Installation and Operating Instructions

Zeverlution 3680/4000/5000 Solar Inverter

zeversolar

Table of Contents

1 Notes on this document

1.1 Validity

This document describes the mounting, installation, commissioning and maintenance of the following solar inverters:

- Zeverlution 3680
- Zeverlution 4000
- Zeverlution 5000

Observe all documentation that accompanies the inverter. Keep them in a convenient place and available at all times.

1.2 Target group

This document is for qualified electriciansonlywho must perform the tasks exactly as described.

All persons installing inverters must be trained and experienced in general safety which must be observed when working on electrical equipments. Installation personnel should also be familiar with local requirements, rules and regulations.

1.3 Symbols used in this document

The following safety precautions and general informationare used in this document.

⚠ 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, can result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, can result in minor or moderate injury.

NOTICE

NOTICE indicates a situation which, if not avoided, can result in property damage.

i

INFORMATION provides tips which are valuable for the optimal installation and operation of the inverter.

2 Safety

2.1 Intended use

1. Zeverlutionconverts the direct current from PV arrays into grid-compliant alternating currentand feeds it into the utility grid.
2. Zeverlution must only be operated by qualified persons with the appropriate skills who have already read and understood all documentation relating to its installation, commissioning, operation and maintentance.
3. Zeverlutionis suitable for indoor and outdoor use.
4. Zeverlutionmust only be operated with PV arrays (PV modules and cabling) of protection class II, in accordance with IEC 61730, application class A.
   Do not connect any sources of energy other than PV modules to the inverter.
5. PV modules with a high capacity to ground mustonlybe used if their coupling capacitydoes not exceed 1.0μF.
6. When exposed to sunlight,the PV array generates dangerous DC voltage which is present in the DC conductors and the live components of the inverter. Touching the DC conductors or the live components can lead to lethal electric shocks.
7. All components must remain within their permitted operating ranges at all times.

2.2 Safety standards

Zeverlutioncomplieswith the EU Low-Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC.
Zeverlution also complies with the requirements for safety and EMC in Australia and NewZealand markets.
The inverter is labeled with the CE mark and RCM mark.
For more information about certificates in other countries and regions, please visit website(http:// www.zeversolar.com).

2.3 Important safety information

⚠ DANGER

- All work on the inverter must only be carried out by qualified personnel who have read and fully understood all safety information contained in this document.
- Children must be supervised to ensure that they do not play with this device.

⚠ DANGER

Danger to life due to high voltages of the PV array

When exposed to sunlight, the PV array generates dangerous DCvoltage which is present in theDC conductors and the live components of the inverter. Touching the DC conductors or the livecomponents can lead tolethal electric shocks. If you disconnect the DC connectors from theinverter under load, an electric arc may occur leading to electric shock and burns.

- Do not touch non-insulated cable ends.
- Do not touch the DC conductors.
- Do not touch any live components of the inverter.
- Have the inverter mounted, installed and commissioned only by qualified persons with theappropriate skills.
- If an error occurs, have it rectified by qualified persons only.
- Before assembling the DC connectors, please first cover the PV modules with opaque material..
- Prior to performing any work on the inverter, disconnect it from all voltage sources asdescribed in this document (see Chapter 8).

⚠ WARNING

Risk of injury due to electric shock and fire caused by high leakage current

- The inverter must be reliably grounded in order to protect property and personal safety.

⚠ CAUTION

Risk of injury due to hot heat sink

- The heat sink may get hot during operation. Do not touch!

⚠ CAUTION

Possible damage to health as a result of the effects of electromagnetic radiation

- Please maintain a distance of at least 20cm from the inverter when it is inoperation.

NOTICE

Grounding the PV array

- Comply with local regulations for grounding the PV array.
  We suggest the frames of PV modules must be reliably grounded.
- Do not ground any of the terminals of the PV strings.

NOTICE

Damage to the seal of the cover in sub-zero conditions

- If you open the cover in sub-zero condition,the sealing of the cover can be damaged. This can lead moisture entering the inverter.
- Do not open the inverter at ambient temperatures lower than -5℃.
- If a layer of ice has formed on the seal of the cover in sub-zero conditions, remove it prior to opening the inverter(e.g. by melting the ice with warm air).Observe the applicable safety regulation.

NOTICE

Damage to the inverter due to electrostatic discharge

- Touching electronic components can cause damage to or destroy the inverter through electrostatic discharge.
- Ground yourself before touching any component.

2.4 Symbols on the type label

Icon	Explanation
	Risk of danger, warning and caution Safety information important for human safety.Failure to observe the safetyinformation in this document mayresult in injury or death.
	Danger to life due to electric shock The product operates at high voltages. Prior to performing any workon the product, disconnect the product from all voltage sources. Allwork on the product must be carried out by electrically qualified personsonly.
	Risk of burns due to hot surfaces The product can get hot during operation. Avoid contact during operation. Allow the product to cool down sufficiently before carrying out anywork.
	WEEE designation Do not dispose of the product together with the household waste butinaccordance with the disposal regulations for electronic waste applicableat the installation site.
	CE marking The product complies with the requirements of the applicable EUdirectives.
	Certified safety The product is TUV-tested and complies with the requirements of the EU Equipment and Product Safety Act.
	Capacitors discharge Danger to life due to high voltages in the inverter, observe the waiting time of five minutes. Prior to performing any work on theinverter, disconnect it from all voltage sources as described in Section 8.
	Observe the documentation Observe all documentation supplied with the product.

2.5 Basic safety protection

We provide the following safety protection:

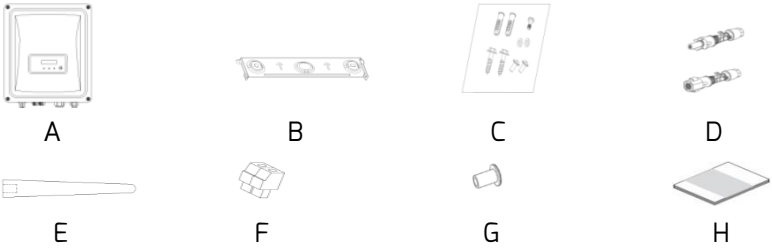
1) Overvoltage, undervoltage protection
2) Overfrequency, underfrequency protection
3) Overtemperature monitoring
4) Residual current monitoring
5) Isolationmonitoring
6) Anti-islanding protection
7) DC feed-in monitoring

3 Unpacking

3.1 Scope of delivery

Object	Description	Quantity
A	Inverter	1
B	Wall bracket	1
C	Mounting accessory kit: Wall anchors and hexagon bolts (2×) M5×12 pan head screw (2×) *M5×14 pan head screw (1×) *Ground washer (2×)	1
D	Positive and negativeDC plug connector	2
E	WiFi antenna	1 (optional)
F	Smart meter connector	1 (optional)
G	Sealing plug	2
H	Documentation	1

* One spare part for cover mounting



Please carefully check all of the components in the carton. If anything is missing, contact your dealer at once.

3.2 Checking for transport damage

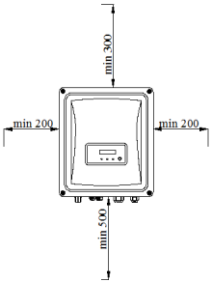
Thoroughly inspect the packaging upon delivery. If you detect any damage to the packaging which indicates the inverter may have been damaged, inform the responsible shipping company immediately.

4 Mounting

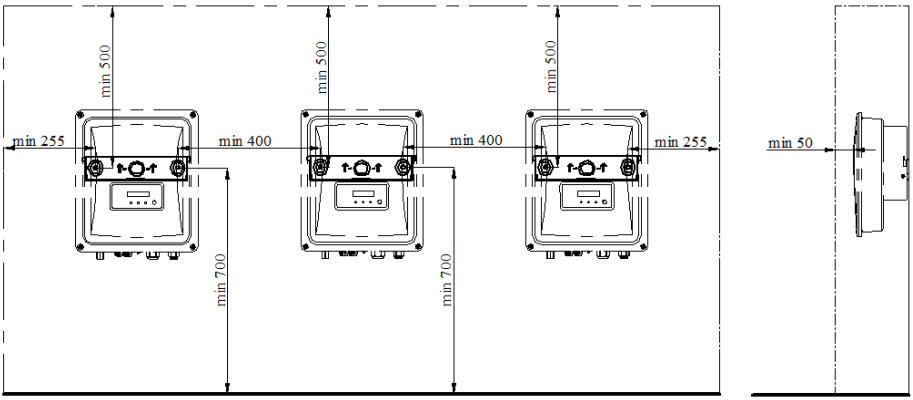
4.1 Ambient conditions

1. Be sure the inverter is mountedout of the reach of children.
2. Mount the inverter in areas where it cannot be touched inadvertently.
3. Ensure good access to the inverter for installation and possible service.
4. Ambient temperature should be below 40°C to ensure optimal operation.
5. Observe the recommended clearances to walls, other inverters, or objects as follows to ensure sufficient heat dissipation.

Direction	Recommended clearance（mm）
above	300
below	500
sides	200



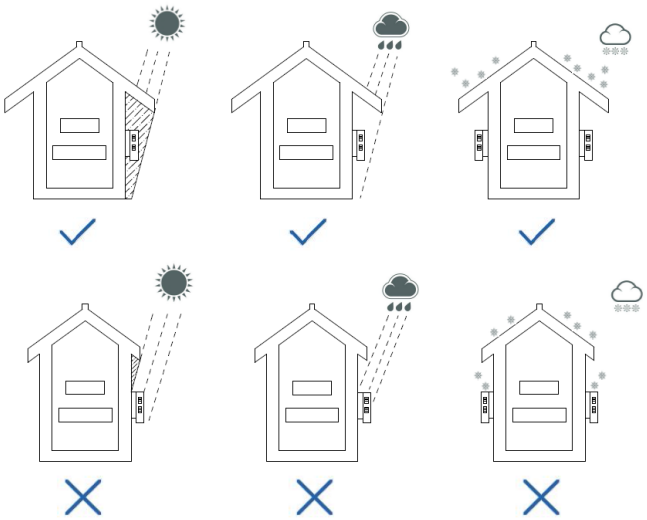
Clearances for one inverter



Clearances for multiple inverters

6. In order to avoid power reduction caused byoverheating,do not mountthe inverter in a location that allowslong-term exposure to direct sunlight.

7. Ensure optimum operation and extend service life by avoiding exposingtheinverterto direct sunlight, rainand snow.

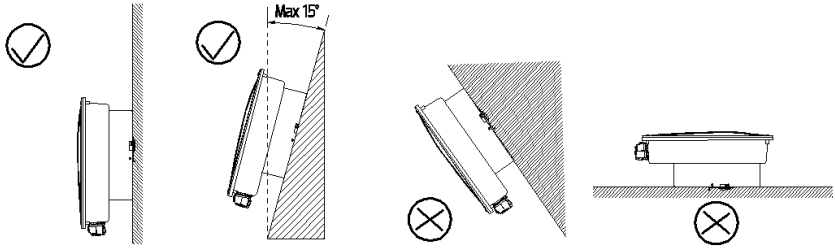


8. The mounting method, location and surface must be suitable for the inverter's weight and dimensions.
9. If mounted in a residential area, we recommendmounting the inverter on a solid support surface.Drywallandsimilarmaterialsare not recommended due to audible vibrationsduring operation which could be perceived as annoying.
10. Do not put any objects on the inverter.
11. Do not cover the inverter.

⚠ DANGER

Danger to life due to fire or explosion

- Do not mount the inverter in areas whereflammablematerialsarestored.
- Do not mount the inverter in areas where there is a risk of explosion.



1. Never mount the inverter tilted forward.
2. Never mount the inverter tilted sideways.
3. Never mount the inverter horizontally.
4. Mount the inverter vertically or tilted backwardby a max of 15°.
5. Mount the inverter at eye level to make it easy to operate andread the display.
6. The electrical connection area must point downwards.

4.3 Mounting the inverter with the wall bracket

⚠ CAUTION

Risk of injury when lifting the inverter, or if it is dropped

The inverter weighs approximately 11kg. There is risk of injury if the inverter is lifted incorrectly or dropped while being transported or when attaching it to or removing it from the wall bracket.

- Transport and lift the inverter carefully

⚠ CAUTION

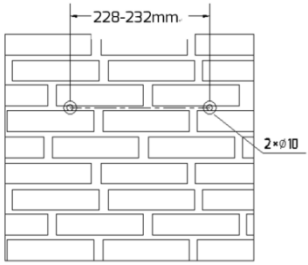
Risk of injury due to damaged cables

There may be power cables or other supply lines (e.g. gas or water) routed in the wall.

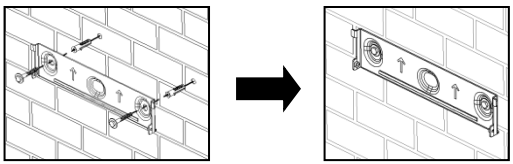
- Ensure that no lines are laid in the wall which could be damaged when drilling holes.

Mounting procedures:

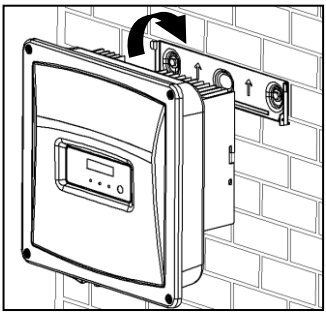
1. Use the wall bracket as a drilling template and mark the positions of the drill holes, then drill 2 holes (Φ 10) to a depth about 70mm. During operation, keep the drill vertical to the wall, and hold the drill steady to avoid tilted holes.



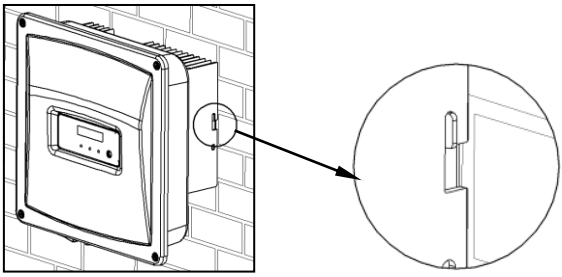
2. After cleaning the holes, place the 2 wall anchors into the holes, then attach the wall bracket to the wall using the hexagon head screw delivered with the inverter.



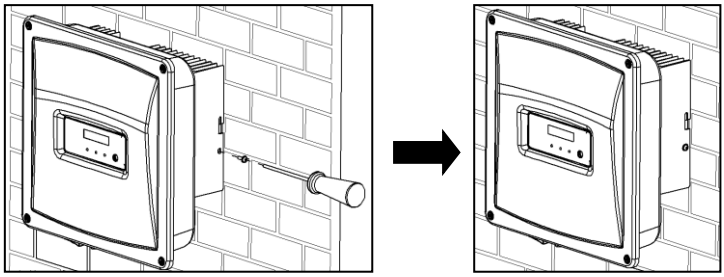
3. Hold the inverter using the housing side edges and attach it onto the wall bracket tilted slightly downwards.



4. Check both sides of the heatsink to ensure that it is securely in place.



5. Pushthe inverter inwards as far as possible and attach it to both sides of the wall bracket using the M5 screws(screwdriver type: T25,torque: 2.2Nm).



5 Electrical connection

5.1 Safetyduring Electrical Connection

⚠ DANGER

Danger to life due to high voltages of the PV array

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in theDC conductors and the live components of the inverter. Touching the DC conductors or the livecomponents can lead tolethal electric shocks. If you disconnect the DC connectors from theinverter under load, an electric arc may occur leading to electric shock and burns.

- Do not touch non-insulated cable ends.
- Do not touch the DC conductors.
- Do not touch any live components of the inverter.
- Have the inverter mounted, installed and commissioned only by qualifiedpersons with the appropriate skills.
- If an error occurs, have it rectified by qualified persons only.
- Before assembling the DC connectors, please first cover the PV modules with apaque material.
- Prior to performing any work on the inverter, disconnect it from all voltagesources as described in Section 8.

⚠ WARNING

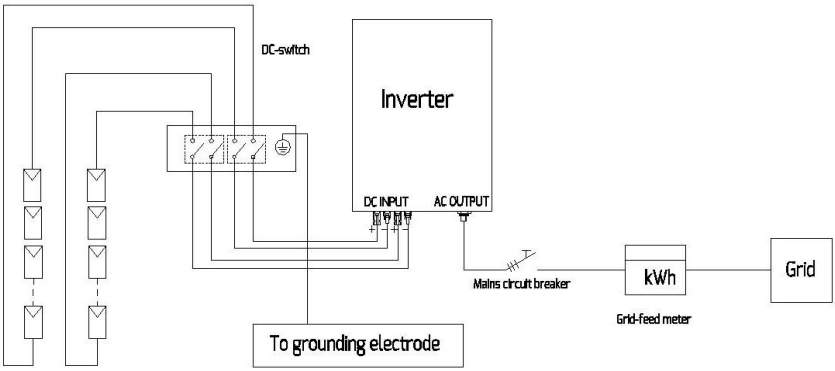
Risk of injury due to electric shock

The external protective grounding conductor is connected to the inverter's protective grounding terminal through the AC screw terminal block. Make sure the groundingconnection is reliable.

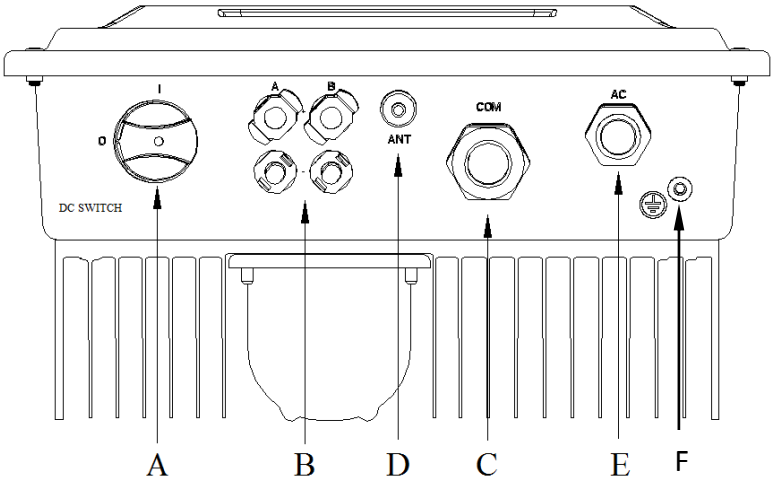
- When connecting,connect the AC connection first to ensure the inverter grounding reliably and then connect the DC inputs.
- When disconnecting, disconnect the DC inputs first and then disconnect the AC connection.
- Don't connect the DC inputs while the AC connection is disconnected under any circumstances.
- All electrical installations must be done in accordance with the National Wiring Rules Standards and Local Code.

5.2 System layout ofunits without integrated DC switch

Local standards or codes may require that PV systems are fitted with an external DC switch on the DC side. The DC switch must be able to safely disconnect the open-circuit voltage of the PV array plus a safety reserve of 20%.
Install a DC switch to each PV string to isolate the DC side of the inverter.
We recommend the following electrical connection:



5.3 Overview of the connection area



Object	Description
A	DC-switch (optional): switch on or off forPV-load
B	DC input: plug-in connector to connect the PV string
C	COM: connect the monitoring device with communication cable
D	ANT (optional): antenna, transmit and receive WiFi signal
E	AC output: connect the grid
F	Earthing terminal: connect a second protective earthing conductor

5.4 AC connection

⚠ DANGER

Danger to life due to high voltages in the inverter

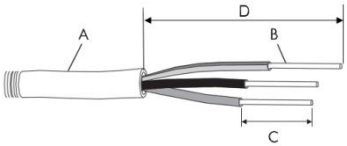
- Before performing the electrical connection, ensure that the AC circuitbreaker is switched off and cannot be reactivated.

5.4.1 Conditions for the AC connection

Cable Requirements

The grid connection is established using three conductors (L, N, and PE).

We recommend the following requirementsforACcable.



Object	Description	Value
A	External diameter	9 to 14mm
B	Copper conductor cross-section	4 to 6 mm^2
C	Stripping length of the insulated conductors	approx. 12 mm
D	Stripping length of the outer sheath of AC cable	approx. 120mm
The PE conductor must be 10mm longer than the L and N conductors.		

Cable design

The cable must be dimensioned in accordance with the local and national directives for the dimensioning of cables.

The conductor cross-section should be dimensioned to avoid power loss in cables exceeding 1% of rated output power.

The higher grid impedance of the AC cable makes the inverter easier to disconnect from the grid due to excessive voltage at the feed-in point.

The maximum cable lengthrelative to the conductor cross-section as follows:

Conductor cross-section	Maximum cable length		
	Zeverlution3680	Zeverlution4000	Zeverlution5000
4 mm^2	25 m	20m	16m
6 mm^2	40 m	30m	24m

The required conductor cross-section depends on the inverter rating, ambient temperature, routing method, cable type, cable losses, applicablelocalinstallation requirements, etc.

5.4.2 Grid connection

⚠ WARNING

Risk of injury due to electric shock and fire caused by high leakage current

- The inverter must be reliably grounded in order to protect property and personal safety.

NOTICE

Damage to the seal of the cover in sub-zero conditions

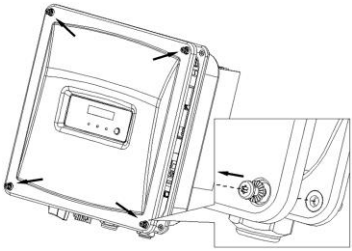
- If you open the cover in sub-zero condition, the sealing of the cover can be damaged. This can lead moisture entering the inverter.
- Do not open the inverter at ambient temperatures lower than -5℃.
- If a layer of ice has formed on the seal of the cover in sub-zero comditions, remove it prior to opening the inverter(e.g. by melting the ice with warm air). Observe the applicable safety regulation.

Procedure:

1. Switch off the ACcircuitbreaker and secure it against reconnection.

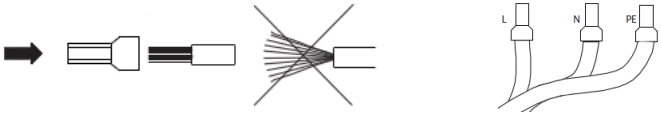
> loosen the screws of the cover
>
> During loosening the screws of the cover, it is not necessary to take off the screws and conical spring washers, which can remain on the cover and will not fall off.

2. Loosen the 4 screws ofthe cover using a screwdriver (T25) andremove the cover.



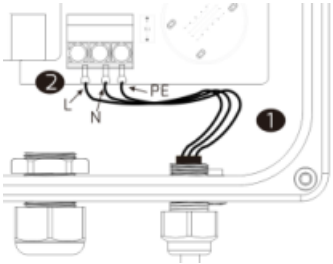
3. Strip the AC cable's outer sheath 120 mm.
   Shorten L and N by 10 mm each.
   Strip the insulation of L, N, and PE conductors by 12 mm.

4. Insert the conductor into the suitable ferruleacc. to DIN 46228-4 and crimp the contact.

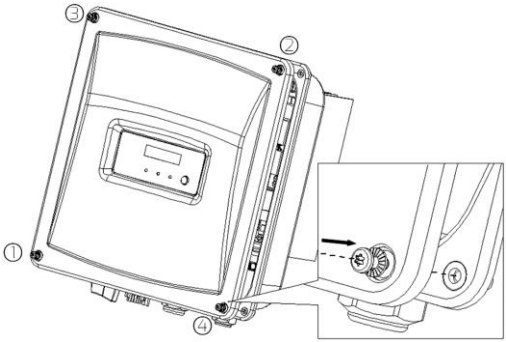


5. Route the AC cable into the inverter through the cable gland.
   If necessary, slightly loosen the swivel nut of the cable gland.

6. Bend the AC cable according to the path.
   Insert the conductors to the screw terminal block and tighten them (screwdriver type: blade 1×5.5 acc. to DIN5264, torque: 1.2Nm).
   - Insert the protective conductor (green-yellow) into the screw terminal with the grounding sign and tighten the screw.
   - Insert theneutral conductor (blue) into the screw terminal with N sign and tighten the screw.
   - Insert the L conductor (brown or black) into the screw terminal with L sign and tighten the screw.



7. Check to ensure that all conductors are securely in place by pulling lightly on all conductors.
8. Tighten the swivel nut of the cable gland.
9. Secure the cover in the sequence 1 to 4 (screwdriver type: T25, torque: 2.5Nm).



5.4.3 Grounding connection

NOTICE

In case of operation on a Delta-IT Grid type, in order to ensure safety compliance in accordance with IEC 62109, the following step should be taken:
The second protective earth/ground conductor, with a diameter of at least 10 mm^2 and be made from copper , should be connected to the designated earth point on the inverter.

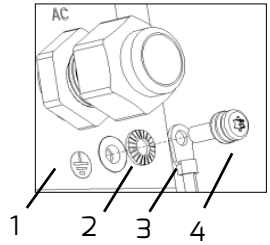
If additional grounding or equipotential bonding is required locally, you can connect additional grounding to the inverter. This prevents touch current if the grounding conductor at the terminal forthe AC cable fails.

Procedure:

1. Insert the grounding conductor into the suitable terminal lug and crimp the contact.

2. Align the terminal lug with the grounding conductor and the ground washer on the screw. The teeth of the ground washer must be facing the housing.

3. Tighten it firmly into the housing (screwdriver type: T25,torque: 2.5Nm).



Grounding parts information:

Object	Description
1	Housing
2	Ground washer
3	Terminal lug(M5) with protective conductor
4	M5 pan head screw

5.4.4 Residual current protection

The inverter is equipped with an all-pole sensitive residual current monitoring unit(RCMU) with an integrated differential current sensor which fulfills the requirementsof DIN VDE 0100-712 (IEC60364-7-712:2002).Therefore an external residual current device (RCD) is not required. If an external RCD needs to be installed because of local regulations, a RCDtype A or type B can be installed as an additional safety measure.

The all-pole sensitive residual current monitoring unit (RCMU) detects alternating and direct differential current. The integrated differential current sensor detects the current difference between the neutral conductor and the line conductor. If the current difference increases suddenly, the inverter disconnects from the grid. The function of the all-pole sensitive residual current monitoring unit (RCMU) has been tested in accordance with IEC 62109-2.

Tip about the external residual current device (RCD)

Where an external residual current device (RCD) is required in a TT or TN-S system, install a residual current device which trips at a residual current of 100mA or higher.

For each connected inverter, a rated residual current of 100mA has to be provided. The rated residual current of the RCD must be equal to at least the sum of the rated residual currents of the connected inverters.That means that, if, for example, 2 transformerless inverters are connected, the rated residual current of the RCD must be at least 200mA.

5.4.5 Overvoltage category

The inverter can be deployed in grids of installation category III or lower, as defined under IEC 60664-1. This means that it can be permanently connected at the grid-connection point in a building. In installations involving long outdoor cable routing, additional overvoltage-reducing measures must be taken so that the overvoltage category is reduced from IV to III.

5.4.6 Rating of AC circuit breaker

⚠ DANGER

Danger to life due to fire
You must safeguard each inverter with an individual AC circuit breaker in order that the inverter can be disconnected safely.

No consumer load should be applied between AC circuit breaker and the inverter.
Use dedicated AC circuitbreakerwith load switch functionality for load switching.
The selection of the AC circuit breaker rating depends on the wiring design (wire cross-section area), cable type, wiring method, ambient temperature, inverter current rating etc. Derating of the circuit breaker rating may be necessary due to self-heating or if exposed to heat.
The maximum output current of the inverters and recommended AC circuit breaker can be found in the following table.

Type	Zeverlution3680	Zeverlution4000	Zeverlution5000
Max. output current	16 A	20 A	23 A
Recommended AC circuit breaker rating	20 A, type B	25 A, type B	32 A, type B

5.5 DC connection

⚠ DANGER

Danger to life due to high voltages in the inverter

- Before connecting the PV array, ensure that the DC switch is switched off and that it cannot be reactivated.
- Do not disconnect the DC connectors under load.

5.5.1 Requirements for the DC connection

Use of Y adapters for parallel connection of PV strings

The Y adapters must not be used to interrupt the DC circuit.

- Do not use the Y adapters in the immediate vicinity of the inverter. The adapters must notbe visible or freely accessible.
- In order to interrupt the DC circuit, always disconnect the inverter as described in thisdocumentinSection 8.

Requirements for the PV modules of a string:

- PV modules of the connected strings must be of:thesame type, identical alignment and identical tilt.
- The thresholds for the input voltage and the input current of the inverter must be adhered to (see Section 10.1 "Technical DC input data").
- On the coldest day based on statistical records, the open-circuit voltage of the PV array must never exceed the maximum input voltage of the inverter.
- The connection cables of the PV modules must be equipped with the connectors included in the scope of delivery.
- The positive connection cables of the PV modules must be equipped with the positive DC connectors.The negative connection cables of the PV modules must be equipped with the negative DC connectors.

5.5.2 Assembling the DC connectors

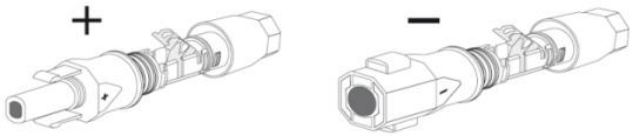
⚠ DANGER

Danger to life due to high voltages on DC conductors

When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors. Touching the DC conductors can lead to lethal electric shocks.

- Cover the PV modules with apaque material.
- Do not touch the DC conductors.

Assemble the DC connectors as described below. Be sure to observe the correct polarity. The DC connectors are marked with the symbols "+" and " – ".



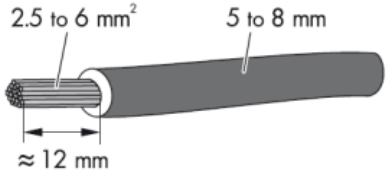
Cable requirements:

The cable must be of type PV1-F, UL-ZKLA or USE2 and comply with the following properties:

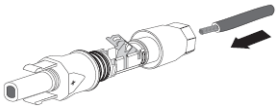
- ✧ External diameter: 5 mm to 8 mm
- ✧ Conductor cross-section: 2.5 mm² to 6 mm²
- ✧ Qty single wires: minimum7
- ✧ Nominal voltage: minimum 600V

Proceed as follows to assemble each DC connector:

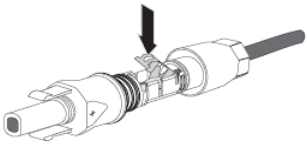
1. Strip 12 mm off the cable insulation.



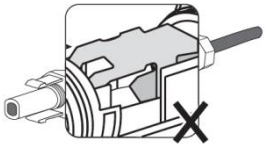
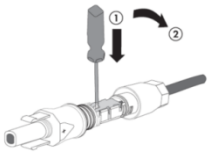
2. Route the stripped cable all the way into the DC connector. Ensure that the stripped cable and the DC connector have the same polarity.



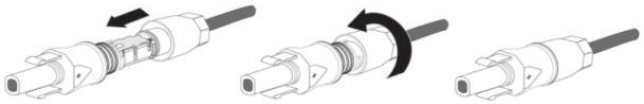
3. Press the clamping bracket down until it audibly snaps into place.



4. Ensure that the cable is correctly positioned:

Result	Measure
If the stranded wires are visible in the chamber of the clamping bracket, the cable is correctly positioned. 	· Proceed to step 5.
If the stranded wires are not visible in the chamber, the cable is not correctly positioned. 	· Release the clamping bracket. To do so, insert a flat-blade screwdriver (blade width: 3.5 mm) into the clamping bracket and lever it open.  · Remove the cable and go back to step 2.

5. Push the swivel nut up to the thread and tighten (torque: 2 Nm).



5.5.3 Disassembling the DC connectors

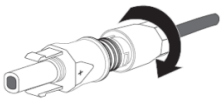
⚠ DANGER

Danger to life due to high voltages on DC conductors

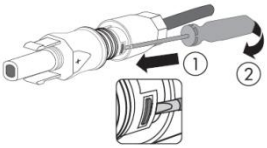
When exposed to sunlight, the PV array generates dangerous DC voltage which is present in the DC conductors. Touching the DC conductors can lead to lethal electric shocks.

- Cover the PV moduleswithapaque material.
- Do not touch the DC conductors.

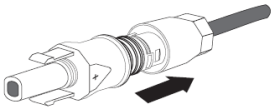
1. Unscrew the swivel nut.



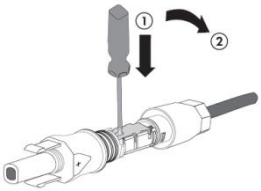
2. To release the DC connector, insert a flat-blade screwdriver (blade width: 3.5 mm) into the side catch mechanism and lever open.



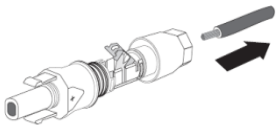
3. Carefully pull the DC connector apart.



4. Release the clamping bracket. To do so, insert a flat-blade screwdriver (blade width:3.5 mm) into the clamping bracket and lever it open.



5. Remove the cable.



5.5.4 Connecting the PV array

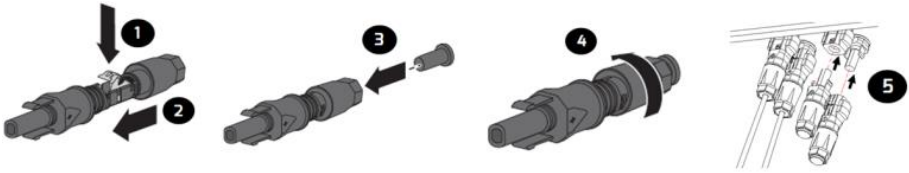
NOTICE

Damage to the inverter due to overvoltage

If the voltage of the strings exceeds the max. DC input voltage of the inverter, it can be destroyed due to overvoltage. All warranty claims become void.

- Do not connect strings with an open-circuit voltage greater than the maximum DC input voltage of the inverter.
- Check the design of the PV system.

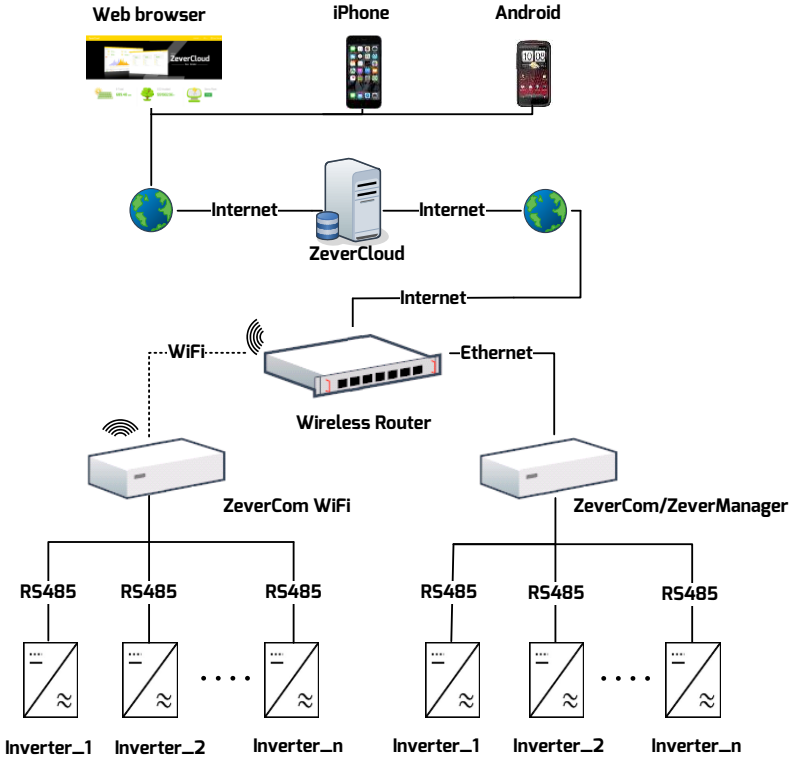
1. Ensure that the individual AC circuit breaker is switched off and ensure it against reconnection.
2. Ensure that the DC switch is switched off and ensure it against reconnection.
3. Ensure that there is no ground fault in the PV strings.
4. Check whether the DC connector has the correct polarity.
   If the DC connector is equipped with a DC cable having the wrong polarity, the DC connector must be reassembled. The DC cable must always have the same polarity as the DC connector.
5. Ensure that the open-circuit voltage of the PV strings does not exceed the maximum DC input voltage of the inverter.
6. Connect the assembled DC connectors to the inverter until they audibly snap into place. Ensure that all DC connectors are securely in place.
7. For unused DC connectors, push down the clamping bracket and push the swivel nut up to the thread. Insert the sealing plug into the DC connector. Tighten the DC connector (torque: 2.0 Nm). Finally insert the DC connectors with sealing plugs into the corresponding DC inputs on the inverter.



6 Communication

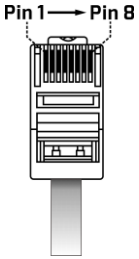
6.1 System monitoring via RS485

This inverter is equipped with RJ45 interfaces for multipoint communication.
One ZeverCom/ZeverManager connects inverters via an RS485 bus. The overall length of the network cable should not exceed 1,000 m. The monitoring system layout for inverters is as follows.



The ZeverCom/ZeverManager connects to the inverter via the RJ45 interface, and it connects to the router via Ethernet.
We offer a remote monitoring platform called "ZeverCloud". You can install the "ZeverCloud" application on a smart phone using Android or an iOS operating systems.
The website address of the "ZeverCloud" is *www.zevercloud.com*

The pin assignment of the RJ45 socket is as follows:

Pin1------- TX_RS485A	
Pin2-------TX_RS485B	
Pin3-------RX_RS485A	
Pin4-------GND	
Pin5-------GND	
Pin6-------RX_RS485B	
Pin7-------+7V	
Pin8-------+7V	

Cable requirement :

- Shielding wire
- CAT-5E or higher
- UV-resistant for outdoor use
- RS485 cable maximum length 1000m

Connect the network cable:

NOTICE

The inverter can be destroyed by wrong communication wiring

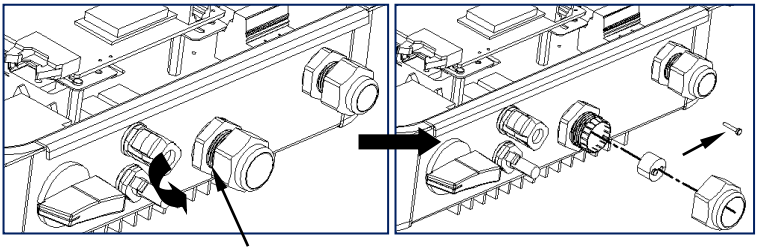
- Internal components of the inverter can be irreparably damaged due to incorrect wiring between the power wire and signal wire. All the warranty claim will be invalid.
- Please check the wiring of the RJ45 connector before crimping the contact.

NOTICE

Damage to the inverter due to moisture and dust penetration

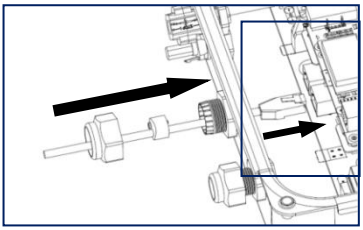
- If the cable gland are not mounted properly, the inverter can be destroyed due to moisture and dust penetration. All the warranty claim will be invalid.
- Make surethe cable gland has been tightened firmly.

1. Loosen the screws of the cover using a screwdriver (T25) and remove the cover. (see Section 5 "Electrical Connection ").
2. Unscrew the swivel nut of the M25 cable gland, remove the filler-plug from the cable gland and keep it well. If there is only one communication cable, please keep a filler-plug in the remaining hole of the sealing ring against water ingress.

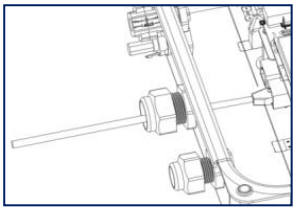


M25 cable gland for RJ45

3. Route the communication cable into the inverter through the M25 cable gland, and connect it to the RJ45 keystone socket on the upper cuicirt board.



4. Connect the inverter to ZeverCom/ZeverManager or another communication device via the above- mentioned communication cable.



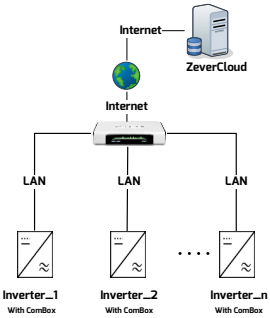
5. Press the sealing ring with the network cable into the cable gland, and then tighten the swivel nut firmly (torque: 2.5-3.0Nm). Make sure the cable gland is mounted properly. The cable gland must be adequately locked to prevent any movement of the cable.

6. Secure the cover (torque: 2.5 Nm) using a screwdriver (T25).

Disassemble the communication cable in reverse order.

6.2 System monitoring via Ethernet

User can monitor the inverter through the integrated ComBox with Ethernet module (optional), The connection diagram between the inverter and internet with network cable is shown as follows.

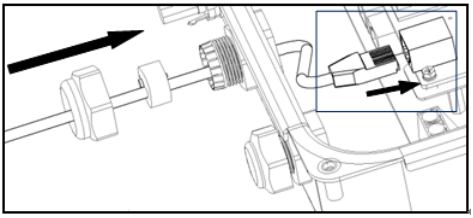


The inverter has integrated ComBox (with Ethernet module),

Possible reason of communication failure due to closed port

- The ComBox uses port #6655 and #80 communicates with the ZeverCloud. Both of these two ports must be opened, or else the ComBox cannot connect to the ZeverCloud and upload data

The inverter is connected to the network by simply connecting the network cable with wiring standard of EIA/TIA 568B from the router to the Ethernet port on the ComBox inside the inverter, please refer to the relative instruction at section 6.1.



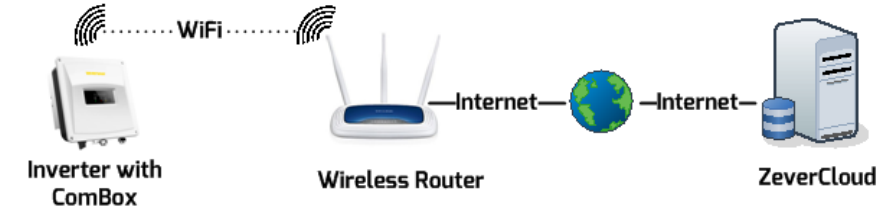
Possible reason of communication failure due to DHCP

- The router needs to support DHCP services if the ComBox use the DHCP function.

The inverter obtains an IP address from the router via DHCP automatically and shows it on the display. The time it takes to connect to the network depends on the network communication conditions.

6.3 System monitoring via WiFi

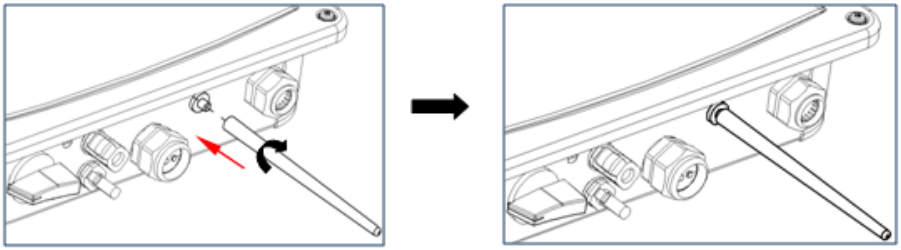
User can monitor the inverter through the integrated ComBox with WiFi module (optional). The connection diagram between the inverter and internet with a WiFi connection is shown as follows.



Mounting the antenna:

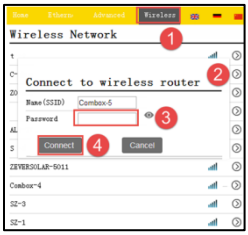
Take the antenna included in the scope of delivery.

Tighten the antenna into the WIFIconnection port by hand. Make sure the antenna is securely connected.

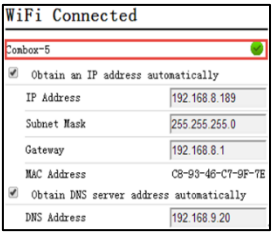


1. Open your mobile device or laptop's WLAN page. The new access point called ZEVERSOLAR -XXXX is displayed. Note: "XXXX" stands for the last four digits in the Registry ID (Figure A).
2. Connect to the access point using your mobile device or laptop, the password is 'zeversolar'.

FigureA



FigureB



FigureC

3. Start the web browser and type in 'http://160.190.0.1'. The internal website will open. Select a router in the [Wireless] area. The Password/Security Key dialog box will pop up.
4. Enter the password of the router (Figure B).If the WiFi device is connected to the router successfully, the status indicator on the wireless page will display the icon (Figure C).
5. Please change to a secure WiFi password to ensure highest security and prevent unauthorized access, refer to manual for the process of password change (you can download the manual from Zeversolar home page www.zeversolar.com).
6. This page shows the WiFi SSID and password information, you can change the SSID and WiFi password accordingly (default password is 'zeversolar'). To ensure highest security of your system, please change the default password ‚zeversolar' and keep the new password confidential. If you do not change to a secure password, you expose your system to a risk of unauthorized access by persons who know the default password and are within the reach of the WiFi network.

7. Monitor SN and Registry Key is printed on the labels which is attached on inverter side and warranty card

More operating information for ComBox:
In order to achieve remote monitoring reliably, please visit website(*http:// www.zeversolar.com*) and download the detailed information, you can also find how to use ZeverCloud in it.

6.4 Inverter demand response modes (DRED)

DRMS application description

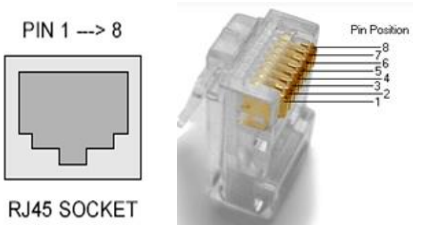
- Only applicable to AS/NZS4777.2:2015.
- DRM0, DRM5, DRM6, DRM7, DRM8 are available.

The inverter shall detect and initiate a response to all supported demand response commands ,demand response modes are described as follows:

Mode	Requirement
DRM 0	Operate the disconnection device
DRM 1	Do not consume power
DRM 2	Do not consume at more than 50% of rated power
DRM 3	Do not consume at more than 75% of rated power ANDSource reactive power if capable
DRM 4	Increase power consumption(subject to constraints from other active DRMs)
DRM 5	Do not generate power
DRM 6	Do not generate at more than 50% of rated power
DRM 7	Do not generate at more than 75% of rated power ANDnot more than 60% reactive power
DRM 8	Increase power generation(subject to constraints from other active DRMs)

The RJ45 socket pin assignments for demand response modes as follows:

Pin1--------DRM 1/5
Pin2------- DRM 2/6
Pin3------- DRM 3/7
Pin4------- DRM 4/8
Pin5------- RefGen
Pin6------- Com/DRM0
Pin7--------N/A
Pin8------- N/A



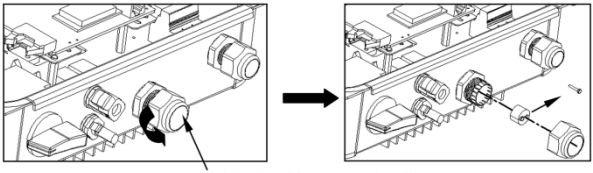
Connect the network cable:

NOTICE

Damage to the inverter due to moisture and dust penetration

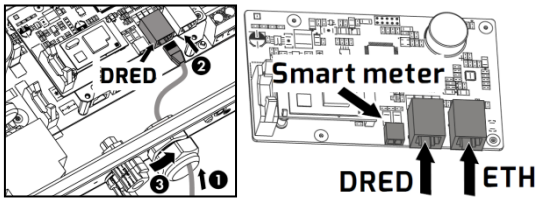
- If the cable gland are not mounted properly, the inverter can be destroyed due to moisture and dust penetration. All the warranty claim will be invalid.
- Make surethe cable gland has beentightened firmly.

1. Loosen the screws of the cover using a screwdriver (T25) and remove the cover. (see Section 5.4.2).
2. Unscrew the swivel nut of the M25 cable gland, remove one filler-plug from the cable gland and keep it well. If there is only one network cable, please keep another filler-plug in the remaining hole of the sealing ring against water ingress.



M25 cable gland for network cable

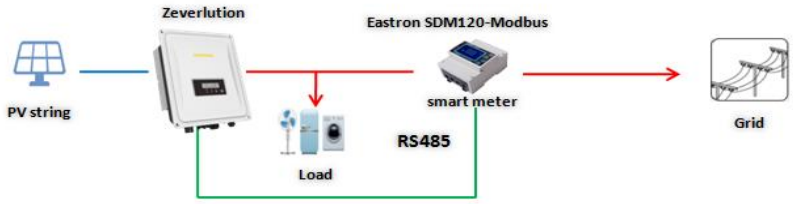
3. Insert the network cable into the RJ45 socket on the upper circuit board(ComBox).



4. Connect the inverter to DRED via the abovementioned network cable.
5. Press the sealing ring with the network cable into the cable gland, and then tighten the swivel nut firmly. Make sure the cable gland is mounted properly. The cable gland must be adequately locked to prevent any movement of the cable.
6. Secure the cover (screw driver type: T25,torque: 2.5Nm).

6.5 Active power control with smart meter & ComBox

The inverter can control activepower output via connecting smart meter and ComBox integrated in Zeversolar'sinverter,following is the system connection mode.



Smart meter(model: SDM120,SDM220,SDM230-Modbus) connecting method and baud rate setting method, please refer to smart meter user manual.

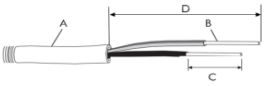
NOTICE

Possible reason of communication failure due to incorrect connection

- ComBox only supports single inverter to do active power control
- The overall length of the cable from combox to smart meter should not exceed 1,000 m

Connect the smart meter to the inverter:

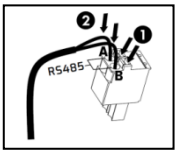
1. Cable requirements:



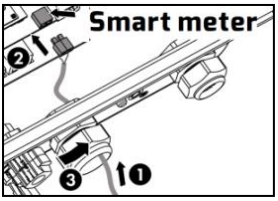
Object	Description	Value
A	External diameter	5 to 8 mm
B	Conductor cross-section	0.14 to 1.5 mm^2
C	Stripping length of the insulated conductors	approx. 9 mm
D	Stripping length of the outer sheath of the cable	approx. 30 mm

2. Route the cable into inverter through the cable gland, referring to the cable connection (Section 6.1).

3. Connect the conductors to the supplied smart meter connector in accordance with the symbol"A" and "B". Whendoing so, ensure the conductors are plugged completely into the terminal up to the insulation.



4. Plug the assembled smart meter connector into the pin connector.



5. Push the seal insert back into the cable gland. Tighten the swivel nut slightly.

6. Place the cover on the housing, then tighten all 4 screws with a Torx screwdriver (screw driver type: T25, torque: 2.5Nm).

NOTICE

Possible reason of communication failure due to the wrong meter

- The smart meterbrand:EASTRON
- Supported model: SDM120-Modbus,SDM220-Modbus,SDM230-Modbus
- Must set the meter baud rate for modbus to 9600bps

More meter details are available at http://www.eastron.com.cnor http://www.eastrongroup.com/

6.6 Communication with third-party devices

Zeverlutioninverters can communicate with Solarlog or Meteocontrol, in other words, you can use Solarlog or Meteocontrol to monitor Zeverlution inverters. For more information, please refer to their user manual.

7 Commissioning

NOTICE

Risk of injury due to incorrect installation

We strongly recommend carrying out preliminary checks before commissioning to avoid possible damage to the device caused by incorrect installation.

7.1 Electrical checks

Carry out the main electrical checks as follows:

① Check the PE connection with a multimeter: check that the inverter's exposed metal surface has a ground connection.

⚠ DANGER

Danger to life due to the presence of DC voltage

- Only touch the insulation of the PV array cables.
- Do not touch parts of the sub-structure and frame of PV array which are not grouned.
- Wear personal protective equipment such as insulating gloves.

② Check the DC voltage values: check that the open-circuit voltage of the PV array on the coldest day based on statistical records does not exceed 600V.

③ Check the polarity of the DC voltage: make sure the DC connectors have the correct polarity.

④Check the PV array's insulation to ground with a multimeter: make sure that the insulation resistance to ground is greater than 1 Mohm.

⑤Check and make sure that the AC circuit breaker must be correctly rated and mounted.

⚠ DANGER

Danger to life due to the presence of AC voltage

- Only touch the insulation of the AC cables.
- Wear personal protective equipment such as insulating gloves.

⑥Check the grid voltage: check that the grid voltage at the connection point of the inverter complies within the permitted range.

7.2 Mechanical checks

Carry out the main mechanical checks to ensure the inverter is waterproof:

① Make sure the inverter and wall bracket have been correctly mounted.

②Make sure that all usedDC connectors are securely in place.
Make sure that unused DCinputs on the inverter have been inserted by DC plug connectors with sealing plugs.

③ Make sure the communication wires has correctly connected
Make sure the communication cable gland has been correctly mounted and tightened.

④Make sure theAC conductors have correctly connected
Make sure the AC cable gland has been correctly mounted and tightened.

⑤Make sure the cover has been correctly mounted.

⑥Make sure that cables are routed in safe place or protected against mechanical damage.

7.3 Start-up

After finishing the electrical and mechanical checks, switch on the DC switch, then check various settings in the display and make changes if necessary.
Ensure the correct safety setting has been selected for the region, then switch on the AC circuit breaker.
When there is sufficient DC voltage applied and the gridconnection conditions are met, the inverter will start to operate automatically.

Usually, there are three states during operation:
Waiting: When the initial DC voltage of the PV strings is greater than the minimum DC input voltage but lower than the start-up DC input voltage, the inverter is waiting for sufficient DC input voltage and cannot feed power into the grid.

Checking: When the initial voltage of the PV strings exceeds the start-up DC input voltage, the inverter will check feeding conditions at once. If there is anything wrong during checking, the inverter will switch to the "Fault" mode.

Normal: After checking, the inverter will switch to "Normal" state and feed power into the grid.

During periods of low radiation, the inverter may continuously start up and shut down. This is due to insufficient power generated by the PV generator.
If this fault occurs often, please call service.


Quick Troubleshooting

If the inverter is in "Fault" mode, refer to Section 11 "Troubleshooting".

8 Disconnecting the inverter from voltage sources

Prior to performing any work on the inverter, disconnect it from all voltage sources as described in this section. Always adhere strictly to the prescribed sequence.

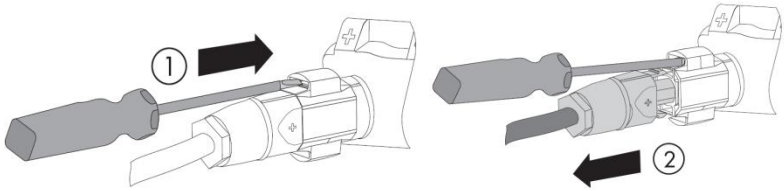
NOTICE

Destruction of the measuring device due to overvoltage

- Only use measuring devices with a DC input voltage range of 1000V or higher.

Procedure:

1. Disconnect the ACcircuitbreaker and secure it against reconnection.
2. Disconnect the DC switch and secure it against reconnection.
3. Use a current clampto ensure that no current is present in the DC cables.
4. Release and remove all DC connectors. Insert a flat-blade screwdriver or an angled screwdriver (blade width: 3.5 mm) into one of the slide slots and pull the DC connectors out downwards. Do not pull on the cable.



5. Ensure that no voltage is present at the DC inputs on the inverter using a suitable measuring device.

⚠ DANGER

Danger to life due to high voltages

The capacitors in the inverter take 5 minutes to discharge.

- Wait 5 minutes before opening the cover.

6. Loosen the 4 screws of the cover using a screwdriver (T25) and remove the cover.

NOTICE

Damage to the inverter due to electrostatic discharge

・Touching electronic components can cause damage to or destroy the inverter through electrostatic discharge.

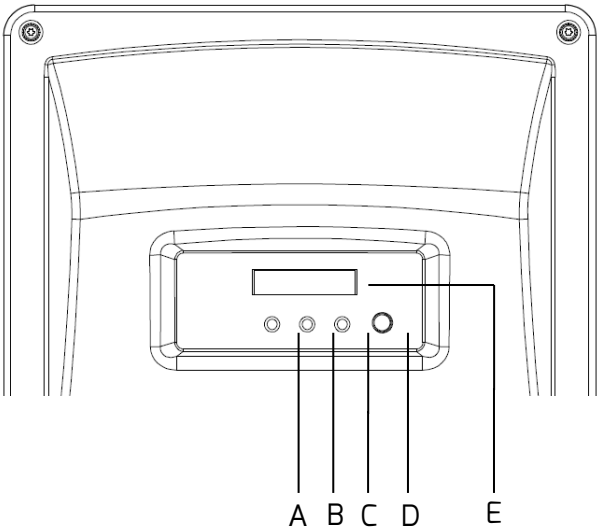
7. Use a suitable measuring device to check that no voltage is present at the AC screw terminal blocks between L and N and L and PE.
8. Loose the screws of the screw terminal blocks and the swivel nut of the M20 cable gland, remove the AC cable.
9. Secure the cover (screw driver type: T25,torque: 2.2Nm).

9 Operation

The information provided this chapter covers the LED indicators, control button, display messages, and the language and safety regulation settings.

9.1 Overview of the control panel

The inverter is equipped with a text display, three LED indicators and one control button.



Object	Description
A	Normal (Green LED)
B	Fault (Red LED)
C	Communication (Yellow LED)
D	Control button
E	Display

9.1.1 Display

The display consists of 16 characters×2 lines. The bottom line shows the current output (Pac = xxxx.xW). The top line shows the current state by default, it will switch to different runninginformation by pressing the control button.

Line 1	Runninginformation	
	E-today	Daily energy
	E-total	Energy generated since the inverter has been installed
	Vpv	DC input voltage
	Ipv	DC input current
	Vac	Grid voltage
	Iac	Present output current
	Frequency	Grid frequency
	Model	Type name
	Set Language	Selected language
	Version	Firmware version
	Serial No.	Serial number
	IP Addr	IP address
Line 2	Pac = xxxx.xW[1)]	Current output power

1)If the item "IP Addr" on the top line is displayed, thecommunicationconnection state withZeverCould (Disconnected or Connected) will be displayed on bottom line.

For how to create a new plant in ZeverCloud, please visit website (www.zevercloud.com) and follow the procedureas described in the relative manual (ZeverCloud User Manual).
The item "IP Addr" on the top linewill show the relative IP addressonlywhen user monitor the inverterwiththe Ethernet moduleorWiFi module which is integrated inside the inverter, otherwisethe item "IP Addr" on the top line will show"0.0.0.0".
If the inverter is monitored with external communication devices (e.g. ZeverCom, Solar-Log, or other 3rd party devices), read the IP address on these devices.

9.1.2 Control button

The inverter has a control button which is necessary to switch between the various displays for measured values and device information, to enter next entry and to lock the expected item.

The display menus wrap around, which means that when you arrive at the last item, the first itemwill be displayed when you press the control button again.

You can freeze the display as follows:
Keep pressing the button for 5s whenthe display shows thedesireditem, and do not release the button until you see "LOCK". The display will always show the selected item until you press the button again or the operating state of the inverter changes.

To save power, the backlight of the display turns off automatically after 10s. Press the button again to activate it.

9.1.3 LEDindicators

The inverter is equipped with three LED indicators "green", "red" and "yellow" which provide information about the various operating states.

Green LED:
The green LED is lit when the inverter is operating normally.

Yellow LED:
The yellow LED flashes during communication.
Also, the yellow LED is lit during updatingfirmwarethrough RS485.

Red LED:
The red LED is lit when the inverter has stopped feeding power into the grid due to a fault. The corresponding error code will be shown on the display.

9.2 Display messages

Along with the various operating states, various messages may be shown on the display, as follows.

State	Error code	Description	Causes
Initializat-ion		Waiting	Initial PV voltage is between minimum DC input voltage and the start-up DC input voltage of the inverter.
		Checking	The inverter is checking the feed-in conditions after the initial PV voltage exceeds the start-up DC input voltage of the inverter.
		Reconnect	The inverter is checking feed-in conditions after the occured fault has been solved.
Normal		Normal	The inverter is feeding power into grid normally.
Fault	1	SCI Fault	Communication between the master and slave CPU has failed.
	2	EEPROM R/W Fault	Reading or writing of EEPROM has failed.
	3	Rly-Check Fault	Output relay has failed.
	4	DC INJ. High	Output DC feed-in exceeds the permitted upper limit.
	6	High DC Bus	The voltage of DC bus exceeds the permitted upper limit.
	8	AC HCT Fault	Output current is abnormal
	9	GFCI Fault	Groundfault detection circuit is abnormal
	10	Device Fault	Unknown Error
	33	Fac Fault	The grid frequency is outside the permitted range.
	34	Vac Fault	The grid voltage is outside the permitted range.
Fault	35	No Utility Grid	The utility cannot be detected, which may

	Available	be caused by no utility, grid disconnected, AC cables damaged, fuse broken or island mode.
36	Residual current fault	The residual current exceeds the permitted upper limit.
37	PV Overvoltage	The voltage of the PV strings exceeds the permitted upper limit.
38	ISO Fault	The PV array's insulation resistance to ground is below the permitted value, or the electrical insulation inside the inverter has failed.
40	Over Temp.	The internal temperature exceeds the permitted value.
41	Vac differs for M-S	A different value of grid voltage has been detected by the master and slave MCU.
42	Fac differs for M-S	A different value of grid frequency has been detected by the master and slave MCU.
43	Residual current differs for M-S	A different value of residual current has been detected by the master and slave MCU.
44	DC Inj. differs for M-S	A different value of DC feed-in has been detected by the master and slave MCU.
45	Fac,Vac differs for M-S	Different values of grid frequency and voltage has been detected by the master and slave MCU.

The last five failure reports on the network and system protection device can be read. An interruption in the supply voltage of ≤ 3s does not result in any loss of failure reports (according to VDE-AR-N 4105).

9.3 Language and safety regulation settings

Before setting, switch on the DC switch, and ensure that the AC circuit breaker is switched off and cannot be reactivated, while the inverter should be reliably grounded.

9.3.1 Language setting

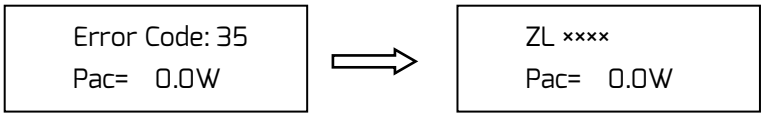
The inverter provides two languages: English and German.
Keep pressing the button for approx. 5s at the item of "Set Language" to enter the language menu and select the language. The display will switch to current state information automatically and the language setting will be saved at the same time unless you press the button again within approx. 10s.

9.3.2 Safety regulation setting

You can choose desired safety regulation according to the local requirements, procedure as follows.

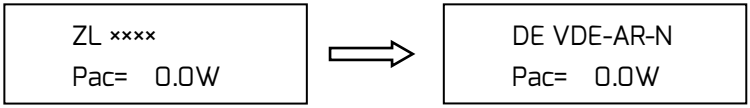
Step 1:

Press the button (see section 9.1.1)once per second until the type name of the inverter appears.



Step 2:

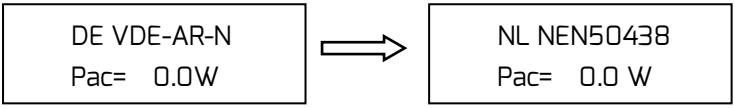
Keep pressing the button for 10 seconds to enter the safety regulation setting menu.



Step 3:

Press the buttononceper second to scroll the safety regulations.

IF you want to choose the safety regulation for the Netherlands, press the buttononce per seconduntilthedisplay shows "NL NEN50438".



If the display shows "DEFAULT", keep on pressing the button until the displayshows the desired safety regulation.

After waiting for10 seconds, the safety regulation setting will be saved.

10 Technical Data

10.1 DC input data

Type	Zeverlution 3680	Zeverlution 4000	Zeverlution 5000
Max. PV array power （STC）	4780Wp	5720Wp	6500Wp
Max.DC power (@cosφ=1)	3900W	4650W	5300W
Max. input voltage	600V		
MPP voltage range	100V-520V		
Rated input voltage	360V		
Min. start voltage	80V		
Min. feed-in power	30W		
Max. input current per MPP input	11A/11A		
Number of independent MPP inputs	2		
Strings per MPP input	1/1		

10.2 AC output data

Type	Zeverlution3680	Zeverlution 4000	Zeverlution 5000
Rated active power	3680W	4000W	5000W
Max. apparent AC power	3680VA	4400VA [1)]	5000VA
Nominal AC voltage / range	220V,230V,240V / 180V-280V		
AC power frequency / range	50, 60 / ±5Hz		
Max. output current	16A	20A	23A
Power factor (@rated power)	1		
Adjustable displacement power factor	0.95 $_{\text{inductive}}$ ... 0.95 $_{\text{capacitive}}$ (only for VDE-AR-N 4105)		
	0.8 $_{\text{inductive}}$.... 0.8 $_{\text{capacitive}}$ (for others)		
Feed-in phase / connection phase	1 / 1		
Harmonic distortion (THD) at rated output	< 3%		

[1)] For Belgium, Sac, max=4000VA

10.3 General data

Type	Zeverlution 3680	Zeverlution 4000	Zeverlution 5000
communication: RS485 / Ethernet / WiFi	● / ○ / ○		
Display	16 x 2 characters		
Earth Fault Alarm	cloud based, audible and visible(AU)		
Zero power output	Via connecting smart meter(AU)		
Dimensions (W x H x D)	341 x395x172 mm		
Weight	11kg		
Cooling method	convection		
Noise emission (typical)	<25 dB(A)@1m		
Installation	indoor & outdoor		
Mounting information	wall mounting bracket		
DC connection	SUNCLIX		
AC connection	screw terminalterminal		
Operating temperature range	-25℃...+60℃		
Relative humidity (non-condensing)	0% ... 100%		
Max. operating altitude	4000m(>3000m derating)		
Degree of protection (according to IEC 60529)	IP65		
Climatic category (according to IEC 60721-3-4)	4K4H		
Topology	H5		
Self-consumption (night)	<1W		
Radio technology	WLAN 802.11 b / g / n		
Radio spectrum	2.4 GHz		
Standby power	<8.5W		

●—Standard ○—Optional —-N/A

10.4 Safety regulations

Type	Zeverlution 3680	Zeverlution 4000	Zeverlution 5000
DC switch	○		
PV ISO	●		
Grid monitoring	●		
DC reverse polarity protection	●		
AC overcurrent protection	●		
Residual current monitoring(GFCI)	●		
Protection class (according to IEC 62103)	Ⅰ		
Overvoltage category (according to IEC 60664-1)	Ⅱ(DC), Ⅲ(AC)		
Internal overvoltage protection	Integrated		
DC feed-in monitoring	Integrated		
Islanding protection	Integrated		
EMC immunity	EN61000-6-1, EN61000-6-2		
EMC emission	EN61000-6-3, EN61000-6-4		
Utility interference	EN61000-3-2, EN61000-3-3		

●—Standard ○—Optional

Information for choosing the safetystandard VDE-AR-N 4105

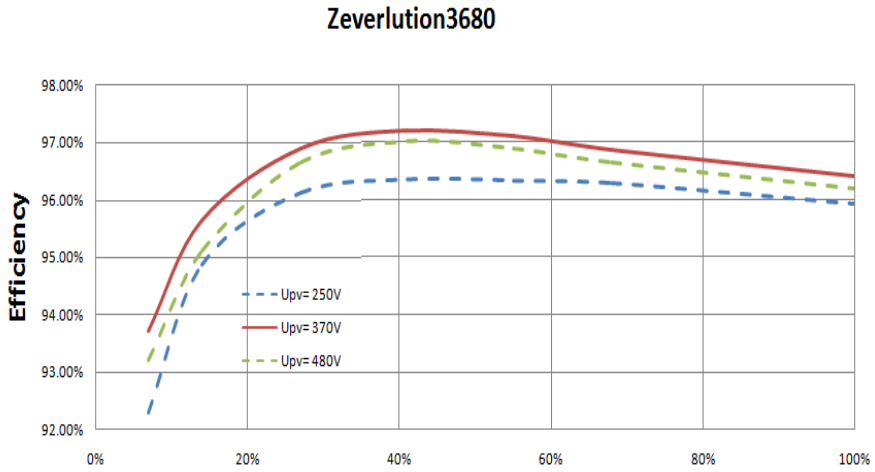
If a central network and system protection device is used for power generationsystems, the value of the rise-in-voltage protection U > of 1.1Un presented in theintegrated network and system protection can be changed, but a password is required.

It is not necessary to adjust the value of the displacement power factor cos (phi) if the power generation system is $\Sigma SA_{max} \leq$ 3.68KVA and was set to 1 as default in the embedded inverter software. However, if the power generation system is 3.68KVA < Σ $SA_{max} \leq$13.8KVA,the standard cos (phi) characteristic curve defined in VDE-AR-N 4105 shall be applied through the ZeverCom.

10.5 Efficiency

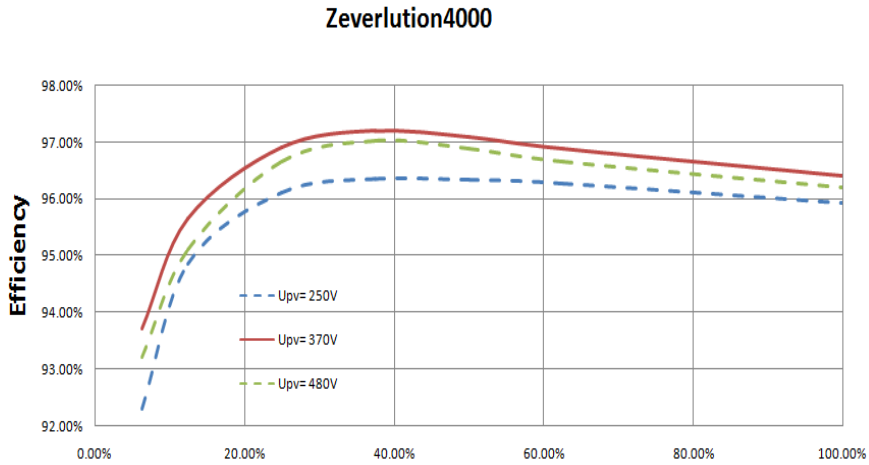
The operating efficiency is shown for the three input voltages (V_{mppmax}, $V_{dc,r}$ and V_{mppmin}) graphically. In all cases the efficiency refers to the standardized power output ($P_{ac}/P_{ac,r}$). (According to EN 50524 (VDE 0126-13): 2008-10, cl. 4.5.3).
Notes: Values are based on rated grid voltage, cos(phi) = 1and an ambient temperature of 25℃.

Efficiency curve Zeverlution3680



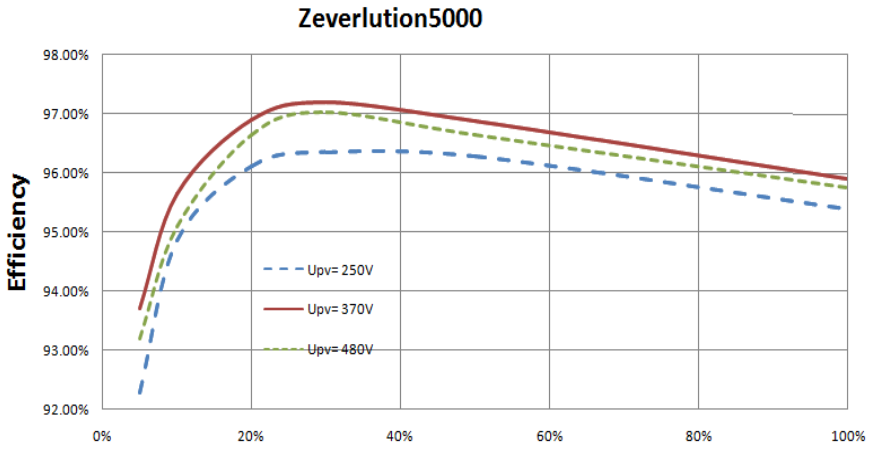
Max. efficiency, η_{max}	97.2%

Efficiency curve Zeverlution4000



Max. efficiency, η_{max}	97.2%

Efficiency curve Zeverlution5000



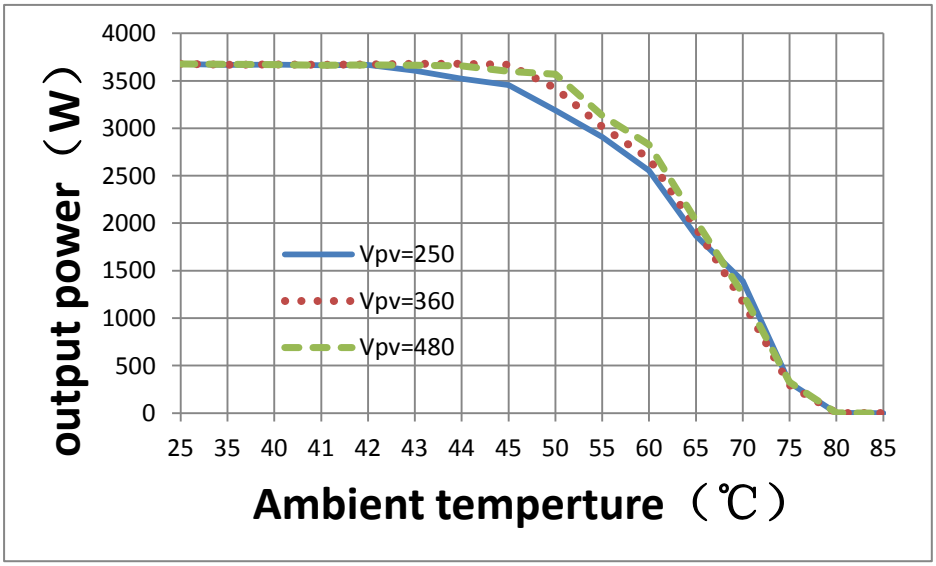
Max. efficiency, η_{max}	97.2%

10.6 Power reduction

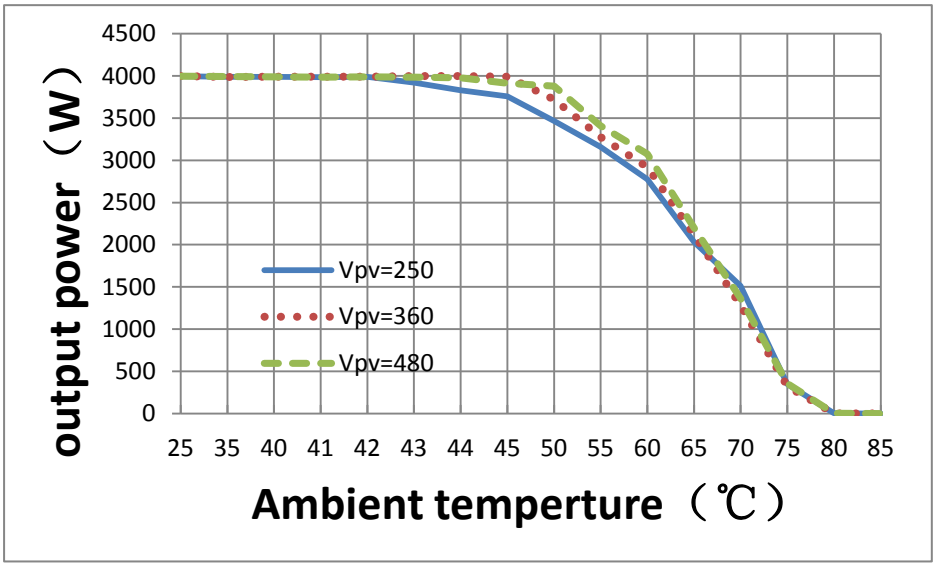
In order to ensure inverter operation under safe conditions ,the device may automatically decrease power output.

Power reduction depends on many operating parameters including ambient temperature and input voltage, grid voltage, grid frequency and power available from the PV modules. This device can decrease power output during certain periods of the day according to these parameters.

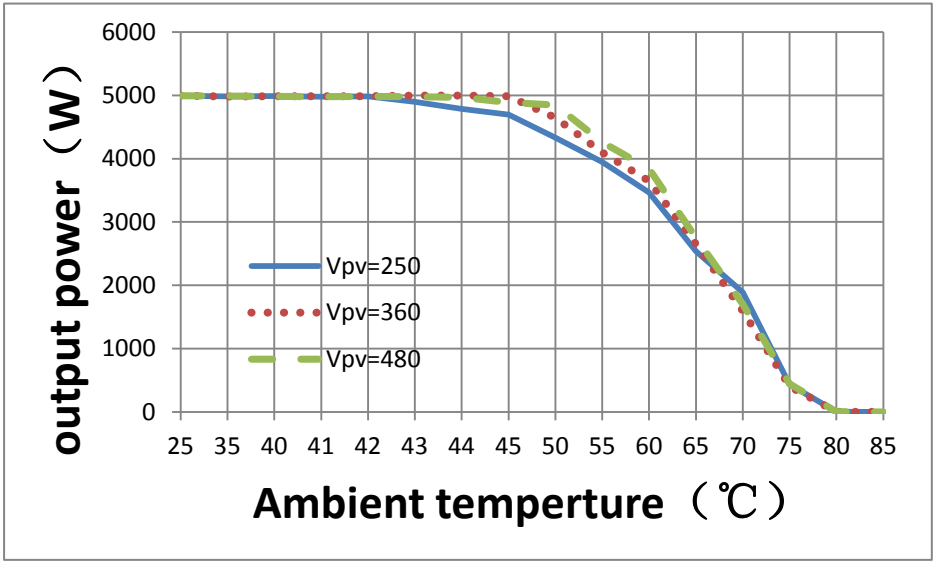
Notes: Values are based on rated grid voltage and cos (phi) = 1.



Power reduction with increased ambient temperature (Zeverlution3680)



Power reduction with increased ambient temperature (Zeverlution4000)



Power reduction with increased ambient temperature (Zeverlution5000)

10.7 Tools and torque

Tools and torque required for installation and electrical connections:

Tools, model		Object	Torque
Torque screwdriver, T25		Screws for the cover	2.5Nm
		Screw for second protective grounding connection	
		Screws for tighteningthe inverter and wall bracket	
Flat-head screwdriver, blade with 1×5.5mm		Screw terminal block for AC cable	1.2Nm
Flat-head screwdriver, blade width 3.5mm		Sunclix DC connector	
		Antenna	Hand-tight
Socket wrench	Open end of 30	Swivel nut of M25 cable gland	Hand-tight
	Open end of 15	Swivel nut of sunclix connector	2.0Nm
	Open end of 10	Hex bolts for wall bracket	
Wire stripper		Peel cable jackets	
Crimping tools		Crimp power cables	
Hammer drill, drill bit of Ø10		Drill holes on the wall	
Rubber mallet		Hammer wall plugs into holes	
Cable cutter		Cut power cables	
Multimeter		Check electrical connection	
Current clamp			
Marker		Mark the positions of drill holes	
ESD glove		Wear ESD glove when opening the inverter	
Safety goggle		Wear safety goggle during drillingholes	
Anti-dust respirator		Wear anti-dust respirator during drilling holes	

11 Troubleshooting

When the PV power plant does not operate normally, fault information will be shown up on the displayand the red LED will be lit at the same time.
We recommend the following actions for quick troubleshooting.
The corresponding causes are described in section 9.2 “Display messages”.

Object	Error code	Corrective measures
Presumable Fault	6	· Check the open-circuit voltages of the strings and make sure it is below the maximum DC input voltage of the inverter. · If the input voltage is within the permitted range and the fault still occurs, it might be that the internal circuit has broken. Contact the service.
	33	· Check the grid frequency and observe how often major fluctuations occur. If this fault is caused by frequent fluctuations, try to change the operating parameters after informing the grid operator first.
	34	·Check the grid voltage and grid connection of the inverter. · Check the grid voltage at the connection point of the inverter. If the grid voltage is outside the permissible range due to local grid conditions, try to change the values of the monitored operating limits after informing the grid operator first. If the grid voltage lies within the permitted range and this fault still occurs, please contact the service.
	35	· Check the fuse and the triggering of the AC circuit breaker in the distribution box. · Check the grid voltage, grid usability. · Check the AC cable, grid connection on the inverter. If this fault is still being shown, contact the service.

Presumable Fault	36	· Make sure the grounding connection of the inverter is reliable. ·Make a visual inspection of all PV cables and modules. If this fault is still shown, contact the service.
	37	· Check the open-circuit voltages of the strings and make sure it is below the maximum DC input voltage of the inverter. If the input voltage lies within the permitted range and the fault still occurs, contact the service.
	38	·Check the PV array's insulation to ground and make sure that the insulation resistance to ground is greater than 1 MOhm. Otherwise, make a visual inspection of all PV cables and modules. · Make sure the grounding connection of the inverter is reliable. If this fault occurs often, contact the service.
	40	·Check whether the airflow to the heat sink is obstructed. ·Check whether the ambient temperature around the inverter is too high.
	41, 42 43, 44 45	· Disconnect the inverter from the grid and the PV arrays, reconnect them after 3 minutes. If this fault is still being shown, contact the service.
Permanent Fault	1, 2,3, 4,5,6, 8,9	· Disconnect the inverter from the grid and the PV arrays, reconnect themafter 3 minutes. If this fault is still being shown, contact the service.

Contact the Zeversolarservice if you meet other problems not in the above table.

12 Maintenance

Normally, the inverter needs no maintenance or calibration. Regularly inspect the inverter and the cables for visible damage. Disconnect the inverter from all power sources before cleaning. Clean thehousing, coverand display with a soft cloth. Ensure the heat sink at the rear of the inverter is not covered.

12.1 Cleaning the contacts of the DC switch

Clean the contacts of the DC switch annuallytoextend itsservicelife.
Perform cleaning by cycling the switch to“ | ”positionand“○”position 10timesin a row.
The DC switch is located at the lower left of the housing.

12.2 Cleaning the heat sink

⚠ CAUTION

Risk of injury due to hot heat sink

- The heat sink may exceed 70℃during operation. Do not touch the heat sink during operation.
- Wait approx. 30 minutes before cleaning until the heat sink has cooled down.
- Ground yourself before touching any component.

Clean the heat sink with compressed air or a soft brush. Do not use aggressive chemicals, cleaning solvents or strong detergents.

For proper function and long service life, ensure free air circulation around the heat sink.

13 Dismantling the Inverter

Below is the procedure for dismantlng the inverter out of service:

①Disconnect the inverter from all voltage sources (see Section 8).

②Remove the AC cable from the inverter.

③If a network cable is connected, remove the cable from theinverter.

④If other cables (e.g. smart meter connection) are connected, remove them from theinverter.

⑤If a WiFi antenna is connected, remove them from theinverter.

⑥ Reclose the cover and tighten the 4 fixing screws.

⚠ CAUTION

Risk of burns due to hot housing and heat sink

・Wear protective gloves before lifting the inverter.

⑦Unscrew and remove the 2 blocking screws located on the sides of the inverter.

⑧Raise the inverter to remove it from the wall bracket.

⑨ Remove the wall bracket.

If the inverter is disassembled due to a device replacement, it is not necessary todismantle the wall bracket.

⑩If the inverter is to be stored or shipped in packaging, pack the inverter.

Use the original packaging or packaging that is suitable for the weight and dimensions of the inverter and thenseal them by using adhesive tape.

14 Disposing the Inverter

If Zeverlution service life expires, dispose of the packaging and replaced parts according to the local rules aboutdisposingelectronic waste.

Do not dispose the inverter with normal domestic waste.

WEEE designation

Do not dispose of the inverter together with the household waste butin accordance with the disposal regulations for electronic waste applicableat the installation site.

15 EU Declaration of Conformity

within the scope of the EU directives

- Electromagnetic compatibility 2014/30/EU (L 96/79-106, March 29, 2014) (EMC).
- Low Voltage Directive 2014/35/EU.(L 96/357-374, March 29, 2014)(LVD).
- Radio Equipment Directive 2014/53/EU (L 153/62-106. May 22. 2014) (RED)

SMA New Energy Technology (Jiangsu) Co., Ltd. confirms herewith that the inverters described in this document are in compliance with the fundamental requirements and other relevant provisions of the abovementioned directives. The entire EU Declaration of Conformity can be found at www.zeversolar.com.

16 Warranty

The factory warranty card is enclosed with the package, please keep well the factory warranty card. Warranty terms and conditions can be downloaded at www.zeversolar.com/service/warranty/ if required. When the customer needs warranty service during the warranty period, the customer must provide a copy of the invoice, factory warranty card, and ensure the typelabel of the inverter is legible. If these conditions are not met, Zeversolar has the right to refuse to provide with the relevant warranty service.

17 Contact

If you have any technical problems concerning our products, please contact zeversolar service. We require the following information in order to provide you with the necessary assistance:

- Inverter device type
- Inverter serial number
- Type and number of connected PV modules
- Error code
- Mounting location
- Warranty card

Service Contact
Our regional services contact information can be found at :https://www.zeversolar.com/service/customer-interaction-center/

SMA New Energy Technology (Jiangsu) Co., Ltd.
Tel.: +86 512 6937 0998
Fax: +86 512 6937 3159
Web: www.zeversolar.com
Factory add.: No.588 Gangxing Road, Yangzhong Jiangsu, China
Headquarters add.: Building 9, No.198 Xiangyang Road, Suzhou 215011, China

540-00140-04

REV	DATE
04	2017/11/16