## **USE AND INSTALLATION INSTRUCTIONS**

Thank you very much for purchasing this Heat Pump Air Conditioner Please read this use and installation instructions carefully before installing and using this appliance and keep this manual for future reference.



## **!** WARNING

This product can expose you to chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm.

For more information go to www.P65Warnings.ca.gov.

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### Alert Symbols:

A DANGER The symbol refers to a hazard which can result in severe personal injury or death.

MARNING: The symbol refers to a hazard or an unsafe practice which may result in severe personal injury or death.

A CAUTION: The symbol refers to a hazard or an unsafe practice which may result in minor personal iniurv. product or property damage.

NOTE : It refers to the remarks and instruction to the operation, maintenance and service.

- Installation, maintenance and repair of this unit must be performed by a qualified, licensed service personnel.
- Read these instructions thoroughly before installation or operation. Failure to follow these instructions may result in improper installation, service or maintenance, possibly resulting in fire, electrical shock, property damage, personal injury or death.
- Before installation, check if the voltage of the power supply at installation site is the same as the voltage shown on the nameplate.

### ⚠ DANGER

- Do not perform any alteration to this product, otherwise, it may cause water leakage, breakdown, short circuit, electric shock, fire, etc.
- An unventilated area where the appliance using FLAMMABLE REFRIGERANTS is installed shall be so constructed that should any refrigerant leak, it will not stagnate so as to create a fire or explosion hazard.
- Piping, welding and other such work should be carried out far away from the flammable and explosive materials, including the air conditioner refrigerant, to guarantee the security of the site.
- To protect the air conditioner from heavy corrosion, avoid installing the outdoor unit in the place, where sea water can splash directly onto it or in sulphurous air near a spa.

### ▲ WARNING

- The appliance shall be installed in accordance with local and national electrical codes.
- This unit must only be connected to other units that have been confirmed by the manufacturer.
- 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.
- The building this product is installed in must have a proper earth ground. Failure to properly ground this equipment may result in injury or even death. Please do not connect the grounding of this product to various kinds of air feeding ducts, drain pipes, lightning protection facilities as well as other piping lines to avoid
- Wiring must be done by a qualified electrician. All the wiring operations must be conducted according to local and national electrical codes.
- You should consider the capacity of the electric current of your electrical meter and socket before installation.
- This product must be installed on a single dedicated electrical circuit. Circuit breaker protection must be installed in accordance with this manual. In moist and humid locations, an ELB type circuit breaker must be used.
- Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
  - The appliance shall be stored in a room without continuously operating ignition sources(for example: open flames, an operating gas appliance or operating electric heater.) Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.

electric shock and damage caused by other factors.

For duct connected appliances, false ceilings or drop ceilings can't be used as a return air plenum.

### **WARNING**

- Never use gasoline or other inflammable gas near the air conditioner to avoid danger.
  When any abnormality like burnt smell, deformation, fire, smoke, etc. is found, you
  should stop using the air conditioner, immediately cut off the main power supply and
  contact the dealer.
- The first 6 inches of supply air plenum and duct work must be constructed of sheet metal as required by NFPA 90B.
- The supply air plenum or duct must have a solid sheet metal bottom piece directly after the air handler unit with no opening, registers or flexible air ducts located in it. If flexible supply air ducts are used, they may be located only in the side walls of the rectangular plenum, a minimum of 6 inches from the solid bottom.
- Do not install the air conditioner where excessively high heat-generating objects are placed.
- Auxiliary devices which may be a POTENTIAL IGNITION SOURCE shall not be installed in the duct work. Examples of such POTENTIAL IGNITION SOURCES are hot surfaces with a temperature exceeding 600°C and electric switching devices.
- Only auxiliary devices approved by the appliance manufacturer or declared suitable
  with the refrigerant shall be installed in connecting ductwork. You can contact the
  manufacturer for the detail.

### ▲ WARNING

#### PROPOSITION 65:

- This appliance contains fiberglass insulation. Respirable particles of fiberglass are known to State of California to cause cancer.
- All manufacturer products meet current federal OSHA Guidelines for safety. California Proposition 65 warnings are required for certain products, which are not covered by the OSHA standards.
- California's Proposition 65 requires warnings for products sold in California that
  contain or produce any of over 600 listed chemicals known to the State of California to
  cause cancer or birth defects such as fiberglass insulation, lead in brass, and
  combustion products from natural gas.
- All "new equipment" shipped for sale in California will have labels stating that the
  product contains and /or produces Proposition 65 chemicals. Although we have not
  changed our processes, having the same label on all our products facilitates
  manufacturing and shipping. We cannot always know "when, or if" products will be
  sold in the California market.
- You may receive inquiries from customers about chemicals found in, or produced by, some of our heating and air conditioning equipment, or found in natural gas used with some of our products. Listed below are those chemicals and substances commonly associated with similar equipment in our industry and other manufacturers.
  - -Fiberglass Insulation
  - -Carbon Monoxide(CO)
  - -Formaldehyde
  - -Benzene
- More details are available at the websites for OSHA (Occupational Safety and Health Administration), at www.osha.gov and the State of California's OEHHA (Office of Environmental Health Hazard Assessment), at www.oehha.org. Consumer education is important since the chemicals and substances on the list are found in our daily lives, Most consumers are aware that products present safety and health risks, when improperly used, handled and maintained.

### ▲ CAUTION

- Do not use the main breaker as means of turning equipment off/on unless for service needs. Use supplied thermostat for operation.
- Do not stick anything into the air inlet and air outlet of both the indoor and outdoor units. This is dangerous because the fan is rotating at a high speed.
- Means for disconnection from the supply mains having a contact separation in all
  poles that provide full disconnection under over voltage category III conditions must
  be incorporated in the fixed wiring in accordance with the wiring rules.
- Type and rating of circuit breakers / ELB are detailed below.
- The method of connection of the appliance to the electrical supply and interconnection of separate components are detailed below.
- The information of dimensions of the space necessary for correct installation of the appliance including the minimum permissible distances to adjacent structures is detailed below.
- The range of external static pressures for ducted appliances is detailed below.
- Make sure the blower motor support is tight (3-motor mounting bolts). Then check to see if wheel is tightly secured to motor shaft before operation unit.

#### NOTE:

• In general, it is recommended to use this air conditioner within the following temperature setting range.

Mode	Indoor setting temperature range $[{}^\circ F ({}^\circ C)]$			
	Maximum	Minimum		
Cooling operation	90 (32)	61 (16)		
Heating operation	81 (27)	45 (7)		

- Storage condition: Temperature -13~140°F (-25~60°C) Humidity 30%~80%
- Heating and electric heater function are only valid for heat pump types.
- This air conditioner uses new refrigerant HFC (R454B). R454B refrigerant is flammable.
- Read this manual carefully before using this air conditioner. If you still have any
  difficulties or problems, consult your dealer for help.
- The air conditioner is designed to provide you with comfortable room conditions. Use this unit only for its intended purpose as described in this instruction manual.
- The minimum rated airflow:

Model	Min. rated airflow required (m³/h) [gph]
24K	1.07×10⁵
36K	1.47×10 <sup>5</sup>
48K/60K	2.15×10⁵

### Precautions for using R454B refrigerant

The basic installation work procedures are the same as the conventional refrigerant (R22 or R410A). However, pay attention to the following points:

## **MARNING**

1. Transportation equipment containing flammable refrigerants.

Pay attention to the fact that additional transportation regulations may exist with respect to equipment containing flammable gas. The maximum number of pieces of equipment or the configuration of the equipment, permitted to be transported together will be determined by the applicable transport regulations.

2. Equipment signs

Signs for similar appliances (containing flammable refrigerants) used in a work area generally are addressed by local regulations and give the minimum requirements for the provision of safety and/or health signs for a work location. All required signs are to be maintained and employers should ensure that employees receive suitable and sufficient instruction and training on the meaning of appropriate safety signs and the actions that need to be taken in accordance with these signs.

The effectiveness of signs should not be diminished by too many signs being placed together. Any pictograms used should be as simple as possible and contain only essential details.

### 3. Disposal of equipment containing flammable refrigerants

In compliance with national regulations.

#### 4. Storage of equipment/appliances

The storage of equipment should be in accordance with the manufacturer's instructions.

5. Storage of packed (unsold) equipment

- •Storage package protection should be constructed so that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant.
- •The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.
- •The storage temperature should not exceed 140°F (60°C), as the refrigerant leakage may occur above 140°F (60°C), which can cause danger.

### 6. Information on servicing

#### 6-1 Checks to the area

Prior to beginning work on systems containing flammable refrigerants, safety checks are necessary to ensure that the risk of ignition is minimized. To repair the refrigerating system, the following precautions should be complied with prior to conducting work on the system.

6-2 Work procedure

Work shall be undertaken following a controlled procedure so as to minimise the risk of flammable gas or vapour being leaked while the work is being performed.

6-3 General working area

- •All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.
- •The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by controlling flammable material.

6-4 Checking for leakage of refrigerant

- The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potential flammable atmospheres.
- •Ensure that the leak detection equipment being used is suitable for flammable refrigerants, i.e. non-sparking, adequately sealed or intrinsically safe.

6-5 Fire extinguisher

- •If any hot work is to be conducted on the refrigeration equipment or any associated parts, appropriate fire extinguishing equipment shall be available to hand.
- •Have a dry powder or CO, fire extinguisher adjacent to the charging area.

6-6 No ignition sources

- •No person carrying out work in relation to a refrigeration system which involves exposing any pipe work that contains or has contained flammable refrigerant shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion.
- •All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which flammable refrigerant can possibly be released to the surrounding space.
- •Prior to working, the area around the equipment should be checked to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

6-7 Ventilateď area

•Ensure that the area is in the open air or that it is adequately ventilated before tearing down the system or conducting any hot work.

## **MARNING**

•A degree of ventilation shall be kept during the period that the work is carried out.

•The ventilation should safely disperse any released refrigerant and preferably discharge it externally into the

6-8 Checks of the refrigeration equipment

- Where electrical components are being changed, they shall be fit for the purpose and the correct specification.
- At all times the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

• The following checks shall be applied to installations using flammable refrigerants:

The charge amount is in accordance with the room size within which the refrigerant containing parts are

The ventilation machinery and outlets are operating adequately and are not obstructed;

If an indirect refrigerating circuit is used, the secondary circuit shall be checked for the leak of refrigerant;
 Marking of the equipment should be visible and legible. Illegal markings and signs hall be corrected;

- Refrigeration pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

6-9 Checks of electrical devices

- · Repair and maintenance of electrical components shall include initial safety checks and component inspection procedures.
- If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with.
- If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used.
- This shall be reported to the owner of the equipment so all parties are advised.

· Initial safety checks shall include:

- That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- That there no live electrical components and wiring are exposed while charging, recovering or purging the
- That there is continuity of earth bonding.

7. Repairs of sealed components

- During repairs of sealed components, all electrical supplies shall be disconnected prior to any removal of sealed
- · If it is absolutely necessary to have an electrical supply for equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn a potentially hazardous situation.
- Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected.
- This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.

Ensure that apparatus is mounted securely.

• Ensure that seals or sealing materials have not degraded such that they no longer serve the purpose of preventing the ingress of flammable atmospheres.

• Replacement parts shall be in accordance with the manufacturer's specifications.

NOTE: The use of silicon sealants may inhibit the effectiveness of some types of leak detection equipment. Intrinsically safe components do not have to be isolated prior to working on them.

#### 8. Repairs of intrinsically safe components

- Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current for the equipment in use.
- Intrinsically safe components are the only types that can work in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

• Replace components only with parts specified by the manufacturer.

Other parts may result in the ignition of refrigerant leaked in the atmosphere.

9. Cabling

- Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects.
- The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

## **WARNING**

### 10. Detection of flammable refrigerants

- Under no circumstances shall potential sources of ignition be used in the searching or detection of refrigerant leaks.
- REFRIGERANT DETECTION SYSTEM include a means for self-testing to determine if a REFRIGERANT SENSOR (The lifespan of sensors ≥ 15 years) or SENSING ELEMENT malfunction has occurred. If occurs, the fan shall work, and the compressor shall stop. The controller displays the caution information. You must contact qualified personnel to repair.

REFRIGERANT DETECTION SYSTEM shall only be replaced with parts authorized by the manufacturer.

• A halide torch (or any other detector using a naked flame) shall not be used.

#### 11. Leak detection methods

The following leak detection methods are deemed acceptable for systems containing flammable refrigerants:

- Electronic leak detectors shall be used to detect flammable refrigerants, but the sensitivity may not be adequate, or may need re-calibration. (Detection equipment shall be calibrated in a refrigerant-free area.)
- Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant used.
- Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed and the appropriate percentage of gas (maximum 25%) is confirmed.
- Leak detection fluids are suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.
- If a leak is suspected, all naked flames shall be removed/ extinguished.
- If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system, or isolated (by means of shut off valves) in a part of the system remote from the leak.
- Oxygen free nitrogen (OFN) shall be purged through the system both before and during the brazing process.

#### 12. Removal and evacuation

- When breaking into the refrigerant circuit to make repairs or for any other purpose
- -conventional procedures shall be used.
- However, it is important that best practice is followed since flammability is a consideration.
- The following procedure shall be adhered to:

Remove refrigerant;

Purge the circuit with nitrogen;

Evacuate:

Purge again with nitrogen;

Open the circuit by cutting or brazing.

- The refrigerant charge shall be recovered into the correct recovery cylinders.
- The system shall be "flushed" with OFN to render the unit safe.
- This process may need to be repeated for several times.
- Compressed air or oxygen shall not be used for this task.
- Flushing shall be achieved by breaking the vacuum in the system with OFN and continuing to fill until the
  working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum.
- This process shall be repeated until no refrigerant is within the system. When the final OFN charge is used, the system shall be vented down to atmospheric pressure to enable working.
- This operation is absolutely vital if brazing operations on the pipe-work are to take place.
- Ensure that the outlet for the vacuum pump is not close to any ignition sources and there is ventilation available.

### 13. Charging procedures

- In addition to conventional charging procedures, the following requirements shall be followed:
- Ensure that contamination of different refrigerants does not occur when using charging equipment.
- Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- Cylinders shall be kept upright.
- Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- Label the system when charging is complete (if not already).
- Extreme care shall be taken not to overfill the refrigeration system.
- Prior to recharging the system pressure shall be tested with OFN.
- The system shall be leak tested on completion of charging but prior to commissioning.
- A follow up leak test shall be carried out prior to leaving the site.

# **MARNING**

#### 14. Decommissioning

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail.

It is recommended that all refrigerants are recovered safely.

Prior to the task, an oil and refrigerant sample shall be taken in case that an analysis is required prior to the re-use of recovered refrigerant. It is essential that electrical power is available before the task.

- a) Become familiar with the equipment and its operation.
- b) Isolate system electrically.
- c) Before attempting the procedure ensure that:
- Mechanical handling equipment is available, if required, for handling refrigerant cylinders;
- All personal protective equipment is available and being used correctly;
- The recovery process is supervised at all times by a competent person;
- Recovery equipment and cylinders conform to the appropriate standards.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery.
- g) Start the recovery machine and operate in accordance with manufacturer's instructions.
- h) Do not overfill cylinders. (No more than 80 % volume liquid charge).
- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

#### 15. Labelling

Equipment shall be labelled stating that it has been de-commissioned and empty of refrigerant. The label shall be dated and signed.

Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

#### 16. Recovery

- When removing refrigerant from a system, either for servicing or decommissioning, it is recommended that all refrigerant is removed safely.
- When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed.
- Ensure that the correct number of cylinders for holding the total system charge is available.
- All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e. special cylinders for the recovery of refrigerant).
- Cylinders shall be complete with pressure relief valve and associated shut-off valves in good working order.
- Empty recovery cylinders are evacuated and, if possible, cooled before recovery.
- The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants.
- In addition, a set of calibrated weighing scales shall be available and in good working order.
- · Hoses shall be complete with leak-free disconnect couplings and in good condition.
- Before using the recovery machine, check that it is in satisfactory working order, has been properly
  maintained and that any associated electrical components are sealed to prevent ignition in the event of a
  refrigerant release.
- · Consult manufacturer if in doubt.
- The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant Waste Transfer Note arranged.
- Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant.
- The evacuation process shall be carried out prior to returning the compressor to the suppliers.
- Only electric heating to the compressor body shall be employed to accelerate this process.
- When oil is drained from a system, it shall be carried out safely.

## **MARNING**

### 17. Competence of service personnel

Information and training

The training should include the substance of the following:

Information about the explosion potential of flammable refrigerants to show that flammables may be dangerous when handled without care.

Information about potential ignition sources, especially those that are not obvious, such as lighters, light switches, vacuum cleaners, electric heaters.

Information about the concept of sealed components and sealed enclosures according to UL 60335. Information about the correct working procedures:

- a) Commissioning
- Ensure that the floor area is sufficient for the refrigerant charge or that the ventilation duct is assembled in a correct manner.
- Connect the pipes and carry out a leak test before charging with refrigerant.
- Check safety equipment before putting into service.
- b) Maintenance
  - Portable equipment shall be repaired outside on in a workshop specially equipped for servicing units with flammable refrigerants.
- Ensure sufficient ventilation at the repair place.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark. The standard procedure to short circuit the capacitor terminals usually creates sparks.
- Reassemble sealed enclosures accurately If seals are worn, replace them.
- · Check safety equipment before putting into service.
- c) Repair
- Portable equipment shall be repaired outside or in a workshop specially equipped for servicing units with flammable refrigerants.
- Ensure sufficient ventilation at the repair place.
- Be aware that of the equipment may be caused by refrigerant loss and a refrigerant leak is possible.
- Discharge capacitors in a way that won't cause any spark.
- When brazing is required the following procedures shall be carried out in the right order.
- Remove the refrigerant. If the refrigerant is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
- Evacuate the refrigerant circuit.
- Purge the refrigerant circuit with nitrogen for 5 min.
- Evacuate again (not required for A2L refrigerants)
- Remove parts to be replaced by cutting, not by flame.
- Purge the braze point with nitrogen during the brazing procedure.
- Carry out a leak test before charging with refrigerant.
- Reassemble sealed enclosures accurately. If seals are worn, replace them.
- Check safety equipment before putting into service.
- d) Decommissioning
  - If the safety is affected when the equipment is putted out of service, the refrigerant charge shall be removed before decommissioning.
- Ensure sufficient ventilation at the equipment location.
- Be aware that malfunction of the equipment may be caused by refrigerant loss and a leak is possible.
- Discharge capacitors in a way that won't cause any spark.
- Remove the lift he recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet .Take special care that drained refrigerant will not float back into the building.
- e) Disposal
- Ensure sufficient ventilation at the working place.
- Remove the refrigerant. If the recovery is not required by national regulations, drain the refrigerant to the outside. Take care that the drained refrigerant will not cause any danger. In doubt, one person should guard the outlet. Take special care that drained refrigerant will not float back into the building.
- · Evacuate the refrigerant circuit
- Purge the refrigerant circuit with nitrogen for 5 min.
- Evacuate again.
- · Cut out the compressor and drain the oil.

## **⚠ WARNING**

- The pipe-work shall be complianced with national gas regulations.
- The maximum refrigerant charge amount is X oz.(g) (X see below).
- Appliance shall be installed, operated and stored in a room with a floor area larger than Y (Y see below).
- The installation of pipe-work shall be kept to a a room with a floor area larger than Y (Y see below).
- When moving or relocating the air conditioner, consult experienced service technicians for disconnection and reinstallation of the unit.
- Do not place any other electrical products or household belongings under indoor unit or outdoor unit. Condensation dripping from the unit might get them wet, and may cause damage or malfunction of your property.
- · Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer.
- The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).
- Do not pierce or burn.
- Be aware that refrigerants may not contain an odour.
- To keep ventilation openings clear of obstruction.
- The appliance shall be stored in a well-ventilated area where the room size meets requirements as specified for operation.
- The appliance shall be stored in a room without continuously operating open flames (for example an operating gas appliance) and ignition sources (for example an operating electric heater).
- Any person involved with a refrigerant circuit should hold a valid certificate from an industry-accredited assessment authority, which authorizes their competence to handle refrigerants safely in accordance with required specification.
- Service shall only be performed as recommended by the equipment manufacturer.
- · Maintenance and repair requiring the assistance of other skilled personnel shall be carried out under the supervision of the person competent in the use of flammable refrigerants.
- The appliance shall be installed and stored so as to prevent mechanical damage.

  Mechanical connectors used indoors shall comply with ISO 14903. When mechanical connectors are reused indoors, sealing parts shall be renewed. When flared joints are reused indoors, the flare part shall be re-fabricated.
- The installation of pipe-work shall be kept to a minimum.
- Mechanical connections shall be accessible for maintenance purposes.

#### Note:

- If the duct system meets the below requirement, the minimum room area of conditioned space Y can be calculated by all the rooms.
- 1) The appliances shall be connected via an air duct system to one or more rooms, the supply and return air shall be directly ducted to the space.
- 2) If no refrigerant detection system is provided, then, spaces where the airflow may be limited by zoning dampers shall not be included in the determination of Y. Y shall not less than below requirement.
- If the duct system doesn't meet the below requirement, any one room shall meet below minimum room area. And any duct outlet(the supply and return air) shall be 7.2ft (2.2m) high.

### **Safety Precautions**

132(12.3) 139(12.9)

145(13.5) 158(14.7)

172(16)

186(17.3)

202(18.8)

217(20.2)

236(21.7)

251(23.3)

269(25)

287(26.7)

306(28.4)

325(30.2)

346(32.1)

366(34)

388(36)

409(38)

7.2(2.2)

#### Required minimum room area Y [ft.2(m2)] Air handler unit Installation Installation Installation $Y[ft.^2(m^2)]$ $Y[ft.^2(m^2)]$ $Y[ft.^2(m^2)]$ height [ft.(m)] height [ft.(m)] height [ft.(m)] 628(58.3) 101(9.4) 83(7.7) 678(63) 105(9.8) 86(8) 787(73.1) 113(10.5) 93(8.6) 903(83.9) 122(11.3) 99(9.2) 1028(95.5) 129(12) 105(9.8) 1160(107.8) 138(12.8) 112(10.4) 1328(123.4) 147(13.7) 121(11.2) 1449(134.6) 161(15) 126(11.7)

179(16.6)

197(18.3)

216(20.1)

236(21.9)

257(23.9)

279(25.9)

301(28)

325(30.2)

350(32.5)

375(34.8)

402(37.3)

428(39.8)

456(42.4)

485(45.1)

516(47.9)

547(50.8)

578(53.7)

610(56.7)

**WARNING** 

5.9(1.8)

Explanation of symbols displayed on the indoor unit or outdoor unit.

1606(149.2)

1771(164.5)

1943(180.5)

2124(197.3)

2312(214.8)

2509(233.1)

2714(252.1)

2927(271.9)

3147(292.4)

3376(313.6)

3613(335.7)

3858(358.4)

4111(381.9)

4371(406.1)

4640(431.1)

4918(456.9)

5202(483.3)

5496(510.6)

2(0.6)

X[oz.(g)]

88.88(2500)

91.71(2600)

98.77(2800)

105.82(3000)

112.88(3200)

119.93(3400) 126.99(3600)

134.04(3800)

141.10(4000)

148.15(4200) 155.21(4400)

162.26(4600)

169.32(4800)

176.37(5000)

183.42(5200)

190.48(5400)

197.53(5600)

204.59(5800)

211.64(6000)

218.7(6200)

225.75(6400)

232.81(6600)

239.86(6800)

246.92(7000)

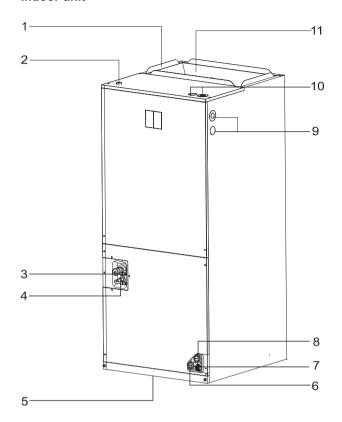
253.97(7200)

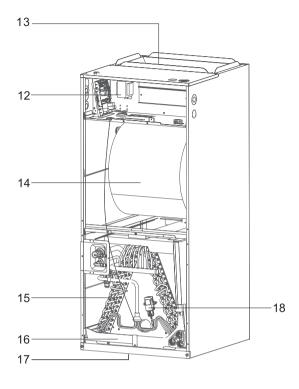
261.03(7400)

Refrigerant safety group A2L	WARNING	This symbol shows that this appliance uses a flammable refrigerant. If the refrigerant is leaked and exposed to an external ignition source, there is a risk of fire.
	CAUTION	This symbol shows that the operation manual should be read carefully.
	CAUTION	This symbol shows that a service personnel should be handling this equipment with reference to the installation manual.
Ţ <u>i</u>	CAUTION	This symbol shows that information is available such as the operating manual or installation manual.

## Composition of the Air conditioner

#### Indoor unit





- 1. Supply air outlet flange
- 2. Low voltage connection (for 24V)
- 3. Refrigerant pipe (Gas)
- 4. Refrigerant pipe (Liquid)
- 5. Return air inlet
- 6. Auxiliary drainage hole
- 7. Primary drain connection
- 8. Auxiliary drainage connection
- 9,10. Knockout for power cable
- 11. Supply air outlet
- 12. Electrical enclosure
- 13. Auxiliary heater (Optional)
- 14. Blower fan
- 15. Evaporator
- 16. Condensate drain pan
- 17. Filter cover
- 18. Refrigerant detection sensor

NOTE: The figures are based on the external views of the standard model.

Consequently, the shape may differ for the air conditioner model you have selected.

### **Trouble Shooting**



When drain water overflows from the indoor unit, stop the operation and contact your dealer. When you smell or see white smoke coming out of the unit, turn OFF the main power supply and contact your dealer.

#### 1. If Trouble still Exists

If the trouble still exists even after checking the following, contact your dealer and inform them of the following items.

- (1) Unit Model Name
- (2) Content of Trouble

#### 2. No Operation

Check whether the SET TEMP is set at the correct temperature.

#### 3. Not Cooling or Heating Properly

- Check for obstruction of air flow of outdoor or indoor units.
- Check if there are too many heating sources in the room.
- Check if the air filter is clogged with dust.
- Check if the doors or windows are open.
- Check if the temperature condition is within the operation range.

#### 4. This is Not Abnormal

#### Odour from Indoor Unit

Unpleasant odour diffuses from indoor unit after a long period of time. Clean the air filter and panels or allow a good ventilation.

#### Sound from Deforming Parts

When start or stop the system, a sound might be heard. However, this is due to thermal deformation of plastic parts. It is not abnormal.

#### • Steam from Outdoor Heat Exchanger

During defrosting operation, ice on the outdoor heat exchanger melts resulting in steam.

#### • Dew on Air Panel

When the cooling operation continues for a long period of time under high humidity conditions, dew can form on the air panel.

#### Refrigerant Flow Sound

While the system is being started or stopped, the refrigerant flow sound may be heard.

Air Filter

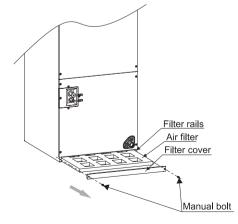
### **Air Filter (Not Factory-installed)**

Please replace or clean the filter regularly, because there will be lots of dust accumulated on the surface of the filter after a period of time.

#### Follow these steps to properly replace the filter:

After removing the two manual bolts, take down the filter cover and pull out the filter from the case, then insert the new one into the case along the filter rail, at last fix the filter cover with manual bolts.

Model	Filter size (L×W×H) in.
24K/36K	20×18×1
48K/60K	22×20×1



### 1. Safety Notice

### **▲** WARNING

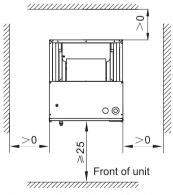
- Install the air conditioner on a solid base that can support the unit weight. (An inadequate base or incomplete installation may cause injury due to falling off from the base.)
- Electrical work should be carried out in accordance with the installation manual and the local and national electrical wiring rules or code.
  - (Insufficient capacity or incomplete electrical work may cause electrical shock or fire.)
- · Be sure to use a dedicated power circuit. (Never use the power supply shared by another appliance.)
- For wiring, use a cable long enough for the entire distance, and do not use an extension cord.
- · Do not put other loads on the power supply, and please use a dedicated power circuit.
- Use the specified types of wires for electrical connections between the indoor and outdoor units. (Firmly clamp the interconnecting wires so that the terminals receive no external stress.)
- Incomplete connections or clamping may cause terminal overheating or fire.
- · After establishing connection between all the wires, fix the cables to prevent undue force on the electrical covers or panels. (Install covers over the wires, incomplete cover installation may cause terminal overheating, electrical shock or fire.)
- There is 100PSIG high pressure nitrogen in the evaporator, please release it first before installation. It proves the evaporator to be in good state if there is nitrogen out, otherwise, it indicates the evaporator leaks.
- · When installing or relocating the system, be sure to keep the refrigerant circuit free from air (Air in the refrigerant circuit may cause an abnormal pressure rise or rupture, resulting in injury.)
- · If any refrigerant leakage occurs during the installation work, ventilate the room.
- After all installations are completed, make sure that no refrigerant leaks. (The refrigerant produces, toxic gas if exposed to flames.)
- When carrying out piping connection, do not let air substances other than the specified refrigerant get into refrigeration cycle. (Otherwise, it will cause decreased performance, abnormal high pressure in the refrigeration cycle, explosion and injury.)
- Make sure that the installation has a proper earth connection. Do not ground the unit to a utility pipe, arrester, or telephone grounding. Incomplete grounding may cause electrical shock. (A high surge current from lightning or other sources may cause damage to the air conditioner.)
- An earth leakage circuit breaker may be required depending on the site condition to prevent electrical shock.
- · Disconnect the power supply before wiring, piping, or checking the unit.

### 2. Installation of the Indoor Unit

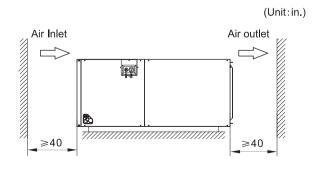
### 2.1 Initial Check

## ▲ CAUTION

- When moving the unit after unpacking, make sure not to exert any pressure on other parts, especially the refrigerant piping, drain piping and flange parts.
- · Wear proper PPE when installing the units.



Clearance in the Vertical Position



Clearance in the Horizontal Position

#### 2.2 Installation Location

Before choosing the installation site, obtain the user's approval.

- Optimum air distribution is ensured.
- The air path is not blocked.
- Condensation can drain properly.
- Ensure sufficient clearance for maintenance and servicing.
- Piping between the indoor and outdoor units should be within the allowable limits. (Refer to the installation of the outdoor unit)
- The indoor unit, outdoor unit, power supply wiring and transmission wiring should be kept at least 1 meter away from televisions and radio, which prevents image interference and noise in those electrical appliances.

(Noise may be generated depending on the conditions under which the electric wave is generated, even if a one-meter distance is maintained.)

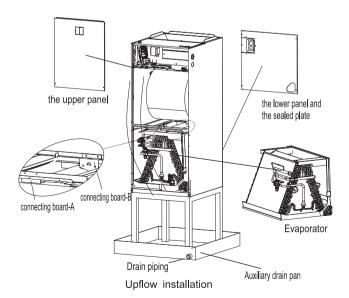
- Do not install the indoor unit in a machinery shop or kitchen where vapor from oil or its mist flows to the indoor unit. The oil will deposit on the heat exchanger, thereby reducing the performance of the indoor unit, and may deform and in the worst case, break the plastic parts of the indoor unit.
- When the unit is installed in a hot and humid place, it is recommended to insulate the cabinet exterior and to use auxiliary drain pans.
- If installed above a finished living space, a auxiliary drain pan(as required by many building codes),must be installed under the entire unit and its condensate drain line must be routed to a location such that the user will see the condensate discharge.

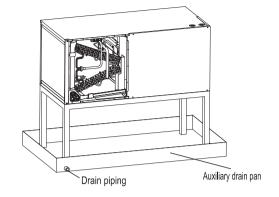
### 2.3 Installation

#### NOTE:

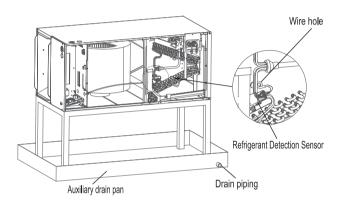
These appliances are designed for indoor installation only.

The indoor units can be installed in one of the upflow, horizontal left, horizontal right or vertical downflow orientations as shown in Figures below.

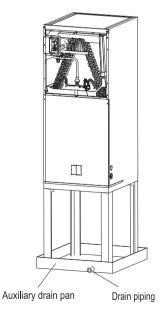




Horizontal right installation



Horizontal left installation



downflow installation

Up-flow installation method is selected by default. (You need to install different accessories for the left exhaust air and right exhaust air installation modes. For details about the accessories and installation instructions, see the accessory package.)

Horizontal right installation

When the unit is horizontal right mounted, it is necessary to remove the evaporator, After pulling out the evaporator, select the corresponding accessory package according to the accessory list. Please refer to the operating instructions in the accessory package for installation.

• Horizontal left installation When the unit is horizontal left mounted, the following steps are required.

- 1) Disassemble the lower panel, the sealed plate and the connecting board A & B;
- 2) Disassemble the retaining clips and the refrigerant detection sensor wire for the evaporator so that the evaporator can be pulled out along the lead rail easilyAfter pulling out the evaporator,After pulling out the evaporator, select the corresponding accessory package according to the accessory list. Please referto the operating instructions in the accessory package for installation.
- 3) Rotate the evaporator for 180 degrees and insert it into the upper side of the lead rail. Insert the refrigerant detection sensor wire through the evaporator wire hole and insert it into the inner section of the electrical box, then fixed it by clamper;
- 4) Rotate the unit to the left for 90 degrees, as shown in image horizontal left installation;
- 5) Reinstall the sealed plate and the lower panel.
- downflow installation

When the equipment needs to be installed upside down, first follow steps 1), 2), 3) of "Horizontal left installation" to complete the rotating installation of the evaporator. Rotate the equipment by 180 degrees to make the air outlet downward.

#### 2.4 Air duct

#### **▲** WARNING

Field duct work must comply with the National Fire Protection Association NFPA 90NFPA 90B and any applicable local ordinance.

Do not, under any circumstances, connect return duct work to any other heat producing device such as fireplace insert, stove, etc. Unauthorized use of such devices may result in fire, carbon monoxide poisoning, explosion, personal injury or property damage.

Sheet metal duct work run in unconditioned spaces must be insulated and covered with a vapor barrier. Fibrous duct work may be used if constructed and installed in accordance with SMACNA Construction Standard on Fibrous Glass Ducts. Duct work must comply with National Fire Protection Association as

tested by U/L Standard 181 for Class I Air Ducts. Check local codes for requirements on duct work and insulation.

Duct system must be designed within the range of external static pressure the unit is designed to operate against. It is important that the system airflow be adequate. Make sure supply and return duct work, grills, special filters, accessories, etc, are accounted for in total resistance.

### 3. Refrigerant Pipe

### ⚠ DANGER

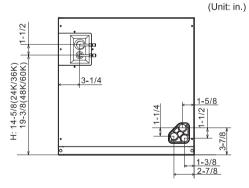
Use the refrigerant according to outdoor nameplate. When carrying out the leakage check and test, do not mix in the oxygen, the acetylene and the flammable and the reactive gas, because these gases may result in explosion. It is suggested to use nitrogen to perform these experiments.

### 3.1 Pipe Material

- (1) Prepare the copper pipe on the spot.
- (2) Choose dustless, non-humid, clean copper pipe. Before installing the pipe, use nitrogen or dry air to blow away the dust and impurity on the pipe.
- (3) Choose the copper pipe according to outdoor manual.

### 3.2 Piping Connection

(1) The connection positions of the pipe are shown below.



Connection positions of the pipe

Refer to the outdoor unit Installation Instructions for details on piping size selection, piping installation, and charging information.

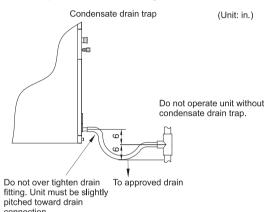
Coil is shipped filled with Nitrogen. Evacuate the system before charging with refrigerant. Install refrigerant lines so that it does not block service access to the front of the unit. Nitrogen should flow through the refrigerant lines

Nitrogen should flow through the refrigerant lines while brazing.

Use a wet rag or an approved heat paste to protect the TXV sensing bulb during the brazing process.

### 4. Drain Piping

The coil drain pan has a primary and a secondary drain with 3/4" NPT female connections. The connectors required are 3/4" NPT male, either PVC or metal pipe. To prevent damage of the drain pan connection, it is recommended to seal the connector with Teflon tape, and should be hand-tightened with a torque less than 37 in-lbs. An insertion depth of approximately 3/8" to 1/2"(5-8 turns)should be expected at this torque. All horizontal drain pipes must be pitched downward away from the unit a minimum of 1/8" per foot to provide free drainage.



Do not connect the drain pipes directly to sewage pipes to avoid ammonia odour. The ammonia in the sewage might enter the indoor unit through the drain pipes and corrode the heat exchanger. Do not twist or bend the drain hose, because excessive force is applied during twisting or bending and may also cause leakage.

The drain line should be insulated where necessary to prevent sweating and damage due to condensate forming on the outside surface of the pipe. Test condensate drain pan and drain pipe after installation is complete. Keep the case horizontal (horizontal left or horizontal right) to ensure a smooth drainage, or incline the case 0.5° to the drainage hole, making it the lowest point for draining. Pour water into drain pan, enough to fill drain trap and line. Check to make sure drain pan is draining completely, no leaks are found in drain pipe fittings, and water is draining from the termination of the primary drain pipe.

#### NOTES:

If unit is located in or above a living space where damage may result from condensate overflow, a field-supplied, external condensate pan should be installed underneath the entire unit, and a secondary condensate line (with appropriate trap) should be run from the unit into the pan. Any condensate in this external condensate pan should be drained to a noticeable place. The owner of the structure must be informed that when condensate flows from the secondary drain or external condensate pan, the unit requires servicing or water damage will occur. Install traps in the condensate lines as close to the coil as possible.

## 5. Electrical Wiring

### 5.1 Electrical Installation



- Before proceeding with electrical connections, make certain that power supply are as specified on the unit rating plate. See unit wiring label for proper field high and low-voltage wiring. Make all electrical connections in accordance with the NEC and any local codes or ordinances that may apply. Refer to the NEC(USA) or CSA(Canada) for wire sizing. Use copper wire only.
- Every installation must include an NEC(USA) or CSA (Canada) approved over-current protection device.



Disconnect all power before servicing or installing this unit.

To avoid the electrical shock, please ensure the air conditioner is proper grounded.

All routing of electrical wiring must be made through provided electrical knockouts. Do not cut, puncture or alter the cabinet for electrical wiring.

Knockouts are provide on the indoor unit top panel and sides of the cabinet to allow for the entry of the supply voltage conductors. If the knockouts on the cabinet sides are used for electrical conduit, an adapter ring must be used in order to meet UL 60335 safety requirements. An MEC or CEC approved strain relief is to be used at this entry point. Some codes/ municipalities require the supply wire to be enclosed in conduit. Consult your local codes.

L: Fault terminal: Y1: Cooling/Heating level 1; Y/Y2: Cooling/Heating level 2;

### Wiring diagram

#### Outdoor unit connected to an indoor unit of the same brand

Y1-th: Controller wiring for Cooling/Heating level 1 Y1-OUT: Outdoor unit wiring for Cooling/Heating level 1; Y/Y2·th: Controller wiring for Cooling/Heating level 2; Y/Y2-OUT: Outdoor unit wiring for Cooling/Heating level 2; O: 4-WAY valve signal; C: AC 24V Public terminal; L R· AC 24V Live Wire Y1 G. Indoor unit fan signal; 0 W: Defrost signal: Y/Y2 W1/W2: Electric auxiliary heat signal G W1 R OR W2 (L1)(L2) ( С Power terminal C G O Y/Y2 Y1 W (L1)(L2) Thermostat Y/Y2-th G W1 R W2 Y1-th L C Y/Y2-OUT Y1-OUT G-OUT Indoor unit Outdoor unit Power supply Power supply Power supply

#### NOTE:

- (1) Wiring must be performed according to wiring diagram that pasted on indoor unit.
- (2) The Y/Y2-th wire between the indoor and outdoor units is not indispensable, especially when the outdoor unit is connected to an indoor unit of a different brand. It is more energy-saving when the outdoor unit is connected to an indoor unit of the same brand by Y/Y2-th wire. However, it still can run without it.
- (3) Since the thermostat is locally provided, the terminal block in the diagram may differ from the actual one. The letter Y is the same as Y1-th.
- (4) When connecting the same brands indoor unit, it should be matched with a wire controller with fault signal detection, connect the thermostat to the terminal L of the indoor unit, After any refrigerant leakage is detected, the terminal L outputs an AC 24 V fault signal to the wire controller, and then the wire controller displays the fault and gives an alarm.
- When electric auxiliary heating is selected, the thermostat needs to be connected to terminals W1 and W2 of the indoor unit, as shown by the dotted line in the wiring diagram.
- (6) 4-WAY valve is energized for cooling (O)

### Electrical data

#### When connect with heat pump outdoor unit:

	Model	Power Supply	ELB		MCA(A)	Transmitting	Thermostat	Fuse or
(	Capacity)		Rated Current (A)	Nominal Sensitive Current (mA)	IVIC. $\Delta(\Delta)$	Cable Size	Signal Size	Circuit Breaker (A)
	24K/36K/ 48K/60K	208/230V ~/60Hz	10	30	3.3/4.8/6.8/6.8	5×16AWG	5×18AWG/ 6×18AWG	10

#### Max. Running Current (A): REFER TO NAMEPLATE

Note:

- (1) Follow local codes and regulations when select field wires ,and all the above are the minimum wire size.
- (2) 18AWG. color-coded low voltage wire should be used for lengths less than 100ft(30m). For wire lengths than 100ft.(30m), 16AWG, wire should be used. When transmitting cable length is longer than 262ft, (80m), a larger wire size should be selected.
- (3) Install main switch for each system separately. Where required according to conditions and local codes, select the high response type ELB that acts within 0.1second. Recommended capacity to see outdoor machine switch capacity.
- (4) If auxiliary heater is required and already installed on indoor unit, power source cable should be installed separately and the size should be selected in accordance with local and national electrical codes.

### 5.2 Change of Static Pressure

The static pressure can be selected by changing Dip Switches on electric board.

#### **Static Pressure Setting:**

Dip Switch S2 Setting	Blower Speed Tap	Fan Speed Select	Static Pressure (W.C.[kPa]) 24K	Static Pressure (W.C.[kPa]) 36K	Static Pressure (W.C.[kPa]) 48K/60K
ON OFF 1 2	1	Medium	0.25[0.08]	0.4[0.1]	0.4[0.1]
ON OFF 1 2	2	Medium High (Default setting)	0.58[0.145]	0.58[0.145]	0.58[0.145]

NOTE: Symbol " ■ " indicates the position of the dip switch. Symbol " \[ \] " indicates any position of ON or OFF.

### 6. Test Run

Please perform test run according to installation manual of outdoor unit.

### 7. TXV Replacement Information

Please follow the steps below when replace TXV:

- (1) Disassemble the front panel.
- (2) Take the thermal bulb down by undoing the copper strips around it.
- (3) Weld the pressure pipe off from the gas pipe with a welding gun. Be careful not to burn the gas pipe.
- (4) Weld the TXV off from the liquid pipe with a welding gun. Be careful not to burn the liquid pipe.
- (5) Wrap the new TXV with a piece of wet cloth to prevent it from being too hot and connect the nitrogen flow to liquid pipe to prevent it from being oxidized. Weld the TXV to the liquid pipe, and pay attention to the direction of the TXV, then weld the pressure pipe to the gas pipe.
- (6) When the pipe gets cool after the welding, connect it with 150PSI nitrogen equipment and examine if leakage occurs.
- (7) Fix the thermal bulb to the gas pipe with copper strips and perform insulation works.
- (8) Vacuumize the unit, start up the system and the unit will start cooling operation.
- (9) When the unit has operated for 20 minutes, adjust the TXV superheat to 6°F.
- (10) When the unit has operated for another 20 minutes, examine whether the superheat is appropriate and record the figures then.

### 8. Electric Heat Kit Selection Table

Electric Heat Kit Model	Air Handler Model	Electric Heat	MIN. Circu	it Ampacity		e or Breaker Ampacity	Fan Speed Tap
		(kW)	230VAC	208VAC	230VAC	208VAC	5
21-4245-01 A2L		5	28.3	25.9	30	30	•
21-4245-02 A2L	24K	7.5	40.7	37.2	45	40	•
21-4245-03 A2L		10	53.2	48.5	60	50	•
21-4245-01 A2L		5	29.8	27.4	30	30	•
21-4245-02 A2L	2014	7.5	42.2	38.7	45	40	•
21-4245-03 A2L	36K	10	54.7	49.9	60	50	•
21-4245-04 A2L		15	42.2+36.9	38.6+33.8	45+40	40+35	•
21-4245-01 A2L		5	31.8	29.4	35	30	•
21-4245-02 A2L		7.5	44.8	40.7	45	45	•
21-4245-03 A2L	48K/60K	10	56.7	51.9	60	55	•
21-4245-04 A2L		15	44.8+36.9	40.7+33.8	50+40	50+35	•
21-4245-05 A2L		20	56.7+49.9	51.9+45.2	60+50	60+50	•

•: available ×: unavailable

#### NOTE:

Heat kit is an optional part, and it must be connected to the power supply separately.

It is recommended that electric heater kit should be installed in low temperature area or when long piping is used. Check if heat kit suitable for AHU 4-way position installation.

Ampacities for MCA and Fuse/breaker including the blower motor.

Heat pump systems require a specified airflow. Each ton of cooling requires between 350 and 450 cubic feet of air per minute(CFM).