



# OWNER'S MANUAL

## VHP-DA SERIES

### DUCTED UNIT

B-VHP09DA-1

B-VHP12DA-1

B-VHP18DA-1

B-VHP24DA-1

B-VHP36DA-1



**IMPORTANT NOTE:**

Read this manual carefully before installing or operating your new air conditioning unit. Make sure to save this manual for future reference.

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# SAFETY PRECAUTIONS

It is really important that you read Safety Precautions Before Operation and Installation. Incorrect installation due to ignoring instructions can cause serious damage or injury. The seriousness of potential damage or injuries is classified as either a WARNING or CAUTION.

## Explanation of Symbols



### WARNING

This symbol indicates the possibility of personnel injury or loss of life.



### CAUTION

This symbol indicates the possibility of property damage or serious consequences.

## WARNING

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.

## WARNING FOR PRODUCT USE

- Turn off the air conditioner and disconnect the power before performing any cleaning, installation or repairing. Failure to do so can cause electric shock.
- If an abnormal situation arises (like a burning smell), immediately turn off the unit and disconnect the power. Call your dealer for instructions to avoid electric shock, fire or injury.
- Do not insert fingers, rods or other objects into the air inlet or outlet. This may cause injury, since the fan may be rotating at high speeds.
- Do not use flammable sprays such as hair spray, lacquer or paint near the unit. This may cause fire or combustion.
- Do not operate the air conditioner in places near or around combustible gases. Emitted gas may collect around the unit and cause explosion.
- Do not operate your air conditioner in a wet room such as a bathroom or laundry room. Too much exposure to water can cause electrical components to short circuit.
- Do not expose your body directly to cool air for a prolonged period of time.
- Do not allow children to play with the air conditioner. Children must be supervised around the unit at all times.
- If the air conditioner is used together with burners or other heating devices, thoroughly ventilate the room to avoid oxygen deficiency.
- In certain functional environments, such as kitchens, server rooms, etc., the use of specially designed air-conditioning units is highly recommended.

## ELECTRICAL WARNINGS

- Only use the specified wire. If the wire is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- The product must be properly grounded at the time of installation, or electric shock may occur.
- For all electrical work, follow all local and national wiring standards, regulations, and the Installation Manual. Connect cables tightly, and clamp them securely to prevent external forces from damaging the terminal. Improper electrical connections can overheat and cause fire, and may also cause shock. All electrical connections must be made according to the Electrical Connection Diagram located on the panels of the indoor and outdoor units.
- All wiring must be properly arranged to ensure that the control board cover can close properly. If the control board cover is not closed properly, it can lead to corrosion and cause the connection points on the terminal to heat up, catch fire, or cause electric shock.
- Disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
- Do not share the electrical outlet with other appliances. Improper or insufficient power supply can cause fire or electric shock.
- If connecting power to fixed wiring, an all-pole disconnection device which has at least 3mm clearances in all poles, and have a leakage current that may exceed 10mA, the residual current device (RCD) having a rated residual operating current not exceeding 30mA, and disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

## CLEANING AND MAINTENANCE WARNINGS

- Turn off the device and disconnect the power before cleaning. Failure to do so can cause electric shock.
- Do not clean the air conditioner with excessive amounts of water.
- Do not clean the air conditioner with combustible cleaning agents. Combustible cleaning agents can cause fire or deformation.

## CAUTION

- Turn off the air conditioner and disconnect the power if you are not going to use it for a long time.
- Turn off and unplug the unit during storms.
- Make sure that water condensation can drain unhindered from the unit.
- Do not operate the air conditioner with wet hands. This may cause electric shock.
- Do not use device for any other purpose than its intended use.
- Do not climb onto or place objects on top of the outdoor unit.
- Do not allow the air conditioner to operate for long periods of time with doors or windows open, or if the humidity is very high.

## **⚠ WARNING FOR USING FLAMMABLE REFRIGERANTS**

- 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.
- LEAK DETECTION SYSTEM installed. Unit must be powered except for service. For the unit with refrigerant sensor, when the refrigerant sensor detects refrigerant leakage, the indoor unit will display a error code and emit a buzzing sound, the compressor of outdoor unit will immediately stop, and the indoor fan will start running. The service life of the refrigerant sensor is 15 years. When the refrigerant sensor malfunctions, the indoor unit will display the error code "FHCC". The refrigerant sensor can not be repaired and can only be replaced by the manufacture. It shall only be replaced with the sensor specified by the manufacture.

### **For R454B refrigerant charge amount and minimum room area:**

The machine you purchased may be one of the types in the table below. The indoor and outdoor units are designed to be used together. Please check the machine you purchased. The Air Conditioner should be installed at least 7.3ft/2.2m above from the floor, the minimum room area of operating or storage should be as specified in the following table:

<b>Model</b>	<b>Indoor unit</b>	<b>Outdoor unit</b>
09K	B-VHP09DA-1	A-VHP09SA-1
12K	B-VHP12DA-1	A-VHP12SA-1
18K	B-VHP18DA-1	A-VHP18SA-1
24K	B-VHP24DA-1	A-VHP24SA-1
30K	B-VHP30DA-1	A-VHP33SA-1
36K	B-VHP36DA-1	N/A

## Room size restriction

The appliances are connected via an air duct system to one or more rooms, the bottom of the air outlet of the air duct in the room should be at a height  $\geq 7.3\text{ft}/2.2\text{m}$  from the floor. In UL/CSA 60335-2-40, the R454B refrigerant belongs to mildly flammable refrigerants, which will limit the room area of the system service. Similarly, the total amount of refrigerant in the system should be less than or equal to the maximum allowable refrigerant charge, which depends on the room area serviced by the system.

### NOTE

The nouns in this section are explained as follows :

Mc: The actual refrigerant charge in the system.

A: the actual room area where the appliance is installed.

Amin: The required minimum room area.

Mmax: The allowable maximum refrigerant charge in a room.

Qmin: The minimum circulation airflow.

Anvmin The minimum opening area for connected rooms.

T Amin: The total area of the conditioned space (For appliances serving one or more rooms with an air duct system).

TA: The total area of the conditioned space connected by air ducts .

## Rerrigerant charge and room area limitations

For the purpose of determination of room area (A) when used to calculate the maximum allowable refrigerant charge (mmax) in an unventilated space, the following shall apply.

The room area (A) shall be defined as the room area enclosed by the projection to the floor of the walls, partitions and doors of the space in which the appliance is installed.

Spaces connected by only drop ceilings, ductwork, or similar connections shall not be considered a single space.

For units mounted higher than 1,8 m, spaces divided by partition walls which are no higher than 1,6 m shall be considered a single space.

For fixed appliances, rooms on the same floor and connected by an open passageway between the spaces can be considered a single room when determining compliance to Amin, if the passageway complies with all of the following.

- It is a permanent opening.
- It extends to the floor.
- It is intended for people to walk through.

For fixed appliances, the area of the adjacent rooms, on the same floor, connected by permanent opening in the walls and/or doors between occupied spaces, including gaps between the wall and the floor, can be considered a single room when determining compliance to Amin, provided all of the following are met.

- The space shall have appropriate openings according to Sec.2.
- The minimum opening area for natural ventilation Anvmin shall not be less than the following:

Height of outlet/m	A/m <sup>2</sup>	Mc/Kg	Mmax/kg	Anvmin/m <sup>2</sup>
2.2	5	5.0	2.685	0.045
2.2	6	5.0	2.941	0.042
2.2	7	5.0	3.177	0.038
2.2	8	5.0	3.396	0.035
2.2	9	5.0	3.602	0.031
2.2	10	5.0	3.797	0.028
2.2	11	5.0	3.983	0.024
2.2	12	5.0	4.160	0.020
2.2	13	5.0	4.330	0.016
2.2	14	5.0	4.493	0.013
2.2	15	5.0	4.651	0.009
2.2	16	5.0	4.803	0.005
2.2	17	5.0	4.951	0.001

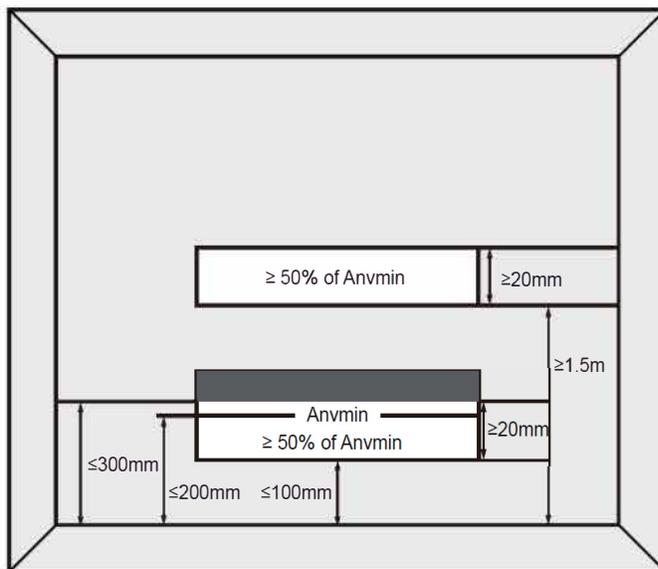
**Note:** Take the  $M_c = 5.0\text{kg}$  as an example. For appliances serving one or more rooms with an air duct system, the room area calculation shall be determined based on the total area of the conditioned space (TA) connected by ducts taking into consideration that the circulating airflow distributed to all the rooms by the appliance integral indoor fan will mix and dilute the leaking refrigerant before entering any room.

**Opening conditions for connected rooms**

When the openings for connected rooms are required, the following conditions shall be applied.

- The area of any openings above 300mm from the floor shall not be considered in determining compliance with  $A_{nvmin}$ .
- At least 50% of the required opening area  $A_{nvmin}$  shall be below 200mm from the floor.
- The bottom of the lowest openings shall not be higher than the point of release when the unit is installed and not more than 100mm from the floor.
- Openings are permanent openings which cannot be closed.
- For openings extending to the floor the height shall not be less than 20mm above the surface of the floor covering
- A second higher opening shall be provided. The total size of the second opening shall not be less than 50% of minimum opening area for  $A_{nvmin}$  and shall be at least 1.5 m above the floor.

NOTE: The requirement for the second opening can be met by drop ceilings, ventilation ducts, or similar arrangements that provide an airflow path between the connected rooms.



- The room into which refrigerant can leak, plus the connected adjacent room(s) shall have a total area of not less than  $T_{Amin}$ .
- The room area in which the unit is installed shall be not less than 20 %  $T_{Amin}$ .

$A_{min}/TA_{min}$ [ft <sup>2</sup> /m <sup>2</sup> ]	$h_{inst}$ [ft/m]					
	6.0~7.3/ 1.8~2.2	7.6/2.3	7.9/2.4	8.6/2.6	9.2/2.8	9.9/3.0
<=62.6/1.776	12/1.10					
63.4/1.8	60/5.53	57/5.29	55/5.07	51/4.68	47/4.35	44/4.06
70.5/2.0	67/6.15	64/5.88	61/5.64	56/5.20	52/4.83	49/4.51
77.5/2.2	73/6.76	70/6.47	67/6.20	62/5.72	58/5.31	54/4.96
84.6/2.4	80/7.38	76/7.06	73/6.76	68/6.24	63/5.80	59/5.41
91.7/2.6	86/7.99	83/7.64	79/7.32	73/6.76	68/6.28	64/5.86
98.7/2.8	93/8.60	89/8.23	85/7.89	79/7.28	73/6.76	68/6.31
105.8/3.0	100/9.22	95/8.82	91/8.45	84/7.80	78/7.24	73/6.76
112.8/3.2	106/9.83	102/9.41	97/9.01	90/8.32	84/7.73	78/7.21
119.9/3.4	113/10.45	108/9.99	104/9.58	96/8.84	89/8.21	83/7.66
126.9/3.6	120/11.06	114/10.58	110/10.14	101/9.36	94/8.69	88/8.11
134/3.8	126/11.68	121/11.17	116/10.70	107/9.88	99/9.17	93/8.56
141.0/4.0	133/12.29	127/11.76	122/11.27	112/10.40	104/9.66	97/9.01
148.1/4.2	139/12.90	133/12.34	128/11.83	118/10.92	110/10.14	102/9.46
155.1/4.4	146/13.52	140/12.93	134/12.39	124/11.44	115/10.62	107/9.91
162.2/4.6	153/14.13	146/13.52	140/12.96	129/11.96	120/11.11	112/10.37
169.2/4.8	159/14.75	152/14.11	146/13.52	135/12.48	125/11.59	117/10.82
176.3/5.0	166/15.36	159/14.69	152/14.08	140/13.00	130/12.07	122/11.27
Area formula	<p> <math>A_{min}/TA_{min}</math> is the required minimum room area in ft<sup>2</sup>/m<sup>2</sup>  <math>m_c</math> is the actual refrigerant charge in the system in oz/kg  <math>m_{REL}</math> is the refrigerant releaseable charge in oz/kg  <math>h_{inst}</math> is the height of the bottom of the appliance relative to the floor of the room after installation.                     </p> <p> <b>WARNING:</b> The minimum room area or minimum room area of conditioned space is based on releasable charge and total system refrigerant charge.                     </p>					

When the unit detects a refrigerant leak, the minimum airflow of the indoor unit is as follows:

#### Medium And High Static Pressure Duct Type Air Conditioner

Model	9K	12K	18K	24K	36K
Nominal air volume	324CFM 550m <sup>3</sup> /h	382CFM 650m <sup>3</sup> /h	647CFM 1100m <sup>3</sup> /h	824CFM 1400m <sup>3</sup> /h	1176CFM 2000m <sup>3</sup> /h

1. Installation (where refrigerant pipes are allowed)
  - Any person who is involved with working on or breaking into a refrigerant circuit should hold a current valid certificate from an industry-accredited assessment authority, which authorises their competence to handle refrigerants safely in accordance with an industry recognised assessment specification.
  - 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.
  - That the installation of pipe-work shall be kept to a minimum.
  - That pipe-work shall be protected from physical damage.
  - Where refrigerant pipes shall be compliance with national gas regulations.
  - That mechanical connections shall be accessible for maintenance purposes.
  - Be more careful that foreign matter (oil, water, etc) does not enter the piping. Also, when storing the piping, securely seal the opening by pinching, taping, etc.
  - Appliance shall be stored in a well ventilated area where the room size corresponds to the room area as specified for operation.
  - Appliance shall be stored in a well ventilated area where the room size corresponds to the room area as specified for operation.
  - Joints shall be tested with detection equipment with a capability of 5 g/year of refrigerant or better, with the equipment in standstill and under operation or under a pressure of at least these standstill or operation conditions after installation. Detachable joints shall NOT be used in the indoor side of the unit (brazed, welded joint could be used).
  - In cases that require mechanical ventilation, ventilation openings shall be kept clear of obstruction.
  
2. When a FLAMMABLE REFRIGERANT is used, the requirements for installation space of appliance and /or ventilation requirements are determined according to
  - the mass charge amount (M) used in the appliance,
  - the installation location,
  - the type of ventilation of the location or of the appliance.
  - piping material, pipe routing, and installation shall include protection from physical damage in operation and service, and be in compliance with national and local codes and standards, such as ASHRAE 15, IAPMO Uniform Mechanical Code, ICC International Mechanical Code, or CSA B52. All field joints shall be accessible for inspection prior to being covered or enclosed.
  - that protection devices, piping, and fittings shall be protected as far as possible against adverse environmental effects, for example, the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris;
  - that piping in refrigeration systems shall be so designed and installed to minimize the likelihood of hydraulic shock damaging the system;
  - that steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation;
  - that precautions shall be taken to avoid excessive vibration or pulsation;
  - the minimum floor area of the room shall be mentioned in the form of a table or a single figure without reference to a formula;
  - after completion of field piping for split systems, the field pipework shall be pressure tested with an inert gas and then vacuum tested prior to refrigerant charging, according to the following requirements:
    - a. The minimum test pressure for the low side of the system shall be the low side design pressure and the minimum test pressure for the high side of the system shall be the high side design pressure, unless the high side of the system can not be isolated from the low side of the system in which case the entire system shall be pressure tested to the low side design pressure.
    - b. The test pressure after removal of pressure source shall be maintained for at least 1 h with no decrease of pressure indicated by the test gauge, with test gauge resolution not exceeding 5% of the test pressure.

- c. During the evacuation test, after achieving a vacuum level specified in the manual or less, the refrigeration system shall be isolated from the vacuum pump and the pressure shall not rise above 1500 microns within 10 min. The vacuum pressure level shall be specified in the manual, and shall be the lessor of 500 microns or the value required for compliance with national and local codes and standards, which may vary between residential, commercial, and industrial buildings.
    - field-made refrigerant joints indoors shall be tightness tested according to the following requirements: The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the maximum allowable pressure. No leak shall be detected.
    - Any servicing shall be performed only as recommended by the manufacturer.
3. Qualification of workers
- Any maintenance, service and repair operations must be required qualification of the working personnel. Every working procedure that affects safety means shall only be carried out by competent persons that joined the training and achieved competence should be documented by a certificate. The training of these procedures is carried out by national training organizations or manufacturers that are accredited to teach the relevant national competency standards that may be set in legislation. All training shall follow the ANNEX HH requirements of UL 60335-2-40 4th Edition.
- Examples for such working procedures are:
- breaking into the refrigerating circuit;
  - opening of sealed components;
  - opening of ventilated enclosures.

## Information Servicing

### 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 minimised. For repair to the refrigerating system, the following precautions shall be complied with prior to conducting work on the system.

### 2. Work procedure

Works shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

### 3. General work 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.

### 4. Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with flammable refrigerants, i.e. no sparking, adequately sealed or intrinsically safe.

### 5. Presence of 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 power or CO<sub>2</sub> fire extinguisher adjacent to the charging area.

## **6. No ignition sources**

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work 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 refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

## **7. Ventilated area**

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

## **8. Checks to the refrigeration equipment**

Where electrical components are being changed, they shall be fit for the purpose and to 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 actual refrigerant charge is in accordance with the room size within which the refrigerant containing parts are installed;
- the ventilation machinery and outlets are operating adequately and are not obstructed;
- if an indirect refrigerating circuit is being used, the secondary circuits shall be checked for the presence of refrigerant;
- marking to the equipment continues to be visible and legible, marking and signs that are illegible shall 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.

## **9. Checks to electrical devices**

Repair and maintenance to 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 are no live electrical components and wiring are exposed while charging, recovering or purging the system;
- that there is continuity of earth bonding.

## **10. Sealed electrical components shall be replaced**

## **11. Intrinsically safe components must be replaced.**

## 12. 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.

## 13. Detection of flammable refrigerants

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for refrigerant systems. Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, 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 (25 % maximum) is confirmed.

Leak detection fluids are also 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.

NOTE Examples of leak detection fluids are

- bubble method,
- fluorescent method agents.

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. See the following instructions of removal of refrigerant.

## 14. Removal and evacuation

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

The following procedure shall be adhered to:

- safely remove refrigerant following local and national regulations;
- evacuate;
- purge the circuit with inert gas (optional for A2L);
- evacuate (optional for A2L);
- continuously flush or purge with inert gas when using flame to open circuit; and
- open the circuit

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

The outlet for the vacuum pump shall not be close to any potential ignition sources, and ventilation shall be available.

## 15. Charging procedures

In addition to conventional charging procedures, the following requirements shall be followed:

- Works shall be undertaken with appropriate tools only (In case of uncertainty, please consult the manufacturer of the tools for use with flammable refrigerants)
- Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize 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 it shall be pressure tested with oxygen free nitrogen(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.

## 16. 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 good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- 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 takes place.
- g) Start the recovery machine and operate in accordance with 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.

## 17. Labelling

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

## 18. Recovery

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are 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 occurs.

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 the flammable refrigerant. If in doubt, the manufacturer should be consulted. 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.

The recovered refrigerant shall be processed according to local legislation 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 compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. When oil is drained from a system, it shall be carried out safely.

### 19. Transportation, marking and storage for units

1. Transport of equipment containing flammable refrigerants  
Compliance with the transport regulations.
2. Marking of equipment using signs  
Compliance with local regulations.
3. Disposal of equipment using flammable refrigerants  
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 such that mechanical damage to the equipment inside the package will not cause a leak of the refrigerant charge.  
The maximum number of pieces of equipment permitted to be stored together will be determined by local regulations.

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

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

## More Features

### NOTE

Every time the air conditioner is powered on, a buzzing sound will be heard to indicate that the product has been powered on normally. If there is no sound, it is possible that the unit is abnormal. Please power on again or check the circuit.

The actual functions are subject to the product you purchased, please check the indoor display and remote control of your AC. See the <Remote Controller Manual> for more features.

#### • Heat exchanger dust removal function:

This feature helps keep the outdoor coil cleaner and may extend the duration between regular maintenance intervals depending on local conditions. When the unit is turned off, a 10 seconds delay occurs then the outdoor fan runs in reverse rotation for 70 seconds to blow off loose accumulated dust and debris.

#### • Refrigerant Leakage Detection

- When the system detects a malfunction of the refrigerant, the indoor unit will automatically display the following error codes: “EL0C (System lacks refrigerant)”, “EHC1 (Refrigerant sensor detects leakage)”, “EHC2 (Working condition of the refrigerant sensor is out of range and leakage is detected)”, “EHC3 (Working condition of the refrigerant sensor is out of range)”, or “ECC1 (Other indoor unit refrigerant sensor detects leakage (Multi-zone))”.
- When “EHC1” or “EHC2” error occurs, the buzzer will continue to beep for 5 to 6 minutes before stopping. You can also press any button on the remote controller to stop the buzzer.

# CARE AND MAINTENANCE

## ⚠ CAUTION

### Cleaning Your Indoor Unit

- Always **TURN OFF** your AC system and disconnect its power supply before cleaning or maintenance.
- Only use a soft, dry cloth to wipe the unit clean. You can use a cloth soaked in warm water to wipe it clean if the unit is especially dirty.
- Do not use chemicals or chemically treated cloths to clean the unit
- Do not use benzene, paint thinner, polishing powder or other solvents to clean the unit. They can cause the plastic surface to crack or deform.
- Do not use water hotter than 40°C (104°F) to clean the front panel. This can cause the panel to deform or become discolored.
- Before changing the filter or cleaning, turn off the unit and disconnect its power supply. Removal and maintenance must be performed by a certified technician.
- When removing filter, do not touch metal parts in the unit. The sharp metal edges can cut you.
- Do not use water to clean the inside of the indoor unit. This can destroy insulation and cause electrical shock.
- Do not expose filter to direct sunlight when drying. This can shrink the filter.
- Any maintenance and cleaning of outdoor unit should be performed by an authorized dealer or a licensed service provider.
- Any unit repairs should be performed by an authorized dealer or a licensed service provider.

## Maintenance your AC.

### Maintenance - Long Periods of Non-Use

If you plan not to use your air conditioner for an extended period of time, do the following:



Turn off the unit and disconnect the power



Turn on FAN function until unit dries out completely

### Maintenance - Pre-Season Inspection

After long periods of non-use, or before periods of frequent use, do the following:



Check for damaged wires



Check for leaks



Make sure nothing is blocking all air inlets and outlets

# TROUBLESHOOTING

## CAUTION

If any of the following conditions occurs, turn off your unit immediately!

- The power cord is damaged or abnormally warm
- You smell a burning odor
- The unit emits loud or abnormal sounds
- A power fuse blows or the circuit breaker frequently trips
- Water or other objects fall into or out of the unit

**DO NOT ATTEMPT TO FIX THESE YOURSELF! CONTACT AN AUTHORIZED SERVICE PROVIDER IMMEDIATELY.**

## Common Issues

The following problems are not a malfunction and in most situations will not require repairs.

Issue	Possible Causes
<b>Unit does not turn on when pressing ON/OFF button</b>	The Unit has a 3-minute protection feature that prevents the unit from overloading. The unit cannot be restarted within three minutes of being turned off.
	Cooling and Heating Models: If the Operation light and PRE-DEF (Pre-heating/Defrost) indicators are lit up, the outdoor temperature is too cold and the unit's anti-cold wind is activated in order to defrost the unit.
	In Cooling-only Models: If the "Fan Only" indicator is lit up, the outdoor temperature is too cold and the unit's anti-freeze protection is activated in order to defrost the unit.
<b>The unit changes from COOL/HEAT mode to FAN mode</b>	The unit may change its setting to prevent frost from forming on the unit. Once the temperature increases, the unit will start operating in the previously selected mode again.
	The set temperature has been reached, at which point the unit turns off the compressor. The unit will continue operating when the temperature fluctuates again.
<b>The indoor unit emits white mist</b>	In humid regions, a large temperature difference between the room's air and the conditioned air can cause white mist.
<b>Both the indoor and outdoor units emit white mist</b>	When the unit restarts in HEAT mode after defrosting, white mist may be emitted due to moisture generated from the defrosting process.
<b>The indoor unit makes noises</b>	A rushing air sound may occur when the louver resets its position.
	A squeaking sound is heard when the system is OFF or in COOL mode. The noise is also heard when the drain pump (optional) is in operation.
	A squeaking sound may occur after running the unit in HEAT mode due to expansion and contraction of the unit's plastic parts.
<b>Both the indoor unit and outdoor unit make noises</b>	Low hissing sound during operation: This is normal and is caused by refrigerant gas flowing through both indoor and outdoor units.
	Low hissing sound when the system starts, has just stopped running, or is defrosting: This noise is normal and is caused by the refrigerant gas stopping or changing direction.
	Squeaking sound: Normal expansion and contraction of plastic and metal parts caused by temperature changes during operation can cause squeaking noises.

Problem	Possible Causes	Solution
<b>The unit is not working</b>	Power failure	Wait for the power to be restored
	The power is turned off	Turn on the power
	The fuse is burned out	Replace the fuse
	Remote control batteries are dead	Replace batteries
	The Unit's 3-minute protection has been activated	Wait three minutes after restarting the unit
	Timer is activated	Turn timer off
<b>The unit starts and stops frequently</b>	There's too much or too little refrigerant in the system	Check for leaks and recharge the system with refrigerant.
	Incompressible gas or moisture has entered the system.	Evacuate and recharge the system with refrigerant
	System circuit is blocked	Determine which circuit is blocked and replace the malfunctioning piece of equipment
	The compressor is broken	Replace the compressor
	The voltage is too high or too low	Install a manostat to regulate the voltage
<b>Poor heating performance</b>	The outdoor temperature is extremely low	Use auxiliary heating device
	Cold air is entering through doors and windows	Make sure that all doors and windows are closed during use
	Low refrigerant due to leak or long-term use	Check for leaks, re-seal if necessary and top off refrigerant
<b>Indicator lamps continue flashing</b>		
<p><b>Error code appears and begins with the letters as the following in the window display of indoor unit:</b></p> <ul style="list-style-type: none"> <li>• E(x), P(x), F(x)</li> <li>• EH(xx), EL(xx), EC(xx)</li> <li>• PH(xx), PL(xx), PC(xx)</li> </ul>	<p>The unit may stop operation or continue to run safely. If the indicator lamps continue to flash or error codes appear, wait for about 10 minutes. The problem may resolve itself.</p> <p>If not, disconnect the power, then connect it again. Turn the unit on. If the problem persists, disconnect the power and contact your nearest customer service center.</p>	

## Troubleshoot Your Wireless Remote Control

Problem	Possible Causes	Solution
<b>The fan speed cannot be changed.</b>	Check whether AUTO mode is selected.	In AUTO mode, the fan speed is set automatically and cannot be changed.
	Check whether DRY mode is selected.	In DRY mode, the FAN SPEED button is ineffective. The fan speed can only be changed in COOL, FAN and HEAT mode.
<b>The temperature display is off</b>	Check whether FAN mode is selected.	In FAN mode, the temperature cannot be adjusted.
<b>The TIMER OFF disappears after a period of time</b>	If the TIMER OFF function was activated, the operation may have finished.	The air conditioner will automatically stop at the set time and the indicator light will turn off.
<b>The TIMER ON indicator disappears after a period of time</b>	If the TIMER ON function was activated, the operation may have finished.	The air conditioner will automatically start at the set time and the indicator light will turn off.
<b>There is no sound when the ON/OFF button is pressed.</b>	Check whether the signal transmitter of the remote control is properly directed towards the infrared signal receiver of the indoor unit.	Point the remote control directly at the receiver and press the ON/OFF button twice.

**NOTE:** If your problem persists after performing the checks and diagnostics above, turn off your unit immediately and contact an authorized service center.

# PACKING AND UNPACKING THE UNIT

Instructions for packing unpacking the unit:

Unpacking:

Indoor unit:

1. Cut the packing belt.
2. Unpack the package.
3. Take out the packing cushion and packing support.
4. Remove the packing film.
5. Take out the accessories.
6. Lift the machine out and lay it flat.

Outdoor Unit

1. Cut the packing belt.
2. Take the unit out of the package.
3. Remove the foam from the unit.
4. Remove the packing film from the unit.

Packing:

Indoor unit:

1. Put the indoor unit into the packing film.
2. Put the accessories in.
3. Place the packing cushion and packing support.
4. Put the indoor unit into the package.
5. Close the package and seal it.
6. Using the packing belt if necessary.

Outdoor unit:

1. Put the outdoor unit into the packing film.
2. Put the bottom foam into the box.
3. Put the outdoor unit into the package, then put the upper packaging foam on the unit.
4. Close the package and seal it.
5. Using the packing belt if necessary.

**NOTE:** Please keep all packaging items if you may need in the future.



### LIMITED EXPRESS WARRANTY

Congratulations on purchasing your new HVAC equipment. It's been designed for long life and reliable service, and is backed by one of the strongest warranties in the industry. Your unit automatically qualifies for the warranty coverage listed below, providing you keep your proof of purchase (receipt) for the equipment and meet the warranty conditions.

#### LIMITED TEN (10) YEAR EXPRESS WARRANTY

MARS warrants all parts including the compressor of the VHP-SA Series Ductless Mini-Split to be free from defects in workmanship and materials for normal use and maintenance for ten (10) years from the date of purchase by the original consumer for the original installation. This Express Limited Warranty applies only when the Ductless Mini-Split is installed as a complete matched system: outdoor unit and indoor unit, and only when the system is installed per MARS installation instructions and in accordance with all local, state and national codes for normal use.

#### EXCEPTIONS

The Limited Express Warranty does not cover normal maintenance—MARS recommends that regular inspection/maintenance be performed at least once a season and proof of maintenance be kept. Additionally, labor charges, transportation charges for replacement parts, replacement of refrigerant or filters, any other service calls/repairs are not covered by this Limited Warranty. It also does not cover any portion or component of the system that is not supplied by MARS, regardless of the cause of failure of such portion or component.

#### CONDITIONS FOR WARRANTY COVERAGE

- Unit must be operated according to MARS operating instructions included with the unit and cannot have been subjected to accident, alteration, improper repair, neglect or misuse, or an act of God (such as a flood)
- Installation was done by a trained, licensed or otherwise qualified HVAC dealer/contractor
- Performance cannot be impaired by use of any product not authorized by MARS, or by any adjustments or adaptations to components
- Serial numbers and/or rating plate have not been altered or removed
- Damage has not been a result of inadequate wiring or voltage conditions, use during brown-out conditions, or circuit interruptions
- Air flow around any section of the unit has not been restricted
- Unit remains in the original installation
- Unit was not purchased over the internet

#### DURATION OF WARRANTY & REGISTRATION

The warranty begins on the date of purchase by the original consumer. The consumer must retain a receipted bill of sale as proof of warranty period. Without this proof, the express warranty begins on the date of shipment from the factory.

#### REMEDY PROVIDED BY THE LIMITED EXPRESS WARRANTY

The sole remedy under the Limited Warranty is replacement of the defective part. If replacement parts are required within the period of this warranty, MARS replacement parts shall be used; any warranty on the replacement part(s) shall not affect the applicable original unit warranty. Ready access to the unit for service is the owner's responsibility. Labor to diagnose and replace the defective part is not covered by this Limited Express Warranty. If for any reason the replacement part/product is no longer available during the warranty period, MARS shall have the right to allow a credit in the amount of the current suggested retail price of the part/product instead of providing repair or replacement.

#### LIMITATION OF LIABILITY

1. There are no other express or implied warranties. MARS makes no warranty of merchantability. We do not warrant that the unit is suitable for any particular purpose or can be used in buildings or rooms of any particular size or condition except as specifically provided in this document. There are no other warranties, express or implied, which extend beyond the description in this document.
2. All warranties implied by law are limited in duration to the seven-year term of the parts warranty. Your exclusive remedy is limited to the replacement of defective parts. **We will not be liable for any consequential or incidental damages caused by any defect in this unit.**
3. This warranty gives you specific legal rights and you may also have other rights which vary from state to state. Some states do not allow limitation on how long an implied warranty lasts or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.
4. No warranties are made for units sold outside the continental United States and Canada. Your distributor or final seller may provide a warranty on units sold outside these areas.
5. MARS will not be liable for damages if our performance regarding warranty resolution is delayed by events beyond our control including accident, alteration, abuse, war, government restrictions, strikes, fire, flood, or other acts of God.

#### HOW TO OBTAIN WARRANTY SERVICE OR PARTS

If you have a warranty claim, notify your installer promptly. If the installer does not remedy your claim, write to MARS, 1900 Wellworth Ave., Jackson MI 49203. Enclose a report of inspection by your installer or service person. Include model number, serial number, and date of purchase.

**Owner responsibilities are set forth in the instruction manual—read it carefully.**

**Please visit [www.marsdelivers.com](http://www.marsdelivers.com) to register your new product**



#### KEEP THIS INFORMATION AS A RECORD OF YOUR PURCHASE

Outdoor Unit: Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Indoor Unit 1: Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Indoor Unit 2: Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Indoor Unit 3: Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Indoor Unit 4: Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Indoor Unit 5: Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_

Date of Purchase \_\_\_\_\_

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Due to ongoing product improvements, specifications and dimensions are subject to change and correction without notice or incurring obligations. Determining the application and suitability for use of any product is the responsibility of the installer. Additionally, the installer is responsible for verifying dimensional data on the actual product prior to beginning any installation preparations.

Incentive and rebate programs have precise requirements as to product performance and certification. All products meet applicable regulations in effect on date of manufacture; however, certifications are not necessarily granted for the life of a product. Therefore, it is the responsibility of the applicant to determine whether a specific model qualifies for these incentive/rebate programs.

*Comfort-Aire*® **Century**®

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