

Product Specification

Product number: 90333D

Name: PCM series 2KVA bidirectional
power module

Model: PCM2KW-2A24

Version: V2.03

Date: 2025.07.31

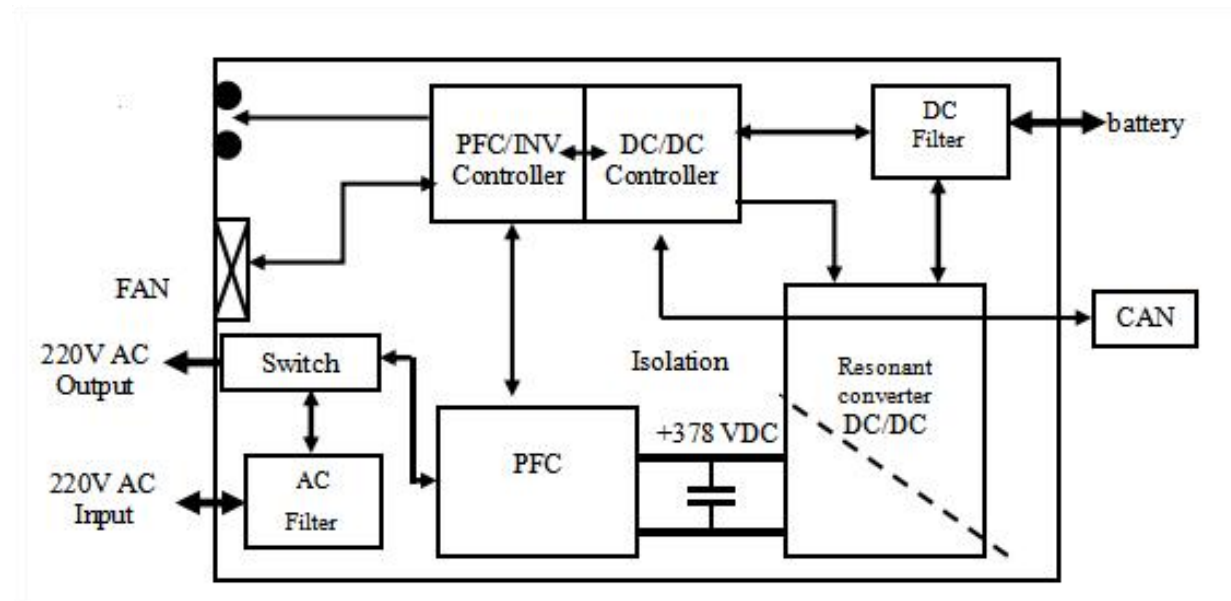
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1. Product Description

PCM2KW-2A series power supply is widely used in high-end portable mobile power supply or home energy storage system because of its bidirectional charge and discharge function. According to the perfect control strategy, the energy of the power grid/battery/load can be comprehensively managed and the AC/DC can be automatically changed. In the case of no power grid, it can directly supply AC load, and in the case of power grid, the power grid directly supplies AC load, and at the same time charges and stores energy to the battery at a large rate, which is a truly meaningful charging and discharging integrated machine. At the same time, it is compatible with the grid-connected discharge function, which can realize the grid-connected discharge when there is a grid under the control of the host computer, and the energy in the battery is transmitted back to the grid, ensuring the accurate phase alignment and smooth energy exchange between the grid and the battery, making it an ideal choice for applications such as energy storage systems, renewable energy integration and power grid stability.

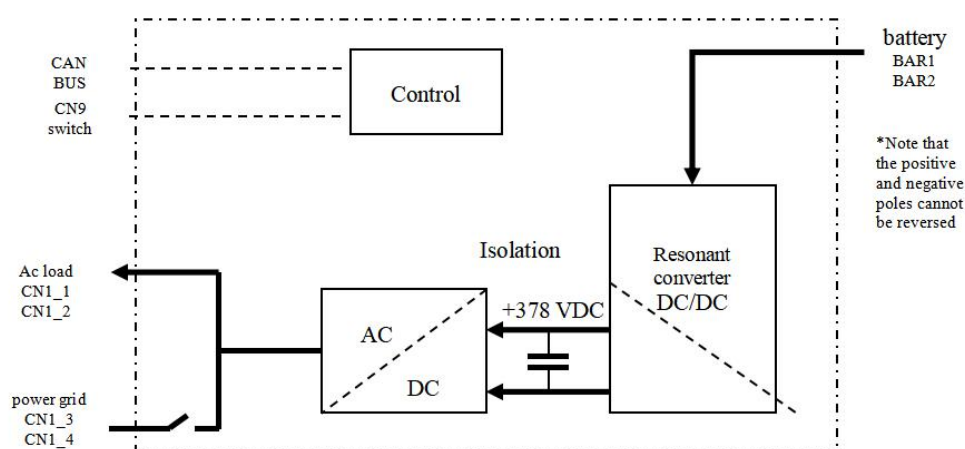
Working principle:



2. Working mode

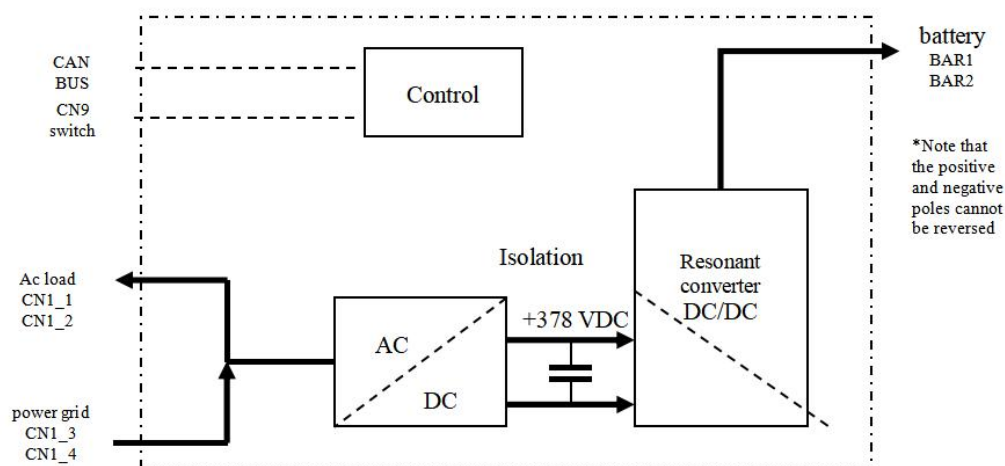
a) Off-grid discharge mode

Send boot when there is no grid and only battery connected. The battery passes through a voltage boosting unit to boost the low voltage DC into a high voltage DC bus, which is then converted into AC power by a DC/AC full bridge inverter unit to supply power to the load.



b) Charging mode

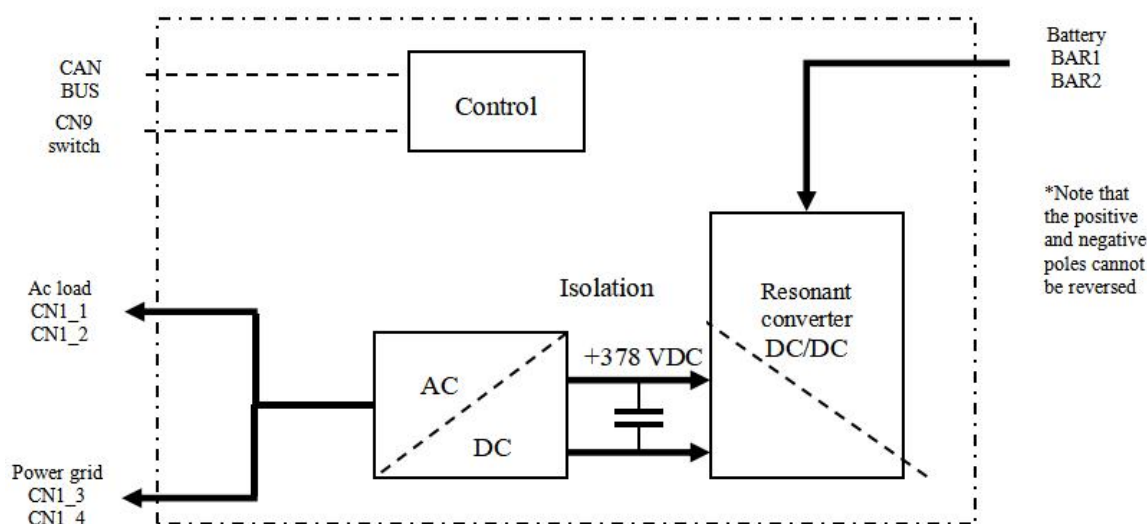
When the grid and battery are connected, the charging voltage and current parameters are sent through CAN_BUS, and the charging mode is selected, and then the startup command is sent. The grid supplies the load through the switching unit, and charges the battery through the full-bridge inverter unit/booster unit.



c) Grid-connected discharge mode

When the power grid and battery are connected, the discharge current parameters are sent through CAN_BUS, and the grid-connected discharge mode is selected, and then the boot is sent.

The battery boosts the low-voltage DC into the high-voltage DC bus through the booster unit, and the DC bus is converted into the AC power with the same frequency and phase as the power grid through the DC/AC full-bridge inverter unit.



d) Switching logic between three modes

1) Off-grid discharge mode ↔ Charging mode

When there is no grid and only battery is connected, the charging voltage and current parameters are sent through CAN_BUS, the charging mode is selected, and the startup command is sent. In this case, the state is off-grid discharge mode, and then the power grid is restored, and the off-grid discharge mode is switched to the previously set charging mode. When the power grid is powered off, switch to off-grid discharge mode again.

2) Off-grid discharge mode ↔ Grid-connected discharge mode

When there is no grid and only battery is connected, the grid-connected discharge current parameters are sent through CAN_BUS, the grid-connected discharge mode is selected, and the startup command is sent. In this case, the mode is off-grid discharge mode. Then the power grid is restored, and the off-grid discharge mode is switched to the previously set grid-connected discharge mode. When the power grid is powered off, switch to off-grid

discharge mode again.

Note: grid-connected and off-grid switching, when there is a power grid, the power grid is preferred, and the module works in grid-connected charging/discharging and bypass on-load mode after startup; The charge/discharge state is executed according to the last set state. When there is no power grid, the module works in off-grid inverter mode after starting up. After the power grid is restored, the module will automatically switch to grid-connected charging/discharging and bypass on-load mode.

3) Charging mode ↔ Grid-connected discharge mode

In the charging mode, send the grid-connected discharge mode command through CAN_BUS to switch to grid-connected discharge; In the grid-connected discharge mode, send the charging mode command through CAN_BUS to switch to grid-connected charging

e) Off-grid output voltage and frequency selection

In the standby mode, after sending the AC and frequency setting command, sending the reset command, and then following the off-network mode startup step, the AC voltage and frequency will change to the set

f) Frequency following grid

When the AC frequency in off-grid mode is inconsistent with the AC frequency of the grid, so the grid exists but cannot be switched to grid-connected charging/discharging, send the shutdown command, send the reset command after the module is switched to standby mode, and then send the startup command, then the switch can be successfully switched to

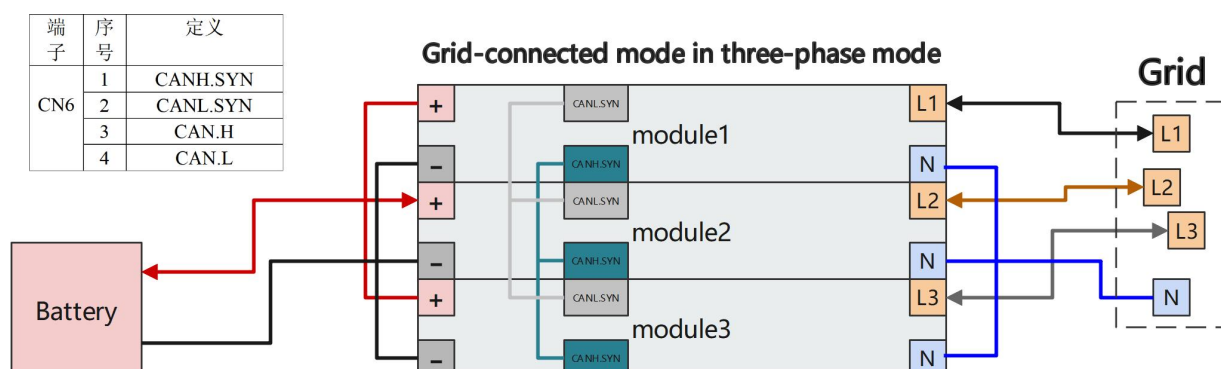
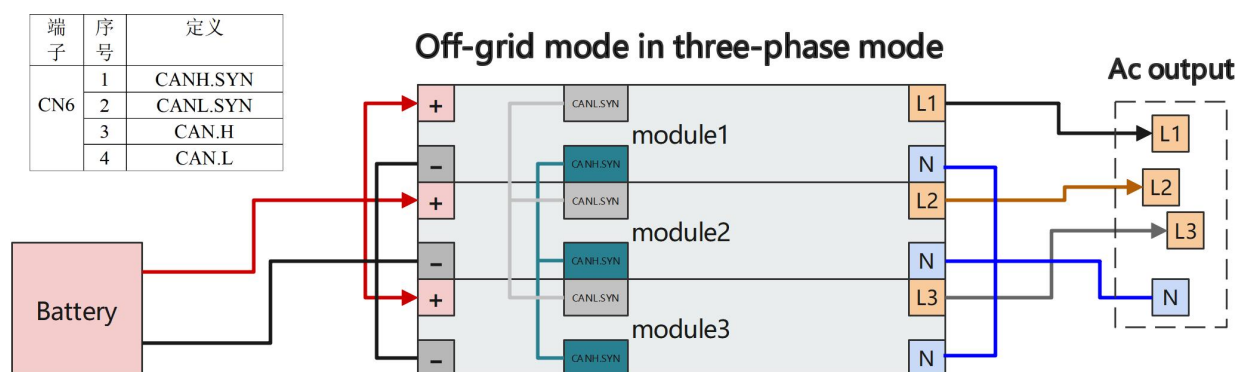
grid-connected.

Note: The reset command takes effect only in standby mode.

g) Three-phase mode

Connect CANH.SYN and CANL.SYN (pin 1 and pin 2 of the CN6 terminal) of the three modules to each other. Select one as the host, power on the other two to enter the standby mode respectively, send address change instructions through CAN_BUS one to one, so that their addresses are changed to 2/3 units respectively(The new version is toggle dip switch), the factory default is three-phase mode, send boot, so that all three modules enter the three-phase mode, forming a three-phase system.

Note: Three-phase AC power is required for the power grid in three-phase mode.



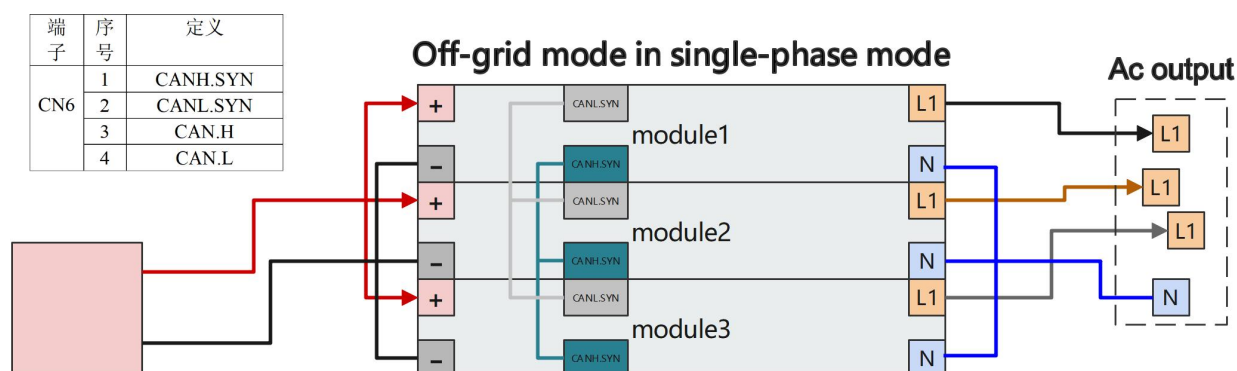
h) Single-phase mode

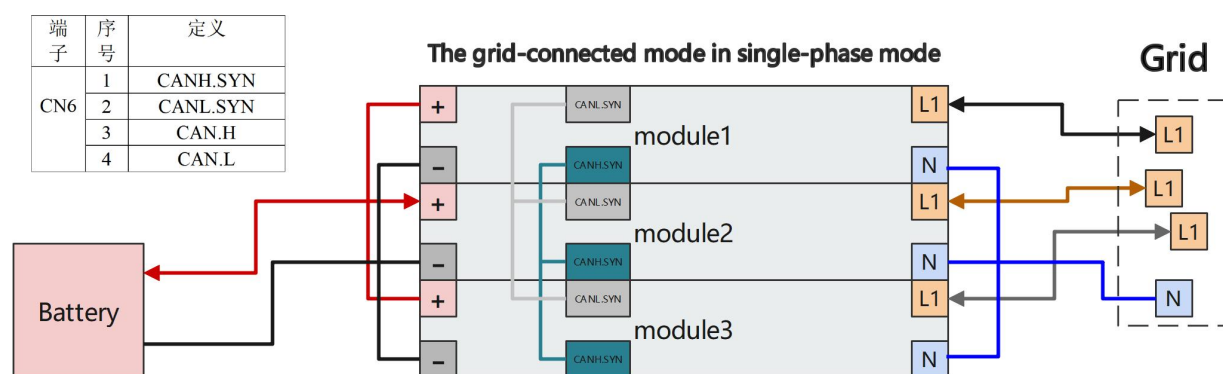
Connect CANH.SYN and CANL.SYN (pin 1 and pin 2 of the CN6 terminal) of the three modules to each other. Select one as the host, power on the other two to enter the standby mode respectively, send address change instructions through CAN_BUS one to one, so that their addresses are changed to 2/3 units respectively(The new version is toggle dip switch), then send single-phase mode command to the three modules at the same time. After the module is completely powered off, power it on again. Then send boot, so that all three modules enter the single-phase mode, forming a single-phase parallel system.

Note: The AC output of the three modules is in phase, and the power grid input is also in phase.

To switch between the three-phase mode and the single-phase mode, the module must be powered off completely and powered on again.

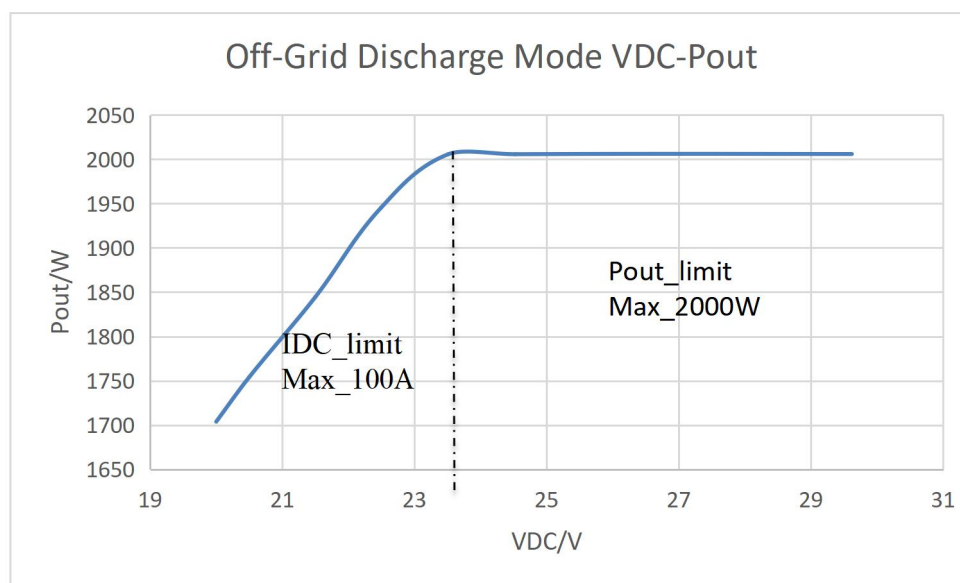
If off-grid/grid-connected switching is required in the single-phase parallel mode, the total load carried by the three parallel modules (parallel system) can only be equivalent to the full-load power of a single module. At this time, each module actually bears one-third of the total load.





i) Off-grid discharge Mode_VDC-Pout

In off-grid mode, when the DC input voltage is low, the DC current is limited to 100A. When the DC input voltage is high, the output power is limited to 2000W.



3. Main technical indicators and characteristics

Product model	PCM2KW-2A24
Battery voltage	20~30VDC
Battery current (charging)	100A Max
Battery current (grid-connected discharge mode)	100A Max
Battery current (Off-grid discharge mode)	100A Max
Rated power (charging)	2400W Max
Ac input voltage range	220Vac±15%
Input power	2700W max @Charging mode
Ac input voltage frequency	50Hz/60Hz±1%Frequency adaptation
Input current	12.2A max @Charging mode
Power factor (charging)	>0.99 @Charging mode
THDi(charging)	5% (Typ.) @full load and THDu < 2%
Ac output voltage	220Vac/230Vac(±1%)
THDu(Off-grid discharge mode)	≤2%@Resistive load
Bypass output power	2 KVA
Inverter output power	2 KVA
Inverter output power factor	0.8
Ac maximum overload capability	10% @30s
	30%@3s
Charge-discharge conversion	Communication command/self judgment
Dynamic load(50% to 100%)	±5%
Switching from bypass to inverter	≤20ms
Efficiency (charge/Off-grid discharge mode)	92%/92% max
Parallel (reserve)	/
Heat dissipation mode	Air cooling
Overcurrent protection range	110%-130%
Weight	<3.1Kg (Including the module casing) < 1.5Kg (Individual module)

4. Use environment

Environment	Working temperature	-20℃ ~ 45℃
	Storage temperature	-40℃ ~ 70℃
	Relative humidity	5% ~ 95%
	Altitude	<1000 m

Note: 1、Parallel function must be equipped with parallel communication board, and set before the factory.

2、The current limit of charging and bypass is 2700W. When the module is in grid-connected charging mode and the bypass is loaded, the bypass power is too large, and the charging power will decrease accordingly.

3、The above products have corresponding AC 110V specifications.

4、If the customer does not choose the chassis, additional fans should be installed for forced air cooling.

5. Application

a) Portable energy storage emergency power

b) Special purpose vehicle inverter Marine inverter

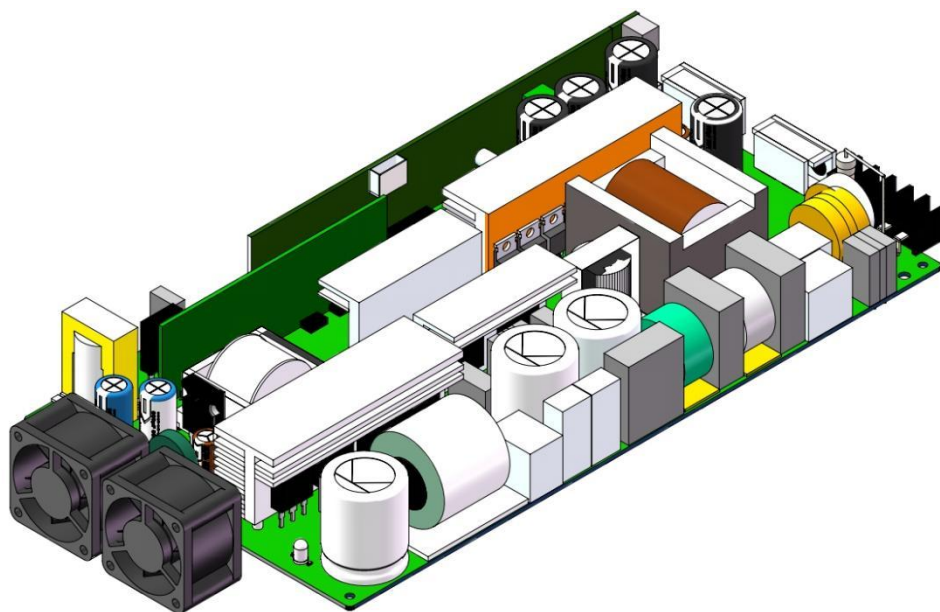
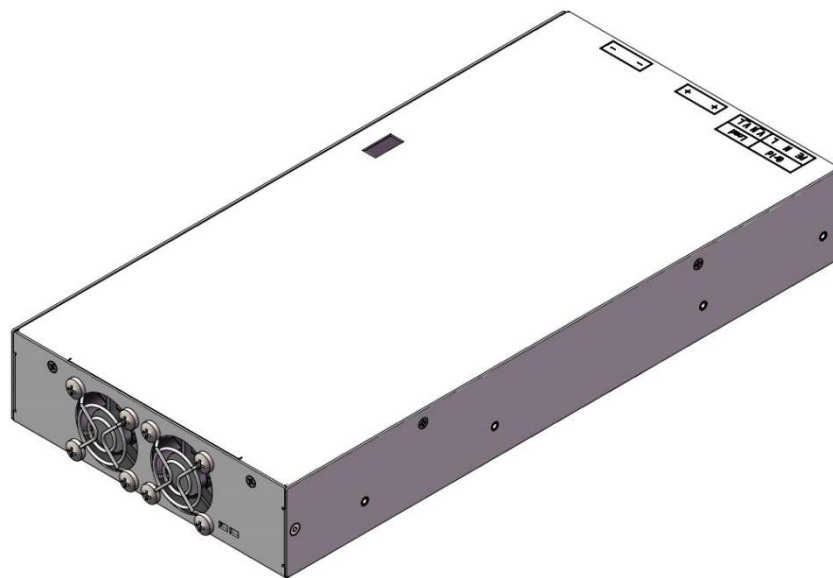
c) Small off-grid systems

6. Shape structure, interface, specifications

Size (width /height/depth): 165×47×333mm±1mm (Shell)

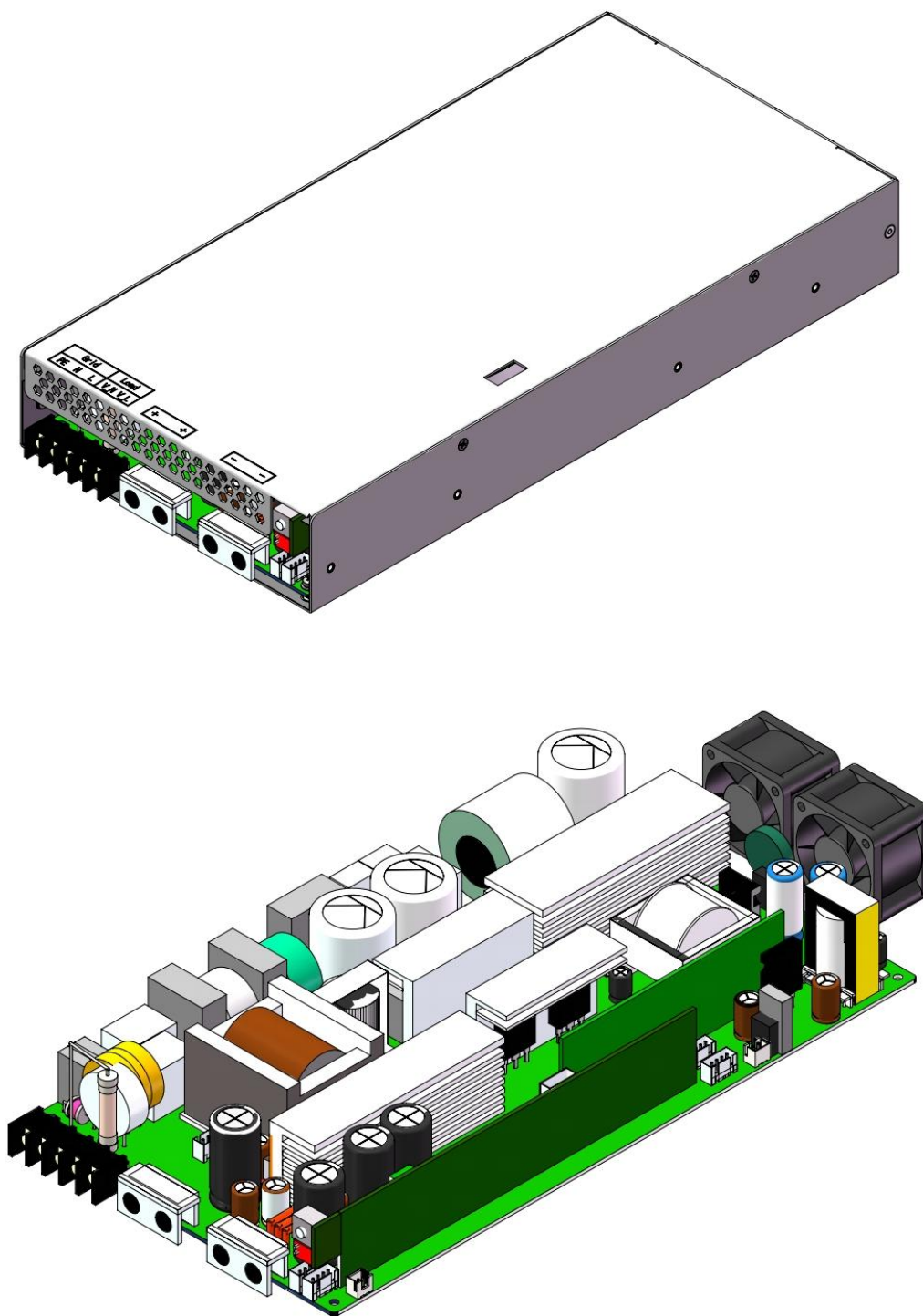
165×47×333mm MAX (PCB)

Front panel



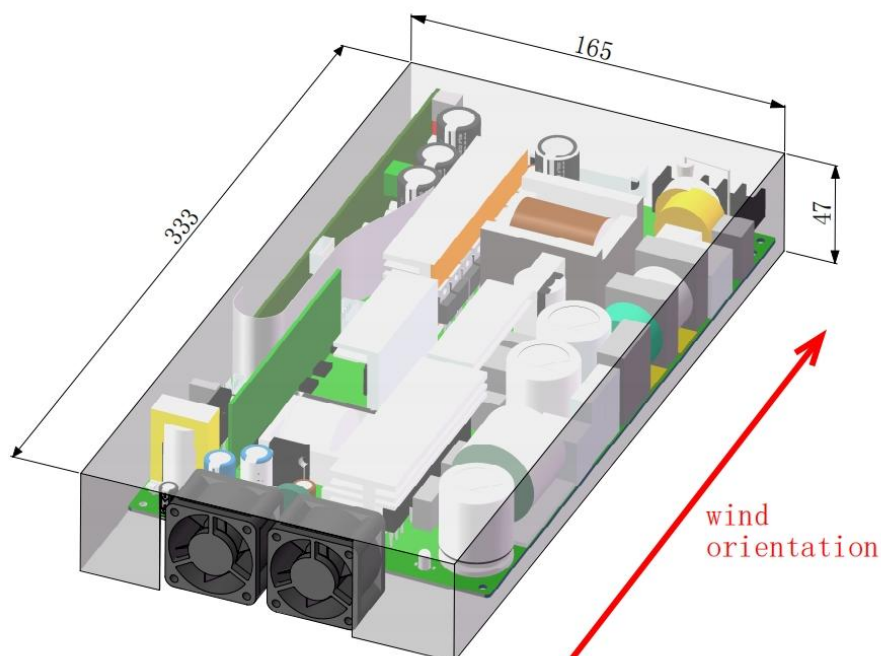
Note: The fan is schematic, Optional

Back panel



Heat dissipation mode(No chassis)

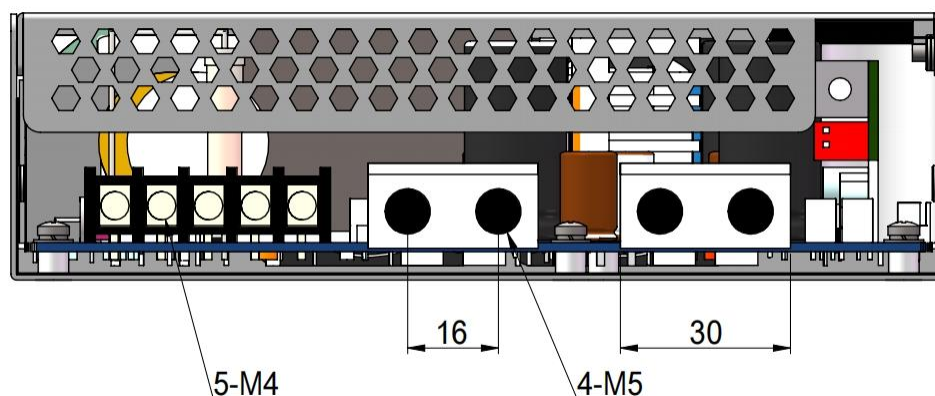
If there is no chassis, the air duct paper should be installed and the fan should be used as follow.

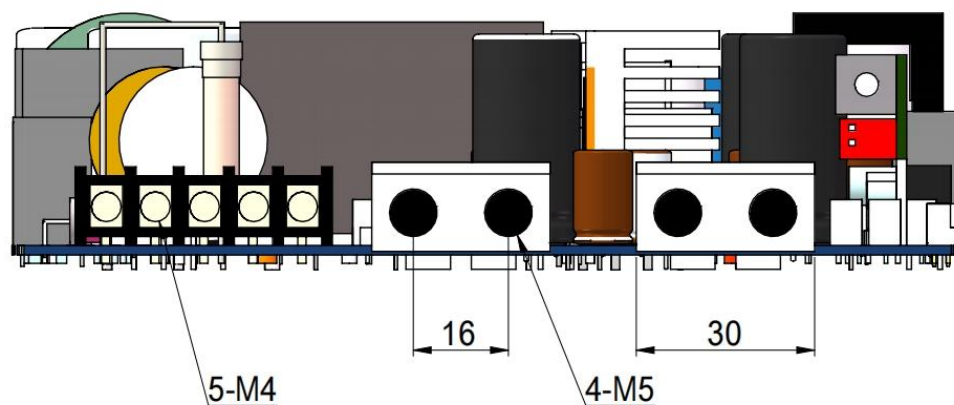


The following table describes the parameters for a single fan

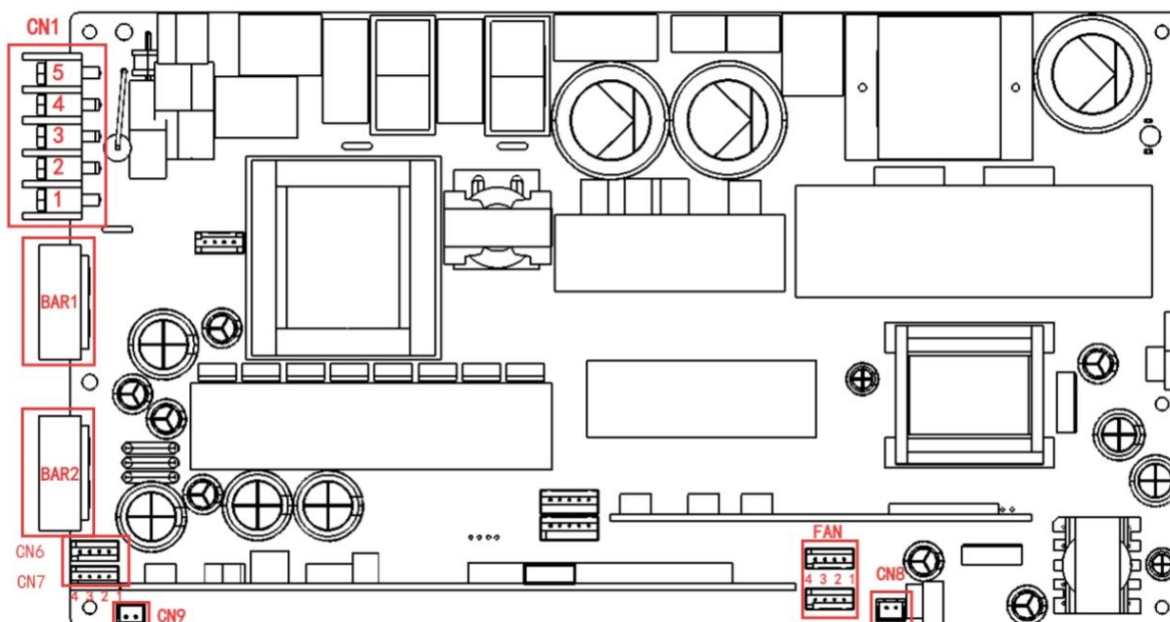
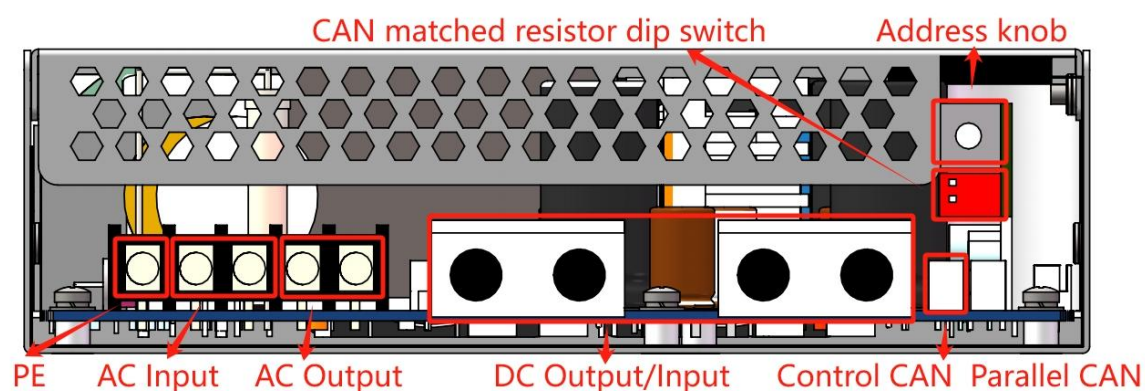
Air flow	24.56CFM/Min: 22.10CFM	At zero static pressure
Air pressure	50.9mmH ₂ O/Min: 41.23mmH ₂ O	At zero air flow

Terminal size





Terminal definition



The whole machine has four basic interfaces: grid AC input, off-grid AC output, DC output (input), communication control interface, in which the DC

interface is a copper busbar, all ports are in the back end of the bidirectional inverter.

Input/output terminal definition

AC input/output socket CN1 Definition:

Table 1

Number	Definition	Notes
1	V _L	Ac load Live Wire
2	V _N	Ac load Naught wire
3	L	Ac input Live Wire
4	N	Ac input Naught wire
5	E	Grounding

DC output terminal definition:

Table 2

Number	Definition	Notes
BAR1	Output Positive +	M5 Screw
BAR2	Output Negative-	M5 Screw

CAN communication terminal definition:

Table 3

Name	Number	Definition	Notes
CN6	1	CANH.SYN	When multiple inverters are connected in parallel
	2	CANL.SYN	
	3	CAN.H	
	4	CAN.L	
CN7	1	+5V.CAN	Used in communication and monitoring with the host computer
	2	GND.CAN	
	3	/	
	4	/	

Hardware switch socket CN9 definition:

Suspension (disconnect) Power on, short-circuit shutdown。(After shutdown through this port, there will be 14W power loss in standby mode, if not used for a long time, it should be completely shut down by disconnecting CN8).

External main switch socket CN8 definition:

If there is no air switch at the battery end of the module and the module is not needed for a long time, turn off the air switch to avoid battery energy consumption. In normal use, please keep the short connection.

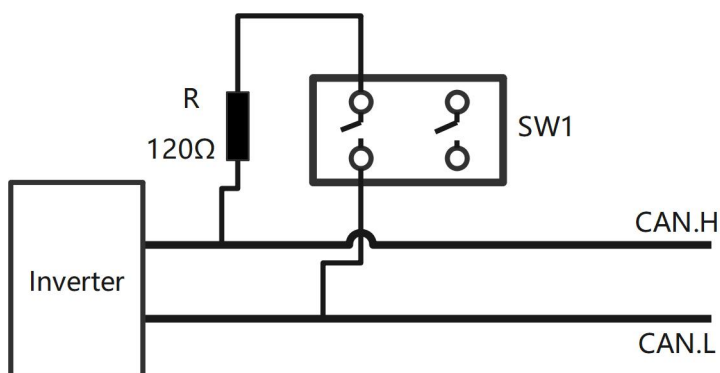
Definition of FAN terminal CN4/5:

Table 4

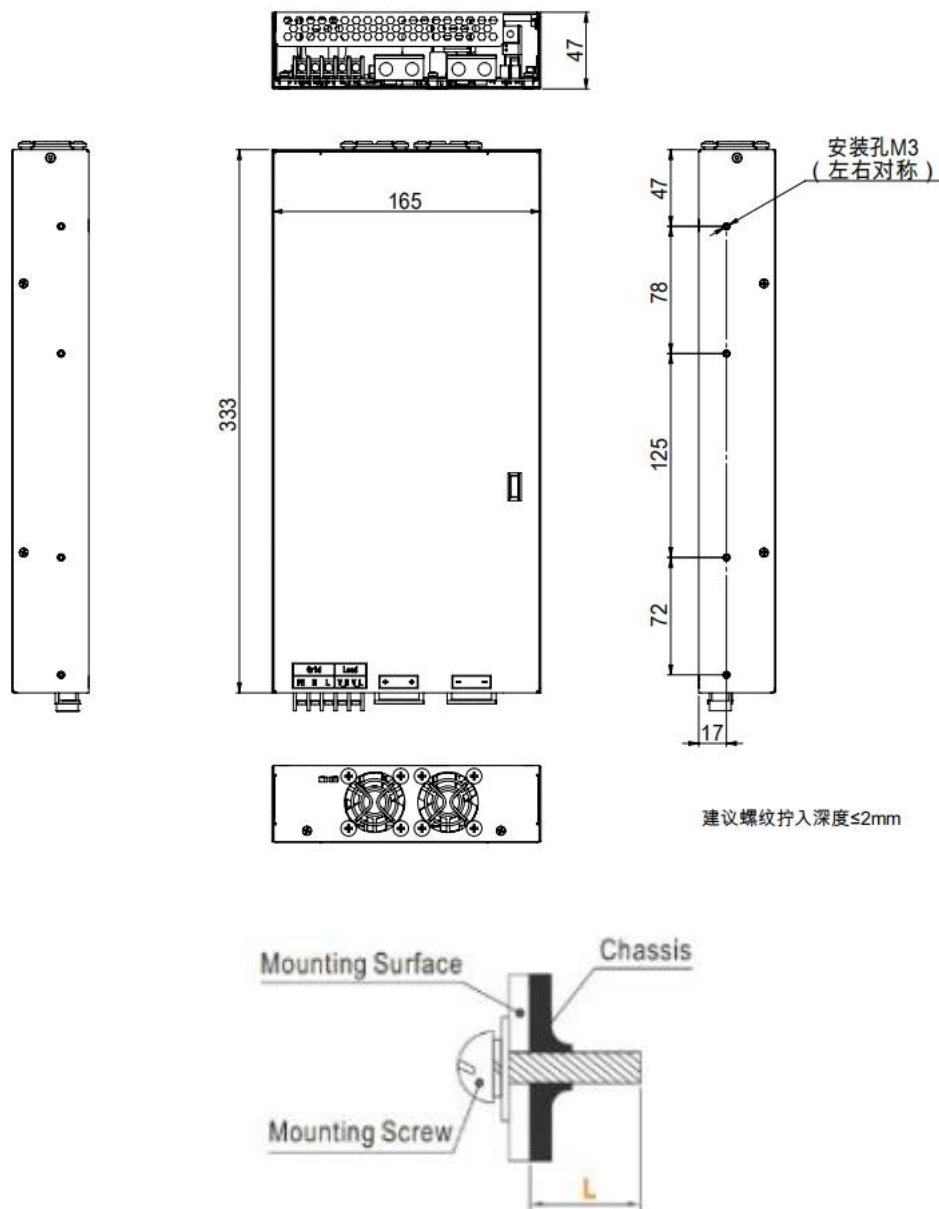
1	GND
2	+12V FAN
3	Speed.FB(PWM)
4	Speed.CNTL(FG)

Definition of the control board CAN matched resistor dip switch SW1:

Switch to ON, and a $120\ \Omega$ resistor will be added between CAN.H and CAN.L.

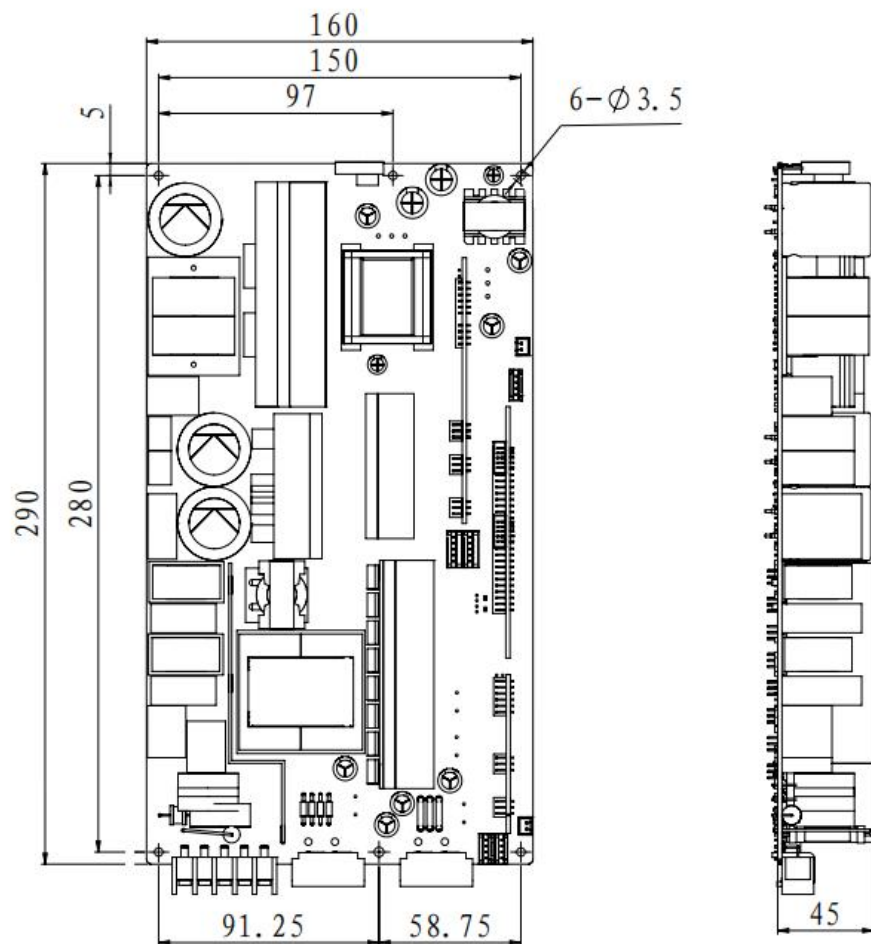


Installation size



Recommended Screw Size	Maximum Penetration Depth/L	Recommended Installation Torque
M3	2mm	4.4 N • m

PCB size



7. Operating Instructions

a) Unpacking inspection

(1) Check whether the packing case is damaged, dented, and the fuselage is damaged, deformed, or rusted.

(2) Check whether accessories are complete. See packing list for accessories.

If it is found that the variety or quantity of equipment parts does not match or is damaged during transportation, it should contact the company in time.

b) Installation requirements

(1) Environmental requirements:

Ensure that the operating environment meets the requirements of the power module.

(2) Installation:

a. There are mounting holes on both sides of the power module and the bottom shell, so install the power module correctly;

b. Check whether the input and output cables are installed correctly and there is no short circuit.

(3) Work:

After the AC is powered on, check the power output status, if there is an abnormality in this process, please shut down immediately.

c) Daily care and maintenance

(1) Clean the power module regularly to prevent dust accumulation.

(2) Check whether the parameters of the power module are normal once a

week, and remove any abnormalities in time.

(3) Please check whether the various connections are loose or have poor contact each time you use it.