PRODUCT & ITS FUNCTIONING

SOLAR PCU : Solar PCU is an integrated system consisting of the Solar Charge Controller, PCU and a Grid charger. It has dual charging options, through Solar Energy as well as through Grid Power. During day time, Solar array produce DC electricity, which charges the batteries. This DC power is converted into AC via PCU and can be used to run AC loads. If due to dim sunlight during daytime, DC power generated through Solar panels is very low, then the battery bank gets charged via the grid charger if mains is available. Microtek PCU continuously monitors the status of Battery Voltage, Solar Power Output and the Loads. Due to sustained usage of power, if the battery voltage falls below the preset level, then the PCU connects the load automatically to the Grid Power. Microtek PCU is designed to give First Priority to Solar Energy and uses the Grid Power only when the Battery charge is insufficient to meet the load requirement at that time.

SOLAR PHOTOVOLTAIC ARRAY: Solar Cell made out of silicon material is the basic element converting sunlight into electricity. A Solar Cell generates approximately 0.6 volts open circuit voltage and 30mA/sq.cm. short circuit current under Standard Test Conditions (STC). To have building block of practical utility, 36 numbers of identical solar cells are connected in series to make a module suitable for charging 12 volts battery. By putting them either in series or in parallel arrangement, required voltage/current/power levels can be generated.

Solar Photovoltaic Array generate DC Power during daytime when the Sun Light is available. Power generated from the array varies along-with changes in the quantum of sunlight falling on the modules, so for the Electricity requirement during low sunlight time and for night, needs energy storage, which is invariably a storage battery. The solar insolation falling on the array varies from day to day and the ratio of average insolation in the peak month could be as high as 1.5 to 2 times of the solar insolation received during lean month. Due to these battery will be overcharged if not monitored regularly. To guard against such undesired occurrence, a charge controller is required for an Solar Photovoltaic Array system.

CHARGING PROCESS

SOLAR CHARGE CONTROLLER

Microtek has MPPT based Solar Charge Controller integrated in all PCU models, to provide 4-Stage Charging Process which charges/re-charges the Batteries more effectively in comparison to other regulators. It consists of a DC-DC converter, which is used to operate Solar Panels at their maximum power point. This increases charging current supply to the batteries connected. MPPT Control dynamically tracks IV curve of Solar Array and ensures operations on maximum power point. Faster recharging increases the performance of the PCU system by storing more from the SPV array's limited output. The charge controller allows the flow of maximum current generated in the SPV array to the batteries, till it charged to its capacity. Then it regulates further charging current to keep battery in float stage and protect the batteries from getting overcharged. The final float setting reduces battery gassing and ensures complete battery charging.

4 STAGE CHARGING PROCESS: When Battery is in some level of discharged status after being used. As the Sun rises and SPV array start producing DC power, the charge controller begins charging the batteries in PEAK stage.

1. **PEAK Stage:** The current produced by the solar array is fed to the batteries. Battery Voltage level increases when the battery is charged. In this 1st Stage, Battery charges till their voltage level reaches to Boost Setting Level. Battery current settable from front panel.
2. **ABSORPTION Stage:** Charge Controller keeps the battery at maximum boost level for a cumulative period of 2 hour, in order to build proper battery electrolyte gravity. Absorption settable from front panel.
3. **FLOAT Stage:** In this 3rd Stage the battery voltage is held at float setting level and the charging current is further reduced. Full current from PV array can be used, if PCU is running and connected load is sufficient during float stage. Float settable from front panel.

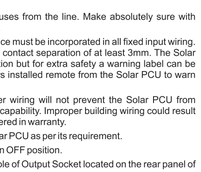
   Transition from FLOAT to PEAK Stage: When battery voltage drops below the float setting for a cumulative period of one hour, a new boost cycle will be triggered. This typically occurs every night. Transition will take place instant if battery voltage falls below the preset level.

This 3-Stage Charging Process results in fast and safe Charging/Re-charging of the batteries without getting them over charged.

FRONT PANEL

LED Indications

1. Mains ON.
2. Solar Charging
   - ✱ LED Continuously Blinks when Charging from Solar Panel.
   - ✱ LED Continuously Glows when Battery is Charged by Solar.
   - ✱ LED OFF when Solar is not available or Fault in Solar Connection.
3. PCU on Backup. (UPS ON)
4. Battery Low.
5. Overload.
   - ✱ LED Blinks with Beep, if PCU is Overloaded.
   - ✱ LED Continuously Glows with Beep and No Output, if Short Circuit.
6. Battery Charging.
   - ✱ LED Continuously Glows when Charged.
   - ✱ LED Blinks when Battery is Charging.



II. LCD Display.

SALIENT FEATURES

DSP BASED SOLAR PCU WITH MPPT Technology is designed using latest state-of-the-art Technology for Better Performance and High Reliability. The Solar Sinewave Technology used enhances the life of the battery and minimum effort has to be put for maintenance.

- MICRO-CONTROLLER / DSP BASED Intelligent Control Design.
- Dual Charging, Mains Mode and Solar Mode.
- Pure Sine Wave Output.
- MPPT Controlled multistage ATM Charging.
- Display Indications (Status & Fault).
- Smart Overload Sense and Short Circuit Protection.
- Easily Serviceable.
- Auto Reset Feature.
- Mains Input Voltage Range Selection.

Parameter Selectable from the Front Panel:

Priority - SBG - DOD Setting.
- SGB - Fixed DOD.
- Solar only.
- Normal Mode-No Solar Transfer.

Battery Type - TUB, FLAT (LA),
- SMF, LITHIUM,
- LOCAL

MPPT Battery Current Setting

1kVA/12V	5-50A-5A STEP
2kVA/24V	5-90A-5A STEP
2kw/36V	5-55A-5A STEP
3kW/48V	5-60A-5A STEP

Grid Charging Current

1kVA/12V	- OFF (0)A to 20A in 5A STEP.
1kVA/12V	- OFF (0)A to 20A in 5A STEP.
1kVA/12V	- OFF (0)A to 30A in 5A STEP.
1kVA/12V	- OFF (0)A to 30A in 5A STEP.

Mains Low Voltage
- Low - 100~180V -10V Recovery
- High- 250~300V -10V Recovery

LCD DISPLAY INDICATIONS

1 - BACK-UP MODE
- 1.0 BATT VOLT:
- 2.0 % LOAD
- 3.0 O/P VOLTAGE

2 - SOLAR MODE
- 1.0 PV VOLT:
- 2.0 PV CURRENT
- 3.0 SOLAR POWER
- 4.0 UNITS SAVED

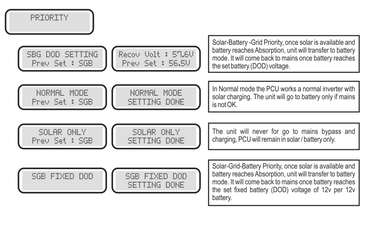
3 - MAINS MODE
- 1.0 GRID VOLT:
- 2.0 O/P VOLT:
- 3.0 GRID CHARG:
- 4.0 BATT-VOLT:

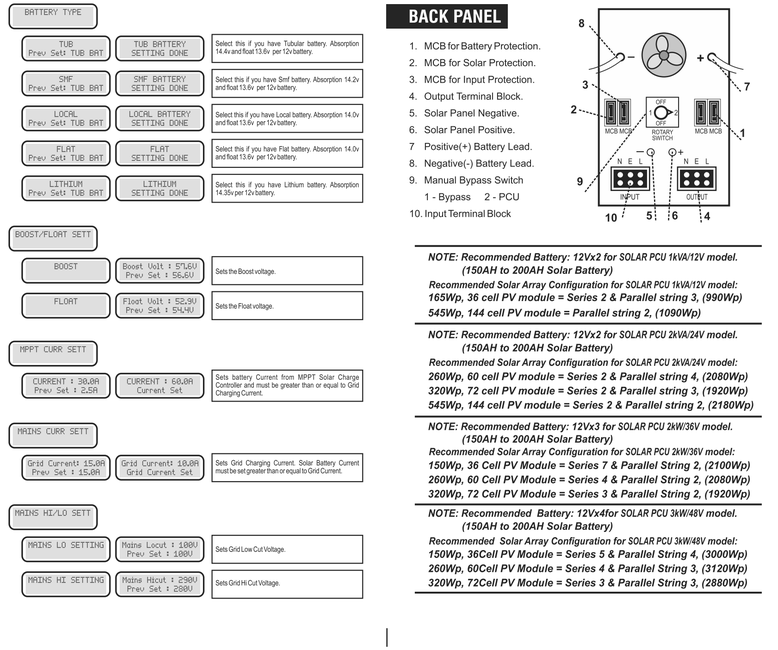
4 - FAULT MODE
- 1.0 TURN OFF SOLAR

MCB MPPT Fail. (In case Battery Charge more then equal to 16V Per Battery)

MENU SETTING

Press ON-OFF for 4±1sec to ON and OFF the PCU.
Press UP-Down to scroll PCU values, press ENTER to set value.





BACK PANEL

1. MCB for Battery Protection.
2. MCB for Solar Protection.
3. MCB for Input Protection.
4. Output Terminal Block.
5. Solar Panel Negative.
6. Solar Panel Positive.
7. Positive(+) Battery Lead.
8. Negative(-) Battery Lead.
9. Manual Bypass Switch
   1 - Bypass 2 - PCU
10. Input Terminal Block

NOTE: Recommended Battery: 12Vx2 for SOLAR PCU 1kVA/12V model. (150AH to 200AH Solar Battery)

Recommended Solar Array Configuration for SOLAR PCU 1kVA/12V model:
165Wp, 36 cell PV module = Series 2 & Parallel string 3, (990Wp)
545Wp, 144 cell PV module = Parallel string 2, (1090Wp)

NOTE: Recommended Battery: 12Vx2 for SOLAR PCU 2kVA/24V model. (150AH to 200AH Solar Battery)

Recommended Solar Array Configuration for SOLAR PCU 2kVA/24V model:
260Wp, 60 cell PV module = Series 2 & Parallel string 4, (2080Wp)
320Wp, 72 cell PV module = Series 2 & Parallel string 3, (1920Wp)
545Wp, 144 cell PV module = Series 2 & Parallel string 2, (2180Wp)

NOTE: Recommended Battery: 12Vx3 for SOLAR PCU 2kW/36V model. (150AH to 200AH Solar Battery)

Recommended Solar Array Configuration for SOLAR PCU 2kW/36V model:
150Wp, 36 Cell PV Module = Series 7 & Parallel String 2, (2100Wp)
260Wp, 60 Cell PV Module = Series 4 & Parallel String 2, (2080Wp)
320Wp, 72 Cell PV Module = Series 3 & Parallel String 2, (1920Wp)

NOTE: Recommended Battery: 12Vx4for SOLAR PCU 3kW/48V model. (150AH to 200AH Solar Battery)

Recommended Solar Array Configuration for SOLAR PCU 3kW/48V model:
150Wp, 36Cell PV Module = Series 5 & Parallel String 4, (3000Wp)
260Wp, 60Cell PV Module = Series 4 & Parallel String 3, (3120Wp)
320Wp, 72Cell PV Module = Series 3 & Parallel String 3, (2880Wp)

TROUBLE SHOOTING

TO BE DONE BY A COMPETENT & KNOWLEDGEABLE PERSON.

PROBLEMS	DISPLAY	POSSIBLE CAUSE	CHECK POINTS
Mains Connected and No Output	Mains LED-OFF	1. No mains present in the wall socket.	1. Check wall socket.
		2. Power Cord Faulty.	2. Check Power Cord.
	Mains LED-ON	Check output Connections.	Check output from the Socket.
	Mains LED-Blink	Mains Out of Range.	Check Mains Voltage.
PCU doesn't Operate	No Display	1. Battery/ies Dead.	1. Replace the Battery/ies.
		2. Battery Terminal corroded or Loose Connections.	2. Clean the Battery Terminal & Tighten the Terminals if the Loose.
Mains Present-Battery Charging always LED OFF and Low Backup.	Mains on LED-ON Charging LED-OFF	1. Battery may be fully Charged.	Discharge the Battery to 11.5V for sometime and try.
		2. Battery Terminal corroded or Loose Connections.	
		3. Battery may be Faulty.	
Mains Present-but works on Battery	Mains On LED Blink	Mains out of Range	1. Check Mains Voltage.
			2. Check Power Cord.
Continuous Buzzer On	High Battery	Charger Faulty.	Shut Down or call auth. Service Personal.
PCU Trips Very Often in Backup Mode	Overload LED-ON & Buzzer Sounds	Excess Load, PCU tries to Restart.	Reduce the Load or Remove the Output of the PCU and try.
Solar Present But No Solar Indication	Overload LED-ON & Buzzer Sounds	1. Check Solar Terminal Voltage Voc with meter.	1. Confirm Voc Greater than the Battery Volt.
		2. Solar Loose Contact.	2. Solar DC Fuse failure
Solar Present But Charging LED OFF	Solar LED-ON UPS LED-ON Charging LED-OFF	Load is on Solar, Battery has been Charged Fully.	Discharge the Battery below 11.7V and Check for Charging LED
Solar Present But PCU working on Grid	Solar LED-ON Charging LED-ON UPS LED-OFF/Blink	Battery is Discharged, Solar is Charging Battery so Load on Grid.	Wait until the Solar Charges the Battery fully or Solar may be in-sufficient.

TECHNICAL SPECIFICATIONS

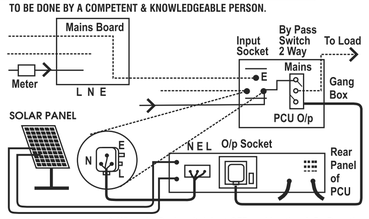
MODEL SOLAR PCU	1kVA/12V	2kVA/24V	2kW/36V	3kW/48V
Capacity (VA / WATT)	1000VA/800W	2000VA/1600W	2000VA/2000W	3000VA/3000W
INPUT PARAMETERS				
Input voltage Range	100V~300V Settable			
Nominal Input Batt. Volt.	12V	24V	36V	48V
OUTPUT PARAMETERS				
Waveform Type	PURE SINE WAVE			
Output frequency	50 Hz ± 0.5 Hz			
MPPT SOLAR CHARGER				
Type / Solar Panel VOC	MPPT/ Min 16-55V Max	MPPT/ Min 30-105V Max	MPPT/ Min 60-170V Max	MPPT/ Min 60-170V Max
Max. Panel Current	24A	34A	20A	30A
ENVIRONMENT				
Operating Temp.	0-40˚C ; 32-104˚F			
Relative Humidity	0-95% non-condensing			
Audible Noise	Less than 55dBA (at 1M)			
PROTECTIONS				
Low Battery Indication	10.6 ± 0.4Vdc	21.2 ± 0.6Vdc	31.8 ± 0.6Vdc	42.4 ± 0.8Vdc
Low Battery Shut Down	10.5 ± 0.4Vdc	21.0 ± 0.6Vdc	31.5 ± 0.6Vdc	41.0 ± 0.8Vdc
Output Overload	Electronic @>100% Load			
Output Short Circuit with Solar	Electronic Current Limiting with Shut Down + MCB			
BATTERY CHARGING VOLTAGE				
Boost Voltage w.r.t. Battery type	FLA/Local/LiMPO4= 14.0V, SMF= 14.2V, TUB= 14.4V(Default); Tolerance ± 0.4V.	FLA/Local/LiMPO4= 28.0V, SMF= 28.4V, TUB= 28.8V(Default); Tolerance ± 0.8V.	FLA/Local/LiMPO4= 42.0V, SMF= 42.6V, TUB= 43.2V(Default); Tolerance ± 0.8V.	FLA/Local/LiMPO4= 56.0V, SMF= 56.8V, TUB= 57.6V(Default); Tolerance ± 0.8V.
Keypad settable Boost voltage	FLA/Local/LiMPO4= 13.5 to 14.5Vdc±0.4V, SMF= 13.7 to 14.7Vdc±0.4V, TUB= 13.9 to 14.9Vdc±0.4V; @0.4V, @0.1V Step	FLA/Local/LiMPO4= 27.0 to 29.0Vdc±0.8V, SMF= 27.4 to 29.4Vdc±0.8V, TUB= 27.8 to 29.8Vdc±0.8V; @0.8V, @0.1V Step	41.7 to 44.7Vdc±0.8V @0.1V Step	55.6 to 59.6Vdc±0.8V @0.1V Step
Float Voltage	FLA/Local= 13.7V, SMF= 13.4V, TUB= 13.6V(Default) Tolerance ± 0.4V, no float for Lithium Battery Bank	FLA/Local= 27.4V, SMF= 26.8V, TUB= 27.2V(Default) Tolerance ± 0.8V, no float for Lithium Battery Bank	41.1Vdc ± 0.8V, no float for Lithium Battery Bank	54.8Vdc ± 0.8V, no float for Lithium Battery Bank
Keypad settable Float voltage	FLA/Local= 13.4 to 14.0 Vdc ±0.4V, SMF= 13.1 to 13.7Vdc±0.4V, TUB= 13.3 to 13.9Vdc±0.4V; @0.4V, @0.1V Step	FLA/Local= 26.8 to 28.0 Vdc ±0.8V, SMF= 26.2 to 27.4Vdc±0.8V, TUB= 26.6 to 27.8Vdc±0.8V; @0.8V, @0.1V Step	39.9 to 41.7Vdc ±0.8V, @0.1V Step	53.2 to 55.6Vdc ±0.8V, @0.1V Step
PHYSICAL				
Dimensions (LxWxH) mm	527x255x426			
Net Weight (Kgs.)	27.5Kgs.	32.7Kgs.	32.2Kgs.	39.2Kgs.

Caution: If Solar Charger is ON then don't remove the battery. Switch OFF Solar MCB First & then remove the battery else it can cause system damage.

NOTE: **Because of a policy of continuous product improvement, the specifications are subject to change without notice.*

CONNECTION DIAGRAM FOR INSTALLATION

TO BE DONE BY A COMPETENT & KNOWLEDGEABLE PERSON.



P - Positive Terminal of PCU O/p
L - Mains Line I/p
N - Neutral
E - Earth

* **When the Push switch is at OFF position then it By-Pass the mains AC supply & charges the Battery.**
* **When the Push switch is at ON position(Pressed) and is having alternating supply, It charges the battery and has mains By-Pass and when the alternating supply(mains) is not present at that instant it is ready for Backup.**

STEPS FOR SOLAR PCU INSTALLATION

TO BE DONE BY A COMPETENT & KNOWLEDGEABLE PERSON.

- Switch OFF the supply to the distribution point to which the Solar PCU unit is to be connected.
- For extra safety also remove the fuses from the line. Make absolutely sure with measurement that there is no power.
- A readily accessible disconnect device must be incorporated in all fixed input wiring. The disconnect device shall have a contact separation of at least 3mm. The Solar PCU has automatic backfeed isolation but for extra safety a warning label can be added on all primary power isolators installed remote from the Solar PCU to warn electrical maintenance personnel.
- Check the building wiring, Improper wiring will not prevent the Solar PCU from operating but will limit its protection capability. Improper building wiring could result in equipment damage that is not covered in warranty.
- Connect the Battery/Batteries to Solar PCU as per its requirement.
- Keep the front switch of Solar PCU on OFF position.
- Connect the Load wire to the right hole of Output Socket located on the rear panel of Solar PCU.
- Switch ON the front Switch of the Solar PCU.
- Connect AC input wire to commercial mains socket.

SERVICING / WARRANTY

Microtek International P. Ltd., warrants each instrument to be free from defects in materials and workmanship for a period of Two years after initial delivery. This obligation is limited to servicing any instrument or part returned to the authorised service center for that purpose and to making good any parts thereof which shall, within the warranty period, be returned to the company or authorised Service center under a written intimation and which to the company's satisfaction be found defective. The company reserves the right to decide as to whether the repair work should be carried out in the company's service center or at site or at any other place.

The freight incurred for to and fro dispatch will have to be borne by the customer and the transit risk for the material will rest with the customer.

The warranty will be invalidated if defects arising in company's opinion are by reasons of accident, abuse, misuse, neglect, Improper Installation (if not undertaken by the company or its representative), fire, flood, any other act of God and any other natural calamities. Further, this warranty does not extend to any instrument which has been repaired / tampered with by any agency/person not authorized by the company. The services given for the same will be paid service.

The warranty will last for a period of 24 months from the date of initial delivery/dispatch of the instrument if used within its specifications. The warranty for the replaced components will lapse along with that of the main instrument.

MICROTEK International P. Ltd., reserves the right to make changes in design and specifications without notice and without any obligation to install such changes on units previously supplied.

In no event will MICROTEK International P. Ltd., its distributors / dealers be liable for any loss or injury or damage caused to life or property or death & disability caused to any form of life for any reasons whatsoever. The company, its distributors / dealers will also not be liable for consequential damages or for any expenses incurred by the buyer or user, due to use or sale of products sold by MICROTEK International P. Ltd., directly or through its authorised Distributors / dealers or any third party.

SAFETY INSTRUCTIONS

Always connect the Solar PCU to a two pole, three-wire grounding mains socket, near by the product. The socket must be connected to appropriate branch protection (fuse/circuit-breaker). Connection to any other type of socket may result in a shock hazard. To switch off the Solar PCU output in emergency, use switch on the Front panel. Also disconnect the mains cord and battery wires.

Avoid installing the Solar PCU in open, excessively humid place or where there is water or near flammable materials (plywood, chemicals, gasoline etc.). Care must be taken to ensure that the Solar PCU is kept away from heat-emitting appliances such as a heater, blower, oven etc.

The unit must also be placed in a manner that it avoids exposure to sunlight. The place of installation should be well-ventilated and easily accessible for servicing. Kindly ensure that ELCB/RCCB is not connected at either Input or Output, Only MCB upto 63A or MCCB above 100A to be used as per Solar PCU capacity.

Foreign objects and water must not enter the Solar PCU. Always ensure that objects containing liquid are avoided near the unit.

Place the Battery Compartment as near as possible to the Solar PCU. Don't allow sparks near the Battery. Be sure not to come in contact with Battery Acid by any means.

Always Switch Off the Solar PCU and disconnect mains when disconnecting the Battery.

Avoid connecting the stabilizer between Utility Power and Solar PCU. The AVR of the stabilizer may cause rebooding of the Computer.

The equipment must be earthed.

Do not open the Solar PCU there are dangerous high voltages inside even when the power is OFF, Contact the Company only if it is not working properly.

Replace Batteries and the Fuse only with same Rating and Type.

Do not place Solar PCU on a sloping shelf unless properly secured. Use perfect stand to hold the Solar PCU. Backfeed, See the warning label on the Solar PCU.

IMPORTANT

In the event of any instrument requiring service at our authorised service centre, the following procedure should be adopted:-

1. The instrument must be securely packed, preferably in its original packing. Also ensure that nothing inside packing is damaged. Please transport the product in its original packing to protect against shock, damage & Impact.
2. We reserve the right to charge the consignee for any damage incurred during transit.
3. The output of the PCU should never be connected to a generator or incoming utility power source. This situation is far worse than a short-circuit. If the unit survives the condition, it will shutdown until correction is made.

GOING ON VACATIONS

1. Must put the PCU ON/OFF Switch in OFF Position.

DO'S & DON'TS RELATED TO PCU

Do's Related to SOLAR PCU

✓ Unplug and Switch OFF the Solar PCU before touching or cleaning the surface.

✓ Unplug the Solar PCU from the wall outlet during a Lightening Strom.

Don'ts Related to SOLAR PCU

☒ Don't block the bottom ventilation slots by cloth or other material it may result in fire hazard.

☒ Don't place the Solar PCU near radiation or heat source.

☒ Don't Install near Kitchen Sink, Laundry, Wash Bowl, Bath Tub or Swimming Pool.

POST WARRANTY ANNUAL MAINTENANCE CONTRACT (AMC)

Microtek Offers Annual Maintenance Contract to save you from any inconvenience in case of a product failure post warranty. Various options are available in select cities for all models of Microtek Products: ***For Details, Contact nearest Microtek Branch or e-mail at: ho@microtek.in***

In case of any Service requirement kindly contact Microtek Customer Care, specifying following details:

(i) Model Number & Serial Number of the Product.
(ii) Name & phone no. of the contact person with full address & e-mail ID if any.
(iii) Reported problem/description of the complaint.

Note: (a) Refer all servicing queries to Microtek Customer Care only.
(b) Please take care that Serial Number is kept intact and that the product is not allowed to be fiddled (opened) by any unauthorised person; otherwise the warranty will be void.

MICROTEK CUSTOMER CARE: ALL INDIA: 7283838383
WHATSAPP: 8800255733 E-mail: cc@microtek.in

*All disputes subject to Delhi jurisdiction only.

MICROTEK INTERNATIONAL P. LTD.
H-57, Udyog Nagar, Rohtak Road, New Delhi-110041.

INSTRUMENT DESCRIPTION - MICROTEK MPPT SOLAR PCU

MPPT SOLAR PCU 1kVA/12V ☐ MPPT SOLAR PCU 2kVA/24V ☐

MPPT SOLAR PCU 2kW/36V ☐ MPPT SOLAR PCU 3kW/48V ☐

SERIAL NO.

Authorised Dealer Stamp with Signatures

Vend. C:
Form No.: QPN/003-264 (China PART CODE: 902-00027-03)
Issue No.: 04, 23/08/2024 (PART CODE: 902-514-3000) 002-298-SOLAR-PCU1kVA-3kW V.4

MICROTEK

MPPT BASED

SOLAR PCU 1kVA/12V
SOLAR PCU 2kVA/24V
SOLAR PCU 2kW/36V
SOLAR PCU 3kW/48V

USER MANUAL

ISO CERTIFIED COMPANY ISO 9001:2015 CERTIFIED
ISO 14001:2015
CE
2 YEARS WARRANTY

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