



VRF (Variable Refrigerant Flow) Installation manual

V*D****6M-5*

- Thank you for purchasing this Lennox Product.
- Before operating this unit, please read this manual carefully and retain it for future reference.



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SAMSUNG



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Safety Information

California Proposition 65 Warning (US)

⚠ WARNING : Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

Please follow the following safety information for safety of the installer and the user.

- VRF uses R-32 refrigerant.
 - When using R-32, moisture or foreign substances may affect the performance and reliability of the product. Safety precautions must be obeyed when installing the refrigerant pipe.
 - The designed maximum pressure of the system is 4.1MPa (594.6psi) and therefore select appropriate material and thickness according to the regulations.
 - Make sure to charge with liquid phase when filling refrigerant. If you charge gaseous refrigerant, it may affect the capacity and reliability of the product.
- You must connect the indoor units for R-32 refrigerant. Refer to product catalog to find out the models names for connectable indoor units. (If you connect the indoor units that are not designed for R-32, it cannot operated normally.)
- After completing the installation and trial operation, explain to the user how to use and maintain the product. Also, hand over this installation manual so that it can be stored by the user.
- Manufacturer is not responsible for the incidents occurred by improper installation. Installer is responsible for any installation related claims from the user occurred by neglecting warnings and cautions stated in this manual. (Installer will be responsible for any service charges that may occur)
- Generally, VRF should not be relocated after installation. But when it has to be relocated for inevitable reasons, please contact Lennox's qualified dealers for VRF.

⚠ WARNING

- Hazards or unsafe practices that may result in severe personal injury or death.

⚠ CAUTION

- Hazards or unsafe practices that may result in minor personal injury (to installer/user) or property damage.

Symbol	Meaning
	Flammable gas
	Flammable materials
	Refrigerant safety group
	Read installation manual
	Refer to installation manual
	Read service manual

General information

⚠ WARNING

- Consult qualified installer or dealer for installation.
 - When installation is done by unqualified person, problems such as water leakage, electric shock or fire may occur.
- Installation work must be done properly according to this installation manual.
 - When installation is not done properly, it may cause water leakage, electric shock or fire.
- When installing the unit in a small room, take measure to keep the refrigerant concentration from exceeding allowable safety limits in case of refrigerant leakage. Consult the dealer for precautionary measure before the installation.
 - When refrigerant leaks and exceed dangerous concentration level, it may cause suffocation accidents.
- If any gas or impurities, except R-32 refrigerant, come into the refrigerant pipe, serious problem may occur and it may cause injury.

Do not use means to accelerate the defrost operation or to clean, other than those recommended by Lennox.

Do not pierce or burn.

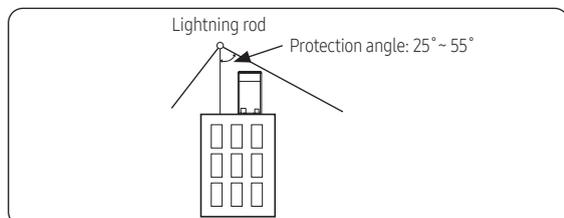
Be aware that refrigerants may not contain an odor.

Safety Information

- Use the supplied accessories, specified components and tools for the installation.
 - Do not use the pipe and the installation product used for refrigerants except R-32.
 - Failure to use the specified components can cause product fall down, water leakage, electrical shock, and fire. (The pipe and flare components used for refrigerants except R-32 must not be used)
- Install the outdoor unit on a hard and even place that can support its weight.
 - If the place cannot support its weight, the outdoor unit may fall down and it may cause injury.
- Check the following before installation and service work.
 - Before welding, remove dangerous and inflammable things that may cause an explosion and fire around the work.
 - Before welding, remove the refrigerant from inside the pipe or the product.
 - If you perform welding while refrigerant is in the pipe, it may increase the pressure of the refrigerant and cause the pipe to burst. If the pipe bursts or explodes, it may cause severe injury to the installer.
 - When welding, use the nitrogen gas to eliminate oxidation inside the pipe.
- Do not modify the product on your own.
 - Potential risk of electric shock, fire, product failure or injury.
- Fix the outdoor unit securely on foundation to resist strong wind or earthquake.
 - If the outdoor unit is not properly fixed, it turns over and accidents may occur.
- Electric work must be done by qualified persons, complying the national wiring regulations and installed according to the instruction stated in the installation manual with leased circuit.
 - Capacity shortage on the leased circuit and improper installation may cause electric shock or fire.
- Make sure to perform grounding work.
 - Do not connect the ground wire to a gas pipe, water pipe, lightning rod or telephone grounding. Improper grounding could cause electric shock.
- Wiring must be connected with the designated wires and it must be fixed securely so that it does not apply any external force to the connection part of the terminals.
 - If connection for fixation is not properly done, it may cause heat generation or fire.
- Neatly arrange the wires in the electrical parts to make sure that electrical cover is closed securely without any gaps.
 - If the cover is not properly closed, heat may generate on the electrical terminal and cause electric shock or fire.
- Exclusive circuit breaker (MCCB, ELB) must be installed to the power supply.
 - When overcurrent or current leakage occurs with no circuit breaker installed, power will not be cut-off and it may cause electric shock or fire.
 - Do not use damaged parts. It may cause fire or electric shock.
- You must cut-off the power before you work on, or adjust any power supply part for product installation, maintenance, repair or any other services.
 - There is risk of electric shock.
 - Even when the power is off, it is dangerous when you come in contact with inverter PCB, fan PCB since high pressure DC voltage is charged to those parts.
 - When replacing/repairing the PCB, cut-off the power and wait until the DC voltage is discharged before replacing/repairing them. (Wait for more than 15 minutes to allow it to discharge naturally.)
- If the refrigerant gas leaks during the installation, you should ventilate the room.
 - When the refrigerant gas gets in contact with flammable substance, it may generate toxic gas.
- Gas leakage must be checked after installation is completed.
 - When the refrigerant gas gets in contact with flammable substance, it may generate toxic gas.
- You can get frostbite if you get in contact with the leaked refrigerant gas.
- Supply power to the product during winter time since the product will operate in protection mode when the temperature decrease below 32 °F (0 °C).
 - If power is removed, compressor protection mode cannot operate and may cause damage to the product.
- Wear protective equipment (such as safety gloves, goggles, and headgear) during installation and maintenance works. Installation/repair technicians may be injured if protective equipment is not properly equipped.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

CAUTION

- Do not install the drain pipe directly to the bottom part of the outdoor unit and built a proper drainage so that water drains out smoothly. If not, pipe may freeze or bursts during winter time and cause damage to the product or water leakage.
 - When the draining work is not done properly, water leak may occur and cause property damage.
- Install the power cable and communication cable of the indoor and outdoor unit at least 4.92 ft (1.5 m) away from the electric appliances and install it at least 6.56 ft (2 m) away from the lightning conductor.
 - Noise may be generated from the electronic devices, depending on the status of the electric wave.
- Install the outdoor unit within the angle stated in the table, according to the height of the building.
 - Do not leave the refrigerant container under the hot sunlight. (There is risk of explosion.)
 - You must use the appropriate pipes according to the standard since the pressure of the refrigerant is high.
 - Make sure that the pipes does not get any weaker by welding it too much.
 - Make sure to install the product away from children's' reach. (Sharp parts of the heat exchanger may cause personal injury and when parts of the product gets damage, it may decrease product's performance.)



Height of the building	Protection angle
65.6 ft (20 m) or less	55°
131.2 ft (40 m) or less	35°
196.9 ft (60 m) or less	25°

- Install the indoor unit away from lighting apparatus that uses ballast stabilizer.
 - If you use the wireless remote control, it may not operate normally due to ballast stabilizer.
- Do not install the product in following places.
 - Place where outdoor unit's noise and warm air may disturb neighbors.
 - Do not leave any obstacles around the inlet and outlet of the product. (It may cause damage or accidents.)
 - The place where there is mineral oil or arsenic acid.
 - Those parts may get damaged due to burned resin and cause water leakage or product may fall.
 - The efficiency of the heat exchanger may reduce or product may break.
 - The place where corrosive gas such as sulfurous acid gas generates from the vent pipe or air outlet.
 - The copper pipe or connection pipe may corrode and refrigerant may leak.
 - The place where there is a machine that generates electromagnetic waves.
 - The air conditioner may not operate normally due to problems in control system.
 - The place where there is a danger of combustible gas leakage or place where thinner or gasoline is handled.
 - (There is risk of fire or explosion.)
 - The place with carbon fiber or flammable dust.
 - The place near seashore or hot spring where there is risk of outdoor unit corrosion.
- Changes in VRF compare to conventional models that has to noted when installing
 - For optimal distribution of the refrigerant, you must use Y-joint as branch joint for connecting outdoor units. (Do not use T-joint)
 - You cannot operate normally if you do not complete the trial operation through outdoor unit key mode. You must use KEY MODE to run trial operation.
 - Check the compatibility of other products such as indoor unit etc. which will be connected to VRF.
 - The length of maximum piping, level difference, the quantity of connectable indoor units, the installation at the outdoor joints and the outdoor unit combinations are different from the conventional models.
 - If the pipe length is over 6.56 ft (2 m) between outdoor units, make traps to prevent oil stagnation. Oil stagnation may occur when outdoor unit at the end of module stops while other outdoor units are still in operation.

Preparation of fire extinguisher

- If flammable work is to be done, appropriate fire extinguishing equipment should be available.
- Have a dry CO₂ fire extinguisher adjacent to the charging area and workspace.

Ignition source safety

- Make sure to store the units in a place without continuously operating ignition sources (for example, open flames, an operating gas appliance or an operating electric heater).
- The service technician shall not use any ignition sources with the risk of fire or explosion.
- Potential ignition sources shall be kept away from the work area where the flammable refrigerant can be released into the surrounding area.
- The work area should be checked to ensure that there are no flammable hazards or ignition risks. The "No Smoking" sign shall be attached.
- Under no circumstances shall potential sources of ignition be used while detecting refrigerant leaks.
- Make sure that the seals or sealing materials have not degraded.
- Safe parts are the ones with which the worker can work in a flammable atmosphere. Other parts may result in ignition due to leakage.
- Replace components only with parts specified by Lennox. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.

Area ventilation

- Make sure that the work area is well ventilated before performing hot work.
- Ventilation shall be made even during work.
- The ventilation should safely disperse any released gases and preferably expel them into the atmosphere.

Leakage detection methods

- The leakage detector shall be calibrated in a refrigerant-free area.
- Make sure that the detector is not a potential source of ignition.
- The leakage detector shall be set to the LFL (lower flammability limit).
- The use of detergents containing chlorine shall be avoided for cleaning because the chlorine may react with the refrigerant and corrode the piping.
- If leakage is suspected, naked flames shall be removed.
- The work area shall be checked with an appropriate refrigerant detector before and during work.
- Ensure that the leakage detector is appropriate for use with flammable refrigerants.



Safety Information

Labeling

- The parts shall be labeled to ensure that they have been decommissioned and emptied of refrigerant.
- The labels shall note the date of application.
- Make sure that the labels are affixed on the system to notify it contains flammable refrigerant.

Recovery

- When removing refrigerant from the system for servicing or decommissioning, it is recommended to remove the entire refrigerant charge.
- When transferring refrigerant into cylinders, make sure that only refrigerant recovery cylinders are used.
- All cylinders used for the recovered refrigerant shall be labeled.
- Cylinders shall be equipped with pressure relief valves and shut-off valves in a proper order.
- Empty recovery cylinders shall be evacuated and cooled before recovery.
- The recovery system shall operate normally according to the specified instructions and shall be suitable for refrigerant recovery.
- In addition, the calibration scales shall operate normally.
- Hoses shall be equipped with leak-free disconnect couplings.
- Before starting the recovery, check for the status of the recovery system and sealing state. Consult with the manufacturer if suspected.
- The recovered refrigerant shall be returned to the supplier in the correct recovery cylinders with the Waste Transfer Note attached.
- Do not mix refrigerants in the recovery units or cylinders.
- If compressors or compressor oils are to be removed, make sure that they have been evacuated to an acceptable level to ensure that flammable refrigerant does not remain in the lubricant.
- The evacuation process shall be performed before sending the compressor to the suppliers.
- Only the electrical heating of the compressor body is allowed to accelerate the process.
- Oil shall be drained safely from the system.
- For installation with handling the refrigerant (R-32), use dedicated tools and piping materials. Because the pressure of the refrigerant, R-32, is approximately 1.6 times higher than that of R-22, failure to use the dedicated tools and piping materials may cause rupture or injury. Furthermore, it may cause serious accidents such as water leakage, electric shock, or fire.
- Never install motor-driven equipment to prevent ignition.

Power supply line, fuse or circuit breaker

WARNING

- Always make sure that the power supply is compliant with current safety standards. Always install the air conditioner in compliance with current local safety standards.
- Always verify that a suitable grounding connection is available.
- Verify that the voltage and frequency of the power supply comply with the specifications and that the installed power is sufficient to ensure the operation of any other domestic appliance connected to the same electric lines.
- Always verify that the cut-off and protection switches are suitably dimensioned.
- Verify that the air conditioner is connected to the power supply following the instructions provided in the wiring diagram included in the manual.
- Always verify that electric connections (cable entry, section of leads, protections...) are compliant with the electric specifications and with the instructions provided in the wiring scheme. Always verify that all connections comply with the standards applicable to the installation of air conditioners.
- Devices disconnected from the power supply should be completely disconnected in the condition of overvoltage category.
- Be sure not to perform power cable modification, extension wiring, and multiple wire connections.
 - It may cause electric shock or fire due to poor connection, poor insulation, or current limit override.

Precautions for using R-32 refrigerant

General

- This product is pre-charged with mildly flammable gas classified as A2L by ASHRAE. The following precautions and instruction manuals must be followed during installation, operation, servicing and decommissioning of the product.
- The appliance shall be stored in a room without continuously operating ignition sources, like open flames or a gas appliance or an electric heater.
- All national and local regulations shall be observed at all times.
- All pipe-work including piping material, pipe routing and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, ASHRAE 15.2, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.
- All field piping and joints shall be pressure tested with an inert gas according to prevalent industry standards prior to refrigerant charging and system commissioning.
- Where additional field charging is required. The installer shall write with a permanent marker the field charge added on the ODU label provided, such that the Total Charge = Factory 'Pre-charge' + field charge.
- For ducted systems, any auxiliary systems that are potential ignition sources shall not be installed in the duct work. Examples of ignition sources are hot surfaces with temperatures exceeding 1292 °F (700 °C) and electric switching devices.



- Any auxiliary device installed must be approved by Lennox and must be suitable for operating with the refrigerant marked on the label.
- Where mechanical ventilation is used, the lower edge of the air extraction opening shall not be more than 3.94 inch (100 mm) above the floor. The exhaust location outside the building must be at least 9.84 ft (3 m) away from the building opening and mechanical air intake openings.
- To handle, purge, and dispose of the refrigerant, or break into the refrigerant circuit, the worker should have a certificate from an industry accredited authority.
- Non-ducted systems may be installed in areas such as false ceilings not being used as return air plenum if the conditioned air does not mix with the air in the false ceilings.
- For ducted appliances false ceiling or drop ceilings may be used as return air plenum if a refrigerant leak detection system is provided in the system and any external connections are also provided with a sensor immediately below the return air plenum duct joint.
- Installation, servicing and any type of maintenance or repair must be performed by certified personnel that are competent to carry out such activity in accordance with national and local regulations.

General Information on Servicing

- Do not work in a confined space. Ensure adequate ventilation is provided at the workspace during the entirety of the duration of the work to safely disperse any released refrigerant.
- All maintenance staff and others working in the local area shall be instructed on the nature of the work being performed and instructed to follow all instructions provided by Lennox, national and local authorities.
- The area shall be checked with an approved refrigerant detector before and during any work on the system.
- Have a dry CO₂ fire extinguisher adjacent to the charging area and workspace.

The following checks shall be applied to installations and maintenance operations.

- The actual total refrigerant charge is in accordance with the room size in accordance with Table 1.
- The ventilation machinery and outlets are operating adequately and are not obstructed.
- Markings on the equipment are visible and legible.
- Refrigerant pipes or components are installed in a position where they are unlikely to be exposed to any substance that may corrode refrigerant containing components.

Initial checks of electrical devices shall include the following.

- that capacitors are discharged in a safe manner to avoid sparking.
- that no live electrical components and wiring are exposed while charging, recovering or purging the system.
- That there is continuity to earth bonding.
- Check that the cabling is not worn, corroded or damaged in any manner.

Electrical repair safety measures

- All electrical components used or replaced must be to Lennox's specifications.
- If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with.
- Sealed electrical components and intrinsically safe components shall be replaced and not repaired.
- Cabling should be protected from excessive vibration, pressure, sharp edges, and other adverse environmental factors.

Detection of flammable refrigerants

- Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
- Make sure that the detector is not a potential source of ignition.
- Leak detection equipment shall be set at a percentage of the LFL (Lower flammable limit) of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (25% maximum) is confirmed.
- The use of detergents containing chlorine shall be avoided for cleaning because the chlorine may react with the refrigerant and corrode the piping.
- If leakage is suspected, naked flames shall be removed.
- The work area shall be checked with an appropriate refrigerant detector before and during work.
- Ensure that the leakage detector is appropriate for use with flammable refrigerants.

Removal and Evacuation

- When removing refrigerant for servicing it is recommended to remove the entire quantity.
- When removing refrigerant follow local and national regulations and follow best practices including;
 - evacuate;
 - purge the circuit with inert gas (optional for A2L);
 - evacuate (optional for A2L);
 - continuously flush or purge with inert gas when using a flame to open the circuit; and
 - open the circuit.
- Use proper recovery cylinders appropriate for the type of refrigerant.
- Follow prescribed industry best practices for purging and evacuation.
- Oxygen free nitrogen shall be used for purging the system.

Safety Information

Charging procedure

- Follow industry standard refrigerant charging best practices.
- Before recharging the system, it shall be pressure tested with oxygen-free nitrogen gas.
- Ensure that contamination of different refrigerants does not occur when charging.
- Cylinders shall be kept in the appropriate position as per instructions.
- The refrigerant system should be grounded before charging the system.
- Label the system when charging is completed.
- Take extreme care not to overfill the refrigeration system.
- The system shall be leak tested on completion of charging before commissioning.

Decommissioning

- Only qualified licensed professionals shall perform refrigerant recovery and decommissioning.
- Isolate the system electrically.
- All recovery equipment and cylinders shall conform to appropriate standards. Only approved cylinders, with pressure relief valves, for the type of refrigerant shall be used.
- Recover refrigerant following industry standard procedure for flammable refrigerants.
- When draining compressors oil care must be taken that there is no flammable refrigerant in the compressor and that the compressor is not hot. Oil should be handled according to local and federal regulations.
- After decommissioning, the system shall be labeled stating that it has been decommissioned. The label shall be dated and signed. The label should state that it "contains flammable refrigerant".
- Ensure that there are labels on the equipment indicating the equipment contains flammable refrigerant.
- Recovered refrigerant shall not be mixed or reused. It shall be processed according to national, state and local regulations.

FOR BATTERY USAGE

WARNING

- Do not use your product in a hot environment or near a fire.
- Do not swallow or disassemble any battery, chemical burn hazard.
- If the battery from your product is swallowed, it can cause severe internal burns in just 2 hours and can lead to death.
- Keep batteries away from infants and children. If the battery compartment does not close securely, stop using the product and keep it away from infants and children. If you think the batteries might have been swallowed or inserted inside any part of the body, seek immediate medical attention.

WARNING

- **INGESTION HAZARD:** This product contains a button cell or coin battery.
- **DEATH** or serious injury can occur if ingested.
- A swallowed button cell or coin battery can cause **Internal Chemical Burns** in as little as **2 hours**.
- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.



- Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.
- Even used batteries may cause severe injury or death.
- Call a local poison control center for treatment information.
- Compatible battery is ML414H.
- Nominal battery voltage is 3 V.
- Non-rechargeable batteries are not to be recharged.
- Do NOT force discharge, recharge, disassemble, heat above -4 °F (-20 °C) to +140 °F (+60 °C) or incinerate. Doing so may result in injury due to venting, leakage or explosion resulting in chemical burns.
- This product contains non-replaceable batteries.

Possible symptoms of battery consumption

If a battery has been ingested, or there is a possibility one might have been ingested, please seek medical attention and inform the medical authorities that you suspect battery ingestion.

It's not always clear when a child has swallowed a button battery, as there are no specific symptoms. However, they might:

- cough, gag, or drool;
- seem to have a stomach bug or virus;
- vomit;
- complain of pain in their stomach, chest, or throat;
- appear tired or sluggish; and
- lose their appetite.

Since the signs aren't obvious, it's important to keep a close eye on loose, used, or spare button batteries in your home, as well as the products that contain them.



- **KEEP** new and used batteries **OUT OF REACH of CHILDREN**
- **Seek immediate medical attention** if a battery is suspected to be swallowed or inserted inside any part of the body.



R-32 General Guidelines for Compliance

DISCLAIMER: This section is provided as a general guideline to assist with compliance for VRF system installations. It is not intended to serve as a substitute for a comprehensive code compliance document. The responsibility for ensuring that all designs, installations, and operations meet applicable regulations, codes, and standards rests solely with the project's licensed engineer or other qualified design professional.

The VRF uses R-32, a mildly flammable gas classified as A2L by ASHRAE. The system is certified as Enhanced Tightness Refrigeration System (ETRS) and allows for connection with shut off valve box and remote-control alarm to alert the users and limit the refrigerant leakage in case of a leak. Follow the installation requirement presented in this manual, and ensure system is compliant with relevance regulations and codes.

Outdoor Unit

Ensure that the outdoor unit is installed outdoors. If installed indoor, additional safety measures may be required to comply with applicable regulations. The outdoor unit includes an external output terminal that can be used to activate safety devices. This terminal outputs a signal if the R-32 sensor in the indoor unit detects a refrigerant leak or if the sensor malfunctions or short-circuits. This signal can be used to trigger required safety measures for the outdoor unit, such as activating a ventilation system or alarm.

Indoor Unit

Safety measures should be determined based on the size of the room where the indoor unit is installed and the total R-32 refrigerant charge of the system. Use the instructions in this manual as a guideline to help assess the necessary safety measures. The indoor unit includes an output signal for external devices, which is activated if the R-32 sensor detects a refrigerant leak or if the sensor malfunctions or short-circuits. This signal can be used to activate additional safety devices, such as a ventilation system or alarm. For detailed information on using this function, refer to the indoor unit installation manual.

Deciding on the required Safety Measures for indoor unit

- Step 1: Determine the system's total refrigerant charge.
The total refrigerant charge of the system is determined by the sum of the refrigerant charged in the outdoor unit and the additional refrigerant required based on the piping length and indoor unit combination.
- Step 2: Determine the smallest area of the room the indoor units are installed in.
It includes the room where the indoor unit is directly installed and the room served by the ducted indoor unit.
Calculate the area of the room with walls, doors, and partitions excluded.
Spaces connected by false ceilings, ducts, or similar connections are not considered a single space.
- Step 3: Referring to the total refrigerant charge determined in Step 1, determine the minimum required room area from the table below.
- Step 4: If the smallest area of the room determined in step 2 is larger than the minimum required room area determined in step 3, no additional measures are necessary. However, if the smallest area of the room determined in step 2 is smaller than that minimum required room area, additional safety measures must be taken (e.g., changing installation conditions, ventilation, shut-off valves).

R-32 General Guidelines for Compliance

<Table 1>

m [lbs(kg)] Installation Height [ft(m)]	Minimum required room area [A, ft ² (m ²)]			
	2.0(0.6)	5.9(1.8)	7.2(2.2)	8.2(2.5)
11.02(5)	586(54.47)	195(18.16)	160(14.85)	141(13.07)
13.23(6)	704(65.36)	235(21.79)	192(17.83)	169(15.69)
15.43(7)	821(76.25)	274(25.42)	224(20.8)	197(18.3)
17.64(8)	938(87.15)	313(29.05)	256(23.77)	225(20.92)
19.84(9)	1055(98.04)	352(32.68)	288(26.74)	253(23.53)
22.05(10)	1173(108.93)	391(36.31)	320(29.71)	281(26.14)
24.25(11)	1290(119.83)	430(39.94)	352(32.68)	310(28.76)
26.46(12)	1407(130.72)	469(43.57)	384(35.65)	338(31.37)
28.66(13)	1524(141.61)	508(47.2)	416(38.62)	366(33.99)
30.86(14)	1642(152.51)	547(50.84)	448(41.59)	394(36.6)
33.07(15)	1759(163.4)	586(54.47)	480(44.56)	422(39.22)
35.27(16)	1876(174.29)	625(58.1)	512(47.53)	450(41.83)
37.48(17)	1993(185.19)	664(61.73)	544(50.51)	478(44.44)
39.68(18)	2111(196.08)	704(65.36)	576(53.48)	507(47.06)
41.89(19)	2228(206.97)	743(68.99)	608(56.45)	535(49.67)
44.09(20)	2345(217.86)	782(72.62)	640(59.42)	563(52.29)
46.3(21)	2462(228.76)	821(76.25)	672(62.39)	591(54.9)
48.5(22)	2580(239.65)	860(79.88)	704(65.36)	619(57.52)
50.71(23)	2697(250.54)	899(83.51)	736(68.33)	647(60.13)
52.91(24)	2814(261.44)	938(87.15)	767(71.3)	675(62.75)
55.12(25)	2931(272.33)	977(90.78)	799(74.27)	704(65.36)
57.32(26)	3049(283.22)	1016(94.41)	831(77.24)	732(67.97)
59.52(27)	3166(294.12)	1055(98.04)	863(80.21)	760(70.59)
61.73(28)	3283(305.01)	1094(101.67)	895(83.18)	788(73.2)
63.93(29)	3400(315.9)	1133(105.3)	927(86.16)	816(75.82)
66.14(30)	3518(326.8)	1173(108.93)	959(89.13)	844(78.43)
68.34(31)	3635(337.69)	1212(112.56)	991(92.1)	872(81.05)
70.55(32)	3752(348.58)	1251(116.19)	1023(95.07)	901(83.66)
72.75(33)	3869(359.48)	1290(119.83)	1055(98.04)	929(86.27)
74.96(34)	3987(370.37)	1329(123.46)	1087(101.01)	957(88.89)
77.16(35)	4104(381.26)	1368(127.09)	1119(103.98)	985(91.5)
79.37(36)	4221(392.16)	1407(130.72)	1151(106.95)	1013(94.12)
81.57(37)	4338(403.05)	1446(134.35)	1183(109.92)	1041(96.73)
83.78(38)	4456(413.94)	1485(137.98)	1215(112.89)	1069(99.35)
85.98(39)	4573(424.84)	1524(141.61)	1247(115.86)	1097(101.96)
88.18(40)	4690(435.73)	1563(145.24)	1279(118.84)	1126(104.58)
90.39(41)	4807(446.62)	1602(148.87)	1311(121.81)	1154(107.19)
92.59(42)	4925(457.52)	1642(152.51)	1343(124.78)	1182(109.8)
94.8(43)	5042(468.41)	1681(156.14)	1375(127.75)	1210(112.42)
97(44)	5159(479.3)	1720(159.77)	1407(130.72)	1238(115.03)
99.21(45)	5276(490.2)	1759(163.4)	1439(133.69)	1266(117.65)
101.41(46)	5394(501.09)	1798(167.03)	1471(136.66)	1294(120.26)
103.62(47)	5511(511.98)	1837(170.66)	1503(139.63)	1323(122.88)
105.82(48)	5628(522.88)	1876(174.29)	1535(142.6)	1351(125.49)
108.03(49)	5745(533.77)	1915(177.92)	1567(145.57)	1379(128.1)
110.23(50)	5863(544.66)	1954(181.55)	1599(148.54)	1407(130.72)
112.44(51)	5980(555.56)	1993(185.19)	1631(151.52)	1435(133.33)
114.64(52)	6097(566.45)	2032(188.82)	1663(154.49)	1463(135.95)
116.85(53)	6214(577.34)	2071(192.45)	1695(157.46)	1491(138.56)
119.05(54)	6332(588.24)	2111(196.08)	1727(160.43)	1520(141.18)

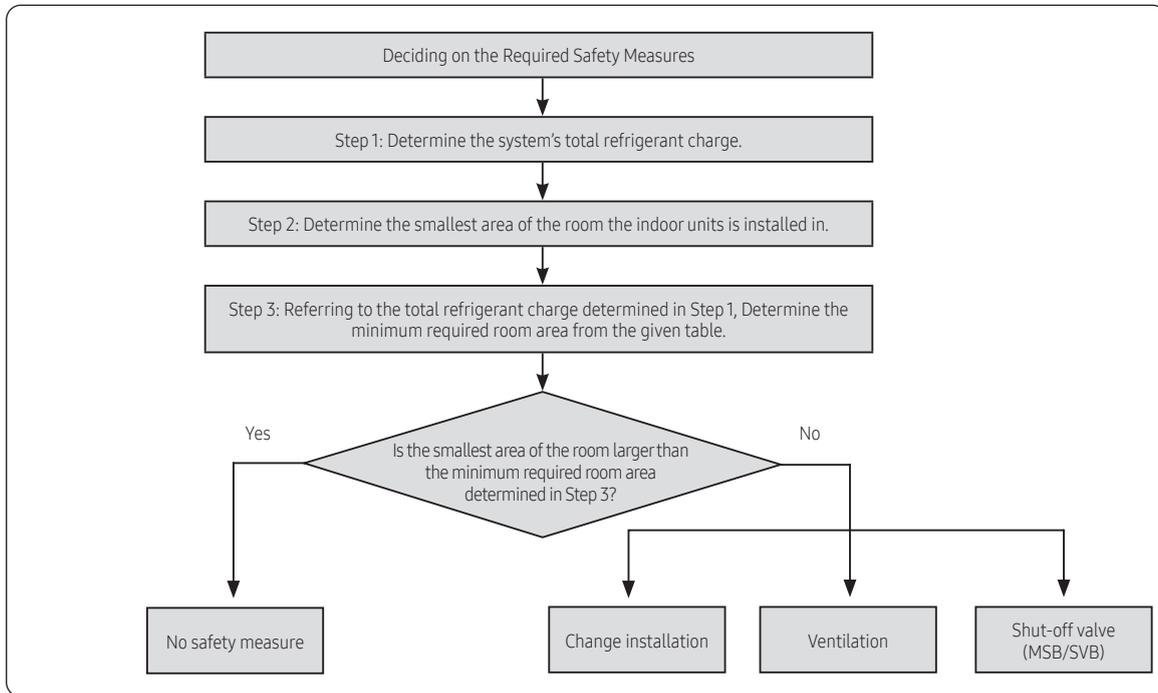
m [lbs(kg)] Installation Height [ft(m)]	Minimum required room area [A, ft ² (m ²)]			
	2.0(0.6)	5.9(1.8)	7.2(2.2)	8.2(2.5)
121.25(55)	6449(599.13)	2150(199.71)	1759(163.4)	1548(143.79)
123.46(56)	6566(610.02)	2189(203.34)	1791(166.37)	1576(146.41)
125.66(57)	6683(620.92)	2228(206.97)	1823(169.34)	1604(149.02)
127.87(58)	6801(631.81)	2267(210.6)	1855(172.31)	1632(151.63)
130.07(59)	6918(642.7)	2306(214.23)	1887(175.28)	1660(154.25)
132.28(60)	7035(653.59)	2345(217.86)	1919(178.25)	1688(156.86)
134.48(61)	7152(664.49)	2384(221.5)	1951(181.22)	1717(159.48)
136.69(62)	7270(675.38)	2423(225.13)	1983(184.19)	1745(162.09)
138.89(63)	7387(686.27)	2462(228.76)	2015(187.17)	1773(164.71)
141.1(64)	7504(697.17)	2501(232.39)	2047(190.14)	1801(167.32)
143.3(65)	7622(708.06)	2541(236.02)	2079(193.11)	1829(169.93)
145.51(66)	7739(718.95)	2580(239.65)	2111(196.08)	1857(172.55)
147.71(67)	7856(729.85)	2619(243.28)	2143(199.05)	1885(175.16)
149.91(68)	7973(740.74)	2658(246.91)	2175(202.02)	1914(177.78)
152.12(69)	8091(751.63)	2697(250.54)	2207(204.99)	1942(180.39)
154.32(70)	8208(762.53)	2736(254.18)	2238(207.96)	1970(183.01)
156.53(71)	8325(773.42)	2775(257.81)	2270(210.93)	1998(185.62)
158.73(72)	8442(784.31)	2814(261.44)	2302(213.9)	2026(188.24)
160.94(73)	8560(795.21)	2853(265.07)	2334(216.87)	2054(190.85)
163.14(74)	8677(806.1)	2892(268.7)	2366(219.85)	2082(193.46)
165.35(75)	8794(816.99)	2931(272.33)	2398(222.82)	2111(196.08)
167.55(76)	8911(827.89)	2970(275.96)	2430(225.79)	2139(198.69)
169.76(77)	9029(838.78)	3010(279.59)	2462(228.76)	2167(201.31)
171.96(78)	9146(849.67)	3049(283.22)	2494(231.73)	2195(203.92)
174.17(79)	9263(860.57)	3088(286.86)	2526(234.7)	2223(206.54)
175.4(79.56)	9329(866.67)	3110(288.89)	2544(236.36)	2239(208)

※ If the total refrigerant charge for your system is not shown, use linear interpolation to calculate it using the closest smallest and largest area values in the table.
 And if the height for your installation is not shown, use the closest lower height value in the table.
 To get a more accurate confirmation, consult the appropriate experts.

m Total refrigerant charge in the system [kg]

A_{min} Minimum room area [m²]

Flowchart



R-32 General Guidelines for Compliance

Safety measures

Alarm

The R-32 wired remote controller (MWR-WG01**) is equipped with a refrigerant leakage alarm.

For details on R-32 wired remote controller with alarm functionality, please refer to the installation and user manual provided with the remote controller.

Change Installation

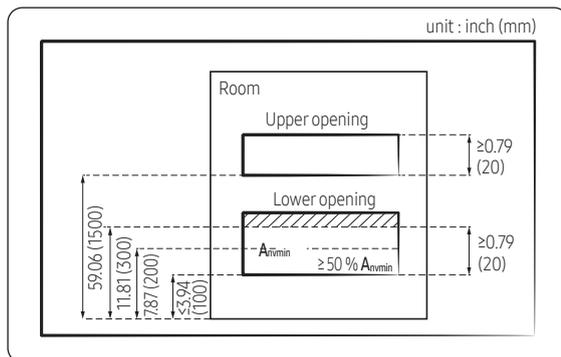
By changing the installation conditions, the safety measure decision step can be re-executed.

Re-execute the decision step after the following actions:

- 1 Increase the area of the smallest room where the indoor unit is installed.
- 2 Reduce the length of the piping to decrease the total refrigerant charge of system.
- 3 Increase the installation height of the product.

Natural ventilation

Natural ventilation is a safety measure involving ventilation through a large space with enough air to dilute leaked refrigerant. If natural ventilation is applied, the following conditions must be met:



A_{nvmin} Minimal natural ventilation area

Lower opening:

- Not an opening leading to the outside.
- Not an opening that can be closed.
- Area of the opening is $\geq 0.13 \text{ ft}^2$ (0.012 m^2) (A_{nvmin}).
- Area of an opening from the floor that is 12 inch (300 mm) or greater is not included in the calculation of A_{nvmin} .
- A minimum of 50 % of A_{nvmin} must be located below 8 inch (200 mm) from the floor.
- The bottom of the lower opening must be located at ≤ 4 inch (100 mm) from the floor.
- The height of the opening is ≥ 0.78 inch (20 mm).

Upper opening:

- Not an opening leading to the outside.
- Not an opening that can be closed.
- The area of the opening is $\geq 0.065 \text{ ft}^2$ (0.006 m^2) (50 % of A_{nvmin}).
- The bottom of the lower opening must be located at ≥ 59 inch (1500 mm) from the floor.
- The height of the opening is ≥ 0.78 inch (20 mm).

* Upper opening requirements can be satisfied through false ceilings, ventilation ducts, or similar arrangements for airflow between connected rooms.

Mechanical ventilation

The indoor unit provides an additional output signal for external devices.

This output signal occurs if the R-32 sensor in the indoor unit detects a refrigerant leak, or the R-32 sensor has a malfunction or short circuit.

Based on this signal, a mechanical ventilation system can be activated.

If mechanical ventilation is applied, the following conditions must be met:

- The upper edge of the air outlet must be located at the same level as or below the refrigerant release point.
- The mechanical ventilation air extracted from the space must be positioned relative to the mechanical ventilation air intake openings to ensure that the supplementary air mixes with the leaked refrigerant.
- Required airflow (Please refer to the technical data for the exact required airflow value.)

Shut-off valves

R-32 MSB/SVB with built in shut-off valve can be used as a safety device section off pipes and reduce releasable charge.

As the M_{rel} , which is releasable charge that can be released per port, is used, the total refrigerant charge in the system is no longer used for the minimum required room area calculation.

The maximum possible refrigerant leakage is determined by the length of the piping and the size of the indoor heat exchanger, which are related to the capacity of the indoor units connected to each port.

If a leak is detected from an indoor unit, the shut-off valve within the MSB/SVB for the corresponding port will close. This isolates the leaking section of the piping from the rest of the system, significantly reducing the amount of refrigerant that could leak.

The maximum allowable indoor unit capacity is determined according to the following procedure.

- Step 1: Determine the smallest area among the following:
 - Each room where indoor units connected to the MSB/SVB unit branch piping port are installed.
 - Each room served by duct-type indoor units installed in other rooms.

Calculate the area of the room with walls, doors, and partitions excluded. Spaces connected by false ceilings, ducts, or similar connections are not considered a single space.

Using the calculated area of the smallest room from above, determine the maximum allowable indoor unit capacity for the corresponding port in the next step.

- Step 2: Use the table to determine the maximum allowable indoor unit capacity (the sum of the capacities of all connected indoor units) for each branch piping port.
(* Round down the calculated value.)

Area of installed/ conditioned room [ft ² (m ²)]	Maximum total indoor unit capacity[Btu/h(kW)]	
	1 port 1 room or 2 port 1 room	1 port multi-room
<53.82(5)	-	-
53.82(5)	5118(1.5)	
64.58(6)	5118(1.5)	
75.35(7)	5118(1.5)	
86.11(8)	5118(1.5)	
96.88(9)	5118(1.5)	
107.64(10)	19108(5.6)	
118.4(11)	19108(5.6)	10236(3)
129.17(12)	19108(5.6)	10236(3)
139.93(13)	19108(5.6)	10236(3)
150.69(14)	19108(5.6)	10236(3)
161.46(15)	24226(7.1)	10236(3)
215.28(20)	47770(14)	10236(3)
269.1(25)	95540(28)	20473(6)
322.92(30)	95540(28)	25591(7.5)
376.74(35)	95540(28)	30709(9)
430.56(40)	95540(28)	35827(10.5)
484.38(45)	95540(28)	40946(12)
≥538.2(50)	95540(28)	54594(16)

- Step 3: The total indoor unit capacity connected to each branch piping port must be equal to or less than the capacity limit derived from the table. If not, the installation must be adjusted, and all the steps above should be repeated.

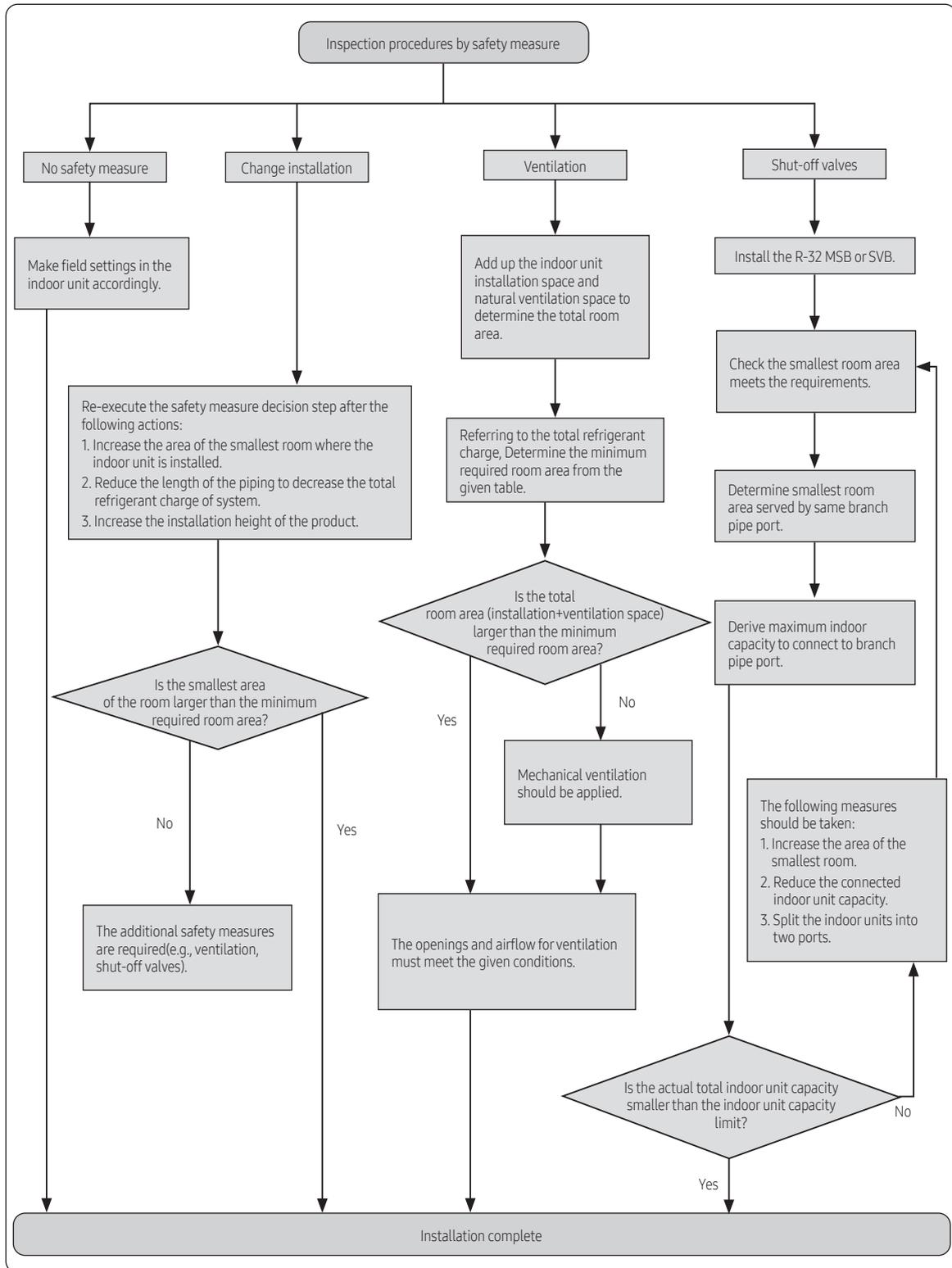
Possible measures:

- Increase the area of the smallest room connected to the same branch piping port.
- Reduce the capacity of the indoor units connected to the same branch piping port.
- Split the indoor unit capacity into two separate branch piping ports.
- Consult with appropriate experts to adjust the system through more detailed calculations.

For details on the installation of the MSB/SVB, please refer to the installation manual provided with the MSB/SVB.

R-32 General Guidelines for Compliance

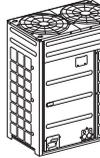
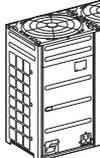
Flowchart



Installation Procedure

Preparations for Outdoor Unit

Outdoor unit classification

Classification	VRF Small type	VRF Large type	VRF X-Large type
Appearance			

⚠ CAUTION

Packaging material disposition

- Safely store or dispose the packaging materials.
 - Sharp metals such as nails or wooden material packaging that may break into pieces become a cause for personal injury.
 - Make sure to store or dispose the vinyl type packaging material to keep it out of reach of children. Children may put them over their face, which is very dangerous since it may lead them to suffocation.

Moving the outdoor unit

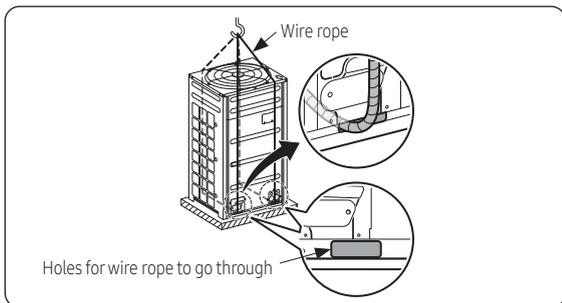
- Select the moving path in advance.
- Be sure that moving path can support weight of the outdoor unit.
- Do not slant the product more than 30° when carrying it. (Do not lay the product down in sideways.)
- Surface of the heat exchanger is sharp. Be careful not to get injured while moving the product.
- When transporting VRF outdoor, be aware of the center of gravity of the outdoor (Please refer to the center of gravity label attached on the front panel, and remove it after installation.)

⚠ CAUTION

- You must use certain part of the product when moving the product.

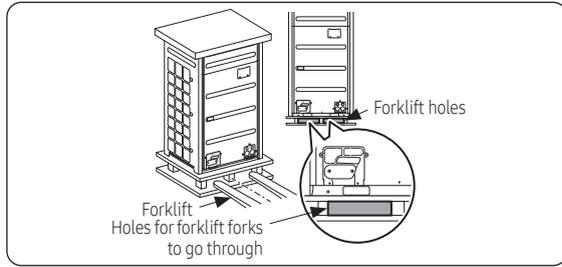
When moving with a crane

- Fasten the wire rope as shown in the figure.
- To protect damage or scratches, insert a piece of cloth between the outdoor unit and the wire rope.



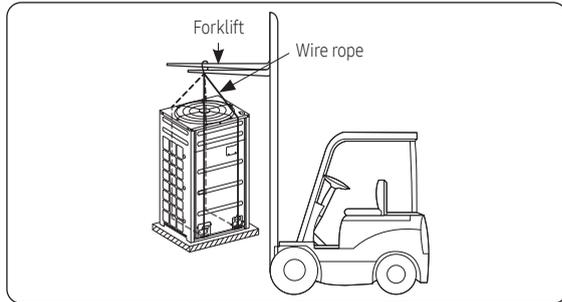
When moving with a forklift

- Carefully insert the forklift forks into the forklift holes at the bottom of the outdoor unit.
- Be careful with the forklift from damaging the product.



When moving the product without wooden pallet and the crane is not available for use

- Connect a wire rope to the outdoor unit as you would move it with a crane.
- Hang the wire rope to the forklift fork to move the outdoor unit.



Outdoor unit combination

- Make sure to use an indoor unit that is compatible with VRF.
- Indoor units can be connected within the range indicated in following table.
- If the total capacity of the connected indoor units exceeds the indicated maximum capacity, cooling and heating capacity of the indoor unit may decrease.
- Total capacity of the connected indoor units can be allowed from 50 % to 130 % of the total outdoor unit capacity. $0.5 \times \Sigma(\text{Outdoor unit capacity}) \leq \text{Total capacity of the connected indoor units} \leq 1.3 \times \Sigma(\text{Outdoor unit capacity})$
- Please contact your local Lennox representative or refer to the Technical Data Book for further details if the project requires you to design the project with a connection ratio greater than 130 %.
- You can connect maximum 64 indoor units to the outdoor unit. Maximum quantity of connectable indoor unit is set to 64 since outdoor unit only support up to 64 communication address. Indoor unit address can be assigned from 0~63. If the indoor unit address was assigned from 64~79, E201 error will occur.
- Maximum 32 Wall-mount type indoor units with EEV (VWMD***S6-5P) can be connected.
- Do not install MSB for R-410A refrigerant. It is not compatible with R-32 products.
 - MSB for R-410A refrigerant: V1MSBB**HR
 - MSB for R-32 refrigerant: V2MSBB**HR

⚠ CAUTION

- Use the following table to determine the size and number of outdoor units needed to achieve the capacity requirements.

Preparations for Outdoor Unit

Module combination for V*D***S6M-5* series

Model name for combination	Number of individual outdoor units	Nominal Capacity		Rated Capacity		Total cooling capacity of the connected indoor units		Maximum number of connectable indoor units	Combined outdoor units								
		Cooling (Btu/h)	Heating (Btu/h)	Cooling (Btu/h)	Heating (Btu/h)	Minimum (Btu/h)	Maximum (Btu/h)		V*D***S6M-5*								
									072 (6Ton)	096 (8Ton)	120 (10Ton)	144 (12Ton)	168 (14Ton)	192 (16Ton)	216 (18Ton)	240 (20Ton)	
V*D072S6M-5*	1	72000	81000	69000	77000	36000	93600	12	1								
V*D096S6M-5*	1	96000	108000	92000	103000	48000	124800	16		1							
V*D120S6M-5*	1	120000	135000	114000	129000	60000	156000	20			1						
V*D144S6M-5*	1	144000	162000	138000	154000	72000	187200	25				1					
V*D168S6M-5*	1	168000	189000	160000	180000	84000	218400	29					1				
V*D192S6M-5*	1	192000	216000	184000	206000	96000	249600	33						1			
V*D216S6M-5*	1	216000	243000	206000	232000	108000	280800	37								1	
V*D240S6M-5*	1	240000	270000	228000	258000	120000	312000	41									1
V*D264S6M-5*	2	264000	297000	252000	282000	132000	343200	45		1			1				
V*D288S6M-5*	2	288000	324000	274000	308000	144000	374400	49		1				1			
V*D312S6M-5*	2	312000	351000	298000	334000	156000	405600	54		1					1		
V*D336S6M-5*	2	336000	378000	320000	360000	168000	436800	58		1							1
V*D360S6M-5*	2	360000	405000	342000	386000	180000	468000	62			1						1
V*D384S6M-5*	2	384000	432000	366000	412000	192000	499200	64						2			
V*D408S6M-5*	2	408000	459000	388000	438000	204000	530400	64						1	1		
V*D432S6M-5*	3	432000	486000	412000	462000	216000	561600	64			2			1			
V*D456S6M-5*	3	456000	513000	436000	488000	228000	592800	64			1	1		1			

Module combination for V*D***L6M-5* series

Model name for combination	Number of individual outdoor units	Nominal Capacity		Rated Capacity		Total cooling capacity of the connected indoor units		Maximum number of connectable indoor units	Combined outdoor units		
		Cooling (Btu/h)	Heating (Btu/h)	Cooling (Btu/h)	Heating (Btu/h)	Minimum (Btu/h)	Maximum (Btu/h)		V*D***L6M-5*		
									072 (6Ton)	096 (8Ton)	120 (10Ton)
V*D072L6M-5*	1	72000	81000	69000	77000	36000	93600	12	1		
V*D096L6M-5*	1	96000	108000	92000	103000	48000	124800	16		1	
V*D120L6M-5*	1	120000	135000	114000	129000	60000	156000	20			1
V*D144L6M-5*	2	144000	162000	138000	154000	72000	187200	25	2		
V*D168L6M-5*	2	168000	189000	161000	180000	84000	218400	29	1	1	
V*D192L6M-5*	2	192000	216000	184000	206000	96000	249600	33		2	
V*D216L6M-5*	3	216000	243000	206000	232000	108000	280800	37	3		
V*D240L6M-5*	3	240000	270000	228000	258000	120000	312000	41	2	1	
V*D264L6M-5*	3	264000	297000	252000	283000	132000	343200	45	2		1
V*D288L6M-5*	3	288000	324000	275000	309000	144000	374400	49	1	1	1

Choosing the installation location

Outdoor unit location requirements

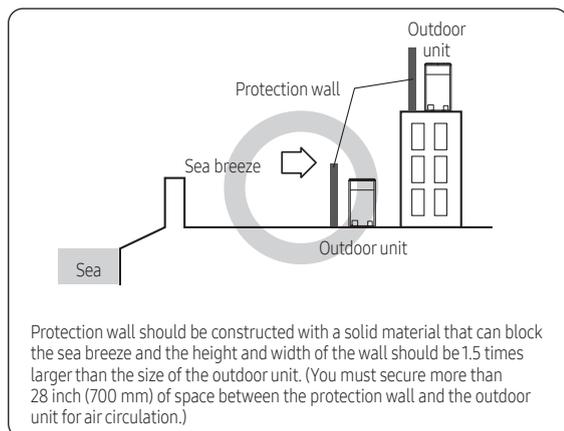
Decide the installation location, with the consideration of the following conditions, under user's approval.

- Place where hot discharge air or noise from the outdoor unit may not disturb the neighbor.
- Place where structure can bear the weight and vibration of the outdoor unit.
- Place with flat surface where rainwater does not settle or leak.
- Place where it is not exposed to strong wind.
- Place in a well ventilated place with sufficient service place for repairs and maintenance. A discharge duct may be required (field provided).
- Place where you can connect the refrigerant pipes between indoor and outdoor units within allowable distance.
- Place where it allows easy waterproofing and draining work for the condensation water generated from the outdoor unit during heating operation.
- Place where there is no risk of inflammable gas leakage.
- Place where there is no direct influence of snow or rain.
- Place where a large amount of water generated by external environment does not directly affect the top of the outdoor unit.

Installation Guide at the seashore

Make sure to follow below guides when installing at the seashore.

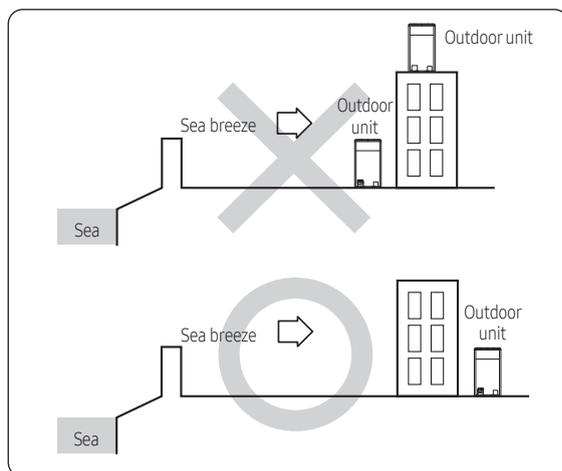
- 1 Do not install the product in a place where it is directly exposed to sea water and sea breeze.
 - Make sure to install the product behind a structure (such as building) that can block sea breeze.
 - Even when it is inevitable to install the product in seashore, make sure that product is not directly exposed to sea breeze by installing a protection wall.



- 2 Consider that the salinity particles clinging to the external panels should be sufficiently washed out.
- 3 Because the residual water at the bottom of the outdoor unit significantly promotes corrosion, make sure that the slope does not disturb drainage.
 - Keep the floor level so that rain does not accumulate.
 - Be careful not to block the drain hole due to foreign substance
- 4 When product is installed in seashore, periodically clean it with water to remove attached salinity.

- 5 Make sure to install the product in a place that provides smooth water drainage. Especially, ensure that the base part has good drainage.
- 6 If the product is damaged during the installation or maintenance, make sure to repair it.
- 7 Check the condition of the product periodically.
 - When the product is to be shut down for a long period of time, such as off-peak hours, take appropriate measures like covering the product.
- 8 If the product installed within 1640 ft (500 m) of seashore, special anti-corrosion treatment is required.
 - × Please contact your local Lennox representative for further details.

If you cannot find a proper location to install the outdoor unit, consult with an expert or specialty store.



CAUTION

- System air conditioner may cause static noise when listening to AM stations. Therefore, select an installation location for indoor unit where electrical wiring can be done while keeping certain distance from a radio, computer and stereo equipment.
 - Especially, keep the unit at least 9.84 ft (3 m) away from the electrical equipment in an area with weak electromagnetic waves and put the main power cable and communication cables in a separately installed protection tube.
 - Make sure that there is no equipment that generates electromagnetic waves. If not electromagnetic waves may cause problem to the control systems which may lead to air conditioner malfunction. (Example: Remote control sensor of the indoor unit may not receive the signal very well, due to ballast stabilizer of the lighting equipment.)
- In regions with heavy snowfall, make sure to install the outdoor unit where there is no concerns of direct snowfall on the outdoor unit. Also, build higher base support so that accumulated snow does not block the air inlet or the heat exchanger.
- R-32 refrigerant is slightly flammable. Therefore, a ventilation device is required if the outdoor unit is installed indoors or in an enclosed area.
- When you install the outdoor unit in high places such as a roof, install fence or guardrail around it. When there is no fence or guardrail, service person could fall.

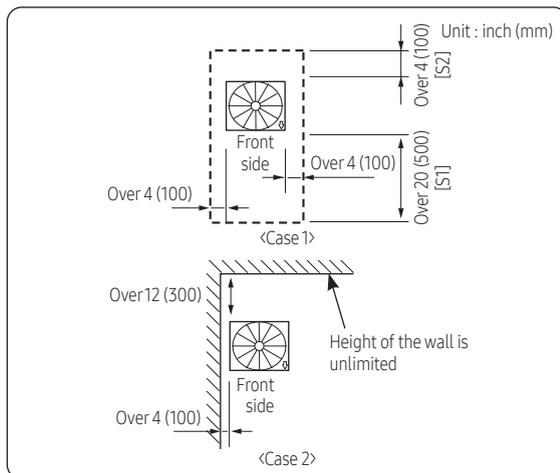
Choosing the installation location

- Do not install the product in places where corrosive gases such as sulfur oxides, ammonia, and sulfurous gas are produced. (e.g. Toilet outlet, ventilation opening, sewage works, dyeing complex, cattle shed, sulfuric hot spring, nuclear power plant, ship etc.) When installing the product in those places, contact an installation specialty store as the copper pipe and brazing part will need additional corrosion proof or anti-rust additive to prevent corrosion.
- Make sure not to keep any inflammable materials (such as wooden materials, oil etc.) around the outdoor unit. When there's fire, those inflammable material will easily catch the fire and may pass it on to the product.
- Depending on the condition of power supply, unstable power or voltage any cause malfunction of the parts or control system. (At the ship or places using power supply from electric generator...etc)
- Heat Recovery systems require installation of MSB(s).
- Heat Pump systems require installation of SVB(s)
 - ※ SVB(Shut-off Valve Box):
An auxiliary device installed to reduce the indoor refrigerant leakage when installing a H/P model for R-32 refrigerant
- During operation, MSBs may create noise. When selecting the MSB installation location, make sure to install in an area where potential noise will not be an issue.

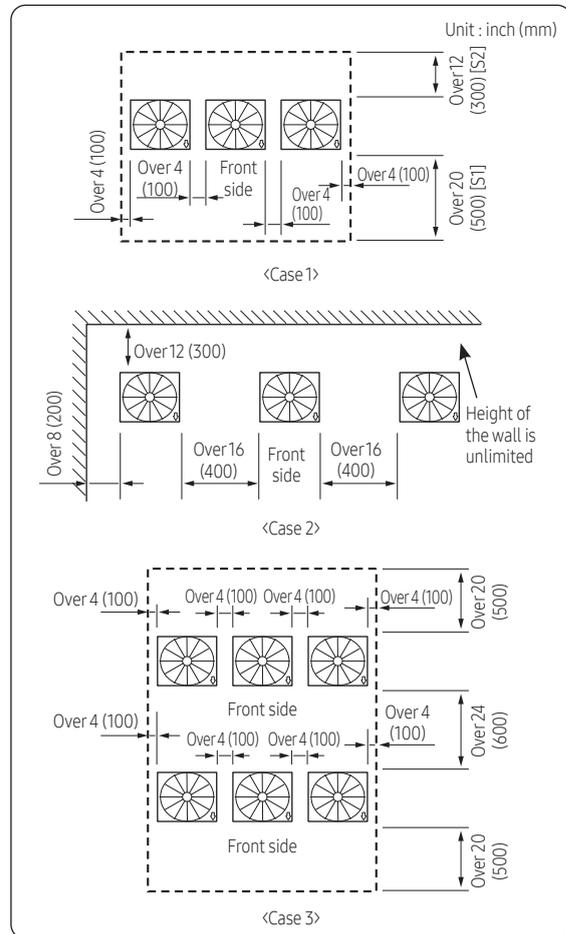
Outdoor unit space requirements

- Space requirement was decided based on following conditions; Cooling mode, outdoor temperature of 95 °F (35 °C). Larger space is required if the outdoor temperature is higher than 95 °F (35 °C) or if the place is heated easily by quantity of solar radiation.
- When you secure installation space, consider path for people and the direction of the wind.
- Secure installation space as shown in the below illustration, considering ventilation and the service space.
- If the installation space is narrow, installer or other worker may get injured during work and may also cause problem to the product.
- If you install multiple number of outdoor units in one space, make sure to secure enough ventilation space if there's any walls around the product that may disturb the air flow. If enough ventilation space is not secured, product may malfunction.
- You may install the outdoor units with 0.78 inch (20 mm) of space between the product, but product's performance may decrease depending on the installation environment.

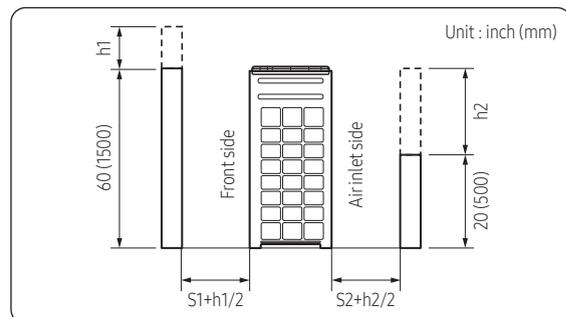
Single installation



Module installation



- For <Case 1> or <Case 3>
 - Height of the wall on the front side should not be higher than 60 inch (1500 mm).
 - Height of the wall on the air inlet side should not be higher than 20 inch (500 mm).
 - Height of the wall on the side is not limited.
 - If the height of the wall exceeds by certain value (h_1 , h_2), additional clearance $[(h_1)/2, (h_2)/2 : \text{Half of the exceeded height}]$ should be added to the service space (S_1 , S_2).



Preparing materials and tools

- You must keep the installation manual until the installation is finished.
- Hand over the installation manual to the customer after finishing the installation.

Installation manual (1)	Packing socket (1)
	

- ※ Certain models are supplied with a packing socket. The socket type may differ, depending on the model.

Optional accessories

- Following optional accessories are needed for connecting pipes between the indoor and outdoor units.

Classification	Model Name
Y-Joint	V1IDBP01PR
	V1IDBP02PR
	V1IDBP03PR
	V1IDBP04PR
	V1IDBP05PR
	V1IDBP06PR

Classification	Model Name
Y-Joint (Only H/R)	V1IDBP08HR
	V1IDBP09HR
	V1IDBP10HR
Distribution header	V1HDRK11PR
	V1HDRK12PR
	V1HDRK13PR
Y-Joint - Outdoor unit	V10DBP14HP
Y-Joint (Only H/R) - Outdoor unit	V10DBP14HR

- ※ Only use the genuine accessories listed in above table and do not use imitated accessories.
- ※ Please refer to the "Refrigerant pipe installation" section on the back page for the criteria for accessory selection.

Outdoor unit installation

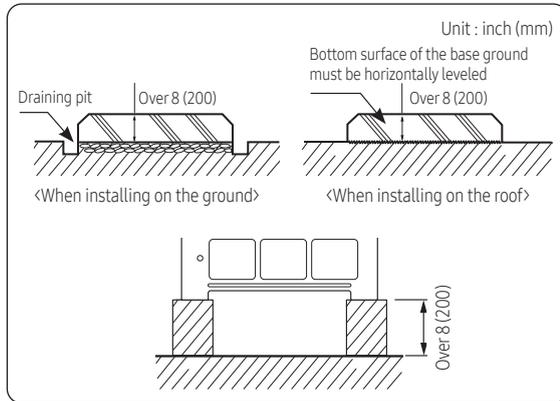
⚠ WARNING

- Make sure to remove the wooden pallet before installing the outdoor unit. If you do not remove the wooden pallet, there is risk of fire during welding the pipes. If the outdoor unit is installed with wooden pallet on, and it was used for long period time, wooden palette may break and cause electrical hazard or high pressure may damage the pipes.
 - ※ Fix an outdoor unit firmly on the base ground with anchor bolts.
 - ※ Manufacturer is not responsible for the damage occurred by not following the installation standards.
- Make sure that the height of the base ground is 8 inch (200 mm) or higher to protect the outdoor unit from rain water or other external conditions. Also, install a draining pit around the base ground and connect the drain pipe to the drainage.
 - Considering the vibration and weight of the outdoor unit, strength of the base ground must be strong to prevent noise and the top surface of it should be flat.
 - Base ground should be 1.5 times larger than the bottom of the outdoor unit.
 - Outdoor unit must be fixed firmly so that it can withstand the wind speed of 30 m/s. If you cannot fix the outdoor unit on the base ground, fix it by side or use extra structure.

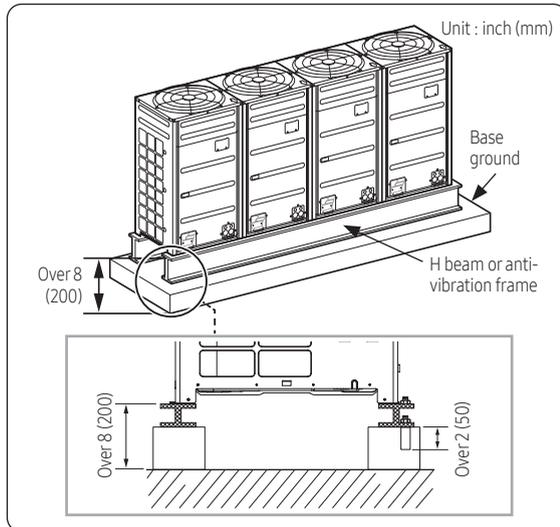
- In heating operation, defrost water may form so you must really care about the drainage and waterproofing the floor. To prevent defrost water from stagnating or freezing, construct a drainage with over 1/50 slope. (Ice may form on the floor in winter season.)
- It is necessary to add wire mesh or steel bar during concrete construction for the base ground to prevent damages or cracks.
- When installing multiple outdoor units at the same place, construct an H beam or an anti-vibration frame on the base ground to install the outdoor unit.
- After installing an H beam or an anti-vibration frame, apply corrosion protection and other necessary coating.
- When concrete construction for outdoor unit installation is completed, install an anti-vibration pad [t=0.78 inch(20 mm) or more] or an anti-vibration frame to prevent vibration of the outdoor unit from transferring to the base ground.
- Place the outdoor unit on an H beam or an anti-vibration frame and fix it with the bolt, nut and washer. (The bearing force has to be over 3.5 kN)

Outdoor unit installation

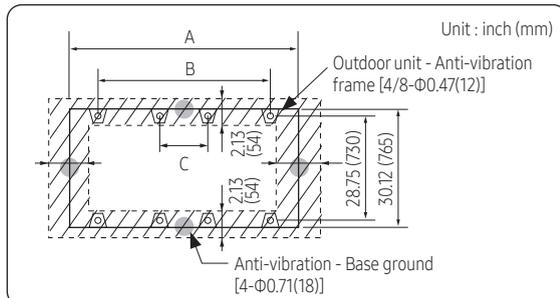
Base ground construction



Outdoor unit installation



Outdoor unit base mount and anchor bolt position



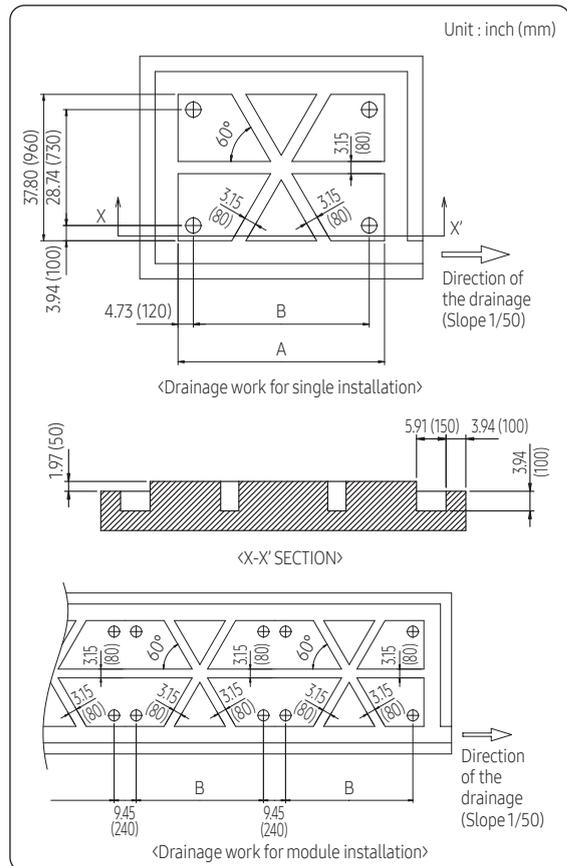
Unit : inch (mm)

Classification	VRF Small type	VRF Large type	VRF X-Large type
A	36.6 inch (929.6 mm)	51 inch (1295 mm)	73.2 inch (1859 mm)
B	31.1 inch (790 mm)	45.5 inch (1156 mm)	67.7 inch (1720 mm)
C	-	-	5.9 inch (150 mm)

※ Refer to the blueprints in technical data book to make a holes for connecting the anti-vibration pad.

Examples of draining work

- Construct the drainage ditch with reinforced concretes and make sure that water-proofing work is done.
- For smooth draining of defrost water, make sure to apply 1/50 slope.
- Construct a drainage around the outdoor unit to prevent the defrost water (from the outdoor unit) from stagnating, overflowing or freezing near the installation space.
- When the outdoor unit is installed on the roof, check the strength and waterproof status of the roof.



Unit : inch (mm)

Classification	VRF Small type	VRF Large type	VRF X-Large type
A	40.6 (1031)	54.9 (1395)	77.2 (1961)
B	31.1 (790)	45.5 (1156)	67.7 (1720)

⚠ CAUTION

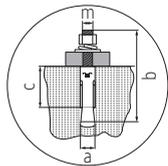
- Cautions regarding on connecting the anchor bolt
 - Tighten the rubber washer to prevent the bolt connection part of the outdoor unit from corroding.



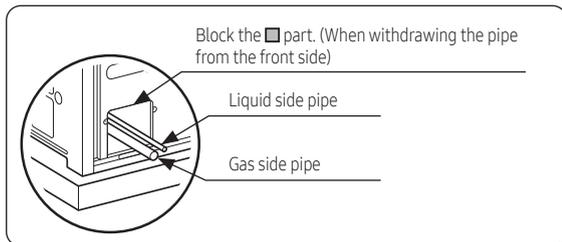
- Anchor specification

Size	Diameter of drill bit (a)	Anchor length (b)	Sleeve length (c)	Insert depth	Fastening torque
Ø10	1/2" (14 mm)	3" (75 mm)	1-1/2" (40 mm)	2" (50 mm)	30 N·m

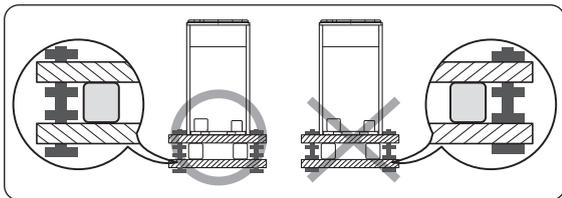
- * Use the anchor bolts and nuts that is zinc plated or made of STS material. Regular anchor bolts or nuts may get damaged by corrosion.



- Cautions regarding on connecting the pipe
 - If you install the outdoor unit on the rooftop, check the strength and make sure to waterproof the rooftop.
 - Construct draining pit around the base construction and pay attention to the drainage around the outdoor unit. (Condensation or defrost water may form during outdoor unit operation.)
 - If there's any possibility of small animals from entering the pipe outlet, block the outlet as shown in the illustration.

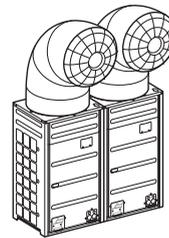


- Cautions regarding on anti-vibration frame installation
 - During installation, make sure there is no gap between the base ground and the supporting structures such as anti-vibration frame or H beam.
 - Base ground must be constructed strongly to support the bottom part of the anti-vibration mount.



- After installing the anti-vibration frame, untighten the fixing part on the top and bottom part of the frame.

- Caution for installing discharge duct
 - Static pressure of the discharge duct should be within the standard specification when installing the duct.
 - If you remove the fan guard to install the discharge duct, make sure to install a safety net on the duct outlet. Foreign substance may enter into the product and there could be a risk of personal injury.
 - Wear protection equipment at all times when making galvanized sheet metal duct, since the worker may get injured by the sharp parts.
 - When installing the outdoor unit under the tree or near forest, leaves may get into the product and cause problems on the product. Therefore, install a discharge duct to prevent foreign substance infiltration.

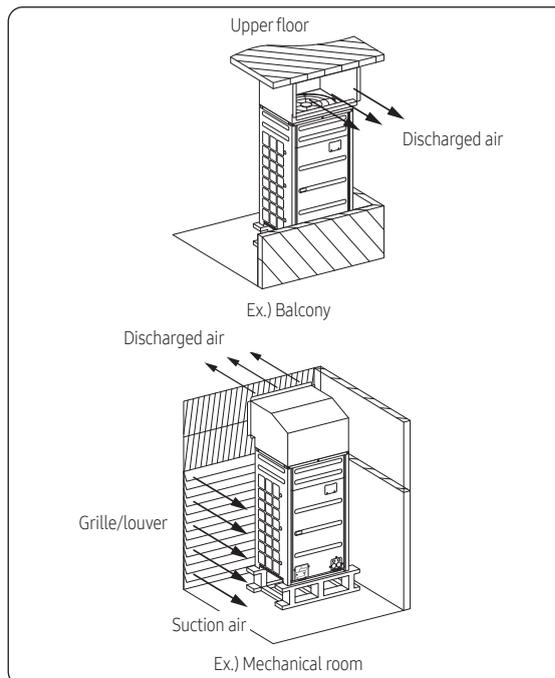


<Preventing foreign substance infiltration>

Installing the outdoor unit in various environments

Installing the outdoor unit around the obstacles

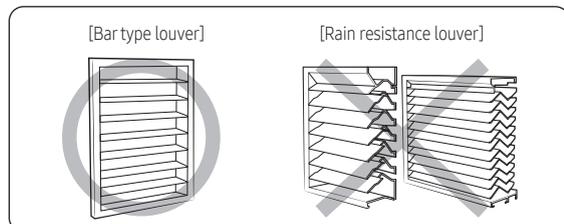
- It is necessary to install a discharge guide duct(field supply) to direct exhaust from the fan horizontally, when it is difficult to provide a minimum space of 6.56 ft (2 m) between the air outlet and a nearby obstacle.



Outdoor unit installation

⚠ WARNING

- Should adopt bar type louver. Don't use a type of rain resistance louver.



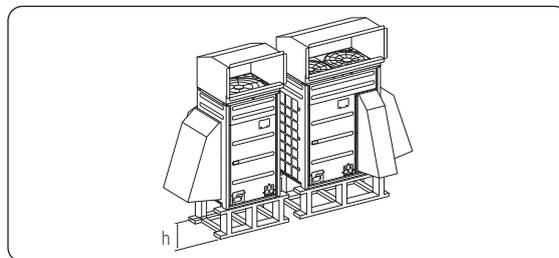
- Louver specifications.
 - Angle criteria : less than 20°
 - Opening ratio criteria : greater than 80 %

Installing the outdoor unit in cold region

- In cold regions with lots of snowfall, install a snow prevention duct, as a sufficient countermeasure, to prevent snow from accumulating on the outdoor unit. When the snow prevention duct is not installed, frost may accumulate on the heat exchanger and heating operation may not work normally.
- Air outlet of the duct should not be directed to the enclosed space.

⚠ CAUTION

- Cautions regarding on installing the frame and selecting the base ground
 - Height (h) of the frame and the base ground should be higher than the "heaviest expected snowfall".
 - Area of the frame and the base ground should not be larger than the are of the outdoor unit. Snow may accumulate if the area of the frame or the base ground is larger.

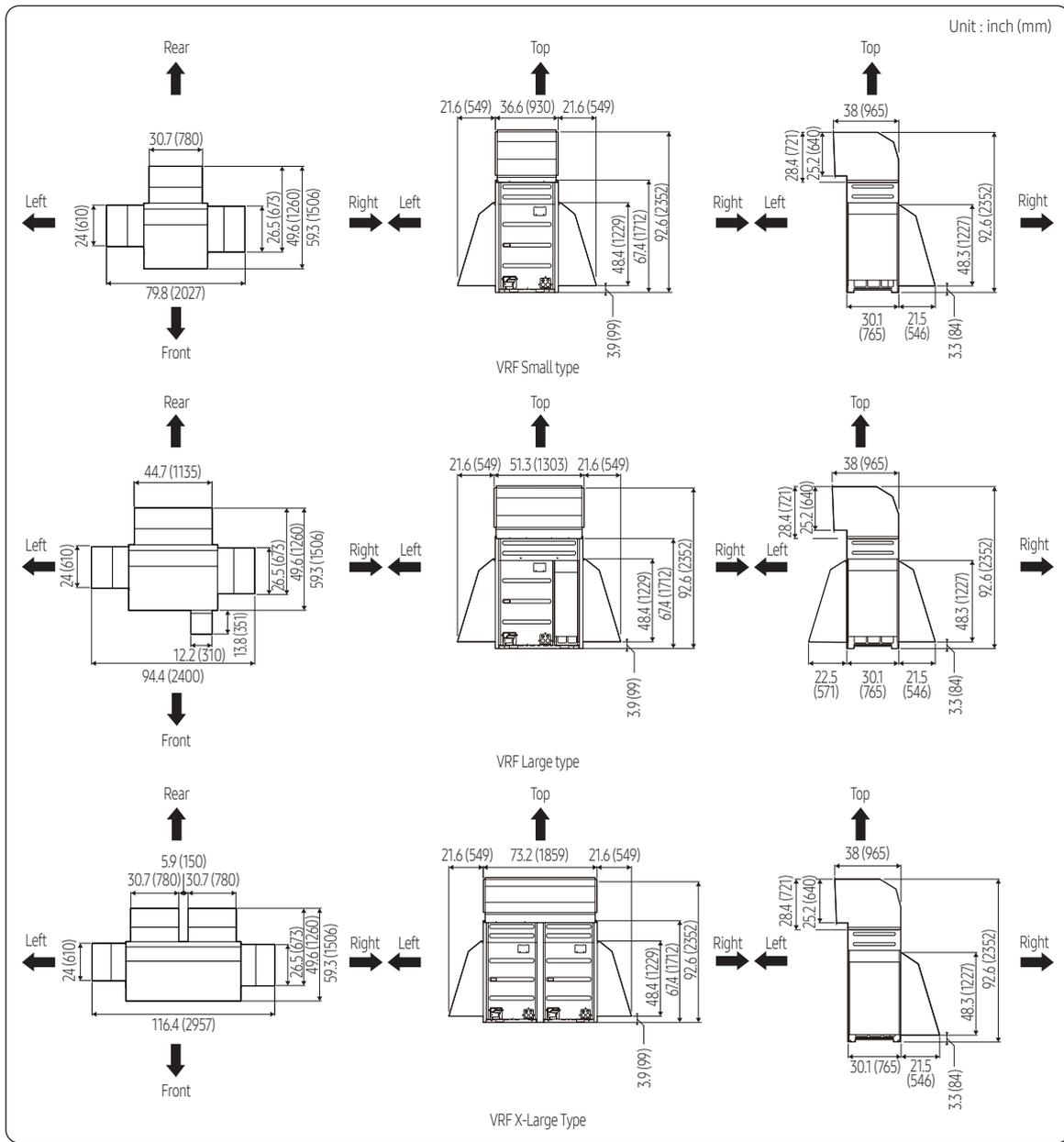


Installing the outdoor unit in windy region

- In windy regions such as near sea shores, protection wall or wind protection duct must be installed for normal operation of the outdoor unit. (Refer to the illustration of the snow prevention duct, for installing the wind protection duct.)
- Install the wind prevention duct with the consideration of major wind direction. If the direction of the discharge part is same as major direction of the wind, it could cause product's performance decrease.

⚠ CAUTION

- Cautions regarding on installing the frame and selecting the base ground
 - The base ground must be solid and the outdoor unit must be fixed with anchor bolts.
 - Make sure to install outdoor unit in a place strong enough to withstand its weight. If the place cannot withstand the weight of the outdoor unit, outdoor unit may fall and cause personal injury.
 - When installing on a rooftop subject to strong wind, countermeasures must be taken to prevent the unit from falling down.
 - Use a frame that is resistant to corrosion.



Installation Procedure



Refrigerant pipe installation

⚠ WARNING

- When installing, make sure there is no leakage. When collecting the refrigerant, stop the compressor first before removing the connection pipe. If the refrigerant pipe is not properly connected and the compressor works with the service valve open, the pipe inhales the air and it makes the pressure inside of the refrigerant cycle abnormally high which may lead to explosion and injury.

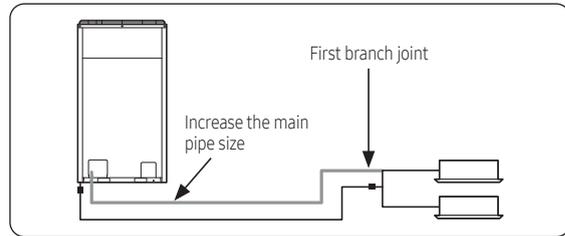
Refrigerant pipe work

- The length of refrigerant pipe should be as short as possible and the height difference between an indoor and outdoor unit should be minimized.
- Piping work must be done within allowable piping length, height difference, and the allowable length after branching.
- The pressure of the R-32 is high. Use only certified refrigerant pipe and follow the installation method.
- After installing the pipes, calculate the total length of the pipe to check if additional refrigerant is needed. When you need to charge the additional refrigerant, make sure to use R-32 refrigerant.
- Use clean refrigerant pipe and there shouldn't be any harmful ion, oxide, dust, iron content or moisture inside pipe.
- Use tools and accessories that fit on R-32 only.

Tool	Installation process/ purpose	Compatibility with conventional tool
Pipe cutter	Refrigerant pipe installation	Pipe cutting
Flaring tool		Pipe flaring
Refrigerant machine oil		Apply refrigerant oil on flared part
Torque wrench		Connect flare nut with pipe
Pipe bender	Air tightness test	Pipe bending
Nitrogen gas		Prevent oxidation within the pipe
Welder		Pipe welding
Manifold gauge	Air tightness test ~ additional refrigerant charging	Vacu- mum- ing, charg- ing refrigerant and check- ing operation
Refrigerant charging hose		Need exclusive one since there is risk of refrigerant leakage or inflow of impurities

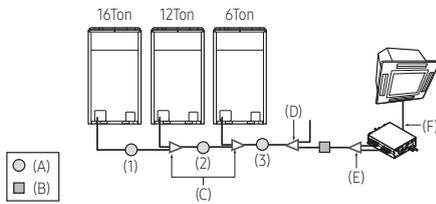
Tool	Installation process/ purpose	Compatibility with conventional tool
Vacuum pump	Pipe drying	Compatible (Use products which contain the check valve to prevent the oil from flowing backward into the outdoor unit.) Use the one that can be vacuumed up to 0.5 Torr (500 microns).
Scale for refrigerant charging	Refrigerant charging	Compatible
Gas leak detector	Gas leak test	Need exclusive one
Flare nut	Must use the flare nut equipped with the product.	

Selecting refrigerant pipe



- Install the refrigerant pipe according to main pipe size of each outdoor unit capacity.
- When the pipe length (including elbow) between an outdoor unit and the farthest indoor unit exceeds 295.3 ft (90 m), you must increase the size of the pipe (main pipe) by one grade which connects between the outdoor unit to the first branch joint.
- For H/R model, When the pipe length (including elbow) between an outdoor unit and the farthest indoor unit exceeds 295.3 ft (90 m), you must increase the size of the liquid pipe by one grade among the pipes(main pipe) which connects between the outdoor unit to the first branch joint.

H/P



Ex.) 34 Ton

Ton	No.	Pipe size (O.D)			
		Liquid		Gas	
		mm	inch	mm	inch
16	(1)	12.70	1/2	28.58	1 1/8
28	(2)	15.88	5/8	34.92	1 3/8
34	(3)	15.88	5/8	34.92	1 3/8

Size of the pipe connected to the outdoor unit (A)

Select the size of the main pipe according to the below table.

Outdoor unit capacity (MBH) (Cooling)	Outdoor unit capacity (kW) (Cooling)	* Maximum pipe length within 295 ft (90 m)				* Maximum pipe length over 295 ft (90 m)			
		Liquid		Gas		Liquid		Gas	
		inch	mm	inch	mm	inch	mm	inch	mm
Capacity ≤ 85	Capacity ≤ 25	Ø3/8	Ø9.52	Ø3/4	Ø19.05	Ø1/2	Ø12.70	Ø7/8	Ø22.22
85 < Capacity ≤ 99	25 < Capacity ≤ 29							Ø1 Note1)	Ø25.40 Note1)
99 < Capacity ≤ 120	29 < Capacity ≤ 35	Ø1/2	Ø12.70	Ø7/8	Ø22.22	Ø5/8	Ø15.88	Ø1 1/8	Ø28.58
120 < Capacity ≤ 140	35 < Capacity ≤ 41							Ø1 1/4 Note2)	Ø31.75 Note2)
140 < Capacity ≤ 181	41 < Capacity ≤ 53	Ø5/8	Ø15.88	Ø1 1/8	Ø28.58	Ø3/4	Ø19.05	Ø1 3/8	Ø34.92
181 < Capacity ≤ 222	53 < Capacity ≤ 65							Ø1 1/2 Note3)	Ø38.10 Note3)
222 < Capacity ≤ 240	65 < Capacity ≤ 70	Ø3/4	Ø19.05	Ø1 3/8	Ø34.92	Ø7/8	Ø22.22	Ø1 5/8	Ø41.28
240 < Capacity ≤ 273	70 < Capacity ≤ 80							Ø1 3/4 Note4)	Ø44.45 Note4)
273 < Capacity ≤ 314	80 < Capacity ≤ 92	Ø7/8	Ø22.22	Ø1 5/8	Ø41.28	Ø1 1/2	Ø38.10	Ø1 5/8	Ø41.28
314 < Capacity ≤ 369	92 < Capacity ≤ 108							Ø1 3/4 Note4)	Ø44.45 Note4)
369 < Capacity ≤ 409	108 < Capacity ≤ 120	Ø1 1/8	Ø28.58	Ø1 5/8	Ø41.28	Ø1 1/2	Ø38.10	Ø1 5/8	Ø41.28
409 < Capacity ≤ 467	120 < Capacity ≤ 137							Ø1 3/4 Note4)	Ø44.45 Note4)
467 < Capacity ≤ 583	137 < Capacity ≤ 171	Ø3/4	Ø19.05	Ø1 5/8	Ø41.28	Ø7/8	Ø22.22	Ø1 5/8	Ø41.28

*Maximum pipe length : The pipe length between an outdoor unit and the farthest indoor unit.
 Note1) If Ø1" (25.40 mm) pipe is not available on site, use Ø1 1/8" (28.58 mm) pipe.
 Note2) If Ø1 1/4" (31.75 mm) pipe is not available on site, use Ø1 3/8" (34.92 mm) pipe.
 Note3) If Ø1 1/2" (38.10 mm) pipe is not available on site, use Ø1 5/8" (41.28 mm) pipe.
 Note4) If Ø1 3/4" (44.45 mm) pipe is not available on site, use Ø2 1/8" (53.98 mm) pipe.
 ※ For the case that the diameter of the default pipe of an outdoor unit does not match that of the pipe installed on the site, a socket is provided by default together with the outdoor unit.

Size of the pipe between branch joints (B)

Select the pipe size according to the sum of indoor unit capacity which will be connected after the branch.
 ※ However, if the size of the pipe between branch joints (B) is bigger than the size of the pipe connected to the outdoor unit (A), apply the pipe size (A).

Indoor unit capacity (MBH)	Indoor unit capacity (kW)	Branch pipe length within 148 ft (45 m)				Branch pipe length between 148 ft-295 ft (45-90 m)			
		Liquid		Gas		Liquid		Gas	
		inch	mm	inch	mm	inch	mm	inch	mm
Capacity < 19	Capacity < 5.7	Ø1/4	Ø6.35	Ø1/2	Ø12.7	Ø3/8	Ø9.52	Ø5/8	Ø15.88
19 ≤ Capacity < 55	5.7 ≤ Capacity < 16							Ø3/4	Ø19.05
55 ≤ Capacity < 79	16 ≤ Capacity < 23.2	Ø3/8	Ø9.52	Ø3/4	Ø19.05	Ø1/2	Ø12.7	Ø7/8	Ø22.22
79 ≤ Capacity < 115	23.2 ≤ Capacity < 33.6							Ø1 Note1)	Ø25.40 Note1)
115 ≤ Capacity < 134	33.6 ≤ Capacity < 39.2	Ø1/2	Ø12.7	Ø7/8	Ø22.22	Ø5/8	Ø15.88	Ø1 1/8	Ø28.58
134 ≤ Capacity < 153	39.2 ≤ Capacity < 44.8							Ø1 1/4 Note2)	Ø31.75 Note2)
153 ≤ Capacity < 191	44.8 ≤ Capacity < 56	Ø5/8	Ø15.88	Ø1 1/8	Ø28.58	Ø3/4	Ø19.05	Ø1 3/8	Ø34.92
191 ≤ Capacity < 229	56 ≤ Capacity < 67.2							Ø1 1/2 Note3)	Ø38.10 Note3)
229 ≤ Capacity < 248	67.2 ≤ Capacity < 72.8	Ø1 1/8	Ø28.58	Ø1 3/8	Ø34.92	Ø1 1/2	Ø38.10	Ø1 3/8	Ø34.92
248 ≤ Capacity < 287	72.8 ≤ Capacity < 84							Ø1 3/4 Note4)	Ø44.45 Note4)
287 ≤ Capacity < 325	84 ≤ Capacity < 95.2	Ø3/4	Ø19.05	Ø1 5/8	Ø41.28	Ø7/8	Ø22.22	Ø1 5/8	Ø41.28
325 ≤ Capacity < 382	95.2 ≤ Capacity < 112							Ø1 3/4 Note4)	Ø44.45 Note4)
382 ≤ Capacity < 420	112 ≤ Capacity < 123.2	Ø7/8	Ø22.22	Ø1 5/8	Ø41.28	Ø1 1/2	Ø38.10	Ø1 5/8	Ø41.28
420 ≤ Capacity < 478	123.2 ≤ Capacity < 140							Ø1 3/4 Note4)	Ø44.45 Note4)
478 ≤ Capacity < 592	140 ≤ Capacity < 173.6	Ø1 1/8	Ø28.58	Ø1 5/8	Ø41.28	Ø1 1/2	Ø38.10	Ø1 5/8	Ø41.28
592 ≤ Capacity < 669	173.6 ≤ Capacity < 196							Ø1 3/4 Note4)	Ø44.45 Note4)
669 ≤ Capacity < 726	196 ≤ Capacity < 212.8	Ø1 1/8	Ø28.58	Ø1 5/8	Ø41.28	Ø1 1/2	Ø38.10	Ø1 5/8	Ø41.28
726 ≤ Capacity < 822	212.8 ≤ Capacity < 240.8							Ø1 3/4 Note4)	Ø44.45 Note4)
822 ≤ Capacity < 882	240.8 ≤ Capacity < 280.8	Ø7/8	Ø22.22	Ø1 5/8	Ø41.28	Ø1 1/2	Ø38.10	Ø1 5/8	Ø41.28

Note1) If Ø1" (25.40 mm) pipe is not available on site, use Ø1 1/8" (28.58 mm) pipe.
 Note2) If Ø1 1/4" (31.75 mm) pipe is not available on site, use Ø1 3/8" (34.92 mm) pipe.
 Note3) If Ø1 1/2" (38.10 mm) pipe is not available on site, use Ø1 5/8" (41.28 mm) pipe.
 Note4) If Ø1 3/4" (44.45 mm) pipe is not available on site, use Ø2 1/8" (53.98 mm) pipe.

Branch joint (C-E)

Branch joint between outdoor units (C)

Select a branch joint according to the sum of the capacity of outdoor units connected to the branch joint.

Classification	Outdoor unit capacity		Model name
	MBH	kW	
Y-joint for outdoor unit (C)	Capacity ≤ 467	Capacity ≤ 137	V10DBP14HP

First branch joint (D)

Select according to the sum of the capacity of the outdoor unit.

Classification	Outdoor unit capacity		Model name
	MBH	kW	
Y-joint (D)	Capacity ≤ 140	Capacity ≤ 41	V11DBP02PR
	Capacity ≤ 160	Capacity ≤ 47	V11DBP03PR
	Capacity ≤ 239	Capacity ≤ 70	V11DBP04PR
	Capacity ≤ 336	Capacity ≤ 98	V11DBP05PR
	Capacity ≤ 467	Capacity ≤ 137	V11DBP06PR

Branch joint (E)

Select a branch joint according to the sum of indoor unit capacity which will be connected after the branch.

※ However, if the branch joints (E) is bigger than the first branch joint (D), apply the branch joint of the same size as the first branch joint (D).

Classification	Indoor unit capacity		Model name
	MBH	kW	
Y-joint (E)	Capacity < 55	Capacity < 16	V11DBP01HR
	55 ≤ Capacity < 133	16 ≤ Capacity < 39	V11DBP02HR
	133 ≤ Capacity < 172	39 ≤ Capacity < 50.4	V11DBP03HR
	172 ≤ Capacity < 248	50.4 ≤ Capacity < 72.8	V11DBP04HR
	248 ≤ Capacity < 344	72.8 ≤ Capacity < 100.8	V11DBP05HR
Distribution header (E)	344 ≤ Capacity < 478	100.8 ≤ Capacity < 140	V11DBP06HR
	Capacity < 172 (for 4 rooms)	Capacity < 50.4 (for 4 rooms)	V1HDRK11PR
	Capacity < 248 (for 8 rooms)	Capacity < 72.8 (for 8 rooms)	V1HDRK12PR
	Capacity < 478 (for 8 rooms)	Capacity < 140 (for 8 rooms)	V1HDRK13PR

Size of the pipe between the branch joint and the indoor unit (F)

Select according to the capacity of the indoor unit.

Indoor unit capacity		Liquid		Gas	
MBH	kW	inch	mm	inch	mm
Capacity ≤ 20	Capacity ≤ 6	Ø1/4	Ø6.35	Ø1/2	Ø12.7
20 < Capacity ≤ 54	6 < Capacity ≤ 16	Ø3/8	Ø9.52	Ø5/8	Ø15.88
54 < Capacity ≤ 78	16 < Capacity ≤ 23	Ø3/8	Ø9.52	Ø3/4	Ø19.05
78 < Capacity	23 < Capacity	Ø3/8	Ø9.52	Ø7/8	Ø22.22

※ If the criteria for selecting the branch in the outdoor installation manual and the branch installation manual are different, please select the branch in accordance with the outdoor installation manual.

Refrigerant pipe installation

H/P

When all the following conditions are met, install the main liquid pipe that is one step smaller to reduce piping load and the amount of refrigerant.

Note that the refrigerant for the main liquid pipe must be added by the specified amount upon reduction.

Condition 1: The vertical piping length is less than 131 ft (40 m)

Condition 2: For BG units, allowable length A (ft) \geq max. piping length (ft) / {1 - (vertical piping length (ft) * 0.0046)}

※ Max. piping length: The equivalent length (ft) of piping from the outdoor unit to the farthest indoor unit

For SI units, allowable length A (m) \geq max. piping length (m) / {1 - (vertical piping length (m) * 0.015)}

※ Max. piping length: The equivalent length (m) of piping from the outdoor unit to the farthest indoor unit

※ If the conditions above are satisfied and one-size smaller piping has been installed, set the "liquid pipe (main pipe) size reduction" option.

- Length allowed to reduce the diameter of liquid pipe, A (equivalent length)

Outdoor unit capacity (Ton)	Maximum pipe length within 295.3 ft (90 m)				Maximum pipe length over 295.3 ft (90 m)			
	Pipe diameter		Allowable length		Pipe diameter		Allowable length	
	mm	inch	m	ft	mm	inch	m	ft
6	This capacity is not supported.				9.52	3/8	200	656
8	This capacity is not supported.				9.52	3/8	140	459
10	9.52	3/8	90	295	12.70	1/2	200	656
12	9.52	3/8	70	230	12.70	1/2	200	656
14	9.52	3/8	50	164	12.70	1/2	200	656
16	9.52	3/8	40	131	12.70	1/2	190	623
18	9.52	3/8	30	98	12.70	1/2	150	492
20	9.52	3/8	20	66	12.70	1/2	120	394
22	12.70	1/2	90	295	15.88	5/8	200	656
24	12.70	1/2	90	295	15.88	5/8	200	656
26	12.70	1/2	70	230	15.88	5/8	200	656
28	12.70	1/2	60	197	15.88	5/8	200	656
30	12.70	1/2	60	197	15.88	5/8	170	558
32	12.70	1/2	50	164	15.88	5/8	150	492
34	12.70	1/2	40	131	15.88	5/8	140	459
36	15.88	5/8	90	295	19.05	3/4	200	656
38	15.88	5/8	90	295	19.05	3/4	200	656
40	15.88	5/8	90	295	19.05	3/4	200	656
42	15.88	5/8	90	295	19.05	3/4	200	656
44	15.88	5/8	80	262	19.05	3/4	200	656

E.g. 1: For a site with 14 tons (BG units), max. piping length of 460 ft (395 ft-long horizontal piping and 65 ft-long vertical piping) condition, allowable length A \geq max. piping length / {1 - (vertical piping length * 0.0046)}

$$656 \text{ ft} \geq 460 \text{ ft} / \{1 - (65 * 0.0046)\} = 460 \text{ ft} / 0.701 = 656 \text{ ft}$$

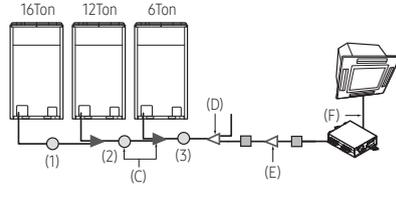
Accordingly, the max. piping length of 460 ft (395 ft-long horizontal piping and 65 ft-long vertical piping) is allowable.

E.g. 2: For a site with 14 tons (SI units), max. piping length of 140 m (120 m-long horizontal piping and 20 m-long vertical piping) condition, allowable length A \geq max. piping length / {1 - (vertical piping length * 0.015)}

$$200 \text{ m} \geq 140 \text{ m} / \{1 - (20 * 0.015)\} = 140 \text{ m} / 0.7 = 200 \text{ m}$$

Accordingly, the max. piping length of 140 m (120 m-long horizontal piping and 20 m-long vertical piping) is allowable.

H/R



Ex.) 34 Ton

Ton	No.	Pipe size (O.D)					
		Liquid		Low pressure Gas		High pressure Gas	
		mm	inch	mm	inch	mm	inch
16	(1)	12.70	1/2	28.58	1 1/8	22.22	7/8
28	(2)	15.88	5/8	34.92	1 3/8	28.58	1 1/8
34	(3)	15.88	5/8	34.92	1 3/8	34.92	1 3/8

Size of the pipe connected to the outdoor unit (A)

Select the size of the main pipe according to the below table.

Outdoor unit capacity (MBH) (Cooling)	Outdoor unit capacity (kW) (Cooling)	*Maximum pipe length within 295 ft (90 m)						*Maximum pipe length over 295 ft (90 m)					
		Liquid		Low pressure gas		High pressure gas		Liquid		Low pressure gas		High pressure gas	
		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
Capacity ≤ 85	Capacity ≤ 25	03/8	09.52	03/4	019.05	05/8	015.88	01/2	012.70	03/4	019.05	05/8	015.88
85 < Capacity ≤ 99	25 < Capacity ≤ 29			07/8	022.22	03/4	019.05			07/8	022.22	03/4	019.05
99 < Capacity ≤ 120	29 < Capacity ≤ 35									01/8	028.58		
119 < Capacity ≤ 140	35 < Capacity ≤ 41												
140 < Capacity ≤ 181	41 < Capacity ≤ 53	01/2	012.70					05/8	015.88			07/8	022.22
181 < Capacity ≤ 222	53 < Capacity ≤ 65			01 1/8	028.58					01 1/8	028.58		
222 < Capacity ≤ 240	65 < Capacity ≤ 70												
239 < Capacity ≤ 273	70 < Capacity ≤ 80					01 1/8	028.58					01 1/8	028.58
273 < Capacity ≤ 314	80 < Capacity ≤ 92							03/4	019.05	01 3/8	034.92		
314 < Capacity ≤ 369	92 < Capacity ≤ 108	05/8	015.88	01 3/8	034.92							01 3/8	034.92
369 < Capacity ≤ 409	108 < Capacity ≤ 120												
409 < Capacity ≤ 467	120 < Capacity ≤ 137	03/4	019.05	01 5/8	041.28	01 3/8	034.92	07/8	022.22	01 5/8	041.28	01 3/8	034.92
467 < Capacity ≤ 583	137 < Capacity ≤ 171												

*Maximum pipe length : The pipe length between an outdoor unit and the farthest indoor unit.
 ※ For HR model, only increase the size of the liquid pipe if pipe length exceeds 295 ft (90 m).
 ※ For the case that the diameter of the default pipe of an outdoor unit does not match that of the pipe installed on the site, a socket is provided by default together with the outdoor unit

Size of the pipe between branch joints (B)

Select the pipe size according to the sum of indoor unit capacity which will be connected after the branch.
 ※ However, if the size of the pipe between branch joints (B) is bigger than the size of the pipe connected to the outdoor unit (A), apply the pipe size (A).

Indoor unit capacity (MBH)	Indoor unit capacity (kW)	Branch pipe length within 148 ft (45 m)						Branch pipe length between 148 ft-295 ft (45-90 m)					
		Liquid		Low pressure gas		High pressure gas		Liquid		Low pressure gas		High pressure gas	
		inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
Capacity < 19	Capacity < 5.7	01/4	06.35	01/2	012.7	03/8	09.52	03/8	09.52	01/2	012.7	03/8	09.52
19 < Capacity < 55	5.7 < Capacity < 16			05/8	015.88	01/2	012.7			05/8	015.88	01/2	012.7
55 < Capacity < 79	16 < Capacity < 23.2	03/8	09.52	03/4	019.05	05/8	015.88	01/2	012.7	03/4	019.05	05/8	015.88
79 < Capacity < 115	23.2 < Capacity < 33.6												
115 < Capacity < 134	33.6 < Capacity < 39.2			07/8	022.22	03/4	019.05			07/8	022.22	03/4	019.05
134 < Capacity < 153	39.2 < Capacity < 44.8												
153 < Capacity < 191	44.8 < Capacity < 56	01/2	012.7			07/8	022.22	05/8	015.88			07/8	022.22
191 < Capacity < 229	56 < Capacity < 67.2												
229 < Capacity < 248	67.2 < Capacity < 72.8			01 1/8	028.58					01 1/8	028.58		
248 < Capacity < 287	72.8 < Capacity < 84					01 1/8	028.58					01 1/8	028.58
287 < Capacity < 325	84 < Capacity < 95.2							03/4	019.05				
325 < Capacity < 382	95.2 < Capacity < 112	05/8	015.88	01 3/8	034.92			03/4	019.05	01 3/8	034.92		
382 < Capacity < 420	112 < Capacity < 123.2												
420 < Capacity < 478	123.2 < Capacity < 140											01 3/8	034.92
478 < Capacity < 592	140 < Capacity < 173.6	03/4	019.05	01 5/8	041.28			07/8	022.22	01 5/8	041.28	01 3/8	034.92
592 < Capacity < 669	173.6 < Capacity < 196												
669 < Capacity < 726	196 < Capacity < 212.8			01 3/4	044.45	01 1/2	038.10			01 3/4	044.45	01 1/2	038.10
726 < Capacity < 822	212.8 < Capacity < 240.8	07/8	022.22	02 1/8	053.98	01 5/8	041.28	01 1/2	038.10	02 1/8	053.98	01 5/8	041.28
822 < Capacity	240.8 < Capacity												

Note1) If 01" (25.40 mm) pipe is not available on site, use 01 1/8" (28.58 mm) pipe.
 Note2) If 01 1/2" (38.10 mm) pipe is not available on site, use 01 5/8" (41.28 mm) pipe.
 Note3) If 01 3/4" (44.45 mm) pipe is not available on site, use 02 1/8" (53.98 mm) pipe.

Branch joint (C-E)

Branch joint between outdoor units (C)

Select a branch joint according to the sum of the capacity of outdoor units connected to the branch joint.

Classification	Outdoor unit capacity		Model name
	MBH	kW	
Y-joint for liquid/low pressure gas pipe (C)	Capacity ≤ 467	Capacity ≤ 137	V10DBP14HP
Y-joint for high pressure gas pipe (C)	Capacity ≤ 467	Capacity ≤ 137	V10DBP14HR

First branch joint (D)

Select according to the sum of the capacity of the outdoor unit.

Classification	Outdoor unit capacity		Model name
	MBH	kW	
Y-joint for liquid/low pressure gas pipe (D)	Capacity ≤ 140	Capacity ≤ 41	V11DBP02PR
	Capacity ≤ 160	Capacity ≤ 47	V11DBP03PR
	Capacity ≤ 239	Capacity ≤ 70	V11DBP04PR
	Capacity ≤ 336	Capacity ≤ 98	V11DBP05PR
Y-joint for high pressure gas pipe (D)	Capacity ≤ 467	Capacity ≤ 137	V11DBP06PR
	Capacity ≤ 85	Capacity ≤ 25	V11DBP08HR
	Capacity ≤ 239	Capacity ≤ 70	V11DBP09HR
	Capacity ≤ 467	Capacity ≤ 137	V11DBP10HR

Branch joint (E)

Select a branch joint according to the sum of indoor unit capacity which will be connected after the branch.

※ However, if the branch joints (E) is bigger than the first branch joint (D), apply the branch joint of the same size as the first branch joint (D).

Classification	Indoor unit capacity		Model name
	MBH	kW	
Y-joint for liquid/low pressure gas pipe (E)	Capacity < 55	Capacity < 16	V11DBP01PR
	55 ≤ Capacity < 133	16 ≤ Capacity < 39	V11DBP02PR
	133 ≤ Capacity < 172	39 ≤ Capacity < 50.4	V11DBP03PR
	172 ≤ Capacity < 248	50.4 ≤ Capacity < 72.8	V11DBP04PR
	248 ≤ Capacity < 344	72.8 ≤ Capacity < 100.8	V11DBP05PR
Y-joint for high pressure gas pipe (E)	344 ≤ Capacity < 478	100.8 ≤ Capacity < 140	V11DBP06PR
	Capacity < 79	Capacity < 23.2	V11DBP08HR
	79 ≤ Capacity < 248	23.2 ≤ Capacity < 72.8	V11DBP09HR
	248 ≤ Capacity < 478	72.8 ≤ Capacity < 140	V11DBP10HR

Size of the pipe between the branch joint and the indoor unit (F)

Select according to the capacity of the indoor unit.

Indoor unit capacity		Liquid		Gas	
MBH	kW	inch	mm	inch	mm
Capacity ≤ 20	Capacity ≤ 6	01/4	06.35	01/2	012.7
20 < Capacity ≤ 54	6 < Capacity ≤ 16	03/8	09.52	05/8	015.88
54 < Capacity ≤ 78	16 < Capacity ≤ 23	03/8	09.52	03/4	019.05
78 < Capacity	23 < Capacity	03/8	09.52	07/8	022.22

※ If the criteria for selecting the branch in the outdoor installation manual and the branch installation manual are different, please select the branch in accordance with the outdoor installation manual.

Refrigerant pipe installation

H/R

When all the following conditions are met, install the main liquid pipe that is one step smaller to reduce piping load and the amount of refrigerant.

Note that the refrigerant for the main liquid pipe must be added by the specified amount upon reduction.

Condition 1: The vertical piping length is less than 131 ft (40 m)

Condition 2: For Imperial units, allowable length A (ft) \geq max. piping length (ft) / { 1 - (vertical piping length (ft) * 0.0046) }

※ Max. piping length: The equivalent length (ft) of piping from the outdoor unit to the farthest indoor unit

For SI units, allowable length A (m) \geq max. piping length (m) / { 1 - (vertical piping length (m) * 0.015) }

※ Max. piping length: The equivalent length (m) of piping from the outdoor unit to the farthest indoor unit

※ If the conditions above are satisfied and one-size smaller piping has been installed, set the "liquid pipe (main pipe) size reduction" option.

- Length allowed to reduce the diameter of liquid pipe, A (equivalent length)

Outdoor unit capacity (Ton)	Maximum pipe length within 295.3 ft (90 m)				Maximum pipe length over 295.3 ft (90 m)			
	Pipe diameter		Allowable length		Pipe diameter		Allowable length	
	mm	inch	m	ft	mm	inch	m	ft
6	This capacity is not supported.				9.52	3/8	200	656
8	This capacity is not supported.				9.52	3/8	140	459
10	9.52	3/8	90	295	12.70	1/2	200	656
12	9.52	3/8	70	230	12.70	1/2	200	656
14	9.52	3/8	50	164	12.70	1/2	200	656
16	9.52	3/8	40	131	12.70	1/2	190	623
18	9.52	3/8	30	98	12.70	1/2	150	492
20	9.52	3/8	20	66	12.70	1/2	120	394
22	12.70	1/2	90	295	15.88	5/8	200	656
24	12.70	1/2	90	295	15.88	5/8	200	656
26	12.70	1/2	70	230	15.88	5/8	200	656
28	12.70	1/2	60	197	15.88	5/8	200	656
30	12.70	1/2	60	197	15.88	5/8	170	558
32	12.70	1/2	50	164	15.88	5/8	150	492
34	12.70	1/2	40	131	15.88	5/8	140	459
36	15.88	5/8	90	295	19.05	3/4	200	656
38	15.88	5/8	90	295	19.05	3/4	200	656
40	15.88	5/8	90	295	19.05	3/4	200	656
42	15.88	5/8	90	295	19.05	3/4	200	656
44	15.88	5/8	80	262	19.05	3/4	200	656

E.g. 1: For a site with 14 tons (BG units), max. piping length of 460 ft (395 ft-long horizontal piping and 65 ft-long vertical piping) condition, allowable length A \geq max. piping length / { 1 - (vertical piping length * 0.0046) }

$$656 \text{ ft} \geq 460 \text{ ft} / \{ 1 - (65 * 0.0046) \} = 460 \text{ ft} / 0.701 = 656 \text{ ft}$$

Accordingly, the max. piping length of 460 ft (395 ft-long horizontal piping and 65 ft-long vertical piping) is allowable.

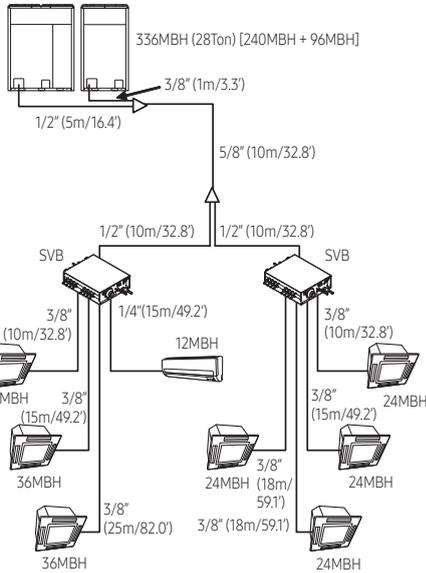
E.g. 2: For a site with 14 tons (SI units), max. piping length of 140 m (120 m-long horizontal piping and 20 m-long vertical piping) condition, allowable length A \geq max. piping length / { 1 - (vertical piping length * 0.015) }

$$200 \text{ m} \geq 140 \text{ m} / \{ 1 - (20 * 0.015) \} = 140 \text{ m} / 0.7 = 200 \text{ m}$$

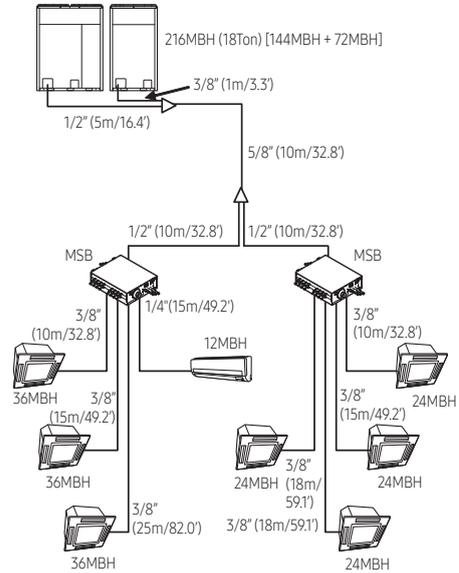
Accordingly, the max. piping length of 140 m (120 m-long horizontal piping and 20 m-long vertical piping) is allowable.

Additional refrigerant

H/P



H/R



Refrigerant pipe installation

- Basic amount of refrigerant within the outdoor unit [(lb)(kg)]

Classification	V*D072S6M-5*	V*D096S6M-5*	V*D120S6M-5*	V*D144S6M-5*
Basic amount [(lb)(kg)]	11.0 (5.0)	14.1 (6.4)	14.1 (6.4)	18.5 (8.4)
Classification	V*D168S6M-5*	V*D192S6M-5*	V*D216S6M-5*	V*D240S6M-5*
Basic amount [(lb)(kg)]	18.5 (8.4)	22.0(10.0)	25.8 (11.7)	25.8 (11.7)
Classification	V*D072L6M-5*	V*D096L6M-5*	V*D120L6M-5*	
Basic amount [(lb)(kg)]	14.1 (6.4)	14.1 (6.4)	14.1 (6.4)	

- Amount of additional refrigerant for X-Large outdoor unit (a)

Classification	V*D216S6M-5*	V*D240S6M-5*
Additional amount [(lb)(kg)]	1.54 (0.7)	1.54 (0.7)

- Amount of additional refrigerant depending on the pipe size (b)
 - Amount of additional refrigerant has to be calculated based on the sum of all liquid pipe length.

Size of liquid pipe [inch (mm)]	Ø1/4 (Ø6.35)	Ø3/8 (Ø9.52)	Ø1/2 (Ø12.7)	Ø5/8 (Ø15.88)	Ø3/4 (Ø19.05)	Ø7/8 (Ø22.22)	Ø1 (Ø25.4)	Ø11/8 (Ø28.58)
Additional amount [(lb/ft)(kg/m)]	0.013 (0.02)	0.037 (0.055)	0.077 (0.115)	0.111 (0.165)	0.165 (0.245)	0.228 (0.34)	0.323 (0.48)	0.396 (0.59)
Amount of refrigerant added when the diameter of liquid pipe is reduced [(lb/ft)(kg/m)]	-	0.047 (0.07)	0.081 (0.12)	0.121 (0.18)	0.181 (0.27)	0.255 (0.38)	0.323 (0.48)	-

Refrigerant pipe installation

- Amount of additional refrigerant for each indoor unit (C)

Unit : lb (kg)

Capacity Index (MBH)	5	6	7	9	12	15	18	20	24	27	28	30	32	36	42	48	54	60	72	76	96	144	
1-Way cassette (VOWD***S6-5P)	0.31 (0.14)		0.31 (0.14)	0.51 (0.23)	0.51 (0.23)	0.64 (0.29)	0.64 (0.29)		0.64 (0.29)														
Mini 4-Way cassette S (600x600) (V22D***S6-5P)	0.57 (0.26)		0.57 (0.26)	0.57 (0.26)	0.73 (0.33)		0.73 (0.33)	0.73 (0.33)															
4-Way cassette (V33D***S6-5P)		1.46 (0.66)		1.46 (0.66)	1.46 (0.66)		1.46 (0.66)		1.46 (0.66)					1.74 (0.79)	1.74 (0.79)	1.74 (0.79)							
360 cassette (V36D***S6-5P)				0.90 (0.41)	0.90 (0.41)		0.90 (0.41)		0.90 (0.41)					1.37 (0.62)	1.37 (0.62)	1.37 (0.62)							
LSP duct (VLOD***S6-5P)			0.62 (0.28)	0.62 (0.28)	0.62 (0.28)		0.62 (0.28)		0.62 (0.28)														
MSP duct (VMDD***S6-5P)		0.90 (0.41)	0.90 (0.41)	0.90 (0.41)	0.90 (0.41)	0.90 (0.41)	1.34 (0.61)																
HSP duct (VHID***S6-5P)									1.34 (0.61)	1.34 (0.61)		1.34 (0.61)		1.68 (0.76)	1.68 (0.76)	1.68 (0.76)				2.34 (1.06)	2.34 (1.06)		
OAP duct (VOSD***S6-5P)																			2.34 (1.06)		2.34 (1.06)		
Floor Standing (VSCD***S6-5P) (VSED***S6-5P)		0.24 (0.11)		0.44 (0.20)	0.44 (0.20)		0.64 (0.29)		0.64 (0.29)														
Ceiling (VUCD***S6-5P)							0.95 (0.43)		0.95 (0.43)					0.95 (0.43)		1.9 (0.86)							
MPAHU(V-AHU) (VVC***S6-5P)					0.66 (0.30)		1.00 (0.45)		1.00 (0.45)			1.65 (0.75)		1.74 (0.79)		2.34 (1.06)	2.51 (1.14)	3.35 (1.52)	3.35 (1.52)				
Wall mounted (VWMD***S6-5P)	0.46 (0.21)		0.46 (0.21)	0.64 (0.29)	0.64 (0.29)	0.95 (0.43)	0.95 (0.43)		0.95 (0.43)		0.95 (0.43)		1.34 (0.61)										
Hydro unit HE ^{Note1)} (VHED***S6-5P)														1.19 (0.54)		1.19 (0.54)					1.39 (0.63)	2.38 (1.08)	
Hydro unit HT ^{Note1)} (VHTD***S6-5P)																1.19 (0.54)			1.19 (0.54)				
MSB/SVB (** : 01/02/04) (V2MSBB**HR) (V2SOB**HP)	0.66 (0.30)																						
MSB/SVB (** : 06/08) (V3MSBB06HR, V2MSBB08HR) (V2SOB**HP)	1.43 (0.65)																						
MSB/SVB (** : 12) (V2MSBB**HR) (V2SOB**HP)	2.20 (1.00)																						

※ If there is no additional refrigerant value for the indoor unit in the above table, refer to the indoor unit installation manual.

Note1) In case the capacity conjunction of the Hydro Unit HT/HE exceeds 50 % among the total indoor unit, please don't put the additional refrigerant.

- Method to calculate total amount of additional refrigerant
 - Amount of additional refrigerant for X-Large outdoor unit (a)
 - Amount of additional refrigerant depending on the pipe length (b)
 - Amount of additional refrigerant for each indoor unit (C) = Σ (Amount of additional refrigerant for each connected indoor unit)
 - ※ Refer to the table
 - Total amount of additional refrigerant = a+b+C
- ※ Sum of total amount of additional refrigerant and the basic amount of refrigerant should not exceed 175.40 lb (79.56 kg).
If the refrigerant exceeds 175.40 lb (79.56 kg), it goes beyond the scope of the UL standards, rendering the safety measures we provide ineffective.
Ex) If the outdoor unit's basic refrigerant amount is 23.15 lb (10.5 kg), the total amount of additional refrigerant(a+b+C) should not exceed 152.25 lb (69.32 kg).



- Example of refrigerant calculation for HP models

Classification	Model name of outdoor unit	Number of outdoor units	Unit amount of refrigerant [lb/EA (kg/EA)]	Amount of additional refrigerant [lb (kg)]	Amount of additional refrigerant [lb (kg)]
		①	②	①×②	Σ(①×②)
Outdoor unit (a)	VPD240S6M-5Y	1	1.54 (0.7)	1.54 (0.7)	a) 1.54 (0.7)

Classification	Size of liquid pipe [inch (mm)]	Length [ft (m)]	Unit amount of refrigerant [lb/ft (kg/m)]	Amount of additional refrigerant [lb (kg)]	Total amount of additional refrigerant [lb (kg)]
		①	②	①×②	Σ(①×②)
Liquid pipe (b)	Ø1/4 (Ø6.35)	49.2(15)	0.013 (0.02)	0.64(0.30)	b) 24.19(10.99)
	Ø3/8 (Ø9.52)	367.5(112)	0.037 (0.055)	13.60(6.16)	
	Ø1/2 (Ø12.70)	82.0(25)	0.077 (0.115)	6.31(2.88)	
	Ø5/8 (Ø15.88)	32.8(10)	0.111 (0.165)	3.64(1.65)	

Classification	Model name of indoor unit	Number of indoor units	Unit amount of refrigerant [lb/EA (kg/EA)]	Amount of additional refrigerant [lb (kg)]	Total amount of additional refrigerant [lb (kg)]
		①	②	①×②	Σ(①×②)
Indoor unit (c)	4way cassette (V33D024S6-5P)	4	1.46 (0.66)	5.84 (2.64)	c) 14.56 (6.60)
	4way cassette (V33D036S6-5P)	3	1.74 (0.79)	5.22 (2.37)	
	Wall mounted (VWMD012S6-5P)	1	0.64 (0.29)	0.64 (0.29)	
	SVB (V2SOB06HP)	2	1.43 (0.65)	2.86 (1.30)	

Total amount of refrigerant (a+b+c) = 1.54 + 24.19 + 14.56 = 40.29 (lb)
 = 0.7 + 10.99 + 6.60 = 18.29 (kg)

- Example of refrigerant calculation for HR models

Classification	Size of liquid pipe [inch (mm)]	Length [ft (m)]	Unit amount of refrigerant [lb/ft (kg/m)]	Amount of additional refrigerant [lb (kg)]	Total amount of additional refrigerant [lb (kg)]
		①	②	①×②	Σ(①×②)
Liquid pipe (b)	Ø1/4 (Ø6.35)	49.2(15)	0.013 (0.02)	0.64(0.30)	b) 24.19(10.99)
	Ø3/8 (Ø9.52)	367.5(112)	0.037 (0.055)	13.60(6.16)	
	Ø1/2 (Ø12.70)	82.0(25)	0.077 (0.115)	6.31(2.88)	
	Ø5/8 (Ø15.88)	32.8(10)	0.111 (0.165)	3.64(1.65)	

Classification	Model name of indoor unit	Number of indoor units	Unit amount of refrigerant [lb/EA (kg/EA)]	Amount of additional refrigerant [lb (kg)]	Total amount of additional refrigerant [lb (kg)]
		①	②	①×②	Σ(①×②)
Indoor unit (c)	4way cassette (V33D024S6-5P)	4	1.46 (0.66)	5.84 (2.64)	c) 14.56 (6.60)
	4way cassette (V33D036S6-5P)	3	1.74 (0.79)	5.22 (2.37)	
	Wall mounted (VWMD012S6-5P)	1	0.64 (0.29)	0.64 (0.29)	
	MSB (V3MSBB06HR)	2	1.43 (0.65)	2.86 (1.30)	

- Total amount of refrigerant (b+c) = 24.19 + 14.56 = 38.75 (lb)
 = 10.99 + 6.60 = 17.59 (kg)

Refrigerant pipe installation

Precautions on adding R-32 refrigerant

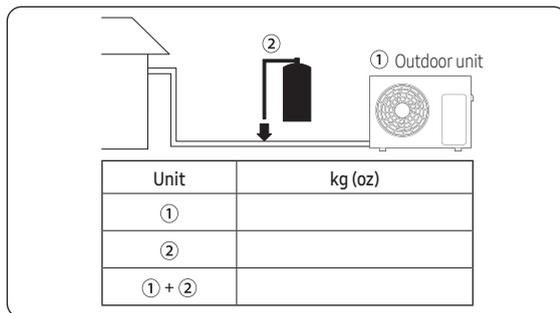
In addition to the conventional charging procedure, the following requirements shall be kept.

⚠ CAUTION

- Make sure that contamination by other refrigerants does not occur for charging.
- To minimize the amount of refrigerant, keep the hoses and lines as short as possible.
- The cylinders shall be kept upright.
- Make sure that the refrigeration system is earthed before charging.
- Label the system with the final system charge with indelible ink.
- Extreme care is required not to overcharge the system.
- If the system must be evacuated for any reason, before recharging system tightness must be checked with nitrogen.
- After charging, check for leakage before commissioning.
- Be sure to check for leakage before leaving the work area.

⚠ CAUTION

- Please fill in the following with indelible ink on the refrigerant charge label supplied with this product and on this manual.
- ① the factory refrigerant charge of the product,
- ② the additional refrigerant amount charged in the field and
- ① + ② the total refrigerant charge. on the refrigerant charge label supplied with the product.



⚠ CAUTION

- Make sure that the total refrigerant charge(① + ②) does not exceed 175.40 lb (79.56 kg)

Temper grade and minimum thickness of the refrigerant pipe

Outer diameter		Minimum thickness		Temper grade
mm	inch	mm	inch	
6.35	1/4	0.70	0.028	Annealed
9.52	3/8	0.70	0.028	
12.70	1/2	0.80	0.031	
15.88	5/8	1.00	0.039	
19.05	3/4	0.90	0.035	Drawn
22.22	7/8	0.90	0.035	
25.40	1	1.00	0.039	
28.58	1 1/8	1.10	0.043	
31.75	1 1/4	1.10	0.043	
34.92	1 3/8	1.21	0.048	
38.10	1 1/2	1.35	0.053	
41.28	1 5/8	1.43	0.056	
44.45	1 3/4	1.60	0.063	
50.80	2	2.00	0.079	
53.98	2 1/8	2.10	0.083	

⚠ CAUTION

- For pipes larger than Ø3/4" (Ø19.05 mm), drawn type (C1220T-1/2H or C1220T-H) type copper pipe must be used. If a annealed type (C1220T-O) copper pipe is used, pipe may break due to its low pressure resistance and cause personal injury.

Keeping refrigerant pipe

To prevent foreign materials or water from entering the pipe, storing method and sealing method (especially during installation) is very important. Apply correct sealing method depending on the environment.

Exposure place	Exposure time	Sealing type
Outdoor	Longer than one month	Pipe pinch
	Shorter than one month	Taping
Indoor	-	Taping

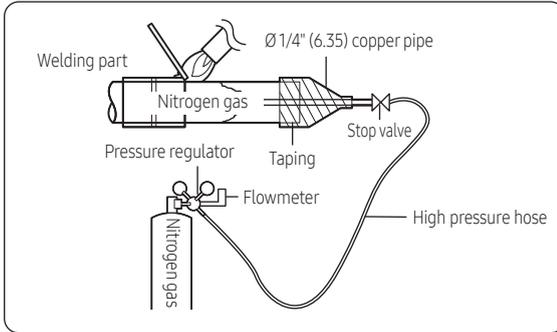
Refrigerant pipe welding and safety information

⚠ CAUTION

- Important information for refrigerant pipe work.
 - Make sure there is no moisture inside the pipe.
 - Make sure there are no foreign substances and impurities in the pipe.
 - Make sure there is no leakage.
 - Make sure to follow the instruction when welding or storing the pipe.

Nitrogen flushing welding

- When welding the refrigerant pipes, flush them with nitrogen gas as shown in the picture.
- If you do not perform nitrogen flushing when welding the pipes, oxide may form inside the pipe. It can cause the damage of the important parts such as compressor and valves etc.
- Adjust the flow rate of the nitrogen flushing with a pressure regulator to maintain 0.54 ft³/h (0.05 m³/h) or less.



Direction of the pipe when welding

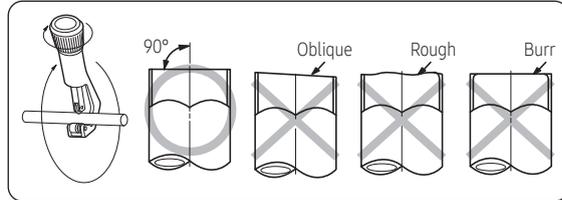
- Direction of the pipe should be headed downward or in a sideways when welding.
- Avoid welding the pipe with pipe direction heading upward.

CAUTION

- When you test gas leakage after welding the pipes, use a designated solution for gas leakage detection. If you use the detection solution that includes sulfuric ingredient, it may cause corrosion to the pipes.

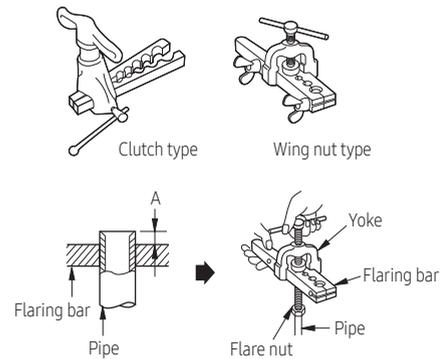
Cutting or flaring the pipes

- 1 Make sure that you prepared the required tools.
 - Pipe cutter, Deburring tool, flaring tool and pipe holder, etc.
- 2 If you want to shorten the pipe, cut it with a pipe cutter ensuring that the cut edge remains at 90° with the side of the pipe.
 - Refer to below illustrations for correct and incorrect examples of cut edges.



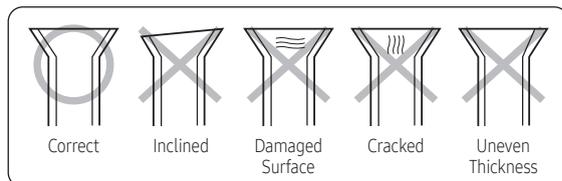
- 3 To prevent a gas leak, remove all burrs at the cut edge of the pipe using a Deburring tool.
- 4 Carry out flaring work using flaring tool as shown below.

[Flaring tools]



	Pipe diameter [D, inch (mm)]	Depth of flaring part [A, inch (mm)]		
		Using flaring tool for R-32	Using conventional flaring tool	
			Clutch type	Wing nut type
Ø1/4 (Ø6.35)	0~0.02 (0~0.05)	0.04~0.06 (1.0~1.5)	0.06~0.08 (1.5~2.0)	
Ø3/8 (Ø9.52)				
Ø1/2 (Ø12.70)				
Ø5/8 (Ø15.88)				

- 5 Check that you flared the pipe correctly.
 - Refer to below illustrations for correct and incorrect examples of flared pipe.



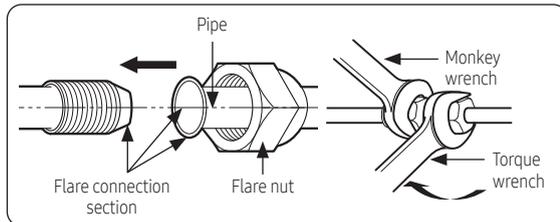
Refrigerant pipe installation

⚠ CAUTION

- If foreign matters or burrs are not removed after cutting pipe, refrigerant gas may leak.
- If foreign matters enter inside the pipe, important interior parts of the unit may get damaged or product efficiency will be reduced. So, the direction of pipe should be downward during pipe cutting or flaring.

Connecting the flared pipes

- Check if the flaring is properly done according to the standard size.
- Align the center of the piping and tighten the flare nut with your hands. Then, tighten the flare nut with torque wrench in a direction of the arrow indicated in below illustration.
- Make sure to use ester oil to coat the flare connection section.



Outer diameter (D)		Torque		Flare dimension (L)		Flare shape [inch (mm)]
mm	inch	N·m	lbf·ft	mm	inch	
6.35	1/4	14 ~ 18	10.3 ~ 13.3	8.7 ~ 9.1	0.34 ~ 0.36	
9.52	3/8	34 ~ 42	25.1 ~ 31.0	12.8 ~ 13.2	0.50 ~ 0.52	
12.7	1/2	49 ~ 61	36.1 ~ 45.0	16.2 ~ 16.6	0.64 ~ 0.65	
15.88	5/8	68 ~ 82	50.2 ~ 60.5	19.3 ~ 19.7	0.76 ~ 0.78	

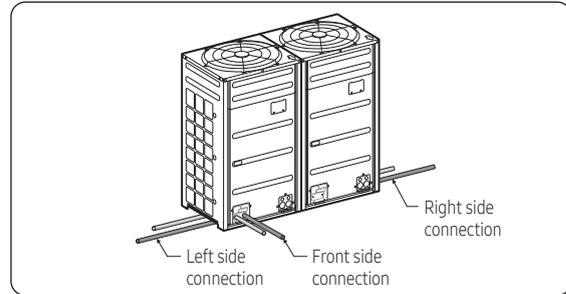
⚠ CAUTION

- Blowing Nitrogen gas should be done when welding the pipe.
- Make sure to use the provided flare nut.
- Make sure that there are no cracks or twisted part when you need to bend the pipe.
- Do not fasten the flare nut with excessive strength.
- R-32 is a high pressure refrigerant and there is a risk of refrigerant leakage if the flare connection is not coated with ester oil. Therefore, apply ester oil to coat the flare connection area.

Pipe installation for an outdoor unit

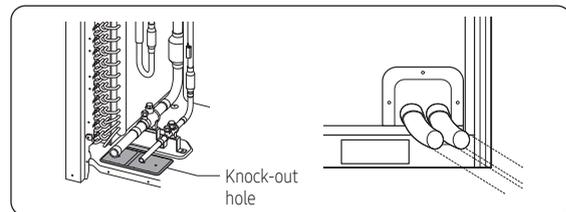
1 Direction of the pipe

Refrigerant pipe can be withdrawn from the front, left and right side. Take necessary method to install the pipes according to the condition of the installation site.



⚠ CAUTION

- Caution for using knock-out hole



- Make sure to prevent any damages on the exterior of the outdoor unit.
- Remove all burrs around the knock-out hole and apply varnish on the cross section and edges of the knock-out hole to prevent rust.
- Use a cable protection tube and bushing to prevent a cable from being damaged when passing through a knock-out hole.

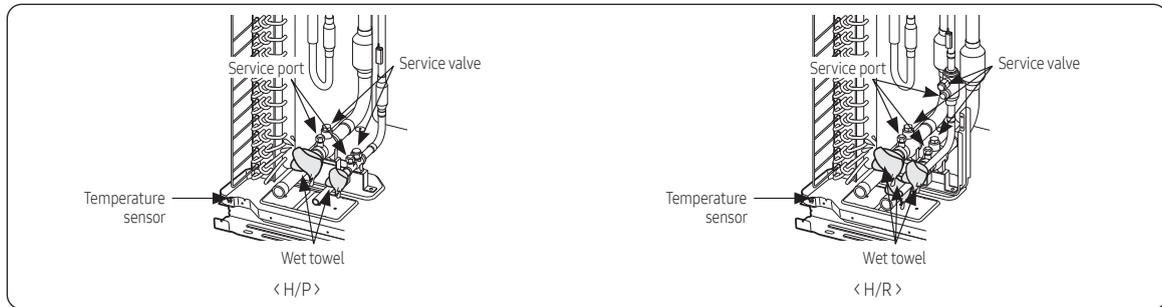
2 Connecting refrigerant pipe for outdoor unit

Classification	Front side connection	Right/left (and bottom) side connection
Working process	<ul style="list-style-type: none"> First, remove the piping cover from the outdoor unit. Separate the knock-out hole that you are going to use. If you separate the knock-out hole that is going to be unused, small animals such as squirrels and rats may get into the unit through the hole. Fix the bottom side of the piping cover first and then fix the top part of it. 	<ul style="list-style-type: none"> 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 holes. If not, small animals such as rats and squirrels may get inside the unit.
H/P		
H/R		

CAUTION

- Caution for welding the pipe to an outdoor unit
 - When welding the pipe, the unit may get damaged by the heat and flame from welding. Use a flame proofing cloth to protect the unit from a welding fire or flame. Sensor for detecting outside temperature is located on the left side of the welding part so be extra careful not to damage the sensor when welding.
 - The O-ring and Teflon packing inside service valve may get damaged by the heat from welding. Wrap the bottom side of the service valve with a wet cloth and weld it as shown in the illustration. Also, water dripping from the wet cloth may interrupt the welding. Make sure the water does not drip from the wet cloth.
 - Make sure that connected pipes does not interrupt each other or make contact with the product. (Vibration may cause damage to the pipes.)
 - When removing the sealed pipe on the bottom side of the service valve, cut it with a pipe cutter first and then start the welding. When the sealed pipe is welded without cutting, you may get injured by the refrigerant within the pipe.

Refrigerant pipe installation



3 Pipe installation between the outdoor units

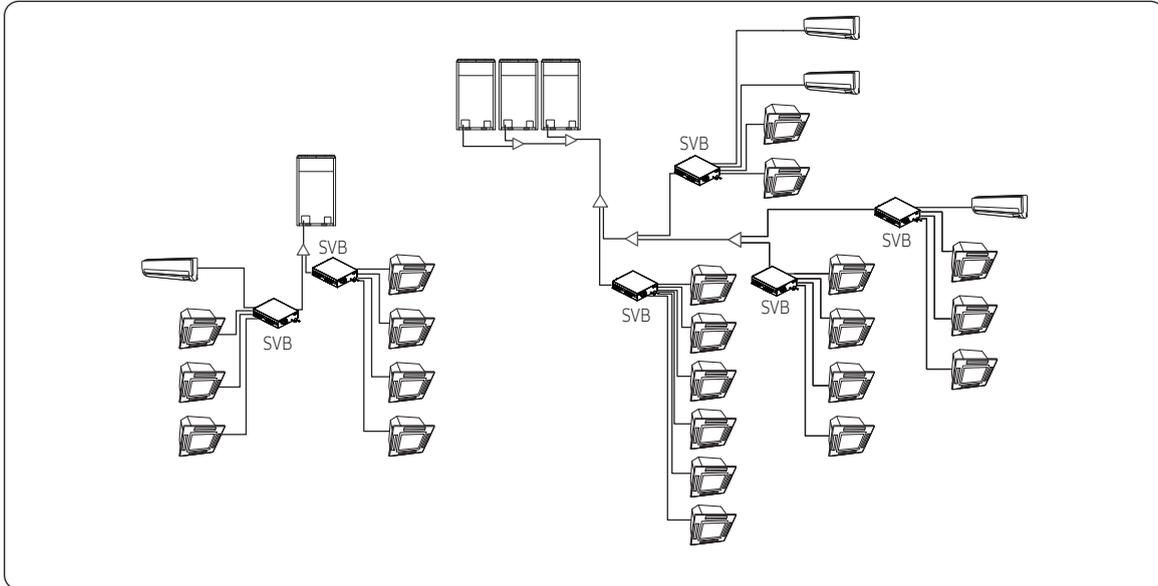
- You will need branch joints, which is an optional accessory, for connecting in between outdoor units in order to combine outdoor units in module.
- ※ For optimal distribution of the refrigerant, you must use Y-joint as branch joint for connecting outdoor units. (Do not use T-joint)
- When you install the outdoor units in module, there is no restriction of installation order among outdoor units.
- Height of the connection pipe should be same or lower than the ones connected to the outdoor units.

Caution	Correct installation	Incorrect installation
Refrigerant pipes should be connected at the same or lower level than the ones connected to the outdoor unit.		
Refrigerant pipes must be connected by the side of the product. Straight section should be 12 inch (300 mm) or more		
Branch joint between outdoor units must be installed horizontally.		
Install a vertical trap in following cases as shown in the figure : Case1. Pipe length between outdoor unit branches exceeds 8.20 ft (2.5 m). Case2. Pipe length between outdoor unit and its branch exceeds 8.20 ft (2.5 m).		

Examples of refrigerant pipe installation

H/P

Using Y-joint

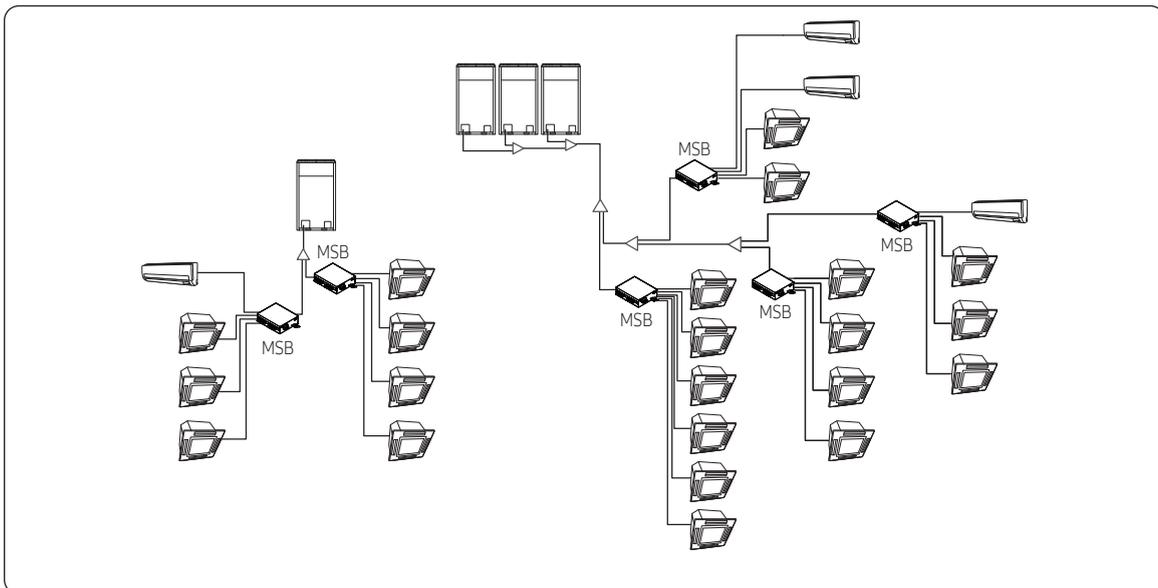


NOTE

- Indoor unit without SVB (for H/P only)
 - Consult a qualified installer to ensure compliance with all safety standards related to refrigerant leakage and to determine whether an SVB connection is required.

H/R

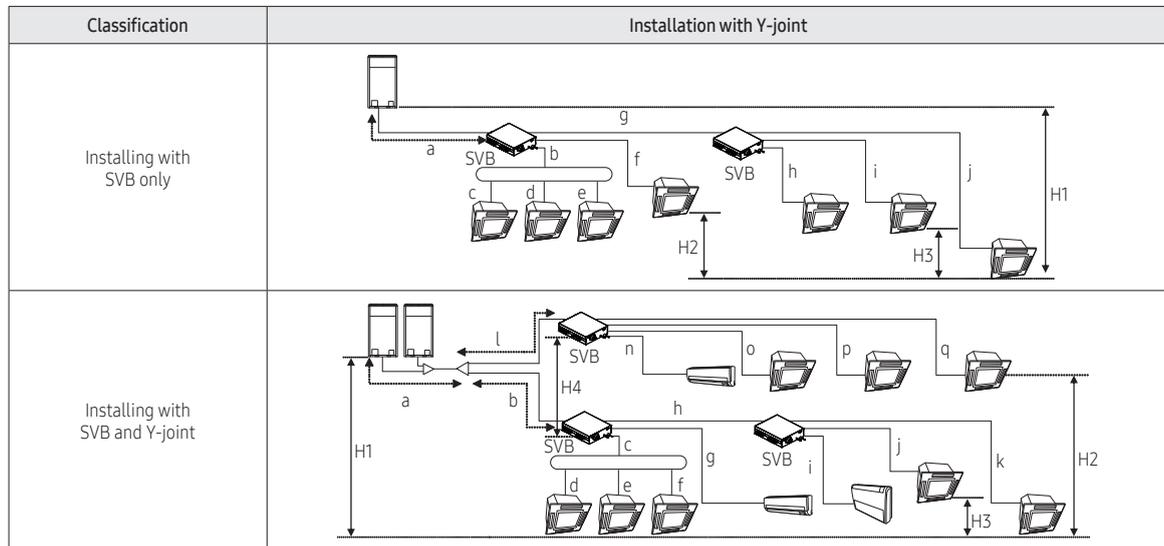
Using Y-joint



Refrigerant pipe installation

Allowable length of the refrigerant pipe and the installation examples

H/P



Classification		Example		Remarks	
Maximum allowable pipe length	Outdoor unit ~ Indoor unit	Actual pipe length	656' (200 m) or less	Installing only with SVB $a+g+j \leq 656' (200 \text{ m}) (722' (220 \text{ m}))$	Equivalent length Y-joint: 1.64' (0.5 m) Distribution header: 1 m SVB: 3.28' (1 m)
		(Equivalent length)	722' (220 m) or less		
	Total length of pipe	Installing only with SVB	3281' (1000 m) or less	$a+b+c+d+e+f+g+h+i+j \leq 3281' (1000 \text{ m})$	
		Installing with SVB and Y-joint	$a+b+c+\dots+r \leq 3281' (1000 \text{ m})$		
Outdoor unit ~ Outdoor unit (Module installation)	Pipe length	33' (10 m) or less	$x \leq 33' (10 \text{ m}), y \leq 33' (10 \text{ m}), z \leq 33' (10 \text{ m})$		
	Equivalent length	43' (13 m) or less	$x \leq 43' (13 \text{ m}), y \leq 43' (13 \text{ m}), z \leq 43' (13 \text{ m})$		
SVB ~ Indoor unit	Pipe length	Installing only with SVB	$b+c \leq 148' (45 \text{ m}), b+d \leq 148' (45 \text{ m}), b+e \leq 148' (45 \text{ m}), f \leq 148' (45 \text{ m}), g+h \leq 148' (45 \text{ m}), g+i \leq 148' (45 \text{ m}), g+j \leq 148' (45 \text{ m})$		
		Installing with SVB and Y-joint	$c+d, c+e, c+f, g, h+i, h+j, h+k, n, o, p, q, \leq 148' (45 \text{ m})$		
Maximum allowable height difference	Outdoor unit ~ Indoor unit	Pipe length	$361'/361'$ (110/110 m) ^{Note 1)}	$H1 \leq 361'/361' (110/110 \text{ m})$	
	Indoor unit ~ Indoor unit		131' (40 m) or less	$H2 \leq 131' (40 \text{ m})$	
	But, when VWMD***S6-5P is installed, H2 is 49' (15 m) or less.				
	Indoor unit ~ Indoor unit (in one SVB)		49' (15 m) or less	$H3 \leq 49' (15 \text{ m})$	
SVB ~ SVB	98' (30 m) or less	$H4 \leq 98' (30 \text{ m})$			
Maximum allowable length after branch joint	First branch joint ~ Farthest Indoor unit	Pipe length	148' (45 m) or less	Installing only with SVB $g+j \leq 148' (45 \text{ m})$	
			Installing with SVB and Y-joint $b+h+k \leq 148' (45 \text{ m})$ $l+q \leq 148' (45 \text{ m})$		
		$148' \sim 295'$ (45 m ~ 90 m) ^{Note 2)}	Required conditions must be satisfied		

Note 1) When indoor unit is located at higher level than outdoor unit, allowable height difference is 361 ft (110 m), (If the height difference is over 131 ft (40 m), contact your local dealer for more information.) but when the indoor unit is located at lower level than outdoor unit, allowable height difference is 361 ft (110 m) (If the height difference is over 164 ft (50 m), need to decide whether to install PDM kit or not.)

Model name of the PDM kit : V1PDMK03PR, V1PDMK01PR, V1PDMK02PR

Note 2) Required condition

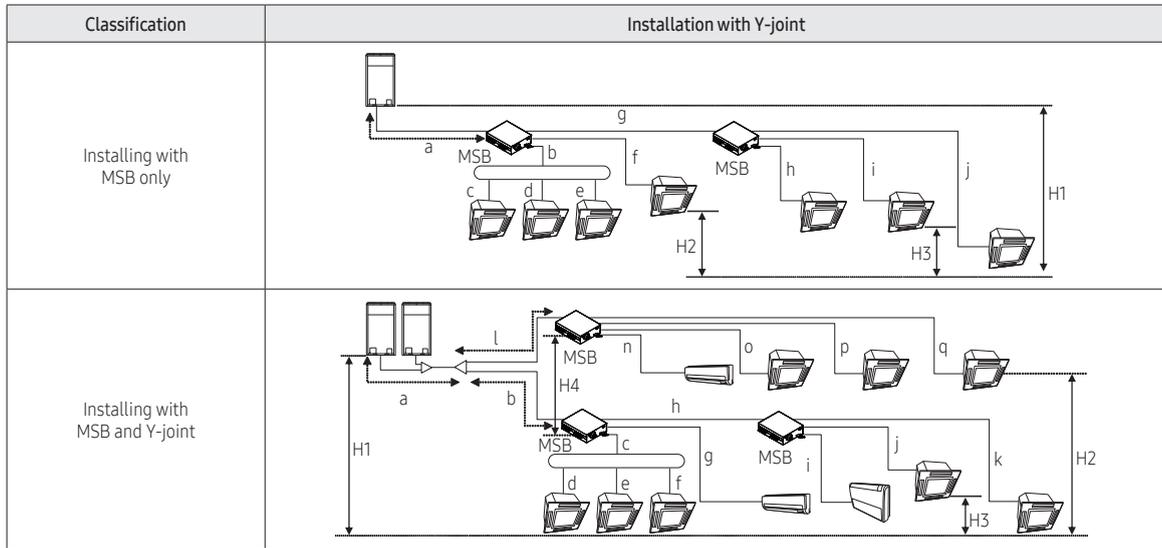
Classification	Condition	Example
First branch joint ~ Farthest Indoor unit	$148' (45 \text{ m}) \leq b+h+k, l+q \leq 295' (90 \text{ m})$: Size of the branch liquid and low pressure gas pipes (b, l) must be increased by 1 grade.	
Total length of extended pipe	If the size of pipe (main pipe), between the first branch joint and the outdoor unit, is not increased by 1 grade, $a+(b+l) \times 2+c+d+e+f+g+h+i+j+k+n+o+p+q \leq 3281' (1000 \text{ m})$	
	If the size of pipe (main pipe), between the first branch joint and the outdoor unit, is increased by 1 grade, $(a+b+l) \times 2+c+d+e+f+g+h+i+j+k+n+o+p+q \leq 3281' (1000 \text{ m})$	
SVB ~ Each indoor unit	$c+d, c+e, c+f, g, h+i, h+j, h+k, n, o, p, q \leq 148' (45 \text{ m})$	
Difference between the distance of the outdoor unit to the farthest indoor unit and nearest indoor unit $\leq 148' (45 \text{ m})$ $(a+b+h+k) - (a+b+c+d) \leq 148' (45 \text{ m})$		

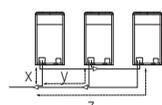
※ In case of connecting more than one indoor unit in one SVB Port, the below indoor units cannot be combined. OAP duct(VOSD***S6-5P), Hydro Unit(VH*D***S6-5P)

※ In case of connecting two SVB ports with Y-joint, the indoor units cannot be combined to more than one.

Refrigerant pipe installation

H/R



Classification			Example		Remarks	
Maximum allowable pipe length	Outdoor unit ~ Indoor unit	Actual pipe length (Equivalent length)	656' (200 m) or less 722' (220 m) or less	Installing only with MSB Installing with MSB and Y-joint	$a+g+j \leq 656'$ (200 m) (722' (220 m)) $a+b+h+k \leq 656'$ (200 m) (722' (220 m))	Equivalent length Y-joint: 1.64' (0.5 m) Distribution header: 1 m MSB: 3.28' (1 m)
		Total length of pipe	3281' (1000 m) or less	Installing only with MSB Installing with MSB and Y-joint	$a+b+c+d+e+f+g+h+i+j \leq 3281'$ (1000 m) $a+b+c+\dots+r \leq 3281'$ (1000 m)	
	Outdoor unit ~ Outdoor unit (Module installation)	Pipe length	33' (10 m) or less	$x \leq 33'$ (10 m), $y \leq 33'$ (10 m), $z \leq 33'$ (10 m)		
		Equivalent length	43' (13 m) or less	$x \leq 43'$ (13 m), $y \leq 43'$ (13 m), $z \leq 43'$ (13 m)		
	MSB ~ Indoor unit	Pipe length	148' (45 m) or less	Installing only with MSB	$b+c \leq 148'$ (45 m), $b+d \leq 148'$ (45 m), $b+e \leq 148'$ (45 m) $f \leq 148'$ (45 m), $g+h \leq 148'$ (45 m), $g+i \leq 148'$ (45 m) $g+j \leq 148'$ (45 m)	
				Installing with MSB and Y-joint	$c+d, c+e, c+f, g, h+i, h+j, h+k, n, o, p, q, \leq 148'$ (45 m)	
Maximum allowable height difference	Outdoor unit ~ Indoor unit	Pipe length	361'/361' (110/110 m) ^{Note 1)}	$H1 \leq 361'/361'$ (110/110 m)		
	Indoor unit ~ Indoor unit	Pipe length	131' (40 m) or less	$H2 \leq 131'$ (40 m)		
	Indoor unit ~ Indoor unit (in one MSB)	Pipe length	49' (15 m) or less	But, when VWMD***S6-5P is installed, H2 is 49' (15 m) or less.		
	MSB ~ MSB	Pipe length	98' (30 m) or less	$H4 \leq 98'$ (30 m)		
Maximum allowable length after branch joint	First branch joint ~ Farthest Indoor unit	Pipe length	148' (45 m) or less	Installing only with MSB Installing with MSB and Y-joint	$g+j \leq 148'$ (45 m) $b+h+k \leq 148'$ (45 m) $l+q \leq 148'$ (45 m)	
			148' ~ 295' (45 m ~ 90 m) ^{Note 2)}	Required conditions must be satisfied		



Note 1) When indoor unit is located at higher level than outdoor unit, allowable height difference is 361 ft (110 m), (If the height difference is over 131 ft (40 m), contact your local dealer for more information.) but when the indoor unit is located at lower level than outdoor unit, allowable height difference is 361 ft (110 m) (If the height difference is over 164 ft (50 m), need to decide whether to install PDM kit or not.)

Model name of the PDM kit : V1PDMK03PR, V1PDMK01PR, V1PDMK02PR

Note 2) Required condition

Classification	Condition	Example
First branch joint ~ Farthest Indoor unit	$148' (45 \text{ m}) \leq b+h+k, l+q \leq 295' (90 \text{ m})$: Size of the branch liquid and low pressure gas pipes (b, l) must be increased by 1 grade.	
Total length of extended pipe	If the size of pipe (main pipe), between the first branch joint and the outdoor unit, is not increased by 1 grade, $a+(b+l) \times 2+c+d+e+f+g+h+i+j+k+n+o+p+q \leq 3281' (1000 \text{ m})$	
	If the size of pipe (main pipe), between the first branch joint and the outdoor unit, is increased by 1 grade, $(a+b+l) \times 2+c+d+e+f+g+h+i+j+k+n+o+p+q \leq 3281' (1000 \text{ m})$	
MSB - Each indoor unit	$c+d, c+e, c+f, g, h+i, h+j, h+k, n, o, p, q \leq 148' (45 \text{ m})$	
Difference between the distance of the outdoor unit to the farthest indoor unit and nearest indoor unit $\leq 148' (45 \text{ m})$ $(a+b+h+k) - (a+b+c+d) \leq 148' (45 \text{ m})$		

- ※ In case of connecting more than one indoor unit in one MSB Port, the below indoor units cannot be combined. OAP duct(VOSD***S6-5P), Hydro Unit(VH*D***S6-5P)
- ※ In case of connecting two MSB ports with Y-joint, the indoor units cannot be combined to more than one.

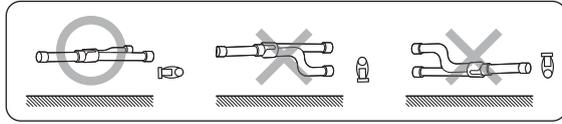
Installation Procedure

Refrigerant pipe installation

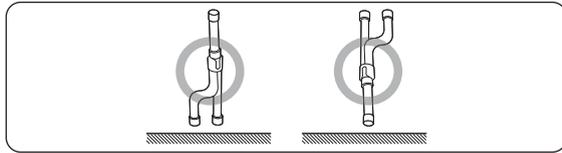
Installing the branch joints

Branch joints must be installed 'horizontally' or 'vertically'.

Horizontal installation

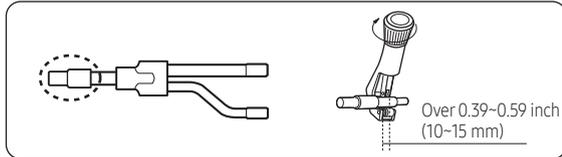


Vertical installation



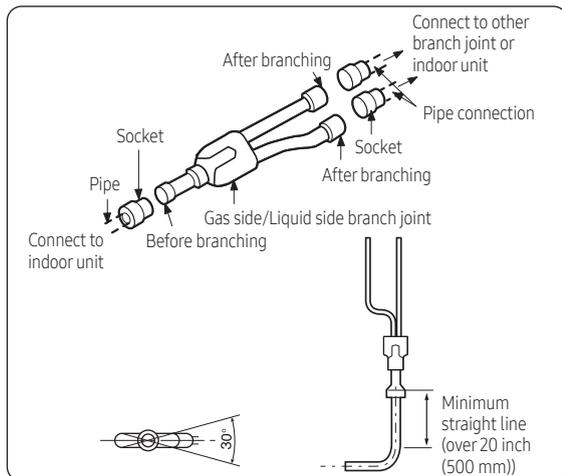
NOTE

- For A-J type branch joints : Connect the branch joint to the connection pipe with the provided reducer.
- For K-Z type branch joints : Cut the connection part of the branch joint or the provided socket, according to the diameter of the connection pipe, before connecting them.



CAUTION

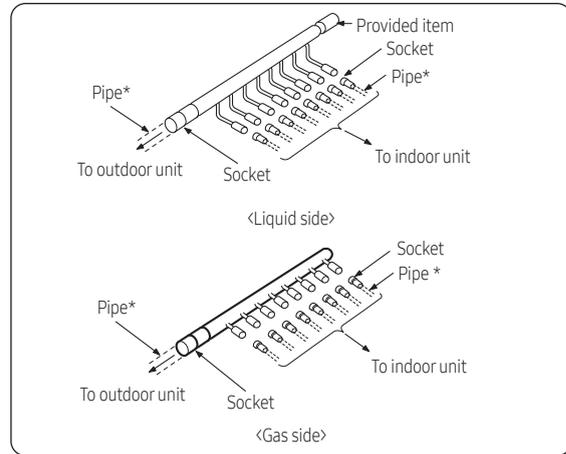
- Install the branch joint within $\pm 15^\circ$ of the horizon or vertical line.
- Make sure that the pipe is not bent at where it is connected to the branch joint.
- Keep a minimum straight line distance of 20 inch (500 mm) or more before connecting branch joint.



※ Install within $\pm 15^\circ$ of the horizon or vertical line.

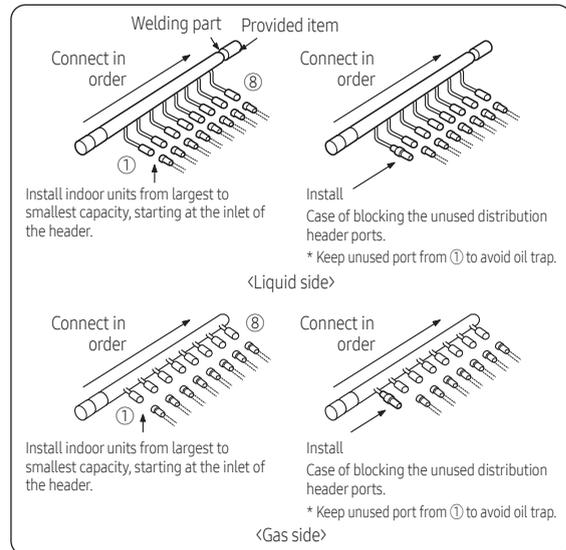
Installing the distribution header

1 Select the reducer that fits the diameter of the pipe.



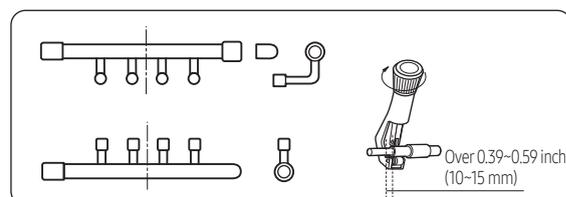
※ Pipe : Separately purchased item

2 If the number of connected indoor unit is fewer than ports on the distribution header, block the unused ports with caps.



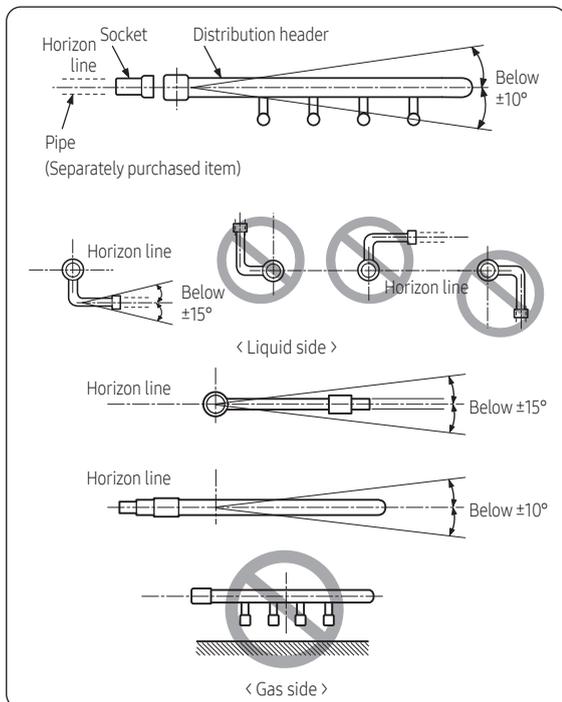
NOTE

- For A~J type distribution header : Connect the distribution header to the connection pipe with the provided reducer.
- For K-Z type distribution headers : Cut the provided socket, according to the diameter of the connection pipe, before connecting it.



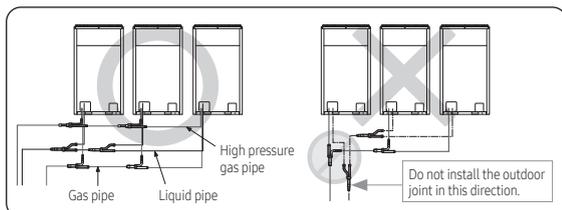
⚠ CAUTION

- Connect the indoor units in order, while respecting the direction of the arrow shown in the illustration.
 - When indoor units are connected to same distribution head, indoor unit must be connected in order of their capacity, from largest to smallest.
 - Keep unused port from ① to avoid oil trap.
- 3 Install the distribution header horizontally.
- Install the distribution header horizontally so that its ports does not face down.

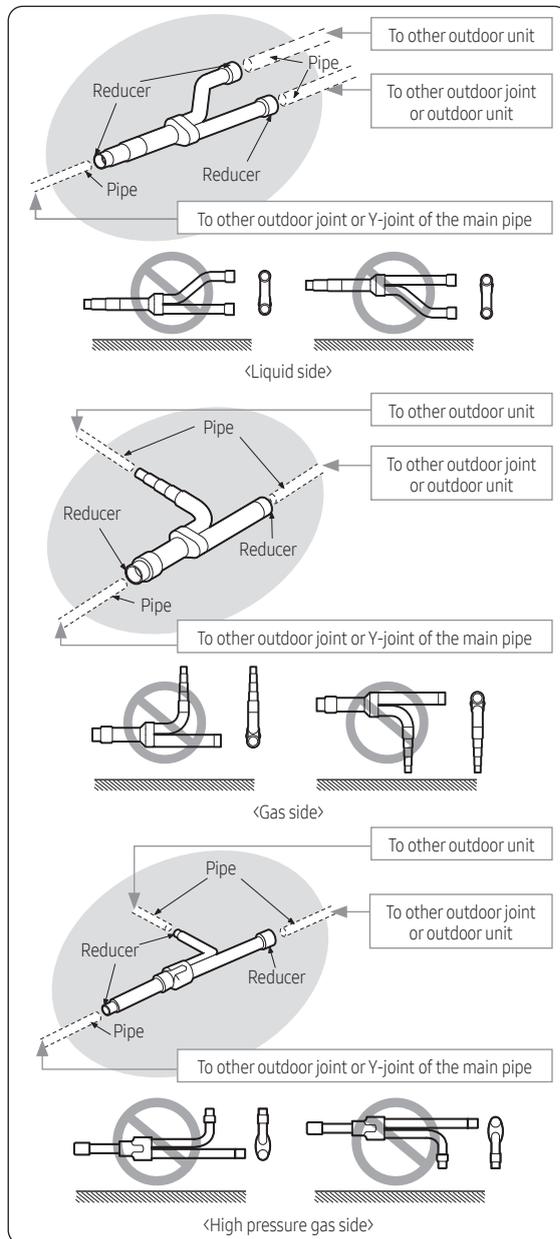


Installing the branch joint between outdoor units

Installation of outdoor joints



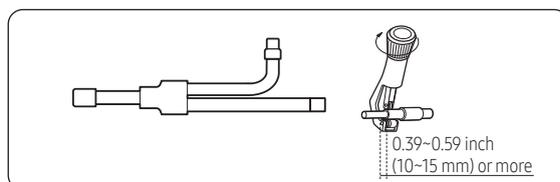
- ※ High pressure gas pipe only applies to the H/R product.



- ※ Use the attached reducer according to the selected pipe size.

NOTE

- Connect the Outdoor joint to the pipe by cutting the outlet of the Outdoor joint or provided reducer properly.



Electrical wiring work

Electric Characteristics

1 [V*D***S6M-5Y series] Heat Pump / Heat Recovery (208-230V)

Nom. Ton	Model	Units		Module #1						Module #2						Module #3					
				RLA		FLA		Power Supply		RLA		FLA		Power Supply		RLA		FLA		Power Supply	
		Hz	Volts	Comp1	Comp2	FAN1	FAN2	MCA	MOP	Comp1	Comp2	FAN1	FAN2	MCA	MOP	Comp1	Comp2	FAN1	FAN2	MCA	MOP
6Ton	V*D072S6M-5Y	60	208-230	18.7	-	4.6	-	28.0	35.0	-	-	-	-	-	-	-	-	-	-	-	-
8Ton	V*D096S6M-5Y	60	208-230	12.2	12.2	4.2	4.2	36.0	40.0	-	-	-	-	-	-	-	-	-	-	-	-
10Ton	V*D120S6M-5Y	60	208-230	14.4	14.4	4.2	4.2	40.8	45.0	-	-	-	-	-	-	-	-	-	-	-	-
12Ton	V*D144S6M-5Y	60	208-230	19.6	19.6	4.2	4.2	52.6	60.0	-	-	-	-	-	-	-	-	-	-	-	-
14Ton	V*D168S6M-5Y	60	208-230	20.4	20.4	4.2	4.2	54.4	60.0	-	-	-	-	-	-	-	-	-	-	-	-
16Ton	V*D192S6M-5Y	60	208-230	22.5	22.5	4.6	4.6	60.0	70.0	-	-	-	-	-	-	-	-	-	-	-	-
18Ton	V*D216S6M-5Y	60	208-230	24.3	24.3	4.6	4.6	64.0	80.0	-	-	-	-	-	-	-	-	-	-	-	-
20Ton	V*D240S6M-5Y	60	208-230	26.1	26.1	4.6	4.6	68.0	80.0	-	-	-	-	-	-	-	-	-	-	-	-
22Ton	V*D264S6M-5Y	60	208-230	12.2	12.2	4.2	4.2	36.0	40.0	20.4	20.4	4.2	4.2	54.4	60.0	-	-	-	-	-	-
24Ton	V*D288S6M-5Y	60	208-230	12.2	12.2	4.2	4.2	36.0	40.0	22.5	22.5	4.6	4.6	60.0	70.0	-	-	-	-	-	-
26Ton	V*D312S6M-5Y	60	208-230	12.2	12.2	4.2	4.2	36.0	40.0	24.3	24.3	4.6	4.6	64.0	80.0	-	-	-	-	-	-
28Ton	V*D336S6M-5Y	60	208-230	12.2	12.2	4.2	4.2	36.0	40.0	26.1	26.1	4.6	4.6	68.0	80.0	-	-	-	-	-	-
30Ton	V*D360S6M-5Y	60	208-230	14.4	14.4	4.2	4.2	40.8	45.0	26.1	26.1	4.6	4.6	68.0	80.0	-	-	-	-	-	-
32Ton	V*D384S6M-5Y	60	208-230	22.5	22.5	4.6	4.6	60.0	70.0	22.5	22.5	4.6	4.6	60.0	70.0	-	-	-	-	-	-
34Ton	V*D408S6M-5Y	60	208-230	22.5	22.5	4.6	4.6	60.0	70.0	24.3	24.3	4.6	4.6	64.0	80.0	-	-	-	-	-	-
36Ton	V*D432S6M-5Y	60	208-230	14.4	14.4	4.2	4.2	40.8	45.0	14.4	14.4	4.2	4.2	40.8	45.0	22.5	22.5	4.6	4.6	60.0	70.0
38Ton	V*D456S6M-5Y	60	208-230	14.4	14.4	4.2	4.2	40.8	45.0	19.6	19.6	4.2	4.2	52.6	60.0	22.5	22.5	4.6	4.6	60.0	70.0

2 [V*D***S6M-5G series] Heat Pump / Heat Recovery (460V)

Nom. Ton	Model	Units		Module #1						Module #2						Module #3					
				RLA		FLA		Power Supply		RLA		FLA		Power Supply		RLA		FLA		Power Supply	
		Hz	Volts	Comp1	Comp2	FAN1	FAN2	MCA	MOP	Comp1	Comp2	FAN1	FAN2	MCA	MOP	Comp1	Comp2	FAN1	FAN2	MCA	MOP
6Ton	V*D072S6M-5G	60	460	10.0	-	2.3	-	15.0	20.0	-	-	-	-	-	-	-	-	-	-	-	-
8Ton	V*D096S6M-5G	60	460	6.0	6.0	2.1	2.1	18.0	20.0	-	-	-	-	-	-	-	-	-	-	-	-
10Ton	V*D120S6M-5G	60	460	6.6	6.6	2.1	2.1	19.4	25.0	-	-	-	-	-	-	-	-	-	-	-	-
12Ton	V*D144S6M-5G	60	460	9.6	9.6	2.1	2.1	26.2	35.0	-	-	-	-	-	-	-	-	-	-	-	-
14Ton	V*D168S6M-5G	60	460	11.0	11.0	2.1	2.1	29.0	35.0	-	-	-	-	-	-	-	-	-	-	-	-
16Ton	V*D192S6M-5G	60	460	13.0	13.0	2.3	2.3	34.0	40.0	-	-	-	-	-	-	-	-	-	-	-	-
18Ton	V*D216S6M-5G	60	460	14.8	14.8	2.3	2.3	38.0	50.0	-	-	-	-	-	-	-	-	-	-	-	-
20Ton	V*D240S6M-5G	60	460	15.6	15.6	2.3	2.3	40.0	50.0	-	-	-	-	-	-	-	-	-	-	-	-
22Ton	V*D264S6M-5G	60	460	6.0	6.0	2.1	2.1	18.0	20.0	11.0	11.0	2.1	2.1	29.0	35.0	-	-	-	-	-	-
24Ton	V*D288S6M-5G	60	460	6.0	6.0	2.1	2.1	18.0	20.0	13.0	13.0	2.3	2.3	34.0	40.0	-	-	-	-	-	-
26Ton	V*D312S6M-5G	60	460	6.0	6.0	2.1	2.1	18.0	20.0	14.8	14.8	2.3	2.3	38.0	50.0	-	-	-	-	-	-
28Ton	V*D336S6M-5G	60	460	6.0	6.0	2.1	2.1	18.0	20.0	15.6	15.6	2.3	2.3	40.0	50.0	-	-	-	-	-	-
30Ton	V*D360S6M-5G	60	460	6.6	6.6	2.1	2.1	19.4	25.0	15.6	15.6	2.3	2.3	40.0	50.0	-	-	-	-	-	-
32Ton	V*D384S6M-5G	60	460	13.0	13.0	2.3	2.3	34.0	40.0	13.0	13.0	2.3	2.3	34.0	40.0	-	-	-	-	-	-
34Ton	V*D408S6M-5G	60	460	13.0	13.0	2.3	2.3	34.0	40.0	14.8	14.8	2.3	2.3	38.0	50.0	-	-	-	-	-	-
36Ton	V*D432S6M-5G	60	460	6.6	6.6	2.1	2.1	19.4	25.0	6.6	6.6	2.1	2.1	19.4	25.0	13.0	13.0	2.3	2.3	34.0	40.0
38Ton	V*D456S6M-5G	60	460	6.6	6.6	2.1	2.1	19.4	25.0	9.6	9.6	2.1	2.1	26.2	35.0	13.0	13.0	2.3	2.3	34.0	40.0

3 [V*D***L6M-5Y series] Heat Pump / Heat Recovery (208~230V)

Nom. Ton	Model	Units		Module #1						Module #2						Module #3					
				RLA		FLA		PowerSupply		RLA		FLA		PowerSupply		RLA		FLA		PowerSupply	
		Hz	Volts	Comp1	Comp2	FAN1	FAN2	MCA	MOP	Comp1	Comp2	FAN1	FAN2	MCA	MOP	Comp1	Comp2	FAN1	FAN2	MCA	MOP
6Ton	V*D072L6M-5Y	60	208-230	18	18	4.2	4.2	50	60	-	-	-	-	-	-	-	-	-	-	-	-
8Ton	V*D096L6M-5Y	60	208-230	22	22	4.2	4.2	62	70	-	-	-	-	-	-	-	-	-	-	-	-
10Ton	V*D120L6M-5Y	60	208-230	28	28	4.2	4.2	76	90	-	-	-	-	-	-	-	-	-	-	-	-
12Ton	V*D144L6M-5Y	60	208-230	18	18	4.2	4.2	50	60	18	18	4.2	4.2	50	60	-	-	-	-	-	-
14Ton	V*D168L6M-5Y	60	208-230	18	18	4.2	4.2	50	60	22	22	4.2	4.2	62	70	-	-	-	-	-	-
16Ton	V*D192L6M-5Y	60	208-230	22	22	4.2	4.2	62	70	22	22	4.2	4.2	62	70	-	-	-	-	-	-
18Ton	V*D216L6M-5Y	60	208-230	18	18	4.2	4.2	50	60	18	18	4.2	4.2	50	60	18	18	4.2	4.2	50	60
20Ton	V*D240L6M-5Y	60	208-230	18	18	4.2	4.2	50	60	18	18	4.2	4.2	50	60	22	22	4.2	4.2	62	70
22Ton	V*D264L6M-5Y	60	208-230	18	18	4.2	4.2	50	60	18	18	4.2	4.2	50	60	28	28	4.2	4.2	76	90
24Ton	V*D288L6M-5Y	60	208-230	18	18	4.2	4.2	50	60	22	22	4.2	4.2	62	70	28	28	4.2	4.2	76	90

4 [V*D***L6M-5G series] Heat Pump / Heat Recovery (460V)

Nom. Ton	Model	Units		Module #1						Module #2						Module #3					
				RLA		FLA		PowerSupply		RLA		FLA		PowerSupply		RLA		FLA		PowerSupply	
		Hz	Volts	Comp1	Comp2	FAN1	FAN2	MCA	MOP	Comp1	Comp2	FAN1	FAN2	MCA	MOP	Comp1	Comp2	FAN1	FAN2	MCA	MOP
6Ton	V*D072L6M-5G	60	460	9.2	9.2	2.1	2.1	25	30	-	-	-	-	-	-	-	-	-	-	-	-
8Ton	V*D096L6M-5G	60	460	11	11	2.1	2.1	31	35	-	-	-	-	-	-	-	-	-	-	-	-
10Ton	V*D120L6M-5G	60	460	14	14	2.1	2.1	38	45	-	-	-	-	-	-	-	-	-	-	-	-
12Ton	V*D144L6M-5G	60	460	9.2	9.2	2.1	2.1	25	30	9.2	9.2	2.1	2.1	25	30	-	-	-	-	-	-
14Ton	V*D168L6M-5G	60	460	9.2	9.2	2.1	2.1	25	30	11	11	2.1	2.1	31	35	-	-	-	-	-	-
16Ton	V*D192L6M-5G	60	460	11	11	2.1	2.1	31	35	11	11	2.1	2.1	31	35	-	-	-	-	-	-
18Ton	V*D216L6M-5G	60	460	9.2	9.2	2.1	2.1	25	30	9.2	9.2	2.1	2.1	25	30	9.2	9.2	2.1	2.1	25	30
20Ton	V*D240L6M-5G	60	460	9.2	9.2	2.1	2.1	25	30	9.2	9.2	2.1	2.1	25	30	11	11	2.1	2.1	31	35
22Ton	V*D264L6M-5G	60	460	9.2	9.2	2.1	2.1	25	30	9.2	9.2	2.1	2.1	25	30	14	14	2.1	2.1	38	45
24Ton	V*D288L6M-5G	60	460	9.2	9.2	2.1	2.1	25	30	11	11	2.1	2.1	31	35	14	14	2.1	2.1	38	45

NOTE

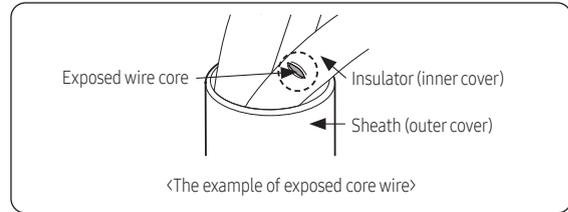
- RLA is based on AHRI 1230 Cooling Standard Condition (Indoor Temp : 80 °F/26.7 °C / 67 °F/19.46 °C(WB), Outdoor Temp : 95 °F/35 °C(DB))
- Voltage Tolerance is ± 10 %
- Maxium allowable voltage between phases is 2 %
- Refer to module combination table for independent units information
- Symbols:
 - RLA : Rated Load Ampere
 - FLA : Full Load Ampere
 - MCA : Minimum Circuit Ampere (A)
 - MOP : Maxium Overcurrent Protective Device(A)

Electrical wiring work

⚠ CAUTION

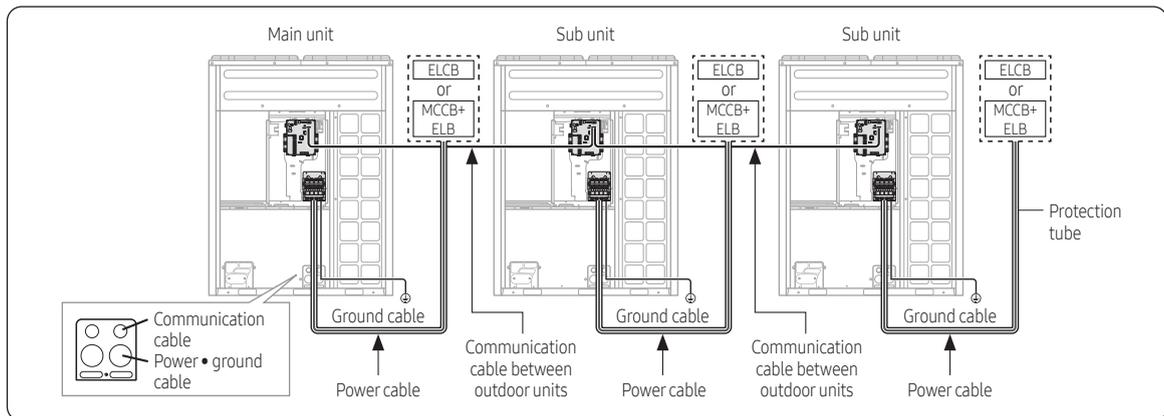
- Caution for electrical work
 - You must install ELCB or MCCB + ELB
 - ELCB: Earth leakage breaker
 - MCCB: Molded case circuit breaker
 - ELB: Earth leakage breaker
 - Do not operate the outdoor unit before completing the refrigerant pipe work.
 - Do not disconnect or change the cable inside the product. It may cause damage to the product.
 - Specification of the power cable is selected based on following installation condition; culvert installation/ ambient temperature 86 °F (30 °C)/ single multi conductor cables. If the condition is different from the ones stated, please consult an electrical installation expert and re-select the power cable.
 - If the length of power cable exceed 164.04 ft (50 m), re-select the power cable considering the voltage drop.

- Use a power cable made out of incombustible material for the insulator (inner cover) and the sheath (outer cover).
- Do not use the power cable with the core wire exposed due to insulator damage occurred during removal of the sheath. When the core wire is exposed, it may cause fire.



Power and communication cable configuration

- Main power and the ground cable must be withdrawn through the knock-out hole on the bottom-right or right side of the cabinet.
- Withdraw the communication cable from the designated knock-out hole on the bottom-right side of the front part.
- Install the power and communication cable using separate cable protection tube.
- Fix a protection tube to the knock-out hole on the outdoor unit by using a CD connector or bushing. Make sure to use insulating bushing.



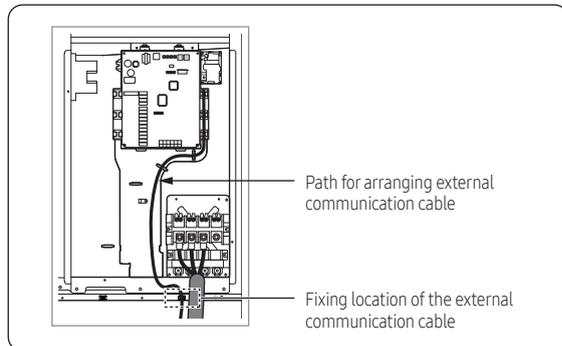
Specification of the protection tube

Name	Temper grade	Applicable conditions
Flexible PVC conduit	PVC	When the protection tube is installed indoor and not exposed to outside, because it is embedded in concrete structure
Class 1 flexible conduit	Galvanized steel sheet	When the protection tube is installed indoor but exposed to outside so there are risk of damage to the protection tube
Class 1 PVC coated flexible conduit	Galvanized steel sheet and Soft PVC compound	When the protection tube is installed outdoor and exposed to outside so there are risk of damage to the protection tube and extra waterproof is needed

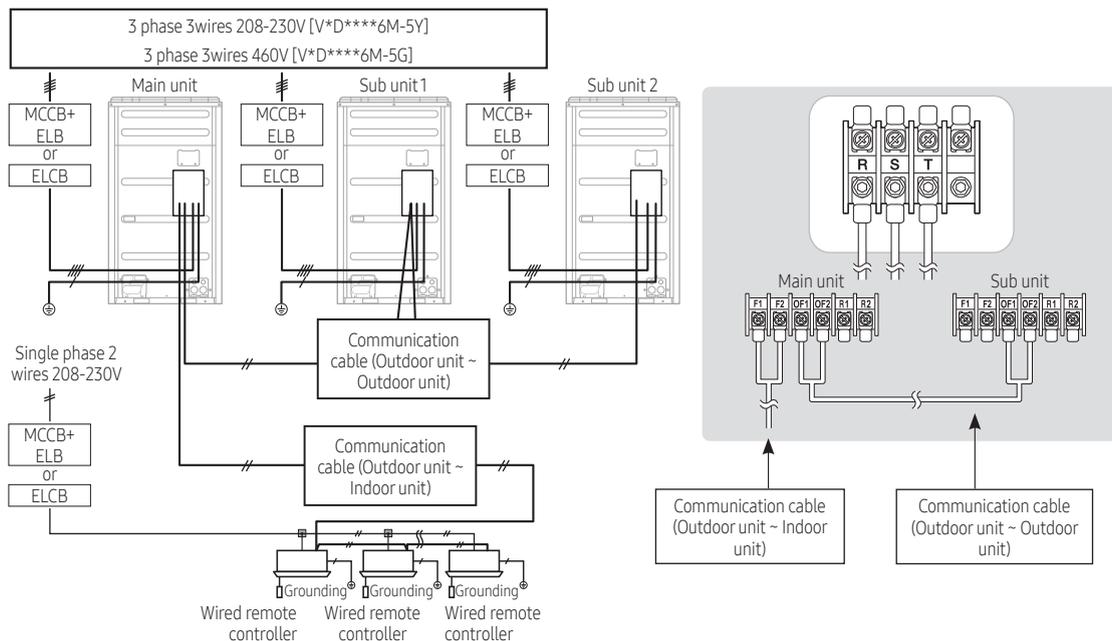
⚠ CAUTION

- Caution for perforating the knock-out hole
- Perforate a knock-out hole by punching it with a hammer.

- After perforating the knock-out hole, apply rust resisting paint around the hole.
- When you need to pass the cables through the knock-out hole, remove burrs on the hole and protection the cable with a protection tape or bushing etc.
- Caution for installing communication cable
- When you connect the cable, it may sag and pressed by other parts. Therefore cables should be fixed to a clamp highlighted with a box on the illustration.



Power wiring diagram

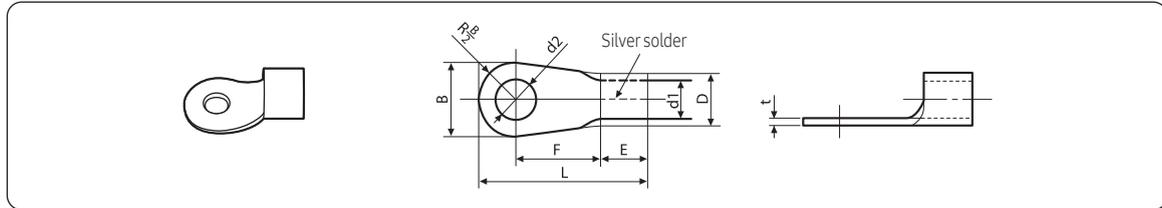


- Connect a power cable of the outdoor unit after checking that R-S-T (3 phase 3 wire) is properly connected.
- Malfunction may occur if one or more of the wires among R-S-T phases (3 Phases-3 Wires) are not connected properly. (*Malfunction: Turning on/off, occurrence of error, consecutive reset)
- Communication cable between indoor and outdoor units and communication cable between outdoor units has no polarity.
- Arrange the cables with a cable tie.
- ※ ELCB and ELB must be installed since there is risk of electric shock or fire when they are not installed.

Electrical wiring work

Selecting solderless ring terminal

- Select a solderless ring terminal for a power cable according to the nominal dimensions for cable.
- Apply insulation coating to the connection part of the solderless ring terminal and the power cable.

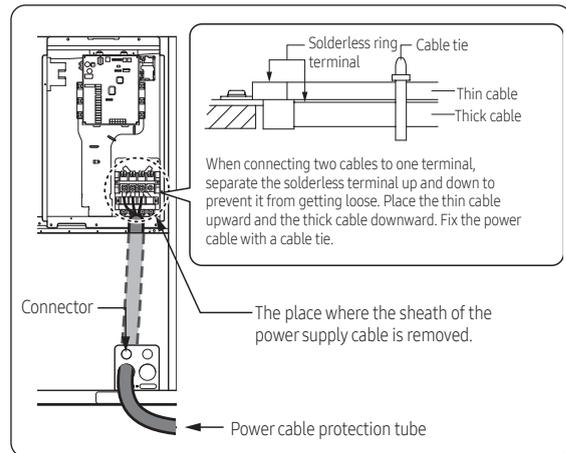


Nominal dimensions for cable [inch ² (mm ²)]		0.006/0.009 (4/6)	0.016 (10)	0.025 (16)	0.039 (25)		0.054 (35)		0.078 (50)	0.109 (70)	
Nominal dimensions for screw [inch (mm)]		0.157 (4)	0.315 (8)	0.315 (8)	0.315 (8)	0.315 (8)	0.315 (8)	0.315 (8)	0.315 (8)	0.315 (8)	
B	Standard dimension [inch (mm)]	0.374 (9.5)	0.591 (15)	0.591 (15)	0.630 (16)	0.472 (12)	0.650 (16.5)	0.630 (16)	0.866 (22)	0.866 (22)	0.945 (24)
	Allowance [inch (mm)]	±0.008 (±0.2)		±0.008 (±0.2)		±0.012 (±0.3)		±0.012 (±0.3)		±0.012 (±0.3)	±0.016 (±0.4)
D	Standard dimension [inch (mm)]	0.220 (5.6)	0.280 (7.1)	0.354 (9)	0.453 (11.5)		0.524 (13.3)		0.531 (13.5)	0.689 (17.5)	
	Allowance [inch (mm)]	+0.012 (+0.3) -0.008 (-0.2)	+0.012 (+0.3) -0.008 (-0.2)	+0.012 (+0.3) -0.008 (-0.2)	+0.020 (+0.5) -0.008 (-0.2)		+0.020 (+0.5) -0.008 (-0.2)		+0.020 (+0.5) -0.008 (-0.2)	+0.020 (+0.5) -0.016 (-0.4)	
d1	Standard dimension [inch (mm)]	0.134 (3.4)	0.177 (4.5)	0.228 (5.8)	0.303 (7.7)		0.370 (9.4)		0.449 (11.4)	0.524 (13.3)	
	Allowance [inch (mm)]	±0.008 (±0.2)		±0.008 (±0.2)	±0.008 (±0.2)		±0.008 (±0.2)		±0.012 (±0.3)	±0.016 (±0.4)	
E	Min. [inch (mm)]	0.236 (6)		0.311 (7.9)	0.374 (9.5)		0.433 (11)		0.492 (12.5)	0.689 (17.5)	0.728 (18.5)
F	Min. [inch (mm)]	0.197 (5)	0.354 (9)	0.354 (9)	0.512 (13)	0.591 (15)	0.512 (13)	0.512 (13)	0.512 (13)	0.551 (14)	0.787 (20)
L	Max. [inch (mm)]	0.787 (20)	1.122 (28.5)	1.181 (30)	1.299 (33)	1.339 (34)		1.496 (38)	1.693 (43)	1.969 (50)	2.008 (51)
d2	Standard dimension [inch (mm)]	0.169 (4.3)	0.331 (8.4)	0.331 (8.4)	0.331 (8.4)	0.331 (8.4)	0.331 (8.4)	0.331 (8.4)	0.331 (8.4)	0.331 (8.4)	0.331 (8.4)
	Allowance [inch (mm)]	+0.008 (+0.2) 0 (0)	+0.016 (+0.4) 0 (0)	+0.016 (+0.4) 0 (0)	+0.016 (+0.4) 0 (0)	+0.016 (+0.4) 0 (0)		+0.016 (+0.4) 0 (0)		+0.016 (+0.4) 0 (0)	+0.016 (+0.4) 0 (0)
t	Min. [inch (mm)]	0.035 (0.9)		0.045 (1.15)	0.057 (1.45)		0.067 (1.7)		0.071 (1.8)	0.071 (1.8)	0.079 (2.0)

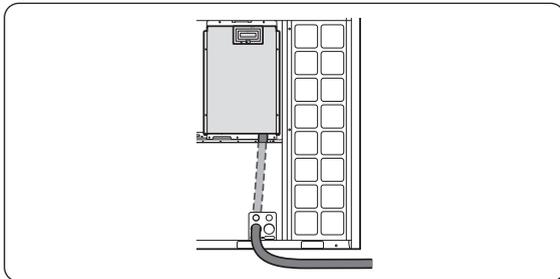
Connecting the power terminal

- Connect the cables to the terminal board with solderless ring terminals.
- Properly connect the cables by using certified and rated cables and make sure to fix them properly so that external force is not applied to the terminal.
- Use a driver and wrench that can apply the rated torque when tightening the screws on the terminal board.
- Tighten the terminal screws by complying rated torque value. If the terminal is loose, fire can occur due to arc heat generation and if the terminal is too tight, terminal board could get damaged.

1 Front connection



2 Closing the cover

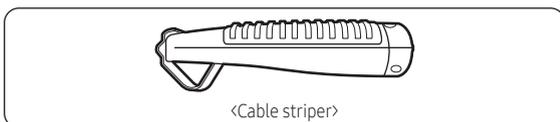


Screw	Tightening torque for terminal		Remarks
	N-m	lbf-ft	
M3.5	0.78~1.18	0.6~0.9	communication cable
M4	1.2~1.8	0.9~1.3	Single phase 208~230V power cable
M8	5.5~7.3	4.1~5.4	3 phase 208~230V/460V

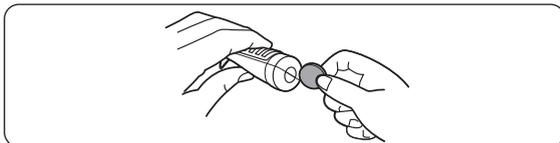
⚠ CAUTION

- When removing the outer sheath of the power supply cable, be careful not to scratch the inner sheath of the cable.
- Make sure that more than 0.78 inch (20 mm) of the outer sheath of the indoor unit power and communication cable are inside the electrical component box.
- Install the communication cable separately from power cable and other communication cables.
- There is a risk of electric shock when power is applied. Close the cover of the control box before proceeding to work.
- To inspect the compressor or PBA, first make sure to turn off the system. Electricity may flow even in a compressor that has not been used recently. Exercise caution to protect yourself from an electric shock.

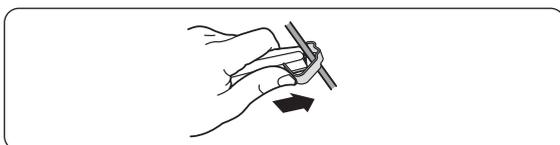
Examples of how to use the cable stripper



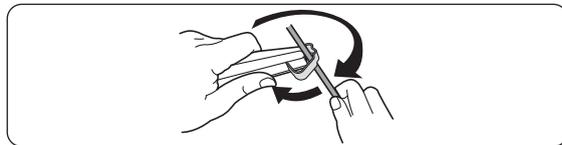
- 1 Adjust the blade position by coin. (Controller is at the bottom side of the tool.) Fix the blade position according to the outer sheath thickness of the power cable.



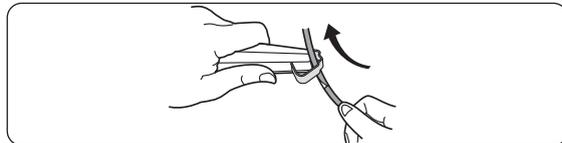
- 2 Fix the power cable and tool by using the hook at the top side of the tool.



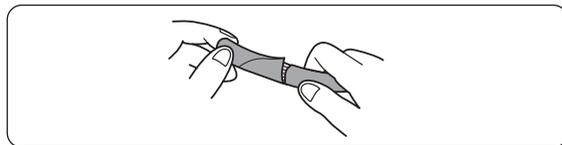
- 3 Cut out the outer sheath of the power cable by revolving the tool in the direction of the arrow, two or three times.



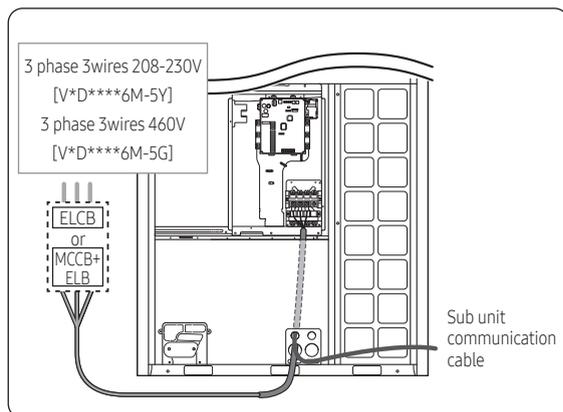
- 4 At this situation, cut out the outer sheath of the power cable by moving the tool toward the direction of the arrow.



- 5 Slightly bend the wire and pull out the cut part of the outer sheath.



Fixing the power cable



⚠ CAUTION

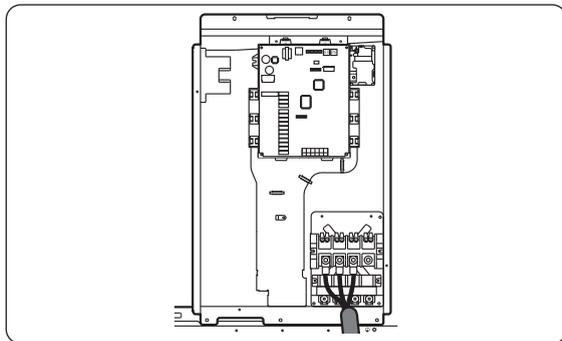
- Do not let the power cable come into contact with the pipes inside the outdoor unit. If the power supply cable touches the pipes, the vibration of the compressor is transferred to the pipes and can damage the power supply cables or pipes, creating the danger of fire or explosion.
- Make sure that the place where the sheath of power supply cable is removed is inside the power supply box. If it is impossible, you should connect the protection tube for power cable to the power supply box.
- After arranging the power cable into the power supply box, tighten the cover.



Electrical wiring work

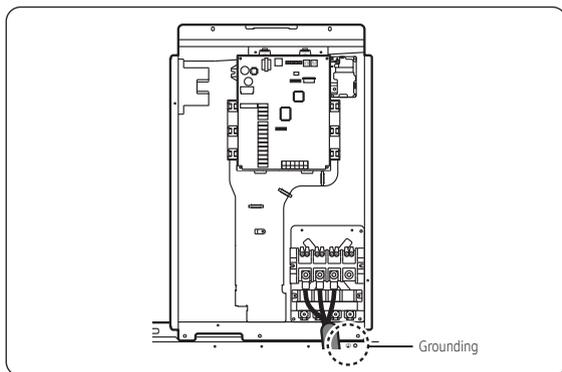
Connect the ring terminal of 3 phase cable

- 1 Cut the power cable to an appropriate length and connect it with the solderless terminal.
- 2 After connecting the power cable to the terminal as seen in the illustration, fix it with cable tie.
- 3 Fix the housing, which has an insulator, to the terminal board.



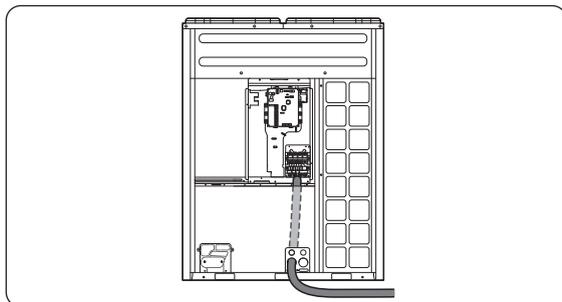
Fixing the ground cable

- Connect the ground cable to the grounding hole inside the power supply box.



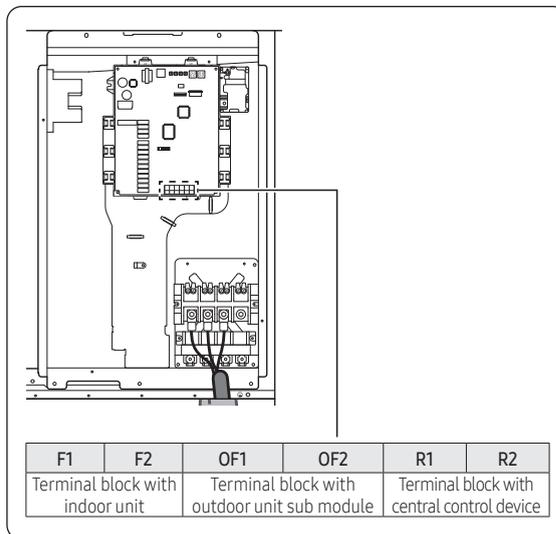
Withdrawing the power cable

- Withdrawing from the front side
 - Connect the power cable protection tube into the power supply box as shown picture.
 - Be sure that the power supply cable is not damaged by burr on the knock-out hole.

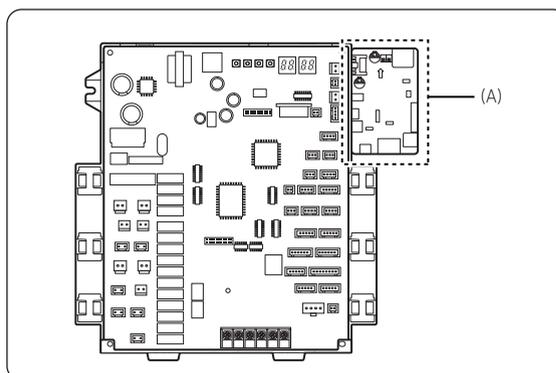


Connecting Central Controls

- When the number of indoor units installed with the outdoor unit is 16 or less



Where to install the interface module



- Install the interface module in location (A), considering the installation conditions.
 - For details on how to install, refer to the interface module installation manual.



Grounding work

Grounding must be done by a qualified installer for your safety.

Grounding the power cable

- The standard of grounding may vary according to the rated voltage and installation place of the air conditioner.
- Ground the power cable according to the following table.

Installation place \ Power condition	Voltage to ground is lower than 150V	Voltage to ground is over 150V
High humidity	Must perform the grounding work 3. ^{Note 1)} (Including the case where earth leakage breaker is installed)	
Average humidity	Perform grounding work 3. ^{Note 1)}	Must perform the grounding work 3. ^{Note 1)} (Including the case where earth leakage breaker is installed)
Low humidity	Perform grounding work 3, if possible, for your safety. ^{Note 2)}	

Note 1) About grounding work 3.

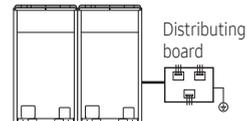
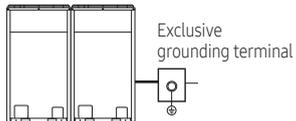
- Grounding work must be done by an expert (with qualification).
- Check if the grounding resistance is lower than 100 Ω . When installing an earth leakage breaker (that can cut the electric circuit within 0.5 second in case of a short circuit), allowable grounding resistance should be 30~500 Ω .

Note 2) Grounding at dry place

- The grounding resistance should be lower than 100 Ω . Even in worst case, grounding resistance should be lower than 250 Ω .

Performing the grounding work

- Use a rated grounding cable by referring to the specification of the electric cable for the outdoor unit.
 - ※ When using the exclusive grounding terminal (When the grounding terminal is already built on the house)
 - ※ When using grounding of the switch board



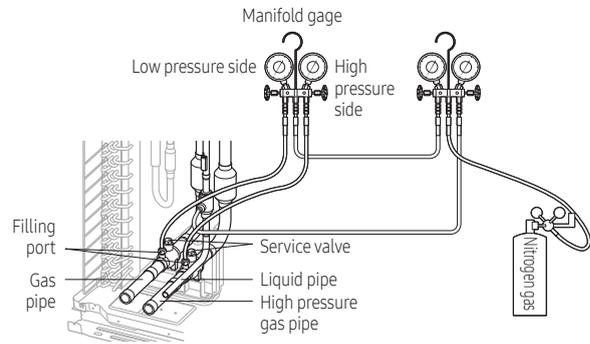
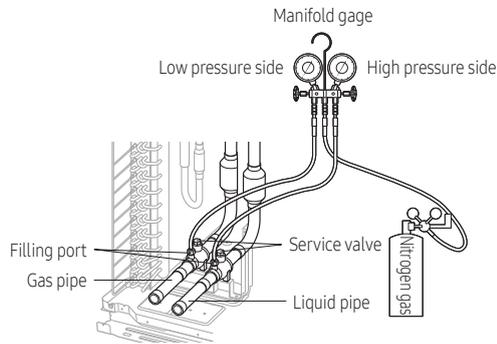
Airtightness test and vacuum drying

Airtightness test

- Use tools for R-32 to prevent the inflow of foreign substances and resist against the internal pressure.
- Do not remove the core of filling port.
- Use dry nitrogen gas for airtightness test as shown in the illustration.

H/P

H/R



Apply pressure to the liquid side pipe and gas side pipe (when installing outdoor units in module) with Nitrogen gas at 4.1MPa (594.6psi).

If you apply pressure at more than 4.1MPa (594.6psi), pipes may get damaged. Apply pressure with pressure regulator and pay attention to the pressure of the nitrogen.

Keep it for minimum 24 hours to check if pressure drops.

After applying Nitrogen gas, check there's any change of pressure, using a pressure regulator.

If the pressure drops, check for gas leakage.

If the pressure is changed, apply soap water to check for leakage and check the pressure of the nitrogen gas again.

Maintain 1.0MPa (145psi) of the pressure before performing vacuum drying and check for further gas leakage.

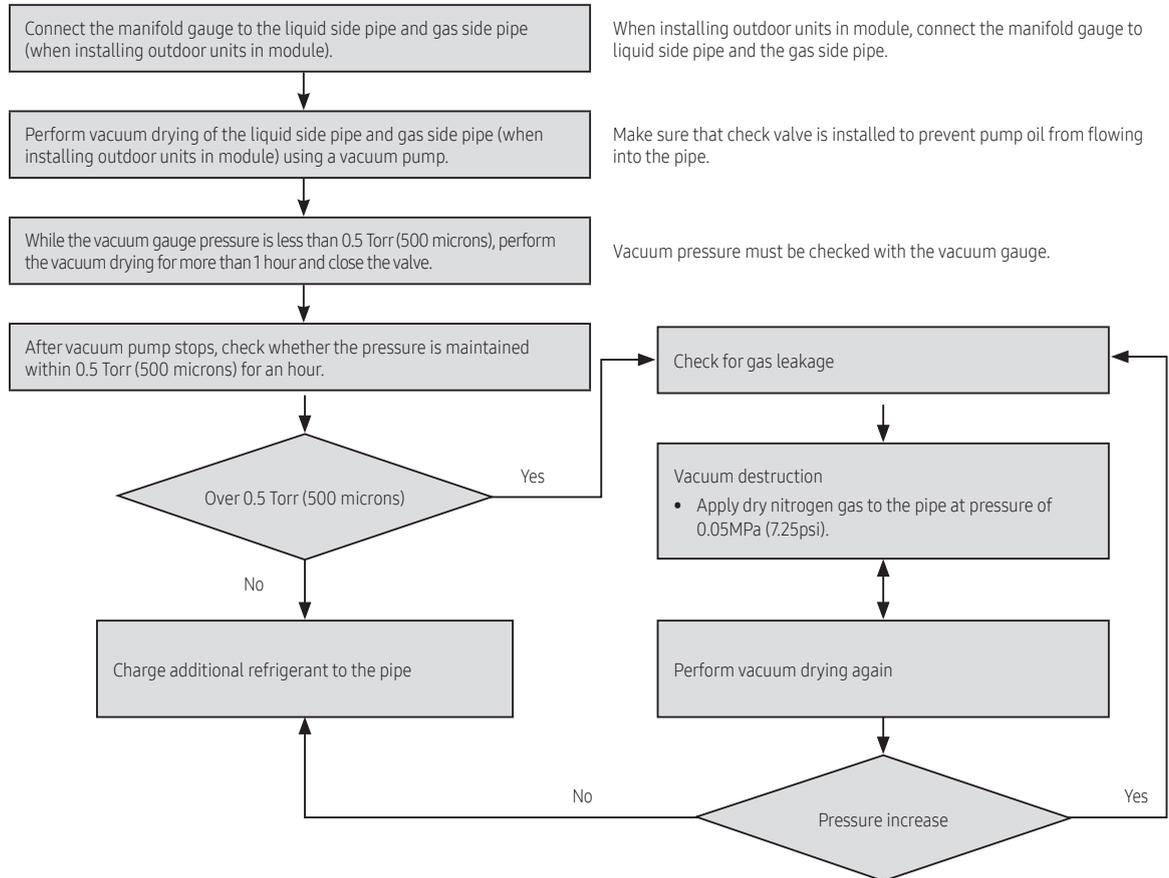
After checking the first gas leakage, maintain 1.0MPa (145psi) to check for further gas leakage.

⚠ CAUTION

- Perform a Nitrogen gas leak test with the service valve of the outdoor unit closed.
- When charging the nitrogen gas, charge it from the both (high•low pressure) sides.
- If the pipe is filled in a short time with a highly excessive pressure of Nitrogen gas, the pipes may get damaged. Make sure to use a regulator to prevent the high pressure Nitrogen gas, over 4.1MPa (594.6psi), from entering into the pipe.

Vacuum drying pipes and indoor units

- Use tools for R-32 to prevent the inflow of foreign substances and resist against the internal pressure.
- Use vacuum pump that allows vacuuming under 0.5 Torr (500 microns).
- Use the vacuum pump with the check valve to prevent pump oil from flowing backward while the vacuum pump is stopped.
- Completely close the liquid gas side service valve of the outdoor unit.



- ※ If the pressure rises in an hour, either water is remaining inside the pipe or there is a leakage.
- ※ When the ambient temperature of vacuuming pipe is low (less than 32 °F (0 °C)), moisture might remain within the pipe. Therefore, pay special attention to the pipe sealing in the winter.

Pipe insulation

Insulating the refrigerant pipes and branch joints

- Check for gas leakage before completing (the hose and pipe insulation) and if there is no sign of leakage, make sure to insulate the pipes and hoses.
- Use EPDM material insulator that meets the following conditions.

Test item	Unit	Standard
Density	g/cm ³	0.048-0.096
Dimensional change rate by heat	%	Below -5
Absorption rate	g/cm ³	Below 0.005
Thermal conduction rate	W/m-K	Below 0.037
Moisture transpiration factor	ng/(m ² ·s·Pa)	Below 15
Moisture transpiration grade	g/(m ² ·24h)	Below 15
Formaldehyde dispersion	mg/L	There should be none
Oxygen rate	%	Over 25

Selecting the refrigerant pipe insulator

- Insulate the gas pipe and liquid pipe by referring to the thickness of insulator for each pipe size.
- The standard condition is; temperature at 86 °F (30 °C), humidity less than 85 %. In case if the humidity is higher, you must increase the size by one grade as stated in below table.

Pipe	Diameter of refrigerant pipe		Insulator (Cooling-Heating)				Remarks
			General ¹⁾ [86 °F (30 °C), 85 %]		High humidity ²⁾ [86 °F (30 °C), over 85 %]		
			EPDM, NBR				
mm	inch	mm	inch	mm	inch		
Liquid	6.35~9.52	1/4~3/8	9	3/8	9	3/8	Heat resisting temperature over 248 °F (120 °C)
	12.7~50.8	1/2~2	13	1/2	13	1/2	
Gas	6.35	1/4	13	1/2	19	3/4	
	9.52~25.4	3/8~1	19	3/4	25	1	
	28.58~44.45	1 1/8~1 3/4	19	3/4	32	1 1/4	
	50.8	2	25	1	38	1 1/2	

¹⁾ To install in any of the following places or environments, use the same insulating material used in general conditions.

- An air-conditioned place where humidity is high inside the ceiling tiles
- A space where temperature/humidity difference is large between the upper and lower air due to a high ceiling (e.g., a large chapel/church, cinema, split-level open lobby, lecture hall with theatre seating)
- A corridor or passageway with no air conditioning system
- An old building with poor insulation

[Under the following conditions, a gas pipe of Ø3/8 inch to Ø1 inch (9.52 mm to 25.40 mm) and plumbing of thickness 1/2 inch (13 mm) can be used]

- A general town centre building (e.g., an apartment building, dwelling house, lecture hall, educational institute building, office, shopping complex)
- A structure with an exposed ceiling
- A structure with ceiling tiles and a ventilation system
- A structure where there is no inflow of air from the outside due to plumbing laid inside a wall

※ Even in the above conditions, if humidity is very high or condensation is expected to occur, change the installation thickness for high humidity.

²⁾ To install in any of the following places or environments, use the same insulating material used in a place with high humidity.

<Geographical conditions>

- A location with high humidity, such as a seaside area, a hot spring area, an area near a pond/river or a ridge (a building that is partially covered in earth and sand)
- A location where morning dew occurs frequently (e.g., once every three days)

<Purpose of the building>

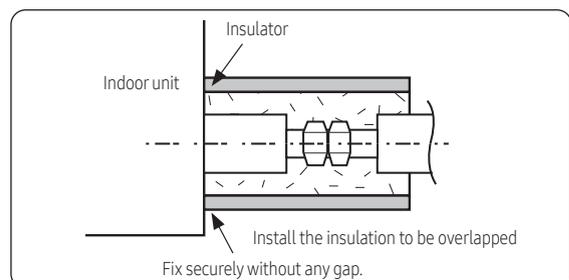
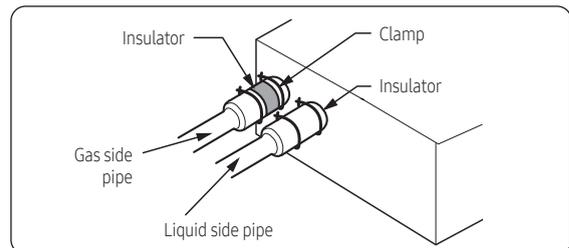
- Sauna, swimming pool or restaurant

<Structural conditions of the building>

- Installation inside a ceiling that is not air-conditioned where there is inflow of a large amount of moisture (plumbing installed along a corridor or near the entrance of a hall of residence or studio flat)
- A place where humidity is high due to an insufficient ventilation system in the space where plumbing is installed
- A room on a semi-basement floor
- If you are not sure which insulating material to use, choose material used in a place with high humidity.
- If the purpose of the room is subject to change, reconsider the thickness of insulating material.
- Use the specified insulating material only.

Insulate the refrigerant pipe

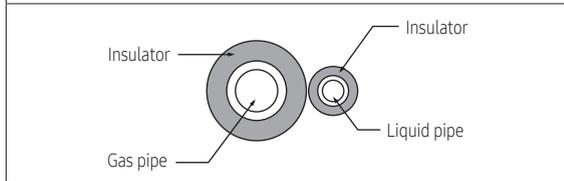
- Make sure to insulate the refrigerant pipe, branch joint, distribution header, and the connection part of the pipes.
- If you insulate the pipes, condensed water will not fall from the pipes.
- Check if there are any cracks on the insulation at the bent part of the pipe.





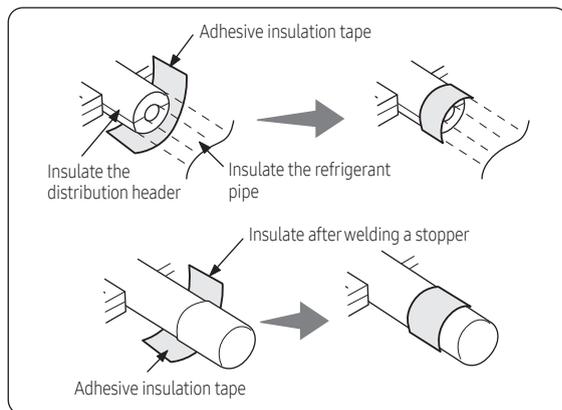
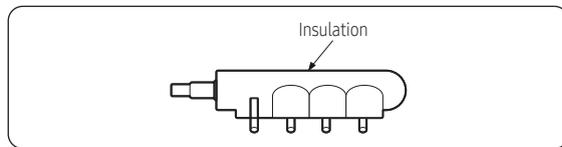
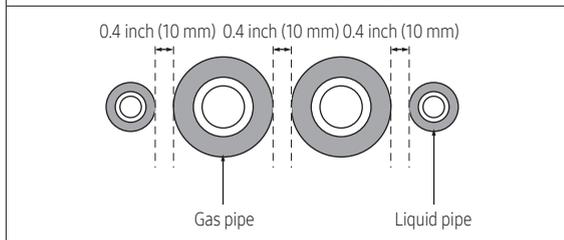
Insulating pipes

- The insulation of the gas and liquid pipes can be in contact with each other but they should not press excessively against each other.
- When the gas side and liquid side pipes are contacting each other, increase the thickness of the insulation by one grade.

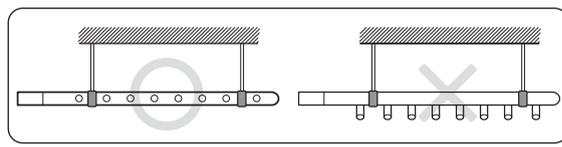


Insulating pipes after MSB or SVB.

- When installing the gas side and liquid side pipes, leave at least 0.4 inch (10 mm) of space.
- When the gas side and liquid side pipes are contacting each other, increase the thickness of the insulation by one grade.

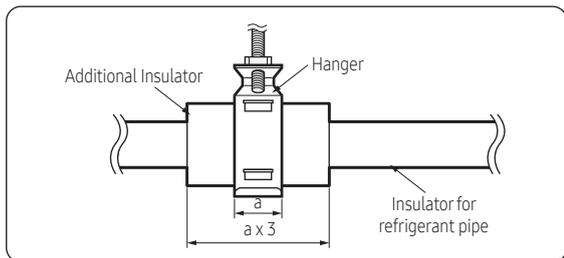


- Fix the distribution header with a hanger after insulating it.



CAUTION

- Install the insulation without any gaps or cracks and use adhesive on the connection part of it to prevent moisture from entering.
- Bind the refrigerant pipe with insulation tape if it is exposed to outside sunlight. (When binding the pipe with finishing tape, be careful not to reduce the thickness of the insulation.)
- Install the refrigerant pipe respecting that the insulation does not get thinner on the bent part or hanger of pipe.
- When the thickness of insulation is reduced, reinforce the reduced thickness with additional insulation.

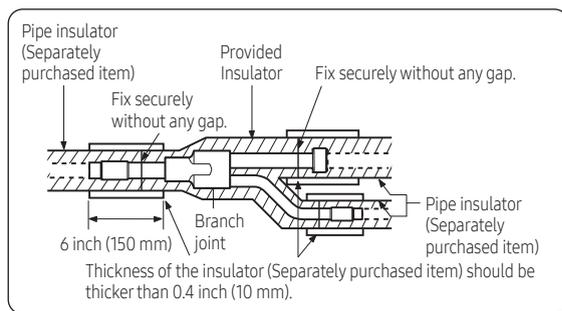


Insulate the distribution header

- Fix the distribution header with a cable tie and cover the connected part.
- Insulate the distribution header and the welded part and wrap the connected part with an adhesive insulation tape to prevent dew formation.

Insulating the branch joint

- Tightly attach the insulator, provided with the branch joint, to the separately purchased insulator. Wrap the connected part with an insulator (separately purchased item) that has thickness of at least 0.4 inch (10 mm).
- Use an insulator that resist heat up to 248 °F (120 °C). Wrap the branch joint with an insulation that has thickness of at least 0.4 inch (10 mm).

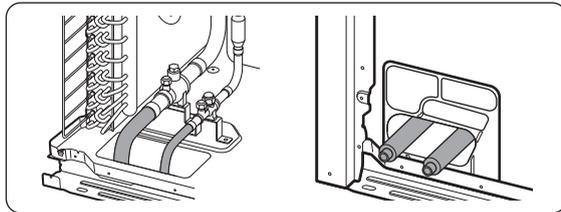


Pipe insulation

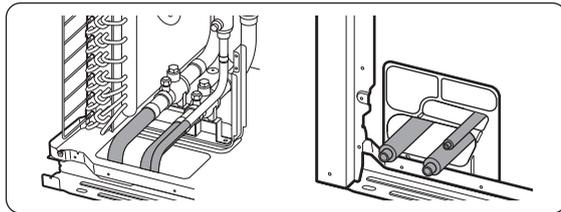
Insulating the pipe located inside of the outdoor unit

- With a pipe insulator, insulate the pipe up to whole service valve located inside of the outdoor unit.
- Seal the gap between the outdoor unit pipe and the insulator. Rainwater and dewdrops may soak through the gap between the pipe and the insulation of the outdoor unit installed on the outside.
- Separate the cover of the pipe and close it after insulation work. Only remove a knock-out hole cover where the pipe will be installed. If the knock-out hole is open unnecessarily, it must be closed. If not, small animals such as squirrels and rats may get into the unit through the hole and the unit may be damaged.

H/P



H/R

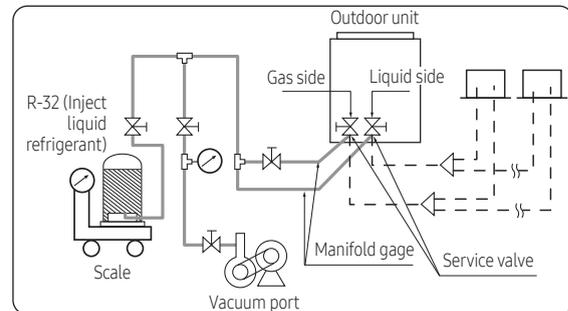


CAUTION

- The filled-out label must be adhered in the proximity of the product charging port. (ex. onto the inside of the stop valve cover.)

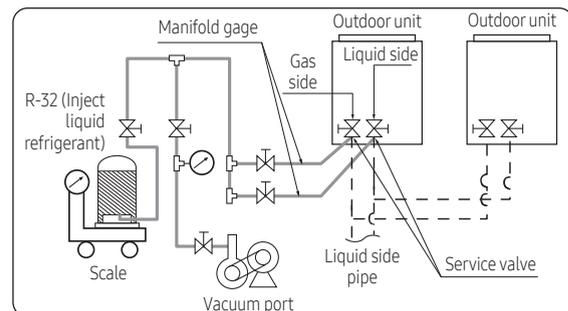
Single installation

- Open the manifold gauge valve connected to the liquid side service valve and add the liquid refrigerant.
- If you cannot add the whole quantity of the refrigerant while the outdoor unit is stopped, open the gas side and liquid side service valve. Then, add remaining refrigerant by pressing the refrigerant adding button of the outdoor PCB.



Module installation

- Open the manifold gauge valve connected to the liquid side service valve and add the liquid refrigerant.
- If you cannot add the whole quantity of the refrigerant while the outdoor unit is stopped, open the gas side and liquid side service valve. Then, add remaining refrigerant by pressing the refrigerant adding button of the outdoor PCB.
- If you use the refrigerant charging function from the PCB, outdoor unit will operate and charge the refrigerant. At this time, you must use gas side manifold gauge for cooling operation and use charging port for heating at the manifold gauge for heating operation.



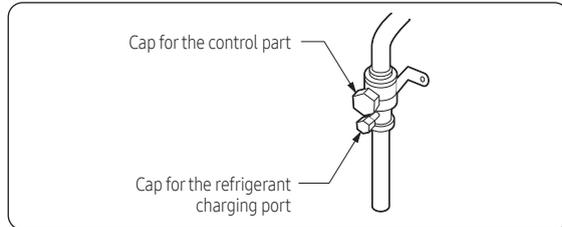


⚠ CAUTION

- Open the gas side and liquid side service valve completely after charging the refrigerant. (If you operate the air conditioner with the service valve closed, the important parts may be damaged.)
- Put on safety equipment when charging refrigerant.
- Do not charge the refrigerant when you adjust or control other product such as indoor units.
- If you charge the refrigerant with the front cabinet open, be very careful with the fan on the top of the product to prevent personal injury.
- When the ambient temperature is low in winter time, do not heat the refrigerant container to speed up the charging process. There is risk of explosion.
- Beware for possibility of refrigerant leakage when you connect the manifold gauge to the charging port for heating.
- Close the valve of the refrigerant container immediately after charging the refrigerant. If not, there might be a change in entire amount of refrigerant.

Using service valve for gas

- After charging the refrigerant, close all caps as shown in the illustration.
- Tightening torque for the cap of refrigerant charging port 7.4 ~ 8.9 lbf-ft (10~12 N·m)
- Tightening torque for the cap of control part 14.8 ~ 18.4 lbf-ft (20~25 N·m)
- Opening/closing torque for the valve
 - Ø3/4 inch (Ø19.05 mm) : 7.4 lbf-ft (10 N·m)



Basic segment display

Step	Display content	Display			
		SEG 1	SEG 2	SEG 3	SEG 4
At initial power input	Checking segment display	"8"	"8"	"8"	"8"
While setting communication between indoor and outdoor unit (Addressing)	Number of connected indoor units	SEG 1	SEG 2	SEG 3	SEG 4
		"A"	"d"	Number of communicated units Refer to "View Mode" for communication address	
After communication setting (usual occasion)	MSB/SVB, Indoor unit address	SEG 1	SEG 2	SEG 3	SEG 4
		I/U: "A" MSB/SVB: "C"	I/U: "0" MSB/SVB: "1"	Reception address (in decimal number)	

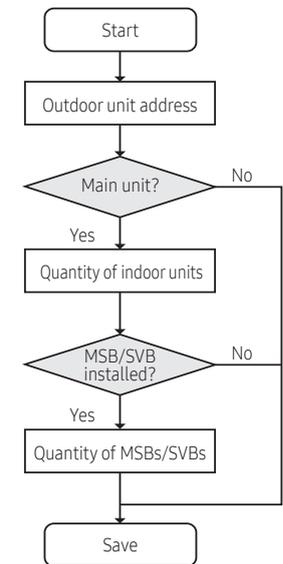
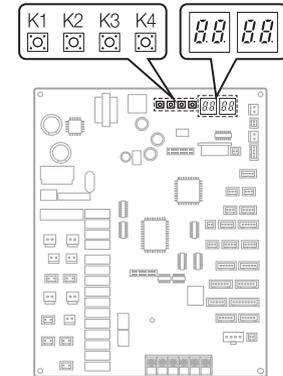
※ I/U : Indoor unit

Setting outdoor unit option switch and key function

Setting outdoor unit option switches

- Setting outdoor install option

Step	Button	Display	Description	Note
Outdoor unit address				
Step1	Outdoor unit display	00 00	Setting required	-
Step2	Press (K1+K2) for 2 seconds	00 00	Unit address for module combination	00: Main unit
	K4 x 1 time	00 01		01: Sub1 unit
	K4 x 2 times	00 02		02: Sub2 unit
	K4 x 3 times	00 03		03: Sub3 unit
Step3	If it is main unit, go to step4. Otherwise, press K2 button for 2 seconds to save & exit (system will be reset)			
Quantity of indoor units				
Step4	Press K1	00 00	Ready to set	-
Step5	K2 x n times	00 x0	Tens digit (0 ~ 6)	Ex) 03: 3 units 64: 64 units
	K4 x n times	00 0x	Ones digit (0 ~ 9)	
	* K4: Press for 2 seconds - automatic detection of indoor units' quantity			
Step6	If MSB/SVB is installed, go to step 7. Otherwise, press K2 button for 2 seconds to save & exit (system will be reset)			
Quantity of MSBs/SVBs				
Step7	Press K1	00 00	Ready to set	-
Step8	K2 x n times	00 x0	Tens digit (0 ~ 1)	Ex) 03: 3 units 16: 16 units
	K4 x n times	00 0x	Ones digit (0 ~ 9)	
	* K4: Press for 2 seconds - automatic detection of MSBs/SVBs' quantity			
Step9	K2: long	00 00	Save	Restart
* Press K1 for 2 seconds to exit without save regardless of setting step.				



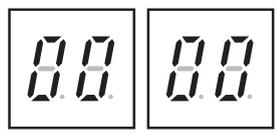
- ※ When counting the quantity of MSBs/SVBs, one MSB/SVB is one.
However, for V3MSBB06HR, V2MSBB08HR, V2SOB06/08HP, one MSB/SVB must be counted as two MSBs/SVBs, and V2MSBB12HR, V2SOB12HP must be counted as three MSBs/SVBs.
 - Example 1> V2MSBB04HR + V3MSBB06HR → 3ea
 - Example 2> V2SOB04HP + V2SOB06HP + V2SOB12HP → 6ea



Installing and setting the option with tact switch and explanation of the functions

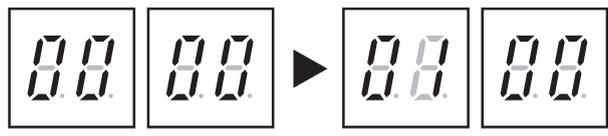
Setting the option

- 1 Press and hold K2 to enter the option setting. (Only available when the operation is stopped)
 - If you enter the option setting, display will show the following. (If you have set the 'Emergency operation for compressor malfunction', 1 or 2 will be displayed on SEG 4.)



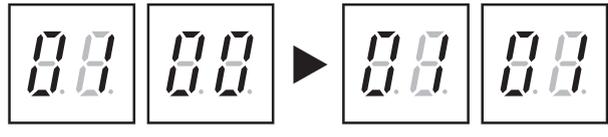
- SEG 1 and SEG 2 will display the number for selected option.
 - SEG 3 and SEG 4 will display the number for set value of the selected option.
- 2 If you have entered option setting, you can shortly press the K1 switch to adjust the value of the SEG 1, SEG 2 and select the desired option.

Example)



- 3 If you have selected desired option, you can shortly press the K2 switch to adjust the value of the SEG 3, SEG 4 and change the function for the selected option.

Example)



- 4 After selecting the function for options, press and hold the K2 switch for 2 seconds. Edited value of the option will be saved when entire segments blinks and tracking mode begins.

⚠ CAUTION

- Edited option will not be saved if you do not end the option setting as explained in above instruction.
- ※ While you are setting the option, you may press and hold the K1 button to reset the value to previous setting.
- ※ If you want to restore the setting to factory default, press and hold the K4 button while you are in the option setting mode.
 - If you press and hold the K4 button, setting will be restored to factory default but it doesn't mean that restored setting is saved. Press and hold the K2 button. When the segments shows that tracking mode is in progress, setting will be saved.

Setting outdoor unit option switch and key function

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Emergency operation for compressor malfunction	Individual	0	0	0	0	Disabled (Factory default)	E560 will occur when all the compressors are set as malfunction state.
				0	1	Set compressor 1 as malfunction state	
				0	2	Set compressor 2 as malfunction state	
Capacity correcton for cooling	Main	0	1	0	0	7-9	Targeted evaporation temperature [°F (°C)]. (When low temperature value is set, discharged air temperature of the indoor unit will decrease)
				0	1	5-7 (Factory default)	
				0	2	9-11	
				0	3	10-12	
				0	4	11-13	
				0	5	12-14	
Capacity correction for heating	Main	0	2	0	0	3.0 (Factory default)	Targeted high pressure [MPa]. (When low pressure value is set, discharged air temperature of the indoor unit will decrease)
				0	1	2.5	
				0	2	2.6	
				0	3	2.7	
				0	4	2.8	
				0	5	2.9	
				0	6	3.1	
				0	7	3.2	
Current restriction rate	Individual	0	3	0	0	100 % (Factory default)	When restriction option is set, cooling and heating performance may decrease.
				0	1	95 %	
				0	2	90 %	
				0	3	85 %	
				0	4	80 %	
				0	5	75 %	
				0	6	70 %	
				0	7	65 %	
				0	8	60 %	
				0	9	55 %	
				1	0	50 %	
Oil collection interval	Main	0	4	0	0	Factory default	
				0	1	Shorten the interval by 1/2	
Temperature to trigger defrost operation	Main	0	5	0	0	Factory default	
				0	1	Apply setting when the product is being installed in humid area such as near river or lake	
Fan speed correction for outdoor unit	Individual	0	6	0	0	Factory default	Increase the outdoor unit's fan speed to maximum value
				0	1	Increase fan speed	



Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Silent mode	Main	0	7	0	0	Disabled (Factory default)	Enables the silent mode for night-time in cooling mode (It operates automatically depending on the temperature.) However, if the external contact interface module (MIM-B14U) is used, entering the silent mode is available with contact signal in cooling and heating mode.
				0	1	LEVEL 1 / Auto	
				0	2	LEVEL 2 / Auto	
				0	3	LEVEL 3 / Auto	
				0	4	LEVEL 1 / External contact	
				0	5	LEVEL 2 / External contact	
				0	6	LEVEL 3 / External contact	
				0	7	LEVEL 1	
				0	8	LEVEL 2	
				0	9	LEVEL 3	
High-head condition setting	Main	0	8	0	0	Disabled (Factory default)	When outdoor unit is located 131.2~262.5 ft (40~80 m) above the indoor unit When outdoor unit is located over 262.5 ft (80 m) above the indoor unit When indoor unit is over 98.4 ft (30 m) above the outdoor unit
				0	1	Level 1 of height difference type 1 (Indoor unit is lower than outdoor unit)	
				0	2	Level 2 of height difference type 1 (Indoor unit is lower than outdoor unit)	
				0	3	Height difference type 2 (Outdoor unit is lower than indoor unit)	
Long-piping condition setting	Main	0	9	0	0	Disabled (Factory default)	When equivalent length of farthest indoor unit from the outdoor unit is between 328.1~557.7 ft (100~170 m) When equivalent length of farthest indoor unit from the outdoor unit is over 557.7 ft (170 m)
				0	1	LEVEL 1	
				0	2	LEVEL 2	
Energy control operation	Main	1	0	0	0	Basic (Factory default)	Energy control option of designated operation sequence Operating in energy saving mode, capacity might decrease compared to normal operation mode
				0	1	Energy saving	
				0	2	Power	
Rotation defrost (HR only)	Main	1	1	0	0	Disabled (Factory default)	When enabled, continuous heating operation is possible but heating performance will decrease during rotation defrost operation
				0	1	Enabled	
Expand operational temperature range for cooling operation (HR only)	Main	1	2	0	0	Disabled (Factory default)	When enabled, continuous cooling operation is possible even in low temperature condition up to 5 °F (-15 °C), but noise of the MSB will increase
				0	1	Enabled	
Channel address	Main	1	3	A	U	Automatic setting (Factory default)	Address for classifying the product from upper level controller (DMS, Lennox Service Software, etc.)
				0 ~ 15		Manual setting for channel 0~15	
Snow accumulation prevention control	Main	1	4	0	0	Enabled (Factory default)	During snow accumulation, the fan may spin even when the unit is not in operation
				0	1	Disabled	
Unused option	Main	1	5	0	0	Unused option	Unused option by this model
Unused option	Main	1	6	0	0	Unused option	Unused option by this model

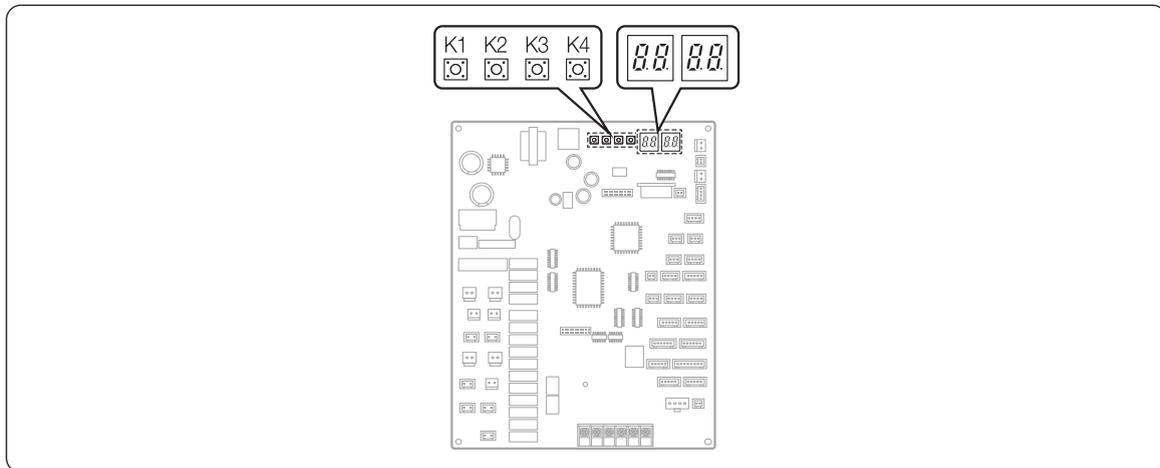


Setting outdoor unit option switch and key function

Optional item	Input unit	SEG1	SEG2	SEG3	SEG4	Function of the option	Remarks
Speed operation	Main	1	7	0	0	Disabled (Factory default)	Enabling this setting will command the air conditioner to cool/heat faster at initial start-up. However, this function will not work when High-head condition setting or Long-piping condition setting is enabled.
				0	1	Enabled	
Max. capacity restriction	Main	1	8	0	0	Enabled (Factory default)	Restrict excessive capacity increase when operating indoor units with small capacity
				0	1	Disabled	
Gas leak pump down	Main	1	9	0	0	Disabled(Factory default)	if the gas leak occurred it should be entered in the pump down operation.
						Enabled	
Unused option	Main	2	0	0	0	Unused option	Unused option by this model
Low ambient cooling kit (LA Kit) option	Main	2	1	0	0	Disabled (Factory default)	Set when LA KIT is installed. In case of using LA KIT option, AI High Pressure Control is restricted.
				0	1	Enabled	
Emergency operation for indoor unit communication error	Main	2	2	0	0	Disabled (Factory default)	When set, emergency operation is possible even if an indoor communication error occurs.
				0	1	Indoor high humidity condition (operating for up to 12hours)	
				0	2	Indoor low humidity condition (operating for up to 24hours)	
Base Heater	Main	2	3	0	0	Disabled (Factory default)	Set when Base Heater is installed.
				0	1	Enabled	
Inverter Carrier Frequency	Main	2	4	0	0	Disabled (default)	Set inverter carrier frequency
				0	1	8kHz	
Aux Heater's interworking control for cycle heating (cooling priority control)	Main	2	5	0	0	Not applied	When using the Aux Heating, set the delay time for Switching from cooling to heating. * Unused by the cooling only models
				0	1	Switching delay to heating (30 mins.)	
				0	2	Switching delay to heating (15 mins.)	
				0	3	Switching delay to heating (10 mins.)	
				0	4	Switching delay to heating (5 mins.)	
0	5	Not switching delay					
Auto Change Over	Main	2	6	0	0	Not applied	When Thermo off for all running indoor units, change the operation mode. * Unused by the cooling only models
				0	1	Applied	
Emergency defrost operation	Main	2	7	0	0	Disable (default)	You can enable this fuction, if the ice on the outdoor Heat exchanger is not removed even after continuous defrost operation, emergency defrosting operation is performed, but defrost operation can take a long time.
				0	1	Enable	
Reduction of the diameter of liquid pipe	Main	2	8	0	0	Disable (default)	Set when piping is installed with Reduction of the diameter of liquid pipe.
				0	1	Enable	
View Mode Unit Option	Main	2	9	0	0	Temperature : °C Pressure : Mpa	Converts the temperature, pressure units in the view mode(K4 switch)
				0	1	Temperature : °F Pressure : psi	
Emergency heat	Main	3	0	0	0	Disabled (Factory default)	While configured, in case of the system errors, emergency heating operation is possible using an external heater.
				0	1	Enabled	

* There is a risk of water leakage during emergency operation for indoor unit communication error. Please be careful when using it.

Setting key operation and checking the view mode with tact switch



K1 control	KEY operation	Display on segment
Press and hold 1 time	Auto trial operation	"K" "K" "BLANK" "BLANK" Display can be changed into "K" "9" "X" "X" (Last two digits display the progress.)

K1 (Number of press)	KEY operation	Display on segment
1 time	Refrigerant charging in Heating mode	"K" "1" "BLANK" "BLANK"
2 times	Trial operation in Heating mode	"K" "2" "BLANK" "BLANK"
3 times	Pump out in Heating mode (Outdoor unit address 1)	"K" "3" "BLANK" "1"
4 times	Pump out in Heating mode (Outdoor unit address 2)	"K" "3" "BLANK" "2"
5 times	Pump out in Heating mode (Outdoor unit address 3)	"K" "3" "BLANK" "3"
6 times	Pump out in Heating mode (Outdoor unit address 4)	"K" "3" "BLANK" "4"
7 times	Vacuuming (Outdoor unit address 1)	"K" "4" "BLANK" "1"
8 times	Vacuuming (Outdoor unit address 2)	"K" "4" "BLANK" "2"
9 times	Vacuuming (Outdoor unit address 3)	"K" "4" "BLANK" "3"
10 times	Vacuuming (Outdoor unit address 4)	"K" "4" "BLANK" "4"
11 times	Vacuuming (All outdoor units)	"K" "4" "BLANK" "A"
12 times	Inverter Fault Detection (Comp#1)	"K" "5" "1" "1"
13 times	Inverter Fault Detection (Comp#2)	"K" "5" "1" "2"
14 times	Inverter Fault Detection (Fan#1)	"K" "5" "F" "1"
15 times	Inverter Fault Detection (Fan#2)	"K" "5" "F" "2"
16 times	End Key operation	-

⚠ WARNING

- After installing the product, be sure to perform leak tests on the piping connections. After pumping down refrigerant to inspect or relocate the outdoor unit, be sure to stop the compressor and then remove the connected pipes.
 - Do not operate the compressor while a valve is open due to refrigerant leakage from a pipe or an unconnected or incorrectly connected pipe. Failure to do so may cause air to flow into the compressor and too a high pressure to develop inside the refrigerant circuit, leading to an explosion or product malfunction.

Setting outdoor unit option switch and key function

K2 (Number of press)	KEY operation	Display on segment
1 time	Refrigerant charging in Cooling mode	"K" "5" "BLANK" "BLANK"
2 times	Trial operation in Cooling mode	"K" "6" "BLANK" "BLANK"
3 times	Pump down all units in Cooling mode	"K" "7" "BLANK" "BLANK"
4 times	H/R : Unused H/P: Automatic setting of operation mode (Cooling/Heating) for trial operation	"K" "8" "BLANK" "BLANK"
5 times	Checking the amount of refrigerant	"K" "9" X X (Display of last two digits may differ depending on the progress)
6 times	Discharge mode of DC link voltage	"K" "A" "BLANK" "BLANK"
7 times	Forced defrost operation	"K" "B" "BLANK" "BLANK"
8 times	Forced oil collection	"K" "C" "BLANK" "BLANK"
9 times	Inverter compressor 1 check	"K" "D" "BLANK" "BLANK"
10 times	Inverter compressor 2 check	"K" "E" "BLANK" "BLANK"
11 times	Fan 1 check	"K" "F" "BLANK" "BLANK"
12 times	Fan 2 check	"K" "G" "BLANK" "BLANK"
13 times	H/R : Auto pipe pairing H/P : Unused	"K" "H" X X (Display of last two digits may differ depending on the progress)
14 times	Baseheater testing mode	"K" "I" "BLANK" "BLANK"
15 times	Unused	"K" "J" X X (Display of last two digits may differ depending on the progress)
16 times	Emergency check standby mode	"K" "L" "BLANK" "BLANK"
17 times	End Key operation	-

- ✱ Even when the outdoor unit power is off, it is dangerous when you come in contact with inverter PCB and fan PCB since they are charged with high DC voltage.
- ✱ When replacing/repairing the PCB, cut-off the power and wait until the DC voltage is discharged before replacing/repairing them. (Wait for more than 15 minutes to allow it to discharge naturally.)
- ✱ When there were error, 'Discharge mode of DC link voltage' may not have been effective. Especially if error E464 and E364 have been occurred, power element might be damaged by fire and therefore, do not use the 'Discharge mode of DC link voltage'.
- ✱ During "Discharge mode of DC link voltage", voltage of INV1 and INV2 will be displayed alternately. After discharging of DC link voltage, "K" "A" "o" "k" is displayed.
- ✱ If "K" "A" "n" "A" is displayed or the voltage does not drop during "Discharge mode of DC link voltage", please cut-off the power and wait for 15 minutes until voltage discharges naturally. Due to the characteristics of the inverter PCB, "Discharge mode of DC link voltage" may not be supported.
- ✱ When pressing K2 key 9 to 12 times without inverter checker, error code can be displayed on segment even though the outdoor unit is normal.
- ✱ If error have been occurred, do not use the key operation.
- ✱ KEY operation of K2 15 times(Automatic refrigerant charging function) is an unused function.
It can be available with Automatic refrigerant charging option KIT.

K3 (Number of press)	KEY operation	Display on segment
1 time	Initialize (Reset) setting	Same as initial state

K4 (Number of press)	KEY operation	Display on segment	
		SEG1	SEG2, 3, 4
1 time	Capacity of Outdoor unit Model	1	(a) Capacity → Off, 1, 6
2 times	Order frequency of the compressor1	2	120 Hz → 1, 2, 0
3 times	Order frequency of the compressor 2	3	120 Hz → 1, 2, 0
4 times	High pressure	4	1.52 MPa → 1, 5, 2 / 220 psi → 2, 2, 0
5 times	Low pressure	5	0.43 MPa → 0, 4, 3 / 62 psi → 0, 6, 2
6 times	Discharge temperature (Compressor 1)	6	87 °C → 0, 8, 7 / 189 °F → 1, 8, 9
7 times	Discharge temperature (Compressor 2)	7	87 °C → 0, 8, 7 / 189 °F → 1, 8, 9
8 times	IPM temperature (Compressor 1)	8	87 °C → 0, 8, 7 / 189 °F → 1, 8, 9
9 times	IPM temperature (Compressor 2)	9	87 °C → 0, 8, 7 / 189 °F → 1, 8, 9
10 times	CT sensor value (Compressor 1)	A	2 A → 0, 2, 0
11 times	CT sensor value (Compressor 2)	B	2 A → 0, 2, 0
12 times	Suction temperature	C	-42 °C → -, 4, 2 / -44 °F → -, 4, 4
13 times	COND OUT temperature	D	-42 °C → -, 4, 2 / -44 °F → -, 4, 4



K4 (Number of press)	KEY operation	Display on segment	
		SEG1	SEG2, 3, 4
14 times	Temperature of liquid pipe	E	-42 °C → -, 4, 2 / -44 °F → -, 4, 4
15 times	TOP temperature (Compressor 1)	F	87 °C → 0, 8, 7 / 189 °F → 1, 8, 9
16 times	TOP temperature (Compressor 2)	G	87 °C → 0, 8, 7 / 189 °F → 1, 8, 9
17 times	Outdoor temperature	H	-42 °C → -, 4, 2 / -44 °F → -, 4, 4
18 times	EVI inlet temperature	I	-42 °C → -, 4, 2 / -44 °F → -, 4, 4
19 times	EVI outlet temperature	J	-42 °C → -, 4, 2 / -44 °F → -, 4, 4
20 times	Main EEV1 step	K	2000 steps → 2, 0, 0
21 times	Main EEV2 step	L	2000 steps → 2, 0, 0
22 times	EVI EEV step	M	300 steps → 3, 0, 0
23 times	HR EEV step	N	300 steps → 3, 0, 0
24 times	Fan step (SSR or BLDC)	O	13 steps → 0, 1, 3
25 times	Current frequency (Compressor 1)	P	120 Hz → 1, 2, 0
26 times	Current frequency (Compressor 2)	Q	120 Hz → 1, 2, 0
27 times	Suction 2 temperature	R	-42 °C → -, 4, 2 / -44 °F → -, 4, 4
28 times	Main indoor unit address	S	Main indoor unit not selected → BLANK, N, D If indoor unit No.1 is selected as the main unit → 0, 0, 1
29 times	unused	T	-
30 times	Suction 3 temperature	U	-42 °C → -, 4, 2 / -44 °F → -, 4, 4
31 times	COND OUT 2 temperature	V	-42 °C → -, 4, 2 / -44 °F → -, 4, 4
32 times	Refrigerant leak detection sensor operational duration	W	1000 days → 1, 0, 0
33 times	End Key operation		

※ Suction2 temperature is displayed on Heat Recovery or X-Large models.

※ Suction3 temperature & Cond out2 temperature are displayed on X-Large models.

(a) When pressing K4 key 1 time, below number is displayed on segment depending on model.

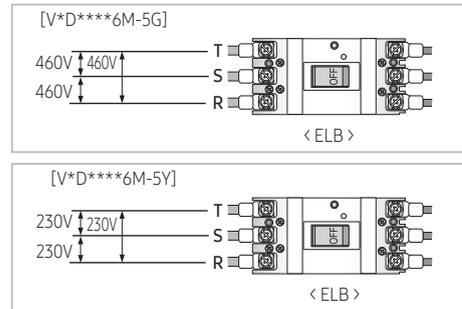
Model	Display on segment
V*D072*6M-5*	Off, 0, 8
V*D096*6M-5*	Off, 1, 0
V*D120*6M-5*	Off, 1, 2
V*D144*6M-5*	Off, 1, 4
V*D168*6M-5*	Off, 1, 8
V*D192*6M-5*	Off, 2, 0
V*D216*6M-5*	Off, 2, 2
V*D240*6M-5*	Off, 2, 4

K4 (Number of press) Press and hold the K4 to enter the setting	Displayed content	Display on segment			
		page1	page2		
1 time	Main version	MAIN	Version (ex. 1412)		
2 times	Hub version	HUB	Version (ex. 1412)		
3 times	Inverter 1 version	INV1	Version (ex. 1412)		
4 times	Inverter 2 version	INV2	Version (ex. 1412)		
5 times	Fan 1 version	FAN1	Version (ex. 1412)		
6 times	Fan 2 version	FAN2	Version (ex. 1412)		
7 times	EEP version	EEP	Version (ex. 1412)		
8 times	AI Version	AI	Version (ex. 1412)		
9 times	Automatically assigned address of the units	AUTO	SEG1 Indoor unit: "A" MSB/SVB: "C"	SEG2 Indoor unit: "0" MSB/SVB: "1"	SEG3, 4 Address (ex: 07)
		MANU	SEG1 Indoor unit: "A"	SEG2 Indoor unit: "0"	SEG3, 4 Address (ex: 15)
10 times	Manually assigned address of the units	MANU	SEG1 Indoor unit: "A"	SEG2 Indoor unit: "0"	SEG3, 4 Address (ex: 15)

※ I/U : Indoor unit

Performing final checks and trial operation

- Before supplying the power, use DC 500V (V*D****6M-5G) or DC 600 V (V*D****6M-5Y) insulation resistance tester to measure the power (3 phase: R, S, T/ 1 phase: L, N) terminal and the outdoor unit grounding.
 - Measurement should be over 30MΩ.
- Before supplying the power, use a voltmeter and phase tester to check the voltage and the phase.
 - R, S, T terminal: Check the 460V(V*D****6M-5G) or 230V(V*D****6M-5Y) between wires(R-S, S-T, T-R)



⚠ CAUTION

- Never measure the communication terminal since communication circuit may get damaged.
 - Check for short-circuit of the communication terminal with a general circuit tester.
- Check if the R-32 indoor units are connected.
 - When N phase is not correctly connected to R, S and T phase, over-voltage protection control will be in effect and it will cut-off the power of the PCB. Check the power cable connection of the N phase if the PCB is not turned on.
 - Check the following after the installation is completed.

Installation work	Outdoor unit	<ul style="list-style-type: none"> Have you checked the external surface and the inside of the outdoor unit? Is there any possibility of short-circuit caused by the heat of an outdoor unit? Is the place well-ventilated and ensures space for service? Is the outdoor unit fixed securely to withstand any external force?
	Indoor unit	<ul style="list-style-type: none"> Have you checked the external surface and the inside of the indoor unit? Is there enough space for service? Have you checked if the center of the indoor unit is ensured and it is installed horizontally?
Refrigerant pipe work		<ul style="list-style-type: none"> Have you selected correct pipes? Are the liquid and gas valve open? Is the total number of connected indoor units within the allowable range? Are the length and the height difference between the refrigerant pipes within the allowable range? Are the branch joints properly installed? Did you check the connection of liquid and gas pipes? Have you selected correct insulator for pipes and insulated them correctly? Did you insulate the pipes and connection part correctly? Is the quantity of the additional refrigerant correctly weighed in? (You must record the amount of additional refrigerant on the service record paper placed inside of the outdoor unit.)
Drain pipe work		<ul style="list-style-type: none"> Have you checked if the drain pipes of the indoor and outdoor unit are connected together? Have you completed the drain test? Is the drain pipe properly insulated?
Electrical wiring work		<ul style="list-style-type: none"> Are the power cable and communication cable tightened firmly on the terminal board within the range of rated tightening torque? Have you checked for cross-connection of the power and communication cables? Have you performed the earthing work 3 to the outdoor unit? Did you make sure to use 2-core cable (not multi-core cable) for the communication cable? Is the length of the wire within allowed range? Is the wiring route correct?
Setting address		<ul style="list-style-type: none"> Did you set the address of the indoor and outdoor units properly? Did you set the address of the indoor and outdoor units properly? (When using multiple remote controllers)
Option		<ul style="list-style-type: none"> If there is a possibility of the outdoor unit from vibrating, check whether the anti-vibration frame is correctly installed.



CAUTION

Precautions before test operation

- When the outdoor temperature is low, turn on the main power 6 hours before beginning the operation.
 - If you start the operation immediately after turning on the main power, it may cause serious damage to the part in the product.
- Do not touch the refrigerant pipe during or right after the operation.
 - Refrigerant pipe may be hot or cold during or right after the operation depending on the status of the refrigerant which flows through the refrigerant pipe, compressor and other parts of the refrigerant cycle.
- Do not operate the product with its panel or protection nets off.
 - There is risk of personal injury from the parts rotating, heated or with the high voltage.
- Do not turn off the main power immediately after stopping the operation.
 - Wait for at least 5 minutes before turning off the main power. If not, water leakage or other problems may occur.
- Connect all the indoor units and the power supply for the outdoor unit and run auto address setting. Run auto address setting even after changing the indoor unit PCB.

- In Auto trial operation, product will automatically select either cooling or heating mode and operate in selected mode.
- In the temperature range marked with slashed pattern, system protection control may trigger during operation.(If the system protection control is enabled, it can be hard to get the precise judgment after the auto trial operation.)
- When the temperature is outside of guaranteed range, accuracy of judgment on auto trial operation may decrease near boarder line area.
- If all indoor units are connected with only hydro unit, it is operated by heating mode. If outdoor temperature is above 95 °F (35 °C), auto trial operation is skipped and UP mode will be cleared.

Checklist before auto trial operation

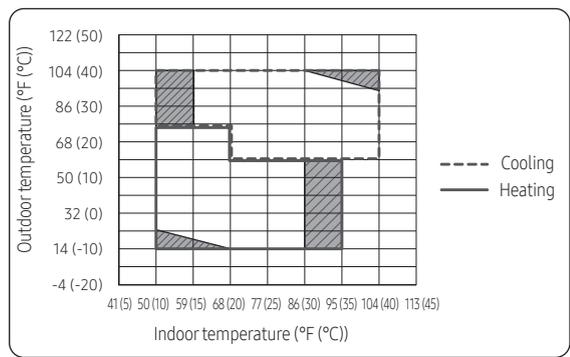
- 1 Check the power cable and communication cable of the indoor and outdoor unit.
- 2 Supply power to the outdoor unit 6 hours before trial operation to pre-heat the compressor.
- 3 Before supplying the power, use a voltmeter and phase tester to check the voltage and the phase.
 - R,S,T terminal: check the 460V between wires (R-S, S-T, T-R) (V*D****6M-5G Model only)/ 230V between wires (R-S, S-T, T-R)(V*D****6M-5Y Model only)
- 4 When the power is supplied, outdoor unit will execute tracking to check the indoor unit connection and other optional functions.
- 5 Write down the installation report on the service history report paper attached on the front part of the control box.

Auto trial operation

- 1 If the Auto Trial Operation is not completed, normal operation will be prohibited.
 - When the auto trial operation is not completed, UP (UnPrepared) will appear on the segment after the communication check and restrict compressor from operating. (UP Mode will be cleared automatically when auto trial mode is completed.)
 - Auto trial operation may take 20 minutes to maximum 2 hours depending on the operation status.
 - During auto trial operation, noise can be generated due to valve inspection. (Check the product if abnormal noise occurs continuously)
- 2 When error occurs during auto trial operation, check the error code and take appropriate measures.
 - Refer to next couple of pages when E503, E505 or E506 error occurs.
- 3 When auto trial operation ends, use Lennox Service Software to issue a result report.
 - Refer to service manual if you have any items with "NG" on the result report.
 - After taking appropriate measure for the items with "NG", run the auto trial operation again.
- 4 Check the following items by running trial operation (cooling/heating).
 - Check if cooling/heating operation performs normally.
 - Individual indoor unit control: Check for air flow direction and fan speed.
 - Check for abnormal operation noise from the indoor and outdoor unit.
 - Check for proper draining from the indoor unit during cooling operation.
 - Use Lennox Service Software to check the detail operation status.
- 5 Explain to the user how to use the air conditioner according to the user's manual.
- 6 Hand over the installation manual to the customer so they can keep it with them.

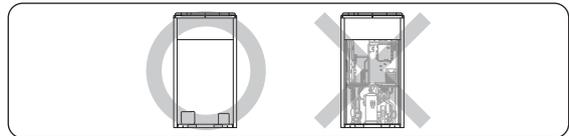
CAUTION

- Supply power to the outdoor unit 6 hours before auto trial operation to pre-heat the compressor.
- 6 Guaranteed range of auto trial operation
For precise judgment, you must perform auto trial operation in below indoor/outdoor temperature condition.



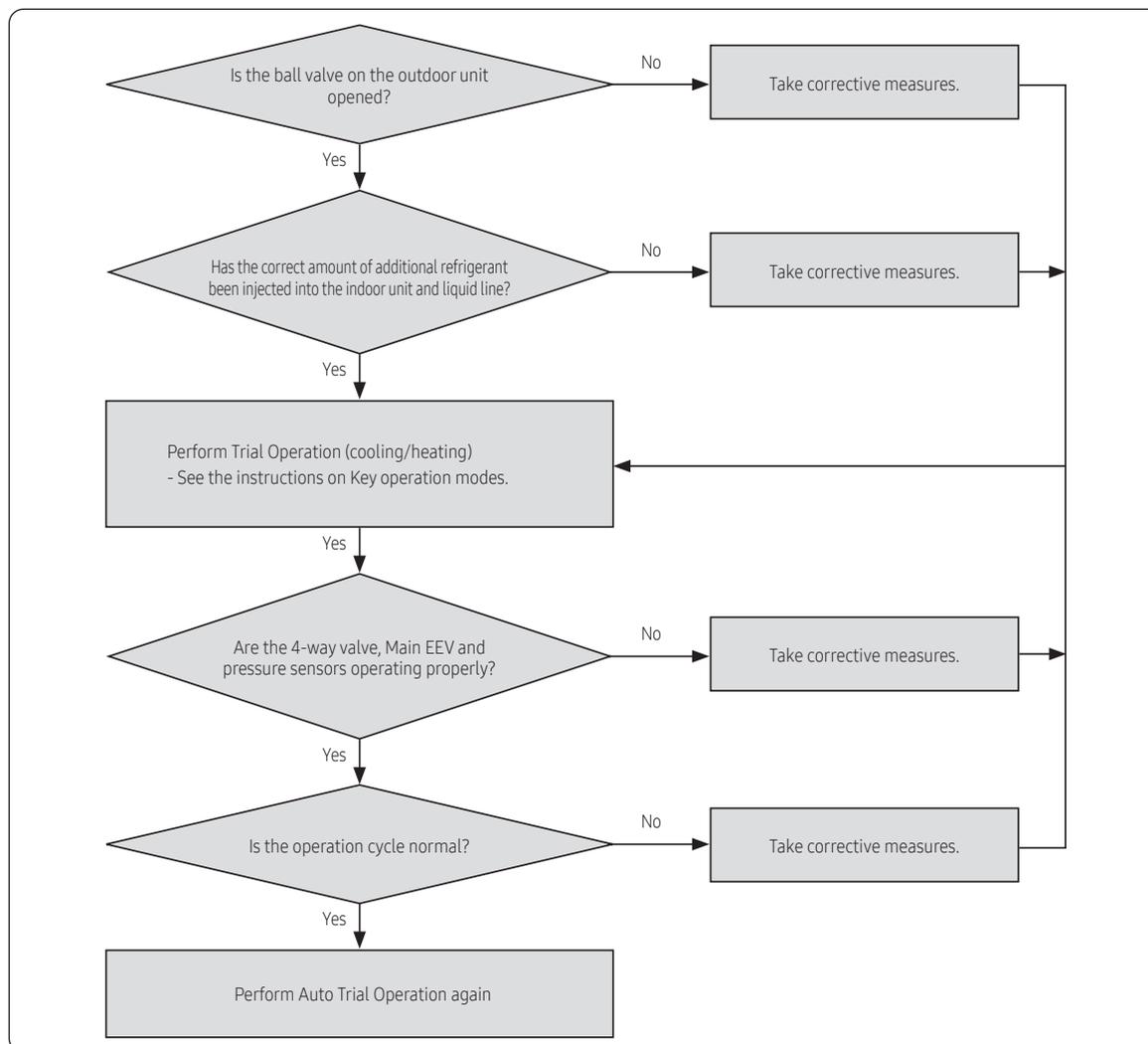
CAUTION

- Make sure to close the top and bottom part of the outdoor unit cabinet during operation. If you operate the unit with the front cabinet open, it may cause damage to the product and you may not get the precise data from Lennox Service Software.



Inspection and trial operation

Measure to take when E503 error occurs

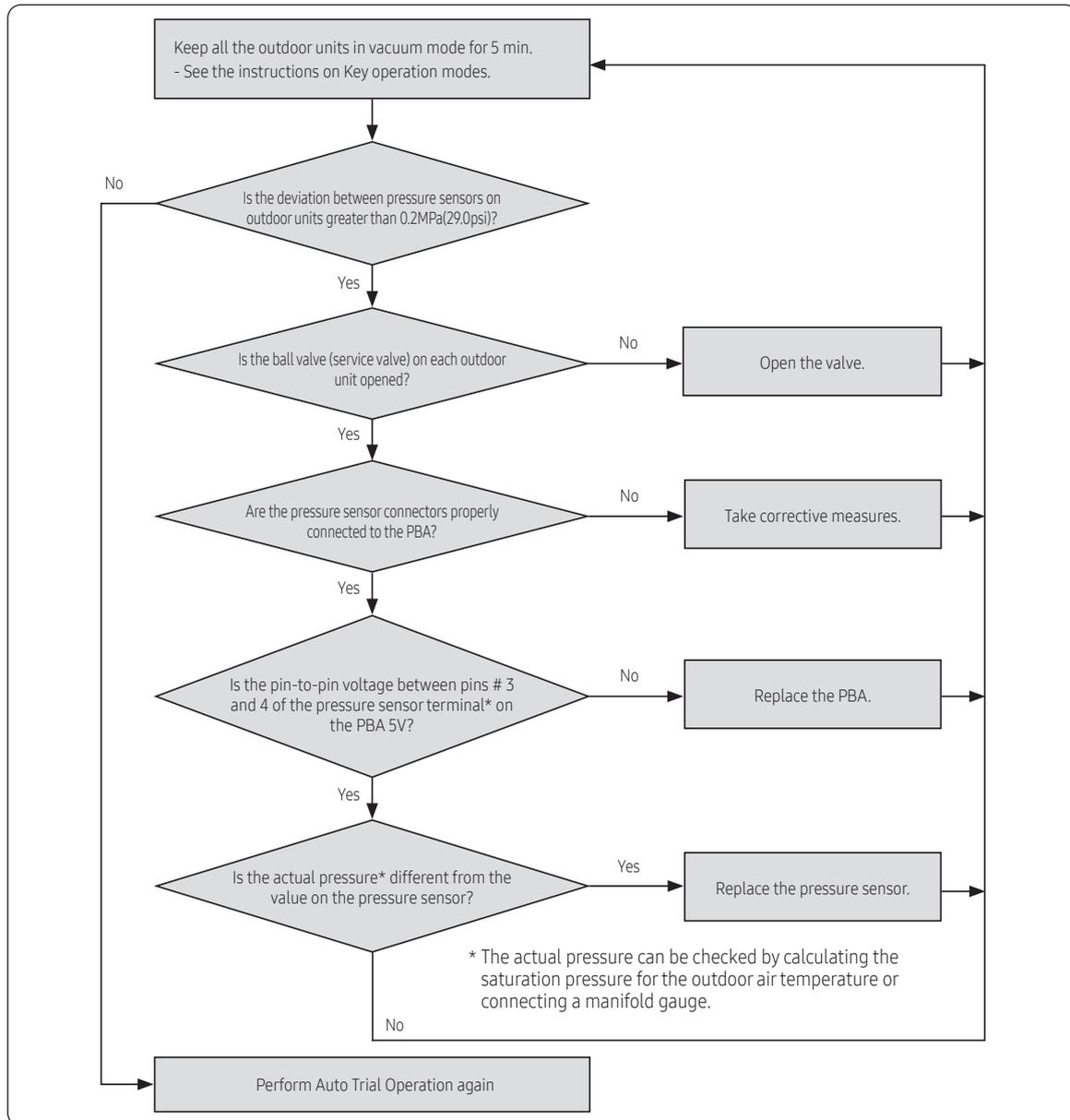


- ※ Symptoms for abnormal operation of the 4way valve
 - Abnormal noise during compressor operation, Increase in the suction temperature.
- ※ Symptoms for abnormal operation of the Main EEV
 - It is not possible to control the superheat (SH)
 - It is not possible to secure a Discharge superheat(DSH) of higher than 20K
- ※ For more information, see the troubleshooting in the service manual.

CAUTION

- If service valve (ball valve) check is required, corresponding outdoor unit will display the error.
- If service valve (ball valve) check is required, auto detection mode will be terminated. Check service valve (ball valve) of gas pipe and liquid pipe at the same time when checking service valve (ball valve).
- When 4way valve, Main EEV detection is needed, run heating trial operation for more than 1 hour and analyze the data to check for a problem.
- If there's frost formed in outdoor unit or the outdoor unit is operating in defrost operation, it may be hard to detect problem normally. In this case, perform Trial operation or Forced defrost operation to eliminate the frost, and then perform Auto Trial Operation again.
- If the operation range is not within guaranteed range, error may occur even though the product is normal.
- To replace a component or inspect the PBA, be sure to cut off the power supply first. If inspection must be performed with the power supply on, exercise extra care to prevent electric shock.

Measure to take when E505 or E506 error occurs



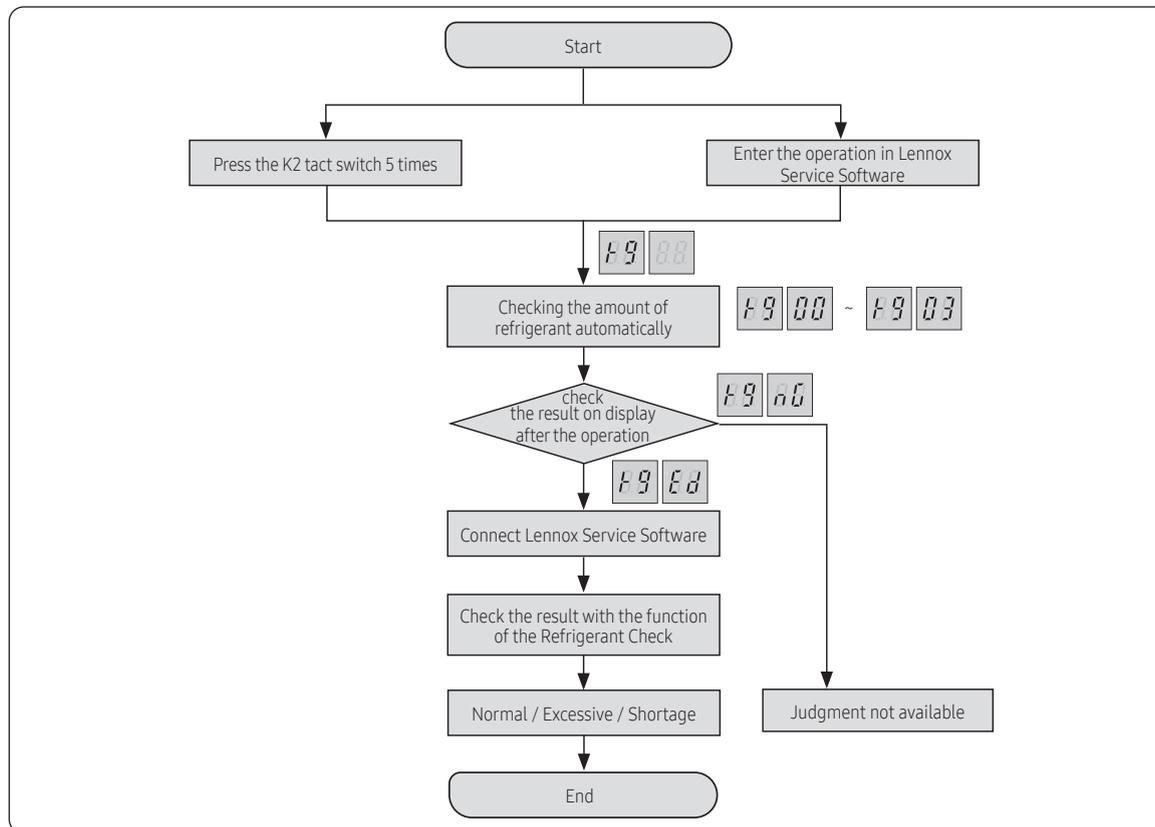
※ For more information, see the troubleshooting in the service manual.

CAUTION

- When the auto trial operation for pressure sensor was executed before the pressure of the outdoor unit is equalized (when there's close to no difference between high and low pressure), error may occur even though the product is normal.
- If pressure sensor check is required, error will be displayed on all installed outdoor units.
- If pressure sensor check is required, outdoor units will terminate auto trial operation mode automatically.
- To check for the pressure sensor with the problem, run trial operation for more than 1 hour and analyze the data to check for a problem.
- To replace a component or inspect the PBA, be sure to cut off the power supply first. If inspection must be performed with the power supply on, exercise extra care to prevent electric shock.

Automatic refrigerant amount detection function

This function checks amount of refrigerant in the system through refrigerant amount detection operation



※ After refrigerant amount detection is finished, if you see “K9 Ed” on the display and cannot check the refrigerant amount from the Lennox Service Software, it means insufficient degree of supercooling.

⚠ CAUTION

- If the temperature is out of the guaranteed range below, exact result will not be obtained.
 - Indoor: 68~89.6 °F (20~32 °C)
 - Outdoor: 41~109.4 °F (5~43 °C)
- If the operation cycle is not stable, the operation of refrigerant amount check may be forcibly finished.
- Accuracy of the result may decrease if the product has not been operated for a long period of time or Heat mode has been operated before running the function of refrigerant amount check. Therefore, use the function of refrigerant amount check after operating the product in Cool mode for at least 30 minutes.
- Product may trigger system protection operation depending on the installation environment. In this case, the result of refrigerant amount check may not be accurate.

Actions to take for the check result

- Excessive amount of refrigerant
 - Discharge 10 % of total amount of refrigerant and restart the refrigerant amount check.
- Insufficient amount of refrigerant
 - Add 10 % of the total amount of refrigerant and restart the refrigerant amount check.
- Judgment not available
 - Check if the function of refrigerant amount check is executed within the guaranteed temperature range. Run trial operation to check if there are other problems on the system.

SmartThings app

To use the SmartThings app, connect the product to the network in the sequence described below. The images shown may differ depending on your smartphone model, OS version and manufacturer. You need to set up the Wi-Fi access point only when connecting the product to a Wi-Fi network. Once the product is connected, you can use the SmartThings app via Wi-Fi, 3G, LTE, 5G or more wireless networks.

1 Checking the power connections

Check if the power is connected to the product and the access point.

2 Setting up and connecting to a Wi-Fi access point using your smartphone

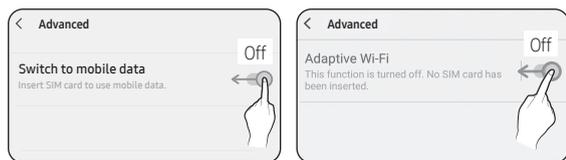
1 To connect the product to a Wi-Fi network, turn on Wi-Fi at "Settings > Wi-Fi", and then select the access point to connect to

- Only alphanumeric characters are supported for wireless access point names (SSIDs). If an SSID has a special character, rename it before connecting to it.
- This product supports only Wi-Fi 2.4 GHz.



2 Turning off "Switch to mobile data" at "Settings > Wi-Fi" on your Smartphone

- If "Switch to mobile data" or "Adaptive Wi-Fi" is turned on, you cannot connect to the network. Be sure to turn off these functions before connecting to the network.



NOTE

- The setup may differ depending on your smartphone model, OS version and manufacturer.

3 Checking the Internet connectivity

- After connecting to Wi-Fi, check that your smartphone is connected to the Internet.

NOTE

- A firewall may prevent your smartphone from connecting to the Internet. Contact your Internet service provider for troubleshooting.

3 Downloading the SmartThings app and registering your Samsung account

1 Downloading the SmartThings app

- Search for "SmartThings" on Play Store or App Store, and download the SmartThings app to your smartphone.
- If the SmartThings app is already installed on your smartphone, update it to the latest version.

NOTE

- The SmartThings app supports Android OS 7.0 or later (with at least 2 GB RAM) and iOS 12.0 or later. The app is optimized for iPhone 6s or later and Samsung smartphones (Galaxy S and Note series). The updates of the SmartThings app or the functions supported by it may be discontinued for the previously supported OS versions due to reasons such as usability and security.
- The SmartThings app may change without prior notice to improve product usability and performance.

2 Registering your Samsung account

- A Samsung account is required to use the SmartThings app. To create your Samsung account and log in to your account, follow the instructions displayed on the SmartThings app. You do not need to install an additional app.

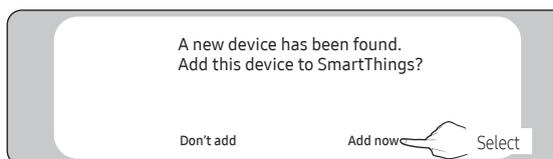
NOTE

- If you already have a Samsung account, log in to the account. If you have a smartphone that is a Samsung device and you have a Samsung account, your smartphone is automatically logged in to your account.
- If you log in from a smartphone produced for another country, you need to log in with its country code when you create your Samsung account, and the SmartThings app may not be used on some smartphones.

4 Connecting the SmartThings app to your product

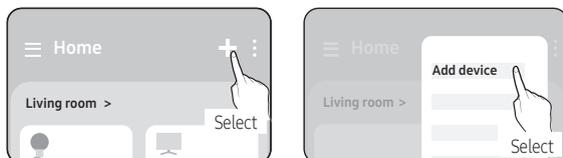
1 Selecting the product to connect to

- 1) Start the SmartThings app about one minute after turning on the product to connect to.
- 2) After the SmartThings app is started, select 'ADD NOW' when a pop-up window saying that a product to connect to is found appears.



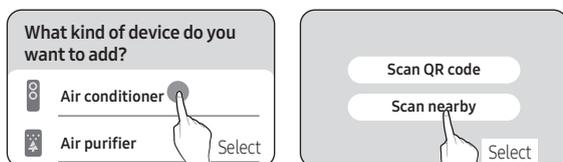
SmartThings app

- 3) If the pop-up window does not appear, select "+", and then "Add Device".



You can add a product you want to connect to by selecting it manually or by selecting "Scan nearby".

- Select manually: Samsung devices > Air conditioner
- Scan: Scan nearby > Air conditioner



2 Connecting the SmartThings app to your product

- Follow the instructions displayed on the SmartThings app to connect to your product.
- For information on how to use the SmartThings app, select the How To menu on the app.

NOTE

- If any pop-up window appears on the top of the smartphone while connecting to your product, do not select it.
- If a pop-up window saying that the device is already registered appears during connecting to your product, get permission using "REQUEST PERMISSION" from a user already connected to the product, or create a new account using "REGISTER MY ACCOUNT" to independently connect to the product.
- If a Samsung account-related country error occurs while connecting to your product, log out of your current Samsung account, log in to your previous Samsung account, and then delete all devices that have been connected previously. Then, log in to your current Samsung account again, and configure the settings.
- If a failure message appears while adding a device, see "Setting up and connecting to a Wi-Fi access point using your smartphone" on page 71. The connection may fail temporarily due to an installation location problem of the access point or other problems.
- If a message appears on the SmartThings app, follow its instructions.

NOTE

- For the security protocols for wireless/wired access points, WPA-PSK and WPA2-PSK are recommended. For the authentication methods, AES is recommended. New Wi-Fi authentication specifications and Wi-Fi non-standard authentication methods are not supported.
- The product supports the IEEE802.11 b/g/n (2.4 GHz) communication protocol. (Samsung recommends IEEE802.11n.)
- If your Internet service provider has permanently registered the MAC address (a unique identification number) of your PC or modem, you may not be able to connect your product to the Internet. Contact your Internet service provider and ask how to connect devices other than your PC (such as an air conditioner and an air purifier) to the Internet.

Open Source Announcement

The software included in this product contains open source software.

The following URL http://opensource.samsung.com/opensource/SMART_TP1_0/seq/0 leads to open source license information as related to this product.



Security updates information

Security updates are provided to strengthen the security of your device and protect your personal information. For more information on security updates, visit <https://security.samsungda.com>.

* The website supports only some languages.

Regulatory Notice

FCC Notice

FCC CAUTION:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This appliance contains the transmitter module.

This device complies with Part 15 of FCC Rules. Operation is Subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received including interference that cause undesired operation.

For products available in the US and Canadian markets, only channels 1~11 are available.

You cannot select other channels.

FCC STATEMENT:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC RADIATION EXPOSURE STATEMENT:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This equipment should be installed and operated so there is at least 8 inches (20 cm) between the radiator and your body. This device and its antennas must not be co-located or operated in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

IC Notice

This appliance contains the transmitter module.

The term "IC" before the radio certification number only signifies that Industry Canada technical specifications were met. Operation is subject to the following two conditions : (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus complies with Canadian ICES-003.

For products available in the US and Canadian markets, only channels 1~11 are available.

You cannot select other channels.

IC RADIATION EXPOSURE STATEMENT:

This equipment complies with IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated so there is at least 8 inches (20 cm) between the radiator and your body. This device and its antennas must not be co-located or operated in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

SAVE THESE INSTRUCTIONS



LENNOX Powered by **SAMSUNG**

