



PNI GreenHouse SB5000 5KW MPPT

Invertor solar /Solar inverter



Manual de utilizare ... p.3
User manual ... p.43

1 Note despre acest manual

1.1 Informatii de baza

Acest manual contine instructiuni si detalii legate de instalarea, modul de operare si intretinere a urmatoarelor invertoare solare: 3.6KW, 4.2KW, 4.6KW, 5KW.

Pastrati acest manual pentru utilizarea in caz de urgenta.

Acest manual nu contine detalii referitoare la alte dispozitive conectate (cum ar fi panouri PV). Informatii legate de echipamentele conectate gasiti la producatorul echipamentului respectiv.

1.2 Instructiuni de utilizare

1.2.1 Recomandam ca instalarea, intretinerea si repararea acestui inverter sa fie facute doar de personal calificat care a citit si inteles toate recomandarile din acest manual. Utilizatorul acestui produs trebuie sa stie ca opereaza cu un dispozitiv cu tensiune ridicata. Personalului care opereaza acest dispozitiv trebuie sa i se aduca la cunostinta riscurile manipularii acestui inverter.

1.2.2 Inainte de a utiliza inverterul, cititi toate etichetele si atentionarile de pe produs. Nu suntem responsabili pentru daune survenite din nerespectarea atentionarilor si instructiunilor.

1.2.3 Inverterul solar PNI este conform cu legile si regulamentele europene privind dispozitive de stocare a energiei.

1.2.4 In timpul instalarii, utilizarii si intretinerii inverterului, trebuie respectate toate conditiile de siguranta.

1.2.5 Utilizarea incorecta poate cauza scurtcircuit sau daune produsului.

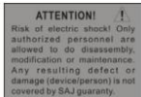
1.3 Simboluri

Acordati atentie deosebita modului de despachetare.

1.3.1 Simboluri din manual

SIMBOL	DESCRIERE
 DANGER	PERICOL indica o situatie periculoasa care, daca nu este evitata, va duce la moarte sau raniri grave.
 WARNING	ATENTIONARE indica o situatie periculoasa care, daca nu este evitata, va duce la moarte sau raniri grave sau moderate.
 CAUTION	PRUDENTA indica o situatie periculoasa care, daca nu este evitata, va duce la raniri moderate sau minore.
 NOTE	INSTIINTARE indica o situatie care poate duce la daune potentiale, daca nu este evitata.
	Cititi manualul.

1.3.2 Marcaje pe produs

Simbol	Descriere
	Avertisment privind tensiunea periculoasa Produsul functioneaza cu tensiune inalta. Toate operatiunile pe produs trebuie efectuate doar asa cum este descris in documentatia sa.
	Atentie, suprafata fierbinte Produsul poate deveni fierbinte in timpul functionarii. Nu atingeti produsul in timpul functionarii.
	Urmati instructiunile de utilizare Inainte de a utiliza produsul, cititi toata documentatia acestuia. Urmati toate atentionarile de siguranta si instructiunile.
	Marcaj CE Echipamentele cu marcajul CE indeplinesc cerintele compatibilitatii electromagnetice (EMC si LVD).
	Marcaj SAA Invertorul este conform cu cerintele SAA (Equipment and Product Safety Act in Australia).
	Marcaj CQC Echipament standard cu directiva de siguranta si calitate CQC (China Quality Inspection Center).
	Nu sunt autorizate modificari aduse produsului. Orice modificare adusa produsului este strict interzisa. Daca acestea duc la daune sau vatamari, compania noastra nu este responsabila.
	Impamantare
	Curent continuu (DC)
	Curent alternativ (AC)
	Semnalizeaza pericol cauzat de scurtcircuit si indica perioada de siguranta (5 minute) dupa ce invertorul a fost oprit si deconectat

2 Siguranta si conformitate

SIMBOL	INSTRUCTIUNI
  DANGER	Pericol de moarte din cauza tensiunii letale! Tensiunile letale se regasesc in interiorul invertorului si pe liniile de alimentare. De aceea, doar electricienii pot face anumite operatiuni si pot deschide produsul. Chiar daca invertorul este deconectat, in interiorul acestuia mai pot ramane contacti cu tensiune ridicata.
  DANGER	Pericol de arsuri datorita zonelor fierbinti de pe carcasa ! In timpul functionarii, toate laturile carcasei si radiatorul pot deveni fierbinti. Nu atingeti invertorul in timpul functionarii.

 CAUTION	Posibil pericol pentru sanatate ca rezultat al actiunii radiatiilor! In unele situatii, mai pot exista interferente in ciuda mentinerii valorilor limita standardizate de emisie (de ex. atunci cand echipamentul sensibil este situat in locatia de configurare sau cand locatia de configurare este in apropierea receptoarelor radio sau TV). In acest caz, trebuie luate masuri pentru rectificarea situatiei. Nu stati mai aproape de 20 cm de invertor timp indelungat.
 NOTE	Impamantarea generatorului PV! Respectati cerintele locale privind impamantarea modulelor fotovoltaice si a generatorului fotovoltaic. Recomandam conectarea cadrului generatorului si a altor suprafete conductoare electric astfel incat sa sigure conductie continua cu solul pentru a asigura protectie sistemului si persoanei.
 NOTE	Curenti de descarcare capacitiva! Modulele PV cu capacitate mare fata de sol, cum ar fi module PV cu film subtire, cu celule pe substrat metalic, pot fi folosite doar cand capacitatea lor de cuplare nu depaseste 470nF. In timpul operatiunii de alimentare, un curent de scurgere trece din celule catre pamant; valoarea curentului depinde de modul in care sunt instalate modulele (de ex. folie pe acoperis metalic) si de vreme (ploaie, zapada). Acest curent de scurgere "normal" nu trebuie sa depaseasca 50mA; altfel, invertorul s-ar deconecta automat de la reseaua electrica ca masura de protectie.

2.1 Intrerupator DC si AC

Separati invertorul de reseaua electrica, de modulele PV, de generator si de baterie folosind un intrerupator DC si AC, care va deconecta toti conductorii fara masa dupa instalare.

2.2 Impamantarea modulelor PV

Acesta este un invertor fara transformator. De aceea nu are separare galvanica. Nu impamantati circuitele DC ale modulelor PV conectate la invertor. Impamantati doar cadrul de montaj al modulelor PV.

Cand conectati la invertor module PV impamantate, veti vedea mesajul "PV Isolation Low".

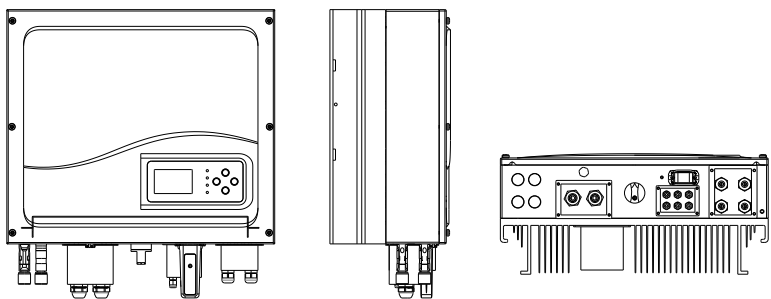
2.3 Calificarea personalului operativ

Doar operatorii cu urmatoarele calificari ar trebui sa instaleze invertorul:

- sa aiba cunostinte despre modul de utilizare si operarea ale unui invertor.
- Sa aiba cunostinte despre modul de reactie la pericol si despre riscurile instalarii si utilizarii dispozitivelor si sistemelor electrice.
- Sa aiba experienta in instalarea dispozitivelor si sistemelor electrice.
- Sa aiba cunostinte despre standardele aplicabile.
- Sa cunoasca toate instructiunile si atentionarile din acest manual.

3 Descriere produs

3.1 Schema



3.2 Prezentare inverter

Acesta este un inverter de energie bidirectional, compatibil cu sisteme fotovoltaice si cu baterii pentru stocarea energiei. Energia produsa de sistemul PV este folosita pentru optimizarea autoconsumului; excesul de energie este folosit pentru a incarca bateria si apoi alimenteaza rețeaua publica atunci cand energia PV este adecvata. Cand energia este suficienta pentru a alimenta consumatori, sistemul trage automat energie din baterie. Daca bateria nu poate oferi energia suficienta pentru toti consumatorii, atunci acestia se vor alimenta de la rețeaua publica de energie.

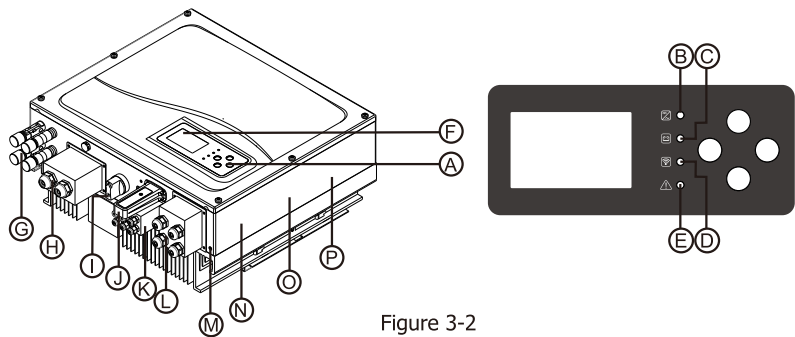


Figure 3-2

A	Buton Functii
B	Indicator stare de functionare
C	Indicator baterie
D	Indicator status Wi-Fi
E	Indicator Eroare
F	Ecran LCD
G	Terminale intrare PV
H	Terminale intrare baterie
I	Comutator intrare PV
J	Modul Wi-Fi com
K	Terminal BTS, terminal BMS, terminal monitorizare incarcare, terminal releu neenergizat, terminal comunicare CAN, terminal USB
L	Terminale iesire AC
M	Orificiu secundar de impamantare
N	Numarul de serie al inverterului
O	Eticheta
P	Eticheta cu simbolurile de avertizare

Table 3-1

3.3 Depozitarea invertorului

Daca doriti sa depozitati invertorul acasa, alegeti locatia cea mai potrivita si in conditiile de mai jos:

- Invertorul trebuie depozitat in ambalajul original care trebuie sa contina substante anti-umezeala.
- temperatura de depozitare trebuie sa fie intre -25 si +60°C.
- Umiditatea relativa trebuie sa fie intre 0 si 95%.
- Un numar de maxim 4 invertore pot fi depozitate vertical.

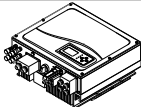
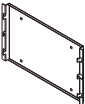
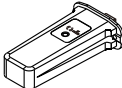
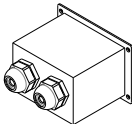
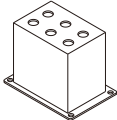
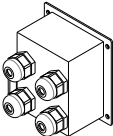
4 Despachetarea

4.1 Verificarea ambalajului

Chiar daca invertorul a trecut prin teste severe si este riguros verificat inainte de livrare, acesta poate suferi accidentari in timpul transportului. Verificati ca ambalajul sa nu prezinte urme de lovituri.

4.2 Verificarea continutului pachetului

Dupa ce ati desfacut pachetul, verificati existenta tuturor accesoriilor din Tabelul 4-1. .

Nr.	Imagine	Descriere	Cantitate
1		Invertor	1 buc.
2		Suport montaj	1 buc.
3		Modul Wi-Fi	1 buc.
4		Protectie fire BAT	1 buc.
5		Protectie fire BMS, RS485 com	1 buc.
6		Protectie iesire AC	1 buc.
7		Surub	4 buc.
8		Surub	2 buc.

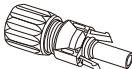
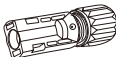
9		Terminal intrare baterie	2PCS
10		Terminal intrare PV+	2PCS
11		Terminal intrare PV-	2PCS
12		Terminale metalice fixate pe cablurile de alimentare PV+	2PCS
13		Terminale metalice fixate pe cablurile de alimentare PV+	2PCS
14		CT	1PCS
15		Manual de utilizare	1PCS

Table 4-1

4.3 Scule necesare

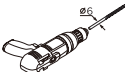
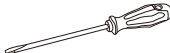
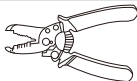
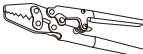
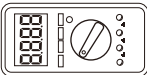
NO.	Scule	Model	Funcție
1		Bormasina cu burghiu de 6mm	Pentru a face gauri in perete
2		Surubelnita	Pentru strangerea suruburilor de pe suportul de montaj, terminalele bateriei, si terminalele AC
3		Cheie conectori solari	Deconectare terminale PV
4		Cleste de dezizolat cabluri	Dezizoleaza cablurile
5		Cleste pentru sertizat	Sertizeaza cablurile de alimentare
6		Multimetru	Masoara tensiunea din retea

Table 4-2

5 Instalare si conexiune electrica

5.1 Atentionari de siguranta



DANGER

Pericol de moarte din cauza incendiului sau exploziei

Chiar daca sunt concepute cu grija, dispozitivele electrice pot cauza incendii. Nu instalati inverterul pe suprafete inflamabile sau unde sunt depozitate substante inflamabile.



DANGER

Pericol de arsuri cauzate de atingerea suprafetelor fierbinti

Instalati inverterul in asa fel incat sa nu poata fi atins in mod accidental.



DANGER

Toate instalatiile electrice trebuie realizate respectand regulamentele locale si nationale. Nu indepartati carcasa. Inverterul nu contine componente care pot fi reparate de utilizator. In caz de defectiune, apelati doar la un centru service specializat. Toate conexiunile electrice trebuie efectuate doar de catre personal calificat.

Alte informatii:

- Scoateti cu grija inverterul din ambalajul sau si verificati-l pe toate partile.
- Asigurati-va ca puteti conecta inverterul la impamantare pentru garantarea sigurantei personale.
- Inverterul trebuie folosit doar cu un generator PV. Nu conectati alta sursa la el.
- Ambele surse de tensiune AC si DC se termina in interiorul inverterului PV. Deconectati aceste circuite inaintea operatiunilor de reparatie/intretinere.
- Acest inverter este conceput pentru a alimenta reseaua electrica publica (utility). Nu conectati inverterul la o sursa AC.
- Cand un panou PV este expus la lumina, el genereaza o tensiune DC. Cand este conectat la inverter, panoul PV va incarca bateria.
- Energia stocata in baterie poate fi sursa de scurtcircuit. Chiar daca inverterul a fost deconectat de la panourile PV si de la reseaua publica de energie, in interiorul lui mai poate ramane tensiune ridicata. Nu desfaceti carcasa inverterului mai devreme de 5 minute dupa ce ati deconectat toate sursele de alimentare.
- In timpul functionarii, unele parti ale inverterului ar putea fi fierbinti. Pentru a reduce riscul de accidentare, nu atingeti ventilatorul de pe partea din spate a inverterului si nici celelalte laturi in timp ce inverterul functioneaza.

5.2 Alegerea locatiei de instalare

Pentru a evita daune aduse proprietatii sau vatamarea personala, urmati recomandarile de mai jos.

- Inverterul trebuie montat la o distanta de cel putin 914 mm deasupra solului.
- Locatia de instalare trebuie sa fie adaptata dimensiunilor si greutatii inverterului.
- Instalati inverterul astfel incat sa aveti acces usor la ecranul acestuia.
- Nu instalati inverterul pe suprafete fabricate din materiale inflamabile.
- Umiditatea mediului de functionare trebuie sa fie intre 0~95% fara condens.
- Locatia de instalare trebuie sa fie sigura si accesibila oricand.
- Instalati inverterul vertical sau inclinat spre spate maxim 15° iar conexiunile trebuie sa fie in jos. NU instalati niciodata inverterul orizontal. Evitati inclinarea lui laterala sau in fata.

- Copiii nu trebuie sa aiba acces la locatia de instalare a invertorului.
- Nu acoperiti niciodata invertorul.
- Nu instalati invertorul in apropierea antenei TV sau a oricarei alte antene si a cablurilor acesteia.
- Invertorul necesita spatiu de ventilatie. Prin instalarea lui, asigurati o buna ventilatie invertorului. Temperatura ambientala nu trebuie sa depaseasca 40°C pentru a asigura o functionare optima.

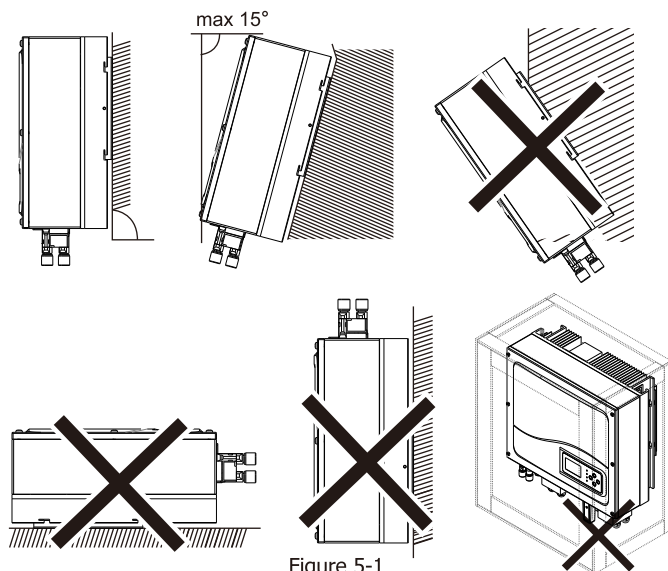


Figure 5-1

- Invertorul nu trebuie instalat in bataia directa a soarelui si trebuie sa aiba o protectie fata de ploaie/ninsoare.

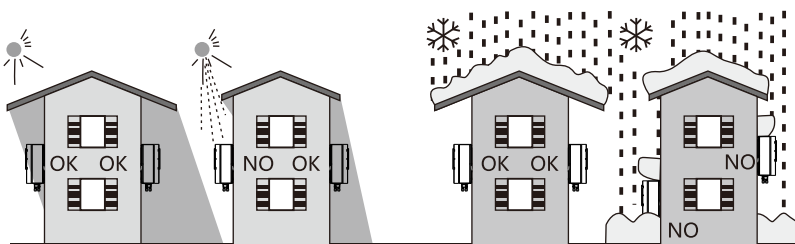


Figure 5-2

- Pentru a asigura o buna disipare a caldurii, pastrati intre invertor si alte obiecte distantele recomandate mai jos.

Directia	Spatiu minim (cm)
Sus	80
Jos	50
Lateral	50
Fata	30

Table 5-1

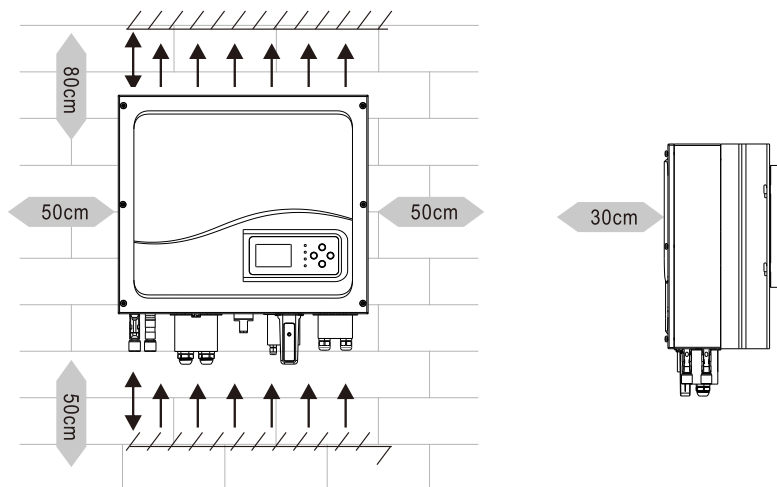


Figure 5-3

Conditii de instalare pentru invertoare montate in serie:

- Trebuie sa asigurati intre invertoare o distanta suficienta, astfel incat caldura de la un inverter sa nu afecteze invertoarele invecinate.

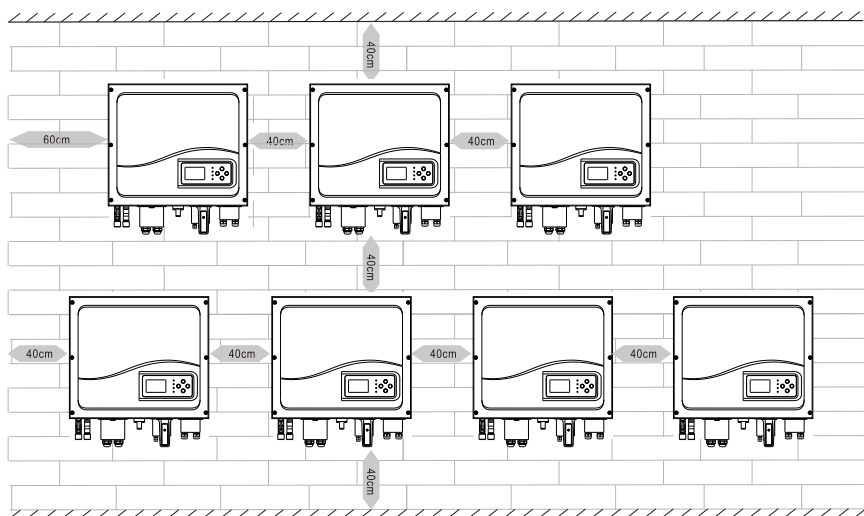


Figure 5-4

5.3 Instalarea invertorului cu suportul de motaj



Pentru a evita producerea unui scurtcircuit, înainte de a face gaurile pentru montaj, verificați traseele cablurilor electrice și ale conductelor de instalații.

Dimensiunile suportului de montaj:

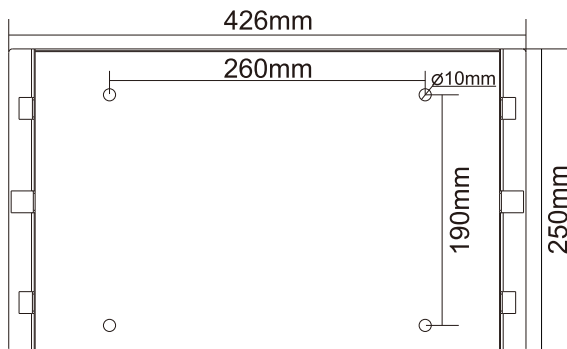


Figure 5-5

- Faceți gauri conform suportului de montaj.
- Fixați suportul de montaj ca în imaginea de mai jos. Nu bagați suruburile complet în perete, lăsați 2 - 4mm în afara.

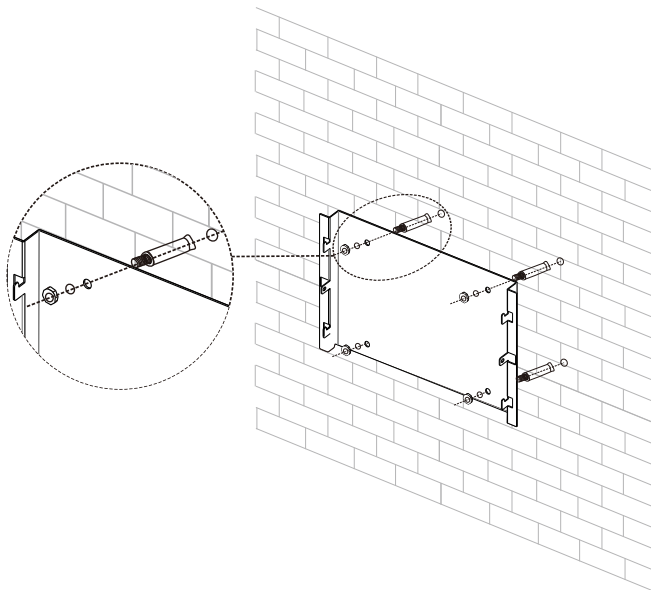


Figure 5-6

5.4 Fixati invertorul pe perete



Pentru a evita accidentari produse de obiecte care cad, inainte de a fixa invertorul de suport, asigurati-va ca suportul de montaj este bine prins de perete.

Ridicati invertorul un pic mai sus decat suportul de pe perete, patrund in echilibru invertorul.

- Agatati invertorul de suport cu ajutorul carligelor de pe suport.

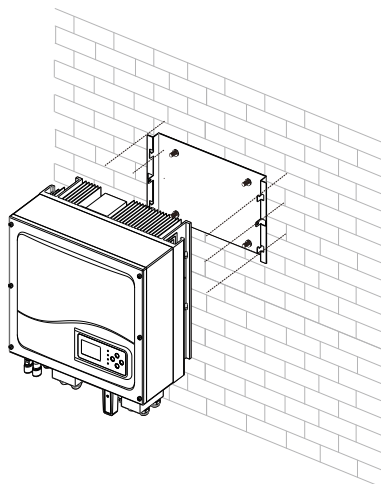


Figure 5-7

- Dupa ce v-ati asigurat ca invertorul este bine fixat pe suport, strangeti cele doua suruburi de siguranta M5, pe partea stanga si dreapta a invertorului pentru a preveni ridicarea invertorului de pe suport.

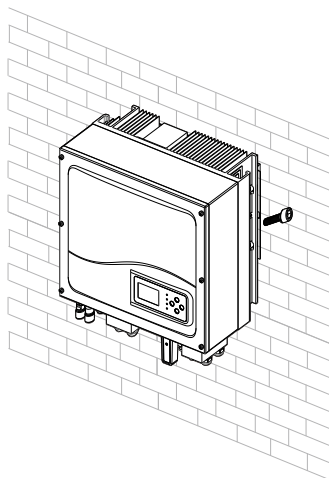


Figure 5-8

5.5 Verificati modul de instalare a invertorului

- Verificati partea superioara a invertorului ca este bine fixata de suport.
- Verificati siguranta montarii invertorului incercand sa-l ridicati de partea de jos. Invertorul trebuie sa ramana ferm atasat la suport.
- Pentru montaj, alegeti un perete puternic pentru a preveni vibratiile in timp ce invertorul functioneaza.

5.6 Conexiune electrica

5.6.1 Atentionari de siguranta



Pericol de moarte din cauza tensiunilor ridicate!

Tensiunea ridicata care poate provoca socuri electrice se regaseste in partile conductoare ale invertorului. Inainte de a efectua orice operatiune pe invertor, deconectati invertorul de la alimentarea AC, de la panourile PV si de la baterie.

Nu inversati intrarea bateriei, intrucat puteti defecta invertorul!



Pericol de deteriorare a componentelor electronice din cauza descarcarii electrostatice.

Luati masurile de siguranta corespunzatoare atunci cand instalati invertorul.



Impamantarea

Inainte de a conecta cablurile de alimentare, trebuie sa conectati mai intai cablul de impamantare.

Note:

- Toate conexiunile electrice trebuie efectuate de personal calificat. Inainte de a face orice conexiune electrica, tineti cont ca invertorul are alimentare bidirectionala. Personalul calificat trebuie sa poarte echipament de protectie, cum ar fi manusi izolate, incaltaminte de cauciuc izolata si casca de protectie, cand face conexiunile electrice.
- Conexiunile electrice trebuie sa respecte anumite reguli, cum ar fi sectiunea transversala a conductorului, sigurantele si protectia la impamantare.

5.6.2 Diagrama sistem invertor

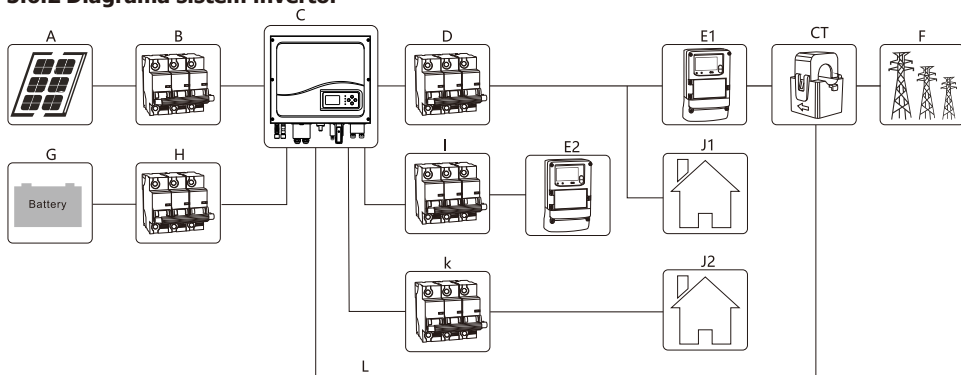


Figure 5-9

Pozitie	Descriere
A	Modul PV
B	Intrerupator lateral PV
C	Invertor
D	Intrerupator principal iesire AC
E1&E2	Contor de energie, E1 este utilizat pentru a detecta consumul de energie electrica din retea publica, si E2 este folosit pentru a detecta energia generata de PV
F	Reteaua publica de energie
G	Baterie
H	Intrerupator DC baterie
I	Intrerupator lateral invertor
J1&J2	J1 este sarcina normala, J2 sarcina importanta (max. 2500VA)
K	Intrerupator iesire de backup (max.2500VA)
L	Monitor sarcina
CT	Detecteaza curentul din retea / in afara retelei

Table 5-1

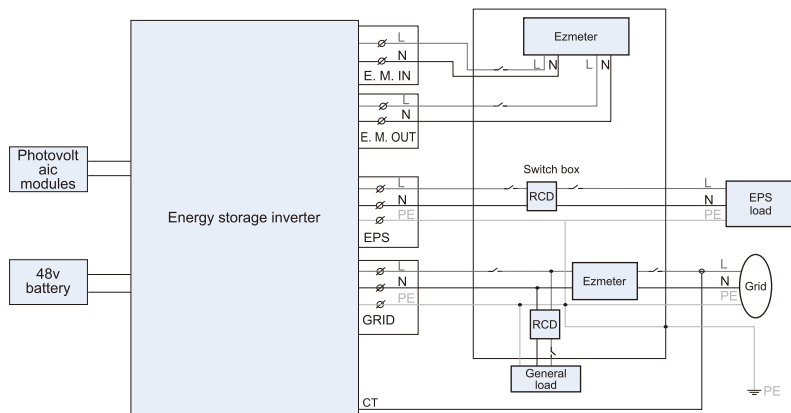


Figure 5-10

5.6.3 Conectarea la retea (retea publica de energie AC)



NOTE

- Folositi doar fire solide sau torsadate, dar nu fire torsadate subtiri.
- Folositi cabluri care suporta temperaturi ridicate.
- Folositi cabluri cu sectiune transversala mare.

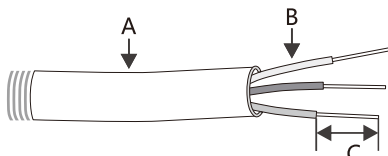


Figure 5-11

Lungime neizolat C=8mm, Cerinte cablu:

Model	Area(mm ²) B	AWG No.
3.6KW	5.26~9.0	8~10
4.2KW	5.26~9.0	8~10
4.6KW	5.26~9.0	8~10
5KW	5.26~9.0	8~10

Table 5-2



NOTE

Cablul nu trebuie sa depaseasca 48 m lungime deoarece rezistenta cablului va consuma puterea de iesire a invertorului si va reduce eficienta acestuia.

• Conectati contorul bidirectional

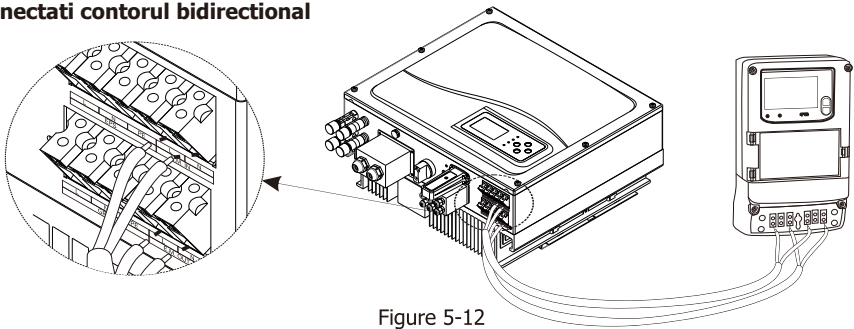


Figure 5-12



WARNING

- Un intrerupator separat monofazat AC trebuie instalat intre invertor si contorul bidirectional pentru fiecare invertor. Cerinte intrerupator: **Tensiune:** tensiunea nu trebuie sa fie mai mica decat tensiunea retelei AC pe care o conectati. **Curent:** curentul nu trebuie sa fie mai mic de 1,2 ori din curentul maxim de iesire al invertorului (definit in specificatiile invertorului).
- Contorul bidirectional trebuie sa fie instalat in apropierea invertorului si lungimea totala a liniilor de intrare si iesire din contor nu trebuie sa depaseasca 2m.

Recomandam specificatiile de mai jos:

3.6KW	24A/230V
4.2KW	28A/230V
4.6KW	30A/230V
5KW	32A/230V

Table 5-3

Rolul contorului bidirectional este de a inregistra energia generata de PV pentru utilizator. Daca nu aveti nevoie de aceasta functie, conectati-l cum este aratat mai jos.

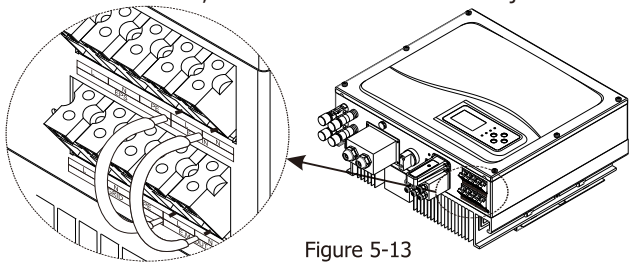


Figure 5-13

• Conectarea la retea.

Conexiuni:

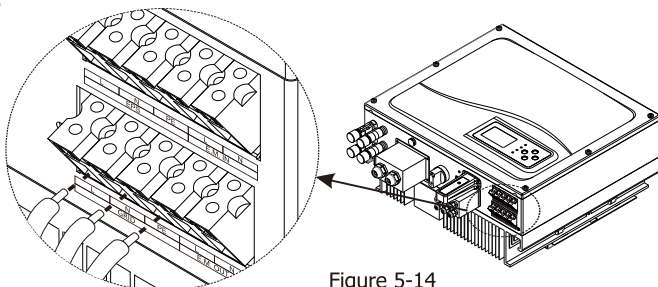


Figure 5-14



- Trebuie sa instalati separat un intrerupator AC sau alt dispozitiv de deconectare intre inverter si retea, pentru a va asigura ca puteti deconecta inverterul in mod sigur. Cerinte dispozitiv de deconectare:

Tensiune: nu trebuie sa fie mai mica decat tensiunea retelei AC la care va conectati.

Curent: nu trebuie sa fie mai mic de 1,2 ori din curentul maxim de iesire al inverterului (definit in specificatiile inverterului).

- Inverterul are functia de detectie si protectie a curentului de scurgere. Daca este selectata functia de detectare a curentului de scurgere pe intrerupatorul AC, curentul rezidual nominal al intrerupatorului de circuit trebuie sa fie mai mare de 300 mA.
- Intreruptoarele monofazate AC sunt selectate conform tabelului 5-3.

• Conectarea la dispozitivul de backup.

Dispozitivul de backup poate furniza o putere maxima de iesire de 2300VA si puteti conecta sarcina importanta la terminalul pentru back-up, oricum trebuie sa instalati un intrerupator de circuit AC sau alt dispozitiv de deconectare intre iesirea inverterului pentru back-up si sarcina importanta, pentru a va asigura ca puteti deconecta inverterul in mod sigur.

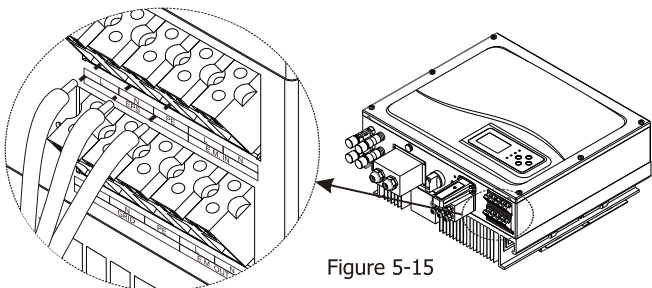


Figure 5-15

Specificatie dispozitiv de back-up: 20A.



Puterea maxima de iesire a dispozitivului de backup este de 2300VA, daca sarcina este mai mare de 2300VA si daca de 3 ori are loc eroare de suprasarcina, inverterul va intrerupe iesirea. Puterea de iesire a dispozitivului de backup depinde de capacitatea bateriei.

• Impamantarea inverterului

Inverterul trebuie conectat la conductorul de impamantare AC de la reseaua de distributie prin terminalul de impamantare (PE) ⊕. Simbolul "PE" apare in Figura 5-14 si Figura 5-15. Daca este necesar, impamantati sasiul dupa cum este aratat mai jos.

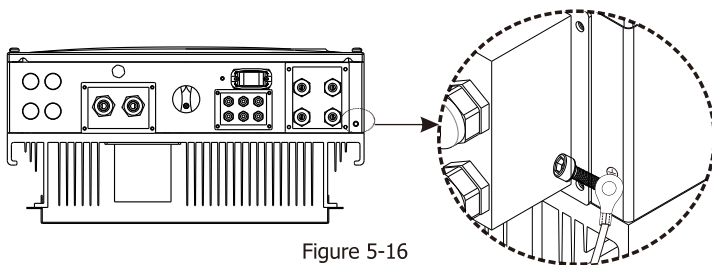


Figure 5-16

• Etape de cablare

A. Scoateti capacul de protectie la apa de pe iesirea AC si treceti cablul AC prin capacul de protectie.

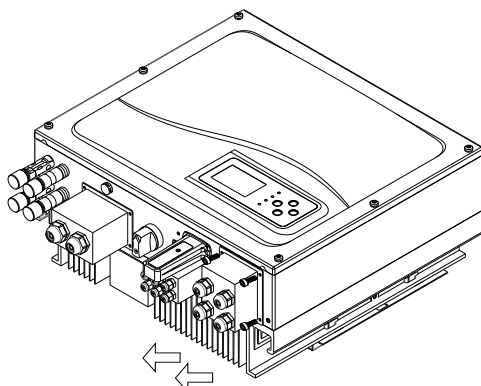


Figure 5-17

B. Identificatorii pentru cablu "EPS", "GRID", "E.M.IN" si respectiv "E.M.OUT", corespund cablurilor conectate „L/N/PE”.

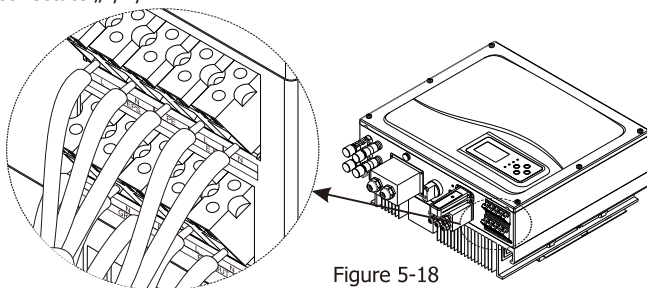


Figure 5-18

C. Strangeti capacul de protectie la apa (AC) si strangeti conexiunile.

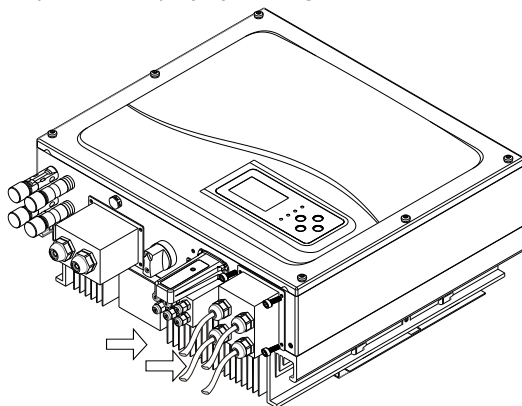


Figure 5-19

5.6.4 Conectarea la panoul PV



DANGER

Risc de scurtcircuit si incendiu, folositi doar cu module PV si cu o tensiune maxima a sistemului de 580Vdc.



DANGER

Pericol de scurtcircuit, conductorii DC ai acestui sistem PV nu sunt de obicei impamantati dar vor deveni impamantati intermitent atunci cand invertorul detecteaza izolarea panourilor fotovoltaice.



DANGER

Nu deconectati conectorii DC aflati sub sarcina.



DANGER

Datorita design-ului fara transformator, polurile DC pozitiv si negativ al panourilor solare nu pot fi impamantate.

• Conectarea cablurilor de alimentare PV

Pasul 1 Indepartati presetupele de pe conectorii pozitiv si negativ.

Pasul 2 Scoateti terminalele metalice din pachetul de accesorii si cablati-le dupa cum este afisat mai jos.

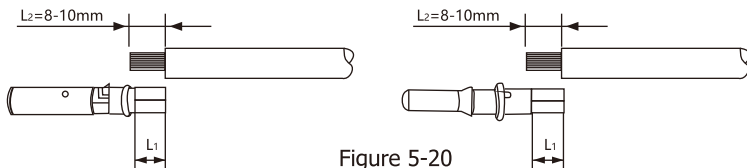


Figure 5-20

Pasul 3 Introduceți cablurile de alimentare pozitiv și negativ în preștupele corespunzătoare.

Pasul 4 Introduceți cablurile de alimentare pozitiv și negativ în terminalele metalice pozitive și respectiv negative fixați-le folosind un instrument de prindere. Asigurați-vă că ați sertizat bine cablurile (nu pot fi trase cu o forță mai mică de 400 N).

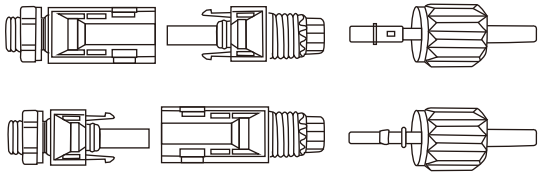


Figure 5-21

Pasul 5 Introduceți conectorii pozitiv și negativ în terminalele de intrare DC ale invertorului până auziți un click.

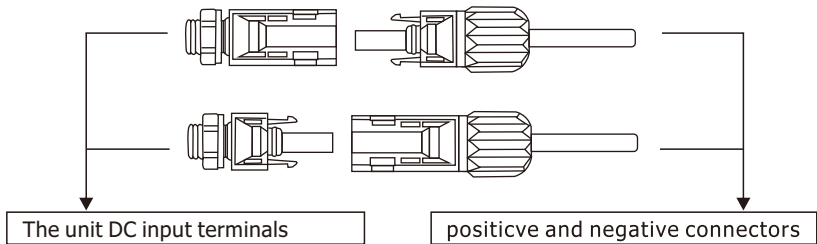


Figure 5-22

• Condiții pentru conexiunea DC

Invertorul monofazat are două intrări independente: intrarea A & intrarea B.

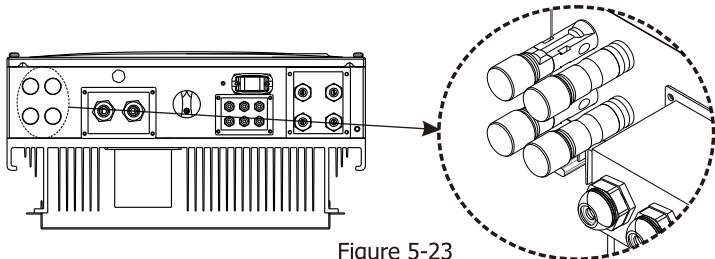


Figure 5-23

Schema DC este prezentată mai jos. Conectorii sunt împerecheați (conectori mama și tata). Conectorii pentru invertor și panourile PV sunt conectori H4 (yunfan).

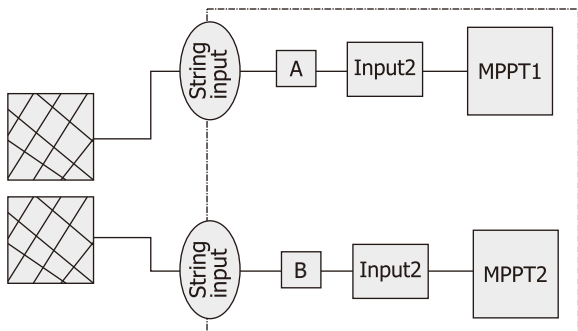


Figure 5-24

Sugestii pentru modulele fotovoltaice conectate in serie:

A. Acelasi tip

B. Aceeasi calitate a modulelor PV conectate in serie



Daca inverterul nu este echipat cu un comutator PV, dar acest lucru este obligatoriu in tara de instalare, instalati un comutator PV extern.

Urmatoarele valori limita la intrarea PV a inverterului nu trebuie depasite:

Product Model	Max.current input A	Max.current input B
3.6KW	11A	11A
4.2KW	11A	11A
4.6KW	11A	11A
5KW	11A	11A

Table 5-4

• **Conditii pentru conexiunea DC**



Inainte de a conecta panoul solar, asigurati-va ca comutatorul DC si intrerupatorul AC sunt deconectate de la inverter. Niciodata nu conectati si nu deconectati conectorii DC sub sarcina. Asigurati-va ca tensiunea maxima a circuitului deschis (Voc) a fiecarui sir de panouri PV este mai mica de 580Vdc. Verificati proiectul instalatiei fotovoltaice. Tensiunea maxima a circuitului deschis, care poate aparea la o temperatura de -10°C a panourilor solare, nu trebuie sa depaseasca tensiunea max. de intrare a inverterului.



Operarea necorespunzatoare in timpul procesului de cablare poate provoca ranirea fatala a operatorului sau deteriorarea inverterului. Numai personalul calificat poate efectua lucrarile de cablare.



Datorita designului fara transformator, polurile DC pozitiv si negativ al panourilor solare nu pot fi impamantate.

Cerinte cablu:

Product Model	Area(mm ²) B	AWG No.
3.6KW	5.26~9.0	8~10
4.2KW	5.26~9.0	8~10
4.6KW	5.26~9.0	8~10
5KW	5.26~9.0	8~10

Table 5-5

5.6.5 Conectarea la baterie

Inainte de conectarea la baterie, trebuie sa instalati un intrerupator PV separat (nu mai mic de 120A) intre inverter si baterie care asigura deconectarea inverterului in timpul operatiunilor de intretinere.

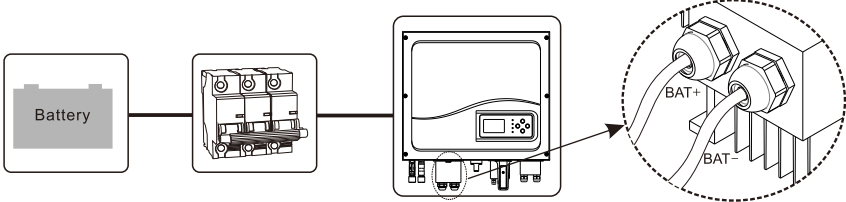


Figure 5-25



Polaritatea inversata va defecta invertorul!!!

Este foarte important pentru siguranta sistemului si pentru o utilizare sigura sa folositi cablu corespunzator pentru conectarea bateriei. Pentru a reduce riscul de accidentare, trebuie sa folositi dimensiunile de cablu din tabelul de mai jos.



Figure 5-26

Grade	Descriere	Valoare
A	O.D.	10~12mm
B	Sectieune material conductor	20~25mm ²
C	Lungime fir gol	10mm around

Table 5-6

Instalarea bateriei trebuie sa se faca conform instructiunilor producatorului acesteia, inclusiv conditiilor de instalare (la exterior sau la interior) si la distanta de instalare fata de invertor recomandate de producator.

Curentul maxim de incarcare/descarcare a invertorului este de 50A; verificati specificatiile bateriei.

Deoarece tensiunea nominala a bateriei invertorului este de 48V, tensiunea de conectare a bateriei nu trebuie sa depaseasca cu mult 48V sau se va deteriora invertorul.

Urmatorii pasi trebuie respectati pentru conectarea bateriei:

(1) Deconectati intrerupatorul dintre invertor si baterie.

(2) Verificati polaritatea invertorului si a bateriei.

(3) Comprimati capul terminalului cu un instrument profesional.

(4) Strangeti cablul de borna de intrare a bateriei invertorului.

(5) Daca invertorul este conectat la o baterie cu plumb acid, trebuie sa conectati un BTS la invertor, la terminalul CN8 in portul COM. (Figure 5-25)

(6) Daca invertorul este conectat la o baterie cu Litiu, trebuie sa conectati un BMS la portul CN3 BMS com. (Figure 5-27)

Nota: va recomandam sa utilizati baterie cu Litiu, deoarece comunicarea BMS a fost proiectata pentru a fi compatibil cu invertorul cu stocare de energie.



Pericol de moarte cauzata de tensiune ridicata!

Inainte de a instala BAT. NTC, trebuie sa inchideti invertorul, sa verificati ca toate intrerupatoarele separate sunt inchise, si ca ledurile invertorului sunt stinse. Apoi puteti instala in conditii de siguranta terminalul BAT.NTC.

5.6.6 Conexiune terminal de comunicare

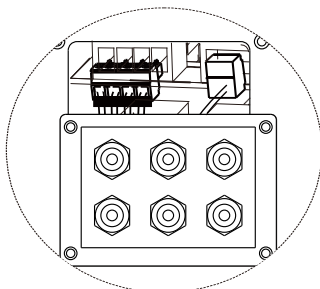
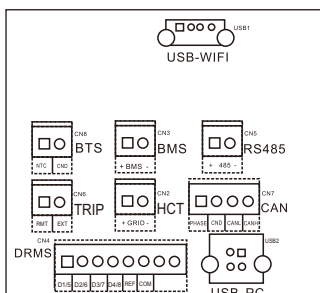


Figure 5-27

5.6.6.1 Conectare dispozitiv de monitorizare consum - CT (current transformer)

În sistemele cu un singur inverter, un CT trebuie instalat pentru a monitoriza consumul din casa pentru a decide statusul inverterului: încărcare sau descărcare. Acesta trebuie instalat de la început, între rețeaua publică și casa, astfel, inverterul poate monitoriza întreg consumul energetic din casa. În funcție de senzor, inverterul va controla alimentarea cu energie PV a rețelei pentru a echilibra nivelul de utilizare a energiei casnice. (Figure 5-9)

Instrucțiuni de instalare CT:

- Instalați CT-ul orientând săgeata de pe acesta înspre rețeaua publică de energie.
- Conectați firul alb și negru de pe CT la terminalul CT "CN2" "+" și "-" la portul COM al inverterului. (Figure 5-27)

Nota: Firul alb trebuie conectat la "+" și firul negru la "-", nu trebuie inversate.

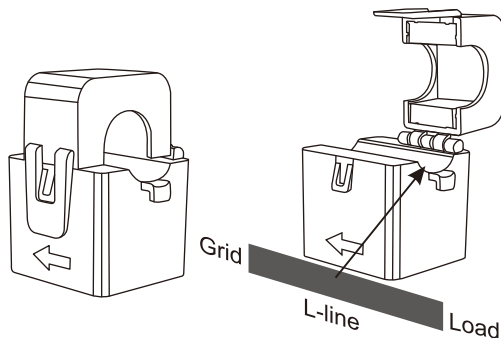


Figure 5-28



WARNING

Întrarea L-line a dispozitivului de monitorizare consum trebuie să fie aceeași cu L-line de pe senzorul CT, iar intrarea L&N nu poate fi inversată. Dacă se întâmplă asta, inverterul va inversa direcția de control a energiei, ceea ce înseamnă că energia PV nu va fi stocată în baterie, iar bateria nu va putea furniza energie către consumatorii casnici.

5.6.6.2 Conectare PC la inverter

Conectați cablul USB la terminalul USB2 USB-PC de pe portul COM al inverterului. (Figure 5-27)

Nota: Pe PC se poate instala un software special de monitorizare. Puteți monitoriza inverterul conectându-l la PC prin USB.

5.6.6.3 Funcția DRMO pentru certificarea SAA

DRMO este localizat pe terminalul CN6 DMR0 de pe inverter. (Vezi Figure 5-27)

Când primește o comandă de pe conexiunea DRMO, inverterul va acționa conform comenzii. Inverterul va acționa astfel: POWER OFF sau POWER ON.

6 Pornirea si oprirea invertorului

6.1 Pornirea invertorului

- (1) Conectati intrerupatorul de circuit AC
- (2) Porniti comutatorul DC
- (3) Porniti intrerupatorul pentru baterie
- (4) Invertorul va porni automat cand tensiunea PV este mai mare de 150V iar tensiunea bateriei este mai mare de 44V.

6.2 Oprirea invertorului

**DANGER**

Nu deconectati conectorii DC sub sarcina.

Pasi:

- (1) Deconectati intrerupatorul de circuit AC si fiti atenti sa nu fie reactivat.
- (2) Deconectati intrerupatorul pentru baterie si fiti atenti sa nu fie reactivat.
- (3) Inchideti comutatorul PV.
- (4) Verificati statusul de functionare a invertorului.
- (5) Asteptati pana cand ledurile de pe invertor se sting, ceea ce inseamna ca invertorul este complet inchis.

7 Panoul de afisare, ecranul LCD si setari

7.1 Panou de afisare

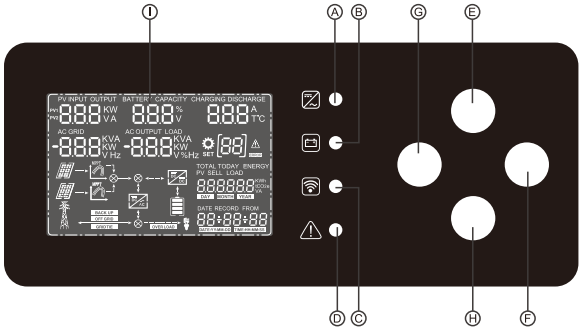


Figure 7-1

Funcțiile de e ecran pot fi controlate prin 4 butoane functionale, care sunt descrise mai jos:

No.	Name	Descriere
A	LED	Verde: Status Normal
B		Galben: Incarcare sau descarcare baterie
C		Albastru: Status comunicare Wi-Fi sau GPRS
D		Rosu: Eroare
E	Button	UP: Inainte sau crestere valoare
F		ENTER :OK
G		ESC : Inapoi la meniul principal sau iesire din interfata curenta
H		Down: Inapoi sau scadere valoare
I	LCD	Afiseaza informatii despre modul de lucru al invertorului

Table 7-1

7.2 Ecran LCD si setari

7.2.1 Informatii LCD

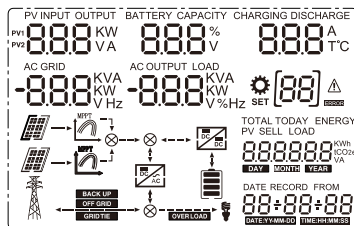


Figure 7-2

Display	Funcție
PV INPUT OUTPUT PV1 888 KW PV2 888 VA	Indica tensiunea de intrare sau curentul sau puterea PV1/PV2. KW: Putere; V: Tensiune; A: Curent.
BATTERY CAPACITY 888 % V	Indica tensiunea bateriei sau capacitatea bateriei in %. V: Tensiune; %: Procent.
CHARGING DISCHARGE 888 A T°C	Indica curentul de incarcare sau curentul de descarcare al bateriei sau temperatura bateriei.
AC GRID -888 KVA KW V Hz	Indica puterea sau tensiunea sau frecventa rețelei AC. KVA/KW: Putere; V: Tensiune; Hz: Frecventa.
AC OUTPUT LOAD 888 KVA KW V Hz	Indica puterea pe iesirea AC sau tensiunea sau frecventa sau procentul de incarcare. KVA/KW: Putere; V: Tensiune; Hz: Frecventa; %: Procent incarcare.
 [88]	Indica numarul paginii interfeței de setare.
 [88]	Indica codul de eroare sau de avertizare. Cod avertizare: [88]  . Cod eroare: [88]  .
TOTAL TODAY ENERGY PV SELL LOAD 888888 kWh DAY MONTH YEAR	Indica generarea de electricitate. TOTAL ENERGY PV : Total PV input; TOTAL ENERGY SELL : Total electricity sale; TOTAL ENERGY LOAD : Total load power; TODAY ENERGY PV : Intare PV input today; TODAY ENERGY SELL : Electricity sale today; TODAY ENERGY LOAD : Load power today;
DATE RECORD FROM 88-88-88 DATE Y MM DD TIME HH MM SS	Indica data si ora.
	Indica panou solar; Cand clipeste indica tensiune de intrare PV in afara intervalului.
	Indica statusul rețelei publice.
	Capacitate baterie (0-24%, 25-49%, 50-74% and 75-100%) si status incarcare.
	Indica stadiul sarcinii.
	Indica statusul de incarcare sau descarcare.
	Indica statusul invertorului.

Table 7-2

7.2.2 Ecran LCD

Cand porneste invertorul apare interfata principala implicita. In interfata principala sunt 7 blocuri cu informatii (cu exceptia zonei pentru erori si consumul de energie) apasati "UP" sau "DOWN" pentru a afisa urmatoarele informatii: (toate blocurile se schimba in acelasi timp)

- (1) Tensiune intrare PV, curent si putere.(Figure 1)
- (2) Procent tensiune baterie si incarcare.(Figure 2)
- (3) Curent de incarcare/descarcare baterie, temperatura.(Figure 3)
- (4) Putere iesire inverter, tensiune, frecventa si curent, putere, sarcina.(Figure 4)
- (5) Puterea electrica, tensiune, curent si frecventa.(Figure 5)
- (6) Putere sau putere totala generata.(Figure 6)
- (7) Data si ora.(Figure 7)

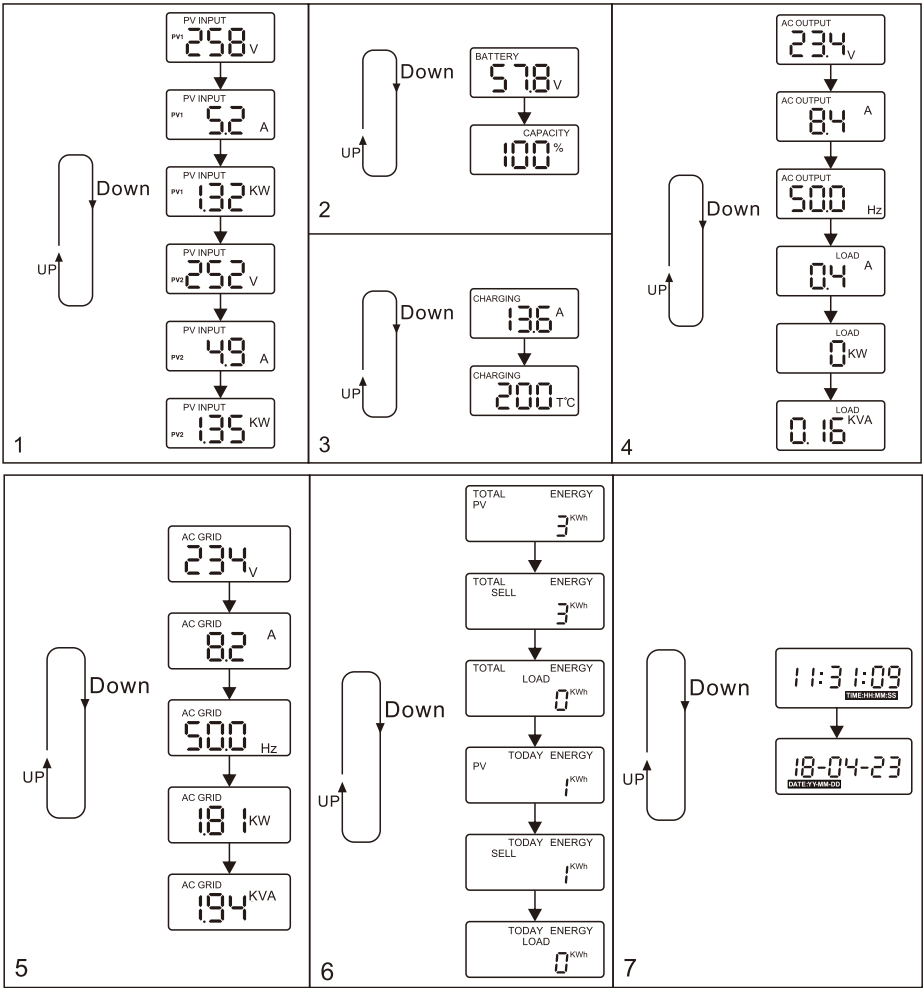
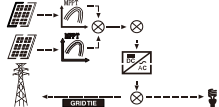
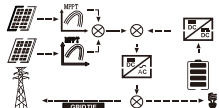
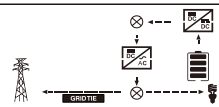
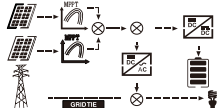
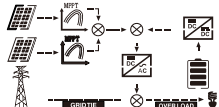
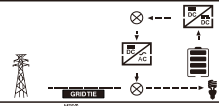
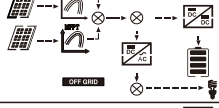
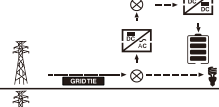
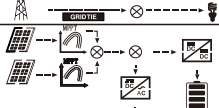
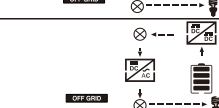


Figure 7-3

7.2.3 Afisare stadii de lucru

Run status		
Sell power to grid	Doar PV furnizeaza energie catre retea si consumatori	
	PV si bateria furnizeaza energie catre retea si consumatori impreuna	
	Doar bateria furnizeaza energie catre retea si consumatori	
Match Load	Energia PV nu este suficienta, deci ofera energie doar bateriei si consumatorilor, nu si catre retea	
	PC si bateria alimenteaza consumatorii, fara energie catre retea	
	Fara PV, doar bateria alimenteaza cu energie, fara energie catre retea	
Battery Charge	PV alimenteaza cu energie consumatorii si incarca bateria	
	Reteaua ofera energie pentru incarcarea bateriei si pentru consumatori	
Standby	Cand invertorul intra in eroare, retea alimenteaza consumatorii	
Off grid	Puterea PV este suficienta, alimenteaza bateria pentru incarcare, alimenteaza cu energie consumatorii	
	PV si alimentarea cu energie de la bateria pentru consumatori	
	Descarcarea bateriei si alimentarea cu energie pentru consumatori	
Stop	Invertorul s-a inchis sau Eroare	

7.2.4 Setari ecran LCD

Tineti apasata timp de 5 secunde tasta "ESC" pentru a intra in modul de setare. Apasati "ESC" pentru a va intoarce la interfata [00], apasati tasta ENTER pentru a intra in meniul de setari sau tineti apasata timp de 5 secunde tasta "ENTER" pentru a intra in meniul de setari, apasati UP sau DOWN pentru a selecta diferite setari, apasati tasta "ENTER" pentru a accesa setarea respectiva, apasati UP sau DOWN pentru a selecta diferite setari, dupa ce ati setat parametrul dorit, apasati "ENTER" pentru a confirma setarea si "ESC" pentru a anula setarea.

No.	Describe	Option	
00	Setup Mode	 00 ESC 00	ESC corespunde tastei ESC si indica iesire; GO corespunde tastei ENTER si indica intrarea in interfata urmatoare.
01	Manual On/Off Control	(default)  01 PWT OFF  01 PWT On	Inchideti manual invertorul Porniti manual invertorul
02	User Mode	 02 SET	Mod stocare energie 1. Natural logic (1) Conditii operare On-grid ① Exista energie solara •Solar: Energia solara de preferinta incarca bateria, o parte din energia suplimentara alimenteaza consumatorii si alta parte merge catre retea publica. •Baterie: bateria se incarca si nu se descarca si doar energia solara incarca bateria (cu exceptia cazului in care perioada de incarcare forzata AC este activata, retea publica nu va incarca in mod activ bateria). •Consumatorii: consumatorii de preferinta se alimenteaza de la baterie; daca este energie insuficienta, se alimenteaza de la retea. ②Fara energie solara •Solar: lipsa energie solara. •Baterie: bateria se descarca si nu se incarca si alimenteaza consumatorii. • Consumatorii: consumatorii de preferinta se alimenteaza de la baterie, daca este energie insuficienta, se alimenteaza de la retea (2) Conditii operare Off-grid ① Exista energie solara Cand energia solara este suficienta, aceasta incarca bateria si alimenteaza consumatorii. Cand energia solara este insuficienta, energia solara si bateria impreuna alimenteaza consumatorii. ②Fara energie solara Bateria alimenteaza consumatorii.

			2. Forced logic (1) Timp de descarcare fortata In conditiile conectarii la retea, pretul energiei consumate seara si dimineata este mai mare, permitand bateriei sa se adapteze consumului, iar logica fortata are prioritate asupra logicii naturale. (2) Timp de incarcare fortata In conditiile conectarii la retea, pretul energiei consumate noaptea este mai mic, permitand incarcarea bateriei, iar logica obligatorie are prioritate asupra logicii naturale. Nota: Logica de incarcare fortata are prioritate fata de logica de descarcare fortata.
	 LdP		Mod prioritate sarcina (optiune default) 1. Conditii de operare On-grid (1) Exista energie solara •Solar: Energia solara alimenteaza consumatorii, o parte din energia suplimentara alimenteaza consumatorii si alta parte merge catre retea. •Baterie: Bateria se incarca doar de la PV. Cand energia solara este suficienta, energia solara incarca bateria; cand energia solara este insuficienta, bateria va contribui la alimentarea consumatorilor. •Sarcina: Consumatorii de alimenteaza de la PV. cand energia solara este insuficienta, consumatorii se alimenteaza de la baterie, cand si bateria este insuficienta, consumatorii se alimenteaza de la retea. (2) Fara energie solara •Energie solara: Lipsa energie solara. •Baterie: bateria se incarca de la retea si energia din baterie alimenteaza consumatorii. •Sarcina: Consumatorii se alimenteaza de la baterie daca bateria nu este suficienta, se alimenteaza de la retea. 2. Conditii de operare Off-grid (1) Exista energie solara Cand energia solara este suficienta, aceasta alimenteaza consumatorii. Cand energia solara este insuficienta, energia solara si bateria alimenteaza simultan consumatorii. (2) Lipsa energie solara Doar bateria alimenteaza consumatorii. (Nota: Functie supraincarcare/supradescarcare baterie: daca tensiunea bateriei este mai mica decat limita setata, PV si AC vor incarca bateria; daca tensiunea bateriei este mai mare decat limita setata, se activeaza Forced Stop.)

		 [02] UPS	Mod UPS Mod alimentare UPS 1. Natural (1) Conditii operare On-grid ①Exista energie solara •Solar: energia solara incarca bateria o parte din energia suplimentara alimenteaza consumatorii si alta parte merge catre retea. •Baterie:bateria este incarcata atat de la energia solara cat si de la retea. Puteti alege sa opriti incarcarea de la retea. •Sarcina: consumatorii se alimenteaza de preferinta de la PV, daca energia solara este insuficienta, consumatorii se alimenteaza de la retea. ②Lipsa energie solara -- Solar: fara energie solara. --Baterie: bateria se incarca de la retea. -- Sarcina: consumatorii se alimenteaza de la retea. (2) Conditii operare Off-grid ①Exista energie solara Cand energia solara este insuficienta, atat energia solara cat si bateria alimenteaza consumatorii; cand energia solara este suficienta, aceasta alimenteaza consumatorii si incarca bateria. ②Lipsa energie solara Bateria alimenteaza consumatorii. 2. Fortat (1) Timp descarcare fortata In conditiile conexiunii grid, bateria trebuie fortata sa corespunda descarcarii sarcinii in perioada de timp. (2) Timp incarcare AC fortat In conditiile conexiunii grid, se interzice bateriei sa se incarca de la retea.
03	Power Safety Regulation	 [03] C0dnUL	NULL
		 [03] C0dudE	VDE0126
		 [03] C0dtUW	TUV
		 [03] C0dRUS	AS4777-Australian

		 [03] SET	CEI0-21
		COdCE,	
		 [03] SET	SP1663
		COdSPi	
		 [03] SET	XINA1
		COdXin	
		 [03] SET	N4105
		COdn41	
		 [03] SET	G83
		COdG83	
		 [03] SET	Ireland
		COdiIE	
		 [03] SET	CGC
		COdCGC	
		 [03] SET	Danmark
		COddAn	
		 [03] SET	G59
		COdG59	
		 [03] SET	CGC_K
		COdCGK	
		 [03] SET	AS4777-New Zealand
		COdnZL	
04	PV Source Input mode	(default)IND  [04] SET	Mod intrare duala independenta
		ind  [04] SET	Mod intrare paralela duala
		PAR  [04] SET	Mod intrare sursa DC
		dc	

05	Interfata autotestare	 [05] tSt OFF	tSt :test OFF :OFF Nu porniti functia autotest
		 [05] tSt On	tSt :test On :ON Porniti functia autotest
	Procedura testare	(default) SLF tSt uOL H, 2 CEI autotest pentru 59.S2	SLF :self tSt :test uOL :tensiune H, 2 :High 2 CEI autotest pentru 59.S2
		SLF tSt uOL H, 1 CEI autotest pentru 59.S1	SLF :self tSt :test uOL :tensiune H, 1 :High 1 CEI autotest pentru 59.S1
		(default) SLF tSt uOL LO 1 CEI autotest pentru 27.S1	SLF :self tSt :test uOL :tensiune LO 1 :Low 1 CEI autotest pentru 27.S1
		(default) SLF tSt FfE H, 2 CEI autotest pentru 81>.S2	SLF :self tSt :test FfE :frecventa H, 2 :High 2 CEI autotest pentru 81>.S2
		(default) SLF tSt FfF H, 1 CEI autotest pentru 81>.S2	SLF :self tSt :test FfE :frecventa H, 1 :High 2 CEI autotest pentru 81>.S2
		(default) SLF tSt FfE LO 1 CEI autotest pentru 81<.S2	SLF :self tSt :test FfE :frecventa LO 1 :Low 1 CEI autotest pentru 81<.S2
		(default) SLF tSt FfE LO2 CEI autotest pentru 81<.S2	SLF :self tSt :test FfE :frecventa LO2 :Low 2 CEI autotest pentru 81<.S2
		SLF tSt PASS Autotestare reusita, cand autotestarea esueaza pe ecran apare FR, L	SLF :self tSt :test PASS :pass Autotestare reusita, cand autotestarea esueaza pe ecran apare FR, L
06	Raport autotestare	 [06] tPt OFF	tPt :raport OFF :OFF Nu verificati inregistrare raport autotest
		 [06] tPt On	tPt :report On :ON Verificati inregistrare raport autotest

Verificare raport autotest	ፎፍፍፍ ፎፍፍፍ ህዘፍ ፳፭፭, ፳፭፭, ፑፑ ፳፬፬ፑፑ ፲፱፱ ስፑ	ፎፍፍፍ :test ፎፍፍፍ :report ህዘፍ :voltage high 2 ፳፭፭, :264V(Setting value) ፳፭፭, :264V(test value) ፑፑ :Pass ፳፬፬ፑፑ :200ms(Setting value) ፲፱፱ፑፑ :195ms(test value) Afiseaza autotestare pentru 59.S2, cand esueaza pe ecran apare ፑፑ, ፌ
	ፎፍፍፍ ፎፍፍፍ ህዘፍ ፳፭፭, ፳፭፭, ፑፑ ፳፬፬ፑፑ ፲፱፱ፑፑ	ፎፍፍፍ :test ፎፍፍፍ :report ህዘፍ :voltage high 1 ፳፭፭, :253V(Setting value) ፳፭፭, :253V(test value) ፑፑ :Pass ፳፬፬ፑፑ :200ms(Setting value) ፲፱፱ፑፑ :198ms(test value) Afiseaza autotestare pentru 59.S2, cand esueaza pe ecran apareፑፑ, ፌ
	ፎፍፍፍ ፎፍፍፍ ህፌፍ ፲፱፱, ፲፱፱, ፑፑ ፭፬፬ፑፑ ፳፱፱ ፲ ስፑ	ፎፍፍፍ :test ፎፍፍፍ :report ህፌፍ :voltage low 1 ፳፭፭, :195V(Setting value) ፳፭፭, :195V(test value) ፑፑ :Pass ፭፬፬ፑፑ :400ms(Setting value) ፳፱፱ ስፑ :391ms(test value) Afiseaza autotestare pentru 27.S2, cand esueaza pe ecran apareፑፑ, ፌ
	ፎፍፍፍ ፎፍፍፍ ፑዘፍ ፱፱ ስፑ ፱፱ ስፑ ፑፑ ፲፬፬ፑፑ ፱፱ ስፑ	ፎፍፍፍ :test ፎፍፍፍ :report ፑዘፍ :frequency High 2 ፱፱ ስፑ :51.5Hz(Setting value) ፱፱ ስፑ :51.5Hz(test value) ፑፑ :Pass ፲፬፬ፑፑ :100ms(Setting value) ፱፱ ስፑ :93ms(test value) Afiseaza autotestare pentru 81>.S2, cand esueaza pe ecran apare ፑፑ, ፌ
	ፎፍፍፍ ፎፍፍፍ ፑዘፍ ፱፱ ስፑ ፱፱ ስፑ ፑፑ ፲፬፬ፑፑ ፱፱ ስፑ	ፎፍፍፍ :test ፎፍፍፍ :report ፑዘፍ :frequency High 1 ፱፱ ስፑ :50.5Hz(Setting value) ፱፱ ስፑ :50.5Hz(test value) ፑፑ :Pass ፲፬፬ፑፑ :100ms(Setting value) ፱፱ ስፑ :98ms(test value) Afiseaza autotestare pentru 81>.S2, cand esueaza pe ecran apare ፑፑ, ፌ

		F5E FPE FL1 495 Hz 495 Hz PS 100ms 95 ms	F5E :test FPE :report FL1 :frequency High 1 495 Hz :49.5Hz(Setting value) 495 Hz :49.5Hz(test value) PS :Pass 100ms:100ms(Setting value) 95 ms :95ms(test value) Afiseaza autotestare pentru 81<.S2, cand esueaza pe ecran apar F5E, L
		F5E FPE FL2 475 Hz 475 Hz PS 100ms 92 ms	F5E :test FPE :report FL2 :frequency low 2 475 Hz :47.5Hz(Setting value) 475 Hz :47.5Hz(test value) PS :Pass 100ms:100ms(Setting value) 92 ms :92ms(test value) Afiseaza autotestare pentru 81<.S2, cand esueaza pe ecran apar F5E, L
07	Battery type selection	(default)Lead  [07] LEAD	Baterie cu Plumb Acid
		Lithium  [07] L, EVN	Baterie Litiu
08	Battery capacity (AH)	Lead  [08] L, EVN100	Interval 0-900, adaugati de fiecare data 10,
		Lithium  [08] LEAD100	Setarea nu va avea efect, obtineti informatii BMS
09	BCC Battery charge current limit	(default)  [09] bcc 100	Interval 0% - 100%, 100% inseamna 50A
10	Battery stop discharge SOC	Lithium  [10] soc 20	Interval 0% - 100%, doar pentru baterii Litiu

11	BSV Tensiune descarcare baterie	(default)48.5V  [11] b5w48.5	Range from 40V-59V, must fit the battery to set value, the value must higher than Low voltage Protect 1V
12	BCV Battery const charge voltage	(default)54.5V  [12] bCw54.5	Range from 40V-59V, must fit the battery to set value, the value must lower than High voltage Protect 1V
13	BFV Battery float charge voltage	(default)55.5V  [13] bFw55.5	Range from 40V-59V, must fit the battery to set value, the value must lower than High voltage Protect 1V
14	BOV Protectie tensiune ridicata baterie	(default)56.5V  [14] bOw56.5	Range from 40V-59V, must fit the battery to set value, the value must higher than const/float charge voltage 1V
15	Protectie tensiune scazuta baterie	(default)44.0V  [15] bUw44.0	Range from 40V-59V, must fit the battery to set value, the value must lower than stop discharge voltage 1V
16	CT anti-flux Enable	(default)OFF  [16] Ct OFF	Set anti-flux Disable function
		ON  [16] Ct ON	Set anti-flux Enable function
17	Parallel Enable	PAR OFF  [17] PAR OFF	Set Disable Parallel function
		PAR ON  [17] PAR ON	Set Enable Parallel function

7.3 Setare parametri prin WiFi

Prin aplicatia WiFi, puteti seta parametrul bateriei, timpul de incarcare de la retea, etc. Daca nu personalizati parametrul, inverterul va functiona cu setarile default.

Asigurati-va ca firele sunt conectate corect inainte de a porni intrerupatorul AC si intrerupatorul pentru baterie. Comutatorul PV va trebui activat mai intai ca sa porneasca inverterul iar parametrii bateriei trebuie setati in functie de sistemul bateriei si de timpul de lucru. Altfel, inverterul va functiona la parametrii impliciti si nu va mai corespunde cu tensiunea si capacitatea bateriei.

8 Comunicare

Inverterul PNI foloseste Wi-Fi ca standard de comunicare wireless. Pentru detalii despre modul de comunicare, va rugam sa cititi ghidul "Wi-Fi Plug14 Data Acquisition".

9 Probleme si solutii

Cateodata inverterul nu functioneaza corespunzator, recomandam solutiile de mai jos.

Cod eroare	Mesaj eroare	Descriere	Sugestie
01	N/A		
02	Eroare comunicare BMS	Eroare comunicare BMS	1.Verificati daca interfata de comunicare BMS este normala si re conectati linia de comunicare BMS. 2. Daca eroare persista, contactati instalatorul sistemului sau distribuitorul.
03	Eroare lipsa baterie	Eroare lipsa baterie	1.Verificati daca bateria este conectata corect 2.Verificati daca tensiunea bateriei este scazuta, daca da, incarcati bateria 3.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul.
04	Eroare suprasarcina backup	Eroare suprasarcina backup	1.Verificati daca sarcina EPS depaseste intervalul acceptat de inverter 2. Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
05	Eroare temperatura incarcator	Eroare temperatura incarcator	1.Verificati temperatura mediului unde se afla inverterul 2.Verificati daca NTC este conectat corect 3. Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
06	Eroare temperatura baterie	Eroare temperatura baterie	1. Verificati temperatura mediului unde se afla bateria 2. Verificati daca NTC este conectat corect 3. Daca este o baterie litiu, restart BMS si vedeti daca eroarea persista

07	Eroare Charger	Eroare supracurent sau supratensiune charger	1.daca bateria este litiu reporniti BMS-ul (battery management system) bateriei si verificati daca persista eroarea. 2.daca eroarea persista, sau daca este o baterie cu plumb acid, reporniti inverterul 3. Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
08	Eroare Soft Up	Eroare pornite Charger	1.Reporniti inverterul 2. Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
11	Eroare Grid CT	Eroare self-test CT	1.Verificati conexiunea CT reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
12	Eroare self-test CET	Eroare self-test CET	1.Reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
13	Eroare STMF103 Com	Eroare comunicare chip placa de baza	1.Reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
17	Eroare frecventa inverter	Eroare frecventa inverter	1.Reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
18	Eroare releu	Eroare releu	1.Reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
19	Eroare tensiune de iesire	Eroare tensiune de iesire	1.Reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
20	Defectiune GFCI	Defectiune dispozitiv GFCI	1.Reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
21	Eroare Hall Sensor	Eroare HCT	1.Reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
22	Eroare comunicatie	Eroare comunicatie CPU	1.Reporniti inverterul 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul
23	Eroare tensiune BUS	Eroare tensiune BUS	1.Check if the PV voltage exceeds the inverter input voltage range. 2.Reporniti inverterul 3. Daca mesajul de eroare persista contactati instalatorul sau distribuitorul.
24	Eroare curent inverter	Eroare supra-curent inverter	1.Reporniti inverterul 2. Daca mesajul de eroare persista contactati instalatorul sistemului sau distribuitorul.

25	Lipsa retea	Nu este nici o conexiune la retea sau eroare putere retea.	1.Verificati toate cablurile SC, mai ales impamantarea 2. Daca mesajul de eroare persista contactati instalatorul sistemului sau distribuitorul.
26	Eroare PV ISO	Problema de izolare	1.Verificati daca carcasa panoului este impamantata corect 2.Verificati daca invertorul este impamantat 3.Check if the DC breaker gets wet. 4.Daca mesajul de eroare persista contactati instalatorul sistemului sau distribuitorul.
27	GFCI High		1.Reporniti invertorul. 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul.
28	DCI High	Curentul DC de iesire offset este prea mare	1.Reporniti invertorul. 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul.
29	Eroare tensiune mare PV	Tensiunea DC de intrare depasete valoarea maxima tolerata.	1.Deconectati imediat comutatorul DC. 2.Daca eroare persista, contactati instalatorul sistemului sau distribuitorul.
30	Eroare tensiune retea	Tensiunea retelei publice este in afara intervalului permis.	1.Verificati tensiunea retelei. 2.Daca eroare persista chiar daca tensiunea retelei este in intervalul permis, contactati instalatorul sistemului sau distribuitorul.
31	Eroare frecventa retea	Frecventa retelei publice este in afara intervalului permis.	1.Verificati frecventa retelei. 2.Daca eroare persista chiar daca frecventa retelei este in intervalul permis, contactati instalatorul sistemului sau distribuitorul.
32	Eroare temperatura inverter	Eroare NTC	1.Reporniti invertorul. 2.Daca eroarea persista, contactati instalatorul sistemului sau distribuitorul.

Table 9-1

10 Intretinerea si curatatea

10.1 Verificarea disiparii caldurii

Daca invertorul in mod frecvent isi reduce puterea de iesire datorita temperaturii ridicate, imbunatatiti conditiile de disipare a caldurii. Curatati periodic ventilatorul de racire..

10.2 Curatarea invertorului

Daca invertorul este murdar, inchideti intrerupatorul AC si intrerupatorul DC, asteptati ca invertorul sa se inchida, apoi curatati-i carcasa si ecranul cu o carpa moale. Nu folositi substante de curatate (detergenti) sau substante abrazive.

10.3 Verificarea deconectarii DC

Verificati periodic daca exista deteriorari si decolorari vizibile ale intrerupatorului si ale cablurilor. Daca observati deteriorari sau decolorari, apelati la un centru specializat.

O data pe an, rotiti de 5 ori consecutiv butonul DC de pe pozitia ON pe pozitia OFF. Aceasta procedura curata contactii de pe buton si-i prelungeste viata.

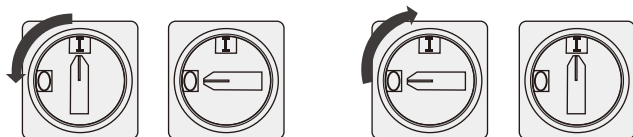


Figure 10-1

11 Dezafectare

11.1 Dezafectarea invertorului

- (1) Deconectati invertorul de la retea, PV si baterie.
- (2) Scoateti toate cablurile de conexiune din invertor.
- (3) Desurubati toate presetupele de pe cabluri.
- (4) Dati jos invertorul de pe suportul sau si desurubati suportul.



Pericol de arsuri datorate de atingerea partilor fierbinti!

Dupa deconectarea invertorului, asteptati >20 min. inainte de a-l atinge, ca acesta sa se raceasca

11.2 Ambalarea invertorului

Daca este posibil, ambalati tot timpul invertorul in ambalajul original si strangeti-l cu benzi. Daca nu mai aveti ambalajul original, puteti folosi o cutie de carton asemanatoare. Cutia trebuie sa suporte greutatea si dimensiunea invertorului.

11.3 Depozitarea invertorului

Depozitati invertorul intr-un loc uscat cu o temperatura cuprinsa intre -25°C si +60°C.

11.4 Casarea invertorului



Nu aruncati invertoarele sau accesoriile defecte ale acestuia la un loc cu deseurile menajere. Respectati reglementarile privind eliminarea deseurilor electronice care se aplica la locul de instalare in acel moment.

12 Stadii de lucru

In functie de conditii, invertorul are in principal urmatoarele stadii de lucru.

Descriere	Afisaj ecran LCD
Stadiul 1: Energia produsa de sistemul PV este folosit pentru optimizarea autoconsumului. Excesul de energie este folosit pentru a reincarca bateriile, apoi este exportat in retea.	
Stadiul 2: Cand nu exista PV, si bateria este suficienta, poate furniza energie impreuna cu reseaua publica.	
Stadiul 3: Cand alimentarea de la retea esueaza, sistemul trece automat pe modul "offline grid". Sarcina EPS poate fi suportata de PV si baterie.	
Stadiul 4: Bateria poate fi incarcata fortat de la retea, si timpul de incarcare/puterea pot fi setate prin aplicatia PV Master APP.	

Table 12-1

1 Notes on this manual

1.1 Validity

This User Manual describes instructions and detailed procedures for installing, operating, maintaining, and troubleshooting of the following energy storage inverter: 3.6KW, 4.2KW,4.6KW, 5KW.

Please keep this manual all time available in case of emergency.

This manual does not cover any details concerning equipment connected to the unit (e.g. PV modules). Information concerning the connected equipment is available from the manufacturer of the equipment.

1.2 Use instructions

1.2.1 Only professionals who have read and fully understand all the safety rules contained in this manual can install, maintain and repair this inverter. The operator must be aware that this is a high-voltage device. Qualified personnel must be trained to deal with the danger of installing electrical equipment.

1.2.2 Before using the inverter, read all labels and warning labels on this machine and instructions carefully and store the instructions in a place easily found. We are not responsible for any damage caused by non-compliance with these instructions.

1.2.3 The energy storage inverter strictly comply with local laws and regulations in testing and design.

1.2.4 The local safety standards should be complied with during the installation, operation and maintenance of the inverter.

1.2.5 Incorrect operation may cause electric shock or damage to the inverter.

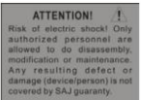
1.3 Symbols

Pay attention to the relevant identification in the product manual and product packaging.

1.3.1 Markings in the manual

SYMBOL	DESCRIPTION
 DANGER	Danger indicates a hazardous situation which, if not avoided, will result in death or serious injury.
 WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury or moderate injury.
 CAUTION	CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
 NOTE	NOTICE indicates a situation that can result in potential damage, if not avoided.
	Read the manual.

1.3.2 Markings on this product

Symbol	Description
	Warning regarding dangerous voltage The product works with high voltage. All work on the product must only be performed as described in its documentation.
	Beware of hot surface The product can become hot during operation. Do not touch the product during operation.
	Observe the operating instructions Read the product's documentation before working on it. Follow all safety precautions and instructions as described in the documentation.
	CE Mark Equipment with the CE mark fulfills the basic requirements of the Guideline Governing Low-Voltage and Electro-magnetic Compatibility.
	SAA Mark The inverter complies with the requirement of Equipment and Product Safety Act in Australia.
	CQC Mark Equipment standard with China Quality Inspection Center safety directive.
	ATTENTION! Risk of electric shock! Only authorized personnel are allowed to do disassembly, modification or maintenance. Any resulting defect or damage (device/person) is not covered by S&W warranty.
	Point of connection for grounding protection
	Direct Current (DC)
	Alternating Current (AC)
	Signals danger due to electrical shock and indicates the times (5 minutes) to allow after the inverter has been turned off and disconnected to ensure safety in any installation operation.

2 Safety and conformity

SYMBOL	INSTRUCTIONS
  DANGER	Danger to life due to lethal voltages! Lethal voltages are present within the unit and on the power supply lines. Therefore, only authorized electricians may install and open the unit. Even when the unit is disconnected, high contact voltages may still be present within the unit.
  DANGER	Danger of burn injuries due to hot enclosure parts! During operation, the four sides of the enclosure lid and the heat sink may become hot. Only touch the front enclosure lid during operation.

 CAUTION	Possible damage to health as a result of the effects of radiation! In special cases, there may still be interference for the specified application area despite maintaining standardized emission limit values (e.g. when sensitive equipment is located at the setup location or when the setup location is near radio or television receivers). In this case, the operator is obliged to take proper action to rectify the situation. Do not stay closer than 20 cm to the inverter for any length of time.
 NOTE	Grounding the PV generator! Comply with the local requirements for grounding the PV modules and the PV generator. We recommend connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction with ground in order to have optimal protection of the system and personnel.
 NOTE	Capacitive Discharge Currents! PV modules with large capacities relative to earth, such as thin-film PV modules with cells on a metallic substrate, may only be used if their coupling capacity does not exceed 470nF. During feed-in operation, a leakage current flows from the cells to earth, the size of which depends on the manner in which the PV modules are installed (e.g. foil on metal roof) and on the weather (rain, snow). This "normal" leakage current may not exceed 50mA due to the fact that the inverter would otherwise automatically disconnect from the electricity grid as a protective measure.

2.1 DC and AC breaker

Separate the unit securely from the grid and the PV, generators and battery using DC and AC breaker. DC and AC breaker shall be able to disconnect all non-ground conductors after installation.

2.2 Grounding the PV modules

The unit is a transformerless inverter. That is why it has no galvanic separation. Do not ground the DC circuits of the PV modules connected to the unit. Only ground the mounting frame of the PV modules.

If you connect grounded PV modules to the unit the error message "PV Isolation Low".

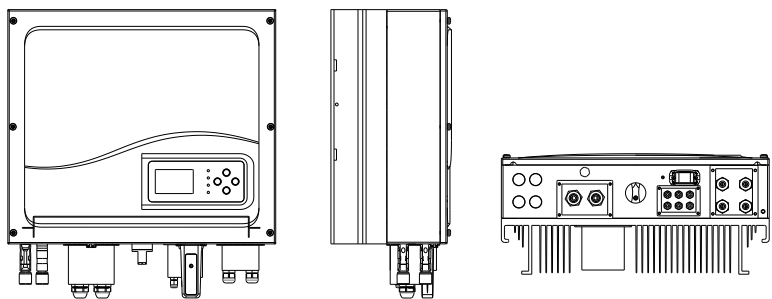
2.3 Qualification of Skilled Workers

Only workers with the following skills should install this inverter:

- Knowledge of how an inverter works and is operated.
- Instructed in how to deal with the dangers and risks associated with installing and using electrical devices and plants.
- Training in the installation and commissioning of electrical devices and plants.
- Knowledge of all applicable standards and guidelines.
- Knowledge and observance of this manual and all safety instructions.

3 Product Description

3.1 Inverter Overview



3.2 Information of the unit

The unit is a bidirectional energy storage inverter, suitable for photovoltaic systems with batteries to store energy. The unit is bidirectional which applies to PV systems with batteries to store energy. Energy produced by the PV system is used to optimize self-consumption; excess energy is used to charge the batteries, and then fed into the public grid when the PV energy is adequate. When PV energy output is insufficient to support connected loads, the system automatically draws energy from the batteries if battery capacity is abundant. If the battery capacity is insufficient to meet own consumption requirements, electricity will be drawn from the public grid.

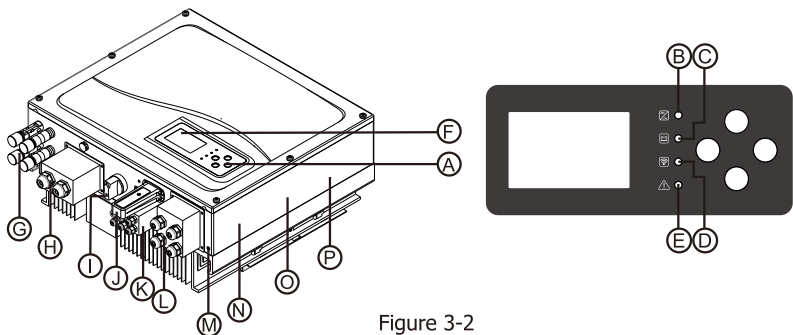


Figure 3-2

A	Function button
B	The inverter operation status indicator
C	Battery indicator
D	Wi-Fi status indicator
E	Fault indicator
F	LCD display panel
G	PV input terminals
H	Battery input terminals and cover
I	PV input switch
J	Wi-Fi com module
K	BTS terminal, BMS terminal, load monitor terminal, dry contact terminal, CAN communication terminal, USB terminal and cover
L	AC Output terminals and cover
M	Secondary grounding hole
N	Inverter Serial No.
O	Rating label
P	Warning signals label

3.3 Storage of Inverter

If you want to store the unit in your warehouse, you should choose an appropriate location:

- The unit must be stored in its original package and desiccant must be left in the package.
- The storage temperature should always be between -25°C and +60°C.
- The storage relative humidity should always be between 0 and 95%.
- A maximum of four units can be stacked vertically.

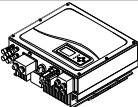
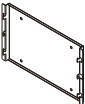
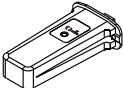
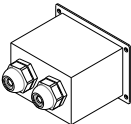
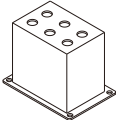
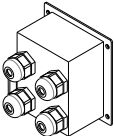
4 Unpacking

4.1 Check the Package

Although The inverter have surpassed stringent testing and are checked before they leave the factory, it is uncertain that the inverter. may suffer damages during transportation. Please check the package for any obvious signs of damage, and if such evidence is present, do not open the package and contact your dealer as soon as possible.

4.2 Check the Assembly Parts

After opening the package, please refer to Table 4-1 to check the completeness of the assembly parts. Please contact your dealer if anything is damaged or missing.

NO.	Pictures	Description	Quantity and Unit
1		inverter	1PCS
2		Mounting frame	1PCS
3		Wi-Fi module	1PCS
4		BAT wire cover	1PCS
5		BMS, RS485 com wire cover	1PCS
6		AC output cover	1PCS
7		Blasting screws	4PCS
8		Inverter hold screw	2PCS

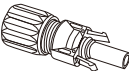
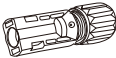
9		Battery input terminal	2PCS
10		PV+ input terminal	2PCS
11		PV- input terminal	2PCS
12		Metal terminals secured to PV+ input power cables	2PCS
13		Metal terminals secured to PV- input power cables	2PCS
14		CT	1PCS
15		User Manual	1PCS

Table 4-1

4.3 tools

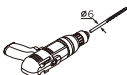
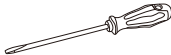
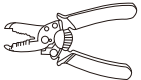
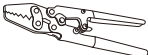
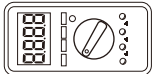
NO.	Tool	Model	Function
1		Hammer drill Recommend drill dia. 6mm	To drill holes on the wall
2		Unscrew screw	Lock the screws that mounting frame, battery terminals, and AC terminals
3		Removal tool	Removal PV terminal
4		Wire stripper	Strip wire
5		Crimping tools	To crimp power cables
6		multimeter	Measuring grid voltage

Table 4-2

5 Installation and Electrical Connection

5.1 Safety



DANGER

Danger to life due to fire or explosion

Despite careful construction, electrical devices can cause fires. Do not install the inverter on easily flammable materials and where flammable materials are stored.



DANGER

Risk of burns due to hot enclosure parts

Mount the inverter in such a way that it cannot be touched inadvertently.



DANGER

All electrical installations shall be done in accordance with the local and national electrical codes.

Do not remove the casing. Inverter contains no user serviceable parts. Refer servicing to qualified service personnel. All wiring and electrical installation should be conducted by a qualified service personnel.

Other installation points:

- Carefully remove the unit from its packaging and inspect for external damage. If you find any imperfections, please contact the installation contractor or supplier.
- Be sure that the inverter connect to the ground in order to protect property and personal safety.
- The inverter must only be operated with a PV generator. Do not connect any other source of energy to it.
- Both AC and DC voltage sources are terminated inside the PV Inverter. Please disconnect these circuits before servicing.
- This unit is designed to feed power to the public power grid (utility) only. Do not connect this unit to an AC source. Connecting the inverter to external devices could result in serious damage to your equipment.
- When a PV panel is exposed to light, it generates a DC voltage. When connected to this equipment, a PV panel will charge the DC link capacitors.
- Energy stored in this equipment's DC link capacitors presents a risk of electric shock. Even after the unit is disconnected from the grid and photovoltaic panels, high voltages may still exist inside the PV-Inverter. Do not remove the casing until at least 5 minutes after disconnecting all power sources.
- Although designed to meet all safety requirements, some parts and surfaces of Inverter are still hot during operation. To reduce the risk of injury, do not touch the heat sink at the back of the PV-Inverter or nearby surfaces while Inverter is operating.

5.2 Selecting the installation location

This is guidance for installer to choose a suitable installation location, to avoid potential damages to device and operators.

- The unit shall be mounted at least 914 mm (3 feet) above the ground.
- The installation location must be suitable for the inverter's weight and dimensions for a long period of time.
- Select the installation location so that the status display can be easily viewed.
- Do not install the inverter on structures constructed of flammable or thermolabile materials.
- The humidity of the installation location should be 0~95% without condensation.
- The installation location must be free and safe to access at all times.
- Installation must be vertical or tilted backwards by max. 15° and make sure the connection of the inverter is downwards. Never install horizontally. Avoid forward or sideways tilt.

- Be sure that the inverter is out of children’s reach.
- Don’t put anything on top of or cover the inverter.
- Do not install the inverter near television antennae or any other antennae/antennae cables.
- The inverter requires adequate cooling space. Ensure good ventilation for the inverter to ensure the heat escape adequately. The ambient temperature should be below 40°C to ensure optimum operation.

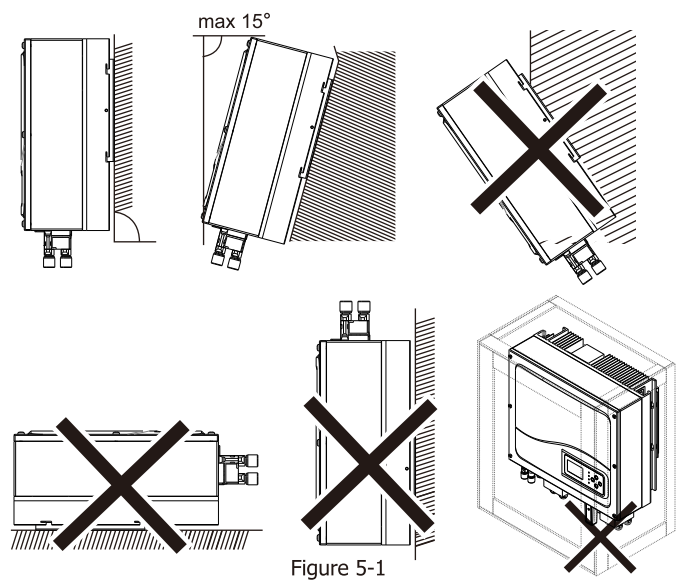


Figure 5-1

- The inverter should not be installed in direct sunlight and should have some coverage from the elements:

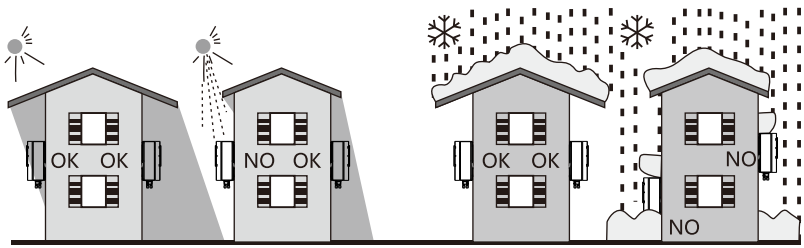


Figure 5-2

- Observe the minimum clearances to walls, other inverters or objects as shown in the diagrams below in order to guarantee sufficient heat dissipation.

Direction	Min. clearance (cm)
above	80
below	50
sides	50
front	30

Table 5-1

Ambient dimensions of one inverter

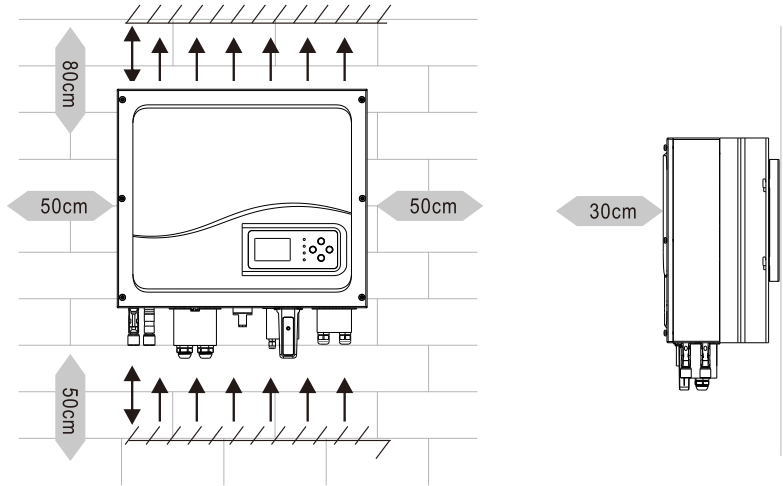


Figure 5-3

Ambient dimensions of a series inverters:

- There must be sufficient space between each individual inverter to ensure that the cooling air of the adjacent inverter is not taken in.
- If necessary, increase the clearance space and make sure there is enough fresh air supply to ensure sufficient cooling of the inverters.

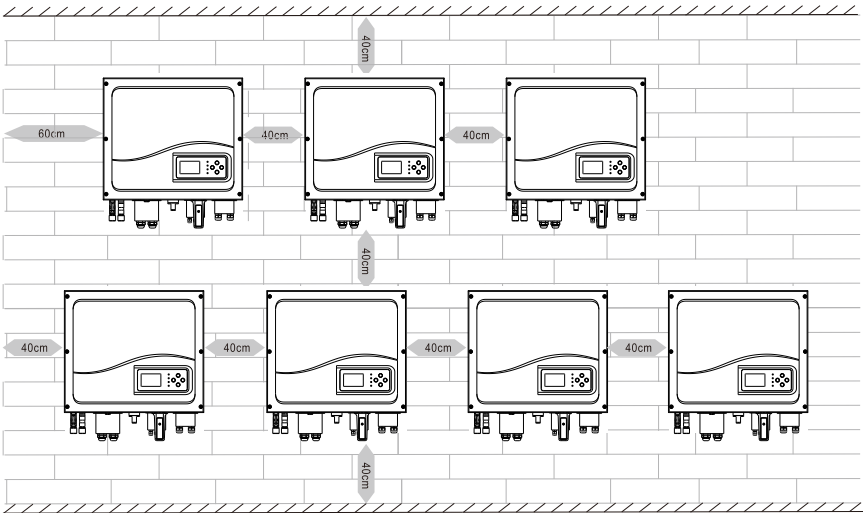


Figure 5-4

5.3 Mounting the Inverter with bracket



WARNING

In order to avoid electrical shock or other injury, inspect existing electronic or plumbing installations before drilling holes.

The dimension of bracket as follows:

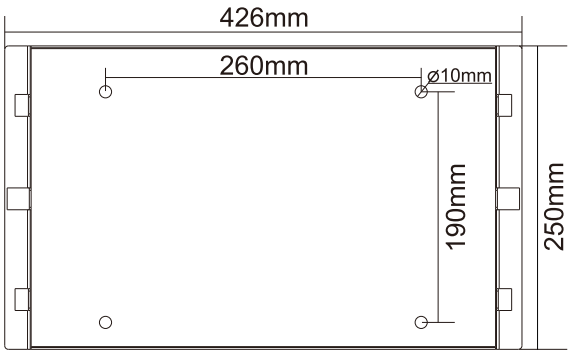


Figure 5-5

- Using the mounting frame as a template, drill holes as illustrated in image.
- Fix the mounting frame as the figure shows. Do not make the screws to be flush to the wall, Instead, leave 2 to 4mm exposed.

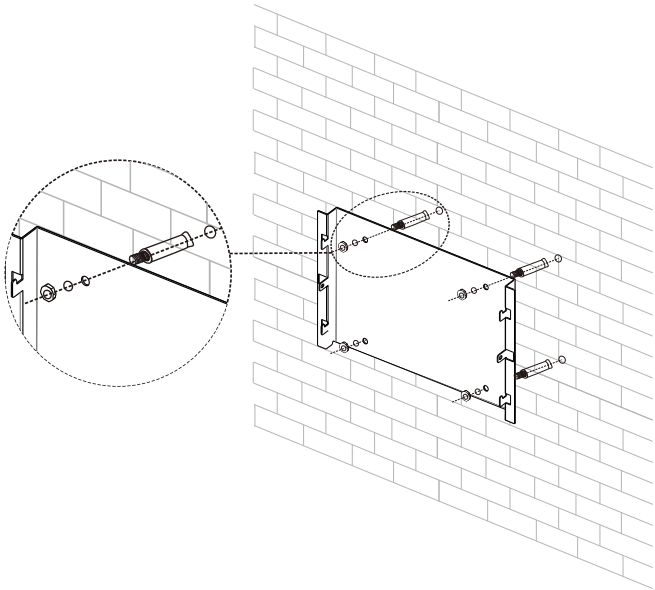


Figure 5-6

5.4 Fixed the inverter on the wall



WARNING

Falling equipment can cause serious or even fatal injury, never mount the inverter on the bracket unless you are sure that the mounting frame is firmly mounted on the wall after cautious checking.

Raise the inverter a little higher than the bracket whilst maintaining the balance of the inverter.

- Hang the inverter on the bracket through the match hooks on bracket.

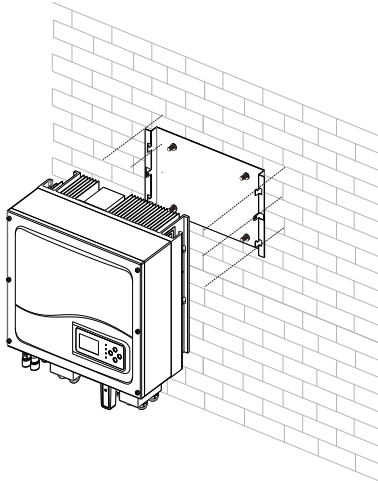


Figure 5-7

- After confirming the inverter is fixed reliably, fasten two M5 safety-lock sockets head cap screws on the left and right side firmly to prevent the inverter from being lifted off the bracket.

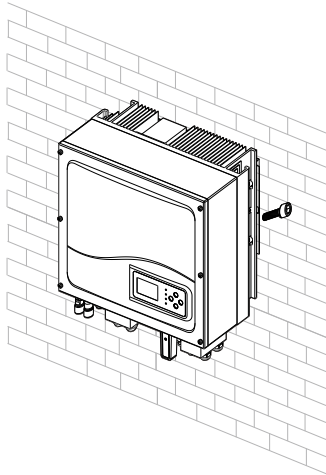


Figure 5-8

5.5 Check Inverter Installation Status

- Check the upper straps of inverter and ensure it fits on to the bracket.
- Check the secure mounting of the inverter by trying to raise it from the bottom. The inverter should remain firmly attached.
- Choose a strong mounting wall to prevent vibration while inverter is operating.

5.6 Electrical Connection

5.6.1 Safety



WARNING

Danger to life due to lethal voltages!

High voltages which may cause electric shocks are present in the conductive parts of the inverter. Prior to performing any work on the inverter, disconnect the inverter on the AC side, PV side, battery side.

Do not reverse input the battery as this will destroy the inverter!



WARNING

Danger of damage to electronic components due to electrostatic discharge.

Take appropriate ESD precautions when replacing and installing the inverter.



WARNING

Grounding

Before connecting the power cables, you must connect ground wire first.

Note:

- The electrical connection must be carried out by professional technicians. Before any electrical connection is made, it must be kept in mind that the inverter is bi-directionally powered. Professional personnel must wear personal protective equipment such as insulating gloves, insulating rubber shoes and safety helmet when making electrical connections.
- Electrical connections should follow appropriate rules such as conductor cross-sectional area, fuses, and grounding protection.

5.6.2 System Diagram with Inverter Electrical

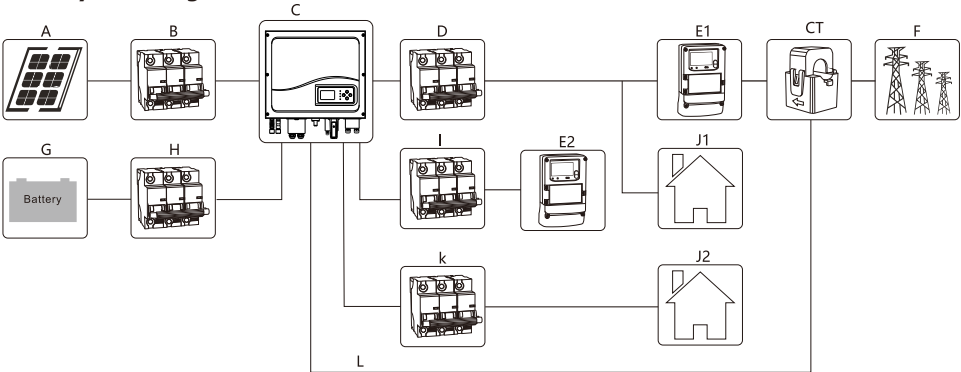


Figure 5-9

Position	Description
A	PV module
B	PV side breake
C	Inverte
D	Main AC output breaker
E1&E2	Energy meter, E1 is used to detect utility power consumption, and E2 is used to detect PV generation
F	Utility grid
G	Battery
H	Battery DC breaker
I	Inverter side breaker
J1&J2	J1 is normal load, J2 important load (maximum 2500VA)
K	Back-up output breaker(max.2500VA)
L	Load monitor
CT	Detect current flow from grid / out to grid

Table 5-1

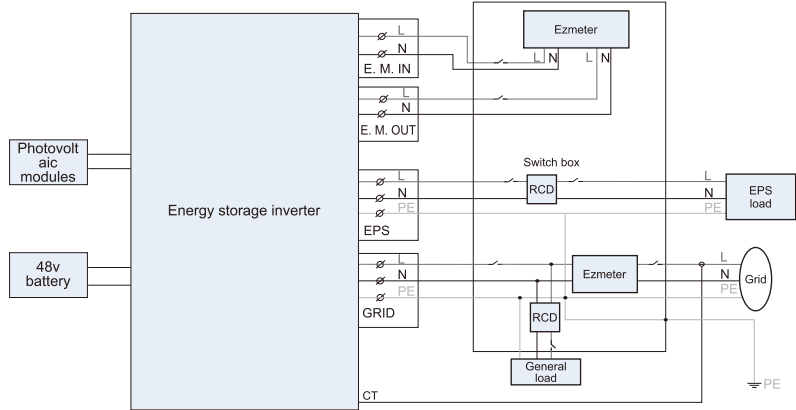


Figure 5-10

5.6.3 Connecting to the grid (AC utility)



NOTE

- Use only solid or stranded wire but not fine stranded wire.
- Use cables with high ambient temperatures.
- Use cables with a large cross-section.

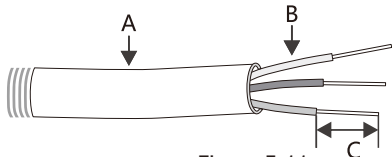


Figure 5-11

Bare length C=8mm,Output cable requirements:

Product Model	Area(mm²) B	AWG No.
3.6KW	5.26~9.0	8~10
4.2KW	5.26~9.0	8~10
4.6KW	5.26~9.0	8~10
5KW	5.26~9.0	8~10

Table 5-2



NOTE

The cable length should not exceed 48 m as the resistance of the cable will consume inverter output power and reduce the inverter efficiency.

• Connect bidirectional meter

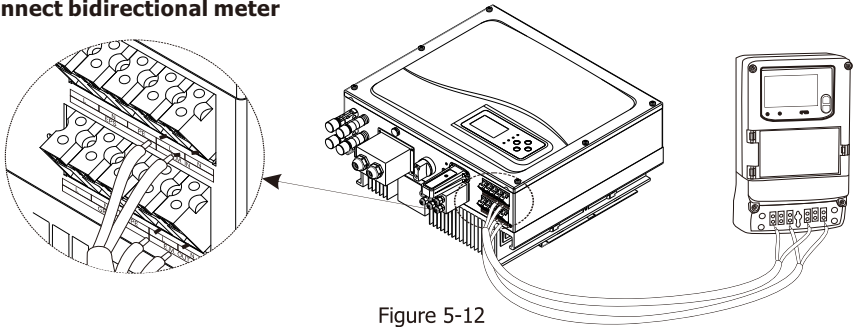


Figure 5-12



WARNING

- A separate single-phase AC circuit breaker must be installed between the inverter and the bi-directional meter for each inverter. The separate disconnection unit has below requirement:
Voltage: the voltage must not be less than the AC grid voltage which you connect.
Current: the current must not be less than 1.2 times of the inverter max output current which defined in the inverter spec.
- The bidirectional meter must be installed near the inverter, and the total length of the incoming and outgoing meter lines should not exceed 2m.

We suggest the AC separate unit spec as follow:

3.6KW	24A/230V
4.2KW	28A/230V
4.6KW	30A/230V
5KW	32A/230V

Table 5-3

The function of the bidirectional meter is to record the PV generation for the user. If the user does not need this function, please wire it as shown below.(Inverter default shipping method)

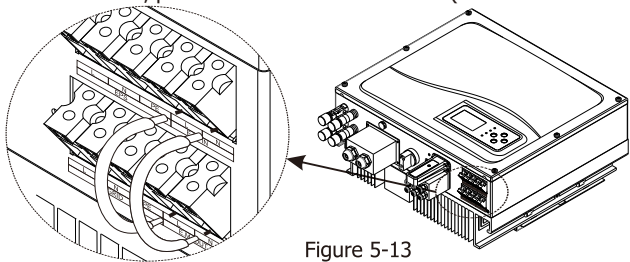


Figure 5-13

• Connecting to the grid.

The wiring is as follows:

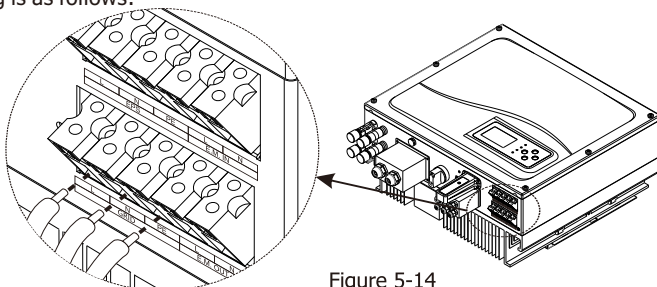


Figure 5-14



WARNING

- You must install a separate AC circuit-breaker or other load disconnection unit between the inverter and utility, in order to ensure that the inverter can be safely disconnected under load. The separate disconnection unit has below requirement:

Voltage: the voltage must not be less than the AC grid voltage which you connect.

Current: the current must not be less than 1.2 times of the inverter max output current which defined in the inverter spec.

- The inverter has leakage current detection and protection functions. If a leakage current detection function AC circuit breaker is selected, the rated residual current of the circuit breaker must be more than 300 mA.

- Single-phase AC circuit breakers are selected according to Table 5-3.

• Connecting to the back-up.

The back-up can provide max output power 2300VA and you can connect the important load to the back-up terminal, however you must install a AC separate circuit-breaker or other load disconnection unit between the inverter back-up output and the important load, in order to ensure that the inverter can be safely disconnected under load.

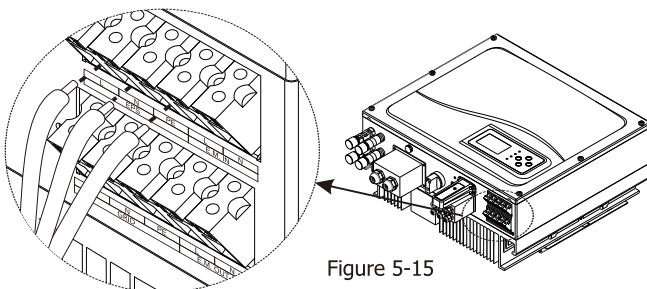


Figure 5-15

We suggest the separate unit spec is 20A.



WARNING

The back-up MAX output power is 2300VA, if the load greater than 2300VA, and after overload fault happen 3 times, the inverter will stop output. The output power of back-up also depends on the battery capacity.

• Grounding the inverter

The inverter must be connected to the AC grounding conductor of the power distribution grid via the ground terminal (PE) ⊕, The symbol "PE" is shown in Figure 5-14 and Figure 5-15. If necessary, ground the chassis as shown below.

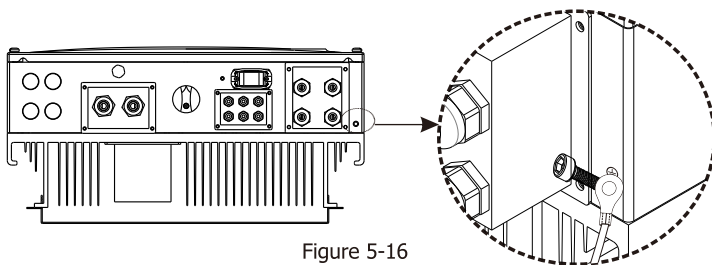


Figure 5-16

• Wiring steps

A. Open the AC waterproof cover and pass the AC cable through the waterproof cover locking screw hole.

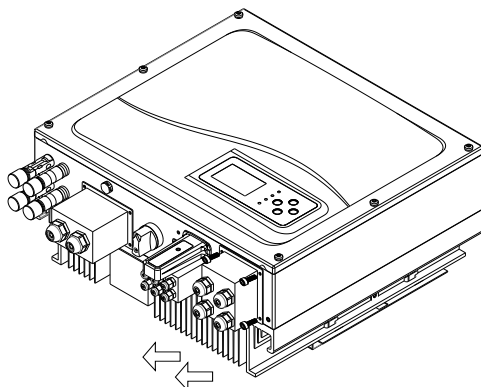


Figure 5-17

B. According to the wiring identifiers "EPS", "GRID", "E.M.IN" and "E.M.OUT", respectively, corresponding to their "L/N/PE" connected cables.

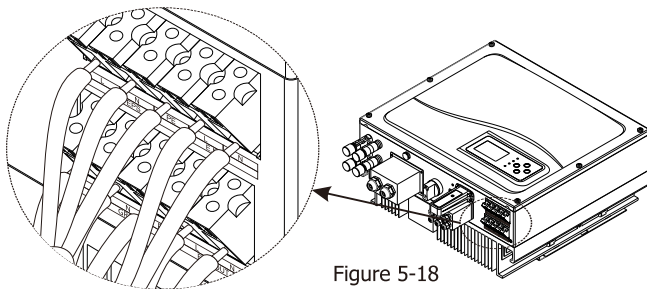


Figure 5-18

C. Secure the AC waterproof cover and tighten the connections.

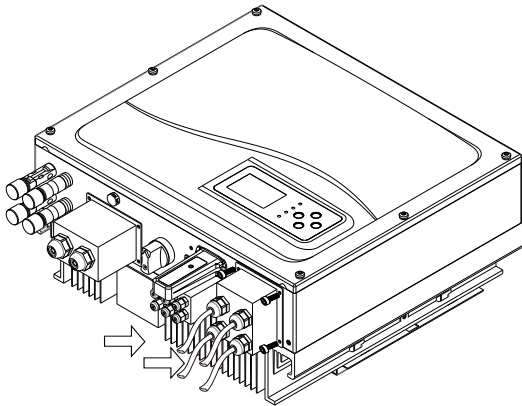


Figure 5-19

5.6.4 Connect to PV Panel



DANGER

Risk of electric shock and fire, use only with PV modules, and with a maximum system voltage of 580Vdc.



DANGER

Electric shock hazard, the DC conductors of this PV system are normally ungrounded but will become intermittently grounded without indication when the inverter detects the PV array isolation.



DANGER

Do not disconnect the DC connectors under load.



DANGER

Because of the transformerless design, the DC positive pole and DC negative pole of PV arrays are not permitted to be grounded.

• **Connecting PV Input Power Cables**

Step1 Remove cable glands from the positive and negative connectors.

Step2 Take out metal terminals from accessory package, Wiring as illustrated in image.

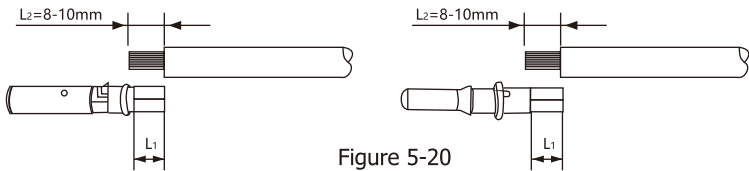


Figure 5-20

Step3 Insert the positive and negative power cables into corresponding cable glands.

Step4 Insert the stripped positive and negative power cables into the positive and negative metal terminals respectively and crimp them using a crimping tool. Ensure that the cables are crimped until they cannot be pulled out by force less than 400 N, as shown in image.

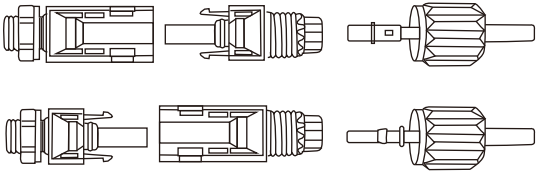


Figure 5-21

Step5 Insert the positive and negative connectors into corresponding DC input terminals of the PH5000 until you hear a "click" sound.

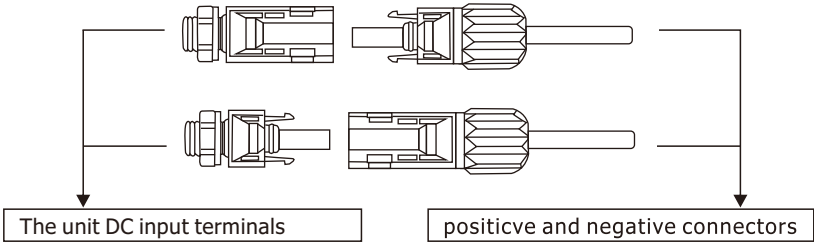


Figure 5-22

• Conditions for DC Connection

The PH500 single-phase inverter has 2 independent input : input A & input B.

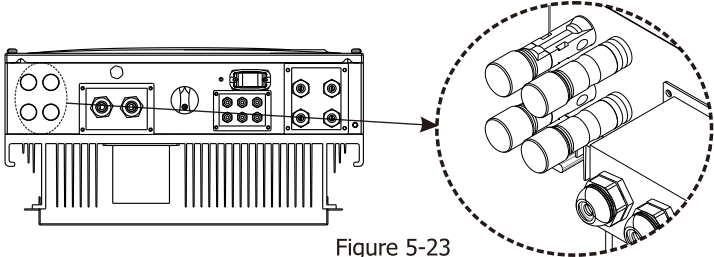


Figure 5-23

The diagram drawing of DC side is shown as below, notice that the connectors are in paired(male and female connectors). The connectors for PV arrays and inverters are H4 (yunfan) connectors.

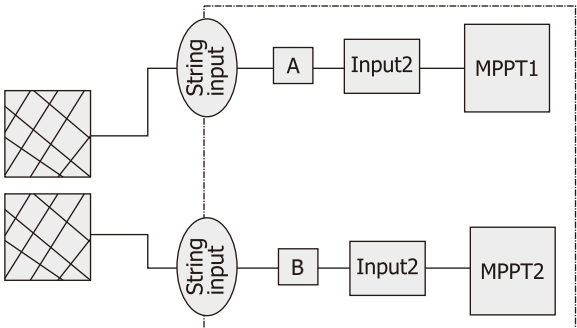


Figure 5-24

Suggestions for the PV modules of the connected strings:

- A. Same type
- B. Same quantity of PV modules connected in series



CAUTION

If the inverter is not equipped with a PV switch but this is mandatory in the country of installation, install an external PV switch.

The following limit values at the PV input of the inverter must not be exceeded:

Product Model	Max.current input A	Max.current input B
3.6KW	11A	11A
4.2KW	11A	11A
4.6KW	11A	11A
5KW	11A	11A

Table 5-4

• Conditions for DC Connection



CAUTION

Before connecting the PV array, ensure that the DC switch and AC breaker are disconnect from the inverter. NEVER connect or disconnect the DC connectors under load.
Make sure the maximum open circuit voltage(Voc) of each PV string is Less than 580Vdc.
Check the design of the PV plant. The Max. open circuit voltage, which can occur at solar panels temperature of -10°C, must not exceed the Max.input voltage of the inverter.



WARNING

Improper operation during the wiring process can cause fatal injury to operator or unrecoverable damage to the inverter. Only qualified personnel can perform the wiring work.



WARNING

Because of the transformerless design, the DC positive pole and DC negative pole of PV arrays are not permitted to be grounded.

Cable requirements:

Product Model	Area(mm ²) B	AWG No.
3.6KW	5.26~9.0	8~10
4.2KW	5.26~9.0	8~10
4.6KW	5.26~9.0	8~10
5KW	5.26~9.0	8~10

Table 5-5

5.6.5 connect to the battery

Before connecting to the battery, you must install a separate PV breaker (not less than 120A) between the inverter and battery that will ensure the inverter can be securely disconnected during maintenance.

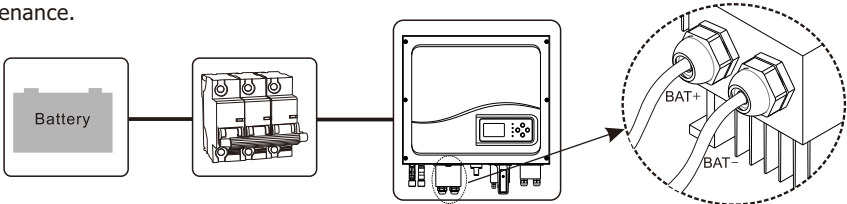


Figure 5-25



DANGER

Reversed polarity will damage the inverter!!!

It is very important for system safety and efficient operation to use appropriate cable for battery connection. To reduce risk of injury, you much use the recommended cable size, refer to the below chart.

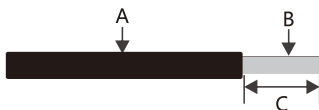


Figure 5-26

Grade	Description	Value
A	O.D.	10~12mm
B	Conductor Material Sectional Area	20~25mm ²
C	Bare Wire Length	10mm around

Table 5-6

The battery installation must comply with the manufacturer's user manual, include installing indoor or outdoor and the distance to the inverter.

The maximum charge/discharge current is 50A of the inverter, check the battery current in the spec. As the inverter's battery rated voltage is 48V, the battery series connection voltage much not exceed 48V or it will damage the inverter.

The following steps must be adhered to in order to implement the battery connection:

- (1) Disconnect the breaker between inverter and battery.
- (2) Check the polarity of the battery and the inverter.
- (3) Compress the terminal head by professional tool.
- (4) Screw the wire cable to the inverter's battery input terminal.
- (5) If the inverter connects to a lead-acid type battery, you must connect BTS to the inverter, the CN8 BTS connection terminal in the COM connection port. (Figure 5-25)
- (6) If the inverter connects to a lithium battery, you must connect the BMS to the CN3 BMS com. (Figure 5-27)

Note: we recommend using the appointed lithium battery, because the battery BMS communication has been designed to be compatible with the energy storage Inverter.



DANGER

Danger to life due to voltages!

Before you install the BAT. NTC, you must turn off the inverter, check all the separate breakers are off, and the inverter's LED is off. Then you can safely install the BAT.NTC terminal to the I nverter.

5.6.6 Communication terminal connection

Communication terminal as shown in the figure below:

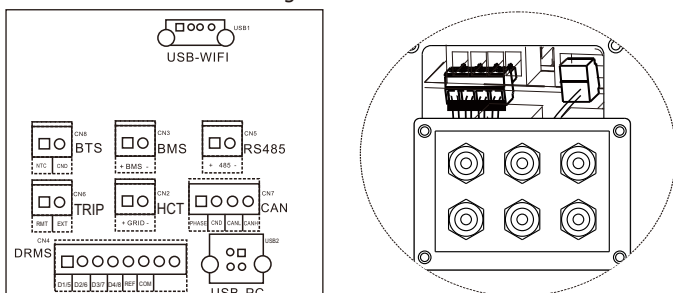


Figure 5-27

5.6.6.1 CT Load monitor connect to the inverter

In single inverter system, a CT must be installed to monitor the power of the house to decide the inverter status: charge or discharge.

The CT must be installed at the beginning from the grid to the house, in this case, the inverter can monitor all household consumption of power. According to the sensor, the inverter will control the PV power feeding to the grid to balance the level of household power use. (Figure5-9)

The CT installation directions are as follows:

- The direction of the CT-marked arrow points to the grid.
- Connect the white and black leads of the CT to the "CN2" CT terminals "+" and "-" on the COM-HCT port of the inverter. (Figure 5-27)

Note: The white line is connected with "+" and the black line with "-", it cannot be reversed.

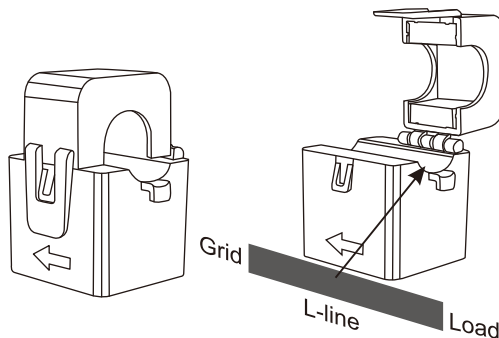


Figure 5-28



WARNING

The load monitor input L-line must be the same as the CT sensor L-line, and the input of the load monitor L&N cannot reverse. If this occurs the inverter will do the reverse direction power control, which means PV power will not store to the battery and the battery cannot discharge the power to the house load.

5.6.6.2 PC connected to inverter

Connect the USB cable to the USB2 USB-PC terminal on the inverter COM port. (Figure 5-27)

Note: Special monitoring software can be installed on the PC. You can set up and monitor the inverter by connecting the inverter via USB. Remove the communication terminal cover when connecting the PC.

5.6.6.3 The DRM0 function for SAA certification

The DRM0 function of the energy storage Inverter be provided for SAA.

The DRM0 is located on the CN6 DRM0 terminal of the inverter's front panel COM port. (See Figure 5-27)

When receive the order from DRM0 connection, the inverter will acting responding to the order, the inverter must POWER OFF or POWER ON.

6 Start-Up and shut down the inverter

6.1 Start-Up the inverter

- (1) Connect the AC circuit breaker
- (2) Turn on the DC switch
- (3) Turn on the battery breaker
- (4) The inverter will start automatically when the PV voltage is higher than 150V and the battery voltage is higher than 44V.

6.2 Turn-off the Inverter

**DANGER**
Do not disconnect the DC connectors under load.

Turn –off the inverter step:

- (1) Disconnect the AC circuit breaker and prevent it from being reactivated.
- (2) Disconnect the Battery breaker and prevent it from being reactivated.
- (3) Turn off the PV switch.
- (4) Check the inverter operating status.
- (5) Wait until LED and LCD display has gone out, this will indicate the inverter is shut down.

7 Display panel and LCD display and settings

7.1 Display panel

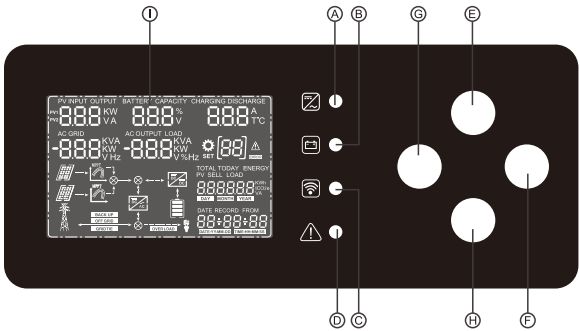


Figure 7-1

The display interface is operated by four functional buttons, which are defined as follows:

No.	Name	Describe
A	LED	Green: Normal Status
B		Yellow: Battery charge or discharge
C		Blue: Wi-Fi or GPRS Communication status
D		Red: Fault Status
E	Button	UP :UP turn or Value increase
F		ENTER :OK
G		ESC : Go to the main menu or leave the current interface
H		Down :Down turn or Value abate
I	LCD	Display machine work information

Table 7-1

7.2 LCD display and settings

7.2.1 LCD Information Definition

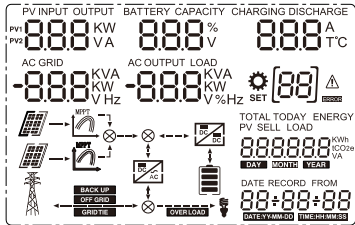


Figure 7-2

Display	Function
PV INPUT OUTPUT PV1 888 KW PV2 888 VA	Indicating the input voltage or current or power of the PV1/PV2. KW: Power; V: Voltage; A: Current.
BATTERY CAPACITY 888 % 888 V	Indicating battery voltage or percentage of battery capacity. V: Voltage; %: Percentage.
CHARGING DISCHARGE 888 A 888 T°C	Indicating the charge current or discharge current of battery or battery temperature of battery.
AC GRID -888 KVA 888 KW V Hz	Indicating of power or voltage or frequency of AC Grid. KVA/KW: Power; V: Voltage; Hz: Frequency.
AC OUTPUT LOAD 888 KVA 888 KW V %Hz	Indicating AC output power or voltage or frequency or percentage with load. KVA/KW: Power; V: Voltage; Hz: Frequency; %: Loaded Percentage.
 [88]	Indicating setup interface page number.
 [88]	Indicating warning or Fault codes. Warning Code: [88] △ . Fault Code: [88] □ .
TOTAL TODAY ENERGY PV SELL LOAD 888888 kWh 888888 kVA DAY MONTH YEAR	Indicating of electricity generation. TOTAL ENERGY PV : Total PV input; TOTAL ENERGY SELL : Total electricity sale; TOTAL ENERGY LOAD : Total load power; TODAY ENERGY PV : PV input today; TODAY ENERGY SELL : Electricity sale today; TODAY ENERGY LOAD : Load power today;
DATE RECORD FROM 88+88+88 DATE+MM+DD TIME+HH+MM+SS	Indicating date and time.
	Indicating solar panel; Flicker refers to PV input voltage out of range.
	Indicating the state of the public grid.
	Indicating battery capacity (0-24%, 25-49%, 50-74% and 75-100%) And charging status.
	Indicating the state of the load.
	Indicating the state of charge or discharge.
	Indicating the state of the inverter or rectifier.

Table 7-2

7.2.2 LCD Display Step

The main interface is the default interface for the system, when the inverter is start on, default display primary interface. There are seven information display blocks in the main interface, (failure and energy flow chart excepted) press "UP" or "DOWN" to page for the following information:(all blocks turn over at the same time)

- (1) PV input voltage, current and power.(Figure 1)
- (2) Percentage of battery voltage and capacity.(Figure 2)
- (3) Battery charge or discharge current, temperature.(Figure 3)
- (4) Inverter output power, voltage, frequency and load current, power.(Figure 4)
- (5) Electric power, voltage, current and frequency.(Figure 5)
- (6) Power or total power generation.(Figure 6)
- (7) Time and date.(Figure 7)

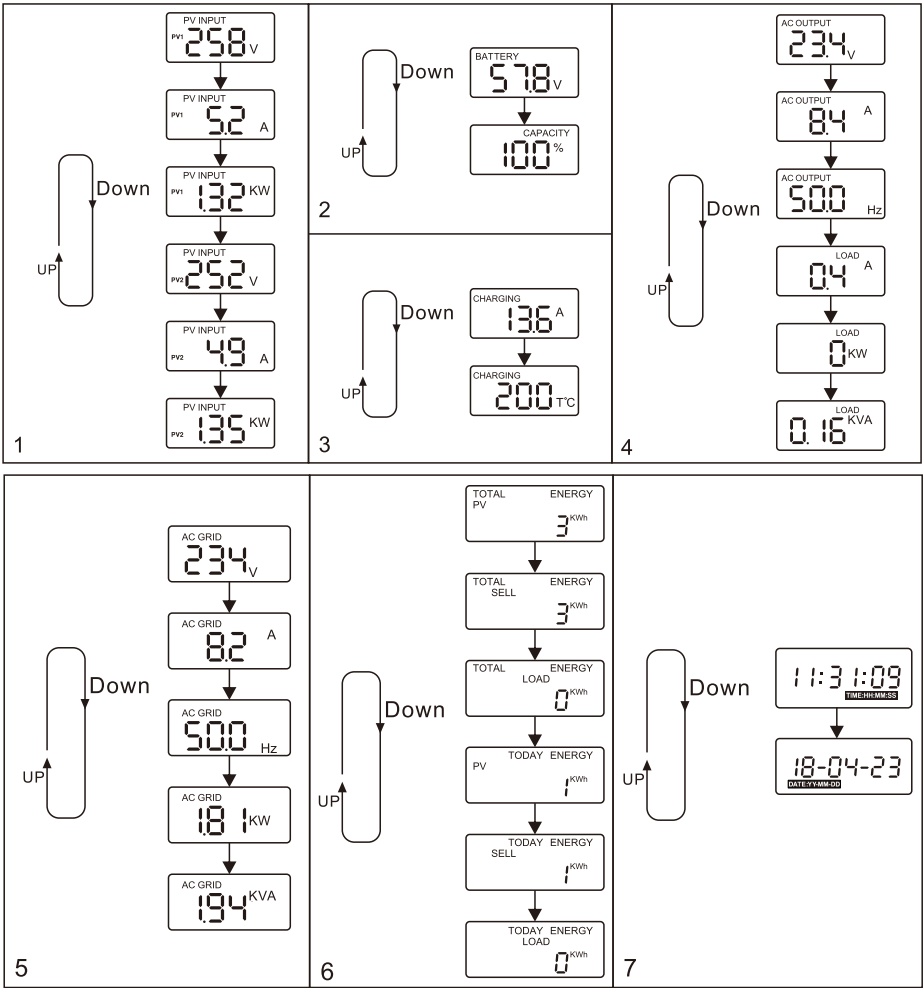
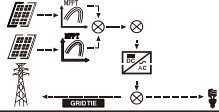
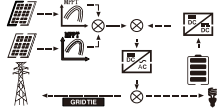
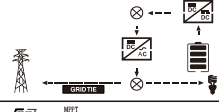
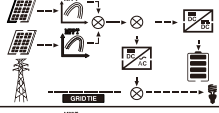
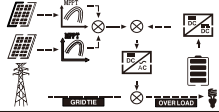
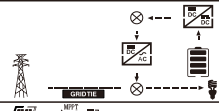
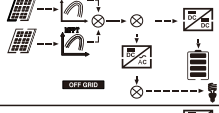
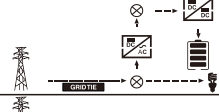
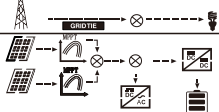
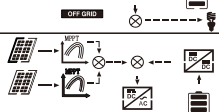
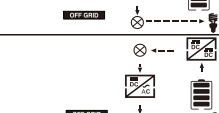


Figure 7-3

7.2.3 LCD Run status display

Run status		
Sell power to grid	Only PV supply and sell power to grid and load	
	PV and battery supply power to grid and load together	
	Only Battery supply power to grid and load	
Match Load	PV power is not enough, so only supply power to battery and load, no power to grid	
	PV and battery power supply power to load, no power to grid	
	No pv, only battery match load to supply power, no power to grid	
Battery Charge	PV supply power to load and battery charging	
	The grid supply power to battery for charging, and load	
standby	When invert happen fault, the grid supply power to load	
Off grid	PV power is enough, supply power to battery for charge , supply power to load	
	PV and battery power supply power to load	
	Only battery discharge and supply power to load	
Stop	Inverter shut down or fault happen	

7.2.4 LCD display settings

Hold down the "ESC" key for 5 seconds and enter setup mode. Press "ESC" to exit at [00] interface, press the ENTER key to enter the setup menu, Or hold down "ENTER" key for 5 seconds to enter the setup menu, enter the settings menu and press up or DOWN to select different settings, press the "ENTER" key to start the setting in the corresponding settings entry, press "up" or "DOWN" to select different settings, after setting the parameters, press "ENTER" to confirm settings and press "ESC" to cancel settings.

No.	Describe	Option	
00	Setup Mode	 	ESC Corresponding ESC key indicates exit; GO Corresponding Enter key represents the entry into the next interface.
01	Manual On/Off Control	(default)  	Manual shut down inverter
		 	Manual starting up inverter
02	User Mode	 	Energy storage mode 1 natural logic (1) On-grid operating conditions ① There is solar energy ●Solar: The solar energy preferentially charges the battery, the remaining energy is supplied to the load, and the remaining energy is incorporated into the grid. ●Battery: The battery is only charged and does not discharge, and only solar energy is selected to charge the battery (unless the forced AC charging time period is turned on, the utility will not actively charge the battery). ●Load: The load preferentially selects the battery to supply energy, and the insufficient energy is supplemented by the grid. ②No solar energy ●Solar: No solar energy. ●Battery: The battery only discharges and does not charge, and matches the load output energy (unless the forced AC charging time period is set, the grid will not charge the battery). ●Load: The load preferentially selects the battery to supply energy, and the insufficient power is supplemented by the grid. (2) Off-grid operating conditions ① There is solar energy When solar energy is sufficient, solar energy charges the battery and supplies energy to the load. When the solar energy is insufficient, the solar energy and the battery jointly supply energy to the load. ②No solar energy The battery provides energy separately to the load.

			2 Forced logic (1) Forced discharge time In the case of grid-connected conditions, the peak usage of the mains at noon or evening, the electricity price is high, allowing the battery to match the load discharge, and the forced logic takes precedence over the natural logic. (2) Forced charging time In the case of grid-connected conditions, late night power consumption is low, electricity prices are low, allowing the city to charge the battery, and the mandatory logic takes precedence over natural logic. Note: Forced charging logic takes precedence over forced discharge logic.
		 LdP	Load priority Mode (default option) 1 On-grid operating conditions (1) There is solar energy ●Solar: The solar energy gives priority to the load, the superfluous recharges the battery, and then the surplus is fed into the power grid. ●Battery: The battery only selects solar charging. When the solar energy is sufficient, the solar energy charges the battery; when the solar energy is insufficient, the battery assists the power supply to the load. ●Load: The load priority is powered by solar energy. When the solar energy is insufficient, it is supplemented by the battery energy, and when it is insufficient, the energy is supplemented by the grid. (2) No Solar Energy ●Solar Energy: No solar energy. ●Battery: The battery is charged by the grid, and the battery energy is preferentially supplied to the load. ●Load: The load is given priority to the battery supply, which is less than the power grid supplement. 2 Off-grid operating conditions (1)There is solar energy When the solar energy is sufficient, the solar rechargeable battery supplies the load at the same time. When the solar energy is insufficient, solar energy and the battery simultaneously provide power to the load. (2)No Solar Energy The battery alone provides energy to the load. (Remark: Battery over-discharge or over-charge protection function: if the battery voltage is lower than the deep stop discharge set value, the PV and AC small current are forced to charge the battery; when the battery voltage is higher than the depth stop charge set value, the forced stop is given Charging batteries.)

		 [02] UPS	UPS mode UPS power supply mode 1 natural logic (1) On-grid operating conditions ① There is solar energy ●Solar: Solar energy preferentially charges the battery, excess energy is supplied to the load, and excess energy is incorporated into the grid. ●Battery: The battery is charged by the combination of solar energy and commercial power by default. You can choose to turn off the mains charging option. ●Load: The load preferentially selects the solar energy supply, and the insufficient power is supplemented by the grid. ② No solar energy -- Solar: no solar energy. -- Battery: The battery is charged by the mains. -- Load: The mains supply energy to the load. (2) Off-grid operating conditions ① There is solar energy When the solar energy is insufficient, the solar energy and the battery jointly supply power to the load; when the solar energy is sufficient, the solar energy charges the battery and supplies energy to the load. ② No solar energy The battery supplies energy separately to the load. 2 Forced logic (1) Forced discharge time In the grid-connected condition, the battery must be forced to match the load discharge during the time period. (2) Forced prohibition of AC charging time In the grid-connected condition, during the time period, the battery is prohibited from being charged by the utility power.
03	Power Safety Regulation	 [03] C0dnUL	NULL
		 [03] C0dudE	VDE0126
		 [03] C0dtUW	TUV
		 [03] C0dRUS	AS4777-Australian

		 [03] SET	CEI0-21
		 [03] SET	SP1663
		 [03] SET	XINA1
		 [03] SET	N4105
		 [03] SET	G83
		 [03] SET	Ireland
		 [03] SET	CGC
		 [03] SET	Danmark
		 [03] SET	G59
		 [03] SET	CGC_K
		 [03] SET	AS4777-New Zealand
04	PV Source Input mode	 [04] SET	Dual Independent input mode
		 [04] SET	Dual parallel input mode
		 [04] SET	DC Source input mode

05	Selftest setting interface	 [05] tSt OFF	tSt :test OFF :OFF Don't start CEI Self test function
		 [05] tSt On	tSt :test On :ON start CEI Self test function
		Testing Procedure	
	(default)	SLF tSt uOL Hi 2	SLF :self tSt :test uOL :voltage Hi 2 :High 2 CEI self test for 59.S2
	(default)	SLF tSt uOL Hi 1	SLF :self tSt :test uOL :voltage Hi 1 :High 1 CEI self test for 59.S1
	(default)	SLF tSt uOL LO 1	SLF :self tSt :test uOL :voltage LO 1 :Low 1 CEI self test for 27.S1
	(default)	SLF tSt FtE Hi 2	SLF :self tSt :test FtE :Frequency Hi 2 :High 2 CEI self test for 81>.S2
	(default)	SLF tSt FtE Hi 1	SLF :self tSt :test FtE :Frequency Hi 1 :High 2 CEI self test for 81>.S2
	(default)	SLF tSt FtE LO 1	SLF :self tSt :test FtE :Frequency LO 1 :Low 1 CEI self test for 81<.S2
	(default)	SLF tSt FtE LO 2	SLF :self tSt :test FtE :Frequency LO 2 :Low 2 CEI self test for 81<.S2
06	Self test report	 [06] tPt OFF	tPt :report OFF :OFF Don't check CEI Self test report record
		 [06] tPt On	tPt :report On :ON check CEI Self test report record
		PRSS CEI self test finish, and pass, when the test fail, it will display FR, L	

		୧୫୧ ୮୫୧ ୫୮ ୮ ୪୨୫ ୫୫ ୪୨୫ ୫୫ ୫୫ ୧୦୦୦୫ ୨୫ ୦୫ ୧୫୧ :test ୮୫୧ :report ୫୮ ୮ :frequency High 1 ୪୨୫ ୫୫ :49.5Hz(Setting value) ୪୨୫ ୫୫ :49.5Hz(test value) ୫୫ :Pass ୧୦୦୦୫:100ms(Setting value) ୨୫ ୦୫ :95ms(test value) Show CEI Self test report for 81<.S2, when this test fail, it will display ୫୫୮, ୮	
		୧୫୧ ୮୫୧ ୫୮ ୨ ୪୨୫ ୫୫ ୪୨୫ ୫୫ ୫୫ ୧୦୦୦୫ ୨୨ ୦୫ ୧୫୧ :test ୮୫୧ :report ୫୮ ୨ :frequency low 2 ୪୨୫ ୫୫ :47.5Hz(Setting value) ୪୨୫ ୫୫ :47.5Hz(test value) ୫୫ :Pass ୧୦୦୦୫:100ms(Setting value) ୨୨ ୦୫ :92ms(test value) Show CEI Self test report for 81<.S2, when this test fail, it will display ୫୫୮, ୮	
07	Battery type selection	(default)Lead  [07] LEAd	Lead-acid Battery
		Lithium  [07] Li EVn	Lithium Battery
08	Battery capacity (AH)	Lead  [08] Li EVn100	Range from 0-900, every time add 10, NOTE: must same as the lead battery real capacity
		Lithium  [08] LEAd100	Set will not take effect, get from BMS information
09	BCC Battery charge current limit	(default)  [09] bCC 100	Range from 0% - 100%, 100% mean 50A
10	Battery stop discharge SOC	Lithium  [10] SOC 20	Range from 0% - 100%, only fit lithium battery

11	BSV Battery stop discharge voltage	(default)48.5V  [11] b5w48.5	Range from 40V-59V, must fit the battery to set value, the value must higher than Low voltage Protect 1V
12	BCV Battery const charge voltage	(default)54.5V  [12] bCw54.5	Range from 40V-59V, must fit the battery to set value, the value must lower than High voltage Protect 1V
13	BFV Battery float charge voltage	(default)55.5V  [13] bFw55.5	Range from 40V-59V, must fit the battery to set value, the value must lower than High voltage Protect 1V
14	BOV Battery High voltage Protect	(default)56.5V  [14] bOw56.5	Range from 40V-59V, must fit the battery to set value, the value must higher than const/float charge voltage 1V
15	Battery Low voltage Protect	(default)44.0V  [15] bUw44.0	Range from 40V-59V, must fit the battery to set value, the value must lower than stop discharge voltage 1V
16	CT anti-flux Enable	(default)OFF  [16] Ct OFF	Set anti-flux Disable function
		ON  [16] Ct ON	Set anti-flux Enable function
17	Parallel Enable	PAR OFF  [17] PAR OFF	Set Disable Parallel function
		PAR ON  [17] PAR ON	Set Enable Parallel function

7.3 Use Wi-Fi parameter settings

With the Wi-Fi app, you can go through the local mode to set up the battery parameters, and the grid charging time, inverter discharging time etc. If you are not setting parameters, the inverter will work in default mode.



WARNING

Ensure that all wire connections are OK before turning on the battery breaker and the AC breaker. The PV switch should be turned on first to light the inverter and the battery parameters must be set according to your battery system and work status times. Otherwise the inverter will work at default status that may not conform to the battery voltage and the capacity.

8 Communication

This energy storage inverter uses Wi-Fi as the standard wireless communication. For details on the connection method, please refer to the "Wi-Fi Plug14 Data Acquisition Quick Installation Guide".

9 Trouble shooting

Sometimes, the PV inverter does not work normally, we recommend the following solutions for common troubleshooting. The following table can help the technician to understand the problem and take action.

error code	Error message	Description	Suggestion
01	N/A		
02	BMS Communication Fault	BMS Communication Fault	1.Check whether the BMS communication interface connection is normal and re-plug the BMS communication line. 2.If error message still exists, contact the installation contractor or supplier.
03	No BAT Fault	No BAT Fault	1.Check if the battery terminal is connected properly 2.Check battery voltage is very low, if true, change the battery 3.If error message still exists, contact the installation contractor or supplier.
04	Backup Overload Fault	Backup Overload Fault	1.Check whether the EPS access load exceeds the inverter load range. 2.If error message still exists, contact the installation contractor or supplier.
05	Charger Temperature fault	Charger Temperature fault	1.Check the operating environment of the inverter. 2.Check if the internal NTC is connected properly. 3.If error message still exists, contact the installation contractor or supplier.
06	Battery Temperature fault	Battery Temperature fault	1. Check the battery environment. 2. Check if the external NTC is connected properly. 3. If the battery is a lithium battery, restart the lithium battery BMS to see if the fault is eliminated. 4.If error message still exists, contact the installation contractor or supplier.

07	Charger Fault	Charger over-voltage or over-current fault	1.If the battery is configured as a lithium battery, restart the lithium battery BMS to see if the fault is eliminated. 2.If the fault is not eliminated, or if it is configured as a lead-acid battery, restart the inverter and see if the fault is eliminated. 3.If error message still exists, contact the installation contractor or supplier.
08	Soft Up Fail Fault	Charger soft start failure	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
11	Grid CT Fault	CT self-test failed	1.Check the CT connection and restart the inverter 2.If error message still exists, contact the installation contractor or supplier.
12	CET Self Test Fail	CEI self-test failed	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
13	STMF103 Com Fault	Control board chip communication failure	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
17	Inverter Frequency Fault	Inverter Frequency Fault	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
18	Relay Fault	Rely error	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
19	Output Voltage Fault	Output Voltage Fault	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
20	GFCI Damage	GFCI Device Damage	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
21	Hall Sensor Fault	HCT fault	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
22	Communication Fault	CPU communication fault	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
23	Bus Voltage Fault	Bus overvoltage fault	1.Check if the PV voltage exceeds the inverter input voltage range. 2.Restart the inverter. 3.If error message still exists, contact the installation contractor or supplier.
24	Inverter Current Fault	Inverter over current fault	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.

25	No Utility	No utility grid connected or utility grid power failure.	1.Check AC wiring, especially the ground wire. 2.If error message still exists, contact the installation contractor or supplier.
26	PV ISO Fault	Insulation problem	1.Check if panel enclosure ground properly. 2.Check if inverter ground properly. 3.Check if the DC breaker gets wet. 4.If the error message is displayed despite the above checking passed, contact the installation contractor or supplier.
27	GFCI High		1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
28	DCI High	Output current DC offset too high	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.
29	PV High Fault	The DC input voltage is exceeding the Maximum tolerable value.	1.Disconnect the DC switch immediately. 2.If error message still exists, contact the installation contractor or supplier.
30	Grid Voltage Fault	Utility grid voltage is out of permissible range.	1.Check grid voltage. 2.If the error message still exists despite the grid voltage being within the tolerable range, contact the installation contractor or supplier.
31	Grid Frequency Fault	Utility grid Frequency out of permissible range.	1.Check grid frequency. 2.If the error message is displayed despite the grid frequency being within the tolerable range, contact the installation contractor or supplier.
32	Inverter temperature fault	NTC error	1.Restart inverter. 2.If error message still exists, contact the installation contractor or supplier.

Table 9-1

Note:If the suggestions do not work, please connect to the the installation contractor or supplier

10 Maintenance and Cleaning

10.1 Checking Heat Dissipation

If the inverter regularly reduces its output power due to high temperature, please improve the heat dissipation conditions. The heat sink may need to be cleaned as part of this process.

10.2 Cleaning the Inverter

If the inverter is dirty, turn-off the AC breaker and DC switch, waiting the inverter shut down ,then clean the enclosure lid, the display, and the LCD using only a wet cloth. Do not use any cleaning agents.(e.g. solvents or abrasives)

10.3 Checking the DC Disconnect

Check for externally visible damage and discoloration of the breaker and the cables at regular intervals. If there is any visible damage to the breaker, or visible discoloration or damage to the cables, please contact professional staff for maintenance.

Once a year, turn the rotary switch of the DC switch from the ON position to the OFF position 5 times in succession. This cleans the contacts of the rotary switch and prolongs the electrical endurance of the DC Disconnect.

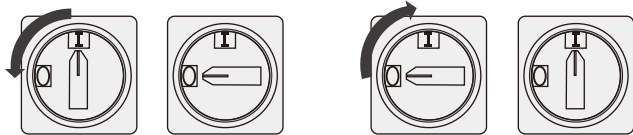


Figure 10-1

11 Decommissioning

11.1 Dismantling the Inverter

- (1) Disconnect the inverter from the grid, PV and battery.
- (2) Remove all connection cables from the inverter.
- (3) Screw off all projecting cable glands.
- (4) Lift the inverter off the bracket and unscrew the bracket screws.

**WARNING**
Danger of burn injuries due to hot enclosure parts!
Wait 20 minutes before disassembling until the housing has cooled down.

11.2 Packing the Inverter

If possible, always pack the inverter in its original carton and secure it with tension belts. If it is no longer available, you can also use an equivalent carton. The box must be capable of being closed completely and supporting both the weight and the size of the inverter.

11.3 Storing the Inverter

Store the inverter in a dry place where ambient temperatures are always between -25°C and +60°C.

11.4 Disposing of the Inverter



Do not dispose of faulty inverters or accessories together with household waste. Please comply with the disposal regulations for electronic waste which apply at the installation site at that time. Ensure that the old unit and any accessories are disposed of in a proper manner.

12 Working status

According to different conditions, The energy storage inverter mainly has the following kinds of working status.

description	LCD display operation diagram
State 1: The energy produced by the PV system is used to optimize self-consumption. The excess energy is used to recharge the batteries, then exported to grid.	
State 2: When there is no PV, and the battery is sufficient, it can supply the load together with grid power.	
State 3: When grid fails, the system automatically switches to offline grid mode. The EPS load can be supported by PV and battery.	
State 4: Battery can be force charged by grid, and charging time/power can be set flexibly on PV Master APP.	

Table 12-1

13 specification

MODEL	3.6KW	4.2KW	4.6KW	5KW
RATED POWER(W)	3600	4200	4600	5000
PV INPUT(DC)				
Maximum recommended DC power(W)	4100	4800	5300	5750
Nominal DC operating voltage(V)	360	360	360	360
Maximum DC voltage(V)	580	580	580	580
Full Load Voltage range(tracker A/B)	173~500	204~500	218~500	238~500
Start voltage(V) ^①	120	120	120	120
MPPT voltage range(V)	120~550	120~550	120~550	120~550
Maximum input current(A)	11/11	11/11	11/11	11/11
No.of MPP tracker	2	2	2	2
Strings per MPP tracker	1	1	1	1
GRID OUTPUT(AC)				
Nominal AC output power(W)	3600	4200	4600	5000
Nominal output voltage(V);range(V)	220/230/240;180-280	220/230/240;180-280	220/230/240;180-280	220/230/240;180-280
AC gridfrequency(Hz); range(Hz)	50/60;45~55/55-65	50/60;45~55/55-65	50/60;45~55/55-65	50/60;45~55/55-65
Nominal output current(A)	15.7	18.3	20.0	21.8
Maximum output current(A)	16.4	19.1	21.0	22.8
Inrush current (spike/duration)	57.5A/5.2us	57.5A/5.2us	57.5A/5.2us	57.5A/5.2us
Total harmonic distortion i(THDi)	<3%	<3%	<3%	<3%
Power factor at rated power	1	1	1	1
Displacement power factor	0.8leading~0.8lagging	0.8leading~0.8lagging	0.8leading~0.8lagging	0.8leading~0.8lagging
Grid type	Single phase	Single phase	Single phase	Single phase
BATTERY MODE OUTPUT(AC)				
Output Rated power(VA)	2300	2300	2300	2300
Nominal output voltage(V);accuracy range	230;±1%	230;±1%	230;±1%	230;±1%

Output frequency(Hz); accuracy range	50/60(optional); ±0.2%	50/60(optional); ±0.2%	50/60(optional); ±0.2%	50/60(optional); ±0.2%
Output rated current(A)	10	10	10	10
Output waveform	Pure sine wave	Pure sine wave	Pure sine wave	Pure sine wave
Peak power(VA)	3450,10s	3450,10s	3450,10s	3450,10s
Total harmonic distortion v(linear load)	<3%	<3%	<3%	<3%
BATTERY & CHARGER				
Battery type	Lead-acid battery/ Lithium battery	Lead-acid battery/ Lithium battery	Lead-acid battery/ Lithium battery	Lead-acid battery/ Lithium battery
Nominal DC voltage(V)	48	48	48	48
Battery voltage range(V)	40 ~ 60	40 ~ 60	40 ~ 60	40 ~ 60
Charging curve	3-stage adaptive with maintenance	3-stage adaptive with maintenance	3-stage adaptive with maintenance	3-stage adaptive with maintenance
Over-current protection/Over-temp erature protection	YES/YES	YES/YES	YES/YES	YES/YES
Maximum charging rated power(W)	2500	2500	2500	2500
Maximum charging current(A)	50	50	50	50
Efficiency				
Maximum efficiency	97.1%	97.1%	97.1%	97.1%
Euro-efficiency	96.5%	96.5%	96.5%	96.5%
MPPT efficiency	99.5%	99.5%	99.5%	99.5%
PROTECTION DEVICES				
DC reverse polarity protection	Yes	Yes	Yes	Yes
DC switch rating for each MPPT	Yes	Yes	Yes	Yes
Output over current protection	Yes	Yes	Yes	Yes
Output overvoltage protection-varistor	Yes	Yes	Yes	Yes
Ground fault monitoring	Yes	Yes	Yes	Yes
Grid monitoring	Yes	Yes	Yes	Yes
Integrated all-pole sensitive leakage current	Yes	Yes	Yes	Yes

Table 13-1

Note: (1) Backup output power depends on of the battery.
(2) Specifications are subject to change without further notice.

14 Contact

If you have technical problems about our products, contact the installation contractor or supplier .
We need the following information in order to provide you with the necessary assistance:

- ◆ Inverter type;
- ◆ Inverter error messages;
- ◆ Inverter LED & LCD display;
- ◆ Type and number of PV modules connected;
- ◆ Optional equipment.

RO:

Declaratie UE de conformitate simplificata

SC ONLINESHOP SRL declara ca **Invertor solar On Off Grid PNI GreenHouse SB5000 5KW** este in conformitate cu Directiva EMC 2014/30/EU. Textul integral al declaratiei UE de conformitate este disponibil la urmatoarea adresa de internet:

<https://www.mypni.eu/products/6719/download/certifications>

EN:

EU Simplified Declaration of Conformity

SC ONLINESHOP SRL declares that **Solar inverter On Off Grid PNI GreenHouse SB5000 5KW** complies with the Directive EMC 2014/30/EU. The full text of the EU declaration of conformity is available at the following Internet address:

<https://www.mypni.eu/products/6719/download/certifications>