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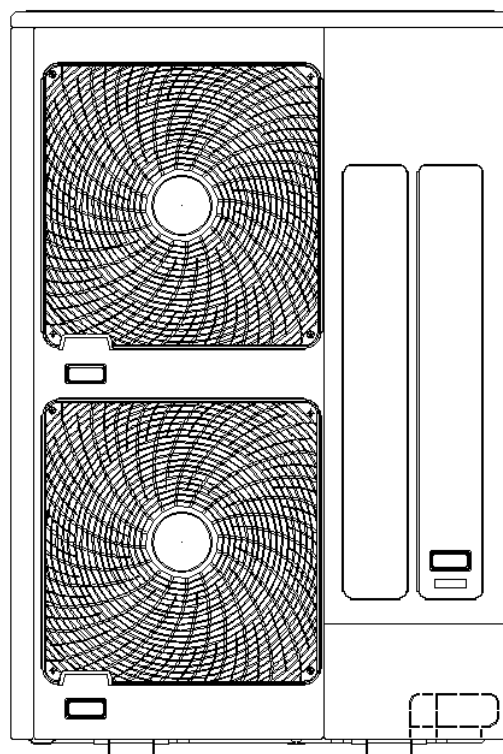
Installation & Maintenance Manual

*INVERTER-DRIVEN
SPLIT SYSTEM
HEAT PUMP
AIR CONDITIONERS*

Model
AVW-76U9SR
AVW-96U9SR
AVW-114U9SR

IMPORTANT:

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



P00819Q

ORIGINAL INSTRUCTIONS

IMPORTANT NOTICE

- HISENSE pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- HISENSE 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.
British Standard, BS4434 or Japan Standard, KHKS0010.
- 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 customer should add safety, caution and operating signs in the native language.
- If you have any questions, contact your distributor or dealer of HISENSE.
- This manual gives a common description and information for this heat pump air conditioner which you operate as well as for other models.
- Perform installation work according to local codes and regulations.
- This heat pump air conditioner has been designed for the following temperatures. Operate the heat pump air conditioner within this range.

Temperature		(°C)	
		Maximum	Minimum
Cooling Operation	Indoor	23 WB	15 WB
	Outdoor	43 DB	-15 DB
Heating Operation	Indoor	30 DB	15 DB
	Outdoor	17 WB	-20 WB

DB: Dry Bulb, WB: Wet Bulb

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-tight 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.
- 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 (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 lead 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 and which may lead to a fire.
- Fix the cables securely. External forces on the terminals could lead to a fire.

SAFETY SUMMARY

CAUTION

- Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 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.
- 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.

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 1000m;
 - Regarding frequency of supply power within $\pm 1\%$ Hz of rated frequency;
 - Regarding transport / storage temperature within -25~55°C.

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.

Hisense's liability shall not cover defects arising from the alteration performed by a customer without Hisense's consent in a written form.

⚠ ATTENTION :



This product shall not be mixed with general household waste at the end of its life and it shall be retired according to the appropriated local or national regulations in an environmentally correct way. Due to refrigerant, oil and other components contained in the Air Conditioner, its dismantling must be done by a professional installer accordingly to the applicable regulations.

Contact the Hisense Customer Care for more information.

TABLE OF CONTENTS

1. Safety Summary	1
2. Structure	1
2.1 Outdoor Unit & Refrigerant Cycle	1
2.2 Necessary Tools and Instrument List for Installation	3
3. Transportation and Handling	4
3.1 Transportation	4
3.2 Handling of Outdoor Unit	4
4. Outdoor Unit Installation	5
4.1 Factory-Supplied Accessories	5
4.2 Initial Check	5
4.3 Service Space	6
4.4 Installation Work	8
5. Refrigerant Piping Work	10
5.1 Piping Materials	10
5.2 Refrigerant Piping Work	11
5.3 Piping Connection	13
5.4 Air Tight Test	15
5.5 Vacuum Pumping	16
5.6 Caution of the Pressure by Check Joint	18
5.7 Collecting Refrigerant	19
6. Electrical Wiring	19
6.1 General Check	19
6.2 Electrical Wiring Connection	20
7. Test Run	24
8. Safety and Control Device Setting	28

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.

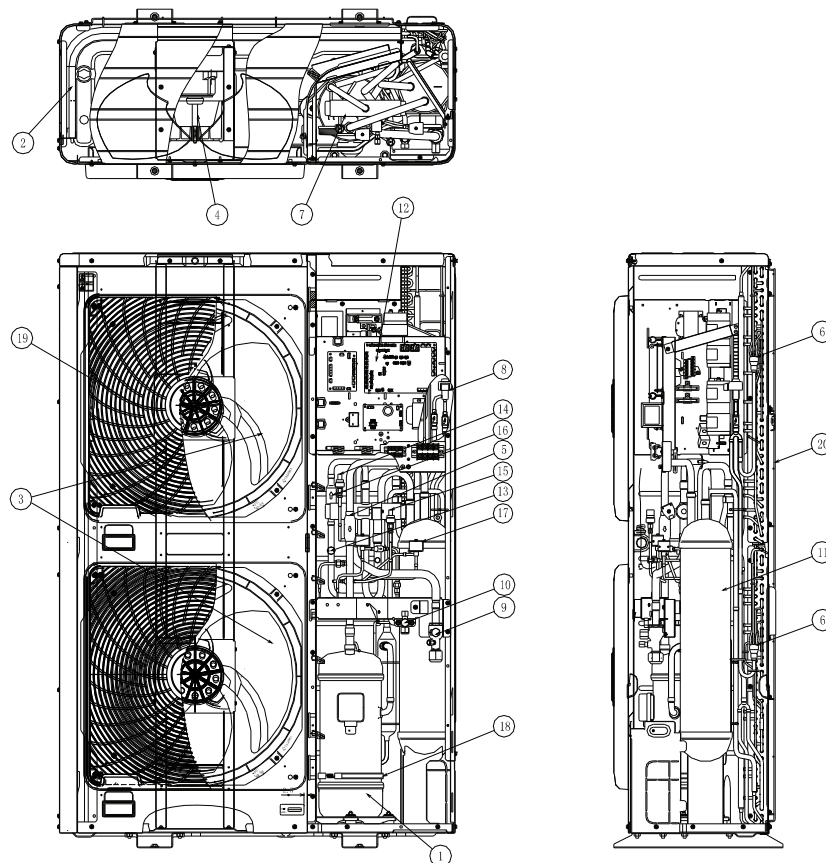
! CAUTION

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

2. Structure

2.1 Outdoor Unit & Refrigerant Cycle

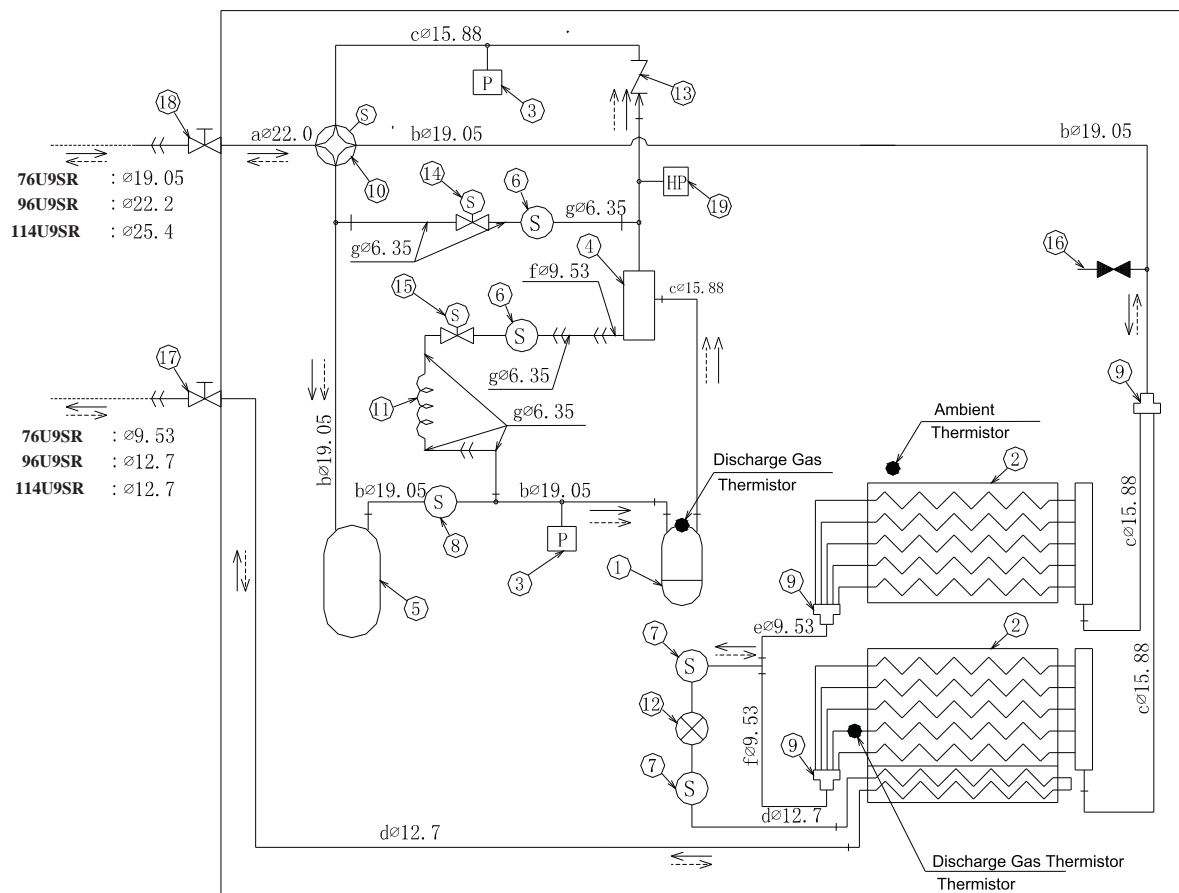
<Outdoor Unit>



No.	Part Name	No.	Part Name
1	Compressor	12	Electrical Box
2	Heat Exchanger	13	High Pressure Switch for Protection
3	Propeller Fan	14	Low Pressure Sensor
4	Fan Motor	15	High Pressure Sensor
5	Strainer	16	Check Valve
6	Distributor	17	Solenoid Valve
7	Reversing Valve	18	Crankcase Heater
8	Micro-Computer Control Expansion Valve	19	Air Outlet
9	Stop Valve for Gas Line	20	Air Inlet
10	Stop Valve for Liquid Line	21	
11	Accumulator		

<Refrigerant Cycle>

<Outdoor Unit>



Mark	Part Name
①	Compressor
②	Heat Exchanger
③	Sensor for Refrigerant Pressure
④	Oil Separator
⑤	Accumulator
⑥	Strainer(3/8)
⑦	Strainer(1/2)
⑧	Strainer(3/4)
⑨	Distributor
⑩	Reversing Valve
⑪	Capillary Tube
⑫	Electronic Expansion Valve
⑬	Check Valve
⑭	Solenoid Valve
⑮	Solenoid Valve
⑯	Check Joint
⑰	Stop Valve for Liquid Line
⑱	Stop Valve for Gas Line
⑲	High Pressure Switch for Protection

Mark	O. D. × T	Material
a	φ22.0 × 1.5 t	C1220T-0
b	φ19.05 × 1.65 t	
c	φ15.88 × 1.2 t	
d	φ12.7 × 1.0 t	
e	φ9.53 × 1.0 t	
f	φ9.53 × 0.8 t	
g	φ6.35 × 1.07 t	

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 only for the new refrigerant which is directly touch to 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	◇	◇	-	Cutting Pipe
	Chamfering Reamer	◇	◇	-	Removing Burrs
	Flaring Tool	◇ ●	◇	* The flaring tools for R407C are applicable to R22.	Flaring for Tubes
	Extrusion Adjustment Gauge	●	-	* If using flaring tube, make dimension of tube larger for R410A. * In case of material 1/2H, flaring is not available.	Dimensional Control for Extruded Portion of Tube after Flaring
	Pipe Bender	◇	◇	* In case of material 1/2H, bending is not available. Use elbow for bend and braze.	Bending
	Expanding Tool	◇	◇	* In case of material 1/2H, expanding of tube is not available. Use socket for connecting tube.	Expanding Tubes
	Torque Wrench	●	◇	* For φ12.7, φ15.88, spanner size is up 2mm.	Connection of Flare Nut
		◇	◇	* For φ6.35, φ9.53, φ19.05, spanner size is the same.	
	Brazing Tool	◇	◇	* Perform correct brazing work.	Brazing for Tubes
Vacuum Drying Refrigerant Charge	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
	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.	Vacuum Pumping, Vacuum Holding, Refrigerant Charging and Check of Pressures
	Charging Hose	●	✦	* 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. 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 practical 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.

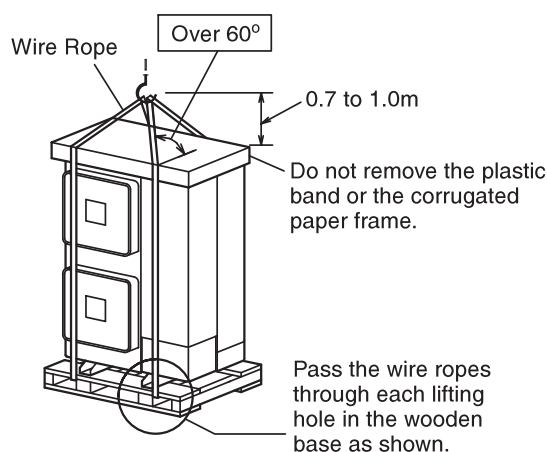


Fig. 3.1 Hanging Work for Transportation

! CAUTION

- Lift the outdoor unit in its factory packaging with 2 wire ropes.
- For safety reasons ensure that the outdoor unit is lifted smoothly and does not lean.
- Do not attach lifting equipment to the plastic band or the corrugated paper frame.
- Ensure the exterior of the unit is adequately protected with cloth or paper.

3.2 Handling of Outdoor Unit

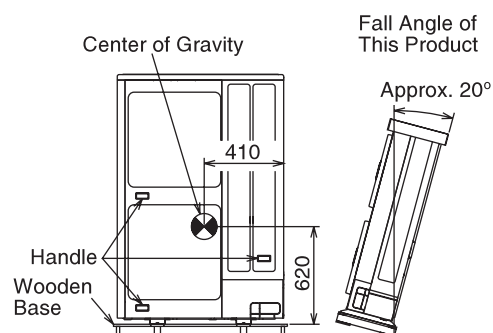
! WARNING

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 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.



(kg)	
Model	Unit Gross Weight
76 96	179
114	182

Fig. 3.2 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

Accessory	Q'ty
Pipe with Flange of Refrigerant Piping	1
Compressed Sheet	1

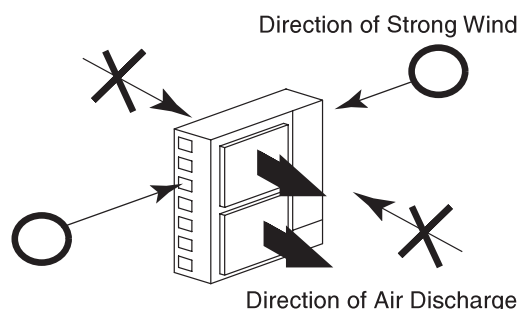
NOTE

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

4.2 Initial Check

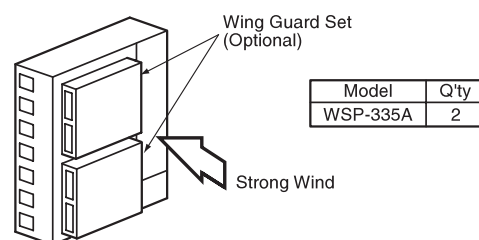
- Install the outdoor unit where good ventilation is available, and where it is dry.
- Install the outdoor unit where the sound or the discharge air from the outdoor unit does not affect neighbors or surrounding vegetation. The operating sound at the rear or right/left sides is higher than the value 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 practical, being at least 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.

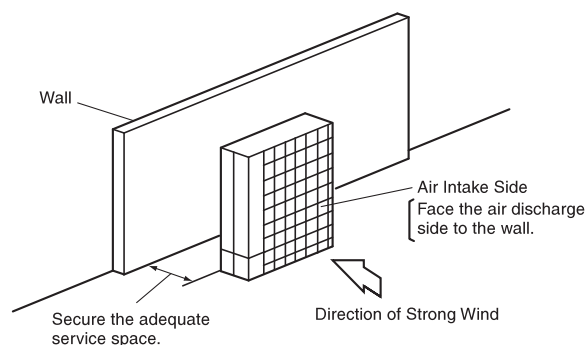


- In case of installation in the open spaces unavoidably where there is no buildings or surrounding structures, adopt the wind guard set or install near the wall to avoid facing the wind directly. Ensure that the service space should be secured.

(1) Using Wind Guard



(2) 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.

NOTE

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

4.3 Service Space

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

(1) Obstacles on Inlet Side

(a) Upper Side is Open.

(mm)

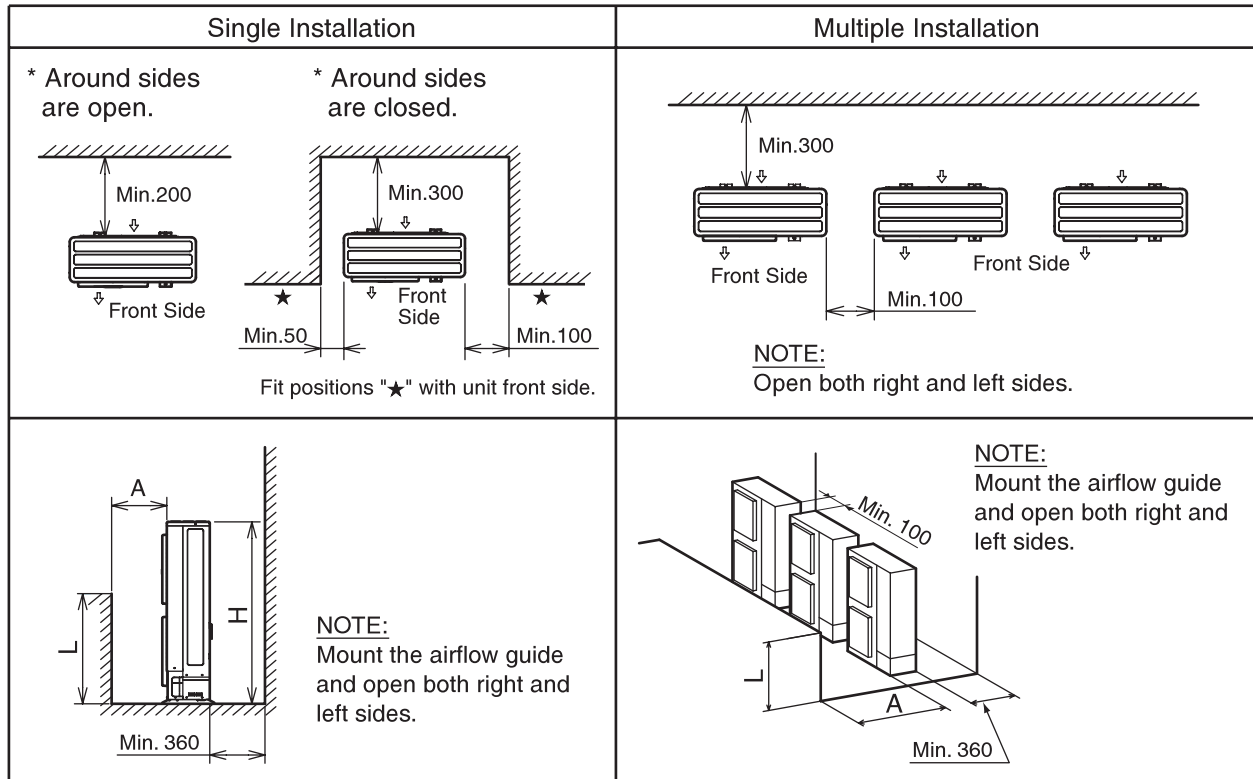


Fig. 4.1 Installation Space (1)

(b) Obstacles in Above

(mm)

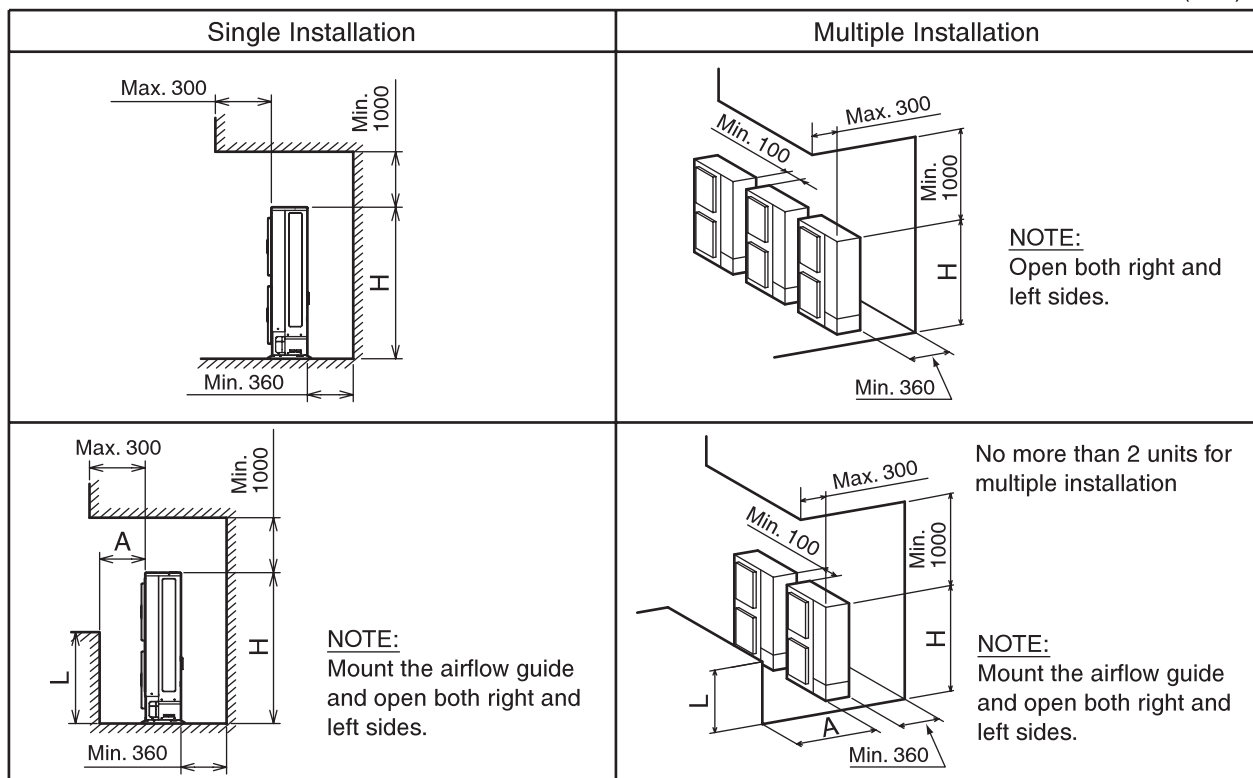


Fig. 4.2 Installation Space (2)

(2) Obstacles on Discharge Side

(a) Upper Side is Open.

(mm)

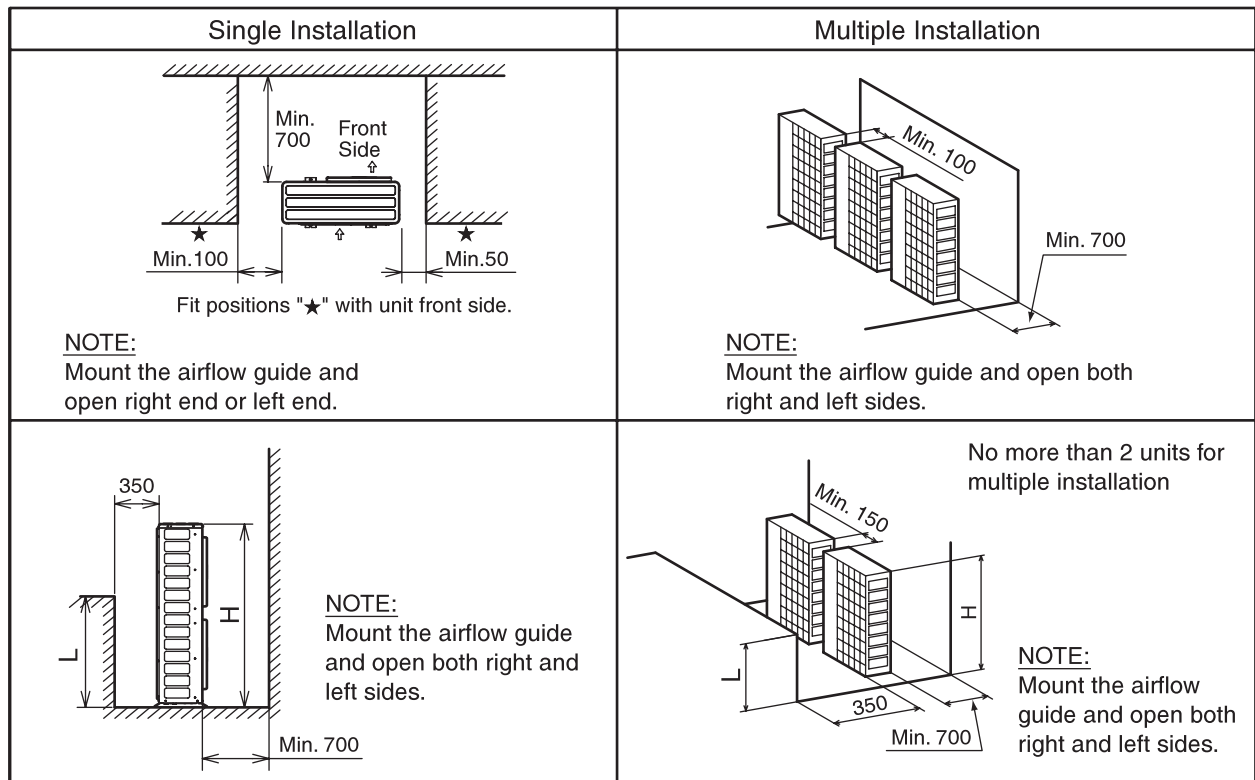
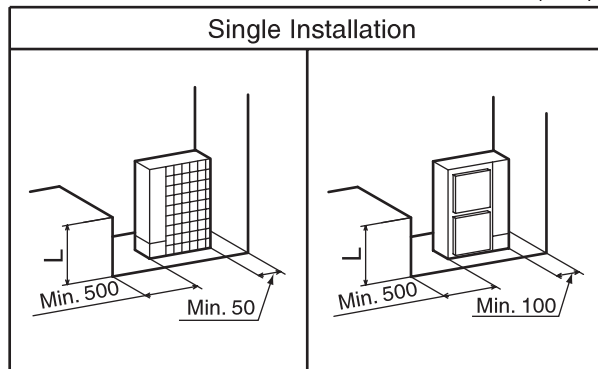


Fig. 4.3 Installation Space (3)

(3) Obstacles in Right and Left

(a) Upper Side is Open.

(mm)



(b) Obstacles in Above

(mm)

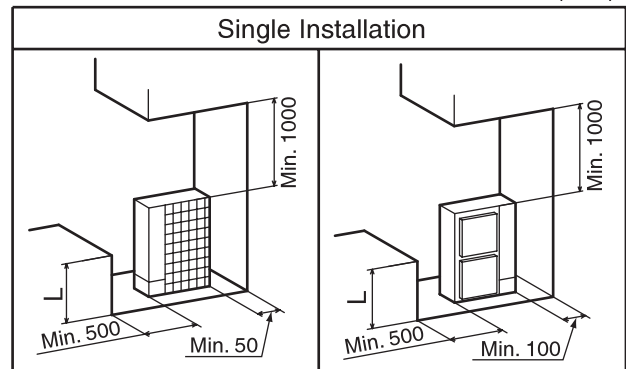


Fig. 4.4 Installation Space (4)

NOTE

If L is larger than H, mount the units on a base so that H is greater or equal to L.

H: Unit Height (1650mm) + Base Concrete Height

L	A
$0 < L \leq 1/2H$	600 or more
$1/2H < L \leq H$	1400 or more

In this situation ensure that the base is closed and does not allow the airflow to short circuit. In each case, install the outdoor unit so that the discharge flow is not short-circuited.

(4) Multi-Row and Multiple Installations

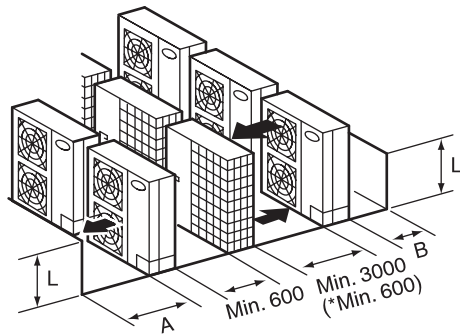


Fig. 4.5 Installation Space (5)

Keep a distance of more than 15mm between other units and do not put obstacles on the right and left sides. Dimension B is as shown below.

L	A	B
$0 < L \leq 1/2H$	600 or more	300 or more
$1/2H < L \leq H$	1400 or more	350 or more

NOTE:

If L is larger than H, mount the units on a base so that H is greater or equal to L.

In this situation ensure that the base is closed and does not allow the airflow to short circuit.

When the mark * dimension is secured, be sure to mount the airflow guide.

4.4 Installation Work

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

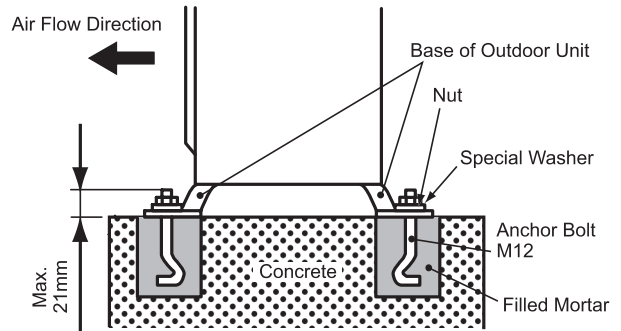
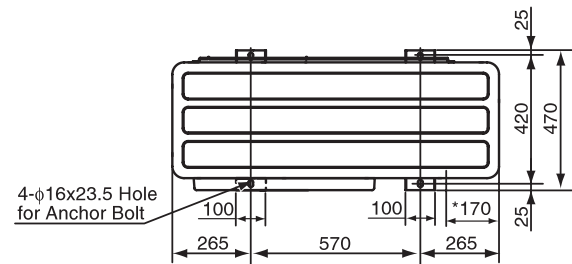


Fig. 4.6 Installation of Anchor Bolts

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. 4.7 regarding the location of fixing holes.



NOTE:

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

Fig. 4.7 Position of Anchor Bolts

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

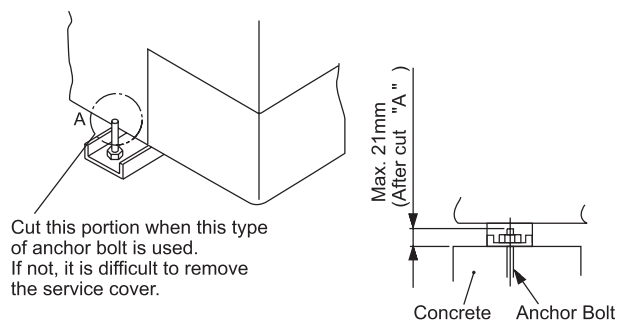


Fig. 4.8 Fixing Example

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

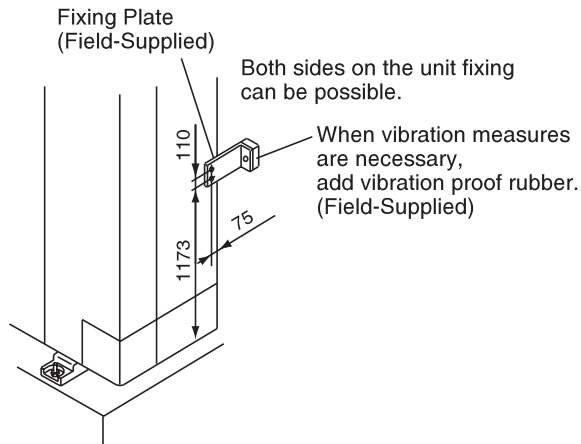
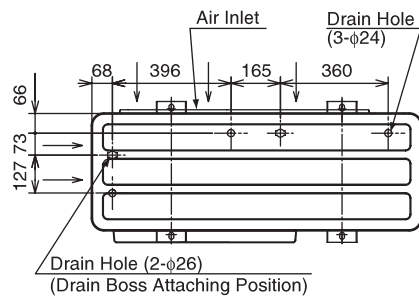


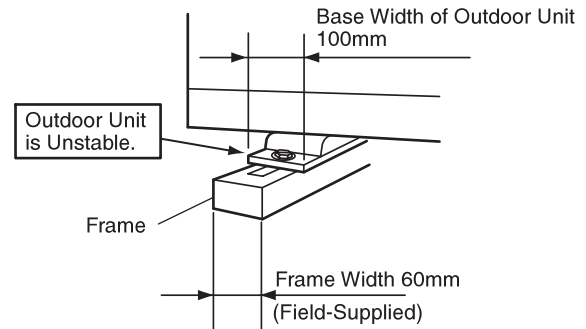
Fig. 4.9 Additional Fixing Arrangement

- (5) When installing the unit on a roof or a veranda, drain water sometimes turns to ice in a cold morning. Therefore, avoid draining in an area where people often use because it is slippery.
- (6) In case of the drain piping is necessary for the outdoor unit, use the drain-kit (DBS-26 or DBS-26L: Optional Parts).

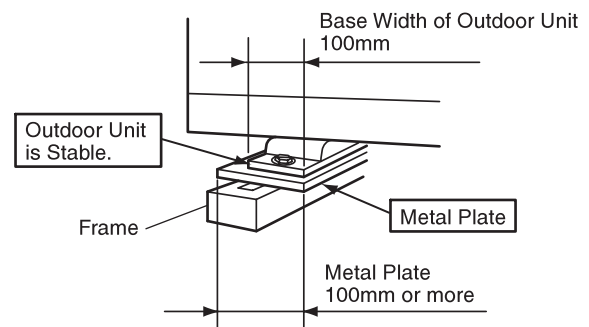


- (7) The whole of the base of the outdoor unit should be installed on a foundation. When using vibration-proof mat, it should also be positioned the same way. When installing the outdoor unit on a field-supplied frame, use metal plates to adjust the frame width for stable installation as shown in Fig. 4.10.

Incorrect



Correct



Recommended Metal Plate Size (Field-Supplied)

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

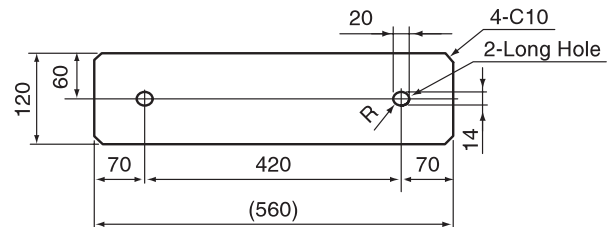


Fig. 4.10 Frame and Base Installation

5. Refrigerant Piping Work

! DANGER

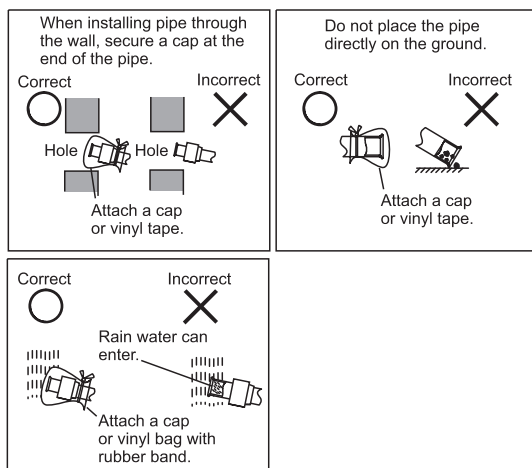
Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed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

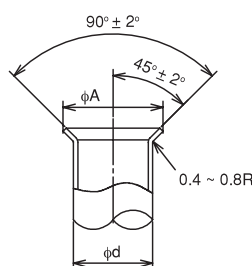
NOTE

● Cautions for Refrigerant Pipe Ends



● Flaring Dimension

Perform the flaring work as shown below.



Diameter φd	(mm)
	A +0 -0.4 R410A
6.35	9.1
9.53	13.2
12.7	16.6
15.88	19.7
19.05	(*)

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

● Piping Thickness and Material

Use the pipe as below.

Diameter	R410A	
	Thickness	Material
φ6.35	0.8	O material
φ9.53	0.8	O material
φ12.7	0.8	O material
φ15.88	1.0	O material
φ19.05	1.0	1/2H material
φ22.2	1.0	1/2H material
φ25.4	1.0	1/2H material
φ28.6	1.0	1/2H material

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

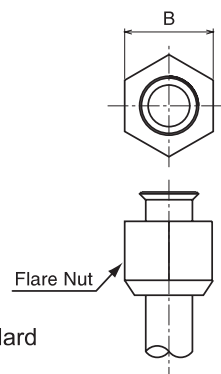
● Flare Nut Dimension

Use the flare nut as below.

<Flare Nut Dimension B (mm)>

Diameter	R410A
φ6.35	17
φ9.53	22
φ12.7	26
φ15.88	29
φ19.05	36

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



! 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.

● Combination between Indoor Unit and Outdoor Unit

Table 5.1 Indoor Unit Type List

Indoor Unit Type	Nominal Horsepower (kBtu/h)										
	07	09	14	18	24	27	30	38	48	76	96
Ceiling Ducted Type	○	○	○	○	○	○	○	○	○	○	○
Low-Height Duct Type	○	○	○	○	○						
4-Way Cassette		○	○	○	○	○	○	○	○		
2-Way Cassette		○	○	○	○	○		○	○		
Wall-Mounted Type		○	○	○	○	22					
Floor		○	○								
Floor Concealed		○	○								
Ceiling Type				○	○	○	○	○	○		

○: Available

- A maximum total capacity of 130% and a minimum total capacity of 50% can be obtained by combination of the indoor units when compared with the nominal outdoor unit capacity.

Table 5.2 System Combination

Outdoor Unit Model	Indoor Unit			
	Minimum Combination Capacity (kBtu/h)	Maximum Combination Capacity (kBtu/h)	Combination Quantity	Minimum Individual Operation Capacity (kBtu/h)
76	38	98	1 (*1) ~ 10	07
96	48	124	1 (*1) ~ 10	07
114	54	148	1 (*1) ~ 10	07

(*1) A total capacity of 100% must be obtained by combination of the indoor units when compared with the nominal outdoor unit capacity, if only one indoor unit is combined.

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

Length Model	Outer Diameter and Piping Size (mm)		Maximum Piping Length	Maximum Lift between Outdoor Unit and Indoor Unit
	Gas (*1)	Liquid		
76	19.05	φ9.53 (φ12.7 (*2))	Actual Length ≤ 100m Equivalent Length ≤ 125m	Outdoor Unit is higher than Indoor Unit: ≤ 50m Indoor Unit is higher than Outdoor Unit: ≤ 40m
96	22.2	φ 12.7		
114	25.4			

(*1): The accessory pipe with flange is attached.

(*2): Select the liquid piping size of φ12.7 when the piping length is more than 70m. only for AVW-76U9SR

Table 5.3 BRANCH PIPE for Line Branch

Multi-Kit	HFQ-102F
Gas Line	<p>Technical drawing of the HFQ-102F Gas Line assembly. The main view shows a manifold with a top inlet of $\phi 22.22 \times 1.5t$. It has two side inlets: ID 25.4 and ID 28.6. On the right side, there are five outlets with IDs: 28.6, 25.4, 22.2, 19.05, 15.88, and 12.7. A detail view on the right shows the manifold body with dimensions: ID 25.4, OD 28.6, ID 15.88, ID 12.7, ID 19.05, ID 22.2, and a $\phi 28.6 \times 1.2t$ section.</p>
Liquid Line	<p>Technical drawing of the HFQ-102F Liquid Line assembly. The main view shows a manifold with a top inlet of ID 9.53 and a $\phi 12.7 \times 1.0t$ section. It has two side inlets: $\phi 9.53 \times 1.0t$ and ID 9.53. On the right side, there are two outlets with IDs: 6.35 and 9.53. A detail view on the right shows the manifold body with dimensions: ID 9.53, OD 6.35, and a quantity of 1 (Q'ty:1).</p>
Multi-Kit	HFQ-162F
Gas Line	<p>Technical drawing of the HFQ-162F Gas Line assembly. The main view shows a manifold with a top inlet of $\phi 22.22 \times 1.5t$. It has two side inlets: ID 25.4 and ID 28.6. On the right side, there are five outlets with IDs: 28.6, 25.4, 22.2, 19.05, 15.88, and 12.7. A detail view on the right shows the manifold body with dimensions: ID 25.4, OD 28.6, ID 15.88, ID 12.7, ID 19.05, ID 22.2, and a $\phi 28.6 \times 1.2t$ section.</p>
Liquid Line	<p>Technical drawing of the HFQ-162F Liquid Line assembly. The main view shows a manifold with a top inlet of $\phi 12.7 \times 1.0t$ and ID 12.7. It has two side inlets: $\phi 9.53 \times 1.0t$ and ID 12.7. On the right side, there are two outlets with IDs: 9.53 and 6.35. A detail view on the right shows the manifold body with dimensions: ID 9.53, OD 6.35, and a quantity of 1 (Q'ty:1).</p>

Unit: mm , ID: Inner Diameter OD:Outer Diameter

(2) Piping System

<Outdoor Uni to First Branch>

Outdoor Unit	Gas/Liquid (Φmm)	
	(Equivalent Piping Length<70m)	(Equivalent Piping Length<70m)
76	19.05/9.53	19.05/12.7
96	22.2/12.7	22.2/12.7
114	25.4/12.7	25.4/12.7

<Multi-kit to Indoor Unit>

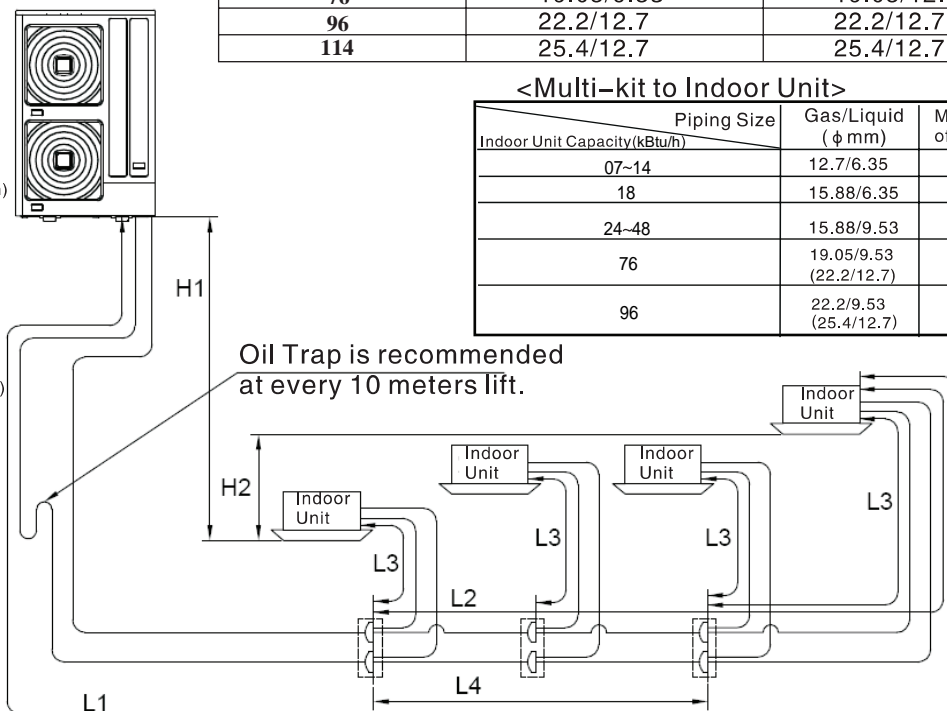
Piping Size	Gas/Liquid (φ mm)	Max.Length of Liquid Pipe
Indoor Unit Capacity(kBtu/h)		
07~14	12.7/6.35	15m
18	15.88/6.35	15m
24~48	15.88/9.53	15m
76	19.05/9.53 (22.2/12.7)	15m
96	22.2/9.53 (25.4/12.7)	15m

<First Branch>
(Equivalent Piping Length<70m)

Outdoor Unit Capacity (kBtu/h)	Branch pipe
76	HFQ-102F
96 ~ 114	HFQ-162F

<First Branch>
(Equivalent Piping Length<70m)

Outdoor Unit Capacity (kBtu/h)	Branch pipe
76	HFQ-162F
96 ~ 114	HFQ-162F



<Piping Size and Branch pipe after First Branch>

Model	Pipe Length	Gas/Liquid (φ mm)	Branch pipe Model
76	≤ 70m	19.05/9.53	HFQ-102F
	≥ 70m	19.05/12.7	HFQ-162F
96	—	22.2/12.7	
114	—	25.4/12.7	

Item		Applicable Range
Ref.Pipe Length: L1	Actual	Within 100m
	Equivalent	Within 125m
Piping Length from 1st Branch to each I.U.: L2		Within 40m
Piping Length from each Branch to I.U.: L3		Within 15m
Lift between I.U. and O.U.: H1	O.U.is Higher	Within 50m
	O.U.is Lower	Within 40m
Lift between Indoor Units: H2		Within 15m
Total Length of I.U.Piping		Within 250m

5.3 Piping Connection

Pipes can be connected from 4 directions.

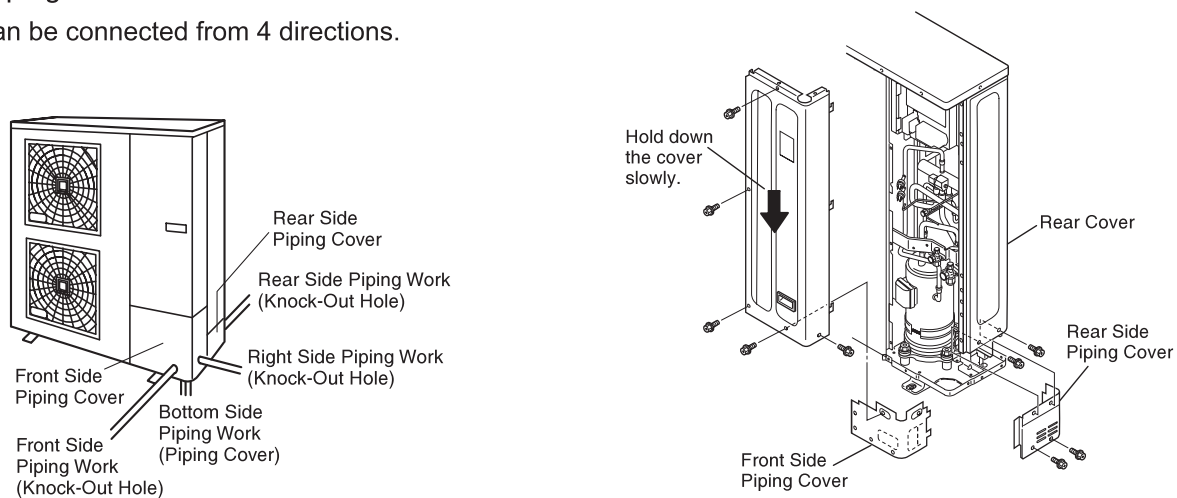
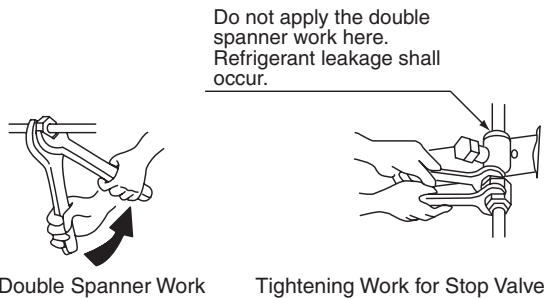


Fig. 5.1 Piping Direction

- (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 Piping Connection

When tightening the flare nut, use two spanners.



Double Spanner Work

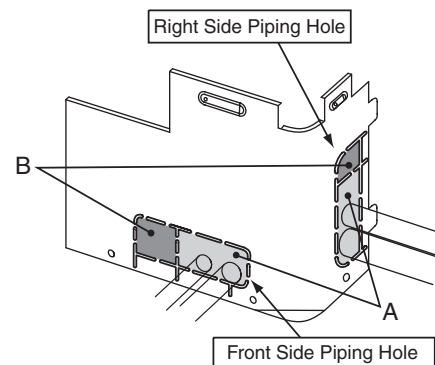
Tightening Work for Stop Valve

Pipe Size	Tightening Torque for Flare Nut
φ6.35 (1/4)	20N-m
φ9.53 (3/8)	40N-m
φ12.7 (1/2)	60N-m
φ15.88 (5/8)	80N-m
φ19.05 (3/4)	100N-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.

(a) Front and Right Side Piping Work

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



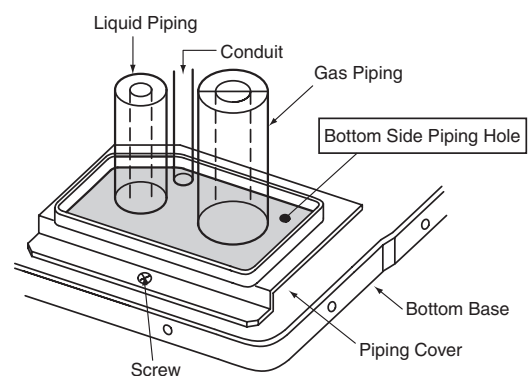
It is available to correct the liquid or gas piping, power wiring less than 14mm² and transition wiring from "A" part.

NOTE:

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

(b) Bottom Side Piping Work

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

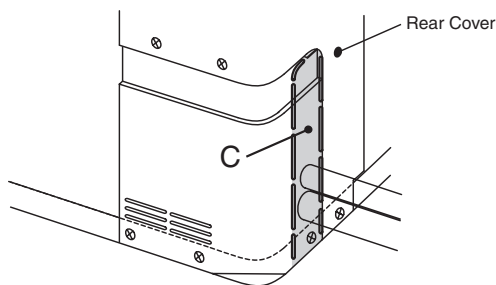


NOTE:

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

(c) Rear Piping Work

After removing rear piping cover, punch out the "C" holes along the guide line.



NOTE:

To avoid damage protect cables and pipes with adequate insulation (Field-Supplied).

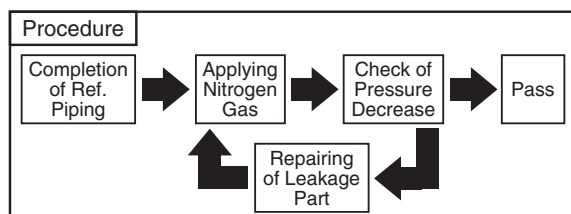
- (5) To prevent gaps use a rubber bush and insulation (Factory-Supplied) adequately when installing the piping cover. Cut the lower side guide line of the piping cover when attaching work is difficult. If not, it will be included water in the unit and electrical parts will be damaged.
- (6) Use a pipe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

5.4 Air Tight Test

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

Refrigerant Oil is field-supply.

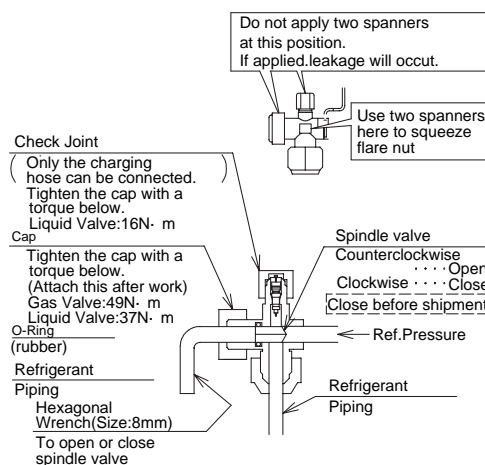
Model: FVB68D (Ether Oil)
Manufacturer: IDEMITSU KOSAN Co., Ltd.



(4) Stop Valve

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

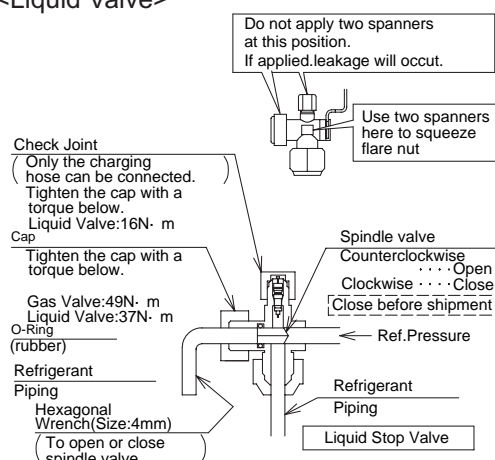
<Gas Valve>



Spindle Valve Torque (N-m)

Gas	Liquid
9~11	7~9

<Liquid Valve>



Hexagonal Wrench Size (mm)

Gas	Liquid
8	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.
- At the test run, fully open the spindle. If not fully opened, the devices will be damaged.

- (5) Connect the gauge mani-fold using charging hoses with a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves.
Perform the air-tight test.
Do not open the stop valves. Apply nitrogen gas pressure of 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 tight test, release nitrogen gas.

5.5 Vacuum Pumping

- (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.
- (2) 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.
- (3) Fully open the gas valve and liquid valve.

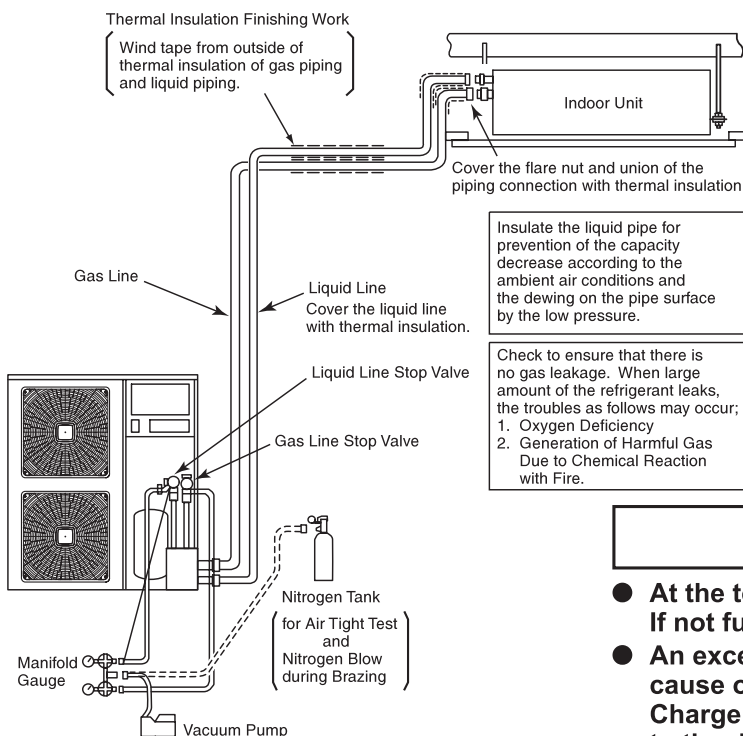
- (4) This system is not necessary to charge refrigeration less than 30m of the actual piping length. If the total piping length is more than 30m, it is necessary additional refrigerant charge.
- (5) Check for any gas leakage by gas leak detector or forming agent. Use the foaming agent which does not generate the ammonia (NH_3) by chemical reaction. The recommended forming agent are as shown below. Do not use general household detergent for checking.

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

NOTES:

1. When the spindle cap for stop valve is removed, the gas accumulated at O-ring or screws is released and may make sound. This phenomenon is NOT a gas leakage.
2. This unit is only for the refrigerant R410A. The manifold gauge and the charging hose should be exclusive use for R410A.
3. If vacuum degree of -0.1MPa (-756mmHg) is not available, it is considered of gas leakage or entering moisture. Check for any gas leakage once again. If no leakage exists, operate the vacuum pump for more than one to two hours.

**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 trouble 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.

(6) Additional Refrigerant Charge

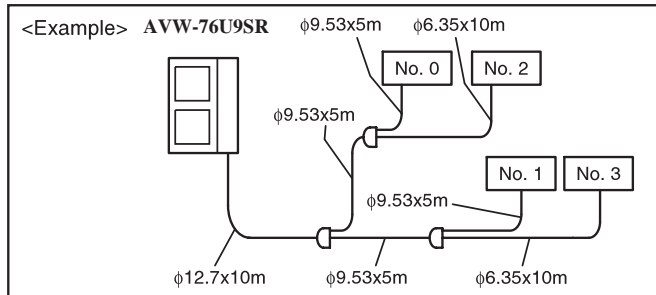
If total piping length is more than 30m, it is necessary additional refrigerant charge as follows.

Additional Refrigerant Charge Calculation

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

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

1. Calculating Method of Additional Refrigerant Charge (W kg)



<Table 1>

Outdoor Unit	W ₀ : Outdoor Unit Ref. Charge (kg)	
76	5.0	
96	5.5	
114	6.5	

NOTE:

W₀ is outdoor unit ref. charge before shipment.

See Example for Model **AVW-114U9SR**, and fill in the following table.

Pipe Diameter (mm)	Total Piping Length (m)	Additional Charge (kg)
φ12.7	(10)	x 0.12 = 1.2
φ9.53	(5 + 5 + 5 + 5)	x 0.07 = 1.4
φ6.35	(10 + 10)	x 0.03 = 0.6
Total Piping Length	50m	Additional Charge W ₁ = 3.2 (kg)
Additional Charge W = W ₁ - P		
= 3.1 - 2.0 = 1.1 (kg)		

Pipe Diameter (mm)	Total Piping Length (m)	Additional Charge (kg)
φ12.7	<input type="text"/>	x 0.12 = <input type="text"/>
φ9.53	<input type="text"/>	x 0.07 = <input type="text"/>
φ6.35	<input type="text"/>	x 0.03 = <input type="text"/>
Total Piping Length	<input type="text"/> m	Additional Charge W = <input type="text"/> (kg)

2. Charging Work

Charge refrigerant (R410A) into the system as follows.

- 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.
- Fully open the gas line stop valve and slightly open the liquid line stop valve.
Charge refrigerant by opening the gauge mani-fold valve.
- 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.

$$\begin{aligned} \text{Total Ref. Charge of This System} &= W + W_0 \\ \text{This System} &= \text{ } + \text{ } = \text{ } \text{ kg} \end{aligned}$$

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

5.6 Caution of the Pressure by Check Joint

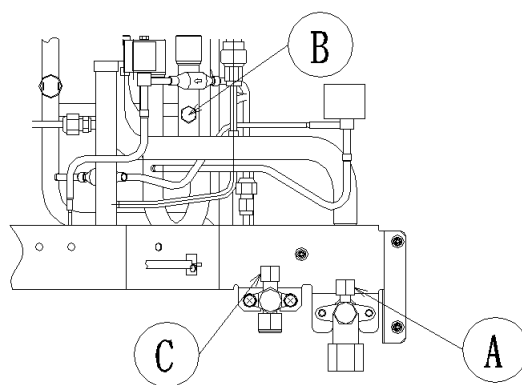
When the pressure is measured, use the check joint of gas stop valve ((A) in the figure below) and use the check joint of liquid piping ((B) in the figure below).

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

	Cooling Operation	Heating Operation
Check Joint for Gas Stop Valve "A"	Low Pressure	High Pressure
Check Joint for 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 to the electrical parts at removing the charge hoses.



1. Maximum Permissible Concentration of HFC GAS R410A charged in the DC INVERTER is an incombustible and non-toxic gas.

However, if leakage occurs and gas fills a room, it may cause suffocation. The maximum permissible concentration of HCFC gas, R410A in air is 0.3kg/m^3 , according to the refrigeration and air conditioning facility standard (KHK S 0010) by the KHK (High Pressure Gas Protection Association) Japan. Therefore, some effective measure must be taken to lower the R410A concentration in air below 0.3kg/m^3 , in case of leakage.

2. Calculation of Refrigerant Concentration

- (1) Calculate the total quantity of refrigerant R (kg) charged in the system connecting all the indoor units of objective rooms.
- (2) Calculate the room volume V (m^3) of each objective room.
- (3) Calculate the refrigerant concentration C (kg/m^3) of the room according to the following equation.

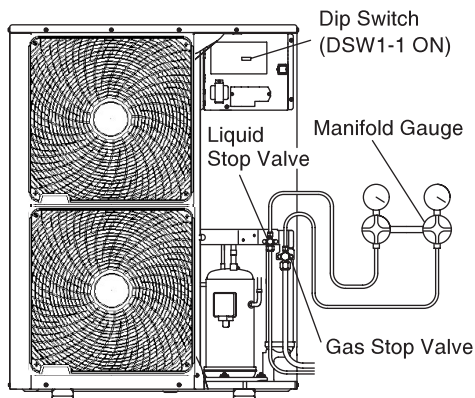
$$\frac{\text{R: Total Quantity of Charged Refrigerant (kg)}}{\text{V: Room Volume (m}^3\text{)}} = \text{C: Refrigerant Concentration} \cdots \cdots 0.3 (\text{kg/m}^3)$$

If local codes or regulations are specified, follow them.

5.7 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 -0.01MPa (-100mmHg), 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

Measure the low pressure by the pressure gauge and keep it not to decrease than -0.01MPa . If the pressure is lower than -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 1 minute 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 and earth phase is contained in the power supply wires. If not, electrical parts will be damaged.
- (3) Check to ensure that the capacity of power supply is enough. If not, the compressor will be not able to operate cause of voltage drop abnormally at starting.
- (4) Check to ensure that the earth wire is connected.
- (5) Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.

6.2 Electrical Wiring Connection

6.2.1 For Outdoor Unit

The electrical wiring connection for the outdoor unit is shown in Fig. 6.1

- (1) Connect the power supply wires to L1, L2, L3, and N (for 380-415V), to R, S and T (for 220V) for the three phase power source on the terminal board and ground wires to the terminals in the electrical control box.
- (2) Connect the wires between the outdoor and indoor units to terminals 1 and 2 on the terminal board.
- (3) Do not wire in front of the fixing screw of the service panel. If do, the screw can not be removed.

6.2.2 Electrical Wiring Between Indoor Unit and Outdoor Unit

Connect the electrical wires between the indoor unit and the outdoor unit, as shown in Fig. 6.2

Check to ensure that the terminal for power source wiring (terminals "L1" to "L1" and "N" to "N" of each terminal board: AC380-415V, terminals "R" to "L1" and "S" to "L2" of each terminal board: AC 220V) and intermediate wiring (Operating Line: terminals "1" to "1" and "2" to "2" of each terminal board: DC5V) between the indoor unit

and the outdoor unit coincide correctly. If not, some component will be damaged.

- (1) Use shielded wires ($\geq 0.75\text{mm}^2$) for intermediate wiring to protect electrically noise obstacle at length of less than 1,000m and size complied with local code.
- (2) Open a hole near the connection hole of power source wiring when the multiple outdoor units are connected from one power source line.
- (3) The recommended breaker sizes are shown in Table 6.1.
- (4) In the case that a conduit tube for field-wiring is not used, fix rubber bushes with adhesive on the panel.

⚠ 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:	1.0 to 1.3 N-m
M5:	2.0 to 2.5 N-m
M6:	4.0 to 5.0 N-m
M8:	9.0 to 11.0 N-m
M10:	18.0 to 23.0 N-m

 Keep the above tightening torque when wiring work.

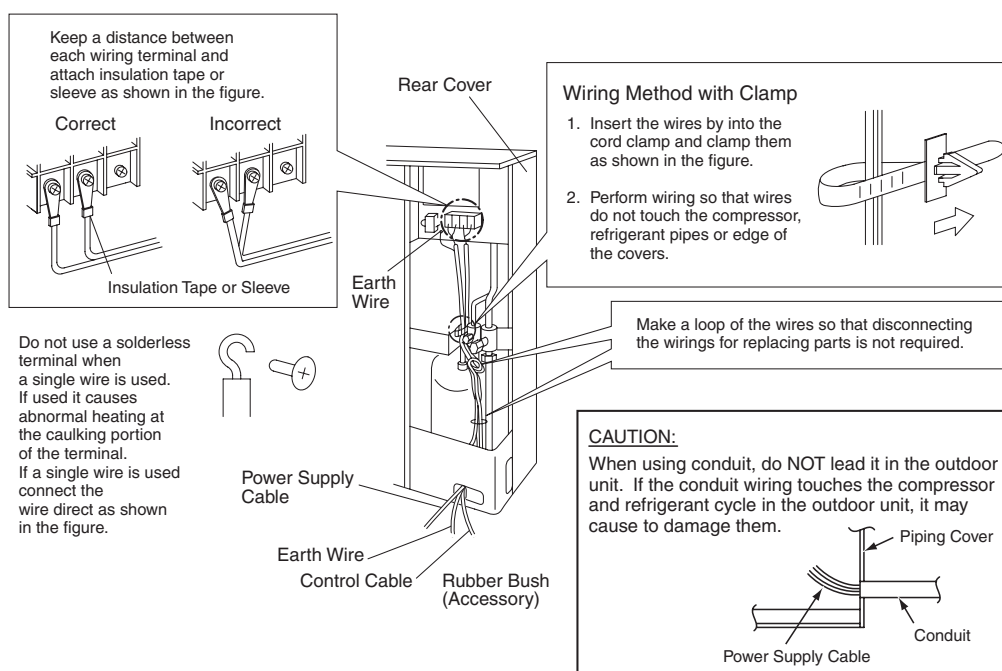


Fig. 6.1 Wiring Connection for Outdoor Unit

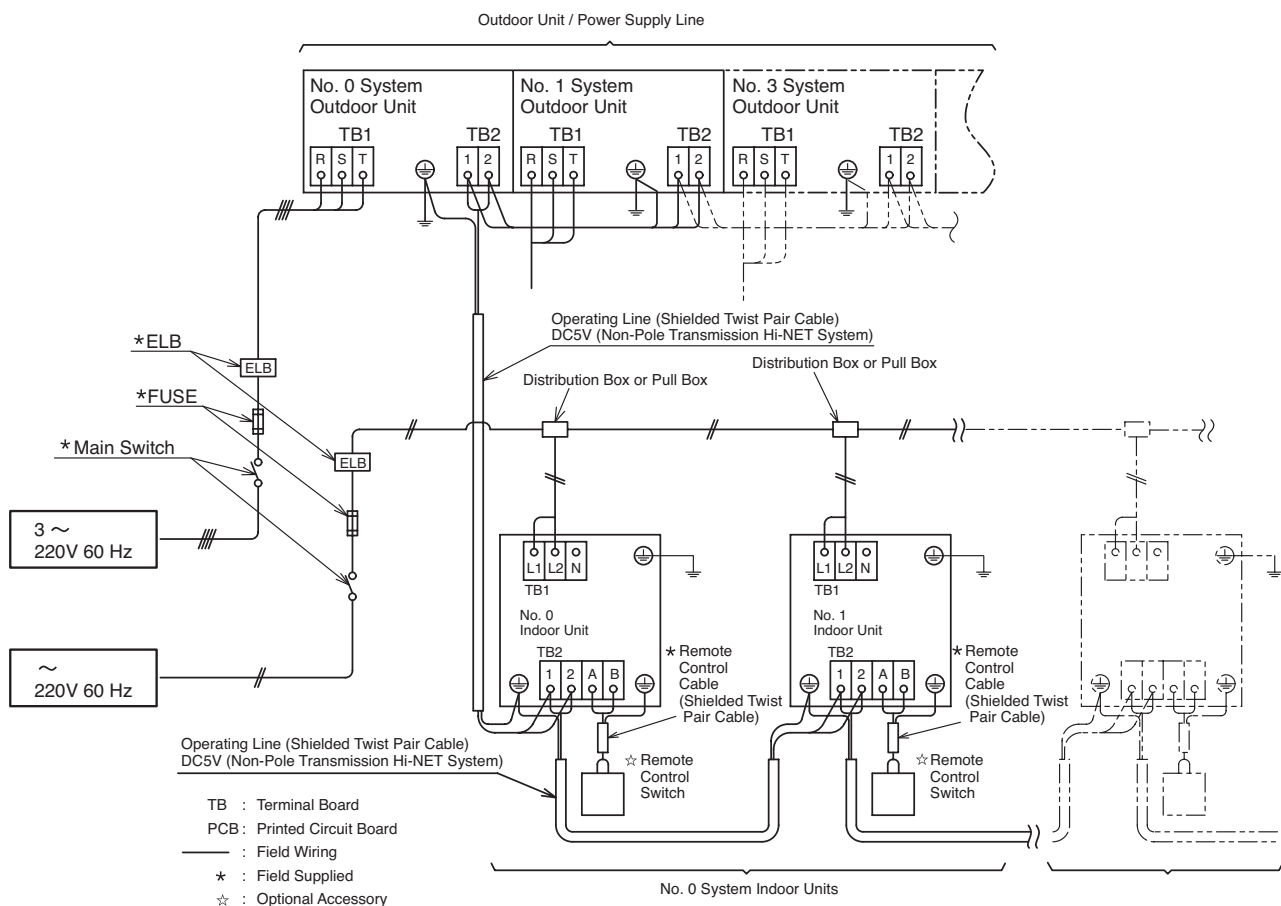


Fig. 6.2 Instruction for Electrical Wiring Connection (220V 60Hz)

Table 6.1 Electrical Data and Recommended Wiring, Breaker Size/1 Outdoor Unit

Model	Power Supply	Maximum Running Current (A)	Power Supply Line (φmm)	ELB		Fuse (A)
				Nominal Current (A)	Nominal Sensitive Current (mA)	
76	220V/60Hz	22	MLFC2.5SQ	30	30	30
96		29	MLFC4SQ	40	30	40
114		37	MLFC4SQ	50	100	50

ELB: Earthleakage Breaker, MLFC: Flame Retardant Polyflex Wire

■ Field Minimum Wire Size for Power Source

Model	Power Source	Maximum Current	Power Source Cable Size	Transmitting Cable Size
			EN60335-1 *1 (mm ²)	EN60335-1 *1 (mm ²)
76	220V/60Hz	22	4.0mm ²	0.75mm ²
96		29	4.0mm ²	
114		37	4.0mm ²	

NOTES:

- 1) Follow local codes and regulations when selecting field wires.
- 2) The wire sizes marked with *1 in the above table are selected at the maximum current of the unit according to the European Standard, EN60335-1. Use the wires which are not lighter than the ordinary polychloroprene sheathed flexible cord (code designation H05RN-F).
- 3) Use a shielded cable for the transmitting circuit and connect it to ground.
- 4) In the case that power cables are connected in series, add each unit maximum current and select wires below.

Selection According to EN60335-1

Current i (A)	Wire Size (mm ²)
$i \leq 6$	2.5
$6 < i \leq 10$	2.5
$10 < i \leq 16$	2.5
$16 < i \leq 25$	4
$25 < i \leq 32$	6
$32 < i \leq 40$	10
$40 < i \leq 63$	16
$63 < i$	※1

* 1 : In the case that current exceeds 63A, Don't series connection

- 5) Install main switch and ELB for each system separately. Select the high response type ELB that is acted within 0.1 second.
- 6) Separate the control wiring between outdoor unit and indoor unit more than approximately 5 to 6cm from power supply wiring. Do not use a coaxial cable.



Install a multi-pole main switch with a space of 3.5mm or more between each phase.

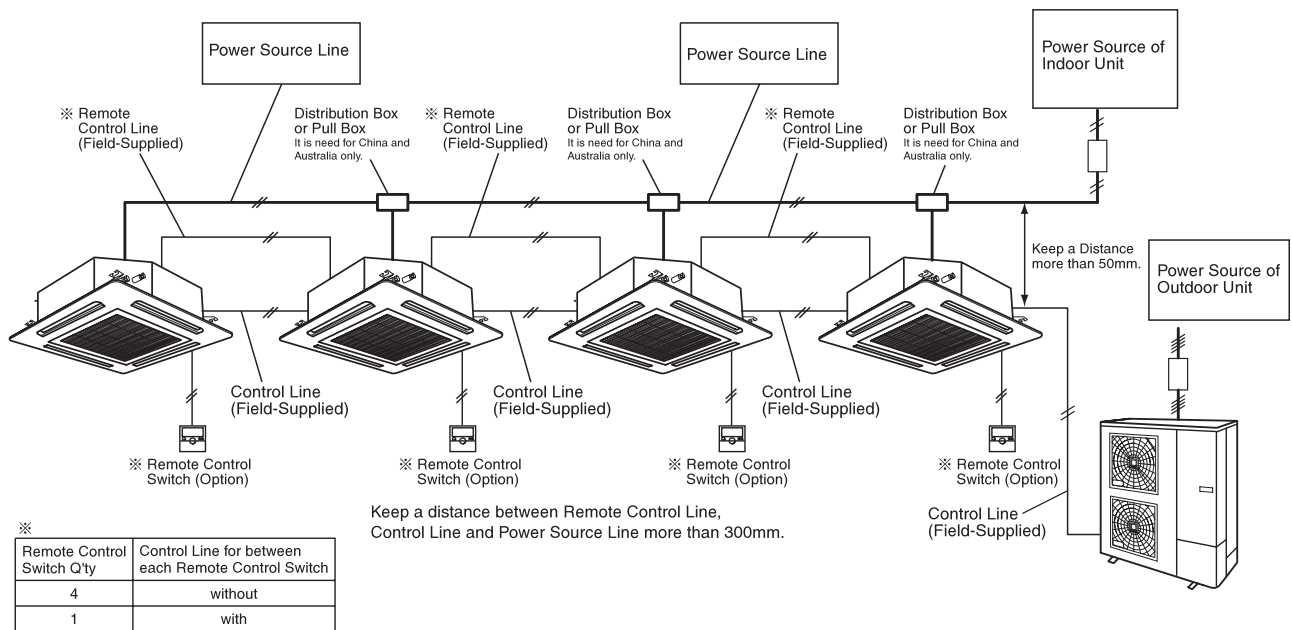


Fig.6.3 Instruction for Electrical Wiring Connection

7. Test Run

Test run should be performed according to the Table 7.2 on page 26. And use the Table 7.1 on page 25 for recording test run.

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 oil heater.
 - Pay attention to the following items while the system is running.
 - (A) Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 90°C.
 - (B) DO NOT PUSH THE BUTTON OF THE MAGNETIC SWITCH(ES). It will cause a serious accident.
 - Do not touch any electrical components for more than three minutes after turning OFF the main switch.
-

Table 7.1 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:	No. 1 DB	/WB	°C,	No. 2 DB	/WB	°C,	No.3 DB	/WB	°C,	No.4 DB	/WB	°C
Outlet:	DB	/WB	°C,	DB	/WB	°C,	DB	/WB	°C,	DB	/WB	°C
6. Check Outdoor Ambient Temperature

Inlet:	DB	°C,	WB	°C
Outlet:	DB	°C,	WB	°C
7. Check Refrigerant Temperature

Liquid Temperature:	°C
Discharge Gas Temperature:	°C
8. Check Pressure

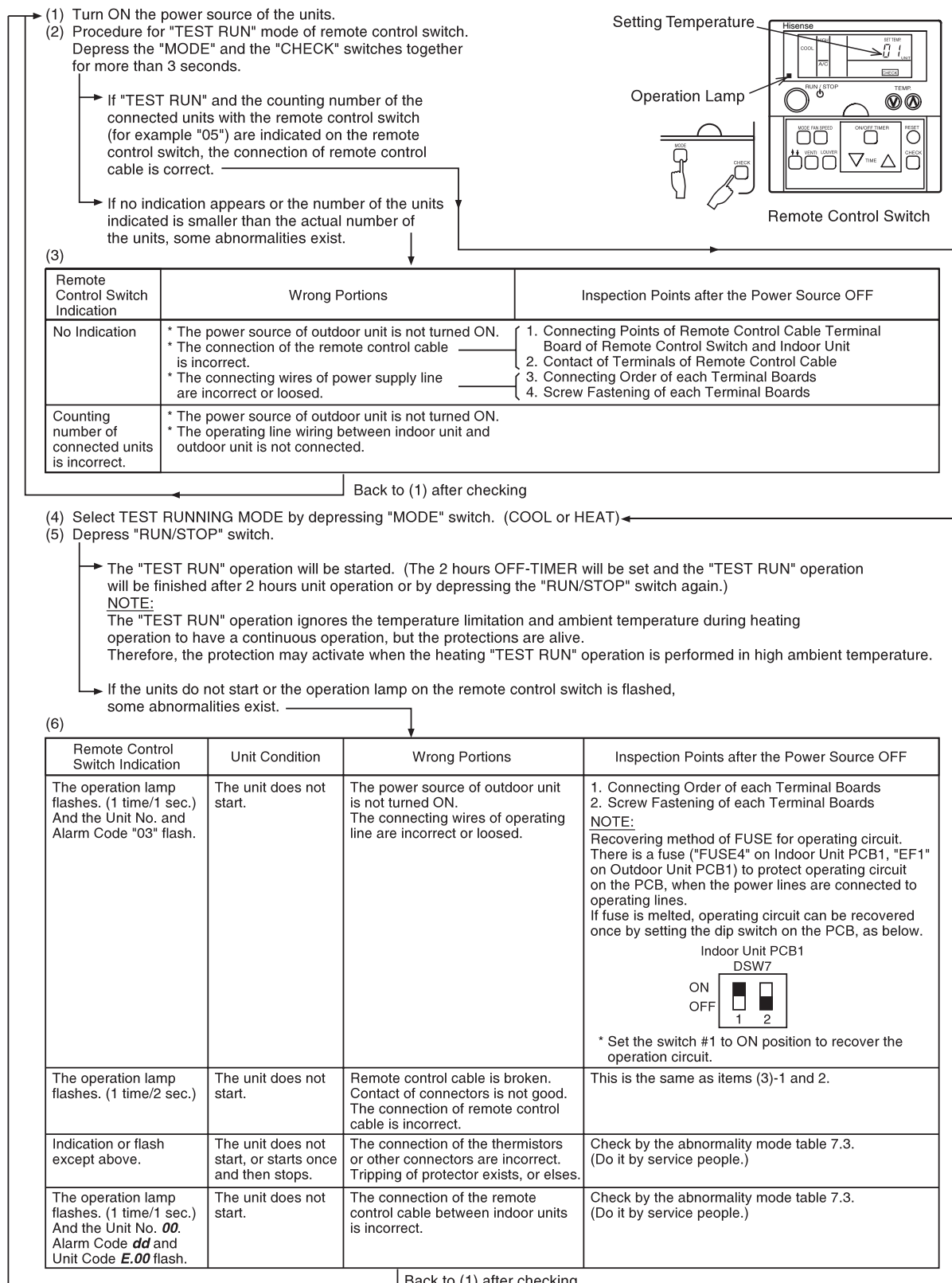
Discharge Pressure:	MPa
Suction Pressure:	MPa
9. Check Voltage

Rated Voltage:	V
Operating Voltage:	L ₁ -N or L ₁ -L ₂ V,
Starting Voltage:	V
10. Check Compressor Input Running Current

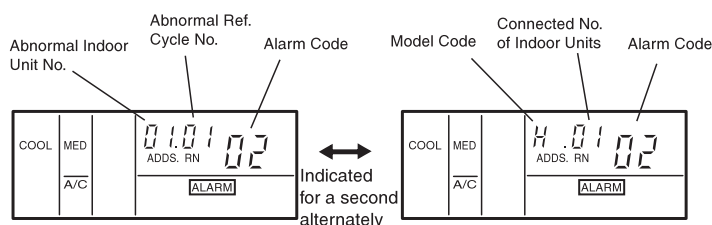
Input:	kW
Running Current:	A
11. Is the refrigerant charge adequate? ☐
12. Do the operation control devices operate correctly? ☐
13. Do the safety devices operate correctly? ☐
14. Has the unit been checked for refrigerant leakage? ☐
15. Is the unit clean inside and outside? ☐
16. Are all cabinet panels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

Table 7.2 Checking of Wire Connection by Test Run

NOTE: "TEST RUN" shall be performed with each refrigerant cycle (each outdoor unit).



● Alarm Code Indication of Remote Control Switch



Model Code

Indication	Model
H	Heat-pump
P	Inverter
F	Multi
C	Cooling Only
E	Others

Table 7.3 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-LINKII Units are Connected to One System.

8. Safety and Control Device Setting

- Compressor Protection
High Pressure Switch: This switch cuts out the operation of the compressor when the discharge pressure exceeds the setting.
- Fan Motor Protection
When the thermistor temperature is reached to the setting, motor output is decreased. The other way, when the temperature becomes lower, limitation is cancelled.

Model		76	96	114
For Compressor Pressure Switch High Cut-Out	MPa	Automatic Reset, Non-Adjustable		
		4.15 -0.05 -0.15	4.15 -0.05 -0.15	4.15 -0.05 -0.15
Cut-In	MPa	3.2±0.15	3.2±0.15	3.2±0.15
Fuse 3φ, 220V, 60Hz	A	60	60	60
CCP Timer Setting Time	min.	3	Non-Adjustable 3	3
For Condenser Fan Motor Internal Thermostat		Automatic Reset, Non-Adjustable (each one for each motor)		
DC Cut-Out	°C	120±5	120±5	120±5
AC Cut-Out	°C	135±5	135±5	135±5
Cut-In	°C	110~60	110~60	110~60
For Control Circuit Fuse Capacity on PCB1, 5	A	5	5	5
Fuse Capacity on PCB3	A	10	10	10



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