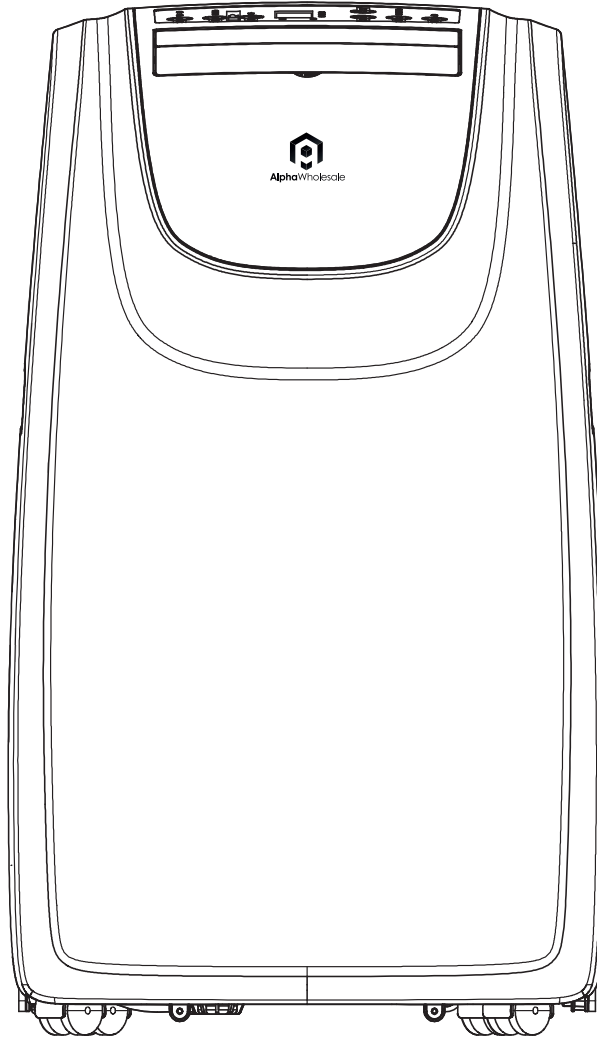




AlphaWholesale

# PORTABLE AIR CONDITIONER



## Instruction Manual

### CFAP12C

Thank you very much for selecting this model of Portable Air Conditioner, please read this Use and Care Manual carefully before installing and using this appliance. Please keep this Use and Care Manual properly for future reference.

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The refrigerant used in portable air conditioner is the environmentally friendly hydrocarbon R290. This refrigerant is odorless, and compared to the alternative refrigerant, the R290 is an ozone-free refrigerant.

Please read the instructions before use and repair.

The drawings provided in this manual may not be the same as the physical objects. Please refer to the physical objects.



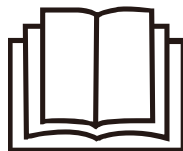
# Safety Instructions

## Warning

- 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.
- Appliance shall be installed, operated and stored in a room with a floor area larger than 12.5 m<sup>2</sup>.
- Keep any required ventilation openings clear of obstruction.
- Servicing shall be performed only as recommended by the manufacturer.
- The appliance shall be stored in a well-ventilated area where the room size corresponds to the room area as specified for operation.
- 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.
- Servicing 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.
- All working procedure that affects safety means shall only be carried by competent persons.
- Be careful not to bump when moving to avoid leakage in the refrigeration line.



**Flammable material.**  
**This appliance contains**  
**R290/Propane, a**  
**flammable refrigerant.**



**Refer operators**  
**manual**



**Read technical**  
**manual**



**Read operators**  
**manual**

## Notes:

- The air conditioning is only suitable for indoor use, and is not suitable for other applications.
- Follow local grid interconnection rules while installing the air conditioning and ensure that it is properly grounded. If you have any question on electrical installation, follow the instructions of the manufacturer, and if necessary, ask a professional electrician to install it.
- Place the machine in a flat and dry place and keep a distance of above 50cm between the machine and the surrounding objects or walls.
- After the air conditioning is installed, ensure that the power plug is intact and firmly plugged into the power outlet, and place the power cord orderly to prevent someone from being tripped or pulling out the plug.
- Do not put any object into the air inlet and outlet of the air conditioning. Keep the air inlet and outlet free from obstructions.
- When drainage pipes are installed, ensure that the drainage pipes are properly connected, and are not distorted or bended.
- While adjusting the upper and lower wind-guide strips of the air outlet, pluck it with hands gently to avoid damaging wind-guide strips.
- When moving the machine, make sure that it is in an upright position.
- The machine should stay away from gasoline, flammable gas, stoves and other heat sources.
- Don't disassemble, overhaul and modify the machine arbitrarily, otherwise it will cause a machine malfunction or even bring harm to persons and properties. To avoid danger, if a machine failure occurs, ask the manufacturer or professionals to repair it.

- Do not install and use the air conditioning in the bathroom or other humid environments.
- Do not pull the plug to turn off the machine.
- Do not place cups or other objects on the body to prevent water or other liquids from spilling into the air conditioning.
- Do not use insecticide sprays or other flammable substances near the air conditioning.
- Do not wipe or wash the air conditioning with chemical solvents such as gasoline and alcohol. When you need to clean the air conditioning, you must disconnect the power supply, and clean it with a half-wet soft cloth. If the machine is really dirty, scrub with a mild detergent.
- The appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children shall not play with the appliance. Cleaning and maintenance shall not be made by children without supervision.
- If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.
- The appliance shall be installed in accordance with national wiring regulations.

## 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.

The appliance shall be stored so as to prevent mechanical damage from occurring

### Remark:

The best operating ambient temperature for cooling is 17-35 ° C, and the optimum ambient temperature for heating is 8-25 ° C.

Fuse Parameter:  $\phi 5.0 \times 20 \text{mm}$  3.15A, 250Vac.

Appliance is filled with flammable gas R290, and the maximum charge of refrigerant is 250g.

GWP value of R290 refrigerant is 3.

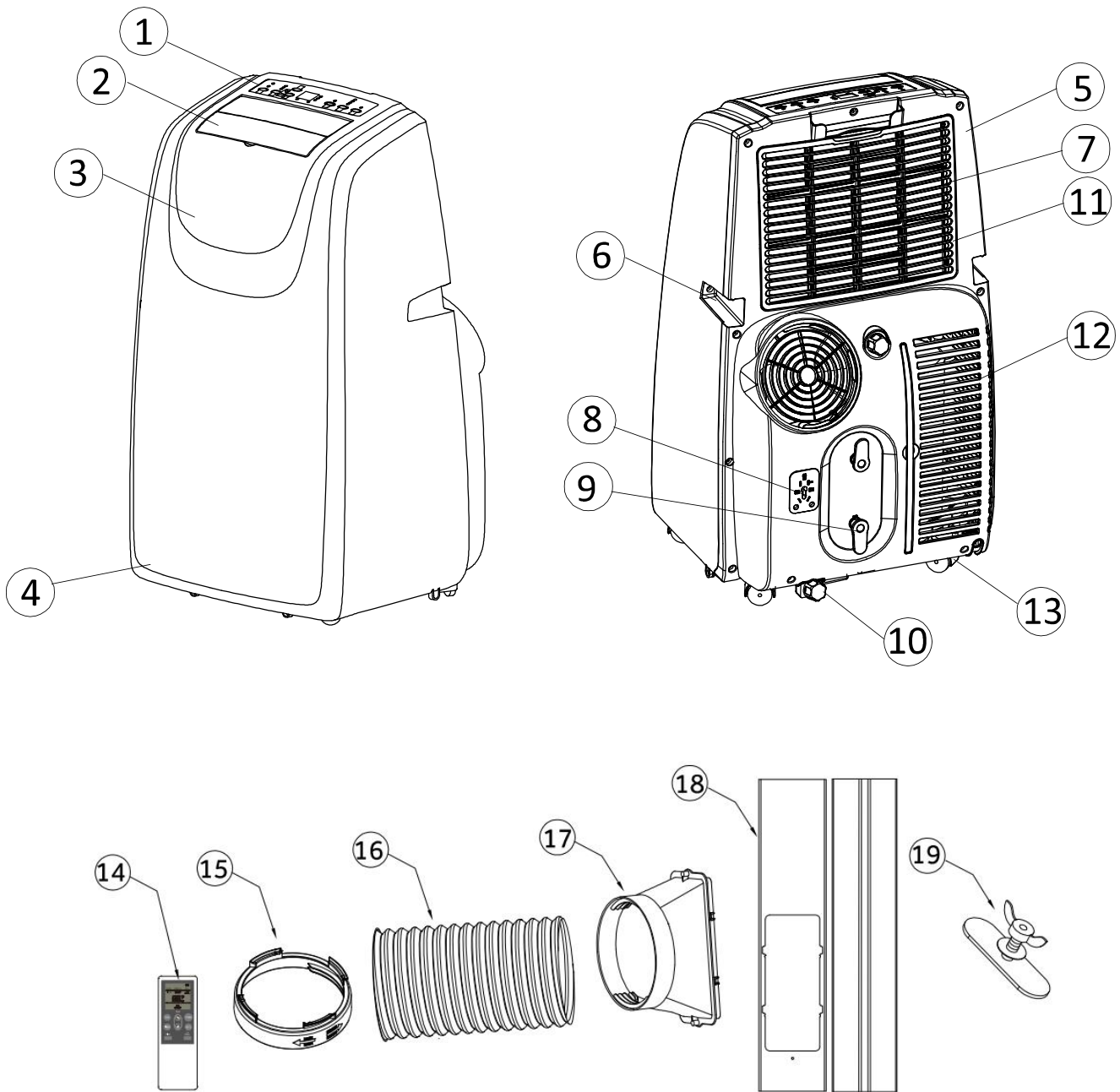
Any repairs you need, contact the nearest authorized Service Centre and strictly follow manufacturer's instruction only.

## Features and Identification of Parts

### Features

- ※ New appearance with compact design, more luxury and upscale.
- ※ Outlet louver swing automatically and wind direction up to consumer needs.
- ※ Beautiful and simple appearance, humanized design for remote control storage, which can be placed in storage bracket at the back of the unit body.
- ※ Simple operation, LED digital display control panel and high-end LCD remote control.
- ※ Winding pillar and universal socket can protect power cord better.
- ※ 24-hour Timer function, unique on/off reminding music.
- ※ 3-minute re-start delay protection to compressor and other multiple protection functions.
- ※ Unique exhaust hose and fasteners, convenient installation.

## Identification of Parts

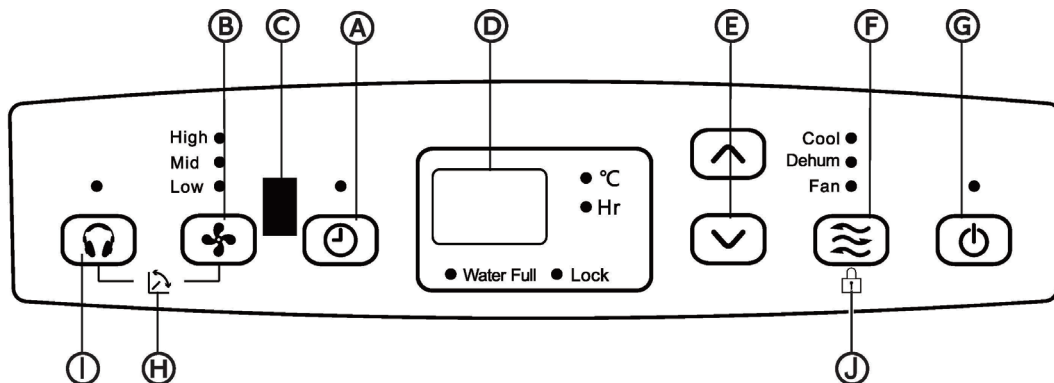


1. Control panel
2. Horizontal louver
3. Front shell
4. Universal wheel
5. Back shell
6. Handle
7. Filter
8. Universal socket
9. Wire winding pillar
10. Drain hole and cover
11. Up filter assemble

12. Lower filter assembly
13. Chassis
14. Remote control
15. Round connector
16. Exhaust hose
17. Adapter
18. Window kits
19. Window kits screw(butterfly nut)

## Operation and Settings

### Control panel instructions



#### A. TIMER BUTTON

Program a time from (1-hour to 24-hours) for the air conditioner to turn Off or On. When a Time Delay is programmed, the Timer indicator light will illuminate.

While the air conditioner is operating:

1. Press the Timer button.
2. Press the Up/Down arrow buttons to select the number of hours you want the air conditioner to continue to operate before turning Off.

NOTE: Wait approximately 5 seconds for the Turn-Off time to be saved.

While the air conditioner is off:

1. Press the Timer button.
2. Press the Up/Down arrow buttons to select the number of hours you want the air conditioner to remain on before turning On.

NOTE: Wait approximately 5 seconds for the Turn-On time to be saved.

To cancel the timer:

- Press the Timer button once, the hours remaining will flash, press the timer button again and the timer will be canceled.

#### B. FAN SPEED BUTTON

The fan speed can be adjusted from Low speed to High speed when the air conditioner is in operation.

NOTE: The fan speed cannot be adjusted when the unit is in Dehum mode.

- Press the Fan Speed button to toggle among the two speeds. The corresponding fan speed indicator will illuminate.

#### C. REMOTE CONTROL SIGNAL RECEIVING WINDOW

Aim the Remote Control at this window so the Control will receive the signal.

#### D. CONTROL PANEL DISPLAY

Displays the Set Temperature in degrees Fahrenheit or degrees Celsius, or the hours remaining in a Time Delay. The corresponding indicator light will illuminate.

#### E. UP AND DOWN ARROW BUTTONS

Adjusts the Temperature or Hours in Time Delay.

**To Set the Temperature:**

The temperature can be set between 17°C and 30°C when the air conditioner is in Cool mode.

1. Press the Mode button until the Cool mode is selected.
2. Press the Up Arrow or Down Arrow buttons to select the Temperature.

NOTE: The temperature cannot be set when the air conditioner is in either Fan or Dehum mode.

NOTE: The Up Arrow and Down Arrow buttons, when pressed at the same time, allow you to select between displaying the temperature in °C or °F. The corresponding indicator will illuminate.

#### F. MODE BUTTON

Press the Mode button to toggle among the operating options. The corresponding indicator will illuminate:

Cool – Cools the room to the set temperature

Dehum – Reduces the humidity in the room

Fan – Circulates the air in the room without cooling

#### G. POWER BUTTON

Turns ON/OFF power to the air conditioner.

**NOTE:** Turning off power by pressing the Power button does NOT disconnect the appliance from the power supply.

• Press the Power button. The Power indicator will illuminate.

#### H. Air Sweep Buttons

Opens and closes the louvers to direct the airflow.

• Press the Timer and Mute buttons at the same time to activate the louvers.

#### I. Mute Button

Press mute button, fan will be low and quiet.

#### J. Child Lock Button

Press mode button for 3 seconds to start the child lock function, while "lock" indicator lights up; and press mode button for 3 seconds to cancel the function.

## Remote Control Operation

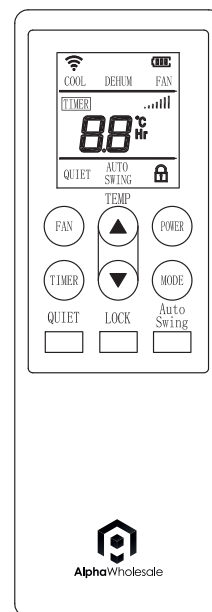
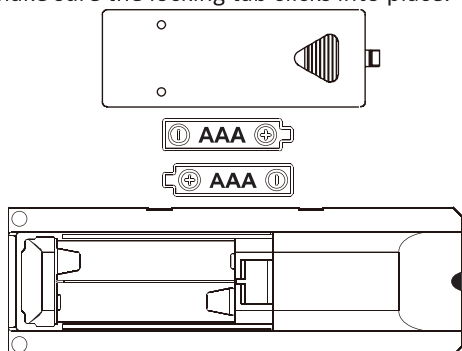
### 1) The operation interface of this remote controller is as follows:

- A. ON/OFF button: Press this button to start unit when it is energized or stop the unit when it is in operation;
- B. Timer button: Press this button to set unit automatic on and off time;
- C. Fan button: press this button to select high, medium or low speed of fan running (except dehumidify mode);
- D. Up button: press this button to increase temperature or timer setting;
- E. Down button: Press this button decrease temperature or timer setting.
- F. Mode button: press this button to select Cool mode, Dehumidification mode or Fan mode;
- G. Quiet button: whenever in which mode, press this button, fan will be low and quiet.
- H. Lock button: press this button to lock all buttons, lock indicator light is on. When you turn on the lock button, other buttons cannot be used.
- I. Swing: press this button to open or close auto swing function.

### 2) Battery installation:

Before using your remote, install the AAA batteries into remote control.

- A. Press and glide the battery cover on the back of the remote control, then you can remove the cover.
- B. Insert two new AAA batteries into the battery compartment. Be sure to note the proper polarity.
- C. Reattach the battery cover and make sure the locking tab clicks into place.

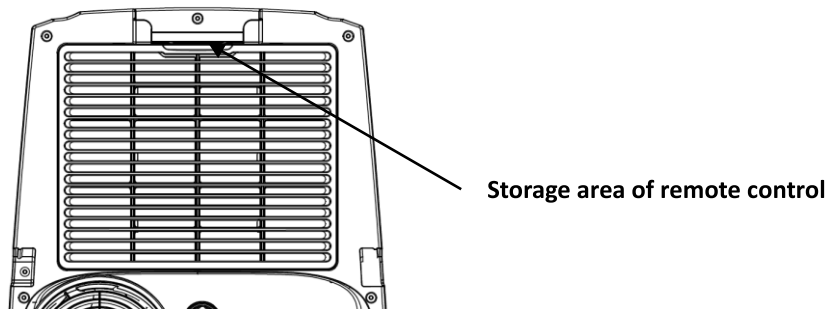


**Notes:**

- Use alkaline batteries only. Do not use rechargeable batteries.
- When replace batteries, always replace both batteries with new batteries, do not mix old and new batteries.
- If the air conditioner will not be used for an extended period of time, remove the batteries from the remote control.

**3) Storage of remote control**

This machine has the storage area of remote control. Please put the remote control in this area to prevent the loss of remote control.

**CAUTION**

1. If the liquid from the batteries gets onto your skin or clothes, wash it well with clean water, do not use the remote control if the batteries have any leakage.
2. If you eat the liquid from the batteries, brush your teeth and see doctor. The chemicals in batteries could cause burns or other health hazards.

## Protection functions

**1. Water-full protect:**

Use Water switch to achieve water-full protect, water switch is always off, it will be on when it works. both water-full indicator and "FL" on LED window is flashing.

**2. Anti-freeze protection function**

Compressor, water spraying motor will turn off when compressors are running over 10 minutes and tube temperature ( $T_p$ ) is continuously  $\leq 2^{\circ}\text{C}$  for 20 seconds under cooling mode, E4 will show on LED display window. Once the tube temperature  $\geq 8^{\circ}\text{C}$ , the protection is relieved to recover into original status, and compressor apply to 3-minute delay protection.

**3. Delay protection function of compressor**

This unit offers restart protection to compressor. Except that the compressor may start immediately when the unit is energized at first time, there is 3-minute start delay after compressor is shut down.

**4. Coil and room temperature sensors auto-diagnosis**

- (1) Sensor test at the first time or power up state.
- (2) When room temperature sensor tests out failure, unit will be off and display Error Code E2;  
When Coil temperature sensor test out failure, unit will be off and display Error Code E1.  
If sensors test ok, unit restore original state of work or enter into standby state when energized.

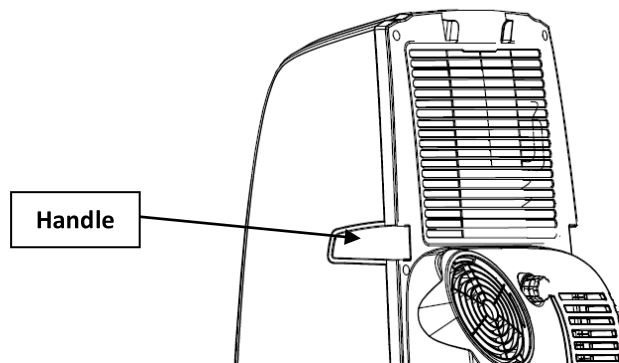
## Handling and Transportation

### 1. Handle and move the unit

1) Hold handles on side panels to move the unit in upright position.

Note:

- Do not hold the louver.
- Make the unit in the upright position whatever handling or moving it.
- Drain the water in the unit completely to prevent water leakage and wet the floor or carpet before handling or moving the unit.
- Take out the remote control from the storage area and keep it.



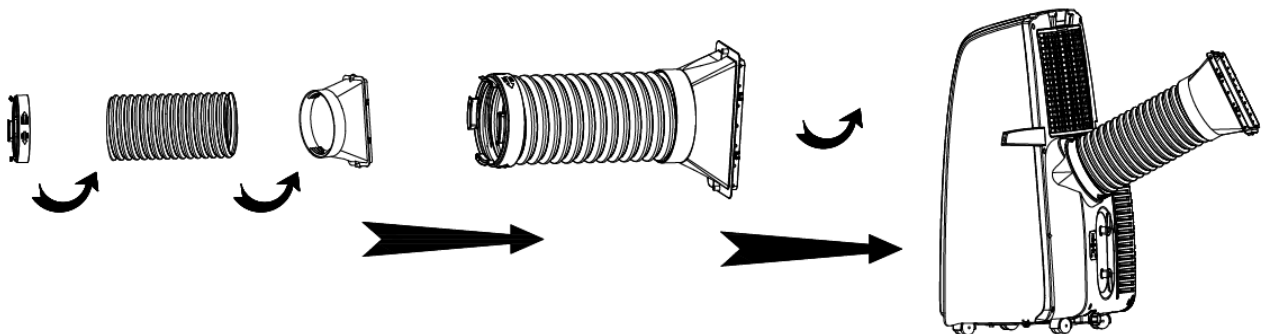
## Installation & Adjustment

### 1. Installation

Warning: Keep this mobile air-conditioner in upright position at least 2 hours before first installation.

This air-conditioner may be moved indoors conveniently; keep the unit in upright position while moving it. The air-conditioner shall be placed on flat and hard surface. Do not install or operate this air-conditioner in bathroom or other wet environments.

#### 1.1 Installation of exhaust hose assembly and its adapter



- 1) Take out the exhaust hose assembly and its adapter from plastic bag.
- 2) Extend the exhaust hose at one end, screw the round end of adapter into exhaust hose at anticlockwise direction

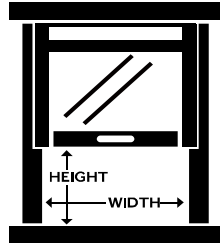
#### 1.2 Installation of window seal-plate

Depending on the size of your window opening, use the main panel and one or both of the extension panels.

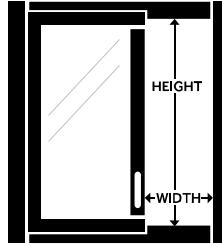
A. Open the window and place the main window panel into the window.

**NOTE:** The window assembly is designed to accommodate either a vertical slide or horizontal slide window.

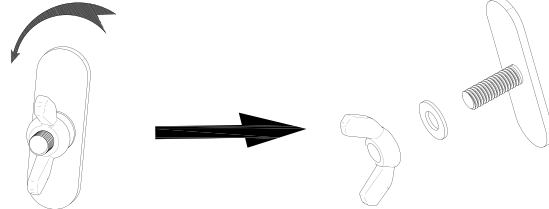
### Vertical Slide Window



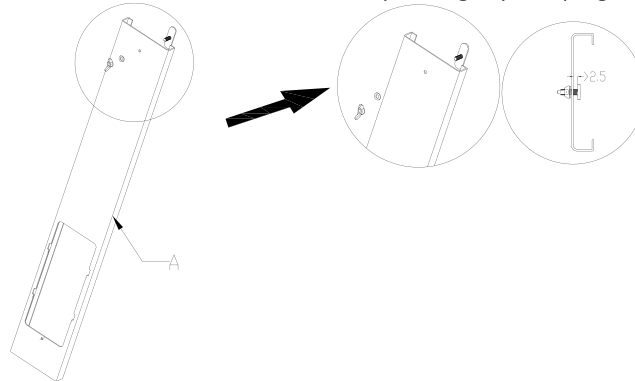
### Horizontal Slide Window



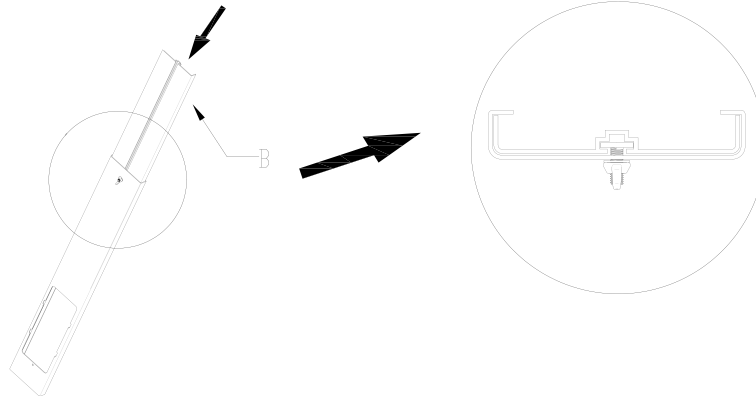
- B. Take out the butterfly nut from the user manual's bag, and disassemble the screws in the following directions.



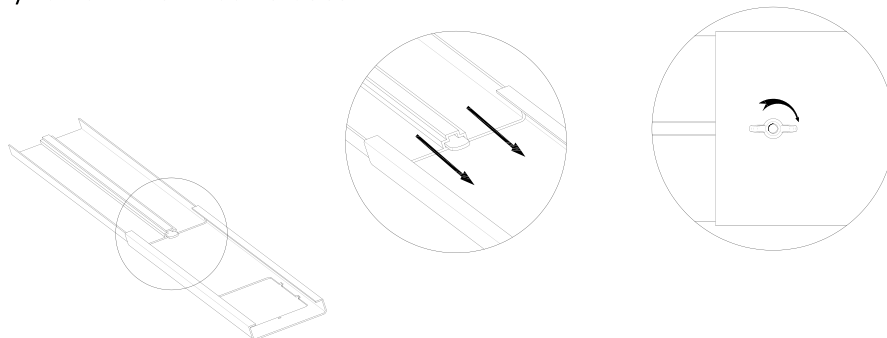
- C. Lock the butterfly nut on panel A, and do not lock the butterfly nut tightly, keeping the spacing of 2.5mm.



- D. Connect with panel B, adjust the panel(s) to the width or height of the window as shown.



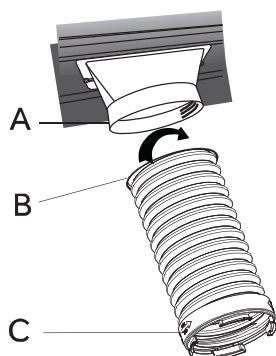
- E. Fasten the butterfly nut to fix the window slide set.





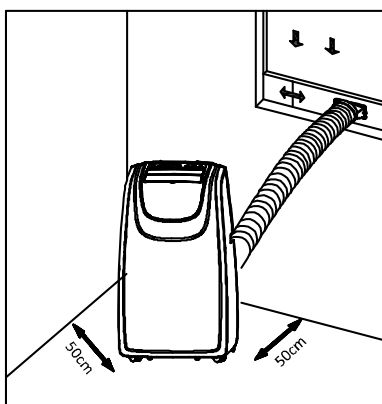
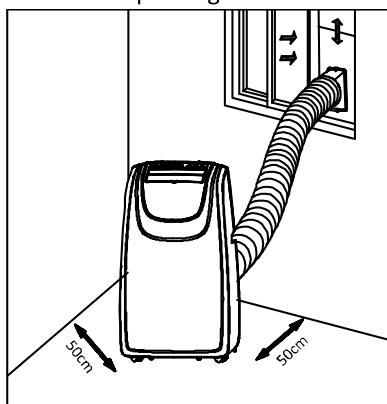
### 1.3 Installation of the unit

1. Move the unit together with its exhaust hose assembly in front of the window and keep the unit at least 50cm away from the walls or other objects.
2. Install the rectangle end of exhaust hose adapter into the corresponding rectangle hole in window seal-plate assembly, fix it with screw and close the window.
  - A. Align the 4 locks on window seal-plate with corresponding 4 fasteners on exhaust hose adapter and set them together, then slide adapter downwards.
  - B. Lock self-tapping screw  $\phi 4\text{mm}$  into adapter hole.
3. Remarks:
  - Slide the adapter downwards and assure the adapter installed in good position.
  - Lock the  $\phi 4$  screw tightly to avoid fall off.
  - Exhaust hose can't be bent or with flexure higher than  $45^\circ$ , in order to keep good ventilation of exhaust hose.



#### Important notes:

The exhaust hose is 280mm-1500mm long and which is determined by the specification of the air-conditioner (s). Do not use prolonged the hose or replace it with other different hoses as this may affect the functions of the



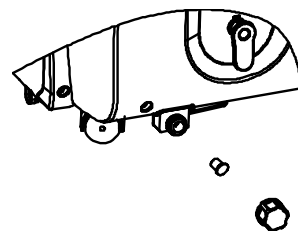
air-conditioner. The exhaust hose must be smooth or it may lead air-conditioner overheat and trip because exhaust hose is obstructed.

## Drainage Instruction

This portable air conditioner has two drain ports, higher one and lower one and we can use two drainage methods: manual drainage and continuous drainage;

### 1. Manual Drain:

This unit is designed with high efficient self-evaporative system and It is suggested to use manual drainage in cooling mode, all condensate will recycle in the unit to ensure enough water to recycle in the unit to cool condenser and enhance cooling performance advance; however in extreme humidity, water tank at chassis will be full, "FL" will show on LED display, it need to be drained



manually from lower drain port.

- 1) Put the tray below the water outlet at the back of the unit.
- 2) Screw off the drain cover; unplug the water stopper for water flow into the tray.
- 3) Plug in stopper and screw the water cover tightly onto water outlet after drainage.

**Notes:**

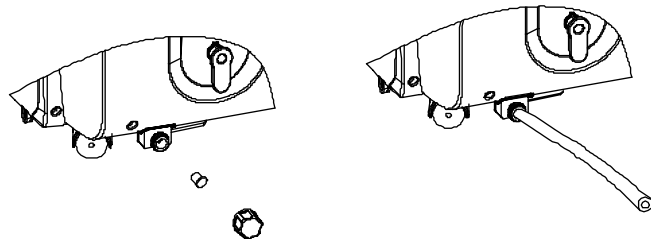
- A. Move the unit carefully to avoid the leakage if it is necessary.
- B. Protect the drain cover and water stopper properly.
- C. Tilt the unit slightly backwards when draining.
- D. Block the drain hole as soon as possible before the tray is full if it can't hold all water in the unit to prevent the water leakage and wet the floor or carpet.
- E. Water stopper and drain cover must be tightly installed, to avoid new condensate to wet the floor or carpet when the unit re-starts working.

**2. Continuous drain**

- 1) Screw off the drain cover.
- 2) Connect drain-hole with  $\phi 13\text{mm}$  PVC drain hose, as deep as possible to avoid leakage. (The hose can be purchased by users)
- 3) Pull the drain hose to bathroom or outdoor.

**Notes:**

1. Drain hose must be installed before unit starts working.
2. It is suggested to use manual drainage when unit in cooling mode, to ensure enough water to recycle in the unit to cool condenser and enhance cooling performance.
3. Put the drain hose in an inaccessible place, not higher than drainage hole and keep drain hose straight without any flexure.
4. Keep the drain cover and its stopper properly installed when continuous drainage is adopted.

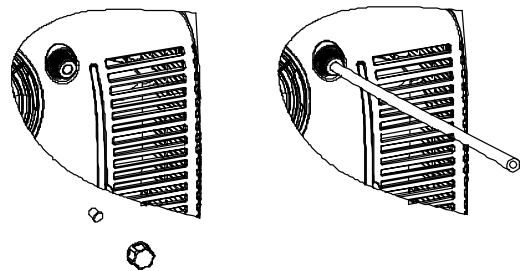


**3. Continuous drain in dehumidification mode: higher drain port is the best.**

- 1) Screw off the drain cover and unplug the water stopper.
- 2) Connect drain-hole with  $\phi 13\text{mm}$  PVC drain hose, into depth of 8mm-10mm (The drain hose should be purchased by user)
- 3) Pull the drain hose to bathroom or outdoor.

**Notes:**

1. Drain hose must be installed before unit starts working.
2. Put the drain hose in an inaccessible place, not higher than water outlet and keep drain hose straight without any flexure.
3. Keep the drain cover and its stopper properly installed when continuous drainage is adopted.



## Maintenance and Service

Turn off the unit and pull out the plug before maintenance or send the unit to service center.

**1. Surface cleaning**

Clean the unit surface with wet and soft cloth, but do not use chemical solvents such as alcohol and gasoline to avoid any damage to unit.

**2. Filter cleaning**

Clean the filter every two weeks

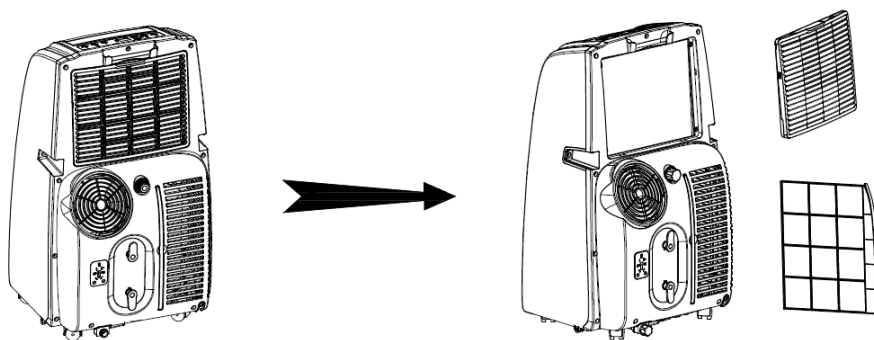
Note: If filter is blocked by dust or any other things, it would influence the unit performance.

**3. Clean filter**

- 1) Grip the filter handle and take it out gently in correct direction shown by the arrow.
- 2) Hold hand positions with your hands, take filters out in correct direction shown by the arrow.

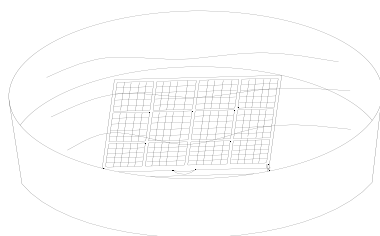
**Note:**

- a) Use even force to take out the filter to avoid any twist or damage to filter.
- b) Clean the filters gently in warm water (about  $40^{\circ}\text{C}$ ) mixed with detergent, and dry in the shade.



**Notes:**

- a) Do not squash the mesh.
- b) Do not hit the mesh with sharp objects or brush.



**4. Clean of handle position and remote control storage area.**

- a) Take out the remote control
- b) Clean the handle position and remote control storage area with wet and soft cloth.

Note: Do not drip water into the unit.

## End of Season Storage

1. Screw off the drain cover, and then pull out the stopper to drain water completely.  
Note: The tilt angle of the unit must be  $\leq 30^\circ$ .
2. Keep the unit running in fan mode half day to dry inside of unit completely and prevent from going mouldy.
3. Turn off the unit, pull out plug then wrap the power cord around the wire-winding pillar, insert the plug into the universal fixing hole at the back panel of the unit, install the water plug and drain cap.
4. Remove the heat exhaust hose assembly, clean and keep it properly.  
Note: 1) Hold the exhaust hose assembly with both hands when removal.  
2) Push the fasteners aside on exhaust air outlet using your thumbs, then pull out exhaust hose assembly.
5. Pack the air-conditioner properly with soft plastic bag and put it in dry place with appropriate dust-proof measures and keep the unit away from children.
6. Take out the batteries from the remote control and keep it properly.

**Note: Assure the unit is stored in a dry place. All accessories of the unit shall be properly protected together.**

## Troubleshooting

Please check the unit and suggestions below before asking for professional service, but never dismantle or repair the unit by yourself, it may cause harm to you and your property.

Trouble	Cause	Remedy
The unit fails to start up	Power supply failure	Connect the unit to a live socket and turn it on.
	Water-full and its indicator lighting up	Drain the water stored in the unit.
	Ambient temperature too low or too high	It is recommended to use this unit between 5-35°C
	The room temperature is lower than the set temperature in cooling mode.	Change the set temperature
Bad cooling effects	There is direct sunlight	Close the curtain
	The doors and windows are open, the room is crowded or there are other heat sources	Close the door and window, remove other heat sources, and add new air-conditioners
	Dirty filter	Clean or replace the filter.
	Air inlet or air outlet clogged	Remove the obstruction
High noise level	The unit is being placed at uneven surface.	Put the unit at a flat and firm place (may reduce noise)
The compressor does not work	Initiation of overheat protection.	Wait for 3 minutes until the temperature decrease, then re-start the unit
The remote control does not work	Too long distance	Bring the remote control close to the air-conditioner and ensure it's at signal receptor on unit.
	The remote control didn't aim at signal receptor on unit.	
	The batteries have no electricity	Replace the batteries
LED displays error code "E1"	Tube temperature sensor failure	Check the tube temperature sensor and related circuits
LED displays error code "E2"	Room temperature sensor failure	Check the room temperature sensor and related circuits
LED displays error code "E4"	Anti-freeze protection	Restore the functions automatically once anti-freeze protection is over.
Water-full indicator lights	The water in chassis is full	Drain the water and re-start the unit

# Maintenance and Servicing

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

### 2) Work procedure

Work shall be undertaken under a controlled procedure so as to minimize the risk of a flammable gas or vapor 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. The area around the workspace shall be sectioned off. Ensure that the conditions within the area have been made safe by control of flammable material.

### 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. non-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 powder or CO2 fire extinguisher adjacent to the charging area.

### 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 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:

#### a) The charge size is in accordance with the room size within which the refrigerant containing parts are installed.

#### b) The ventilation machinery and outlets are operating adequately and are not obstructed.

#### c) If an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant.

#### d) Marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected.

#### e) 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:

#### a) That capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.

#### b) That there no live electrical components and wiring are exposed while charging, recovering or purging the system.

#### c) That there is continuity of earth bonding.

## 2. Repairs to sealed components

### 1) During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a

potentially hazardous situation.

- 2) 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 sealant 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.

### 3. Repair to 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 permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live 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 in the atmosphere from a leak.

### 4. 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.

### 5. 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.

### 6. 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 (25 % maximum) 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 then be purged through the system both before and during the brazing process.

### 7. 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:

- 1) Remove refrigerant.
- 2) Purge the circuit with inert gas.
- 3) Evacuate.
- 4) Purge again with inert gas.
- 5) 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 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 work to take place. 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.

## **8. Charging procedures**

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

- 1) 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.
- 2) Cylinders shall be kept upright.
- 3) Ensure that the refrigeration system is earthed prior to charging the system with refrigerant.
- 4) Label the system when charging is complete (if not already).
- 5) Extreme care shall be taken not to overfill the refrigeration system.  
Prior to recharging the system it shall be pressure 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.

## **9. 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 reclaimed refrigerant. It is essential that electrical power is available before the task is commenced.

- 1) Become familiar with the equipment and its operation.
- 2) Isolate system electrically.
- 3) Before attempting the procedure ensure that:
  - a) Mechanical handling equipment is available, if required, for handling refrigerant cylinders.
  - b) All personal protective equipment is available and being used correctly.
  - c) The recovery process is supervised at all times by a competent person.
  - d) Recovery equipment and cylinders conform to the appropriate standards.
- 4) Pump down refrigerant system, if possible.
- 5) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- 6) Make sure that cylinder is situated on the scales before recovery takes place.
- 7) Start the recovery machine and operate in accordance with manufacturer's instructions.
- 8) Do not overfill cylinders. (No more than 80 % volume liquid charge).
- 9) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- 10) 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.
- 11) Recovered refrigerant shall not be charged into another refrigeration system unless it has been cleaned and checked.

## **10. Labelling**

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. Ensure that there are labels on the equipment stating the equipment contains flammable refrigerant.

## **11. 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.

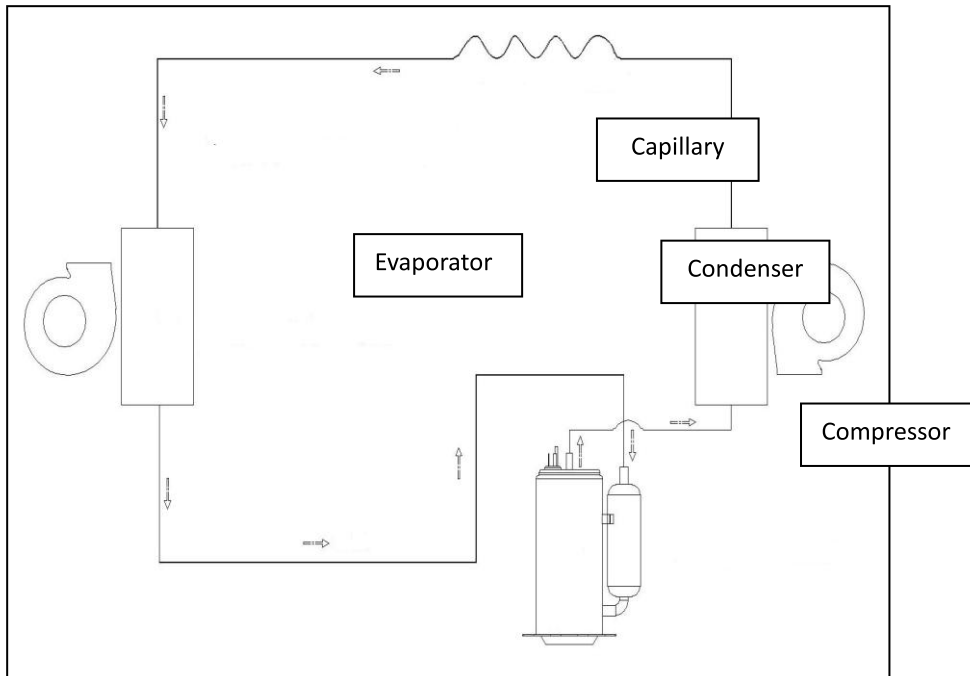
The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete 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.

## Appendix

Schematic diagram of the air-conditioner



For specific technical parameters of the model, refer to rating label on the product.



**Correct Disposal of this product**

This marking indicates that the product should not be disposed with other household wastes. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.