

Thank you for purchasing a KS2 product. Manufactured to a high standard, this product will, if used according to these instructions and maintained properly, give you years of trouble free performance.

IMPORTANT PLEASE NOTE THAT THE GLOBAL HF INVERTER SHOULD NOT BE USED IN CONNECTION WITH LIFE SUPPORT SYSTEMS OR OTHER PRECISE MEDICAL EQUIPMENT OR DEVICES.
BEFORE USING THE INVERTER, YOU NEED READ AND SAVE THE SAFETY INSTRUCTIONS.



Refer to Instruction Manual

1. SAFETY

Battery

- ▲ **DANGER!** - Lead-acid batteries generate explosive gases during normal battery operation.
- ✓ Wash with soap and water immediately if battery acid contacts skin or clothing. If acid enters eye, flush immediately with cool, clean running water for at least 15 minutes and seek immediate medical attention.
- x **DO NOT** smoke or allow a spark or flame in the vicinity of the battery or engine.
- ✓ If the battery terminals are corroded or dirty, clean them before attaching the leads.
- ❑ **WARNING!** To prevent the risk of sparking, short circuit and possible explosion, **DO NOT** drop metal tools in the battery area, or allow them to touch the battery terminals.
- ✓ Before attaching to battery, remove personal metallic items such as rings, bracelets, necklaces and watches. A lead acid battery can produce a short-circuit current which is high enough to weld such items and cause severe burns.

Inverter

- x **DO NOT** expose inverter to rain, snow, spray, bilge or dust. **DO NOT** cover or obstruct ventilations.
- ✓ **MAKE SURE** the existing wiring is in good electrical condition. **DO NOT** operate inverter with damaged or substandard wiring.
- x **DO NOT** install in compartments containing batteries. **DO NOT** install flammable materials or in locations which require ignition protected equipment.
- x **DO NOT** disassemble this inverter charger. Internal capacitors remain charged after all power is disconnected.
- ▲ Attempting to service this inverter by yourself may cause electrical shock or fire.
- ❑ **WARNING!** Disconnect both AC output and DC power from the GMC inverter before any maintenance. Turning off controls will not reduce risk.
- ▲ **DANGER!** The output side of inverter's AC wiring at no time be connected to public power or a generator. Beware the wiring connection.

2. INTRODUCTION

General Information

GMC pro-line inverter charger, as the latest model, is designed and produced for the growing demands of mobile power system. GMC inverter charger can work perfectly for recreational vehicles, special purpose vehicles, and marine. Besides high efficiency, high anti-surge, multi-stage charging, and automatically switching between the AC/DC system, GMC combines the CAN-BUS communication port and main battery charger. It is able to complete various requirements of monitoring and interactive control. GMC is good at working in high temperature (up to 50 °C). There is no power loss and it will continue to work without fault.

Application

Power tools- circular saws, drills, grinders, sanders, buffers, weed and hedge trimmers, air compressor, etc.

Office equipment- computers, printers, monitors, facsimile machines, scanners, etc.

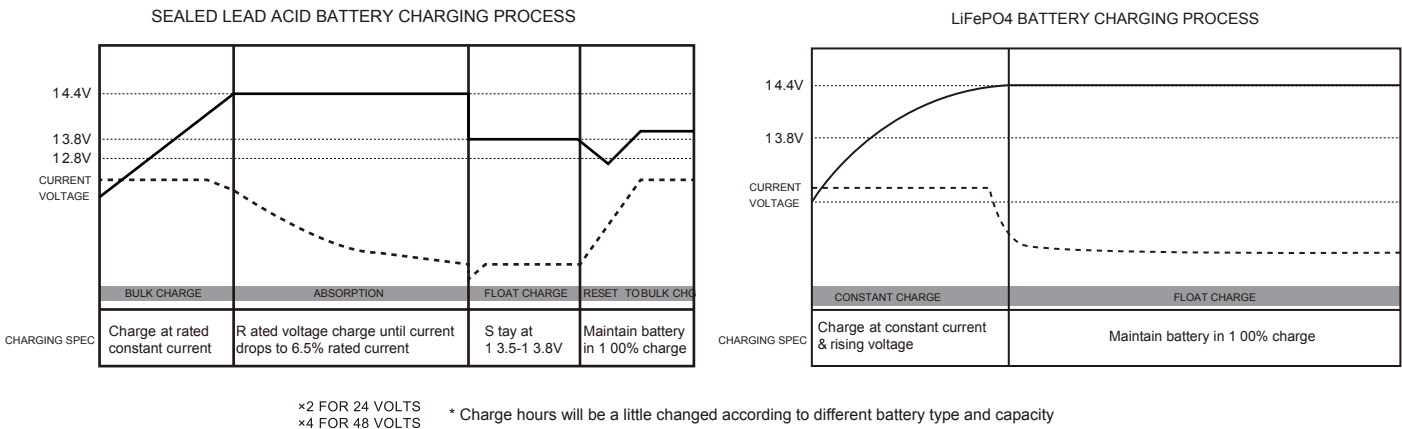
Household appliances- vacuum, fans, lights, TV, refrigerator, microwave, coffee machine, toaster, blender, etc.

Industrial equipment- metal halide lamp, high pressure sodium lamp, etc.

NOTE: The inverter working time (with 100% loads) is not recommended to exceed 120 minutes.

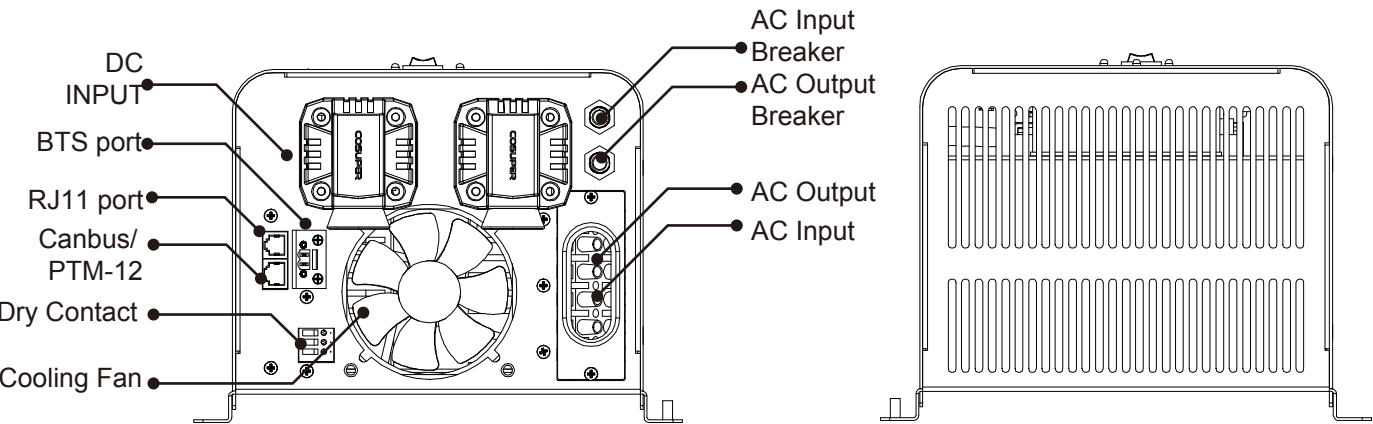
Electrical Performance

Inverter: Full bridge topology
GMC series inverter surges 3×rated power to support the induction loads ie: air compressor, residential refrigerator, blender, or coffee maker.
When operating the heat blower and microwave, it would draw more than the rated power to boost the appliances.
Peak efficiency of GMC series is 90.5%.



GMC inverter charger can work only by shore power or generator as AC input is used to charge the battery.
When the battery is higher than 2V(rated 12V battery), the AC input inverter will start working as the battery charger. At the same time, the inverter can also run loads by external AC source.
GMC provides another charge circuit with 5 amp current for the starter battery.

Inverter Charger



Indictors

LED Status			Inverter Condition
*AC/INV	GREEN	ON	AC priority mode - power loads by Shore/GEN
		Blink	Power loads by battery
*CHG	GREEN	ON	Battery is fully charged
		Blink	Battery is being charged
Δ FAULT	RED	ON	Inverter stops working due to fault or error
		Blink	Inverter alarm

3. INVERTER OPERATION

Getting Started

When a motorized appliance or a tool turns on, there is an initial surge of power to start. This surge of power is referred to as the "starting load" or "peak load." Once started, the tool or appliance requires less power to operate. This is referred to as the "continuous load" in terms of power requirements. You will need to determine how much power your tool or appliance requires to start up (starting load) and its continued running power requirements (continuous load).

Power consumption is rated in watts, or can be calculated from amperes (amps). This information is typically printed on most appliances and equipment. If this information is not indicated on the appliance or equipment, check the owner's manual.

Multiply: AC AMPS X 110 (AC voltage) = WATTS

* This formula yields a close approximation of the continuous load of your appliance.

Multiply: WATTS X 1.5 = Starting Load

* This formula yields a close approximation of the starting load of most appliances. Exceptions are motorized appliances such as pumps, freezers and air conditioners. These appliances can have startup loads of up to three to eight times the rated watts.

Determining the DC Power Requirement

Powering multiple appliances from the high-power GMC3000 inverter requires a 12 volt bank of batteries (several batteries). To calculate the approximate power in amps a 12 volt battery bank has to supply you need. To know the current, or amps required for powering the continuous AC load, a shortcut method is to divide the continuous AC load wattage by 12. For example, the continuous AC load is

1500 watts. The current (amps) is: $1500/12$ or 125 amps at 12 VDC.

Sizing the Battery Bank

To determine the minimum battery bank ampere-hour rating that you will need to operate appliances from the inverter, and any DC appliances powered by the battery bank, follow these steps:

1. List the maximum wattage that the inverter has to provide (as above).
2. Estimate the number of hours the appliances will be in use between battery recharges. This will differ depending on appliances. As an example, a typical home-use coffeemaker draws 500 watts during its brew time of 5 minutes; it maintains the temperature of the pot at about 100 watts. Typical use of a microwave oven is only for a few minutes. Some longer operating time appliances are lamps, TVs, computers and refrigerator / freezers.
3. Determine the total watt-hours of energy needed. Then multiply the average power consumption in watts by the number of hours of run time.
For example: 1500 watts for 10 hours = 15,000 watt hours. Using the 1500 watts (or 150 Amps) for 10 hours example as above, then 150 amps is needed for 10 hours. This provides us with the basic amp-hours (AH) of battery that is required. Ten hours at 150 amps equals 1500 Amp Hours (AH). This answer is just a beginning because there are other conditions that determine actual run time.

These include:

- AC appliance load and time in use (basic Amp Hour)
- Cable gauge and length (cable losses)
- Charge level of the batteries (between use, chargers have to be able to fully charge the batteries)
- Temperature of the batteries (colder batteries provide fewer amps)
- Age and condition of the batteries (older batteries lose capacity/amp hours)
- Compliance with turning off unnecessary AC and DC loads. If there is any doubt about sizing the battery bank, it is safe to overestimate the amp hour requirements of the battery bank.

Note:

The type of batteries you use to power your high power inverter is important. Operating a high-power inverter will routinely diGMCarge batteries and they will require frequent recharging. Batteries used to start engines are not designed to repeatedly charge and diGMCarge. COSUPER recommends using "deepcycle" or "marine" rated batteries.

WARNING:

DANGER OF BATTERY EXPLOSION – INSTALL A FUSE

Battery banks can deliver very high levels of current that can vaporize metal, start fires and cause explosions. COSUPER recommends installing one ANL type fuse and fuse holder close to the positive battery bank terminal. This fuse protects the batteries from accidental DC cable shorts, which can cause batteries to explode. ANL fuses and fuse holders are available at most marine supply stores

Cable & Battery

To operate safely, ensure that the connecting cable is equal or stronger than the standards below. Nonstandard cables will cause overheating, overloading, and are a risk. If the DC cable is longer than 1m, please use a thicker cable or double cables on one terminal

Model	Wiring
GMC3000 ; 12V	000AWG; 85mm2

Recommended Battery

Model	Min. Battery Capacity
GMC3000 ; 12V 230VAC	250Ah

Mounting Instructions

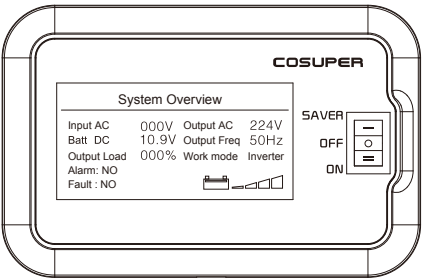
Your COSUPER® Inverter should not be mounted under the hood of a vehicle.
If installing in a vehicle, choose a dry, cool, ventilated area closest to the battery as practical. Before drilling any mounting holes, make sure that there are no wires, fuel lines, or tanks directly behind the surface to be drilled.
To mount the inverter:
1. Inverter must be OFF.
2. The inverter should be mounted horizontally or vertically.
3. Position the inverter against the mounting surface and mark locations of the mounting screw openings.
4. Remove the inverter and drill four mounting holes.
5. Fasten the inverter to the mounting surface using corrosion-resistant fasteners sized #10 or larger

Connecting Inverter

- 1. Prepare all cable ends with cable lugs.
- 2. Install a circuit breaker or high current fuse and fuse holder in the positive line as close to the battery as possible.
- 3. Make sure the inverter On/Off switch is turned OFF.
- 4. Connect the cables to the DC input terminals on the rear of the inverter. The red terminal is positive (+) and the black terminal is negative (-).
 - a. Connect the positive cable to the inverter and battery positive terminals.
 - b. Connect the negative cable to the inverter and battery negative terminals.
 - e. Connect an insulated wired from the chassis-ground terminal at the front panel of the inverter to the vehicle's chassis or any other ground point.

*Remote Controller(optional)

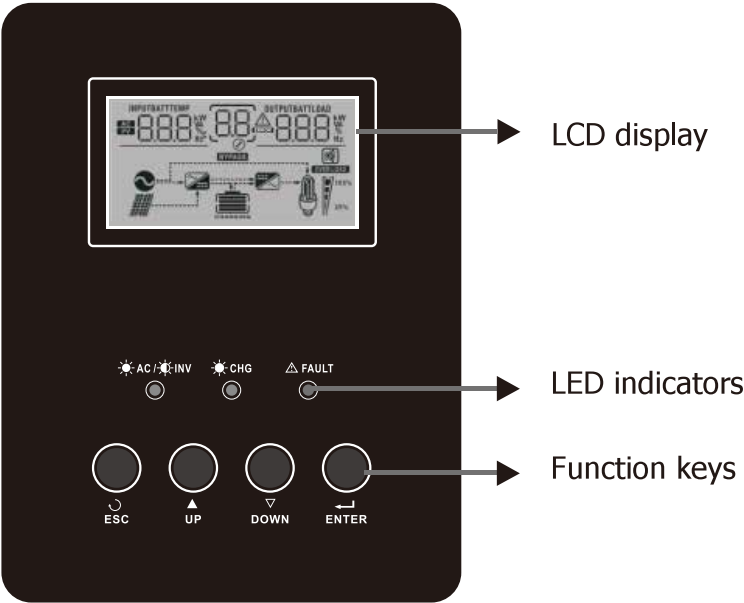
GMC inverter charger gives two different remote controllers by two different ports RJ11 and RJ45. Remote controller and inverter charger switch work in parallel, inverter charger can be controlled by only one side. Never cut the communication cable during inverter working even if inverter is turned off. It will damage the remote PCB inside if the cable is short circuited during cutting.



PTM-12

Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes three indicators, four function keys and a LCD display, indicating the operating status and input/output power information.



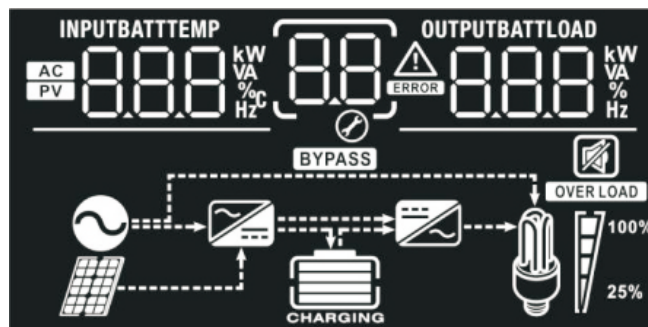
LED Indicator

LED Indicator			Messages
AC / INV	Green	Solid On	Output is powered by utility in Line mode.
		Flashing	Output is powered by battery or PV in battery mode.
CHG	Green	Solid On	Battery is fully charged.
		Flashing	Battery is charging.
FAULT	Red	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.

Function Keys

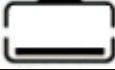
Function Key	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

LCD Display Icons

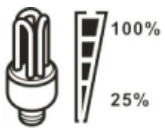


Icon	Function description	
Input Source Information		
	Indicates the AC input.	
	Indicates the PV input	
	Indicate input voltage, input frequency, PV voltage, battery voltage and charger current.	
Configuration Program and Fault Information		
	Indicates the setting programs.	
	Indicates the warning and fault codes. Warning:  flashing with warning code.	
	Fault:  lighting with fault code	
Output Information		
	Indicate output voltage, output frequency, load percent, load in VA, load in Watt and discharging current.	
Battery Information		
	Indicates battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.	
In AC mode, it will present battery charging status.		
Status	Battery voltage	LCD Display
Constant Current mode / Constant Voltage mode	<2V/cell	4 bars will flash in turns.
	2 ~ 2.083V/cell	Bottom bar will be on and the other three bars will flash in turns.
	2.083 ~ 2.167V/cell	Bottom two bars will be on and the other two bars will flash in turns.
	> 2.167 V/cell	Bottom three bars will be on and the top bar will flash.
Floating mode. Batteries are fully charged.		4 bars will be on.

In battery mode, it will present battery capacity.

Load Percentage	Battery Voltage	LCD Display
Load >50%	< 1.717V/cell	
	1.717V/cell ~ 1.8V/cell	
	1.8 ~ 1.883V/cell	
	> 1.883 V/cell	
50%> Load > 20%	< 1.817V/cell	
	1.817V/cell ~ 1.9V/cell	
	1.9 ~ 1.983V/cell	
	> 1.983	
Load < 20%	< 1.867V/cell	
	1.867V/cell ~ 1.95V/cell	
	1.95 ~ 2.033V/cell	
	> 2.033	

Load Information

OVER LOAD	Indicates overload.			
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.			
	0%-24%	25%-49%	50%-74%	75%-100%
				

Mode Operation Information

	Indicates unit connects to the mains.
	Indicates unit connects to the PV panel.
BYPASS	Indicates load is supplied by utility power.
	Indicates the utility charger circuit is working.
	Indicates the DC/AC inverter circuit is working.

Mute Operation

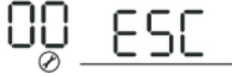
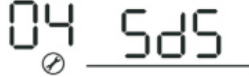
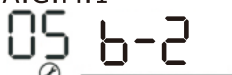
	Indicates unit alarm is disabled.
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LCD Setting

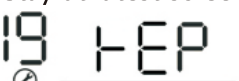
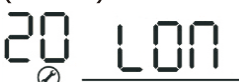
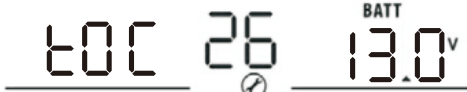
After pressing and holding ENTER button for 3 seconds, the unit will enter setting mode. Press "UP" or "DOWN" button to select setting programs. And then, press "ENTER" button to confirm the selection or ESC button to exit.

After setting out the output frequency, the output voltage, the charge current and the AC input voltage range, it is necessary to turn off the electricity and restart the inverter.

Setting Programs:

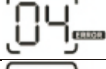
Program	Description	Selectable option		
00	Exit setting mode	Escape 		
01	Output source priority: To configure load power source priority	Utility first (default) 	Utility will provide power to the loads as first priority. battery energy will provide power to the loads only when utility power is not available.	
		Battery priority 	battery energy provides power to the loads as first priority. Utility provides power to the loads only when battery voltage drops to either low-level warning voltage or the setting point in program 12.	
03	Input voltage range	Wide Utility effective range: Nominal output voltage: -23%to+15% 		
		Narrow(default) Utility effective range: Nominal output voltage:-15%to+15% 		
04	Power saving mode enable/disable	Saving mode disable (default) 	If disabled, no matter connected load is low or high, the on/off status of inverter output will not be effected.	
		Saving mode enable 	If enabled, the output of inverter will be off when connected load is pretty low or not detected.	
05	Battery type	Type of battery	Fast V	Floting V
		Gel U.S.A 	14.0	13.7
		A.G.M.1 	14.1	13.4

		A.G.M.2 05 b-3 ⊗	14.6	13.7
		Sealed lead acid 05 b-4 ⊗	14.4	13.6
		Gel euro 05 b-5 ⊗	14.4	13.8
		Open lead acid 05 b-6 ⊗	14.8	13.8
		Calcium 05 b-7 ⊗	15.1	13.6
		De-sulphation 05 b-8 ⊗	15.5 for 4 hrs	
		Li 05 b-L ⊗	When the battery voltage reached to 14.7V, UPS closes the charge. UPS open charging when the battery voltage down to 12.5V.	
		User-defined (default fast V 14.3, Floating V 13.7) 05 b-0 ⊗	If User-Defined is selected ,user can set the battery type in program 94	
07	Auto restart when over temperature occurs	Restart disable (default) 07 Lfd ⊗	Restart enable 07 LfE ⊗	
09	Output frequency	50Hz (default) 09 50 Hz ⊗	60Hz 09 60 Hz ⊗	
11	Maximum utility charging current	Refer to Appendix ,the default is the maximum value , with 5A base, it can be up/down set, the minimum is 0A, the maximum can not exceed($P_{out} \times 0.42 / V_{DC}$) 11 5A ⊗		
12	Low battery voltage inverter transfer to Utility	The default is low battery voltage alarm point setting range is from 10.5V to 12.5V for 12V (*2 for 24V, *4 for 48V), if the voltage set by user is below default point ,the default is low battery voltage alarm point. Increment of each click is 0.1V for 12V (*2 for 24V, *4 for 48V) 12 BATT 11.5V ⊗		

13	High battery voltage recovery	Output of Battery model if battery voltage is set higher 13.5v-15.5v, otherwise it is output of bypass setting range is from 13.0Vto 15.5Vfor 12V (*2for 24V, *4for 48V),if the voltage set by user Increment of each click is 0.2V for 12V (*2for 24V,*4for 48V) 	
18	Alarm control	Alarm on (default) 	Alarm off 
19	Auto return to default display screen	Return to default display screen (default) 	If selected, no matter how users switch display screen, it will automatically return to default display screen (Input voltage /output voltage) after no button is pressed for 1 minute.
		Stay at latest screen 	If selected, the display screen will stay at latest screen user finally switches.
20	Backlight control	Backlight on (default) 	Backlight off 
22	Beeps while primary source is interrupted	Alarm on (default) 	Alarm off 
25	Record Fault code	Record enable 	Record disable (default) 
26	Bulk charging voltage(C.V voltage)	If User-defined is selected in program94,this program can be set up.setting range is from 13.0V to 15.5V for 12V (*2 for 24V,*4 for 48V) 	
	Maximum charging voltage for lithium battery,when the battery voltage reached the charge voltage,it closes the charge	If User-defined is selected in program 94,this program can be set the maximum charging voltage.setting range is from 13.0V-15.5V 	

27	Floating charging voltage	If User-defined is selected in program 94, this program can be set up. setting range is from 13.0V to 15.0V for 12V (2* for 24V, *4 for 48V)	
		FLV	FLV 27 ^{BATT} 13.0 ^v
29	Battery low voltage open charging (for lithium battery)	If User-defined is selected in program 94, this program can be set up. setting range is from 12.0V to 14.0V for 12V (2* for 24V, *4 for 48V)	
		LC	LC 27 ^{BATT} 12.0 ^v
93	Low DC cut-off voltage	The default single section is 10.0V. setting range is from 10.0V to 12V for 12V (*2 for 24V, *4 for 48V) Increment of each click is 0.1V for 12V (*2 for 24V, *4 for 48V)	
		COV	COV 29 ^{BATT} 10.0 ^v
93	Frequency Range	Special 40-70HZ	
		93 ALT	General 50HZ 45-55HZ/ 60HZ 55-65HZ
94	Selection of battery type	Lithium battery	If selected, battery charge voltage and battery low open charging can be set up in program 26, 27
		94 ALB	Other battery
94	Selection of battery type	94 OLP	If selected, battery charge voltage can be set up in program 26, 27
95	Battery high voltage trip	When dry contact switch from NC to NO, battery voltage arrive to setting voltage, dry contact point switch to NC. This setting can not be higher than fast charge voltage. setting range is from 13.0V to 15.5V for 12V (*2 for 24V, *4 for 48V) Increment of each click is 0.1V for 12V (*2 for 24V, *4 for 48V)	
		HBU	HBU 95 ^{BATT} 13.0 ^v

Fault Reference Code

warning code	warning event	Icon on
03	Battery voltage overcharge	
04	Battery voltage is too low	
05	Inverter over temperature	
07	Inverter over load	
12	PV input voltage is too low	
13	PV input voltage is too higher	
14	PV over current	
15	PV over temperature	
88	Transformer phase reversal	
89	Frequency is out of range	
97	Inverter fail to communicate with MPPT	

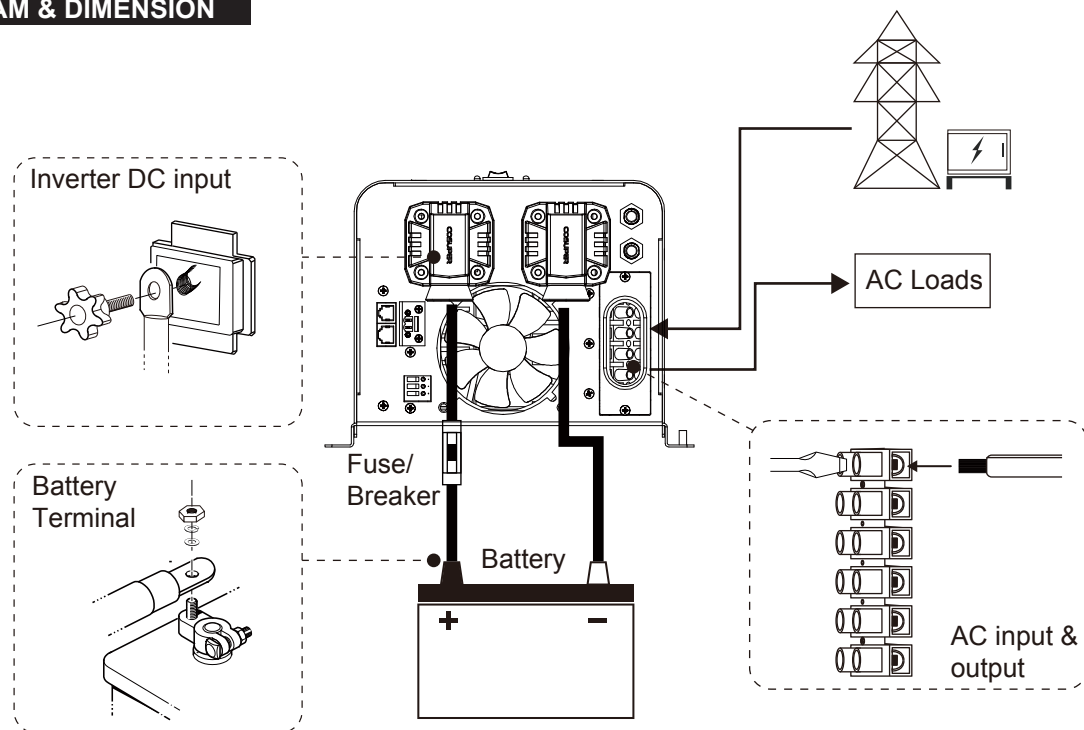
Fault Code	Fault Event	Icon on
02	Heat sink over temperature	
03	Battery voltage is too higher	
04	Battery voltage is too low	
05	Output short circuit	
06	Output is too high or too low	
07	Overload	
99	Inverter fail to slow start	

96	Battery low voltage trip	When battery voltage arrive to setting point, the dry contact switch from NC to NO. This setting can not be lower than low battery voltage cut off point. setting range is from 10.5V to 12.5Vfor 12V (*2for 24V,*4for 48V) Increment of each click is 0.1V for 12V (*2for 24V,*4for 48V) 
97	Dry contact control	If inverter is set in dcd, dry contact function is disable, 95,96 can not be set up in program. 
		If inverter is set in dce, dry contact function is enable and 95,96 can be set up in program. 
98	Low battery alarm	The default is 10.5V The setting range is 10.5-12.5V for12V (*2for 24V,*4for 48V).if the shutdown voltage set by the user is lower than the default voltage point ,the default will be low voltage shutdown point +0.5V Increment of each click is 0.1V for 12V (*2for 24V,*4 for 48V) 
99	Output voltage setting	The default is 230V/120V setting range is from 200V/100Vto 240V/120V Increment of each click is 5V for 120V machine Increment of each click is 10V for 230V machine 

6. SPECIFICATIONS

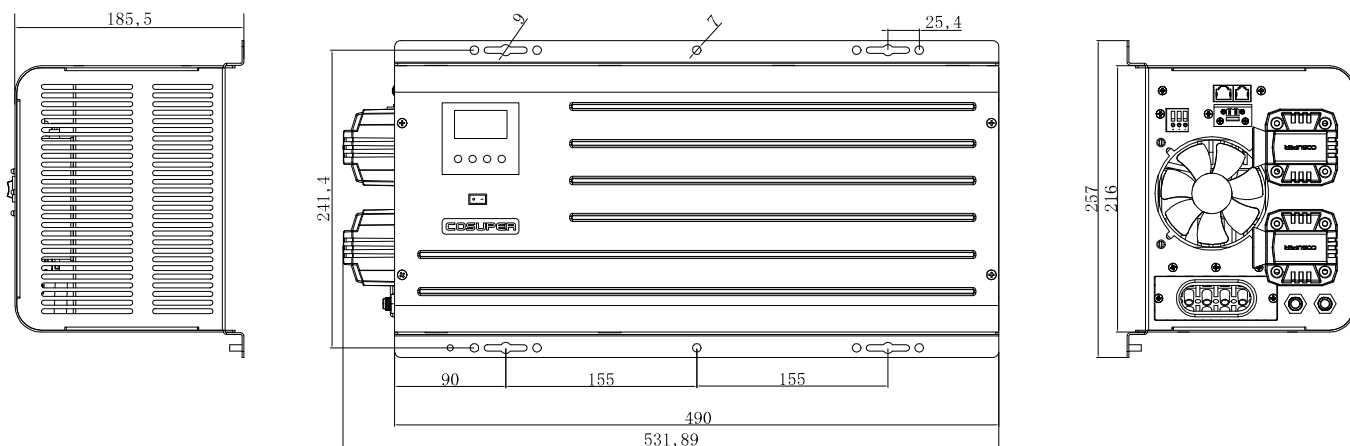
MODEL	GMC 3000
Rated Power	3000W
INPUT	
Voltage	100/110/120VAC;220/230/240VAC
Selectable Voltage Range	Wide Range :75VAC~138VAC;155VAC~275VAC (for home appliances) Narrow Range :82VAC~138VAC ;165VAC~275VAC (for personal computer)
Frequency	100/110/120VAC (±5V);220/230/240VAC (±10V)
OUTPUT	
AC Voltage Regulation (Batt Mode)	100/110/120VAC (±5V); 220/230/240VAC (±10V)
Surge Power	9000W
Efficiency (Peak)	91%
Transfer Time	< 10ms
Wave form	Pure sine wave
BATTERY	
Battery Voltage	12V/24V/48V
Charge Current	75A/50A/25A
Fast Charge Voltage	14.3VDC for 12V
Float Charge Voltage	13.7VDC for 12V
Battery Low Voltage Alarm	16.5VDC for 12V
Over Voltage Protect	10.5VDC for 12V
Battery Low Voltage Shutdown	10.0VDC for 12V
Protection	Over charging, Over temp, Over battery voltage, Over load, Short-circuit
Operating Environment Temperature	55°C
Cooling	Intelligent Fan
Display	LCD
Specification Setting	By LCD or position machine: Charging current, battery type, input voltage, output frequency, wide and narrow of AC input voltage, power-saver model, AC priority or battery priority
PHYSICAL	
Dimension, (D*W*H)	532*257*185.5
Net Weight (kg)	25.2/24.6
ENVIRONMENT	
Humidity	5~95% Relative humidity (No-condensing)
Operating Temperature	-10°C~50°C
Storage Temperature	-10°C~60°C

7. DIAGRAM & DIMENSION



Dimensions:

GMC3000





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