

说明书归档首页

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Hisense

Installation & Maintenance Manual

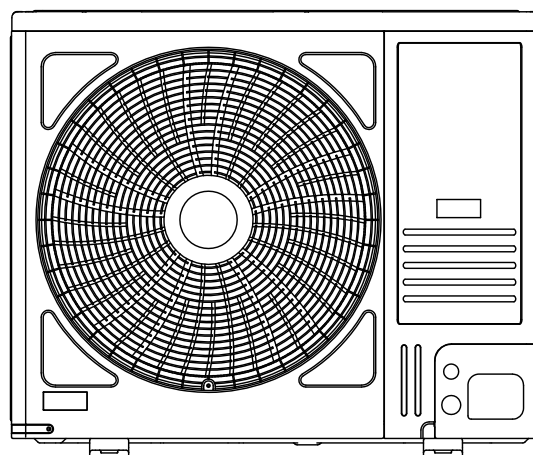
*SPLIT AIR TO WATER
HEAT PUMP OUTDOOR UNIT*

- Outdoor Units -

MODEL
AHW - 070UCSDP
AHW - 090UCSDP
AHW - 120UCSDP

IMPORTANT:

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



M00061Q



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:

AHW-070UCSDP, AHW-090UCSDP, AHW-120UCSDP
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 61000-3-2
EN 61000-3-3
EN 55014-2

following the provisions of:

2006/42/EC
2014/30/EU
2012/19/EU
2011/65/EU

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.

Name, Surname : Li Hu

Position/ Title : Director

Date : April 15, 2017

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.
- 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.
- Install this 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)	
Condition		Min.	Max.
Outdoor Unit	Cooling Operation	10 DB	43 DB
	Heating Operation	-20WB	35 DB
	Domestic Hot Water	-20WB	43 DB
Water Module (Water Supply)	Cooling Operation	5	25
	Heating Operation	15	55
	Domestic Hot Water	15	55

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.

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.

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.

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.

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.

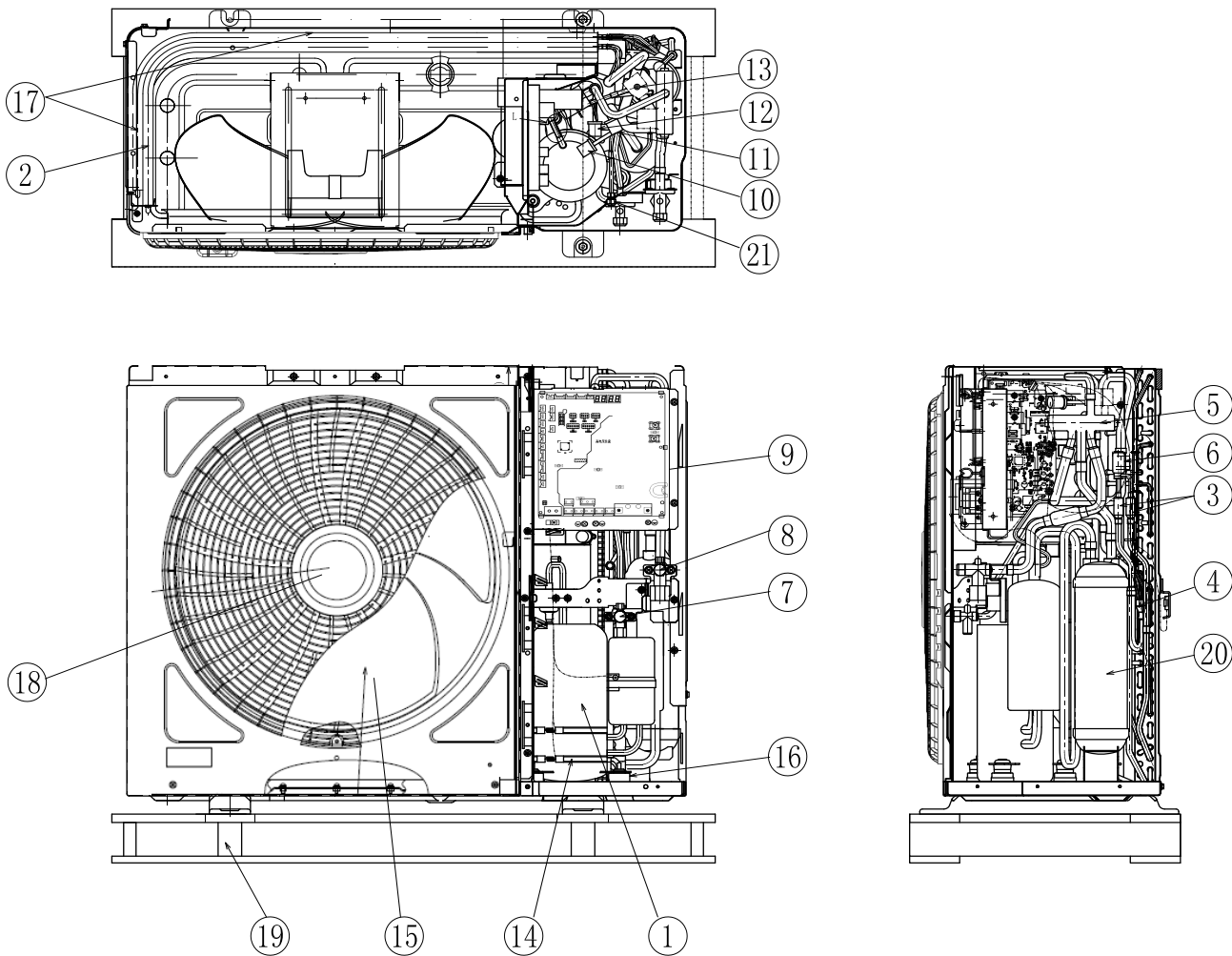
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Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 3 meters from strong electromagnetic wave radiators such as medical equipment.

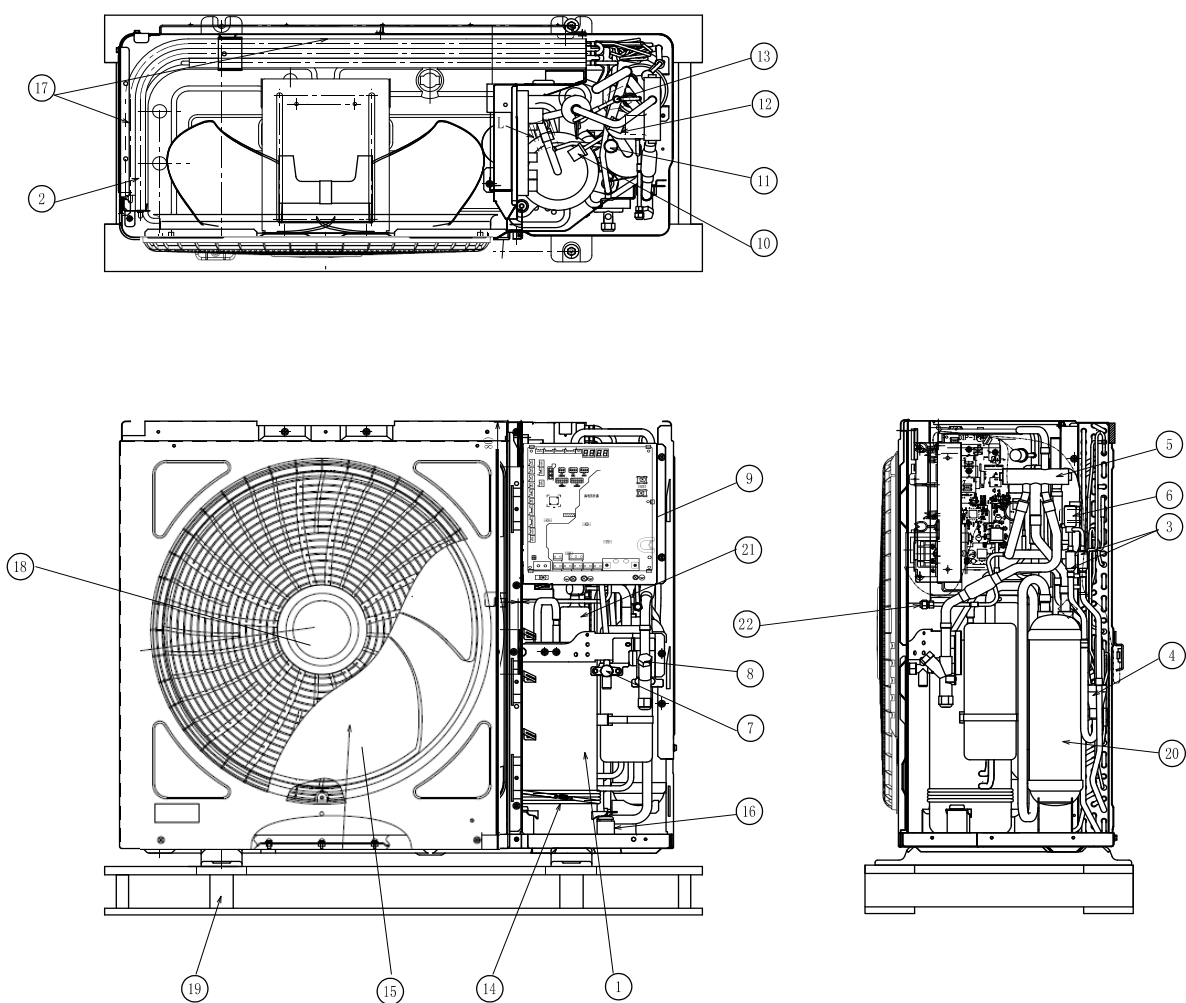
2. Structure

2.1 Outdoor Unit & Refrigerant Cycle
<Outdoor Unit>

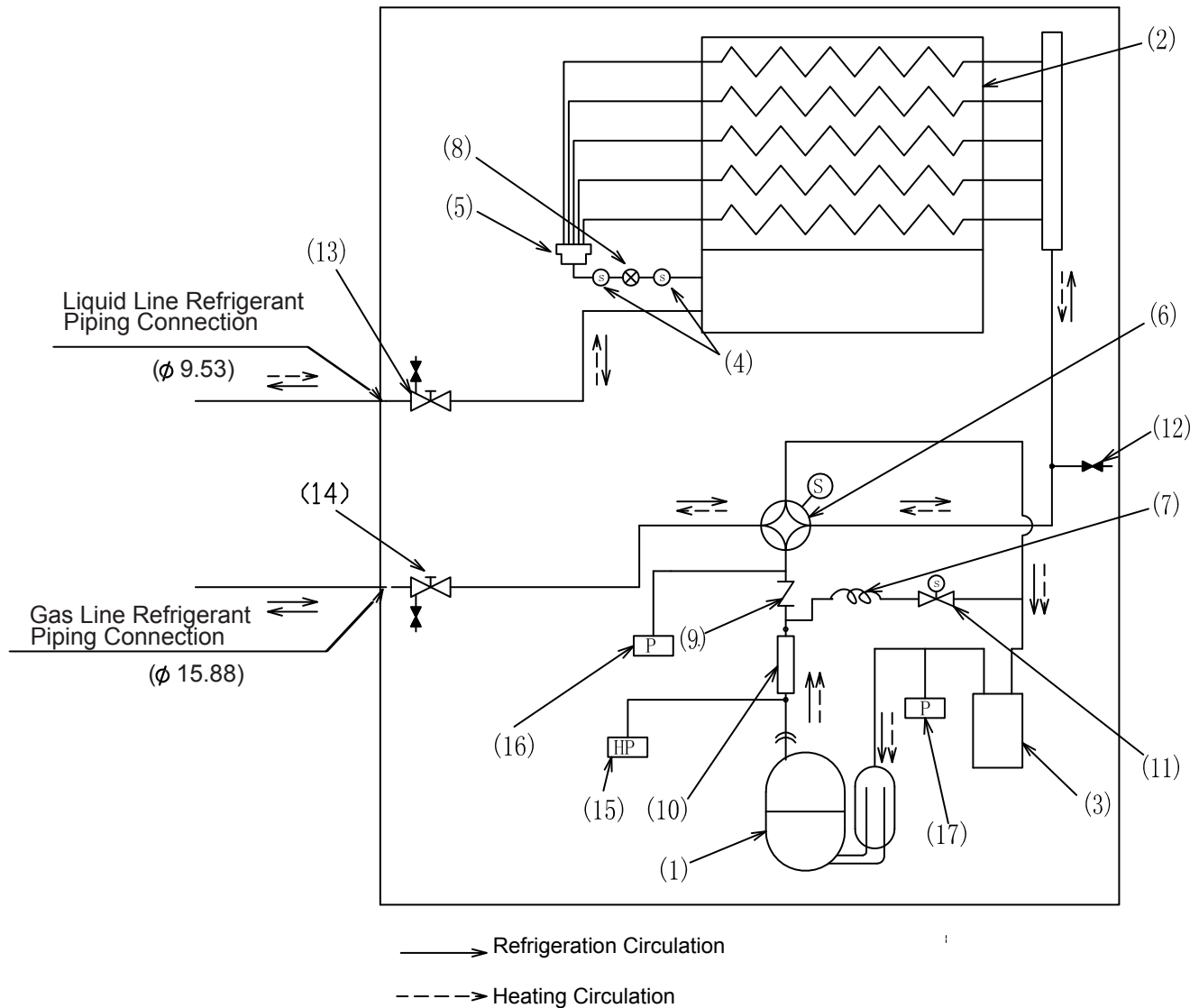
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NO.	Part Name	NO.	Part Name	NO.	Part Name
1	Compressor	9	Electrical Box	17	Air Inlet
2	Heat Exchanger	10	Low Pressure Sensor	18	Air Outlet
3	Strainer	11	High Pressure Switch	19	Wood backing
4	Flow Divider	12	High Pressure Sensor	20	Accumulator
5	Reversing Valve	13	Solenoid Valve	21	Check Joint
6	Expansion Valve	14	Crankcase Heater		
7	Liquid Valve	15	Fan Motor		
8	Gas Valve	16	Damper Rubber		



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NO.	Part Name
1	Compressor
2	Heat Exchanger
3	Accumulator
4	Strainer
5	Flow Divider
6	Reversing Valve
7	Capillary Tube
8	Expansion Valve
9	Check Valve
10	Silencer
11	Solenoid Valve
12	Check Joint
13	Liquid Valve
14	Gas Valve
15	Pressure Switch
16	Pressure Sensor
17	Pressure Sensor

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	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
X: Prohibited

●: only for Refrigerant R410A (No Interchangeability with R22)
◆: 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.	Dimensional Control for Extruded Portion of Tube after Flaring
	Pipe Bender	◇	◇	* In case of material 1/2H, flaring is not available.	Bending
	Expanding Tool	◇	◇	* In case of material 1/2H, bending is not available. Use elbow for bend and braze.	Expanding Tubes
	Torque Wrench	●	◇	* In case of material 1/2H, expanding of tube is not available. Use socket for connecting tube.	Connection of Flare Nut
	Brazing Tool	◇	◇	* For φ12.7, φ15.88, spanner size is up 2mm.	Brazing for Tubes
	Nitrogen Gas	◇	◇	* For φ6.35, φ9.53, φ19.05, spanner size is the same.	Prevention from Oxidation during Brazing
Vacuum Drying Refrigerant Charge	Lubrication Oil (for Flare Surface)	●	◆	* Perform correct brazing work.	Applying Oil to the Flared Surface
	Refrigerant Cylinder	●	◆	* Strict Control against Contamin (Blow nitrogen during brazing.)	Refrigerant Charging
	Vacuum Pump	◇	◇	* Use a synthetic oil which is equivalent to the oil used in the refrigeration cycle.	Vacuum Pumping
	Adapter for Vacuum Pump	* ●	◆	* Synthetic oil absorbs moisture quickly.	Vacuum Pumping
	Manifold Valve	●	◆	* Check refrigerant cylinder color.	Vacuum Pumping, Vacuum Holding, Refrigerant Charging and Check of Pressures
	Charging Hose	●	◆	★ Liquid refrigerant charging is required regarding zeotropic refrigerant.	
	Charging Cylinder	X	X	★ 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.	
	Weight Scale	◇	◇	* No interchangeability is available due to higher pressures when compared with R22.	
Refrigerant Gas Leakage Detector	Refrigerant Gas Leakage Detector	* ●	◆	★ 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.	Gas Leakage Check
				* Use the weight scale.	-

*: Interchangeability with R407C.

3. Transportation and Handling

3.1 Combination of Indoor Unit and Outdoor Unit

- Group one for one, namely an outdoor unit used in combination with a water module.
Specific ratios shown in the table below

	Outdoor Unit	Water Module
Model	AHW-070UCSDP	AHM-070UXCSAPA3
	AHW-090/120UCSDP	AHM-160UXCSAPA3

3.2 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.

● Lifting Method

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

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

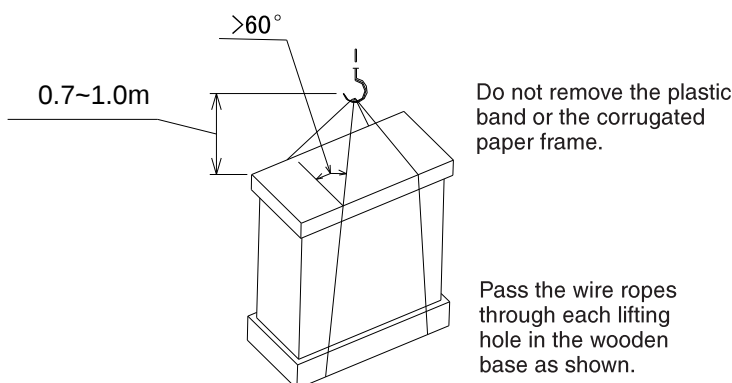


Fig. 3.1 Lifting Work for Transportation

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.

3.3 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.

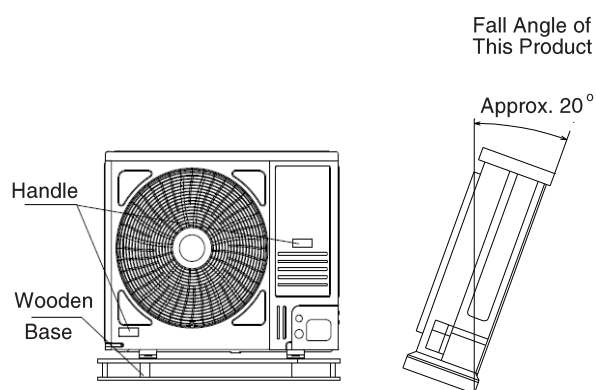


Fig. 3.2 Handling of Outdoor Unit

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

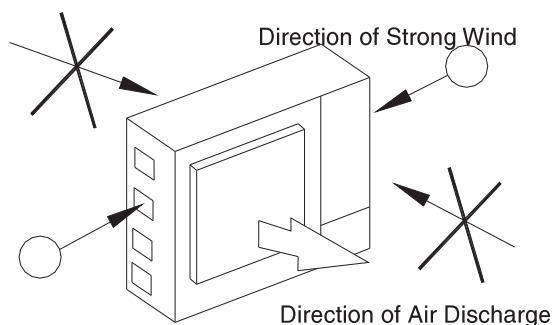
Accessory	Q'ty	Recommend
Shim	4	
Magnetic Ring	1	
Screw	2	
Clamp	1	

NOTE

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

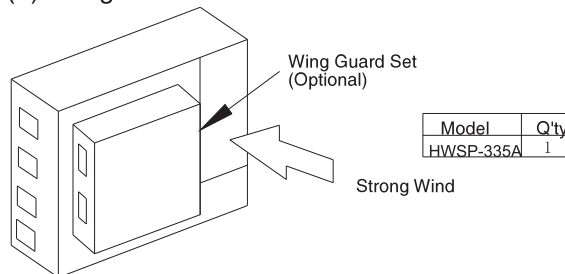
4.2 Initial Check

- 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.

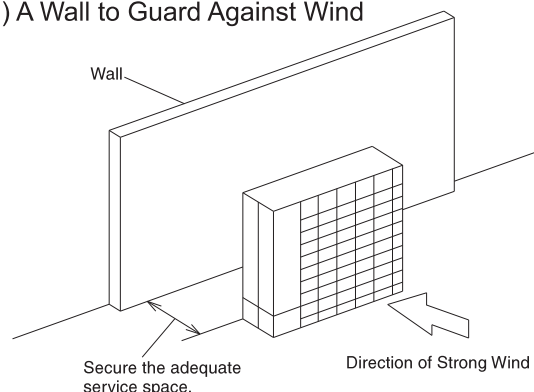


- In case of installation in the open spaces unavoidably where there is no buildings or surrounding structures, adopt the wind guard set or install near the wall to avoid facing the wind directly. Ensure that the service space should be secured.

(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) Upper Side is Open.

(mm)

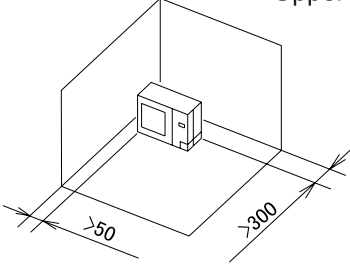
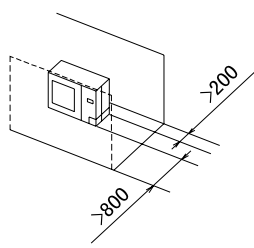
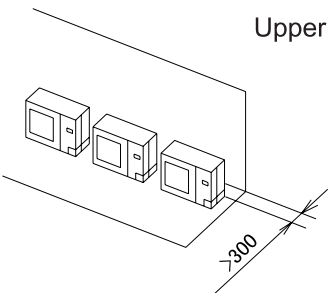
Single Installation	Upper Side is Open  Keep a distance of 100mm between service cover and wall.
Single Installation	 Above of two sides of the unit is open. (Occasion of obstacles in the obverse side of the units)
Multiple Installation	Upper Side is Open  Keep a distance of more than 100mm between other units.

Fig. 4.1 Installation Space

(2) Obstacles in Above

When obstacles is in above ,it is should be ensured that the distance between the top of units and obstacles is more than 500mm, besides the space for installation and maint nance is satisfied.

4.4 Installation Work

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

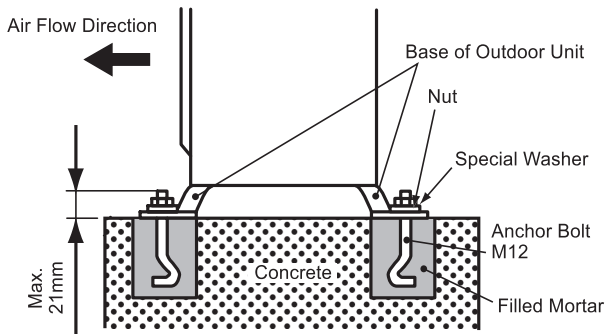


Fig. 4.2 Installation of Anchor Bolts

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

- (2) When installing the outdoor unit, fix the unit by anchor bolts. Refer to Fig. 4.3 regarding the location of fixing holes.

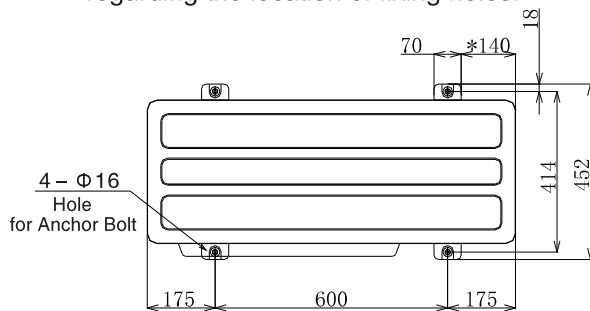


Fig. 4.3 Position of Anchor Bolts

NOTE:

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

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

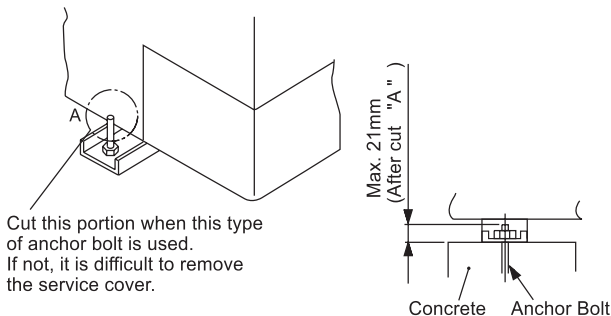


Fig. 4.4 Fixing Example

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

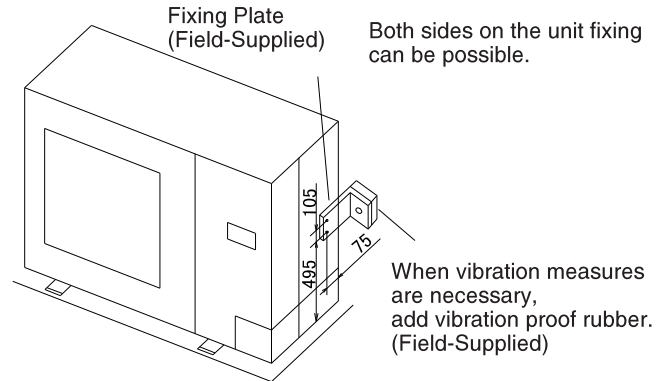
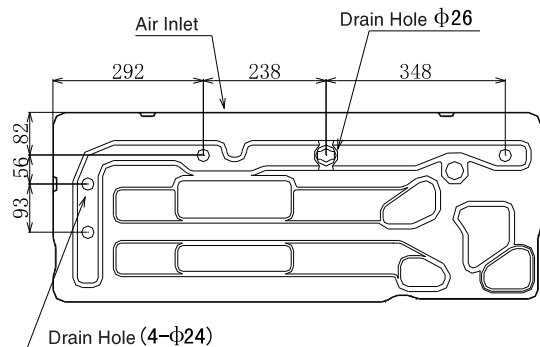


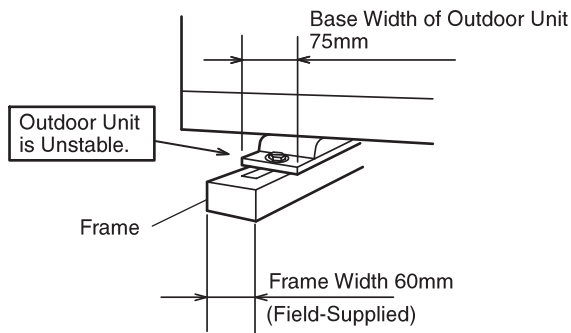
Fig. 4.5 Additional Fixing Arrangement

- (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 (HDBS-26 or HDBS-26L:Optional Parts) .

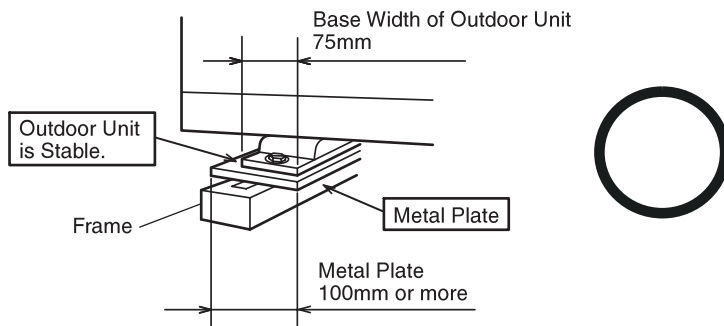


- (7) The whole of the base of the outdoor unit should be installed on a foundation. When using vibration-proof mat, it should also be positioned the same way. When installing the outdoor unit on a field-supplied frame, use metal plates to adjust the frame width for stable installation as shown in Fig.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

Incorrect



Correct



Recommended Metal Plate Size (Field-Supplied)

Material: Hot-Rolled Mild Steel Plate (SPHC)

Plate Thickness: 4.5T

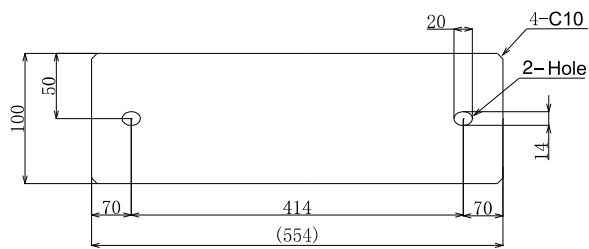


Fig. 4.6 Frame and Base Installation

5. Refrigerant Piping Work

! DANGER

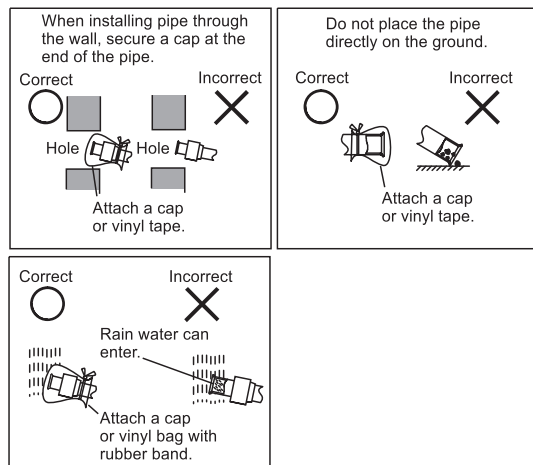
Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed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

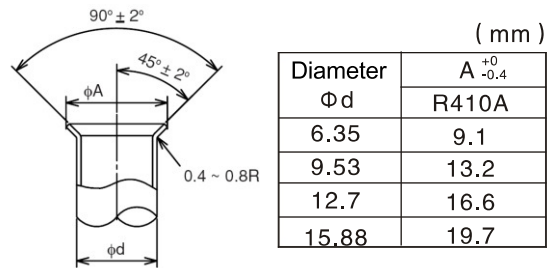


! CAUTION

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

● Flaring Dimension

Perform the flaring work as shown below.



● Piping Thickness and Material

Use the pipe as below. (mm)

Diameter	R410A	
	Thickness	Material
φ 6.35	0.8	0
φ 9.53	0.8	0
φ 12.7	0.8	0
φ 15.88	1.0	0

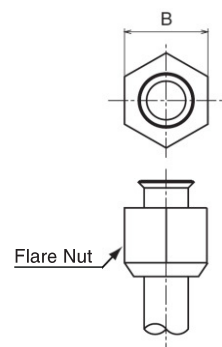
Material is based on a JIS standard (JIS B8607).

● Flare Nut Dimension

Use the flare nut as below.

<Flare Nut Dimension B (mm)

Diameter	R410A
φ 6.35	17
φ 9.53	22
φ 12.7	26
φ 15.88	29



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

5.2 Refrigerant Piping Work

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

Table 5.1 Limitation of Outdoor Unit

Diameter Model	Outer Diameter of Pipe(mm)	
	Gas	Liquid
AHW-070/090/120 UCSDP	φ 15.88	φ 9.53

Table 5.2 Indoor Unit Pipe Model

Model	Gas Pipe	Liquid Pipe
AHM-070/160UXCSAPA3	φ 15.88	φ 9.53

(2) Additional Refrigerant Charge R410A

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

Table 5.3 W₀ is Outdoor Unit Ref.charge before shipment

Outdoor Unit Model	W ₀ (kg)
AHW-070UCSDP	2.30
AHW-090/120UCSDP	3.05

- Calculate charge refrigerant quantity by liquid pipe length, charge it to refrigerant cycle.

$$W1 (kg): (\text{length of liquid pipe}(\phi 9.53)-5, m) \times 0.05$$

$$W = W_0 + W1$$

- Inform local service the quantity of charging refrigerant after finish charging.

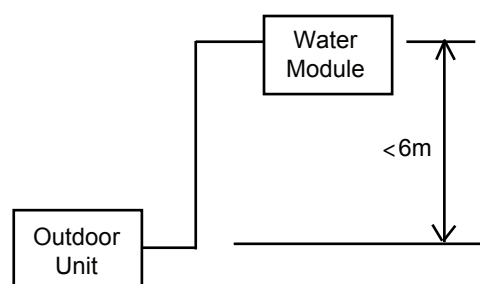
(3) Pipes running the length and height difference

Table 5.4 the length of the refrigerant pipe running

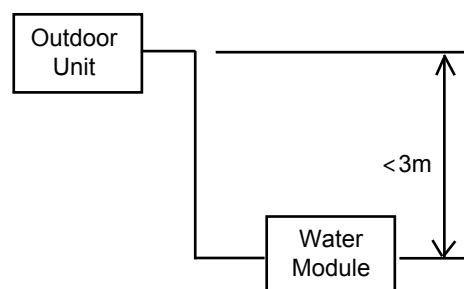
Project Model	Pipe length	
	Actual Length	Equivalent Length
AHW-070/090/120 UCSDP	≤ 30m	≤ 33m

Table 5.5 outdoor unit and water module allows the height difference

Outdoor unit location	Maximum height difference
Outdoor unit is lower than indoor unit	6m
Outdoor unit is higher than indoor unit	3m



Outdoor unit is lower than indoor unit



Outdoor unit is higher than indoor unit

5.3 Piping Connection

Pipes can be connected from 4 directions.

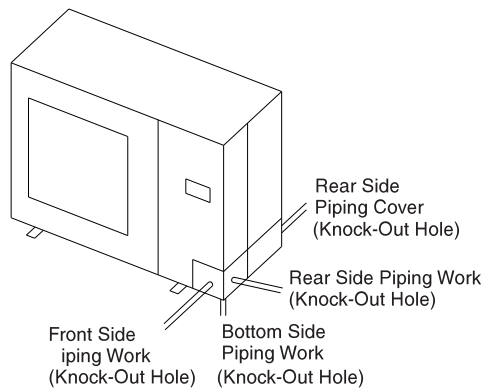
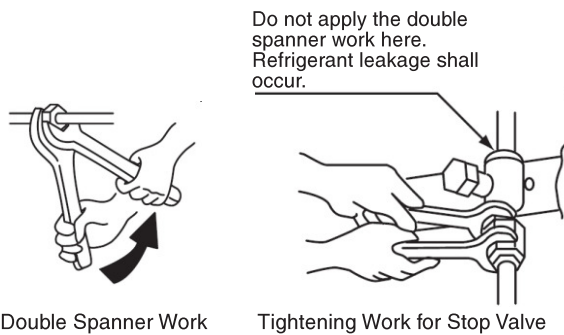


Fig. 5.1 Piping Direction

- (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 Gas Piping Connection
Prepare a field-supplied bend pipe for gas line. Braze it and the factory-supplied pipe flange at the outside of the unit.



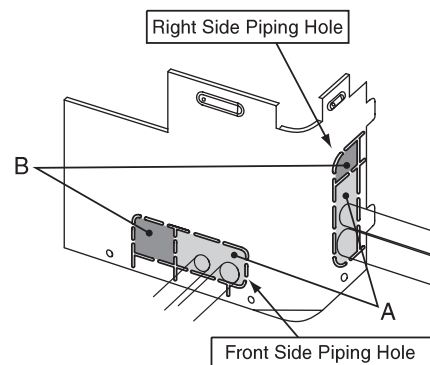
Double Spanner Work

Tightening Work for Stop Valve

Pipe Size	Tightening Torque for Flare Nut
Φ6.35(1/4)	20N · m (2kgf · m)
Φ9.53(3/8)	40N · m (4kgf · m)
Φ12.7(1/2)	60N · m (6kgf · m)
Φ15.88(5/8)	80N · m (8kgf · 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.

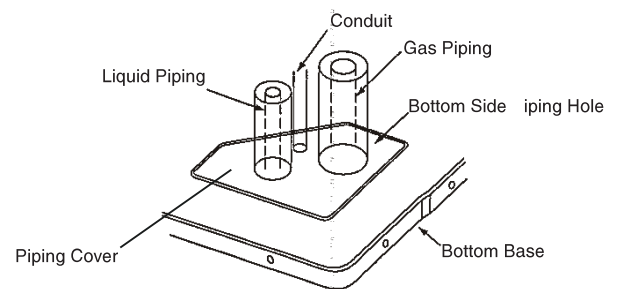


It is available to correct the liquid or gas piping, power wiring less than 14mm² and transition wiring from "A" part.

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.

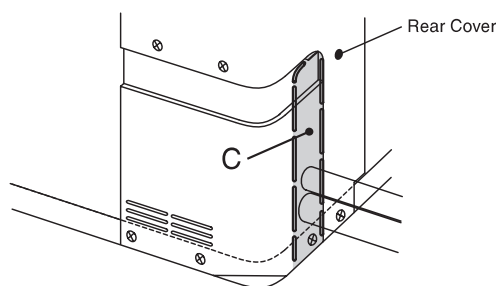


NOTE:

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).

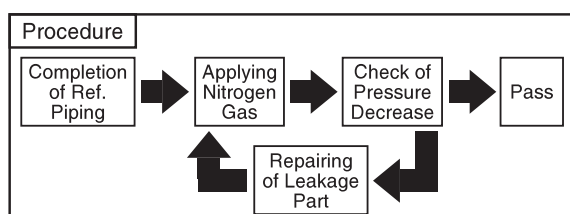
- (5) To prevent gaps use a rubber bush and insulation (Factory-Supplied) adequately when installing the piping cover. Cut the lower side guide line of the piping cover when attaching work is difficult. If not, it will be included water in the unit and electrical parts will be damaged.
- (6) Use a pipe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

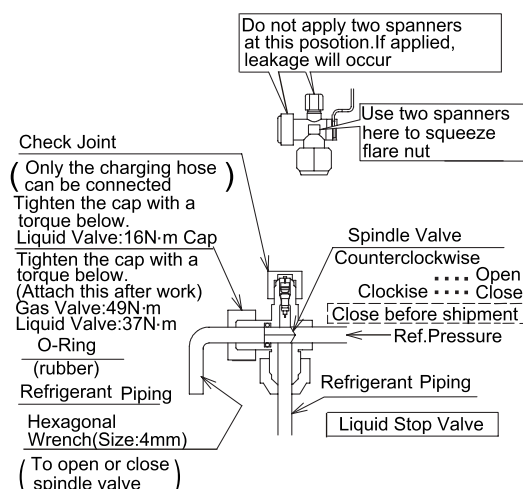
Lubrication Oil is field-supply.

〔 Model:HAF68D1C(or the same type Oil) 〕



(4) Stop Valve

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



Spindle Valve Torque (N·m)

Gas	Liquid
9~11	7~9

Hexagonal Wrench Size (mm)

Gas	Liquid
5	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 manifold using charging hoses with a nitrogen cylinder to the check joints of the liquid line and the gas line stop valves.
Perform the air-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 manifold gauge to the check joints at the both sides.
Continue vacuum pumping work until the pressure reaches 760mmHg or lower for one to two hours.
- (2) After vacuum pumping work, stop the manifold valve's valve, stop the vacuum pump and leave it for one hour. Check to ensure that the pressure in the manifold gauge does not increase.
- (3) Fully open the gas valve and liquid valve.
- (4) Add refrigerant according to the piping diameter and piping length in the field connecting.

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

- (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:

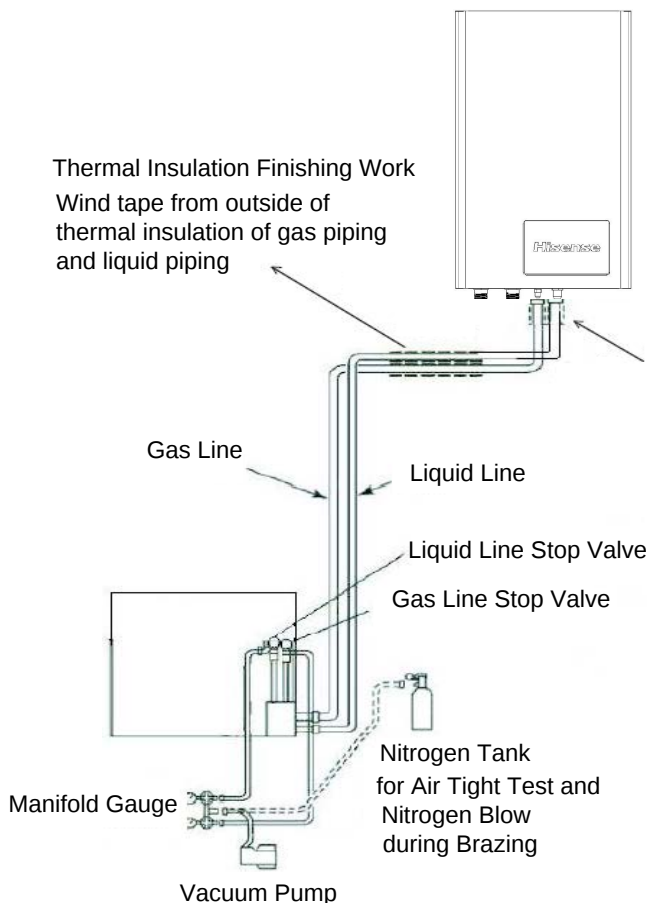
1. When the spindle cap for stop valve is removed, the gas accumulated at O-ring or screws is released and may make sound. This phenomenon is NOT a gas leakage.
2. This unit is only for the refrigerant R410A. The manifold gauge and the charging hose should be exclusive use for R410A.
3. If vacuum degree of -0.1MPa (760mmHg) 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.

Insulate the liquid pipe for prevention of the capacity decrease according to the ambient air conditions and the dewing on the pipe surface by the low pressure.

Check to ensure that there is no gas leakage. When large amount of the refrigerant leaks, the troubles as follows may occur.

1. Oxygen Deficiency
2. Generation of Harmful Gas Due to Chemical Reaction with Fire

Cover the flare nut and union of the piping connection with thermal insulation



! 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.

5.6 Caution of the Pressure by Check Joint

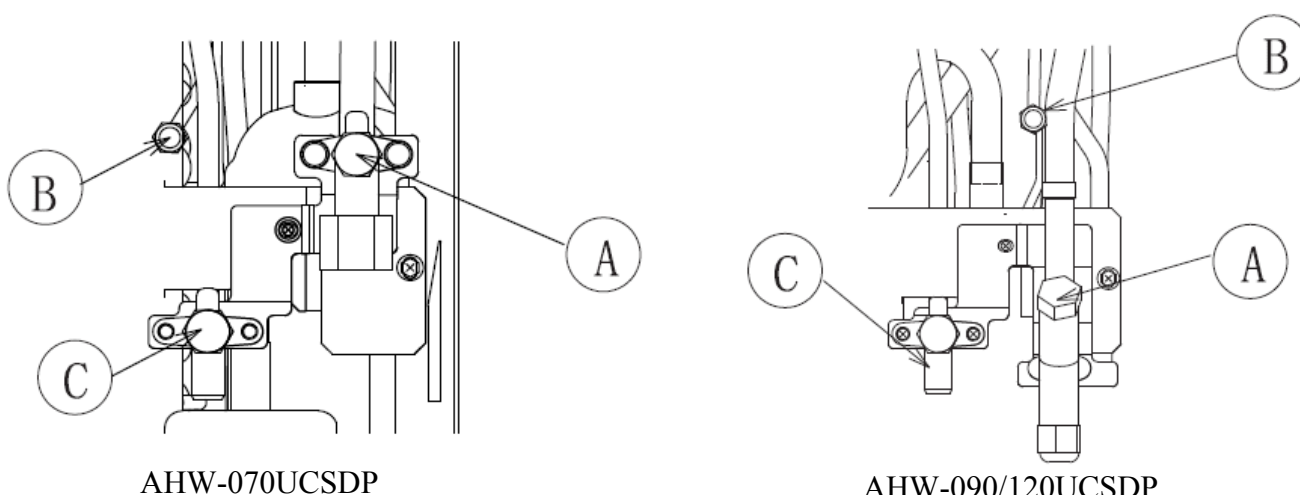
When the pressure is measured, use the check joint of gas stop valve ((A) in the figure below) and use the check joint of liquid piping ((B) in the figure below).

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 when removing the charge hoses.



1. Maximum Permissible Concentration of HFC GAS R410A ,R410A 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 .

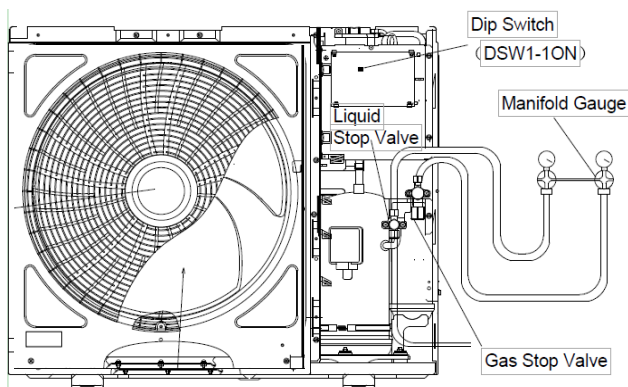
$$\frac{\text{R: Total Quantity of Charged Refrigerant (kg)}}{\text{V: Room Volume (m}^3\text{)}} = \text{C: Refrigerant Concentration} \leq 0.3 \text{ (kg/m}^3\text{)}$$

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 (684mmHg), perform the following procedures immediately.
 - * Close the gas stop valve.
 - * Set the DSW1-1 pin at the "OFF" side. (To stop the unit operation.)
- (5) Turn OFF the power source.



CAUTION

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, fuse, 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 because of abnormal voltage drop 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

- (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. 6.1.

- (2) Connect the wires between the outdoor and indoor units to terminal board(TB2). If power supply wiring is connected to the terminal board (TB2), printed circuit board will be damaged. Refer to Fig.6.1

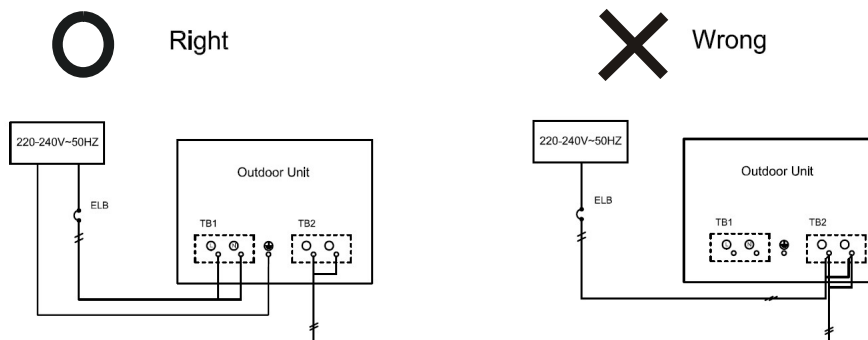


Fig. 6.1 Wiring Connection

Do not connect the power source line to the terminal board(TB2).These terminals are for the control line. If connected,the printed circuit board will be damaged.

- (3) Do not wire in front of the fixing screw of the service panel. Otherwise, the screw can not be removed.
- (4) Use shielded twist pair for control between outdoor unit and indoor unit, control wiring between indoor units, Connect the wires between the outdoor and indoor units to terminal board(TB2).
- (5) The recommended fuse size etc. are shown in Table 6.1.
- (6) In the case that a conduit tube for field-wiring not used, fix rubber bushes with adhesive on the panel.

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.

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.

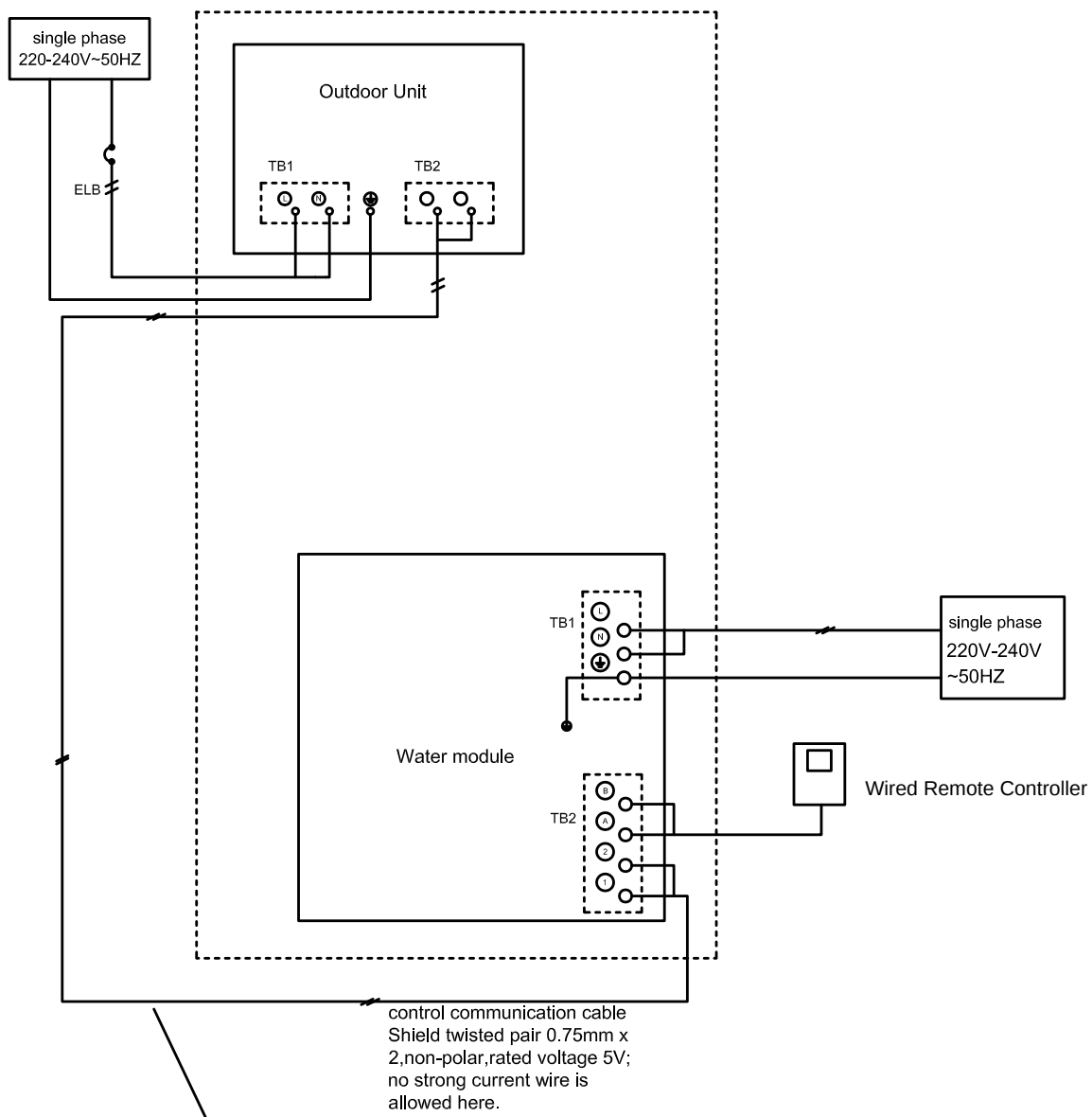


Fig. 6.2 Wiring Connection for Indoor & Outdoor

Table 6.1 Electrical Data and Recommended Wiring, Fuse Size Outdoor Unit

Model	Power Supply	Maximum Running Current (A)	Power cord (mm ²)	Communication Line (mm ²)	ELB		Fuse (A)
					Normal Current (A)	Sensitive Current (mA)	
AHW-070UCSDP	220-240V ~50Hz	27.5	6.0	0.75	32	30	32
AHW-090UCSDP	220-240V ~50Hz	28.0	6.0	0.75	32	30	32
AHW-120UCSDP							

*1 Refer to the NOTES for selection of the power source cable size.

ELB: Earth Leakage Breaker

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.

Current(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

*2 : 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 6 cm from power supply wiring. Do not use a coaxial cable.

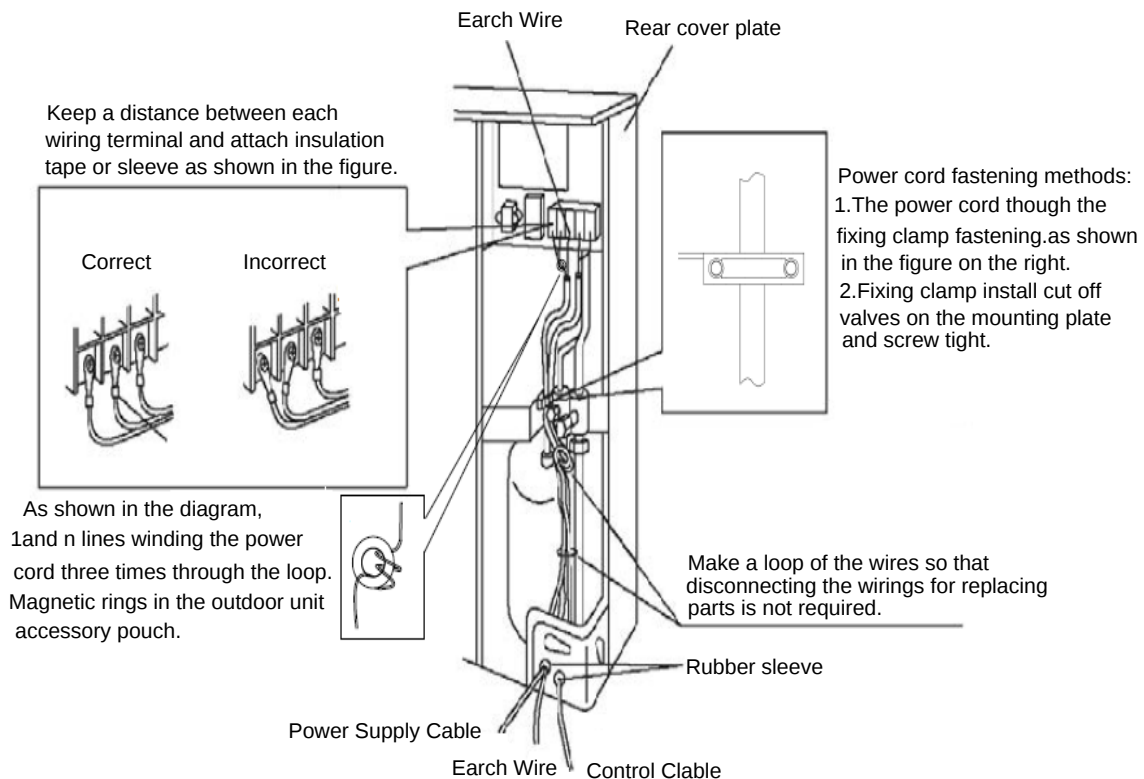


Fig.6.3 Wiring Connection of Outdoor Unit

■ Field Minimum Wire Sizes for Power Source of Indoor Unit

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

NOTES:

- 1) Follow local codes and regulations when selecting field wires.
- 2) The power cable *1 stated above is chosen according to the maximum current value stipulated in EN60335-1
The size of the power cable over 63A is referred to other standards.
- 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 by taking the front page.

7. Test Run

Using the Table 7.1 on page 22 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.	COMPRESSO 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:	
Operating Voltage:	V
Starting Voltage:	
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 Alarm Code

Code NO.	Category	Content of Abnormally	Leading Cause
(01)	Indoor Unit	Activating of Protection Device	High Water Level in Drain Pan, Activated Float Switch.
02	Outdoor Unit	Activating of Protection Device (Except Alarm Code 41 and 42)	Activated High Pressure Switch. Locked Motor in Cooling Operation. Abnormality of Power Supply Phase
03	Transmission	Abnormality between Indoor and Outdoor	Incorrect Wiring, Loose Terminals, Disconnected wire, Tripping of Fuse.
04		Incorrect Wiring, Loose Terminals, Disconnected wire, Tripping of Fuse.	Failure in Transmission of PCB for Inverter.
06	Voltage Drop	Voltage Drop by Excessively Low or High Voltage to Outdoor Unit	Voltage Drop of Power Supply Insufficient Capacity of Power Supply Wiring.
07	Cycle	Decrease of Discharge Gas Superheat	Discharge Gas SUPERHEAT less than 10 deg. is maintained for one hour.
08		Increase of Discharge Gas Temperature	Temperature of the top of Compressor: Td Td > 127oC(Cooling), Td > 120oC(Heating) over 10 minutes, or Td > 140oC over 5 seconds.
(11)	Sensor on Indoor Unit	Inlet Air Thermistor	Failure of Thermistor, Loose Terminal, Disconnected Wire.
(12)		Outlet Air Thermistor	
(13)		Freeze Protection Thermistor	
(14)		Gas Piping Thermistor	
(16)		Remote Control Thermistor	
(17)		Wired controller built-in Thermistor	
(19)		Tripping of Protection Device	Activated Internal Thermo of Fan Motor.
21	Sensor on Outdoor Unit	High Pressure Thermistor	Failure of Pd Thermistor, Loose Terminal, Disconnected Wire.
22		Outdoor Air Thermistor	Failure of Ta Thermistor, Loose Terminal, Disconnected Wire.
23		Discharge Gas Temperature	Failure of Td1 Thermistor, Loose Terminal, Disconnected Wire.
24		Evaporating Thermistor	Failure of Thermistor, Loose Terminal, Disconnected Wire.
27		Suction Gas Temperature	Failure of Ts Thermistor, Loose Terminal, Disconnected Wire.
29		Low Pressure Thermistor	Failure of Ps Thermistor, Loose Terminal, Disconnected Wire.
31	System	Incorrect Capacity of Outdoor and Indoor Unit	Incorrect Setting of Capacity Combination or Incorrect O.U. Capacity Setting.
35		Incorrect Indoor Unit No. Setting	Duplication of Indoor Unit No.
36		Incorrect Indoor Unit Combination	The Indoor Unite of Different Series Exist for the Same Refrigerant System.
38		Abnormality of Protective Circuit in outdoor Unit	Failure of Protection detecting Circuit
43	Pressure	Abnormality of Pressure Ratio Lower	Poor Compression (Compressor, Inverter Failure)

44		Abnormality of Low-Pressure Rise	Cooling Overload of Indoor Unit; Heating Overload of Outdoor Unit
45		Abnormality of High-Pressure Rise	Overload Operation (Heat Exchanger Fouling), Non-condensable Gas Mixing
-		Abnormality of High-Pressure Decline	Refrigerant Shortage
47		Activation of Low Pressure Decrease Protection Device	Stop page by Excessively Decrease of evaporating Temperature ($T_e < -35^{\circ}\text{C}$) is activated 3 times in one hour, Locked Motor in Heating Operation.
48		Overload Protection Operation	Abnormal Circulation, Frequency Conversion Substrate, DM or Heat Exchanger Fouling, etc.
51	Inverter	Abnormality of Current Sensor for Inverter	Failure of Control PCB1, IPM or PCB2
53		Protection Activation of IPM or PCB2	IPM or PCB2 Abnormality Failure of Compressor, clogging of Heat Exchanger.
54		Inverter Fin Temperature Increase	Abnormal Inverter Fin Thermistor, Clogging of Heat Exchanger Abnormal Outdoor Fan
55		IPM or PCB2 Abnormality	Failure of IPM or PCB2
57	Outdoor Fan	Fan Motor Abnormality	Disconnected wire or Incorrect wiring between Control PCB and Inverter PCB. Incorrect Wiring or Fan Motor Abnormality
(b1)	Indoor Unit No. Setting	Incorrect Unit No. Setting	Over 64 I.U. Setting by Ref. No. or I.U. Address.
b5	-	Failure Number of Indoor Unit	The Corresponding Number of Indoor Unit Connection of Non H-Link II is more than 17
EE	Compressor	Compressor Protection Alarm	Failure of Compressor.

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.

Automatic Reset, Non-Adjustable

Model			070	090	120
Pressure Switch For Compressor	Cut-Out	MPa	$4.15^{+0.05}_{-0.20}$	$4.15^{+0.05}_{-0.20}$	$4.15^{+0.05}_{-0.20}$
	Cut-In	MPa	$3.2^{+0.15}_{-0.20}$	$3.2^{+0.15}_{-0.20}$	$3.2^{+0.15}_{-0.20}$
Fuse (220V-240V~ 50)		A	50	50	50
CCP Timer Setting time		Min.	3	3	3
Control Circuit Fuse Capacity on PCB1		A	5	5	5

Technical parameters for heat pump space heaters

Model(s):

Outdoor unit: AHW-070UCSDP

Indoor unit: AHM-070UXCSAPA3

Air-to-water heat pump:	yes
Water-to-water heat pump:	no
Brine-to-water heat pump:	no
Low-temperature heat pump:	yes
Equipped with a supplementary heater:	yes
Heat pump combination heater:	no
Parameters shall be declared for	low-temperature application.
Parameters shall be declared for	average climate conditions.

Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heat output (*)	Prated	7.6	kW	Seasonal space heating energy efficiency	η_s	134	%
Declared capacity for heating for part load at indoor temperature 20℃ and outdoor temperature Tj				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20℃ and outdoor temperature Tj			
Tj = - 7℃	Pdh	6.7	kW	Tj = - 7℃	COPd	2.21	-
Tj = +2℃	Pdh	4.1	kW	Tj = +2℃	COPd	3.21	-
Tj = +7℃	Pdh	2.6	kW	Tj = +7℃	COPd	5.17	-
Tj = +12℃	Pdh	1.2	kW	Tj = +12℃	COPd	4.15	-
Tj =bivalent temperature	Pdh	6.7	kW	Tj =bivalent temperature	COPd	2.21	-
Tj = operation limit temperature	Pdh	7.6	kW	Tj = operation limit temperature	COPd	2.02	-
Tj = - 15℃ (if TOL < - 20℃)	Pdh	-	kW	Tj = - 15℃ (if TOL < - 20℃)	COPd	-	-
Bivalent temperature	Tbiv	-7	℃	Operation limit temperature	TOL	-10	℃
Cycling interval capacity for heating	Pcyc	-	kW	Cycling interval efficiency	COPcyc	-	-
Degradation co-efficient (**)	Cdh	0.9	-	Heating water operating limit temperature	WTOL	-	℃

Power consumption in modes other than active mode				Supplementary heater			
Off mode	P _{OFF}	0.018	kW	Rated heat output (*)	P _{sup}	0.0	kW
Thermostat-off mode	P _{TO}	0.168	kW				
Standby mode	P _{SB}	0.018	kW	Type of energy input		Electric	
Crankcase heater mode	P _{CK}	0.060	kW				

Other items

Capacity control		variable		Rated air flow rate, outdoors		3840	m ³ /h
Sound power level, indoors/outdoors	L _{WA}	46/64	dB				
Annual energy consumption	Q _{HE}	4584	kWh				

Contact details

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(*) For heat pump space heaters and heat pump combination heaters, the rated heat output Prated is equal to the design load for heating Pdesignh, and the rated heat output of a supplementary heater Psup is equal to the supplementary capacity for heating sup(Tj).

(**) If Cdh is not determined by measurement then the default degradation coefficient is Cdh = 0.9.

Technical parameters for heat pump space heaters

Model(s):

Outdoor unit: AHW-090UCSDP

Indoor unit: AHM-160UXCSAPA3

Air-to-water heat pump:	yes
Water-to-water heat pump:	no
Brine-to-water heat pump:	no
Low-temperature heat pump:	yes
Equipped with a supplementary heater:	yes
Heat pump combination heater:	no
Parameters shall be declared for	low-temperature application.
Parameters shall be declared for	average climate conditions.

Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heat output (*)	Prated	12.1	kW	Seasonal space heating energy efficiency	η_s	155	%
Declared capacity for heating for part load at indoor temperature 20℃ and outdoor temperature Tj				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20℃ and outdoor temperature Tj			
Tj = - 7℃	Pdh	10.7	kW	Tj = - 7℃	COPd	2.47	-
Tj = +2℃	Pdh	6.5	kW	Tj = +2℃	COPd	3.69	-
Tj = +7℃	Pdh	4.2	kW	Tj = +7℃	COPd	6.09	-
Tj = +12℃	Pdh	1.9	kW	Tj = +12℃	COPd	5.30	-
Tj = bivalent temperature	Pdh	10.7	kW	Tj = bivalent temperature	COPd	2.47	-
Tj = operation limit temperature	Pdh	10.4	kW	Tj = operation limit temperature	COPd	2.13	-
Tj = - 15℃ (if TOL < - 20℃)	Pdh	-	kW	Tj = - 15℃ (if TOL < - 20℃)	COPd	-	-
Bivalent temperature	Tbiv	-7	℃	Operation limit temperature	TOL	-10	℃
Cycling interval capacity for heating	Pcyc	-	kW	Cycling interval efficiency	COPcyc	-	-
Degradation co-efficient (**)	Cdh	0.9	-	Heating water operating limit temperature	WTOL	-	℃

Power consumption in modes other than active mode				Supplementary heater			
Off mode	P _{OFF}	0.025	kW	Rated heat output (*)	P _{sup}	1.7	kW
Thermostat-off mode	P _{TO}	0.175	kW				
Standby mode	P _{SB}	0.025	kW	Type of energy input		Electric	
Crankcase heater mode	P _{CK}	0.060	kW				

Other items							
Capacity control		variable		Rated air flow rate, outdoors		4140	m ³ /h
Sound power level, indoors/outdoors	L _{WA}	46/65	dB				
Annual energy consumption	Q _{HE}	6340	kWh				

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(**) If Cdh is not determined by measurement then the default degradation coefficient is Cdh = 0.9.

Technical parameters for heat pump space heaters

Model(s):

Outdoor unit: AHW-120UCSDP

Indoor unit: AHM-160UXCSAPA3

Air-to-water heat pump:	yes
Water-to-water heat pump:	no
Brine-to-water heat pump:	no
Low-temperature heat pump:	yes
Equipped with a supplementary heater:	yes
Heat pump combination heater:	no
Parameters shall be declared for	low-temperature application.
Parameters shall be declared for	average climate conditions.

Item	Symbol	Value	Unit	Item	Symbol	Value	Unit
Rated heat output (*)	Prated	13.1	kW	Seasonal space heating energy efficiency	η_s	150	%
Declared capacity for heating for part load at indoor temperature 20℃ and outdoor temperature Tj				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20℃ and outdoor temperature Tj			
Tj = - 7℃	Pdh	11.6	kW	Tj = - 7℃	COPd	2.32	-
Tj = +2℃	Pdh	7.1	kW	Tj = +2℃	COPd	3.61	-
Tj = +7℃	Pdh	4.5	kW	Tj = +7℃	COPd	5.91	-
Tj = +12℃	Pdh	2.0	kW	Tj = +12℃	COPd	5.14	-
Tj =bivalent temperature	Pdh	11.6	kW	Tj =bivalent temperature	COPd	2.32	-
Tj = operation limit temperature	Pdh	10.4	kW	Tj = operation limit temperature	COPd	2.02	-
Tj = - 15℃ (if TOL < - 20℃)	Pdh	-	kW	Tj = - 15℃ (if TOL < - 20℃)	COPd	-	-
Bivalent temperature	Tbiv	-7	℃	Operation limit temperature	TOL	-10	℃
Cycling interval capacity for heating	Pcyc	-	kW	Cycling interval efficiency	COPcyc	-	-
Degradation co-efficient (**)	Cdh	0.9	-	Heating water operating limit temperature	WTOL	-	℃

Power consumption in modes other than active mode				Supplementary heater			
Off mode	P _{OFF}	0.025	kW	Rated heat output (*)	P _{sup}	2.7	kW
Thermostat-off mode	P _{TO}	0.175	kW				
Standby mode	P _{SB}	0.025	kW	Type of energy input		Electric	
Crankcase heater mode	P _{CK}	0.060	kW				

Other items							
Capacity control		variable		Rated air flow rate, outdoors		4140	m ³ /h
Sound power level, indoors/outdoors	L _{WA}	46/67	dB				
Annual energy consumption	Q _{HE}	7104	kWh				

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(**) If Cdh is not determined by measurement then the default degradation coefficient is Cdh = 0.9.



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