UnInterruptible Power Supply

Model: MTP-3000-200W30H

Features

. True sine wave output (THD<3%)

. 3000W rate output

. 500A/12v Battery

. High surge power up to 6000w

. UPS mode and energy saving mode(selectable)

. Utility<–>inverter transfer time < 10ms(Typ)

. High efficiency up to 92%

. Output voltage/frequency selectable

. Power ON-OFF switch

. Complete protections for both the input and output

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P.O.Box: 9401,Emirates Industrial City – Sharjah - UAE
Email: mtpTrafficSign@gmail.com
www.MTPpoland.com

. Battery low alarm and indicator

. Standby saving mode can be selectable

. Front panel LED indicator for operation status

. Full digital controlled with digital display

. Thermostatically controlled cooling fan

. Protection Bat low alarm/ Bat low shutdown/ Over voltage/ Over temp/ Output short/ input polarity reverse/ Over load/ AC circuit breaker

. Built in solar / AC charger

. Computer-based monitoring software

. Dimension: 72(W)x43(D)x153(H)cm

. 2 years warranty

Main Specification MTP-3000-200W30H

Rated Power(type)	3000w
Maximum Output Power(type)	3450w for 180sec/4500w for 10sec
AC voltage	220 volt
Frequency	50/60Hz selectable
Waveform	True sine wave (THD<3%)
AC Regulation(type)	± 3%
Transfer time	10ms invert from/to by pass
Dimension	720*1530*430 mm (W*H*D)
Weight	235kg
Saving Mode	Default disabled. Load ≤5w will be change to standby mode
Front panel indicator	Battery voltage level, output load level, saving mode, fault and operation mode
Battery voltage	12 volt
Voltage range	10.5- 15VDC
DC current(type)	500A
No load dissipation	≤10w @ standby saving mode

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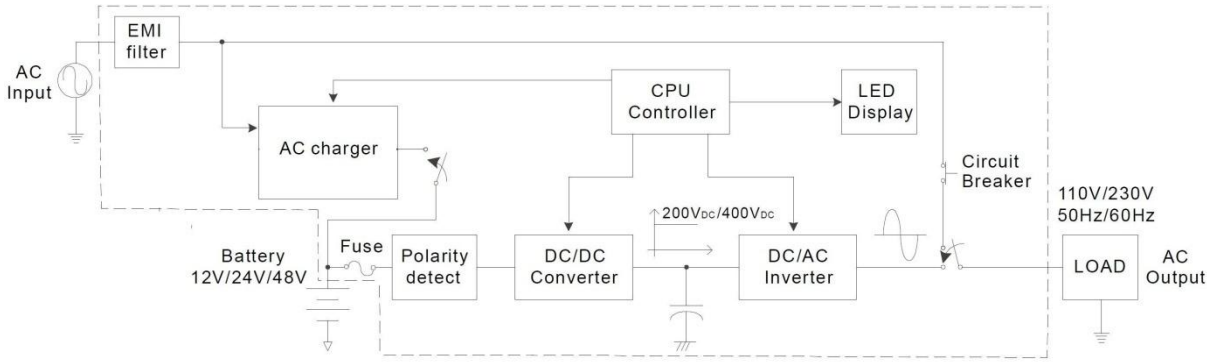
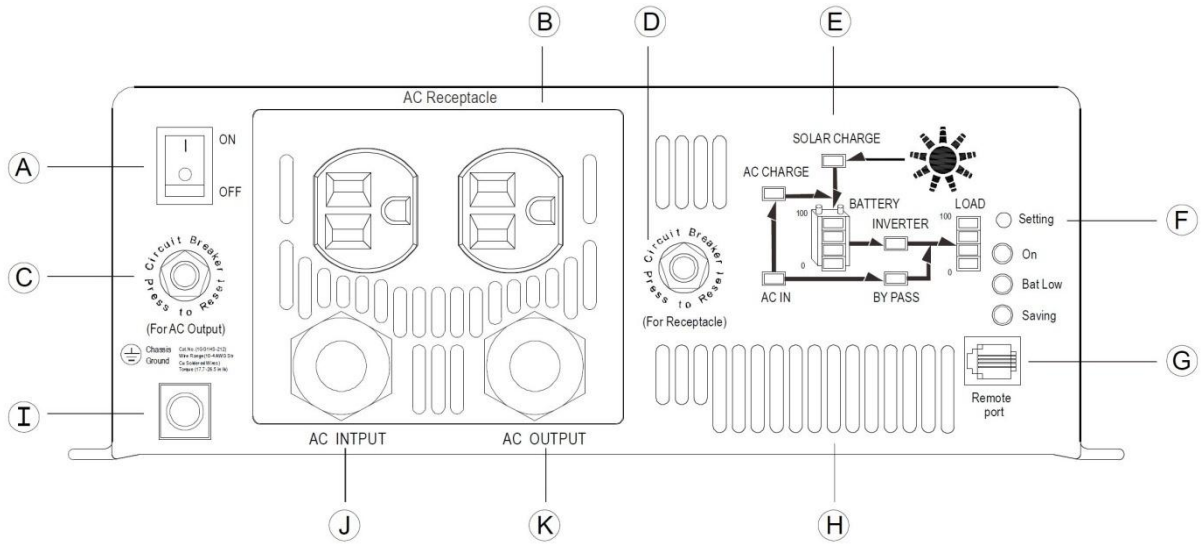
Off mode current draw	≤1mA
Efficiency	89%
Battery type	500A/12v Sealed lead acid
Fuse	40A*12
Battery Low alarm	11.3v
Battery Low shutdown	10.5v
Over temperature	80°C ± 5°C
	Protection type: Shutdown o/p voltage, re-power on to recover
Output short	Protection type: Shutdown o/p voltage, re-power on to recover
Over Load(type)	105-115% load for 180 sec, 115-150% load for 10 sec
	Protection type: Shutdown o/p voltage, re-power on to recover
Circuit Breaker	AC output: 20A, AC receptacle: 15A
Working humidity	20% - 90% RH non-condensing
Working Temp	0-40°C @100% load, 60°C @50% load
Vibration	10-500Hz, 3G 10min/1cycle, 60min each analog X,Y,Z axes
Safety Standard	IEC62368-1 CB, EAC TP TC 004 approved
EMC EMISSION	Compliance to EN55032 class A, 72/245/CEE, 95/54/CE, E-mark, EAC TP TC 020
EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, EAC TP TC 020
AC Charge Current(Type)	25A
AC Charge Voltage	14.3 v

System Block Diagram



Front Panel

A: POWER ON/OFF switch: The inverter will turn OFF if the switch is in the OFF position.
B: AC OUTPUT outlet: To satisfy demands of different geographic areas all over the world, there are many optional AC outlets to choose from. (A & B types are standard; C, D, E, F types are optional)
C: No fuse breaker with reset button (for AC input): Under "bypass mode", when the AC output is shorted or the load current exceeds the rated current of the No Fuse Breaker, the Breaker will open and that stops bypassing energy for the utility thus prevent possible danger. When the abnormal condition is cleared, the user can press down on the reset button to resume operation.



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D: No fuse breaker with reset button (for receptacle): The AC output outlet has a current rating of 15A. When the load current exceeds 15A, the Breaker will open and that stops AC provision from the outlet. For application requiring more than 15A, please use the internal terminal block behind the front panel (refer to section 3.2).
E: LED indication panel: Operating status, load condition, battery low, and all types of warning will be displayed.
F: Function setting: Operating mode, output voltage, frequency, and standby saving mode can be set through this button.
G: Communication port: For remote monitoring purpose, the unit can be connected to a PC through this communication port by using the cable and monitoring software. Also for remote control purpose, the unit can be connected to the IRC module through this port.
H: Ventilation slits: The inverter requires good ventilation for proper operation and prolonging its lifetime.
I: Frame ground (FG).
J: Grommet hole for input AC utility connection.
K: Grommet hole for output AC connection.

LED Indicator On Front Panel

Battery capacity indicator: represents the remaining capacity of external batteries.

LED Display	LED 1 ON	LED 1~ 2 ON	LED 1 ~ 3 ON	LED 1 ~ 4 ON
Battery Capacity	0 ~ 25%	26 ~ 50%	51 ~ 75%	76 ~ 100%

Load condition indicator: represents the magnitude of output loads.

LED Display	LED 1 ON	LED 1~ 2 ON	LED 1 ~ 3 ON	LED 1 ~ 4 ON
Battery Capacity	0 ~ 30%	30 ~ 50%	50 ~ 75%	76 ~ 100%

Function Indication and Alarm

. **ON indicator:** The inverter had started up and the output is normal.

. **Bat low indicator:** Voltage of external batteries is too low. The inverter will send out a "Beep" sound to warn the users.

. **Saving mode indicator:** The inverter is operating under the "standby saving mode" and there is no AC output.
. **AC CHARGE indicator:** The built-in AC charger is charging the external batteries.

. **SOLAR CHARGE indicator:** The external solar panels are providing charging current to the external batteries through the built-in solar charger.
mode" and there is no AC output.

. **AC IN indicator:** The status of utility is normal.

. **BY PASS indicator:** The unit is working under "bypass mode." The AC power consumed by the loads is provided by the utility instead of the inverter.

. **INVERTER indicator:** The unit is working under "inverter mode." The AC power consumed by the loads is converted from the batteries.

. **BATTERY indicator:** Display the remaining capacity of external batteries.

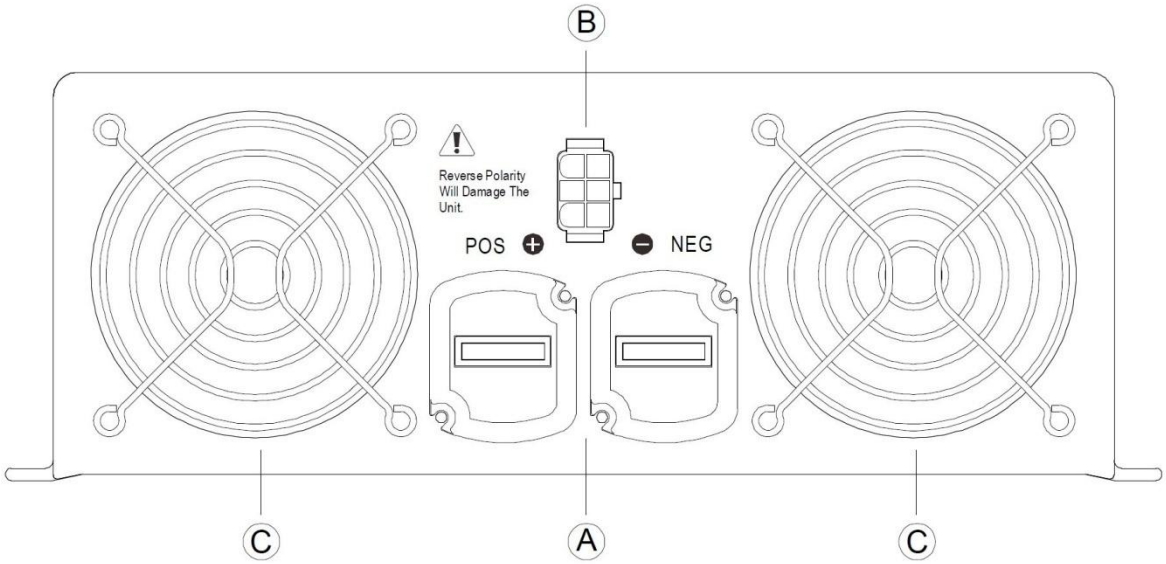
. **LOAD indicator:** Display the output load level.

Rear Panel

A: Battery input (+),(-).

B: Solar panel input connector.

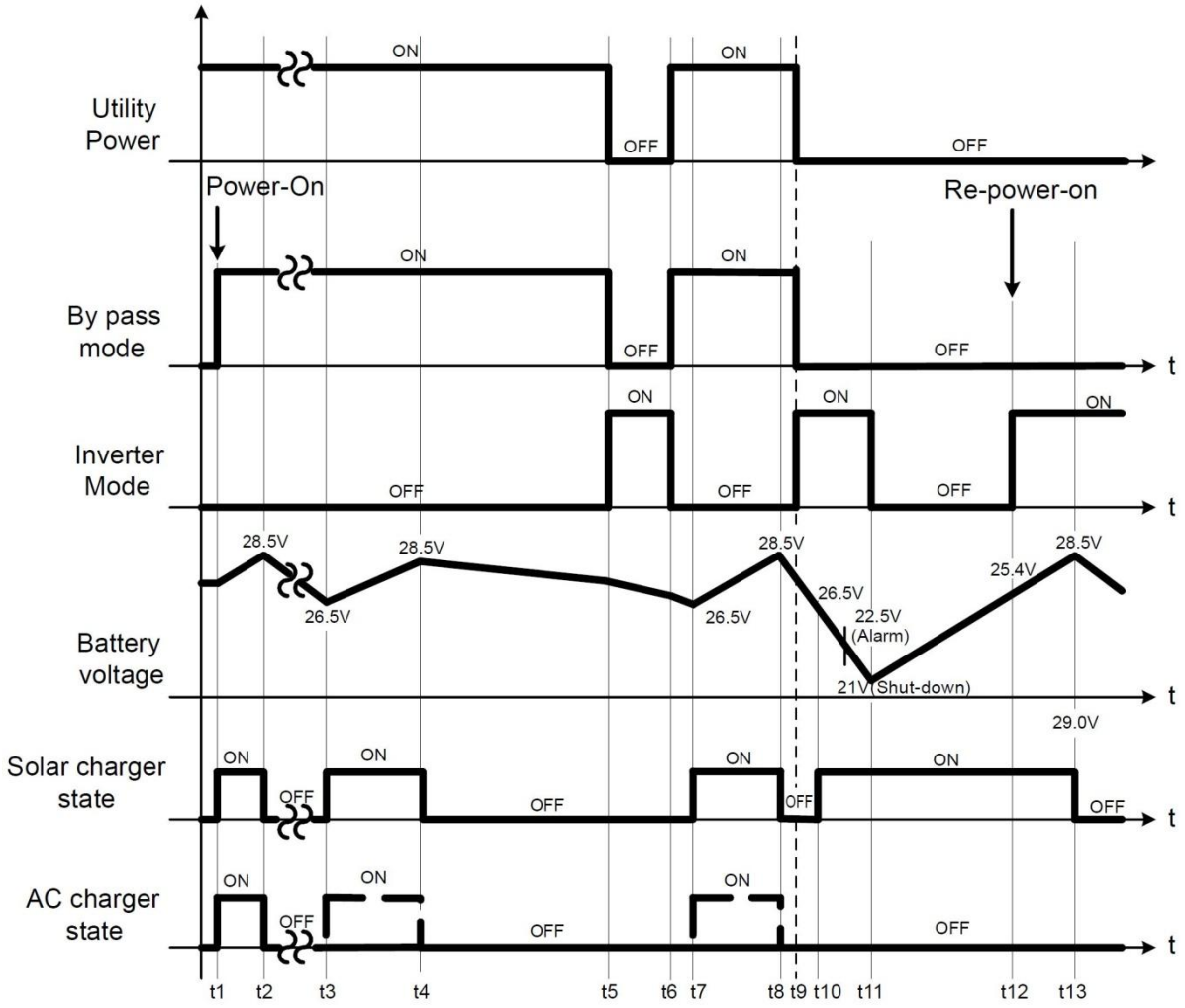
C: Fan ventilation openings.



. Explanation of Operating Logic

MTP-3000 is CPU digital controlled true sine wave DC/AC inverter. It is designed to achieve the target of energy conservation and possesses both UPS and energy saving modes. These 2 modes are user adjustable. The unit will be factory set in the UPS mode. Depending on weather and utility conditions, users can manually adjust
(refer to section 5.3) or use the monitoring software to switch to the energy saving mode.
The main difference between the UPS and Energy saving mode is the amount of energy conserved. Under the UPS mode, the unit will remain in the bypass mode as long as utility is available, thus less energy is conserved (refer to figure 4.1 for details of UPS mode control logic). Under the Energy saving mode, the priority of input
source chosen is solar panel to AC utility to battery. If available, the CPU will automatically select external solar panel as its first priority in order to conserve energy.
In case of insufficient solar power and utility failure, battery power will be drawn as the last the last resort. When the capacity of batteries drops to around 10~20%, the CPU will remind the end user by continuously sending out warning siren until the system shuts down.

Explanation of UPS Mode Control Logic



t1: To ensure the battery is at full capacity, when the MTP-3000 is turned ON, the CPU will execute the "bypass mode" automatically connecting the AC main to the load. In the meantime, it will activate both the AC charger and solar charger to simultaneously charge the batteries.

t2 : When the batteries are full (battery voltage around 28.5V), both the AC and solar charger will be turned OFF by the CPU to prevent overcharging and reducing battery lifetime.

t3 : At this time period, MTP-3000 is still in the bypass mode. The battery voltage level will decrease gradually due to standby power dissipation. When the batteries are consumed to around 90% of their capacity (battery voltage around 26.5V) the CPU will restart the charger. The CPU will use solar charging current of 3A as a guideline. When the provided charging current is >3A (solar charge LED indicator turns ON), the solar charger will be used to charge the

battery. When the provided solar charging current is under 3A, the AC charger will be turned ON (e.g. night time or cloudy day) taking over battery charging duty and at this time the solar charger indicator will turn OFF.

t4 : With the charger activated, voltage of the battery bank will increase gradually until 28.5V is reached then the CPU will shut off the charger to prevent over charging. At this time, output load is still supplied by utility.

t5 : If utility were to fail at this moment, the CPU will automatically switch (<10ms) to the inverter mode insuring uninterrupted power.

t6 : Once utility recovers, the CPU will switch back to the bypass mode.

t7 : When battery voltage drops to below 26.5V, the CPU will again activate the charger to charge the battery banks (refer to t3 for detailed description).

t8 : Same as t4.

t9 : Due to lack of utility, the CPU will switch to the inverter mode. Since utility is unavailable and it is night time/cloudy, the charging function is in the OFF mode. The AC output relies purely on battery power. So, the battery bank will be depleted rather quickly.

t10 : As the battery discharges below 26.5V and utility remains unavailable and only the solar charger is ON. The battery bank will continue to discharge at a quick pace.

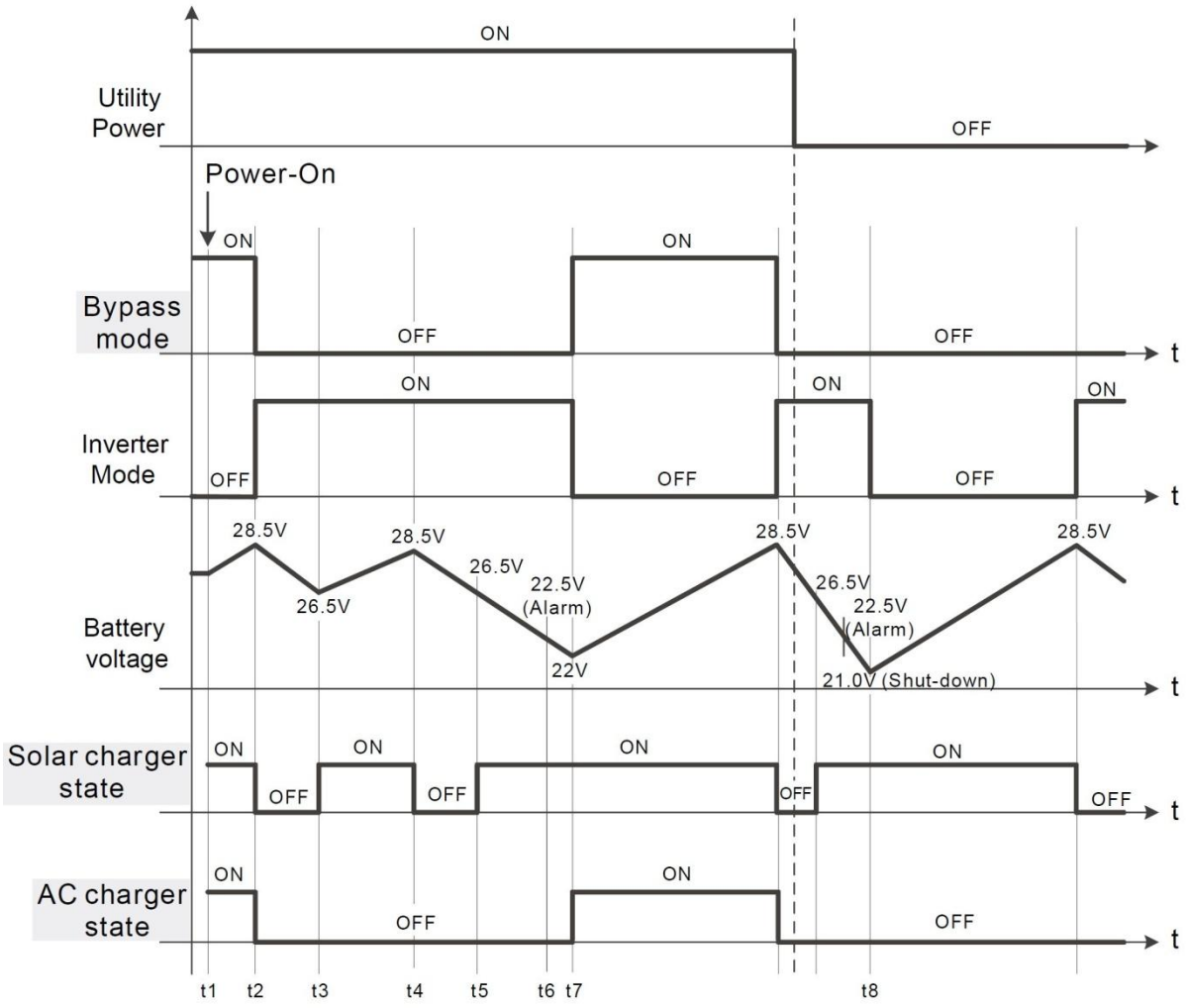
t11 : The battery eventually becomes completely discharged and the inverter shuts down because utility is unavailable. Only when the solar charger current is >3A (day time/sunny) will charging recommence and the battery voltage level will gradually increase.

t12 : Once the battery voltage level has risen to a level capable of restarting the inverter, the inverter will automatically restart. At this time, utility is still OFF, so power to the load is provided by the inverter.

t13 : Utility power is still OFF. If the equipment draws power which is lower than what the solar panel can provide and the solar current is <3A, battery charging will terminate. Inverter will continue to provide power through the battery. The subsequent supply period is subject to capacity of battery and load condition.

Note: The advantage of the UPS mode is that battery voltage level will be maintained at 90% at all times. This insures that uninterrupted power can be provided to equipment in case of utility failure. Backup period will depend on capacity of battery banks. UPS mode is suitable for areas where AC utility is readily available such as offices and homes.

Explanation of Energy Saving Mode Control Logic



t1 : To ensure the battery is at full capacity, when the MTP-3000 is turned ON, the CPU will execute the "bypass mode" automatically connecting the AC main to the load. In the meantime, it will activate both the AC charger and solar charger to
simultaneously charge the batteries.

t2 : When the batteries are full (battery voltage around 28.5V), both the AC and solar charger will be turned OFF by the CPU to prevent overcharging and reducing battery lifetime. The CPU will also switch to inverter mode and the AC electricity provided to the loads will be coming from the batteries.

t3 : When the batteries are depleted to around 90% of their capacity (battery voltage around 26.5V), CPU will start up the solar charger but not the AC charger to achieve the goal of energy saving.
t4 : If the energy provided by the solar panels is larger than the load requirement, voltage of the battery bank will increase gradually until reaching battery voltage around 28.5V and then the solar charger will shut off to prevent the batteries from overcharging.
t5 : When the capacity of batteries goes down to battery voltage around 26.5V, solar charger will restart and begin charging.
t6 : If the energy provided by the solar panels is lower than consumed by the loads, voltage of the battery bank will decrease gradually to battery voltage around 22.5V. The built-in buzzer will sound to inform the user that battery power is very low.
t7 : If the power consumption of the loads does not decrease and the AC main is normal, the CPU will detect this and the unit will be transferred to "bypass mode."
The utility will provide electricity to the loads and charge the battery bank at the same time in order to prevent the unit from shutting off. If the solar current is higher than 3A, the CPU will not activate the AC charger and just let the solar changer charge the batteries to achieve energy saving target.
t8 : When there is no AC main, the CPU will shutdown the whole system if the external battery bank voltage is less than 21V in order to prevent over-discharging and reducing its lifetime. After shutdown, the CPU will still provide LED indication so the user knows why the inverter has shut off.

Note:
The advantage of the energy saving mode is that the user only has to add solar panels and solar energy can be harnessed and stored in battery bank for converts into AC voltage. The user no longer has to rely on AC mains for electricity. The sun can provide all the free electricity needed. Energy saving mode is suitable for areas where AC utility is not readily available such as mountain tops, boats, and vehicles. Even when AC utility is available, the main source of power will still be solar, AC utility will supplement only when necessary.
This type of design cuts back the use of paid electricity thus reaching the goal of energy conservation.