

Service Manual

"R" SERIES INVERTER-DRIVEN AIR CONDITIONING UNITS

Type	Model
OUTDOOR UNITS	DHR18CSB21S DHR24CSB21S DHR30CSB21S DHR36CSB21S DHR42CSB21S DHR48CSB21S

Type	Model
INDOOR UNITS DUCT	DHR18NDB21S DHR24NDB21S DHR30NDB21S DHR36NDB21S DHR42NDB21S DHR48NDB21S

Type	Model
INDOOR UNITS CASSETTE	DHR18NKB21S DHR24NKB21S DHR30NKB21S DHR36NKB21S DHR42NKB21S DHR48NKB21S

Type	Model
INDOOR UNITS CEILING	DHR18NCB21S DHR24NCB21S DHR30NCB21S DHR36NCB21S DHR42NCB21S DHR48NCB21S

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PLEASE READ AND UNDERSTAND THIS MANUAL BEFORE USING THIS INVERTER-DRIVEN AIR CONDITIONING UNIT. KEEP THIS MANUAL FOR FUTURE REFERENCE.



Important Notice

- Johnson Controls, Inc. pursues a policy of continuing improvement in design and performance in its products. As such, Johnson Controls, Inc. reserves the right to make changes at any time without prior notice.
- Johnson Controls, Inc. cannot anticipate every possible circumstance that might involve a potential hazard.
- This inverter air conditioning unit is designed for standard air conditioning applications only. Do not use this unit for anything other than the purposes for which it was intended for.
- The installer and system specialist shall safeguard against leakage in accordance with local pipefitter and electrical codes. The following standards may be applicable, if local regulations are not available. International Organization for Standardization: (ISO 5149 or European Standard, EN 378). No part of this manual may be reproduced in any way without the expressed written consent of Johnson Controls, Inc.
- This inverter-driven (cooling or heat pump) air conditioning unit will be operated and serviced in the United States of America and comes with all required Safety, Danger, and Caution, warnings.
- If you have questions, please contact your distributor or dealer.
- This manual provides common descriptions, basic and advanced information to maintain and service this inverter-driven (cooling or heat pump) air conditioning unit which you operate, as well for other models.
- This inverter-driven (cooling or heat pump) air conditioning unit has been designed for a specific temperature range. For optimum performance and long life, operate this unit within range limits.
- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.

Product Inspection upon Arrival

1. Upon receiving this product, inspect it for any damages incurred in transit. Claims for damage, either apparent or concealed, should be filed immediately with the shipping company.
2. Check the model number, electrical characteristics (power supply, voltage, and frequency rating), and any accessories to determine if they agree with the purchase order.
3. The standard utilization for this unit is explained in these instructions. Use of this equipment for purposes other than what it designed for is not recommended.
4. Please contact your local agent or contractor as any issues involving installation, performance, or maintenance arise. Liability does not cover defects originating from unauthorized modifications performed by a customer without the written consent of Johnson Controls, Inc. Performing any mechanical alterations on this product without the consent of the manufacturer will render your warranty null and void.

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1. Introduction

This manual concentrates on inverter-driven cooling or heat pump air conditioning units. Read this manual carefully before installation.

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

2. Important Safety Instructions

Safety Messages

	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
	Indicates information considered important, but not hazard-related (for example, messages relating to property damage).
General Precautions	
	To reduce the risk of serious injury or death, read these instructions thoroughly and follow all warnings or cautions included in all manuals that accompanied the product and are attached to the unit. <i>Refer back to these safety instructions as needed.</i>

- This system should be installed by personnel certified by Johnson Controls, Inc. Personnel must be qualified according to local, state and national building and safety codes and regulations. Incorrect installation could cause leaks, electric shock, fire or explosion. In areas where Seismic Performance requirements are specified, the appropriate measures should be taken during installation to guard against possible damage or injury that might occur in an earthquake if the unit is not installed correctly, injuries may occur due to a falling unit.
- Use appropriate Personal Protective Equipment (PPE), such as gloves and protective goggles and, where appropriate, have a gas mask nearby. Also use electrical protection equipment and tools suited for electrical operation purposes. Keep a quenching cloth and a fire extinguisher nearby during brazing. Use care in handling, rigging, and setting of bulky equipment.
- When transporting, be careful when picking up, moving and mounting these units. Although the unit may be packed using plastic straps, do not use them for transporting the unit from one location to another. Do not stand on or put any material on the unit. Get a partner to help, and bend with your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut fingers, so wear protective gloves.
- Do not touch or adjust any safety devices inside the indoor or outdoor units. All safety features, disengagement, and interlocks must be in place and functioning correctly before the equipment is put into operation. If these devices are improperly adjusted or tampered with in any way, a serious accident can occur. Never bypass or jump-out any safety device or switch.
- Johnson Controls, Inc. will not assume any liability for injuries or damage caused by not following steps outlined or described in this manual. Unauthorized modifications to Johnson Controls products are prohibited as they...
 - May create hazards which could result in death, serious injury or equipment damage.
 - Will void product warranties.
 - May invalidate product regulatory certifications.
 - May violate OSHA standards.

NOTICE

Take the following precautions to reduce the risk of property damage.

- Be careful that moisture, dust, or variant refrigerant compounds not enter the refrigerant cycle during installation work. Foreign matter could damage internal components or cause blockages.
- If air filters are required on this unit, do not operate the unit without the air filter set in place. If the air filter is not installed, dust may accumulate and breakdown may result.
- Do not install this unit in any place where silicon gases can coalesce. If the silicon gas molecules attach themselves to the surface of the heat exchanger, the finned surfaces will repel water. As a result, any amount of condensate can overflow from the condensate pan and could run inside of the electrical box, possibly causing electrical failures.
- When installing the unit in a hospital or other facility where electromagnetic waves are generated from nearby medical and/or electronic devices, be prepared for noise and electronic interference Electromagnetic Interference (EMI). Do not install where the waves can directly radiate into the electrical box, controller cable, or controller. Inverters, appliances, high-frequency medical equipment, and radio communications equipment may cause the unit to malfunction. The operation of the unit may also adversely affect these same devices. Install the unit at least 10 ft. (approximately 3m) away from such devices.
- When a wireless zone controller is used, locate at a distance of at least 3.3 ft. (approximately 1 meter) between the indoor unit and electric lighting. If not, the receiver part of the unit may have difficulty receiving operation commands.
- Do not install the unit in any location where animals and plants can come into direct contact with the outlet air stream. Exposure could adversely affect the animals and plants.
- Do not install the unit with any downward slope to the side of the drain boss. If you do, you may have water flowing back which may cause leaks.
- Be sure the condensate hose discharges water properly. If connected incorrectly, it may cause leaks.
- Do not install the unit in any place where oil can seep onto the units, such as table or seating areas in restaurants, and so forth. For these locations or social venues, use specialized units with oil-resistant features built into them. In addition, use a specialized ceiling fan designed for restaurant use. These specialized oil-resistant units can be ordered for such applications. However, in places where large quantities of oil can splash onto the unit, such as a factory, even the specialized units cannot be used. These products should not be installed in such locations.

Installation Precautions

WARNING

To reduce the risk of serious injury or death, the following installation precautions must be followed.

- When installing the unit into...
 - A wall: Make sure the wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.
 - A room: Properly insulate any refrigerant tubing run inside a room to prevent "sweating" that can cause dripping and water damage to wall and floors.
 - Damp or uneven areas: Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the unit to prevent water damage and abnormal vibration.
 - An area with high winds: Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.
 - A snowy area (only for heat pump model): Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.
- Do not install the unit in the following places. Doing so can result in an explosion, fire, deformation, corrosion, or product failure.
 - Explosive or flammable atmosphere
 - Where fire, oil, steam, or powder can directly enter the unit, such as in close proximity or directly above a kitchen stove.
 - Where oil (including machinery oil) may be present.
 - Where corrosive gases such as chlorine, bromine, or sulfide can accumulate, such as near a hot tub or hot spring.
 - Where dense, salt-laden airflow is heavy, such as in coastal regions.
 - Where the air quality is of high acidity.
 - Where harmful gases can be generated from decomposition.

- Do not position the condensate pipe for the indoor unit near any sanitary sewers where corrosive gases may be present. If you do, toxic gases can seep into breathable air spaces and can cause respiratory injuries. If the condensate pipe is installed incorrectly, water leakage and damage to the ceiling, floor, furniture, or other possessions may result. If condensate piping becomes clogged, moisture can back up and can drip from the indoor unit. Do not install the indoor unit where such dripping can cause moisture damage or uneven locations: Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the unit to prevent water damage and abnormal vibration.
- Before performing any brazing work, be sure that there are no flammable materials or open flames nearby.
- Perform a run test to ensure normal operation. Safety guards, shields, barriers, covers, and protective devices must be in place while the compressor/unit is operating. During the test run, keep fingers and clothing away from any moving parts.
- Clean up the site when finished, remembering to check that no metal scraps or bits of wiring have been left inside the unit being installed.
- During transportation, do not allow the backrest of the forklift to make contact with the unit, otherwise, it may cause damage to the heat exchanger and also may cause injury when stopped or started suddenly.
- Remove gas inside the closing pipe when the brazing work is performed. If the brazing filler metal is melted with remaining gas inside, the pipes will be blown off and it may cause injury.
- Be sure to use nitrogen gas for an airtight test. If other gases such as oxygen gas, acetylene gas or fluorocarbon gas are accidentally used, it may cause explosion or gas intoxication.

After installation work for the system has been completed, explain the “Safety Precautions,” the proper use and maintenance of the unit to the customer according to the information in all manuals that came with the system. All manuals and warranty information must be given to the user or left near the Indoor Unit.

Refrigerant Precautions



To reduce the risk of serious injury or death, the following refrigerant precautions must be followed.

- As originally manufactured, this unit contains refrigerant installed by Johnson Controls. Johnson Controls uses only refrigerants that have been approved for use in the unit’s intended home country or market. Johnson Controls distributors similarly are only authorized to provide refrigerants that have been approved for use in the countries or markets they serve. The refrigerant used in this unit is identified on the unit’s faceplate and/or in the associated manuals. Any additions of refrigerant into this unit must comply with the country’s requirements with regard to refrigerant use and should be obtained from Johnson Controls distributors. Use of any non-approved refrigerant substitutes will void the warranty and will increase the potential risk of injury or death.
- If installed in a small room, take measures to prevent the refrigerant from exceeding the maximum allowable concentration in the event that refrigerant gases should escape. Refrigerant gases can cause asphyxiation (0.42 kg/m³ based on ISO 5149 for R410A). Consult with your distributor for countermeasures (ventilation system and so on). If refrigerant gas has leaked during the installation work, ventilate the room immediately.
- The design pressure for this product is 601 psi (4.15MPa). The pressure of R410A refrigerant is 1.4 times higher than that of the refrigerant R22. Therefore, the refrigerant piping for R410A shall be thicker than that for R22. Make sure to use the specified refrigerant piping. If not, the refrigerant piping may rupture due to an excessive refrigerant pressure. Besides, pay attention to the piping thickness when using copper refrigerant piping. The thickness of copper refrigerant piping differs depending on its material.
- The refrigerant R410A is adopted. The refrigerant oil tends to be affected by foreign matters such as moisture, oxide film, (or fat). Perform the installation work with care to prevent moisture, dust, or different refrigerant from entering the refrigerant cycle. Foreign matter can be introduced into the cycle from such parts as expansion valve and the operation may be unavailable.
- To avoid the possibility of different refrigerant or refrigerant oil being introduced into the cycle, the sizes of the charging connections have been changed from R407C type and R22 type. It is necessary to prepare the appropriate tools before performing the installation work.
- Use refrigerant pipes and joints which are approved for use with R410A.
- A compressor/unit comprises a pressurized system. Never loosen threaded joints while the system is

under pressure and never open pressurized system parts.

- Before installation is complete, make sure that the refrigerant leak test has been performed. If refrigerant gases escape into the air, turn OFF the main switch, extinguish any open flames and contact your service contractor. Refrigerant (Fluorocarbon) for this unit is odorless. If the refrigerant should leak and come into contact with open flames, toxic gas could be generated. Also, because the fluorocarbons are heavier than air, they settle to the floor, which could cause asphyxiation.
- When installing the unit, and connecting refrigerant piping, keep all piping runs as short as possible, and make sure to securely connect the refrigerant piping before the compressor starts operating. If the refrigerant piping is not connected and the compressor activates with the stop valve opened, the refrigerant cycle will become subjected to extremely high pressure, which can cause an explosion or fire.
- Tighten the flare nut with a torque wrench in the specified manner. Do not apply excessive force to the flare nut when tightening. If you do, the flare nut can crack and refrigerant leakage may occur.
- When maintaining, relocating, and disposing of the unit, dismantle the refrigerant piping after the compressor stops.
- When pipes are removed out from under the piping cover, after the insulation work is completed, cover the gap between the piping cover and pipes by a packing (field-supplied). If the gap is not covered, the unit may be damaged if snow, rain water or small animals enter the unit.
- Do not apply an excessive force to the spindle valve at the end of opening. Otherwise, the spindle valve flies out due to refrigerant pressure. At the run test, fully open the gas and liquid valves, otherwise, these devices will be damaged. (It is closed before shipment.)
- If the arrangement for outdoor units is incorrect, it may cause flowback of the refrigerant and result in failure of the outdoor unit.
- The refrigerant system may be damaged if the slope of the piping connection kit exceeds $\pm 15^\circ$.

Electrical Precautions



Take the following precautions to reduce the risk of electric shock, fire or explosion resulting in serious injury or death.

- Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause serious injury or death.
- Perform all electrical work in strict accordance with this installation and maintenance manual and all the relevant regulatory standards.
- Before servicing, open and tag all disconnect switches. Never assume electrical power is disconnected. Check with meter and equipment.
- Only use electrical protection equipment and tools suited for this installation.
- Use specified cables between units.
- The new air conditioner may not function normally in the following instances:
 - If electrical power for the new air conditioner is supplied from the same transformer as the device* referred to below.
 - If the power source cables for this device* and the new air conditioner unit are located in close proximity to each other.

Device*: (Example): A lift, container crane, rectifier for electric railway, inverter power device, arc furnace, electric furnace, large-sized induction motor and large-sized switch.

Regarding the cases mentioned above, surge voltage may be inducted into the power supply cables for the packaged air conditioner due to a rapid change in power consumption of the device and an activation of a switch.





Check field regulations and standards before performing electrical work in order to protect the power supply for the new air conditioner unit.

- Communication cabling shall be a minimum of 18-Gauge, 2-Conductor, Stranded Copper. Shielded cable must be considered for applications and routing in areas of high EMI and other sources of potentially excessive electrical noise to reduce the potential for communication errors. When shielded cabling is applied, proper bonding and termination of the cable shield is required as per Johnson Controls guidelines. Plenum and riser ratings for communication cables must be considered per application and local code requirements.
- Use an exclusive power supply for the air conditioner at the unit's rated voltage.
- Be sure to install circuit breakers (ground fault interrupter, isolating switch, molded case circuit breaker and so on), with the specified capacity. Ensure that the wiring terminals are tightened securely to recommended torque specifications.
- Clamp electrical wires securely with a cable clamp after all wiring is connected to the terminal block. In addition, run wires securely through the wiring access channel.
- When installing the power lines, do not apply tension to the cables. Secure the suspended cables at regular intervals, but not too tightly.
- Make sure that the terminals do not come into contact with the surface of the electrical box. If the terminals are too close to the surface, it may lead to failures at the terminal connection.
- Turn OFF and disconnect the unit from the power source when handling the service connector. Do not open the service cover or access panel to the indoor or outdoor units without turning OFF the main power supply.
- After ceasing operation, be sure to wait at least five minutes before turning off the main power switch. Otherwise, water leakage or electrical breakdown may result. Disconnect the power source completely before attempting any maintenance for electrical parts. Check to ensure that no residual voltage is present after disconnecting the power source.
- Do not clean with, or pour water into, the controller as it could cause electric shock and/or damage the unit. Do not use strong detergent such as a solvent. Clean with a soft cloth.
- Check that the ground wire is securely connected. Do not connect ground wiring to gas piping, water piping, lighting conductor, or telephone ground wiring.
- If a circuit breaker or fuse is frequently activated, shut down the system and contact your service contractor.
- Perform all electrical work in accordance with this manual and in compliance with all regulations and safety standards.
- Do not open a service access cover or panel of an indoor or outdoor unit without first turning OFF the power at the main power supply.
- Residual voltage can cause electric shock. At all times, check for residual voltage after disconnecting from the power source before starting work on the unit.
- This equipment can be installed with a Ground Fault Circuit Breaker (GFCI), which is a recognized measure for added protection to a properly grounded unit. Install appropriate sized breakers/fuses/overcurrent protection switches, and wiring in accordance with local, state and NEC codes and requirements. The equipment installer is responsible for understanding and abiding by applicable codes and requirements.


PRODUCT

1 MODELS LIST

1.1 Outdoor Unit

Model Name	Power Supply (V, Ph, Hz)	Appearance
DHR18CSB21S	208/230V~60Hz	
DHR24CSB21S	208/230V~60Hz	
DHR30CSB21S	208/230V~60Hz	
DHR36CSB21S	208/230V~60Hz	
DHR42CSB21S	208/230V~60Hz	
DHR48CSB21S	208/230V~60Hz	

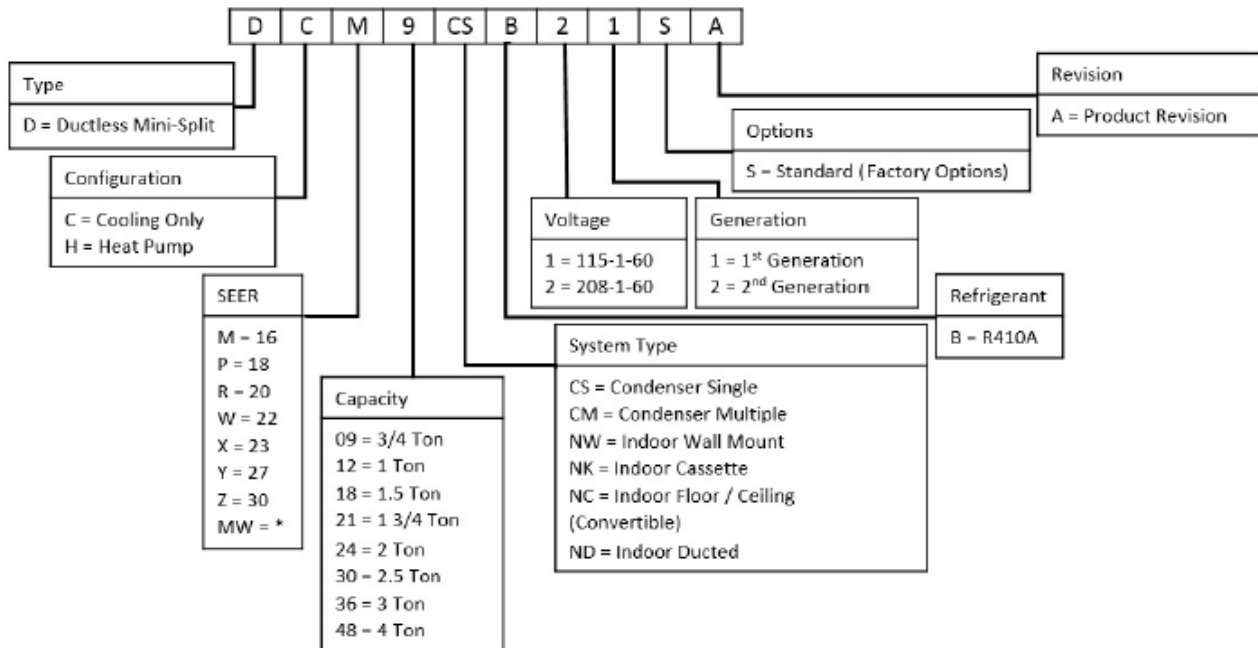
1.2 Indoor Unit

Type	Model Name	Nominal Capacity Cooling/Heating (Btu/h)	Power Supply (V, Ph, Hz)	Appearance
Duct Type	DHR18NDB21S	17100/18800	208/230V~60Hz	
	DHR24NDB21S	23800/27200	208/230V~60Hz	
	DHR30NDB21S	28200/31200	208/230V~60Hz	
	DHR36NDB21S	34000/41000	208/230V~60Hz	
	DHR42NDB21S	39500/44000	208/230V~60Hz	
	DHR48NDB21S	48000/54500	208/230V~60Hz	
Cassette Type	DHR18NKB21S	17100/18400	208/230V~60Hz	
	DHR24NKB21S	23800/27200	208/230V~60Hz	
	DHR30NKB21S	28200/31200	208/230V~60Hz	
	DHR36NKB21S	34000/41000	208/230V~60Hz	
	DHR42NKB21S	39500/44000	208/230V~60Hz	
	DHR48NKB21S	48000/54500	208/230V~60Hz	
Ceiling Type	DHR18NCB21S	17100/19100	208/230V~60Hz	
	DHR24NCB21S	23800/27200	208/230V~60Hz	
	DHR30NCB21S	28200/31200	208/230V~60Hz	
	DHR36NCB21S	34000/41000	208/230V~60Hz	
	DHR42NCB21S	39500/44000	208/230V~60Hz	
	DHR48NCB21S	48000/54500	208/230V~60Hz	

Note: 1 Ton = 12000Btu/h = 3.517kW

Note: This series allows the customer to choose any of the three types of indoor units to match up with the outdoor equipment.

2 Nomenclature



3 PRODUCT DATA

3.1 Product Data of Indoor Unit

3.1.1 Duct Type

Model	Indoor unit		DHR18NDB21S	DHR24NDB21S	DHR30NDB21S
	Outdoor unit		DHR18CSB21S	DHR24CSB21S	DHR30CSB21S
Capacity	Cooling Capacity	Btu/h	17100(5400~19800)	23800(7400~29000)	28200(8200~29600)
	Heating Capacity	Btu/h	18800(4700~23200)	27200(8200~32400)	31200(8200~33600)
Power Input	Cooling	kW	1.55(0.55~1.75)	2.23(0.85~2.50)	3.30(0.85~3.70)
	Heating	kW	1.65(0.50~1.90)	2.36(0.80~2.75)	3.10(0.80~3.50)
SEER / HSPF		(Btu/h)/W	16.00/9.50	16.00/9.00	16.00/9.00
Indoor Unit			DHR18NDB21S	DHR24NDB21S	DHR30NDB21SI
Power Supply		V/Ph/Hz	208/230V1Ph~60Hz	208/230V1Ph~60Hz	208/230V1Ph~60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Fan	Drive	-	Direct	Direct	Direct
	Motor Output	kW	0.06×1	0.15×1	0.15×1
	Air Flow	m ³ /h(CFM)	1000(585)	1400(820)	1400(820)
	Rated Ext. Static Pressure	Pa(InWg)	25(0.1)	25(0.1)	37(0.15)
	Ext. Static Pressure Range	Pa(InWg)	0~30(0~0.12)	0~75(0~0.3)	0~75(0~0.3)
Sound Pressure Level(SS/H/M/L)		dB(A)	40/39/36/28	47/46/44/40	47/46/44/40
Air Filter		-	PP	PPKZ	PPKZ
Condensate Piping		mm(inch)	Φ30×1.5 (φ1.18×0.06)	Φ20×1.2 (φ0.79×0.05)	Φ20×1.2 (φ0.79×0.05)
Outline Dimensions (W×H×D)		mm (inch)	1037×266×721 (40.8×10.5×28.4)	1279×268×558 (50.4×10.6×22.0)	1279×268×558 (50.4×10.6×22.0)
Net Weight		kg(lb)	33.0(72.8)	34.0(75.0)	35.0(77.2)
Outdoor Unit			DHR18CSB21S	DHR24CSB21S	DHR30B21S
Power Supply		V/Ph/Hz	208/230V1Ph~60Hz	208/230V1Ph~60Hz	208/230V1Ph~60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Compressor	Type	-	Rotary	Rotary	Rotary
	Power Input	W	1440	2550	2550
Refrigerant R410A	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve
	Charge	kg(oz)	1.4(49.4)	2.2(77.6)	2.4(84.7)
Outline Dimensions (W×H×D)		mm(inch)	955×700×396 (37.6×27.6×15.6)	980×790×427 (38.6×31.1×16.8)	980×790×427 (38.6×31.1×16.8)
Net Weight		kg(lb)	48.0(105.8)	69.0(152.1)	72.0(158.8)
Piping Connections	Liquid	Inch	Φ1/4	Φ3/8	Φ3/8
	Gas	Inch	Φ1/2	Φ5/8	Φ5/8
	Max. Length	m(ft)	20(65.6)	30(98.4)	30(98.4)
	Max. Height	m(ft)	15(49.2)	15(49.2)	15(49.2)

Model	Indoor unit		DHR36NDB21S	DHR42NDB21S	DHR48NDB21SI
	Outdoor unit		DHR36CSB21S	DHR42CSB21S	DHR48CSB21S
Capacity	Cooling Capacity	Btu/h	34000(10800~39000)	39500(12000~42500)	48000(20400~49500)
	Heating Capacity	Btu/h	41000(9800~49500)	44000(13000~52500)	54500(17500~58000)
Power Input	Cooling	kW	3.28(0.70~4.50)	4.15(0.65~4.70)	5.15(1.40~5.60)
	Heating	kW	3.75(0.70~4.60)	3.90(0.76~4.75)	5.15(1.30~5.50)
SEER / HSPF		(Btu/h)/W	16.00/9.00	16.00/9.00	16.00/9.00
Indoor Unit			DHR36NDB21S	DHR42NDB21S	DHR48NDB21S
Power Supply		V/Ph/Hz	208/230V1Ph~60Hz	208/230V1Ph~60Hz	208/230V1Ph~60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Fan	Drive	-	Direct	Direct	Direct
	Motor Output	kW	0.25×1	0.25×1	0.56×1
	Air Flow	m ³ /h(CFM)	2000(1175)	2000(1175)	2500(1470)
	Rated Ext. Static Pressure	Pa(InWg)	37(0.15)	37(0.15)	50(0.2)
	Ext. Static Pressure Range	Pa(InWg)	0~100(0~0.4)	0~100(0~0.4)	0~125(0~0.5)
Sound Pressure Level(SS/H/M/L)		dB(A)	53/52/48/44	53/52/48/44	55/53/49/45
Air Filter		-	PPKZ	PPKZ	PPKZ
Condensate Piping		mm(inch)	Φ20×1.2 (φ0.79×0.05)	Φ20×1.2 (φ0.79×0.05)	Φ20×1.2 (φ0.79×0.05)
Outline Dimensions (W×H×D)		mm (inch)	1226×290×775 (48.3×11.4×30.5)	1226×290×775 (48.3×11.4×30.5)	1340×350×750 (52.8×13.8×29.5)
Net Weight		kg(lb)	46.0(101.4)	46.0(101.4)	56.0(123.5)
Outdoor Unit			DHR36CSB21S	DHR42CSB21S	DHR48CSB21S
Power Supply		V/Ph/Hz	208/230V1Ph~60Hz	208/230V1Ph~60Hz	208/230V1Ph~60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Compressor	Type	-	Rotary	Rotary	Rotary
	Power Input	W	4150	4150	4580
Refrigerant R410A	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve
	Charge	kg(oz)	3.5(123.5)	3.7(130.5)	4.0(141.1)
Outline Dimensions (W×H×D)		mm(inch)	1107×1100×440 (43.6×43.3×17.3)	958×1349×412 (37.7×53.1×16.2)	958×1349×412 (37.7×53.1×16.2)
Net Weight		kg(lb)	93.0(205.1)	95.0(209.5)	105.0(231.5)
Piping Connections	Liquid	Inch	Φ3/8	Φ3/8	Φ3/8
	Gas	Inch	Φ5/8	Φ5/8	Φ5/8
	Max. Length	m(ft)	30(98.4)	50(164.0)	50(164.0)
	Max. Height	m(ft)	15(49.2)	30(98.4)	30(98.4)

3.1.2 Cassette Type

Model	Indoor unit		DHR18NKB21S	DHR24NKB21S	DHR30NKB21S
	Outdoor unit		DHR18CSB21S	DHR24CSB21S	DHR30CSB21S
Capacity	Cooling Capacity	Btu/h	17100(5400~18700)	23800(8200~29000)	28200(8800~31400)
	Heating Capacity	Btu/h	18400(4700~22200)	27200(8200~32400)	31200(8200~33600)
Power Input	Cooling	kW	1.70(0.55~1.75)	2.23(0.85~2.50)	2.70(0.85~3.70)
	Heating	kW	1.80(0.50~1.90)	2.36(0.80~2.75)	2.50(0.80~3.50)
SEER / HSPF		(Btu/h)/W	16.00/9.50	16.00/9.00	17.00/9.00
Indoor Unit			DHR18NKB21S	DHR24NKB21S	DHR30NKB21S
Power Supply		V/Ph/Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Fan	Drive	-	Direct	Direct	Direct
	Motor Output	kW	0.045x1	0.045x1	0.075x1
	Air Flow	m ³ /h(CFM)	760(445)	1300(765)	1500(880)
Sound Pressure Level(SS/H/M/L)		dB(A)	47/46/44/37	47/46/42/38	49/48/45/40
Air Filter		-	PP	ABS+PP	ABS+PP
Condensate Piping		mm(inch)	Φ25×1.5 (φ0.98×0.06)	Φ25×1.5 (φ0.98×0.06)	Φ25×1.5 (φ0.98×0.06)
Outline Dimensions (W×H×D)		mm(inch)	665×240×596 (26.2×9.4×23.5)	917×240×840 (36.1×9.4×33.1)	917×320×840 (36.1×12.6×33.1)
Net Weight		kg(lb)	20.0(44.1)	27.0(59.5)	32.0(70.6)
Outdoor Unit			DHR18CSB21S	DHR24CSB21S	DHR30CSB21S
Power Supply		V/Ph/Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Compressor	Type	-	Rotary	Rotary	Rotary
	Power Input	W	1440	2550	2550
Refrigerant R410A	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve
	Charge	kg(oz)	1.4(49.4)	2.2(77.6)	2.4(84.7)
Outline Dimensions (W×H×D)		mm(inch)	955×700×396 (37.6×27.6×15.6)	980×790×427 (38.6×31.1×16.8)	980×790×427 (38.6×31.1×16.8)
Net Weight		kg(lb)	48.0(105.8)	69.0(152.1)	72.0(158.8)
Piping Connections	Liquid	Inch	Φ1/4	Φ3/8	Φ3/8
	Gas	Inch	Φ1/2	Φ5/8	Φ5/8
	Max. Length	m(ft)	20(65.6)	30(98.4)	30(98.4)
	Max. Height	m(ft)	15(49.2)	15(49.2)	15(49.2)

Model	Indoor unit		DHR36NKB21S	DHR42NKB21S	DHR48NKB21S	
	Outdoor unit		DHR36CSB21S	DHR42CSB21S	DHR48CSB21S	
	Capacity	Cooling Capacity	Btu/h	34000(10800~39000)	39500(11000~41000)	48000(20400~50500)
		Heating Capacity	Btu/h	41000(9800~49500)	44000(12000~51000)	54500(17500~61500)
Power Input	Cooling	kW	3.28(0.75~4.50)	4.40(0.53~4.65)	5.50(1.30~5.70)	
	Heating	kW	3.75(0.60~4.80)	4.45(0.64~4.80)	4.80(1.20~5.40)	
SEER / HSPF		(Btu/h)/W	16.00/9.00	16.00/9.00	16.00/9.00	
Indoor Unit			DHR36NKB21S	DHR42NKB21S	DHR48NKB21S	
Power Supply		V/Ph/Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil	
Fan	Drive	-	Direct	Direct	Direct	
	Motor Output	kW	0.075x1	0.075x1	0.1x1	
	Air Flow	m ³ /h(CFM)	1860(1095)	1860(1095)	2300(1350)	
Sound Pressure Level(SS/H/M/L)		dB(A)	51/49/46/43	51/49/46/43	53/52/47/41	
Air Filter		-	ABS+PP	ABS+PP	ABS+PP	
Condensate Piping		mm(inch)	Φ25×1.5 (φ0.98×0.06)	Φ25×1.5 (φ0.98×0.06)	Φ25×1.5 (φ0.98×0.06)	
Outline Dimensions (W×H×D)		mm(inch)	917×320×840 (36.1×12.6×33.1)	917×320×840 (36.1×12.6×33.1)	910×290×910 (35.8×11.4×35.8)	
Net Weight		kg(lb)	32.0(70.6)	32.0(70.6)	43.0(94.8)	
Outdoor Unit			DHR36CSB21S	DHR42CSB21S	DHR48CSB21S	
Power Supply		V/Ph/Hz	208/230V1PH~ 60Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil	
Compressor	Type	-	Rotary	Rotary	Rotary	
	Power Input	W	4150	4150	4580	
Refrigerant R410A	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve	
	Charge	kg(oz)	3.5(123.5)	3.7(130.5)	4.0(141.1)	
Outline Dimensions (W×H×D)		mm(inch)	1107×1100×440 (43.6×43.3×17.3)	958×1349×412 (37.7×53.1×16.2)	958×1349×412 (37.7×53.1×16.2)	
Net Weight		kg(lb)	93.0(205.1)	95.0(209.5)	105.0(231.5)	
Piping Connections	Liquid	Inch	Φ3/8	Φ3/8	Φ3/8	
	Gas	Inch	Φ5/8	Φ5/8	Φ5/8	
	Max. Length	m(ft)	30(98.4)	50(164.0)	50(164.0)	
	Max. Height	m(ft)	15(49.2)	30(98.4)	30(98.4)	

3.1.3 Floor-ceiling Type

Model	Indoor unit		DHR18NCB21S	DHR24NCB21S	DHR30NCB21S
	Outdoor unit		DHR18CSB21S	DHR24CSB21S	DHR30CSB21S
Capacity	Cooling Capacity	Btu/h	17100(5400~19800)	23800(8200~27800)	28200(8800~31400)
	Heating Capacity	Btu/h	19100(4700~23200)	27200(8200~30600)	31200(8200~33600)
Power Input	Cooling	kW	1.55(0.55~1.75)	2.23(0.85~2.50)	2.40(0.85~3.70)
	Heating	kW	1.55(0.50~1.90)	2.36(0.80~2.75)	2.60(0.80~3.50)
SEER / HSPF		(Btu/h)/W	17.00/9.50	16.00/9.00	17.00/9.00
Indoor Unit			DHR18NCB21S	DHR24NCB21S	DHR30NCB21S
Power Supply		V/Ph/Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Fan	Drive	-	Direct	Direct	Direct
	Motor Output	kW	0.06×1	0.06×1	0.15×1
	Air Flow	m ³ /h(CFM)	1000(585)	1200(705)	1500(880)
Sound Pressure Level(SS/H/M/L)		dB(A)	44/42/38/32	49/48/46/40	49/46/44/38
Air Filter		-	PP	PP	PP
Condensate Piping		mm(inch)	Φ17×1.75 (φ0.67×0.07)	Φ17×1.75 (φ0.67×0.07)	Φ17×1.75 (φ0.67×0.07)
Outline Dimensions (W×H×D)		mm(inch)	1220×225×700 (48.0×8.9×27.6)	1220×225×700 (48.0×8.9×27.6)	1420×245×700 (55.9×9.6×27.6)
Net Weight		kg(lb)	39.0(86.0)	40.0(88.2)	48.0(105.8)
Outdoor Unit			DHR18CSB21S	DHR24CSB21S	DHR30CSB21S
Power Supply		V/Ph/Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Compressor	Type	-	Rotary	Rotary	Rotary
	Power Input	W	1440	2550	2550
Refrigerant R410A	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve
	Charge	kg(oz)	1.4(49.4)	2.2(77.6)	2.4(84.7)
Outline Dimensions (W×H×D)		mm(inch)	955×700×396 (37.6×27.6×15.6)	980×790×427 (38.6×31.1×16.8)	980×790×427 (38.6×31.1×16.8)
Net Weight		kg(lb)	48.0(105.8)	69.0(152.1)	72.0(158.8)
Piping Connections	Liquid	Inch	Φ1/4	Φ3/8	Φ3/8
	Gas	Inch	Φ1/2	Φ5/8	Φ5/8
	Max. Length	m(ft)	20(65.6)	30(98.4)	30(98.4)
	Max. Height	m(ft)	15(49.2)	15(49.2)	15(49.2)

Model	Indoor unit		DHR36NCB21S	DHR42NCB21S	DHR48NCB21S
	Outdoor unit		DHR36CSB21S	DHR42CSB21S	DHR48CSB21S
Capacity	Cooling Capacity	Btu/h	34000(10800~39000)	39500(12000~42500)	48000(20400~50500)
	Heating Capacity	Btu/h	41000(9800~49500)	44000(13000~52500)	54500(17500~61500)
Power Input	Cooling	kW	3.28(0.80~4.60)	4.05(0.60~4.70)	4.95(1.30~5.50)
	Heating	kW	3.75(0.65~4.80)	4.05(0.69~4.80)	4.60(1.20~5.40)
SEER / HSPF		(Btu/h)/W	16.00/9.00	16.00/9.00	16.00/9.00
Indoor Unit			DHR36NCB21S	DHR42NCB21S	DHR48NCB21S
Power Supply		V/Ph/Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Fan	Drive	-	Direct	Direct	Direct
	Motor Output	kW	0.15×1	0.15×1	0.25×1
	Air Flow	m ³ /h(CFM)	1900(1115)	1900(1115)	2300(1350)
Sound Pressure Level(SS/H/M/L)		dB(A)	54/53/51/46	55/54/52/47	56/55/50/46
Air Filter		-	PP	PP	PP
Condensate Piping		mm(inch)	Φ17×1.75 (φ0.67×0.07)	Φ17×1.75 (φ0.67×0.07)	Φ17×1.75 (φ0.67×0.07)
Outline Dimensions (W×H×D)		mm(inch)	1420×245×700 (55.9×9.6×27.6)	1420×245×700 (55.9×9.6×27.6)	1700×245×700 (66.9×9.6×27.6)
Net Weight		kg(lb)	48.0(105.8)	50.0(110.3)	59.0(130.1)
Outdoor Unit			DHR36CSB21S	DHR42CSB21S	DHR48CSB21S
Power Supply		V/Ph/Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz	208/230V1Ph~ 60Hz
Heat Exchanger		-	Cross Fin Coil	Cross Fin Coil	Cross Fin Coil
Compressor	Type	-	Rotary	Rotary	Rotary
	Power Input	W	4150	4150	4580
Refrigerant R410A	Control	-	Electronic Expansion Valve	Electronic Expansion Valve	Electronic Expansion Valve
	Charge	kg(oz)	3.5(123.5)	3.7(130.5)	4.0(141.1)
Outline Dimensions (W×H×D)		mm(inch)	1107×1100×440 (43.6×43.3×17.3)	958×1349×412 (37.7×53.1×16.2)	958×1349×412 (37.7×53.1×16.2)
Net Weight		kg(lb)	93.0(205.1)	95.0(209.5)	105.0(231.5)
Piping Connections	Liquid	Inch	Φ3/8	Φ3/8	Φ3/8
	Gas	Inch	Φ5/8	Φ5/8	Φ5/8
	Max. Length	m(ft)	30(98.4)	50(164.0)	50(164.0)
	Max. Height	m(ft)	15(49.2)	30(98.4)	30(98.4)

Note: Nominal capacities are based on the following conditions.

	Indoor	Outdoor
Cooling	DB: 80.0°F (26.7°C)	DB: 95.0°F (35.0°C)
	WB: 67.0°F (19.4°C)	WB: 75.0°F (23.9°C)
Heating	DB: 70.0°F (21.1°C)	DB: 47.0°F (8.33°C)
	WB: 60.0°F (15.6°C)	WB: 43.0°F (6.11°C)
Piping Length	18k~48k units	25.0ft (7.6m)

The air volume is measured at the relevant standard external static pressure.

Noise is tested in a semi-anechoic room, so it should be slightly higher in the actual operation due to environmental change.

3.2 Operation Range

Mode	Range of Outdoor Temperature
Cooling	0°F (-18.0°C)~118.4°F (48.0°C)
Heating	0°F (-18.0°C)~75.2°F (24.0°C)

3.3 Electrical Data

3.3.1 Outdoor unit

Table 1-3-1 Electrical Data of Outdoor Unit

Model	Compressor			Fan Motor	Fuse/Breaker Capacity	Minimum Circuit Ampacity	Maximum Overcurrent Protection
	Power Supply	Qty.	RLA	FLA			
	V/Ph/Hz	-	A	A			
DHR18CSB2	208/230V1Ph ~ 60Hz	1	12.0	1.5	5/25	17	25
DHR24CSB21S	208/230V1Ph ~ 60Hz	1	18.0	1.5	5/40	24	40
DHR30CSB21S	208/230V1Ph ~ 60Hz	1	18.0	1.5	5/40	24	40
DHR36CSB21S	208/230V1Ph ~ 60Hz	1	21.2	2.0	5/45	29	45
DHR42CSB21S	208/230V1Ph ~ 60Hz	1	21.2	2*2.0	5/50	31	50
DHR48CSB21S	208/230V1Ph ~ 60Hz	1	32.5	2*2.0	5/70	45	70

3.3.2 Indoor unit

Table 1-3-2 Electrical Data of Indoor Unit

Model	Power Supply	Fan Motor FLA	Fuse/Breaker Capacity	Minimum Circuit Ampacity	Maximum Overcurrent Protection
	V/Ph/Hz	A	A	A	A
DHR18NDB21S	208V/230V1Ph ~ 60Hz	0.6	5/15	1	15
DHR24NDB21S	208V/230V1Ph ~ 60Hz	1.3	5/15	2	15
DHR30NDB21S	208V/230V1Ph ~ 60Hz	1.3	5/15	2	15
DHR36NDB21S	208V/230V1Ph ~ 60Hz	2.1	5/15	3	15
DHR42NDB21S	208V/230V1Ph ~ 60Hz	2.1	5/15	3	15
DHR48NDB21S	208V/230V1Ph ~ 60Hz	4.0	5/15	5	15
DHR18NKB21S	208V/230V1Ph ~ 60Hz	0.5	5/15	1	15
DHR24NKB21S	208V/230V1Ph ~ 60Hz	0.5	5/15	1	15
DHR30NKB21S	208V/230V1Ph ~ 60Hz	0.9	5/15	1.5	15
DHR36NKB21S	208V/230V1Ph ~ 60Hz	0.9	5/15	1.5	15
DHR42NKB21S	208V/230V1Ph ~ 60Hz	0.9	5/15	1.5	15
DHR48NKB21S	208V/230V1Ph ~ 60Hz	1.5	5/15	2	15
DHR18NCB21S	208V/230V1Ph ~ 60Hz	0.6	5/15	1	15
DHR24NCB21S	208V/230V1Ph ~ 60Hz	0.6	5/15	1	15
DHR30NCB21S	208V/230V1Ph ~ 60Hz	1.4	5/15	2	15
DHR36NCB21S	208V/230V1Ph ~ 60Hz	1.4	5/15	2	15
DHR42NCB21S	208V/230V1Ph ~ 60Hz	1.4	5/15	2	15
DHR48NCB21S	208V/230V1Ph ~ 60Hz	2.1	5/15	3	15

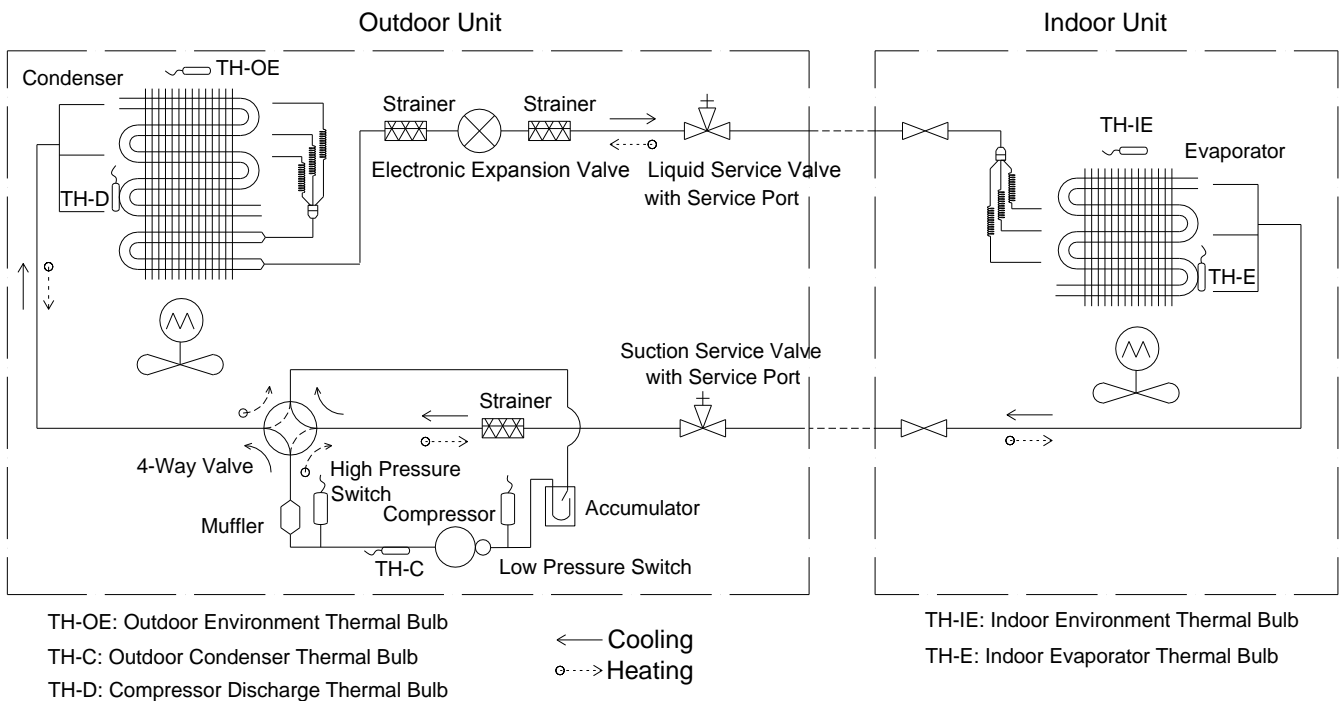
! Note:

RLA: Rated load amperes (marked in the nameplate of the outdoor unit)

FLA: Full load amperes

- ① The fuse is located on the main board.
- ② Install the disconnect device with a contact gap of at least 3mm (1/8inch) in all poles near the outdoor unit. The outdoor unit must be positioned so that the disconnect is reachable from the unit..
- ③ Interconnecting cable from outdoor unit to indoor unit should be a minimum 14AWG stranded 3-conductor with ground. Maximum cable length is 164 feet.
- ④ When connecting a wired zone controller to an indoor unit use 18AWG stranded cabling not exceeding 98 feet.

4 PIPING DIAGRAM

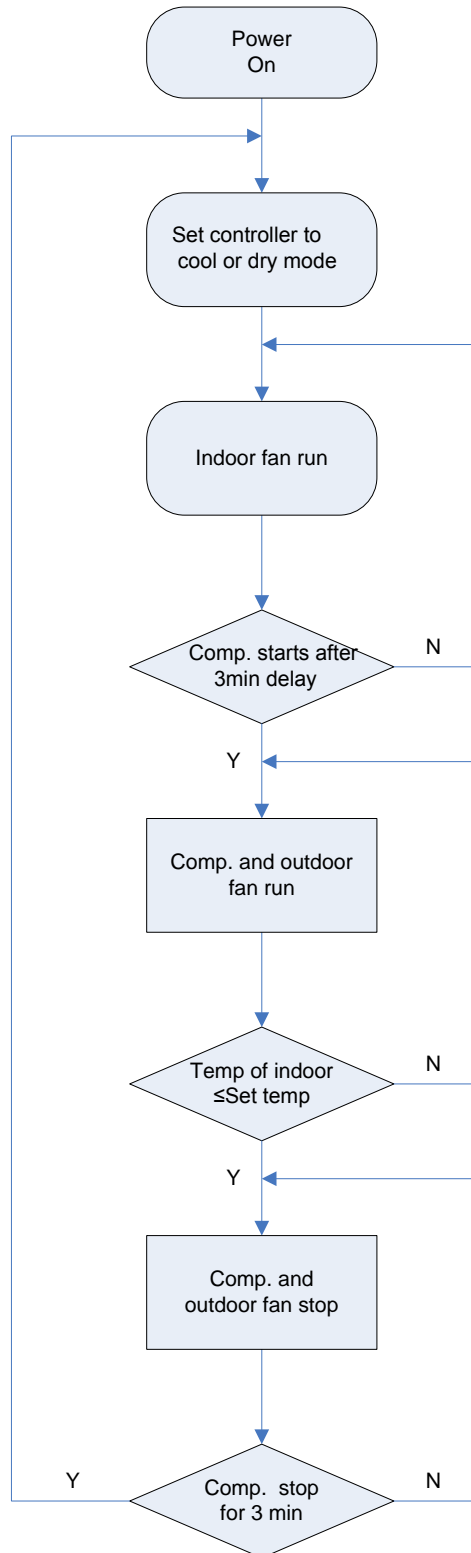


! Note: Not all items depicted in the diagram will necessarily apply to all units.

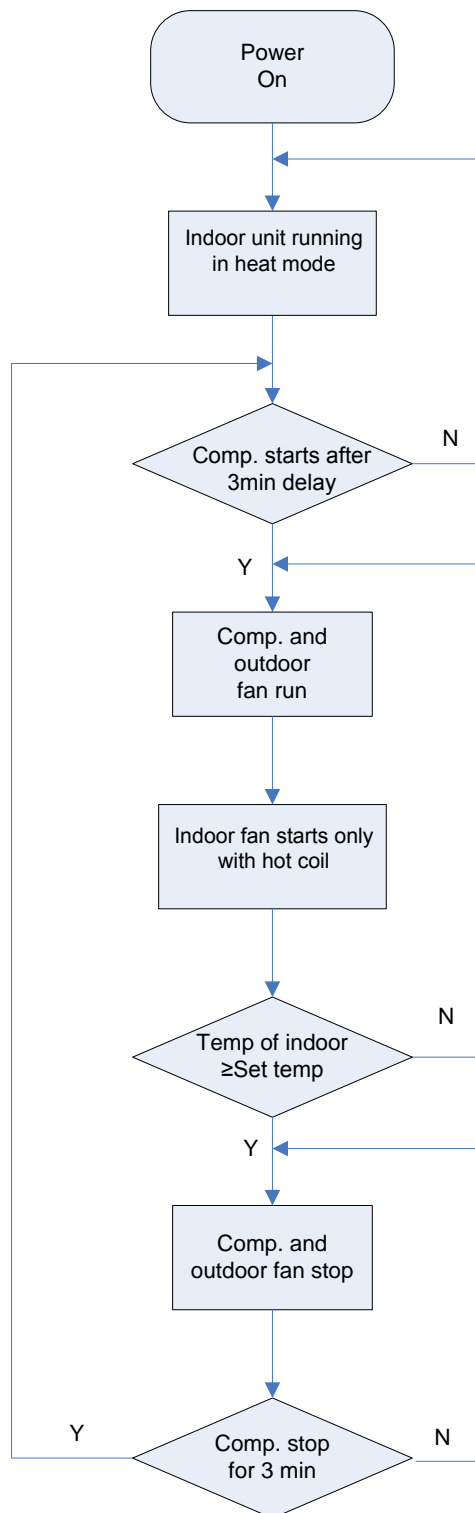
5 CONTROLLERS

OPERATION FLOWCHART

5.1 Cooling/Dry Operation



5.2 Heating Operation



6 WIRELESS REMOTE CONTROLLER

6.1 Operation and Display View

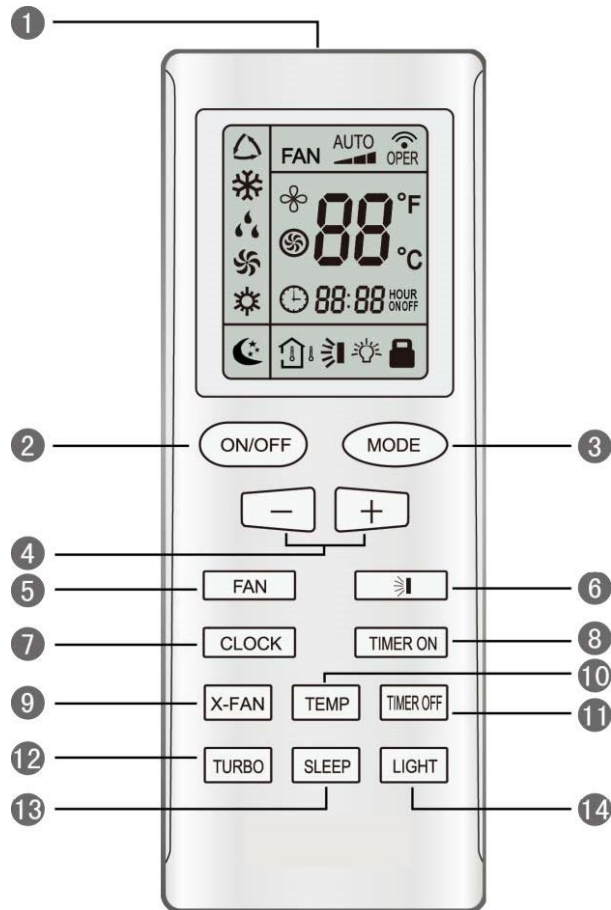
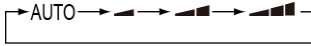



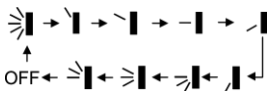
















Table 2-2-1 Instructions for wireless remote controller

No.	Name	Function Description
①	Signal transmitter	<ul style="list-style-type: none"> Signal transmitter
②	ON/OFF button	<ul style="list-style-type: none"> Press this button and the unit will be turned on; press it once more and the unit will be turned off. When turning off the unit, the Sleep function will be canceled, but the current time is still displayed.
③	MODE button	<ul style="list-style-type: none"> By pressing this button, Auto, Cool, Dry, Fan, Heat mode can be selected. Auto mode is default after power on. Under the Auto mode, the setpoint temperature will not be displayed; Under the Heat mode, the initial value is 28° C(82° F);under other modes, the initial value is 25° C(77° F). <div style="text-align: center;"> </div> <ul style="list-style-type: none"> AUTO; COOL; DRY; FAN; HEAT (heat pump only)

<p>4</p>	<p>- button</p>	<ul style="list-style-type: none"> ● Preset temperature can be decreased by pressing this button. Pressing and holding this button for more than 2 seconds will quickly adjust the temperature until released. The temperature adjustment is unavailable under the Auto mode. Celsius setting range: 16°C~30°C; Fahrenheit scale setting range 61°F~86°F.
<p>4</p>	<p>+ button</p>	<ul style="list-style-type: none"> ● Preset temperature can be increased by pressing this button. Pressing and holding this button for more than 2 seconds can make the temperature changed quickly until release the button and then transmit this order. The temperature adjustment is unavailable under the Auto mode, but the order can be sent by pressing this button. Celsius setting range: 16~30; Fahrenheit scale setting range 61~86.
<p>5</p>	<p>FAN button</p>	<ul style="list-style-type: none"> ● By pressing this button, Auto, Low, Middle, High speeds can be selected. After power on, Auto fan speed is default.  <ul style="list-style-type: none"> ●  Low speed ●  Middle speed ●  High speed <p>Note: Under the DRY mode, the fan will be kept running at the low speed and the fan speed isn't adjustable.</p>
<p>6</p>	<p>SWING UP/DOWN button</p>	<ul style="list-style-type: none"> ● Press this button to set up the swing angle, which changes as below:  <ul style="list-style-type: none"> ● When the guide louver starts to swing up and down, if SWING functions are canceled, the air guide louver will stop and remains at the current position. ●  Indicates the guide louver swings up and down among those five directions (Simplified SWING function applicable for some Fan Coil Units: When the wireless remote controller is energized initially with the unit under the OFF status, it should be set by pressing the + button and the SWING button simultaneously, with the symbol  blinking twice. Then, after the unit is turned on, this function can be activated by pressing the SWING button, with the displayed symbol  indicating swing function is on. If the swing symbol is not showing, then the function is turned off.
<p>7</p>	<p>CLOCK button</p>	<ul style="list-style-type: none"> ● By pressing this button, the clock is allowed to be set, with  blinking, and then press the +/- button to adjust the clock. If the +/- button is held down for more than 2 seconds, the clock setting will be increased or decreased 10 minutes every 0.5 seconds. After that, another press on the CLOCK button accepts the setting. 12:00 is displayed, when the wireless remote controller is powered up for the first time.
<p>8</p>	<p>TIMER ON button</p>	<ul style="list-style-type: none"> ● When TIMER ON is activated, ON will blink while the symbol  will disappear. Within 5 seconds it is allowed to set the ON time by pressing the +/- button. Each press will make the time increase or decrease one minute. If the +/- button is held down, the time will change quickly in single minute increments to begin with, then in 10 minute increments. After the desired time value is set, press TIMER ON again to confirm the setting within five seconds. After that, another press on TIMER ON will cancel the setting. Prior to the timer set up, the current time must be set for the timer to work correctly.

9	X-FAN button	<ul style="list-style-type: none"> Pressing this button can activate or deactivate the X-FAN function. In Cool or Dry mode, by pressing this button, if "  " is displayed, it indicates the X-FAN function is activated. By repressing this button, if "  " disappears, it indicates the X-FAN function is deactivated. When powering on the remote, the X-FAN function will be off. If the unit is turned off, X-FAN can be deactivated but can't be activated.
10	TEMP button	<ul style="list-style-type: none"> By pressing this button you can choose to select the indoor setpoint temperature or the indoor ambient temperature. The indoor setpoint temperature is displayed when the remote is first powered on. By pressing the TEMP button, when the temperature symbol  is displayed, the indoor unit display will show the indoor setpoint temperature; when  is displayed, it will show the indoor ambient temperature; when  is displayed, this is indicating that the outdoor temperature, if received the other remote control signal, it will display presetting temperature is being read. (This is not applicable to all models.)
11	TIMER OFF button	<ul style="list-style-type: none"> By pressing this button it is available to go to the TIMER OFF setting state with the same setting method as that of the TIMER ON, in which case the OFF symbol blinks.
12	TURBO button	<ul style="list-style-type: none"> In the Cool or Heat mode, pressing this button can activate or deactivate the TURBO function. When the TURBO function is activated, its symbol  will be displayed; when the running mode or the fan speed is changed, this function will be canceled automatically (This function is applicable to partial of models).
13	SLEEP button	<ul style="list-style-type: none"> By pressing this button, Sleep On and Sleep Off can be selected. After powered on, default mode is Sleep Off. Once the unit is turned off, the Sleep function is canceled. When Sleep is set to On, the symbol of SLEEP  will display. Under the Fan and Auto modes, this function is not available.
14	LIGHT button	<ul style="list-style-type: none"> Press this button to select LIGHT on or off at the indoor display. When the LIGHT is set to on, the icon  will be displayed at the hand-held remote. When the LIGHT is set to off, the icon  will no longer be shown at the hand-held remote and the display of the indoor unit will be turned off.

7 WIRED ZONE CONTROLLER

7.1 Display View

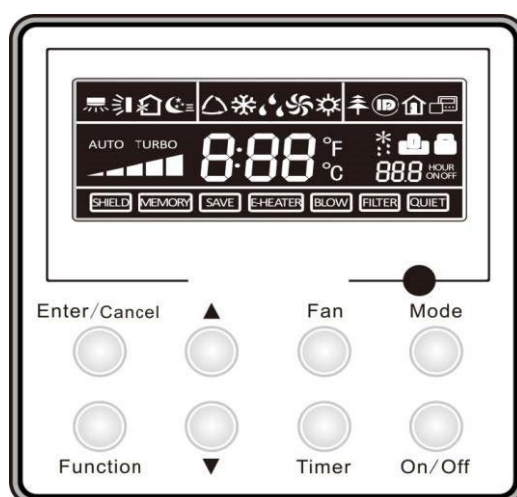


Figure 2-3-1 Appearance of wired zone controller

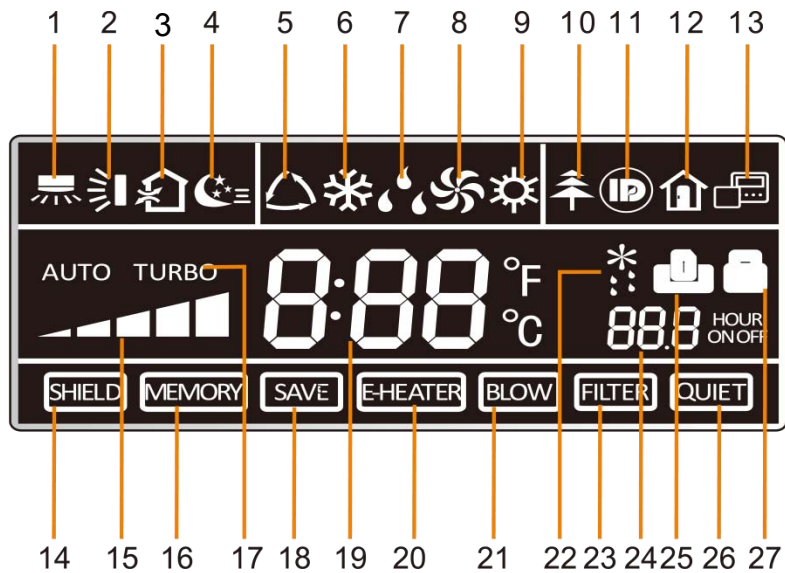














Figure 2-3-2 LCD display of wired controller

Table 2-3-1 Instruction to LCD Display

No.	Icons	Introduction
1		Left and right swing function
2		Up and down swing function
3		Air exchange function
4		Sleep function
5		Auto mode
6		COOL mode
7		DRY mode
8		FAN mode
9		HEAT mode
10		Health function
11		I-Demand function
12		Vacation function
13		Status display of main and secondary wired zone controller
14		Shield function This button disables temperature adjustment, On/Off function, mode change and the Energy Save function.

15		Fan speed
16		Memory function The unit will resume the original setting state after power is restored
17		Turbo function
18		Energy-saving function
19		Ambient/setting temperature
20		Electric heater
21		Blow function (Coil drying function)
22		Defrosting function (Heat Pump only)
23		Filter cleaning reminder
24		Timer Setting
25		Keycard control / Motion Sensor Activation
26		Quiet function
27		Lock function

7.2 Operation View

7.2.1 Wired Zone Controller Buttons

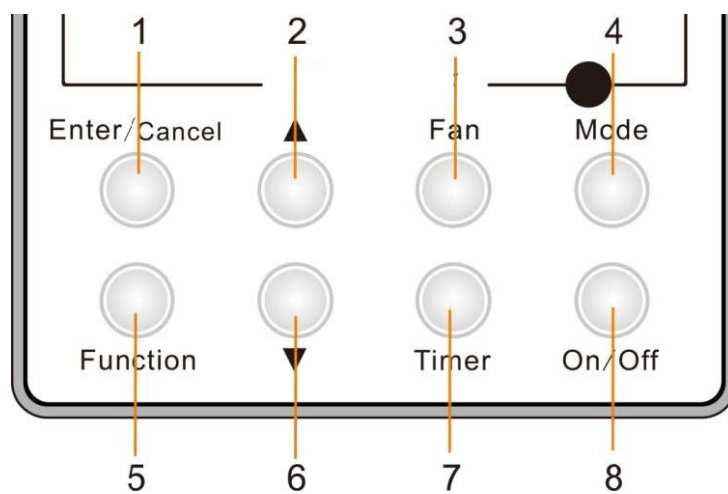


Figure 2-3-3 Wired zone controller buttons

7.3.2 Button Functions

Table 2-3-2 Wired Zone Controller Button Functions

No.	Description	Functions
1	Enter/Cancel	①. Function selection and canceling; ②. Press it for 5s to view the ambient temperature; press Mode button to select viewing outdoor ambient temperature or indoor ambient temperature.
2	▲	①. Running temperature setting range of indoor unit: 61°F~86°F (16°C~30°C); ②. Timer setting range: 0.5~24hr;
6	▼	③. Setting of air function level; ④. Setting of energy-saving temperature; ⑤. Setting of cleaning class.
3	Fan	Setting of high/medium high/medium/medium low/low/auto fan speed.
4	Mode	Setting of auto/cooling/heating/fan/dry mode of indoor unit.
5	Function	Switch over among these functions of swing/air/sleep/health/I-Demand/turbo/save and cancel/e-heater/X-fan/clean/quiet.
7	Timer	Timer setting.
8	On/Off	Turn on/off indoor unit.
4 Mode and 2 ▲	Memory function	Press Mode and ▲ buttons at the same time for 5s under off state of the unit to enter/cancel memory function (If memory function is set, indoor unit will resume original setting state after power failure and then power recovery. If not, indoor unit is defaulted to be off after power recovery. (Factory default for this function is "on").
2 ▲ and 6 ▼	Lock	Upon startup of the unit without malfunction or under off state of the unit, press ▲ and ▼ buttons at the same time for 5s to enter lock state. All wired zone controller buttons are locked out when lock is turned on. Repress ▲ and ▼ buttons for 5s to quit lock state.
4 Mode and 5 Function	Programming function (Unit/controller address)	Pressing Mode and Function buttons at the same time with the unit turned off puts the controller into Program Mode to allow confirmation/setting of the unit/controller address. (See below for Programming information)
5 Function and 7 Timer	Programming Function (General Parameters)	Under off state of the unit, press Function and Timer buttons at the same time for 5s to go to the programming menu. Press Mode button to scroll through parameters and press ▲ or ▼ buttons to set the actual value.
4 Mode and 6 ▼	Switch between Fahrenheit and Celsius	Under off state of the unit, press Mode and ▼ buttons at the same time for 5s to switch between Fahrenheit and Celsius.
5 Function and 6 ▼	Viewing historical malfunction	Continuously press Function and ▼ buttons for 5s to view historical malfunction. Then press ▲ and ▼ buttons to scroll through listed error codes if any. The timer displaying position displays the sequence of malfunction and the detailed error code. Up to five error codes may be displayed.
1 Enter/Cancel and 4 Mode	Setting of main and secondary wired zone controller	Under off state of the unit, press Enter/Cancel and Mode buttons at the same time for 5s to set main and secondary wired zone controller. Press ▲ or ▼ button to adjust. (Additional details available in the programming section.)

Note: The following functions can be set through Function and Timer buttons: setting of ambient temperature sensor, selecting three speeds in high speed and three speeds in low speed of indoor fan motor, display setting of freeze protection error code, setting of cold air prevention and hot air hot prevention function, setting of refrigerant-lacking protection function, selecting of blowing residual heat of indoor unit, selecting of compressor electric heater mode, selecting of low-power consumption mode, selecting door control function, selecting human sensitive function, long-distance monitoring, temperature compensation value at the air return port.

7.2.3 Setting of Wired Zone Controller/Indoor Unit Address

7.2.3.1 Setting and Confirmation of Address

Under off state of the unit, press Function and Mode buttons at the same time for 5s to enter setting interface of wired controller's address. In this case, LCD displays address number. Then press ▲ or ▼ button to adjust address and then press Enter/Cancel button to confirm. The address setting is related to the setting of Programming Function 4.9.10. When the selection in 4.9.10 is 00, this indicates the use of a central controller and must have an address from 01 - 16. When the selection in 4.9.10 is 01, this indicates the use of a BAS (building automation system) or BMS (building management system). In this case, the unit/controller address would range from 01-255.

Confirming or setting of the indoor unit/controller address as shown in Figure 2-3-4 below:

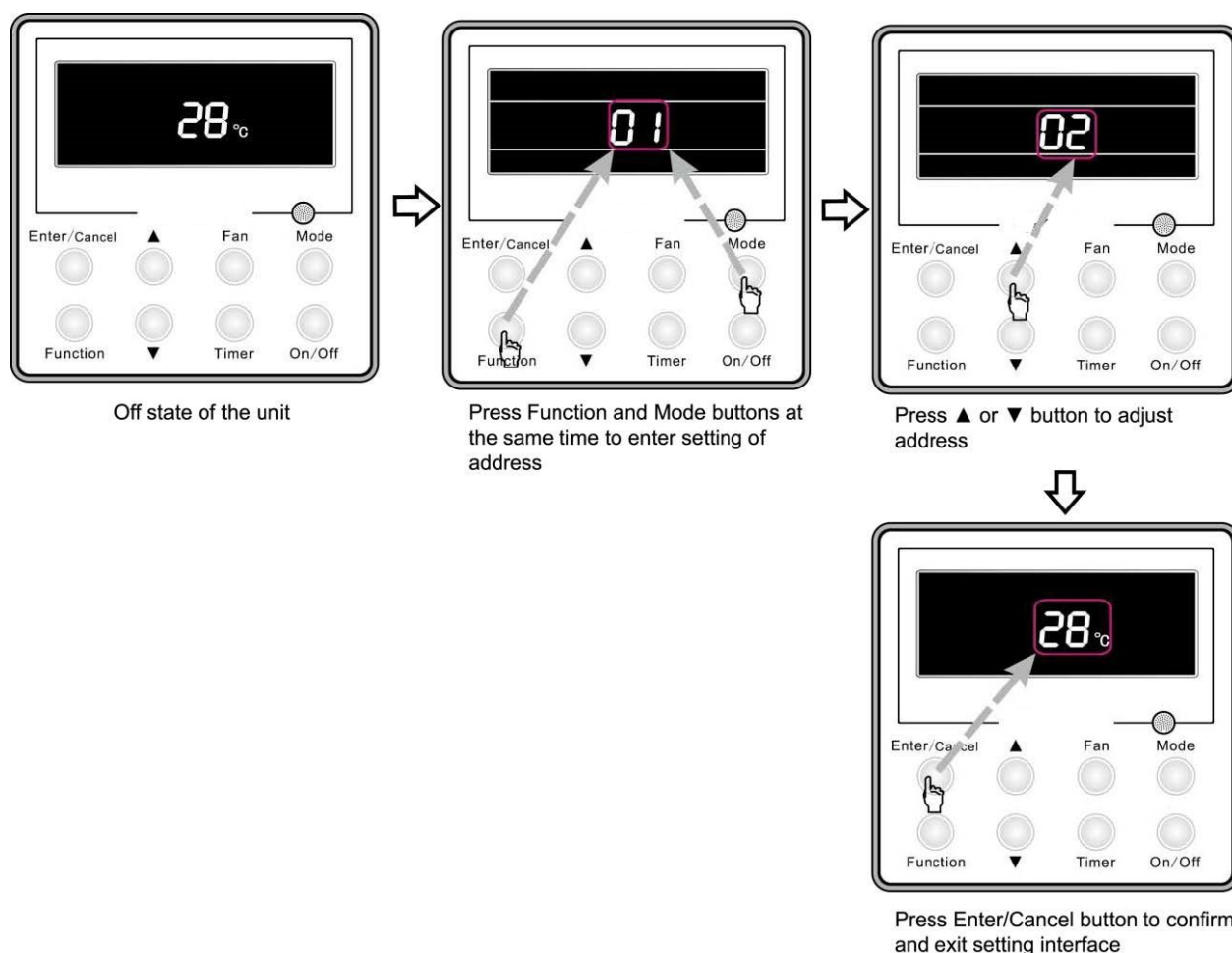



Figure 2-3-4 Setting and confirming of address

7.2.3.2 Setting of Main/Secondary for Wired Zone Controllers

With the indoor unit turned off, press Enter/Cancel and Mode buttons at the same time for 5s to go to the programming of main/secondary wired zone controller. Once in the program area, the LCD displays the wired zone controller's address (01 for main wired zone controller and 02 for secondary wired zone controller). Press ▲ or ▼ button to adjust address of main/secondary wired zone controller and then press Enter/Cancel button to confirm. If wired zone controller is set as a secondary, the icon  will be displayed.

Note: If there is only one wired zone controller, it can only be set as the main; if there are two wired zone controllers, one should be the main and the other should be the secondary.

Setting of main/secondary wired zone controller's address is shown as Figure 2-3-5 below:

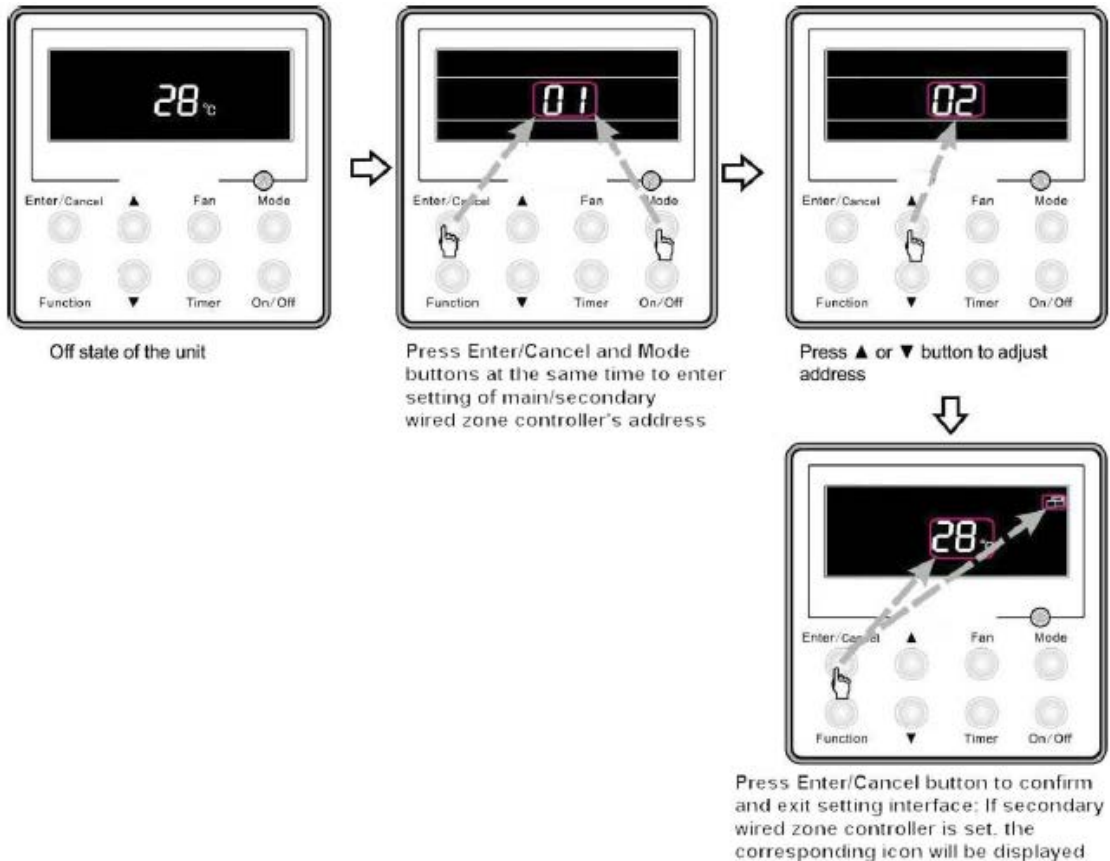




Figure 2-3-5 Enquiry and setting of main/secondary wired zone controller's address

8 SPECIAL FUNCTIONS SETTINGS

8.1 Setting of Filter Clean Reminder Function

When unit is on, press Function button to switch to filter clean reminder function. The  icon will blink and then enter setting of filter clean reminder function. Timer zone displays the set pollution level and you can press ▲ or ▼ button to adjust the level. Then press Enter/Cancel button to turn on this function.

When filter clean reminder function is turned on, press Function button to switch to filter clean reminder function. The  icon will blink and press ▲ or ▼ button to adjust timer zone to display "00". Then press Enter/Cancel button to cancel this function.

Setting of filter clean reminder function is shown as Figure 2-4-1 below:

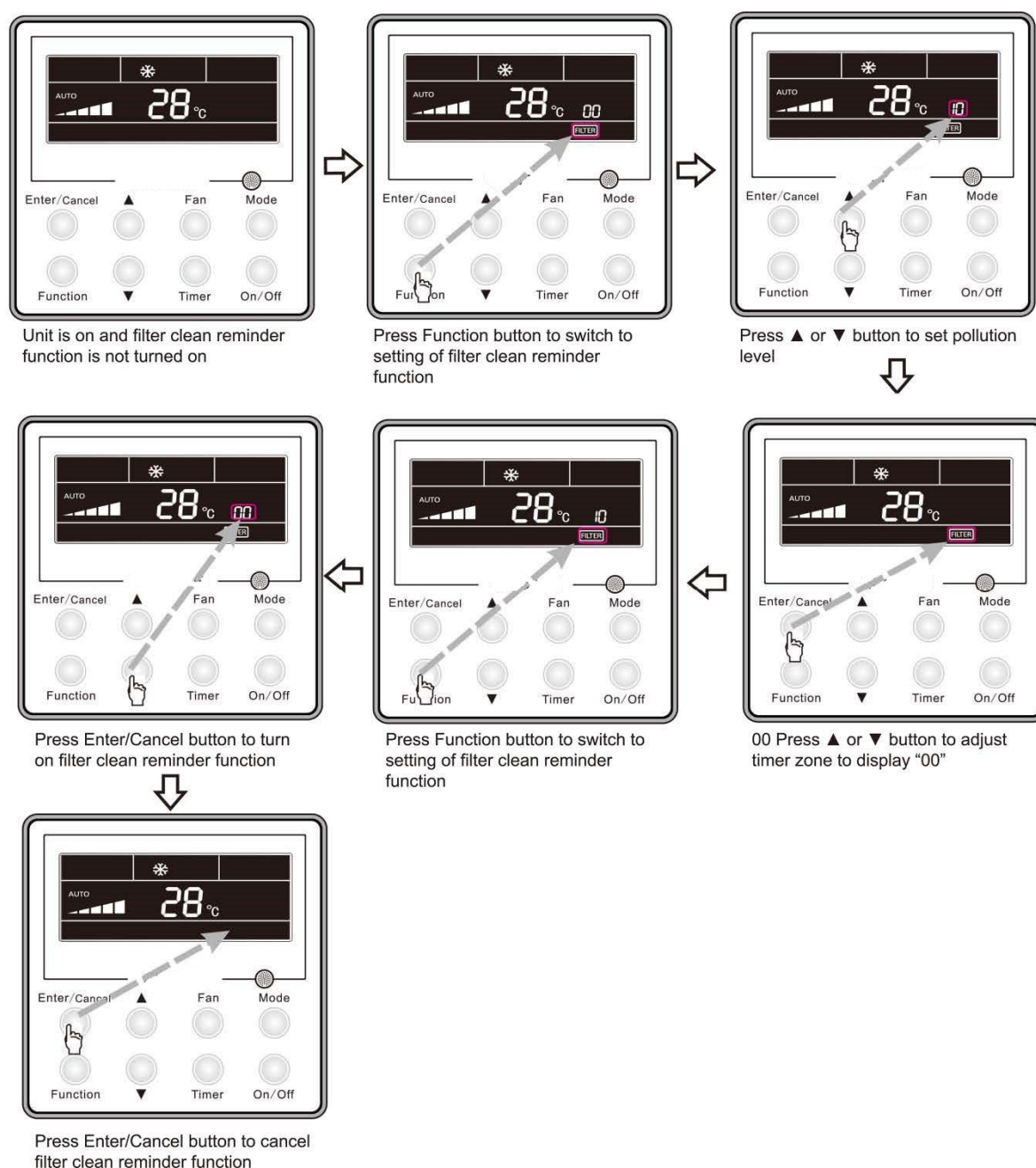


Figure 2-4-1 Setting of filter clean reminder function

When setting the filter clean reminder function, timer zone will display 2 digits, of which the former indicates the pollution degree of operating place and the latter indicates the accumulated operating time of indoor unit. There are 4 types of situations:

- (1) Clean Reminder is off (Timer zone shows "00");
- (2) Low particulate: the former digit in timer zone shows 1 while the latter one shows 0, which indicates the accumulated operating time is 5500hr. Each time the latter digit increases 1, the accumulated operating time increases 500hr. When it reaches 9, it means the accumulated operating time is 10000hr.
- (3) Medium particulate: the former digit in timer zone shows 2 while the latter one shows 0, which indicates the accumulated operating time is 1400hr. Each time the latter digit increases 1,


accumulated operating time increases 400hr. When it reaches 9, it means the accumulated operating time is 5000hr;




(4) High particulate: the former digit in timer zone shows 3 while the latter one shows 0, which indicates the accumulated operating time is 100hr. Each time the latter digit increases 1, the accumulated operating time increases 100hr. When it reaches 9, it means the accumulated operating time is 1000hr;

The detailed pollution level and the corresponding time is as shown in Table 2-4-1 below:

Table 2-4-1 Pollution level and corresponding time

Pollution level	Accumulated operating time (hour)	Pollution level	Accumulated operating time (hour)	Pollution level	Accumulated operating time (hour)
10	5500	20	1400	30	100
11	6000	21	1800	31	200
12	6500	22	2200	32	300
13	7000	23	2600	33	400
14	7500	24	3000	34	500
15	8000	25	3400	35	600
16	8500	26	3800	36	700
17	9000	27	4200	37	800
18	9500	28	4600	38	900
19	10000	29	5000	39	1000

If filter clean reminder function is turned on, the  icon will be on.


- (1) If cleaning time is not reached, no matter the setting is changed or not, the accumulated operating time won't be recalculated when pressing Enter/Cancel button;
- (2) If cleaning time is reached, in unit on or off state,  will blink every 0.5s for reminder. Press Function button to switch to  icon and press ▲ and ▼ button to adjust the level. Then press Enter/Cancel button, so the accumulated operating time won't be cleared (If the adjusted level is higher than the present accumulated operating time, the icon won't blink any more; if the adjusted level is lower than the present accumulated operating time, the icon will go on blinking).
- (3) The only way to cancel filter clean reminder function is to press Function button to switch to filter clean reminder function. The  icon will blink and press ▲ or ▼ button to adjust timer zone to display "00". In this case, the accumulated operating time will be cleared.

8.2 Low Temperature Drying Function

Under dry mode and when set temperature is 16°C(61°F), continuously press ▼ button until the temperature is set to 12°C (54°F). At this point, the unit will enter the low temperature drying function.


To exit low temperature drying function, press the temperature up button or mode button.

8.3 Lock Function

When unit is turned on normally or turned off, pressing ▲ and ▼ buttons at the same time for 5s will turn on Lock function. LCD will display . Pressing ▲ and ▼ buttons at the same time for 5s will turn off this function.

When Lock function is turned on, no other buttons will respond when pressed. This function will be retained in the unit memory in the event of a power failure.

8.4 Memory Function


Press Mode and ▲ buttons at the same time for 5s under off state of the unit to turn on or cancel memory function. If memory function is set,  is displayed. If not, indoor unit is defaulted to be off after power recovery.

If memory function is set, indoor unit will resume original setting state after power failure and then power recovery.




Note: Do not turn off power to the system immediately after activating/deactivating the memory function as this may result in improper operation.

8.5 Door Control Function/Occupancy Function

When door control function is selected, the wired zone controller will work when the room card is inserted and stop working when the room card is removed; when occupancy function is selected, the wired controller will work when it senses there is somebody in the room and stop working when it senses there is nobody in the room. When the door control function senses the room card is not inserted or occupancy function senses there is nobody in the room, the wired zone controller will display  icon. These two functions cannot be used at the same time.



Note:

- ① In long-distance monitoring or centralized control, no matter the room card is inserted or not, the ON/OFF of unit can be controlled. If long-distance monitoring or centralized control information is received when the room card is not inserted,  icon is cleared. When the card is reinserted, door control function is judged to be turned on. If long-distance monitoring or centralized control information is received when the room card is inserted, the indoor unit will maintain its original status.
- ② The unit can not be controlled by the wired zone controller when the card is not inserted.
- ③ When door control function and occupancy function have been set at the same time, only the door control function will be operational.

8.6 Changing from Fahrenheit to Celsius

Under off state of the unit, press Mode and ▼ buttons at the same time for 5s to switch between Fahrenheit and Celsius.

8.7 Ambient Temperature

Under off or on state of the unit, press it for 5s to view the ambient temperature. In this case, timer zone displays ambient temperature type 01 or 02. Ambient temperature zone displays the corresponding temperature of that type. 01 stands for outdoor ambient temperature and 02 stands for the indoor ambient temperature after compensation. Press Mode button to switch between 01 and 02. Pressing other buttons except Mode button or receiving remote control signal will exit enquiry state. If there is no operation within 20s will also exit enquiry state.



Note:

- ① If the unit is not connected to outdoor ambient temperature sensor, display of outdoor ambient temperature will be shielding after energizing for 12hr.
- ② If there is malfunction of outdoor ambient temperature sensor, display of outdoor ambient temperature will be shielding after energizing for 12hr.

8.8 Error Code Recall

Under off or on state of the unit, continuously press Function and ▼ buttons for 5s to view recent error codes.

When recalling error codes, you will see "00" in the set temperature area of the controller. Press ▲ and ▼ buttons to view the five most recent error codes, if any. The error code(s) will be displayed in the timer section of the controller. The fifth displayed code is the most recent.

8.9 Programming Function

Under off state of the unit, press Function and Timer buttons at the same time for 5s to go to the programming menu. Press Mode button to adjust the setting items and press ▲ or ▼ button to set the actual value.

8.9.1 Setting ambient temperature sensor (dual ambient temperature sensors function)

In the programming area, press Mode button to adjust to "00" in temperature displaying area of controller. Press ▲ or ▼ button to adjust. There are three selections:

- (1) If the room temperature is to be read at the return air of the unit then the setting value would be "01".
- (2) If the room temperature is to be read at the wired zone controller, then the setting value would be "02".
- (3) To read the the room temperature at the indoor unit return in cooling, dry and fan mode, and/or to read the room temperature at the wired zone controller in heating and auto modes, select "03".

8.9.2 Freeze protection error code

In the programming area, press Mode button until "02" is displayed on the controller. Press ▲ or ▼ button to adjust. There are two selections:

- (1) When activated controller displays "01"
- (2) When deactivated controller displays "02"

This function may not apply to all models.

8.9.3 Low refrigerant lock out protection

In the programming area, press Mode button until "04" is displayed at the controller. Press ▲ or ▼ button to adjust. There are two selections:

- (1) When protection is on, "01" will be displayed.
- (2) When protection is off, "02" will be displayed.

8.9.4 Selecting blowing residual heating of indoor unit

In the programming area, press Mode button until "05" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- (1) Mode 1 will be displayed as "00" on the controller
- (2) Mode 2 will be displayed as "01"

Mode 1: Outdoor unit stops when indoor unit reaches temperature setpoint. The indoor unit fan continues to run if in cooling mode; after outdoor unit stops when reaching temperature setpoint in heating mode, duct type unit and floor ceiling unit will blow residual heat for 60s and then stop indoor unit fan. Cassette units always operate in low fan speed and will blow residual heat for 60s.

Mode 2: After outdoor unit stops when reaching temperature setpoint. The indoor fan motor stops operation with a 10s delay regardless if in heating or cooling mode.

8.9.5 Mode selecting of compressor crankcase heater

In programming area, press Mode button until "06" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- (1) Mode 1 (LCD displays 00)
- (2) Mode 2 (LCD displays 01)



Notes:

- ① Mode 1: Compressor crankcase heater starts when outdoor ambient temperature is below 35°C(95°F) and stops when outdoor ambient temperature is above 37°C (99°F). When outdoor ambient temperature is within 35°C (95°F)~ 37°C (99°F), the heater will maintain its previous operation state.
- ② Mode 2: Compressor crankcase heater starts when outdoor ambient temperature is below -2°C (28°F) and stops when outdoor ambient temperature is above 0°C (32°F). When outdoor ambient temperature is within -2°C (28°F)~0°C (32°F), the heater will maintain its previous

operation state.

8.9.6 Selecting low-power consumption mode

In the programming area, press Mode button until "07" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- (1) With low-power consumption mode (LCD displays 00)
- (2) Without low-power consumption mode (LCD displays 01)

8.9.7 Selecting door control function

In the programming area, press Mode button until "08" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- (1) Without door control function (LCD displays 00)
- (2) With door control function (LCD displays 01)

8.9.8 Selecting occupancy function

In the programming area, press Mode button until "09" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- (1) Without occupancy function (LCD displays 00)
- (2) With occupancy function (LCD displays 00)

8.9.9 Selecting building management system or central controller

In the programming area, press Mode button until "10" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- (1) Central controller (LCD displays 00)
- (2) Building management system (LCD displays 01)

8.9.10 Selecting fan mode of indoor fan motor

In the programming area, press Mode button until "11" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- (1) P3 (LCD displays 03)
- (2) P4 (LCD displays 04)
- (3) P5 (LCD displays 05)
- (4) P6 (LCD displays 06)
- (5) P7 (LCD displays 07)



Note: You can select P03, P04, P05, P06, P07 in fan mode of indoor fan motor, which means different fan mode combinations are corresponding to different static pressure. Ex-factory defaulted mode is P05. You can set the mode through wired controller. S01 (lowest), S02, S03.....S12, S13 (highest).

Table 2-4-2 Combination relationship of P03, P04, P05, P06, P07

Static pressure selection	Super high speed	High speed	Medium high speed	Medium speed	Medium low speed	Low speed	Quiet R1 speed	Quiet R2 speed	Quiet R3 speed
P03	S09	S08	S07	S06	S05	S04	S03	S02	S01
P04	S10	S09	S08	S07	S06	S05	S04	S03	S02
P05	S11	S10	S09	S08	S07	S06	S05	S04	S03
P06	S12	S11	S10	S09	S08	S07	S06	S05	S04
P07	S13	S12	S11	S10	S09	S08	S07	S06	S05

8.9.11 Selecting compensation of temperature sensor at air return

In the programming area, press Mode button until "12" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- (1) Compensate 0°C (32°F) (LCD displays 00)
- (2) Compensate 1°C (34°F) (LCD displays 01)
- (3) Compensate 2°C (36°F) (LCD displays 02)
- (4) Compensate 3°C (37°F) (LCD displays 03)
- (5) Compensate 4°C (39°F) (LCD displays 04)
- (6) Compensate 5°C (41°F) (LCD displays 05)
- (7) Compensate 6°C (43°F) (LCD displays 06)
- (8) Compensate 7°C (45°F) (LCD displays 07)
- (9) Compensate 8°C (46°F) (LCD displays 08)
- (10) Compensate 9°C (48°F) (LCD displays 09)
- (11) Compensate 10°C (50°F) (LCD displays 10)
- (12) Compensate 11°C (52°F) (LCD displays 11)
- (13) Compensate 12°C (54°F) (LCD displays 12)
- (14) Compensate 13°C (55°F) (LCD displays 13)
- (15) Compensate 14°C (57°F) (LCD displays 14)
- (16) Compensate 15°C (59°F) (LCD displays 15)



Note: Indoor ambient temperature compensation can be set through wired zone controller (e.g. If 02 is selected, it indicates the compensation temperature is 36°F (2°C). If the indoor ambient temperature detected by the temperature sensor at air return is 84°F (29°C), the ambient temperature after compensation is 29°C (84°F)-2°C (36°F)=27°C (81°F)).

After finishing setting, press Enter/Cancel button to save and exit setting. If there is no input for 20s while in this programming area, it will automatically exit to normal controller function. Any changes made will not be saved.

PE	Temperature excursion protection
PL	Low voltage protection of bus bar
PH	High voltage protection of bus bar
PU	Charging circuit malfunction
PP	Abnormity of input voltage
ee	Malfunction of outdoor drive memory chip

When there is a malfunction during operation, error will be displayed at the controller. When several malfunctions occur at the same time, these error codes will be displayed as a sequence that can be scrolled through.

When there is a malfunction, please turn off the unit and call the installing contractor or local service professional. See below for an example of a displayed error (E1-high pressure protection).

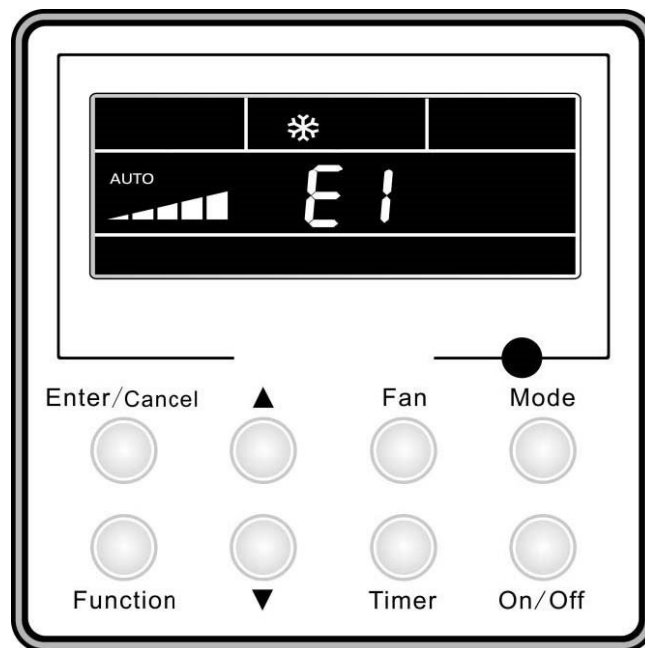


Figure 2-6-1

9 CENTRAL CONTROLLER

9.1 Smart Zone Controller

9.1.1 Function

The smart zone controller can directly control up to 16 sets of indoor units in a control network and is available to check the running status of any unit through the LCD, including running mode, timer, fan speed, centralized control, etc.

9.1.2 Buttons and Display of Central Controller



Figure 2-7-1

9.1.3 Function Buttons

Table 2-7-1 Functions of Buttons

No.	Name	Function Description
1	Mode	It is used for the switchover among different modes.
2	Fan	It is used to set the fan speed, high, medium, low or auto.
3	On/Off	It is used to set the on/off status of the indoor unit.
4	▲	①. Under the single/centralized control status: It is used to set the running temperature of the indoor unit with max. 86°F (30° C) and min. 61°F (16° C);
5	▼	②. Under the timer setting status: It is used to set the timer period with max. 24 hours;
		③. Under the clock setting status: It is used to set the hour and minute.
6	Mon 1/9	It is used for the switchover between unit 1 and unit 9; Under the timer or clock setting status, it indicates Monday.
7	Tue 2/10	It is used for the switchover between unit 2 and unit 10; Under the timer or clock setting status, it indicates Tuesday.
8	Wed 3/11	It is used for the switchover between unit 3 and unit 11; Under the timer or clock setting status, it indicates Wednesday.

9	Thu 4/12	It is used for the switchover between unit 4 and unit 12; Under the timer or clock setting status, it indicates Thursday.
10	Fri 5/13	It is used for the switchover between unit 5 and unit 13; Under the timer or clock setting status, it indicates Friday.
11	Sat 6/14	It is used for the switchover between unit 6 and unit 14; Under the timer or clock setting status, it indicates Saturday.
12	Sun 7/15	It is used for the switchover between unit 7 and unit 15; Under the timer or clock setting status, it indicates Sunday.
13	8/16	It is used for the switchover between unit 8 and unit 16.
14	Timer/Time	It is used to set the timer or on/off time of the selected indoor unit as well as to set the clock of the system.
15	Central	It is used for the switchover between single and centralized control modes.
16	Shield	It is used to deactivate some or all functions of a single or a group of indoor unit(s).
17	All on/off	It is used to start/stop all indoor units.

9.1.4 LCD of the Controller

9.1.4.1 Outline Drawing of the LCD

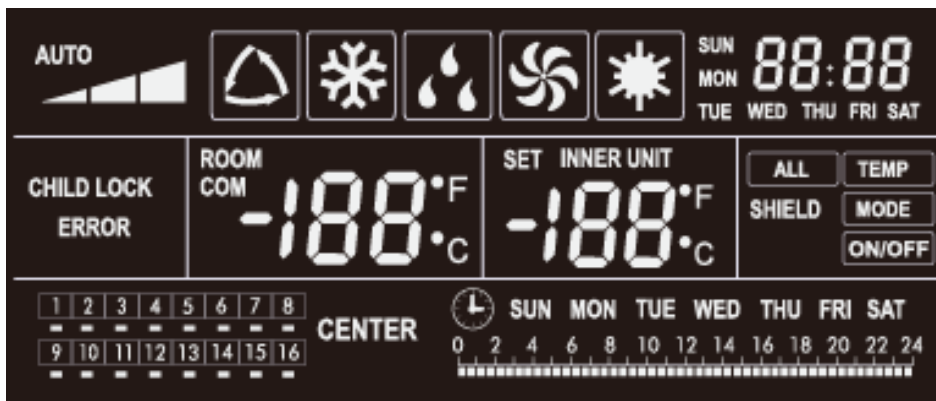


Figure 2-7-2

9.1.4.2 Introduction to Symbols on the LCD



Figure 2-7-3

Table 2-7-2 Introduction to the Symbols on the LCD

No.	Name	Description
1	Fan speed	It displays the fan speed of the indoor unit, high, medium, low and auto.
2	Running mode	It displays the running mode of the indoor unit, auto, cool, dry, fan and heat.
3	System clock	It displays the current time (hour and minute) in 24-hour time system and also the week day.
4	Shield/Lock	It displays the shield/lock status, "ALL", "TEMP", "MODE" and 'On/Off'.
5	Weekly timer	It displays the timer period (unit: 0.5 hour) which will repeat every week.
6	Set temperature Indoor unit code	It displays the set temperature, indoor unit code (01-16), and symbols of Celsius and Fahrenheit scale.
7	Control mode	It displays "CENTER" under the centralized control mode and no display under the single control mode.
8	Ambient temperature Serial port	It displays the ambient temperature, serial port as well as symbols of Celsius and Fahrenheit scale.
9	Indoor unit code On/off status	Numbers indicate the indoor unit codes which will be displayed when the corresponding indoor unit is online; "" indicates the on/off status of the indoor unit, its flashing for "on" or else for "off"
10	Error Child lock	It displays the error codes when some error(s) arises and also "CHILD LOCK" when this function is activated.

9.1.4.3 Network Topology

Network Connection of the Smart Zone Controller

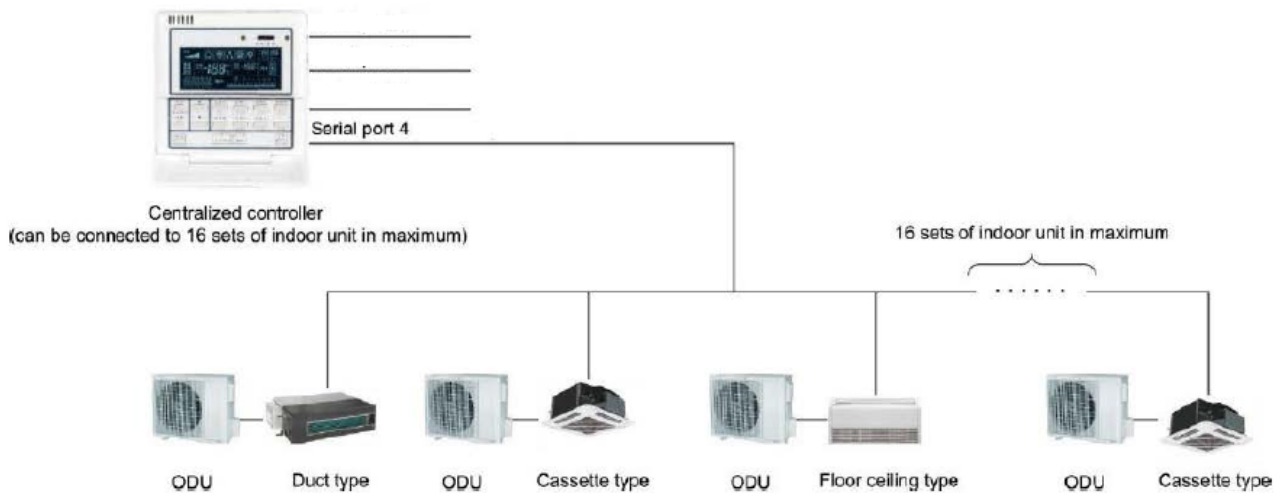


Figure 2-7-4

9.1.4.4 Dimensions

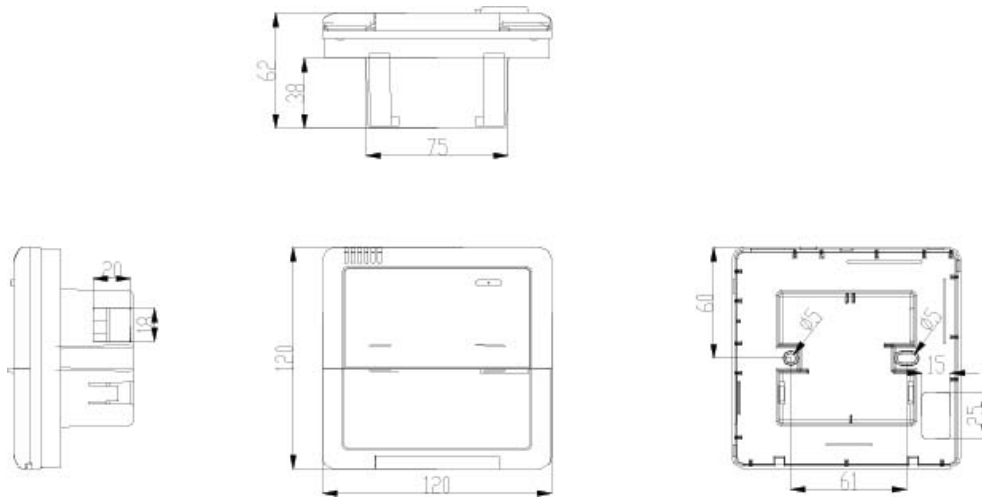


Figure 2-7-5

9.2 Additional Special Functions

9.2.1 Door control function

Door control function is available for this series. In order to carry out this function, please consult the Call Center for information on door control accessories. (Call Center Support information is on last page of this manual.)

(1) Interface instructions

- 1) The interface printing is DOOR-C and the type is B2B-XH-B. The wires of door control accessories must be connected to this interface;
- 2) Electrical characteristic: none;
- 3) Working principle: When a room card or similar object is inserted, the interface allows the indoor unit to be operated normally. When the card is removed, the indoor unit returns to the off state and cannot be turned on.

Connect the door control detection port of indoor main board with the interface of door control board (CN1 in the following Figure); connect the door control signal to the door control signal input port (X1 and X2 in the following Figure). X1 is AC 220V signal input and X2 is DC +5V to 24V. You can only choose X1 or X2. Definition of interface is as shown in Figure below:

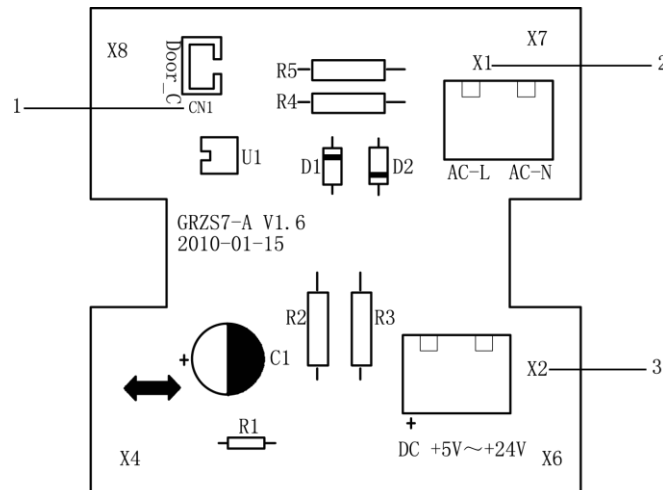



Figure 2-7-6 Illustration of door control port

Table 2-7-3 Door control wiring port

No.	Terminal name	Terminal instruction
1	CN1	CN1 wiring terminal and door control interface of indoor main board
2	X1(AC-L, AC-N)	X1(AC-L, AC-N) wiring terminal, connected to door control input signal, rated voltage 220V.
3	X2	X2 wiring terminal, connected to door control input signal (low voltage)

(2) Function instructions:

In order to achieve this function, set it through wired controller and refer to the following operation method. Factory default is that this function is not activated; if this function is set and door control accessories are connected, the unit will control the ON/OFF of unit according to the card state detected by door control detection board. When the card is not inserted, the unit will go to standby state. If the unit has a wired zone controller,  icon will be displayed on the wired zone controller.

If the unit has no wired zone controller, there will be no display. The unit will control the ON/OFF of unit according to the detected information.

(3) Setting method:

Under off state of the unit, press Function and Timer buttons at the same time for 5s to go to the programming menu. Press Mode button until "08" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- 1) Without door control function (LCD displays 00)
- 2) With door control function (LCD displays 01)

Choose the second selection and then press Enter/Cancel button to save and exit setting. Now, door control function is activated. The unit will memorize this setting status. The setting value will be maintained in the event of a power failure. The detailed setting is as shown in the Figure below:

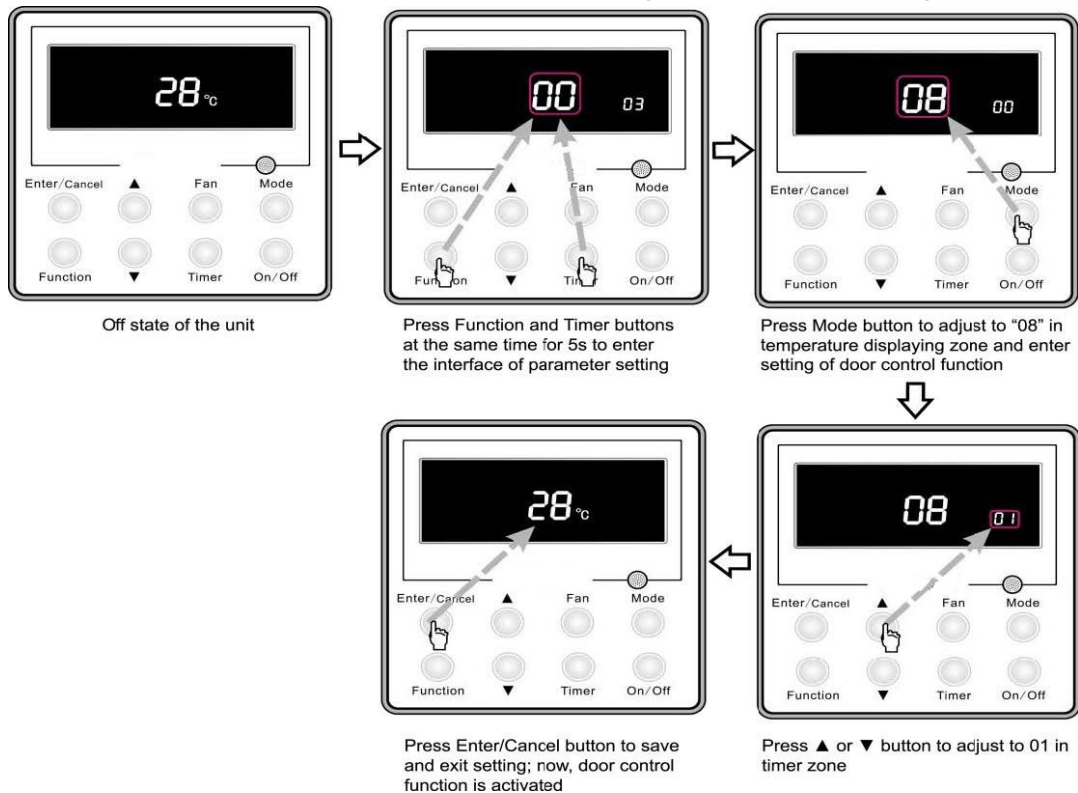


Figure 2-7-7


9.2.2 Occupancy function

You must purchase the occupancy module for this function to be activated. An interface for this module is reserved on the mainboard of indoor unit.

(1) Interface instruction:

- 1) The printing is CN23 and the interface type is JST B3B-PH-K-S;
- 2) Electrical characteristic: 1-pin: +12V; 2-pin: detection port; 3-pin: GND; current: 150mA;
- 3) Working principle: When the module detects there is nobody in the room, 2-pin and 3-pin are short-circuited and they are low electrical level; when there is somebody in the room, 2-pin output is high electrical level.

(2) Function instructions:

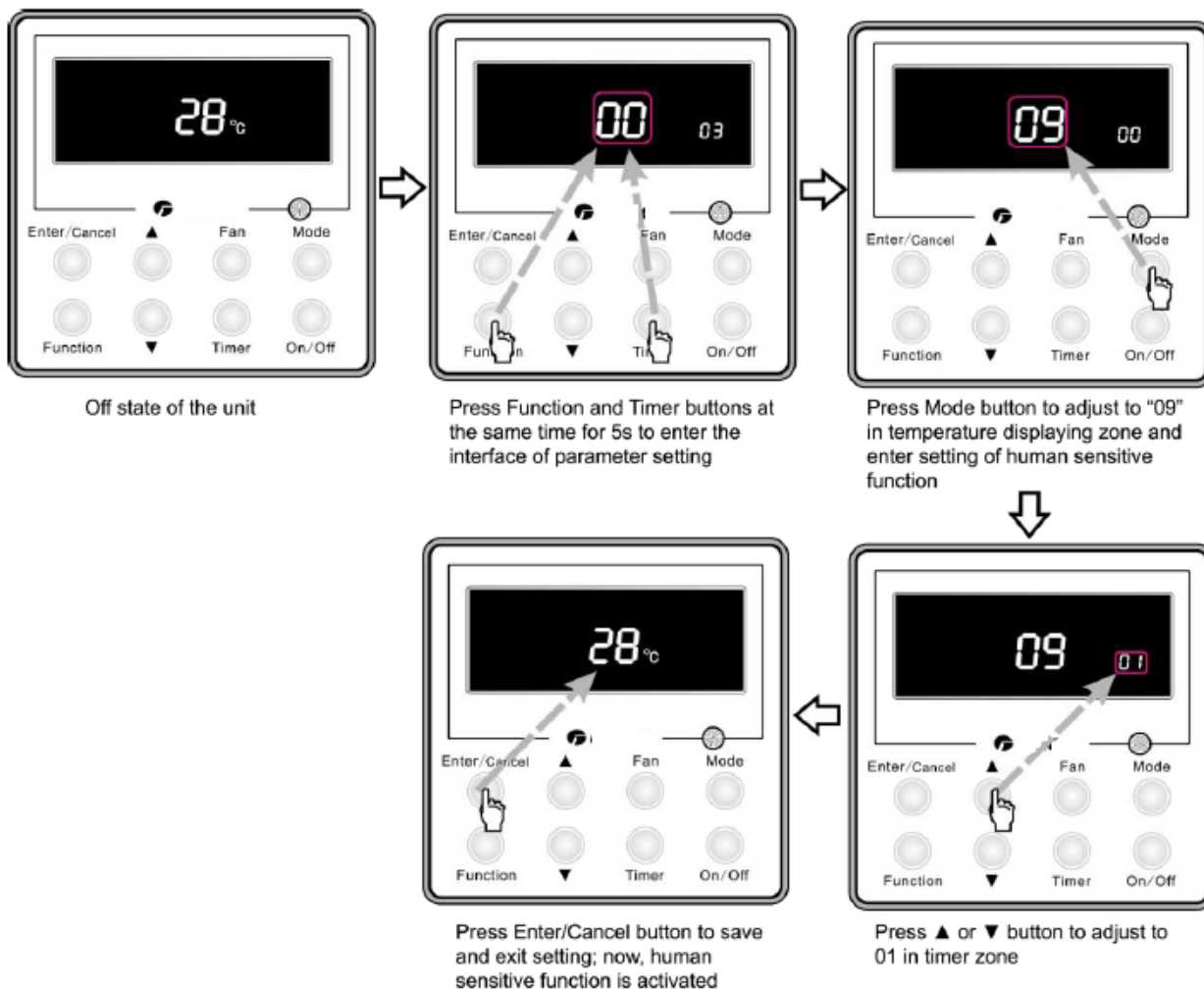
In order to achieve this function, set it through wired controller and refer to the following operation method. It is defaulted that this function is not activated; if this function is set and occupancy module is connected, the unit will control the ON/OFF of unit according to the signal detected by occupancy module. When there is nobody in the room and the unit has a wired zone controller,  icon will be displayed on the wired zone controller; if the unit has no wired zone controller, there will be no display. The unit will control the ON/OFF of unit according to detected information.

(3) Setting method:

With the indoor unit turned off, press Function and Timer buttons simultaneously for 5s to go to the programming menu. Press Mode button until "09" is displayed at the controller. Press ▲ or ▼ button to adjust. There are 2 selections:

- 1) Without occupancy function (LCD displays 00)
- 2) With occupancy function (LCD displays 01)

Choose the second selection and then press Enter/Cancel button to save and exit setting. Now, occupancy function is activated. The unit will maintain this setting status. The setting value will be maintained after a power failure. The detailed setting is as shown in the Figure on the next page.



Note:

Figure 2-7-8 ("human sensitive" = "occupancy")

When the door control function and occupancy function have been set at the same time, it is defaulted that door control function is valid and occupancy function is invalid.

The user can purchase the occupancy module as an accessory. Please pay attention to the following notes:

- ① There is a dedicated connection on the mainboard. The interface module inserted into this connection must be PH-3P-K.
- ② The current consumption of module can not exceed the current capacity provided by this interface.

9.2.3 Connect to interface of central controller:

The indoor unit is interfaced with the central controller. When a central controller is connected, centralized control of a unit can be realized if the wired zone controller is not connected;

(1) Interface instruction:

- 1) The connection is COM-BMS2, COM-BMS3 and the interface type is B2B-XH-K3;
- 2) Working principle: Centralized control and communication of indoor mainboard and unit control;

(2) Function instructions:

In order to achieve this function, set the address mode and address through the wired zone controller. Please refer to Point 3 (below) for the setting method. The address mode is defaulted to be connecting to a central controller mode and the defaulted address is 1.

When the central controller is connected, centralized control of the unit can be realized to control unit ON/OFF, operation mode, set fan speed/temperature and weekly timer.

(3) Setting method:

First, set the address mode of the wired zone controller into central controller address mode. The setting method is:

1) Under off state of the unit, press Function and Timer buttons at the same time for 5s to go to the programming menu. Press Mode button until "10" is displayed at the controller. Press ▲ or ▼ button to scroll through selections:

- ① Centralized controller address mode (LCD displays 00)
- ② Building management control address mode (LCD displays 01)

Choose the first selection and then press Enter/Cancel button to save and exit setting. Now, the address of wired zone controller is set to match the address of centralized controller.

The unit will memorize this setting status. The setting value will be maintained after a power failure. The detailed setting is as shown in the Figure below:

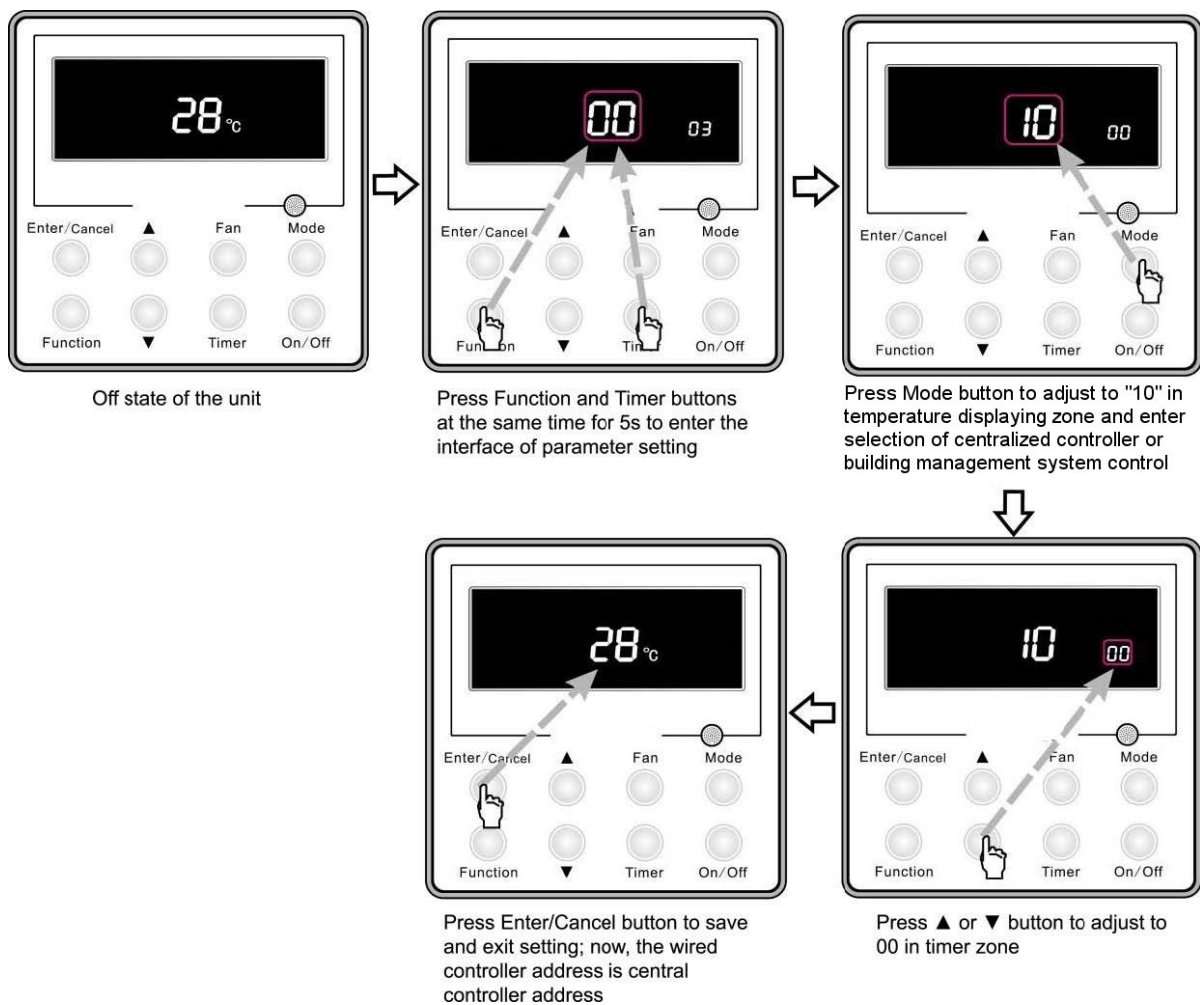


Figure 2-7-12

2) Address setting of each unit: When the address mode is set to be central controller address mode. The address setting value range is 01~16. The setting method is:

Under off state of the unit, press Function and Mode buttons at the same time for 5s to enter setting interface of wired zone controller address. LCD displays address sequence. Press ▲ or ▼ button to adjust the address sequence and then press Enter/Cancel button to confirm. The setting value will be maintained after a power failure. The detailed setting is as shown in the Figure below:

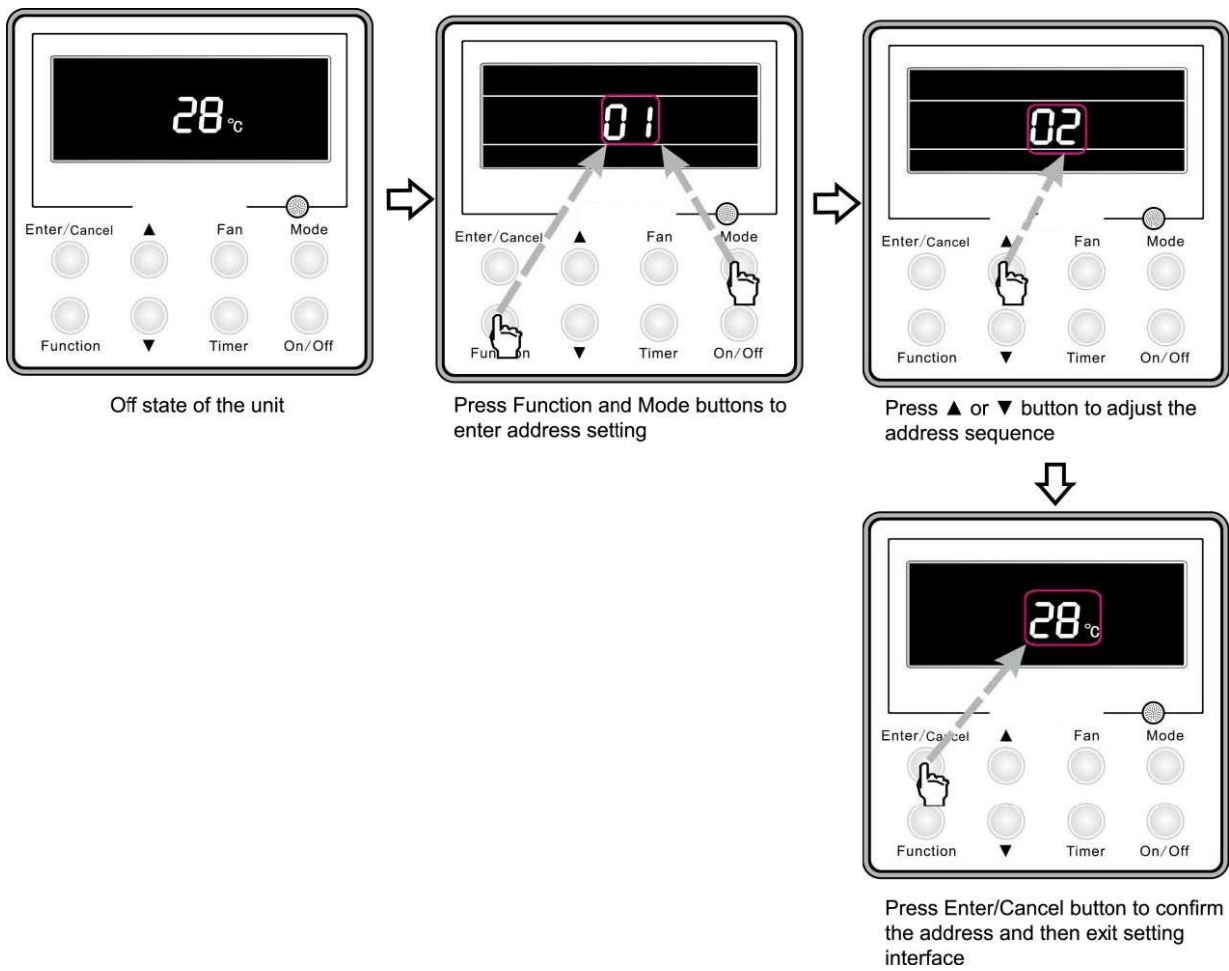


Figure 2-7-13

(2) Function instructions:

In order to achieve this function, set the address mode and address through wired zone controller. Please refer to Point 3 below for the setting method. The address mode is defaulted to be connecting to central controller mode and the defaulted address is 1;

When the central controller is connected, central control of the unit can be realized to control unit ON/OFF, operation mode, set fan speed/temperature and weekly timer.

(3) Setting method:

First, set the address mode of wired zone controller into central controller address mode. The setting method is:

- 1) Under off state of the unit, press Function and Timer buttons at the same time for 5s to go to the programming menu. Press Mode button until "10" is displayed at the controller. Press ▲ or ▼ button scroll through selections:
 - ① Central controller address mode (LCD displays 00)
 - ② Building management control address mode (LCD displays 01)

Choose the first selection and then press Enter/Cancel button to save and exit setting. Now, the address of wired controller is set to match the address of centralized controller. The unit will memorize this setting status. The setting value will be maintained after a power failure. The detailed setting is as shown in the Figure below:

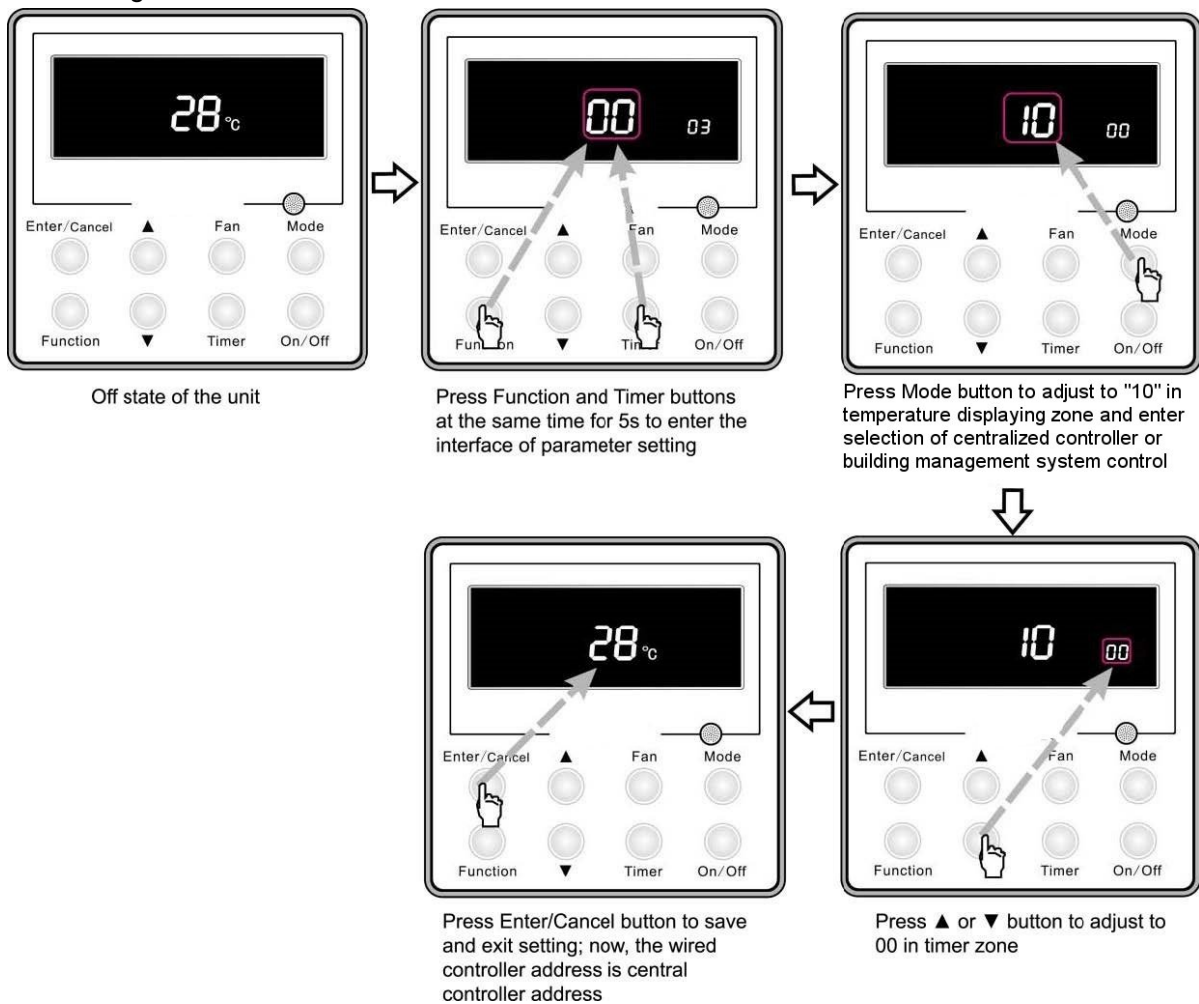


Figure 2-7-12

- 2) Address setting of each unit: When the address mode is set to be central controller address mode. The address setting value range is 01~16. The setting method is:

Under off state of the unit, press Function and Mode buttons simultaneously for 5s to enter setting interface of wired zone controller address. LCD displays address sequence. Press ▲ or ▼ button to adjust the address sequence and then press Enter/Cancel button to confirm. The setting value will be maintained after a power failure. The detailed setting is as shown in the Figure below:

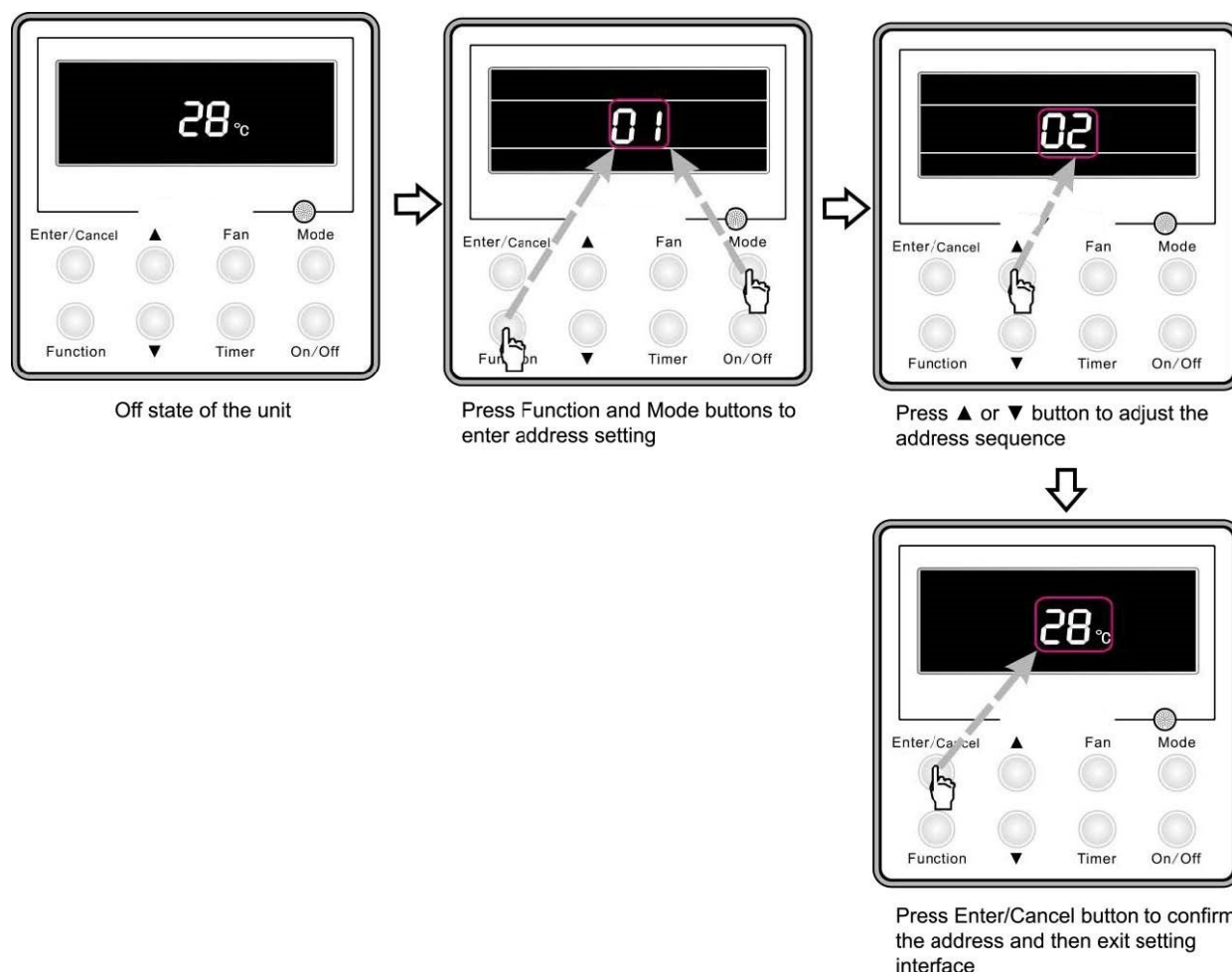


Figure 2-7-13

When the address is set, the wired zone controller can be removed and connect the central controller to the indoor mainboard. Then connect the required units to realize central control of these units.

**Notes:**

- ① When central controller is to be connected, set the address mode into central controller address mode through wired zone controller. Building management system control address mode can not be set;
- ② The unit addresses in the same network must be different, otherwise, communication malfunction will occur and the unit will not work correctly.
- ③ When central controller is to be connected, the unit address range is 1-16. Only 16 indoor units can be connected to each central controller.
- ④ The code and model of central controller is as below:

Name	Remark
Central Controller DCCRMW	Only 16 indoor units can be connected to this controller

10 MAINTENANCE AND TROUBLESHOOTING

ERROR CODES TABLE

10.1 Main Control Malfunction

Table 4-1-1 Fault Display on Indoor Wired Zone Controller

No.	Error code	Malfunction name	Origin of malfunction signal	Control description
1	E1	High pressure protection	High pressure switch	When outdoor unit detects the high pressure switch is cut off for 3s successively, high pressure protection will occur. All the loads (except the 4-way valve in heating mode) will be switched off. In this case, all the buttons and remote control signals except ON/OFF button will be disabled and cannot be recovered automatically. Switch off the unit or re-energize the unit after cutting off power to eliminate this protection.
2	E2	Freeze protection	Indoor evaporator temperature sensor	If detecting that the evaporator temperature is lower than protective temp. value after the unit has been running for a period of time under cooling or dry mode, the unit will report this fault, in which case the compressor and outdoor fan motor will be stopped. The unit will not run until evaporator temperature is higher than the protective temp. value and the compressor is stopped for 3min.
3	E3	Low pressure protection	Low pressure switch	If it is detected within 30s successively that the low-pressure switch is cut off under ON or standby state, the unit will report low pressure protection. If the fault occurs successively 3 times within 30min, the unit cannot be recovered automatically.
		Refrigerant lacking protection		If the unit reports system refrigerant lacking within 10min after turning on the unit, the unit will stop operation. If the fault occurs successively 3 times, the unit cannot be recovered automatically.
		Refrigerant recycling mode		If enter refrigerant recycling mode through special operation, E3 will be displayed. After exiting refrigerant recycling mode, the code will disappear.
4	E4	Compressor high discharge temperature protection	Compressor discharge temperature is high	If outdoor unit detects that the discharge temperature is higher than protective temp. value, the unit will report high discharge temperature protection. If the protection occurs over 6 times, the unit cannot be recovered automatically. Switch off the unit or re-energize the unit after cutting off power to eliminate this protection.
5	E6	Communication malfunction	Communication between indoor and outdoor main board	If the outdoor unit does not receive data from indoor unit, communication malfunction will be reported. If there is communication abnormality between display board and indoor unit, communication malfunction will be reported too.
6	E8	Malfunction of indoor fan motor	Indoor fan motor	If the indoor unit does not receive signal from indoor fan motor for 30s successively when the fan motor is operating, indoor fan motor malfunction will be reported. In this case, the unit can automatically resume operation after stopping. If the malfunction occurs 6 times within one hour, the unit cannot be recovered automatically. Switch off the unit or re-energize the unit after cutting off power to eliminate this malfunction.

No.	Error code	Malfunction name	Origin of malfunction signal	Control description
7	E9	Full water protection	Water level switch	If cut-off of water level switch is detected for 8s successively once energized, the system will enter full water protection. In this case, switch off the unit and then switch it on to eliminate this malfunction.
8	F0	Malfunction of indoor ambient temperature sensor at air return port	Indoor ambient temperature sensor	If the indoor ambient temperature sensor is detected of open circuit or short circuit for 5s successively, indoor ambient temperature sensor malfunction will be reported. The unit can automatically resume operation after the malfunction disappears. If indoor ambient temperature sensor malfunction occurs in fan mode, only the error code is displayed and the indoor unit can work normally.
9	F1	Malfunction of evaporator temperature sensor	Evaporator temperature sensor	If the indoor evaporator temperature sensor is detected of open circuit or short circuit for 5s successively, evaporator temperature sensor malfunction will be reported. The unit can automatically resume operation after the malfunction disappears. If evaporator temperature sensor malfunction occurs in fan mode, only the error code is displayed and the indoor unit can work normally.
10	F2	Malfunction of condenser temperature sensor	Condenser temperature sensor	If the outdoor condenser temperature sensor is detected of open circuit or short circuit for 5s successively, condenser temperature sensor malfunction will be reported. The unit can automatically resume operation after the malfunction disappears. If condenser temperature sensor malfunction occurs in fan mode, only the error code is displayed and the indoor unit can work normally.
11	F3	Malfunction of outdoor ambient temperature sensor	Outdoor ambient temperature sensor	If the outdoor ambient temperature sensor is detected of open circuit or short circuit for 5s successively, outdoor ambient temperature sensor malfunction will be reported. The unit can automatically resume operation after the malfunction disappears. If outdoor ambient temperature sensor malfunction occurs in fan mode, only the error code is displayed and the indoor unit can work normally.
12	F4	Malfunction of discharge temperature sensor	Discharge temperature sensor	If the outdoor discharge temperature sensor is detected of open circuit or short circuit for 5s successively after the compressor has been operating for 3min, outdoor discharge temperature sensor malfunction will be reported. The unit can automatically resume operation after the malfunction disappears.
13	F5	Malfunction wired controller temperature sensor	Wired controller	If the wired controller detects open circuit or short circuit of its temperature sensor for 5s successively, wired controller temperature sensor malfunction will be reported.
14	ee	Malfunction of outdoor drive memory chip	Outdoor drive board	If the memory chip of outdoor drive board is broken, the unit cannot be started. The unit cannot be recovered automatically. If the malfunction cannot be eliminated after switching off the unit and then energizing the unit for several times, please replace the outdoor drive board.
15	H3	Compressor overload protection	Compressor overload switch	If it is detected within 3s successively that the overload switch is cut off under ON or standby state, the unit will report overload protection. If the fault occurs successively 3 times, the unit cannot be recovered automatically. Switch off the unit or re-energize the unit after cutting off power to eliminate this protection.

No.	Error code	Malfunction name	Origin of malfunction signal	Control description
16	H4	Overload protection	Evaporator temperature, condenser temperature	If outdoor unit detects that the tube temperature is higher than protective temp. value, the unit will report overload protection. The unit will not restart operation until tube temperature is lower than the protective temp. value and the compressor is stopped for 3min. If the protection occurs over 6 times, the unit cannot be recovered automatically. Switch off the unit or re-energize the unit after cutting off power to eliminate this protection.
17	H6	Malfunction of outdoor fan motor	Outdoor fan motor	If the outdoor unit does not receive signal from outdoor fan motor for 30s successively when the fan motor is operating, outdoor fan motor malfunction will be reported. In this case, the unit can automatically resume operation after stopping. If the malfunction occurs 6 times within one hour, the unit cannot be recovered automatically. Switch off the unit or re-energize the unit after cutting off power to eliminate this malfunction.
18	U7	Direction changing malfunction of 4-way valve	4-way valve	After the compressor starts operation in heating mode, if the outdoor unit detects the difference between evaporator temperature and indoor ambient temperature is lower than the protective value for 10min successively, direction changing malfunction of 4-way valve will be reported and the outdoor unit will stop operation. The unit can automatically resume operation in the first two malfunctions. If the malfunction occurs 3 times, the unit cannot be recovered automatically. Switch off the unit or re-energize the unit after cutting off power to eliminate this malfunction.
19	P6	Communication malfunction between main control and drive	Communication between main control board and drive board	If the outdoor main control board does not receive data from drive board, communication malfunction between main control and drive will be reported. This malfunction can be eliminated automatically.
20	EE	Malfunction of outdoor main control memory chip	Outdoor main control board	If the memory chip of outdoor main control board is broken, the unit cannot be started. The unit cannot be recovered automatically. If the malfunction cannot be eliminated after switching off the unit and then energizing the unit for several times, please replace the outdoor main control board.

10.2 Description of Drive Malfunction

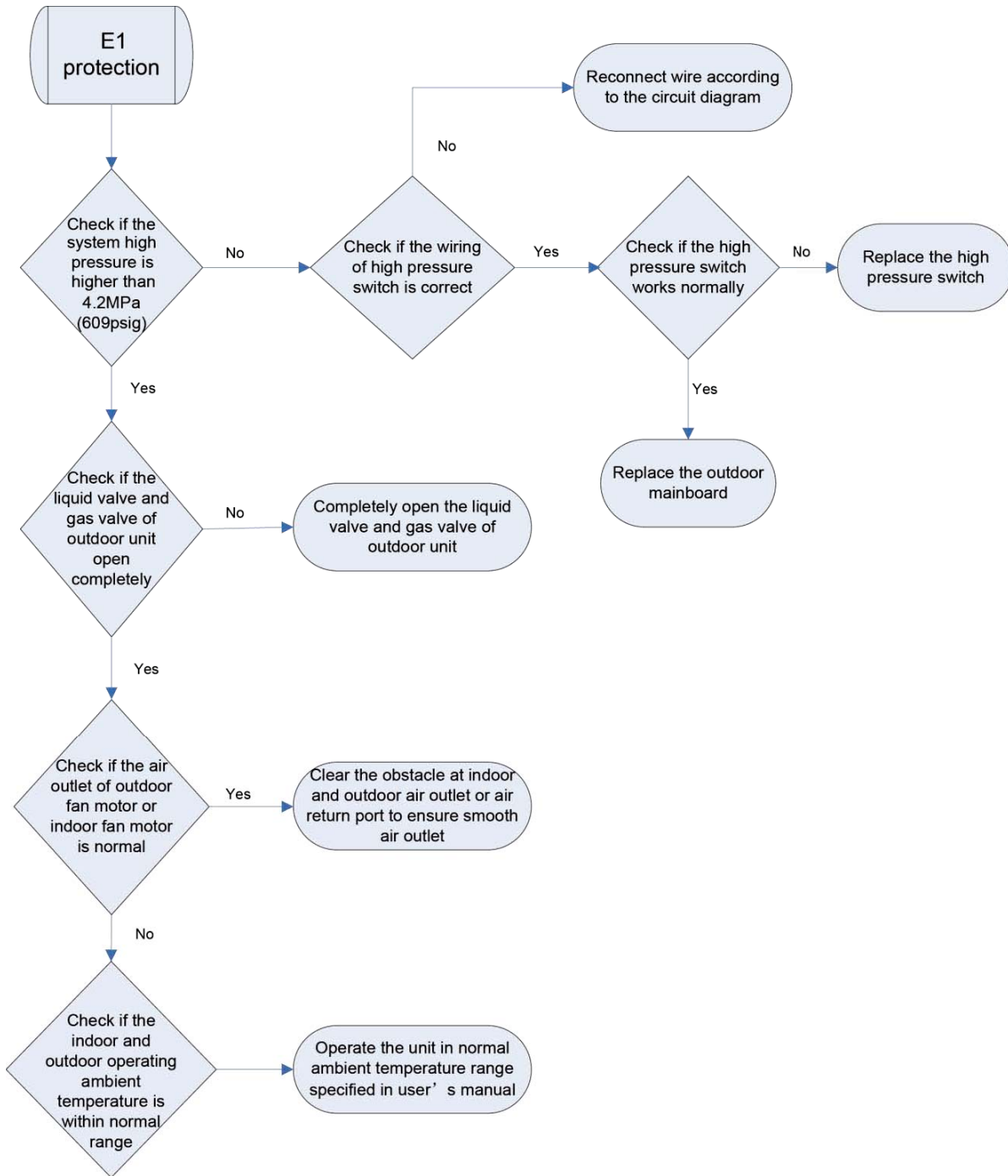
Main board dual 8 numeral tube Display Codes for Outdoor Unit of 18k~48k

Malfunction Item	Indoor Unit Display	Outdoor unit display of dual 8 numeral tube
DC busbar over-voltage protection	PH	PH
IPM or PFC over-temperature protection	P8	P8
Current sense circuit error	Pc	Pc
IPM or PFC temperature sensor error	P7	P7
Compressor current protection	P5	P5
DC busbar under-voltage protection	PL	PL
Compressor startup failure	Lc	Lc
Drive module reset	P0	P0
Compressor motor desynchronizing	H7	H7
Phase loss	Ld	Ld
Drive-to-main-control communication error	P6	P6
IPM protection	H5	H5
Compressor overload protection	H3	H3
AC current protection (input side)	PA	PA
Charging circuit error	PU	PU
PFC protection	HC (48k only)	HC (48k only)
DC fan error	H6	H6
Input AC voltage abnormality	PP	PP
Driving board memory chip error	ee	ee

11 FLOW CHART FOR TROUBLESHOOTING

11.1 Troubleshooting Flow Chart of Main Control Malfunction

◆ E1 High Pressure Protection



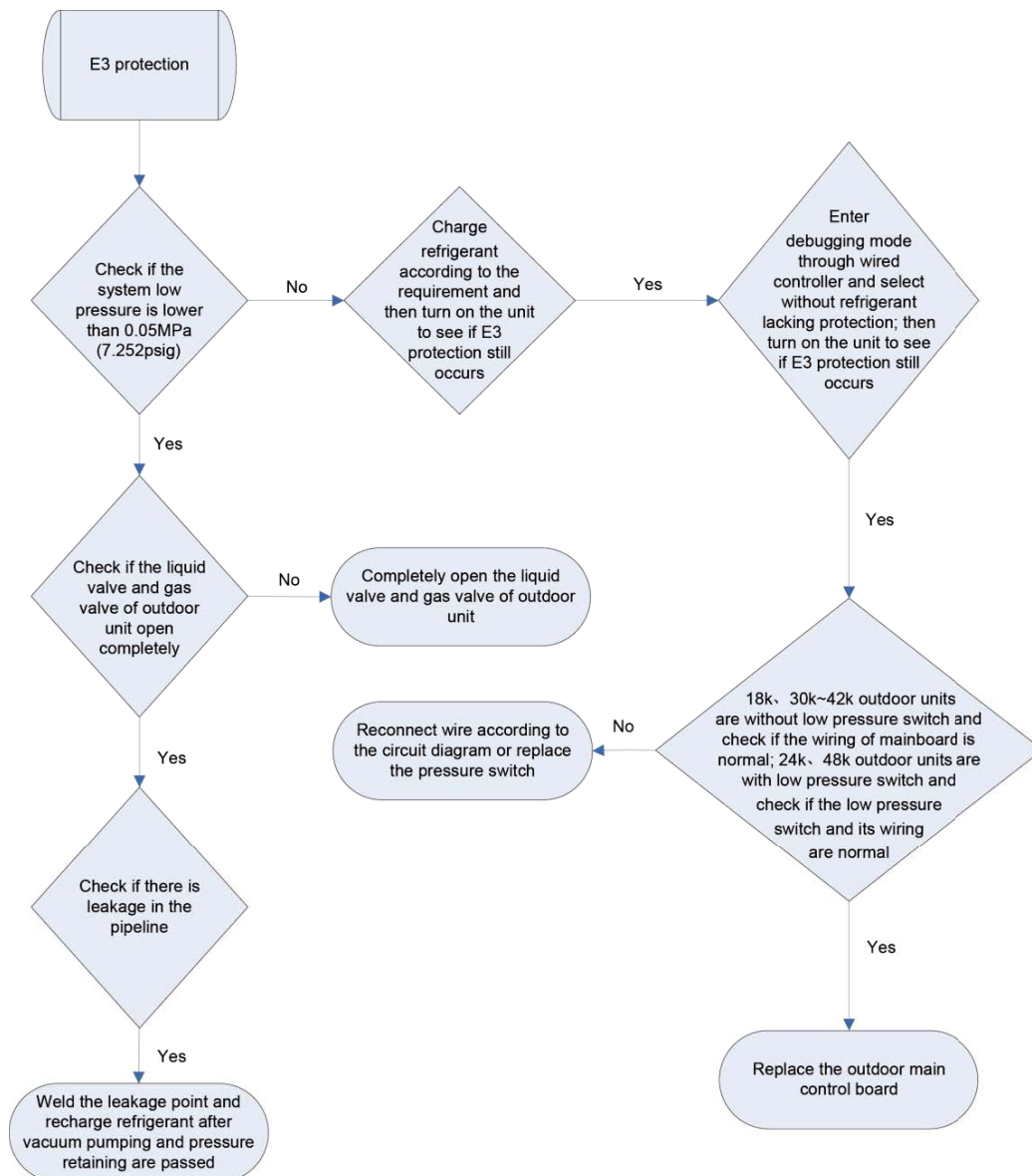
◆ E2 Freeze Protection

Freeze protection is normal protection but not abnormal malfunction. If freeze protection occurs frequently during operation, please check if the indoor filter is dirty or if the indoor air outlet is abnormal. The user is required to clean the filter, check the air outlet and air return pipe periodically to ensure smooth air return and air outlet.

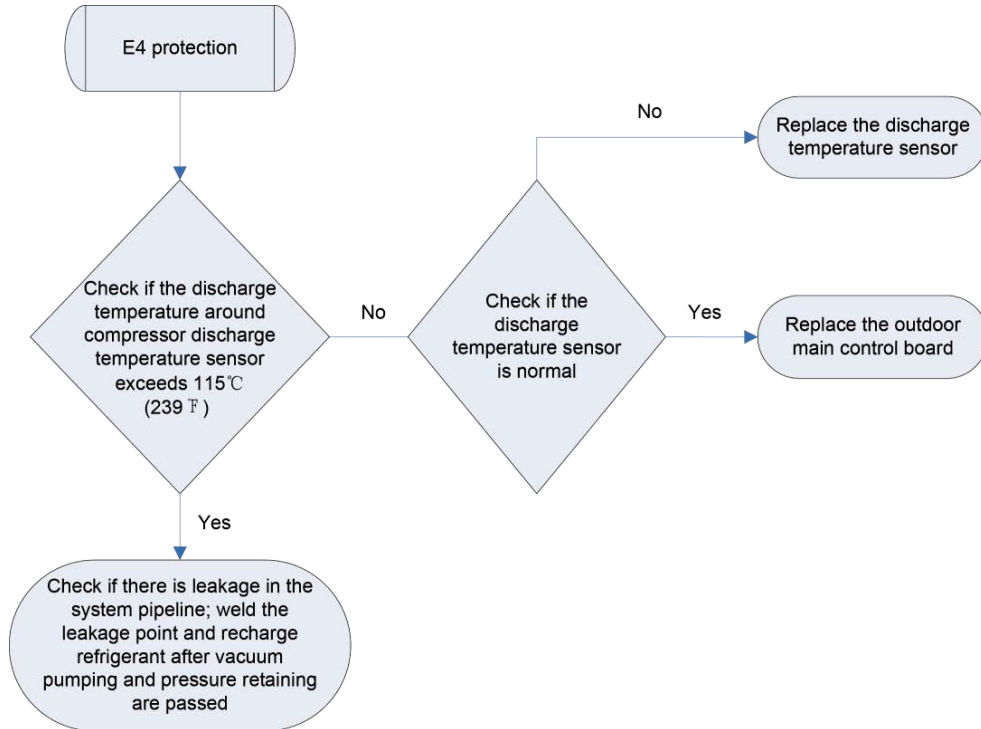
◆ E3 stands for three statuses:

- (1) Low pressure protection
- (2) Refrigerant lacking protection
- (3) Refrigerant recycling mode

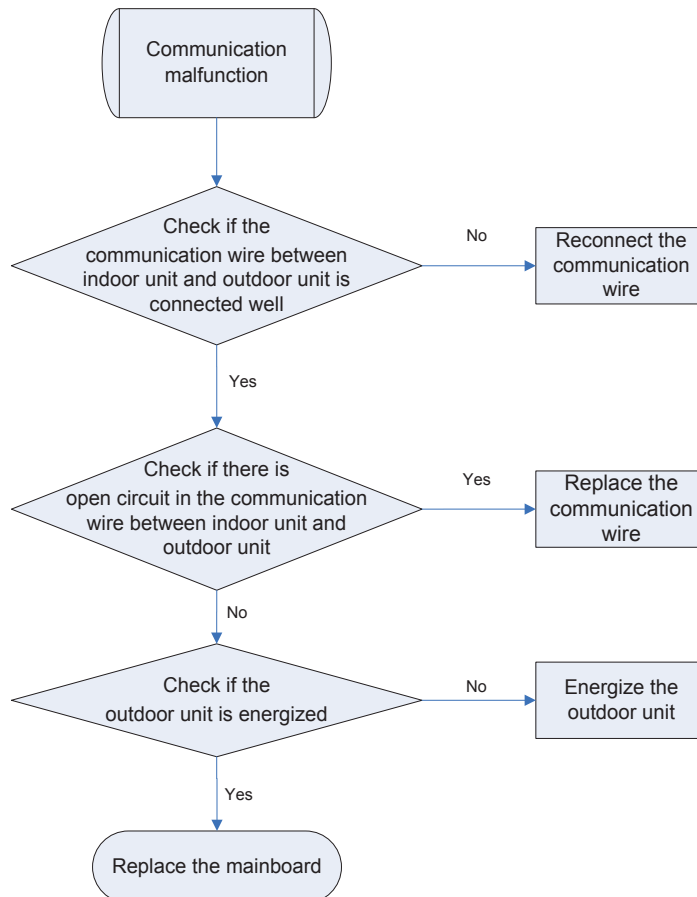
- 1) If enter refrigerant recycling mode through special operation, the displayed E3 is not an error code. It will be eliminated when exiting refrigerant recycling mode.
- 2) If you do not want to have refrigerant lacking protection, you can enter the debugging mode through wired zone controller and then cancel the refrigerant lacking protection mode.



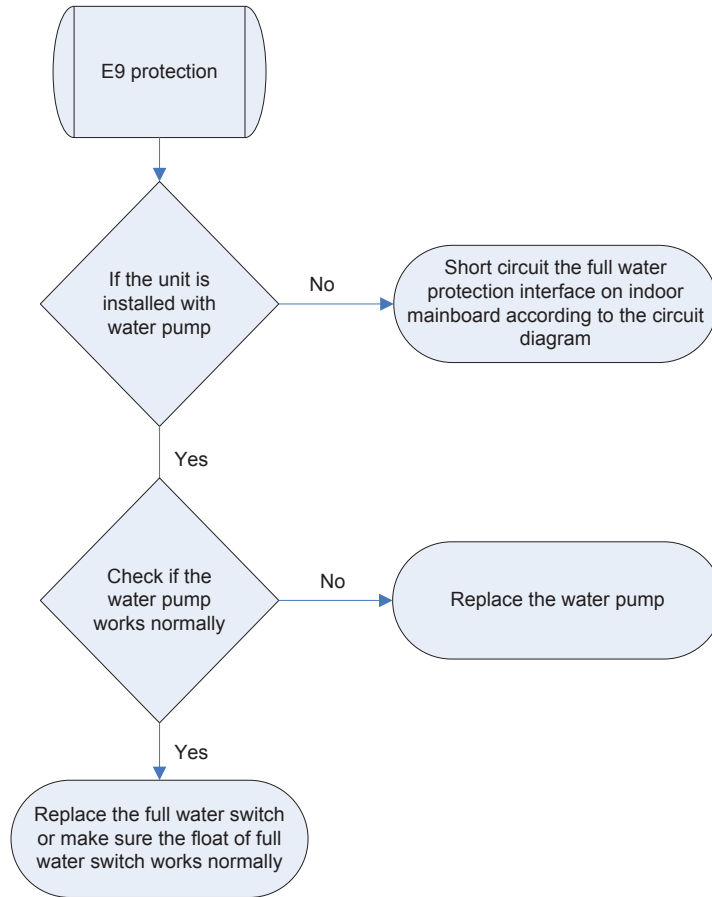
◆ E4 Discharge Protection



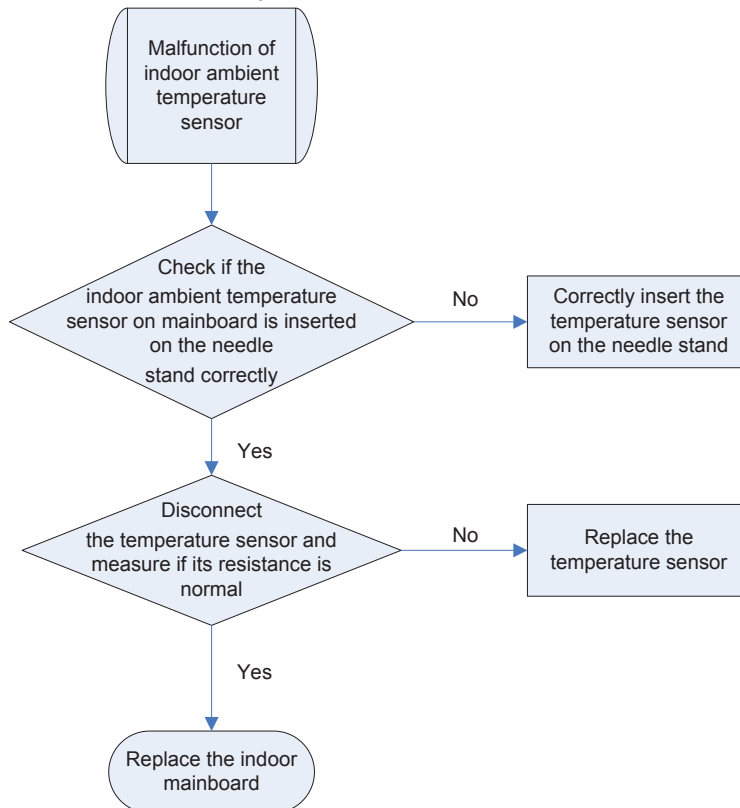
◆ E6 Communication Malfunction



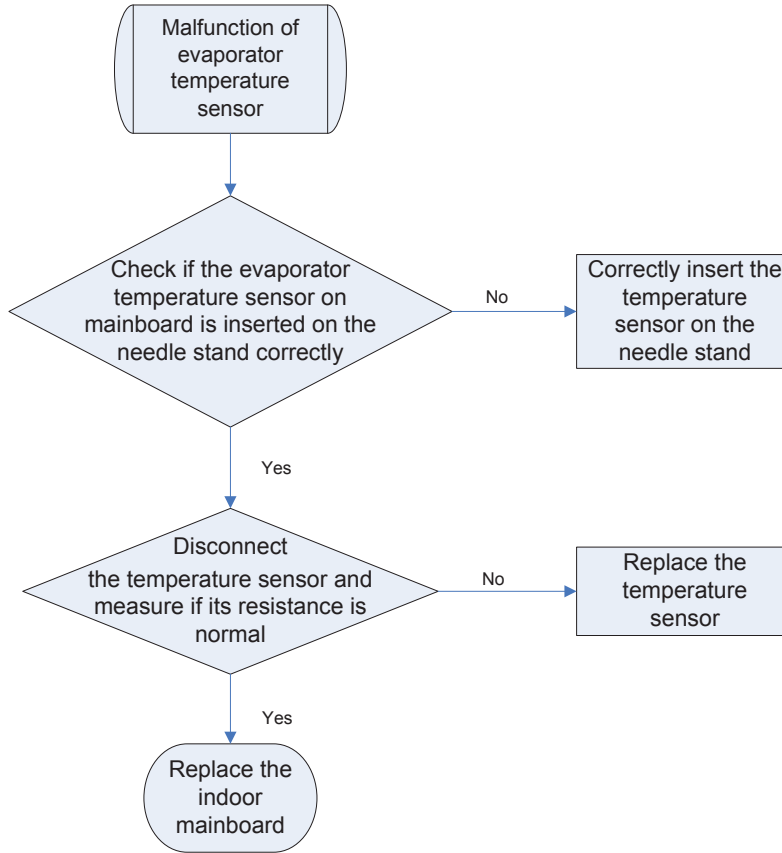
◆ E9 Full Water Protection



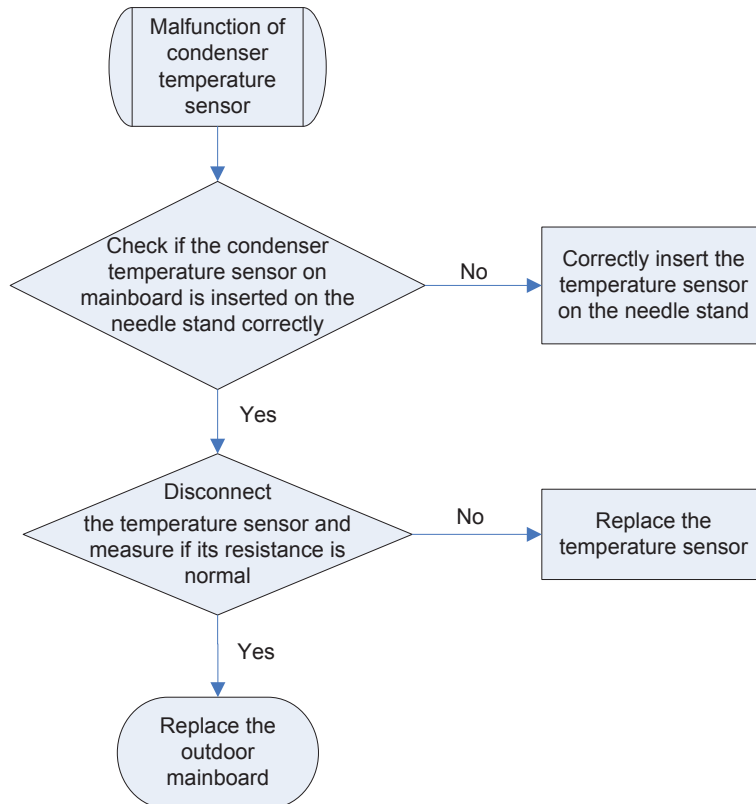
◆ F0 Malfunction of Indoor Ambient Temperature Sensor



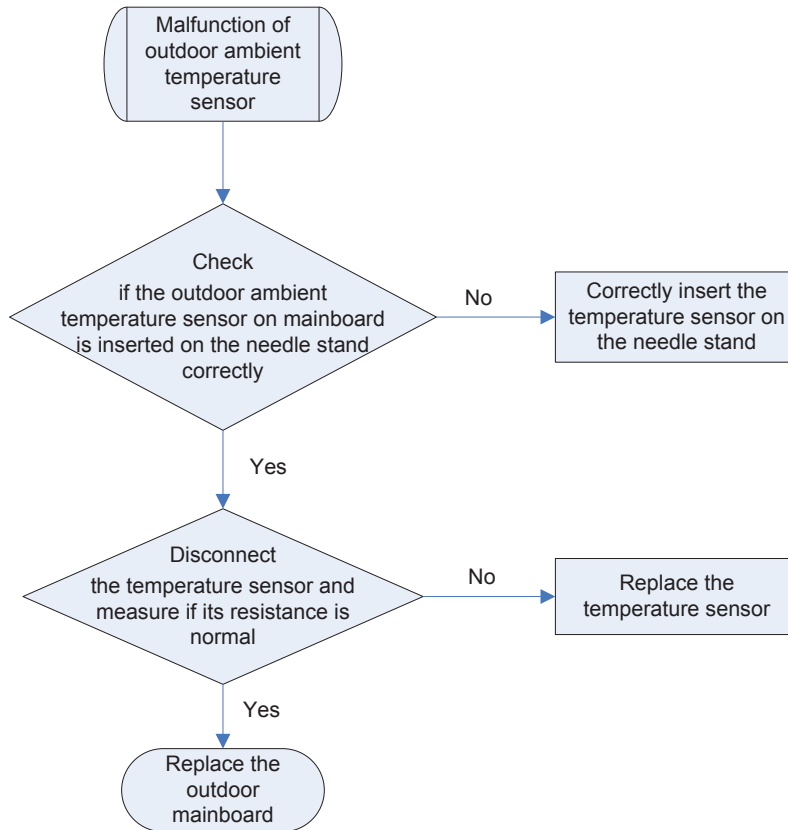
◆ F1 Malfunction of Evaporator Temperature Sensor



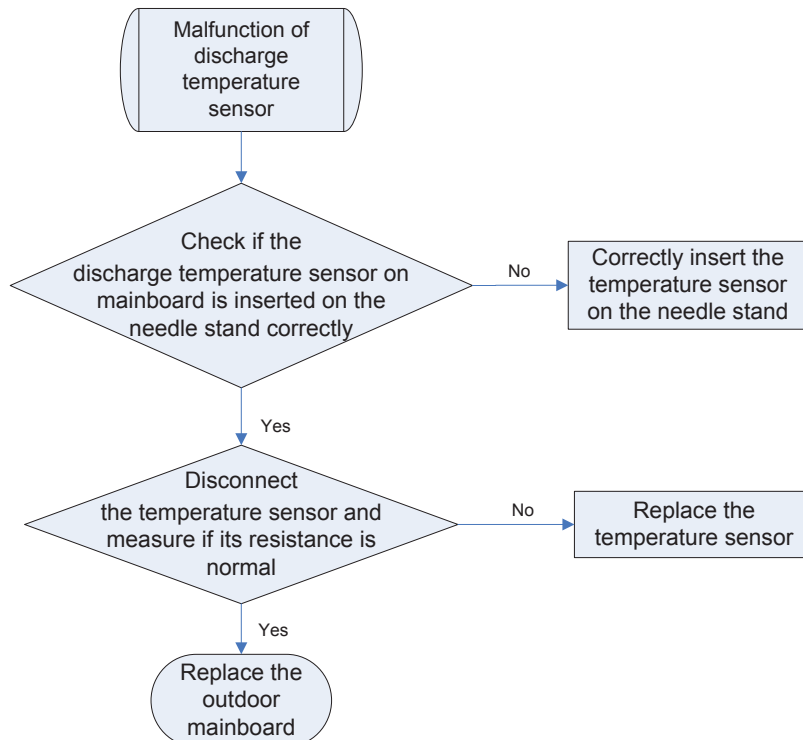
◆ F2 Malfunction of Condenser Temperature Sensor



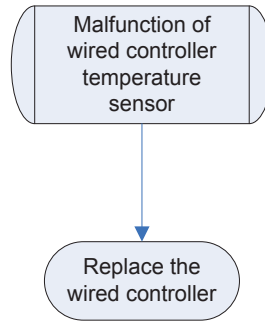
◆ F3 Malfunction of Outdoor Ambient Temperature Sensor



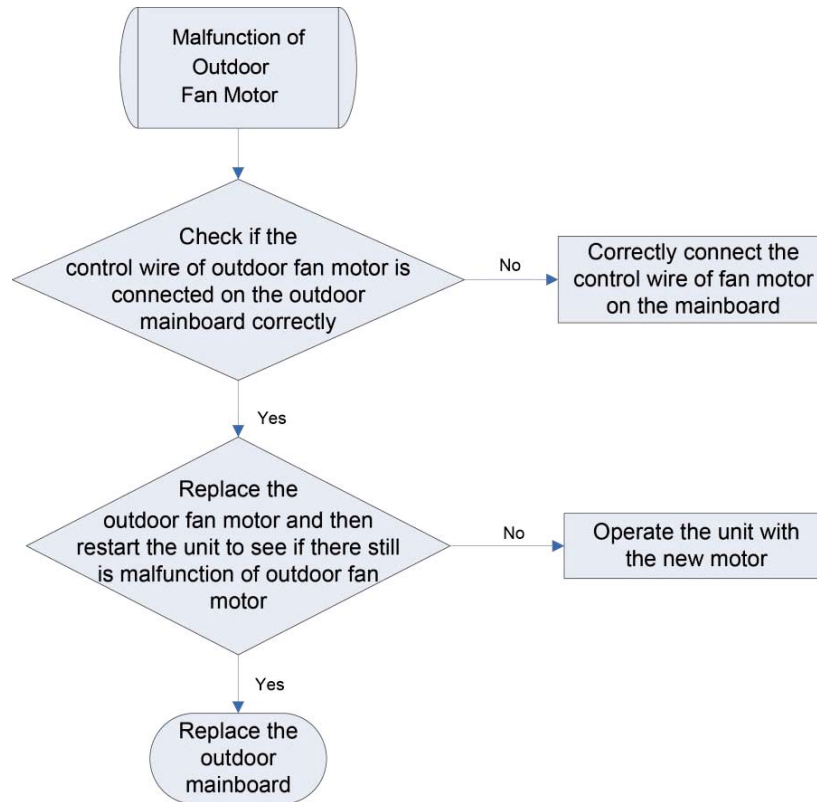
◆ F4 Malfunction of Discharge Temperature Sensor



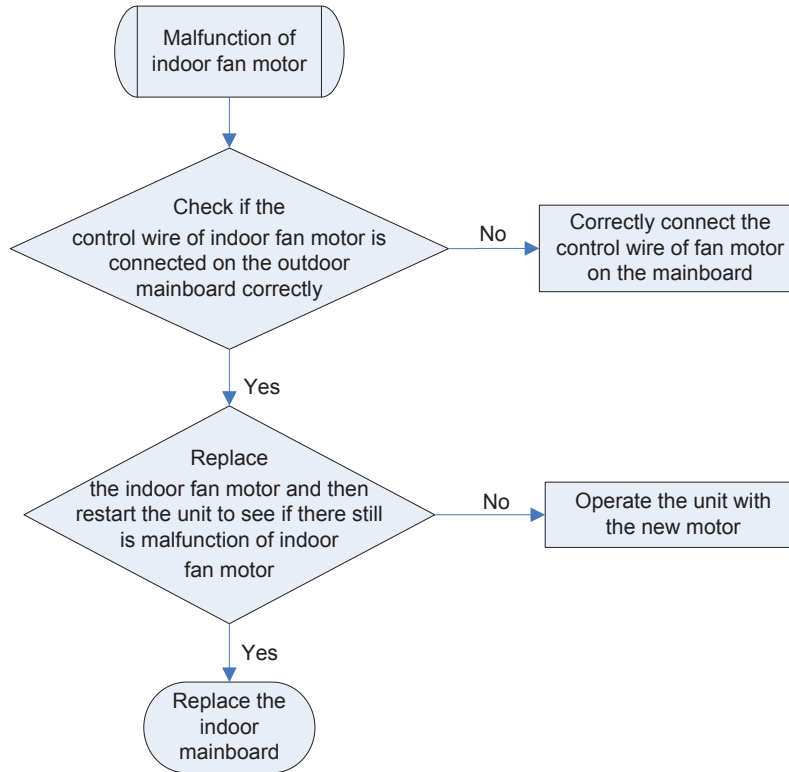
◆ F5 Malfunction of Wired Controller Temperature Sensor



◆ H6 Malfunction of Outdoor Fan Motor



◆ E8 Malfunction of Indoor Fan Motor

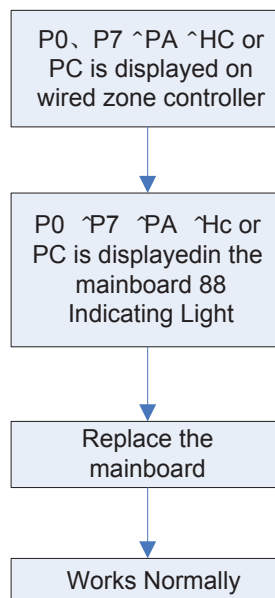


11.2 Troubleshooting Flow Chart of Drive Malfunction

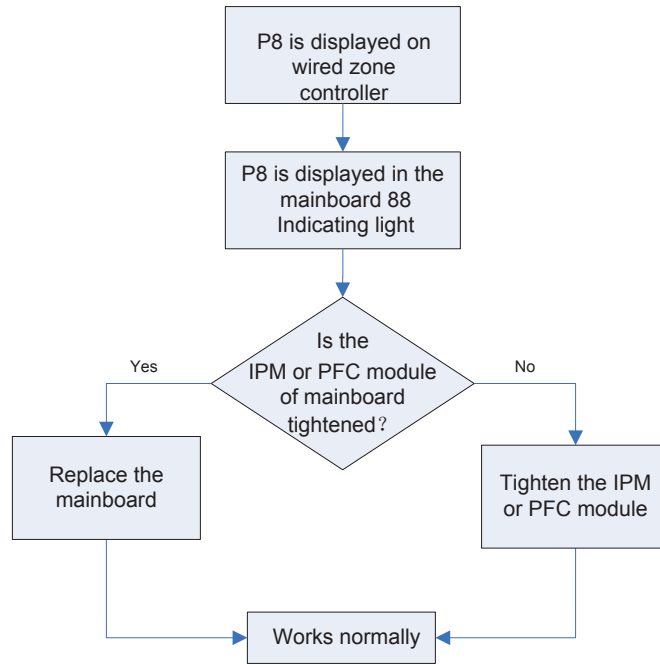
Note: For Outdoor Unit Drive (Inverter) by Single-phase Motor ◆

P0 Drive module reset

- ◆ P7 IPM or PFC temperature sensor error
- ◆ PA AC current protection (input side)
- ◆ PC Current sensor circuit error
- ◆ HC PFC protection (48k only)

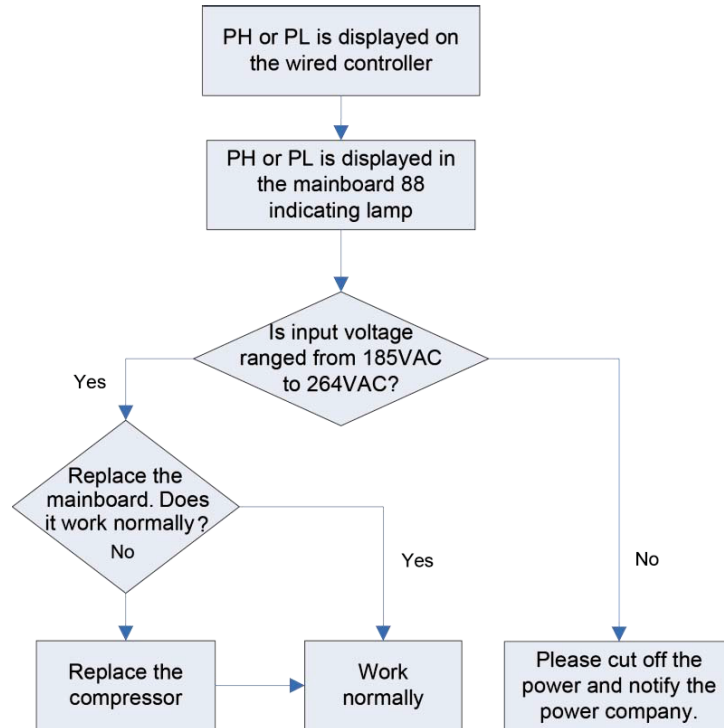


◆ P8 IPM or PFC over-temperature protection

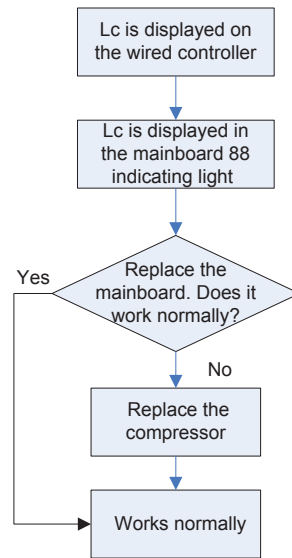


◆ PH DC busbar over-voltage protection

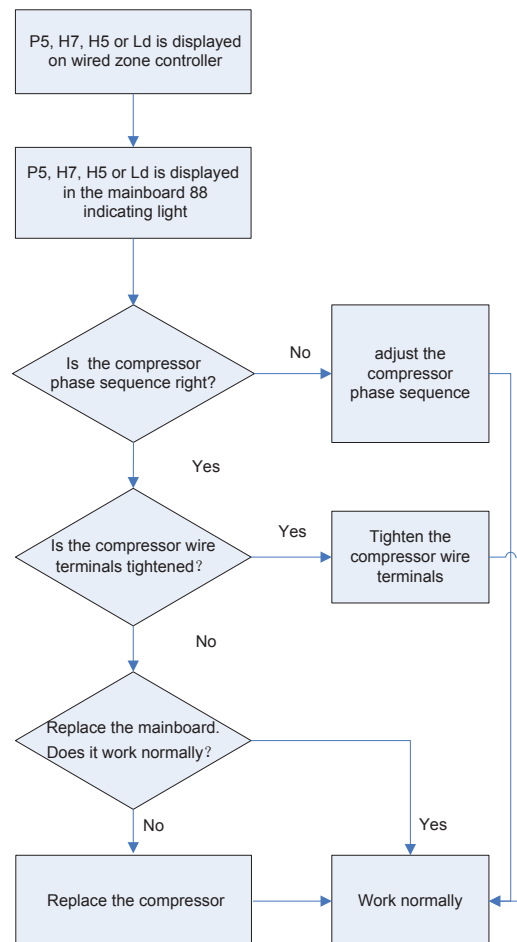
◆ PL DC busbar under-voltage protection



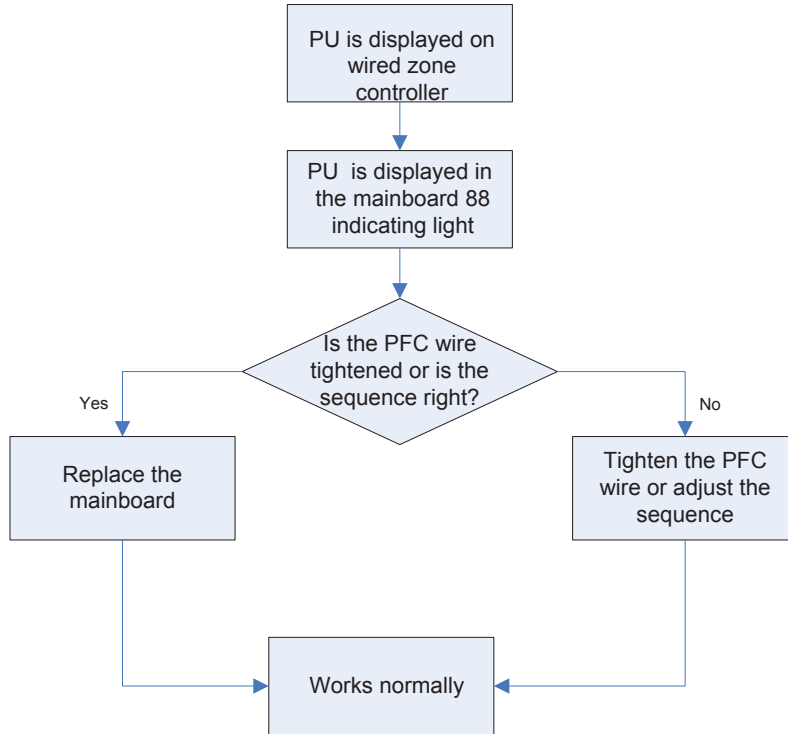
- ◆ P6 Drive-to-main-control communication error
- ◆ Lc Compressor Startup Failure



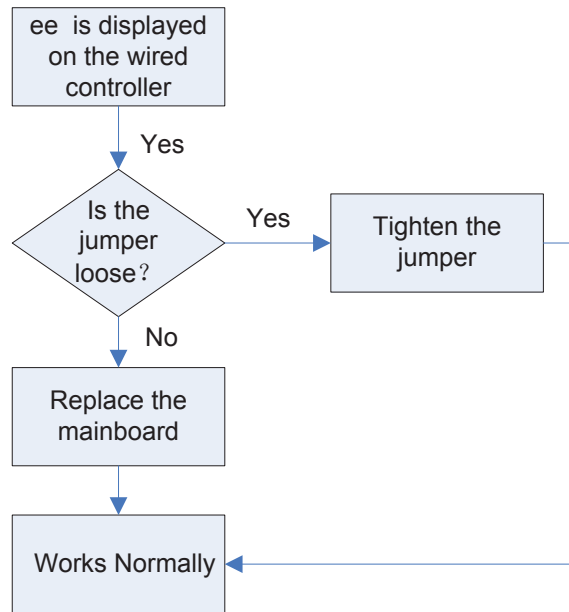
- ◆ P5 Compressor current protection
- ◆ H7 Compressor motor desynchronizing
- ◆ H5 IPM protection
- ◆ Ld Phase loss



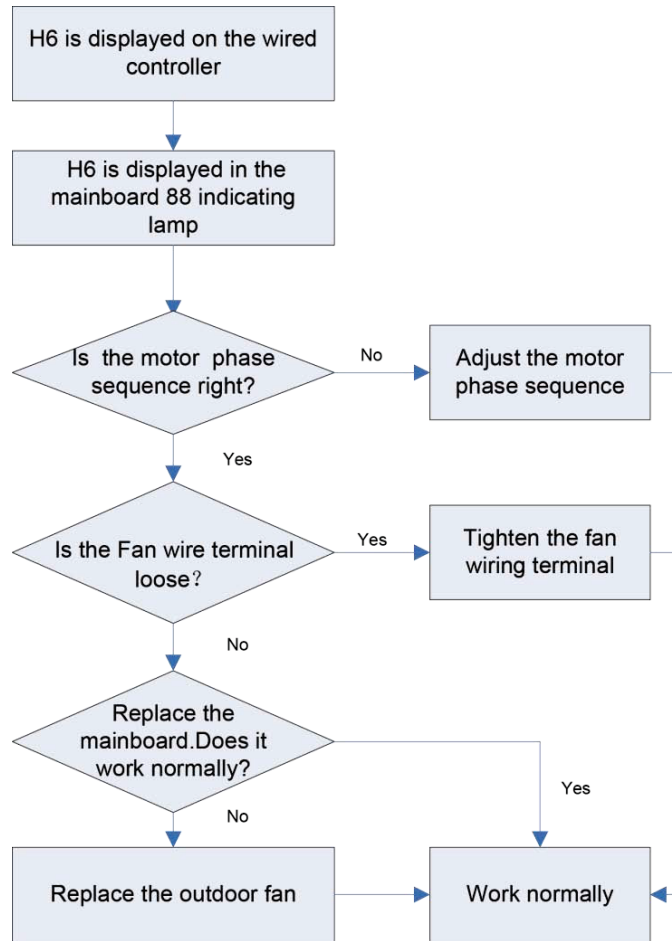
◆ PU Charging circuit error



◆ ee driving board chip error

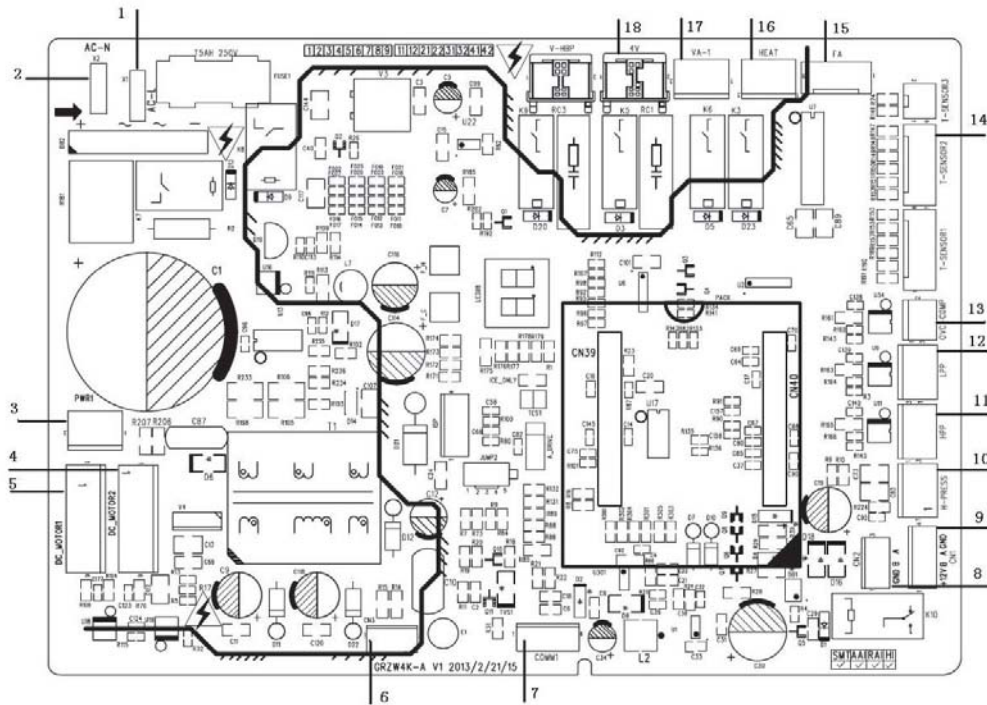


◆ H6 DC fan error



11.3 Interface

- ◆ DHR18CSB21S / DHR24CSB21S / DHR30CSB21S / DHR36CSB21S / DHR42CSB21S / DHR48CSB21S Main Control Board

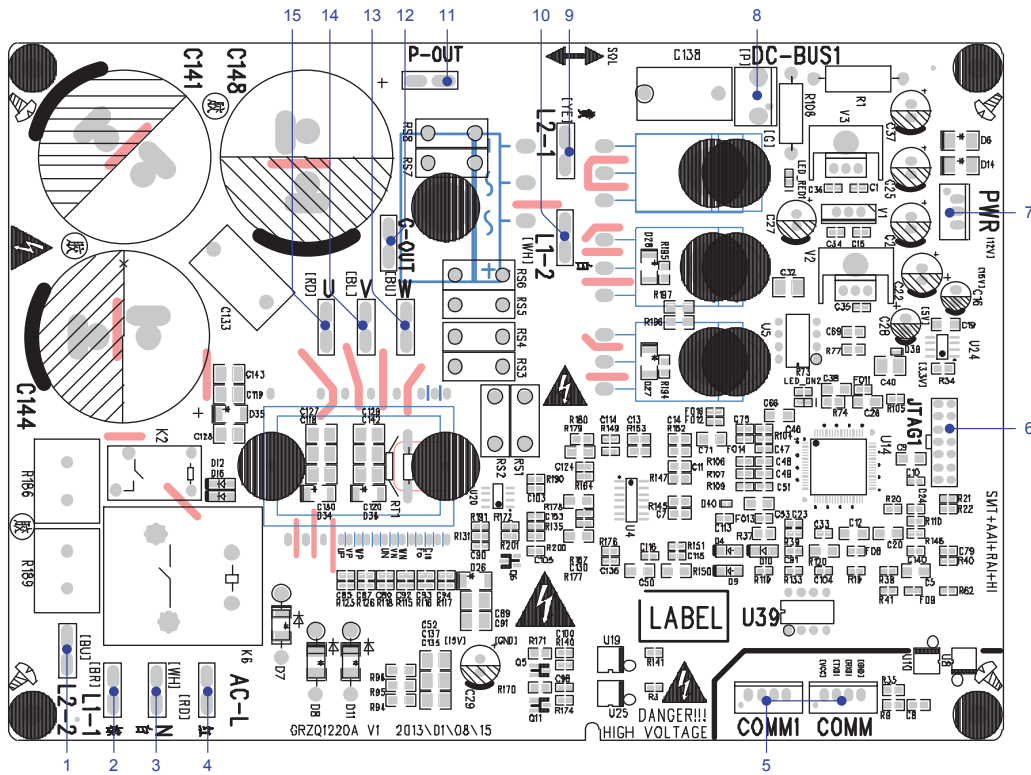


NO.	SILK-SCREEN	INTERFACE	INTERFACE INSTRUCTIONS
1	AC-L	Live wire input	Live wire input
2	AC-N	Neutral wire input	Neutral wire input
3	PWR 1	Control power output[1- DC bus voltage, 3- GND]	Power supply interface to the drive 1-pin: DC bus voltage 3-pin: DC bus GND
4	DC_MOTOR2	DC fan motor2 1-pin: Power supply of fan motor 3-pin: Fan GND 4-pin: +15V 5-pin: Signal control 6-pin: NC	Interface of DC fan motor 1-pin: DC bus voltage 2-pin: Suspended 3-pin: DC bus GND 4-pin: +15V 5-pin: Control signal input 6-pin: Not connected
5	DC_MOTOR1	DC fan motor1 1-pin: Power supply of fan motor 3-pin: Fan GND 4-pin: +15V 5-pin: Signal control 6-pin: Signal Feedback	Interface of DC fan motor 1-pin: DC bus voltage 2-pin: Suspended 3-pin: DC bus GND 4-pin: +15V 5-pin: Control signal input 6-pin: DC fan motor feedback
6	CN3	Control power output[1-GND、2-18V ~3-15V]	Power supply interface to the drive 1-pin: GND 2-pin: +18V 3-pin: +15V

7	COMM1	Communication line [1-3.3V、 2-TX、 3-RX、 4-GND]	Communication needle stand of main control drive 1-pin: +3.3V 2-pin: TXD 3-pin: RXD 4-pin: GND
8	CN2	Communication line with 1-pin GND, 2-pin B and 3-pin A)	Communication needle stand with indoor unit 1-pin: GND 2-pin: B 3-pin: A
9	CN1	Communication line with 1-pin plus 12V, 2-pin B, 3-pin A and 4-pin GND	Communication interface (reserved): 1-pin: +12V 2-pin: B 3-pin: A 4-pin: GND
10	H-PRESS	High pressure switch for fan speed adjustment	Pressure protection switch for fan speed adjustment
11	HPP	High pressure switch for system protection (obligate)	Interface of high pressure protection
12	LPP	Low pressure switch for system protection (obligate)	Interface of low pressure protection
13	OVC-COMP	Compressor overload protection	Interface of compressor overload protection
14	T-SENSOR2	1&2 pin: Tube sensor 3&4 pin: Ambient temperature 5&6 pin: Air discharge	1&2 pin: Case temperature sensor 3&4 pin: Ambient temperature sensor 5&6 pin: Discharge temperature sensor
15	FA	Electronic expansion valve line 1 to 4-pin: Drive impulse output; 5-pin: +12V;	Interface of electronic expansion valve: 1 to 4-pin: Drive impulse output; 5-pin: +12V;
16	HEAT	Compressor electrical heater	Compressor electric heating belt
17	VA-1	Chassis electrical heater	Chassis electric heating belt
18	4V	4-way valve	4-way valve

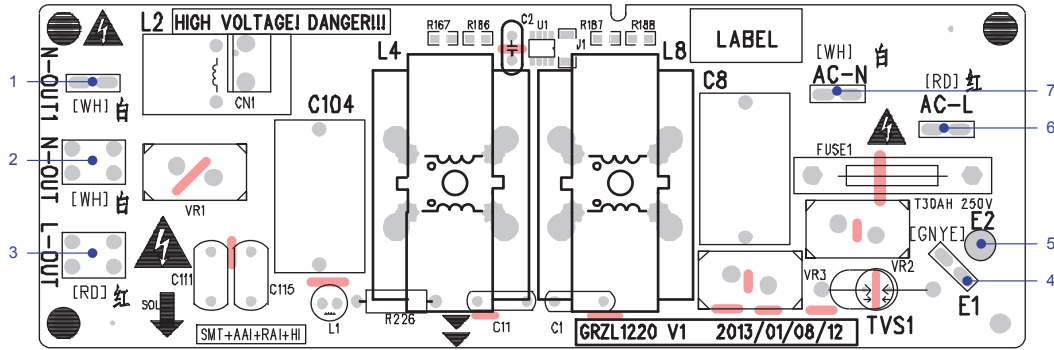
◆ DHR18CSB21S / DHR24CSB21S / DHR30CSB21S / DHR36CSB21S / DHR42CSB21S

(1) Drive Board



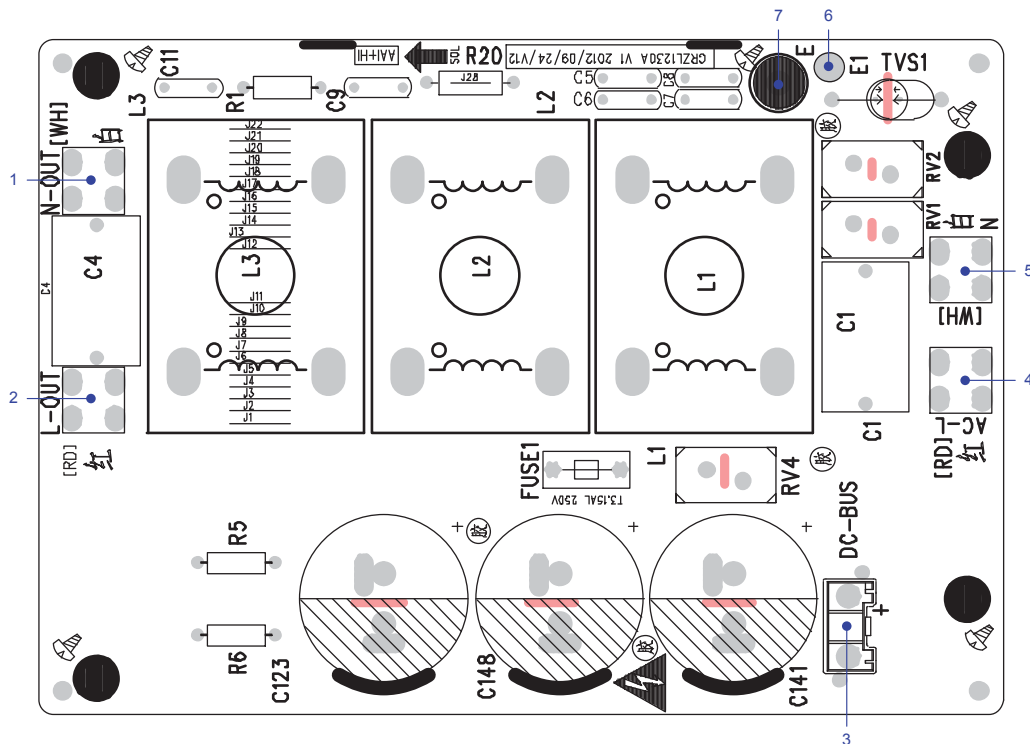
No.	Printing	Interface	No.	Printing	Interface
1	L2_2	PFC induction wire (blue)	2	L1_1	PFC induction wire (brown)
3	N	Neutral wire input (white)	4	AC-L	Live wire input (red)
5	COMM/COMM1	Communication interface	6	JTAG1	(Reserved)
7	PWR	Control power input	8	DC-BUS1	Bus electric discharging interface (for testing)
9	L2-1	PFC induction wire (yellow)	10	L1-2	PFC induction wire (white)
11	P-OUT	(Reserved)	12	G-OUT	(Reserved)
13	W	Compressor Phase W	14	V	Compressor Phase V
15	U	Compressor Phase U			

(2) Filtering Board



No.	Printing	Interface	No.	Printing	Interface
1	N-OUT1	Neutral wire output 1 (white) (only for 18k)	2	N-OUT	Neutral wire output (white)
3	L-OUT	Live wire output (red)	4	E1	Grounding wire
5	E2	(Reserved)	6	AC-L	Live wire input (red)
7	AC-N	Neutral wire input (white)			

(2) Filtering Board:



No.	Printing	Interface	No.	Printing	Interface
1	N-OUT	Neutral wire output (white)	2	L-OUT	Live wire output (red)
3	DC-BUS	DC bus interface (connect to drive board)	4	AC-L	Live wire input (red)
5	N	Neutral wire input (white)	6	E1	(Reserved)
7	E	Grounding wire (screw hole)			

11.4 IPM, PFC Testing Method

11.4.1 Method of Testing IPM Module

(1) Preparation before test: Prepare a universal meter and turn to its diode option, and then remove the wires U, V, W of the compressor after it is powered off for one minute.

(2) Testing Steps

Step 1: Put the black probe on the place of P and the red one on the wiring terminal U, V, W respectively as shown in the following figure to measure the voltage between UP, VP and WP.

Step 2: Put the red probe on the place of N and the black one on the wiring terminal U, V, W respectively as shown in the following figure to measure the voltage between NU, NV and NW.

(3) If the measured voltages between UP, VP, WP, NU, NV, NV are all among 0.3V-0.7V, then it indicates the IPM module is normal; If any measured valve is 0, it indicates the IPM is damaged.

11.4.2 Method of Testing PFC Module Short Circuit (only for DHR48CSB21S):

(1) Preparation before test: prepare a universal meter and turn to its diode option, and then remove the wires L1-2, L2-1 after it is powered off for one minute.

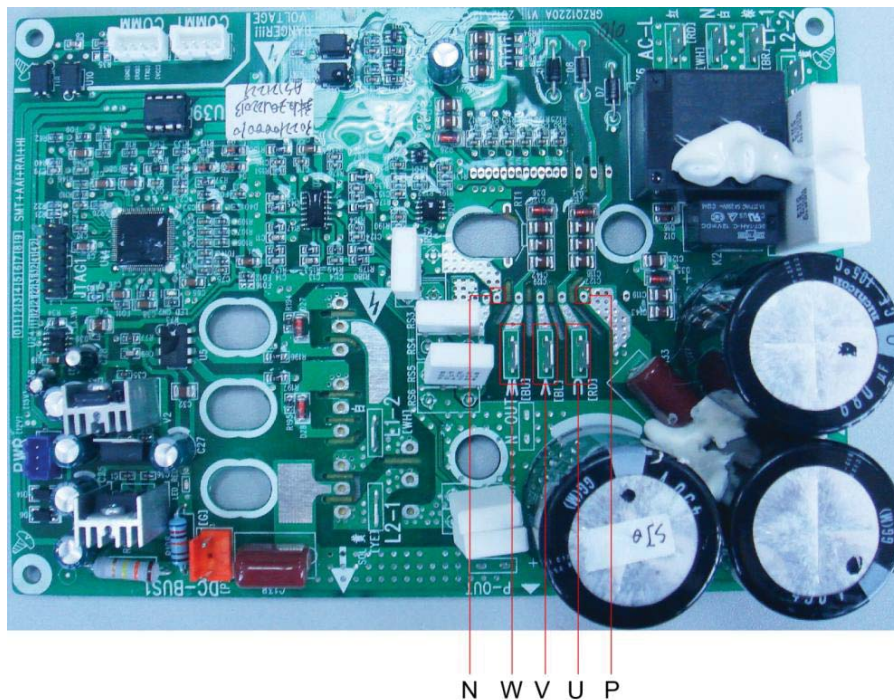
(2) Testing Steps

Step 1: Put the black probe on the place P and the red one on the wiring terminal L1-2, L2-1 respectively as shown in the following figure to measure the voltage between L1-2P and L2-1 P.

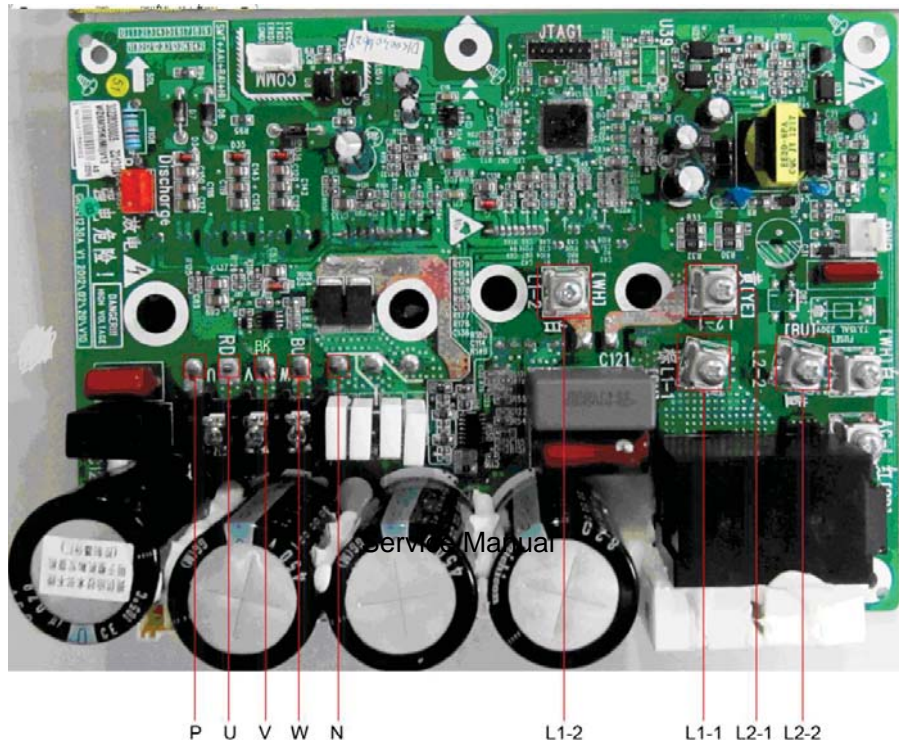
Step 2: Put the red probe on the place N and the black one on the wiring terminal L1-2, L2-1 respectively as shown in the following figure to measure the voltage between N L1-2 and NL2-1.

(3) If the measured voltages between L1-2P, L2-1 P, N L1-2, NL2-1 are all among 0.3V-0.7V, then it indicates the PFC module is normal; If any measured valve is 0, it indicates the PFC is damaged.

◆ DHR18CSB21S / DHR24CSB21S / DHR30CSB21S / DHR36CSB21S / DHR42CSB21S



◆ DHR48CSB21S

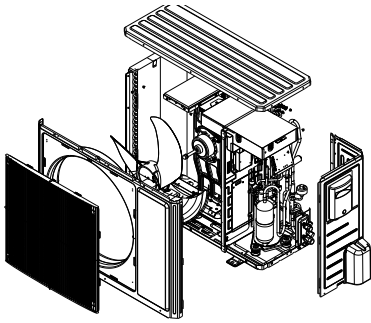
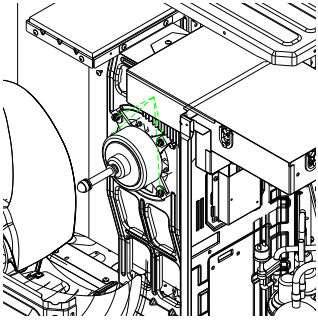
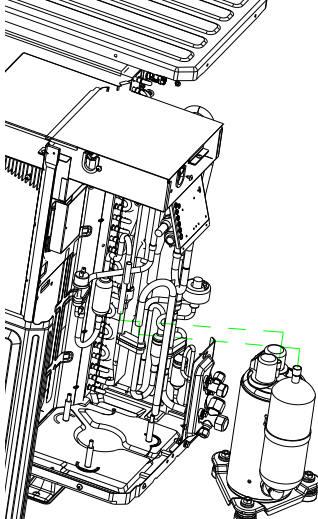


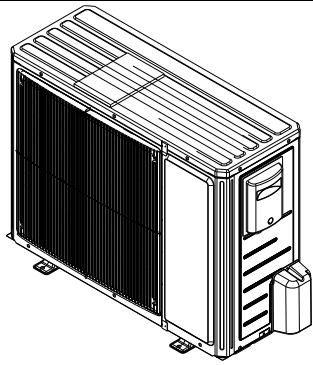
12 DISASSEMBLY AND ASSEMBLY PROCEDURES FOR MAIN PARTS

12.1 Outdoor Unit

18k:

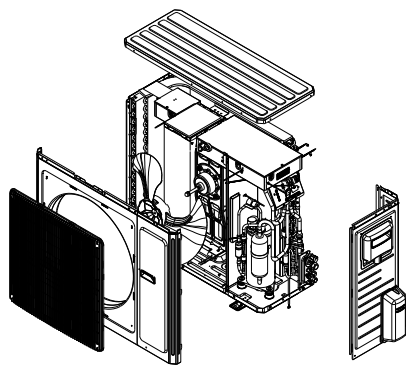
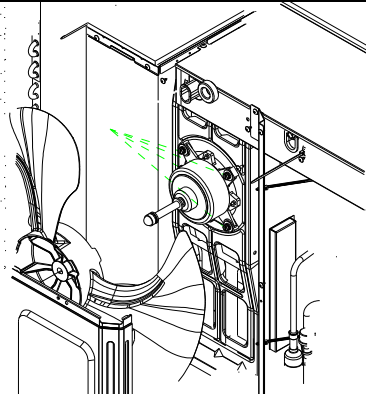
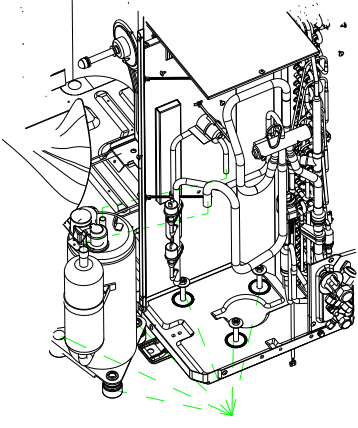
Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.

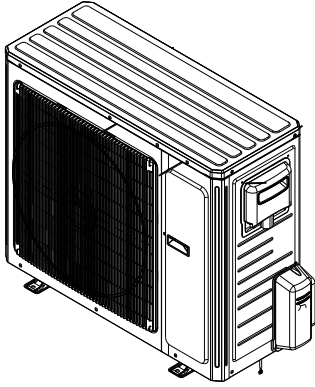
Step	Illustration	Handling Instruction
1. Remove external casing		<ol style="list-style-type: none"> 1. Remove the top cover and handle; 2. Remove the grille, outer case and right side plate.
2. Remove motor		<ol style="list-style-type: none"> 1. Remove the blade nut and then remove the blade; 2. Remove the motor from motor support.
3. Remove compressor		<ol style="list-style-type: none"> 1. Reclaim the refrigerant from the entire system 2. Unsolder the 4-way valve piping assy from compressor; 3. Remove the compressor mounting bolts; 4. Carefully remove the compressor from chassis.

<p>4. Assemble unit</p>		<p>Assemble the unit in the reverse order of disassembly.</p>
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24k/30k:

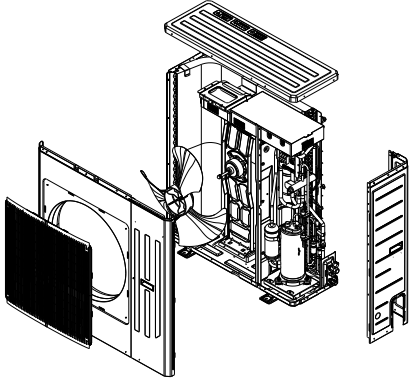
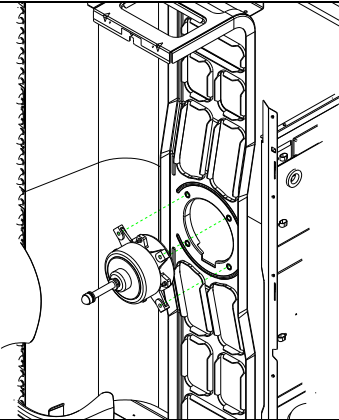
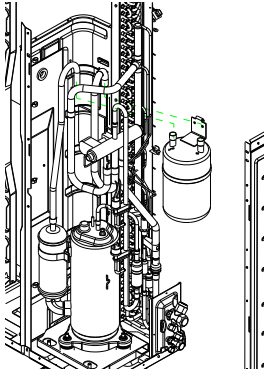
Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.

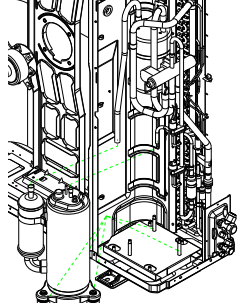
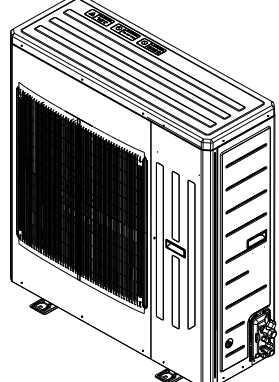
Step	Illustration	Handling Instruction
<p>1. Remove external casing</p>		<ol style="list-style-type: none"> 1. Remove the top cover and handle; 2. Remove the grille, outer case, front side plate and right side plate.
<p>2. Remove motor</p>		<ol style="list-style-type: none"> 1. Remove the blade nut and then remove the blade; 2. Remove the motor from motor support.
<p>3. Remove compressor</p>		<ol style="list-style-type: none"> 1. Reclaim the refrigerant from the entire system. 2. Unsolder the 4-way valve piping assy from compressor; 3. Remove the compressor mounting bolts; 4. Carefully remove the compressor from chassis.

<p>4. Assemble unit</p>		<p>Assemble the unit in the reverse order of disassembly.</p>
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36k:

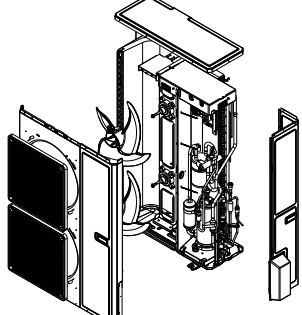
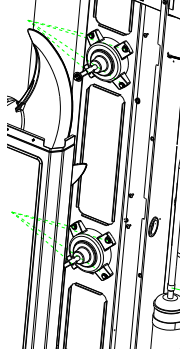
important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.

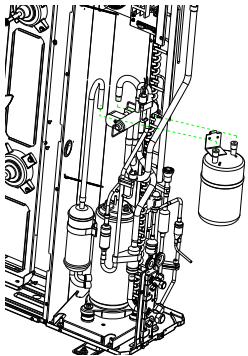
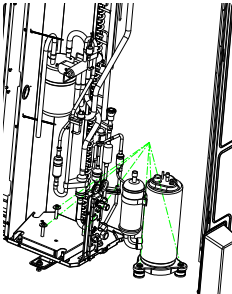
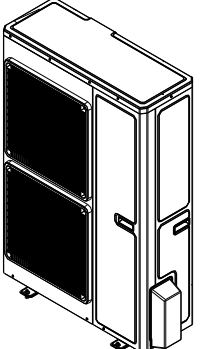
Step	Illustration	Handling Instruction
<p>1. Remove external casing</p>		<p>1. Remove the top cover and handle; 2. Remove the grille, outer case and right side plate.</p>
<p>2. Remove motor</p>		<p>1. Remove the blade nut and then remove the blade; 2. Remove the motor from motor support.</p>
<p>3. Remove gas liquid separator</p>		<p>1. Reclaim the refrigerant from the entire system. 2. Unsolder the 4-way valve piping assembly from gas liquid separator; 3. Remove the gas liquid separator.</p>

<p>4. Remove compressor</p>		<ol style="list-style-type: none"> 1. Unsolder the 4-way valve piping assy from compressor; 2. Remove the compressor mounting bolts; 3. Carefully remove the compressor from chassis.
<p>5. Assemble unit</p>		<p>Assemble the unit in the reverse order of disassembly.</p>

42k/48k:

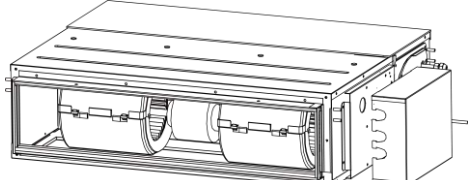
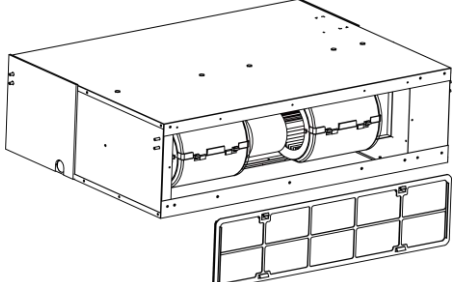
Important: Before disassembly and assembly, make sure that the power to the system has been disconnected and verified as voltage free.

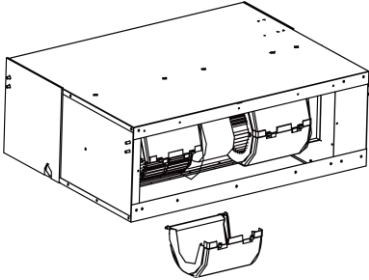
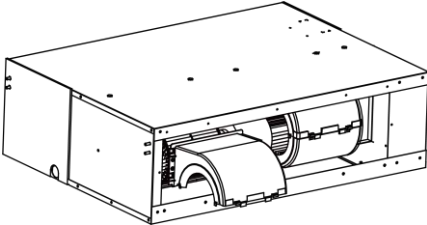
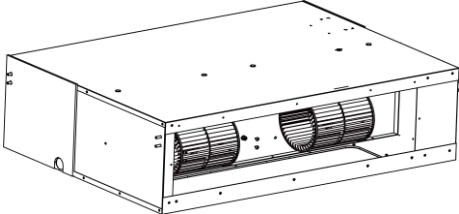
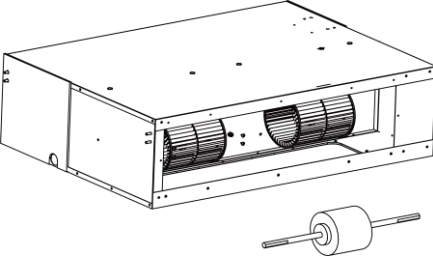
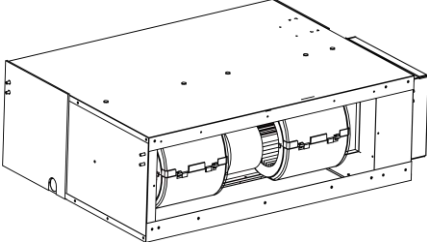
Step	Illustration	Handling Instruction
<p>1. Remove external casing</p>		<ol style="list-style-type: none"> 1. Remove the top cover and handle; 2. Remove the grille, outer case and right side plate.
<p>2. Remove motor</p>		<ol style="list-style-type: none"> 1. Remove the blade nuts and then remove the blades; 2. Remove the motors from motor supports.

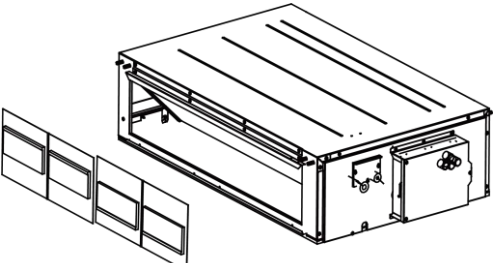
<p>3. Remove gas liquid separator.</p>		<ol style="list-style-type: none"> 1. Reclaim the refrigerant from the entire system. 2. Unsolder the 4-way valve piping assy from gas liquid separator; 3. Remove the gas liquid separator.
<p>4. Remove compressor</p>		<ol style="list-style-type: none"> 1. Unsolder the 4-way valve piping assy from compressor; 2. Remove the compressor mounting bolts; 3. Carefully remove the compressor from chassis.
<p>5. Assemble unit</p>		<p>Assemble the unit in the reverse order of disassembly.</p>

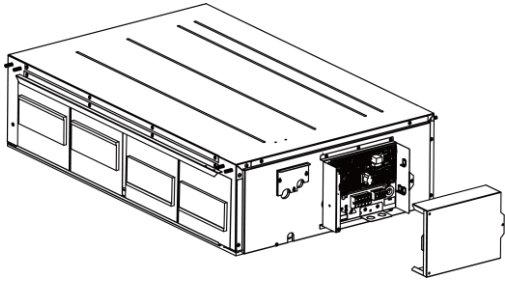
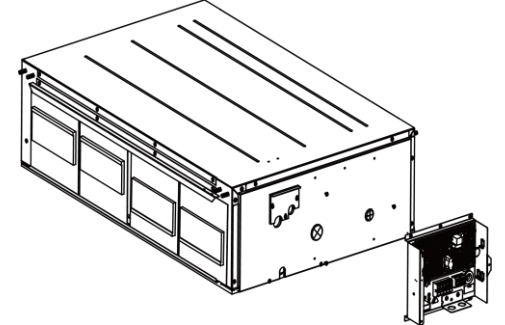
12.2 Indoor Unit

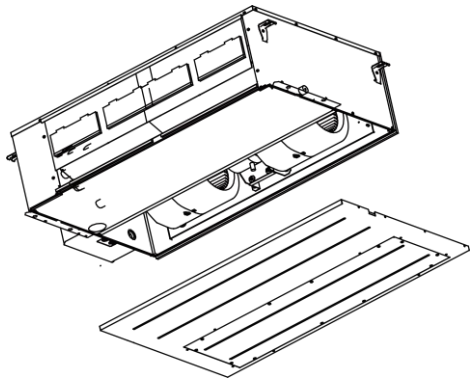
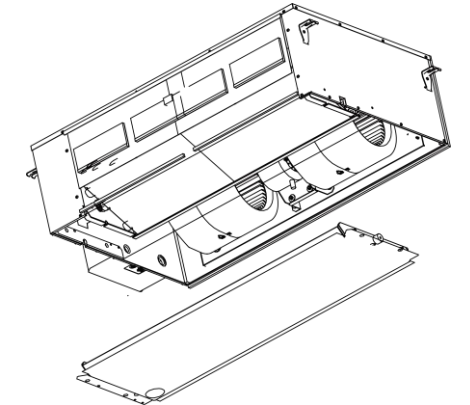
12.2.1 Duct type

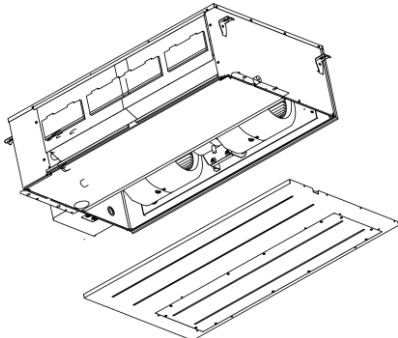
<p>Removal and Assembly of Fan Motor</p>		
<p>Important: Before removing the fan, make sure power to the system is disconnected..</p>		
Step	Illustration	Handling Instruction
<p>1. Unplug the motor cables</p>		<p>Use screwdriver to remove the electric box cover and unplug the motor cables in electric box.</p>
<p>2. Remove the filter sub-assembly and air inlet cover board</p>		<p>Remove the filter sub-assembly from the air inlet frame and use screwdriver to remove the air inlet cover board.</p>

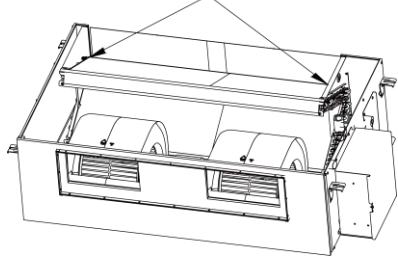
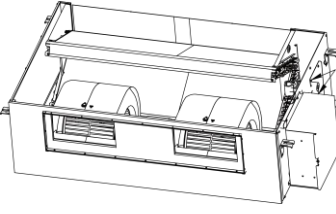
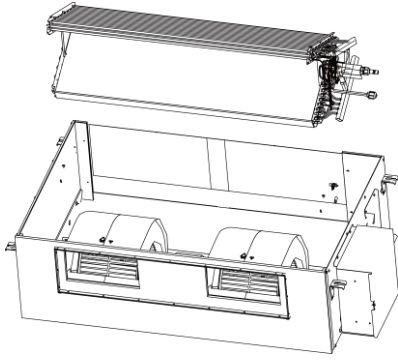
<p>3. Remove the screws on fan sub-assembly.</p>		<p>Remove the screws on fan sub-assembly.</p>
<p>4. Removing the fan cage enclosure</p>		<p>Rotate the fan cage housing toward supply opening and remove.</p>
<p>5. Loosen the fan and motor.</p>		<p>Use a hex wrench to loosen the screws holding the fan cage to the motor shaft. Remove outer housing holding motor in place.</p>
<p>6. Replace the motor</p>		<p>Remove the motor from the support bracket. Then remove the fan cages from the motor shafts. Remove the motor from the air inlet and replace with new motor. If the new motor comes with a mounting bracket, attach the bracket to the housing after sliding on the fan cages. Be sure to tighten the cages onto the motor shafts.</p>
<p>7. Reassembly of the unit</p>		<p>Reassemble the unit in the reverse order of disassembly and test operation.</p>

<p>Disassembly of filter screen for return air</p>		
<p>Important: Make sure that the power supply to the system is turned off before disassembling and protect all the parts during disassembly. Do not put filter screen near a high temperature heat source.</p>		
<p>Step</p>	<p>Illustration</p>	<p>Handling Instruction</p>
<p>Disassembly of filter screen for return air</p>		<p>Gently push down on the filters in the slots and pull/slide out slowly to prevent damage.</p>

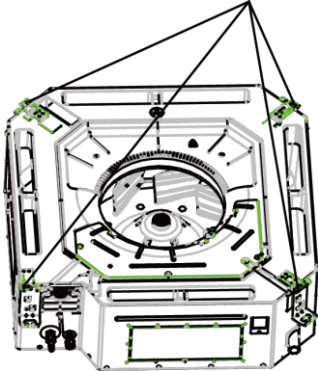
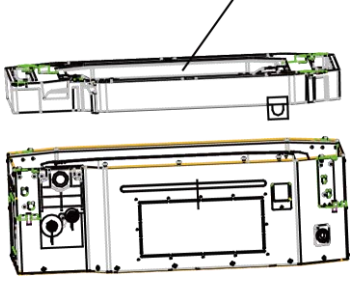
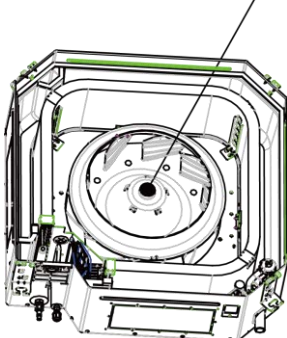
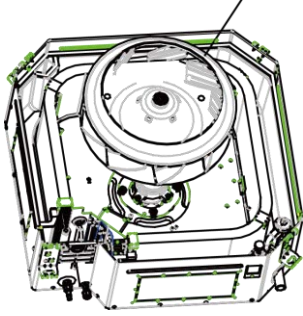
Disassembly of electrical parts box cover panel and electrical parts box		
Important: Make sure that power supply is turned off before disassembling and protect all parts during disassembly, especially electrical components. Keep all moisture away from the electrical box area and protect the board and components.		
Step	Illustration	Handling Instruction
1. Disassembly of electric box cover		The cover can be removed once the screw(s) are removed.
2. Disassembly of electric parts box		By removing the screws inside the box, the electrical box can be completely removed. This should not be necessary unless the box is damaged.

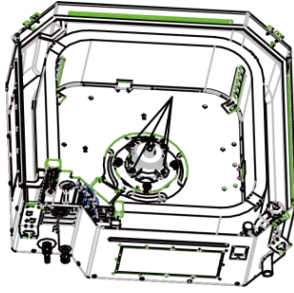
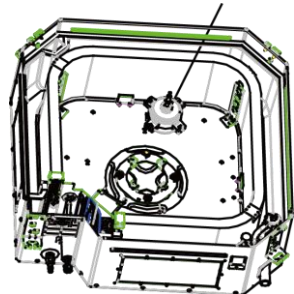
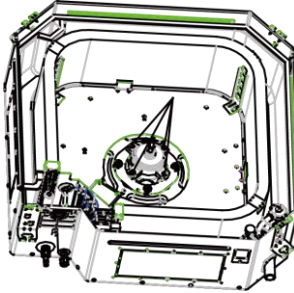
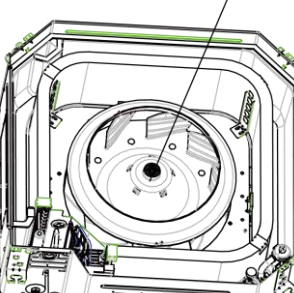
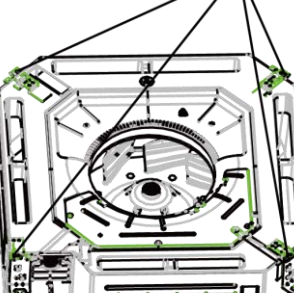
Removal of condensate pan		
Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
1. Disassembly of cover plate		To access the condensate drain pan the bottom plate will need to be removed first. This is done by removing the cover plate screws.
2. Removal of condensate pan		The condensate pan will drop down once the screws holding the pan to the chassis are removed.

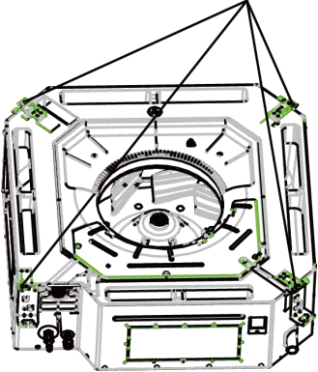
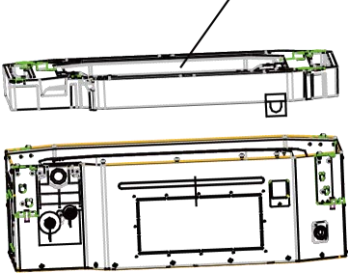
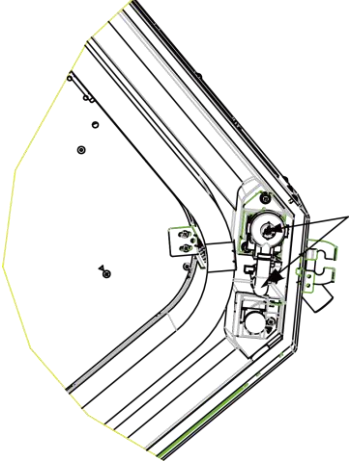
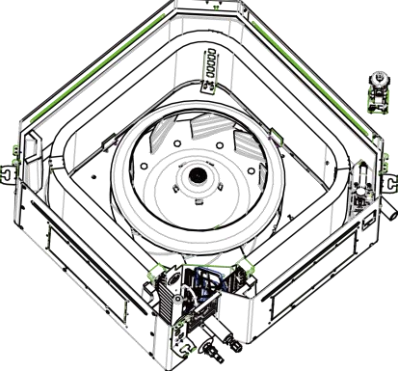
Removal of fan and motor		
Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
Removal of fan motor		<p>Disassemble the fixing screws on the fan components. (As is shown in graph, circle represents 6 screws.)</p> <p>Disassemble the fastening screws on the fan and motor. Remove the fan. (As is shown in the graph, box represents screws.)</p>

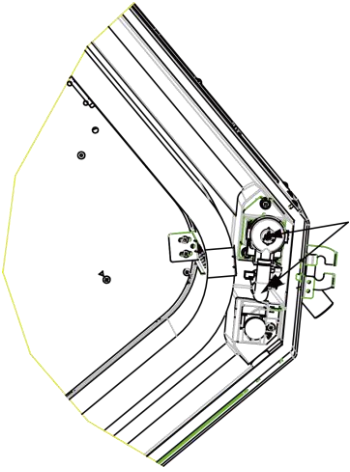
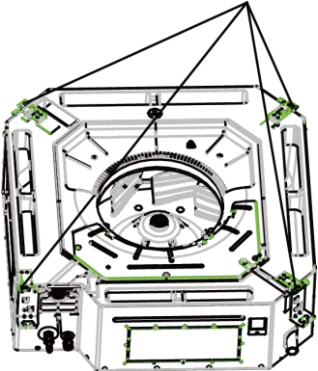
Removal of evaporator		
Important: Make sure that the power supply is off and protect the copper tube and aluminum fin. Use caution when removing coil to prevent damage.		
Step	Illustration	Handling Instruction
1. Removal of evaporator screws	<p>Disassemble of fixing screws on the side panels of evaporator</p> 	Remove the cover plate and the screws on each end of the coil.
2. Seal plate removal	 <p>Disassemble the fastening screws connecting evaporator valve seal-plate and joint flange</p>	Remove the screws holding the seal plate for the tubing assemblies. At this point the flare connections may be disconnected provided that system refrigerant has been reclaimed or charge has been pumped down into outdoor unit.
3. Removal of evaporator		Be aware that if coil is being replaced due to a leak then refrigerant should be reclaimed as charge in the system is unknown at this point.

12.2.2 Cassette-type Unit

Replacement of Fan Motor		
Step	Illustration	Handling Instruction
1. Loosen the screws holding condensate pan		Use screwdriver to loosen the screws holding the drain pan in place.
2. Remove the condensate pan		Carefully remove the condensate pan.
3. Loosen the bolts holding the fan blades in place		Use a wrench or socket to carefully remove the fan blade bolts
4. Remove the fan blade		The fan blade can now be removed.

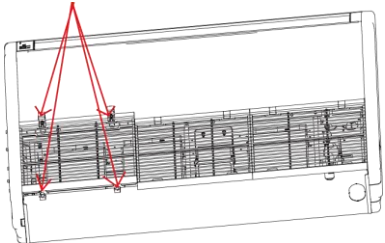
<p>5. Loosen the screws holding the motor in place</p>		<p>Use screwdriver to loosen the screws holding the motor.</p>
<p>6. Remove the motor and replace it</p>		<p>Remove the motor and replace it.</p>
<p>7. Tighten the screws holding the motor</p>		<p>Use screwdriver to carefully tighten the screws holding the motor.</p>
<p>8. Mount the fan blade and tighten the bolts</p>		<p>Mount the fan blade and use a wrench or socket to carefully tighten the bolts holding the fan blade in place. Do not overtighten as damage may occur.</p>
<p>9. Reinstall the condensate pan and tighten the screws</p>		<p>Use a screwdriver to carefully tighten the screws holding the condensate pan in place. Take care to not overtighten as damage to pan will occur.</p>

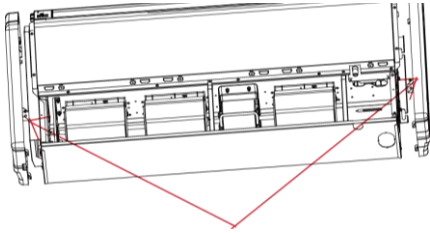
Removal and Installation of Condensate Pump		
Step	Illustration	Handling Instruction
1. Loosen the screws holding the condensate pan		Use a screwdriver to loosen the screws holding the condensate pan in place.
2. Remove the condensate pan		Remove the condensate pump and replace it.
3. Pull out the water outlet pipe and loosen the screws holding the condensate pump.		Pull out the water outlet pipe and use screwdriver to loosen the screws holding the condensate pump.
4. Take out the pump and replace it		Take out the pump and replace it

<p>5. Connect the condensate pipe and tighten the screws holding the condensate pump.</p>		<p>Connect the condensate pipe and use a screwdriver to tighten the screws holding the condensate pump in place.</p>
<p>6. Mount the condensate pan and tighten the screws</p>		<p>Use a screwdriver to carefully tighten the screws holding the condensate pan in place. Damage may occur if over tightened.</p>

12.2.3 Floor Ceiling Type

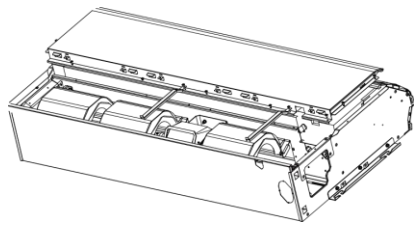
Model: DHR30NCB21S / DHR36NCB21S / DHR42NCB21S

<p>Removal of main outer cover</p>		
<p>Important: Make sure that the power supply is turned off before disassembling. Use care when disassembling and do not put the cover or filters near a high temperature heat source.</p>		
Step	Illustration	Handling Instruction
<p>Disassembly of sub-assy of front grille</p>		<ol style="list-style-type: none"> 1. Unscrew the 2 clasps of the upper grille and the 2 screws of the clasps. 2. Open the grille, disassemble the two bottom clasps to remove the grille.
<p>Disassembly of right and left panels</p>		
<p>Important: Make sure the power supply is off before disassembling and protect all the parts during disassembly. Do not scratch the outer parts.</p>		

Step	Illustration	Handling Instruction
Disassembly of right and left finishing plates		Disassemble the screws as shown with a screwdriver and then push upward to remove the right and left panels. Screw locations are shown in the drawing.

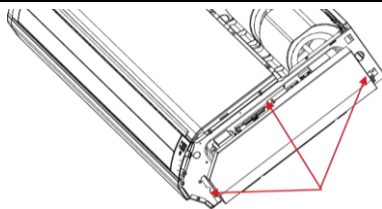
Disassembly of panel parts

Important: Make sure the power supply to the system is cut off before disassembling and protect all the parts during disassembly. Do not scratch the outer parts.

Step	Illustration	Handling Instruction
Disassembly of panel parts		Remove the three screws on the cover to remove the cover.

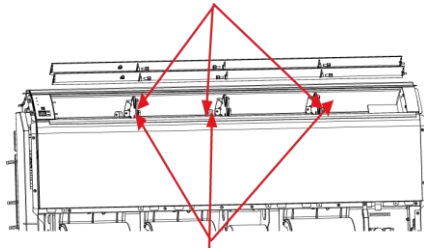
Disassembly of electrical box

Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly, especially the components inside the box as these are prone to moisture and impact damage.

Step	Illustration	Handling Instruction
Removal of electrical box cover		Remove the three screws as shown in the picture, then remove the cover.

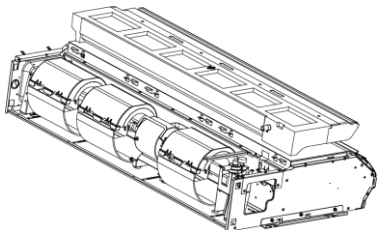
Disassembly of air deflecting louvers

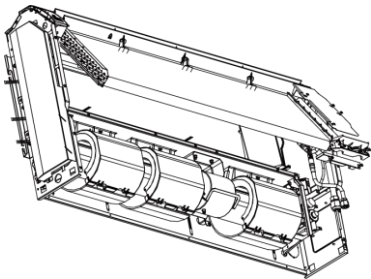
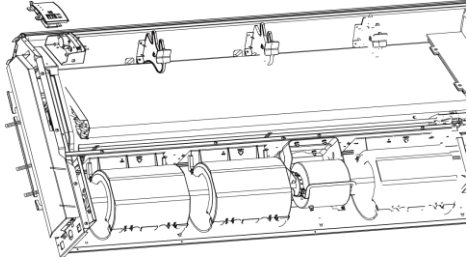
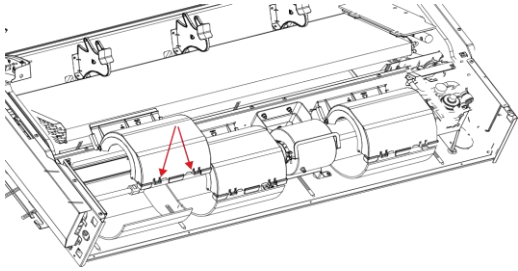
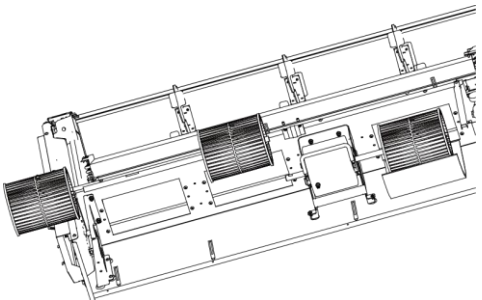
Important: Make sure the power supply is cut off before disassembling and protect all the parts during disassembly, especially the linkages of the air deflecting louvers.

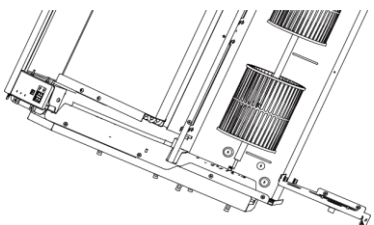
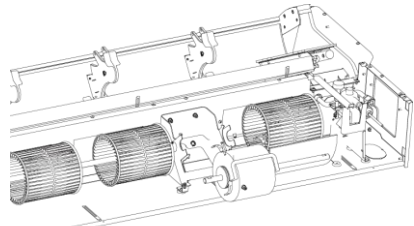
Step	Illustration	Handling Instruction
Disassembly of air deflecting louvers		Remove the air deflecting louvers from the air deflecting louver support assembly, and then remove both ends from the stepper motor linkage.

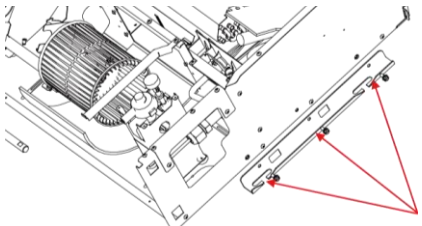
Removal of condensate pan

Important: Make sure the power supply is turned off before disassembling and protect all the parts during disassembly.

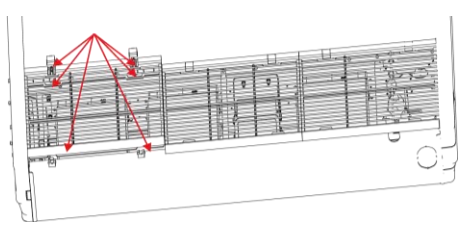
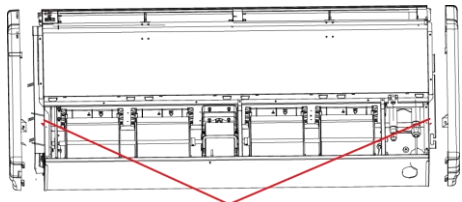
Step	Illustration	Handling Instruction
Removal of the condensate pan		Once the outer cover has been removed, then the condensate pan can be accessed and removed.

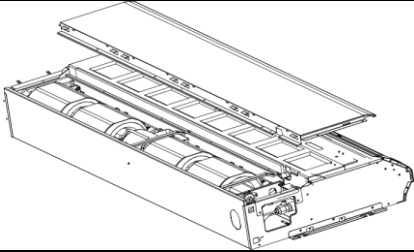
Disassembly of evaporator components		
Important: Make sure that the power supply is turned off. Work deliberately to avoid damaging the copper tube assemblies and the fins of the coil.		
Step	Illustration	Handling Instruction
Removal of evaporator coil		Remove the six screws of the coil, three screws of the water channel and the two screws of the condensate deflector to remove the evaporator.
Removal of discharge air guide		
Important: Make sure that the power supply is off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
Removal of the discharge air guide		Remove the display board, mounting support and mounting plate of the motor in this order.
Disassembly of fan and motor components		
Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly, especially the fastening screws for the fans.		
Step	Illustration	Handling Instruction
1. Disassembly of front and back fan cage housings		Press the buckle at the joints of front and back housings with hands and pull upward to remove the front housing. Then remove the screws on the back housing. Lift the buckle of the back housing with hands and remove it.
2. Removal of fan assemblies		Unscrew the two screws of the center coupling, take out the main shaft and blower wheels, then loosen the set screws of the blower wheels to remove them from the main shaft.

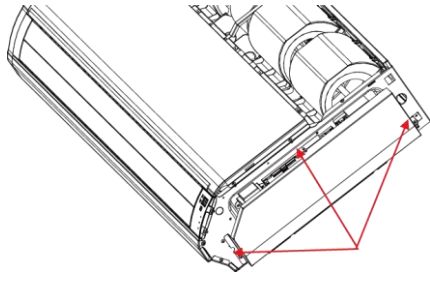
<p>3. Removal of the bearing mounting plates</p>		<p>Unscrew the 3 screws and 2 nuts of support to remove the mounting support.</p>
<p>4. Removal of motor</p>		<p>Loosen the two screws of the motor mounting bracket and remove. The motor can then be removed.</p>

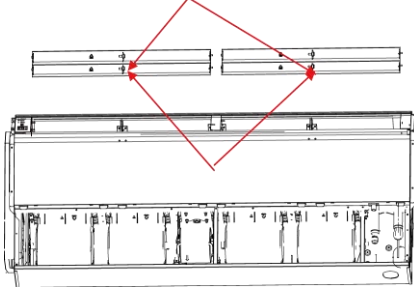
<p>Removal of right and left fixing plates</p>		
<p>Step</p>	<p>Illustration</p>	<p>Handling Instruction</p>
<p>Removal of right and left mounting plates</p>		<p>Disassemble the bolts on right and left mounting plates with tools. (As is shown by the arrows in the drawing.)</p>

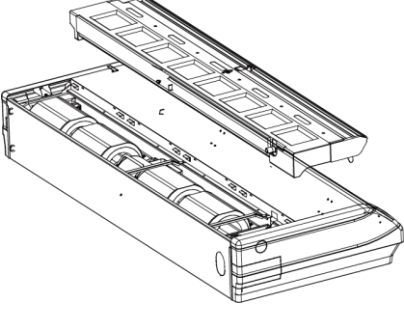
Model: DHR18NCB21S / DHR24NCB21S / DHR48NCB21S

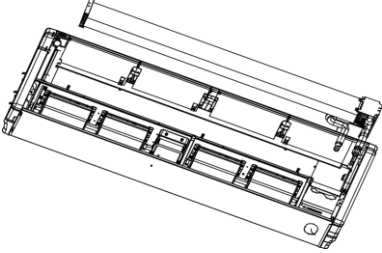
<p>Removal of the main grille cover</p>		
<p>Step</p>	<p>Illustration</p>	<p>Handling Instruction</p>
<p>Removal of grille sections</p>		<ol style="list-style-type: none"> 1. Unscrew the 2 clasps of the upper grille and the two screws of the clasps. 2. Open the grille, disassemble the two bottom clasps to remove the grille.
<p>Removal of the left and right panels</p>		
<p>Important: Make sure the power supply is turned off before disassembling and protect all the parts during disassembly. Do not scratch the outer panels.</p>		
<p>Step</p>	<p>Illustration</p>	<p>Handling Instruction</p>
<p>Removal of right and left finishing panels</p>		<p>Remove the screws as shown in the drawing and then push upward to remove the right and left panels.</p>

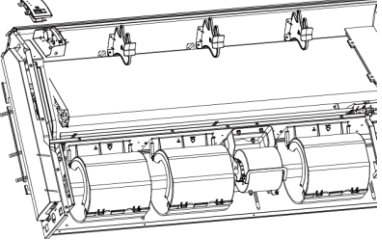
Disassembly of panel parts		
Important: Make sure the power supply is turned off before disassembling and protect all the parts during disassembly. Do not scratch the panels.		
Step	Illustration	Handling Instruction
Panel removal		Remove the three screws on the cover to remove the cover.

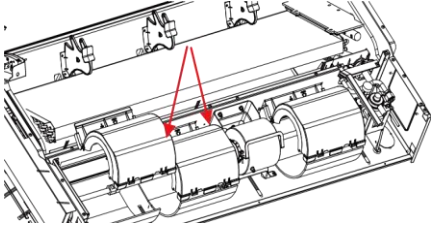
Removal of the electrical box		
Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly, especially the components inside the box to prevent moisture and impact damage.		
Step	Illustration	Handling Instruction
1. Removal of electrical box cover		Remove three screws as shown by the arrows in the drawing on the left and remove the electrical box cover.

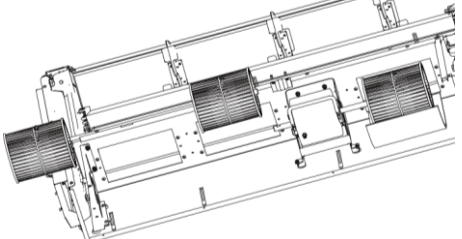
Removal of the discharge air louvers		
Important: Make sure the power supply is turned off before disassembling and protect all the parts during disassembly, especially linkages and connections of the louvers.		
Step	Illustration	Handling Instruction
Removal of the discharge air louvers		Remove the discharge air louvers from the support assembly, and then remove both ends from the stepper motor linkages.

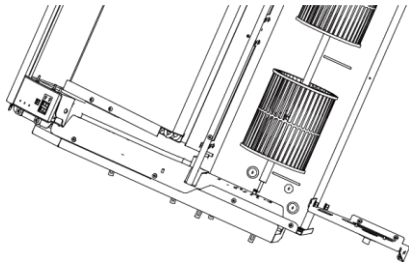
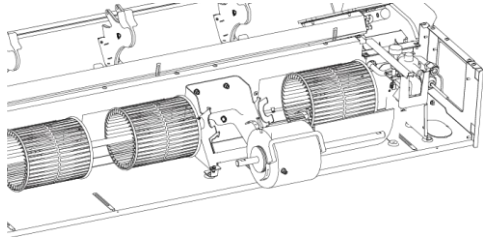
Removal of the condensate pan		
Important: Make sure the power supply is turned off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
Condensate pan removal		Once the outer cover has been removed, then the condensate pan can be accessed and removed.

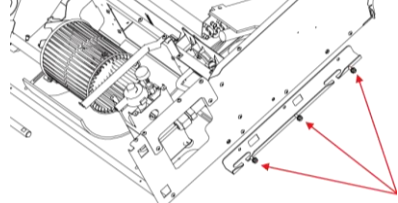
Evaporator coil removal		
Important: Make sure that the power supply is cut off and protect the copper tube and aluminum fin if coil is to be re-used.		
Step	Illustration	Handling Instruction
Removing the coil		Remove the six screws of the evaporator coil, three screws of the water channel and the two screws of the condensate reflector to remove the evaporator coil.

Removal of the discharge air guide		
Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly.		
Step	Illustration	Handling Instruction
Removal of the discharge air guide		Remove the display board, mounting support and mounting plate of the motor in this order.

Removal of fan and motor components		
Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly, especially the fastening screws for fans.		
Step	Illustration	Handling Instruction
Disassembly of front and back fan cage housings		Press the buckle at the joints of front and back of the fan cage housings by hand and pull upward to remove the front housing. Then remove the screws on the back housing. Lift the buckle of back housing with hands and remove it.

Removal of fan and motor components		
Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly, especially the fastening screws for fans.		
Step	Illustration	Handling Instruction
1. Removal of fans		Unscrew the two screws of the center coupling, take out the main shaft and blower wheels, then loosen the screws of the blower wheels to remove them from the main shaft.

<p>2. Removing the bearing mounting plates</p>		<p>Remove the three screws and two nuts to remove the mounting plate.</p>
<p>3. Removal of motor</p>		<p>Loosen the two screws of the motor attaching clamp, remove the motor attaching clamp and motor attaching clamp subassembly to remove the motor.</p>

<p>Removal of right and left mounting plates</p>		
<p>Important: Make sure that the power supply is turned off before disassembling and protect all the parts during disassembly.</p>		
<p>Step</p>	<p>Illustration</p>	<p>Handling Instruction</p>
<p>Removal of right and left mounting plates</p>		<p>Disassemble the bolts on right and left mounting plates with tools. (As is shown by the arrows in the drawing.)</p>

Support Contact Information:

	Phone	Email
Technical Support Support during installation, commissioning, service and troubleshooting	1(844) 873-4443	BE-VRFTechSupport@jci.com
Applications and Design Presale assistance with equip applications and design support, as well as use of selection tool	1(844) 873-6755	BE-VRFApplicationDesign@jci.com
Customer Service Assistance ordering equipment, parts and accessories	1(844) 873-4445	BE-VRFCustomerService@jci.com
Warranty Assistance with warranty registration, warranty claims, etc.	1(844) 873-9768	BE-VRFWarranty@jci.com
Parts Equipment and parts pre- and post-sale support	1(844) 873-4445	BE-VRFParts@jci.com

Product improvement, specifications and appearance in this manual are subject to change without prior notice.