EXIDE ADITYA

MPPT SOLAR OFF-GRID PCU

USER MANUAL

Dear Customer,

Congratulations! You are now a proud owner of Exide MPPT SOLAR OFF-GRID PCUwith world's latest MOSFET-IGBT based technology.

Please do spare some time to read this manual. This manual will provide you a thorough understanding of your Off Grid MPPT PCU for its optimum use. Please take a note of installation and operating instructions in this manual carefully before installation and using your Off Grid MPPT PCU.

Pay special attention to the section under Precaution. In this section the manual lists out conditions and practices which can not only help in avoiding damage to your Off Grid MPPT PCU or other equipment, but also prevent personal injury or loss of life.

Hope you will be fully satisfied with Exide product for years to come.
We value your relationship with us.

With best wishes and warm regards

Management Team

Exide Industries Ltd.

Salient Features

- Pure Sine Wave Output Wave Form, same as Grid
- Smart Solar Selection for Maximum Utilization of Solar Power.
- Intelligent Battery Charging and Charge Sharing with Mains/
- Solar; with priority to Solar.
- ASIC (Automatic Sense Intelligent Charge) Control Technology to enhance the life of Battery.
- Users can set the Critical Parameters as per there requirement.
- Ability to operate applied load on Solar Power exclusively to result optimum Power Saving.
- Tri Colour LCD Display for better user interface.
- PV Reverse Protection.
- In-built fully regulated MPPT Solar Charge Controller which based on Advance **(SCA) Sun Clock Algorithm.**
- Dual Mode of Charging Current i.e. High & Normal Charging.
- Programmed in-built cooling fan which operates as needed.
- Smart Protection in-built as: PV Reverse, Reverse Current Flow, Overload, Short Circuit, Fuse Blown/ MCB Trip, Battery Low, Battery over Charge, Thermal Trip etc.

- Tri State of Power Saving Level:
    - **Power Saving Leve 1 - PH-0** Solar Available & Mains Available Grid is not disconnected at all.
      Load always run on Mains supply.
      Charges the battery only with solar (Default 30 amp).
      Battery charge sharing is also available if Solar Current is low.

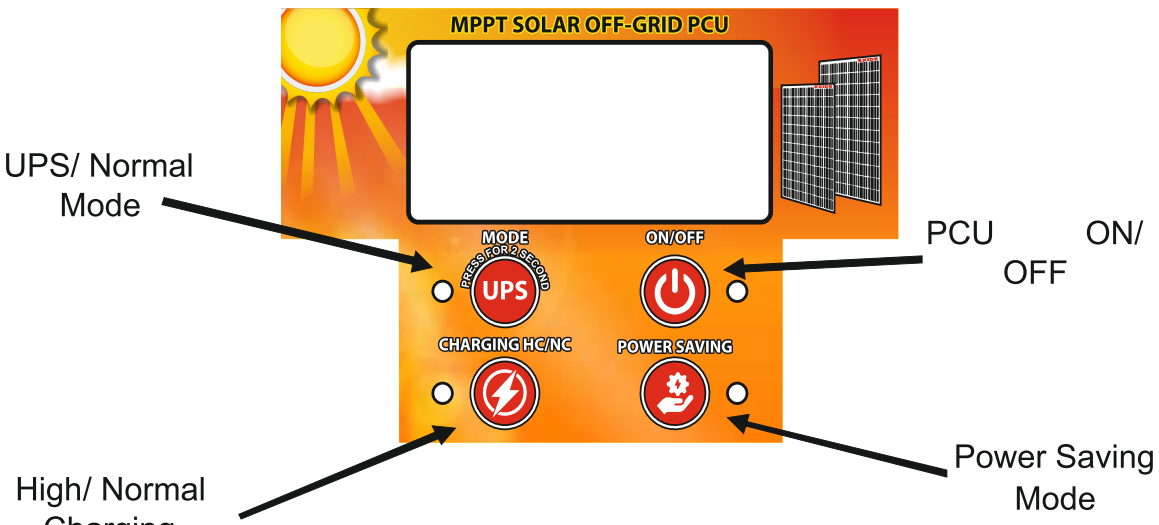
- **Power Saving Leve 2 - PL-1 (Saving of Grid Power)** Solar Available & Mains Available Charges the battery with Solar & Mains controlled by the mains charging current limit. (Default 15 amp), charge sharing is also available. Disconnect mains immediately as battery reaches 13.8±0.1V.Reconnects mains when battery voltage reaches the disconnect voltage (default 11.7volt).

- **Power Saving Leve 3 - PU-2 Ultra Mode (MAX Saving of Grid power)** Solar Available & Mains Available Disconnect mains immediately from Load as battery reaches 13.8±0.1V. Now Load will run on Inverter & Solar (as per availability) Reconnects mains to Load when battery voltage reaches the disconnect voltage (default 11.7volt).

About Off Grid MPPT PCU

Let's begin the journey to explore our Off Grid MPPT PCU. Off Grid MPPT PCU transforms Direct Current (DC) to Alternating Current (AC). Primary source will be Solar Power and Mains/ Grid will be treated as Secondary Source and the Battery Bank act as a reservoir to ensure continuous supply of Power whenever Mains/ Grid supply not available.

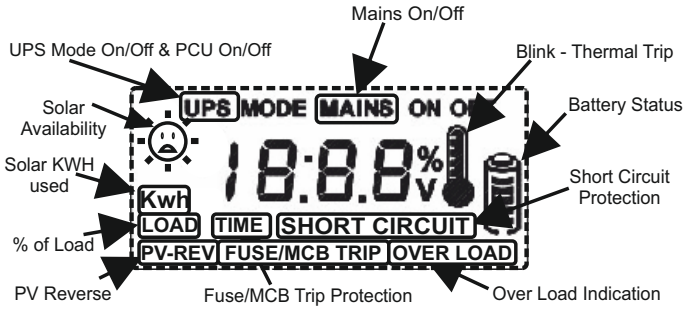
Front Panel of Off Grid MPPT PCU



Description of Switches & LEDs of Front Panel

S. No.	LED Indication	Function
1	LED 3 is Glowing	PCU ON
	LED 3 Not Glowing	PCU OFF
2	LED 1 is Glowing	PCU in UPS Mode
	LED 1 is Not Glowing	PCU is in Normal Mode
3	LED 2 is Glowing	PCU is in High Charging Mode
	LED 2 is Not Glowing	PCU is in Normal Charging Mode
4	LED 4 is Not Glowing	PCU is in Power Saving Level - 1
	LED 4 isGlow	PCU is in Power Saving Level - 2
	LED 4 is Blinking	PCU is in Power Saving Level - 3

Details of LCD Display



Description of LCD Display

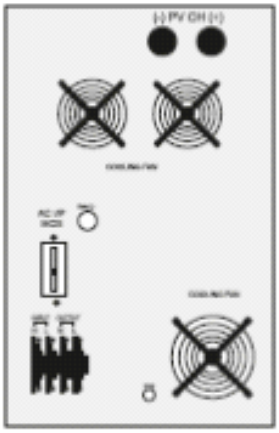
S. No.	Display on LCD	Indication	Action
1	Mains ON	Mains Input Voltage is Available	No Action Required
	Mains OFF	Mains Not Available	No Action Required
2	UPS Mode ON	UPS Mode Selected	No Action Required
	UPS Mode OFF	Normal Mode Selected	No Action Required
3	Battery Slab Increasing	Charging	No Action Required
	Battery Slab Decreasing	Discharging	No Action Required
	Empty Battery Blinking	Battery Low Cut	Switch Off the Load and wait for Mains/Solar to resume
	Battery Slab Full	Battery fully Charged	No Action Required
4	Smiling Sun	Solar is Available	No Action Required
4	Sad Sun	Solar is Not Available	No Action Required

		Available	Required
5	Overload	Applied Load >100%	Reduce the Load
6	Short Circuit	PCU Output Short Circuited	Call nearby electrician to check household wiring
7	Fuse/ MCB Trip	Thermal Circuit Breaker/ MCB Trip	Reset Thermal Circuit Breaker/ AC MCB
8	PV Reverse	Wrong Polarity of Solar Wires	Interchange the wires
9	Load___%	Display Load %	No Action Required
10	____.__V	Display Battery Voltage	No Action Required
11	Mains ___.__V	Display Input Voltage	No Action Required
12	Solar Capacity	If Solar ON	No Action Required
13	Panel ___V	If Solar Present	No Action Required
14	Panel ___A	If Solar Present	No Action Required
15	Panel ___W	If Solar Present	No Action

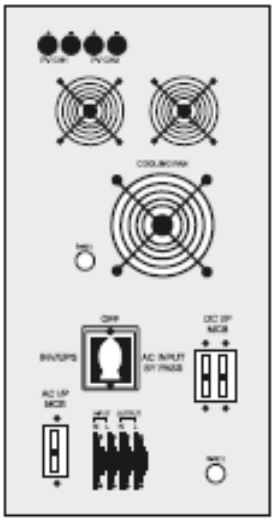
Description of LCD Backlight Indication

Yellow Colour	PCU is in Back-up Operation
Green Colour	PCU is in Charging Operation
Red Colour	PCU is in any Protection

Rear Panel of Off Grid MPPT PCU



2KVA 24V



2.5KVA 48V & Above

Description of Rear Panel

S. No.	Nomenclature	Function/ Remarks
1	Cooling Fan	Air Ventilation of PCU
2	Mains Input MCB	To Switch ON AC Supply
3	DC Input MCB	To Switch ON DC Supply
4	Input Terminals	Mains Input Connections
5	Output Terminal	AC Output from PCU
6	Red Battery Wire	Positive Connection of Battery
7	Black Battery Wire	Negative Connection of Battery
8	PV Channel (+Ve&-Ve)	Solar Input Terminal
9	Bypass Switch	To Bypass Mains Supply (Not Applicable for 2KVA)

Safety Measures

Important Protections

Our MPPT PCU has two Battery Terminals (Red and Black Wires), Thermal Circuit Breaker/AC MCB, DC MCB, Grid Input

and AC Output Terminal at rear panel. Red Wire should be connected with +Ve Battery Terminal & Black Wire should be connected with - Ve Battery Terminal only. Never connect Battery Wires in Reverse Polarity, it will Blow DC Fuse/ Trip DC MCB.

Cautions: Ensure that incoming phase in connected to “L”, Neutral is connected to “N” and Earth is connected through “E” of MPPT PCU

General Precautions: Read all Instructions & Cautions marking on the MPPT PCU before use.

Disassembling the MPPT PCU without experienced service person may cause electric shock or fire Hazard.

Always connect under guidance of authorized person or take it to authorised service centre. All wiring should be disconnected before cleaning of MPPT PCU to prevent risk of electric shock. Avoid exposing your MPPT PCU or Batteries to any type of explosive gases (in the vicinity, as battery generates explosive gases during normal operations). Installation should be done in an area with proper air ventilation. Vent the Battery compartment from the highest point. A sloped lit can also be used to direct flow to the vent opening location to reduce the risk of Battery explosion, follow all the instructions of the Battery manufacturer or any other equipment you intend to use in the vicinity of Batteries. Always use the correct tools to manage AC/ DC wiring connections. Never install the MPPT PCU near highly flammable objects or sources of heat.

Cautions: The MPPT PCU connections should be properly grounded through permanent wiring system. Installation should ensure that the UPS AC Output should not be connected to AC Mains Input.

1. Before installing, connecting any wires , or using the PCU,read all instruction s provided in this manual.
2. Never disconnect the Battery cables while the UPS is delivering Power or Battery Charger is operating. Always turn the Switch OFF first and turn OFF AC Mains input.
3. Do not install or connect batteries unless instructed to do so. Failing to comply with this instruction can cause damage or complete failure of the unit.
4. To reduce risk of injury, use only deep cycle lead acid battery.
5. Do not expose the system to rain, snow or any type of liquids. Do not disassemble the system; take it to our nearby authorized service centre when service or repair is required. Incorrect re-assembling may result in a risk of electric shock or fire.
6. To reduce risk of electric shock, disconnect all wiring from the system before attempting any maintenance or cleaning. Turning off the system will not reduce this risk.
7. Be extra cautious when working with metallic tools on, or around batteries. Dropping a metallic tool over terminals can short-circuit batteries or other electrical parts resulting in spark that can cause an explosion.
8. Baking soda neutralizes lead acid Battery electrolyte. Keep a supply in hand near the area of Batteries.

Personal Precautions:

1. Someone should be within range of your voice to come to your aid when you work near batteries.
2. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eyes, immediately flood eyes with running cool water for

at least 15 Minutes and get medical attention immediately

3. Never attempt to charge a frozen battery.
4. Before touching the battery terminal make sure that the system front Switch is OFF and an AC Main s input to the UPS is also OFF.
5. Never smoke or allow a spark or flame in the vicinity of batteries.
6. If it is necessary to remove any battery, always remove the grounded terminal from the Battery first. Make sure all the accessories are off, so as to avoid arcing and corrosion in the terminal area.
7. Add only distilled water in each cell until acid reaches level specified by battery manufacturer. This helps purge excess gas from cells. Do not overfill from the battery caps and carefully follow manufacturer's recharging instructions.

Getting Started

Environment & Location

MPPT PCU should be installed as close as possible to the Battery Bank to keep the Battery Wires short in length. Never Place the MPPT PCU in same compartment with Batteries, since Batteries generate gases which are very corrosive to electronic equipment. As it is a sophisticated device it should be kept in Non-Condensing, well ventilated and moisture free environment.

Important Precautions

Never connect the output wiring of the PCU to the DG set or incoming utility wiring. This can lead to situation worse than short circuit. However if the PCB survives this situation the system will shut down automatically until the corrective action taken. We suggest independent circuit breakers (MCB/ MCCB) for I/P, O/P & Solar Circuit as per the Capacity of the MPPT PCU.

Recommended Cable Cross Sections for Connection

Rating	IP/ OP Wire	Battery Wire	Solar Wire	Earthing Wire
2KVA 24V	1.5 SQMM	25SQMM	6 SQMM	1.5SQMM
2.5KVA 48V	2.5 SQMM	10 SQMM	6 SQMM	2.5 SQMM
3.5KVA 48V	2.5 SQMM	16 SQMM	6 SQMM	2.5 SQMM
5.2KVA 48V	6.0 SQMM	25 SQMM	6 SQMM	6.0 SQMM
5.2KVA 96V	6.0 SQMM	10 SQMM	6 SQMM	6.0 SQMM
7.5KVA 96V	10.0 SQMM	16 SQMM	6 SQMM	10.0 SQMM
7.5KVA 120V	10.0 SQMM	16 SQMM	6 SQMM	10.0 SQMM
10KVA 120V	10.0 SQMM	16 SQMM	6 SQMM	10.0 SQMM

Secure the Wires with Cable Tie or Other Non-Conductive Fasteners to Prevent Damages.

NOTE: There shall be no back feed current to PV Array

WARNING: Photovoltaic Array when exposed to light, shall immediately start supplying DC Voltage to MPPT PCU.

Installation of MPPT PCU

Where to Install

The PCU should be installed in a location that is near to Distribution Box and meets the following requirements

- Dry—do not allow water to drip or splash on the PCU
- Cool—the ambient storage temperaturen ear the system should be in between °C and 60°C (30 F and 113 F) the cooler environment is better for the system.
- Ventilated - allow at least 6 Inches (15 cm) of clearance around the system for air flow

- Safe—do not install the UPS along with battery in any closed compartment without ventilation. Also, do not install the battery near to storage of any flammable gas/ liquid
- Distance from the Battery–install the system at a safe distance from the Battery as any electric spark on PCU fuse or Output/ Input, connection may get in touch with the explosive gases of the Battery which may cause fire. **EXIDE** will not be responsible for any damage due to such event.

CAUTION! TO PREVENT FIRE, DO NOT COVER OR OBSTRUCT VENTILATION OPENINGS. DO NOT INSTALL THE SYSTEM IN A ZERO–CLEARANCE COMPARTMENT. ELSE IT MAY RESULT IN OVER HEATING.

How to Install

DC Cabling

1. Ensure that the ON/ OFF Switch on the front panel of PCU is in OFF Condition before completion of installation

2. Connect the Black Battery Wire with –Ve Terminal and Red Battery Wire with +Ve Terminal of Battery. It is advisable to not use any extra cable for Batteries other than which is supplied by the Company

3. Connect +Ve and – Ve Wires from Solar Panel to +Ve & -Ve Terminal of Solar Input Terminal respectively

AC Cabling

The Cabling should have proper earthing. Connect AC Input supply to the 4 Way Terminal of the System such that the line in connected to “Input L”, Neural is Connected to “Input/ Output N” and Earth is connected with “E” and AC Output Line should be connected with “Output L”and Neutral should be connected with “Input/ Output N”.

Start Operation

Once the AC and DC wiring have been completed and connected, take a moment to re-examine all the connections and make sure they are secured and in the proper terminals.

- Switch ON the PCU. The PCU should run on load without AC input(battery only). Place some load on the system and make sure it works.
- To charge the batteries, connect Mains input & check the connection of wires from Solar PV Array and turn it ON. Battery BAR running upward on LCD indicates the charger is working properly. AC load connected to the PCU should also work at this time since the AC Power fed to the load is passed through the PCU in both (Normal and High) Modes.
- Disconnect the AC Power. The PCU will transfer the supply to the load from Mains to Battery mode immediately. This will be indicated by Battery BAR running downward on LCD with clicking sounds as the internal relay changes its connection. The system will begin to take power from the batteries and use it to power the load uninterruptedly.

The above steps will complete a functional test of the PCU. If all steps passed, the system is ready for use. If any steps fail, figure out the reason before preceding and contact to the service support accordingly.

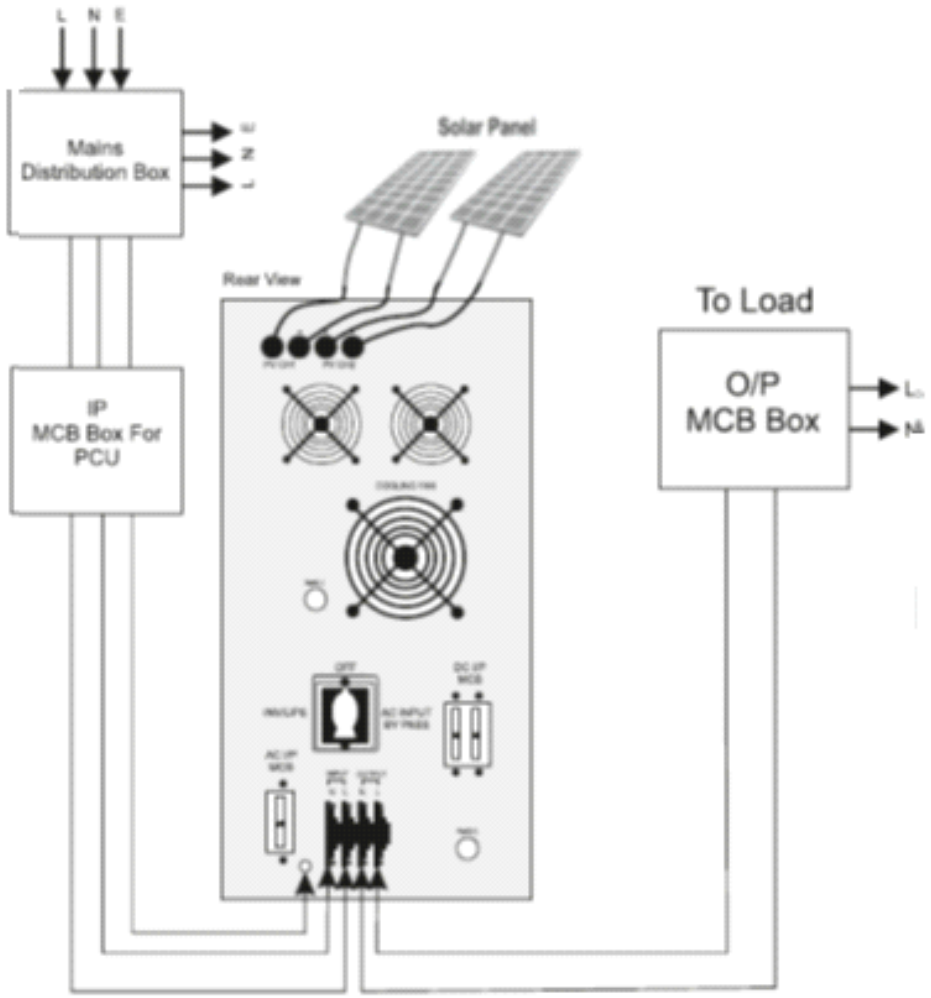
Note:
Fuses and disconnect switches must be sized appropriately to protect the wiring of the system. The fuse has to be blown before the wire reaches its maximum current carrying capacity.

Application*:

- ❖ Power Backup for Household as well as Computers.
- ❖ Emergency Power System.
- ❖ Water Pumps and all motor based application. LED TV Set, Fan, Tube Light, CFL etc.

*Condition Apply

Installation Layout



TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS								
Model	2KVA	2.5KVA	3.5KVA	5.2KVA	5.2KVA	7.5KVA	7.5KVA	10KVA
	Back-up Mode							
Output Wave Shape	Pure Sine Wave							
Normal Battery Voltage	24VDC	48V DC			96VDC		120VDC	
No Load Output Voltage	225V±1%AC	230V±1%AC						
Output Frequency	50Hz±1Hz							
No Load Battery Current	2.2Amp	2.0Amp						
Max. Discharging Current(DC)	81A±1A	50A±1A	59A±1A	100A±1A	49A±1A	75A±1A	65A±1A	80A±1A
Battery Low Alarm	Default 11.0 V							
Battery Low Cut Off	±0.2V Battery Low Alarm							
Max. Output Current (AC) ± 0.5A	7.4A	11.5A	13A	17.5A	17.5A	26A	26A	35A
Max. Output Power	1600 W	2000W	3000 W	4000W	4000W	6000W	6000W	8000W
Power Factor	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Max. Output Over Current Protection								
Mains Mode								
Recommended Nominal Mains Input	230V , 1Phase							
Max. Charging Current (HC) ± 1A (Settable 5Amp to Default Value)	15Adefault	15Adefault	15A default	15A default	15Adefault	15A default	15Adefault	
Max. Charging Current (NC) ± 1A	75% of High Current							
Battery Boost Voltage	Default 14.8V/Battery (Settable14.0V-15.6V)							
Battery Float Voltage	13.7V±0.2V/Battery							
Input Frequency	50Hz±1Hz							
Normal Mode (Mains Mode)								
Mains Input Voltage Range (± 10V)	90V-300V	100V-280V						
Change over Time (Mains to Back-up)	<40msec							
Change Over Time (Back-upto Mains)	<10msec							
UPS Mode (Mains Mode)								
Mains Input Voltage Range (± 10V)	180V-270V	180V-260V						
Change over Time (Mains to Back-up)	<10msec							
Change Over Time (Back-upto Mains)	<10msec							
Solar Mode								
Panel Capacity	2010Wp	2500Wp	3500Wp	5000Wp	5000Wp	8040Wp	7500Wp	
Solar Input Range (Voc)	40V-110V	70V-265V	70V-265V	70V-265V	200V-500V	360V Max.	200V-500V	
Operating Voltage Range (Vmp)	30V-85V	40V-230V	40V-230V	40V-230V	130V-310V	300V	160V-420V	
Max. PV Output Current	80A	50A	65A	90A	50A	75A	50A	75A
Sizing of Panel 335Wp - Series	2	4	5	5	5	8	8	10
Sizing of Panel 335Wp - Parallel	3	2	2	3	3	3	3	3
Mains Reconnect voltage (settable 11.0V-12.2V)	11.7V (by Default)							
Type of Solar Charge Control	True MPPT							
Protections								
Overload Retry	6AutoRetries							
Battery Retry	4Auto Retries							
Short Circuit Retry	Not Available							
Protections	Short Circuit Trip, Overload Trip, Battery Low & Over Charge Protection, Over Temperature, AC Fuse Blown/MCB Trip, PV Reverse, Reverse Current Flow etc.							
Display								
Display	Mains Input Voltage, Battery Voltage, Applied Load in %age, Battery Charging/Charged, Battery Low/Over Charge, Short Circuit, Overload, Over Temperature, AC Fuse Blow/MCB Trip, PV Reverse, Solar ON/OFF, Solar Voltage, Solar Current, Charging Current by Solar etc.							
	Other Details							
PollutionDegree	2							
Max.AltitudeRating	2000Meters							
Environmentalcategory	IP21 (Condensation)							
RelativeHumidity	75%Maximum							
OverVoltageCategory	OVCII							

Parameter setting display

Users/ Dealers can set Critical parameters at the time of installation depending upon the grid power and solar power availability and battery Ah conditions.

Below steps to be followed to set up critical parameters

1. Press switch 1 and hold till display 1 not appear
2. Press switch 4 for next parameter display and switch 2 for previous display
3. For display 2 – 6, press switch 3 to increase and switch 4 to decrease The value showing on particular display
4. Press switch 1 to save all parameters
5. Press switch 1 again to come out from setting mode.

Set parameter start display

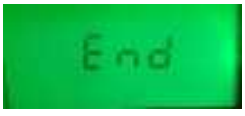
Battery boost voltage display

Battery low cut display

Maximum mains charging current display

Solar battery low cut display

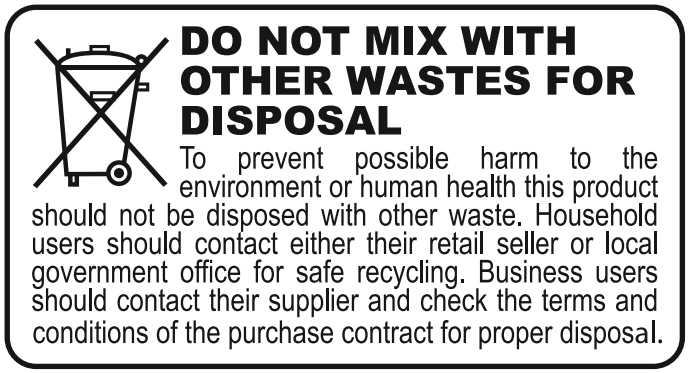
Maximum solar charging current display



End display and save

Note: These settings will remain saved in the memory and will change in case of Battery disconnection.

Please do not change the default values till you have the complete knowledge of the Solar PCU & Battery. Improper setting may hamper performance of of the PCU.



Safety Measures

Trouble Shooting Guide

Problems and Symptoms	Possible Cause	Solution
No Indication on LCD or LCD Not ON	Poor Battery Condition or Battery Fuse Blown/ Battery MCB Trip	Use New Battery or Make Proper Connections or Replace Battery Fuse/ Reset Battery MCB
Overload Fault with Continuous Buzzer	System is Overloaded	Reduce the excessive load from the PCU & OFF/ON System
Unit Trips Frequently in UPS Mode	System is Overloaded	Reduce the load and reset the PCU
Short Circuit Fault with Continuous Buzzer	House wiring Short Circuited	Get the House Wiring checked & OFF/ ON System
Thermometer Blink Thermal Trip with Continuous Buzzer	System under Thermal Trip/ Shutdown	Call for Service support. There is overheat problem in the PCU
Fuse trip Fault with Continuous Buzzer	Mains MCB Trip	Reset AC Mains MCB. Check and reduce the load connected to the PCU
PV Reverse Fault	Solar Wires Connected in reverse	Interchange the Cables of PV Array at PCU end
Low Surge Power	Weak Batteries/ Cable too long	Refer the cable and Battery recommendation in this manual
Empty Battery Blinking with Continuous Buzzer	Battery Low Cut	Remove all loads and switch ON/ OFF the system, OR Allow the battery to charge when the mains is resumed before running the system on Battery again
Err1	LCD Communication	Contact Authorized Service Centre
	Error	

TERMS OF WARRANTY

The Exide MPPT PCU is warranted against manufacturing defects arising out of faulty or defective materials or workmanship for a period of 24months from the date of purchase. (Please note that plastic/rubber parts are not covered under this warranty).

Should a defect develop in this equipment during the period of warranty, Exide undertakes to get the equipment repaired Free of Cost. However if the purchaser has to shift his residence to another town account of transfer or other causes, the warranty benefit will be available at the nearest Exide authorised distributor/ service centre. Exide or its authorised distributor/Service centre reserves the right to retain any part or component replaced at its discretion in the event of defect notice d in the equipment during the warranty period.

This warranty is not valid in case of the following events :

- The equipment is not used according to the instruction given in the user's manual.
- The warranty will not apply to defects arising in Company's opinion by reasons of accidents, abuse, misuse, neglect, improper installation (if not under taken by the Company or its representative), fire, flood or other act of God or any other natural calamities. Any other un-authorised repairs done or carried out will have to be borne by the purchaser. The problem of Thermal Circuit Breaker blown will not be included in the warranty of the product. The services given for the same will be a paid service.

- The warranty will not apply if the original seals are found broken or tampered with.

- The Company in no way will be held liable for any loss or injury or damage caused to any form of life for any reason whatsoever

- All disputes are subject to the jurisdiction Kolkata only

For after Sales Service: Contact

Toll Free No. : 1800-203-5758

CONDITIONS OF WARRANTY

- The warranty will not apply to defects arising in Company's opinion by reasons of accidents, abuse, misuse, neglect, improper installation (if not undertaken by the Company or its representative), fire, flood or other act of God or any other natural calamities. Any other un-authorised repairs done or carried out will have to be borne by the purchaser. The problem of Thermal Circuit Breaker blown will not be included in the warranty of the product. The services given for the same will be a paid service.

- This warranty is not valid if the serial number and/or warranty seal of the Exide MPPT PCU has been deleted, defected or altered.
- The warranty card should accompany the Exide MPPT PCU if service under warranty period is required to be carried out by the Company/Authorised dealer.

- Any accessories (like battery, battery trolley, LED/LCD, plastic parts or any house hold goods etc.) connected to the system will not be covered under warranty.

- If the system is purchased from unauthorised source/ dealer, the warranty will be null and void for lodging any claim. Customer have to produce the warranty card and invoice in original
- The warranty will not apply if the original seals are found broken or tempered with.

- All disputes are subject to the jurisdiction Kolkata only.

EXIDE ADITYA

24 Months WARRANTY

WARRANTY CARD

MODEL : --

Serial No. : ____________________

Warranty is void if the above Serial Number differs from the Serial Number on the UPS

Customer's Name : ____________________

Address : ____________________

____

Dealer's Name : ____________________

Date of Purchase : ____________________

Dealer's Signature & Stamp

Customer's Signature

For any Service related issue Call:

✆ Toll Free No. 1800-203-5758

EXIDE INDUSTRIES LIMITED

59E Chowringhee Road, Kolkata – 700 020