Installation and Maintenance Manual

INVERTER-DRIVEN MULTI-SPLIT SYSTEM HEAT PUMP AIR CONDITIONERS

Type	Model
Ducted (High Static)	(H,Y,C)IDH015B22S (H,Y,C)IDH018B22S (H,Y,C)IDH024B22S (H,Y,C)IDH027B22S (H,Y,C)IDH030B22S (H,Y,C)IDH036B22S (H,Y,C)IDH048B22S (H,Y,C)IDH054B22S
Ducted (Medium Static)	(H,Y,C)IDM006B22S (H,Y,C)IDM008B22S (H,Y,C)IDM012B22S (H,Y,C)IDM015B22S (H,Y,C)IDM018B22S (H,Y,C)IDM024B22S (H,Y,C)IDM027B22S (H,Y,C)IDM030B22S (H,Y,C)IDM036B22S (H,Y,C)IDM048B22S (H,Y,C)IDM054B22S

IMPORTANT:

READ AND UNDERSTAND THIS MANUAL BEFORE INSTALLING THIS HEAT PUMP AIR CONDITIONER. KEEP THIS MANUAL FOR FUTURE REFERENCE.

P5417013

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 heat pump 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 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..
- If you have questions, please contact your distributor or dealer.
- This manual provides common descriptions, basic and advanced information to maintain and service this heat pump air conditioning unit which you operate as well for other models.
- This heat pump air conditioning unit has been designed for a specific temperature range. For optimum performance and long life, operate this unit within the range limits according to the table below.

Temperature

		Maximum	Minimum
Cooling Operation	Indoor	89°F DB/73°F WB (32°C DB/23°C WB)	69°F DB/59°F WB (21°C DB/15°C WB)
	Outdoor	118°F DB (48°C DB) *	14°F DB (-10°C DB) *
Heating Operation	Indoor	80°F DB (27°C DB)	59°F DB (15°C DB)
	Outdoor	59°F WB (15°C WB) *	-4°F WB (-20°C WB) *

DB: Dry Bulb, WB: Wet Bulb

* The temperature may change depending on the outdoor unit.

- 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 is 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

Read following sections carefully before installing this product.

Read over the "Installation and Maintenance Manual" for the outdoor unit as well.

Forward this information and the warranty to all installers and users.
Ask end users to maintain copies for future reference.
(Refrigerant Piping Work) → (Electrical Wiring Work) → (Ref. Charge Work) → (Test Run) → (User)

- For details on wiring between the indoor unit and the outdoor unit, refer to the "Installation and Maintenance Manual" for the outdoor unit.
- For details on the optional controller, refer to the "Installation and Maintenance Manual" for that optional controller module.
- For details on each optional part, refer to the "Installation and Maintenance Manual" for each optional part.
- For central controller, refer to the "Installation and Maintenance Manual" for the central controller.

2. Safety Instructions

Signal Words	
⚠ WARNING	Indicates a hazardous situation that, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates information considered important, but not hazard-related (for example, messages relating to property damage).

General Precautions

⚠ WARNING	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 heat shields, fire blankets, 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.
- Before servicing, turn-OFF the power supply and use accepted lockout and tag out procedures at all main switches.
- This unit is pressurized. Never loosen threaded joints while the system is under pressure and never open pressurized system parts.
- Johnson Controls 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 drainage moisture 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. (3m) away from such devices.
- When a wireless controller is used, locate at a distance of at least 3.3 ft. (1m) 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 adapter. If you do, you may have condensate flowing back which may cause leaks.
- Be sure the condensate hose discharges water properly. If connected incorrectly, it may cause leaks.
- If the wired controller is installed in a location where electromagnetic radiation is generated, make sure that the wired controller is shielded and cables are sleeved inside conduit tubing.
- If there is a source of electrical interference near the power source, install noise suppression equipment (filter).
- 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 wind baffle.
  - A snowy area: Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow protection hood.
- 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 a fire, oil, steam or powder can directly enter the unit, such as nearby or 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 a 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 install a motion sensor in the following places. It may cause failure or deterioration of the sensor.
  - Ambient temperature changes drastically.
  - Where excessive force or vibration is applied to the sensor.
  - Where static electricity or electromagnetic waves may generate.
  - Where interference of infrared light such as gases or mist is in the detecting area.
  - Where the lens for sensor is exposed in high temperature and humidity for a long time.
  - Where fluid and corrosive gas exist.
  - Where light such as sunlight or direct light affect the sensor.
  - Where hot air from a heater or something similar directly affects the sensor.
  - Where weather directly affects the surface of the sensor.
  - Where the lens surface may smudge or be damaged from something like a dusty environment.

    Detecting function will decrease if the lens of the sensor has smudges.
    In this case, wipe off smudges using a cotton swab soaked with alcohol or a soft cloth. Isopropyl alcohol is recommended. (When wiping off smudges on the lens sensor, do not apply excessive force. If excessive force is applied, the resin lens may be damaged and this may cause malfunctions such as misdetection or undetectable motion.)
- 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 the condensate pipe becomes clogged, water may drip from the indoor unit. Do not install the indoor unit where such dripping can cause moisture damage. 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 test run 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.

After installation work for the system has been completed, explain the “Safety Precautions,” the proper use and maintenance of this 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

⚠ WARNING	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. The installation should meet the requirements in ASHRAE Standards 15 and 34. If refrigerant gas has leaked during the installation work, ventilate the room immediately.
- Check the design pressure for this product is 601 psi (4.15Pa). The pressure of the refrigerant R410A is 1.4times 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 excessive refrigerant pressure. 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 introduced into the cycle may damage the expansion valve and may cause equipment damage or failure.
- 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 following tools listed in Section 3 before performing the installation work. Use refrigerant pipes and joints which are approved for use with R410A.
- 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, air is sucked in and 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.
- A compressor/unit comprises a pressurized system. Never loosen threaded joints while the system is under pressure and never open pressurized system parts.
- When maintaining, relocating, and disposing of the unit, dismantle the refrigerant piping after the compressor stops.

Electrical Precautions

⚠ WARNING	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 installation and maintenance manual and all relevant regulatory standards.
- Do not open the service cover or access panel to indoor or outdoor units without turning OFF the main power supply. Before servicing, open and tag all disconnect switches. Never assume electrical power is disconnected. Check with a meter and equipment.
- Only use electrical protection equipment and tools suited for this installation.
- Use specified cables between units.
- Do not run the connector cable for the motion sensor and power supply wiring in parallel. Electromagnetic Interference (EMI) may cause malfunction of the sensor.
- Communication cable shall be a minimum of AWG18 (0.82mm^2), 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 cable 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. If a circuit breaker is tripped or fuse is blown, shut down the system and contact your service contractor.
- The polarity of the input terminal is important, so be sure to match the polarity when using contacts that have polarity.
- Before installing the controller or remote devices, ensure the indoor and outdoor unit has stopped. Further, be sure to wait at least five minutes before turning OFF the main power switch to the indoor or outdoor units. Otherwise, water leakage or electrical breakdown may result.
- Clamp electrical wires securely with a cable band 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 supply 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.
- Disconnect the power supply completely before attempting any maintenance for electrical parts. Check to ensure that no residual voltage is present after disconnecting the power supply.
- 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 wiring is securely connected. Do not connect ground wiring to gas piping, water piping, lightning conductor, or telephone ground wiring.
- 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 appropriately-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.

⚠CAUTION

Proper handling of this unit requires two-people. Safe handling and installing the indoor unit requires the strength of two people. Mounting the unit alone may cause injury due to fall of the unit. Although the unit may be girded with steel banding, do not use it for transportation. Avoid contact with finned surfaces of the heat exchanger as sharp edges can cause severe injury to hands and fingers. Use appropriate work gloves for the job.

NOTICE

- Check to ensure that the condensate hose discharges moisture properly. If connected incorrectly, it can result in leakage and damage to furniture.
- Make sure to use the factory-supplied condensate hose and hose clamp. Other makes can cause moisture leakage.
- Do not bend or twist the factory-supplied condensate hose. This could compromise the seal and result in moisture leakage.
- Do not apply an excessive force to the condensate pipe connection. This can also compromise the seal properties of the connection.
- Verify that the installed unit is level with floor and ceiling surfaces. Any variance or inclination can cause moisture to back up into the condensate pan, overflow, and leak onto ceiling or wall surfaces, causing damage to carpeted surfaces or furniture below.
- Do not install this system in close proximity to septic sewer lines where flammable and toxic gases can accumulate.
- Inspect the condensate pan before the onset of winter to drain away all accumulated moisture in the pan.
- The heat exchanger of indoor unit produces heat whenever there is a slight amount of refrigerant circulating during slowdown or stoppage. As a result, any moisture in the condensate pan evaporates where it can condense on ceiling or wall surfaces.
- After the drain check is completed, insert the rubber plug again and seal the gap with a silicon sealant.

Electrical Installation

⚠WARNING

In some cases, the packaged air conditioner may not be operated normally under the following cases:

- When electrical power for the packaged air conditioner is supplied from the same power transformer as the external equipment.
- When the power supply wiring for the external equipment and the packaged air conditioner are located close to each other.

Regarding that mentioned above, surge voltage may be inducted into the power supply wiring for the crated air conditioner due to a spike in power consumption for this device and an activation of the switch. Check the field regulations and standards before performing any electrical work in order to safeguard the power supply for the crated air conditioner unit.

3. Before Installation

3.1 Combination of Outdoor Unit and Indoor Unit

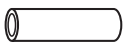
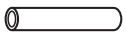
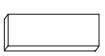
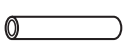
The combination capacity of indoor unit against the outdoor unit is selected depending on the outdoor unit capacity. Refer to the "Installation and Maintenance Manual" for the outdoor unit to decide the required combination of indoor and outdoor units, and the combination unit capacity.

3.2 Transportation and Handling

- Transport the product as close to the installation location as possible before unpacking.
- Do not lay any objects on the indoor unit.
- The indoor unit comes crated upside-down with the foam polystyrene condensate pan positioned on top. Do not invert the unit until it is ready to be suspended above the floor. Inverting the unit while on the floor will crush the condensate pan. Do not handle the unit by grabbing at the polystyrene pan and other air outlets as they are fragile and will sustain damage.
- The indoor unit handle is fabricated from foam polystyrene and is susceptible to breakage if any excessive force is applied as a result of mishandling of the unit during installation.

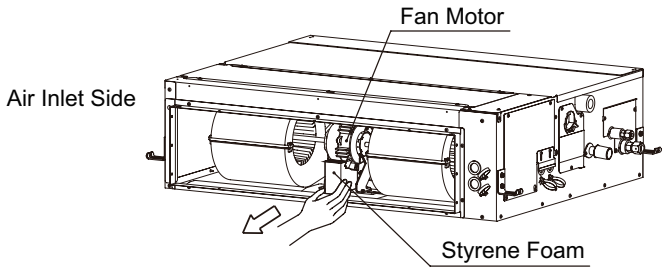
3.3 Factory-Supplied Accessories

Check to ensure that the following accessories are packed with the indoor unit.
The screws, washers, and flare nuts are packed in the pipe insulation.

Accessory	Qty.	Purpose
Washer with Insulation Material (M10) 	4	For Unit Installation
Washer (M10) 	4	
Truss Head Screw (M4) 	18	For Securing Flange
Condensate Hose 	1	For Condensate Piping Connection
Hose Clamp 	1	For Condensate Hose Connection
Insulation 3/16T x 10-5/8 x 10-5/8 (5T x 270 x 270) 	1	For Insulating Condensate Piping
Pipe Insulation 	1	For Insulating Refrigerant Piping
Pipe Insulation 	1	
Cable Band 	6	For Securing Refrigerant Piping Insulation
Cable Band 	2	For Securing Wired Controller Cable
Insulation 3/16T x 1-15/16 x 7-7/8 (5T x 50 x 200) 	1	For Covering Wiring Connection
PVC Tube 7/16ID (11ID) 	2	For Separating Communication Cables and Wired Controller Cables from Power Supply Wiring
Cable Band 	5	

NOTICE

- The controller and branch piping are optional accessories which are not included with the indoor unit. If necessary, please contact your distributor or contractor.
- Styrene foam is attached to the base of fan motor as a cushion material during transport. Make sure to remove it before installation. (It can be removed by grabbing hand from the air inlet side.) Below figure illustrate the indoor unit in the package, upside-down with the foam polystyrene condensate pan positioned on top.



3.4 Necessary Tools and Instrument List for Installation

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

NOTE:
Use tools and measuring instruments (vacuum pump, gas hose, charging cylinder, manifold gauge) exclusively for refrigerant R410A.

4. Installation Location

⚠WARNING

- **Make sure to use the factory-supplied condensate hose and hose clamp. Other makes can cause moisture leakage.**
- **Do not install the unit where flammable gas may exists. Doing so can result in fire.**
- **The refrigerant used in this unit normally does not leak. 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.**

(1) Check that the ceiling is strong enough to install the indoor unit. If not, it may cause noise and vibration.

(2) Install the indoor unit with sufficient space around it for operation and maintenance access as shown in Figure 4.1. Install the indoor unit with respect to the space allowing for refrigerant piping, condensate piping and maintenance. Do not leave combustible materials in the service spaces of the indoor unit. Be sure to prepare the access door.

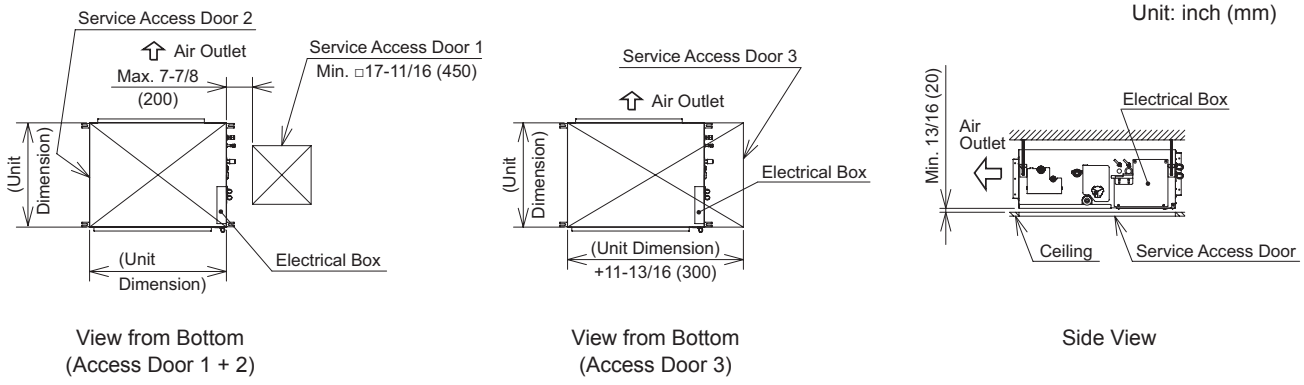
(3) Check if there is sufficient space for condensate piping slope for drainage. Consider the location where the condensate piping gradient can be 1/25 to 1/100. Install the indoor unit at least 8.2ft (2.5m) above the floor.

(4) In the event that temperature and humidity levels inside the ceiling exceed 86˚F (30˚C)/RH, relative humidity 80%, apply additional insulation materials to the external surface of the indoor unit to avoid condensation.

Service Space

NOTICE:
In case of installing optional filter box, please refer to the dimensional drawing for the service space. Prepare one of the following access door(s) under the indoor unit. "Access Door 1 + Access Door 2" or "Access Door 3".

Unit: inch (mm)



View from Bottom (Access Door 1 + 2)

View from Bottom (Access Door 3)

Side View

Figure 4.1 Service Space

> In case that the ceiling board can not be detached for servicing, prepare a service access door below the indoor unit for removal of the indoor unit.

(5) When installing the indoor unit to intake the air from the bottom side, more than 11-13/16 inches (300mm) space is required under the indoor unit.

(6) Check if the installation place is stable for refrigerant piping and electrical wiring connection.

(7) Do not install the indoor unit near a kitchen or anyplace where humidity is high. Condensation may occur during cooling operation. In this case attach additional insulation or other measures.

(8) Do not install the indoor unit to the atmosphere where filled with organic solvent (paint thinner or benzene) as such as painting factory or dry cleaning factory. Synthetic resin components may be dissolved.

(9) Do not install the indoor unit in a place where flammable gas may be generated and be retained.

(10) To avoid vibration transmission from duct to the ceiling, be sure to attach canvas duct for the duct connection.

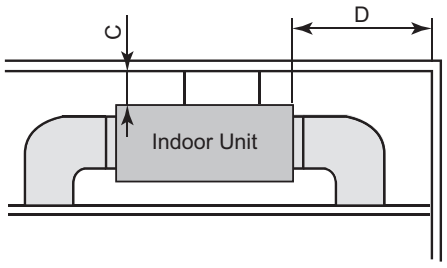
(11) To avoid any corrosive action to the heat exchangers, do not install the indoor unit in an acid or alkaline environment.

(12) The unit is not equipped with an air filter. Be sure to attach air filter (field-supplied) to the air inlet inside at the time of duct installation work.

(13) Attach additional insulation to the outer surface or install secondary condensate pan to the bottom of the unit if installing the unit in an area with high humidity.

(14) Do not install the indoor unit where airflow from the air outlet grille blows directly onto temperature detection devices such as an alarm device or a control device. It can result in false readings and an alarm failure.

(15) Ensure to follow the dimensions are as shown in Figure 4.2 when installing the indoor unit for safety reasons. Material for duct shall be in non-combustible as well.



Unit: inch (cm)

	Material of the Wall, Frame	
	Flammable	Non-flammable
C	Min. 39-3/8 (100)	Min. 3-15/16 (10)
D	Min. 23-5/8 (60)	Min. 1-15/16 (5)

Figure 4.2 Recommended Installation Space

(16) Pay attention to the following points when the indoor unit is installed in a hospital or other facilities where there are electronic waves from medical equipment.

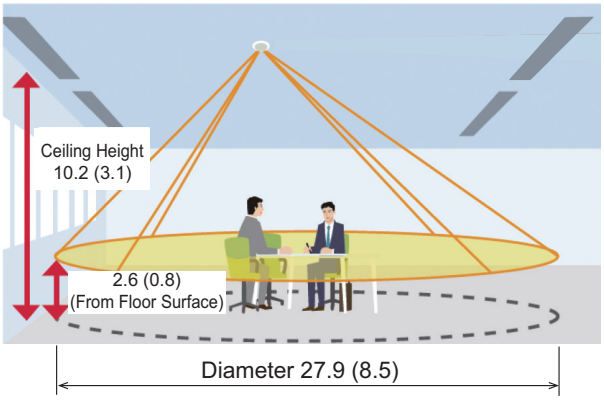
(a) Do not install the indoor unit where the electromagnetic wave is directly radiated to the electrical box, communication cable or wired controller.

(b) Install the indoor unit and components as far away as practical or at least 10ft (3m) from any electromagnetic wave radiator.

(c) Prepare a steel box and install the wired controller in it. Prepare a steel conduit tube and wire the controller cable in it. Then, connect the ground wiring with the box and the tube.

(d) Install a noise filter if the power supply is too noisy.

(17) The detecting area for the motion sensor kit (option) is shown in the figure below.



Unit: ft (m)

Figure 4.3 Detecting Area for Motion Sensor

⚠CAUTION

Install the indoor unit in a compartment handling air for circulation through a duct supplying only one room.

5. Installation Work

5.1 Location of Suspension Bolts

(1) Determine the final location and installation orientation of the indoor unit with respect to the space allowed for piping, wiring, and maintenance access.

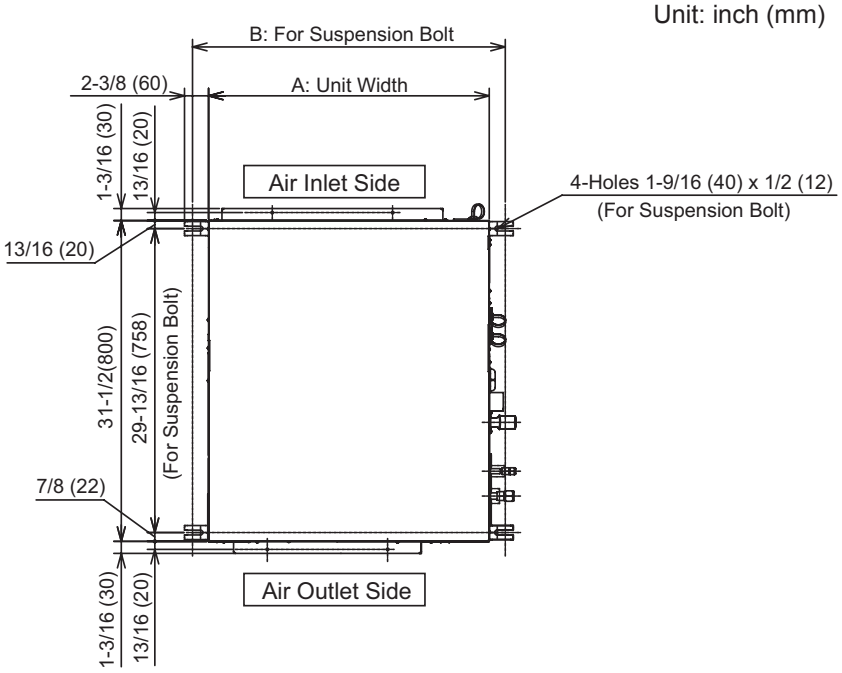
(2) Then cut away the false ceiling area for the indoor unit installation and install suspension bolts. The dimensions for location of suspension bolts are shown in Figure 5.1.

(3) Ceiling work differs depending on the building structure. Consult with a building engineer or an interior finish contractor for more information.

NOTICE:

- Reinforce rib, ceiling joist and ceiling batten of the lower surface of the ceiling to keep the ceiling flat and prevent ceiling panel vibration. Add semi-seismic rubber, if strength of the suspension rib to the upper surface of the ceiling is insufficient.
- Cut and remove the lower surface of the ceiling to access air inlet grille, air outlet grille and for maintenance.
- Reinforce the edge of the cut ceiling and add brackets to the edge of the ceiling panel.
- Do not install electric lighting in too close proximity to the unit as unit operation can cause the lights to flicker.

Unit: inch (mm)



Model \ Dimension		A	B
High Static Type	Medium Static Type		
(H,Y,C)IDH015B22S	(H,Y,C)IDM006B22S (H,Y,C)IDM008B22S (H,Y,C)IDM012B22S (H,Y,C)IDM015B22S	27-9/16 (700)	30-11/16 (780)
(H,Y,C)IDH018B22S (H,Y,C)IDH024B22S (H,Y,C)IDH027B22S	(H,Y,C)IDM018B22S (H,Y,C)IDM024B22S (H,Y,C)IDM027B22S	41-5/16 (1,050)	44-1/2 (1,130)
(H,Y,C)IDH030B22S (H,Y,C)IDH036B22S (H,Y,C)IDH048B22S (H,Y,C)IDH054B22S	(H,Y,C)IDM030B22S (H,Y,C)IDM036B22S (H,Y,C)IDM048B22S (H,Y,C)IDM054B22S	55-1/8 (1,400)	58-1/4 (1,480)

Figure 5.1 Suspension Bolts

5.2 Installing Suspension Bolts

(1) Reinforce the designated opening in the false ceiling area. Use approved materials of sufficient tensile strength to allow for quality installation.

(2) Strengthen suspension bolts with support plates as required in earthquake areas. Use field-supplied M10 suspension bolts and support plates.

NOTICE:

Install the indoor unit to the tie beam (for single-storied building) or to the second floor girder (for two-storied building), and use sufficiently strong squared timber as shown in Figure 5.2.

Unit: inch (mm)

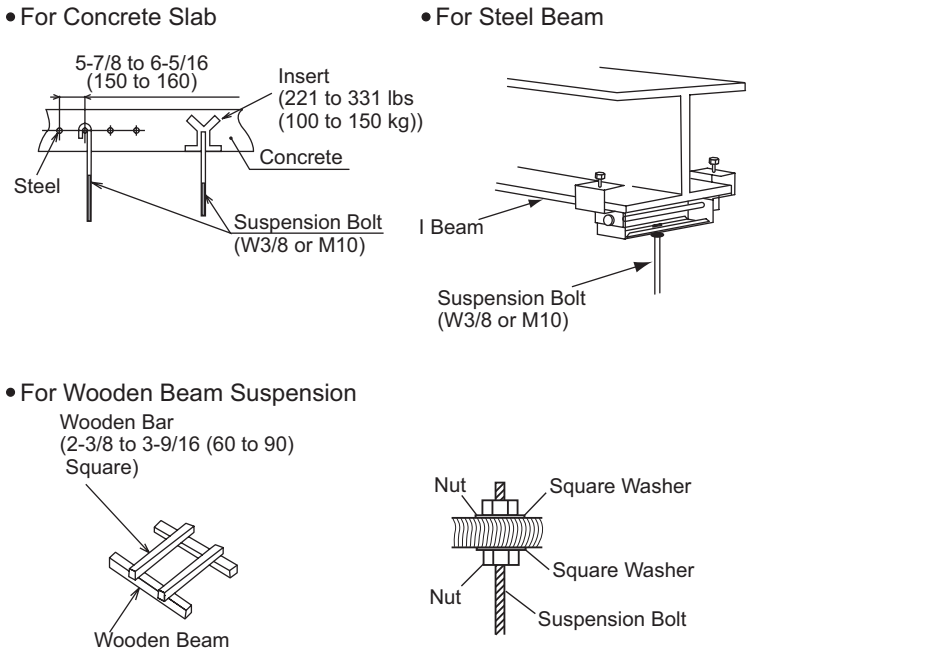
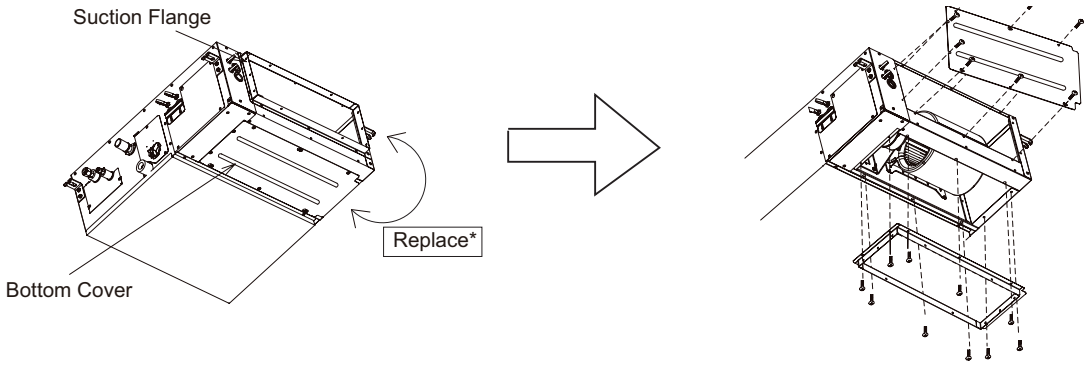


Figure. 5.2 Mounting of Suspension Bolts

5.3 Intaking Air from Bottom Side



* If the unit is intaking air from the bottom side, replace the suction flange and the bottom cover.

Figure 5.3 Intaking Air from Bottom Side

5.4 Working Procedure

⚠CAUTION

- Air filter is not installed in the unit. Be sure to install air filter. Otherwise, it may cause heat exchanger clog and condensate leakage.

(1) Mounting Nuts and Washers

Place nuts and washers onto the suspension bolts before installing the indoor unit.

NOTICE:

* Make sure to use washers (accessories) for installing the suspension bolts to the suspension brackets.
Install the washer with the insulation side facing down for suspended installation applications. This way, the washers themselves remain in position on the suspension bolts during the installation phase.

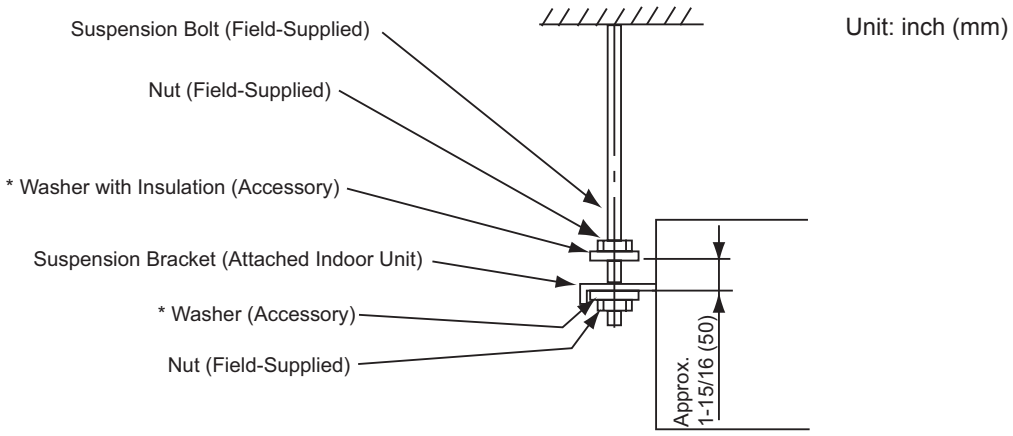


Figure 5.4 Suspension Bolts and Nuts

(2) Mounting the Indoor Unit

- Suspend the unit by placing your hands below the suspension brackets on each corner of the unit.
- Insert the suspension bolts into the notches of the suspension brackets to capture the unit. Secure the unit using nuts and washers. Then check that the washers serve as stoppers at the rising parts of the suspension brackets.

NOTICE:

After securing the unit, piping and electric power needs to be installed inside the ceiling area adjacent to the unit. If a false ceiling is already in place, determine the proper pathway for piping and electrical lines before the unit is installed. While adjusting the clearance spacing between the indoor unit and the ceiling surface, keep the indoor unit level. Otherwise, it may cause a malfunction of the float switch. Also, a unit that is not level will not drain or pump correctly. (Refer to the Figure below for checking the vertical alignment.)

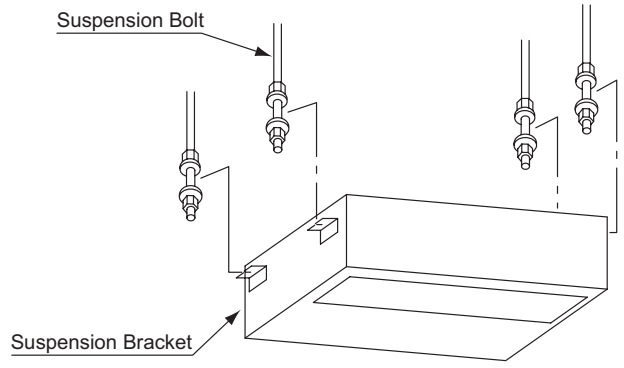


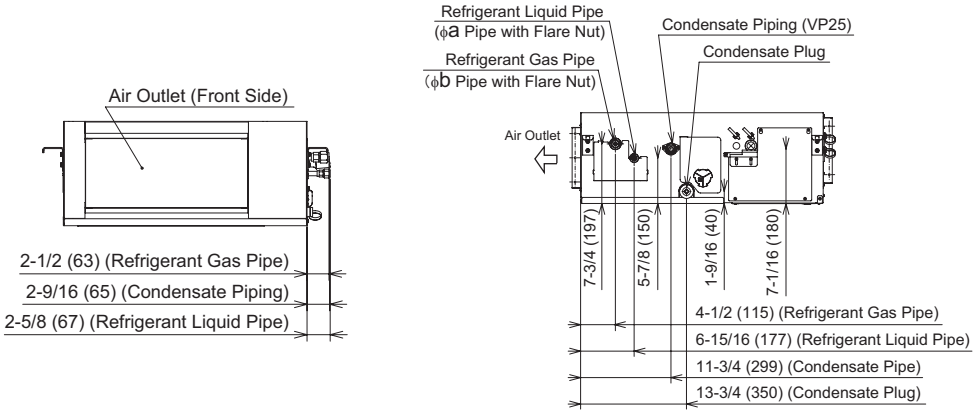
Figure 5.5 Suspended Indoor Unit

NOTICE:

The duct flanges on the air outlet side and air inlet side of the unit are temporary attached at the time of shipping. If the optional filter box will not be installed, secure them firmly with the screws (accessory).

● Connecting position of the indoor unit and piping are as shown in the figure below.

Unit: inch (mm)



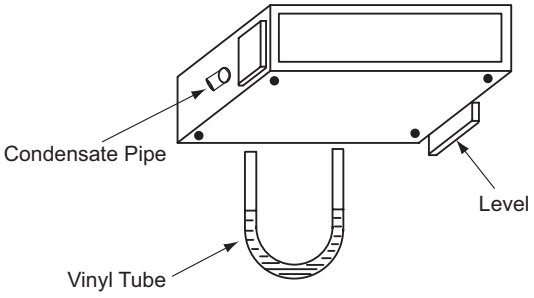
Model \ Dimension		a	b
High Static Type	(H,Y,C)IDH015B22S	1/4 (6.35)	1/2 (12.7)
	(H,Y,C)IDH018B22S (H,Y,C)IDH024B22S (H,Y,C)IDH027B22S (H,Y,C)IDH030B22S (H,Y,C)IDH036B22S (H,Y,C)IDH048B22S (H,Y,C)IDH054B22S	3/8 (9.53)	5/8 (15.88)
Medium Static Type	(H,Y,C)IDM006B22S (H,Y,C)IDM008B22S (H,Y,C)IDM012B22S (H,Y,C)IDM015B22S	1/4 (6.35)	1/2 (12.7)
	(H,Y,C)IDM018B22S (H,Y,C)IDM024B22S (H,Y,C)IDM027B22S (H,Y,C)IDM030B22S (H,Y,C)IDM036B22S (H,Y,C)IDM048B22S (H,Y,C)IDM054B22S	3/8 (9.53)	5/8 (15.88)

Figure 5.6 Position of Piping Connection

(3) Tighten the nuts on the suspension brackets after adjustments are completed. Apply LockTite thread lock compound to the suspension bolts and nuts in order to prevent them from loosening.

NOTICE:

While adjusting the clearance spacing between the indoor unit and the ceiling surface, keep the indoor unit level. Otherwise, it may cause a malfunction of the float switch. Check the vertical alignment of the unit with a level.

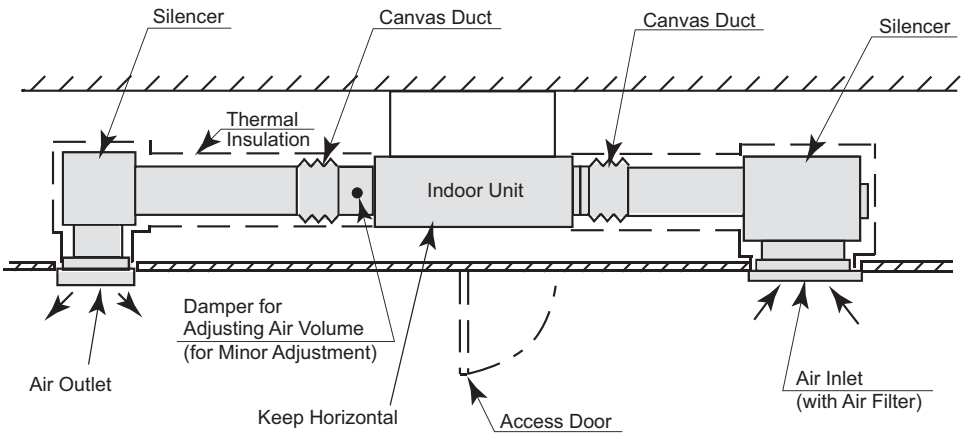


The unit should be installed so the condensate piping side of the unit is pitched slightly (1/8 to 3/16 inch (3 to 5mm))lower than the other side. Check the vertical alignment at each corner (●) of the unit by pouring water to the clear vinyl tube as shown in the figure.

Figure 5.7 Checking Vertical Alignment

(4) Connecting Return Duct and Supply Duct

- Air filter is not attached to the indoor unit. Attach the air filter which is easy to clean to the air inlet grille.
- Supply duct should be connected with the indoor unit through canvas duct in order to minimize abnormal sound vibration transmitted to the ceiling and slab.
- Attach the vibration proof rubber piece or vibration proof hanger to suspension bolt in order to minimize abnormal sound vibration transmitted to the ceiling and slab.
- Operating frequency of each indoor unit is shown in Figure 5.8.
- To avoid drift of the air inlet side air velocity distribution, install the unit to have uniform air velocity distribution by connecting circular duct to the inlet side chamber.
- Be sure to prepare access door on the ceiling for electric box or motor maintenance.
- Duct material should be a non-flammable material type.
- Add additional insulation to sheet metal ducting when the humidity is high inside the ceiling.



Unit: Hz

MBH	Operating Frequency	
	High Static Type	Medium Static Type
06 - 15	9 -29	9 - 28
18 - 27	8 - 28	10 - 27
30 - 54	8 - 28	10 - 28

Figure 5.8 Duct Connection Example

⚠CAUTION

- **If a lower sound level is further required, install the additional field-supplied silencer.**
- **Design duct arrangement as "Unit External Static Pressure = Pressure Drop of Duct + Pressure Drop of Air Outlet and Air Inlet".**
  Poorly designed duct will result in sound, comfort and water blow-off issues.

Notice for Outdoor Air Intake (Fresh Air)

This air conditioner unit is NOT designed for outdoor use.
The following items are to be strictly observed when designing a system for fresh air intake from the outdoors.

1) Considering Ventilation Load

Calculate the air-conditioning load properly with the load of the outdoor air intake. If the load of the outdoor air is not considered, it may cause insufficient cooling or heating operation due to an excessive air-conditioning load against the unit capacity.

2) Limits on Outdoor Air Intake

- Do NOT apply air from the outdoors directly into the indoor unit.
  If an outdoor fresh air intake is necessary for air-conditioning, Johnson Controls Inc. recommends the installation of the ERV (Energy Recovery Ventilation) (Field-supplied) system.
  The outdoor air shall be processed by the ERV and mixed with indoor air.
  Only then, can the outside air be introduced into the indoor unit.

  NOTICE:
  The temperature of the air that is intermixed should fall within the working range as shown below.

	Heating	Cooling
Working Range of Required Indoor Room Temperature	59 to 80°F DB (15 to 27°C DB)	69°F DB/59°F WB (21°C DB/15°C WB) to 89°F DB/73°F WB (32°C DB/23°C WB)

- If the ERV is not used for processing the outdoor air, it can result in insufficient heating/cooling operation or condensation build-up on the inside surfaces of the indoor unit or duct depending on the outdoor air conditions.
- The volume of fresh air is recommended to be within 20% of the airflow volume “Hi2” according to the specification’s table in the technical documentation. If it exceeds 20%, additional condensation may build-up on the inside surfaces of the indoor unit and the airflow volume of the indoor unit cannot be adjusted due to increasing pressure loss of air intake caused by insufficient internal static pressure.
- When outdoor air is introduced into the indoor unit, make sure to install an air filter capable of keeping the indoor unit free from dust.

3) Facilities for Outdoor Air Intake

- Use a damper or the duct fan at the outside air ductwork to adjust fresh air volume.
- Do NOT ingest in fresh air from the outdoors directly into the indoor unit.
  Installing and integrating an ERV as a part of the system is recommended if incoming air from outdoors is routinely drawn indoors.
- When using an ERV or installing a duct fan, make sure to install the interlock circuit between them and the indoor unit. Make sure to install an ERV in accordance with this manual.
- Install thermal insulation on surfaces of interconnecting ducts to prevent the build-up of condensation.

⚠CAUTION

- **Select the appropriate silencer according to the operation sound to the room installing the unit.**
- **If a lower sound level is further required, install additional field-supplied silencer.**
- **The facility design should be "Unit External Static Pressure = Duct Pressure Loss + Suction / Discharge Pressure Loss".**
  If duct pressure loss falls below the external static pressure, airspeed will increase and noise levels along with it. Also, water may splash out from unit and the motor protection circuit will activate. Problems such as the inability to adjust airspeed can occur if the external unit static pressure falls below the duct pressure loss. Adjust the airflow control damper or shift the static pressure control switch to an equal level between the external static pressure and duct pressure loss (Refer to "Setting the External Pressure" section for the details).
- **Basically, this unit is configured to install the ducts on the inlet side and the outlet side. Ask for more information on using return ducts in the ceiling.**

Unit: inch (mm)

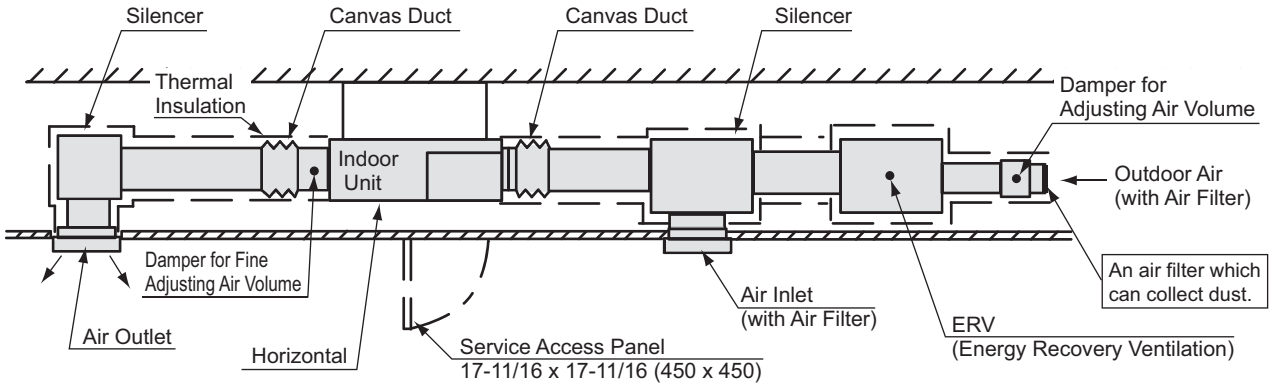


Figure 5.9 Duct Connection Example

5.5 Installation of Optional Parts or Field-Supplied Parts

(1) Refer to the manual for each parts for the installation of air intake panel, canvas duct, air outlet duct, flexible duct, motion sensor.

NOTICE:

1. Install flexible duct to all air outlets without bending so that airflow is not restricted. Restricting air outlets or bent flexible duct may cause operational failure or stoppage, sweating and dripping.
2. Perform the insulation work (non-combustible material, more than 13/16 inch (20mm) thickness) after completely attaching the flexible duct connection without gap. This will prevent air leakage, sweating and dripping.

After the pipe is connected, pour some water into the pan to check pump or drain operation. Once pump or drain are confirmed to be working, the plenum or ductwork can be connected. At least one air outlet shall be open until the condensate piping is completed.

(2) Unit external static pressure can be adjusted on this unit to compensate for ductwork. Refer to "External Static Pressure Setting" section for more details.

5.6 Wired Controller Settings

Refer to the installation manual for the wired controller for the installation.

5.7 Installation of Auxiliary Heater (Field-Supplied)

⚠WARNING

- **When the auxiliary heater shall be installed and connected, make selection by following local codes, regulations and approved by UL1996, and refer to this manual. Improper installation may result in fire from overheating.**
- **When the auxiliary heater shall be installed and connected, do not install in places where heater can come into contact with combustible materials. Otherwise, fire may result.**
- **Provide adequate clearance spacing between the auxiliary heater and indoor unit.**
  Refer to the auxiliary heater manual for details.
  Otherwise, fire may result from over heating the indoor unit.
- **Do not attach the auxiliary heater directly to the indoor unit.**
  Otherwise, fire may result from combustible materials inside the indoor unit.
- **Route the auxiliary heater wiring so that it can not come into contact with any part of the heater. Otherwise, fire may result.**
- **When the auxiliary heater shall be installed and connected, duct material should be a sheet metal or non-flammable material. Otherwise, fire may result.**
- **Fire may result from debris and dust inside the duct. Indoor unit must be cleaned on a regular basis by following the Service Manual. Also auxiliary heater and duct must be cleaned on a regular basis by following their manuals.**
- **Auxiliary heater must be properly selected so that double overheating safety protection devices (Thermal Protector and Thermal Fuse) are built-in. Otherwise, fire may result from over heating of heater when the components such as relays fails.**

5.7.1 Selection of Auxiliary Heater

Auxiliary heater for connection can only be duct heater type.

When using the auxiliary heater, auxiliary heater capacity must be properly selected. Otherwise, fire may result from abnormal heating of heater. Select the allowable auxiliary heater capacity by following the procedure below.

(1) Confirmation of Actual Airflow Volume

Indoor unit is restricted to the following fan speeds during the auxiliary heater ON and does not correspond to the wired controller setting.

Wired Controller Setting	Fan Speed
Low	High
Medium	High
High	High
High2	High2

Confirm the actual airflow volume of the switched fan speed from the fan performance curves in Section 10.

Be sure to design the duct arrangement so that the actual airflow volume does not exceed the upper limit.
If the actual airflow volume exceeds the upper limit, unwanted noise may occur.

(2) Auxiliary Heater Capacity Selection

Select auxiliary heater capacity with minimum airflow volume requirement smaller than actual airflow volume of indoor unit confirmed in step (1). When the minimum airflow volume requirement for the auxiliary heater is greater than actual airflow volume of indoor unit confirmed in step (1) then failure of indoor unit or fire may result from over heating of heater.

Depending on the temperature setting of the wired controller the maximum air outlet temperature of indoor unit becomes approximately 122°F (50°C) and may exceed the maximum air inlet temperature requirements for the auxiliary heater.

Usage conditions such as minimum airflow volume, temperature range (maximum air inlet temperature) for the auxiliary heater differs by heater manufacturer.
Be sure to follow the usage conditions when selecting the auxiliary heater capacity from the heater manufacturer.

Maximum allowable heater capacity is different depending on indoor unit model.

If cold draft is a problem then select a larger heater capacity within the allowable capacity range.
If cold draft during defrost is a problem then change the optional function L9 to "01" to turn off both heater and fan operation during defrost.

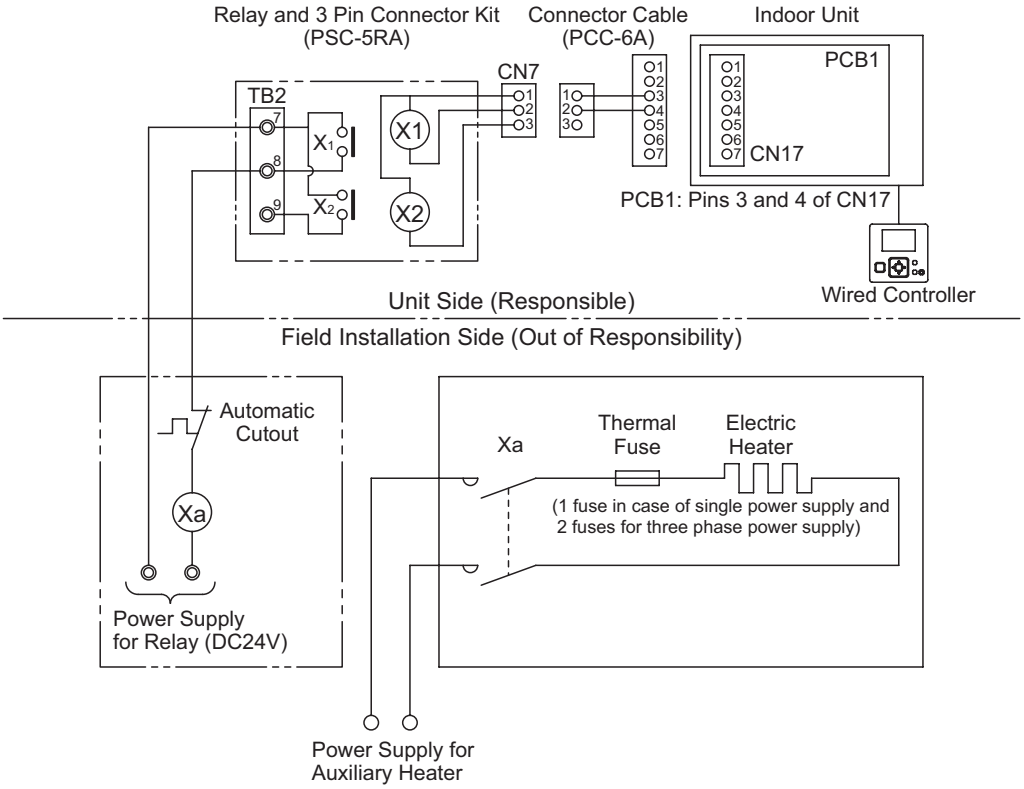
NOTICE

Depending on the Function Setting the heater and fan is turned off for approximately three minutes at defrost recovery.

5.7.2 Auxiliary Heater Connection

When the auxiliary heater shall be used, wire the circuit as shown below.

Example of Electrical Wiring



⚠ WARNING

When PSC-5RA (optional part, required) is used for connection between the auxiliary heater and indoor unit DO NOT connect connector (CN7) to indoor unit PCB. **Otherwise, fire may result.** Use connector cable (optional part, required)) between the connector (CN7) of PSC-5RA and indoor unit PCB connector (CN17). Connector (CN3) can be used for input integration functionality. Use another PSC-5RA for output integration functionality.

5.7.3 Setting for Auxiliary Heater

Auxiliary heater setting is disabled by default.
Refer to "Function Selection by Wired Controller" section for details.

6. Refrigerant Piping Work

⚠ DANGER

Use the specified non-flammable refrigerant (HFC R410A) for the outdoor unit refrigerant cycle. Do not charge the unit with anything other than HFC R410A, such as hydrocarbon refrigerants (propane and Isobutene), oxygen, and other flammable gases (acetylene, ammonia, and so forth), or any poisonous gases when installing, maintaining and moving the unit. These substances are volatile and dangerous and can result in fire, explosion, and serious or fatal injuries.

For details on refrigerant piping work, vacuum pump, and refrigerant charge, refer to the "Installation and Maintenance Manual" for the outdoor unit. Also, refer to the nameplate and caution plate attached on the outdoor unit for the refrigerant charge varieties.

6.1 Piping Materials

(1) Tolerances for refrigerant piping lengths depend on the combination with the outdoor unit. Refer to the “Installation and Maintenance Manual” for the outdoor unit for details.

(2) Select the piping size from the following table.

Table 6.1 Piping Size

inch (mm)

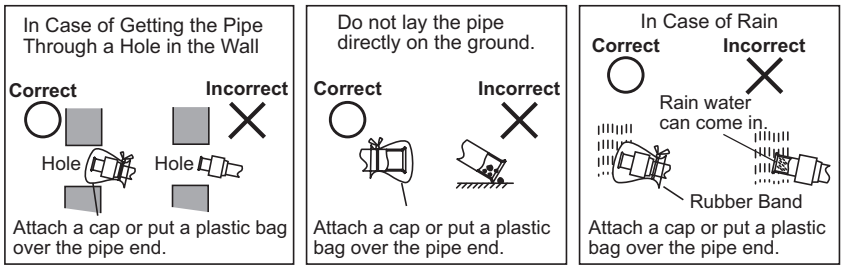
Model		Gas Piping	Liquid Piping
(H,Y,C)IDH015B22S	(H,Y,C)IDM006B22S (H,Y,C)IDM008B22S (H,Y,C)IDM012B22S (H,Y,C)IDM015B22S	1/2 (12.7)	1/4 (6.35)
(H,Y,C)IDH018B22S (H,Y,C)IDH024B22S (H,Y,C)IDH027B22S (H,Y,C)IDH030B22S (H,Y,C)IDH036B22S (H,Y,C)IDH048B22S (H,Y,C)IDH054B22S	(H,Y,C)IDM018B22S (H,Y,C)IDM024B22S (H,Y,C)IDM027B22S (H,Y,C)IDM030B22S (H,Y,C)IDM036B22S (H,Y,C)IDM048B22S (H,Y,C)IDM054B22S	5/8 (15.88)	3/8 (9.52)

(3) Prepare the field-supplied copper piping.

(4) Select clean copper pipes. Make sure there is no dust and moisture inside.

(5) The refrigerant oil used in combination with refrigerant R410A is susceptible to problems relating to moisture contamination, oxide film, oil, and fat. Exercise special care during the installation so that moisture, particulate contamination, or old refrigerant oil will not enter the refrigerant cycle. Otherwise, impurities may adhere to the expansion valve and it may prevent the proper operation.

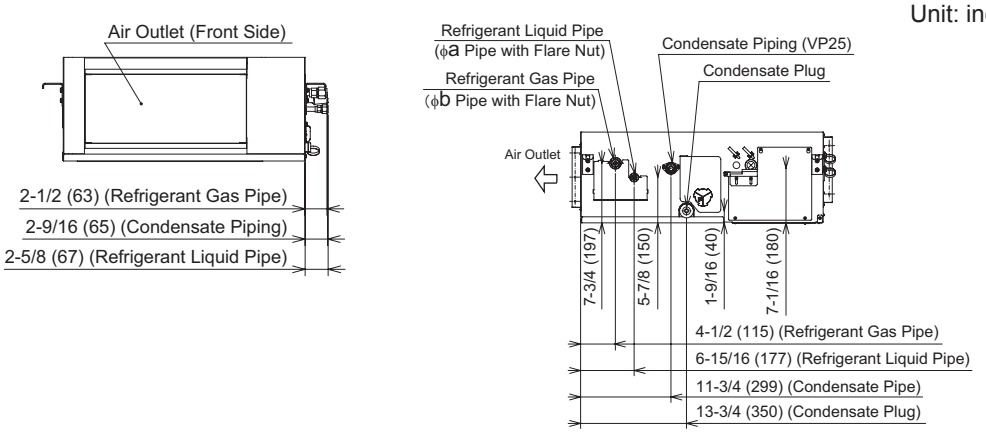
(6) Caution: When cutting piping, do not use conventional tools such as saws and grinding wheel cutting disks produce harmful metallic filings that can damage a refrigerant system. Use a pipe cutter to eliminate the chances of metal filings produced by the cutting operation. After the cut is made, blow out each pipe with dry compressed air or nitrogen to remove this residue before making pipe connections.



6.2 Piping Connection

(1) Position of piping connection is shown below.

Unit: inch (mm)

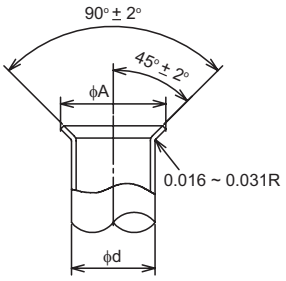


Model \ Dimension		a	b
High Static Type	(H,Y,C)IDH015B22S (H,Y,C)IDH018B22S	1/4 (6.35)	1/2 (12.7)
	(H,Y,C)IDH024B22S (H,Y,C)IDH027B22S (H,Y,C)IDH030B22S (H,Y,C)IDH036B22S (H,Y,C)IDH048B22S (H,Y,C)IDH054B22S	3/8 (9.53)	5/8 (15.88)
Medium Static Type	(H,Y,C)IDM006B22S (H,Y,C)IDM008B22S (H,Y,C)IDM012B22S (H,Y,C)IDM015B22S (H,Y,C)IDM018B22S	1/4 (6.35)	1/2 (12.7)
	(H,Y,C)IDM024B22S (H,Y,C)IDM027B22S (H,Y,C)IDM030B22S (H,Y,C)IDM036B22S (H,Y,C)IDM048B22S (H,Y,C)IDM054B22S	3/8 (9.53)	5/8 (15.88)

Figure 5.6 Position of Piping Connection

(2) Perform the flaring work as shown below.

inch (mm)



Diameter (d)	A +0 -0.02 (-0.4)
1/4 (6.35)	0.36 (9.1)
3/8 (9.52)	0.52 (13.2)
1/2 (12.7)	0.65 (16.6)
5/8 (15.88)	0.78 (19.7)

(3) Use factory-supplied flare nut attached with the unit.

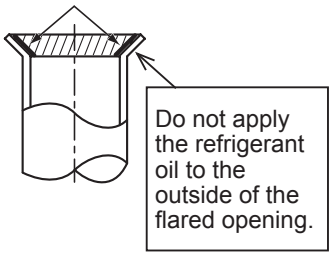
(4) Verify that there are no scratches, burrs stuck to internal surfaces, or surface deformations at the flared opening.

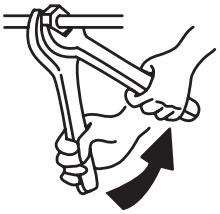
(5) Before tightening the flare nut, apply the (Field-Supplied) refrigerant oil in a thin layer over the flared part. (Do not apply the oil on other areas.) Tighten the flare nut for the liquid pipe to the specified torque with two wrenches. Then, tighten the flare nut for the gas piping in the same way. After the tightening work has been completed, check that no refrigerant leakage occurs.

NOTICE:

1. Refrigerant oil is field-supplied.
   [Polyvinyl Ether Oil FVC68D (Idemitsu Lubricants America)]
2. It may cause cracks on resin parts if refrigeration oil adheres.

Apply Refrigerant Oil.





Required Tightening Torque

Pipe Size	Tightening Torque
1/4 inch (6.35 mm)	10.3 - 13.3 ft·lbs (14 - 18 N·m)
3/8 inch (9.52 mm)	25.1 - 31.0 ft·lbs (34 - 42 N·m)
1/2 inch (12.7 mm)	36.1 - 45.0 ft·lbs (49 - 61 N·m)
5/8 inch (15.88 mm)	50.2 - 60.5 ft·lbs (68 - 82 N·m)

(6) Wherever buried piping exists on site, make sure there is a service doorway to provide adequate access to inspect piping sockets and elbows, and for interconnecting parts.

(7) Piping must be reinforced to withstand earthquakes so as not to be damaged by an external force.

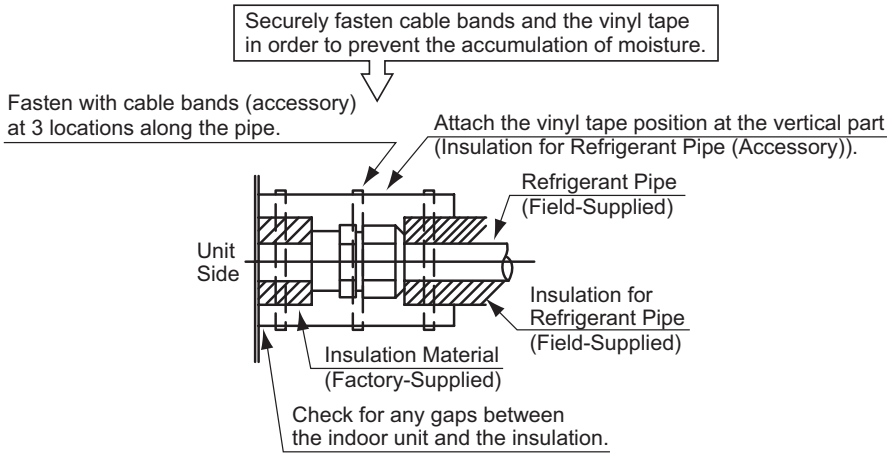
(8) Do not tightly secure refrigerant piping to accommodate expansion and contraction.

(9) Prevent the pipes from touching structures such as walls, ceilings, etc. (Otherwise, abnormal sounds may be heard due to vibration of the piping.)

(10) Leak test all piping and connections. The procedures should be performed in accordance with the "Installation and Maintenance Manual" for the outdoor unit.

(11) If temperature and humidity inside the ceiling exceed 80.6°F (27°C)/RH80%, condensation occurs on the surface of the accessory insulation. Wrap additional insulation (approximately 3/16 to 3/8 inch (5 to 10mm) thickness) around the accessory insulation of the refrigerant pipe as a preventive measure.

(12) Insulate each flare connection without gap with accessory insulations to prevent condensation. Then insulate each refrigerant pipe as well.



⚠ WARNING

- **Do not apply excessive force to the flare nut when tightening. If applied, the flare nut may crack due to stress fracture and refrigerant leakage may occur. Use the correct torque specifications.**
- **Make sure that a refrigerant leak test has been performed. Refrigerant (fluorocarbon) for this unit is non-flammable, non-toxic, and odorless. If the refrigerant should somehow escape and come into contact with flame, toxic gas <u>will</u> form. This gas is heavier than air and will settle near floor areas and spread where it can cause asphyxiation to those nearby.**

7. Condensate Piping

⚠WARNING

Do not run condensate piping into underground areas near sanitary or sewage lines where toxic and corrosive gases can seep into the system. This creates a pathway for the flow of poisonous gas to penetrate inhabited areas.

NOTICE

- Check to ensure that the condensate pipe discharges moisture properly. If connected incorrectly, it can cause structural damage to indoor wall and ceiling surfaces and damage to property.
- Avoid sloping the condensate pipe upward as it will impede drainage. Otherwise, condensate will run back into the unit and it may cause water leakage when the pump operation stops.
- Do not connect condensate piping with sanitary or sewer lines or any other condensate pipe.
- When a main condensate pipe is connected to other indoor units, the connected position of each indoor unit must be higher than the main pipe. The pipe size of the main condensate pipe must be large enough to accommodate all the connected units and their condensation.
- After performing condensate piping work and electrical wiring, check to ensure that water flow is smooth using the following procedures.

Perform condensate piping work and attach the insulation before attempting any refrigerant piping work.

(1) Prepare a polyvinyl chloride (PVC) pipe with 1-1/4 inches (32mm) outer diameter VP25.

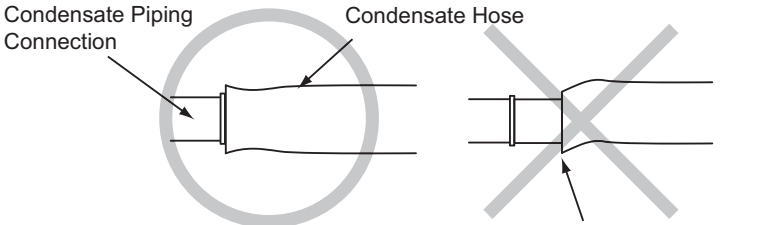
(2) Connecting Condensate Piping

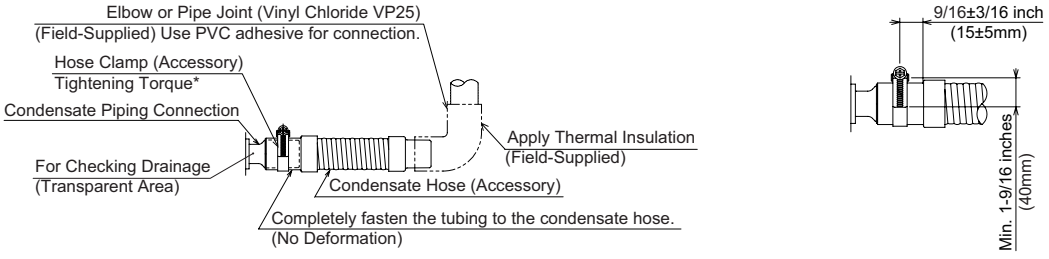
Follow procedures (b) and (c) to install the factory-supplied condensate hose and pipe without adhesive.

(a) Connect the factory-supplied condensate hose at the condensate pipe connection using PVC adhesive.

(b) Insert the condensate hose completely. If it is not inserted properly, or if it is twisted, water leakage can occur.

(c) The hose clamp shall be 9/16 inch (15mm) away from the end face of the condensate hose. Then tighten the hose clamp to make sure that it is approximately 1-9/16 (40mm) in length from the screw to the edge of the hose clamp as shown in the figure below.





*Tightening Torque: 2.2 to 2.6ft·lbs
(3.0 to 3.5N·m)

Figure 7.1 Condensate Hose Connection

(3) For Gravity Condensate Drain
Ask your distributor or dealer.

NOTICE

- **Make sure to use the factory-supplied condensate hose and hose clamp. Other makes are more susceptible to moisture leakage.**
- **Do not bend or twist the factory-supplied condensate hose. Sealing properties of the hose can be compromised.**
- **Do not apply excessive force to condensate pipe connections. They can be easily damaged.**

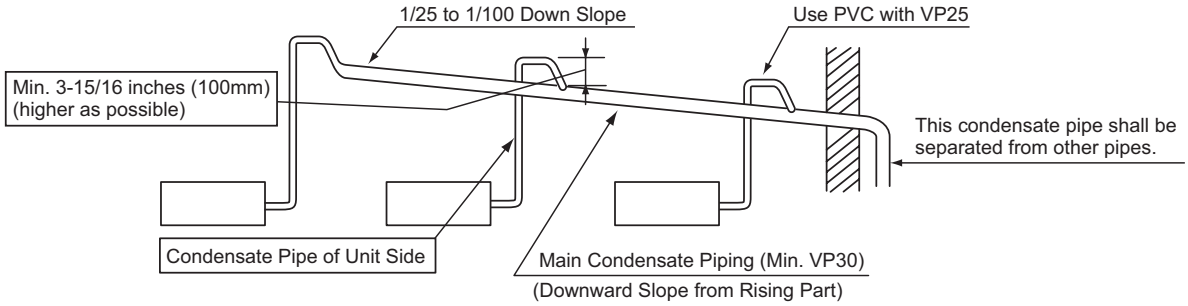
(4) On-site Condensate Piping Work

(a) Connect the factory-supplied condensate hose to the condensate pipe connection using polyvinyl chloride adhesive.

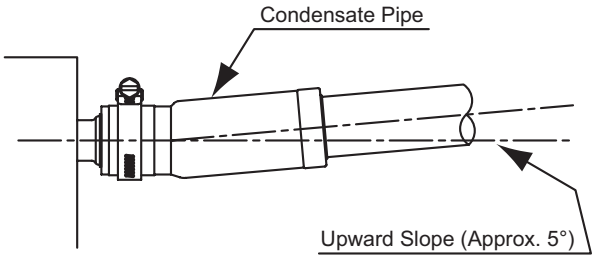
(b) When cleaning the connection surface, applying the adhesive, inserting, retaining and curing the condensate pipe, refer to the information given by the adhesive manufacturer.

(c) Install supports at an interval of 3.3 to 4.9ft (1 to 1.5m) to prevent bending of the condensate pipe.

(d) Install condensate piping with a downward slope of 1/25 to 1/100 as shown below.

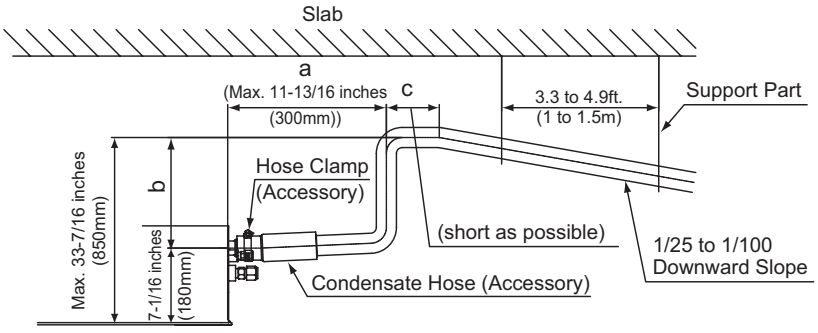


(e) Install the condensate hose horizontally or slightly on an upward slope to prevent air pockets from forming inside it. If air pockets form, moisture will settle back into the unit, which could result in undesired sluicing and bubbling noises, and spillover into the room after unit operation is stopped.



(f) Raising Condensate Piping

In case of raising the condensate pipe, install it according to the dimension shown in the figure below. The total condensate piping length of a+b+c shall be within 39-3/8 inches (1,000mm).



(g) Installing Main Condensate Piping

- Install the main condensate pipe on a downward slope to make sure that it is lower than each rising part of the condensate pipe from the indoor unit.
- The size for the main condensate pipe must be larger than VP30, the nominal diameter size of 1-3/16 inches (30mm) and, outer diameter 1-1/2 inches (38mm) depending on the number of the connected indoor units.

  Refer to the above figure shown in (d).

⚠CAUTION

- **Do not allow condensate pipe to rise or incline upward. Otherwise, the condensate water will flow back into the unit and may cause water leaks when the unit is not in operation.**
- **Do not connect the condensate pipe with sanitary or sewage piping or any other drainage piping since it may cause corrosion of heat exchanger and abnormal smells.**

(5) Drainage and Water Leakage Check

After performing the condensate piping work and electrical wiring work, check to ensure that water flows smoothly according to the following procedures and figure below.

- Drainage Operation by Float Switch

The following are regular procedures to check the float switch operation.

(a) Turn ON the power supply.

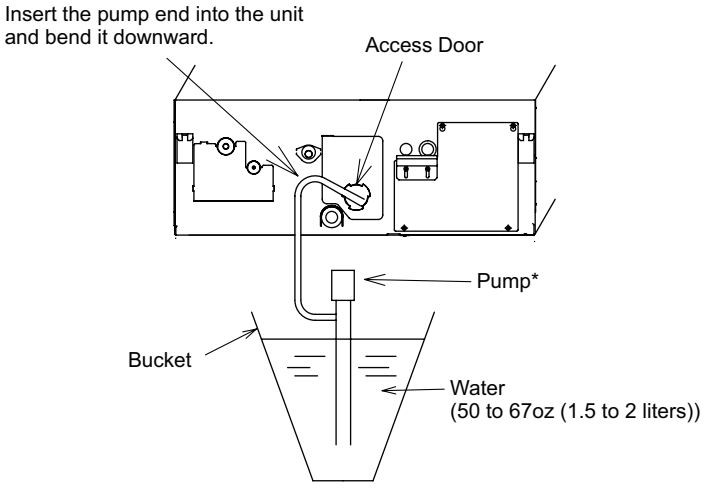
(b) Pour 50 to 67oz (1.5 to 2 liters) of water gradually into the condensate pan.

(c) Check to ensure that water flows smoothly inside the transparent condensate pipe and has drained out fully at the pipe end, and that no leaks occur.

(d) If the end of the condensate pipe cannot be checked visually, pour another 50 to 67oz (1.5 to 2 liters) of water into the condensate pan. If the water overflows from the condensate pan, there may be an issue with the condensate riser pipe or condensate pipe. Recheck all condensate piping.

NOTICE:

1. Before installation of air outlet duct: Pour water from air outlet side with a cup.
2. After installation of air outlet duct: Pour water from the access door on the piping side of the unit.



* You may also use a water bottle to put water in unit for testing.

Figure 7.2 Drainage Check

⚠CAUTION

- During heating season ensure all moisture and condensate has been removed from the condensate pan after drainage testing.
- The heat exchanger is heated because a slight amount of refrigerant circulates inside the indoor unit during periods of stoppage. As a result, moisture in the condensate pan evaporates and condensation builds up inside the indoor unit which causes sweating and dripping. This can potentially cause condensation issues.
- After the drain check is completed, reinsert the rubber plug and seal with a silicon sealant.

NOTICE:
Be careful that water does not splash onto electrical components such as the fan motor, float switch or thermistors.

● Simplified Operation of Drain-up Mechanism

The following is the simplified operation procedure for the drain-up mechanism.

(a) Turn OFF the power supply.

(b) Disconnect the service connector.

* Make sure to hold the connector part. Do not take out and plug in the connector frequently more than two or three times).

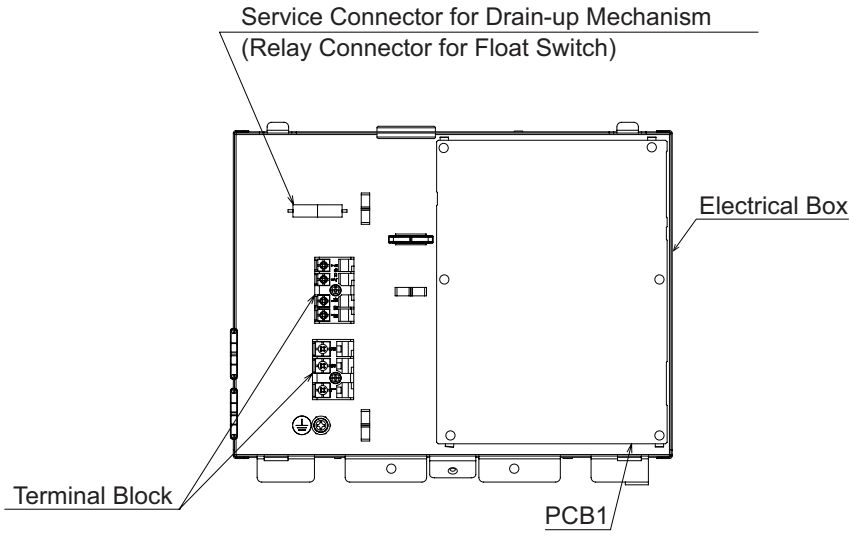
(c) Turn ON the power supply and start the simplified operation of the drain-up mechanism.

(d) Turn OFF the power supply.

(e) Reconnect the service connector.

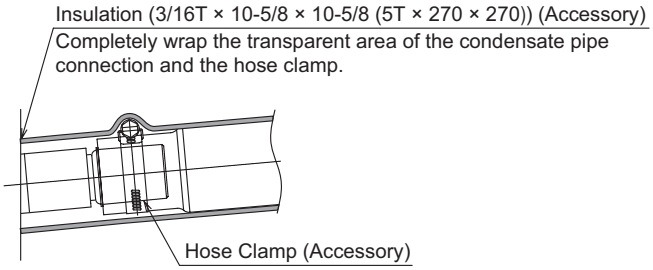
⚠WARNING

Turn OFF the main power supply when handling service connector in order to avoid electrical shock.



(6) Insulate the condensate pipe connection and the condensate hose after connecting them. If improperly insulated, condensation may occur.

Unit: inch (mm)



(7) Insulate the condensate piping with insulation wrap.

NOTICE:
If the relative humidity at the indoor unit space exceeds 80%, install a (field-supplied) auxiliary condensate pan beneath the indoor unit as shown in Figure 7.3.

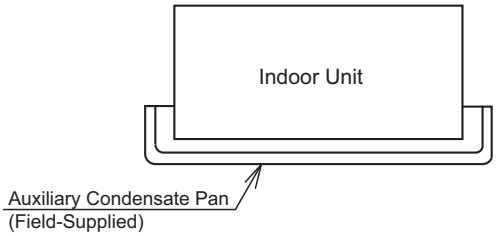


Figure 7.3 Auxiliary Condensate Pan

8. Electrical Wiring

⚠WARNING

- **All electrical work must be done as outlined in this manual and in accordance with this manual. Substandard work can result in fire and damage to the unit.**
- **Use specified cables between units and connect the cables correctly. If not, an electrical shock or fire may occur.**
- **Do not open the service cover or access panel for the indoor or outdoor units without turning OFF the main power supply. It can result in an electrical shock.**
- **Turn OFF the main power switch of the indoor unit and the outdoor unit before attempting any electrical wiring work or maintenance check. If power is left on it may result in an electric shock or a fire.**
- **Check to ensure that the indoor fan and the outdoor fan have stopped before attempting any electrical wiring work or for any scheduled electrical work that is being performed.**
- **Electrical work should be performed by a licensed contractor. Personnel must be qualified according to local, state and national building and safety codes and regulations. Incorrect installation could cause leaks, electrical shock, fire or explosion.**
- **Insulate electrical wiring, condensate piping and electrical components from threats posed by rodents and insects, and temperature extremes. Failure to do so, can over time, affect system performance.**
- **GFCI may be recommended depending on the application; if not, electric shock or a fire can result.**
- **Tighten screws according to the following torque.**

  M3.5: 0.9 ft·lbs (1.2 N·m)
  M4: 0.7 to 1.0 ft·lbs (1.0 to 1.3 N·m)

⚠CAUTION

- **Secure all cables together with zip-ties and seal the connecting hole against moisture and insects.**
- **Run the electrical wiring through the connecting hole in the side cover when using conduit.**
- **Secure the wired controller cable using the cable band inside the electrical box.**

8.1 General Check

(1) Make sure that the field-selected electrical components: (main power switches, circuit breakers, wires, conduit connectors, and wire terminals) have been properly labeled in accordance with electrical data as specified in the Engineering Manual. Make sure that the components comply with local codes.

(2) Check to ensure that the power supply voltage is within ±10% of the rated voltage.

(3) Ensure wiring size is correct for equipment load.
Incorrect wire size may prevent system start-up due to a voltage drop.

(4) Verify that the ground wiring is securely connected.

8.2 Electrical Wiring Capacity

8.2.1 Field Minimum Wire Sizes for Power Supply

- This equipment can be installed with GFCI, which is a recognized measure for added protection to a properly grounded unit. Install appropriately-sized breakers / fuses / overcurrent protection switches and wiring in accordance to local codes and requirements. The equipment installer is responsible for understanding and abiding by applicable codes and requirements. Failure to use GFCI can result in electrical shock or fire.
- Do not operate the system until all the check points have been cleared.

(A) Verify that electrical resistance is more than one megaohm by measuring the resistance between ground and the terminals of the line voltage connections. If less than one megaohm, do not activate the system until the electrical current drain is found and repaired.

(B) Check to ensure that the stop valves for the outdoor unit are fully opened, and perform the Test Run.

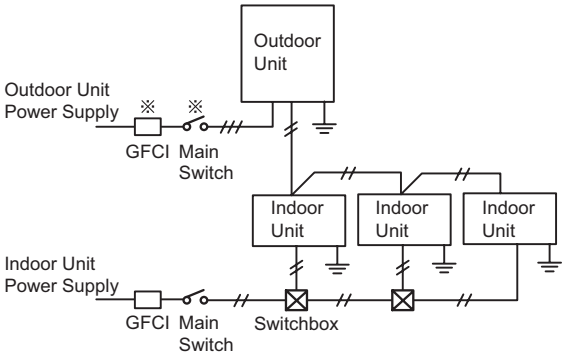
(C) Check to see that the main power has been switched ON for longer than 12 hours prior activating the system. Power to the crankcase heater needs this time interval to warm the compressor oil up to operating temperature.

- Do not touch any of the parts by hand at the discharge gas side, since the compressor chamber and the pipes at the discharge side could be in excess of 194°F (90°C).

8.2.2 Details of Electrical Wiring Connection

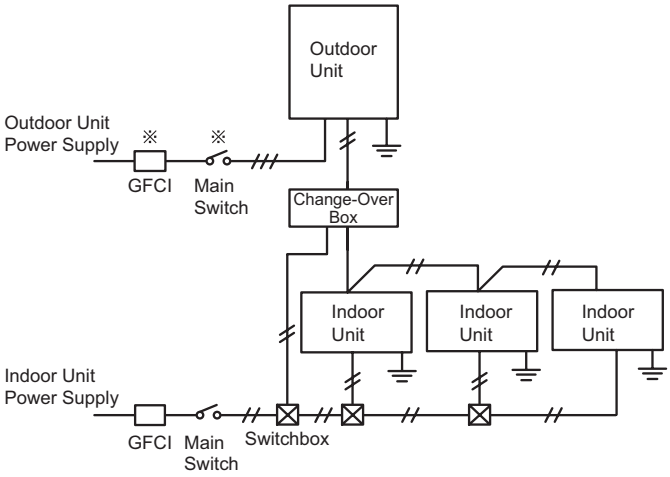
The electrical wiring capacity of the outdoor unit should be referred according to the "Installation and Maintenance Manual" for the outdoor unit. Adjusting the DIP switches may be required depending on the arrangement with the outdoor unit.
Select wiring capacity according to the table 8.1. Install GFCI and main switch as shown in each of the system diagrams below.

Heat Pump System



※ Refer to the “Installation and Maintenance Manual” for the connected outdoor unit for details of wire, GFCI and main switch for outdoor unit.

Heat Recovery System



※ Refer to the “Installation and Maintenance Manual” for the connected outdoor unit for details of wire, GFCI and main switch for outdoor unit.

Table 8.1 Recommended Wiring Capacity and Size

● High Static Type

Model	Power Supply	Minimum Wire Thickness [AWG (mm^2)]			GFCI		Main Switch		MCA (Minimum Circuit Ampacity)
		Power Supply Wiring Size (Main)	Ground Wiring Size	Communication Cable Size	Nominal Current [A]	Nominal Sensitive Current [mA]	Nominal Current [A]	Fuse [A]	[A]
(H,Y,C)IDH015B22S	1~, 208/230V 60Hz	18 (0.82)	18 (0.82)	18 (0.82)	15	30	15	15	2.4
(H,Y,C)IDH018B22S									2.4
(H,Y,C)IDH024B22S									2.9
(H,Y,C)IDH027B22S									2.9
(H,Y,C)IDH030B22S									4.7
(H,Y,C)IDH036B22S									5.0
(H,Y,C)IDH048B22S									5.3
(H,Y,C)IDH054B22S									5.3

● Medium Static Type

Model	Power Supply	Minimum Wire Thickness [AWG (mm^2)]			GFCI		Main Switch		MCA (Minimum Circuit Ampacity)
		Power Supply Wiring Size (Main)	Ground Wiring Size	Communication Cable Size	Nominal Current [A]	Nominal Sensitive Current [mA]	Nominal Current [A]	Fuse [A]	[A]
(H,Y,C)IDM006B22S	1~, 208/230V 60Hz	18 (0.82)	18 (0.82)	18 (0.82)	15	30	15	15	1.0
(H,Y,C)IDM008B22S									1.2
(H,Y,C)IDM012B22S									1.7
(H,Y,C)IDM015B22S									1.9
(H,Y,C)IDM018B22S									1.8
(H,Y,C)IDM024B22S									2.2
(H,Y,C)IDM027B22S									2.2
(H,Y,C)IDM030B22S									3.5
(H,Y,C)IDM036B22S									4.0
(H,Y,C)IDM048B22S									4.5
(H,Y,C)IDM054B22S									4.5

NOTES:

1) Follow local codes and regulations when selecting field wiring and GFCI.
2) Select GFCI with an activation speed of (0.1 second or less).
3) Total operating current is less than 12A.

NOTICE

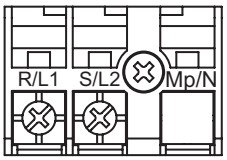
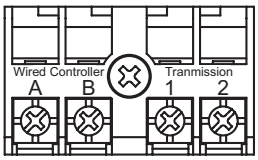
- Check for the recommended size GFCI shown in the Table 8.1.
- Between indoor and outdoor units, communication cabling should be a minimum of AWG18 (0.82mm^2), 2-Conductor, Stranded Copper. Shielded cable must be considered for applications and routing in areas of high EMI and other sources of potentially 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. Total cable length should not exceed 3281 ft (1000m).
- Select the wiring size, GFCI in accordance with the regulations for each region, the "Installation and Maintenance Manual", and the dedicated electrical circuit that must be used.
- Outside of the indoor unit, installation of the power supply wiring, communication cable, and wired controller cable should be spaced as far apart as possible.

8.3 Position of Electrical Wiring Connection

- The electrical wiring connection for the indoor unit is shown in Section 8.2.2.
- The connections at the terminal block for the indoor unit is shown below. Check the outdoor unit for the combination before performing any wiring. Screws in the terminal block should be tightened according to recommended torque specifications as shown in the table below.

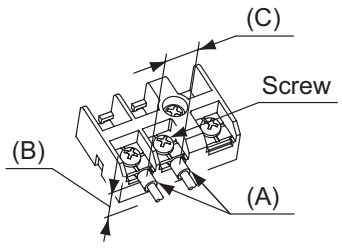
Torque Specifications for Terminals

Screw Size		Torque Specification
TB1	M4	0.7 - 1.0 ft·lbs (1.0 - 1.3 N·m)
TB2	M3.5	0.9 ft·lbs (1.2 N·m)

Terminal Block for Power Supply Wiring TB1 (black)	Terminal Block for Communication Cable TB2 (white)
	

NOTICE

- Do not connect the main power supply wiring to any terminals at TB2. If high voltage is connected to TB2 the printed circuit board (PCB) will be destroyed.
- Note the following for wire connections at TB1 and TB2:
  - (A) When making connections, use only insulated crimp connectors.
  - (B) Maintain a safe distance between the electrical box and the terminals to prevent a short circuit.
  - (C) Maintain a safe distance between the terminals.



(1) Connect the cable for the optional controller or the optional extension cable to the terminals inside the electrical box through the connecting hole of the cabinet.

(2) Connect the power supply and the ground wiring to the terminals in the electrical box.

(3) Connect the cables between the indoor unit and the outdoor unit to the terminals inside the electrical box.

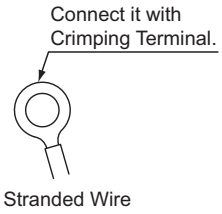
(4) Ensure cables are connected to the correct terminals or damage will occur.

(5) Connect the communication cable between the indoor units connected to the same outdoor unit.

(6) Do not connect the main power supply wiring to any terminals at TB2. If connected, the PCB will be destroyed.

(7) Tightly clamp the power supply wiring and communication cables using the cable band inside the electrical box.

NOTICE:
When the standard wire is used for the field-wiring connection, the M4 crimping terminal should be used. The screws at the terminal block should be tightened according to the torque specification as shown in the table above.

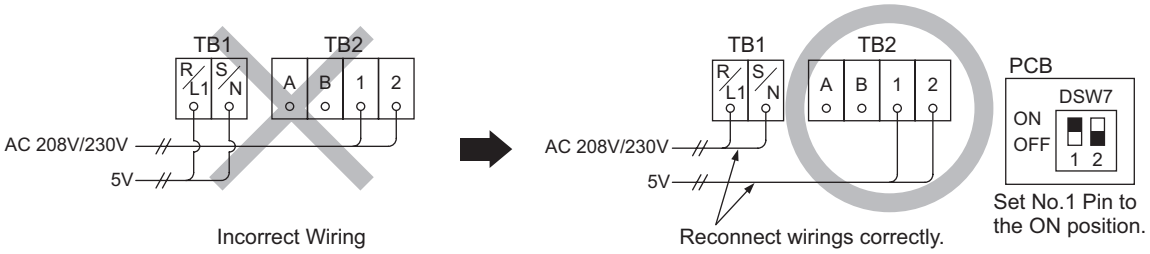


(8) All electrical work should be performed in strict accordance with electrical schematics in the "Installation and Maintenance Manual".

(9) If Power Supply Voltage (208V/230V) is introduced into the Communication Line:
If 208V/230V) are applied to the communication line at (Terminals 1 and 2 of TB2) by mistake, the fuse on the PCB for the communication line will blow. In this case, perform the recovery work as shown in the diagrams below.

(a) Reconnect the wirings correctly.
(b) Set the No.1 pin at DSW7 (on the PCB) to ON.

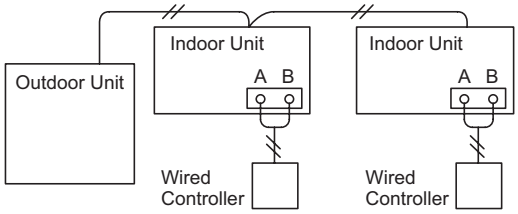
Upon PCB recovery after the fuse has been replaced, if 208V/230V//220-240V is reintroduced into the communication line, the PCB will be seriously damaged.



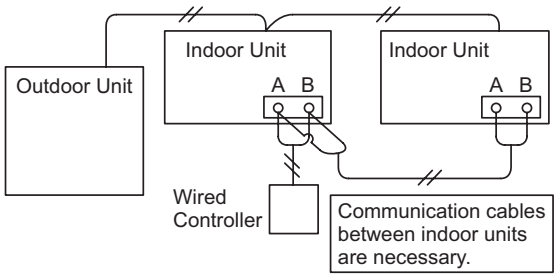
(10) Wired Controller Connection

- VRF Systems

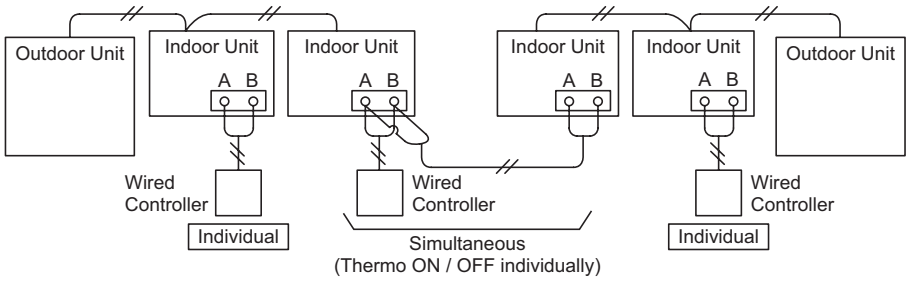
(a) Wired Controllers to each Unit for Individual Operation Setting



(b) Single Wired Controller for Individual Operation Setting



(c) Wired Controller Connections between different Refrigerant Cycles



NOTICE

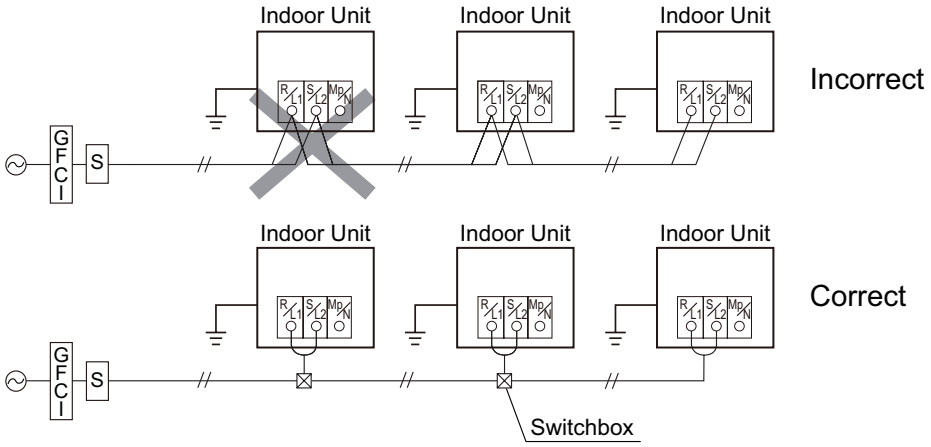
1. The DIP switch settings for the outdoor unit should be performed in accordance with the "Installation and Maintenance Manual" for the outdoor unit.
2. Be aware that communication cables between indoor units is required in these instances:
   a. The following functions are set to the sub unit which is not installed with the wired controller.
      - Remote ON/OFF function settings, (No.1, 2, and 3), (External Input / Output Function)
      - Power supply ON/OFF functions, (No.1 and 2), (Function Selection)
      - Prohibiting the wired controller after manual stoppage (External Input / Output Function)
      - Group setting by the centralized controller

   b. The combination of multiple indoor units is controlled by a single wired controller.

   c The addresses of the indoor units are to be changed from the wired controller.

Caution for Electrical Wiring

- Do not connect the power supply wiring and the communication cable to the same terminals.
- The manual switchbox is required when communication cable is required.



8.4 Wiring Connection

(1) Remove the electrical box cover.
Remove two screws at the bottom and one screw below the connecting hole. Then loosen but do not remove two screws at the top side to remove the electrical box cover.

(2) Pass the communication cable and the wired controller cable through the connecting hole for communication cable.
Connect the communication cable to the terminals 1, 2 of TB2 inside the electrical box.
Connect the wired controller cable to the terminals A, B of TB2 inside the electrical box.

(3) Pass the power supply wiring and the ground wiring through the connecting hole for power supply wiring.
Connect the power supply wiring to the terminals L1, L2 of TB1 inside the electrical box.
Connect the ground wiring to the ground terminal inside the electrical box.
(When connecting the power supply wiring and the ground wiring outside of the unit, ensure all wiring is routed through electrical conduit tube.)

(4) After all wiring is complete, exercise caution when reinstalling the electrical box cover.

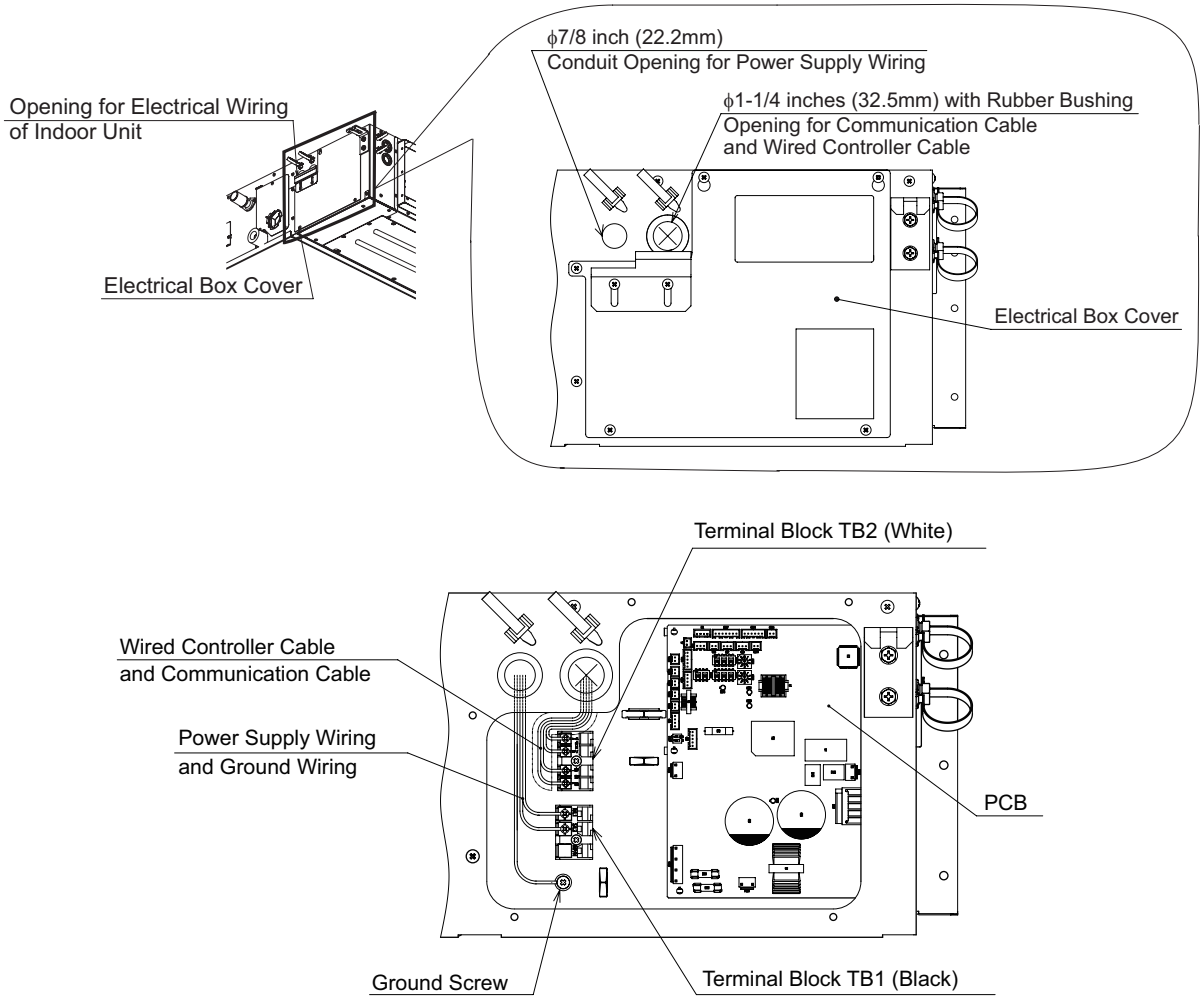
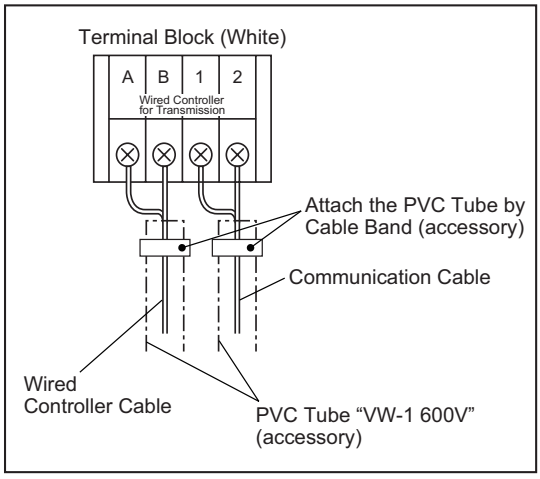


Figure 8.1 Electrical Wiring Connections

NOTE

- Insert the communication cable and wired controller cable into the PVC tube “VW-1 600V” (Accessory) to separate from the power supply wiring for the indoor unit.
- Attach cable band (Accessory) to both ends of the PVC tube by squashing the end.



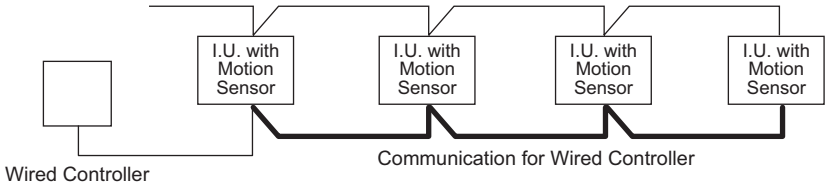
⚠WARNING

Install and secure all electrical wiring correctly through the opening, to the terminal blocks using cable bands. Wiring should be spaced appropriately and firmly fastened to prevent electrical shorts, arcing or fire.

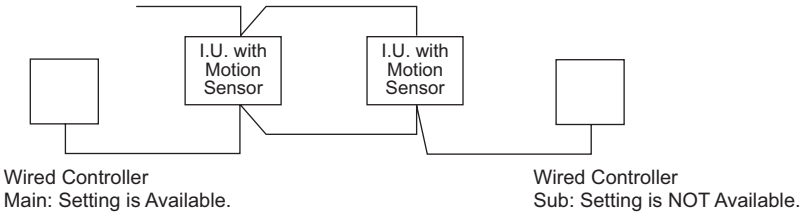
8.5 Caution for Motion Sensor Kit (SOR-NEZ)

(1) The motion sensor can be connected up to 16 indoor units by one wired controller (CIW01). The motion sensor is activated even if it is installed without motion sensor.

(2) When the multiple indoor units with motion sensor are controlled by one wired controller (CIW01), the communication cable for the wired controller is required for all the indoor units. If not, the indoor units with motion sensor are not activated.



(3) In case two wired controllers are connected, the motion sensor can be set on only the main wired controller. The sub wired controller is for the display only.



(4) The wired controller CIW01 must be utilized. Others are not available to set the motion sensor.

(5) The motion sensor function will not apply to an indoor unit without a wired controller.

(6) The motion sensor can not be set from a central controller.

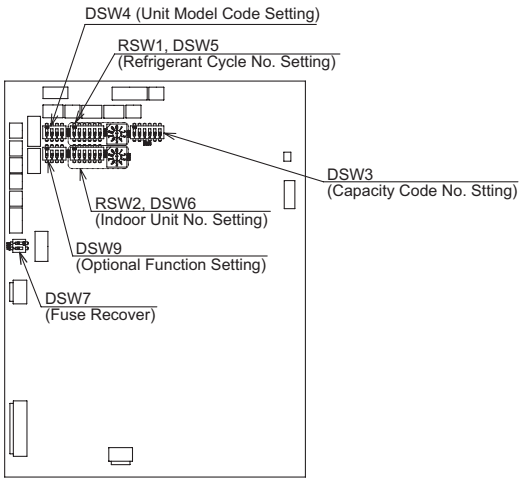
(7) The motion sensor can not be used when it is connected to the same wired controller of an indoor unit in another refrigerant cycle which is set as the simultaneous operation.

(8) The room thermostat function is not available.

8.6 DIP Switch Settings

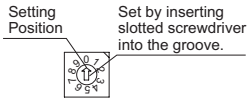
(1) Turn OFF the power supply to both indoor and outdoor units before adjusting DIP switch settings. Otherwise, the settings will not take effect.

(2) Positions of DIP switches are shown below.

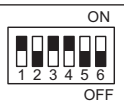
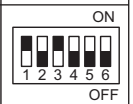
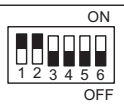
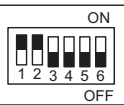
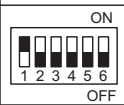


(3) Unit No. Setting (RSW2 and DSW6)
Setting is not required.
Indoor unit numbers are set by the auto-address function. If an indoor unit number setting is required, set the unit number of all indoor units respectively and sequentially by following setting position. It is recommended that you assign a number to each indoor unit from “1”. A maximum of 64 indoor units per refrigerant cycle can be connected to an H-LINK II System. Though the available numbers range from zero to 63, the applicable number for the 64th indoor unit in theory supplants the number "zero".
For centralized control, this setting is required.

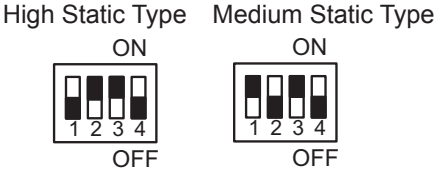
Unit No. Setting

DSW6 (Tens Digit)	RSW2 (Units Digit)	Ex.) Set at No.16 Unit
		
Before shipment, DSW6 and RSW2 are set at "0". For the units supporting H-LINK II, the unit No. can be set for Max. 64 indoor units (No.0~63).		

(4) Capacity Code Setting (DSW3)
No setting is required, due to setting before shipment. This switch is utilized for setting the capacity code which corresponds to the capacity of the indoor unit.

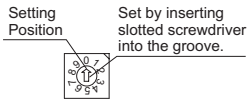
Indoor Unit Capacity (MBH)	06	08	12	15	18	
Setting Position						
Indoor Unit Capacity (MBH)	24	27	30	36	48	54
Setting Position						

(5) Unit Model Code Setting (DSW4)
No setting is required. It is for setting the model code of the indoor unit.
Do not change the setting. Otherwise, unit will not operate effectively.



(6) Refrigerant Cycle No. Setting (RSW1 and DSW5)
This setting is required. The unit arrives with all settings in the OFF position.

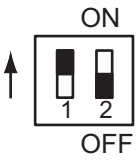
Refrigerant Cycle No. Setting

DSW5 (Tens Digit)	RSW1 (Units Digit)	Ex.) Set at No.5 Cycle
		DSW5  Set All Pins OFF RSW1  Set at "5"
Before shipment, DSW5 and RSW1 are set at "0". For the units supporting H-LINK II, the ref. cycle No. can be set for Max. 64 cycles. (No. 0~63)		

(7) Fuse Recover (DSW7)

* Factory Settings

* When high voltage is applied to terminals 1 and 2 of TB2, the 0.5A fuse on the PCB will blow. If this has happened, first reconnect the wiring correctly to TB2, and then set the number one pin to ON.



(8) Optional Function Setting (DSW9)
No setting is required. Setting positions before shipment are all OFF.

NOTICE:

- The "■" mark indicates setting for DIP switches. The illustration immediately above show settings in the OFF position.
- When the unit number and the refrigerant cycle are set, record the unit number and refrigerant cycle to facilitate ease of service and maintenance thereafter.

NOTICE

Turn OFF all power to the indoor and outdoor units prior to adjusting DIP switch settings. Otherwise, the setting will be invalidated and not take effect.

8.7 External Static Pressure Setting

The factory setting of external static pressure is set to Standard. The setting can be changed to High Pressure Setting 1 or High Pressure Setting 2.
Follow the procedure in "Function Selection by Wired Controller" section for changing the setting for the external static pressure.

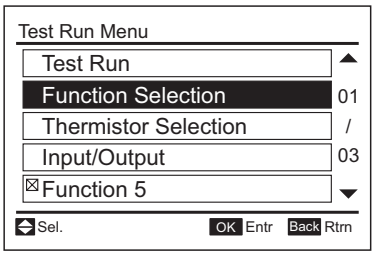
8.8 Function Selection by Wired Controller

Each function can be selected with the wired controller.
Refer to the “Installation and Maintenance Manual” for the wired controller and the “Engineering Manual” for details.

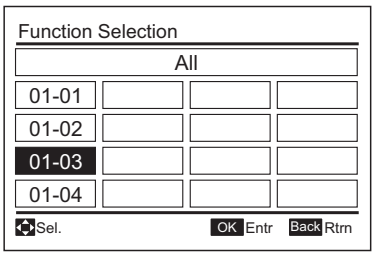
- Set external static pressure using wired controller.

(1) Press and hold "Menu" and "Back/Help" simultaneously for at least 3 seconds during the normal mode (when unit is not operated). The test run menu is displayed.

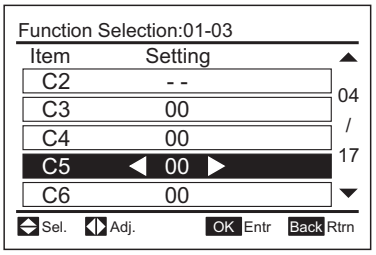
(2) Select “Function Selection” from the test run menu and press “OK”.



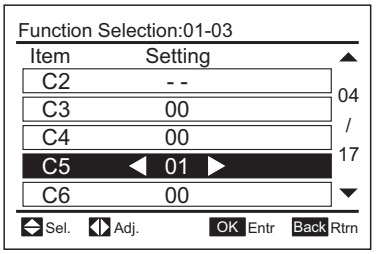
(3) Select the indoor unit by pressing “△ ▽ ◁ ▷” and press “OK”.
(This screen is NOT displayed when the number of indoor unit connected with the controller is 1 (one).
In this case, (4) is displayed.)
Press "All" to select all the indoor units connected to the wired controller.



(4) Press “△ ▽” and select the item required to change.



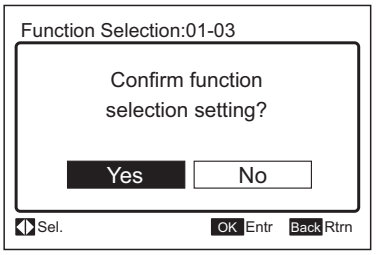
(5) Press “◁ ▷” and change the setting.



(6) Press “OK” to display the confirmation screen.

(7) Select “Yes” and press “OK”.
The test run menu is displayed after the setting is confirmed.
If “No” is pressed, the screen will return to (4).

(8) Press "Back/Help" on the test run menu to return to the normal mode.



(Figure for Function Selection)

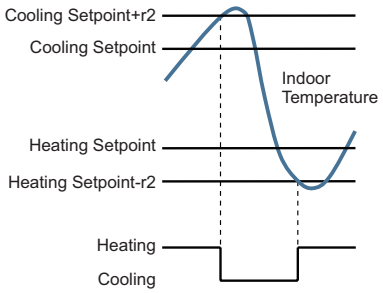
To set other units, press "Back/Help" at (4), (5) so that the screen will return to (3).
(If the number of indoor unit connected with the controller is 1 (one), the screen will return to (1).)

Optional Function			Function Selection Item	Unit	Setting Condition (Underlined Part is Factory Setting)										
					00	01	02	03	04	05	06	07	08	09	10
External Static Pressure Setting	High Static Type		C5	in.W.G (Pa)	0.2 (50)	0.4 (100)	0.8 (200)								
	Medium Static Type				0.2 (50)	0.4 (100)	0.6 (150)								
Automatic COOL/HEAT Operation			b8	-	Not Available	Available									
	Dual Setpoint		r1	-	Not Available	Available									
		(A) Cooling/Heating Changeover Temperature	r2	°F (°C)	2 (1.0)	3 (1.5)	3* (2.0)	4 (2.5)	5 (3.0)	1 (0.5)					
Setback Temperature Compensation (During card key removal, setpoint is setbacked)			r3	°F (°C)	4 (2.5)	5 (3.0)	6 (3.5)	7 (4.0)	8 (4.5)	9 (5.0)	10 (5.5)	1 (0.5)	2 (1.0)	3 (1.5)	3* (2.0)
Auxiliary Heater Setting			q1	-	Not Available	Available									
	(B)	Auxiliary Heater ON Compensation	q2	°F (°C)	-3 (-1.5)	-3* (-2.0)	-4 (-2.5)	-5 (-3.0)	-6 (-3.5)	-7 (-4.0)	-8 (-4.5)	-9 (-5.0)	-1 (-0.5)	-2 (-1.0)	
		Auxiliary Heater OFF Compensation	q3	°F (°C)	0 (0.0)	1 (0.5)									
	(C)	Ambient Temperature Restriction Setpoint [1]	q4	°F (°C)	-4 (-20.0)	2 (-17.0)	8 (-13.0)	14 (-10.0)	20 (-7.0)	26 (-3.0)	32 (0.0)	-13 (-25.0)	-8 (-22.0)		
		Ambient Temperature Restriction Setpoint Compensation [1]	q5	°F (°C)	4 (2.5)	5 (3.0)	6 (3.5)	1 (0.5)	2 (1.0)	3 (1.5)	3* (2.0)				
	Auxiliary Heater OFF at Defrosting Operation		L9	-	Not Available	Available									

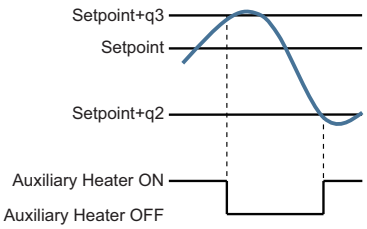
* Not displayed when fahrenheit (°F) is selected to be displayed.

1. Be sure to use only the "00" setting condition when combining this function with a water source unit.

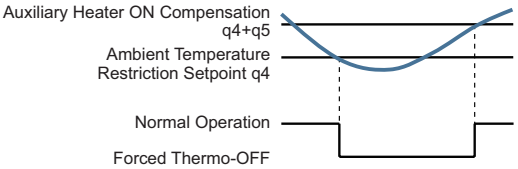
(A)



(B)



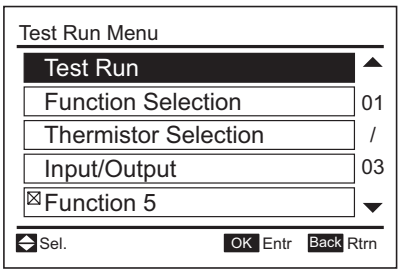
(C)



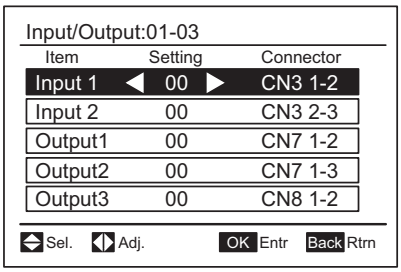
8.9 Setback Operation

(1) Press and hold “Menu” and “Back/Help”on the wired controller simultaneously for at least three seconds during the normal mode (unit stoppage).
The Test Run menu will be displayed.

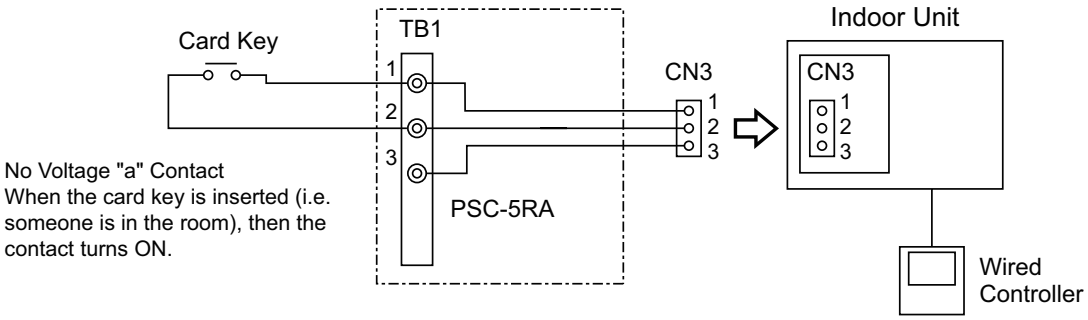
(2) Select “Input/Output” from the Test Run menu and press “OK”.



(3) Select either "Input 1" or "Input 2" and change the setting to "09".



(4) Build a circuit such as shown below.



(5) Temperature compensation for the setback function can be selected on the wired controller.
Refer to “Function Selection by Wired Controller” section for details.

9. Test Run

9.1 Before Test Run

Verify that there are no problems with the installation, and do not perform Test Run until all the following conditions are resolved.
Refer to the "Installation and Maintenance Manual" for the outdoor unit for details on Test Run operations from the outdoor unit.
Verify that refrigerant piping and the communication cable are connected to the same refrigerant cycle system. If not, it will cause abnormal operation and damage to system components.

(1) Verify that electrical resistance is more than one megaohm, by measuring the resistance between ground and the terminal for electrical components. If the electrical resistance is less than one megaohm, do NOT operate the system until the electrical current outflow to ground is detected and repaired. Do not introduce any high voltage to the terminals of the communication cables (TB2 terminals A and B or 1 and 2).

(2) Verify that each wire is connected correctly at the correct phase for the power supply. If it is incorrectly connected, the unit will not operate and the wired controller will display the alarm code “05”. In this case, check the phase for the primary power supply according to the “Attention” label affixed to the back side of the service cover. Then, with the power supply turned OFF at the power supply, verify the correct connections.

(3) Check to ensure that the main power supply has been turned ON for more than 12 hours to allow crankcase heaters to warm up the compressor oil.

(4) Verify that all DIP Switch settings are correct. Refer to Section 8.6 “DIP Switch Settings”.

9.2 Test Run

After all installation work is completed, **Test Run** should be performed.

(1) Check to ensure that stop valves (gas and liquid) for the outdoor unit are fully opened.

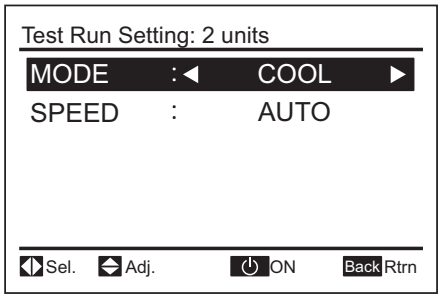
(2) Whenever indoor units are connected to the VRF system, perform the **Test Run** for the indoor units one by one sequentially and then check the refrigerant piping system and the electrical wiring system for conformity. (If these multiple indoor units are operated simultaneously, system conformity cannot be verified.)

(3) Perform the **Test Run** in accordance with the following procedure. Ensure that the Test Run is carried out without any problem. The following procedure shows a case where a wired controller is utilized. If other controllers are activated instead, refer to the "Installation and Maintenance Manual" for those other controllers.

NOTICE:
The outdoor unit may not be operated depending on the indoor and outdoor temperature conditions. Refer to the "Installation and Maintenance Manual" for outdoor units for details.

(a) Press and hold “Menu” and “Back/Help” simultaneously for at least 3 seconds.
The **Test Run** menu is displayed.

Test Run Screen



NOTICE:
If “00 unit” is displayed, the system may be in the auto-address function.
Cancel **“Test Run”** mode and reset.

- The total number of connected indoor units is indicated on the LCD (Liquid Crystal Display). In the case of a twin combination (set of two indoor units), the total number of the connected indoor units is displayed as **“2 units”**, and where there is a triple combination (set of three indoor units), the total number of the connected indoor units is displayed as **“3 units”**.
- If the number indicated is not equal to the actual number of connected indoor units, the auto-address function is not performing correctly due to incorrect wiring or electrical interference. Turn OFF the power supply, and resolve the wiring issue after verifying the following items; (When resetting power, allow 3-5 minutes before turning power back on.)
  - The power supply to the indoor unit is not turned ON or there is an incorrect wiring issue.
  - Incorrect connection of the interconnecting cable between indoor units or a poorly connected controller cable.
  - Incorrect setting of the rotary switch and DIP switch for the indoor unit PCB. (The setting is overlapped.)
- Press “⏻ On/Off” to start the Test Run.
- Press “△ ▽ ◁ ▷” and set each item.

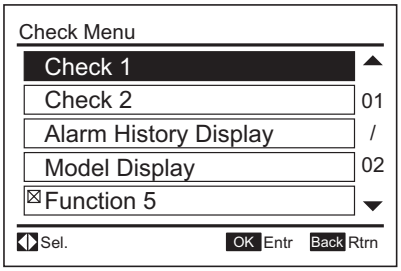
(b) Press “⏻ On/Off”.
The RUN indicator turns ON and the operation starts. At this time, a two-hour OFF timer is set automatically.

(c) Verify that the motion sensor is operating correctly using the following steps (if there is a decorative panel with a motion sensor).

1. Press and hold “Menu” and “Back/Help” simultaneously for at least three seconds during the Test Run mode.
   The Check Menu screen “A” is displayed.

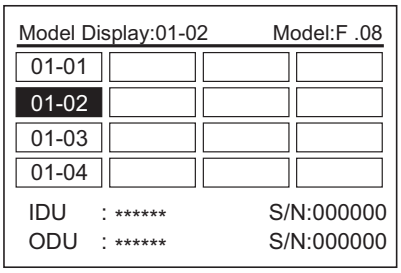
   Select "Check 1" at the Check Menu screen and press "OK".

“A”



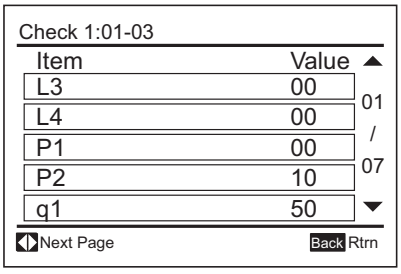
2. Screen “B” will be displayed.
   (This screen is NOT displayed when only one indoor unit is connected to the wired controller. In this case, screen “C” is displayed.)

“B”



3. Select the indoor unit by pressing “△ ▽ ◁ ▷” and press “OK”.
   The Check Data screen “C” is displayed.

“C”

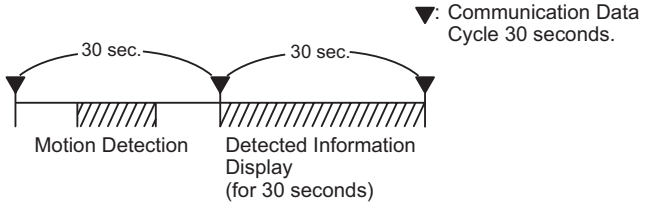


4. Press “△ ▽” to change the screen until it displays the check screen “q1”.

< Checking the Motion Sensor >

1. Perform a motion detection action (such as waving a hand) under the motion sensor of the selected indoor unit for approximately 10 to 15 seconds.
2. Check the value of “q1" after 30 seconds(*1) from starting the motion detection at Step 1. The detection information from the motion sensor against the motion detection is displayed at a range of 0% to 100%.

   (*1): Communication between the indoor unit and the controller occurs every 30 seconds. Timing for motion detection and the detected information being displayed is shown below..



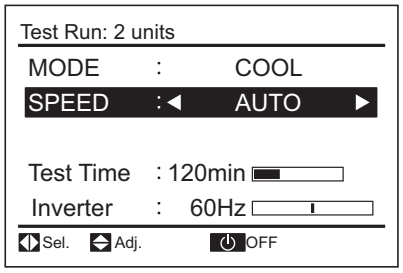
NOTICE:
Refer to the operation manual for indoor unit settings, setup of the motion sensor. (“Motion Sensor Setting”, “If Absent” and “Check Interval” can be set.)

3. Check that the value of “q1” is neither 0% nor 100%.
   If the value displayed is 0% or 100%, repeat the procedures from Step 1. If the same value reappears, it may be a malfunction of the motion sensor.

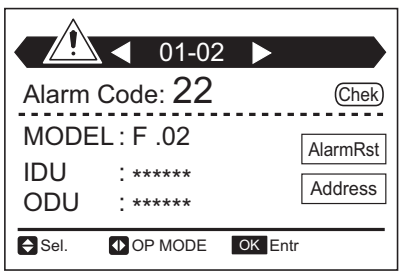
(d) Though temperature recordings by the thermistors are invalid during the Test Run phase, the protection devices are valid.

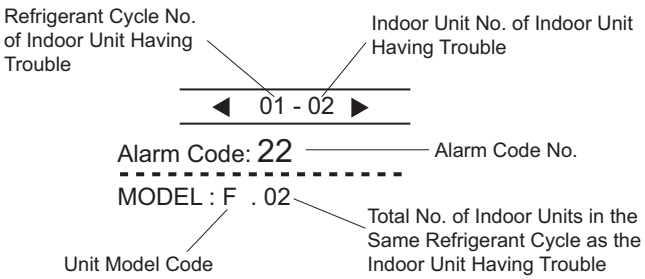
(e) For VRF System
According to the label; “Checking Method by 7-Segment Display” affixed to the inside of the front cover of the outdoor unit, check temperature, pressure, and operation frequency, and interconnected indoor unit numbers by 7-Segment displays.

(f) To complete Test Run, press “⏻ On/Off” again or wait for the set Test Run time to pass.
When changing the Test Run time, press “△” or “▽” to select **“TEST TIME”**. Then, set the test run time (30 to 600 minutes) by pressing “◁” or “▷”.



- The RUN indicator on the wired controller for the indoor unit will flash orange (0.5 second ON/ 0.5 second OFF), indicative of a fault or error having been generated with activation of protection devices during the Test Run phase. Alarm code, unit model code, and the number of interconnected indoor units will be displayed on the LCD as shown below. If the RUN indicator on the wired controller flashes for two seconds ON and two seconds OFF, the source of the problem could be a failure in the communication cable between the indoor unit and the wired controller (a loose or severed connection). In this case, verify Section 9.3 “Alarm Code” and perform the appropriate troubleshooting measures. Consult with an authorized service engineer if the problem cannot be resolved at your end.





Unit Model Code
The relationship between the unit model code and the unit model is shown in the table below.

Indication	Unit Model
F	VRF System
E	Except Above Models

9.3 Alarm Code

Alarm (Troubleshooting) Code Table

Code No.	Category	Nature of Problem	Likely Cause
01	Indoor Unit	Activation of a protection device (Float switch)	Activation of the float switch; (High water level present in the condensate pan.) A problem exists in the piping.
02	Outdoor Unit	Activation of protection device; (Except for Alarm Code: 41, 42)	High Pressure Cut; (R410A: 601 psi (4.15MPa)), fan motor lockup during the outdoor unit cooling operation.
03	Communication	Communication failure between indoor and outdoor units	Incorrect wiring, loose terminals, disconnected wiring or a blown fuse.
04-09	Problem with the outdoor unit; (Refer to the "Installation and Maintenance Manual" for outdoor units.)		
11	Sensor on Indoor Unit	Inlet Air Thermistor failure	Loosely connected, disconnected, or a severed connection.
12		Outlet Air Thermistor failure	
13		Freeze Protection Thermistor failure	
14		Gas Piping Thermistor failure	
19	Fan Motor	Problem with Indoor Fan	Fan motor lockup, fan motor protection control device for indoor unit activated.
20-29	Problem with the outdoor unit; (Refer to the "Installation and Maintenance Manual" for outdoor units.)		
31	System	Incorrect capacity setting for indoor and outdoor units.	Incorrect capacity code setting for combination, excessive or insufficient total indoor unit capacity code.
32		Incorrect setting of other indoor unit number	Problem with a different Indoor Unit in the same refrigerant cycle; (Failure at the power supply, defective PCB).
35		Incorrect setting of indoor	Indoor unit number duplicated in same refrigerant group.
36		Incorrect indoor unit combination	Indoor unit is designed for other refrigerant; (R22 or R407C).
38-59	Problem with the outdoor unit; (Refer to the "Installation and Maintenance Manual" for the outdoor unit.)		
b0	System	Incorrect setting for unit capacity	Incorrect setting for unit capacity
b1		Incorrect setting of unit and refrigerant cycle number	Unit number or refrigerant cycle ≥ 64
EE	Compressor	Compressor protection alarm	This alarm code displays when the alarms such as damage to the compressor occur three times within a six hour period.

- When the RUN indicator flashes every four seconds, there is a communication failure between the indoor unit and the wired controller (loose connector, disconnected or incorrect wiring, or a severed connection).
- The indication of the alarm code “EE” indicates a serious compressor issue and must be addressed.

Refer to the "Installation and Maintenance Manual" for the indoor/outdoor unit connections.

NOTICE

Do NOT operate the air conditioning just to run checks on electrical wiring until preparations for the Test Run phase are complete.

All the installation work of the air conditioning is completed.
Handover this information to the building owner and request to maintain all the equipment manuals and warranty.

Refrigerant Leak Check

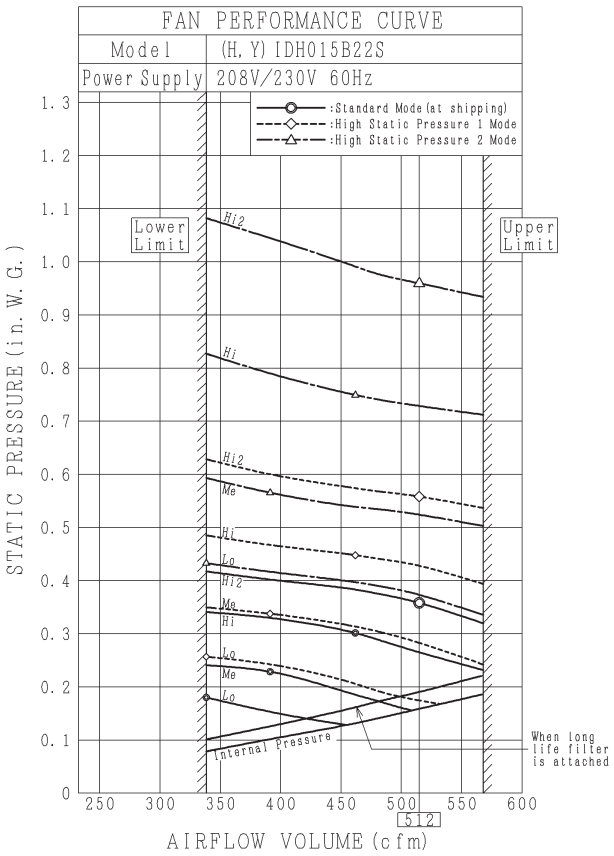
Conduct a periodic refrigerant leak check to maintain product performance and secure storage of refrigerant (Fluorocarbons). After completing installation, record the following results into this manual:

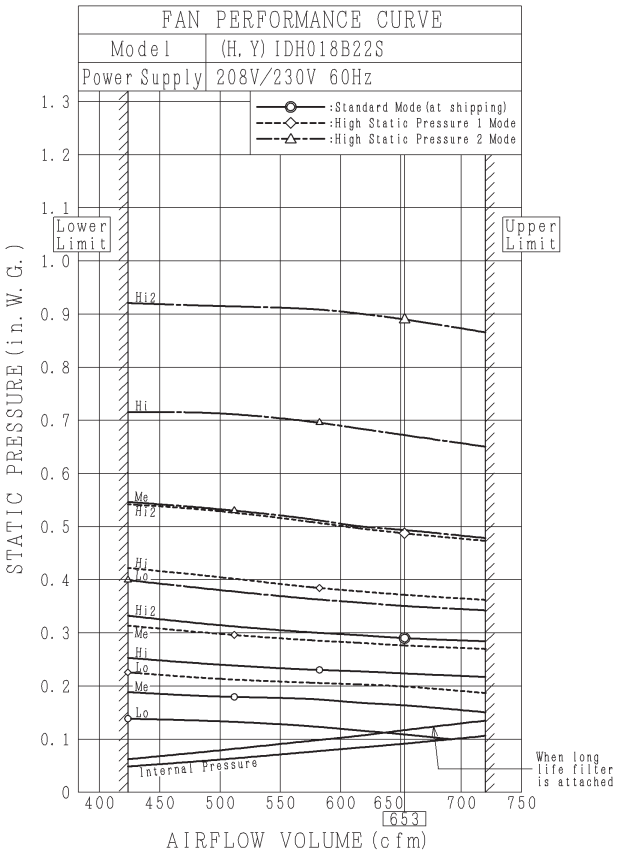
1. Results of a leak test all piping and connections
2. Total refrigerant charge volume dispensed (including a trim charge added following the installation)
3. Result of the refrigerant leak check

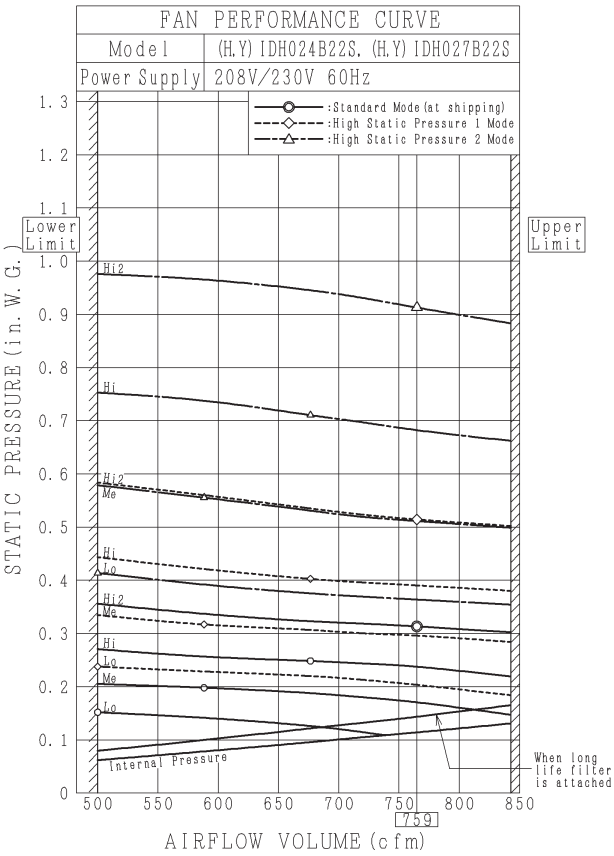
Then hand it over to users and ask them to retain for reference.
All periodic service and maintenance procedures must be conducted only by authorized and trained personnel.

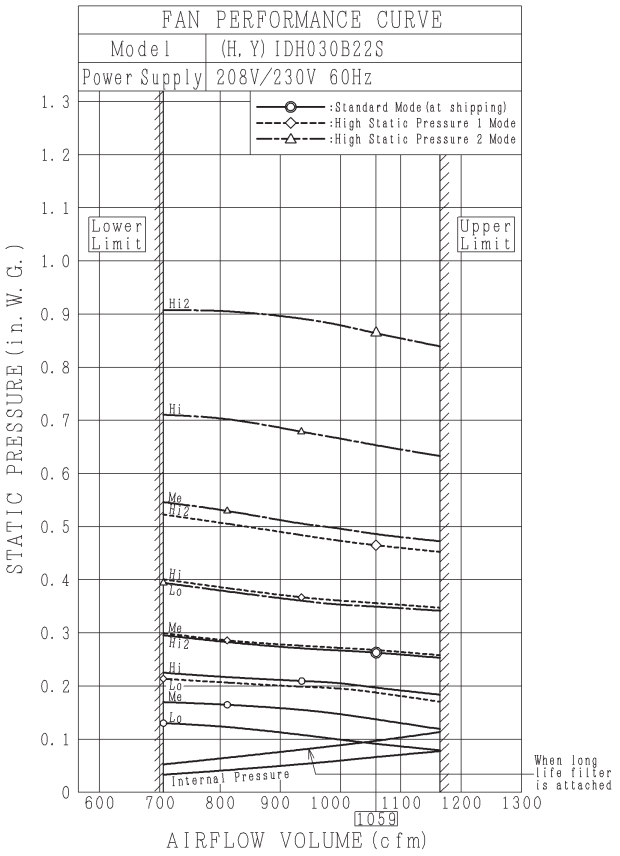
10. Fan Performance Curves

High Static Type

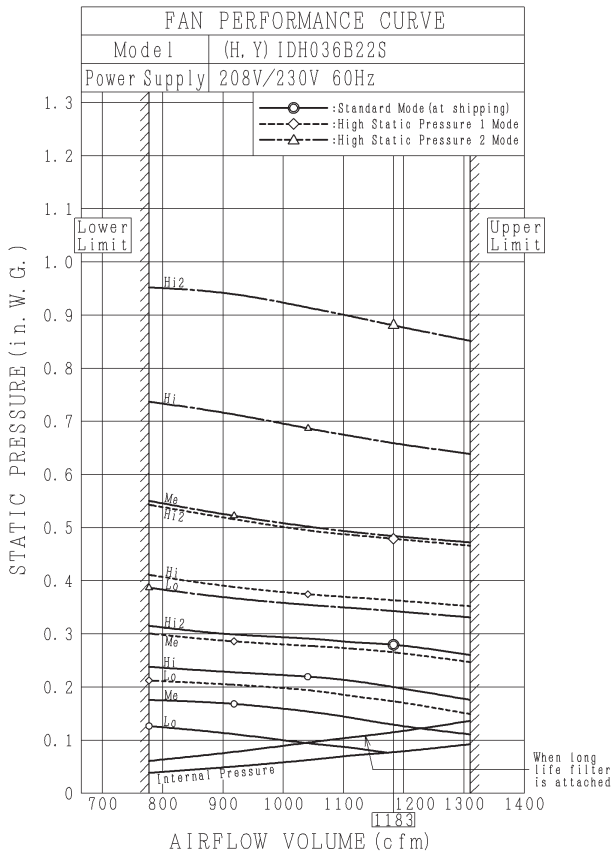


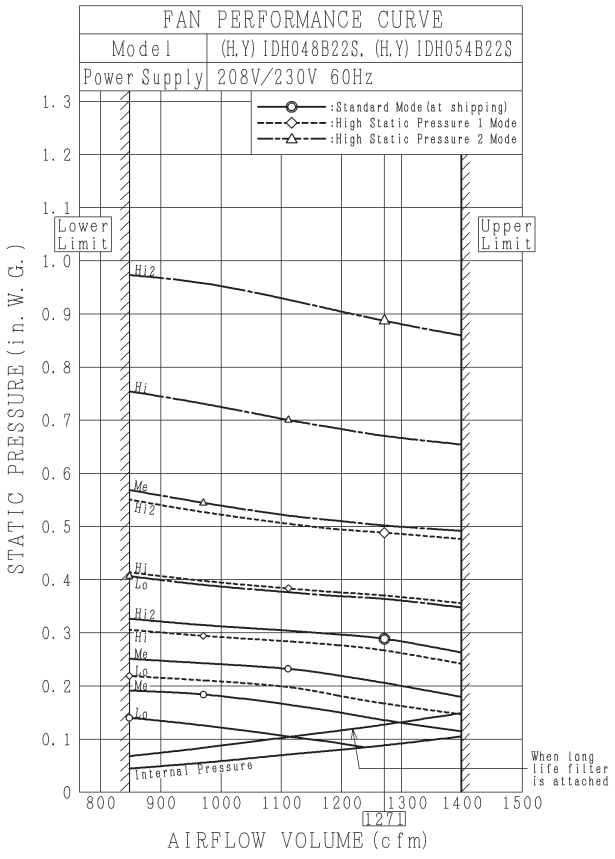






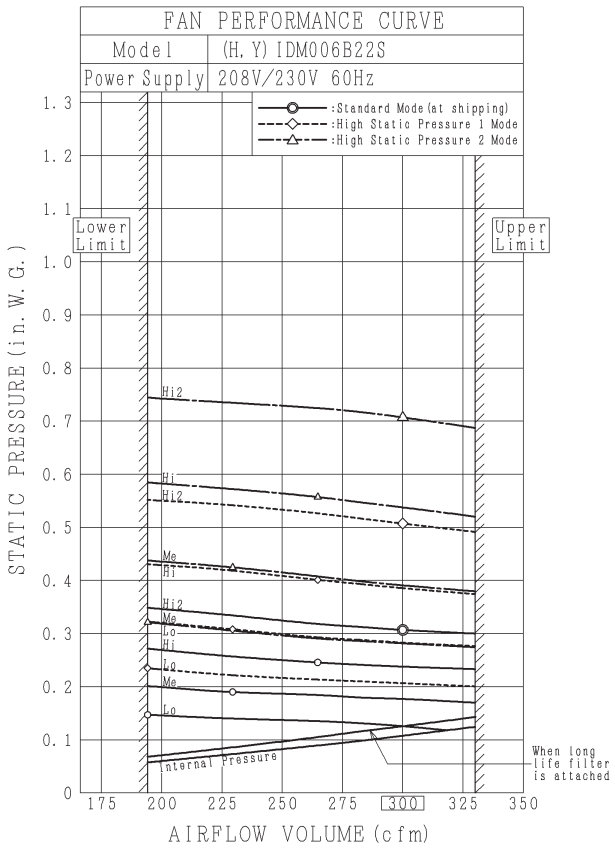
NOTE:
The settings of Standard, High Static Pressure 1 and High Static Pressure 2 Mode can be changed using the Wired Controller.

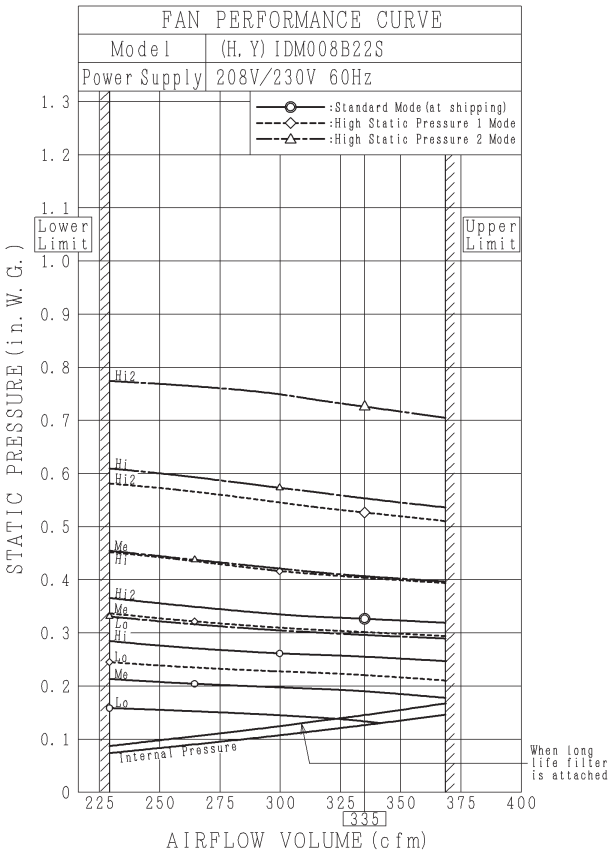


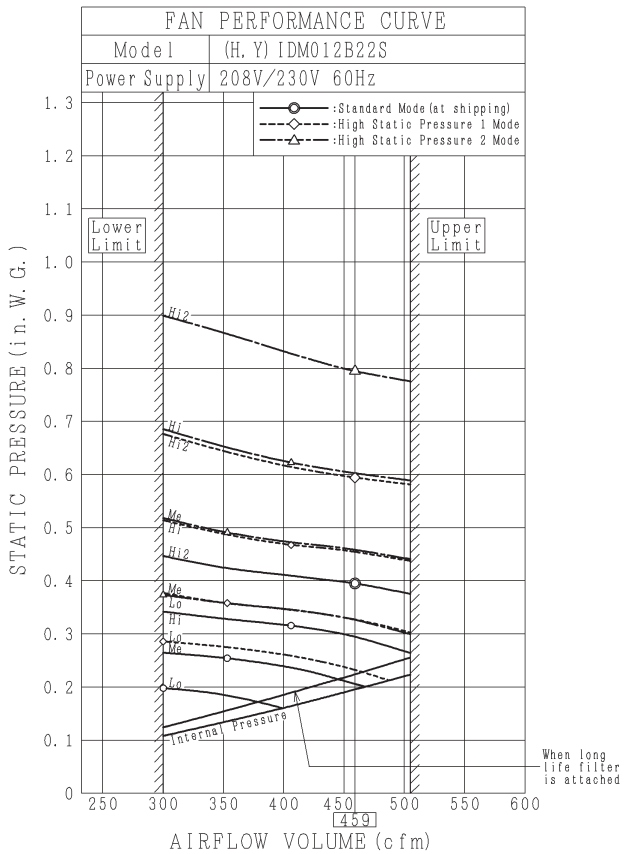


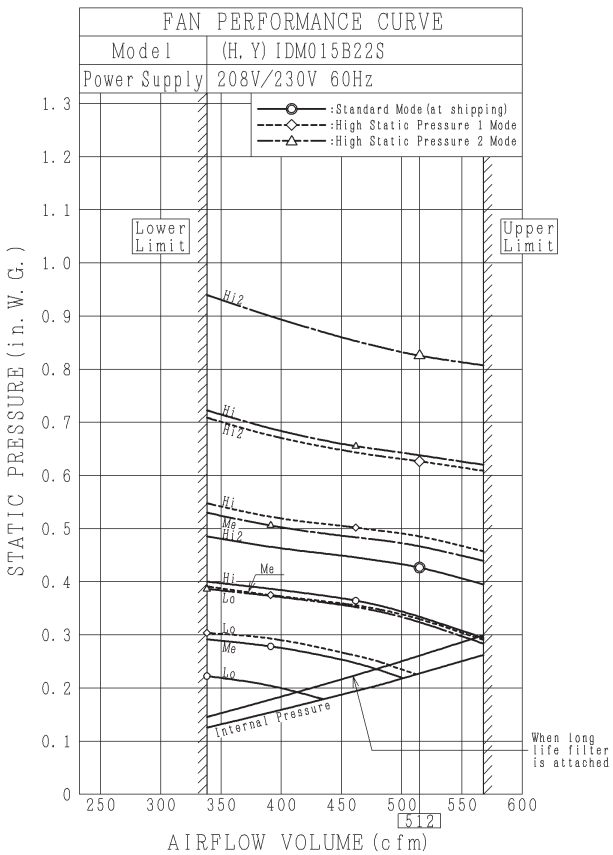
NOTE:
The settings of Standard, High Static Pressure 1 and High Static Pressure 2 Mode can be changed using the Wired Controller.

Medium Static Type

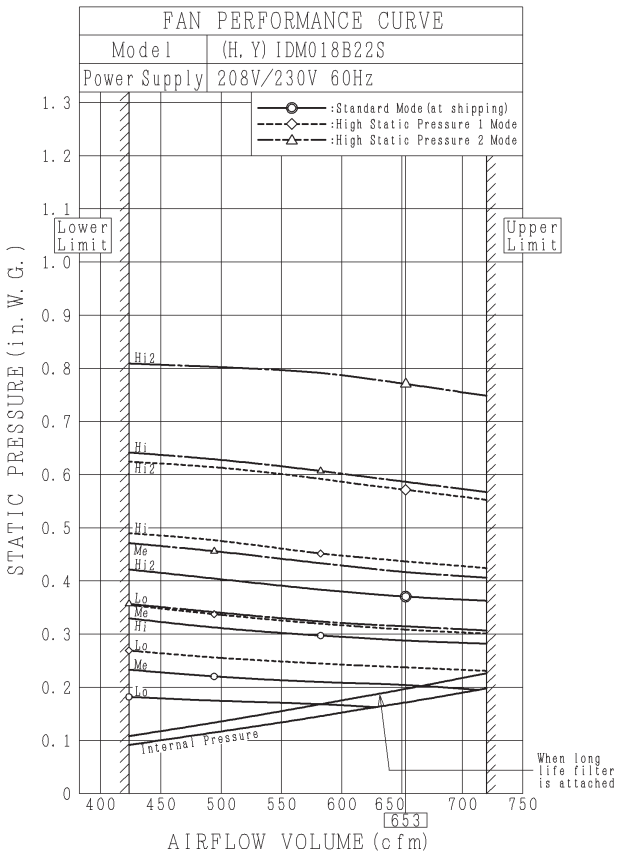


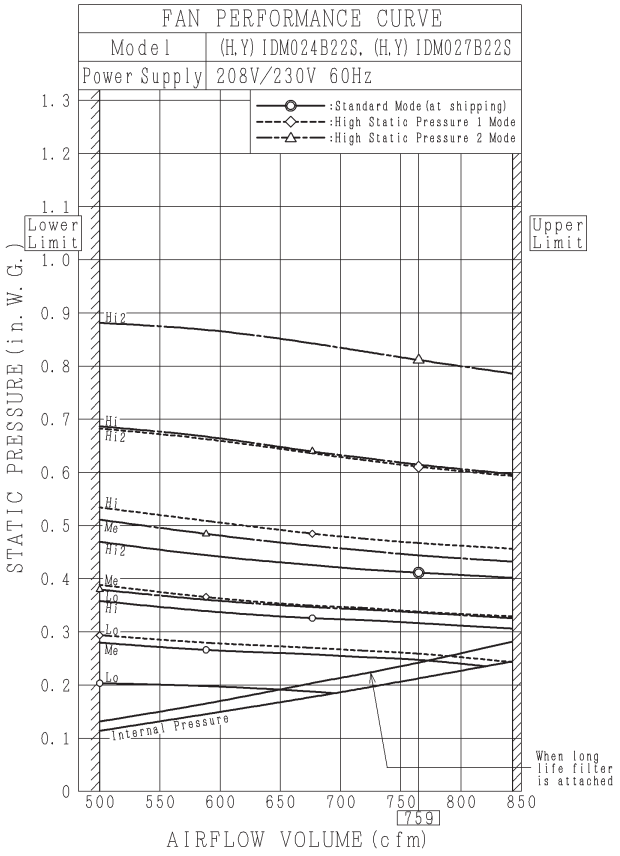


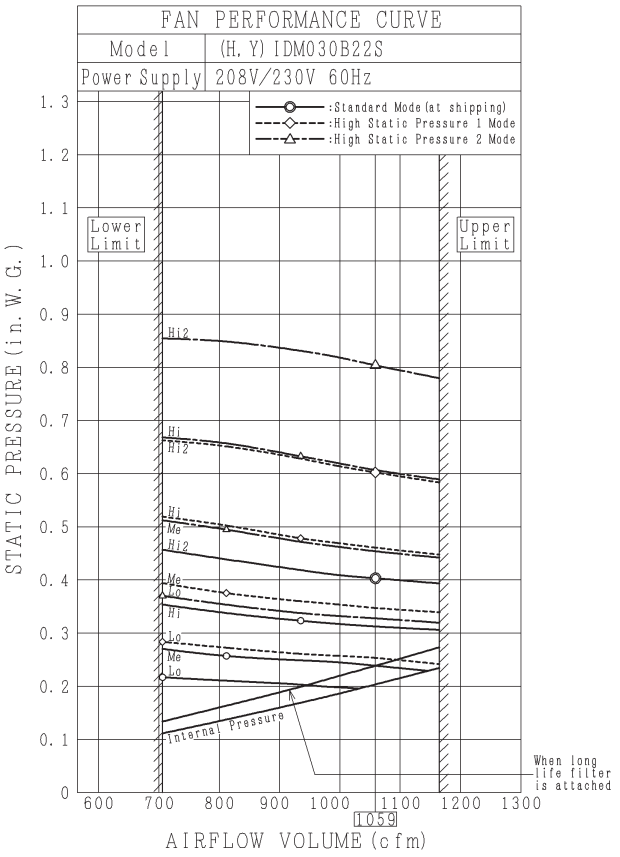


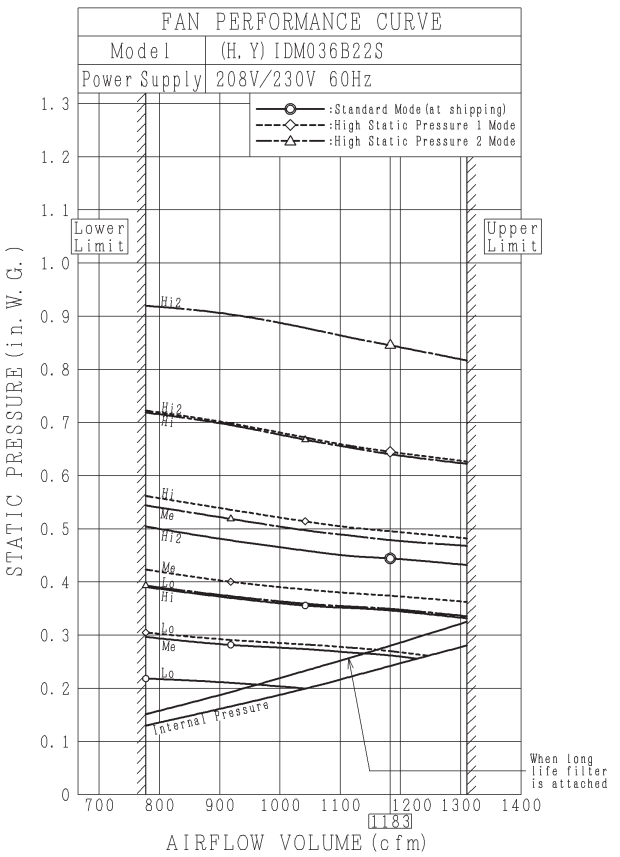


NOTE:
The settings of Standard, High Static Pressure 1 and High Static Pressure 2 Mode can be changed using the Wired Controller.

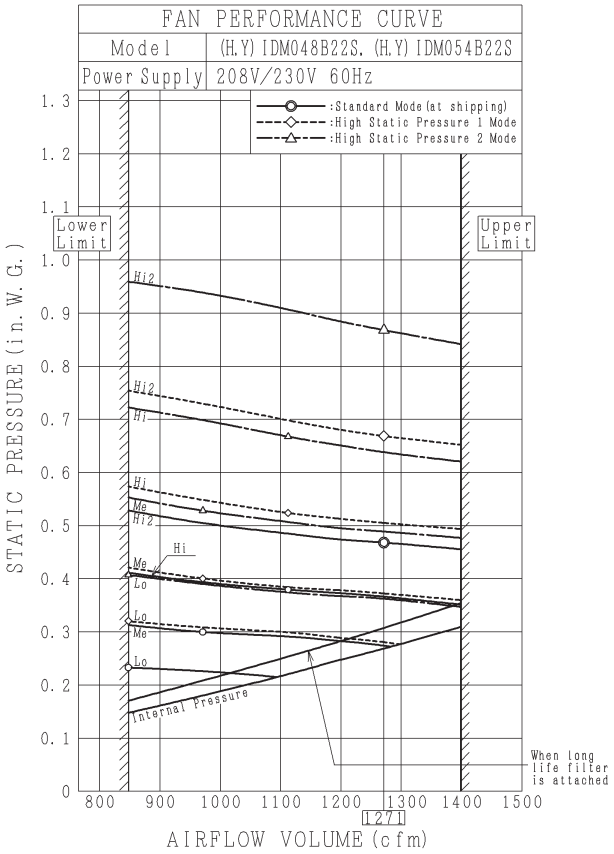








NOTE:
The settings of Standard, High Static Pressure 1 and High Static Pressure 2 Mode can be changed using the Wired Controller.



NOTE:
The settings of Standard, High Static Pressure 1 and High Static Pressure 2 Mode can be changed using the Wired Controller.

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