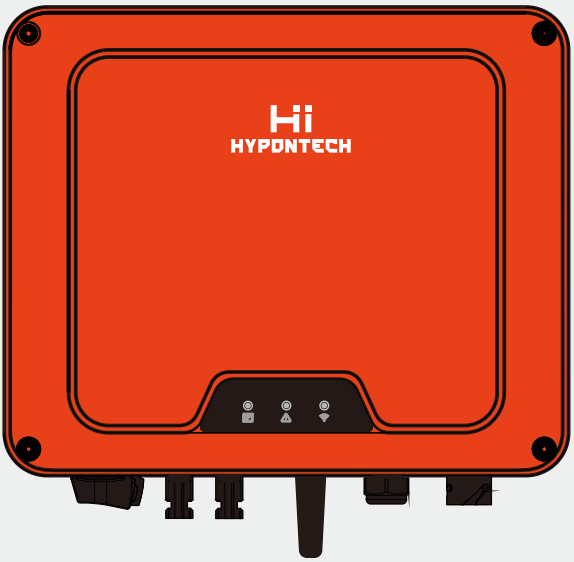
HYPONTECH



HPS-1500/2000/3000/3680/4000/5000

Installation and operating instructions

Table of Contents

1 Notes on this Manual

General Notes

The HPS series is a transformerless solar inverter with indenpendent MPP tracker.
It converts the direct current (DC) from a photovoltaic (PV) array to grid-compliant alternating current (AC) and feeds it into the utility grid.

1.1 Area of validity

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

- HPS-1500
- HPS-2000
- HPS-3000
- HPS-3680
- HPS-4000
- HPS-5000

1.2 Target group

This manual is for qualified electricians only, who 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 manual

The safety precautions and general information are used in this manual as follows:

⚠ 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.

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

2 Safety

2.1 Intended use

1. HPS converts the direct current from PV array into grid-compliant alternating current.
2. The product is suitable for indoor and outdoor use.
3. The product must only be operated with PV arrays (PV modules and cabling) of protection class II, in accordance with IEC 61730, application class A.
4. PV modules with a high capacitance to ground must only be used if their coupling capacitance is less than 1.0µF.
5. All components must remain within their permitted operating ranges at all times.
6. The product is also approved for the Australian market and may be used in Australia and New Zealand. If DRM support is specified, the inverter may only be used in conjunction with a Demand Response Enabling Device (DRED). This ensures that the inverter implements the commands from the grid operator for active power and reactive power limitation at all times. The inverter and the Demand Response Enabling Device (DRED) must be connected in the same network and the inverter communication interface must be activated.

2.2 Safety standards

HPS inverters comply with the EU Low-Voltage Directive 2014/35/EU and the EMC Directive 2014/30/EU. HPS also complies with the requirement for safety and EMC in Australia and New Zealand market. They are labeled with the CE mark and RCM mark.

For more information about certificates in other countries and regions, please visit website (http://www.hypontech.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 manual.
- 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 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. If you disconnect the DC connectors from the inverter 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, commissioned and maintained only by qualified persons with the appropriate skills.
- Prior to performing any work on the inverter, disconnect it from all voltage sources as described in this document then wait 5 minutes at least.

⚠ 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 in operation.

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 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 cover 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.

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 label

Symbol	Explanation
	Danger of life due to electric shock
	Risk of burns due to hot surface.
	Do not dispose of this inverter with household waste.
	CE mark.
	Certified safety The product is TUV-tested and complies with the requirements of the EU Equipment and Product Safety Act.
	RCM Mark The product complies with the requirements of the applicable Australian
	Danger of high voltage and electric shock, wait at least 5 munites to allow after the inverter has been disconnected from the grid and PV array.
	Refer to the manual accompanying the inverter.
	Risk of danger, warning and caution Safety information important for human safety. Failure to observe the safety information in this manual may result in injury or death.

2.5 Basic safety protection

We provide the following safety protection:

1) Over-voltage, under-voltage protection;

2) Over-frequency, under-frequency protection;

3) Over-temperature monitoring;

4) Residual current monitoring;

5) Insulation monitoring

6) Anti-islanding protection;

7) DC feed-in monitoring;

3 Unpacking

3.1 Scope of delivery

Object	Description	Quantity
A	PV Inverter	1 piece
B	Wall-mounting bracket	1 piece
C	Mounting accessory kit: Wall anchors and hexagon bolts (2×) M5×12 mm pan head screw (1×)	1 set
D	DC connector	1 pair / 2 pairs(*)
E	AC Plug connector	1 piece
F	WiFi stick(optional)	1 piece (optional)
H	Documentation	1 set

*: HPS–3680/4000/5000: 2 pairs

			
A	B	C	D
			
E	F	H	

Carefully check all of the components in the carton. If anything is missing, contact your dealer.

3.2 Checking for transport damage

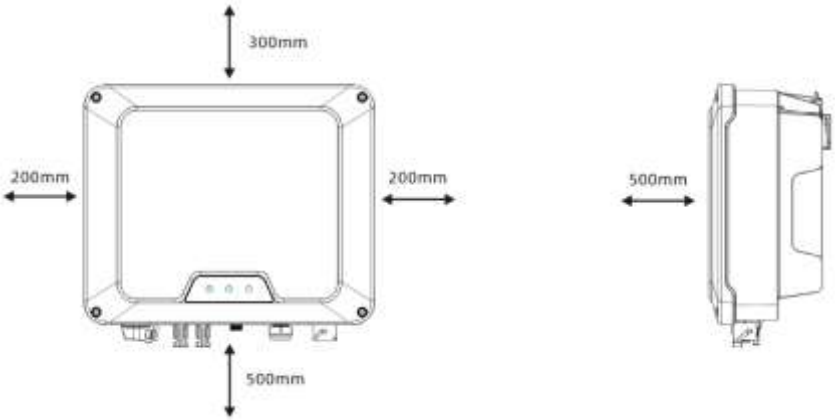
Thoroughly inspect the packaging upon delivery. If you detect any damage to the packaging which indicates the inverter may have been damaged, inform the responsible shipping company immediately. We will be glad to assist you if required.

4 Mounting

4.1 Ambient conditions

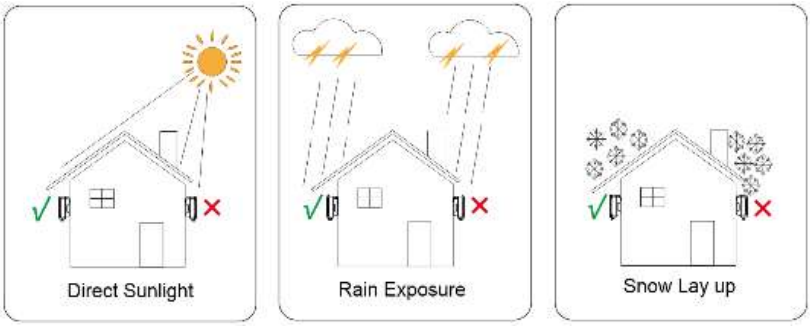
1. Be sure the inverter is installed out of the reach of children.
2. Mount the inverter in areas where it cannot be touched inadvertently.
3. Ensure good access to the inverter for installation and possible service.
4. To make sure that heat can dissipate, observe the following minimum clearance to walls, other inverters, or objects:

Direction	Min. clearance
Upward	300 mm
Sides	200 mm
Downawrd	500 mm
Front	500 mm



5. The ambient temperature should be below 40℃ to ensure optimal operation.
6. Recommend to mount the inverter under the shaded site of the building or mount an awning above the inverter.

7. Avoid exposing the inverter to direct sunlight, rain and snow to ensure optimal operation and extend service life.
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 recommend mounting the inverter on a solid surface. Plasterboard and similar materials are not recommended due to audible vibrations when in use.
10. Do not put any objects on the inverter.
11. Do not cover the inverter.

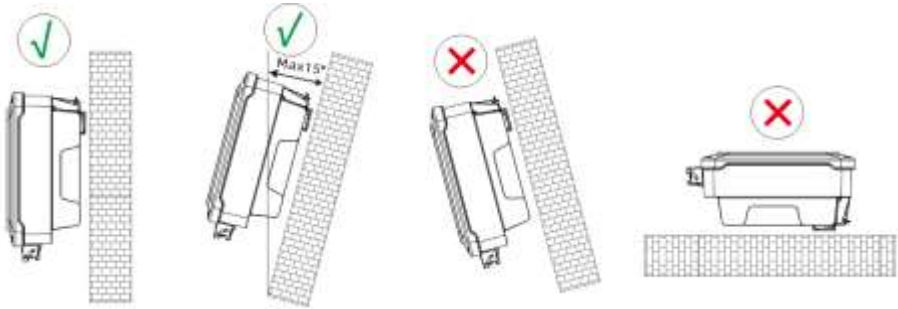


4.2 Selecting the mounting location

⚠ DANGER

Danger to life due to fire or explosion

- Do not mount the inverter on flammable construction materials.
- Do not mount the inverter in areas where flammable materials are stored.
- Do not mount the inverter in areas where there is a risk of explosion.

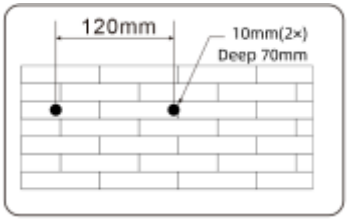


1. Mount the inverter vertically or tilted backward by a maximum of 15°.
2. Never mount the inverter tilted forward or sideways.
3. Never mount the inverter horizontally.
4. Mount the inverter at eye level to make it easy to operate and to read the display.
5. The electrical connection area must point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

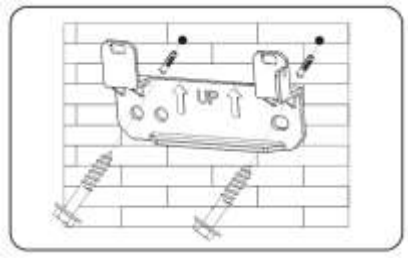
4.3 Mounting the inverter with the wall bracket

Mounting procedures:

1. Use the wall bracket as a drilling template and mark the positions of the drill holes. Drill 2 holes required using a drill with 10 mm bit. The holes must be about 70 mm deep. Keep the drill vertical to the wall, and hold the drill steady to avoid tilted holes.



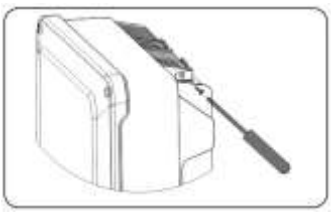
2. After drilling holes in the wall, place two screw anchors into the holes, then attach the wall mounting bracket to the wall using the self-tapping screws and washers delivered with the inverter.

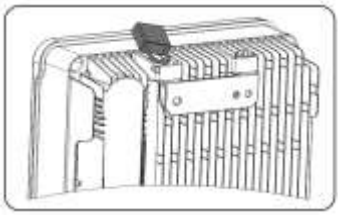


3. Holding the inverter and attach it tilted slightly downwards to the wall bracket.

3. Check both sides of the heat sink to ensure that it is securely in place.

4. Push the inverter as far as possible and attach it to both sides of the wall bracket using the M5 screws.Install an antitheft lock (optional), the lock is prepared by customer.



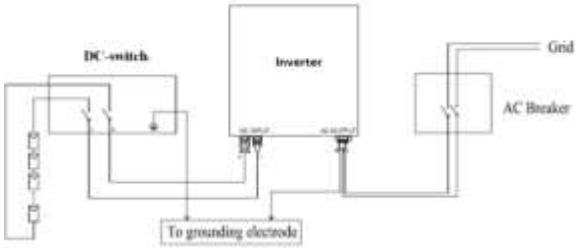


Dismante the inverter in reverse order.

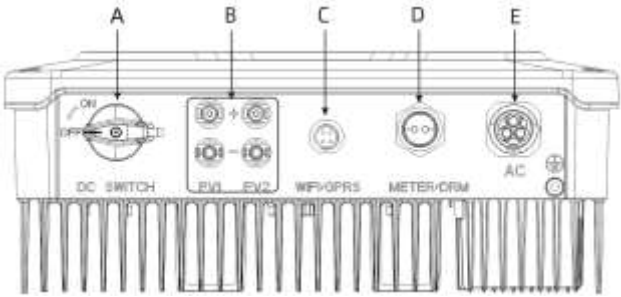
5 Electrical Connection

5.1 System layout of units 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:



5.2 Overview of the connection area



Objec	Description
A	DC SWITCH: switch on or off for PV-load.
B	DC input: plug-in connector to connect the strings.
C	WIFI/GPRS (optional): transmit and receive Wi-Fi or GPRS signal.
D	METER/DRM: connect the monitoring device with network cable.
E	AC OUTPUT: plug-in connector, connect the grid.

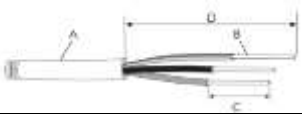
5.3 AC connection

5.3.1 Conditions for the AC connection

Cable Requirements

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

We recommend the following specifications for stranded copper wire.



HPS-1500/2000/3000

Object	Description	Value
A	External diameter	9 to 14 mm
B	Conductor cross-section	2.5 to 6 mm²
C	Stripping length of the insulated conductors	approx. 12 mm
D	Stripping length of the outer sheath of AC cable	approx. 50 mm
The PE conductor must be 8mm longer than the L and N conductors		

Larger cross-sections should be used for longer cables.

HPS-3680/4000/5000

Object	Description	Value
A	External diameter	9 to 14 mm
B	Conductor cross-section	4 to 6 mm²
C	Stripping length of the insulated conductors	approx. 12 mm
D	Stripping length of the outer sheath of AC cable	approx. 50 mm
The PE conductor must be 8mm longer than the L and N conductors		

Larger cross-sections should be used for longer cables.

Cable design

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 it easier to disconnect from the grid due to excessive voltage at the feed-in point.

The maximum cable lengths depend on the conductor cross-section as follows:

Conductor cross-section	HPS-1500	HPS-2000	HPS-3000
2.5 mm²	37 m	28 m	17 m
4 mm²	59 m	44 m	27 m
6 mm²	89 m	67 m	40 m

Conductor cross-section	Maximum cable length		
	HPS-3680	HPS-4000	HPS-5000
4 mm²	25 m	20m	16m
6 mm²	40 m	30m	24m

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

5.3.2 Grid connection

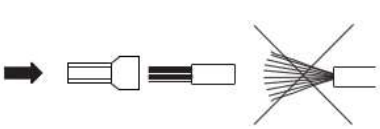
⚠ WARNING

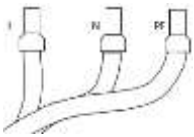
Risk of injury due to electric shock and fire caused by high leakage current

- The inverter must be reliably grounded in order to protect property and personal safety.
- The PE wire should longer than 20mm during strip the outer sheath of AC cable.

Procedure:

1. Switch off the miniature circuit-breaker and secure it against being inadvertently switched back on.
2. Insert the conductor into the suitable ferrule acc. to DIN 46228-4 and crimp the contact.





3. Unscrew the swivel nut from the threaded sleeve,then thread the

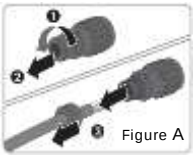


Figure A

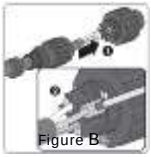


Figure B

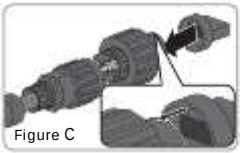


Figure C

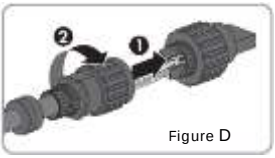


Figure D

swivel nut and threaded sleeve over the AC cable(Figure A).

4. Insert the crimped conductors L, N and PE into the corresponding terminals and tighten the screw with a Torx screwdriver(TX 8, torque: 1.4Nm). Ensure that all conductors are securely in place in the screw terminals on the bush insert (Figure B).
5. Assemble the locking cap, threaded sleeve and swivel nut together. When doing so, hold the bush insert firmly by the locking cap (Figure C),This ensures that the threaded sleeve can be screwed firmly onto the bush insert.Then screw the threaded sleeve and swivel nut(Figure D).
6. Plug the AC connector into the jack for the AC connection and screw tight. When doing so, align the AC connector so that the key on the inverter AC jack is inserted into the keyway on the AC connector bush insert(Figure E).

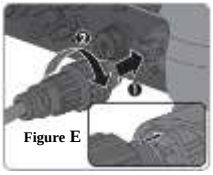


Figure E

5.4.3 Second protective 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:

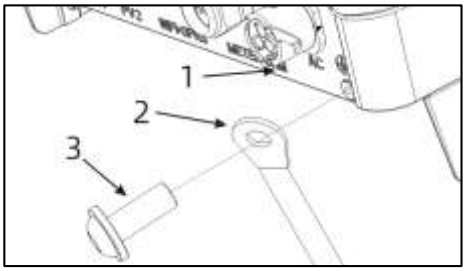
The second protective earth/ground conductor, with a diameter of at least 10 mm^2 and be made from copper , should be connected to the designated earth point on the inverter.

Procedure:

1. Insert the grounding conductor into thesuitableterminal 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).



Information on grounding components:

Object	Description
1	Housing
2	M5 terminal lug with protective conductor
3	M5×12 pan head screw

5.3.3 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 requirements of DIN VDE 0100-712 (IEC60364-7-712).
Therefore an external residual current device (RCD) is not required. If an external RCD needs to be installed because of local regulations, a RCD type A or type B can be installed as an additional safety measure.

5.3.4 Overvoltage category

The inverter can be deployed in grids of installation category III or lower, as defined under IEC 60664-1.

5.3.5 Rating of miniature circuit-breaker

⚠ DANGER

Danger to life due to fire

- You must protect each inverter with an individual miniature circuit- breaker in order that the inverter can be disconnected safely.

No load should be applied between the circuit-breaker and the inverter. Use dedicated circuit-breakers with load switch functionality for load switching. The selection of the 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 currents of the inverters can be found in the following table.

Type	HPS-1500	HPS-2000	HPS-3000
Max. output current	7.5 A	10 A	15 A
Recommended AC circuit breaker rating	16 A, type B	16 A, type B	25A, type B

Type	HPS-3680	HPS-4000	HPS-5000
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

5.4 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.

5.4.1 Requirements for the DC Connection

Use of Y adapters for parallel connection of 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 not be visible or freely accessible.

- In order to interrupt the DC circuit, always disconnect the inverter

Requirements for the PV modules of a string:

- PV modules of the connected strings must be of: the same 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.

5.4.2 Assembling the DC connectors

Assemble the DC connectors as described below. Be sure to observe the correct polarity.

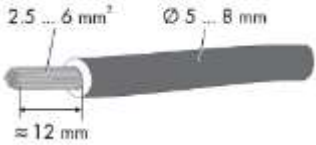
Cable requirements:

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
- ✧ Number of conductors: at least 7
- ✧ Nominal voltage: at least 600V

Proceed as follows to assemble each DC connector.

1. Switch off the DC-switch and secure against being inadvertently switched back on. Eliminate any existing ground faults or short circuits in the strings.
2. Strip the cable as follows:



3. Put the contact barrel with stripped cable in the corresponding crimping notch, ensure all conductor strands are captured in the contact barrel, and then crimp the contact.

4. Insert contact cable assembly into back of the MC4 plug connector until it audibly locks into place.

5. Screw the cap nut by using the torque of 2.6~2.9Nm.

6. After screw the cap nut tightly, connect the fault-free strings of the PV generator into DC input connectors on the inverter until it audibly locks into place.

7. When you want to separate the DC connectors, please use the specified tool to do it. Please make sure the wedge side of the fingers face the MC4 plug connector and push the tool down, as follows.
8. Please use sealing caps for tight sealing of unplugged DC input connectors. If using H4 connector, the operating procedures are similar as that of MC4 connector.

5.4.3 Connecting the PV array

NOTICE

The inverter can be destroyed by overvoltage

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

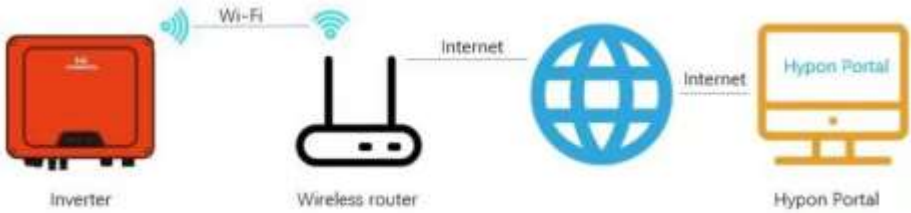
- Do not connect strings with an open-circuit voltage greater than the maximum DC input voltage of the inverter.
- Check the design of the PV system.

1. Ensure that the individual miniature circuit-breaker is switched off and ensure that it cannot be accidentally reconnected.
2. Ensure that the DC switch is switched off and ensure that it cannot be accidentally reconnected.
3. Ensure that there is no ground fault in the PV array.
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 array 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.
7. Ensure that all DC connectors are securely in place.

6 Communication

6.1 System monitoring via WiFi

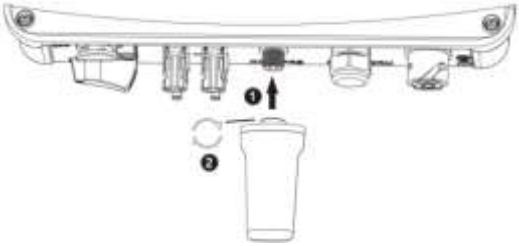
User can monitor the inverter through the WiFi stick(optional). The connection diagram between the inverter and internet with a WiFi connection is shown as follows.



Mounting the WiFi stick:

Take the WiFi stick included in the scope of delivery.

Tighten the WiFi stick into the WiFi connection port by hand. Make sure the WiFi stick is securely connected.



More operating information for WiFi stick:

In order to achieve remote monitoring reliably, please visit website (http://www.hypontech.com) and download the Wifi stick's manual for detailed information, you can also find how to use HyponPortal in it.

6.2 Inverter demand response modes (DRED)

DRMS application description

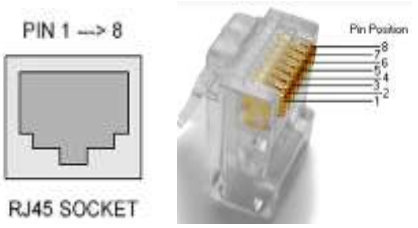
- Only applicable to AS/NZS4777.2:2015.
- DRM0, DRM5, DRM6, DRM7, DRM8 are available.

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 AND Source 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 AND Sink reactive power if capable
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



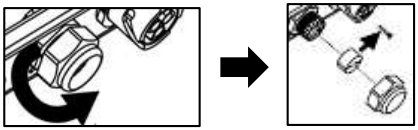
Connect the network cable:

NOTICE

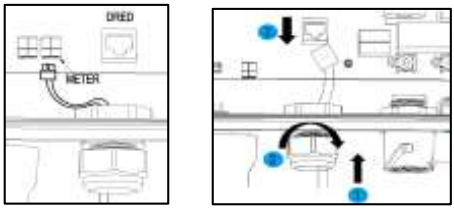
Damage to the inverter due to moisture and dust penetration

- 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 sure the cable gland has been tightened 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.



3. Insert the network cable into the RJ45 socket on the circuit board.



4. Connect the inverter to DRED via the above mentioned 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).

6.3 Active power control with smart meter

The inverter can control activepower output via connecting smart meter,following is the system connection mode.

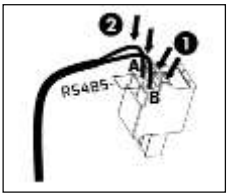
Smart meter as above SDM230-Modbus connecting method and seting baud rate method for modbus please refer to it's user manual.

Connect the smart meter to the inverter:

1. Cable Requirements:

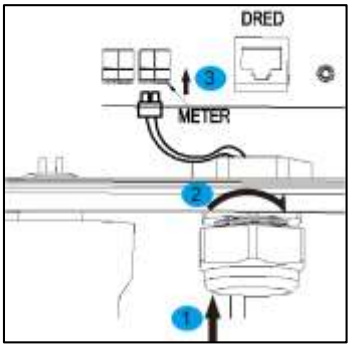
Object	Description	Value
A	External diameter	5 to 8 mm
B	Conductor cross-section	0.14 to 1.5 mm²
C	Stripping length of the insulated conductors	approx. 9 mm
D	Stripping length of the outer sheath of the cable	approx. 30 mm

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



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

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: 2.2Nm).

NOTICE

Possible reason of communication failure due to the wrong meter

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

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

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 faulty installation.

7.1 Electrical checks

Carry out the main electrical tests as follows:

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

② Check the DC voltage values: check that the DC voltage of the strings does not exceed the permitted limits. Refer to the Section 2.1 "Intended use" about designing the PV system for the maximum allowed DC voltage.

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

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

⑤ Check the grid voltage: check that the grid voltage at the point of connection of the inverter complies with the permitted value.

7.2 Mechanical checks

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

① Make sure the inverter has been correctly mounted with wall bracket.

② Make sure the cover has been correctly mounted.

③ Make sure the communication and AC cable gland has been mounted properly and adequately locked.

7.3 Start-Up

After finishing the electrical and mechanical checks, switch on the miniature circuit-breaker and DC-switch in turn. Once the DC input voltage is sufficiently high and the grid-connection conditions are met, the inverter will start operation automatically. Usually, there are three states during operation:

Indicator lights in Green/Red/Yellow correspondently refer to:

POWER LED	ON=Inverter is feeding power
	BLINK=DC is on,but the inverter is not feeding power
	OFF=DC is off
FAULT LED	ON=Inverter is faulty
	OFF=No fault
COM LED	BLINK=Communication device is connected to inverter
	OFF=No communication

During periods of low radiation, the inverter may continuously start up and shut down. This is due to insufficient power generated by the PV array.
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.

Procedure:

1. Disconnect the miniature circuit- breaker and secure against reconnection.
2. Disconnect the DC switch and secure against reconnection.
3. Use a current clamp meter to ensure that no current is present in the DC cables.
4. please use the specified tool to do it. Please make sure the wedge side of the fingers face the female connector and push the tool down, as following figure.

5. Ensure that no voltage is present at the DC inputs of the inverter.

- 6. Loosen and remove the AC connector.

9.1 DC input data

Input (DC)	HPS-1500	HPS-2000	HPS-3000
Max. PV array power (STC)	2195Wp	2926Wp	3990Wp
Max. input voltage	600V		
MPP voltage range	80-480V		80-520V
Rated input voltage	360V		
Initial feeding-in voltage	90V		
Min. feed-in power	6W		
Max. input current per MPPT	12.5A		
Isc PV(absolute maximum)	15.2A		
Number of MPPTs	1		
Number of independent MPP inputs	1		
Max. inverter backfeed current to the array	0A		

Type	HPS-3680	HPS-4000	HPS-5000
Max. PV array power(STC)	4895Wp	5852Wp	6650Wp
Max. input voltage	600V		
MPP voltage range	80V-520V		
Rated input voltage	360V		
Initial feeding-in voltage	150V		
Min. feed-in power	30W		
Max. input current per MPP input	12A/12A		
Isc PV(absolute maximum)	15A/15A		
Number of independent MPP inputs	2		
Strings per MPP input	1/1		
Max. inverter backfeed current to the array	0A		

9.2 AC output data

Output (AC)	HPS-1500	HPS-2000	HPS-3000
Rated active power	1500W	2000W	3000W
Max. / Rated apparent AC power	1650VA	2200VA	3000VA
Nominal AC voltage / range	220V,230V / 180V-280V		
AC power frequency / range	(50±5)Hz/(60±5)Hz		
Rated power frequency / rated grid voltage	50Hz / 230V		
Max. output current (Rated output current)	8.5A	12A	15A
Max. output fault current (Peak and duration)*	45A@1ms	45A@1ms	45A@1ms
Max. output overcurrent protection	16A	16A	25A
Inrush current (Peak and duration)*	10,6A@108us	15,9A@156us	20,2A@123us
Power factor (@rated power)	1		
Adjustable displacement power factor	0.8 inductive ... 0.8 capacitive		
Feed-in phases / connection phases	1 / 1		
Harmonic distortion (THD) at rated output	< 3%		

Type	HPS-3680	HPS-4000	HPS-5000
Rated active power	3680W	4000W	5000W
Max. /Rated apparent AC power	3680VA	4400VA	5000VA
Nominal AC voltage / range	220V,230V / 180V-280V		
AC power frequency / range	(50±5)Hz/(60±5)Hz		
Max. output current (Rated output current)	16A	20A	23A
Max. output fault current(Peak and duration)*	60A@1ms	60A@1ms	60A@1ms
Max. output overcurrent protection	20A	25A	32A
Inrush current (Peak and duration)*	13,7A@128us	14,3A@111us	23,3A@174us
Power factor (@rated power)	1		
Adjustable displacement power factor	0.8 inductive.... 0.8 capacitive		
Feed-in phase / connection phase	1 / 1		
Harmonic distortion (THD) at rated output	< 3%		
Note "*" The inrush current and Max. output fault current are really test values.			

9.3 General data

General data	HPS-1500	HPS-2000	HPS-3000
communication: RS485 / GPRS / WiFi	○ / ○ / ○		
Earth Fault Alarm	cloud based, audible and visible(AU)		
Zero power output	Via connecting smart meter(AU)		
Dimensions (W x H x D)	393 x 324.5 x 154mm		
Weight	9Kg		
Cooling concept	convection		
Noise emission (typical)	< 20 dB(A)@1m		
Installation	indoor & outdoor		
Mounting information	wall mounting bracket		
DC connection technology	MC4(SUNCLIX /H4 optional)		
AC connection technology	Plug-in Connector		
Operating temperature range	-25℃...+60℃ / -13℉...+140℉		
Relative humidity	0% ... 100%		
Max. operating altitude	3000m（＞3000m derating）		
Degree of protection (according to IEC 60529)	IP65		
Climatic category (according to IEC 60721-3-4)	4K4H		
Self-consumption (night)	<1W		
Radio technology	WLAN 802.11 b / g / n		
Radio spectrum	2.4 GHz		
Standby power	<6W		

Type	HPS-3680	HPS-4000	HPS-5000
communication: RS485 / GPRS / WiFi	○ / ○ / ○		
Earth Fault Alarm	cloud based, audible and visible(AU)		
Zero power output	Via connecting smart meter(AU)		
Dimensions (W x H x D)	393 x 324.5 x 154mm		
Weight	9.5kg		
Cooling method	convection		
Noise emission (typical)	<20 dB(A)@1m		
Installation	indoor & outdoor		
Mounting information	wall mounting bracket		
DC connection	MC4(SUNCLIX /H4 optional)		
AC connection	Plug-in Connector		
Operating temperature range	-25℃...+60℃		
Relative humidity (non-condensing)	0% ... 95%		
Max. operating altitude	3000m		
Degree of protection (according to IEC 60529)	IP65		
Climatic category (according to IEC 60721-3-4)	4K4H		
Self-consumption (night)	<1W		
Standby power	<8.5W		

9.4 Safety regulations

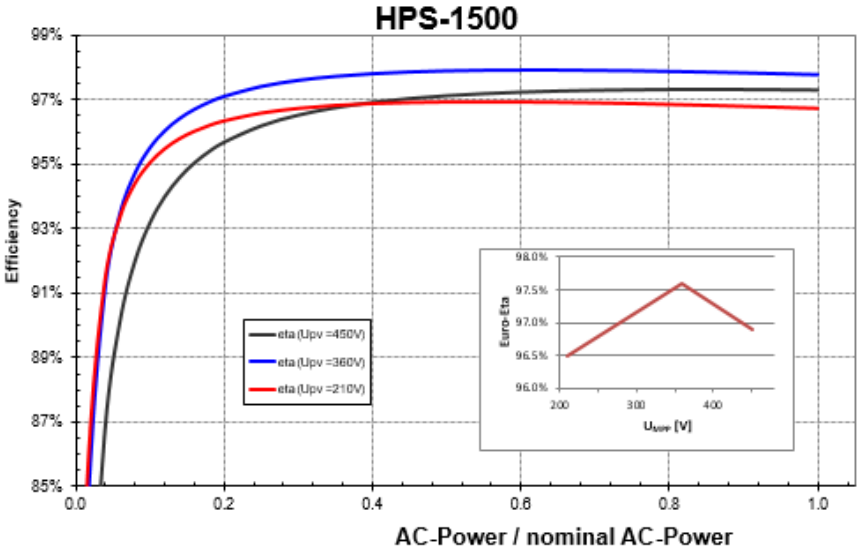
Protective devices	HPS-1500 / 2000 / 3000/ 3680 / 4000 / 5000
Inverter topology	transformerless
DC isolator	○
PV iso / Grid monitoring	● / ●
DC reverse polarity protection / AC short-circuit current capability	● / ●
Residual current monitoring(GFCI) function	●
Earth Fault Alarm	cloud based, audible and visible(AU)
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / II(DC), III(AC)
Internal overvoltage protection	Integrated
DC feed-in monitoring	Integrated
Islanding protection	Frequency shift, 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 --N/A

9.5 Efficiency

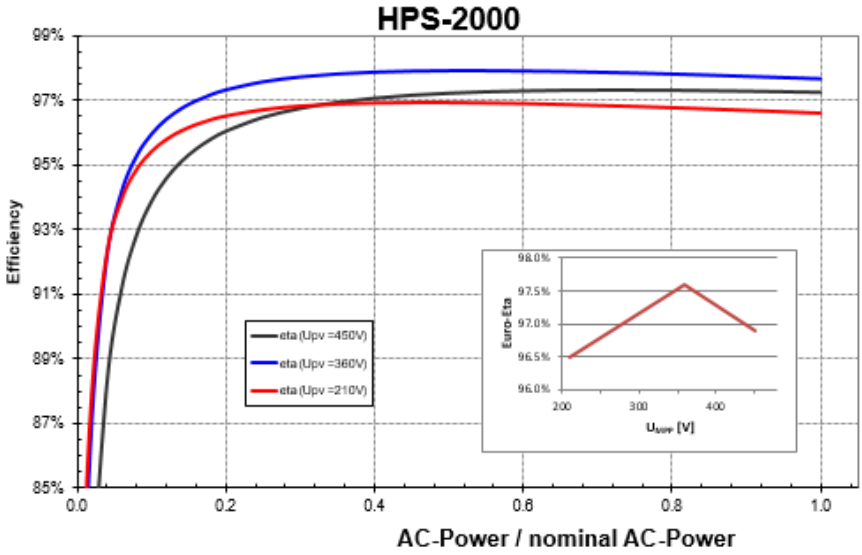
The operating efficiency is shown for the three input voltages (V_{mppmax}, $V_{dc,r}$ and V_{mppmin}) graphically. In all cases the efficiency refers to the standardized power output ($P_{ac}/P_{ac,r}$). (according to EN 50524 (VDE 0126-13): 2008-10, cl. 4.5.3).
Notes: Values are based on rated grid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

Efficiency curve HPS-1500



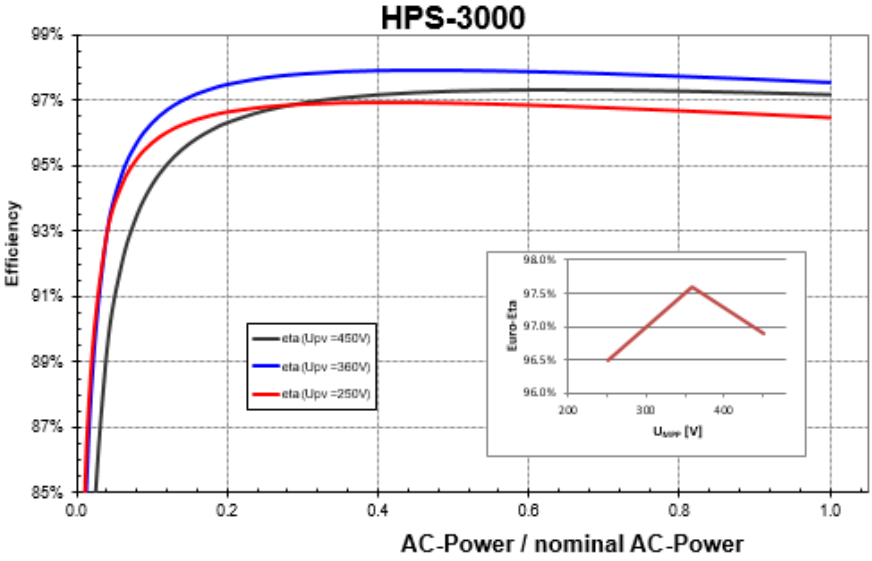
Efficiency	
Max. efficiency / European weighted efficiency	97.8% / 97.6%
MPPT efficiency	99.50%

Efficiency curve HPS-2000



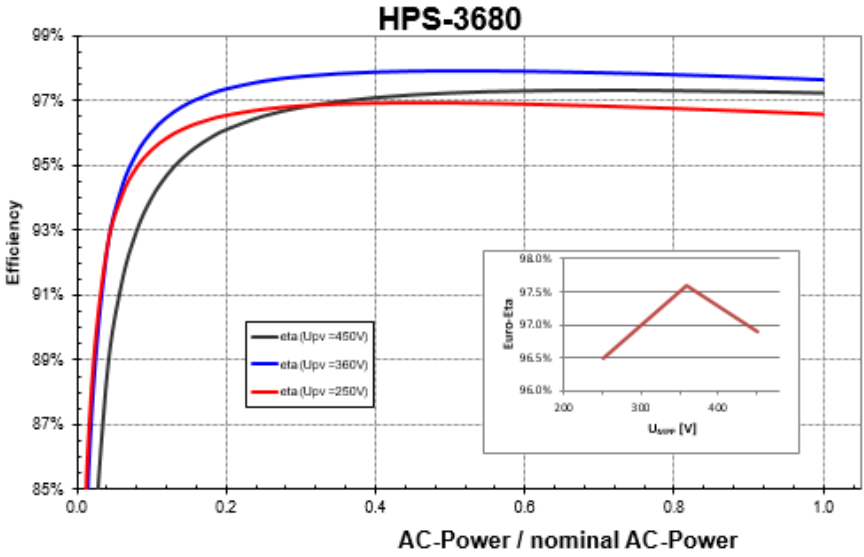
Efficiency	
Max. efficiency / European weighted efficiency	97.8% / 97.6%
MPPT efficiency	99.50%

Efficiency curve HPS-3000



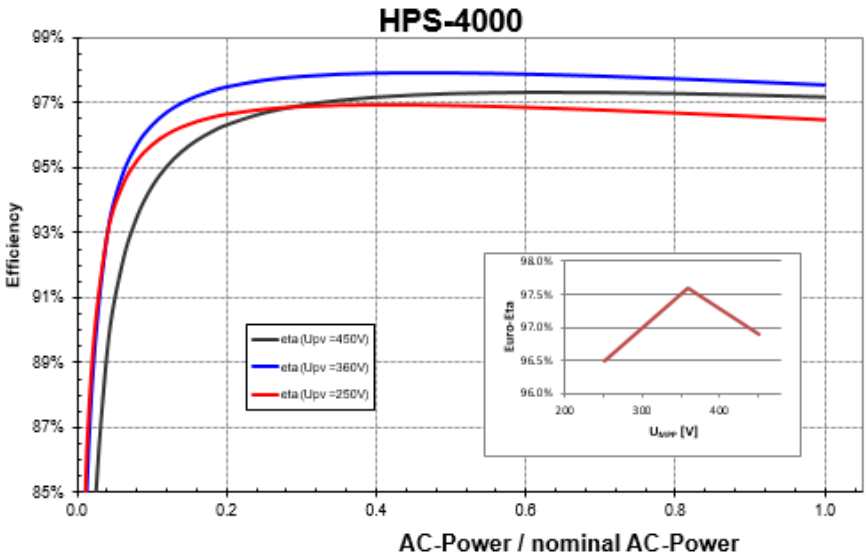
Efficiency	
Max. efficiency / European weighted efficiency	97.8% / 97.6%
MPPT efficiency	99.50%

Efficiency curve HPS-3680



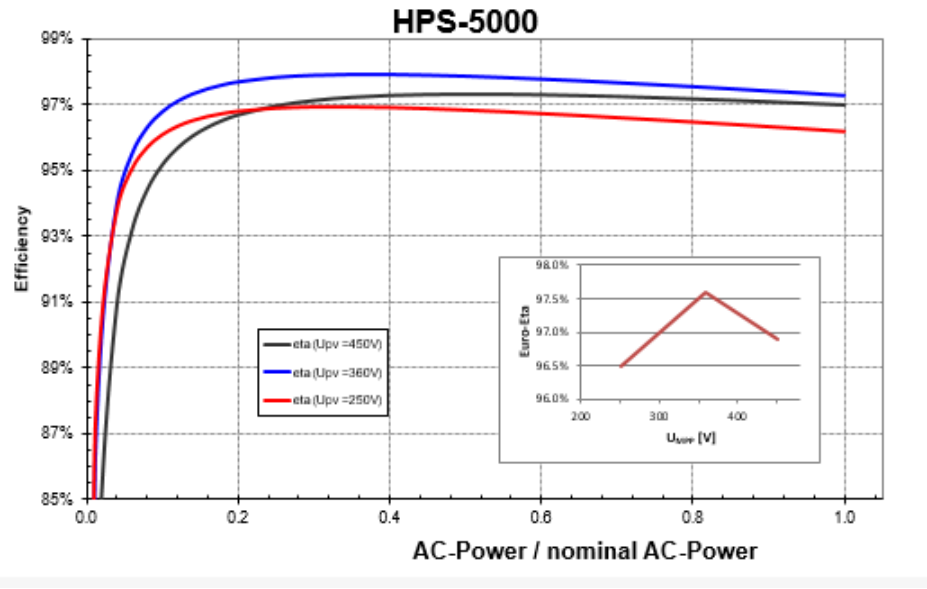
Efficiency	
Max. efficiency / European weighted efficiency	97.9% / 97.6%
MPPT efficiency	99.5%

Efficiency curve HPS-4000



Efficiency	
Max. efficiency / European weighted efficiency	97.9% / 97.6%
MPPT efficiency	99.5%

Efficiency curve HPS-5000



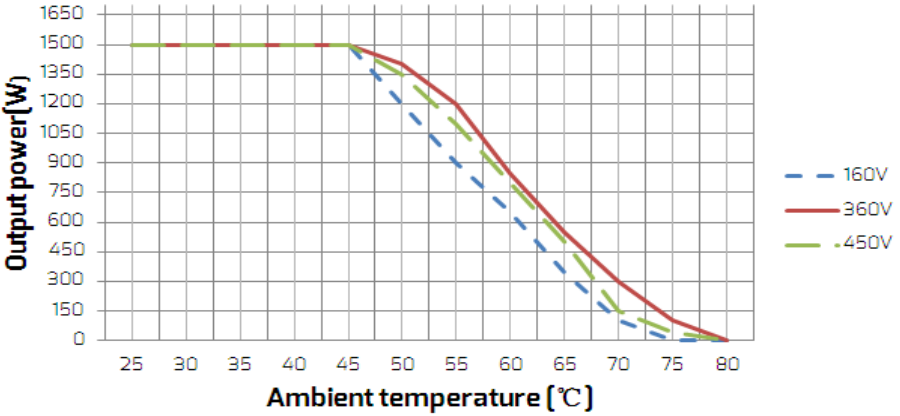
Efficiency	
Max. efficiency / European weighted efficiency	97.9% / 97.6%
MPPT efficiency	99.5%

9.6 Power reduction

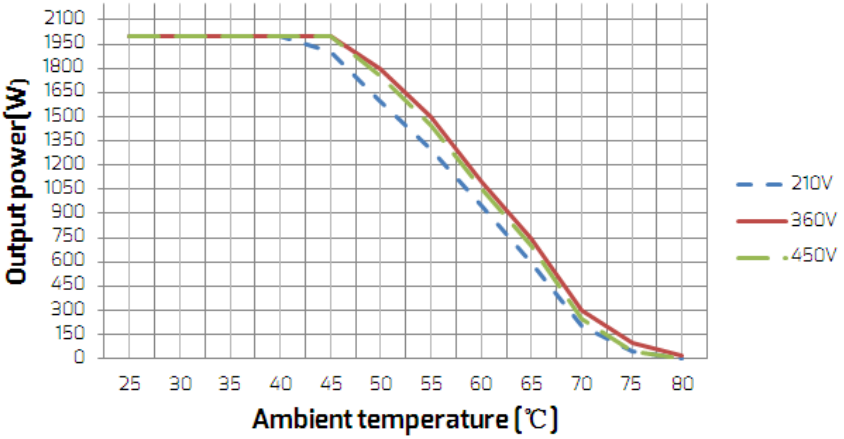
In order to ensure inverter operation under safe conditions ,the device may automatically decrease power output.

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.

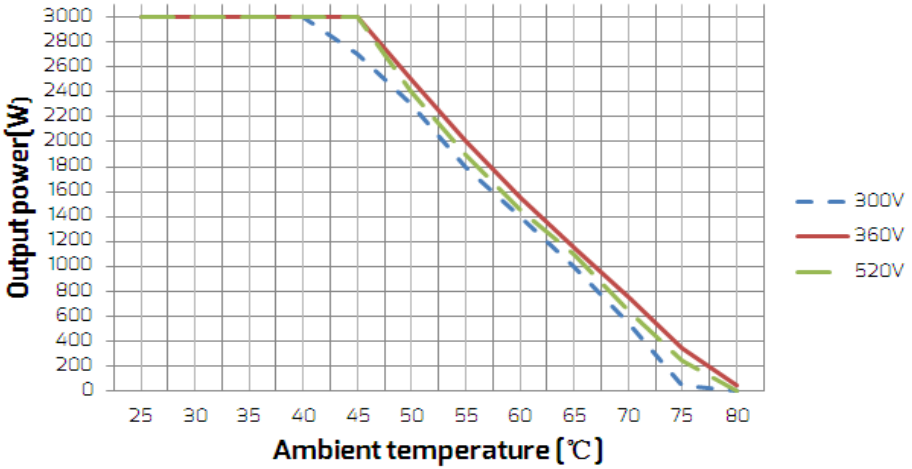
Notes: Values are based on rated grid voltage and cos (phi) = 1.



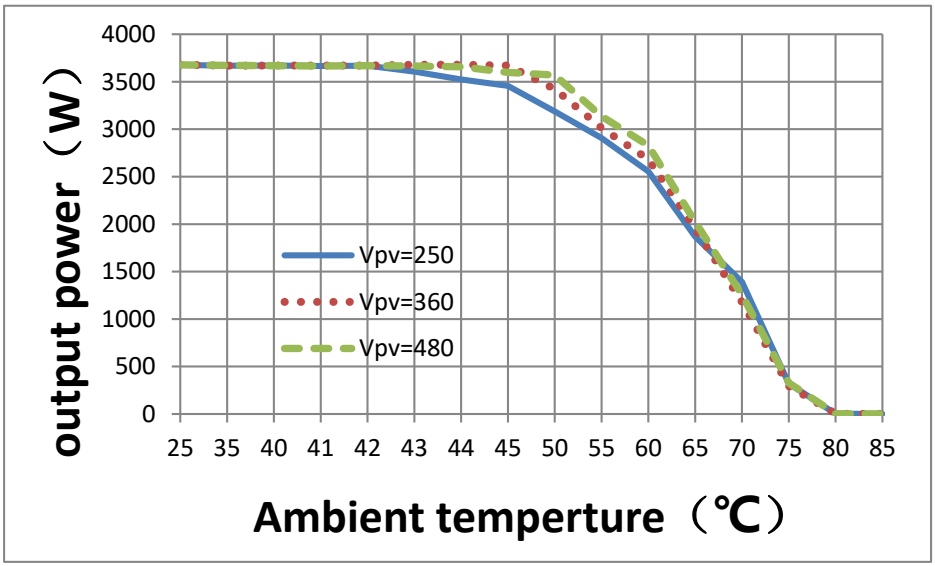
Power reduction with increased ambient temperature (HPS-1500)



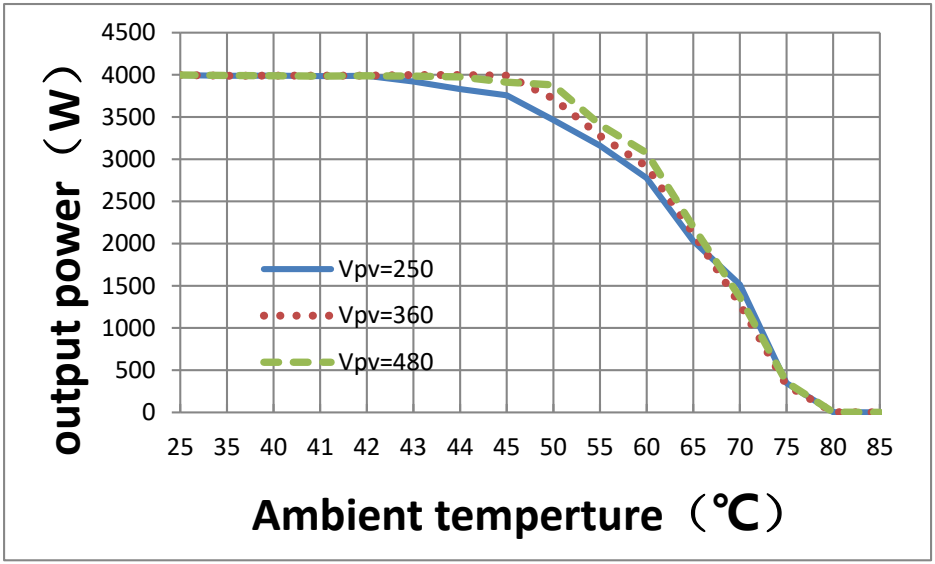
Power reduction with increased ambient temperature (HPS-2000)



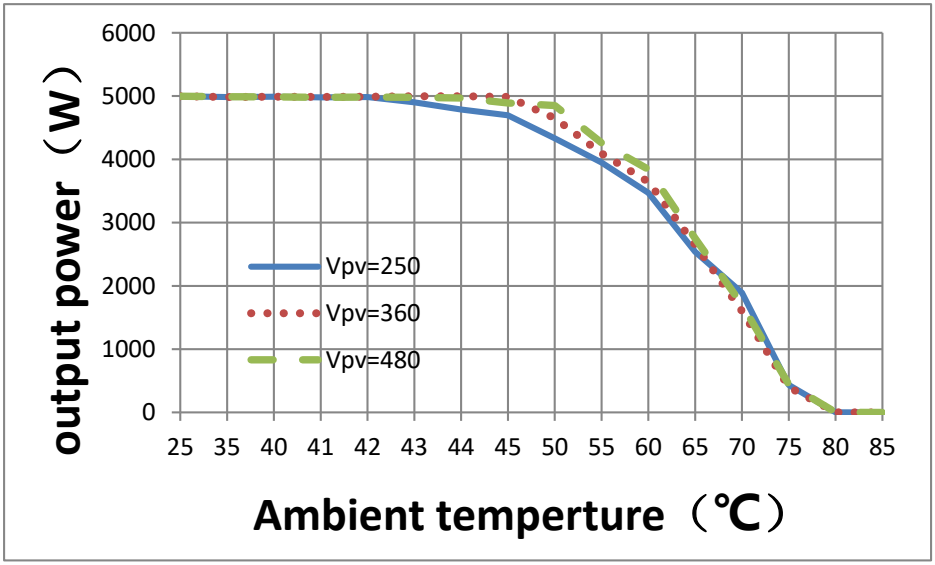
Power reduction with increased ambient temperature (HPS-3000)



Power reduction with increased ambient temperature (HPS-3680)



Power reduction with increased ambient temperature (HPS-4000)



Power reduction with increased ambient temperature (HPS-5000)

The power reduction curve is tested at normal air pressure!
Different air pressure condition will cause different test result

9.7 Tools and torque

Tools and torque required for installation and electrical connections.

<table>
<tr><th colspan="2">Tools, model</th><th>Object</th><th>Torque</th></tr>
<tr><td colspan="2" rowspan="3">Torque screwdriver, T25</td><td>Screws for the cover</td><td rowspan="3">2.5Nm</td></tr>
<tr><td>Screw for second protective grounding connection</td></tr>
<tr><td>Screws for connecting the inverter and wall bracket</td></tr>
<tr><td colspan="2">Flat-head screwdriver, blade with 3.5mm</td><td>Sunclix DC connector</td><td></td></tr>
<tr><td colspan="2"></td><td>Antenna</td><td>Hand-tight</td></tr>
<tr><td rowspan="3">Socket wrench</td><td>Open end of 30</td><td>Swivel nut of M25 cable gland</td><td>Hand-tight</td></tr>
<tr><td>Open end of 15</td><td>Swivel nut of sunclix connector</td><td>2.0Nm</td></tr>
<tr><td>Open end of 10</td><td>Hex bolts for wall bracket</td><td>Hand-tight</td></tr>
<tr><td colspan="2">Wire stripper</td><td>Peel cable jackets</td><td></td></tr>
<tr><td colspan="2">Crimping tools</td><td>Crimp power cables</td><td></td></tr>
<tr><td colspan="2">Hammer drill, drill bit of Ø10</td><td>Drill holes on the wall</td><td></td></tr>
<tr><td colspan="2">Rubber mallet</td><td>Hammer wall plugs into holes</td><td></td></tr>
<tr><td colspan="2">Cable cutter</td><td>Cut power cables</td><td></td></tr>
<tr><td colspan="2">Multimeter</td><td>Check electrical connection</td><td></td></tr>
</table>

Marker	Mark the positions of drill holes	
ESD glove	Wear ESD glove when opening the inverter	
Safety goggle	Wear safety goggle during drilling holes.	
Anti-dust respirator	Wear anti-dust respirator during drilling holes.	

10 Troubleshooting

When the PV system does not operate normally, we recommend the following solutions for quick troubleshooting. If an error occurs, the red LED will light up. The corresponding corrective measures are as follows:

Object	Error code	Corrective measures
Presumable Fault	11	• Check the grid frequency and observe how often major fluctuations occur. If this fault is caused by frequent fluctuations, try to modify the operating parameters after informing the grid operator first.
	10	•Check the grid voltage and grid connection on inverter. • Check the grid voltage at the point of connection of inverter. If the grid voltage is outside the permissible range due to local grid conditions, try to modify the values of the monitored operational limits after informing the electric utility company first. If the grid voltage lies within the permitted range and this fault still occurs, please call service.
	9	• Check the fuse and the triggering of the 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.
	7	• Make sure the grounding connection of the inverter is reliable. •Make a visual inspection of all PV cables and modules.

Presumable Fault		If this fault is still shown, contact the service.
	5	• 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, please call service.
	6	•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.
	8	•Check whether the airflow to the heat sink is obstructed. •Check whether the ambient temperature around the inverter is too high.
Permanent Fault	1, 2,3, 4,13 14	• Disconnect the inverter from the utility grid and the PV array and reconnect it after LED turn off. If this fault is still being displayed, contact the service.

Contact the service if you meet other problems not in the table.

11 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 the enclosure and display with a soft cloth. Ensure the heat sink at the rear of the inverter is not covered.

11.1 Cleaning the contacts of the DC switch

Clean the contacts of the DC switch annually. Perform cleaning by cycling the switch to "1" and "0" positions 5 times. The DC switch is located at the lower left of the enclosure.

11.2 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.

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.

12 Recycling and disposal

Dispose of the packaging and replaced parts according to the rules applicable in the country where the device is installed.
Do not dispose the inverter with normal domestic waste.

INFORMATION

- Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.

13 EU Declaration of Conformity

within the scope of the EU directives

- Electromagnetic compatibility 2014/30/EU
- Low Voltage Directive 2014/35/EU.

Suzhou Hypontech Co., Ltd. confirms here with 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 http://www.hypontech.com.

14 Warranty

The factory warranty card is enclosed with the package, please keep well the factory warranty card. 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 electrical label of the inverter is legible. If these conditions are not met, HYPONTECH has the right to refuse to provide with the relevant warranty service.

15 Contact

If you have any technical problems concerning our products, please contact HYPONTECH 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
- Installation date
- Warranty card

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