RV Underbunk Air Conditioner

HEAT PUMP



Operation, maintenance and installation manual

CAUTION



For safe operation, this unit must:

1. This appliance can't 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 safe way and understand the hazards involved. Children shall not play with the appliance.

   Cleaning and user maintenance shall not be made by children without supervision.
2. 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.
3. The appliance have full disconnection switch in the fixed wiring in accordance with the wiring rules.

Failure to do so can result in property damage, personal injury and/or death.

Table of Contents

Instructions handbook for operation, maintenance and installation
Heat pump

1 General information

1.1 Scope of the manual 3
1.2 Manufacturer and machine identification 3
1.3 Machine description 3
1.4 User tips 5
1.5 Description of controls 5
1.6 Installing and changing batteries 10
1.7 Description of the receiver 10
1.8 Technical data 14
1.9 Routine maintenance 15

2 Information on installation

2.1 Packing, unpacking and handing 16
2.2 Choice of the place of installation 17
2.3 Preparing the opening and fixing 18
2.3.1 Fixing systems 19
2.4 Fitting the wall-pad controller 21
2.5 Compartment opening and electrical hook-up 22
2.6 Air ducting 23

3 Troubleshooting, maintenance, recycling

3.1 Trouble,causes,remedies 24
3.2 Special maintenance 24
3.3 Decommissioning and recycling 24

Wiring diagram 25
Spare parts catalogue table 26

1.1 Scope of the manual

This manual has been drawn up by the Manufacturer and is an integrated Part of the machine.

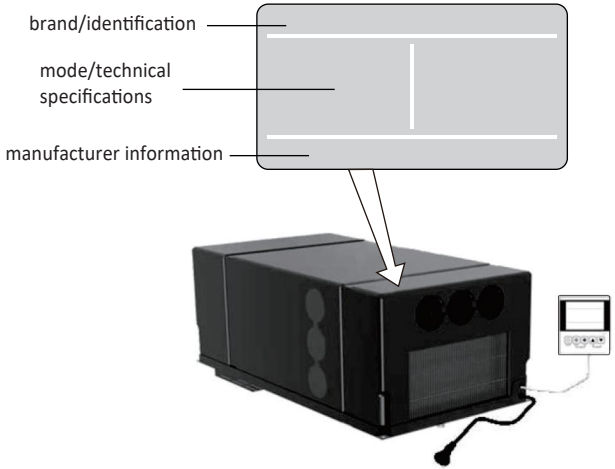
The information it contains can guarantee correct use of the machine.

The first part of the manual is for the user the second part is for the expert personnel who install the machine.

To highlight some parts of the text, the following symbols have been added:

- This operation may be a source of danger.
- Useful advice.
- Information on being environment friendly.

1.2 Manufacturer and machine identification



1.3 Machine description

This machine has been designed and built to be installed on vehicles (motor homes, caravans, special vehicles,etc.) in order to improve the internal temperature. When the weather is hot it supplies cool and dehumidified air; when the weather is cold it supplies hot air without however replacing the vehicle's original heating system. In both cases the air temperature is adjustable.

Cool air-Description of operation(see FIG)

The system is composed of : compressor (A), condenser (B), evaporator (D) a 4-way switchover valve (F) and the pressurized refrigerant.

The refrigerant.by changing physical state from liquid to gas, heats, or cools the components through which it passes.

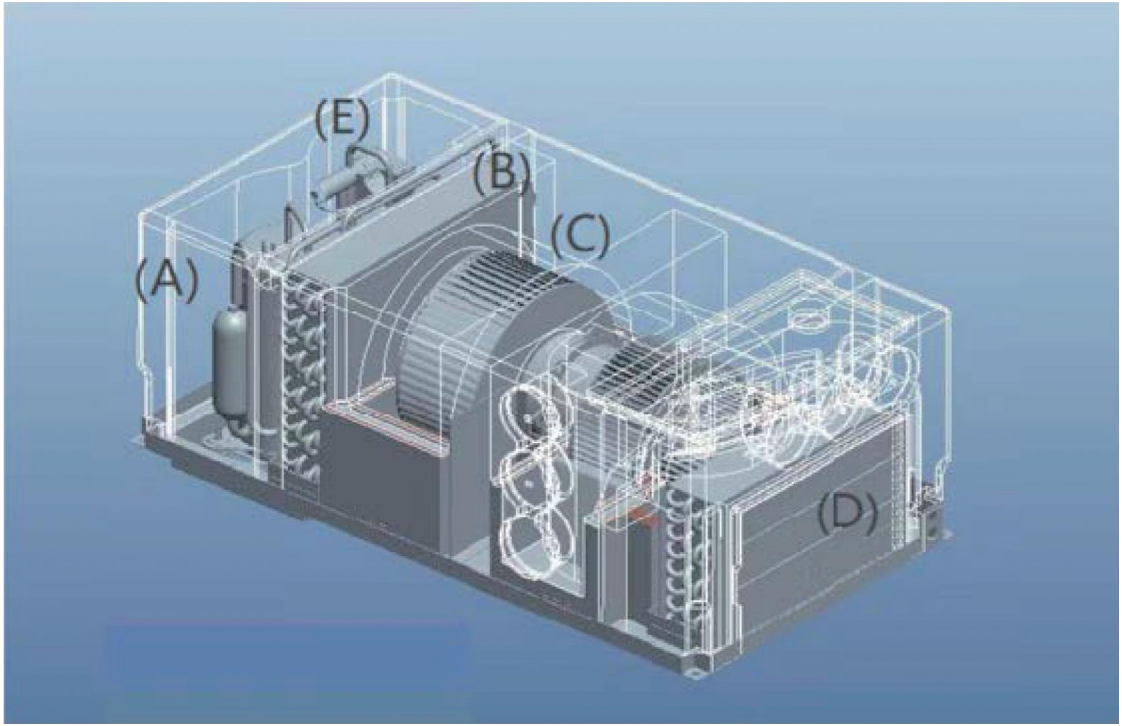
The evaporator that has been made cold is crossed by the internal air Blown by the fan (C).

It comes out cooled and dehumidified air.This action protracted over time creates a reduction in the temperature inside the vehicle.

Hot air-Description of operation(see FIG)

The refrigerating cycle is reversed by the 4-way valve switching over (F); the internal coil changes from evaporator to condenser, thereby heating the air passing through it.

The system is equipped with an additional heating element(E) that increases the heating capacity of the heat pump at low temperatures.

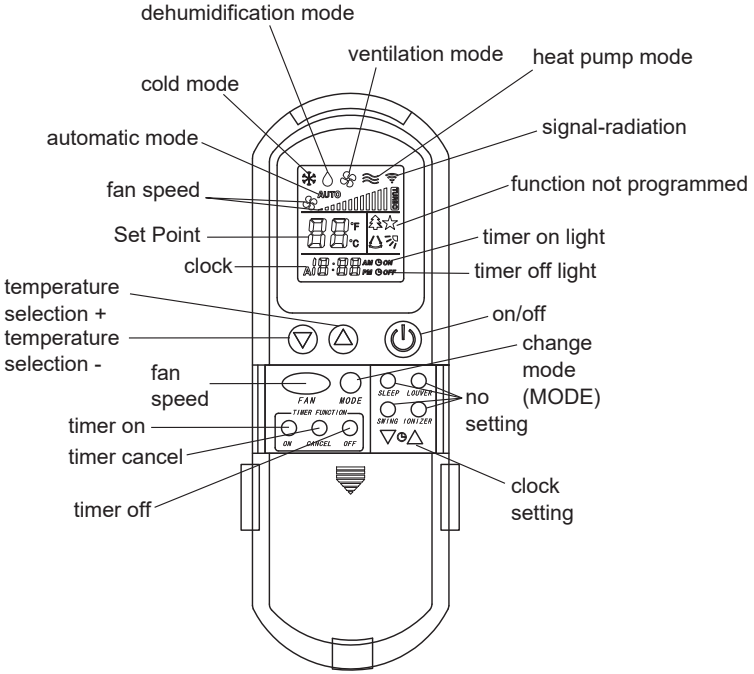


A:(Compressor) B:(Condenser)
C:(Fan) D:(Evaporator)
E:(4 Way switchover valve)

1.4 User tips

The machine performance can be improved by taking some precautions.

- Improve the vehicle's heat insulation by eliminating openings and covering the glass surface with reflecting curtains.
- Avoid frequently opening doors and windows when not necessary.
- Select the appropriate temperature and fan speed. Direct the air vents suitably.
- In order to avoid machine malfunctioning and risks of injury, take the following precautions;
- Do not obstruct the ventilation air inlet and outlet with cloth, paper or any other items;
- do not put your hands or any other items into the openings;
- do not spray water inside the machine;
- Keep flammable substances well away from the machine. Clean the air filter periodically.



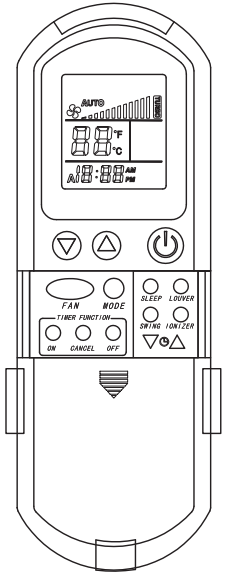
1.5 Description of the controls

Selecting functional status

At the time of **switching on. The system waits for a few minutes before operating the compressor.**

Press the"**MODE**" button to move between the possible states (automatic, cold, dehumidification, ventilation, heat pump) and wait two seconds on the selected state for this to be confirmed by the system with an audible warning (the buzzer is inside the machine). Always point the remote control towards the receiver to send all the signals.

Automatic mode



1		Press the on/off button to switch on the machine.
2	 MODE	Press the change mode button to select automatic mode[1].
3		The temperature selection buttons are disabled.
4	 FAN	Press the fan speed button to select low, medium or high speed or automatic speed[2].
5		Press the on/off button to switch off the machine.This mode stays in memory for switching on the next time.

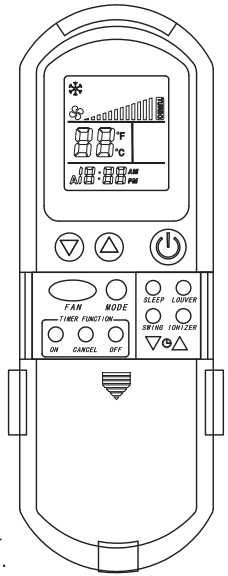
note[1]: In this mode the machine manages the compressor, heat pump and fan speed entirely automatically by comparing the set temperature with the internal temperature according to table A.

note[2]: on automatic speed the correct ventilation is set according to the difference in temperature between the set point and the ambient temperature.

TABLEA

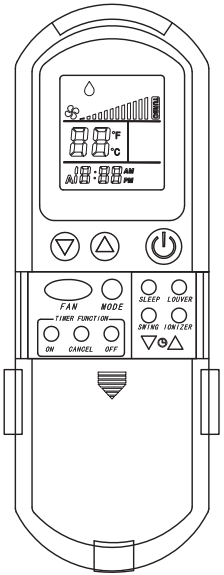
Internal temperature	T≦20°C	20°C<T<25°C	T≧25°C
Operating mode	Heat pump o ventilation	Dehumidification o ventilation	Cold
Set point	20°C	22°C	25°C

Cold mode



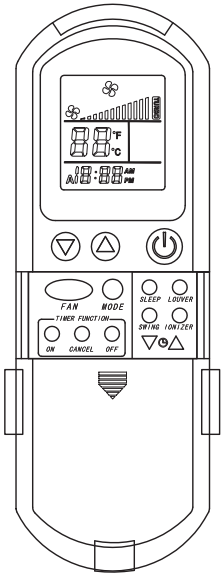
1		Press the on/off button to switch on the machine.
2	 MODE	Press the change mode button to select cold mode.
3		Press the selection buttons to set the ambient temperature on the desired value between 18°C and 30°C.
4	 FAN	Press the fan speed button to select low. Medium or high speed or automatic speed[2].
5		Press the on/off button to switch off the machine.This mode stays in memory for switching on the next time.

Dehumidification mode



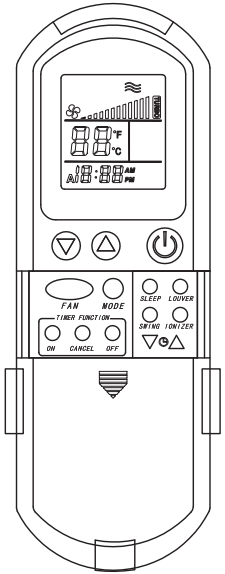
1		Press the on/off button to switch on the machine.
2	 MODE	Press the change mode button to select dehumidification mode.
3		Press the selection buttons to set the ambient temperature on the desired value between 18°C and 30°C.
4	 FAN	The fan speed selection button is disabled.
5		Press the on/off button to switch off the machine. This mode stays in memory for switching on the next time.

Ventilation mode



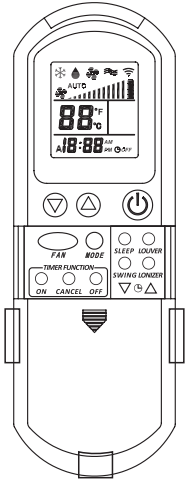
1		Press the on/off button to switch on the machine.
2	 MODE	Press the change mode button to select ventilation mode.
3		Press the selection buttons to set the ambient temperature on the desired value between 18°C and 30°C.
4	 FAN	Press the fan speed button to select low, medium or high speed or automatic speed[2].
5		Press the on/off button to switch off the machine. This mode stays in memory for switching on the next time.

Heat pump mode



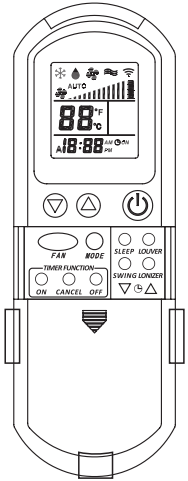
1		Press the on/off button to switch on the machine.
2	 MODE	Press the change mode button to select heat pump mode.
3		Press the selection buttons to set the ambient temperature on the desired value between 18°C and 30°C.
4	 FAN	Press the fan speed button to select low, medium or high speed or automatic speed[2].
5		Press the on/off button to switch off the machine. This mode stays in memory for switching on the next time.

Timer off mode



1		Press the on/off button to switch on the machine.
2	MODE	Press the change mode button to select the desired mode from all the ones available.
3		Press the selection buttons to set the ambient temperature on the desired value between 18°C and 30°C.
4	FAN	Press the fan speed button to select low, medium or high speed or automatic speed[2].
5		Press the timer off button to set the time when the machine must switch off[3].
6		Press the selection buttons to change the time when the machine must switch off.
7		Press the timer off button to confirm the data entered.
8		Pressing the timer off button a third time disables this function

Timer on mode



1		The machine must be off.
2		Press the timer on button to set the time when the machine must switch on[4].
3		Press the selection buttons to change the time when the machine must switch on.
4		Press the timer on button to confirm the data entered[5].
5		Pressing the timer on button a third time disables this function

note[3]: When you press the button the first time the symbol on the display flashes to signal you are programming a switch-off.pressing it a second time saves the data and the icon stays on steady to signal activation of the timer off function (a yellow LED lights up on the receiver panel);pressing it a third time turns off the timer off mode.

note[4]: When you press the button the first time the symbol on the display flashes to signal you are programming a switch-on: pressing it a second time saves the data and the icon stays on steady to signal activation of the timer on function (a yellow LED lights up on the receiver panel); pressing it a third time turns off the timer on mode.

note[5]: At the set time the machine will start in automatic mode.

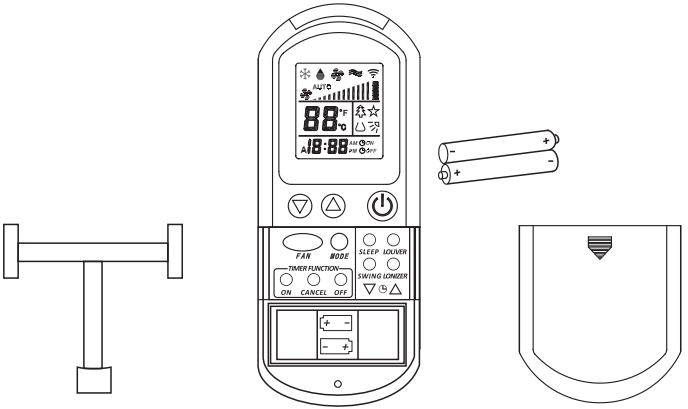
1.6. Installing and changing the remote control batteries

Take off the battery cover.

Insert the two batteries supplied (size AAA), Paying attention to their polarity.

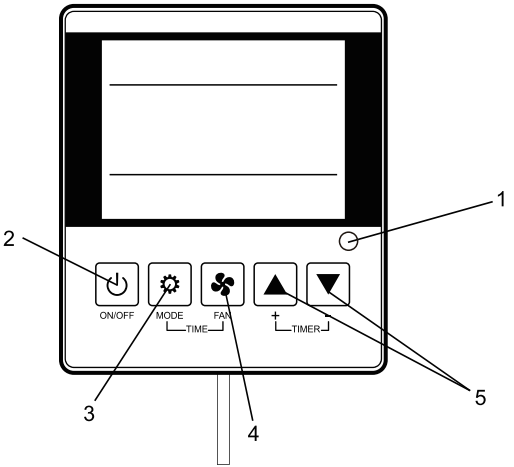
Fit the battery cover back on.

Check the remote control works properly by pressing the on button: if ,on pressing the button, no icon appears on the display the you need to re-install the batteries checking their polarity. The machine is connected to the power supply and ready for use.

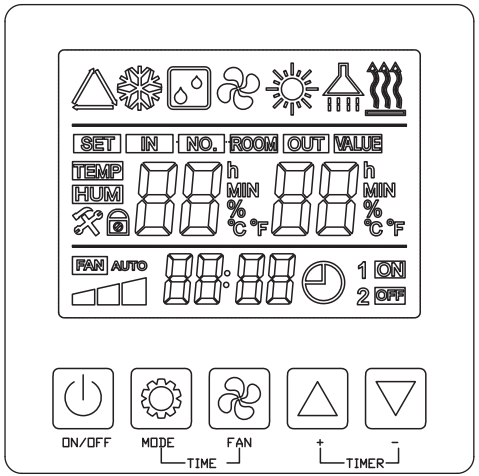


1.7. Description of the receiver

1. Signal receiver.
2. Press the ON/OFF button to switch ON or OFF the air conditioner,it will run in memory mode.
3. Press the MODE button to select cooling or heating mode.
4. Press the FAN button to select fan speed.
5. Press the UP or DOWN button to select the desired temperature.



1.7.1 Icons and buttons



The meaning of icon/button:

ON/OFF ----------ON or OFF MODE ----------Mode FAN ----------Fan speed

\+ ----------Up – ----------Down MODE TIME / FAN ---------- Combined button for Natural clock setting

\+ TIMER – ----------Combined button for timing ON/OFF ----------Cooling mode

----------Dehumidify mode ----------Fan only ----------Heating mode

SET ----------Setting temp ROOM ----------Room temp

NO. ----------show malfunction or protection number

SET ROOM 24.℃ 28.℃ ----------Set temperature and room temperature

----------When malfunction or protection

FAN AUTO ----------Fan speed (Auto, Hi, Med, Low) 88:88 ----------Natural clock

1 ON
2 OFF ---------- Timing operation setting.

1.7.2 Wall pad operation

A) ON/OFF: press this button, turn on unit or turn off unit.

B) MODE CHANGE: press mode button "MODE" circle cool-dehumidify-fan-heat-cool mod.

C) TEMPERATURE SETTING: When turn on status, LCD will display set temperature and room temperature, press "UP" or "DOWN" button to adjust the setting temperature. The temperature range: 16~31

D) FAN SETTING: Under the normal display page, each time you press the "FAN SPEED" BUTTON, select Auto-High-Mid-Low-Auto in turn

E) SYSTEM CLOCK SETTING: (real-time clock setting): (Note: Since the timing operation time of the electronic control system depends on the system time, the system time must be set before setting the timing function.)

- ✓ On the main interface, press the "Settings" and "FAN SPEED" BUTTONs at the same time to enter the real-time clock setting interface, the clock hour and minute icons flash at the same time.
- ✓ In the real-time clock setting interface, press the "FAN SPEED" BUTTON, the hour part will flash, and the minute part will stop flashing. At this time, press the "+" or "-" BUTTON to set the hour of the real-time clock .
- ✓ After setting the hour part, press the "FAN SPEED" BUTTON again, the number of the minute part flashes, and the hour part stops flashing. At this time, press the "+" BUTTON or "-" BUTTON to adjust the minutes of the real-time clock. set up.
- ✓ After the minutes is set, press the "FAN SPEED" BUTTON again to confirm the real-time clock setting and return to the main interface.
- ✓ In the real-time clock setting interface, press the "ON/OFF" BUTTON to confirm the current real-time clock setting value and return to the main interface.
- ✓ In the real-time clock setting interface, if there is no BUTTON operation for 15 seconds, confirm the current real-time clock setting value and return to the main interface.

F） Timing operation setting: (Remote time signal is not treated)

✓ 1 Press △▽ at same time, the icons display ON OFF at same time

2 Press FAN button clock "hour" flash it start "hour" setting, you can setting timer ON through press+/- △▽

✓ 3 After seting "hour", press button again icons ON flash it starts "nimutes" setting. You can set timer on "minute" through press +/- △▽

✓ 4 After seting "Minute" of time ON, press fan speed button again these icons will display OFF it starts TIME OFF setting, press "up" or "down" to set "hours" of timer OFF operation.

✓ 5 After setting the HOUR of timing off, press fan speed button again these icons display OFF it entes "Minute"of TIME OFF settin, press "up" or "down" to adjust the number.

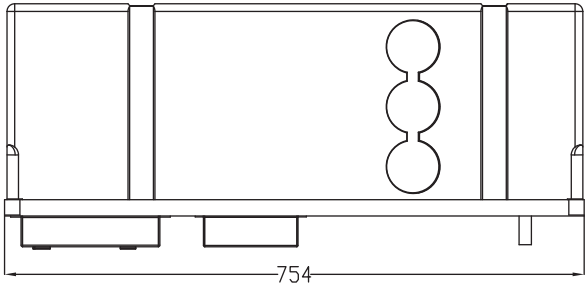
✓ 6 press button go back to no.2 circle

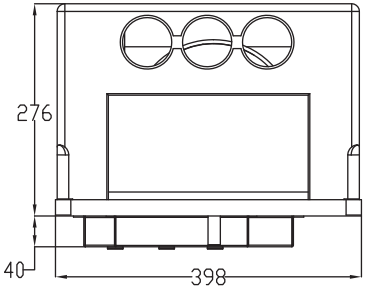
✓ 7 In steps 1-5, long press the mode button MODE to confirm the current timing clock, first flashing display the TIME ON clock 5 seconds (OFF ,), and then flashing the TIME OFF OFF icon for 5 seconds (OFF), and then automatically return to the main interface, at the same time Display ON OFF , timing icons,

8 In steps1-5 long press ON/OFF button ON/OFF cancel timing setting return back to normal interface.

1.7.3 ERROR AND PROTECTION LIST---when error or protection happen, the buzzer will sound; press any button, the buzzer' sound will be disappear.

CODE	ERROR OR PROTECTION	SOLUTION
E1	Room temp thermostat error	Check connection or replace thermostat
E2	Indoor coil thermostat error	Check connection or replace thermostat
P	Communication abnormal	Check connection or replace thermostat
P1	Indoor coil frozen	Check the connections or whether it is really frozen. Check the fan motor.
P2	Indoor coil overheat protection	Confirm whether the indoor fan is running normally and whether the return air inlet and outlet are unobstructeda.





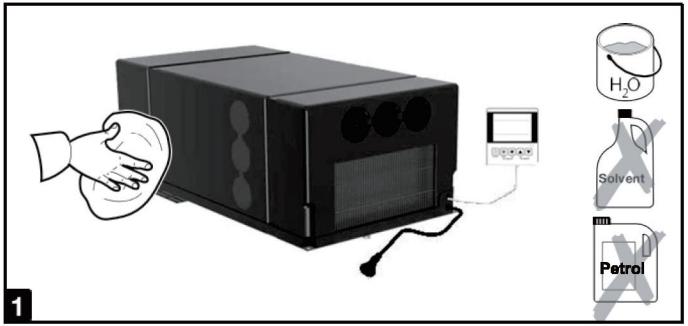
Description	Unit of measurement	Model RV Underbunk Air Conditioner
Refrigerant type/quantity	See machine dataplate	
Cooling capacity	Watt/h	See machine dataplate
Heating capacity	Watt/h	
Consumption when cooling (35°C/24°C/27°C/19°C)	A-Watt	
Consumption when heating (7°C/6°C/20°C/15°C)	A-Watt	
Breakaway current	A	
Additional heating element	Watt	
Electricity supply	V-Hz	
Protection class	IP	X5
Treated volume of air (max)	m^3/h	300
Max volume (Recommended with insulated walls)	m^3	25
Weight	kg	28
E.E.R.	—	2.6
C.O.P	—	2.2
Ventilation	Speed no.	3
Operating temperature	°C	from -7 to +43

with no CFCs

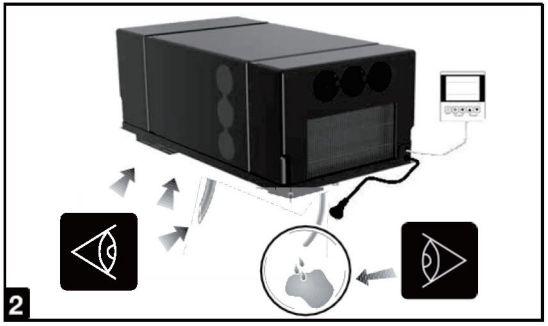
*Additional heating element

** according to EN14511

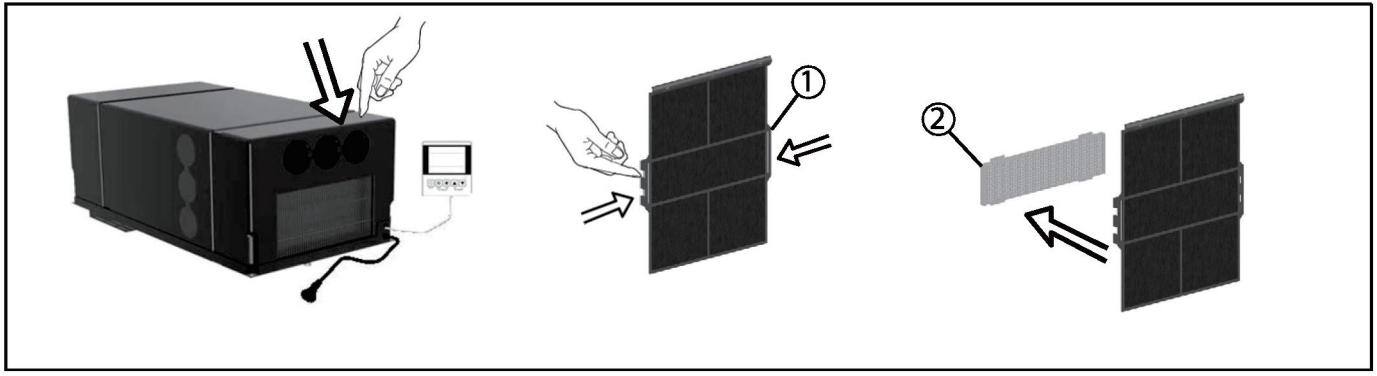
1.9. Routine maintenance



Cleaning: do it periodically,removing the dust with a moist cloth. if necessary, use a non-aggressive detergent.Never use petrol or solvents.



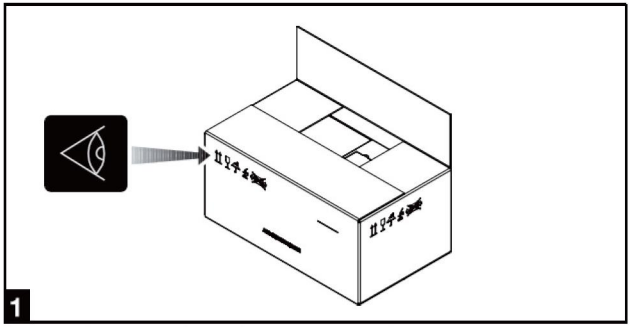
Checking: do it periodically, making sure that:
- the condensation drain holes are not obstructed.
- the openings in the floor are not obstructed.



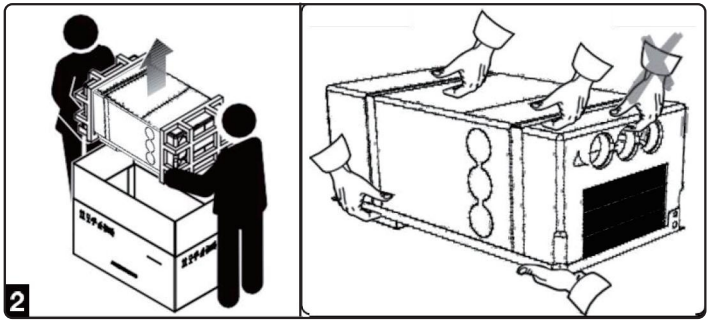
Filters cleaning(1): periodically carry out this operation, wash the filters (N.1) with a detergent solution and allow to dry before refitting.

Installation can be performed by persons with specific technical knowledge. In addition to this requirement, installers must have adequate working conditions in order to ensure their own safety and that of others.

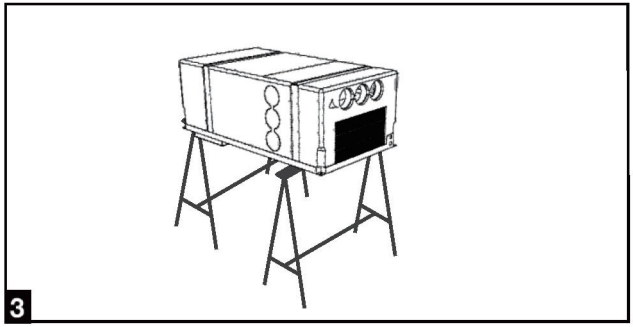
2.1. Packing, unpacking and handling

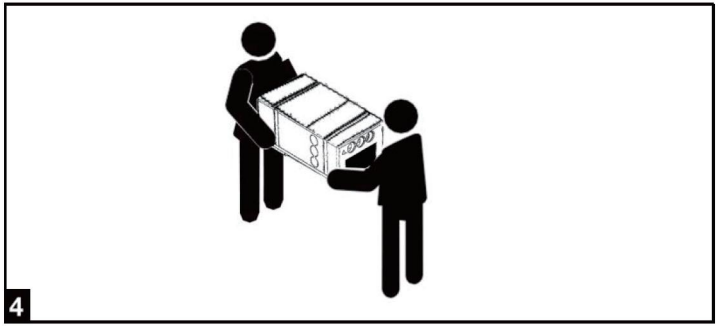


Observe the instructions given on the packing.



Lift the machine, checking it is good.
Lift it using the handles or the belts on the base.





Transfer the machine to the place of installation in conditions of safety.

2.2. Choice of the place of installation

To accomplish uniform climate control in a vehicle, the machine must be installed correctly.

Position the machine, to ensure easy access for servicing and to facilitate disassembly and installation.

Place the assembly template in the compartment intended for installation and check the space available for the openings in the floor.

To minimize the transmission of noise and vibration during operation, the machine must have a minimum clearance on each side of 30 mm from the walls and fittings.

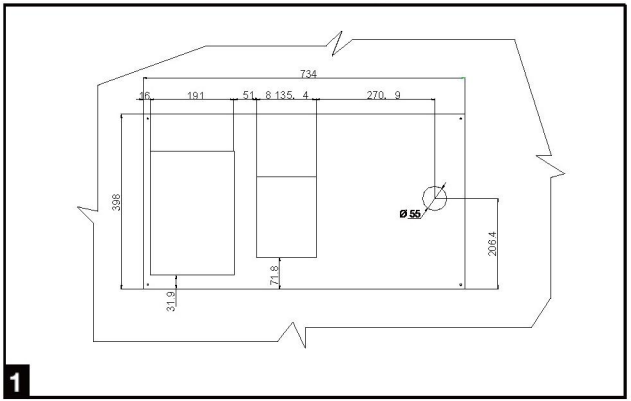
The machine must be installed on the floor.

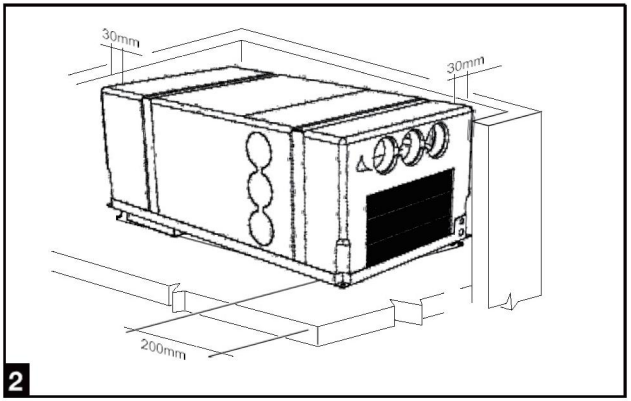
To make renewing the filter easier, keep a distance of 200 mm between the front of the machine and the walls of the compartment.

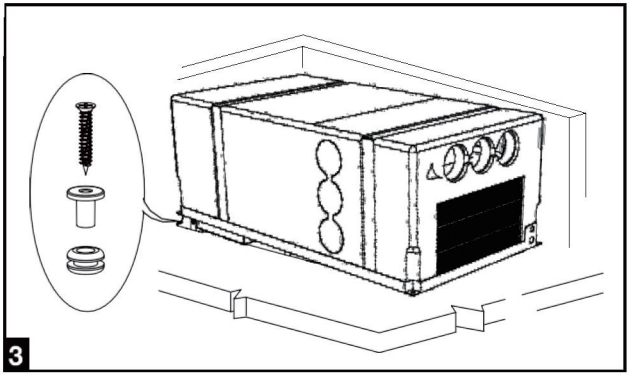
If fitting in external compartments (e.g.,false bottoms), the air to be treated must be drawn in from the vehicle's passenger compartment.

Drawing in outside air can significantly reduce the power of the system.

2.3. Preparing the opening and fixing





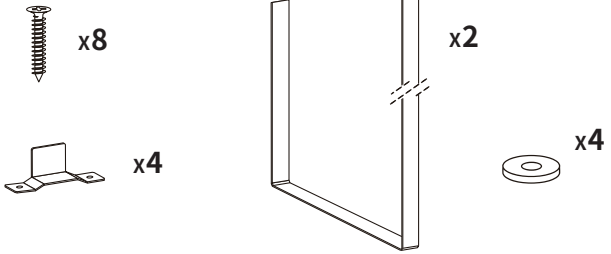


To install the machine it is necessary to create openings in the floor.
The openings in the floor of the vehicle must be accessible and,therefore,must not be covered by parts of the chassis frame behind or the like.
These openings must not be reached by splashes from the wheels; fit a splash guard or something similar if necessary.
Take care to leave a gap of at least 30 mm between the machine and the adjacent walls. Secure the machine to the floor using the kit provided.

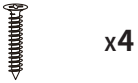
⚠ The machine must preferably be installed level. Maximum angle 10° to prevent condensation coming out.
Before making the holes, always check there are no cables,gas pipes, parts of the chassis frame or the like underneath or hidden. Seal the machined surfaces of the openings in the floor with water-repellent products.

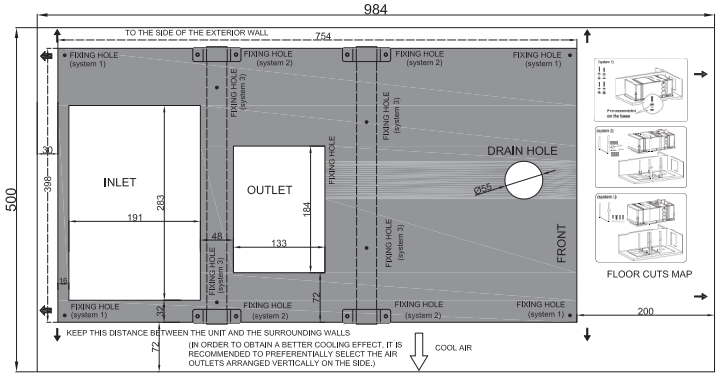
2.3.1 Fixing systems

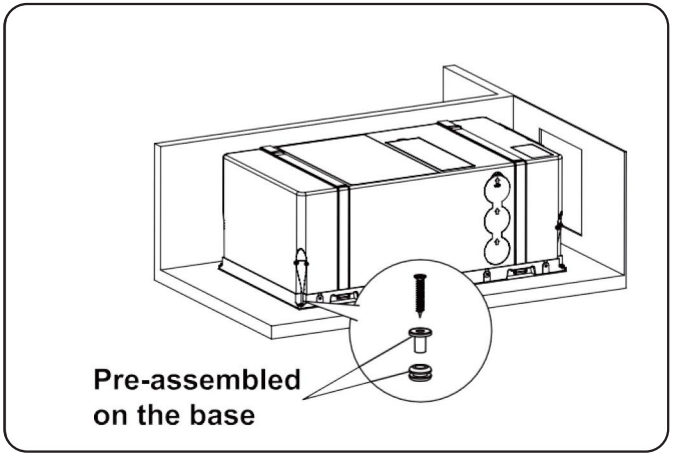
Parts supplied for the a/c fixing



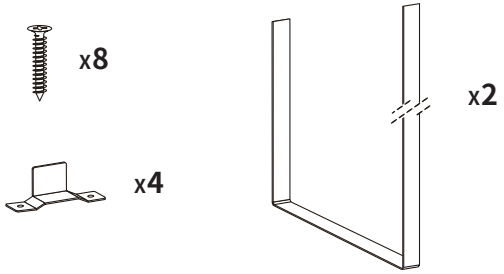
Mode 1: use n °4 screws for the a/c fixing



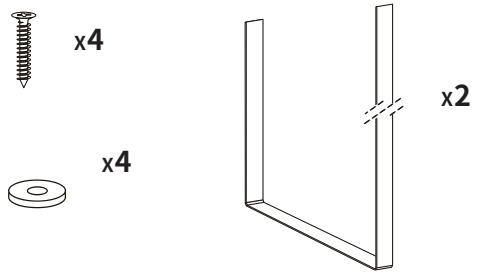


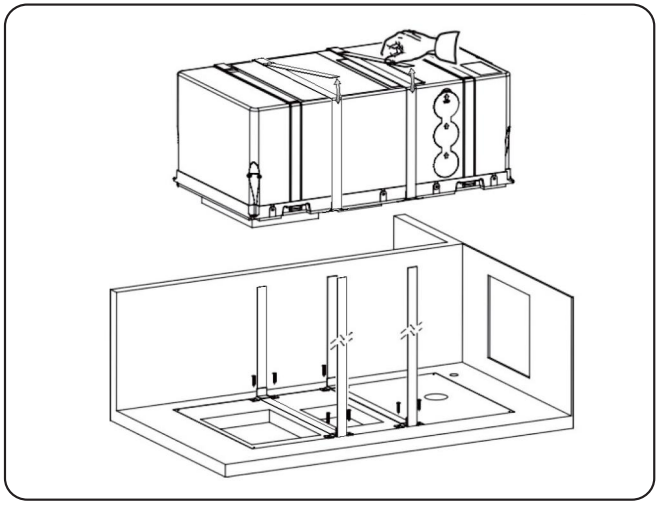


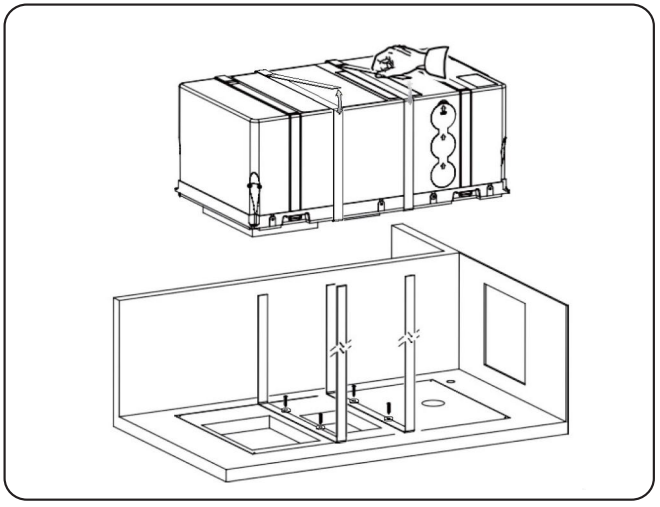
Mode 2: use n° 8 screws, n° 4 brackets and n° 2 belts for the a/c fixing



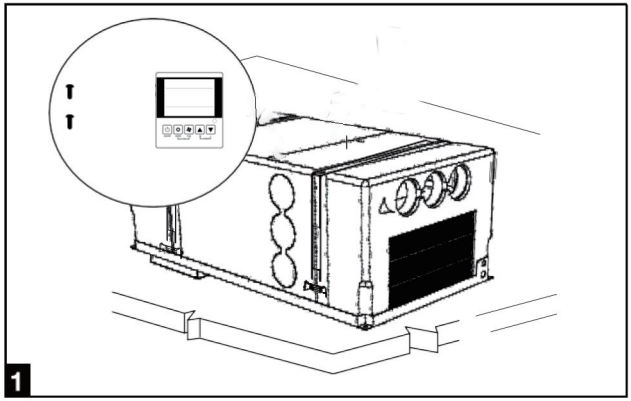
Mode 3: use n° 4 screws and n° 4 washers for the a/c fixing

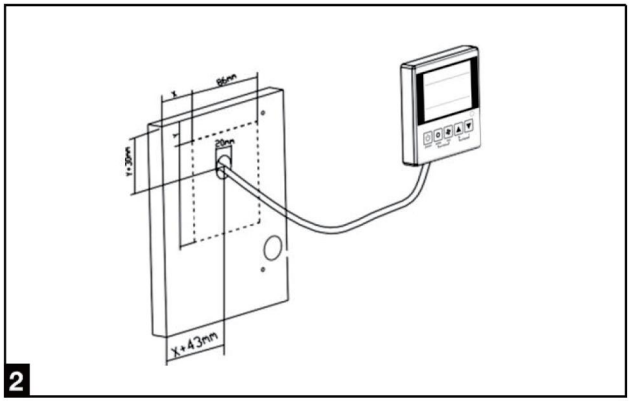


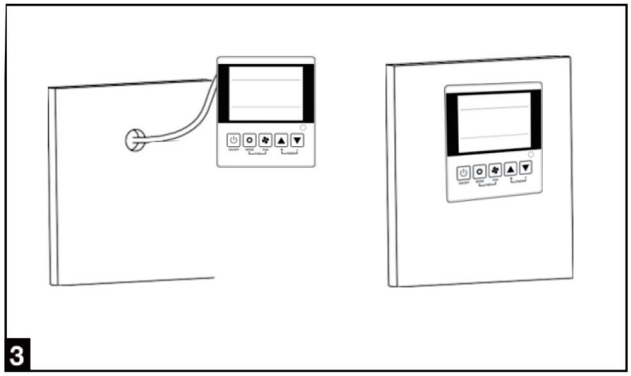




2.4. Fitting the wall-pad controller



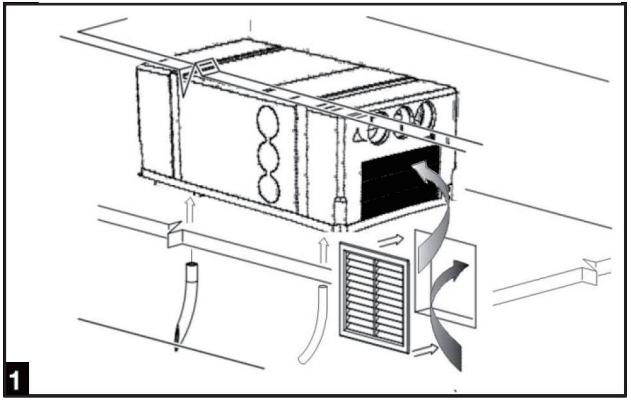


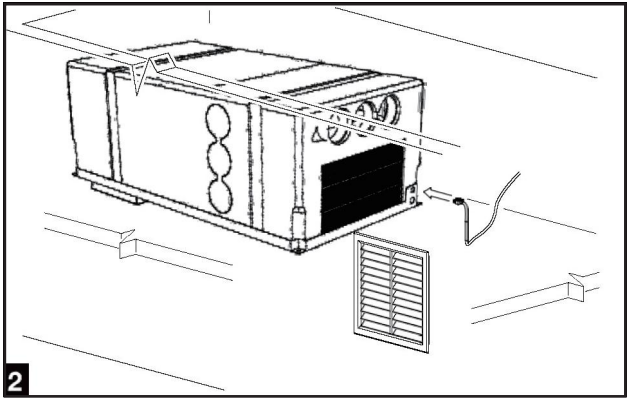


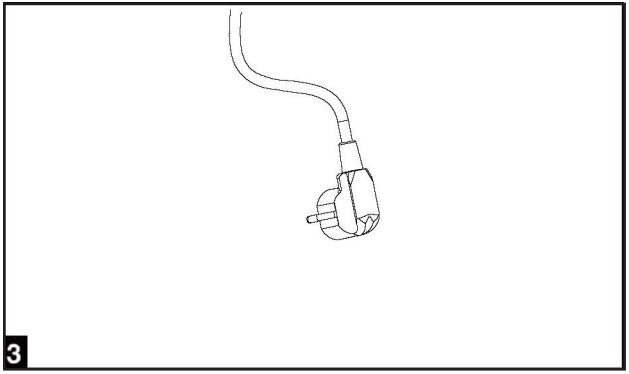
Position the wall-pad: To fit the wall-pad controller you need to make a 20 mm hole in the wall for fixing the connecting cable to pass through (observe the stated distances for correct positioning).

Open wall-pad,let cable pass through the bottom box hole, fix it to the wall, so as to hide the hole you have made. Connect cable to wall-pad PCB connector, buckle the top box to the bottom box.

2.5. Compartment opening and electrical hook-up







Make a hole in the compartment where the machine has been installed to permit recirculation of the internal air; Close this hole with a grille that allows at least 300cm² of air to pass through. Install the condensation drain pipes provided, connect the wall-pad controller extension to the machine and lastly power up by inserting the plug into a socket outlet (Operating voltage of the air conditioner can be found on the nameplate of the unit).

Before switching on, make sure that the campsite column and the extension used are able to withstand the power input required by the machine (See machine dataplate).

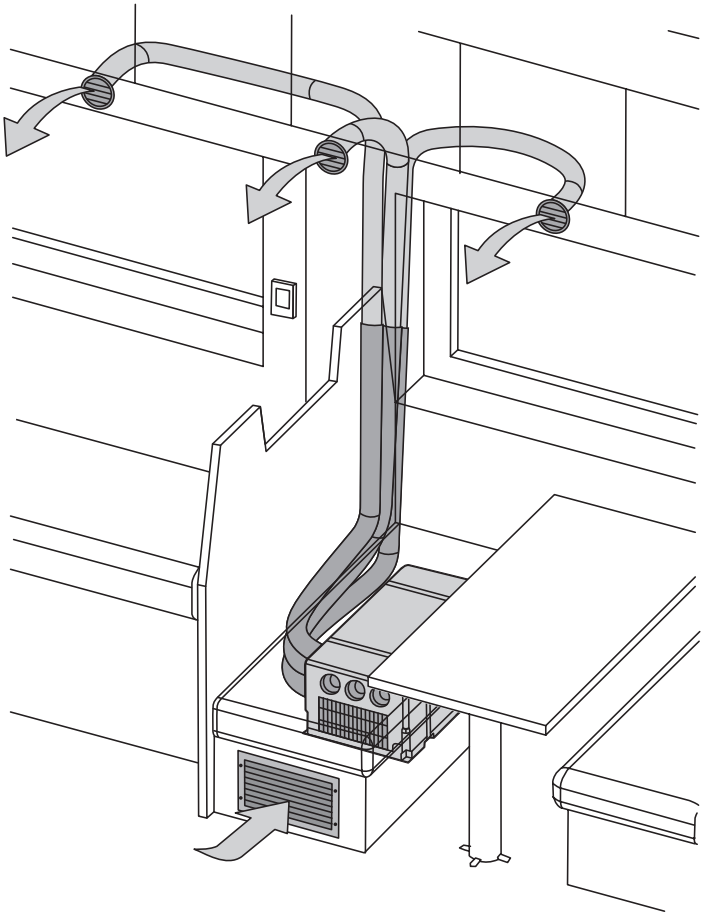
2.6. Air ducting

Make the air ducting with trade parts that are not supplied. It is recommended to use cardboard pipe for air conditioning with an aluminium core and external covering of PVC with an inside nominal diameter of 60 mm. This pipe has an outside diameter of 65 mm.
The ventilation pipes are joined by pressing them together thanks to the tapered hole on the air outlet.
The pipes can be connected either on the outlet on the coil side or, by removing the guard and closing the front holes, on the side outlet.

To achieve the best efficiency it is recommended to:
- lay the air pipes so they are as short and straight as possible;
- not use pipes any longer than 5 m;
- not place the pipes near sources of heat.

The recirculation air is drawn in through a grille or through other openings with a total cross-section of at least 300 cm².
The recirculation air opening must be made near the machine; if this is not the case then make sure that the air flow cannot be obstructed by anything (if necessary, create an air duct between the opening and the machine).
The recirculation air must be taken from inside the passenger compartment; if it were taken from the outside then machine efficiency would suffer.

In order to obtain a better cooling effect, it is recommended to preferentially select the air outlets arranged vertically on the side.



3.1. Trouble, causes, remedies

Operations the user can perform

Operations authorized personnel can perform

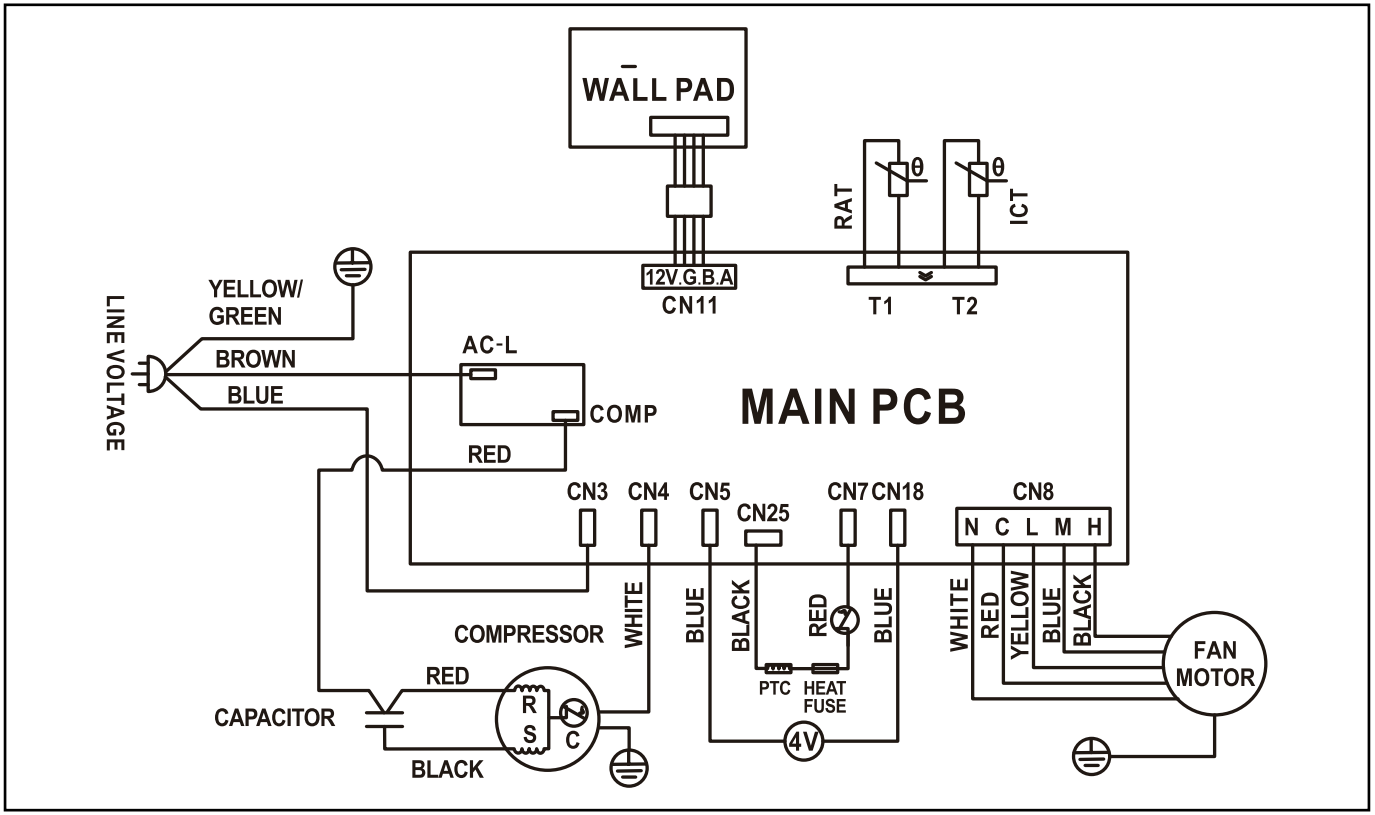
CAUSE	the temperature is lower than 18°C	the temperature is higher than 30°C	check the Set Point temperature	Defective thermal protection	The Mode button is not in the right position	damaged electric heating element	low gas charge	damaged compressor	dirty heat exchange coils	defective internal fan	obstructed air filter	defective external fans	clogged condensation drain holes	damaged 4-way valve	no power arrives	voltage too low	defective electric condenser
the machine does not cool	○		○	●	○		●	●	●			●					
the machine does not heat		○	○	●	○	●	●	●	●					●			
air no longer circulates inside the vehicle									●	●	○						
water seeps into the vehicle													○				
the machine will not start				●				●							○	●	●
the machine stops working				●					●		○	●				●	●

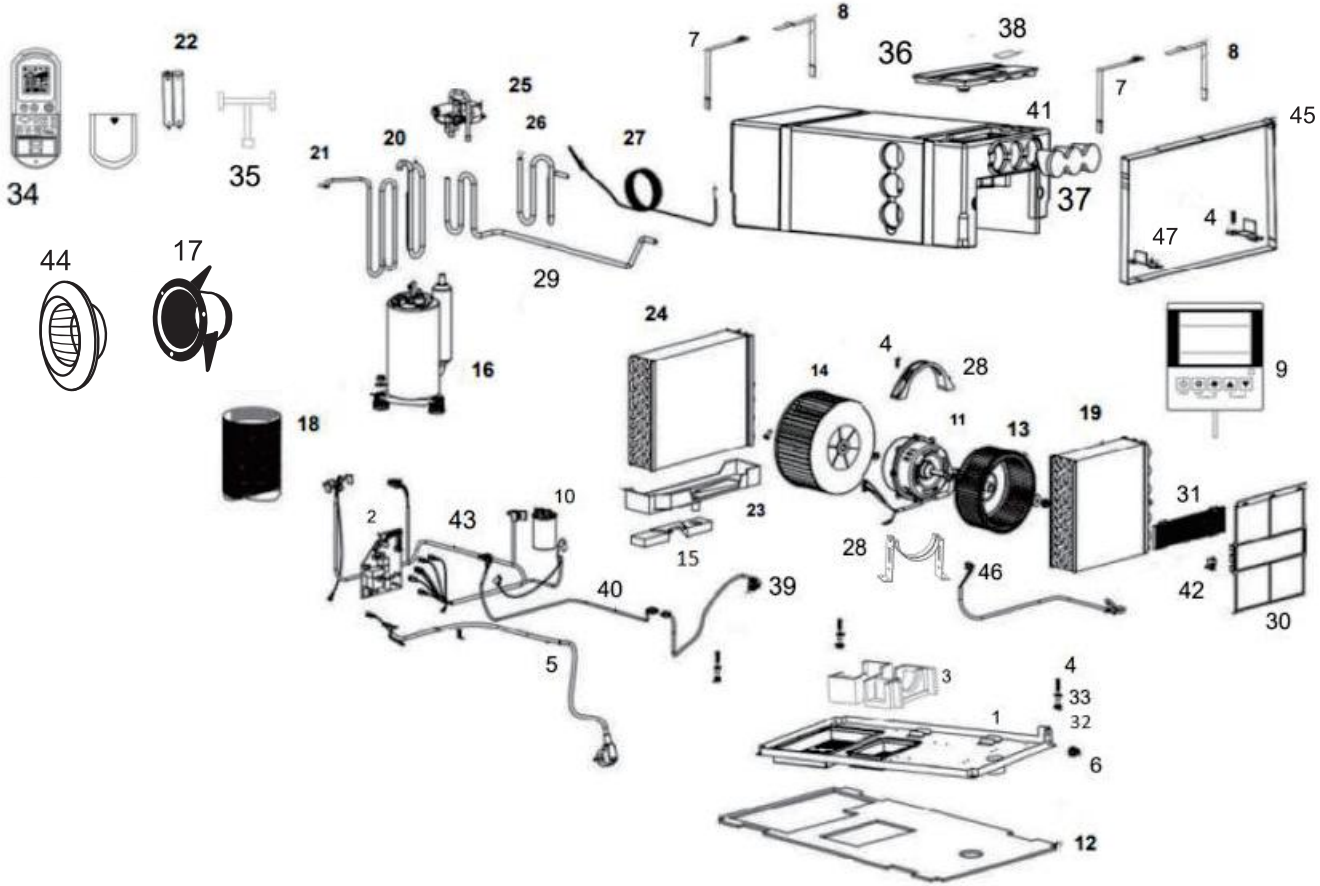
3.2. Special maintenance

For better efficiency it is advisable to have your dealer/workshop perform special cleaning before using:
1. heat exchange coils;
2. condensation drain holes.

3.2. Decommissioning and recycling

For scrapping and recycling, observe the national law. Please contact your environmental authorities or authorized boards.


WALL PAD
RAT
ICT
θ
θ
12V.G.B.A
CN11
T1
T2
YELLOW/
GREEN
LINE VOLTAGE
BROWN
BLUE
AC-L
COMP
RED
MAIN PCB
CN3
CN4
CN5
CN25
CN7
CN18
CN8
N C L M H
COMPRESSOR
WHITE
BLUE
BLACK
RED
BLUE
WHITE
RED
YELLOW
BLUE
BLACK
FAN
MOTOR
PTC
HEAT
FUSE
RED
CAPACITOR
R
S
C
BLACK
4V


34
22
35
21
20
25
26
27
29
7
8
36
38
41
37
7
8
45
47
4
44
17
16
18
24
14
4
28
11
13
19
9
31
42
30
2
43
10
23
15
28
46
40
39
5
3
4
33
32
1
6
12

NO.	DESCRIPTION
1	BASE
2	MAIN PCB
3	EPP BASE
4	SCREW FOR FIXING
5	ELECTRIC CABLE
6	CABLE CLAMP
7	BELT 1
8	BELT 2
9	WALL-PAD CONTROLLER
10	CAPACITOR
11	MOTOR
12	EVA INSULATION
13	INTERNAL FAN
14	EXTERNAL FAN
15	INSULATION
16	COMPRESSOR
17	BUSH
18	AIR PIPE
19	EVAPORATOR
20	COPPER PIPE1
21	COMPRESSOR COPER PIPE
22	BATTERIES(SIZE AAA)
23	WATER PAN
24	CONDENSER

NO.	DESCRIPTION
25	FOUR-WAY VALVE
26	COPPER PIPE 2
27	CAPILLARY PIPE
28	MOTOR FIXING BRACKET
29	COPPER PIPE 3
30	AIRFILTER
31	ELECTRICAL HEATING
32	VIBRATION-DAMPING
33	PIN FOR FIXING
34	REMOTE CONTROL
35	REMOTE CONTROL SUPPORT
36	ACCESSORIES DOOR
37	DEFLECTOR
38	MACHINE DATAPLATE
39	REMOTE PANEL EXTENSION
40	REMOTE PANEL CABLE
41	COVER
42	SENSOR SUPPORT
43	GENERAL WIRING
44	GRILLE
45	BELT3
46	SENSOR CABLE
47	FIXING BRACKET