



# *Installation & Maintenance Manual*

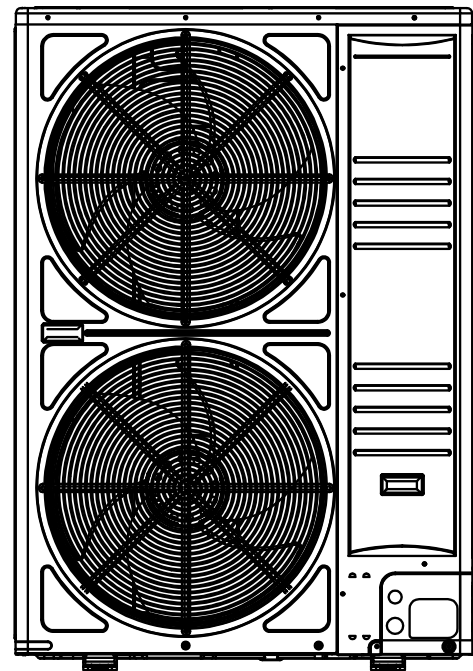
*VRF AIR-CONDITIONER  
(HEAT PUMP)  
OUTDOOR UNIT*

## **- Outdoor Units -**

MODEL
CHV6-36URBM
CHV6-48URBM
CHV6-60URBM

### **IMPORTANT:**

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



ORIGINAL INSTRUCTIONS

## IMPORTANT NOTICE

- 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.
- This heat pump air conditioner is designed for standard air conditioning only. Do not use this heat pump air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process.
- The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available.
- No part of this manual may be reproduced without written permission.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.



: Immediate hazards which WILL result in severe personal injury or death.



: Hazards or unsafe practices which COULD result in severe personal injury or death.



: Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.

### NOTE

: Useful information for operation and/or maintenance.

- It is assumed that this heat pump air conditioner will be operated and serviced by English speaking people. If this is not the case, the distributor should add safety, caution and operating signs in the native language.
- If you have any questions, contact your distributor or dealer of our company.
- This manual gives a common description and information for this heat pump air conditioner which you operate as well as for other models.
- Install these air conditioners by local regulations or standards.
- This heat pump air conditioner has been designed for the following temperatures. Operate the heat pump air conditioner within this range .

Temperature

		Maximum	Minimum
Cooling Operation	Indoor	90°F DB / 73°F WB (32°C DB / 23°C WB)	70°F DB / 59°F WB (21°C DB / 15°C WB)
	Outdoor	114°F DB (46°C DB)	23°F DB (-5°C DB)
Heating Operation	Indoor	86°F DB (30°C DB)	59°F DB ( 15°C DB)
	Outdoor	60°F WB (15.5°C WB)	-4°F WB (-20°C WB)

DB: Dry Bulb, WB: Wet Bulb

- The air-conditioning installation, maintenance can only be conducted by dealers or professionals.

**NOTE:**

These air conditioners are only applicable for cooling or heating mode. Do not operate cool and heat mode together, if operate cool and heat mode at the same time, air conditioner system will be fluctuated for large difference in temperature for changing operate mode.

This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

## **SAFETY SUMMARY**

### **DANGER**

- Use refrigerant R410A 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 nitrogen be used for these types of tests.
- Do not pour water into the indoor or outdoor unit. These products are equipped with electrical parts. If poured, it will cause a serious electrical shock.
- Do not touch or adjust safety devices inside the indoor or outdoor units. If these devices are touched or readjusted, it may cause a serious accident.
- Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply.
- Refrigerant leakage can cause difficulty with breathing due to insufficient air. Turn OFF the main switch, extinguish any naked flames and contact your service contractor, if refrigerant leakage occurs.
- The installer and system specialist shall secure safety against refrigerant leakage according to local regulations or standards.
- Use an ELB (Electric Leakage Breaker). In the event of a fault, there is danger of an electric shock or a fire if it is not used.
- Do not install the outdoor unit where there is a high level of oil mist, flammable gases, salty air or harmful gases such as sulphur.

### **WARNING**

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately one 3.3 ft. (1 meter) from the system.
- If circuit breaker or fuse is often activated, stop the system and contact your service contractor.
- Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to our installation manual. If the instructions are not followed, it may result in a water leakage, electric shock or a fire.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it may lead to electric shock. Do not connect the ground wiring to gas piping, water piping, lightning conductor or ground wiring for telephone.
- Connect a fuse of specified capacity.
- Do not put any foreign material on the unit or inside the unit.
- Make sure that the outdoor unit is not covered with snow or ice, before operation.
- Before performing any brazing work, check to ensure that there is no flammable material around.  
When using refrigerant be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts, etc. from rats or other small animals.  
If not protected, rats may gnaw at unprotected parts which may lead to a fire.
- Fix the cables securely. External forces on the terminals could lead to a fire.
- 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 done by children without supervision.
- The appliances are not intended to be operated by means of an external timer or separate remote-control system.

## **SAFETY SUMMARY**

### **WARNING**

- **The appliance is not to be used by children or person 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. Keep the appliance and its cord out of reach of children under 8 years.**

### **CAUTION**

- Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 10 ft. (3 meters) from strong electromagnetic wave radiators such as medical equipment.
- Supply electrical power to the system to energize the oil heater for 12 hours before start-up after a long shutdown.
- Do not step or put any material on the product.
- Provide a strong and correct foundation so that;
  - a. The outdoor unit is not on an incline.
  - b. Abnormal sound does not occur.
  - c. The outdoor unit will not fall down due to a strong wind or earthquake.

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#### **NOTE:**

- It is recommended that the room be ventilated every 3 to 4 hours.
- The heating capacity of the heat pump unit is decreased according to the outdoor air temperature. Therefore, it is recommended that auxiliary heating equipment be used in the field when the unit is installed in a low temperature region.
- Operate the heat pump air conditioner within this range.  
Regarding installation altitude below 3281ft.(1000m);  
Regarding frequency of supply power within  $\pm 1\%$ Hz of rated frequency;  
Regarding transport/storage temperature within  $-13\sim 131^{\circ}\text{F}(-25\sim 55^{\circ}\text{C})$ ;
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
- The A-weighted emission sound pressure level at workstations, all this level does not exceed 70 dB(A) .

## **CHECKING PRODUCT RECEIVED**

- Upon receiving this product, inspect it for any shipping damage.  
Claims for damage, either apparent or concealed, 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.
- Our company's liability shall not cover defects arising from the alteration performed by a customer without our company's consent in a written form.

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## 1. Safety Summary

### **⚠ WARNING**

- Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to the installation manual.
- Check that the ground wire is securely connected.
- Connect a fuse of specified capacity.

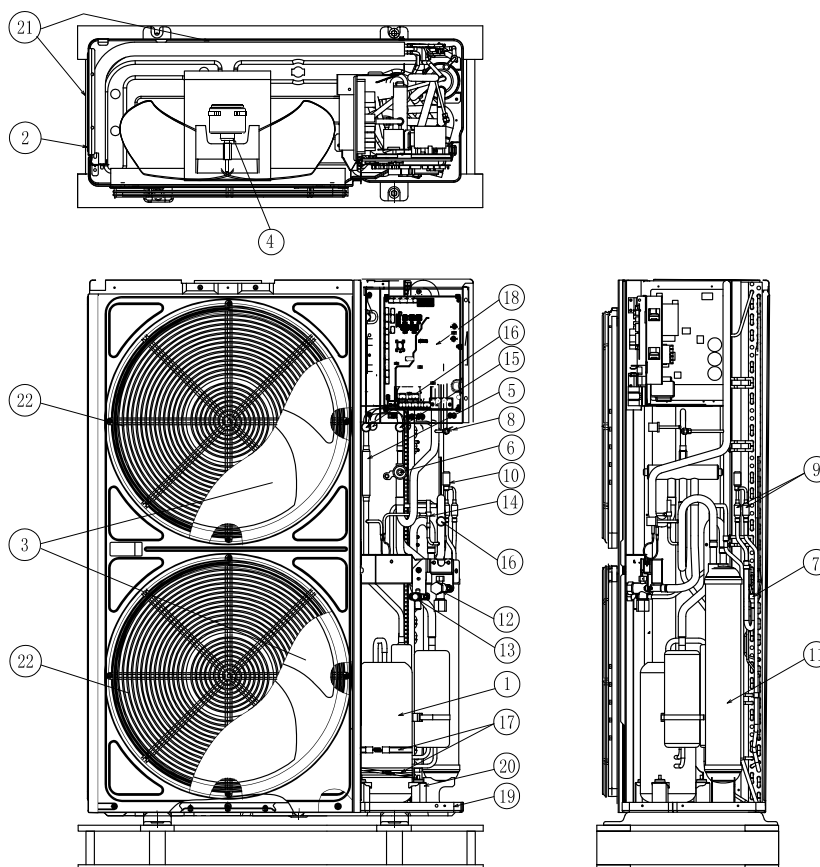
### **⚠ CAUTION**

Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 9.8ft. (3 meters) from strong electromagnetic wave radiators such as medical equipment.

## 2. Structure

### 2.1 Outdoor Unit & Refrigerant Cycle

<Outdoor Unit-CHV6-36/48/60URBM >

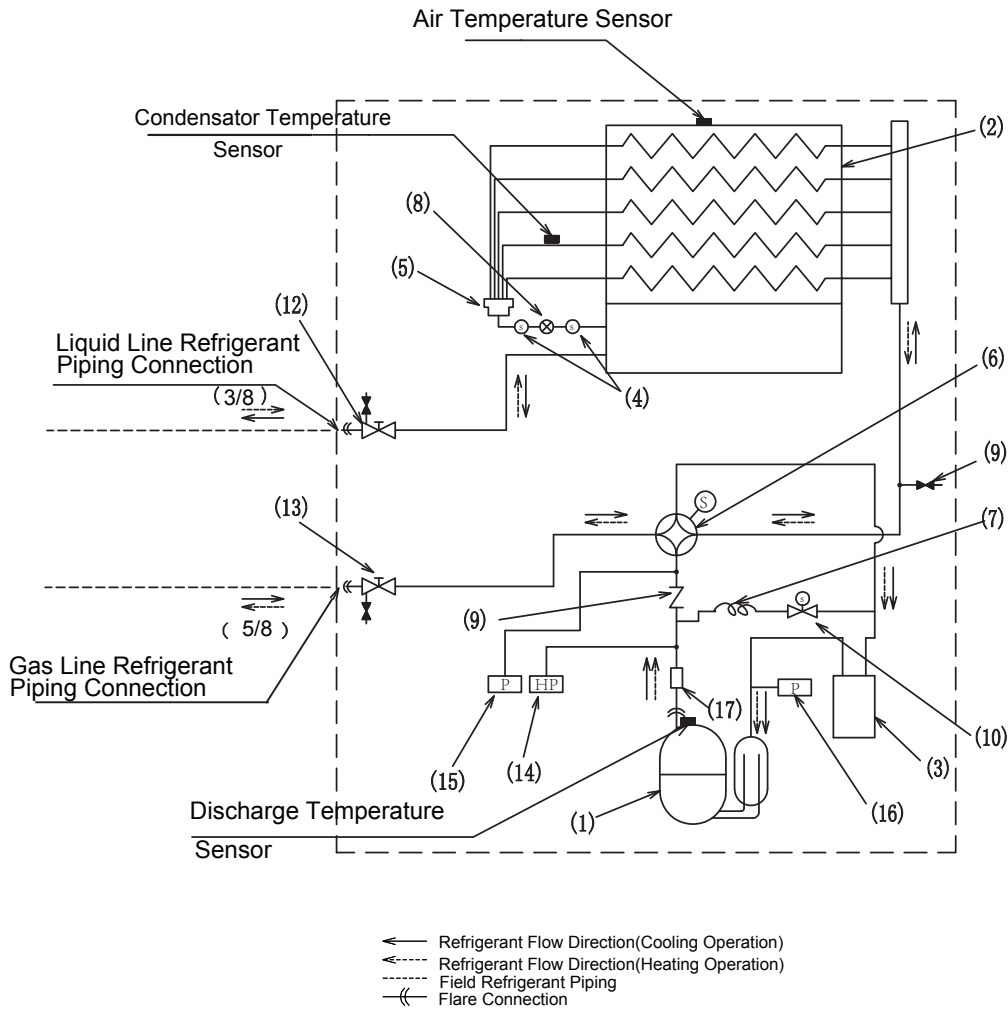


No.	Part Name	No.	Part Name
1	Compressor	14	Bypass Solenoid Valve
2	Heat Exchanger	15	High Pressure Switch
3	Propeller Fan	16	Pressure Sensor
4	Fan Motor	17	Crankcase Heater
5	Check Valve	18	Electrical Box
6	Reversing Valve	19	Base assembly
7	Distributor	20	Vibration Absorbing Rubber
8	Check Joint for High/Low Pressure(Cool/Heat)	21	Air Inlet
9	Strainer	22	Air Outlet
10	Electrical Expansion Valve	23	
11	Gas & Liquid Separator	24	
12	Stop Valve for Gas Line	25	
13	Stop Valve for Liquid Line	26	

<Refrigerant Cycle>

Outdoor Unit-CHV6-36/48/60URBM

in.



NO.	Part Name	Remark
1	Compressor	
2	Heat Exchanger	
3	Gas & Liquid Separator	
4	Strainer	
5	Distributor	
6	Reversing Valve	
7	Capillary Tube	Bypass
8	Electrical Expansion Valve	
9	Check Valve	
10	Solenoid Valve	Bypass
11	Check Joint	
12	Stop Valve for Liquid Line	
13	Stop Valve for Gas Line	
14	Pressure Switch	High Pressure Protect
15	Pressure Sensor	High Pressure
16	Pressure Sensor	Low Pressure
17	Expansion Muffler	

## 2.2 Necessary Tools and Instrument List for Installation

No.	Tool	No.	Tool	No.	Tool	No.	Tool
1	Handsaw	6	Copper Pipe Bender	11	Spanner	16	Leveller
2	Phillips Screwdriver	7	Manual Water Pump	12	Charging Cylinder	17	Clamper for Solderless Terminals
3	Vacuum Pump	8	Pipe Cutter	13	Gauge Manifold	18	Hoist (for Indoor Unit)
4	Refrigerant Gas Hose	9	Brazing Kit	14	Cutter for Wires	19	Ammeter
5	Megohmmeter	10	Hexagon Wrench	15	Gas Leak Detector	20	Voltage Meter

Use tools and measuring instruments exclusive for the new refrigerant in case of direct contact with refrigerant.

◇: Interchangeability is available with current R22 ●: Only for Refrigerant R410A (No Interchangeability with R22)

×: Prohibited

✦: Only for Refrigerant R407C (No Interchangeability with R22)

Measuring Instrument and Tool		Interchangeability with R22		Reason of Non-Interchangeability and Attention (★: Strictly Required)	Use
		R410A	R407C		
Refrigerant Pipe	Pipe Cutter, Chamfering Reamer	◇	◇	-	Cutting Pipe Removing Burrs
	Flaring Tool	◇●	◇	* The flaring tools for R407C are applicable to R22. * If using flaring tube, make dimension of tube larger for R410A. * In case of hard temper pipe, flaring is not available.	Flaring for Tubes
	Extrusion Adjustment Gauge	●	-		Dimensional Control for Extruded Portion of Tube after Flaring
	Pipe Bender	◇	◇	* In case of hard temper pipe, bending is not available. Use elbow for bend and braze.	Bending
	Expanding Tool	◇	◇	* In case of hard temper pipe, expanding of tube is not available. Use socket for connecting tube.	Expanding Tubes
	Torque Wrench	●	◇	* For 1/2 in. D. (12.7mm), 5/8 in. D. (15.88mm), spanner size is up 3/32 in. (2mm).	Connection of Flare Nut
		◇	◇	* For 1/4 in. D. (6.35mm), 3/8 in. D. (9.52mm), 3/4 in. D. (19.05mm), spanner size is the same.	
	Brazing Tool	◇	◇	* Perform correct brazing work.	Brazing for Tubes
	Nitrogen Gas	◇	◇	* Strict Control against Contamin (Blow nitrogen during brazing.)	Prevention from Oxidation during Brazing
Lubrication Oil (for Flare Surface)	●	✦	* Use a synthetic oil which is equivalent to the oil used in the refrigeration cycle. * Synthetic oil absorbs moisture quickly.	Applying Oil to the Flared Surface	
Vacuum Drying Refrigerant Charge	Refrigerant Cylinder	●	✦	* Check refrigerant cylinder color. ★ Liquid refrigerant charging is required regarding zeotropic refrigerant.	Refrigerant Charging
	Vacuum Pump	◇	◇	★ The current ones are applicable. However, it is required to mount a vacuum pump adapter which can prevent from reverse flow when a vacuum pump stops, resulting in no reverse oil flow.	Vacuum Pumping
	Adapter for Vacuum Pump	*●	✦		
	Manifold Valve	●	✦	* No interchangeability is available due to higher pressures when compared with R22. ★ Do not use current ones to the different refrigerant. If used, mineral oil will flow into the cycle and cause sludges, resulting in clogging or compressor failure.	Vacuum Pumping, Vacuum Holding, Refrigerant Charging and Check of Pressures
	Charging Hose	●	✦	Connection diameter is different; R410A: UNF1/2, R407C: UNF7/16.	
	Charging Cylinder	×	×	* Use the weight scale.	-
	Weight Scale	◇	◇	-	Measuring Instrument for Refrigerant Charging
Refrigerant Gas Leakage Detector	*●	✦	* The current gas leakage detector (R22) is not applicable due to different detecting method.	Gas Leakage Check	

\*: Interchangeability with R407C.



### 3. Transportation and Handling

#### 3.1 Transportation

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

#### **CAUTION**

**Do not put any material on the product. Apply two lifting wires onto the outdoor unit, when lifting it by crane.**

● Hanging Method:

When hanging the unit, ensure a balance of the unit, check safety and lift up smoothly.

- (1) Do not remove any packing materials.
- (2) Hang the unit under packing condition with two (2) ropes, as shown in Fig. 3.1.

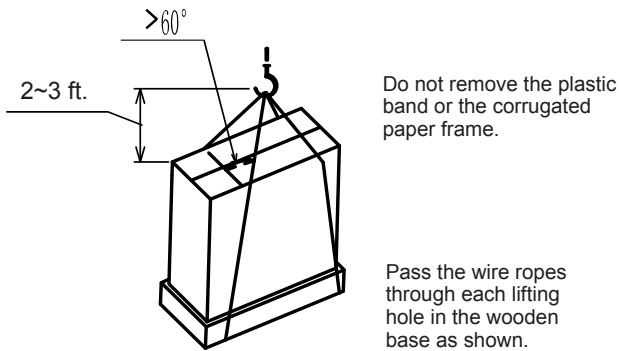


Fig. 3.1 Hanging Work for Transportation

#### **CAUTION**

**If have no package to move, please protect with cloth or paper**

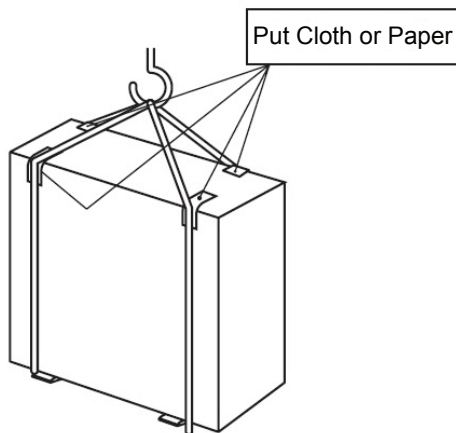


Fig.3.2 Transportation for no wooden base

#### 3.2 Handling of Outdoor Unit

#### **WARNING**

**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 Using Handles:

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

- (1) Do not remove the wooden base from the outdoor unit.
- (2) To prevent the unit from overturning, pay attention to the center of gravity as shown in the below figure.
- (3) Two or more personnel should be used to move the unit.

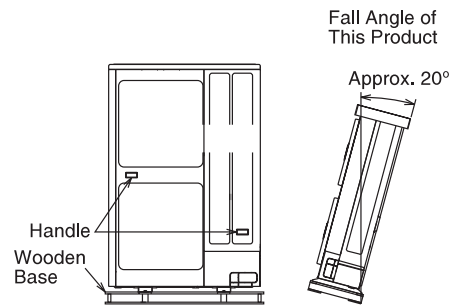


Fig. 3.3 Handling of Outdoor Unit

## 4. Outdoor Unit Installation

### 4.1 Factory-Supplied Accessories

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

Table 4.1 Factory-Supplied Accessories

Accessories	Recommend
Washerx4	For Anchor Bolts

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### NOTE

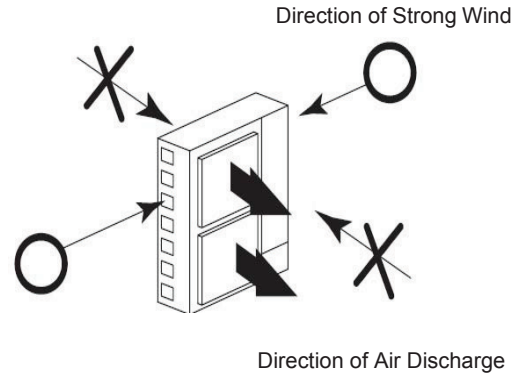
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If any of these accessories are not packed with the unit, please contact your contractor.

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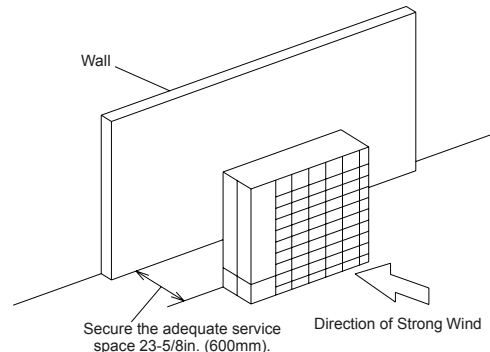
### 4.2 Initial Check

- Install the outdoor unit where good ventilation is available, and where it is dry.
- Install the outdoor unit where the sound or the discharge air from the outdoor unit does not affect neighbors or surrounding vegetation. The operating sound at the rear or right/left sides is higher than the value in the catalog at the front side.
- Check to ensure that the foundation is flat, level and sufficiently strong.
- Do not install the outdoor unit where there is a high level of oil mist, salty air or harmful gases such as sulphur.
- Do not install the outdoor unit where the electromagnetic wave is directly radiated to the electrical box.
- Install the outdoor unit as far as possible being at least 10 ft. (3 meters) from the electromagnetic wave radiator.
- 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.
- Install the outdoor unit where it is in the shade or it will not be exposed to direct sunshine or direct radiation from high temperature heat source.
- Do not install the outdoor unit where dust or other contamination could block the outdoor heat exchanger.
- Install the outdoor unit in a space with limited access to general public.
- Do not install the outdoor 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.



- Install near the wall to avoid facing wind directly. Ensure that the service space should be secured.

### 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.

## CAUTION

**Aluminum fins have very sharp edges. Pay attention to the fins to avoid any injury.**

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### NOTE

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Install the outdoor unit on a roof or in an area where people except service engineers can not touch the outdoor unit.

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### 4.3 Service Space

Install the outdoor unit with a sufficient space around the outdoor unit for operation and maintenance as shown below Fig4.1.

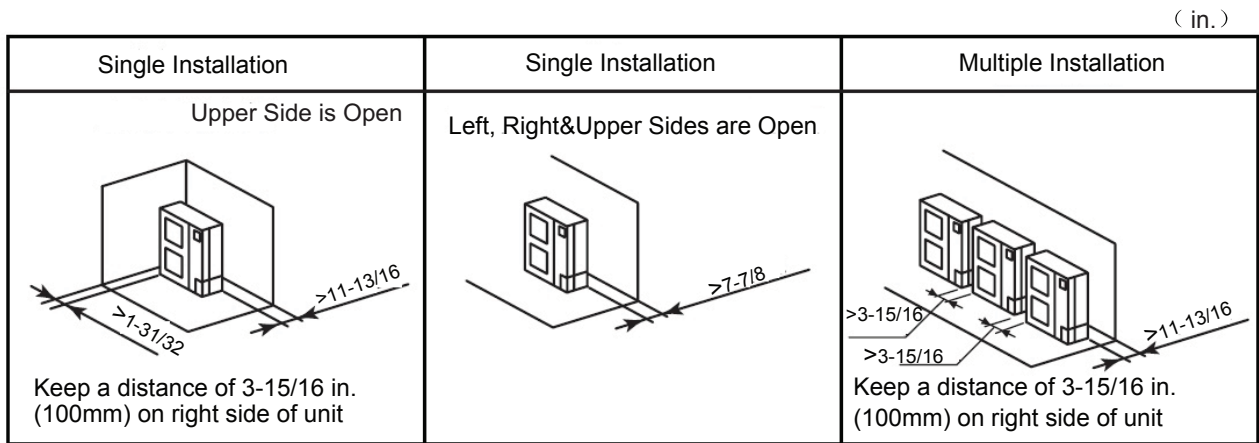


Fig. 4.1 Installation Space Requirement

### 4.4 Installation Work

- (1) Secure the outdoor unit with the anchor bolts.

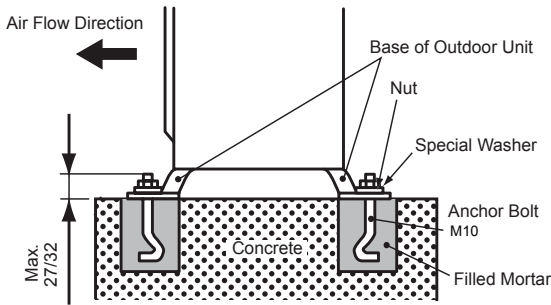


Fig. 4.2 Installation of Anchor Bolts

Fix the outdoor unit to the anchor bolts by special washer of factory-supplied accessory.

- (2) When installing the outdoor unit, fix the unit by anchor bolts. Refer to Fig. 4.3

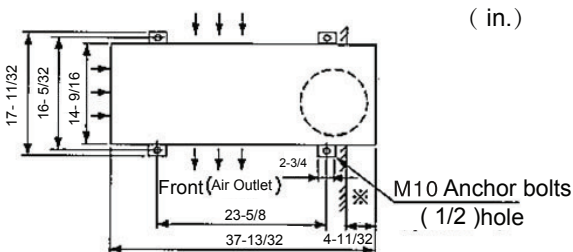


Fig. 4.3 Position of Anchor Bolts

**NOTE:**

When the mark \* dimension is secured, piping work from bottom side is easy without interference of foundation.

- (3) Example of fixing outdoor unit by anchor bolts.

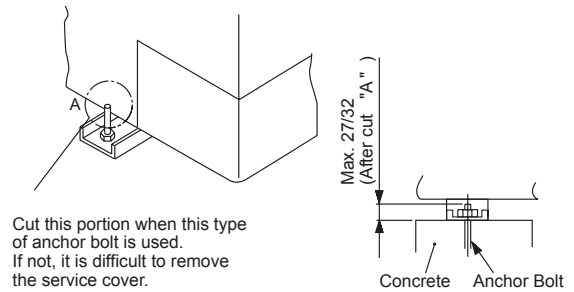


Fig. 4.4 Fixing Example

- (4) Fix the outdoor unit firmly so that declining, making noise, and falling down by strong wind or earthquake is avoided.

( in. )

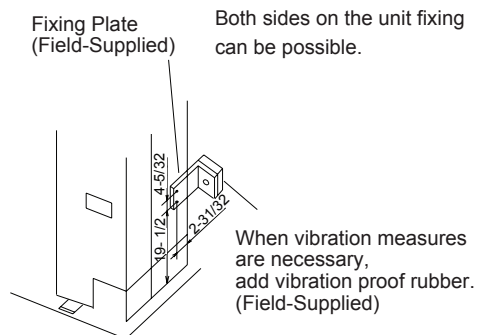
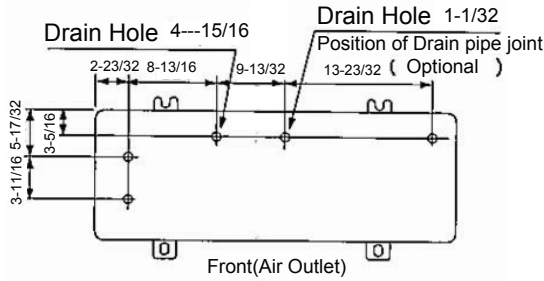


Fig. 4.5 Additional Fixing Arrangement

- (5) When installing the unit on a roof or a veranda, drain water sometimes turns to ice on a cold morning. Therefore, avoid draining in an area people often use because it is slippery.

- (6) In case the drain piping is necessary for the outdoor unit, use the drain-kit (DC-01Q:Optional Parts).

(in.)



Recommended Metal Plate Size (Field-Supplied)

Material: Hot-Rolled Mild Steel Plate (SPHC)  
Plate Thickness: 4.5T

(in.)

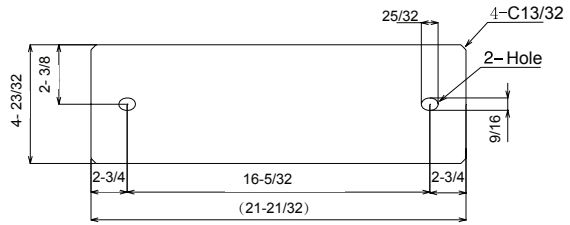
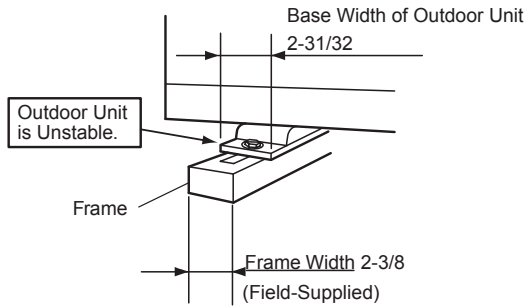


Fig. 4.6 Frame and Base Installation

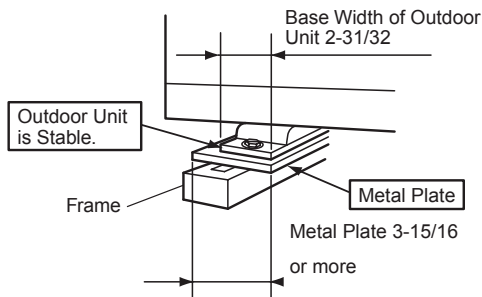
- (7) The whole of the base of the outdoor unit should be installed on a foundation. When using vibration-proof mat, it should also be positioned the same way. When installing the outdoor unit on a field-supplied frame, use metal plates to adjust the frame width for stable installation as shown in Fig. 4.6.

**Incorrect**

(in.)



**Correct**



## 5. Refrigerant Piping Work

### **⚠ DANGER**

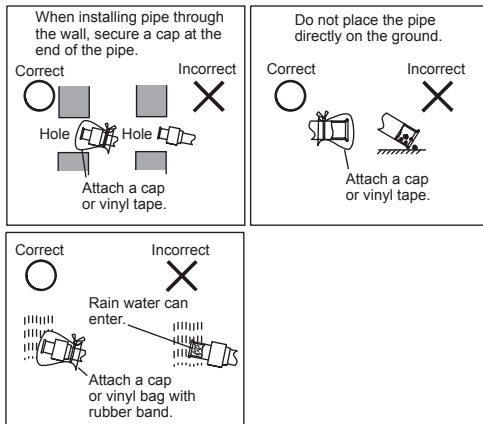
Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tightness test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.

### 5.1 Piping Materials

- (1) Prepare locally-supplied copper pipes.
- (2) Select the piping size from the Table 5.1.
- (3) 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.

### NOTE

#### ● Cautions for Refrigerant Pipe Ends

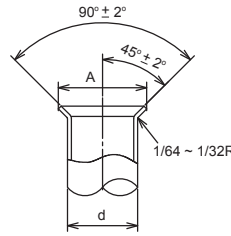


### **⚠ CAUTION**

- 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 Dimension

Perform the flaring work as shown below.



Diameter (d)	in. (mm)	
	A +0	A -0.02 (-0.4)
	R410A	
1/4 (6.35)	0.36 (9.1)	
3/8 (9.52)	0.52 (13.2)	
1/2 (12.7)	0.65 (16.6)	
5/8 (15.88)	0.78 (19.7)	
3/4 (19.05)	(*)	

- Piping Thickness and Material  
Use the pipe as below.

Table 5.1 Piping Size in. (mm)

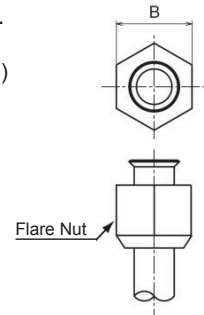
Diameter	R410A	
	Thickness	Material
1/4 (6.35)	0.031 (0.8)	O
3/8 (9.52)	0.031 (0.8)	O
1/2 (12.7)	0.031 (0.8)	O
5/8 (15.88)	0.039 (1.0)	O

#### ● Flare Nut Dimension

Use the flare nut as below.

<Flare Nut Dimension B in.(mm)

Diameter	R410A
1/4 (6.35)	21/32 (17)
3/8 (9.53)	7/8 (22)
1/2 (12.7)	1-1/32 (26)
5/8 (15.88)	1-5/32 (29)



## 5.2 Refrigerant Piping Work

- (1) Ensure that the directions for refrigerant piping work according to the tables.

Table 5.2 Limitation of Outdoor Unit

Capacity (kBtu/h)	Diameter	Outer Diameter of Pipe in. (mm)		
		Gas	Liquid	Branch Pipe
36	5/8 (15.88)	3/8 (9.53)	SPBPK-102HP	
48				
60				

Table 5.3 Indoor Unit Pipe Model in. (mm)

Capacity(kBtu/h)	Gas Pipe	Liquid Pipe
05~17	1/2(12.7)	1/4(6.35)
19~22(4-Way Cassette)	1/2(12.7)	1/4(6.35)
19(Ducted)	5/8(15.88)	1/4(6.35)
22(Ducted)	5/8(15.88)	3/8(9.53)
18~22(Wall-Mounted)	5/8(15.88)	3/8(9.53)
24~54	5/8(15.88)	3/8(9.53)

● Combination between Indoor Unit and Outdoor Unit

Table 5.4 Indoor Unit Type List

Indoor Unit Type	Nominal Power(kBtu/h)															
	05	07	09	12	14	15	17	18	19	22	24	27	30	38	48	54
Ceiling Ducted Type		○	○	○		○			○	○	○	○	○	○	○	○
Low Height Ceiling Ducted Type	○	○	○	○		○	○		○	○	○					
4-Way Cassette Type			○	○		○			○	○	○	○	○	○	○	○
Mini 4-Way Cassette Type	○	○	○	○		○	○		○							
Wall-Mounted Type		○	○	○	○			○		○	○					

○: Available

Table 5.5 Limitation of Combination Quantity

Model	Minimum Individual Operation Capacity (kBtu/h)	Minimum Combination Quantity	Maximum Combination Quantity	Recommend Combination Quantity	Combination Range
36	05	1	9	5	50%~150%
48	05	1	11	5	
60	05	1	11	5	

(\*1) The connection ratio should not be bigger than 100% for systems where all indoor units may operate at the same time; otherwise, overload operation may occur in harsh conditions or narrow range.

(\*2) Capacity ratio must be 100% when only one indoor unit is connected, and the refrigerant additional charge should be reduced according to the indoor unit type. Refer to Table 5.10.

(\*3) The capacity of indoor unit should be modified when the capacity ratio exceeds 100% or the combination quantity exceeds the recommended quantity.

$$\text{Modified capacity} = \text{nominal capacity} \times \text{correction factor}$$

Correction factors are defined as follows:

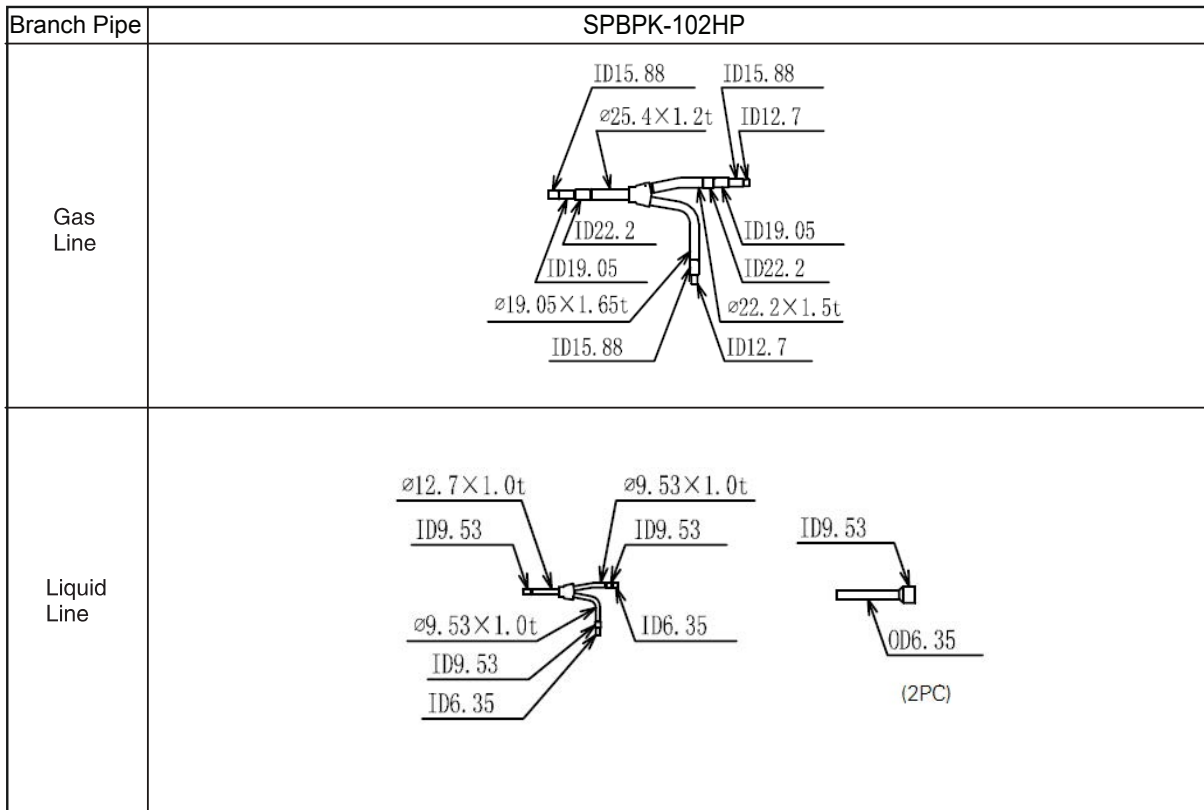
Indoor Unit Type	Model	Correction Factor
Wall mounted	07/09	2.0

Table 5.6 Refrigerant Pipe System

Item	System	Branch pipe for Line Branch
<p><b>Example</b> This is a system of one outdoor unit and six indoor units. Pipe materials are not provided by the manufacturer.</p>		<p>Oil Trap is recommended at every 32.8 ft. (10meters) lift</p> <p><math>H1 \leq 98.4 \text{ ft. (30m)}</math></p> <p><math>H2 \leq 32.8 \text{ ft. (10m)}</math></p> <p><math>H2 \leq 32.8 \text{ ft. (10m)}</math></p> <p><math>L \leq 98.4 \text{ ft. (30m)}</math> <math>L \leq 246 \text{ ft. (75m)}</math></p>
Max.Pipe Length	Max.Saving Length Lt	$Lt \leq 246 \text{ ft. (75m)}$
	Total Pipe Length $L_{to} = Lt + L0 + L1 + L2 + L3 + L4$	$L_{to} \leq 393 \text{ ft. (120m)}$
Height Distance between Outdoor and Indoor Unit	Outdoor is Higher than Indoor Unit	$H1 \leq 98.4 \text{ ft. (30m)}$
	Indoor is Higher than Outdoor Unit	$H1 \leq 98.4 \text{ ft. (30m)}$
Max.Height Distance between Indoor and Indoor or Indoor and Branch Pipe		$H2 \leq 32.8 \text{ ft. (10m)}$
Max.Pipe Length between Branch Pipe and Indoor	From "a" Branch Pipe to Indoor of Max. Distance	$L \leq 98.4 \text{ ft. (30m)}$
	From every Branch Pipe to Indoor of connecting	$L1, L2, L3, L4, L5 \leq 32.8 \text{ ft. (10m)}$
Choose Branch Pipe	36/48/60	"a、 b、 c、 d、 e" with SPBPK-102HP

### 5.3 Branch Pipe for Line Branch

Table 5.7 T Shape Branch Pipe



Unit : in. ID: Inner Diameter



## 5.4 Piping Connection

Pipes can be connected from 4 directions.

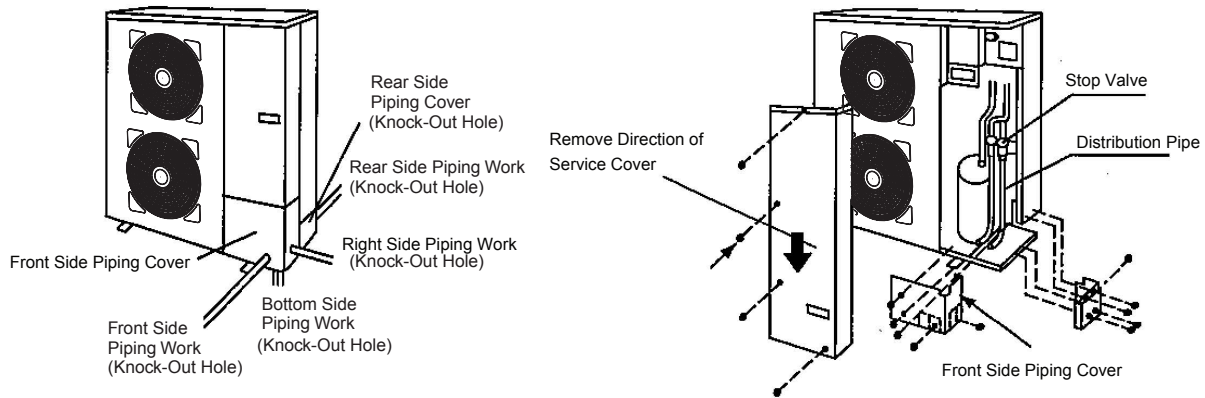


Fig. 5.1 Piping Direction

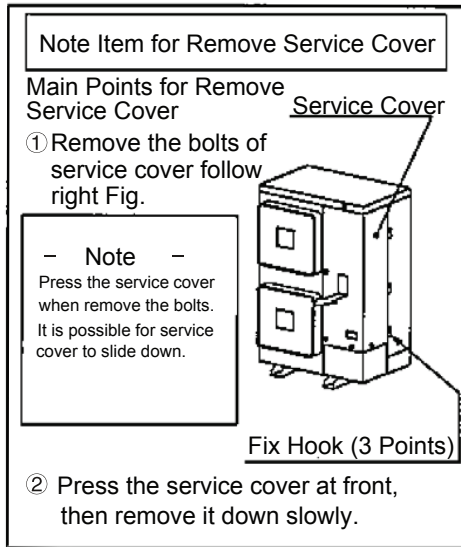
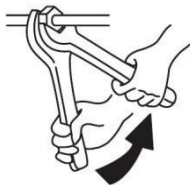


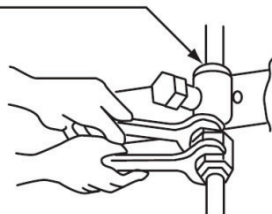
Fig. 5.2 Remove Service Cover

- (1) Confirm that the valve is closed.
- (2) Prepare a field-supplied bend pipe for liquid line. Connect it to the liquid valve by flare nut through the square hole of bottom base.
- (3) For Gas Piping Connection  
Prepare a field-supplied bend pipe for gas line. Braze it and the factory-supplied pipe flange at the outside of the unit.

Do not apply the double spanner work here. Refrigerant leakage shall occur.



Double Spanner Work



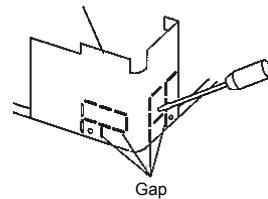
Tightening Work for Stop Valve

Table 5.8 Tightening Torque for Flare Nut

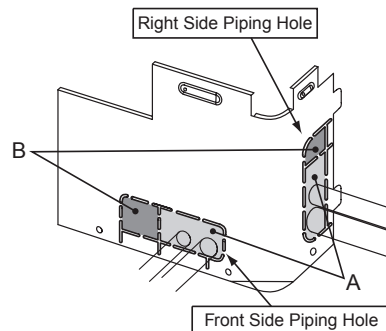
Pipe Size mm(in.)	Torque ft.-lbs(N·m)
Φ6.35(1/4)	14.7 ft.-lbs (20 N·m)
Φ9.53(3/8)	29.5 ft.-lbs (40 N·m)
Φ12.7(1/2)	44.3 ft.-lbs (60 N·m)
Φ15.88(5/8)	59.0 ft.-lbs (80 N·m)

- (4) Pipes can be connected from 4 directions as shown Fig. 5.1. Make a knock-out hole in the front pipe cover or bottom 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.

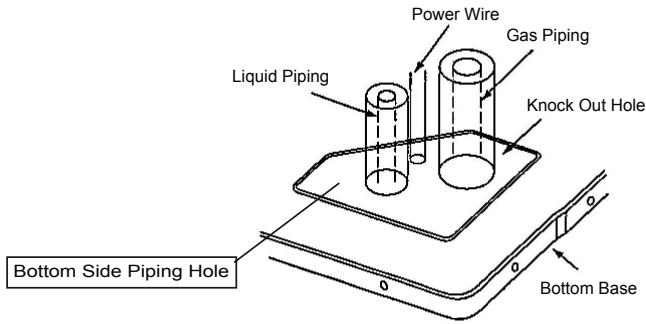
Front Side Piping Cover



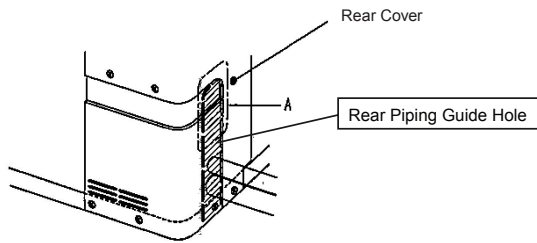
(a) Connect Front and Right Side Pipe



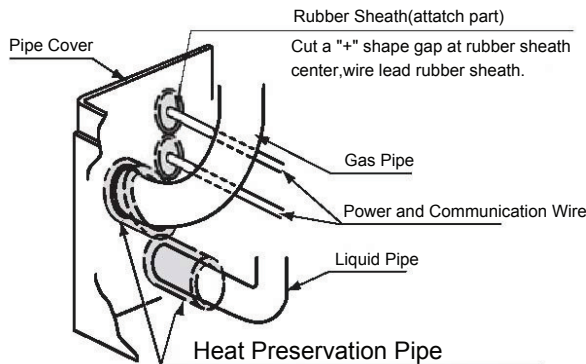
(b) Bottom Side Piping Work



(c) Rear Piping Work



- (5) To avoid damage protect cables and pipes with rubber sheath (Field-Supplied).

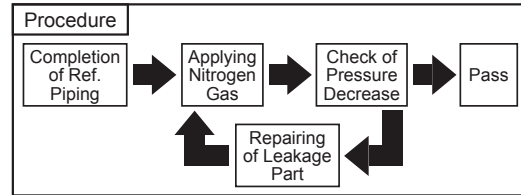


To prevent gaps use a rubber bush and insulation (Factory-Supplied) adequately when installing the piping cover. Cut the lower side guide line of the piping cover when attaching work is difficult.

5.5 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) Tighten the flare nut by using two spanners.



(4) Stop Valve

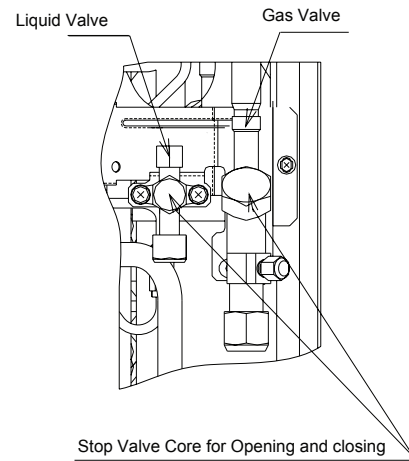
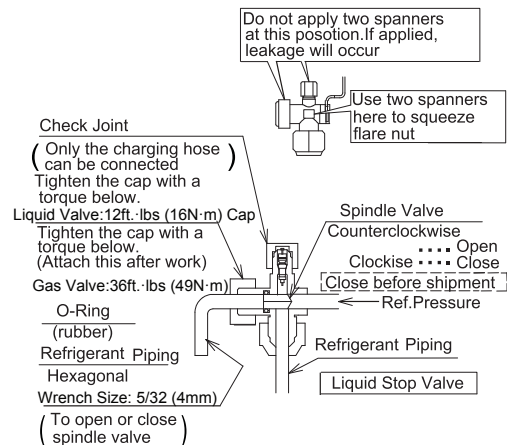


Fig.5.3 Stop Valve Position

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

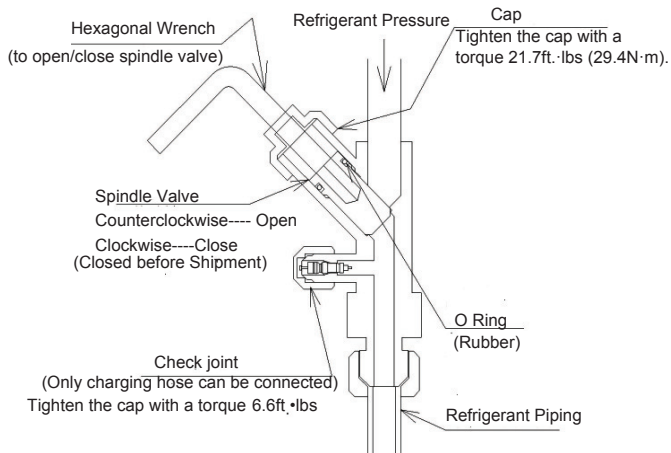
<Stop Valve>



Spindle Valve Torque ft. lbs (N·m)

Gas	Liquid
8.9~11.1 (12~15)	3.7~5.9 (5~7)

<Gas Valve>



Hexagonal Wrench Size in. (mm)	
Gas	Liquid
7/32 ( 5 )	5/32 ( 4 )

**CAUTION**

- Do not apply an abnormal big force to the spindle valve at the end of opening (5.0N·m or smaller). The back seat construction is not provided.
- Do not loosen the stop ring. If the stop ring is loosened, it is dangerous, since the spindle will hop out.

- (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 601psi(4.15MPa).
- (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.

**CAUTION**

After pipe and nut cap connected,when make air tightness test , open the stop valve spindle cap, make sure valve closed already(clock wise).

- Tighten nut cap below torque,over torque will bring on refrigerant leakage of valve spindle.

Pipe Size in. (mm)	Tightening Torque ft.·lbs(N·m)
1/4 in. (6.35 mm)	10.3 - 13.3 ft.·lbs (14 - 18 N·m)
3/8 in. (9.52 mm)	25.1 - 31.0 ft.·lbs (34 - 42 N·m)
1/2 in. (12.7 mm)	36.1 - 45.0 ft.·lbs (49 - 61 N·m)
5/8 in. (15.88 mm)	50.2 - 60.5 ft.·lbs (68 - 82 N·m)

- Make air-tightness test after valve spindle is turned off closely.

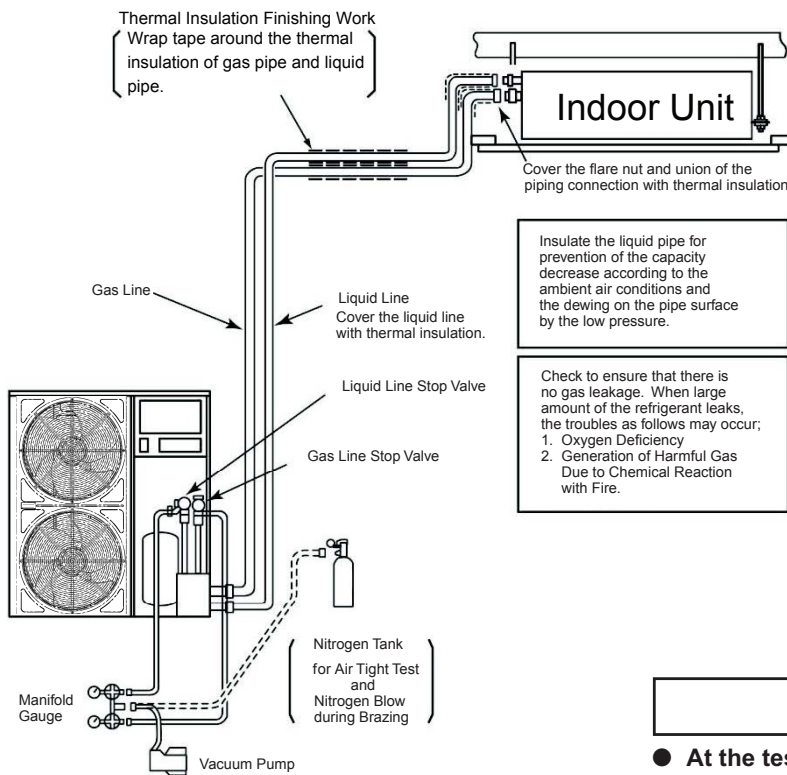
Note:

Do not connect nut cap on test joint, which is used for connecting refrigerant charging hose. It is normal that the slight leak sound comes out when the seal cap of the check joint and the valve spindle cap are opened, which has no effect upon the unit's function.

5.6 Vacuum Pumping and Charging Refrigerant

- (1) Connect a mani-fold gauge to the check joints at the both sides.  
Continue vacuum pumping work until the pressure reaches 756mmHg or lower for one to two hours.  
After vacuum pumping work, stop the mani-fold valve's valve, stop the vacuum pump and leave it for one hour. Check to ensure that the pressure in the mani-fold gauge does not increase.  
Note:  
1. This unit is only for the refrigerant R410A. The manifold gauge and the charging hose should be exclusive use for R410A.  
2. If vacuum degree of -14.5psi (-0.1MPa/756mmHg) is not available, it is considered a 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.
- (2) Connect adjusted valve and charge kettle to check joint of liquid valve.
- (3) Fully open the gas valve and liquid valve slowly.
- (4) Open adjusted valve to add refrigerant (must be refrigerant in liquid).
- (5) Operate cool mode, charge stated refrigerant.
- (6) Confirm the capacity of charging refrigerant with balance. an excess or a shortage of refrigerant can cause damages to the units.
- (7) Fully open the liquid valve.

**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 fully opened, the devices will be damaged.**
- **An excess or a shortage of refrigerant is the main cause of damages to the units. Charge the correct refrigerant quantity according to the description of label at the inside of service cover.**
- **Check for refrigerant leakage in detail. If a large refrigerant leakage occurs, it will cause difficulty with breathing or harmful gases would occur if a fire was being used in the room.**

### NOTE:

- **Special Attention Regarding Refrigerant Gas Leakage**

Pay attention to the critical gas concentration to avoid accidental refrigerant gas leakage before installing air conditioning systems.

$$\frac{R: \text{Total Quantity of Charged Refrigerant (lbs(kg))}}{V: \text{Room Volume (ft}^3\text{(m}^3\text{))}} \leq C: \text{Critical Concentration } 0.026 \text{ lbs/ft}^3 \text{ (0.42kg/m}^3\text{)}$$

\* This value should be decided according to each country's regulation such as ISO5149, EN378 and ASHRAE Standard 15. In the case that the calculated critical concentration is higher than this value, take the following actions:

- 1) Provide a gas leakage detector and exhaust fan controlled by its gas leakage detector.
- 2) Provide effective opening in the wall or door for ventilation to next door so that the critical gas concentration can be maintained lower than the above value. (Provide an opening with area greater than 0.15% of the floor surface at the lower part of a door.)

## ⚠ CAUTION

1. Maximum Permissible Concentration of HFC GAS R410A  
 The refrigerant R410A is an incombustible and non-toxic gas.  
 However, if leakage occurs and gas fills a room, it may cause suffocation.  
 Once leakage occurs, it is a must to take effective actions to make the concentration of R410A lower than 0.026 lbs/ft<sup>3</sup> (0.42 kg/m<sup>3</sup>).
2. Calculation of Refrigerant Concentration
  - (1) Calculate the total quantity of refrigerant R (lbs(kg)) charged in the system connecting all the indoor units of target rooms.
  - (2) Calculate the volume of the room installing this unit V (ft<sup>3</sup>(m<sup>3</sup>)).
3. Calculate the refrigerant concentration C (lbs/ft<sup>3</sup>) (kg/m<sup>3</sup>) of the room according to the above equation.  
 Please follow local codes or regulations, if any.

### 5.7 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 Piping "B"	High Pressure	Low Pressure
Check Joint for Liquid Stop Valve "C"	Exclusive for Vacuum Pump and Refrigerant Charge	

**NOTE:**

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

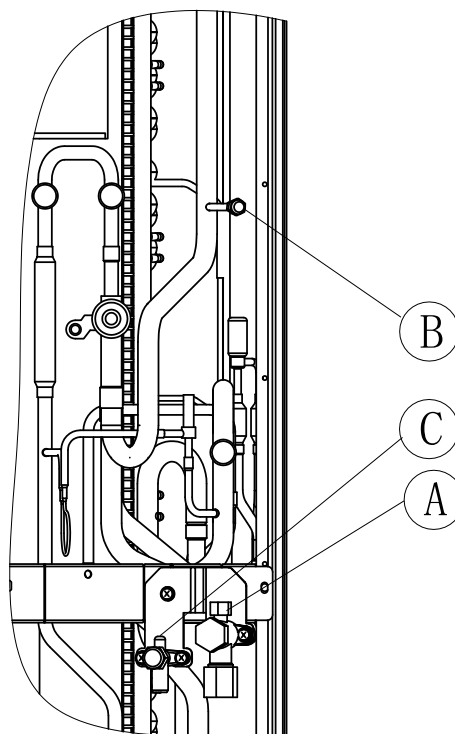


Fig 5.4 Check Joint Position

## 5.8 Additional Refrigerant Charge

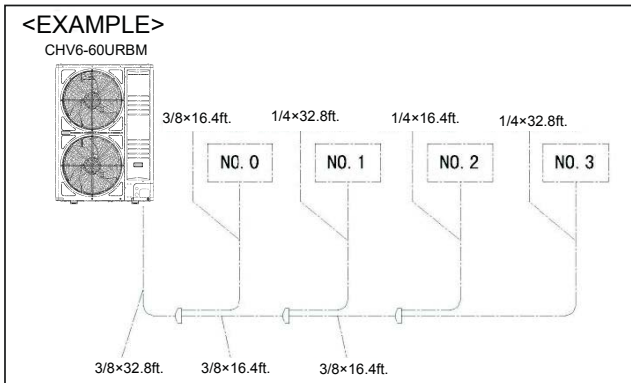
It is necessary to add additional refrigerant charge as follows.

### Additional Refrigerant Charge Calculation

Although refrigerant has been charged into this unit, it is required that additional refrigerant be charged according to piping length.

A. Determine an to additional refrigerant quantity according to the following procedure, and charge it into the system. B. Record the additional refrigerant quantity to facilitate service activities thereafter.

#### 1. Calculating Method of Additional Refrigerant Charge



See Example for Model CHV6-60URBM, and fill in the following table.

Pipe Diameter in.(mm) Total Piping Length ft. (m) Additional Charge (lbs)

$$W11 = \frac{3}{8} \dots (32.8 + 16.4 + 16.4 + 16.4) \times 0.0268 = 2.2 \text{ ( lbs )}$$

$$W12 = \frac{1}{4} \dots (32.8 + 32.8 + 16.4) \times 0.0134 = 1.1 \text{ ( lbs )}$$

$$W2 = 0$$

Total Piping Length 164ft.

$$\text{Additional Ref.Charge } W = W1 + W2 = W11 + W12 + W2 = 3.3 \text{ ( lbs )}$$

Pipe Diameter (in.) Total Piping Length (ft.)

$$W11 = \frac{3}{8} \dots \boxed{\phantom{000}} \times a = \boxed{\phantom{000}}$$

$$W12 = \frac{1}{4} \dots \boxed{\phantom{000}} \times b = \boxed{\phantom{000}}$$

Total Piping Length  m

$$\text{Additional Ref.Charge } W1 = W11 \boxed{\phantom{000}} + W12 \boxed{\phantom{000}} = \boxed{\phantom{000}} \text{ ( lbs )}$$

$$W2 = \boxed{\phantom{000}} \text{ ( lbs )}$$

$$\text{Total Ref.Charge } Wt = W0 + W1 + W2 = \boxed{\phantom{000}} + \boxed{\phantom{000}} + \boxed{\phantom{000}} = \boxed{\phantom{000}} \text{ ( lbs )}$$

Additional Refrigerant Charge according to Table 5.9

Table 5.9 Additional Refrigerant Charge Calculation

Model	W0: Ref.Charge before shipment (lbs)	W1: Additional Ref.Charge according to piping (lbs/ft.)		W2: Additional Ref.Charge according to Connection Ratio (lbs)		Wt: Total Ref. Charge (lbs)	Max. Total Ref. Charge (lbs)
		a	b	100%~130%	130%~150%		
CHV6-36URBM	8.4	0.0268	0.0134	0.33lbs for each 10% <sup>①</sup>	1.32lbs for each 10% <sup>①</sup>	W0+W1+W2	17.4
CHV6-48URBM	8.4	0.0268	0.0134				17.4
CHV6-60URBM	9.0	0.0268	0.0134				17.4

NOTE:①Less than 10% is calculated as 10%.

## 2. Charging Work

Charge refrigerant (R410A) into the system as follows.

- (1) For charging refrigerant, connect the gauge mani-fold using charging hoses with a refrigerant cylinder to the check joint of the liquid line stop valve.
  - (2) Fully open the gas line stop valve and slightly open the liquid line stop valve.  
Charge refrigerant by opening the gauge manifold valve.
  - (3) Charge the required refrigerant by operating the system in cooling.  
Ensure to charge correct volume by utilizing a weight scale. An excess or shortage of refrigerant is the main cause of trouble to the units.
- Fully open the liquid line stop valve after completing refrigerant charge.

## 3. Record of Additional Charge

Record the refrigerant charging quantity in order to facilitate maintenance and servicing activities.

Total refrigerant charge of this system is calculated in the following formula.

$$\text{Total Ref. Charge of This System} = W0+W1+W2$$

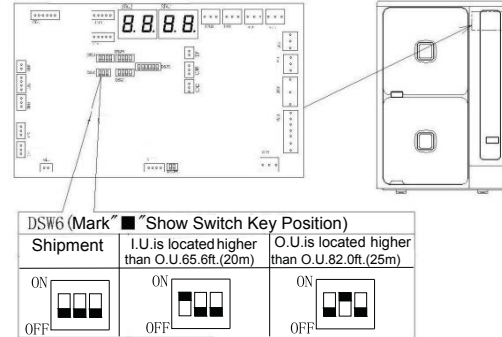
$$\text{This System} = \boxed{\phantom{00}} + \boxed{\phantom{00}} = \boxed{\phantom{00}} \text{ lbs}$$

Total Additional Charge W	<input type="text"/>	lbs
Total Ref. Charge of This System	<input type="text"/>	lbs
Date of Ref. Charge Work		
Day	<input type="text"/>	Month <input type="text"/> Year <input type="text"/>

## 4. Dip-Switch Setting for Piping Length

Follow below, setting the Dip-Switch for piping length.

PCB1



## 5. Notice of Additional Charge

When the system is connected one-to-one, the connection ratio must be 100%, and the additional refrigerant need to be reduced as the following requirements:

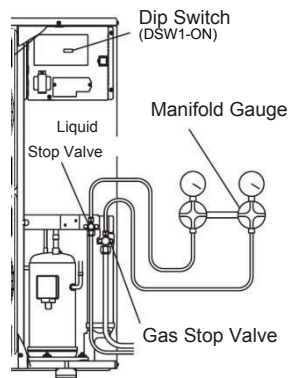
Table 5.10 Reduced Refrigerant Charge for Special Indoor Units  
(lbs)

Model	Connection ratio	Indoor Unit Type	
		Duct type	4-Way Cassette Type
CHV6-36URBM	100%	0.33	—
CHV6-48URBM		—	0.44
CHV6-60URBM		0.44	0.44

## 5.9 Collecting Refrigerant

When the refrigerant should be collected into the outdoor unit due to indoor/outdoor unit relocation, collect the refrigerant as follows.

- (1) Attach the manifold gauge to the gas stop valve and the liquid stop valve.
- (2) Turn ON the power source.
- (3) Set the DSW1-1 pin of the outdoor unit PCB at the "ON" side for cooling operation. Close the liquid stop valve and collect the refrigerant.
- (4) When the pressure at lower pressure side (gas stop valve) indicates -1.45 psi (-0.01MPa ,684mmHg), perform the following procedures immediately.
  - \* Close the gas stop valve.
  - \* Set the DSW1-1 pin at the "OFF" side. (To stop the unit operation.)
- (5) Turn OFF the power source.



### **CAUTION**

Use the pressure gauge to measure the low pressure and keep it above -1.45 psi(-0.01MPa). If the pressure is lower than -1.45 psi(-0.01MPa), the compressor may be faulty.

## 6. 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.

### **CAUTION**

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

### **NOTE**

Fix the rubber bushes with adhesive when conduit tubes to the outdoor unit are not used.

### 6.1 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. If not, electrical parts will be damaged.
- (3) Check to ensure that the capacity of power supply is enough. If not, the compressor will not be able to operate cause of abnormally voltage drop at starting.
- (4) Check to ensure that the ground 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.



## 6.2 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 ground wire to the electrical control box of outdoor unit.

In addition, connect the ground wire to earth screw in the electrical control box of indoor unit. Refer to Fig. 6.2.

- (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 (TB1), printed circuit board will be damaged. Refer to Fig. 6.1.

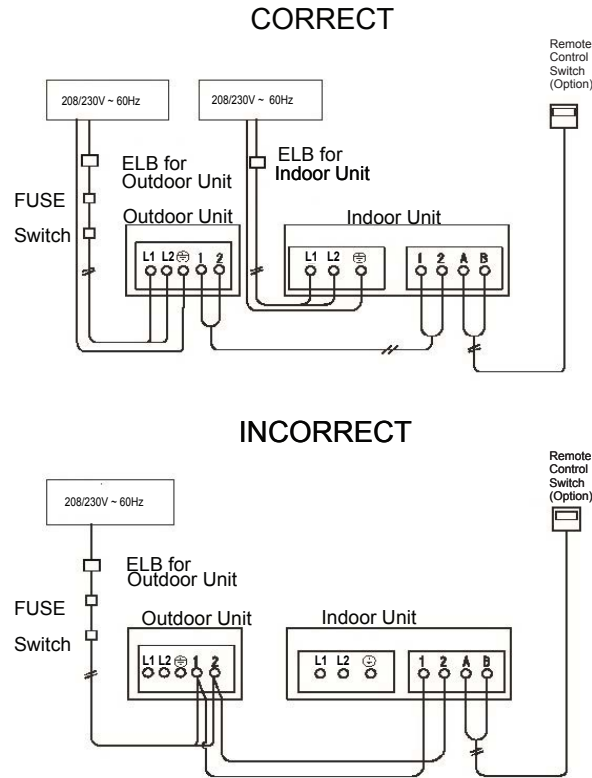


Fig. 6.1 Indoor unit and outdoor unit communication wire connection

Do not connect the Power Source Line to the terminal 1 and 2. These terminals are for the Control. If connected, the printed circuit board will be damaged.

- (3) Do not wire in front of the fixing screw of the service panel. If you do, the screw can not be removed.
- (4) Use shielded twisted pair for communication wire connecting the indoor unit and outdoor unit, respectively connected to the 1 and 2 terminals of the terminal block between the indoor and outdoor unit. Connect the communication wire of the wired controller to the A and B terminals of the indoor unit terminal block.

### NOTES:

1. In case of total wiring length at intermediate wiring between outdoor unit and indoor unit and between indoor units is less than 328 ft. (100m), it is possible to use the normal wiring (more than AWG18 (0.75mm<sup>2</sup>)) except twist pair cable.
2. Total wiring length for remote control switch can be extended up to 1640.4ft.(500m). If total wiring length less than 98.4ft. (30m), it is possible to use the normal wiring AWG22 (0.3mm<sup>2</sup>) except twist pair cable.

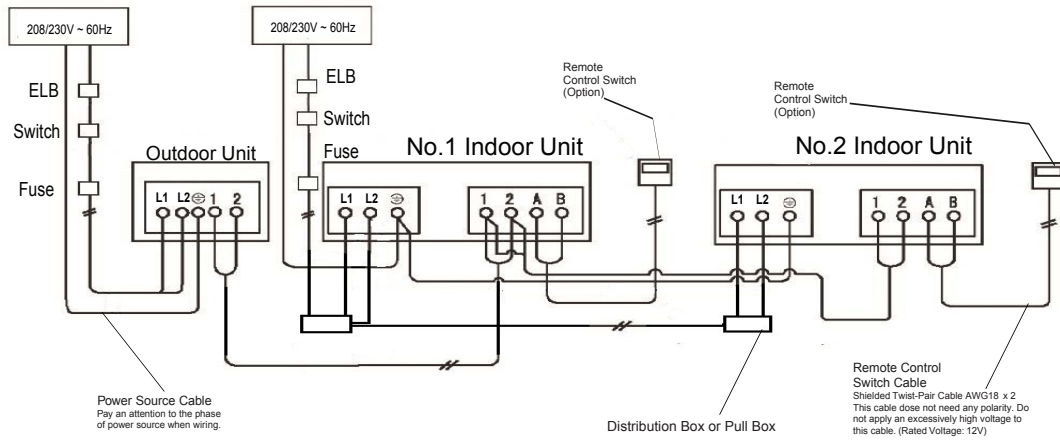


Fig. 6.2 Wiring Connection for Indoor & Outdoor

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

**NOTE:**

Supply the power source of outdoor units and indoor units respectively.

- (1) Power Source Wiring:  
Power Source Wiring is fundamental according to this method.

**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.
- Install main switch and ELB for each system separately. Select the high response type ELB that is acted within 0.1 second.
  - Separate the control wiring between outdoor unit and indoor unit more than approximately 1-31/32 to 2-3/8 in. (50 to 60mm) from power supply wiring. Do not use a coaxial cable.

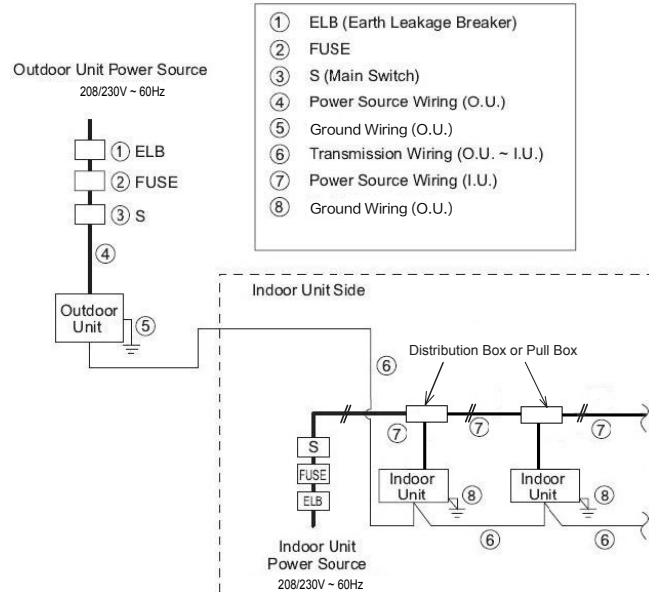


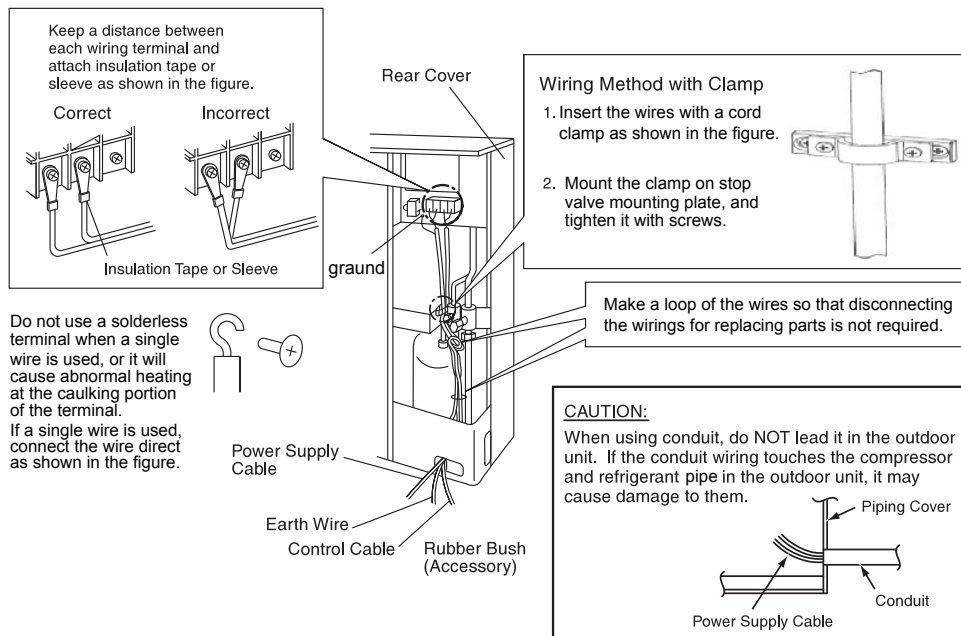
Table 6.1 Electrical Data

Model	Power Source	MCA ( A )	MOP ( A )	Minimum transmission cable size
CHV6-36URBM	208/230V ~ 60Hz	31.4	40	AWG18(0.75mm <sup>2</sup> )
CHV6-48URBM		32.8	45	AWG18(0.75mm <sup>2</sup> )
CHV6-60URBM		33.2	45	AWG18(0.75mm <sup>2</sup> )

**NOTES:**

- (1) Field wiring shall conform to local laws and regulations, and all wiring operations must be performed by qualified professionals.
- (2) Refer to relevant standards for above-noted power cord size.
- (3) Where power cord is connected through junction box in series, be sure to determine the total current and choose wires based on the table below 6.1.
- (4) The wiring specifications for weak-current communication circuit shall not be lower than that for RVV(S)P shielded wires or equivalent, and the shielding layer shall be grounded.
- (5) 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).
- (6) Once the power cord is damaged, the dealer or the professionals from designated maintenance department must be contacted in a timely manner for repair and replacement.
- (7) For the installation of power cord, the ground wire must be longer than the current-carrying conductor.

Fig. 6.3 Wiring Connection of Outdoor Unit



# ! CAUTION

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

## 7. Outdoor Unit Dip-Switch Setting

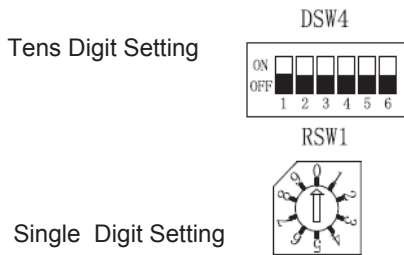
Turn off all power switch before setting Dip-Switch, or else the Dip-Switch is of no effect.

Follow this table setting Dip-Switch, "■" symbol denote the position of Dip-Switch contact joint.

<p style="text-align: center;">DSW1</p> <div style="text-align: center;"> </div> <p>ALL OFF: Shipment Set</p> <p>1 ON: Test Run(Cool)</p> <p>1, 2 ON: Test Run(Heat)</p> <p>4 ON: Compressor Forced Stop</p>	<p style="text-align: center;">DSW2</p> <p>ALL OFF: Shipment Set</p> <p>5 ON: Optional Function Setting</p> <p>6 ON: Input Power Setting</p> <div style="text-align: center;"> </div>	<p style="text-align: center;">DSW4</p> <p>Ref. Cycle No. Setting</p> <div style="text-align: center;"> </div>	<p style="text-align: center;">DSW5</p> <p>Communication Setting</p> <div style="text-align: center;"> </div>
<p style="text-align: center;">DSW3</p> <p style="text-align: center;">Capacity Setting</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CHV6-36URBM</p> </div> <div style="text-align: center;"> <p>CHV6-48URBM</p> </div> <div style="text-align: center;"> <p>CHV6-60URBM</p> </div> </div>		<p style="text-align: center;">DSW6</p> <p style="text-align: center;">Pipe length Setting</p> <p style="text-align: center;">Shipment</p> <div style="text-align: center;"> </div> <p>I.U. is located higher than O.U.(&gt;65.6ft.)</p> <div style="text-align: center;"> </div> <p>O.U. is located higher than I.U.(&gt;82.0 ft.)</p> <div style="text-align: center;"> </div>	

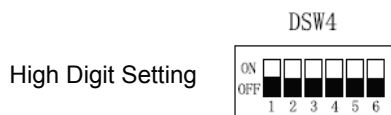
- Communication Setting  
It is necessary to set Ref. cycle system No. and terminal resistor connect to H-NET system.

- Setting Ref.cycle system No.  
Setting Ref.cycle (DSW4&RSW1)



Digital Unit	0	1	2	~	5	6
0				~		
1				~		
2				~		
3				~		
4				~		Forbid Setting
5				~		
}	}	}	}	~	}	
9				~		

- Setting Ref.cycle system No.  
Setting Ref.cycle (DSW4)

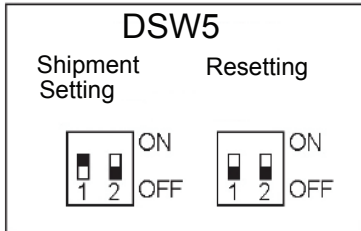


Ten A Bit	0	1	2	3	4	~	62	63
0						~		

● Terminal Resistor Setting

Before shipment, No.1 pin of DSW5 is set at the "ON" side. In the case that the outdoor units quantity in the same H-NET is 2 or more, set No. 1 pin of DSW5 at the "OFF" side from the 2nd refrigerant group outdoor unit. If only one outdoor unit is used, no setting is required.

Setting Terminal Resistor



8. Test Run

Test run should be performed according to the Table 8.1 on page 26. Use the Table 8.2 on page 28 for recording test run.

**! WARNING**

- Do not operate the system until all the check points have been cleared.
  - (A) Check and confirm Ref. pipe system and communication wire link to same Ref. 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 12 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 194°F (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 within ten minutes after turning OFF the main switch.
- Operate every indoor unit one by one, check and confirm their Ref. cycle and connect wire joint to same Ref. cycle system.

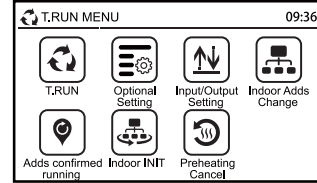
Table 8.1 Checking of Wire Connection by Test Run

(1) Turn ON the power supply for all the indoor units.

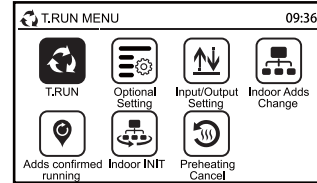
(2) For the models with the auto-address function, wait for 3 minutes approximately. The addressing is automatically performed. (There is a case that 5 minutes is required according to the setting condition.) After that, select using language from "Menu". Refer to the operation manual for details.

(3) Press and hold "Menu" and "Return" simultaneously for at least 3 seconds.

a. The test run menu will be displayed.

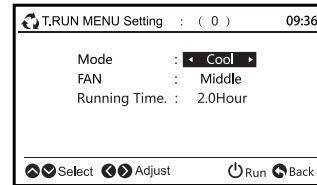


b. Select "T.RUN" and press "Enter". The test run settings will be displayed.

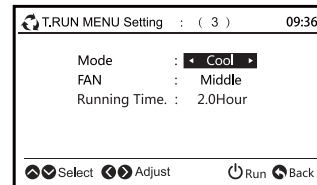


**NOTE**

When "0" is indicated, the auto-address function may be performing. Cancel "Test Run" mode and set it again.



(4) The total number of the indoor units connected is indicated on the LCD (liquid crystal display). The case of the twin combination (one (1) set with two (2) indoor units) is indicated "2", and the triple combination (one (1) set with three (3) indoor units) is indicated "3".



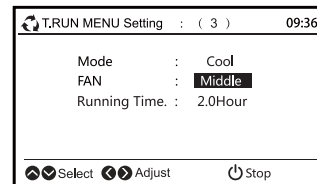
a. If the indicated number is not equal to the actual connected number of indoor unit, the auto-address function is not performed correctly due to incorrect wiring, the electric noise or etc. Turn OFF the power supply and correct the wiring after checking the following points; (Do not repeat turning ON and OFF within 10 seconds.)

- Power supply for indoor unit is not turned ON or incorrect wiring.
- Incorrect connection of connecting cable between indoor units or incorrect connection of controller cable.
- Incorrect setting of rotary switch and dip switch (the setting is overlapped) on the indoor units PCB.

b. Press "Run/stop" (run/stop) to start the test run.

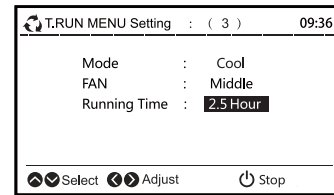
c. Press "< > ^ v" and set each item.

(5) Press "Run/stop" (run/stop). At this time, 2-hour OFF timer will be set automatically.



(6) The temperature detections by the thermistors are invalid though the protection devices are valid during the test run.

(7) To finish the test run, press "⏻" (run/stop) again or pass over the set test run time. When changing the test run time, press "∧" or "∨" to select "Running Time". Then, set the test run time (30 to 600 minutes) by pressing "<" or ">".



- The RUN indicator on the remote control switch flashes when some abnormalities such as protection devices activated occur during the test run as well as the RUN indicator (red) on the indoor unit flashes (0.5 second ON/ 0.5 second OFF). Additionally, the alarm code, the unit model code and connected number of indoor units will be displayed on the LCD as shown in the figure below. If the RUN indicator on SPWT-J01 flashes, it may be a failure in the transmission between the indoor unit and the remote control switch (loosening of connector, disconnecting wiring or breaking wire, etc.). Consult authorized service engineers if abnormality can not be recovered.

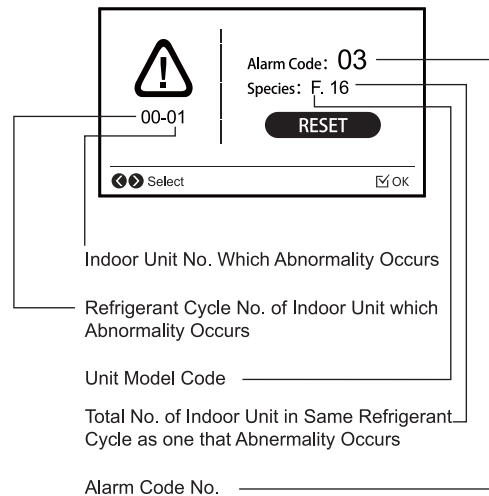




Table 8.2 Test Run and Maintenance Record

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

1. Is the rotation direction of the indoor coil 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:	<u>        </u>	No. 1 DB /WB °F,	<u>        </u>	No. 2 DB /WB °F,	<u>        </u>	No.3 DB /WB °F,	<u>        </u>	No.4 DB /WB °F
Outlet:	<u>        </u>	DB /WB °F,	<u>        </u>	DB /WB °F,	<u>        </u>	DB /WB °F,	<u>        </u>	DB /WB °F
6. Check Outdoor Ambient Temperature
 

Inlet:	<u>        </u>	DB	°F,	<u>        </u>	WB	°F
Outlet:	<u>        </u>	DB	°F,	<u>        </u>	WB	°F
7. Check Refrigerant Temperature
 

Liquid Temperature:	<u>                                </u>	°F
Discharge Gas Temperature:	<u>                                </u>	°F
8. Check Pressure
 

Discharge Pressure:	<u>                                </u>	Psi
Suction Pressure:	<u>                                </u>	Psi
9. Check Voltage
 

Rated Voltage:	<u>                                </u>	V
Operating Voltage:	<u>                                </u>	V
Starting Voltage:	<u>                                </u>	V
10. Check Compressor Input Running Current
 

Input:	<u>                                </u>	kW
Running Current:	<u>                                </u>	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?

Table 8.3 Alarm Code

Code	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Activation of Protection Device	Activation of Float Switch, High Level in Drain Pan
02	Outdoor Unit	Activation of Protection Device	Activation of PSH, Pipe Clogging, Excessive Refrigerant, Inert Gas Mixing
03	Transmission	Abnormality between Indoor and Outdoor (or Outdoor and Outdoor)	Incorrect Wiring, Loose Terminals, Disconnect Wire, Tripping of Fuse
04	Transmission	Abnormality between Inverter PCB and Outdoor PCB Abnormality between Fan Controller and Outdoor PCB	Transmission Failure (Loose Connector)
05	Supply Phase	Abnormality Power Source Phases	Incorrect Power Source, Connection to Reversed-Phase, Open Phase
06	Voltage	Abnormal Inverter Voltage	Outdoor Voltage Drop, Insufficient Power Capacity
07	Cycle	Decrease in Discharge Gas Superheat	Excessive Refrigerant Charge, Failure of Thermistor, Incorrect Wiring
08	Cycle	Increase in Discharge Gas Temperature	Insufficient Refrigerant Charge, Pipe Clogging, Failure of Thermistor, Incorrect Wiring
11	Sensor on Indoor Unit	Inlet Air Thermistor	Incorrect Wiring, Disconnecting Wiring
12		Outlet Air Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
19	Fan Motor	Activation of Protection Device for Indoor Fan	Fan Motor Overheat, Locking
21	Sensor on Outdoor Unit	High Pressure Sensor	Incorrect Wiring, Disconnecting Wiring
22		Outdoor Air Thermistor	
23		Discharge Gas Thermistor	
24		Evaporating Piping Thermistor	
29		Low Pressure Sensor	
31	System	Incorrect Capacity of Outdoor Unit and Indoor Unit	Incorrect Setting of Capacity Combination
35		Incorrect Setting of Indoor Unit No.	Duplication of Indoor Unit No.
38		Abnormality of Protective Circuit in Outdoor Unit	Failure of Protection Detecting Circuit (Failure of Protection Detecting Device, Abnormality of Outdoor PCB, Incorrect Wiring of PCB)
43	Protection Device	Activation of Low Pressure Decrease Protection Device	Defective Compression (Failure of Compressor of Inverter, Loose Power Supply Connection)
44		Activation of Low Pressure Increase Protection Device	Overload at Cooling, High Temp. at Heating, Locking (Loose Connector)
45		Activation of High Pressure Increase Protection Device	Overload Operation (Clogging, Short-Pass), Pipe Clogging, Insufficient Refrigerant, Inert Gas Mixing
47		Activation of Low Pressure Decrease Protection Device (Vacuum Operation)	Insufficient Refrigerant, Refrigerant Piping Clogging, Locking (Loose Connector)
48		Activation of Inverter Overcurrent Protection Device	Overload Operation, Compressor Failure
51	Sensor	Abnormal Current Sensor	Current Sensor Failure
53	Inverter	Inverter Error Signal Detection	Driver IC Error Signal Detection (Protection for Overcurrent, Low Voltage, Short-Circuit)
54		Increase of Inverter Fin Temperature	Abnormal Inverter Fin Thermistor, Heat Exchanger Clogging, Abnormal Fan
55		Inverter Failure	Inverter PCB Failure
57	Outdoor Fan Motor	Abnormality of Fan Motor	Disconnecting Wiring or Incorrect Wiring between Control PCB (PCB1) and Fan Relay PCB (PCB3, PCB5), Failure of Fan Motor
EE	Compressor	Compressor Protection Alarm	Failure of Compressor
b1	Outdoor Unit No. Setting	Incorrect Outdoor Unit No. Setting	Over 64 No. is Set for Address or Refrigerant Cycle.
b5	Indoor Unit No. Setting	Incorrect Indoor Unit No. Setting	More than 17 Non-Corresponding to H-NET Units are Connected to One System

## 9. 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.

Model		CHV6-36/48/60URBM
For Compressor Pressure Switch High Pressure Cut-Out	Psi (MPa)	Automatic Reset, Non-Adjustable 601 <sup>-7</sup> <sub>-29</sub> (4.15 <sup>-0.05</sup> <sub>-0.20</sub> )
	Cut-In	Psi (MPa) 464 <sup>+22</sup> <sub>-29</sub> (3.2 <sup>+0.15</sup> <sub>-0.20</sub> )
Fuse on Main Circuit	A	50
Compressor Crank Heater Power	W	60 <sup>+28</sup>
CCP Timer Set Time	Min	Non-Adjustable 3
Control Circuit Fuse	A	5

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The Company is committed to continuous product improvement. We reserve the right, therefore, to alter the product information at any time and without prior announcement.

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