



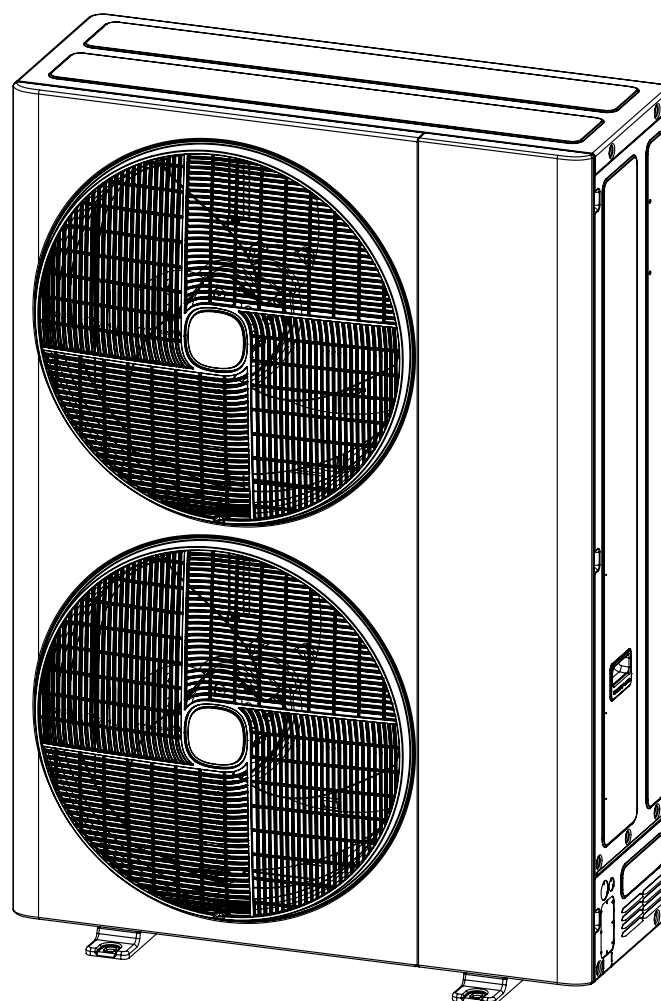
Installation & Maintenance Manual

VRF-AIR-CONDITIONER (HEAT PUMP)

MODEL
CHV6-RS36URBMHH
CHV6-RS48URBMHH
CHV6-RS60URBMHH

IMPORTANT:

*READ AND UNDERSTAND
THIS MANUAL BEFORE
USING THIS HEAT-PUMP
AIR CONDITIONER.
KEEP THIS MANUAL
FOR FUTURE REFERENCE.*



M01675Q

ORIGINAL INSTRUCTIONS

English

Specifications in this manual are subject to change without notice in order that CH may bring the latest innovations to their customers.

The English version is the original one; other languages are translated from English. Should any discrepancy occur between the English and the translated versions, the English version shall prevail.

English (Only when using R32)

WARNING

BURST HAZARD

Do not allow air or any gas mixture containing oxygen into refrigerant cycle (i.e. piping)

RISK OF EXPLOSION

The compressor must be stopped before removing the refrigerant pipes.

All service valves must be fully closed after pumping down operation.

WARNING

This symbol displayed on the unit indicates that this appliance is filled with R32, an odourless flammable refrigerant gas with low burning velocity (A2L class pursuant to ISO 817). If the refrigerant is leaked, there is a possibility of ignition if it enters in contact with an external ignition source.

CAUTION

This symbol displayed on the unit indicates that this appliance shall be handled by authorized service personnel only, referring to the Installation Manual.

CAUTION

This symbol displayed on the unit indicates that there is relevant information included in the Operation Manual and/or Installation Manual.

TABLE OF CONTENTS

1.	GENERAL INFORMATION.....	1
1.1	GENERAL NOTES.....	1
2.	SAFETY.....	4
2.1	APPLIED SYMBOLS.....	4
2.2	ADDITIONAL INFORMATION.....	4
2.3	SPECIAL REQUIREMENTS FOR R32 UNITS.....	6
2.3.1	DETERMINATION OF ROOM FLOOR AREA.....	7
2.3.2	DETERMINATION THE RELEASE HEIGHT AND THE EFFECTIVE HEIGHT OF THE INDOOR UNIT.....	7
2.3.3	THE TOTAL AMOUNT OF REFRIGERANT.....	8
2.3.4	REQUIREMENT FOR UNITS WITH INCORPORATED CIRCULATION AIRFLOW TO PREVENT STAGNATION.....	8
2.3.5	SAFETY MEASURES.....	8
3.	IMPORTANT NOTICE.....	20
4.	TRANSPORTATION AND HANDLING.....	21
5.	BEFORE OPERATION.....	21
5.1	LINE-UP OF OUTDOOR UNITS.....	21
5.2	FACTORY-SUPPLIED UNIT COMPONENTS.....	21
6.	GENERAL DIMENSIONS.....	22
7.	UNIT INSTALLATION.....	23
7.1	INSTALLATION SPACE.....	23
7.2	INSTALLATION PLACE PROVISION.....	25
7.3	DRAIN PIPING.....	26
8.	REFRIGERANT PIPING WORK.....	26
8.1	PIPING MATERIALS.....	26
8.2	REFRIGERANT PIPING WORK.....	27
8.3	PIPING CONNECTION.....	27
8.4	AIR-TIGHTNESS TEST.....	28
8.5	VACUUM PUMPING AND CHARGE REFRIGERANT.....	29
8.6	CAUTION OF THE PRESSURE BY CHECK JOINT.....	31
9.	ELECTRICAL WIRING.....	32
9.1	GENERAL CHECK.....	32
9.2	ELECTRICAL WIRING CONNECTION.....	32
10.	COMMON.....	36
11.	TEST RUN.....	38
12.	SAFETY AND CONTROL DEVICE SETTING.....	40

1. GENERAL INFORMATION

1.1 GENERAL NOTES

- This manual gives a common description and information for this heat pump air conditioner which you operate as well for other models.
- This manual should be considered as a permanent part of the heat pump air conditioning equipment and should remain with the air conditioning equipment.
- No part of this publication may be reproduced, copied, filed or transmitted in any shape or form without the permission of our company.
- Within the policy of continuous improvement of its products, Our company reserves the right to make changes at any time without prior notification and without being compelled to introducing them into products previously sold. This document may therefore have been subject to amendments during the life of the product.
- As a result, some of the images or data used to illustrate this document may not refer to specific models. No claims will be accepted based on the data, illustrations and descriptions included in this manual.
- This heat pump air conditioner has been designed for the following ambient temperatures. Please operate the air conditioner within the ranges.

Temperature

°F (°C)

		Max.	Min.
Working rang (Space Cooling)	Indoor	89(32) DB/ 73(23) WB	69(21) DB/ 59(15) WB
	Outdoor	126(52) DB	23(-5) DB
Working rang (Space Heating)	Indoor	86(30) DB	59(15) DB
	Outdoor	78(25.6) DB*	-13(-25) DB

DB: Dry Bulb, WB: Wet Bulb

*78(25.6) DB:73(23)~78(25.6) intermittent operation

- Upon receiving this product, inspect it for any shipping damage. Claims for damage, either apparent or concealed, in a written form, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.
- The standard utilization of the unit shall be explained in these instructions. Therefore, the utilization of the unit other than those indicated in these instructions is not recommended. Please contact your local agent, as the occasion arises.
- If you have any questions, please contact your dealer or designated service center of our company.

1.1.1 GENERAL SAFETY

- **Notice: Servicing shall be performed only as recommended by the manufacturer.**
- **Qualification of workers**

Warning: Every working procedure that affects safety means shall only be carried out by competent persons.

Examples for such working procedures are:

- breaking into the refrigerating circuit.
- opening of sealed components.
- opening of ventilated enclosures.

Information on servicing

- Prior to beginning work on systems, safety checks are necessary to ensure that the risk of ignition is minimized.

- Work shall be undertaken under a controlled procedure so as to minimize the risk of flammable gas or vapor being present while the work is being performed.

- Work in confined spaces shall be avoided. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

Checking for presence of refrigerant

- The area shall be checked with an appropriate refrigerant detector prior to and during work. The leak detection equipment should be suitable for use with all applicable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

Presence of fire extinguisher

- If any hot work is to be conducted, appropriate fire extinguishing equipment shall be available to hand. Have a dry powder or CO₂ fire extinguisher adjacent to the charging area.

No ignition sources

- All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Ventilated area

- Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Checks to the refrigeration equipment

- where electrical components are being changed, they shall be fit for the purpose and to the correct specification.

At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance. The following checks shall be applied to installations.

- The charge mass is in accordance with the room size within which the refrigerant containing parts are installed.

No power outage

This unit is equipped with a refrigerant leak detector for safety. To be effective, the unit must be electrically powered at all times after installation, other than when servicing.

GENERAL INFORMATION

- The ventilation machinery and outlets are operating adequately and are not obstructed.
- If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.
- Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.
- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.
- **Checks to electrical devices**
 - Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so that all parties are advised.
 - Initial safety checks shall include:
 - (1) that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
 - (2) that no live electrical components and wiring are exposed while charging, recovering or purging the system;
 - (3) that there is continuity of earth bonding.
- **Repairs to sealed components**
 - During repairs to sealed components, all electrical supplies shall be disconnected prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.
 - Ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected, including damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
 - Ensure that the apparatus is mounted securely.
 - Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.
- **Repair to intrinsically safe components**
 - Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.
- Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere.
- Replace components only with parts specified by the manufacturer. Other parts may result in the ignition of refrigerant in the atmosphere from a leak.
- **Cabling**
 - Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.
- **Detection of flammable refrigerants**
 - Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.
- **Leak detection methods**
 - Electronic leak detectors may be used to detect refrigerant leaks but the sensitivity may not be adequate, or may need re-calibration for the flammable refrigerants.
 - Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL 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.
 - If a leak is suspected, all naked flames shall be removed/extinguished.
 - If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak. Oxygen free nitrogen (OFN) shall then be purged through the system both before and during the brazing process.
- **Removal and evacuation**
 - The refrigerant charge shall be recovered into the correct recovery cylinders and the system shall be "flushed" with OFN to render the unit safe. This process may need to be repeated several times.
 - Compressed air or oxygen shall not be used for purging refrigerant systems.
 - Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable work to take place. This operation is absolutely vital if brazing operations on the pipe-work are to take place.
 - The outlet for the vacuum pump is not close to any ignition sources and that ventilation is available.

GENERAL INFORMATION

- **Charging procedures**

- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

- **Decommissioning**

- Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail.
- Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of reclaimed refrigerant.
- Electrical power must be available before the task is commenced.
- Become familiar with the equipment and its operation.
- Isolate system electrically.
- Before attempting the procedure, ensure that:
 - (1) mechanical handling equipment is available, if required, for handling refrigerant cylinders;
 - (2) all personal protective equipment is available and being used correctly;
 - (3) the recovery process is supervised at all times by a competent person;
 - (4) recovery equipment and cylinders conform to the appropriate standards.
- Pump down refrigerant system, if possible.
- If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- Make sure that cylinder is situated on the scales before recovery takes place.
- Start the recovery machine and operate in accordance with manufacturer's instructions.
- Do not overfill cylinders. (No more than 80 % volume liquid charge).
- Do not exceed the maximum working pressure of the cylinder, even temporarily.
- When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

- **Labeling**

- Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed.
- Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

- **Recovery**

- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.
- Ensure that the correct number of cylinders for holding the total system charge are available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).
- Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants.
- A set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged.
- Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.
- The evacuation process shall be carried out prior to returning the compressor to the suppliers.
- Only electric heating to the compressor body shall be employed to accelerate this process.
- When oil is drained from a system, it shall be carried out safely.

SAFETY

2. SAFETY

2.1 APPLIED SYMBOLS

- During normal VRF system design work or unit installation, greater attention must be paid in certain situations requiring particular care in order to avoid damage to the unit, the installation or the building or property.
- Situations that pose a risk to the safety of those in the surrounding area or to the unit itself are clearly indicated in this manual.
- A series of special symbols are used to clearly identify these situations.
- Pay close attention to these symbols and to the messages following them, as your safety and that of others depends on it.

DANGER

- *The text following this symbol contains information and instructions relating directly to your safety.*
- *Not taking these instructions into account could lead to serious, very serious or even fatal injuries to you and others.*

CAUTION

- *The text following this symbol contains information and instructions relating directly to your safety.*
- *Not taking these instructions into account could lead to minor injuries to you and others.*
- *Not taking these instructions into account could lead to unit damage.*

NOTE

- *The text following this symbol contains information and instructions that may be use or that require a more thorough explanation.*
- *Instructions regarding inspections to be made on unit parts or systems may also be included.*



This appliance is filled with R32, an odourless low burning velocity refrigerant. If the refrigerant is leaked, there is a possibility of ignition if it enters in contact with an external ignitions source.

DANGER



This symbol shows that this equipment uses a low burning velocity refrigerant. If the refrigerant is leaked, there is a possibility of ignition if it enters in contact with an external ignition source.

RISK OF EXPLOSION

The compressor must be stopped before removing the refrigerant pipes. All service valves must be fully closed after pumping down operation.

Symbol	Explanation
	Before installation, read the installation and operation manual, and the wiring instruction sheet.
	Before performing maintenance and service tasks, read the service manual.
	For more information, see the Technical, Installation and Service Handbook.

2.2 ADDITIONAL INFORMATION

DANGER

- *The air conditioner can only connect non air duct type IUs.*
- *Do not pour water into the unit. These products are equipped with electrical parts. If the electrical components are in contact with water, a serious electrical shock will take place.*
- *Do not touch or adjust safety devices inside the unit. If these devices are touched or adjusted, a serious accident can take place.*
- *Do not open the service cover or access inside the unit with-out disconnecting the main power supply.*
- *In case of fire Turn OFF the main switch, put out the fire at once and contact your service contractor.*
- *Disconnect the appliance from its power source during service and when replacing parts.*
- *Check that the earth wire is securely connected. If the unit is not properly earthed, it may lead to electric shock. Do not connect the earth wire to gas piping, water piping, lighting conductor or earth wire of a telephone.*
- *Fix the cables securely. External forces on the terminals could lead to a fire.*
- *Use ELB with high sensing speed(earth leakage breaker, with an actuation time of 0.1s or less). In the event of a fault, there is danger of an electric shock or a fire if it is not used.*
- *Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tightness test. These types of gases are extremely dangerous and can cause an explosion.*
- *Do not install the unit in the following places, otherwise, it may lead to a fire, deformation, corrosion or failure.*
 - *Places where oil (including machinery oil) splashes.*
 - *Places where flammable gas may generate or flow.*
 - *Places where there is splashing water.*
 - *Places where sulfide gas drifts such as in hot spring.*
 - *Places where strong wind with high salinity blows such as coast regions, or places with an atmosphere of acidity or alkalinity.*
- *Do not install the unit in the place where silicon gas drifts. If the silicon gas attaches to the surface of heat exchanger, the fin surface repels water. As a result, drain water splashes outside of the drain pan and splashed water runs inside of electrical box. In the end, water leakage or electrical devices failure may occur.*

SAFETY

- **Means for disconnection from the supply mains, which have a contact separation in all poles that provide full disconnection under overvoltage category III conditions, must be incorporated in the fixed wiring in accordance with the wiring rules.**
- **The appliance shall be installed in accordance with national wiring regulations.**
- **The installation and service of this product shall be carried out by professional personnel, who have been trained and certified by national training organizations that are accredited to teach the relevant national competency standards that may be set in legislation.**
- **Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated.**
- **Reusable mechanical connectors and flared joints are not allowed indoors.**
- **Disconnect the appliance from its power source during service and when replacing parts.**

CAUTION

- *Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately 3.28ft. (1 m) from the system.*
- *If circuit breaker or fuse is often activated, stop the system and contact your service contractor.*
- *Do not make service or inspections tasks by yourself. This work must be performed by qualified service person.*
- *Do not put any foreign material (sticks, etc...) inside the units. These units have high speed rotating fans and it is dangerous when any object touches them.*
- *Refrigerant leakage can cause difficulty with breathing due to insufficient air. Ventilation is required in case of refrigerant leakage.*
- *Installation and service engineering must comply with local standards, laws and regulations.*
- *Do not install the unit in the place where the breeze directly catches the animals and plants. It could adversely affect the animals and plants.*
- *Pay attention to the following points when the unit is installed in hospital or other facilities where there are strong electromagnetic waves from medical equipment.*
 - *Do not install the unit where the electromagnetic wave is directly radiated to the electrical box, wiring, wired controller and adapter.*
 - *At least 9.8 ft.(3 m) from strong electromagnetic wave radiators, such as radio equipment.*
- *If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.*
- *This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.*

NOTE

- *It is recommended to ventilate the room every 3 or 4 hours.*
- *The air conditioner may not work properly in the following cases.*
 - *The power supplied by the power transformer is less than or equal to the electric power of the air conditioner.*
 - *The large power-consuming equipment is too close to the power supply wiring of the air conditioner, large surge voltage may be induced in the power supply wiring of the air conditioner.*
- *Only indoor units produced by our company and using the same refrigerant R32 can be connected for enhanced tightness refrigerating system*

NOTE

- *To avoid personal injury, do not put your hands or stick deep into the fan.*
- *Stick warning signs near the machine casing or customer connection terminal block to prevent electric shock injury*
- *To prevent electric shock, do not remove the protective cover. Please contact professional service personnel; Before starting the inspection, be sure to cut off all power sources.*

NOTE

- *Precautions shall be taken to avoid excessive vibration or pulsation to refrigeration piping.*
- *Protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects.*
- *Provision shall be made for expansion and contraction of long runs of piping.*
- *Piping in refrigerating systems shall be designed and installed such as to minimise the likelihood of hydraulic shock damaging the system.*
- *The indoor equipment and pipes shall be securely mounted and guarded such that accidental rupture of equipment or pipes cannot occur from events such as moving furniture or reconstruction activities.*

NOTE

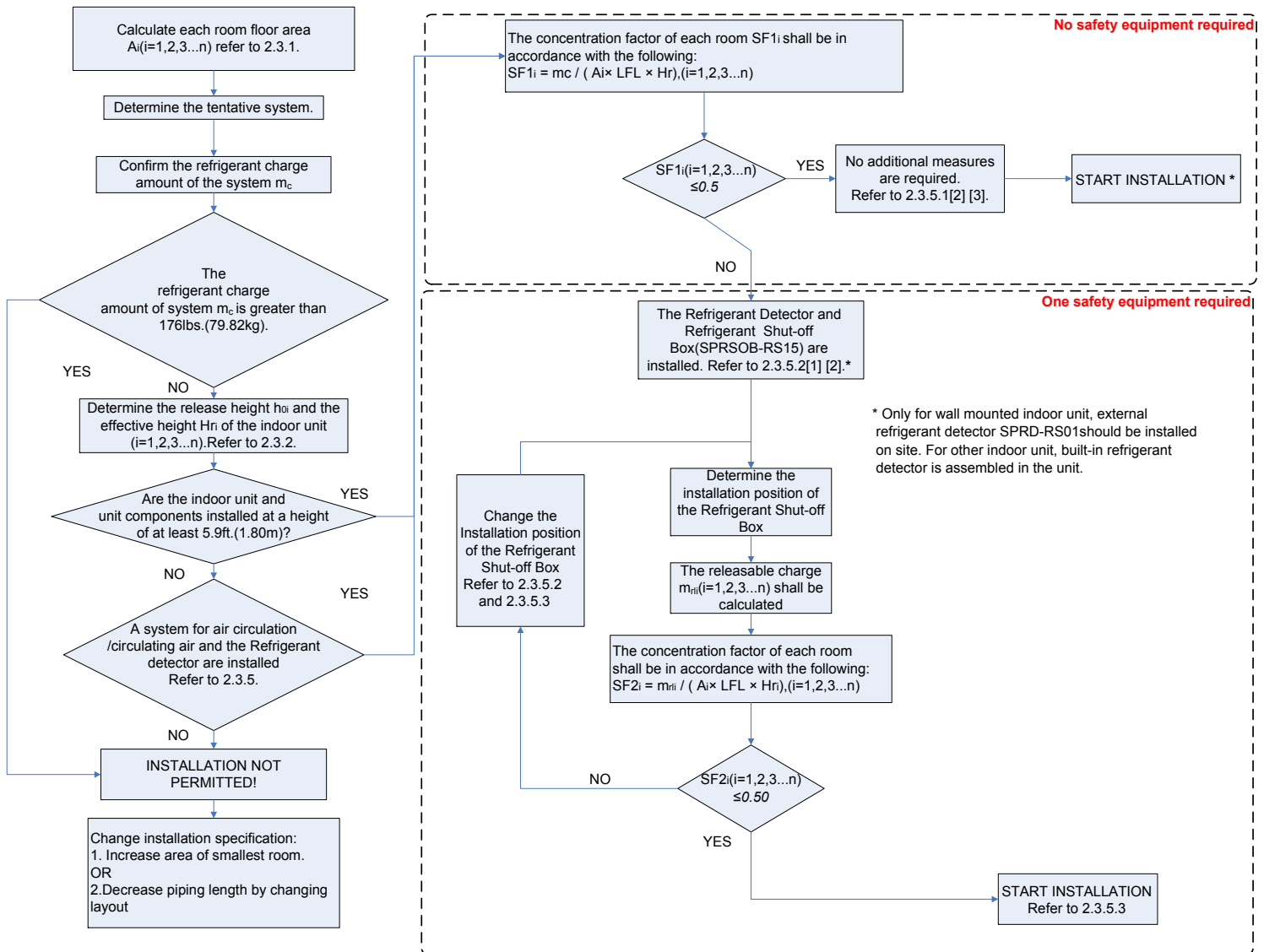
- *Pipework shall be protected from physical damage.*
- *Installation of pipework shall be kept to a minimum.*

SAFETY

2.3 SPECIAL REQUIREMENTS FOR R32 UNITS

- The VRF system uses R32 refrigerant which is rated as A2L and is mildly flammable. To comply with the requirements of enhanced tightness refrigerating systems of the UL 60335-2-40, this system is equipped with the Refrigerant Detector (optional external refrigerant detector SPRD-RS01 for indoor unit without built-in sensor) and the Refrigerant Shut-off Box (optional part). And each systems have the appropriate safety systems in according to the system specifications. In case the requirements of this manual are followed, no additional safety measures are needed.
- Depending on the conditions, safety measures (optional parts) may be required. Follow the installation requirements below to ensure that the complete system is compliant to legislation. If you have any questions, please contact the dealer where you purchased the product.

Determine the installation specifications according to the following safety measure selection flow.



NOTE

SF1: The concentration factor of each room which is based on total refrigerant charging of system.

SF2: The concentration factor of each room which is based on releasable refrigerant after Refrigerant shut-off box.

SAFETY

2.3.1 DETERMINATION OF ROOM FLOOR AREA

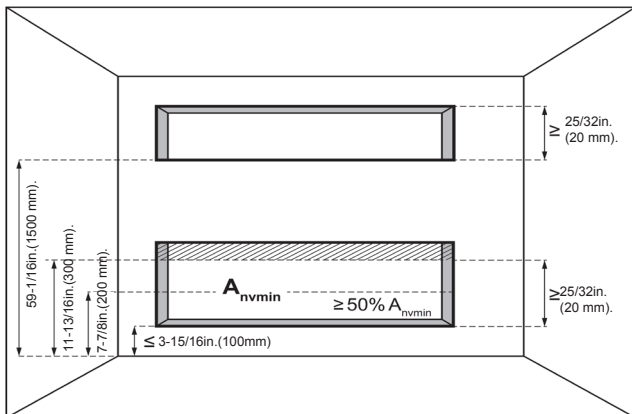
The room area (A_r) shall be defined as the room area enclosed by the projection to the floor of the walls, partitions and doors of the space in which the appliance is installed.

Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space.

If the partition between 2 rooms on the same floor meets certain requirements then the rooms are considered as one room and the areas of the rooms may be added up. In this way it is possible to decrease the concentration factor of the room.

One of the following 2 requirements must be met in order to add up room areas.

- Rooms on the same floor that are connected with a permanent opening that extends to the floor and is intended for people to walk through can be considered as one room.
- Rooms on the same floor connected with openings that fulfill following requirements can be considered as a single room. The opening must consist out of 2 parts to allow for air circulation.



For the lower opening:

- The opening cannot go outdoors
- The lower opening must be $\geq 0.13 \text{ ft}^2 (0.012 \text{ m}^2) (A_{nvmin})$
- The opening cannot be closed.
- The area of any openings above $11-13/16$ in. (300 mm) from the floor does not count when determining A_{nvmin}
- At least 50% of A_{nvmin} is less than $7-7/8$ in. (200 mm) above the floor
- The bottom of the lower opening is $\leq 3-15/16$ in. (100 mm) from the floor
- The height of the openings is $\geq 25/32$ in. (20 mm)

For the upper opening:

- The opening cannot go outdoors
- The opening cannot be closed
- The upper opening must be $\geq 0.064 \text{ ft}^2 (0.006 \text{ m}^2) (50\% \text{ of } A_{nvmin})$
- The bottom of the upper opening must be $\geq 59-1/16$ in. (1500 mm) above the floor
- The height of the opening is $\geq 25/32$ in. (20 mm)

Note: The requirement for the upper opening can be met by drop ceilings, ventilation ducts or similar arrangements that provide an airflow path between the connected rooms.

In case of appliances connected via an air duct system to one or more rooms, the room floor area shall be determined as the total conditioned space if the following requirements are met:

- The appliances shall be connected via an air duct system to one or more rooms, the supply and return air shall be directly ducted to the space.
- Operation of circulation airflow: the circulation airflow shall be activated by a refrigerant detection system, and the refrigerant sensor shall be located within the unit (Indoor unit with built-in sensor **SPRS-RS02**).
- The minimum airflow requirement shall be: $Q_{min} \geq 30 \times m_c / \text{LFL}$, in which m_c is the actual refrigerant charge amount in the system in lbs. (kg), if releasable charge m_{ri} is determined by 2.3.5.2, the actual refrigerant charge m_c may be replaced by the releasable charge m_{ri} in the equation of Q_{min}

2.3.2 DETERMINATION THE RELEASE HEIGHT AND THE EFFECTIVE HEIGHT OF THE INDOOR UNIT

The release height h_0 , the vertical distance in ft.(m) from the floor to the point of release when the appliance is installed.

$h_0 = (h_{inst} + h_{rel})$ or 1.97 ft.(0.6 m), whichever is higher.

h_{rel} is the release offset in ft.(m) from the bottom of the appliance to the point of release. Cumulative openings smaller than $0.78 \text{ in.}^2 (5 \text{ cm}^2)$ and openings with a single dimension of not more than $1/64 \text{ in.} (0.1 \text{ mm})$ are not considered as openings where leaking refrigerant can escape. Openings for routing of wires and tubing which are not sealed openings shall include the total area of the opening without consideration of the area occupied by the tubing or wire.

h_{inst} is the installed height of the unit.

Reference installed heights are given below:

$h_{inst} = 0.0 \text{ ft.} (0.0 \text{ m})$ for portable, floor mounted ;

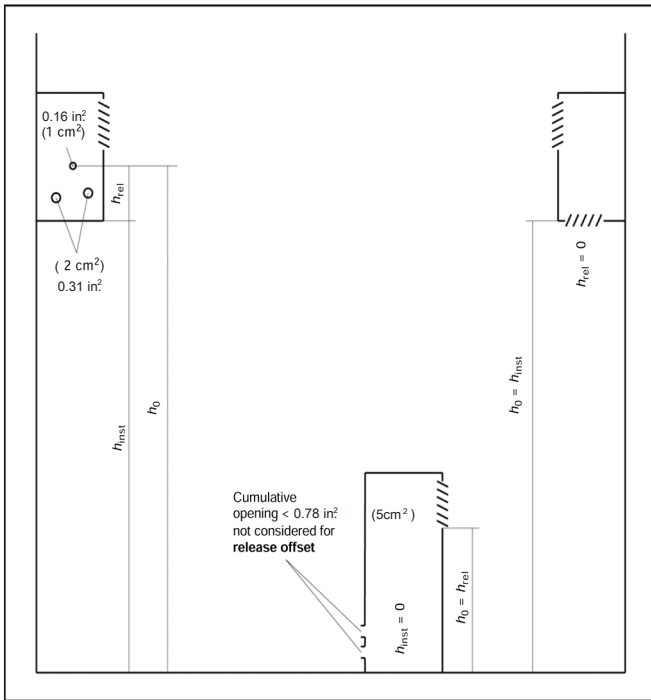
$h_{inst} = 3.3 \text{ ft.} (1.0 \text{ m})$ for window mounted;

$h_{inst} = 5.9 \text{ ft.} (1.8 \text{ m})$ for wall mounted;

$h_{inst} = 7.2 \text{ ft.} (2.2 \text{ m})$ for ceiling mounted.

H_r is the effective height of the unit , which is determined as follows:

- When the release height h_0 is equal to or greater than 5.9 ft.(1.8 m) or the appliance is with integral circulation airflow, the effective height H_r is room height in ft.(m) but not more than 7.2 ft.(2.2 m) unless h_0 is higher than 7.2 ft.(2.2 m) ;
- In all other cases, the effective height H_r is the release height h_0



2.3.5 SAFETY MEASURES

2.3.5.1 NO ADDITIONAL MEASURES

[1] NO ADDITIONAL MEASURES FOR INDOOR UNITS

When the concentration factor of each room which is based on total refrigerant charging of system $SF1_i$ not exceed 0.5, no additional measures are required.

$SF1_i$ shall be in accordance with the following:

$$SF1_i = m_c / LFL \times Hr_i \times A_i \quad (i=1,2,...n)$$

m_c is the total refrigerant charge in the refrigerating system in lbs.(kg);

LFL is the lower flammability limit in lbs./ft.³(kg/m³);

Hr_i is the effective height of the indoor unit in ft.(m);

A_i is the room floor area in ft.²(m²);

$SF1_i$ is the concentration factor of each room which is based on total refrigerant charging of system.

Only for wall mounted indoor unit, external refrigerant detector SPRD-RS01 should be installed on site. For other indoor unit, built-in refrigerant detector is assembled in the unit.

2.3.3 THE TOTAL AMOUNT OF REFRIGERANT

The total refrigerant charge amount in the system MUST always be lower than 176 lbs.(79.82 kg).

2.3.4 REQUIREMENT FOR INDOOR UNITS WITH INCORPORATED CIRCULATION AIRFLOW TO PREVENT STAGNATION

The circulation shall operate continuously or be turned on by refrigerant detection systems.

For indoor units where h_0 as determined in Clause 2.3.2 is less than 5.9 ft.(1.8 m), the minimum air velocity and minimum airflow shall be as follows:

- Minimum airflow = 84.72 ft.³/h (240 m³/h)
- Minimum air velocity = $1.87344 / \sin \varphi$
 φ is the airflow angle above horizontal in degrees.
- The unit air velocity (v) shall be calculated as airflow divided by the nominal face area of the outlet. The grill area shall not be deducted.

i NOTE

If the release height of the indoor unit is less than 5.9 ft.(1.8m), the airflow and air velocity of the indoor unit must be greater than the minimum requirements mentioned above. The Refrigerant Detector needs to be installed to trigger air circulation.

[2] INSTALLATION OF EXTERNAL REFRIGERANT DETECTORS

Installation rules of external Refrigerant Detectors

Only for wall mounted indoor unit, external refrigerant detector SPRD-RS01 should be installed on site. For other indoor unit, built-in refrigerant detector is assembled in the unit.

The installation of the Refrigerant Detector SPRD-RS01 for indoor unit should comply with the following rules.

For the Refrigerant Detector to function, the unit shall be powered on at all times after installation, except during service.

At least one refrigerant detector inside the occupied space shall be installed. For the occupancy listed below, the Refrigerant Detector shall also warn at a supervised location, such as the night porter's location, as well as the occupied space:

- rooms, parts of buildings, building where sleeping facilities are provided,
- rooms, parts of buildings, building where people are restricted in their movement,
- rooms, parts of buildings, building where an uncontrolled number of people are present, or
- rooms, parts of buildings, building to which any person has access without being personally acquainted with the necessary safety precautions.

If there are multiple indoor units with different safety systems in refrigerant system, safety system behaviors may be different in each indoor unit.

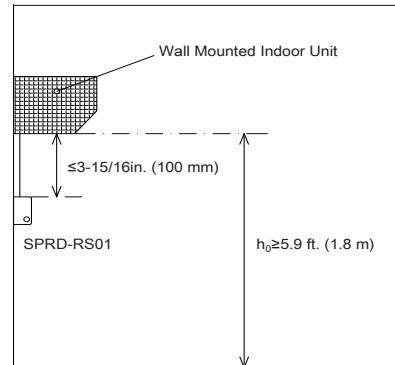
The Refrigerant Detector SPRD-RS01 implements have safety measures to light up in red and to sound a buzzer, that will warn in case of a refrigerant leak.

Check Installation Manual of the Refrigerant Detector SPRD-RS01 for more information.

For the Refrigerant Detector SPRD-RS01 installation to R32 air conditioning system, check the following before installing.

- The Refrigerant Detector used as a safety device for the air conditioning system shall be used the specified our company optional product.
- Refrigerant Detector installation shall be complied with the following requirements.
 1. Refrigerant Detector shall be installed in each room that requires a safety measure.
 2. The installation position shall be determined by the type and height of the indoor unit and the presence or the absence of obstacles between the indoor unit and the Refrigerant Detector.
- The Refrigerant Detector shall always be 15 dB(A) louder than the room background noise.
- This Refrigerant Detector has output terminals to external ventilation and an external alarm.
- When taking safety measures using external ventilation or an external alarm, install according to the installation manual for the Refrigerant Detector.

Installation positions of external Refrigerant Detectors (SPRD-RS01 FOR UNIT WITHOUT BUILT-IN SENSOR)



- The Refrigerant Detector SPRD-RS01 must be installed 3-15/16in.(100mm) or less directly below the indoor unit.
- If the refrigerant leakage sensor is built-in in the indoor unit (all other indoor unit type other than wall mounted type), the indoor unit needs to use a dedicated wired controller with alarm function (SPWT-WG01/SPWT-WG01B).

SAFETY

INSTALLATION CASE FOR EXTERNAL REFRIGERRANT DETECTOR

	Incorrect	Correct	Case
1			Multiple refrigerant detectors cannot be connected to one indoor unit.
2			Install the Refrigerant Detector in the same room as the connected indoor unit.
3			Multiple indoor units are installed in two rooms, even opening of two rooms meet requirements referring to 2.3.1, two Refrigerant Detector need to be installed
4			Installing multiple indoor units with different systems in the room, and each system needs to be equipped with the Refrigerant Detector.
5			The installation height of indoor units is less than 1.8m, and each indoor unit needs to be equipped with the Refrigerant Detector HOPT-ERD01

A Outdoor unit(OU)

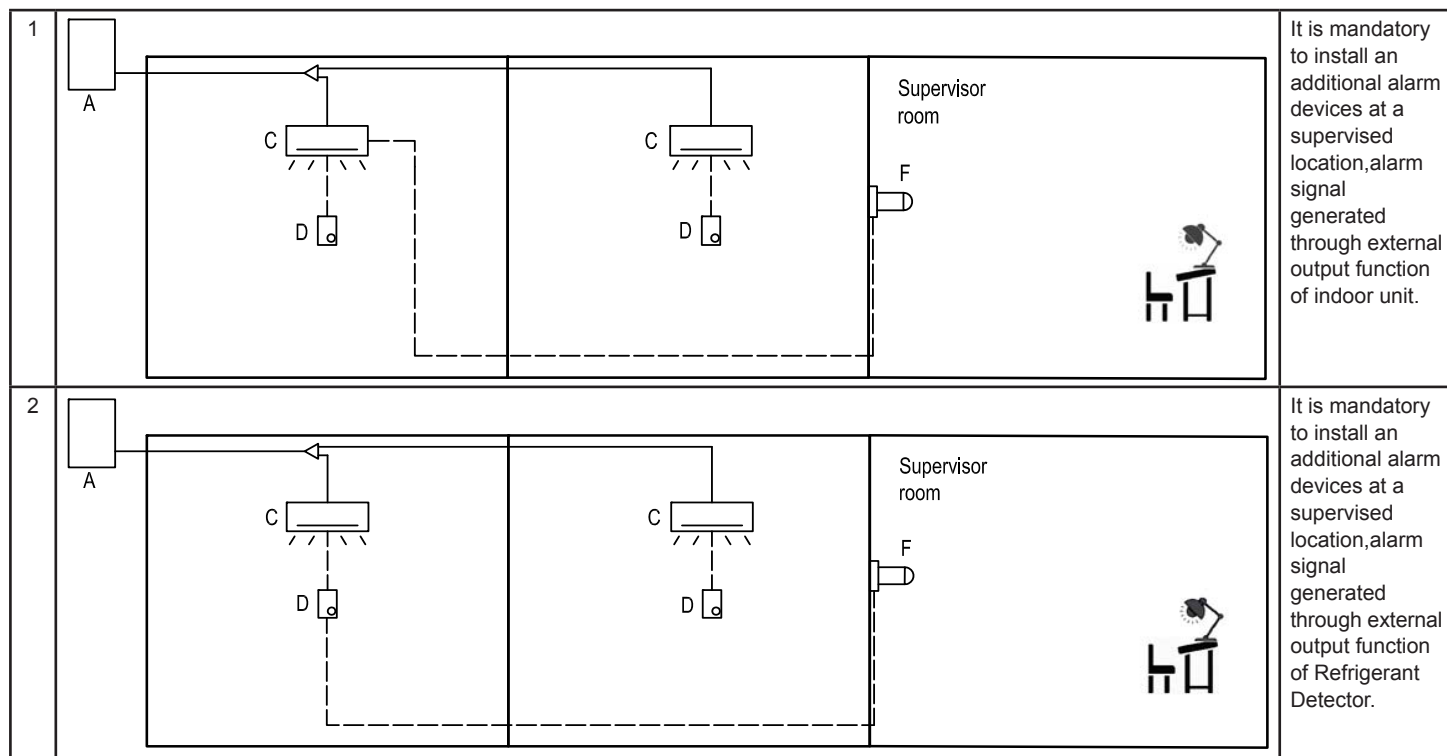
C Indoor unit(IU)

D Refrigerant Detector (SPRD-RS01 for indoor unit without built-in sensor)

SAFETY

Installation example of the detector and additional alarm device

For buildings where sleeping facilities are offered (e.g. hotel), where persons are restricted in their movements (e.g. hospitals), an uncontrolled number of persons is present or buildings where people are not aware of the safety precautions it is mandatory to install an additional alarm devices at a supervised location with 24-hour monitoring. In this situation refer to following diagram to install detector and additional alarm device.



A Outdoor unit(OU)

C Indoor unit(IU)

D Refrigerant Detector (SPRD-RS01 for indoor unit without built-in sensor)

F Alarm system (acoustic and visual alarm)

SAFETY

2.3.5.2 REFRIGERANT DETECTORS AND REFRIGERANT SHUT-OFF BOX (SPRSOB-RS15) ARE INSTALLED

The following situation require the installation of the Refrigerant Detector and Refrigerant Shut-off Box(SPRSOB-RS15).

The indoor unit is installed in the occupied area, $SF1$, exceeds 0.50

Only for wall mounted indoor unit, external refrigerant detector SPRD-RS01 should be installed on site. For other indoor unit, built-in refrigerant detector is assembled in the unit.

[1] CALCULATION OF m_{rl}

If the Refrigerant Detector and Refrigerant Shut-off Box(SPRSOB-RS15) are taken, the releasable charge m_{rl} needs to be calculated, which depends on the installation position of the Refrigerant Shut-off Box. and the calculation rules are as follows:

$$m_{rl} = 0.93\text{lbs.}(0.42\text{kg}) + m_{rla} + m_{rlb}$$

m_{rl} is the total amount of releasable refrigerant charge after the Refrigerant Shut-off Box is shut off in the event of a leak.

m_{rla} is the amount of releasable refrigerant charge in refrigerant piping after the Refrigerant Shut-off Box is shut off,

m_{rlb} is the amount of releasable refrigerant charge in indoor units after the Refrigerant Shut-off Box is shut off.

(1) Calculation Method of m_{rla}

Calculation Method of the amount of releasable refrigerant in the refrigerant piping

Liquid Pipe Diameter Φ in. (Φ mm)	Total Liquid Piping Length ft.(m)	Releasable refrigerant amount per ft.(m) lbs./ft.(kg/m)	Gas Pipe Diameter Φ in. (Φ mm)	Total Gas Piping Length ft.(m)	Releasable refrigerant amount per ft.(m) lbs./ft.(kg/m)
1/4 (6.35)		$\times 0.012$ (0.018)	1/2 (12.7)		$\times 0.005$ (0.008)
3/8 (9.53)		$\times 0.034$ (0.050)	5/8 (15.88)		$\times 0.008$ (0.012)
1/2 (12.7)		$\times 0.066$ (0.099)	3/4 (19.05)		$\times 0.012$ (0.018)
m_{rla} : The amount of releasable refrigerant in the refrigerant piping $m_{rla} = \sum \text{Total piping length} * \text{releasable refrigerant amount per meter}$				() lbs.(kg)	

(2) Calculation Method of m_{rlb}

Releasable refrigerant amount per IU of different type

lbs./IU (kg/IU)

Model Type	05	07	09	12	15	17	18	19	22	24	27	28	30	36	38	42	48	54	60
4-way Cassette Type			1.65 (0.75)	1.65 (0.75)	1.65 (0.75)			1.65 (0.75)		2.36 (1.07)			3.57 (1.62)		4.63 (2.10)		4.63 (2.10)	4.63 (2.10)	
Mini 4-way Cassette Type	0.71 (0.32)	0.71 (0.32)	1.12 (0.51)	1.12 (0.51)	1.76 (0.80)	1.76 (0.80)	1.76 (0.80)	1.76 (0.80)											
Ceiling Ducted Type(Low height)	0.60 (0.27)	0.60 (0.27)	1.12 (0.51)	1.12 (0.51)	1.50 (0.68)		2.09 (0.95)	2.09 (0.95)		2.25 (1.02)									
Wall Mounted Type		1.26 (0.57)	1.26 (0.57)	1.26 (0.57)	1.81 (0.82)		2.43 (1.10)	2.43 (1.10)		2.43 (1.10)	2.43 (1.10)	2.43 (1.10)							
Multi-position Air Handler Unit Type			1.81 (0.82)	1.81 (0.82)		2.87 (1.30)	2.87 (1.30)			2.87 (1.30)			4.37 (1.98)	4.37 (1.98)		4.37 (1.98)	6.59 (2.99)	6.59 (2.99)	6.59 (2.99)

m_{rlb} : The amount of releasable refrigerant in the indoor unit

$$m_{rlb} = \sum \text{number of the IU} * \text{releasable refrigerant amount per corresponding IU} \quad () \text{ lbs.(kg)}$$

SAFETY

The concentration factor of each room which is based on releasable refrigerant charge. $SF2_i$ of each room shall be in accordance with the following:

$$SF2_i = m_{ri} / LFL \times Hr_i \times A_i \quad (i=1,2,...n)$$

LFL is the lower flammability limit in lbs./ft.³(kg/m³);

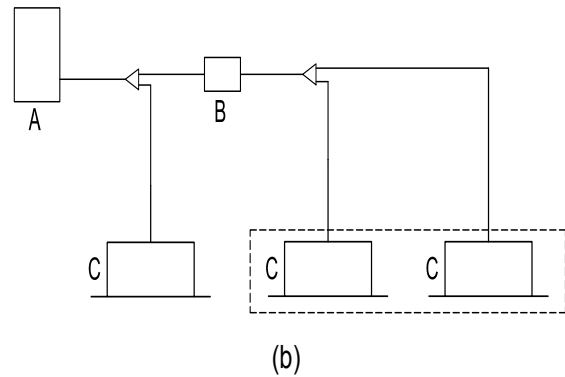
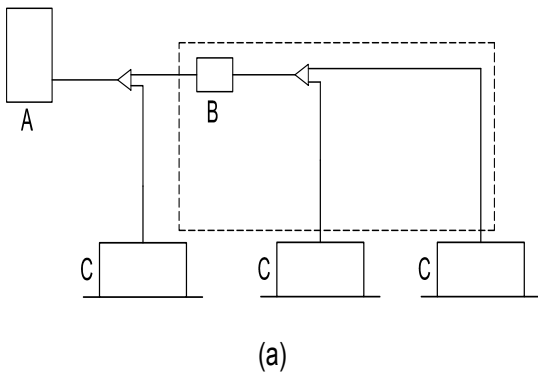
Hr_i is the effective height of the indoor unit in ft.(m);

A_i is the room floor area in ft.²(m²);

$SF2_i$ is the concentration factor of each room which is based on releasable refrigerant charge;

i NOTE

- Only piping after the Refrigerant Shut-off Box is included to calculate m_{ria} , refer to following figure (a).
- Only IUs after the Refrigerant Shut-off Box are included to calculate m_{rib} , refer to following figure (b).
- When $SF2_i$ of the room exceeds 0.50, the installation position of Refrigerant Shut-off Box (SPRSOB-RS15) need to be adjusted.



SAFETY

[2] INSTALLATION CASE OF THE REFRIGERANT DETECTORS AND THE REFRIGERANT SHUT-OFF BOX(SPRSOB-RS15)

	Installation example	OK or NG	Case
1		OK	Installed the Refrigerant Detector complied with 2.3.5.1[3]. Installed the Refrigerant Shut-off Box(SPRSOB-RS15) between OU and the first branch.
2		OK	Installed the Refrigerant Detector complied with 2.3.5.1[3]. Installed the Refrigerant Shut-off Box(SPRSOB-RS15) between OU and the first branch.
3		OK	Installed the Refrigerant Detector complied with 2.3.5.1[3]. Installed the Refrigerant Shut-off Box(SPRSOB-RS15) in the branch.
4		OK	Installed the Refrigerant Detector complied with 2.3.5.1[3]. Installed multiple Refrigerant Shut-off Box(SPRSOB-RS15) in the branch.

A Outdoor unit(OU)

B Refrigerant Shut-off Box(SPRSOB-RS15)

C Indoor unit(IU)

D Refrigerant Detector (SPRD-RS01 for indoor unit without built-in sensor)

SAFETY

	Installation example	OK or NG	Case
5		OK	Installed the Refrigerant Detector complied with 2.3.5.1[3]. The Refrigerant Shut-off Box (SPRSOB-RS15) can only be installed when a refrigerant detector is equipped in the room. When multi IUs connected to the Refrigerant shut off box, to ensure that at least one IU is equipped with the Refrigerant detector.
6		NG	The Refrigerant Shut-off Box (SPRSOB-RS15) can only be installed when a refrigerant detector is equipped in the room.
7		NG	Installed the Refrigerant Detector (SPRD-RS01) complied with 2.3.5.1[3]. An indoor unit can not pass through two or more Refrigerant Shut-off Box .
8		OK	Installed the Refrigerant Detector complied with 2.3.5.1[3]. All indoor unit pass though the Refrigerant Shut-off Box (SPRSOB-RS15) in the branch is allowed.

A Outdoor unit(OU)

B Refrigerant Shut-off Box (SPRSOB-RS15)

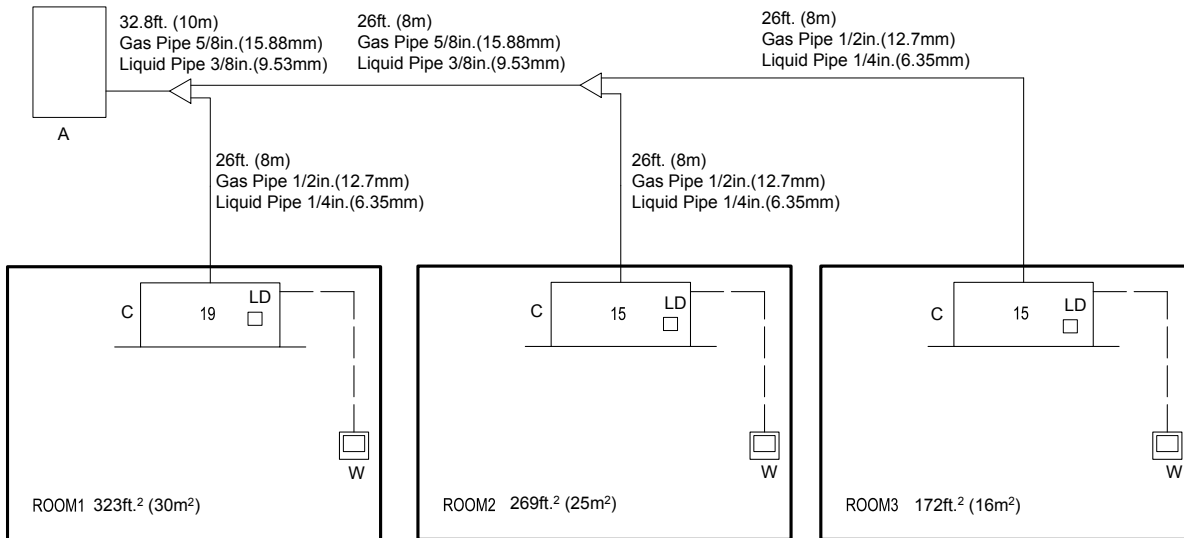
C Indoor unit(IU)

D Refrigerant Detector (SPRD-RS01 for indoor unit without built-in sensor)

2.3.5.3 INSTALLATION EXAMPLES

Example 1

The outdoor unit is connected to three indoor units, with an installation height of 7.2ft.(2.2m) and a total refrigerant charge of 8.82lbs. (4kg). $SF1_i$ for each room is calculated according to section 2.3.5.1, and $SF1_i$ for room 1/room 2/room 3 are 0.20/0.24/0.37 respectively. Room 1/Room 2/Room 3 meet the requirements of section 2.3.5.1, no additional measures are required.



- A Outdoor unit(OU)
- C Indoor unit(IU)
- LD Built-in Refrigerant Detector(for indoor unit with built-in sensor)
- W Wired Controller

SAFETY

Example 2

The outdoor unit is connected to three indoor units, with an installation height of 7.2ft.(2.2m) and a total refrigerant charge of 8.82lbs. (4kg). $SF1_i$ for each room is calculated according to section 2.3.5.1, and $SF1_i$ for room 1/room 2/room 3 are 0.19/0.25/0.48 respectively. Room 1 /Room 2 meet the requirements of section 2.3.5.1, no additional measures are required. Room 3 meets the requirements of section 2.3.5.2, the Refrigerant Detector and the Refrigerant Shut-off Box(SPRSOB-RS15) shall be taken.

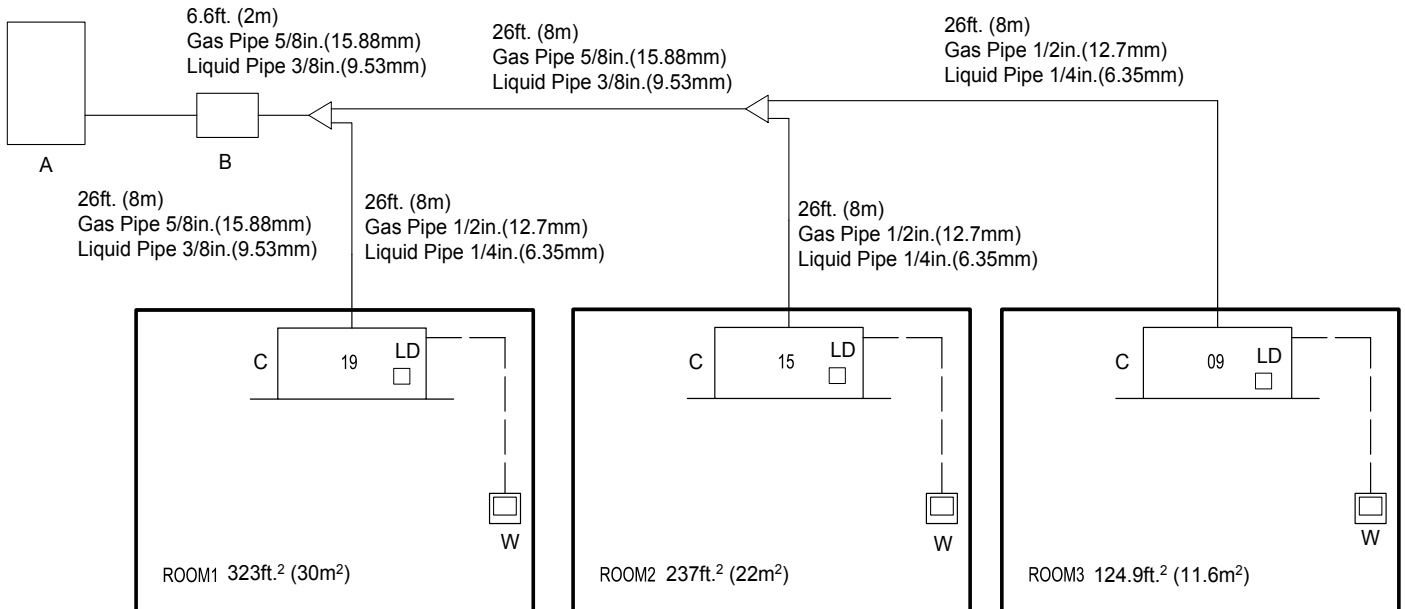
The amount of releasable refrigerant in the refrigerant piping $m_{ria}=2.73\text{lbs.}(1.24\text{kg})$

Liquid Pipe Diameter Φ in. (Φ mm)	Total Liquid Piping Length ft. (m)	Releasable refrigerant amount per meter lbs./ft.(kg/m)	Gas Pipe Diameter Φ in. (Φ mm)	Total Gas Piping Length ft.(m)	Releasable refrigerant amount per meter lbs./ft.(kg/m)
1/4 (6.35)	78.7 (24)	0.012 (0.018)	1/2 (12.7)	78.7 (24)	0.005 (0.008)
3/8 (9.53)	32.8 (10)	0.034 (0.050)	5/8 (15.88)	32.8 (10)	0.008 (0.012)
1/2 (12.7)	0 (0)	0.066 (0.099)	3/4 (19.05)	0 (0)	0.012 (0.018)
The amount of releasable refrigerant in the refrigerant piping				2.73lbs. (1.24kg)	

The amount of releasable refrigerant for indoor unit $m_{rib}=1.12+1.76+1.76=4.64\text{lbs.}(0.51+0.80+0.80=2.11\text{ kg})$.

The releasable refrigerant $m_{ri}=0.93 + m_{ria} + m_{rib}=0.93+2.73+4.64=8.30\text{lbs.}(0.42+1.24+2.10=3.76\text{kg})$

$SF2_i$ for room 1/room 2/room 3 are 0.19/0.25/0.48 respectively. The installation of the unit meets the requirements.



- A Outdoor unit(OU)
- B Refrigerant Shut-off Box(SPRSOB-RS15)
- C Indoor unit(IU)
- LD Built-in Refrigerant Detector(for indoor unit with built-in sensor)
- W Wired Controller

SAFETY

Example 3

The outdoor unit is connected to three indoor units, with an installation height of 7.2ft.(2.2m) and a total refrigerant charge of 8.82lbs. (4 kg). $SF1_i$ for each room is calculated according to section 2.3.5.1, and $SF1_i$ for room 1/room 2/room 3 are 0.19/0.25/0.70 respectively. Room 1 / Room 2 meet the requirements of section 2.3.5.1, no additional measures are required. Room 3 meets the requirements of section 2.3.5.2, the Refrigerant Detector and the Refrigerant Shut-off Box(SPRS0B-RS15) shall be taken.

POSITION1 of the Refrigerant Shut-off Box (SPRS0B-RS15):

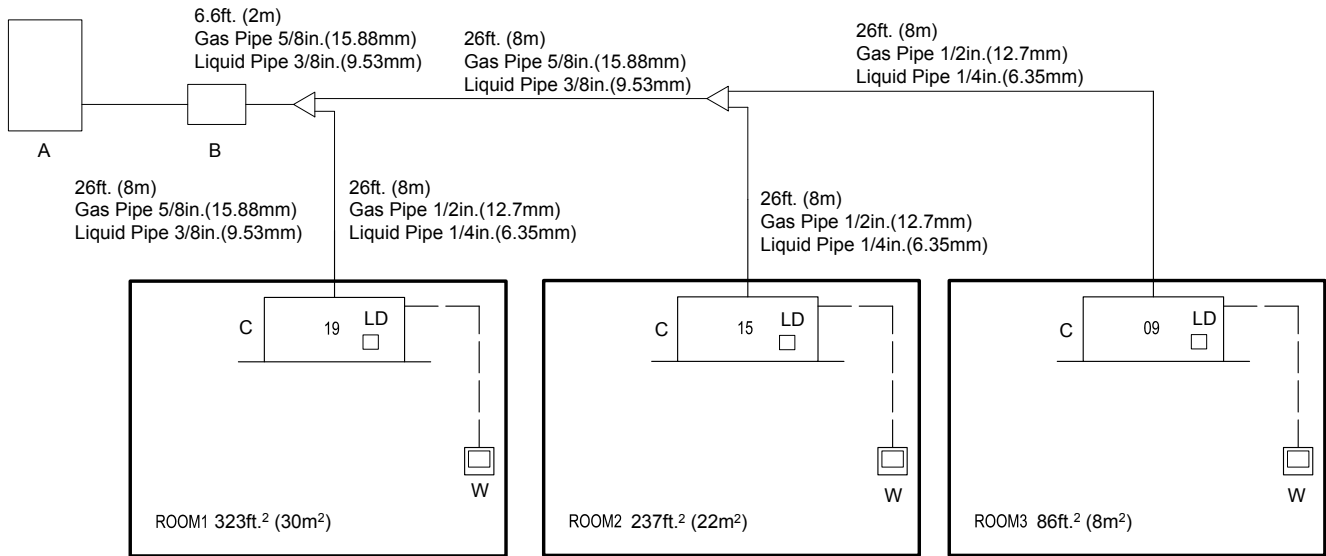
The amount of releasable refrigerant in the refrigerant piping $m_{ria}=2.73\text{lbs.}(1.24\text{kg})$

Liquid Pipe Diameter Φ in. (Φ mm)	Total Liquid Piping Length ft.(m)	Releasable refrigerant amount per meter lbs./ft.(kg/m)	Gas Pipe Diameter Φ in. (Φ mm)	Total Gas Piping Length ft.(m)	Releasable refrigerant amount per meter lbs./ft.(kg/m)
1/4 (6.35)	78.7 (24)	0.012 (0.018)	1/2 (12.7)	78.7 (24)	0.005 (0.008)
3/8 (9.53)	32.8 (10)	0.034 (0.050)	5/8 (15.88)	32.8 (10)	0.008 (0.012)
1/2 (12.7)	0 (0)	0.066 (0.099)	3/4 (19.05)	0 (0)	0.012 (0.018)
The amount of releasable refrigerant in the refrigerant piping				2.73lbs. (1.24kg)	

The amount of releasable refrigerant for indoor unit $m_{rib}=1.12+1.76+1.76=4.64\text{lbs.}(0.51+0.80+0.80=2.11\text{ kg})$.

The releasable refrigerant $m_{ri}=0.93 + m_{ria} + m_{rib}= 0.93+2.73+4.64=8.30\text{lbs.}(0.42+1.24+2.10=3.76\text{kg})$

$SF2_i$ for Room 1/Room 2/Room 3 are 0.19/0.25/0.70 respectively. The Refrigerant Shut-off Box is installed at position 1, which does not meet the requirements. The installation position of Refrigerant Shut-off Box(SPRS0B-RS15) need to be adjusted.



- A Outdoor unit(OU)
- B Refrigerant Shut-off Box(SPRS0B-RS15)
- C Indoor unit(IU)
- LD Built-in Refrigerant Detector(for indoor unit with built-in sensor)
- W Wired Controller

SAFETY

POSITION2 of the Refrigerant Shut-off Box(SPRSOB-RS15):

The amount of releasable refrigerant in the refrigerant piping $m_{ria}=1.19\text{lbs.}(0.54\text{kg})$

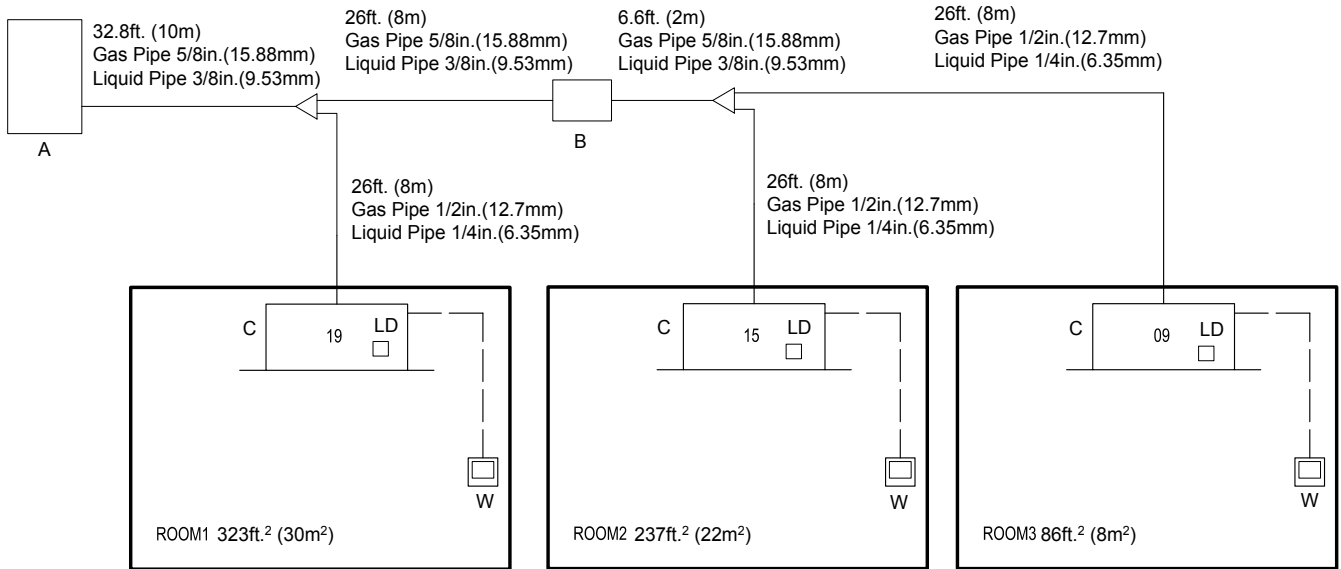
Liquid Pipe Diameter Φ in. (Φ mm)	Total Liquid Piping Length ft.(m)	Releasable refrigerant amount per meter lbs./ft.(kg/m)	Gas Pipe Diameter Φ in. (Φ mm)	Total Gas Piping Length ft.(m)	Releasable refrigerant amount per meter lbs./ft.(kg/m)
1/4 (6.35)	52.5 (16)	0.012 (0.018)	1/2 (12.7)	52.5 (16)	0.005 (0.008)
3/8 (9.53)	6.6 (2)	0.034 (0.050)	5/8 (15.88)	6.6 (2)	0.008 (0.012)
1/2 (12.7)	0 (0)	0.066 (0.099)	3/4 (19.05)	0 (0)	0.012 (0.018)
The amount of releasable refrigerant in the refrigerant piping				1.19lbs.(0.54kg)	

The amount of releasable refrigerant for indoor unit $m_{rib}=1.12+1.76=2.88\text{lbs.}(0.51+0.80=1.31\text{ kg})$.

The releasable refrigerant $m_r=0.93 + m_{ria} + m_{rib} = 0.93+1.19+2.88=5.00\text{lbs.}(0.42+0.54+1.31=2.27\text{kg})$

$SF1_i$ for Room1 is 0.20 ,which is calculated according to section 2.3.5[2], Room 1 meets the requirements of section 2.3.5[2]. No safety measures are required for installation.

$SF2_i$ for Room 2/Room 3 are 0.15/0.42 respectively. The Refrigerant Shut-off Box is installed at position 2, meeting the requirements.



A Outdoor unit(OU)

B Refrigerant Shut-off Box(SPRSOB-RS15)

C Indoor unit(IU)

LD Built-in Refrigerant Detector(for indoor unit with built-in sensor)

W Wired Controller

IMPORTANT NOTICE

3. IMPORTANT NOTICE

- Please read the manual carefully before starting work on the installation of the system. Failure to observe the instructions for installation, use and operation described in this documentation may result in operating failure including potentially serious faults, or even the destruction of the system.
- Verify, in accordance with the manuals which appear in the outdoor and indoor unit, that all the information required for the correct installation of the system is included. If this is not the case, contact your distributor.
- Our company pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- Our company cannot anticipate every possible circumstance that might involve a potential hazard.
- Check and make sure that the explanations of each part of this manual correspond to your air to air VRF system model.
- Refer to the models codification to confirm the main characteristics of your system.
- Signal words (DANGER, CAUTION and NOTE) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided in initial pages of this document.
- This unit is exclusively for air to air systems.

DANGER



Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.

- ***The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater.***
- ***Do not pierce or burn.***
- ***Be aware that the R32 refrigerants does not contain an odour.***

DANGER

Pressure Vessel and Safety Device: This heat pump is equipped with a high pressure vessel under PED (Pressure Equipment Directive). The pressure vessel has been designed and tested before shipment according to PED.

Also, in order to prevent the system from an abnormal pressure, a high pressure switch, which needs no field adjustment, is utilized in the refrigeration system.

Therefore, this heat pump is protected from abnormal pressures. However, if abnormally high pressure is applied to the refrigeration cycle including the high pressure vessel(s), it will result in serious injury or death due to explosion of the pressure vessel.

Do not apply a pressure higher than the maximum allowable pressure (refer to nameplate) to the system, by modifying or changing the high pressure switch.

- **Start-up and Operation:** Check to ensure that all the stop valves are fully opened and no obstacle exists at the inlet/outlet sides before start-up and during the operation.
- **Maintenance:** Check the high pressure side pressure at least once every 3 months. If the pressure is higher than the maximum allowable pressure, stop the system and clean the heat exchanger or remove the cause.

TRANSPORTATION AND HANDLING

4. TRANSPORTATION AND HANDLING

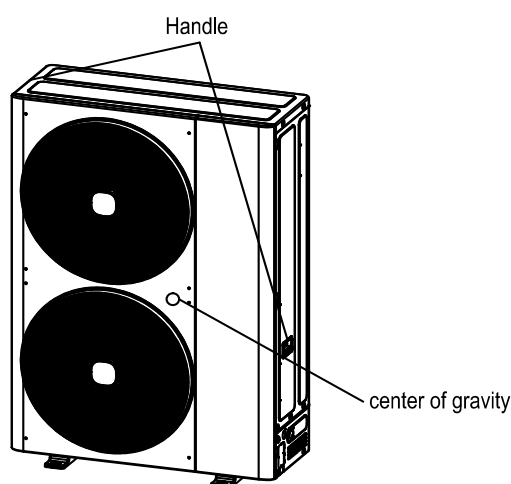
Transport the product as close to the installation location as possible before unpacking.

CAUTION

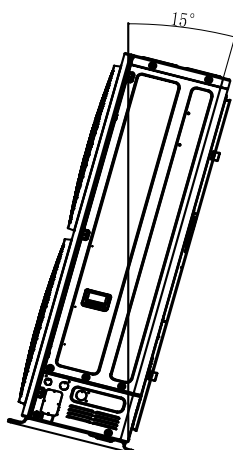
- Do not step on or put any materials on the product.
- Do not put any foreign material into the outdoor unit and check to ensure that none exists in the outdoor unit before the installation and test run. Otherwise, a fire or failure, etc. may occur.

When manually lifting the unit using the handles, pay attention to the following points.

- To prevent the unit from overturning, pay attention to the center of gravity as shown in the below figure.
- Two or more personnel should be used to move the unit.



Fall angle of the outdoor unit



5. BEFORE OPERATION

CAUTION

- When the system is started after a shut-off longer than approximately 3 months, it is recommended to check the system by your service contractor.
- Make sure that the outdoor unit is not covered with snow or ice. If covered, remove it by using hot water (approximately 122°F(50°C)). If the water temperature is higher than 122°F(50°C), it will cause damage to plastic parts.

5.1 LINE-UP OF OUTDOOR UNITS

Capacity	Power supply	3RT	4RT	5RT
Model	1PH 208/230V 60Hz	CHV6-RS 36URBMHH	CHV6-RS 48URBMHH	CHV6-RS 60URBMHH

5.2 FACTORY-SUPPLIED UNIT COMPONENTS

Check to ensure that the following accessories are packed with the outdoor unit.

Accessory	Image	Qty.	Purpose
Instruction manual		1	Basic instructions for the installation of the device
Drain nozzle		1	For water discharge when necessary
Washer		1	Between drain hole and drain nozzle for sealing
Rubber plug		4	For blocking the drain outlet
Rubber hole		2	For cable protection

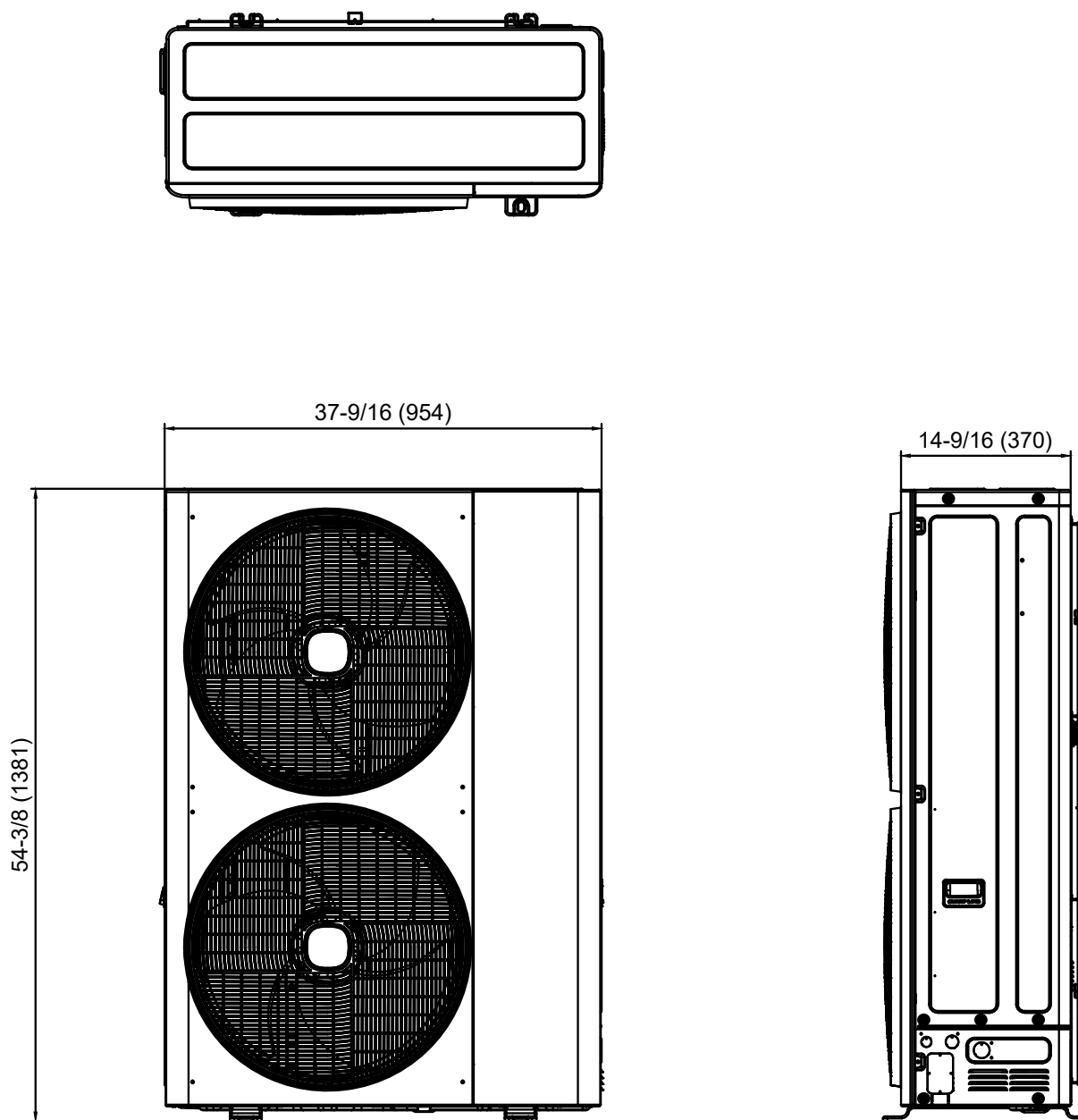
NOTE

- The previous accessories are supplied inside the unit.
- If any of these accessories are not packed with the unit or any damage to the unit is detected, please contact your dealer.

GENERAL DIMENSIONS

6. GENERAL DIMENSIONS

Unit: in. (mm)

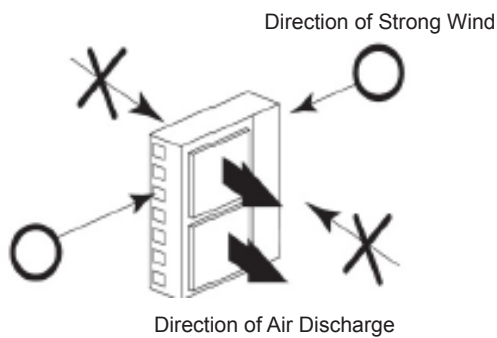


UNIT INSTALLATION

7. UNIT INSTALLATION

⚠ CAUTION

- Install the unit in the shade or not exposed to direct sunshine or direct radiation from high temperature heat source.
- Make sure that the foundation is flat and sufficiently strong.
- This unit has aluminum fin with sharp edges. Pay attention to the fin to avoid injury. Install the unit in a restricted area not accessible by the general public.
- When installing the outdoor unit in snow-covered areas, mount the field-supplied hoods at the discharge side of the outdoor unit and the inlet side of the heat exchanger.
- Do not install the unit in a space where a seasonal wind directly blows to the outdoor heat exchanger or a wind from a building space directly blows to the outdoor fan.

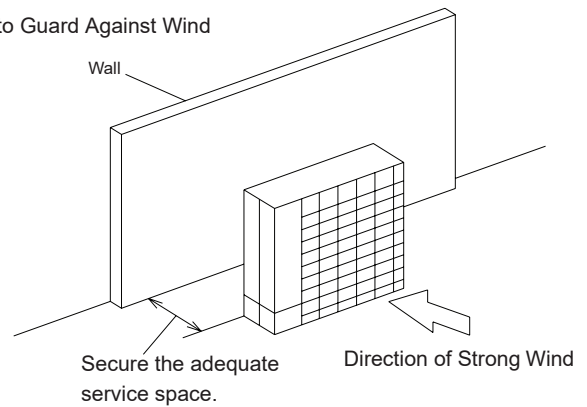


- In case of installation in the open spaces unavoidably where there is no buildings or surrounding structures, install near the wall to avoid facing the wind directly.
- Ensure that the service space should be secured.

⚠ DANGER

- Install the unit with sufficient clearance around it for operation and maintenance. Install the unit where good ventilation is available.
- For cleaning, use nonflammable and nontoxic cleaning liquid. Use of inflammable agent should cause explosion or fire.
- Work with sufficient ventilation, for working in an enclosed space should cause oxygen deficiency. Toxic gas should be produced when cleaning agent is heated to high temperature by e.g., being exposed to fire.
- Install the unit in a location where noise emitted by the unit does not disturb neighbours.
- Cleaning liquid shall be collected after cleaning.
- Pay attention not to clamp cables when attaching the service cover to avoid electric shock or fire.

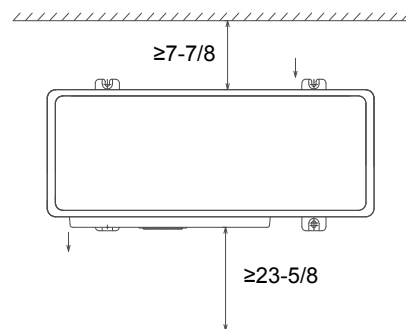
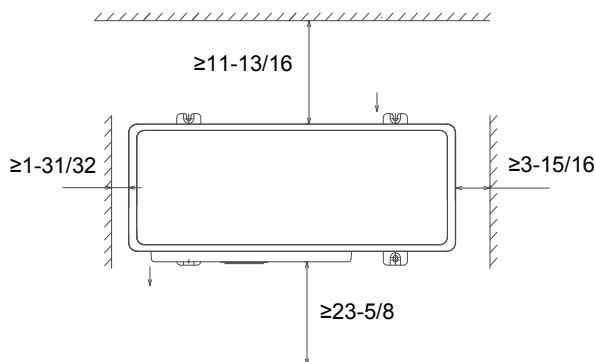
A Wall to Guard Against Wind



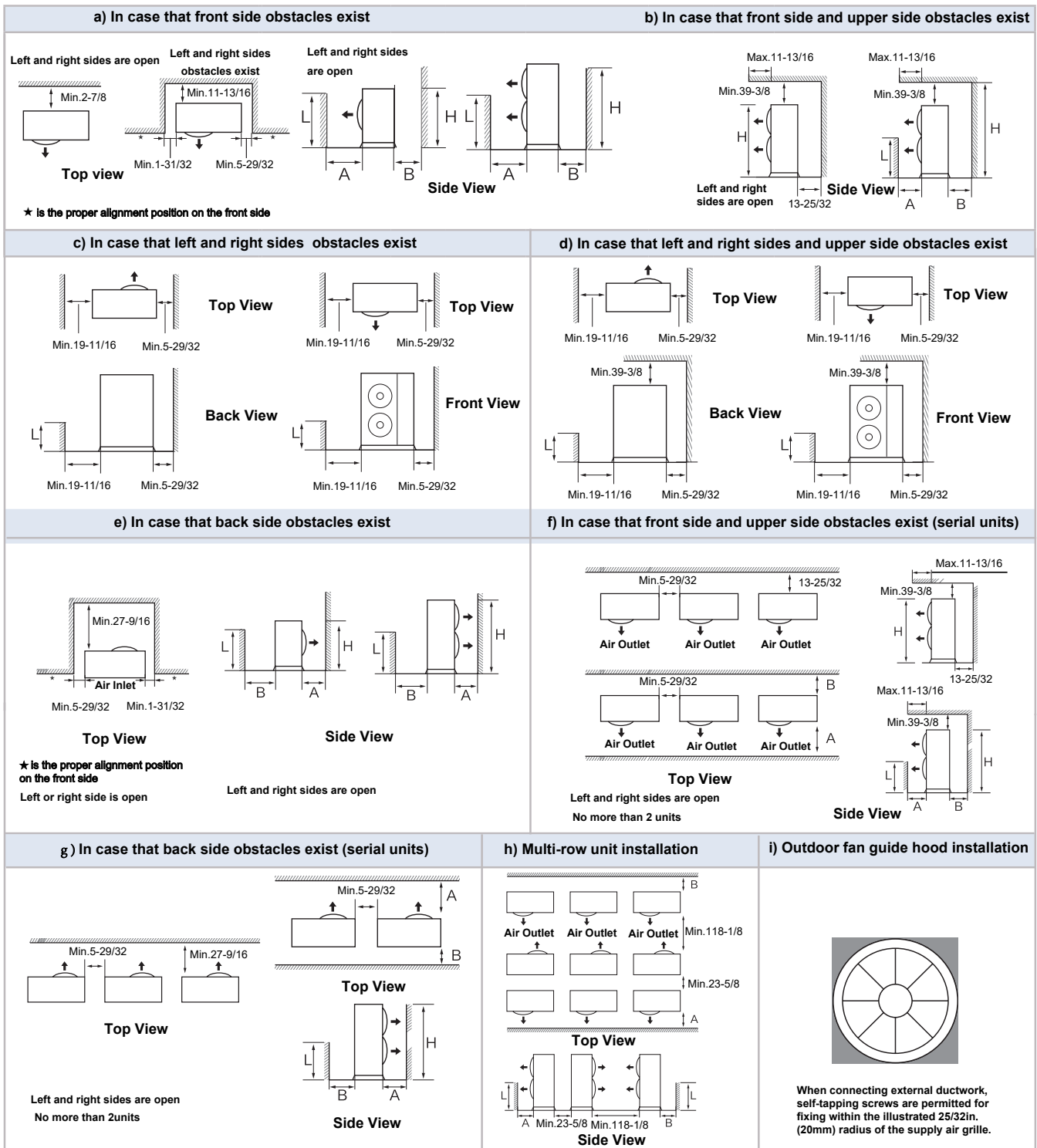
NOTE:

If the extreme strong wind blows directly against the air discharge portion, the fan may rotate reversely and be damaged.

7.1 INSTALLATION SPACE



UNIT INSTALLATION



Note: Shaded and thick solid lines in the diagram above represent walls (obstacles)

L	A in(mm)	B in(mm)
$0 < L \leq 1/2H$	$\geq 23-5/8(600)$	$\geq 11-13/16(300)$
$1/2H < L \leq H$	$\geq 55-1/8(1400)$	$\geq 13-25/32(350)$

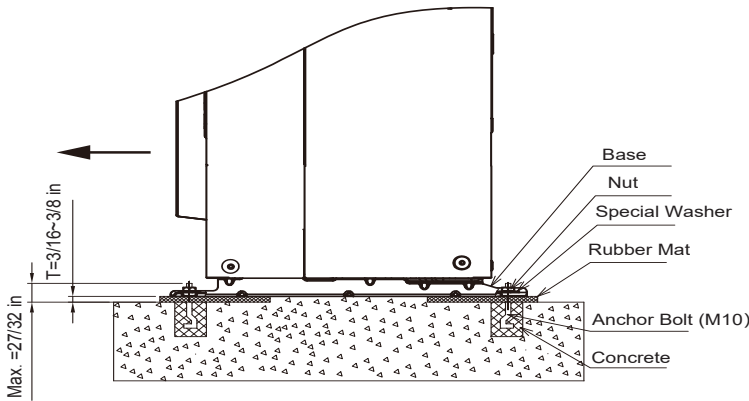
i NOTE

- If L is greater than H , install the outdoor unit on the foundation, so that H is greater than or equal to L . H : Outdoor unit height + foundation height.
- Do not stack more than two units in height.
- In all cases, short circuit of air flow is not allowed.
- Check the installation requirement in Installation Manual for Air Outlet Guide(SH-SFA2D) or Wind Guard(SH-SFA2F) in case of optional parts (Air Outlet Guide or Wind Guard) are applied.

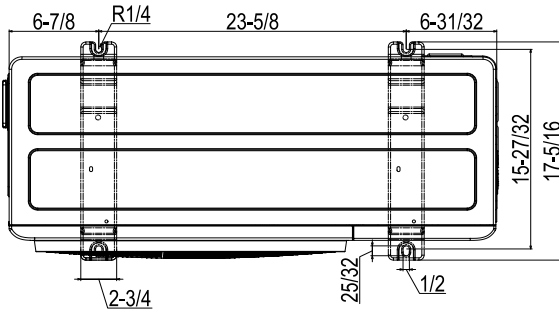
UNIT INSTALLATION

7.2 INSTALLATION PLACE PROVISION

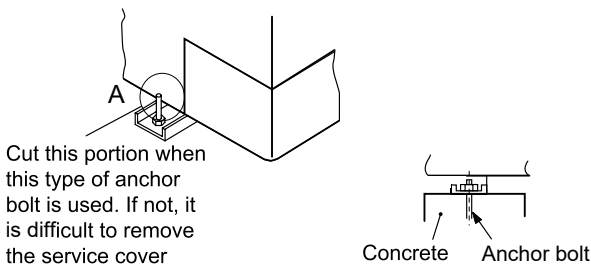
- Secure the outdoor unit with the anchor bolts.



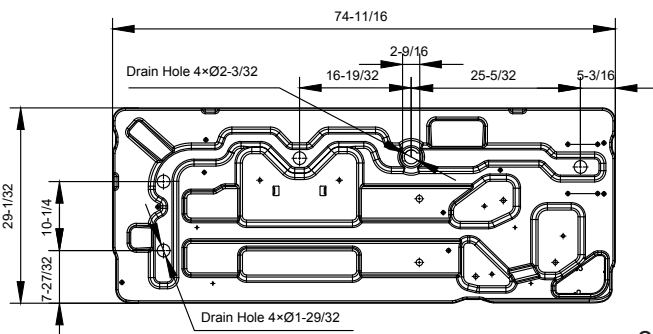
- Fix the outdoor unit to the anchor bolts by field-supplied special washer.
- When installing the outdoor unit, fix the unit by anchor bolts. Regarding the location of fixing holes



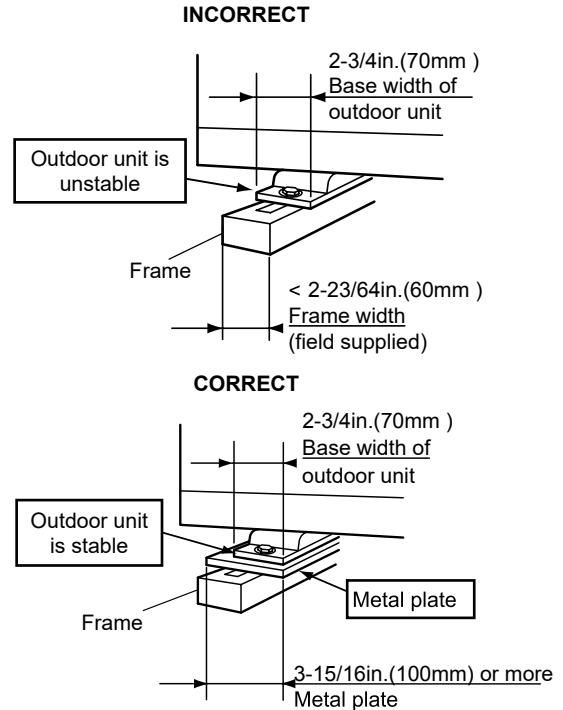
- Example of fixing outdoor unit by anchor bolts.



- When installing the unit on a roof or a veranda, drain water may turn to ice in a cold morning. Therefore, avoid draining in an area where people often use because it is slippery. In case of installing in such a place, provide the additional drainage around the foundation.

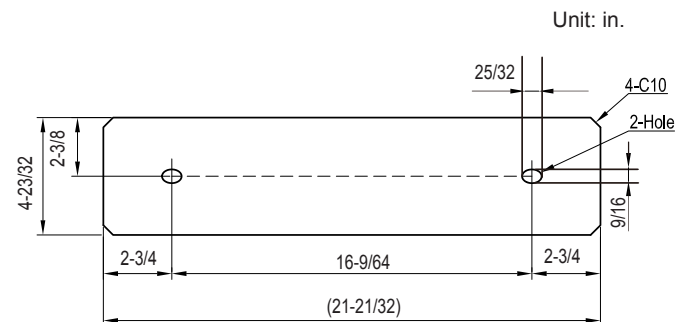


- The whole of the base of the outdoor unit should be installed on a foundation. When using vibration-proof mat, it should also be positioned in the same way. When installing the outdoor unit on a field-supplied frame, use metal plates to adjust the frame width for stable installation as shown in figure.



Recommended metal plate size (field-supplied)

- Material: Hot-rolled mild steel plate (SPHC)
- Plate thickness: 4.5T



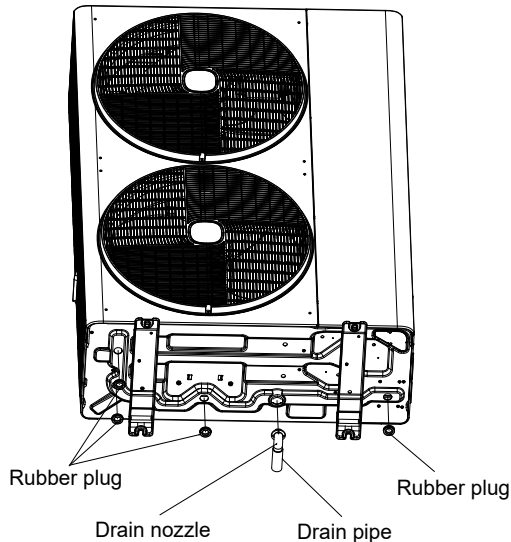
Unit: in.

REFRIGERANT PIPING WORK

7.3 DRAIN PIPING

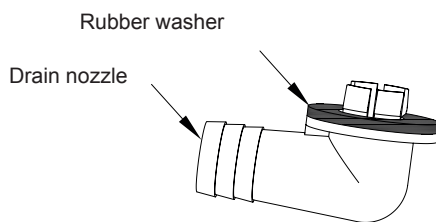
When the base of the outdoor unit is temporarily utilized as a drain receiver and the drain water in it is discharged, one drain nozzle is needed.

The drain nozzle should be inserted into the base of the outdoor unit up to the extruded portion. In addition, use four rubber plugs to block the remaining 4 drain outlets if necessary.



i NOTE

- The drain nozzle is factory-supplied with a rubber washer.



- A drain pipe (inner diameter: 19/32in. (15mm)) should be field-supplied.
- Do not use this drain nozzle in a cold area, because the drain water may freeze.
- The rubber plug is factory-supplied.
- Please install the drain nozzle and rubber plug before the refrigerant piping work.

8. REFRIGERANT PIPING WORK

! DANGER

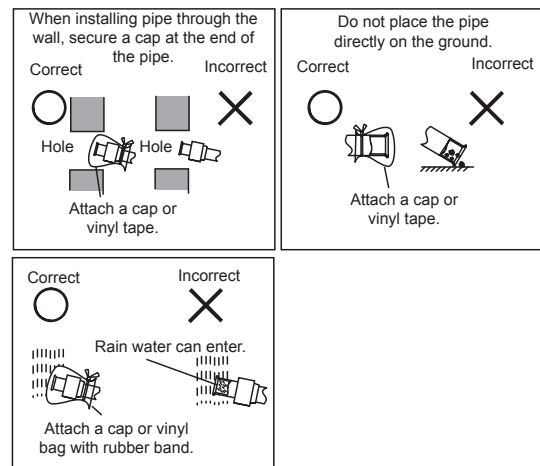
Use refrigerant R32 in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tightness test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.

8.1 PIPING MATERIALS

- Prepare locally-supplied copper pipes.
- Select the piping size from Table 8.1.
- Select clean copper pipes. Make sure there is no dust and moisture inside of the pipes. Blow the inside of the pipes with nitrogen or dry air, to remove any dust or foreign materials before connecting pipes.

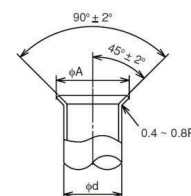
i NOTE

- Cautions for Refrigerant Pipe Ends



! CAUTION

- Cap the end of the pipe when the pipe is to be inserted through a hole.
- Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe.
- Flaring Dimensions



Diameter Φd	in.(mm)
	A ⁺⁰ -1/64(0.4)
1/4 (6.35)	23/64 (9.1)
3/8 (9.53)	17/32 (13.2)
1/2 (12.7)	21/32 (16.6)
5/8 (15.88)	25/32 (19.7)

REFRIGERANT PIPING WORK

- Piping Thickness and Material

Use the pipe as below.

Table 8.1 Piping Size

Diameter	R32	
	Thickness	Material
Φ1/4 (Φ6.35)	1/32 (0.8)	○
Φ3/8 (Φ9.53)	1/32 (0.8)	
Φ1/2 (Φ12.7)	1/32 (0.8)	
Φ5/8 (Φ15.88)	3/64 (1.0)	

Material is based on a JIS standard (JIS B8607).

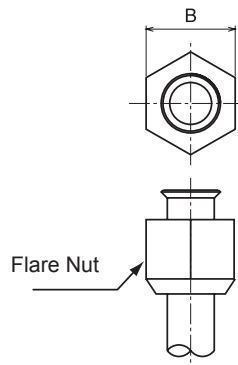
- Flare Nut Dimension

Use the flare nut as below.

<Flare Nut Dimension B> in.(mm)

Diameter	R32
Φ1/4 (Φ6.35)	43/64 (17)
Φ3/8 (Φ9.53)	55/64 (22)
Φ1/2 (Φ12.7)	1-1/32 (26)
Φ5/8 (Φ15.88)	1-9/64 (29)

Dimension is based on a JIS standard (JIS B8607).



8.2 REFRIGERANT PIPING WORK

Ensure that the directions for refrigerant piping work according to the tables.

Table 8.2 Limitation of outdoor unit

Capacity (KBtu/h)	Outer diameter of pipe		Maximum piping length	Branch pipe for Indoor Unit
	Gas Line	Liquid Line		
CHV6-RS36URBMHH	Φ5/8 in. (Φ15.88mm)	Φ3/8 in. (Φ9.53mm)	Max.Total pipe length≤ 591ft. (180m)	SPBPK-052HP or SPBPK-102HP
CHV6-RS48URBMHH				
CHV6-RS60URBMHH				

Table 8.3 Indoor unit pipe model

Unit capacity (KBtu/h)	Gas pipe	Liquid pipe
05~14	Φ12.7 (1/2)	Φ6.35 (1/4)
17~18	Φ15.88 (5/8)	Φ6.35 (1/4)
22~54	Φ15.88 (5/8)	Φ9.53 (3/8)

8.3 PIPING CONNECTION

Pipes can be connected from 3 directions.

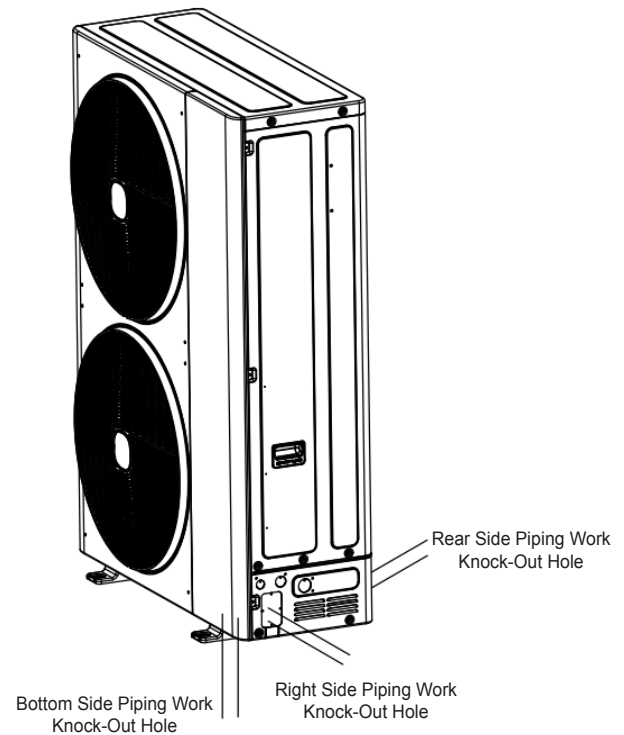
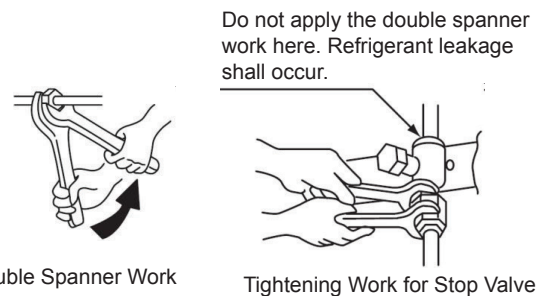
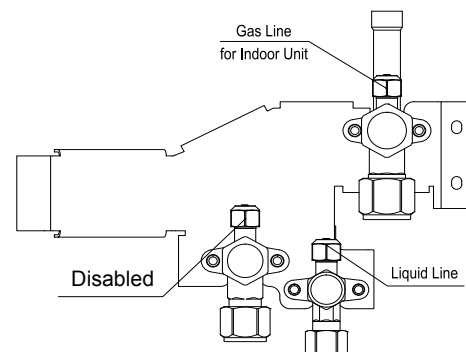


Fig. 8.1 Piping direction

- (1) Confirm that the valve is closed.
- (2) Prepare a field-supplied elbows and pipes. According to the operation requirements for connecting by braze and flare nuts.
- (3) For the pipe connection at the stop valve, use two spanners to tighten the nut.



- (4) The pipe connection of indoor unit is shown in the figure below.



REFRIGERANT PIPING WORK

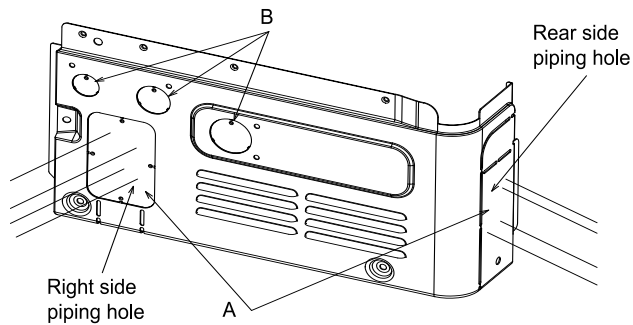
- (4) Pipes can be connected from 3 directions as shown Fig. 8.1. Make a knock-out hole in the right base to pass through the hole.

After removing the pipe cover from the unit, punch out the holes following the guide line with screwdriver and a hammer.

Then, cut the edge of the holes and attach insulation (Field-Supplied) for cables and pipes protection.

(a) Connect Back and Right Side Pipe

Select the correct knock-out size depending on whether it is for power wiring or transition wiring.

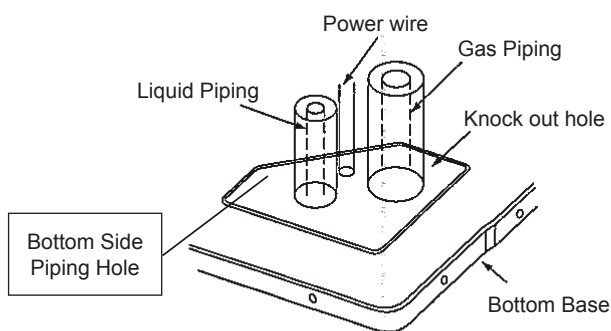


NOTE:

When using conduit, check to the tube size before removing "B" part.

(b) Bottom Side Piping Work

After removing bottom of the piping cover, perform piping and wiring works.



NOTE:

Prevent the cables from coming into direct contact with the piping.

- (5) To prevent gaps, use a rubber bush and insulation (Field-Supplied) adequately when installing the piping cover. Cut the lower side guide line of the piping cover when attaching work is difficult. If not, it will be included water in the unit and electrical parts will be damaged.

- (6) Use a pipe bender or elbow (Field-Supplied) for bending work when connecting pipe.

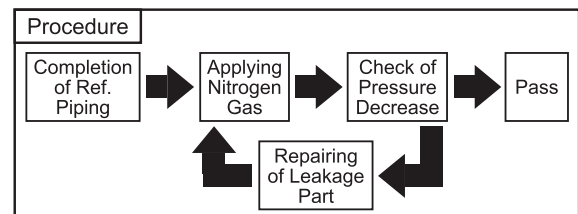
8.4 AIR-TIGHTNESS TEST

- (1) The stop valve has been closed before shipment, however, make sure that the stop valves are closed completely.
- (2) Connect the indoor unit and the outdoor unit with field-supplied refrigerant piping. Suspend the refrigerant piping at certain points and prevent the refrigerant piping from touching the weak part of the building such as wall, ceiling, etc.
(If touched, abnormal sound may occur due to the vibration of the piping. Pay special attention in case of short piping length.)
- (3) Apply the oil thinly at the seat surface of the flare nut and pipe before tightening.

And when tightening the flare nut, use two spanners.

Refrigerant oil is field-supplied.

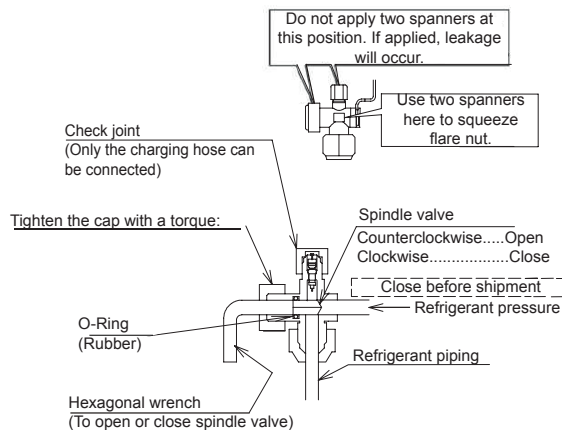
[Model: FW68S (Ether Oil)
Manufacturer: IDEMITSU KOSAN Co., Ltd.]



REFRIGERANT PIPING WORK

(4) Stop Valve

Operation of the stop valve should be performed according to the below.



CAUTION

- Do not apply an abnormal big force to the spindle valve at the end of opening (3.7lbs.·ft.(5.0N·m) or smaller). The back seat construction is not provided.
- Do not loosen the O-ring. If the O-ring is loosened, it is dangerous, since the spindle will hop out.
- At the test run, fully open the spindle. If not fully opened, the devices will be damaged.

- (5) Connect the gauge manifold using charging hoses with a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves.

Perform the air-tightness test.

Do not open the stop valves. Apply nitrogen gas pressure of 624psi(4.3MPa).

- (6) Check for any gas leakage at the flare nut connections, or brazed parts by gas leak detector or foaming agent.

- (7) After the air tightness test, release nitrogen gas.

8.5 VACUUM PUMPING AND CHARGE REFRIGERANT

- (1) Connect a manifold gauge to the check joints at the both sides. Continue vacuum pumping work until the pressure reaches -14.5psi(-0.1MPa/756mmHg) or lower for one to two hours.

- (2) After vacuum pumping work, stop the manifold valve, stop the vacuum pump and leave it for one hour. Check to ensure that the pressure in the manifold gauge does not increase.

- (3) Fully open the Gas stop valve and Liquid stop valve,

- (4) Add refrigerant according to the piping diameter and piping length in the field connecting.

- (5) Check for any gas leakage by gas leak detector or forming agent. Use the foaming agent which does not generate the ammonia (NH₃) by chemical reaction. The recommended forming agent are as shown below. Do not use general household detergent for checking.

Foaming Agent	Manufacturer
SNOOP	NUPRO (U.S.A.)
Gupoflex	YOKOGAWA & CO., LTD

NOTES:

1. When the spindle cap for stop valve is removed, the gas accumulated at O-ring or screws is released and may make sound. This phenomenon is NOT a gas leakage.

2. This unit is only for the refrigerant R32. The manifold gauge and the charging hose should be exclusive use for R32

3. If vacuum degree of -14.5psi(-0.1MPa/756mmHg) is not available, it is considered of gas leakage or entering moisture. Check for any gas leakage once again. If no leakage exists, operate the vacuum pump for more than one to two hours.

After vacuum pumping, check that the Gas stop valve for Indoor Unit and Liquid stop valve are completely closed, Charge additional refrigerant (tolerance: 1.1lbs.

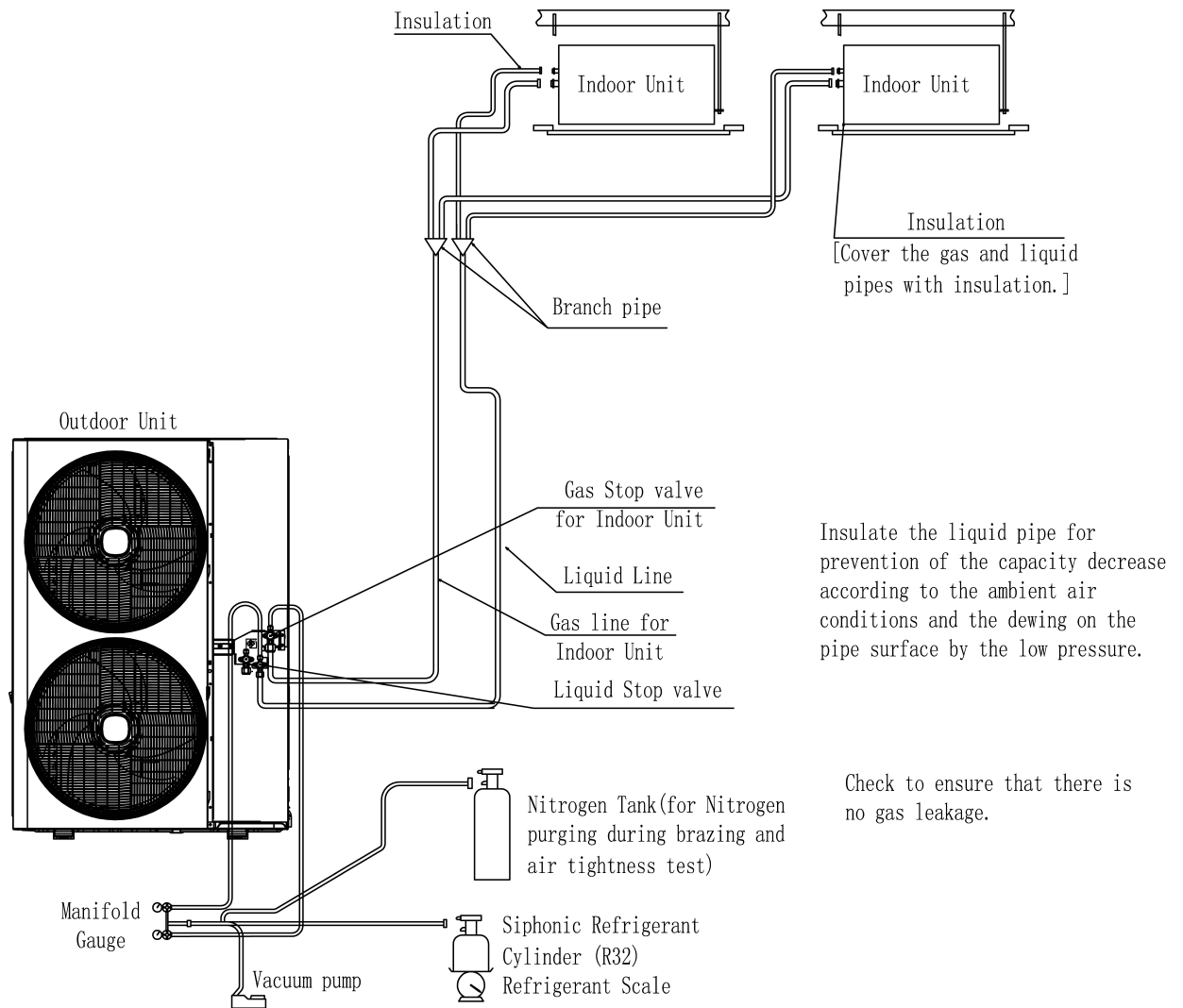
(0.5kg)) from the check joint of liquid stop valve. If the specified refrigerant quantity can not be charged, follow the procedure below.

(1) Fully open stop gas valve and liquid stop valve, (2) Operate the compressor in cooling mode and charge refrigerant (tolerance: 1.1lbs.(0.5kg)) from the check joint of the liquid stop valve. At this time, the liquid stop valve is slightly opened.

After refrigerant charge, fully open the stop valve for both liquid and gas sides.

REFRIGERANT PIPING WORK

Never use the refrigerant charged in the outdoor unit for air purging. Insufficient refrigerant will lead to failure.



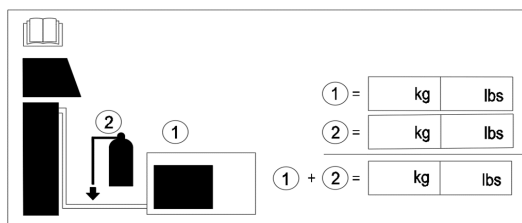
CAUTION

- At the test run, fully open the spindle. If not, the devices will be damaged.
- Refrigerant charging from check joint of Gas stop valve may lead to compressor failure. Be sure to charge refrigerant from the check joint of liquid stop valve.
- Insulate the liquid piping and gas piping completely to avoid decreasing of performance and dewing on the surface of the pipe.
- An excess or a shortage of refrigerant is the main cause of trouble to the units.
- Insulate the flare nut and union of the piping connection with insulation.
Charge the correct refrigerant quantity according to the description of label at the inside of service cover.
- Check for refrigerant leakage carefully.
- Contact with fire can produce harmful gases, so it is necessary to extinguish the open flame.
- Since this refrigerant gas is heavier than air, it may result in lack of oxygen, thereby leading to breathing difficulties when the area near the ground is filled with this gas. If that's the case, please turn off the main switch immediately, cut off the power supply, and open the doors and windows for ventilation.

REFRIGERANT PIPING WORK

NOTE

Fill in the table attached to the unit with the amount of refrigerant charged during installation.



① =	kg	lbs
② =	kg	lbs
① + ② =	kg	lbs

DANGER

- Only use R32 as refrigerant. Other substances may cause explosions and accidents.
- R32 is fluorinated greenhouse gases. Its global warming potential (GWP) value is 675. Do NOT vent these gases into the atmosphere.

8.6 CAUTION OF THE PRESSURE BY CHECK JOINT

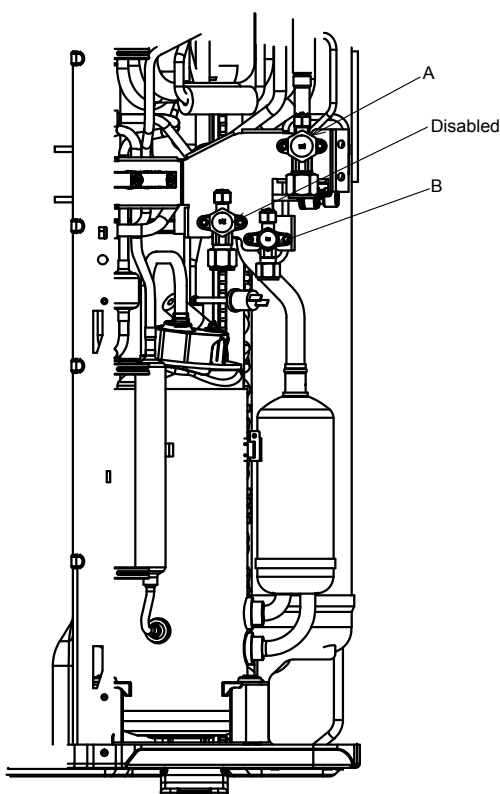
When the pressure is measured, use the check joint of gas stop valve ((A) in the figure below) and use the check joint of liquid piping (B) in the figure below) .

At that time, connect the pressure gauge according to the following table because of high pressure side and low pressure side changes by operation mode.

	Cooling Operation	Heating Operation
Check Joint for Gas Stop Valve "A"	Low Pressure	High Pressure
Check Joint for Liquid Stop Valve "B"	Exclusive for Vacuum Pump and Refrigerant Charge	

NOTE:

Be careful that refrigerant and oil do not splash to the electrical parts at removing the charge hoses.



9. ELECTRICAL WIRING



WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit and wait for more than 10 minutes before electrical wiring work or a periodical check is performed.
- Check to ensure that the indoor fan and the outdoor fan have stopped before electrical wiring work or a periodical check is performed.
- Protect the wires, electrical parts, etc. from rats or other small animals. If not protected, rats may gnaw at unprotected parts and at the worst, a fire will occur.
- Avoid the wirings from touching the refrigerant pipes, plate edges and electrical parts inside the unit.
If not do, the wires will be damaged and at the worst, a fire will occur.



CATION

- Tightly secure the power source wiring using the cord clamp inside the unit.

9.1 GENERAL CHECK

- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data.
Make sure that the components comply with National Electrical Code (NEC).
- (2) Check to ensure that the voltage of power supply is within $\pm 10\%$ of nominal voltage and earth phase is contained in the power supply wires. If not, electrical parts will be damaged.
- (3) Check to ensure that the capacity of power supply is enough.
If not, the compressor will be not able to operate cause of voltage drop abnormally at starting.
- (4) Check to ensure that the earth wire is connected.

- (5) Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts.

If not, do not operate the system until the electrical leakage is found and repaired.

9.2 ELECTRICAL WIRING CONNECTION

- (1) Connect the power supply wires to the terminal board in the electrical control box of both outdoor unit and indoor unit. And connect the earth wire to the electrical control box of outdoor unit. In addition, connect the earth wire to earth screw in the electrical control box of indoor unit. Refer to Fig. 9.1
- (2) Connect the wires between the outdoor and indoor units to terminals 1 and 2 on the terminal board. If power supply wiring is connected to 1 and 2 of terminal board, printed circuit board will be damaged.

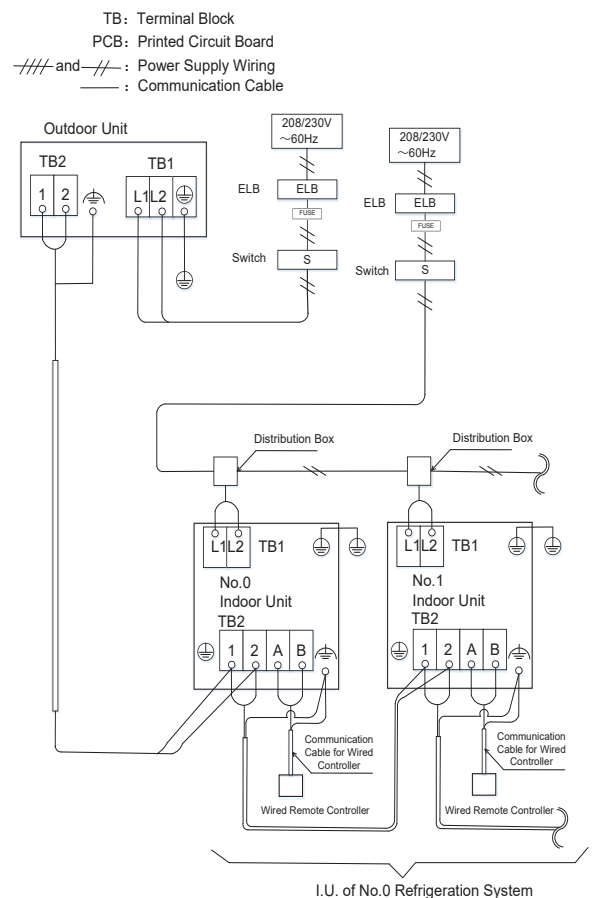


Fig. 9.1 (a) Wiring connection for indoor & outdoor

ELECTRICAL WIRING

- (3) Do not wire in front of the fixing screw of the service panel. If do, the screw can not be removed.
- (4) Use twist pair cable with shielded for control between outdoor unit and indoor unit, control wiring between indoor units, wiring (1 and 2) for wired controller and communication cable (A and B) for wired controller.

NOTE

1. In case of total wiring length at intermediate wiring between outdoor unit and indoor unit and between indoor units is less than 328ft.(100m), it is possible to use the normal wiring (more than AWG18(0.75mm²)) except shielded twist pair.
2. Total wiring length for wired controller can be extended up to 1640ft. (500m).
If total wiring length less than 98ft.(30m), it is possible to use the normal wiring AWG22(0.3mm²) except shielded twist pair.
3. Power supply wiring is fundamentally according to this method.
4. Do not touch electrical parts with your hands, as there is a risk of electric shock;
5. It is forbidden to use the terminal block of air conditioner power supply to extend power line to other indoor units .
6. Use the power distribution box to extend the power supply wiring on the inner side of the air conditioner. Pay attention to the wiring capacity calculation, otherwise, the wiring capacity is too small and a fire may break out.

WARNING

Install an ELB in the power source. If ELB is not used, it will cause electric shock or fire at the worst. The tightening torque of each screw shall be as follows.

M4: 0.7 to 1.0 ft.·lbs.(1.0 to 1.3 N·m)

M5: 1.5 to 1.8 ft.·lbs.(2.0 to 2.5 N·m)

M6: 3.0 to 3.7 ft.·lbs.(4.0 to 5.0 N·m)

M8: 6.6 to 8.1 ft.·lbs.(9.0 to 11.0 N·m)

M10:13.3 to 17.0 ft.·lbs.(18.0 to 23.0 N·m)

Keep the above tightening torque when wiring work.

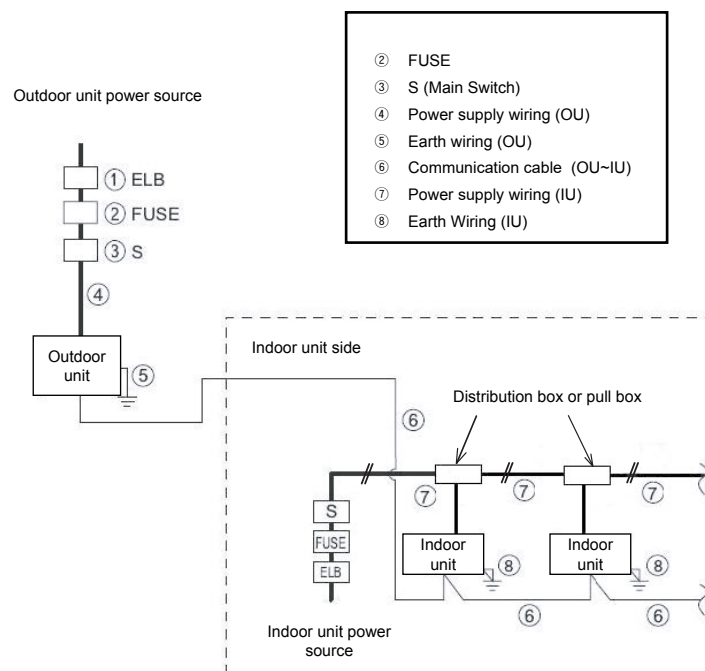


Fig. 9.2(a) Wiring connection (1 PH 208/230V 60Hz)

ELECTRICAL WIRING

7. The recommended fuse sizes etc. are shown in Table 9.1.

8. In the case that a conduit tube for field-wiring is not used, fix rubber bushes with adhesive on the panel.

Table 9.1 Electrical Data and Recommended Wiring, Fuse Size

Model	Outdoor Unit					Wiring Size			ELB	
	Hz (Hz)	Voltage (V)	MCA (A)	MOP (A)	Fuse (A)	Power Supply Cable (AWG)	Earth Wring (AWG)	Communication Cable (AWG)	Nominal Current(A)	Nominal Sensitive Current(mA)
CHV6-RS36URBMHH	60	208/230	30.3	40	40	10	10	18	40	30
CHV6-RS48URBMHH	60	208/230	40.9	50	50	8	8	18	50	30
CHV6-RS60URBMHH	60	208/230	44.0	60	60	6	6	18	60	30

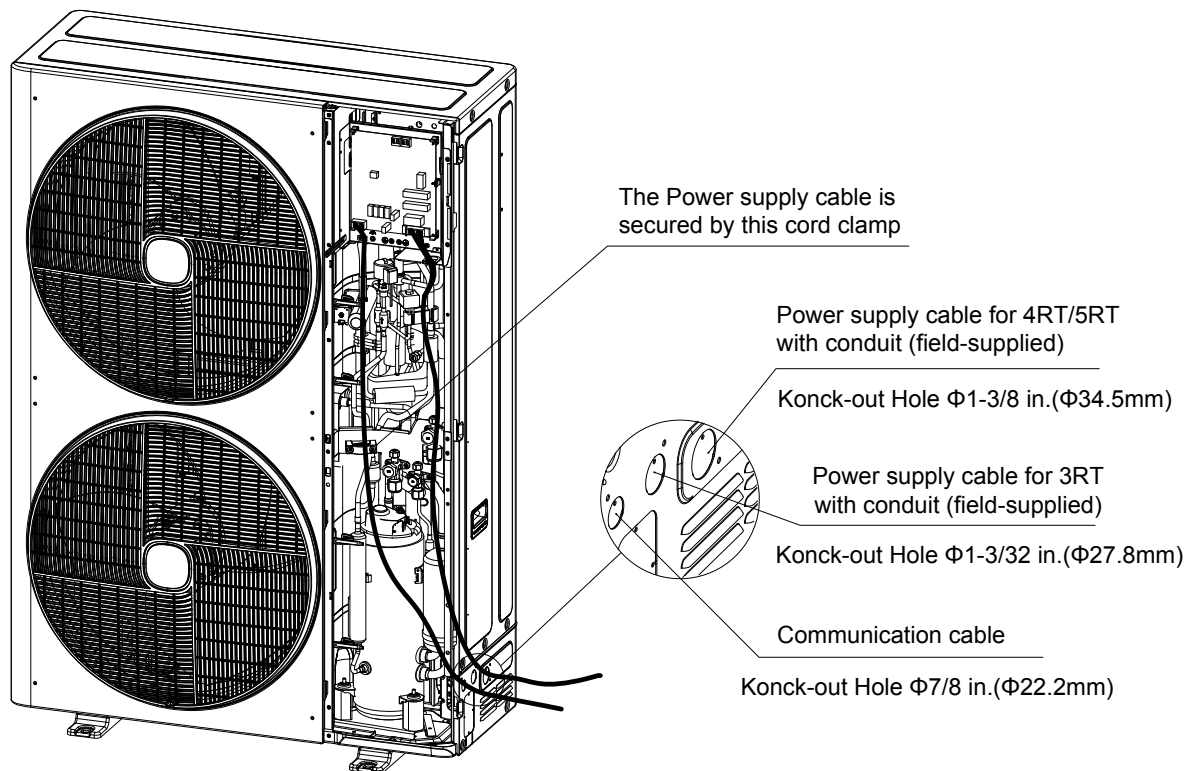
MCA: Minimum Circuit Ampacity (A)

MOP: Maximum Overcurrent Protective Device (A)

ELB: Earth Leakage Breaker

NOTES:

- Field wiring shall conform to local laws and regulations, and all wiring operations must be performed by qualified professionals.
- Refer to relevant standards for noted power supply cable size.
- Power supply cable selection shall be compliant with requirements stated in UL62 and C22.2 No.49, while the power cord shall be made from copper conductor.
- The wiring specifications for weak-current communication loop shall comply with local regulations, and the shielding layer needs to be earthed.
- Ensure communication cable is a minimum of AWG18 (0.82mm²), 2-Conductor, Stranded Copper.
- A switch that can ensure all-pole disconnection shall be installed between power supply and air conditioning unit in such a manner that the contact spacing shall not be less than 1/8 in. (3mm).
- Once the power supply cable is damaged, the dealer or the professionals from designated maintenance department must be contacted in a timely manner for repair and replacement.
- For the installation of power supply cable, the earth wire must be longer than the current-carrying conductor.
- Select appropriate sized breakers / fuses / overcurrent protection switches and wiring according to Table 9.1 and local codes. Select power supply cable size based on the value of the MCA.



- Inner view:

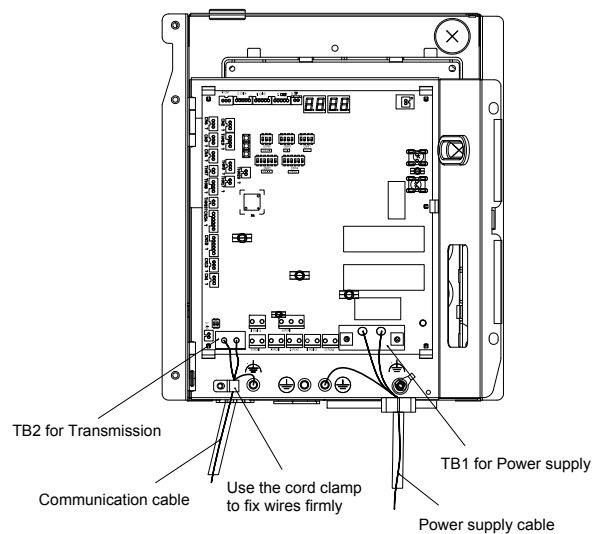


Fig. 9.3 Wiring Connection of outdoor unit

■ Field Minimum Wire Sizes for Power Source of Indoor Unit

- Connect correct series indoor unit.
- Use an ELB (Earth Leakage Breaker). If not used, it will cause an electric shock or a fire.
- Do not operate the system until all the check points

⚠ CAUTION

Install a multi-pole main switch with a space of $1/8\text{in.}$ (3.0mm) or more between each phase.

COMMON

10. COMMON

CAUTION

DIP switch must be set with power sources in OFF state. Otherwise, the settings are invalid. However, DSW1-No. 1 and 2 can work when power supply is ON.

(1) Test Operation and Service Setting (DSW1)

DSW4 Test Operation and Service Setting		
Setting Before Shipment	Test Cooling Operation	Test Heating Operation
ON  OFF	ON  OFF	ON  OFF

(2) Optional Function Setting (DSW2)

Setting is required.		
Setting Before Shipment		
		
	Setting Item	Pin No.
1	Function Setting	ON  OFF
2	External Input/Output Setting	ON  OFF
3	Function Setting for Wind Guard	ON  OFF

(3) Capacity Code Setting (DSW3)

No setup is required.

The code is set before shipment. This switch is used to set the capacity of outdoor unit.

(4) Ref. System No. Setting (DSW4)

In the same refrigerant cycle, set the same refrigerant cycle No. for the outdoor unit and the indoor unit.

Setting Method 1	DSW4 (Setting 0~63)	Ex.) Set machine number 16
	 ON OFF Note: 8421 coding method	 ON OFF

DSW4 is set to "0" before shipment; Maximum refrigerant cycle No. is 63.

(5) Communication Setting (DSW5)

No setup is required.

The code is set before shipment.

(6) Other Setting (DSW6)

No setup is required.

The code is set before shipment. This switch is used to set the capacity of outdoor unit.

NOTE

Symbol "■" indicates the location of DIP switch.

The position indicated in the diagram is in the factory-set state.

Table 10.1 8421 Coding Method

Decimal number	8421 code					
	1	2	3	4	5	6
0	○	○	○	○	○	○
1	●	○	○	○	○	○
2	○	●	○	○	○	○
3	●	●	○	○	○	○
4	○	○	●	○	○	○
5	●	○	●	○	○	○
6	○	●	●	○	○	○
7	●	●	●	○	○	○
8	○	○	○	●	○	○
9	●	○	○	●	○	○
10	○	●	○	●	○	○
11	●	●	○	●	○	○
12	○	○	●	●	○	○
13	●	○	●	●	○	○
14	○	●	●	●	○	○
15	●	●	●	●	○	○
16	○	○	○	○	●	○
17	●	○	○	○	●	○
18	○	●	○	○	●	○
19	●	●	○	○	●	○
20	○	○	●	○	●	○
21	●	○	●	○	●	○
22	○	●	●	○	●	○
23	●	●	●	○	●	○
24	○	○	○	●	●	○
25	●	○	○	●	●	○
26	○	●	○	●	●	○
27	●	●	○	●	●	○
28	○	○	●	●	●	○
29	●	○	●	●	●	○
30	○	●	●	●	●	○
31	●	●	●	●	●	○
32	○	○	○	○	○	●
33	●	○	○	○	○	●
34	○	●	○	○	○	●
35	●	●	○	○	○	●
36	○	○	●	○	○	●
37	●	○	●	○	○	●
38	○	●	●	○	○	●
39	●	●	●	○	○	●

40	○	○	○	●	○	●
41	●	○	○	●	○	●
42	○	●	○	●	○	●
43	●	●	○	●	○	●
44	○	○	●	●	○	●
45	●	○	●	●	○	●
46	○	●	●	●	○	●
47	●	●	●	●	○	●
48	○	○	○	○	●	●
49	●	○	○	○	●	●
50	○	●	○	○	●	●
51	●	●	○	○	●	●
52	○	○	●	○	●	●
53	●	○	●	○	●	●
54	○	●	●	○	●	●
55	●	●	●	○	●	●
56	○	○	○	●	●	●
57	●	○	○	●	●	●
58	○	●	○	●	●	●
59	●	●	○	●	●	●
60	○	○	●	●	●	●
61	●	○	●	●	●	●
62	○	●	●	●	●	●
63	●	●	●	●	●	●

11. TEST RUN

Test run should be performed according to Table 11.1. And use the Table 11.2 for recording test run.

WARNING

- *Do not operate the system until all the check points have been cleared.*
 - (A) *Check and confirm Refrigerant pipe system and communication wire link to same Refrigerant cycle system.*
 - (B) *Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.*
 - (C) *Check to ensure that the stop valves of the outdoor unit are fully opened, and then start the system.*
 - (D) *Check to ensure that the switch on the main power source has been ON for more than 1 hours, to warm the compressor oil by the oil heater.*
- *Pay attention to the following items while the system is running.*
 - (A) *Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 90°C.*
 - (B) *DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES). It will cause a serious accident.*
- *Do not touch any electrical components for more than 10 minutes after turning OFF the main switch.*
- *Operate every indoor unit one by one, check and confirm their refrigerant cycle and connect wire joint to same refrigerant cycle system.*

Table 11.1 Checking of Wire Connection by Test Run

When test run with wired controller, please refer to the manual of the wired controller for test run method.

- (1) Turn ON the power supply for all the indoor units.
- (2) For the models with the auto-address function, wait for 3 minutes approximately. The addressing is automatically performed.
(There is a case that 5 minutes is required according to the setting condition.) After that, select using language from menu.
- (3) Enter the test run mode.
 - a. The test run menu will be displayed.
 - b. The test run settings will be displayed.
 - c. Set the test run parameters, such as mode, fan speed, running time.
- (4) To finish the test run, press "run/stop" again or pass over the set test run time.

TEST RUN

Table 11.2 Test Run and Maintenance Record

MODEL:	SERIAL No.	COMPRESSOR MFG. No.
CUSTOMER'S NAME AND ADDRESS:	DATE:	

1. Is the rotation direction of the indoor fan correct? ☐
2. Is the rotation direction of the outdoor coil fan correct? ☐
3. Are there any abnormal compressor sounds? ☐
4. Has the unit been operated at least twenty (20) minutes? ☐
5. Check room temperature

Inlet:	No. 1 DB	/WB	°F	No. 2 DB	/WB	°F	No. 3 DB	/WB	°F	No. 4 DB	/WB	°F
Outlet:	DB	/WB	°F	DB	/WB	°F	DB	/WB	°F	DB	/WB	°F
6. Check Outdoor Ambient Temperature

Inlet: DB _____ °F,	WB _____ °F
Outlet: DB _____ °F,	WB _____ °F
7. Check refrigerant temperature

Liquid temperature: _____ °F	
Discharge gas temperature: _____ °F	
8. Check pressure

Discharge pressure: _____ psi	
Suction pressure: _____ psi	
9. Check voltage

Rated voltage: _____ V	
Operating voltage: _____ V	
Starting voltage: _____ V	
10. Check compressor input running current

Input: _____ kW	
Running current: _____ A	
11. Is the refrigerant charge adequate? ☐
12. Do the operation control devices operate correctly? ☐
13. Do the safety devices operate correctly? ☐
14. Has the unit been checked for refrigerant leakage? ☐
15. Is the unit clean inside and outside? ☐
16. Are all cabinet panels fixed? ☐
17. Are all cabinet panels free from rattles? ☐
18. Is the filter clean? ☐
19. Is the heat exchanger clean? ☐
20. Are the stop valves open? ☐
21. Does the drain water flow smoothly from the drain pipe? ☐

12. SAFETY AND CONTROL DEVICE SETTING

- Compressor Protection

High Pressure Switch: This switch cuts out the operation of the compressor when the discharge pressure exceeds the setting.

- Fan Motor Protection

When the thermistor temperature is reached to the setting, motor output is decreased.

The other way, when the temperature becomes lower, limitation is cancelled.

Outdoor unit model (KBtu/h)		CHV6-RS36URBMHH	CHV6-RS48URBMHH	CHV6-RS60URBMHH
Pressure switch high pressure		Automatic Reset, Non-Adjustable		
Cut-Out	MPa	4.3	4.3	4.3
Cut-In	MPa	3.8	3.8	3.8
Fuse on Main Circuit	A	63	63	63
CCP Timer Set Time	min.	3	3	3
Control Circuit Fuse	A	5	5	5



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