User Manual

Hybrid 5KW PV Inverter

Version: 1.0

Table Of Contents

1. Introduction

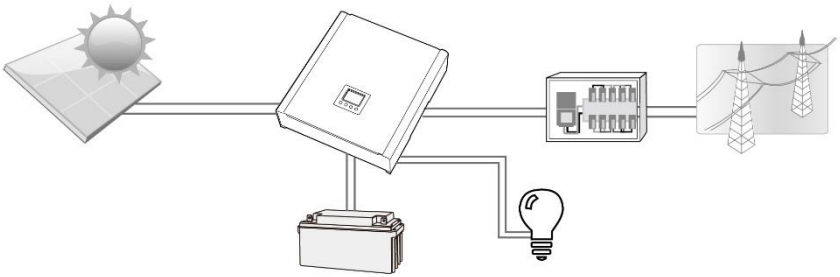

Figure 1 Basic hybrid PV System Overview

CAUTION!

CAUTION!

CAUTION!

CAUTION!

CAUTION!

Before working on this circuit
Risk of Voltage Backfeed

Symbols used in Equipment Markings

3. Unpacking & Overview

3-1. Packing List

3-2. Product Overview

4. Installation

4-1. Selecting Mounting Location

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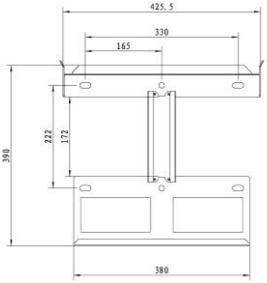
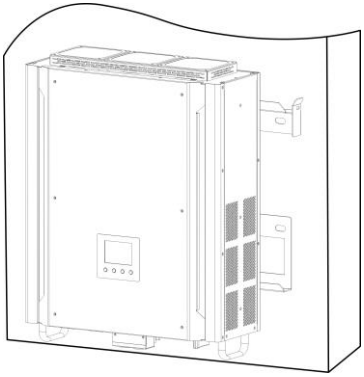
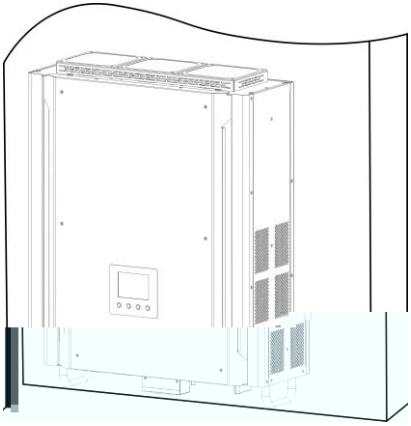
4-2. Mounting Unit

WARNING!!

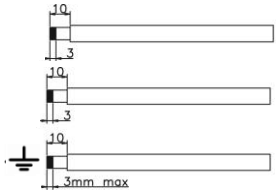
WARNING!!


425.5
330
165
390
222
172
380

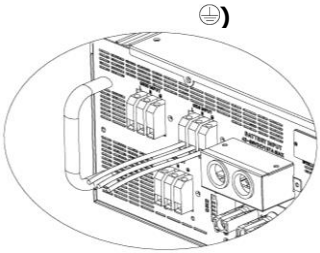




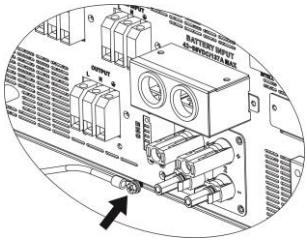
5-3. Connecting to the Generator



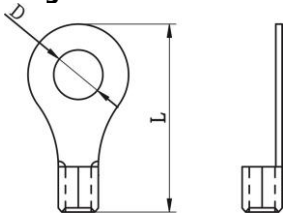
L→LINE (brown or black)
⏚→Ground (yellow-green)
N→Neutral (blue)



Note:



Ring terminal:



Recommended wire and terminal size:

Wire Size	Ring Terminal			Torque value
	Cable mm^2	Dimensions		
		D (mm)	L (mm)	

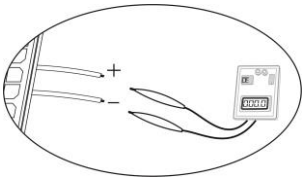
CAUTION:

6. PV Module (DC) Connection

CAUTION: **separately**

NOTE1:
NOTE2:

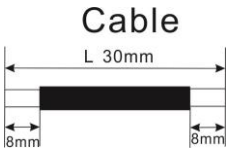
WARNING: **CAUTION:**

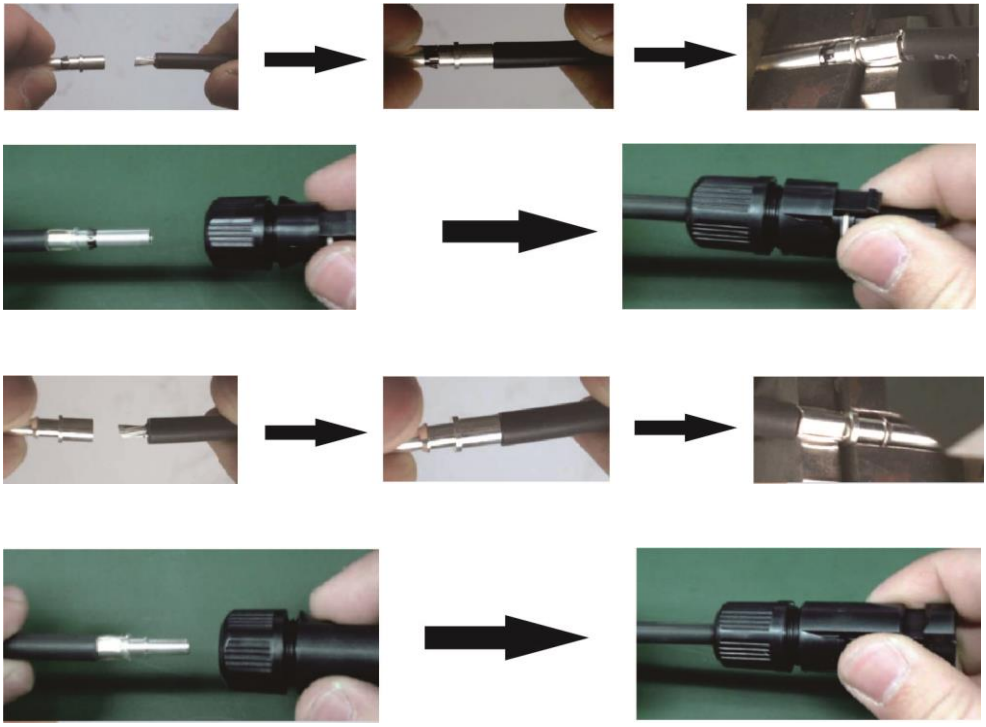


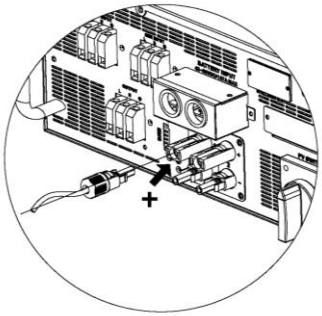
CAUTION:

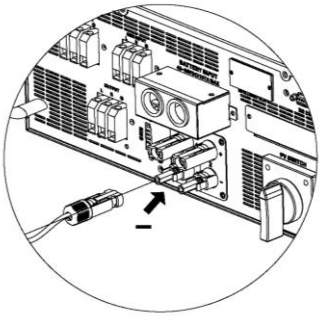
Components for PV connectors and Tools:

Cable preparation and connector assembly process:









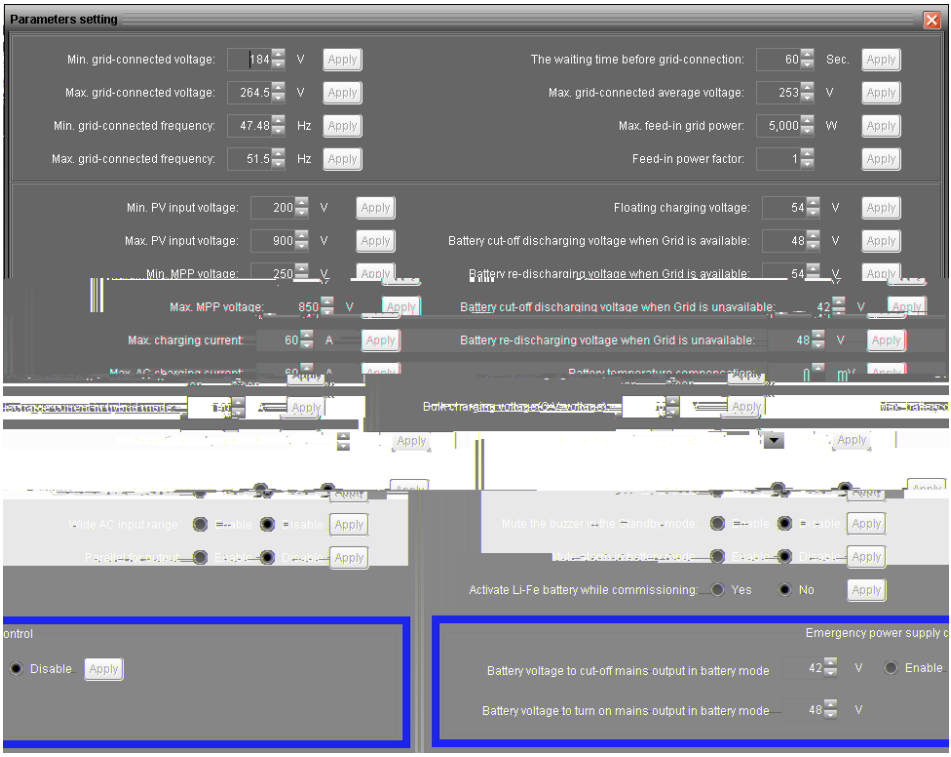
WARNING!

CAUTION: Never

CAUTION:

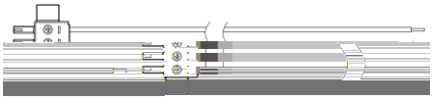
Recommended Panel Configuration

Solar Panel Spec. (reference)	SOLAR INPUT 1	SOLAR INPUT 2	Q'ty of panels	Total Input Power
	(Min in serial: 11pcs; Max. in serial: 18pcs)			


Parameters setting
Min. grid-connected voltage: 184 V Apply
Max. grid-connected voltage: 264.5 V Apply
Min. grid-connected frequency: 47.48 Hz Apply
Max. grid-connected frequency: 51.5 Hz Apply
The waiting time before grid-connection: 60 Sec. Apply
Max. grid-connected average voltage: 253 V Apply
Max. feed-in grid power: 5,000 W Apply
Feed-in power factor: 1 Apply
Min. PV input voltage: 200 V Apply
Max. PV input voltage: 900 V Apply
Min. MPP voltage: 250 V Apply
Max. MPP voltage: 850 V Apply
Max. charging current: 60 A Apply
Floating charging voltage: 54 V Apply
Battery cut-off discharging voltage when Grid is available: 48 V Apply
Battery re-discharging voltage when Grid is available: 54 V Apply
Battery cut-off discharging voltage when Grid is unavailable: 42 V Apply
Battery re-discharging voltage when Grid is unavailable: 48 V Apply
Activate Li-Fe battery while commissioning: Yes No Apply
Disable Apply
Battery voltage to cut-off mains output in battery mode 42 V Enable
Battery voltage to turn on mains output in battery mode 48 V

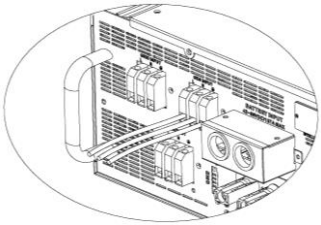
9. EMS Connection

9-1 Interface Configuration

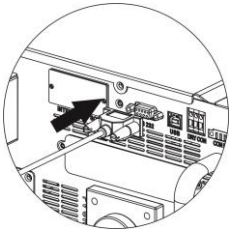
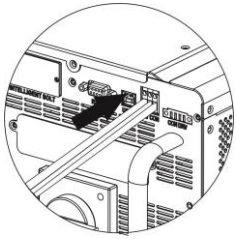
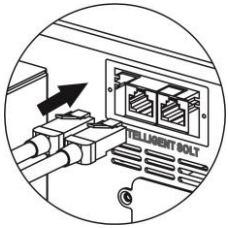


9-2. Function Description

10. Generator connection



12. Communication

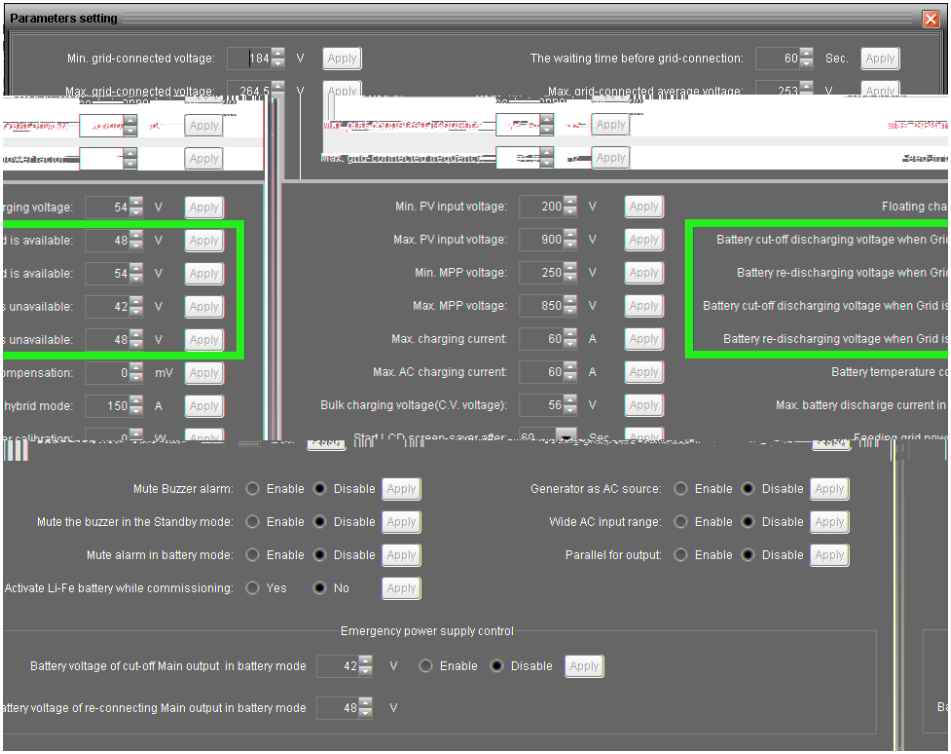
	
	

13. Dry Contact Signal

12-1. Electric Parameter

Note:

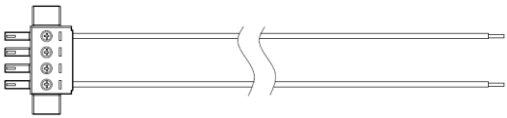
12-2. Function Description

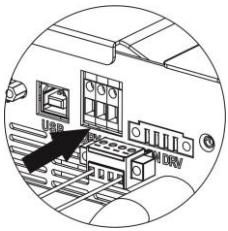

Parameters setting
Min. grid-connected voltage:
184
V
Apply
The waiting time before grid-connection:
60
Sec.
Apply
Max. grid-connected voltage:
264.5
V
Apply
Max. grid-connected average voltage:
253
V
Apply
Min. PV input voltage:
200
V
Apply
Max. PV input voltage:
900
V
Apply
Min. MPP voltage:
250
V
Apply
Max. MPP voltage:
850
V
Apply
Max. charging current:
60
A
Apply
Max. AC charging current:
60
A
Apply
Bulk charging voltage(C.V. voltage):
56
V
Apply
Battery cut-off discharging voltage when Grid
Battery re-discharging voltage when Grid
Battery cut-off discharging voltage when Grid is
Battery re-discharging voltage when Grid is
Battery temperature co
Max. battery discharge current in
Mute Buzzer alarm:
Enable
Disable
Apply
Mute the buzzer in the Standby mode:
Enable
Disable
Apply
Mute alarm in battery mode:
Enable
Disable
Apply
Activate Li-Fe battery while commissioning:
Yes
No
Apply
Generator as AC source:
Enable
Disable
Apply
Wide AC input range:
Enable
Disable
Apply
Parallel for output:
Enable
Disable
Apply
Emergency power supply control
Battery voltage of cut-off Main output in battery mode
42
V
Enable
Disable
Apply
48
V

14. Relay Control Port

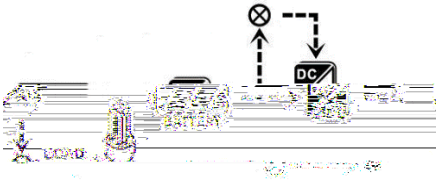
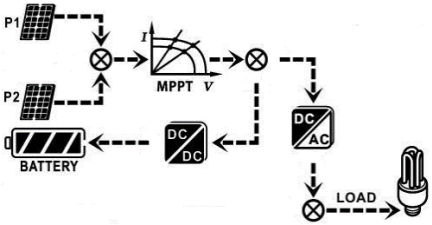
Grid-tie with backup II

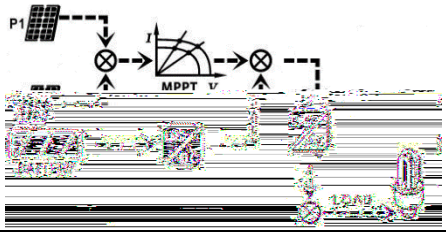
13-1. Interface Configuration



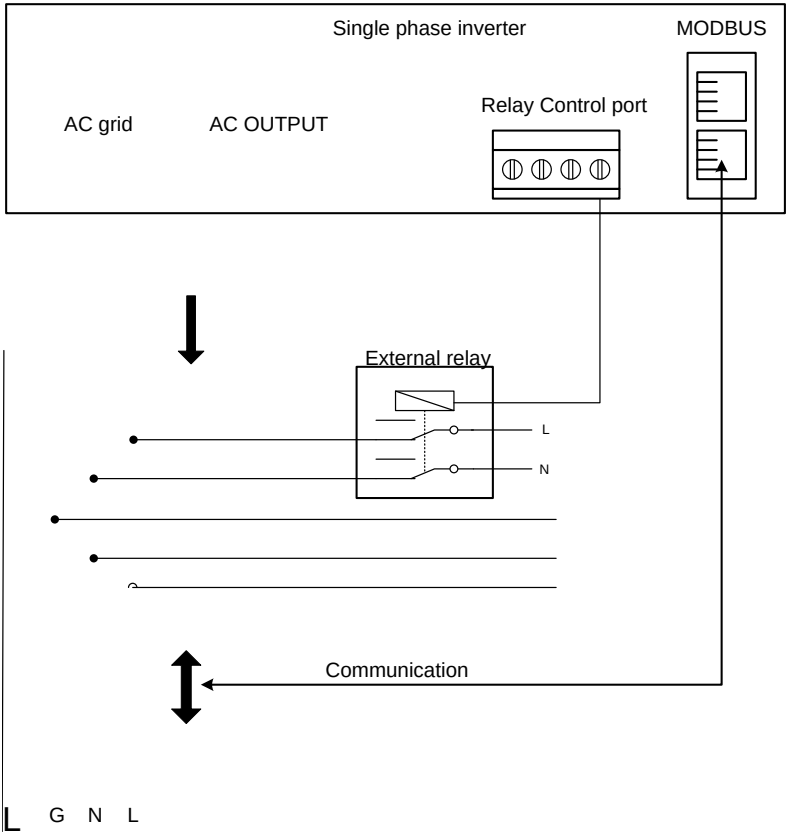


13-2. Function Description

	Condition 1:  **Condition 2:** 	

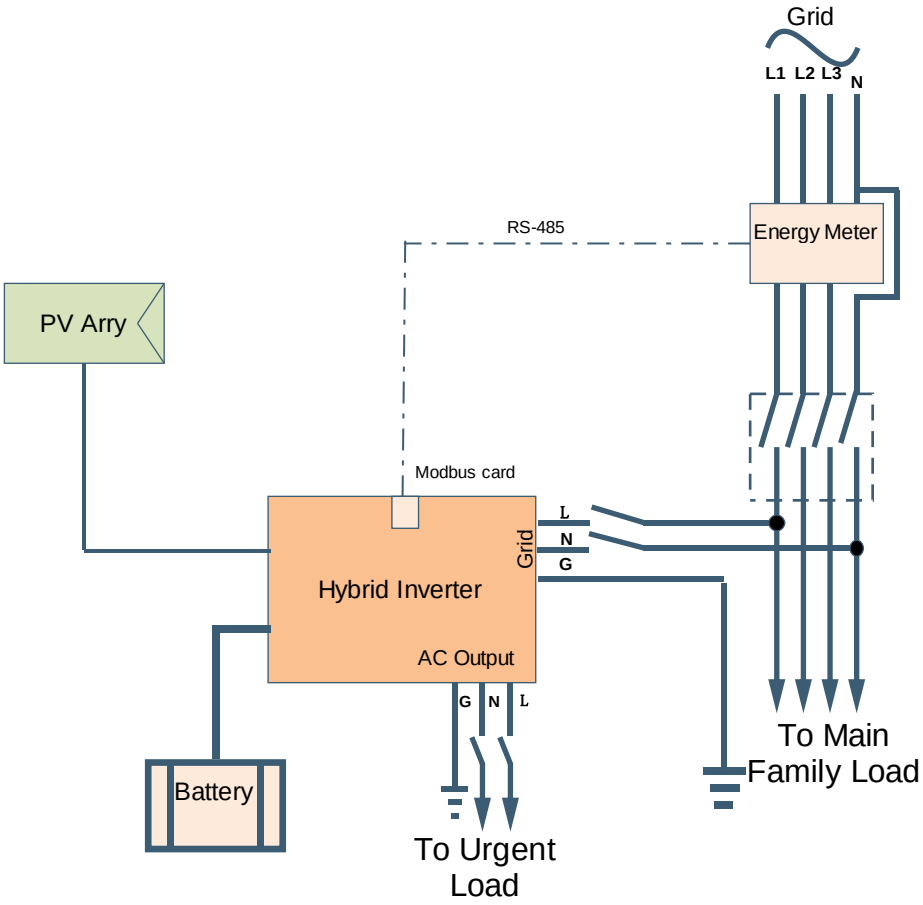
	Condition 3:  	

13-3. Application



15. Application with Energy Meter

Note: **Grid-Tie with Backup II**



16. Commissioning

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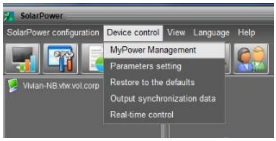
NOTE:

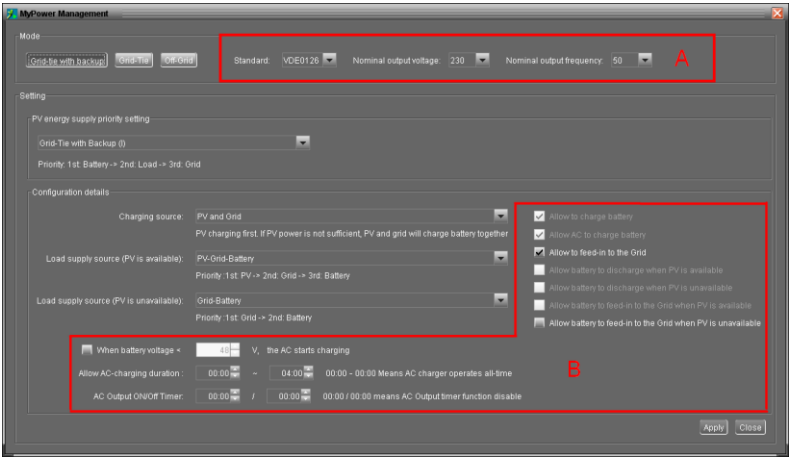
17. Initial Setup

Step 1:

Step 2:

Step 3:





Mode

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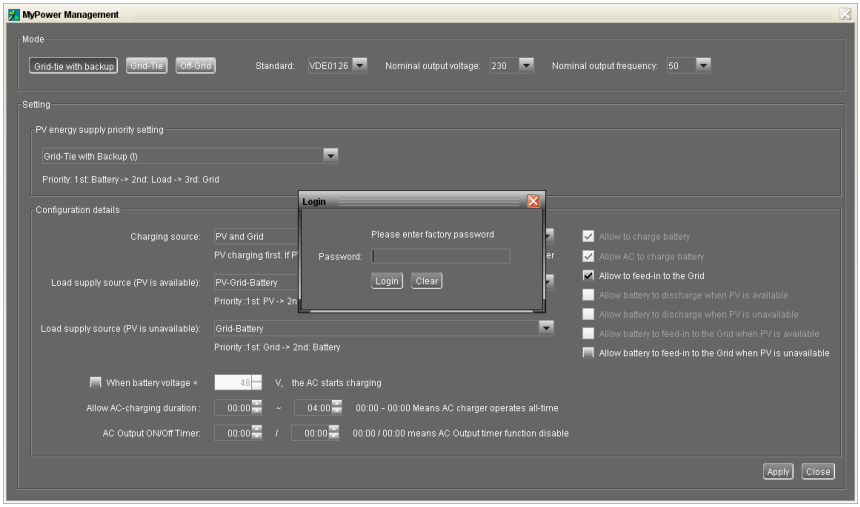
SECTION A:

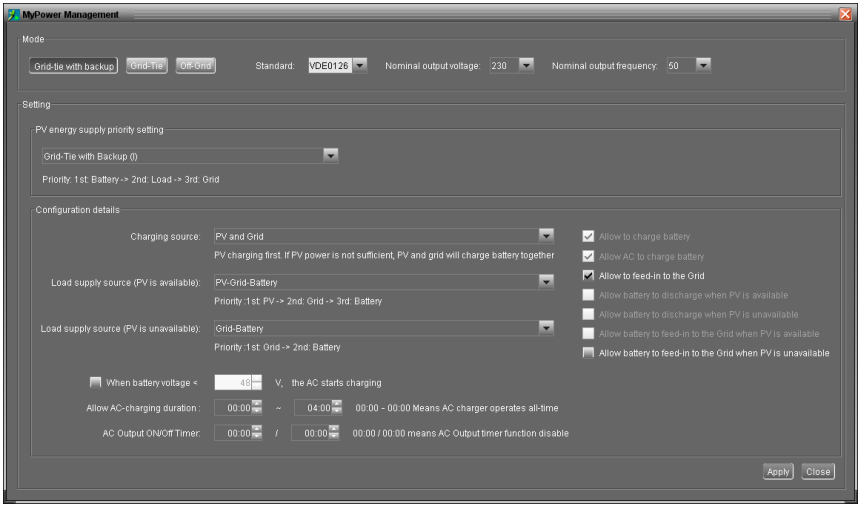
CAUTION:



SECTION B:

Grid-tie with backup

●



NOTE:

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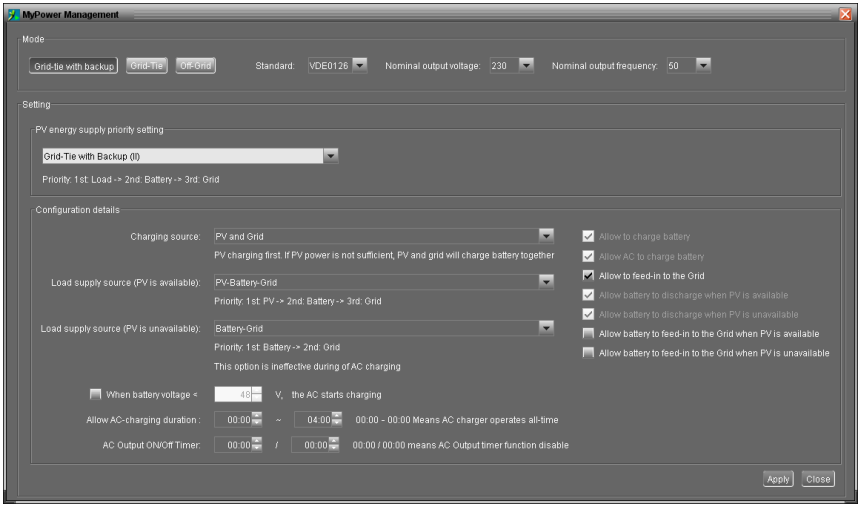
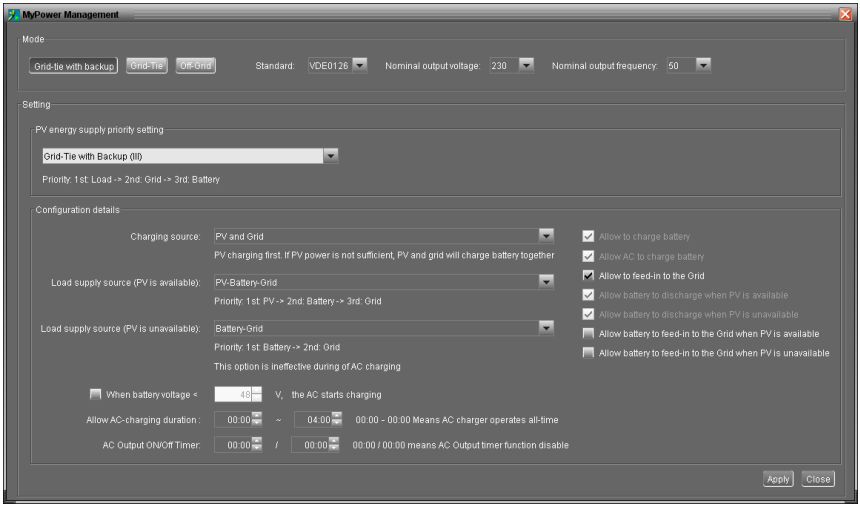

MyPower Management
Mode
Grid-tie with backup
Grid-Tie
Off-Grid
Standard:
VDE0126
Nominal output voltage:
230
Nominal output frequency:
50
Setting
PV energy supply priority setting
Grid-Tie with Backup (II)
Priority: 1st: Load -> 2nd: Battery -> 3rd: Grid
Configuration details
Charging source:
PV and Grid
PV charging first. If PV power is not sufficient, PV and grid will charge battery together
Load supply source (PV is available):
PV-Battery-Grid
Priority: 1st: PV -> 2nd: Battery -> 3rd: Grid
Load supply source (PV is unavailable):
Battery-Grid
Priority: 1st: Battery -> 2nd: Grid
This option is ineffective during of AC charging
When battery voltage <
48
V, the AC starts charging
Allow AC-charging duration :
00:00
~
04:00
00:00 ~ 00:00 Means AC charger operates all-time
AC Output ON/Off Timer:
00:00
/
00:00
00:00 / 00:00 means AC Output timer function disable
Allow to charge battery
Allow AC to charge battery
Allow to feed-in to the Grid
Allow battery to discharge when PV is available
Allow battery to discharge when PV is unavailable
Allow battery to feed-in to the Grid when PV is available
Allow battery to feed-in to the Grid when PV is unavailable
Apply
Close

NOTE:

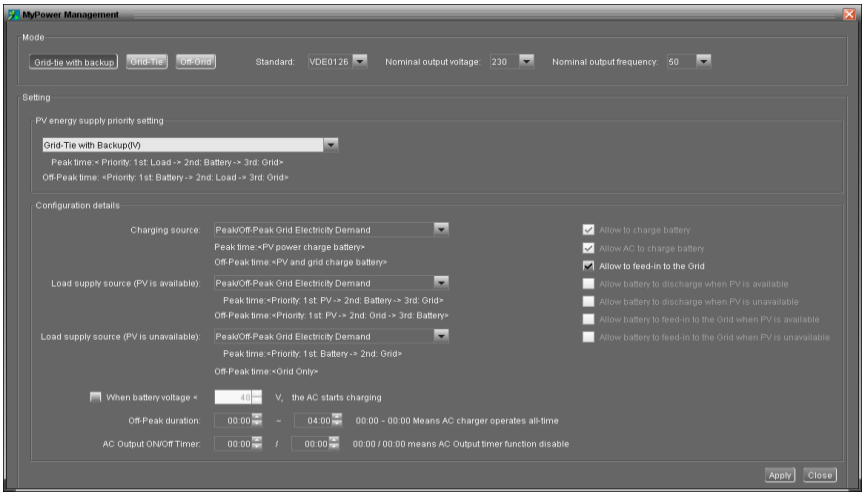
●


MyPower Management
Mode
Grid-tie with backup
Grid-Tie
Off-Grid
Standard:
VDE0126
Nominal output voltage:
230
Nominal output frequency:
50
Setting
PV energy supply priority setting
Grid-Tie with Backup (III)
Priority: 1st: Load -> 2nd: Grid -> 3rd: Battery
Configuration details
Charging source:
PV and Grid
PV charging first. If PV power is not sufficient, PV and grid will charge battery together
Load supply source (PV is available):
PV-Battery-Grid
Priority: 1st: PV -> 2nd: Battery -> 3rd: Grid
Load supply source (PV is unavailable):
Battery-Grid
Priority: 1st: Battery -> 2nd: Grid
This option is ineffective during of AC charging
When battery voltage <
43
V, the AC starts charging
Allow AC-charging duration :
00:00
~
04:00
00:00 - 00:00 Means AC charger operates all-time
AC Output ON/Off Timer:
00:00
/
00:00
00:00 / 00:00 means AC Output timer function disable
Allow to charge battery
Allow AC to charge battery
Allow to feed-in to the Grid
Allow battery to discharge when PV is available
Allow battery to discharge when PV is unavailable
Allow battery to feed-in to the Grid when PV is available
Allow battery to feed-in to the Grid when PV is unavailable
Apply
Close

NOTE:

NOTE:

●

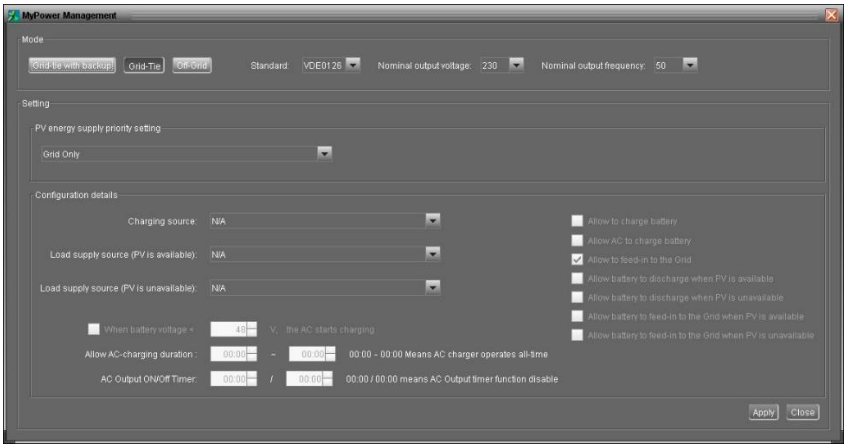


Working logic under peak time:

Working logic under off-peak time:

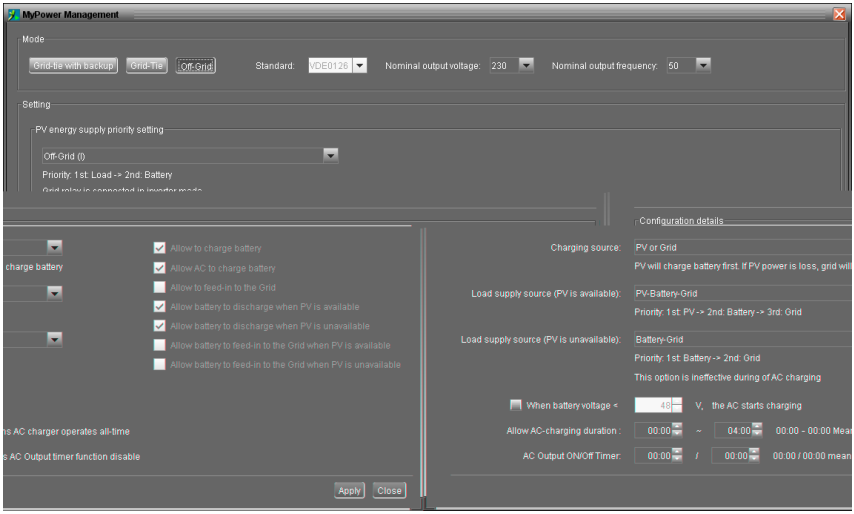
NOTE:

Grid-Tie


MyPower Management
Mode
Grid-tie with backup
Grid-Tie
Off-Grid
Standard:
VDE0126
Nominal output voltage:
230
Nominal output frequency:
50
Setting
PV energy supply priority setting
Grid Only
Configuration details
Charging source:
N/A
Load supply source (PV is available):
N/A
Load supply source (PV is unavailable):
N/A
When battery voltage <
48
V, the AC starts charging
Allow AC-charging duration :
00:00
~
00:00
00:00 - 00:00 Means AC charger operates all-time
AC Output ON/Off Timer:
00:00
/
00:00
00:00 / 00:00 means AC Output timer function disable
Allow to charge battery
Allow AC to charge battery
Allow to feed-in to the Grid
Allow battery to discharge when PV is available
Allow battery to discharge when PV is unavailable
Allow battery to feed-in to the Grid when PV is available
Allow battery to feed-in to the Grid when PV is unavailable
Apply
Close

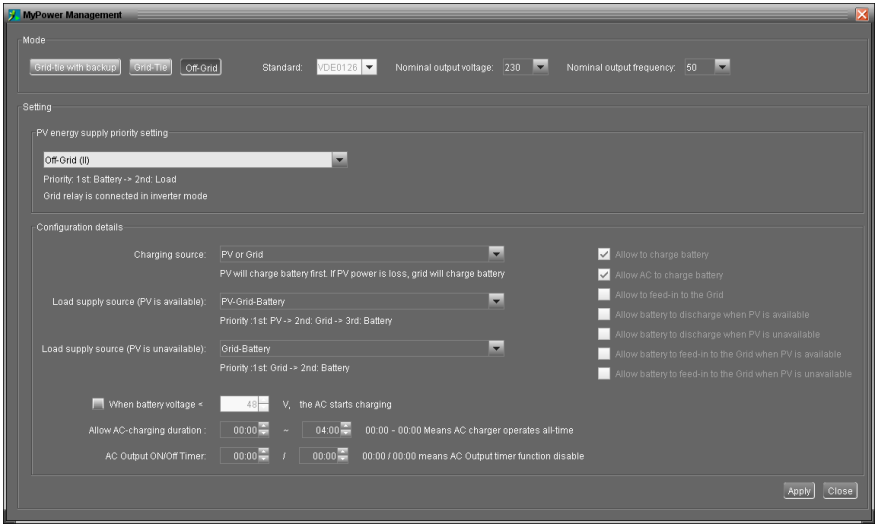
Off-Grid

●


MyPower Management
Mode
Grid-tie with backup
Grid-Tie
Off-Grid
Standard:
VDE0126
Nominal output voltage:
230
Nominal output frequency:
50
Setting
PV energy supply priority setting
Off-Grid (I)
Priority: 1st: Load -> 2nd: Battery
Allow to charge battery
Allow AC to charge battery
Allow to feed-in to the Grid
Allow battery to discharge when PV is available
Allow battery to discharge when PV is unavailable
Allow battery to feed-in to the Grid when PV is available
Allow battery to feed-in to the Grid when PV is unavailable
s AC charger operates all-time
s AC Output timer function disable
Apply
Close
Configuration details
Charging source:
PV or Grid
PV will charge battery first. If PV power is loss, grid will
Load supply source (PV is available):
PV-Battery-Grid
Priority: 1st: PV -> 2nd: Battery -> 3rd: Grid
Load supply source (PV is unavailable):
Battery-Grid
Priority: 1st: Battery -> 2nd: Grid
This option is ineffective during of AC charging
When battery voltage <
48
V, the AC starts charging
Allow AC-charging duration :
00:00
~
04:00
00:00 - 00:00 Mea
AC Output ON/Off Timer:
00:00
/
00:00
00:00 / 00:00 mean

NOTE:

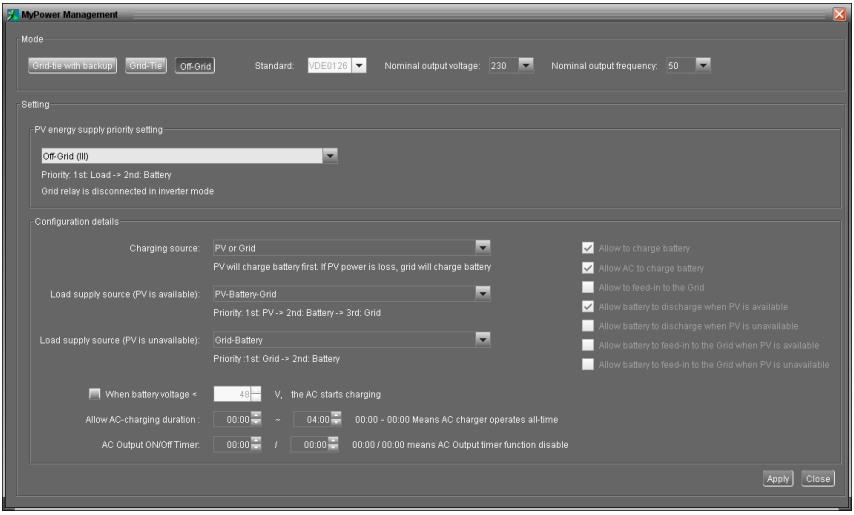
●


MyPower Management
Mode
Grid-tie with backup
Grid-Tie
Off-Grid
Standard:
VDE0126
Nominal output voltage:
230
Nominal output frequency:
50
Setting
PV energy supply priority setting
Off-Grid (II)
Priority: 1st: Battery -> 2nd: Load
Grid relay is connected in inverter mode
Configuration details
Charging source:
PV or Grid
PV will charge battery first. If PV power is loss, grid will charge battery
Load supply source (PV is available):
PV-Grid-Battery
Priority :1st: PV -> 2nd: Grid -> 3rd: Battery
Load supply source (PV is unavailable):
Grid-Battery
Priority :1st: Grid -> 2nd: Battery
Allow to charge battery
Allow AC to charge battery
Allow to feed-in to the Grid
Allow battery to discharge when PV is available
Allow battery to discharge when PV is unavailable
Allow battery to feed-in to the Grid when PV is available
Allow battery to feed-in to the Grid when PV is unavailable
When battery voltage <
48
V, the AC starts charging
Allow AC-charging duration :
00:00
~
04:00
00:00 - 00:00 Means AC charger operates all-time
AC Output ON/Off Timer:
00:00
/
00:00
00:00 / 00:00 means AC Output timer function disable
Apply
Close

NOTE:

NOTE:

●


MyPower Management
Mode
Grid-tie with backup
Grid-Tie
Off-Grid
Standard:
VDE0126
Nominal output voltage:
230
Nominal output frequency:
50
Setting
PV energy supply priority setting
Off-Grid (III)
Priority: 1st: Load -> 2nd: Battery
Grid relay is disconnected in inverter mode
Configuration details
Charging source:
PV or Grid
PV will charge battery first. If PV power is loss, grid will charge battery
Load supply source (PV is available):
PV-Battery-Grid
Priority: 1st: PV -> 2nd: Battery -> 3rd: Grid
Load supply source (PV is unavailable):
Grid-Battery
Priority :1st: Grid -> 2nd: Battery
When battery voltage <
40
V, the AC starts charging
Allow AC-charging duration :
00:00
~
04:00
00:00 ~ 00:00 Means AC charger operates all-time
AC Output ON/Off Timer:
00:00
/
00:00
00:00 / 00:00 means AC Output timer function disable
Allow to charge battery
Allow AC to charge battery
Allow to feed-in to the Grid
Allow battery to discharge when PV is available
Allow battery to discharge when PV is unavailable
Allow battery to feed-in to the Grid when PV is available
Allow battery to feed-in to the Grid when PV is unavailable
Apply
Close

NOTE:

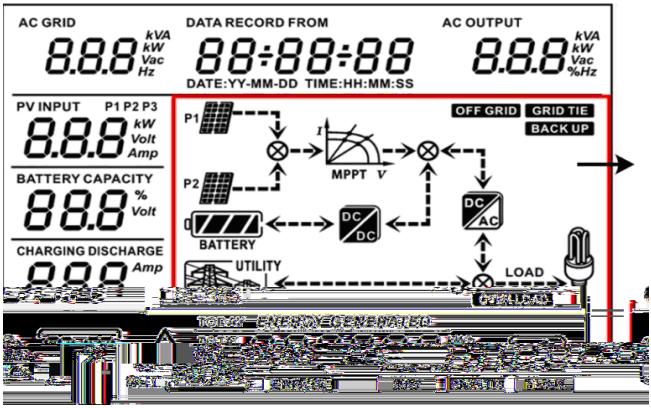
NOTE:

18. Operation

17-1. Interface

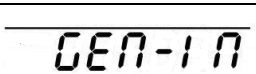
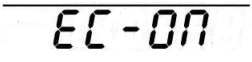
NOTICE:

17-2. LCD Information Define



Real-time operation status

Display	Function
AC GRID 888 Vac Hz	
AC OUTPUT 888 kVA kW Vac %Hz	
PV INPUT P1 P2 888 kW Volt	
BATTERY CAPACITY 88.8 % Volt	
CHARGING DISCHARGE 88.8 Amp	
⚠	

ERROR	
OVER LOAD	
	
	

17-3. Button Definition

NOTE:

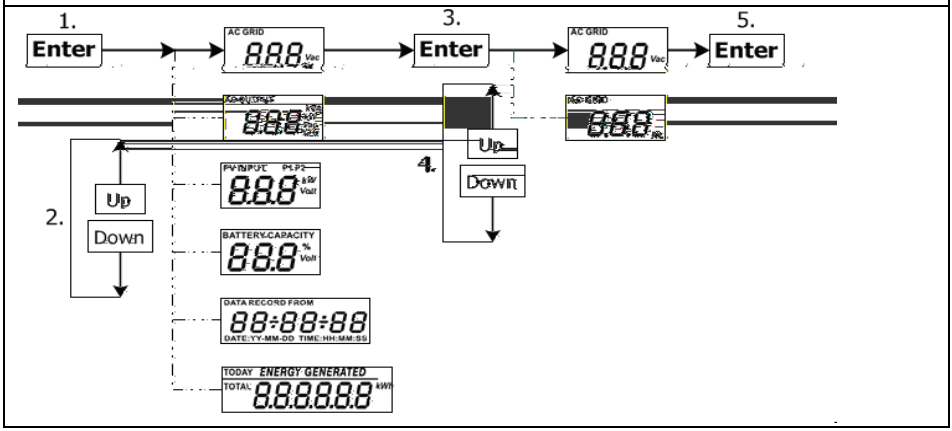
17-4. Query Menu Operation

-
-
-
-
-
-
-

Setting Display Procedure

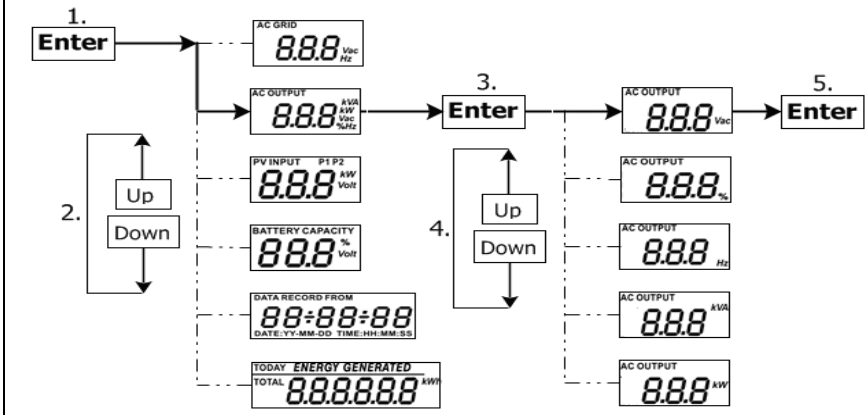
- **Input voltage or frequency of AC input**

Procedure



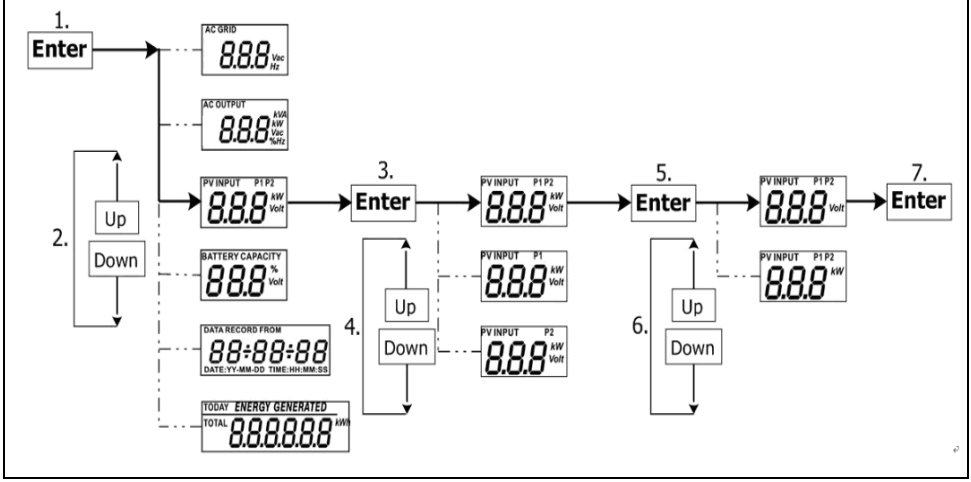
- **Frequency, voltage, power or percentage of AC output**

Procedure



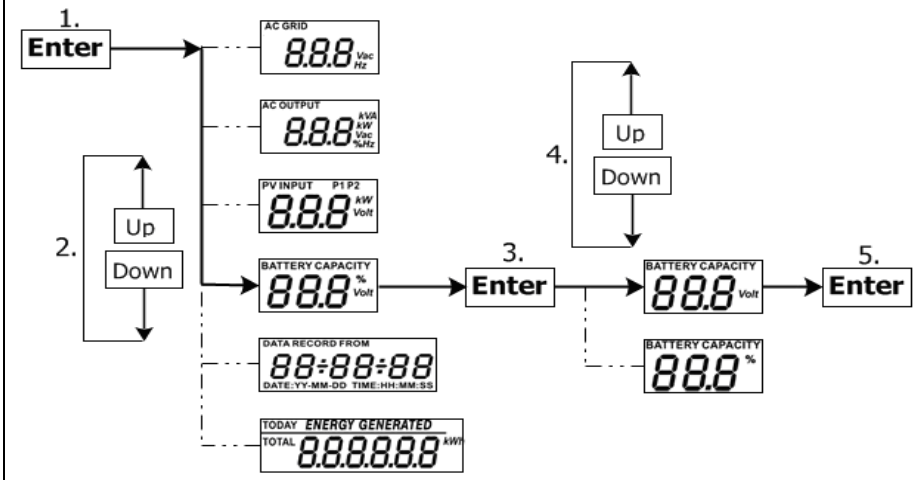
- **Input voltage or power of PV input.**

Procedure



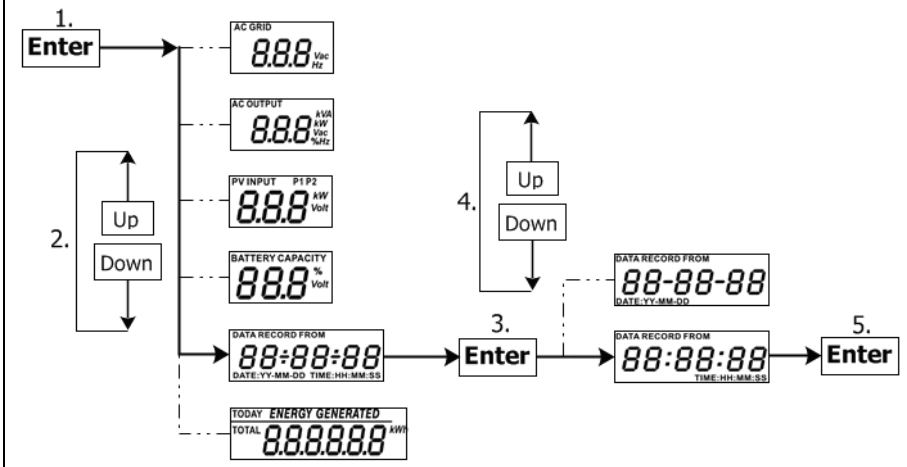
- **Battery voltage or percentage.**

Procedure



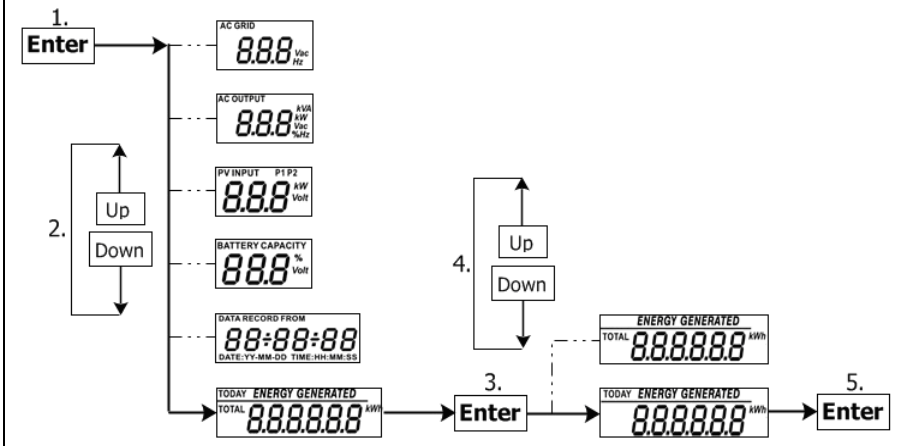
- **Date and time.**

Procedure



- **Today or total energy generated.**

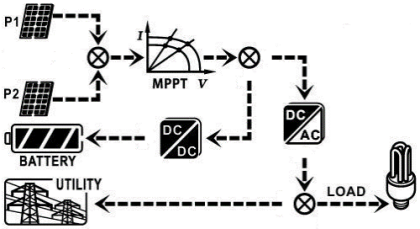
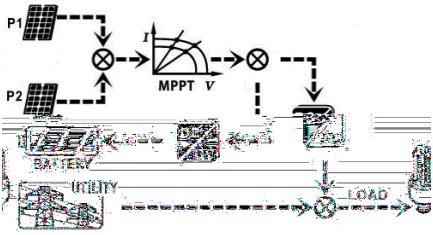
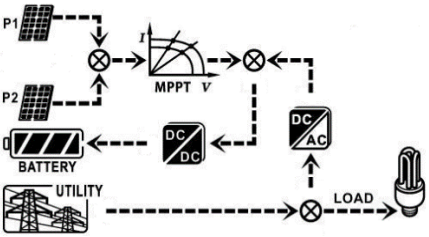
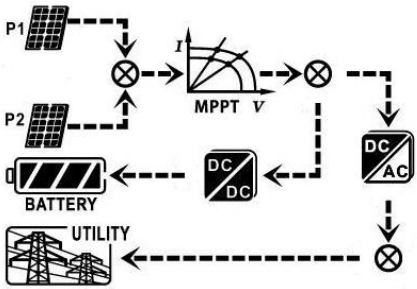
Procedure

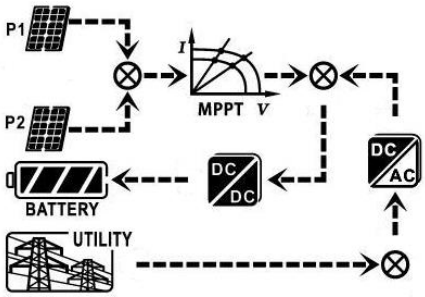
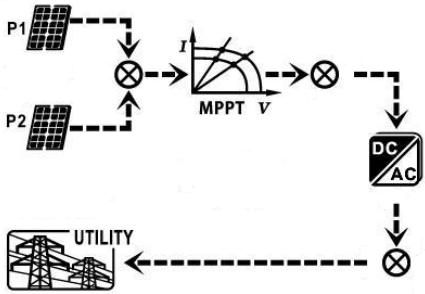
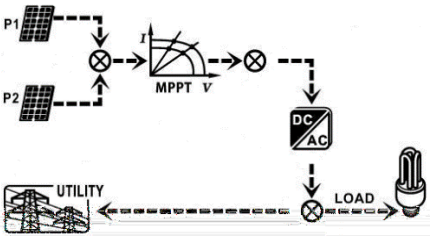
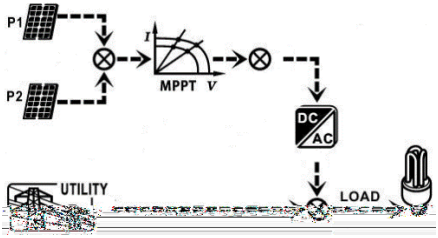


17-5. Operation Mode & Display

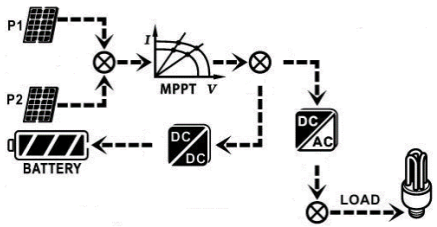
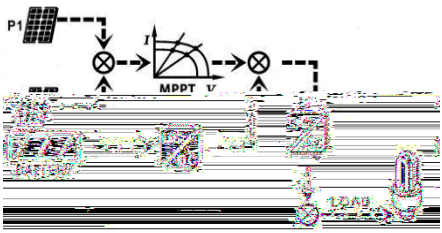
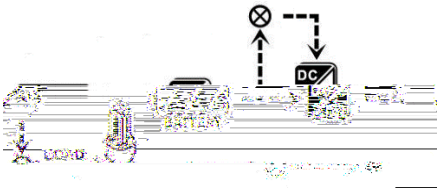
grid-tie with backup mode (I)

Inverter mode with grid connected

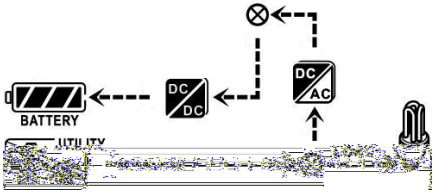
LCD Display	Description
	
	
	
	

 P1 P2 I MPPT V DC/DC DC/AC BATTERY UTILITY	
 P1 P2 I MPPT V DC/AC UTILITY	
 P1 P2 I MPPT V DC/AC UTILITY LOAD	
 P1 P2 I MPPT V DC/AC UTILITY LOAD	

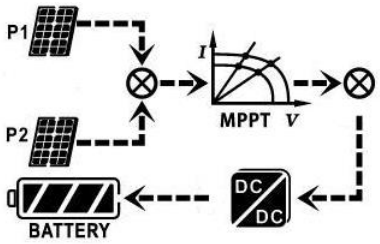
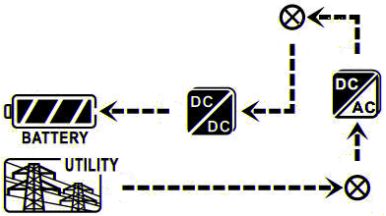
Inverter mode without grid connected

LCD Display	Description
	
	
	

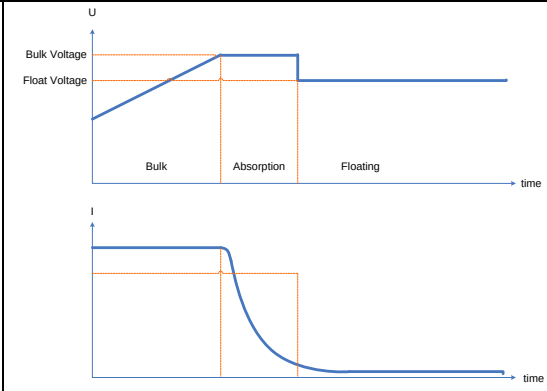
Bypass mode

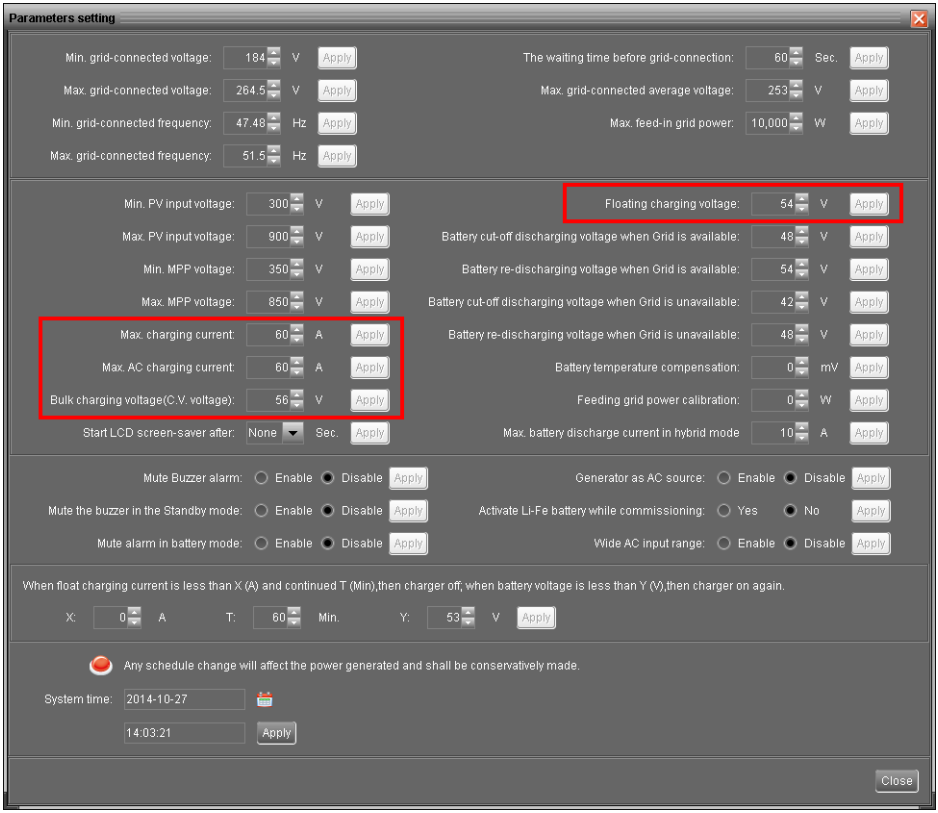
LCD Display	Description
	

Standby mode :

LCD Display	Description
	
	

19. Charging Management


Parameters setting
Min. grid-connected voltage: 184 V Apply
Max. grid-connected voltage: 264.5 V Apply
Min. grid-connected frequency: 47.48 Hz Apply
Max. grid-connected frequency: 51.5 Hz Apply
The waiting time before grid-connection: 60 Sec. Apply
Max. grid-connected average voltage: 253 V Apply
Max. feed-in grid power: 10,000 W Apply
Min. PV input voltage: 300 V Apply
Max. PV input voltage: 900 V Apply
Min. MPP voltage: 350 V Apply
Max. MPP voltage: 850 V Apply
Max. charging current: 60 A Apply
Max. AC charging current: 60 A Apply
Bulk charging voltage(C.V. voltage): 56 V Apply
Start LCD screen-saver after: None Sec. Apply
Floating charging voltage: 54 V Apply
Battery cut-off discharging voltage when Grid is available: 48 V Apply
Battery re-discharging voltage when Grid is available: 54 V Apply
Battery cut-off discharging voltage when Grid is unavailable: 42 V Apply
Battery re-discharging voltage when Grid is unavailable: 48 V Apply
Battery temperature compensation: 0 mV Apply
Feeding grid power calibration: 0 W Apply
Max. battery discharge current in hybrid mode 10 A Apply
Mute Buzzer alarm: Enable Disable Apply
Mute the buzzer in the Standby mode: Enable Disable Apply
Mute alarm in battery mode: Enable Disable Apply
Generator as AC source: Enable Disable Apply
Activate Li-Fe battery while commissioning: Yes No Apply
Wide AC input range: Enable Disable Apply
When float charging current is less than X (A) and continued T (Min),then charger off; when battery voltage is less than Y (V),then charger on again.
X: 0 A T: 60 Min. Y: 53 V Apply
Any schedule change will affect the power generated and shall be conservatively made.
System time: 2014-10-27
14:03:21
Apply
Close

20. Maintenance & Cleaning

-
-
-
-

WARNING

Battery Maintenance

-
-
-

CAUTION

CAUTION
CAUTION

21. Trouble Shooting

NOTE:

20-1. Warning List

Code	Warning Event	Icon (flashing)	Description

20-2. Fault Reference Codes

ERROR

Situation			Solution
Fault Code	**Fault Event**	**Possible cause**	

22. Specifications

MODEL	5KW
RATED POWER	
PV INPUT (DC)	
GRID OUTPUT (AC)	
AC INPUT	
BATTERY MODE OUTPUT (AC)	
BATTERY & CHARGER (Lead-acid/Li-ion)	