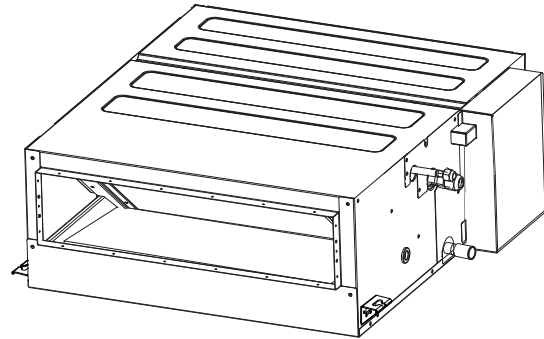




# **Operation Installation & Maintenance Manual**

**VRF INDOOR UNIT**



| Type                      | Model  |
|---------------------------|--|
| CEILING<br>DUCTED<br>TYPE | CHV-07SDHSP<br>CHV-09SDHSP<br>CHV-12SDHSP<br>CHV-15SDHSP<br>CHV-19SDHSP<br>CHV-24SDHSP<br>CHV-30SDHSP<br>CHV-38SDHSP<br>CHV-48SDHSP<br>CHV-54SDHSP |

**IMPORTANT:**

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



## 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.  
International Organization for Standardization: (ISO 5149 or European Standard, EN 378).
- 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.

### **DANGER**

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

### **WARNING**

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

### **CAUTION**

: 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.
- Refer to Installation & Maintenance Manual of outdoor unit for temperature operation range.
- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

## **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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# Section1 Operation Manual

## 1. Safety Summary

### DANGER

- 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 the indoor or outdoor units without turning OFF the main power supply.

### WARNING

- Refrigerant leakage can cause difficulty with breathing due to insufficient air. If leakage occurs, turn OFF the main switch, put out fire at once and contact your service contractor.
- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately 3.3ft.(1m) from the system.
- If Ground Fault Circuit Interrupter(GFCI) or fuse is often activated, stop the system and contact your service contractor.

### CAUTION

- 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 so that they do not play with the appliance.
- The appliance should not be installed in the laundry.

### NOTE

- It is recommended that the room be ventilated every 3 to 4 hours.

## 2. System Description

The heat pump air conditioner is designed to offer cooling, heating, dry and fan operations. These operation modes are controlled by the remote control switch (optional).

Table 2.1 Indoor Unit Type List

| Indoor Unit Type    | Nominal Capacity ( 10 <sup>3</sup> Btu/h ) |    |    |    |    |    |    |    |    |    |
|---------------------|--|----|----|----|----|----|----|----|----|----|
|                     | 07   | 09 | 12 | 15 | 19 | 24 | 30 | 38 | 48 | 54 |
| CEILING DUCTED TYPE | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○  | ○  |

○ : Available

### 3. Remote Control Switch



Press switches only with fingers. Do not press switches by any other item, as it may break switches.

Do not touch the CHECK switch. This switch is only for servicing. If touched, press the CHECK switch again to reset.

---

#### ● Temperature Setting

When the TEMP switch is pressed, temperature increases by 1 degree. The minimum setting indication is 61°F(16°C) and the maximum setting indication is 90°F(32°C).

#### ● Set and Actual Temperature

The set temperature is for the air temperature at the sensor (thermistor) of the indoor unit. The actual room temperature may be different

from the air temperature of the sensor due to the difference of the sensing location.

#### ● Touching Type Switches

This control switch is of touching type. Slightly press the switch by finger. The operation can be checked by the display of the liquid crystal.

#### ● Multiple-Unit Control

16 indoor units, as a maximum number, can be controlled by one remote control switch. Refer to the Installation Manual for Remote Control Switch.

## 4. Before Operation

### CAUTION

Supply electrical power to the system for approximately 12 hours before start-up after long shutdown. Do not start the system immediately after power supply, it may cause a compressor failure, because the compressor is not heated well.

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.

---

When the system is started after a shutdown longer than approximately 3 months, it is recommended that the system be checked by your service contractor.

Turn OFF the main switch when the system is stopped for a long period of time. If the main switch is not turned OFF, electricity is consumed, because the oil heater is always energized during compressor stopping.

## 5. Operation Method

Regarding the instructions of Wired Remote Control Switch or Wireless Remote Control Switch, read the operation manual attached to the control switch.

## 6. Automatic Control

The system is equipped with the following functions.

---

### NOTE

---

Except for a long period of shutdown, keep the main power switch ON. The drain discharge mechanism is operated if the drain level is higher than the setting.

---

- **Three Minute Guard (Enforced Stoppage)**  
The compressor remains off for at least 3 minutes once it has stopped. If the system is started within approximately 3 minutes after it has stopped, the RUN indicator is activated. However, the cooling operation or the heating operation remains off and does not start until 3 minutes has elapsed.
- **Three Minute Guard (Enforced Operation)**  
If all indoor units of the system are Thermo-OFF within approximately 3 minutes after compressor has started, compressor is operated during 3 minutes continuously. However, if all indoor units of the system are stopped by remote control switch, compressor is stopped.
- **Oil Return Operation**  
If an indoor unit is stopped more than 2 hours continuously, this function is operated during a few minutes.  
It has this function to prevent to accumulate in the heat exchanger of stoppage indoor unit at cooling operation.
- **Frost Prevention During Cooling Operation**  
When the indoor unit is operated at low discharge air temperature, the cooling operation may be changed to fan operation for a while to avoid frost formation on the indoor heat exchanger.
- **Hot Start During Heating Operation**  
To prevent cold air discharge in the room, the fan speed is controlled from the slow position and the low position and then to the set position according to the discharge air temperature.
- **Slow Air Control During Defrosting Operation**  
When the outdoor unit is performing the automatic defrosting operation, the indoor fan is stopped.
- **Cooling of Indoor Unit**  
When the heating operation is stopped, the indoor fan operation is maintained at the slow position for the maximum of 2 minutes to lower temperature of the inside unit.
- **Automatic Defrosting Cycle**  
When the heating operation is stopped by pressing RUN/STOP switch, frosting on the outdoor unit is checked and the defrosting operation may be performed for the maximum of 10 minutes.

● **Prevention of Overload Operation**

When the outdoor temperature is high during heating operation, heating operation is stopped due to activation of the outdoor thermistor until the temperature becomes low.

---

**NOTE**

---

If the system is stopped due to a power failure, it will not automatically start again although power is restored.

Repeat the start-up procedure from Step 1 to start the system. In the event of a very brief power failure (2 seconds maximum), the settings are memorized.

Therefore, the system starts automatically after approximately 3 minutes.

---

**7. Troubleshooting**

**⚠ CAUTION**

**When overflow of drain water from the indoor unit occurs, stop the operation and contact your contractor.**

**When you smell or see white smoke coming from the unit, turn OFF the main power supply and contact your contractor.**

---

**7.1 If Trouble Still Remains**

If the trouble still remains even after checking the following, contact your contractor and inform them of the following items.

- (1) Unit Model Name
- (2) Content of Trouble
- (3) Alarm Code No. on Liquid Crystal Display

**7.2 No Operation**

Check whether the SET TEMP is set at the correct temperature.

**7.3 Not Cooling or Heating Well**

- Check for obstruction of air flow of the outside or inside units.
- Check if too much heat source exists in the room.
- Check if the air filter is clogged with dust.
- Check to see if the doors or windows are opened or not.
- Check if the temperature condition is not within the operation range.

**7.4 This is Not Abnormal**

● **Smells from Indoor Unit**

Smell adheres on indoor unit after a long period of time. Clean the air filter and panels or allow a good ventilation.

● **Sound from Deforming Parts**

During system starting or stopping, an abrading sound might be heard. However, this is due to thermal deformation of plastic parts. It is not abnormal.

● **Steam from Outdoor Heat Exchanger**

During defrosting operation, ice on the outdoor heat exchanger is melted, resulting in making steam.

● **Dew on Air Panel**

When the cooling operation continues for a long period of time under high humidity conditions (higher than 80 F (27°C)/80% R.H), dew can form on the fair panel.

● **Refrigerant Flow Sound**

While the system is being started or stopped, sound from the refrigerant flow may be heard.

● **Self-clean:**

During self-cleaning, the sound of sputter may be heard, which is a normal physical phenomena, and will disappear after cleaning.

---

**NOTE**

---

Except for a long period of shutdown, keep the main switch ON, since the oil heater is energized when the compressor is stopping.

---

## 8. Filter Cleaning

Turn OFF the main power switch before taking out the filter. (The previous operation mode may appear.)

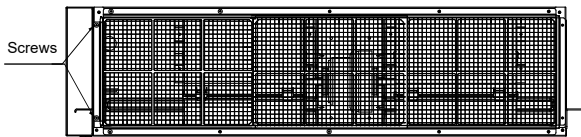
### 8.1 Taking Out the Filter

The indication, "FILTER" is shown on the display of the remote control switch after approximately 1,200 hour operation.

Take out the air filter according to the following steps.

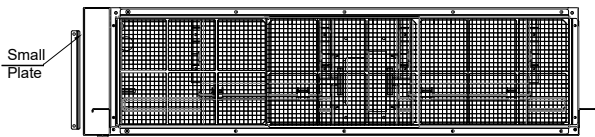
#### Step 1

Remove two screws from the small plate next to the electric box.



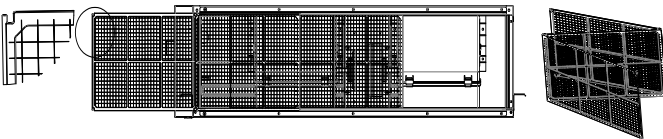
#### Step 2

Take out the small plate from the indoor unit.



#### Step 3

Take out the air filter from the air inlet grille. Slots are reserved for the tools in the front of the air filter. Air filter can be folded for multistage filters.



### 8.2 Clean the Filter

Clean the air filter according to the following steps.

#### Step 1

Use a vacuum cleaner or let water flow onto the air filter for removing the dirt from the air filter.

### CAUTION

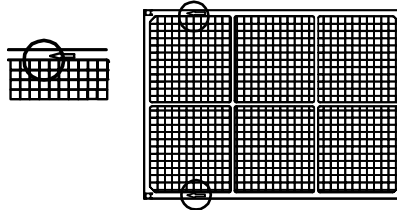
**Do not use hot water higher than approximately 104 °F(40°C).**

#### Step 2

Dry the air filter in the shade after shaking off moisture.

### 8.3 Installation of the Filter

The installation method is contrary to the disassembly method. But Install air filter according to arrow direction.



### 8.4 Reset of Filter Indication

After cleaning the air filter, press the "FILTER" button. The FILTER indication will disappear and the next filter cleaning time will be set.

# Section2 Installation & Maintenance Manual

## 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.
- Pay a special attention to the place, such as a basement, etc. where refrigerant can stay, since refrigerant is heavier than air.

### **CAUTION**

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

## 2. Structure

### 2.1 Indoor Unit & Refrigerant Cycle

Regarding the structural drawings and the refrigerant cycle diagrams, refer to Technical Catalogue.

### 2.2 Necessary Tools and Instrument List for Installation

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

### NOTE

About vacuum pump, gas hose, charging cylinder, gauge manifold, please use suitable equipments for R410A respectively. Do not mix other refrigerant.

## 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.

### 3.2 Handling of Indoor Unit

### **WARNING**

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

### **CAUTION**

Be careful not to damage on insulation materials of unit's surface when lifting.

#### 4. Indoor Unit Installation

### **⚠ DANGER**

Do not install the indoor unit in a flammable environment to avoid fire or an explosion.

### **⚠ WARNING**

- Check to ensure that the ceiling slab is strong enough. If not strong enough, the indoor unit may fall down on you.
- Do not install the indoor unit outdoors. If installed outdoors, an electric hazard or electric leakage will occur.

It is recommended that indoor units be installed higher than 8.2ft.(2.5m) from the floor level.


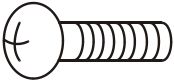

#### 4.1 Factory-Supplied Accessories

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

#### **NOTE**

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

Table 4.1 Factory-Supplied Accessories

| Accessory   | Q'ty | Purpose                   |
|---|------|---------------------------|
| Washer<br>       | 8    | For Unit Suspension       |
| Screw<br>       | 16   | For Fixing Flanges        |
| Hose Clamp<br> | 1    | For Drain Hose Connection |

## 4.2 Initial Check

- Install the indoor unit with a proper clearance around it for operation and maintenance working space, as shown in Fig. 4.1.

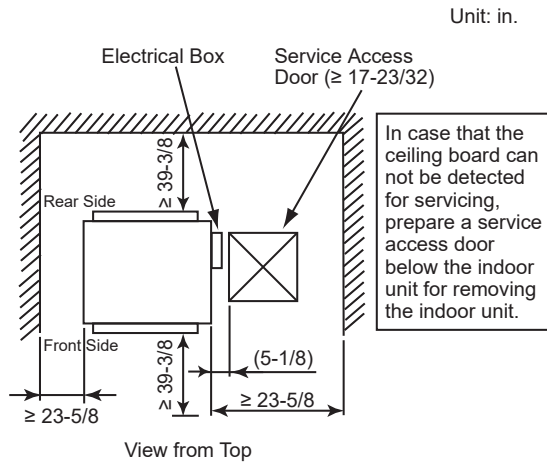


Fig. 4.1 Operation and Installation Space

- Consider the air distribution from the indoor unit to the space of the room, and select a suitable location so that uniform air temperature in the room can be obtained.
- Do not install flammable parts in the service space for the indoor unit.
- Avoid obstacles which may hamper the air intake or the air discharge flow.
- Do not install the indoor unit in a machine shop or kitchen where vapor from oil or its mist flows to the indoor unit.

The oil will deposit on the heat exchanger, thereby reducing the indoor unit performance, and may deform and in the worst case, break the plastic parts of the indoor unit.

- Pay attention to the following points when the indoor unit is installed in a hospital or other facilities where there are electronic waves from medical equipment.
  - (A) Do not install the indoor unit where the electromagnetic wave is directly radiated to the electrical box, remote control cable or remote control switch.
  - (B) Install the indoor unit and components as far as possible or at least 9.8ft.(3m) from the electromagnetic wave radiator.
  - (C) Prepare a steel box and install the remote control switch in it. Prepare a steel conduit tube and wire the remote control cable in it. Then, connect the ground wire with the box and the tube.

(D) Install a noise filter when the power supply emits harmful noises.

- To avoid any corrosive action to the heat exchangers, do not install the indoor unit in an acid or alkaline environment.

## ! WARNING

**Check to ensure that the number below is within 0.026lb/ft<sup>3</sup> (0.42kg/m<sup>3</sup>). Otherwise it may lead to dangerous situation if the refrigerant in the Outdoor Unit leaks into the room where this Indoor Unit is installed.**

$$\frac{\text{(Total Refrigerant Quantity per Outdoor Unit)}}{\text{( Volume of the room where this Indoor Unit is installed. )}} \leq 0.026\text{lb/ft}^3 \text{ (0.42kg/m}^3\text{)}$$

**This value should be decided according to the each country's regulation such as ISO5149, EN378 and ASHRAE Standard 15.**

## 4.3 Installation

### 4.3.1 Suspension Bolts

#### Step 1

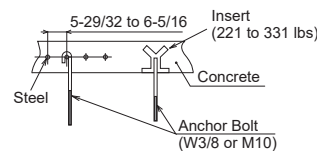
Select final location and installation direction of the indoor unit paying careful attention to the space for the piping, wiring and maintenance.

#### Step 2

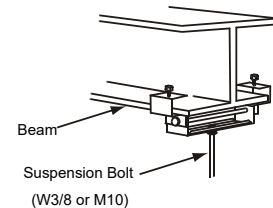
Mount suspension bolts, as shown in Fig. 4.2

Unit: in.

- For Concrete Slab



- For Steel Beam



- For Wooden Beam Suspension

Wooden Bar  
(2-23/64 to 3-35/64 Square)

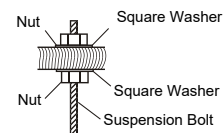
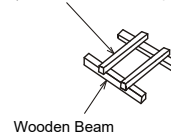
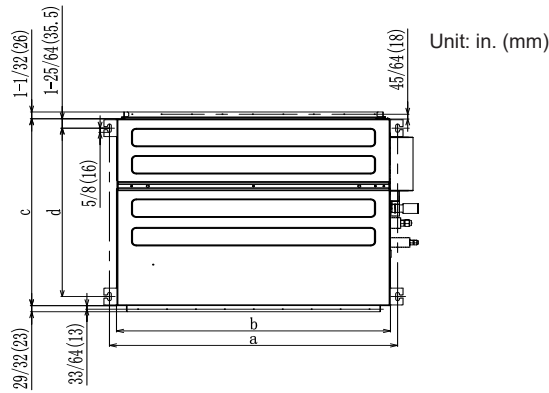


Fig. 4.2 Mounting of Suspension Bolts

### 4.3.2 Marking the Positions of the Sling Bolts and Piping Connections

- (1) Mark the positions of the sling bolts, refrigerant piping connections and drain connection.
- (2) Installation dimensions are shown in Fig. 4.3.



| Model   | a                 | b                 | c                 | d                 |
|---------|-------------------|-------------------|-------------------|-------------------|
| 07 ~ 15 | 27-9/16<br>(700)  | 25-19/32<br>(650) | 28-11/32<br>(720) | 25-19/32<br>(650) |
| 19 ~ 24 | 37-1/4<br>(946)   | 35-7/16<br>(650)  | 28-11/32<br>(720) | 25-19/32<br>(650) |
| 30 ~ 38 | 45-9/32<br>(1150) | 43-5/16<br>(110)  | 31-1/2<br>(800)   | 28-5/8<br>(727)   |
| 48 ~ 54 | 57-3/32<br>(1450) | 55-1/8<br>(1400)  | 31-1/2<br>(800)   | 28-5/8<br>(727)   |

Fig. 4.3 Installation dimensions

### 4.3.3 Mounting the Indoor Unit

Hang the indoor unit as shown in Fig. 4.4.

#### Field-Supplied Parts

- \*Sling Bolts 4-M10 or W3/8
- \*Nut 8-M10 or W3/8

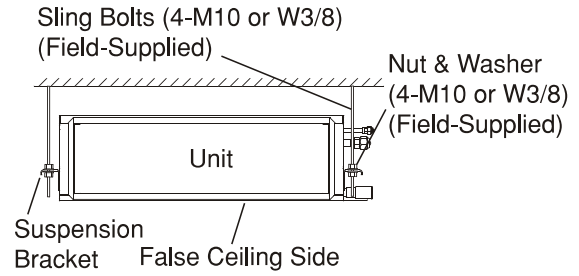


Fig. 4.4 Hanging Indoor Unit

- (1) How to put Nuts or Sling Bolts  
Put nuts on each of the four hanging bolts, as shown in Fig. 4.5.

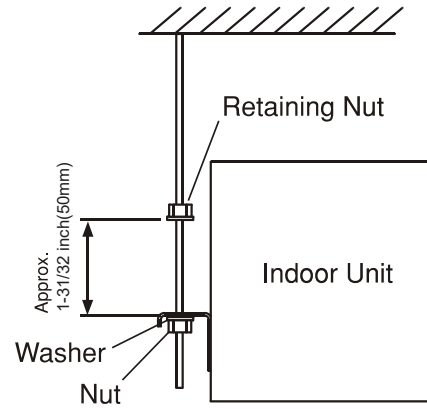


Fig. 4.5 Sling Bolts and Nut

- (2) Hanging the Indoor Unit

- \* Hook suspension bracket to the nut and washer of each hanging bolt, as shown, starting at the opposite side to service cover side.
- \* After checking that the nut and washer are correctly fixed by the retainers of the suspension bracket, hook the suspension bracket of the service cover side to the nut and washer.  
(Put the sling bolts away from the unit when hooking.)

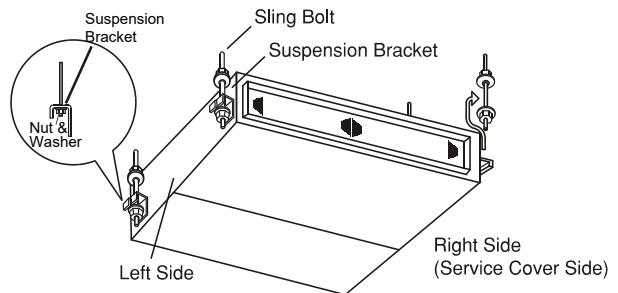


Fig. 4.6 Hanging Indoor Unit

#### 4.3.4 Adjusting of the Unit Level

- (1) Check to ensure that the foundation is flat, taking into account the maximum foundation gradient. Unit: in. (mm)

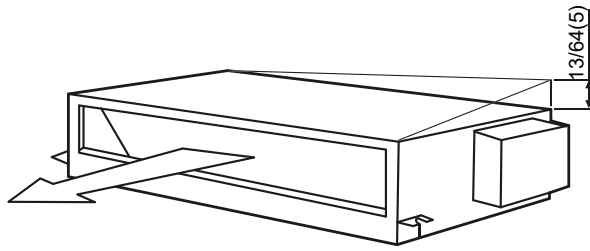


Fig. 4.7 Foundation Gradient

- (2) The unit should be installed so that the rear side of the unit is slightly 0~13/64in.(0~5mm) lower than the front side, in order to avoid the incorrect position of the drain discharge.
- (3) Tighten the bolts of the sling nuts with the suspension brackets after adjustment is completed.

Special plastic paint must be applied to the bolts in order to prevent them from loosening.

#### NOTE

Keep the unit as well as relevant equipment covered with the vinyl cover during installation work.

#### 4.3.5 Connecting Supply Duct

- (1) The supply duct should be connected with the indoor unit through canvas ducts, in order to avoid abnormal sound vibration (Refer to Fig. 4.8). The unit is equipped with a pre-drilled duct flange for the supply duct connection.
- (2) Attach the vibration proof rubber to Sling Bolt in order to avoid abnormal sound vibration.
- (3) Duct material should be non-flammable material.
- (4) Perform the heat insulation work over the duct for dew protection.

### CAUTION

- If a lower sound level is further required, install silencer (field-supplied).
- Design duct arrangement as “Unit External Static Pressure=Pressure Drop of Duct+Pressure Drop of Air Outlet and Air Inlet”.  
If duct design is not appropriate, loud sound and splash will occur.

| Voltage  | Model          | Static Pressure in.W.G.(Pa)                           |
|----------|----------------|---|
| 208/230V | CHV-07~24SDHSP | 0.12 <sup>(0)</sup> /0.60<br>(30 <sup>(0)</sup> /150) |
|          | CHV-30~54SDHSP | 0.20 <sup>(0)</sup> /0.80<br>(50 <sup>(0)</sup> /200) |

(0): Before Shipment

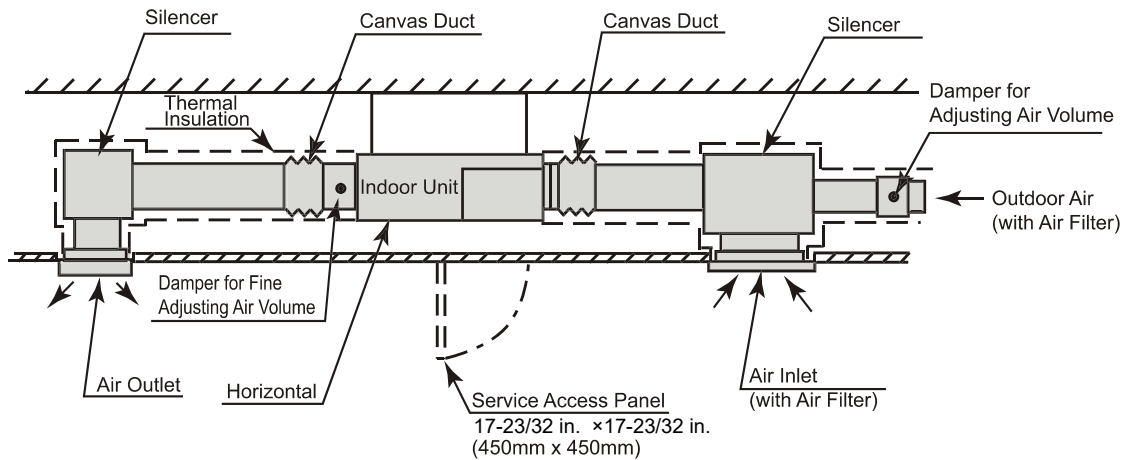


Fig. 4.8 Duct Connection

## 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

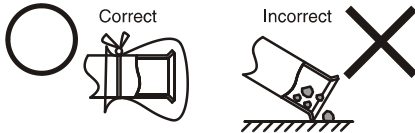
- (1) Prepare locally-supplied copper pipes.
- (2) Select clean copper tubes making sure there is no dust and moisture inside the tubes.

Before connecting pipes, blow the inside of the tubes with nitrogen or dry air, to remove any dust or foreign materials.

### 5.2 Piping Connection

### **⚠ CAUTION**

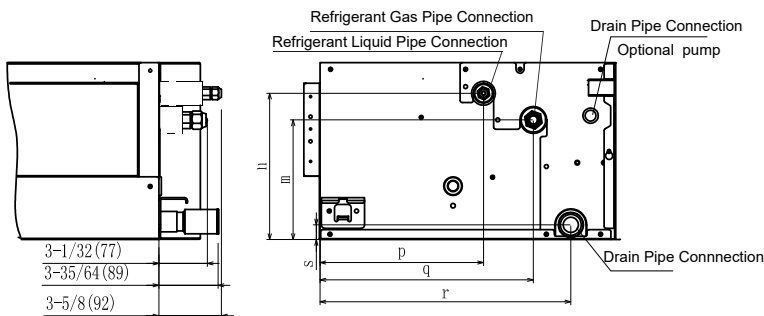
- Cap the end of the pipe when the pipe is to be inserted through a hole.
- Do not put pipes on the ground directly without a cap or vinyl tape at the end of the pipe.



- An excess or a shortage of refrigerant is the main cause of trouble to the units. Charge refrigerant by the correct quantity.

- (1) Position of piping connection is shown below.

Unit: in. (mm)



| Dimension | m                | n                | p                | q                 | r                 | s             |
|-----------|------------------|------------------|------------------|-------------------|-------------------|---------------|
| Model     |                  |                  |                  |                   |                   |               |
| 07~24     | 7-11/64<br>(182) | 8-47/64<br>(222) | 9-11/16<br>(246) | 12-41/64<br>(321) | 14-27/32<br>(377) | 29/32<br>(23) |
| 30~54     | 5-29/32<br>(150) | 7-31/64<br>(190) | 10-5/8<br>(270)  | 13-37/64<br>(345) | 15-25/32<br>(401) | 55/64<br>(22) |

Fig. 5.1 Position of Piping Connection

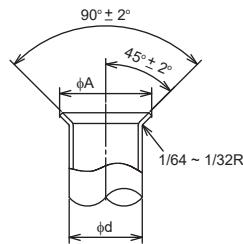
### **NOTE**

The position of the drain pipe connection is as shown in the above figure, and the lower connection hole shall be closed with the rubber plug. Unit: in.(mm)

| Model   | Gas Piping   | Liquid Piping |
|---------|--------------|---------------|
| 07 ~ 15 | 1/2 (φ12.7)  | 1/4 (φ6.35)   |
| 19      | 5/8 (φ15.88) | 1/4 (φ6.35)   |
| 24 ~ 30 | 5/8 (φ15.88) | 3/8 (φ9.53)   |
| 38 ~ 54 | 5/8 (φ15.88) | 3/8 (φ9.53)   |

### ※ Flaring Dimension

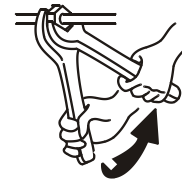
Perform the flaring work as shown below. Unit: in.(mm)



| Diameter<br>φD | A <sup>+0</sup><br>-1/64(0.4) |
|----------------|-------------------------------|
|                | R410A                         |
| 1/4(6.35)      | 1/32(9.1)                     |
| 3/8(9.53)      | 33/64(13.2)                   |
| 1/2(12.7)      | 21/32(16.6)                   |
| 5/8(15.88)     | 25/32(19.7)                   |
| 3/4(19.05)     | (*)                           |

- (\*) It is impossible to perform the flaring work with 1/2H material. In this case, use an accessory pipe(with a flare).

- (2) When tightening the flare nut, use two spanners as shown in Fig. 5.2.



Required Tightening Torque

| Pipe Size           | Tightening Torque                |
|---------------------|----------------------------------|
| φ1/4 in. (6.35 mm)  | 10.3 - 13.3 ft·lbs (14 - 18 N·m) |
| φ3/8 in. (9.53 mm)  | 25.1 - 31.0 ft·lbs (34 - 42 N·m) |
| φ1/2 in. (12.7 mm)  | 36.1 - 45.0 ft·lbs (49 - 61 N·m) |
| φ5/8 in. (15.88 mm) | 50.2 - 60.5 ft·lbs (68 - 82 N·m) |

Fig. 5.2 Tightening Work of Flare Nut

- (3) After connecting the refrigerant piping, seal the refrigerant pipes by using the Field - supplied insulation material as shown in Fig 5.3.

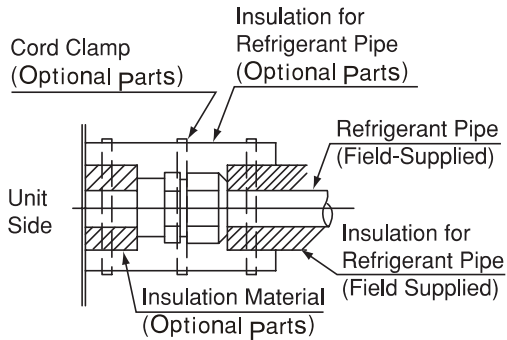


Fig. 5.3 Insulation on Pipes

- (4) Evacuation and refrigerant charging procedures should be performed according to "Installation & Maintenance Manual" of the outdoor unit.

## 6. Drain Piping

- (1) The position of the drain piping connection is shown in Fig. 6.1.
- (2) Prepare polyvinyl chloride pipe with a 1-1/4in. (32mm) outer diameter.
- (3) Fasten the tube to the drain hose with the adhesive agent and the filed-supplied clamp. The drain piping must be performed with a DOWN-SLOPE pitch of 1/25 to 1/100.
- (4) Insulate the drain pipe after connecting the drain hose.

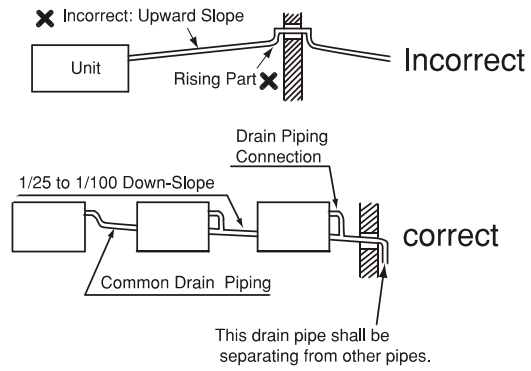


Fig. 6.1 Drain Piping

### NOTE

When the relative humidity of inlet or ambient air exceeds 80%, apply an (field-supplied) auxiliary drain pan beneath the indoor unit as shown in Fig. 6.2.

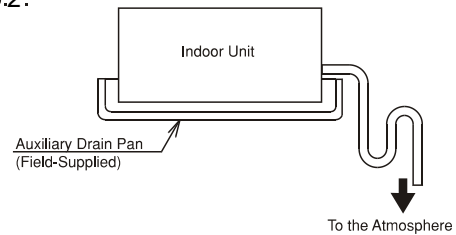


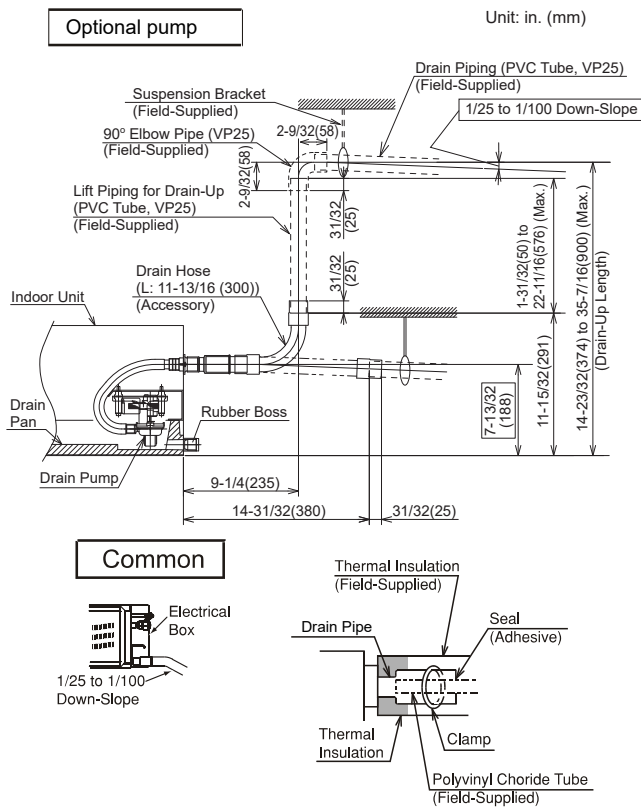
Fig. 6.2 Auxiliary Drain Pan

### NOTE

- (1) Do not create an upper-slope or rise for the drain piping, since drain water can flow back to the unit and leakage to the room will occur when the unit operation is stopped.
- (2) Do not connect the drain pipe with sanitary or sewage piping or any other drainage piping.
- (3) When the common drain piping is connected with other indoor units, the connected position of each indoor unit must be higher than the common piping. The pipe size of the common drain pipe must be large enough according to the unit size and number of units.
- (4) After performing drain piping work and electrical wiring, check to ensure that water flows smoothly as in the following procedure.
 

**Checking with the Float Switch**

  - a. Switch ON the power supply.
  - b. Pour 2 to 2.5 liters of water into the drain pan.
  - c. Check to ensure that the water flows smoothly and no water leakage occurs. When water cannot be found at the end of the drain piping, pour another 2 liters of water into the drain pan.



## 7. Electrical Wiring

### **⚠ WARNING**

- All electrical work must be done as outlined in this manual and in accordance with this manual. Substandard work can result in fire and damage to the unit.
- Use specified cables between units and choose the cables correctly. If not, an electrical shock or fire may occur.
- Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply. It can result in an electrical shock.
- Turn OFF the main power switch of the indoor unit and the outdoor unit before attempting any electrical wiring work or a periodical check is performed. If not, it will result in an electric shock or a fire.
- Check to ensure that the indoor fan and the outdoor fan have stopped before attempting any electrical wiring work or for any scheduled electrical work that is being performed.
- The wires must be firmly secured. External force applied to terminals may cause a fire.
- It is forbidden to connect a plurality of power lines into one power terminal block. At the indoor unit side of air conditioner, power wiring can be extended through a power distribution box. Be sure to calculate the wiring capacity carefully, since excessively low wiring capacity may frequently cause fire.
- Do not start the system before all check points are thoroughly checked.

### **⚠ CAUTION**

- Wrap the accessory packing around the wires, and plug the wiring connection hole with the seal material to protect the product from any condensate or insects.
- Tightly secure the wires with the cord clamp inside the indoor unit.
- Secure the cable of wired control using the cord clamp inside the electric box. But North American products, Local safety standards are adopted for power wiring.
- Tighten screws to the following torques.
  - M3.5: 0.9 ft·lbs (1.2 N·m)**
  - 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 2.4 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)**

### 7.1 General Check

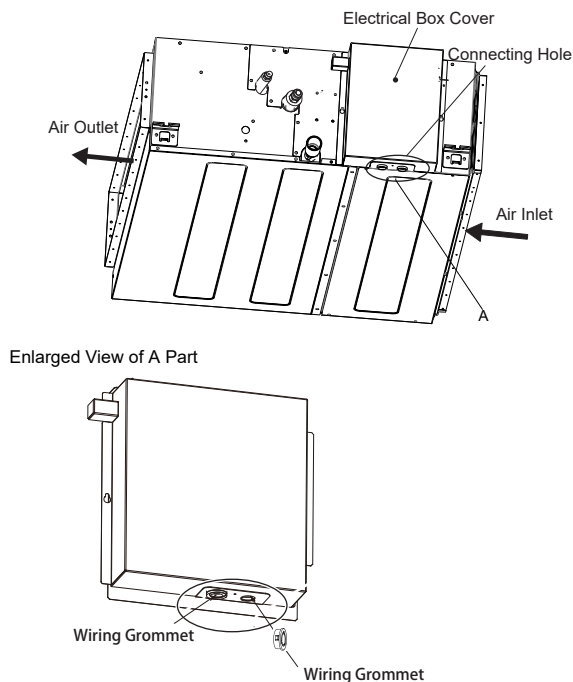
- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data given in "Technical Catalog". Make sure that the components comply with National Electrical Code (NEC).

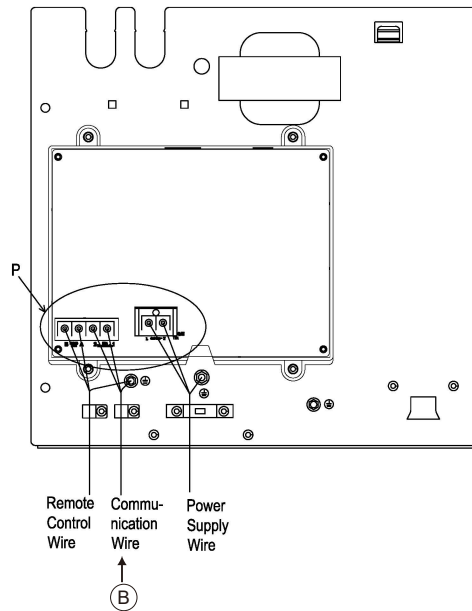
- (2) Check to ensure that the power supply voltage is within  $\pm 10\%$  of the rated voltage.
- (3) Check the capacity of the electrical wires.  
If the power source capacity is too low, the system cannot be started due to the voltage drop.
- (4) Check to ensure that the ground wire is connected.
- (5) Power Source Main Switch  
Install a multi pole main switch with a space of 9/64in.(3.5mm) or more between each phase.

### 7.2 Electrical Wiring Connection

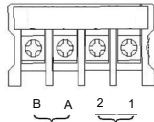
The electrical wiring connection for the indoor unit is shown in Fig. 7.1.

- (1) Connect the cable of an optional remote control switch or an optional extension cable to the connectors on the printed circuit board inside the electrical box through the connecting hole in the cabinet.
- (2) Connect the power supply and earth wires to the terminals in the electrical box.
- (3) Connect the wires between the indoor unit and the outdoor unit to the terminals in the electrical box.
- (4) Tightly clamp the wires using the cord clamp inside the electrical box.

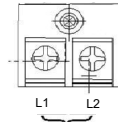




Enlarged View of P Part Terminal Block (TB) Wiring



Wired Remote Control Wire



Communication Cable

208/230V~60Hz

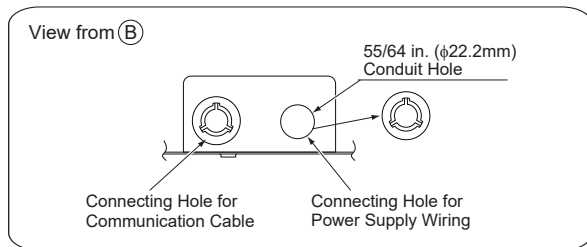


Fig. 7.1 Electrical Wiring Connection

## 8. Test Run

Test run should be performed according to "Installation & Maintenance Manual" of the outdoor unit.

### **! WARNING**

- Do not operate the system until all the check points have been cleared.
  - (A) 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.
  - (B) Check to ensure that the stop valves of the outdoor unit are fully opened, and then start the system.
  - (C) 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 crankcase 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.

## 9. Safety and Control Device Setting

Indoor Unit

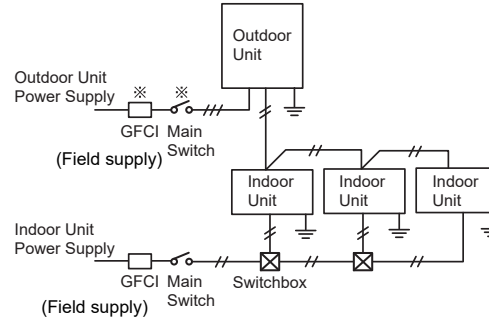
|                                   |  |        |        |
|-----------------------------------|--|--------|--------|
| Model                             |  | 07~ 54 |        |
| For Control Circuit Fuse Capacity |  | A      | 10     |
| Freeze Protection Thermostat      |  | °F(°C) | 32(0)  |
| Cut-Out                           |  | °F(°C) | 58(14) |
| Cut-In                            |  | °F(°C) | 58(14) |
| Set Temperature Difference        |  | °F(°C) | 4(2)   |

## 10. Common

### 10.1 Field Minimum Wire Sizes for Power Source Line

This equipment can be installed with a Ground Fault Circuit Interrupter (GFCI), which is a recognized measure for added protection to a properly grounded unit. Install appropriate sized breakers /fuses / overcurrent protection switches and wiring in accordance to local, state and NEC codes and requirements. The equipment installer is responsible for understanding and abiding by applicable codes and requirements. Failure to use a GFCI can result in electrical shock or fire.

Select wiring capacity according to the table 10.1. Install a GFCI (Ground Fault Circuit Interrupter) and main switch as shown in each of the system diagrams below.



※ Refer to the "Installation and Maintenance Manual" for the connected outdoor unit for details of wire, GFCI and main switch for outdoor unit.

Select a GFCI according to the Max. Overcurrent Protective Device (A).

Table 10.1 Recommended Wiring Capacity and Size

| Units       |    |          |               | Power supply |      | Power supply wiring size                             | Communication Cable Size     | Fan motor |      |
|-------------|----|----------|---------------|--------------|------|--|------------------------------|-----------|------|
| Model       | Hz | Volts    | Voltage range | MCA          | MOP  |  |                              | kW        | FLA  |
| CHV-07SDHSP | 60 | 208/230V | 187-253V      | 1.81         | 2.48 | Wiring size and length must comply with local codes. | AWG18 (0.82mm <sup>2</sup> ) | 0.150     | 0.65 |
| CHV-09SDHSP |    |          |               | 1.81         | 2.48 |  |                              | 0.150     | 0.65 |
| CHV-12SDHSP |    |          |               | 1.81         | 2.48 |  |                              | 0.150     | 0.65 |
| CHV-15SDHSP |    |          |               | 1.81         | 2.48 |  |                              | 0.150     | 0.65 |
| CHV-19SDHSP |    |          |               | 2.27         | 3.66 |  |                              | 0.250     | 1.00 |
| CHV-24SDHSP |    |          |               | 2.27         | 3.66 |  |                              | 0.250     | 1.00 |
| CHV-30SDHSP |    |          |               | 2.68         | 4.84 |  |                              | 0.250     | 1.00 |
| CHV-38SDHSP |    |          |               | 2.68         | 4.84 |  |                              | 0.250     | 1.00 |
| CHV-48SDHSP |    |          |               | 5.04         | 9.07 |  |                              | 0.375     | 1.40 |
| CHV-54SDHSP |    |          |               | 5.04         | 9.07 |  |                              | 0.375     | 1.40 |

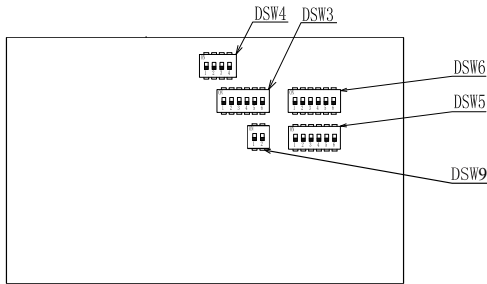
MCA: Min. Circuit Amps (A)

MOP: Max. Overcurrent Protective Device (A)

FLA: Full Load Amps (A)

## 10.2 Setting of Dip Switch

- (1) DIP switch must be set with power sources of the indoor and outdoor units in OFF state. Otherwise, the settings are invalid.  
 (2) The location of DIP switch is shown in the figure below.



- (3) The PCB of indoor unit is furnished with 5 DIP switches that must be set based on the following requirements before test run. The system must not be started before the completion of DIP setup.

- (a) All indoor units must be numbered (DSW6) as shown in the figure below. The outdoor unit numbering must start with "0".

|                    |                       |
|--------------------|-----------------------|
| DSW6(Setting 0~63) | Ex.)Set machine No.16 |
|                    | <br>No.5 ON           |

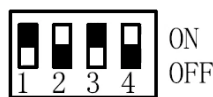
DSW6 are set to "0" before delivery. 64 indoor units can be connected.

Remarks: For DSW6 six-bit binary 8421 code, see the comparison table on the next page.

- (b) Capacity Code Setting (DSW3)  
 No setup is required.  
 The code is set before delivery. This switch is used to set the capacity of indoor unit.

|                  |    |    |    |    |    |    |
|------------------|----|----|----|----|----|----|
| Capacity         | 07 | 09 | 12 | 15 | 19 | 24 |
| Setting Position |    |    |    |    |    |    |
| Capacity         | 30 | 38 | 48 | 54 |    |    |
| Setting Position |    |    |    |    |    |    |

- (c) Model Code Setting (DSW4)  
 No setup is required. The code is set before delivery.  
 Default No.1 and 3 ON.



- (d) Cooling System Code No. Setting (DSW5)  
 The setup is needed. All are set to OFF before delivery.

### Refrigerant System Setting

|                    |                       |
|--------------------|-----------------------|
| DSW5(Setting 0~63) | Ex.) Set system No. 5 |
|                    |                       |

DSW5 are set to "0" before delivery. 64 indoor units can be connected.

Remarks: For DSW5 six-bit binary 8421 code, see the comparison table on the next page.

- (e) Other function setting (DSW9)  
 No setup is required. The code is set before delivery.

|                  |            |
|------------------|------------|
| Model            | All models |
| Setting Position |            |

### Note:

Symbol "■" indicates the location of DIP switch. The position indicated in the diagram is in the factory-set state.

## CAUTION

The power supply shall be turned off before the setup of DIP switch. Otherwise, the settings will be invalid.

Appendix: Comparison table of 8421 Code and Decimal No

| Decimal No. | 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 | ● | ● | ● | ● | ● | ● |

○ : The current position is set to OFF

● : The current position is set to ON

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08.2022 V00