



FULL DC INVERTER SYSTEMS

USER MANUAL

OUTDOOR UNITS SDV5-XXXEAI

COMMERCIAL AIR CONDITIONERS SDV5

Original instructions

IMPORTANT NOTE:

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

CONTENTS

PAGE

| | |
|--|----------|
| IMPORTANT SAFETY INFORMATION..... | 1 |
| PARTS NAMES..... | 2 |
| OPERATION AND PERFORMANCE..... | 2 |
| TROUBLES AND CAUSES..... | 3 |
| MALFUNCTION..... | 4 |
| Button FUNCTION..... | 5 |
| AFTER-SALES SERVICE..... | 8 |

1. IMPORTANT SAFETY INFORMATION

To gain full advantage of the unit's functions and to avoid malfunction due to mishandling, we recommend that you read this instruction manual carefully before use.

The precautions described herein are classified as WARNING and CAUTION. They both contain important information regarding safety. Be sure to observe all precautions without fail.



WARNING

Failure to follow these instructions properly may result in personal injury or loss of life.



CAUTION

Failure to observe these instructions properly may result in property damage or personal injury, which may be serious depending on the circumstances.

After reading, keep this manual in convenient place so that you can refer to it whenever necessary. If the equipment is transferred to a new user, be sure also to hand over the manual.



WARNING

- This unit should only be serviced and maintained by a professional air conditioning service engineer. Incorrect servicing or maintenance can cause electric shock, fire or leakage of water. Contact your dealer for servicing and maintenance.
- The appliance must be installed in accordance with national wiring regulations.
- Ensure that the power supply is disconnected before any servicing or maintenance is carried out.
- Ensure that the unit is properly grounded, otherwise electric shock or fire may result. Electrical surges (such as those that can be caused by lightning) can damage electrical equipment. Ensure that suitable surge protectors and circuit breakers are properly installed, otherwise electric shock or fire may result.
- When replacing a fuse, ensure that the replacement fuse is of the correct rating.
- Do not attempt to inspect or repair this unit yourself. Engage a professional air conditioning engineer to carry out all servicing and maintenance.

- If this unit exhibits any abnormal behavior (such as emitting smoke) there is danger of serious injury or death. Disconnect the power supply and contact your dealer or service engineer immediately.
- This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning
- use of the appliance in a safe way and understand the hazards involved.
- If sufficient quantity of refrigerant leaks into a room oxygen levels can fall dangerously low, which can cause serious injury or death. The refrigerant used in this unit is heavier than air, so this danger can be greater in basements or other underground spaces. In the event of refrigerant leakage contact your dealer or service engineer immediately.
- Do not use paint, varnish, hair spray, other flammable sprays or other liquids that may give off flammable fumes/vapor near this unit, as doing so can cause fire.
- Do not touch the unit with wet or moist hands, as doing so can lead to electric shock.
- Take anti-lightning measures in areas subject to thunderstorms.
- This appliance is intended to be used by expert or trained users in shops, in light industry and on farms, or for commercial use by lay persons



CAUTION

- This unit is designed to provide space cooling and/or space heating in spaces designed for human occupation and should only be used for these purposes. This unit should not be used to provide refrigeration or cooling for food, plants, animals, machinery, equipment or artworks.
- Ask your supplier or installation engineer for guidance about cleaning the unit. Incorrect cleaning methods can damage plastic components, which can lead to electric shock or leakage of water. Disconnect the power supply before wiping or dusting the unit, otherwise electric shock or injury may result. Use a dry or slightly damp cloth only when wiping or dusting the unit. Do not use a wet cloth, as doing so can lead to electric shock or fire.
- Do not insert fingers or other objects into the unit's air inlet or air outlet, as touching the fan can cause injury or damage equipment.
- Do not remove the unit's panel as doing so causes danger when the fan is operating at high speed.
- The fins on the unit's heat exchanger are sharp and can cause injury if touched. When the unit is being serviced, gloves should be worn or the heat exchanger should be covered to prevent injury.
- After long-term use, check the unit stand and fitting for damage. If damaged, the unit may fall and result in injury.
- Arrange the drain hose to ensure smooth drainage. Incomplete drainage may cause the building or furniture to become wet.

- Ensure the air inlet and outlet are not blocked or performance may suffer or it may activate protection, which will stop the unit from running.
- In extremely strong winds, please prevent the air from flowing backwards into the outdoor unit.
- Choose an appropriate place where the noise and hot or cold wind blown out of the outdoor unit will not cause inconvenience to your neighbors or affect the growth of an animal or plant.
- Do not place appliances that have naked flames under or near the unit, as heat from the appliance can damage the unit.
- Do not allow children to play near this unit, as doing so risks injury.
- This unit should not be operated by children or by adults that are not capable of operating the unit safely.
- When disposing of this unit, ensure that all applicable legislation regarding the disposal of refrigerant, oil and other materials is adhered to.
- Leave the power on for a minimum of 12 hours prior to running the system to ensure that the crankcase heaters have heated the compressor oil sufficiently.



2. PARTS NAMES

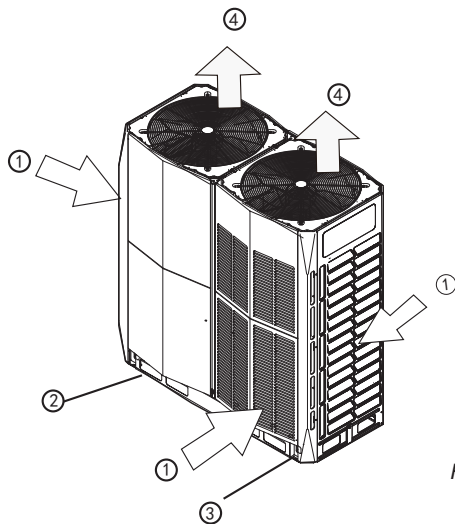


Fig.2-1

| | |
|---|---|
| ① | Air inlets (left, right, rear and front (24-32HP) |
| ② | Refrigerant piping and wiring connection port |
| ③ | Fixed foot |
| ④ | Air outlet |



NOTE

- All pictures in this manual are for explanation purposes only. They may be slightly different from the air conditioner you purchased (depend on model).

3. OPERATION AND PERFORMANCE

■ The cooling and heating operation in a VRF system

- Each indoor unit can be controlled alone. The indoor units in the same system cannot run cooling and heating at the same time.
- **Explanation of priority mode operation**
Priority mode can only be set on the master unit. When an indoor unit is in mode conflict with the outdoor units the unit displays the mode conflict error.
 1. **Auto priority mode (default):** In auto priority mode, the outdoor unit will operate in heating priority mode or cooling priority mode according to the outdoor ambient temperature.
 2. **Heating priority mode:**
 - a) **During cooling operation:** If an indoor unit requests heating, the outdoor units stop and then restart in heating mode after 7 minutes. Indoor units requesting heating then start in heating mode and indoor units requesting cooling display the mode conflict error.
 - b) **During heating operation:** If an indoor unit requests cooling, the outdoor units ignore the request and continue to run in heating mode. The indoor unit requesting cooling displays the mode conflict error. If all the indoor units requesting heating are later turned off and one or more indoor units are still requesting cooling, the outdoor units restart in cooling mode after 7 minutes and any indoor units requesting cooling then start in cooling mode.
 3. **Cooling priority mode:**
 - a) **During heating operation:** If an indoor unit requests cooling, the outdoor units stop and then restart in cooling mode after 7 minutes. Indoor units requesting cooling then start in cooling mode and indoor units requesting heating display the mode conflict error.
 - b) **During cooling operation:** If an indoor unit requests heating, the outdoor units ignore the request and continue to run in cooling mode. The indoor unit requesting heating displays the mode conflict error. If all the indoor units requesting cooling are later turned off and one or more indoor units are still requesting heating, the outdoor units restart in heating mode after 7 minutes and any indoor units requesting heating then start in heating mode.
 4. **VIP priority mode or voting priority mode :** 63 is the VIP address. If the VIP indoor unit is operating, the outdoor units operate in the mode of the VIP indoor unit. Indoor units that are in a mode different to that of the VIP unit display the mode conflict error. If there is no unit with address 63 or the unit at address 63 is in standby, the outdoor units operate in voting priority mode. In voting priority mode, the outdoor units operate in whichever of heating and cooling modes is being requested by the larger number of indoor units.
 5. **Heating only mode :** The outdoor units only operate in heating mode. Indoor units requesting heating operate in heating mode. Indoor units requesting cooling or in fan only mode display the mode conflict error.
 6. **Cooling only mode:** The outdoor units only operate in cooling mode. Indoor units requesting cooling operate in cooling mode; indoor units in fan only mode operate in fan only mode. Indoor units requesting heating display the mode conflict error.

■ **Explanation of heating operation**

- It may take longer to reach the set temperature for general heating operation than for cooling operation.

The following operation is performed in order to prevent the heating capacity from dropping or cold air from blowing

● **Defrost operation**

- When the system is running in heating mode, the outdoor unit may frost in low ambient temperature. To increase efficiency, the unit will start defrosting automatically (after 2-10 minutes), and then water will be drained out from the outdoor unit.
- In order to prevent cold air from blowing out of an indoor unit at the start of heating operation, the indoor fan is automatically stopped. It may take some time before the fan starts. This is not a malfunction.

■ **Protection mode**

- In protection mode the system will stop automatically and the outdoor main PCB will display the specified protection code. If the unit displays protection or error code, contact your dealer for servicing and maintenance.

● **Error**

When the system has error, the system will stop automatically and the outdoor main PCB will display the specified error code. If the unit displays protection or error code, contact your dealer for servicing and maintenance.



NOTE

Please switch off the power supply when protection or error occurs. Do not restart until the problems are solved.

■ **Operation range**

Use the system in the following temperature and humidity ranges for safe and effective operation.

Table.3-1

| Temperature Mode | Outdoor temperature | Indoor temperature | Indoor room's relative humidity |
|---------------------|---------------------|--------------------|---------------------------------|
| Cooling mode | -5°C ~ 48°C | 17°C ~ 32°C | below 80% |
| Heating mode | -23°C ~ 24°C | 15°C ~ 30°C | |



NOTE

The temperature should be below 55°C during transpiring

The protection function may occur if the unit operates beyond above conditions, the unit will stop running.

4. TROUBLES AND CAUSES



CAUTION

- This unit should only be serviced and maintained by a professional air conditioning service engineer. Incorrect servicing or maintenance can cause electric shock, fire or leakage of water. If the unit displays protection or error code, contact your dealer for servicing and maintenance.

Please read following information before asking for maintenance.

4.1 Symptoms that are not air conditioner troubles

■ Symptom 1: Outdoor unit makes a hiss noise

- A slight hiss noise is caused by the heat-expansion and cold-contraction of the heat exchanger as the temperature changes.
- At the beginning or end of the defrosting process, a slight hiss noise is caused by the four-way valve action.
- At the beginning or end of the running process, a sound like water flowing in the valve occurs, which will be amplified after 3-15 minutes. This sound may be caused by refrigerant flow or discharge the drain water.

■ Symptom 2: Outdoor unit heat exchanger discharge mist or water

- Outdoor unit is defrosting.

■ Symptom 3: Indoor unit emit foreign smell

- The foreign smell is from indoor furniture, cigarettes or cosmetics which adhere to the unit.

■ Symptom 4: Indoor unit operation indicator flash

- Power supply resumes after an abnormal power off
- In mode conflict
- Fan stops to prevent sending cold air

■ Symptom 5: Automatically start-up or stop

- Timer setting is activated.

■ Symptom 6: System does not operate

- Power supply is off
- Power manual switch is off
- Fuse is blown
- Timer setting time is activated

■ Symptom 7: Insufficient cooling or heating capacity

- Dirty heat exchanger
- Unit inlet, outlet or filter is blocked
- Fan speed is low
- In fan only mode
- Temperature setting is not suitable

5. MALFUNCTION

Malfunction display of the outdoor unit's DSP1

Table.5-1

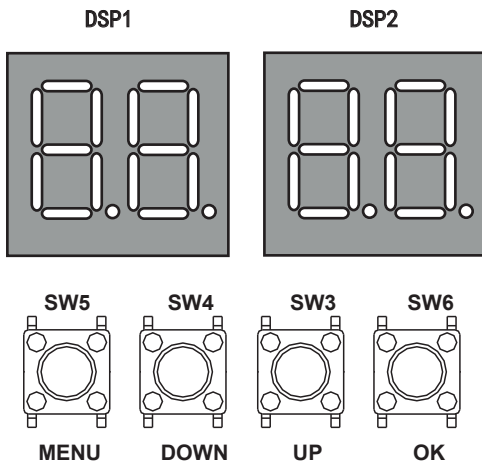
| Error code | Error description | Remarks |
|------------|--|--|
| E0 | Communication error between outdoor units | Only displayed on the slave unit with the error |
| E1 | Phase sequence error | Displayed on the unit with the error |
| E2 | Communication error between indoor and master unit | Only displayed on the master unit with the error |
| E4 | T3/T4 Temp. sensor error | Displayed on the unit with the error |
| E5 | Abnormal power supply voltage | Displayed on the unit with the error |
| E6 | Reserved | Reserved |
| E7 | Discharge Temp. sensor error | Displayed on the unit with the error |
| E8 | Outdoor unit address error | Displayed on the unit with the error |
| xE9 | EEPROM mismatch of compressor | Displayed on the unit with the error |
| xF1 | DC bus voltage error | Displayed on the unit with the error |
| F3 | T6B Temp. sensor error | Displayed on the unit with the error |
| F5 | T6A Temp. sensor error | Displayed on the unit with the error |
| F6 | Electronic expansion valve connection error | Displayed on the unit with the error |
| xH0 | Communication error between main board and compressor drive board | Displayed on the unit with the error |
| H2 | Qty. of outdoor unit decreases error | Only displayed on the master unit with the error |
| H3 | Qty. of outdoor unit increases error | Only displayed on the master unit with the error |
| xH4 | Inverter-module protection | Displayed on the unit with the error |
| H5 | 3 times of P2 protection in 60 minutes | Displayed on the unit with the error |
| H6 | 3 times of P4 protection in 100 minutes | Displayed on the unit with the error |
| H7 | Qty. of indoor units mismatching | Only displayed on the master unit with the error |
| H8 | High pressure sensor error | Displayed on the unit with the error |
| H9 | 10 times of P9 protection in 120 minutes | Displayed on the unit with the error |
| yHd | Slave unit malfunction(y=1,2 . e.g , 1Hd stands for slave unit 1 error) | Only displayed on the master unit with the error |
| C7 | 3 times of PL protection in 100 minutes | Displayed on the unit with the error |
| P1 | High pressure protection or discharge Temp. switch protection | Displayed on the unit with the error |
| P2 | Low pressure protection | Displayed on the unit with the error |
| xP3 | Compressor current protection | Displayed on the unit with the error |
| P4 | Discharge Temp. protection | Displayed on the unit with the error |
| P5 | High Temp. protection of condenser | Displayed on the unit with the error |
| xP9 | Fan module protection | Displayed on the unit with the error |
| xPL | Inverter module Temp. protection | Displayed on the unit with the error |
| PP | Compressor discharge insufficient superheat protection | Displayed on the unit with the error |
| xL0 | Inverter compressor module error | Displayed on the unit with the error |
| xL1 | DC bus low voltage protection | Displayed on the unit with the error |
| xL2 | DC bus high voltage protection | Displayed on the unit with the error |
| XL4 | MCE error | Displayed on the unit with the error |
| xL5 | Zero speed protection | Displayed on the unit with the error |
| xL7 | Phase sequence protection | Displayed on the unit with the error |
| xL8 | Compressor frequency variation greater than 15Hz within one second protection | Displayed on the unit with the error |
| xL9 | Actual compressor frequency differs from target frequency by more than 15Hz protection | Displayed on the unit with the error |

Note:

1. 'x' is a placeholder for the compressor system (compressor and related electrical components),with 1 representing compressor system A and 2 representing compressor system B. 'y' is a placeholder for the address (1or2) of the slave unit with the error.
2. For some error codes,a manual restart is required before the system can resume operation.

6. BUTTON FUNCTION

Table 6-1



6.1 Button switch function

- 1) MENU: Long press 5 seconds to enter menu function mode, short press return to the previous menu
- 2) OK: Short press to enter the next level menu or confirm the selection
- 3) UP/DOWN:
 - a) Select different menus in menu function mode.
 - b) System check when it is not menu function mode.

6.2 Menu function mode

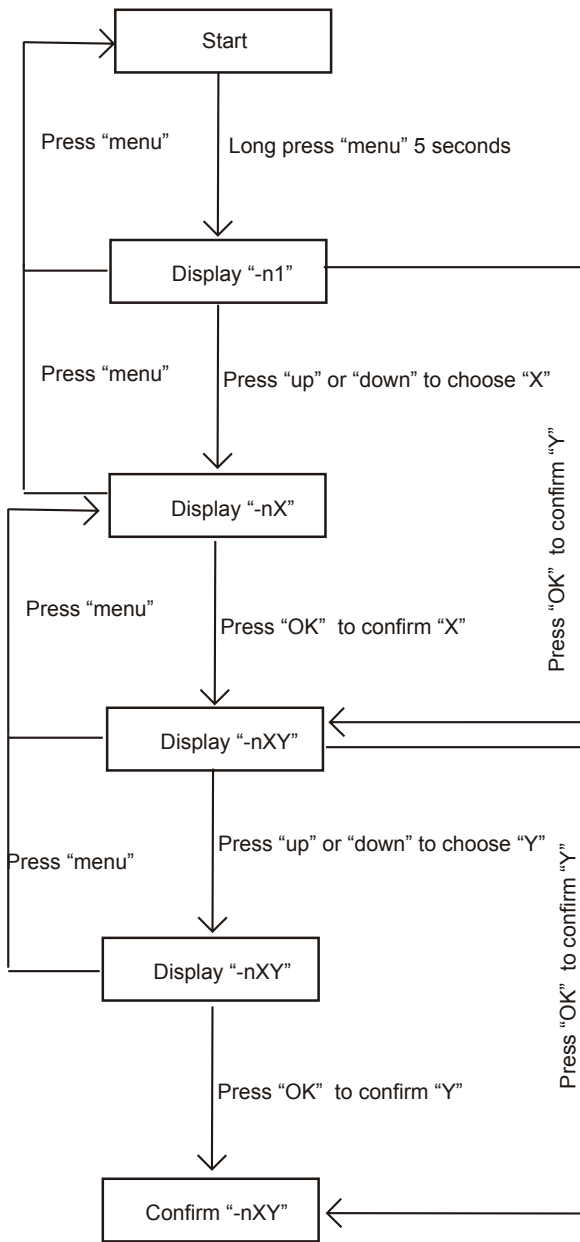
Only master unit has the full menu functions, slaves units only have error codes check and cleaning menu functions.

1. Long press "MENU" button 5 seconds, then display "n1", and enter the menu function mode.
 - a) Use "UP" and "DOWN" to select a different level 1 menu (for example, n3)
 - b) Press "OK" to enter a level 2 menu (for example, n31)
2. At level 2 menu status
 - a) Use "UP" and "DOWN" to select different level 2 menu (for example, n32)
 - b) Use "OK" to confirm the specified level 2 menu

| MENU | Description | Note |
|------|-----------------------------|--------------------------------|
| n14 | Debug mode 1 | ① |
| n15 | Debug mode 2 | ② |
| n16 | Maintenance mode | ③ |
| n24 | Reserved | |
| n25 | Reserved | |
| n26 | Backup run | ④ |
| n27 | Vacuum mode | Display "R006" |
| n31 | History codes | |
| n32 | Cleaning history error | |
| n33 | Reserved | |
| n34 | Restore factory settings | ⑤ |
| n41 | Power limitation mode 1 | ⑥ |
| n42 | Power limitation mode 2 | ⑦ |
| n43 | Power limitation mode 3 | ⑧ |
| n44 | Power limitation mode 4 | ⑨ |
| n45 | Power limitation mode 5 | ⑩ |
| n46 | Power limitation mode 6 | ⑪ |
| n47 | Power limitation mode 7 | ⑫ |
| nb1 | Fahrenheit degree (°F) | Only available for master unit |
| nb2 | Celsius degree (°C) | Only available for master unit |
| nb3 | Exit auto power save mode | Only available for master unit |
| nb4 | Enter auto power save mode | Only available for master unit |
| nb5 | Auto snow-blowing mode 1 | |
| nb6 | Auto snow-blowing mode 2 | |
| nb7 | Exit auto snow-blowing mode | |
| nb8 | VIP address setting | |
| nF1 | Reserved | |
| nF2 | Reserved | |

- ① Only available for master unit(all indoor units running in cooling mode)
- ② Only available for master unit(if all the indoor unit in the system are the 2nd generation indoor units, all the indoor units will run in heating mode. Once there is one or more old indoor unit in the system, all the indoor units will run in force cooling mode)
- ③ Only available for the master unit, the system does not check the indoor units' number.
- ④ Only available for outdoor unit with two compressors. If one of the two compressors is fail, the other compressor will keep running for up to 4 days and then stop automatically.
- ⑤ Only available for the master unit
- ⑥ Only available for the master unit, 100% capacity output
- ⑦ Only available for the master unit, 90% capacity output
- ⑧ Only available for the master unit, 80% capacity output
- ⑨ Only available for the master unit, 70% capacity output
- ⑩ Only available for the master unit, 60% capacity output
- ⑪ Only available for the master unit, 50% capacity output
- ⑫ Only available for the master unit, 40% capacity output

Menu function mode flowchart



6.3 System check table

Table 6-2

Press UP/DOWN button to enter system check mode when it is not in menu function mode.

| DSP1 content | Parameters displayed on DSP2 | Remarks |
|--------------|--|-----------|
| 0 | Unit address | 0-2 |
| 1 | Unit capacity | 8-32HP |
| 2 | Number of outdoor units | ① |
| 3 | Number of indoor units as set on PCB | ① |
| 4 | Total capacity of outdoor unit | ② |
| 5 | Total capacity requirement of indoor units | ① |
| 6 | Total capacity requirement correction of master unit | ① |
| 7 | Operating mode | ③ |
| 8 | Outdoor unit actual operating capacity | |
| 9 | Fan A speed index | |
| 10 | Fan B speed index | |
| 11 | T2/T2B average Temp (°C) | |
| 12 | Main heat exchanger pipe(T3) temperature (°C) | |
| 13 | Outdoor ambient(T4) temperature (°C) | |
| 14 | Plate heat exchanger cooling refrigerant inlet (T6A) temperature (°C) | |
| 15 | Plate heat exchanger cooling refrigerant outlet (T6B) temperature (°C) | |
| 16 | Discharge Temp. of compressor A (°C) | |
| 17 | Discharge Temp. of compressor B (°C) | |
| 18 | Inverter-module heatsink Temp. A (°C) | |
| 19 | Inverter-module heatsink Temp. B (°C) | |
| 20 | Plate exchanger degree of superheat (°C) | |
| 21 | Discharge superheat degree | |
| 22 | Inverter compressor A current (A) | |
| 23 | Inverter compressor B current (A) | |
| 24 | EXVA position | ④ |
| 25 | EXVB position | ④ |
| 26 | EXVC position | ⑤ |
| 27 | Compressor discharge pressure (MPa) | ⑥ |
| 28 | Reserved | Reserved |
| 29 | Number of indoor units currently in communication with master unit | |
| 30 | Number of indoor units currently operating | ① |
| 31 | Priority mode | ⑦ |
| 32 | Silent mode | ⑧ |
| 33 | Static pressure mode | ⑨ |
| 34 | Reserved | |
| 35 | Reserved | |
| 36 | DC bus voltage A | ⑩ |
| 37 | DC bus voltage B | ⑩ |
| 38 | Reserved | |
| 39 | Address of VIP indoor unit | |
| 40 | Reserved | |
| 41 | Reserved | |
| 42 | Refrigerant state | ⑪ |
| 43 | Reserved | |
| 44 | Power mode | ⑫ |
| 45 | Most recent error or protection code | |
| -- | -- | Check end |

- ① Available for master unit
- ② Only available for master unit, displayed on slave units has no sense;
- ③ Operation mode: 0-OFF; 2-Cooling; 3-Heating;4-Forced cooling
- ④ Opening angle of EEV: Actual value=Display value*4(480P) or Actual value=Display value*24(3000P)
- ⑤ Opening angle of EEV: Actual value=Display value*4(480P)
- ⑥ High pressure: Actual value=Display value*0.1MPa
- ⑦ Priority mode: 0-Auto priority, 1-cooling priority, 2-VIP priority or voting priority, 3-Heating only, 4-Cooling only
- ⑧ Silent mode: 0-Night silent time is 6h/8h, 1-Night silent time is 6h/12h, 2-Night silent time is 8h/10h, 3-Night silent time is 8h/12h, 7-Silent mode 3,8-Super silent mode 1, 9-Super silent mode 2, 10-Super silent mode 3, 11-Super silent mode 4;
- ⑨ Static pressure mode: 0-Standard static pressure, 1-Low Static pressure, 2-Medium static pressure, 3-High static pressure, 4-Super high static pressure;
- ⑩ DC bus voltage: Actual value=Display value*10 V
- ⑪ Refrigerant quantity: 0-Normal, 1-Slightly excessive, 2-Significantly excessive, 11-Slightly insufficient, 12-Significantly insufficient, 13-Critically insufficient.
- ⑫ 0-100% capacity output, 1-90% capacity output, 2-80% capacity output, 3-70% capacity output, 4- 60% capacity output, 5-50% capacity output, 6- 40% capacity output. 10-Auto power save mode, 100% capacity output. 11-Auto power save mode, 90% capacity output, 12-Auto power save mode, 80% capacity output, 13-Auto power save mode, 70% capacity output, 14-Auto power save mode, 60% capacity output, 15-Auto power save mode, 50% capacity output, 16-Auto power save mode, 40% capacity output.

7. AFTER-SALE SERVICE

This unit should only be serviced and maintained by a professional air conditioning service engineer. Incorrect servicing or maintenance can cause electric shock, fire or leakage of water. If the unit displays protection or error code, contact your dealer for servicing and maintenance.



NOTE

The temperature should below 55°C during transporing

The protection function may occur if the unit operates beyond above conditions, the unit will stop running.
