

Hisense

Installation & Maintenance Manual

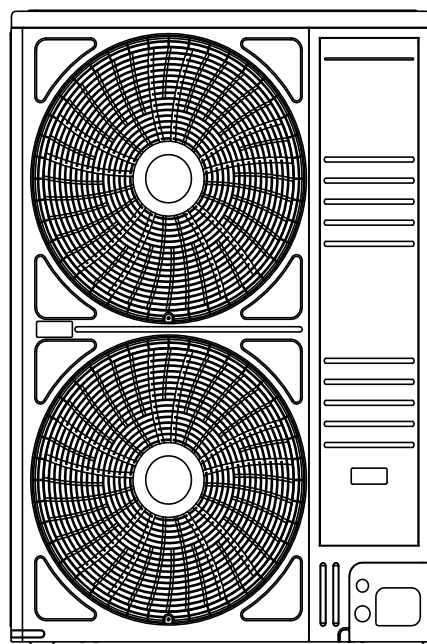
*SPLIT AIR TO WATER
HEAT PUMP OUTDOOR UNIT*

- Outdoor Units -

MODEL
AHW - 140UCSEP
AHW - 160UCSEP

IMPORTANT:

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



M00062Q



1084291



Declaration of Conformity (Manufacturer's Declaration)



Hisense Corporation ,
17, Donghai Xi Road, Qingdao 266071, P.R. China
declares under its sole responsibility that the air conditioning models to
which this declaration relates:

AHW-140UCSEP, AHW-160UCSEP
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.

Hisense

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

NOTE:

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

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

SAFETY SUMMARY

DANGER

- Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-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.

▲ 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.

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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.

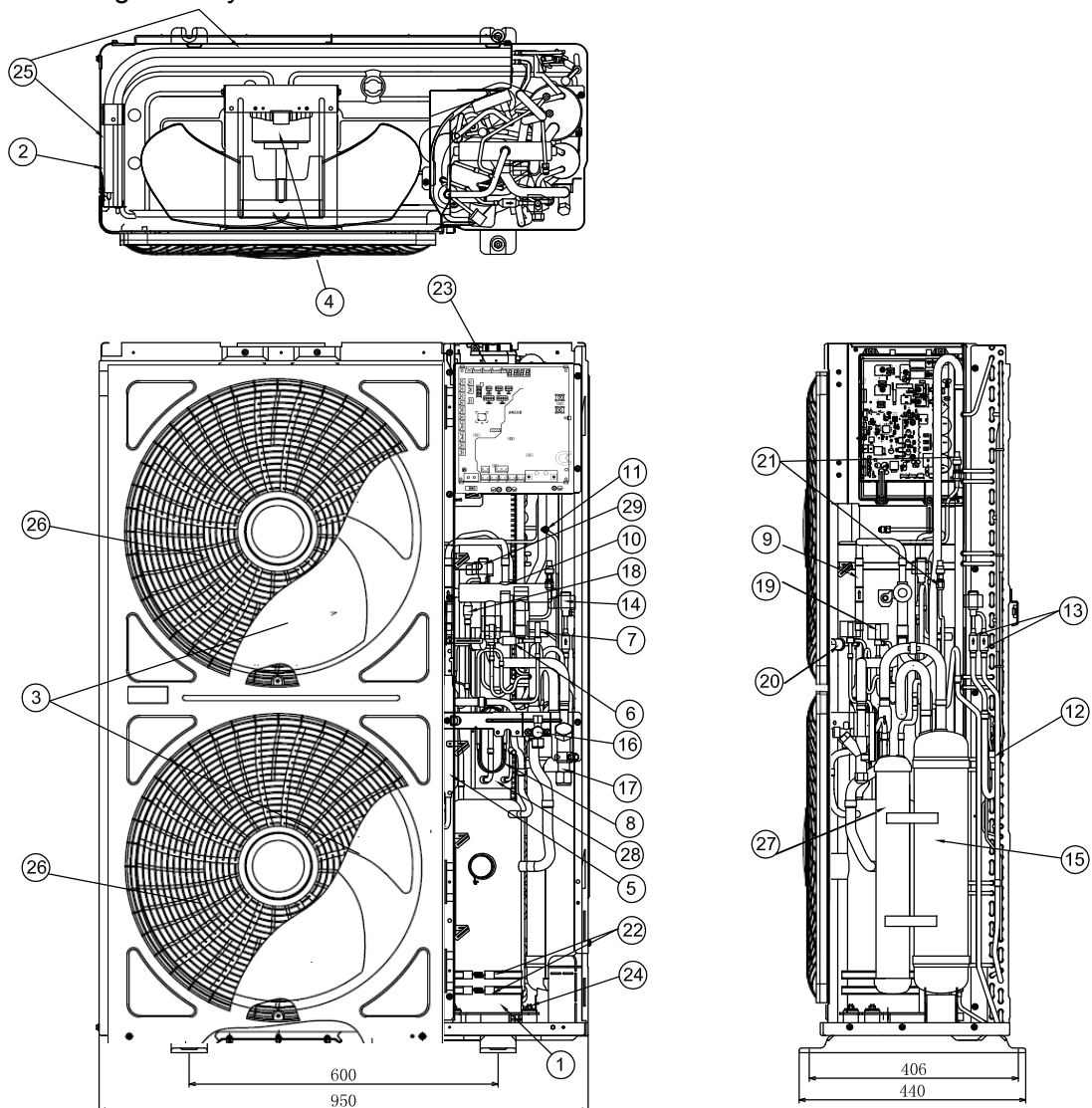
⚠ CAUTION

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

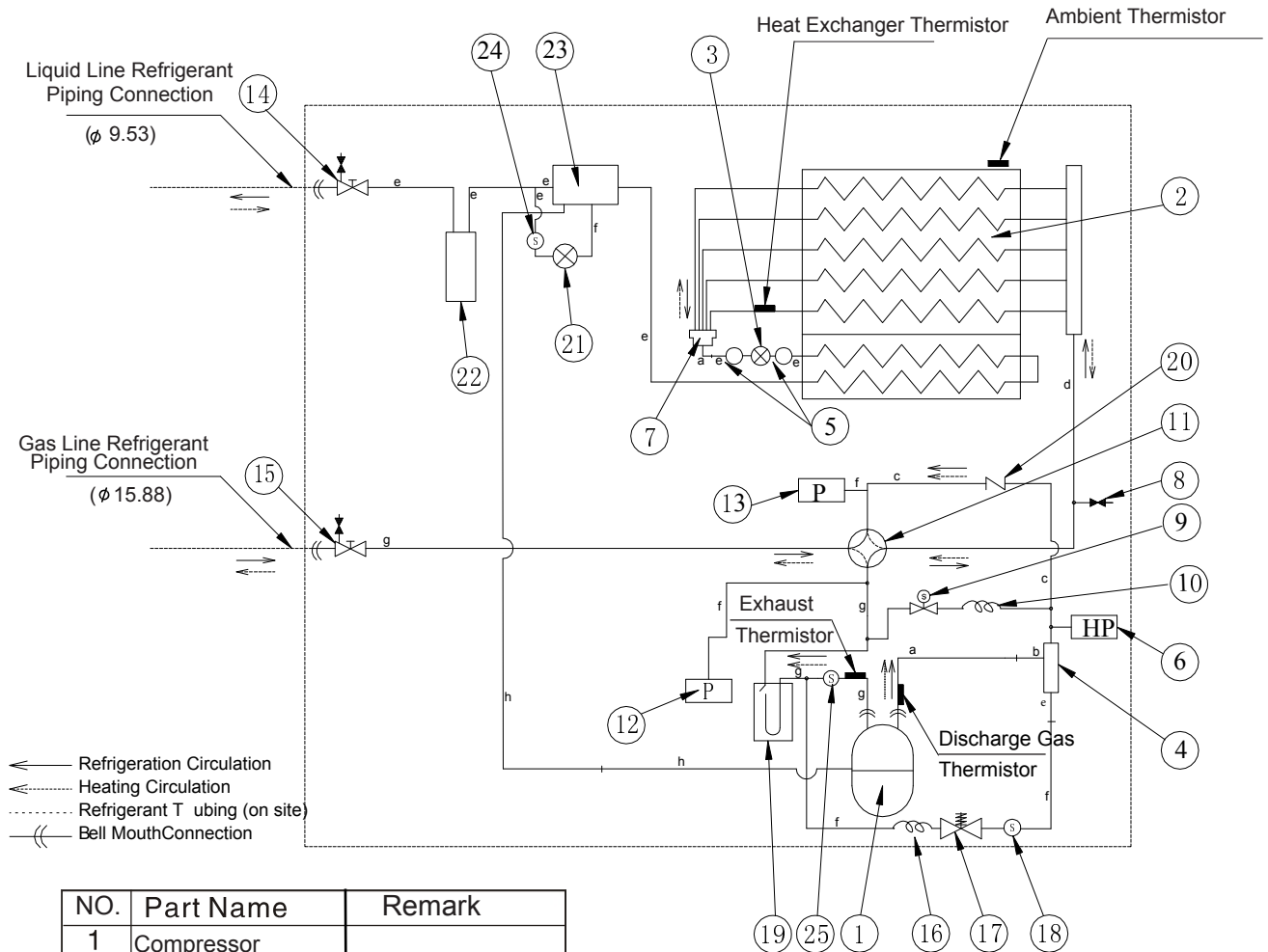
<Outdoor Unit>



		NO.	Part Name	NO.	Part Name	NO.	Part Name
1	Compressor	9	Check Valve	16	Liquid Valve	24	Damper Rubber
2	Heat Exchanger	10	Reversing Valve	17	Gas Valve	25	Air Inlet
3	Axial Flow Fan	11	High/ Low Pressure Check Joint	18	Strainer	26	Air Outlet
4	Fan Motor		(refrigeration / heating)	19	By-pass Solenoid Valve	27	Receiver
5	Oil Separator	12	Flow Divider	20	High Pressure Switch	28	Plate Heat Exchanger
6	Strainer	13	Strainer	21	Pressure Sensor	29	Expansion Valve
7	Oil Return Solenoid Valve	14	Expansion Valve	22	Crankcase Heater		
8	Oil Return Capillary Tube	15	Accumulator	23	Electrical Box		

Refrigerant Cycle

Outdoor Unit



NO.	Part Name	Remark
1	Compressor	
2	Heat Exchanger	
3	Expansion Valve	EV0
4	Oil Separator	
5	Strainer	
6	Pressure Switch	high pressure
7	Flow Divider	
8	Check Joint	
9	SVA1 Solenoid Valve	
10	Capillary Tube	
11	Reversing Valve	
12	Pressure Sensor	low pressure
13	Pressure Sensor	high pressure
14	Liquid Valve	
15	Gas Valve	
16	Capillary Tube	For oil return
17	Solenoid Valve	For oil return
18	Strainer	
19	Accumulator	
20	Check Valve	
21	Expansion Valve	EVB
22	Accumulator	
23	Plate Heat Exchanger	

NO	Part Name	Remark
24	Strainer	
25	Strainer	

NO.	O.D. × T	Material
a	Φ 12.7 × 1.0 t	C1220T-0
b	Φ 15.88 × 1.65 t	
c	Φ 12.7 × 1.2 t	
d	Φ 15.88 × 1.0 t	
e	Φ 9.53 × 0.8 t	
f	Φ 6.35 × 1.07 t	
g	Φ 19.05 × 1.2 t	
h	Φ 9.53 × 1.0 t	

2.2 Necessary Tools and Instrument List for Installation

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

Use tools and measuring instruments only for the new refrigerant which is directly touch to refrigerant.

◇: Interchangeability is available with current R22

●: only for Refrigerant R410A (No Interchangeability with R22)

×: Prohibited

◆: only for Refrigerant R407C (No Interchangeability with R22)

Measuring Instrument and Tool		Interchangeability with R22		Reason of Non-Interchangeability and Attention (★: Strictly Required)	Use
		R410A	R407C		
Refrigerant Pipe	Pipe Cutter	◇	◇	-	Cutting Pipe
	Chamfering Reamer	◇	◇	-	Removing Burrs
	Flaring Tool	◇ ●	◇	* The flaring tools for R407C are applicable to R22.	Flaring for Tubes
	Extrusion Adjustment Gauge	●	-	* If using flaring tube, make dimension of tube larger for R410A. * In case of material 1/2H, flaring is not available.	Dimensional Control for Extruded Portion of Tube after Flaring
	Pipe Bender	◇	◇	* In case of material 1/2H, bending is not available. Use elbow for bend and braze.	Bending
	Expanding Tool	◇	◇	* In case of material 1/2H, expanding of tube is not available. Use socket for connecting tube.	Expanding Tubes
	Torque Wrench	●	◇	* For φ12.7, φ15.88, spanner size is up 2mm.	Connection of Flare Nut
		◇	◇	* For φ6.35, φ9.53, φ19.05, spanner size is the same.	
	Brazing Tool	◇	◇	* Perform correct brazing work.	Brazing for Tubes
Vacuum Drying Refrigerant Charge	Nitrogen Gas	◇	◇	* Strict Control against Contamin (Blow nitrogen during brazing.)	Prevention from Oxidation during Brazing
	Lubrication Oil (for Flare Surface)	●	◆	* Use a synthetic oil which is equivalent to the oil used in the refrigeration cycle. * Synthetic oil absorbs moisture quickly.	Applying Oil to the Flared Surface
	Refrigerant Cylinder	●	◆	* Check refrigerant cylinder color. ★ Liquid refrigerant charging is required regarding zeotropic refrigerant.	Refrigerant Charging
	Vacuum Pump	◇	◇	★ The current ones are applicable. However, it is required to mount a vacuum pump adapter which can prevent from reverse flow when a vacuum pump stops, resulting in no reverse oil flow.	Vacuum Pumping
	Adapter for Vacuum Pump	* ●	◆		
	Manifold Valve	●	◆	* No interchangeability is available due to higher pressures when compared with R22.	Vacuum Pumping, Vacuum Holding, Refrigerant Charging and Check of Pressures
	Charging Hose	●	◆	* Do not use current ones to the different refrigerant. If used, mineral oil will flow into the cycle and cause sludges, resulting in clogging or compressor failure. Connection diameter is different; R410A: UNF1/2, R407C: UNF7/16.	
	Charging Cylinder	×	×	* Use the weight scale.	-
	Weight Scale	◇	◇	-	Measuring Instrument for Refrigerant Charging
	Refrigerant Gas Leakage Detector	* ●	◆	* The current gas leakage detector (R22) is not applicable due to different detecting method.	Gas Leakage Check

*: Interchangeability with R407C.

3. Transportation and Handling

3.1 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-140UCSEP	AHM-160UXCSAPA3
	AHW-160UCSEP	

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.

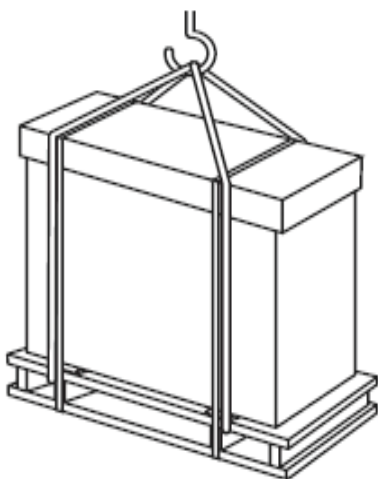


Fig. 3.1 Lifting Work for Transportation

CAUTION

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

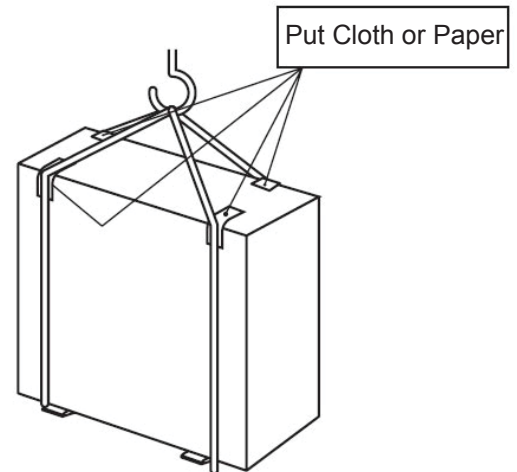


Fig.3.2 Transportation for no wooden base

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.

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

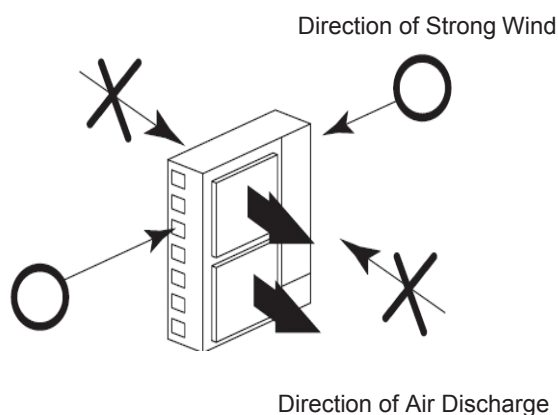
Accessory	Q'ty	Recommend
Shim	4	
Magnetic Ring	2	
Screw	2	
Tier	1	
Clamp	1	

NOTE

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

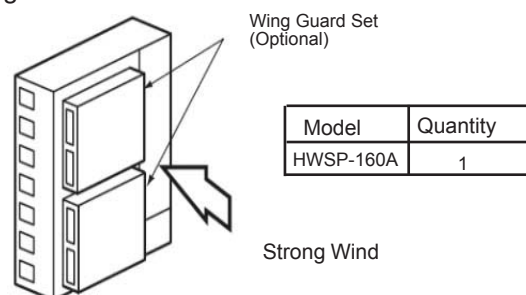
4.2 Initial Check

- 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.

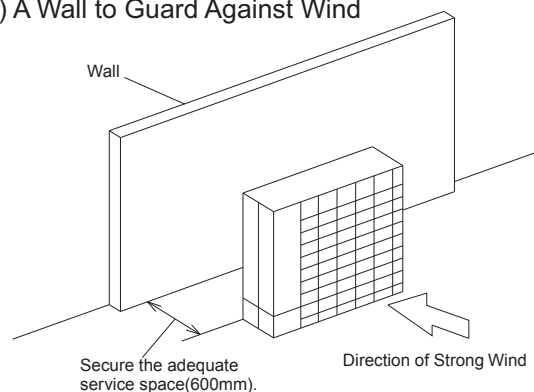


- In case of installation in the open spaces unavoidably where there is no buildings or surrounding structures, adopt the wind guard set or install near the wall to avoid facing the wind directly. Ensure that the service space should be secured.

(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 Fig4.1.

(unit:mm)

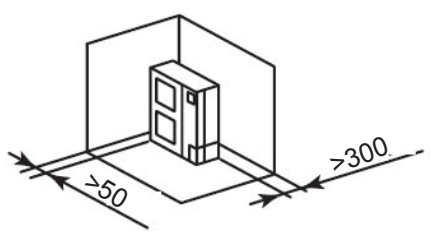
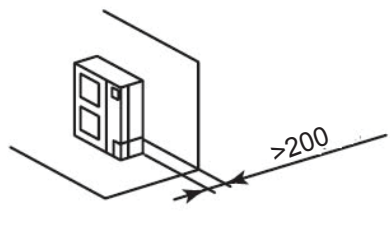
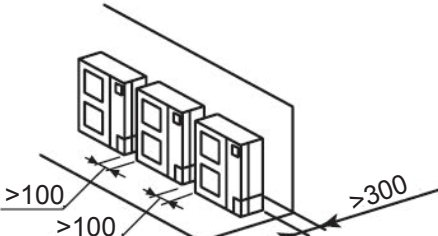
Single Installation	Single Installation	Multiple Installation
Upper Side is Open  Keep a distance of 100mm between right side at least	Left, Right & Upper Side is Open 	 Keep a distance of 100mm between right side at least

Fig. 4.1 Installation Space

4.4 Installation Work

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

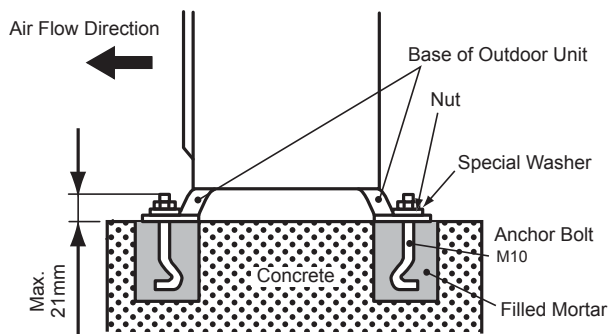


Fig. 4.2 Installation of Anchor Bolts

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

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

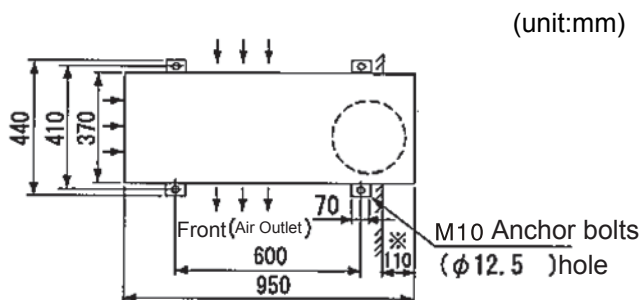


Fig. 4.3 Position of Anchor Bolts

NOTE:

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

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

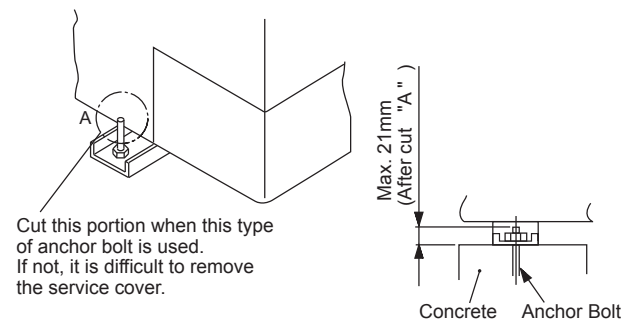


Fig. 4.4 Fixing Example

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

(unit:mm)

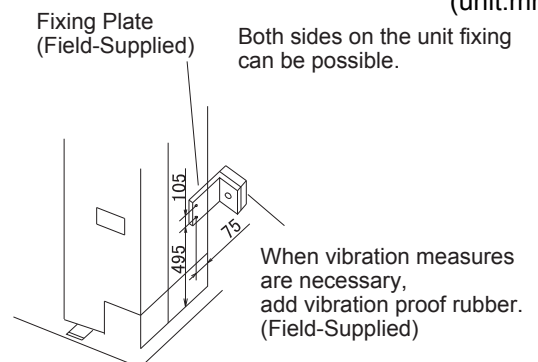
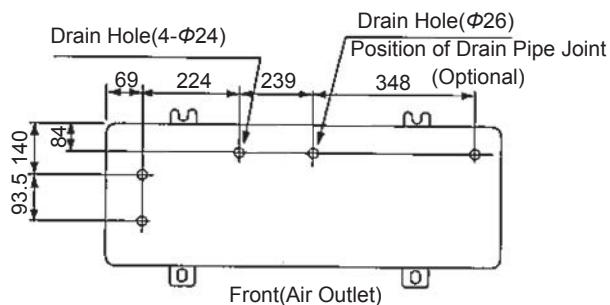


Fig. 4.5 Additional Fixing Arrangement

- (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) .

(unit:mm)



Recommended Metal Plate Size (Field-Supplied)

Material: Hot-Rolled Mild Steel Plate (SPHC)

Plate Thickness: 4.5T

(unit:mm)

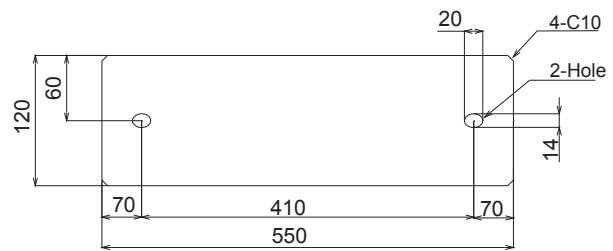
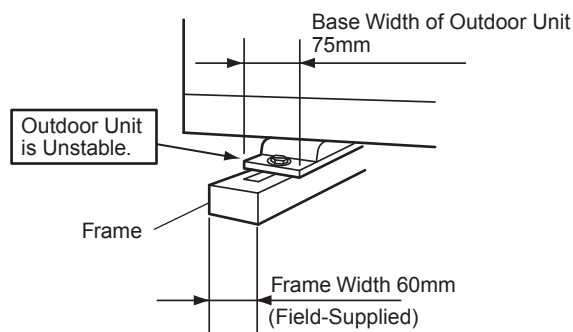


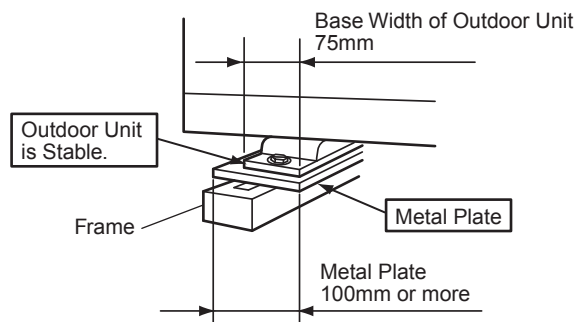
Fig. 4.6 Frame and Base Installation

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

Incorrect



Correct



5. Refrigerant Piping Work

⚠ DANGER

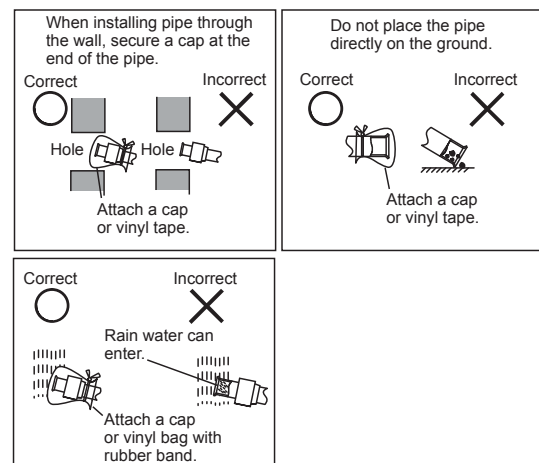
Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed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

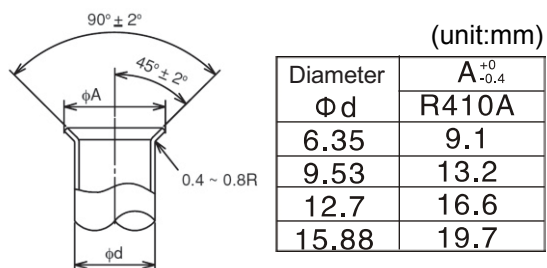
● Cautions for Refrigerant Pipe Ends



⚠ 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. (unit:mm)

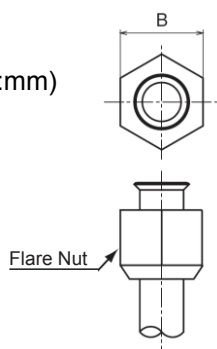
Diameter	R410A	
	Thickness	Material
φ 6.35	0.8	0
φ 9.53	0.8	0
φ 12.7	0.8	0
φ 15.88	1.0	0

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

- Flare Nut Dimension
Use the flare nut as below.

<Flare Nut Dimension B (unit: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

Model \ Diameter	Outer Diameter of Pipe(mm)	
	Gas	Liquid
AHW-140UCSEP	φ 15.88	φ 9.53
AHW-160UCSEP		

Table 5.2 Indoor Unit Pipe Model

Model	Gas Pipe	Liquid Pipe
AHW-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 W_0 is Outdoor Unit Ref.charge before shipment

Outdoor Unit Model	W_0 (kg)
AHW-140UCSEP	4.9
AHW-160UCSEP	4.9

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

$$W_1 (\text{kg}): (\phi 9.53 \text{ liquid length , m}) \times 0.03$$

$$W = W_0 + W_1$$

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

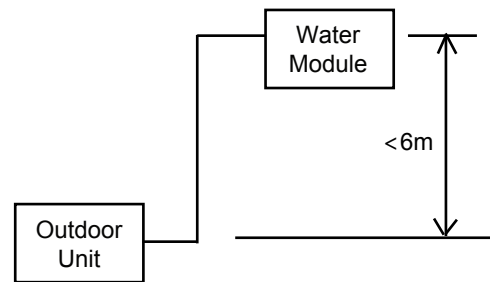
(3) Pipes running the length and height difference

Table 5.4 the length of the refrigerant pipe running

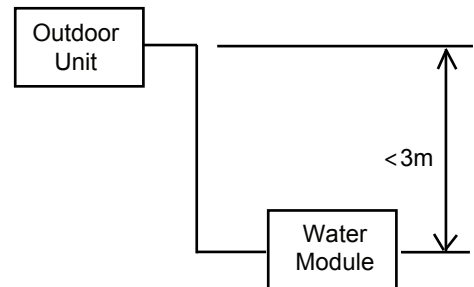
Project \ Model	Pipe Length	
	Actual Length	Equivalent Length
AHW-140UCSEP AHW-160UCSEP	$\leq 25\text{m}$	$\leq 35\text{m}$

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.

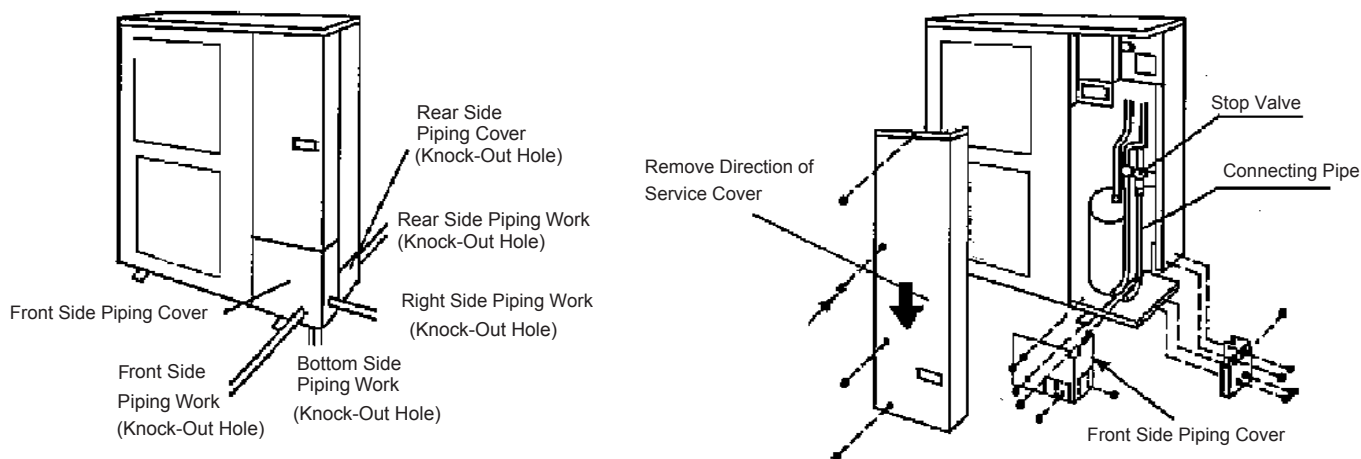


Fig. 5.1 Piping Direction

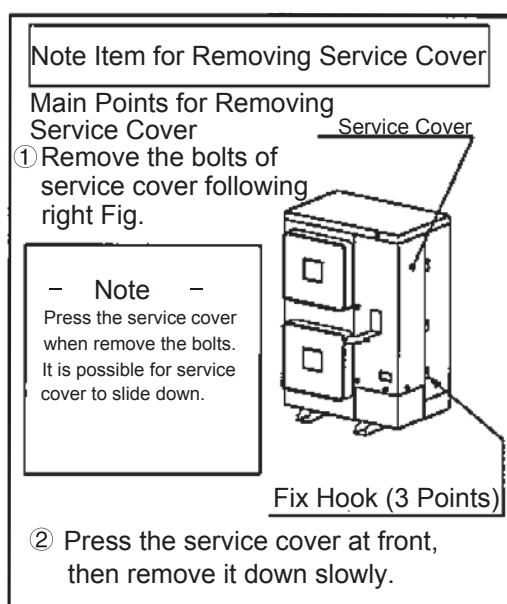


Fig. 5.2 Remove Service Cover

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

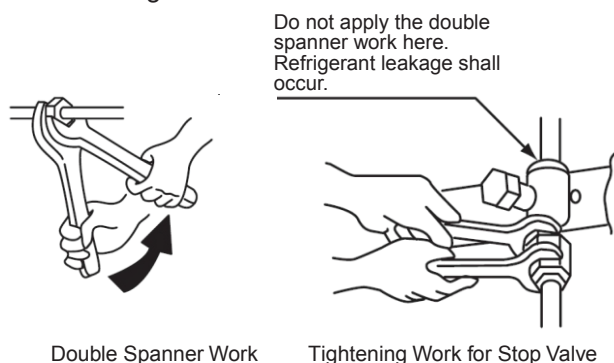
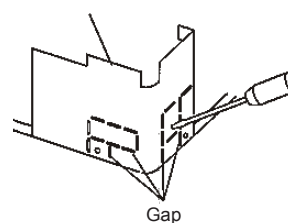


Table 5.6 Tightening Torque for Flare Nut

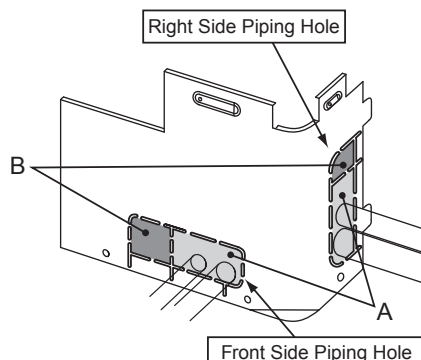
Pipe Size	Torque
Φ6.35(1/4)	20N · m (2kgf · m)
Φ9.53(3/8)	40N · m (4kgf · m)
Φ12.7(1/2)	60N · m (6kgf · m)
Φ15.88(5/8)	80N · m (8kgf · m)

- (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.

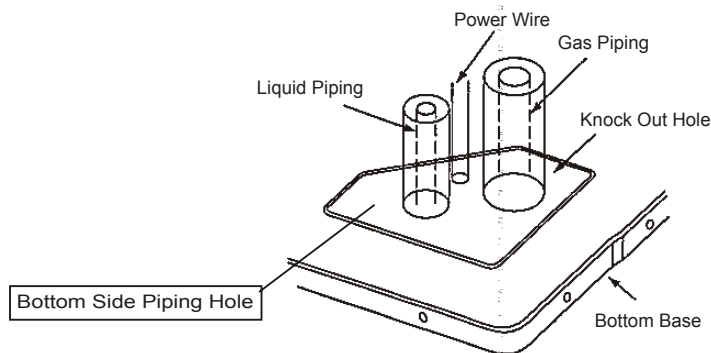
Front Side Piping Cover



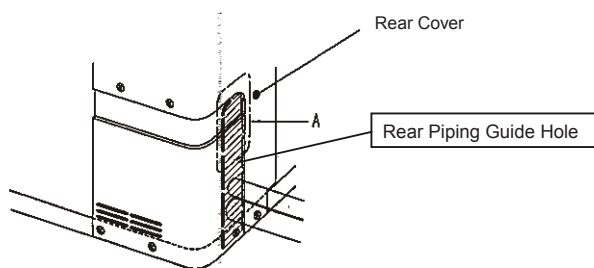
(a) Connect Front and Right Side Pipe



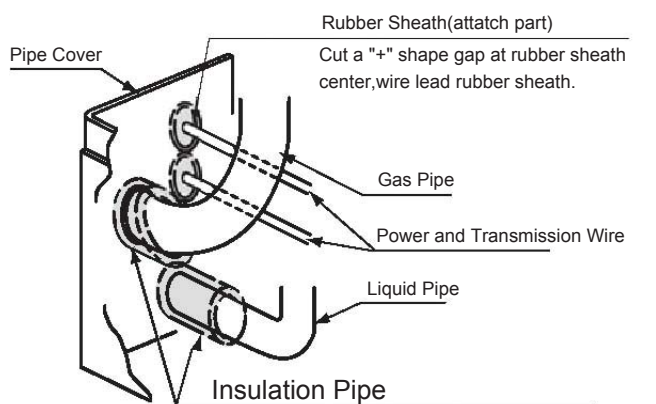
(b) Bottom Side Piping Work



(c) Rear Piping Work



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



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

5.4 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.)

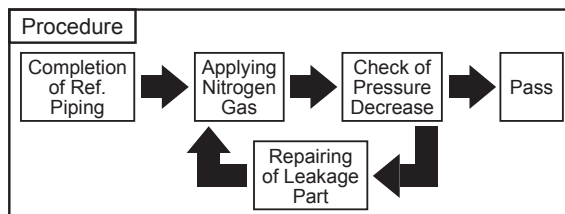
- (3) Apply the oil thinly at the seat surface of the flare nut and pipe before tightening.

And when tightening the flare nut, use two spanners.

Lubrication Oil is field-supply.

Model: POE Oil (Ester Oil)

Manufacturer: IDEMITSU KOSAN Co., Ltd.



(4) Stop Valve

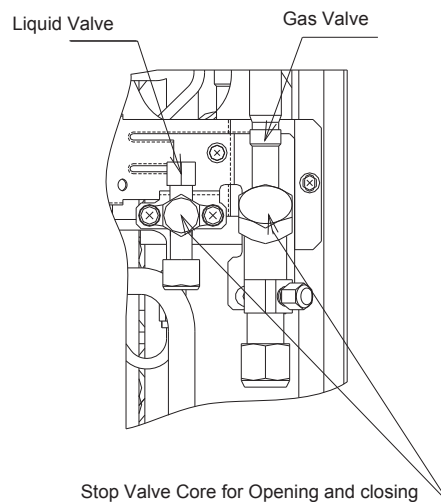
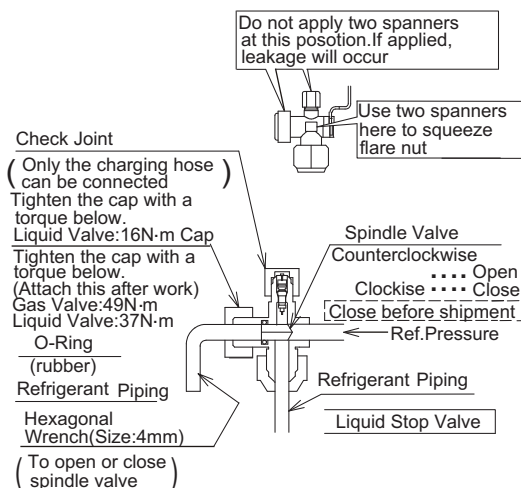


Fig.5.3 Stop Valve Position

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

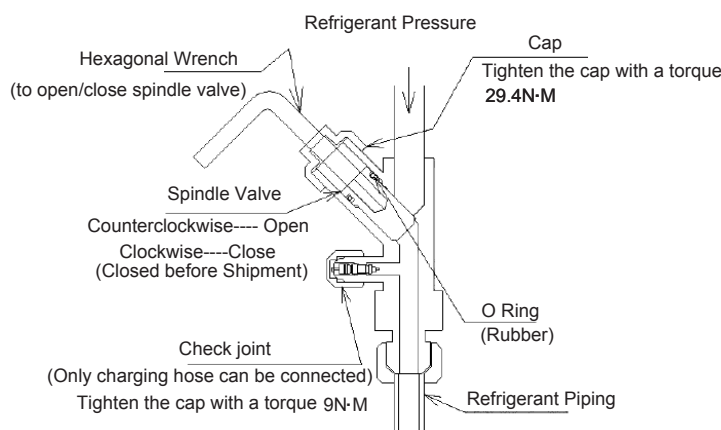
<Liquid Valve>



Spindle Valve Torque (N·m)

Gas	Liquid
11~14	7~9

<Gas 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.

- (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.

CAUTION

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

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

Pipe Diameter	Tighten Torque
Φ6.35(1/4)	14 ~ 18N · m
Φ9.53(3/8)	34 ~ 42N · m
Φ12.7(1/2)	49 ~ 61N · m
Φ15.88(5/8)	68 ~ 82N · m

- Make air-tight test after valve spindle turn off closely.

Note:

Do not connect nut cap on test joint,supply for connecting refrigerant charging hose. It has no effect for system capacity when connect joint cap and valve cap opened together "pu chi" light sound.

5.5 Vacuum Pumping and charge refrigerant

- (1) Connect a mani-fold gauge to the check joints at the both sides.

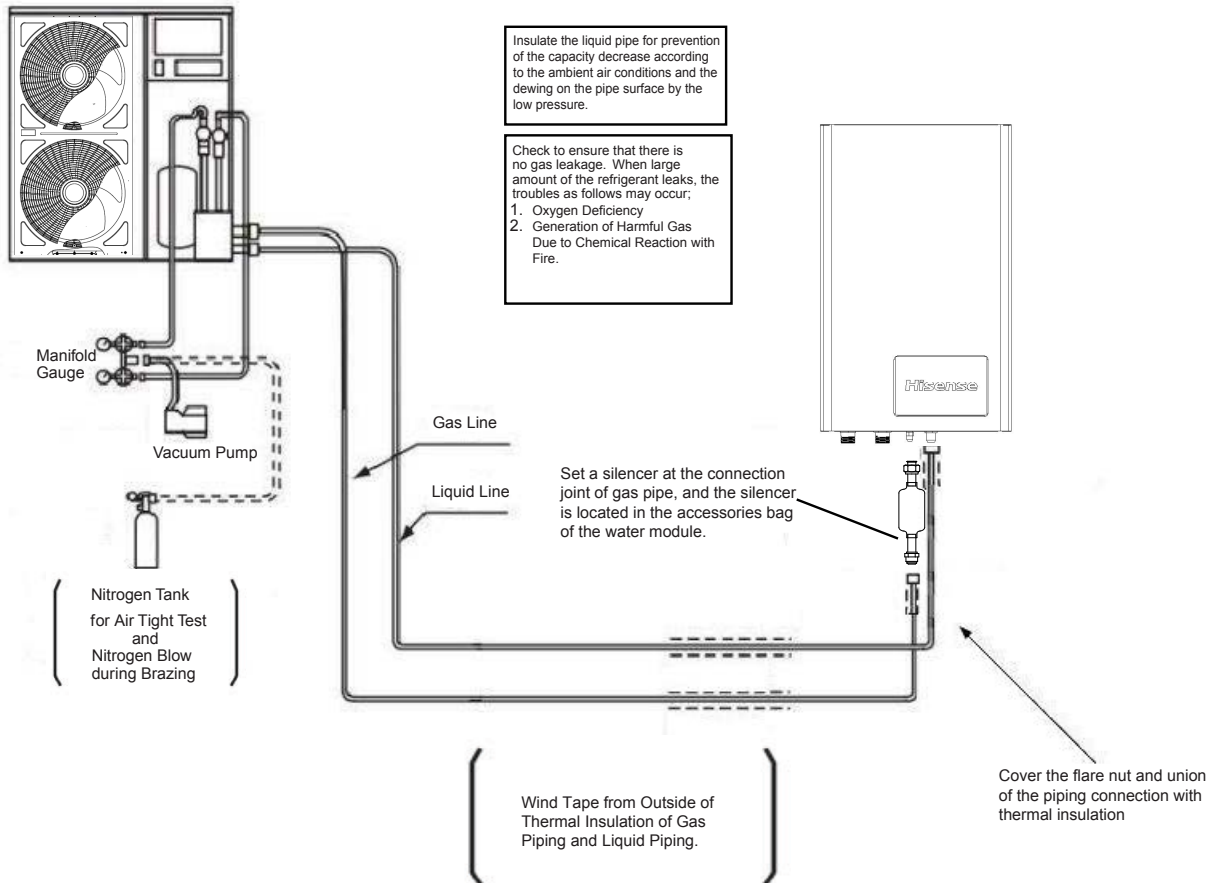
Continue vacuum pumping work until the pressure reaches 760mmHg or lower for one to two hours.

After vacuum pumping work, stop the mani-fold valve's valve, stop the vacuum pump and leave it for one hour. Check to ensure that the pressure in the mani-fold gauge does not increase.

Note:

1. This unit is only for the refrigerant R410A. The manifold gauge and the charging hose should be exclusive use for R410A.
2. If vacuum degree of -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.
- (2) Connect adjusting valve and charge kettle to check joint of liquid valve.
- (3) Fully open the gas valve and liquid valve slowly.
- (4) Open adjusting valve to add refrigerant (must be refrigerant is liquid).
- (5) Operate cool mode,charge stated refrigerant.
- (6) Confirm the capacity of charging refrigerant with Weighing meter.An excess or a shortage of refrigerant is cause of trouble to the units.
- (7) Fully open the liquid valve.

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



⚠ CAUTION

- At the test run, fully open the spindle. If not fully opened, the devices will be damaged.
- An excess or a shortage of refrigerant is the main cause of 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.

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.

5.6 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.

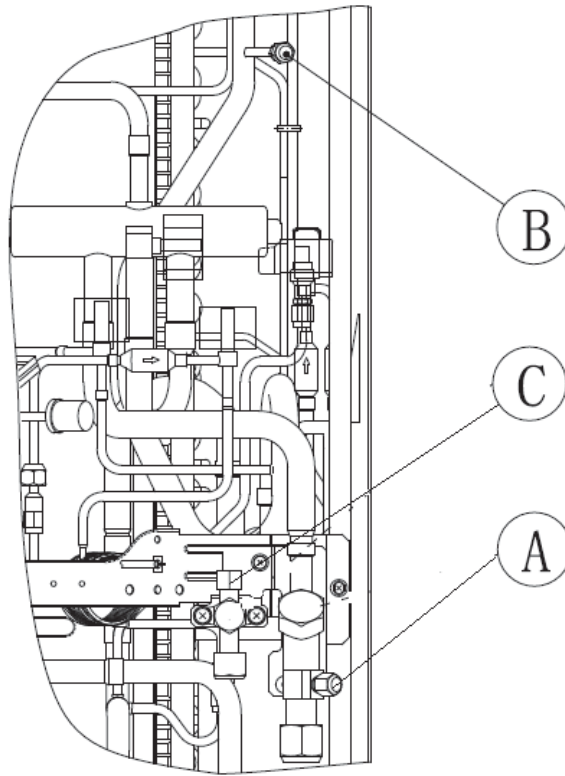
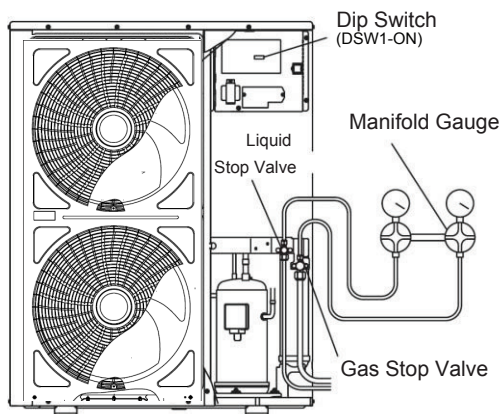


Fig 5.4 Check Joint Position

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, 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).
 - Connect the power cords to each outdoor unit respectively, and connect one ELB and one knife switch onto each piece of power cord.
 - Bridge the main power supply to all indoor units connected to the same outdoor unit, and connect one ELB and one knife switch onto each piece of power cord.
- (2) Check to ensure that the voltage of power supply is within $\pm 6\%$ 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.6.2

- (2) Connect the wires between the outdoor and indoor units to the 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
- (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 the terminal board (TB2).

○ Right

× Wrong

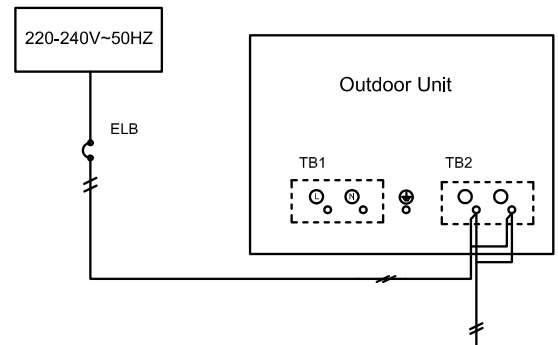
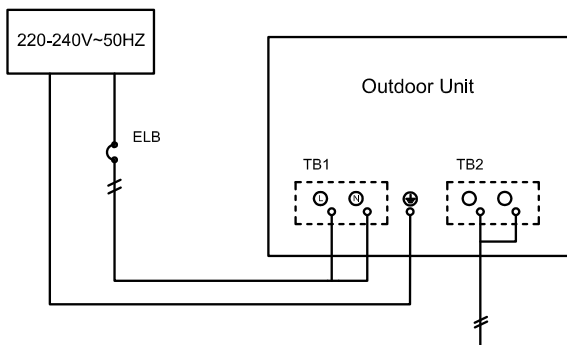


Fig. 6.1 Single phase indoor unit and outdoor unit transmission wire connection

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.

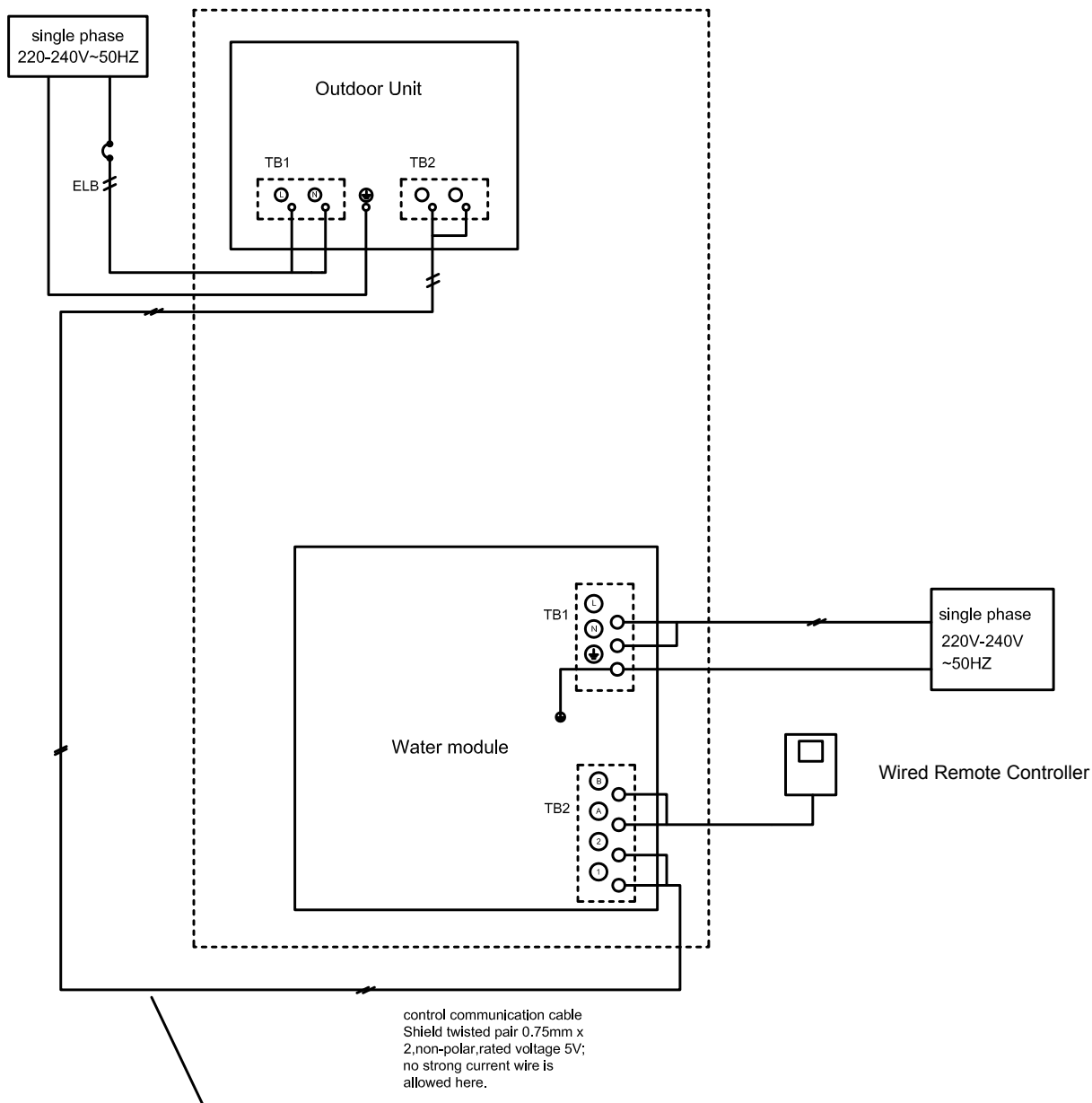


Fig. 6.2 Wiring Connection for Indoor & Outdoor

⚠ 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.

- (5) The recommended breaker size etc. are shown in Table 6.1.
- (6) In the case that a conduit tube for field-wiring is not used, fix rubber bushes with adhesive on the panel.

! WARNING

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

Table 6.1 Electrical Data and Recommended Wiring, Breaker 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-140UCSEP	220-240V ~ 50Hz	27.5	6.0	0.75	32	30	32
AHW-160UCSEP							

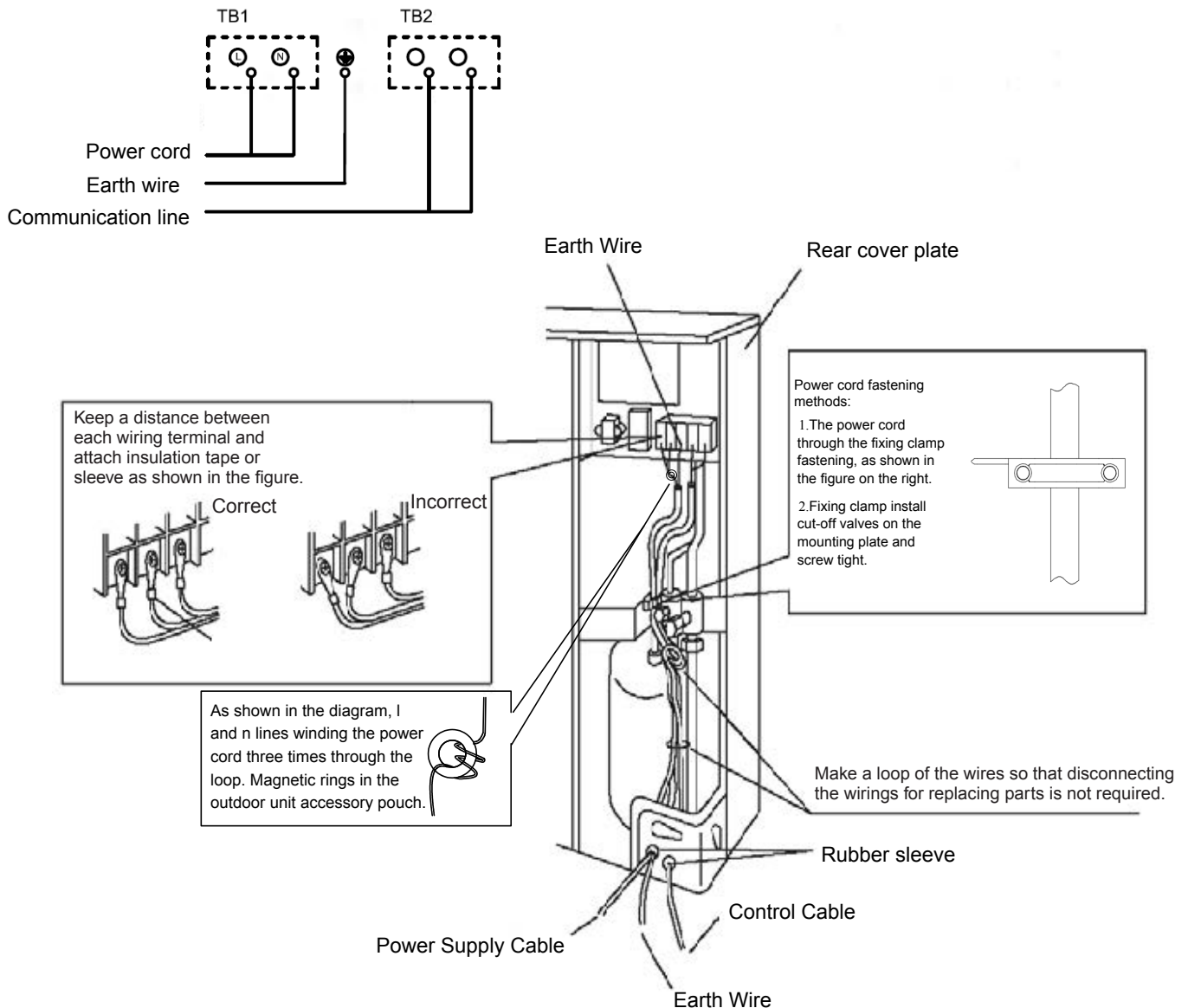


Fig. 6.3 Wiring Connection of Outdoor Unit

NOTES:

- 1) Follow local codes and regulations when selecting field wires.
- 2) Use a shielded cable for the communication line and connect it to ground.
- 3) In the case that power cables are connected in series, add each unit maximum current and select wires.

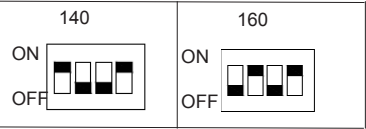
CAUTION

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

7. Outdoor Unit Dip-Switch Setting

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

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

DSW1	DSW2	DSW4	DSW5
 ALL OFF: Shipment Set 1 ON: Test Run(Cool) 1、2 ON: Test Run(Heat) 4 ON: Compressor Forced Stop	ALL OFF: Shipment Set 5 ON: Optional Function Setting 6 ON: External Input and Output Setting 	Ref. Cycle No. Setting 	Communication Setting 
	DSW3	DSW6	
	Capacity Setting 	Unit Mode Setting Shipment 	

- Communication Setting
It is necessary to set Ref. cycle system No. and terminal resistor connect to Hi-NET system.
- Setting Ref.cycle system No.
Setting Ref.cycle (DSW4&RSW1)

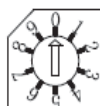
DSW4

Tens Digit Setting



RSW1

Single Digit Setting



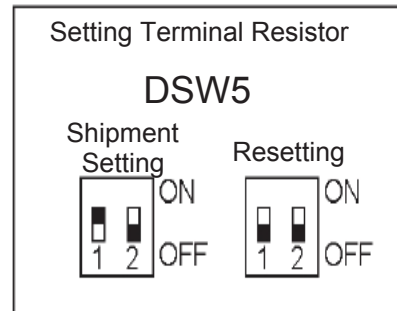
Unit number	Set	Unit number	Set
0		8	
1		9	
2		10	
3		11	
4		12	
5		13	
6		14	
7		15	

- **Terminal Resistor Setting**

The first key of DSW5 is "ON" position shipment.

It is not necessary to set when HI-NET is connected with one outdoor unit.

It is necessary to set the first key of DSW5 to "OFF" position from the second outdoor unit when a HI-NET system is connected with more than one outdoor unit



8. Test Run



- **Do not operate the system until all the check points have been cleared.**
 - (A) Check and confirm Ref. pipe system and communication wire link to same Ref. cycle system.
 - (B) Check to ensure that the electrical resistance is more than 1 megohm, by measuring the resistance between ground and the terminal of the electrical parts. If not, do not operate the system until the electrical leakage is found and repaired.
 - (C) Check to ensure that the stop valves of the outdoor unit are fully opened, and then start the system.
 - (D) Check to ensure that the switch on the main power source has been ON for more than 12 hours, to warm the compressor oil by the oil heater.
- **Pay attention to the following items while the system is running.**
 - (A) Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side are heated higher than 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.**
- **Operate every indoor unit one by one, check and confirm their Ref. cycle and connect wire joint to same Ref. cycle system.**

Table 8.1 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:	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 8.2 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.

9. Safety and Control Device Setting

● Compressor Protection

High Pressure Switch: This switch cuts out the operation of the compressor when the discharge pressure exceeds the setting.

Outdoor Unit Model			140、160
For Compressor Pressure Switch High Pressure	Cut-Out	MPa	Automatic Reset, Non-Adjustable $4.15_{-0.20}^{-0.05}$
	Cut-In	Mpa	$3.2_{-0.20}^{+0.15}$
Fuse on Main Circuit		A	50
Compressor Crank Heater Power		W	28×2
CCP Timer Set Time		Min	Non-Adjustable 3
Control Circuit Fuse		A	5

Technical parameters for heat pump space heaters

Model(s):	Outdoor unit: AHW-140UCSEP
	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	Uni	Item	Symbol	Value	Unit
Rated heat output (*)	Prated	13.3	kW	Seasonal space heating energy efficiency	η_s	173	%
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature T _j				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature T _j			
T _j = -7 °C	Pdh	11.8	kW	T _j = -7 °C	COPd	3.01	-
T _j = +2 °C	Pdh	7.2	kW	T _j = +2 °C	COPd	4.56	-
T _j = +7 °C	Pdh	4.6	kW	T _j = +7 °C	COPd	5.32	-
T _j = +12 °C	Pdh	2.1	kW	T _j = +12 °C	COPd	4.42	-
T _j = bivalent temperature	Pdh	11.8	kW	T _j = bivalent temperature	COPd	3.01	-
T _j = operation limit temperature	Pdh	10.6	kW	T _j = operation limit temperature	COPd	2.30	-
T _j = -15 °C (if TOL < -20 °C)	Pdh	-	kW	T _j = -15 °C (if TOL < -20 °C)	COPd	-	-
Bivalent temperature	Tbiv	-7	°C	Operation limit temperature	TOL	-10	°C
Cycling interval capacity for heating	Pcyc	-	kW	Cycling interval efficiency	COPcyc	-	-
Degradation co-efficient (**)	Cdh	1	-	Heating water operating limit temperature	WTOL	-	°C

Power consumption in modes other than active mode				Supplementary heater			
Off mode	POFF	0.175	kW	Rated heat output (*)	Psup	2.7	kW
Thermostat-off mode	P _{TO}	0.025	kW				
Standby mode	PSB	0.025	kW	Type of energy input		Electric	
Crankcase heater mode	PCK	0.056	kW				

Other items							
Capacity control		variable		Rated air flow rate, outdoors		5400	m ³ /h
Sound power level, indoors/outdoors	LWA	46/65	dB				
Annual energy consumption	Q _{HE}	4321	kWh				

Contact details

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

218, Qianwangang Road, Economic and Technological Development Zone, Qingdao, P.R. China

(*) 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(T_j).

(**) 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-160UCSEP
	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	Uni	Item	Symbol	Value	Unit
Rated heat output (*)	Prated	14.9	kW	Seasonal space heating energy efficiency	η_s	165	%
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature T _j				Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature T _j			
T _j = -7 °C	Pdh	13.2	kW	T _j = -7 °C	COPd	2.85	-
T _j = +2 °C	Pdh	8.0	kW	T _j = +2 °C	COPd	4.33	-
T _j = +7 °C	Pdh	5.2	kW	T _j = +7 °C	COPd	5.05	-
T _j = +12 °C	Pdh	2.3	kW	T _j = +12 °C	COPd	4.21	-
T _j = bivalent temperature	Pdh	13.2	kW	T _j = bivalent temperature	COPd	2.85	-
T _j = operation limit temperature	Pdh	12.4	kW	T _j = operation limit temperature	COPd	2.19	-
T _j = -15 °C (if TOL < -20 °C)	Pdh	-	kW	T _j = -15 °C (if TOL < -20 °C)	COPd	-	-
Bivalent temperature	Tbiv	-7	°C	Operation limit temperature	TOL	-10	°C
Cycling interval capacity for heating	Pcyc	-	kW	Cycling interval efficiency	COPcyc	-	-
Degradation co-efficient (**)	Cdh	1	-	Heating water operating limit temperature	WTOL	-	°C

Power consumption in modes other than active mode				Supplementary heater			
Off mode	POFF	0.175	kW	Rated heat output (*)	Psup	2.5	kW
Thermostat-off mode	PTO	0.025	kW				
Standby mode	PSB	0.025	kW	Type of energy input		Electric	
Crankcase heater mode	PCK	0.056	kW				

Other items							
Capacity control		variable		Rated air flow rate, outdoors		6000	m ³ /h
Sound power level, indoors/outdoors	LWA	46/66	dB				
Annual energy consumption	Q _{HE}	5075	kWh				

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(**) If Cdh is not determined by measurement then the default degradation coefficient is Cdh = 0,9.

Hisense Corporation

Add: 17,Donghai Xi Road,Qingdao 266071,China