Qoltec®

Model: 51913, 51914, 51915

INSTRUCTION MANUAL

3-in-1 DC-AC converter

Inverter | AC battery charger | MPPT solar charger

EN

INTRODUCTION

Thank you for your trust and for choosing the Monolith by Qoltec Pure Sine Wave inverter. We are confident that the product will meet your expectations. This manual contains instructions for the installation and use of the product, including important safety instructions for proper operation and installation. If you have any questions after reading this manual, please contact our Customer Service Department.

ABOUT THE PRODUCT

Fully digitally controlled by an advanced processor, the pure sine wave inverter is equipped with an AC charger and a solar charger. The unit can also operate in UPS and energy-saving mode and can draw power from a solar panel, thus providing uninterrupted power (UPS mode). In addition, it offers a user-controlled energy-saving mode (ECO mode). This multifunctional system has been designed with the environment in mind. The unit will automatically detect the input sources (whether mains power or solar panels) and then adjust the internal settings. Users can also configure the UPS and (ECO) mode themselves based on their individual needs, location and environmental conditions.

PRODUCT FEATURES

- UPS or energy-saving (ECO) mode selectable
- Pure sine wave output (THD<4%)
- High efficiency of up to 90%
- LED indication of operating status
- Full digital control
- Solar charging current max. 20 A
- AC battery charging current max. 20 A
- Fast transfer time 16 ms
- 3-stage charge control
- MPPT solar charger

SAFETY INSTRUCTIONS

1. Risk of electric shock and energy hazard. Any fault should be checked by a qualified service technician.
2. Do not remove the inverter housing yourself.
3. When the AC input of the inverter is connected to the power supply, the AC output of the inverter will be supplied with AC power, even if the power switch on the front panel is in the OFF position.
4. It is recommended that the unit be mounted in a horizontal position.
5. Do not install the inverter in areas of high humidity or near water.
6. Do not mount the inverter in areas with high ambient temperatures or exposed to direct sunlight.
7. Only connect batteries of the same brand and model number in one battery pack, the use of batteries from different manufacturers or with different capacity is strictly prohibited!
8. Never allow sparks or flames in the vicinity of batteries, as they can generate explosive gases during normal operation.
9. Ensure that the airflow from the fan is not blocked on either side (front and rear) of the inverter (leave at least 15 cm of clearance).

NOTE : Batteries undergo a process of wear and tear after many years of use. Regular maintenance of the battery is recommended (e.g. every year). After this time, the batteries should be serviced by a qualified technician, otherwise damaged batteries may cause fire or other safety hazards.

TECHNICAL SPECIFICATIONS

Model		**51913**	**51914**	**51915**
Inverter	Rated power	1000W	2000W	3000W
	Peak power	2000W	4000W	6000W
	DC input voltage	12V		
	AC output voltage	230V		
	Wave shape	Pure sine wave inverter (THD<4%)		
	AC regulation	10%		
	Battery voltage	12V		
	Idle current	0.56A	0.7A	1.1A
	Output frequency	50/60Hz		
	Performance	87%		
	Transfer time	<16s		
AC charger	Charging current	20A max		
	Output voltage	12V		
MPPT solar charger	Charging performance with MPPT	97%		
	Input voltage	70V max		
	Output voltage	12V		
	Solar charging current	Max 20A		
USB		5V 2.1A		

Security	LVP, OVP, OLP, OTP, battery reverse polarity protection, short circuit protection, OCP, ODP

CONSTRUCTION OF THE DEVICE

1) Rear panel ***(Illustration 1)***

A. Power on/off switch: switch the inverter on and off
B. AC output socket: to meet the demand for applications in different geographical areas around the world, there are a number of optional AC sockets to choose from
C. Power/AC socket
D. Solar panel input connector (MC4 connector)
E. Fuse switch: in 'bypass mode', when the AC output is short-circuited or the load current exceeds the rated current of the fuse switch, the fuse switch will blow to stop energy being bypassed from the network, posing a potential hazard.
F. Ventilation openings: the inverter requires adequate ventilation for proper operation.
G. Structure grounding (FG)
H. LED indicator: Operating status, warning
I. Communication port: for remote control purposes, the unit can be connected to a remote panel using an optional cable.
J. Ups and energy saving mode (ECO)

2) Functional designation

Inverter: The inverter has started up and its output is normal.

Error: warning to the user that a problem has occurred, the system must now be checked. e.g. low voltage, overvoltage, overload, short circuit, etc.

AC in: power supply status is normal

Bypass: the unit operates in 'bypass' mode, the AC electricity consumed by the consumers is supplied by the utility instead of the inverter.

AC charger: The built-in AC charger charges external batteries.

Solar charger: External solar panels supply power to external batteries via a built-in solar charger.

3) Front panel **(*Illustration 2*)**

A. Battery input (+), (-)
B. Fan
C. Fuse

DETAILED DESCRIPTION OF THE OPERATION OF THE DEVICE

The system is designed with energy conservation in mind and has both a UPS mode and an energy-saving mode. These two modes are user adjustable. The unit will be factory set in UPS mode. Depending on weather and usage conditions, users can manually adjust the switch to energy saving mode. Once the system is fully connected, the solar panel will start charging the battery during the day, regardless of whether the inverter switch is on or off. when the UPS model is selected, mains power will be supplied directly to the loads when the mains is available.

The main difference between UPS mode and energy-saving mode is the amount of energy saved. In UPS mode, the unit remains in Bypass mode as long as mains power is available. This saves less energy (see Figure 4.1 for the control logic of UPS mode). In energy saving mode, the priority of the input source is solar panel - battery - power. If possible, the CPU will select the external solar panels as priority to save energy. In case of insufficient solar power and battery failure, mains power will be taken as a last resort. When the battery capacity is around 11 V (12 V battery), in the meantime, in the event of solar panel and installation failure, the CPU will remind end users by sending out a warning siren until the system shuts down (**see *figure 3***).

T0-T1: When the system is switched on, the processor will automatically activate 'bypass mode', connecting the AC mains to the consumers. In the meantime, the solar charger that charges the battery will be activated. The voltage of the battery charger exceeds 11 V, so the AC charger will not operate at present.

T1-T5: When the battery voltage exceeds 11 V, the system will switch to 'inverter mode'. As the energy supplied by the solar panels is higher than that consumed by the loads, the battery voltage will increase until it is fully charged.

T5-T6: When the energy supplied by the solar panels is lower than that consumed by the loads, the battery voltage will gradually drop to 11 V. The CPU will start the AC charger to charge the battery. Solar charging stops charging, due to the night time.

T6-T9: When the voltage drops below 11 V, the CPU will restart "bypass mode", automatically connecting mains power to the load. The battery voltage will gradually increase until full capacity is reached.

T9-T10: In case of mains power failure, the CPU will switch to "inverter mode". The AC charging function will be switched off. As the AC output is based solely on battery power, the battery bank will be depleted quite quickly. When the battery voltage is around 10.5 V, the CPU will remind end users by continuously sending out a warning siren until the system shuts down the output power to represent excessive battery discharge.

T9-T10: When power is restored, the CPU will switch back to bypass mode. In the meantime, it will activate both the AC charger and the solar charger to charge the batteries simultaneously. When the battery voltage recovers to around 13 V, the AC charger will be switched off to save energy.

3-stage charging mode (*Figure 4*)

I. Constant current mode: Charging at rated current.
II. Constant voltage mode: 14.4 V/28.8 V until the current drops to 1/5 of the rated current.
III. Variable voltage: Maintains the battery at 100% charge at 13.8V/27.6V.

Installation requirements

The unit should be mounted on a flat surface or stand of adequate strength. The unit should not be used in dusty or humid environments. The unit is equipped with a built-in DC fan. Ensure that the ventilation is not blocked. We recommend that there are no obstructions within 15 cm of the ventilation openings.

Battery wiring

NOTE : Cables should be as short as possible, we recommend that they are shorter than 1.5 metres. Too small a cross-section will result in lower power output. Cables may overheat and cause a hazard.

Notes on output load

This system can power most appliances that require an AC source of rated power, however, for some specific types of load the unit may not function properly.

I. Since inductive loads or motor-based equipment require a high inrush current (5-10 times the rated current), it is necessary to ensure that the inrush current is less than the maximum current capacity of the inverter.
II. When capacitive or rectified devices (such as a switched-mode power supply) are present at the output, we suggest operating these devices with no or little load. To ensure proper operation, slightly increase the load only after the system has started up.

SECURITY

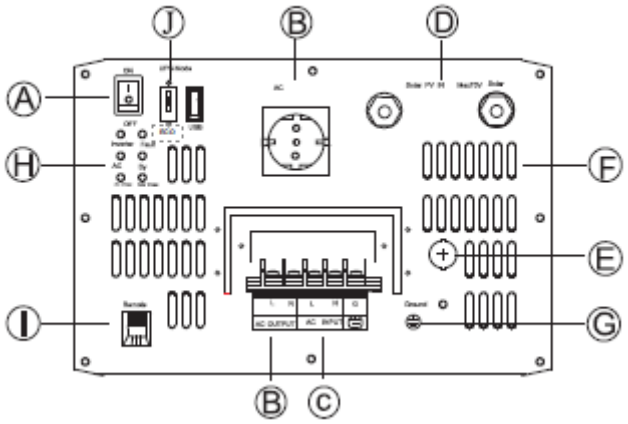
Notes on remedying failures

This system should be serviced by a professional service technician. Improper use may damage the unit or cause a risk of electric shock. If you are unable to rectify the fault, contact your distributor for repair.

ENTRANCE	**REVERSE POLARITY**	The internal fuse will blow if the

PROTECTION	**PROTECTION**	battery input is connected in reverse polarity.
	UNDER-VOLTAGE BATTERY PROTECTION	The battery voltage is lower than the set value (10+0.5 V), the inverter will automatically switch off the output. (3 beeps).
	BATTERY OVERVOLTAGE PROTECTION	If the battery voltage is too high, the inverter will automatically switch off the output (4 beeps).
SECURITY EXECUTIONS	**PROTECTION AGAINST OVERHEATING**	If the internal temperature is higher than 75 °C, the "overheat protection" is activated. The appliance will automatically switch off.
	OVERVOLTAGE PROTECTION	When the AC output voltage of the inverter is too high (16+0.5 V), the unit will switch off.
	SHORT CIRCUIT PROTECTION	If a short circuit occurs on the output side of the inverter or the load increases significantly in a short period of time, the unit will switch off.
	LOW BATTERY VOLTAGE PROTECTION	It will be activated when the battery voltage is too low (10+0.5 V). When the battery voltage returns to a safe level (12.5 V), the inverter will automatically regenerate and the user will not have to restart it.

1



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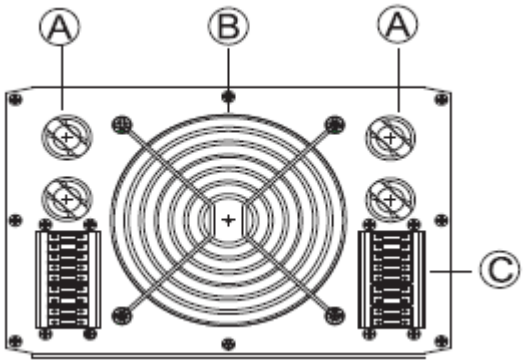

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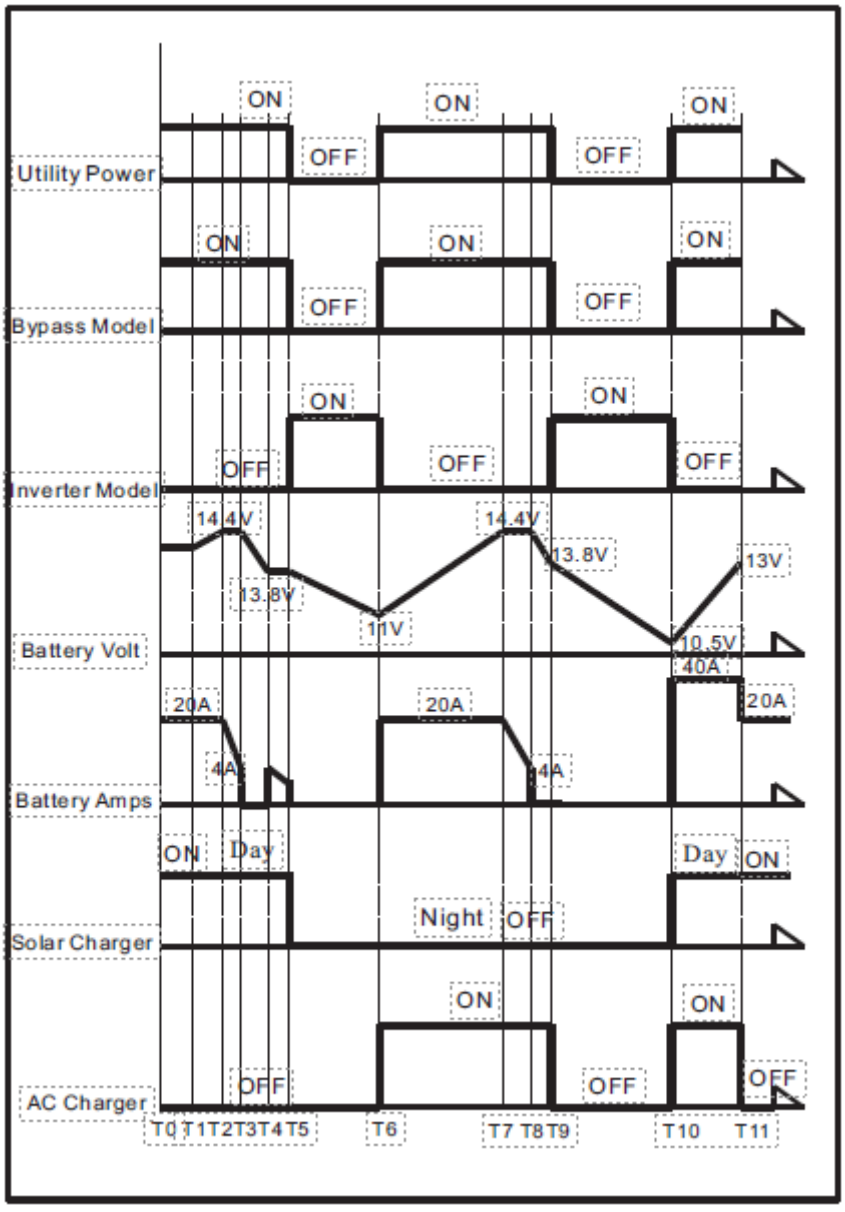
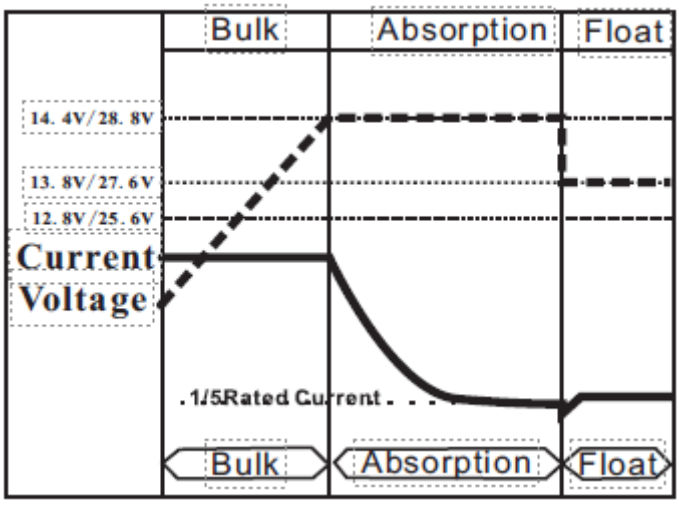

Utility Power
Bypass Model
Inverter Model
Battery Volt
Battery Amps
Solar Charger
AC Charger
ON
OFF
14.4V
13.8V
11V
13V
10.5V
20A
4A
40A
Day
Night
T0 T1 T2 T3 T4 T5
T6
T7 T8 T9
T10
T11

4


Bulk
Absorption
Float
14. 4V/28. 8V
13. 8V/27. 6V
12. 8V/25. 6V
Current
Voltage
1/5Rated Current
Bulk
Absorption
Float