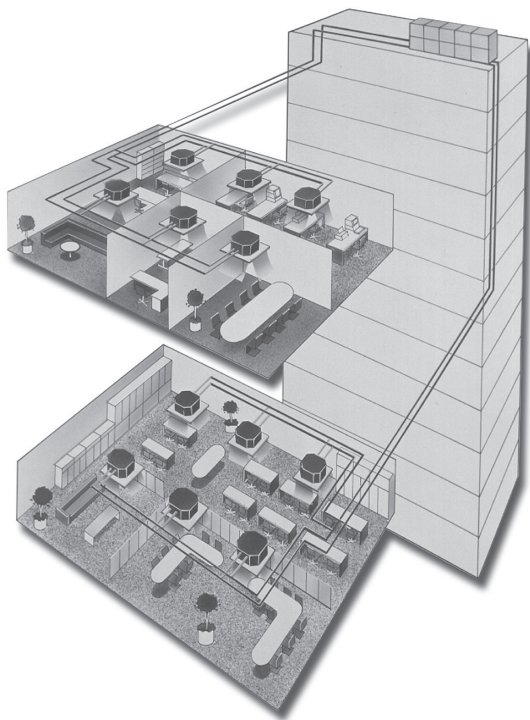


ENGINEERING MANUAL

INVERTER-DRIVEN MULTI-SPLIT SYSTEM HEAT PUMP AIR CONDITIONERS



Engineering Manual

< Outdoor Units (Low Ambient VRF Heat Pump) >

(H,Y)VAHP072B(3,4)1CW
(H,Y)VAHP096B(3,4)1CW
(H,Y)VAHP144B(3,4)1CW
(H,Y)VAHP168B(3,4)1CW
(H,Y)VAHP192B(3,4)1CW
(H,Y)VAHP288B(3,4)1CW

IMPORTANT NOTICE AND SAFETY SUMMARY



1. Introduction

This Engineering Manual concentrates on the Low Ambient VRF Heat Pump Outdoor Unit.
Read this manual carefully before performing installations or operations.


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

(Transportation/Installation Work) > (Refrigerant Piping Work) > (Electrical Wiring Work) > (Ref. Charge Work) > (Test Run) > (User)

2. Important 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 instructions as needed.
--	--

- This system should be installed by personnel certified by Johnson Controls, Inc. Personnel must be qualified according to local, state and national building and safety codes and regulations. Incorrect installation could cause leaks, electric shock, fire or explosion. In areas where Seismic "Performance requirements are specified, the appropriate measures should be taken during installation to guard against possible damage or injury that might occur in an earthquake if the unit is not installed correctly, injuries may occur due to a falling unit.
- Use appropriate Personal Protective Equipment (PPE), such as gloves and protective goggles and, where appropriate, have a gas mask nearby. Also use electrical protection equipment and tools suited for electrical operation purposes. Keep a quenching cloth and a fire extinguisher nearby during brazing. Use care in handling, rigging, and setting of bulky equipment.
- When transporting, be careful when picking up, moving and mounting these units. Although the unit may be packed using plastic straps, do not use them for transporting the unit from one location to another. Do not stand on or put any material on the unit. Get a partner to help, and bend with your knees when lifting to reduce strain on your back. Sharp edges or thin aluminum fins on the air conditioner can cut fingers, so wear protective gloves.
- Do not touch or adjust any safety devices inside the indoor or outdoor units. All safety features, disengagement, and interlocks must be in place and functioning correctly before the equipment is put into operation. If these devices are improperly adjusted or tampered with in any way, a serious accident can occur. Never bypass or jump-out any safety device or switch.
- Johnson Controls 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 drain condensate pan and could run inside of the electrical box, possibly causing electrical failures.
- When installing the unit in a hospital or other facility where electromagnetic waves are generated from nearby medical and/or electronic devices, be prepared for noise and electronic interference Electromagnetic Interference (EMI). Do not install where the waves can directly radiate into the electrical box, controller cable, or controller. Inverters, appliances, high-frequency medical equipment, and radio communications equipment may cause the unit to malfunction. The operation of the unit may also adversely affect these same devices. Install the unit at least 10 ft. (approximately 3m) away from such devices.
- When a wireless controller is used, locate at a distance of at least 3.3 ft. (approximately 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 boss. If you do, you may have drain water flowing back which may cause leaks.
- Be sure the drain hose discharges water properly. If connected incorrectly, it may cause leaks.
- Do not install the unit in any place where oil can seep onto the units, such as table or seating areas in restaurants, and so forth. For these locations or social venues, use specialized units with oil-resistant features built into them. In addition, use a specialized ceiling fan designed for restaurant use. These specialized oil-resistant units can be ordered for such applications. However, in places where large quantities of oil can splash onto the unit, such as a factory, even the specialized units cannot be used. These products should not be installed in such locations.
- 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).
- During the test run, check the unit's operation temperature. If the unit is used in an environment where the temperature exceeds the operation boundary, it may cause severe damage. Check the operational temperature boundary in the manual. If there is no specified temperature, use the unit within the operational temperature boundary of 35 to 104°F (0 to 40°C).
- Read installation and appropriate user manuals for connection with PC or peripheral devices. If a warning window appears on the PC, the product stops, does not work properly or works intermittently, immediately stop using the equipment.

Installation Precautions

WARNING

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

- When installing the unit into...
 - A wall: Make sure the wall is strong enough to hold the unit's weight. It may be necessary to construct a strong wood or metal frame to provide added support.
 - A room: Properly insulate any refrigerant tubing run inside a room to prevent "sweating" that can cause dripping and water damage to wall and floors.
 - Damp or uneven areas: Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the unit to prevent water damage and abnormal vibration.
 - An area with high winds: Securely anchor the outdoor unit down with bolts and a metal frame. Provide a suitable air baffle.
 - A snowy area: Install the outdoor unit on a raised platform that is higher than drifting snow. Provide snow vents.
- If the remote sensors are not used with this controller, then do not install this controller...
 - in a room where there is no thermostat.
 - where the unit is exposed to direct sunshine or direct light.
 - where the unit will be in close proximity to a heat source.
 - where hot/cold air from the outdoors, or a draft from elsewhere (such as air vents, diffusers or grilles) can affect air circulation.
 - in areas with poor air circulation and ventilation.
- Do not install the unit in the following places. Doing so can result in an explosion, fire, deformation, corrosion, or product failure.
 - Explosive or flammable atmosphere.
 - Where fire, oil, steam, or powder can directly enter the unit, such as in close proximity or directly above a kitchen stove.
 - Where oil (including machinery oil) may be present.
 - Where corrosive gases such as chlorine, bromine, or sulfide can accumulate, such as near a hot tub or hot spring.
 - Where dense, salt-laden airflow is heavy, such as in coastal regions.
 - Where the air quality is of high acidity.
 - Where harmful gases can be generated from decomposition.
- Do not position the drain 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 drainpipe is installed incorrectly, water leakage and damage to the ceiling, floor, furniture, or other possessions may result. If condensate piping becomes clogged, moisture can back up and can drip from the indoor unit. Do not install the indoor unit where such dripping can cause moisture damage or uneven locations: Use a raised concrete pad or concrete blocks to provide a solid, level foundation for the unit to prevent water damage and abnormal vibration.
- Before performing any brazing work, be sure that there are no flammable materials or open flames nearby.
- Perform a 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.
- During transportation, do not allow the backrest of the forklift make contact with the unit, otherwise, it may cause damage to the heat exchanger and also may cause injury when stopped or started suddenly.
- Remove gas inside the closing pipe when the brazing work is performed. If the brazing filler metal is melted with remaining gas inside, the pipes will be blown off and it may cause injury.
- Be sure to use nitrogen gas for an airtight test. If other gases such as oxygen gas, acetylene gas or fluorocarbon gas are accidentally used, it may cause explosion or gas intoxication.

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

Refrigerant Precautions

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. Refrigerant gases can cause asphyxiation (0.026 lbs/ft³ (0.42 kg/m³) based on ISO 5149 for R410A). Consult with your distributor for countermeasures (ventilation system and so on). If refrigerant gas has leaked during the installation work, ventilate the room immediately.
- Check the design pressure for this product is 601 psi (4.15MPa). The pressure of the refrigerant R410A is 1.4 times higher than that of the refrigerant R22. Therefore, the refrigerant piping for R410A shall be thicker than that for R22. Make sure to use the specified refrigerant piping. If not, the refrigerant piping may rupture due to an excessive refrigerant pressure. Besides, pay attention to the piping thickness when using copper refrigerant piping. The thickness of copper refrigerant piping differs depending on its material.
- The refrigerant R410A is adopted. The refrigerant oil tends to be affected by foreign matters such as moisture, oxide film, (or fat). Perform the installation work with care to prevent moisture, dust, or different refrigerant from entering the refrigerant cycle. Foreign matter can be introduced into the cycle from such parts as expansion valve and the operation may be unavailable.
- To avoid the possibility of different refrigerant or refrigerant oil being introduced into the cycle, the sizes of the charging connections have been changed from R407C type and R22 type. It is necessary to prepare the appropriate tools before performing installation work.
- Use refrigerant pipes and joints which are approved for use with R410A.
- A compressor/unit comprises a pressurized system. Never loosen threaded joints while the system is under pressure and never open pressurized system parts.
- Before installation is complete, make sure that the refrigerant leak test has been performed. If refrigerant gases escape into the air, turn OFF the main switch, extinguish any open flames and contact your service contractor. Refrigerant (Fluorocarbon) for this unit is odorless. If the refrigerant should leak and come into contact with open flames, toxic gas could be generated. Also, because the fluorocarbons are heavier than air, they settle to the floor, which could cause asphyxiation.
- When installing the unit, and connecting refrigerant piping, keep all piping runs as short as possible, and make sure to securely connect the refrigerant piping before the compressor starts operating. If the refrigerant piping is not connected and the compressor activates with the stop valve opened, the refrigerant cycle will become subjected to extremely high pressure, which can cause an explosion or fire.
- Tighten the flare nut with a torque wrench in the specified manner. Do not apply excessive force to the flare nut when tightening. If you do, the flare nut can crack and refrigerant leakage may occur.
- When maintaining, relocating, and disposing of the unit, dismantle the refrigerant piping after the compressor stops.
- When pipes are removed out from under the piping cover, after the insulation work is completed, cover the gap between the piping cover and pipes by a packing (field-supplied). If the gap is not covered, the unit may be damaged if snow, rain water or small animals enter the unit.
- Do not apply an excessive force to the spindle valve at the end of opening. Otherwise, the spindle valve flies out due to refrigerant pressure. At the test run, fully open the gas and liquid valves, otherwise, these devices will be damaged. (It is closed before shipment.)
- If the arrangement for outdoor units is incorrect, it may cause flowback of the refrigerant and result in failure of the outdoor unit.
- The refrigerant system may be damaged if the slope of the piping connection kit exceeds $\pm 15^\circ$.

Electrical Precautions



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

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

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

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

Check field regulations and standards before performing electrical work in order to protect the power supply for the new air conditioner unit.
- Communication cabling shall be a minimum of AWG18 (0.82mm²), 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.
- The polarity of the input terminals is important, so be sure to match the polarity when using contacts that have polarity.
- Use an exclusive power supply for the air conditioner at the unit's rated voltage.
- Highly dangerous electrical voltages may be 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.
- Before installing the controller or remote devices, ensure that the indoor and outdoor unit operation has been 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.
- Do not open the service cover or access panel to the indoor or outdoor units without turning OFF the main power supply. Before connecting or servicing the controller or cables to indoor or outdoor units, open and tag all disconnect switches. Never assume electrical power is disconnected. Check with a meter and equipment.
- This equipment can be installed with a Ground Fault Circuit Breaker (GFCI), which is a recognized measure for added protection to a properly grounded unit. Install appropriate sized breakers / fuses / overcurrent protection switches, and wiring in accordance with local, state and NEC codes and requirements. The equipment installer is responsible for understanding and abiding by applicable codes and requirements.

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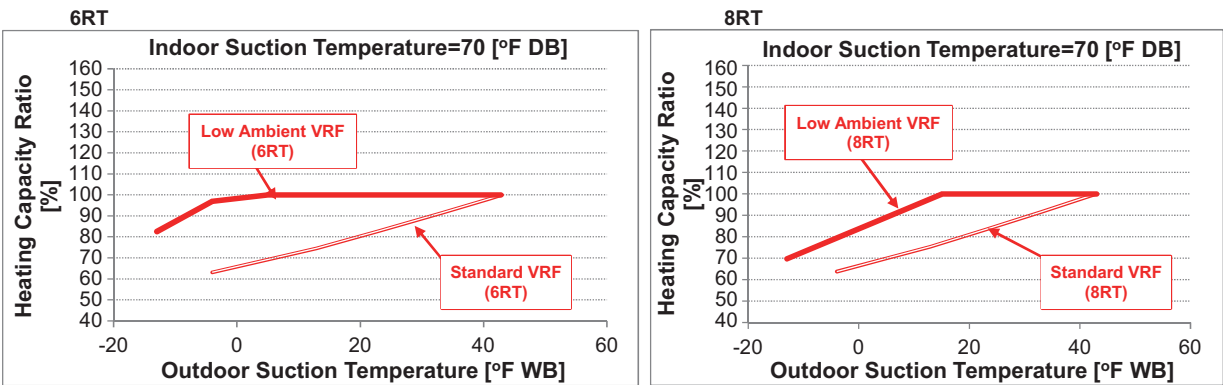
1. General Informations (Features)

Low Ambient VRF Air Conditioners

Johnson Controls has developed Variable Refrigerant Flow (VRF) air conditioners. Johnson Controls currently introduces a Low Ambient VRF Heat Pump Outdoor Unit that realizes highly-efficient heating performance under the low ambient temp. conditions by adopting Liquid Injection Cycle into scroll compressor and improving defrosting function.

High Heating Performance

- Provide 100% Heating Capacity Even Under Low Ambient Temperature Conditions
- High heating operation is available under the ambient temp. up to 15°F (-10°C). Also even under the ambient temp. up to -13°F (-25°C), maintain stability for the heating operation.
High heating capacity is 1.5 times higher (6RT: -4°F (-20°C)) than that of our standard VRF.



Improved Defrosting Function

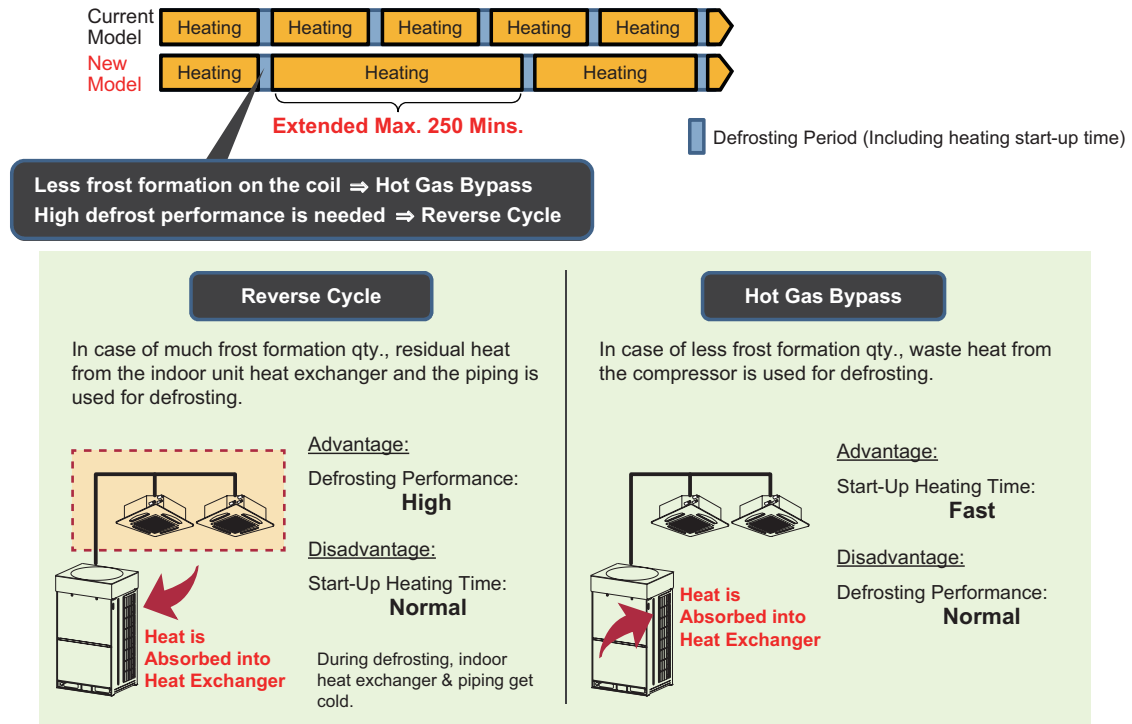
■ Sensor Function for Frost Formation on Coil

The newly-adopted sensor function detects frost formation on the coil.

Accuracy is improved for detecting the frost formation condition and quantity. As a result the frequency of the defrosting operation is decreased.

The interval for defrosting can be extended approximately to a maximum of 250 minutes.

Two defrosting methods can be automatically selected depending on the frost formation quantity. They provide adequate defrosting operation without impairing the comfort environment during heating operation.



Advanced Technologies to Provide High Heating Performance

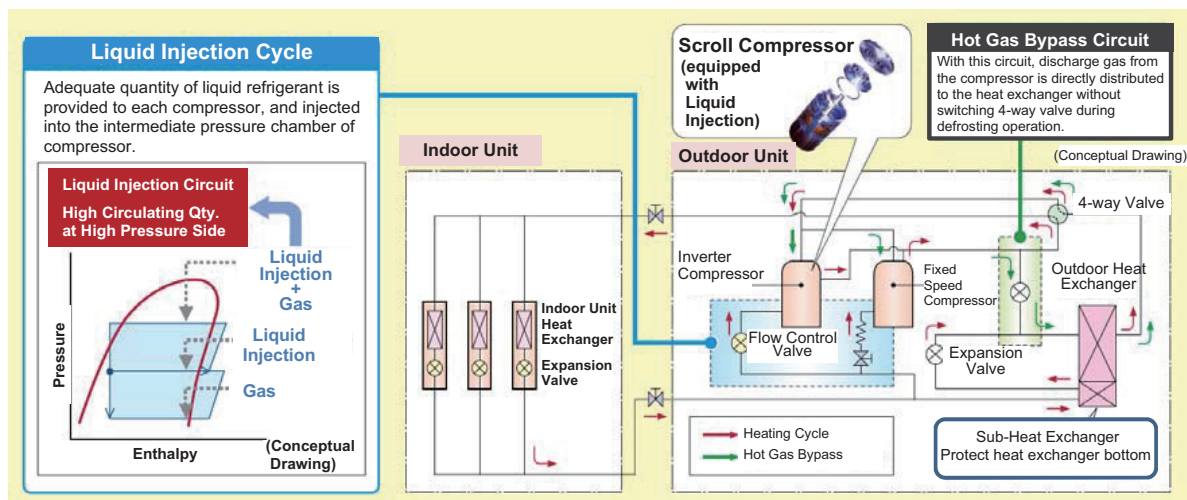
Newly Adopted Compressor Equipped with Liquid Injection Cycle & Hot Gas Bypass Circuit

■ Compressor Adopted Liquid Injection

By adopting Liquid Injection Cycle into scroll compressor, heating performance under the low ambient temp. conditions is improved without using burner or electric heater. Heating operation is available under -13°F (-25°C) of ambient temp. circumstances.

■ Hot Gas Bypass Circuit

Newly adopted Hot Gas Bypass Circuit. Defrosting operation concurrently with heating cycle is available without switching four-way valve for defrosting.



■ Wide Variety of Indoor Unit Line-Up

Various indoor units can be selected depending on the installation location, shape of air outlet and interior.

Table 1.1 Indoor Unit Models

Indoor Unit Type			Capacity (MBH)										
			6	8	12	15	18	24	30	36	48	72	96
Ducted	Ducted (High Static)	(H,Y)IDH_B21S					○	○	○	○	○	○	○
	Ducted (Medium Static)	(H,Y>IDM_B21S	○	○	○	○	○	○	○	○	○		
	Ducted (Slim)	(H,Y)IDS_B21S	○	○	○	○	○						
	Ducted (EconoFresh)	(H,Y>IDM_B21E							○	○	○		
	DOAS	(H,Y)DOA_B21S											○
Non-Ducted	Ceiling-Mounted 4-Way Cassette	(H,Y)IC4_B21S			○	○	○	○	○	○			
	Ceiling-Mounted 4-Way Cassette Mini	(H,Y)ICM_B21S		○	○	○	○						
	Ceiling-Mounted 2-Way Cassette	(H,Y)IC2_B21S					○	○					
	Ceiling-Mounted 1-Way Cassette	(H,Y)IC1_B21S	○	○	○	○							
	Wall-Mounted	TIWM_B21S	○	○	○	○	○	○					
	Ceiling Suspended	(H,Y)ICS_B21S				○		○	○	○			
	Floor Exposed	(H,Y)IFE_B21S	○	○	○	○							
	Floor Concealed	(H,Y)IFC_B21S	○	○	○	○							

○ : Available

NOTE:

Please refer to Section 2.13 “Combinations of Indoor Units and Outdoor Units”.

Energy-Saving Improvement through Schedule Setting of “Self-Demand Function”

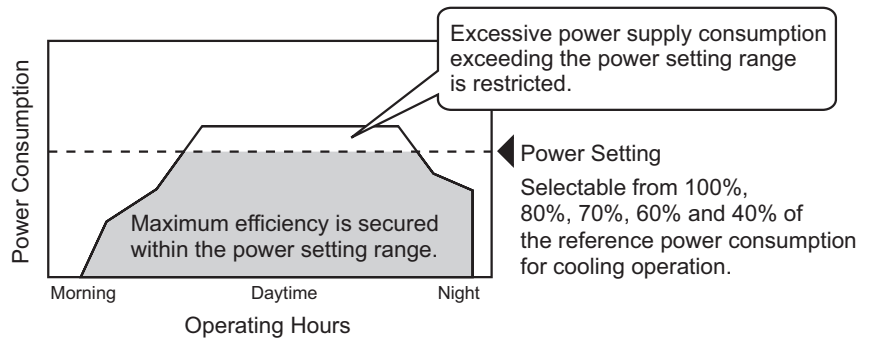
“Self-Demand Function”* can be set for each outdoor unit from a Computerized Central Controller (CCCS01 and CCCA01) or Wired Controller (CIW01).

For small and medium buildings, it facilitates power saving. The energy-saving operation can be adjusted conforming to an operating environment and individual needs.

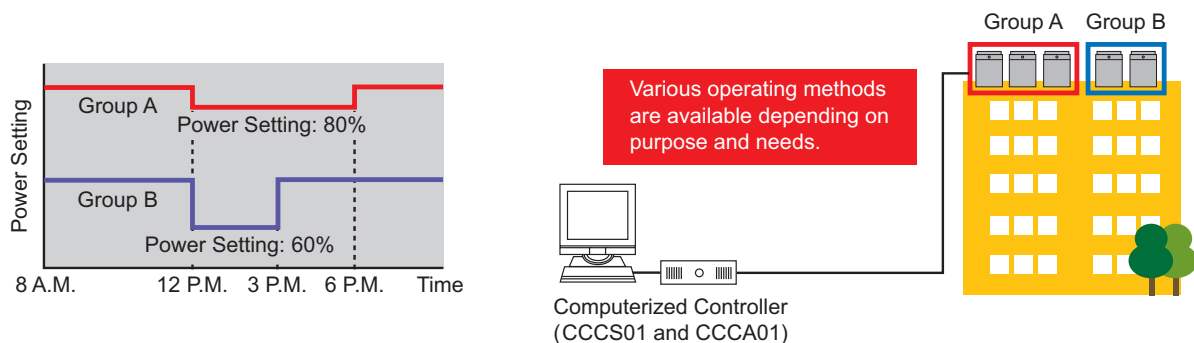
*Self-Demand Function: Saves capacity so as not to exceed demand current control based on the electric power data detected.

< Self-Demand Function >

Outdoor Unit Capacity [MBH]	Reference Power Consumption [kW]
072, 096	9.6



< Setting Example: Schedule Setting for Each Group by Computerized Controller >



The specific outdoor unit and the period of time can be set from computerized controller.

NOTE:

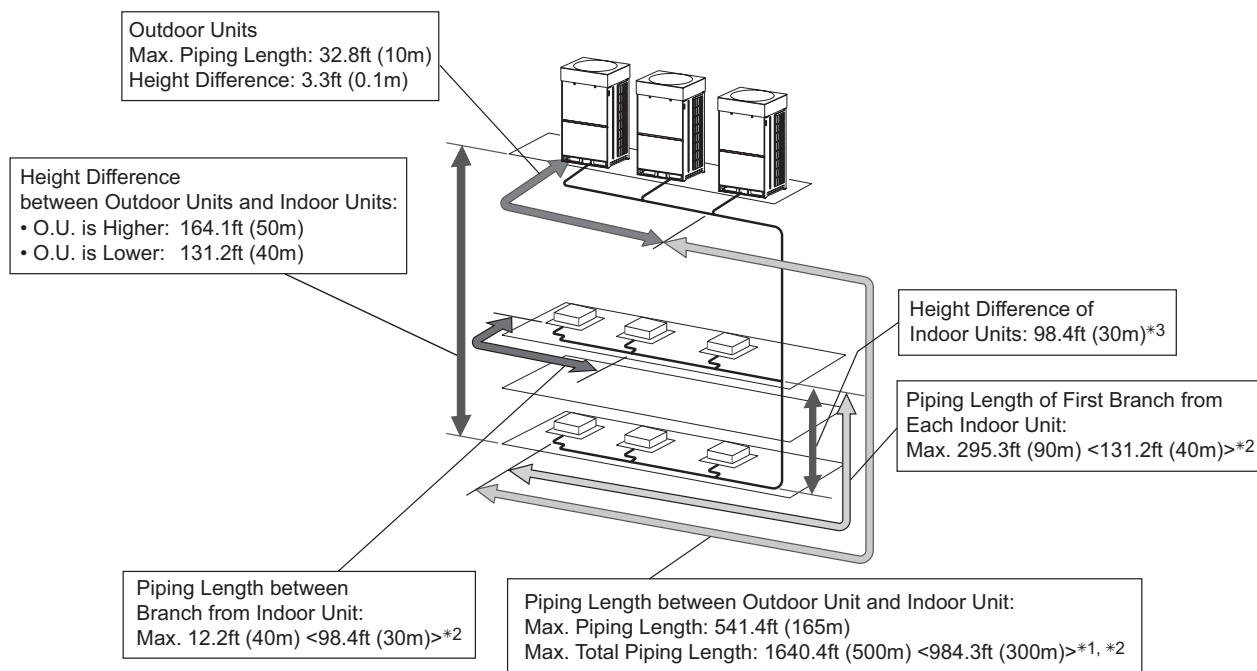
1. The demand current control (%) is indicated by approximate values. The value in this control which is calculated by the current is different from the value in the wattmeter.
If it is required that the maximum power consumption is managed precisely, a field-supplied demand controller should be used.
2. The range may temporarily be higher than the power-setting range (%) depending on the operating control condition such as protection control.
3. When the above self-demand control is set, performance is restricted because the rotation frequency of the compressor is forcibly decreased.

Flexibility of Facility Design

■ Improvement of Piping Installation

Height difference between the outdoor units and indoor units and the height difference between the indoor units are changed as shown below.

Height Difference between Outdoor Units and Indoor Units	Outdoor Unit is Higher	$\leq 164.1 \text{ ft}$ ($\leq 50\text{m}$)
Height Difference between Indoor Units		$\leq 98.4 \text{ ft}^{*3}$ ($\leq 30\text{m}$)



NOTES:

*1: When the total piping length is over 984.3 ft (300m), the maximum additional refrigerant charge is restricted.

(The total field additional charge (refrigerant pipe + indoor unit) should not exceed the maximum additional refrigerant charge (table below)).

Outdoor Unit Capacity (MBH)	72, 96	144 - 192	288
Max. Additional Refrigerant Charge: lbs (kg)	61.7 (28)	112.5 (51)	138.9 (63)

2: If the piping length exceeds the dimensions as shown above, the connectable indoor units number should be less than the recommended number.

*3: In case that either DOAS or EconoFresh or both of them are including in the connected indoor units, be sure the height difference of indoor units is within 49.2ft (15m).

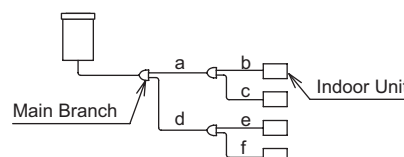
■ Lifting Limits on Main Piping Branch Numbers (*)

No Limit for the Number of Main Piping Branches

No limit for the number of main piping branches is realized.

(*): Main Piping Branch:

Both of the pipes branched from a Multi-Kit (Line Branch) are connected to the next Multi-Kits.



Wide Operation Range

This unit has been designed for cooling operations under low ambient temperatures down to 14°F (-10°C) *3), *4).

This wide temperature range enables cooling even in winter in buildings with high internal heat resulting from lighting, people, and machines, particularly in areas such as shops, lecture rooms, and data processing areas. Heating units can operate under low ambient temperature down to -13°F (-25°C).

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) *1), *2)	14°F DB (-10°C DB) *3), *4)
Heating Operation	Indoor	80°F DB (27°C DB)	59°F DB (15°C DB)
	Outdoor	59°F WB (15°C WB) *5)	-13°F WB (-25°C WB) *6), *7)

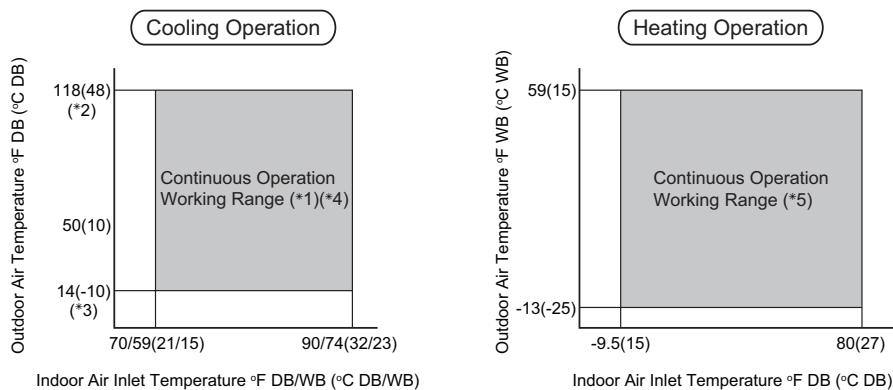
DB: Dry Bulb, WB: Wet Bulb

- *1) When the outdoor air temperature is 100°F DB (38°C DB) or more and the outdoor unit operation capacity ratio is 100% or more, the outdoor unit will be Thermo-OFF to protect the compressor from failure.
- *2) When the outdoor air temperature is 109°F (43°C) or more during the outdoor unit cooling operation, the maximum connectable indoor unit capacity ratio is 100%.
- *3) When the outdoor air temperature is 23°F (-5°C) or less during the outdoor unit cooling operation, the minimum connectable indoor unit capacity is 18,000 Btu/h.
In this case, installing the snow protection hood (optional part) is required.
- *4) When operating the outdoor unit under the low cooling load conditions and in the low outdoor air temperature, (approx. 50°F DB (10°C DB) or less), the indoor unit will be Thermo-OFF to prevent the heat exchanger of the indoor unit from being frosted.
- *5) When operating the outdoor unit under the low heating load conditions and the outdoor temperature is 59°F DB (15°C DB) or more, the outdoor unit will be Thermo-OFF to protect the compressor from failure.
- *6) When the outdoor temperature is lower than 14°F (-10°C) select the combination of indoor units and outdoor unit as the total capacity of indoor units not to exceed the capacity of outdoor unit.
- *7) If some indoor units start operating simultaneously at a low outdoor air temperature, the airflow may be less than the setting airflow on wired controller for maintaining indoor comfort.

Thermo-ON: The outdoor unit and some indoor units are running.

Thermo-OFF: The outdoor unit and some indoor units stay on, but don't run.

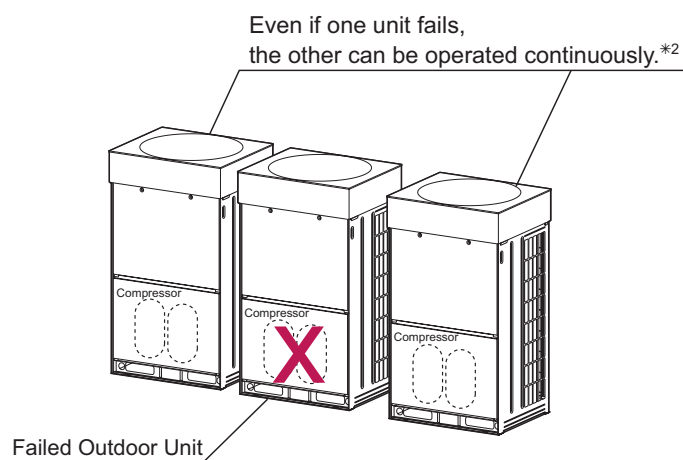
- This manual should be considered as a permanent part of the air conditioning equipment and should remain with the air conditioning equipment.



Backup Operation Function for Emergency

The Backup Operation Function prevents the system from coming to a complete stop when an outdoor unit failure occurs. *1

The wired controller starts an emergency operation after an alarm occurrence. *3

**NOTE:**

*1: At least two outdoor units are required for this function.

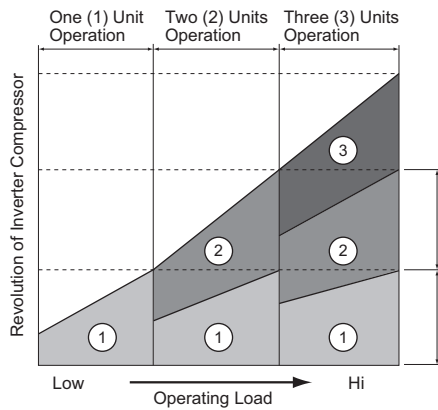
*2: Do not perform an emergency operation for more than eight hours. Doing so may damage the unit.

*3: An emergency operation can be performed when a specified alarm code occurs.
Refer to the following.

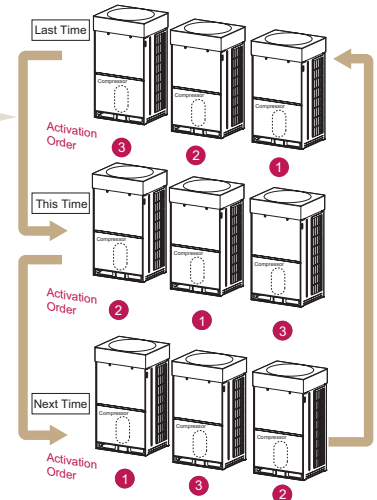
Rotation Operation Function for Outdoor Unit ^{*1}

Regulating the operation time of each outdoor unit leads to a compressor load reduction. ^{*2}
 During a multiple unit operation, the same rotation frequency of the inverter compressor results in an equivalent load on each compressor.
 Therefore, there is improved function of the outdoor unit.

Inverter Compressor Rotation Frequency Control (Example)



Revolution of ②
 It is operated so that the revolution of the inverter compressor ① and ② may become the same.
 Revolution of ①



NOTE:

- *1. At least two outdoor units are required for this function.
- *2. Comparison between rotation operation function and non-rotation operation function based on the same system.

Noise Reduction Preference Mode

■ Noise Reduction Preference Mode (Optional Function)

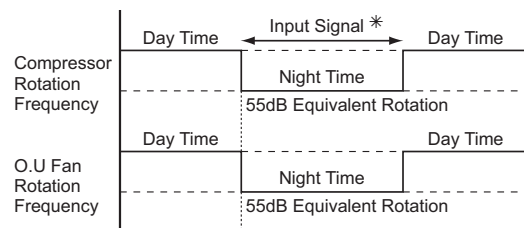
With the Noise Reduction Preference Mode, the sound pressure level for a particular time zone can be set based upon the usage environment. ^{*1}

- Selecting from three Stages of Sound Pressure Level by setting from Outdoor Unit PCB External Input and Output Function

Control Function No.	Item	Sound Pressure Level (dB) (Approx. Value) ^{*2}
11	Noise Reduction Setting 1 (Standard Value -2dB)	58
12	Noise Reduction Setting 2 (Standard Value -5dB)	55
13	Noise Reduction Setting 3 (Standard Value -8dB)	52

< Setting Example >

Low-Sound Operation during Night Time only by Using Timer



*: Perform the electrical wiring work on site when setting input signal.

NOTE:

- *1. A range of performance and operation is restricted because the rotation frequency of the compressor and outdoor fan is forcibly decreased.

[Target Capacity of Each Setting]

- Noise Reduction Setting 1: 80% of Standard Capacity
- Noise Reduction Setting 2: 60% of Standard Capacity
- Noise Reduction Setting 3: 40% of Standard Capacity

- *2: The table above shows an approximate value of 72 MBH model.

In some cases, the value may temporarily become higher than the approximate value on the table above because of an operating condition.

Installation**■ Transportation and Handling Using Elevator**

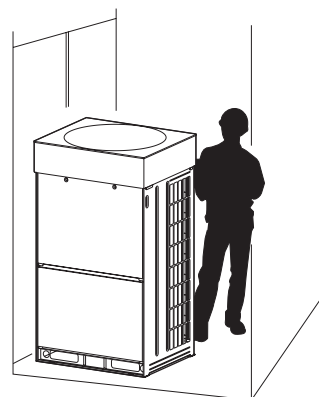
An elevator * can be used to transport the base unit.

< Elevator * >

Capacity: Maximum of 11 persons.

Door Opening: 31-1/2 inches (800 mm)

Depth: 53-1/8 inches (1344 mm)

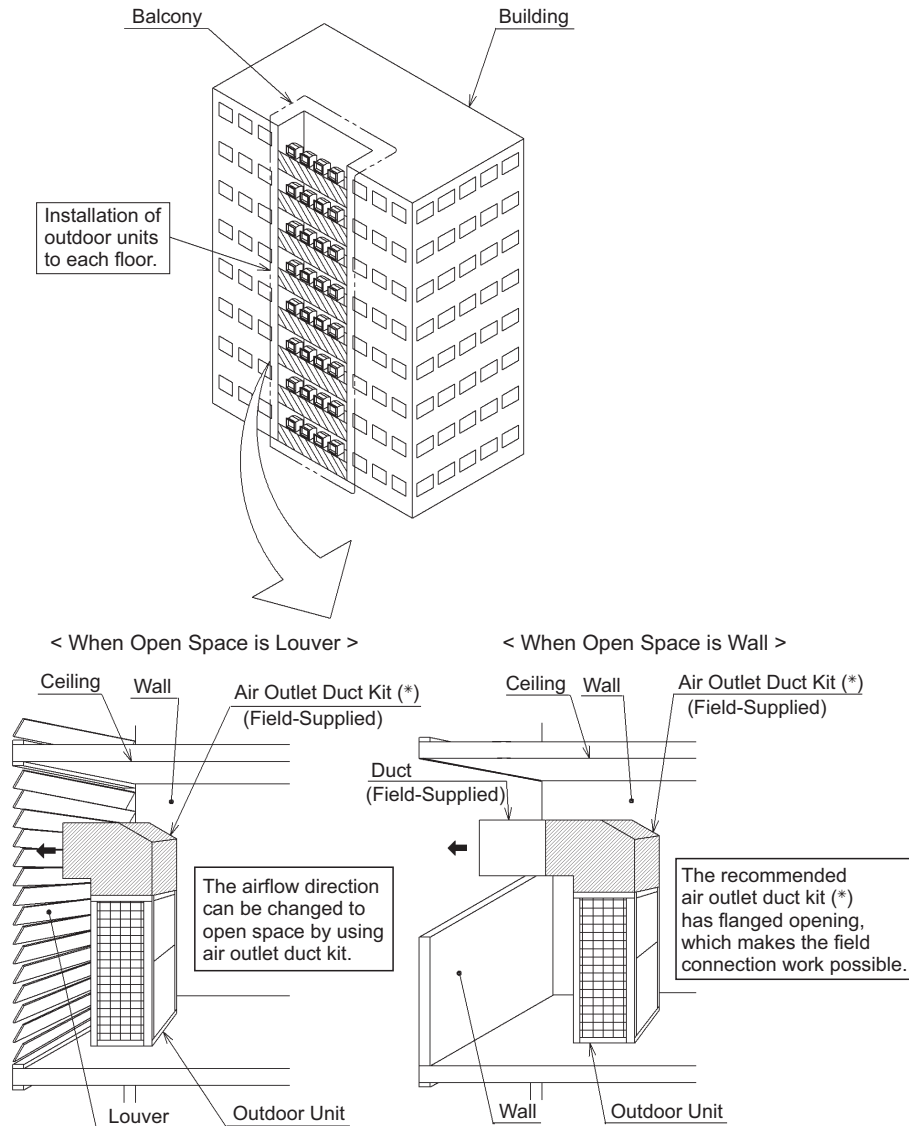


FEATURES

■ Installation Flexibility

There is flexibility for installation spaces such as a balcony or a floor where an external static pressure such as a louver or a duct is required for installation, the external static pressure 0.24in.W.G.(60Pa) by the DIP switch setting (No. 5 pin on DSW5 is "ON").

< Installation Example for Air Outlet Duct Kit >

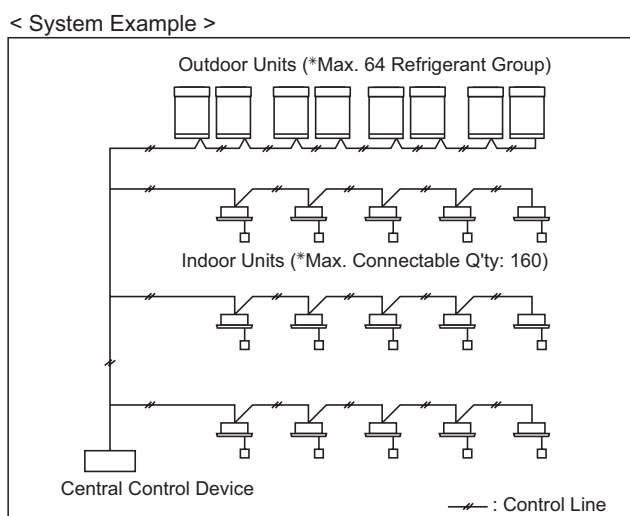


NOTE:

If the outlet air intakes short-circuit, the operation range is limited because of increasing high pressure in the cooling operation or decreasing low pressure in the heating operation causing failure of the unit.

Corresponds to H-LINK II System

The outdoor units in the VRF Series corresponds to the H-LINK II transmission system. A maximum of 64 refrigerant groups and a maximum 160 indoor units can be controlled by only one central control device when the equipment (central control device, indoor units, wired controller) in the same transmission system all correspond to H-LINK II.



■ H-LINK II System

The H-LINK II wiring system requires only two communication cables to connect each indoor unit and outdoor unit for up to 64 refrigerant systems, and to connect wires for all indoor units and outdoor units.

<Specifications>

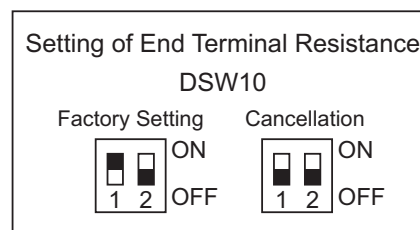
- * Communication Cable: 2-Wire
- * Polarity of Communication Cable: Non-Polar Cable
- * Maximum Outdoor Units to be Connected: 64 Units per System
- * Maximum Indoor Units to be Connected: 160 Units per H-LINK II System
- * Maximum Cable Length: Total 3,280 ft. (1,000m) (including central controller)
- * Recommended Cable: Communication Cable with Shield, over AWG18 (Equivalent to KPEV-S)
- * Voltage: DC5V

NOTE:

When using an H-LINK II system, the setting of DIP switches for an outdoor unit and indoor unit is required. If the DIP switches are not set, or set incorrectly, an alarm may occur because of a communication failure.

■ Setting of End Terminal Resistance

Factory setting of the No.1 pin of DSW10 is in the "ON" position. When the number of outdoor units in the same H-LINK II system is two or more, set the No.1 pin of DSW10 at "OFF" at the second unit. If only one outdoor unit is used, no setting is required.



2. Outdoor Units

2.1 Unit Nomenclature

- Outdoor Units
Model Descriptions

Example

Nomenclature Description		H	V	A	HP	192	B	4	1	CW
H = Hitachi Brand Y = York Brand	H									
VRF	V									
A = Air Source	A									
HP = Heat Pump	HP									
072 = 72 MBH 096 = 96 MBH 144 = 144 MBH 168 = 168 MBH 192 = 192 MBH 288 = 288 MBH	192									
B = R410A	B									
3 = 208/230Volts - 3Phase - 60Hz 4 = 460Volts - 3Phase - 60Hz	4									
1 = 1st Generation	1									
CW = Low Ambient	CW									

2.2 Line-up

Voltage		Capacity (MBH)	Model Name
208/230V	Base Unit	72	(H,Y)VAHP072B31CW
	Base Unit	96	(H,Y)VAHP096B31CW
	72 + 72	144	(H,Y)VAHP144B31CW
	96 + 72	168	(H,Y)VAHP168B31CW
	96 + 96	192	(H,Y)VAHP192B31CW
	96 + 96 + 96	288	(H,Y)VAHP288B31CW
460V	Base Unit	72	(H,Y)VAHP072B41CW
	Base Unit	96	(H,Y)VAHP096B41CW
	72 + 72	144	(H,Y)VAHP144B41CW
	96 + 72	168	(H,Y)VAHP168B41CW
	96 + 96	192	(H,Y)VAHP192B41CW
	96 + 96 + 96	288	(H,Y)VAHP288B41CW

• Combinations

< 208/230V >

Base Unit

Capacity (MBH)	72	96
Model	(H,Y)VAHP072B31CW	(H,Y)VAHP096B31CW

Combination of Base Units

Capacity (MBH)	144	168	192	288
Model	(H,Y)VAHP144B31CW	(H,Y)VAHP168B31CW	(H,Y)VAHP192B31CW	(H,Y)VAHP288B31CW
Combination	(H,Y)VAHP072B31CW	(H,Y)VAHP096B31CW	(H,Y)VAHP096B31CW	(H,Y)VAHP096B31CW
	(H,Y)VAHP072B31CW	(H,Y)VAHP072B31CW	(H,Y)VAHP096B31CW	(H,Y)VAHP096B31CW
	-	-	-	(H,Y)VAHP096B31CW

< 460V >

Base Unit

Capacity (MBH)	72	96
Model	(H,Y)VAHP072B41CW	(H,Y)VAHP096B41CW

Combination of Base Units

Capacity (MBH)	144	168	192	288
Model	(H,Y)VAHP144B41CW	(H,Y)VAHP168B41CW	(H,Y)VAHP192B41CW	(H,Y)VAHP288B41CW
Combination	(H,Y)VAHP072B41CW	(H,Y)VAHP096B41CW	(H,Y)VAHP096B41CW	(H,Y)VAHP096B41CW
	(H,Y)VAHP072B41CW	(H,Y)VAHP072B41CW	(H,Y)VAHP096B41CW	(H,Y)VAHP096B41CW
	-	-	-	(H,Y)VAHP096B41CW

2.3 General Data

(1) 208/230V Type

Category		Ton			6RT		8RT		
Model (combination)				(H,Y)VAHP072B31CW				(H,Y)VAHP096B31CW	
Model (individual)		Unit A			-		-		
		Unit B			-		-		
		Unit C			-		-		
Power Supply				208/230V/ 3PH 60Hz		208/230V/ 3PH 60Hz			
Capacity (Nominal) *1	Cooling	Capacity (Nominal)		Btu/h	(kW)	72,000	(21.1)	96,000	(28.1)
		Power Input		kW		5.88		9.61	
		Current Input		A (208/230V)		16.8 / 16.1		27.2 / 25.9	
	Heating	Capacity (Nominal)		Btu/h	(kW)	81,000	(23.7)	108,000	(31.7)
		Power Input		kW		5.51		8.08	
		Current Input		A (208/230V)		15.8 / 15.0		23.1 / 21.8	
Efficiency Ratings *2	Cooling	Capacity (Rated)		Btu/h	(kW)	69,000	(20.2)	92,000	(27.0)
		EER		Btu/Wh	(W/W)	13.00	(3.81)	11.90	(3.49)
		IEER		Btu/Wh	(Wh/Wh)	18.10	(5.31)	18.90	(5.54)
	Heating High	Capacity (Rated)		Btu/h	(kW)	76,000	(22.3)	103,000	(30.2)
		COP		W/W		4.09		3.80	
	Heating Low	Capacity		Btu/h	(kW)	64,000	(18.8)	87,000	(25.5)
		COP		W/W		2.57		2.42	
	Cooling Operating Range		Indoor	°F WB (°C WB)		59(15) ~ 73(23)		59(15) ~ 73(23)	
		Outdoor	°F DB (°C DB)		14(-10) ~ 118(48) *3		14(-10) ~ 118(48) *3		
Heating Operating Range		Indoor	°F DB (°C DB)		59(15) ~ 80(27)		59(15) ~ 80(27)		
		Outdoor	°F WB (°C WB)		-13(-25) ~ 59(15) *4		-13(-25) ~ 59(15) *4		
Cabinet Color (Munsell Code)				-		2.5Y 8/2		2.5Y 8/2	
Outer Dimensions	Height		in	(mm)	68-1/8	(1730)	68-1/8	(1730)	
	Width		in	(mm)	48-1/8	(1222)	48-1/8	(1222)	
	Depth		in	(mm)	31-1/4	(793)	31-1/4	(793)	
Package Dimensions	Height		in	(mm)	74-1/4	(1886)	74-1/4	(1886)	
	Width		in	(mm)	50-7/8	(1292)	50-7/8	(1292)	
	Depth		in	(mm)	34	(864)	34	(864)	
Weight	Net		lbs	(kg)	699	(317)	699	(317)	
	Gross		lbs	(kg)	756	(343)	756	(343)	
Connection Ratio	Total Indoor Unit Capacity		%		130 - 60		110 - 60		
	Max. (Recommendation) indoor units/system				15 (10)		16 (10)		
Heat Exchanger	Type		-		Multi-Pass Cross-Finned Tube		Multi-Pass Cross-Finned Tube		
	Material		-		Cu-Al (Anti-corrosion)		Cu-Al (Anti-corrosion)		
Compressor	Type	Inverter	-		EK655DHD×1		EK655DHD×1		
		Fixed Speed	-		EK655DH×1		EK655DH×1		
	Motor Output (Pole)		kW (Pole)		3.2(4)+3.0(2)		3.2(4)+3.0(2)		
	Start Method		-		Inverter		Inverter		
	Operation Range		%		14 ~ 100		14 ~ 100		
	Refrigeration Oil Type		-		FVC68D		FVC68D		
Crank Case Heater			W×Q'ty		40.8 (230V)×6		40.8 (230V)×6		
Fan	Type		-		Propeller Fan		Propeller Fan		
	Motor Output (Pole)		kW (Pole)		0.66(8)		0.66(8)		
	Quantity		Q'ty		1		1		
	Airflow Rate		cfm	(m³/min)	6884	(195)	6884	(195)	
	External Static Pressure		in.WG	(Pa)	0 (0) *5		0 (0) *5		
Electrical	Drive		-		Direct-drive		Direct-drive		
	Min Circuit Amps		A		51/46		51/46		
	Max Overcurrent Protective Device		A		72/65		72/65		
	Maximum Fuse Size		A		70/60		70/60		
Sound Pressure Level *6	Cooling (Night-Shift)		dB (A)		60	(56)	60	(56)	
	Heating		dB (A)		61		61		
Protection Devices	Cycle		-		High pressure switch at 601psi (4.15MPa)		High pressure switch at 601psi (4.15MPa)		
	Inverter		-		Over-current protection		Over-current protection		
	Compressor		-		Over-heat protection		Over-heat protection		
	PCB		-		Over-heat protection		Over-heat protection		
Refrigerant	Type		-		R410A		R410A		
	Charge Amount		lbs	(kg)	17.0	(7.7)	17.0	(7.7)	
Refrigeration Oil	Charge Amount		gal/Unit	(L/Unit)	2.1	(7.9)	2.1	(7.9)	
Defrost Method			-		Reversed Refrigerant Cycle Hot Gas Bypass		Reversed Refrigerant Cycle Hot Gas Bypass		
Main Refrigerant Piping (Heat Pump)	Gas Line		in	(mm)	7/8	(22.2)	7/8	(22.2)	
	Liquid Line		in	(mm)	3/8	(9.52)	3/8	(9.52)	

NOTES:

*1 Rating Conditions:

Cooling

Indoor Air Inlet Temperature: 80°F (26.7°C) DB

67°F (19.4°C) WB

Outdoor Air Inlet Temperature: 95°F (35.0°C) DB

Piping Length: 24 ft. 7-3/16 in. (7.5m), Piping Lift: 0ft (0m)

*2 Efficiency ratings are based on the AHRI 1230 test standard.

*3 There are some exceptions and notes for cooling operation ranges. For details, refer to "FEATURES".

*4 There are some exceptions and notes for heating operation ranges. For details, refer to "FEATURES".

*5 External static pressure can be changed via DSW setting 0.24in.W.G.(60Pa).

*6 The operation sound is measured in an anechoic chamber. However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise. Be sure to check environmental conditions before installation. The sound of the air inlet side is 8dB higher than that of the front side.

Heating

Indoor Air Inlet Temperature: 70°F (21.1°C) DB

Outdoor Air Inlet Temperature: 47°F (8.3°C) DB

43°F (6.1°C) WB

OUTDOOR UNITS

Category		Ton		12RT (6RT+6RT)		14RT (8RT+6RT)		16RT (8RT+8RT)		
Model (combination)				(H,Y)VAHP144B31CW		(H,Y)VAHP168B31CW		(H,Y)VAHP192B31CW		
Model (individual)		Unit A		(H,Y)VAHP072B31CW		(H,Y)VAHP096B31CW		(H,Y)VAHP096B31CW		
		Unit B		(H,Y)VAHP072B31CW		(H,Y)VAHP072B31CW		(H,Y)VAHP096B31CW		
		Unit C		-		-		-		
Power Supply				208/230V/ 3PH 60Hz		208/230V/ 3PH 60Hz		208/230V/ 3PH 60Hz		
Capacity (Nominal) *1	Cooling	Capacity (Nominal)	Btu/h	(kW)	144,000	(42.2)	168,000	(49.2)	192,000	(56.3)
		Power Input	kW		11.77		15.50		19.23	
		Current Input	A (208/230V)		33.6 / 32.2		44.0 / 42.0		54.4 / 51.8	
	Heating	Capacity (Nominal)	Btu/h	(kW)	162,000	(47.5)	189,000	(55.4)	216,000	(63.3)
		Power Input	kW		11.02		13.59		16.16	
		Current Input	A (208/230V)		31.6 / 30.0		38.9 / 36.8		46.2 / 43.6	
Efficiency Ratings *2	Cooling	Capacity (Rated)	Btu/h	(kW)	138,000	(40.5)	160,000	(46.9)	182,000	(53.4)
		EER	Btu/Wh	(W/W)	12.80	(3.75)	12.30	(3.61)	12.20	(3.58)
		IEER	Btu/Wh	(Wh/Wh)	17.60	(5.16)	18.50	(5.43)	18.50	(5.43)
	Heating	Capacity (Rated)	Btu/h	(kW)	154,000	(45.2)	178,000	(52.2)	204,000	(59.8)
		COP	W/W		3.99		3.80		3.68	
	Heating	High								
		Low	Capacity	Btu/h	(kW)	129,000	(37.8)	151,000	(44.3)	174,000
			COP	W/W		2.50		2.33		2.37
Cooling Operating Range		Indoor	°F WB (°C WB)		59(15) ~ 73(23)		59(15) ~ 73(23)		59(15) ~ 73(23)	
		Outdoor	°F DB (°C DB)		14(-10) ~ 118(48) *3		14(-10) ~ 118(48) *3		14(-10) ~ 118(48) *3	
Heating Operating Range		Indoor	°F DB (°C DB)		59(15) ~ 80(27)		59(15) ~ 80(27)		59(15) ~ 80(27)	
		Outdoor	°F WB (°C WB)		-13(-25) ~ 59(15) *4		-13(-25) ~ 59(15) *4		-13(-25) ~ 59(15) *4	
Cabinet Color (Munsell Code)			-		2.5Y 8/2		2.5Y 8/2		2.5Y 8/2	
Outer Dimensions	Height		in	(mm)	68-1/8	(1730)	68-1/8	(1730)	68-1/8	(1730)
	Width *5		in	(mm)	96-5/8	(2454)	96-5/8	(2454)	96-5/8	(2454)
	Depth		in	(mm)	31-1/4	(793)	31-1/4	(793)	31-1/4	(793)
Package Dimensions	Height		in	(mm)	-	-	-	-	-	-
	Width		in	(mm)	-	-	-	-	-	-
	Depth		in	(mm)	-	-	-	-	-	-
Weight	Net		lbs	(kg)	1398	(634)	1398	(634)	1398	(634)
	Gross		lbs	(kg)	1513	(686)	1513	(686)	1513	(686)
Connection Ratio		Total Indoor Unit Capacity	%		130 - 60		110 - 60		110 - 60	
		Max. (Recommendation) indoor units/system			31 (18)		30 (18)		33 (18)	
Heat Exchanger		Type	-		Multi-Pass Cross-Finned Tube		Multi-Pass Cross-Finned Tube		Multi-Pass Cross-Finned Tube	
		Material	-		Cu-Al (Anti-corrosion)		Cu-Al (Anti-corrosion)		Cu-Al (Anti-corrosion)	
Compressor	Type	Inverter	-		EK655DHD×2		EK655DHD×2		EK655DHD×2	
		Fixed Speed	-		EK655DH×2		EK655DH×2		EK655DH×2	
	Motor Output (Pole)		kW (Pole)		3.2(4)+3.0(2) 3.2(4)+3.0(2)		3.2(4)+3.0(2) 3.2(4)+3.0(2)		3.2(4)+3.0(2) 3.2(4)+3.0(2)	
	Start Method		-		Inverter		Inverter		Inverter	
	Operation Range		%		7 ~ 100		7 ~ 100		7 ~ 100	
	Refrigeration Oil Type		-		FVC68D		FVC68D		FVC68D	
Crank Case Heater			W×Q'ty		40.8 (230V)×12		40.8 (230V)×12		40.8 (230V)×12	
Fan	Type		-		Propeller Fan		Propeller Fan		Propeller Fan	
	Motor Output (Pole)		kW (Pole)		0.66(8)×2		0.66(8)×2		0.66(8)×2	
	Quantity		Q'ty		2		2		2	
	Airflow Rate		cfm	(m ³ /min)	6884+6884	(195+195)	6884+6884	(195+195)	6884+6884	(195+195)
	External Static Pressure		in.WG	(Pa)	0 (0) *6		0 (0) *6		0 (0) *6	
	Drive		-		Direct-drive		Direct-drive		Direct-drive	
Electrical	Min Circuit Amps		A		-		-		-	
	Max Overcurrent Protective Device		A		-		-		-	
	Maximum Fuse Size		A		-		-		-	
Sound Pressure Level *7	Cooling (Night-Shift)		dB (A)		63 (59)		63 (59)		63 (59)	
	Heating		dB (A)		64		64		64	
Protection Devices	Cycle		-		High pressure switch at 601psi (4.15MPa)		High pressure switch at 601psi (4.15MPa)		High pressure switch at 601psi (4.15MPa)	
	Inverter		-		Over-current protection Over-heat protection		Over-current protection Over-heat protection		Over-current protection Over-heat protection	
	Compressor		-		Over-heat protection		Over-heat protection		Over-heat protection	
	PCB		-		Over-current protection		Over-current protection		Over-current protection	
Refrigerant	Type		-		R410A		R410A		R410A	
	Charge Amount		lbs	(kg)	17.0+17.0	(7.7+7.7)	17.0+17.0	(7.7+7.7)	17.0+17.0	(7.7+7.7)
Refrigeration Oil	Charge Amount		gal/Unit	(L/Unit)	2.1+2.1	(7.9+7.9)	2.1+2.1	(7.9+7.9)	2.1+2.1	(7.9+7.9)
Defrost Method			-		Reversed Refrigerant Cycle Hot Gas Bypass		Reversed Refrigerant Cycle Hot Gas Bypass		Reversed Refrigerant Cycle Hot Gas Bypass	
Main Refrigerant Piping (Heat Pump)	Gas Line		in	(mm)	1-1/8	(28.58)	1-1/8	(28.58)	1-1/8	(28.58)
	Liquid Line		in	(mm)	5/8	(15.88)	5/8	(15.88)	5/8	(15.88)

NOTES:

*1 Rating Conditions:

Cooling

Indoor Air Inlet Temperature: 80°F (26.7°C) DB

67°F (19.4°C) WB

Outdoor Air Inlet Temperature: 95°F (35.0°C) DB

Piping Length: 24 ft. 7-3/16 in. (7.5m), Piping Lift: 0ft (0m)

Heating

Indoor Air Inlet Temperature: 70°F (21.1°C) DB

Outdoor Air Inlet Temperature: 47°F (8.3°C) DB

43°F (6.1°C) WB

*2 Efficiency ratings are based on the AHRI 1230 test standard.

*3 There are some exceptions and notes for cooling operation ranges. For details, refer to "FEATURES".

*4 There are some exceptions and notes for heating operation ranges. For the detail, refer to "FEATURES".

*5 The table shows an example where there is 7/8in.(22mm) clearance between the base units.

*6 External static pressure can be changed using the DSW setting 0.24in.W.G.(60Pa).

*7 The operation sound is measured in an anechoic chamber. However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise. Be sure to check environmental conditions before installation. The sound of the air inlet side is 8dB higher than that of the front side.

Category		Ton			24RT (8RT+8RT+8RT)		
Model (combination)					(H,Y)VAHP288B31CW		
Model (individual)		Unit A			(H,Y)VAHP096B31CW		
		Unit B			(H,Y)VAHP096B31CW		
		Unit C			(H,Y)VAHP096B31CW		
Power Supply					208/230V/ 3PH 60Hz		
Capacity (Nominal) *1	Cooling	Capacity (Nominal)		Btu/h	(kW)	288,000	(84.4)
		Power Input		kW		28.84	
		Current Input		A (208/230V)		81.6 / 77.7	
	Heating	Capacity (Nominal)		Btu/h	(kW)	324,000	(95.0)
		Power Input		kW		24.25	
		Current Input		A (208/230V)		69.3 / 65.4	
Efficiency Ratings *2	Cooling	Capacity (Rated)		Btu/h	(kW)	274,000	(80.4)
		EER		Btu/Wh	(W/W)	10.60	(3.11)
		IEER		Btu/Wh	(Wh/Wh)	17.70	(5.19)
	Heating	Capacity (Rated)		Btu/h	(kW)	308,000	(90.3)
		COP		W/W		3.57	
	High	Capacity		Btu/h	(kW)	260,000	(76.3)
		COP		W/W		2.34	
	Cooling Operating Range	Indoor			°F WB (°C WB)		59(15) ~ 73(23)
Outdoor				°F DB (°C DB)		14(-10) ~ 118(48) *3	
Heating Operating Range	Indoor			°F DB (°C DB)		59(15) ~ 80(27)	
	Outdoor			°F WB (°C WB)		-13(-25) ~ 59(15) *4	
Cabinet Color (Munsell Code)				-		2.5Y 8/2	
Outer Dimensions	Height		in	(mm)	68-1/8	(1730)	
	Width *5		in	(mm)	145-1/8	(3686)	
	Depth		in	(mm)	31-1/4	(793)	
Package Dimensions	Height		in	(mm)	-	-	
	Width		in	(mm)	-	-	
	Depth		in	(mm)	-	-	
Weight	Net		lbs	(kg)	2097	(951)	
	Gross		lbs	(kg)	2269	(1029)	
Connection Ratio	Total Indoor Unit Capacity			%		110 - 60	
	Max. (Recommendation) indoor units/system					50 (32)	
Heat Exchanger	Type			-		Multi-Pass Cross-Finned Tube	
	Material			-		Cu-Al (Anti-corrosion)	
Compressor	Type	Inverter	-		EK655DHD×3		
		Fixed Speed	-		EK655DH×3		
	Motor Output (Pole)		kW (Pole)		3.2(4)+3.0(2) 3.2(4)+3.0(2) 3.2(4)+3.0(2)		
	Start Method		-		Inverter		
	Operation Range		%		8 ~ 100		
	Refrigeration Oil Type		-		FVC68D		
	Crank Case Heater			W×Q'ty		40.8 (230V)×18	
Fan	Type		-		Propeller Fan		
	Motor Output (Pole)		kW (Pole)		0.66(8)×3		
	Quantity		Q'ty		3		
	Airflow Rate		cfm	(m³/min)	6884+6884+6884	(195+195+195)	
	External Static Pressure		in.WG	(Pa)	0 (0) *6		
	Drive		-		Direct-drive		
Electrical	Min Circuit Amps		A		-		
	Max Overcurrent Protective Device		A		-		
	Maximum Fuse Size		A		-		
Sound Pressure Level *7	Cooling (Night-Shift)		dB (A)		65	(61)	
	Heating		dB (A)		66		
Protection Devices	Cycle		-		High pressure switch at 601psi (4.15MPa)		
	Inverter		-		Over-current protection		
	Compressor		-		Over-heat protection		
	PCB		-		Over-current protection		
Refrigerant	Type		-		R410A		
	Charge Amount		lbs	(kg)	17.0+17.0+17.0	(7.7+7.7+7.7)	
Refrigeration Oil	Charge Amount		gal/Unit	(L/Unit)	2.1+2.1+2.1	(7.9+7.9+7.9)	
Defrost Method			-		Reversed Refrigerant Cycle Hot Gas Bypass		
Main Refrigerant Piping (Heat Pump)	Gas Line		in	(mm)	1-3/8	(34.93)	
	Liquid Line		in	(mm)	3/4	(19.05)	

NOTES:

*1 Rating Conditions:

Cooling

Indoor Air Inlet Temperature: 80°F (26.7°C) DB

67°F (19.4°C) WB

Outdoor Air Inlet Temperature: 95°F (35.0°C) DB

Piping Length: 24 ft. 7-3/16 in.(7.5m), Piping Lift: 0ft (0m)

Heating

Indoor Air Inlet Temperature: 70°F (21.1°C) DB

Outdoor Air Inlet Temperature: 47°F (8.3°C) DB

43°F (6.1°C) WB

*2 Efficiency ratings are based on the AHRI 1230 test standard.

*3 There are some exceptions and notes for cooling operation ranges. For details, refer to "FEATURES".

*4 There are some exceptions and notes for heating operation ranges. For details, refer to "FEATURES".

*5 The table shows an example where there is 7/8in.(22mm) clearance between the base units.

*6 External static pressure can be changed via DSW setting 0.24in.W.G.(60Pa).

*7 The operation sound is measured in an anechoic chamber. However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise. Be sure to check environmental conditions before installation. The sound of the air inlet side is 8dB higher than that of the front side.

(2) 460V Type

Category		Ton			6RT		8RT		
Model (combination)					(H,Y)VAHP072B41CW		(H,Y)VAHP096B41CW		
Model (individual)		Unit A			-		-		
		Unit B			-		-		
		Unit C			-		-		
Power Supply					460V/ 3PH 60Hz		460V/ 3PH 60Hz		
Capacity (Nominal) *1	Cooling	Capacity (Nominal)	Btu/h	(kW)	72,000	(21.1)	96,000	(28.1)	
		Power Input	kW		5.88		9.61		
		Current Input	A		7.9		12.8		
	Heating	Capacity (Nominal)	Btu/h	(kW)	81,000	(23.7)	108,000	(31.7)	
		Power Input	kW		5.51		8.08		
		Current Input	A		7.4		10.8		
Efficiency Ratings *2	Cooling	Capacity (Rated)	Btu/h	(kW)	69,000	(20.2)	92,000	(27.0)	
		EER	Btu/Wh	(W/W)	13.00	(3.81)	11.90	(3.49)	
		IEER	Btu/Wh	(Wh/Wh)	18.10	(5.31)	18.90	(5.54)	
	Heating High	Capacity (Rated)	Btu/h	(kW)	76,000	(22.3)	103,000	(30.2)	
		COP	W/W		4.09		3.80		
	Heating Low	Capacity	Btu/h	(kW)	64,000	(18.8)	87,000	(25.5)	
		COP	W/W		2.57		2.42		
	Cooling Operating Range		Indoor	°F WB (°C WB)		59(15) ~ 73(23)		59(15) ~ 73(23)	
		Outdoor	°F DB (°C DB)		14(-10) ~ 118(48) *3		14(-10) ~ 118(48) *3		
Heating Operating Range		Indoor	°F DB (°C DB)		59(15) ~ 80(27)		59(15) ~ 80(27)		
		Outdoor	°F WB (°C WB)		-13(-25) ~ 59(15) *4		-13(-25) ~ 59(15) *4		
Cabinet Color (Munsell Code)			-			2.5Y 8/2		2.5Y 8/2	
Outer Dimensions	Height	in	(mm)	68-1/8	(1730)	68-1/8	(1730)		
	Width	in	(mm)	48-1/8	(1222)	48-1/8	(1222)		
	Depth	in	(mm)	31-1/4	(793)	31-1/4	(793)		
Package Dimensions	Height	in	(mm)	74-1/4	(1886)	74-1/4	(1886)		
	Width	in	(mm)	50-7/8	(1292)	50-7/8	(1292)		
	Depth	in	(mm)	34	(864)	34	(864)		
Weight	Net	lbs	(kg)	787	(357)	787	(357)		
	Gross	lbs	(kg)	845	(383)	845	(383)		
Connection Ratio	Total Indoor Unit Capacity		%		130 - 60		110 - 60		
	Max. (Recommendation) indoor units/system				15 (10)		16 (10)		
Heat Exchanger	Type	-			Multi-Pass Cross-Finned Tube		Multi-Pass Cross-Finned Tube		
	Material	-			Cu-Al (Anti-corrosion)		Cu-Al (Anti-corrosion)		
Compressor	Type	Inverter	EK655DHD×1			EK655DHD×1			
		Fixed Speed	-			EK655DH×1			
	Motor Output (Pole)	kW (Pole)		3.2(4)+3.0(2)		3.2(4)+3.0(2)			
	Start Method	-			Inverter		Inverter		
	Operation Range	%			14 ~ 100		14 ~ 100		
	Refrigeration Oil Type	-			FVC68D		FVC68D		
Crank Case Heater		W×Q'ty		40.8 (230V)×6		40.8 (230V)×6			
Fan	Type	-			Propeller Fan		Propeller Fan		
	Motor Output (Pole)	kW (Pole)		0.66(8)		0.66(8)			
	Quantity	Q'ty			1		1		
	Airflow Rate	cfm	(m³/min)	6884	(195)	6884	(195)		
	External Static Pressure	in.WG	(Pa)	0 (0) *5		0 (0) *5			
Electrical	Drive	-			Direct-drive		Direct-drive		
	Min Circuit Amps	A			24		24		
	Max Overcurrent Protective Device	A			34		34		
	Maximum Fuse Size	A			30		30		
Sound Pressure Level *6	Cooling (Night-Shift)	dB (A)		60	(56)	60	(56)		
	Heating	dB (A)		61		61			
Protection Devices	Cycle	-			High pressure switch at 601psi (4.15MPa)		High pressure switch at 601psi (4.15MPa)		
	Inverter	-			Over-current protection		Over-current protection		
	Compressor	-			Over-heat protection		Over-heat protection		
	PCB	-			Over-current protection		Over-current protection		
Refrigerant	Type	-			R410A		R410A		
	Charge Amount	lbs	(kg)	17.0	(7.7)	17.0	(7.7)		
Refrigeration Oil	Charge Amount	gal/Unit	(L/Unit)	2.1	(7.9)	2.1	(7.9)		
Defrost Method		-			Reversed Refrigerant Cycle Hot Gas Bypass		Reversed Refrigerant Cycle Hot Gas Bypass		
Main Refrigerant Piping (Heat Pump)	Gas Line	in	(mm)	7/8	(22.2)	7/8	(22.2)		
	Liquid Line	in	(mm)	3/8	(9.52)	3/8	(9.52)		

NOTES:

*1 Rating Conditions:

Cooling

Indoor Air Inlet Temperature: 80°F (26.7°C) DB

67°F (19.4°C) WB

Outdoor Air Inlet Temperature: 95°F (35.0°C) DB

Piping Length: 24 ft. 7-3/16 in. (7.5m), Piping Lift: 0ft (0m)

Heating

Indoor Air Inlet Temperature: 70°F (21.1°C) DB

47°F (8.3°C) DB

43°F (6.1°C) WB

*2 Efficiency ratings are based on the AHRI 1230 test standard.

*3 There are some exceptions and notes for cooling operation ranges. For details, refer to "FEATURES".

*4 There are some exceptions and notes for heating operation ranges. For details, refer to "FEATURES".

*5 External static pressure can be changed using the DSW setting 0.24in.W.G.(60Pa).

*6 The operation sound is measured in an anechoic chamber. However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise. Be sure to check environmental conditions before installation. The sound of the air inlet side is 8dB higher than that of the front side.

Category		Ton		12RT (6RT+6RT)		14RT (8RT+6RT)		16RT (8RT+8RT)		
Model (combination)				(H,Y)VAHP144B41CW		(H,Y)VAHP168B41CW		(H,Y)VAHP192B41CW		
Model (individual)		Unit A		(H,Y)VAHP072B41CW		(H,Y)VAHP096B41CW		(H,Y)VAHP096B41CW		
		Unit B		(H,Y)VAHP072B41CW		(H,Y)VAHP072B41CW		(H,Y)VAHP096B41CW		
		Unit C		-		-		-		
Power Supply				460V/ 3PH 60Hz		460V/ 3PH 60Hz		460V/ 3PH 60Hz		
Capacity (Nominal) *1	Cooling	Capacity (Nominal)	Btu/h	(kW)	144,000	(42.2)	168,000	(49.2)	192,000	(56.3)
		Power Input	kW		11.77		15.50		19.23	
		Current Input	A		15.8		20.7		25.6	
	Heating	Capacity (Nominal)	Btu/h	(kW)	162,000	(47.5)	189,000	(55.4)	216,000	(63.3)
		Power Input	kW		11.02		13.59		16.16	
		Current Input	A		14.8		18.2		21.6	
Efficiency Ratings *2	Cooling	Capacity (Rated)	Btu/h	(kW)	138,000	(40.5)	160,000	(46.9)	182,000	(53.4)
		EER	Btu/Wh (W/W)		12.80 (3.75)		12.30 (3.61)		12.20 (3.58)	
		IEER	Btu/Wh (Wh/Wh)		17.60 (5.16)		18.50 (5.43)		18.50 (5.43)	
	Heating High	Capacity (Rated)	Btu/h	(kW)	154,000	(45.2)	178,000	(52.2)	204,000	(59.8)
		COP	W/W		3.99		3.80		3.68	
	Heating Low	Capacity	Btu/h	(kW)	129,000	(37.8)	151,000	(44.3)	174,000	(51.0)
		COP	W/W		2.50		2.33		2.37	
	Cooling Operating Range		Indoor	°F WB (°C WB)		59(15) ~ 73(23)		59(15) ~ 73(23)		59(15) ~ 73(23)
Outdoor			°F DB (°C DB)		14(-10) ~ 118(48) *3		14(-10) ~ 118(48) *3		14(-10) ~ 118(48) *3	
Heating Operating Range		Indoor	°F DB (°C DB)		59(15) ~ 80(27)		59(15) ~ 80(27)		59(15) ~ 80(27)	
		Outdoor	°F WB (°C WB)		-13(-25) ~ 59(15) *4		-13(-25) ~ 59(15) *4		-13(-25) ~ 59(15) *4	
Cabinet Color (Munsell Code)			-		2.5Y 8/2		2.5Y 8/2		2.5Y 8/2	
Outer Dimensions	Height	in	(mm)	68-1/8	(1730)	68-1/8	(1730)	68-1/8	(1730)	
	Width *5	in	(mm)	96-5/8	(2454)	96-5/8	(2454)	96-5/8	(2454)	
	Depth	in	(mm)	31-1/4	(793)	31-1/4	(793)	31-1/4	(793)	
Package Dimensions	Height	in	(mm)	-	-	-	-	-	-	
	Width	in	(mm)	-	-	-	-	-	-	
	Depth	in	(mm)	-	-	-	-	-	-	
Weight	Net	lbs	(kg)	1574	(714)	1574	(714)	1574	(714)	
	Gross	lbs	(kg)	1689	(766)	1689	(766)	1689	(766)	
Connection Ratio	Total Indoor Unit Capacity		%	130 - 60		110 - 60		110 - 60		
	Max. (Recommendation) indoor units/system			31 (18)		30 (18)		33 (18)		
Heat Exchanger	Type	-		Multi-Pass Cross-Finned Tube		Multi-Pass Cross-Finned Tube		Multi-Pass Cross-Finned Tube		
	Material	-		Cu-Al (Anti-corrosion)		Cu-Al (Anti-corrosion)		Cu-Al (Anti-corrosion)		
Compressor	Type	Inverter	-	EK655DHD×2		EK655DHD×2		EK655DHD×2		
		Fixed Speed	-	EK655DH×2		EK655DH×2		EK655DH×2		
	Motor Output (Pole)	kW (Pole)		3.2(4)+3.0(2) 3.2(4)+3.0(2)		3.2(4)+3.0(2) 3.2(4)+3.0(2)		3.2(4)+3.0(2) 3.2(4)+3.0(2)		
	Start Method	-		Inverter		Inverter		Inverter		
	Operation Range	%		7 ~ 100		7 ~ 100		7 ~ 100		
	Refrigeration Oil Type	-		FVC68D		FVC68D		FVC68D		
Crank Case Heater		W×Q'ty		40.8 (230V)×12		40.8 (230V)×12		40.8 (230V)×12		
Fan	Type	-		Propeller Fan		Propeller Fan		Propeller Fan		
	Motor Output (Pole)	kW (Pole)		0.66(8)×2		0.66(8)×2		0.66(8)×2		
	Quantity	Q'ty		2		2		2		
	Airflow Rate	cfm	(m ³ /min)	6884+6884	(195+195)	6884+6884	(195+195)	6884+6884	(195+195)	
	External Static Pressure	in.WG	(Pa)	0 (0) *6		0 (0) *6		0 (0) *6		
	Drive	-		Direct-drive		Direct-drive		Direct-drive		
Electrical	Min Circuit Amps	A		-		-		-		
	Max Overcurrent Protective Device	A		-		-		-		
	Maximum Fuse Size	A		-		-		-		
Sound Pressure Level *7	Cooling (Night-Shift)	dB (A)		63 (59)		63 (59)		63 (59)		
	Heating	dB (A)		64		64		64		
Protection Devices	Cycle	-		High pressure switch at 601psi (4.15MPa)		High pressure switch at 601psi (4.15MPa)		High pressure switch at 601psi (4.15MPa)		
	Inverter	-		Over-current protection		Over-current protection		Over-current protection		
	Compressor	-		Over-heat protection		Over-heat protection		Over-heat protection		
	PCB	-		Over-current protection		Over-current protection		Over-current protection		
Refrigerant	Type	-		R410A		R410A		R410A		
	Charge Amount	lbs	(kg)	17.0+17.0	(7.7+7.7)	17.0+17.0	(7.7+7.7)	17.0+17.0	(7.7+7.7)	
Refrigeration Oil	Charge Amount	gal/Unit	(L/Unit)	2.1+2.1	(7.9+7.9)	2.1+2.1	(7.9+7.9)	2.1+2.1	(7.9+7.9)	
Defrost Method		-		Reversed Refrigerant Cycle Hot Gas Bypass		Reversed Refrigerant Cycle Hot Gas Bypass		Reversed Refrigerant Cycle Hot Gas Bypass		
Main Refrigerant Piping (Heat Pump)	Gas Line	in	(mm)	1-1/8	(28.58)	1-1/8	(28.58)	1-1/8	(28.58)	
	Liquid Line	in	(mm)	5/8	(15.88)	5/8	(15.88)	5/8	(15.88)	

NOTES:

*1 Rating Conditions:

Cooling

Indoor Air Inlet Temperature: 80°F (26.7°C) DB

67°F (19.4°C) WB

Outdoor Air Inlet Temperature: 95°F (35.0°C) DB

Piping Length: 24 ft. 7-3/16 in. (7.5m), Piping Lift: 0ft (0m)

Heating

Indoor Air Inlet Temperature: 70°F (21.1°C) DB

47°F (8.3°C) DB

43°F (6.1°C) WB

*2 Efficiency ratings are based on the AHRI 1230 test standard.

*3 There are some exceptions and notes for cooling operation ranges. For details, refer to "FEATURES".

*4 There are some exceptions and notes for heating operation ranges. For details, refer to "FEATURES".

*5 The table shows an example where there is 7/8in.(22mm) clearance between the base units.

*6 External static pressure can be changed using the DSW setting 0.24in.W.G.(60Pa).

*7 The operation sound is measured in an anechoic chamber. However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise. Be sure to check environmental conditions before installation. The sound of the air inlet side is 8dB higher than that of the front side.

OUTDOOR UNITS

Category		Ton			24RT (8RT+8RT+8RT)	
Model (combination)					(H,Y)VAHP288B41CW	
Model (individual)		Unit A			(H,Y)VAHP096B41CW	
		Unit B			(H,Y)VAHP096B41CW	
		Unit C			(H,Y)VAHP096B41CW	
Power Supply					460V/ 3PH 60Hz	
Capacity (Nominal) *1	Cooling	Capacity (Nominal)	Btu/h	(kW)	288,000	(84.4)
		Power Input	kW		28.84	
		Current Input	A		38.4	
	Heating	Capacity (Nominal)	Btu/h	(kW)	324,000	(95.0)
		Power Input	kW		24.25	
		Current Input	A		32.4	
Efficiency Ratings *2	Cooling	Capacity (Rated)	Btu/h	(kW)	274,000	(80.4)
		EER	Btu/Wh	(W/W)	10.60	(3.11)
		IEER	Btu/Wh	(Wh/Wh)	17.70	(5.19)
	Heating High	Capacity (Rated)	Btu/h	(kW)	308,000	(90.3)
		COP	W/W		3.57	
	Heating Low	Capacity	Btu/h	(kW)	260,000	(76.3)
		COP	W/W		2.34	
Cooling Operating Range		Indoor	°F WB (°C WB)		59(15) ~ 73(23)	
		Outdoor	°F DB (°C DB)		14(-10) ~ 118(48) *3	
Heating Operating Range		Indoor	°F DB (°C DB)		59(15) ~ 80(27)	
		Outdoor	°F WB (°C WB)		-13(-25) ~ 59(15) *4	
Cabinet Color (Munsell Code)			-		2.5Y 8/2	
Outer Dimensions	Height		in	(mm)	68-1/8	(1730)
	Width *5		in	(mm)	145-1/8	(3686)
	Depth		in	(mm)	31-1/4	(793)
Package Dimensions	Height		in	(mm)	-	-
	Width		in	(mm)	-	-
	Depth		in	(mm)	-	-
Weight	Net		lbs	(kg)	2362	(1071)
	Gross		lbs	(kg)	2534	(1149)
Connection Ratio	Total Indoor Unit Capacity		%		110 - 60	
	Max. (Recommendation) indoor units/system				50 (32)	
Heat Exchanger	Type		-		Multi-Pass Cross-Finned Tube	
	Material		-		Cu-Al (Anti-corrosion)	
Compressor	Type	Inverter	-		EK655DHD×3	
		Fixed Speed	-		EK655DH×3	
	Motor Output (Pole)		kW (Pole)		3.2(4)+3.0(2) 3.2(4)+3.0(2) 3.2(4)+3.0(2)	
	Start Method		-		Inverter	
	Operation Range		%		8 ~ 100	
	Refrigeration Oil Type		-		FVC68D	
	Crank Case Heater		W×Q'ty		40.8 (230V)×18	
Fan	Type		-		Propeller Fan	
	Motor Output (Pole)		kW (Pole)		0.66(8)×3	
	Quantity		Q'ty		3	
	Airflow Rate		cfm	(m³/min)	6884+6884+6884	(195+195+195)
	External Static Pressure		in.WG	(Pa)	0 (0) *6	
	Drive		-		Direct-drive	
Electrical	Min Circuit Amps		A		-	
	Max Overcurrent Protective Device		A		-	
	Maximum Fuse Size		A		-	
Sound Pressure Level *7	Cooling (Night-Shift)		dB (A)		65	(61)
	Heating		dB (A)		66	
Protection Devices	Cycle		-		High pressure switch at 601psi (4.15MPa)	
	Inverter		-		Over-current protection Over-heat protection	
	Compressor		-		Over-heat protection	
	PCB		-		Over-current protection	
Refrigerant	Type		-		R410A	
	Charge Amount		lbs	(kg)	17.0+17.0+17.0	(7.7+7.7+7.7)
Refrigeration Oil	Charge Amount		gal/Unit	(L/Unit)	2.1+2.1+2.1	(7.9+7.9+7.9)
Defrost Method			-		Reversed Refrigerant Cycle Hot Gas Bypass	
Main Refrigerant Piping (Heat Pump)	Gas Line		in	(mm)	1-3/8	(34.93)
	Liquid Line		in	(mm)	3/4	(19.05)

NOTES:

*1 Rating Conditions:

Cooling

Indoor Air Inlet Temperature: 80°F (26.7°C) DB

67°F (19.4°C) WB

Outdoor Air Inlet Temperature: 95°F (35.0°C) DB

Piping Length: 24 ft. 7-3/16 in. (7.5m), Piping Lift: 0ft (0m)

Heating

Indoor Air Inlet Temperature: 70°F (21.1°C) DB

Outdoor Air Inlet Temperature: 47°F (8.3°C) DB

43°F (6.1°C) WB

*2 Efficiency ratings are based on the AHRI 1230 test standard.

*3 There are some exceptions and notes for cooling operation ranges. For details, refer to "FEATURES".

*4 There are some exceptions and notes for heating operation ranges. For details, refer to "FEATURES".

*5 The table shows an example where there is 7/8in.(22mm) clearance between the base units.

*6 External static pressure can be changed using the DSW setting 0.24in.W.G.(60Pa).

*7 The operation sound is measured in an anechoic chamber. However, the actual operation sound may appear louder or with an echo because of surrounding environmental noise. Be sure to check environmental conditions before installation. The sound of the air inlet side is 8dB higher than that of the front side.

2.4 Dimensional Data and Weights

2.4.1 Overall Dimensional and Weight Data

< 208/230V >

Model	Height [in (mm)]	Width * [in (mm)]	Depth [in (mm)]	Weight [lbs (kg)]
(H,Y)VAHP072B31CW	68-1/8 (1730)	48-1/8 (1222)	31-1/4 (793)	699 (317)
(H,Y)VAHP096B31CW	68-1/8 (1730)	48-1/8 (1222)	31-1/4 (793)	699 (317)
(H,Y)VAHP144B31CW	68-1/8 (1730)	96-5/8 (2454)	31-1/4 (793)	1398 (634)
(H,Y)VAHP168B31CW	68-1/8 (1730)	96-5/8 (2454)	31-1/4 (793)	1398 (634)
(H,Y)VAHP192B31CW	68-1/8 (1730)	96-5/8 (2454)	31-1/4 (793)	1398 (634)
(H,Y)VAHP288B31CW	68-1/8 (1730)	145-1/8 (3686)	31-1/4 (793)	2097 (951)

< 460V >

Model	Height [in (mm)]	Width * [in (mm)]	Depth [in (mm)]	Weight [lbs (kg)]
(H,Y)VAHP072B41CW	68-1/8 (1730)	48-1/8 (1222)	31-1/4 (793)	787 (357)
(H,Y)VAHP096B41CW	68-1/8 (1730)	48-1/8 (1222)	31-1/4 (793)	787 (357)
(H,Y)VAHP144B41CW	68-1/8 (1730)	96-5/8 (2454)	31-1/4 (793)	1574 (714)
(H,Y)VAHP168B41CW	68-1/8 (1730)	96-5/8 (2454)	31-1/4 (793)	1574 (714)
(H,Y)VAHP192B41CW	68-1/8 (1730)	96-5/8 (2454)	31-1/4 (793)	1574 (714)
(H,Y)VAHP288B41CW	68-1/8 (1730)	145-1/8 (3686)	31-1/4 (793)	2361 (1071)

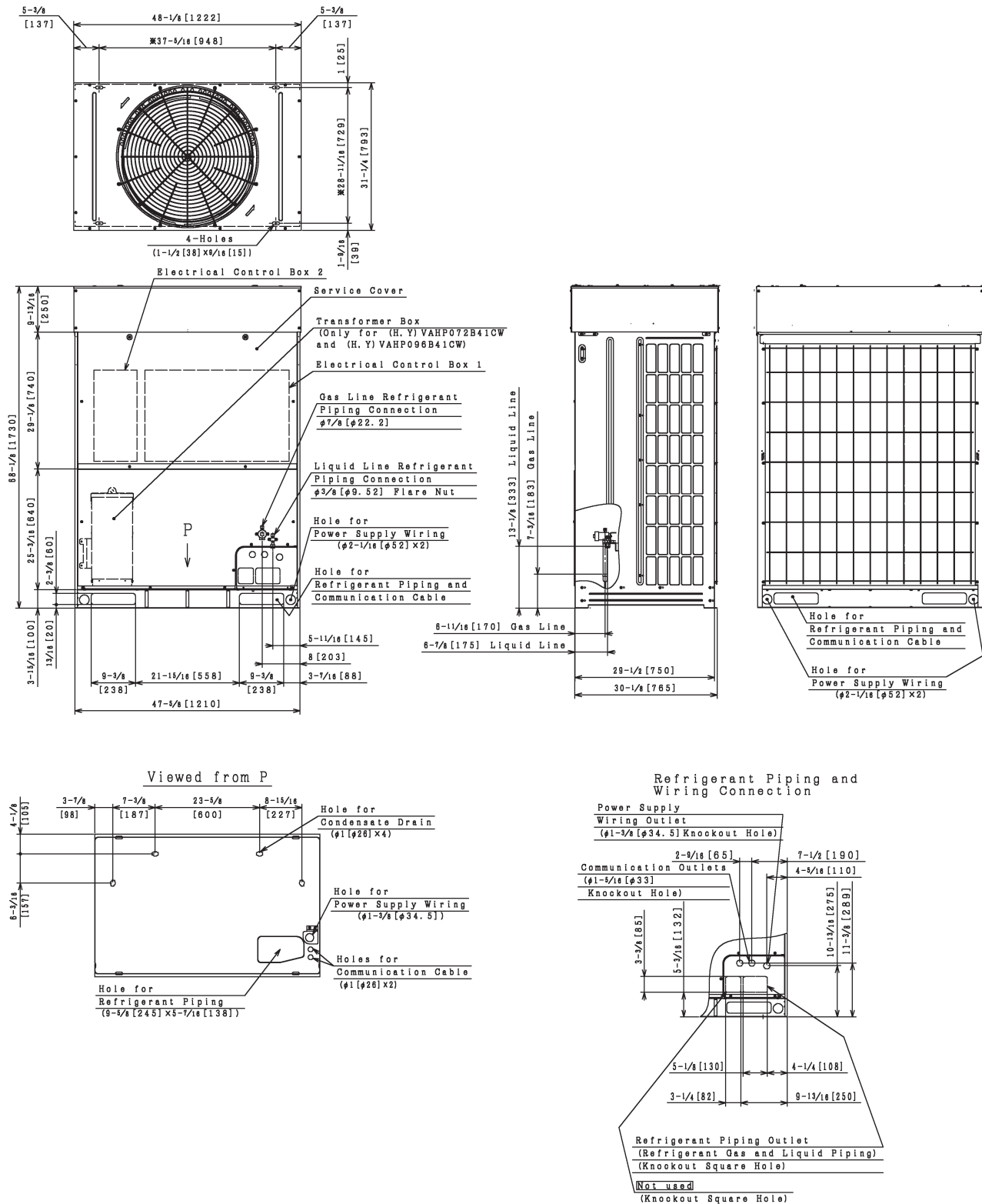
NOTE:

With a combination model, the above tables show an example width that has a 7/8 in. (22mm) clearance between the base units.

2.4.2 Outdoor Units

Model: (H,Y)VAHP072B(3,4)1CW and (H,Y)VAHP096B(3,4)1CW

inch (mm)

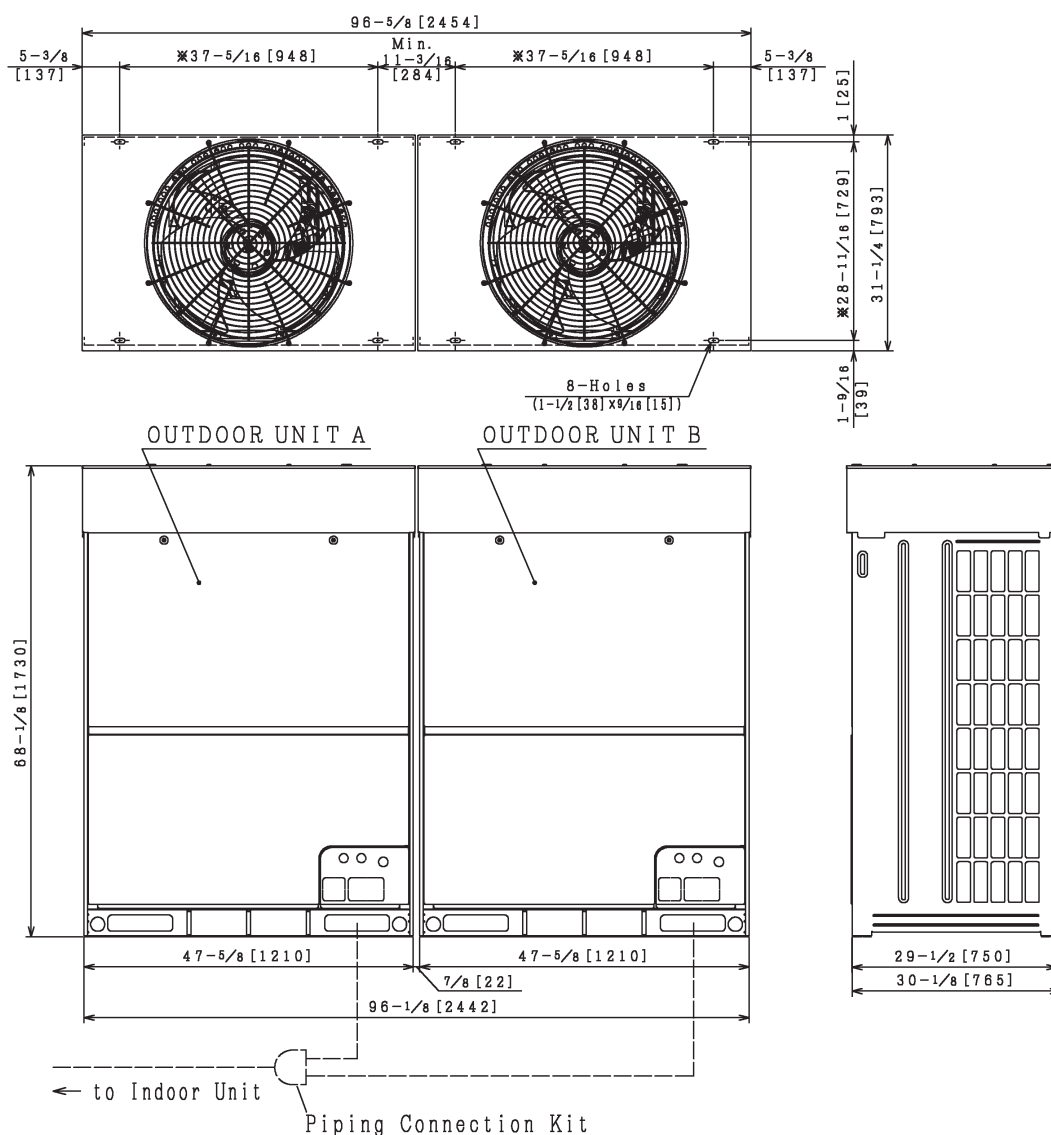


NOTES:

1. Drain water is discharged from the unit during the operation.
 - ① Choose a place where well drainage is available. Provide a groove for drain.
 - ② Do not provide an upward slope from the unit to avoid reverse flow of the drain.
 - Provide a second drainpan under the outdoor unit, to collect drain water securely.
 - ③ Do not use the drain boss (optional) in a cold area.
 - (Drain water in the drain pipe may be frozen and the drain pipe may crack.)
2. The dimensions marked with * indicates the mounting pitch dimension for anchor bolts.

Model: (H,Y)VAHP144B(3,4)1CW, (H,Y)VAHP168B(3,4)1CW and (H,Y)VAHP192B(3,4)1CW

inch (mm)



NOTES:

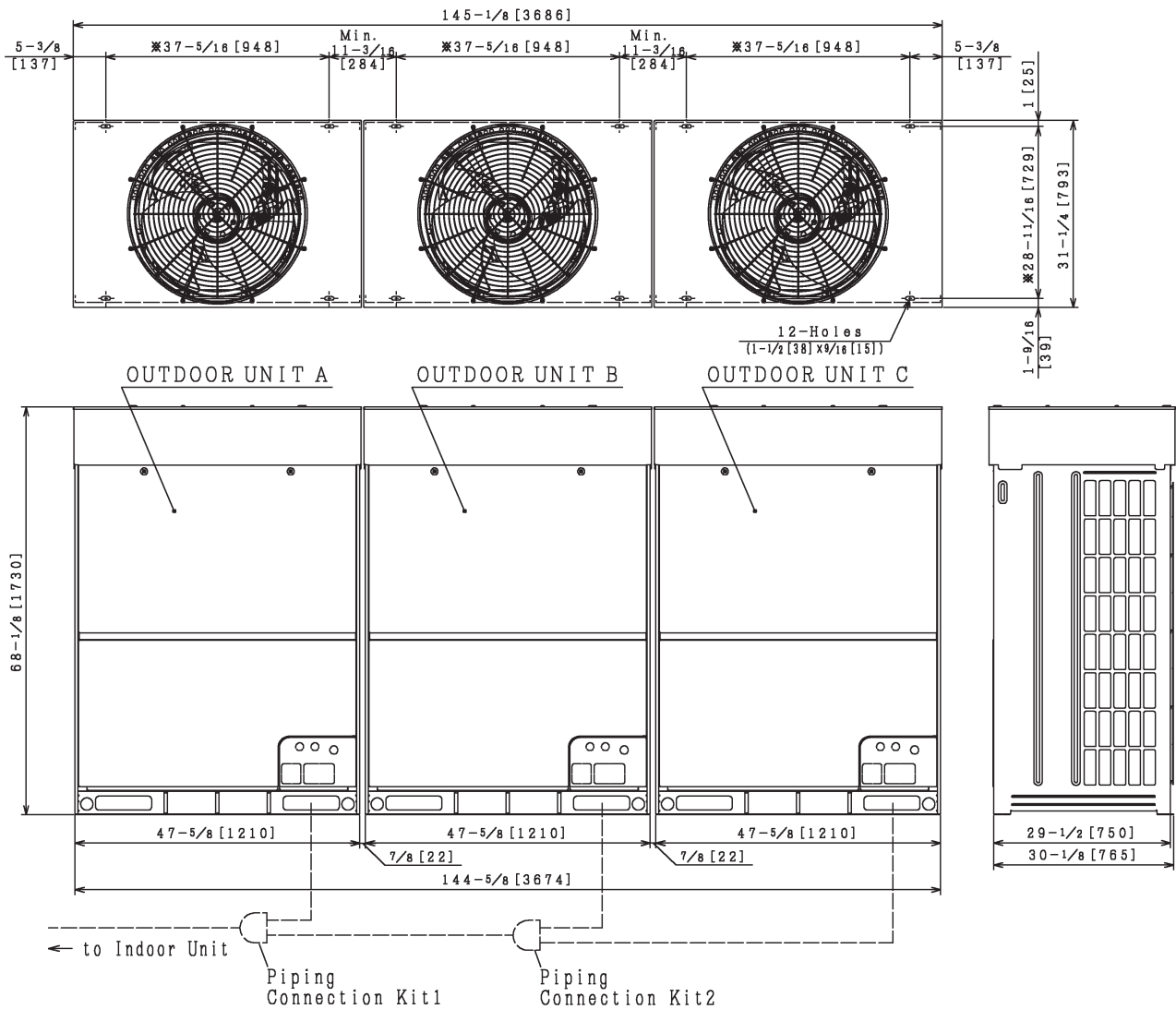
1. Make sure that the outdoor unit A is placed on the indoor unit side.
Arrange the outdoor units according to the capacity. $A \geq B$.
2. Check "Installation Manual" for the piping connection kit and piping connection size.
3. This drawing shows that there is 7/8 inch [22mm] clearance between the base units.
In case of the outdoor unit with "Snow Protection Hood (Optional Parts)" or "Air Outlet Duct (Field-Supplied)", the clearance between the base units of more than 1-15/16 inch [50mm] is required.
4. The dimensions marked with * indicates the mounting pitch dimension for anchor bolts.
5. The width of outer dimension and anchor bolt mounting position are changed by clearance between the base units.

Outdoor Unit Model	Combination of Base Unit Models	
	OUTDOOR UNIT A	OUTDOOR UNIT B
(H,Y)VAHP144B31CW	(H,Y)VAHP072B31CW	(H,Y)VAHP072B31CW
(H,Y)VAHP144B41CW	(H,Y)VAHP072B41CW	(H,Y)VAHP072B41CW
(H,Y)VAHP168B31CW	(H,Y)VAHP096B31CW	(H,Y)VAHP072B31CW
(H,Y)VAHP168B41CW	(H,Y)VAHP096B41CW	(H,Y)VAHP072B41CW
(H,Y)VAHP192B31CW	(H,Y)VAHP096B31CW	(H,Y)VAHP096B31CW
(H,Y)VAHP192B41CW	(H,Y)VAHP096B41CW	(H,Y)VAHP096B41CW

OUTDOOR UNITS

Model: (H,Y)VAHP288B(3,4)1CW

inch (mm)



Outdoor Unit Model	Combination of Base Unit Models		
	OUTDOOR UNIT A	OUTDOOR UNIT B	OUTDOOR UNIT C
(H,Y)VAHP288B31CW	(H,Y)VAHP096B31CW	(H,Y)VAHP096B31CW	(H,Y)VAHP096B31CW
(H,Y)VAHP288B41CW	(H,Y)VAHP096B41CW	(H,Y)VAHP096B41CW	(H,Y)VAHP096B41CW

NOTES:

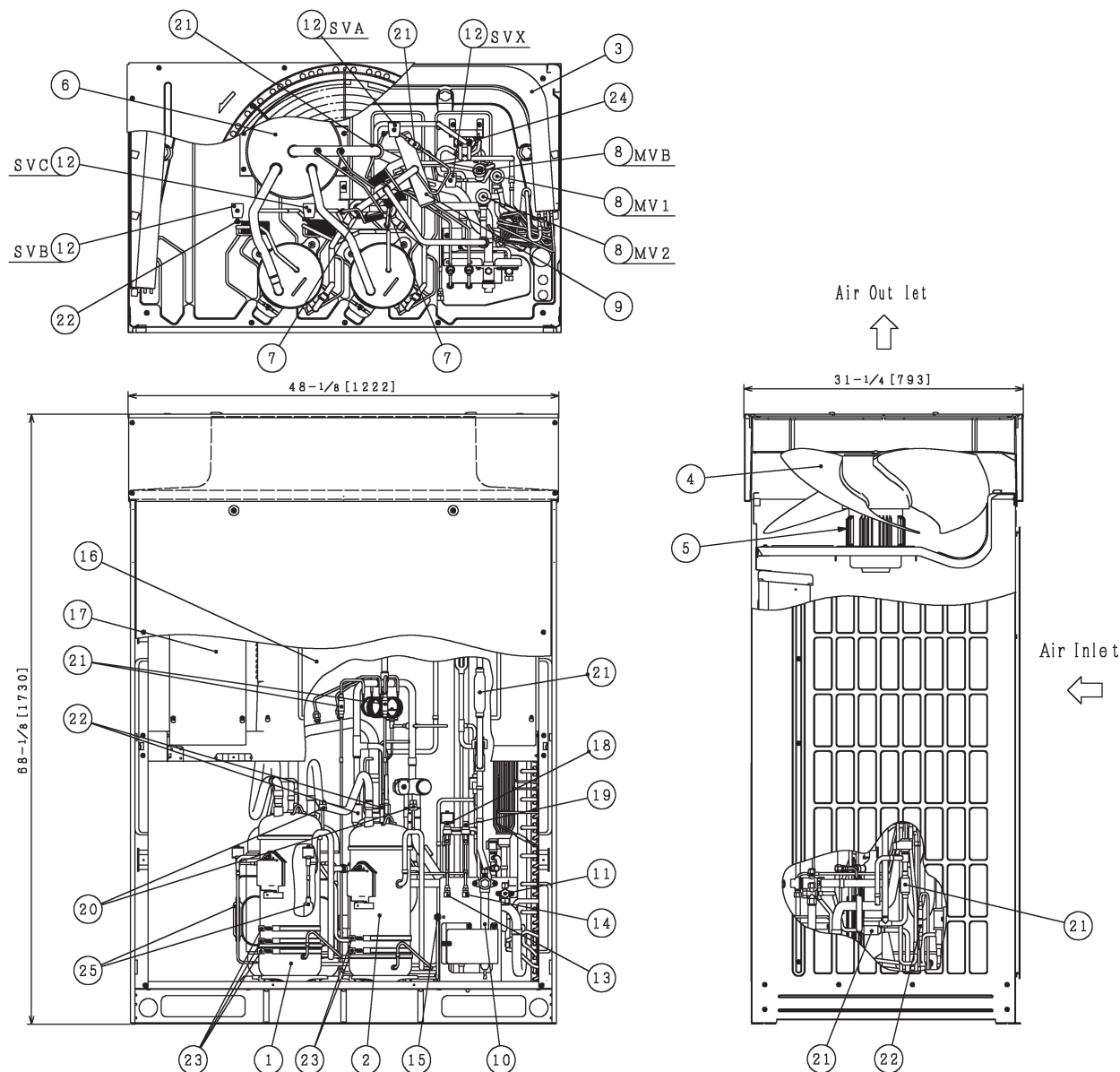
- Make sure that the outdoor unit A is placed on the indoor unit side.
Arrange the outdoor units according to the capacity. $A \geq B \geq C$.
- Check "Installation Manual" for the piping connection kit and piping connection size.
- This drawing shows that there is 7/8 inch [22mm] clearance between the base units.
In case of the outdoor unit with "Snow Protection Hood (Optional Parts)" or "Air Outlet Duct (Field-Supplied)", the clearance between the base units of more than 1-15/16 inch [50mm] is required.
- The dimensions marked with * indicates the mounting pitch dimension for anchor bolts.
- The width of outer dimension and anchor bolt mounting position are changed by clearance between the base units.

2.5 Structure

(1) 208/230V Type

Model: (H,Y)VAHP072B31CW and (H,Y)VAHP096B31CW

inch (mm)



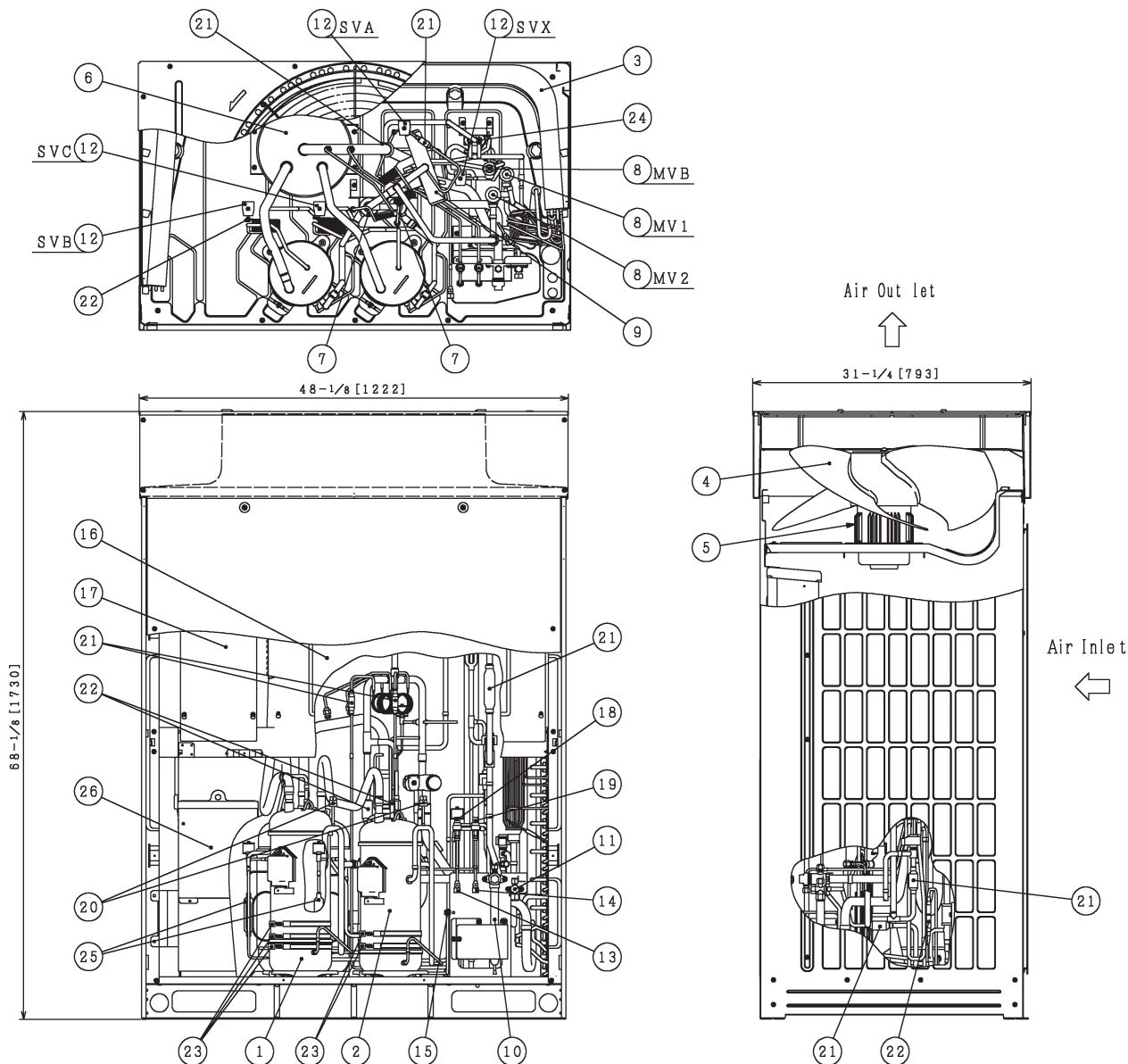
No.	Part Name
1	Compressor (Inverter)
2	Compressor (Const. Speed)
3	Heat Exchanger
4	Propeller Fan
5	Fan Motor
6	Accumulator
7	Oil Separator
8	Electronic Expansion Valve (three pieces)
9	Reversing Valve
10	Stop Valve (Gas)
11	Stop Valve (Liquid)
12	Solenoid Valve (four pieces)

No.	Part Name
13	Check Joint (Low)
14	Check Joint (High)
15	Check Joint (for Oil)
16	Electrical Control Box 1
17	Electrical Control Box 2
18	Low Pressure Sensor
19	High Pressure Sensor
20	High Pressure Switch for Protection (two pieces)
21	Strainer (seven pieces)
22	Check Valve (four pieces)
23	Crankcase Heater (five pieces)
24	Double Tube Type Heat Exchanger
25	Silencer (two pieces)

(2) 460V Type

Model: (H,Y)VAHP072B41CW and (H,Y)VAHP096B41CW

inch (mm)



No.	Part Name
1	Compressor (Inverter)
2	Compressor (Const. Speed)
3	Heat Exchanger
4	Propeller Fan
5	Fan Motor
6	Accumulator
7	Oil Separator
8	Electronic Expansion Valve (three pieces)
9	Reversing Valve
10	Stop Valve (Gas)
11	Stop Valve (Liquid)
12	Solenoid Valve (four pieces)
13	Check Joint (Low)

No.	Part Name
14	Check Joint (High)
15	Check Joint (for Oil)
16	Electrical Control Box 1
17	Electrical Control Box 2
18	Low Pressure Sensor
19	High Pressure Sensor
20	High Pressure Switch for Protection (two pieces)
21	Strainer (seven pieces)
22	Check Valve (four pieces)
23	Crankcase Heater (five pieces)
24	Double Tube Type Heat Exchanger
25	Silencer (two pieces)
26	Transformer Box

2.6 Component Data

Outdoor Heat Exchanger and Fan

Model		(H,Y)VAHP072B(3,4)1CW	(H,Y)VAHP096B(3,4)1CW
Heat Exchanger Type		Multi-Pass Cross Finned Tube	
Tube Material		Copper Tube	
Outer Diameter	φin (mm)	1/4 (7.0)	1/4 (7.0)
Rows		3	3
Number of Tube/Coil		204	204
Fin Material		Aluminum	
Pitch	in (mm)	1/16 (1.7)	1/16 (1.7)
Maximum Operating Pressure	psi (MPa)	601 (4.15)	601 (4.15)
Total Face Area	ft ² (m ²)	30.57 (2.84)	30.57 (2.84)
Number of Coil/Unit		1	1
Outdoor Fan		Large Diameter Fan (Propeller Fan)	
Number/Unit		1	1
Outer Diameter	φin (mm)	25-3/8 (644)	25-3/8 (644)
Nominal Airflow	cfm (m ³ /min)	6884 (195)	6884 (195)
Outdoor Fan Motor		Drip-Proof Type Enclosure	
Starting Method		Inverter	
Nominal Output	W	660	660
Quantity		1	1
Insulation Class (*)		E	E

Model		(H,Y)VAHP144B(3,4)1CW	(H,Y)VAHP168B(3,4)1CW	(H,Y)VAHP192B(3,4)1CW	(H,Y)VAHP288B(3,4)1CW
Heat Exchanger Type		Multi-Pass Cross Finned Tube			
Tube Material		Copper Tube			
Outer Diameter	φin (mm)	1/4 (7.0)	1/4 (7.0)	1/4 (7.0)	1/4 (7.0)
Rows		3+3	3+3	3+3	3+3+3
Number of Tube/Coil		204+204	204+204	204+204	204+204+204
Fin Material		Aluminum			
Pitch	in (mm)	1/16 (1.7)	1/16 (1.7)	1/16 (1.7)	1/16 (1.7)
Maximum Operating Pressure	psi (MPa)	601 (4.15)	601 (4.15)	601 (4.15)	601 (4.15)
Total Face Area	ft ² (m ²)	30.57+30.57 (2.84+2.84)	30.57+30.57 (2.84+2.84)	30.57+30.57 (2.84+2.84)	30.57+30.57+30.57 (2.84+2.84+2.84)
Number of Coil/Unit		2	2	2	3
Outdoor Fan		Large Diameter Fan (Propeller Fan)			
Number/Unit		2	2	2	3
Outer Diameter	φin (mm)	25-3/8+25-3/8 (644+644)	25-3/8+25-3/8 (644+644)	25-3/8+25-3/8 (644+644)	25-3/8+25-3/8+25-3/8 (644+644+644)
Nominal Airflow	cfm (m ³ /min)	6884+6884 (195+195)	6884+6884 (195+195)	6884+6884 (195+195)	6884+6884+6884 (195+195+195)
Outdoor Fan Motor		Drip-Proof Type Enclosure			
Starting Method		Inverter			
Nominal Output	W	660+660	660+660	660+660	660+660+660
Quantity		2	2	2	3
Insulation Class (*)		E+E	E+E	E+E	E+E+E

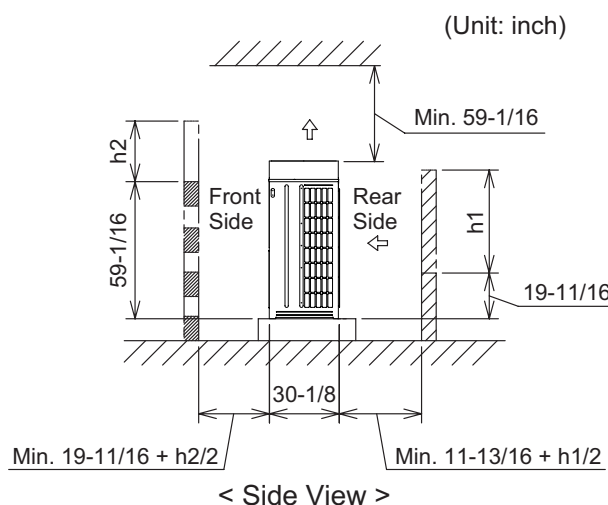
NOTE:

(*) The insulation class means the heat resistant grade of the insulation material is based on the IEC standard. Refer to the IEC 60085 for more information.

2.7 Service Space

When the outdoor unit is installed, create a service space as follows.

If the service spaces for air inlet and outlet are insufficient, there may be a slump in performance and some irregularities due to insufficient air intake. Additionally, the service space is required for facilitating maintenance.



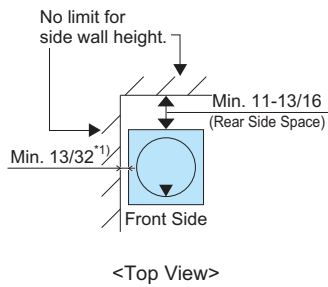
- If there are no walls on the front side and the rear side, the service space required is as follows.
 - * Front Side: Min. 19-11/16 inches (500mm)
 - * Rear Side: Min. 11-13/16 inches (300mm)
 - * Right and Left Sides: Min. 13-31/32 inch (10mm)

(If the field-supplied snow protection hood or the air outlet duct is applied to the unit, minimum spacing required is 1-31/32 inch (50mm) are required.)
- If the wall on the front side is over 59-1/16 inches (1,500mm) high, a space of (19-11/16 inch (500mm) + h₂/2) for the front side is required.
- If the wall on the rear side is over 19-11/16 inches (500mm) high, a space of (11-13/16 inch (300mm) + h₁/2) for the rear side is required.
- When the units are surrounded by walls on more than two sides, the figure above indicates required spacing.
- For walls on more than two sides, secure the service space as shown in the following figures.
- If the space between the unit and an obstacle above the unit is less than 59-1/16 inch (1,500mm) or the space above the unit is closed, set up the duct at the air outlet side in order to prevent a short circuit.
- When there are obstacles above the unit, it is imperative to follow the guidelines for minimum clearances for the front, rear, right, and left sides of the unit.

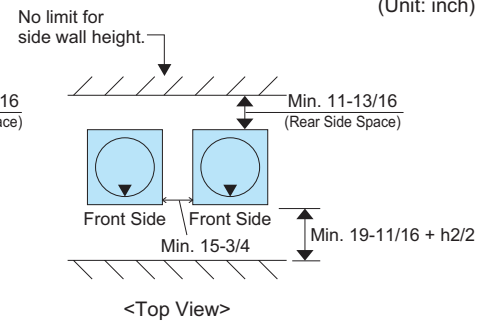
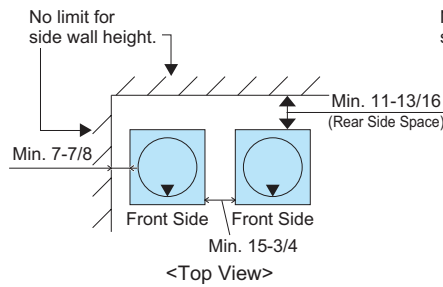
2.7.1 Walls on Two Sides

When the units are installed adjacent to tall buildings and there are no walls on two sides, the minimum rear side space must be 11-13/16 inches (300mm).

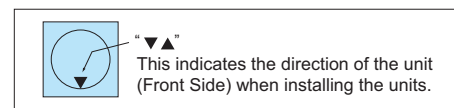
• Single Installation



• Multiple / Serial Installation

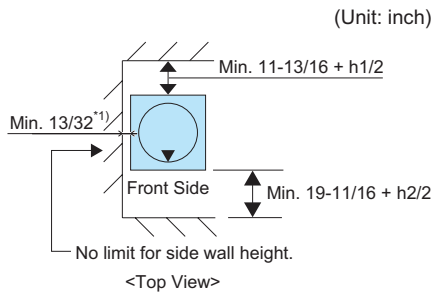


*1): If the field-supplied snow protection hood or the air outlet duct is adopted, the space of minimum 1-31/32 inch is required.



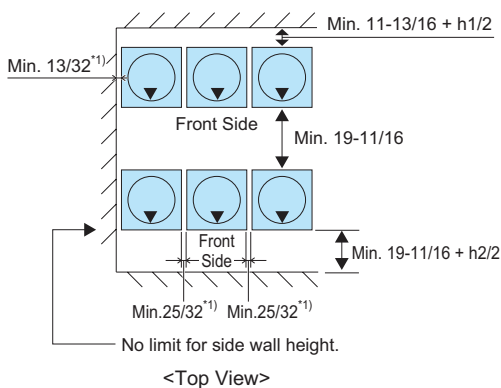
2.7.2 Walls on Three Sides

• Single Installation

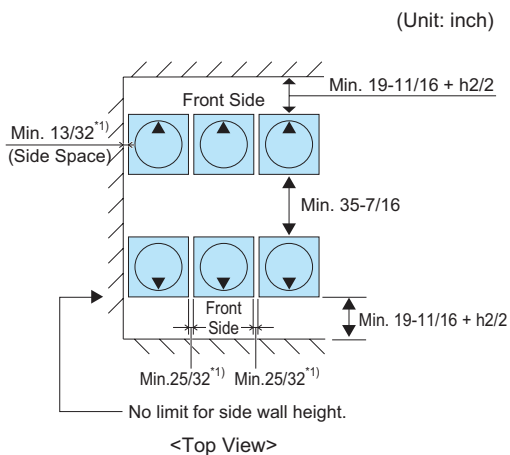


• Multiple / Serial Installation

< Installation in the Same Direction >



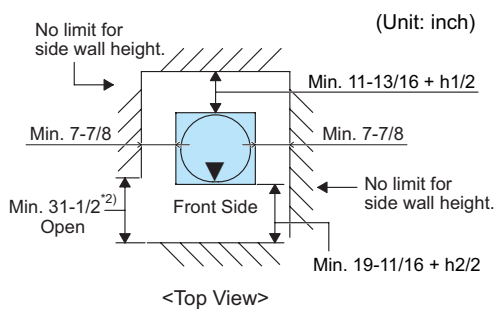
< Rear to Rear Installation >



*1): If the field-supplied snow protection hood or the air outlet duct is adopted, the space of minimum 1-31/32 inch is required.

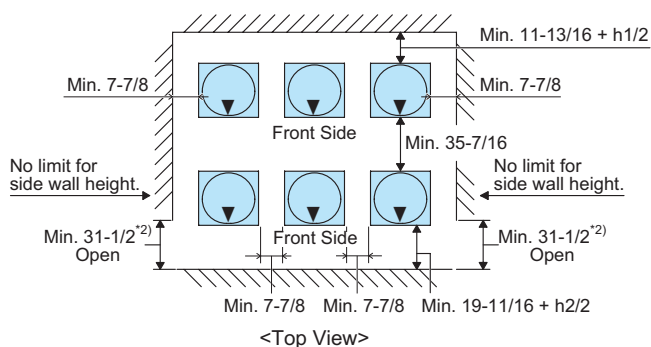
2.7.3 Walls on Four Sides

• Single Installation

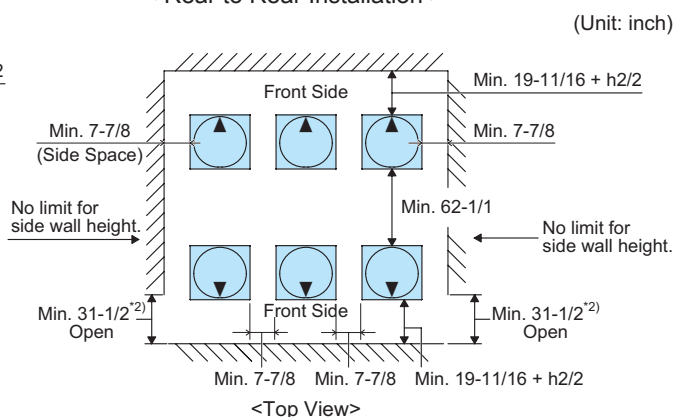


• Multiple / Serial Installation

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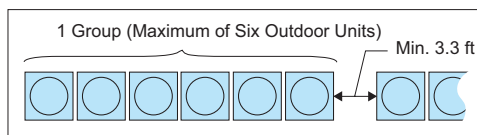
< Rear to Rear Installation >



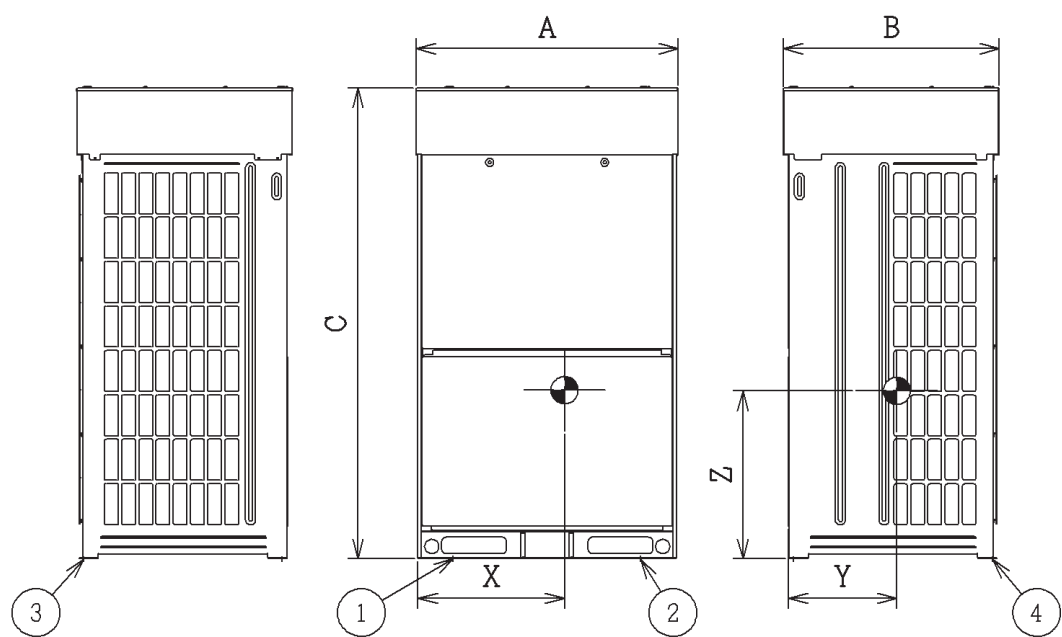
*2): Partly open a wall if the unit is surrounded by walls on four sides.

NOTE

1. Keep the upper side open to prevent interference between the inlet and outlet air of each outdoor unit.
2. The figure dimensions indicate sufficient spaces around outdoor units for operation and maintenance at typical installation conditions as follows. [Operation Mode: Cooling Operation, Outside Temp.: 95°F (35°C)]
If the outdoor unit ambient temperature is higher than installation limits, a short circuit is likely to occur.
Find an appropriate dimension by calculating airflow current.
3. For multiple installations, one group should consist of six outdoor units (maximum).
Keep an interval of 3.3 ft (1m) between each unit group.



2.8 Center of Gravity



< 208/230V >

Model	Net Weight [lbs (kg)]	Center of Gravity [inch (mm)]			Outer Dimensions [inch (mm)]		
		X	Y	Z	A	B	C
(H,Y)VAHP072B31CW (H,Y)VAHP096B31CW	699 (317)	20-7/8 (530)	12 (305)	22-13/16 (580)	48-1/8 (1222)	31-1/4 (793)	68-1/8 (1730)

< 460V >

Model	Net Weight [lbs (kg)]	Center of Gravity [inch (mm)]			Outer Dimensions [inch (mm)]		
		X	Y	Z	A	B	C
(H,Y)VAHP072B41CW (H,Y)VAHP096B41CW	787 (357)	19-11/16 (500)	11-13/16 (300)	21-5/8 (550)	48-1/8 (1222)	31-1/4 (793)	68-1/8 (1730)

2.9 Electrical Data

< 208/230V >

Model	Unit Main Power			Applicable Voltage		Power Supply			Compressor	Fan Motor	
	VOL	PH	Hz	Max.	Min.	MCA [A]	MFA [A]	STC [A]	RLA [A]	OPT [kW]	FLA [A]
(H,Y)VAHP072B31CW	208/230	3	60	253	188	51/46	70/60	172/182	24.2+28.8 /22+26	1.2	5.6 /5.1
(H,Y)VAHP096B31CW						51/46	70/60	172/182	24.2+28.8 /22+26	1.2	5.6 /5.1
(H,Y)VAHP144B31CW						51+51 /46+46	70+70 /60+60	220/229	24.2+28.8+24.2+28.8 /22+26+22+26	1.2+1.2	5.6+5.6 /5.1+5.1
(H,Y)VAHP168B31CW						51+51 /46+46	70+70 /60+60	220/229	24.2+28.8+24.2+28.8 /22+26+22+26	1.2+1.2	5.6+5.6 /5.1+5.1
(H,Y)VAHP192B31CW						51+51 /46+46	70+70 /60+60	220/229	24.2+28.8+24.2+28.8 /22+26+22+26	1.2+1.2	5.6+5.6 /5.1+5.1
(H,Y)VAHP288B31CW						51+51+51 /46+46+46	70+70+70 /60+60+60	268/276	24.2+28.8+24.2+28.8+24.2+28.8 /22+26+22+26+22+26	1.2+1.2+1.2	5.6+5.6+5.6 /5.1+5.1+5.1

< 460V >

Model	Unit Main Power			Applicable Voltage		Power Supply			Compressor	Fan Motor	
	VOL	PH	Hz	Max.	Min.	MCA [A]	MFA [A]	STC [A]	RLA [A]	OPT [kW]	FLA [A]
(H,Y)VAHP072B41CW	460	3	60	506	414	24	30	87	15.3+12.2	1.2	9
(H,Y)VAHP096B41CW						24	30	87	15.3+12.2	1.2	9
(H,Y)VAHP144B41CW						24+24	30+30	110	15.3+12.2+15.3+12.2	1.2+1.2	9+9
(H,Y)VAHP168B41CW						24+24	30+30	110	15.3+12.2+15.3+12.2	1.2+1.2	9+9
(H,Y)VAHP192B41CW						24+24	30+30	110	15.3+12.2+15.3+12.2	1.2+1.2	9+9
(H,Y)VAHP288B41CW						24+24+24	30+30+30	133	15.3+12.2+15.3+12.2+15.3+12.2	1.2+1.2+1.2	9+9+9

VOL: Rated Unit Power Supply Voltage (V)

PH: Phase (φ)

HZ: Frequency (Hz)

MCA: Minimum Circuit Ampacity (A)

MFA: Maximum Fuse Ampacity (A)

STC: Starting Current (A)

RLA: Rated Load Ampacity (A)

OPT: Rated Motor Output (kW)

FLA: Full Load Ampacity (A)

NOTES:

1. Power supply voltage should be satisfied with the following.

Supply Voltage: Rated Voltage within ±10%

Starting Voltage: Rated Voltage within -15%

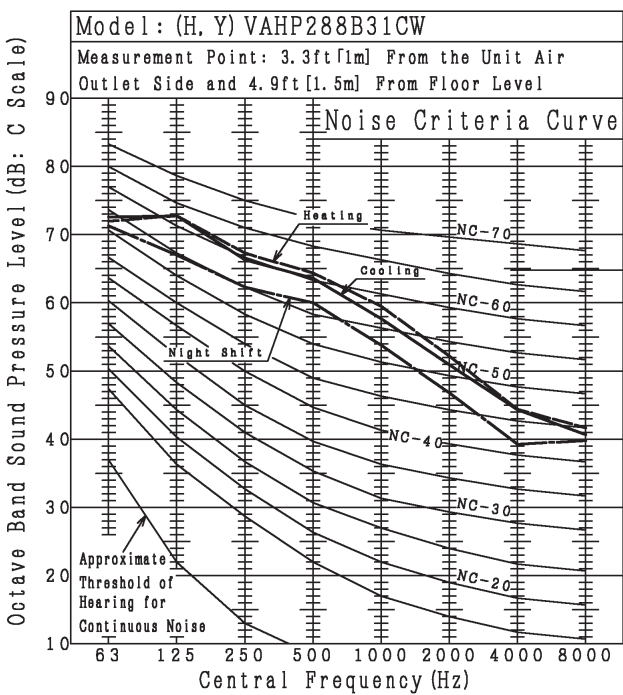
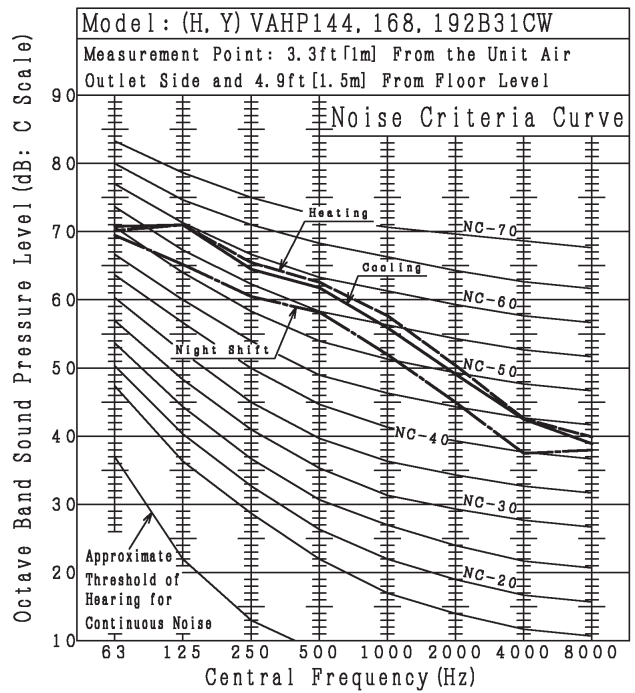
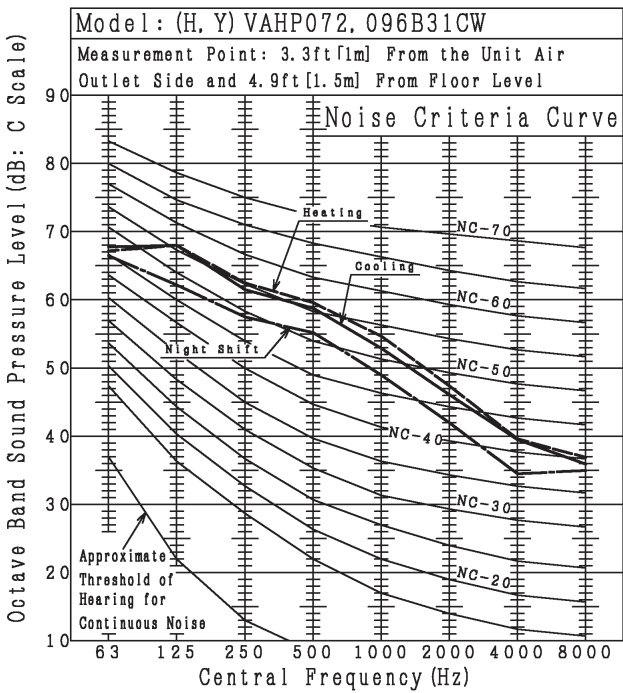
Operating Voltage: Rated Voltage within ±10%

Imbalance between Phases: Within 3%

2. The compressor is started by an inverter, resulting in extremely low starting current.

2.10 Sound Data

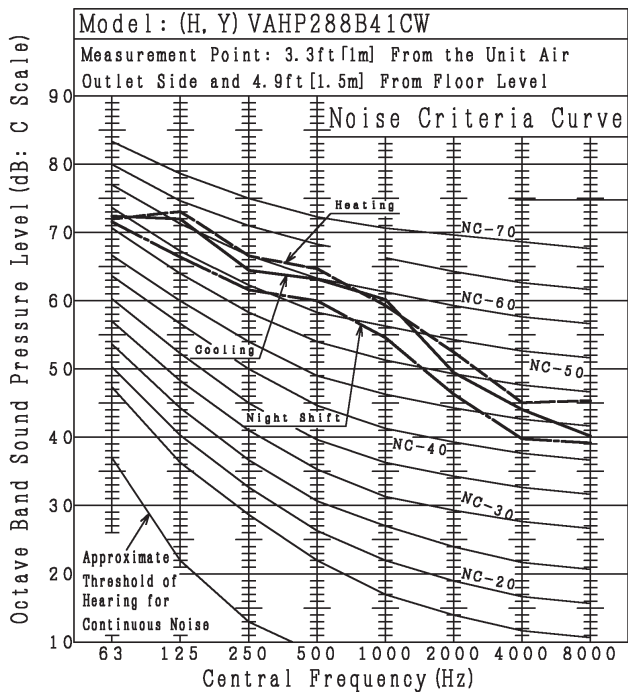
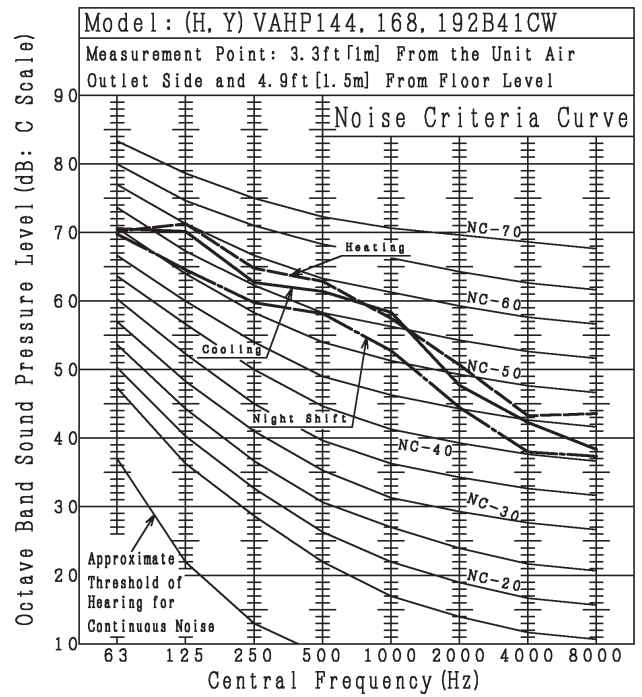
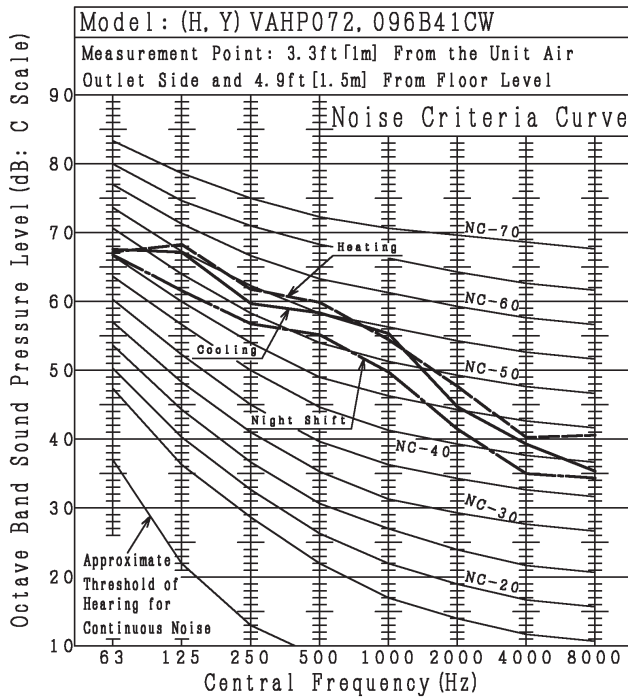
(1) 208/230V Type



NOTE:

The operation sound is measured in an anechoic chamber. However, the actual operation sound may appear louder because of ambient noise or echoing. Be sure to check ambient conditions before installation. The sound of the air inlet side is 8dB higher than that of the front side.

(2) 460V Type



NOTE:

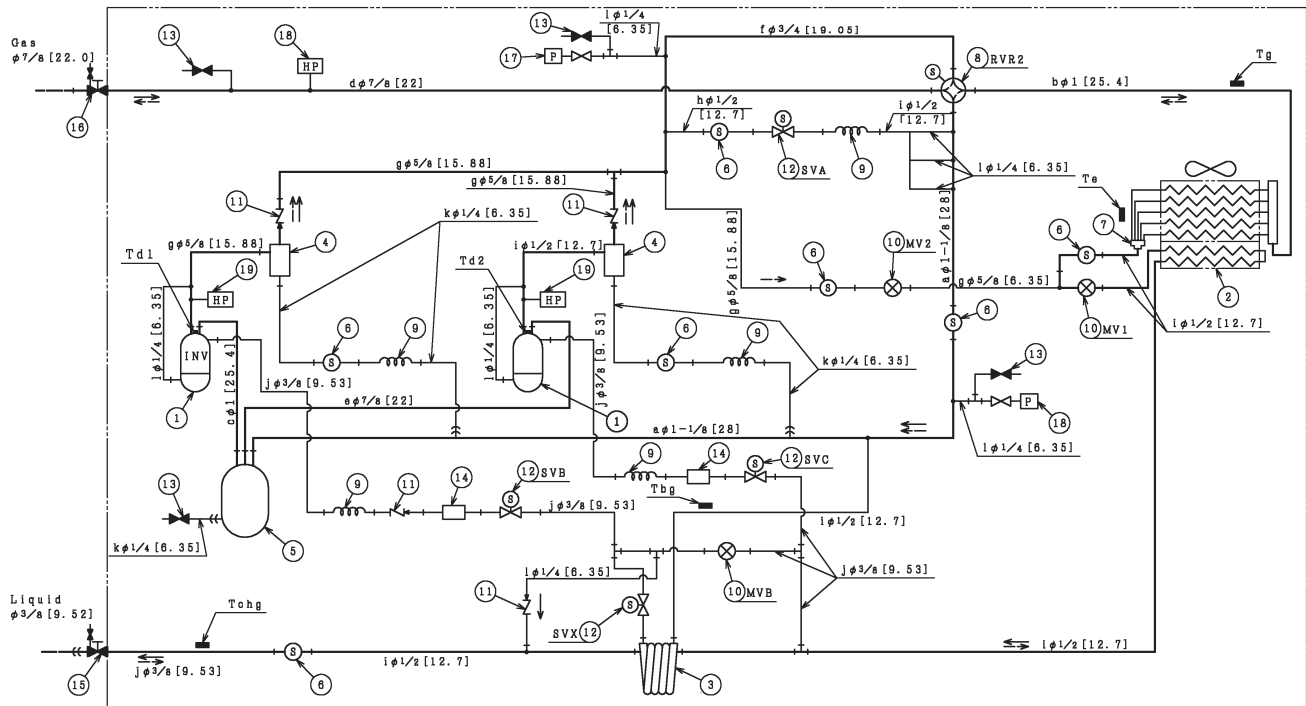
The operation sound is measured in an anechoic chamber. However, the actual operation sound may appear louder because of ambient noise or echoing. Be sure to check ambient conditions before installation. The sound of the air inlet side is 8dB higher than that of the front side.

2.11 Control System

2.11.1 Refrigerant Cycle

Model: (H,Y)VAHP072B31CW, (H,Y)VAHP096B31CW, (H,Y)VAHP072B41CW and (H,Y)VAHP096B41CW

inch (mm)



- ← :Refrigerant Flow Direction (Cooling)
- ← :Refrigerant Flow Direction (Heating)
- :Field Refrigerant Piping
- :Flare Connection
- :Brazing Connection
- :Thermistor

Mark	Name
Td1	Thermistor for Upper Side of Compressor 1
Td2	Thermistor for Upper Side of Compressor 2
Tg	Thermistor for Heat Exchanger Gas Side
Te	Thermistor for Heat Exchanger Liquid Side
Tbg	Thermistor for Subcooler Bypass Side
Tchg	Thermistor for Auto Charge of Refrigerant

Mark	Part Name
①	Compressor
②	Heat Exchanger
③	Double Tube Type Heat Exchanger
④	Oil Separator
⑤	Accumulator
⑥	Strainer
⑦	Distributor
⑧	Reversing Valve
⑨	Capillary Tube
⑩	Micro-Computer Control Expansion Valve
⑪	Check Valve
⑫	Solenoid Valve
⑬	Check Joint
⑭	Silencer
⑮	Stop Valve for Liquid Line
⑯	Stop Valve for Gas Line
⑰	Sensor for Refrigerant Pressure (High Pressure Sensor)
⑱	Sensor for Refrigerant Pressure (Low Pressure Sensor)
⑲	High Pressure Switch for Protection

Mark	OD×T	Material
a	1-1/8×0.063 [28.0]×[1.6]	C1220T-0
b	1×0.071 [25.4]×[1.8]	
c	1×0.047 [25.4]×[1.2]	
d	7/8×0.059 [22.0]×[1.5]	
e	7/8×0.047 [22.0]×[1.2]	
f	3/4×0.056 [19.05]×[1.42]	
g	5/8×0.047 [15.88]×[1.2]	
h	1/2×0.042 [12.7]×[1.07]	
i	1/2×0.039 [12.7]×[1.0]	
j	3/8×0.031 [9.53]×[0.8]	
k	1/4×0.042 [6.35]×[1.07]	
l	1/4×0.028 [6.35]×[0.7]	

OD:Outer diameter
T:Thickness

2.11.2 Control System

< Cycle Control >

Control Device	Control				
	Cooling Operation		Heating Operation, Heat Recovery System		Defrosting
	Control Category	Purpose of Control	Control Category	Purpose of Control	Condition
Inverter Frequency of Compressor	Total I.U. Operating Capacity	Capacity control is carried out to achieve the targeted value of evaporating temperature.	Total I.U. Operating Capacity	PI control is carried out to achieve the targeted value of Pd.	All of the compressors: ON
Electronic Expansion Valve for O.U. Heat Exchanger	Capacity Control	Fully open (Electronic expansion valve opening is dependent on the refrigerant cycle condition.)	Condenser <COND> Capacity Control	Condenser <COND> Fully Open (Electronic expansion valve opening is depending on the refrigerant cycle condition.)	Fully open
			Evaporator <EVAP> O.U. Heat Exchanger SH	Evaporator <EVAP> PI control is carried out to achieve the targeted value of O.U. heat exchanger SH.	
Electronic Expansion Valve for Supercooling Heat Exchanger	TsSH Control	Control TsSH of compressor to achieve the targeted value.	TsSH Control	Control TsSH of compressor to achieve the targeted value.	TsSH Control
Electronic Expansion Valve for Hot Gas Bypass (MV2)	Closed	Open/Close of Hot Gas Bypass Circuit	Closed	Open/Close of Hot Gas Bypass Circuit	Open
Electronic Expansion Valve for I.U. Heat Exchanger	I.U. Heat Exchanger SH	PI control is carried out to achieve the targeted value of I.U. heat exchanger SH.	<Cooling Setting> (*) I.U. Heat Exchanger SH	<Cooling Setting> PI control is carried out to achieve the targeted value of I.U. heat exchanger SH.	I.U. Heat Exchanger SH Control
			<Heating Setting> I.U. Heat Exchanger SC	<Heating Setting> Controls supercooling of I.U. liquid thermistor to achieve the targeted value.	
Outdoor Fan	Pd Control	PI control is carried out to achieve the targeted value of Pd.	Condenser <COND> Pd Control	Condenser <COND> PI control is carried out to achieve the targeted value of Pd.	Stop
			Evaporator <EVAP> Stabilizing by Ambient Temperature and Operating Capacity	Evaporator <EVAP> Fan rotation is controlled by ambient temperature and I.U. operating capacity.	
Gas Bypass Valve (SVA)	1. Pd Increase Protection 2. Ps Decrease Protection	1. Pd>3.6MPa: Open 2. Ps<0.2MPa: Open	1. Pd Increase Protection 2. Ps Decrease Protection	1. Pd>3.5MPa: Open 2. Ps<0.1MPa: Open	Closed
Liquid Injection Valve	Closed	Open/Close of Liquid Injection Circuit	Closed	Liquid Injection Circuit is On: Open	Closed
Inverter Compressor (SVB) Constant Speed Compressor (SVC)				Liquid Injection Circuit is Off: Closed	
Heat Exchanger Valve for Supercooling (SVX)	Supercooling Circuit is On: Open	On/Off of Supercooling Circuit	Supercooling Circuit is On: Open Supercooling Circuit is Off: Closed	On/Off of Supercooling Circuit	Open

(*): Dry operation is included in the cooling operation.

Pd: Discharge Pressure

Ps: Suction Pressure

SH: Superheat

SC: Supercool

TsSH: Superheat of Suction Gas Temperature

I.U.: Indoor Unit

O.U.: Outdoor Unit

Compressor Operation Control

(1) Compressor Rotation Control

The compressor rotation control is performed in order to make the compressor operating time equal for each outdoor unit.

When the system power supply is turned ON, the inverter compressor rotation is determined in ascending order of accumulated operating time. The operating sequence of compressor rotation control is as follows.

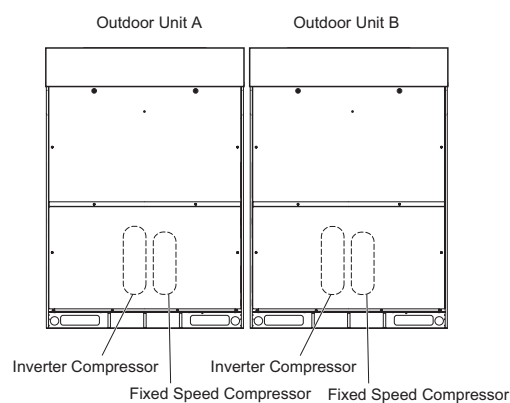
When the system is turned OFF or thermo-OFF, the first operated inverter compressor will be shifted to last rotation. This control function applies to systems comprised of two or more outdoor unit modules.

NOTE:

Thermo-ON: The outdoor unit and some indoor units are running.

Thermo-OFF: The outdoor unit and some indoor units stay on, but don't run.

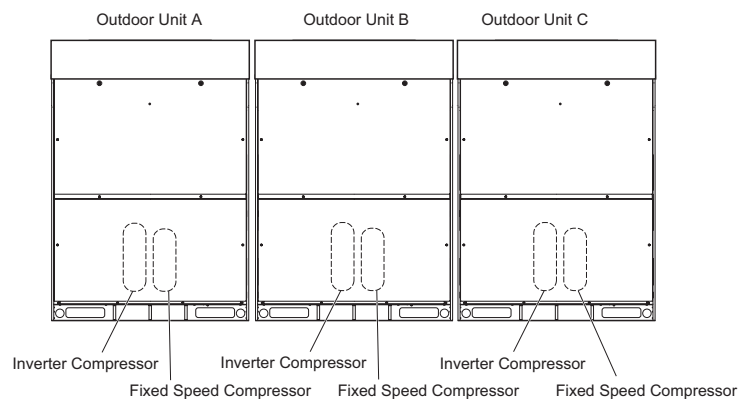
(H,Y)VAHP144B(3,4)1CW, (H,Y)VAHP168B(3,4)1CW and (H,Y)VAHP192B(3,4)1CW



< Compressor Operating Sequence >

	Outdoor Unit A		Outdoor Unit B	
	Inverter Compressor	Fixed Speed Compressor	Inverter Compressor	Fixed Speed Compressor
Last Time	1	3	2	4
This Time	2	4	1	3
Next Time	1	3	2	4

(H,Y)VAHP288B(3,4)1CW



< Compressor Operating Sequence >

	Outdoor Unit A		Outdoor Unit B		Outdoor Unit C	
	Inverter Compressor	Fixed Speed Compressor	Inverter Compressor	Fixed Speed Compressor	Inverter Compressor	Fixed Speed Compressor
Last Time	1	4	2	5	3	6
This Time	2	5	3	6	1	4
Next Time	3	6	1	4	2	5

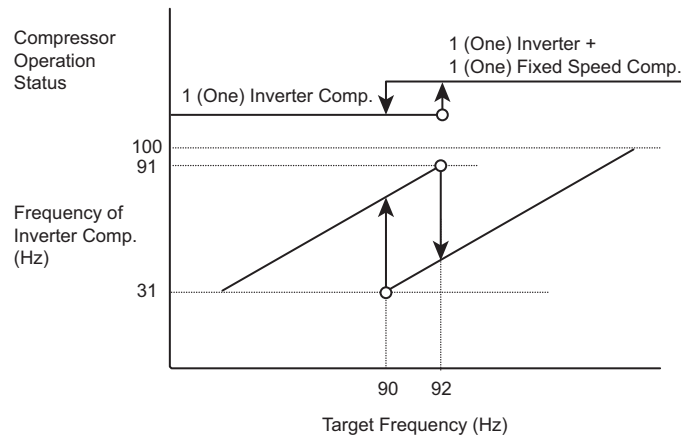
(2) Compressor Frequency Control

Compressor Operation Control is to perform the output frequency of an Inverter Compressor or run/stop of a fixed speed compressor according to Target Frequency.

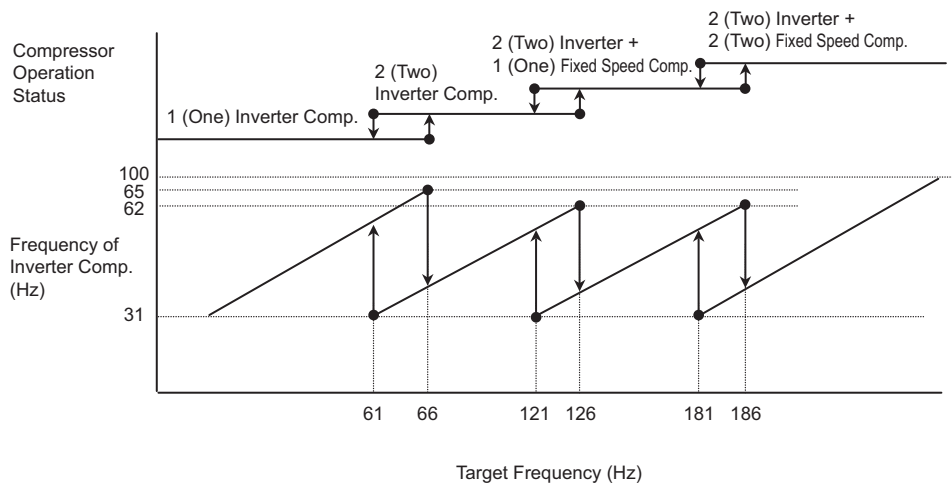
(Target Frequency is determined by PI calculation according to cooling and heating loads.)

Therefore, when the load is smaller, the fixed speed compressor may not operate.

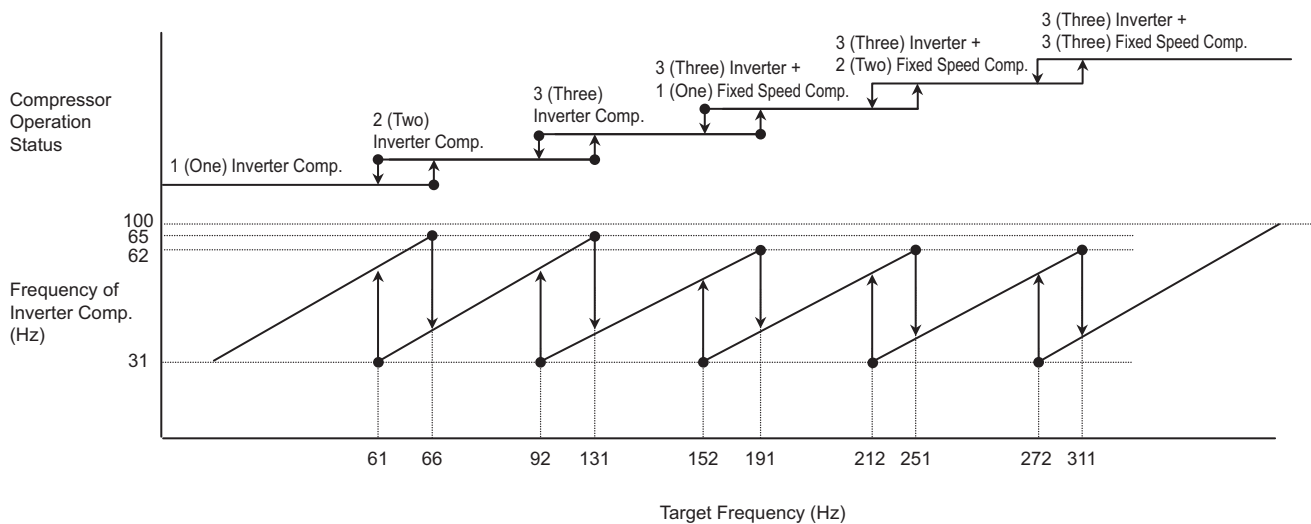
(H,Y)VAHP072B(3,4)1CW and (H,Y)VAHP096B(3,4)1CW



(H,Y)VAHP144B(3,4)1CW, (H,Y)VAHP168B(3,4)1CW and (H,Y)VAHP192B(3,4)1CW

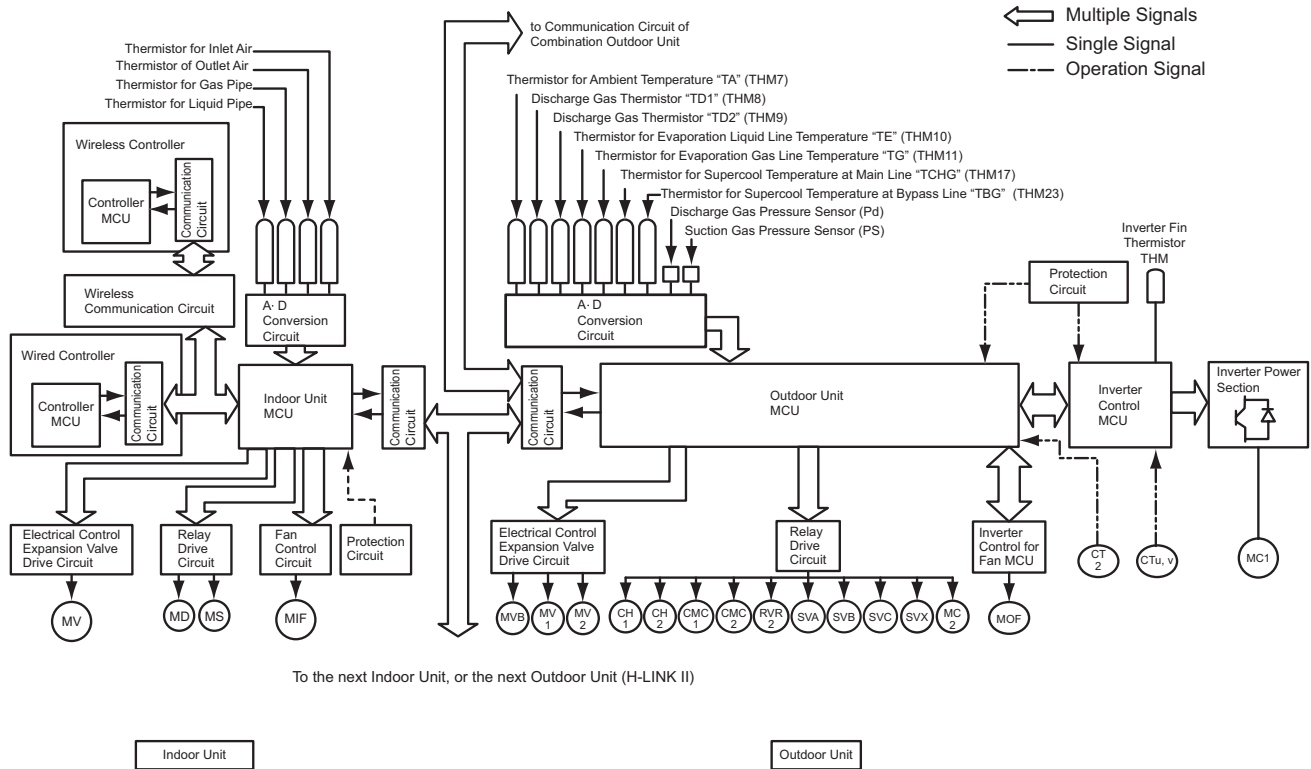


(H,Y)VAHP288B(3,4)1CW



The figure below is a representation of the control system.

(Example: Combination of Base Units, (H,Y)VAHP072, 096B(3,4)1CW + Indoor Unit)

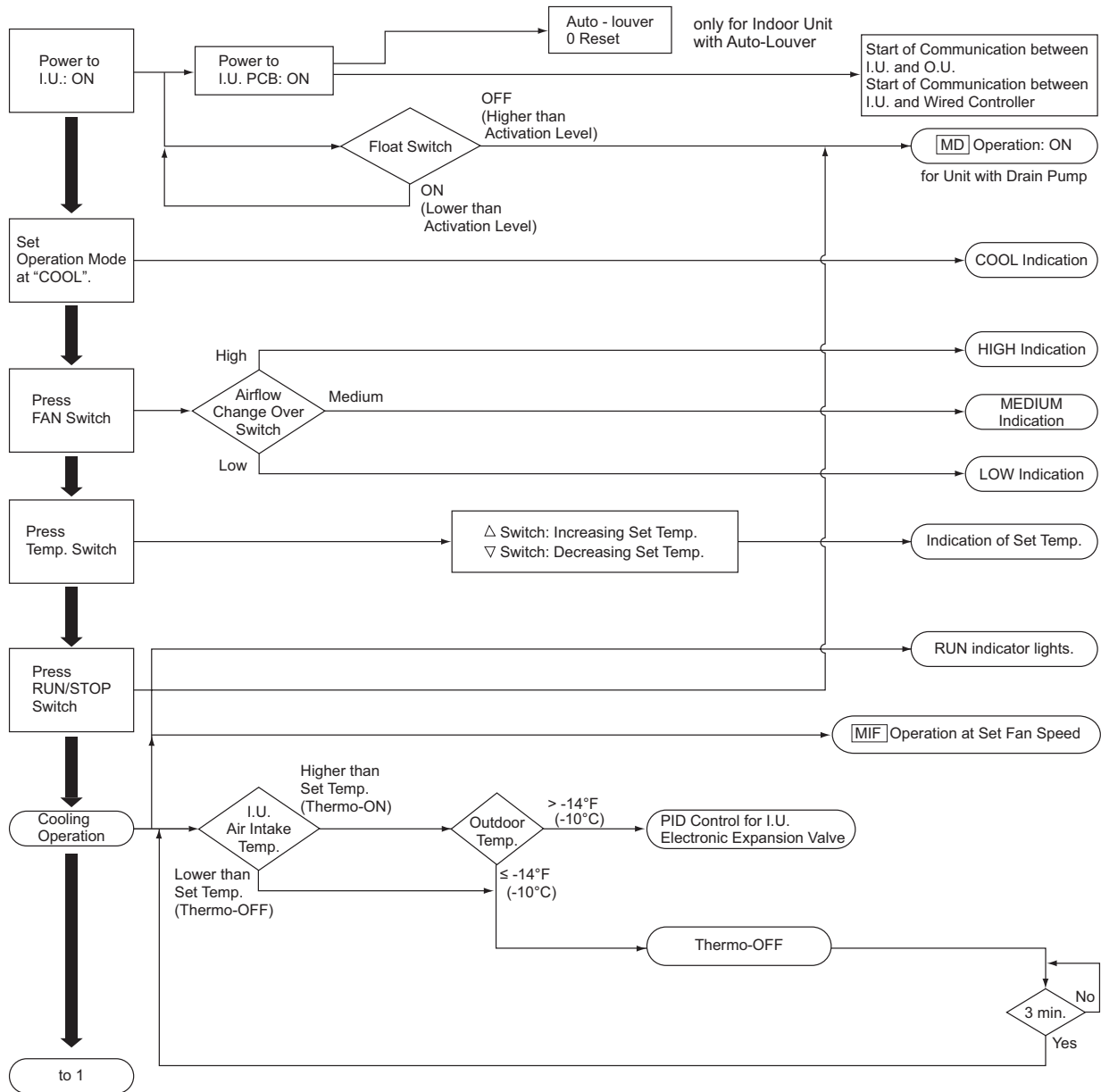


Callout	Description
THM	Thermistor
MCU	Microcontroller
MC1	DC Motor (for Inverter Compressor)
MC2	AC Motor (for Fixed Speed Compressor)
MOF	DC Motor (for Outdoor Fan)
MIF	Motor (for Indoor Fan)
MS	Motor (for Auto-Louver)
MD	Motor (for Drain Pump)
MV	Electronic Expansion Valve (for Indoor Unit)
MV1, 2	Electronic Expansion Valve (for Outdoor Unit)
MVB	Electronic Expansion Valve for Supercooling Heat Exchanger
CMC1, 2	Magnetic Contactor for Compressor
SVA	Solenoid Valve
SVB	Solenoid Valve
SVC	Solenoid Valve
SVX	Solenoid Valve
RVR2	Reversing Valve
CH1, 2	Crankcase Heater
CTz, u, v	Current Transformer

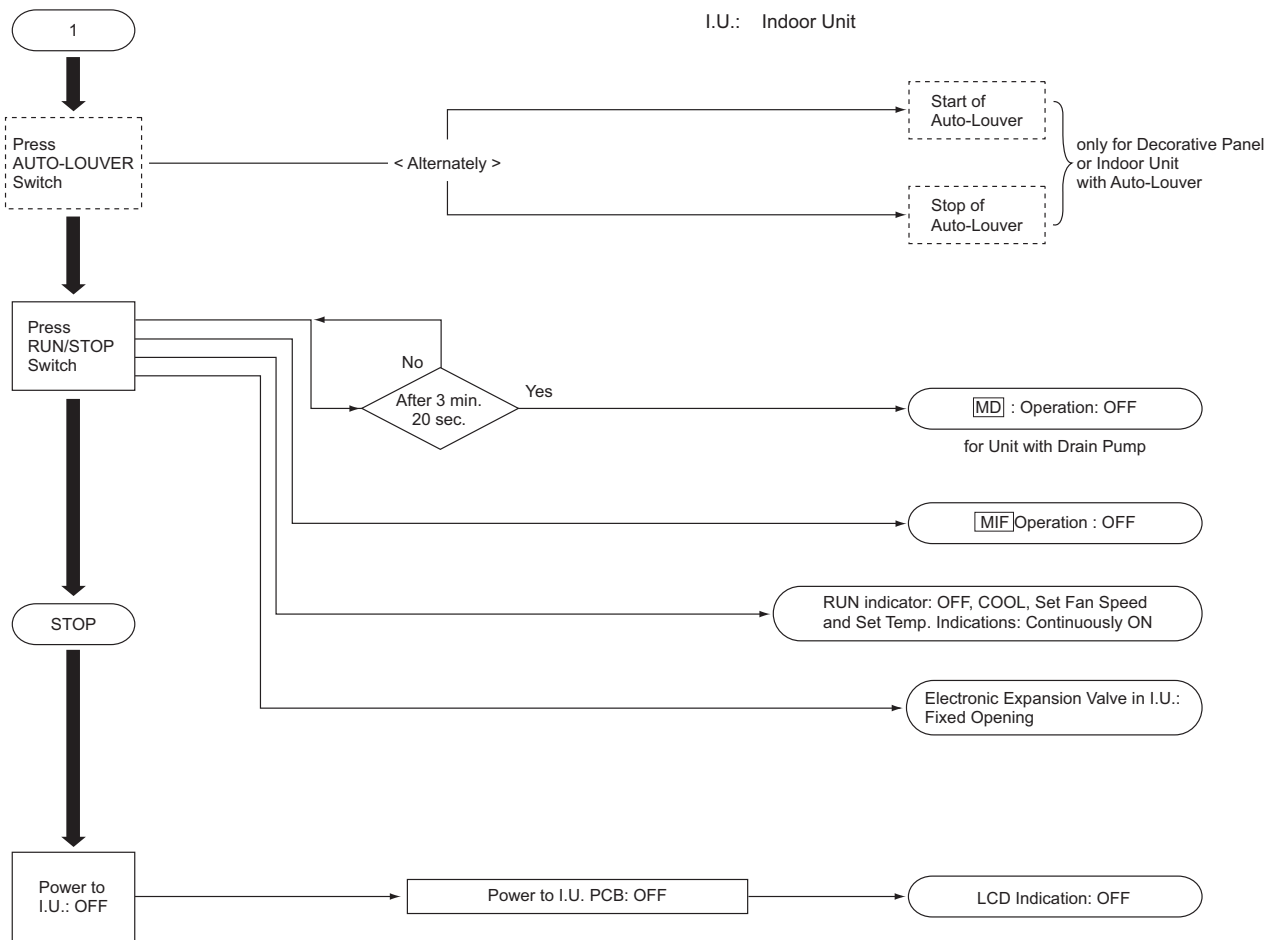
2.11.3 Standard Operation Sequence

Cooling Operation

I.U.: Indoor Unit
O.U.: Outdoor Unit

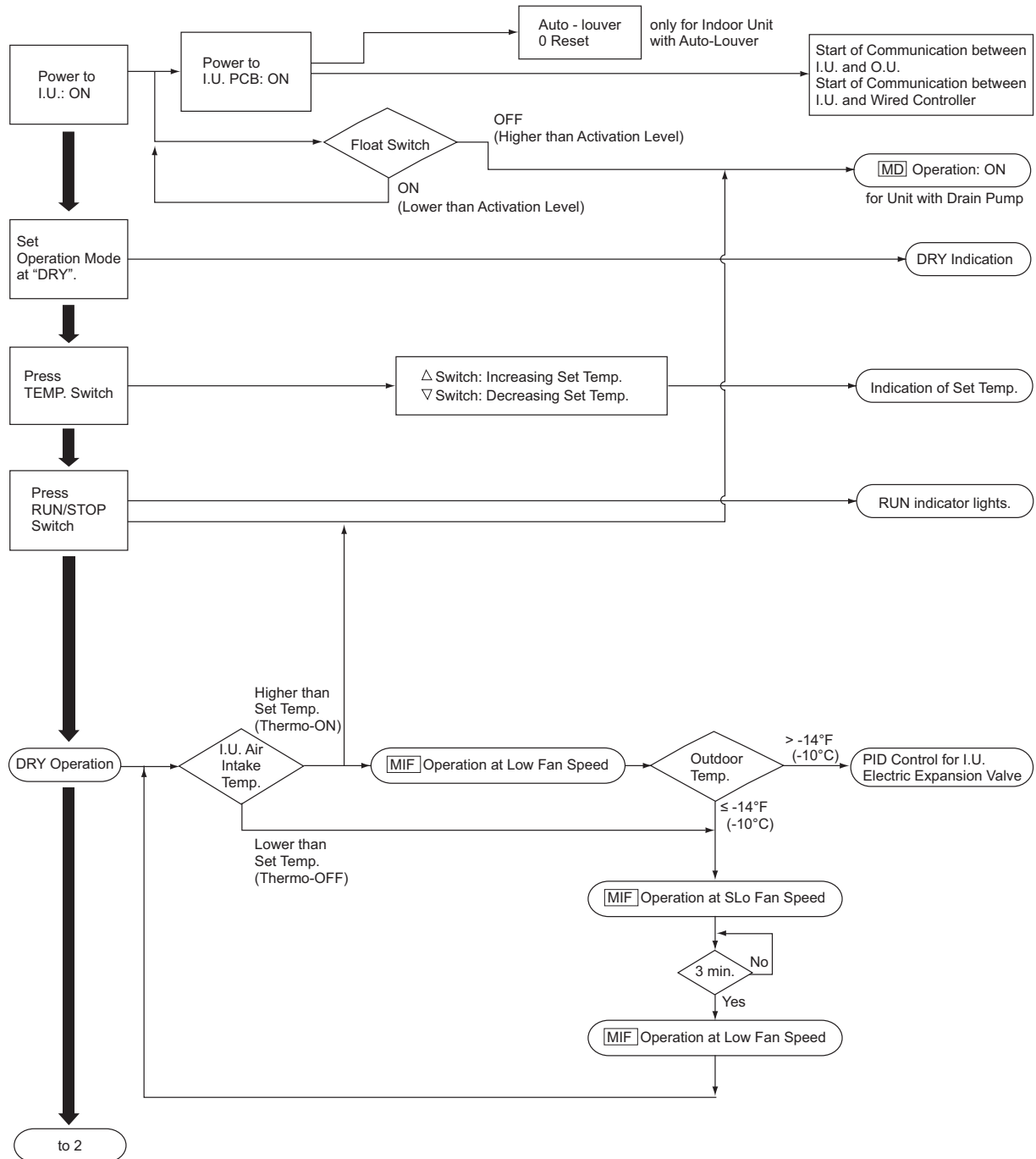


Cooling Operation

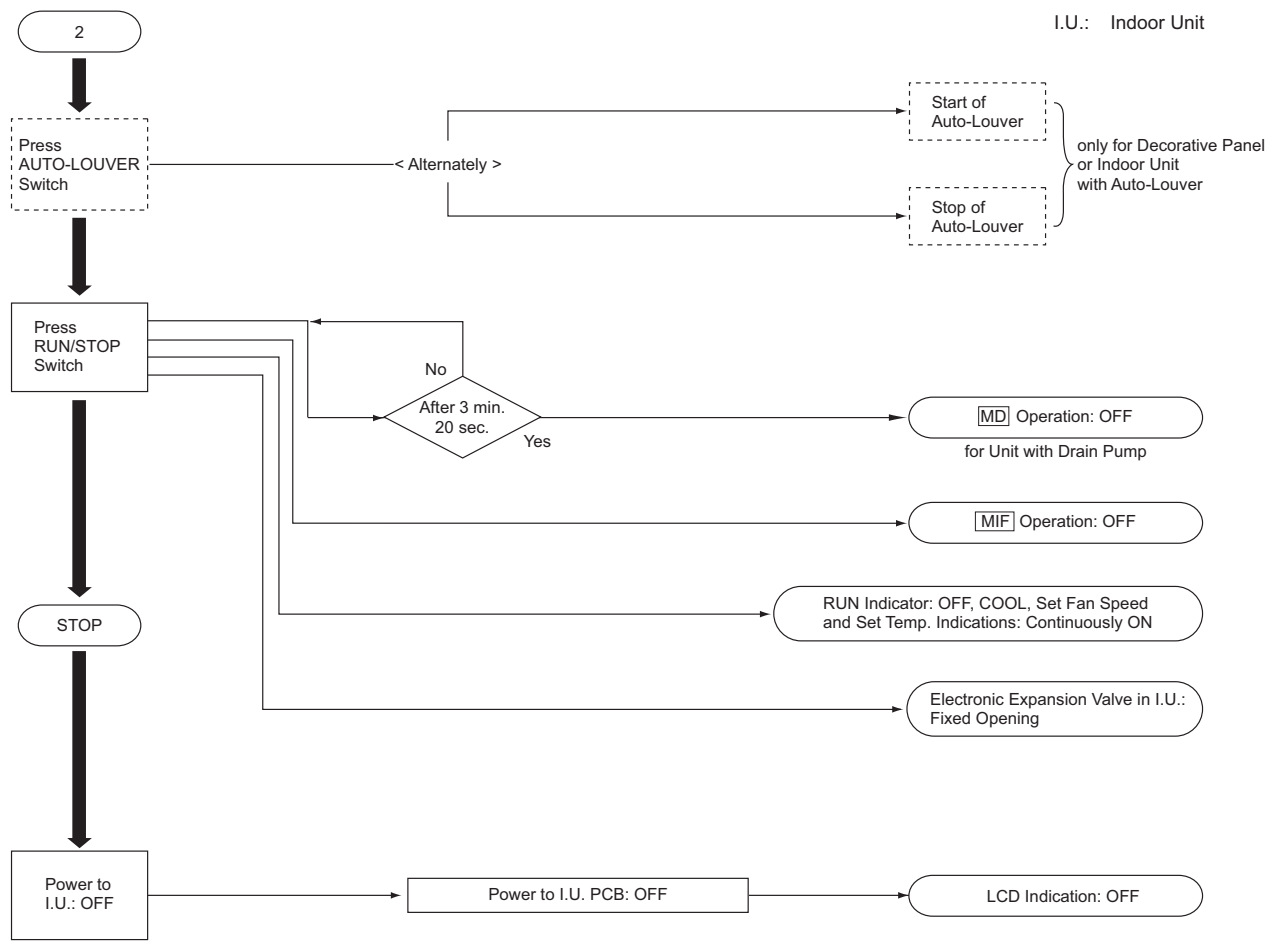


Dry Operation

I.U.: Indoor Unit
O.U.: Outdoor Unit

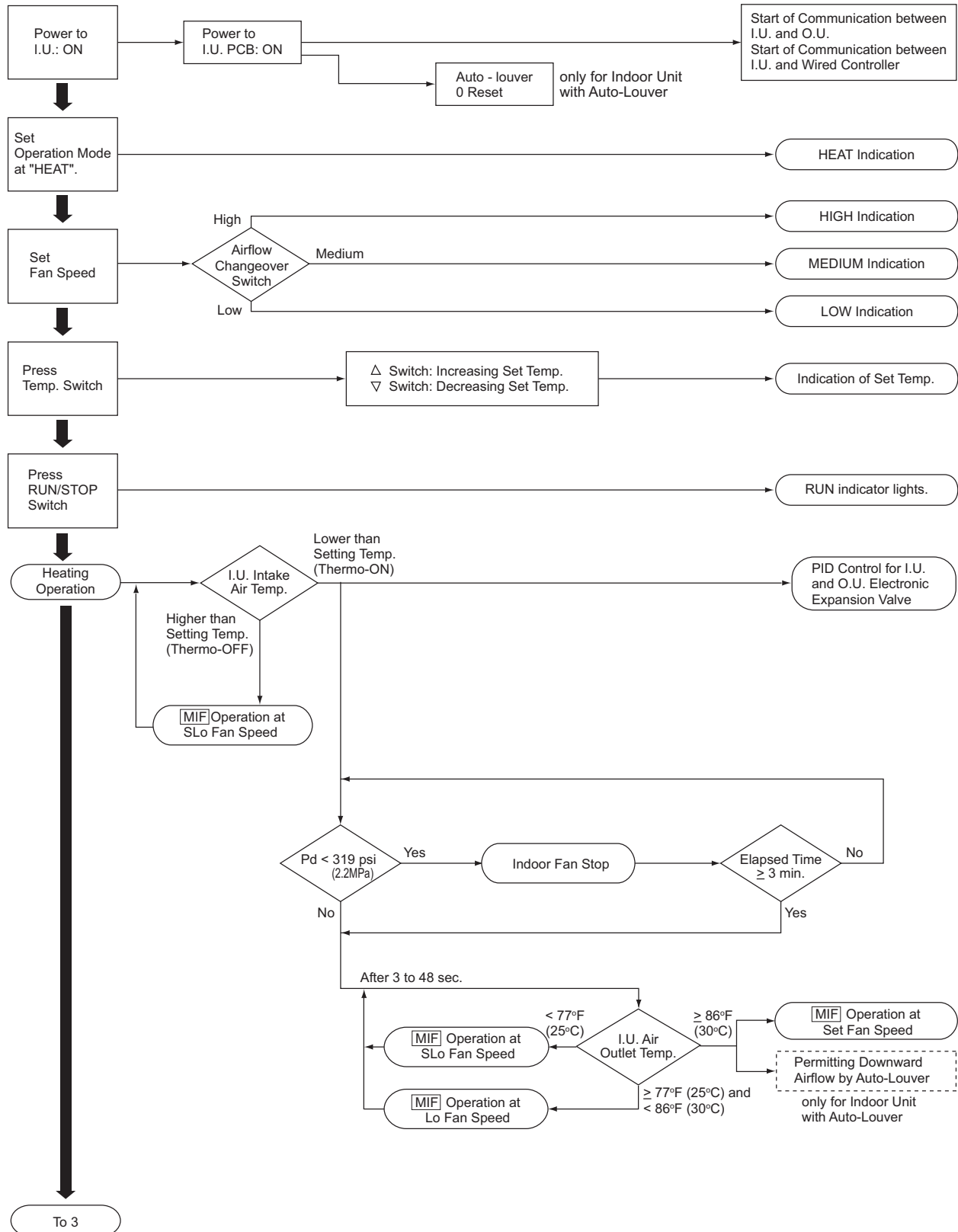


Dry Operation



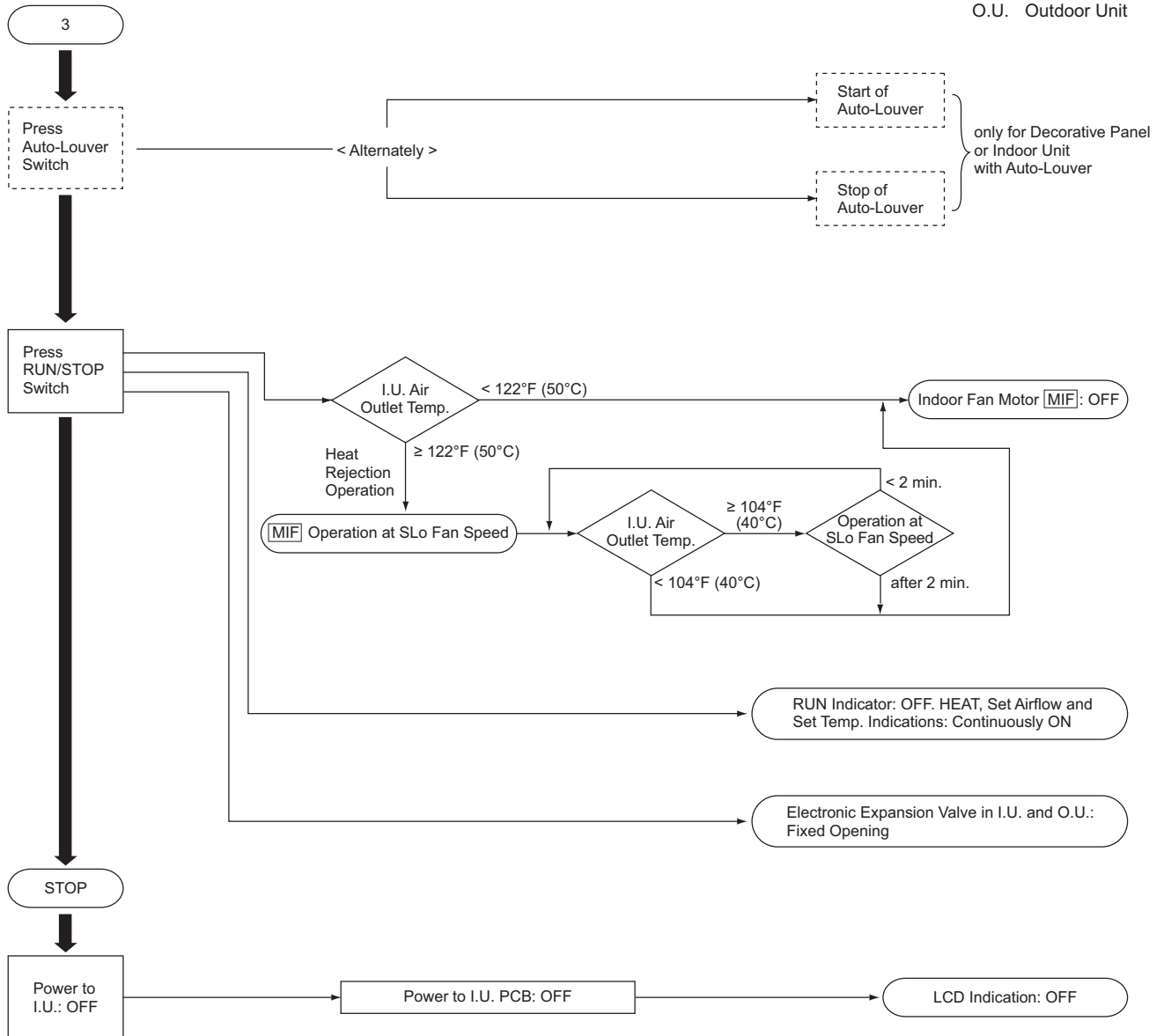
Heating Operation

I.U.: Indoor Unit
O.U.: Outdoor Unit

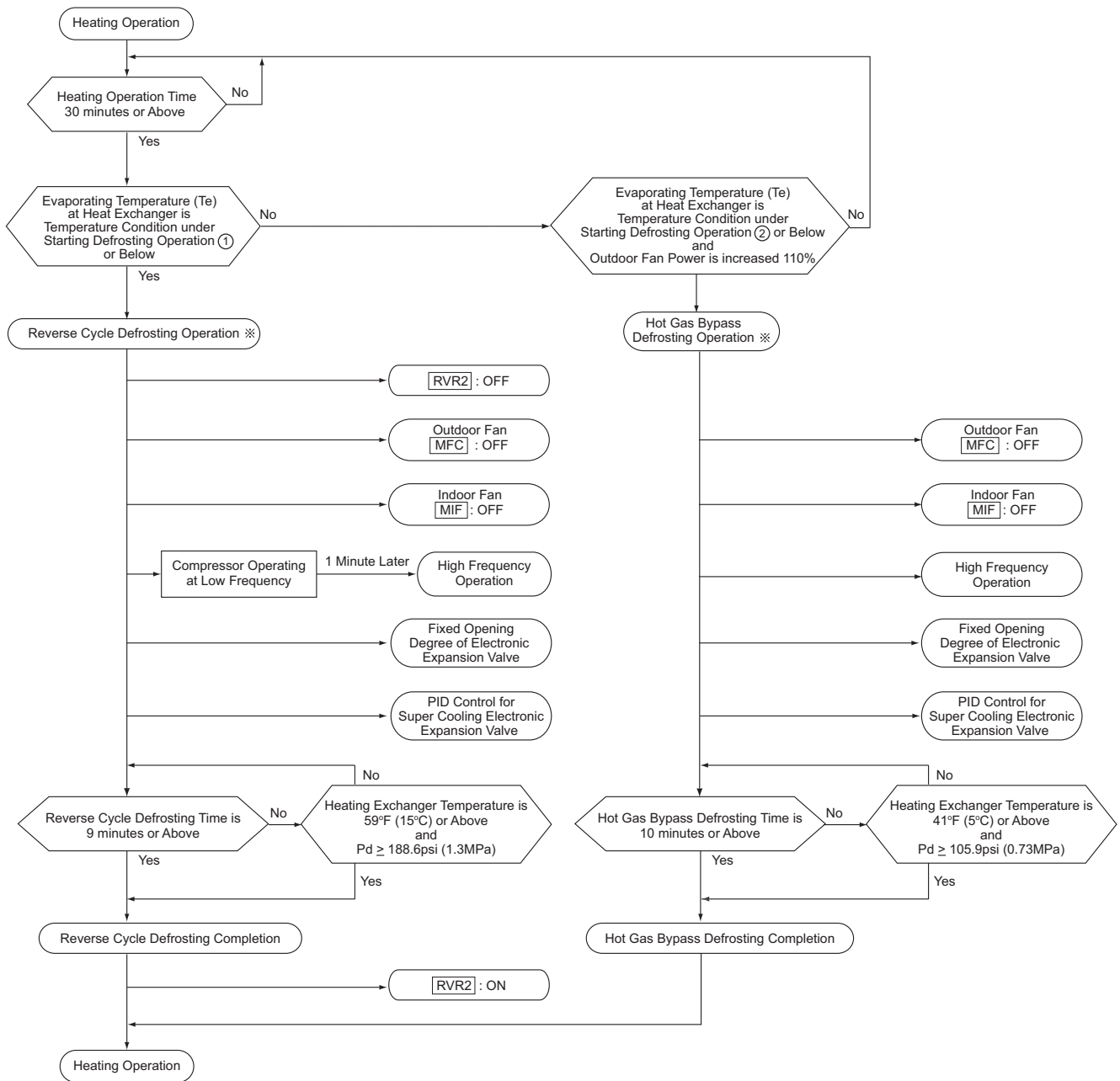


Heating Operation

I.U.: Indoor Unit
O.U.: Outdoor Unit

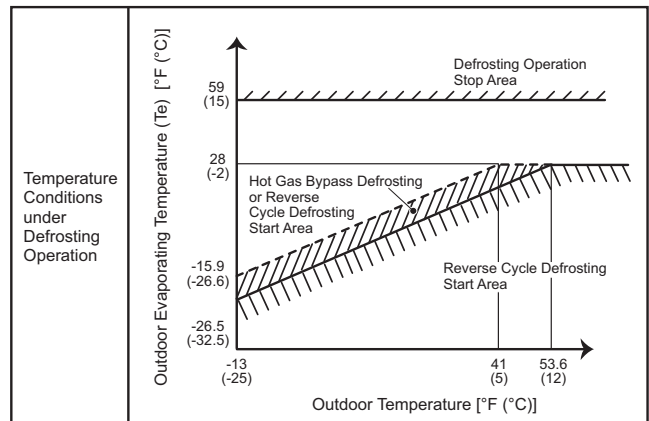


Defrosting Operation



————— Temperature Condition under Starting Defrosting Operation: ①
 - - - - - Temperature Condition under Starting Defrosting Operation: ②

※: Defrosting operation signal is transmitted to the indoor unit during the defrosting operation. After the signal is received, “DEFROST” will be indicated on the LCD of the wired controller and the indoor fan will stop.



Protection Control

- * Whenever protection control sequences are activated, the corresponding code is displayed on the 7-segment LED array of the main control board.
- * Protection control code is displayed while a function is working, and goes out when released.

< Indicated Contents >

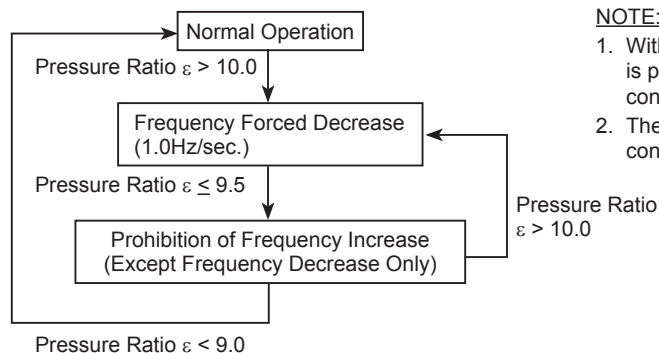
Indication	Protection Control Contents	Code During Degeneration Control
P01	Pressure Ratio Protection Control	Pc1
P02	High Pressure Increase Protection Control	Pc2
P03	Inverter Current Protection Control	Pc3
P04	Inverter Fin Temperature Increase Protection Control	Pc4
P05	Discharge Temperature Increase Protection Control	Pc5
P06	Low Pressure Decrease Protection Control	Without
P09	High Pressure Decrease Protection Control	
P0A	Demand Current Control	
P0d	Low Pressure Increase Protection Control	

(1) P01: Pressure Ratio Protection Control

(a) Pressure Ratio Increase Protection Control

Pressure Ratio Increase Protection Control is performed in order to protect the compressor from an increase of pressure ratio.

< Details of Control >



NOTE:

1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. The pressure ratio is calculated in each outdoor unit, and this control uses the maximum value.

$$\varepsilon = (Pd [\text{psi}] + 15) / (Ps [\text{psi}] + 9)$$

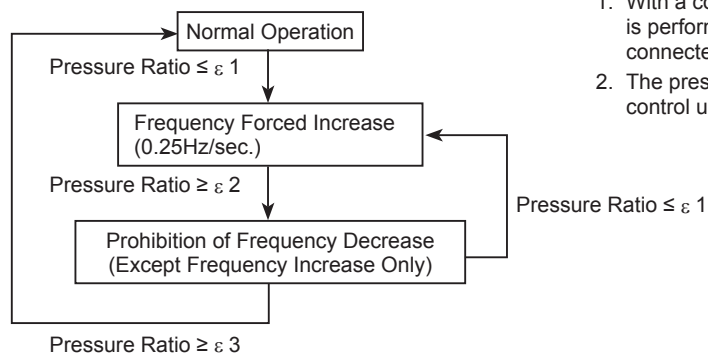
$$\varepsilon = (Pd [\text{MPa}] + 0.1) / (Ps [\text{MPa}] + 0.06)$$

Pd: Detected Value of High Pressure Sensor [psi]
Ps: Detected Value of Low Pressure Sensor [psi]

(b) Low Compression Ratio Protection Function

This function is activated to protect the compressor during occurrences of low compression ratio.

< Details of Control >



NOTE:

1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. The pressure ratio is calculated in each outdoor unit, and this control uses the minimum value.

< Control Value >

	ε 1	ε 2	ε 3
During Fixed Speed Comp. Operation	2.0	2.1	2.2
Except Above Operation	1.8	1.9	2.0

(2) P02: High Pressure Increase Protection Control

High Pressure Protection Control is performed in order to prevent activation of a protection device caused by a high pressure increase during an abnormality and to protect the compressor from an excessive increase of discharge pressure.

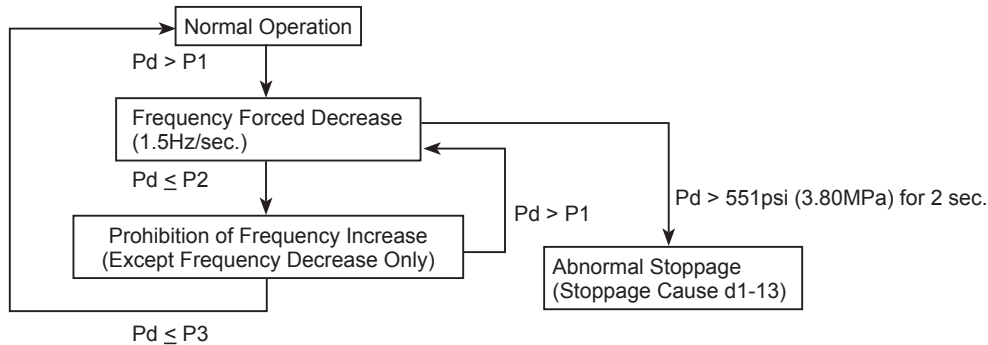
< Control Value >		[psi(MPa)]		
Operation Mode	P1	P2	P3	
Cooling	500 (3.45)	493 (3.40)	464 (3.20)	
Heating	486 (3.35)	479 (3.30)	450 (3.10)	

NOTE:

1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. High pressure is detected in each outdoor unit, and this control uses the maximum value.

Pd: Detected Value of High Pressure Sensor [psi(MPa)]

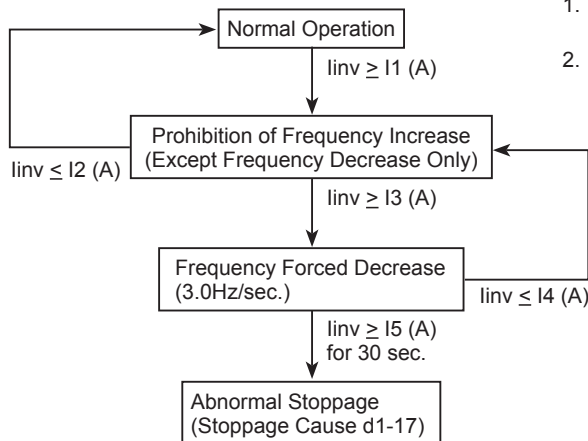
< Details of Control >



(3) P03: Inverter Current Protection Control

Inverter Current Protection Control is performed in order to prevent an inverter trip caused by an increase of inverter secondary current value.

< Details of Control >



NOTE:

1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. The inverter current value is detected in each outdoor unit, and this control uses the maximum value.

linv: Detected Value of Inverter Secondary Current Sensor[A]

< 208/230V >

Model	I1	I2	I3	I4	I5
(H,Y)VAHP072, 096B31CW	43.5	42.5	45.0	44.0	47.0

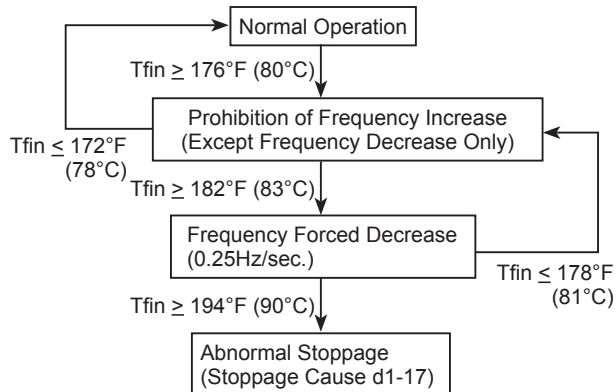
< 460V >

Model	I1	I2	I3	I4	I5
(H,Y)VAHP072, 096B41CW	21.5	21.0	22.5	22.0	24.5

(4) P04: Inverter Fin Temperature Increase Protection Control

Inverter Fin Temperature Increase Protection Control is performed in order to prevent an inverter trip caused by a temperature increase of the inverter fin.

< Details of Control >



NOTE:

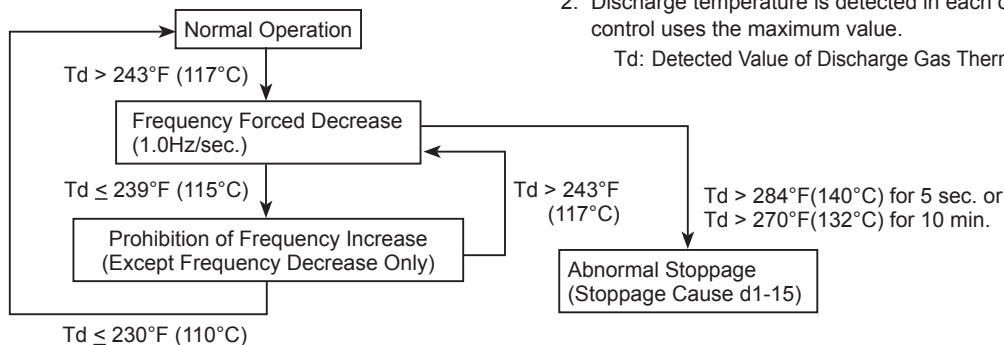
1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. The inverter fin temperature is detected in each outdoor unit, and this control uses the maximum value.

Tfin: Detected Value of Inverter Fin Thermistor [°F(°C)]

(5) P05: Discharge Temperature Increase Protection Control

Discharge Temperature Increase Protection Control is performed in order to protect the compressor motor coil from an increase of discharge temperature during an abnormality.

< Details of Control >



NOTE:

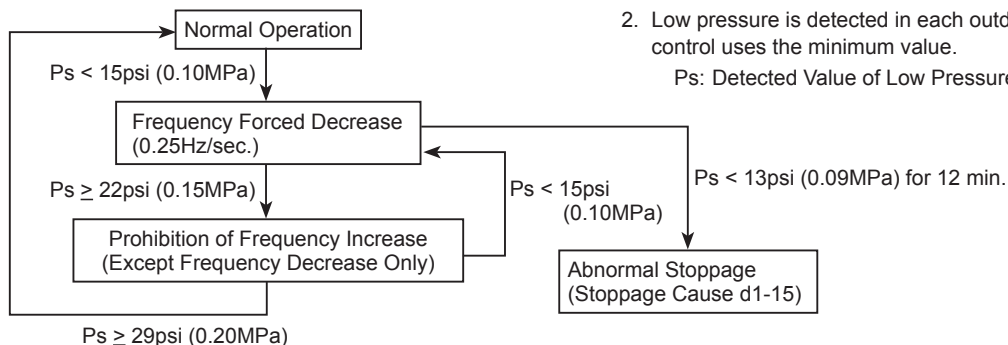
1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. Discharge temperature is detected in each outdoor unit, and this control uses the maximum value.

Td: Detected Value of Discharge Gas Thermistor [°F(°C)]

(6) P06: Low Pressure Decrease Protection Control

Low Pressure Decrease Protection Control is performed in order to protect the compressor from a transitional decrease of suction pressure.

< Details of Control >



NOTE:

1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. Low pressure is detected in each outdoor unit, and this control uses the minimum value.

Ps: Detected Value of Low Pressure Sensor [psi(MPa)]

(7) P09: High Pressure Decrease Protection Control

When decreasing high pressure, the compressor operation frequency is controlled by this protection control for the following purposes.

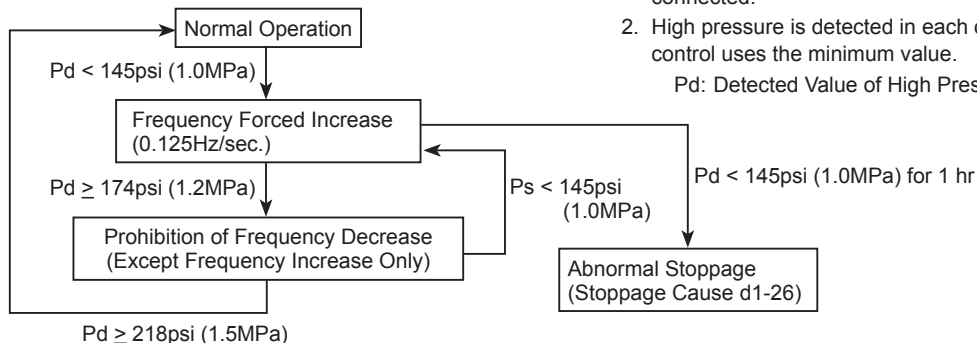
- To prevent insufficient refrigerant supply to indoor units installed at different height locations.
- To keep the refrigerant oil supply in the compressor.

NOTE:

1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. High pressure is detected in each outdoor unit, and this control uses the minimum value.

Pd: Detected Value of High Pressure Sensor [psi(MPa)]

< Details of Control >



(8) P0A: Demand Current Control

The compressor operation frequency is controlled to set at the setting value of the outdoor unit inverter primary current (40% to 100% of rated current of cooling operation). This function is detailed in the "External Input and Output Setting". Refer to the Service Manual for details.

< Operating Conditions >

The demand current control can be performed under the following conditions.

- (a) The demand signal is input from the centralized operation controller.
- (b) The demand signal is input at the external input terminals of the outdoor unit from external equipment such as a building management system or a utility with a smart meter.
- (c) The demand function settings are set from the outdoor unit PCB.
- (d) The wave function is set from the outdoor unit PCB.
- (e) The demand signal is input from the indoor unit (wired controller).

If the operation current exceeds each setting function value, the compressor operation frequency is controlled.

< Cancellation Condition >

The input signal is stopped at each condition (a) to (e).

NOTE:

This function is not available when the compressor starts or during a defrosting operation.

(9) P0d: Low Pressure Increase Protection Control

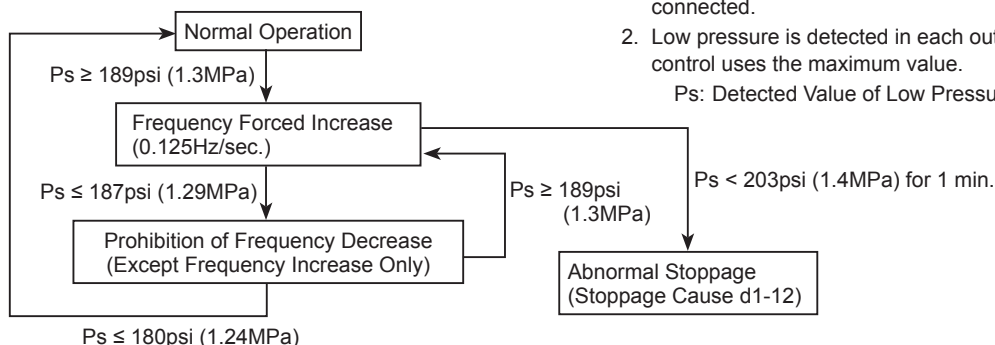
The compressor operation frequency is controlled to protect the compressor from suction pressure transitional increasing.

NOTE:

1. With a combination of base units, the control in the figure is performed for the entire number of outdoor units to be connected.
2. Low pressure is detected in each outdoor unit, and this control uses the maximum value.

Ps: Detected Value of Low Pressure Sensor [psi(MPa)]

< Details of Control >



(10) Priority of Protection Control

If two or more protection controls meet a condition, the protection controls perform according to the following.

Rank Order.	Indication	Protection Control Performed
1	P01	Pressure Ratio Protection Control
2	P02	High Pressure Increase Protection Control
3	P03	Inverter Current Protection Control
4	P04	Inverter Fin Temperature Increase Protection Control
5	P05	Discharge Temperature Increase Protection Control
6	P06	Low Pressure Decrease Protection Control
7	P0A	Demand Current Control
8	P0d	Low Pressure Increase Protection Control
9	P09	High Pressure Decrease Protection Control

		② Lower Rank Order of Protection Control Function			
		Forced Decrease	Forced Increase	Prohibition of Increase	Prohibition of Decrease
① Higher Rank Order of Protection Control Function	Forced Decrease	①	①	①	①
	Forced Increase	①	①	①	①
	Prohibited Increase	②	①	② *1	①
	Prohibited Decrease	②	②	②	②

*1: Discharge Temperature Increase Protection Control (P05) is higher than the following protection controls.

a) Low Pressure Decrease Protection Control (P06)

b) Demand Current Control (P0A)

(11) Degeneration Control

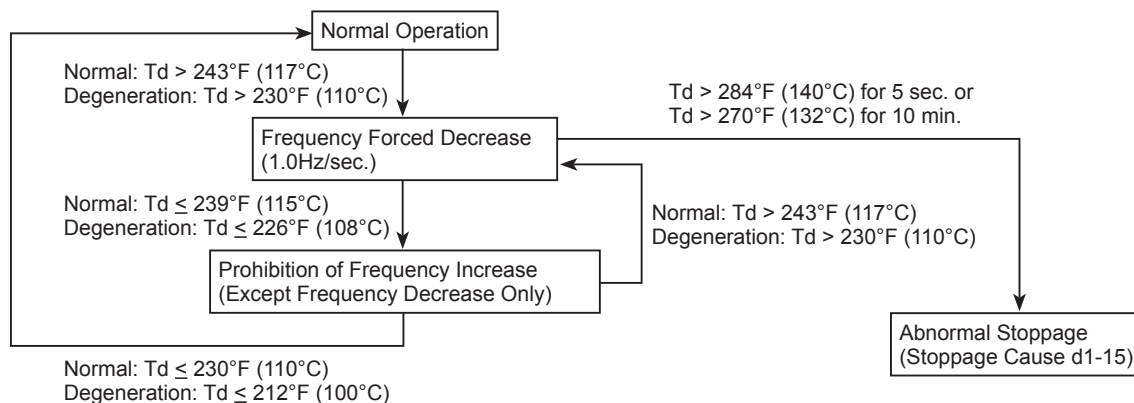
Degeneration Control is performed to change the protection control range.

This control sequence will suppress re-occurring alarms in response to repeated equipment restarts during protection control conditions listed below.

< Related Protection Control >

- (1) Pressure Ratio Decrease Protection Control (P01)
- (2) High Pressure Increase Protection Control (P02)
- (3) Inverter Current Protection Control (P03)
- (4) Inverter Fin Temperature Increase Protection Control (P04)
- (5) Discharge Temperature Increase Protection Control (P05)

< Example of Discharge Temperature Increase Protection Control >



2.11.4 Safety and Control Device Setting

< 208/230V 60Hz >

Model		(H,Y)VAHP072B31CW		(H,Y)VAHP096B31CW		
High Pressure Increase Protection		Automatic Reset, Non-Adjustable				
High Pressure Increase Protection Control	psi (MPa)	551 (3.80)		551 (3.80)		
Pressure Switch	Cut-Out	(for each compressor)				
		psi (MPa)	601 -7 -21 (4.15 -0.05) -0.15		601 -7 -21 (4.15 -0.05) -0.15	
	Cut-In	psi (MPa)	464 ±21 (3.20 ±0.15)		464 ±21 (3.20 ±0.15)	
		Automatic Reset, Non-Adjustable				
For Inverter Compressor						
Over Current						
Inverter Current Protection Control	A	45.0		45.0		
Breaker	A	50.0		50.0		
Over Heat		Automatic Reset, Non-Adjustable				
Discharge Temperature Increase Protection Control	°F	284 for 5sec (140)		284 for 5sec (140)		
	°F	270 for 10min (132)		270 for 10min (132)		
	°C					
	°C					
For Fixed Speed Compressor		Automatic Reset, Non-Adjustable				
Over Current						
Abnormality Running Current Control	208V A	32		32		
Control	230V A	29		29		
Breaker	A	32		32		
Over Heat		Automatic Reset, Non-Adjustable				
Discharge Temperature Increase Protection Control	°F	284 for 5sec (140)		284 for 5sec (140)		
	°C	270 for 10min (132)		270 for 10min (132)		
	°F					
	°C					
For Fan Motor		Automatic Reset, Non-Adjustable				
Over Current Protection Control	A	7		7		
Fuse	A	16		16		

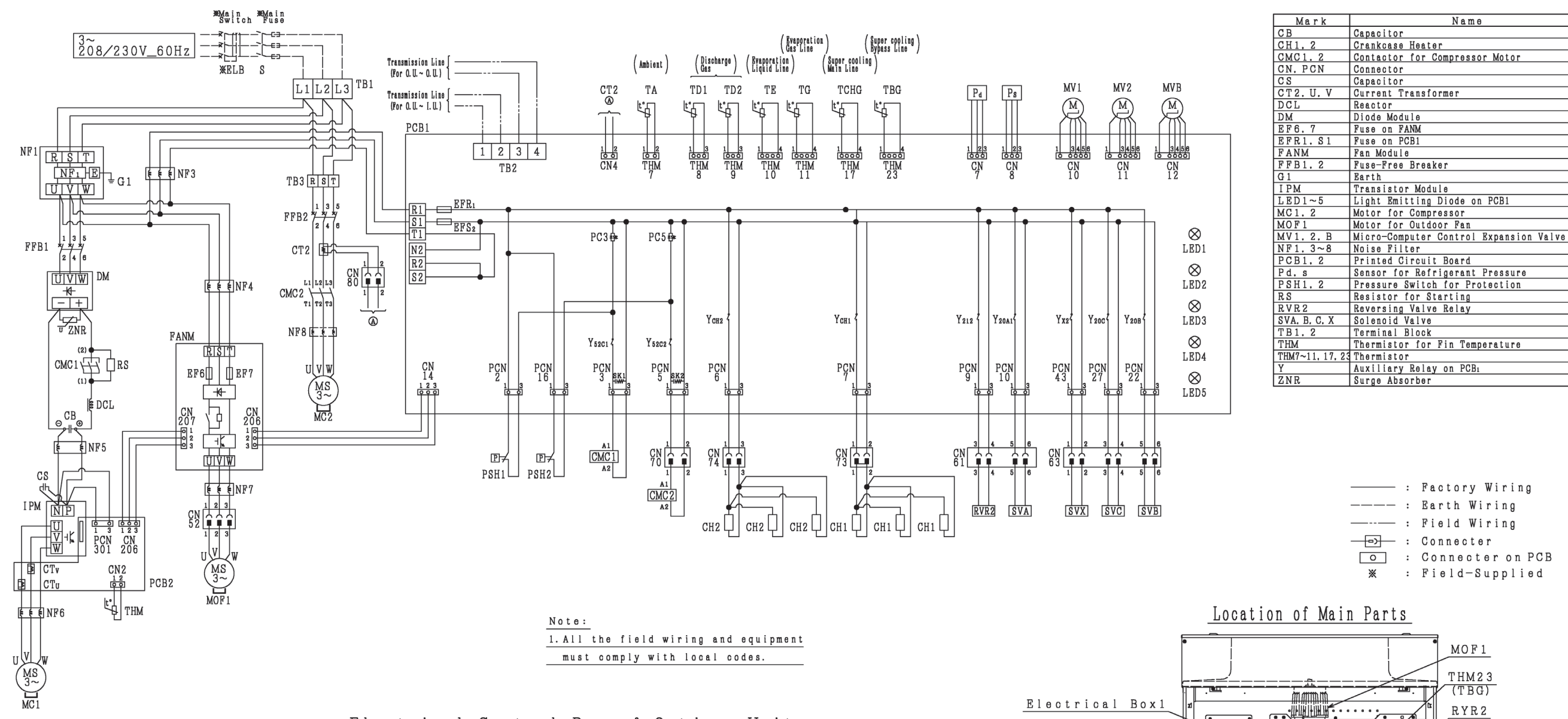
< 460V 60Hz >

Model		(H,Y)VAHP072B41CW		(H,Y)VAHP096B41CW	
High Pressure Increase Protection		Automatic Reset, Non-Adjustable			
High Pressure Increase Protection Control	psi (MPa)	551 (3.80)		551 (3.80)	
Pressure Switch		(for each compressor)			
Cut-Out	psi (MPa)	601 -7 -21 (4.15 -0.05) -0.15		601 -7 -21 (4.15 -0.05) -0.15	
	Cut-In	psi (MPa)	464 ±21 (3.20 ±0.15)		464 ±21 (3.20 ±0.15)
For Inverter Compressor		Automatic Reset, Non-Adjustable			
Over Current					
Inverter Current Protection Control	A	23.5		23.5	
Breaker	A	30.0		30.0	
Over Heat		Automatic Reset, Non-Adjustable			
Discharge Temperature Increase Protection Control	°F	284 for 5sec		284 for 5sec	
	°C	(140)		(140)	
	°F	270 for 10min		270 for 10min	
	°C	(132)		(132)	
For Fixed Speed Compressor		Automatic Reset, Non-Adjustable			
Over Current					
Abnormality Running Current Control	A	14.5		14.5	
Breaker	A	15		15	
Over Heat		Automatic Reset, Non-Adjustable			
Discharge Temperature Increase Protection Control	°F	284 for 5sec		284 for 5sec	
	°C	(140)		(140)	
	°F	270 for 10min		270 for 10min	
	°C	(132)		(132)	
For Fan Motor		Automatic Reset, Non-Adjustable			
Over Current Protection Control	A	7		7	
Breaker	A	10		10	

2.11.5 Electrical Wiring Diagram

(1) 208/230V 60Hz

MODEL: (H,Y)VAHP072B31CW and (H,Y)VAHP096B31CW

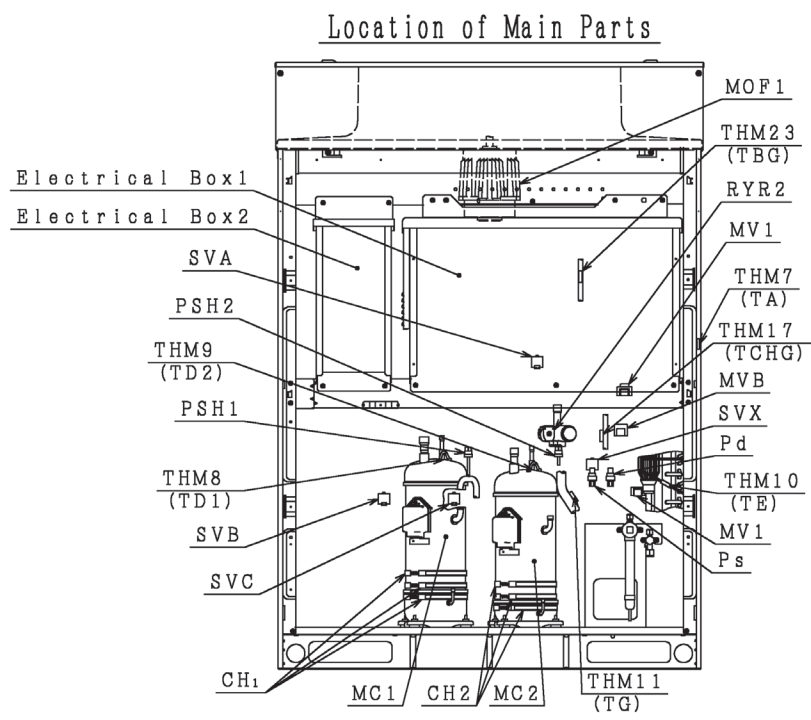
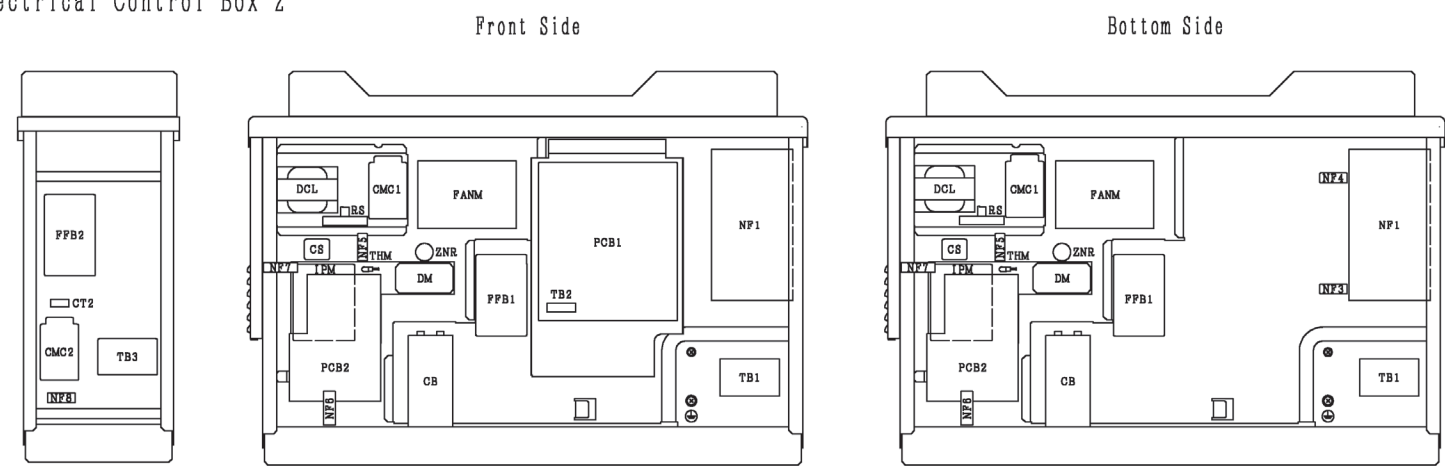


Note:
1. All the field wiring and equipment must comply with local codes.

Electrical Control Box of Outdoor Unit

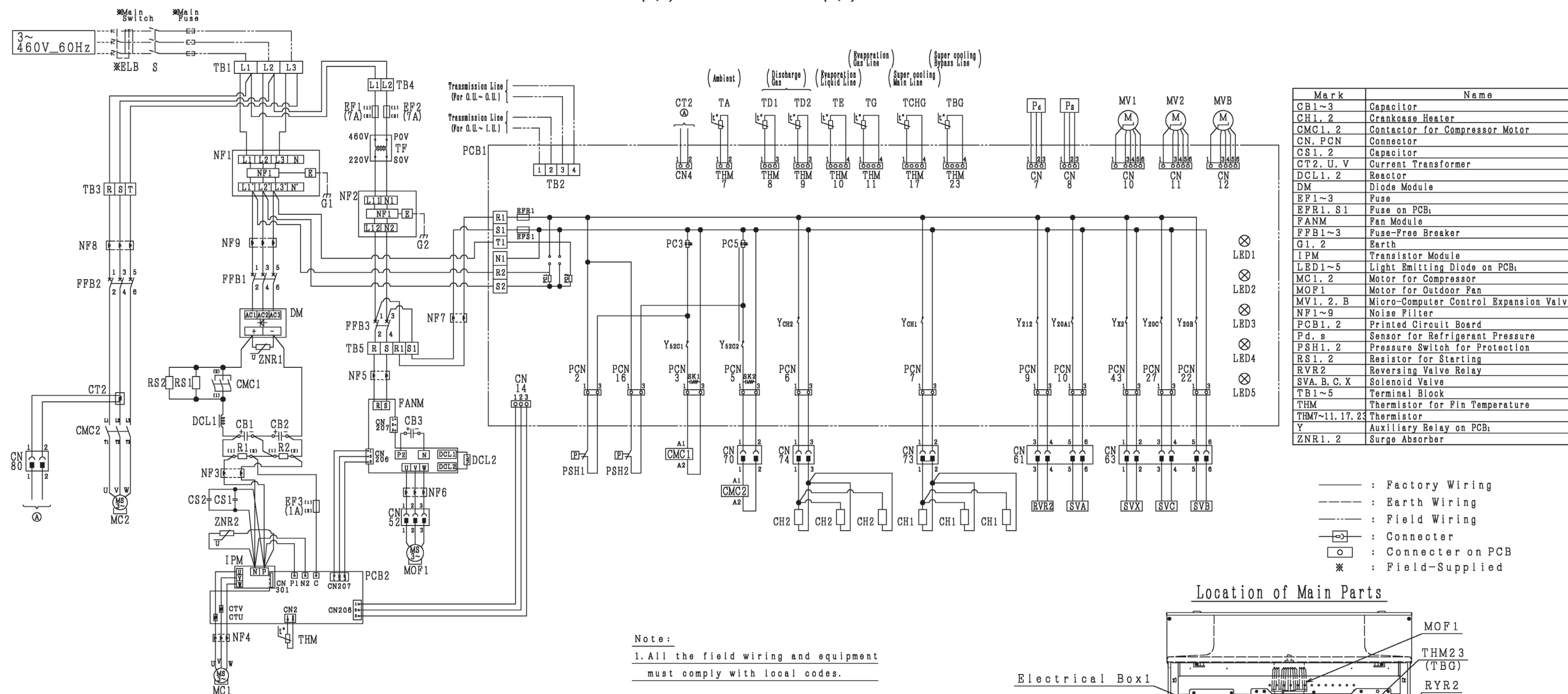
The Interior of the Electrical Control Box 2

The Interior of the Electrical Control Box 1



(2) 460V 60Hz

MODEL: (H,Y)VAHP072B41CW and (H,Y)VAHP096B41CW

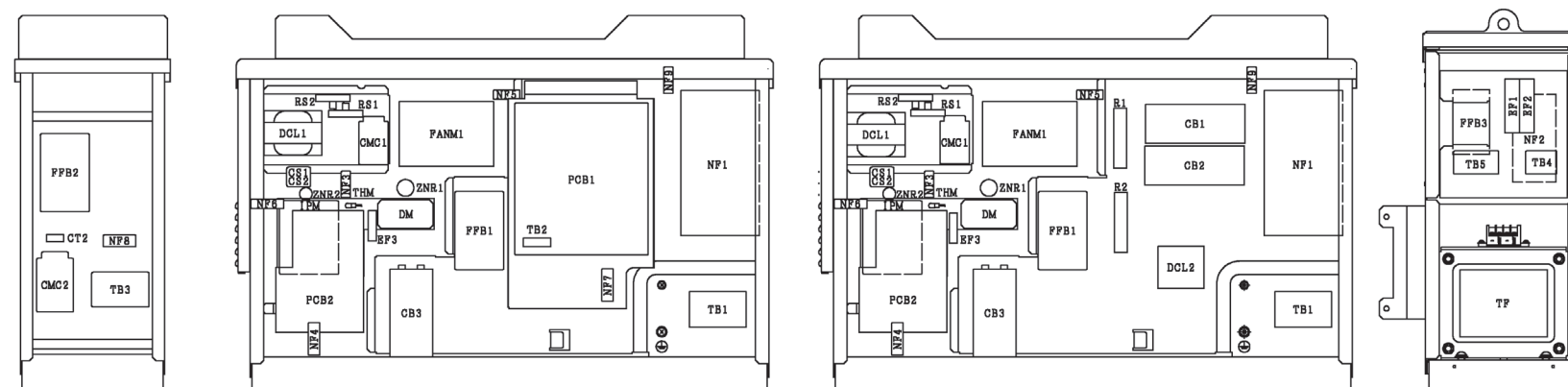


Electrical Control Box of Outdoor Unit

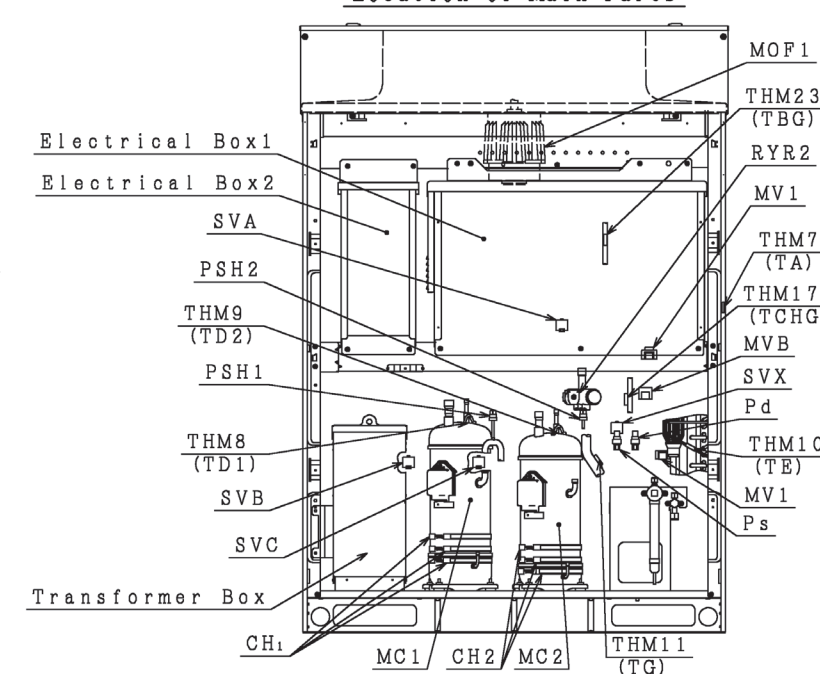
The Interior of the Electrical Control Box 2

The Interior of the Electrical Control Box 1

Transformer Box



Location of Main Parts



2.12 Operation Range

This unit has been designed for cooling operations under low ambient temperatures down to 14°F (-10°C) *3), *4).

This wide temperature range enables cooling even in winter in buildings with high internal heat resulting from lighting, people, and machines, particularly in areas such as shops, lecture rooms, and data processing areas. Heating units can operate under low ambient temperature down to -13°F (-25°C).

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) *1), *2)	14°F DB (-10°C DB) *3), *4)
Heating Operation	Indoor	80°F DB (27°C DB)	59°F DB (15°C DB)
	Outdoor	59°F WB (15°C WB) *5)	-13°F WB (-25°C WB) *6), *7)

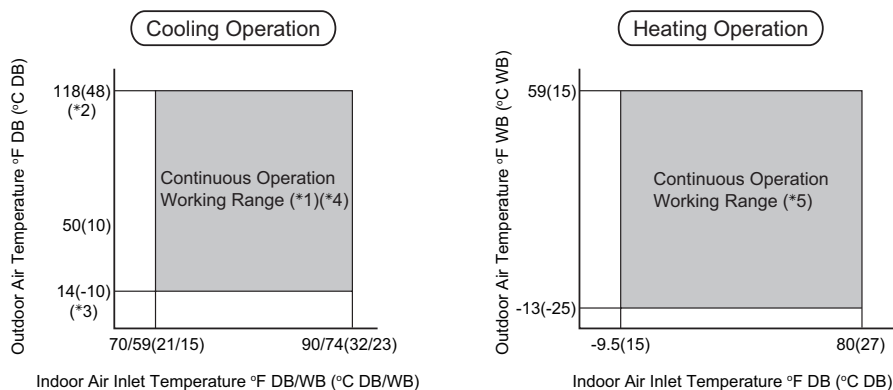
DB: Dry Bulb, WB: Wet Bulb

- *1) When the outdoor air temperature is 100°F DB (38°C DB) or more and the outdoor unit operation capacity ratio is 100% or more, the outdoor unit will be Thermo-OFF to protect the compressor from failure.
- *2) When the outdoor air temperature is 109°F (43°C) or more during the outdoor unit cooling operation, the maximum connectable indoor unit capacity ratio is 100%.
- *3) When the outdoor air temperature is 23°F (-5°C) or less during the outdoor unit cooling operation, the minimum connectable indoor unit capacity is 18,000 Btu/h.
In this case, installing the snow protection hood (optional part) is required.
- *4) When operating the outdoor unit under the low cooling load conditions and in the low outdoor air temperature, (approx. 50°F DB (10°C DB) or less), the indoor unit will be Thermo-OFF to prevent the heat exchanger of the indoor unit from being frosted.
- *5) When operating the outdoor unit under the low heating load conditions and the outdoor temperature is 59°F DB (15°C DB) or more, the outdoor unit will be Thermo-OFF to protect the compressor from failure.
- *6) When the outdoor temperature is lower than 14°F (-10°C) select the combination of indoor units and outdoor unit as the total capacity of indoor units not to exceed the capacity of outdoor unit.
- *7) If some indoor units start operating simultaneously at a low outdoor air temperature, the airflow may be less than the setting airflow on wired controller for maintaining indoor comfort.

Thermo-ON: The outdoor unit and some indoor units are running.

Thermo-OFF: The outdoor unit and some indoor units stay on, but don't run.

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



2.13 Combinations of Indoor Units and Outdoor Units

Table 2.1 Indoor Unit Type List

Indoor Unit Type			Capacity (MBH)										
			6	8	12	15	18	24	30	36	48	72	96
Ducted	Ducted (High Static)	(H,Y)IDH_B21S					○	○	○	○	○	○	○
	Ducted (Medium Static)	(H,Y>IDM_B21S	○	○	○	○	○	○	○	○	○		
	Ducted (Slim)	(H,Y)IDS_B21S	○	○	○	○	○						
	Ducted (EconoFresh)	(H,Y>IDM_B21E							○	○	○		
	DOAS	(H,Y)DOA_B21S											○
Non-Ducted	Ceiling-Mounted 4-Way Cassette	(H,Y)IC4_B21S			○	○	○	○	○	○			
	Ceiling-Mounted 4-Way Cassette Mini	(H,Y)ICM_B21S		○	○	○	○						
	Ceiling-Mounted 2-Way Cassette	(H,Y)IC2_B21S					○	○					
	Ceiling-Mounted 1-Way Cassette	(H,Y)IC1_B21S	○	○	○	○							
	Wall-Mounted	TIWM_B21S	○	○	○	○	○	○					
	Ceiling Suspended	(H,Y)ICS_B21S				○		○	○	○			
	Floor Exposed	(H,Y)IFE_B21S	○	○	○	○							
	Floor Concealed	(H,Y)IFC_B21S	○	○	○	○							

○ : Available

- The number of indoor units that can be connected to an outdoor unit is defined in Table 2.2: Comply with the following conditions when selecting a system.
- A maximum and minimum total capacity against the nominal outdoor unit capacity can be obtained through combination of indoor units.

Table 2.2 System Combination

Outdoor Unit Capacity (MBH)	Minimum Capacity at Individual Operation (MBH)	Maximum Number of Connectable I.U.	Recommended Number of Connected I.U.	Connectable Indoor Unit Capacity Ratio ^{*3)}	
				Maximum ^{*2)}	Minimum
72	6 ^{*1)}	15	10	130%	60%
96		16	10	110%	60%
144		31	18	130%	60%
168		30	18	110%	60%
192		33	18	110%	60%
288		50	32	110%	60%

*1) When the outdoor air temperature is 23°F (-5°C) or cooler during the outdoor unit cooling operation, the minimum connectable indoor unit capacity is 18,000 Btu/h. A snow protection hood (optional part) should be installed.

*2) When the outdoor air temperature is 109°F (43°C) or warmer during the outdoor unit cooling operation, the maximum connectable indoor unit capacity ratio is 100%.

*3) When the outdoor air temperature is lower than 14°F (-10°C) select the combination of indoor units and outdoor unit as the total capacity of indoors not to exceed the capacity of outdoor unit.

NOTES:

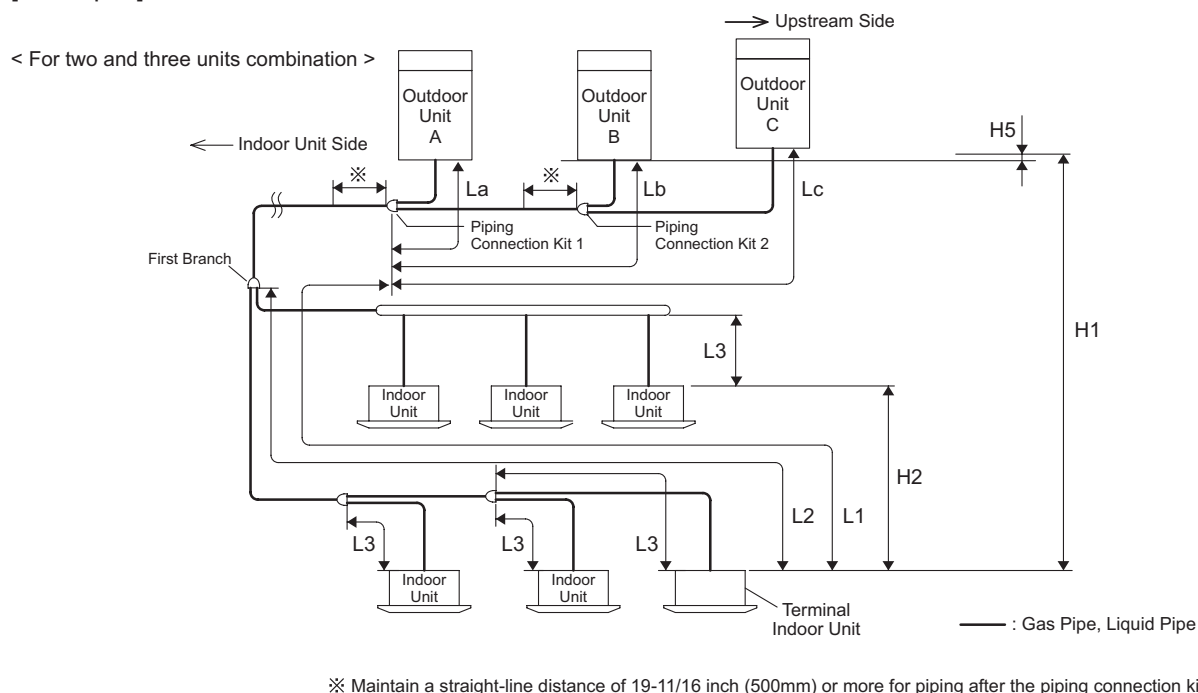
- The connectable indoor unit capacity ratio can be calculated as follows:
Connectable Indoor Unit Capacity Ratio = Total Indoor Unit Capacity / Total Outdoor Unit Capacity
- For the system under which all the indoor units operate simultaneously, the total indoor unit capacity should be less than the outdoor unit capacity. Otherwise, a decrease in operating performance and an increase in the operating limit can result in an overload.
- For the system under which all the indoor units do not operate simultaneously, the total indoor unit capacity is available up to each maximum capacity ratio shown in the above Table 2.2.
- A maximum number of connectable indoor units differs depending on the model, capacity, environment and installation location of connected indoor units. Refer to the "Engineering Manual" for the selection.
- When operating the outdoor unit in cold areas with temperatures of 14°F (-10°C), or under the high heating load conditions, the total indoor unit capacity should be less than 100% against the outdoor unit capacity and the total piping length should be less than 984.3ft (300m).
- If some indoor units start operating simultaneously at a low outdoor air temperature, the airflow may be less than the setting airflow on wired controller for maintaining indoor comfort.
- The airflow volume for indoor units of 6 and 8 MBH is set higher than that for indoor units of 12 MBH or more. Make sure to select appropriate indoor units for installation where cold drafts may occur during heating operation. If installing indoor units in such locations, refer to the recommended number of indoor units that can be connected.

2.14 Piping Work

2.14.1 Piping Work Conditions

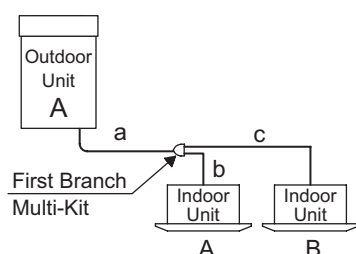
Comply with the following when installing the unit.

[Example]

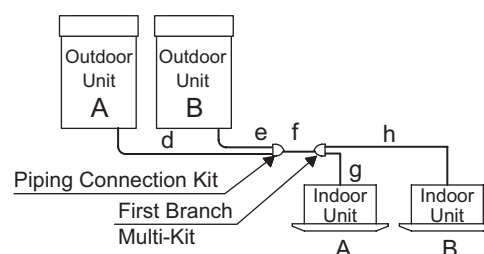


Item	Mark		Details
Total Piping Length	Ex1	a+b+c	The total amount of all piping actual length.
	Ex2	d+e+f+g+h	
Maximum Piping Length	Ex1	a+c	The actual piping length between the stop valve of the outdoor unit or the piping connection kit1 and the terminal indoor unit.
	Ex2	f+h	
Piping Length	-		The actual length of pipe that takes no account for equivalent lengths for pressure drops of elbows.
Equivalent Piping Length	-		The combination of the straight pipe length plus the equivalent length of elbows and other pressure drop calculations.

Example1) If a Line Branch Including Main Branch



Example 2) If Utilizing a Piping Connection Kit



OUTDOOR UNITS

Item		Mark	Allowable Piping Length	
			≤ the recommended number of connected indoor unit	> the recommended number of connected indoor unit
Total Piping Length		-	≤ 1,640 ft (500m)	≤ 984 ft (300m)
Maximum Piping Length	Actual Length	L1	≤ 541 ft (165m)	≤ 541 ft (165m)
	Equivalent Length		≤ 623 ft (190m)	≤ 623 ft (190m)
Maximum Piping Length between Multi-kit of 1st Branch and Each Indoor Unit		L2	≤ 295 ft (90m)	≤ 131 ft (40m)
Maximum Piping Length between Each Multi-kit and Each Indoor Unit		L3	≤ 131 ft (40m)	≤ 98 ft (30m)
Piping Length between Piping Connection Kit 1 and Each Outdoor Unit		La, Lb, Lc	≤ 32 ft (10m)	≤ 32 ft (10m)
Height Difference between Outdoor Units and Indoor Units	O.U. is Higher	H1	≤ 164 ft (50m)	≤ 164 ft (50m)
	O.U. is Lower		≤ 131 ft (40m)	≤ 131 ft (40m)
Height Difference between Indoor Units		H2	≤ 98 ft (30m)	≤ 98 ft (30m)
Height Difference between Outdoor Units		H5	≤ 0.3 ft (0.1m)	≤ 0.3 ft (0.1m)

NOTICE

Comply with the following conditions when installing the unit.

- For a combination of two or three outdoor units, the outdoor unit "A" should be connected to the piping connection of Kit 1. (Refer to Section 2.14.6 "Piping Size between Outdoor Units".)
Refer to the Piping Kit Installation Manual for piping details.
- The piping length between outdoor units should be $L_a \leq L_b \leq L_c \leq 32.8 \text{ ft (10m)}$.
(If the piping length is incorrect, there may be a failure of outdoor units caused by a refrigerant back-up.)
- Maintain a straight-line distance of 19-11/16 inch (500mm) or more for piping after the piping connection kit.
- The condition of refrigerant piping installation is different depending on the connected number of indoor units.
Refer to Table 2.2 "System Combination" (Section 2.13) above for details.
- Allowable total piping length may not exceed 1,640 ft (500m) because of the limitation of maximum additional refrigerant amount as described in the following table. Make sure that the additional refrigerant volume does not exceed the maximum additional refrigerant amount as shown below.

Outdoor Unit Capacity (MBH)	72, 96	144 - 192	288
Max. Additional Refrigerant Charge: lbs (kg)	61.7 (28)	112.5 (51)	138.9 (63)

- If the piping length (L3) between each multi-kit and indoor unit is considerably longer than other indoor unit, refrigerant may not flow well, lessening performance compared to other models.
(Recommended Piping Length: Within 49.2 ft (15m))
- When the piping length from the multi-kit to the first branch to the terminal indoor unit exceeds 131.2 ft (40m), refer to "Piping Branch Restrictions" on the next page.
- When installing Energy Recovery Ventilation in the system, the piping length between Energy Recovery Ventilation and the outdoor unit must be within 49.2 ft (15m).
- When completing on-site piping, install bent piping or horizontal loop piping to absorb any expansion or contraction due to changing temperatures.

● Piping Branch Restriction

In the following instances, there is no limit to the number of main piping branches.

If the piping length L2 from the Multi-Kit at the first branch to the farthest indoor unit is over 131.2 ft (40m), follow the instructions below when performing the field-supplied piping work.

(Example 1) : Installation with Main Piping Branch (*)

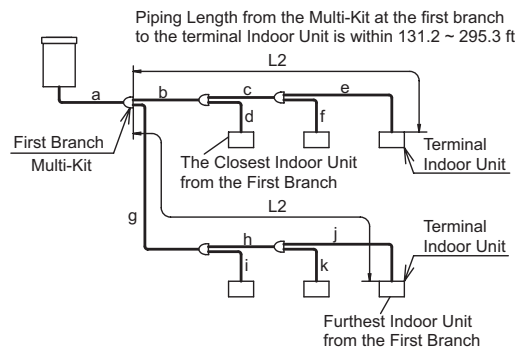
Piping length from the Multi-Kit at the first branch to the terminal indoor unit is within 131.2 - 295.3 ft (40 - 90m).

- (1) If the pipe length L2 is over 131.2 ft (40m), the size of gas and liquid pipes “b and c” or “g and h” should be selected according to Table ④ (see Section 2.14.3), “Diameter of Pipe after First Branch”.

* If the size of (a) is smaller than the size of (b, g) after selecting the size according to Table ④ (see Section 2.14.3), “Diameter of Pipe after First Branch”, adjust the size of (a) so it is the same size as (b, g).
If the size of (a) is larger than the size indicated in Table ③ (see Section 2.14.3), “Main Pipe Diameter” of (Equivalent Piping Length ≥ 328.1 ft), adjust the size of (a) so it is the same size according to Table ③ (see Section 2.14.3), “Main Pipe Diameter” of (Equivalent Piping Length ≥ 328.1 ft).
In this instance, if the size of (b, c, g, h) is larger than the size of each before the branch, adjust the size of (b, c, g, h) to the same size as each before the branch.

- (2) The difference between the piping length from the first branch to the farthest indoor unit and the piping length from the first branch to the closest indoor unit must be within 131.2 ft (40m).

$$*(g+h+j)-(b+d) \leq 131.2 \text{ ft (40m)}$$

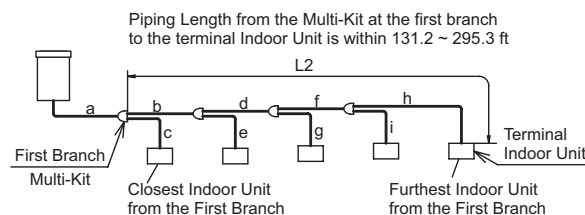


(Example 2): Installation without Main Piping Branch (*)

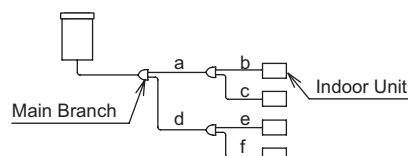
Piping length from the Multi-Kit at the first branch to the terminal indoor unit is within 131.2 - 295.3 ft (40 - 90m).

- (1) If the pipe length L2 is over 131.2 ft (40m), the size of gas and liquid pipes “b, d and f” should be selected according to Table ④ (see Section 2.14.3), “Diameter of Pipe after First Branch”.

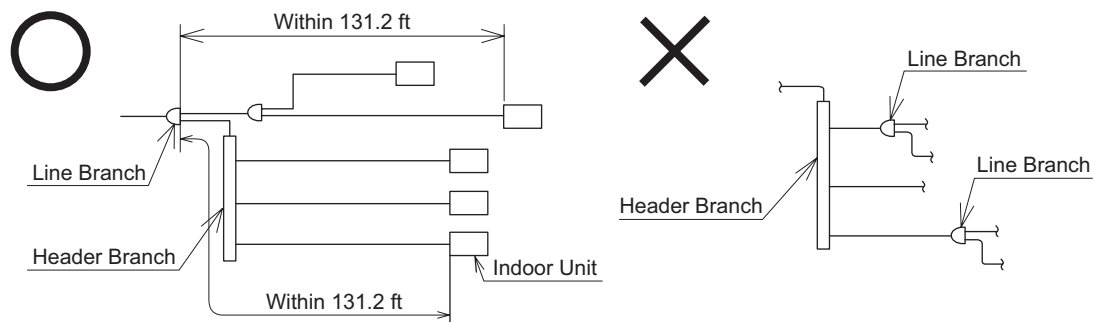
* If the size of (a) is smaller than the size of (b) after selecting the size according to Table ④ (see Section 2.14.3), “Diameter of Pipe after First Branch”, adjust the size of (a) so it is the same size as (b).
If the size of (a) is larger than the size indicated in Table ③ (see Section 2.14.3), “Main Pipe Diameter” of (Equivalent Piping Length ≥ 328.1 ft), adjust the size of (a) so it is the size according to Table ③ (see Section 2.14.3), “Main Pipe Diameter” of (Equivalent Piping Length ≥ 328.1 ft).
In this case, if the size of (b, d, f) is larger than the size of each before the branch, adjust the size of (b, d, f) to the same size as each before the branch.



(*) : Main Piping Branch:
Both branches of piping from a Multi-Kit are connected to the next Multi-Kits.



A header branch can be used with a line branch at the three pipes segment and two pipes segment. A header branch can also be used after the second branch. Do not connect a line branch to a header branch. When using a header branch, make sure that the piping length L2 from the Multi-Kit at the first branch to the farthest indoor unit is within 131.2 ft (40m).



- The number of indoor units connectable to outdoor unit is as follows:
Comply with the following conditions when installing the unit.
- A maximum total capacity and a minimum total capacity against the nominal outdoor unit capacity can be obtained by combination of the indoor units.

Outdoor Unit Capacity (MBH)	72	96	144	168	192	288
Maximum Number of Connectable I.U.	15	16	31	30	33	50
Recommended Number of Connectable I.U.	10	10	18	18	18	32

NOTES:

1. For a system under which all the indoor units are supposed to operate simultaneously, the total indoor unit capacity should be less than outdoor unit capacity. Otherwise, it may cause a decrease of operating performance and operating limit in overload operation.
2. For the system under which all the indoor units are not supposed to operate simultaneously, the total indoor unit capacity is available 100% or more against the outdoor unit capacity. Refer to Table 2.2 "System Combination" (Section 2.13) for detail.
3. When operating the outdoor unit in cold area with temperatures of 14°F (-10°C), or under the high heating load conditions, the total indoor unit capacity should be 100% or less against the outdoor unit capacity and the total piping length should be 984.3ft (300m) or less.
4. The airflow volume for indoor units of 6 and 8 MBH is set higher than that for indoor units of 12 MBH or more. Make sure to select appropriate indoor units when installing indoor units where cold draft may occur during heating operation. If installing indoor units in such places, refer to the recommended number of connectable indoor units.
5. When installing an Energy Recovery Ventilation (ERV) unit, the additional load must be considered when calculating the maximum units that can be attached.

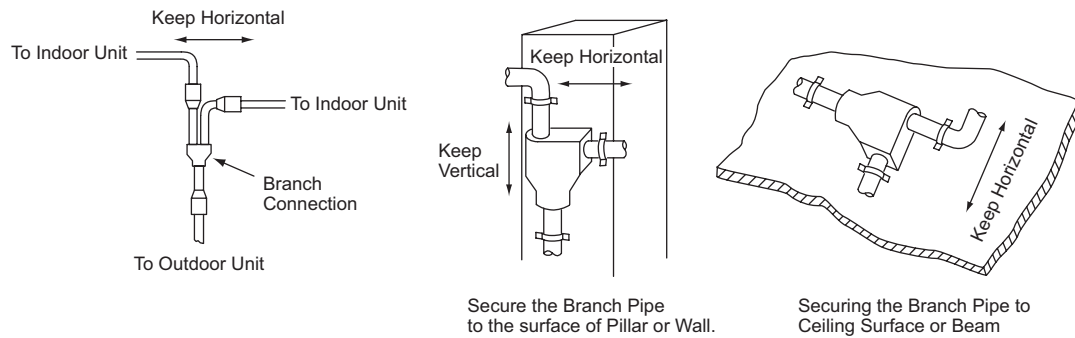
2.14.2 Multi-Kit Connection

Use the branch piping kit to ensure proper piping.

Do not use a T-Joint. Secure the branch pipes horizontally to a pillar, a wall, or a ceiling.

NOTE:

When installing the piping by securing plates, wrap the branch pipe with an insulation or slip a cushioning between the pipe and the plate. Then secure it to the wall.



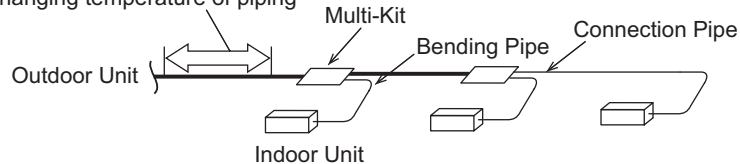
< Installation Posture of Branch Piping >

Upper Side	Upper Side	Upper Side	Upper Side
CORRECT	CORRECT	CORRECT	INCORRECT

[Piping Form from Multi-Kit to Indoor Unit]

Ex. Recommended To prevent pipe damage, use bending pipes from each Indoor Unit to the Multi-Kit.

Piping stretches during operation because of changing temperature of piping



Ex. Not Recommended

Piping stretches during operation because of changing temperature of piping

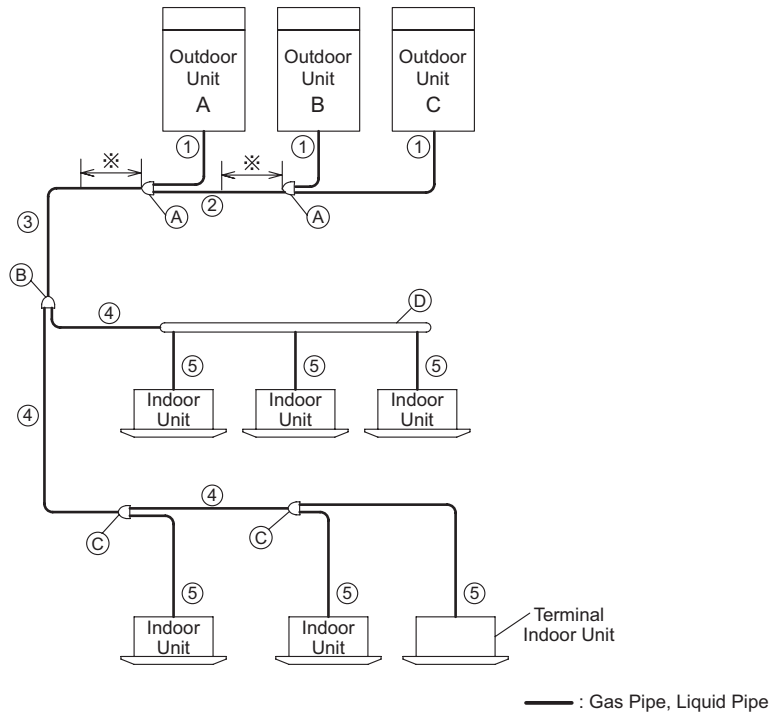


NOTICE:

When on-site piping, install the bend pipes or the horizontal loop pipes to absorb stretched pipes that is due to the changing temperature of refrigerant pipes.

2.14.3 Piping Size and Multi-Kit Selection

For selecting the pipe sizes ① between the outdoor unit and the piping connection kit, the piping size ② between the piping connection kits and piping connection kit ③, refer to Section 2.14.6 “Piping Size between Outdoor Units”.



Multi-Kit (Optional Parts)

< Line Branch >

③ First Branch

Outdoor Unit Capacity (MBH)	Model
72, 96	MW-NP282A2
144 - 192	MW-NP692A2
288	MW-NP902A2

< Header Branch >

④ Header Branch

Total Indoor Unit Capacity (MBH)	No. of Header Branches	Model
36 - 60	4	MH-NP224A
36 - 72	8	MH-NP288A

⑤ Line Branch after First Branch

Total Indoor Unit Capacity (MBH)	Model
≤ 86	MW-NP282A2
87 - 125	MW-NP452A2
126 - 185	MW-NP692A2
≥ 186	MW-NP902A2

NOTE:

If ⑤ “Line Branch after First Branch” is larger than ③ “First Branch”, use the same model as ③ “First Branch”.

Refer to the figure on the previous page.

Piping Size < inch (mm) >

- ③ [Main Pipe Diameter]
(Base Unit or Piping Connection Kit 1 to First Branch)

Outdoor Unit Capacity (MBH)	Equivalent Piping Length			
	< 328.1 ft (100m)		≥ 328.1 ft (100m) *1)	
	Gas	Liquid	Gas	Liquid
72, 96	7/8 (22.2)	3/8 (9.52)	1-1/8 (28.58)	1/2 (12.7)
144 - 192	1-1/8 (28.58)	5/8 (15.88)	1-3/8 (34.93)	3/4 (19.05)
288	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)	7/8 (22.2)

*1): In some cases, it is required to prepare the reducer (field-supplied).

- ④ [Diameter of Pipe after First Branch]

Total Indoor Unit Capacity (MBH)	Piping Length between First Branch and Indoor Unit			
	≤ 131.2 ft (40m)		> 131.2 ft (40m) *1)	
	Gas	Liquid	Gas	Liquid
≤ 41	5/8 (15.88)	3/8 (9.52)	3/4 (19.05)	1/2 (12.7)
42 - 65	3/4 (19.05)	3/8 (9.52)	7/8 (22.2)	1/2 (12.7)
66 - 86	7/8 (22.2)	3/8 (9.52)	1-1/8 (28.58)	1/2 (12.7)
87 - 113	1-1/8 (28.58)	1/2 (12.7)	1-1/8 (28.58)	5/8 (15.88)
114 - 125	1-1/8 (28.58)	1/2 (12.7)	1-3/8 (34.93)	5/8 (15.88)
126 - 155	1-1/8 (28.58)	5/8 (15.88)	1-3/8 (34.93)	3/4 (19.05)
156 - 185	1-3/8 (34.93)	5/8 (15.88)	1-3/8 (34.93)	3/4 (19.05)
186 - 257	1-3/8 (34.93)	3/4 (19.05)	1-5/8 (41.28)	7/8 (22.2)
≥ 258	1-5/8 (41.28)	3/4 (19.05)	1-5/8 (41.28)	7/8 (22.2)

*1): If piping length from the multi-kit at the first branch to the terminal indoor unit exceeds 131.2 ft (40m), according to "Piping Branch Restriction" in Section 2.14.1 when installing. In some cases, it is required to prepare the reducer (field-supplied).

NOTE:

If the size of ④ "Pipe after First Branch" is larger than the size of ③ "Main Pipe", adjust the size of ④ "Pipe after First Branch" to the same size as ③ "Main Pipe".

- ⑤ [Diameter of Pipe between Multi-Kit and Indoor Unit]

Indoor Unit Capacity (MBH)	Gas	Liquid
6 - 15	1/2 (12.7)	1/4 (6.35) *1)
18 - 48	5/8 (15.88)	3/8 (9.52)
72	3/4 (19.05)	3/8 (9.52)
96	7/8 (22.2)	3/8 (9.52)

*1): When liquid piping length is longer than 49.2 ft (15m), use 3/8 inch (9.52mm) diameter piping with the reducer (accessory pipe for Multi-Kit).

NOTE:

The pipe diameter should be the same as the indoor unit piping connection size.

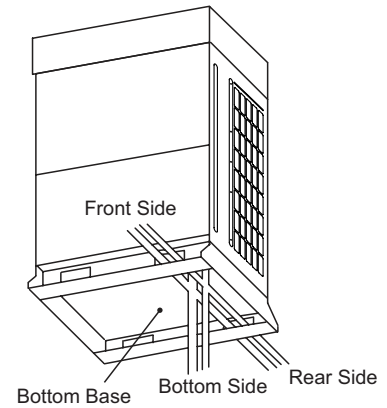
2.14.4 Piping Connection Method

Perform the piping connection work for each outdoor unit.

NOTE:

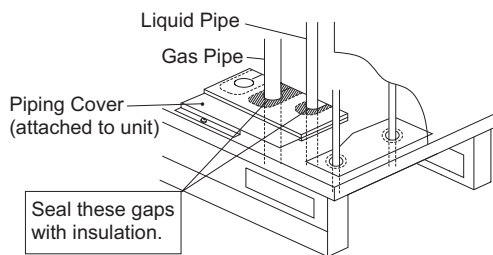
Ensure that the refrigerant pipe is connected to the same refrigerant system.

- Firmly secure the piping in order to avoid vibration and excessive force exerted on the valve.
- (1) Piping can be installed in three directions (front, rear, or bottom side) from the bottom base.
For vibration protection, properly secure piping connections and check that no excessive force is applied to the stop valve.

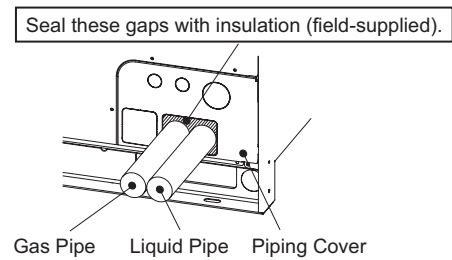


- (2) Follow the installation procedures in the figure below.
- (3) Connect the piping in accordance with Figures 2.1 and 2.2.
- (4) Seal the gap between the bottom base or front piping cover and pipes with the insulation.

● For Piping from Bottom Base



● For Piping from Front Piping Cover



- For Stop Valve

< Gas Valve >

- (1) Make sure that all the spindles are closed completely.
- (2) Connect the charging hose to the service port and release the gas inside the piping.
- (3) Cut the end of the closing pipe and ensure that no residual gas exists inside the gas piping.
- (4) Remove the closing pipe from the brazing portion with a torch. Be careful that the flame doesn't burn the stop valve.

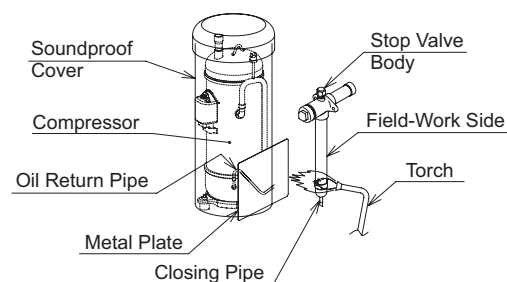
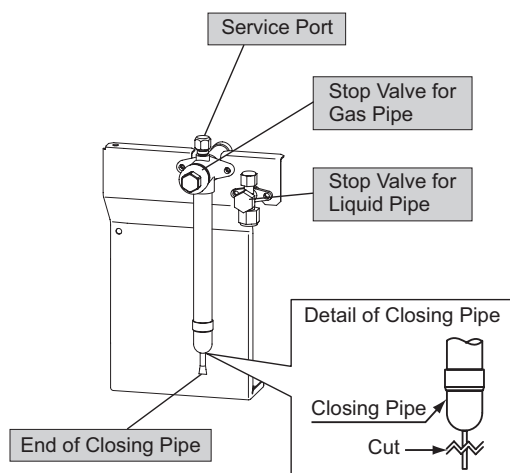


Figure 2.1

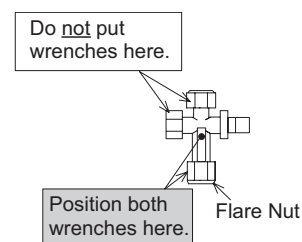
WARNING

- Remove gas inside the closing pipe before the brazing work is performed. If the brazing filler metal melts with residual gas inside, the piping will explode and injuries can result.
- Do not expose surrounding parts and the oil return pipe of the compressor to flames when a torch is used. If the oil return piping is exposed to the fire, high temperature oil will spurt and cause a fire or injury.

< Liquid Valve >

Tighten the flare nut for the liquid stop valve according to the following torque. If excessive force is applied to the flare nut, refrigerant leakage may occur from the spindle part. (To prevent leakage, place two wrenches at the positions as shown at the right when removing and connecting piping.)

Model Type	Tightening Torque
72 and 96	24.3 - 31.0 ft·lbs (33 - 42 N·m)

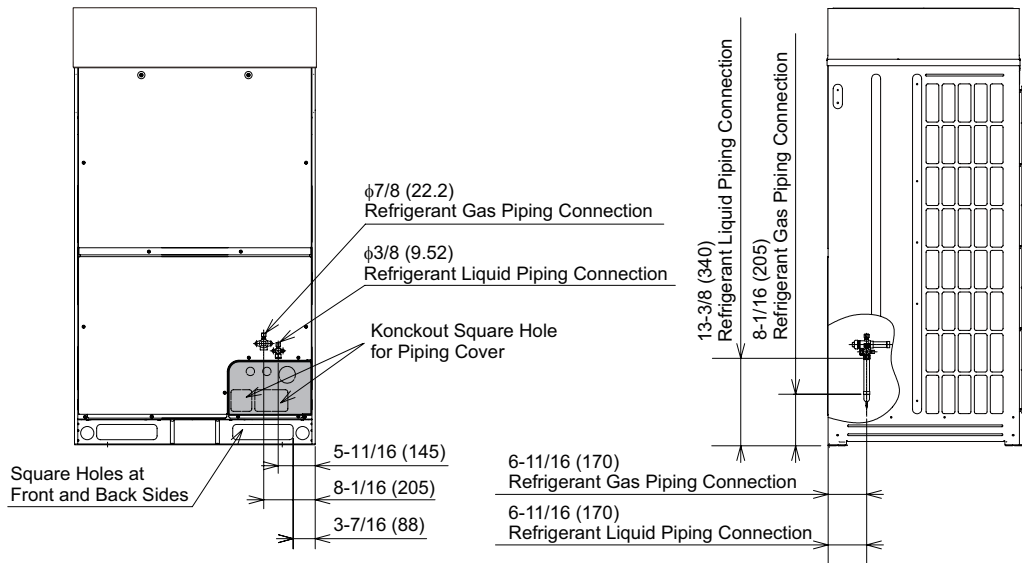


CAUTION

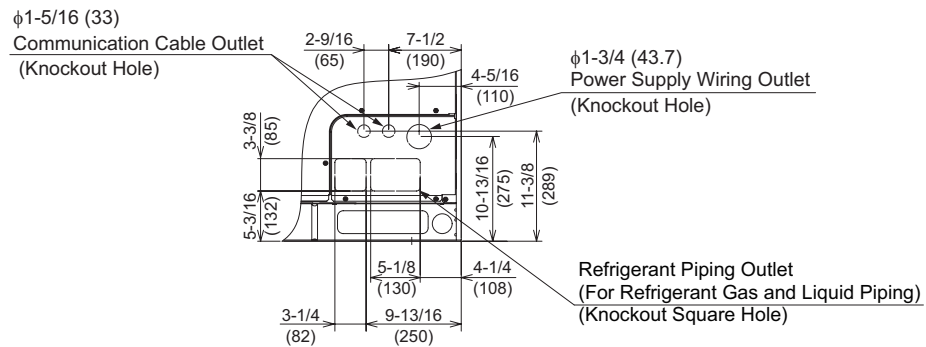
- Do not apply an excessive force to the spindle valve after fully opening the spindle.
- At the test run, fully open the spindle. If it is not fully opened, the devices will be damaged.

- Prepare refrigerant piping for assembly.
Refer to Figure 2.2 for the position for piping connections.

Unit: inch (mm)



< Detail of Piping Cover >

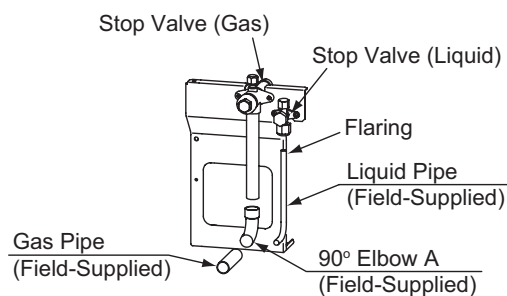


Field Piping (*)	
Gas	Liquid
7/8 (22.2)	3/8 (9.52)

(*): Using the accessory pipe, combine the piping size.

Figure 2.2 Refrigerant Piping Connection

- Details of Stop Valve Piping Connection



NOTES:

1. Ensure that the closing pipe of the gas stop valve is removed first.
2. Refer to Figure 2.1 above for the flaring work.

2.14.5 Piping Work between Outdoor Units

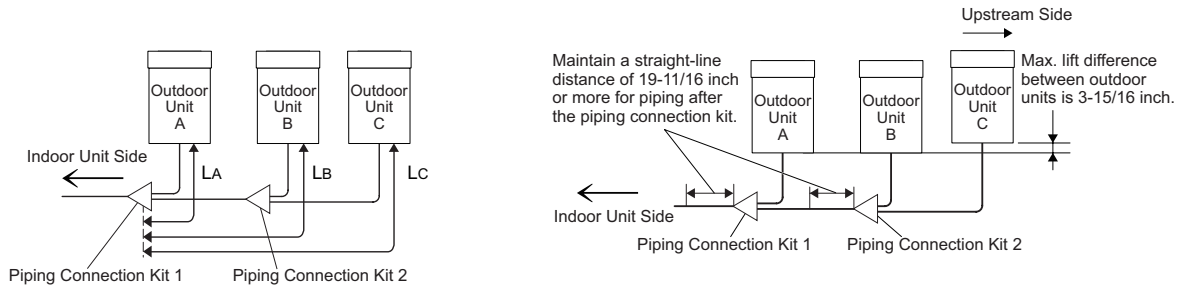
Select the pipe size according to Section 2.14.6 "Piping Size between Outdoor Units".

For refrigerant piping between multiple outdoor units, use the optional piping connection kit.

The arrangement for outdoor units should be determined depending on the piping direction when the refrigerant piping work and installation work are planned. When the outdoor unit is installed, perform the installation work according to the following restrictions.

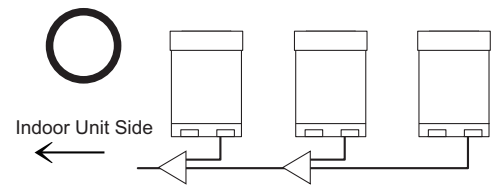
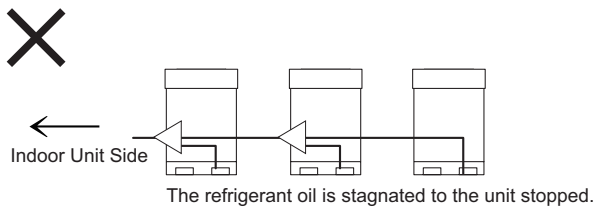
- (1) Piping length between piping connection kit 1 and each outdoor unit should be $L_A \leq L_B \leq L_C \leq 32.8 \text{ ft (10m)}$.

Maintain a straight-line distance of 19-11/16 inch (500mm) or more for piping after the piping connection kit 1.

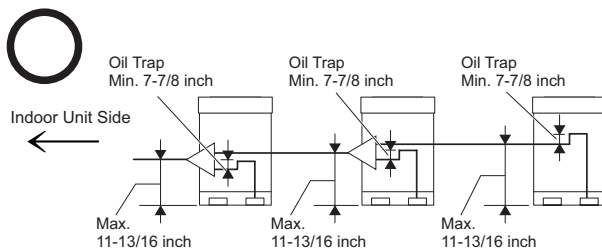
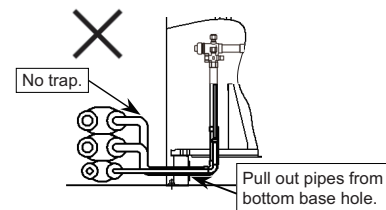


- (2) Place the piping connection kit lower than the outdoor unit piping connection.

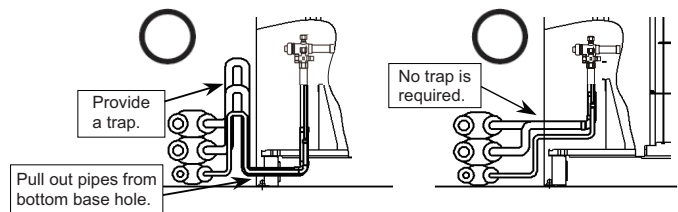
When the piping connection kit is installed higher than the outdoor unit piping connection, maintain a maximum clearance of 11-13/16 inch (300mm) between the piping connection kit and the bottom of the outdoor unit. Also, install an oil trap (minimum 7-7/8 inch (200mm)) between the piping connection kit and the outdoor unit.



< Side View of Outdoor Unit >

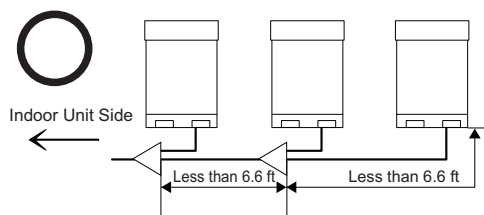


< Side View of Outdoor Unit >

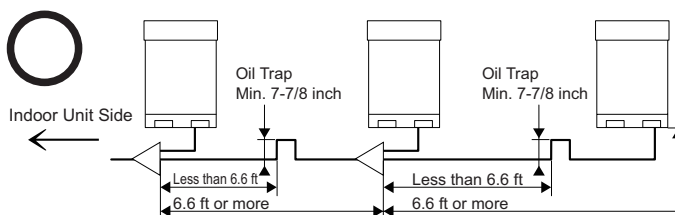


- (3) When piping length between outdoor units is 6.6 ft (2m) or more, an oil trap for the gas piping should be installed so that any accumulation of refrigerant oil cannot occur.

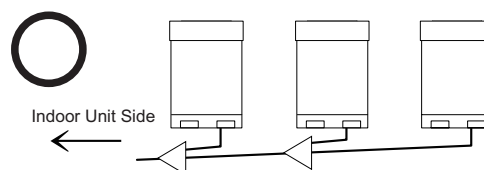
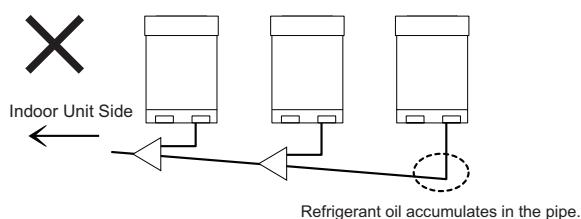
• Less than 6.6 ft (2m)



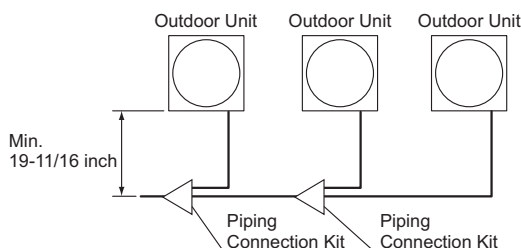
• 6.6 ft (2m) or More



- (4) Place the outdoor unit pipe horizontally or with the pipe slanted downward towards the indoor unit side so that accumulation of refrigerant oil does not occur in the pipe.

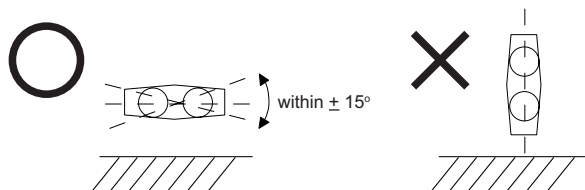


- (5) For servicing, if the pipe is installed in front of the outdoor unit, make sure minimum clearance of 19-11/16 inch (500mm) between the outdoor unit and piping connection kits. (When the compressor is replaced, minimum clearance of 19-11/16 inch (500mm) is required.)



- (6) Direction of Piping Connection Kit

Place the piping connection kit so it is vertical to the ground (the slope must be within $\pm 15^\circ$) as shown in the figure.



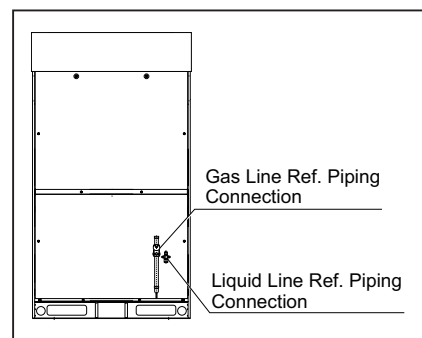
NOTICE

The refrigerant system may be damaged if the slope of the piping connection kit exceeds $\pm 15^\circ$.

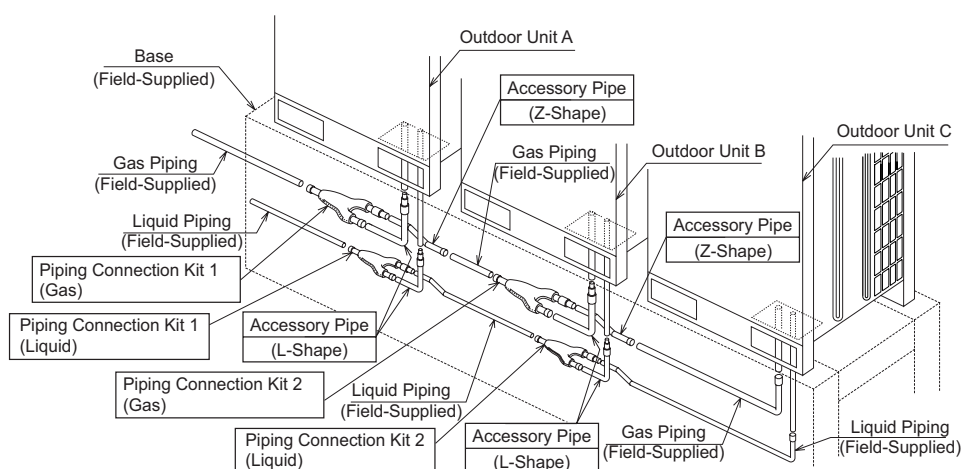
● Construction Example

The following figures show the examples of three units combination.

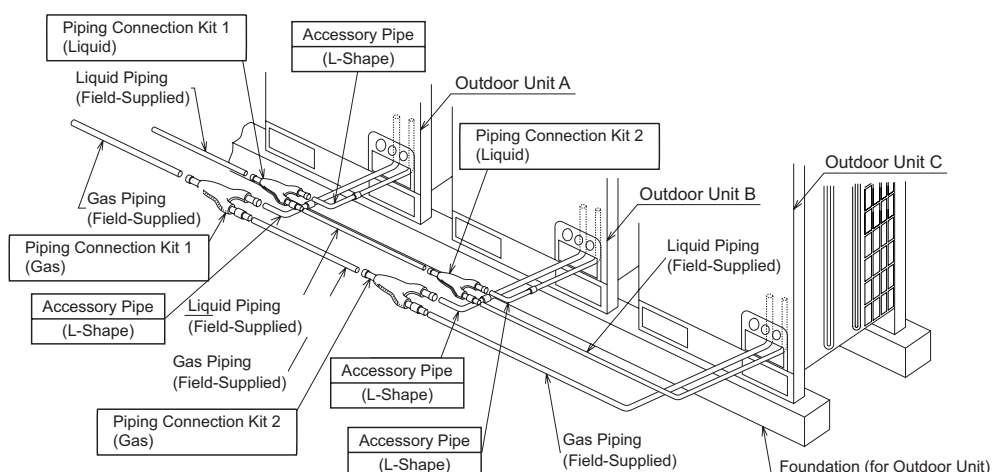
Regarding the piping work for Combination Unit, refer to the "Installation and Maintenance Manual" attached to the piping connection kit.



< Downward Piping Connection >

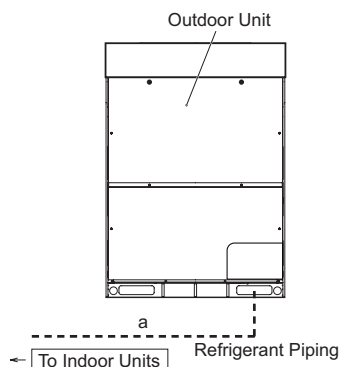


< Front Side Piping Connection >



2.14.6 Piping Size between Outdoor Units

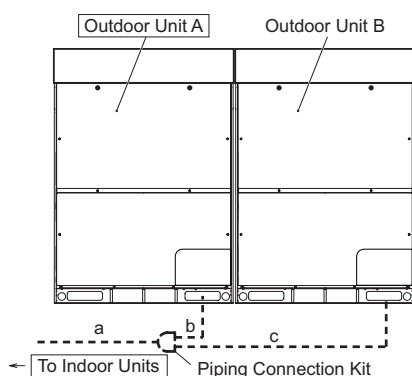
Base Unit



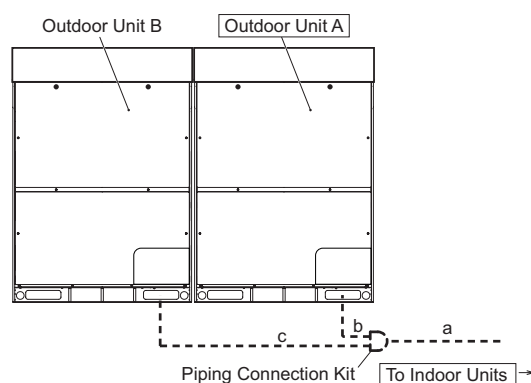
Model Type		inch (mm)	
Piping Size	a	72	96
		Gas	7/8 (22.2)
		Liquid	3/8 (9.52)

Two Units Combination

(Indoor Unit on Left Side)



(Indoor Unit on Right Side)

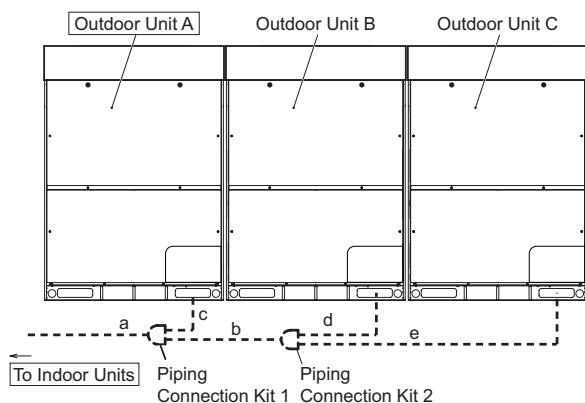


				inch (mm)	
Model Type			144	168	192
Combination Unit	Outdoor Unit A		72	96	96
	Outdoor Unit B		72	72	96
Piping Connection Kit			MC-NP20A1		
Piping Size	a	Gas	1-1/8 (28.58)	1-1/8 (28.58)	1-1/8 (28.58)
		Liquid	5/8 (15.88)	5/8 (15.88)	5/8 (15.88)
	b	Gas	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)
		Liquid	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)
	c	Gas	7/8 (22.2)	7/8 (22.2)	7/8 (22.2)
		Liquid	3/8 (9.52)	3/8 (9.52)	3/8 (9.52)

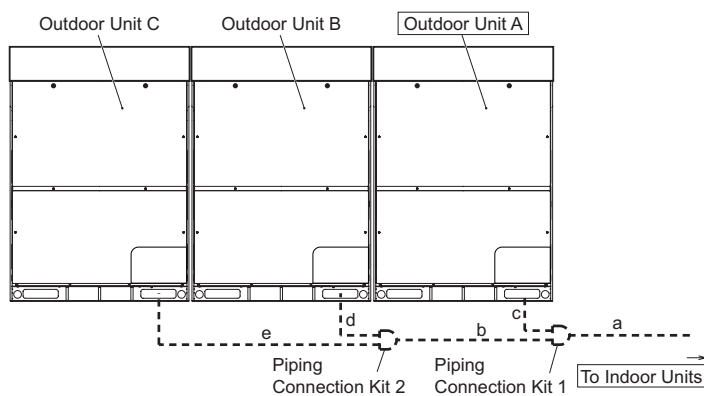
* Install the outdoor unit and piping connections in accordance to whatever is applicable to your situation.
Refer to the table for the outdoor unit model, the piping connection kit model, and the piping diameter.

Three Units Combination

(Indoor Unit on Left Side)



(Indoor Unit on Right Side)



		inch (mm)
Model Type		288
Combination Unit	Outdoor Unit A	96
	Outdoor Unit B	96
	Outdoor Unit C	96
Piping Connection Kit		MC-NP30A1
Piping Size	a	Gas 1-3/8 (34.93)
		Liquid 3/4 (19.05)
	b	Gas 1-1/8 (28.58)
		Liquid 5/8 (15.88)
	c	Gas 7/8 (22.2)
		Liquid 3/8 (9.52)
	d	Gas 7/8 (22.2)
		Liquid 3/8 (9.52)
	e	Gas 7/8 (22.2)
		Liquid 3/8 (9.52)

* Install the outdoor unit and piping connections in accordance to whatever is applicable to your situation. Refer to the table for the outdoor unit model, the piping connection kit model, and the piping diameter.

2.15 Electrical Wiring

2.15.1 Electrical Wiring Connection

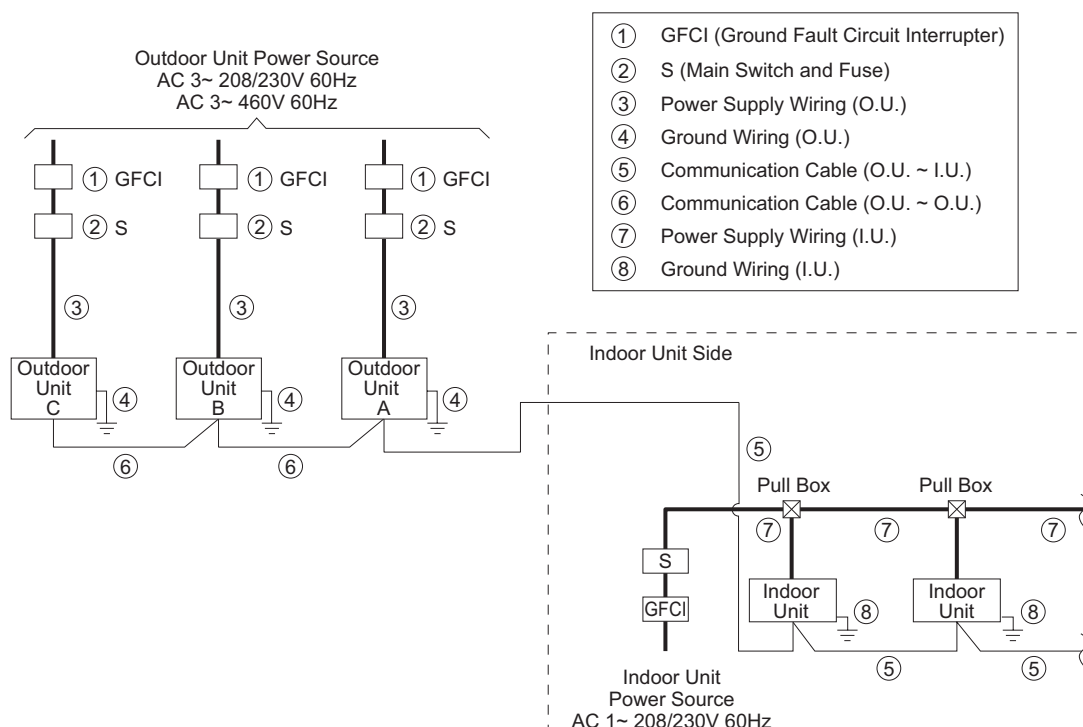
! WARNING

- This equipment can be installed with a Ground Fault Circuit Interrupter (GFCI), which is a recognized measure for added protection to a properly grounded unit. Install appropriate sized breakers / fuses / overcurrent protection switches and wiring in accordance to local, state and NEC codes and requirements. The equipment installer is responsible for understanding and abiding by applicable codes and requirements. Failure to use a GFCI could result in electric shock or fire.
- Perform the electrical work according to the regulations of each region and this installation and maintenance manual. A separate, dedicated electrical circuit must be used. If the electrical wiring work is performed incorrectly or there is a capacity shortage of the power circuit, it will cause an electric shock or a fire.
- Check that the ground wire is securely connected. If the unit is not correctly grounded, it may lead to an electrical shock.
Do not connect the ground wiring to gas piping, water piping, lighting conductor, or telephone ground cables.

(1) Power Source Wiring

Supply the power sources to each outdoor unit and indoor unit group respectively.

Using this method is a basic principle of power supply wiring.



(2) Electrical Characteristics

Table 2.3 Electrical Characteristics and Recommended Wiring Size

Model	Outdoor Unit							INV Comp.	
	Hz (Hz)	Voltage (V)	Max. (V)	Min. (V)	MCA (A)	MOP (A)	Max. Fuse (A)	RLA (A)	LRA (A)
(H,Y)VAHP072B31CW	60	208/230	253	188	51/46	72/65	70/60	24.2/22.0	150
(H,Y)VAHP096B31CW	60	208/230	253	188	51/46	72/65	70/60	24.2/22.0	150
(H,Y)VAHP072B41CW	60	460	506	414	24	34	30	15.3	75
(H,Y)VAHP096B41CW	60	460	506	414	24	34	30	15.3	75

Model	Fix Speed Comp.		Fan Motor		Wiring Size		
	RLA (A)	LRA (A)	Output (kW)	FLA (A)	Power Supply Wiring (AWG)	Ground Wiring (AWG)	Communication Cable (AWG)
(H,Y)VAHP072B31CW	28.8/26.0	155	1.2	5.6/5.1	6	6	18
(H,Y)VAHP096B31CW	28.8/26.0	155	1.2	5.6/5.1	6	6	18
(H,Y)VAHP072B41CW	12.2	74	1.2	9	12	12	18
(H,Y)VAHP096B41CW	12.2	74	1.2	9	12	12	18

MCA: Minimum Circuit Ampacity (A)

MOP: Maximum Overcurrent Protective Device (A)

RLA: Rated Load Ampacity (A)

LRA: Locked Rotor Ampacity (A)

FLA: Full Load Ampacity (A)

NOTES:

1. Select wire size based on the value of MCA.
2. MOP is used to select the fuse, circuit breaker, or a Ground Fault Circuit Interrupter (GFCI).
3. Communication cabling shall be a minimum of AWG18 (0.82mm²), 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.

CAUTION

Install a multi-pole main switch with a space of 1/8 inch (3.5mm) or more between each phase.

NOTES:

1. When the power supply wiring is longer, select the minimum wiring size which the voltage drop is within 2%.
2. Power supply voltage should be satisfied with the followings.
 - Supply Voltage: Rated Voltage within $\pm 10\%$
 - Starting Voltage: Rated Voltage within -15%
 - Operating Voltage: Rated Voltage within $\pm 10\%$
 - Imbalance between Phases: within 3%
3. Do not connect the ground wiring to gas piping, water piping, or a lightning conductor.
 - Gas Piping: An explosion and ignition may occur if there is escaping gas.
 - Water Piping: There is no effective electrical ground provided when hard vinyl piping is used.
 - Lightning Conductor: The electrical potential of the earth increases when a lightning conductor is used.

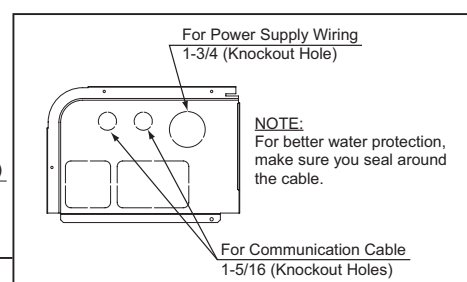
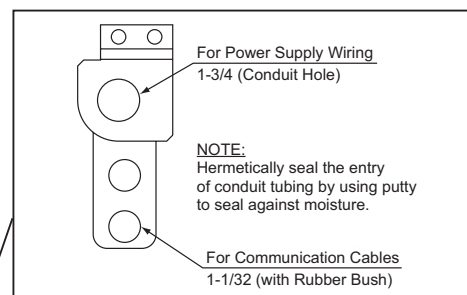
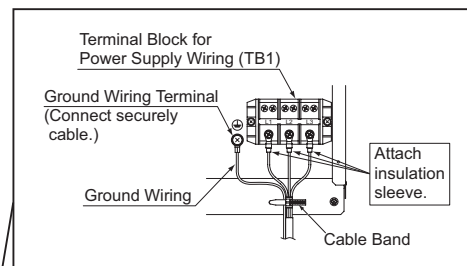
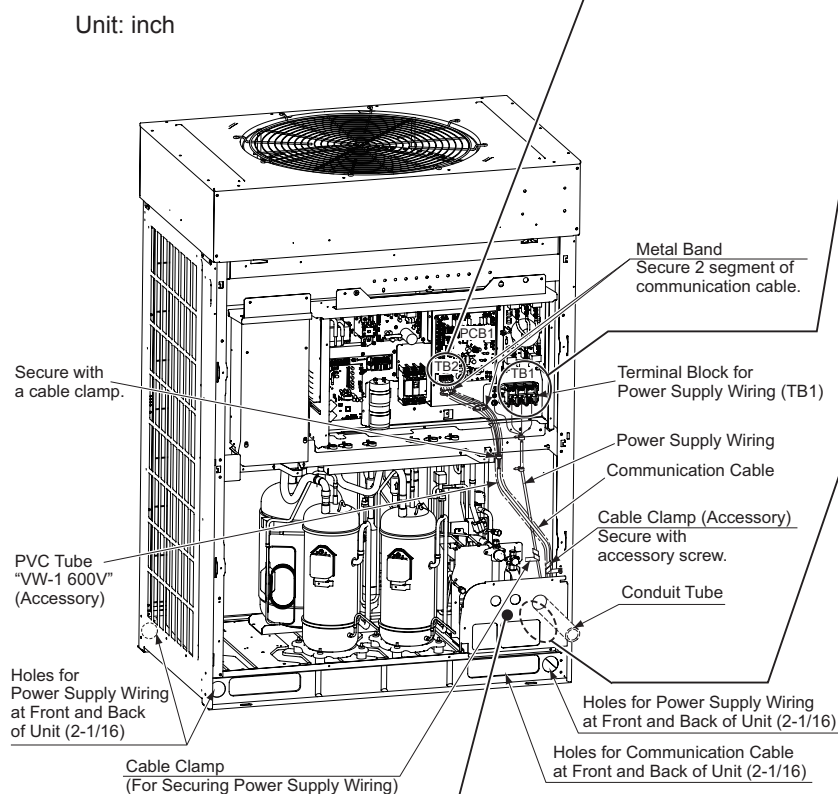
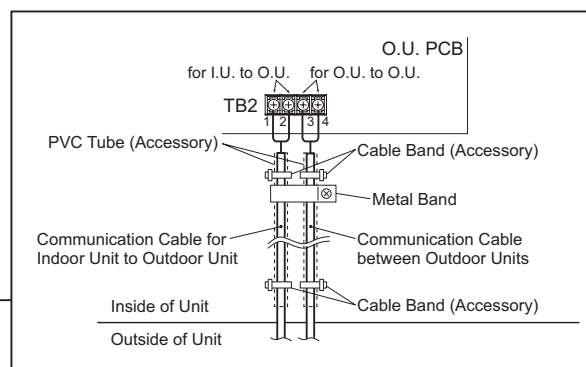
2.15.2 Electrical Wiring Method

Connect the electrical wiring according to the following figure:

- (1) Connect the power supply wires to L1, L2 and L3 for the three-phase power source on the terminal block TB1 and ground wiring to the terminal in the electrical control box.
- (2) Connect the communication cables between the outdoor and indoor units to the TB2 terminals 1 and 2 on the PCB1. As for the communication cables between outdoor units in the same refrigerant system, connect them to the TB2 terminals 3 and 4 on the PCB1. When shielded cabling is applied (M4), 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. Communication cabling shall be a minimum of AWG18 (0.82mm²), 2-Conductor, Stranded Copper.
- (3) Insert the communication cables into the PVC tube "VW-1 600V" (Accessory) to separate from the power supply wirings and the communication cables in the outdoor unit. Local codes will need to be followed.
Then, tighten both ends of the PVC tubing with the cable bands (accessory) in order to secure the PVC tubing to the communication cables.
When the rated voltage of the communication cables (local code) is 600V or more, it is not required to insert them into the PVC tube "VW-1 600V" (accessory).
- (4) Tighten screws for the terminal block according to the following table.

< Required Tightening Torque >

Size	Tightening Torque	
M4	0.7 to 1.0 ft·lbs	(1.0 to 1.3 N·m)
M5	1.5 to 1.8 ft·lbs	(2.0 to 2.4 N·m)
M6	3.0 to 3.7 ft·lbs	(4.0 to 5.0 N·m)
M8	6.6 to 8.1 ft·lbs	(9.0 to 11.0 N·m)
M10	13.3 to 17.0 ft·lbs	(18.0 to 23.0 N·m)



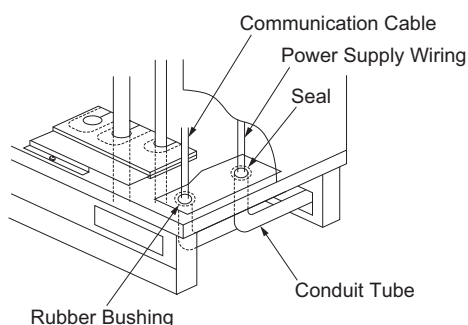
⚠ CAUTION

Be sure to note the following points when running cables under the unit using conduit tubing.
(The pipe cover needs to be removed before performing piping and wiring.)

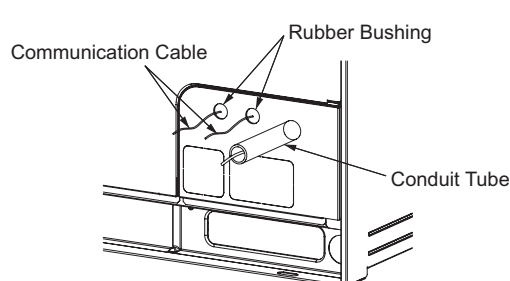
NOTES:

1. When installing the power supply wiring, use the field-supplied conduit tube as shown below. Remove the rubber bushing from the unit for the conduit tubing installation.
2. When installing the communication cables, run them through the rubber grommet attached to the unit.
3. Maintain at least 5 inch (127mm) between the power supply wiring and communication cables.
4. Prevent cables from touching or rubbing up against refrigerant piping, plate edges, and electrical components inside the unit.
5. Completely seal the end of conduit tube with sealing materials to prevent the rain from entering the conduit tube. (In case of wiring from bottom base)
6. Create a drainage hole at the lowest part of the conduit tube. (In case of wiring from bottom base)

● For Wiring from Bottom Base



● For Wiring from Front Piping Cover



⚠ CAUTION

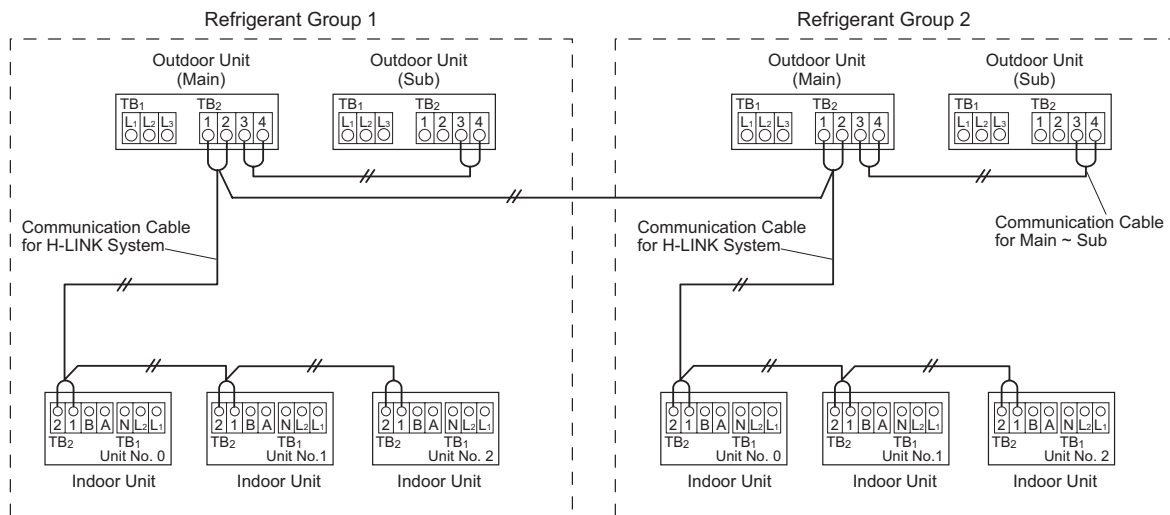
Tightly secure the power supply wiring using a cable clamp inside the unit.

2.15.3 Electrical Wiring Connections of Indoor Unit, and Outdoor Unit

- (1) Connect a power supply wiring to each outdoor unit. Connect a Ground Fault Circuit Interrupter (GFCI), fuse, and main switch (S) to each outdoor unit.
- (2) Connect a power supply wiring to each indoor unit group connected to the same outdoor unit. (Total operating current be less than 12A.)
Connect a Ground Fault Circuit Interrupter (GFCI), fuse, and main switch (S) to each indoor unit group.
- (3) Connect the communication cable between indoor units, and outdoor units, as shown in Figure 2.3.
- (4) Connect the communication cables in the same refrigerant system unit. (If the refrigerant piping of indoor unit is connected to the outdoor unit, also connect the communication cables to the same indoor unit.) Connecting the refrigerant piping and communication cables to the different refrigerant systems may lead to malfunction.
- (5) Use communication cabling that is a minimum of AWG18 (0.82mm²), 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. (Do not use Tri-Core or anything beyond.)

- (6) Use the same kind of cables in the same H-LINK system.
- (7) Maintain at least 5 inch (127mm) between the communication cables and the power supply wiring, and also min. 5 ft (1.5m) between the communication cables and power supply wiring for other electrical device. If these cables are not secured, sleeve the power supply wiring into the metallic conduit tubing to separate them from the other cables. Make sure power supply wiring are well-grounded.
- (8) Connect the following communication cables to the terminals 1 and 2 on terminal block (TB2) in the outdoor unit A (main unit).
 - between outdoor unit and indoor unit
 - between outdoor unit and outdoor unit in other refrigerant systems
- (9) Do not connect the power supply wiring to the terminal block for transmission wiring (TB2). All the printed circuit boards in the same refrigerant system will be damaged.
- (10) Connect the ground wiring to the outdoor/indoor units. The ground wiring work under the condition of 100Ω (max.) ground resistance must be performed by a authorized personnel.
- (**) Connect the communication cables between outdoor units in the same refrigerant system to the terminals 3 and 4 on TB2.

• Communication Cabling



NOTES:

1. For the combination units, DSW settings of Main and Sub are required.
2. An alarm occurs if the communication cables between main outdoor unit and sub outdoor units are connected to the terminals 1 and 2 for H-LINK system.
3. In an alarm is triggered on the LCD of Main outdoor unit, follow the "7-segment" display at the Main outdoor unit for verification purposes.
4. Perform a function setting at the Main outdoor unit.
5. Maximum number of refrigerant groups with one central controller is 64 (for H-LINK II).
Maximum number of indoor units to be connected is 160 (for H-LINK II).

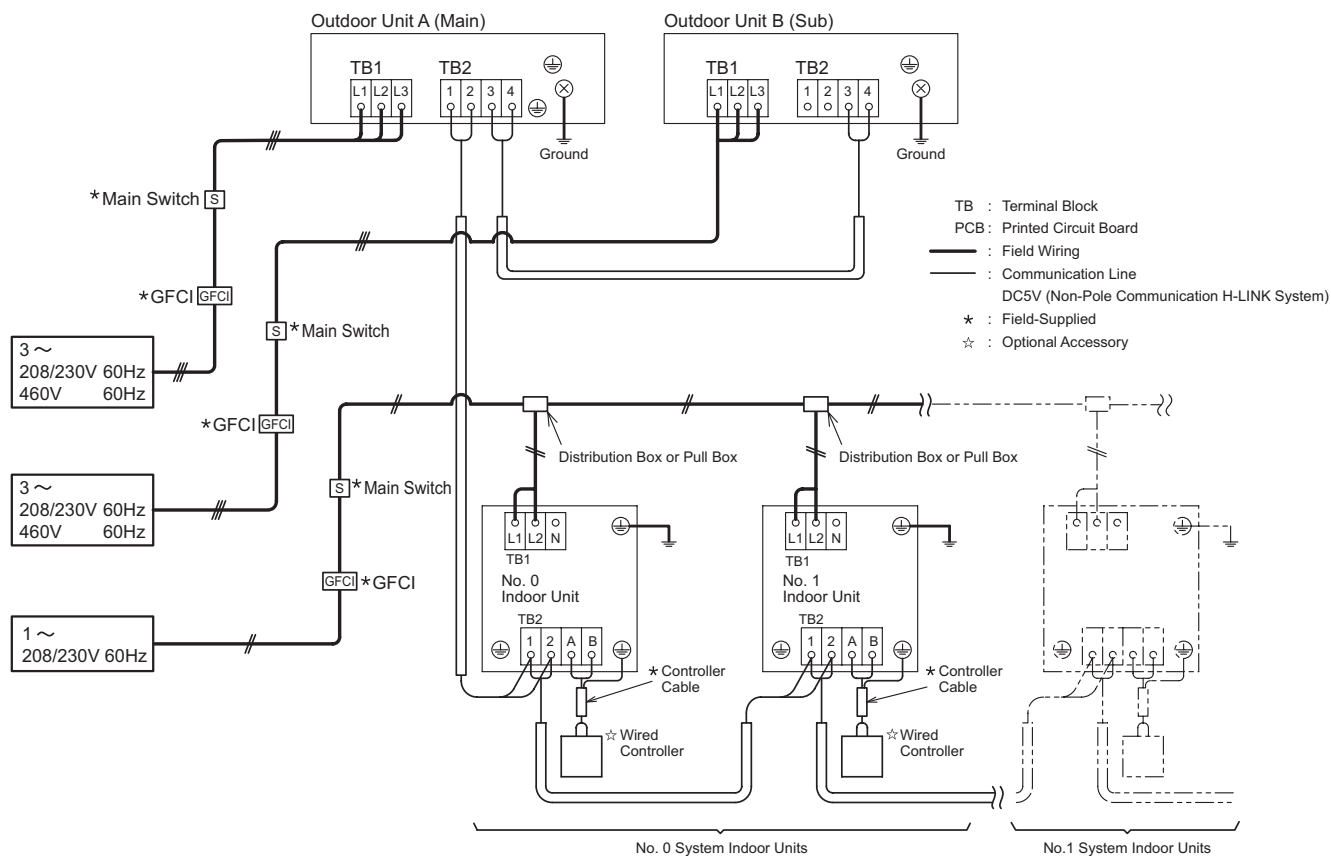


Figure 2.3 Illustration of Electrical Wiring Connections

2.16 Additional Refrigerant Charge Calculation

Table 2.4 Additional Refrigerant Charge Calculation

Although this unit has been charged with refrigerant, an additional refrigerant charge is required according to piping length.

Determine what additional quantity of refrigerant according to the following procedures, and charge it into the system. Record the additional refrigerant quantity to facilitate maintenance and servicing activities thereafter.

(1) Calculating Method of Additional Refrigerant Charge (WT lbs)

No.	Symbol	Contents	Additional Charge																																														
1	W1	<div>① Additional Refrigerant Charge Calculation for Liquid Piping (W1 lbs)</div> <table><thead><tr><th>Pipe Diameter inch (mm)</th><th>Total Piping Length (ft)</th><th>Refrigerant Amount for 1 ft Pipe</th><th>Additional Charge (lbs)</th></tr></thead><tbody><tr><td>7/8 (22.2)</td><td></td><td>× 0.24 =</td><td></td></tr><tr><td>3/4 (19.05)</td><td></td><td>× 0.17 =</td><td></td></tr><tr><td>5/8 (15.88)</td><td></td><td>× 0.11 =</td><td></td></tr><tr><td>1/2 (12.7)</td><td></td><td>× 0.074 =</td><td></td></tr><tr><td>3/8 (9.52)</td><td></td><td>× 0.038 =</td><td></td></tr><tr><td>1/4 (6.35)</td><td></td><td>× 0.016 =</td><td></td></tr><tr><td colspan="3">Total Additional Charge For Liquid Piping =</td><td></td></tr></tbody></table> <div>② Minimum Additional Refrigerant Change for Liquid Piping (lbs)</div> <table><thead><tr><th>Outdoor Unit Type (x 1,000 Btu/h)</th><th>72</th><th>96</th><th>144</th><th>168</th><th>192</th><th>288</th></tr></thead><tbody><tr><td>Minimum Additional Refrigerant Charge</td><td>4.4</td><td>4.4</td><td>8.8</td><td>8.8</td><td>8.8</td><td>13.2</td></tr></tbody></table> <div>In case the calculated quantity (①) is less than the minimum quantity (②) then add ② as the additional refrigerant charge quantity for liquid piping (W1).</div>	Pipe Diameter inch (mm)	Total Piping Length (ft)	Refrigerant Amount for 1 ft Pipe	Additional Charge (lbs)	7/8 (22.2)		× 0.24 =		3/4 (19.05)		× 0.17 =		5/8 (15.88)		× 0.11 =		1/2 (12.7)		× 0.074 =		3/8 (9.52)		× 0.038 =		1/4 (6.35)		× 0.016 =		Total Additional Charge For Liquid Piping =				Outdoor Unit Type (x 1,000 Btu/h)	72	96	144	168	192	288	Minimum Additional Refrigerant Charge	4.4	4.4	8.8	8.8	8.8	13.2	lbs
Pipe Diameter inch (mm)	Total Piping Length (ft)	Refrigerant Amount for 1 ft Pipe	Additional Charge (lbs)																																														
7/8 (22.2)		× 0.24 =																																															
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Outdoor Unit Type (x 1,000 Btu/h)	72	96	144	168	192	288																																											
Minimum Additional Refrigerant Charge	4.4	4.4	8.8	8.8	8.8	13.2																																											
2	W2	<div>Depending on connection of indoor unit type, additional refrigerant charge is required. Select adequate refrigerant amount from the table below.</div> <div>Additional Refrigerant Charge for Each Indoor Unit Connected (W2 lbs)</div> <table><thead><tr><th>Capacity (x 1,000 Btu/h)</th><th>6</th><th>8</th><th>12</th><th>15</th><th>18</th><th>24</th><th>30</th><th>36</th><th>48</th></tr></thead><tbody><tr><td>Indoor Unit (H,Y)IDM***B21S</td><td>0</td><td>0</td><td>0.26</td><td colspan="2">0.35</td><td>0.55</td><td>0.66</td><td>1.1</td><td>0</td></tr><tr><td>Type (H,Y)IC4***B21S</td><td>-</td><td>-</td><td colspan="2">0.55</td><td colspan="3">1.1</td><td colspan="2">-</td></tr></tbody></table> <div>NOTE: Maximum additional refrigerant charge must not exceed 4.4 lbs.</div>	Capacity (x 1,000 Btu/h)	6	8	12	15	18	24	30	36	48	Indoor Unit (H,Y)IDM***B21S	0	0	0.26	0.35		0.55	0.66	1.1	0	Type (H,Y)IC4***B21S	-	-	0.55		1.1			-		lbs																
Capacity (x 1,000 Btu/h)	6	8	12	15	18	24	30	36	48																																								
Indoor Unit (H,Y)IDM***B21S	0	0	0.26	0.35		0.55	0.66	1.1	0																																								
Type (H,Y)IC4***B21S	-	-	0.55		1.1			-																																									
3	W3	<div>Calculation Method for Additional Refrigerant Charge (W3 lbs)</div> <div>The additional refrigerant charge must be 2.2 lbs per indoor unit which is 072 MBH or more.</div> <div><div></div> unit × 2.2 lbs/unit = <div></div></div>	lbs																																														
4	W4	<div>The Ratio of Indoor Unit Connection Capacity (Indoor Unit Total Capacity/Outdoor Unit Capacity) Additional Charge (W4 lbs)</div> <div>Determine the ratio of indoor unit connection capacity.</div> <table><thead><tr><th>Condition</th><th>Refrigerant Amount</th></tr></thead><tbody><tr><td>I.U. Capacity Ratio is less than 100%</td><td>0.0 lbs</td></tr><tr><td>I.U. Capacity Ratio is 100% or more</td><td>1.1 lbs</td></tr></tbody></table>	Condition	Refrigerant Amount	I.U. Capacity Ratio is less than 100%	0.0 lbs	I.U. Capacity Ratio is 100% or more	1.1 lbs	lbs																																								
Condition	Refrigerant Amount																																																
I.U. Capacity Ratio is less than 100%	0.0 lbs																																																
I.U. Capacity Ratio is 100% or more	1.1 lbs																																																
5	WT	<div>Calculation of Additional Charge (WT lbs) = W1 + W2 + W3 + W4 =</div> <div>NOTE: When the total capacity of the following indoor unit connected is 50% or more of the outdoor unit capacity, then add 1.2 times of the above total additional refrigerant charge (WT).</div> <div>● 4-Way Cassette Type: (H,Y)IC4***B21S</div> <div>● 1-Way Cassette Type: (H,Y)IC1***B21S</div> <div>● Wall Mount Type: TIWM***B21S</div>	lbs																																														

NOTE:

Ensure that the total additional charge WT does not exceed the maximum additional refrigerant charge quantity as shown in the table on the following page.

< Max. Additional Refrigerant Charge Quantity Allowed >

Outdoor Unit Capacity (x 1,000 Btu/h)	72, 96	144 - 192	288
Max. Additional Ref. Charge Quantity (lbs)	61.7	112.5	138.9

< Initial Ref. Charge Amount of O.U. (Before Shipment) (W0 lbs) >

Outdoor Unit Capacity (x 1,000 Btu/h)	72, 96
W0 Outdoor Unit Ref. Charge (lbs)	17.0

NOTE:
W0 is the outdoor unit refrigerant charge prior to shipment.
If there is a combination of base units, calculate the total refrigerant charge prior to shipment of those combined outdoor units.

- (2) Record of Additional Charge
- Total refrigerant charge of this system is calculated in the following formula.
- Total Ref. Charge = WT lbs + W0 lbs = lbs

NOTE:
When refrigerant is recovered or charged due to repairs, operating, or adjusting the unit, record the refrigerant quantity again.

NOTICE

1. Emissions of the fluorocarbons without any reason are prohibited.
2. For disposal and maintenance of this product, recovery of fluorocarbons is required.

3. Optional Parts

3.1 Line Up

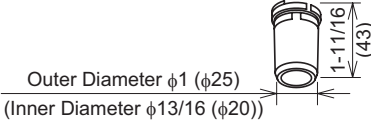


Item No.	Type	Item No.	Optional Parts		Model
3.2	Outdoor Unit	3.2.1	Drain Adapter		DBS-TP10A
		3.2.2	Protection Net	for Rear Side Air Inlet	PN-TP10BB
				for Left Side Air Inlet	PN-TP10L
				for Right Side Air Inlet	PN-TP10R
		3.2.3	Snow Protection Hood	for Top Side Air Outlet	ASG-TP20FBS1
				for Rear Side Air Inlet	ASG-TP20BBS1
				for Left Side Air Inlet	ASG-TP20LS2
				for Right Side Air Inlet	ASG-TP20RS2
				Toppling Prevention Tool	ASG-SW20A
3.3	Piping Kit	3.3.1	Piping Connection Kit		MC-NP20A1
					MC-NP30A1
		3.3.2	Multi-Kit	Line Branch	MW-NP282A2
					MW-NP452A2
					MW-NP692A2
					MW-NP902A2
		3.3.3		Header Branch	MH-NP224A
					MH-NP288A

3.2 Outdoor Unit

3.2.1 Drain Adapter DBS-TP10A

The drain adapter is for the drain pipe connection in order to use the outdoor unit bottom base as a drain pan.

Unit: inch (mm)

No.	Accessory	Qty	Remarks
①	Drain Adapter (VP20 Equivalent) 	2	Connection for Drain Piping
②	Rubber Cap 	4	Fitting for ① Adapter and ③ Cap
③	Drain Cap 	2	Plug for Future Use

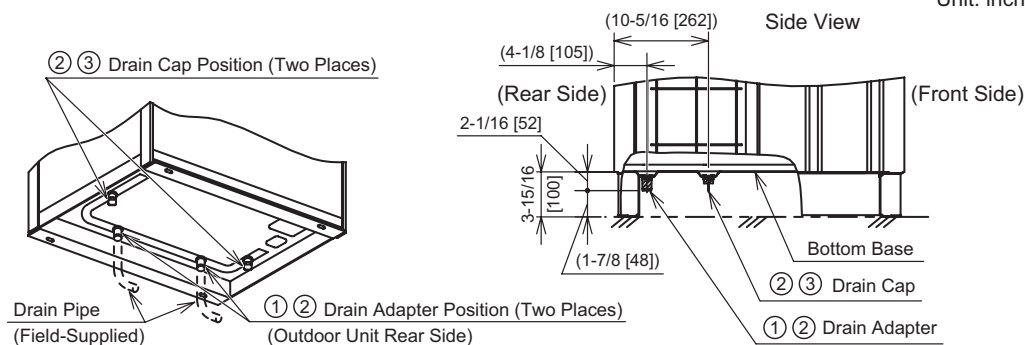
CAUTION

Place the outdoor unit on a flat foundation or block and place it at least 4 inches (100mm) higher than the ground. For smooth drainage, install the outdoor unit with a slight incline on the drainage side (rear side).

< Installation Position >

[Example] Capacity: 72,000 Btu/h

Unit: inch [mm]



< Condensate Treatment >

Condensate is discharged during heating and defrosting operation. (Rain water is also discharged.)
Note the following.

- (1) Choose a place that is well drained or provide a drain ditch.
- (2) Do not install the unit over walkways. Condensation may drip on people.
If installing the unit in such a place, provide an additional drain pan.
- (3) Do not use a drain adapter in a cold area. The condensate in the drain pipe may freeze resulting in a cracked pipe.

3.2.2 Protection Net

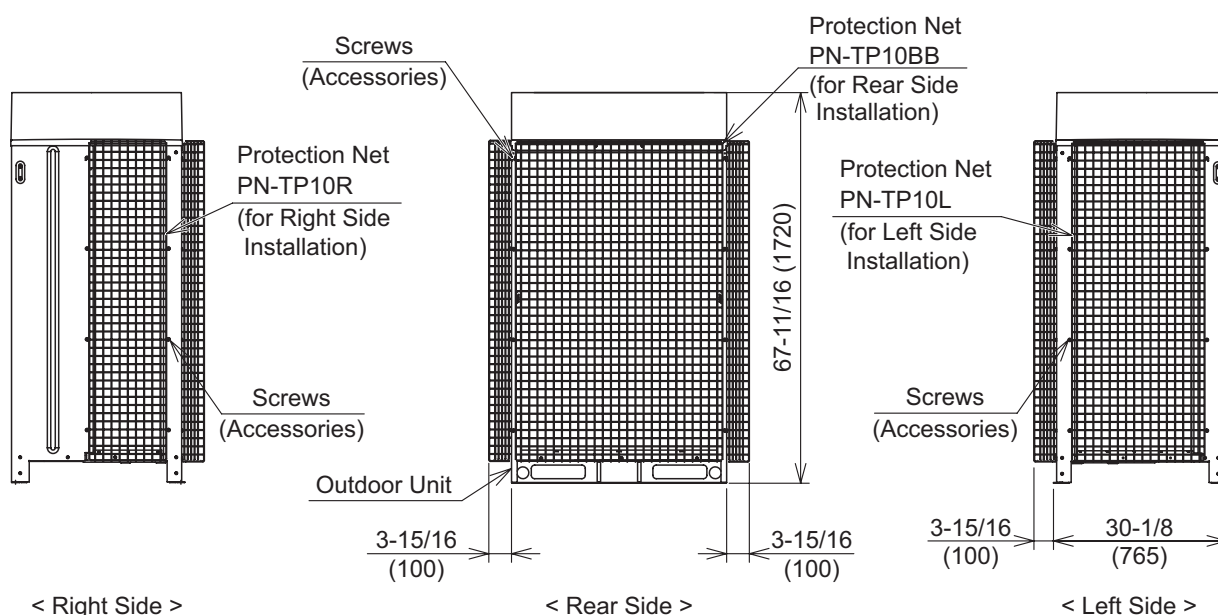
The protection net is to protect the outdoor unit heat exchanger from external damages such as being hit by a ball.

Components of Protection Net

Model		PN-TP10BB	PN-TP10R	PN-TP10L
Required Qty		1	1	1
Accessory	Protection Net	1	1	1
	Screw Spare = ()	10 (1)	9 (1)	9 (1)
	Drill Screw	—	2	2

< Installation Position >

Unit: inch (mm)

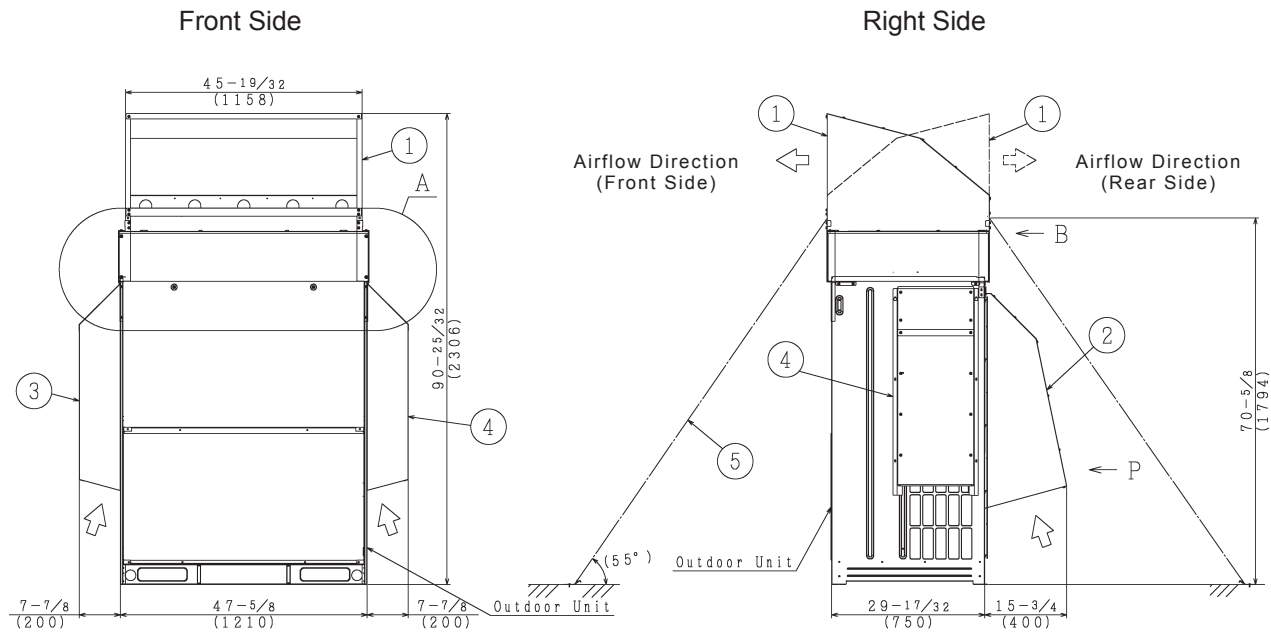


< Installation Notice >

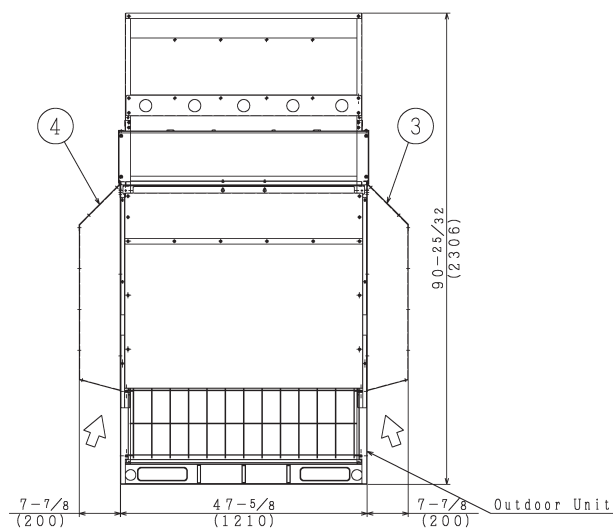
- (1) Secure enough service space with consideration for attaching/detaching the protection net.
- (2) Do not step on the protection net or the outdoor unit in order to prevent falls and injuries.
- (3) Fallen leaves or other objects may get caught in the protection net. Be sure to clean the net periodically.
- (4) Be sure to securely tighten the protection net with the supplied screws (accessories).
(If the screws are not tightened securely, there may be noise caused by vibration. If they are over-tightened, the screw thread will be broken.)
- (5) Apply touch-up coating at the screw holes of the outdoor unit in order to prevent rusting.
(field-supplied)
- (6) The protection net may become frozen in cold weather.
- (7) It is not possible to use the snow-protection hood (for rear side inlet and air outlet) along with the protection net.

3.2.3 Snow Protection Hood

Unit: inch (mm)



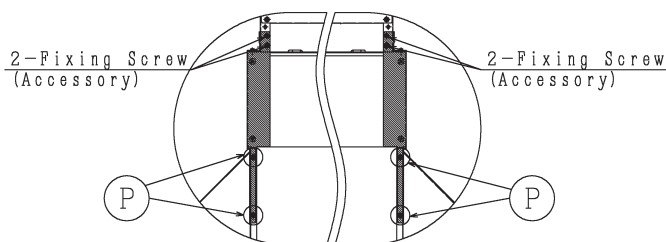
**Rear Side
(View from P)**



No.	Item	Model
1	Hood for Top Side Air Outlet	ASG-TP20FBS1
2	Hood for Rear Side Air Inlet	ASG-TP20BBS1
3	Hood for Left Side Air Inlet	ASG-TP20LS2
4	Hood for Right Side Air Inlet	ASG-TP20RS2
5	Toppling Prevention Tool	ASG-SW20A

< Detailed Views of A and B >

Detail A

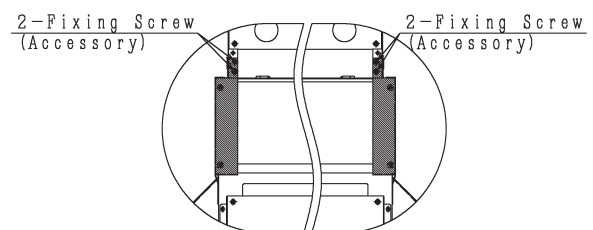


Detail P

Punch Mark (four places)

Drill a pilot hole into the punch mark and mount the fixing plate.

Detail B



● Installation Work

- (1) After the snow protection hood is installed, the noise at the air outlet side may slightly increase. Therefore, it is necessary to carefully consider the air discharge direction when installing.
- (2) Be sure to tighten the snow protection hood securely to the top panel and side panel of the outdoor unit with the supplied screws (accessories). Not doing so may lead to noise caused by vibrations.
- (3) There must be no obstacles blocking the air discharge direction of the snow protection hood. If there are obstacles, they may cause a short circuit or an insufficient airflow rate.
- (4) Do not install other outdoor units in the direction of air outlet. If the air blown out of the snow protection hood is sucked into the other outdoor unit, it may cause a malfunction.
- (5) The wind loads which the outdoor unit receives change by attaching the snow protection hood. The required installation strength will also change in a strong wind. Therefore, recheck the strength of the anchor bolts of the outdoor unit.
- (6) When a snow protection hood is installed, cooling/heating performance may be slightly lower depending on the usage conditions.

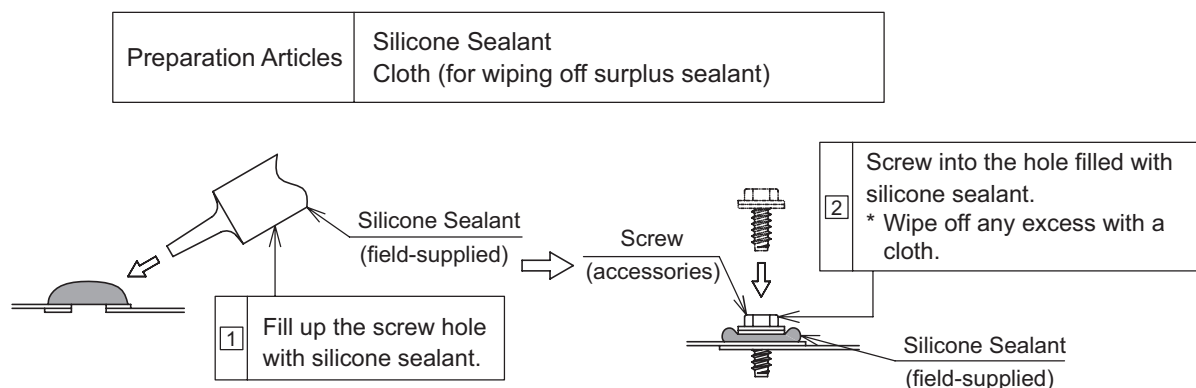
⚠ WARNING

To hold the snow protection hood securely on the outdoor unit against a strong wind or earthquake, a safety rope should be used for reinforced installation of the hood. Use the field-supplied safety wire rope to prevent the outdoor unit from overturning.

⚠ CAUTION

- Install the snow protection hood to avoid facing the direction of a seasonal or strong wind.
- Apply touch-up coating or silicone sealant (field-supplied) at the screw holes of the outdoor unit in order to prevent rusting.
- Even though the units are comprised of stainless steel and other corrosion-resistant metals, they may rust if they are exposed to a salty environment, such as near a coastal region. Be attentive when installing or maintaining the units.
- The snow protection hood is of a heavy weight. More than two persons are required for installation. Be sure to wear protective equipment (such as gloves).
- The screws and the snow protection hood must be protected from scratches or scrapes. These may be the cause of rusting. Handle the snow protection hood with care when installing or assembling.

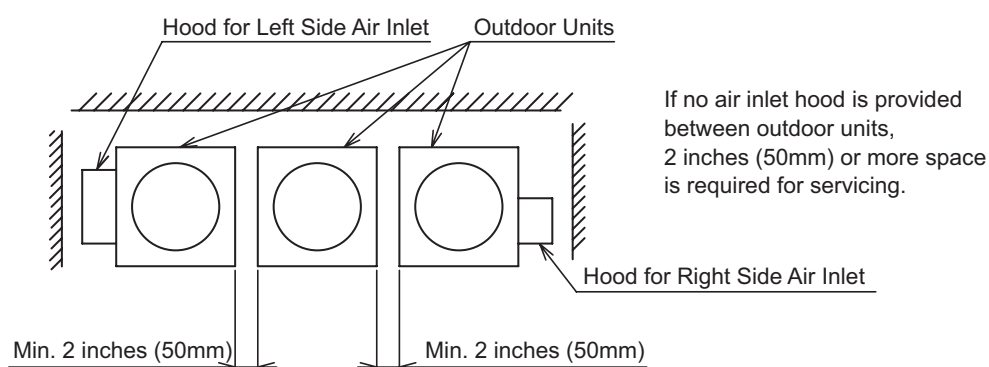
< Sealing Procedures (Example) >



• Selection of Installation Place

- (1) Install the outdoor unit at a suitable height with consideration for snow accumulation. Increase the base height or additionally provide a frame under the unit (higher than snow accumulation), and install the outdoor unit securely with anchor bolts.
- (2) Secure enough service space with consideration for snow accumulation height and snow removal operations.
- (3) There must be no obstacles in the air discharge direction.
- (4) Be sure to apply touch-up coating or caulking agent for rustproofing where there are screws.
- (5) When multiple units are installed, provide service space as shown below.

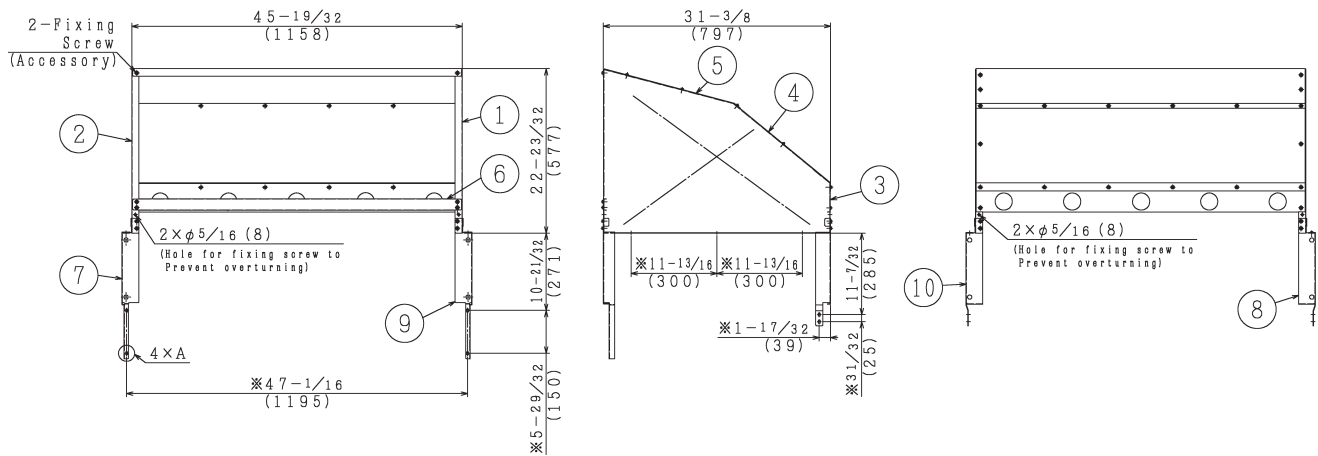
< Service Space for Multiple Outdoor Units Installation >



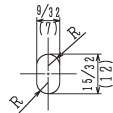
• Structure of Each Hood

Unit: inch (mm)

• Hood for Air Outlet

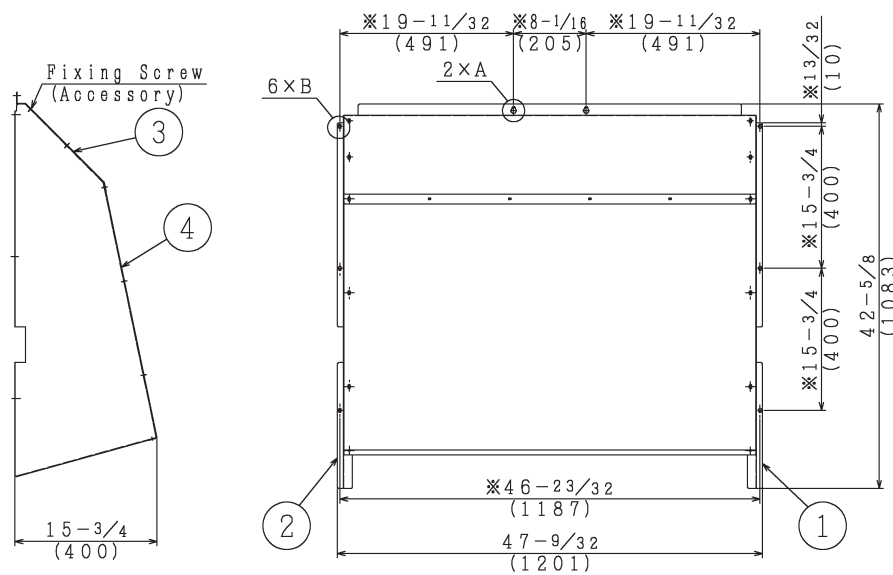


Details of A

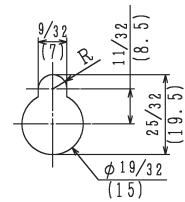


No.	Item	Qty.
1	Right Side Plate	1
2	Left Side Plate	1
3	Faceplate (1)	1
4	Faceplate (2)	1
5	Faceplate (3)	1
6	Horizontal Plate	1
7	Fixing Plate for Left Side (Front Side)	1
8	Fixing Plate for Left Side (Rear Side)	1
9	Fixing Plate for Right Side (Front Side)	1
10	Fixing Plate for Right Side (Rear Side)	1

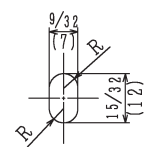
• Hood for Rear Side Air Inlet



Details of A



Details of B

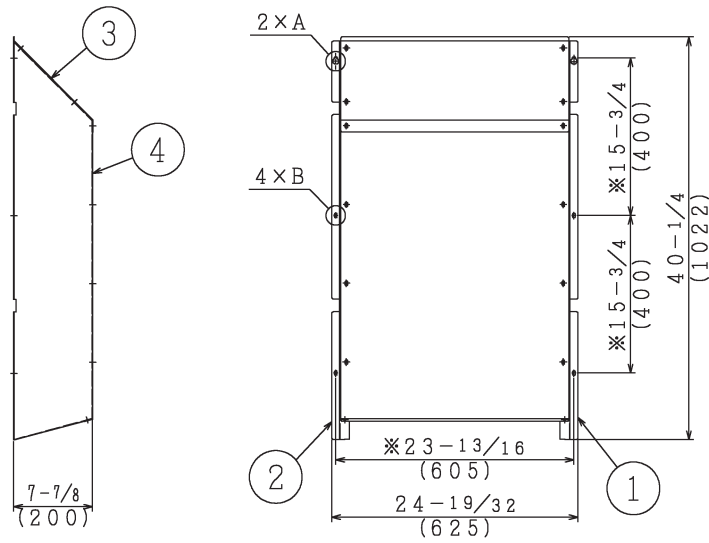


No.	Item	Qty.
1	Right Side Plate	1
2	Left Side Plate	1
3	Faceplate (Top Side)	1
4	Faceplate (Bottom Side)	1

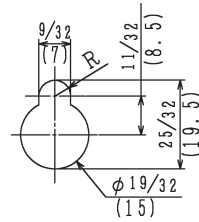
※: Installation Dimension

Unit: inch (mm)

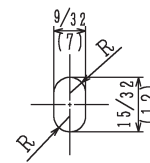
• Hood for Left Side Air Inlet



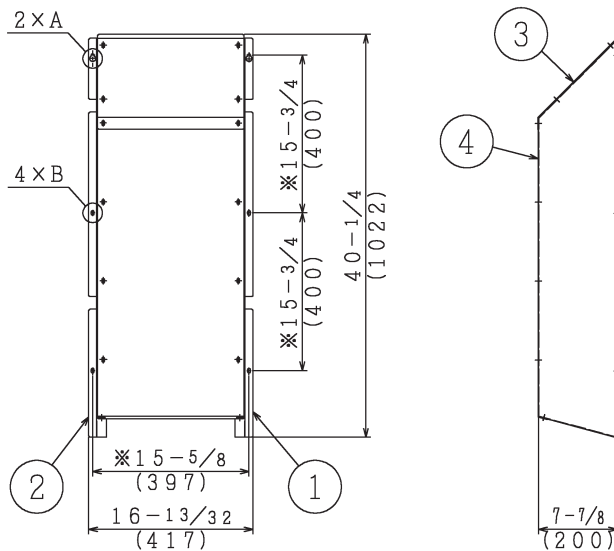
Details of A



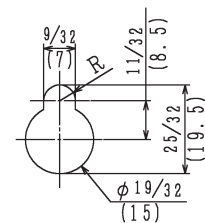
Details of B



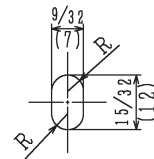
• Hood for Right Side Air Inlet



Details of A



Details of B

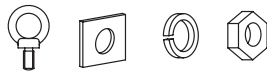
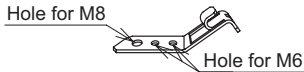




No.	Item	Qty.
1	Right Side Plate	1
2	Left Side Plate	1
3	Faceplate (Top Side)	1
4	Faceplate (Bottom Side)	1

※ : Installation Dimension

- Toppling Prevention Tool (for Snow Protection Hood attached): ASG-SW20A

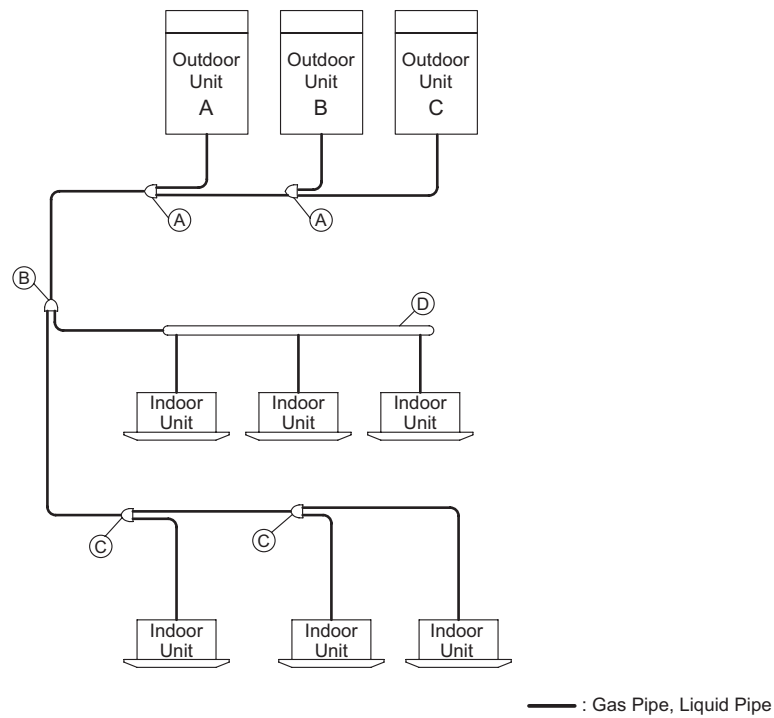
The Toppling Prevention Tool should be utilized to prevent the outdoor unit from overturning.
(It is not possible to use the toppling prevention tool along with the Wind Prevention Tool.).

No.	Accessory		Qty.
①	Eyebolt (SUS, M6)	 (with Square Washer, Spring Washer and Nut)	4 sets for each
②	Securing Plate (SUS)		4
③	Wire (SUS)	 f1/16 inch (2mm) x 66 ft (20m)	1
④	Fastening Fitting		8

3.3 Piping Connection Kit

Item		Model
Piping Connection Kit		MC-NP20A1
		MC-NP30A1
Multi-Kit	Line Branch	MW-NP282A2
		MW-NP452A2
		MW-NP692A2
		MW-NP902A2
	Line Branch	MH-NP224A
		MH-NP288A

● Piping Kit Selection



Piping Connection Kit

Ⓐ Piping Connection Kit

Outdoor Unit Capacity (MBH)	Model
144 - 192	MC-NP20A1
288	MC-NP30A1

Multi-Kit

< Line Branch >

Ⓑ First Branch

Outdoor Unit Capacity (MBH)	Model
72, 96	MW-NP282A2
144 - 192	MW-NP692A2
288	MW-NP902A2

< Header Branch >

Ⓓ Header Branch

Total Indoor Unit Capacity (MBH)	No. of Header Branches	Model
36 - 60	4	MH-NP224A
36 - 72	8	MH-NP288A

Ⓒ Line Branch after First Branch

Total Indoor Unit Capacity (MBH)	Model
≤ 86	MW-NP282A2
87 - 125	MW-NP452A2
126 - 185	MW-NP692A2
≥ 186	MW-NP902A2

NOTE:

If Ⓒ “Line Branch after First Branch” is larger than Ⓑ “First Branch”, use the same model as Ⓑ “First Branch”.

3.3.1 Piping Connection Kit MC-NP20A1 and MC-NP30A1

Piping Connection Size

The ends of the piping connection kits are finished as shown in the following figures. Cut the end of the pipe to meet with the pipe size.

Model	Branch Pipe for Gas Line	Branch Pipe for Liquid Line	Reducer for Gas Line	Reducer for Liquid Line
MC-NP20A1				
MC-NP30A1				
MC-NP30A1				

Unit: inch, ID: Inner Diameter, OD: Outer Diameter

NOTES:

- When installing "Branch Pipe for Gas Line" of "Piping Connection Kit 2", install "Long Reducer" at "To Piping Connection Kit 1" side of "Piping Connection Kit 2". Otherwise, it will cause an abnormal oil distribution between each of the outdoor units. (Shown in the (X) above.)
- Refer to the "Installation Manual for Piping Connection Kit" for more details.

3.3.2 Multi-Kit (Line Branch)

MW-NP282A2, MW-NP452A2, MW-NP692A2 and MW-NP902A2

Piping Connection Size

The ends of the multi-kits are finished as shown in the following figures. Cut the end of the pipe to meet with the pipe size.

Model	Branch Pipe for Gas Line	Branch Pipe for Liquid Line	Reducer for Gas Line	Reducer for Liquid Line
MW-NP282A2				
MW-NP452A2				
MW-NP692A2				
MW-NP902A2				

Unit: inch, ID: Inner Diameter, OD: Outer Diameter

NOTE:

Refer to the "Installation Manual for Multi-Kit" for more details.

3.3.3 Multi-Kit (Header Branch) MH-NP224A and MH-NP288A

Piping Connection Size

The ends of the multi-kits are finished as shown in the following figures. Cut the end of the pipe to meet with the pipe size.

Models	Gas Line	Liquid Line	Expander	Closing Pipe
MH-NP224A			(For Gas Line)	<p>Qty.: 2</p>
			(For Liquid Line)	(For Liquid Line)
MH-NP288A			(For Gas Line)	<p>Qty.: 6</p>
			(For Liquid Line)	(For Liquid Line)
			<p>Qty.: 8</p>	<p>Qty.: 6</p>

Unit: inch, ID: Inner Diameter, OD: Outer Diameter

NOTE:

Refer to "Installation Manual for Multi-Kit" for more details.

4. Selection Data

4.1 Selection Guide

(1) Key for Terms Used for Indoor Units

Nomenclature Description									
H = Hitachi Brand Y = York Brand T = Tag in the Bag	H								
Indoor Unit	I								
Indoor Unit Type C4 = 4-Way Cassette Type C4M = 4-Way Cassette Mini Type C2 = 2-Way Cassette Type C1 = 1-Way Cassette Type DH = Ducted High Static Type DM = Ducted Medium Static Type DS = Ducted Slim Type DE = Ducted EconoFresh Type WM = Wall Mount Type CS = Ceiling Suspended Type FE = Floor Exposed Type FC = Floor Concealed Type	C4								
Capacity (MBH)	012								
Refrigerant Type B = R410A	B								
Power Supply 2 = 208/230Volts - 1Phase - 60Hz	2								
1 = 1st Generation	1								
S = Standard Type	S								

NOTE:

Select the indoor units and outdoor unit so the total indoor capacity is near the outdoor capacity.

(2) Nominal Capacity of Indoor Units

Capacity		006	008	012	015	018	024	030	036	048
Nominal Cooling Capacity	Btu/h	6,000	8,000	12,000	15,000	18,000	24,000	30,000	36,000	48,000
	(kW)	(1.8)	(2.3)	(3.5)	(4.4)	(5.3)	(7.0)	(8.8)	(10.5)	(14.1)
Nominal Heating Capacity	Btu/h	6,700	9,000	13,500	17,000	20,000	27,000	34,000	40,000	54,000
	(kW)	(2.0)	(2.6)	(4.0)	(5.0)	(5.9)	(7.9)	(10.0)	(11.7)	(15.8)

SELECTION DATA

(3) Key for Terms Used for Outdoor Unit

Nomenclature Description		H	V	A	HP	072	B	4	1	CW
H = Hitachi Brand Y = York Brand	H									
VRF	V									
A = Air Source	A									
HP = Heat Pump	HP									
072 = 72 MBH 096 = 96 MBH 144 = 144 MBH 168 = 168 MBH 192 = 192 MBH 288 = 288 MBH	072									
B = R410A	B									
3 = 208/230Volts - 3Phase - 60Hz 4 = 460Volts - 3Phase - 60Hz	4									
1 = 1st Generation	1									
CW = Low Ambient	CW									

(4) Nominal Capacity of Outdoor Unit

Model		(H,Y)VAHP072B31CW	(H,Y)VAHP096B31CW	(H,Y)VAHP144B31CW
		(H,Y)VAHP072B41CW	(H,Y)VAHP096B41CW	(H,Y)VAHP144B41CW
Nominal Cooling Capacity	Btu/h (kW)	72,000 (21.1)	96,000 (28.1)	144,000 (42.2)
Nominal Heating Capacity	Btu/h (kW)	81,000 (23.7)	108,000 (31.7)	162,000 (47.5)

Model		(H,Y)VAHP168B31CW	(H,Y)VAHP192B31CW	(H,Y)VAHP288B31CW
		(H,Y)VAHP168B41CW	(H,Y)VAHP192B41CW	(H,Y)VAHP288B41CW
Nominal Cooling Capacity	Btu/h (kW)	168,000 (49.2)	192,000 (56.3)	288,000 (84.4)
Nominal Heating Capacity	Btu/h (kW)	189,000 (55.4)	216,000 (63.3)	342,000 (100.2)

Nominal Capacity of Outdoor Unit is under the condition that the total indoor unit capacity is same as outdoor unit capacity.

(5) Given Condition (Example)

● Estimated Load

Item		Room (1)	Room (2)	Room (3)
Estimated Cooling Load	Btu/h (kW)	18,000 (5.3)	18,000 (5.3)	22,000 (6.4)
Estimated Heating Load	Btu/h (kW)	18,000 (5.3)	18,000 (5.3)	22,000 (6.4)

Item		Room (4)	Room (5)	Room (6)
Estimated Cooling Load	Btu/h (kW)	24,000 (7.0)	30,000 (8.8)	32,000 (9.4)
Estimated Heating Load	Btu/h (kW)	27,000 (7.9)	34,000 (10.0)	36,000 (10.6)

● Temperature Condition

Cooling	Heating
Outdoor Coil Air Inlet Dry Bulb: 100°F (38°C)	Outdoor Coil Air Inlet Dry Bulb: 37°F (2.8°C)
Indoor Coil Air Inlet Dry Bulb: 75°F (24°C)	Indoor Coil Air Inlet Wet Bulb: 35°F (1.7°C)
Wet Bulb: 63°F (17°C)	Dry Bulb: 68°F (20°C)

● Altitude Condition: 1000 ft (305m)

< Heat Pump System (2 Pipes) >

Equivalent Piping Length between Indoor Units and Outdoor Unit: 200 ft (61m)

Piping Lift: 50 ft (15m)

Power Source: 60Hz

(6) Selecting Matching Indoor Units and Nominal Capacity

Select Ducted Medium Type Indoor Units (Example)

Item		Room (1)	Room (2)	Room (3)
Selected Model		HIDM024B21S	HIDM024B21S	HIDM030B21S
Nominal Cooling Capacity	Btu/h (kW)	24,000 (7.0)	24,000 (7.0)	30,000 (8.8)
Nominal Heating Capacity	Btu/h (kW)	27,000 (7.9)	27,000 (7.9)	34,000 (10.0)

Item		Room (4)	Room (5)	Room (6)	Total
Selected Model		HIDM036B21S	HIDM048B21S	HIDM048B21S	(1) ~ (6)
Nominal Cooling Capacity	Btu/h (kW)	36,000 (10.6)	48,000 (14.1)	48,000 (14.1)	210,000 (61.6)
Nominal Heating Capacity	Btu/h (kW)	40,000 (11.7)	54,000 (15.8)	54,000 (15.8)	236,000 (69.2)

Item		Outdoor Unit
Selected Model		HVAHP192B31CW
Nominal Cooling Capacity	Btu/h (kW)	192,000 (56.3)
Nominal Heating Capacity	Btu/h (kW)	216,000 (63.3)

Connected Indoor Unit Capacity Ratio \div 110%

SELECTION DATA

(7) Actual Capacity

In the example, the total indoor unit capacity is 210MBH

(= 24MBH + 24MBH + 30MBH + 36MBH + 48MBH + 48MBH),

and outdoor unit capacity is 192MBH.

Therefore, the connected indoor unit capacity ratio is about 110%.

a) Actual Capacity of Outdoor Unit

Maximum Actual Capacity of Outdoor Unit

- = ① Outdoor Unit Capacity According to Temperature Condition and Connected IDU Capacity Ratio
- × ② Correction Factor According to Piping Length and Lift
- × ③ Correction Factor According to Defrosting Operation (only heating)
- × ④ Correction Factor According to Altitude

	①	②	③	④
Cooling	172 MBH	0.89	-	0.97
Heating	226 MBH	0.955	0.88	0.97
Note	Section 4.2	Section 4.3	Section 4.4	Section 4.5

Maximum Actual Capacity of Outdoor Unit

Cooling = 172,000Btu/h × 0.89 × 0.97 = 148,488Btu/h

Heating = 226,000Btu/h × 0.955 × 0.88 × 0.97 = 184,232Btu/h

b) Actual Capacity of Each Indoor Unit

Actual Capacity of Each Indoor Unit

= Actual Capacity of Outdoor Unit × Each Indoor Unit Capacity ÷ Summation of Indoor Units Capacity

< Result >

Item			Room (1)	Room (2)	Room (3)
Selected Model			HIDM024B21S	HIDM024B21S	HIDM030B21S
Actual Capacity	Actual Maximum Cooling Capacity	Btu/h (kW)	16,970 (5.0)	16,970 (5.0)	21,213 (6.2)
	Actual Maximum Heating Capacity	Btu/h (kW)	18,735 (5.5)	18,735 (5.5)	23,419 (6.9)
Design Load	Estimated Cooling Load	Btu/h (kW)	18,000 (5.3)	18,000 (5.3)	22,000 (6.4)
	Estimated Heating Load	Btu/h (kW)	18,000 (5.3)	18,000 (5.3)	22,000 (6.4)

Item			Room (4)	Room (5)	Room (6)	Total
Selected Model			HIDM036B21S	HIDM048B21S	HIDM048B21S	(1) ~ (6)
Actual Capacity	Actual Maximum Cooling Capacity	Btu/h (kW)	25,455 (7.5)	33,940 (10.0)	33,940 (10.0)	148,488 (43.6)
	Actual Maximum Heating Capacity	Btu/h (kW)	28,103 (8.2)	37,471 (11.0)	37,471 (11.0)	163,934 (48.1)
Design Load	Estimated Cooling Load	Btu/h (kW)	24,000 (7.0)	30,000 (8.8)	32,000 (9.4)	144,000 (42.2)
	Estimated Heating Load	Btu/h (kW)	27,000 (7.9)	34,000 (10.0)	36,000 (10.6)	155,000 (45.5)

4.2 Outdoor Unit Capacity According to Temperature Condition and Connected IDU Capacity Ratio

(1) Cooling Capacity

(H,Y)VAHP072B(3,4)1CW

Connection ratio	Outdoor air temp	Indoor air temp. °FWB											
		59			61			63			65		
		TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH
%	°FDB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW
130	14	83	5.47	84	5.02	86	4.82	88	4.62	90	4.36	91	4.26
	18	82	5.33	84	4.91	85	4.72	87	4.53	89	4.30	91	4.18
	23	81	5.15	83	4.77	84	4.60	86	4.41	88	4.22	90	4.08
	32	80	4.83	81	4.53	83	4.37	84	4.21	86	4.04	88	3.80
	42	78	4.80	79	4.50	81	4.32	82	4.13	84	3.94	85	3.89
	50	76	4.77	77	4.47	79	4.27	80	4.07	82	3.86	83	3.80
	54	75	4.76	76	4.46	78	4.24	79	4.03	81	3.81	82	3.55
	58	74	4.74	75	4.44	77	4.21	78	4.00	80	3.77	81	3.50
	62	74	4.76	76	4.46	77	4.23	78	4.01	80	3.79	81	3.52
	66	73	4.81	75	4.53	76	4.30	77	4.08	79	3.86	80	3.61
	70	73	4.86	74	4.59	75	4.37	76	4.15	78	3.93	79	3.69
	74	72	4.90	73	4.64	74	4.43	75	4.21	77	3.99	78	3.77
	78	71	4.94	72	4.69	73	4.48	74	4.27	76	4.06	77	3.84
	82	71	5.18	72	4.93	73	4.71	74	4.49	75	4.27	76	4.05
	86	70	5.62	71	5.34	72	5.11	73	4.86	74	4.63	75	4.40
	90	69	6.05	70	5.76	71	5.50	72	5.24	73	4.98	74	4.75
	95	68	6.60	69	6.28	70	6.00	71	5.71	72	5.43	73	5.18
	100	67	7.41	68	7.05	69	6.74	70	6.43	71	6.12	72	5.84
120	14	81	5.17	82	4.76	83	4.51	85	4.27	86	4.02	87	3.93
	18	81	5.13	82	4.74	83	4.50	85	4.27	86	4.02	87	3.90
	23	81	5.08	82	4.72	83	4.49	85	4.26	86	4.03	87	3.86
	32	80	4.89	81	4.59	83	4.42	84	4.25	86	4.04	87	3.80
	42	78	4.88	79	4.58	81	4.38	82	4.19	84	3.98	85	3.73
	50	76	4.86	77	4.56	79	4.35	80	4.14	82	3.92	83	3.66
	54	75	4.85	77	4.54	78	4.32	79	4.11	81	3.88	82	3.61
	58	74	4.84	76	4.53	77	4.30	78	4.08	80	3.84	81	3.57
	62	74	4.86	76	4.56	77	4.33	78	4.10	80	3.86	81	3.60
	66	73	4.92	75	4.63	76	4.40	77	4.17	79	3.94	80	3.69
	70	73	4.98	74	4.70	75	4.48	76	4.25	78	4.02	79	3.78
	74	72	5.03	73	4.76	74	4.54	75	4.31	77	4.09	78	3.86
	78	71	5.08	72	4.82	73	4.60	74	4.38	76	4.16	77	3.94
	82	71	5.32	72	5.06	73	4.84	74	4.61	75	4.38	76	4.16
	86	70	5.77	71	5.49	72	5.25	73	5.00	74	4.75	75	4.52
	90	69	6.22	70	5.92	71	5.66	72	5.39	73	5.12	74	4.88
	95	68	6.78	69	6.46	70	6.17	71	5.88	72	5.58	73	5.33
	100	67	7.62	68	7.25	69	6.93	70	6.61	71	6.29	72	6.01
110	14	79	4.98	80	4.68	81	4.43	83	4.19	84	3.94	85	3.80
	18	79	4.94	80	4.64	81	4.39	83	4.15	84	3.90	85	3.76
	23	79	4.89	80	4.59	81	4.34	83	4.10	84	3.85	85	3.71
	32	77	4.60	78	4.32	80	4.12	81	3.92	82	3.72	83	3.50
	42	76	4.76	77	4.48	79	4.26	80	4.03	81	3.81	83	3.58
	50	75	4.86	77	4.56	78	4.33	79	4.10	81	3.86	82	3.61
	54	75	4.89	76	4.59	78	4.35	79	4.11	80	3.88	82	3.62
	58	74	4.92	76	4.61	77	4.37	78	4.13	80	3.89	81	3.62
	62	74	4.96	76	4.66	77	4.42	78	4.18	80	3.94	81	3.67
	66	73	5.03	75	4.73	76	4.50	77	4.27	79	4.03	80	3.77
	70	73	5.09	74	4.81	75	4.58	76	4.35	78	4.12	79	3.87
	74	72	5.15	73	4.88	74	4.65	75	4.42	77	4.20	78	3.95
	78	71	5.20	72	4.95	73	4.72	74	4.49	76	4.27	77	4.04
	82	71	5.46	72	5.20	73	4.96	74	4.73	75	4.50	76	4.27
	86	70	5.83	71	5.54	72	5.38	73	5.13	74	4.88	75	4.64
	90	69	6.39	70	6.08	71	5.80	72	5.53	73	5.26	74	5.01
	95	68	6.97	69	6.63	70	6.33	71	6.03	72	5.74	73	5.47
	100	67	7.83	68	7.44	69	7.12	70	6.79	71	6.47	72	6.17
100	14	77	4.76	78	4.38	80	4.16	81	3.93	82	3.71	83	3.62
	18	77	4.72	78	4.37	80	4.15	81	3.93	82	3.71	83	3.59
	23	77	4.68	78	4.35	80	4.14	81	3.93	82	3.72	83	3.56
	32	77	4.60	78	4.32	80	4.12	81	3.92	82	3.72	83	3.50
	42	76	4.76	77	4.48	79	4.26	80	4.03	81	3.81	83	3.58
	50	75	4.86	77	4.56	78	4.33	79	4.10	81	3.86	82	3.61
	54	75	4.89	76	4.59	78	4.35	79	4.11	80	3.88	82	3.62
	58	74	4.92	76	4.61	77	4.37	78	4.13	80	3.89	81	3.62
	62	74	4.96	76	4.66	77	4.42	78	4.18	80	3.94	81	3.67
	66	73	5.03	75	4.73	76	4.50	77	4.27	79	4.03	80	3.77
	70	73	5.09	74	4.81	75	4.58	76	4.35	78	4.12	79	3.87
	74	72	5.15	73	4.88	74	4.65	75	4.42	77	4.20	78	3.95
	78	71	5.20	72	4.95	73	4.72	74	4.49	76	4.27	77	4.04
	82	71	5.46	72	5.20	73	4.96	74	4.73	75	4.50	76	4.27
	86	70	5.83	71	5.54	72	5.38	73	5.13	74	4.88	75	4.64
	90	69	6.39	70	6.08	71	5.80	72	5.53	73	5.26	74	5.01
	95	68	6.97	69	6.63	70	6.33	71	6.03	72	5.74	73	5.47
	100	67	7.83	68	7.44	69	7.12	70	6.79	71	6.47	72	6.17
	106	66	8.86	67	8.42	68	8.06	69	7.69	70	7.34	71	7.00

Connection ratio	Outdoor air temp	Indoor air temp. °FWB																							
		59			61			63			65			67			69			71			73		
		TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH
%	°FDB	TC	IP	MBH	KW	TC	IP	MBH	KW	TC	IP	MBH	KW	TC	IP	MBH	KW	TC	IP	MBH	KW	TC	IP	MBH	KW
90	14	66	3.84	67	3.54	69	3.36	70	3.18	71	2.99	72	2.92	73	2.86	74	2.55								
	18	66	3.81	67	3.53	69	3.35	70	3.18	71	2.99	72	2.90	73	2.82	74	2.54								
	23	66	3.78	67	3.51	68	3.34	69	3.17	71	3.00	72	2.88	73	2.76	74	2.53								
	32	66	3.71	67	3.49	68	3.33	69	3.17	70	3.01	72	2.83	73	2.66	74	2.51								
	42	65	3.85	66	3.61	68	3.44	69	3.26	70	3.08	71	2.89	72	2.71	73	2.57								
	50	65	3.95	66	3.71	68	3.52	69	3.33	70	3.14	71	2.94	72	2.75	73	2.63								
	54	65	4.01	66	3.76	67	3.57	68	3.36	69	3.17	70	2.96	72	2.77	73	2.65								
	58	65	4.06	66	3.81	67	3.61	68	3.40	69	3.20	70	2.99	72	2.79	73	2.68								
	62	65	4.15	66	3.90	67	3.69	68	3.48	69	3.27	70	3.06	72	2.87	73	2.75								
	66	64	4.26	65	4.02	66	3.81	67	3.61	68	3.40	70	3.19	71	3.00	72	2.87								
	70	64	4.38	65	4.14	66	3.93	67	3.73	68	3.52	70	3.32	71	3.13	72	2.99								
	74	64	4.50	65	4.26	66	4.05	67	3.85	68	3.64	70	3.45	71	3.26	72	3.11								
	78	64	4.62	65	4.39	66	4.18	67	3.98	68	3.77	69	3.58	70	3.39	72	3.24								
	82	64	4.89	64	4.65	65	4.43	66	4.22	67	4.01	69	3.81	70	3.63	71	3.46								
	86	63	5.31	63	5.05	64	4.82	65	4.59	66	4.36	68	4.15	69	3.96	70	3.78								
	90	62	5.73	63	5.46	64	5.21	65	4.96	66	4.71	67	4.49	68	4.29	69	4.10								
	95	61	6.26	62	5.96	63	5.69	64	5.42	65	5.15	66	4.92	67	4.70	68	4.50								
	100	60	7.05	61	6.70	62	6.41	63	6.12	64	5.82	65	5.56	66	5.31	67	5.10								
80	14	60	3.99	61	3.73	63	3.52	64	3.33	65	3.15	67	2.97	68	2.80	69	2.63								
	18	59	3.36	60	3.10	61	2.94	62	2.78	63	2.62	64	2.56	64	2.50	66	2.23								
	23	59	3.30	60	3.07	61	2.92	62	2.77	63	2.62	64	2.51	65	2.41	66	2.22								
	32	59	3.25	60	3.05	61	2.91	62	2.77	63	2.63	64	2.51	65	2.41	66	2.20								
	42	58	3.36	59	3.16	60	3.00	61	2.85	62	2.69	63	2.53	64	2.37	65	2.29								
	50	58	3.46	59	3.25	60	3.08	61	2.91	62	2.75	63	2.57	64	2.41	65	2.29								
	54	58	3.50	58	3.29	59	3.11	60	2.94	61	2.77	63	2.59	64	2.42	65	2.32								
	58	58	3.55	58	3.34	59	3.15	60	2.97	61	2.80	63	2.61	64	2.44	65	2.34								
	62	58	3.62	58	3.41	59	3.22	60	3.04	61	2.86	63	2.68	64	2.51	65	2.40								
	66	57	3.73	58	3.52	59	3.33	60	3.15	61	2.97	62	2.79	63	2.62	64	2.51								
	70	57	3.83	58	3.62	59	3.44	60	3.26	61	3.08	62	2.90	63	2.74	64	2.61								
	74	57	3.93	58	3.73	59	3.55	60	3.37	61	3.19	62	3.01	63	2.86	64	2.72								
	78	56	4.04	57	3.84	58	3.66	59	3.48	60	3.30	61	3.12	62	2.97	63	2.83								
	82	56	4.28	57	4.07	58	3.88	59	3.69	60	3.50	61	3.33	62	3.17	63	3.03								
	86	55	4.65	56	4.42	57	4.22	58	4.01	59	3.81	60	3.63	61	3.46	62	3.31								
	90	55	5.02	56	4.77	57	4.56	58	4.34	59	4.12	59	3.93	60	3.75	61	3.59								
	95	54	5.48	55	5.21	56	4.98	57	4.74	58	4.51	58	4.30	59	4.11	60	3.94								
	100	53	6.16	54	5.86	55	5.61	56	5.35	57	5.10	57	4.86	58	4.64	59	4.46								
70	14	53	6.98	54	6.68	55	6.36	56	6.04	57	5.72	58	5.40	59	5.08	60	4.76								
	18	52	7.53	53	7.16	54	6.80	55	6.46	56	6.16	57	5.86	58	5.57	59	5.27								
	23	52	7.77	53	7.38	54	7.06	55	6.74	55	6.42	56	6.11	56	5.82	57	5.60								
	32	51	8.01	52	7.59	53	7.25	54	6.91	54	6.57	55	6.23	55	5.92	56	5.68								
	42	52	2.94	52	2.71	53	2.57	54	2.43	55	2.29	56	2.24	56	2.19	58	1.95								
	18	52	2.92	52	2.70	53	2.57	54	2.43	55	2.29	56	2.22	56	2.15	58	1.95								
	23	51	2.89	52	2.69	53	2.56	54	2.43	55	2.30	56	2.20	56	2.11	58	1.94								
	32	51	2.84	52	2.67	53	2.55	54	2.42	55	2.30	56	2.16	57	2.04	57	1.92								
	42	51	2.94	52	2.76	53	2.63	54	2.49	54	2.36	55	2.21	56	2.08	57	1.97								
	50	51	3.02	52	2.84	53	2.69	54	2.55	54	2.40	55	2.25	56	2.10	57	2.01								
	54	50	3.07	51	2.88	52	2.73	53	2.58	54	2.43	55	2.26	56	2.12	56	2.03								
	58	50	3.11	51	2.92	52	2.76	53	2.61	54	2.45	55	2.28	56	2.13	56	2.05								
	62	50	3.17	51	2.99	52	2.83	53	2.67	54	2.51	55	2.34	56	2.19	56	2.11								
	66	50	3.26	51	3.08	51	2.92	52	2.76	53	2.60	54	2.44	55	2.29	56	2.20								
	70	50	3.35	51	3.17	52	3.01	52	2.85	53	2.69	54	2.53	55	2.38	56	2.29								
	74	50	3.44	51	3.27	52	3.11	52	2.95	53	2.79	54	2.64	55	2.49	56	2.40								
	78	49	3.53	50	3.35	51	3.20	52	3.04	52	2.88	53	2.74	54	2.60	55	2.47								
	82	49	3.74	50	3.55	51	3.40	52	3.23	52	3.06	53	2.92	54	2.78	55	2.64								
86	49	4.06	49	3.86	50	3.69	51	3.51	51	3.33	52	3.18	53	3.03	54	2.84									
90	48	4.39	49	4.17	50	3.98	51	3.80	51	3.60	52	3.44	53	3.28	54	3.14									
95	48	4.79	48	4.56	49	4.35	50	4.15	50	3.94	51	3.76	52	3.60	53	3.45									
100	47	5.39	47	5.13	48	4.90	49	4.68	49	4.45	50	4.25	51	4.07	52	3.91									
106	47	6.11	47	5.81	48	5.56	49	5.32	49	5.07	50	4.84	51	4.63	51	4.45									
110	46	6.59	46	6.26	47	6.00	48	5.74	48	5.48	49	5.23	50	5.00	50	4.82									
114	46	6.79	46	6.44	47	6.17	48	5.89	48	5.60	49	5.33	49	5.08	50	4.88									
118	45	6.99	45	6.62	46	6.33	47	6.03	47	5.72	48	5.43	48	5.16	49	4.94									
60	14	44	2.58	45	2.38	46	2.26	46	2.13	47	2.01	48	1.96	48	1.92	49	1.71								
	18	44	2.56	45	2.37	46	2.26	46	2.13	47	2.01	48	1.95	48	1.89	49	1.71								
	23	44	2.54	45	2.35	46	2.24	46	2.13	47	2.01	48	1.95	48	1.90	49	1.70								
	32	44	2.49	45	2.34	46	2.22	46	2.13	47	2.02	48	1.90	48	1.82	49	1.63								
	42	44	2.58	44	2.43	45	2.31	46	2.19	46	2.07	47	1.94	48	1.79	48	1.73								
	50	44	2.66	44	2.49	45	2.37	46	2.24	46	2.11	47	1.97	48	1.84	48	1.77								
	54	43	2.69	44	2.53	45	2.40	46	2.26	46	2.13	47	1.99	48	1.86	48	1.78								
	58	43	2.73	44	2.56	45	2.43	46	2.29	46	2.15	47	2.00	48	1.87	48	1.80								
	62	43	2.79	44	2.62	45	2.48	46	2.34	46	2.20	47	2.05	48	1.92	48	1.85								
	66	43	2.86	43	2.70	44	2.56	45	2.42	46	2.29	46	2.14	47	2.01	48	1.93								
	70	43	2.94	43	2.78	44	2.64	45	2.50	46	2.37	46	2.23	47	2.10	48	2.01								
	74	43	3.02	43	2.86	44	2.72	45	2.58	46	2.45	46	2.32	47	2.19	48	2.09								
	78	42	3.10	43	2.95	44	2.81	44	2.67	45	2.54	46	2.41	46	2.28	47	2.18								
	82	42	3.28	43	3.12	44	2.98	44	2.83	45	2.70	46	2.56	46	2.44	47	2.33								
	86	42	3.57	42	3.39	43	3.24	44	3.08	44	2.93	45	2.79	45	2.66	46	2.54								
	90	41	3.82	42	3.66	43	3.50	43	3.33	44	3.17	45	3.02	45	2.88	46	2.76								
	94	41	4.21	41	4.00	42	3.82	43	3.64	43	3.46	44	3.30	44	3.16	45	3.03								
	98	40	4.74	41	4.50	41	4.30	42	4.11	43	3.73	43	3.73	43	3.57	44	3.44								
106	40	5.37	40	5.10	41	4.88	42	4.67	42	4.45	43	4.25	43	4.06	44	3.91									
110	39	5.79	40	5.50	40	5.27	41	5.04	41	4.81	42	4.59	42	4.39	43	4.26									
114	39	5.96	40	5.65	40	5.40	41	5.16	41	4.91	42	4.67	42	4.45	43	4.27									
118	38	6.12	39	5.79	39	5.53	40	5.27	40	5.00	41	4.74	41	4.50	42	4.43									

SELECTION DATA

(H,Y)VAHP096B(3,4)1CW

Conne- ratio	Outdoor air temp	Indoor air temp. °FWB											
		59			61			63			65		
		TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH
%	°FDB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW
110	14	106	8.05	112	7.92	118	7.76	123	7.60	128	7.44	132	7.61
	18	106	8.01	112	7.90	117	7.76	122	7.62	127	7.48	131	7.64
	23	107	7.97	111	7.88	116	7.77	121	7.65	126	7.53	130	7.68
	32	106	7.89	110	7.85	115	7.77	120	7.70	124	7.62	128	7.75
	42	104	7.95	108	7.89	113	7.82	117	7.76	122	7.70	126	7.75
	50	102	7.99	106	7.91	111	7.86	115	7.81	120	7.76	124	7.75
	54	101	8.02	105	7.93	110	7.88	114	7.83	119	7.79	123	7.75
	58	100	8.04	104	7.94	109	7.90	113	7.86	118	7.82	122	7.75
	62	99	8.11	103	7.99	107	7.97	112	7.94	116	7.92	121	7.81
	66	98	8.23	102	8.08	106	8.09	111	8.09	115	8.09	119	7.92
	70	97	8.35	100	8.17	104	8.21	109	8.24	113	8.27	117	8.03
	74	95	8.28	98	8.13	102	8.17	106	8.20	110	8.23	114	8.05
	78	92	8.21	95	8.10	99	8.13	103	8.17	107	8.19	111	8.06
	82	90	8.36	93	8.27	97	8.29	101	8.32	105	8.33	109	8.24
	86	87	8.71	90	8.64	94	8.64	98	8.65	102	8.65	106	8.59
	90	85	9.07	88	9.01	92	9.00	96	8.98	99	8.97	103	8.93
	95	82	9.51	85	9.47	89	9.44	92	9.40	96	9.37	100	9.36
	100	79	10.16	82	10.11	86	10.06	89	10.01	93	9.97	96	9.95
	106	76	10.95	79	10.87	82	10.81	85	10.75	89	10.70	92	10.65
	110	74	11.47	77	11.38	80	11.31	83	11.24	86	11.18	89	11.12
100	114	71	10.72	74	10.62	77	10.56	79	10.51	82	10.46	85	10.41
	118	67	9.96	70	9.86	73	9.81	76	9.76	79	9.71	82	9.66
	14	103	7.42	107	7.30	112	7.15	117	7.01	122	6.86	126	7.01
	18	103	7.39	107	7.29	112	7.15	117	7.03	121	6.90	125	7.04
	23	102	7.35	106	7.27	111	7.16	116	7.05	120	6.94	124	7.08
	32	101	7.28	105	7.23	110	7.16	114	7.09	118	7.03	122	7.14
	42	99	7.33	103	7.27	108	7.21	112	7.15	116	7.09	120	7.14
	50	97	7.37	101	7.29	106	7.25	110	7.19	114	7.15	118	7.14
	54	96	7.39	100	7.30	105	7.26	109	7.22	113	7.18	117	7.14
	58	95	7.41	99	7.31	104	7.28	108	7.24	112	7.21	116	7.14
	62	95	7.50	98	7.40	102	7.38	106	7.34	110	7.31	114	7.24
	66	94	7.65	97	7.57	101	7.55	105	7.52	109	7.50	113	7.44
	70	93	7.80	96	7.74	100	7.72	104	7.70	108	7.68	112	7.64
	74	92	7.96	95	7.91	99	7.90	103	7.88	107	7.87	111	7.84
	78	91	8.11	94	8.08	98	8.07	102	8.06	106	8.06	110	8.05
	82	89	8.40	92	8.38	96	8.36	100	8.35	104	8.34	108	8.34
	86	87	8.81	90	8.79	94	8.77	97	8.75	101	8.73	105	8.73
	90	85	9.23	88	9.20	92	9.17	95	9.15	99	9.12	103	9.12
	95	82	9.75	85	9.71	89	9.68	92	9.65	96	9.61	100	9.60
	100	79	10.42	82	10.37	86	10.32	89	10.28	93	10.23	96	10.20
90	106	76	11.22	79	11.15	82	11.10	85	11.04	89	10.97	92	10.92
	110	74	11.76	77	11.68	80	11.61	83	11.54	86	11.47	89	11.40
	114	71	10.99	74	10.89	77	10.83	79	10.78	82	10.73	85	10.68
	118	67	10.22	70	10.12	73	10.07	76	10.02	79	9.97	82	9.92
	14	93	6.50	97	6.39	101	6.27	105	6.16	109	6.04	113	6.17
	18	93	6.47	97	6.36	101	6.25	105	6.14	109	6.03	113	6.16
	23	92	6.44	96	6.37	100	6.27	104	6.18	108	6.08	112	6.20
	32	91	6.37	95	6.34	99	6.28	103	6.22	107	6.16	111	6.26
	42	89	6.42	93	6.37	97	6.32	101	6.26	105	6.22	109	6.26
	50	87	6.46	91	6.39	95	6.35	99	6.30	103	6.26	107	6.26
	54	87	6.47	90	6.40	94	6.36	98	6.32	102	6.29	106	6.25
	58	86	6.49	89	6.41	93	6.38	97	6.34	101	6.31	105	6.25
	62	85	6.57	88	6.49	92	6.46	96	6.43	99	6.40	103	6.34
	66	84	6.70	86	6.64	90	6.61	94	6.59	98	6.57	102	6.51
	70	83	6.83	85	6.78	89	6.76	93	6.75	97	6.73	101	6.69
	74	82	6.97	84	6.93	88	6.92	92	6.91	96	6.89	100	6.87
	78	81	7.10	83	7.08	87	7.07	91	7.06	95	7.06	99	7.05
	82	80	7.35	82	7.34	86	7.33	90	7.31	94	7.31	98	7.31
	86	78	7.72	81	7.70	85	7.68	89	7.66	93	7.65	97	7.65
	90	76	8.08	79	8.06	82	8.04	86	8.01	89	7.99	93	7.99
	95	74	8.54	77	8.51	80	8.48	83	8.45	86	8.42	90	8.41
	100	72	9.20	74	9.12	77	9.10	80	9.07	83	9.04	87	9.03
80	106	69	9.98	71	9.86	74	9.84	77	9.81	80	9.78	83	9.66
	110	67	10.51	69	10.35	72	10.33	75	10.31	78	10.28	81	10.12
	114	65	10.14	67	9.95	70	9.93	73	9.87	76	9.73	79	9.41
	118	63	9.76	65	9.54	68	9.53	71	9.43	73	9.18	76	8.69
	14	83	5.68	86	5.60	90	5.48	94	5.37	98	5.26	102	5.17
	18	83	5.66	86	5.59	90	5.48	93	5.38	97	5.29	100	5.39
	23	82	5.63	85	5.57	89	5.49	92	5.40	96	5.32	99	5.42
	32	81	5.57	84	5.54	88	5.49	91	5.44	95	5.34	98	5.47
	42	80	5.61	83	5.57	86	5.53	90	5.48	93	5.44	97	5.47
	50	78	5.65	81	5.59	84	5.55	88	5.52	91	5.48	95	5.47
	54	77	5.66	80	5.60	84	5.56	87	5.53	90	5.50	94	5.47
	58	76	5.68	79	5.61	83	5.57	86	5.55	89	5.52	93	5.47
	62	76	5.75	79	5.67	82	5.65	85	5.63	89	5.60	92	5.55
	66	75	5.86	78	5.80	81	5.78	84	5.76	88	5.74	91	5.70
	70	74	5.98	77	5.93	80	5.92	83	5.90	87	5.88	90	5.85
	74	73	6.10	76	6.06	79	6.05	82	6.04	86	6.02	89	6.01
	78	72	6.22	75	6.19	78	6.18	81	6.18	85	6.17	88	6.16
	82	71	6.44	74	6.42	77	6.41	80	6.40	83	6.39	86	6.39
	86	70	6.76	72	6.73	75	6.72	78	6.71	81	6.69	84	6.69
	90	68	7.07	70	7.05	73	7.03	76	7.01	79	6.99	82	6.99
	95	66	7.47	68	7.44	71	7.42	74	7.39	77	7.37	80	7.36
	100	64	8.04	66	7.98	69	7.96	72	7.93	75	7.91	78	7.86
	106	62	8.73	64	8.62	66	8.60	69	8.58	72	8.56	75	8.45
	110	60	9.19	62	9.05	64	9.03	67	9.01	70	8.99	72	8.85
	114	58	8.85	60	8.68	63	8.67	65	8.64	68	8.61	70	8.46
	118	56	8.51	58	8.31	61	8.30	63	8.27	66	8.22	68	8.07

Conne- ratio	Outdoor air temp	Indoor air temp. °FWB											
		59			61			63			65		
		TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH
%	°FDB	MBH	KW	MBH	KW	MBH	KW	TC	IP	MBH	TC	IP	MBH
80	14	83	5.68	86	5.60	90	5.48	94	5.37	98	5.26	102	5.17
	18	83	5.66	86	5.59	90	5.48	93	5.38	97	5.29	100	5.39
	23	82	5.63	85	5.57	89	5.49	92	5.40	96	5.32	99	5.42
	32	81	5.57	84	5.54	88	5.49	91	5.44	95	5.34	98	5.47
	42	80	5.61	83	5.57	86	5.53	90	5.48	93	5.44	97	5.47
	50	78	5.65	81	5.59	84	5.55	88	5.52	91	5.48	95	5.47

(H,Y)VAHP144B(3,4)1CW

Con- nection ratio	Outdoor air temp	Indoor air temp. °FWB															
		59		61		63		65		67		69		71		73	
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
%	°FDB	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW
130	14	166	10.94	166	10.04	172	9.64	176	9.24	180	8.72	182	8.52	184	8.00	188	7.44
	18	164	10.66	167	9.82	170	9.44	174	9.06	178	8.60	181	8.36	183	8.00	187	7.36
	23	162	10.30	166	9.54	168	9.20	172	8.82	176	8.44	180	8.16	182	8.00	186	7.28
	32	160	9.66	162	9.06	166	8.74	168	8.42	172	8.08	176	7.60	178	8.00	182	6.86
	42	156	9.60	158	9.00	162	8.64	164	8.26	168	7.88	172	7.38	174	6.58	176	6.66
	50	152	9.54	155	8.94	158	8.54	160	8.14	164	7.72	166	7.20	170	6.00	172	6.48
	54	151	9.52	154	8.92	157	8.48	159	8.06	163	7.62	165	7.10	167	6.00	171	6.40
	58	149	9.48	153	8.88	155	8.42	157	8.00	161	7.54	163	7.00	165	6.00	169	6.30
	62	148	9.52	151	8.92	153	8.46	155	8.02	159	7.58	161	7.04	163	6.00	167	6.34
	66	147	9.62	150	9.06	152	8.60	154	8.16	158	7.72	160	7.22	162	6.00	164	6.52
	70	146	9.72	148	9.18	150	8.74	152	8.30	156	7.86	158	7.38	160	6.00	162	6.68
	74	144	9.80	146	9.28	148	8.86	150	8.42	154	7.98	156	7.54	158	6.80	160	6.82
	78	143	9.88	145	9.38	147	8.96	149	8.54	151	8.12	155	7.68	157	6.50	159	6.96
	82	141	10.36	143	9.86	145	9.42	147	8.98	149	8.54	153	8.10	155	6.80	157	7.24
	86	140	11.24	142	10.68	144	10.22	146	9.72	148	9.26	151	8.80	153	8.00	155	8.02
	90	138	12.10	140	11.52	142	11.00	144	10.48	146	9.96	149	9.50	151	9.34	153	8.60
	95	136	13.20	138	12.56	140	12.00	142	11.42	144	10.86	146	10.36	148	10.00	150	9.50
	120	100	134	14.82	136	14.10	138	13.48	140	12.86	142	12.24	144	11.68	146	11.34	147
106		132	16.78	134	15.94	136	15.28	138	14.58	140	13.90	142	13.26	144	12.94	144	12.22
110		130	18.08	132	17.18	134	16.46	136	15.72	138	15.00	140	14.32	142	14.00	142	13.22
114		127	18.28	129	17.24	130	16.46	132	15.64	134	14.86	136	14.06	138	13.50	135	12.74
118		124	18.48	126	17.30	128	16.46	130	15.56	132	14.70	134	13.78	136	12.80	126	12.24
14		162	10.34	164	9.52	166	9.02	170	8.54	172	8.04	174	7.86	176	7.68	180	6.86
18		162	10.26	164	9.48	166	9.00	170	8.54	172	8.04	174	7.80	176	7.56	180	6.84
23		162	10.16	164	9.44	166	8.98	170	8.52	172	8.06	174	7.72	176	7.42	180	6.80
32		160	9.78	162	9.18	166	8.84	168	8.50	172	8.08	174	7.60	176	7.16	180	6.76
42		156	9.76	158	9.16	162	8.76	164	8.38	168	7.96	170	7.46	174	7.00	176	6.70
52		152	9.72	154	9.08	158	8.68	160	8.32	164	7.92	166	7.44	170	6.40	172	6.52
54		151	9.70	154	9.00	157	8.64	159	8.22	163	7.76	165	7.22	167	6.74	171	6.52
58		149	9.68	153	9.06	155	8.60	157	8.16	161	7.68	163	7.14	166	6.64	169	6.44
62		148	9.72	151	9.12	153	8.66	155	8.20	159	7.72	161	7.20	163	6.70	167	6.48
66		147	9.84	150	9.26	152	8.80	154	8.34	158	7.88	160	7.38	162	6.92	164	6.66
74		146	9.96	148	9.40	150	8.96	152	8.50	156	8.04	158	7.56	160	7.12	162	6.84
78		143	10.16	145	9.64	147	9.20	149	8.76	151	8.32	155	7.88	157	7.48	159	7.14
82		141	10.64	143	10.12	145	9.68	147	9.22	149	8.76	153	8.32	155	7.90	157	7.56
86	140	11.54	142	10.98	144	10.50	146	10.00	148	9.50	151	9.04	153	8.60	155	8.24	
90	138	12.44	140	11.84	142	11.32	144	10.78	146	10.24	149	9.76	151	9.30	153	8.92	
95	136	13.56	138	12.92	140	12.34	142	11.78	144	11.16	146	10.66	148	10.18	150	9.76	
100	134	15.24	136	14.50	138	13.86	140	13.22	142	12.58	144	12.02	146	11.48	147	11.04	
110	106	132	17.26	134	16.40	136	15.70	138	14.98	140	14.28	142	13.64	144	13.04	144	12.56
	110	130	18.60	132	17.68	134	16.92	136	16.16	138	15.42	140	14.72	142	14.02	142	13.22
	114	127	18.80	129	17.72	130	16.92	132	16.08	134	15.28	136	14.44	138	13.70	135	12.66
	118	124	19.00	126	17.78	128	16.90	128	16.00	128	15.10	128	14.16	128	13.30	128	12.56
	14	154	9.52	156	8.76	160	8.32	162	7.86	164	7.42	166	7.24	168	7.08	172	6.32
	18	154	9.44	157	8.74	160	8.30	162	7.86	164	7.42	166	7.18	169	6.88	172	6.30
	23	154	9.36	156	8.60	160	8.28	162	7.86	164	7.44	166	7.12	170	6.94	172	6.28
	32	154	9.20	156	8.64	160	8.24	162	7.84	164	7.44	166	7.00	170	6.60	172	6.32
	42	153	9.52	155	8.96	159	8.52	161	8.06	163	7.62	166	7.16	169	6.72	171	6.28
	50	151	9.72	153	9.12	157	8.66	159	8.20	161	7.72	165	7.22	167	6.76	169	6.46
	54	150	9.78	153	9.18	156	8.70	158	8.22	161	7.76	164	7.24	166	6.74	169	6.48
	58	149	9.84	152	9.22	155	8.74	157	8.26	160	7.78	163	7.24	165	6.74	168	6.50
	62	148	9.92	151	9.32	153	8.84	155	8.36	159	7.88	161	7.34	163	6.84	167	6.62
	66	147	10.06	150	9.46	152	9.00	154	8.54	158	8.06	160	7.54	162	7.06	164	6.80
	70	146	10.18	148	9.62	150	9.16	152	8.70	156	8.24	158	7.74	160	7.28	162	6.98
	74	144	10.30	146	9.74	148	9.26	150	8.84	154	8.34	156	7.84	158	7.34	160	6.94
	78	143	10.40	145	9.90	147	9.44	149	8.98	152	8.54	155	8.08	157	7.66	159	7.32
	82	141	10.92	143	10.40	145	9.92	147	9.46	149	9.00	153	8.54	155	8.12	157	7.74
86	140	11.86	142	11.28	144	10.76	146	10.26	148	9.76	151	9.28	153	8.84	155	8.48	
90	138	12.78	140	12.16	142	11.60	144	11.06	146	10.52	149	10.02	151	9.56	153	9.14	
95	136	13.94	138	13.26	140	12.66	142	12.06	144	11.48	146	10.94	148	10.46	150	10.02	
100	134	15.66	136	14.88	138	14.24	140	13.58	142	12.94	144	12.34	146	11.80	147	11.34	
106	132	17.72	134	16.84	136	16.12	138	15.38	140	14.68	142	14.00	144	13.40	144	12.90	
110	130	19.10	132	18.14	134	17.38	136	16.60	138	15.84	140	15.12	142	14.64	142	13.96	
114	127	19.32	129	18.20	130	17.36	132	16.52	133	15.68	134	14.84	135	14.06	135	13.44	
118	124	19.52	126	18.26	127	16.34	128	16.42	128	15.52	128	14.54	128	13.66	128	12.92	
100	14	148	8.78	150	8.08	152	7.66	154	7.24	158	6.84	160	6.68	162	6.52	164	5.82
	18	148	8.70	150	8.06	152	7.66	154	7.24	157	6.84	160	6.62	162	6.42	164	5.80
	23	148	8.62	150	8.02	152	7.64	154	7.24	156	6.84	160	6.56	162	6.30	164	5.78
	32	146	8.48	148	7.96	150	7.52	152	7.24	156	6.80	160	6.46	162	6.08	164	5.70
	42	146	8.78	148	8.24	150	7.80	152	7.44	156	6.96	159	6.58	161	6.24	163	5.84
	54	145	9.02	147	8.48	149	8.04	152	7.60	154	7.16	157	6.70	160	6.28	162	6.00
	58	145	9.14	147	8.58	149	8.14	152	7.70	154	7.24	157	6.76	160	6.32	162	6.06
	62	144	9.26	146	8.70	148	8.24	152	7.78	154	7.30	156	6.82	159	6.36	162	6.12
	68	144	9.46	146	8.90	148	8.42	152	7.96	154	7.48	156	6.98	159	6.54	162	6.28
	66	143	9.72	145	9.18	148	8.70	151	8.22	153	7.76	155	7.28	158	6.84	161	6.54
	70	142	10.00	144	9.46	146	8.98	150	8.50	152	8.04	154	7.56	156	7.14	160	6.82
	74	142	10.28	144	9.74	147	9.26	149	8.78	151	8.32	153	7.86	155	7.44	159	7.10
	78	142	10.54	144	10.02	146	9.54	148	9.08	150	8.60	152	8.16	154	7.74	158	7.40
	82	141	11.16	143	10.62	145	10.12	147	9.64	149	9.14	151	8.68	153	8.28	157	7.90
	86	140	12.12	142	11.54	144	11.00	146	10.48	148	9.94	150	9.46	152	9.04	155	8.64
	90</																

Con- nection ratio	Outdoor air temp	Indoor air temp. °FWB															
		59		61		63		65		67		69		71		73	
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
%	°FDB	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW	MBH	kW
90	14	132	7.68	134	7.08	136	6.72	140	6.36	142	5.98	144	5.84	146	5.72	148	5.10
	18	132	7.62	134	7.06	137	6.70	139	6.36	142	5.98	144	5.80	146	5.64	148	5.08
	23	132	7.56	134	7.02	136	6.68	138	6.34	142	6.00	144	5.76	146	5.62	148	5.06
	32	132	7.42	134	6.98	136	6.66	138	6.34	140	6.02	144	5.66	146	5.52	148	5.02
	42	131	7.70	133	7.22	136	6.88	138	6.52	140	6.16	143	5.78	145	5.42	147	5.14
	50	130	7.90	132	7.42	135	7.04	137	6.66	139	6.28	141	5.88	144	5.46	146	5.26
	54	130	8.02	132	7.52	135	7.14	137	6.72	139	6.34	141	5.92	144	5.54	146	5.30
	58	130	8.12	132	7.62	134	7.22	136	6.80	138	6.40	140	5.98	144	5.58	146	5.36
	62	130	8.30	132	7.80	134	7.38	136	6.96	138	6.54	140	6.12	144	5.74	146	5.50
	66	129	8.52	131	8.04	133	7.62	135	7.22	137	6.80	140	6.38	143	6.00	145	5.74
	70	128	8.76	130	8.28	132	7.86	134	7.46	136	7.04	140	6.64	142	6.26	144	5.98
	74	128	9.00	129	8.52	131	8.10	133	7.70	135	7.28	139	6.90	141	6.52	143	6.22
	78	128	9.24	128	8.78	130	8.36	132	7.96	134	7.54	138	7.16	140	6.78	142	6.46
	82	127	9.78	127	9.30	129	8.86	131	8.44	133	8.02	137	7.62	139	7.26	141	6.94
	86	126	10.62	126	10.10	128	9.64	130	9.18	132	8.72	136	8.30	138	7.92	140	7.56
	90	124	11.46	125	10.92	127	10.42	129	9.92	131	9.42	134	8.98	136	8.58	138	8.20
	95	122	12.52	124	11.92	126	11.38	128	10.84	130	10.30	132	9.84	134	9.40	136	9.00
	100	121	14.10	123	13.40	124	12.82	126	12.24	128	11.64	130	11.12	132	10.62	134	10.20
106	119	15.98	121	15.18	122	14.54	124	13.90	126	13.26	128	12.64	130	12.08	132	11.66	
110	117	17.24	119	16.36	120	15.70	122	15.02	124	14.34	126	13.66	128	13.06	130	12.62	
114	117	17.80	118	16.88	119	16.16	121	15.44	123	14.70	124	13.98	126	13.32	127	12.84	
118	116	18.34	116	17.38	118	16.62	120	15.84	122	15.04	122	14.30	124	13.58	126	13.04	
80	14	118	6.72	120	6.20	122	5.88	124	5.56	126	5.24	128	5.12	128	5.00	132	4.46
	18	118	6.66	120	6.18	122	5.86	124	5.56	126	5.24	128	5.08	129	4.92	132	4.46
	23	118	6.60	120	6.14	122	5.84	124	5.54	126	5.24	128	5.02	130	4.82	132	4.44
	32	118	6.50	120	6.10	122	5.82	124	5.54	126	5.26	128	5.04	130	4.66	132	4.40
	42	117	6.72	119	6.32	121	6.00	123	5.70	125	5.38	127	5.06	129	4.74	131	4.50
	50	116	6.92	118	6.52	120	6.20	122	5.88	124	5.56	126	5.24	128	4.92	130	4.68
	54	116	7.00	117	6.58	119	6.22	121	5.98	123	5.54	126	5.18	128	4.84	130	4.64
	58	116	7.10	116	6.68	118	6.30	120	5.94	122	5.60	126	5.22	128	4.88	130	4.68
	62	116	7.24	116	6.82	118	6.44	120	6.08	122	5.72	126	5.36	128	5.02	130	4.80
	66	115	7.46	116	7.04	118	6.66	120	6.30	122	5.94	125	5.58	127	5.24	129	5.02
	70	114	7.66	116	7.24	118	6.88	120	6.52	122	6.16	124	5.80	126	5.48	128	5.22
	74	113	7.86	115	7.46	117	7.10	119	6.74	121	6.38	123	6.02	125	5.72	127	5.44
	78	112	8.08	114	7.68	116	7.32	118	6.96	120	6.60	122	6.24	124	5.94	126	5.66
	82	111	8.56	113	8.14	115	7.76	117	7.38	119	7.00	121	6.66	123	6.34	125	6.06
	86	110	9.30	112	8.84	114	8.44	116	8.02	118	7.62	120	7.26	122	6.92	124	6.62
	90	109	10.04	111	9.54	113	9.12	115	8.68	117	8.24	118	7.86	120	7.50	122	7.18
	95	108	10.96	110	10.42	112	9.96	114	9.48	116	9.02	116	8.60	118	8.22	120	7.88
	100	107	12.32	109	11.72	111	11.22	112	10.70	114	10.20	115	9.72	117	9.28	118	8.92
106	105	13.96	107	13.28	109	12.72	110	12.14	112	11.60	113	11.06	115	10.56	116	10.18	
110	104	15.00	106	14.32	108	13.68	109	13.12	111	12.58	112	12.04	114	11.54	115	11.10	
114	103	15.54	105	14.76	107	14.12	107	13.48	109	12.84	111	12.22	112	11.68	113	11.28	
70	14	102	16.02	104	15.18	106	14.50	108	13.82	108	13.14	110	12.46	110	11.84	112	11.36
	18	104	5.88	104	5.42	106	5.14	108	4.86	110	4.58	112	4.48	112	4.38	116	3.90
	23	103	5.84	104	5.40	106	5.14	108	4.86	110	4.58	112	4.44	112	4.30	116	3.88
	32	102	5.78	104	5.38	106	5.12	108	4.86	110	4.60	112	4.40	112	4.22	116	3.90
	42	102	5.68	104	5.34	106	5.10	108	4.84	110	4.60	112	4.32	114	4.16	114	3.84
	50	102	5.88	104	5.52	106	5.26	107	4.98	109	4.72	111	4.42	113	4.16	114	3.94
	50	101	6.04	103	5.68	105	5.38	106	5.10	108	4.80	110	4.50	112	4.20	113	4.02
	54	101	6.14	103	5.76	105	5.46	106	5.16	108	4.86	110	4.52	112	4.24	113	4.06
	58	100	6.22	102	5.84	104	5.52	106	5.22	108	4.90	110	4.56	112	4.26	112	4.10
	62	100	6.34	102	5.98	104	5.66	106	5.34	108	5.02	110	4.68	112	4.38	112	4.22
	66	100	6.52	102	6.16	103	5.84	105	5.52	107	5.20	109	4.88	111	4.58	112	4.40
	70	100	6.70	102	6.34	104	6.02	106	5.70	106	5.38	108	5.08	110	4.78	112	4.58
	74	99	6.88	101	6.46	103	6.22	105	5.90	107	5.58	109	5.28	111	4.98	112	4.80
	78	98	7.06	100	6.70	102	6.40	104	6.08	104	5.76	106	5.48	108	5.20	110	4.94
	82	98	7.48	99	7.10	101	6.80	103	6.46	103	6.12	105	5.84	107	5.56	109	5.28
	86	97	8.12	98	7.72	100	7.38	102	7.02	102	6.66	104	6.36	106	6.06	108	5.78
	90	97	8.78	97	8.34	99	7.96	101	7.60	101	7.20	103	6.88	105	6.56	107	6.28
	95	96	9.58	96	9.12	98	8.70	100	8.30	100	7.88	102	7.52	104	7.20	106	6.90
100	95	10.78	95	10.26	97	9.80	99	9.36	99	8.90	101	8.50	103	8.14	104	7.82	
106	93	12.22	93	11.62	95	11.12	97	10.64	97	10.14	99	9.68	101	9.26	102	8.90	
110	92	13.18	92	12.52	94	12.00	96	11.48	96	10.96	98	10.46	100	10.00	100	9.64	
114	91	13.58	91	12.88	93	12.34	95	11.78	95	11.20	97	10.66	98	10.16	99	9.76	
118	90	13.98	90	13.24	92	12.66	94	12.06	94	11.44	96	10.86	96	10.32	98	9.88	
60	14	88	5.16	90	4.74	92	4.52	92	4.26	94	4.02	96	3.92	96	3.84	98	3.42
	18	88	5.12	90	4.74	92	4.52	92	4.26	94	4.02	96	3.90	96	3.78	98	3.42
	23	88	5.08	90	4.72	92	4.50	92	4.26	94	4.04	96	3.86	96	3.72	98	3.40
	32	88	4.98	90	4.58	92	4.48	92	4.26	94	4.04	96	3.80	96	3.58	98	3.38
	42	88	5.16	89	4.86	90	4.72	92	4.38	93	4.06	95	3.86	96	3.64	98	3.46
	50	87	5.32	88	4.98	90	4.74	91	4.48	92	4.22	94	3.94	96	3.68	97	3.54
	54	87	5.38	88	5.06	90	4.80	91	4.52	92	4.26	94	3.98	96	3.72	97	3.56
	58	86	5.46	88	5.12	90	4.86	90	4.58	92	4.30	94	4.00	96	3.74	96	3.60
	62	86	5.58	88	5.24	90	4.96	90	4.68	92	4.40	94	4.10	96	3.84	96	3.70
	66	86	5.72	87	5.40	89	5.12	90	4.84	92	4.58	93	4.28	95	4.02	96	3.86
	70	86	5.88	86	5.56	88	5.28	90	5.00	92	4.74	92	4.46	94	4.20	96	4.02
	74	85	6.04	86	5.72	88	5.44	89	5.16	91	4.90	92	4.64	93	4.38	95	4.18
	78	84	6.20	86	5.90	88	5.62	88	5.34	90	5.08	92	4.82	92	4.56	94	4.36
	82	84	6.56	85	6.24	87	5.96	88	5.66	89	5.40	91	5.12	91	4.88	93	4.66
	86	83	7.14	84	6.78	86	6.48	87	6.16	88	5.86	90	5.58	90	5.32	92	5.08
	90	83	7.70	83	7.32	85	7.00	87	6.66	87	6.34	89	6.04	8			

TC: Total Capacity
IP: Input Power

NOTES:

- The table shows the normal value of a cooling operation.
In some cases, the value may change due to the compressor protection control.
- The value on the table shows when the system is operated under the following conditions.
The total piping length: 24.6ft (7.5m), The height difference: 0ft (0m)
- In an instance of a heat recovery system, the value on the table indicates when all the indoor units are operated in cooling mode.

SELECTION DATA

(H,Y)VAHP168B(3,4)1CW

Conne- ratio	Outdoor air temp	Indoor air temp. °FWB											
		59			61			63			65		
		TC	IP	TCH	TC	IP	TCH	TC	IP	TCH	TC	IP	TCH
%	°FDB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW
110	14	185	12.81	191	12.30	198	11.92	204	11.53	210	11.15	215	10.86
	18	185	12.73	190	12.27	197	11.91	203	11.55	209	11.19	214	10.92
	23	184	12.65	189	12.23	196	11.91	202	11.58	208	11.25	213	10.99
	32	183	12.49	186	12.17	195	11.89	201	11.62	206	11.34	211	11.25
	42	180	12.41	185	12.37	192	12.08	197	11.79	203	11.51	209	11.33
	50	179	12.85	183	12.47	189	12.19	195	11.91	201	11.62	207	11.36
	54	176	12.91	182	12.52	188	12.23	193	11.94	199	11.67	205	11.37
	58	175	12.96	181	12.55	186	12.27	192	11.99	198	11.71	204	11.37
	62	173	13.07	179	12.65	184	12.39	190	12.12	196	11.86	202	11.48
	66	172	13.26	178	12.81	181	12.59	187	12.36	193	12.12	199	11.69
	70	170	13.44	174	12.98	179	12.79	185	12.59	191	12.39	196	11.90
	74	167	13.43	171	13.01	176	12.82	181	12.62	187	12.43	192	12.00
	78	164	13.41	168	13.05	173	12.85	178	12.66	183	12.46	189	12.10
	82	160	13.82	164	13.47	169	13.25	174	13.05	179	12.83	185	12.51
	86	157	14.64	161	14.28	166	14.02	171	13.78	176	13.53	181	13.23
	90	154	15.46	158	15.09	163	14.80	167	14.51	172	14.23	176	13.94
	95	150	16.48	154	16.10	159	15.77	163	15.43	168	15.11	173	14.83
	100	147	17.99	150	17.55	155	17.19	159	16.80	164	16.44	169	16.17
	106	142	19.81	146	19.29	150	18.87	154	18.44	158	18.04	163	17.65
	110	139	21.02	143	20.45	147	20.00	151	19.54	155	19.10	159	18.68
	114	134	23.38	138	19.52	140	18.94	143	18.37	146	17.80	149	17.12
	118	129	19.72	133	18.59	137	17.88	141	17.18	145	16.49	149	15.54
100	14	177	11.81	182	11.34	188	10.98	194	10.63	201	10.28	206	10.35
	18	177	11.74	182	11.32	188	10.98	194	10.65	200	10.32	205	10.35
	23	176	11.66	181	11.28	187	10.93	193	10.67	198	10.36	204	10.36
	32	174	11.52	180	11.21	186	10.96	191	10.71	196	10.46	202	10.37
	42	172	11.72	177	11.39	183	11.13	188	10.87	193	10.61	200	10.43
	50	170	11.88	175	11.53	181	11.27	186	10.99	191	10.73	196	10.49
	54	169	11.96	174	11.59	179	11.33	185	11.07	190	10.80	197	10.52
	58	168	12.04	173	11.66	178	11.40	184	11.13	189	10.86	195	10.55
	62	166	12.23	171	11.85	176	11.59	182	11.32	188	11.05	194	10.73
	66	165	12.51	170	12.16	175	11.90	181	11.63	186	11.38	191	11.08
	70	164	12.80	169	12.47	174	12.21	179	11.95	184	11.70	189	11.42
	74	163	13.10	167	12.78	172	12.53	177	12.27	182	12.03	188	11.77
	78	162	13.38	166	13.09	171	12.84	176	12.60	181	12.36	186	12.13
	82	160	13.98	164	13.69	169	13.42	173	13.17	178	12.91	183	12.68
	86	157	14.87	161	14.56	166	14.27	170	13.99	175	13.70	180	13.46
	90	154	15.78	158	15.43	163	15.11	167	14.81	172	14.50	177	14.24
	95	150	16.90	154	16.51	159	16.17	163	15.84	168	15.49	173	15.21
	100	146	18.45	150	18.01	155	17.62	159	17.25	164	16.86	168	16.52
	106	142	20.31	146	19.79	150	19.36	154	18.94	158	18.49	163	18.10
	110	139	21.55	143	20.99	147	20.52	151	20.06	155	19.59	159	19.15
	114	134	23.89	138	20.03	140	19.44	143	18.85	146	18.25	149	17.55
	118	129	23.23	133	19.07	137	18.35	141	17.63	145	16.91	149	16.85
90	14	159	10.34	164	9.94	170	9.63	175	9.32	181	9.00	186	8.68
	18	159	10.28	164	9.92	169	9.62	174	9.34	180	9.03	185	8.71
	23	158	10.22	163	9.88	168	9.61	173	9.35	179	9.08	184	8.81
	32	157	10.08	162	9.83	167	9.61	172	9.39	177	9.17	182	8.95
	42	154	10.27	159	9.98	165	9.76	170	9.52	174	9.30	180	9.15
	50	152	10.41	157	10.10	163	9.87	168	9.63	172	9.40	178	9.20
	54	152	10.48	156	10.16	162	9.93	167	9.68	171	9.46	177	9.21
	58	151	10.55	155	10.22	161	9.99	166	9.74	170	9.51	176	9.24
	62	150	10.72	154	10.39	159	10.15	164	9.91	168	9.67	174	9.40
	66	149	10.96	153	10.66	158	10.42	163	10.20	167	9.97	173	9.70
	70	147	11.21	152	10.92	156	10.69	161	10.48	165	10.25	172	10.01
	74	146	11.47	150	11.19	154	10.97	159	10.76	163	10.53	170	10.32
	78	145	11.72	149	11.47	153	11.25	158	11.04	162	10.83	168	10.63
	82	144	12.24	147	11.99	151	11.79	156	11.53	160	11.32	166	11.12
	86	141	13.03	144	12.75	148	12.50	153	12.25	157	12.01	163	11.80
	90	139	13.81	142	13.52	146	13.25	150	12.97	154	12.70	160	12.48
	95	135	14.80	139	14.47	143	14.17	147	13.87	151	13.57	156	13.33
	100	133	16.25	136	15.82	139	15.51	143	15.19	147	14.86	152	14.54
	106	128	17.97	132	17.45	135	17.11	139	16.76	143	16.41	147	15.98
	110	126	19.13	129	18.53	132	18.18	136	17.82	140	17.45	144	16.95
	114	124	19.04	126	18.39	130	18.01	134	17.59	137	17.08	141	16.40
	118	121	18.93	123	18.23	127	17.84	131	17.35	134	16.70	138	15.84

Conne- ratio	Outdoor air temp	Indoor air temp. °FWB																									
		59			61			63			65			67			69			71			73				
		TC	IP	TCH	TC	IP	TCH	TC	IP	TCH	TC	IP	TCH	TC	IP	TCH	TC	IP	TCH	TC	IP	TCH	TC	IP	TCH		
%	°FDB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW		
80	14	142	9.04	146	8.70	151	8.42	156	8.15	161	7.88	166	7.63	171	7.38	176	7.13	181	6.88	186	6.63	191	6.38	196	6.13	201	5.88
	18	142	8.99	146	8.68	151	8.41	155	8.16	160	7.91	164	7.67	169	7.42	173	7.18	178	6.93	183	6.68	187	6.43	192	6.18	197	5.93
	23	141	8.93	145	8.64	150	8.41	154	8.17	159	7.94	163	7.73	167	7.51	172	7.26	176	7.02	181	6.77	185	6.52	190	6.27	194	6.02
	32	140	8.82	144	8.59	149	8.40	153	8.21	158	8.01	162	7.84	167	7.64	171	7.44	176	7.24	180	7.04	185	6.84	189	6.64	194	6.44
	42	138	8.97	142	8.73	146	8.53	151	8.33	155	8.13	160	8.00	164	7.87	169	7.74	173	7.61	178	7.48	182	7.35	187	7.22	191	7.09
	50	136	9.11	140	8.94	144	8.63	148	8.43	153	8.23	158	8.04	162	7.87	167	7.75	171	7.62	176	7.50	180	7.37	185	7.25	189	7.12
	54	135	9.16	139	8.99	143	8.67	147	8.47	152	8.27	157	8.06	162	7.87	166	7.73	171	7.59	175	7.45	180	7.31	184	7.17	189	7.03
	58	134	9.23	138	9.05	142	8.72	147	8.52	151	8.32	156	8.08	161	7.87	166	7.71	171	7.55	176	7.39	181	7.23	186	7.07	191	6.91
	62	133	9.37	137	9.08	141	8.87	145	8.67	150	8.46	155	8.23	160	8.04	165	7.84	170	7.67	175	7.50	180	7.33	185	7.16	190	6.99
	66	132	9.59	136	9.32	140	9.11	144	8.91	149	8.71	154	8.49	159	8.29	164	8.11	169	7.93	174	7.75	179	7.57	184	7.39	189	7.21
	70	131	9.81	135	9.55	139	9.36	143	9.16	148	8.96	153	8.75	157	8.57	162	8.41	167	8.24	172	8.07	177	7.89	182	7.71	187	7.53
	74	130	10.03	134	9.79	138	9.60	142	9.41	146	9.21	150	9.02	155	8.85	160	8.70	165	8.54	170	8.38	175	8.22	180	8.06	185	7.90
	78	129	10.26	133	10.03	137	9.84	141	9.66	145	9.47	149	9.28	153	9.13	158	8.98	163	8.82	168	8.66	173	8.50	178	8.34	183	8.18
	82	127	10.72	131	10.49	135	10.29	139	10.09	143	9.89	147	9.72	151	9.56	156	9.42	161	9.26	166	9.10	171	8.94	176	8.78	181	8.62
	86	125	11.41	128	11.15	132	10.94	136	10.72	140	10.50	144	10.32	148	10.14	153	9.99	158	9.83	163	9.67	168	9.51	173	9.35	178	9.19
	90	123	12.09	126	11.82	130	11.59	134	11.35	138	11.11	142	10.95	146	10.73	150	10.57	155	10.41	160	10.25	165	10.09	170	9.93	175	9.77
	95	120	12.95	123	12.65	127	12.40	131	12.13	135	11.88	139	11.66	143	11.46	148	11.29	153	11.13	158	10.97	163	10.81	168	10.65	173	10.49
	100	117	14.20	120	13.84	124	13.57	128	13.28	132	13.01	136	12.72	140	12.43	144	12.26	148	12.08	152	11.89	157	11.72	161	11.54	165	11.37
106	114	15.71	117	15.26	120	14.96	124	14.65	128	14.36	132	13.98	136	13.64	140	13.34	144	13.04	148	12.74	152	12.44	156	12.14	160	11.84	
110	112	16.72	115	16.21	118	15.89	121	15.57	125	15.26	129	14.96	133	14.66	137	14.36	141	14.06	145	13.76	149	13.46	153	13.16	157	12.86	
114	110	16.62	113	16.06	116	15.73	119	15.38	123	15.03	126	14.57	129	14.14	133	13.86	137	13.51	141	13.23	145	12.95	149	12.67	153	12.39	
118	107	16.52	110	15.90	114	15.55	118	15.18	122	14.79	126	14.30	130	13.86	134	13.48	138	13.14	142	12.80	146	12.46	150	12.12	154	11.78	
70	14	124	7.91	127	7.61	132	7.37	137	7.14	141	6.89	144	6.94	148	6.98	152	6.71	156	6.45	160	6.19	164	5.93	168	5.67	172	5.41
	18	124	7.87	127	7.59	132	7.37	137	7.14	140	6.92	144	6.94	148	6.96	151	6.75	155	6.49	159	6.23	163	5.97	167	5.71	171	5.45
	23	123	7.81	126	7.56	131	7.36	136	7.16	139	6.96	143	6.94	147	6.94	150	6.79	154	6.53	158	6.27	162	6.01	166	5.75	170	5.49
	32	122	7.72	125	7.52	130	7.35	134	7.18	138	6.91	142	6.95	146	6.95	149	6.80	153	6.54	157	6.28	161	6.02	165	5.76	169	5.50
	42	121	7.86	125	7.63	129	7.46	133	7.29	137	7.11	140	7.00	144	6.90	148	6.82	152	6.56	156	6.30	160	6.04	164	5.78	168	5.52
	50	119	7.96	123	7.73	127	7.54	130	7.37	133	7.19	138	7.04	142	6.88	146	6.79	150	6.53	154	6.27	158	6.01	162	5.75	166	5.49
	54	118	8.02	122	7.78	126	7.60	129	7.42	133	7.24	138	7.08	142	6.89	146	6.77	150	6.51	154	6.25	158	6.00	162	5.74	166	5.48
	58	117	8.07	121	7.80	125	7.64	129	7.46	133	7.28	137	7.12	141	6.93	145	6.77	150	6.51	154	6.25	158	6.00	162	5.74	166	5.48
	62	115	7.19	120	6.96	124	6.77	127	7.59	131	7.42	135	7.20	140	7.00	144	6.80	148	6.54	152	6.28	156	6.02	160	5.76	164	5.50
	66	116	8.39	119	8.16	122	7.98	126	7.80	130	7.63	135	7.43	139	7.25	143	7.07	147	6.81	151	6.55	155	6.29	159	6.03	163	5.77
	70	115	8.58	118	8.36	121	8.19	125	8.01	129	7.84	133	7.66	137	7.49	141	7.36	145	7.10	149	6.84	153	6.58	157	6.32	161	6.06
	74	114	8.77	117	8.57	120	8.41	124	8.23	127	8.06	131	7.90	135	7.73	139	7.61	143	7.35	147	7.09	151	6.83	155	6.57	159	6.31
	78	113	8.97	116	8.77	119	8.61	123	8.45	126	8.28	130	8.13	134	7.99	138	7.85	142	7.59	146	7.33	150	7.07	154	6.81	158	6.55
	82	111	9.37	114	9.17	118	9.01	122	8.83	124	8.65	128	8.51	132	8.37	136	8.23	140	7.97	144	7.71	148	7.45	152	7.19	156	6.93
	86	110	9.97	112	9.75	116	9.57	120	9.38	122	9.19	126	9.03	130	8.88	134	8.74	138	8.48	142	8.22	146	7.96	150	7.70	154	7.44
	90	108	10.58	110	10.34	114	10.13	118	9.94	120	9.72	124	9.55	127	9.39	131	9.25	135	8.99	139	8.73	143	8.47	147	8.21	151	7.95
	95	106	11.33	108	11.07	111	10.84	115	10.62	117	10.39	121	10.20	124	10.03	128	9.88	132	9.62	136	9.36	140	9.10	144	8.84	148	8.58
	100	103	12.43	105	12.11	108	11.88	112	11.62	114	11.37	118	11.12	121	10.90	124	10.74	128	10.48	132	10.22	136	9.96	140	9.70	144	9.44
106	100	13.74	102	13.35	105	13.03	109	12.76	112	12.49	116	12.22	120	12.00	124	11.78	128	11.52	132	11.26	136	11.00	140	10.74	144	10.48	
110	98	14.62	100	14.21	103	13.90	107	13.62	109	13.34	112	12.97	115	12.64	117	12.47	121	12.21	125	11.95	129	11.69	133	11.43	137	11.17	
114	96	14.52	98	14.01	101	13.73	104	13.42	107	13.10	110	12.70	112	12.32	115	12.06	119	11.80	123	11.54	127	11.28	131	11.02	135	10.76	
118	94	14.41	96	13.85	99	13.55	102	13.21	105	12.85	108	12.42	110	12.00	112	11.68	116	11.42	120	11.16	124	10.90	128	10.64	132	10.38	
60	14	106	6.95	109	6.68	113	6.47	116	6.26	120	6.05	123	6.09	126	6.13	129	5.89	133	5.63	137	5.37	140	5.11	144	4.85	148	4.59
	18	106	6.91	109	6.66	113	6.47	116	6.27	120	6.07	123	6.10	126	6.11	129	5.93	133	5.67	137	5.41	140	5.15	144	4.89	148	4.63
	23	105	6.86	109	6.64	113	6.46	116	6.28	119	6.11	122	6.10	125	6.10	128	5.96	132	5.70	136	5.44	140	5.18	144	4.92	148	4.66
	32	105	6.77	108	6.60	111	6.46	114	6.31	118	6.16	121	6.10	124	6.06	127	6.03	131	5.77	135	5.51	139	5.25	143	4.99	147	4.73
	42	104	6.90	108	6.70	110	6.55	113	6.40	116	6.25	120	6.14	123	6.05	126	5.99	130	5.73	134	5.47	138	5.21	142	4.95	146	4.69
	50	102	7.00	105	6.78	108	6.63	111	6.47	114	6.32	118	6.17	122	6.04	125	5.97	129	5.71	133	5.45	137	5.19	141	4.93	145	4.67
	54	101	7.04	104	6.83	107	6.67	110	6.51	113	6.35	117	6.20	120													

(H,Y)VAHP192B(3,4)1CW

Conne- ratio	Outdoor air temp	Indoor air temp. °FWB																Conne- ratio	Outdoor air temp	Indoor air temp. °FWB																	
		59				61				63				65						67				69				71				73					
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP			TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP				
%	°FDB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	%	°FDB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	%	°FDB	MBH	KW
110	14	216	16.10	224	15.84	236	15.52	246	15.20	256	14.88	264	15.22	270	15.52	282	15.40	14	166	11.36	172	11.20	180	10.96	188	10.74	196	10.52	202	10.74	206	10.96	214	10.88			
	18	215	16.02	223	15.80	234	15.52	244	15.24	254	14.96	262	15.28	269	15.56	279	15.54	18	165	11.32	171	11.18	179	10.96	186	10.76	194	10.58	200	10.78	205	11.00	213	10.96			
	23	214	15.94	222	15.76	232	15.54	242	15.30	252	15.06	260	15.36	268	15.62	276	15.70	23	164	11.26	170	11.14	178	10.98	184	10.80	192	10.64	198	10.84	204	11.04	212	11.08			
	32	212	15.78	220	15.70	230	15.54	240	15.40	248	15.24	256	15.50	264	15.72	272	15.98	32	162	11.14	168	11.08	176	10.98	182	10.88	190	10.76	196	10.94	202	11.10	208	11.28			
	42	208	15.90	216	15.78	226	15.64	234	15.52	244	15.40	252	15.50	261	15.60	269	15.70	42	159	11.22	165	11.14	172	11.06	179	10.96	186	10.88	193	10.94	199	11.00	205	11.08			
	50	204	15.98	212	15.82	222	15.72	230	15.62	240	15.52	249	15.50	258	15.44	267	15.44	50	156	11.30	162	11.18	169	11.10	176	11.04	182	10.96	190	10.84	197	10.92	203	10.92			
	54	203	16.04	211	15.86	219	15.76	229	15.66	237	15.58	247	15.50	257	15.34	266	15.30	54	155	11.32	161	11.20	168	11.12	175	11.06	181	11.00	188	10.94	196	10.90	203	10.82			
	58	201	16.08	209	15.88	217	15.80	227	15.72	235	15.64	245	15.50	255	15.24	265	15.16	58	153	11.36	159	11.22	167	11.14	173	11.10	179	11.04	187	10.94	195	10.86	202	10.74			
	62	199	16.22	206	15.98	214	15.94	224	15.88	232	15.84	242	15.62	251	15.30	261	15.20	62	151	11.50	157	11.34	165	11.30	171	11.26	177	11.20	185	11.10	193	11.00	201	10.88			
	66	196	16.46	203	16.16	211	16.18	221	16.18	229	16.18	238	15.84	246	15.48	256	15.42	66	150	11.72	156	11.60	162	11.56	168	11.52	176	11.48	182	11.40	190	11.34	198	11.24			
	70	194	16.70	201	16.34	208	16.42	218	16.48	226	16.54	234	16.06	240	15.66	250	15.62	70	148	11.96	154	11.86	160	11.84	166	11.80	174	11.76	180	11.70	188	11.66	196	11.60			
	74	189	16.56	195	16.26	203	16.34	212	16.40	220	16.46	228	16.10	234	15.78	244	15.76	74	146	12.20	152	12.12	158	12.10	164	12.08	172	12.04	178	12.02	185	11.98	193	11.96			
	78	184	16.42	190	16.20	198	16.26	207	16.34	215	16.38	223	16.12	229	15.92	239	15.90	78	145	12.44	151	12.38	157	12.36	163	12.36	169	12.34	175	12.32	182	12.32	190	12.30			
	82	180	16.72	186	16.54	194	16.58	201	16.64	209	16.66	217	16.48	223	16.34	233	16.32	82	142	12.88	148	12.84	154	12.82	160	12.80	166	12.78	172	12.78	178	12.78	186	12.78			
	86	175	17.42	181	17.28	189	17.28	196	17.30	204	17.30	212	17.18	218	17.06	227	17.06	86	139	13.52	144	13.46	150	13.44	156	13.42	162	13.38	168	13.38	174	13.36	182	13.36			
	90	170	18.14	176	18.02	184	18.00	191	17.96	199	17.94	207	17.86	213	17.80	221	17.78	90	136	14.14	141	14.10	147	14.06	153	14.02	159	13.98	165	13.98	171	13.96	177	13.96			
	95	164	19.02	170	18.94	178	18.88	184	18.80	192	18.74	200	18.72	206	18.70	214	18.70	95	132	14.94	136	14.88	142	14.84	148	14.78	154	14.74	160	14.72	164	14.70	172	14.70			
	100	159	20.32	165	20.22	172	20.12	178	20.02	185	19.94	193	19.90	199	19.84	207	19.82	100	128	16.08	132	15.96	137	15.92	143	15.88	149	15.82	155	15.72	161	15.62	168	15.60			
100	106	152	21.90	158	21.74	165	21.62	171	21.50	177	21.40	184	21.30	191	21.20	198	21.16	106	123	17.46	127	17.24	132	17.20	138	17.16	144	17.12	148	16.90	154	16.72	159	16.70			
	110	148	22.94	154	22.76	160	22.62	166	22.48	172	22.36	178	22.24	186	22.12	192	22.06	110	120	18.38	124	18.10	128	18.06	134	18.02	140	17.98	144	17.70	150	17.46	154	17.42			
	114	141	21.44	144	20.64	149	20.52	154	20.22	159	19.92	162	19.40	167	18.90	170	18.46	114	116	21.44	120	17.36	125	17.34	130	17.28	136	17.22	140	16.92	145	16.84	149	16.52			
	118	134	19.92	134	18.92	138	18.42	142	17.94	146	17.46	148	16.54	148	15.68	148	14.84	118	112	17.02	116	16.62	122	16.60	126	16.54	132	16.44	136	16.14	140	15.80	144	15.60			
	14	206	14.84	214	14.60	224	14.30	234	14.02	244	13.72	252	14.02	258	14.30	268	14.20	14	144	9.94	150	9.80	158	9.60	164	9.40	172	9.20	176	9.40	180	9.58	188	9.52			
	18	205	14.78	213	14.58	223	14.30	233	14.06	242	13.80	250	14.08	257	14.34	266	14.32	18	144	9.90	149	9.78	157	9.60	163	9.42	170	9.26	175	9.44	179	9.62	186	9.60			
	23	204	14.70	212	14.54	222	14.32	232	14.10	240	13.88	248	14.16	256	14.40	264	14.46	23	144	9.84	148	9.74	156	9.60	162	9.46	168	9.32	174	9.48	178	9.66	184	9.70			
	32	202	14.56	210	14.46	220	14.32	228	14.18	236	14.06	244	14.28	252	14.50	260	14.74	32	142	9.76	146	9.70	154	9.60	160	9.52	166	9.42	172	9.58	176	9.72	182	9.88			
	42	198	14.66	206	14.54	216	14.42	224	14.30	232	14.18	241	14.28	249	14.38	257	14.46	42	139	9.84	145	9.74	151	9.66	157	9.60	162	9.50	168	9.58	173	9.64	181	9.70			
	50	194	14.74	202	14.68	212	14.50	220	14.38	228	14.30	236	14.28	246	14.26	255	14.26	50	137	9.88	142	9.78	148	9.70	154	9.64	159	9.58	167	9.58	173	9.56	179	9.56			
	54	193	14.78	201	14.60	209	14.52	217	14.44	225	14.36	233	14.28	245	14.22	254	14.14	54	136	9.90	141	9.80	147	9.74	153	9.68	158	9.62	166	9.58	172	9.54	178	9.48			
	58	191	14.82	199	14.62	207	14.56	215	14.48	223	14.42	231	14.28	243	14.16	253	14.04	58	135	9.92	139	9.82	145	9.76	151	9.70	157	9.66	165	9.58	171	9.50	177	9.42			
	62	189	15.00	197	14.80	205	14.76	213	14.68	221	14.62	230	14.48	240	14.36	250	14.20	62	133	10.04	137	9.94	143	9.90	149	9.84	155	9.80	163	9.72	169	9.62	175	9.54			
	66	186	15.14	194	15.14	202	15.04	210	15.04	218	15.00	226	14.88	237	14.78	247	14.66	66	132	10.26	136	10.16	142	10.12	148	10.08	154	10.06	160	9.98	166	9.92	172	9.84			
	70	180	15.60	192	15.48	200	15.44	208	15.40	216	15.36	226	15.28	236	15.20	244	15.12	70	130	10.46	134	10.38	140	10.36	146	10.32	152	10.30	158	10.24	164	10.20	170	10.14			
	74	184	15.92	190	15.82	198	15.80	206	15.76	214	15.74	223	15.68	231	15.64	240	15.60	74	128	10.66	132	10.62	138	10.60	144	10.56	150	10.54	156	10.52	162	10.48	168	10.46			
	78	181	16.22	187	16.16	195	16.14	203	16.12	211	16.12	220	16.10	228	16.08	236	16.08	78	127	10.88	131	10.84	137	10.82	143	10.82	147	10.80	153	10.78	159	10.78	165	10.78			
	82	176	16.80	184	16.76	192	16.72	200	16.70	208	16.68	216	16.68	223	16.68	231	16.68	82	125	11.26	129	11.24	134	11.22	140	11.20	144	11.18	150	11.18	156	11.18	162	11.18			
86	174	17.62	180	17.58	188	17.54	195	17.50	203	17.46	211	17.46	218	17.46	226	17.46	86	122	11.82	126	11.78	131	<														

SELECTION DATA

(H,Y)VAHP288B(3,4)1CW

[illegible]

TC: Total Capacity

IP: Input Power

NOTES:

1. The table shows the normal value of a cooling operation.
In some cases, the value may change due to the compressor protection control.
2. The value on the table shows when the system is operated under the following conditions.
The total piping length: 24.6ft (7.5m), The height difference: 0ft (0m)
3. In an instance of a heat recovery system, the value on the table indicates when all the indoor units are operated in cooling mode.

(2) Heating Capacity

(H,Y)VAHP072B(3,4)1CW

Connection ratio	Outdoor air temp	Indoor air temp. °FDB															
		59				63				66				68			
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
%	°FWB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
130	-13	69	11.57	69	12.30	70	12.87	70	13.10	71	13.33	71	14.13	71	14.76	71	15.61
	-4	73	10.3	73	10.9	73	11.4	74	11.7	74	11.9	74	12.6	74	13.1	74	13.9
	-1	74	9.88	74	10.47	74	10.94	75	11.17	75	11.40	75	12.07	75	12.60	75	13.30
	3	75	9.31	75	9.86	76	10.29	76	10.52	76	10.75	76	11.38	76	11.88	76	12.53
	7	77	8.75	77	9.26	78	9.66	78	9.90	78	10.14	78	10.71	77	11.16	77	11.76
	11	78	8.18	78	8.67	79	9.05	79	9.31	79	9.57	79	10.06	78	10.43	78	10.99
	15	80	7.62	80	8.08	80	8.43	81	8.71	81	8.99	80	9.40	79	9.70	79	10.21
	19	82	7.48	82	7.94	82	8.30	82	8.58	83	8.86	81	9.23	80	9.50	80	10.00
	23	83	7.33	83	7.80	83	8.17	83	8.45	84	8.73	82	9.06	81	9.30	81	9.79
	27	85	7.13	85	7.60	85	7.98	85	8.25	86	8.53	84	8.82	83	9.04	83	9.53
	31	86	6.88	86	7.35	86	7.73	86	7.99	87	8.26	85	8.53	84	8.71	84	9.20
	35	88	6.62	88	7.09	88	7.47	88	7.73	88	8.00	87	8.23	85	8.39	85	8.88
	39	90	6.28	90	6.74	90	7.11	90	7.37	90	7.62	88	7.83	87	7.97	86	8.45
	43	91	5.94	91	6.39	91	6.75	91	7.00	91	7.24	89	7.43	88	7.55	87	8.01
	47	91	5.68	91	6.10	91	6.43	91	6.67	91	6.91	90	7.12	89	7.26	88	7.69
	51	91	5.43	92	5.81	92	6.11	92	6.35	92	6.59	90	6.81	90	6.97	89	7.38
	55	91	5.17	92	5.52	92	5.79	92	6.02	92	6.26	91	6.50	91	6.68	90	7.08
	59	91	4.85	92	5.18	92	5.44	92	5.67	92	5.90	91	6.13	91	6.31	90	6.39
120	-13	69	11.70	69	12.44	70	13.01	70	13.24	71	13.47	71	14.29	71	14.92	71	15.78
	-4	73	10.4	73	11.1	73	11.6	74	11.9	74	12	74	12.7	74	13.3	74	14
	-1	74	9.98	74	10.59	74	11.06	75	11.29	75	11.52	75	12.21	75	12.73	75	13.45
	3	75	9.41	75	9.98	76	10.41	76	10.64	76	10.87	76	11.51	76	12.00	76	12.67
	7	77	8.85	77	9.37	78	9.77	78	10.01	78	10.25	78	10.83	77	11.27	77	11.89
	11	78	8.28	78	8.77	79	9.14	79	9.40	79	9.67	79	10.16	78	10.54	78	11.10
	15	80	7.71	80	8.17	80	8.52	81	8.80	81	9.09	80	9.50	79	9.81	79	10.32
	19	82	7.54	82	8.01	82	8.37	82	8.65	83	8.93	81	9.30	80	9.59	80	10.09
	23	83	7.37	83	7.85	83	8.22	83	8.50	84	8.78	82	9.11	81	9.36	81	9.86
	27	85	7.15	85	7.63	85	8.00	85	8.28	86	8.56	84	8.85	83	9.08	83	9.57
	31	86	6.86	86	7.35	86	7.73	86	8.00	87	8.27	85	8.54	84	8.73	84	9.22
	35	88	6.58	88	7.07	88	7.46	88	7.72	88	7.98	87	8.22	85	8.39	85	8.88
	39	88	6.00	88	6.46	88	6.83	88	7.11	89	7.39	86	7.68	86	7.89	86	8.37
	43	88	5.41	88	5.84	88	6.19	88	6.45	89	6.79	88	7.13	87	7.39	87	7.85
	47	88	5.16	88	5.55	88	5.87	88	6.14	89	6.41	88	6.71	87	6.94	87	7.37
	51	88	4.92	88	5.27	88	5.55	88	5.79	89	6.04	88	6.29	87	6.48	87	6.87
	55	88	4.67	88	4.98	88	5.23	88	5.44	89	5.66	88	5.87	87	6.03	87	6.38
	59	88	4.38	88	4.68	88	4.91	88	5.12	89	5.33	88	5.54	87	5.70	87	5.77
110	-13	69	11.85	69	12.60	70	13.18	70	13.42	71	13.65	71	14.48	71	15.12	71	15.99
	-4	73	10.6	73	11.2	73	11.7	74	12.2	74	12.9	74	13.5	74	14.2	74	15
	-1	74	10.12	74	10.73	74	11.21	75	11.44	75	11.67	75	12.36	75	12.91	75	13.63
	3	75	9.54	75	10.10	76	10.55	76	10.78	76	11.01	76	11.66	76	12.17	76	12.84
	7	77	8.96	77	9.49	78	9.90	78	10.14	78	10.39	78	10.97	77	11.43	77	12.05
	11	78	8.39	78	8.88	79	9.27	79	9.53	79	9.80	79	10.30	78	10.68	78	11.26
	15	80	7.81	80	8.27	80	8.63	81	8.92	81	9.21	80	9.63	79	9.94	79	10.46
	19	82	7.62	82	8.09	82	8.45	82	8.74	83	9.03	81	9.41	80	9.69	80	10.20
	23	83	7.43	83	7.91	83	8.28	83	8.56	84	8.84	82	9.19	81	9.44	81	9.94
	27	84	7.06	84	7.53	84	7.90	84	8.18	85	8.46	83	8.80	82	9.04	82	9.53
	31	84	6.49	84	6.95	84	7.31	85	7.60	85	7.89	84	8.23	83	8.49	83	8.97
	35	84	5.93	84	6.37	84	6.72	85	7.02	85	7.32	84	7.67	83	7.94	83	8.41
	39	84	5.40	84	5.82	84	6.15	85	6.44	85	6.72	84	7.05	83	7.30	83	7.75
	43	84	4.87	84	5.26	84	5.58	85	5.85	85	6.12	84	6.43	83	6.66	83	7.08
	47	84	4.65	84	5.00	84	5.29	85	5.53	85	5.78	84	6.05	83	6.25	83	6.64
	51	84	4.43	84	4.75	84	5.00	85	5.22	85	5.44	84	5.67	83	5.85	83	6.19
	55	84	4.21	84	4.49	84	4.71	85	4.90	85	5.10	84	5.29	83	5.44	83	5.75
	59	84	3.94	84	4.21	84	4.43	85	4.62	85	4.81	84	5.00	83	5.14	83	5.20
100	-13	69	12.03	69	12.80	70	13.39	70	13.62	71	13.86	71	14.70	71	15.35	71	16.24
	-4	73	10.7	73	11.3	73	11.9	74	12.1	74	12.4	74	13.1	74	13.7	74	14.4
	-1	74	10.27	74	10.90	74	11.38	75	11.62	75	11.85	75	12.55	75	13.10	75	13.84
	3	75	9.68	75	10.27	76	10.71	76	10.95	76	11.18	76	11.84	76	12.35	76	13.04
	7	77	9.10	77	9.64	78	10.05	78	10.30	78	10.54	78	11.14	77	11.60	77	12.24
	11	78	8.51	78	9.02	79	9.41	79	9.68	79	9.95	79	10.46	78	10.85	78	11.43
	15	80	7.93	80	8.40	80	8.77	81	9.06	81	9.35	80	9.78	79	10.09	79	10.62
	19	80	7.47	80	7.92	80	8.26	81	8.53	81	8.80	80	9.22	79	9.52	79	10.03
	23	81	7.02	81	7.43	81	7.75	81	8.00	81	8.25	80	8.65	80	8.95	79	9.44
	27	81	6.56	81	6.94	81	7.24	81	7.46	81	7.69	80	8.09	80	8.38	79	8.84
	31	82	6.10	82	6.45	81	6.73	81	6.93	81	7.14	80	7.52	80	7.81	79	8.23
	35	82	5.64	82	5.96	81	6.21	81	6.40	81	6.59	80	6.95	80	7.23	79	7.62
	39	83	5.19	82	5.48	82	5.71	81	5.88	81	6.05	80	6.40	80	6.66	79	7.02
	43	83	4.73	82	5.00	82	5.21	81	5.36	81	5.51	80	5.84	80	6.09	79	6.41
	47	83	4.52	82	4.76	82	4.94	81	5.07	81	5.20	80	5.50	80	5.72	79	6.01
	51	83	4.30	82	4.51	82	4.67	81	4.79	81	4.90	80	5.15	80	5.34	79	5.61
	55	83	4.09	82	4.27	82	4.40	81	4.50	81	4.59	80	4.81	80	4.97	79	5.21
	59	83	3.83	82	4.00	82	4.14	81	4.23	81	4.33	80	4.54	80	4.70	79	4.71
90	-13	69	12.24	69	13.02	70	13.62	70	13.86	71	14.10	71	14.96	71	15.62	71	16.52
	-4	73	10.9	73	11.6	73	12.1	73	12.2	73	12.3	72	13	72	13.5	71	14.2
	-1	73	10.36	73	10.96	73	11.41	73	11.55	73	11.64	72	12.29	72	12.78	71	13.43
	3	74	9.65	74	10.14	73	10.51	73	10.64	73	10.74	72	11.36	72	11.83	71	12.

SELECTION DATA

(H,Y)VAHP096B(3,4)1CW

Conne- ratio	Outdoor air temp	Indoor air temp. °FDB															
		59				63				66				68			
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
%	°FWB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW
110	-13	69	11.62	70	12.56	70	13.28	73	13.92	75	14.56	76	15.50	77	16.23	77	17.10
	-4	82	11.2	82	12	82	12.6	84	13.1	86	13.6	86	14.7	85	15.6	85	16.4
	-1	86	11.06	86	11.81	86	12.39	88	12.87	89	13.34	89	14.46	88	15.33	88	16.12
	3	92	10.88	92	11.56	92	12.09	93	12.52	94	12.93	93	14.11	92	15.03	91	15.79
	7	98	10.75	98	11.37	98	11.89	98	12.24	98	12.62	97	13.81	96	14.73	95	15.42
	11	104	10.68	103	11.24	103	11.69	103	12.03	103	12.39	101	13.55	100	14.42	98	14.99
	15	110	10.60	109	11.11	108	11.51	108	11.83	108	12.16	106	13.29	104	14.12	102	14.57
	19	112	10.46	111	10.99	110	11.41	110	11.75	110	12.10	107	13.15	106	13.92	104	14.41
	23	114	10.33	113	10.88	113	11.31	112	11.66	112	12.03	110	13.00	108	13.72	106	14.26
	27	115	9.94	114	10.49	114	10.92	113	11.28	113	11.66	111	12.52	109	13.16	107	13.71
	31	115	9.29	114	9.82	114	10.25	113	10.61	113	10.97	111	11.69	109	12.23	107	12.78
	35	115	8.64	114	9.16	114	9.58	113	9.93	113	10.29	111	10.87	109	11.30	107	11.85
	39	115	8.04	114	8.54	114	8.95	113	9.29	113	9.64	111	10.07	109	10.40	107	10.93
	43	115	7.44	114	7.92	114	8.31	113	8.64	113	8.98	111	9.27	109	9.49	107	10.00
	47	115	7.09	114	7.55	114	7.92	113	8.14	113	8.37	111	8.72	109	8.98	107	9.45
100	51	115	6.75	114	7.18	114	7.52	113	7.65	113	7.77	111	8.18	109	8.48	107	8.90
	55	115	6.40	114	6.81	114	7.13	113	7.15	113	7.16	111	7.63	109	7.97	107	8.35
	59	115	6.08	114	6.46	114	6.76	113	6.86	113	6.96	111	7.30	109	7.55	107	7.89
	-13	69	11.80	70	12.75	70	13.48	73	14.13	75	14.78	76	15.74	77	16.48	77	17.36
	-4	82	11.4	82	12.2	82	12.8	84	13.3	86	13.9	86	15	85	15.8	85	16.6
	-1	86	11.24	86	11.99	86	12.57	88	13.06	89	13.54	89	14.69	88	15.56	88	16.36
	3	92	11.05	92	11.74	92	12.27	93	12.71	94	13.13	93	14.34	92	15.26	91	16.03
	7	98	10.91	98	11.54	98	12.03	98	12.43	98	12.81	97	14.03	96	14.96	95	15.68
	11	104	10.84	103	11.41	103	11.86	103	12.22	103	12.58	101	13.76	100	14.65	98	15.23
	15	110	10.76	109	11.28	108	11.69	108	12.01	108	12.34	106	13.49	104	14.34	102	14.80
	19	110	10.25	109	10.74	108	11.12	108	11.42	108	11.72	105	12.76	104	13.54	102	13.98
	23	111	9.74	110	10.19	109	10.55	108	10.83	108	11.11	106	12.03	104	12.73	102	13.17
	27	111	9.23	110	9.65	109	9.99	108	10.24	108	10.49	106	11.30	104	11.92	102	12.34
	31	112	8.72	111	9.11	109	9.42	109	9.65	108	9.88	106	10.57	104	11.11	102	11.50
	35	112	8.21	111	8.57	109	8.85	109	9.06	108	9.26	106	9.84	104	10.29	102	10.66
90	39	113	7.72	111	8.05	110	8.31	109	8.49	108	8.67	106	9.13	104	9.49	102	9.83
	43	113	7.22	111	7.53	110	7.76	109	7.92	108	8.08	106	8.42	104	8.68	102	9.00
	47	113	6.68	111	7.18	110	7.39	109	7.46	108	7.54	106	7.92	104	8.22	102	8.51
	51	113	6.55	111	6.82	110	7.03	109	7.01	108	6.99	106	7.43	104	7.75	102	8.01
	55	113	6.21	111	6.47	110	6.66	109	6.55	108	6.45	106	6.93	104	7.29	102	7.52
	59	113	5.90	111	6.14	110	6.32	109	6.29	108	6.26	106	6.63	104	6.91	102	7.10
	-13	69	12.01	70	12.97	70	13.72	73	14.38	75	15.04	76	16.01	77	16.77	77	17.66
	-4	82	11.6	82	12.4	82	13	84	13.6	86	14.1	86	15.2	85	16.1	85	16.9
	-1	86	11.43	86	12.20	86	12.80	88	13.29	89	13.79	89	14.94	88	15.83	87	16.15
	3	92	11.24	92	11.94	92	12.49	93	12.92	94	13.37	93	14.59	92	15.50	90	16.15
	7	96	10.92	96	11.53	96	12.00	96	12.37	96	12.75	95	13.96	94	14.87	92	15.40
	11	99	10.47	98	10.97	97	11.35	97	11.64	97	11.92	95	13.07	94	13.93	92	14.35
	15	102	10.03	100	10.41	99	10.69	98	10.90	97	11.10	95	12.18	94	12.99	92	13.30
	19	102	9.51	100	9.87	99	10.15	98	10.35	97	10.54	95	11.52	94	12.25	92	12.57
	23	102	8.98	100	9.34	99	9.60	98	9.80	97	9.98	95	10.85	94	11.51	92	11.84
	27	102	8.47	100	8.81	99	9.06	98	9.25	97	9.42	95	10.19	94	10.77	92	11.09
	31	102	7.96	100	8.28	99	8.53	98	8.70	97	8.87	95	9.52	94	10.02	92	10.34
	35	102	7.45	100	7.76	99	8.00	98	8.16	97	8.32	95	8.86	94	9.27	92	9.58
	39	102	6.97	100	7.26	99	7.49	98	7.64	97	7.79	95	8.22	94	8.54	92	8.84
	43	102	6.49	100	6.76	99	6.97	98	7.12	97	7.26	95	7.57	94	7.80	92	8.09
	47	102	6.19	100	6.44	99	6.64	98	6.71	97	6.77	95	7.12	94	7.39	92	7.64
	51	102	5.88	100	6.13	99	6.32	98	6.30	97	6.28	95	6.67	94	6.97	92	7.20
	55	102	5.58	100	5.81	99	5.99	98	5.89	97	5.79	95	6.22	94	6.56	92	6.75
	59	102	5.31	100	5.52	99	5.68	98	5.65	97	5.63	95	5.96	94	6.21	92	6.38

Conne- ratio	Outdoor air temp	Indoor air temp. °FDB															
		59		63		66		68		70		74		77		81	
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
%	°FWB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW
80	-13	69	12.24	70	13.22	70	13.99	73	14.66	75	15.33	76	16.33	77	17.09	77	18.01
	-4	82	11.8	82	12.6	82	13.3	84	13.8	86	14.4	85	15.3	83	16	82	16.5
	-1	85	11.46	84	12.17	84	12.72	85	13.13	86	13.54	85	14.53	83	15.21	82	15.77
	3	89	11.00	87	11.55	87	11.97	86	12.20	86	12.44	85	13.46	83	14.22	82	14.76
	7	91	10.42	88	10.86	88	11.19	87	11.35	86	11.51	85	12.53	83	13.31	82	13.79
	11	91	9.71	89	10.10	88	10.40	87	10.57	86	10.74	85	11.74	83	12.49	82	12.97
	15	91	9.00	89	9.34	88	9.60	87	9.79	86	9.97	85	10.94	83	11.67	82	11.95
	19	91	8.53	89	8.86	88	9.11	87	9.29	86	9.47	85	10.34	83	11.01	82	11.29
	23	91	8.06	89	8.39	88	8.62	87	8.80	86	8.97	85	9.75	83	10.34	82	10.64
	27	91	7.60	89	7.91	88	8.14	87	8.31	86	8.47	85	9.15	83	9.67	82	9.97
	31	91	7.15	89	7.44	88	7.66	87	7.82	86	7.98	85	8.56	83	9.00	82	9.29
	35	91	6.69	89	6.97	88	7.18	87	7.33	86	7.48	85	7.96	83	8.33	82	8.61
	39	91	6.26	89	6.53	88	6.73	87	6.87	86	7.01	85	7.38	83	7.67	82	7.94
	43	91	5.83	89	6.08	88	6.27	87	6.40	86	6.53	85	6.80	83	7.01	82	7.27
	47	91	5.56	89	5.79	88	5.97	87	6.03	86	6.09	85	6.40	83	6.64	82	6.87
70	51	91	5.29	89	5.51	88	5.68	87	5.66	86	5.65	85	5.99	83	6.26	82	6.47
	55	91	5.02	89	5.22	88	5.38	87	5.29	86	5.21	85	5.59	83	5.89	82	6.07
	59	91	4.77	89	4.96	88	5.10	87	5.08	86	5.06	85	5.35	83	5.58	82	5.73
	-13	69	12.50	70	13.51	70	14.28	73	14.97	75	15.66	76	16.19	73	16.53	72	17.09
	-4	79	11.6	78	12.2	77	12.6	76	12.7	76	12.9	74	13.6	73	14.2	72	14.7
	-1	79	10.95	78	11.47	77	11.85	76	11.99	76	12.11	74	12.92	73	13.54	72	14.05
	3	79	10.04	78	10.50	77	10.84	76	10.98	76	11.12	74	12.01	73	12.69	72	13.18
	7	79	9.28	78	9.69	77	9.99	76	10.14	76	10.29	74	11.21	73	11.91	72	12.34
	11	79	8.68	78	9.03	77	9.33	76	9.47	76	9.62	74	10.54	73	11.24	72	11.67
	15	79	8.08	78	8.39	77	8.63	76	8.80	76	8.97	74	9.84	73	10.49	72	10.75
	19	79	7.66	78	7.96	77	8.19	76	8.36	76	8.52	74	9.30	73	9.89	72	10.16
	23	79	7.25	78	7.53	77	7.76	76	7.91	76	8.07	74	8.77	73	9.30	72	9.57
	27	79	6.84	78	7.11	77	7.32	76	7.47	76	7.62	74	8.23	73	8.70	72	8.97
	31	79	6.43	78	6.69	77	6.89	76	7.03	76	7.17	74	7.70	73	8.09	72	8.36
	35	79	6.02	78	6.27	77	6.46	76	6.59	76	6.73	74	7.16	73	7.49	72	7.75
39	79	5.64	78	5.87	77	6.05	76	6.17	76	6.30	74	6.64	73	6.90	72	7.15	
43	79	5.25	78	5.47	77	5.64	76	5.75	76	5.87	74	6.12	73	6.31	72	6.54	
47	79	5.00	78	5.21	77	5.37	76	5.42	76	5.47	74	5.76	73	5.97	72	6.18	
51	79	4.76	78	4.96	77	5.11	76	5.09	76	5.08	74	5.39	73	5.64	72	5.82	
55	79	4.51	78	4.70	77	4.84	76	4.76	76	4.68	74	5.03	73	5.30	72	5.46	
59	79	4.25	78	4.40	77	4.59	76	4.57	76	4.55	74	4.82	73	5.02	72	5.16	
60	-13	68	12.65	67	13.67	66	13.72	67	14.57	69	15.26	70	16.23	71	16.57	69	17.09
	-4	78	10.3	67	10.8	66	11.1	65	11.7	66	11.4	64	12.1	63	12.6	61	13.1
	-1	68	9.67	67	10.16	66	10.49	65	10.62	65	10.75	64	11.50	63	12.05	61	12.52
	3	68	8.90	67	9.32	66	9.63	65	9.77	65	9.91	64	10.72	63	11.33	61	11.78
	7	68	8.27	67	8.64	66	8.92	65	9.07	65	9.21	64	10.04	63	10.67	61	11.07
	11	68	7.77	67	8.10	66	8.35	65	8.50	65	8.65	64	9.46	63	10.06	61	10.38
	15	68	7.27	67	7.56	66	7.78	65	7.93	65	8.09	64	8.88	63	9.46	61	9.70
	19	68	6.90	67	7.18	66	7.38	65	7.53	65	7.69	64	8.40	63	8.92	61	9.16
	23	68	6.53	67	6.79	66	6.99	65	7.14	65	7.28	64	7.91	63	8.39	61	8.63
	27	68	6.16	67	6.41	66	6.60	65	6.74	65	6.88	64	7.43	63	7.85	61	8.04
	31	68	5.79	67	6.03	66	6.21	65	6.35	65	6.47	64	6.94	63	7.30	61	7.59
	35	68	5.43	67	5.65	66	5.83	65	5.95	65	6.07	64	6.45	63	6.76	61	6.99
	39	68	5.09	67	5.29	66	5.46	65	5.57	65	5.69	64	6.03	63	6.29	61	6.46
	43	68	4.74	67	4.93	66	5.05	65	5.19	65	5.30	64	5.52	63	5.69	61	5.85
	47	68	4.52	67	4.70	66	4.85	65	4.89	65	4.94	64	5.19	63	5.39	61	5.58
51	68	4.29	67	4.47	66	4.61	65	4.60	65	4.59	64	4.87	63	5.08	61	5.25	
55	68	4.07	67	4.24	66	4.37	65	4.30	65	4.23	64	4.54	63	4.73	61	4.93	
59	68	3.87	67	4.02	66	4.14	65	4.12	65	4.10	64	4.35	63	4.58	61	4.66	

(H,Y)VAHP144B(3,4)1CW

Conne- ratio	Outdoor air temp	Indoor air temp. °FDB															
		59		63		66		68		70		74		77		81	
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
%	°FWB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW
130	-13	138	23.14	138	24.60	140	25.74	140	26.20	142	26.66	142	28.26	142	29.52	142	31.22
	-4	146	20.6	146	21.9	146	22.8	148	23.3	148	23.8	148	25.2	148	26.3	148	27.8
	-1	148	19.76	148	20.94	149	21.88	150	22.34	150	22.80	150	24.14	149	25.20	149	26.60
	3	151	18.62	151	19.72	152	20.58	153	21.04	153	21.50	153	22.76	151	23.76	151	25.06
	7	154	17.50	154	18.52	155	19.32	156	19.80	156	20.28	156	21.42	153	22.32	153	23.52
	11	157	16.36	157	17.34	158	18.10	159	18.62	159	19.14	159	20.12	156	20.86	156	21.98
	15	160	15.24	160	16.16	160	16.86	162	17.42	162	17.92	160	18.80	158	19.40	158	20.42
	19	163	14.96	163	15.88	163	16.60	164	17.16	165	17.72	162	18.46	160	19.00	160	20.00
	23	166	14.66	166	15.60	166	16.34	167	16.90	168	17.46	165	18.12	163	18.60	163	19.58
	27	170	14.26	170	15.20	170	15.96	170	16.50	171	17.06	168	17.64	165	18.08	165	19.06
	31	173	13.76	173	14.70	173	15.46	173	15.98	174	16.52	171	17.06	168	17.42	168	18.40
	35	176	13.24	176	14.18	176	14.94	176	15.46	176	16.00	174	16.46	170	16.78	170	17.76
	39	179	12.56	179	13.48	179	14.22	179	14.74	179	15.24	176	15.66	173	15.94	172	16.90
	43	182	11.88	182	12.78	182	13.50	182	14.00	182	14.48	178	14.86	176	15.10	174	16.02
	47	182	11.36	183	12.20	183	12.86	183	13.34	183	13.82	179	14.24	178	14.52	176	15.38
	51	182	10.86	183	11.62	183	12.22	183	12.70	183	13.18	181	13.62	180	13.94	178	14.76
	55	182	10.34	184	11.04	184	11.58	184	12.04	184	12.52	182	13.00	182	13.36	180	14.12
	59	182	9.70	184	10.36	184	10.88	184	11.34	184	11.80	182	12.26	182	12.62	180	13.78
120	-13	138	23.40	138	24.88	140	26.02	140	26.48	142	26.94	142	28.58	142	29.84	142	31.56
	-4	146	20.8	146	22.1	146	23.1	148	23.6	148	24	148	25.5	148	26.6	148	28.1
	-1	148	19.96	148	21.18	149	22.12	150	22.58	150	23.04	150	24.42	149	25.46	149	26.90
	3	151	18.82	151	19.96	152	20.82	153	21.28	153	21.74	153	23.02	151	24.01	151	25.34
	7	154	17.70	154	18.74	155	19.54	156	20.02	156	20.50	156	21.66	153	22.54	153	23.78
	11	157	16.56	157	17.54	158	18.28	159	18.80	159	19.34	158	20.32	156	21.08	156	22.20
	15	160	15.42	160	16.34	160	17.04	162	17.60	162	18.18	160	19.00	158	19.62	158	20.64
	19	163	15.08	163	16.02	163	16.74	164	17.30	165	17.86	162	18.60	160	19.18	160	20.18
	23	166	14.74	166	15.70	166	16.44	167	17.00	168	17.56	165	18.22	163	18.72	163	19.72
	27	170	14.30	170	15.26	170	16.00	170	16.56	171	17.12	167	17.70	165	18.16	165	19.14
	31	173	13.72	173	14.70	173	15.46	173	16.00	174	16.54	171	17.08	168	17.46	168	18.44
	35	176	13.16	176	14.14	176	14.92	176	15.44	177	15.96	174	16.44	170	16.78	170	17.76
	39	179	12.50	179	13.42	179	14.16	179	14.72	179	15.28	176	15.78	172	16.16	172	17.14
	43	182	11.82	182	12.76	182	13.36	182	13.88	182	14.38	178	14.78	174	15.12	174	16.04
	47	182	11.32	183	12.16	183	12.76	183	13.28	183	13.78	179	14.28	176	14.58	174	15.44
	51	179	10.84	179	11.76	179	12.48	179	13.00	179	13.48	176	13.88	174	14.16	172	15.04
	55	176	10.34	176	11.26	176	11.98	176	12.50	176	13.02	174	13.42	172	13.74	170	14.64
	59	176	9.76	176	10.68	176	11.40	176	11.92	176	12.44	174	12.84	172	13.16	170	14.06
110	-13	138	23.70	138	25.20	140	26.36	140	26.84	142	27.30	142	28.96	142	30.24	142	31.98
	-4	146	21.1	146	22.4	146	23.4	148	23.9	148	24.3	148	25.8	148	26.9	148	28.4
	-1	148	20.24	148	21.46	149	22.42	150	22.88	150	23.34	150	24.72	149	25.82	149	27.26
	3	151	19.08	151	20.20	152	21.10	153	21.56	153	22.02	153	23.32	151	24.34	151	25.68
	7	154	17.92	154	18.98	155	19.80	156	20.28	156	20.78	155	21.94	153	22.86	153	24.20
	11	157	16.78	157	17.76	158	18.54	159	19.06	159	19.60	158	20.60	156	21.36	156	22.52
	15	160	15.62	160	16.54	160	17.26	162	17.84	162	18.42	160	19.26	158	19.88	158	20.92
	19	163	15.24	163	16.18	163	16.90	164	17.48	165	18.06	162	18.82	160	19.38	160	20.40
	23	166	14.86	166	15.82	166	16.56	167	17.12	168	17.68	165	18.38	163	18.88	163	19.88
	27	169	14.12	169	15.06	169	15.80	169	16.36	170	16.92	166	17.60	164	18.08	164	19.06
	31	168	12.98	168	13.90	168	14.62	169	15.20	170	15.78	167	16.46	165	16.98	165	17.94
	35	168	11.86	168	12.74	168	13.44	170	14.04	170	14.64	166	15.34	166	15.88	166	16.82
	39	168	10.80	168	11.64	168	12.30	170	12.88	170	13.44	166	14.10	166	14.60	166	15.50
	43	168	9.74	168	10.52	168	11.16	170	11.70	170	12.24	166	12.86	166	13.32	166	14.14
	47	168	9.30	168	10.00	168	10.58	170	11.06	170	11.56	168	12.10	166	12.50	166	13.28
	51	168	8.86	168	9.50	168	10.00	170	10.44	170	10.88	166	11.34	166	11.70	166	12.38
	55	168	8.42	168	9.06	168	9.42	170	9.80	170	10.20	166	10.58	166	10.88	166	11.50
	59	168	7.88	168	8.42	168	8.86	170	9.24	170	9.62	166	10.00	166	10.28	166	10.40
100	-13	138	24.06	138	25.60	140	26.78	140	27.24	142	27.72	142	29.40	142	30.70	142	32.48
	-4	146	21.4	146	22.7	146	23.8	148	24.2	148	24.7	148	26.2	148	27.3	148	28.9
	-1	148	20.54	148	21.80	149	22.76	150	23.24	150	23.70	150	25.10	149	26.20	149	27.68
	3	151	19.36	151	20.54	152	21.42	153	21.90	153	22.36	153	23.68	151	24.70	151	26.08
	7	154	18.20	154	19.28	155	20.10	156	20.60	156	21.08	155	22.28	153	23.20	153	24.48
	11	157	17.02	157	18.04	158	18.82	159	19.36	159	19.90	158	20.92	156	21.70	156	22.86
	15	160	15.86	160	16.80	160	17.54	162	18.12	162	18.70	160	19.56	158	20.18	158	21.24
	19	161	14.94	161	15.84	161	16.52	162	17.06	162	17.60	160	18.44	159	19.04	159	20.06
	23	162	14.04	162	14.86	162	15.50	162	16.00	162	16.50	160	17.30	160	17.90	158	18.88
	27	162	13.12	162	13.88	162	14.48	162	14.92	162	15.38	160	16.18	160	16.76	158	17.68
	31	163	12.20	163	12.90	162	13.46	162	13.86	162	14.28	160	15.04	160	15.62	158	16.46
	35	164	11.28	164	11.92	162	12.42	162	12.80	162	13.18	160	13.90	160	14.46	158	15.24
	39	165	10.38	164	10.96	163	11.42	162	11.76	162	12.10	160	12.80	160	13.32	158	14.04
	43	166	9.46	164	10.00	163	10.42	162	10.72	162	11.02	160	11.68	160	12.18	158	12.82
	47	166	9.04	164	9.56	164	9.98	162	10.14	162	10.40	160	11.00	160	11.44	158	12.02
	51	166	8.60	164	9.02	164	9.34	162	9.58	162	9.80	160	10.30	160	10.68	158	11.22
	55	166	8.18	164	8.54	164	8.80	162	9.00	162	9.18	160	9.62	160	9.94	158	10.42
	59	166	7.66	164	8.00	164	8.28	162	8.46	162	8.66	160	9.08	160	9.40	158	9.42

SELECTION DATA

(H,Y)VAHP168B(3,4)1CW

Conne- ratio	Outdoor air temp	Indoor air temp. °FDB																								
		59			63			66			68			70			74			77			81			
		TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	
%	°FWB	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH
110	-13	138	23.47	139	25.16	140	26.46	143	27.34	146	28.21	147	29.98	148	31.35	148	33.09									
	-4	155	21.8	155	23.2	155	24.3	158	25.1	160	25.8	160	27.6	159	29	159	30.6									
	-1	160	21.18	160	22.54	161	23.60	163	24.31	164	25.01	164	26.82	163	28.24	162	29.75									
	3	167	20.42	167	21.66	168	22.64	169	23.30	170	23.94	169	25.77	168	27.20	167	28.63									
	7	175	19.71	175	20.86	175	21.75	175	22.38	176	23.01	175	24.78	174	26.17	173	27.47									
	11	182	19.07	182	20.12	182	20.95	182	21.56	183	22.19	180	23.85	178	25.10	176	26.25									
	15	190	18.41	189	19.38	188	20.14	189	20.75	189	21.37	188	22.92	183	24.06	181	25.03									
	19	194	18.08	193	19.08	192	19.86	192	20.49	193	21.13	189	22.56	186	23.61	184	24.61									
	23	197	17.76	196	18.79	196	19.59	195	20.22	196	20.87	192	22.19	189	23.26	187	24.20									
	27	199	17.00	198	18.02	198	18.82	197	19.46	198	20.12	194	21.32	191	22.20	189	23.24									
	31	199	15.78	198	16.77	198	17.56	198	18.21	198	18.86	195	19.92	192	20.72	190	21.75									
	35	199	14.57	198	15.53	198	16.30	198	16.95	198	17.61	195	18.54	192	19.36	190	20.66									
	39	199	13.44	198	14.36	198	15.10	198	15.73	198	16.36	195	17.12	192	17.70	190	18.65									
	43	199	12.31	198	13.18	198	13.89	198	14.49	198	15.10	195	15.70	192	16.15	190	17.08									
	47	199	11.74	198	12.55	198	13.21	198	13.67	198	14.15	195	14.77	192	15.23	190	16.09									
	51	199	11.18	198	11.93	198	12.52	198	12.87	198	13.21	195	13.85	192	14.33	190	15.09									
	55	199	10.61	198	11.30	198	11.84	198	12.05	198	12.26	195	12.92	192	13.41	190	14.10									
	59	199	10.02	198	10.67	198	11.19	198	11.48	198	11.77	195	12.30	192	12.69	190	13.09									
100	-13	136	23.48	139	25.55	140	26.87	143	27.75	146	28.64	147	30.44	148	31.88	148	33.60									
	-4	155	22.1	155	23.6	155	24.7	158	25.5	160	26.2	160	28	159	29.5	159	31									
	-1	160	21.51	160	22.89	161	23.95	163	24.68	164	25.39	164	27.24	163	28.66	162	30.20									
	3	167	20.73	167	22.01	168	22.98	169	23.66	170	24.31	169	26.18	168	27.61	167	29.07									
	7	175	20.01	175	21.18	175	22.08	175	22.73	176	23.35	175	25.17	173	26.56	171	27.99									
	11	182	19.35	182	20.43	182	21.27	182	21.90	183	22.53	180	24.22	178	25.66	176	27.06									
	15	189	18.69	189	19.68	188	20.46	189	21.07	189	21.69	188	23.27	183	24.43	181	25.62									
	19	191	17.72	190	18.66	189	19.38	189	19.95	189	20.52	185	21.98	183	23.06	181	24.01									
	23	192	16.76	191	17.62	190	18.30	189	18.83	189	19.36	186	20.68	184	21.68	181	22.61									
	27	192	15.79	191	16.59	190	17.23	189	17.70	189	18.18	186	19.39	184	20.30	181	21.28									
	31	193	14.82	192	15.56	190	16.15	190	16.58	189	17.02	186	18.09	184	19.82	181	19.73									
	35	194	13.85	193	14.53	190	15.06	190	15.46	189	15.85	186	16.79	184	17.52	181	18.28									
	39	195	12.91	193	13.53	191	14.02	190	14.37	189	14.72	186	15.53	184	16.15	181	16.85									
	43	196	11.95	193	12.53	192	12.97	190	13.28	189	13.59	186	14.26	184	14.77	181	15.41									
	47	196	11.40	193	11.94	192	12.33	190	12.53	189	12.74	186	13.42	184	13.94	181	14.52									
	51	196	10.85	193	11.33	192	11.70	190	11.80	189	11.89	186	12.58	184	13.09	181	13.62									
	55	196	10.30	193	10.74	192	11.06	190	11.05	189	11.04	186	11.74	184	12.26	181	12.73									
	59	196	9.73	193	10.14	192	10.46	190	10.52	189	10.59	186	11.28	184	11.81	181	11.81									
90	-13	136	24.25	139	26.33	140	27.65	143	28.54	146	29.43	147	31.23	148	32.66	148	34.16									
	-4	155	22.5	155	24	155	25.1	157	25.8	159	26.4	158	28.2	157	29.6	156	31									
	-1	160	21.79	160	23.16	159	24.21	161	24.84	162	25.43	161	27.23	160	28.61	158	30.01									
	3	166	20.89	166	22.08	166	23.00	166	23.56	167	24.11	165	25.95	164	27.33	161	28.57									
	7	170	19.83	170	20.86	169	21.65	169	22.16	169	22.66	167	24.44	166	25.78	163	26.85									
	11	173	18.62	172	19.51	170	20.19	170	20.64	170	21.08	167	22.72	166	23.95	163	24.87									
	15	176	17.42	174	18.16	172	18.71	171	19.12	170	19.51	167	21.00	166	22.13	163	22.88									
	19	176	16.44	174	17.15	172	17.69	171	18.08	170	18.45	167	19.83	166	20.87	163	21.61									
	23	176	15.46	174	16.15	172	16.66	171	17.04	170	17.39	167	18.65	166	19.60	163	20.33									
	27	176	14.49	174	15.15	172	15.64	171	16.00	170	16.33	167	17.47	166	18.34	163	19.04									
	31	176	13.53	174	14.15	172	14.62	171	14.96	170	15.29	167	16.29	166	17.06	163	17.74									
	35	176	12.57	174	13.16	172	13.61	171	13.93	170	14.24	167	15.11	166	15.78	163	16.43									
	39	176	11.66	174	12.21	172	12.64	171	12.94	170	13.23	167	13.97	166	14.51	163	15.65									
	43	176	10.74	174	11.26	172	11.65	171	11.94	170	12.21	167	12.82	166	13.27	163	13.85									
	47	176	10.25	174	10.72	172	11.08	171	11.27	170	11.45	167	12.06	166	12.53	163	13.04									
	51	176	9.74	174	10.18	172	10.52	171	10.60	170	10.68	167	11.30	166	11.77	163	12.24									
	55	176	9.25	174	9.64	172	9.95	171	9.93	170	9.92	167	10.54	166	11.03	163	11.63									
	59	176	8.75	174	9.12	172	9.40	171	9.45	170	9.52	167	10.04	166	10.44	163	10.61									

(H,Y)VAHP192B(3,4)1CW

Conne- ratio	Outdoor air temp	Indoor air temp. °FDB															
		59				63				66				68			
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
%	°FWB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW
110	-13	136	23.24	140	25.12	140	26.56	146	27.84	150	29.12	152	31.00	154	32.46	154	34.20
	-4	164	22.4	164	24	164	25.2	168	26.3	172	27.3	172	29.4	170	31.1	170	32.7
	-1	173	22.12	173	23.62	173	24.78	175	25.74	179	26.68	178	28.92	176	30.66	175	32.24
	3	184	21.76	184	23.12	184	24.18	185	25.04	188	25.86	186	28.22	184	30.06	182	31.58
	7	196	21.50	196	22.74	195	23.70	195	24.48	197	25.24	197	27.62	192	29.46	190	30.84
	11	208	21.36	207	22.48	206	23.36	206	24.06	206	24.78	202	27.10	200	28.84	197	29.98
	15	220	21.20	218	22.22	216	23.02	216	23.66	216	24.32	210	26.58	208	28.24	204	29.14
	19	224	20.92	222	21.98	221	22.82	220	23.50	220	24.20	215	26.30	212	27.84	208	28.82
	23	228	20.66	226	21.76	226	22.62	224	23.32	224	24.06	220	26.00	216	27.44	212	28.52
	27	230	19.88	228	20.98	228	21.84	226	22.56	226	23.32	222	25.04	218	26.32	214	27.42
	31	230	18.58	228	19.64	228	20.50	226	21.22	226	21.94	222	23.38	218	24.46	214	25.56
	35	230	17.28	228	18.32	228	19.16	226	19.86	226	20.58	222	21.74	218	22.60	214	23.70
	39	230	16.08	228	17.08	228	17.90	226	18.58	226	19.28	222	20.14	218	20.80	214	21.86
	43	230	14.88	228	15.84	228	16.62	226	17.28	226	17.96	222	18.54	218	18.98	214	20.00
	47	230	14.18	228	15.10	228	15.84	226	16.28	226	16.74	222	17.44	218	17.96	214	18.90
	51	230	13.50	228	14.36	228	15.04	226	15.30	226	15.54	222	16.36	218	16.96	214	17.80
	55	230	12.80	228	13.62	228	14.26	226	14.30	226	14.32	222	15.26	218	15.94	214	16.70
	59	230	12.16	228	12.92	228	13.52	226	13.72	226	13.92	222	14.60	218	15.10	214	15.76
100	-13	136	23.80	140	25.50	140	26.96	146	28.26	150	29.56	152	31.48	154	32.96	154	34.72
	-4	164	22.8	164	24.4	164	25.6	168	26.7	172	27.7	172	29.9	170	31.6	170	33.2
	-1	173	22.48	173	23.98	173	25.14	175	26.12	179	27.08	178	29.38	176	31.12	175	32.72
	3	184	22.10	184	23.48	184	24.54	185	25.42	188	26.26	186	28.68	184	30.52	182	32.06
	7	196	21.82	196	23.08	195	24.06	195	24.86	197	25.62	194	28.06	192	29.92	190	31.32
	11	208	21.68	207	22.82	206	23.72	206	24.44	206	25.16	202	27.52	200	29.30	197	30.46
	15	220	21.52	218	22.56	216	23.38	216	24.02	216	24.68	210	26.98	208	28.68	204	29.60
	19	221	20.50	219	21.48	217	22.24	216	22.84	216	23.44	211	25.52	208	27.08	204	27.96
	23	222	19.48	220	20.38	218	21.10	216	21.66	216	22.22	212	24.06	208	25.46	204	26.34
	27	222	18.48	220	19.30	218	19.98	216	20.48	216	20.98	212	22.60	208	23.84	204	24.68
	31	223	17.44	221	18.22	218	18.84	217	19.30	216	19.76	212	21.14	208	22.22	204	23.00
	35	224	16.42	222	17.14	219	17.70	218	18.12	216	18.52	212	19.68	208	20.58	204	21.32
	39	225	15.44	222	16.10	219	16.62	218	16.98	216	17.34	212	18.26	208	19.38	204	19.66
	43	226	14.44	222	15.06	220	15.52	218	15.84	216	16.16	212	16.84	208	17.36	204	18.00
	47	228	13.76	224	14.36	220	14.78	218	14.92	216	15.08	212	15.84	208	16.44	204	17.02
	51	228	13.10	222	13.64	220	14.06	218	14.02	216	13.98	212	14.86	208	15.50	204	16.02
	55	228	12.42	222	12.94	220	13.32	218	13.10	216	12.90	212	13.86	208	14.58	204	15.04
	59	228	11.80	222	12.28	220	12.64	218	12.58	216	12.52	212	13.26	208	13.82	204	14.20
90	-13	136	24.02	140	25.94	140	27.44	146	28.76	150	30.08	152	32.02	154	33.54	154	35.32
	-4	164	23.1	164	24.8	164	26.1	168	27.1	172	28.2	172	30.4	170	32.1	170	33.8
	-1	173	22.86	173	24.40	173	25.60	175	26.58	179	27.58	178	29.88	176	31.66	175	33.16
	3	184	22.48	184	23.88	184	24.98	185	25.84	188	26.74	186	29.18	184	31.00	181	32.30
	7	192	21.84	192	23.06	192	24.00	191	24.74	192	25.50	190	27.92	188	29.74	184	30.80
	11	198	20.94	196	21.94	195	22.70	194	23.28	193	23.84	190	26.14	188	27.86	184	28.70
	15	204	20.06	200	20.82	198	21.38	196	21.80	194	22.20	190	24.36	188	25.98	184	26.60
	19	204	19.02	200	19.74	198	20.30	196	20.70	194	21.08	190	23.04	188	24.50	184	25.14
	23	204	17.96	200	18.68	198	19.20	196	19.60	194	19.96	190	21.70	188	23.02	184	23.68
	27	204	16.94	200	17.62	198	18.12	196	18.50	194	18.84	190	20.38	188	21.54	184	22.18
	31	204	15.92	200	16.58	198	17.06	196	17.40	194	17.74	190	19.04	188	20.04	184	20.68
	35	204	14.90	200	15.52	198	16.00	196	16.32	194	16.64	190	17.72	188	18.54	184	19.16
	39	204	13.94	200	14.52	198	14.98	196	15.28	194	15.58	190	16.44	188	17.08	184	17.68
	43	204	12.98	200	13.52	198	13.94	196	14.24	194	14.52	190	15.14	188	15.60	184	16.18
	47	204	12.38	200	12.88	198	13.28	196	13.42	194	13.54	190	14.24	188	14.78	184	15.28
	51	204	11.76	200	12.26	198	12.64	196	12.60	194	12.56	190	13.34	188	13.94	184	14.40
	55	204	11.16	200	11.62	198	11.98	196	11.78	194	11.58	190	12.44	188	13.12	184	13.50
	59	204	10.62	200	11.04	198	11.36	196	11.30	194	11.26	190	11.92	188	12.42	184	12.76

TC: Total Capacity

IP: Input Power

NOTES:

- The table shows the normal value of a heating operation.
In some cases, the value may change due to the compressor protection control.
- The heating capacity on the table indicates the peak value, which does not include the capacity decrease caused by frost.
- The value on the table shows when the system is operated under the following conditions.
The total piping length: 24.6ft (7.5m), The height difference: 0ft (0m)
- In an instance of a heat recovery system, the value on the table indicates when all the indoor units are operated in heating mode.

SELECTION DATA

(H,Y)VAHP288B(3,4)1CW

Conne- ratio	Outdoor air temp	Indoor air temp. °FDB												Conne- ratio	Outdoor air temp	Indoor air temp. °FDB																		
		59			63			66			68					70			74			77			81									
		TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH			TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	TC	IP	MBH	
%	°FWB	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	MBH	KW	
110	-13	207	34.86	210	37.68	210	39.84	219	41.76	225	43.68	228	46.50	231	48.69	231	51.30	-13	207	36.72	210	39.66	210	41.97	219	43.98	225	45.99	228	48.99	231	51.27	231	54.03
	-4	246	33.6	246	36	246	37.8	252	39.4	258	40.9	258	44.2	255	46.7	255	49.1	-4	246	35.4	246	37.9	246	39.8	252	41.5	258	43.1	255	46	249	47.9	246	49.6
	-1	259	33.18	259	35.43	259	37.17	263	38.61	268	40.02	267	43.38	264	45.99	263	48.36	-1	255	34.38	253	36.51	252	38.16	259	39.39	258	40.62	255	43.59	249	45.63	246	47.31
	3	276	32.64	276	34.68	276	36.27	278	37.56	281	38.79	279	42.33	276	45.09	274	47.37	3	267	33.00	267	34.65	260	35.91	259	36.60	258	37.32	255	40.38	249	42.66	246	44.28
	7	294	32.25	293	34.11	293	35.59	293	36.72	295	37.86	291	41.43	288	44.19	284	46.26	7	273	31.26	267	32.58	264	33.57	261	34.05	258	34.53	255	37.59	249	39.93	246	41.37
	11	312	32.04	310	33.72	308	35.04	308	36.09	310	37.17	303	40.65	300	43.26	295	44.97	11	273	29.13	267	30.30	264	31.20	261	31.71	258	32.22	255	35.22	249	37.47	246	38.81
	15	330	31.80	327	33.33	324	34.53	324	35.49	324	36.48	319	39.87	312	42.36	306	43.71	15	273	27.00	267	28.02	264	28.80	261	29.37	258	29.91	255	32.82	249	35.01	246	36.85
	19	336	31.38	333	32.97	331	34.23	330	35.25	330	36.30	322	39.45	318	41.76	312	43.23	19	273	25.59	267	26.58	264	27.33	261	27.87	258	28.41	255	31.02	249	33.03	246	33.87
	23	342	30.99	339	32.64	338	33.93	336	34.98	336	36.09	329	39.00	324	41.16	318	42.78	23	273	24.18	267	25.17	264	25.86	261	26.40	258	26.91	255	29.25	249	31.02	246	31.92
	27	345	29.82	342	31.47	342	32.76	339	33.84	339	34.98	333	37.56	327	39.48	321	41.13	27	273	22.80	267	23.73	264	24.42	261	24.93	258	25.41	255	27.45	249	29.01	246	29.91
	31	345	27.87	342	29.46	342	30.75	339	31.83	339	32.91	333	35.07	327	36.69	321	38.34	31	273	21.45	267	22.32	264	22.98	261	23.46	258	23.94	255	25.68	249	27.00	246	27.87
	35	345	25.92	342	27.48	342	28.74	339	29.79	339	30.87	333	32.61	327	33.90	321	35.55	35	273	20.07	267	20.91	264	21.54	261	21.99	258	22.44	255	23.88	249	24.99	246	25.83
	39	345	24.12	342	25.62	342	26.85	339	27.87	339	28.92	333	30.21	327	31.20	321	32.79	39	273	18.78	267	19.59	264	20.19	261	20.61	258	21.03	255	22.14	249	23.01	246	23.82
	43	345	22.32	342	23.76	342	24.93	339	25.92	339	26.94	333	27.81	327	28.47	321	30.00	43	273	17.49	267	18.24	264	18.81	261	19.20	258	19.59	255	20.40	249	21.03	246	21.81
	47	345	21.27	342	22.65	342	23.76	339	24.42	339	25.11	333	26.16	327	26.94	321	28.35	47	273	16.68	267	17.37	264	17.91	261	18.09	258	18.27	255	19.20	249	19.92	246	20.61
	51	345	20.25	342	21.54	342	22.56	339	22.95	339	23.31	333	24.54	327	25.44	321	26.70	51	273	15.87	267	16.53	264	17.04	261	16.98	258	16.95	255	17.97	249	18.78	246	19.41
	55	345	19.20	342	20.43	342	21.39	339	21.45	339	21.48	333	22.89	327	23.91	321	25.05	55	273	15.06	267	15.66	264	16.14	261	15.87	258	15.83	255	16.77	249	17.67	246	18.21
	59	345	18.24	342	19.38	342	20.28	339	20.58	339	20.93	333	21.90	327	22.65	321	23.67	59	273	14.31	267	14.88	264	15.30	261	15.24	258	15.18	255	16.05	249	16.74	246	17.19
100	-13	207	35.40	210	38.28	210	40.44	219	42.39	225	44.34	228	47.22	231	49.44	231	52.05	-13	207	37.50	210	40.53	210	42.84	219	44.91	225	46.98	228	48.57	231	49.59	231	52.17
	-4	246	34.1	246	36.5	246	38.4	252	40	258	41.6	259	44.9	255	47.4	255	49.8	-4	237	34.9	234	36.6	231	37.8	228	38.2	228	38.6	222	40.8	219	42.5	216	44.1
	-1	259	33.72	259	35.97	259	37.71	263	39.18	268	40.62	267	44.07	264	46.68	263	49.08	-1	237	32.85	234	34.41	231	35.55	228	35.97	228	36.33	222	38.76	219	40.62	216	42.15
	3	276	33.15	276	35.22	276	36.81	278	38.13	281	39.39	279	43.02	276	45.78	274	48.09	3	237	30.12	234	31.50	231	32.52	228	32.94	228	33.36	222	36.03	219	38.07	216	39.54
	7	294	32.73	293	34.62	293	36.09	293	37.29	295	38.43	291	42.09	288	44.88	284	46.98	7	237	27.84	234	29.07	231	29.97	228	30.42	228	30.87	222	33.63	219	35.73	216	37.02
	11	312	32.52	310	34.23	308	35.58	308	36.66	310	37.74	303	41.28	300	43.95	295	45.69	11	237	26.04	234	27.12	231	27.93	228	28.41	228	28.89	222	31.56	219	33.60	216	34.65
	15	330	32.26	327	33.84	324	35.03	324	36.03	324	37.02	315	40.47	312	43.02	306	44.40	15	237	24.24	234	25.32	231	25.89	228	26.40	228	26.91	222	29.52	219	31.47	216	32.25
	19	331	30.75	328	32.22	325	33.36	324	34.26	324	35.16	316	38.28	312	40.62	306	41.94	19	237	22.98	234	23.88	231	24.57	228	25.08	228	25.56	222	27.90	219	29.67	216	30.48
	23	332	29.22	329	30.57	326	31.65	324	32.49	324	33.33	317	36.09	312	38.19	306	39.51	23	237	21.75	234	22.59	231	23.28	228	23.73	228	24.21	222	26.31	219	27.90	216	28.71
	27	334	27.69	331	28.95	327	29.97	325	30.72	324	31.47	318	33.90	312	35.76	306	37.02	27	237	20.52	234	21.33	231	21.96	228	22.41	228	22.86	222	24.69	219	26.10	216	26.91
	31	335	26.16	332	27.33	327	28.26	326	28.95	324	29.64	318	31.71	312	33.33	306	34.50	31	237	19.29	234	20.07	231	20.67	228	21.09	228	21.51	222	23.10	219	24.27	216	25.08
	35	335	24.63	333	25.71	327	26.55	327	27.18	324	27.78	318	29.52	312	30.87	306	31.98	35	237	18.06	234	18.81	231	19.38	228	19.77	228	20.29	222	21.48	219	22.47	216	23.25
	39	338	23.16	333	24.15	329	24.93	327	25.47	324	26.01	318	27.39	312	28.47	306	29.49	39	237	16.92	234	17.61	231	18.15	228	18.51	228	18.90	222	19.92	219	20.70	216	21.45
	43	339	21.66	333	22.59	330	23.28	327	23.76	324	24.24	318	25.26	312	26.04	306	27.00	43	237	15.75	234	16.41	231	16.92	228	17.25	228	17.61	222	18.36	219	19.83	216	19.62
	47	339	20.64	333	21.54	330	22.17	327	22.38	324	22.62	318	23.76	312	24.66	306	25.53	47	237	15.00	234	15.63	231	16.11	228	16.26	228	16.41	222	17.28	219	17.91	216	18.54
	51	339	19.65	333	20.46	330	21.09	327	21.03	324	20.97	318	22.29	312	23.25	306	24.03	51	237	14.28	234	14.88	231	15.33	228	15.27	228	15.24	222	16.17	219	16.92	216	17.46
	55	339	18.33	333	19.41	330	19.98	327	19.85	324	19.35	318	20.79	312	21.87	306	22.56	55	237	13.53	234	14.10	231	14.52	228	14.28	228	14.04	222	15.09	219	15.66	216	16.38
	59	339	17.70	333	18.40	330	19.86	327	18.87	324	18.78	318	19.83	312	21.20	306	21.56	59	237	12.67	234	13.38	231	13.77	228	13.71	228	13.65	222	14.46	219	15.00	216	15.48
90	-13	207	36.03	210	38.91	210	41.17	219	43.43	225	45.69	228	48.03	231	50.39	231	52.98	-13	207	38.15	210	41.04	210	43.39	219	45.65	225	4						

4.3 Correction Factor According to Piping Length

< Cooling Capacity >

Correction Factor for Cooling Capacity According to Piping Length

The cooling capacity should be corrected according to the following formula:

$$CCA = CC \times F$$

CCA: Actual Corrected Cooling Capacity

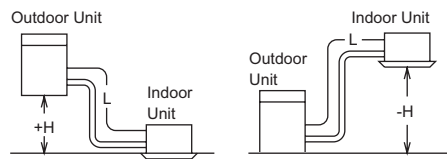
CC: Cooling Capacity in the Performance Table

F: Correction Factor Based on the Equivalent Piping Length

The correction factors are shown in the figure.

Equivalent Piping Length for

- One 90° Elbow is 1.6ft (0.5m).
- One 180° Bend is 4.9ft (1.5m).
- One Multi-Kit is 1.6ft (0.5m).



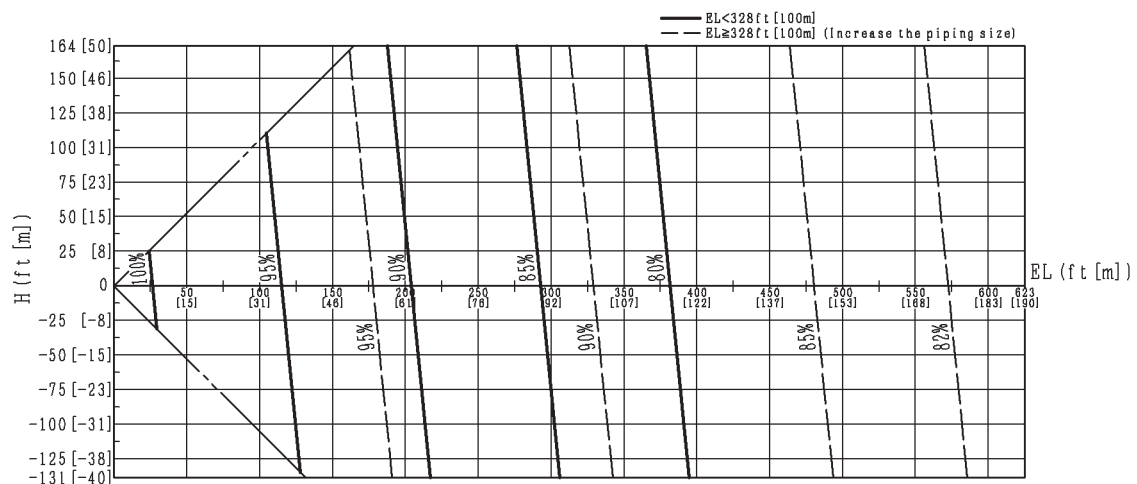
H: Vertical Distance Between Indoor Unit and Outdoor Unit

EL: Equivalent Total Distance Between Indoor Unit and Outdoor Unit (Equivalent One-Way Piping Length)

H>0: Position of Outdoor Unit Higher Than Position of Indoor Unit

L: Actual One-Way Piping Length Between Indoor Unit and Outdoor Unit

*Liquid piping size for EL < 328ft [100m] and EL ≥ 328ft [100m] are different.
Refer to Installation Manual or Engineering Manual for details.



< Heating Capacity >

Correction Factor for Heating Capacity According to Piping Length

The heating capacity should be corrected according to the following formula:

$$HCA = HC \times F$$

HCA: Actual Corrected Heating Capacity

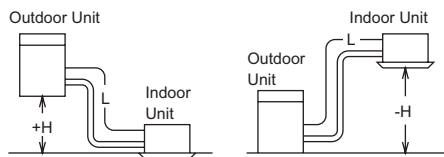
HC: Heating Capacity in the Performance Table

F: Correction Factor Based on the Equivalent Piping Length

The correction factors are shown in the figure.

Equivalent Piping Length for

- One 90° Elbow is 1.6ft (0.5m).
- One 180° Bend is 4.9ft (1.5m).
- One Multi-Kit is 1.6ft (0.5m).



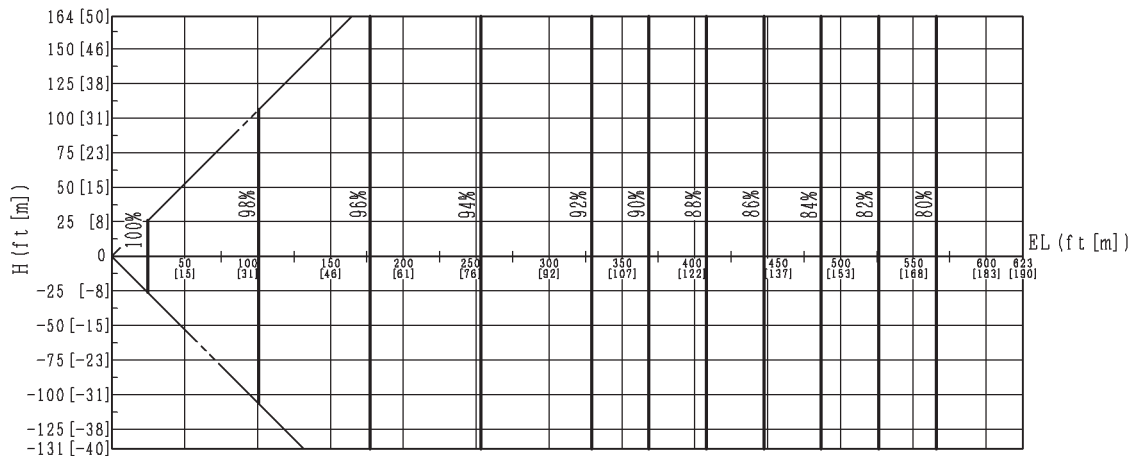
H: Vertical Distance Between Indoor Unit and Outdoor Unit

EL: Equivalent Total Distance Between Indoor Unit and Outdoor Unit in Meters (Equivalent One-Way Piping Length)

H>0: Position of Outdoor Unit Higher Than Position of Indoor Unit

L: Actual One-Way Piping Length Between Indoor Unit and Outdoor Unit in Meters

*Liquid piping size for EL < 328ft [100m] and EL ≥ 328ft [100m] are different.
Refer to Installation Manual or Engineering Manual for details.



4.4 Correction Factor According to Defrosting Operation

The heating capacity in the preceding paragraph does not include defrost operation periods. Therefore, capacity should be corrected as follows:

Corrected Heating Capacity = Correction Factor x Heating Capacity

Outdoor Air Temp. °F DB (°C DB) (Humidity=85% RH)	19 (-7.2)	23 (-5.0)	27 (-2.8)	31 (-0.6)	35 (1.7)	39 (3.9)	41 (5.0)	43 (6.1)	45 (7.2)	47 (8.3)
Correction Factor	0.95	0.93	0.89	0.87	0.88	0.90	0.92	0.96	1.0	1.0

NOTE:

The correction factor is not available for special conditions like snowfall or operation in a transitional period.

4.5 Correction Factor According to Altitude

The capacity is affected by the altitude.

Corrected Capacity = Correction Factor x Capacity

Altitude	ft (m)	0 (0)	1000 (305)	2000 (610)	3000 (914)	4000 (1219)	5000 (1524)	6000 (1829)	7000 (2133)	8000 (2438)	9000 (2743)	10000 (3048)
Correction Factor		1.00	0.97	0.93	0.90	0.87	0.83	0.80	0.77	0.75	0.72	0.69

