

Samsung Air Conditioning

Installation Guide



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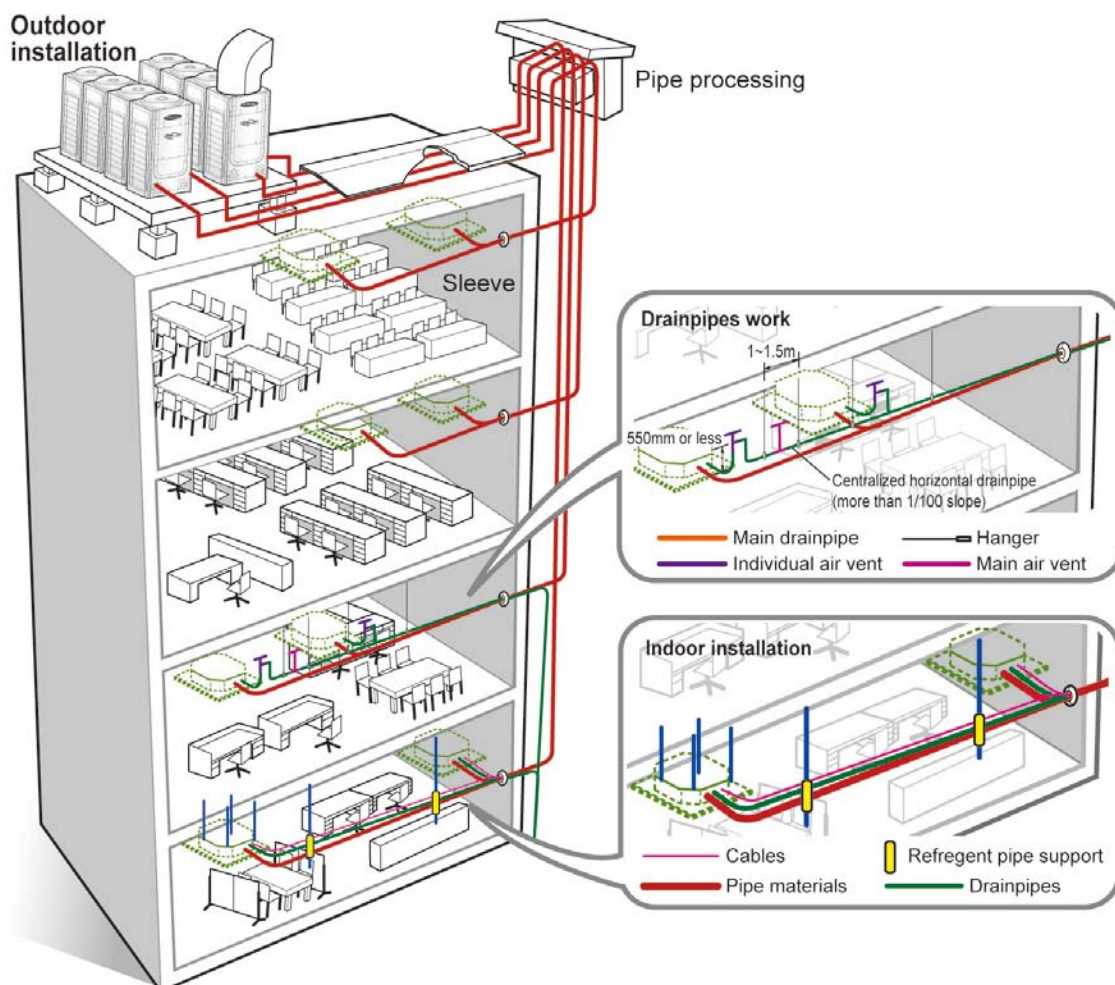
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1. General installation Guide

1. Introduction

The following system diagram illustrates overall organization of the refrigerant pipes for installing a system air conditioner. Multiple outdoor units with sufficient capacities are installed in a location with good air ventilation for cooling and heating and a vibration-proof rubber mat is installed in the bottom of the outdoor unit to prevent vibration from being transferred to the building. The refrigerant pipe and the communication cable from the outdoor unit penetrate the outer wall of the building before reaching the inner area of the building. When penetrating the outer wall of the building, sleeves should be used to prevent air leakage and support water proofing. The refrigerant pipes and electrical wiring works for the indoor unit should be finished by fixing the indoor unit in a level or perpendicular location. In the refrigerant pipe works, you should pay attention to installation of insulation materials as well as branch pipes and incline. You should also make efforts to remove all alien substances from the inner area of the pipe.

To construct an air conditioning system for the building, you must first design the overall air conditioning system and select components such as chillers and indoor units and refer to the construction design diagram in order to prepare a diagram for installing an air conditioning system. System air conditioner installation vendors should refer to the provided construction diagram when preparing a diagram for installation and purchasing components. If necessary, you should process and weld the copper pipes on site and install your indoor and outdoor units and controllers.



2. Product Outline

2-1. Outdoor Units

Samsung provides you the perfectly optimized cooling and heating system with its latest and most innovative technology. World's largest capacity will provide you the powerful performance all year long, no matter how hot or how cold. Furthermore, Samsung's outdoor units barely make any noise or vibration during operations, and they are perfect for residential and commercial buildings, Always stay refreshed with Samsung system air conditioner.

1) DVM PLUS III, DVM PLUS III HR

DVM PLUS III, DVM PLUS III HR is a module multi-system air conditioner that has the world's largest capacity(8~64HP) with the application of a DVI (Digital Vapor Injection) compressor, and can connect up to a maximum of 64 indoor units.



- The world's largest capacity.
 - Compact combinations (8~64 hp) : combinations with the models requiring the smallest installation space
 - High combinations (16~56 hp) : combinations with highly efficient models
- The highest cop levels in the industry
- The smallest installation space requirement in the world
- The highest heating capacity and cop in low temperature condition (-10°C)
- Possible to connect up to 64 indoor units
- Digital unit module

1. General installation Guide

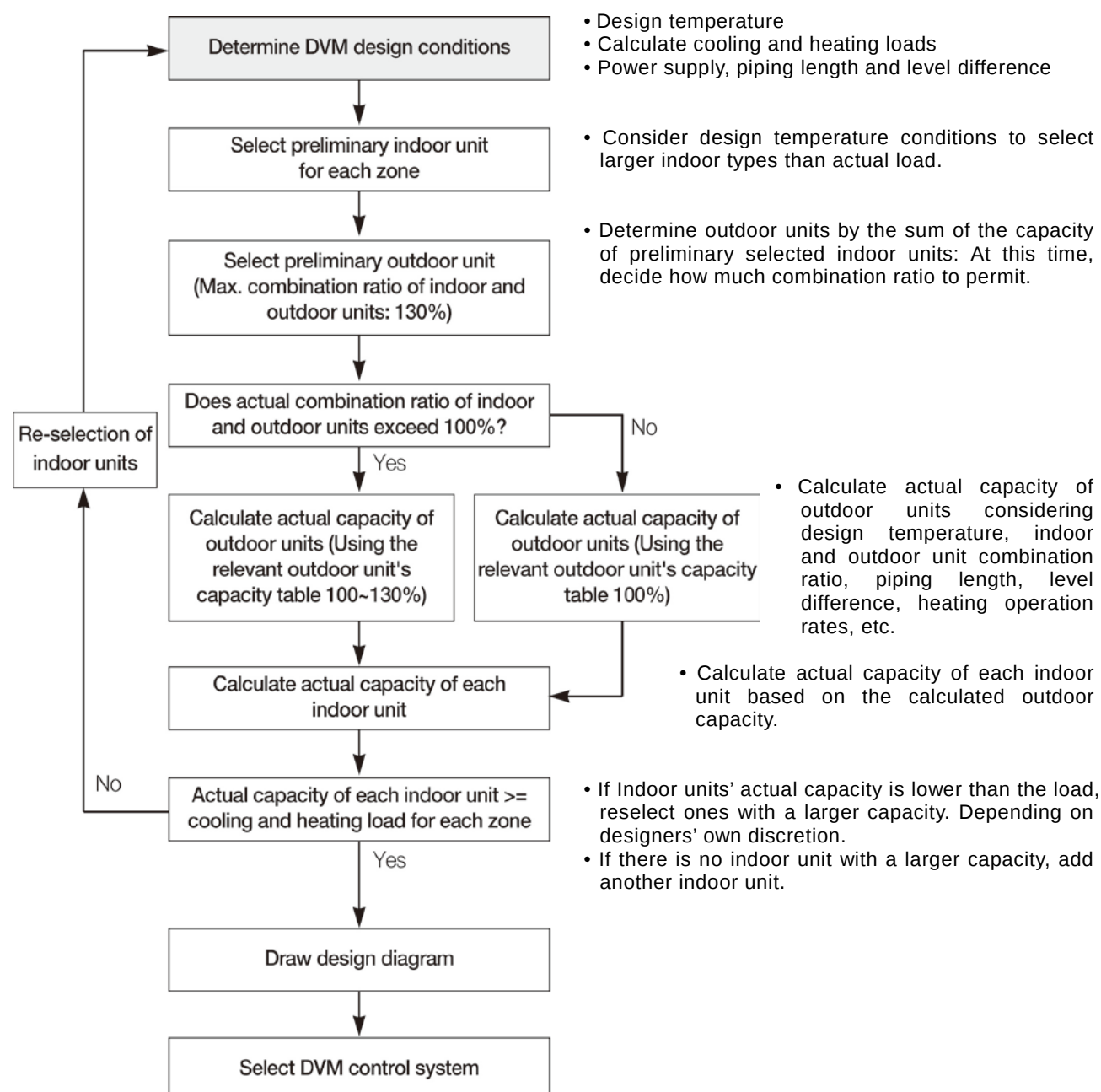
2-2. Indoor Units

Samsung indoor units are not only equipped with high performing functions, but they are also beautifully designed to enlighten your space. Different types of indoor units will be more than enough to satisfy needs of your space and yourself. Only Samsung's beautiful indoor units will provide you the conditioned air that you can enjoy.

Capacity Type	2.2kW	2.8kW	3.6kW	4.5kW	5.6kW	6.0kW	7.1kW	9.0kW	11.2kW	12.8kW	14.0kW
Slim 1way cassette											
2way cassette											
Mini 4way cassette											
4way cassette											
Slim Duct											
M.S.P Duct											
Ceiling											
Console											
MB											
Neo Forte											
Vivace											

3. DVM design process

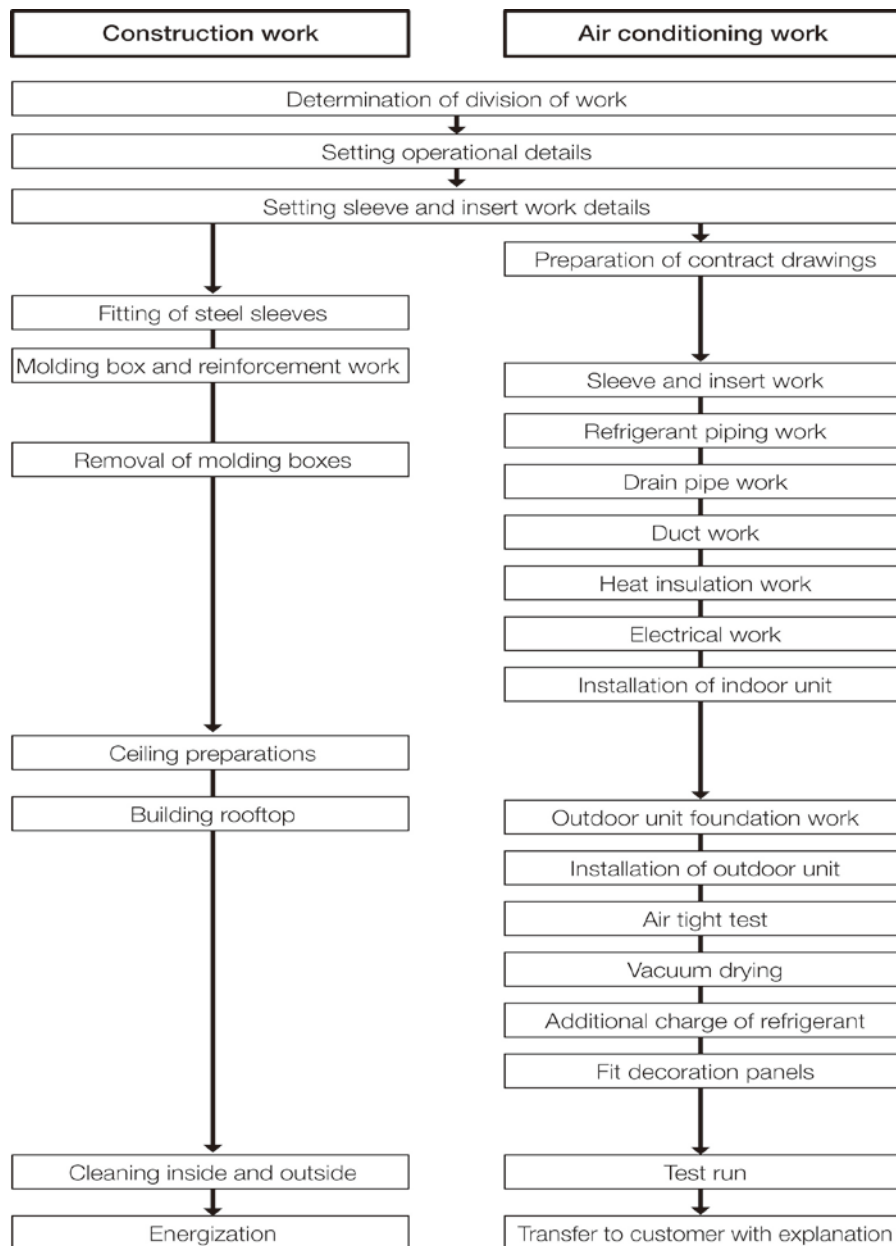
DVM is a multi-system air conditioner that changes its performance by different conditions such as design temperature, indoor and outdoor unit combination rates, heating operation rates, piping length, and level difference. It is important to select the appropriate design condition to the load specification of each room.



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4. Installation process & Guideline

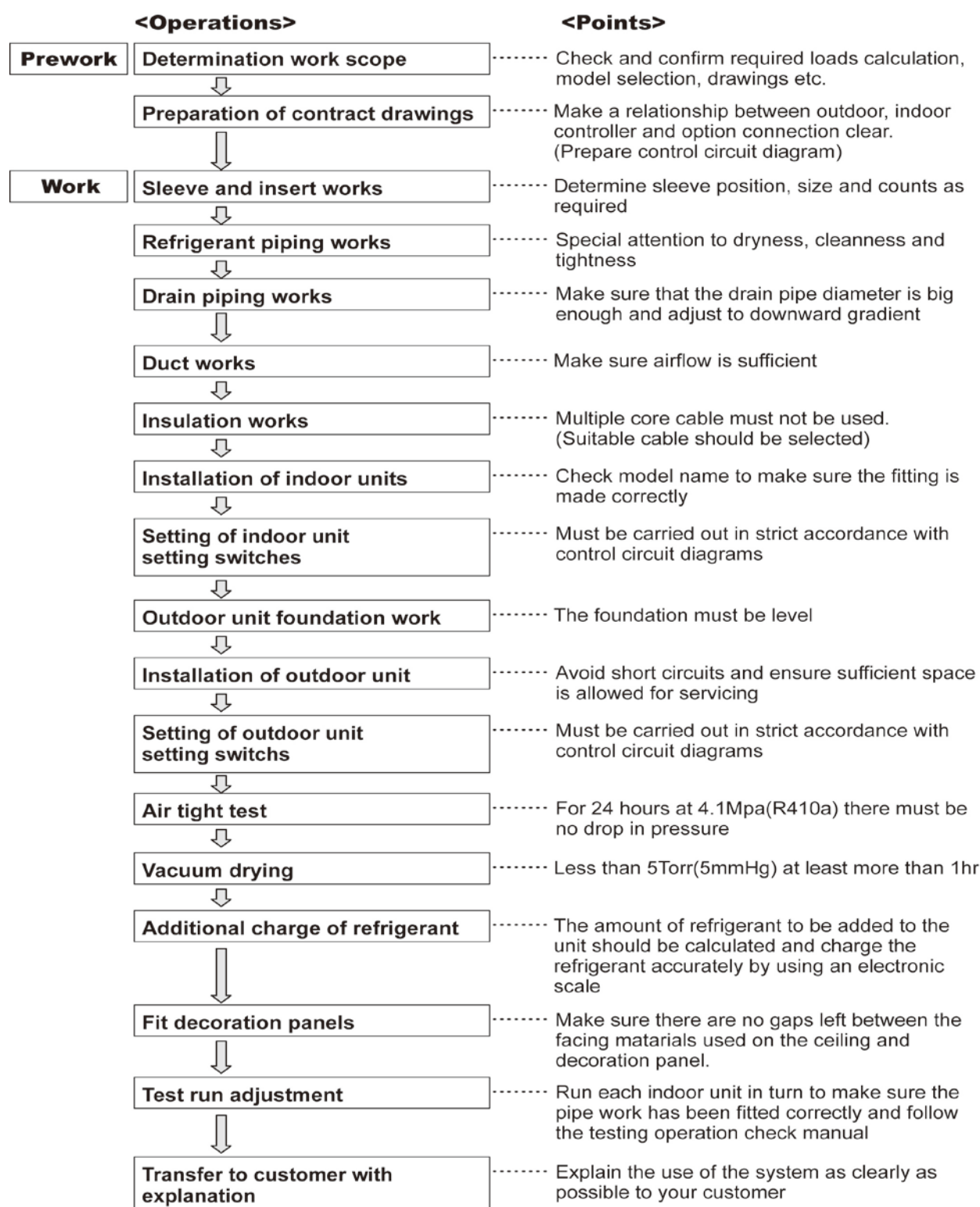
Striking a balance between System Installation & General Construction Work.



- Note**
1. The division of the work should be thoroughly clarified. (This applies particularly to work relating to the connection of control wiring, fitting of remote controller and central control panel, boundary work on areas such as connection of drain piping and humidification supply piping, inspection and foundation)
 2. Keep a constant check on the progress of the construction work to avoid deviations from the air conditioning work schedule.
 3. For sleeve and insert work the positions of ceiling girders should be confirmed and sleeve and insert requirement, hole diameters, positioning and numbers decided. This is particularly important in the case of sleeves for drain piping.

5. Installation Procedure

5-1. Procedure



Note The above list indicates the order in which the individual work operations are normally carried out but this order may be varied according to the local conditions.

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5-2. Step by Step Installation Procedure

1) Refrigerant pipe construction

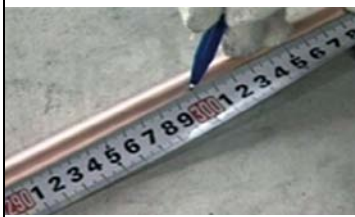
(1) Familiarization with the diagram

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Measure the actual construction diagram.	Familiarize with the construction diagram.	Fully familiarize with the diagram to prevent problems while working on the site.

(2) Straightening the refrigerant pipe

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Straighten the refrigerant pipe.	Considering the job site condition, measure the accurate length to cut.	- Remove sharp object or something that can cause deformation of the pipe in advance. - Do not apply excessive force for straightening the pipe.

(3) Marking

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Accurate marking of the length.	Consider the diagram and the actual site condition when marking it.	Compare the marked area with the diagram accurately.

(4) Cutter (cutting)

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Use a copper cutter to cut it.	- Use proper Size & Quality Cutting tool - Do not apply excessive force. (Prevent deformation of the pipe.)	While cutting the copper pipe, check for deformation of the pipe.

(5) Pipe cutting

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Cut the pipe.	Prevent foreign substances from entering the pipe.	- Check if foreign substances are removed from the pipe. (If foreign substances are found, it can cause performance degradation and malfunctions.)

(6) Removing burr

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Removing burr	- Remove burrs so that the cut side of the pipe is smooth. - Remove burr in a downward direction to keep foreign substances from entering the pipe.	Check for burr residuals in the pipe.

(7) Taping

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Taping	Tape the pipe to keep foreign substances from entering the pipe.	Check if taping is done firmly.

(8) Ready for piping works

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Work completed.	Store it in a safe place to prevent damage.	Store the pipe in a safe place not affected by other works. Remove all other substances from surroundings.

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(9) Anchor works

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Refer to the approved construction diagram when marking the indoor unit installation locations and make a hole for anchor installation.	Familiarize with the construction diagram. - Accurate location marking	- Prevent scattering. - Use a reel wire support. - Safeguard against falling accidents.

(10) Full threads bolt and C-channel fixing

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Fixing the full threads bolt and the c-channel.	- Prevent twisting of the pipe. - Do not damage the insulation materials.	- Check for pipe damage. - Check interferences. - Obey the separation of the channels. (1.2 to 1.5 meter)

2) Refrigerant pipe construction (branch pipe works)

(1) Preparing a branch pipe

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Preparing a branch pipe.	Prepare a branch pipe.	Check for damage in the branch pipes.

(2) Connecting the branch pipes

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Connecting the branch pipes.	When making a connection, do not apply excessive force that might damage the pipe.	- Check the connection. - Use Branch kit for the pipe connection. - (Damage and exterior tests on the branch pipes.)

(3) Brazing the branch pipes

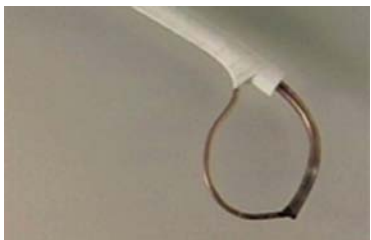
Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Brazing the branch pipe.	- Nitrogen substituted brazing works on the branch pipe to prevent generation of foreign substance/oxide - Check for adequate pressure (0.01 to 0.1kg/cm²)	Check the pressure and entry of nitrogen.

3) Refrigerant pipe works (air tightness works)

(1) Entry of nitrogen

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Entry of nitrogen. Inject nitrogen to the pipe to test leakages.	Inject nitrogen at the proper pressure. 1 st : 10kg/cm ² 2 nd : 41kg/cm ²	In the presence of the manager, check air tightness. Fill out the check forms.

(2) Processing the end of the pipe

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Wrap the end of the pipe before connecting the equipment, so that nitrogen won't escape.	Sufficient brazing on the end of the pipe.	Visual inspection

(3) Pressure meter displays

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Mark the 1 st and 2 nd pressure to see if it leaks.	1 st : 10kg/cm ² 2 nd : 28kg/cm ² look at the scale.	Check for leakages.

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(4) Insulation of the branch pipe

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Heat-preserve the pipe if there is no nitrogen leakage.	Check for leakages.	Check for leakages.

(5) Insulation of the branch pipe

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Heat preservation of the branch pipe	Dense fill up to prevent missing heat preservation material and swelling.	Check the heat preservation condition.

(6) Levelness adjustment of the branch pipe

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Check the levelness of the pipe.	Do not exceed the levelness limit of 15 degrees.	Check the levelness condition.

4) Drainpipe construction

(1) Inserting the heat preservation materials

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Insert the insulation materials into the PVC pipe.	Do not damage the heat preservation materials.	- Check for damage in the heat preservation materials. - Check for damage in the pipe.

(2) Mounting the drainpipe

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Fix the drainpipe in the channel or hanger.	A group of two person should work on the pipe (not using excessive force).	Check the channel/hanger fixing intervals (1.5m or less)

(3) Checking the drain slope

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Checking the gradients.	Obtain good slope to facilitate smooth drainage of the condensed water. (1/100)	Check the slope.

(4) Pipe connection

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Connect the pipes only if there is no leakage. (Drainpipe in each region)	Apply sufficient bond to the pipe.	- Do not perform in the winter season. - Use Standard Quality bond.

(5) Pipe connection and socket works on the indoor unit side

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Use the drainpipe components for the location that the indoor unit is connected to.	Check the height and maintain the drain slope while performing the work.	Check the height.

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(6) Pipe work on the indoor unit side

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Pipe work on the indoor unit side.	Obtain a slope (1/100)	Check the slope.

(7) Vent installation

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Install a vent to facilitate smooth drainage of water.	Install one unit at the end of the equipment.	Check vents installation.

(8) Water soaking test

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Pour the water in the uppermost area to test it.	Check the pipe slope. If there is a problem, readjust the slope.	Check the slope and test water leakage.

(9) Connecting the vertical pipe

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	If there is no problem in the above items, connect the vertical pipe.	- Secure bonding works. - Good heat preservation works.	Must check the pipe pit's inner area before finishing the wall.

5) Power communication works

(1) Power cable pipe works

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Place a power cable pipe in the correct location.	Use Standard quality materials.	Check for bending of the pipe.

(2) Inserting cables

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Insert the standard power communication cable in the pipe.	Be careful not to damage the cable while inserting it.	Check the cable condition.

6) Indoor unit installation

(1) Location determination

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Select an accurate location (check the diagram and on-site measurement)	Fully familiarize with the diagram and mark accurate locations. Select a location with a laser point.	Check if it is in accordance with the diagram.

(2). Fastener / Anchor Bolt

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Anchor works on accurate points.	- Anchor drilling - Full threads bolts mounting	Check the condition of the full thread bolts.

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(3) Connecting the equipment

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Mounting an indoor unit.	A group of two works on the indoor unit.	Check for levelness of the indoor unit and damage to the indoor unit.

(4) Inserting a vibration-proof rubber mat

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Insert a vibration proof rubber mat between the bolt and the indoor unit to prevent transfers of the vibration.	Do not allow the vibration proof rubber mat to be inclined toward either side. Do not omit any of them.	Check the insertion condition of the vibration proof rubber mat.

(5) Check the horizontal height

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Adjust the horizontal height.	Check the levelness condition of the indoor unit.	Considering the ceiling finishing line, check your installation.

(6) Installation completed

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	-	-	-

(7) Connecting the power communication cables

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Connect the power communication cable to the indoor unit.	Use a ring terminal to make a connection.	Check if the ring terminal is used.

(8) Insulation works

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Pipe insulation works.	Do not damage the insulation materials.	Check the heat preservation and the slope.

(9) Insulation works

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Indoor unit wrapping.	Wrap the indoor unit with polythene to avoid any dust, due to other work progress in the vicinity.	Check the indoor unit wrapping status.

7) Outdoor unit installation

(1) Vibration-proof board installation

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Mount the outdoor machine in the correct location by referring to the diagram.	- Acquire levelness of the vibration proof board. - Accurate measurement and safe mounting.	Check if it is in accordance with the diagram. Check the levelness.

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(2) Conveying the outdoor unit

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Checking the outdoor unit.	A group of four move the outdoor unit(22HP)	Check for damages in the outdoor unit.

(3) Mounting the vibration-proof board

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Mounting the vibration-proof board.	Install it in the upper area.	- Do not change the location of the vibration-proof board. - Check the location in the diagram once again.

(4) Connecting the vibration-proof board

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Connect the outdoor unit to the vibration-proof board.	Bolting of the vibration-proof board.	Check bolt installation and the final levelness.

(5) Completed installation of outdoor units

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Completed installation	Reinforce the outdoor unit.	Check for reinforcement.

(6) Connecting the outdoor unit's pipes

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Connecting the outdoor unit's pipe.	Connect the pipe to the outdoor unit and perform heat preservation.	Check the heat preservation of the outdoor unit.

(7) Vacuum works

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Create vacuum inside the pipe.	Connect a vacuum pump to the service valve of the outdoor unit and create vacuum all (Discharge, Suction & Oil) line.	Check the vacuum condition.

(8) Checking the vacuum gauge

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Check the vacuum gauge condition.	Continue the vacuum.	Check the normal vacuum gauge.

8) Refrigerant charging

(1) Refrigerant calculation

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Accurately calculate the amount of refrigerant.	-	Estimate the accurate amount of refrigerant from the diagram.

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(2) Refrigerant injection

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Refrigerant injection	- Accurate refrigerant injection - Keep the Gas cylinder vertically downward during charging.	Estimate the adequate amount of refrigerant.

(3) Completed injection of refrigerant

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Completed injection of refrigerant	Check if the amount of injection is accurate.	Check the adequate amount.

9) Decoration Panel installation (other than the reference floor)

(1) Check the levelness of the indoor unit

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Maintain a distance between the ceiling and the indoor unit.	Use a paper pattern to maintain an adequate separation (adjust the height of the indoor unit).	Check the levelness of the indoor unit.

(2) Panel installation

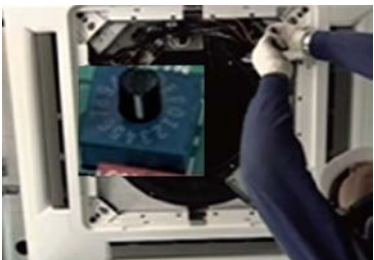
Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Panel installation	- Do not apply excessive force. - Use a clean glove.	- Check if the exterior is dirty. - Check for damage.

(3) Finish

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	End	Check the levelness and any blade damage.	Check for twisting and test the entire unit.

10) Test operation

(1) Indoor unit address setting

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Assign a unique number to the indoor unit.	Assign an accurate address to it.	Check the address of the indoor unit.

(2) Outdoor unit address setting

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Assign a unique number to the outdoor unit.	Assign an accurate address to it.	Check the address to the outdoor unit.

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(3) Connecting a interface module

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Connect a interface module to the outdoor unit.	Assign an accurate interface module number.	Check the interface module number.

(4) Connecting a interface module to S-net

Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Connecting the S-net program to the interface module.	Make a correct cable connection.	Check the condition of the laptop.

(5) S-net connection

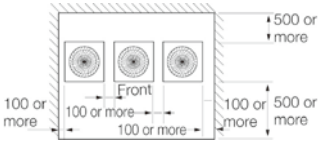
Process photo	Work details	Things to obey (installer)	Items to check (manager)
	Connecting the S-net terminal to the outdoor unit PCB.	Check for normal condition. If abnormal, inject refrigerant and request services.	Check for normal condition.

2. Preparation for installation

1. Checking the Installation Site

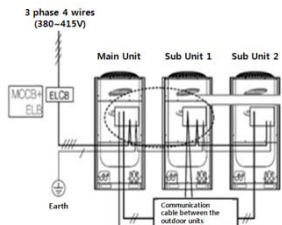
Class	Pre-check items	Handling methods and rules	Reference
Noise vibration	- Is the place affected by noises or vibration at all? - Is the outdoor unit close to a residential area? - Is the bottom of the outdoor unit affected by vibration?	※ Necessary to install a soundproof wall to prevent noise transfer to houses. - Use a gallery for soundproof wall constructions.	 Claims for noises
Weight	- Can the installation location withstand the weight of the outdoor unit?	※ In case of remodeled houses, consider the weight of the outdoor unit and review the columns and the beams for construction.	 Need to consider the weight.
Outdoor machine base	- Have you determined the ground base for the outdoor unit?	- Base area size: 1.5 times the floor. - Total height: 150mm↑	 Wooden pallet installation prohibited.
Outdoor unit base	- Is the outdoor unit placed on a flower garden or soil? (Including the foundation.)	※ In case of soil sands, the ground can get deformed during rain. So make the base with concrete pads or H beams.	 Ground base
Air ventilation	- Is the outdoor unit installed in a disclosed area? ※ Need to determine whether to use a discharge duct.	※ CFD (Computational Fluid Dynamics) simulation is available upon request to HQ's SE.	 Need to improve the air vent structure.
Discharge troubles	- Is there any blockage within 2 meters from the discharge plane of the upper area?	※ Need to use a discharge duct.	
	- Is there any blockage within 1.5 meters from the discharge plane of the front area?	※ Need to install a gallery.	

2. Preparation for installation

Class	Pre-check items	Handling methods and rules	Reference
Gallery	- Is the gallery spec suggested?	- Louver angle should be less than 20° - Opening rate of more than 80%. - Select a louver with a smooth cross section. (Do not use a rainwater prevention louver.)	
Upper discharge type	- Can you clear 500 mm(20inch) or more from the front of the outdoor unit and 300mm(12inch) or more from the rear? [Tray and interfering pipes included.]		
	- Can you access the outdoor unit?		Need some service space.
Front discharge type	- Is the service space available?	※ 2 level stacking not allowed. - Possible when the metal frame is used. Height of 300mm(12inch), side of 100mm(4inch)	
	- Can you have more than 1500mm(60inch) in front of the outdoor unit?	※ When the front and the rear are face-to-face, separate them by more than 3,000mm.	
Corrosion in the outdoor unit	- Is the outdoor unit located close to a bathroom/ kitchen vent/cooling tower or air vent?	※ Corrosion in the outdoor unit and the pipe lead to refrigerant leakage. - Need another location that is not affected by the surroundings.	
	- Is the installation location close to a beach or hot spring?		
	- Is there another source of corrosion? [Methane gas, SO2 gas discharging area, sewage water treatment facility, hot spring, dyeing factory]		
Outdoor unit installation	- Is group installation of outdoor unit necessary? (Group installation for more than 3 rows.)	※ Check the CFD simulation. - Request to HQ's SE.	
			Installation in group may result in compressor damage

Class	Pre-check items	Handling methods and rules	Reference
Ceiling finishing	-What is the finishing material for ceiling?	- If the ceiling is made of plaster boards, install an access hole depending on the internal height of the ceiling. -If the ceiling is made of ceiling tile, then no need to install an access hole.	 Installation at sunken ceiling
	- Is the ceiling sunken?	※ Need space at least 500mm(20inch) away from the equipment at sunken part of ceiling	
Access hole	-Can you install an access hole for interior finishing? - Did you check the work scope of access hole installation? -Did you notify the access hole size of the duct type indoor unit in advance?	※ Access hole is necessary for Duct type indoor unit, ERV, MCU and distribution kit. - Check the access hole size for each product.	-
Installation space	-Is the installation space for the indoor unit sufficient?	※ Obey the incline and pumping height. - Drain incline (1/100) - Drain pumping height should be less than 750mm(30inch) from the bottom of the indoor unit.	-
Installation height	- Is the 4way indoor unit installed within 3.5 meter(11.5ft) from the ground?	※ When the ceiling height is exceed 3.5m(11.5ft), use a special kit for high ceiling, maximum 5.2m(17ft) or switch to a duct-type indoor unit.	 Inefficient or poor sensible cooling/heating
Vertical pipe	- Did you review the path for the vertical pipe?	※ Can't install it in the EPS room or high voltage room.	-
Horizontal running pipe	- Must obey the max permitted pipe length from the initial branch.	※ Avoid indoor installation of the brazed joints or the branch pipe.	-
High elevated pipe	- Must obey the maximum height between indoor and outdoor unit. (50 /40m*) - Must obey the maximum height between indoor units. (15m below)	* As an outdoor unit is located in a lower position than indoor unit, level difference is 40m.	-

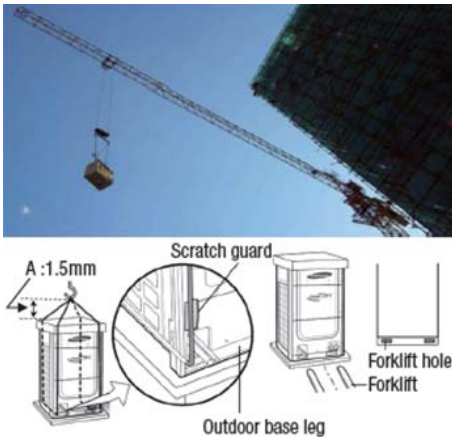
2. Preparation for installation

Class	Pre-check items	Handling methods and rules	Reference
Drain	- Is the discharge area free of bad odors?	※ Do not join rainwater pipes and sewage water pipes. If unavoidable, then join them below the first floor to prevent reverse flows into the indoor unit.	-
Installation location	- Is the location of the MCU, or EEV proper?	※ If installed near human residence such as living rooms or indoor, it can generate noise. ※ Do not install it in a fire fighting zone.	-
Power spec	- Is the power spec or the power receiving capacity good?		-
	- Did you correctly deliver the product power spec?	※ In case of 3 phase/380V/50Hz, Clarify whether it is 3 or 4 line type. - Use power spec, ring terminals. - Need to check the additional spec of the indoor power.	-
Circuit breaker	- Are the circuit breaker's spec and capacity clear?	※ Criteria for selecting a circuit breaker. - Must install a leakage breaker (ELCB) in the indoor unit's power system. - Install a leakage breaker (ELCB) for an individual or group of outdoor units.	 MCCB ELCB

2. Product handling

	Problem analysis ● Dropping the product, due to rough or careless handling of the product during unloading process. Consequence ● It will cause the product damage/deformation and may also cause motor fixation kit to fall off. Such consequences will interrupt normal operation of the product and lead to noise generation. Furthermore, severe damages to the electrical parts may cause performance decrease and even serious accident which may involve personal injury.
	Standard procedure ● Product is future property of our clients. We must take steps to protect the product while during loading, unloading and transporting process in order to prevent damage and operational/functional problem. Proper method ● When moving the indoor units, you must form a group of 2 people to move the indoor units together. Move the indoor units slowly with extra care and lift it down gently. You should never drop the indoor units from higher ground or handle them roughly.

2. Preparation for installation

	<table><tr><th>Problem analysis</th></tr><tr><td> ● A chassis of outdoor unit is bent and a heat exchanger of the condenser is damaged due to inappropriate transportation method. </td></tr><tr><th>Consequence</th></tr><tr><td> ● When moving the product, you must lift up and down the product gently. When the product is scratched, product will corrode or get rust. If the heat exchanger of the condenser gets damaged, it will cause deteriorating performance and even make a leakage from the pipe. </td></tr></table>	Problem analysis	● A chassis of outdoor unit is bent and a heat exchanger of the condenser is damaged due to inappropriate transportation method.	Consequence	● When moving the product, you must lift up and down the product gently. When the product is scratched, product will corrode or get rust. If the heat exchanger of the condenser gets damaged, it will cause deteriorating performance and even make a leakage from the pipe.
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	<table><tr><th>Standard procedure</th></tr><tr><td> ● Since the product is valuable, you must take extra care when moving it. You must protect the product from exterior or structure damage. </td></tr><tr><th>Proper method</th></tr><tr><td> ● When moving with crane : 1) To prevent the surface damage or scratch while moving the product, put 1.5mm thick cloth or other soft material between the product and rope. 2) Use 4 wire ropes From the figure on the left, $A > 1.5m$ </td></tr></table>	Standard procedure	● Since the product is valuable, you must take extra care when moving it. You must protect the product from exterior or structure damage.	Proper method	● When moving with crane : 1) To prevent the surface damage or scratch while moving the product, put 1.5mm thick cloth or other soft material between the product and rope. 2) Use 4 wire ropes From the figure on the left, $A > 1.5m$
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	Problem analysis
	● Product is left alone in the open site. If the ground gets wet with water after rain or due to other reasons, it will cause bad effect on the product.
	Consequence
	● If the indoor unit products gets soaked, water will damage the packaging first and then it may get into the indoor unit and damage the electrical parts. Such damage may cause critical safety trouble.
	Standard procedure
● When leaving the product in the site, you must store them properly. Do not put the product on the ground. You must use some sort of a support, with certain height, underneath the product to prevent the product from getting soaked in water in case of water floods.	Proper method
● Construct a support with at least 200mm(8inch) high above the ground and leave the product on top of those supporting structure.	

2. Preparation for installation

	Problem analysis
	● Pile of indoor units in the site is too high and some of the products are even piled up vertically.
	Consequence
	● Pile may fall down and cause personal injury. Indoor units lying on the bottom of the pile may get damaged due to pressure.
	Standard procedure
	● Pile cannot be over 6rows and exceed 2m(6.5ft) in height. You cannot pile them vertically either.
	Proper method
	1. Do not pile the indoor units too high. - When the product is lighter than 50kg, pile cannot be over 6 rows. - When the product is heavier than 50kg, pile cannot be over 3 rows. ☐ 2. Height of the pile cannot exceed 2m(6.5ft) and you must put the warning signboard around the pile.

	Problem analysis
	● Indoor units are stored vertically. Not only that, it is left on the ground and the ground is wet with large amount of water.
	Consequence
	● Pile may fall down and cause personal injury. Indoor units lying on the bottom of the pile may get damaged due to pressure. ● If the indoor units get soaked, water will damage the packaging first and then it may get into the indoor unit and damage the electrical parts
	Standard procedure
● Store the indoor units horizontally. Do not leave them vertically.	Proper method
● Store the indoor units horizontally (or horizontally piled up) with the supporting structure at least 200mm(8inch) high underneath the product.	

2. Preparation for installation

	Problem analysis ● Products are stored messily in the site and there is no manager in charge. Consequence ● Products are bumped into each other and pressed by one another which cause structural deformation. Internal parts of the product may get damaged or even lost.
	Standard procedure ● When storing the indoor unit : 1. Do not mix different models. 2. Do not leave them upside down. 3. Do not leave them vertically. 4. Do not tilt the indoor units. 5. Do not exceed standard height when storing them in pile. Proper method ● Assign exclusive manager to manage. And store each models on the supporting structure at least 200mm(8inch) high.

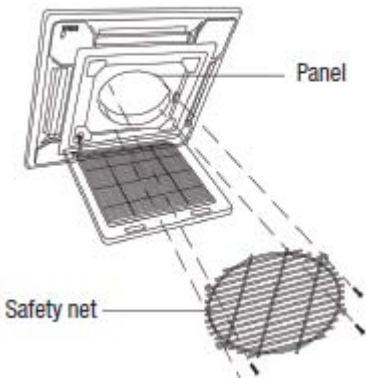
	Problem analysis
	● Inappropriate product management caused outer packaging damage.
	Consequence
	● After damage to the outer packaging of indoor unit, dust and other foreign substances entered to the product. Furthermore, you may lose <Installation manual>, <User manual>, drainpipe or other parts needed for installation.
	Standard procedure
● Strictly regulate the package removal before installing the indoor units. Manage and keep all the related parts and manuals thoroughly.	Proper method
● After indoor units arrive in the site, do not remove the package until it is being installed. When removing the package upon the installation of the product, keep the manuals separately and use other accessories (such as drainpipe) properly. Take extra care to prevent from losing them.	

2. Preparation for installation

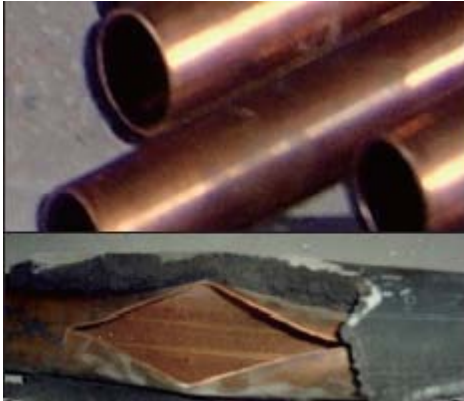
	Problem analysis
	● Indoor unit installation is put on hold, and it was left with all the packaging removed. Dust, foreign substances, rain water, industrial water and dew got inside of the indoor unit. Because it was left with all the packaging removed while installation was put on hold.
	Consequence
	● Dust and other foreign substances will get inside and cause pipe blockage or other malfunctions.
	Standard procedure
	● After indoor unit arrives in the site, do not remove the packaging until it is being installed. If the installation was stopped or put on hold for any reasons, wrap the indoor units for protection.
	Proper method
	● Protect the indoor unit by wrapping it.

	Problem analysis
	● Indoor unit, which is still in the middle of the installation process, is hanging on the ceiling without any protection.
	Consequence
	● Indoor unit was hanging on the ceiling without any Protection which allows dust and other foreign substances to enter and cause malfunction.
	Standard procedure
	● Wrap the indoor unit with vinyl
	Proper method
	● Wrap the indoor unit with vinyl if the installation is still in process to prevent dust, foreign substances and water from entering.

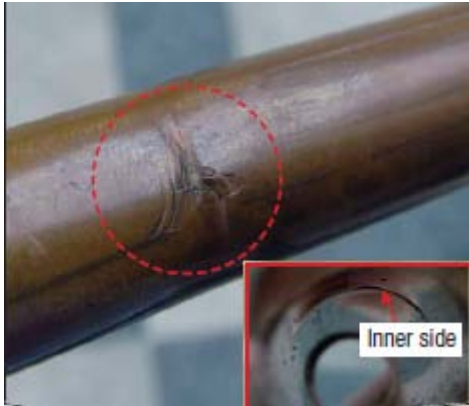
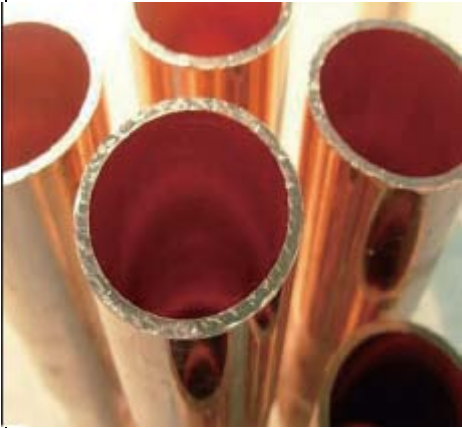
2. Preparation for installation

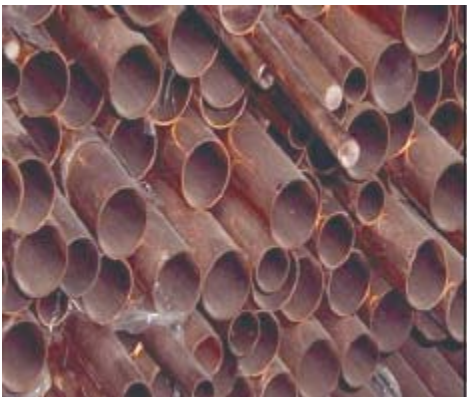
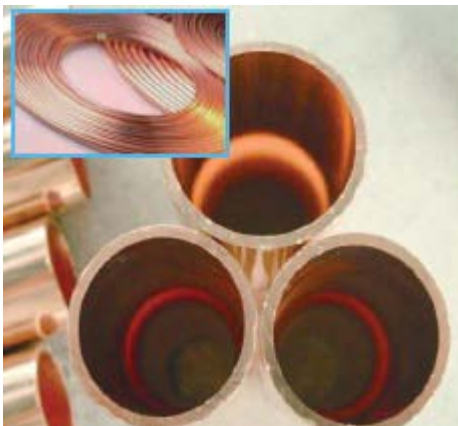
	Problem analysis
	● Safety net is not installed on 4-way cassette indoor unit.
	Consequence
	Standard procedure
	● Install the safety net for safety reasons.
	Proper method
	● Make sure safety net is installed and let the customer know that they must not remove them for their own safety.

3. Materials and Tools

	Problem analysis ● R410a refrigerant system has relatively high pressure. If material does not meet the pressure-proof standards, then it may cause copper pipe explosion. Consequence ● Intensity and material specification doesn't meet factory requirement and this could lead to explosion while using the product which could even bring personal injury.
	Standard procedure ● Installation material requirement Material : phosphorous deoxidized copper, purple copper pipe Analysis result shows that chemical component should meet the below condition (KSD 1651) Cu ≥ 99.90% ; P : 0.015%~0.040% Mechanical properties need to meet KSD 5301 Proper method ● Selecting copper pipe C1220T-O(JIS) : Soft type C1220T-1/2H(JIS) : Semi-hard type

2. Preparation for installation

	Problem analysis
	● Layer of carbon, rust and dirty foreign substances were found on the outer surface of the copper pipe. Pipes must not have any scratches, indents or stains etc.
	Consequence
	● Such defects decrease the strength of the pipe which may result in explosion, decrease in performance or leakage.
	Standard procedure
	● You must select clean and dry copper pipe. Check inside of the pipe for any dust, water, indents or any signs of damage.
	Proper method
	● Select a copper pipe according to the standards.

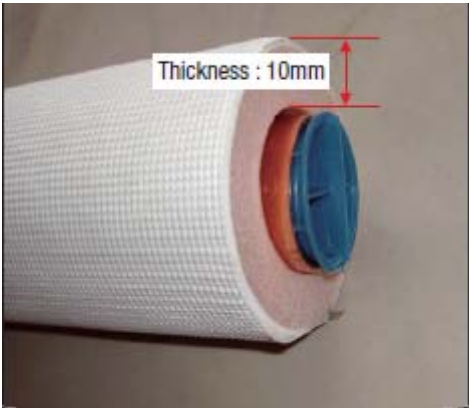
	Problem analysis
	● Due to inappropriate protection management of the internal/external surface of the copper, large amount of oxidation, dust and foreign substances were seen.
	Consequence
	Standard procedure
	● Check if it is clean enough. Foreign substances in the copper pipe < 30mg/10m ● R410a copper pipe must be kept clean until it is installed.
	Proper method
	● Select the clean copper pipes and make sure no dust or foreign substances get into the pipe when you keep them. If the copper pipes are stored for a long period of time, clean them(blow Nitrogen) before installation to remove undesired material from inside of the pipe

2. Preparation for installation

	Problem analysis
	● After purchasing the pipe, it was not kept properly so dust, foreign substances, water and industrial water got inside of the pipe. Also pipe was left on the ground and people just walked on them.
	Consequence
	● Water or foreign substances within the pipe will cause blockage that can lead to product malfunction or performance decrease.
	Standard procedure
	● When storing the pipe, use cover or tape to block the entrance and do not leave them on the ground but keep them on the supporting structure with at least 30mm in height.
	Proper method
	● Strictly follow the standards.

	Problem analysis																												
	● Thickness of the pipe does not meet the standards.																												
	Consequence																												
	● Strength and the duration of the pipe will decrease which may cause breakup. Especially, R410a is a high pressure gas. Pipe with less thickness will have less strength, which may cause the pipe breakup.																												
	Standard procedure																												
	Required thickness – Soft type <table><tr><th>Outer diameter(mm)</th><th>Min. Thickness(mm)</th></tr><tr><td>Ø6.35</td><td>0.8</td></tr><tr><td>Ø9.52</td><td>0.8</td></tr><tr><td>Ø12.70</td><td>0.8</td></tr><tr><td>Ø15.88</td><td>1.0</td></tr></table> Required thickness – Semi hard type <table><tr><th>Outer diameter(mm)</th><th>Min. Thickness(mm)</th></tr><tr><td>Ø19.05</td><td>0.9</td></tr><tr><td>Ø22.23</td><td>0.9</td></tr><tr><td>Ø25.40</td><td>1.0</td></tr><tr><td>Ø28.58</td><td>1.1</td></tr><tr><td>Ø31.75</td><td>1.1</td></tr><tr><td>Ø38.10</td><td>1.35</td></tr><tr><td>Ø44.45</td><td>1.6</td></tr><tr><td>Ø50.80</td><td>2.0</td></tr></table>	Outer diameter(mm)	Min. Thickness(mm)	Ø6.35	0.8	Ø9.52	0.8	Ø12.70	0.8	Ø15.88	1.0	Outer diameter(mm)	Min. Thickness(mm)	Ø19.05	0.9	Ø22.23	0.9	Ø25.40	1.0	Ø28.58	1.1	Ø31.75	1.1	Ø38.10	1.35	Ø44.45	1.6	Ø50.80	2.0
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	Proper method																												
	● Select the pipe according to above specification																												

2. Preparation for installation

	Problem analysis																	
	● Selecting ø22.23 copper pipe, and 10mm insulation as shown in the picture.																	
	Consequence																	
	● Low insulation effect cause large energy consumption and decrease in system performance. ● Condensation will easily form and leakage may occur when performing heating operation in regions with high temperature and humidity.																	
	Standard procedure																	
	● Insulation material and quality must meet the minimum standard thickness requirements. ● Good installation will prevent condensation and guarantee air conditioning performance.																	
	Proper method																	
	● Follow the below specification strictly and aware of the Minimum thickness requirements. <table border="1"><thead><tr><th rowspan="2">Pipe size [mm]</th><th colspan="2">Minimum thickness of insulation [mm]</th></tr><tr><th>PE foam</th><th>EPDM foam</th></tr></thead><tbody><tr><td>Ø6.35~19.05</td><td>13</td><td>10</td></tr><tr><td>Ø22.23~31.75</td><td>19</td><td>13</td></tr><tr><td>Ø38.10</td><td>25</td><td>19</td></tr><tr><td>Ø44.45~</td><td>32</td><td>25</td></tr></tbody></table> ● The thickness of insulation must be increased in case of high humid conditions (over than 27°C and RH 80%) like below place - Tropical / Subtropical regions or equivalent with this region - The region where problems due to high temperature and humidity are expected - Restaurant, hot spring, sauna, basement, seaside - Ceiling inside with high humidity due to weak ventilation	Pipe size [mm]	Minimum thickness of insulation [mm]		PE foam	EPDM foam	Ø6.35~19.05	13	10	Ø22.23~31.75	19	13	Ø38.10	25	19	Ø44.45~	32	25
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Ø38.10	25	19																
Ø44.45~	32	25																

	Problem analysis
	● Regular vacuum pump was used in vacuum operation.
	Consequence
	● If the power of the vacuum pump cuts off unexpectedly then the oil gets back to the refrigerant system due to pressure difference.
	Standard procedure
	● Use the vacuum pump which is 100% dedicated for R410a system with stop valve.
	Proper method
	● Purchase and use the vacuum pump with the stop valve.

2. Preparation for installation

	Problem analysis
	● R22 gauge was used in R410a system.
	Consequence
	● If you use R22 gauge, remaining oil inside can generate wax type material which definitely badly affect POE oil of R410a system, possibly clogging refrigerant passage or causing compressor failure.
	Standard procedure
	● Never utilize R22 gauge for R410a system to prevent the mineral oil from flowing in to the R410a system. ● Use the measuring instruments that meets the standard requirement. High pressure side : -0.1 ~ 5.3MPa Low pressure side : -0.1 ~ 3.8MPa
	Proper method
	● Install in accordance with the standards.

3. Guideline for each installation process

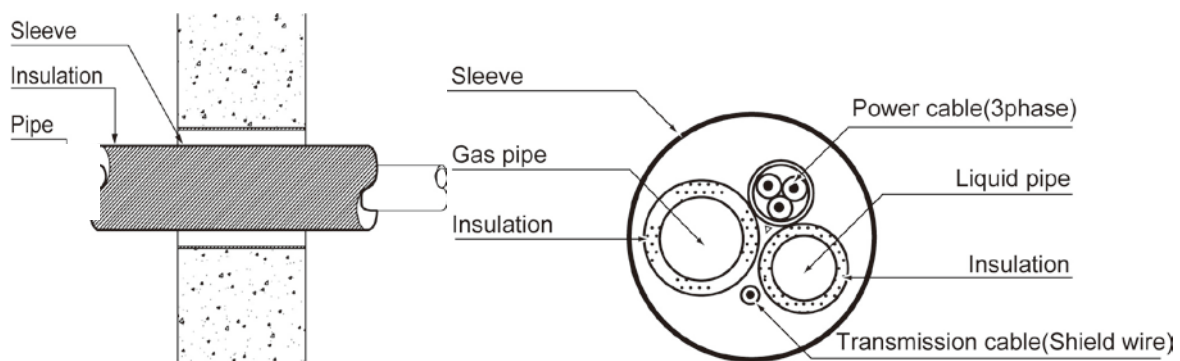
1. Sleeve work

1-1. Positioning of the pipe holes

- 1) The through holes for the drain piping should be positioned such that the pipes have a downward gradient. (The gradient must be at least 1/100. The thickness of the insulating materials must also be taken into consideration.)
- 2) The diameter of the through holes for the refrigerant piping should include allowance for the thickness of the heat insulation materials.
- 3) Attention should be paid to the construction of the beam themselves since there are sometimes parts of the beam which cannot be used to accommodate through holes.

1-2. Selection of sleeve

- 1) Sleeve work should be performed to make a space for passing pipe and wire through the wall or ground under construction
- 2) Use of shielded transmission cable is recommended to avoid the problem of electrical noise



- 3) Depending on the selected product or the installation environment, if the insulation material's thickness is subject to change, then additional calculations are necessary.
$$\text{Sleeve diameter [mm]} = (\text{Liquid pipe diameter} + \text{insulation material thickness} \times 2) + (\text{Gas pipe diameter} + \text{insulation material thickness} \times 2) + 20$$
- 4) Maintain a minimum separation of 10mm between the pipes to facilitate smooth air flows.
(To prevent dew forming)

3. Guideline for each installation process

※ Selection of the refrigerant pipe sleeve's diameter (a)

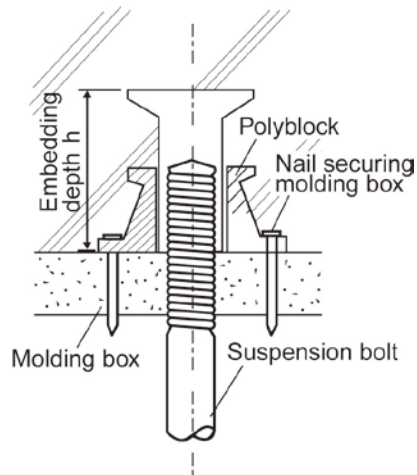
Classification		Liquid pipe diameter(mm)					
		6.35	9.52	12.7	15.88	19.05	22.22
Gas pipe diameter (mm)	Gas pipe diameter + Insulation (based on 19t)	Insulation (Based on 9t)		Insulation (Based on 13t)			
		24.35	27.52	38.7	41.88	45.05	48.22
6.35	32.35	77	80	91	94	97	101
9.52	47.52	92	95	106	109	113	116
12.7	50.7	95	98	109	113	116	119
15.88	53.88	98	101	113	116	119	122
19.05	57.05	101	105	116	119	122	125
22.22	60.22	105	108	119	122	125	128
25.4	63.4	108	111	122	125	128	132
28.58	66.58	111	114	125	128	132	135
31.75	69.75	114	117	128	132	135	138
38.1	76.1	120	124	135	138	141	144
44.45	82.45	127	130	141	144	148	151

※ If the insulation material's thickness is subject to change depending on the installation location, you must reselect a new sleeve pipe diameter.

2. Insert work and support work

2-1. Insert work

Example : Through holes in a reinforced concrete beam



Full thread bolt works	
	
	

3. Guideline for each installation process

2-2. Support work

1) Installation guideline for a vertical piping

► Down-stopper fixing guide

	Height	Fixing interval	Remarks
1	lower	Fix a pipe every 5m(16.5ft)	If there is a pit, fix a pipe at each floor
2	Higher than 15m	Install a down stopper every 3floor or every 15m height	Pipe must be fixed at every 5m

※ How to fix a pipe

- Utilize "U" shape volt or circular band on the insulation of the pipe



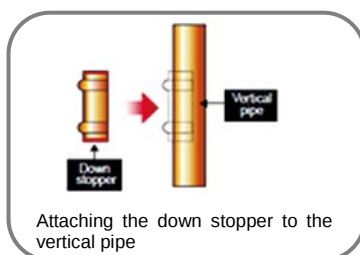
Fixing with a circular band



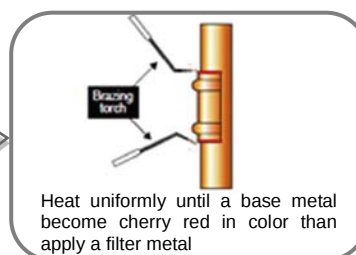
Fixing with a Down-stopper

2) Down-stopper installation

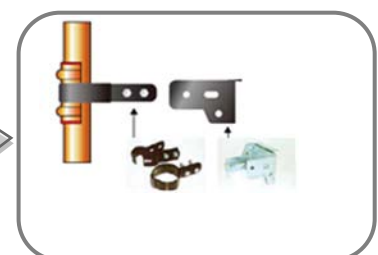
- ① Attaching the Down-stopper part to the vertical pipe



- ② Brazing work



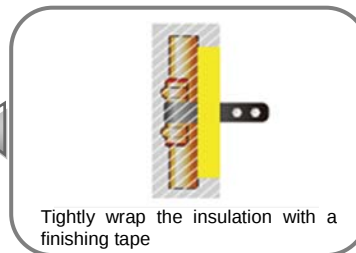
- ③ Assembly of wall contact



- ⑤ Finished sample



- ④ Insulating a pipe

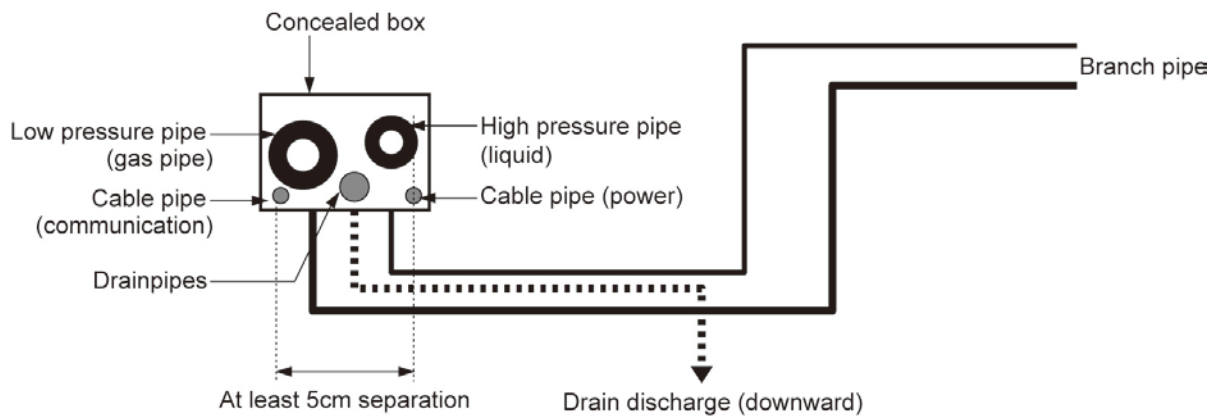


3. Concealed Box work

3-1. Concealed Box work

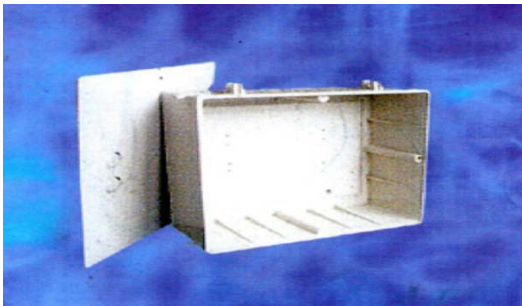
1) Objectives

- The concealed box aims at enhancing the interior inside the building by burying the drains, the copper pipes, the insulation materials, and the wires in the earlier phase, when you need to install an indoor unit

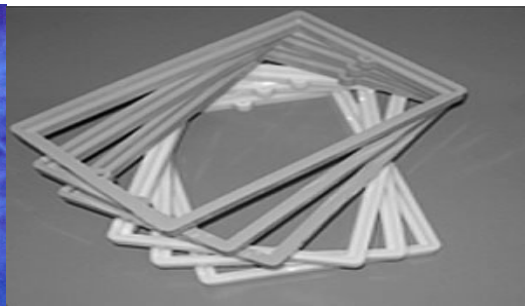


2) Functions

- (1) Buried in the wall on the pipe installation site and connecting the pipes, the drains and the wires.
- (2) Copper pipe protection, enhancing the exterior.
- (3) Mounting a pressure gauge to check the air tightness at any time.



Concealed box



Buried box connection board

3. Guideline for each installation process

4. Refrigerant pipe construction

4-1. Drawing review

- 1) Compare the actual site with the drawing. When installing the refrigerant pipes, check interferences and the requirements for each pipe diameter size/length/quantity ahead of time.



Temper grade and minimum thickness of the refrigerant pipe

Outer diameter	Minimum thickness	Temper grade
6.35	0.7	C1220T-O
9.52	0.7	
12.70	0.8	
15.88	1.0	
19.05	0.9	C1220T-1/2H Or C1220T-H
22.23	0.9	
25.40	1.0	
28.58	1.1	
31.75	1.1	
38.10	1.35	
44.45	1.6	
50.80	2.0	



Make sure to use C1220T-1/2H(Semi-hard) pipe for more than ϕ 19.05mm. In case of using C1220T-O (soft) pipe for ϕ 19.05mm, pipe may be broken, which can result in an injury.

- (2) Soft or hard pipes (Annealed, Drawn temper)

2) Preparing a pipe

- (1) On the drawing, check the pipe diameter/length and the insulation material's thickness and length. Prepare some margins for the dimension shown in the drawing (to give elastic tensions), Use a special cutter to cut the pipes.



3) Check the quantities of the branch pipe/header and the outdoor unit's branch pipes.

- (1) Additionally purchased items

Type	Model	Total capacity
Y-joint	MXJ-YA1509*	15.0kW below
	MXJ-YA2512*	15.0~40.6kW
	MXJ-YA2812*	40.6~46.4 kW
	MXJ-YA2815*	46.4~69.6 kW
	MXJ-YA3119*	69.6~98.6 kW
	MXJ-YA3819*	98.6~139.2 kW
	MXJ-YA4422*	139.2 kW and over
Y-joint (Only for DVM plus III HR module)	MXJ-YA1500*	23.2kW and below
	MXJ-YA2500*	23.2~69.6 kW
	MXJ-YA3100*	69.6~139.2 kW
	MXJ-YA3800*	139.2 kW and over
Header Joint	MXJ-HA2512*	46.4kW and below(For 4 rooms)
	MXJ-HA3115*	69.6kW(For 8 rooms)
	MXJ-HA3819*	69.6kW and over (For 8 rooms)
Outdoor Joint	MXJ-T3819*	48HP and below
	MXJ-T4422*	50HP and over
Outdoor Joint (Only for DVM plus III HR module)	MXJ-T3100*	48HP and below
	MXJ-T3800*	50HP and over

3. Guideline for each installation process

4-2. Pipe Cutting

1) Burring

- When performing burring works, point the pipe face downward to prevent entry of burr.



2) Taping

- To prevent entry of moisture or dust, seal off the pipe completely.



Covering is an extremely important operation as it prevents water, dirt or dust from getting inside the pipes. Moisture inside the pipes was a constant source of trouble in the past. The utmost care is required to nip this problem in the bud.

The end of each pieces of pipe must be covered. “Pinching” is the most effective method but “taping” is an simple alternative which may be used according to the work area and term of work.

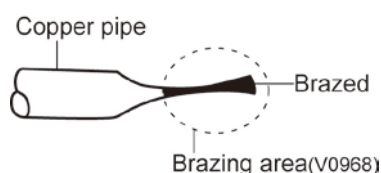
Location	Term of Work	Covering Method
Outdoors	1 months or more	Pinching
	Less than 1 months	Pinching or taping
Indoors	Irrelevant	Pinching or taping

① Pinching method

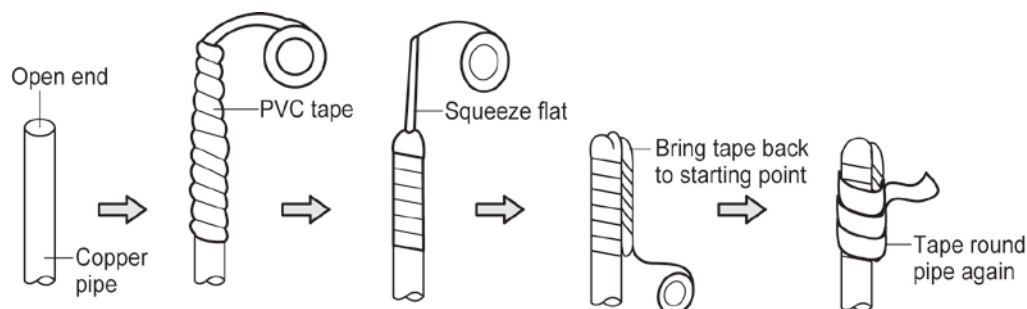
The end of the copper pipe is squeezed together and the gap brazed.

② Taping method

The end of the copper pipe is covered with PVC tape (vinyl tape).

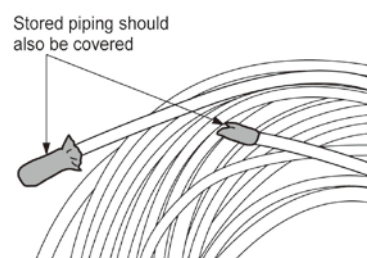
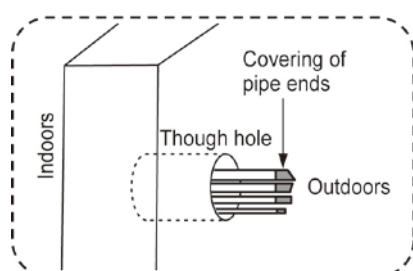


<Taping method>



Particular care should be taken during the following operations:

- When passing copper pipe through a penetration hole (Dirt easily gets into the pipe).
- When copper pipe is located outside (Rainwater gets in)
(Special care is needed when the pipes are standing vertically outside)



3. Guideline for each installation process

4-3. Insulating the Pipe, the Branch Pipe and the Header

1) Insulating the pipe

- (1) To block off external air, insulate the pipe with insulation material.
- (2) Insert the insulation material into the pipe and use a special EPDM glue to finish it.



Materials

The thermal insulation materials which are used must be well able to withstand the heat from the pipes.

Example :

Heat pump type: Heat resistant polyethylene foam (heat resistance of at least 120°C)

Cooling only: Polyethylene foam (heat resistance of 100°C or more)

Essential Points of Thermal Insulation

The insulation of jointed areas such as the soldered, flared or flanged sections should only be carried out after the successful completion of the air tight test.

Attention should be paid to the unit model and its operating conditions since there are occasions when the gas and liquid pipes also need to be thermally insulated.

Example of incorrect work	Example of correct work		
Gas and liquid piping should not be insulated together Jointed areas must also be thoroughly insulated	Insulation of gas pipe only	Insulation of both gas and liquid pipe only	Insulation of support brackets

► Important points

- ① The thickness of the thermal insulation material must be determined in the light of the pipe sizes. Pipe size in. (mm) Thickness of insulation material

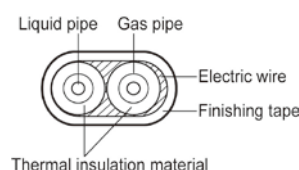
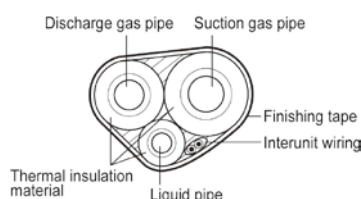
Pipe size in(mm)	Thickness of insulation material
1/4~□1 (6.4mm~25.4mm)	1/2 or more (12.5mm or more)

- ② It will be necessary to increase the values in the above table for top floors or where conditions are hot and humid. (Refer to Installation manual "6-5 Pipe insulation" for more detail)
- ③ Where a customer supplies his own specifications then these must be adhered to.
- ④ Where it is anticipated that the air conditioning unit will be operated at external air temperatures of 10°C or less then thermal insulation will also be required for the liquid pipes.

Heat Recovery Series

- Suction, Discharge Gas piping, liquid piping must be insulated.
- Example of thermal insulation work.

3 piping section (between outdoor unit and MCU unit) 2 piping section (between MCU unit and indoor unit)



- If you think that the humidity around the cooling piping might exceed 86°F and RH80%, reinforce the insulation on the cooling piping (at least 13/16" thick). Condensation might form on the surface of the insulation.

2) Insulating the refrigerant pipe

(1) Insulating the refrigerant

- You must check if there is a gas leak before completing all the installation process.
- Use EPDM insulation which meets the following condition.

Item	Unit	Standard
Density	g/cm ³	0.048~0.096
Dimension change rate by heat	%	-5 or less
Water absorption rate	g/cm ³	0.005 or less
Thermal conductivity	kcal/m·h·°C	0.032 or less
Moisture transpiration factor	ng/(m ² ·s·Pa)	15 or less
Moisture transpiration grade	g/(m ² ·24h)	15 or less
Formaldehyde dispersion	mg/L	-
Oxygen rate	%	25 or less

3. Guideline for each installation process

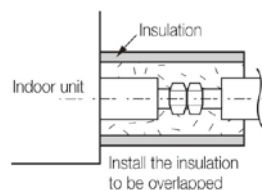
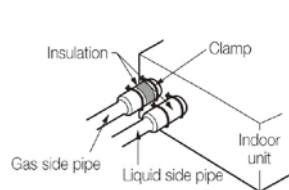
(2) Selecting the insulation of the refrigerant pipe

- Insulate the gas side and liquid side pipe referring to the thickness according to the pipe size.
- The thickness according to the pipe size is calculated at the indoor temperature of 27°C and humidity of 80%. If installing in an unfavorable conditions from it, use thicker one.

Pipe size (mm)	Minimum thickness of insulation (mm) Remarks		
	PE foam	EPDM foam	
ø6.35~19.05	13	10	If you install the pipe underground, at the seaside, a spa or on the lake, use thicker one according to the pipe size.
ø22.23~31.75	19	13	
ø38.10	25	19	
-	32	25	

(3) Insulating the refrigerant pipe

- Be sure to insulate the refrigerant pipe, joints and connections with class 'o' material.
- If you insulate the pipes, the condensed water does not fall from the pipes and the capacity of the air conditioner is improved.
- Check if there are any insulation cracks on the bent pipe.



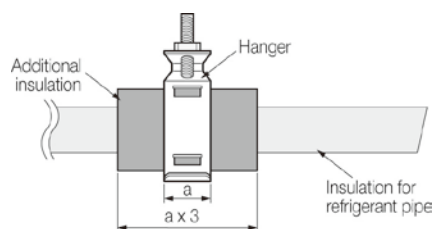
Pipe insulation	Pipe insulation after insulating EEV kit
• Insulation of the gas and liquid pipes can be in contact with each other but they should not be pressing each other. • When contacting the gas side and liquid side pipe, use thicker insulation.	• When installing the gas side and liquid side pipes, leave 10mm of space. • When contacting the gas side and liquid side pipe, use thicker insulation.

Insulating the refrigerant pipe



Cautions

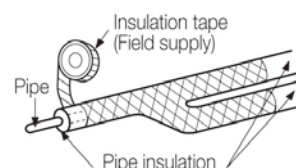
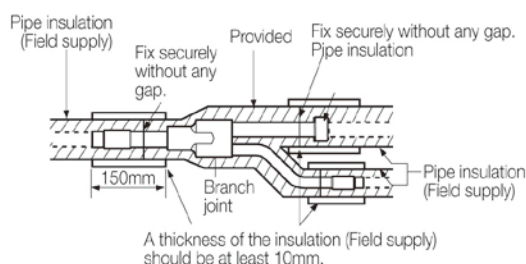
- Install the insulation not to be get wider and use the adhesives on the connection part of it to prevent moisture entering.
- Wind the refrigerant pipe with insulation tape if it is exposed to outside sunlight.
- Install the refrigerant pipe respecting that the insulation does not get thinner on the bent part or hanger of pipe.



(4) Insulating the branch joint

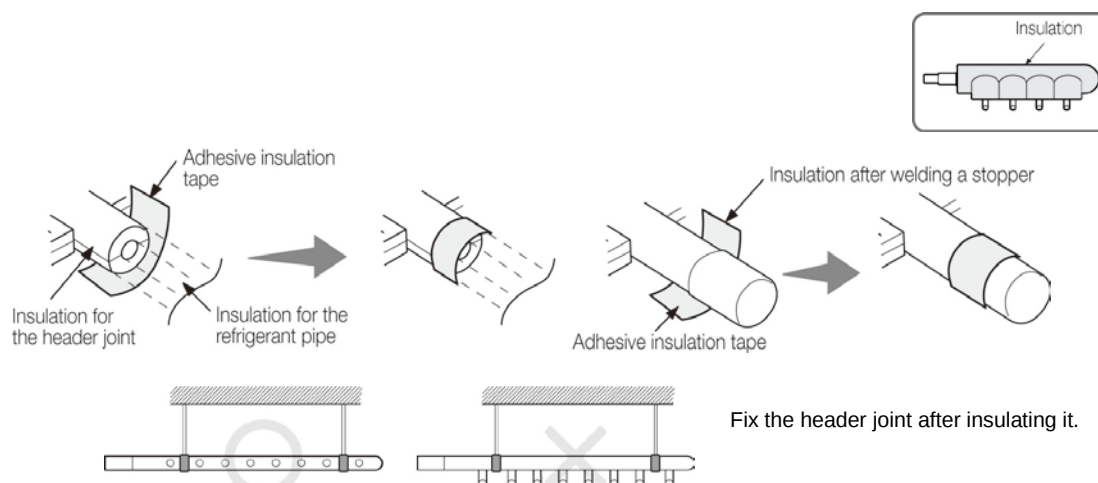
► Y-joint & liquid side of the outdoor unit

- Attach the insulation provided with a branch joint to the insulation purchased individually without a gap. Wrap the connected part with an insulation (purchased in the market) of a thickness of at least 10mm.
- Use an insulation that should be able to handle the interior temperature over 120°C. Wrap the branch joint with an insulation of a thickness of at least 10mm.



► Header joint

- Fasten the header joint using a cable tie and cover the connected part.
- Insulate the header joint and the brazed part and wrap the connected part with an adhesive insulation tape to prevent it from defrosting.
- Before starting the insulation work on joints(brazed part), ensure that the e)pressure test is done (no leakage)

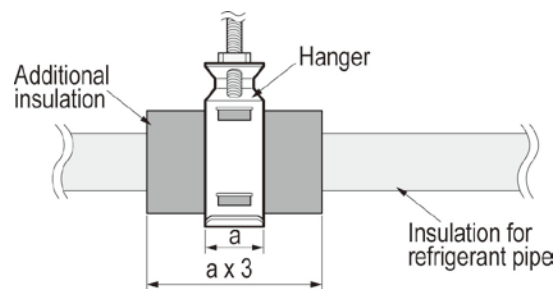
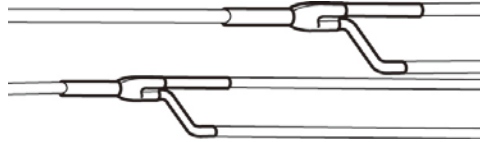


3. Guideline for each installation process

4-4. Mounting the Pipe, the Branch Pipe and the Header

1) Mounting the insulated pipes.

- The liquid/gas pipes should be made as a pair and the branch pipes require step differences with each other.



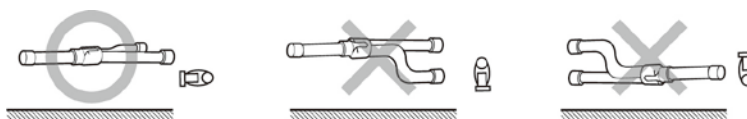
2) Install a hanger before and behind the branch pipe.

- Install a hanger before and behind the branch pipe.

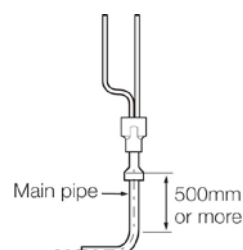
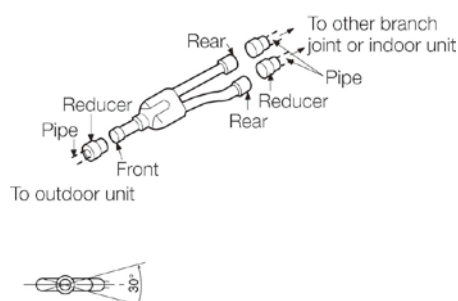


3) When installing the branch pipe, pay attention to the following cautionary items.

Horizontally installed



Vertically installed



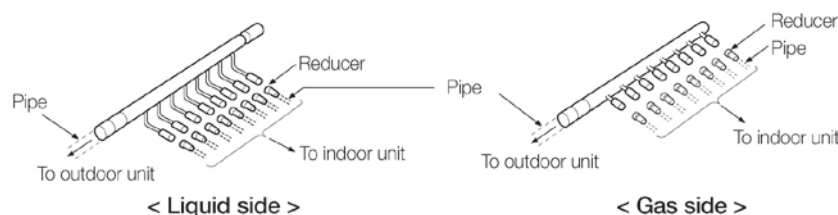
- Install the Y-joint within $\pm 15^\circ$ on the horizontal or on the

Model		MXJ-HA2512*	MXJ-HA3115*	MXJ-HA3819*
Name				
Liquid side				
Gas side				
Insulation (Liquid side/Gas side)				
Socket	Liquid Side			
	Gas side			

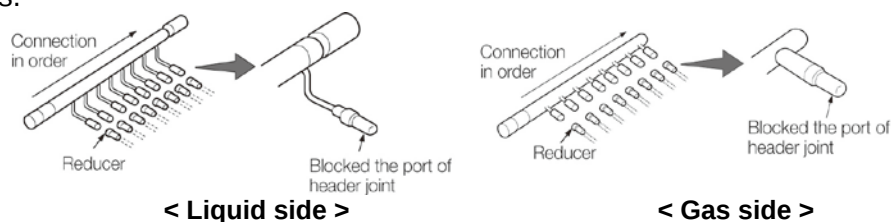
3. Guideline for each installation process

► Header joint

- ① Select the reducer fitted on the diameter of the pipe.

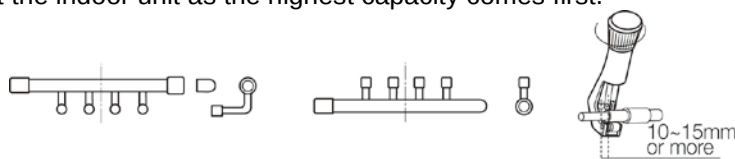


- ② Braze the pipes ends with caps if the number of connected indoor unit is fewer than header joint ports.



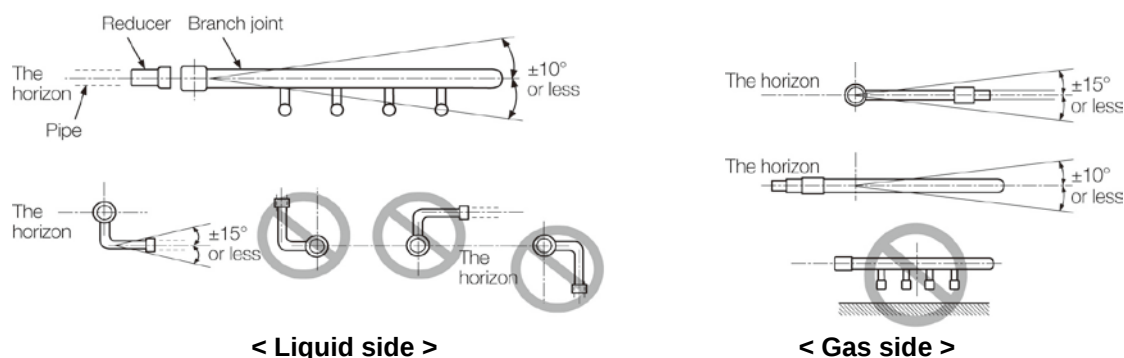
Cautions

- When using A~J type of header joint, connect the header joint to the pipe with provided reducer.
- When using K~Z type of header joint, connect the header joint to the pipe by cutting the provided reducer properly.
- Connect the header joint in order respecting the number of the indoor unit.
- Connect the indoor unit as the highest capacity comes first.



- ③ Install the header joint horizontally.

- Install the header joint horizontally so that it is not facing down.

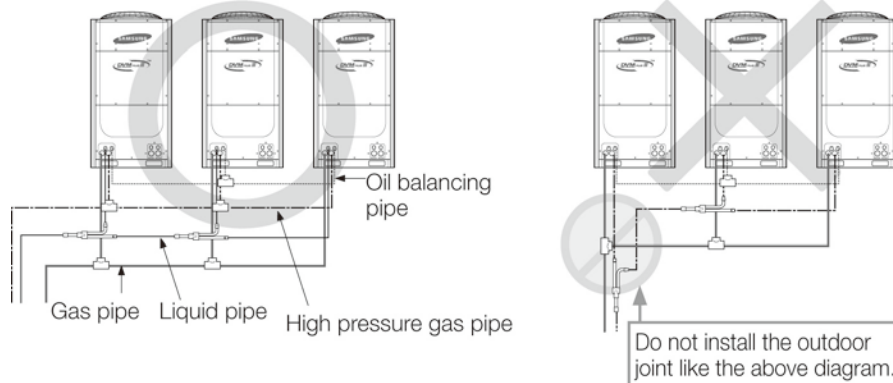


Note Incorrect installation of Y-joint and header joint cause poor oil and refrigerant distribution between indoor units.
It may decrease the system's performance or cause compressor failure.

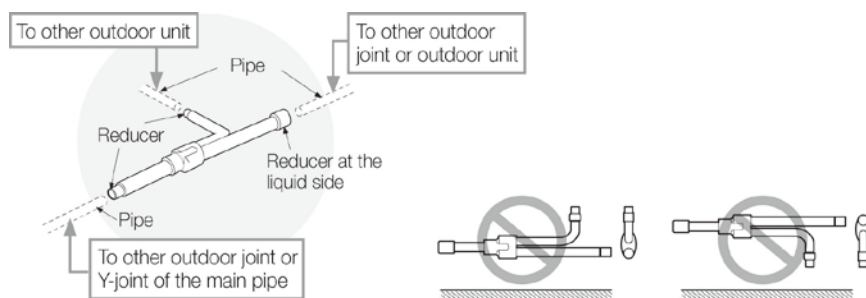
4) Installing the branch joints

► Outdoor joint

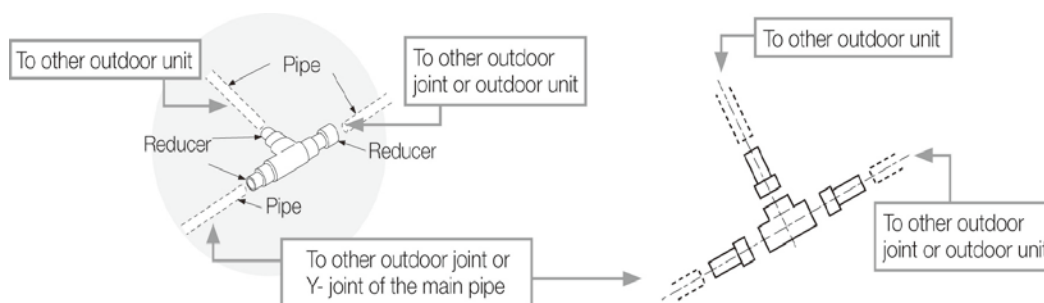
Installation of outdoor joint



Use the attached reducer properly according to the selected pipe size.



<Liquied pipe >

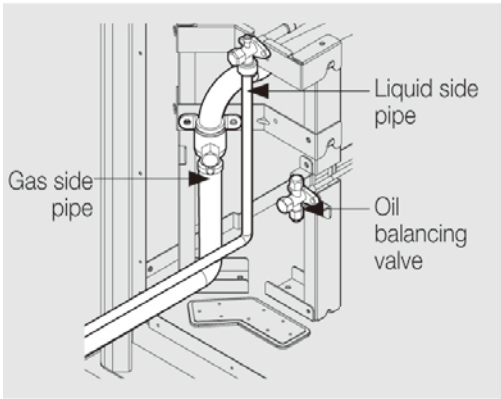
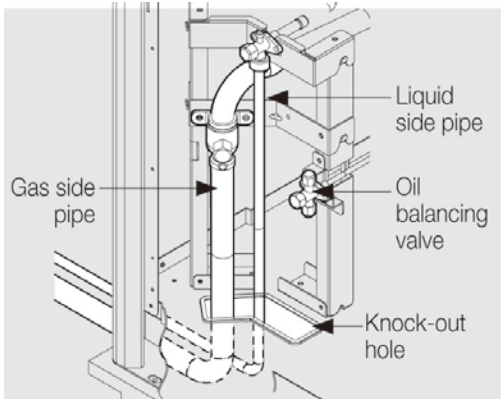
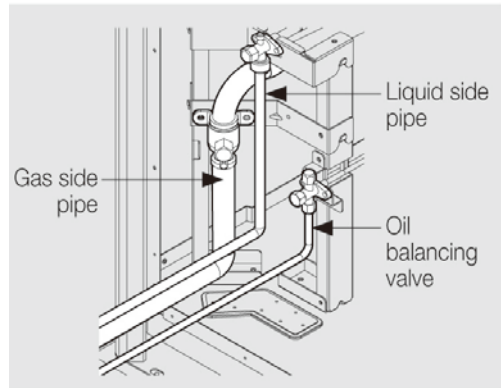
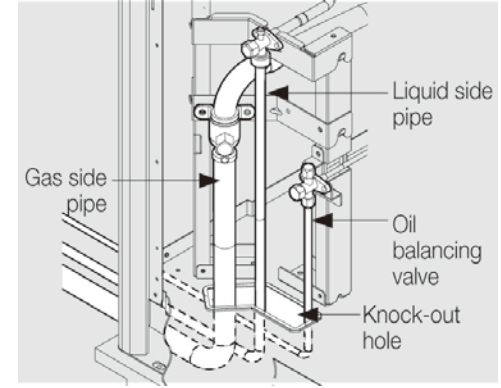


<Gas pipe, High pressure gas pipe>

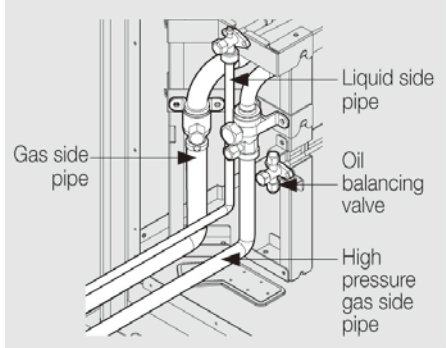
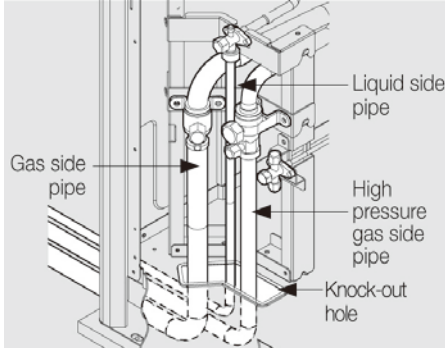
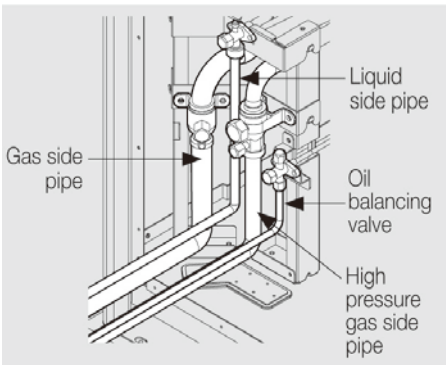
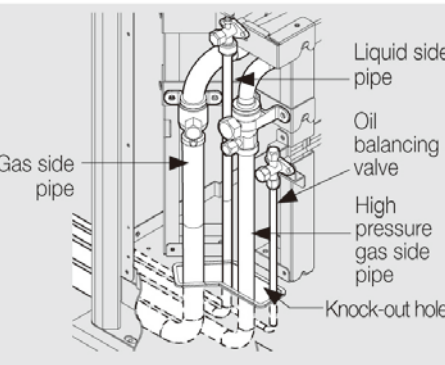
- Note**
- When using A~J type of Outdoor joint, connect the Outdoor joint to the pipe with provided reducer.
 - When using K~Z type of Outdoor joint, connect the Outdoor joint to the pipe by cutting provided reducer properly.

4-6. Installing the Branch Pipe for the Outdoor Unit

1) Connecting the outdoor unit pipe

Heat Pump	Connection from front side	Connection from bottom at the left/right side Working process
Working process	- First, remove the cover from unit. - Separate the knock-out hole to use. If the hole is open, small animals such as squirrels and rats may get into the unit through the hole and the unit may be damaged. - Fix the pipe cover of bottom side and fix the pipe cover of upper side thereafter.	- Separate the knock-out hole at the bottom side of the unit and install the pipe. - After installing and insulating the pipe, close up the remaining gap. If the gap is remain open, small animals such as rats and squirrels may get inside the unit and cause damage to the unit.
Single Installation	 This diagram shows the front-side connection for a single installation. It labels the 'Gas side pipe' entering from the bottom left, the 'Liquid side pipe' entering from the top right, and the 'Oil balancing valve' located between them. The pipes are connected to the outdoor unit's service ports.	 This diagram shows the bottom-side connection for a single installation. It labels the 'Gas side pipe' entering from the bottom left, the 'Liquid side pipe' entering from the top right, the 'Oil balancing valve' between them, and a 'Knock-out hole' at the bottom of the unit's casing.
Combination installation	 This diagram shows the front-side connection for a combination installation. It labels the 'Gas side pipe' entering from the bottom left, the 'Liquid side pipe' entering from the top right, and the 'Oil balancing valve' between them. The pipes are connected to the outdoor unit's service ports.	 This diagram shows the bottom-side connection for a combination installation. It labels the 'Gas side pipe' entering from the bottom left, the 'Liquid side pipe' entering from the top right, the 'Oil balancing valve' between them, and a 'Knock-out hole' at the bottom of the unit's casing.

3. Guideline for each installation process

Heat Recovery	Connection from front side	Connection from bottom at the left/right side
Single Installation	 Labels: Gas side pipe, Liquid side pipe, Oil balancing valve, High pressure gas side pipe	 Labels: Gas side pipe, Liquid side pipe, High pressure gas side pipe, Knock-out hole
Combination installation	 Labels: Gas side pipe, Liquid side pipe, Oil balancing valve, High pressure gas side pipe	 Labels: Gas side pipe, Liquid side pipe, Oil balancing valve, High pressure gas side pipe, Knock-out hole



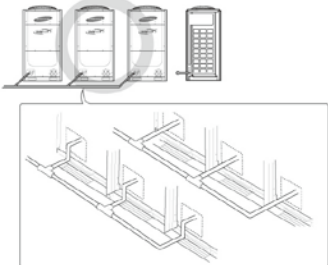
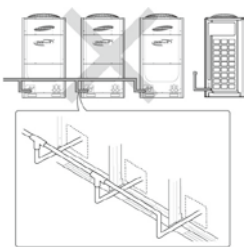
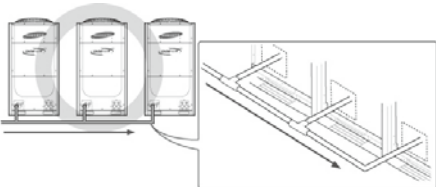
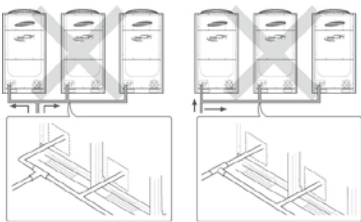
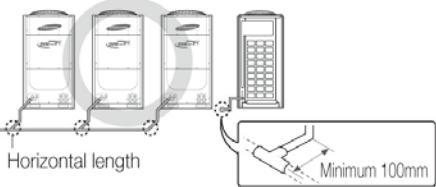
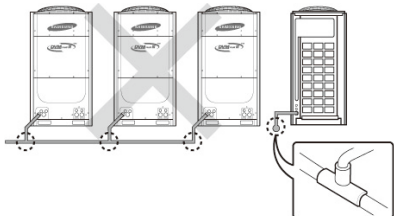
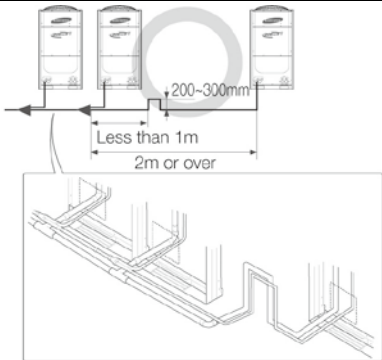
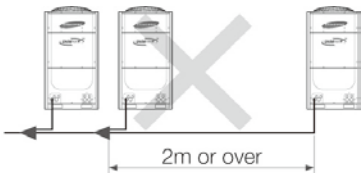
Cautions

Caution for connecting the pipe

- When connecting the pipe to the unit, the unit may get damaged by a brazing fire and a flame.
Use a flame proofing cloth to protect the unit from a brazing fire or flame. Ambient air temperature sensor for detecting outside temperature is located on the left side of the welding part. Make sure not to damage the temperature sensor when welding it.
- The O-ring and Teflon packing inside service valve may get damaged by a welding fire. Wrap the bottom side of the service valve with a wet cloth and weld it as shown above. Make sure not to interrupt the brazing with the drops of the wet cloth.
- The connecting pipes of liquid side and gas side should not contact each other. Vibration may cause a damage to the pipes.

2) Piping works among outdoor units

- The additional branch joints are needed for module installation of the outdoor units.
- When outdoor units are installed in module, there is no designation of outdoor unit's location according to capacity.
- The connected piping should be positioned at the same or lower level with pipe cover hole.

Cautions	Correct piping work	Wrong piping work
The refrigerant piping should be the same level or lower than connecting position of piping to outdoor units.		
Piping work should be run with side direction for better uniform distribution of refrigerant and oil like next diagram.		
Outdoor joint kits should be installed in a horizontal direction, even it is a low pressure pipe.		
When the piping length between outdoor and branch joints is 2m or more, a vertical trap has to be installed like right diagram.		

3. Guideline for each installation process

4-7. Brazing

1) Nitrogen substituted welding

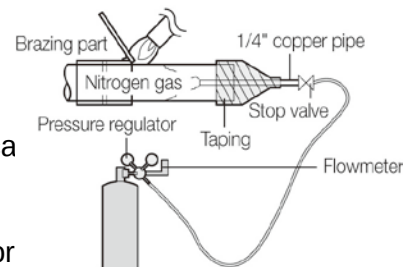
(1) Perform nitrogen substituted brazing works.

► Brazing the pipe

- Make sure that there is no moisture inside the pipe.
- Make sure that there are no foreign materials and impurities in the pipe.
- Make sure that there is no leak.
- Make sure to follow the instruction when brazing the pipe.

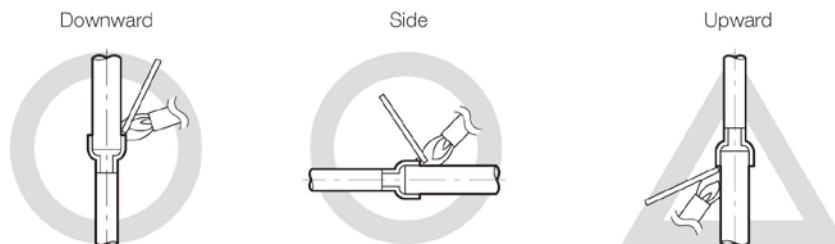
The use of Nitrogen gas

- ① Use Nitrogen gas when brazing the pipes as shown in the picture.
- ② If you do not use Nitrogen gas when brazing the pipes, oxide may form inside the pipe. It can cause the damage of the compressor, valves.
- ③ Adjust the flow rate of the Nitrogen gas with a pressure regulator to maintain 0.05m³/h or



Direction of the pipe when brazing

- Performing the brazing of the pipe should be headed downward or horizontally.



Note Avoid brazing the pipe upward.



Nitrogen substitution for prevention of copper pipe corrosions

2) Comparison with a case without nitrogen substitution



With Nitrogen substitution

Without Nitrogen substitution

3) Precautions for pipe-to-pipe brazing works

Brazing work should be carried out either downwards or sideways.

An upward direction should be avoided wherever possible(to prevent leakage.)



CAUTION

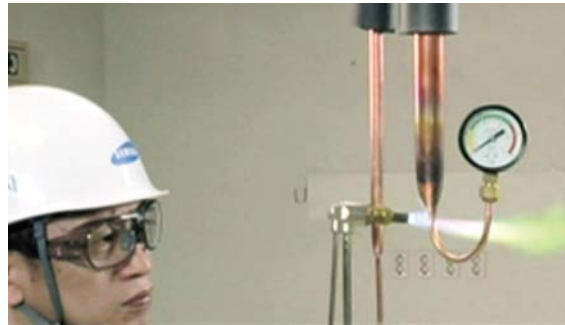
1. Generally expending pipe brazing is performed with pan-coil type copper pipe, and socket blazing is performed with straight copper pipe.
2. Do not perform flare part brazing or butt-brazing.
3. Brazing should be performed on welding table.
4. No dust should enter in the pipe while brazing.
5. Distance of copper pipe support spacing is within 1~2m.
6. The copper pipe should not be secured directly by metal brackets.

3. Guideline for each installation process

4-8. Nitrogen Pressurization Test

1) Leakage test

Perform individual finishing of the liquid/gas pipe or connect the liquid/gas pipes for pinching and brazing.



Air tightness test

Nitrogen pressurization, 4MPa



No change in the gauge for 24 hours



41kgf/cm²(4.1Mpa)pressure maintained

Maintains 4Mpa for 24 hours. If no leakage, then pressure down to 1MPa.

Maintain 1Mpa until connecting the outdoor/indoor units. Prevent corrosion in the copper pipes.



Maintain a pressure of 10kgf/cm² (1Mpa)

5. Refrigerant pipe flushing

Flushing is a method of cleaning extraneous matter out of pipes using pressurized gas.

[3 major effects]

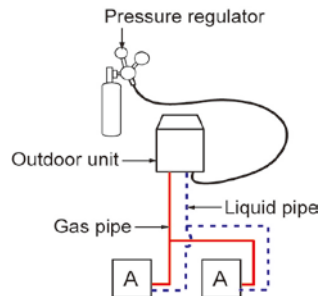
- (1) Removal of oxidation bubbles formed inside copper pipes when “nitrogen replacement is insufficient” during brazing work
- (2) Removal of extraneous material and moisture from pipes when covering has been insufficient
- (3) Check connection in pipes linking outdoor and indoor units (Both liquid and gas pipes)

[Example of procedure]

- (1) Set pressure regulator on nitrogen cylinder.

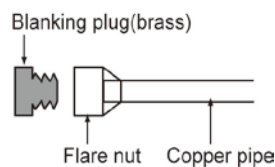
*The gas used must be nitrogen.

(There is a danger of condensation if freon or carbon dioxide are used and oxygen carries the risk of explosions.)

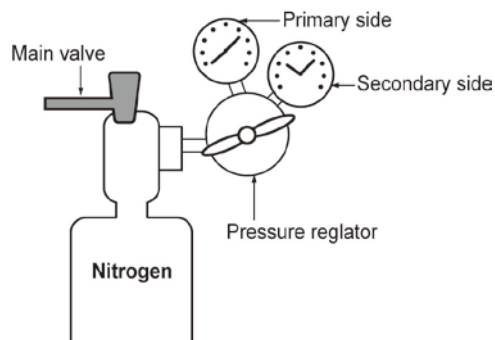


- (2) Connect the charge hose from the pressure regulator to the service port on the liquid pipe side of the outdoor unit.

- (3) Fit blanking plugs to all indoor units (B) other than unit A.



- (4) Open the main valve on the nitrogen cylinder and set the pressure regulator to 72 psi.



3. Guideline for each installation process

(5) Check that the nitrogen is passing through the unit A liquid pipe.

(6) Flushing.

① Block the end of the pipe with the insulation of your hand.



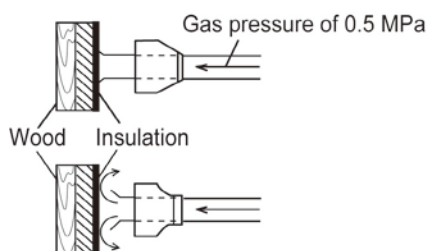
② When the gas pressure becomes too great to contain remove insulation quickly. (First flush)



③ Block the end of the pipe with insulation again.



(Carry out second flushing)



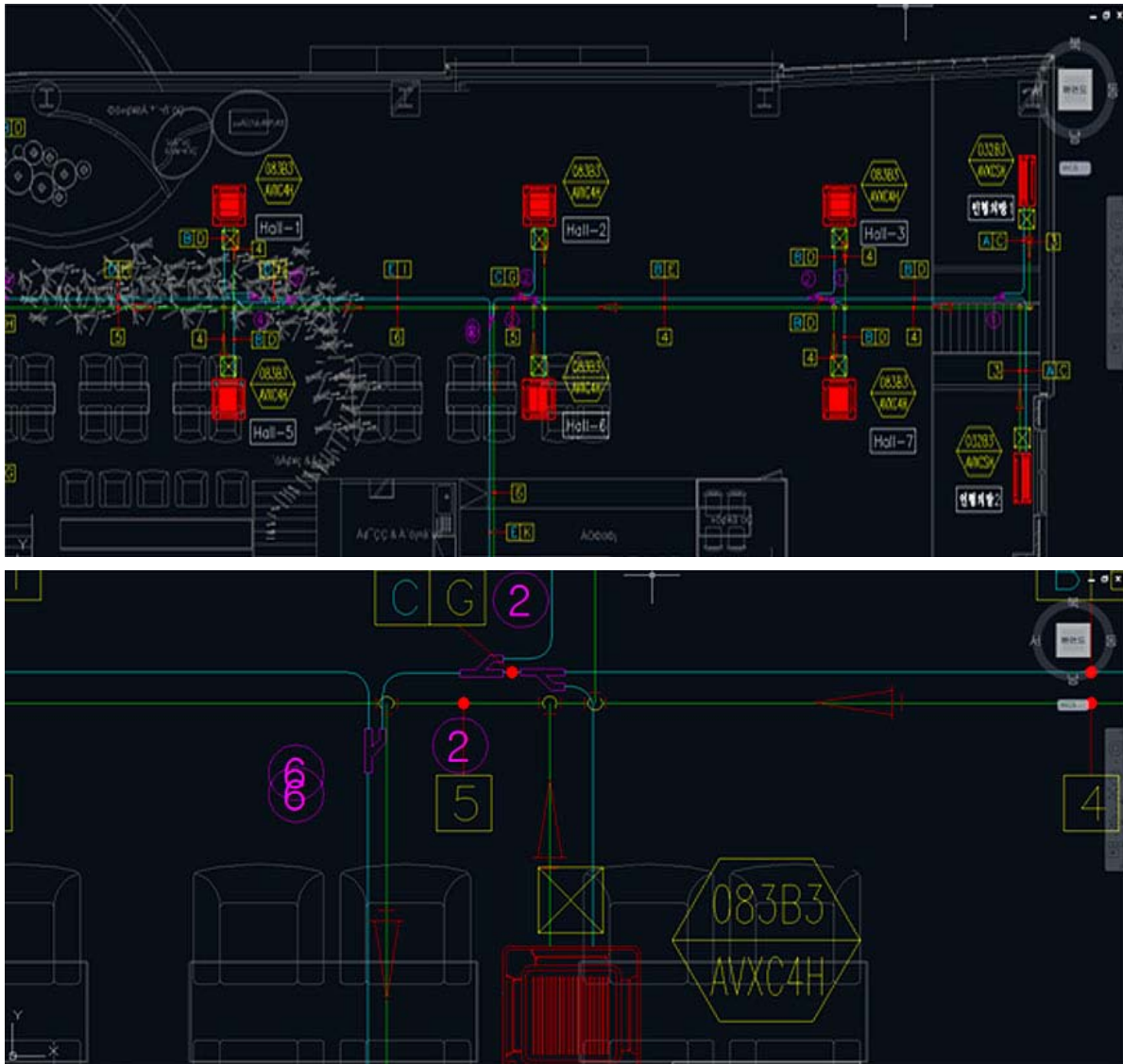
(The nature and amount of the extraneous material inside the pipe can be checked during flushing by placing a rag lightly over the end of the pipe. In the unlikely case that even a small quantity of moisture is found then the inside of the pipe should be dried out thoroughly.)

Action:

- ① Flush the inside of the pipe with nitrogen gas. (Until such time as the moisture disappears.)
- ② Carry out a thorough vacuum drying operation. (See page 34)
 - _ Close the main valve on the nitrogen cylinder.
 - _ Repeat the above operation for unit B.
 - _ When the liquid pipe operations have been completed then do the same with the gas pipes.

6. Drainpipe Work

6-1. Diagram Review



1) On the diagram check the locations of the horizontal, branch and vertical pipes.

(1) What is a horizontal pipe?

It is a drainpipe where the drainpipes from the indoor unit are merged.

(2) What is a branch pipe?

It is a drainpipe from an indoor unit to a horizontal pipe..

(3) What is a vertical pipe?

It is a vertical drainpipe that a horizontal pipe is connected for drain purpose.

3. Guideline for each installation process

2) On the diagram, check the location of the hanger for the drainpipe.

- (1) Due to the weight of the drainpipe and the condensed water, it can cause bending. The hangers should be separated by 1 to 1.5 meters.

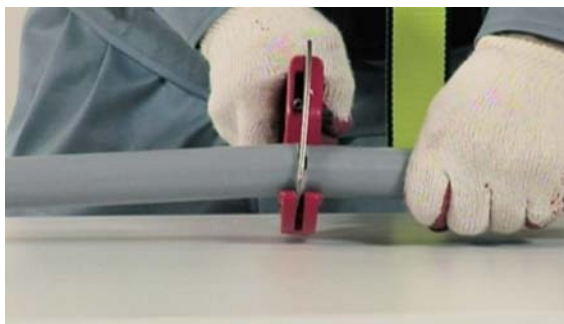
3) Check the drainpipe diameter (horizontal, branch, vertical pipe) on the diagram.

4) Review installation of a horizontal pipe first.

Install a branch pipe after installing an indoor unit. (Since the drainpipe location and direction could be changed.)

6-2. Drainpipe Cutting and Insulation

1) Cut the drainpipe as its dimension and size are shown in the diagram.



Use a specialized cutter for drainpipe

2) Use a special cutter for the PVC pipes. A PVC pipe cutter is shown in the following.



(PVC pipe cutter photo)

3) Insulate the drainpipe that is cut. (Thickness of 5~10T, attach a photo of inserted insulation materials)



Inserting the drainpipe insulation material

- (1) The drainpipe insulation materials should be non-flammable.
- (2) Recommended insulation thickness is 5~10T and select the desirable insulation thickness according to the humidity/temperature of the ceiling.

3. Guideline for each installation process

6-3. Mounting the Drainpipes

1) Mount a horizontal pipe in the hanger.



Cutting and mounting the drainpipe

2) Perform 1/100 slope works on the horizontal pipe in the direction of the vertical pipe. (Discharge the condensed water.)



Checking the slope



1/100 or more downward slope

6-4. Connecting the Drainpipe

- 1) At the area where the branch pipe is connected to the horizontal pipe, use a T-joint to make connections between the horizontal pipe & branch pipe.



- 2) A T-joint should be faced upward.



 **Precaution:** T-joints should not be connected horizontally.

- 3) When you connect the horizontal pipe to the vertical pipe, do not make horizontal connections.

Because the condensed water flowing from the upper area of the vertical pipe can back-flow into the horizontal pipe.

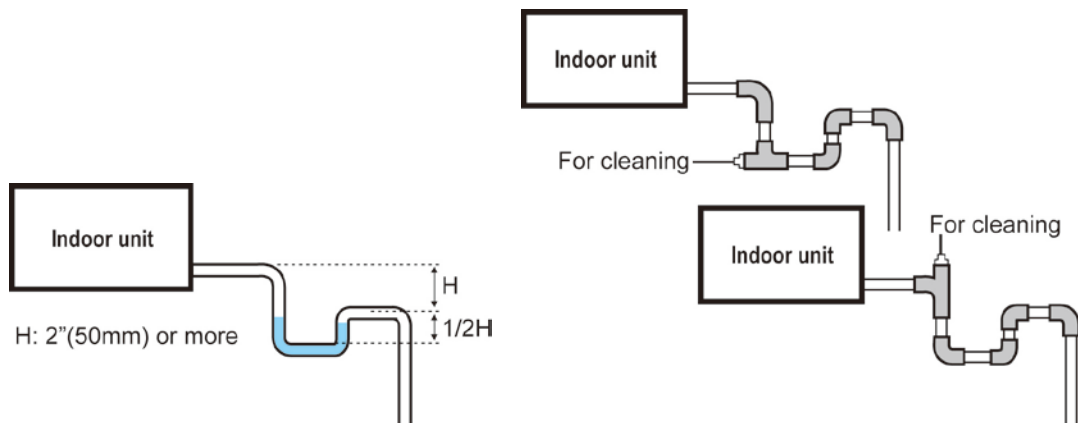


No horizontal connection from the horizontal pipe to the vertical pipe

(2) Indoor unit without a drain pump

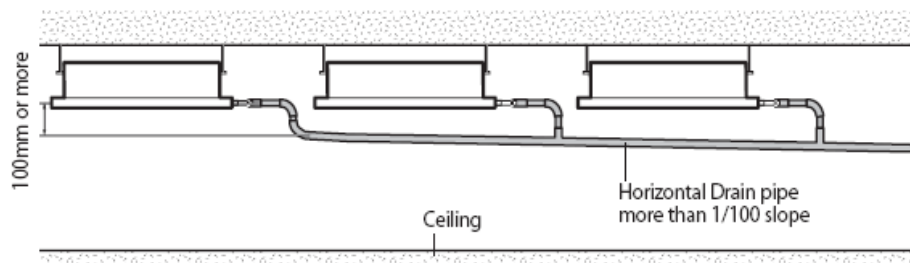
- ① Form a reverse flow prevention P or U-trap on the pipe coming from the indoor unit.

P-Trap, U-Trap pipe photo inserted here.

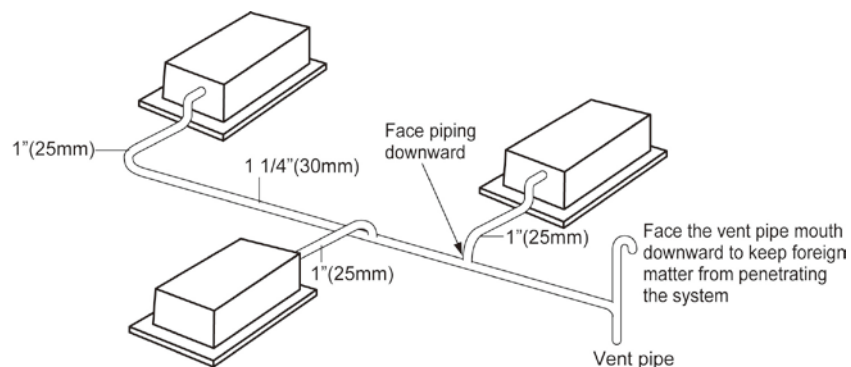


- ② An air-vent should be installed on the indoor unit side and located higher than the drainpipe height.

AVXDD**



- ③ Or, install an air vent on the vertical pipe.



3. Guideline for each installation process

6-5. Drainpipe Combination and Bonding

- 1) Apply PVC glue to the joint area and wait for one to two minutes before combining them.



6-6. Drainpipe Water Soaking Test

- 1) Pour the water through the uppermost drainpipe or an air vent to check if the water flows smoothly. After that, for twenty-four hours, perform water soaking test to test leakages. In this test, the amount of water injection should be same as the amount of water discharge.
- 2) In the winter, use anti-freezing liquid instead of water.
- 3) If the water discharge is not smooth, recheck the tilt of the drainpipe.



Drain water soaking test



Check for leakages after 24 hours



Check for leakages after 24 hours.

6-7. Insulation Material Finishing.

1) In a water soaking test, if there is no leakage, then insulate the bonded areas.



Insulating bonded/joint area of Drainpipe

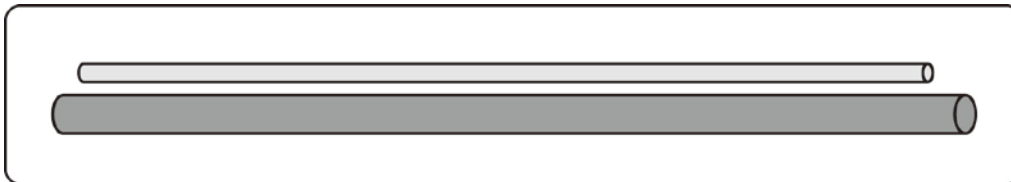
3. Guideline for each installation process

7. Insulation work

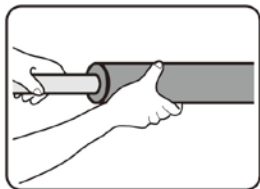
7-1. Purposes of Insulation and Piping

- (1) Explain the purposes.
- (2) List the pipes to be insulated.
 - ① Refrigerant pipe
 - ② Branch pipe
 - ③ Drainpipe

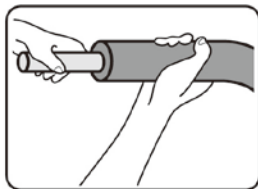
7-2. Insulation Method (Procedure)



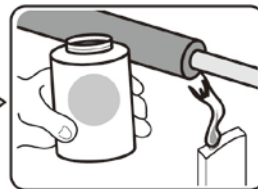
① Operational steps



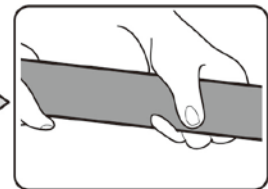
- ① EPDM length should be longer than pipe length. Do not extend EPDM by force



- ② Put the pipe in EPDM insulation carefully so that the pipe will not get damaged with EPDM.

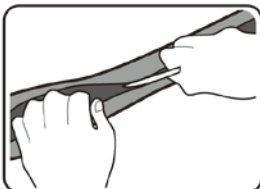


- ③ Apply bond on both side of cut surface. Make sure to use the correct type of bond for EPDM cut surface attaching.

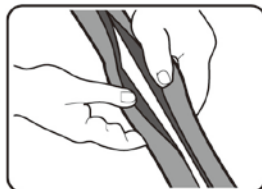


- ④ Dry it until it becomes thick, sticky and does not get detached.

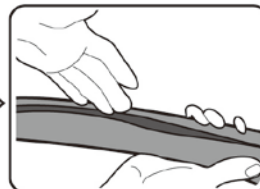
② Bending vertical side of insulation



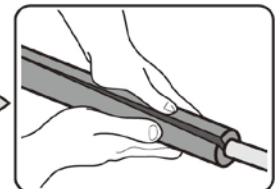
Use the original uncut insulation material.



Only in special case is the vertical cutting of the insulation allowed.

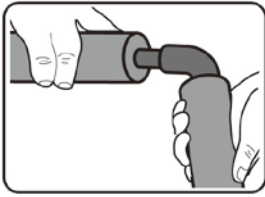


Apply bond both sides of the surface of EPDM and press them together for long lasting bonding.

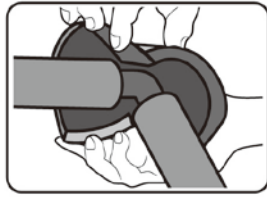


Dry it until it becomes thick and sticky.

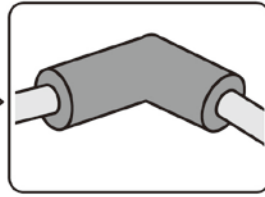
③ 'L' Fitting connection part insulation



All of the fitting connecting parts should be insulated. Bring face to face the each end of EPDM on fitting connection part.



Make fitting cover to fit the EPDM insulation. Fitting cover should be overlapped with insulation min 1inch(2.5cm).



Bond the both cutting sides of fitting cover.

- ① Insertion type: general insulation method
- ② Partitioning: Vertical insertion type
- ③ Elbow & edge area insulation methods

3. Guideline for each installation process

8. Gas leak test

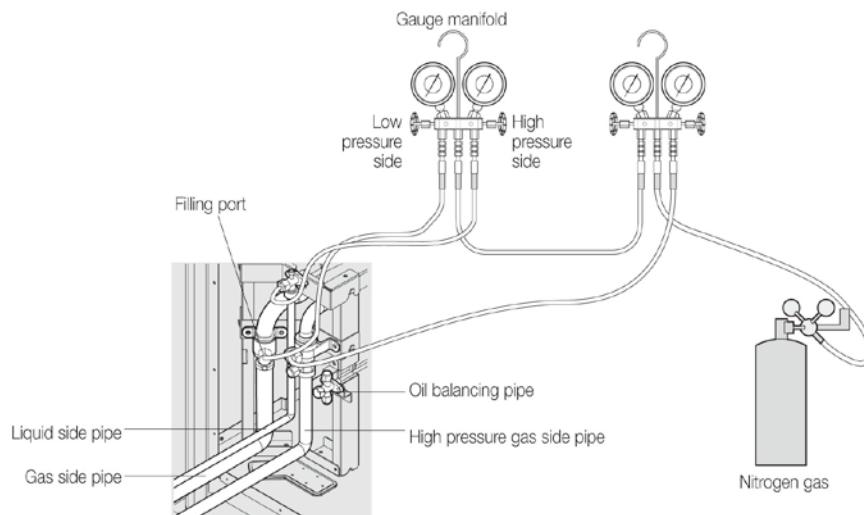
8-1. Purposes

1) Leakage test step

- (1) 1st leakage test: After installing the pipe and the branch pipe, use Nitrogen at 4Mpa for testing.
→ Maintain 1Mpa.
- (2) 2nd leakage test: After connecting the pipe to the outdoor/indoor unit, use Nitrogen at 4Mpa for testing.

2) Detect leakages that can occur while connecting the pipe to the outdoor/indoor units.

3) 1st leakage test is completed, so now proceed with the 2nd leakage test.



8-2. Procedures (HR Module Installation Standard)

1) Before starting

- (1) Check if all the service valves are closed (liquid, gas, high pressure gas, Oil Equalizing pipes).
- (2) When using a nitrogen charging container, install pressure control regulator.
- (3) R410a gauge manifold – minimum 4 units, manifold hoses – five units or more.

2) The following pipes should pass a leakage test.

- (1) Liquid pipe
- (2) Gas pipe
- (3) High-pressure gas pipe
- (4) Oil Equalizing pipe

3) Connect the prepared two manifold gauges and five hoses as shown below and connect to each service valve.

- (1) If due to the shortage of manifold gauge, you can't test all the equal oil pipes at the same time, then first test the three main pipes and perform final tests.

4) Pressure up the inner area of the pipe to 4.1MPa for a leakage test and maintain the pressure for 24 hours.

5) If there is no leakage for 24 hours, then depressurize to 1Mpa and maintain the pressure. The reason is to prevent corrosion in the pipes.

3. Guideline for each installation process

9. Vacuum drying

9-1. Purposes

Using vacuum drying, the moisture inside the product or pipe can be evaporated.

9-2. Procedure (HR Modulation Installation Standard)

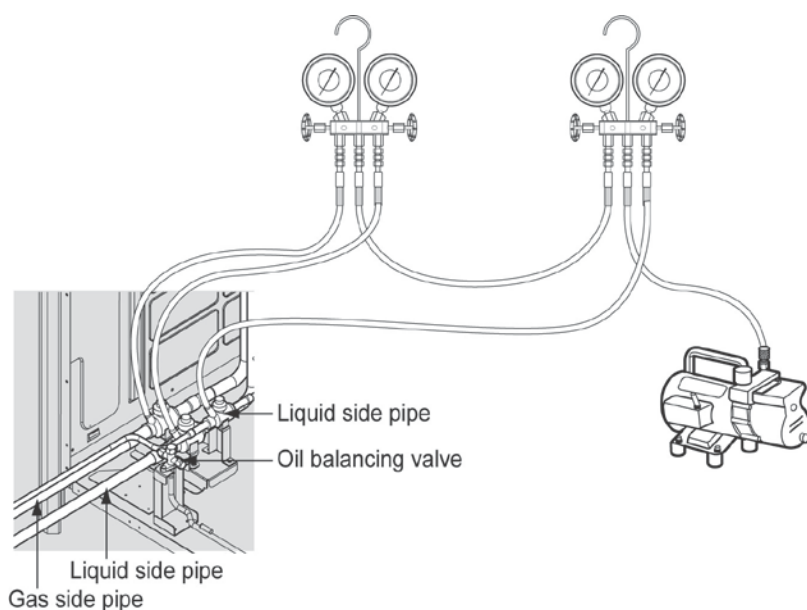
1) Before starting

- (1) Check if the second air tight test (outdoor unit, MCU, indoor unit pipes are all connected.).
- (2) After the second air tight test, check if the pressure is down to 1Mpa and check if there is any leakage of nitrogen gas.
- (3) Minimum two sets of R410a gauge manifolds, five or more manifold hoses, more than one vacuum pump.
- (4) Power up the indoor/outdoor unit. In case of HR, if the power is not on, then all the valves inside the MCU are closed. So the vacuum may not be achieved by using the S/V of the outdoor unit.

2) Connect the gauge manifold to achieve a vacuum for the following pipes.

- (1) Liquid pipe
- (2) Gas pipe
- (3) High-pressure gas pipe
- (4) Oil Equalizing pipe
(If the manifold can't achieve a perfect vacuum, then purge it with refrigerants.)

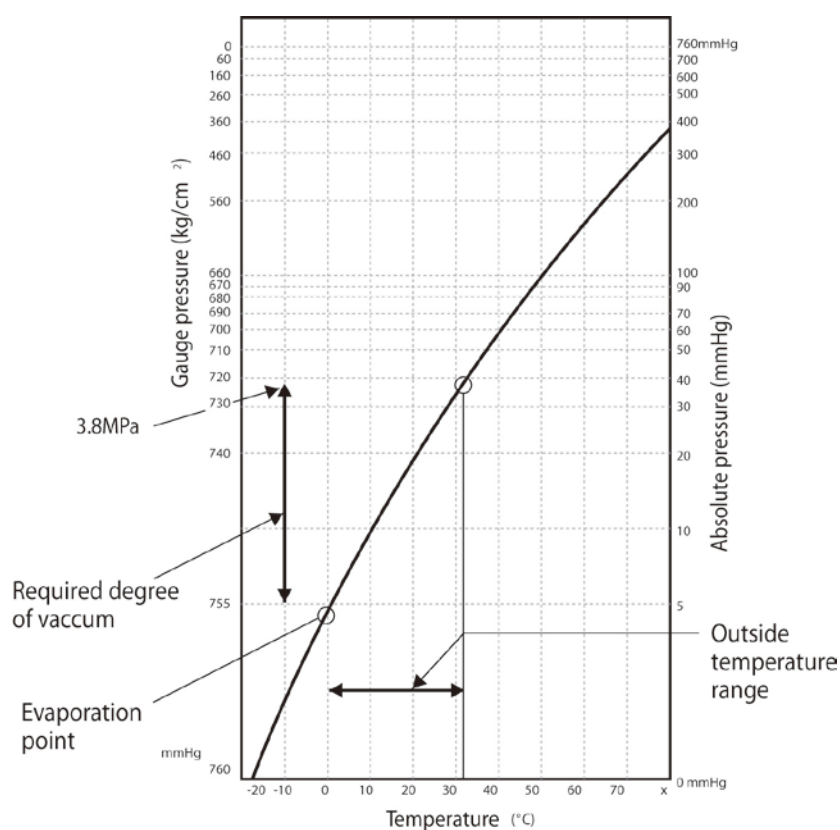
3) Connect the prepared two manifold gauges and five hoses as shown below and connect to each service valve.



- (1) Connect a hose to the liquid/gas/high pressure gas pipes and make the vacuum with a vacuum pump.
- (2) The equal oil pipe has gas type of refrigerants. Purge oxygen inside the equal oil pipe.
- (3) Compare the external temperature with the temperature below. Keep the vacuum until the gauge pressure reaches the value in the below table. (For more than 2-and-a-half hours)

Boiling point of water(°C)	Gauge pressure		
	mmHg	Pa	Torr
40	-705	7333	55
30	-724	4800	36
26.7	-735	3333	25
24.4	-738	3066	22
22.2	-740	2668	20
20.6	-742	240	18
17.8	-745	2000	15
15.0	-747	1733	13
11.7	-750	1333	10
7.2	-752	1066	8
0	-755	667	5

Have been achieved in the vacuum drying operation



- (4) After making the vacuum, check if the gauge pressure has changed. If no change is found, then move to the additional refrigerant charging phase.

3. Guideline for each installation process

10. Charging Refrigerant

10-1. Purposes

Add an additional amount of refrigerant for the installed pipe length to guarantee product performance and reliability.

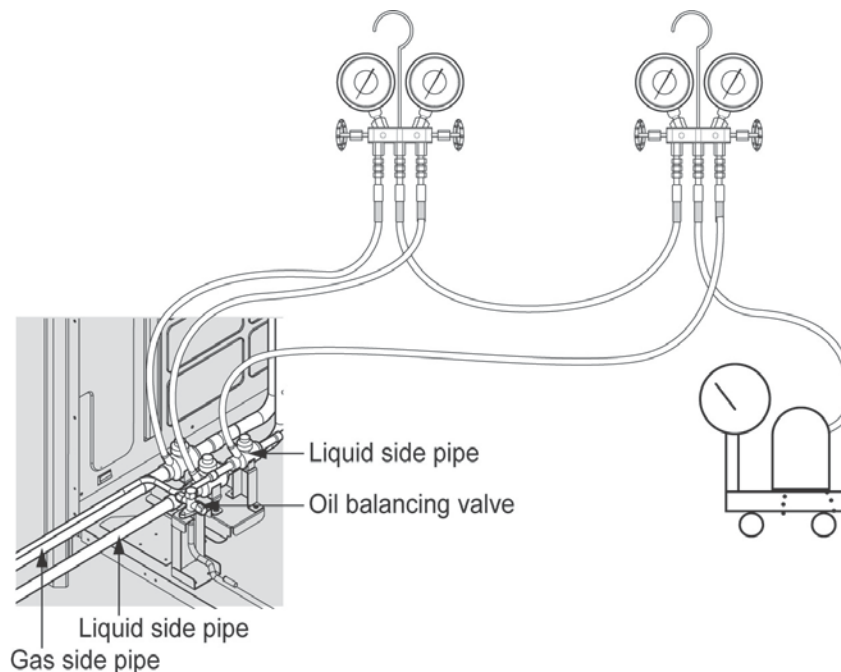
The additional amount of refrigerant varies depending on the product, the liquid pipe diameter and so on, so you must check the installation manual before proceeding.

10-2. Procedures (HR Module Installation Standards)

1) Before starting

- (1) Check the necessary amount of additional refrigerant injection depending on the liquid pipe diameter.
- (2) Check the liquid pipe length for the system.
- (3) Based on the above value, calculate the additional amount of refrigerant.
- (4) Prepare an electronic scale and refrigerants.

2) As shown below, prepare a gauge manifold, a refrigerant box and an electronic scale.



- (1) Connect a refrigerant box to the manifold gauge.
- (2) Since oxygen exists in the hose between the gauge manifold and the refrigerant box, open the refrigerant box valve to purge oxygen from the hose.
- (3) Place the refrigerant box on top of the electronic scale.
- (4) If it is a commercial product (sales with 11kg), then turn the refrigerant box upside down to place it on top of the electronic scale. If the refrigerant box type is chargeable (multiple use), then you don't need to turn it upside down as long as the gauge manifold is connected to the liquid valve of the refrigerant box. If not connected, then turn it upside down before placing it on the electronic scale.

The reason is because you want to inject **liquid** refrigerants.

3) Inject the amount of refrigerant calculated above.

- (1) Open the gauge manifold and check the amount of refrigerant injection.
- (2) If entire refrigerant flows in smoothly, then turn off the valve and separate the gauge manifold from the system.
- (3) If the pipe is too long and entire refrigerant can't be injected, then perform cooling operation to gradually inject the refrigerant.

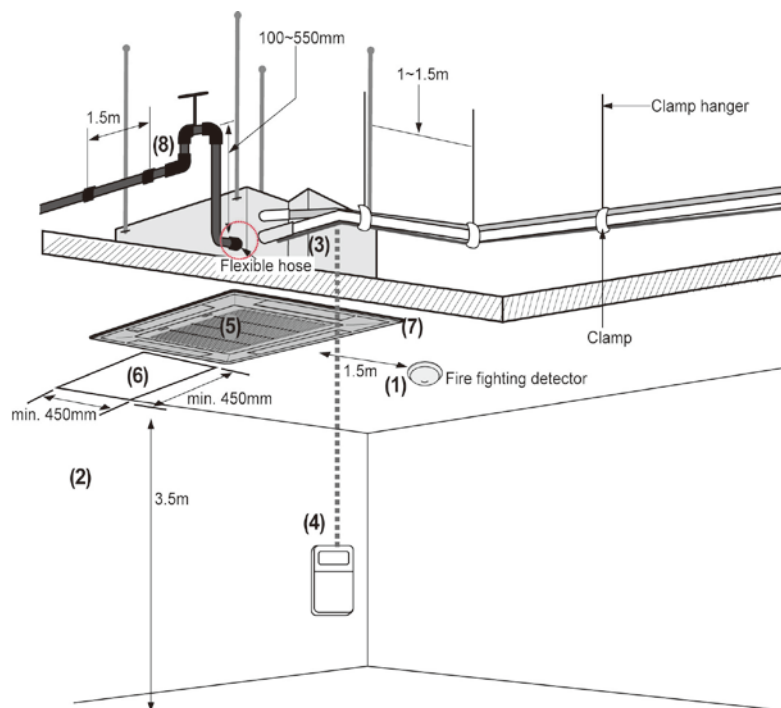
4. Indoor Units installation

1. Ceiling Cassette Type (1WAY/2WAY/4WAY)



1-1. Installation Standard

- The installation location and direction of the indoor unit should be determined based on the relationship with various other processes such as the refrigerant pipe, the drainpipe and the power/communication cables and they should meet various requirements for other facilities (firefighting facilities etc.).



- (1) Firefighting detector 1.5m, Projection 2m separation required.



1.5m of separation



Avoid installation in the direction of discharge

- (2) 4-way indoor unit height limited



<Long fall KIT front/rear>

Installation within 3.5m ※ If the height limit is exceeded, the cooling/heating power can deteriorate.

Use a long fall kit, install up to 5.2m.

- (3) Prohibited installation in contact with the power/comm cable and the refrigerant pipe



Using a cable tie, fix the upper area for the full thread bolts fixing the pipe hanger. Maintain a distance from the pipe. Attach a wire display label to prevent mix up between power and comm cables.

4. Indoor Units installation

(4) Y terminal construction for wired remote controller installation.



<Terminal not used>



<Y terminal used>

If constructed without a terminal, they are likely to make contact with the power cable and damage the PCB.

(5) Indoor unit's ring terminal construction



<Terminal not used/Y terminal used>

Indoor unit's terminal not used and Y terminal used
Slipping out can lead to a short circuit fault.



<Ring terminal used>

(6) Inspection hole installation

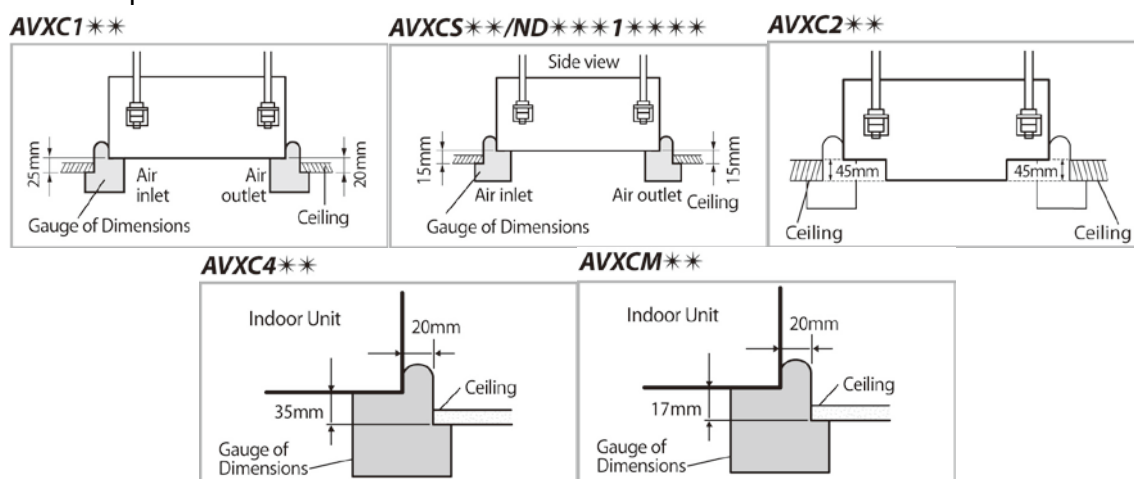


- If the ceiling is made of plaster boards, depending on the internal ceiling height, install an inspection hole.

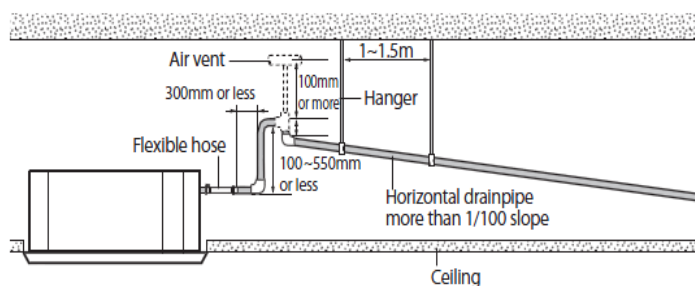
(If the ceiling is made of separable single sheet textile, no additional inspection hole is required.)

(Inspection hole basic size: 450X450)

(7) Decoration panel installation

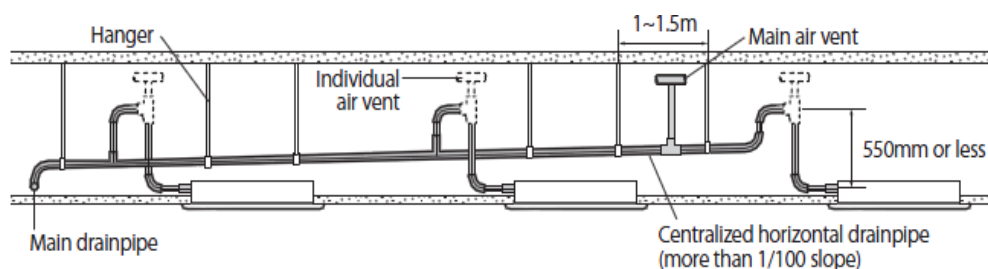


(8) Drain installation



- ① The drainpipe should be installed within 100mm from the flexible hose, lift up from 100mm to 550mm and lift down 20mm or more.
- ② Install horizontal drainpipe with a slope of 1/100 or more and fix it by hanger space of 1~1.5m.
- ③ Install the air vent in the horizontal drainpipe to prevent water flow back to the indoor unit.
- You may not need to install it if there were proper slope in the horizontal drainpipe.
- ④ The flexible hose should not be installed upward position, it may cause water flow back to the indoor unit.
- ⑤ Install U-trap at the end of the drainpipe to prevent a nasty smell to reach the indoor unit.

4. Indoor Units installation



- ① Install main air vent at the front of the farthest indoor unit from the main drain when installed indoor units are more than 3.
- ② You may need to install individual air vent to prevent water flow back at the top of each indoor unit drainpipe.



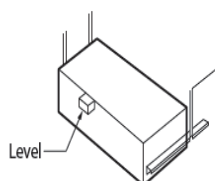
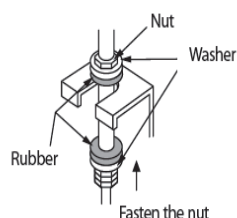
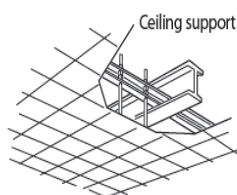
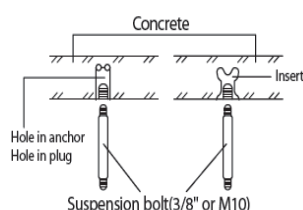
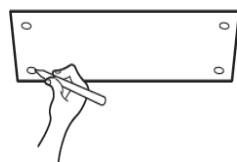
AIR-VENT interval of 10m~15m.

Drainpipe hanger fixed within **1~1.5m**.

If the interval is more than 1~1.5m, bending of the PVC pipe can cause poor water drainage.

1-2. Installation Steps

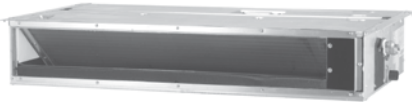
Sleeve work should be performed to make a space for passing pipe and wire through the wall or ground under construction.



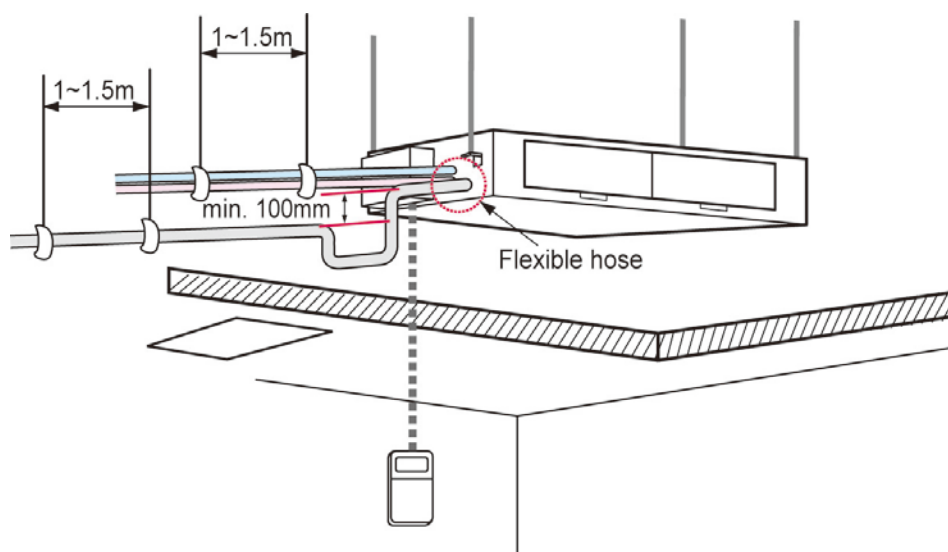
- ① Place the pattern sheet on the ceiling at the spot where you want to install the indoor unit.
 - Since the diagram is made of paper, it may shrink or stretch slightly due to temperature or humidity. For this reason, before drilling the holes maintain the correct dimensions between the markings.
- ② Insert bolt anchors, use existing ceiling supports or construct a suitable support as shown in figure.
- ③ Install the suspension bolts depending on the ceiling type.
 - ※ Ensure that the ceiling is strong enough to support the weight of the indoor unit. Before hanging the unit, test the strength of each attached suspension bolt.
 - If the length of suspension bolt is more than 1.5m, it is required to prevent vibration.
- ④ Screw eight nuts to the suspension bolts making space for hanging the indoor unit.
 - ※ You must install the suspension bolts more than four when installing the indoor unit.
- ⑤ Check the level of the indoor unit by using a leveler. A tilt of the indoor unit may cause malfunction of a built-in float switch and water leaks.
- ⑥ Adjust the height of the indoor unit by using the gauge of dimensions.
 - You should adjust the gauge of dimensions and the pattern sheet to fit the cutting dimensions of ceiling.
 - Make sure that the indoor unit is installed at a level if the indoor unit slants too much, there can be water leaks.
- ⑦ Tighten the upper part nuts
- ⑧ Remove the gauge of dimensions after installing the indoor unit.

4. Indoor Units installation

2. Duct Type (Slim/MSP)

Type	Slim Duct	MSP Duct
Product		
Model	AVXDSH022/028/036/040/045 /056/071/090/112/140**	AVXDUH056/071/090/ 112/128/140**

2-1. Installation Standard



2-2. Selecting the Installation

- (1) There must be no obstacles near the air inlet and outlet.
- (2) Install the indoor unit on a ceiling that can support its weight.
- (3) Maintain sufficient clearance around the indoor unit.
- (4) Make sure that the water dripping from the drain hose runs away correctly and safely.
- (5) The indoor unit must be installed in such a way, that they are out of public access.
(Not touchable by the users)
- (6) After connecting a chamber, insulate the connection part between the indoor unit and the chamber with t10 or thicker insulation.
Otherwise, there can be air leak or dew from the connection part.
- (7) Rigid wall without vibration.
- (8) Where it is not exposed to direct sunshine.
- (9) Where the air filter can be removed and cleaned easily.

2-3. Space Requirements for Indoor Unit

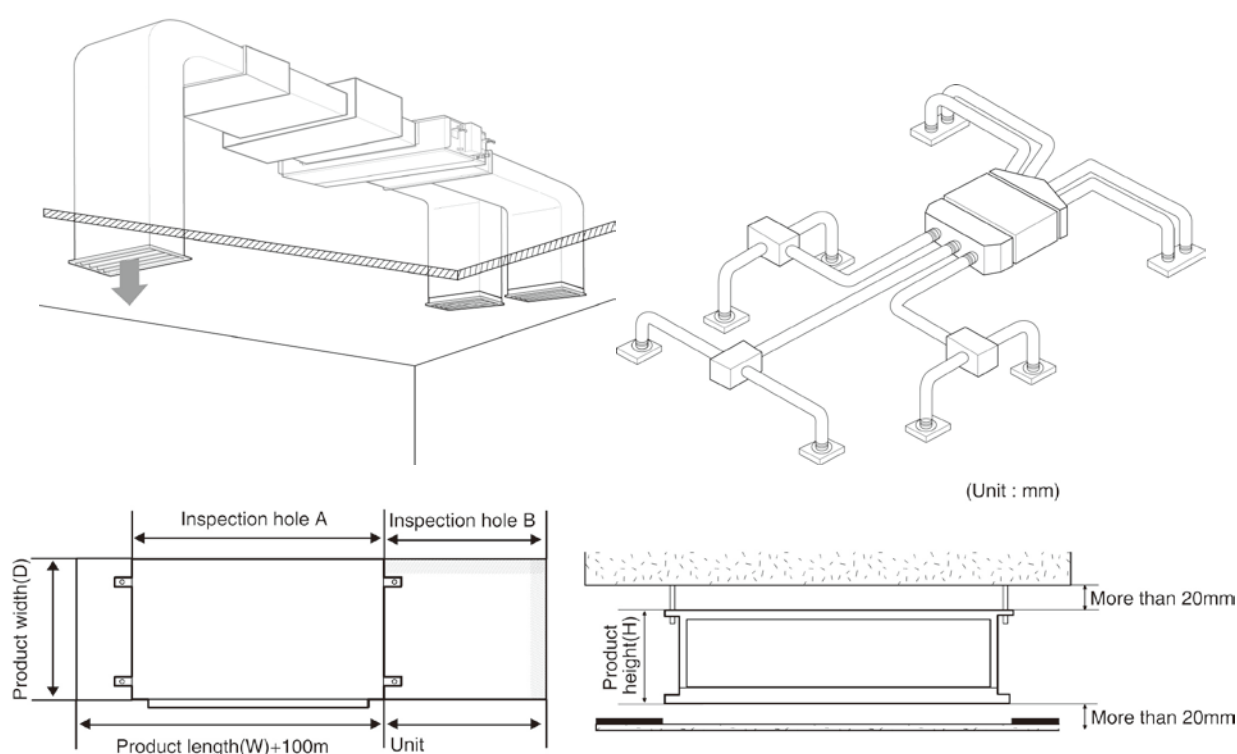
1) If the ceiling is separable to single sheets like textile, then no need to install an inspection hole.

2) If the ceiling is not separable like plaster board:

Depending on the distance between the product bottom and the ceiling top, install holes as follows.

(1) 500 mm or more from the product bottom to the ceiling top: Only install inspection hole B (PBA inspection)

(2) 500 mm or less from the product bottom to the ceiling top: Install inspection holes A, B (2)

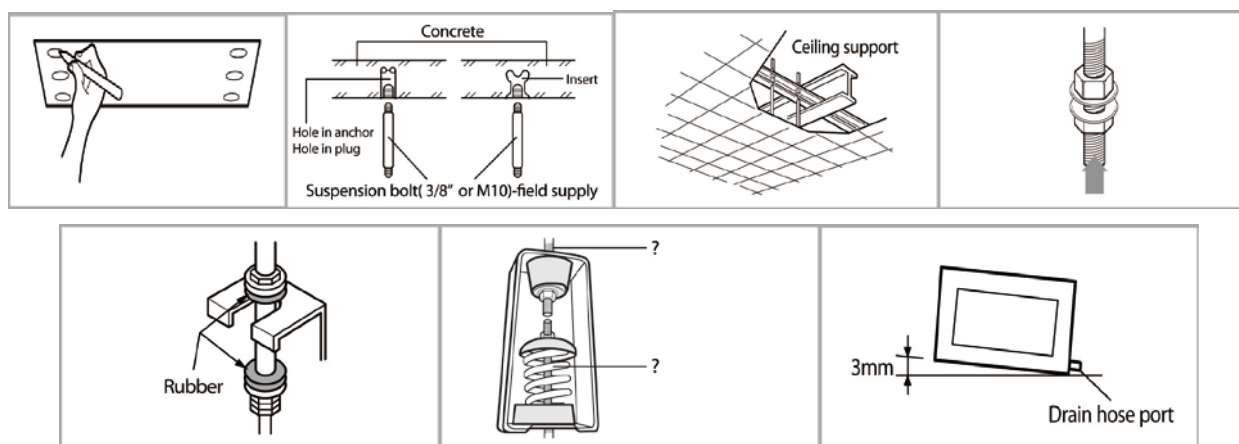


Type	Model Name	Product size (mm)			Inspection hole A (mm)		Inspection hole B (mm)	
		D	W	H	D	W+100	D	C
Slim Duct	AVXDSH022/028/036*	600	900	199	600	1000	600	500
	AVXDSH040/045/056/071*	600	1100	199	600	1200	600	
	AVXDS090/112/128/140*	690	1300	295	690	1400	690	
MSP Duct	AVXDUH056/071/090/112*	480	900/1150	260/320	480	1250	480	
	AVXDUH128/140*	650	1200	360	650	1300	650	

4. Indoor Units installation

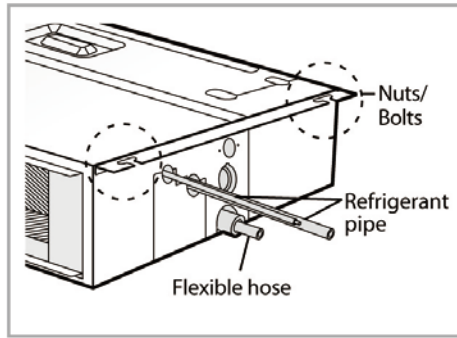
2-4. Indoor Units Installation

- 1) Place the pattern sheet on the ceiling at the spot where you want to install the indoor unit.
- 2) Insert bolt anchors, use existing ceiling supports or construct a suitable support as shown in figure.
- 3) Install the suspension bolts depending on the 3 the ceiling type.
- 4) Screw eight nuts to the suspension bolts making space for hanging the indoor unit.
- 5) Hang the indoor unit to the suspension bolts between two nuts.
- (1) Small: The opposite side of the drainpipe is 3 mm higher than the drain side.
- (2) Large: The opposite side of the drainpipe is 5 mm higher than the drain side.
- 6) If the ceiling bottom is likely to generate vibration due to indoor unit installation, then install an additional spring mount when installing the ceiling base bolts.
- 7) Screw the nuts to suspend the unit.
- 8) Adjust level of the unit by using measurement plate for all 4 sides.



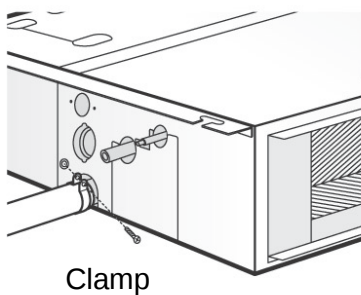
9) Installation of copper pipe

- (1) On delivery, the indoor unit is loaded with inert gas.
unscrew the pinch pipe at the end of each refrigerant pipe.
- (2) Connect the Refrigerant Pipe of units.
- (3) In order to detect basic refrigerant leaks, before recreating the vacuum and re-circulating the R410A, it's responsibility of installer to pressurize the whole system with nitrogen (using a pressure regulator) at a pressure above 4.1MPa (gauge).

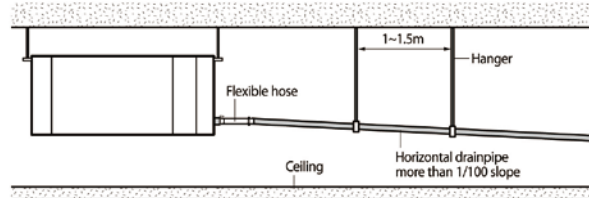


10) Install drainpipe and drain hose.

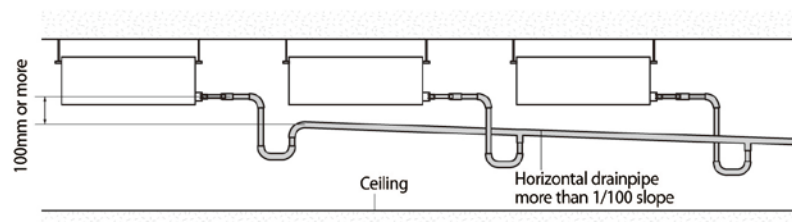
(1) Using a flexible hose clamp, fix the flexible hose.



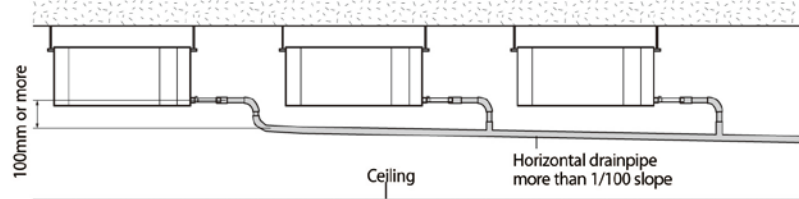
(2) Without the drain pump



MSP Duct

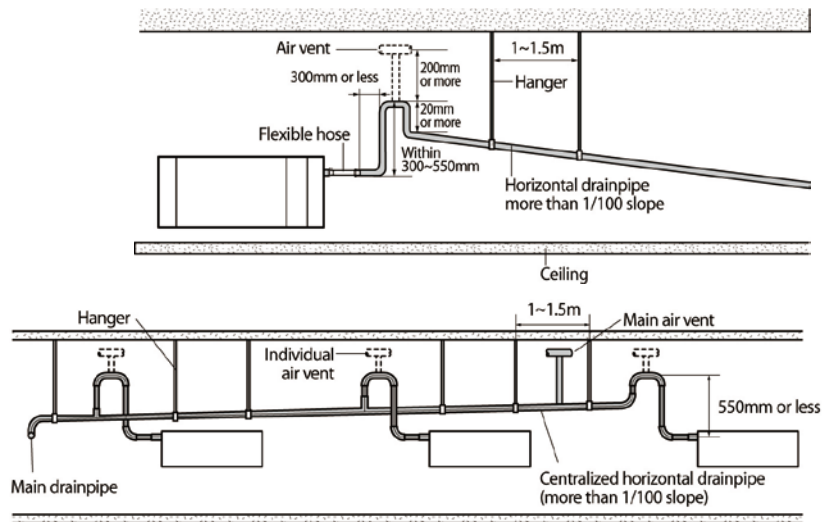


Slim Duct

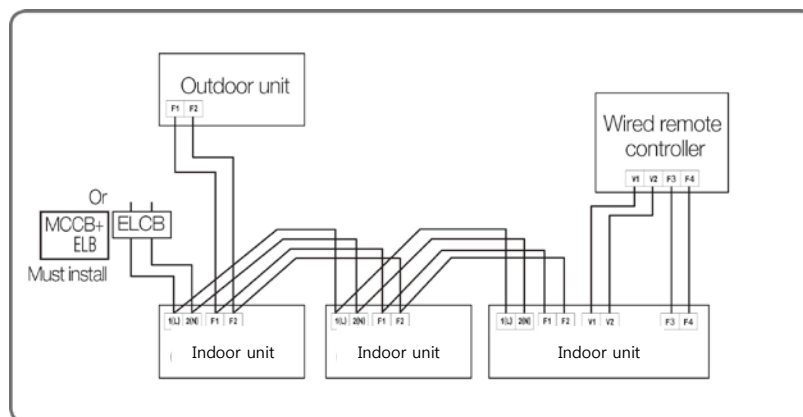


4. Indoor Units installation

(3)With the drain pump



11) Power and communication cable connection



- ❖ Use Y-type thimble for the Communication Connection (Outdoor to Indoor unit / Indoor to Indoor unit) & for Wired remote connection.
- ❖ Use Ring Type thimble for the power connection to the indoor unit.

2-5. Precaution with Duct type

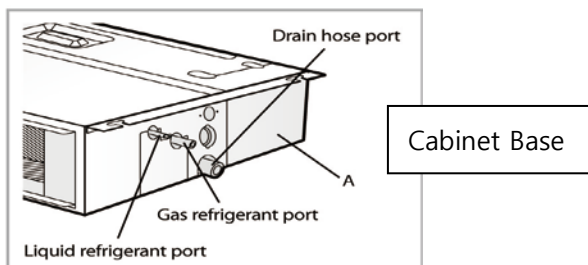
- 1) The suction side should have at least the same cross sectional area as the discharge side. (1.2 times or higher recommended)**
- 2) Diffuser suction/discharge wind speed(->wind velocity) : 3 m/s or less**
- 3) Duct's curvature radius should be greater than the circular duct diameter
→ wind(-> airflow rate), noises problems**
- 4) Design and construction pursuant to the duct design pressure standard**
- 5) Use of a suction/discharge chamber containing soundproofing materials**
→ To minimize the air flow noise, attach a suction/discharge chamber with built-in soundproofing materials.
- 6) When the duct suction hole is located on the ceiling, consider the performance and noise levels.**
→ Foreign substances can clog the filter.
- 7) Obey the standard for fixing a duct.**
 - Spiral 2.5m (0.5t), Flexible Duct fixed within 1.0m.
 - To prevent damage to flexible duct by the hanger band, insert a saddle or use a flexible duct hanger (band).
- 8) Obey the duct insulation handling rules.**
 - Air supply (SA) duct should be insulated.
 - Suction unit (RA) duct should be insulated according to the on-site condition.
- 9) Duct's suction (diffuser/product) should have a filter attached to it.**

4. Indoor Units installation

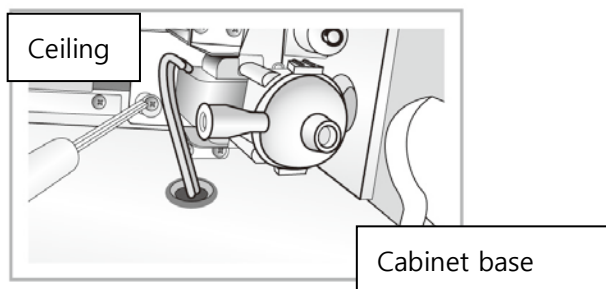
2-6. Drain Pump Installation Process

1) Slim Duct (AVXDSH**) _Drain pump(MDP-E075S**1)

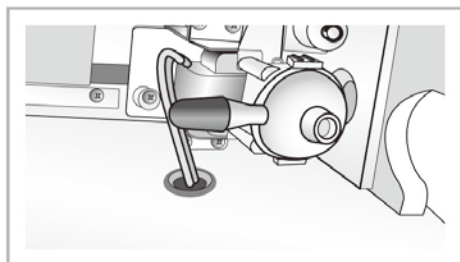
(1) Please, Separate the cabinet of the indoor unite.



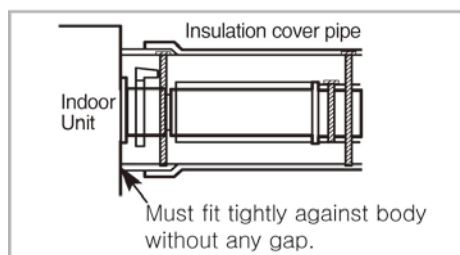
(2) Separate the cabinet base of the indoor unit and fix it with the drain pump.



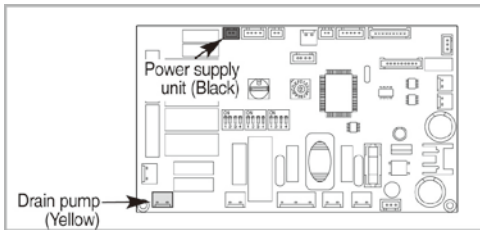
(3) Connect the drain pump and the flexible hose pump.



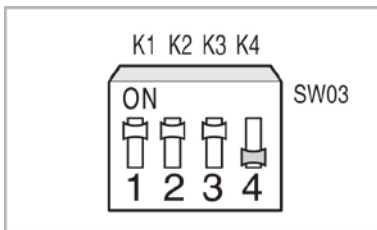
(4) Connect the flexible hose to the flexible hose pump.



- (5) Connect the float switch of the drain pump(Yellow) and power supply unit(Black) to the PCB of the indoor unit.



- (6) Adjust K4 DIP switch(SW03) to the "OFF" position.



- (7) Check water leakage of the drain hose port and the drainpipe after completing installation

2) Slim Duct (AVXDSH** 01)_ Drain pump(MDP-E075S**3)

- (1) Release the two screws on the control box and separate the cover and the cabinet side.



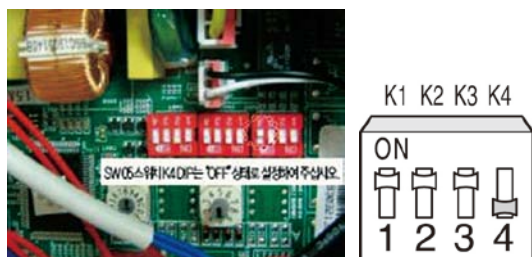
- (2) Remove the terminal and install the Drain Pump. Using screws, fix the drain pump case.



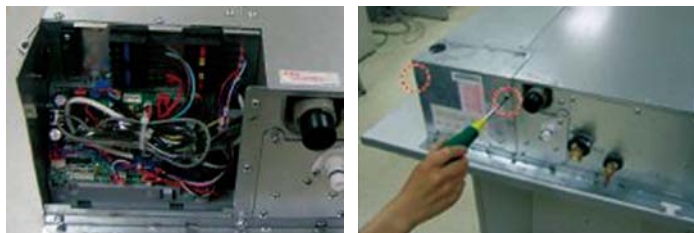
- (3) Connect the drain pump wire. (Yellow terminal.) (Float Switch is a black terminal.)

- (4) On the PCB, turn OFF the DIAL-UP SWITCH K4 corresponding to SW05.

4. Indoor Units installation

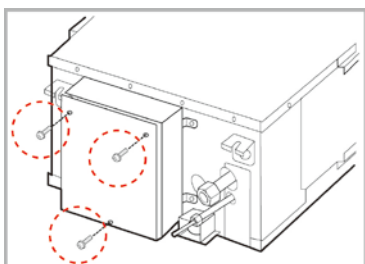


(5) Tie the drain pump wire and install the control box case.

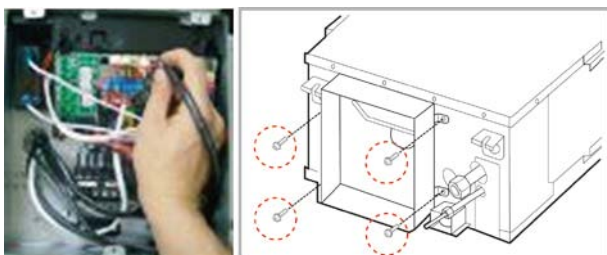


3) MSP Duct (AVXDUH**) _ Drain pump(MDP-M075S***)

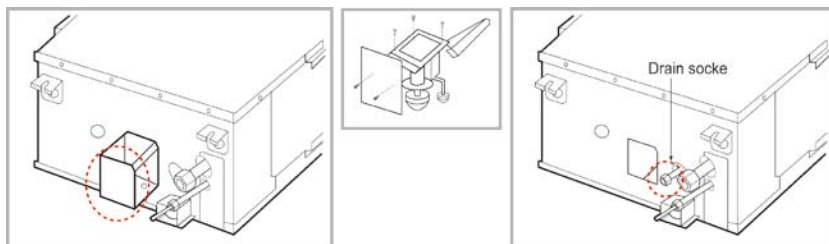
(1) Remove the Control Cover



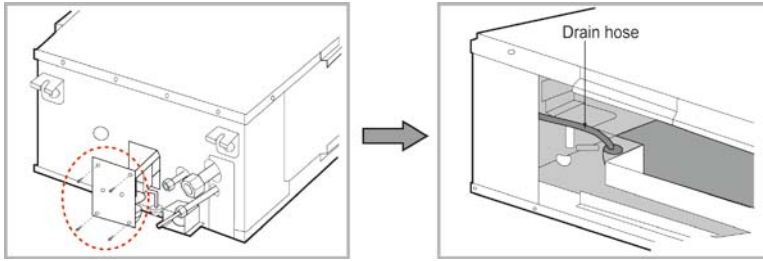
(2) Remove the wire from PCB. Then remove the Control Box



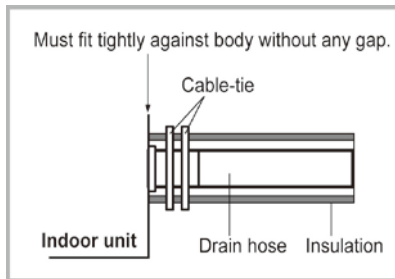
(3) Remove the part as seen in the picture. Assemble the Drain Kit and drain socket.



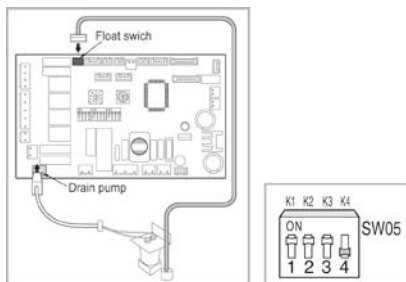
(4) After connecting the Drain Hose with the Drain Socket ,Assemble the Drain Pump



(5) Insert the flexible hose into the drain socket until it clicks.



(6) Connect the cable to the electrical component box as shown at the figure
Adjust K4 DIP switch(SW05) to the "OFF" position.



4. Indoor Units installation

3. Ceiling

3-1. Space Requirements for Indoor Unit



AVXTF**

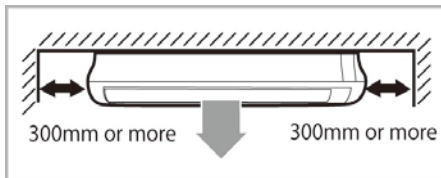
Type	Under Ceiling	Floor Standing
Installation		

3-2. Indoor Units Installation

1) Ceiling Installation

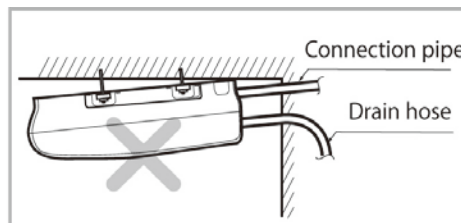
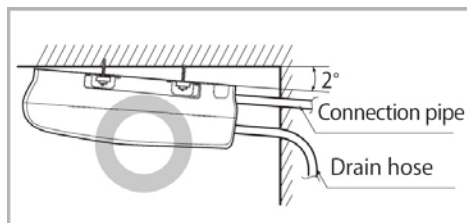
(1) Select pipe directions.

When the directions are selected, drill 4"(100mm, for pipe and cables) and 1-5/8" (40mm, for drain hose) diameter holes on the wall

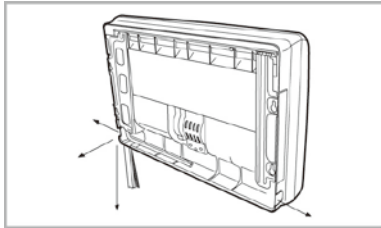


(2) Drill holes for anchor bolts according to the distance and mount them.

(3) Install the unit onto the ceiling. Be sure to arrange the drain hose so that it is leveled lower than the drain hose connecting port of the indoor unit.



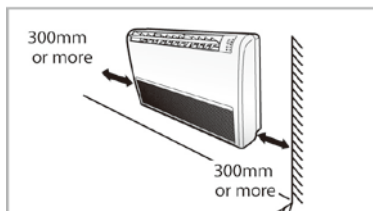
- (4) If installing on dropped ceiling, install threaded rod onto anchor bolt-(expansion bolt) to long enough to suspend the unit right below the dropped ceiling and then install the unit suspending on the threaded rod.



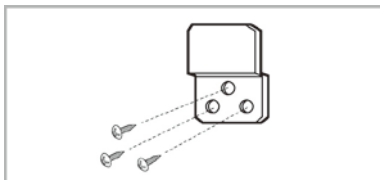
2) Floor Installation

- (1) Select pipe directions.

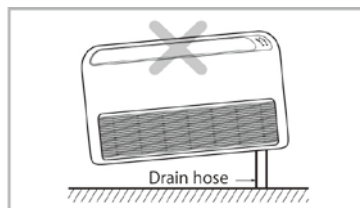
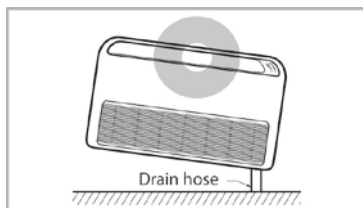
When the directions are selected, drill 4"(100mm, for pipe and cables) and 1-5/8" (40mm, for drain hose) diameter holes on the wall



- (2) Install the hanging plate according to the distance and mount it.



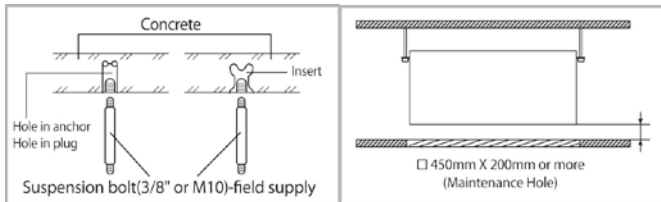
- (3) Install the unit and be sure to arrange the drain hose so that it is leveled lower than the drain hose connecting port of the indoor unit.



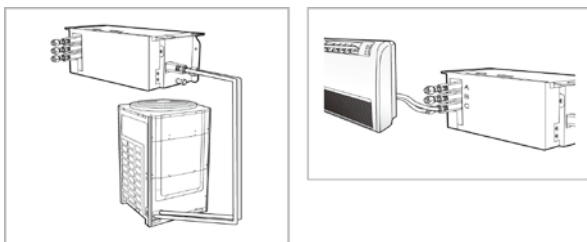
4. Indoor Units installation

3) EEV Kits Installation

- (1) Check dimension and installation location.
- (2) Check installation place.



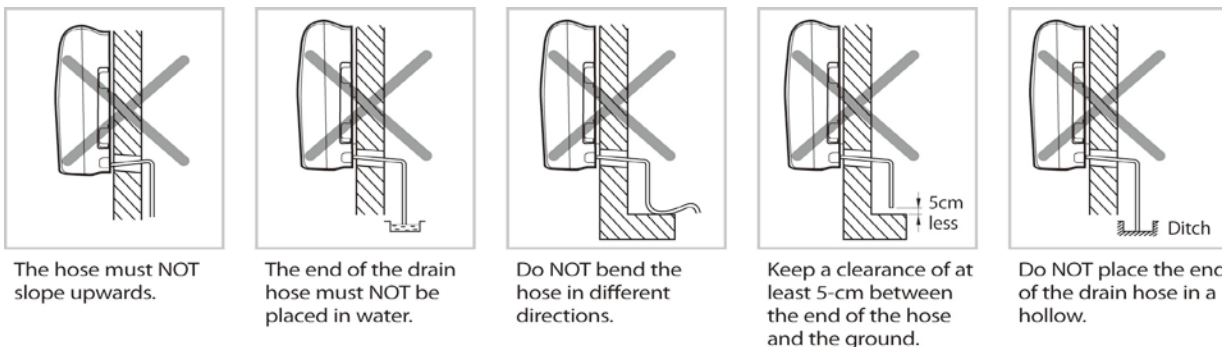
- (3) Connect the “IN” refrigerant pipe to the outdoor unit.
- (4) Connect the “OUT” refrigerant pipe to each indoor unit(A, B and C)
- (5) Insulate the connection piping. A joint part of pipe needs double thickness of insulation.



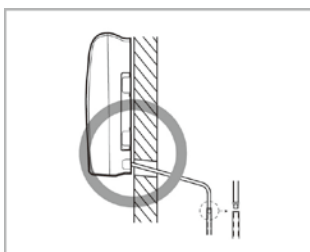
- (6) The EEV kit has to be installed that the user has no access to it. (built-in type)

4) Drain Hose Installation

Care must be taken when installing the drain hose for the indoor unit to ensure that any condensation water is correctly drained outside. When passing the drain hose through the hole drilled in the wall, check that none of the following situations occur

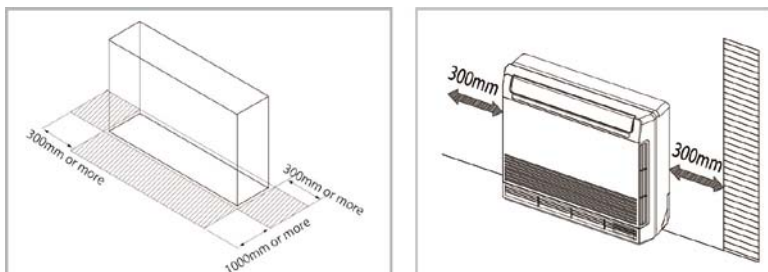


The drain pipe can be extended by connecting as following figure.



4. Console

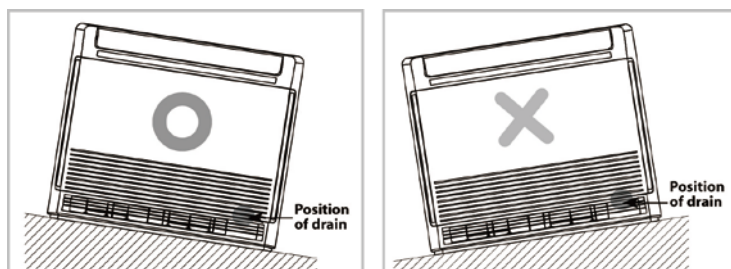
4-1. Space Requirements for Indoor Unit



AVXTJ**

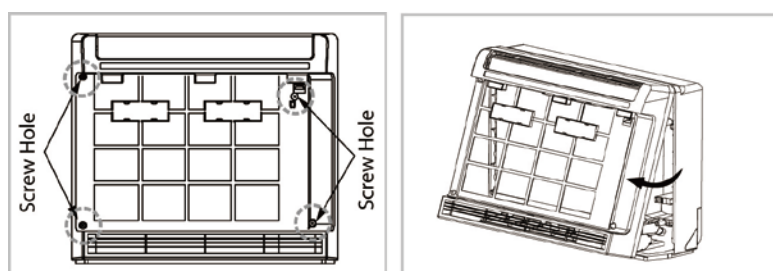
4-2. Indoor Units Installation

- (1) When you install the indoor with side-pipe connection, please make space more than 300mm from the wall
- (2) When you install the indoor at the inclined floor, please lean the set toward the drain hose and pipe connection to prevent water overflowing.

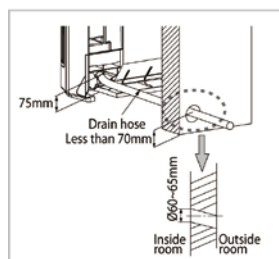


- (3) The body front should be opened to connect pipes

Please release the 4 screws of body front and then pull it out from the bottom of the set.

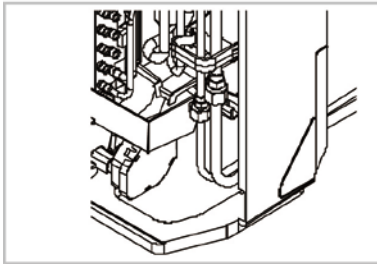


- (4) Make a hole on the wall.

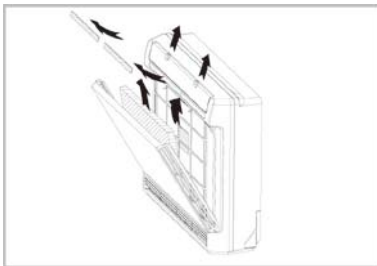


4. Indoor Units installation

(5) The pipes & cable should be gone through the bottom back hole.

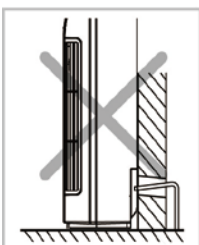
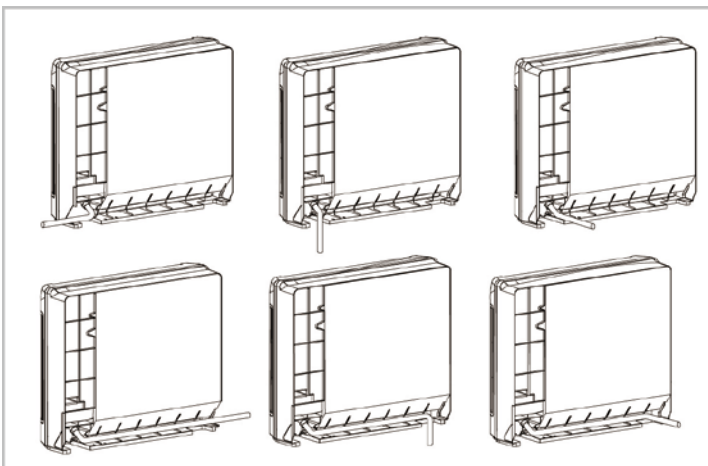


(6) Please remove 6 items when set is installed.

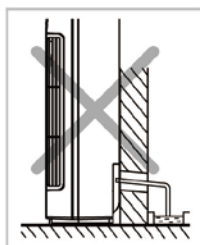


(7) Drain Hose Installation

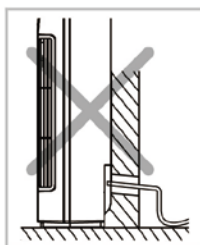
6-Ways to connect Drain Hose and Pipe



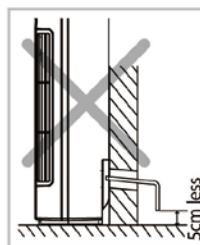
The hose must NOT slant upwards.



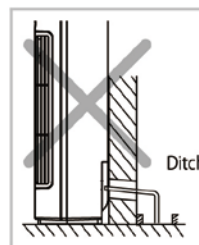
The end of the drain hose must NOT be placed under water.



Do NOT bend the hose in different directions.



Keep a clearance of at least 5cm between the end of the hose and the ground.

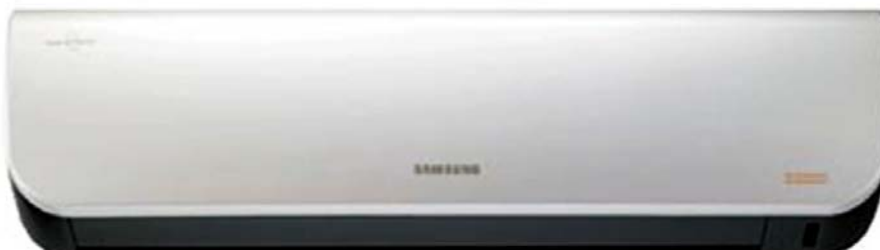


Do NOT place the end of the drain hose in a hollow.

5. Wall-mounted Type

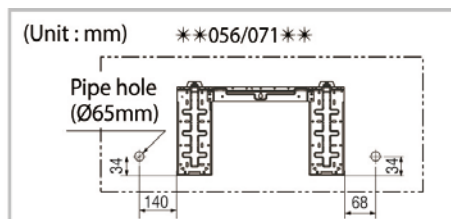
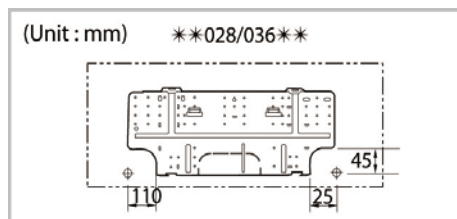
5-1. Installation Standard

1) Overview

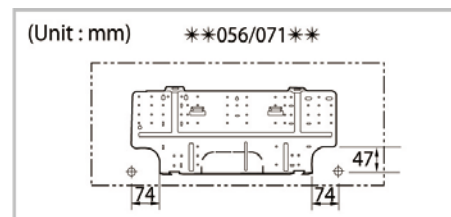
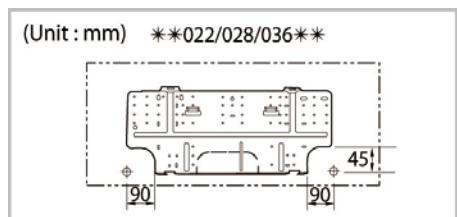


4. Indoor Units installation

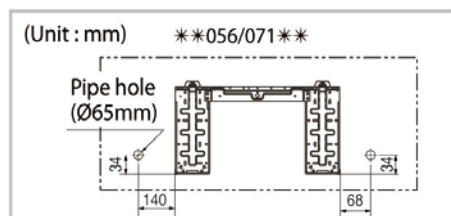
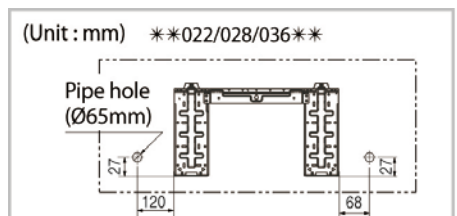
<MB>



<Vivace>



<Neo-Forte>



Before fixing the installation plate to the wall or window frame, you must determine the position of the 3-1/8"(80mm) hole through which the cable, pipe and hose pass to connect the indoor unit to the outdoor unit.

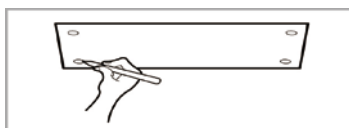
When facing the wall, the pipe and cable can be connected from the:

- Right ● Left ● Underside (right) ● Rear (right or left)

- ① Determine the position of the pipe and drain hose hole as seen in the picture and drill the hole with an inner diameter of 3-1/8"(80mm) so that it slants slightly downwards.
- ② If you fix the indoor unit to a... Follow step(s)...

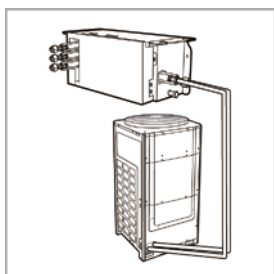
Wall	3.
Window frame	4 to 6.
- ③ Fix the installation plate to the wall giving attention to the weight of the indoor unit.
 - â If you mount the plate to a concrete wall with anchor bolts, the anchor bolts must not project more than 20mm.
- ④ Determine the positions of the wooden uprights to be attached to the window frame.5. Attach the wooden uprights to the window frame giving attention to the weight of the indoor unit.

► Connection of refrigerant piping & Insulation



- ① Insert bolt anchors, use existing ceiling supports or construct a suitable support.

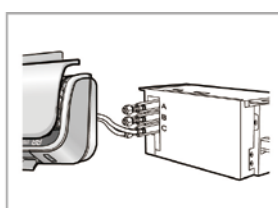
Ensure the ceiling is strong enough to support the weight of the indoor unit. Before hanging the unit, test the strength of each attached suspension bolt.



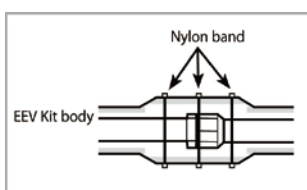
- ② Connect the "IN" refrigerant pipe to the outdoor unit.

- ③ Connect the "OUT" refrigerant pipe to each indoor unit(A, B and C).

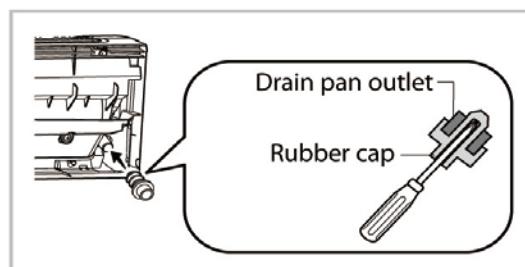
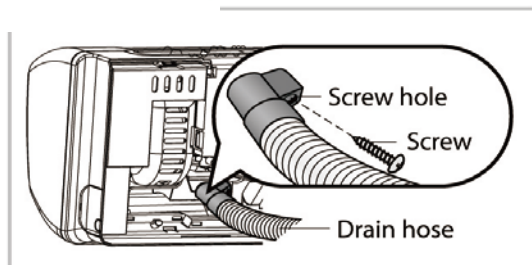
The liquid and gas pipes should not be crossed during piping connection.



- ④ Insulate the connection piping. A joint part of pipe needs double thickness of insulation.



- ⑤ The EEV kit has to be installed that the user has no access to it. (built-in type)



You can select the direction of the drain hose, depending on where you want to install the indoor unit.

- ① Detach the rubber cap with the flyer.
- ② Detach the drain hose by pulling it and turning to the left.
- ③ Insert the drain hose by fixing it into the groove of the drain hose and the outlet of the drain pan.
- ④ Attach the rubber cap with a screwdriver by turning it to the right until it fixes to the end of the groove.

5. Outdoor Units installation

1. Safety Information

1) Caution Signs

(1) Make sure of a earthing.

- ① Do not connect the earth wire to the gas pipe, water pipe, lighting rod or telephone wire. If earthing is incomplete, electric shock or fire may occur.

(2) Do not connect the heater to the outdoor unit and do not install altered duct as you please.

- ① The capacity may reduce, electric shock or fire may occur.

(3) Make sure that the condensed water dripping from the drain hose runs out properly and insulate the drainpipe so that frost does not generate.

- ① Household goods may get wet if the drainpipe is not properly installed.

(4) Install the indoor unit away from lighting apparatus using the ballast.

- ① If you use the wireless remote control, it may not operate normally.

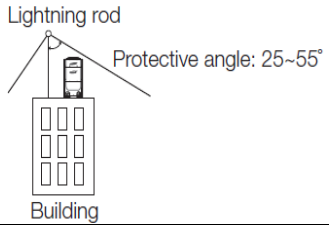
(5) Do not install the air conditioner in following places.

- ① The place where there is mineral oil or arsenic acid.
- ② Those parts may get damaged due to burned resin.
- ③ The efficiency of the heat exchanger may reduce or the air conditioner may be out of order.
- ④ The place where corrosive gas such as sulfurous acid gas generates from the vent pipe or air outlet.
- ⑤ The copper pipe or connection pipe may corrode and refrigerant may leak.
- ⑥ The place where there is a machine that generates electromagnetic waves.
- ⑦ The air conditioner may not operate normally due to control system.
- ⑧ The place where there is a danger of existing combustible gas, thinner or gasoline is handled.
- ⑨ The place where carbon fiber or flammable dust is.
- ⑩ The place where like spa and shore.

(6) Install the power cable and communication cable of the indoor and outdoor unit at least 1.5m away from the electric appliances and install it at least 2m away from the cable from the lightning rod.

- ① Noise may heard depending on the electric wave though the cables.

- (7) Install the outdoor unit within the angle of 25~55 depending on the building height as below table.

Building height	Protective angle	Remarks
Below 20m	55°	
Below 40m	35°	
Below 60m	25°	

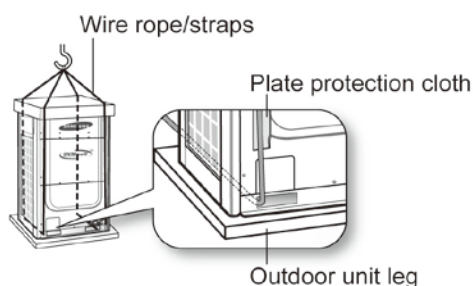
2. Preparing the Installation

1) Moving the Outdoor Unit

- (1) When moving with a crane or straps.

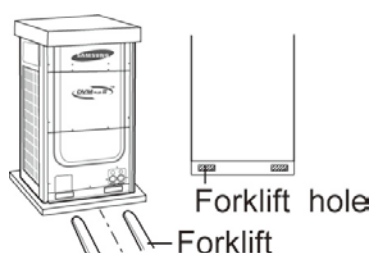
- ① Fasten the wire rope as seen in the picture.

- A. To protect damage or scratches, insert a piece of cloth between the outdoor unit and the wire rope.



- (2) When moving with a fork lift.

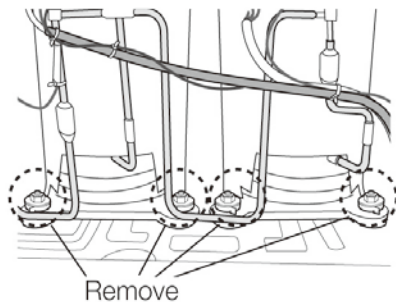
- ① Insert the fork into the bottom of the outdoor unit carefully.
 ② Be careful that the fork does not damage the outdoor unit.



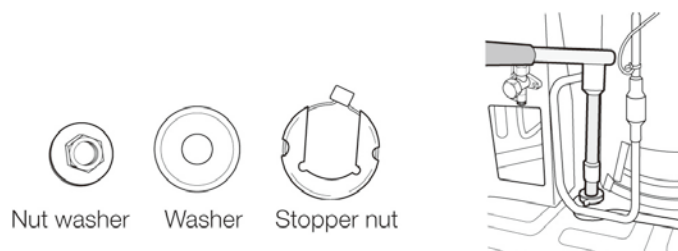
5. Outdoor Units installation

2) Detaching Fasteners

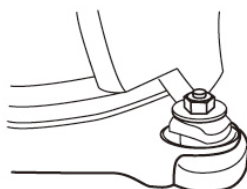
- ① Open the bottom cabinet with screw driver.



- ② Detach nut washer, washer and stopper nut from compressors with a tool.



- ③ Refasten the nut washer only.



3. Selecting Proper Location for Installation

1) Caution

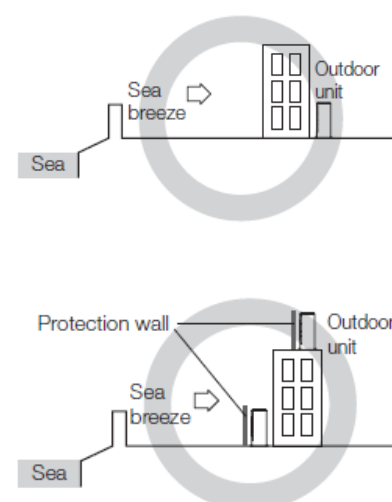
- (1) Install the indoor unit away from any interfering sources such as radio, computer, stereo equipment and also select the place where the electrical wiring work can be possible.
 - ① Especially keep the unit at least 3m away from the electrical equipment in an area electromagnetic waves generated and install the protection tube to protect the main power cable and communication cable.
 - ② Make sure that there is no equipment electromagnetic waves generate. If not, malfunction of the control system may occur due to the effect of the electromagnetic wave. (For example: The remote control sensor of the indoor unit may not be received well of electronic lighting style fluorescent lamps, such as fluorescent lamps are in the same space when using a remote control.)
- (2) Make sure to install the outdoor unit in a safe place where snowfall will not be obstructed. The frame should be installed in a place where the air inlet and heat exchanger of the unit are not buried in the snow.
- (3) Ventilation system will be better installed for the case of the refrigerant leakage in a closed room even if R410A is nonpoisonous and noninflammable refrigerant.
- (4) Install the railing around the outdoor unit to prevent falling when the unit is installed at high place of roof on the building.
- (5) Avoid installing the units in places such as an exhaust pipe and ventilating opening exposed to corrosive gas, oxides of sulfur, ammonia gas or sulfur gas herbicides.
(Corroding copper pipes or soldered parts may result in refrigerant leakage.)

2) Caution for MCU

- (1) Make sure to install MCU when using HR products.
- (2) When you select the location to install MCU, the location is far away from indoor rooms because the refrigerant running of MCU may create noise.

3) Caution for Seashore

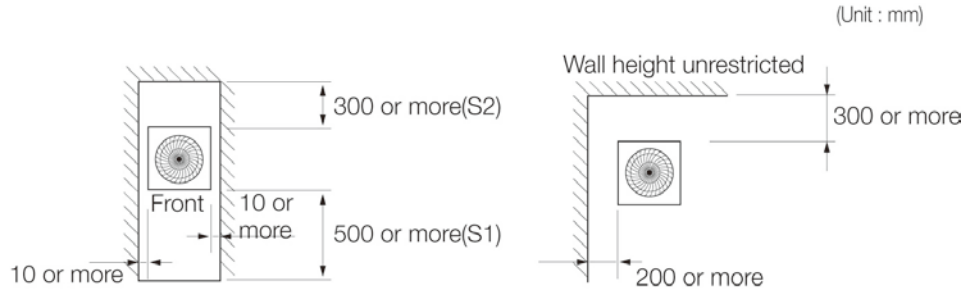
- (1) Install the outdoor unit like a place where the product can be protected from a direct sea breeze.
- (2) If you cannot help installing the outdoor unit by the seashore, construct a protection wall around the outdoor unit to protect the sea breeze.
(Protection wall size : 150% larger than outdoor unit size)
(Min. 700mm distance for air circulation from the protection wall)



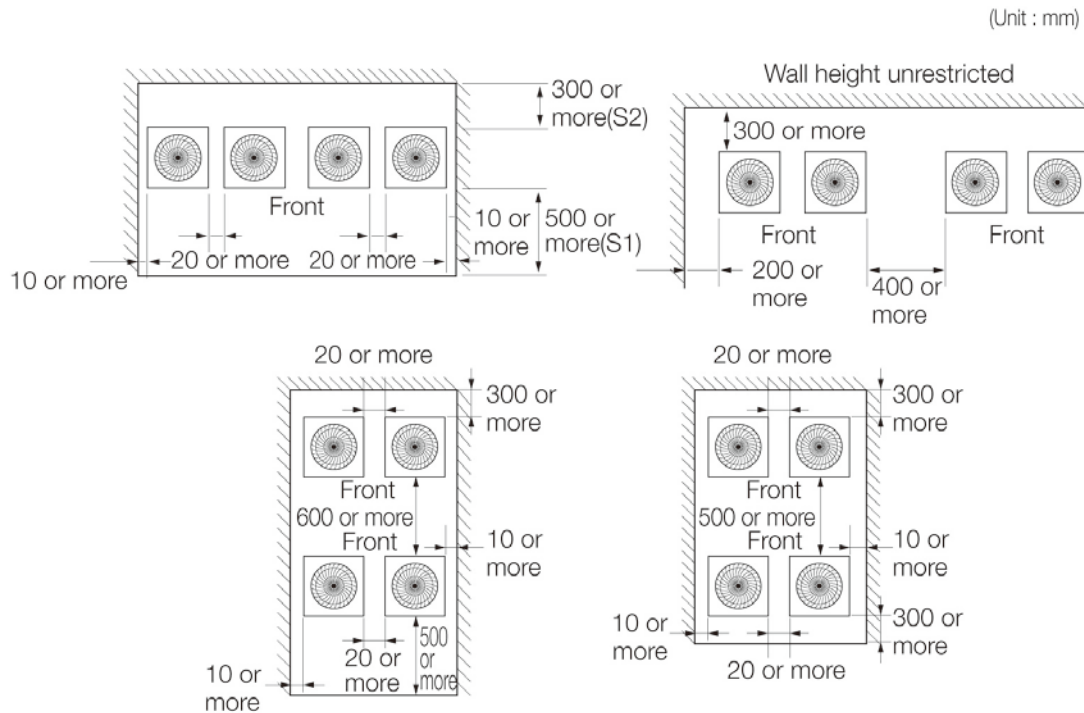
5. Outdoor Units installation

4. Space Requirements

1) Single Installation



2) Group Installation



3) Recommended Case

- (1) At least 200mm(8inch) of space between the outdoor units is needed for service area and heat radiation.



- (2) When the product is installed in the site near the sea, wind-proof cover must be installed additionally, considering effects from typhoon and seasonal wind. Anti-corrosion type must be selected. (Special coating must be applied.)
- (3) All the ventilation systems, which are installed outdoors, should be apart from the outdoor unit. In case they cannot be apart, the direction of the ventilation should be opposite direction to the outdoor unit.

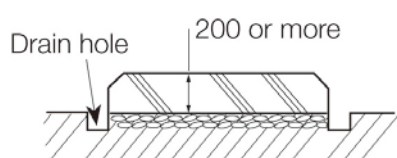


5. Outdoor Units installation

5. Base Mount Construction

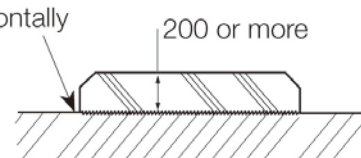
1) Base Mount Construction

(Unit : mm)



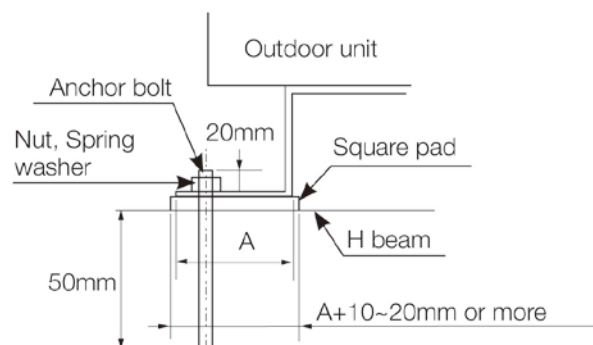
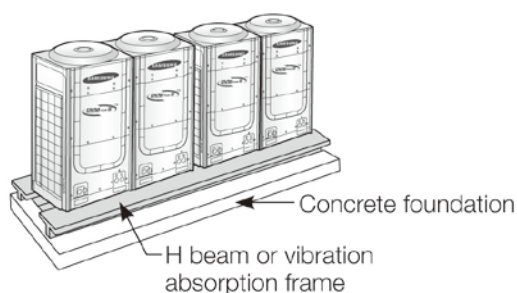
< When installing on the ground >

Install the outdoor unit horizontally on the ground



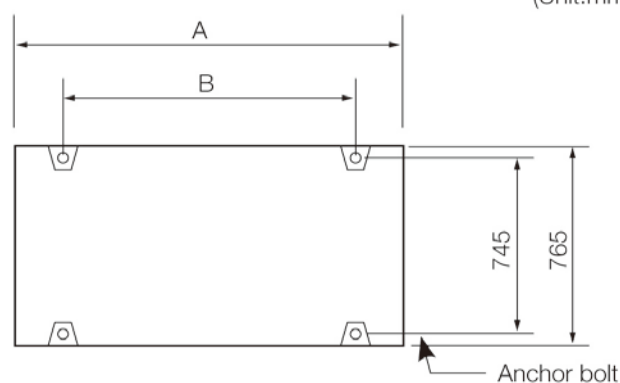
< When installing on the roof >

2) Outdoor Unit Installation



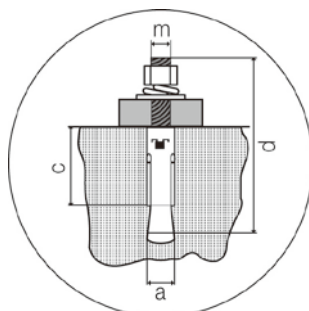
3) Outdoor Unit Base Mount and Anchor Bolt Position

(Unit:mm)



Heat Pump	RVXVHT080/100/120	RVXVHT140/160
Heat Recovery	RVXVRT080/100/120	RVXVRT140/160
A	880	1200
B	738	1058

4) Anchor Specifications



Size	Diameter of drill bit(a)	Anchor length(b)	Sleeve length(c)	Insert depth	Fastening torque
Φ10	14mm	75mm	40mm	50mm	30N·m

5) Caution

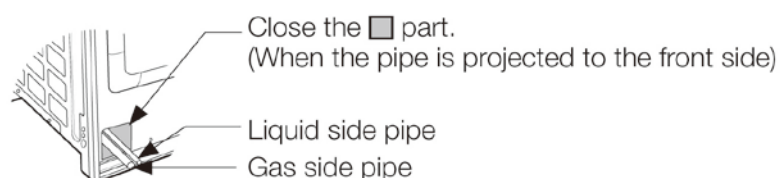
(1) When tightening the anchor bolt.

Tighten the rubber washer to prevent the outdoor unit bolt connection part from corroding.



(2) When connecting the pipes.

- ① Check the strength of the roof to install the outdoor unit and make sure to have a waterproof floor of the roof.
- ② Make sure that a proper drainage system has been put in place around the outdoor unit.
- ③ To protect the internal components of the outdoor unit, secure the pipe work entrance to the unit.

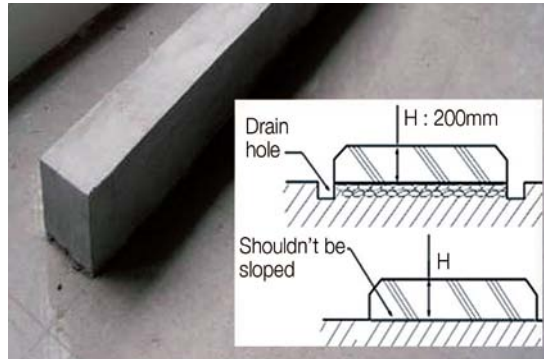


5. Outdoor Units installation

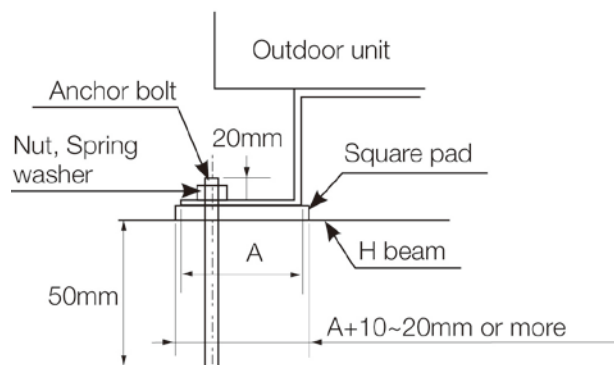
6) Recommended Case

(1) Construct a concrete foundation in accordance with the standards for the site where outdoor unit is being installed.

- ① H-beam: over 200mm
- ② Area of the concrete foundation must be 1.5 times larger than the outdoor unit.
- ③ Concrete foundation shouldn't be slanted and condensed water needs to flow away without any stagnation



(2) After placing the outdoor unit on the basic foundation, fix the outdoor unit with the anchor bolt(M12).



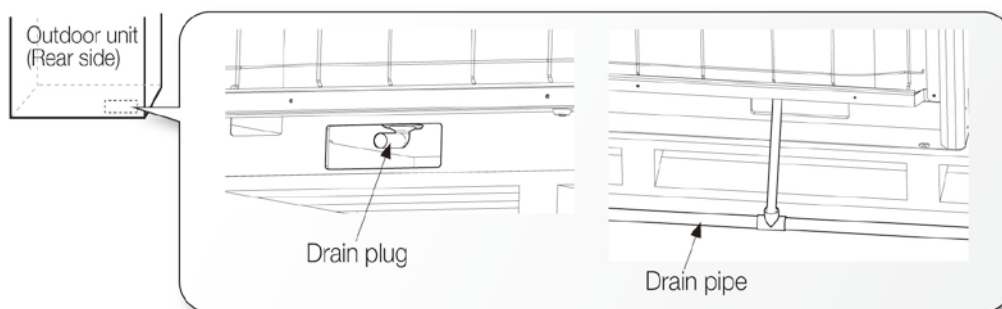
(3) Install the anti-vibration pad between the outdoor unit, H-beam and the concrete foundation.
(t = over 20mm)



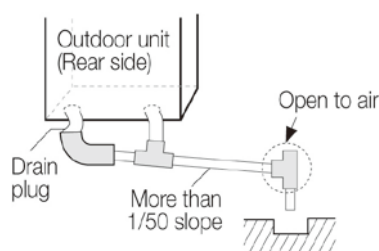
6. Drain Pipe Installation

1) Installing the Drainpipe

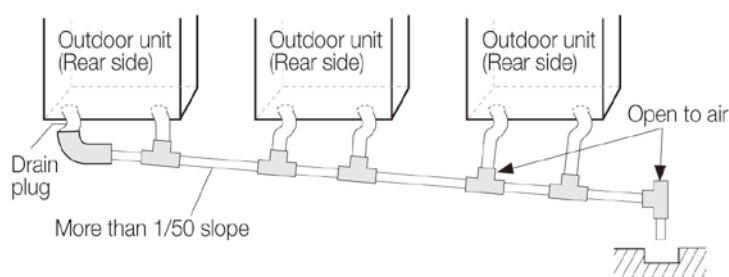
- (1) Insert the provided drain plug at the 2 sides of the bottom of the unit and then connect the drainpipe.
- (2) Install the drainpipe at the rear side of the unit to get a sufficient space for repairs and service.



2) When Installing Single Outdoor Unit



3) When Installing Multiple Outdoor Unit



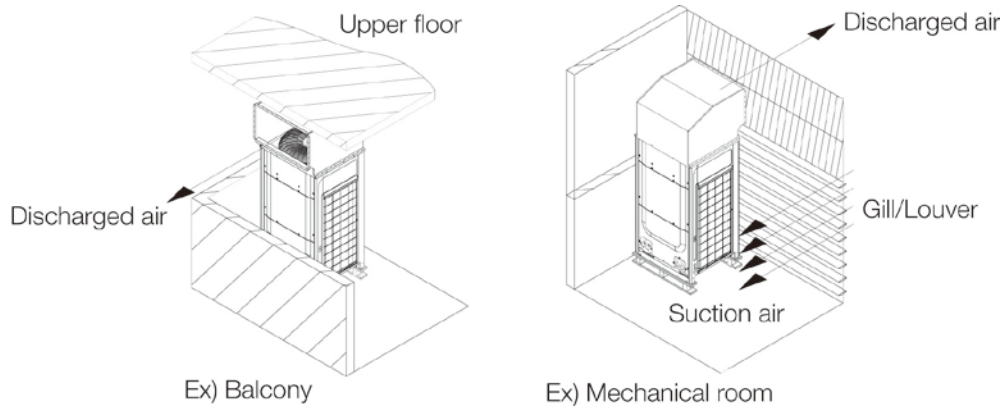
4) Caution

- (1) Do not install a trap on the pipe. And, install the drainpipe horizontally with a slope of 1/50 or more.
- (2) Insulate the drainpipe and drain plug with insulation over 10t.
- (3) Install heating device to the drainpipe to prevent it from being frozen. Install the safety equipment for a heating appliance.

5. Outdoor Units installation

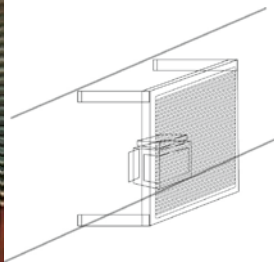
7. Exhaust Duct Installation

1) Installing Duct for Horizontal Exhaust Duct

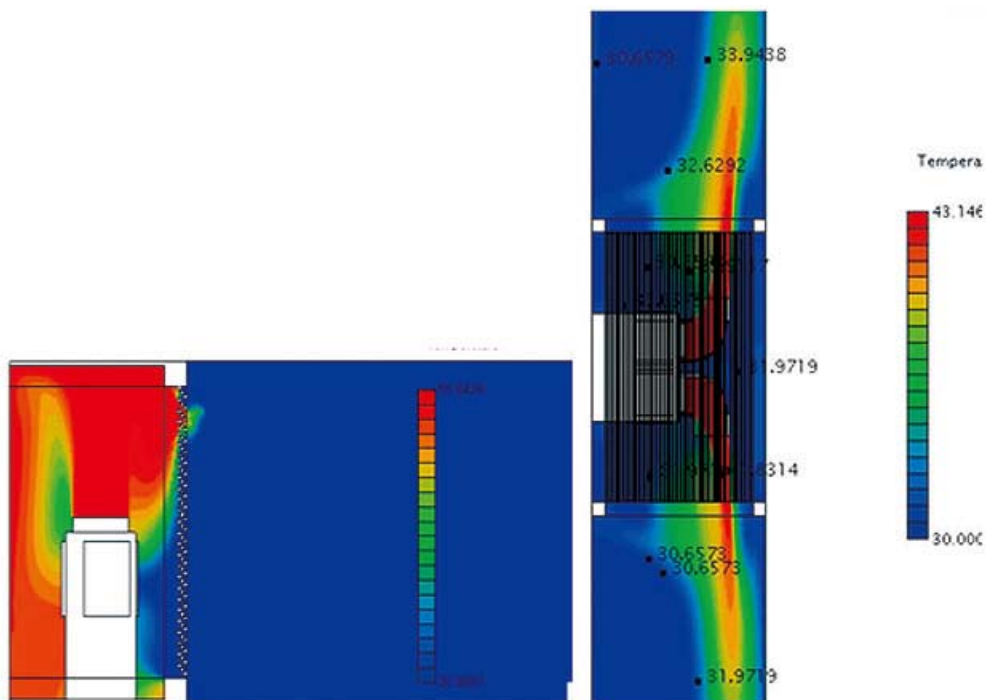
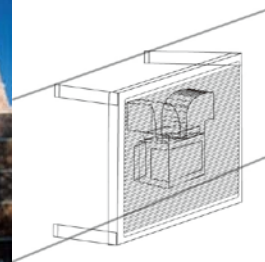


2) Recommended Case

[Before]



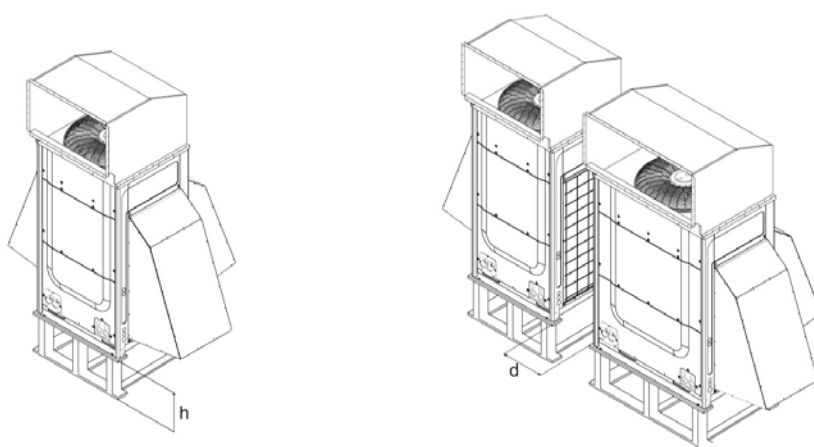
[After]



8. Installing the Outdoor Unit Harsh Environments

1) General Instructions

- (1) In abnormally harsh environments such as cold and/or windy areas, sufficient countermeasures to guard against excessive wind and snow should be taken to ensure the unit's correct operation.
- (2) Snow-proof duct (field supply) should be fitted to the unit and direct exposure to the wind should be avoided as much as possible.
- (3) When the unit is expected to operate in heating mode in condition under -10°C , in snowy area, in environments subject to strong winds or rain, install air inlet and outlet ducting as shown below.



Caution

- a. The frame/foundation should be higher than expected snowfall.
- b. When installing on a roof subject to strong wind, countermeasures must be taken to prevent the unit from being overturned.
- c. Any lack of strength may cause unit to fall down, resulting in a personal injury.

※ Installation example.

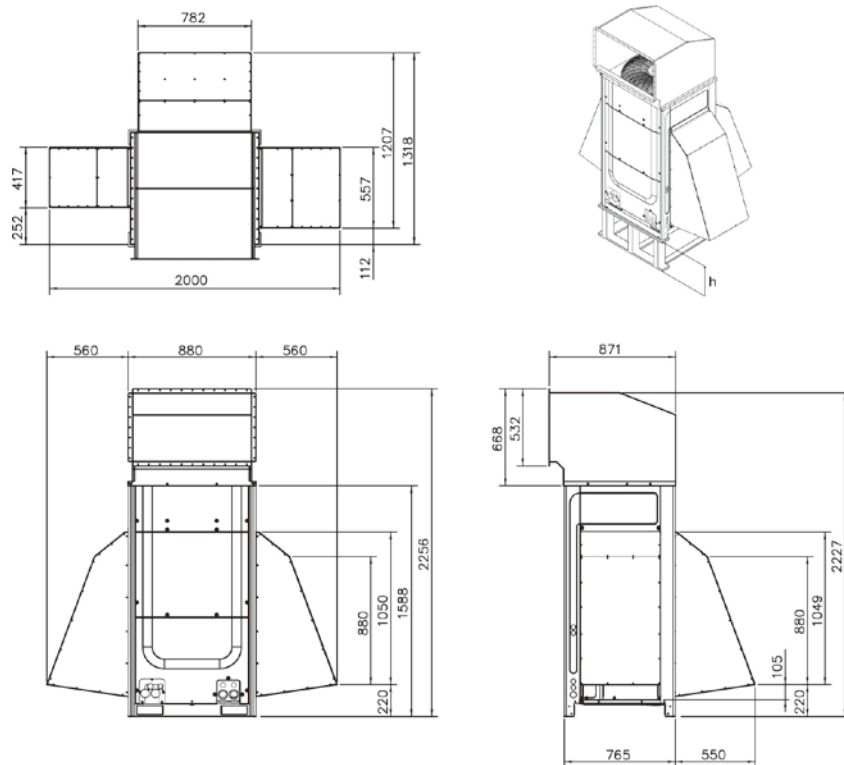
- When the product is installed in the site near the sea, wind-proof cover must be installed additionally, considering effects from typhoon and seasonal wind. Anti-corrosion type must be selected. (Special coating must be applied)



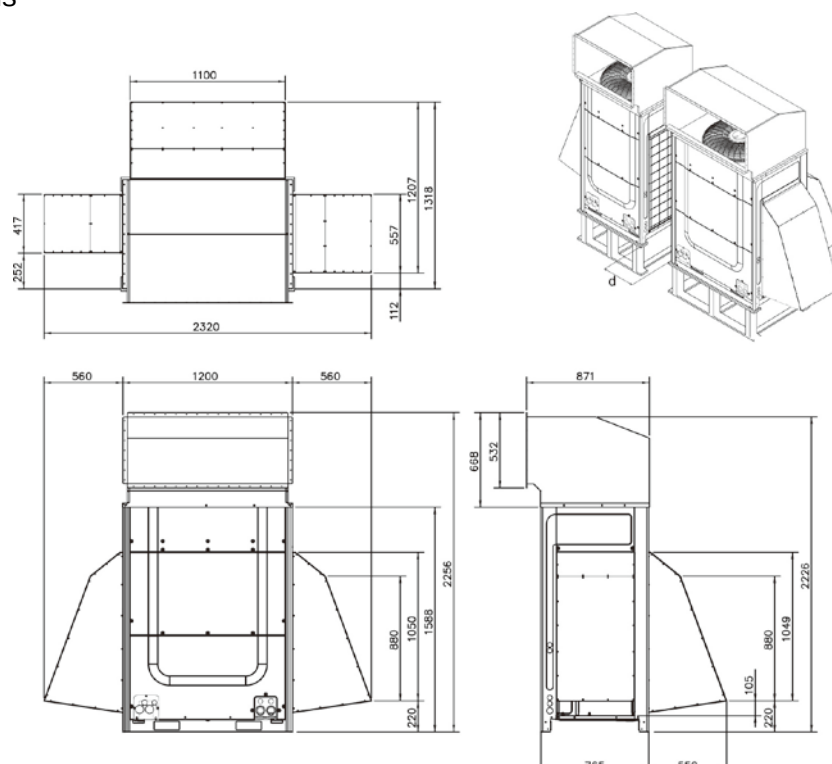
5. Outdoor Units installation

2) Dimensional Drawing of Snow-proof Duct

(1) Small Chassis



(2) Large Chassis

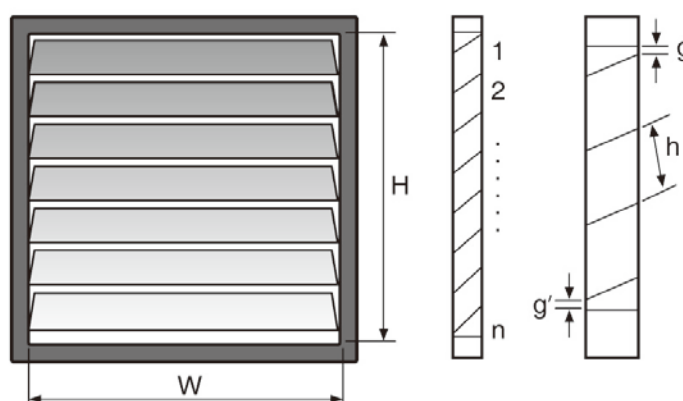


9. Louver Installation

1) Requirements of Louver installation

(1) Opening rate: 80% and more.

$$\text{Opening Rate} = \frac{\text{Louver Free Area}}{\text{Net Opening Size}} = \frac{W \times ((h \times n) + g + g')}{\text{Net Opening Size}} \times 100$$



(2) Louver angle(Blade Slope): 20° and less.

(3) Louver shape: Don't use drainable blade type.

Good	Bad

(4) Air velocity of inlet side: 2.0m/s and less.

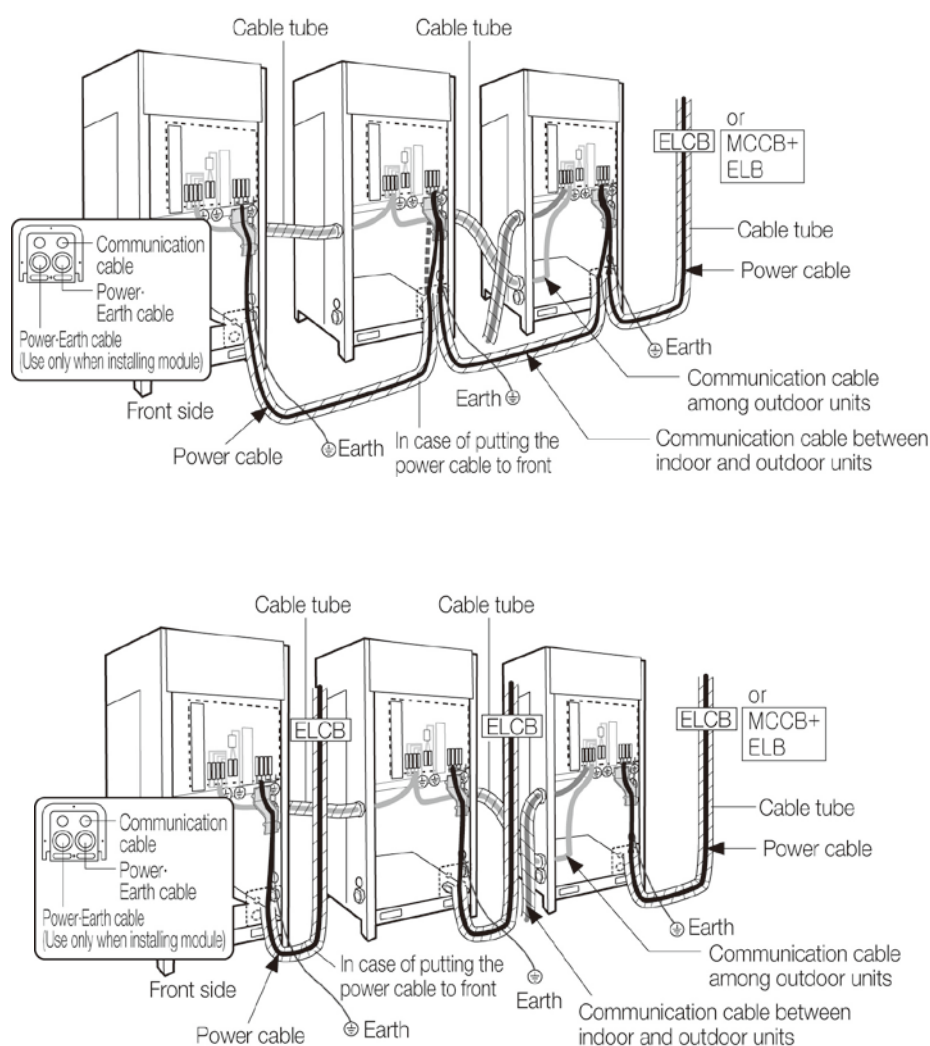
5. Outdoor Units installation

10. Electrical Wiring Work

1) General Instructions

- (1) All wiring, components and materials to be procured on the site must comply with the applicable local and national codes.
- (2) Be sure to comply with the specifications of the circuit breaker and power cable in installation manual.

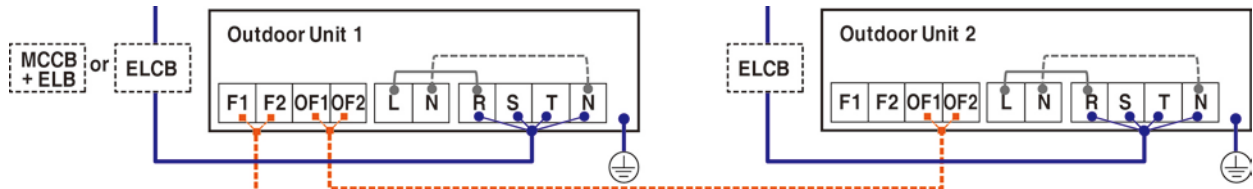
2) Power Supply and Communication Cable Configuration



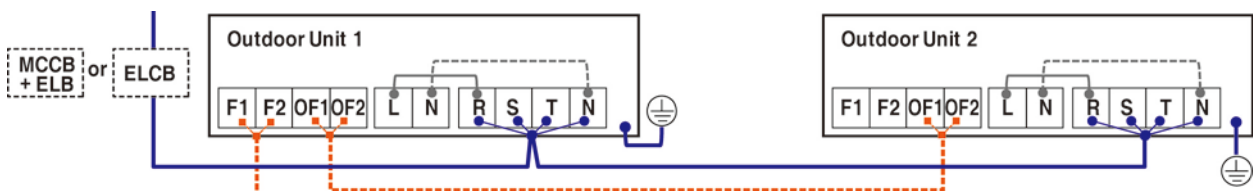
3) Circuit Breaker Installation

(1) 3 phase 4 wires

① Case 1

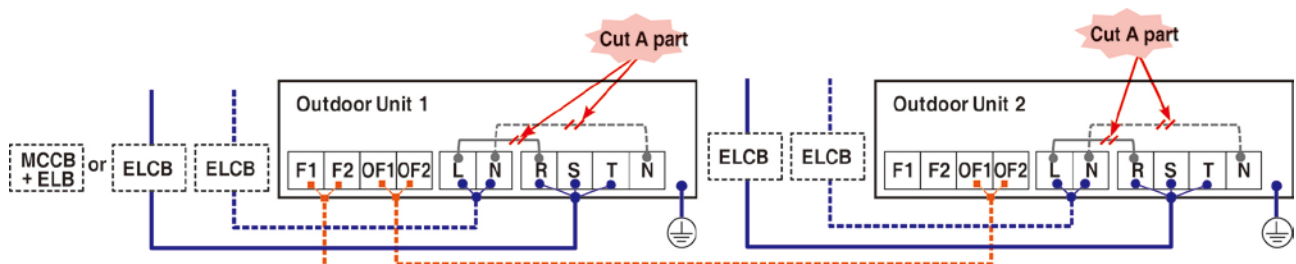


② Case 2

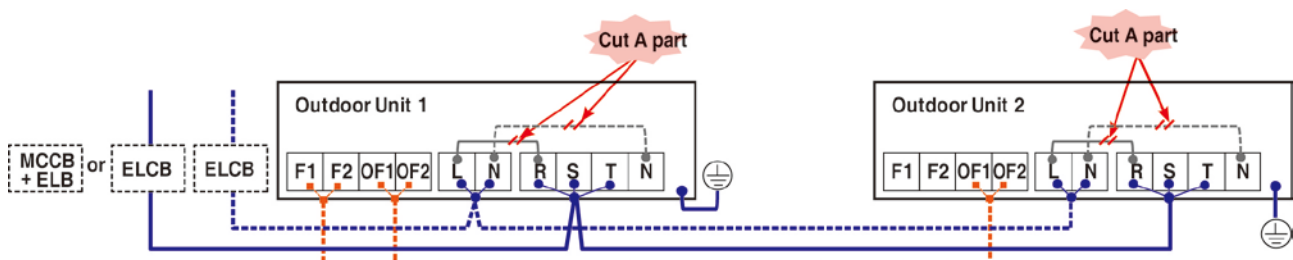


(2) 3 phase 3 wires and 1 phase 2 wires

① Case 1



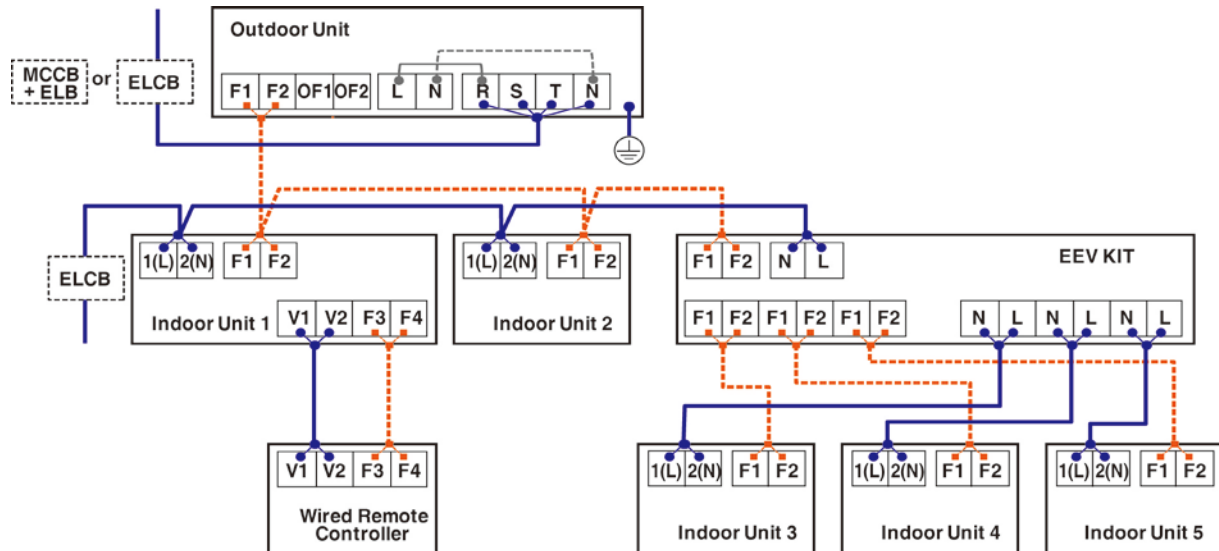
② Case 2



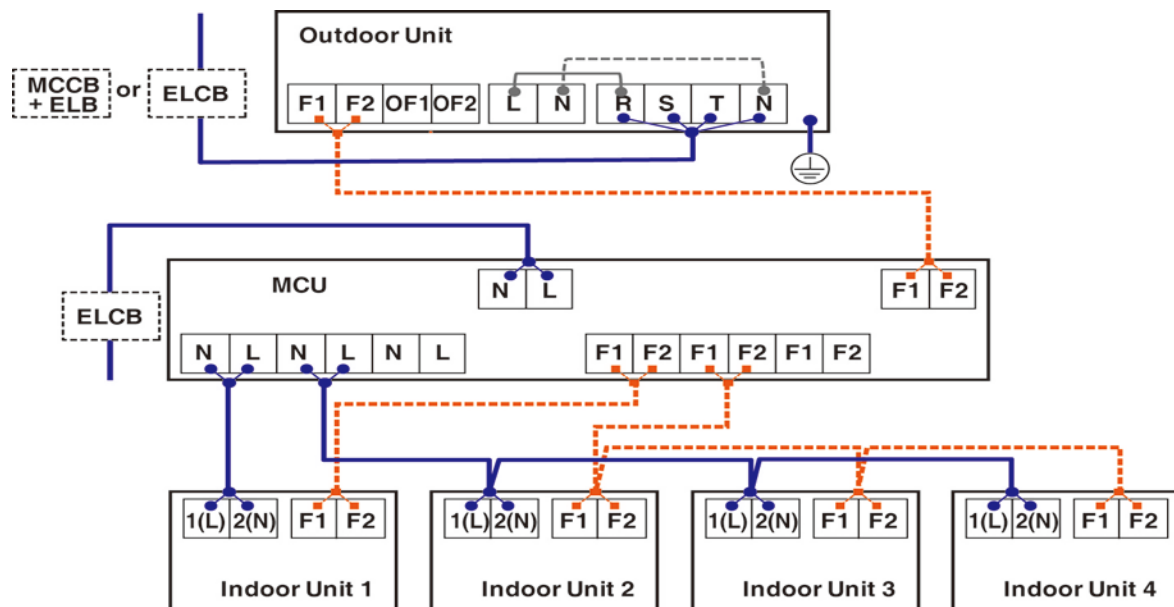
5. Outdoor Units installation

4) Wiring Diagram

(1) CO/HP Model



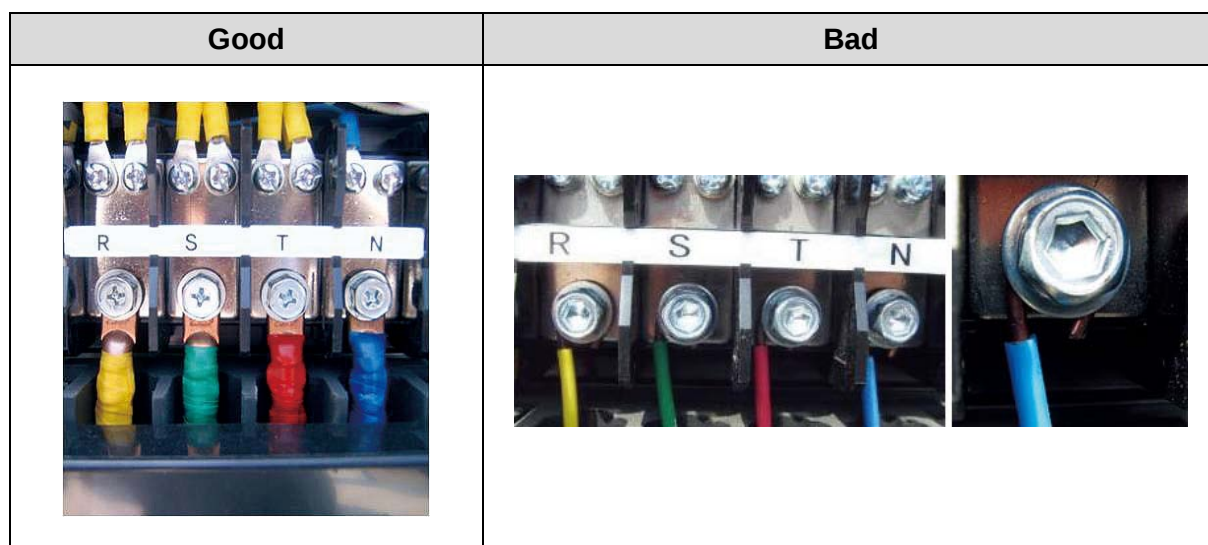
(2) HR Model



※ If the communication cable between indoor and outdoor units and the communication cable among outdoor units are crossed, communication isn't available.

5) Connecting the power terminal

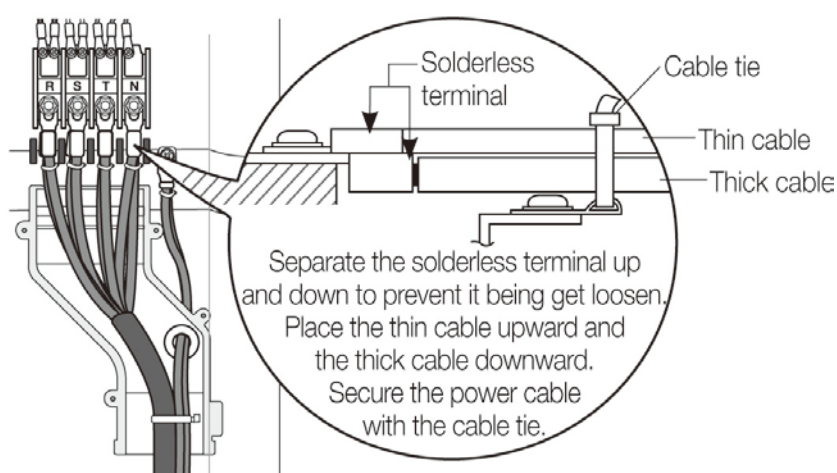
(1) Use solderless ring terminal to connect cable and terminal block.



(2) Install the cable according to a blueprint.

(3) Install the wire box, with uncovered insulation tube, to the product.

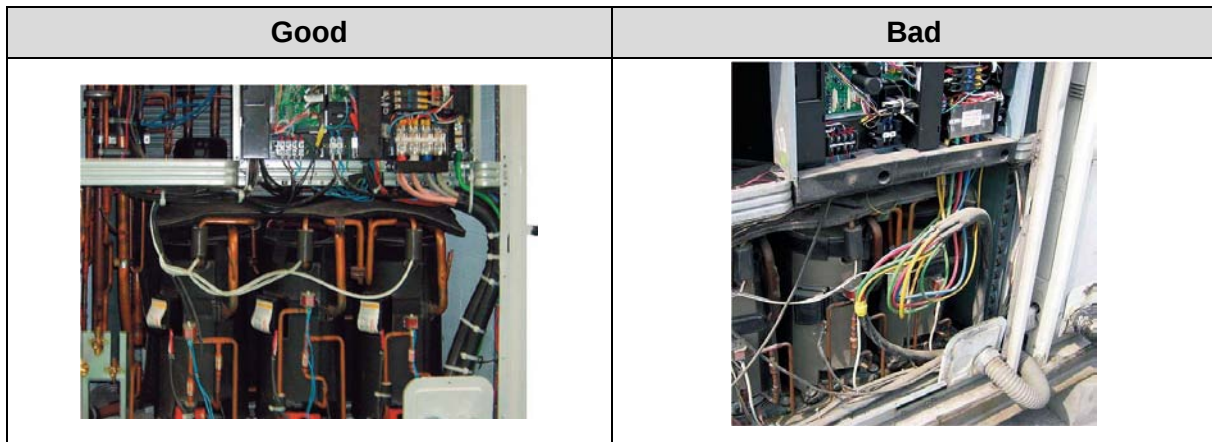
(4) During the installation in the site, make sure the wires and pipes do not contact each other because the vibration of compressor and high temperature pipe can make damage to wiring.



5. Outdoor Units installation

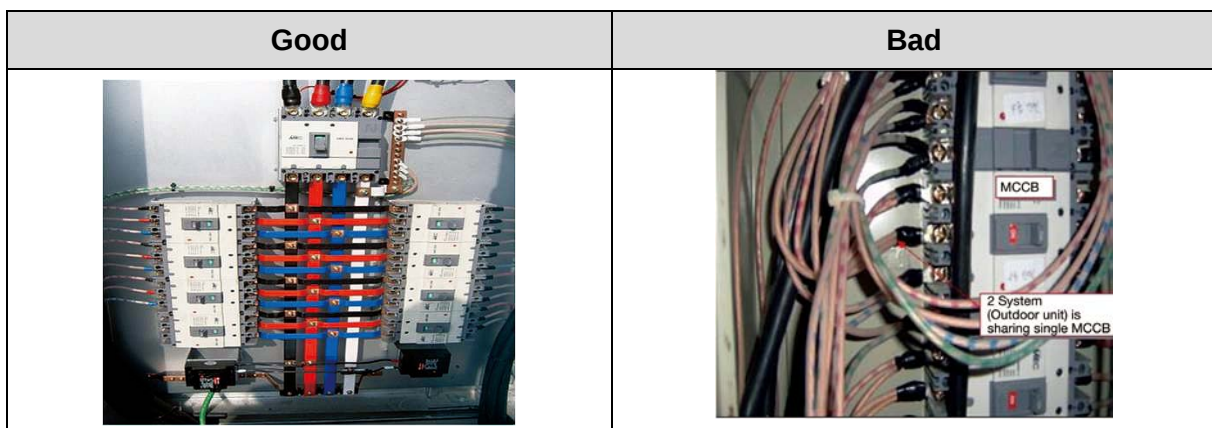
6) Power Cable Arrangement

- (1) Make sure all wiring should not contact with piping line during the field wiring work. If not, the vibration of compressor and high temperature pipe can make damage to wiring



7) Circuit Breaker Installation

- (1) Install a circuit breaker. For safety and maintenance, we strongly recommend that MCCB and ELB and(or) ELCB alone) have to be installed every outdoor unit.
- (2) Every system must be installed individual MCCB and ELB and the specification must meet the requirements.

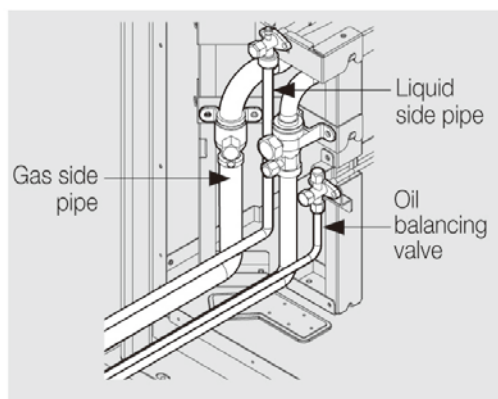
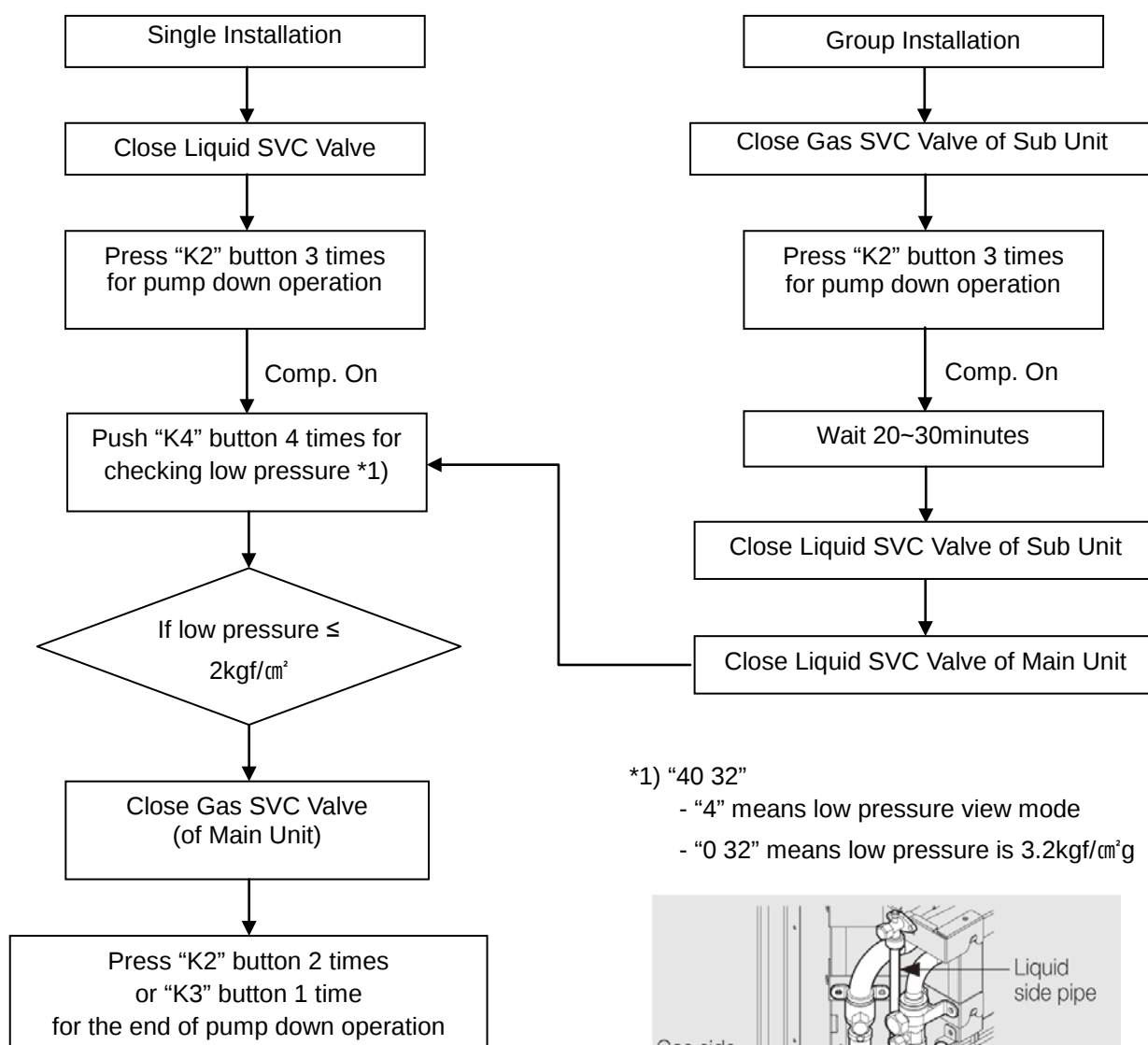


11. Pump-Down Operation

1) General Instructions

- (1) Pump-down operation is to gather the refrigerant into outdoor unit.
- (2) If system is under extremely low pressure, compressor will be damaged. When low pressure go down 2kgf/cm^2 or below, close the service valve quickly.

2) Procedure of Pump down operation



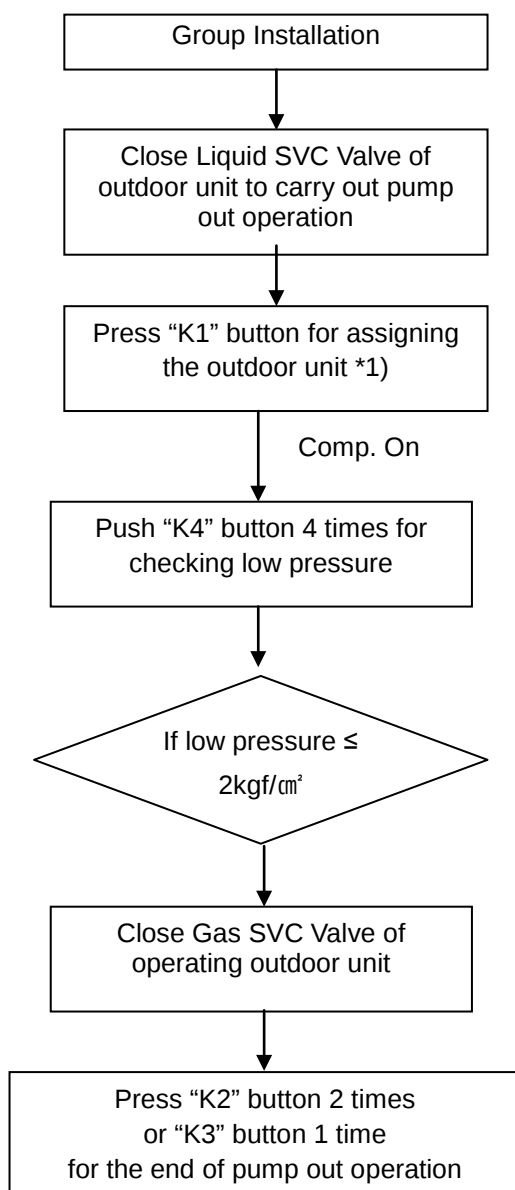
5. Outdoor Units installation

12. Pump-Out Procedure

1) General Instructions

- (1) Pump-out is the name of operation which pumps out the refrigerant from outdoor unit.
- (2) Pump out operation can be put into operation with more than 2 outdoor units installed.
- (3) If system is under extremely low pressure, compressor will be damaged. When low pressure go down 2kgf/cm² or below, close the service valve quickly.

2) Procedure of Pump down operation



*1) Press 1 time → Main Outdoor unit



2 times → Sub 1 Outdoor unit



3 times → Sub 2 Outdoor unit



4 times → Sub 3 Outdoor unit



13. Setting the Option Switches & Function Keys

1) General Instruction

- (1) Refer to the installation manual for details.
- (2) Functions are activated by PCB of “Main unit” only.

2) Check List

Contents		Check
Outdoor Unit	The number of connected indoor unit	
	Outdoor unit address	
	The number of connected MCU (HR model only)	
EEV Kit	Indoor unit address	
MCU	Indoor unit's activating switch setting	
	Indoor unit address	
	MCU address	
Indoor Unit	Indoor unit address (Main, RMC)	

5. Outdoor Units installation

14. Completing the Installation and Commissioning

1) Check List

Contents	Check
Are the outdoor and indoor unit fixed securely?	
Is the place well-ventilated and ensures space for service?	
Is total number of connecting indoor units in the allowable range?	
Are the length and the difference between the refrigerant pipes within the allowable range?	
Is the ref. and drain properly insulated?	
Have you completed the gas leak and drain test?	
Is the wiring route correct?	
Have you performed the earth work to the outdoor unit?	
Are wiring specifications according to the installation manual and national standards?	
Is the length of the wire is in the limited range?	
Have you completed the drain test?	
Are the addresses of the indoor and outdoor units properly set?	
Is the switch setting of the indoor units for centralized control properly made?	
Have you written the installation check card?	



SAMSUNG ELECTRONICS

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