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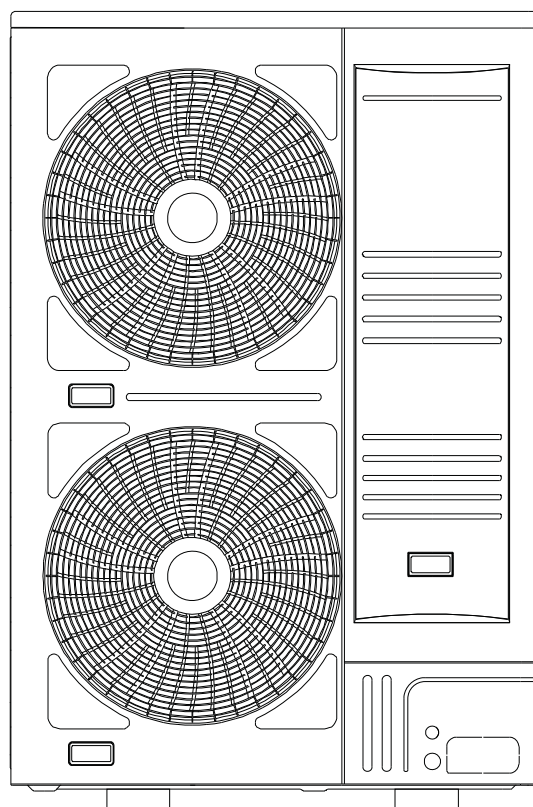
Installation & Maintenance Manual

*INVERTER-DRIVEN
SPLIT SYSTEM
HEAT PUMP
AIR CONDITIONERS*

MODEL
AVW-76HKFH AVW-96HKFH AVW-114HKFH

IMPORTANT:

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



M00212Q

ORIGINAL INSTRUCTIONS



Declaration of Conformity (Manufacturer's Declaration)



Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd.

Add: 218, Qianwangang Road, Economic & Technical Development Zone, Qingdao, P.R. China
declares under its sole responsibility that the air conditioning models to
which this declaration relates:

AVW-76HKFH, AVW-96HKFH, and AVW-114HKFH
are in conformity with the following standard(s) or other normative document(s), provided that
these are used in accordance with our instructions:

EN 60335-1
EN 60335-2-40
EN 62233
EN 55014-1
EN 55014-2
EN 61000-3-11
EN 61000-3-12

following the provisions of:

2006/42/EC
2014/30/EU
2012/19/EU
2011/65/EU
2014/35/EU
2014/68/EU
2014/517/EU
2009/125/EC
2010/30/EU
2006/1907/EC

Directives, as amended.

Manufacturing number and manufacturing year: refer to model Nameplate.

Notes:

This declaration becomes invalid, if technical or operational modifications are introduced
without the manufacturers consent.

Hisense Italia S.r.l. is authorised to Compile the Technical Construction File.

Ad. : Via Montefeltro 6A, 20156 Milano.

Hisense

Name, Surname : Li Hu

Position/ Title : Director

Date : October 31, 2018

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.
- No part of this manual may be reproduced without written permission.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.



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



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



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

NOTE

: Useful information for operation and/or maintenance.

- It is assumed that this heat pump air conditioner will be operated and serviced by English speaking people. If this is not the case, the 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.
- Install these air conditioners by local regulations or standards.
- This heat pump air conditioner has been designed for the following temperatures. Operate the heat pump air conditioner within this range .

Temperature		(°C)	
		Maximum	Minimum
Cooling Operation	Indoor	23 WB	15 WB
	Outdoor	46 DB	-5 DB
Heating Operation	Indoor	30 DB	15 DB
	Outdoor	15.5 WB	-20 WB

DB: Dry Bulb
WB: Wet Bulb

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

NOTE:

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

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



Correct Disposal of this product

This marking indicates that this product should not be disposed with other household wastes. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

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

WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately one (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.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and user maintenance shall not be made by children without supervision.
- The appliances are not intended to be operated by means of an external timer or separate remote-control system.

SAFETY SUMMARY

WARNING

- The appliance is not to be used by children or person with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
- Children should be supervised to insure that they do not play with the appliance.
- Keep the appliance and its cord out of reach of children less than 8 years.

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.

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 $-25\sim 55^{\circ}\text{C}$;
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons.
- The A-weighted emission sound pressure level at workstations, all this level does not exceed 70 dB(A) .

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage.
 - Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.
- The standard utilization of the unit shall be explained in these instructions.
- Therefore, the utilization of the unit other than those indicated in these instructions is not recommended.
- Please contact your local agent, as the occasion arises.
- HISENSE's liability shall not cover defects arising from the alteration performed by a customer without HISENSE's consent in a written form.

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1. Safety Summary

⚠ WARNING

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

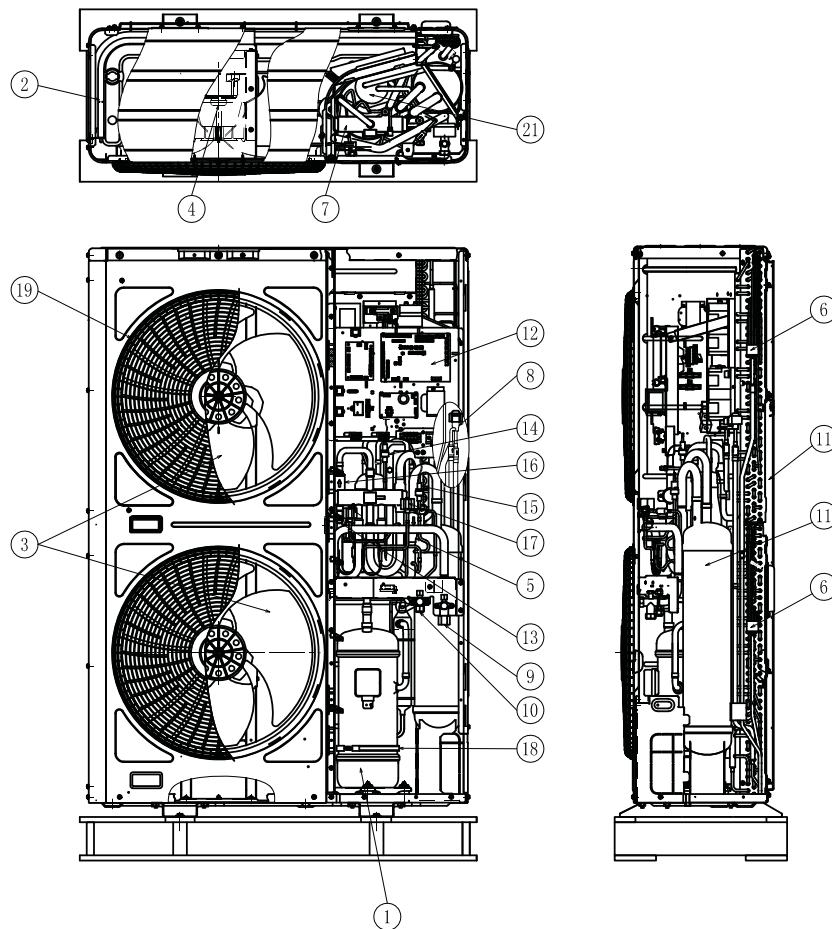
⚠ CAUTION

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

2. Structure

2.1 Outdoor Unit & Refrigerant Cycle

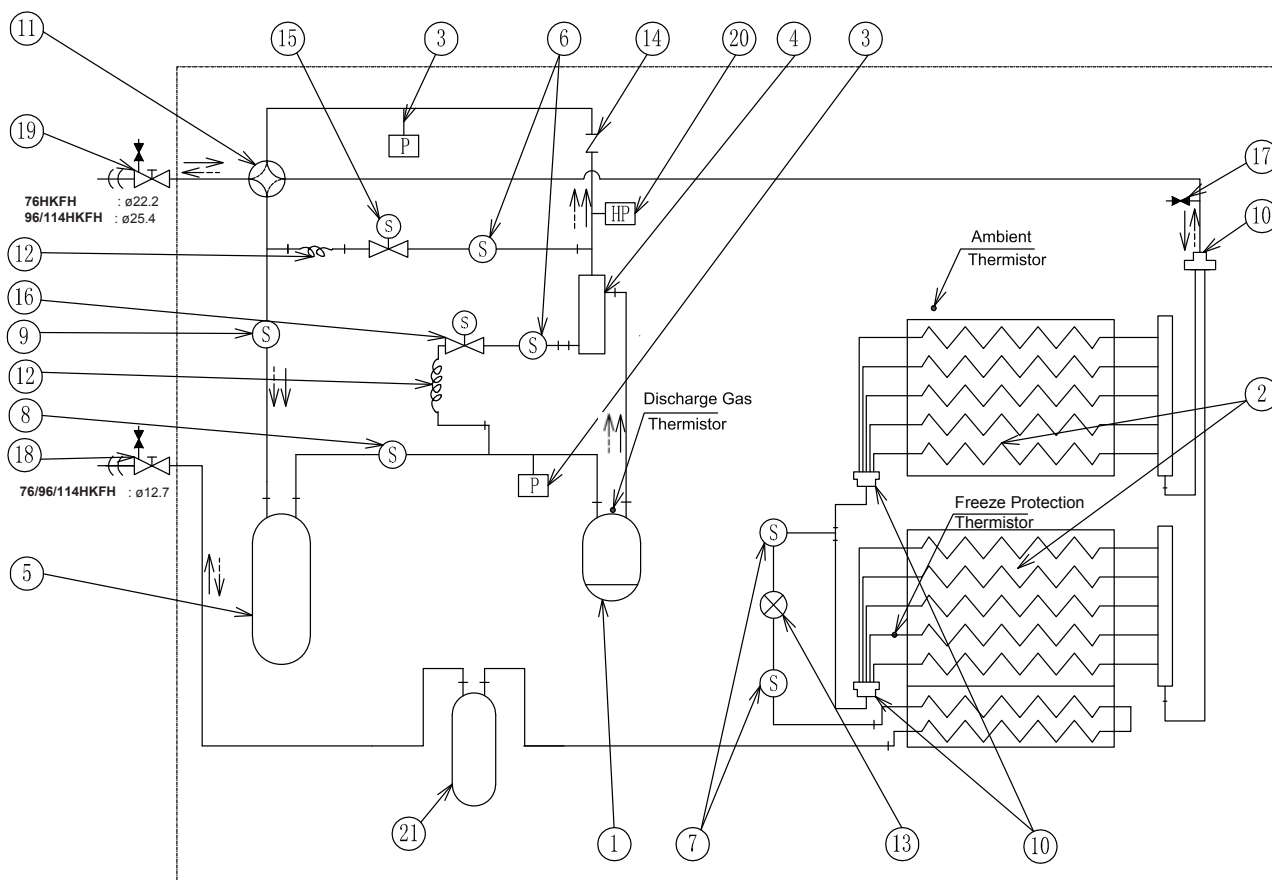
<Outdoor Unit>



No.	Part Name	No.	Part Name
1	Compressor	12	Electrical Box
2	Heat Exchanger	13	High Pressure Switch for Protection
3	Propeller Fan	14	High Pressure Sensor
4	Fan Motor	15	Low 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	High Pressure Reservoir
11	Accumulator		

<Refrigerant Cycle>

<Outdoor Unit>



- ← : Refrigerant Flow Direction (Cooling Operation)
- ←- - : Refrigerant Flow Direction (Heating Operation)
- - - : Field Refrigerant Piping
- ⊘ : Flare Connection
- ⊕ : Brazing Connection
- ⊕⊕ : Flange Connection

Mark	Part Name
①	Compressor
②	Heat Exchanger
③	Sensor for Refrigerant Pressure
④	Oil Separator
⑤	Accumulator
⑥	Strainer
⑦	Strainer
⑧	Strainer
⑨	Strainer
⑩	Distributor
⑪	Reversing Valve
⑫	Capillary Tube
⑬	Electronic Expansion Valve
⑭	Check Valve
⑮	Bypass Solenoid Valve
⑯	Oil Return Solenoid Valve
⑰	Check Joint
⑱	Stop Valve for Liquid Line
⑲	Stop Valve for Gas Line
⑳	Pressure Switch
㉑	High Pressure Reservoir

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	Philips 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	PipeCutter ChamferingReamer	◇	◇	-	Cutting Pipe 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
	Nitrogen Gas	◇	◇	* Strict Control against Contamin (Blow nitrogen during brazing.)	Prevention from Oxidation during Brazing
	Lubrication Oil (for Flare Surface)	●	✦	* Use a synthetic oil which is equivalent to the oil used in the refrigeration cycle. * Synthetic oil absorbs moisture quickly.	Applying Oil to the Flared Surface
Vacuum Drying & Refrigerant Charge	Refrigerant Cylinder	●	✦	* Check refrigerant cylinder color. ★ Liquid refrigerant charging is required regarding zeotropic refrigerant.	Refrigerant Charging
	Vacuum Pump	◇	◇	★ The current ones are applicable. However, it is required to mount a vacuum pump adapter which can prevent from reverse flow when a vacuum pump stops, resulting in no reverse oil flow.	Vacuum Pumping
	Adapter for Vacuum Pump	* ●	✦		
	Manifold Valve	●	✦	* No interchangeability is available due to higher pressures when compared with R22.	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.

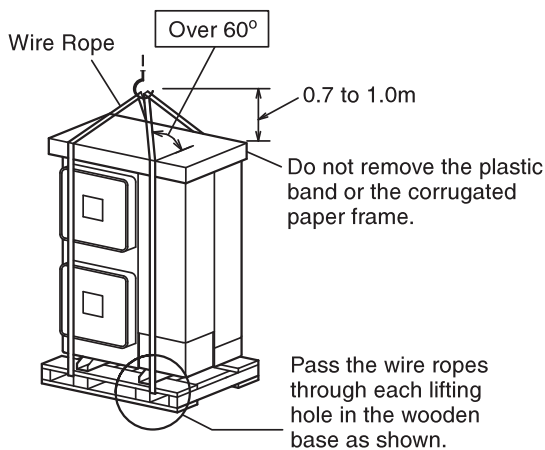


Fig. 3.1 Hanging Work for Transportation

! 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.

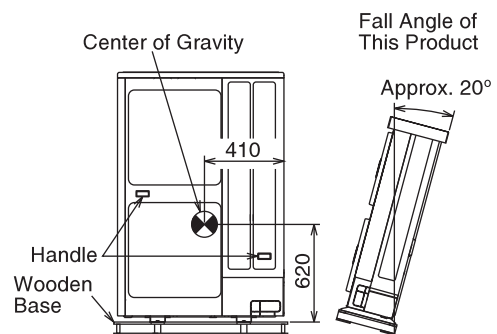


Fig. 3.2 Handling of Outdoor Unit

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

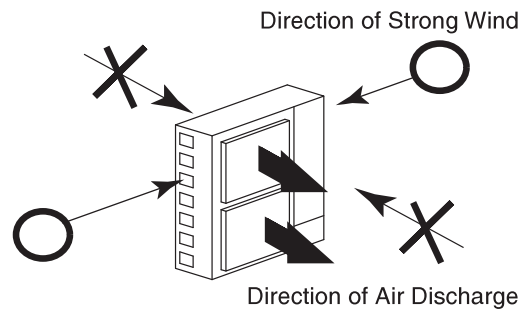
NOTE

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

4.2 Initial Check

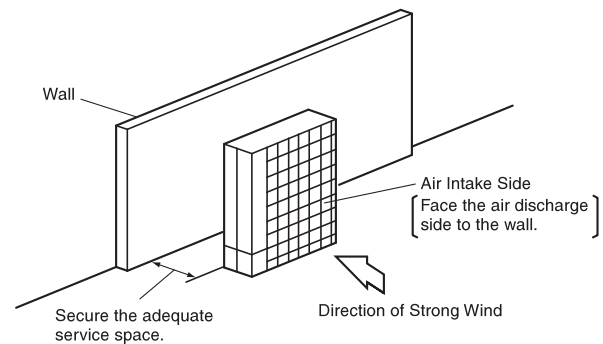
- Install the outdoor unit where good ventilation is available, and where it is dry.
- Install the outdoor unit where the sound or the discharge air from the outdoor unit does not affect neighbors or surrounding vegetation. The operating sound at the rear or right/left sides is higher than the value 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, install near the wall to avoid facing the wind directly. Ensure that the service space should be secured.

A Wall to Guard Against Wind



NOTE:

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

CAUTION

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

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)

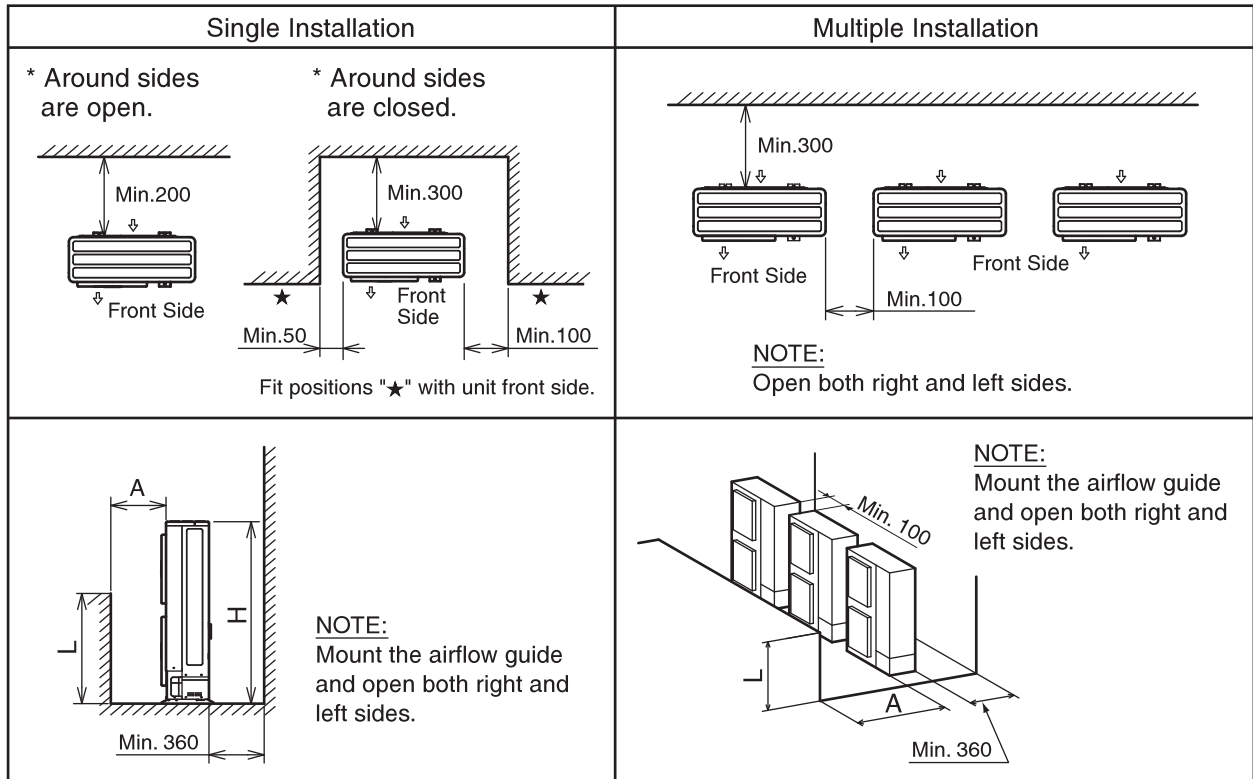


Fig. 4.1 Installation Space (1)

(b) Obstacles in Above

(mm)

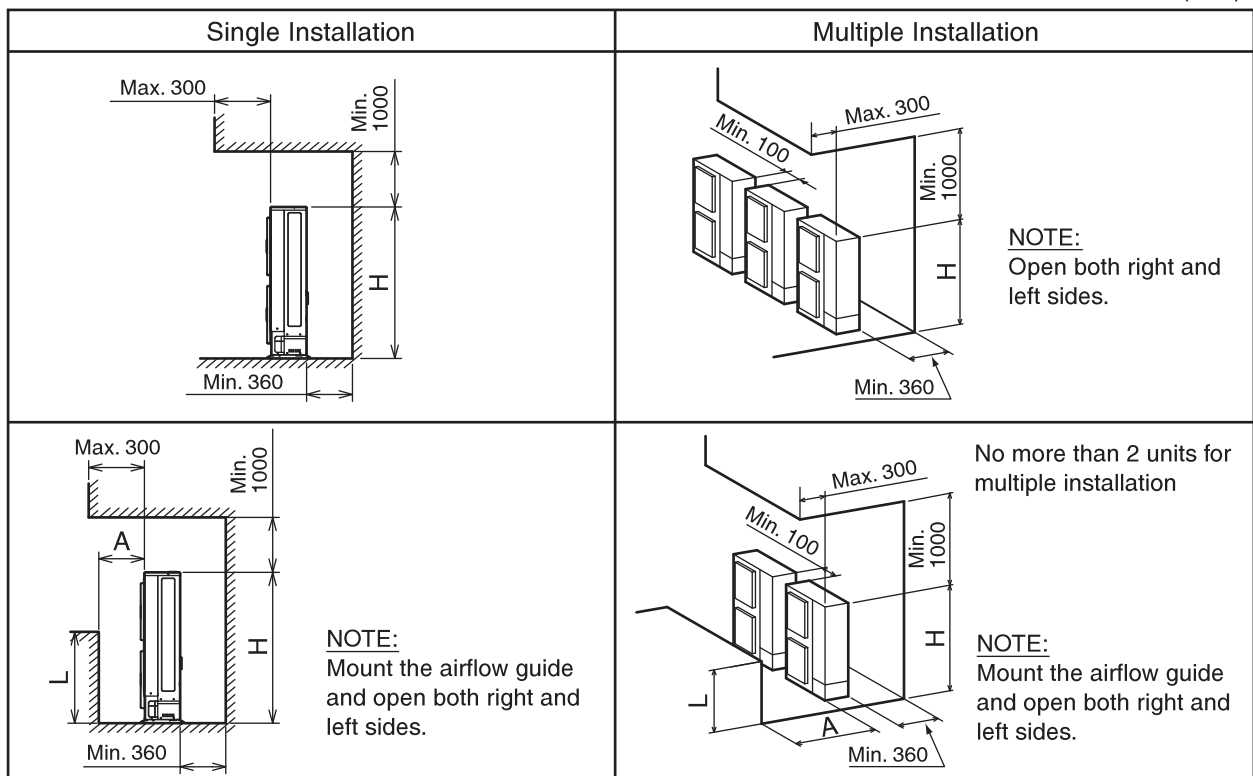


Fig. 4.2 Installation Space (2)

(2) Obstacles on Discharge Side

(a) Upper Side is Open.

(mm)

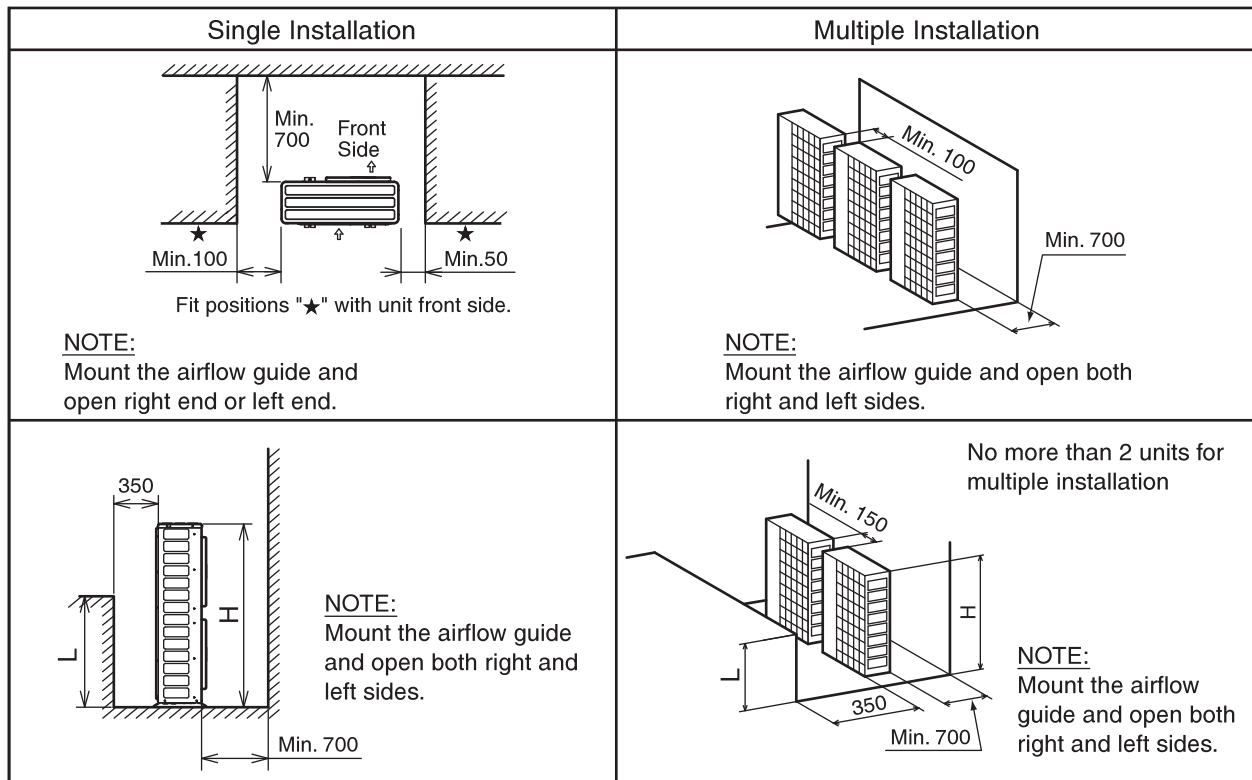
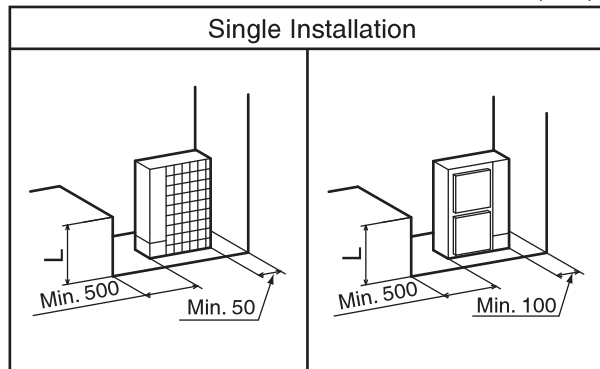


Fig. 4.3 Installation Space (3)

(3) Obstacles in Right and Left

(a) Upper Side is Open.

(mm)



(b) Obstacles in Above

(mm)

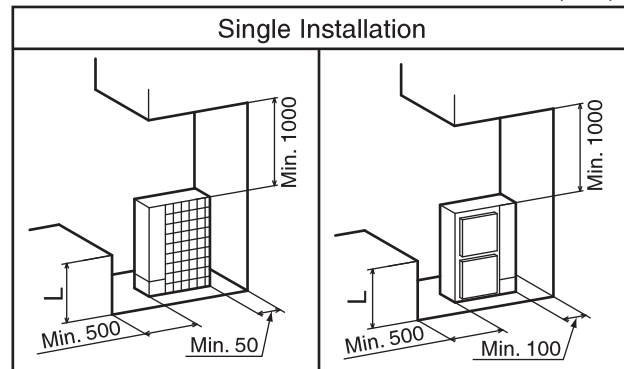


Fig. 4.4 Installation Space (4)

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

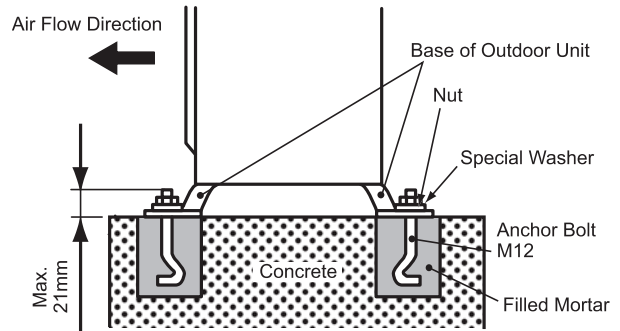
In this situation ensure that the base is closed and does not allow the airflow to short circuit. In each case, install the outdoor unit so that the discharge flow is not short-circuited.

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

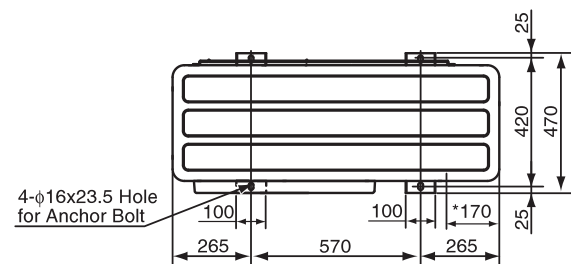
If L is larger than H, mount the units on a base so that H is greater or equal to L.
In this situation ensure that the base is closed and does not allow the airflow to short circuit.
When the mark * dimension is secured, be sure to mount the airflow guide.

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



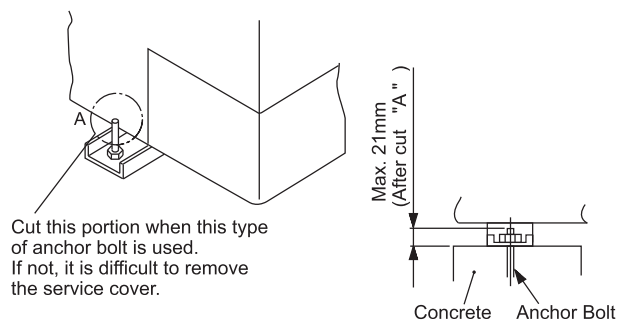
Fix the outdoor unit to the anchor bolts by special washer of factory-supplied accessory.

- (2) When installing the outdoor unit, fix the unit by anchor bolts. Refer to Fig. 4.7 regarding the location of fixing holes.



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

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



8

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

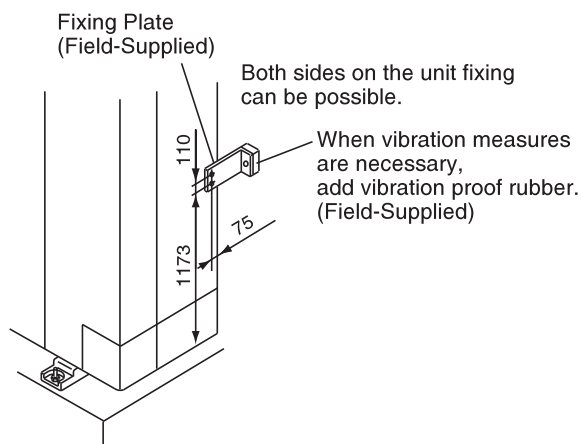
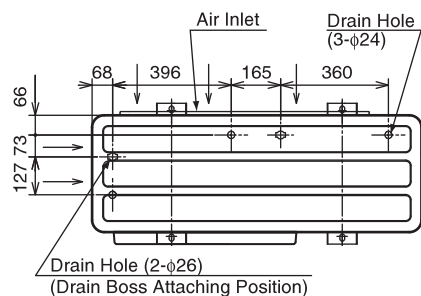


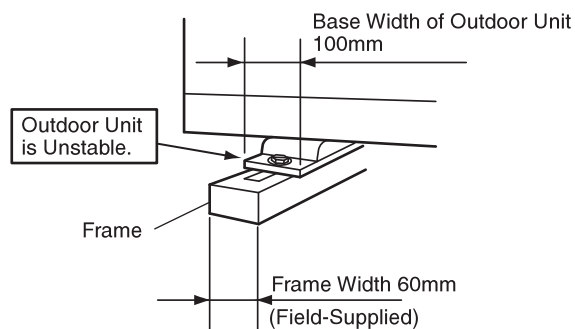
Fig. 4.9 Additional Fixing Arrangement

- (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 (DC-01Q:Optional Parts) .

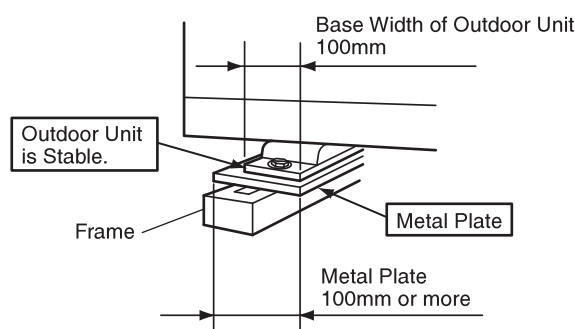


- (7) The whole of the base of the outdoor unit should be installed on a foundation. When using vibration-proof mat, it should also be positioned the same way. When installing the outdoor unit on a field-supplied frame, use metal plates to adjust the frame width for stable installation as shown in Fig.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

Incorrect



Correct



Recommended Metal Plate Size (Field-Supplied)

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

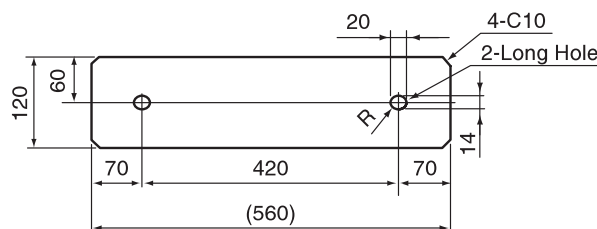


Fig. 4.10 Frame and Base Installation

5. Refrigerant Piping Work

! DANGER

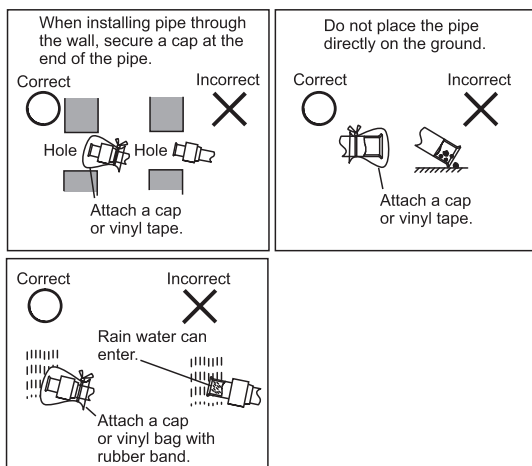
Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed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

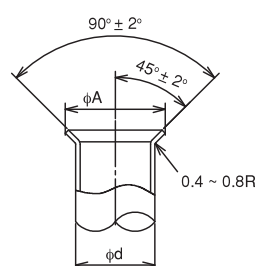
NOTE

● 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.

Table 5.1 Piping Size (mm)

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

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

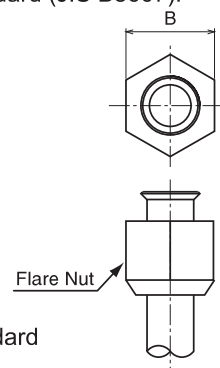
● Flare Nut Dimension

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 5.2 Indoor Unit Type List

Indoor Unit Type	Nominal Power(kBtu/h)																	
	05	07	09	12	14	15	17	18	19	22	24	27	30	38	48	54	76	96
Ceiling Ducted Type (Low Static Pressure)		○	○	○	○		○	○		○	○	○	○	○	○	○	○	○
Ceiling Ducted Type (High Static Pressure)		○	○	○	○		○	○		○	○	○	○	○	○	○	○	○
Low-Height Ceiling Ducted Type		○	○	○	○		○	○		○	○							
Low-Height Ceiling Ducted Type (DC)	○	○	○	○	○		○	○		○	○							
Slim Ceiling Ducted Type		○	○	○	○													
1-Way Cassette Type		○	○	○	○		○			○								
2-Way Cassette Type		○	○	○	○			○			○							
4-Way Cassette Type			○	○	○		○	○		○	○	○	○	○	○	○		
Mini 4-Way Cassette Type	○	○	○	○		○	○		○									
Wall-Mounted Type		○	○	○	○		○	○		○	○							
Ceiling and Floor Type							○	○		○	○	○	○	○	○			
Floor-Concealed Type			○		○			○			○							
Console Type	○	○	○	○		○	○											

○: Available

- A maximum total capacity of 150% 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 5.3 System Combination

Outdoor Unit Model	Indoor Unit				
	Minimum Combination Capacity (kBtu/h)	Maximum Combination Capacity (kBtu/h)	Combination Quantity	Recommend Combination Quantity	Minimum Individual Operation Capacity (kBtu/h)
76	38	114	1~15	8	05
96	48	144	1~17	10	05
114	57	171	1~19	10	05

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

(*2) Capacity ratio must be 100% when only one indoor unit is connected.

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

Modified capacity = nominal capacity × correction factor

Correction factors are defined as follows:

Indoor Unit Type	Model	Correction Factor
Wall mounted	07/09	2.0
2-way cassette	07/09/12	2.0

5.2 Refrigerant Piping Work

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

Table 5.4 Limitation of Outdoor Unit

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

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

Table 5.5 T Shape Branch Pipe

Multi-Kit	HFQ-162F
Gas Line	
Liquid Line	

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

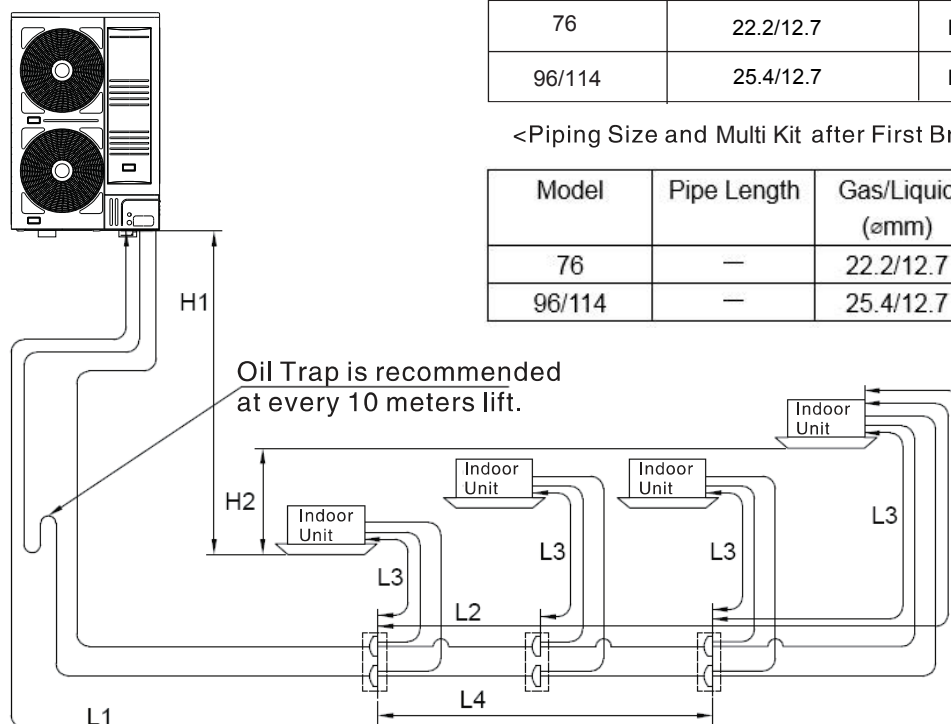
(2) Piping System

<Outdoor Unit to First Branch>

Outdoor Unit	Gas/Liquid (Φmm)	First Branch
76	22.2/12.7	HFQ-162F
96/114	25.4/12.7	HFQ-162F

<Piping Size and Multi Kit after First Branch>

Model	Pipe Length	Gas/Liquid (≈mm)	Multi Kit Model
76	—	22.2/12.7	HFQ-162F
96/114	—	25.4/12.7	



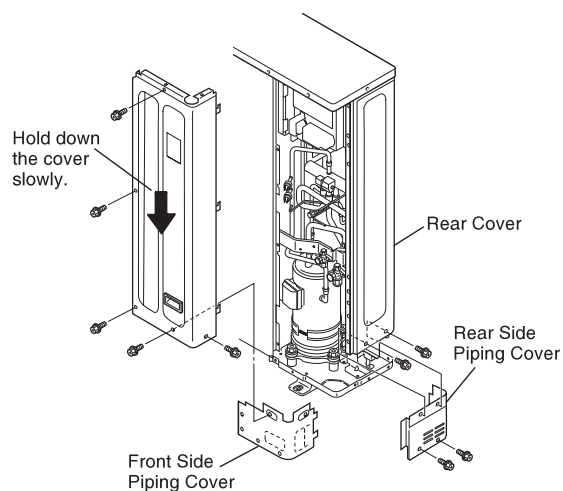
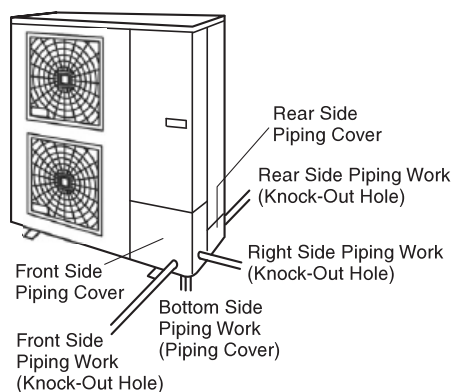
<Multi-kit to Indoor Unit>

Indoor Unit Capacity(kBtu/h)	Piping Size	Gas/Liquid (Φ mm)	Max.Length of Liquid Pipe
05~14		12.7/6.35	15m
18		15.88/6.35	15m
24~48		15.88/9.53	15m
76		19.05/9.53	15m
96		22.2/9.53	15m

Item		Applicable Range
Ref. Pipe Length:	Actual	Within 100m
	Equivalent	Within 125m
Piping Length from 1 st 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 I.U. and O.U.: H2		Within 15m
Total Length of I.U. Piping		Within 250m

5.3 Piping Connection

Pipes can be connected from 4 directions.



Remove the screws with holding down the cover. If not, the cover may fall down (It weights approx. 5kg.).

Fig. 5.1 Piping Direction

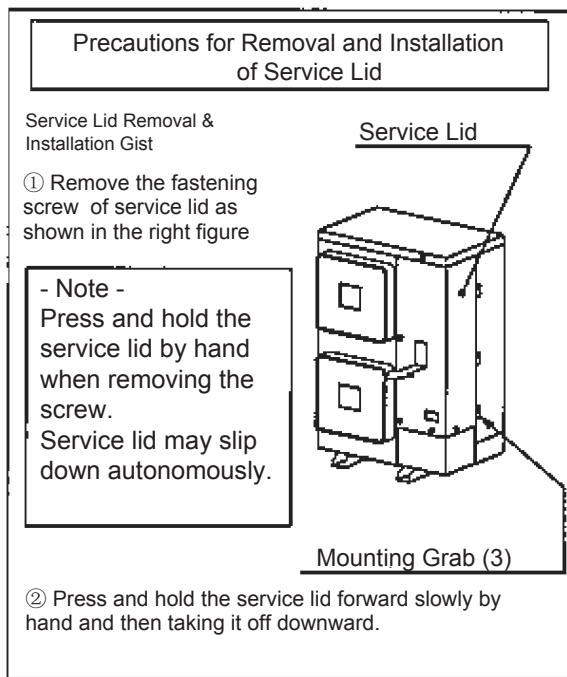
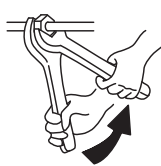


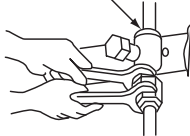
Fig. 5.2 Removal and Installation of Service Lid

- (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.

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



Double Spanner Work



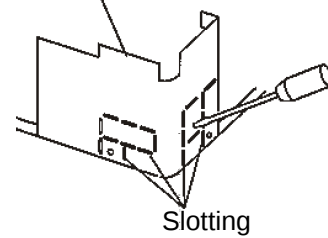
Tightening Work for Stop Valve

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

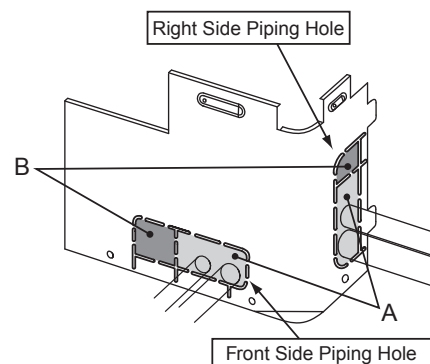
- (4) Pipes can be connected from 4 directions as shown Fig. 5.1. Make a knock-out hole in the front pipe cover or bottom base to pass through the hole.
After removing the pipe cover from the unit, punch out the holes following the guide line with screwdriver and a hammer.

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

Front pipe cover



- (a) Front and Right Side Piping Work
Select the correct knock-out size depending on whether it is for power wiring or transition wiring.

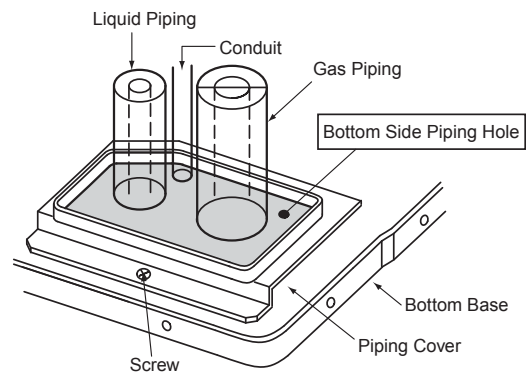


It is available to correct the liquid or gas piping, power wiring less than 14mm² and transition wiring from "A" part.

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.

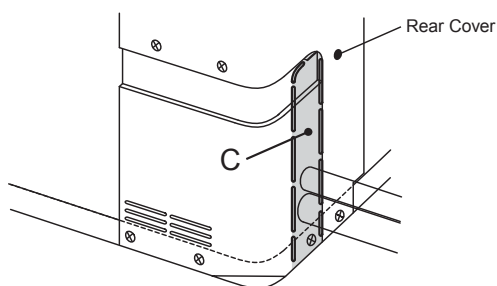


NOTE:

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

(c) Rear Piping Work

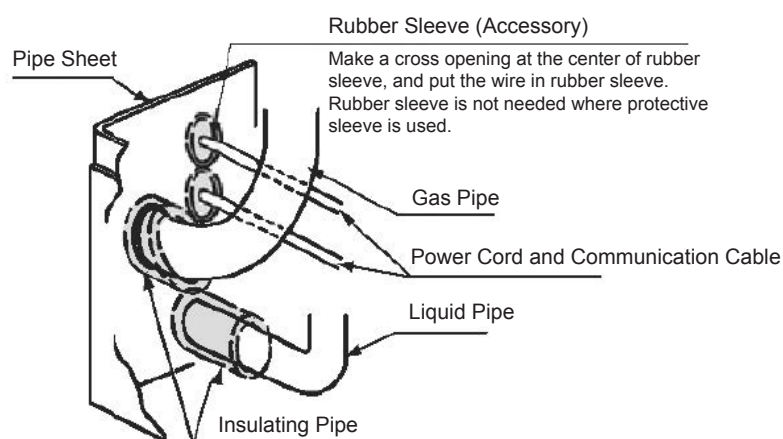
After removing rear piping cover, punch out the "C" holes along the guide line.



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.



Make thermal insulation as shown in the figure, and make sure no gap exists between pipe and opening.

In the case of difficulty in installation, the insulating pipe shall be cut off as shown in the figure.

Interior of Unit with Piping Connected at the Front Part

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

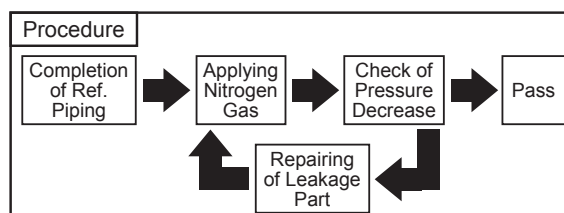
5.4 Air Tight Test

- (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)

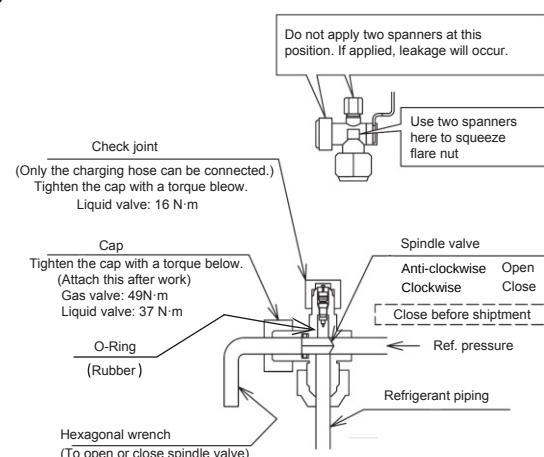
Manufacturer: IDEMITSU KOSAN Co., Ltd.



(4) Stop Valve

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

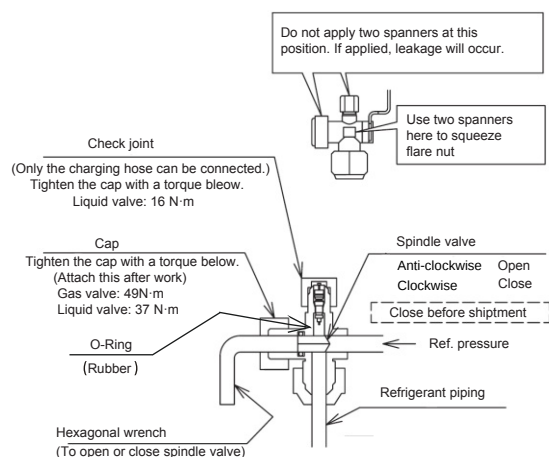
<Gas Valve>



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

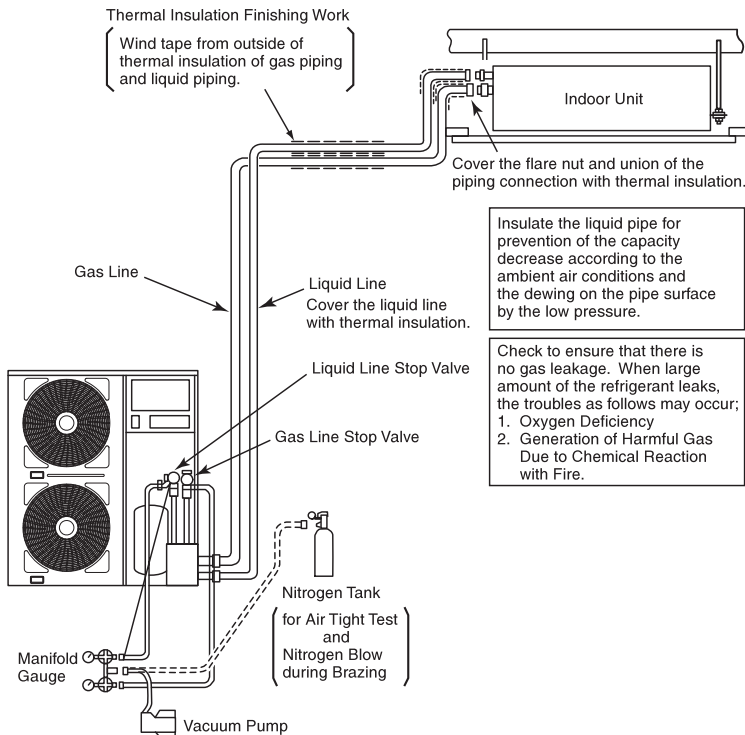
- (1) Connect a mani-fold gauge to the check joints at the both sides.
Continue vacuum pumping work until the pressure reaches -756mmHg or lower for one to two hours.
- (2) After vacuum pumping work, stop the mani-fold valve's valve, stop the vacuum pump and leave it for one hour. Check to ensure that 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 (NH₃) by chemical reaction. The recommended forming agent are as shown below. Do not use general household detergent for checking.

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

NOTES:

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

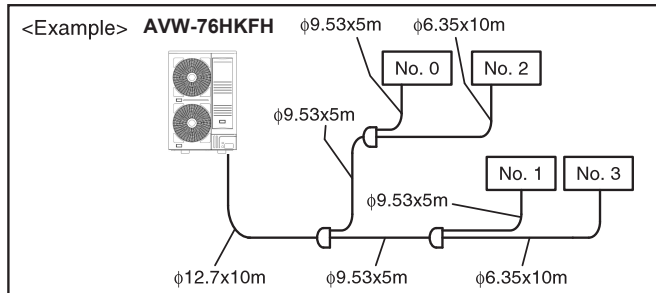
(6) Additional Refrigerant Charge

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)



See Example for Model **AVW-76HKFH**, 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)

Pipe Diameter (mm)	Total Piping Length (m)	Additional Charge (kg)
φ12.7		x 0.12 =
φ9.53		x 0.07 =
φ6.35		x 0.03 =
Total Piping Length	m	Additional Charge W = (kg)

<Table 1>

Outdoor Unit	W ₀ : Outdoor Unit Ref. Charge (kg)
76	7.0
96/114	9.0

NOTE:

W₀ is outdoor unit ref. charge before shipment.

CAUTION

- Max. additional refrigerant charge: 13.5kg
Be sure to contact the manufacturer when this value is exceeded.

2. Charging Work

Charge refrigerant (R410A) into the system as follows.

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

3. Record of Additional Charge

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

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

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

Total Additional Charge W	kg
Total Ref. Charge of This System	kg
Date of Ref. Charge Work	
Day	Month Year

5.6 Caution of the Pressure by Check Joint

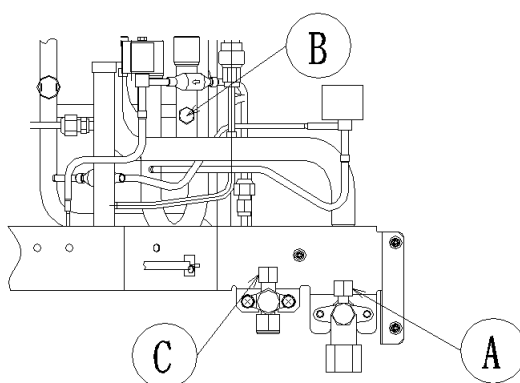
When the pressure is measured, use the check joint of gas stop valve ((A) in the figure below) and use the check joint of liquid piping ((B) in the figure below).

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.

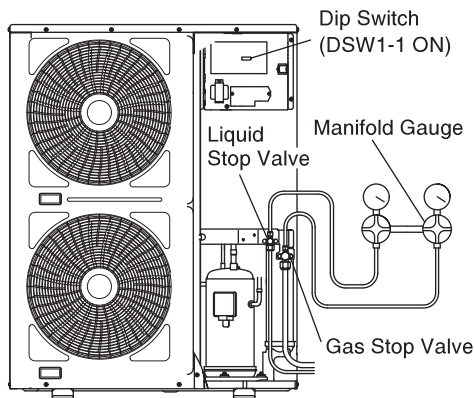
$$\frac{\text{R: Total Quantity of Charged Refrigerant (kg)}}{\text{V: Room Volume (m}^3\text{)}} = \text{C: Refrigerant Concentration} \cdots \cdots 0.3 (\text{kg/m}^3)$$

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

CAUTION

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

NOTE

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

6.1 General Check

- (1) Make sure that the field-selected electrical components (main power switches, circuit breakers, wires, conduit connectors and wire terminals) have been properly selected according to the electrical data. Make sure that the components comply with National Electrical Code (NEC).
- (2) Check to ensure that the voltage of power supply is within $\pm 10\%$ of nominal voltage 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 System Wiring Connection

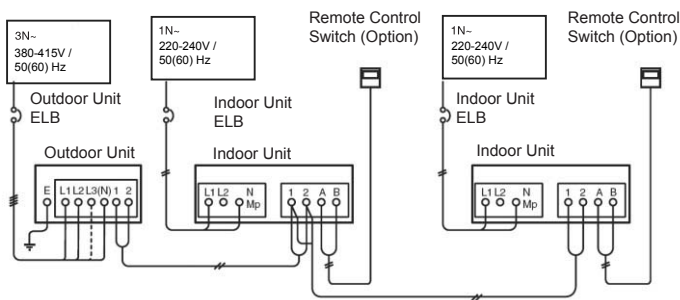
- (1) Connect the power supply wires to the terminal board in the electrical control box of both outdoor unit and indoor unit. And connect the earth wire to the electrical control box of outdoor unit.
In addition, connect the earth wire to earth screw in the electrical control box of indoor unit. Refer to Fig. 6.2, Fig. 6.3 and Fig. 6.4.
- (2) Connect the wires between the outdoor and indoor units to terminals 1 and 2 on the terminal board.
If power supply wiring is connected to 1 and 2 of terminal board (TB2), printed circuit board will be damaged.

- (4) As shown in Fig. 6.2, connect the wire between indoor and outdoor units, and check to assure the tension of terminal crimp wire at each terminal block.
- (5) The communication line between outdoor unit and indoor unit or water module should be shielded twisted pair that is respectively connected to terminals 1 and 2 of terminal block between indoor and outdoor units. Connect the communication cable of wired control to terminals A and B of terminal block.

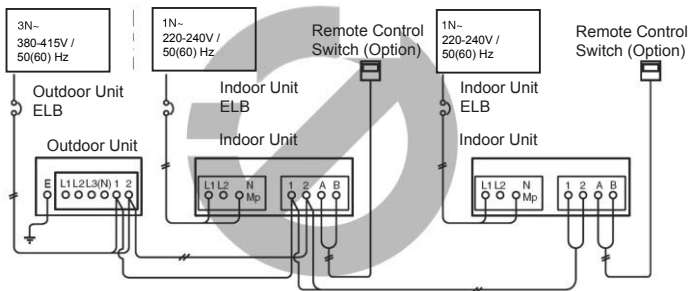
CAUTION

In Case of 3 Phases 4 Wires Type
The power source has to be applied from L1 line and N line. If applied from L1-L2, L1-L3, the electrical parts will be damaged to outdoor unit and indoor unit.

CORRECT



INCORRECT



Do not connect the power source line to the terminals 1 and 2.
These terminals are for the control line.
If connected, the printed circuit board will be damaged.

- (3) Do not connect wires to the fastening screw at the front of service lid.

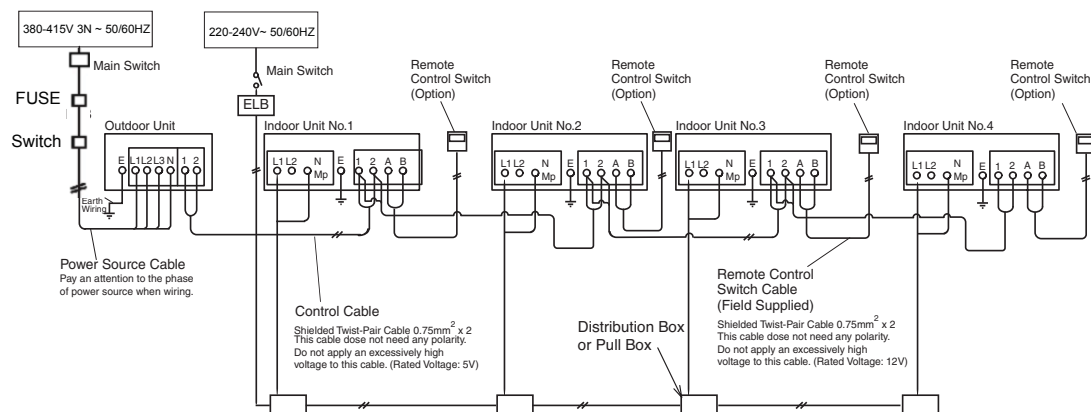


Fig. 6.2 Wiring Connection

! 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.

(6) The recommended breaker sizes etc. are shown in Table 6.1.

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

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

Model	Power Supply	Rated Current (A)	Power Supply Line (mm ²)	Communication Line (mm ²)	ELB		Fuse (A)
					Nominal Current (A)	Nominal Sensitive Current (mA)	
76	380-415V 3N~ 50/60Hz	20.5	6	0.75	32	30	40
96/114	380-415V 3N~ 50/60Hz	26	6	0.75	32	30	40

ELB: Earthleakage Breaker, MLFC: Flame Retardant Polyflex Wire

NOTES:

- (1) Field wiring shall be in conformity to local laws and regulations, and all wiring operations must be performed by qualified professionals.
- (2) Refer to relevant standards for above-noted power cord size.
- (3) Where power cord is connected through junction box in series, be sure to determine the total current and choose wires based on the table below.
- (4) As a minimum, the chosen power cord shall be compliant with requirements on neoprene sheathed wire #57 as stated in IEC60245-1, while the power cord shall be made from copper conductor.
- (5) The wiring specifications for weak-current communication circuit shall not be lower than that for RVV(S)P shielded wires or equivalent, and the shielding layer shall be grounded.
- (6) A switch that can ensure all-pole disconnection shall be installed between power supply and air conditioning unit in such a manner that the contact spacing shall not be less than 3mm.
- (7) Once the power cord is damaged, the dealer or the professionals from designated maintenance department must be contacted in a timely manner for repair and replacement.
- (8) For the installation of power cord, the ground wire must be longer than the current-carrying conductor.

Table 6.2 Basis for Selection of Power Cord

Current (A)	Wire Size (mm ²)	※1: DO NOT connect wires in series when the current exceeds 63A.
$i \leq 6$	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	



Install a multi-pole main switch with a space of 3.0mm or more between each phase.

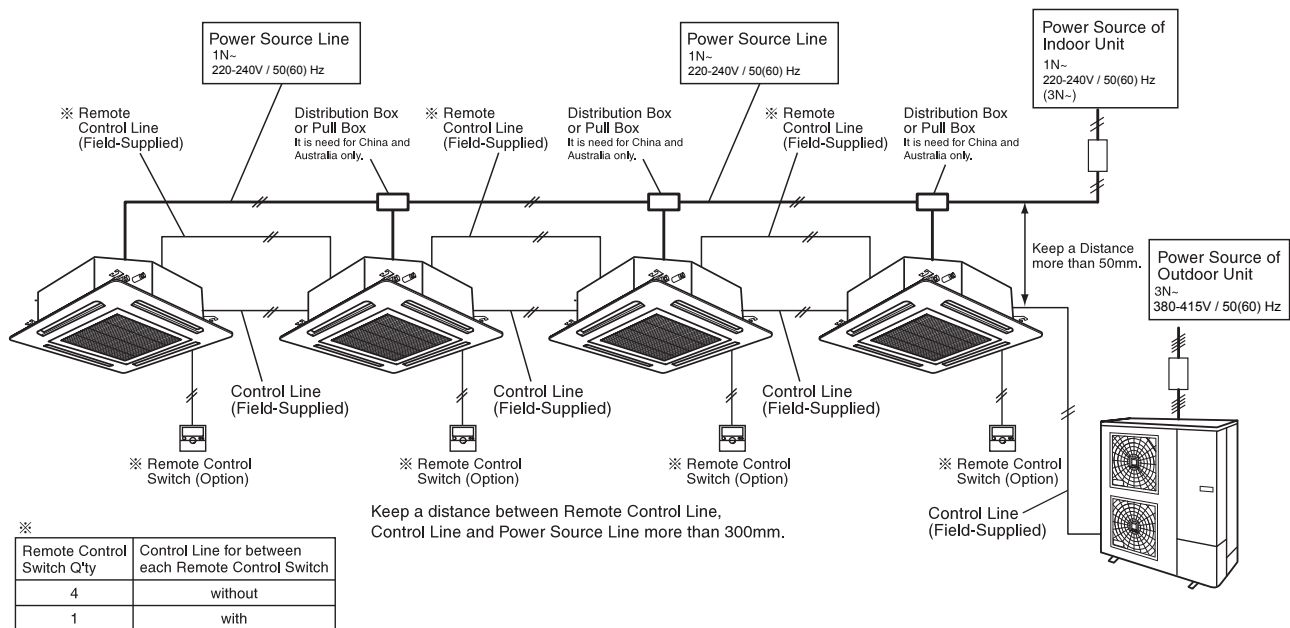


Fig. 6.3 Wiring Connection (3N~ 380-415V/50(60) Hz)

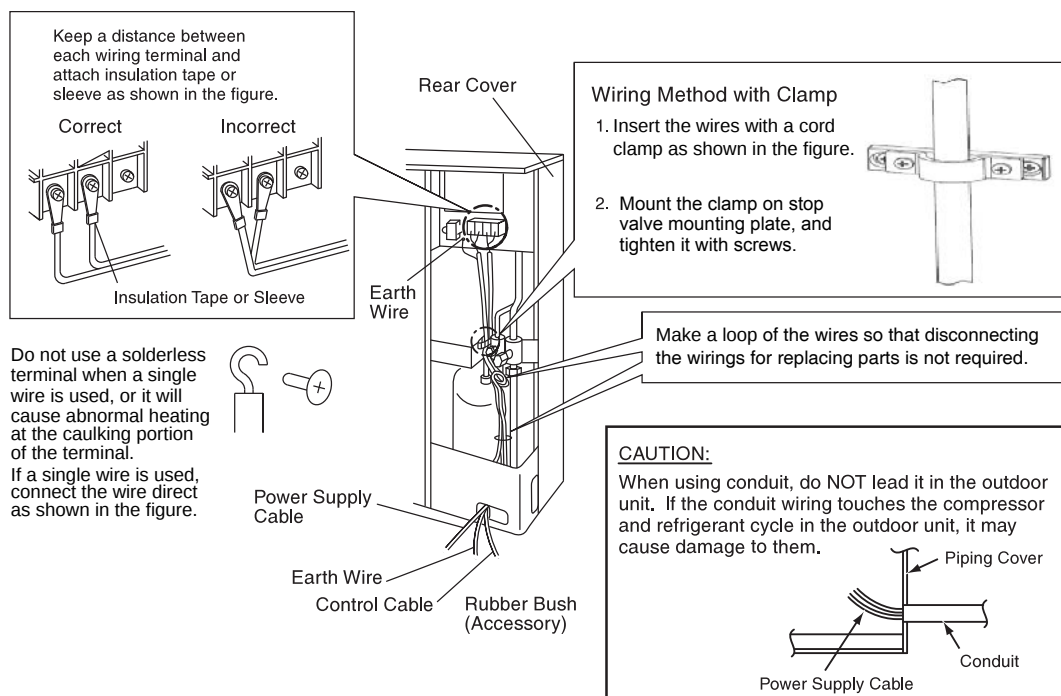
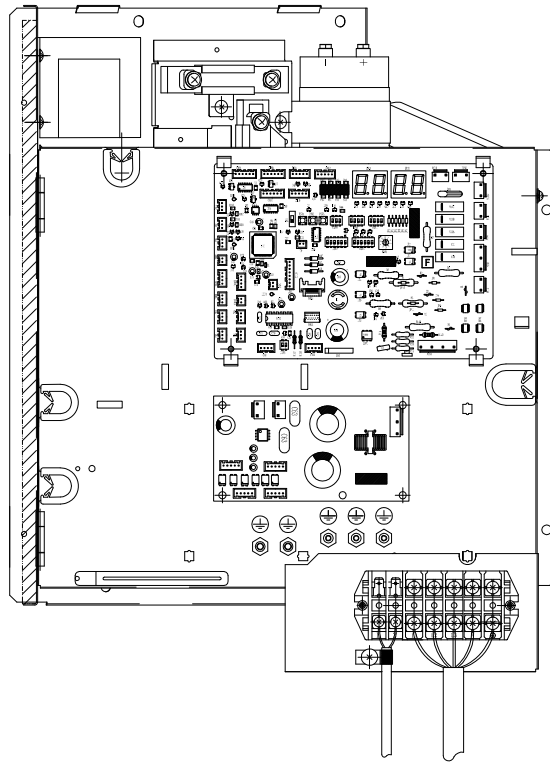


Fig. 6.4 Wiring Connection of Outdoor Unit

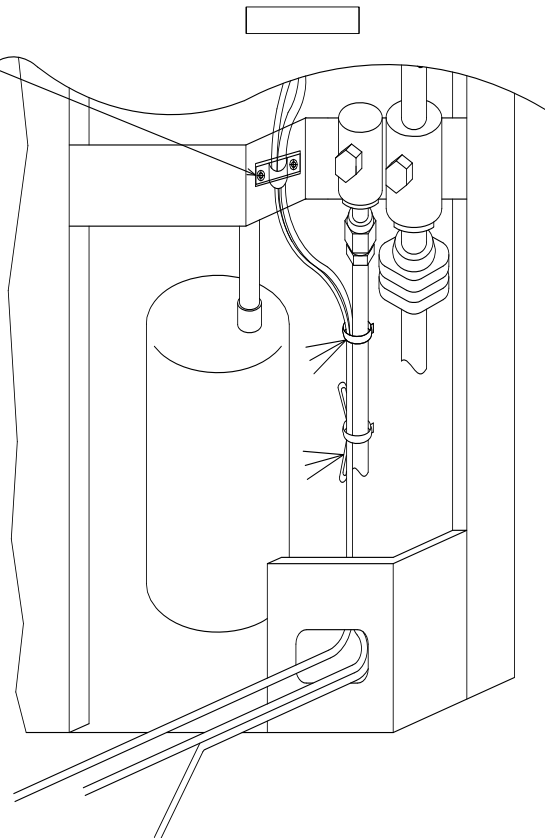
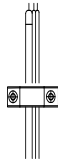
6.2.2 Electric Box Structure



Precautions for Power Connection

Crimp Connection with Wire Clamp

1. Open the wire clip and fix the wire as shown in the figure.
2. Determine the above-noted wire tying method to keep the harness away from contact with compressor, refrigerant pipe and rear cover.



7. Test Run

Test run should be performed according to the Table 7.2 on page 28. And use the Table 7.1 on page 27 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

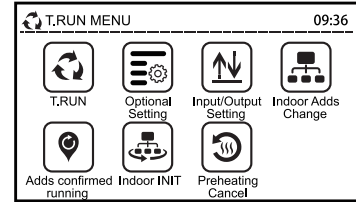
Input:	kW
Running Current:	A

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?	☐

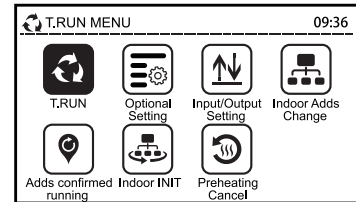
Table 7.2 Checking of Wire Connection by Test Run

- (1) Turn ON the power supply for all the indoor units.
- (2) For the models with the auto-address function, wait for 3 minutes approximately. The addressing is automatically performed. (There is a case that 5 minutes is required according to the setting condition.) After that, select using language from "Menu". Refer to the operation manual for details.
- (3) Press and hold "□" (menu) and "↩" (return) simultaneously for at least 3 seconds.

a. The test run menu will be displayed.

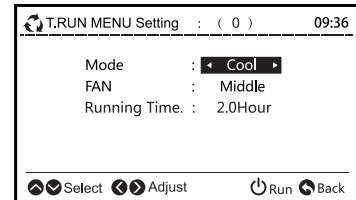


b. Select "↻" and press "☑". The test run settings will be displayed.

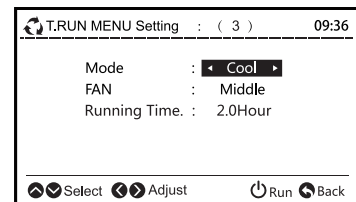


NOTE

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

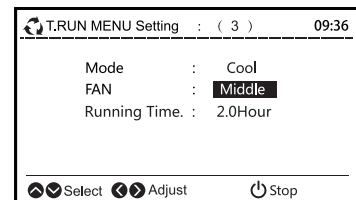


- (4) The total number of the indoor units connected is indicated on the LCD (liquid crystal display). The case of the twin combination (one (1) set with two (2) indoor units) is indicated "2", and the triple combination (one (1) set with three (3) indoor units) is indicated "3".



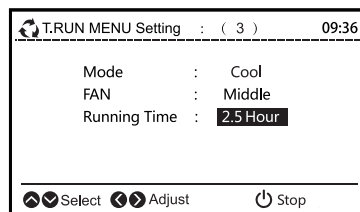
- a. If the indicated number is not equal to the actual connected number of indoor unit, the auto-address function is not performed correctly due to incorrect wiring, the electric noise or etc. Turn OFF the power supply and correct the wiring after checking the following points; (Do not repeat turning ON and OFF within 10 seconds.)
 - Power supply for indoor unit is not turned ON or incorrect wiring.
 - Incorrect connection of connecting cable between indoor units or incorrect connection of controller cable.
 - Incorrect setting of rotary switch and dip switch (the setting is overlapped) on the indoor units PCB.
- b. Press "⏻" (run/stop) to start the test run.
- c. Press "< > ^ v" and set each item.

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



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

(7) To finish the test run, press “” (run/stop) again or pass over the set test run time. When changing the test run time, press “” or “” to select “Running Time”. Then, set the test run time (30 to 600 minutes) by pressing “” or “”.



- The RUN indicator on the remote control switch flashes when some abnormalities such as protection devices activated occur during the test run as well as the RUN indicator () on the indoor unit flashes (0.5 second ON/ 0.5 second OFF). Additionally, the alarm code, the unit model code and connected number of indoor units will be displayed on the LCD as shown in the figure below. If the RUN indicator on HYXE-J01H flashes , it may be a failure in the transmission between the indoor unit and the remote control switch (loosening of connector, disconnecting wiring or breaking wire, etc.). Consult to authorized service engineers if abnormality can not be recovered.

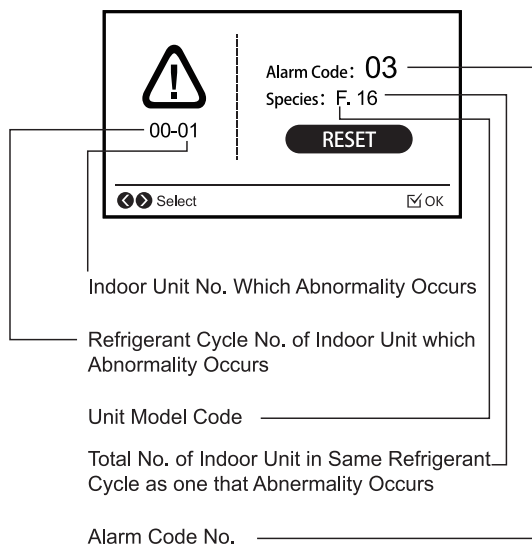


Table 7.4 Alarm Code

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 or 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 4.15 -0.05 -0.15 -0.15	
Cut-In	MPa	3.2±0.15	3.2±0.15
Fuse on Main Circuit	A	40	40
CCP Timer Setting Time	min.	Non-Adjustable 3	Non-Adjustable 3
For Condenser Fan Motor Internal Thermostat		Automatic Reset, Non-Adjustable (each one for each motor)	
DC Cut-Out	°C	120±5	
Cut-In	°C	110~60	110~60
For Control Circuit			
Fuse Capacity on PCB1, 5	A	5	5
Fuse Capacity on PCB3	A	10	10

9. Technical parameters

Technical parameters

Model(s):AVW-76HKFH

Outdoor side heat exchanger of air conditioner/heat pump:air

Indoor side heat exchanger of air conditioner/heat pump:air

Type: compressor driven vapour compression

Driver of compressor:electric motor

Indication if the heater is equipped with a supplementary heater:no

Parameters shall be declared for the average heating season

Item	Symbol	Value	Unit	Item	Symbol	Value	unit
cooling							
Rated cooling capacity	$P_{rated,c}$	22.4	kW	Seasonal space cooling energy efficiency	$\eta_{s,c}$	261.8	%
Declared capacity (*) for cooling, at indoor temperature 27(19) °C and outdoor temperature T_j				Declared energy efficiency ratio (*), at indoor temperature 27(19) °C and outdoor temperature T_j			
$T_j = 35\text{ °C}$	P_{dc}	22.1	kW	$T_j = 35\text{ °C}$	EERd	3.44	—
$T_j = 30\text{ °C}$	P_{dc}	16.4	kW	$T_j = 30\text{ °C}$	EERd	4.54	—
$T_j = 25\text{ °C}$	P_{dc}	10.3	kW	$T_j = 25\text{ °C}$	EERd	7.84	—
$T_j = 20\text{ °C}$	P_{dc}	6.2	kW	$T_j = 20\text{ °C}$	EERd	12.25	—
co-efficient for air conditioners(*)	C_{dc}	0.25					
Power consumption in modes other than 'active mode'							
off mode	P_{OFF}	0.03	kW	crankcase heater mode	P_{CK}	0	kW
thermostat-off mode(cooling)	P_{TO}	0	kW	standby mode	P_{SB}	0.03	kW
heating							
Rated heating capacity	$P_{rated,h}$	22.4	kW	Seasonal space heating energy efficiency	$\eta_{s,h}$	161.7	%
Declared heating capacity for part load at indoor temperature 20 °C and outdoor temperature T_j				Declared coefficient of performance (*)/Average season, at indoor temperature 20 °C and outdoor temperature T_j			
$T_j = -7\text{ °C}$	P_{dh}	14.3	kW	$T_j = -7\text{ °C}$	COPd	2.53	—
$T_j = 2\text{ °C}$	P_{dh}	9.0	kW	$T_j = 2\text{ °C}$	COPd	3.77	—
$T_j = 7\text{ °C}$	P_{dh}	6.0	kW	$T_j = 7\text{ °C}$	COPd	6.17	—
$T_j = 12\text{ °C}$	P_{dh}	3.1	kW	$T_j = 12\text{ °C}$	COPd	7.61	—
$T_j = \text{bivalent temperature}$	P_{dh}	14.3	kW	$T_j = \text{bivalent temperature}$	COPd	2.53	—
$T_j = \text{operating limit}$	P_{dh}	13.1	kW	$T_j = \text{operating limit}$	COPd	2.50	—
Bivalent temperature				Operating limit temperature			
heating/Average	T_{biv}	-7	°C	heating/Average	T_{ol}	-10	°C
heating/Warmer	T_{biv}	—	°C	heating/Warmer	T_{ol}	—	°C
heating/Colder	T_{biv}	—	°C	heating/Colder	T_{ol}	—	°C
Degradation co-efficient heat pumps(**)	C_{dh}	0.25					
Power consumption in modes other than 'active mode'							
off mode	P_{OFF}	0.03	kW	Back-up heating capacity (*)	e_{lbu}	0	kW
thermostat-off mode(heating)	P_{TO}	0.04	kW	Type of energy input			
crankcase heater mode	P_{CK}	0.01	kW	standby mode	P_{SB}	0.03	kW

Other items

Capacity control	variable			air flow rate, outdoor measured		9000	m3/h
Sound power level , indoor/outdoor measured	LWA	-82	dB(A)				
Global warming potential	GWP	2088	kgCO ₂ eq.				

Note

The above performance data is obtained on the basis of the performance of this outdoor unit, with a 100%-combination of ceiling ducted type indoor units.

Contact details

Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd.
218, Qianwangang Road, Economic and Technological Development Zone, Qingdao, P.R. China

Technical parameters

Model(s):AVW-96HKFH

Outdoor side heat exchanger of air conditioner/heat pump:air

Indoor side heat exchanger of air conditioner/heat pump:air

Type: compressor driven vapour compression

Driver of compressor:electric motor

Indication if the heater is equipped with a supplementary heater:no

Parameters shall be declared for the average heating season

Item	Symbol	Value	Unit	Item	Symbol	Value	unit
cooling							
Rated cooling capacity	$P_{rated,c}$	28.0	kW	Seasonal space cooling energy efficiency	$\eta_{s,c}$	268.6	%
Declared capacity (*) for cooling, at indoor temperature 27(19) °C and outdoor temperature T_j				Declared energy efficiency ratio (*), at indoor temperature 27(19) °C and outdoor temperature T_j			
$T_j = 35\text{ °C}$	P_{dc}	27.3	kW	$T_j = 35\text{ °C}$	EERd	3.51	—
$T_j = 30\text{ °C}$	P_{dc}	20.5	kW	$T_j = 30\text{ °C}$	EERd	4.60	—
$T_j = 25\text{ °C}$	P_{dc}	12.9	kW	$T_j = 25\text{ °C}$	EERd	7.79	—
$T_j = 20\text{ °C}$	P_{dc}	7.3	kW	$T_j = 20\text{ °C}$	EERd	13.30	—
co-efficient for air conditioners(*)	C_{dc}	0.25					
Power consumption in modes other than 'active mode'							
off mode	P_{OFF}	0.03	kW	crankcase heater mode	P_{CK}	0	kW
thermostat-off mode(cooling)	P_{TO}	0	kW	standby mode	P_{SB}	0.03	kW
heating							
Rated heating capacity	$P_{rated,h}$	31.5	kW	Seasonal space heating energy efficiency	$\eta_{s,h}$	163.2	%
Declared heating capacity for part load at indoor temperature 20 °C and outdoor temperature T_j				Declared coefficient of performance (*)/Average season, at indoor temperature 20 °C and outdoor temperature T_j			
$T_j = -7\text{ °C}$	P_{dh}	19.5	kW	$T_j = -7\text{ °C}$	COPd	2.54	—
$T_j = 2\text{ °C}$	P_{dh}	12.1	kW	$T_j = 2\text{ °C}$	COPd	3.83	—
$T_j = 7\text{ °C}$	P_{dh}	8.1	kW	$T_j = 7\text{ °C}$	COPd	6.14	—
$T_j = 12\text{ °C}$	P_{dh}	4.1	kW	$T_j = 12\text{ °C}$	COPd	7.66	—
$T_j = \text{bivalent temperature}$	P_{dh}	19.5	kW	$T_j = \text{bivalent temperature}$	COPd	2.54	—
$T_j = \text{operating limit}$	P_{dh}	17.6	kW	$T_j = \text{operating limit}$	COPd	2.49	—
Bivalent temperature				Operating limit temperature			
heating/Average	T_{biv}	-7	°C	heating/Average	Tol	-10	°C
heating/Warmer	T_{biv}	—	°C	heating/Warmer	Tol	—	°C
heating/Colder	T_{biv}	—	°C	heating/Colder	Tol	—	°C
Degradation co-efficient heat pumps(**)	C_{dh}	0.25					
Power consumption in modes other than 'active mode'							
off mode	P_{OFF}	0.03	kW	Back-up heating capacity (*)	elbu	0	kW
thermostat-off mode(heating)	P_{TO}	0.04	kW	Type of energy input			
crankcase heater mode	P_{CK}	0.01	kW	standby mode	P_{SB}	0.03	kW
Other items							
Capacity control	variable			air flow rate, outdoor measured		9780	m3/h
Sound power level , indoor/outdoor measured	LWA	-83	dB(A)				
Global warming potential	GWP	2088	kgCO ₂ eq.				
Note	The above performance data is obtained on the basis of the performance of this outdoor unit, with a 100%-combination of ceiling ducted type indoor units.						
Contact details	Qingdao Hisense Hitachi Air-conditioning Systems Co., Ltd. 218, Qianwangang Road, Economic and Technological Development Zone, Qingdao, P.R. China						

Technical parameters

Model(s):AVW-114HKFH

Outdoor side heat exchanger of air conditioner/heat pump:air

Indoor side heat exchanger of air conditioner/heat pump:air

Type: compressor driven vapour compression

Driver of compressor:electric motor

Indication if the heater is equipped with a supplementary heater:no

Parameters shall be declared for the average heating season

Item	Symbol	Value	Unit	Item	Symbol	Value	unit
cooling							
Rated cooling capacity	$P_{rated,c}$	33.5	kW	Seasonal space cooling energy efficiency	$\eta_{s,c}$	240.4	%
Declared capacity (*) for cooling, at indoor temperature 27(19) °C and outdoor temperature T_j				Declared energy efficiency ratio (*), at indoor temperature 27(19) °C and outdoor temperature T_j			
$T_j = 35\text{ °C}$	P_{dc}	31.9	kW	$T_j = 35\text{ °C}$	EERd	3.01	—
$T_j = 30\text{ °C}$	P_{dc}	24.3	kW	$T_j = 30\text{ °C}$	EERd	4.18	—
$T_j = 25\text{ °C}$	P_{dc}	15.4	kW	$T_j = 25\text{ °C}$	EERd	7.10	—
$T_j = 20\text{ °C}$	P_{dc}	7.8	kW	$T_j = 20\text{ °C}$	EERd	11.07	—
co-efficient for air conditioners(*)	C_{dc}	0.25					
Power consumption in modes other than 'active mode'							
off mode	P_{OFF}	0.03	kW	crankcase heater mode	P_{CK}	0	kW
thermostat-off mode(cooling)	P_{TO}	0	kW	standby mode	P_{SB}	0.03	kW
heating							
Rated heating capacity	$P_{rated,h}$	37.5	kW	Seasonal space heating energy efficiency	$\eta_{s,h}$	151.1	%
Declared heating capacity for part load at indoor temperature 20 °C and outdoor temperature T_j				Declared coefficient of performance (*)/Average season, at indoor temperature 20 °C and outdoor temperature T_j			
$T_j = -7\text{ °C}$	P_{dh}	22.9	kW	$T_j = -7\text{ °C}$	COPd	2.39	—
$T_j = 2\text{ °C}$	P_{dh}	13.7	kW	$T_j = 2\text{ °C}$	COPd	3.51	—
$T_j = 7\text{ °C}$	P_{dh}	9.3	kW	$T_j = 7\text{ °C}$	COPd	5.75	—
$T_j = 12\text{ °C}$	P_{dh}	5.1	kW	$T_j = 12\text{ °C}$	COPd	7.35	—
$T_j = \text{bivalent temperature}$	P_{dh}	22.9	kW	$T_j = \text{bivalent temperature}$	COPd	2.39	—
$T_j = \text{operating limit}$	P_{dh}	20.5	kW	$T_j = \text{operating limit}$	COPd	2.19	—
Bivalent temperature				Operating limit temperature			
heating/Average	T_{biv}	-7	°C	heating/Average	Tol	-10	°C
heating/Warmer	T_{biv}	—	°C	heating/Warmer	Tol	—	°C
heating/Colder	T_{biv}	—	°C	heating/Colder	Tol	—	°C
Degradation co-efficient heat pumps(**)	C_{dh}	0.25					
Power consumption in modes other than 'active mode'							
off mode	P_{OFF}	0.03	kW	Back-up heating capacity (*)	elbu	0	kW
thermostat-off mode(heating)	P_{TO}	0.04	kW	Type of energy input			
crankcase heater mode	P_{CK}	0.01	kW	standby mode	P_{SB}	0.03	kW
Other items							
Capacity control	variable			air flow rate, outdoor measured		9780	m3/h
Sound power level , indoor/outdoor measured	LWA	-83	dB(A)				
Global warming potential	GWP	2088	kgCO ₂ eq.				
Note	The above performance data is obtained on the basis of the performance of this outdoor unit, with a 100%-combination of ceiling ducted type indoor units.						
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