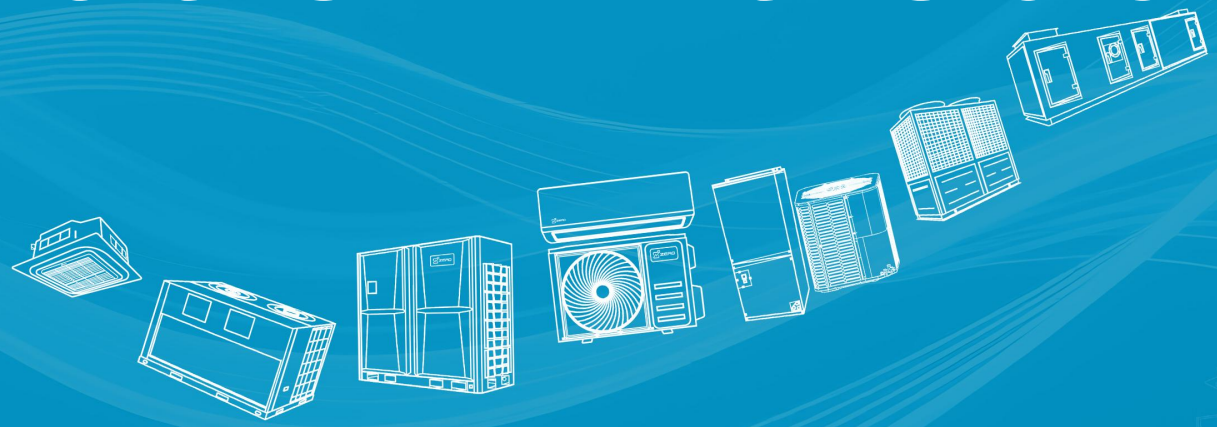
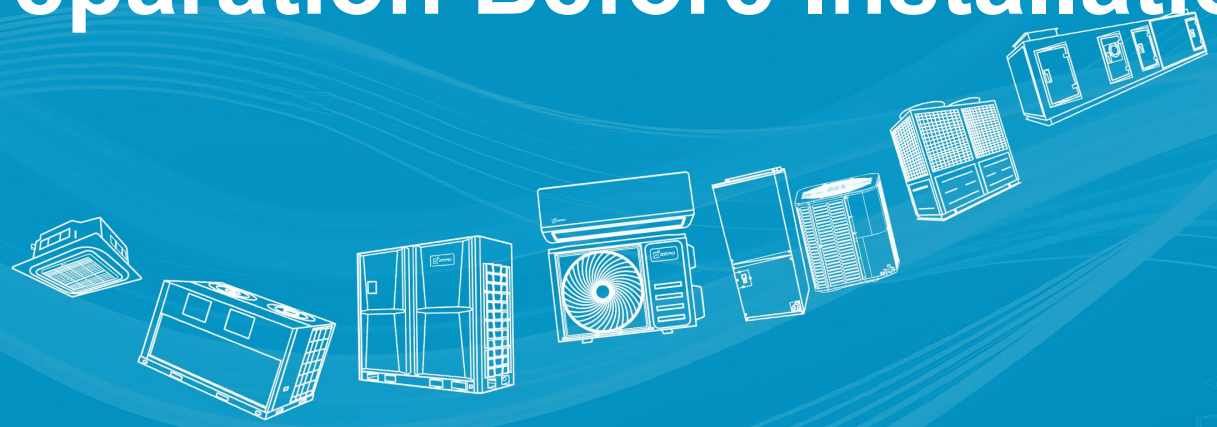
# Air conditioner Installation Introduction



# CONTENTS

# 01

# Preparation Before Installation



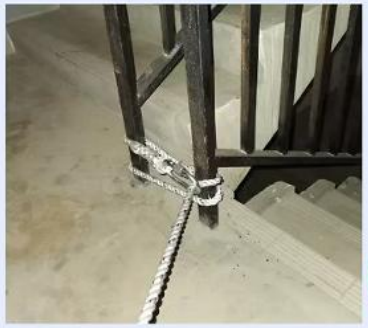
# 01 Preparation Before Installation

➢1. PPE

# 01 Preparation Before Installation

## ➢2. Selecting the right anchor points

Fire hydrant



Metal fence

Wall hole

Metal drainage pipe

Wall

Hand

Person

Window

Shutter

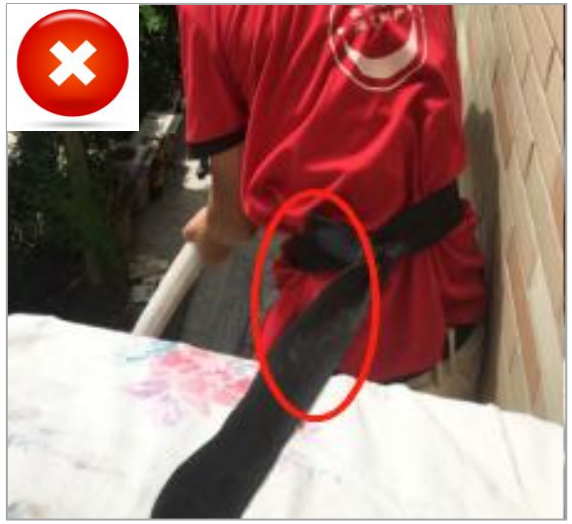
Window

ODU support

Furniture feet

# 01 Preparation Before Installation

➢3. Wrong cases



# 01 Preparation Before Installation

➢4. Tools

Tube tools

Tube expander

Welding tools

Pliers

Hex keys

Screw drivers

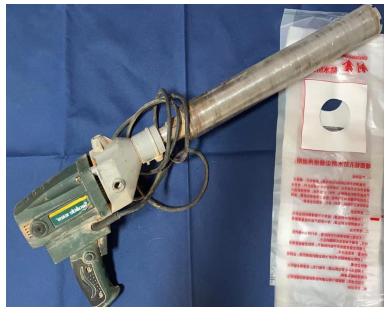
Monkey wrench

Torch wrench

# 01 Preparation Before Installation

➢4. Tools

Lever bar



Electric hammer

Measuring tape

Pressure gauge

Vacuum pump

Clamp meter

Leakage detector

Temperature gun

# 01 Indoor Unit Installation

## Check the match between capacity and room area—Matching table

| Capacity | Conventional area (sq ft) | Western solar exposure、large glass windows （sq ft) | Iron-made house、Top floor （sq ft) |
|---|---|---|---|
| **9000BTU** | 108–162 | 65–140 | 65-97 |
| **12000BTU** | 161–237 | 151–194 | 108-162 |
| **18000BTU** | 215–366 | 172–301 | 129-269 |
| **24000BTU** | 301–484 | 258–388 | 258-335 |
| **48000BTU** | 538–807 | 484–710 | 409-646 |

When choosing an air conditioner, factors such as the size of the space, the height of the space, the orientation and layout, the sealing performance, and the number of occupants should be comprehensively considered.

The general matching principle is as follows:

Cooling capacity： 14–19.5 W/sq ft 46–65 BTU/sq ft

Heating capacity： 15.8–20.4 W/sq ft 56–74 BTU/sq ft

# 01 Preparation Before Installation

## Precautions

**Unit integrality checking**

1) Appearance inspection.

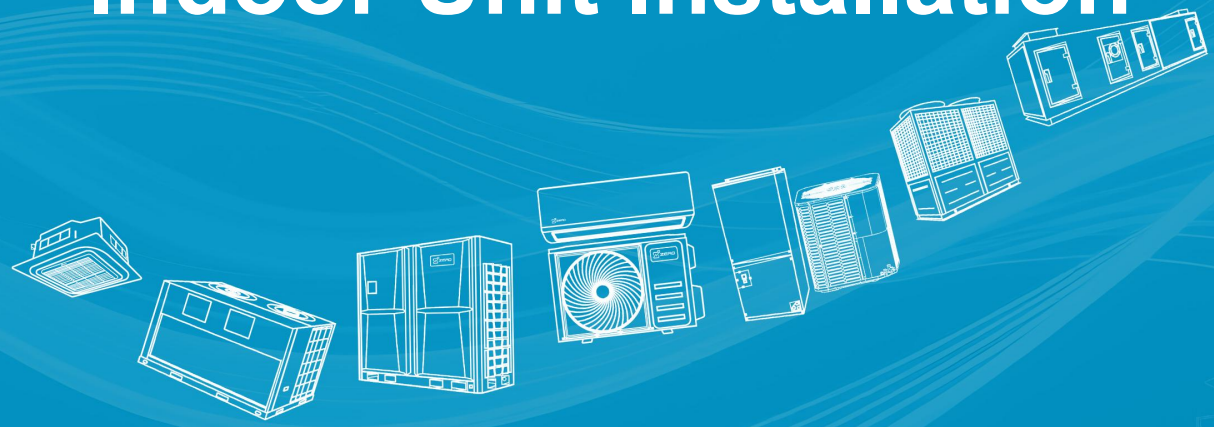
2) Unit model are consistent.

3) Unit refrigerant type checking.

4) Remote controller checking.

# 02

# Indoor Unit Installation



# 02 Indoor Unit Installation

## ➢Installation Process

1. Select installation site
2. Confirm mounting plate position
3. Drill holes
4. (Wire connection)
5. Piping connection
6. Install drain hose
7. Piping configuration
8. Fix indoor unit

# 02 Indoor Unit Installation

## ➢Installation site of indoor unit

1. The air inlet and outlet should be far away from the obstructions. Ensure that the air can be blown throughout the whole room.

2. The condensate water is easy to be discharged. It is easy to connect to the outdoor unit.

3. It is out of reaching for children.

4. It can bear the weight of the indoor unit and minimize the noise and vibration.

5. Ensure that there is enough space for maintenance.

6. It should be far away from the television and stereo, at least 2-3m.

7. Make sure that the indoor unit is installed in accordance with installation dimension instructions.

# 02 Indoor Unit Installation

➢Installation site of indoor unit

**Problem?**

# 02 Indoor Unit Installation

## The gap between the ceilling and the unit

Too close to the ceilling

Too close to the ceilling

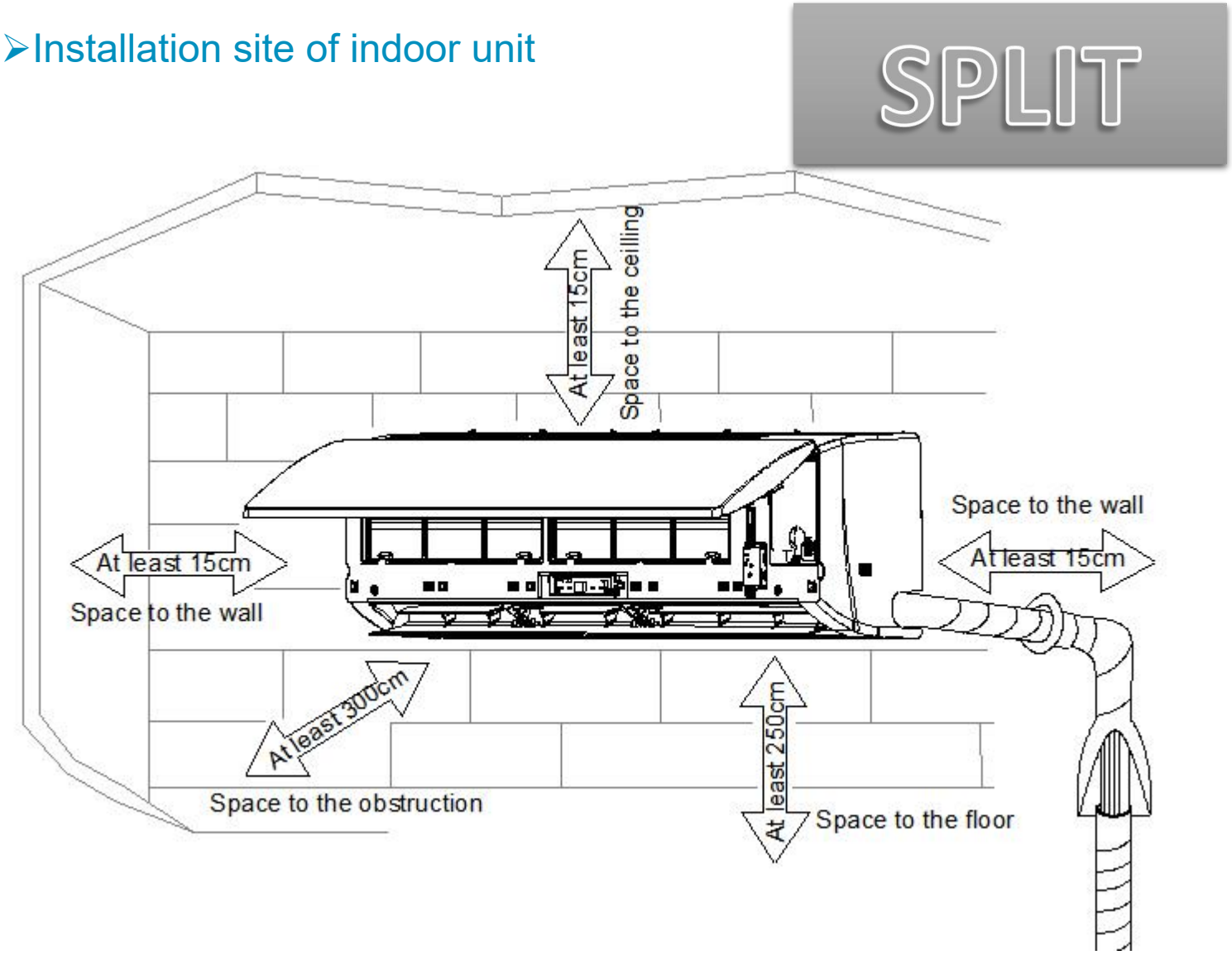
# 02 Indoor Unit Installation

**Too much gap between the wall and the unit:**

1. Looks very ugly;
2. It is possible to make condensed water at the unit back and flow down along the wall

# 02 Indoor Unit Installation

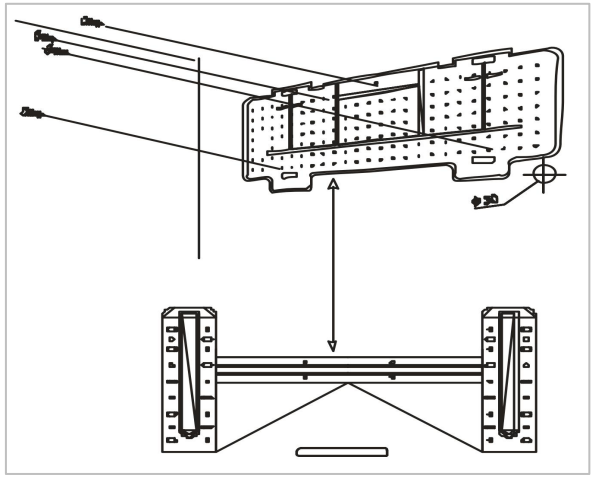
➢Installation site of indoor unit




# 02 Indoor Unit Installation

## ➢Install mounting plate

1. Level (level bar).
2. Drill 32mm holes in the wall to fix the bracket.
3. Secure the mounting bracket with appropriate anchors.
4. Fix the mounting bracket by using  provided screws.



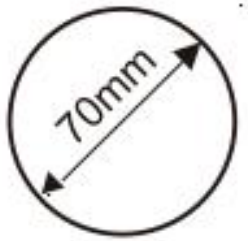
## N O T E

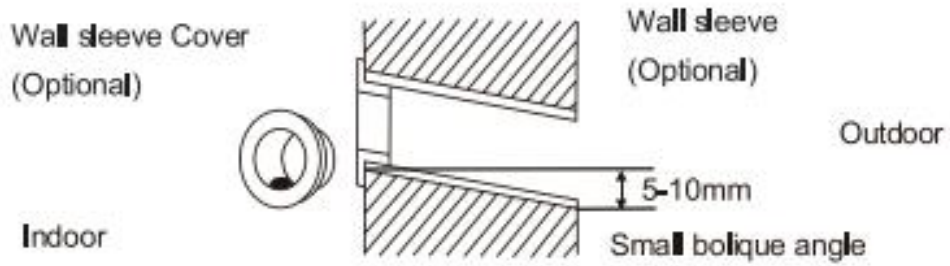
Select installation site that meets all minimum clearance requirements, and can support the weight and vibration of the unit.

# 02 Indoor Unit Installation

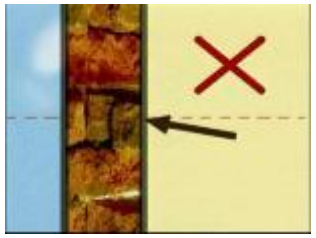
➢Drill holes

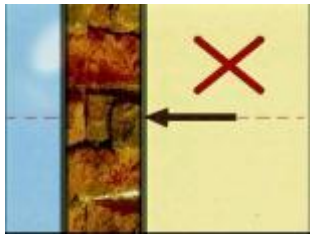
Caution:
When drill the wall hole, maker sure to avoid wires, plumbing and other sensitive components.

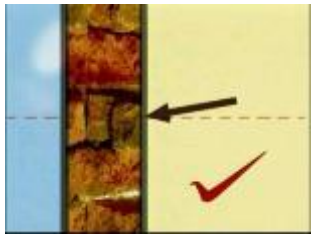



21





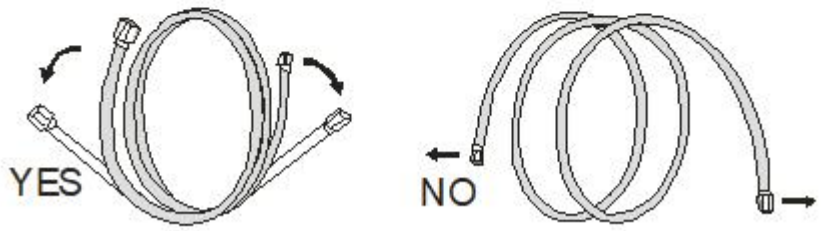


# 02 Indoor Unit Installation

## ➢Piping connection

### 1.6.4 Connecting the pipes.

- Do not remove the cap from the pipe until connecting it, to avoid dampness or dirt from entering.
- If the pipe is bent or pulled too often, it will become stiff. Do not bend the pipe more than three times at one point.
- When extending the rolled pipe, straighten the pipe by unwinding it gently as shown in the picture.

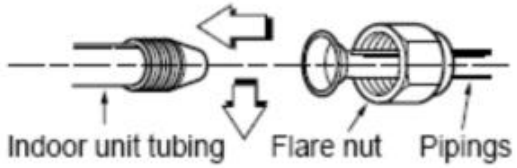



Extending the rolled pipe

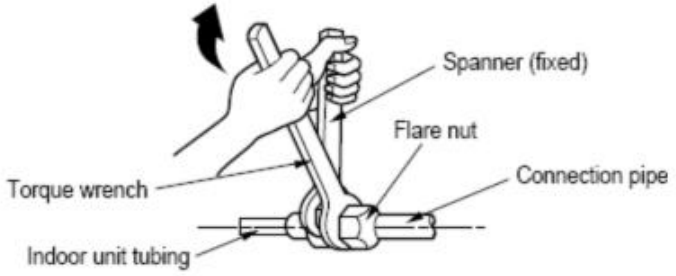
### 2.6.5 Connections to the indoor unit

1). Remove the indoor unit pipe cap (check that there is no debris inside).

2). Insert the fare nut and create a flange at the extreme end of the connection pipe.



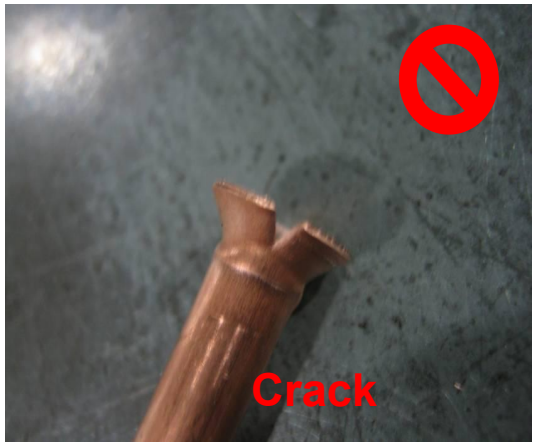

3). Tighten the connections by using two wrenches working in opposite directions.

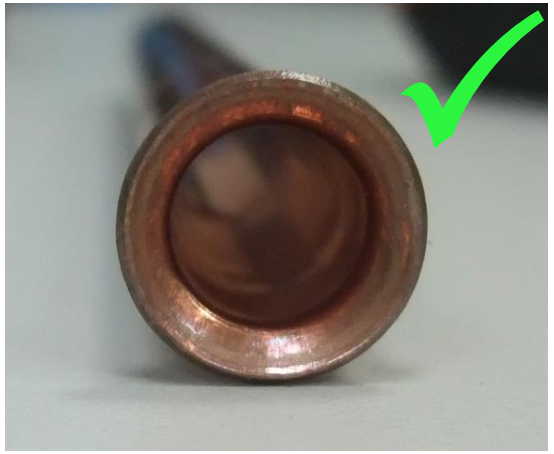


# 02 Indoor Unit Installation

## Flaring


Burr

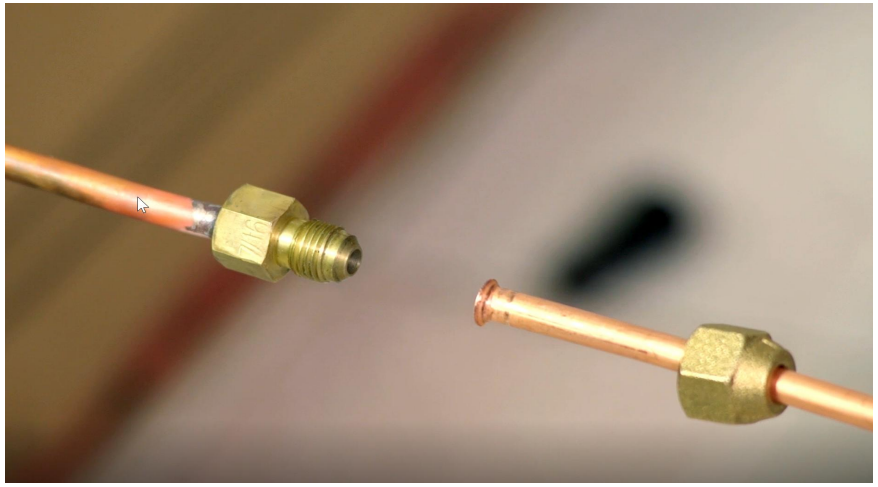
# 02 Indoor Unit Installation

## Avoid this kind of installation

# 02 Indoor Unit Installation

## ➢Piping connection

Tighten the nut of the connecting pipe



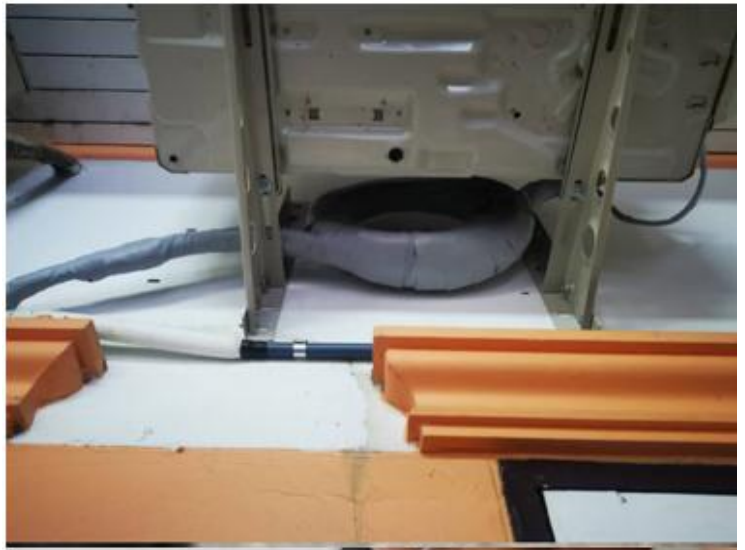

## ATTENTION

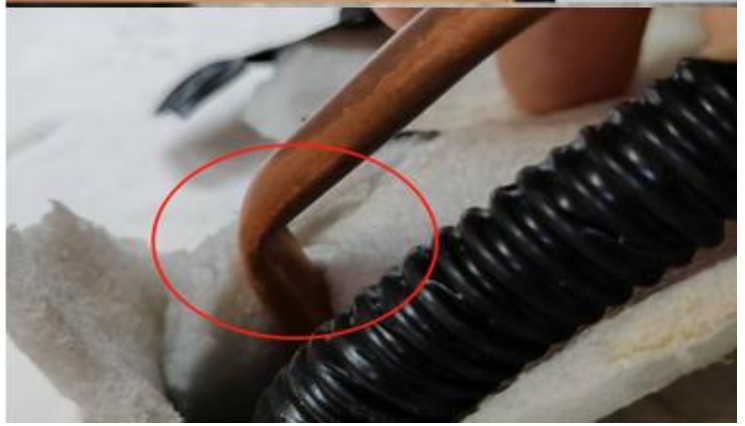
Connect the tube to indoor unit first and then outdoor unit.

The nut of the connector should not be too much force, or it may lead to leakage.

# 02 Indoor Unit Installation

➢Wrong example





# 02 Indoor Unit Installation

➢Wrong example

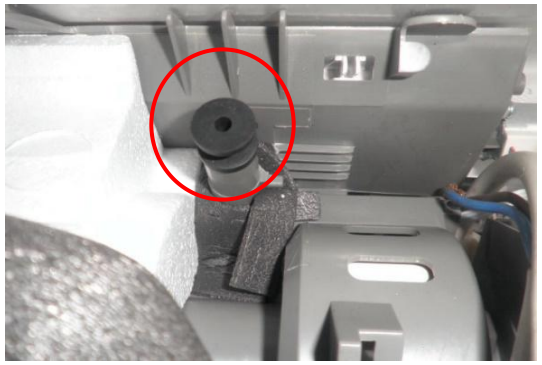
Crack of nuts due to excessive force

Crack on brazing point due to not fasten connection (Force conduction)

# 02 Indoor Unit Installation

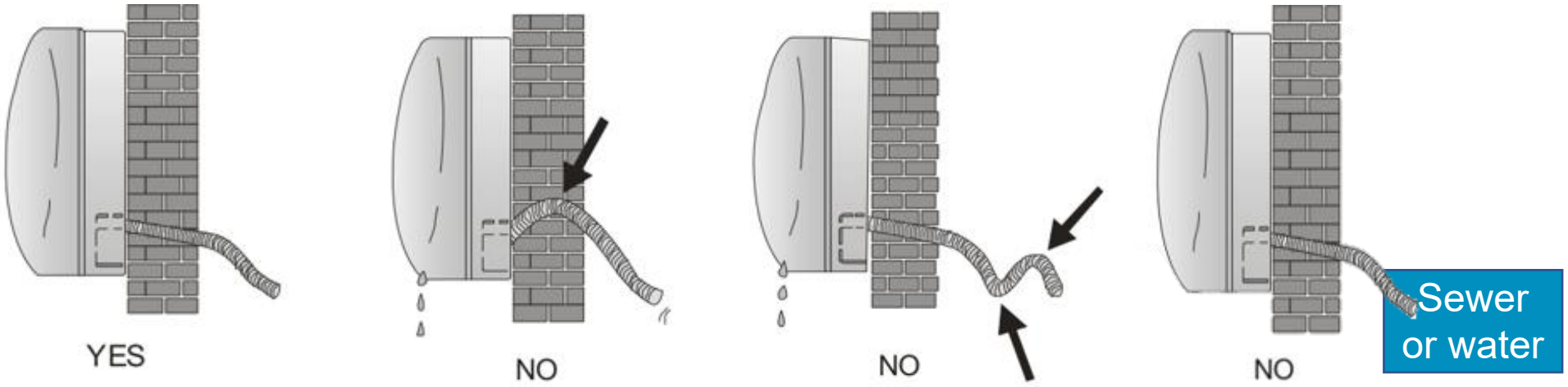
## ➢Install drainage hose

Joint the drainage hose and discharge pipe and fix them



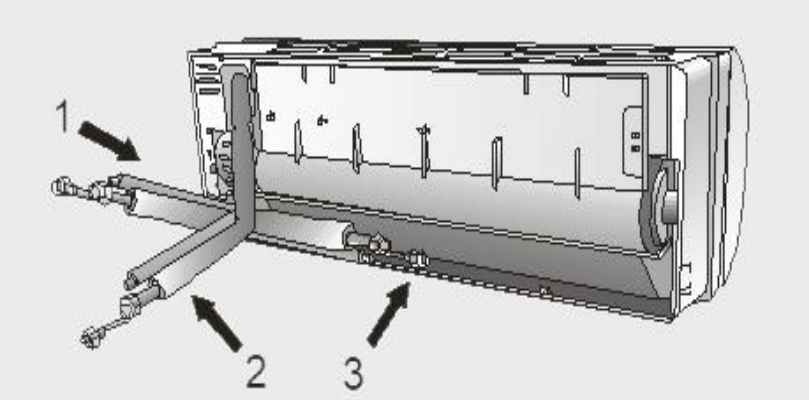
### Both side drainage option:

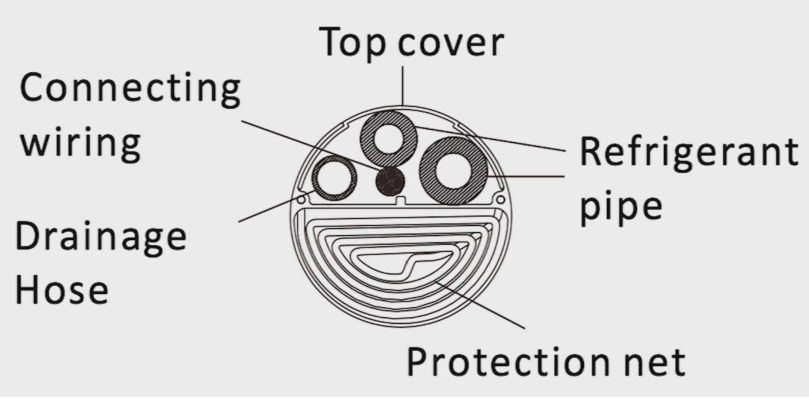
Exchange the position of drainage hose and block on the other side if required.



# 02 Indoor Unit Installation

## ➢Piping Configuration




Tips：wrapping start from IDU to ODU

### Piping Configuration

- Direction & tightness of wrapping
- Do not bend the drainage hose too much;
- Drainage hose should be under the gas and liquid pipes.
- Insulate the indoor section of the drainage hose.
- Water outlet of the drainage hose should be vertical and suspending; do not put it into water.

# 02 Indoor Unit Installation

➢Fix indoor unit

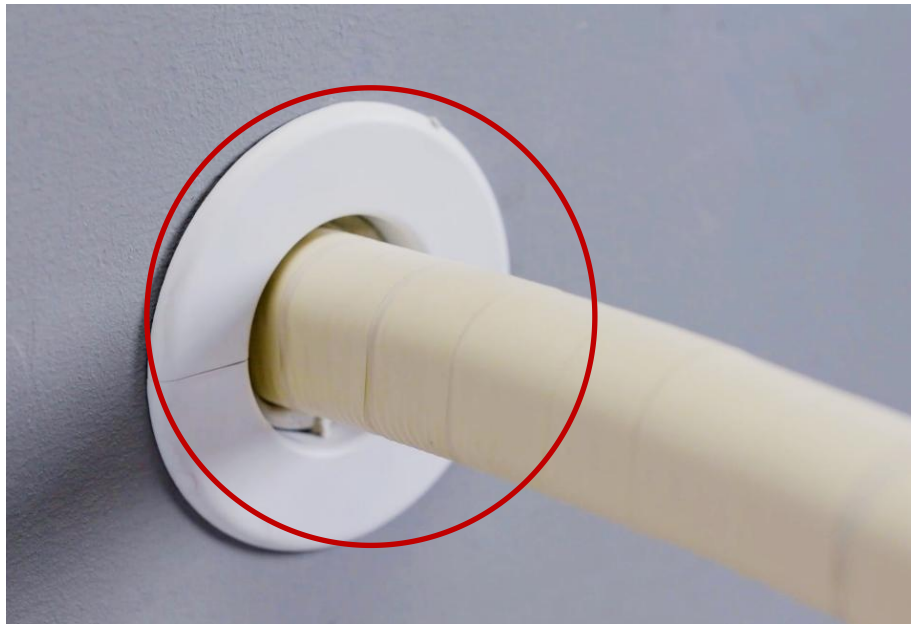
Fix the indoor unit and route the pipe through the wall.

The bottom case of the indoor unit should cling to the wall.

# 02 Indoor Unit Installation

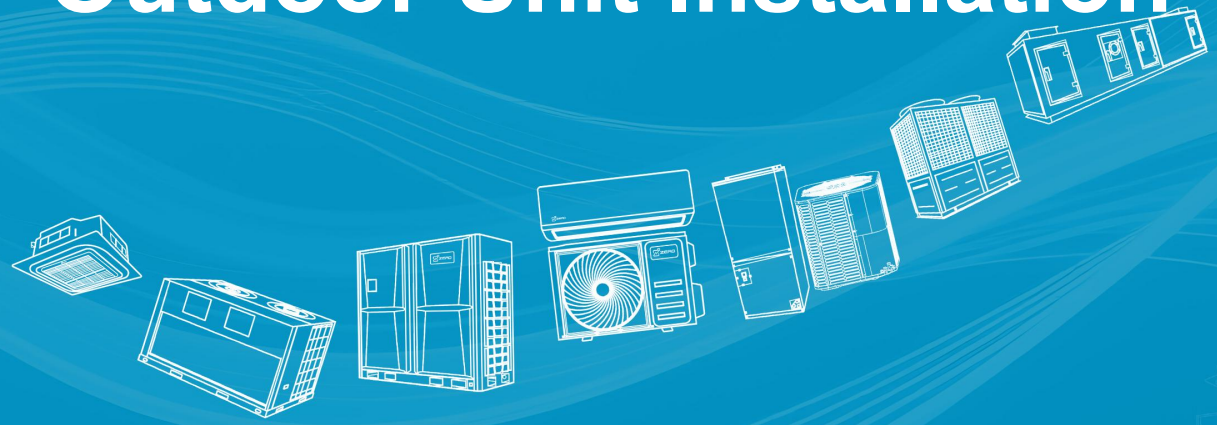
## ➢Seal the holes

Seal the hole after the piping has been run, this will prevent unconditioned air from entering the indoor unit.



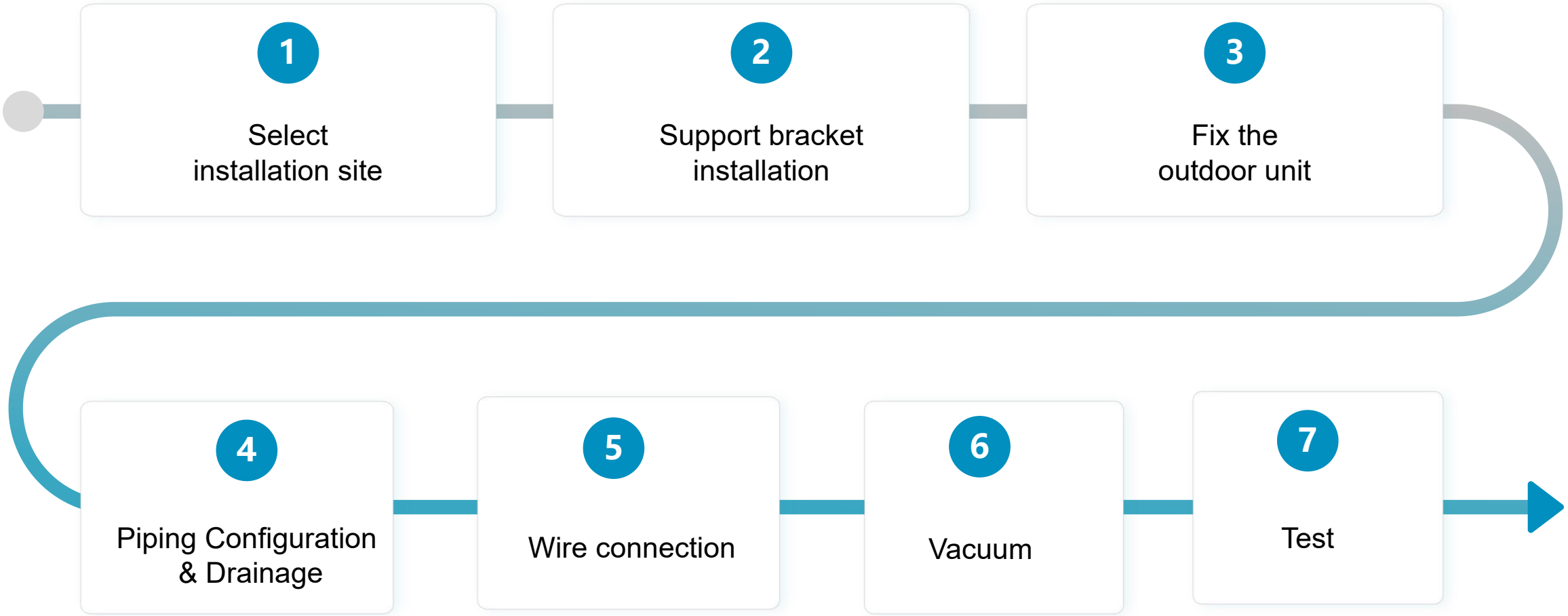
# 03

# Outdoor Unit Installation



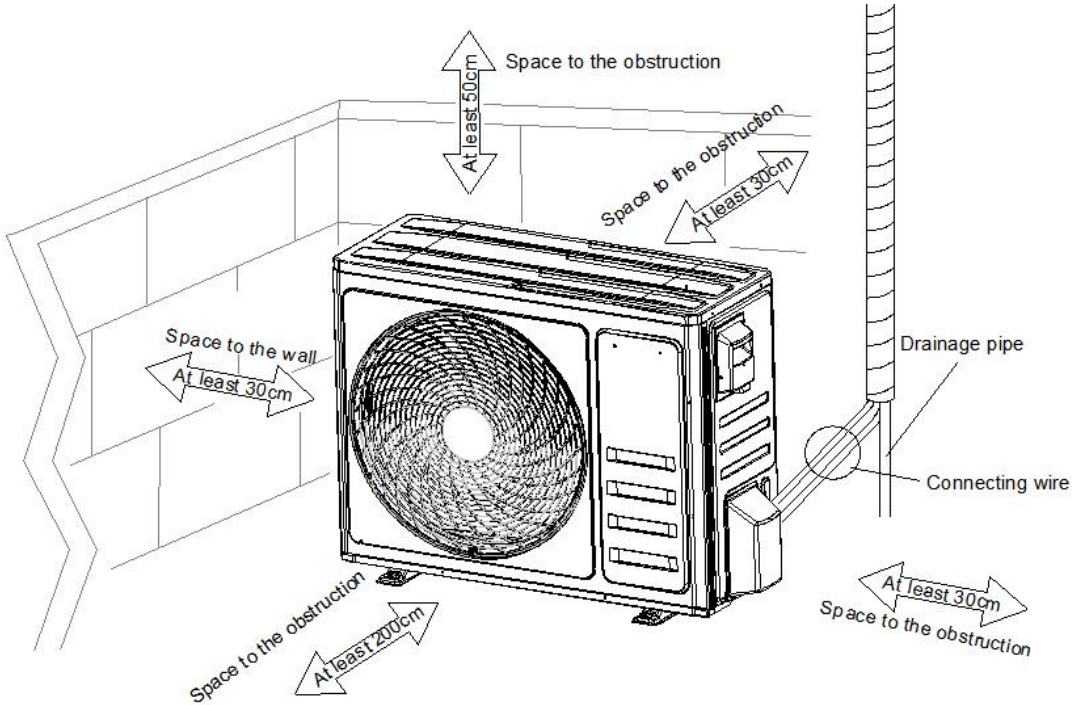
# 03 Outdoor Unit Installation

## ➢Installation Process



# 03 Outdoor Unit Installation

## ➢Selection of Installation Site




1. The noise and the air flow will not affect the neighbor, the animal or the plant.

2. There should be good ventilation.

3. The air inlet and outlet should be far away from obstructions.

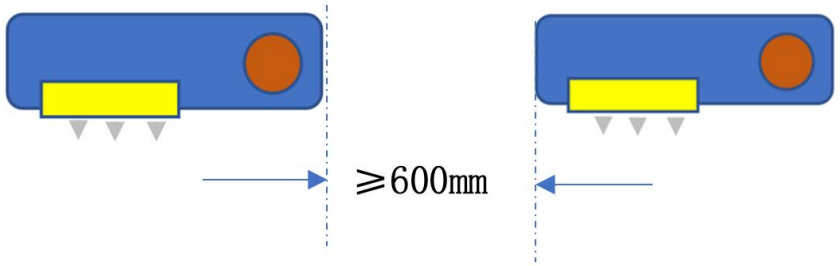
4. The location can bear the weight of the outdoor unit and vibration.

5. Ensure that the space around the back and sides is more than 30cm .

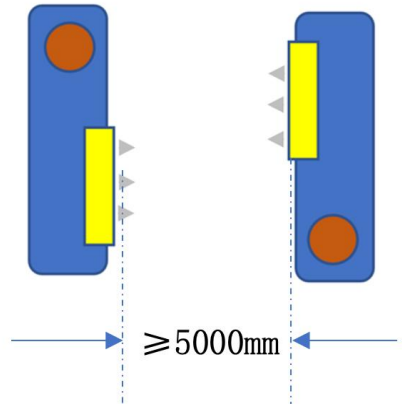
6. The front of the unit should have more than 200cm of space.

# 03 Outdoor Unit Installation

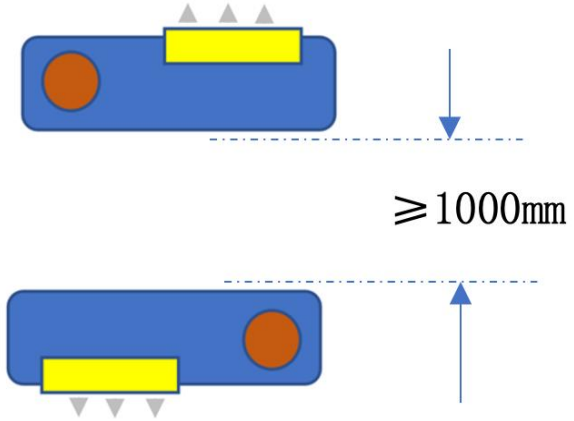
## ➢Reference for Project



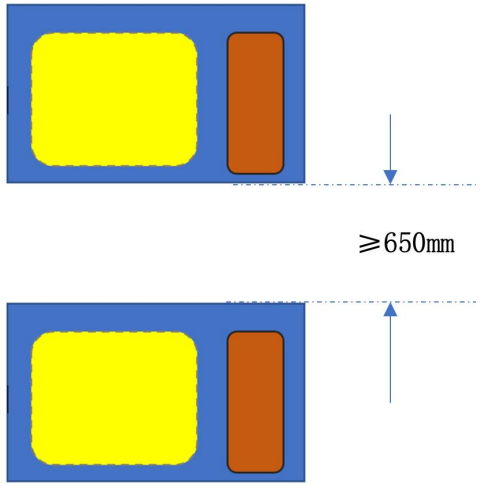

1. SIDE BY SIDE



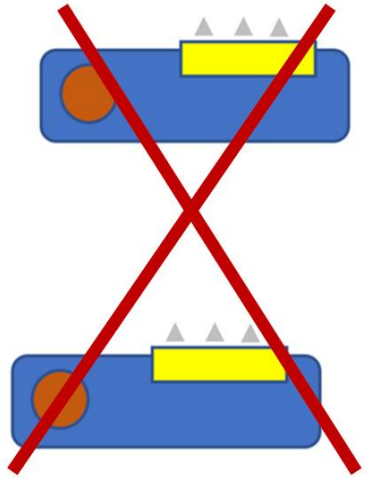

2. FACE TO FACE




3. BACK TO BACK




4. UP & DOWN



5. IN ROWS (not recommended)

## 03 Outdoor Unit Installation

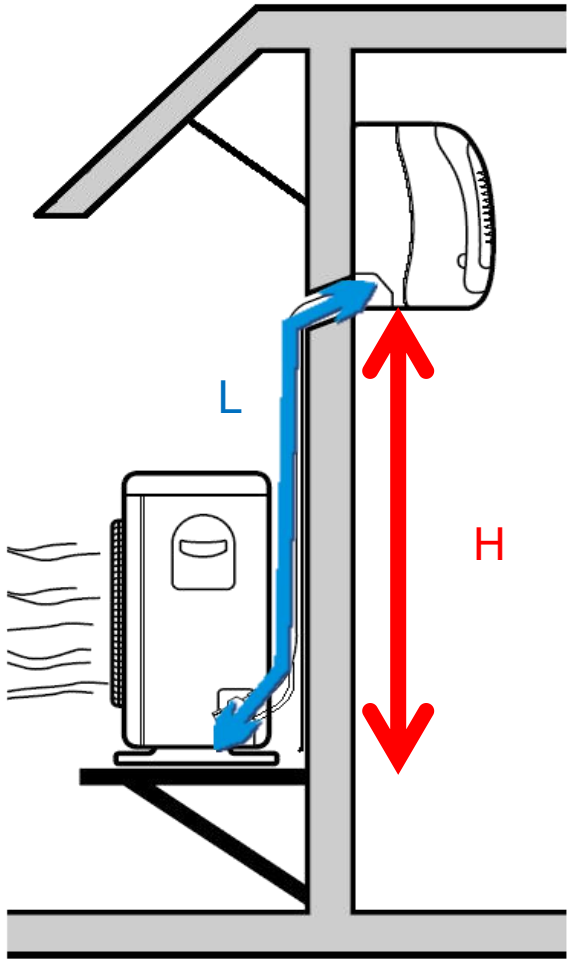
➢Selection of Installation Site

7. Select dry places. It should not be exposed to sunlight or strong wind.

8. Ensure the installation complies with the installation drawing. It should be easy for maintenance and service.

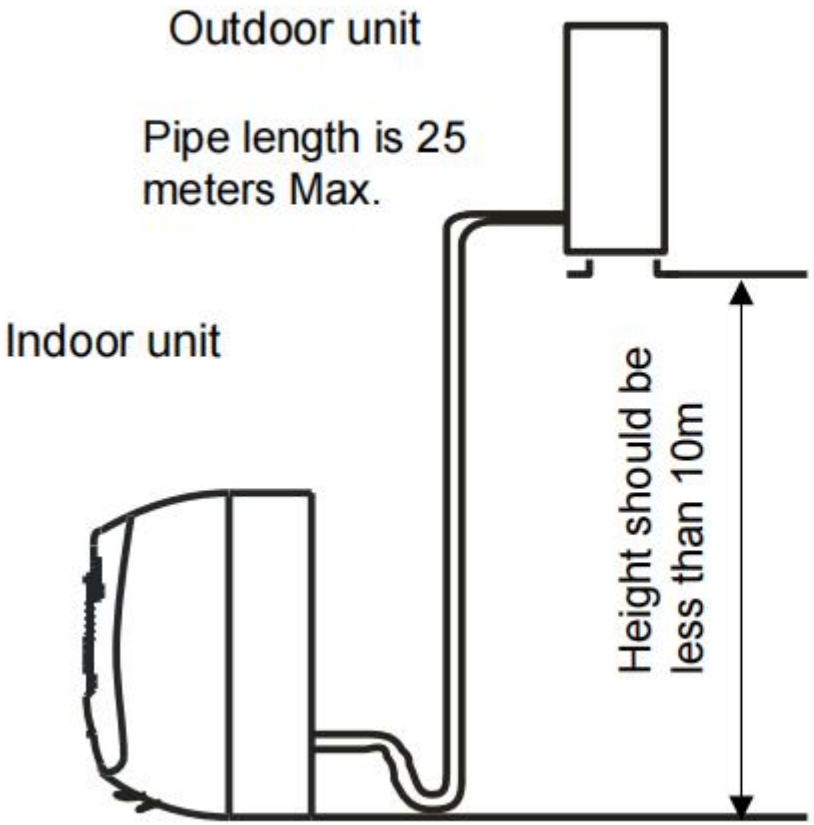
9. It is out of reach for children.

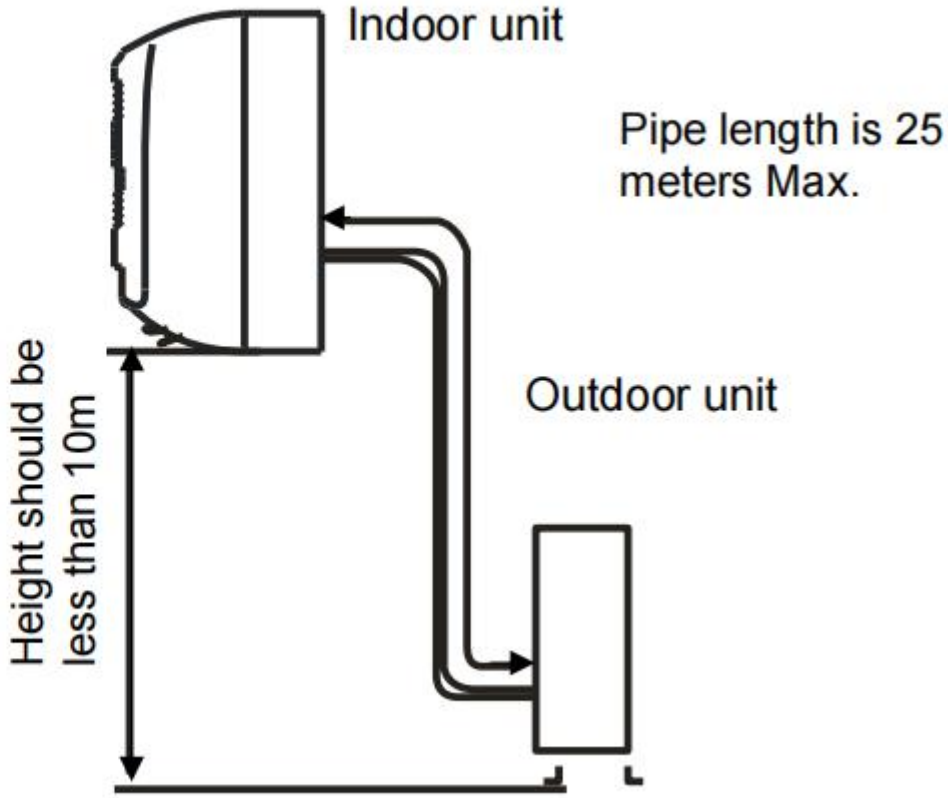
10. No block of the passage.



# 03 Outdoor Unit Installation

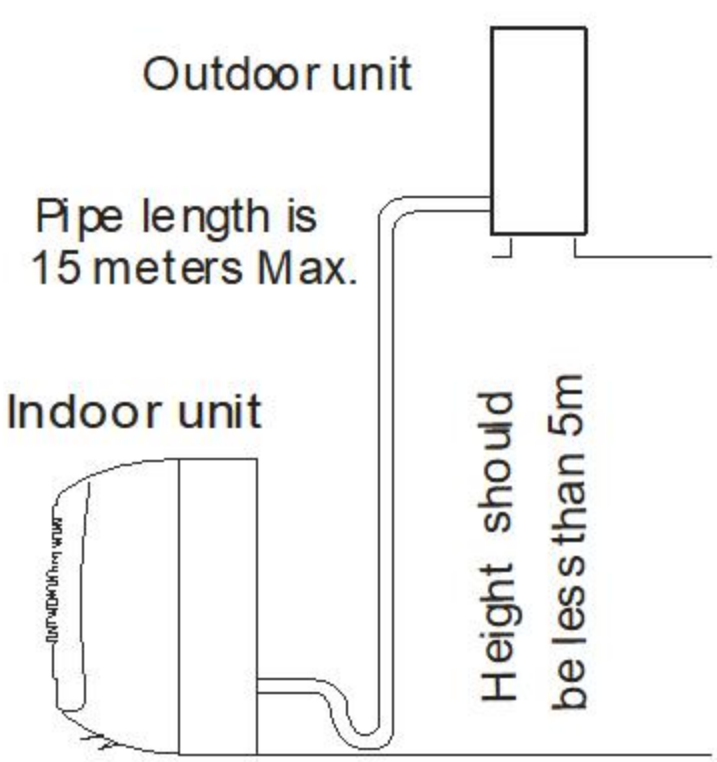
➢Pipe length and height difference (INV)

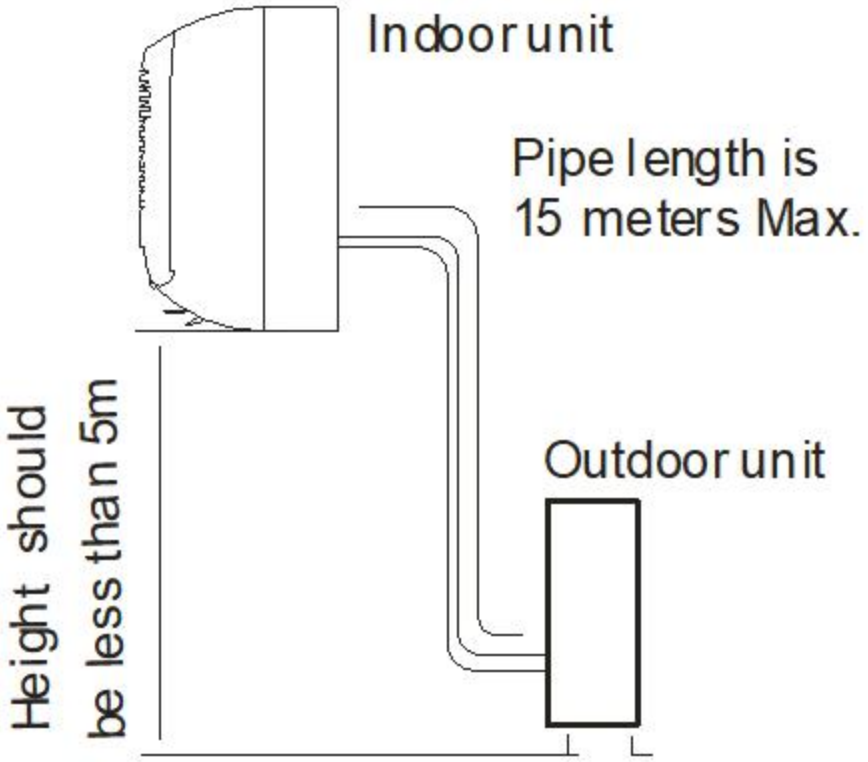


# 03 Outdoor Unit Installation

➢Pipe length and height difference (ON/OFF)



## 03 Outdoor Unit Installation

### ➢Additional gas charging (R410A, R32)

If long connecting pipe is applied, it is necessary to add refrigerant according to the following requirements.

The standard pipe is 5 meters. Additional gas charging shown as table

| Mode | Standard length (m) | Refrigerant piping Max. length (m) A | Additional refrigerant charging: Xg= B * (A-5m) B |
|---|---|---|---|
| 9K | 5.0 | 25 | 20g/m |
| 12K | 5.0 | 25 | 20g/m |
| 18K | 5.0 | 25 | 30g/m |
| 24K | 5.0 | 25 | 30g/m |
| 30K | 5.0 | 25 | 30g/m |
| 36K | 5.0 | 25 | 30g/m |

# 03 Outdoor Unit Installation

➢Additional gas charging (R410A ON/OFF, R32)

If long connecting pipe is applied, it is necessary to add refrigerant according to the following requirements.

The standard pipe is 5 meters. Additional gas charging shown as table

| Mode | Standard length (m) | Refrigerant piping Max. length (m) A | Additional refrigerant charging: Xg= B * (A-5m) B |
|---|---|---|---|
| 9K | 5 | 15 | 20g/m |
| 12K | 5 | 15 | 20g/m |
| 18K | 5 | 15 | 30g/m |
| 24K | 5 | 15 | 30g/m |

# 03 Outdoor Unit Installation

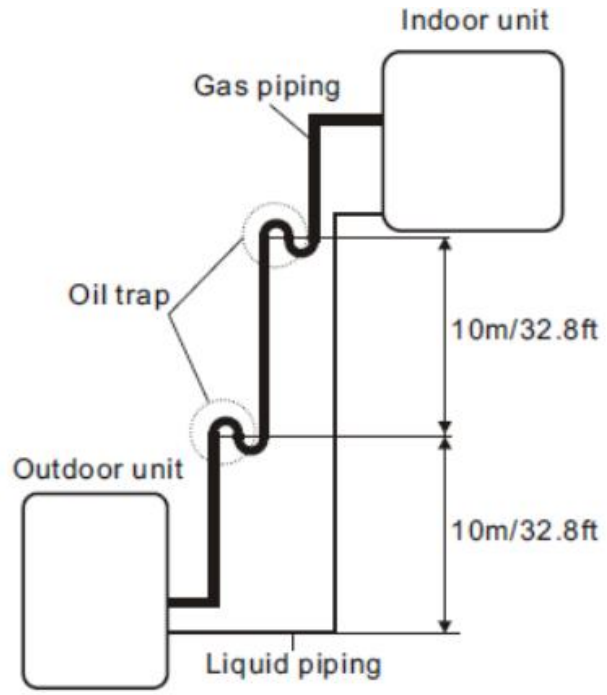
## ➢Oil Traps

**If the connecting pipe over 15m or the height over than 10m, you need add the oil trap.**

### 1. If the Indoor Unit Is Installed Higher than the Outdoor Unit:

If oil flows back into the outdoor unit's compressor, this might cause liquid compression or deterioration of oil return. Oil traps in the rising gas piping can prevent this.

An oil trap should be installed every 10m (32.Sft) of vertical suction line riser.



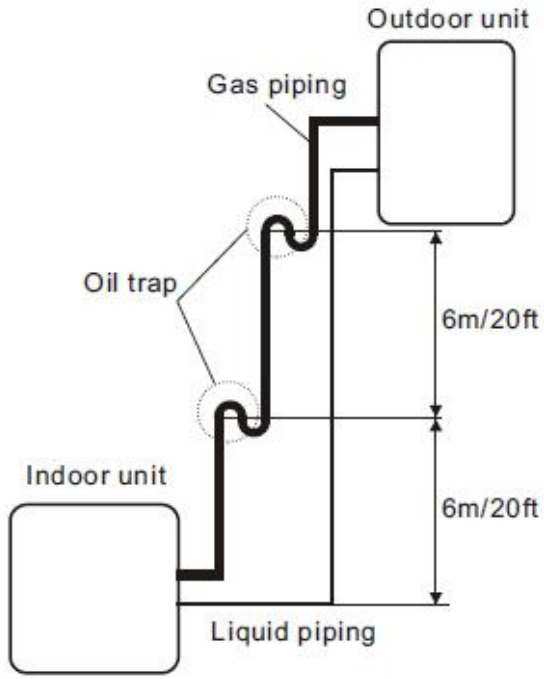
# 03 Outdoor Unit Installation

## ➢Oil Traps

### 2. If the Outdoor Unit Is Installed Higher than the Indoor Unit:

It is recommended that vertical suction risers not be upsized. Proper oil return to the compressor should be maintained with suction gas velocity. If velocities drop below 7.62m/s(1 500fpm (feet per minute)), oil return will be decreased.

An oil trap should be installed every 6m(20ft) of vertical suction line riser.



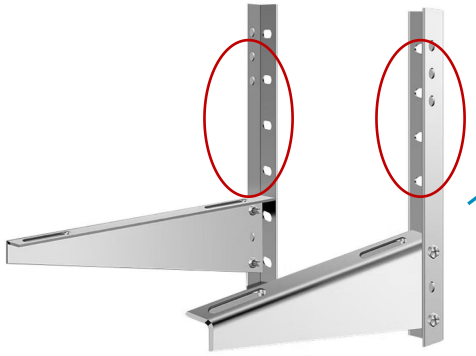

**Note:**

1. After the height difference is more than 5 meters, it is necessary to add the oil trap, which can be done in the middle section of the connecting pipe;
2. Since the installed units height difference of split RAC can not be greater than 10M, only one oil trap is needed.

# 03 Outdoor Unit Installation

➢Install bracket for outdoor unit

Expansion screw



Bracket

- Level and vertical
- The BRACKET should bear at least 4 times of the weight of A/C, that is, at least 180kg.

| Model | Qt. | Spec. |
|---|---|---|
| 7K~12K | 6 | ≥10 mm×100 mm<br>*Using special expansion bolts for Cavity wall<br>Specification: M10X70, openings 16MM |
| 18K~28K | 8 | |
| 30K~60K | 10 | |

# 03 Outdoor Unit Installation

➢Fix Outdoor Unit


- **Safety**

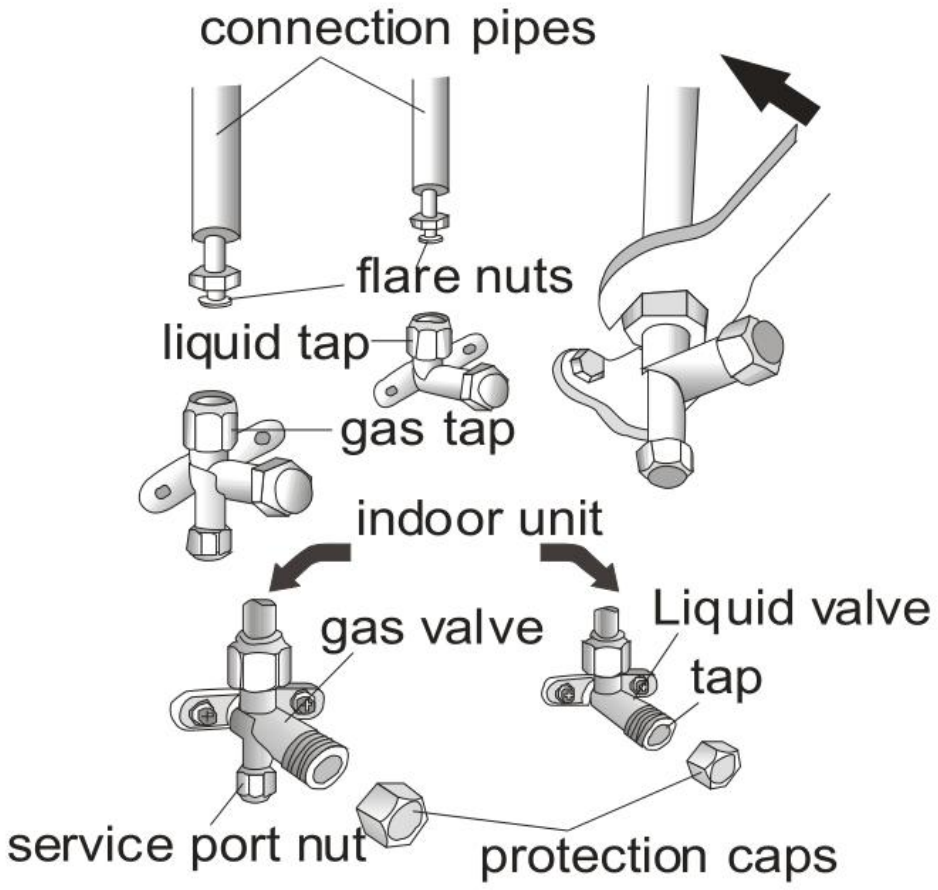
drop prevention, vibration prevention

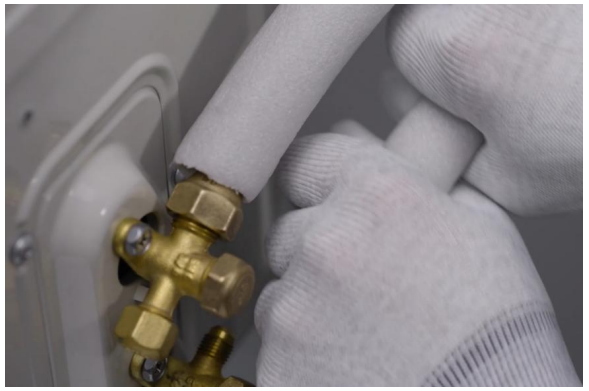
- **Performance**

avoid obstructions, noise prevention

# 03 Outdoor Unit Installation

## ➢Piping



| Capacity (Btu/h) | Pipe Size (Torque) | |
|---|---|---|
| | Gas | Liquid |
| 9/12/18K | 3/8" (4.2kg.m) | 1/4" (1.8kg.m) |
| 24K | 1/2" (5.5kg.m) | 1/4" (1.8kg.m) |
| 30/36K | 5/8" (6.6kg.m) | 1/4" (1.8kg.m) |

# 03 Outdoor Unit Installation

➢Selection of Installation Site

Problem?

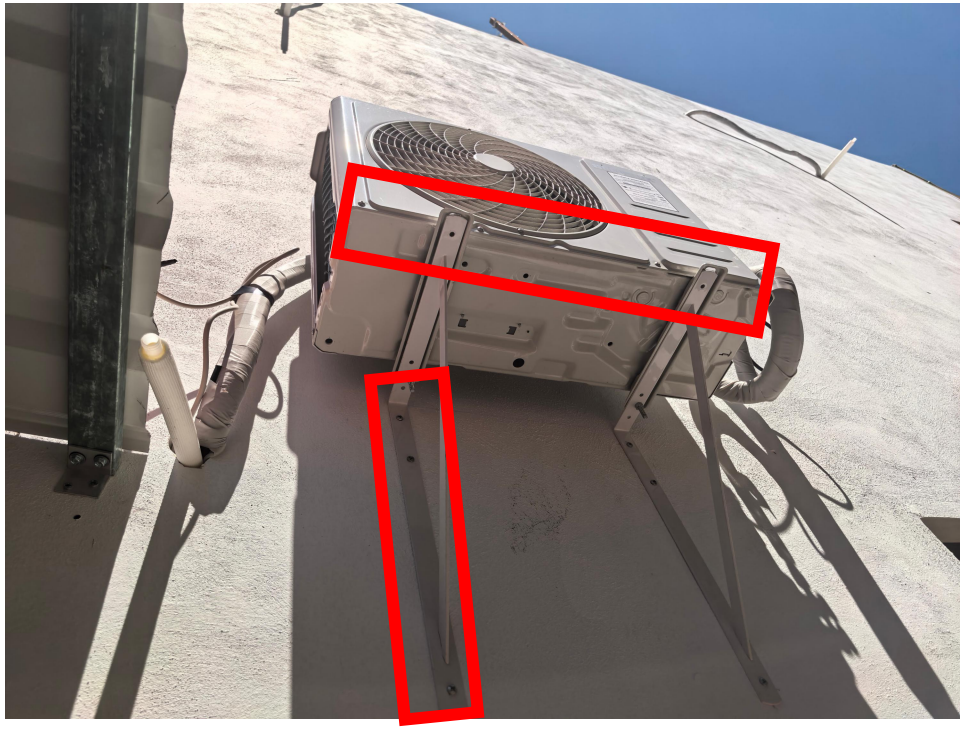
# 03 Outdoor Unit Installation

➢Wrong example

# 03 Outdoor Unit Installation

## Key points

## Avoid this kind of installation



1, The hanger does not match the unit leg and only two bolts fixed

2, The hanger is strong enough? The normal should be expansion bolts.

# 03 Outdoor Unit Installation

## Installation

The connecting wires wrapping is not professional:

1, Looks very rough;

2, It is possible to happen current leakage and agened as time goes by.

# 04

# Electrical Connection

# 04 Electrical Connections

## ➢Indoor Unit Electrical Connection

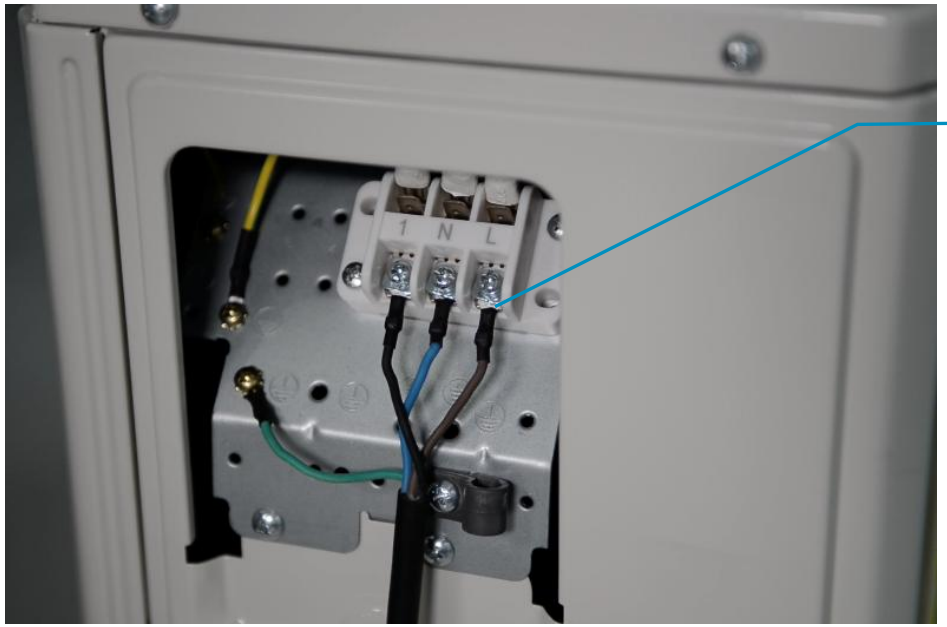
Ensure the wiring is according to the wiring diagram which is on the indoor unit.

| Appliance Amps | Wire Size |
|---|---|
| 5 | AWG21/0.75 mm² |
| 10 | AWG18/1.0 mm² |
| 13 | AWG15 /1.5 mm² |
| 18 | AWG14/1.6 mm² |
| 25 | AWG12/2.0 mm² |
| 30 | AWG10/2.5 mm² |

# 04 Electrical Connections

## ➢Outdoor Unit Electrical Connection

Ensure the wiring is according to the wiring diagram which is on the outdoor unit.

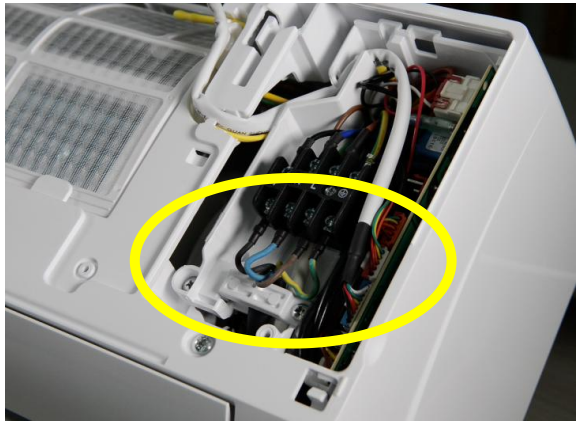


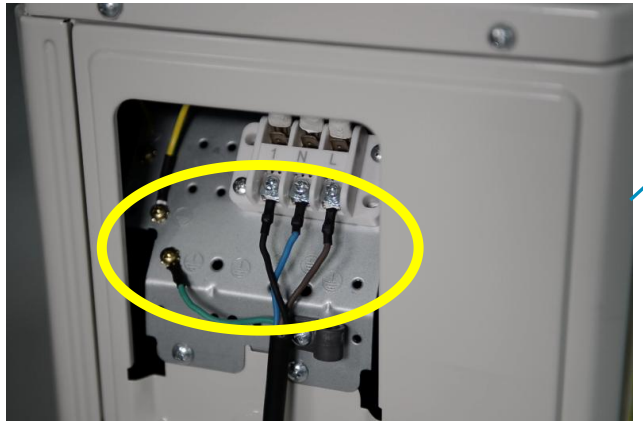

- Color Matching / Number Matching
- Fix the wire with wire clamp
- Install cushion rubber in the wire hole

# 04 Electrical Connections

## ➢ Attention

1. Make sure individual power supply specifically for the air conditioner.
2. Confirm that the cable thickness is as specified in the power source specification.
3. Check the wires and make sure that they are all tightly fastened after cable connection.
4. Attention that grounding needed.



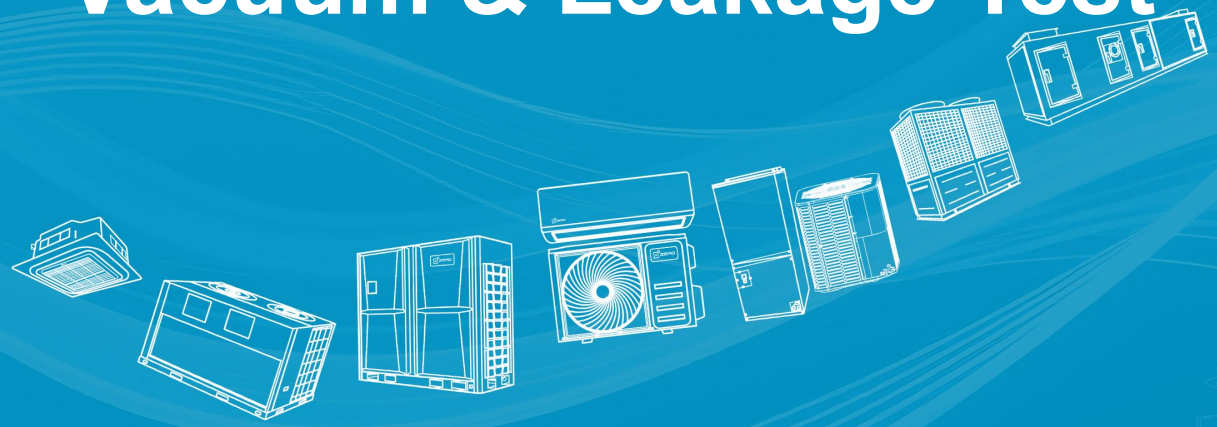


Note：

For inverter AC, make sure IDU wiring connection corresponding to ODU

# 05

# Vacuum & Leakage Test



# 05 Vacuum & Leakage Test

➢Vacuum

For gas R410a , R32& R454B products

Make sure with vacuum pump to air purging.

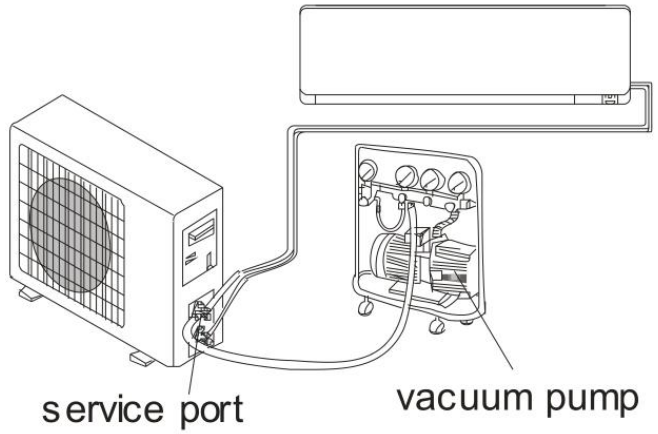

## Precaution

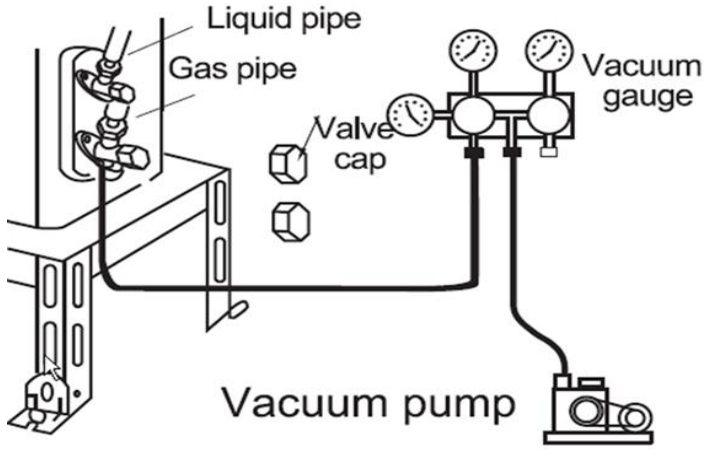
Air and humidity left inside the refrigerant system can cause compressor malfunction.

# 05 Vacuum & Leakage Test

## ➢Vacuum

1. Connect and vacuum for 15-30minutes to check if the pressure of vacuum gauge keeps in -0.1Mpa.
2. Close the vacuum pump and maintain this status for 5mins, check if there is any gas leakage based on the pressure of the garage.
3. Open the liquid valve until the internal pressure of the air conditioner is slightly above zero, then close the valve.
4. (Leakage test) Remove the gauge, open the valve core of liquid valve and gas valve completely.
5. Tighten the screw caps of valve and refrigerant charging vent.



# 05 Vacuum & Leakage Test

## ➢ Leakage Test

### Soapy water


Coat soapy water on the connector and the stop valve and keep for 3mins. Bubbles indicate leak.

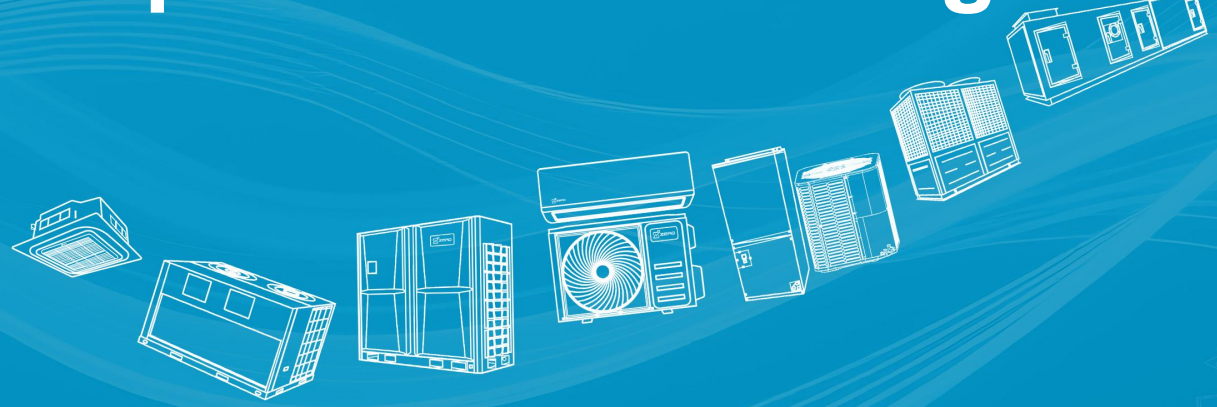
### Electronic leak detector

Test for 3s~5s

Do not install the split air conditioner when it is rainy or snowy.

# 06

# Inspection & Running Test



# 06 Inspection & Running Test

## ➢ Inspection

| Items | Possible results caused by improper installation |
|---|---|
| Is it installed reliably? | drop of the unit, vibration or noise. |
| Is leak test performed? | insufficient cooling (heating) |
| Is insulation good? | Condensate , water drop |
| Is water discharged fluently? | Condensate , water drop |
| Does voltage of power supply conform to nameplate? | Malfunction , burnout of parts |
| Are wire and pipe installed correctly? | Malfunction , burnout of parts |
| Is the unit grounded? | Electrical leakage |
| Does the wire model reach the requirement? | Malfunction , burnout of parts |
| Is there obstruction near air inlet or air outlet? | insufficient cooling (heating) |
| Are length of refrigerant pipe and refrigerant volume recorded? | Insufficient or surplus refrigerant volume |

# 06 Inspection & Running Test

## ➢ Running Test

### 1. Drainage test



## N O T E

Make sure all procedure have been finished and the drainpipe is well installed.

# 06 Inspection & Running Test

## 2、Recording parameters (after at least 15 minutes of power-up)

①Electricity leakage test 

Test the indoor unit evaporator or the outdoor unit casing for electrical leakages with an electric tester.

②Test inlet and outlet temperatures 

The temperature difference between the inlet and outlet air should be more than 8℃ in summer cooling, and the temperature difference between the inlet and outlet air should be more than 15℃ in winter heating.

③Test operating current 

Clamp ammeter to check the input current and the nameplate value is consistent, too large indicates that the refrigerant is too much, too small indicates that the refrigerant is not enough.

## 06 Inspection & Running Test

④Test refrigerant pressure

If the ambient temperature is 35 degrees Celsius, the low pressure in the system is approximately.

0.5-0.6 Mpa（R22）

0.8-1.0 Mpa（R410A）

0.9-1.1 Mpa（R32/R454B）

Higher pressure indicates that there is too much refrigerant, or the small valve is not fully open or the pipeline is clogged, and vice versa, the amount of refrigerant is insufficient or there is leakage in the system.

# 07

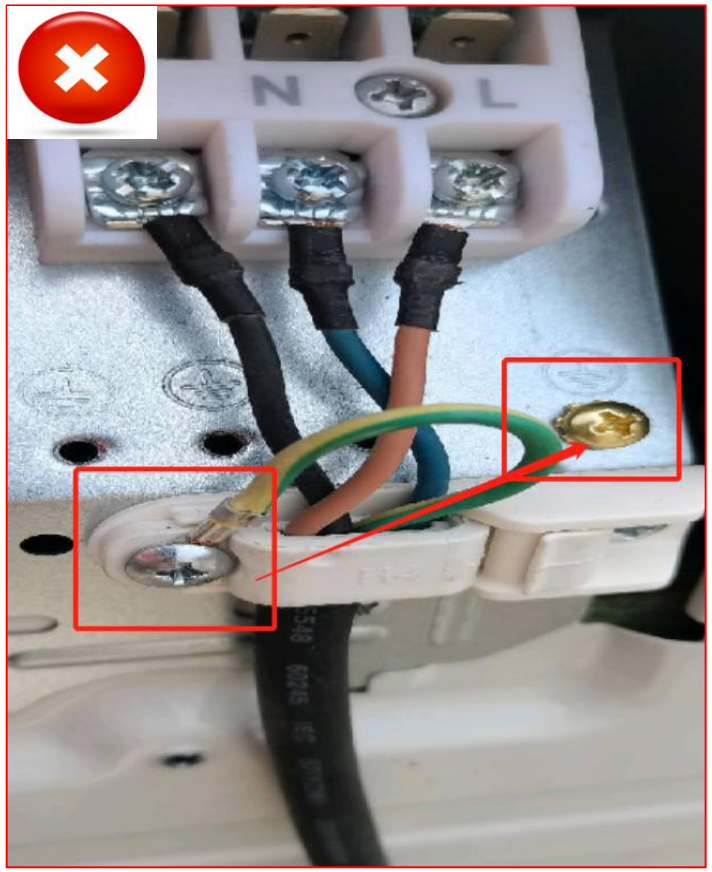
# Typical Case Analysis

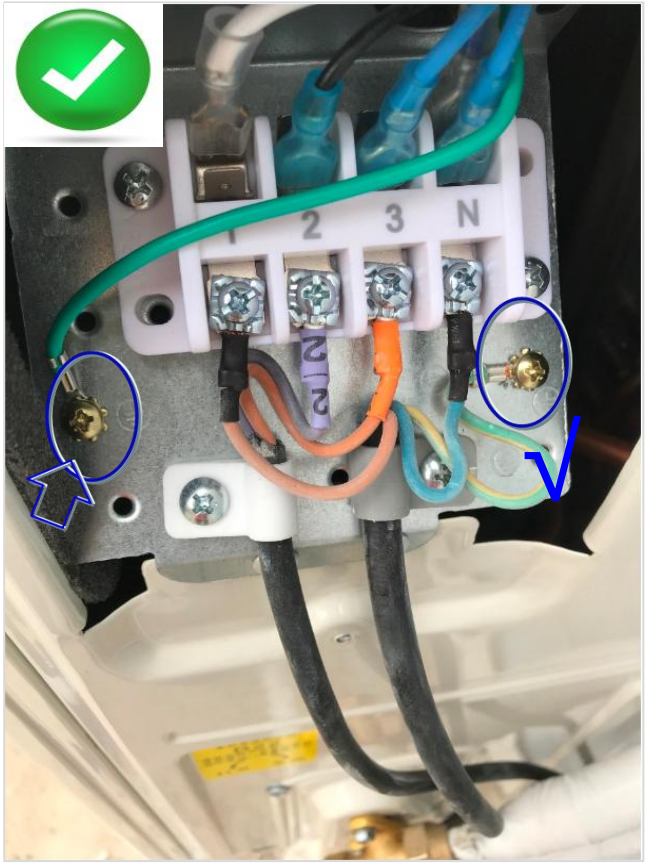
# 07 Typical Case Anaysis

## Drainage leakage

# 07 Typical Case Anaysis

## Poor wiring

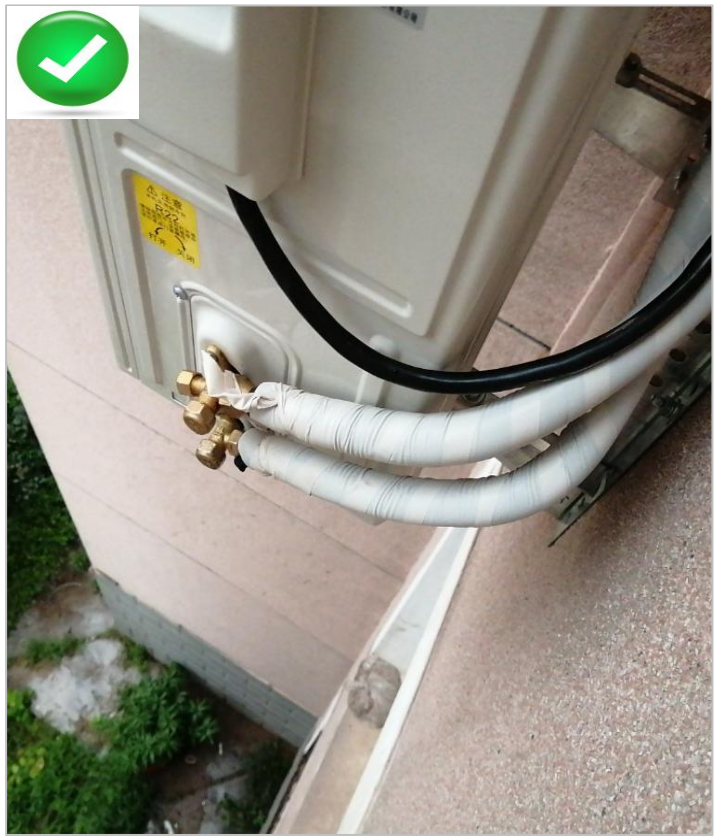



# 07 Typical Case Anaysis

## Block

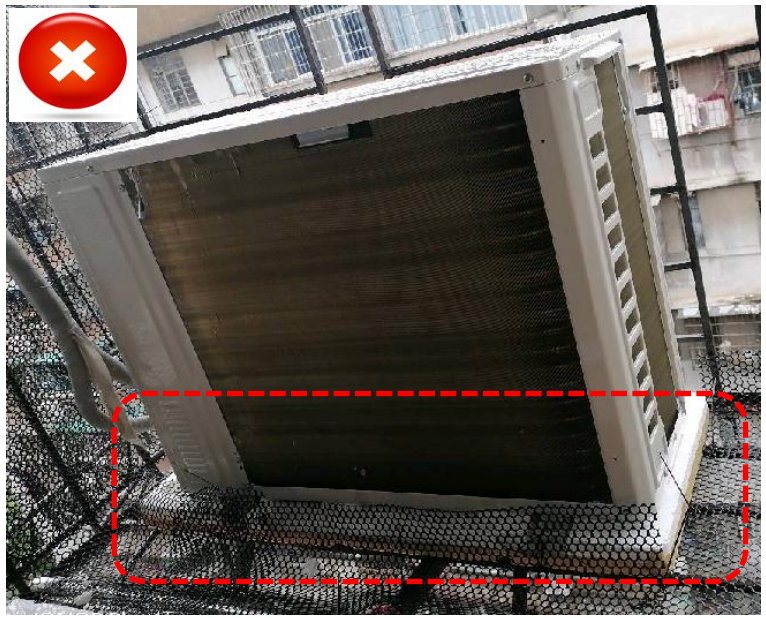
# 07 Typical Case Anaysis

## Tube deformed

# 07 Typical Case Anaysis

## Noise



# Thank You