

Hisense

Inverter-Driven Multi-Split Home Central Air Conditioning Heat Pump System Hi-Smart E Series

Technical Catalog

- Technical Data -
- Installation and Operation -
- Service and Maintenance -

Outdoor Units

AVW-28U(C/2)SB
AVW-34U(C/2)SB
AVW-43U(C/2)SB
AVW-43U(E/7)SB



Hisense


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


Add: Hisense Information Industry Park 218, Qianwangang Road,
Qingdao Economic Development Zone, China
Tel: +86-532-80879968 **Fax:** +86-532-80875929
Http: //www.hisensehitachi.com
E-mail: export@hisensehitachi.com


Specifications in this catalogue are subject to change without notice, in order that Hisense may bring the latest innovations to their customers.

IMPORTANT NOTICE

- Hisense pursues a policy of continuing improvement in design and performance of products. The right is therefore reserved to vary specifications without notice.
- Hisense cannot anticipate every possible circumstance that might involve a potential hazard.
- This heat pump air conditioner is designed for standard air conditioning only. Do not use this heat pump air conditioner for other purposes such as drying clothes, refrigerating foods or for any other cooling or heating process.
- The installer and system specialist shall secure safety against leakage according to local regulations or standards. The following standards may be applicable if local regulations are not available. British Standard, BS4434.
- No part of this manual may be reproduced without written permission.
- Signal words (DANGER, WARNING and CAUTION) are used to identify levels of hazard seriousness. Definitions for identifying hazard levels are provided below with their respective signal words.

 **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.
- This heat pump air conditioner has been designed for the following temperatures. Operate the heat pump air conditioner within this range.

Temperature		(°C)	
		Maximum	Minimum
Cooling operation	Indoor	23 WB	15WB
	Outdoor	43 DB	10 DB
Heating operation	Indoor	30 DB	15 DB
	Outdoor	15 WB	-15 WB

DB: Dry Bulb WB: Wet Bulb

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



Correct Disposal of this product

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

SAFETY SUMMARY



DANGER

- Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed air, nitrogen or refrigerant be used for these types of tests.
- Do not pour water into the indoor or outdoor unit. These products are equipped with electrical parts. If poured, it will cause a serious electrical shock.
- Do not touch or adjust safety devices inside the indoor or outdoor units. If these devices are touched or readjusted, it may cause a serious accident.
- Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply
- Refrigerant leakage can cause difficulty with breathing due to insufficient air. Turn OFF the main switch, extinguish any naked flames and contact your service contractor, if refrigerant leakage occurs.
- The installer and system specialist shall secure safety against refrigerant leakage according to local regulations or standards.
- Use an ELB (Electric Leakage Breaker). In the event of a fault, there is danger of an electric shock or a fire if it is not used.
- Do not install the outdoor unit where there is a high level of oil mist, flammable gases, salty air or harmful gases such as sulphur.



WARNING

- Do not use any sprays such as insecticide, lacquer, hair spray or other flammable gases within approximately one (1) meter from the system.
- If circuit breaker or fuse is often activated, stop the system and contact your service contractor
- Do not perform installation work, refrigerant piping work, drain piping and electrical wiring connection without referring to our installation manual. If the instructions are not followed, it may result in a water leakage, electric shock or a fire.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it lead electric shock. Do not connect the ground wiring to gas piping, water piping, lightning conductor or ground wiring for telephone.
- Connect a fuse of specified capacity.
- Do not put any foreign material on the unit or inside the unit.
- Make sure that the outdoor unit is not covered with snow or ice, before operation.
- Before performing any brazing work, check to ensure that there is no flammable material around.
When using refrigerant be sure to wear leather gloves to prevent cold injuries.
- Protect the wires, electrical parts, etc. from rats or other small animals.
If not protected, rats may gnaw at unprotected parts and which may lead to a fire.
- Fix the cables securely. External forces on the terminals could lead to a fire.

SAFETY SUMMARY



CAUTION

- Do not install the indoor unit, outdoor unit, remote control switch and cable within approximately 3 meters from strong electromagnetic wave radiators such as medical equipment.
 - Supply electrical power to the system to energize the oil heater for 12 hours before start-up after a long shutdown.
 - Do not step or put any material on the product.
 - Provide a strong and correct foundation so that;
 - a. The outdoor unit is not on an incline.
 - b. Abnormal sound does not occur.
 - c. The outdoor unit will not fall down due to a strong wind or earthquake.
 - The appliance is not to be used by children or person with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.
 - Children should be supervised they do not play with the appliance.
-

NOTE:

- It is recommended that the room be ventilated every 3 to 4 hours.
- The heating capacity of the heat pump unit is decreased according to the outdoor air temperature. Therefore, it is recommended that auxiliary heating equipment be used in the field when the unit is installed in a low temperature region.
- Operate the heat pump air conditioner within this range.
 - Regarding installation altitude below 1000 meters;
 - Regarding frequency of supply power within ± 1 % Hz of rated frequency
 - Regarding transport storage temperature within $-25 \sim 55^{\circ}\text{C}$

CHECKING PRODUCT RECEIVED

- Upon receiving this product, inspect it for any shipping damage.
Claims for damage, either apparent or concealed, should be filed immediately with the shipping company
- Check the model number, electrical characteristics (power supply, voltage and frequency) and accessories to determine if they are correct.

The standard utilization of the unit shall be explained in these instructions.

Therefore, the utilization of the unit other than those indicated in these instructions is not recommended.

Please contact your local agent, as the occasion arises.

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

Hisense's consent in a written form.

TABLE OF CONTENTS

1. Feature	1
1.1 Outdoor Series	1
1.2 System Feature	1
1.3 Refrigeration Pipe	7
1.4 System Control	8
1.5 DRY Operation	9
1.6 Test Run and Self-test Control	10
2. Comprehensive Parameter	11
3. Dimension Data	12
4. Application Selection Parameters	13
4.1 Outdoor Unit Gravity Center	13
4.2 Installation and Service Space	13
4.3 Design Selection Guide	18
4.4 Outdoor Unit Capacity Characteristic Curve	19
4.5 Cooling Temperature Correction Factor	21
4.6 Heating Temperature Correction Factor	24
4.7 Piping Length Correction Factor	27
4.8 Heating Capacity Correction Factor in Defrost Operation	29
5. Electrical Parameter	30
6. Operating Range	32
7. Components Parameters	33
8. Control System	34
8.1 System Control	34
8.2 Protection and Control Device	36
9. Electrical Wiring	39
9.1 General Check	39
9.2 Electrical Wiring Connection	39
10. Additional Refrigerant Charge	40

Contents

Installation and Operation

1. Safety Summary	43
2. Structure	43
2.1 Outdoor unit and Refrigeration cycle	43
2.2 Necessary Tools and Instrument List for Installation	46
3. Transportation and Handling	47
3.1 Transportation	47
3.2 Handling of Outdoor Unit	47
4. Outdoor Unit Installation	48
4.1 Factory-Supplied Accessories	48
4.2 Initial Check	48
4.3 Service Space	49
4.4 Installation Work	50
5. Refrigeration Piping	52
5.1 Piping Materials	52
5.2 Refrigeration Piping	53
5.3 Piping Connection	54
5.4 Air Tight Test	55
5.5 Vacuum Pumping	56
5.6 Caution of the Pressure by Check Joint	57
5.7 Collecting Refrigerant	58
6. Electrical Wiring	58
6.1 General Check	58
6.2 Electrical Wiring Connection	59
7. Test Run	63
7.1 Test Run and Maintenance Record	64
7.2 Checking of Wire Connection by Test Run	65
7.3 Alarm Code (AVW-28/34/43U(C/2)SB)	66
7.4 Alarm Code (AVW-43U(E/7)SB)	67
8. Safety and Contort Device Setting	68

Contents

Service and Maintenance

1. Maintenance	69
1.1 Regular Check	69
2. Troubleshooting	70
2.1 Preliminary Check	70
2.2 Overhaul through Alarm Code	70
2.3 Troubleshooting in check mode	72
2.4 Overhaul through 7-segment Digital Display	77
2.5 Protection control code of seven-segment digital display	80
2.6 Self-test of Wired Remote Control	82
3. Steps of Compressor Maintenance and Replacement	83

1. Feature

1.1 Outdoor Series

Model	AVW-28U(C/2)SB	AVW-34U(C/2)SB	AVW-43U(C/2)SB	AVW-43U(E/7)SB
Power Supply	1Φ, 220~240V/50Hz, 220V/60Hz			3Φ,380~415V/50Hz, 380V/60Hz
Rated Cooling Capacity	27.300KBtu/h	34.100KBtu/h	42.700KBtu/h	42.700KBtu/h

1.2 System Feature

Mini Inverter-driven Multi-Split Central Air Conditioner

Mini Inverter-driven Multi-split Central Air Conditioning Hi-Smart E Series product is an energy-saving, high efficient, comfortable, environmentally friendly, stable and reliable air conditioning system. With people's increasing demand of intelligent equipment control, intelligent control, energy-saving operation and requirements of comfort are more and more important for people in order to better meet the requirements of comfort, especially occasions such as villas, apartments, houses etc need a smart comfortable environment all the year.

Hi-Smart E Series-Adopt R410A Refrigerant

Hisense has been committed to the development of more energy-saving and environmentally friendly air conditioning system in order to reduce greenhouse effect and protect the environment of the earth.

E series products are more adaptable to the need of global environment protection through using refrigerant R410A which does not damage ozone layer and adopting energy-saving operation technology.

All Kinds of Indoor Units and Combination

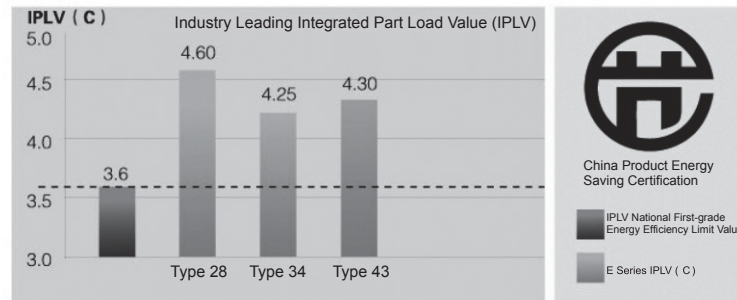
E Series indoor units include 12 types, totally 90 specifications.

Indoor Unit Type	Nominal Capacity (kBtu/h)											
	05	07	09	12	14	17	18	22	24	27	30	38
Ceiling Ducted Type (Low Static Pressure)		○	○	○	○	○	○	○	○	○	○	○
Ceiling Ducted Type (High Static Pressure)		○	○	○	○	○	○	○	○	○	○	○
Low-Height Ceiling Ducted Type		○	○	○	○	○	○	○	○			
Low-Height Ceiling Ducted Type (DC)	○	○	○	○	○	○	○	○	○			
Slim Ceiling Ducted Type		○	○	○	○							
1-Way Cassette Type		○	○	○	○	○		○				
2-Way Cassette Type		○	○	○	○		○		○			
4-Way Cassette Type			○	○	○	○	○	○	○	○	○	○
Compact 4-Way Cassette Type	○	○	○	○	○	○						
Wall-Mounted Type		○	○	○	○	○	○	○	○			
Ceiling and Floor Type						○	○	○	○	○	○	○
Floor-Concealed Type			○		○		○		○			

○: Available

First-grade Energy Saving Certification

Hi-Smart E series Multi-Split Air conditioner adopts high efficient DC inverter compressor and DC inverter technology, integrates heat exchange technology, and ensures a high COP value both in cooling and heating. Each indoor unit can be run separately. The outdoor unit can realize intelligent adjustment of capacity output according to operation condition of indoor unit, which contributes to higher system energy efficiency coefficient and more outstanding energy saving. Product IPLV (C) values are all much higher than the limit values of National First-grade Energy Saving Standard in China and represent top level of the industry.



IPLV (C) is refrigeration integrated performance coefficient, used to measure part load efficiency of multi-split air conditioning in cooling season. Home central air conditioning is more efficient under part load operation, so IPLV can more accurately measure energy saving of home central air conditioning in actual operation.

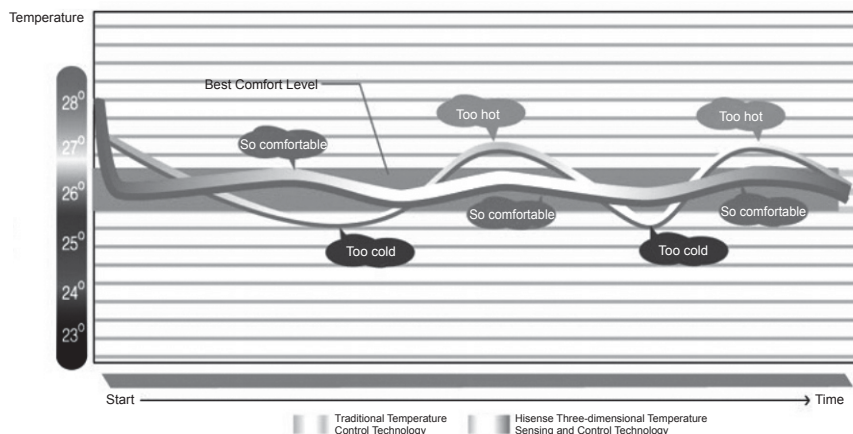
Dual-quiet Operation

Through intelligent control technology of low-frequency operation and optimization of structural design of indoor and outdoor units, you can achieve indoor and outdoor dual-quiet operation and enjoy a quiet home life.

- * New type indoor unit volute with anti-vibration design, minimum running noise being only 21dB;
- * Outdoor unit fan with intelligent variable speed design and high-speed silencing design; meantime with nighttime quiet operation mode, reducing by 5dB compared with that in daytime.

2+1 Mode Three-dimensional Temperature Sensing

Special return air thermistors distributed at different locations of the system, remote thermistor and indoor unit unique air outlet thermistor can accurately perceive temperature changes of each indoor and outdoor sensitive point, and automatically control indoor temperature within fluctuations of ± 0.5 degrees, slight temperature fluctuations ensure a more comfortable mild and moist feeling.



Comfortable Air Supply

The indoor unit adopts multiple air supply modes such as up-supply and up-return, side-supply and back-return, side-supply and bottom-return etc. to realize distant surround air supply and multi-angle surround airflow with superior airflow organization, more uniform temperature, gentle air supply, without dead ends and strong blowing, which can make you more comfortable.

Comprehensive Response to European RoHS Directive

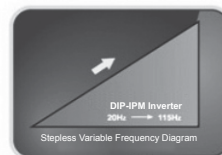
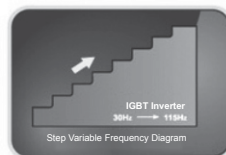
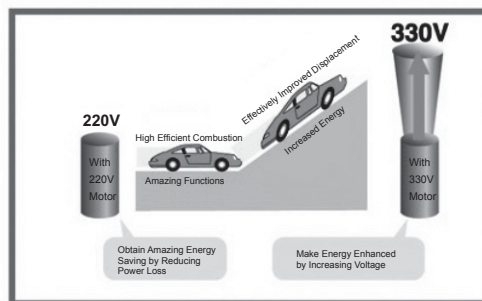
RoHS is called [Reduction of the following six Hazardous Substances in Electrical and Electronic Equipment]. This directive provides that in electrical and electronic equipment prohibit the use of six kinds of hazardous substances [lead, mercury, cadmium, hexavalent chromium, poly-brominated diphenyl ethers (PBDE) or (PBB)]. Hisense actively responds to European RoHS directive and carries out a series of procedures and interventions to control hazardous substances. This directive aims to protect human health and ensure recycling and disposal of waste electrical and electronic equipment meeting environmental requirements.



Substance	RoHS Limit Value	Typical Test Method
Lead	1000ppm	Wet chemical treatment or X-ray fluorescence
Cadmium	100ppm	Wet chemical treatment or X-ray fluorescence
Hexavalent chrome	1000ppm	Wet chemical treatment or X-ray fluorescence
Mercury	1000ppm	Wet chemical treatment or X-ray fluorescence
PBB/PBDE	1000ppm	GCMS, FTTR, or X-ray Fluorescence

Intelligent Stepless Variable Frequency Technology

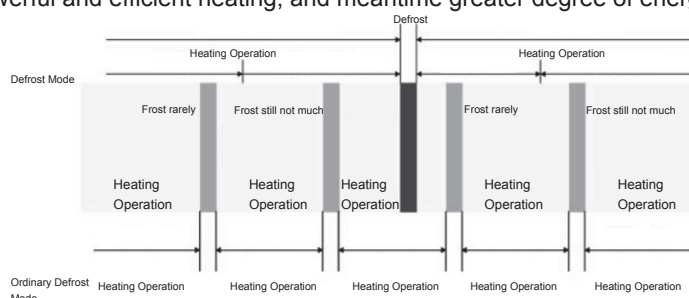
Hisense stepless variable frequency technology adopts PAM (Pulse Amplitude Modulation) and PWM (Pulse Width Modulation), PFC (Power Factor Correction) combination control technology. At startup, the inverter makes indoor temperature reach set value quickly with assistance of PAM by accelerating rotation frequency of compressor. When indoor temperature reaches set value, the inverter effectively and accurately keeps indoor temperature with assistance of PWM by controlling rotation speed of compressor, without need to consume more energy. Stepless variable frequency technology realizes high-power and high-efficiency units with smooth running, comfort and energy-saving, power factor up to 99.5%, significant energy saving effect, economical running, natural and comfortable indoor environment.



Comparison of Stepless Variable Frequency and Step Variable Frequency

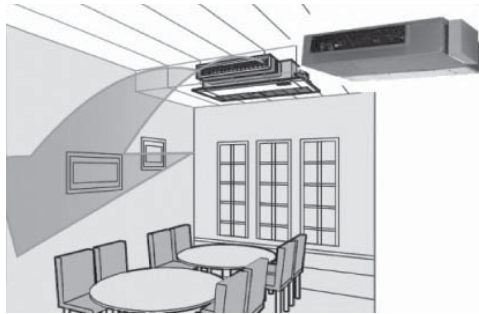
Intelligent Defrost, Powerful Heating

Adopt intelligent defrost mode, accurately grasp defrost time, avoid ubiquitous phenomena "defrost when there is no frost" and "does not defrost when there is frost" of air conditioning in winter heating, ensure efficient heating efficiency of air conditioning, with more powerful and efficient heating, and meantime greater degree of energy saving.



192mm Low-height Ceiling Ducted Type Indoor Units

The thickness of low-height duct is only 192mm. Hidden installation of the ceiling leaves more design space for interior decoration, presenting a more perfect and harmonious home environment.

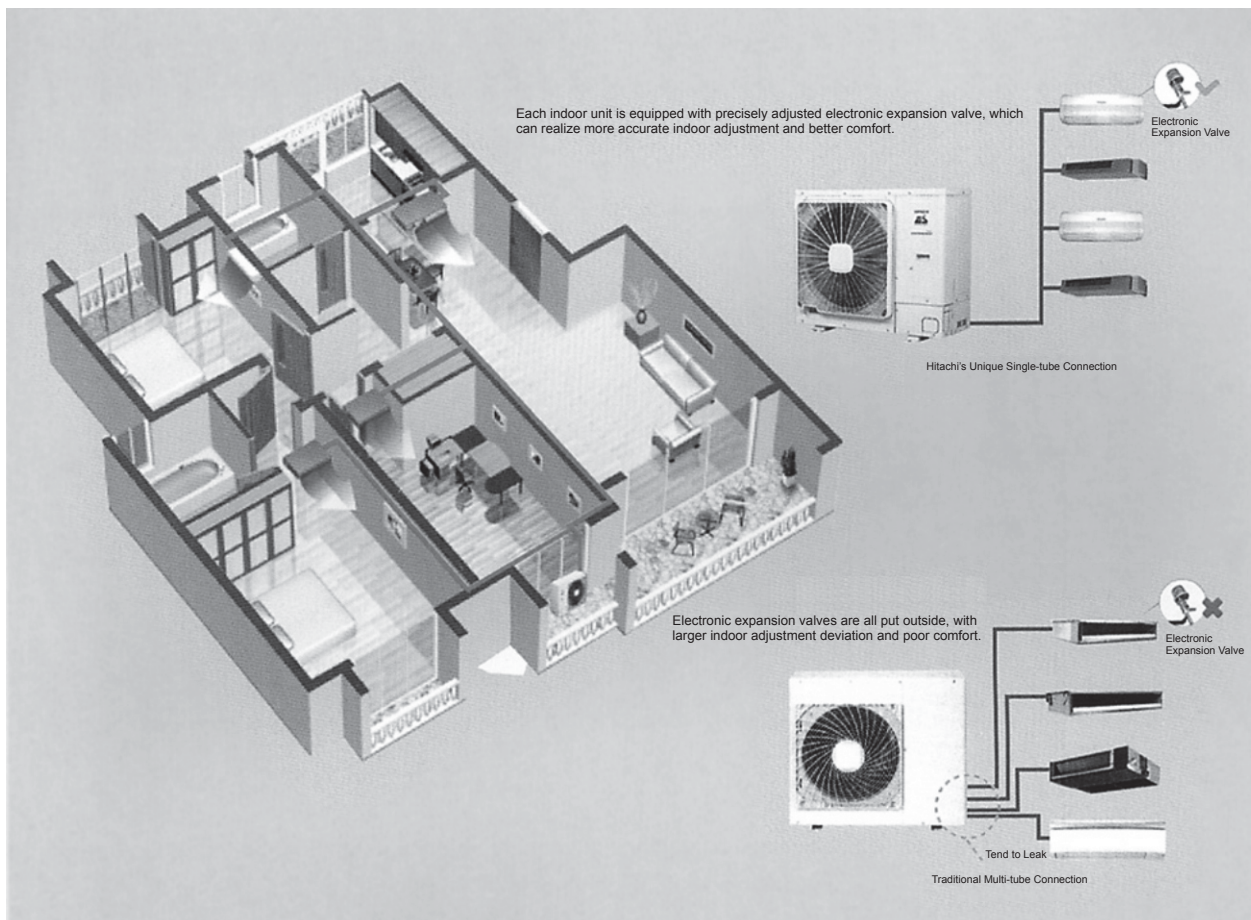


Rich Models

There are low-height ceiling ducted and wall-mounted indoor units; duct models are from 05 to 38, totally 12 kinds of indoor units. You can select based on room size and composite match, respond flexibly to various interior decoration design requirements, with delicate look and feel, perfect interpretation of the visual symbol of the home.

Unique Single-tube Connection, Free Multi-split

Outdoor unit adopts leading single-tube connection technology, freely towing multiple indoor units. Indoor unit adopts imported microcomputer electronic expansion valve, which can perform 2000 steps of fine-tuning, automatically adjust flow accurately according to indoor load, with more precise temperature regulation and better energy saving. It can also beautify and save installation space, avoid disadvantages of tending to leak due to more nodes caused by multiple-tube connection of outdoor unit, and poor regulation of indoor unit capacity.

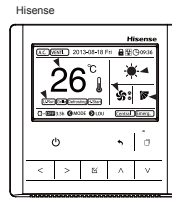


Intelligent Controller

The system provides small, exquisite and flexible wireless remote control, and optional simple and generous wired remote control, both compose intelligent and convenient control system.



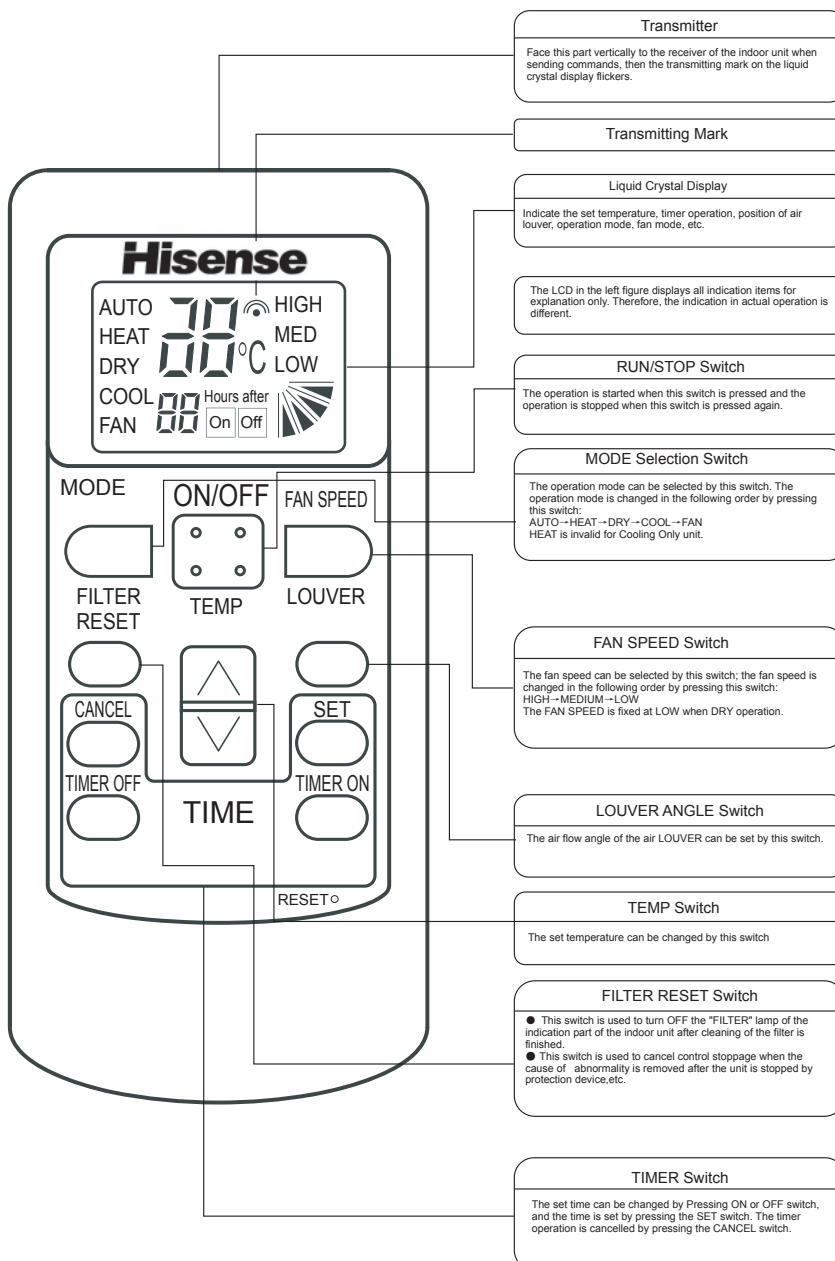
Wireless Remote Control
HYE-Q01 (Standard)



Wired Remote Control
HYXE-J01H (Optional)

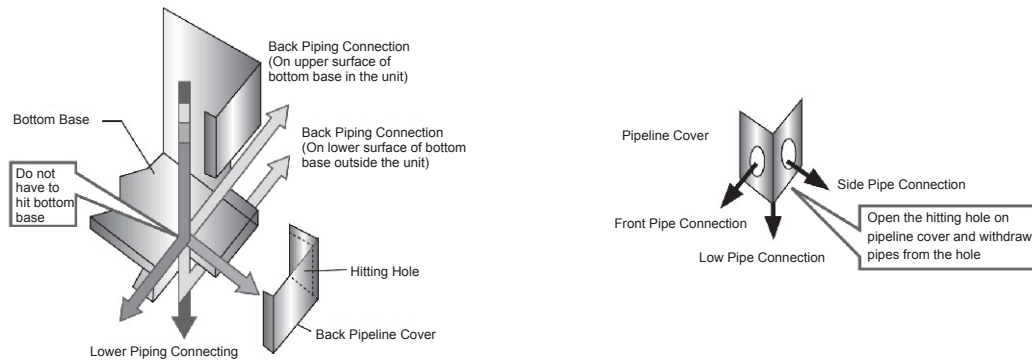
<Wireless Remote Control HYE-Q01 (Standard Accessory) >

Wireless remote control is to transmit instructions such as operation mode, time setting etc., to transmission device of indoor unit. Direct remote control to the signal receiver of indoor unit, and press switches to transmit in infrared form.



Free Pipe Connection

For Hi-Smart E Series, the connecting direction of refrigerant pipe is flexible, any direction of the outdoor unit can be connected to pipes (front, rear, side, bottom), and easy to install, which can freely adapt to different places.



Free Ways

E series product can truly realize free multi-split, break indoor unit driving limit of similar product, realize one-to-one combination and adapt to more commercial and family environments.

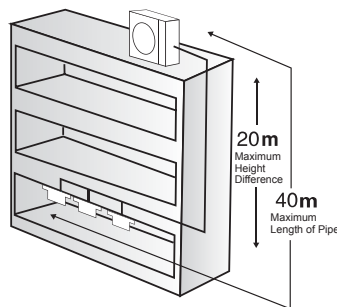
Free Models

Customers can choose a variety of indoor unit combinations according to the need of interior decoration design, to avoid shortcomings of monotonous choices of indoor models, lack of integration with indoor environment.



Free Design

Take 42.7kBtulh (AVW-43UCSB) for example, the maximum total length of actual refrigerant piping between outdoor and indoor unit is up to 40 meters, the maximum vertical height difference is up to 20 meters. The indoor unit height difference is 2 meters, the length from branch pipe to indoor unit is 5 m, and the length from first branch pipe to the farthest indoor unit is 15 meters, which makes design and installation more free.



Compact and Flexible Outdoor Unit Making Use of More Space

E series Mini Inverter-driven Multi-split Outdoor units have features of compact volume, light weight, small size, and easy installation. Take 42.7kBtulh for example, the height of outdoor unit is only 800mm, the smallest size in the industry. E-Series outdoor unit adopts DC fan motor and anti-wind fan, which can effectively reduce the impact of wind gusts, even if the face velocity reaches 10m/s, the unit can also be in stable operation.



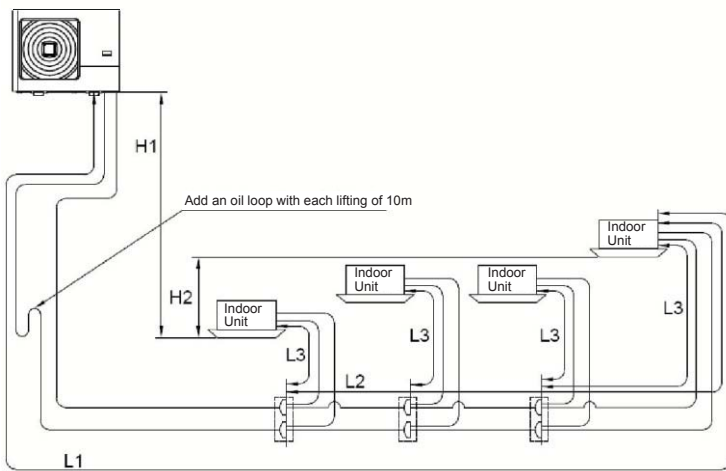
1.3 Refrigeration Pipe

(1) Configure refrigeration pipes according to requirements of the following table.

Table 1.3.1 Outdoor Unit Piping Size

Model	Pipe Length		Outer Diameter of Pipe (mm)	Maximum Total Pipe Length	Branch Pipe Model
	Gas Pipe	Liquid Pipe			
28KBtu/h	φ 15.88	φ 9.53	φ 15.88	φ 9.53	Actual Length ≤ 30m
34KBtu/h					Actual Length ≤ 40m
43KBtu/h					Actual Length ≤ 40m

(2) Pipeline System



<Branch pipe~Indoor Unit Piping>

Indoor Unit Capacity (KBtu/h)	Pipe Size	Gas Pipe / Liquid Pipe (φmm)
07-14		12.7/6.35
17-18		15.88/6.35
22-24		15.88/9.53

Item		Scope
Actual Length of Refrigerant Pipe: L1	28KBtu/h	Within 25m
	34KBtu/h	Within 25m
	43KBtu/h	Within 25m
Pipe Length from First Branch to each Indoor Unit: L2	28KBtu/h	Within 10m
	34KBtu/h	Within 15m
	43KBtu/h	Within 15m
Pipe Length from each Branch Pipe to Indoor Unit: L3	28KBtu/h	Within 5m
	34KBtu/h	Within 5m
	43KBtu/h	Within 5m
Height Difference of Indoor and Outdoor Unit: H1	Outdoor Unit on Upper Side	Within 20m
	Indoor Unit on Upper Side	Within 20m
Height Difference of Indoor Units: H2		Within 2.0m

Table 1.3.2 T Branch Pipe

Unit: mm ID: Inner Diameter OD: Outer diameter

Branch Pipe	HFQ-052F
Gas Pipe	
Liquid Pipe	

1.4 System Control

New Type Transmission System

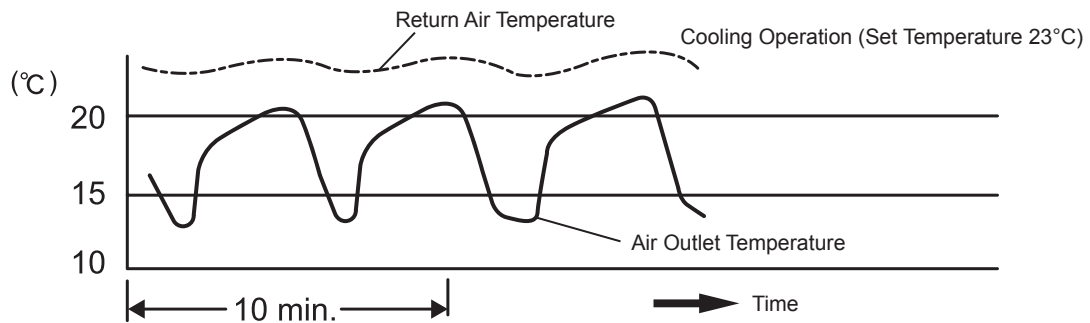
Connect with a twin-core transmission line between indoor and outdoor units; the transmission line has no polarity order limit.

Wide variable frequency range ensures precise control.

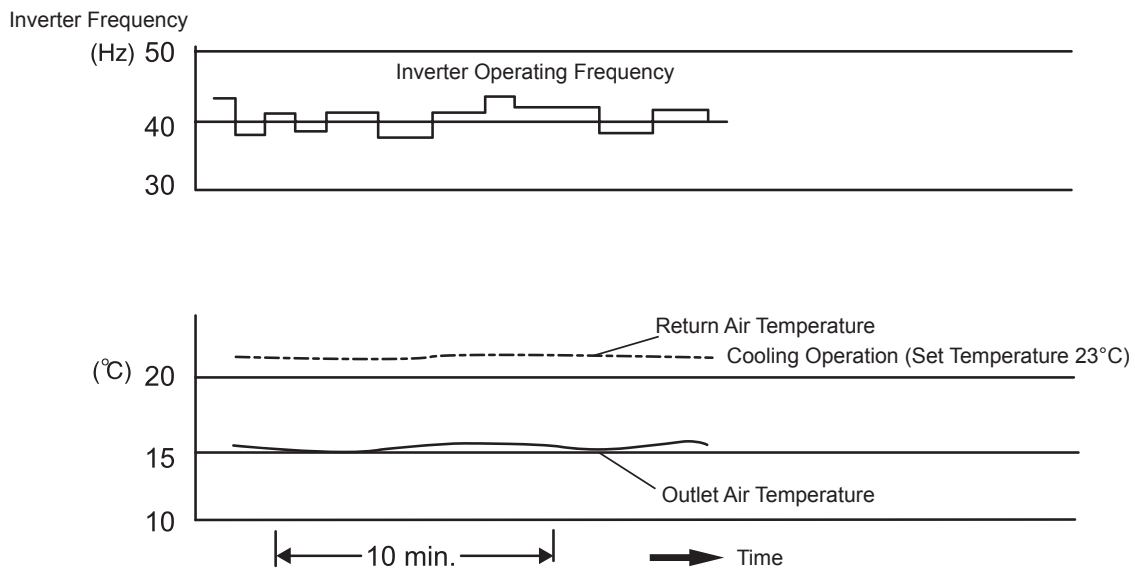
Operation frequency of E series outdoor unit compressor is automatically adjusted within a broad range of 20Hz to 115Hz to avoid frequent ON / OFF control of the units, therefore achieve smooth and stable operation. This new broad range of capacity control not only meets the need of large space, but also meets the need of small space, such as guest room and management office.

The compressor operates with a high speed in defrosting, which makes defrosting very quickly.

Fixed-frequency Units



Inverter Speed Control Units

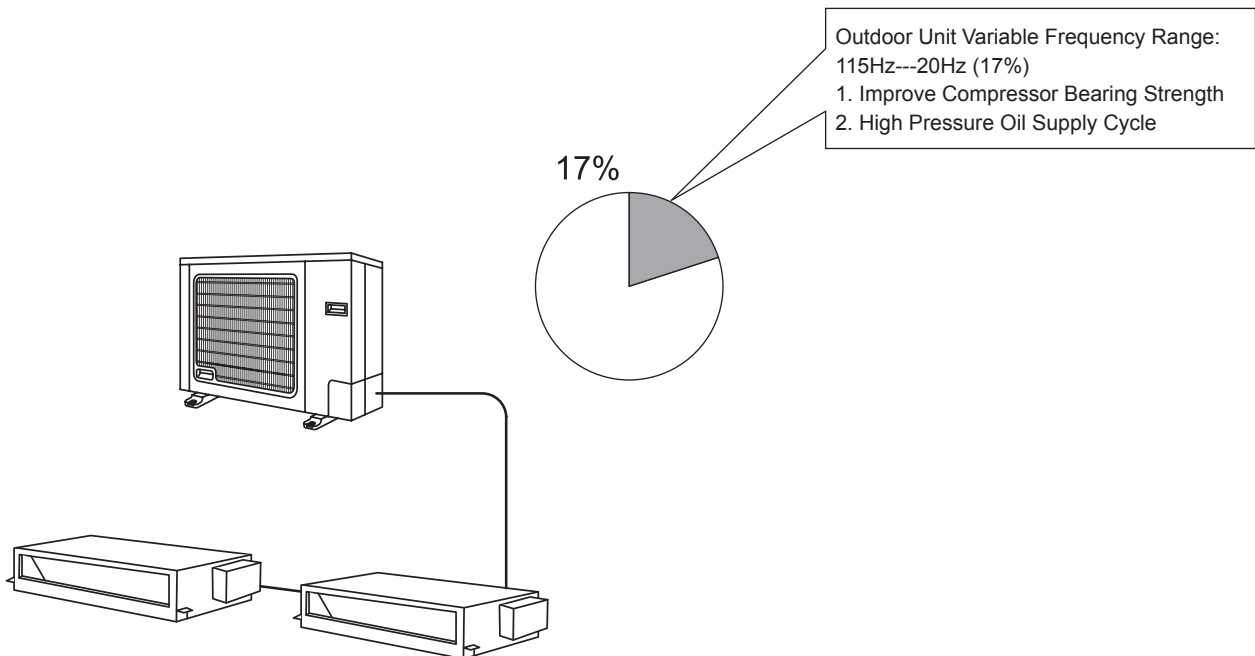


Note: Above is Situation of Lower Air Outlet Temperature

Electronic Capacity Control

Outdoor unit capacity can change continuously through the inverter from 20Hz-115Hz, the broad operation range is ensured by enhancing shaft intensity of compressor and interior oil separation function; therefore, the air conditioning system can be excellently adjusted according to load change of a day.

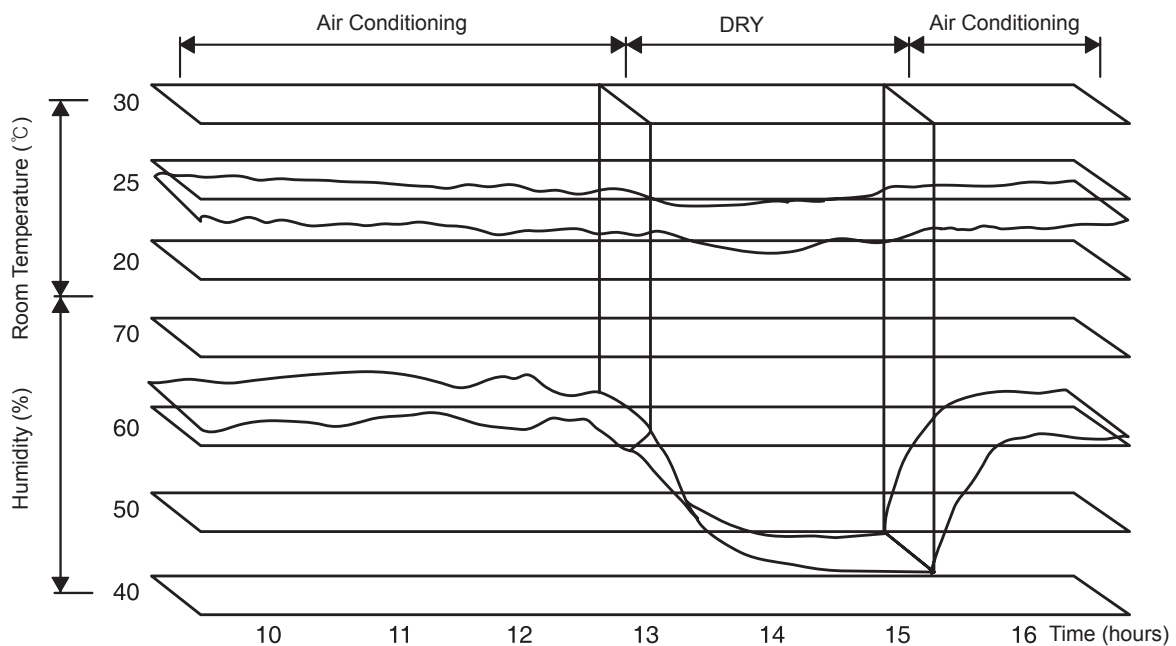
Further, driven by inverter compressor, indoor unit capacity can also be controlled by detecting return air temperature and set room temperature. Therefore, even a small room can meet the requirements of comfortable air conditioning without control of "ON / OFF" operation of the device.



1.5 DRY Operation

This system can achieve excellent DRY effect by combining variable frequency and indoor units air flow control; meantime the room temperature fluctuations are almost unaffected.

Room Temperature Fluctuations and Humidity Changes in DRY Operation



1.6 Test Run and Self-test Control

Test run and self-check function of multi-function remote control and outdoor unit control panel

Through the new wired remote control you can realize high quality control. Self-check function of the latest device can quickly test operation of indoor and outdoor unit. In addition, the alarm data when the unit is abnormal can be stored in computer conveniently.

Self-test function can be achieved through outdoor unit control panel; seven-segment digital display on control panel can display a variety of unit operation data such as electronic expansion valve opening etc.

With these functions, the cycle of unit test run and maintenance work is shortened, and workload is reduced.

● Diagnosis with the Remote Control Switch

LCD remote control switch (optional) can be used to detect PCB control board; therefore, check of PCB is rapid and accurate.

● Data Memory of the Remote Control Switch

When an exception occurs, LCD remote control switch displays the alarm code for rapid fault diagnosis.

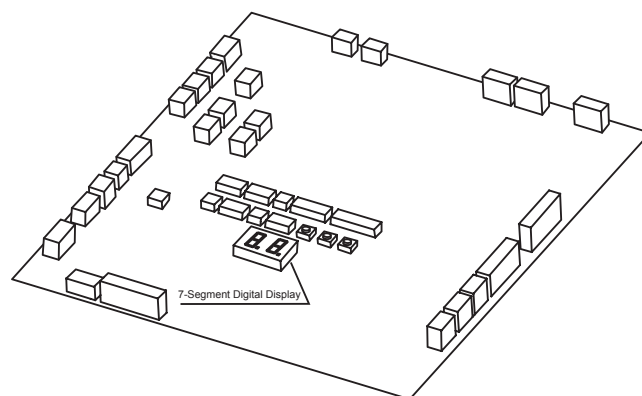
Self-test Function

● Diagnosis with 7-segment digital display of outdoor unit group

PCB of outdoor unit group is equipped with seven-segment digital display tube; these digital tubes can display a variety of operation modes such as:

- Outdoor Ambient Temperature
- Discharge Temperature
- Evaporating Temperature in Heating Operation
- Condensing Temperature
- Discharge Pressure
- Suction Pressure
- Compressor Running Time

In addition, it can also provide fast and accurate test run data or normal working data.



For AVW-28/34/43U(C/2)SB,AVW-43U(E/7)SB

2.Comprehensive Parameter

Hi-Smart E Series Outdoor Units					
Model Power Supply	AC1Φ, 220V/50Hz	AVW-28UCSB	AVW-34UCSB	AVW-43UCSB	—
	AC1Φ, 220V/60Hz	AVW-28U2SB	AVW-34U2SB	AVW-43U2SB	—
	AC3Φ,380~415V /50Hz	—	—	—	AVW-43UESB
	AC3Φ,380V/60Hz	—	—	—	AVW-43U7SB
Nominal Cooling Capacity	kW	8.0	10.0	12.5	12.9
	Btu/h	27,300	34,100	42,700	44,000
Nominal Heating Capacity	kW	9.5	11.2	14.0	14.0
	Btu/h	32,400	38,200	47,800	47,800
Outer Dimensions	H	mm	800	800	800
	W	mm	950	950	950
	D	mm	370	370	370
Net Weight	kg	65	73	78	84
Sound Pressure Level (Cooling/Heating)	dB(A)	50/52	53/54	54/57	55/57
Max Number of Connectable Indoor Units *	—	3 (4)	4 (5)	4 (5)	4 (5)
Refrigerant	—	R410A			
Operation Range	Cooling	10~43°C DB			
	Heating	-15~15°C WB			
Refrigerant Flow Control	—	Micro-Computer Control Expansion Valve			
Refrigerant Piping	—	Flare-Nut Connection			
Liquid Line	mm	Φ9.53			
Gas Line	mm	Φ15.88			
Piping Connection	—	Multi-Kit Connection			

NOTES:

1. The nominal cooling capacity and heating capacity are based on following conditions:

Cooling operation conditions

Indoor Air Inlet Temperature: 27°C DB(80°F DB)

19°C WB(66.2°F WB)

Outdoor Air Inlet Temperature: 35°C DB(95°F DB)

Piping Length: 7.5Meters Piping Life: 0 Meter

Heating Operation Conditions

Indoor Air Inlet Temperature: 20°C DB(68°F DB)

Outdoor Air Inlet Temperature: 7°C DB(45°F DB)

6°C DB(43°F DB)

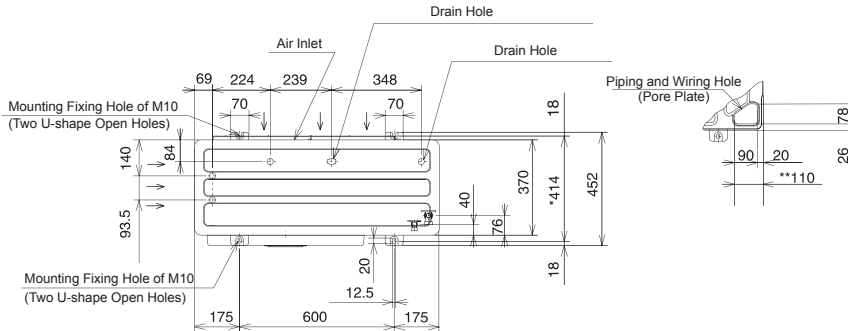
3. For the detail information, Refer To P₁₈ Please.

2. The sound Pressure level is based on following conditions. 1.5m from floor level, and 1 meter from the unit service cover surface.

The above data was measured in an anechoic chamber so that reflected sound should be taken into consideration in the field.

3. Dimension Data

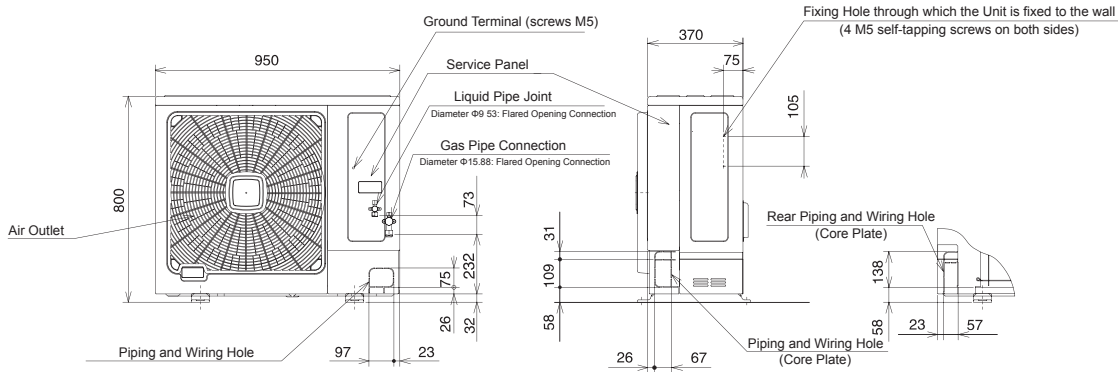
Outdoor Unit
AVW-28~43 *



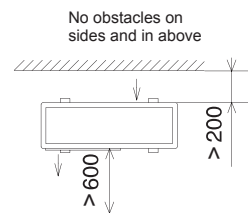
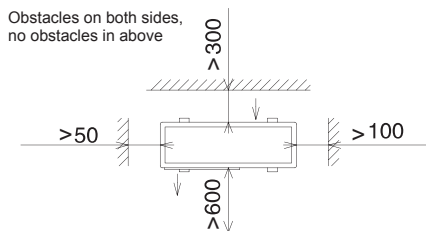
Caution:

Drainage problems will occur in defrosting operation.

- 1) Set the unit at a place with smooth drainage, and provide a waterspout.
- 2) Outdoor unit installation should ensure smooth and strong foundation without upward slope, in order to facilitate discharge of defrosting water. In cold weather, the condensed water will be turned into ice, therefore avoid draining where people often walk because it is slippery.



Service Space



About Installation Site

Please install it in a place that is not against the wind (wind blowing straight to the fan), to prevent the snow blown into the inner unit.

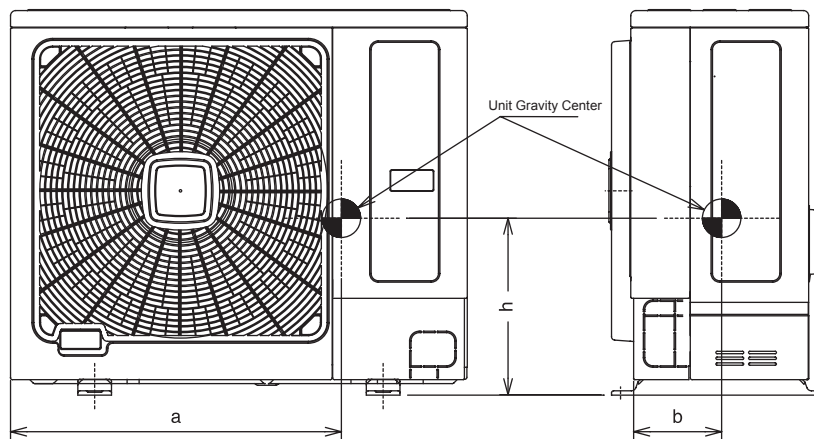
- 1) Select a place with high intensity and good stability to perform infrastructure construction; be sure it is secure and strong.
- 2) The unit air outlet had better not face strong wind.
- 3) If air outlet faces strong wind, please apply optional component to prevent wind.

Note:

1. The outdoor unit refrigerant has been charged at the factory; for field refrigerant pipe charge, see "10. Additional Refrigerant Charge".
2. The unit is equipped with stop valve; field refrigerant pipes are connected to stop valve through flare opening.
3. Illustrated 110 dimension marked with ** is to avoid possible conflict with the foundation, etc. in piping from the bottom.
4. Dimension marked with * is the location dimension of anchor holes.

4. Application Selection Parameter

4.1 Outdoor Unit Gravity Center



Type	Item	Gravity Center Position (mm)		
		a	b	h
AVW-28U(C/2)SB		610	175	375
AVW-34U(C/2)SB		635	180	355
AVW-43U(C/2)SB		630	190	360
AVW-43U(E/7)SB		630	190	360

4.2 Installation and Service Space

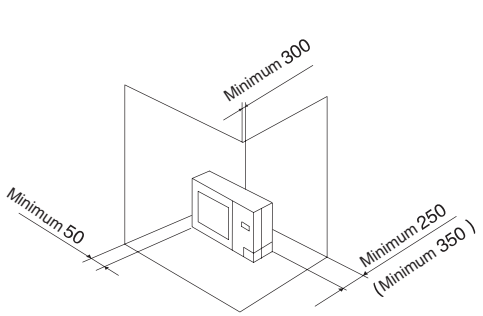
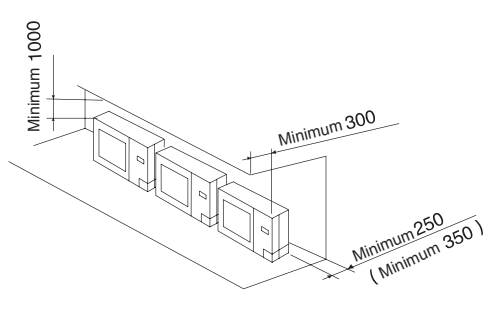
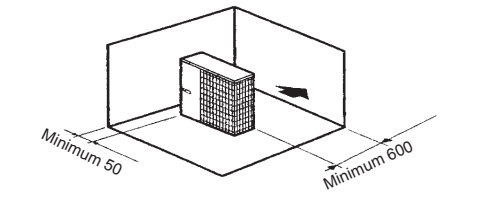
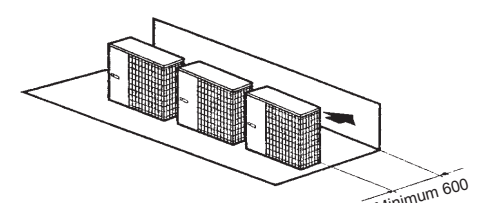
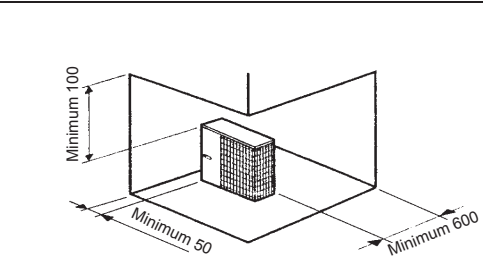
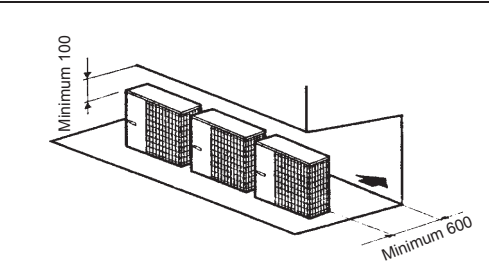
(mm)

Single Installation	<p>Upper Side is Open</p> <p>Keep a distance of 100mm between service cover and wall. The dimension in "()" is for the model 34 and 43.</p>
Single Installation	<p>Upper Side is Open</p> <p>Keep a distance of 100mm between service cover and wall. The dimension in "()" is for the model 34 and 43.</p>
Multiple Installation	<p>Upper Side is Open</p> <p>Keep a distance of more than 100mm between other units. The dimension in "()" is for the model of 34 and 43.</p>

Outdoor Unit

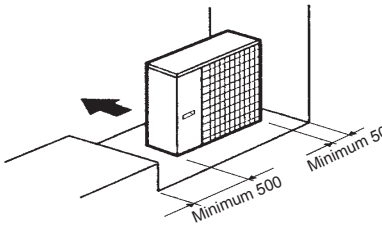
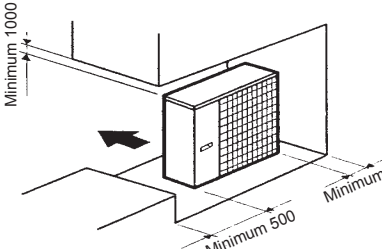
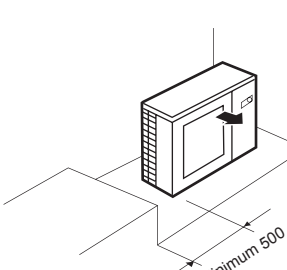
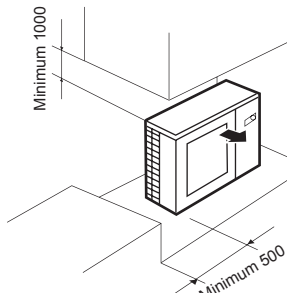
Installing outdoor unit should secure adequate service space as figure.

(mm)

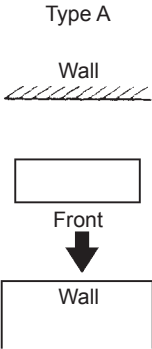
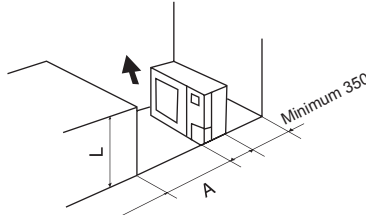
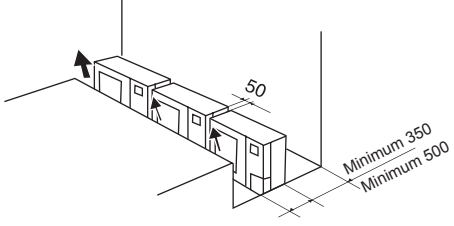
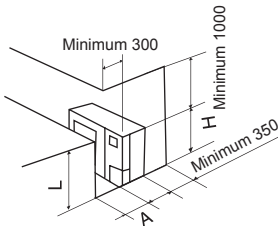
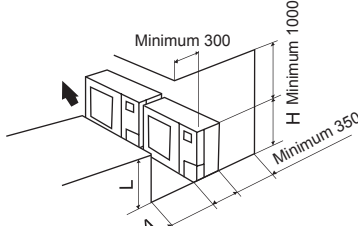
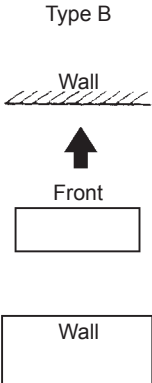
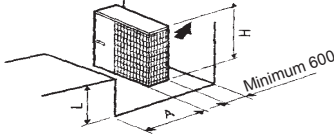
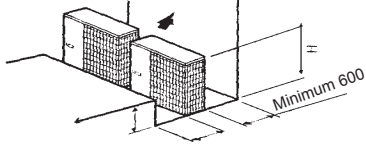
In case of obstacles on inlet and outlet side			
		Single Installation	Multiple Installation
		In case of no obstacles on suction side	No obstacles in above
Obstacles in above	 <p>At least 50mm on each side</p>		 <p>Keep a distance of more than 100mm between other units, and there are no obstacles on the left and right sides of the outdoor unit.</p>
In case of no obstacles on outlet side	No obstacles in above	 <p>At least 50mm on each side</p>	 <p>Keep a distance of more than 100mm between other units, and there are no obstacles on the left and right sides of the outdoor unit.</p>
	Obstacles in above	 <p>At least 50mm on each side</p>	 <p>Keep a distance of more than 100mm between other units, and there are no obstacles on the left and right sides of the outdoor unit.</p>

Note: The dimension in “()” is for the model of 34 and 43.

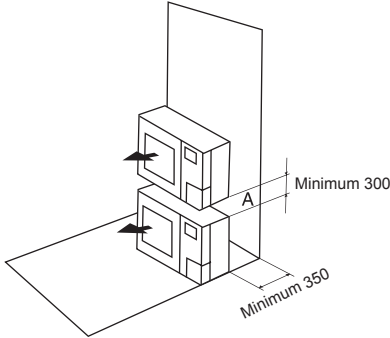
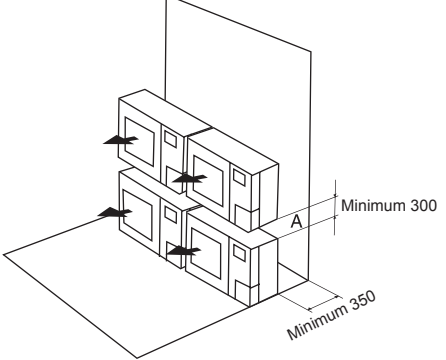
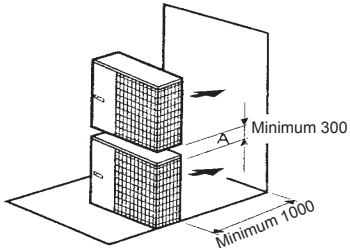
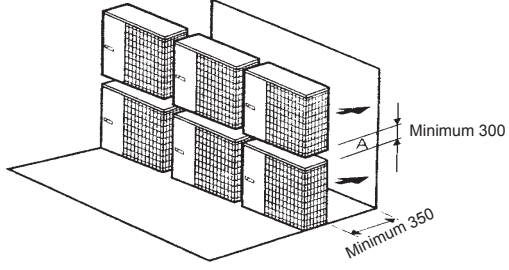
Installation Space (1)

Obstacles on left and right sides	
No Obstacles in above	When installing one outdoor unit 
	 <p>Install Wind Guard on outlet side</p>
No Obstacles in above	
Obstacles in above	

Installation Space (2)

Multiple Installation															
		Single Installation	Installation multiple												
<p>Type A</p> 	No Obstacles in Above	 <p>There shall not be any obstacle at the left and right sides of the outdoor unit. Check and make sure the use of air deflector.</p>	 <p>Ensure a distance of 100mm between outdoor units, and there are no obstacles at the left and right sides. Keep a distance of 500mm between the unit and the wall (at the rear of unit where sunlight can straightly shine at), check and make sure the use of air deflector.</p>												
		Obstacles in Above	 <p>There shall not be any obstacle at the left and right sides of the outdoor unit. Check and make sure the use of air deflector.</p>	 <p>Ensure a distance of 50mm between outdoor units, and there are no obstacles at the left and right sides of the outdoor unit. Check and ensure the use of the air deflector.</p>											
			<p>Size Table of Model A</p> <table border="1"> <thead> <tr> <th>L</th> <th>A</th> </tr> </thead> <tbody> <tr> <td>$0 < L \leq 1/2H$</td> <td>Minimum 600</td> </tr> <tr> <td>$1/2H < L \leq H$</td> <td>Minimum 1200</td> </tr> </tbody> </table> <p>If $L > H$, block up the unit and make $L < H$</p>	L	A	$0 < L \leq 1/2H$	Minimum 600	$1/2H < L \leq H$	Minimum 1200						
L	A														
$0 < L \leq 1/2H$	Minimum 600														
$1/2H < L \leq H$	Minimum 1200														
<p>Type B</p> 	No Obstacles in Above	 <p>There shall not be any obstacle at the left and right sides of the outdoor unit. Check and make sure the use of air deflector.</p>	 <p>Ensure a distance of 100mm between outdoor units; Do not install 3 or more than 3 units at the left and right sides of the outdoor unit; And there shall not be any obstacles at the left and right side; Check and ensure the use of air deflector.</p>												
				<p>Size Table of Model A</p> <table border="1"> <thead> <tr> <th>L</th> <th>A</th> </tr> </thead> <tbody> <tr> <td>$0 < L \leq 1/2H$</td> <td>Minimum 200</td> </tr> <tr> <td>$1/2H < L \leq H$</td> <td>Minimum 300</td> </tr> </tbody> </table> <p>If $L > H$, block up the unit and make $L < H$</p>	L	A	$0 < L \leq 1/2H$	Minimum 200	$1/2H < L \leq H$	Minimum 300	<table border="1"> <thead> <tr> <th>L</th> <th>A</th> </tr> </thead> <tbody> <tr> <td>$0 < L \leq 1/2H$</td> <td>Minimum 200</td> </tr> <tr> <td>$1/2H < L \leq H$</td> <td>Minimum 350</td> </tr> </tbody> </table> <p>If $L > H$, block up the unit and make $L < H$</p>	L	A	$0 < L \leq 1/2H$	Minimum 200
L	A														
$0 < L \leq 1/2H$	Minimum 200														
$1/2H < L \leq H$	Minimum 300														
L	A														
$0 < L \leq 1/2H$	Minimum 200														
$1/2H < L \leq H$	Minimum 350														

Installation Space (3)

Install in the vertical direction (Maximum 2 Groups)	
<p>Single Vertical Installation</p>  <p>Fill space "A" to avoid intake and exhaust short circuit; do not make condensed water drip from the above unit.</p>	<p>Multiple Vertical Installation</p>  <p>With a distance of more than 50mm between the units, do not install more than three outdoor units. There shall not be any obstacles at both sides of the unit; fill space "A" to avoid intake and exhaust short circuit; do not make condensed water drip from the above outdoor unit.</p>
 <p>Fill space "A" to avoid intake and exhaust short circuit; do not make condensed water drip from the above unit.</p>	 <p>With a distance of more than 50mm between the units, do not install more than three outdoor units. There shall not be any obstacles at both sides of the unit; fill space "A" to avoid intake and exhaust short circuit; do not make condensed water drip from the above outdoor unit.</p>

Installation Space (4)

4.3 Design Selection Guide

4.3.1 Unit Capacity in Rated Working Condition

See Chapter 2 Comprehensive Parameter

4.3.2 Factors to Be Considered in Design Selection

- 1) Capacity Correction
- 2) Temperature Correction
- 3) Piping Length Correction
- 4) Heating Capacity Correction in Defrost Operation

4.3.3 Indoor and Outdoor Unit Capacity Distribution Rate and Online Precautions

Model		AVW-28	AVW-34	AVW-48
Calculation Method of Capacity Distribution Rate		Distribution Rate = Indoor Unit Nominal Cooling Capacity / Outdoor Unit Nominal Cooling Capacity		
Range of Distribution Rate	1 Indoor unit	Allowed	Allowed	Allowed
	2 Indoor unit	85 ~ 125%	85 ~ 125%	85 ~ 120%
	3 Indoor unit	85 ~ 125%	85 ~ 125%	85 ~ 120%
	4 Indoor unit	Allowed	85 ~ 125%	85 ~ 120%
Number of connected indoor units		3 (4)*	4 (5)*	4 (5)*
Refrigerant piping conditions	Actual length of refrigerant pipes	25	25	25
	Maximum total pipe length	30	40	40
	Pipe length from the first branch to the farthest indoor unit	10	15	15
	Pipe length from branch pipe to indoor unit	5	5	5
	Height Difference of indoor and outdoor unit	20	20	20
	Piping Method	Flared Joint Connection		
	Outdoor Unit Piping Dimension	φ 15.88/ φ 9.53		
	Branch Pipe Model	HTQ-052F		

*: Max. Number of Connectable I.U. of 5 can be obtained as the following requirements are met for E Series Outdoor Units.

		Connection Ratio
		≤125%
Number of Connectable I.U.	(1)Max. Number of Connectable I.U. of 3 for Model 28; (2)Max. Number of Connectable I.U. of 4 for Model 34/43	(1)Models 05/07/09 of compact cassette type indoor units are forbidden, or the capacity of these units are calculated as two times declared data in case of connection.
	(1)Max. Number of Connectable I.U. of 4 for Model 28 (2)Max. Number of Connectable I.U. of 5 for Model 34/43	(1)No more than 1 unit is allowed for Models 07/09 of wall type indoor units, or the capacity of these units in addition to 1 unit are calculated as two times declared data in case of more than 1 units connection. (2)Models 05/07/09 of compact cassette type indoor units are forbidden, or the capacity of these units are calculated as two times declared data in case of connection.

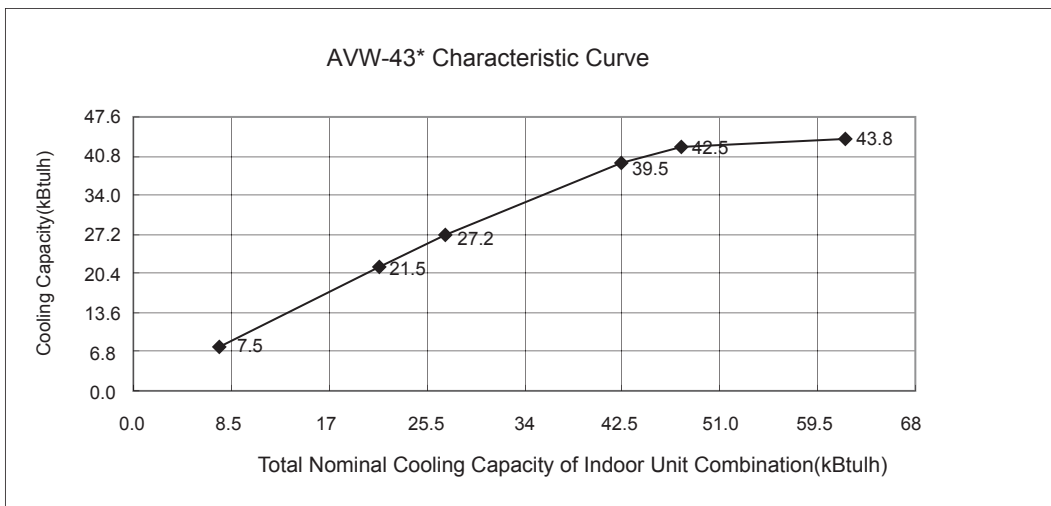
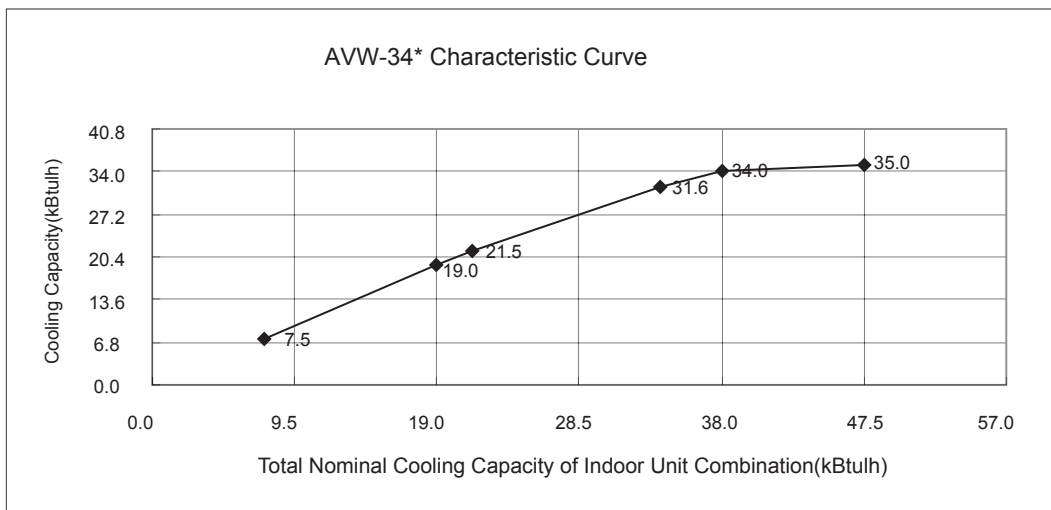
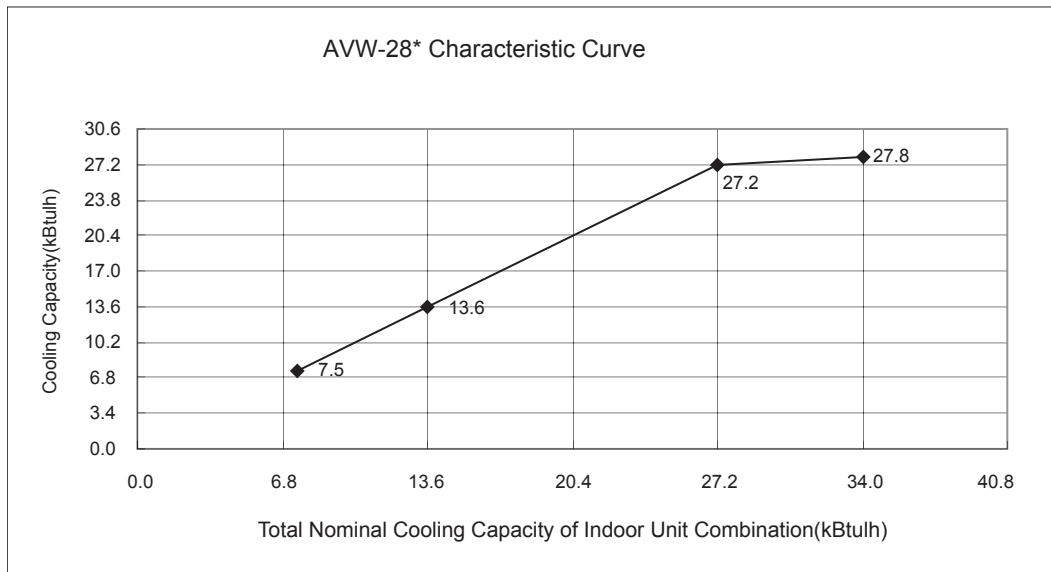
One to One application can be obtained as the following requirements are met for E Series Outdoor Units.

Model	Connection Ratio	1		2		3	
		Indoor Unit Type	The Additional Refrigerant Need to be Reduced	Indoor Unit Type	The Additional Refrigerant Need to be Reduced	Indoor Unit Type	The Additional Refrigerant Need to be Reduced
28	100%	Duct Type	200g				
34		Ceiling & Floor Type	150g	Duct Type	150g	2-Way Cassette Type	150g
43							

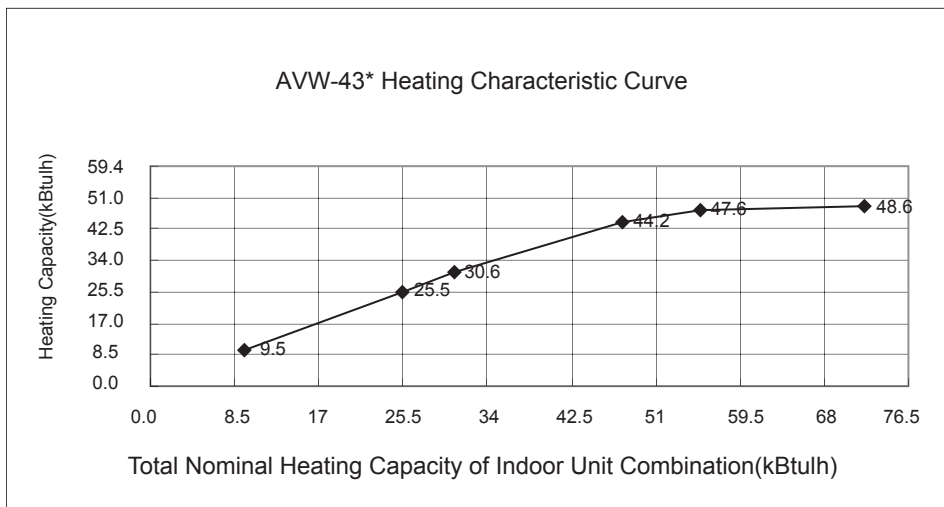
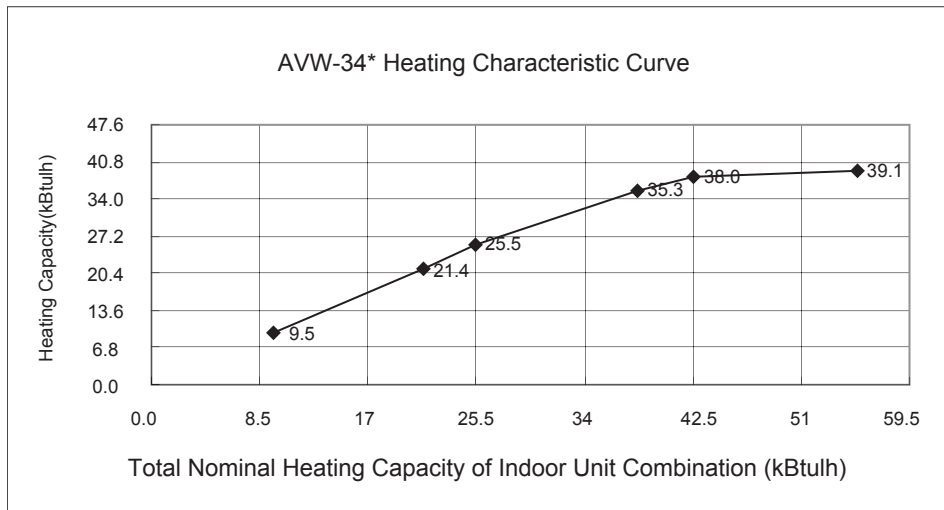
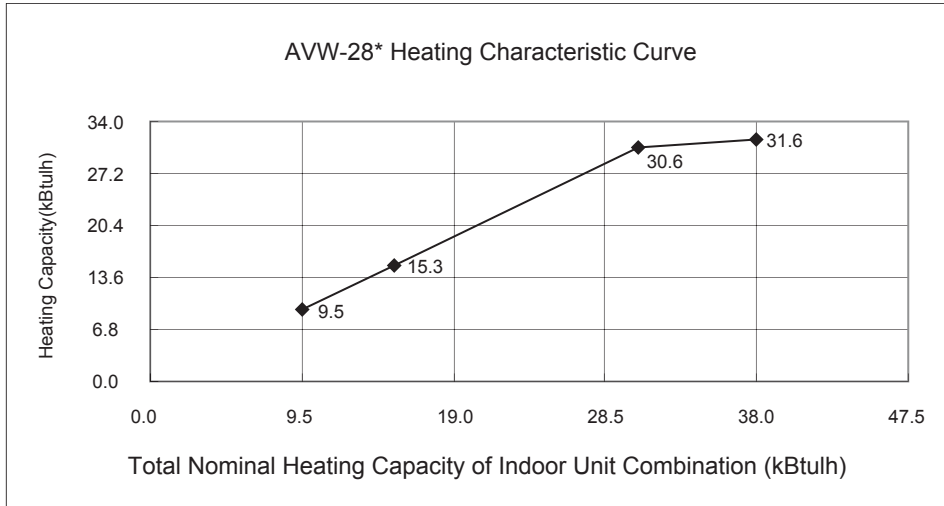
NOTE:①The refrigerant do not need to be adjusted for the indoor units that are not mentioned.

4.4 Outdoor Unit Capacity Characteristic Curve

4.4.1 Cooling Capacity Characteristics Curve



4.4.2 Heating Capacity Characteristic Curve



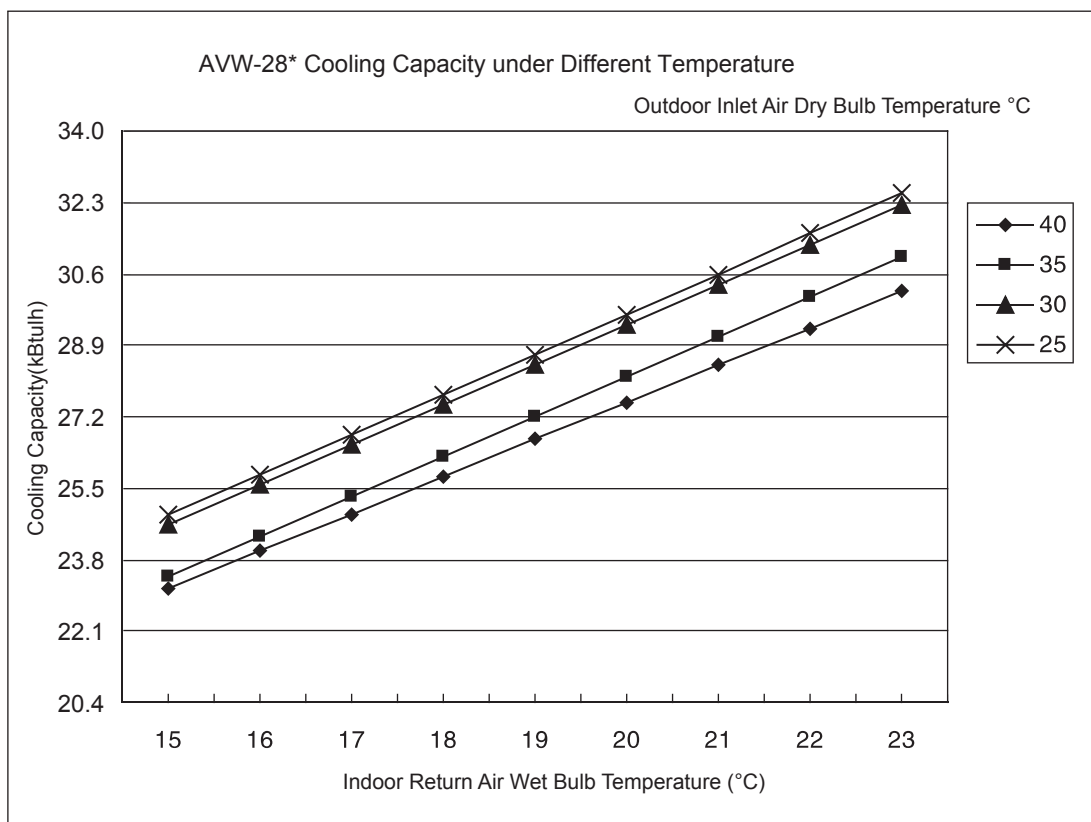
4.5 Cooling Temperature Correction Factor

4.5.1 AVW-28*

1) Cooling Temperature Correction Factor

AVW-28* Cooling Temperature Correction Factor Indoor									
Return Air Wet Bulb Temperature(°C) \ Outdoor Inlet Air Dry Bulb Temperature(°C)	15	16	17	18	19	20	21	22	23
40	0.85	0.88	0.92	0.95	0.98	1.01	1.05	1.08	1.11
35	0.86	0.90	0.93	0.97	1.00	1.04	1.07	1.11	1.14
30	0.91	0.94	0.98	1.01	1.05	1.08	1.12	1.15	1.19
25	0.92	0.95	0.99	1.02	1.06	1.09	1.13	1.16	1.20

2) Cooling Capacity under Different Temperatures

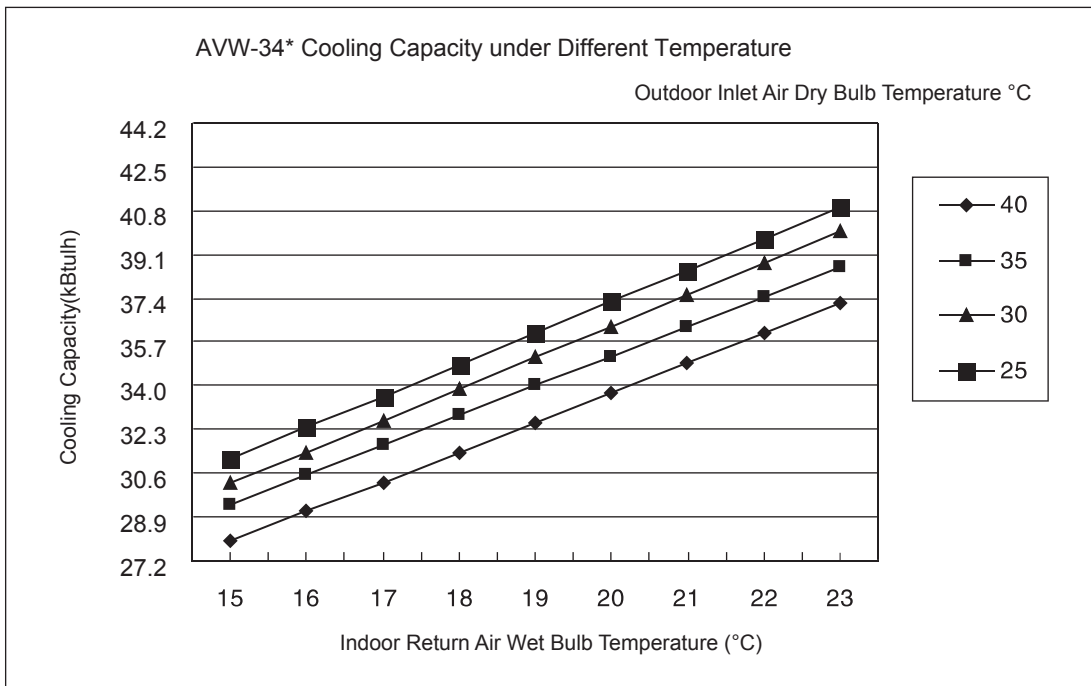


4.5.2 AVW-34*

1) Cooling Temperature Correction Factor

AVW-34* Cooling Temperature Correction Factor Indoor Return									
Air Wet Bulb Temperature(°C)	15	16	17	18	19	20	21	22	23
Outdoor Inlet Air Dry Bulb Temperature(°C)									
40	0.82	0.86	0.89	0.92	0.96	0.99	1.03	1.06	1.09
35	0.86	0.90	0.93	0.97	1.00	1.03	1.07	1.10	1.14
30	0.89	0.92	0.96	1.00	1.03	1.07	1.10	1.14	1.18
25	0.92	0.95	0.99	1.02	1.06	1.10	1.13	1.17	1.20

2) Cooling Capacity under Different Temperatures

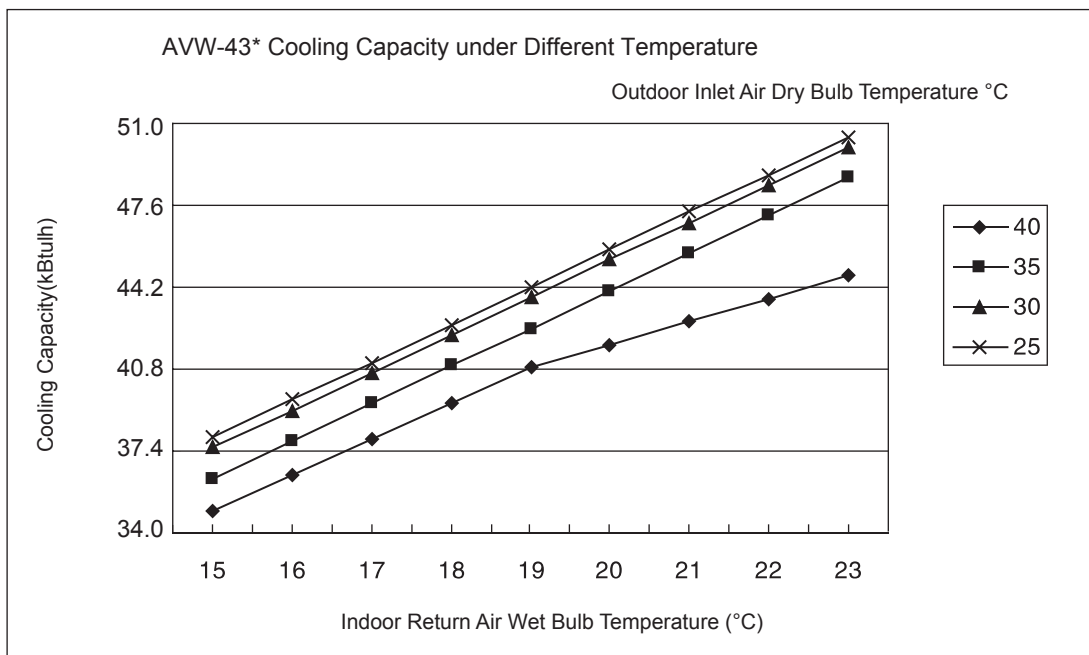


4.5.3 AVW-43*

1) Cooling Temperature Correction Factor

AVW-43* Cooling Temperature Correction Factor Indoor Return Air Wet									
Bulb Temperature(°C) Outdoor Inlet Air Dry Bulb Temperature(°C)	15	16	17	18	19	20	21	22	23
40	0.82	0.86	0.89	0.93	0.96	0.98	1.01	1.03	1.05
35	0.85	0.89	0.93	0.96	1.00	1.04	1.07	1.11	1.15
30	0.88	0.92	0.96	0.99	1.03	1.07	1.10	1.14	1.18
25	0.89	0.93	0.97	1.00	1.04	1.08	1.11	1.15	1.19

2) Cooling Capacity under Different Temperatures



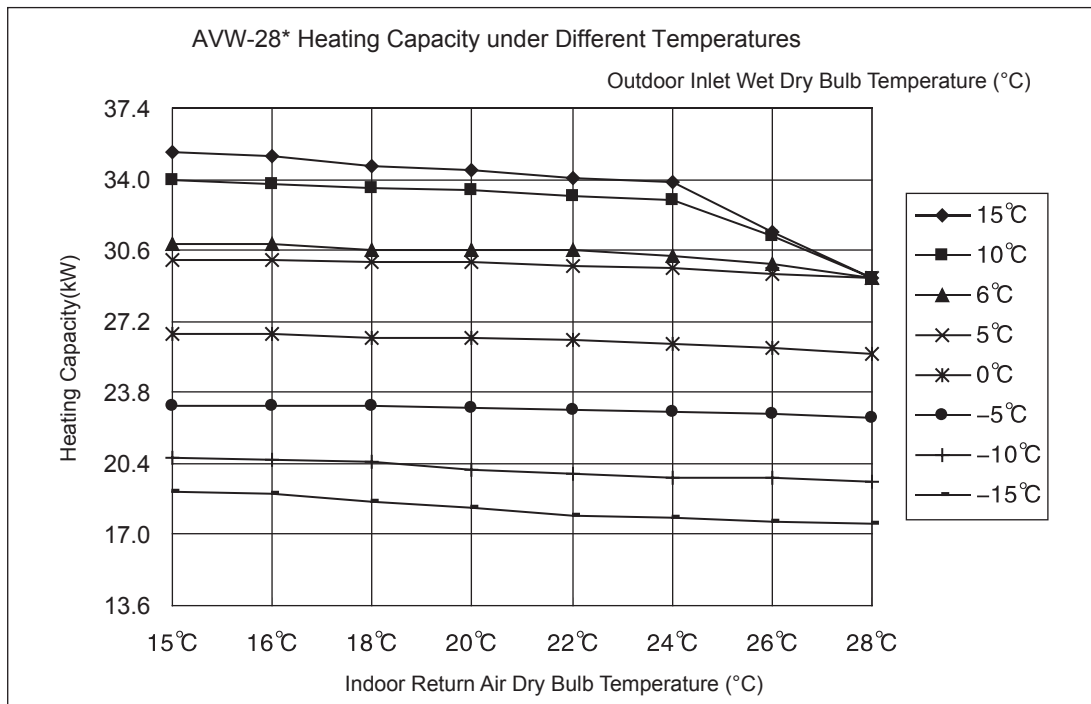
4.6 Heating Temperature Correction Factor

4.6.1 AVW-28*

1) Heating Temperature Correction Factor

AVW-28* Heating Temperature Correction Factor Indoor								
Return Air Dry Bulb Temperature (°C) \ Outdoor Inlet Air Wet Bulb Temperature (°C)	15°C	16°C	18°C	20°C	22°C	24°C	26°C	28°C
15°C	1.15	1.15	1.13	1.13	1.11	1.11	1.03	0.96
10°C	1.11	1.10	1.10	1.09	1.09	1.08	1.02	0.96
6°C	1.01	1.01	1.00	1.00	1.00	0.99	0.98	0.96
5°C	0.99	0.99	0.98	0.98	0.98	0.97	0.96	0.96
0°C	0.87	0.87	0.86	0.86	0.86	0.85	0.85	0.84
-5°C	0.76	0.76	0.76	0.75	0.75	0.75	0.74	0.74
-10°C	0.68	0.67	0.67	0.66	0.65	0.64	0.64	0.64
-15°C	0.62	0.62	0.61	0.60	0.59	0.58	0.58	0.57

2) Heating Capacity under Different Temperatures

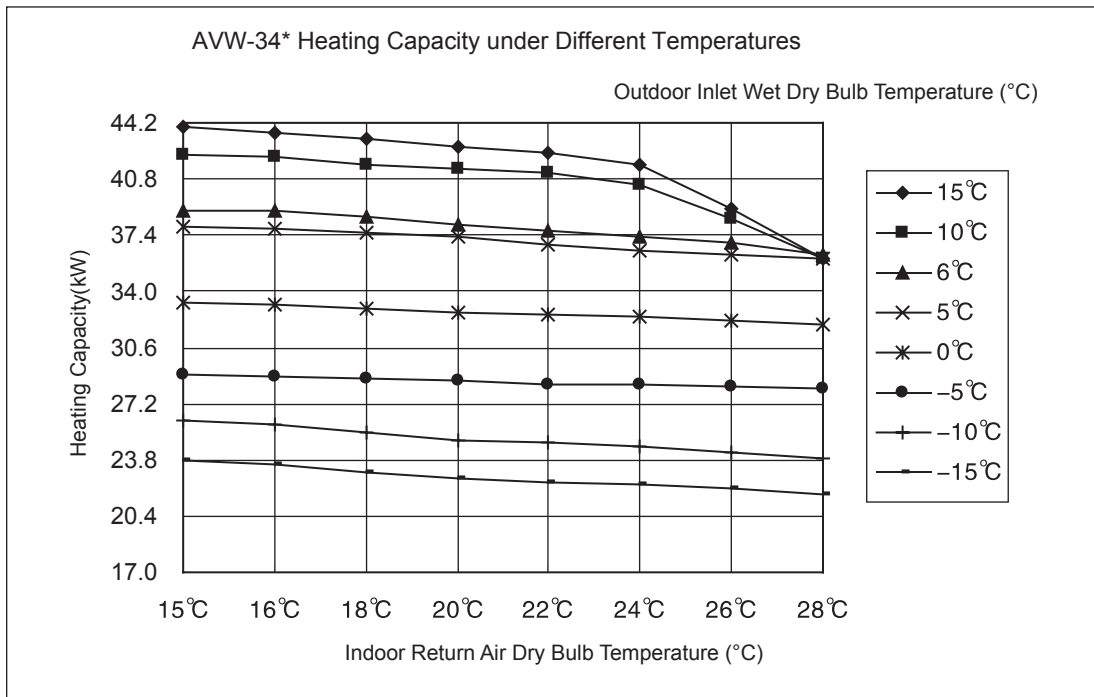


4.6.2 AVW-34*

1) Heating Temperature Correction Factor

AVW-34*, Heating Temperature Correction Factor Indoor								
Return Air Dry Bulb Temperature (°C) \ Outdoor Inlet Air Wet Bulb Temperature (°C)	15°C	16°C	18°C	20°C	22°C	24°C	26°C	28°C
15°C	1.15	1.15	1.13	1.12	1.11	1.09	1.02	0.95
10°C	1.11	1.11	1.09	1.09	1.08	1.06	1.01	0.95
6°C	1.02	1.02	1.01	1.00	0.99	0.98	0.97	0.95
5°C	0.99	0.99	0.99	0.98	0.97	0.96	0.95	0.95
0°C	0.87	0.87	0.87	0.86	0.86	0.85	0.85	0.84
-5°C	0.76	0.76	0.75	0.75	0.75	0.75	0.74	0.74
-10°C	0.69	0.68	0.67	0.66	0.65	0.65	0.64	0.63
-15°C	0.62	0.62	0.61	0.60	0.59	0.59	0.58	0.57

2) Heating Capacity under Different Temperatures

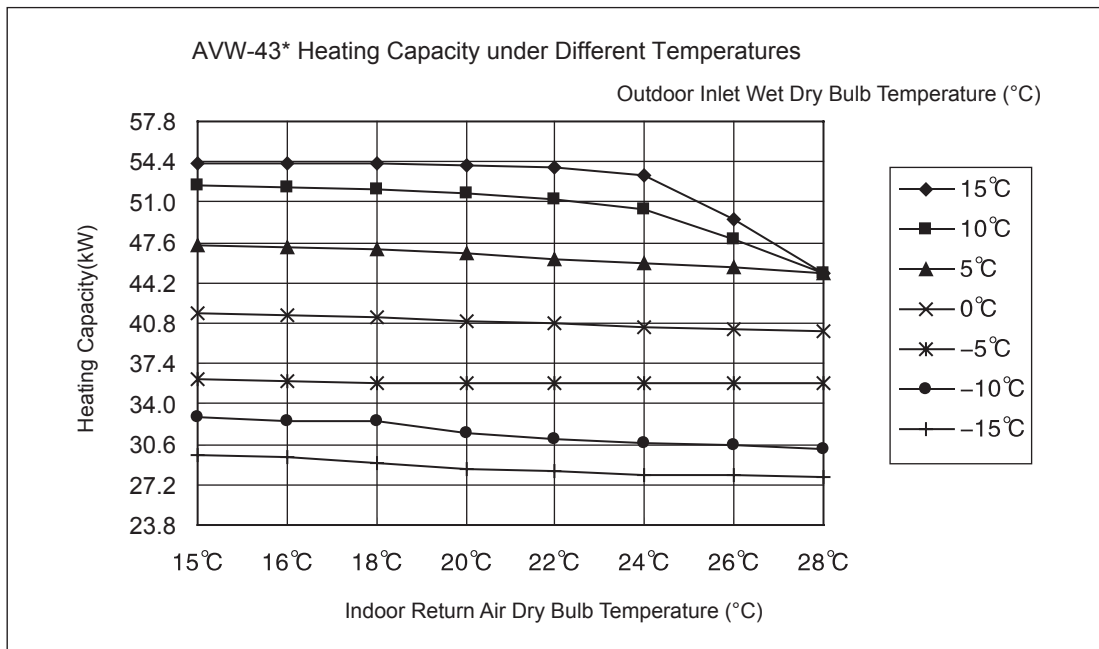


4.6.3 AVW-43*

1) Heating Temperature Correction Factor

AVW-43* Heating Temperature Correction Factor								
Indoor Return Air Dry Bulb Temperature (°C) \ Outdoor Inlet Air Wet Bulb Temperature (°C)	15°C	16°C	18°C	20°C	22°C	24°C	26°C	28°C
15°C	1.14	1.14	1.14	1.14	1.13	1.12	1.04	0.94
10°C	1.10	1.10	1.09	1.09	1.07	1.06	1.01	0.94
6°C	1.01	1.01	1.01	1.00	0.99	0.98	0.97	0.94
5°C	0.99	0.99	0.99	0.98	0.97	0.96	0.95	0.94
0°C	0.87	0.87	0.87	0.86	0.86	0.85	0.85	0.84
-5°C	0.76	0.75	0.75	0.75	0.75	0.75	0.75	0.75
-10°C	0.69	0.69	0.68	0.66	0.65	0.65	0.64	0.63
-15°C	0.62	0.62	0.61	0.60	0.59	0.59	0.59	0.58

2) Heating Capacity under Different Temperatures



4.7 Piping Length Correction Factor

<Cooling>

Correct Factor Based on Cooling Capacity of Pipe Length

Cooling capacity is corrected according to the following formula.

$$CCA = CC \times F$$

CCA: Corrected Actual Cooling Capacity (kW)

CC: Cooling Capacity on Performance Parameter Table (kW)

F: Equivalent Pipe Length Correction Factor

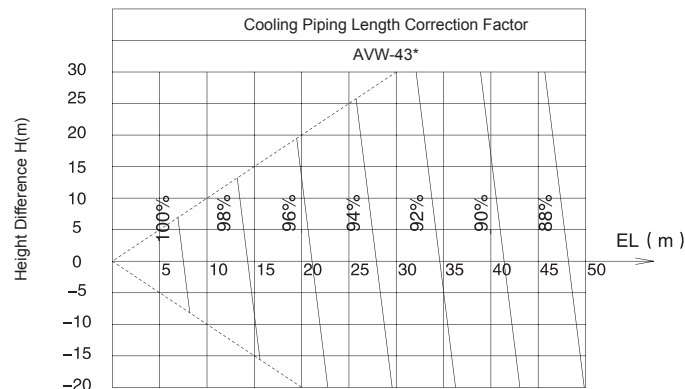
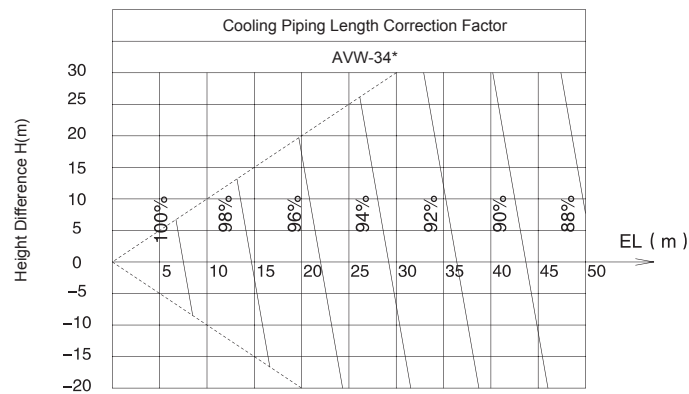
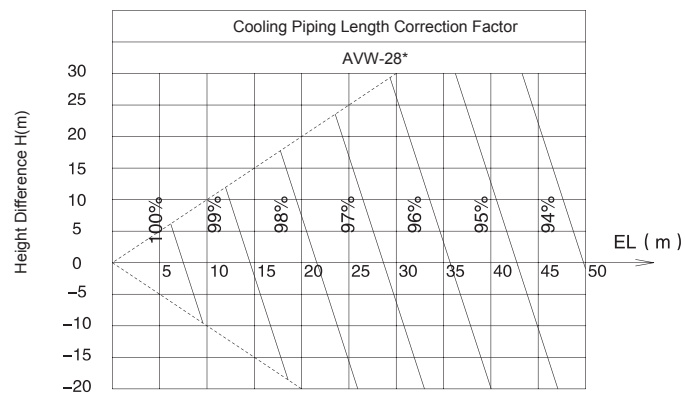
Correction factor is shown below

Equivalent Pipe Length Calculation of Piping Accessories:

A 90-degree elbow is equivalent to 0.5 meters.

A 180-degree elbow is equivalent to 1.5 meters.

A branch pipe joint is equivalent to 0.5 m.



<Heating>

Correct Factor Based on Heating Capacity of Pipe Length.

Heating capacity is corrected according to the following formula.

$$HCA=HCXF$$

HCA: Corrected Actual Heating Capacity (kW)

HC: Heating Capacity on Performance Parameter Table (kW)

F: Equivalent Pipe Length Correction Factor

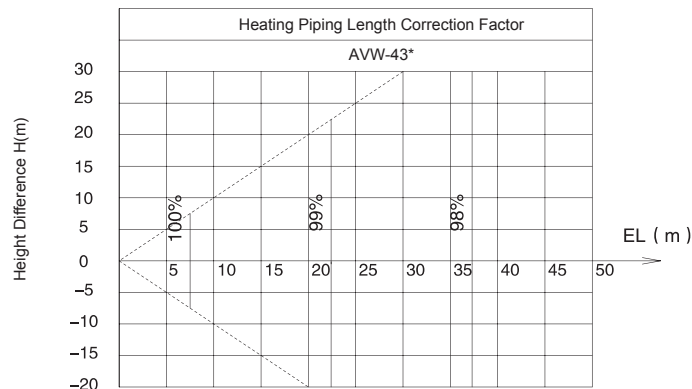
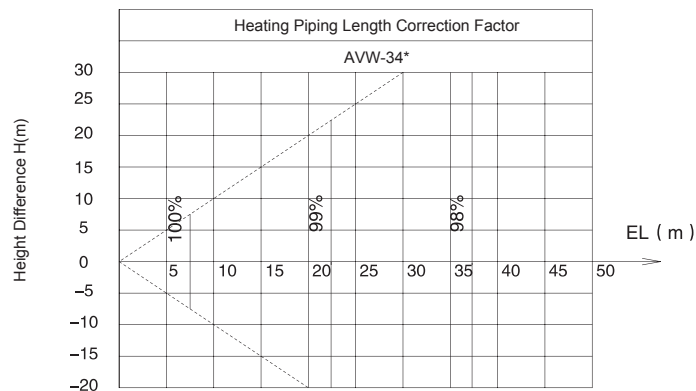
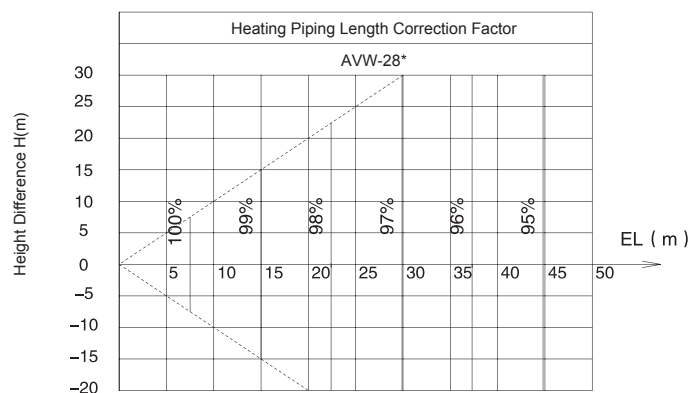
Correction factor is shown below

Equivalent Pipe Length Calculation of Piping Accessories:

A 90-degree elbow is equivalent to 0.5 meters.

A 180-degree elbow is equivalent to 1.5 meters.

A branch pipe joint is equivalent to 0.5 m.



4.8 Heating Capacity Correction Factor in Defrost Operation

The heating capacity of unit on the above table does not take frosting or defrosting operation into account.

Taking into account frosting or defrosting operation, the unit heating capacity is corrected according to the following formula.

Heating Capacity Correction Value= Correction Coefficient × Heating Capacity

Outdoor Dry Bulb Temperature (°C DB) (Relative Humidity 85% RH)	-7	-5	-3	0	3	5	7
Correction Factor	0.95	0.93	0.88	0.85	0.87	0.90	1.0

Note: The correction coefficient does not apply to unit operation in exceptional circumstances, such as in snow or in mode conversion process.

5. Electrical Parameter

Outdoor Unit

50Hz

Model	Unit Main Power			Applicable Voltage		STC	Cooling Operation		Heating Operation	
	VOL	PH	HZ	Maximum	Minimum		RLA	IPT	RAL	IPT
AVW-28UCSB	220~240	1	50Hz	264	198	1	12.6	2.73	12.2	2.7
AVW-34UCSB							14.9	3.28	14.7	3.15
AVW-43UCSB							19.6	4.5	19.6	4.15

50Hz

Model	Unit Main Power			Applicable Voltage		STC	ELB (Earth Leakage Breaker)		MCA
	VOL	PH	HZ	Maximum	Minimum		Rated Current(A)	Sensitivity(mA)	Maximum Operating Current (A)
AVW-28UCSB	220~240	1	50Hz	264	198	1	30	30	19.5
AVW-34UCSB							40	30	27.5
AVW-43UCSB							40	30	31.5

50Hz

Model	Unit Main Power			Applicable Voltage		STC	Cooling Operation		Heating Operation	
	VOL	PH	HZ	Maximum	Minimum		RLA	IPT	RAL	IPT
AVW-43UESB	380~415	3	50Hz	456	342	1	6.43	3.81	6.21	3.68

50Hz

Model	Unit Main Power			Applicable Voltage		STC	ELB (Earth Leakage Breaker)		MCA
	VOL	PH	HZ	Maximum	Minimum		Rated Current(A)	Sensitivity(mA)	Maximum Operating Current (A)
AVW-43UESB	380~415	3	50Hz	456	342	1	20	30	16.2

VOL: Rated Supply Voltage (V) PH: Phase (ϕ) Hz: Frequency (Hz) STC: Starting Current RLA: Rated Load Current (A)

IPT: Rated Input Power (kW) ELB: Earth Leakage Breaker TOCA: Maximum Operating Current (A) RNC: Operating Current (A)

1. The above parameters are tested in case that indoor and outdoor unit distribution rate is 100%.
2. The above parameters are tested in case that the equivalent pipe length is 7.5m, and the pipe height difference is 0 meter.
3. Proposed Power Distribution is 120% of Power Rating.

60Hz

Model	Unit Main Power			Applicable Voltage		STC	Cooling Operation		Heating Operation	
	VOL	PH	HZ	Maximum	Minimum		RLA	IPT	RAL	IPT
AVW-28U2SB	220	1	60Hz	242	198	1	12.6	2.73	12.2	2.7
AVW-34U2SB						1	14.9	3.28	14.7	3.15
AVW-43U2SB						1	19.6	4.5	19.6	4.15

60Hz

Model	Unit Main Power			Applicable Voltage		STC	ELB(Earth Leakage Breaker)		MCA
	VOL	PH	HZ	Maximum	Minimum		Rated Current(A)	Sensitivity(mA)	Maximum Operating Current (A)
AVW-28U2SB	220	1	60Hz	242	198	1	30	30	19.5
AVW-34U2SB						1	40	30	27.5
AVW-43U2SB						1	40	30	31.5

60Hz

Model	Unit Main Power			Applicable Voltage		STC	Cooling Operation		Heating Operation	
	VOL	PH	HZ	Maximum	Minimum		RLA	IPT	RAL	IPT
AVW-43U7SB	380	3	60Hz	418	342	1	6.43	3.81	6.21	3.68

60Hz

Model	Unit Main Power			Applicable Voltage		STC	ELB (Earth Leakage Breaker)		MCA
	VOL	PH	HZ	Maximum	Minimum		Rated Current(A)	Sensitivity(mA)	Maximum Operating Current (A)
AVW-43U7SB	380	3	60Hz	418	342	1	20	30	16.2

VOL: Rated Supply Voltage (V) PH: Phase (φ) Hz: Frequency (Hz) STC: Starting Current RLA: Rated Load Current (A)
 IPT: Rated Input Power (kW) ELB: Earth Leakage Breaker TOCA: Maximum Operating Current (A) RNC: Operating Current (A)

1. The above parameters are tested in case that indoor and outdoor unit distribution rate is 100%.
2. The above parameters are tested in case that the equivalent pipe length is 7.5m, and the pipe height difference is 0 meter.
3. Proposed Power Distribution is 120% of Power Rating.

6. Operating Range

Power Supply

Operating Voltage: 90-110% of Rated Voltage

Unbalanced Phase: Measured each phase voltage deviation at outdoor unit main power supply line end is within 3%.

Starting Voltage: Higher than 85% of Rated Voltage.

Temperature Range

Temperature range is shown as the table below

	Cooling Operation	Heating Operation
Indoor Temperature: Minimum	21°CDB/15°CWB	15°CDB
Maximum	32°CDB/23°CWB	30°CDB
Outdoor Temperature: Minimum	10°CDB	-15°CWB
Maximum	43°CDB	15°CWB

7. Components Parameters

Outdoor unit heat exchanger and fan

Model		AVW-28*	AVW-34*	AVW-43*		
Heat exchanger type	Heat exchanger type	—	Multiple Cross-Flow Finned Tube			
	Pipeline	Material	Internal Thread Copper Pipe			
		Outside diameter	mm	Φ 7	Φ 7	Φ 7
		Rows	—	2	2.6	2.6
		Quantity	—	38	57	57
	Fin	Material	—	Aluminum		
		Spacing	mm	1.9	1.9	1.9
	Maximum Operating Pressure	Mpa	4.15	4.15	4.15	
Maximum Frontal Area	m ²	0.77	0.77	0.77		
Quantity	—	1	1	1		
Fan	Fan	Type	3 Vane-Axial Fan			
		Outer Diameter	mm	544	544	544
		Speed	rpm	505	700	780
		Nominal Fan Speed	m ³ /h	49.5	69	78
	Fan Motor	Type	—	Brushless DC Motor		
		Starting Mode	—	Start Simultaneously		
		Nominal Output Power	W	51	138	138
		Quantity	—	1		
		Insulation Class	—	E		

Detailed Parameters of Compressor

Compressor Model		ATL232SDNC9AU	TNB306FPGMC	E-500HHD	
Type		—	Rotary Compressor	Rotary Compressor	Scrow Compressor
Airtight Pressure	Discharge Pressure	MPa	4.15	4.15	4.20
	Suction Pressure	MPa	2.21	2.21	2.21
Compressor Motor	Type	—	PMSM (Permanent Magnet Synchronous Motors)	PMSM (Permanent Magnet Synchronous Motors)	PMSM (Permanent Magnet Synchronous Motors)
	Starting Mode	—	Start Simultaneously	Start Simultaneously	Soft Start
	Technology	—	DC Inverter	DC Inverter	DC Inverter
	Insulation Class	—	E	E	E
Refrigeration Oil	Trademark	—	68HES-H	FV50S	FVC68D
	Charge Volume	ml	880 ± 20ml	870ml	1200ml

8. Control System

8.1 System Control

8.1.1 Indoor Installation of Remote Controller

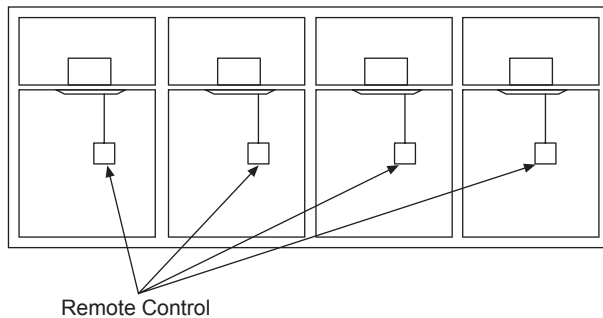
Multiple-Unit Controlling Independent Operating System Simultaneously

“One-to-One” Control – one indoor unit is controlled by one remote control

Control Mode	One-to-One
Operation Mode	Independent
(1) ON / OFF	Can
(2) Operation Mode Setting	Can*
(3) Indoor Temperature Setting	Can
(4) Speed Setting	Can
(5) Time Setting	Can
(6) Timer ON / OFF Setting	Can
(7) Operation Display	Can
(8) Alarm Display	Can
(9) Self-test Function	Can
(10) Test Mode	Can

*:Can not perform cooling and heating operation at the same time

Independent Control

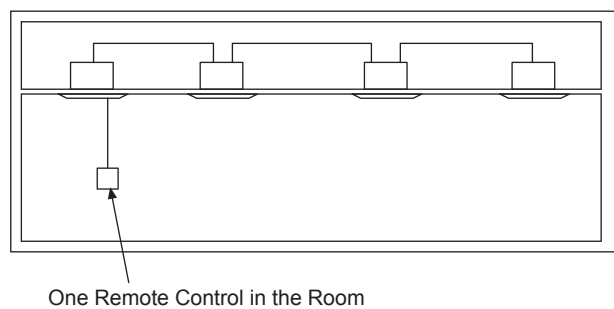


Multiple-Unit Centralized Control of Operating System

One remote control can control up to 16 indoor units; this system is suitable for use in hospitals, hotel lounges, office buildings and other occasions. You can easily turn on and turn off all indoor units with one remote control.

Control Mode	One Remote Control
Operation Mode	Group as a Unit
(1) ON / OFF	Can
(2) Operation Mode Setting	Can
(3) Indoor Temperature Setting	Can
(4) Speed Setting	Can
(5) Time Setting	Can
(6) Timer ON / OFF Setting	Can
(7) Operation Display	Can
(8) Alarm Display	Can
(9) Self-test Function	Can
(10) Test Mode	Can

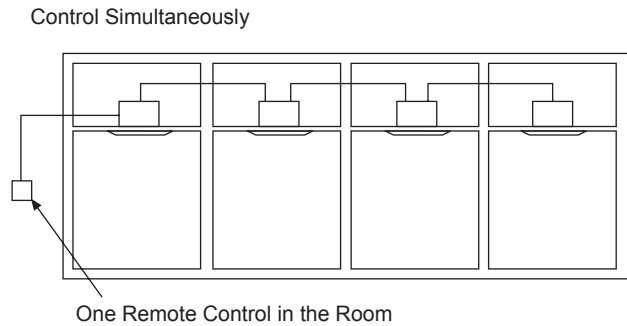
Centralized Control



8.1.2 Remote Centralized Control

A remote control can be installed in a position far away from the field, and control up to 16 indoor units simultaneously. This system is particularly suitable for use in an open air-conditioning place, such as hotel lounge, hospital, office building etc. Using one remote control can easily turn on and off the unit group, with a relatively quick operation.

Control Mode	Control in Group
Operation Mode	Independent
(1) ON / OFF	Can
(2) Operation Mode Setting	Can
(3) Indoor Temperature Setting	Can
(4) Speed Setting	Can
(5) Time Setting	Can
(6) Timer ON / OFF Setting	Can
(7) Operation Display	Can
(8) Alarm Display	Can
(9) Self-test Function	Can
(10) Test Mode	Can



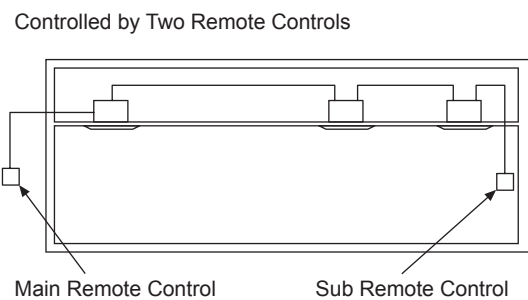
8.1.3 Indoor Installation of Controller / Remote Control

Control up to 16 indoor units with main remote control and sub remote control.

Operate the System Simultaneously

Two remote controls are used to control up to 16 indoor units, one remote control is installed in the room, and the other in the central control room. This system is very suitable for use in an open air conditioning place, such as hotel lounge, restaurant etc.

Control Mode	Optional Remote Control Used in Room	Optional Remote Control Used in Distance
Operation Mode	Of One Group	Of One Group
(1) ON / OFF	Can	Can
(2) Operation Mode Setting	Can	Can*
(3) Indoor Temperature Setting	Can	Can
(4) Speed Setting	Can	Can
(5) Time Setting	Can	Can
(6) Timer ON / OFF Setting	Can	Can
(7) Operation Display	Can	Can
(8) Alarm Display	Can	Can
(9) Self-test Function	Can	Can
(10) Test Mode	Can	Can



Note:

In this system, the remote control which is set last has priority of the two.

8.2 Protection and Control Device

• Compressor Protection

High Pressure Switch: Action will be activated when compressor discharge pressure exceeds the set value, and the compressor stops running.

• Fan Motor Protection

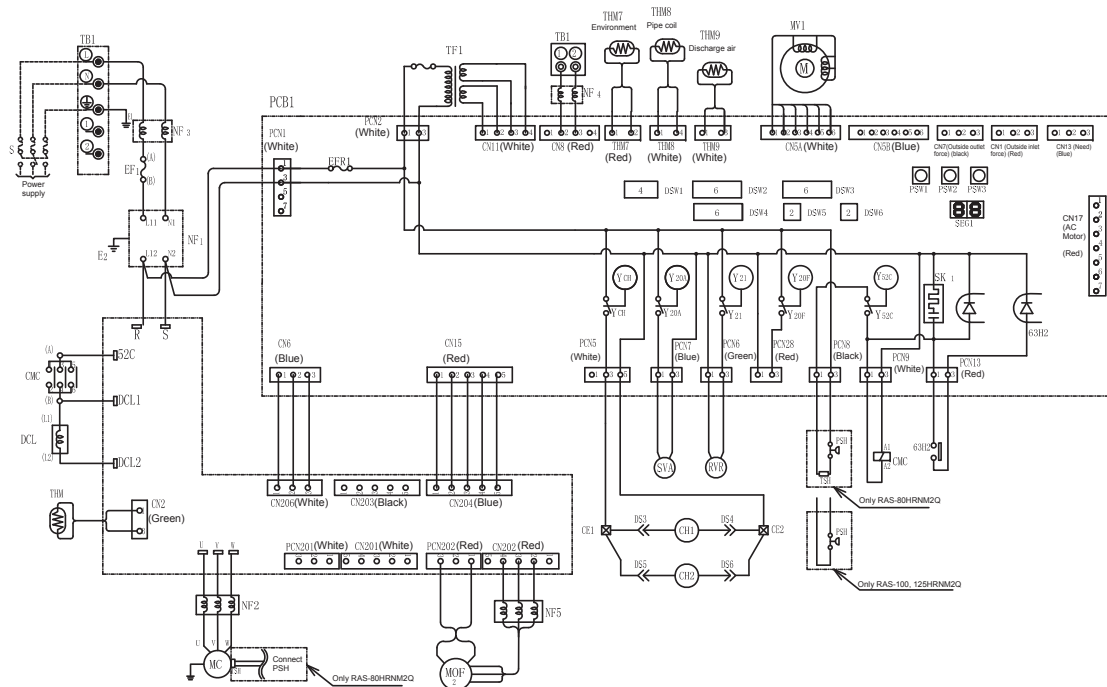
The motor is de-energized and stop running when the temperature of thermistor reaches the set value. Further, the limit will be released when the temperature becomes low.

Safety and Control Device Setting

Model			AVW-28UC(2)SB	AVW-34UC(2)SB	AVW-43UC(2)SB AVW-43UE(7)SB
Compressor	High Pressure Switch		Automatically Reset, Not Adjustable		
	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}
For Control	Control Pressure Switch		Automatically Reset, Not Adjustable		
	Cut Out	MPa	2.85 ± 0.1	2.85 ± 0.1	2.85 ± 0.1
	Cut In	MPa	3.6 ⁰ _{-0.15}	3.6 ⁰ _{-0.15}	3.6 ⁰ _{-0.15}
Fuse Fuse Capacity	A	40	50	50	
Timer	CCP Timer Set Time	min.	3	3	3
Condenser Fan	Condenser Fan Motor Built-in Thermostat		Automatically Reset, Not Adjustable		
	Cut Out	°C	120 ± 5	120 ± 5	120 ± 5
	Cut In	°C	110 ~ 60	110 ~ 60	110 ~ 60
Control Circuit	Fuse Capacity on PCB1	A	5	5	5

ELECTRICAL WIRING DIAGRAM (MODELS: AVW-28~43U(C/2)SB)

Perform electrical operation or regular check one minute later after cutting off the main power of the indoor and outdoor unit.



Service Running Service running of [1]-[2] of the following table can be achieved by DSW1, PSW1 on operating base plate. For the set content of each DSW, see Table 1. Pay special attention to the right issues in running.

When operating DIP switch on the substrate, do not touch other electrical components.
Do not dismantle the service cover in the test run of outdoor unit.
DIP of DSW1 must be in the OFF position when test run is complete.

	Setting method	Operation content	Precautions
1 Test run	<ul style="list-style-type: none"> •DIP setting in operation Refrigeration: 2 of DSW1 is set on the OFF side. Heating: 2 of DSW1 is set at ON side. Starting of test run 1 of DSW1 is set at ON side, running start after counting to 20 seconds. 	<ul style="list-style-type: none"> •After setting of test run of outdoor unit, the indoor unit automatically starts running. •DSW1 of wired remote control and outdoor unit can both the control ON/OFF operation. •Running state: continue to do two hours Therm OFF running. 	<ul style="list-style-type: none"> •Note: Indoor unit will also operate under impact of test run of outdoor unit. •Multiple indoor units connected to a wired controller will run in test run of outdoor unit, therefore units that need not operate should cut off the power supply. •Wired controller test run does not need to do the setting.
2 Manual defrost	<ul style="list-style-type: none"> •manual defrost starts In heating operation, press PSW1 continuously for more than 3 seconds, and then defrosting starts. •Manual defrost ends In defrosting operation, press continuously PSW1 for more than 3 seconds, then defrost ends. In defrost operation defrost ends after the frost has been cleared. 	<ul style="list-style-type: none"> •Defrost operation which has nothing to do with the presence or absence of frost, and has nothing to do with the heating operation time •Temperature of the outdoor heat exchanger is more than 10℃, high pressure is higher, Therm OFF, does not enter the defrosting. 	<ul style="list-style-type: none"> •Do not frequently perform defrost operation.

Note in transmission circuit wiring
 [G at the outdoor terminal block is mistakenly connected to 220V, the substrate will be burned, so the terminal block [G must not be connected to the 220V.

Table 1 DSW (PCB1) is set (factory) (Table below ■ side indicates position of DIP)

DSW1 (For test run)	DSW2 (Function selection)	DSW3 (Outdoor capacity setting)		
ON OFF	ON OFF	AVW-28UC(D)(2)SB	AVW-34UC(D)(2)SB	AVW-43UC(D)(2)SB
ON OFF	ON OFF	ON OFF	ON OFF	ON OFF
DSW4 (Refrigerant system settings)		DSW5	DSW6	
ON OFF		ON OFF	Factory	
Refrigerant system can be set to 0-63		ON OFF	ON OFF	

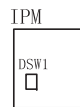
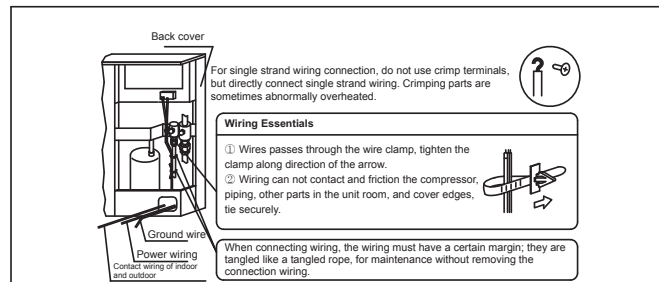
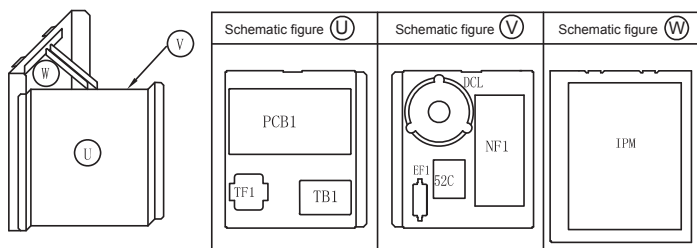


Table 2 Setting of DSW (IPM)

DSW1 (IPM)	
ON	1 When set in ON side, the current check function will be masked. Therefore it must be reset after assembly.
OFF	



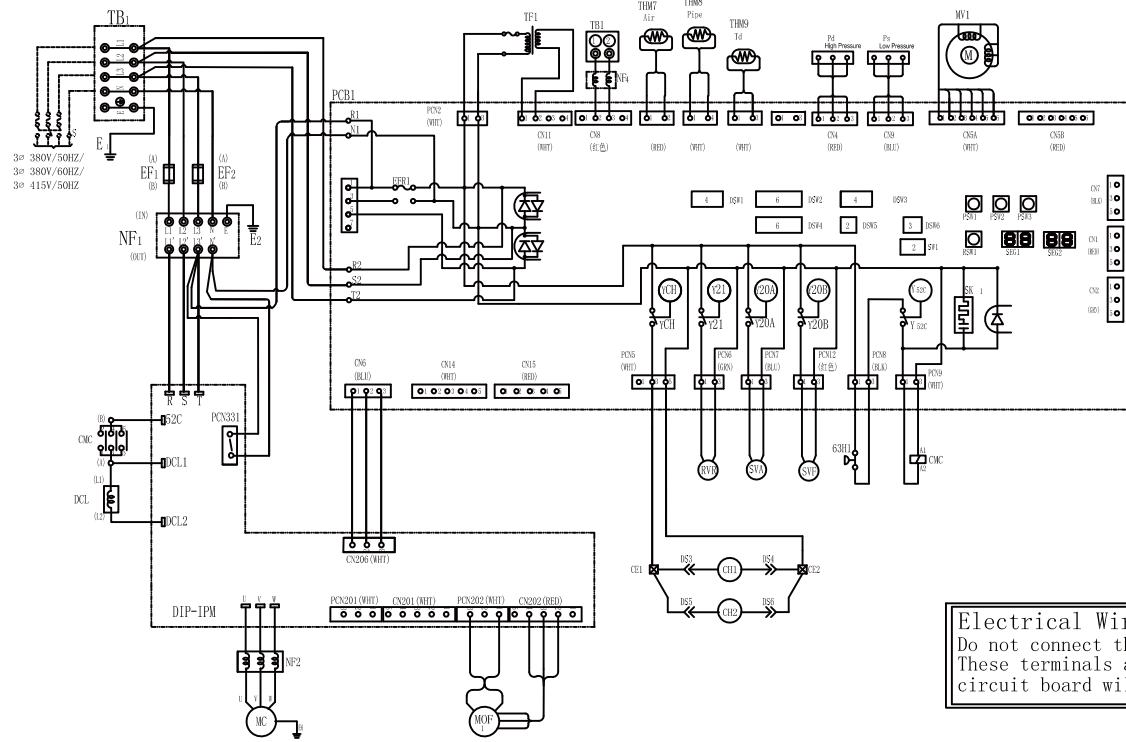
Mark	Name	Remarks
MC	Compressor	
MOF2	Fan motor	
EF1	Fuse	
CMC	AC contactor	
RVR	Reversing valve	
MV1	Electronic expansion valve	
SVA	Hot gas bypass valve	
PSH	Pressure switch	
TSH	Temperature protection switch	
63H2	The high-voltage control switch	
TB1	Terminal Board	
TF1	Transformer	
PCB1	Base plate	
EFR1	Fuse	DC wire coil
Y20C	Auxiliary relay (Compressor, for AC contactor)	DC wire coil
Y21	Auxiliary relay (for reversing valve)	DC wire coil
Y24	Auxiliary relays (for crankcase heater)	DC wire coil
Y20A	Auxiliary appliances (for SVA)	
THM7	Temperature sensor (for atmospheres)	
THM8	Temperature sensor (for tubes)	
THM9	A temperature sensor (for discharge)	
DCL	Reactor	
IPM	DIP-IPM Power Modules	
NF-5	Filter	
PSW1	Switch (Forced defrosting)	On PCB1
PSW2	Switch (for check (PG P	On PCB1
PSW3	Switch (for check (" PG P	On PCB1
DSW1	Switch (for test run)	On PCB1
DSW2	Switch (auxiliary function setting)	On PCB1
DSW3	Switch (outdoor capacity setting)	On PCB1
DSW4	Switch (refrigerant system setting)	On PCB1
DSW5	Switch	On PCB1
DSW6	Switch (Function setting selection)	On PCB1
CH1-2	Crankcase heater	
E1,2,6	Ground wire	

[Alarm (abnormal) Reason Code table]

Alarm code	Alarm content	Major one reason
01	The indoor protection devices action (float switch)	High water level, drains abnormality, abnormal float switch, abnormal drain pan
02	Outdoor protective devices action (high-pressure switch disconnected)	The refrigerant piping blockage, excessive refrigerants, non-condensable gas mixed
03	Abnormal transmission	Terminal portion of operator loop is loose, broken, incorrect wiring Outdoor unit power OFF, outdoor unit fuse blows
04	Outdoor unit substrate and the compressor driver board transmission abnormality	Transmission error, disconnection, incorrect wiring
06	Variable frequency voltage is abnormal	Outdoor unit voltage is too low, insufficient power supply capacity
07	Discharge overheat degree is too low	Excessive refrigerant, an expansion valve is locked in the open state (disconnection) Refrigerant and electrical system wiring errors between indoor and outdoor units
08	(Compressor top) discharge temperature is too high	Insufficient refrigerant, the clogging of the refrigerant pipe, expansion valve is locked in the closed state (disconnection) Refrigerant, electrical systems wiring errors between indoor and outdoor units
11	Abnormal return air temperature sensor (indoor unit)	
12	Air temperature sensor abnormality (indoor unit)	Indoor unit temperature sensor wiring mistake, unwired, disconnection, short circuit
13	Abnormal heat exchange tube (freezing) temperature sensor (indoor unit)	
14	Heat exchange gas pipe temperature sensor abnormality (indoor unit)	
16	Remote control temperature sensor abnormality (outer gas processing)	
17	Wired remote control switch built-in temperature sensor abnormality (outer gas processing)	
19	Indoor fan motor abnormality	Indoor fan motor overheating, stall
22	Ambient temperature sensor abnormality (outdoor unit)	Outdoor unit temperature sensor and pressure sensor: incorrect
23	Discharge temperature sensor abnormality (outdoor unit)	wiring, unwired, disconnection, short circuit
24	Heat exchanger liquid temperature sensor abnormality (outdoor unit)	
31	Indoor and outdoor capacity setting + indoor and outdoor unit capacity combination failure	Indoor and outdoor capacity code setting error Total indoor unit capacity code is too large, too small
35	Unit No. setting error	Different indoor unit is set to the same unit No within the same refrigerant piping system.
36	Indoor unit combination error	The indoor unit is J-type (using R22 refrigerant)
38	Outdoor unit protection check circuit abnormality	Outdoor unit protection circuit anomaly (outdoor unit substrate wiring errors)
47	Protection action to prevent excessively low pressure (prevent vacuum operation)	Insufficient Refrigerant, clogging of refrigerant pipe, expansion valve is locked in the closed state (disconnection)
48	Converter over-current protection action	Overload operation, compressor anomalies
51	Abnormal current sensor	Current sensor failure
53	Inverter error signal check	Driver IC error signal checkout (over-current, low-voltage, short-circuit protection)
54	Inverter heat sink temperature is too high, protection action	Heat sink temperature sensor malfunction, heat exchanger clogging the fan motor abnormalities
55	Drive does not operate	Frequency substrate abnormality
57	Fan motor protection action	Connection wiring of the conversion substrate and fan motor: disconnection, incorrect wiring, fan motor abnormalities
EE	Compressor protection alarm (can not be reset through wired remote control)	Alarm code of damage to compressor appears 3 times within 6 hours.

(ELECTRICAL WIRING DIAGRAM) (FOR MODELS: AVW-43U (E/7) SB)

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.



- Service Operation** Service Operation on the table below can be performed through the Setting of DSW1 and PSW1. Setting of DSW should be according to the Table 1. Take care of the remarks on the right during operation.
- Do not touch any other electrical parts when operating switches on the PCB.
 - Do not attach or detach service cover when the power source for the outdoor unit is ON and the outdoor unit is operated.
 - Turn all the dip switches of DSW1 OFF when the test run operation is completed.

Dip Switch Setting	Operation	Remarks
1 Test Run	<ul style="list-style-type: none"> Setting of Operation Mode Cooling: Set DSW1-2 OFF. Heating: Set DSW1-2 ON. Starting Test Run Set DSW1-1 ON and the operation is started after a few 20 seconds. 	<ul style="list-style-type: none"> The indoor unit automatically start to operate when the test run of the outdoor unit is set. The ON/OFF operation can be performed from the remote control switch of DSW1-1 of the outdoor unit. Continuous operation during 2 hours is performed without Thermo-OFF.
2 Manual OFF of Compressor	<ul style="list-style-type: none"> Setting Compressor Manual OFF: Set DSW1-4 ON Compressor Manual OFF Release: Set DSW1-4 OFF 	<ul style="list-style-type: none"> When DSW1-4 is ON during compressor operation, the compressor stops to operate immediately and the indoor unit is under the condition of Thermo-OFF. When DSW1-4 is OFF, the compressor starts to operate after the cancellation of 3-minutes guard.
3 Manual Defrost	<ul style="list-style-type: none"> Manual Defrost Operation Starts Press PSW-1 for more than 3 seconds during heating operation. Manual Defrost Operation Ends Press PSW-1 for more than 3 seconds during defrost operation. OR is automatically ended. 	<ul style="list-style-type: none"> Defrost operation is available regardless of frosting condition and total time of heating operation. Defrost operation is not performed when the temperature of outdoor heat exchanger is higher than 20°C, high pressure is higher or Thermo-OFF.

Manual Defrost on the above table is performed only for heat pump.

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

Table 1, DSW(PCB1)'s setting before shipment (The mark of ■ indicates the position of dip switches.)

DSW1 (Test Operation)	DSW2 (Optional Function Setting)	DSW3 (Capacity Setting)	DSW5
ON: [1] [2] [3] [4] (1,2,3,4 are ON)	ON: [1] [2] [3] [4] [5] [6] (1,2,3,4,5,6 are ON)	ON: [1] [2] [3] [4] (1,2,3,4 are ON)	ON: [1] [2] (1,2 are ON)
OFF: [1] [2] [3] [4] (1,2,3,4 are OFF)	OFF: [1] [2] [3] [4] [5] [6] (1,2,3,4,5,6 are OFF)	OFF: [1] [2] [3] [4] (1,2,3,4 are OFF)	OFF: [1] [2] (1,2 are OFF)

Ref. Cycle No. Setting (DSW4&RSW1)		DSW6 (Piping length setting)			
DSW4 (High Digit Setting)	RSW1 (Low Digit Setting)	Setting before Shipment	The I.U. is located higher than O.U. (>20m)	The O.U. is located higher than I.U. (>25m)	
ON: [1] [2] [3] [4] [5] [6] (1,2,3,4,5,6 are ON)	ON: [1] [2] [3] [4] [5] [6] (1,2,3,4,5,6 are ON)	ON: [1] [2] [3] (1,2,3 are ON)	ON: [1] [2] [3] (1,2,3 are ON)	ON: [1] [2] [3] (1,2,3 are ON)	
OFF: [1] [2] [3] [4] [5] [6] (1,2,3,4,5,6 are OFF)	OFF: [1] [2] [3] [4] [5] [6] (1,2,3,4,5,6 are OFF)	OFF: [1] [2] [3] (1,2,3 are OFF)	OFF: [1] [2] [3] (1,2,3 are OFF)	OFF: [1] [2] [3] (1,2,3 are OFF)	

(Electrical Control Box)

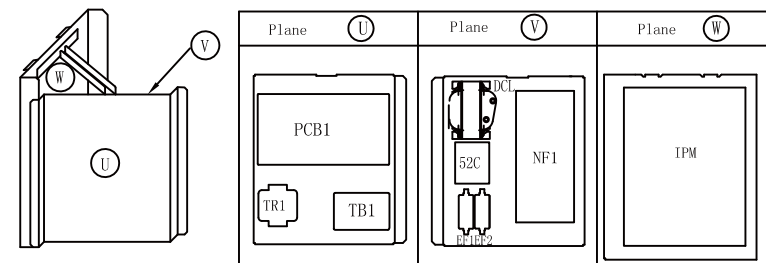
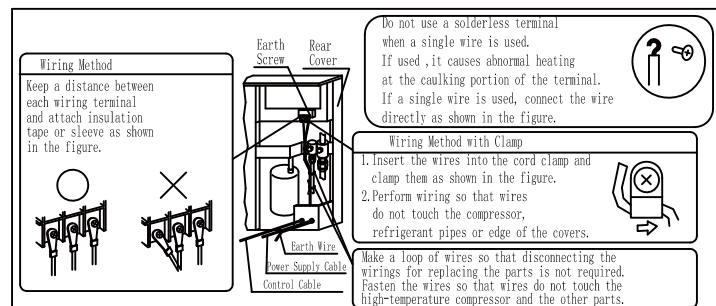


Table 2, Setting of DSW1 (IPM)

DSW1 (IPM)	
ON: [1] [2] [3] (1,2,3 are ON)	Inspection of Current is not available when setting 1 ON. So reset it after assembly.
OFF: [1] [2] [3] (1,2,3 are OFF)	



MARK	NAME
MC	Motor for Compressor
MOF2	Motor for Out Fan
EF1,2	Fuse
CMC	Contactor for Compressor Motor
RVR	Reversing Valve Relay
MV	Micro-Computer Control Expansion Valve
SVA	Solenoid Valve for Hot Gas Bypass
SVF	Solenoid Valve for Backing Of Oil
63H1	High Pressure Switch For Protection
P _a	Sensor for Refrigerant Pressure
P _s	Sensor for Refrigerant Pressure
TB1	Terminal Board
TF1	Transformer
PCB1	Printed Circuit Board
EFR1	Fuse
Y _{52C}	Relay (CMC)
Y ₂₁	Relay (RVR)
Y _{CH}	Relay (CH)
Y _{20A}	Relay (SVA)
Y _{20B}	Relay (SVF)
THM7	Thermistor
THM8	Thermistor
THM9	Thermistor
DCL	Reactor
IPM	Inverter System Power Podule
NF1,2,4	Noise Filter
PSW1	Push Switch on PCB1
PSW2	Push Switch on PCB1
PSW3	Push Switch on PCB1
DSW1	Dip Switch on PCB1
DSW2	Dip Switch on PCB1
DSW3	Dip Switch on PCB1
DSW4	Dip Switch on PCB1
DSW5	Dip Switch on PCB1
DSW6	Dip Switch on PCB1
CH1-2	Crankcase Heater

Code	Content of Abnormality	Leading Cause
01	Activation of Protection Device	Activation of Float Switch, High Water Level in Drain Pan
02	Activation of Protection Device	Activation of PSH, Pipe Clogging, Excessive Ref., Inert Gas Mixing
03	Abnormality between I.U. and O.U./O.U. and O.U.	Incorrect Wiring, Loose Terminals, Disconnected Wire, Tripping of Fuse
04	Abnormality between Inverter PCB and O.U. PCB	Transmission Failure (Loose Connector)
05	Abnormal Power Source Phases	Incorrect Power Source Connection to Reversed-Phase, Open Phase
06	Abnormal Inverter Voltage	O.U. Voltage Drop Insufficient Power Capacity
07	Decrease of Discharge Gas Superheat	Excessive Ref. Charge, Failure of Thermistor, Incorrect Wiring
08	Increase of Discharge Gas Temperature	Insufficient Ref. Charge, Pipe Clogging, Failure of Thermistor, Incorrect Wiring
09	Activation of Protection Device for Indoor Unit Fan	Fan Motor Overheat, Locking
11	Inlet Air Thermistor	
12	Outlet Air Thermistor	
13	Freeze Protection Thermistor	Incorrect Wiring,
14	Gas Piping Thermistor	Disconnected Wiring
16	Remote Control Thermistor	
17	Remote Control Switch Thermistor	
21	High Pressure Sensor	
22	Outdoor Air Thermistor	
23	Discharge Gas Thermistor	Incorrect Wiring,
24	Evaporating Piping Thermistor	Disconnected Wiring
29	Low Pressure Sensor	
31	Incorrect Capacity of O.U. and I.U.	Incorrect Setting of Capacity Combination
35	Incorrect Setting of I.U. No.	Duplication of Indoor Unit No.
36	Incorrect Combination of I.U. No.	Refrigerant of Indoor Unit No.
38	Abnormality of Protective Circuit in O.U.	Failure of Protection Detecting Circuit
43	Activation of Low-Pressure Decrease Protection Device	Detective Compression (Failure of Compressor of Inverter, Loose Power Supply Connection)
44	Activation of Low-Pressure Increase Protection Device	Overload at Cooling High Temp. at Heating Locking (Loose Connector)
45	Activation of High-Pressure Increase Protection Device	Overload Operation (Clogging, Short-Pass), Pipe Clogging, insufficient Ref., Inert Gas Mixing
47	Activation of Low-Pressure Decrease Protection Device (Vacuum Operation)	Insufficient Ref., Ref. Pipe Clogging, Locking (Loose Connector)
48	Activation of Inverter Overcurrent Protection Device	Overload Operation, Comp. Failure
51	Abnormal Current Sensor	Current Sensor Failure
53	Inverter Error Signal Detection	Driver IC Error Signal Detection, (Protection for Overcurrent, Low Voltage, Short-Circuit)
54	Increase of Inverter Pin Temperature	Abnormal Inverter Pin Thermistor, Heat Exchanger Clogging, Abnormal Fan
55	Inverter Failure	Inverter PCB Failure
57	Fan Motor Abnormality	Disconnected Wiring/Incorrect Wiring between Control PCB (PCB1) and Fan Relay PCB (PCB3, PCB5), Fan Motor Failure
FF	Compressor Protection Alarm	Failure of Compressor
b1	Incorrect O.U. No. Setting	Over 64 No. is set for Address or Ref. Cycle
b5	Incorrect I.U. No. Setting	More than 17 Non-Corresponding to H-LINK2 Units are Connected to One System

9. Electrical Wiring



WARNING

- Turn OFF the main power switch to the indoor unit and the outdoor unit 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.
- Prevent wires from touching the refrigerant pipes, steel plate edges and electrical components. Otherwise, the wires will be damaged, and in severe cases, may lead to a fire.



CAUTION

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

NOTE

When the outdoor unit wiring does not use conduit pipe, fix it with the rubber bush.

9.1 General Check

- (1) Ensure that the field-selected electrical parts (main power switch, circuit breaker, wires, conduit and wire terminals, etc.) have been properly selected in accordance with electrical data, and ensure that the devices meet the National Electrical Code.
- (2) Check to ensure that the power voltage is within $\pm 10\%$ of the rated voltage, and the earth wire is included in the power supply wires. Otherwise, the electrical parts may be damaged.
- (3) Check to ensure that the power capacity is sufficient. Otherwise the compressor may not be started because of abnormal voltage drop at starting.
- (4) Check to ensure that the earth wire has been connected reliably.
- (5) Check to ensure that the insulation resistance is more than 1 megohm, by measuring the insulation resistance between ground and electrical parts terminal. Otherwise, do not start the system, until the electrical leakage is found and repaired.

9.2 Electrical Wiring connection

- (1) Connect the power wires to the terminal board in electrical box of the indoor and outdoor unit, and connect the earth wire to the electrical box of the outdoor unit. In addition, connect the earth wire to the earth stud in electrical box of indoor unit. Refer to figure 9.1.
- (2) Connect communication wires between indoor and outdoor unit to terminal 1 and 2 of the terminal board; if the power wiring is connected to 1 and 2 of the terminal board, printed circuit board will be damaged.

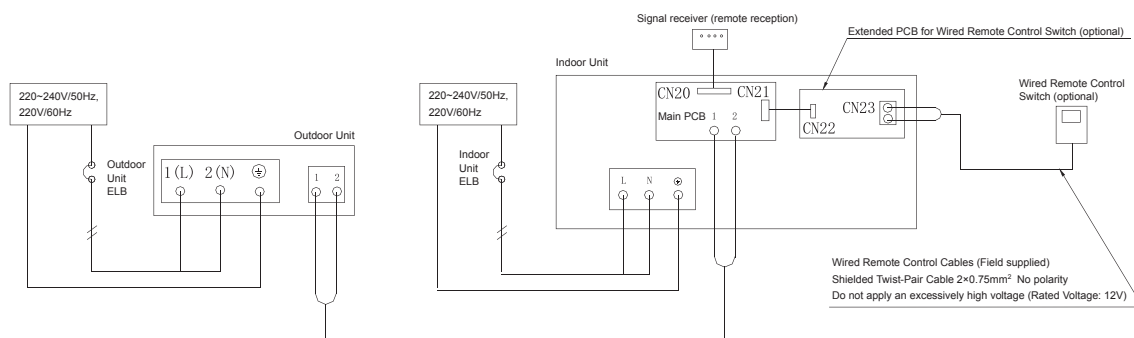


Figure 9.1 Electrical Wiring Connection Diagram of Indoor and Outdoor Units for 1-phase 3-wire type

- (3) Do not wire on the fixing screws in front of service cover.
- (4) As shown in Figure 6.1, connect the wires between indoor and outdoor units; check to ensure the tension of each crimping wire of terminal on terminal board.
- (5) Use STP to connect communication wires between outdoor and indoor units; connect the wires to terminal 1 and 2 of outdoor unit and terminal 1 and 2 of terminal board of indoor unit respectively.



WARNING

- Install an ELB on the power supply (Earth Leakage Breaker). If not installed, it will cause an electric shock; in severe case may result in a fire.
 - Tighten screws as the following torques:
 - M4: 1.0~1.3 N. m
 - M5: 2.0~2.5 N. m
 - M6: 4.0~5.0 N. m
 - M8: 9.0~11.0 N. m
 - M10: 18.0~23.0 N. m
- Keep the above tightening torques when wiring.

10. Additional Refrigerant Charge

When connecting pipes in the field, charge additional refrigerant as follows:

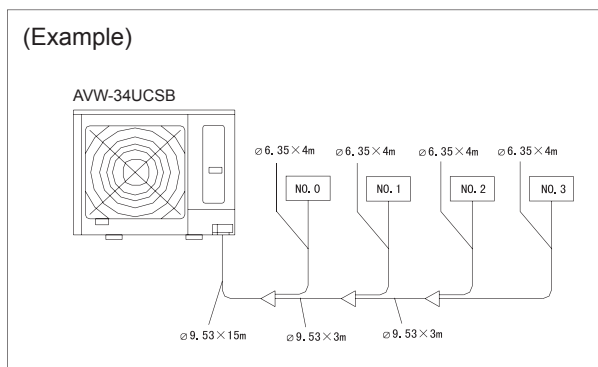
Additional Refrigerant R410A Charge Calculation

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

A: Determine an additional refrigerant quantity according to the following procedure, and charge it into the system.

B: After completion of charging the additional refrigerant quantity should be reported to the local service center.

1 Calculating Method of Additional Refrigerant Charge (W kg)



<Table >

(kg)

Outdoor Unit	Outdoor Unit Refrigerant Charge W0
AVW-28UCSB	2.50
AVW-34UCSB	2.80
AVW-43UCSB	2.80

NOTE:

W0 is outdoor unit refrigerant charge before shipment.

Take AVW-34UCSB for example, fill in the form below.

Pipe Diameter (mm)	Total Piping Length (m)	Additional charge (kg)
Φ9.53....	(15+3+3)	× 0.03 = 0.63
Φ6.35....	(4+4+4+4)	× 0.02 = 0.32

Total Piping Length 37m Additional Charge W1 = 0.95(kg)

Final Refrigerant Charge W = W1 + W0

$$= 2.80 + 0.95 = 3.75 \text{ (kg)}$$

One to One application can be obtained as the following requirements are met for E Series Outdoor Units.(W2)

Model	Connection Ratio	1		2		3	
		Indoor Unit Type	The Additional Refrigerant Need to be Reduced	Indoor Unit Type	The Additional Refrigerant Need to be Reduced	Indoor Unit Type	The Additional Refrigerant Need to be Reduced
28	100%	Duct Type	200g				
34		Ceiling & Floor Type	150g	Duct Type	150g	2-Way Cassette Type	150g
43							

NOTE:①The refrigerant do not need to be adjusted for the indoor units that are not mentioned.

Total Refrigerant Charge W = W1 + W0-W2

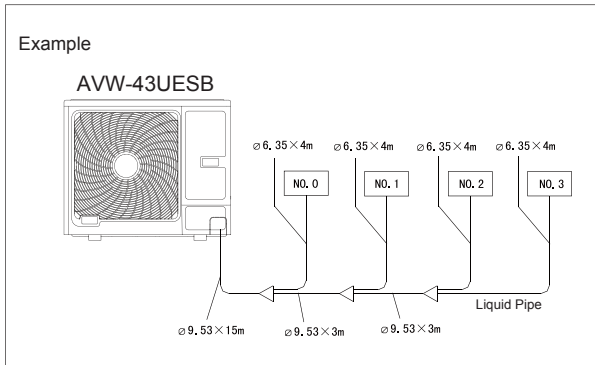
Pipe Diameter (mm)	Total Piping Length (m)	Additional charge (kg)
Φ9.53....	<input type="text"/> × 0.03	= <input type="text"/>
Φ6.35....	<input type="text"/> × 0.02	= <input type="text"/>

Total Refrigerant Charge m Additional Charge W1 = (kg)

Final Refrigerant Charge $W = W1$ + $W0$ - $W2$ = (kg)

Note:
Additional refrigerant charge of the pipe diameter: It is 0.02kg/m for the pipe diameter φ 6.35 of all units; It is 0.03kg/m for the pipe diameter φ 9.53 of all units.

Calculating Method of Additional Refrigerant Charge (W kg)



See Example for Model AVW-43UESB, and fill in the following table.

Pipe Diameter (mm)	Total Piping Length (m)	Additional charge (kg)
Φ9.53....	(15+3+3)	× 0.04 = 0.84
Φ6.35....	(4+4+4+4)	× 0.02 = 0.32

Total Piping Length 37m Additional Charge W1 = 1.16 (kg)
Total Ref. Charge $W = W0 + W1$
 $= 3.0 + 1.16 = 4.16$ (kg)

Table	(kg)
Outdoor Unit	W0: Outdoor Unit Ref. Charge
AVW-43U(E/7)SB	3.00

NOTE:
W0 is outdoor unit ref. charge before shipment.

One to One application can be obtained as the following requirements are met for E Series Outdoor Units.(W2)

Model	Connection Ratio	1		2		3	
		Indoor Unit Type	The Additional Refrigerant Need to be Reduced	Indoor Unit Type	The Additional Refrigerant Need to be Reduced	Indoor Unit Type	The Additional Refrigerant Need to be Reduced
28	100%	Duct Type	200g				
34		Ceiling & Floor Type	150g	Duct Type	150g	2-Way Cassette Type	150g
43							

NOTE:①The refrigerant do not need to be adjusted for the indoor units that are not mentioned.

Final Refrigerant Charge $W = W1 + W0 - W2$

Pipe Diameter (mm)	Total Piping Length (m)	Additional charge (kg)
Φ9.53....	<input type="text"/> × 0.04	= <input type="text"/>
Φ6.35....	<input type="text"/> × 0.02	= <input type="text"/>

Total Refrigerant Charge m Additional Charge W1 = (kg)

Final Refrigerant Charge $W = W1$ + $W0$ - $W2$ = (kg)

NOTE:
Additional refrigerant charge of the pipe diameter
It is 0.02kg/m for the pipe diameter φ 6.35of all units;
of all units; It is 0.03kg/m for the pipe diameter φ 9.53 of all units.

2. Charging Work

Charge refrigerant (R410A) into the system as follows

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

3. Record of Additional Charge

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

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

$$\begin{aligned} \text{Total Ref. Charge of This system} &= W1 + W0 - W2 \\ \text{This system} &= \boxed{} + \boxed{} - \boxed{} = \boxed{} \text{ kg} \end{aligned}$$

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



CAUTION

Slim ceiling ducted type indoor unit 12/14KBtu/h, because the capacity of the indoor unit is small, additional one of the indoor unit, the additional refrigerant need to reduce 150g. (If the calculation of the additional charge of less than 150g, then don't need to add refrigerant, also don't need to release from the outdoor unit .)

Installation and Operation

1. Safety Summary

WARNING

CAUTION

- 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.

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

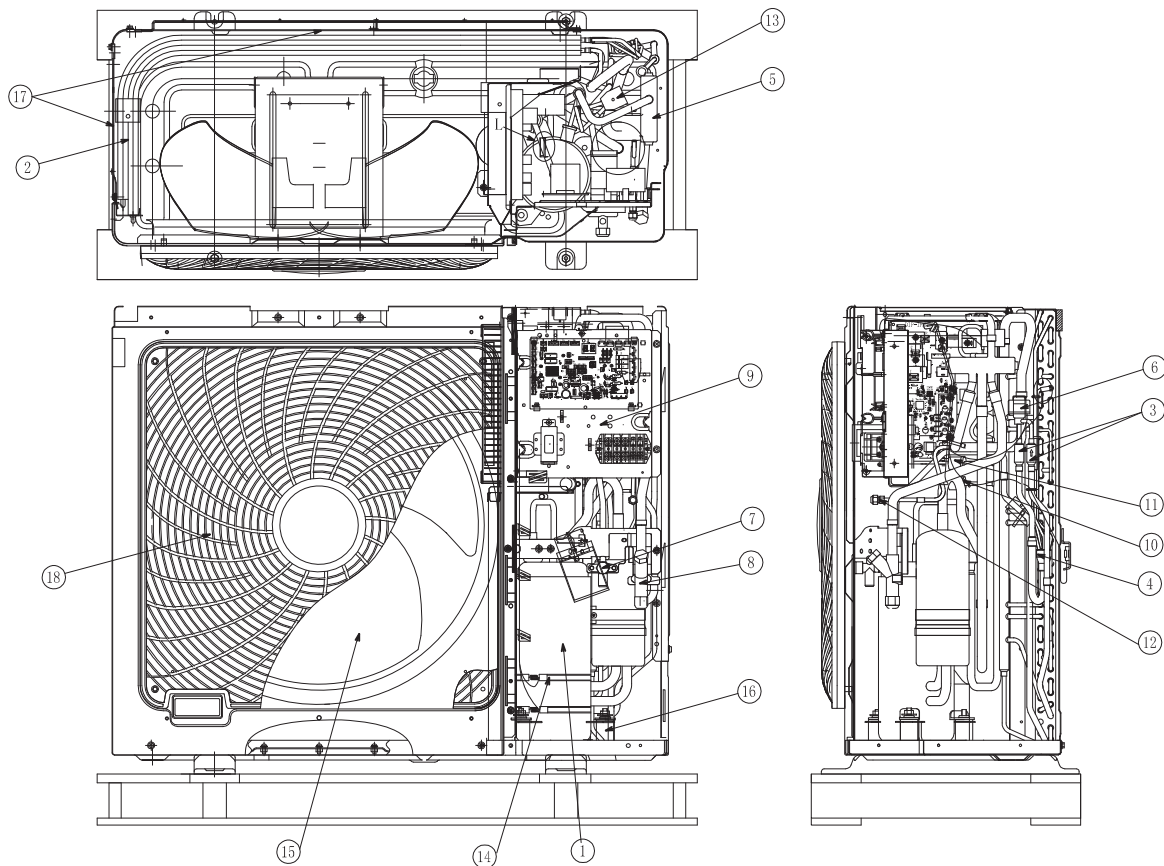
Table 1.1 Line-Up of Outdoor Unit

Capacity(KBtu/k)	28	34	43	43
Model	AVW-28U(C/2)SB	AVW-34U(C/2)SB	AVW-43U(C/2)SB	AVW-43U(E/7)SB

2. Structure

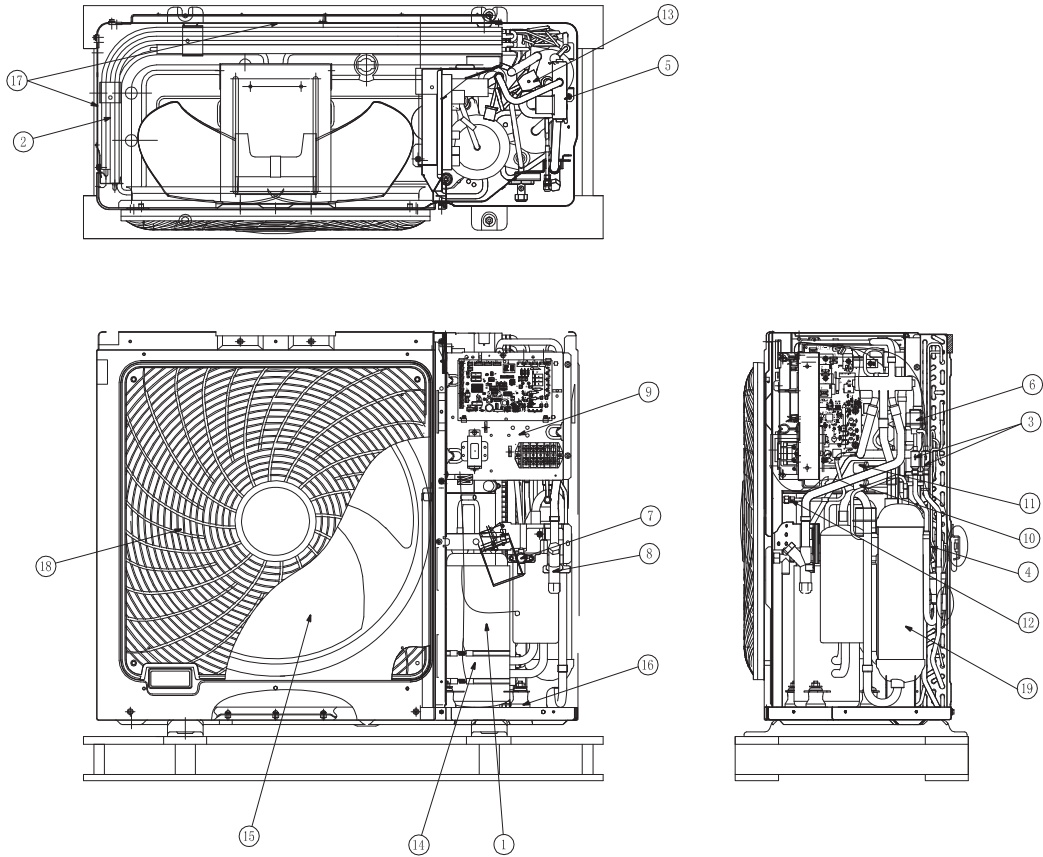
2.1 Outdoor unit and Refrigeration Cycle

<Outdoor Unit > 28KBtu/h



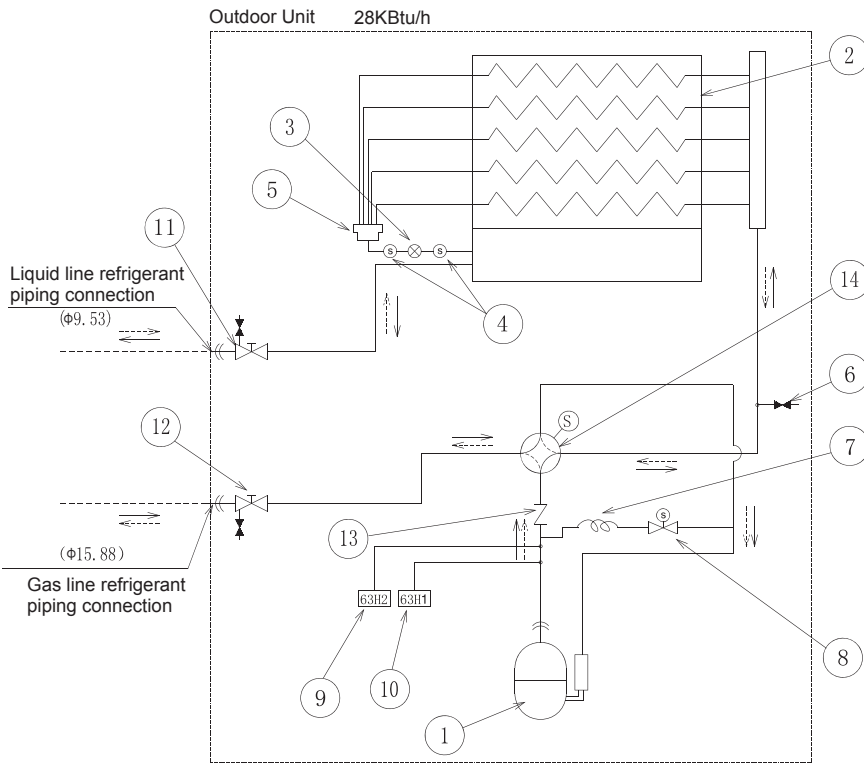
No	Part Name	No	Part Name
1	Compressor	12	Check Joint for High Pressure
2	Heat Exchanger	13	Solenoid Valve
3	Strainer	14	Crankcase heater
4	Distributor	15	Propeller Fan
5	Four-way Valve	16	Vibration Absorbing Rubber
6	Electronic Valve	17	Air Inlet
7	Stop Valve for Liquid Line	18	Air Outlet
8	Stop Valve for Gas Line		
9	Electrical Box		
10	Pressure Switch for Control		
11	High Pressure Switch for Protection		

<Outdoor Unit > 34KBtu/h
43KBtu/h



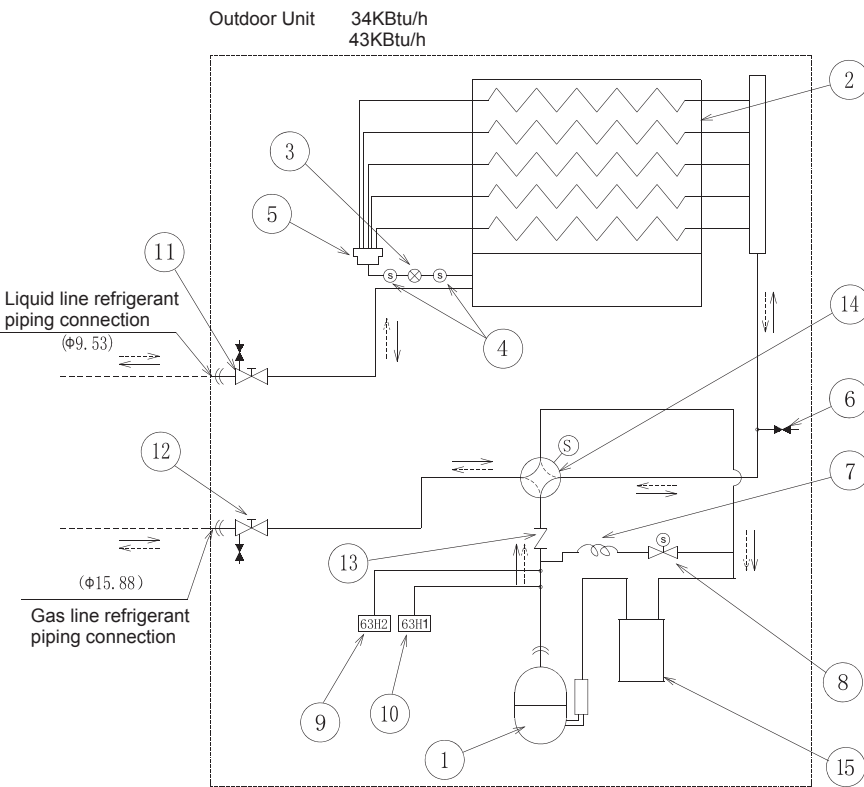
No	Part Name	No	Part Name
1	Compressor	12	Check Joint for High Pressure
2	Heat Exchanger	13	Solenoid Valve
3	Strainer	14	Crankcase Heater
4	Distributor	15	Propeller Fan
5	Four-way Valve	16	Vibration Absorbing Rubber
6	Electronic Valve	17	Air Inlet
7	Stop Valve for Liquid Line	18	Air Outlet
8	Stop Valve for Gas Line	19	Gas - liquid Separator
9	Electrical Box		
10	Pressure Switch for Control		
11	High Pressure Switch for Protection		

<Refrigeration Cycle>



Mark	Part Name
①	Compressor
②	Heat Exchanger
③	Electronic Expansion Valve
④	Strainer
⑤	Distributor
⑥	Check Joint
⑦	SVA Capillary Tube
⑧	Solenoid Valve
⑨	Pressure Switch for Control
⑩	High Pressure Switch for Protection
⑪	Stop Valve Liquid line
⑫	Stop Valve Gas line
⑬	Check Valve
⑭	Four-way Valve

- ← Refrigerant Flow Direction (Cooling Operation)
- ← Refrigerant Flow Direction (Heating Operation)
- - - Field Refrigerant Piping
- ≡ Flare Connection



Mark	Part Name
①	Compressor
②	Heat Exchanger
③	Electronic Expansion Valve
④	Strainer
⑤	Distributor
⑥	Check Joint
⑦	SVA Capillary Tube
⑧	Solenoid Valve
⑨	Pressure Switch for Control
⑩	High Pressure Switch for Protection
⑪	Stop Valve Liquid line
⑫	Stop Valve Gas line
⑬	Check Valve
⑭	Four-way Valve
⑮	Gas - liquid Separator

- ← Refrigerant Flow Direction (Cooling Operation)
- ← Refrigerant Flow Direction (Heating Operation)
- - - Field Refrigerant Piping
- ≡ Flare Connection

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	Charing 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 Chamfering Reamer	◇	◇	–	Cutting Pipe Removing Burrs
	Flaring Tool	* ●	◇	* The flaring tools for R407C are applicable to R22. * If using a flaring tube, make dimension of tube larger for R410A. * In case of material 1/2H, flaring is not available.	Flaring for Tubes
	Extrusion Adjustment Gauge	●	–		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 φ 12.7, φ 15.88, spanner size is up 2mm.	Connection of Flare Nut
		◇	◇	* For φ 6.35, φ 9.53, φ 19.05, spanner size is the same.	
	Brazing Tool	◇	◇	* Perform correct brazing work	Brazing for Tubes
	Nitrogen Gas	◇	◇	* Strict Control against Contamin (Blow nitrogen during brazing.)	Prevention from Oxidation during Brazing
Lubrication Oil (for Flare Surface)	●	◆	* Use a synthetic oil which is equivalent to the oil used in the refrigeration cycle. * Synthetic oil absorbs moisture quickly.	Applying Oil to the Flared Surface	
Vacuum Drying and Refrigerant Charge	Refrigerant Cylinder	●	◆	* Check refrigerant cylinder color. ★Liquid refrigerant charging is required regarding 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
	Adaptor for Vacuum Pump	* ●	◆		
	Manifold Valve	●	◆	* No interchangeability is available due to higher pressure when compared with R22. ★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.	Vacuum Pumping, Vacuum Holding Refrigerant Charging and Check of Pressures
	Charging Hose	●	◆		
	Charging Cylinder	×	×		
	Weight Scale	◇	◇	–	Measuring Instrument for Refrigerant Charging
Refrigerant Gas Leakage Detector	* ●	◆	* The current gas leakage detector (R22) is not applicable due to different detecting method.	Gas Leakage Check	

*: Interchangeability with R407C

3. Transportation and Handling

3.1 Transportation

Transport the product as close to the installation location as practical before unpacking.



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 it 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.

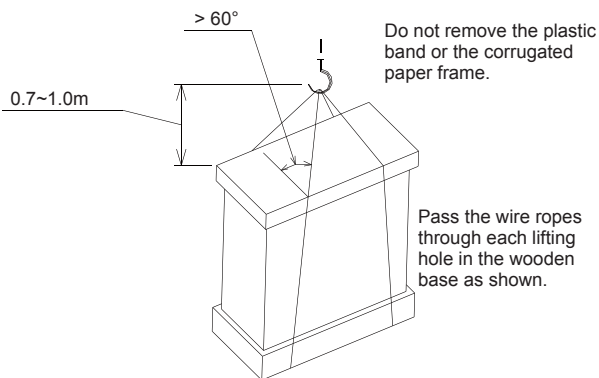


Fig. 3.1 Lifting Work for Transportation



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

3.2 Handling of Outdoor Unit



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.

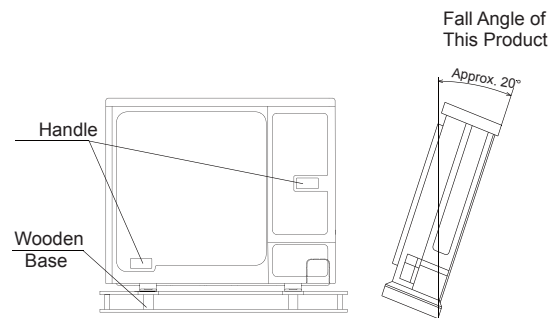


Fig. 3.2 Handling of Outdoor unit

Model(KBtu/h)	Unit Gross weight (kg)
AVW-28U(C/2)SB	65
AVW-34U(C/2)SB	73
AVW-43U(C/2)SB	78
AVW-43U(E/7)SB	89

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

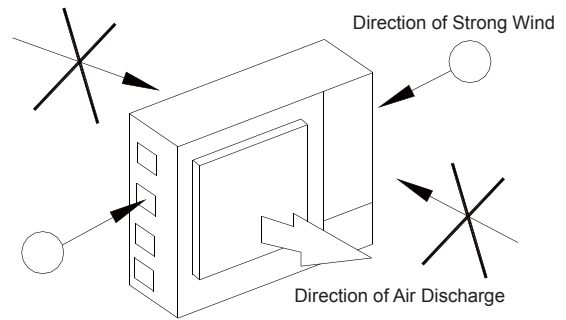
Accessory	Q'ty
Washer	4

NOTE

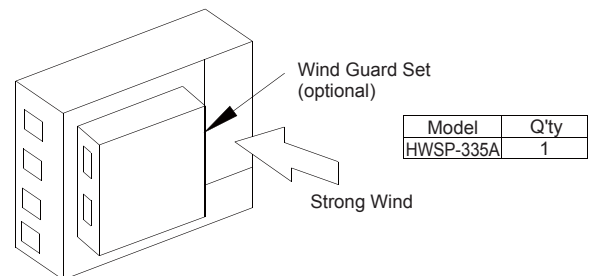
If any of these accessories are not packed with the unit, please contact your contractor.

4.2 Initial Check

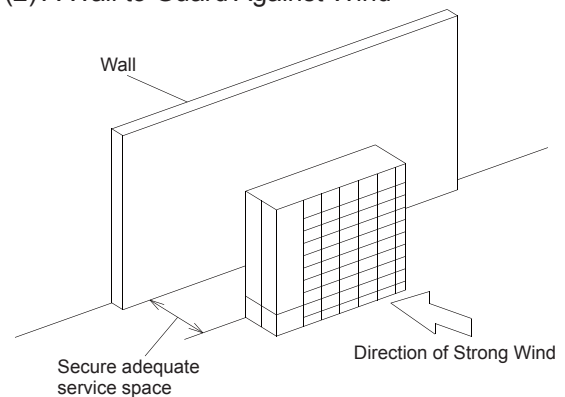
- Install the outdoor unit where good ventilation is available, and where it is dry.
- Install the outdoor unit where the sound or the discharge air from the outdoor unit does not affect neighbors or surrounding vegetation.
The operating sound at the rear or right/left sides is higher than the value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

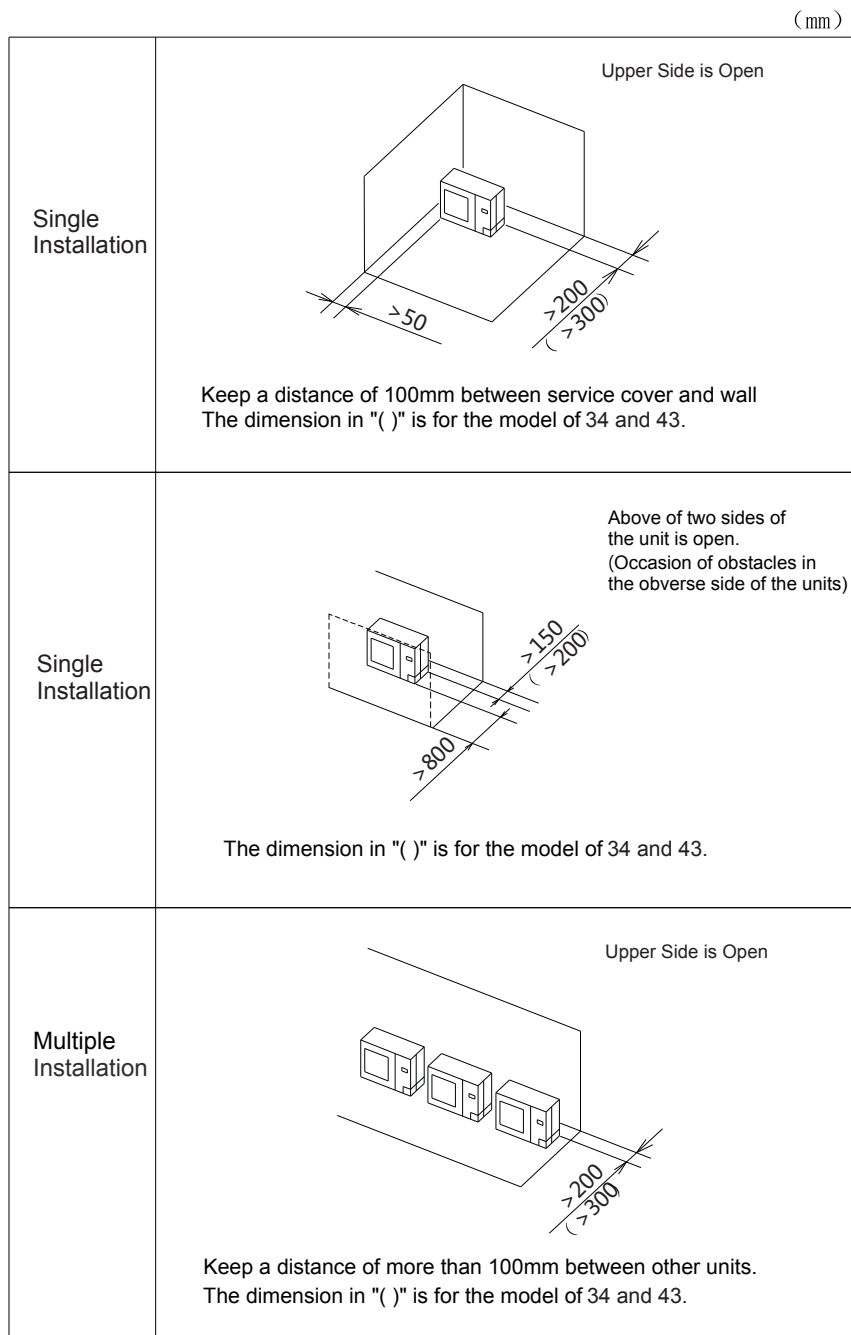


Fig. 4.1 Installation Space

(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 maintenance is satisfied

4.4 Installation Work

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

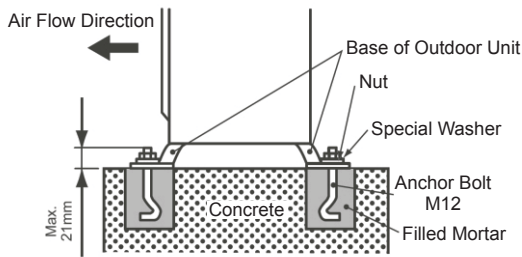


Fig. 4.2 Installation of Anchor Bolts

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

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

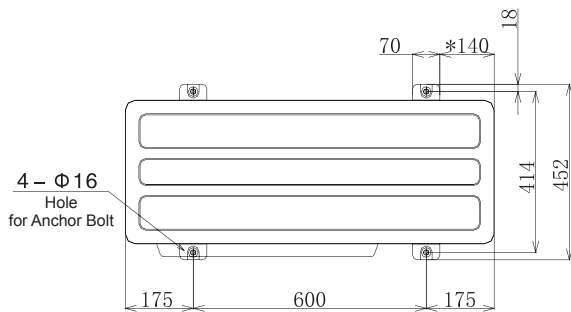


Fig. 4.3 Position of Anchor Bolts

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.

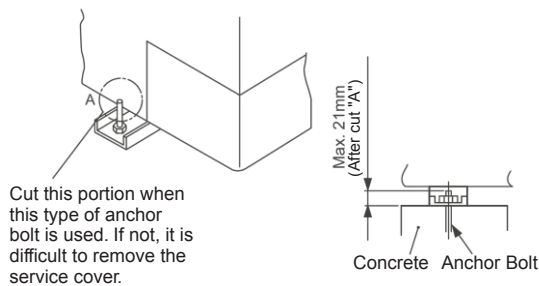


Fig. 4.4 Fixing Example

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

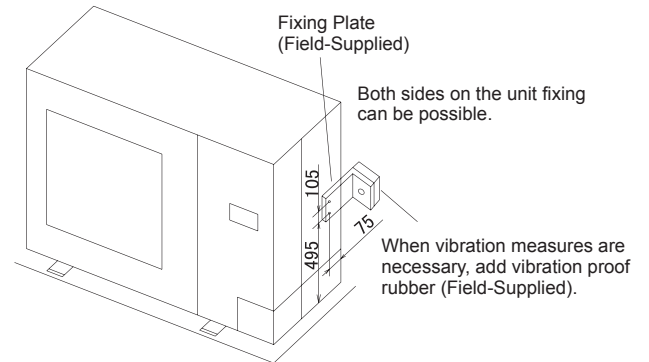
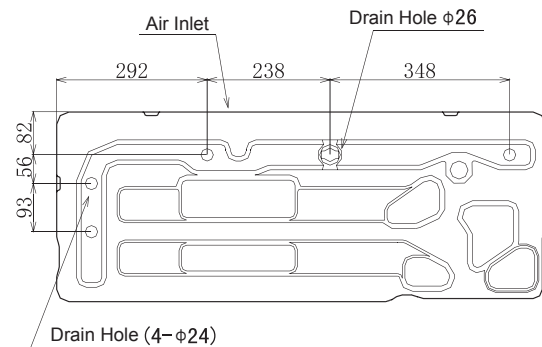


Fig. 4.5 Additional Fixing Arrangement

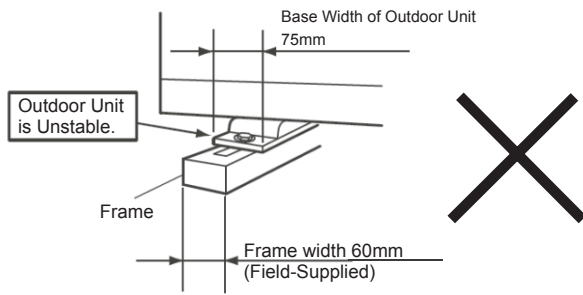
(5) When installing the unit on a roof or a veranda, drain water sometimes turns to ice in a cold morning. Therefore, avoid draining in an area where people often use because it is slippery.

(6) In case of the drain piping is necessary for the outdoor unit, use the drain-kit (DC-01Q:Optional Parts)

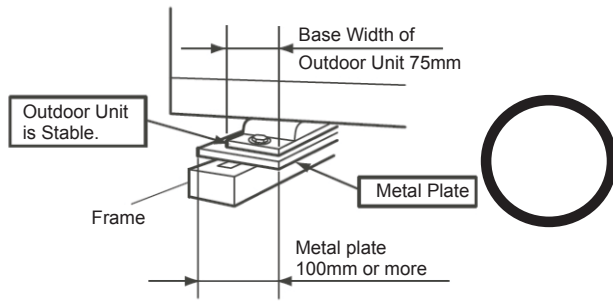


(7) The whole of the base of the outdoor unit should be installed on a foundation. When using vibration-proof mat, it should also be positioned the same way. When installing the outdoor unit on a field-supplied frame, use metal plates to adjust the frame width for stable installation as shown in Fig.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

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. Refrigeration Piping

! DANGER

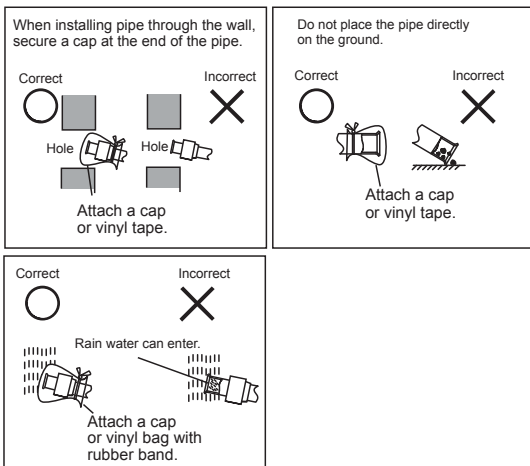
Use refrigerant R410A in the refrigerant cycle. Do not charge oxygen, acetylene or other flammable and poisonous gases into the refrigerant cycle when performing a leakage test or an air-tight test. These types of gases are extremely dangerous and can cause an explosion. It is recommended that compressed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

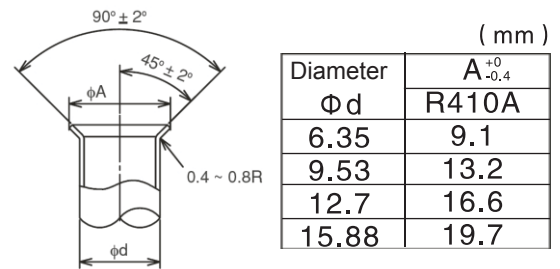


! CAUTION

- 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.

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

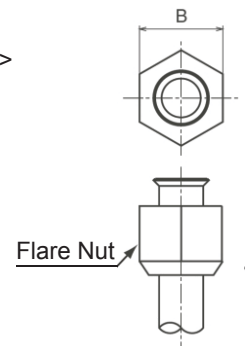
Material is based on JIS standard (JIS B8607).

● Flare Nut Dimension

Using 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 JIS standard (JIS B8607).

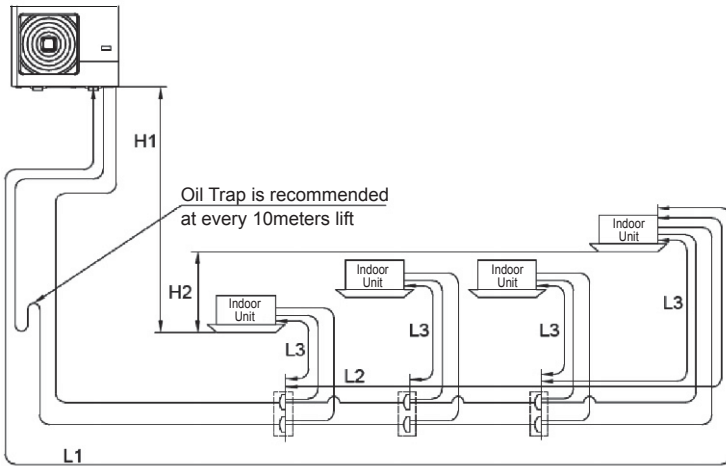
5.2 Refrigeration piping

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

Table 5.1 Limitation of outdoor unit

Model(KBtu/h)	Outer diameter and piping size (mm)		Maximum Piping Length	Branch Pipe Model
	Gas	Liquid		
28	φ 15.88	φ 9.53	Actual Length ≤ 30m	HFQ-052F
34			Actual Length ≤ 40m	
43			Actual Length ≤ 40m	

(2) Piping system



<Branch pipe>

Indoor Unit Capacity (KBtu/h)	Piping size	Gas /Liquid (Φ mm)
07 to 14		12.7/6.35
17 to 18		15.88/6.35
22 to 48		15.88/9.53

Item		Applicable Range
Ref. Pipe Length: L1	28	Within 25m
	34	Within 25m
	43	Within 25m
Piping Length from 1st Branch to each I.U.: L2	28	Within 10m
	34	Within 15m
	43	Within 15m
Pipe length from each Branch to I.U.: L3	28	Within 5m
	34	Within 5m
	43	Within 5m
Lift between I.U. and O.U.: H1	O.U. is Higher	Within 20m
	I.U. is Lower	Within 20m
Total Length of I.U. Piping		Within 2.0m

Table 5.2 Branch Pipe for Line Branch

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

Branch Pipe	HFQ-052F
Gas Line	
Liquid Line	

5.3 piping connection

Pipes can be connected from 4 directions.

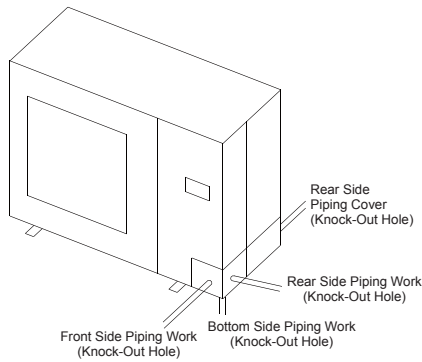
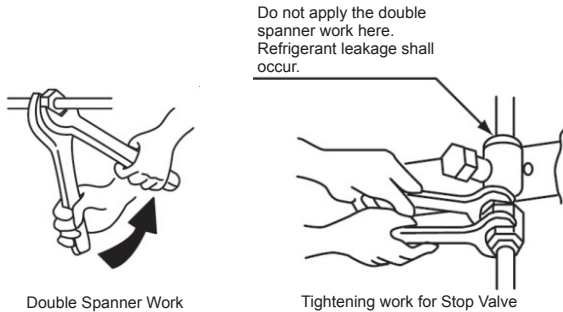


Fig. 5.1 Piping Direction

- (1) Confirm that the stop 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.

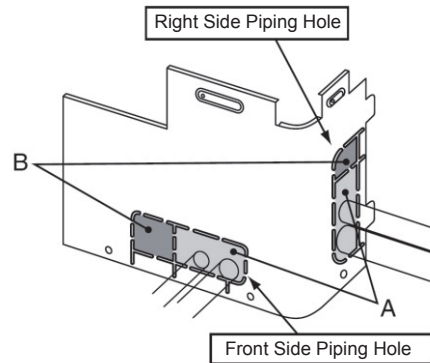


Pipe Size	Tightening Torque for Flare Nut
Φ 6.35(1/4)	20N · m (2kgf · m)
Φ 9.53(3/8)	40N · m (4kgf · m)
Φ 12.7(1/2)	60N · m (6kgf · m)
Φ 15.88(5/8)	80N · m (8kgf · m)

(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.



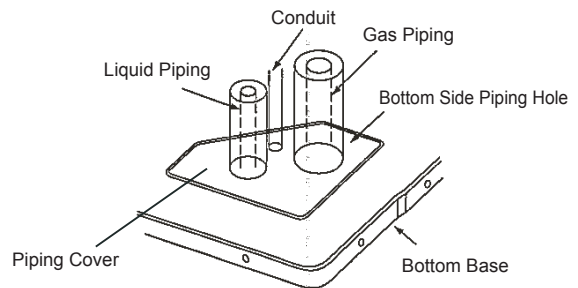
It is available to correct the liquid or gas piping, power wiring less than 14mm² and transition wiring from "A" part.

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.

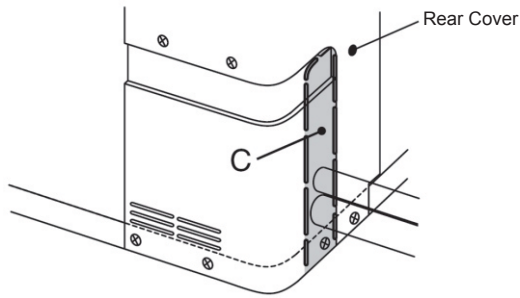


NOTE:

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:

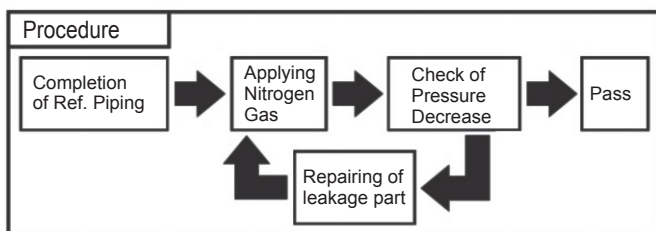
To avoid damage protect cables and pipes with adequate insulation (Field-Supplied).

- (5) To prevent gaps use a rudder 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

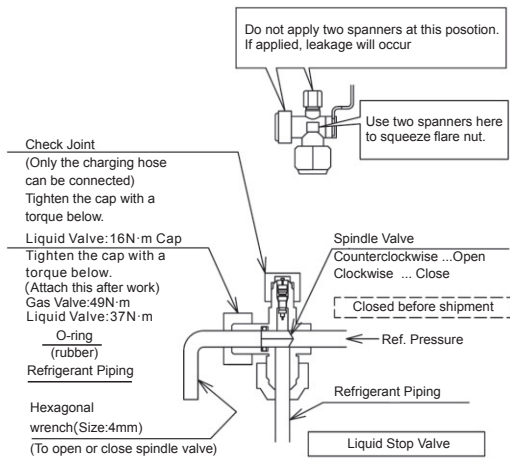
- (1) The stop valve has been closed before shipment; however, make sure that the stop valves are closed completely.
- (2) Connect the indoor unit and the outdoor unit with field-supplied refrigerant piping. Suspend the refrigerant piping at certain points and prevent the refrigerant piping from touching 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.

[a68HES-H/FV50S/FVC68D]



(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

Hexagon 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 with 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.

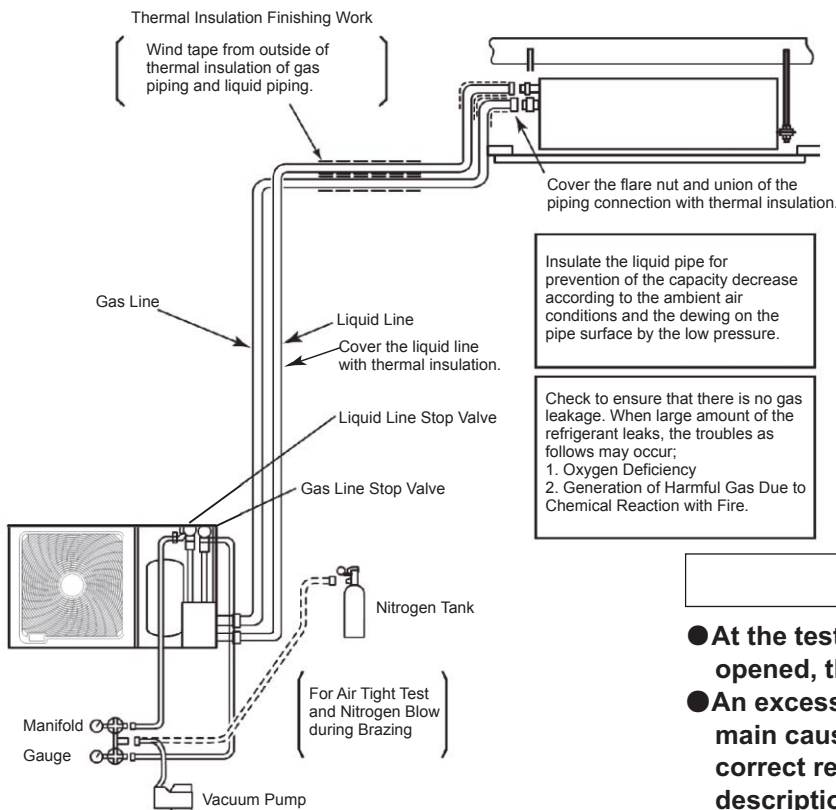
- (5) Check for any gas leakage by gas leak detector or forming agent. Use the foaming agent which does not generate the ammonia (NH₃) by chemical reaction. The recommended forming agent are as shown below. Do not use general household detergent for checking.

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

NOTES:

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

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.

5.6 Caution of the Pressure by Check Joint

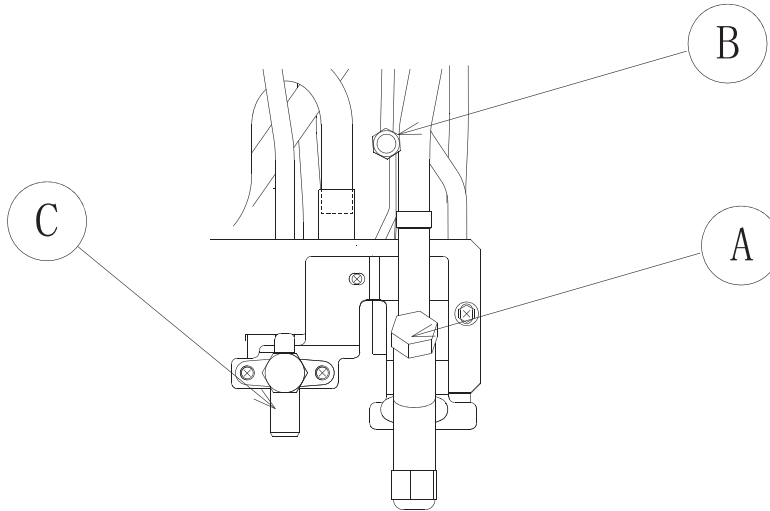
When the pressure is measured, use the check joint of gas stop valve ((A) in the figure below) and use the check joint of liquid piping ((B) in the figure below).

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/m³, 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/m³, 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 (m³) of each objective room.
 - (3) Calculate the refrigerant concentration C (kg/m³) of the room according to the following equation.

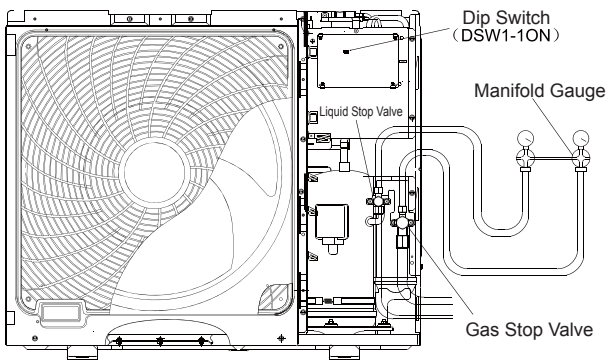
$$\frac{R: \text{Total Quantity of Charged Refrigerant (kg)}}{V: \text{Room Volume (m}^3\text{)}} = C: \text{Refrigerant Concentration} \leq 0.3(\text{kg/m}^3)$$

If local codes or regulations are specified, follow them.

5.7 Collecting Refrigerant

When the refrigerant should be collected into the outdoor unit due to indoor/outdoor unit relocation, collect the refrigerant as follows.

- (1) Attach the manifold gauge to the gas stop valve and the liquid stop valve.
- (2) Turn ON the power source.
- (3) Set the DSW1-1 pin of the outdoor unit PCB at the "ON" side for cooling operation. Close the liquid stop valve and collect the refrigerant.
- (4) When the pressure gauge 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.

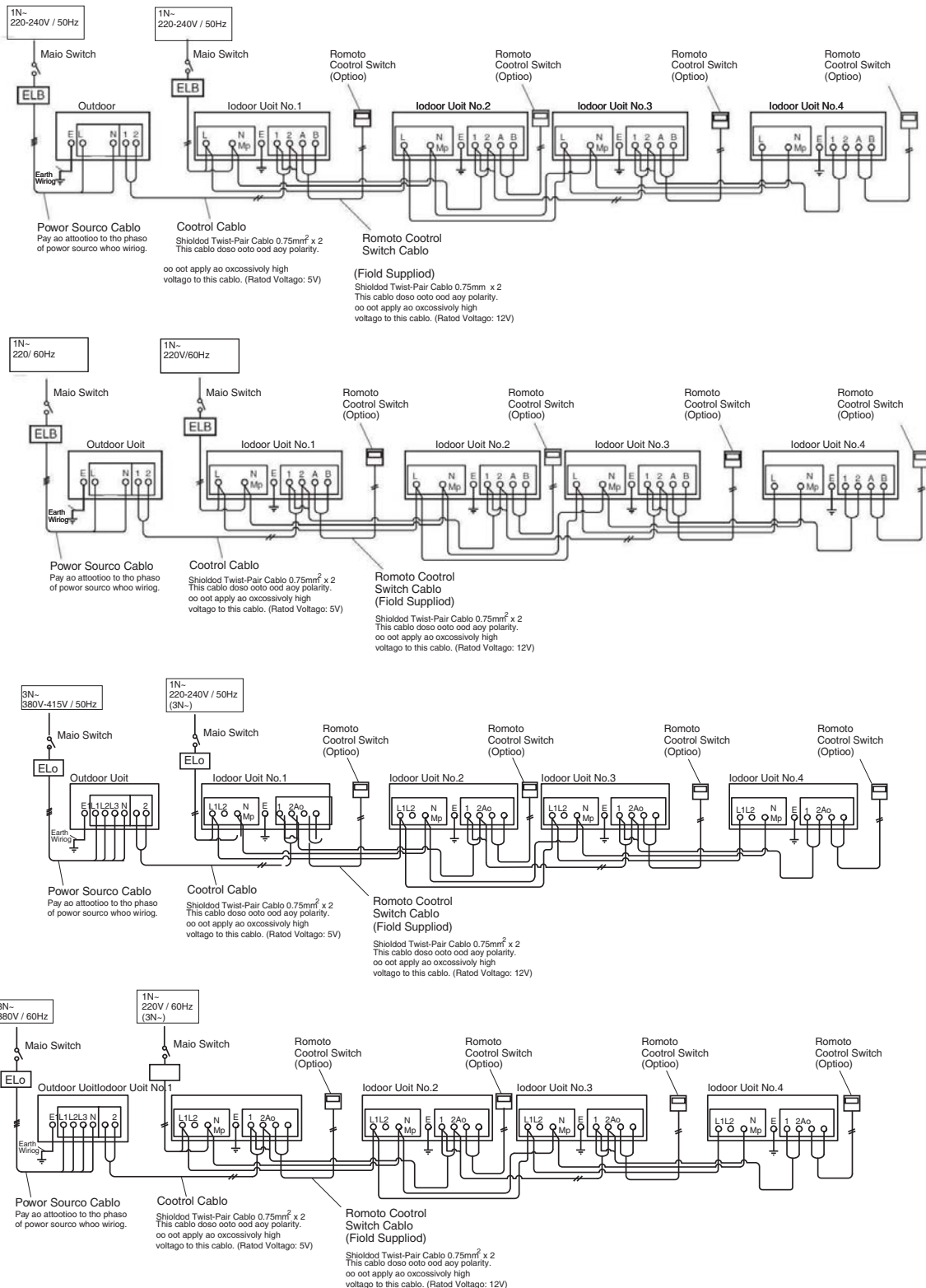
6.1 General Check

- (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 terminals 1 and 2 on the terminal board. If power supply wiring is connected to 1 and 2 of terminal board (TB1), printed circuit board will be damaged.

Fig. 6.1 Wiring Connection



- (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 terminals 1 and 2 on the terminal board.
- (5) The recommended fuse sizes 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

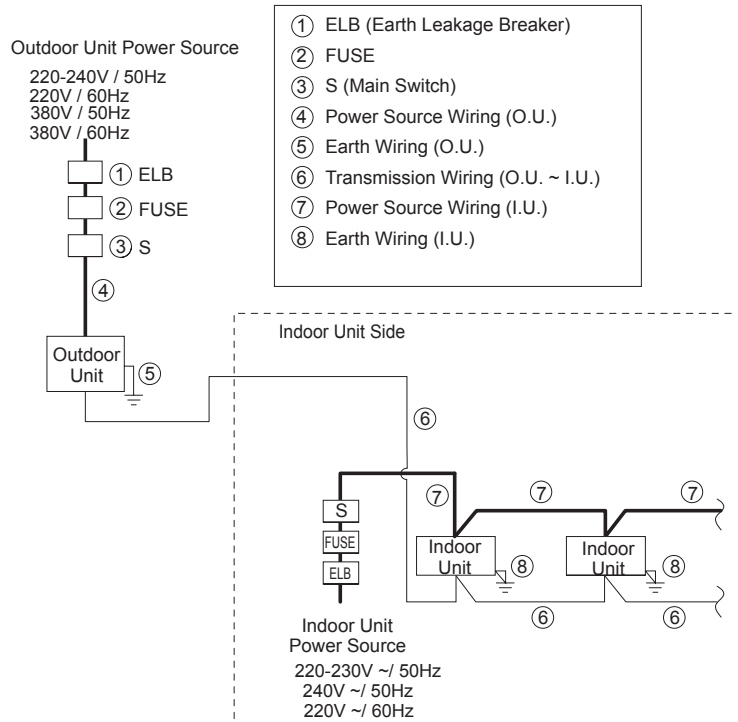
Keep the above tightening torques when wiring work.

NOTE:

Supply the power source of outdoor units and indoor units respectively.

(1) Power Source Wiring

Power source wiring is fundamentally according to this method.



6.1 Electric Data and Recommended Wiring, Fuse Size/1 Outdoor Unit

Model	Power Supply	MCA (A)	Power Source Cable Size	Transmitting Cable Size	Earth Wire Size (mm ²)	ELB		Fuse (A)
			EN60335-1 *1 (mm ²)	EN60335-1 *1 (mm ²)		Nominal Current (A)	Nominal Sensitive Current/(mA)	
28	220~240V/50Hz 220V/60Hz	19.5	4.0mm ²	0.75mm ²	4.0mm ²	25	30	25
34		27.5	4.0mm ²	0.75mm ²	4.0mm ²	32	30	32
43		31.5	4.0mm ²	0.75mm ²	4.0mm ²	40	30	40
43	380V~415V/50Hz 380V/60Hz	16.2	2.5mm ²	0.75mm ²	4.0mm ²	25	30	25

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

ELB: Earth Leakage Breaker

NOTE

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

Selection According to EN60335-1

Current i (A) Wire Size (mm²)

$i \leq 3$	1.0~2.5
$3 < i \leq 6$	1.0~2.5
$6 < i \leq 10$	1.0~2.5
$10 < i \leq 16$	1.5~4.0
$16 < i \leq 25$	2.5~6.0
$25 < i \leq 32$	4.0~10.0
$32 < i \leq 50$	6.0~16.0
$50 < i \leq 63$	10.0~25.0
$63 < i$	*2

*2: In the case that current exceeds 63A, do not connect cables in series.

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

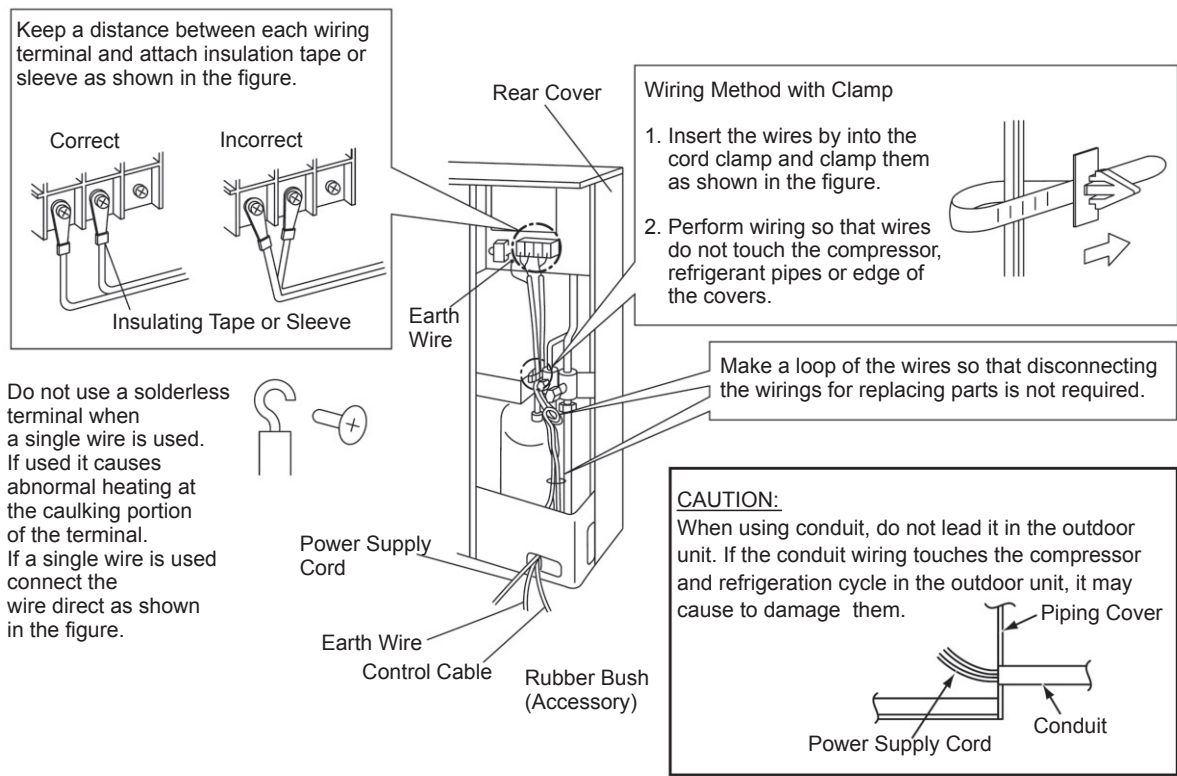


Fig. 6.6 Wiring Connection of Outdoor Unit

■ 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 table of the front page.

7. Test Run

Test run should be performed according to the 7.1 on page 64 . And use the 7.2 on page 65 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.**

7.1 Test Run and Maintenance Record

MODEL:	SERIAL NO:	COMPRESSOR MFG. NO:
CUSTOMER'S NAME AND ADDRESS:	DATE:	

1. Is the rotation direction of the indoor coil fan correct?
2. Is the rotation direction of the outdoor coil fan correct?
3. Are there any abnormal compressor sounds?
4. Has the unit been operated at least twenty (20) minutes?
5. Check Room Temperature

Inlet:	No.1DB /WB °C,	No. 2DB /WB °C,	No. 3DB /WB °C,	No.4DB /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

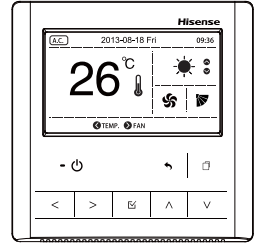
Discharge Pressure: _____	MPa
Suction Pressure: _____	MPa
9. Check Voltage

Rated Voltage: _____	V
Operating Voltage: _____	V
Starting Voltage: _____	V
10. Check Compressor Input Running Current

Input Power: _____	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?

7.2 Checking of Wire Connection by Test Run

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

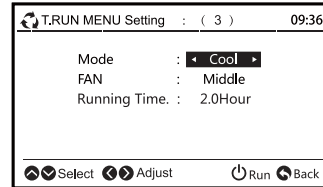
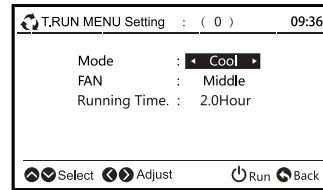
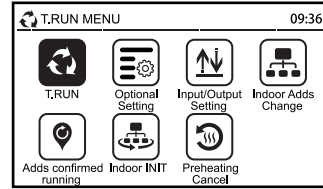
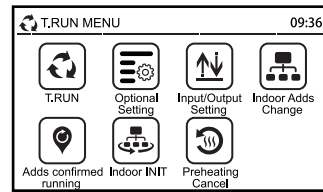


a. The test run menu will be displayed.

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

NOTE

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



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

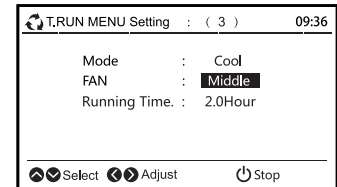
a. If the indicated number is not equal to the actual connected number of indoor unit, the auto-address function is not performed correctly due to incorrect wiring, the electric noise or etc. Turn OFF the power supply and correct the wiring after checking the following points; (Do not repeat turning ON and OFF within 10 seconds.)

- Power supply for indoor unit is not turned ON or incorrect wiring.
- Incorrect connection of connecting cable between indoor units or incorrect connection of controller cable.
- Incorrect setting of rotary switch and dip switch (the setting is overlapped) on the indoor units PCB.

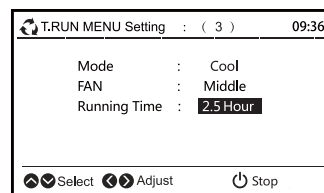
b. Press "⏻" (run/stop) to start the test run.

c. Press "< > ^ v" and set each item.

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

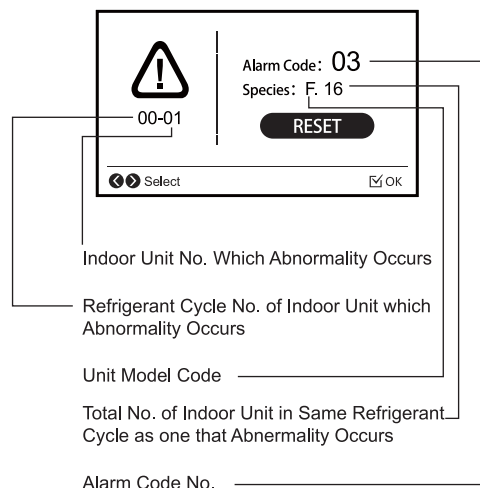


- (6) The temperature detections by the thermistors are invalid though the protection devices are valid during the test run.



- (7) To finish the test run, press "⏻" (run/stop) again or pass over the set test run time. When changing the test run time, press "^" or "v" to select "Running Time". Then, set the test run time (30 to 600 minutes) by pressing "<" or ">".

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



7.3 Alarm Code (AVW-28/34/43U(C/2)SB)

Code No.	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Activating of Protective Device	High water level in the drain pan, activate float switch
02	Outdoor Unit	Activating of Protective Device	Activation of PSH, Pipe Clogging. Excessive Ref., Inert Gas Mixing.
03	Transmission	Abnormality between Indoor and Outdoor	Incorrect Wiring. Loose Terminals,
04		Abnormality between Inverter and Control PCB	Disconnected wire, Tripping of Fuse. Transmission Failure (Loose Connector).
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	Excessive Ref Charge, Failure of Thermistor, Incorrect Wiring
08		Increase of Discharge Gas Temperature	Insufficient Ref.Charge, Pipe Clogging, Failure of Thermistor, Incorrect Wiring
11	Sensor on Indoor Unit	Inlet Air Thermistor	Incorrect Wiring. Loose Terminals Disconnected Wiring
12		Outlet Air Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
16		Remote Control Thermistor	
17		Remote Control Switch Thermistor	
19	Indoor Fan Motor	Failure of Indoor Fan Motor	Indoor Fan Motor is Overheated.
22	Sensor on Outdoor Unit	Outlet Air Thermistor	Incorrect Wiring, Disconnected Wiring
23		Discharge Gas Thermistor	
24		Evaporating Piping Thermistor	
31	System	Incorrect Capacity of O.U.and I.U.	Incorrect Setting of Capacity Combination
35		Incorrect Setting of I.U. No.	Duplication of Indoor Unit No.
38		Abnormality of Protective Circuit in O.U.	Failure of Protection Detecting Circuit
47	Pressure	Activation of Low-Pressure Decrease Protection Device(Vacuum Operation)	Insufficient Ref.,Ref.Pipe Clogging, Locking(Loose Connector)
48	Inverter	Activation of Inverter Overcurrent Protection Device	Overload Operation, Comp. Failure
51		Abnormal Current Sensor	Current Sensor Failure
53		Inverter Error Signal Detection	Driver IC Error Signal Detection,(Protection for Overcurrent,Low Voltage, Short-Circuit)
54		Increase of Inverter Fin Temperature	Abnormal Inverter Fin Thermistor, Heat Exchanger Clogging,Abnormal Fan
55		Inverter Failure	Inverter PCB Failure
57	Outdoor Fan	Fan Motor Failure	Disconnected Wiring/Incorrect Wiring between Control PCB(PCB1) and Fan Relay PCB(PCB3,PCB5), Fan Motor Failure
EE	Compressor	Compressor Protection Alarm	Failure of Compressor

7.4 Alarm code (AVW-43U(E/7)SB)

Code No.	Category	Content of Abnormality	Leading Cause
01	Indoor Unit	Activating of Protection Device	Activation of Float Switch, High Water Level in Drain Pan.
02	Outdoor Unit	Activating of Protection Device	Activation of PSH, Pipe Clogging, Excessive Ref., Inert Gas Mixing.
03	Transmission	Abnormality between I.U. and O.U./O.U. and O.U.	Incorrect Wiring, Loose Terminals, Disconnected wire, Tripping of Fuse.
04		Abnormality between Inverter PCB and O.U.PCB	Transmission Failure (Loose Connector).
05	Supply Phases	Abnormal Power Source Phase	Incorrect Power Source Connection to Reversed-Phase, Open Phase
06	Voltage Drop	Abnormal Inverter Voltage	O.U.Voltage Drop Insufficient Power Capacity
07	Cycle	Decrease of Discharge Gas Temperature	Excessive Ref.Charge, Failure of Thermistor, Incorrect Wiring
08		Increase of Discharge Gas Temperature	Insufficient Ref.Charge, Pipe Clogging, Failure of Thermistor, Incorrect Wiring
09	Outdoor Unit	Activation of Protection Device for Indoor Unit Fan	Fan Motor Overheat, Locking.
11	Sensor on Indoor Unit	Inlet Air Thermistor	Incorrect Wiring, Disconnected Wiring
12		Outlet Air Thermistor	
13		Freeze Protection Thermistor	
14		Gas Piping Thermistor	
16		Remote Control Thermistor	
17		Remote Control Switch Thermistor	
21	Sensor on Outdoor Unit	High Pressure Sensor	Incorrect Wiring, Disconnected Wiring
22		Outlet Air Thermistor	
23		Discharge Gas Thermistor	
24		Evaporating Piping Thermistor	
29		Low Pressure Sensor	
31	System	Incorrect Capacity of O.U.and I.U.	Incorrect Setting of Capacity Combination
35		Incorrect Setting of I.U.No.	Duplication of Indoor Unit No.
36		Incorrect Combination of I.U.No.	Refrigerant of Indoor Unit No.
38		Abnormality of Protective Circuit in O.U.	Failure of Protection Detecting Circuit
43	Pressure	Activation of Low-Pressure Decrease Protection Device	Detective Compression(Failure of Compressor of Inverter,Loose Power Supply Connection)
44		Activation of Low-Pressure Increase Protection Device	Overload at Cooling High Temp.at Heating Locking (Loose Connector)
45		Activation of High-Pressure Increase Protection Device	Overload Operation(Clogging,Short-Pass), Pipe Clogging, insufficient Ref.Inert Gas Mixing
47		Activation of Low-Pressure Decrease Protection Device(Vacuum Operation)	Insufficient Ref.,Ref.Pipe Clogging, Locking(Loose Connector)
48	Inverter	Activation of Inverter Overcurrent Protection Device	Overload Operation, Comp.Failure
51		Abnormal Current Sensor	Current Sensor Failure
53		Inverter Error Signal Detection	Driver IC Error Signal Detection,(Protection for Overcurrent,Low Voltage, Short-Circuit)
54		Increase of Inverter Fin Temperature	Abnormal Inverter Fin Thermistor, Heat Exchanger Clogging,Abnormal Fan
55		Inverter Failure	Inverter PCB Failure
57	Outdoor Fan	Fan Motor Abnormality	Disconnected Wiring/Incorrect Wiring between Control PCB(PCB1) and Fan Relay PCB(PCB3,PCB5), Fan Motor Failure
EE	Compressor	Compressor Protection Alarm	Failure of Compressor
b1	Indoor Unit No. Setting	Incorrect of Address or Ref.Cycle setting	Over 64 NO.is set for Address or Ref.Cycle
b5	Indoor Unit No.Connected	Incorrect I.U.No. Connected	More than 17 Non-Corresponding to H-LINK 2 Units are Connected to One System

8. Safety and Control Device Setting

● Compressor Protection

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

● Fan Motor Protection

When the thermistor temperature is reached to the setting, motor output is decreased. The other way, when the temperature becomes lower, limitation is cancelled.

Automatical Reset, Non-Adjustable

Model					43
For Compressor Pressure Switch	Cut-Out	Mpa	$4.15_{-0.20}^{+0.05}$	$4.15_{-0.20}^{+0.05}$	$4.15_{-0.20}^{+0.05}$
	Cut-In	Mpa	$3.2_{-0.20}^{+0.15}$	$3.2_{-0.20}^{+0.15}$	$3.2_{-0.20}^{+0.15}$
For Control Pressure Switch	Cut-Out	Mpa	2.85 ± 0.1	2.85 ± 0.1	2.85 ± 0.1
	Cut-In	Mpa	$3.6_{-0.15}^0$	$3.6_{-0.15}^0$	$3.6_{-0.15}^0$
Fuse 1 ϕ , 220V~240V, 50Hz z k <k	A		40	50	50
3 ϕ , 380~415V, 50Hz 3 ϕ , 380V, 60Hz	A		—	—	25
CCP Timer Setting Time	min.		3	3	3
For Control Circuit Fuse Capacity on PCB1	A		5	5	5

Service and Maintenance



1. Maintenance

1.1 Regular Check

To ensure operational reliability and extend the service life, pay particular attention to the following additional items:

1) For Indoor Unit and Outdoor Unit

a) Fan and Fan Motor

- Lubrication - All fan motors are charged lubricant oil at the factory, therefore maintenance work does not need oil charging.
- Noise and Vibration - Check abnormal sound and vibration
- Rotation - Check rotation direction, which should be clockwise, and check rotation speed
- Insulation - check the electrical insulation resistance

b) Heat Exchanger

- Blockage - Check regularly and remove dirt and dust accumulated at the heat exchanger. For outdoor units, remove things which hamper air circulation such as higher lawn or paper etc.

c) Pipe Connection

- Leakage - Check refrigerant leak of connecting pipes

d) Unit Cover

- Rust and Oil stain - Check and remove any rust and oil stain
- Tightening Screws - Check and tighten loose screws or missing screws ● Insulation - Check and restore off insulation material

e) Electrical Equipment

- Effectiveness - Check validity of AC contactor, intermediate relay, PCB etc.
- Wiring Situation - Pay attention to working voltage, current and three-phase equilibrium rate; check loose terminals, contact oxidation, sundries and other caused poor contact; check the electrical insulation resistance

f) Control and protection facilities

- Setting - Do not adjust the settings in the field, unless the original setting does not comply with the requirements of "safety and control facilities setting".

2) For Indoor Unit

a) Filter

- Cleaning – Check and remove dirt and dust in reference to requirements of "Filter cleaning"

b) Drain pan, Condensate pump and Drain pipe

- Drain pipe - check and clean the condensate pipe at least twice annually
- Condensate pump - Check effectiveness of the condensate pump

c) Float switch

- Effectiveness - check the effectiveness of the float switch

3) For Outdoor Unit

a) Compressor

- Sound and Vibration - check abnormal sound and vibration
- Effectiveness - Check the voltage drop of power supply is within 16%; and within 2% during operation.

b) Reversing Valve

- Effectiveness – Check abnormal sound in action

c) Refrigerant Filter

- Blockage - Check temperature difference between two ends of the filter

d) Earth Wire

- Earth Wire - Check connectivity to the ground

e) Oil Heater

- Effectiveness – By turning on the main power supply, the oil heater should be heated effectively at least 12 hours before starting the unit.

4) For Wired Remote Control

- Switch and Display - Check effectiveness of switch

2. Troubleshooting

2.1 Preliminary Check

2.1.1 The following phenomena are not abnormal

1) Give off odor from indoor unit

The indoor unit absorbs odor after a long term operation. Clean the filter and grille or keep good ventilation.

2) Deformed parts generate noises.

When the unit is started or stopped, friction sound may be heard. This is due to the thermal deformation of the plastic parts, which is not abnormal.

3) The outdoor unit heat exchanger sends out steam.

The outdoor unit heat exchanger produces steam due to frost melting before defrost operation.

4) Condensation of air louver

After long time cooling operation and in high humidity condition (above 27°CDB/80%R.H) the air louver may be covered condensation.

5) Refrigerant Flow Noise

Sound of refrigerant flow may be heard when the unit starts or stops.

2.1.2 Cooling or heating effect is not good

- Check if the air flow of outdoor unit or indoor unit is smooth
- Check if there are too many heat sources inside the room
- Check if the air filter is clogged with dust
- Check if the doors and windows are closed
- Check if the outdoor temperature is within normal operating range

2.1.3 The unit does not operate.

- Check the electrical wiring
- Check the DIP switch settings
- Check if "SET TEMP" is set correctly
- If "Running" indicator of wired remote control flashes once every two seconds, check wiring connection of wired remote control.
- If "Running" indicator flashes five times every five seconds associated with Unit No. and alarm code display, see the next section "2.2 Overhaul through Alarm Code".

2.2 Overhaul through Alarm Code

During operation, the alarm code will be displayed as follows if a failure occurs.

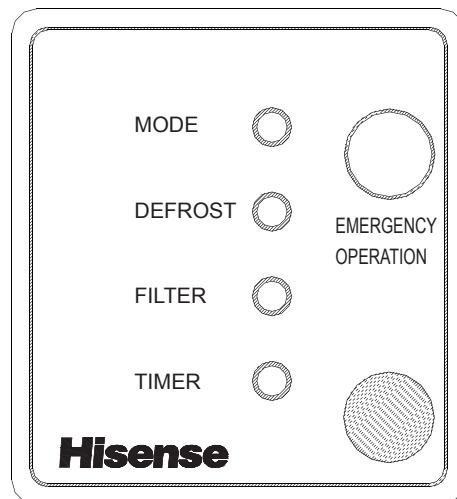
Note: Be sure to completely cut off the power before repairing electrical components.

Wired Remote Control Alarm Code Display

Indication	Failure	Possible Cause	Measure																																
Running indicator flashes once every 2 seconds.	Transmission failure between indoor unit and wired remote control	Breakage or poor contact of wired remote control wires IC or Control chip defects	Find the reason and repair Check through self-test function of wired remote control																																
Run indicator flashes 5 times every 5 seconds, and accompanied by the display system number and the alarm code Wired Controller Hisense	"Failure" 03 Unit No: 3 02 "Outdoor Unit Protective Action" Alarm Code	System number is displayed on the wired remote control	<table border="1"> <thead> <tr> <th>Unit No.0</th><th>Unit No.1</th><th>Unit No.2</th><th>Unit No.3</th><th>Unit No.4</th><th>Unit No.5</th><th>Unit No.6</th><th>Unit No.7</th> </tr> </thead> <tbody> <tr> <td>00</td><td>01</td><td>02</td><td>03</td><td>04</td><td>05</td><td>06</td><td>07</td> </tr> <tr> <th>Unit No.8</th><th>Unit No.9</th><th>Unit No.10</th><th>Unit No.11</th><th>Unit No.12</th><th>Unit No.13</th><th>Unit No.14</th><th>Unit No.15</th> </tr> <tr> <td>08</td><td>09</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td> </tr> </tbody> </table> <p>Note: When a failure occurs, the alarm code is displayed simultaneously on the 7-segment nixie tube of the outdoor unit PCB1.</p>	Unit No.0	Unit No.1	Unit No.2	Unit No.3	Unit No.4	Unit No.5	Unit No.6	Unit No.7	00	01	02	03	04	05	06	07	Unit No.8	Unit No.9	Unit No.10	Unit No.11	Unit No.12	Unit No.13	Unit No.14	Unit No.15	08	09	10	11	12	13	14	15
Unit No.0	Unit No.1	Unit No.2	Unit No.3	Unit No.4	Unit No.5	Unit No.6	Unit No.7																												
00	01	02	03	04	05	06	07																												
Unit No.8	Unit No.9	Unit No.10	Unit No.11	Unit No.12	Unit No.13	Unit No.14	Unit No.15																												
08	09	10	11	12	13	14	15																												

Signal Receiver Alarm Code Display

- When protective device is activated in normal operation, running lamp of signal receiver will flash by cycle of 0.5 sec ON / 0.5 sec OFF.
- Alarm code can be confirmed by flash times of defrosting indicator and filter indicator.
Defrosting Indicator: Flash times represent 10-digit number of alarm code
Filter Indicator: Flash times represent single-digit number of alarm code
E.g. The alarm code 35: After defrosting indicator flashes 3 times by cycle of 0.5 sec ON / 0.5 sec OFF, the filter indicator flashes 5 times by cycle of 0.5 sec ON / 0.5 sec OFF. The above action is repeated before the alarm is terminated.
- Classification of Signal Receiver Display
Abnormality: Running indicator (red), defrosting indicator (green), and filter indicator (yellow) flash. Contact the local office or service provider after confirming the flash conditions.
Power cut: All displays disappear. The unit stops because of power cut, it will not run even it is re-energized. Perform a running operation.
Interference: All displays disappear. The unit is likely to stop. This is because the microprocessor reacts to influence of interference in order to protect the device.





2.3 Troubleshooting in check mode

Each “Check Menu” item and its function are explained in the following table.

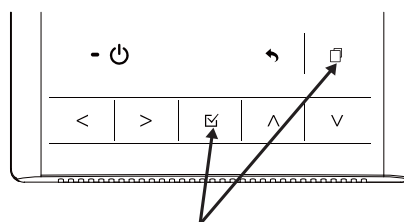
Check menu item	Function
Check 1	Sensor condition of air conditioner will be monitored and indicated.
Check 2	Sensor data of air conditioner prior to alarm occurrence will be indicated.
Alarm Record	Previous alarm record (date, time, alarm code) will be indicated. ※
Species	Model name and manufacturing number will be indicated.
IDU/ODU Diagnosis	The result of PCB check will indicated.
Self Diagnosis	Checking of remote control switch will be carried out.


※ To Erase Alarm Record

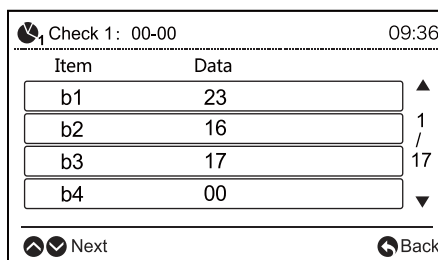
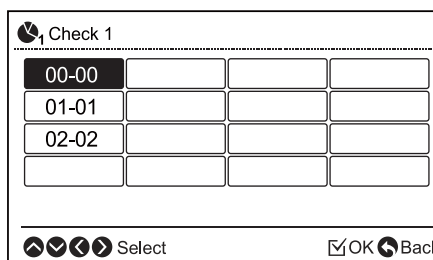
Press “

Select “Yes” and press “

Indication of Check Menu

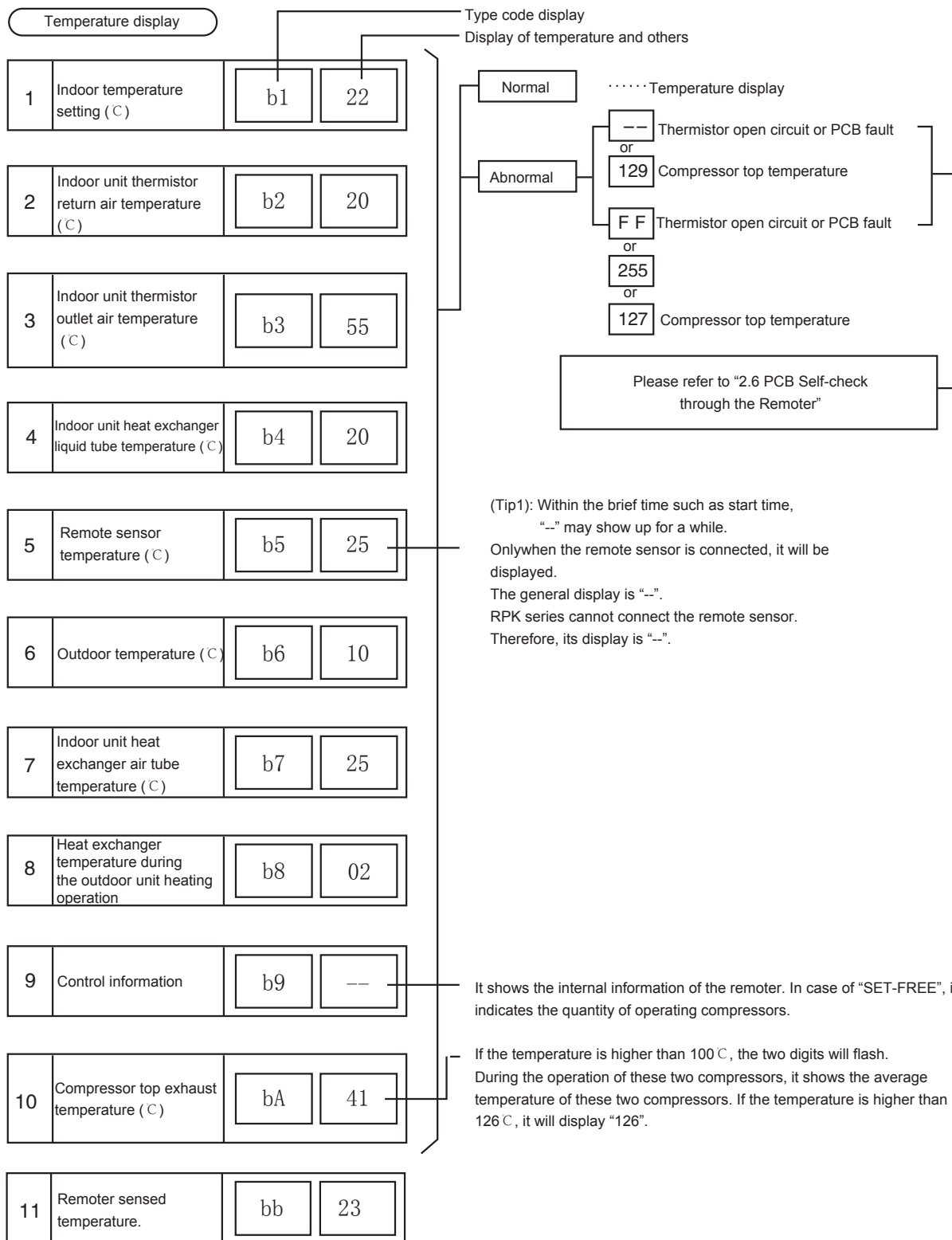


Press and hold “



2.3.1 Content of Check Mode 1

Press "∧" part of "TEMP" switch, the next display will appear. If Press "∨" part of "TEMP" switch, the previous display will appear.



(Tip1): Within the brief time such as start time, "--" may show up for a while.
 Only when the remote sensor is connected, it will be displayed.
 The general display is "--".
 RPK series cannot connect the remote sensor.
 Therefore, its display is "--".

It shows the internal information of the remoter. In case of "SET-FREE", it indicates the quantity of operating compressors.

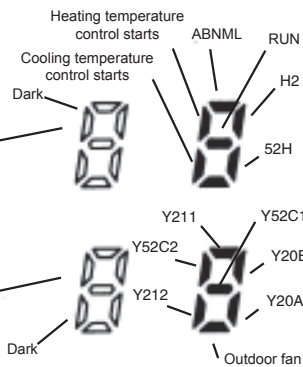
If the temperature is higher than 100 C, the two digits will flash.
 During the operation of these two compressors, it shows the average temperature of these two compressors. If the temperature is higher than 126 C, it will display "126".

12	Remoter sensed humidity (optional).	bC	00
----	-------------------------------------	----	----

Microcomputer output/ input display

13	Indoor unit microcomputer input/ output.	C1	
----	--	----	--

14	Outdoor unit microcomputer input/ output.	C2	-
----	---	----	---



Symbols with the letter "Y" are PCB relays.

Shutdown cause display

15	Cause for shutdown	d1	01
----	--------------------	----	----

Abnormal occurrences counter

16	Abnormal occurrence times	E1	01
----	---------------------------	----	----

17	Indoor unit momentary power failure occurrence times.	E2	00
----	---	----	----

18	Remoter and indoor unit transmission error occurrence times	E3	00
----	---	----	----

19	Frequency converter abnormal occurrence times	E4	00
----	---	----	----

Automatic louver state display

20	Louver sensor	F1	00
----	---------------	----	----

00	Stop the operation and turn off the power
01	Temperature control switch (Tip1)
02	Alarm (Tip2)
03	Freeze protection, overheat protection
05	Outdoor unit momentary power failure, reset (Tip3)
06	Indoor unit momentary power failure, reset (Tip4)
07	Cease of cooling operation due to low outdoor temperature and cease of heating operation due to high outdoor temperature
09	It needs four-way valves to shift to the shutdown
10	It needs forced shutdown.
11	Restart due to the reduced pressure ratio
12	Restart due to the increased low pressure
13	Restart due to the increased high pressure
15	Restart due to the excessively high exhaust temperature and low air inlet pressure.
16	Restart due to the reduced exhaust superheat
17	Restart due to the tripping of the frequency converter
18	Restart due to the reduced voltage
19	Expansion valve opening change protection
20	Indoor unit run mode shift (Tip5)
21	Forced temperature controlled shutdown
22	Forced temperature controlled shutdown (Preheating)
26	Insufficient high pressure, restart

(Tip1): Term definition

Temperature controlled startup: The indoor unit requires the running of the compressor.

Temperature controlled shutdown: The indoor unit does not require the running of the compressor.

(Tip2): Even if the poweroff is caused by the "AlarmABNML", "02" will not always be displayed.

(Tip3): If the communication between the frequency converter PCB and control PCB cannot be carried out within 30 seconds, the outdoor unit will be closed down. In this case, the shutdown is the cause for d1-05 and the alarm code "04" may be displayed.

(Tip4): If the communication between the indoor unit and outdoor unit cannot be carried out within 3 minutes, the outdoor unit will be closed down. In this case, the shutdown is the cause for d1-06 and the alarm code "03" may also be displayed.

(Tip5): "20" will be displayed in different modes of the indoor units. It can be numbered to 99.

If over 99, "99" will always be displayed.

(Tip1): If the communication error lasts for 3 minutes, the occurrence times will be added with 1.

(Tip2): The reserved parameters can be removed with the method indicated in 2.6 "PCB Self-Check through the Remoter".

Next page

Compressor pressure/ frequency display

21	Exhaust pressure (high pressure) (0.1MPa)	H1	18
----	---	----	----

22	Air inlet pressure (low pressure) (0.01MPa)	H2	04
----	---	----	----

23	Control information	H3	44
----	---------------------	----	----

It shows the internal information of the remoter. There's no special meaning.

24	Operation frequency (Hz)	H4	44
----	--------------------------	----	----

When two compressors are running together, it displays the total frequency.

Indoor unit capacity display

25	Indoor unit capacity	J1	08
----	----------------------	----	----

Indoor unit capacity is shown as below.

26	Outdoor unit number	J2	U. n
----	---------------------	----	------

27	Cooling system number	J3	01
----	-----------------------	----	----

28	Cooling system number	J4	00
----	-----------------------	----	----

Indoor unit capacity code:

Code	Indoor unit capacity mark	Horsepower
06	22	0.8
08	28	1.0
10	36	1.3
11	40	1.5
13	45	1.8
14	50	2.0
16	56	2.3
18	63	2.5
20	71	2.8
22	80	3.0
26	90	3.3
32	112	4.0
40	140	4.5

Expansion valve opening display

29	Indoor unit expansion valve opening (%)	L1	20
----	---	----	----

30	Outdoor unit expansion valve MV1 opening (%)	L2	99
----	--	----	----

"n" represents the total quantity of indoor units.

$$n = 01-16$$

J3:01-16 (01, decimal display before delivery (DSW5))
J4:00-0F (00, hexadecimal display before delivery (DSW5))

31	Outdoor unit expansion valve MV2 opening (%)	L3	99
----	--	----	----

In case of the unit without expansion valves, it displays the same digits.

32	Control information	L4	00
----	---------------------	----	----

Estimated current display

	Compressor working current (A)	P1	25
--	--------------------------------	----	----

When several compressors are running at the same time, it displays the total current.
When the inverter compressor is running, it displays the current on the frequency converter side.

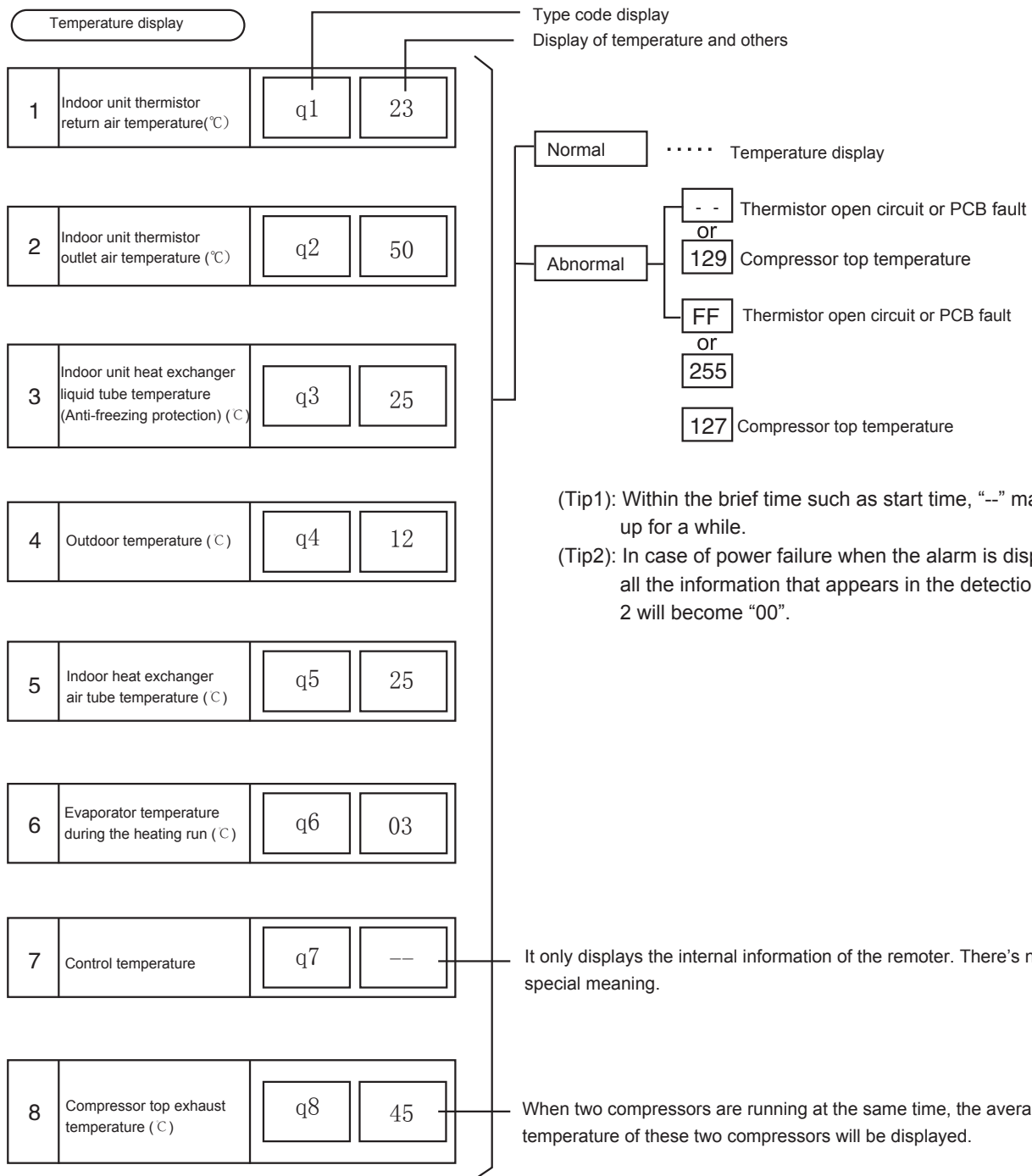
Back to temperature display

Temperature display

2.3.2 Content of Check Mode 2

When more than three units are connected to a remote control, the latest parameters of three continuously connected indoor units in the first group will be displayed.

Press " ^ " part of "TEMP" switch, the next display will appear. Press " v " part of "TEMP" switch, the previous display will appear.



Next page

Compressor pressure/ frequency display

9	Exhaust pressure (high pressure) (0.1MPa)	q9	18
---	---	----	----

10	Air inlet pressure (low pressure) (0.1MPa)	qA	04
----	--	----	----

11	Control information	qb	44
----	---------------------	----	----

It displays the internal information of the remoter.
There's no special meaning.

12	Operation frequency (Hz)	qC	44
----	-----------------------------	----	----

When two compressors are running at the same time,
it'll display the total frequency.

Expansion valve opening display

13	Indoor unit expansion valve opening (%)	qd	20
----	--	----	----

14	Outdoor unit expansion valve MV1 opening (%)	qE	99
----	---	----	----

Estimated current display

15	Compressor working current (A)	qF	20
----	-----------------------------------	----	----

When two compressors are running at the same
time, it'll display the total current.

Back to temperature display

Temperature display

2.4 Repairs through the outdoor unit seven segment display

2.4.1 Simple check through the seven segment digital display

1	※ Turn on all the indoor units
---	--------------------------------

※ All the indoor and outdoor units are connected.

2	Turn on the outdoor unit
---	--------------------------

During the automatic addressing, the following items can be checked with the seven segment digital display on the outdoor unit.

3	Start automatic addressing
---	----------------------------

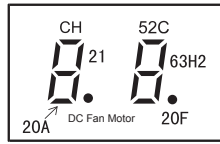
- (1) Poweroff of the indoor unit.
- (2) Reverse connection of operation lines between the outdoor and indoor units.
- (3) Repeated numbers of the indoor units.

Outdoor unit PCB1

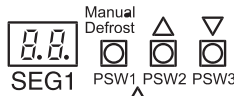
2.4.2 Detection method through the outdoor unit seven segment digital display

Through the 7 segment digital display and detection switch (PSW) on the outdoor unit PCB, it is possible to check all the parts and operation conditions of the cooling system. During the data detection, please do not touch other electrical components in addition to the following switch to prevent from electric shock. Please keep the tools from electrical components; otherwise it may damage the electrical components.











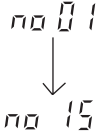



Start Checking
Press "PSW2" switch for 3 seconds or more.



Press "PSW2" switch to perform a check;
Press "PSW2" switch to return to previous menu; press "PSW2" switch for more than 3 seconds to cancel the check.



Check Item	Display	Data Range	Remarks
Output state of outdoor chips	5L	Display only when digital display complies with devices shown in figure	
Total capacity of operating indoor units	0P	0 to 99 (Display Total Indoor capacity Code)	
Inverter Frequency (Command Value)	H1	0-115 (Hz) (0-99: Display 0 to 99, 100 -115: Flashing display 00-15)	
Number of operating compressors	LL	0~1 (Unit)	
Outdoor Fan Motor Speed	F0	0~15	
Outdoor Expansion Valve Opening (EVO) Degree	0E	0 to 99 (%): Display 0-99 100 (%): Flashing display 00	
High Pressure (Conversion value)	Pd	0.0~5.6(MPa) Pd sensor open circuit: 5.6 short-circuit: 0.0	
Low Pressure (Conversion value)	Pg	0.0~2.2(MPa) Ps sensor open circuit: 2.2 short-circuit: 0.0	
Compressor Discharged Air Temperature	Td	1~142(°C) (0 to 99: display 0-99 100 to 142: Flashing display 00 to 42.) Sensor circuit break: 0 Short circuit: 255	
Evaporation Temperature in Heating (Te)	TE	-19~80(°C) Sensor circuit break: -127; short circuit: 127	
Out Gas Temperature (Ta)	To	-19~80(°C) Sensor circuit break: -127; short circuit: 127	
Compressor Current	A1	0~99(A)	
Indoor Expansion Valve Opening Degree Unit No. 0 ↓ Unit No. 63	1E00 ↓ 1E63	0 to 99 (%): Display 0-99 100 (%): Display 00	Display Mode: Project content + Flashing circular display of Indoor unit No. E.g. Electronic expansion valve opening degree of indoor unit No. 00 of is displayed as "1E" and "00" circularly.
Indoor Heat Exchange Liquid Pipe Temperature Unit No. 0 ↓ Unit No.63	TL00 ↓ TL63	-19~80(°C)	
Indoor Heat Exchange Gas Pipe Temperature Unit No.0 ↓ Unit No.63	TO00 ↓ TO63	-19~80(°C)	
Indoor Return Air Temperature Unit No.0 ↓ Unit No.63	TL00 ↓ TL63	-19~80(°C)	
Indoor Our Air Temperature Unit No.0 ↓ Unit No.63	TO00 ↓ TO63	-19~80(°C)	
Indoor Unit Capacity Unit No.0 ↓ Unit No.63	CA00 ↓ CA63	6~96 (Indoor capacity code display)	

Check Item	Display	Data Range	Remarks
Shrink Control to prevent excessively low pressure ratio		0: Shrink control is not activated. 1: Shrink control is activated.	
Shrink Control to prevent excessively high pressure ratio		0: Shrink control is not activated. 1: Shrink control is activated.	
Shrink control to prevent inverter radiator temperature rise		0: Shrink control is not activated. 1: Shrink control is activated.	
Shrink control to prevent excessively high discharged air temperature		0: Shrink control is not activated. 1: Shrink control is activated.	
Shrink control to prevent excessively low TdSH		0: Shrink control is not activated. 1: Shrink control is activated.	
Shrink control to prevent over-current		0: Shrink control is not activated. 1: Shrink control is activated.	
Compressor 1 Cumulative operation time		0-9999(X10 hours) Over 9999 0	
Compressor 1 Cumulative operation time (May be cleared)		0-9999(X10 hours)	
Outdoor and accumulative heat alarm code		0-99	
Inverter shutdown reason code		0~16	
Abnormal record 1 (latest) ↓ Abnormal record 15		Maintaining function records for abnormal operation (Display method: no + (1 ~ 15) flashing circular display)	
Total capacity of connected indoor units		0-99 (Total indoor capacity code display)	
Number of connected indoor units		0~4 (Units)	
Refrigerant cycle address		0-63	

2.5 Protection control code of seven-segment digital display

- 1) When protection control is activated, the protection control code is displayed on the seven-segment digital display.
- 2) When protection function is cancelled, the displayed symbols disappear.
- 3) When several protection controls are activated, protection codes are displayed according to priority. (Priority as follows)
 - a) Protection control code related to frequency control is prior to others.

< Priority >

 - * High pressure rise protection
 - * Over-current protection
 - * Anti cold wind protection
 - * Low pressure ratio control in cooling operation
 - b) For Retry control, if there is not protective control display related to frequency control, then display the latest retry.

Code	Protection control	Code	Protection control
P. 1	Retry control for excessively low pressure ratio	P. 5	Retry control for excessively low Ps / excessively high Td
P. 2	Retry control for excessively high Ps	P. 6	Retry control for excessively low TdSH
P. 3	Retry control excessively high Pd	P. 7	Retry control for inverter TRIP (Contains retry for inverter heat radiator temperature rise)
P. 4	Over-current retry control of compressor	P. 8	Retry control for inverter under-voltage / overvoltage

Note: In 7-segment, decimal point represents ten's place " 1 " , i.e. P. 1 represents P11, and so on.

- Retry display will last 30 minutes, unless there is protection and control to display.
- Retry display disappears when all indoor units send stoppage signal.

Note:

When abnormal operation occurs, the protection control code displayed on 7-segment display will be replaced by alarm code. At the same time, the same alarm code is displayed on the wired remote control.

- Reason for inverter stoppage

Code	Reason	Relevant indoor unit stoppage reason	Remarks	
			Display during retry	Alarm code
1	Power module (IPM failure) automatically stops (over-current, under-voltage, short-circuit protection)	17	P. 7	53
2	Instantaneous over-current	17	P. 7	48
3	Inverter heat sink temperature abnormality	17	P. 7	54
4	Over-current	17	P. 7	48
5	Under-voltage	18	P. 8	06
6	Over-voltage	18	P. 8	06
7	Inverter transmission abnormality	18	--	04
8	Current check abnormality	17	P. 7	51
9	Instantaneous power shutdown check	18	--	--
11	Inverter microcomputer reset	18	--	--
12	Compressor ground connection check failure (only startup)	17	P. 7	53
13	Power phase abnormality (open-phase)	18	--	--
16	Inverter PCB abnormality	18	P. 8	55

Table 2.1 Conditions of protection control code activation

In order to adapt to conditions such as temperature changes, control frequency etc. through protective control functions to prevent abnormal situations. Activation conditions of protective control functions are shown in the following table

Code	Protection control	Activation conditions
P1	Pressure ratio control	Low pressure ratio $\epsilon \leq 1.8$ High pressure ratio $\epsilon \geq 8.0 - T_a/10$ ($T_a < 0$) $\epsilon = 8.0$ ($T_a \geq 0$)
P2	High pressure rise protection	Frequency drops when pressure switch for control is activated.
P3	Over-current protection	Frequency drops when inverter output current $\geq (* 1A)$
P4	IPM heat sink temperature rise protection	Frequency drops when inverter heat-sink temperature $\geq 82^\circ C$
P5	Discharged gas temperature rise protection	Frequency drops when temperature of top compressor is high, and display when temperature of top compressor $\geq 107^\circ C$.
P6	Excessively low pressure protection	Frequency drops when pressure switch for control is activated.
P9	Prevent high pressure - low control	$P_d \leq 1.0MPa$
Pc	Control to prevent excessively low TdSH	$T_d - T_c \leq 10^\circ C$ continued for 30 minutes or more
Pd	Control to prevent excessively high low pressure	$P_s \geq 1.24MPa$

Note:

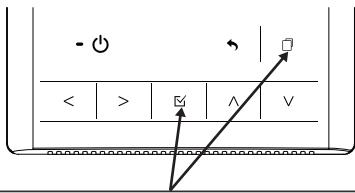
1. In protection control period (except alarm stoppage), protection control code is displayed.
2. Protection control code is displayed during protection control; the code disappears when protection control is cancelled.
3. After retry control, monitoring state lasts for 30 minutes
4. Maximum value of (* 1) is as follows:



(*1)

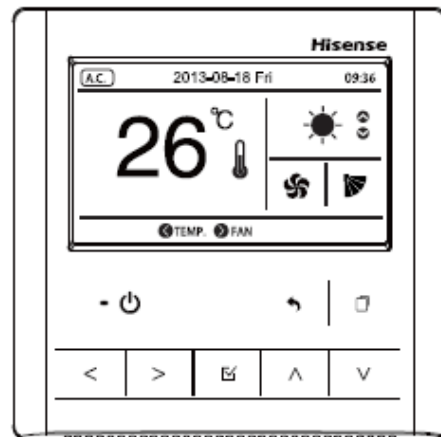
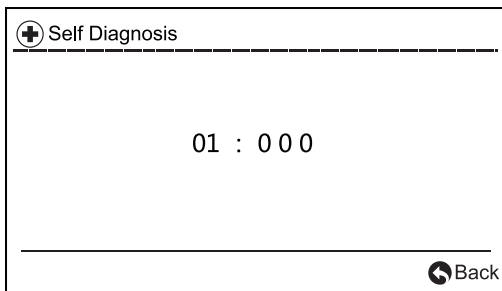
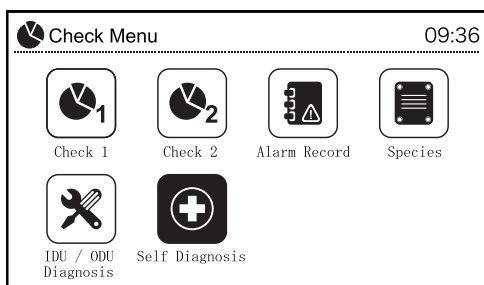
Model	28	34	43
220V			
Current (A)	19.5	27.5	31.5

Model	43
380V	
Current (A)	16.2

2.6 Self-test of wired remote control



Press and hold “” (menu) and “” simultaneously for at least 3 seconds during the normal mode. The check menu will be displayed.



3. Steps of Compressor Maintenance and Replacement

Unit of this series is small and exquisite. Space is limited when performing compressor replacement operation. Please follow the steps outlined below:

Step 1: Dismantle external sheet metal, electrical box assembly, stop valve mounting plate completely, and remove the compressor sound-proof shield and crankcase heater, the final is as shown in figure 3.1.

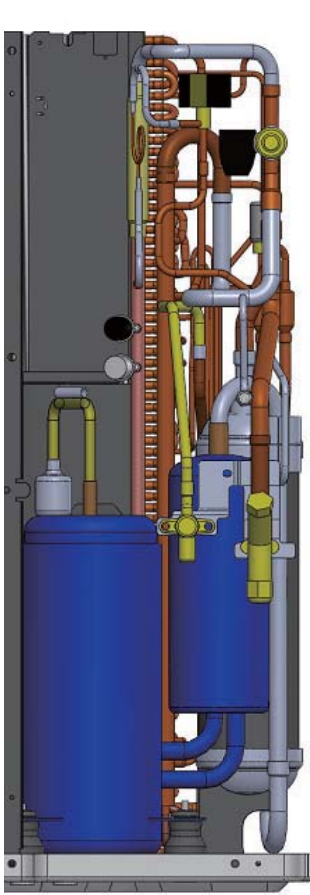


Figure 3.1

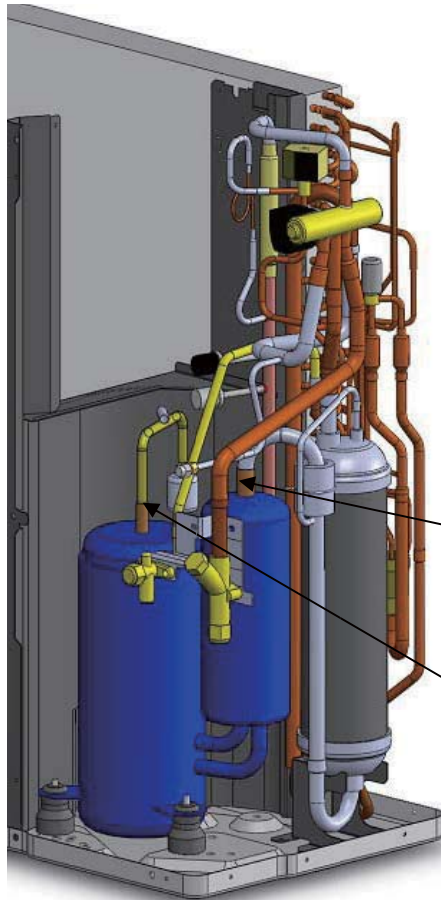
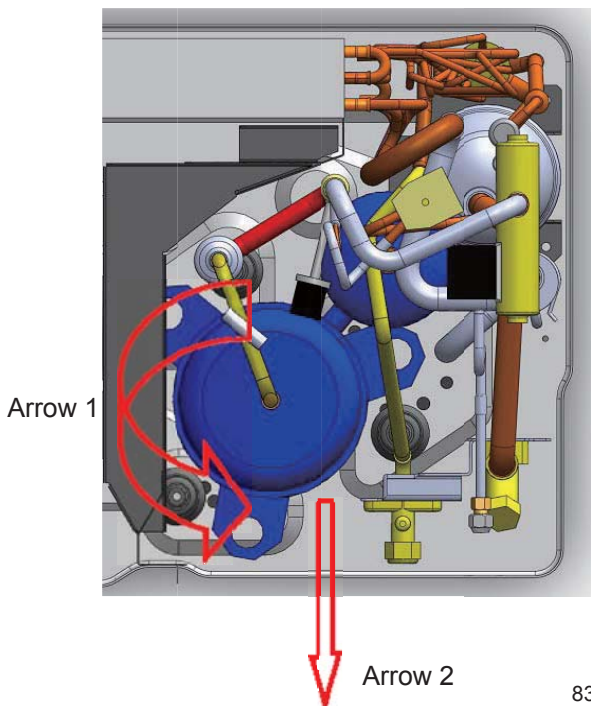


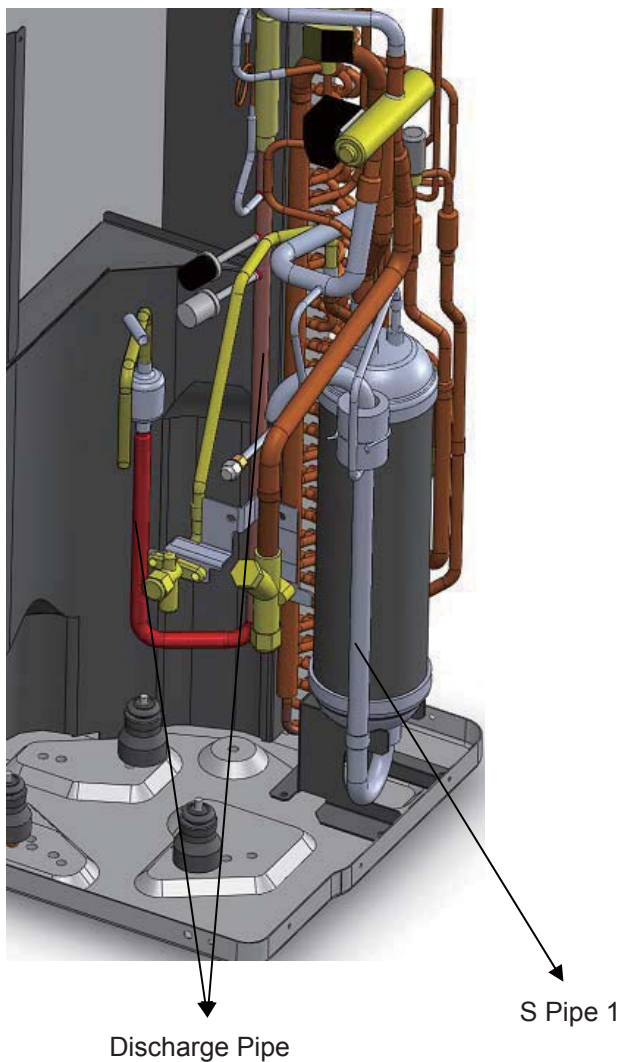
Figure 3.2

Step 2: Open compressor electrical box cover, remove compressor wires and unfasten the compressor anchor bolts, then tip off the discharge opening and suction opening of compressor with a welding torch, as shown in Figure 3.2.

Step 3: Lift the compressor and rotate a certain angle along direction of arrow 1, and take it out along direction of arrow 2, as shown in Figure 3.3.



Step 4: When replacing compressor, install according to the above steps. After welding, wiring and fixing, install compressor sound-proof shield. Because there are two layers of sound-proof shield, the outer layer needs to be installed first, and then the inner layer. Finally after wiring of electrical box, mount the sheet metal and restore it.



Note: When installing compressor sound-proof shield, install the outer shield first, which needs to enclose discharge pipe, piping S; the inner layer simply needs to enclose the compressor.