Freyven

Rooftop Package Type

Instruction Manual

SA-WK03ENG-3

MANUAL FOR MODELS

MODEL	DESCRIPTION
50FYQ036-2A	ROOFTOP FREYVEN INVERTER HEAT PUMP 3T 230-1 R410A
50FYQ060-2A	ROOFTOP FREYVEN INVERTER HEAT PUMP 5T 230-1 R410A

Contents

■ Model Number Nomenclature

50FY	Q	036	-	3	A
FREYVEN ROOFTOP	HEAT PUMP	BTU/H		230-3	VERSION
	C	060		2	
	ONLY COOLING	BTU/H		230-1	
				1	
				115-1	

1. ACCESSORIES

Tab.1-1

Name of accessories	Qty	Shape
Manual	1	
Drain pipe	1	
Snap ring	1	
Drain joint	1	

2. GENERAL INFORMATION

Warnings and Cautions appear at appropriate locations throughout this manual.

Read these carefully.

⚠ WARNING:Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION:Indicates a potentially hazardous situation which,if not avoided,may result in minor or moderate injury.It may also be used to alert against unsafe practices and where property-damage-only accidents could occur.

⚠ Notice

- Read this entire manual before beginning installation procedures.
- Bodily injury can result from high voltage electrical components, fast moving fans. For protection from these inherent hazards during installation and servicing, the electrical supply must be disconnected.
- If operating checks must be performed with the unit operating, it is the technicians responsibility to recognize these hazards and proceed safely.

⚠ Warning

- Ask your dealer for installation of the air conditioner. Incomplete installation performed by yourself may result in a water leakage, electric shock, and fire.
- Ask your dealer for improvement, repair, and maintenance.
- Incomplete improvement, repair, and maintenance may result in a water leakage, electric shock, and fire.
- In order to avoid electric shock, fire or injury, or if you detect any abnormality such as smell of fire, turn off the power supply and call your dealer for instructions.
- Never replace a fuse with that of wrong rated current or other wires when a fuse blows out. Use of wire or copper wire may cause the unit to break down or cause a fire.
- Do not insert fingers, rods or other objects into the air inlet or outlet.
- When the fan is rotating at high speed, it will cause injury.
- Never use a flammable spray such as hair spray, lacquer or paint near the unit. It may cause a fire.
- Never inspect or service the unit by yourself. Ask a qualified service person to perform this work.
- Keep far away from high-frequency equipment.
- Keep away from the following places: A place where it is full of oil, gas; places where salty air surrounding(near the coast); and a place where is caustic gas(the sulfide in hotspring). Location in above places may cause malfunction or shorten the life span of the manchine.

⚠ Warning

- In the cace of extremely strong wind, please prevent the air from flowing backwards into the outdoor unit.
- Snow canopy is necessary in sonwfall places on the outdoor unit. Please consult the local dealer for details.
- In the frequent thunderstruck place, lightning proof actions should be taken.
- To prevent refrigerant leak, contact your dealer. When the system is installed and runs in a small room, it is required to keep the concentration of the refrigerant, if by any chance coming out, below the limit. Otherwise, oxygen in the room may be affected, resulting in a serious accident.
- The refrigerant in the air conditioner is safe and normally does not leak. If the refrigerant leaks in the room, contact with a fire of a burner, a heater or a cooker may result in a harmful gas.
- Turn off any combustible heating devices, ventilate the room, and contact the dealer where you purchased the unit. Do not use the air conditioner until a service person confirms that the portion where the refrigerant leaks is repaired.
- If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.
- The temperature of refrigerant circuit will be high, please keep the interconnection cable away from the copper tube.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.Children should be supervised to ensure that they do not play with the appliance.
- That the appliance shall be installed in accordance with national wiring regulations.
- The inverter rooftop units will blow cold wind during heating for a short time since the machine is in the defrosting mode. And the normal heating mode will restore after the defrosting is completed.

3. DIMENSIONAL DATA

- ●3Tons C/O Units(Hor.)
- ●3Tons H/P Units(Hor.)

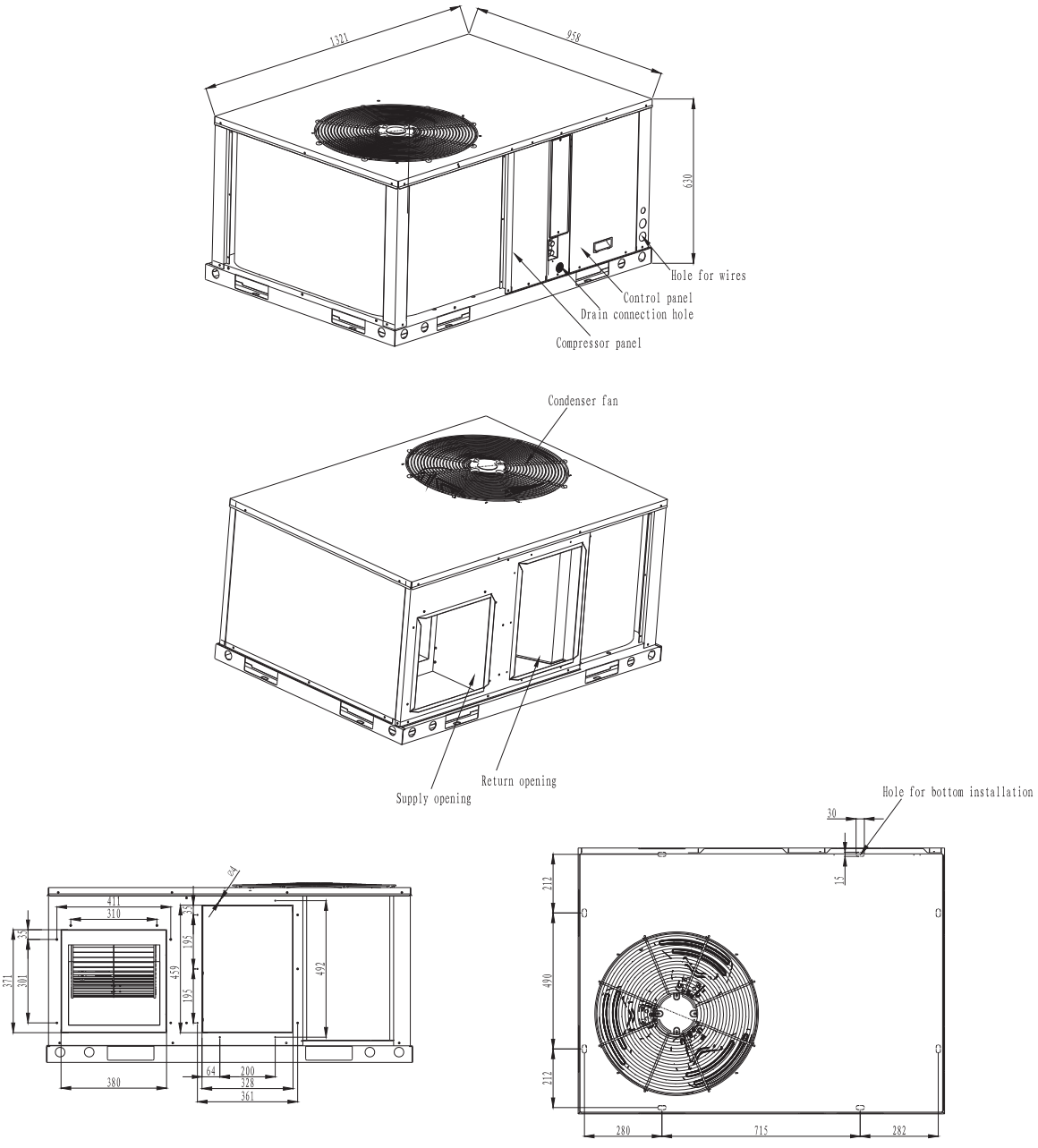


Fig.3-1

●4\5Tons C/O Units(Hor.)

●4\5Tons H/P Units(Hor.)

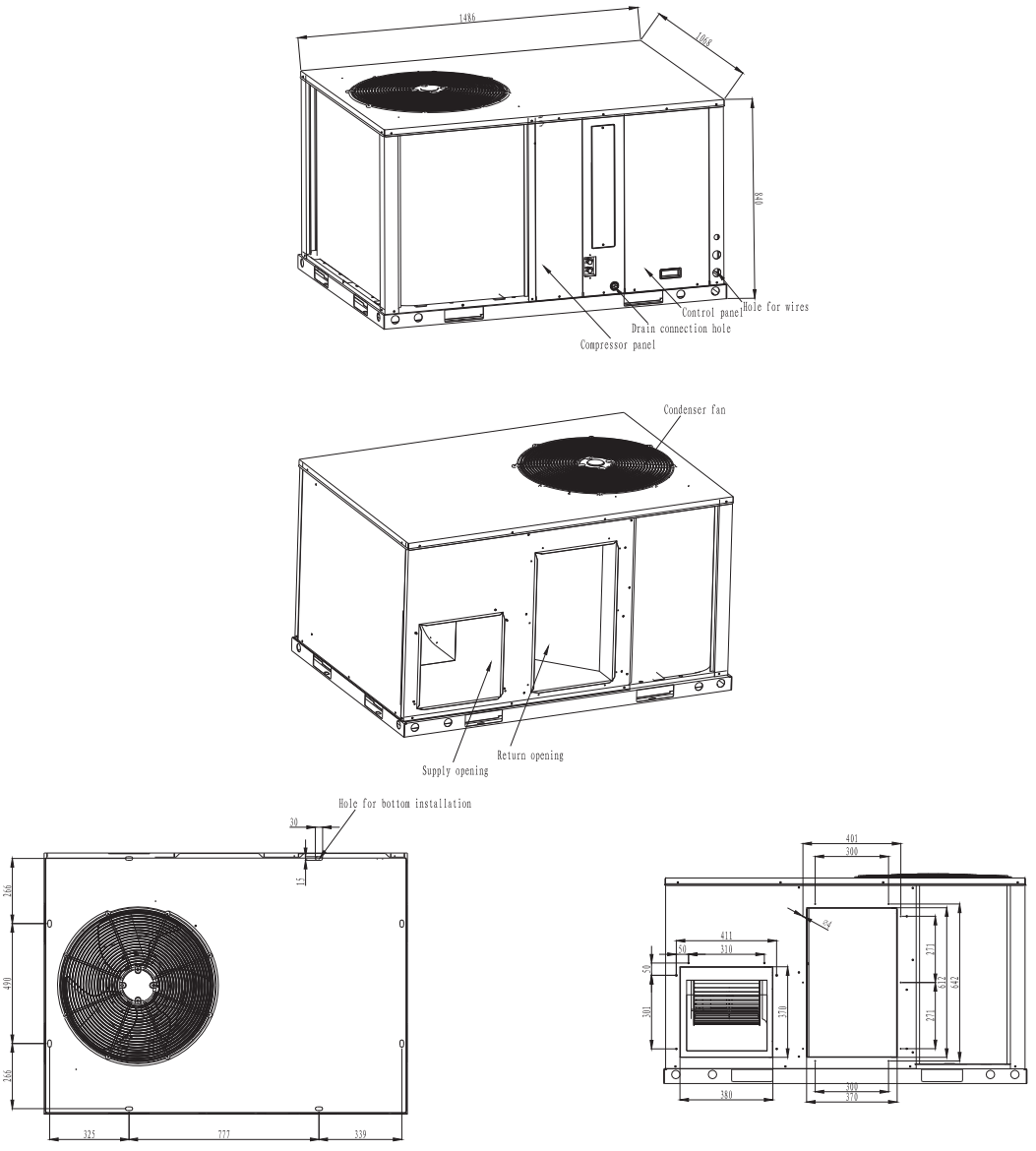


Fig.3-2

4. LOCATIONS AND RECOMMENDATIONS

4.1 Horizotal airflow application

- These units are design certified for outdoor installations. These units may be installed directly on wood flooring or on Class A, Class B, or Class C roof covering material.
- Location of the unit must allow service clearance around it. Clearance of the unit must be given careful consideration.
- Check the handling facilities to ensure the safety of personnel and the unit(s).
- Caution must be taken at all times to avoid Personal injuries and/or damage to equipment.
- The unit must be mounted level for proper drainage of water through the holes in the base pan.
- The unit must not be exposed to direct roof water runoff.
- Flexible duct connectors must be of a flame retardant material. All duct work outside of the structure must be insulated and weatherproofed in accordance with local codes.
- Holes through exterior walls must be sealed in accordance with local codes.
- All fabricated outdoor ducts should be as short as possible.

4.2 Clearances

- The recommended clearances for single-unit installations are illustrated in Fig.4-1
- These minimum requirements are not only an important consideration when determining unit placement, but they are also essential to ensure adequate serviceability, maximum capacity, and peak operating efficiency.
- Any reduction of the unit clearances indicated in these illustrations may result in condenser coil starvation or the recirculation of warm condenser air. Actual clearances which appear to be inadequate should be reviewed with a local engineer.
- See the unit's nameplate for the absolute minimum clearance between the unit and any combustible surface(s).

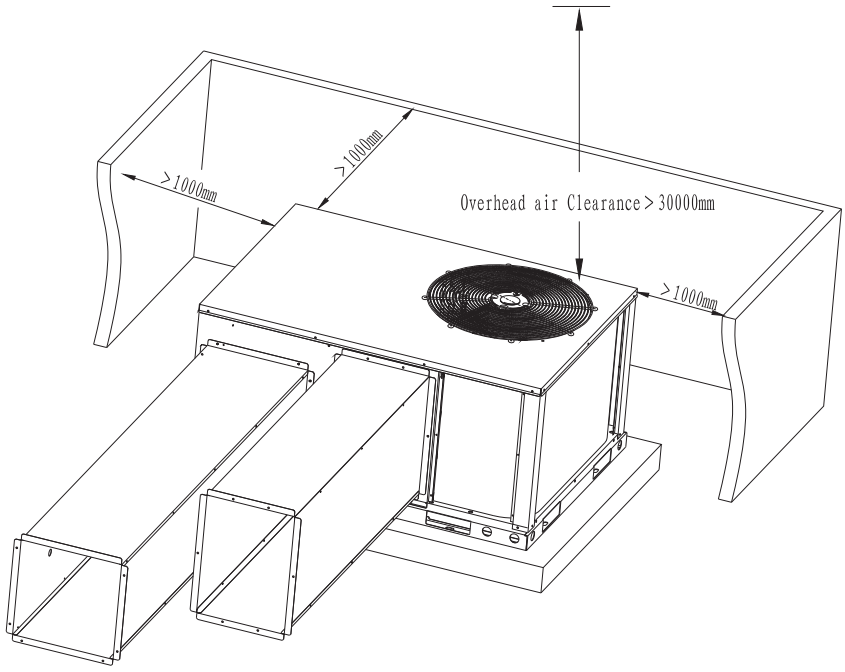


Fig.4-1

5. INSTALLATION

5. 1 Lifting

- Rigging cables should have adequate capability to resist 3 times weight of unit. Before lift, please check and ensure that hooks are holding tightly to unit and lifting angles are no less than 60°.
- Cloth material or hard-paper should be padded in the contact place between unit and rigging cable. Rigging cable should be entwined a round at the hook for prevent danger by cable slip because of weight unbalance.
- During lifting, anyone forbidden lingering under the lifting unit.

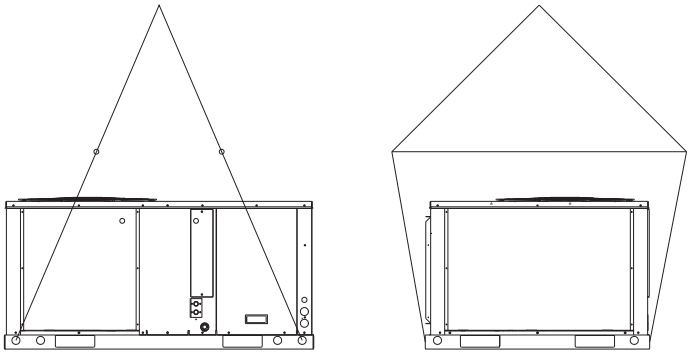


Fig.5-1

5. 2 Rooftop−units

- For roof top applications using a field fabricated frame and ducts, use the following procedure:
- The frame must be located and secured by bolting or welding to the roof. Flashing is required.
- The hole in the roof must be prepared in advance of installing the unit.
- Secure the ducts to the roof.
- Place the unit on the frame or roof curb.
- Secure the unit to the frame or roof curb.
- Insulate any ductwork outside of the structure with at least two (2) inches of insulation and then weatherproof. There must be a weatherproof seal where the duct enters the structure.
- Complete the installation according to the instructions in the following sections of this manual.

Typical rooftop application with frame

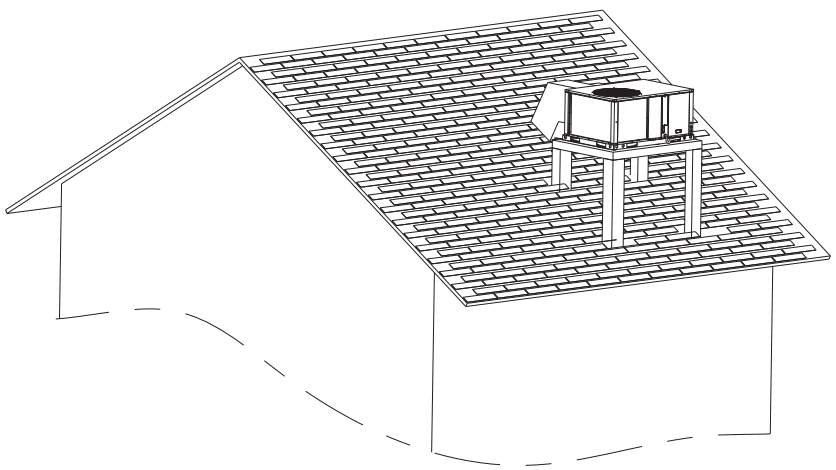


Fig.5-2

5. 3 Ground level–horizontal units

- For ground level installations, the unit should be positioned on a pad in the size of the unit or larger. The unit must be level on the pad. The pad must not come in contact with the structure. Be sure the outdoor portion of the supply and return air ducts are as short as possible.
- Proceed with the installation as follows:
- Place the unit on the pad.
- Attach the supply and return air ducts to the unit.
- Insulate any ductwork outside of the structure with at least 2 inches of insulation and weatherproof. There must be a weatherproof seal where the duct enters the structure.
- Complete the installation according to the instructions in the following sections of this manual.

Typical ground level application

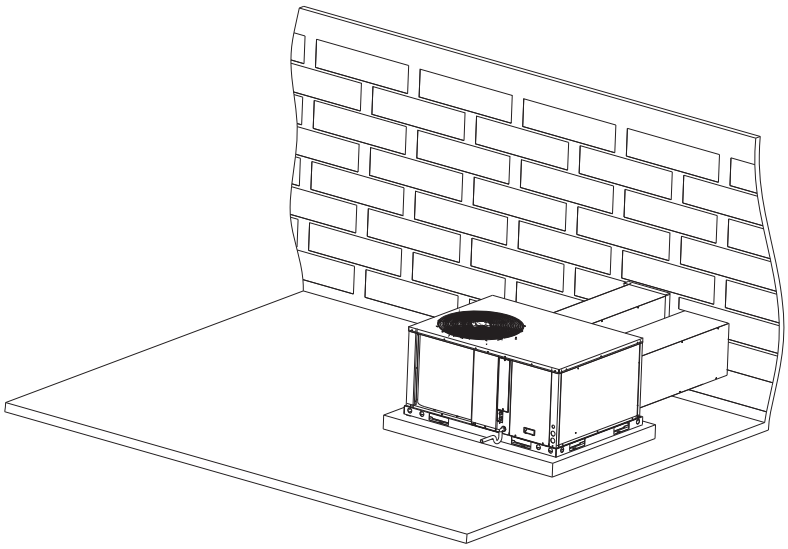


Fig.5-3

5.4 Condensate drain piping

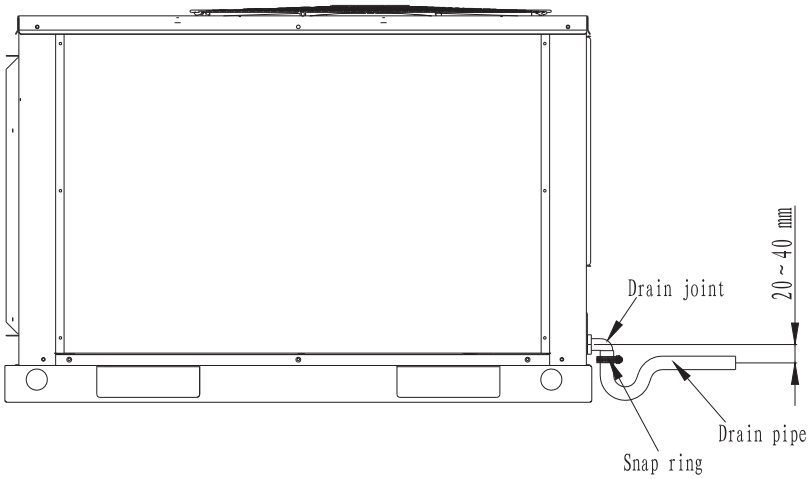


Fig.5-4

5. 5 Ductwork

●Attaching horizontal ductwork to unit

●All conditioned air ductwork should be insulated to minimize heating and cooling duct losses. Use a minimum of two (2) inches of insulation with a vapor barrier. The outside ductwork
●must be weatherproofed between the unit and the building.
●When attaching ductwork to a horizontal unit, provide a flexible watertight connection to

NOTE

Do not draw the canvas taut between the solid ducts.

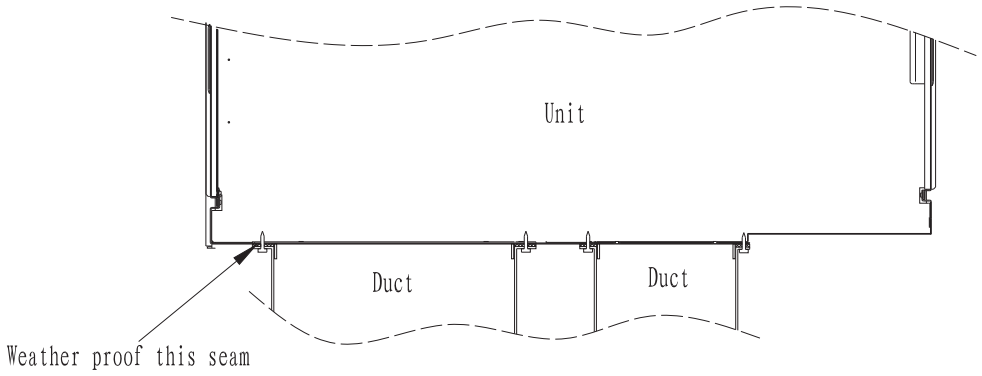


Fig.5-5

6. ELECTRICAL WIRING

6. 1 Protections and safety control

- **When power to the unit, the unit will be test and lasting for about 3 mintues and then recovery, which is a normal circumstance for the unit. This time include the compressor first start 3 mintues delay.**
- **Minutes delay for the compressor start-up**
- At the beginning of energizing or after the stop of the compressor, 3-minutes delay will be taken to start the compressor.
- When switchover between cooling/heating mode, the compressor stops automatically.
- **Compressor discharge gas temperature switch protection**
- When compressor discharge gas temperature >248℉,discharge gas temperature switch will be closed. At the same time, the corresponding compressor will be shut off.
- **Reverse phase protection relay**
- The reverse phase protection relay will make the compressor not start, when the power source is incorrectly connected.
- The checking of phase' order is just carried out at the first time of electrifying. If malfunction happens then the checking will be going on until the order of phase is right, and the F9 will be displayed on the board. If there is no problem in the first checking, then it will be omitted.
- **High pressure and low pressure protection**
- The ON/OFF of high pressure and low pressure will be installed separately around inlet pipe, and both are connected to Main Control Board. The ON/OFF of high pressure will be off when the pressure is higher than 652Psi. The ON/OFF of low pressure will be off when lower than 7Psi.

6. 2 Electrical data

Tab.6-1

Nominal ton		3TONS		4TONS		5TONS	
Model type		C/O	H/P	C/O	H/P	C/O	H/P
Type of flow		Hor.	Hor.	Hor.	Hor.	Hor.	Hor.
Unit main power	VOL	208-230V	208-230V	208-230V	208-230V	208-230V	208-230V
	Hz	60	60	60	60	60	60
Applicable voltage	Max.	253	253	253	253	253	253
	Min.	187	187	187	187	187	187
Compressor motor	STC	22.5	22.5	26	42	32.8	45
	RNC	11.9	11.9	18.6	17.5	21.6	21
	IPT	2.71	2.71	4.16	3.98	4.72	4.74
Evaporator fan motor	RNC	1.36	2.0	2.87	2.54	2.87	3.23
	IPT	0.31	0.26	0.66	0.33	0.66	0.44
Condenser fan motor	RNC	1.12	1.12	2.25	2.25	2.25	2.25
	IPT	0.25	0.25	0.52	0.52	0.52	0.52

- VOL: Unit Power Supply Rated Voltage(V) Hz: Frequency(Hz) STC: Starting Current(A) RNC: Running Current(A) IPT: Input(kW)

Tab.6-2

For Inverter Units

Nominal ton		3TONS (INVERTER UNIT)	4TONS (INVERTER UNIT)	5TONS (INVERTER UNIT)
Model type		H/P	H/P	H/P
Type of flow		Hor.	Hor.	Hor.
Unit main power	VOL	208-230V	208-230V	208-230V
	Hz	60	60	60
Applicable voltage	Max.	253	253	253
	Min.	187	187	187
Compressor motor	STC	15	21	21
	RNC	8.85	14.8	14.8
	IPT	1.94	3.96	3.96
Evaporator fan motor	RNC	1.3	2.8	2.8
	IPT	0.18	0.35	0.35
Condenser fan motor	RNC	0.9	1.5	1.5
	IPT	0.11	0.23	0.23

●VOL: Unit Power Supply Rated Voltage(V) Hz: Frequency(Hz) STC: Starting Current(A) RNC: Running Current(A) IPT: Input(kW)

6. 3 Installation Example

●Suggestion: Thermostat choose Non-programmed eletrical thermostat series of honeywell, such as TH5220D

220V 1N ~ 60Hz
3/4/5 Tons C/O Units
3/4/5 Tons H/P Units

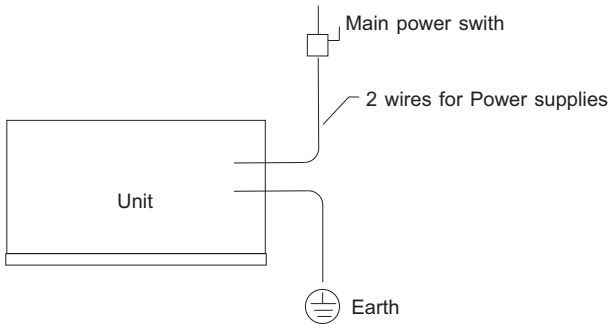


Fig.6-1

6. 4 Wiring provision

●**Field wiring**
●The units are internally wired at the factory according to generally accepted electrical technology.
●**Required field wiring**
●Main power wiring to the unit control wiring between the control center and the unit, and earth wiring are required in the field.
●**Required components**
●The following components are required: main power fuses, conduit coupling, and field supplied room thermostat.
●**Wire and fuse size selection for main power source**
●Wire and fuse sizes should be selected in accordance with national and standard, taking the designed maximum current shall be the total of the compressor maximum current, condenser fan motor current and evaporator fan motor current(refer to “electrical data”).

⚠ WARNING

●An all-pole disconnection switch having a contact separation of at least 3mm in all poles should be connected in fixed wiring.
●The appliance shall be installed in accordance with national wiring regulations.
●An all-pole disconnection device which has at least 3mm separation distance in all pole and a residual current device(RCD)with the rating of above 10mA shall be incorporated in the fixed wiring according to the national rule.
●The appliance shall be installed in accordance with national wiring regulations.

6. 5 Main power supply

Tab.6-3

Model type		Unit main power	Main power switch	Fuse	Wires for power supplies	Type of wires
3Tons	C/O H/P	220V 1N ~ 60Hz	50A	40A	3×16mm²+2×10mm²	3×UL1015 5AWG 2×UL1015 7AWG
4Tons	C/O H/P	220V 1N ~ 60Hz	50A	40A	3×16mm²+2×10mm²	3×UL1015 5AWG 2×UL1015 7AWG
5Tons	C/O H/P	220V 1N ~ 60Hz	63A	50A	3×16mm²+2×10mm²	3×UL1015 5AWG 2×UL1015 7AWG

6. 6 Block cable connection

●Power supply

220V 1N ～ 60Hz
3/4/5 Tons C/O Units
3/4/5 Tons H/P Units

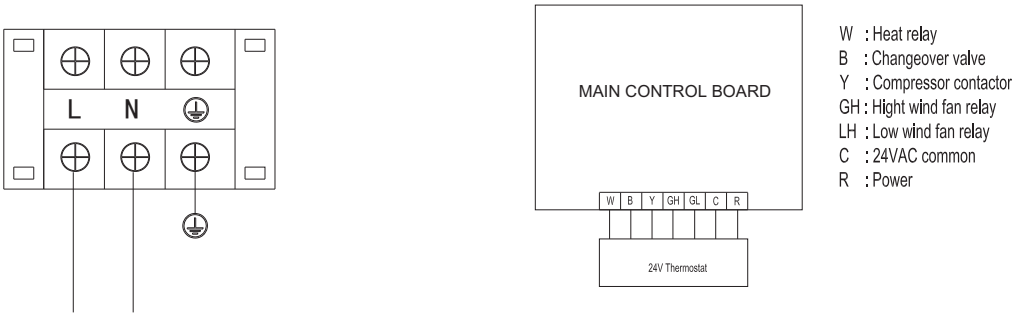


Fig.6-2

●Suggestion: Thermostat choose eletrical thermostat series of honeywell, such as RTH111、RTH2300/RTH221、 TH5220D.

●Power supply(For Inverter Units)

220V 1N ～ 60Hz
3/4/5 Tons H/P

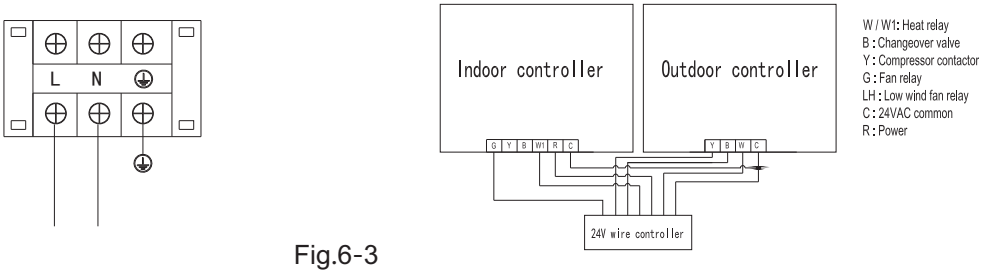


Fig.6-3

●Suggestion: Thermostat choose eletrical thermostat series of honeywell, such as RTH111、RTH2300/RTH221、 TH5220D.

6. 7 Error code

Tab.6-4

220V 1N ～ 60Hz
3/4/5 Tons C/O Units 3/4/5 Tons H/P Units

Digital display	Fault or protect definition
--	Nnormal standby
rC	Cooling mode
rH	Heating mode
rd	Defrost treatment in heating mode
E0	Communication failure of indoor and outdoor unit (reserved)
E1	Communication failure between indoor unit line controller (reserved)
E2	The failure of indoor temperature sensor T1 (reserved)
E3	The failure of evaporator tube temperature sensor T2
E5	The failure of condenser tube temperature sensor T3
E6	The failure of temperature sensor T4
E8	The failure of exhaust pipe temperature sensor T5
F1	Outdoor fan protection (reserved)
F2	Outdoor protection (reserved)
F3	High pressure protection
F4	Low pressure protection
F5	Water full protection
F7	High current protection for outdoor unit
F8	The protection of excessive exhaust pipe temperature
F9	The failure of three-phase sequence
P0	Evaporator protection
P1	Condenser protection
L0	Three times P0 in 30mins(The unit cannot resume operating without having been powered off)
L1	Three times P1 in 30mins(The unit cannot resume operating without having been powered off)
L3	Three times F3 in 30mins(The unit cannot resume operating without having been powered off)
L4	Three times F4 in 30mins(The unit cannot resume operating without having been powered off)
L7	Three times F7 in 30mins(The unit cannot resume operating without having been powered off)

Tab.6-5

For Inverter Units

Digital display	Fault or protect definition
E4	Failure in temperature sensor T4
E6	Failure in temperature sensor T3 in condenser
E8	Failure in temperature sensor T5 on exhaust pipe
E9	One-side over pressure / under pressure
E10	Failure in EEPROM of outdoor unit
E12	Failure in sensor on IPM
E13	Failure in pressure sensor of HLP
E14	standby for T3/T5 sensor has not been tightened up
E15	Malfunction of HPS high pressure switch
H0	Failure in communication between outdoor main control and branch control
H1	Abnormal turn-off or failure in rebooting due to the high temperature of T3 in condenser (Cooling)
H2	Abnormal turn-off or failure in rebooting due to malfunction of high pressure switch
H3	Abnormal turn-off or failure in rebooting due to high pressure in condenser (heating)
H4	Abnormal turn-off or failure in rebooting due to high temperature in modules
H5	Abnormal turn-off or failure in rebooting due to low pressure of refrigerant
H6	Abnormal turn-off or failure in rebooting due to high temperature in T5 exhaust pipe
H7	Abnormal turn-off or failure in rebooting due to abnormal refrigerant status in compressor
H8	Failure in rebooting for T3 sensor in condenser has not been tightened up (cooling)
H12	Failure in rebooting for TP sensor in exhaust pipe has not been tightened up
P1	Protection of high pressure switch
P2	Protection of running of refrigerant in low pressure (cooling)
P3	Overflow protection of One-side over pressure / under pressure
P4	Protection of T5 exhaust pipe for high temperature
P5	Protection of T3 condensor for high temperature (cooling)
P6	Protection of IPM
P8	High temperature protection Tf of IPM
P9	Failure in DC motor and fan
P12	standby due to abnormal refrigerant status in compressor
P13	standby due to abnormal high pressure in condenser (heating)
P14	high compression ratio
P15	low compression ratio
P16	Failure in starting due to inadequate ambient temperature
L1	low electric pressure of generatrix
L2	high electric pressure of generatrix
L3	Sign of forced running
L4	Problems of MCE / synchronization / starting of compressor
L5	no speed
L7	Protection of compressor due to phase loss
L8	Compressor stalling
L9	Restriction on frequency for high pressure in condensation
LA	Restriction on frequency for problems of electrical pressure
LC	Restriction on frequency for inadequate temperature of condenser T3
LD	Restriction on frequency for inadequate exhaust temperature of sensor T5
LE	Restriction on frequency of IPM for high temperature or inadequate temperature
LF	Restriction on electric frequency
d0	oil return
df	Defrosting
dH	Forced running

Tab.6-6
220V 1N ～ 60Hz
3/4/5 Tons H/P Units

Panasonic chip fan modular board error instruction	
Numbers of LED flashes	Meaning
1	Sampling circuit error
2	Bus voltage error
3	Output current error
4	Motor stall error
5	Motor stall,motor overspeed,mothor over current error
Flash rapidly	Error occur

6. 8 Power and power-down control

For 220V 1N ~ 60Hz
3/4/5 Tons C/O Units
3/4/5 Tons H/P Units

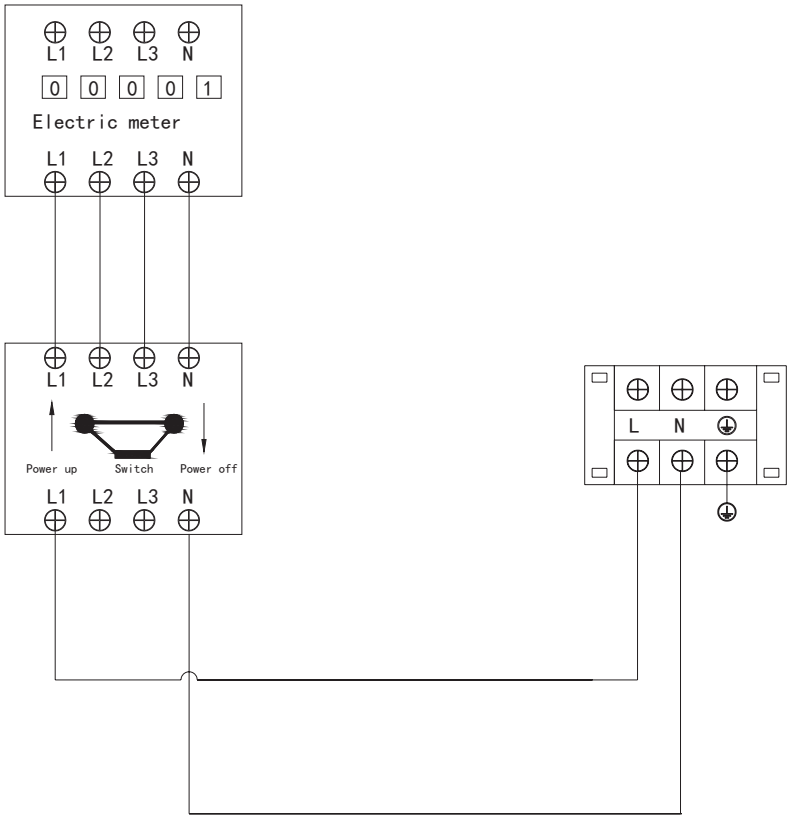


Fig.6-4

7. SPECIFICATION

7. 1 Physical Data

Tab.7-1

Nominal ton		3Tons	3Tons
Model type		Cooling Only	Heat Pump
Power	voltage/phase/frequency	230V/1/60	230V/1/60
Capacity	Cooling(Btu/h)	33500	33000
	Heating(Btu/h)	-	33000
Performance	EER/COP(Btu/h W)	11.0	11.0
	SEER(Btu/W)	13.0	14.0
Dimensions	Length(mm)	1321	1321
	Width(mm)	958	958
	Height (mm)	630	630
Net weigt (Kg)		140	140
Gross weight (Kg)		144	144
Packing dimension: LxWxH		1339*968*660	1339*968*660
Refrigerant type		R410A	R410A
Flow control		throttle valve	throttle valve
Compressor	Quantity/Type	1/Rotor compressor	1/Rotor compressor
Outdoor coil	Rows	2.5	2.5
	Fins per inch	17	17
	Tube diameter(in.)	φ5	φ7
Indoor coil	Rows	4	4
	Fins per inch	17	17
	Tube diameter(mm)	φ7	φ7
Outdoor fan	Quantity used/diameter(mm)	1/560	1/560
	Type	Propeller	Propeller
	Drive type	direct	direct
	Quantity speeds	1	1
	Quantity motors/power(kW)	1/0.11	1/0.11
	Motor RPM	850	850
	Total nominal CFM	2400	2400
Indoor fan	Quantity used/diameter(in.)	1/10*10	1/10*10
	Type	FC centrifugal	FC centrifugal
	Drive type	direct	direct
	Quantity speeds	2	2
	Quantity motors/power(kW)	1/0.18	1/0.35
	Motor RPM	640	750
	Total nominal CFM	1100	1460
Outdoor Static Pressure (Pa)	standard (Minimum-Maximum)	0	0
Indoor Static Pressure (Pa)	standard (Minimum-Maximum)	37	37
Cooling Operation Range	°F	63-118	63-118
Heating Operation Range	°F	-	19-90

NOTE

- (Ⅰ) Cooling capacities are rated at 95℉ amblent,80℉ entering dry bulb,67℉ entering wet bulb.Units are suitableforoperationto±2 0%ofnominal CFM.

- (Ⅱ)Heating capacities are based on the following conditions:Indoor temperature 68℉ entering dry bulb,59℉ entering dry bulb,outdoor temperature 45℉ entering dry bulb,43℉ entering dry bulb.

Tab.7-2

Nominal ton		4Tons	4Tons
Model type		Cooling Only	Heat Pump
Power	voltage/phase/frequency	230V/1/60	230V/1/60
Capacity	Cooling(Btu/h)	47000	46000
	Heating(Btu/h)	-	46000
Performance	EER/COP(Btu/h W)	11.0	11.0
	SEER(Btu/W)	13.0	14.0
Dimensions	Length(mm)	1486	1486
	Width(mm)	1086	1086
	Height(mm)	840	840
Net weigt(Kg)		195	195
Gross weight(Kg)		199	199
Packing dimension: LxWxH		1490*1070*865	1490*1070*865
Refrigerant type		R410A	R410A
Flow control		throttle valve	throttle valve
Compressor	Quantity/Type	1/Scroll	1/Scroll
Outdoor coil	Rows	2	2.5
	Fins per inch	17	17
	Tube diameter(in.)	φ7	φ7
Indoor coil	Rows	4	4
	Fins per inch	17	17
	Tube diameter(mm)	φ7	φ7
Outdoor fan	Quantity used/diameter(mm)	1/600	1/600
	Type	Propeller	Propeller
	Drive type	direct	direct
	Quantity speeds	1	1
	Quantity motors/power(kW)	1/0.23	1/0.23
	Motor RPM	1100	1100
	Total nominal CFM	4000	4000
Indoor fan	Quantity used/diameter(in.)	1/10*10	1/10*10
	Type	FC centrifugal	FC centrifugal
	Drive type	direct	direct
	Quantity speeds	2	2
	Quantity motors/power(kW)	1/0.35	1/0.35
	Motor RPM	765	800
	Total nominal CFM	1690	1630
Outdoor Static Pressure(Pa)	standard (Minimum-Maximum)	0	0
Indoor Static Pressure (Pa)	standard (Minimum-Maximum)	50	50
Cooling Operation Range	°F	63-118	63-118
Heating Operation Range	°F	-	19-90

NOTE

■ (Ⅰ) Cooling capacities are rated at 95℉ amblent,80℉ entering dry bulb,67℉ entering wet bulb.Units are suitableforoperationto±2 0%ofnominal CFM.

■ (Ⅱ) Heating capacities are based on the following conditions:Indoor temperature 68℉ entering dry bulb,59℉ entering dry bulb,outdoor temperature 45℉ entering dry bulb,43℉ entering dry bulb.

Tab.7-3

Nominal ton		5Tons	5Tons
Model type		Cooling Only	Heat Pump
Power	voltage/phase/frequency	230V/1/60	230V/1/60
Capacity	Cooling(Btu/h)	56500	56000
	Heating(Btu/h)	-	56000
Performance	EER/COP(Btu/h W)	11.0	11.0
	SEER(Btu/W)	13.0	14.0
Dimensions	Length(mm)	1486	1486
	Width(mm)	1086	1086
	Height (mm)	840	840
Net weigt (Kg)		200	200
Gross weight (Kg)		204	204
Packing dimension: LxWxH		1490*1070*865	1490*1070*865
Refrigerant type		R410A	R410A
Flow control		throttle valve	throttle valve
Compressor	Quantity/Type	1/Scroll	1/Scroll
Outdoor coil	Rows	2.5	2.5
	Fins per inch	17	17
	Tube diameter(in.)	φ7	φ7
Indoor coil	Rows	4	4
	Fins per inch	17	17
	Tube diameter(mm)	φ7	φ7
Outdoor fan	Quantity used/diameter(mm)	1/600	1/600
	Type	Propeller	Propeller
	Drive type	direct	direct
	Quantity speeds	1	1
	Quantity motors/power(kW)	1/0.23	1/0.23
	Motor RPM	1100	1100
	Total nominal CFM	4000	4000
Indoor fan	Quantity used/diameter(in.)	1/10*10	1/10*10
	Type	FC centrifugal	FC centrifugal
	Drive type	direct	direct
	Quantity speeds	2	2
	Quantity motors/power(kW)	1/0.35	1/0.35
	Motor RPM	765	850
	Total nominal CFM	1690	1810
Outdoor Static Pressure (Pa)	standard (Minimum-Maximum)	0	0
Indoor Static Pressure (Pa)	standard (Minimum-Maximum)	50	50
Cooling Operation Range	°F	63-118	63-118
Heating Operation Range	°F	-	19-90

NOTE

■ (Ⅰ) Cooling capacities are rated at 95℉ amblent,80℉ entering dry bulb,67℉ entering wet bulb.Units are suitableforoperationto±2 0%ofnominal CFM.

■ (Ⅱ)Heating capacities are based on the following conditions:Indoor temperature 68℉ entering dry bulb,59℉ entering dry bulb,outdoor temperature 45℉ entering dry bulb,43℉ entering dry bulb.

Physical Data(For Inverter Units)

Tab.7-4

Nominal ton		3Tons
Model type		Heat Pump
Power	voltage/phase/frequency	230V/1/60
Capacity	Cooling(Btu/h)	34000
	Heating(Btu/h)	35000
Performance	EER/COP(Btu/h W)	10.0
	SEER(Btu/W)	16.0
Dimensions	Length(mm)	1321
	Width(mm)	958
	Height (mm)	630
Net weigt (Kg)		140
Gross weight (Kg)		144
Packing dimension: LxWxH		1330*960*660
Refrigerant type		R410A
Flow control		electronic expansion valve
Compressor	Quantity/Type	1/Rotor compressor
Outdoor coil	Rows	2
	Fins per inch	17
	Tube diameter(in.)	φ7
Indoor coil	Rows	4
	Fins per inch	17
	Tube diameter(mm)	φ7
Outdoor fan	Quantity used/diameter(mm)	1/560
	Type	Propeller
	Drive type	direct
	Quantity speeds	2
	Quantity motors/power(kW)	1/0.11
	Motor RPM	850
	Total nominal CFM	2400
Indoor fan	Quantity used/diameter(in.)	1/10*10
	Type	FC centrifugal
	Drive type	direct
	Quantity speeds	2
	Quantity motors/power(kW)	1/0.18
	Motor RPM	640
	Total nominal CFM	1150
Outdoor Static Pressure (Pa)	standard (Minimum-Maximum)	0
Indoor Static Pressure (Pa)	standard (Minimum-Maximum)	37
Cooling Operation Range	°F	63-118
Heating Operation Range	°F	19-90

NOTE

■ (Ⅰ) Cooling capacities are rated at 95℉ amblent,80℉ entering dry bulb,67℉ entering wet bulb.Units are suitableforoperationto±2 0%ofnominal CFM.

■ (Ⅱ)Heating capacities are based on the following conditions:Indoor temperature 68℉ entering dry bulb,59℉ entering dry bulb,outdoor temperature 45℉ entering dry bulb,43℉ entering dry bulb.

Physical Data(For Inverter Units)

Tab.7-5 Nominal ton		4Tons
Model type		Heat Pump
Power	voltage/phase/frequency	230V/1/60
Capacity	Cooling(Btu/h)	48000
	Heating(Btu/h)	48000
Performance	EER/COP(Btu/h W)	10.0
	SEER(Btu/W)	16.0
Dimensions	Length(mm)	1486
	Width(mm)	1086
	Height (mm)	840
Net weigt (Kg)		195
Gross weight (Kg)		199
Packing dimension: LxWxH		1490*1070*865
Refrigerant type		R410A
Flow control		electronic expansion valve
Compressor	Quantity/Type	1/Rotor compressor
Outdoor coil	Rows	2
	Fins per inch	17
	Tube diameter(in.)	φ7
Indoor coil	Rows	4
	Fins per inch	17
	Tube diameter(mm)	φ7
Outdoor fan	Quantity used/diameter(mm)	1/600
	Type	Propeller
	Drive type	direct
	Quantity speeds	2
	Quantity motors/power(kW)	1/0.23
	Motor RPM	1100
	Total nominal CFM	4000
Indoor fan	Quantity used/diameter(in.)	1/10*10
	Type	FC centrifugal
	Drive type	direct
	Quantity speeds	2
	Quantity motors/power(kW)	1/0.35
	Motor RPM	765
	Total nominal CFM	1650
Outdoor Static Pressure (Pa)	standard (Minimum-Maximum)	0
Indoor Static Pressure (Pa)	standard (Minimum-Maximum)	50
Cooling Operation Range	°F	63-118
Heating Operation Range	°F	19-90

NOTE

■ (Ⅰ) Cooling capacities are rated at 95℉ amblent,80℉ entering dry bulb,67℉ entering wet bulb.Units are suitableforoperationto±2 0%ofnominal CFM.

■ (Ⅱ) Heating capacities are based on the following conditions:Indoor temperature 68℉ entering dry bulb,59℉ entering dry bulb,outdoor temperature 45℉ entering dry bulb,43℉ entering dry bulb.

Physical Data(For Inverter Units)

Tab.7-6

Nominal ton		5Tons
Model type		Heat Pump
Power	voltage/phase/frequency	230V/1/60
Capacity	Cooling(Btu/h)	55000
	Heating(Btu/h)	56000
Performance	EER/COP(Btu/h W)	10.0
	SEER(Btu/W)	16.0
Dimensions	Length(mm)	1486
	Width(mm)	1086
	Height (mm)	840
Net weigt (Kg)		200
Gross weight (Kg)		204
Packing dimension: LxWxH		1490*1070*865
Refrigerant type		R410A
Flow control		electronic expansion valve
Compressor	Quantity/Type	1/Rotor compressor
Outdoor coil	Rows	2
	Fins per inch	17
	Tube diameter(in.)	φ7
Indoor coil	Rows	4
	Fins per inch	17
	Tube diameter(mm)	φ7
Outdoor fan	Quantity used/diameter(mm)	1/600
	Type	Propeller
	Drive type	direct
	Quantity speeds	2
	Quantity motors/power(kW)	1/0.23
	Motor RPM	1100
	Total nominal CFM	4000
Indoor fan	Quantity used/diameter(in.)	1/10*10
	Type	FC centrifugal
	Drive type	direct
	Quantity speeds	2
	Quantity motors/power(kW)	1/0.35
	Motor RPM	765
	Total nominal CFM	1650
Outdoor Static Pressure (Pa)	standard (Minimum-Maximum)	0
Indoor Static Pressure (Pa)	standard (Minimum-Maximum)	50
Cooling Operation Range	°F	63-118
Heating Operation Range	°F	19-90

NOTE

■ (Ⅰ) Cooling capacities are rated at 95℉ amblent,80℉ entering dry bulb,67℉ entering wet bulb.Units are suitableforoperationto±2 0%ofnominal CFM.

■ (Ⅱ) Heating capacities are based on the following conditions:Indoor temperature 68℉ entering dry bulb,59℉ entering dry bulb,outdoor temperature 45℉ entering dry bulb,43℉ entering dry bulb.

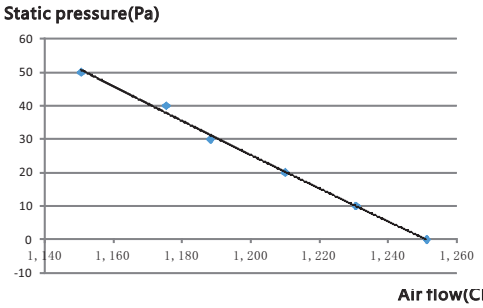
7. 2 Parameter For Air Volume

Tab.7-7

For 220V 1N ~ 60Hz

3 Tons C/O Units

Static pressure (Pa)	Air flow (CFM)	Brake power (kW)	Fan speed (rpm)
0	1251	309	720
10	1231	308	735
20	1210	306	750
30	1188	306	765
40	1175	311	775
50	1151	304	790
60	1137	300	805



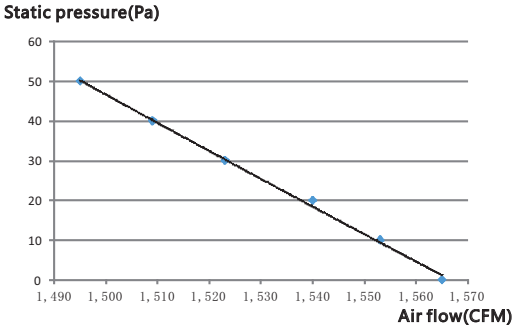
●Curve diagram of static pressure, air flow volumn

Tab.7-8

For 220V 1N ~ 60Hz

3 Tons H/P Units

Static pressure (Pa)	Air flow (CFM)	Brake power (kW)	Fan speed (rpm)
0	1565	298	667
10	1553	290	682
20	1540	283	695
30	1523	276	710
40	1509	270	722
50	1495	264	736
60	1480	260	742



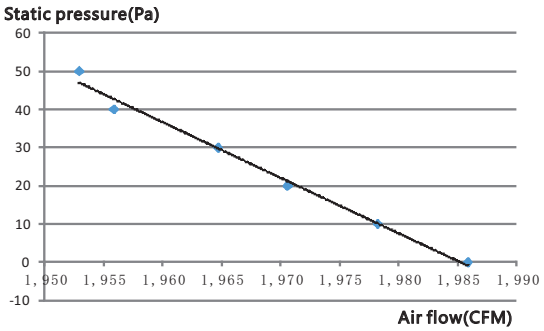
●Curve diagram of static pressure, air flow volumn

Tab.7-9

For 220V 1N ~ 60Hz

4 Tons C/O Units

Static pressure (Pa)	Air flow (CFM)	Brake power (kW)	Fan speed (rpm)
0	1986	730	1040
10	1978	728	1055
20	1971	725	1070
30	1965	722	1085
40	1956	717	1095
50	1953	711	1105
60	1947	709	1120



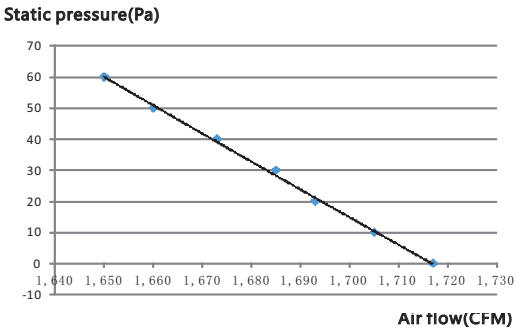
●Curve diagram of static pressure, air flow volumn

Tab.7-10

For 220V 1N ~ 60Hz

4 Tons H/P Units

Static pressure (Pa)	Air flow (CFM)	Brake power (kW)	Fan speed (rpm)
0	1717	420	725
10	1705	402	739
20	1693	390	751
30	1685	375	763
40	1673	366	776
50	1660	357	785
60	1650	350	792



●Curve diagram of static pressure, air flow volumn

●Parameter table for outdoor unit air volume

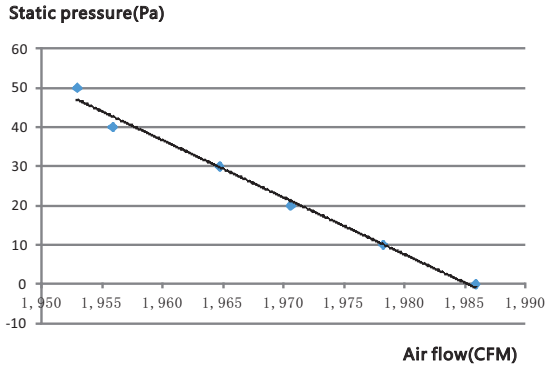
NOTE

●Shield parts in below tables are standard working conditions for the unit.

Tab.7-11

For 220V 1N ~ 60Hz
5 Tons C/O Units

Static pressure (Pa)	Air flow (CFM)	Brake power (kW)	Fan speed (rpm)
0	1986	730	1040
10	1978	728	1055
20	1971	725	1070
30	1965	722	1085
40	1956	717	1095
50	1953	711	1105
60	1947	709	1120

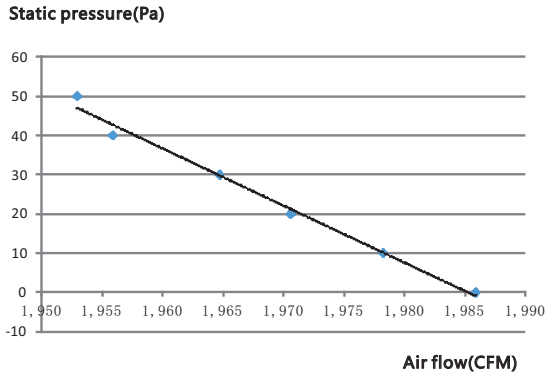


●Curve diagram of static pressure, air flow volumn

Tab.7-12

For 220V 1N ~ 60Hz
5 Tons H/P Units

Static pressure (Pa)	Air flow (CFM)	Brake power (kW)	Fan speed (rpm)
0	1890	538	762
10	1882	515	776
20	1872	500	783
30	1859	489	798
40	1846	475	811
50	1832	463	826
60	1820	450	838



●Curve diagram of static pressure, air flow volumn

●Parameter table for outdoor unit air volume

NOTE

●Shield parts in below tables are standard working conditions for the unit.

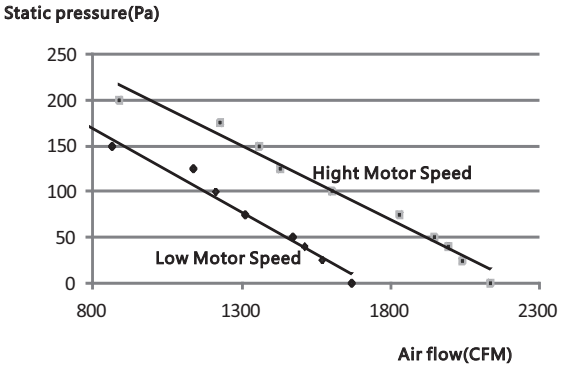
Parameter For Air Volume(For Inventer Unit)

Tab.7-13

For 220V 1N ~ 60Hz

3 Tons H/P Units

Static pressure (Pa)	Hight Motor Speed		LOW Motor Speed	
	Air flow (CFM)	Brake power (kW)	Air flow (CFM)	Brake power (kW)
0	2133	297	1668	229
25	2037	293	1571	224
40	1990	291	1510	221
50	1945	289	1471	219
75	1830	284	1310	214
100	1600	276	1214	208
125	1428	270	1138	204
150	1358	264	866	193
175	1228	259	730	187
200	889	245	–	–



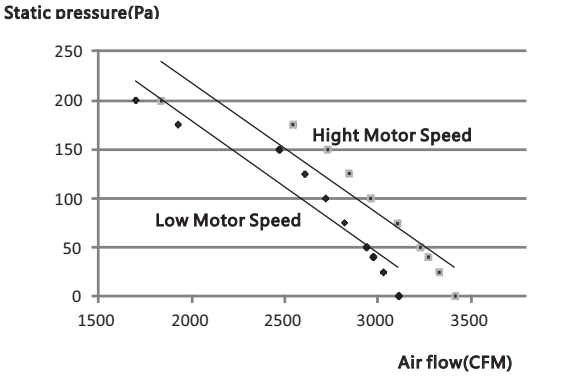
●Curve diagram of static pressure, air flow volumn

Tab.7-14

For 220V 1N ~ 60Hz

4 Tons H/P Units

Static pressure (Pa)	Hight Motor Speed		LOW Motor Speed	
	Air flow (CFM)	Brake power (kW)	Air flow (CFM)	Brake power (kW)
0	3416	647	3112	549
25	3329	639	3030	543
40	3270	633	2977	539
50	3228	629	2941	536
75	3108	616	2821	525
100	2964	601	2720	519
125	2843	590	2608	509
150	2727	590	2472	499
175	2546	575	1928	464
200	1834	510	1700	449



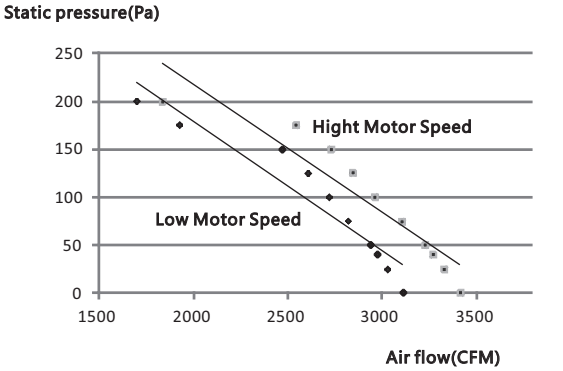
●Curve diagram of static pressure, air flow volumn

Tab.7-15

For 220V 1N ~ 60Hz

5 Tons H/P Units

Static pressure (Pa)	Hight Motor Speed		LOW Motor Speed	
	Air flow (CFM)	Brake power (kW)	Air flow (CFM)	Brake power (kW)
0	3416	647	3112	549
25	3329	639	3030	543
40	3270	633	2977	539
50	3228	629	2941	536
75	3108	616	2821	525
100	2964	601	2720	519
125	2843	590	2608	509
150	2727	590	2472	499
175	2546	575	1928	464
200	1834	510	1700	449



●Curve diagram of static pressure, air flow volumn

●Parameter table for outdoor unit air volume

NOTE

●Shield parts in below tables are standard working conditions for the unit.

7. 3 Operating conditions

For proper performance, run the unit under the following temperature conditions:

Tab.7-13

Cooling operation	Outdoor temperature: 63°F to 118°F
	Room temperature: 63°F to 86°F
	Caution Room relative humidity less than 80%.If the unit operates in excess of this figure,the surface of the unit may attract condensation.
Heating operation	Outdoor temperature: 19°F to 90°F
	Room temperature: 32°F to 86°F

7. 4 Capacity Data

Tab.7-11

Cooling capacity — For 3 Tons C/O Units (220V 1N~60Hz)

Ambient Temperature	Air Flow Ent DB	CFM (F)	940 75	940 80	940 85	940 90	1175 75	1175 80	1175 85	1175 90
85	61	MBH	23.2	24.8	26.4	28.1	23.4	25.0	26.6	28.3
		SHC	20.2	23.6	26.2	28.1	19.9	23.0	25.3	27.7
	67	MBH	28.4	30.0	31.6	33.3	28.6	30.2	31.8	33.5
		SHC	15.9	21.3	25.9	31.3	16.0	21.4	26.1	31.5
	73	MBH	31.6	33.2	34.8	36.5	31.8	33.4	35.0	36.7
		SHC	10.7	15.9	20.2	24.8	11.1	16.4	21.4	26.1
95	61	MBH	21.0	22.4	23.8	25.2	21.2	22.6	24.0	25.4
		SHC	18.5	21.1	22.6	24.4	18.9	21.3	22.8	24.6
	67	MBH	26.0	27.6	29.2	30.9	26.2	27.8	29.4	31.1
		SHC	15.9	21.0	26.3	29.4	16.2	21.4	26.8	29.9
	73	MBH	31.0	32.6	34.2	35.9	31.2	32.8	34.4	36.1
		SHC	9.9	15.3	20.5	24.8	10.3	15.7	21.0	25.6
##	61	MBH	18.8	20.4	22.0	23.7	19.0	20.6	22.2	23.9
		SHC	17.3	18.8	20.7	22.6	17.5	19.0	20.9	22.7
	67	MBH	23.8	25.4	27.0	28.7	24.0	25.6	27.2	28.9
		SHC	13.8	18.8	24.3	27.3	13.9	18.9	24.5	27.5
	73	MBH	28.8	30.4	32.0	33.7	29.0	30.6	32.2	33.9
		SHC	9.2	14.6	20.2	25.3	9.0	14.4	20.0	24.7
##	61	MBH	16.6	18.2	19.8	21.5	16.8	18.4	20.0	21.7
		SHC	14.3	15.8	17.4	19.1	14.4	16.0	17.6	19.3
	67	MBH	21.6	23.2	24.8	26.5	21.8	23.4	25.0	26.7
		SHC	11.4	16.5	21.3	24.1	11.6	16.6	21.5	24.3
	73	MBH	26.6	28.2	29.8	31.5	26.8	28.4	30.0	31.7
		SHC	7.4	12.1	17.9	23.0	7.8	12.5	18.3	23.5

Notes: 1.All capacities are gross and have not considered indoor fan heat.To obtain NET cooling capacity subtract indoor fan heat.

2.MBH=Total Gross Capacity.(Unit:1000Btu/h)

3.SHC=Sensible Heat Capacity.(Unit:1000Btu/h)

Tab.7-12

Cooling capacity — For 3 Tons H/P Units (220V 1N~60Hz)

Ambient Temperature	Air Flow Ent DB	CFM (F)	1260 75	1260 80	1260 85	1260 90	1460 75	1460 80	1460 85	1460 90
85	61	MBH	25.4	27.8	30.2	32.6	27.4	29.8	32.2	34.6
		SHC	17.3	21.1	24.8	28.0	19.7	23.8	27.7	31.1
	67	MBH	30.6	33.0	35.4	37.8	32.6	35.0	37.4	39.8
		SHC	17.7	21.8	26.2	29.5	20.2	24.5	28.4	31.8
	73	MBH	36.8	38.4	40.0	41.7	37.0	38.6	40.8	41.9
		SHC	17.7	21.5	24.8	27.5	19.2	23.2	26.9	29.3
95	61	MBH	23.8	25.2	26.6	28.0	24.0	25.4	26.8	28.2
		SHC	17.6	20.7	23.4	25.8	18.7	21.8	24.1	25.9
	67	MBH	28.8	31.0	33.2	35.4	30.8	33.0	35.2	37.4
		SHC	18.4	22.3	25.2	28.3	20.9	25.1	28.9	32.2
	73	MBH	36.2	37.8	39.4	41.1	36.4	38.0	39.6	41.3
		SHC	19.5	23.4	26.8	29.6	21.1	25.1	28.5	31.4
##	61	MBH	20.7	22.5	24.3	26.1	22.7	24.5	26.3	28.1
		SHC	16.1	19.4	21.9	24.0	18.6	21.6	24.2	26.4
	67	MBH	25.7	27.5	29.3	31.1	27.7	29.5	31.3	33.1
		SHC	17.5	20.9	24.0	26.7	19.9	23.6	26.9	29.8
	73	MBH	34.0	35.6	37.2	38.9	34.2	35.8	37.4	39.1
		SHC	19.7	23.5	26.8	29.6	21.2	25.1	28.4	31.3
##	61	MBH	21.8	23.4	25.0	26.7	18.3	19.5	20.7	21.9
		SHC	17.4	20.1	22.5	24.6	15.4	17.6	19.3	20.8
	67	MBH	26.8	28.4	30.0	31.7	23.3	24.5	25.7	26.9
		SHC	18.8	22.2	25.2	27.9	17.2	20.1	22.6	24.7
	73	MBH	31.8	33.4	35.0	36.7	32.0	33.6	35.2	36.9
		SHC	19.1	22.7	25.9	28.6	20.5	24.2	27.5	30.3

Notes: 1.All capacities are gross and have not considered indoor fan heat.To obtain NET cooling capacity subtract indoor fan heat.

2.MBH=Total Gross Capacity.(Unit:1000Btu/h)

3.SHC=Sensible Heat Capacity.(Unit:1000Btu/h)

Tab.7-13

Cooling capacity — For 4 Tons C/O Units (220V 1N~60Hz)

Ambient Temperature		Air Flow Ent DB	CFM (F)	1620				1910			
				75	80	85	90	75	80	85	90
	85	61	MBH	37.1	38.7	40.3	42.0	37.3	38.9	40.5	42.2
			SHC	32.3	36.8	40.1	42.0	31.7	35.8	38.5	41.4
		67	MBH	42.3	43.9	45.5	47.2	42.5	44.1	45.7	47.4
			SHC	23.7	31.2	37.3	44.4	23.8	31.3	37.5	44.6
		73	MBH	45.5	47.1	48.7	50.4	45.7	47.3	48.9	50.6
			SHC	15.5	22.6	28.2	34.3	16.0	23.2	29.8	35.9
	95	61	MBH	34.9	36.3	37.7	39.1	35.1	36.5	37.9	39.3
			SHC	30.7	34.1	35.8	37.9	31.2	34.4	36.0	38.1
		67	MBH	39.9	41.5	43.1	44.8	40.1	41.7	43.3	45.0
			SHC	24.3	31.5	38.8	42.6	24.9	32.1	39.4	43.2
		73	MBH	44.9	46.5	48.1	49.8	45.1	46.7	48.3	50.0
			SHC	14.4	21.9	28.9	34.4	14.9	22.4	29.5	35.5
	##	61	MBH	32.7	34.3	35.9	37.6	32.9	34.5	36.1	37.8
			SHC	30.1	31.7	33.9	35.8	30.3	31.9	34.0	35.9
		67	MBH	37.7	39.3	40.9	42.6	37.9	39.5	41.1	42.8
			SHC	21.9	29.1	36.8	40.5	22.0	29.2	37.0	40.7
		73	MBH	42.7	44.3	45.9	47.6	42.9	44.5	46.1	47.8
			SHC	13.7	21.3	28.9	35.7	13.3	20.9	28.6	34.9
	##	61	MBH	30.5	32.1	33.7	35.4	30.7	32.3	33.9	35.6
			SHC	26.2	27.9	29.7	31.5	26.4	28.1	29.8	31.7
		67	MBH	35.5	37.1	38.7	40.4	35.7	37.3	38.9	40.6
			SHC	18.8	26.3	33.3	36.8	18.9	26.5	33.5	36.9
		73	MBH	40.5	42.1	43.7	45.4	40.7	42.3	43.9	45.6
			SHC	11.3	18.1	26.2	33.1	11.8	18.6	26.8	33.7

Notes: 1.All capacities are gross and have not considered indoor fan heat.To obtain NET cooling capacity subtract indoor fan heat.

2.MBH=Total Gross Capacity.(Unit:1000Btu/h)

3.SHC=Sensible Heat Capacity.(Unit:1000Btu/h)

Tab.7-14

Cooling capacity — For 4 Tons H/P Units (220V 1N~60Hz)

Ambient Temperature		Air Flow Ent DB	CFM (F)	1460				1630			
				75	80	85	90	75	80	85	90
	85	61	MBH	38.4	40.8	43.2	45.6	40.4	42.8	45.2	47.6
			SHC	26.1	31.0	35.4	39.2	29.1	34.2	38.9	42.8
		67	MBH	43.6	46.0	48.4	50.8	45.6	48.0	50.4	52.8
			SHC	25.3	30.4	35.8	39.6	28.3	33.6	38.3	42.2
		73	MBH	49.8	51.4	53.0	54.7	50.0	51.6	53.8	54.9
			SHC	23.9	28.8	32.9	36.1	26.0	31.0	35.5	38.4
	95	61	MBH	36.8	38.2	39.6	41.0	37.0	38.4	39.8	41.2
			SHC	27.2	31.3	34.8	37.7	28.9	33.0	35.8	37.9
		67	MBH	41.8	44.0	46.2	48.4	43.8	46.0	48.2	50.4
			SHC	26.8	31.7	35.1	38.7	29.8	35.0	39.5	43.3
		73	MBH	49.2	50.8	52.4	54.1	49.4	51.0	52.6	54.3
			SHC	26.6	31.5	35.6	39.0	28.7	33.7	37.9	41.3
	##	61	MBH	33.7	35.5	37.3	39.1	35.7	37.5	39.3	41.1
			SHC	26.3	30.5	33.6	36.0	29.3	33.0	36.2	38.6
		67	MBH	38.7	40.5	42.3	44.1	40.7	42.5	44.3	46.1
			SHC	26.3	30.8	34.7	37.9	29.3	34.0	38.1	41.5
		73	MBH	47.0	48.6	50.2	51.9	47.2	48.8	50.4	52.1
			SHC	27.3	32.1	36.1	39.4	29.3	34.2	38.3	41.7
	##	61	MBH	34.8	36.4	38.0	39.7	31.3	32.5	33.7	34.9
			SHC	27.8	31.3	34.2	36.5	26.3	29.3	31.3	33.2
		67	MBH	39.8	41.4	43.0	44.7	36.3	37.5	38.7	39.9
			SHC	27.9	32.3	36.1	39.3	26.9	30.8	34.1	36.7
		73	MBH	44.8	46.4	48.0	49.7	45.0	46.6	48.2	49.9
			SHC	26.9	31.6	35.5	38.8	28.8	33.6	37.6	40.9

Notes: 1.All capacities are gross and have not considered indoor fan heat.To obtain NET cooling capacity subtract indoor fan heat.

2.MBH=Total Gross Capacity.(Unit:1000Btu/h)

3.SHC=Sensible Heat Capacity.(Unit:1000Btu/h)

Tab.7-15

Cooling capacity — For 5 Tons C/O Units (220V 1N~60Hz)

Ambient Temperature		Air Flow Ent DB	CFM (F)	1620 75	1620 80	1620 85	1620 90	1910 75	1910 80	1910 85	1910 90
	85	61	MBH	45.6	47.2	48.8	50.5	45.8	47.4	49.0	50.7
			SHC	39.7	44.8	48.5	50.5	38.9	43.6	46.6	49.7
		67	MBH	50.8	52.4	54.0	55.7	51.0	52.6	54.2	55.9
			SHC	28.4	37.2	44.3	52.4	28.6	37.3	44.4	52.5
		73	MBH	54.0	55.6	57.2	58.9	54.2	55.8	57.4	59.1
			SHC	18.4	26.7	33.2	40.1	19.0	27.3	35.0	42.0
	95	61	MBH	43.4	44.8	46.2	47.6	43.6	45.0	46.4	47.8
			SHC	38.2	42.1	43.9	46.2	38.8	42.4	44.1	46.4
		67	MBH	48.4	50.0	51.6	53.3	48.6	50.2	51.8	53.5
			SHC	29.5	38.0	46.4	50.6	30.1	38.7	47.1	51.4
		73	MBH	53.4	55.0	56.6	58.3	53.6	55.2	56.8	58.5
			SHC	17.1	25.9	34.0	40.2	17.7	26.5	34.6	41.5
	##	61	MBH	41.2	42.8	44.4	46.1	41.4	43.0	44.6	46.3
			SHC	37.9	39.5	41.9	43.9	38.1	39.7	42.1	44.0
		67	MBH	46.2	47.8	49.4	51.1	46.4	48.0	49.6	51.3
			SHC	26.8	35.4	44.5	48.5	26.9	35.5	44.6	48.7
		73	MBH	51.2	52.8	54.4	56.1	51.4	53.0	54.6	56.3
			SHC	16.4	25.3	34.3	42.1	15.9	24.9	33.9	41.1
	##	61	MBH	39.0	40.6	42.2	43.9	39.2	40.8	42.4	44.1
			SHC	33.5	35.3	37.1	39.1	33.7	35.5	37.3	39.2
		67	MBH	44.0	45.6	47.2	48.9	44.2	45.8	47.4	49.1
			SHC	23.3	32.4	40.6	44.5	23.4	32.5	40.8	44.7
		73	MBH	49.0	50.6	52.2	53.9	49.2	50.8	52.4	54.1
			SHC	13.7	21.8	31.3	39.3	14.3	22.4	32.0	40.0

Notes: 1.All capacities are gross and have not considered indoor fan heat.To obtain NET cooling capacity subtract indoor fan heat.

2.MBH=Total Gross Capacity.(Unit:1000Btu/h)

3.SHC=Sensible Heat Capacity.(Unit:1000Btu/h)

Tab.7-16.

Cooling capacity — For 5 Tons H/P Units (220V 1N~60Hz)

Ambient Temperature		Air Flow Ent DB	CFM (F)	1630 75	1630 80	1630 85	1630 90	1810 75	1810 80	1810 85	1810 90
	85	61	MBH	48.4	50.8	53.2	55.6	50.4	52.8	55.2	57.6
			SHC	32.9	38.6	43.6	47.8	36.3	42.2	47.5	51.8
		67	MBH	53.6	56.0	58.4	60.8	55.6	58.0	60.4	62.8
			SHC	31.1	37.0	43.2	47.4	34.5	40.6	45.9	50.2
		73	MBH	59.8	61.4	63.0	64.7	60.0	61.6	63.8	64.9
			SHC	28.7	34.4	39.1	42.7	31.2	37.0	42.1	45.4
	95	61	MBH	46.8	48.2	49.6	51.0	47.0	48.4	49.8	51.2
			SHC	34.6	39.5	43.6	46.9	36.7	41.6	44.8	47.1
		67	MBH	51.8	54.0	56.2	58.4	53.8	56.0	58.2	60.4
			SHC	33.2	38.9	42.7	46.7	36.6	42.6	47.7	51.9
		73	MBH	59.2	60.8	62.4	64.1	59.4	61.0	62.6	64.3
			SHC	32.0	37.7	42.4	46.2	34.5	40.3	45.1	48.9
	##	61	MBH	43.7	45.5	47.3	49.1	45.7	47.5	49.3	51.1
			SHC	34.1	39.1	42.6	45.2	37.5	41.8	45.4	48.0
		67	MBH	48.7	50.5	52.3	54.1	50.7	52.5	54.3	56.1
			SHC	33.1	38.4	42.9	46.5	36.5	42.0	46.7	50.5
		73	MBH	57.0	58.6	60.2	61.9	57.2	58.8	60.4	62.1
			SHC	33.1	38.7	43.3	47.0	35.5	41.2	45.9	49.7
	##	61	MBH	44.8	46.4	48.0	49.7	41.3	42.5	43.7	44.9
			SHC	35.8	39.9	43.2	45.7	34.7	38.3	40.6	42.7
		67	MBH	49.8	51.4	53.0	54.7	46.3	47.5	48.7	49.9
			SHC	34.9	40.1	44.5	48.1	34.3	39.0	42.9	45.9
		73	MBH	54.8	56.4	58.0	59.7	55.0	56.6	58.2	59.9
			SHC	32.9	38.4	42.9	46.6	35.2	40.8	45.4	49.1

Notes: 1.All capacities are gross and have not considered indoor fan heat.To obtain NET cooling capacity subtract indoor fan heat.

2.MBH=Total Gross Capacity.(Unit:1000Btu/h)

3.SHC=Sensible Heat Capacity.(Unit:1000Btu/h)

8. START-UP

■ Packging and components

- Is the unit properly located and level with the proper clearance?
- Is the duct work correctly sized, run, taped, insulated, and weatherproofed with proper unit arrangement? See Ductwork Installation section.
- Is the wiring properly sized and run according to the unit wiring diagram?
- Are all the wiring connections, including those in the unit, tight?
- Has the unit been properly grounded and fused with the recommended fuse size? See Wiring Data.
- Have the air conditioning systems been checked at the service ports for charge and leak tested if necessary?
- Does the condenser fan and indoor blower turn free without rubbing, and are they tight on the shafts?
- Has the indoor blower speed been determined and the proper speed been set? See the Unit Wiring Diagram.
- Are all covers and access panels in place to prevent air loss and safety hazards?

■ Starting the unit in the cooling mode

- **Voltage**
- With the compressor operating, check the line voltage at the unit. The voltage should be within the range shown on the unit nameplate.
- If low voltage is encountered, check the size and length of the supply line from the main disconnect to the unit. The line may be undersized for the length of the run.
- **Cooling shut down**
- Place the system selector in the OFF position or reset thermostat at a setting above room temperature.
- Do not de-energize the main power disconnect except when unit is to be serviced. Power is required to keep the heat pump compressor warm and boil off refrigerant in the compressor.

9. MAINTENANCE AND UPKEEP

- Regular maintenance and upkeep
  Some regular maintenance and upkeep have been carry on by user, includes: change the one-time dust filter, clean casing, wash condenser and replace a new belt, as well as do some test for the equipment.

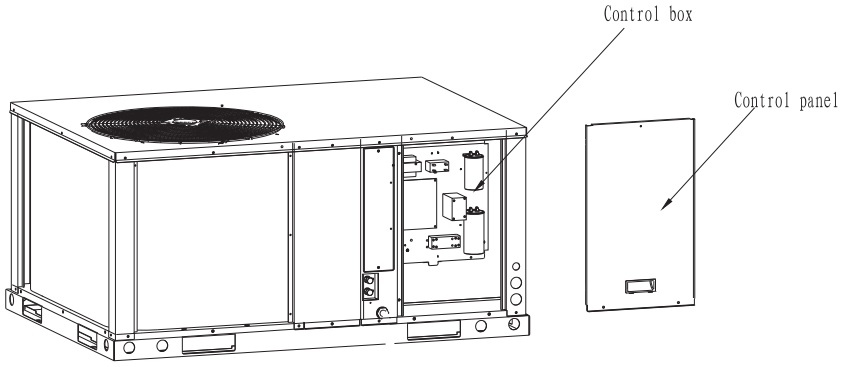


Fig.9-1

WARNING

- At least 1m flame resistant layer must be laid at the end of the air duct internal surface.

CAUTION

- Do not dry out the air filter under direct sunshine or with fire.

CAUTION

- DISPOSAL: Do not dispose this product as unsorted municipal waste. Collection of such waste separately for special treatment is necessary.
- Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities.
- Contact you local government for information regarding the collection systems available.
- If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being.

■ Condenser coil

Unfiltered air circulates through the unit's condenser coil and can cause the coil's surface to become clogged with dust, dirt, etc. To clean the coil, vertically (i.e., with the fins) stroke the coil surface with a soft-bristled brush. Be sure to keep all vegetation away from the condenser coil area.

■ Maintenance performed by serviceman.

To keep your unit operating safely and efficiently, the manufacturer recommends that a qualified serviceman check the entire system at least once each year and any other time that you feel one is needed. Your serviceman should examine these areas of your unit:

- Filters
- Motors and drive system components
- Economizer gaskets (for possible replacement)
- Safety controls (for mechanical cleaning)
- Electrical components and wiring (for possible replacement and connection tightness)
- Condensate drain (for cleaning)
- Unit duct connections (to see that they are physically sound and sealed to the unit casing)
- Unit mounting support (for structural integrity)

- The unit (for obvious unit deterioration)

CAUTION

- Do not operate the unit without the evaporator fan access panel in place. Reinstall the access panel after performing any maintenance. Operating the unit without the access panel may result in severe personal injury or death.

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