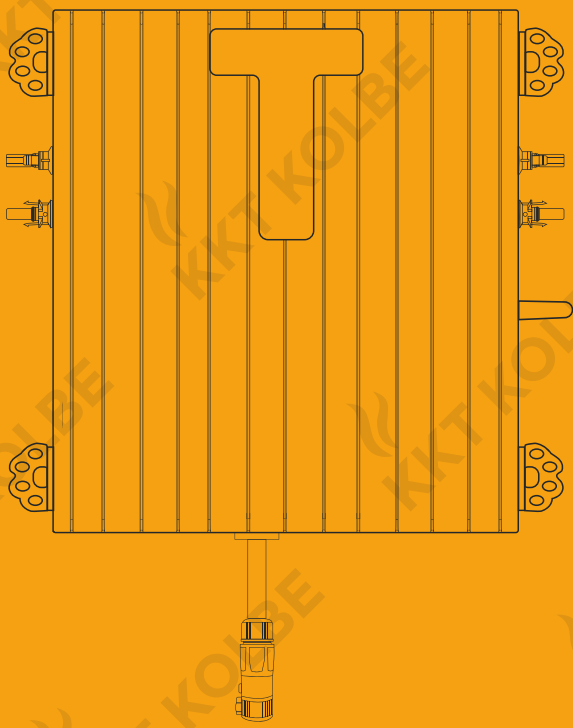
KKT KOLBE

Benutzerhandbuch / User‘s manual

für Ihren Micro-Wechselrichter /
for your micro inverter

Modelle / Models:
SOLAR600-8002T / SOLAR8002T



Version: 0.0 / 230511

DE EN

Seriennummer meines Geräts:

KKT KOLBE

Benutzerhandbuch

Micro-Wechselrichter, Modelle: SOLAR600-8002T, SOLAR8002T
Vorversion (0.0)

Vielen Dank für Ihr Vertrauen
und Glückwunsch zum Kauf Ihres neuen Micro-Wechselrichters.

Sie haben ein gutes Gerät gewählt, welches Ihnen bei sachgerechter Bedienung
und Pflege viele Jahre dienen wird.

Bitte beachten Sie, dass es sich bei diesem Handbuch um eine Vorversion ausschließlich in englischer Sprache handelt.
Sobald verfügbar, erhalten Sie die aktuellste Version Ihres Benutzerhandbuchs in deutsch und englisch über den folgenden QR-Code:

https://www.kolbe.de/mediafiles/handbuecher/Photovoltaikmodule/SOLAR600-8002T_IM_DE-EN.pdf

... und auf der entsprechenden Produktseite oder im Bereich „Fragen & Antworten“ unseres Onlineshops auf www.kolbe.de .
Hier finden Sie auch Hinweise zur Produktkonformität, sowie weitere Informationen.

Lesen Sie das Handbuch sorgfältig und aufmerksam durch, bevor Sie das Gerät auspacken. Es enthält wichtige Informationen über die sichere Installation, Benutzung und Wartung, sowie wichtige Warnhinweise zur Verwendung Ihres Geräts.

Markieren Sie die für Sie wichtigen Stellen,
bewahren Sie das Handbuch so auf, dass Sie jederzeit darin nachschlagen können
und geben Sie es auch an andere Nutzer weiter.

Im Hinblick auf die ständige Weiterentwicklung behalten wir uns evtl. notwendige Modifizierungen des Geräts und/oder des Handbuchs vor, um der Bedienerfreundlichkeit, dem Schutz des Benutzers und dem aktuellen technischen Standard besser zu entsprechen.

Sollten Sie trotz unserer eingehenden Qualitätskontrolle einmal etwas zu beanstanden haben, so wenden Sie sich bitte an unseren hauseigenen Kundenservice.
Dieser wird Ihnen gerne weiterhelfen.

KKT KOLBE Kundenservice

Tel. 09502 667930
Mail: info@kolbe.de
www: www.kolbe.de

→ Weitere Daten und Dokumente
finden Sie auf unserer Website www.kolbe.de
unter "Fragen & Antworten".

Für einen reibungslosen Ablauf bei eventuellen Rückfragen empfehlen wir Ihnen, die Seriennummer Ihres Produkts im entsprechenden Feld auf dem Innencover zu notieren. Bitte halten Sie für Anfragen außerdem Kundennummer, Datum der Rechnung oder des Lieferscheins und Gerätetyp (Modellnummer) bereit.

Ihr KKT KOLBE - Team

Serial number of my device:

KKT KOLBE

User‘manual

Micro inverter, Models: SOLAR600-8002T, SOLAR8002T
Previous version (0.0)

Thank you for your confidence and congratulations on the purchase of your new micro inverter.

You have chosen a good device which, with proper operation and care, will serve you for many years.

Please note that this manual is a previous version in English only. As soon as it is available, you can obtain the latest version of your user manual in German and English via the following QR code:

https://www.kolbe.de/mediafiles/handbuecher/Photovoltaikmodule/KKTHVB10.24_IM_DE-EN.pdf

... or on the corresponding product page or in the „Questions & Answers“ section of our online shop at www.kolbe.de .
Here you will also find notes on product conformity, as well as further information.

Read the manual carefully and thoroughly before unpacking the device.
It contains important information about safe installation, use and maintenance, as well as important warnings about the use of your device.

Mark the passages that are important to you, keep the manual so that you can refer to it at any time and also pass it on to other users.

In view of the continuous development, we reserve the right to make any necessary modifications to the unit and/or the manual in order to better meet the requirements of user-friendliness, user protection and current technical standards.

Should you have any complaints despite our thorough quality control, please contact our in-house customer service.

They will be happy to help you.

KKT KOLBE customer service

Tel. 0049 9502 667930
Mail: info@kolbe.de
www: www.kolbe.de

→ You will find further data and documents on our website www.kolbe.de under „Questions & Answers“.

To ensure a smooth process in the event of any queries, we recommend noting the serial number of your product in the corresponding field on the inside cover / on the left. Please also have the customer number, date of invoice or delivery note and device type (model number) ready for enquiries.

Your KKT KOLBE - Team

Table Of Contents

* Please note that this version will also be modified and updated in the future.

Manual Information

Validity

This manual is valid for the following devices:

- 2-in-1 microinverter 600W-1.2KW; models: SOLAR600-8002T, SOLAR8002T

Scope

This manual describes the transport, installation, operation and troubleshooting of this unit. Please read this manual carefully before installa-tion and operation.

Target Group

This document is intended for qualified persons and end users. Tasks that do not require any particular qualification can also be performed by end users. Qualified persons must have the following skills:

- Knowledge of how an inverter works and is operated
- Training on how to deal with the dangers and risks associated with installing and using electrical devices and installation
- Training on installation and commissioning of electrical devices and installation
- Knowledge of applicable standards and directives
- Knowledge of compliance with this document and all safety information

Symbols

The following symbols appear on the product label and are described here:

Symbols	Explanation
	**Caution: hot surface!** Under "Caution, hot surface", it should be noted that surfaces of equipment may be hot and create a burn hazard.
	**DANGER:** Refer to safety instructions.
	**Refer to manual:** Under "Instructions for Use", it is pointed out that installation and operating instructions are to be read and understood before installation or repair.
	**DANGER:** Risk of electrical shock. Hazardous voltage will cause death or serious injury. Turn off the Power before working on this equipment.
	**Attention!** With the term "attention" - a circumstance is listed which may cause property damage if disregarded.
	**Special disposal instructions!** With "Note Separate Disposal", it is noted out that this product can not be disposed of with normal garbage. An improperly conducted disposal can lead to damage to the environment.

Safety Instructions

WARNING: This chapter containsimportantsafety and operating instructions. Read and keep this manual for future reference

1. Before using the unit, read all instructions and cautionary markings on the unit, and all appropriate sections of this manual.

2. CAUTION – Only qualified personnel should install, troubleshoot, replace this device or cable and accessories.

3. Before connecting the microinverter to the power distribution grid, contact the local power distribution grid company to get appropri-ate approvals.

4. It is the responsibility of the installer to provide external disconnect switches and Over Current Protection Devices (OCPD).

5. Do not exceed the maximum number of microinverters in an AC branch circuit as listed in the manual. You must protect the microin-verter's AC branch circuit with a maximum breaker or fuse as appropriate.

6. Ensure that all AC and DC wiring are correct and none of the AC or DC wires are pinched, shorted or damaged. Ensure that all AC junction boxes are properly closed.

7. Be seriously cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts may cause anexplosion.

8. Please strictly follow the installation procedure when you want to disconnect AC or DC terminals. Please see the INSTALLATION section of this manual for the details.

9. GROUNDING INSTRUCTIONS -the PV array should be connected to a permanent grounded wiring system. Be sure to comply with local standards and regulation to install thisinverter.

10.NEVER cause AC output and DC input short circuited. Do NOT connect to the main power when DC input short circuits.

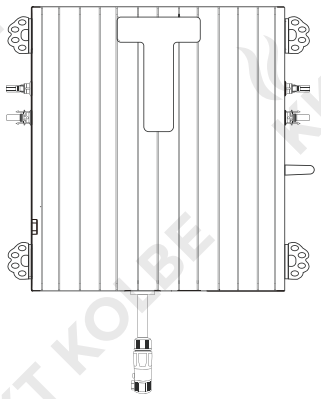
11.Do not connect the microinverters to the grid or energize the AC circuit(s) until you have completed all of the installation procedures and have received approval from the electrical utility authority.

12. Warning!! Only qualified service persons are able to serve this device. If errors still persist after following troubleshooting table, please send this Microinverter back to local dealer orservice center for maintenance.

13.Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.

14.Toreduce the risk of electric shock, disconnect all wiring before attempting any maintenance or cleaning. Only turning off the unit will not reduce the risk.

Introduction



Features:

The microinverter can be widely used in general 190V-276V electric power distribution. The microinverter, with up to 2 PV modules connected, built in quick fit connectors, simplifies the installation process and ranks among the most cost effective solutions for commercial and industrial installations.

The microinverter individually connects to each PV module in your array. This configuration enables an individual MPPT to control each PV module, ensuring that maximum power available from each PV module is transmitted to the utility grid regardless of the performance of the other PV modules in the array. While an individual PV module in the array may be affected by shading, soiling, orientation, or PV module mismatch, the microinverter ensures top performance for its associated PV module.

Real-time Monitoring

Once you install the microinverter and connect your home WiFi successfully, which automatically begin reporting to historical system performance trends and informs you about the PV system status.

Optimal Reliability

Microinverter systems are inherently more reliable than traditional inverters. The distributed nature of a microinverter system ensures that there is no single point of system failure in the PV system. The microinverter is designed to operate at full power at ambient temperatures as high as 65 °C (149 °F).

Ease of Design

PV systems using this micro inverter are very simple to design and install. You will not need cumbersome calculations like traditional string inverters. You can install individual PV modules in any combination of PV module quantity, type, age and orientation. The microinverter quickly mounts on the PV racking, directly beneath the PV module.

Safety

Low voltage DC wires connect from the PV module directly to the co-located microinverter, eliminating the risk of personnel exposure to dangerously high DC voltage.

Installation Preparation

Module Compatibility

The microinverter is compatible with most 60-cell and 72-cell PV modules. For other types of PV modules, please ensure that they are electrically paired with the microinverter. Please see the Technical Data page of this user manual to get more information.

PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:

1. Open circuit Voltage (VOC) of PV modules not exceeding maximum PV array open circuit voltage ofinverter.
2. Open circuit Voltage (VOC) of PV modules should be higher than minimum battery voltage.

Grounding Considerations

This microinverter is a classy equipment with basic isolation transformer and this microinverter must be earthed. There is an earth wire inside the AC cable, so usually the grounding can be done by directly by this wire.

Utility Service Requirements

The microinverters work with single-phase or three-phase service. Measure AC line voltage at the electrical utility connection to confirm that it is within range:

Single-Phase Service		Three-Phase Service	
L1 to N	190 to 276VAC	L1 to L2 to L3	330 to 478 VAC
		L1, L2, L3 to N	190 to 276 VAC

Lightning and Surge Suppression

The microinverter has integral surge protection. However, if the surge has over energy, the protection built into the microinverter can be exceeded, and the equipment can be damaged. For this reason, we recommend you to protect your system with a lightning and/or surge suppression device. In addition, to have some level of surge suppression, it is also important to have insurance that protects against lightning and electrical surges. NOTE: Protection against lightning and resulting voltage surge must be in accordance with local standards.

⚠ Precautions :

-The installation must be done with the equipment disconnected from the grid and with the PV modules shaded or isolated.
-Make sure the environmental conditions fit the microinverter's requirement (degree of protection, temperature, humidity, altitude, etc.) as specified in the Technical Data section.
-Avoid direct sunlight to prevent power derating which can be caused by an increase in the internal temperature of the microinverter.
-Keep the inverter in well-ventilated place to avoid overheating.
-Keep the inverter away from gases or flammable substances.
-Avoid electromagnetic interference because it can compromise the normal operation of electronic equipment.
-Install only on structures specifically designed for PV modules (supplied by PV modules installer).
-Install microinverter underneath PV modules to make sure it works in the shadow. Nonobservance may cause the derating of inverter produc-tion.

Installation

Unpacking and Inspection

Before installation, please inspect the package. Be sure that nothing inside the package is damaged. You should have received the following items inside of package:

- The Microinverter x1
- User manual x1
- Protective end cap x1

Installation Tools

- Besides tools recommended below, other auxiliary tools can also be used on site like Screwdriver and Multimeter.
- Socket Wrench or Allen wrench Marker pen
- Diagonal pliers Steel tap
- Wire cutters Cable tie
- Wire stripper Torque and adjustable wrench
- Utility knife
- Safety glove Dust masks
- Protective goggles Safety shoes

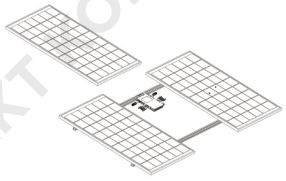
Mounting the Unit

Attention:

The microinverter already is equipped with a 5m cable with Schuko plug and 1.95m AC cable .
Please choose a suitable location and direction for installation.

Step 1. Mounting the microinverter on the rail:

1. For Sloped Roof:



Since the space between the solar panel and the roof is very small, the microinverter should also be parallel to the solar panel and preinstalled on the rail under the solar panel.

WARNING:

1. Microinverter installation and DC connections must be done under the PV module to avoid direct sunlight, rain exposure, snow buildup, UV etc.
2. Leave a minimum of 2 cm of space around the microinverter enclosure to ensure ventilation and heat dissipation.
3. Mounting torque of the 8 mm screw is 9 N·m. Do not over torque.
4. Do not pull or hold the AC cable or PV cable with your hand. Hold the moicroinverter instead.

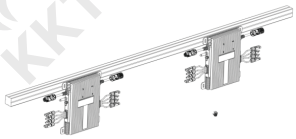
Step A. Mark the right position on the racking system.

Evaluate the location of the micro inverter with respect to the PV module junction box or any other obstructions.

Step B. Fix 4 screws on the rail accordingly. Hang the microinverter on the screws, and tighten the screws.

The silver cover side of the microinverter should be facing the roof.

2. For Flat Roof or Ground System



Step A. Install the solar panels installs first.

Step B. Fix 2-4 screws on the rail. Hang the microinverter on the screws, and tighten the screws.

The silver cover side of the microinverter should be facing the roof. Since the solar panel is installed at a large distance from the ground, the inverter can be vertically suspended under the rail of the corresponding solar panel.

Attention: Ground the system

The AC cable contains earth wire, so grounding can be done directly with it. For regions that have special requirements, use grounding brackets that can be used to complete the external grounding. Route a continuous grounding cable through grounding brackets for the microinverter to the AC grounding electrode that conforms with local regulations. Torque each grounding cleat screw to 2 N·m.

Step 2. Connect the microinverter via "AC plug and play" cable, complete the AC Connection.

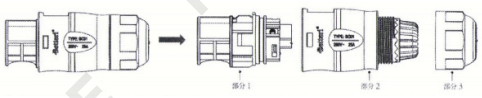
Note:

1.Make sure that the AC Connectors are kept away from any drainage channels.

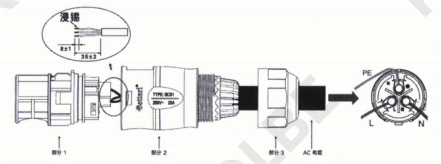
2.The length of the AC cable on the Microinverter is around 5 meters, buy extra AC plug and play cable if needed.

Step 3. Connect AC end cable.

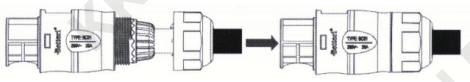
Step A. Separate the AC port into 3 parts.



Step B. Insert the AC cable through Part 3 into Part 2, and complete the wiring for the L, N and Ground inside the AC port in Part 1.



Step C . Plug the AC port Part 2 into Part 1, once the wiring is complete, and then screw on Part 3 to complete the AC extension cable.



Step 4. Install the microinverter directly beneath the PV module and same time connect the PV modules' DC cables to the DC input side of the microinverter.

Step 5. Energize the microinverter system

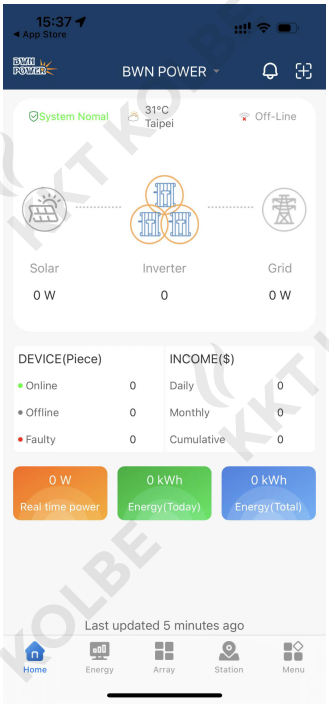
Turn on the AC breaker of the system. Your system will start to generate electric power in about 2-3 minutes.

Attention: The LED light flashed in red last about 1min, then will change into green on.

Step 6. Setup the monitoring system

Refer to the according instruction file on the product page of your device on our website www.kolbe.de to install and use the app for monitoring your system.

Scan QR-code and download SmartApp



LED light display contents

Item	Status	LED	Flashing	Remark
1	Boot initialization	Green	Flash by 1 second	Boot initialization
2	Boot	Green	Flash by 0.5 second	Boot on update, and waiting for the data transfer
3	Boot Refresh program	Green	Flash by 0.2 second	Boot on update, and Refresh program
4	APP initialization	Red	Flash by 2 second	APP initialization
5	APP Waiting	Red	Flash by 1 second	APP Waiting
6	APP Running	Green	Flash by 1 second	APP Running
7	APP Fault	Red	Flash by 1 second	APP Fault

Attention

LED light display order:

1: LED light Normal running order: 1→4→5→6;

2: LED rlight unning order during the software update: 1→2→3→1→4→5→6;

3: LED light running order when update the software during the inverter on running 6→5→1→2→3→4→5→6;

Step 7. Set Up Monitoring System

Setup the monitoring system refer to the instruction for installing the app for monitoring system. (same as above Step 10)

Fault Reference Code

Fault Code	Fault event	What to do
1	Grid not available	Check main grid connection if ok
2	Grid voltage over	Check main grid real voltage
3	Grid voltage under	
4	Grid frequency over	Check main grid real frequency
5	Grid frequency under	
6	PV1 voltage over	Check the Voc of each PV module should less than 60V
7	PV2 voltage over	
8	PV1 current over	Check each PV input cable connection, ensure that there is no looseness
9	PV2 current over	
10	output current over	Inspect the AC output cable connection, ensure no looseness.
11	Relay fault	Contact the installer or factory for after sales service
12	Bus voltage too high	Inspect the PV input cable and ensure no looseness.
13	PV1 input reverse connection	Inspect each pv input ensure no reverse connection between positive and negative.
14	PV2 input reverse connection	
15	Over loading protection (at off-grid)	Stop over loading this devices
16	Battery voltage is too high	Inspect if select the right battery
17	Battery voltage is too low	Inspect if connect the right battery or the battery be discharged.
18	charge current over	Check the BMS if on working and the battery setup if right
19	discharge current over	Not match the right inverter or the inverter overloading
20	EMS grid not available	Inspect the main grid switch if turn on
21	EMS grid voltage over	Check the main grid real voltage
22	EMS grid voltage under	
23	EMS grid frequency over	Check the main grid real frequency
24	EMSgrid frequency under	

Fault Code	Fault event	What to do
25	EMS PV1 voltage over	Check the VOC of each PV string should less than 60V
26	EMS PV2 voltage over	
27	EMS PV1 current over	Check each PV input cable connection, ensure no looseness
28	EMS PV2 current over	
29	EMS loading current over	Check the total power of home devices, should less than the EMS rated output.
30	EMS relay fault	Need ask the installer or factory to maintain or replace it.
31	EMS communication fault	Check the AC connection if looseness
32	EMS bus voltage over	Check the PV1-PV2 input ensure no looseness
33	Output short circuited	Inspect the loading device and output cable if short connection.
34	Solar charger stops due to low battery	Check battery voltage
35	EMS PV1, PV2 input reverse protection	Inspect each pv input ensure no reverse connection between positive and negative.

Troubleshooting

1. Check the connection to the utility grid. Verify that the utility voltage and frequency are within allowable range.
2. Verify utility power is present at the inverter in question by removing AC, then DC power. Never disconnect the DC wires while the microinverter is producing power. Re-connect the DC module connectors, and then watch for the LED blinks.
3. Make sure that any AC disconnects are functioning properly and are closed.
4. Verify the PV module DC voltage is within the allowable range.
5. Check the DC connections between the microinverter and the PV module.
6. If the WIFI signal is weak, it might be due to the distance between the micro inverters and the gateway. It may also be caused by the interference from other electronic devices. In most cases, signal quality may be significantly improved by moving the WIFI router to closer to the micro inverter arrays.
7. If the problem persists, please contact KKT Kolbe customer service.

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Disconnecting the Microinverter from the PV Module

To ensure the Microinverter is not disconnected from the PV modules under load, adhere to the following disconnection steps in the order shown:

1. Disconnect the AC by opening the branch circuit breaker.
2. Disconnect the first AC connector in the branch circuit.
3. Cover the module with an opaque cover.
4. Using a DC current probe, verify there is no current flowing in the DC wires between the PV module and the Microinverter.
5. Care should be taken when measuring DC currents, most clamp-on meters must be zeroed first and tend to drift with time.
6. Disconnect the PV module DC wire connectors from the microinverter.
7. Remove the Microinverter from the PV array racking

Installing a replacement Microinverter

1. Attach the replacement microinverter to the PV module racking using hardware recommended by your module racking vendor
2. Connect the AC cable of the replacement microinverter and the neighboring microinverter to complete the branch circuit connections.
3. Connect the PV Modules, the Microinverter comes with 2 oppositely sexed DC connectors. First connect the positive DC wire from the PV module to the negatively marked DC connector (male pin) of the Microinverter. Then connect the negative DC wire from the PV module to the positively marked DC connector (female socket) of the Microinverter. Repeat for all remaining PV modules using one Microinverter for each module.
4. Completely install all Microinverters replacement, turn on the branch switch, ensure all inverter on working.
5. update the connection map, aach microinverter has a removable WIFI serial number located on the solar map or the mounting plate. Enter this WIFI serial number into your station, and correspond it to a number in the connection map.

WARNING: DO NOT ATTEMPT TO REPAIR THE MICROINVERTER; IT CONTAINS NO USERSERVICEABLE PARTS. IF TROUBLESHOOTING METHODS FAIL, PLEASE RETURN THE MICROINVERTER TO YOUR DISTRIBUTOR FOR MAINTENANCE.
WARNING: NEVER DISCONNECT THE DC WIRE CONNECTORS UNDER LOAD. ENSURE THAT NO CURRENT IS FLOWING IN THE DC WIRES PRIOR TO DISCONNECTING. AN OPAQUE COVERING MAY BE USED TO COVER THE MODULE PRIOR TO DISCONNECTING
WARNING: MICROINVERTER IS POWERED BY DC POWER FROM PV MODULES. MAKE SURE YOU DISCONNECT THE DC CONNECTIONS AND RECONNECT DC POWER TO WATCH FOR THE TWO SECONDS LED ON AND TWO SECONDS LED OFF AFTER DC IS APPLIED. WARNING: ALWAYS DISCONNECT AC POWER BEFORE DISCONNECTING PV MODULE WIRES FROM MICROINVERTER. THE AC CONNEC-TOR OF THE FIRST MICROINVERTER IN A BRANCH CIRCUIT IS SUITABLE AS A DISCONNECTING MEANS ONCE THE AC BRANCH CIRCUIT BREAKER IN THE LOADCENTER HAS BEEN OPENED.

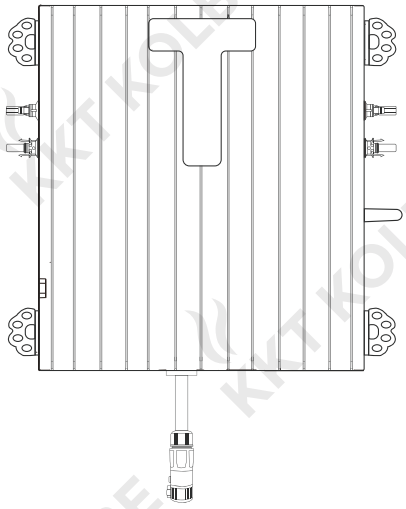
Specifications

Model	SOLAR600-8002T	SOLAR8002T
PV Input Data		
Number of MPPT Trackers	2	
Suggested Modules Range	300W~400W*2	350W~450W*2
Max. Input DC Voltage	60V	
MPPT Operating Voltage Range	25~50V	
Startup Voltage	20V	
Overvoltage Class DC Port	II	
DC Port Backfeed Current	0 A	
Max. Input Current	2 × 18 A	
PV Array Requirement	2x1 Ungrounded array; No Additional PV side protection required	
AC Output Data		
Peak Output Power	1800W	2400W
Max. Continuous Output Power	600W	800W
Max. Continuous Output Current	2.6A	3.5A
Nominal Output Voltage	230Vac	
Nominal Frequency/Range	50HZ	
Extended Frequency/Range	45~55Hz / 55~65Hz	
AC Short Circuit Current	7.5A	
Max. Units Per Branch Circuit	5	
Overvoltage Class AC Port	III	
Power Factor(Adjustable)	>0.99 Default, 0.8 Leading...0.8 Lagging...	
Level of Harmonics Distortion	<3%	
AC Protection Required	AC Output Side Need 63A Circuit Breaker(on grid mode)	
Efficiency		
CEC Weighted Efficiency	95%	
Peak Inverter Efficiency	95.50%	
Static MPPT Efficiency	99%	
Night Time Power Consumption	＜ 50mW	
Mechanical Data		
Operating Ambient Temperature Range	-40 °C to +65 °C(-40 °F to +149 ° F)	
Storage Ambinet Temperature	-40 °C to +85 °C(-40 °F to +185° F)	
Relative Humidity Range	4% to 100% (condensing)	
Connector Type: DC	MC4	
Dimensions(W*H*D)	218*245*42mm	
Weight	4.2KG	
Cooling	Natural Convection-No Fans	
Approved for Wet Locations	Yes	
Enclosure Rating	IP67	
AC Cable Length(Customizable)	5m	
Features		
Communication	WIFI	
Monitoring	Support Remote Web Page Monitoring and Mobile APP by BWN POWER Cloud	
Compliance	VDE4105, CE , EN50549...	

- Support off-grid operation and battery mode operation without mains power

Recycling and disposal

In order to comply with the regulations on recycling management of electrical and electronic wastes in various countries, electrical equipments that have reached its lifetime must be collected separately to the unit or individual that has obtained the qualification for disposing discarded electrical and electronic products. For any equipment that you no longer use, please return it to your dealer for recycling, or send it to an approved recycling unit in your area for recycling.



KKT KOLBE

Vielen Dank fürs Lesen.

Wir wünschen Ihnen viel Freude
mit Ihrem Gerät.

Thank you for reading.

We wish you much pleasure
with your device.

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