



"M" and "W" Series
9K - 24K
Multi Zone Duct Type
Indoor Units

Owner's Manual
Air Conditioning Units

Models:

DHMW09NDB21S
DHMW12NDB21S
DHMW18NDB21S
DHMW21NDB21S
DHMW24NDB21S

Please read this Installation and Operation manual
carefully before installation and operation and retain it 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.

Table of Contents

Introduction and Safety Summary.....	i
1 Additional Usage Information.....	vi
2 Installation Location	1
2.1 Selecting the Installation Location for Indoor Units.....	1
2.2 Electric Wiring	1
2.3 Grounding Requirements	2
2.4 Accessories for Installation	2
3 Installation Instructions	3
3.1 Outline Dimension Drawings of the Indoor Unit	3
3.2 Dimension Requirements on the Installation Space of the Indoor Unit.....	3
3.3 Installation of the Indoor Unit	4
3.4 Horizontal Check of the Indoor Unit	5
3.5 Installation of the Air Supply Duct	5
3.6 Drawings of the Air Supply Outlet and Return Air Inlet	7
3.7 Installation of the Return Air Duct	7
3.8 Installation of the Common Condensate Pipe.....	8
3.9 Design of the Condensate Pipe.....	8
3.10 Installation of Separate Condensate Line.....	9
3.11 Precautions for the Lift Pipe	10
3.12 Test for the Drainage System.....	10
3.13 Piping	11
3.14 Insulation for the Refrigerant Pipe	11
3.15 Wiring between the Wire and the Wiring Terminal	12
3.16 Wiring of the Power Wire (single-phase).....	13
3.17 Wiring of the Signal Line of the Wired Zone Controller.....	15
3.18 Electric Installation	15
4 Rated Working Conditions.....	16
5 Error Analysis	17
6 Maintenance	18
Support Contact Information.....	19

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. *Refer back to these safety instructions as needed.*

- 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, 230 voltage, 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.

Additional Usage Information

- ◆ The total capacity of the indoor units which run at the same time can not exceed 150% of that of the outdoor units. Otherwise, the cooling (heating) effect of each indoor unit will be poor.
- ◆ It is a normal phenomenon that the indoor unit fan will still run for 20~70 seconds after the indoor unit receives the “stop” signal so as to make full use of after-heat for the next operation.
- ◆ When the running modes of the indoor and outdoor units conflict, it will be indicated on the display of the wired zone controller in five seconds and then the indoor unit will stop. In this case, they can return to normal condition by synchronizing their running modes: The HEAT mode conflicts with each of the COOL mode, DRY mode and FAN mode, while the COOL mode, DRY mode and FAN mode are compatible with each other. If the supply power fails when the unit is running, then the indoor unit will send the “start” signal to the outdoor unit three minutes later after power recovery.

An all-pole disconnection switch having a contact separation of at least 1/8 in. (3mm) in all poles should be connected in secured wiring.



This product must not be disposed of with domestic waste. This product has to be disposed of at an authorized place for recycling of electrical and electronic appliances.

2 Installation Location

The installation of the unit must comply with national and local safety regulations. The installation location directly affects the normal use, so the user should ensure installation and debugging is done by a certified technician according to instructions in this manual. Only after that, can the unit be energized.

2.1 Selecting the Installation Location for the Indoor Unit

- (1). Where there is no direct sunlight.
- (2). Where the top hanger, ceiling and the building structure are strong enough to withstand the weight of the unit.
- (3). Where the condensate pipe can be easily connected to the outside.
- (4). Where the flow of the air inlet and outlet is not blocked.
- (5). Where the refrigerant pipe of the indoor unit can be easily led to the outside.
- (6). Where there is no flammable, explosive substances or their leakage.
- (7). Where there is no corrosive gas, heavy dust, salt mist, smog or moisture.

CAUTION!

If the unit is installed in the following places, it is likely to run abnormally. If unavoidable, please contact your local HVAC service center.

- ① Where there is oil;
- ② Where there is sulfur gas (like sulfur hot springs);
- ③ Where there are devices with high frequency (like wireless devices, electric welding devices, or medical equipment);
- ⑤ Special circumstances.

2.2 Electric Wiring

- (1). The installation must be done in accordance with national and local wiring regulations.
- (2). Only a power wire with a rated voltage and exclusive circuit for the air conditioning unit can be used.
- (3). Do not pull the power wire forcefully.
- (4). The electric installation should be carried out by a certified technician as instructed by local laws, regulations and also this manual.
- (5). The diameter of the power wire should be large enough to withstand the voltage and once it is damaged, it must be replaced by another dedicated power wire.
- (6). Grounding should be reliable and ground wire should be connected to the dedicated device of the building by a certified technician. The disconnect coupled with a leakage current protection disconnect must be equipped and be of enough capacity and of both magnetic and thermal tripping functions in case of a short circuit and overload.

2.3 Grounding Requirements

- (1). The air conditioning unit is classified as a Class I appliance, with reliable grounding.
- (2). The yellow-green line of the unit is the grounding line and can not be used for other purposes, cut off or secured with a tapping screw; otherwise it would cause the hazard of electric shock.
- (3). A reliable grounding terminal should be provided and ground wire can not be connected to any of the following places:
 - ① . Running water pipe;
 - ② . Coal gas pipe;
 - ③ . Sewage pipe;
 - ④ Other places a certified technician thinks are unreliable.

2.4 Accessories for Installation

Refer to the packing list for the accessories of the indoor and outdoor units respectively.

3 Installation Instructions

3.1 Outline Dimension Drawings of the Indoor Unit

Note: The unit in the following figures is mm, unless otherwise specified.

Fig.1 is applicable to DHMW09NDB21S,DHMW12NDB21S,DHMW18NDB21S, DHMW21NDB21S, DHMW24NDB21S:

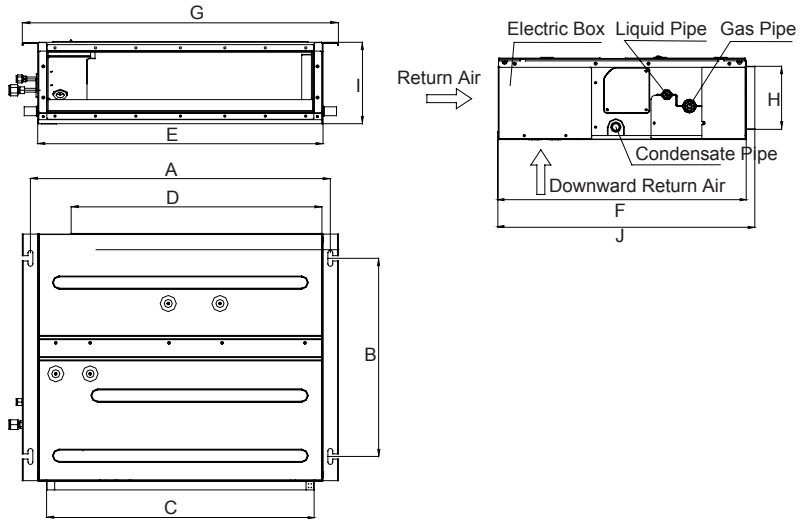


Fig.1

Table 1: Outline Dimensions

Model	Item	A	B	C	D	E	F	G	H	I	J
DHMW09NDB21S		742	491	662	620	700	615	782	156	200	635
DHMW12NDB21S											
DHMW18NDB21S		942	491	862	820	900	615	982	156	200	635
DHMW21NDB21S		1142	491	1062	1020	1100	615	1182	156	200	635
DHMW24NDB21S											

3.2 Dimension Requirements on the Installation Space of the Indoor Unit

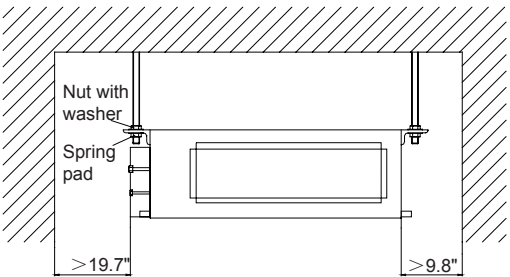


Fig. 2

3.3 Installation of the Indoor Unit

(1). Requirements on the Installation Location

- 1) Ensure the hanger is strong enough to withstand the weight of the unit.
- 2) The condensate pipe is easily connected.
- 3) No obstacle is in the inlet/outlet and the air circulation is in good condition.
- 4) Ensure the installation space shown in Fig.2 is left for maintenance access.
- 5) It should be far away from where there is a heat source, leakage of flammable, explosive substances, or smog.
- 6) It is a ceiling type unit (concealed in the ceiling).
- 7) The power wires and connection lines of the indoor and outdoor units must be at least 40 in. (1m) away from a TV set or radio to avoid electromagnetic interference and noise. (Even at this distance, noise may be produced due to strong electromagnetic waves).

(2). Installation of the Indoor Unit

Insert the M10 expansion bolt into the hole, and then secure the nail into the bolt. Refer to the Outline Dimension Drawings of the Indoor Unit for the distance between holes and see Fig.3 for the installation of the expansion bolt.

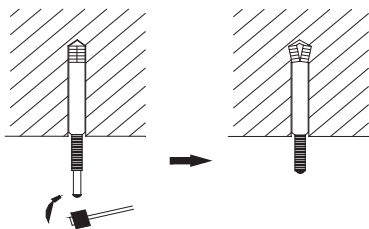


Fig.3

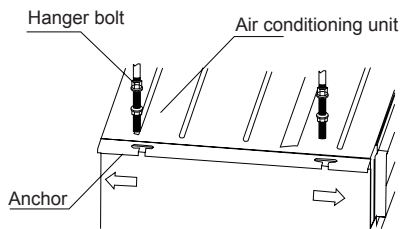


Fig.4

Install the hanger on the indoor unit, as shown in Fig.4.

Install the indoor unit on the ceiling, as shown in Fig.5.

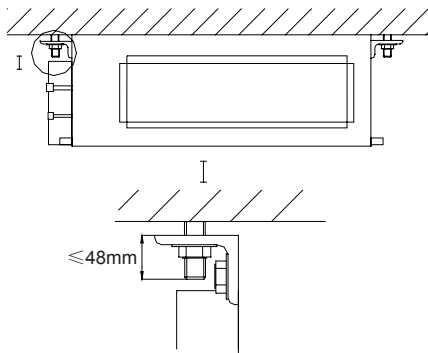


Fig.5

⚠ CAUTION!

- ① . Prior to the installation, please carefully prepare for all piping (refrigerant pipe, condensate pipe) and wiring (wires of the wired zone controller, wires between the indoor and outdoor unit) of the indoor unit to make installation much easier.

- ② . If there is an opening in the ceiling, it is better to reinforce it to keep it flat and prevent it from vibrating. Consult the user and builder for more details.
- ③ . If the strength of the ceiling is not strong enough, a beam made of angle iron can be used and then secure the unit on it.
- ④ . If the indoor unit is not installed in the air conditioning area, the unit needs to be insulated with the local R value insulation to prevent condensation.

3.4 Horizontal Check of the Indoor Unit

After the installation of the indoor unit, check for horizontal alignment to make sure the unit is level in all directions and keep an inclination of 5° toward the condensate pipe at the right and left, as shown in Fig.6.

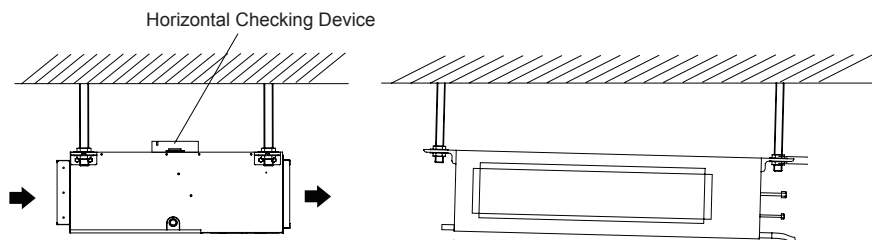


Fig.6

3.5 Installation of the Air Supply Duct

(1). Installation of the Rectangular Air Supply Duct

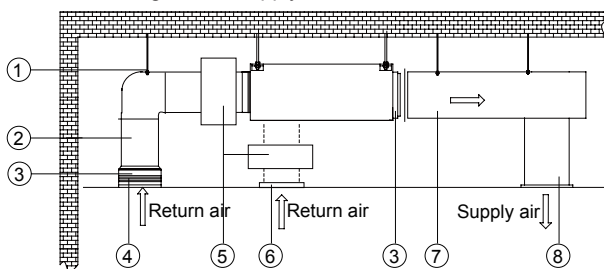


Fig.7

Table 2

No.	Name	No.	Name
1	Hanger	5	Plenum Box
2	Return Air Duct	6	Filter Screen
3	Canvas Duct	7	Main Air Supply Duct
4	Return Air Inlet	8	Air Supply Outlet

(2). Installation of the Round Air Supply Duct

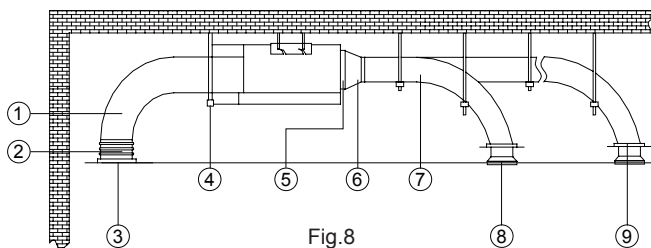


Fig.8

Table 3

No.	Name	No.	Name
1	Return Air Duct	6	Transition Duct
2	Canvas Duct	7	Air Supply Duct
3	Return Air Louver	8	Diffuser
4	Hanger	9	Diffuser Joint
5	Air Supply Outlet		

(3). Installation Steps of the Round Air Supply Duct

- 1). Pre-install the outlet of the round duct on the transition duct and then secure it with a tapping screw.
- 2). Install the transition duct to the air outlet of the unit and secure it with 1/4 in. screws or what the local code requires (cleats, drives, slips).
- 3). Connect the outlet to the duct according to local code standards.

⚠ CAUTION!

- ① . The maximum length of the duct is the maximum length of the air supply duct plus the maximum length of the return air duct.
- ② . For the unit with an auxiliary electric heating function, if the round duct is to be adopted, then the straight length of the transition duct can not be less than 8 in. (200mm).
- ③ . The duct is either rectangular or round and connected with the air inlet/outlet of the indoor unit. Among all air supply outlets, at least one should be kept open. As for the round duct, it needs a transition duct where the size should match with the air supply outlet of the unit. After the fitting of the transition duct, focus on the round duct, which should be kept 33 ft. (10m) away from the corresponding diffuser.

3.6 Drawings of Air Supply Outlet and Return Air Inlet

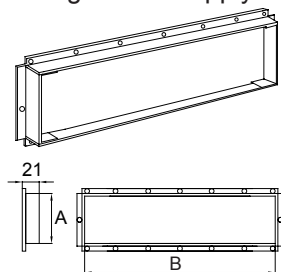


Fig.9 Air Supply Outlet

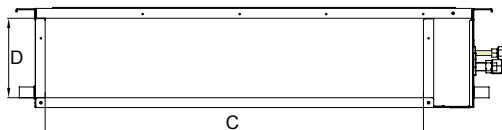


Fig.10 Return Air Inlet

Table 4 Dimensions of Air Supply Outlet and Return Air Inlet (unit: mm)

Model \ Item	Air Supply Outlet		Return Air Inlet	
	A	B	C	D
DHMW09NDB21S	156	662	580	162
DHMW12NDB21S				
DHMW18NDB21S	156	862	780	162
DHMW21NDB21S	156	1062	980	162
DHMW24NDB21S				

3.7 Installation of the Return Air Duct

- (1). The default installation location of the rectangular flange is in the back and the return air cover plate is in the bottom, as shown in Fig.11.

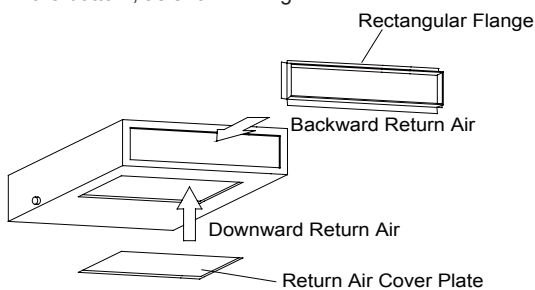


Fig.11

- (2). If the downward return air is desired, just change the place of the rectangular flange and the return air cover plate.
- (3). Connect one end of the return air duct to the return air outlet of the unit with 1/4 in. screws or what the local code requires and the other to the return air louver. For the sake of convenience to freely adjust the height, a cutting of canvas duct will be helpful, which can be reinforced and folded by # 8 iron wire.
- (4). More noise is likely to be produced in the downward return air mode than the backward return air mode, so it is suggested to install an insulated return plenum box to minimize the noise.
- (5). The installation method can be chosen with consideration of conditions of the building and maintenance, etc., as shown in Fig.12.

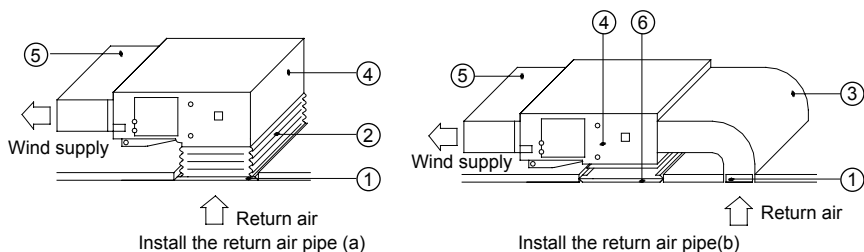


Fig.12

Table 5 Parts and Components of the Return Air Duct

No.	Name	No.	Name
1	Return Air Louver (with the filter screen)	4	Indoor Unit
2	Canvas Duct	5	Air Supply Duct
3	Return Air Duct	6	Access Grille

3.8 Installation of Common Condensate Pipe

- (1). The condensate pipe should keep 1/4 bubble or an angle of $5 \sim 10^\circ$ which can facilitate the drainage of the condensate water. And the joints of the condensate pipe should be insulated by the insulation material to prevent condensing (see Fig.13).

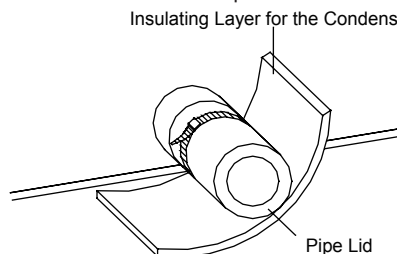


Fig.13 Thermal Insulation of the Condensate Pipe

- (2). There is a condensate outlet on both left and right sides of the unit. Once one is confirmed to be used, the other should be closed with a rubber plug, bundled by the binding wire and insulated by the insulation material to avoid water leakage.
- (3). The right outlet is defaulted to be closed with a plug.

⚠CAUTION! No water leakage should be on the joint of the condensate pipe.

3.9 Design of the Condensate Pipe

- (1). The condensate pipe should always keep an inclination angle ($1/50 \sim 1/100$) to avoid water gathering in any place.
- (2). During the connection of the condensate pipe and pumps, do not use too much force on the pipe on one side of the device and the pipe should be secured close to the device.
- (3). The condensate pipe can be hard PVC pipe which can be purchased locally. During the connection, insert the end of the schedule 40 pipe into the drain outlet, then tighten it with the condensate hose and binding wire, but never connect the drain outlet and the condensate hose with adhesive.

(4). When the condensate pipe is used for multiple devices, the common drain section of the pipe should be 100mm lower than the drain hole of each device. It is better to use a much thicker pipe for such a purpose.

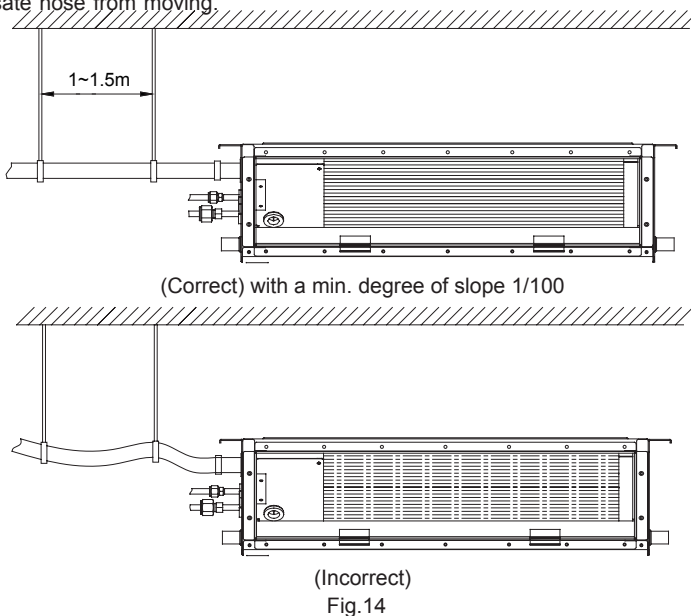
3.10 Installation of a Separate Condensate Line

(1). The diameter of the condensate pipe should be larger than, or equal to, that of the refrigerant pipe (PVC pipe, outer diameter: 1 in. (25mm), wall thickness ≥ 1.5 mm).

(2). The condensate pipe should be as short as possible and with at least a 1/100 degree of slope to avoid forming air pockets.

(3). If the proper degree of slope of the condensate pipe is not possible, a lift pipe should be installed.

(4). A distance of 3.28 ft.-5 ft. (1-1.5m) should be kept between the hangers to avoid the condensate hose from moving.



(5). Insert the condensate hose into the drain hole and tighten it with clamps.

(6). Wrap the clamps with a large amount of armaflex for thermal insulation.

(7). The condensate hose inside the room also should be insulated.

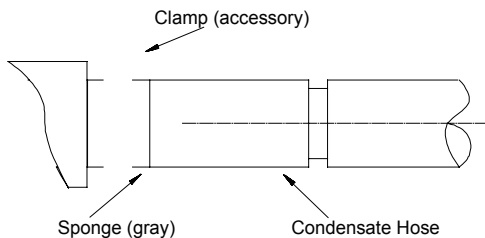


Fig.15

3.11 Precautions for the Lift Pipe

The installation height of the lift pipe should be less than 33 in. (850mm). It is recommended to set an inclination angle $1^{\circ} \sim 2^{\circ}$ for the lift pipe toward the drainage direction. If the lift pipe and the unit form a right angle, the height of the lift pipe must be less than 31 in. (800mm).

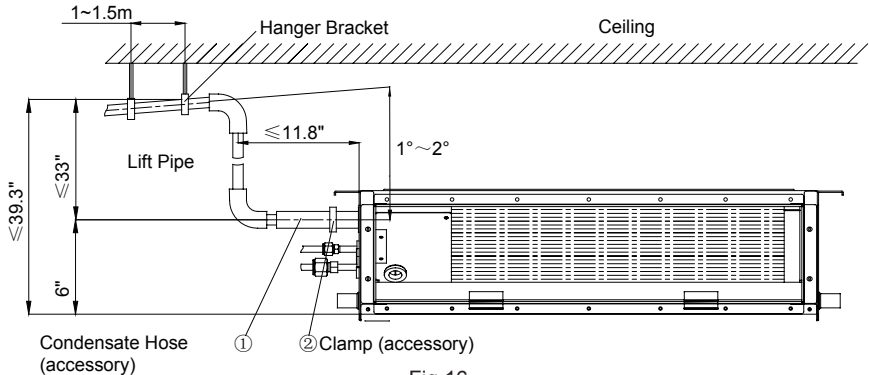
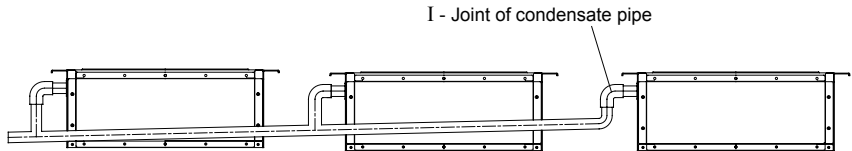


Fig.16

Notes:

- ① . The inclination height of the condensate hose should be within 3 in. (75mm) so that the outlet of the condensate hose does not suffer from an external force.
- ② . If multiple condensate pipes converge, please follow the installation steps below.



The specification of the joint of the condensate pipe should be suitable to the running capacity of the unit

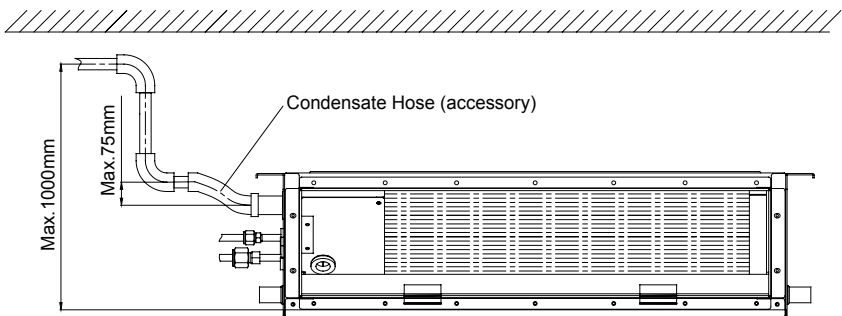


Fig.17

3.12 Test for the Drainage System

- (1). After the electric installation, please take a test for the drainage system.
- (2). During the test, check if the water flows through the pipe freely and ensure the joint doesn't leak.

3.13 Piping

- (1). Let the flare end of the copper pipe point toward the screw, and then tighten the screw by hand.
- (2). After that, tighten the screw with a torque wrench. (Tighten as shown in Fig.18).

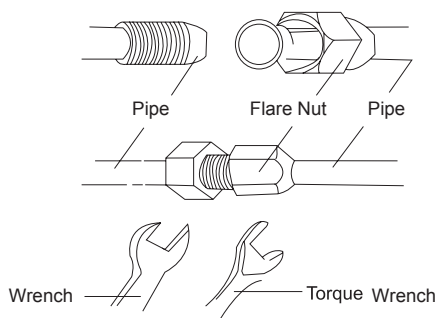


Fig.18

Table 6 Moments of Torque for Tightening Screws

Diameter of Pipe(mm)	Moment of Torque (N·m)
φ6.35	15-30
φ9.52	35-40
φ12	45-50
φ15.9	60-65

- (3). The bending degree of the pipe can not be too small; otherwise it will crack. And please use a tubing bender to bend the pipe.
- (4). Wrap the exposed refrigerant pipe and the joints with armaxflex and then tighten them with the plastic tape.

⚠ CAUTION!

① . During the connection of the indoor unit and the refrigerant pipe, never pull any joints of the indoor unit by force; otherwise the capillary pipe or other pipe may crack, which then would result in leakage.

② . The refrigerant pipe should be supported by brackets so that the unit can withstand the weight of it.

If the specifications of the outdoor unit pipe joint do not conform to that of the indoor unit, then the joint specification of the outlet pipe of the indoor unit takes precedence. A reducing adapter should be installed at the joint of the outdoor unit so as to make the joint of the outdoor unit compatible with that of the indoor unit.

3.14 Insulation for the Refrigerant Pipe

- (1). The refrigerant pipe should be insulated with insulating material and plastic tape in order to prevent condensation and water leakage.

- (2). The joints of the indoor unit should be wrapped with insulating material with no gap allowed on the joint of the indoor unit, as shown in Fig.19.

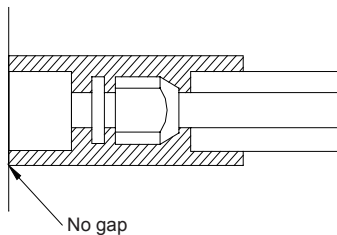


Fig.19

⚠ CAUTION!

After the pipe is well protected, never bend it to form an angle; otherwise it will crack or break.

- (3). Wrap the pipe with tape.

- 1). Bundle the refrigerant pipe and electric wire together with tape, and separate them from the condensate pipe to protect them from water leakage.
- 2). Wrap the pipe from the bottom of the outdoor unit to the top of the pipe where it enters the wall. During the wrapping, overlap half of the width of the tape that is applied.
- 3). Secure the wrapped pipe on the wall with clamps.

⚠ CAUTION!

- ① . Wrapping the pipe too tightly will lessen the R value of the insulation.
- ② . After that, fill the hole on the wall with sealing material to prevent wind and rain from coming into the room.

3.15 Wiring between the Wire and the Wiring Terminal

- (1). Wiring of the Three-Conductor Wire with a Ground

- 1). Strip off the insulating layer at the end of the wire about 1 in. (25mm) with a wire stripper.
- 2). Loosen the screw on the wiring board of the air conditioning unit.
- 3). Shape with the pliers at the end of the wire to a circle matching the size of the screw.
- 4). Place the screw through the circle of the wire and then secure it on the wiring board.

- (2). Wiring of the Multi-Core Wire

- 1). Strip off the insulating layer at the end of the wire about 4 in. (100mm) with a wire stripper.
- 2). Loosen the screw on the wiring board of the air conditioning unit.
- 3). Secure a wiring terminal matching the size of the screw to the end of the multi-core wire with crimping pliers.
- 4). Place the screw through the terminal of the multi-core wire and then secure it on the wiring board.

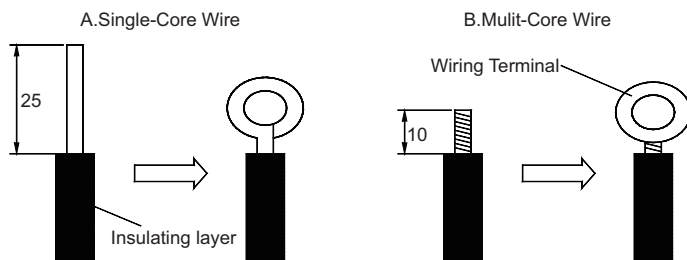


Fig.20

⚠ WARNING!

- ① . If the power cord or the signal line is damaged, they must be replaced with another dedicated cord or line.
- ② . Prior to wiring, please check the voltage marked on the nameplate and then carry out the wiring following the wiring diagram.
- ③ . A dedicated power cord must be used for the air conditioning unit. An electrical leakage protection switch and disconnect must be installed in case of an overload condition.
- ④ . The air conditioning unit must be grounded to prevent a hazard caused by the failed insulation.
- ⑤ . During the wiring, the wiring terminal or the three-conductor wire must be used; the direct wiring between the multi-core wire and wiring board would cause a fire.
- ⑥ . All wiring should be done strictly in accordance with the wiring diagram. Otherwise, improper wiring would cause the air conditioning unit to run abnormally or damaged.
- ⑦ . Do not let the electric wires touch the refrigerant pipe.
- ⑧ . Do not modify the wiring inside the indoor unit in any way. The manufacturer does not accept responsibility for resulting damage or abnormal running of the unit.

3.16 Wiring of the Power Wire (single-phase)

⚠ CAUTION!

The power supply for each indoor unit must be uniform.

- ① . Dismantle the cover of the electric box of the indoor unit.
- ② . Let the power cord go through the rubber ring.
- ③ . Run the 4-conductor cable through the hole of the chassis and the bottom of the appliance upward. Then connect the power line and the communication line from the outdoor unit to the corresponding terminals N(1), 2, 3 , and grounding terminal of the indoor unit. Wiring must be done properly as per the wiring diagram. (Note: Be sure the wiring terminals A/B/C/D and piping joints A/B/C/D of the indoor unit match with that of the outdoor unit respectively).
- ④ . Secure the power wire tightly with binding wire.

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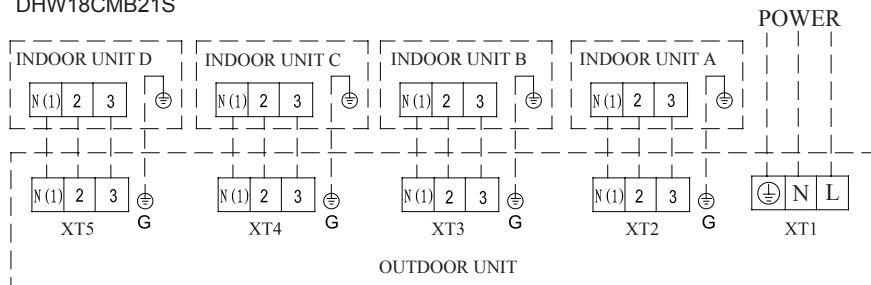


Fig.21

DHW42CMB21S

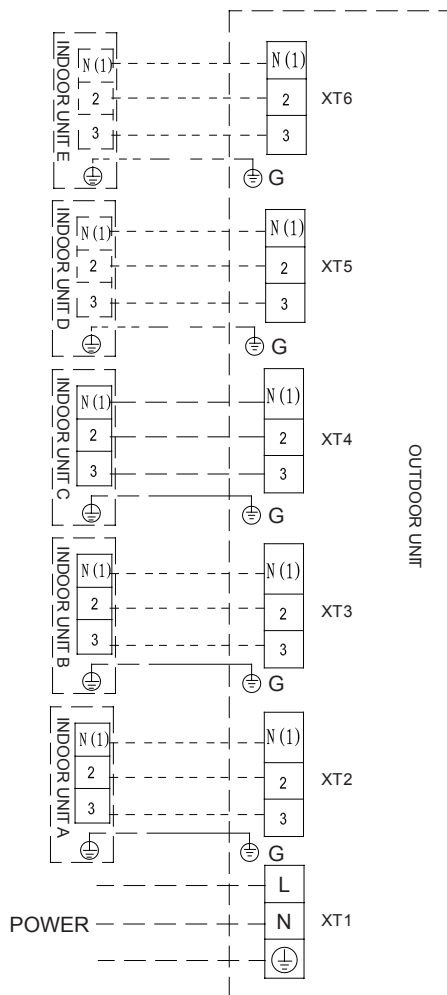


Fig.22

3.17 Wiring of the Signal Line of the Wired Zone Controller

- (1). Open the cover of the electric box of the indoor unit.
- (2). Run the signal line through the rubber ring.
- (3). Insert the signal line to the four-pin socket on the printed circuit board of the indoor unit.
- (4). Secure the signal line with the binding wire.

3.18 Electric Installation

Table 7

Indoor Unit		Power Supply	Running Current (A)	Input Power(W)		Recommended Power Cord (Sectional Area× Pieces)
Type	Model		Indoor Fan Motor	Cooling	Heating	
Cooling and Heating	DHMW09NDB21S	208/230V~ 60Hz	0.406	75	575	AWG14×4
	DHMW12NDB21S	208/230V~ 60Hz	0.348	65	865	AWG14×4
	DHMW18NDB21S	208/230V~ 60Hz	0.428	80	1080	AWG14×4
	DHMW21NDB21S	208/230V~ 60Hz	0.588	110	1610	AWG14×4
	DHMW24NDB21S	208/230V~ 60Hz	0.588	110	1610	AWG14×4

4 Rated Working Conditions

Table 8 Working Temperature Range

	Indoor side state °F (°C)		Outdoor side state °F (°C)	
	Dry bulb temp. °F (°C)	Wet bulb temp. °F (°C)	Dry bulb temp. °F (°C)	Wet bulb temp. °F (°C)
Rated. Cooling	80.0(26.7)	67.0(19.4)	95.0(35.0)	75.0(23.9)
Max. cooling	80.0(26.7)	67.0(19.4)	115.0(46.1)	75.0(23.9)
Min. cooling	67.0(19.4)	57.0(13.9)	67.0(19.4)	57.0(13.9)
Rated. Heating	70.0(21.1)	60.0(15.6)	47.0(8.3)	43.0(6.1)
Max. heating	80.0(26.7)	—	75.0(23.9)	65.0(18.3)
Low Ambient heating	70.0(21.1)	60.0(15.6)	5.0(-15.0)	3.2(-16.0)

5 Error Analysis

If the air conditioning unit runs abnormally, please check the following items before contacting your local HVAC contractor.

Table 9

Errors	Possible Causes
Failed startup	There is no power supply. The breaker opens because of electrical leakage. Voltage is too low.
Stops after a short time of operation	The air inlet/outlet of the indoor/outdoor unit is clogged.
Poor cooling effect	The air filter screen is too dirty or clogged. There are too many heat sources or people in the room. The door or window is open. There are obstacles at the air inlet/outlet. The set temperature is too high.
Poor heating effect	The air filter screen is too dirty or clogged. The door or window is not closed fully. The set temperature is too low.
Controller not working	If the remote controller crashes even if the batteries have been replaced, open the back cover and press the button "ACL" to set it back to a normal condition. Is the remoter controller in the signal receiving range? Or is it blocked by obstacles? For the duct type unit, operate the remote controller pointing at the wired zone controller. Check if the batteries of the wired zone controller are the right size or change them.

Note:

If the air conditioner still runs abnormally after the above check and handling, please contact your local HVAC contractor.

6 Maintenance

CAUTION!

Take note of the following items before cleaning the air conditioning unit.

- (1). Cut off the main power supply before contacting any wiring device.
- (2). Only when the unit is turned off and the main power supply is cut off, can the unit be cleaned. Otherwise it would cause an electric shock or injury.
- (3). Do not wash the unit with water. It may cause an electric shock.
- (4). During the cleaning, remember to use a stable platform.

Daily Maintenance

- 1). How to clean the filter
 - ① . Never dismantle the air filter except for cleaning. It may cause a malfunction.
 - ② . When the air conditioning unit is used in an environment with heavy dust, the air filter should be cleaned often (generally once every two weeks).
- 2). Maintenance before seasonal use
 - ① . Check if the air inlet/outlet of the indoor unit is clogged.
 - ② . Check if the grounding is in good condition.
 - ③ . Check if the wiring is in good condition.
 - ④ . Check if the light indication of the wired zone controller blinks after it is energized.

Note: If there is something abnormal, please consult your local HVAC contractor.

- 3). Maintenance after seasonal use
 - ① . Let the air conditioning unit run for a half day under the fan mode to dry the inside of the unit.
 - ② . If the unit is not to be used for a long time, please shut off the main power supply for energy conservation. At the same time, the power indicating light of the wired zone controller will go off.

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