

DN3H Series(5-10KTL)

User Manual

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Notice

This manual contains important safety instructions, installation, electrical connections, commissioning, maintenance, and troubleshooting of the equipment.

Save the manual!

This manual must be stored carefully and be available at all times.

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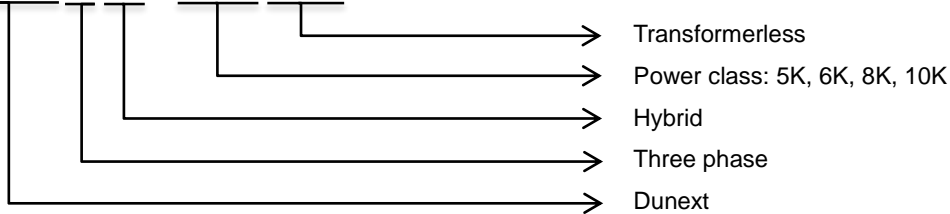
1. About this manual

1.1 Applicability

Please read the product manual carefully before installation, operation or maintenance of your Dunext Hybrid Inverter. This manual contains important safety instructions and installation instructions that must be followed during installation and maintenance of the equipment.

Designation explanation of the DN3H Series(5-10KTL):

DN3H-5KTL



1.2 Target group

This manual is intended for technical professionals for installation, commissioning and maintenance of the hybrid inverter. The technical personnel has to be familiar with the product, local standards, and electric systems.

1.3 Symbols used

The following types of safety instructions and general information appear in this document:

	'Danger' indicates a hazard with a high level of risk that, if not avoided, will result in death or serious injury.
	'Warning' indicates a hazard with a medium level of risk that, if not avoided, will result in death or serious injury.
	'Caution' indicates a hazard with a low level of risk that, if not avoided, could result in minor or moderate injury.
	'Notice' indicates a situation that, if not avoided, could result in equipment or property damage.
	'Note' provides tips that are valuable for the optimal operation of the product.

1.4 Acronyms and abbreviations

A	ADD	additional
B	BAT	battery
E	EMI	electromagnetic interference
	EPS	emergency power supply
	EPS Box	emergency power supply combiner box
L	LED	light emitting diode
M	MPP	maximum power point
	MPPT	maximum power point tracking
O	OLED	organic light-emitting diode
P	PV	photovoltaic
T	THDi	total harmonic distortion

2. Safety

2.1 General safety

The hybrid inverter has been designed and tested strictly according to international safety regulations. Read all safety instructions carefully prior to any work and observe them at all times when working on or with the hybrid inverter. Incorrect operation or work may cause:

- ◆ Injury or death to the operator or a third party;
- ◆ Damage to the inverter or other properties.



WARNING!

During operations, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and insulated gloves.

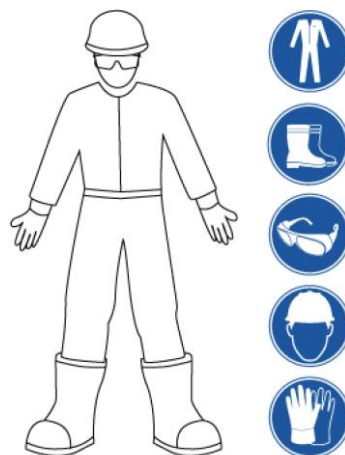






Figure 2-1

2.2 Important safety instructions










 <p>DANGER!</p>	<ul style="list-style-type: none"> ◆PV strings will produce electrical power when exposed to sunlight and can cause lethal voltage and electric shock. ◆Only qualified personnel should work on PV panels. ◆Do not open lid when the inverter is operating. Unauthorized opening will void warranty and warranty claims and in most cases terminate the operating license. ◆When lid is opened, live components will be exposed, touched these may result in death or serious injury. ◆Operating damaged inverter can lead to hazardous situations that can result in death or serious injuries due to electric shock. ◆Batteries store large amounts of electrical energy. Short-circuiting or incorrect installation may lead to burns or serious injuries. ◆Lethal voltages are present at battery terminals and cables connecting to the inverter. Severe injuries or death may occur if the cables and terminals are touched. ◆PV negative (PV-) and battery negative (BAT-) on inverter side are not grounded intentionally. Connecting PV- or BAT- to EARTH is strictly forbidden.
 <p>WARNING!</p>	<ul style="list-style-type: none"> ◆Do not disconnect PV, AC and/or battery plugs and cables while the inverter is operating. Before working on the system power down on all supplies and wait for 5 minutes to discharge. Verify that there is no voltage or current before disconnecting any plugs or cables. <p>Use personal protective equipment, including rubber gloves and protective boots during installation or maintenance.</p>
 <p>CAUTION!</p>	<p>Do not touch any hot parts such as the heat sink during operation, temperature of inverter surface may exceed 60°C during operation.</p>
<p>NOTICE</p> <p>NOTICE!</p>	<ul style="list-style-type: none"> ◆Electrical installation and maintenance must only be carried out by trained and qualified electrician, following all local regulations. ◆Do not open inverter lid or change components without Dunext's authorization. Unauthorized work will invalidate warranty. ◆Operate inverter as explained in this manual, failure will damage equipment and invalidate warranty.
 <p>NOTE!</p>	<p>Installation and maintenance must be carried out by competent electricians following all local regulations.</p> <p>With an integrated universal current-sensitive residual current monitoring inverter included the inverter will disconnect immediately from the mains power once a fault current with a value exceeding the limit is detected.</p>

Anti-Islanding Effect

Islanding is a condition when grid connected PV / batteries back feed energy into the Grid when Grid is turned off for maintenance work, putting maintenance personal at serious risk. DN3H Series(5-10KTL) prevents islanding through Active Frequency Drift (AFD).

2.3 Explanation of symbols

Symbols on the type label:

Symbol	Explanation
	CE mark. The inverter complies with requirements of applicable CE guide-lines.
	Beware of hot surface. The inverter can be hot during operation. Avoid touching during operation.
	Danger of high voltage. Danger to life due to high voltage in the inverter!
	Danger. Risk of electric shock!
	Inverter should not be disposed of with the household waste. Disposal information can be found in this manual.
	Don't work on this inverter until it is isolated from battery, mains supply and on-site PV modules.
	Danger to life due to high voltage. Inverter holds stored energy, wait for 5 minutes to discharge before opening lid.
	Please read this manual before installation.
	RCM (Regulatory Compliance Mark) The product meets the requirements of the applicable Australian standards.

3. Introduction

3.1 Block diagram

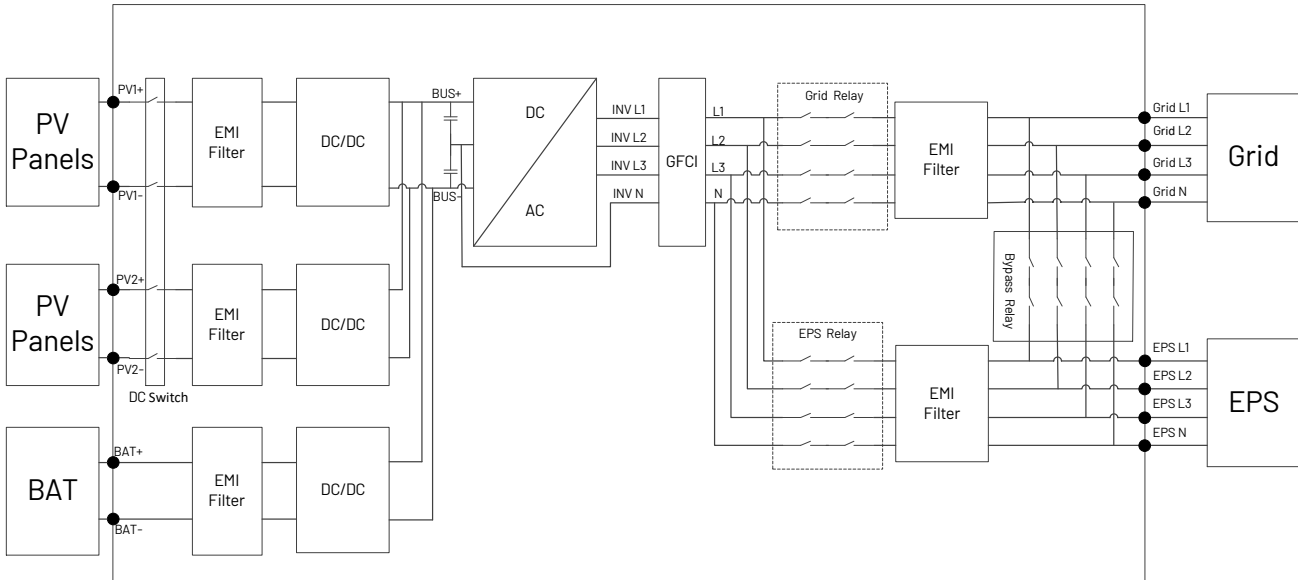


Figure 3-1 Block diagram of DN3H Series(5-10KTL)

3.2 Basic features

The DN3H Series(5-10KTL) is designed to work with PV panels, battery, mains supply and electrical loads. Hybrid inverter helps to optimize on-site consumption, charge battery with surplus PV energy and supply energy from battery to meet load. When PV and battery energy are insufficient, mains supply will be used to support loads.

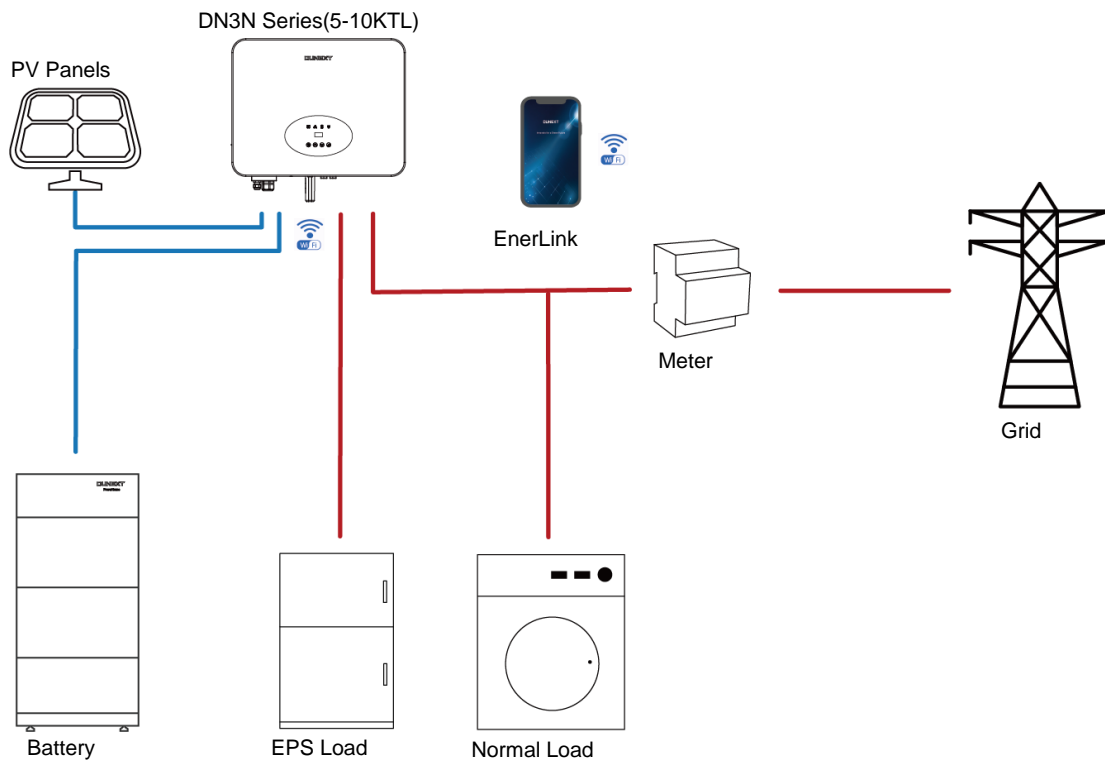


Figure 3-2 DN3H Series(5-10KTL) system

3.3 Work modes

The DN3H Series(5-10KTL) has the following work modes based on the configuration and connected equipment.

Work mode: Self Use

This mode is applicable to areas with low subsidies and high electricity prices. Self-consumption of PV renewable energy is the highest priority. Excess PV generation is used to charge batteries, and then feed back into the grid.

- a. When the PV power is sufficient, PV power will supply the following sequence:
Priority: Load -> Battery -> Grid

- b. When the PV power is insufficient, the battery will discharge to supply loads, and the grid will join in if the battery power is not enough.
Priority: PV power -> Battery -> Grid

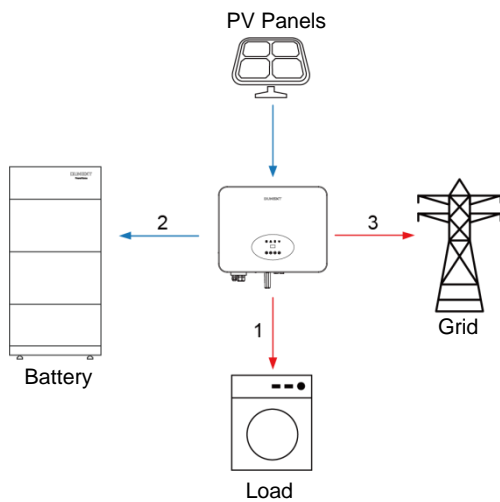


Figure 3-3 Self Use mode 1

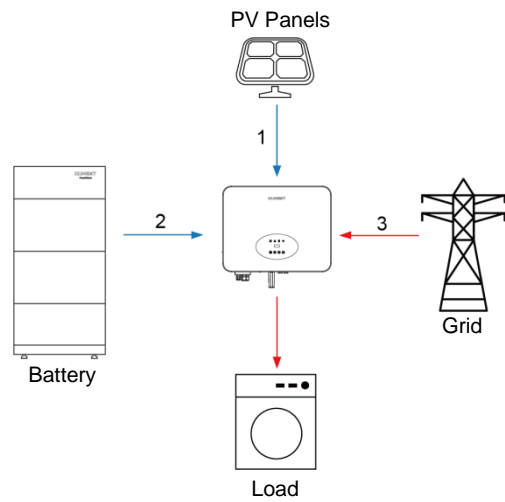


Figure 3-4 Self Use mode 2

Work mode: Time of Use

Applicable to the areas with large gaps between peak and valley electricity prices. Users can set time-based schedules to charge the battery by App or inverter display.

- a. During charging time period inverter will use the power from PV or grid to charge the battery.
Priority: Battery -> Load

- b. Outside the charging time period inverter will work in self use mode. Using the power from PV and battery to supply loads and the insufficient part will be supplied by the grid.
Priority: PV power -> Battery -> Grid

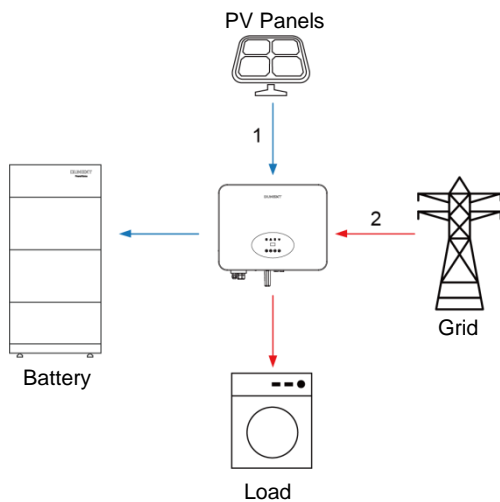


Figure 3-5 Time of Use mode 1

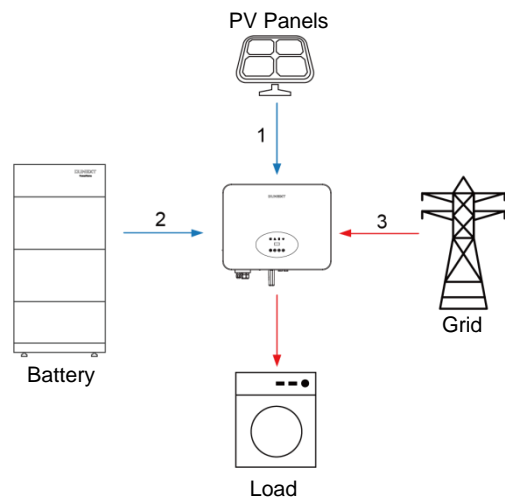


Figure 3-6 Time of Use mode 2

Work mode: Backup Use

It is suitable for the areas with frequent power outages. When the grid is off, the battery is used as backup power to supply load. This mode ensures that the battery will have enough energy to supply loads during a grid outage. PV and battery could support the backup load in the event of a blackout.

a. When grid is on, the battery will be in charging state and will not be discharged.

Priority: Battery -> Load

b. When grid is off, the battery will be discharged to supply load. The inverter will connect grid automatically when grid goes back on.

Priority: PV power -> Battery

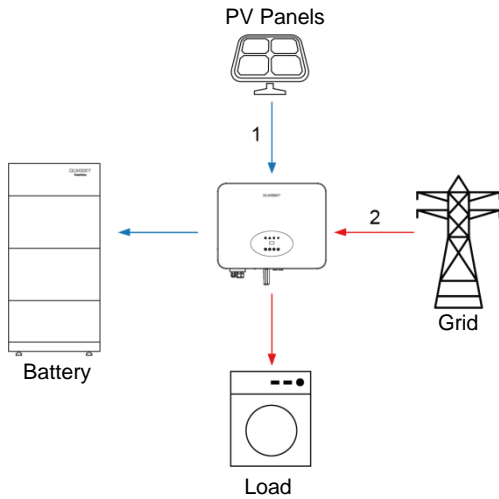


Figure 3-7 Backup mode 1

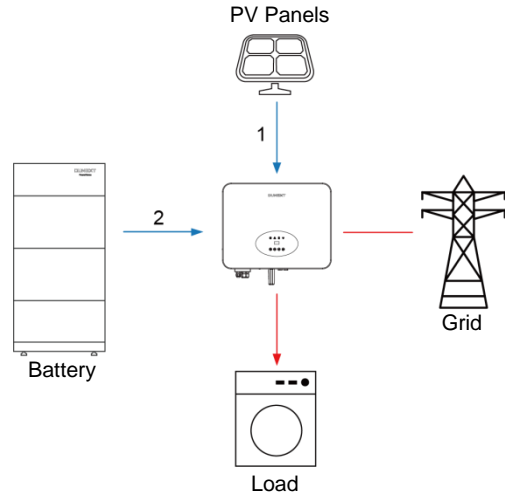


Figure 3-8 Backup mode 2

Work mode: Feed in Use

This mode applies to the area that has high feed-in tariff and export control. This model prioritizes grid feeds with sufficient PV power to maximize the tariff subsidy earned.

a. When the PV power is sufficient, the PV generation will supply load first, then feed into grid, and the excess power will charge the battery last.

Priority: Load -> Grid -> Battery

b. When the PV power is sufficient, using the power from PV and battery to supply loads and the insufficient part will be supplied by the grid.

Priority: PV power -> Battery -> Grid

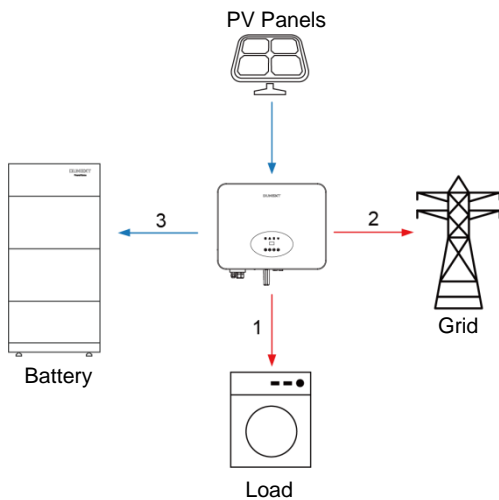


Figure 3-9 Feed in Use mode 1

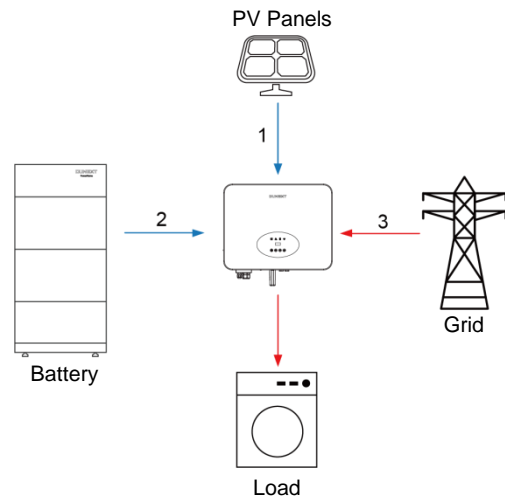


Figure 3-10 Feed in Use mode 2

Work mode: EPS mode (additional)

When grid is off, during daytime PV generation will supply load, excess energy is stored in the battery. At nighttime inverter will discharge battery to supply load.

In this mode, you have to make sure that the EPS load power is within the EPS's output power rating. Otherwise, the inverter will report an EPS Over Load warning.

When EPS Over Load warning appears, reduce load to be with in power rating of the EPS's output power rating and the inverter will return to normal after ESC button on the LCD screen pressed.

For inductive load such as fridge, air conditioner, washing machine, etc. ensure that the start power does not exceed the EPS peak power.

Model	DN3H-5KTL	DN3H-6KTL	DN3H-8KTL	DN3H-10KTL-A	DN3H-10KTL
EPS Data: Peak Apparent Power, Duration [VA, s]	7500, 60	9000, 60	12000, 60	15000, 60	15000, 60

3.4 Ports

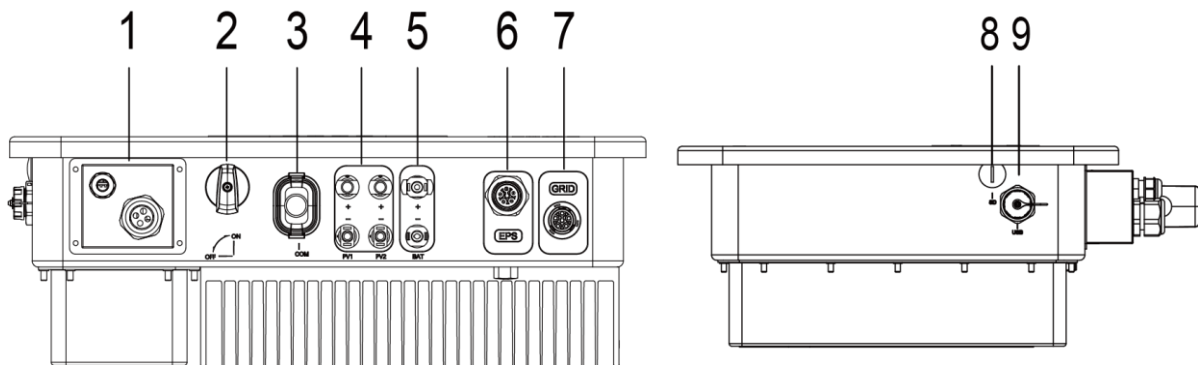


Figure 3-11 Ports of the inverter

- | | |
|---------------------------------|----------------------|
| (1) Communication port | (6) EPS port |
| (2) DC switch | (7) Grid port |
| (3) WIFI or 4G or Ethernet port | (8) SD port(Reserve) |
| (4) PV connectors | (9) USB port |
| (5) Battery connectors | |

3.5 Dimensions

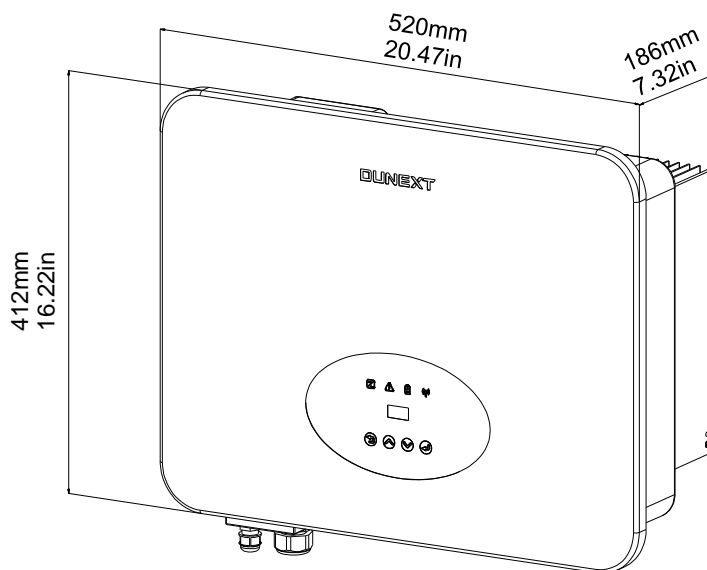


Figure 3-12 DN3N Series(5-10KTL) dimensions

4. Technical specifications

Model	DN3H-5KTL	DN3H-6KTL	DN3H-8KTL	DN3H-10KTL-A	DN3H-10KTL
PV Input					
Max. Recommended PV Power [Wp]	7500	9000	12000	15000	15000
Max. PV Input Voltage [V]	1000				
MPPT Voltage Range [V]	160 ~ 950				
Rated PV Input Voltage [V]	600				
Start-up Voltage [V]	160				
No. of MPP Trackers	2				
No. of Input Strings per Tracker	1				
Max. Input Current per MPPT [A]	18 / 18				
Max. Short-circuit Current per MPPT [A]	23 / 23				
DC Switch	Integrated				
AC Output (On-Grid)					
Maximum Apparent Power [VA]	5500	6600	8800	10000	11000
Rated AC Power [W]	5000	6000	8000	10000	10000
Rated AC Current [A]	7.2	8.7	11.5	14.4	14.4
Maximum AC Current [A]	7.6	9.1	12.2	14.4	15.2

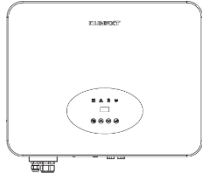
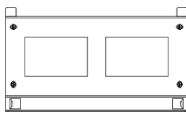








Model	DN3H-5KTL	DN3H-6KTL	DN3H-8KTL	DN3H-10KTL-A	DN3H-10KTL
Rated AC Voltage [V]	3 / N / PE, 220 / 380, 230 / 400				
Grid Frequency [Hz]	50 / 60				
Adjustable Power Factor [cos φ]	0.8 leading ... 0.8 lagging				
Output THDi (@Rated Output)	< 3%				
AC Input					
Max. Apparent AC Power [VA]	10000	12000	16000	20000	20000
Max. AC Current [A]	15.2	18.2	24.3	28.8	30.4
Rated AC Voltage / Range [V]	3 / N / PE, 220 / 380, 230 / 400; ± 20%				
Grid Frequency / Range [Hz]	50 / 60				
Battery					
Battery Type	Lithium				
Battery Voltage Range [V]	160 ~ 700				
Max. Charging / Discharging Current [A]	30 / 30				
Communication Interface	CAN				
AC Output (Backup With Battery)					
Rated AC Power [W]	5000	6000	8000	10000	10000
Rated AC Voltage[V]	3 / N / PE, 220 / 380, 230 / 400				
Rated Frequency [Hz]	50 / 60				
Rated Current [A]	7.6	9.1	12.2	14.4	15.2
Output THDi (@Rated Output)	< 3%				
Automatic Switch Time [ms]	≤ 20				
Peak Apparent Power, Duration [VA, s]	7500, 60	9000, 60	12000, 60	15000, 60	15000, 60
Efficiency					
Max. Efficiency	98.0%	98.0%	98.0%	98.0%	98.0%
European Efficiency	97.7%	97.7%	97.7%	97.7%	97.7%
Protection					
DC Insulation Monitoring	Yes				
DC Reverse Polarity Protection	Yes				
Anti-islanding Protection	Yes				
Residual Current Monitoring	Yes				
Over-heat Protection	Yes				







Model	DN3H-5KTL	DN3H-6KTL	DN3H-8KTL	DN3H-10KTL-A	DN3H-10KTL
AC Overcurrent Protection			Yes		
AC Short-circuit Protection			Yes		
DC Surge Protection			Yes (Type II)		
AC Surge Protection			Yes (Type II)		
AC Overvoltage Protection			Yes		
General Data					
Dimension (W * H * D) [mm]			520 * 412 * 186		
Weight [kg]			27		
Display			LED + OLED		
Communication			RS485 and USB (Standard), Wifi or 4G or Ethernet(Optional)		
Ambient Temperature Range [°C]			-25 ~ +60		
Relative Humidity			0 ~ 100%		
Operating Altitude [m]			≤ 2000		
Standby Self Consumption [W]			< 15		
Topology			Transformerless		
Cooling			Natural		
Degree of Protection			IP65		
Noise [dB]			< 35		
Certifications & Standards					
Grid connection standards	VDE-AR-N 4105, EN 50549-1, VDE 0126, CEI 0-21, EN 50549-GR, ÖVE/ÖNORM E 8001-4-712, AS 4777, UNE 217002				
Safety Regulation	IEC 62109-1, IEC 62109-2				
EMC	EN / IEC 61000-6-1, EN / IEC 61000-6-3				

5. Installation

5.1 Unpacking

Before unpacking the inverter, check the outer packing materials for damage, such as holes and cracks, and check the inverter model. If any damage is found or the inverter model is not what you requested, do not unpack the package and contact your manufacturer as soon as possible.

No.	Description	Shape	Quantity
1	DN3H Series(5-10KTL)		1
2	Mounting Bracket		1
3	Battery Connectors (positive)		1
4	Battery Connectors (negative)		1
5	PV Connectors (positive*2) & PV Pin contact (positive*2)		4
6	PV Connectors (negative*2) & PV Pin contact (negative*2)		4
5	AC Terminal & Tubular terminal*5		6
6	EPS Terminal & Tubular terminal*5		6
8	8P Pluggable Terminal Block		1
10	Ethernet RJ45 Connector		5

No.	Description	Shape	Quantity
11	M5x12 Phillips hexagonal screw		2
12	Earth Terminal		1
13	Expansion tubes*4 & Expansion screws*4		8
14	Energy Meter(EASTRON SDM630MCT 40mA)		1
15	User Manual		1
16	Quality Certificate		1

After placing the equipment in the installation position, unpack it with care to prevent scratches. Keep the equipment stable during unpacking.

5.2 Check for transport damage

Check if the DN3H Series(5-10KTL) has any visible external damage such as cracks in the housing or display, if any damage is found, please contact with your dealer immediately.

5.3 Installation precaution

The DN3H Series(5-10KTL) is designed for outdoor installation (IP65).

- Make sure that the installation does not fall into one of the following:
 - 1) Do not install inverter in direct sunlight.
 - 2) Do not install inverter on flammable construction material.
 - 3) Do not install inverter in areas where highly flammable materials are stored.
 - 4) Do not install inverter in potentially explosive areas.
 - 5) Do not install inverter during rain or high humidity (>95%); Moisture trapped within the inverter may cause corrosion and damage electric components.
- Provide adequate ventilation when using batteries, also read the warning label at the bottom of the inverter.
- Install inverter in a location that maintains ambient air temperature less than 40°C. This is to maintain safe internal component temperature; inverter would reduce power if ambient air temperature exceeds 40°C.
- The inverter should only be installed in locations that are not accessible to children.
- The inverter emits a slight vibration noise when operating, this is normal and will not affect performance.
- Tilt of mounting surface should be within +5°.

- Please select a concrete wall with load-bearing capacity and a non-flammable surface for installation.
- The inverter is heavy; ensure the mounting surface is strong enough to take the weight of the inverter.
- If the inverter is installed in a cabinet, closet, or other small enclosed areas, sufficient air circulation must be provided in order to dissipate heat generated by the inverter.

5.4 Space requirement

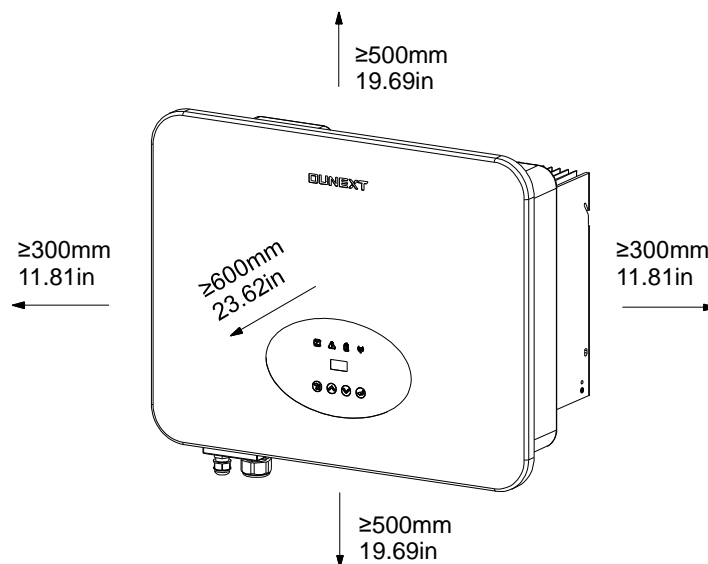







Figure 5-1 Installation space







5.5 Preparation

Tool preparation:

No.	Tool	Model	Function
1		Sprit level	To ensure proper install
2		Two-speed hammer drill	To drill holes on the wall
3		Hammer	Hanging the bracket
4		Impact wrench set	Hanging the bracket
5		PV-AZM-410	Stripping plier for PV cables

No.	Tool	Model	Function
6		PV-CZM-22100	Crimping plier for PV cables
7		Screwdriver	Wiring
8		RJ45 crimping tool	Crimping tool for RJ45 terminals
9		Crimping plier	Crimping tool for insulated electrical connectors
10		Hex key	Wiring

Personal protective equipment preparation:

No.	Tool	Model	No.	Tool	Model
1		Insulated gloves	4		Goggles
2		Protective gloves	5		Insulated shoes
3		Dust mask	6		safety helmet

Cable Preparation:

No.	Name	Cable size	Source
1	Earth cable	4mm ²	Prepared by the users
2	PV cable	4-6mm ²	Prepared by the users
3	Battery cable	4-6mm ²	Prepared by the battery package
4	Battery communication cable	Standard network cable	Prepared by the battery package

No.	Name	Cable size	Source
5	AC cable	4-6mm ² (depends on inverter model)	Prepared by the users
6	Meter communication cable	0.2mm ²	Prepared by the meter package

Lifting and Handling

The inverter is heavy. Do not lift it alone.

- During lifting procedures, ensure that the inverter is firmly secured to avoid the risk of accidental tipping or dropping.
- Parts serving for support or immobilization of the inverter shall be designed and manufactured so as to minimize the risk of physical injuries and accidental loosening or fixing.
- Ensure that the method used for lifting does not allow the inverter to slip from chains and slings, turn-over, or slide from lifting devices.
- Transportation must be carried by qualified persons wearing necessary personal protection equipment.
- Avoid sudden movements and jolts when unloading and positioning the inverter. Handling procedures must be conducted with care. Do not exert leverage on the components of the machine.
- If the inverter is not balanced properly, use ballast.
- The inverter should be installed so that the operating panel is easily accessible and also ensure easy access to the electrical connection points.
- Regarding the loading capacity and hardness of the supporting surface, the load rating of the mounting bracket should be at least four times the weight of the devices, according to IEC62109-1. Supporting characteristics will be impaired by wear, corrosion, and material fatigue or aging; this should be calculated by inspecting the design data of the supporting material and consulting the construction engineer.

5.6 Installation steps

1. Fix wall bracket on the wall.

- Use the wall bracket as a template to mark the position of the 4 holes.

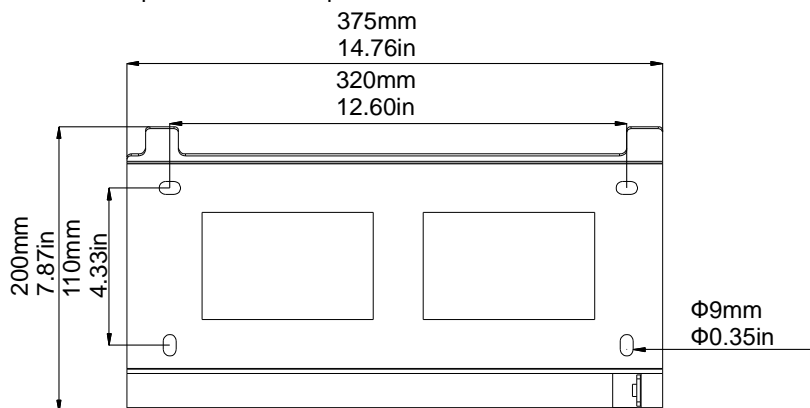


Figure 5-2 Inverter wall mounting

- Drill holes with Φ10 drill bit carefully, make sure the holes are deep enough (at least 45mm).
 - Insert anchors fully into the holes. Install wall bracket using screws provided.
2. Hang the DN3H Series(5-10KTL) on the wall bracket.
- Lifting inverter needs at least 2 people, use handles provided at the sides of the inverter for lifting.
 - To hang the inverter over the bracket, move the inverter close to it, slightly lower inverter making sure the 4 mounting bars on the back of the inverter is fixed well with 4 grooves on the bracket.

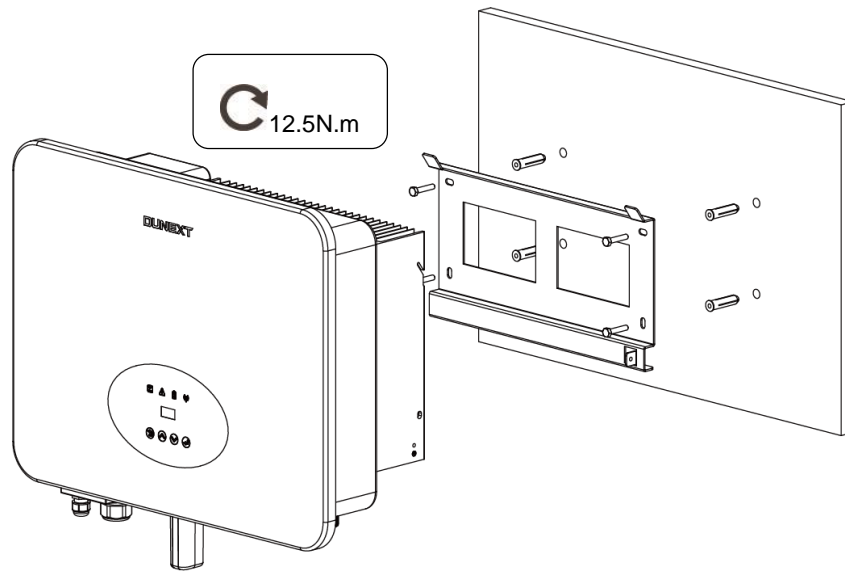


Figure 5-3 Wall mount bracket

3. Install the M5 fix screw.

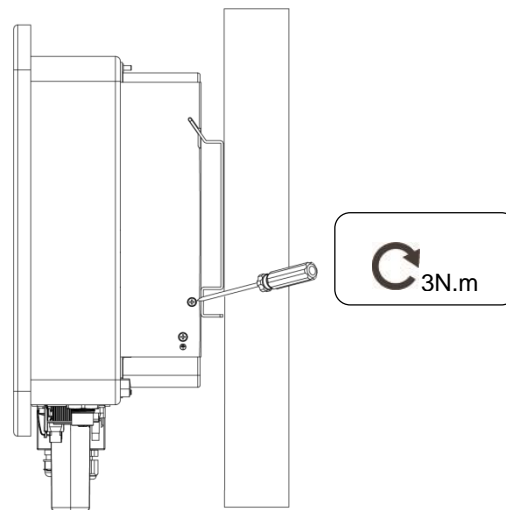


Figure 5-4

5.7 Electrical connection

For an overview of the connection terminals of inverter please refer to Figure3-11, and for wiring connections please refer to Figure 3-2.

System connection diagrams

Note: Diagram below is for Australia, South Africa and New Zealand where neutral line can't be switched.

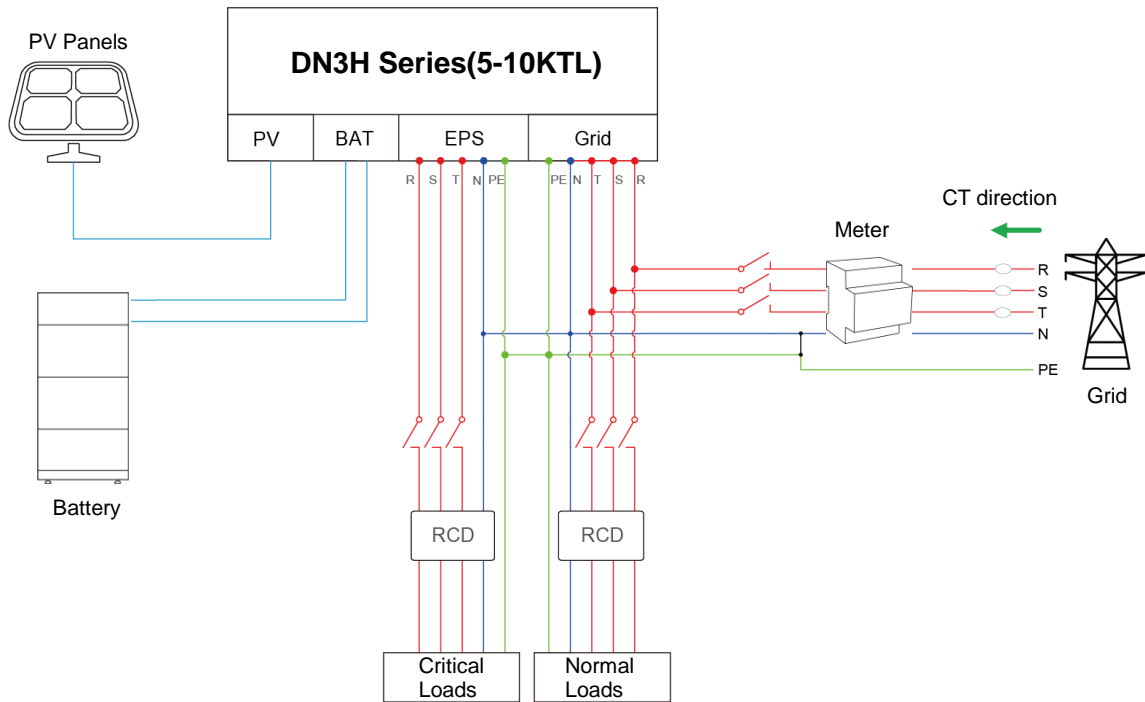


Figure 5-5

Note: Diagram below is for grid system without special requirement.

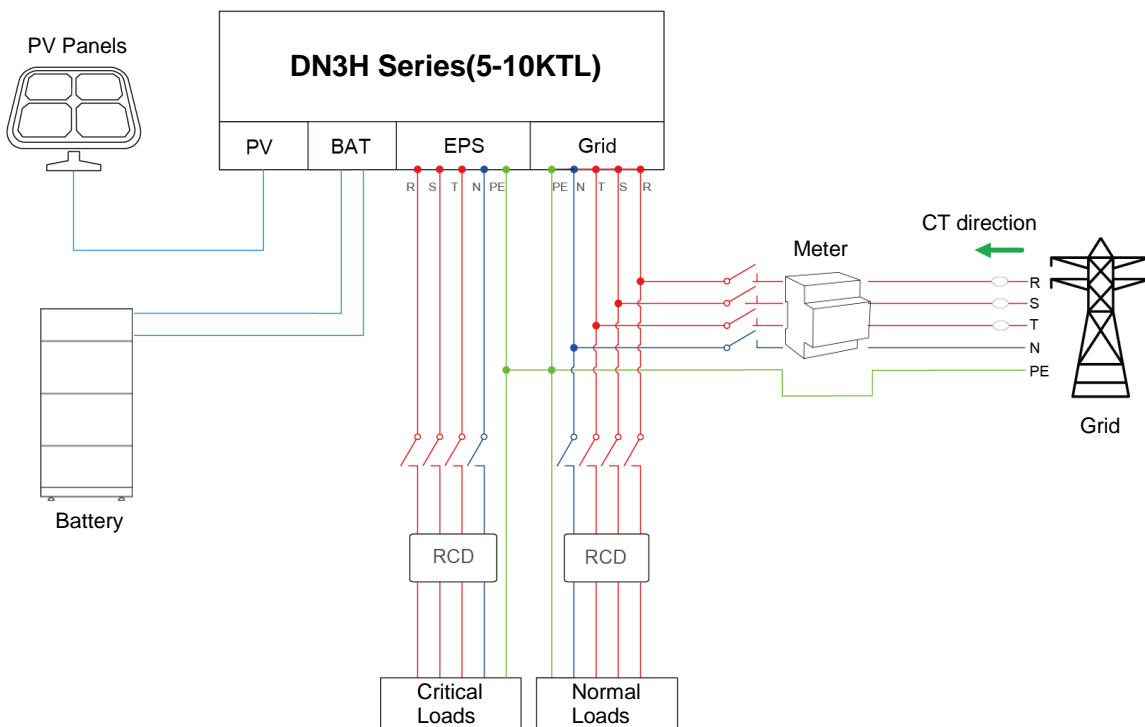


Figure 5-6

Main steps to connect the DN3H Series(5-10KTL) system

- 1) Earth connection
- 2) PV string connection
- 3) AC output connection
- 4) Battery connection:
Battery power connection

Battery communication connection

- 5) EPS connection
- 6) Communication connection

5.7.1 Earth connection

One can additionally earth the inverter enclosure of a second earthed or equipotential bonding, which is required under local regulations. This prevents touch current if the original protective conductor fails.

Cable size: 4mm²

Connection steps:

- Strip the earthed cable insulation.
- Insert the stripped cable into the ring terminal.
- Clamp the end of the ring terminal.
- Unscrew the screw of the earthed connector.
- Insert the ring terminal on the earthed connector.
- Fix gasket on the earthed connector.
- Tighten the screw of the earthed connector.

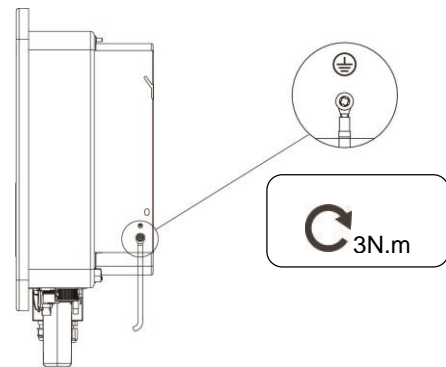


Figure 5-7

5.7.2 PV connection

Before connecting PV strings to DN3H Series(5-10KTL), ensure the following:

- The total short-circuit current of PV string must not exceed inverter's maximum DC current.
- Make sure that open circuit voltage of PV string is less than 1000V.
- PV strings are not connected to earth/grounding conductor.
- Use the right PV plugs from accessory box, Battery plugs look similar to PV plugs, do confirm before using.



WARNING!

WARNING!

The inverter must only be operated with PV strings with class II protection in accordance with IEC 61730, application class A. It is not allowed for the positive pole or the negative pole of the PV strings to be grounded. This can cause the inverter to be destroyed.

Connection Steps:

1. Turn off the DC switch.
2. Prepare 4-6mm² PV cable and PV plugs as below.
3. Strip 7mm of the conductor with stripping plier. Use a suitable stripping tool for this (e.g. "PV-AZM-410").
4. Insert striped cable into pin contact and ensure all conductor strands are captured in the pin contact.

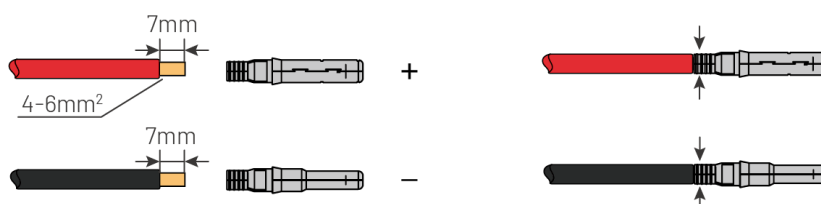


Figure 5-8

5. Crimp pin contact by using a crimping plier (PV-CZM-22100). Put the pin contact with striped cable into the corresponding

crimping pliers and crimp the contact.

6. Insert pin contact through the cable nut to assemble into back of the male or female plug. When clicked the pin contact assembly is seated correctly.

7. Tightening the DC connector.

- (1) Slide the cable nut towards the back shell.
- (2) Rotate the cable nut to secure the cable.

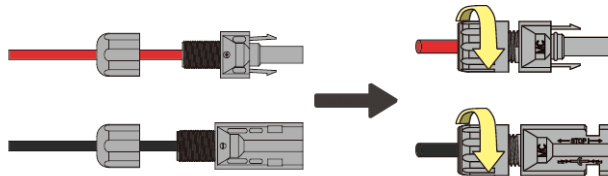


Figure 5-9

8. After securing the cable tightly, align the two half connectors and join together by hand until a 'click' is felt or heard.

9. To separate the DC connector.

- (1) Use the specified wrench tool.
- (2) To separate the DC+ connector, push tool down from upside.
- (3) To separate the DC- connector, push tool down from the bottom side.
- (4) Separate the connectors by hands.

5.7.3 AC output connection

DN3H Series(5-10KTL) has already integrated RCMU (residual current monitoring inverter) inside, however if an external RCD is required, a type A RCD with rated residual current of 100mA or higher is recommended.

There are two AC terminals and the assembly steps for both are the same, just need to check one for Grid another for EPS. The AC cable and micro-breaker/external fuse specification for AC side of DN3H Series(5-10KTL) are as below.

Model	DN3H-5KTL	DN3H-6KTL	DN3H-8KTL	DN3H-10KTL-A	DN3H-10KTL
Cable(Cu)	4mm ²	4mm ²	4mm ²	4-6mm ²	4-6mm ²
Normal Load-Breaker or external fuse	10A	16A	16A	20A	20A
Grid-Breaker	20A	32A	32A	40A	40A



WARNING!

WARNING!

Select cables of the correct specifications.

Failure could result in fire and lead to death or serious injury.

Do not connect the line (phase) to PE terminal. Failure will result in incorrect operation.

Connection Steps:

1. Lead the AC cable through the cable gland and the housing.

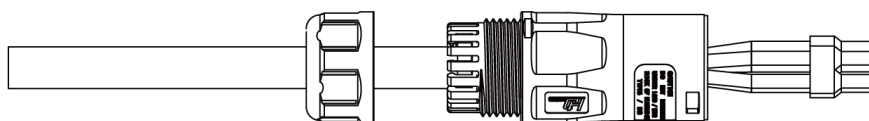


Figure 5-10

2. Remove the cable jacket by 40 mm, and strip the wire insulation by 8 mm–15 mm.

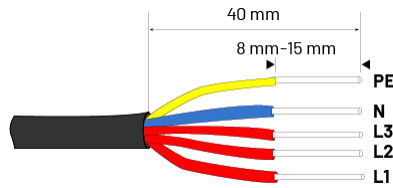


Figure 5-11

3. Fully insert the conductors to the corresponding terminal and tighten the screws to torque of 0.8 N.m. Pull cables outward to check whether they are firmly installed.

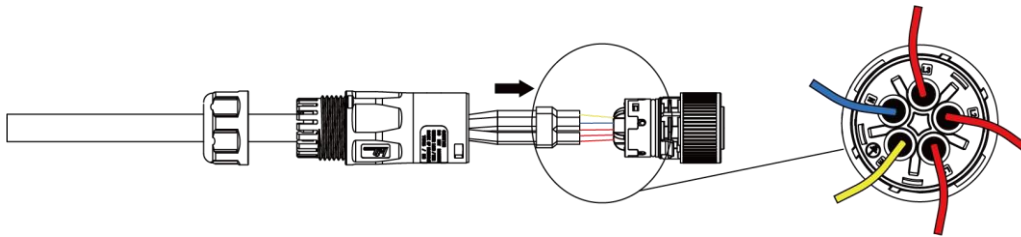


Figure 5-12

4. Assemble the housing, the terminal block and cable gland (torque 4–5 N.m). Make sure that the rib of the terminal block and the groove on the housing engage perfectly, with a click.

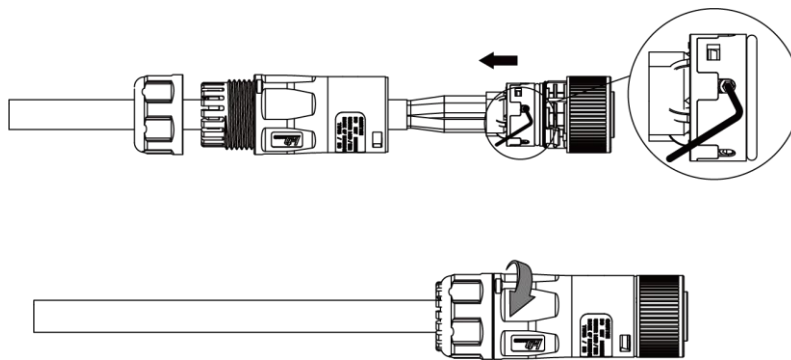


Figure 5-13

5.7.4 Battery connection

When building an on-site consumption storage system, high voltage battery is a necessary part. The DN3H Series(5-10KTL) provides the necessary interfaces to connect the battery.



WARNING!

WARNING!

Make sure to select cables of the right specification.
Failure could cause fire and result in death or serious injury.

1. Battery Power Cable Connection

1. Prepare tin-plated cables of conductor cross section of 4 to 6 mm².
2. Strip 15mm insulation off the conductor. Use a suitable stripping tool for this (e.g. "Knipex Solar 121211").
3. Open spring using a screwdriver (Figure 5-14).

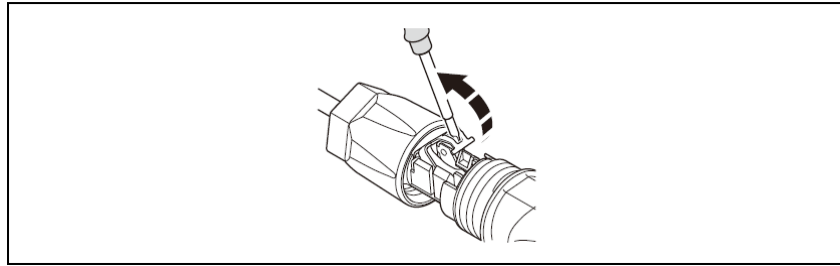


Figure 5-14

4. Carefully insert the stripped wire with twisted conductors all the way in (Figure 5-15, A). The litz wire ends have to be visible in the spring.
5. Close the spring. Make sure that the spring is snapped in (Figure 5-15, B).

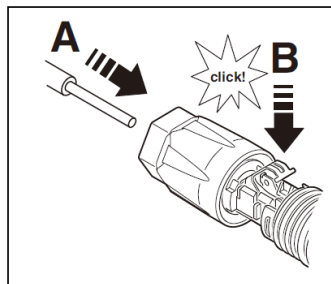


Figure 5-15

6. Push the insert into the sleeve (Figure 5-16, C).
7. Tighten the cable gland to 2 Nm (Figure 5-16, D). Use a suitable and calibrated torque wrench of size 15. Use an open-jaw wrench, size 16, to hold the connector in place.

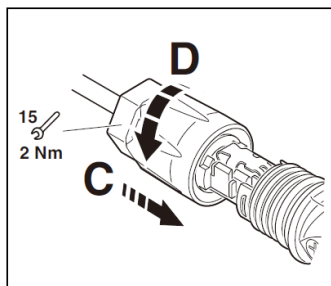


Figure 5-16

8. Fit the two connectors together until the connection audibly locks into place.
9. Check to make sure the connection is securely locked.
10. Separating connectors.

- (1) Insert the screwdriver into one of the four openings (Figure 5-17, A).
- (2) Leave the screwdriver in the opening. Pull the two connectors apart (Figure 5-17, B).

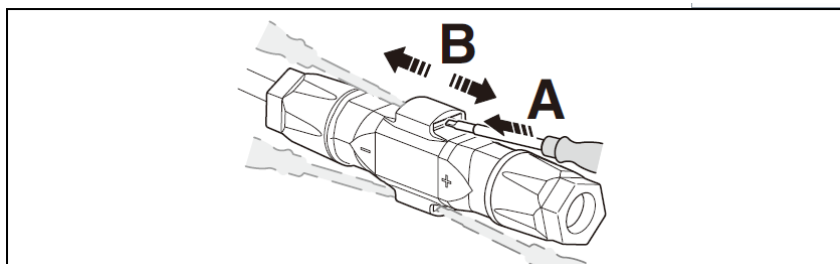


Figure 5-17

2. Battery communication connection

The communication interface between battery and inverter is a RJ45 connector. The Pin definitions are as below.

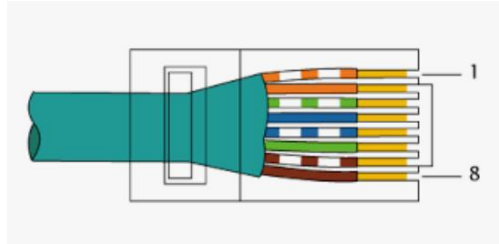


Figure 5-18

Pin	1	2	3	4	5	6	7	8
Function	NC	NC	NC	CANH	CANL	NC	485A	485B

Overview for all battery connections:

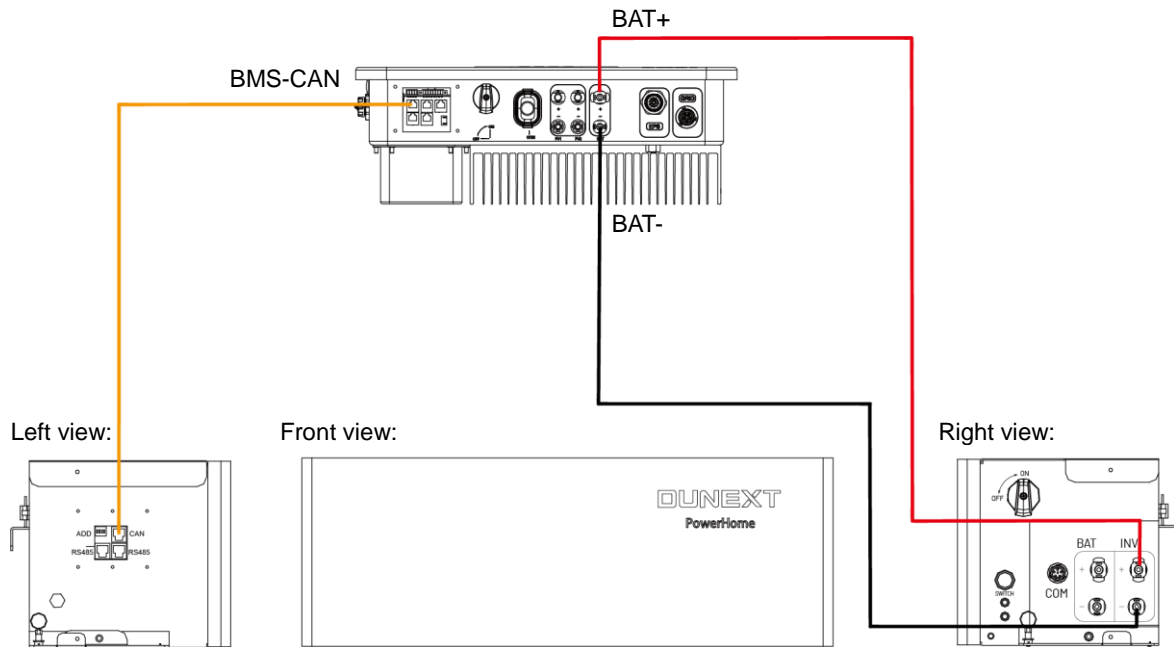


Figure 5-19 Connection diagram between DN3H Series(5-10KTL) and one battery cluster

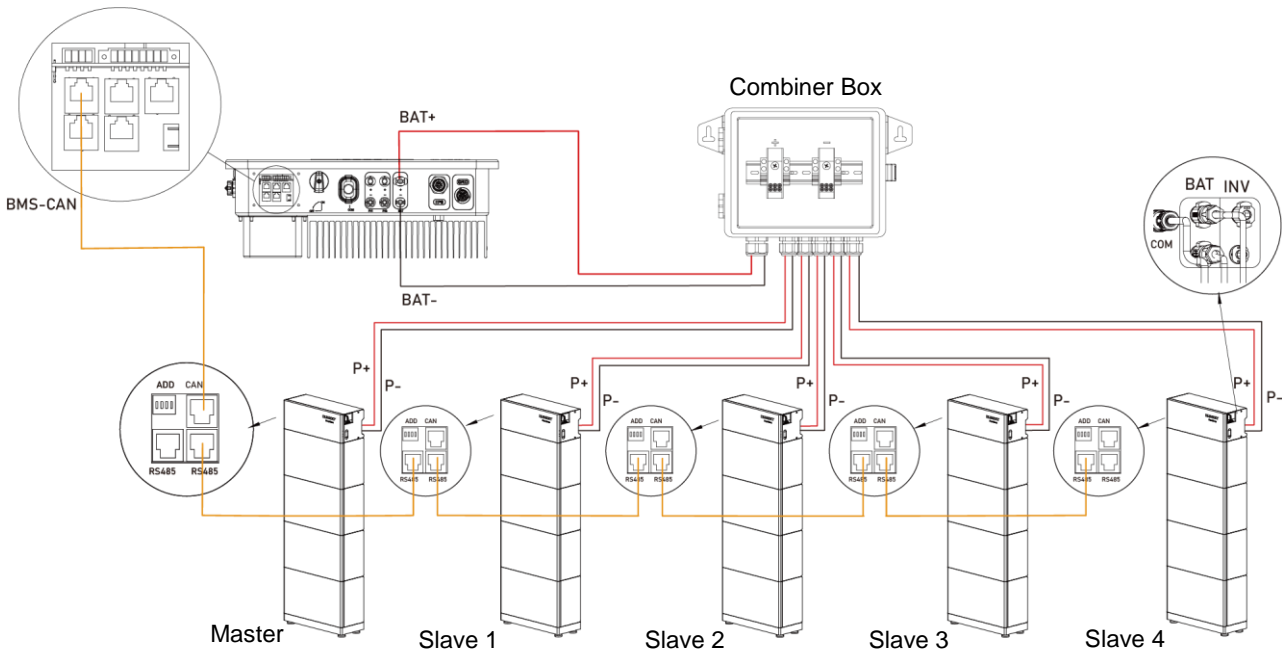


Figure 5-20 Connection diagram between DN3H Series(5-10KTL) and five battery clusters



NOTE!

For the parallel connection of 2 battery clusters and 3 battery clusters, please use the power cable in an accessory bag of the battery package to make the connection.
 For the parallel connection of 4 battery clusters and 5 battery clusters, please use the power cable in an accessory bag of the combiner box to make the connection.
 The combiner box is not standard and needs to be purchased separately.
 See the PowerHome-H1 User Manual for details on battery settings.



WARNING!

The length of power cables between battery clusters and combiner box must be the same.
 When connecting multi-cluster battery systems in parallel, ensure that the number of clusters connected in series is the same in each battery system.

5.7.5 Communication connection

Communication interface

The inverter has a serial communication interface besides WIFI or 4G or Ethernet (Optional). Dry contact, extended port, human and machine communication, etc., can be delivered to PC or other monitoring equipment via these interfaces.

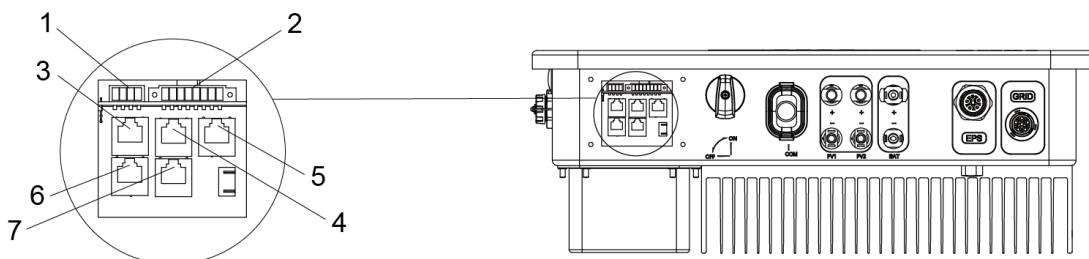


Figure 5-21 Communication interface

No.	Name	Description
(1)	RS485	Used for Modbus RTU communication with 3rd party external device or controller.
(2)	ADD interface	Used for RS485 communication of meter, generator control signals, shutdown signals and digital output.
(3)	BMS-CAN / 485	Used to communicate with the battery management system using CAN or RS485 communication protocol.
(4)	METER	Used for RS485 communication between inverter and the smart meter.
(5)	DRM / RCR	This application meets the requirements of local Australian grid code (AS/NZS 4777.2) and Germany grid code (VDE-AR-N 4105).
(6)	Parallel Port	Used for parallelization between inverters.
(7)	Parallel Port	Used for parallelization between inverters.

1. WIFI or 4G or Ethernet

For details please refer to the WIFI or 4G or Ethernet module user manual.

2. RS485 interface

RS485 interface PINS definition:

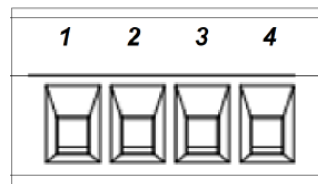


Figure 5-22

Pin	1	2	3	4
Function	+5V	GND	485A	485B

3. ADD interface

ADD interface PINS definition:

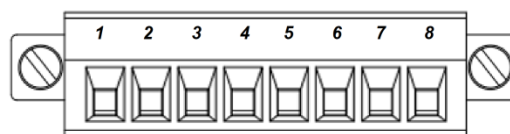


Figure 5-23

Pin	1	2	3	4	5	6	7	8
Function	METER-485A	METER-485B	GENA	GENB	+5V	SHUTDOWN	Relay	GND

Meter communication: METER_485A & METER_485B----pin1 & pin2

Relay contact output for generator: GENA & GENB----pin3 & pin4

Shut down the hybrid inverter: +5V & SHUTDOWN----pin5 & pin6

Relay & GND---pin7 & pin8

4. METER port

Meter port PINS definition:

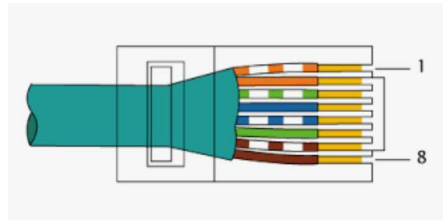


Figure 5-24

Pin	1	2	3	4	5	6	7	8
Function	METER-485A	METER-485B	NC	NC	NC	NC	NC	NC

The function of meter port same as pin1 & pin2 of ADD interface.

4.1 Meter wiring diagram for Typical Energy Storage System

The DN3H Series(5-10KTL) can adopt two types of smart meters. One is our standard equipment, and the other is optional.

- Standard: EASTRON SDM630MCT (40mA) smart meter

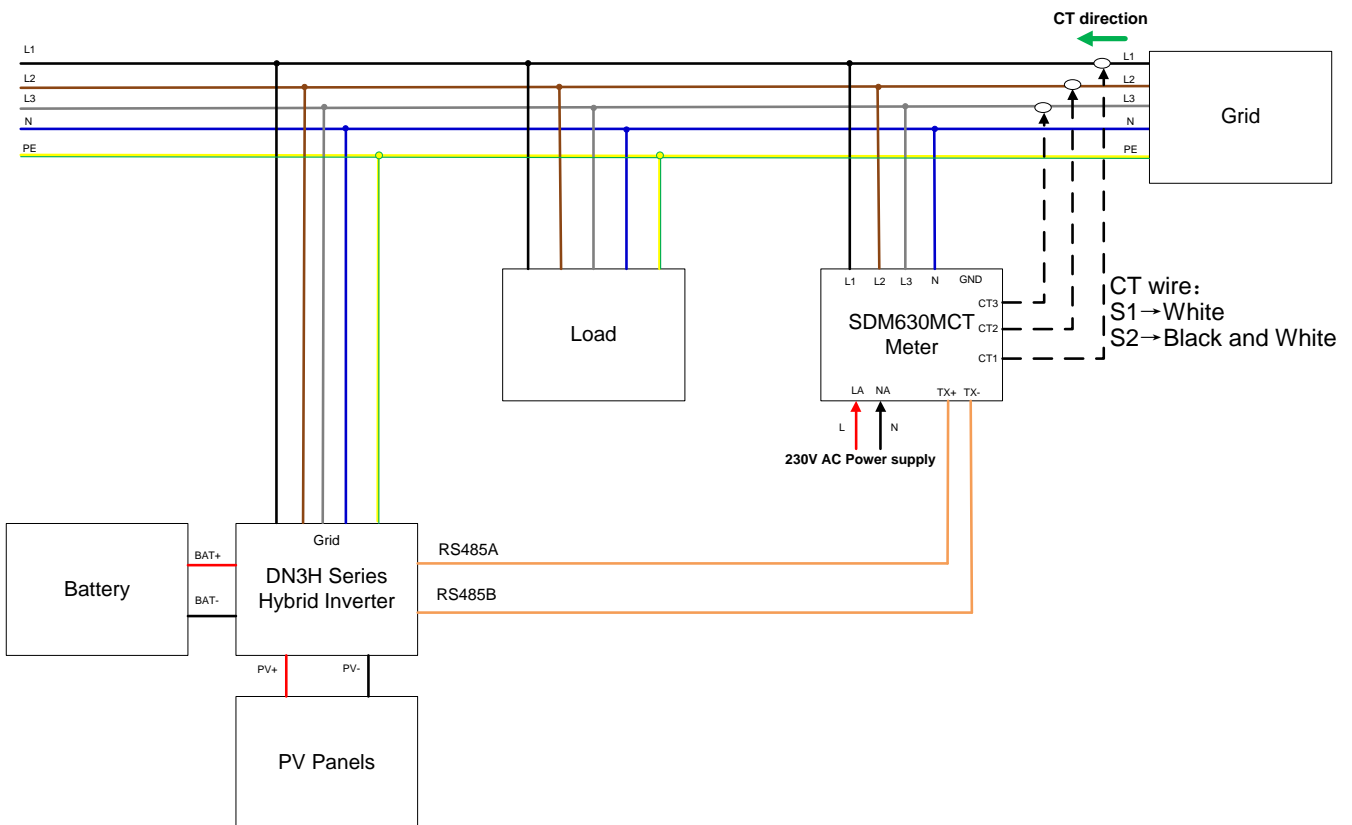


Figure 5-25

- Optional: EASTRON SDM630-Modbus V2 smart meter

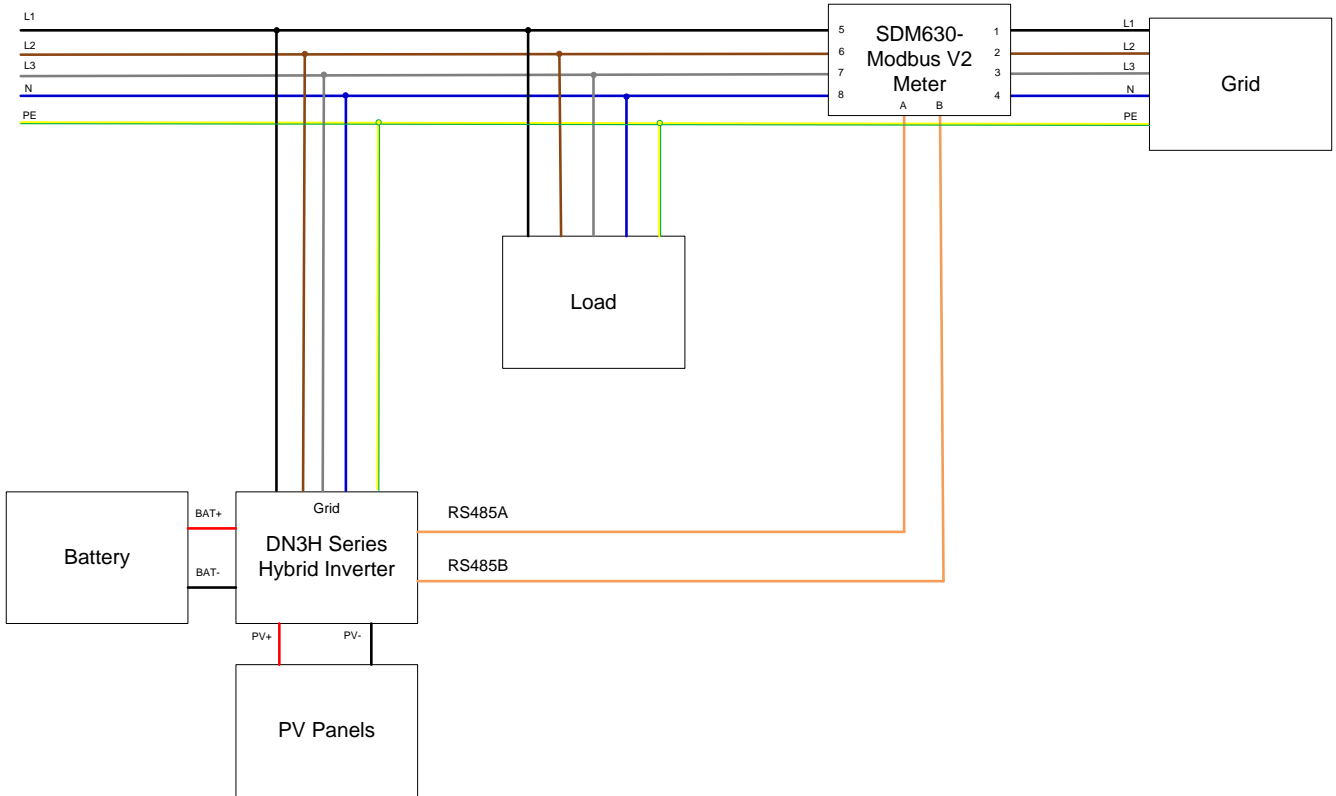


Figure 5-26

The connect steps are as follows:

- Connect the meter output "L1, L2, L3, N" to power Grid. And connect 230V AC power supply to "LA, NA" (LA –Grid L line, NA-Grid Neutral line).
- Connect the meter "TX+" "TX-" to inverter RS485 A and B of "MERER" (RJ45 PIN1 to RS485 A, RJ45 PIN2 to RS485 B).
- Connect meter CT1 to Grid L1, CT2 to Grid L2, CT3 to Grid L3. CT's white cable connects to S1 of the meter, and the black cable connects to S2. The CT direction must be facing to the load and inverter.

Note:

- 1) It is necessary to have the sequence of phases, CT1 must be connected to Grid phase line L1, CT2 must be connected to Grid phase line L2, CT3 must be connected to Grid phase line L3.
- 2) Please note that the CT direction must be facing to the load and inverter.
- 3) The local address and the meter address need to be set as "001" on the inverter screen. The address of the smart meter itself needs to be set to "001".

4.2 Meter wiring diagram for AC Retrofit System

Dunext Hybrid inverters can be used in the following situations also. If the site already has a grid tied PV system and wants to increase module capacity or provide back-up power. Additional meter between the grid-connected inverters and DN3H Series(5-10KTL) is required. One DN3H Series(5-10KTL) can be connected maximum two PV systems, and in the system, the smart meter must be the EASTRON SDM630MCT (40mA).

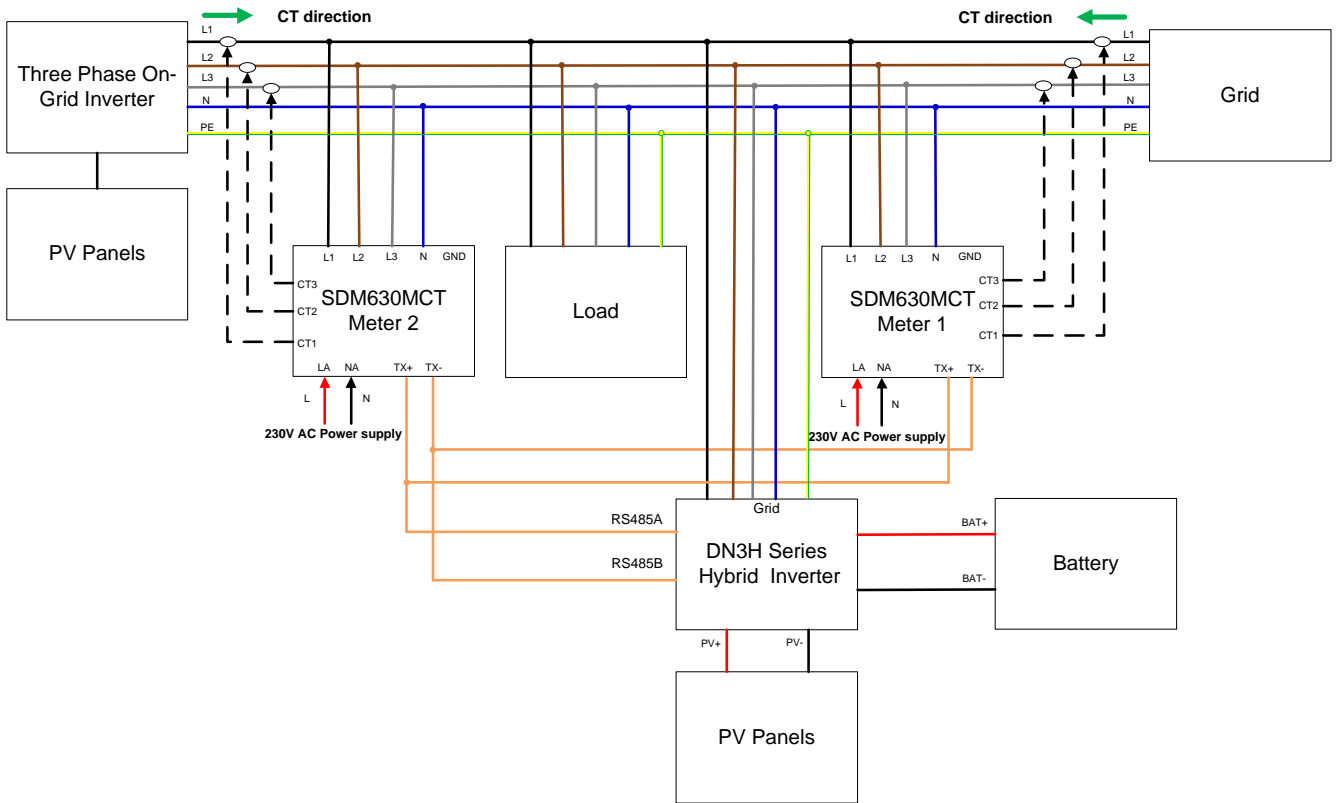


Figure 5-27 Connect one On-Grid three-phase inverter

The connect steps are the same as in the previous section.

Note: The smart meter communication cable "TX+" "TX-" can also be connected to "ADD interface" port of inverter.

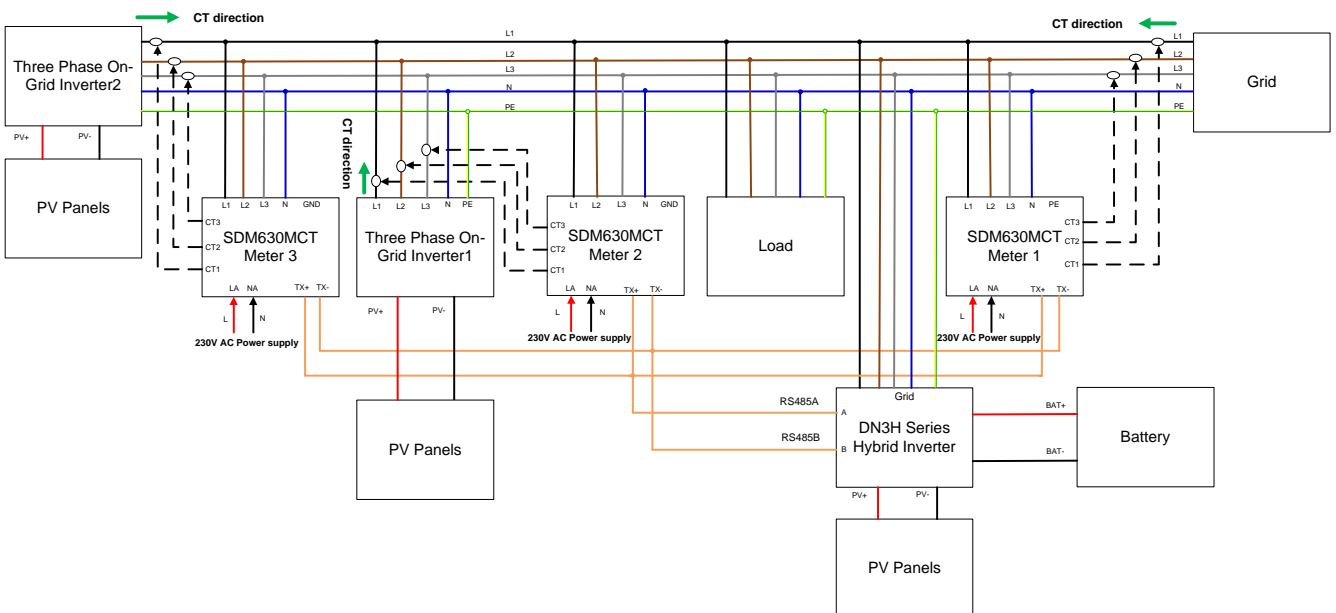



Figure 5-28 Connect two On-Grid three-phase inverters

Note:

- 1) It is necessary to have the sequence of phases, CT1 must be connected to Grid phase line L1, CT2 must be connected to Grid phase line L2, CT3 must be connected to Grid phase line L3.
- 2) Please note that the CT direction must be facing to the load and inverter.

3) Connect one On-Grid three-phase inverter(Figure 5-27): The local address needs to be set as "001" on the inverter screen, and meter1 address set as "001", meter2 address set as "002". The address of meter1 itself needs to be set to "001", and meter2 needs to be set to "002".

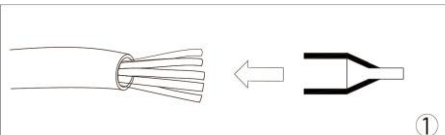
4) Connect two On-Grid three-phase inverters(Figure 5-28): The local address needs to be set as "001" on the inverter screen, and meter1 address set as "001", meter2 address set as "002", and meter3 address set as "003". The address of meter1 itself needs to be set to "001", meter2 needs to be set to "002", and meter3 needs to be set to "003".



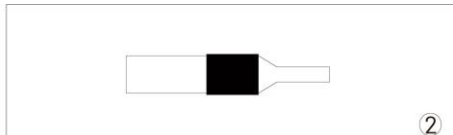
WARNING!

WARNING!

If one chooses a flexible wire, ensure the cord section is pressed on the crimping terminal before connecting it to the meter as below.



①



②

5. DRM/Ripple Control Receiver (RCR)

PINS definition:

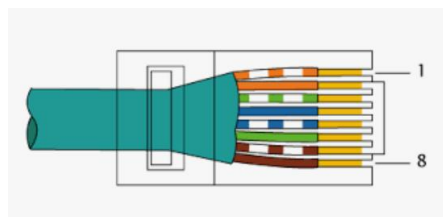


Figure 5-29

Pin	1	2	3	4	5	6	7	8
Function	DRM1/5	DRM2/6	DRM3/7	DRM4/8	+3.3V	COM/DRM0	GND	GND

This application meets the requirements of local Australian grid code (AS/NZS 4777.2) and Germany grid code (VDE-AR-N 4105).

(1) In Australian grid code, requirements for connection call for compatibility with Demand Response Enabling Devices (DRED).

The DRED is controlled by a local network operator and allows to put the inverter in one of the Demand Response Modes (DRMs) defined by the standard:

- 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).

Currently, it is mandatory to respond to DRM0, which allows the network manager to remotely decouple the installation from

the distribution network.

(2) In Germany grid code, this logic interface is for controlling and/or limiting the inverter's output power. The grid company uses the Ripple Control Receiver (RCR) to convert the grid dispatching signal and send it as a dry contact signal. The wiring of the ripple control receiver dry contact cables is shown in the figure below:

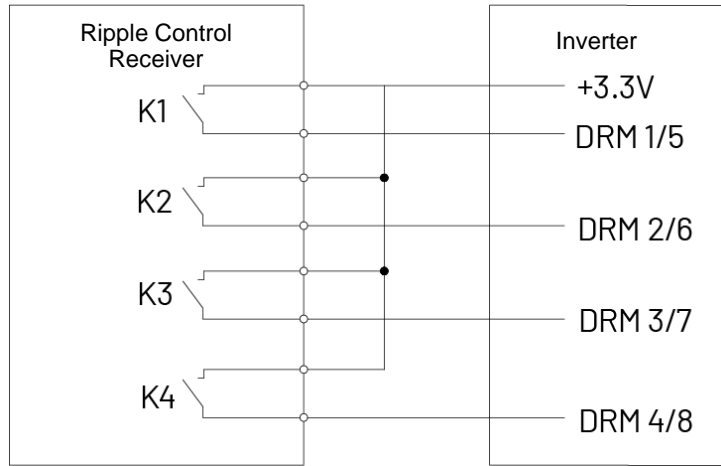


Figure 5-30

K1	K2	K3	K4	Switch Operation on External RCR	Output power (in % of the Rated AC output power)
1	0	0	0	Close K1	100%
0	1	0	0	Close K2	60%
0	0	1	0	Close K3	30%
0	0	0	1	Close K4	0%

6. Parallel port

PINS definition:

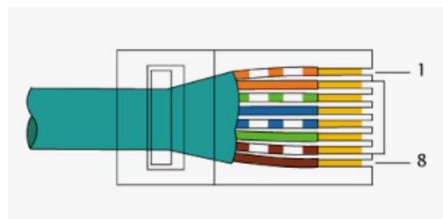


Figure 5-31

Pin	1	2	3	4	5	6	7	8
Function	RS485A	RS485B	VCC	CANH	CANL	GND	SYNA	SYNB

Note: Only 4 and 5 PIN pins are used.

5.7.6 Relay connection

In order to better control the load power consumption, a relay can control a contactor that will open or close in certain condition. Please choose a suitable contactor according to the +12VDC power supply by the inverter provided and field load power, e.g. the contactor types of the CR2020012. Please connect the contactor to the load and power grid according to the field conditions and connect the A1 and A2 of the contactor coil to the Pin7 and Pin8 of the ADD interface of the inverter.

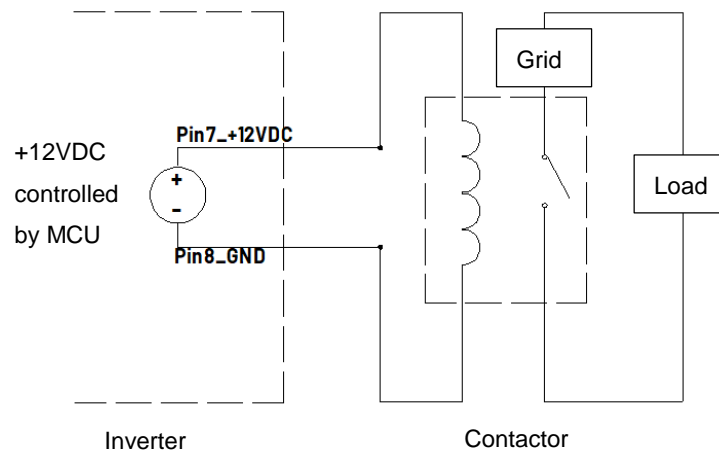


Figure 5-32 Relay function electrical block diagram

There are four function modes in total.

1. Disable: Disable the relay function, and the load under the relay will always be out of power.
2. Manual On/Off: You can manually set the switch state of the relay.
3. Timing: The relay is on according to the setting relay switch-on start time, and it is off according to the setting relay switch-on end time. And it supports setting up to two time periods. (T1, T2).
4. Battery SOC: Under this mode, users need to set relay switch-on battery SOC, relay switch-off battery SOC delay off time.
 - RLY On BAT SOC: Relay is on if battery SOC exceeds a defined value.
 - RLY Off BAT SOC: Relay is off if battery SOC falls below a defined value.
 - Delay Off Time: The relay remains on if battery SOC falls below switch-on SOC for a defined time; the timer will reset if battery SOC exceeds switch-on SOC within a defined time. During the defined time, the relay will be off immediately if battery SOC has fallen below RLY Off BAT SOC.

5.7.7 ATS connection (Optional)

With the hybrid inverter not yet connected to the grid, the hybrid inverter will operate in EPS mode, utilizing the energy from the PV and the batteries to supply power to the loads. If, afterward, the user wants to connect the hybrid inverter to the grid, an external transfer switch is recommended; we recommend the NDQ2A-63 series automatic transfer switch. For maintenance purposes, the transfer switch is also an optional choice for installers; it will provide a power supply for loads when a hybrid inverter is under maintenance.

Automatic mode: The transfer switch automatically switches to supply power to the load depending on which side has power. Priority common power supply.

Manual mode: Users can switch the power supply by themselves according to the actual situation.

- I: The load is powered from the Grid side;
- II: The load is powered from the EPS side.
- OFF: The load is vacant;

The system wiring diagram is shown below:

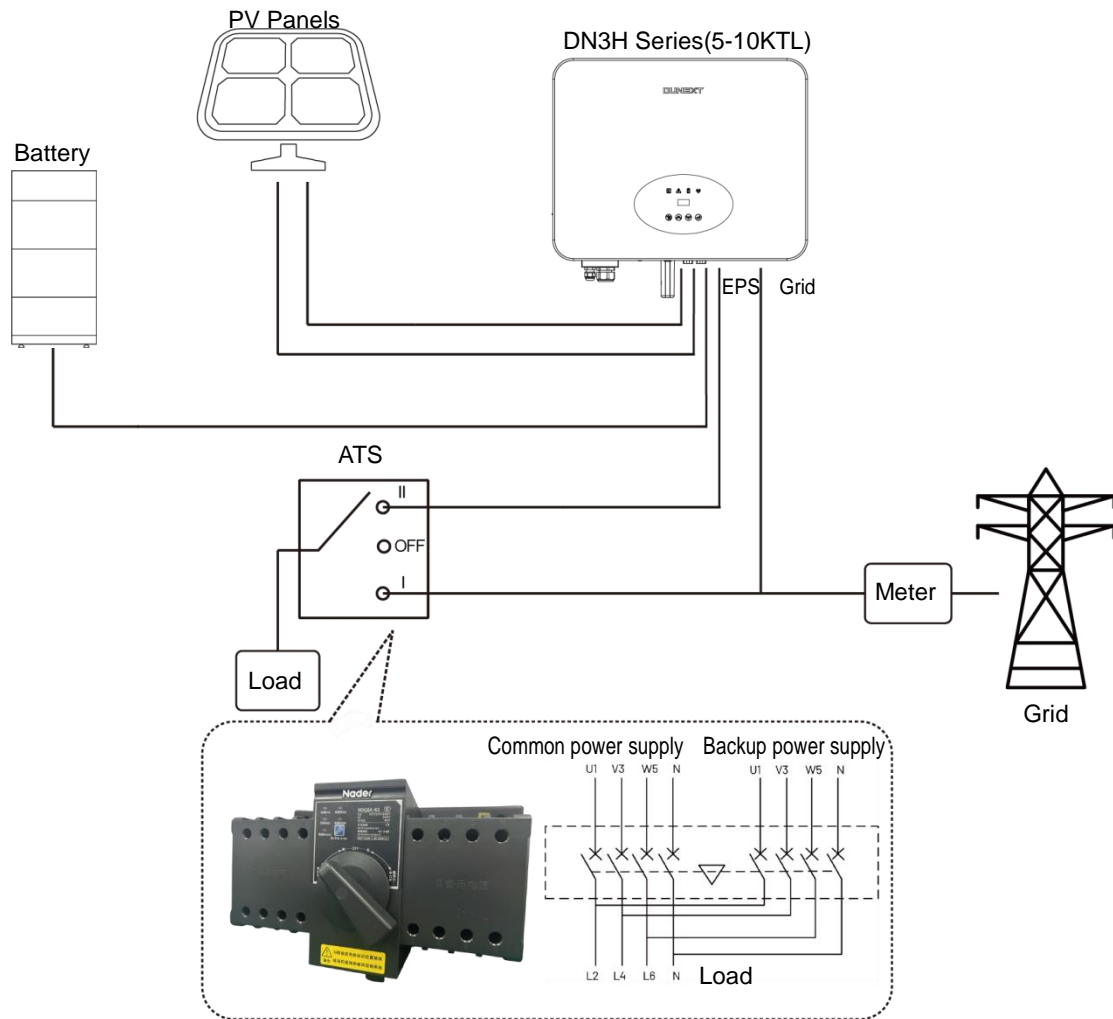


Figure 5-33 ATS connection wiring diagram

6. Power the inverter on and off

6.1 Power on the inverter

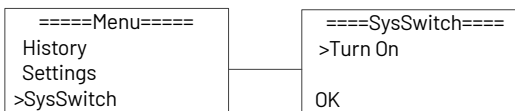
<p>NOTICE</p> <p>NOTICE!</p>	<p>Make sure that all the PE cable is connected.</p> <p>Make sure that all the PV and AC cables are connected.</p> <p>Make sure that Energy meter are connected properly.</p> <p>Make sure that battery is connected correctly.</p>
--	---

Follow the steps to power on the inverter:

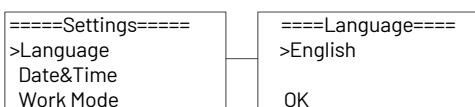
- 1) Turn on the external AC switch and ensure the switch does not trip.
- 2) Turn on the DC switch of the inverter. If the PV cables are reversed, the inverter will report an error when turning the DC switch on.
- 3) Set the ADD switch of the battery, referring to the table below to set the ADD switch for parallel connection of different battery clusters. ADD switch is a 4-bit dial switch to manually distribute the communication address of battery clusters. 1-3 bit means the communication address of battery clusters, the status of 4th bit means if this BMC is the master or not. For the master, the communication address is largest and the fourth digit must be ON status.

	Master	Slave 1	Slave 2	Slave 3	Slave 4
1 battery cluster					
2 battery cluster					
3 battery cluster					
4 battery cluster					
5 battery cluster					

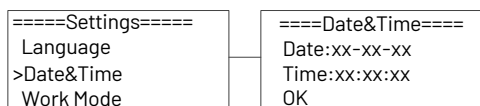
- 4) Turn on the DC switch of the battery and press the start button. If the battery cables are reversed, the inverter will not query the battery voltage when the battery is switched on.
- 5) Turn on the system switch: Menu>- SysSwitch. Set SysSwitch to 'Turn on' and press 'OK' to confirm.



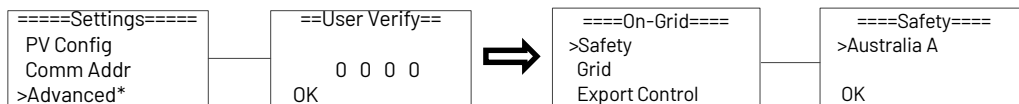
- 6) Set the language: Menu>- Settings>- Language. Set the language of the installation site and press 'OK' to confirm. The default language is English.



- 7) Set date and time: Menu>- Settings>- Date&Time. Set the current date and time of the installation site and press 'OK' to confirm.



8) Set the grid code: Menu>- Settings>- Advanced*>- On-Grid>- Safety. Advanced settings require the original password "0000" and press 'OK' to enter. Set the safety code of the installation site and press 'OK' to confirm.



Note:

For compliance with AS/NZS 4777.2:2020, please select from Australia A/B/C/ or New Zealand.

Please contact your local grid operator to select the region according to the grid code list.

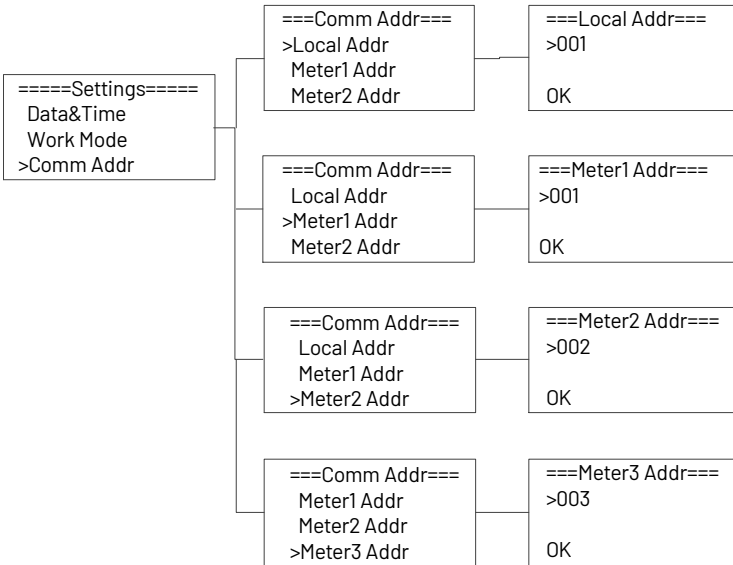
The grid codes are subject to change. The listed codes are updated without notice.

Grid codes

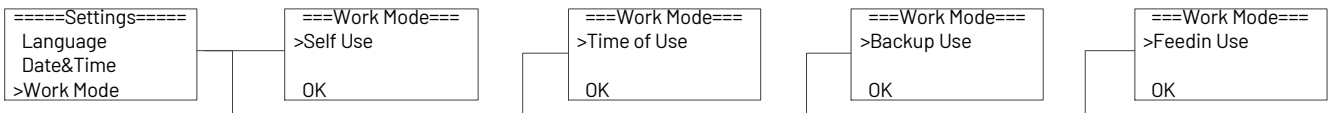
No.	National/Regional Grid Code	Description
0	VDE4105-DE	Germany power Grid, meet Grid standards "VDE-AR-N-4105".
1	CEI0-21	Italy power Grid.
2	Australia A	For large interconnected power systems. e. g. all Australian networks other than Australia B/C and New Zealand.
3	RD1699	Spain power Grid.
4	EN50549	Default EN50549 Grid setting.
5	EN50549-DK-W	West Denmark power Grid.
6	Greece	Greece power Grid.
7	EN50549-NL	Netherland power Grid, meet Grid standards "EN50438".
8	C10/11	Belgium power Grid.
9	G99	UK power Grid.
10	China	China power Grid, meet Grid standards "CN-NBT".
11	VDE0126-FR	France power Grid, meet Grid standards "VDE 0126".
12	EN50549-PL	Poland power Grid.
13	Brazil-180s	Brazil power Grid ,connect/reconnect time 180s
14	VDE0126-DE	Germany power Grid, meet Grid standards "VDE 0126".
15	CEI0-16	Italy power Grid, meet Grid standards "CEI 0-16".
16	G98	UK power Grid.
17	Greece Island	Greece Island power Grid.
18	EN50549-CZ	Czech Republic power Grid, meet Grid standards "EN50438Y2007-CZ"
19	IEC61727-IN	India power Grid.
20	Korea	Korea power Grid.
21	EN50549-SW	Sweden power Grid.
22	China-W	China power Grid, Grid voltage range: 160-290V. Grid frequency range: 47-53HZ.
23	China-H	China power Grid, meet standards "CQC".

No.	National/Regional Grid Code	Description
24	IEC61727-IN-W	India power Grid, meet Grid standards "IEC61727".
25	Brazil	ABNT NBR 16149/16150.
26	IEC61727-SL	Sri Lanka power Grid, meet Grid standards "IEC61727".
27	Mexico	Mexico power Grid, meet Grid standards "IEC61727 60HZ".
28	New Zealand	All systems in New Zealand.
29	Philippines	Philippines power Grid, meet Grid standards "IEC61727 60HZ spec
30	IEC61727-SL-W	Sri Lanka power Grid, Grid voltage range: 160-280V, Grid frequency range: 47-52HZ.
31	PEA	Thailand power Grid.
32	PEA-W	Thailand power Grid, Grid voltage range: 160-280V, Grid frequency range: 47-52HZ.
33	IEC61727-VN	Vietnam power Grid.
34	IEC61727-VN-W	Vietnam power Grid, Grid voltage range
35	Tunisia	Tunisia
36	MEA	Thailand power Grid.
37	MEA-W	Thailand power Grid, Grid voltage range: 160-280V, Grid frequency range: 47-52HZ.
38	Brazil-LV	120V 60Hz voltage of grid L to N(R3-10-15K-LV only, others reserved
39	EN50549-DK-E	East Denmark power Grid
40	Tunisia-W	Tunisia wide range
41	Chile	Chile Power Grid
42	Brazil-W	Brazil power Grid, meet Grid standards "NBT 16150".
43	EN50549-PL-W	Poland power Grid.
44	Brazil-180s-W	Brazil power Grid, meet Grid standards "NBT 16150".
45	UNE217002-ES	Spain power Grid.
46	G98-NI	G98 for Northern Ireland
47	G99-NI	G99 for Northern Ireland
48	EN50549-NW	Norway-400VLine
49	EN50549-NW-LV	Norway-230VLine-R3-10-15K-LV only, others reserved
50	IEC61727-LV	133V 50Hz, low voltage power grid
51	Australia B	For small interconnected power systems. e.g. Western Power
52	Australia C	For isolated or remote power systems e.g. Horizon Power and TasNetworks.

9) Set the local and meter address: Menu>- Settings>- Comm Addr. Set the local address and meter address and press 'OK' to confirm. The default local address is 001, and meter address is 001.

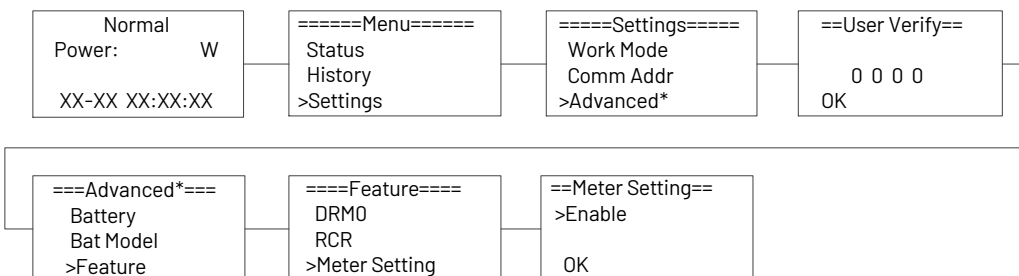


10) Set work mode: Menu>- Settings>- Work Mode. Set the work mode according to the installation site and press 'OK' to confirm.

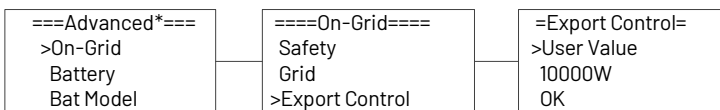


11) Set the export control:

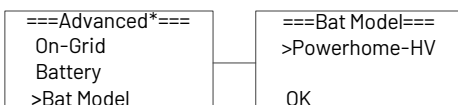
Step1: Enable the meter setting first. Menu>- Settings>- Advanced*>- Feature>-Meter Setting. Advanced settings require the original password "0000" and press 'OK' to enter. Enable the Meter Setting and press 'OK' to confirm. The default Meter Setting is Enable.



Step 2: Setting the power exported to the grid. Menu>- Settings>- Advanced*>- On-Grid>- Export Control. Set the safety code of the installation site and press 'OK' to confirm.



12) Set the battery model: Menu>- Settings>- Advanced*>- Bat Model. Set the battery model to match the inverter and press 'OK' to confirm.



13) Refer to the WIFI user manual for network configuration.

6.2 Power off the inverter



Danger of burns!
Even if the inverter is shut down, it may still be hot and cause burns. Wear protective gloves before working on the inverter.

For maintenance or other service, you must power off the inverter. The steps are as follows:

- 1) Turn off the external AC switch and secure it against reconnection.
- 2) Turn off the DC switch of the inverter for disconnecting all of the PV string inputs.
- 3) Turn off the DC switch of the battery.
- 4) Wait about 5 minutes until the capacitors inside the inverter discharge completely.

7. Operation

7.1 Control panel

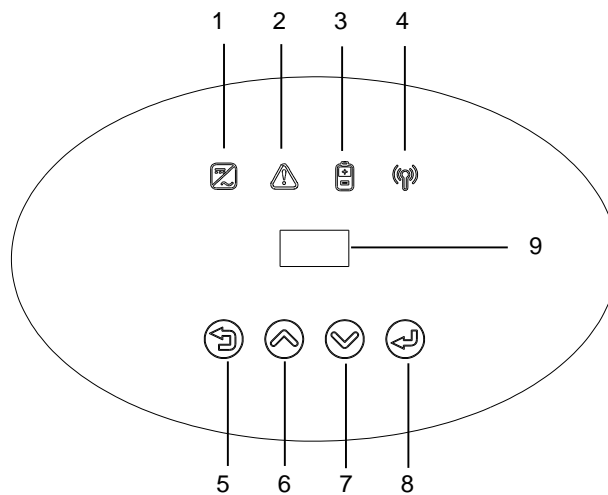


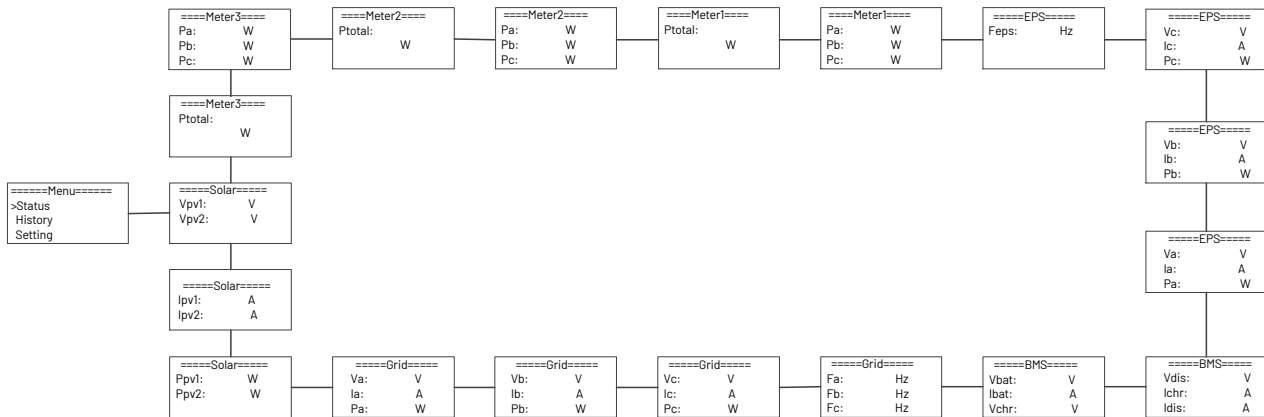
Figure 7-1

No.	Name	Description	
1	Green indicator	Steady	The inverter is operating in on-grid mode.
		Blinking	1. The inverter enters the self-test mode. 2. The DC is on, the AC is on, but the energy transfer between the inverter and the grid is abnormal.
		Off	The DC is off and the AC is on.
2	Red indicator	Steady	The inverter has a warning.
		Off	The inverter is normal.
3	Blue indicator	Steady	Communication between the inverter and the battery is normal.
		Off	Communication between the inverter and the battery is abnormal.
4	Yellow indicator	N / A	Reserve
5	ESC button	Leave from current interface or function.	

No.	Name	Description
6	Up button	Move cursor to upside or increase value.
7	Down button	Move cursor to downside or decrease value.
8	OK button	Press and hold for 2~3 seconds to confirm the selection.
9	LCD Screen	Display the information of the inverter.

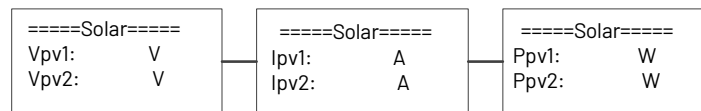
7.3.2 Status

Press 'OK' to enter the menu, check grid, solar, battery, EPS and temperature of the inverter. Press up and down to select, press 'ESC' to return to the Menu.



1) Solar

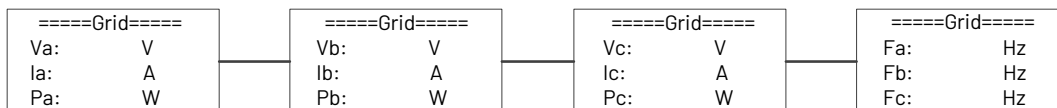
This status shows the real time PV parameters of the system. The input voltage, current and power of each PV input. Press up and down button to review the parameter. Press 'ESC' to return to status.



2) Grid

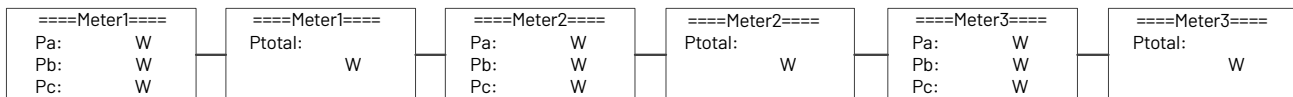
This status shows the real time grid parameters such as voltage, current, output power and frequency. Pac measures the output of the inverter.

Press up and down button to review the parameter. Press 'ESC' to return to status.



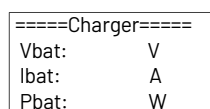
3) Meter

This status shows the meter situation of the system. Include the smart meter A, B, and C phase power and total power. Press up and down button to review the parameter. Press 'ESC' to return to Status.



4) Charger

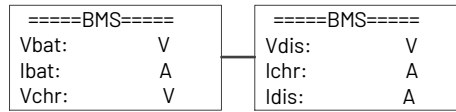
This status shows the charger situation of the system. Include the battery voltage, charge or discharge current, and charge or discharge power. '+' means in charging; '-' means in discharging. Press up and down button to review the parameter. Press 'ESC' to return to Status.



5) BMS

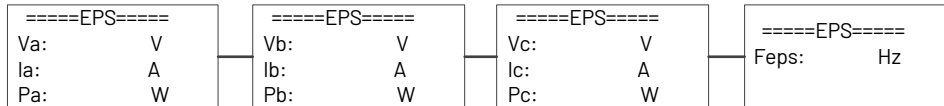
This status shows the battery situation of the system. Include the battery voltage and current, charge and discharge voltage,

charge and discharge current. '+' means in charging; '-' means in discharging. Press up and down button to review the parameter. Press 'ESC' to return to Status.



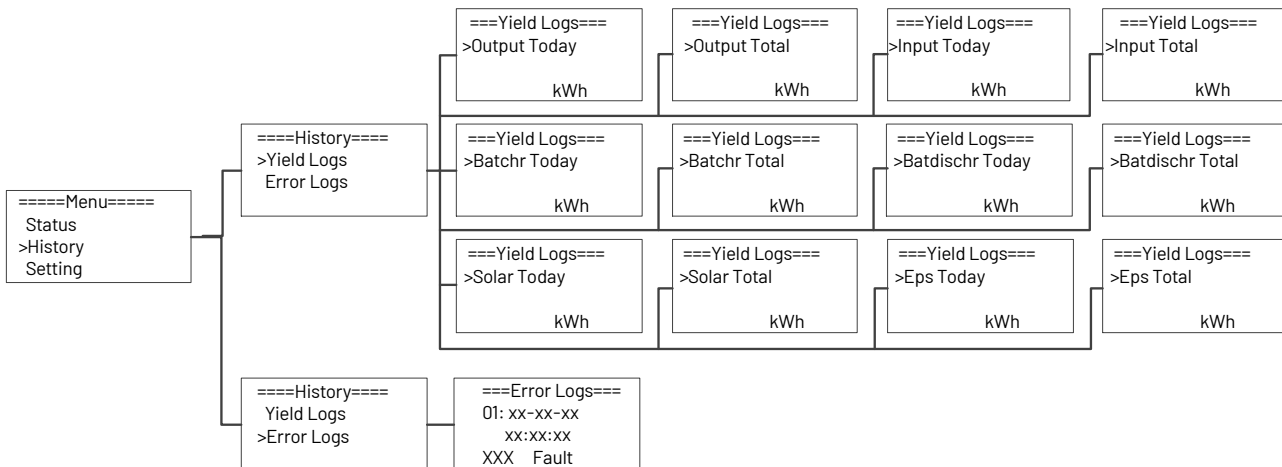
6) EPS

EPS will only have data when the inverter is working in EPS mode, it will show the real time data of the EPS output, as voltage , current, power, frequency. Press up and down button to review the parameter. Press 'ESC' to return to Status.



7.3.3 History

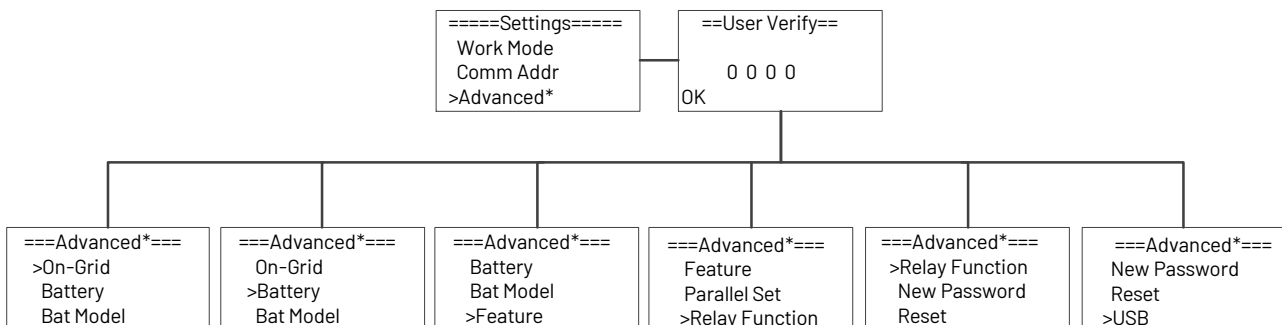
The history function contains three aspects of the information: inverter yield, battery yield and error log. Press up and down to select, and review the data of system, press 'ESC' to return to the Menu.



7.3.4 Advanced settings

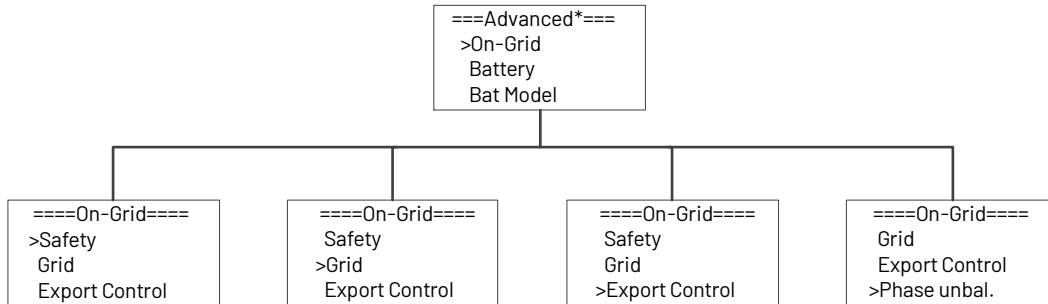
Setting function is used for set the inverter for language, date and time, work mode, communication address, advanced and so on.

1) Advanced settings require the original password '0000', Press 'OK 'to confirm.



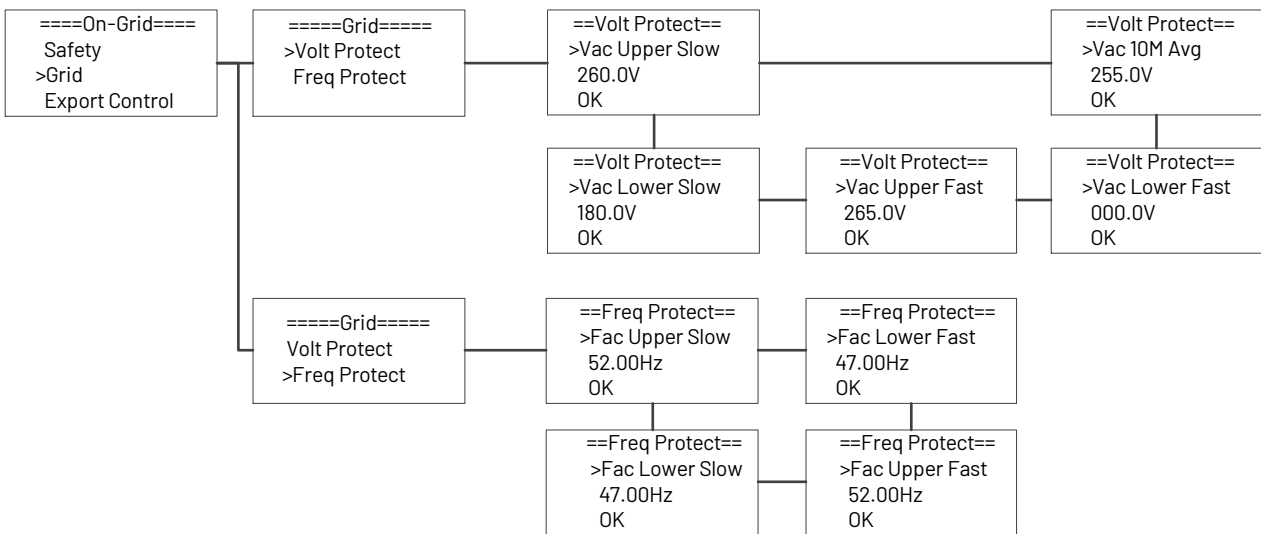
2) On-Grid

Press up or down button to set the grid functions. Press 'OK' to confirm.



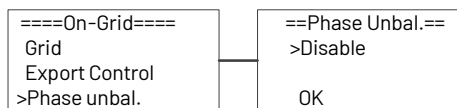
3) Grid

Press up or down button to change the value of grid voltage and grid frequency protect. Press 'OK' to confirm.



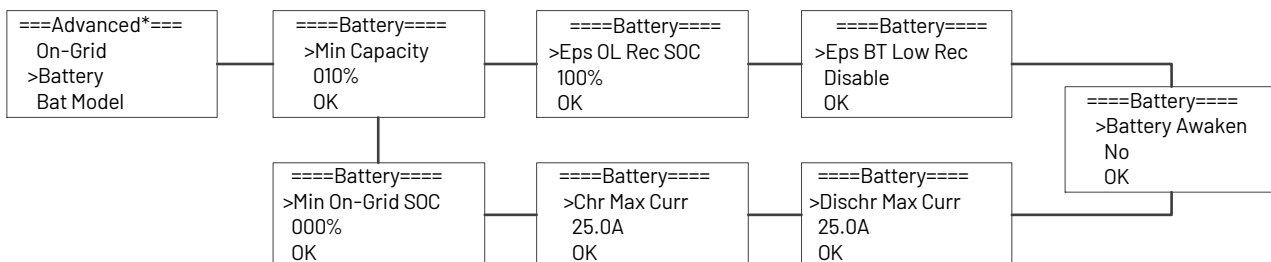
4) Phase unbal.

When the system is connected with three-phase unbalanced load or single-phase load, customers can enable the phase unbalance function, the inverter can detect and identify the three-phase current unbalance in the system through the meter and output unbalanced power to different phase.



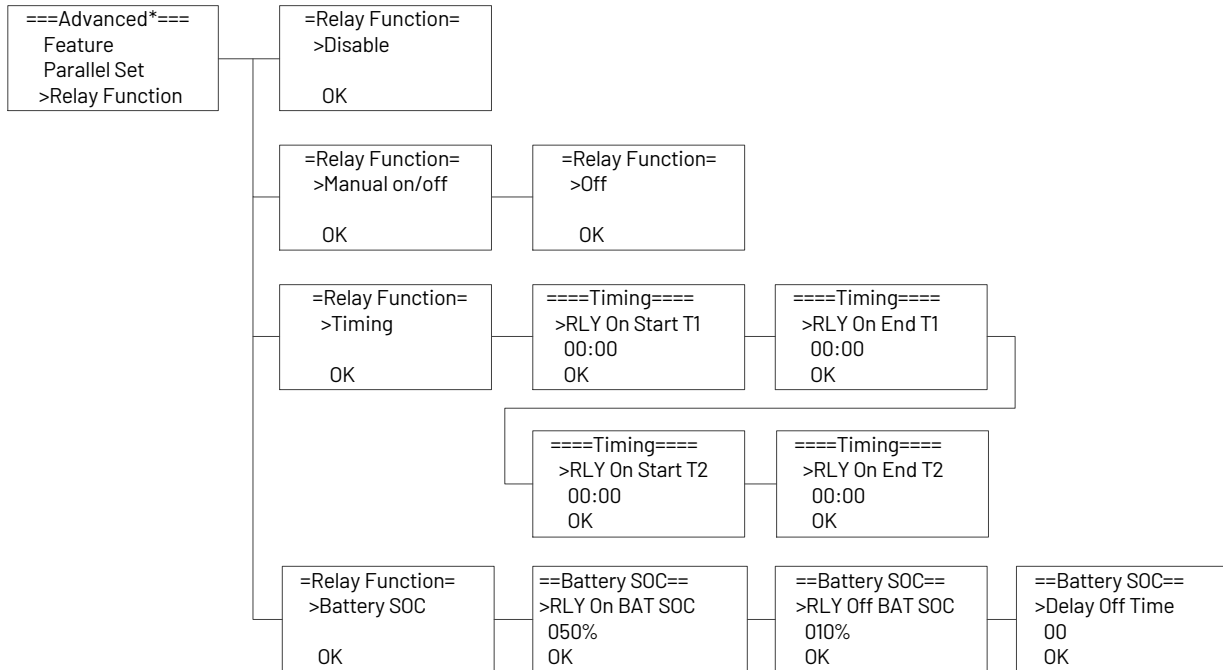
5) Battery

Press up or down button to set the parameters of battery. 'Eps BT Low Rec' means recovery enable switch when battery low capacity in EPS mode, 'Eps OL Rec SOC' means EPS overload due to low capacity for battery, if recovered, min soc. Press 'OK' to confirm.



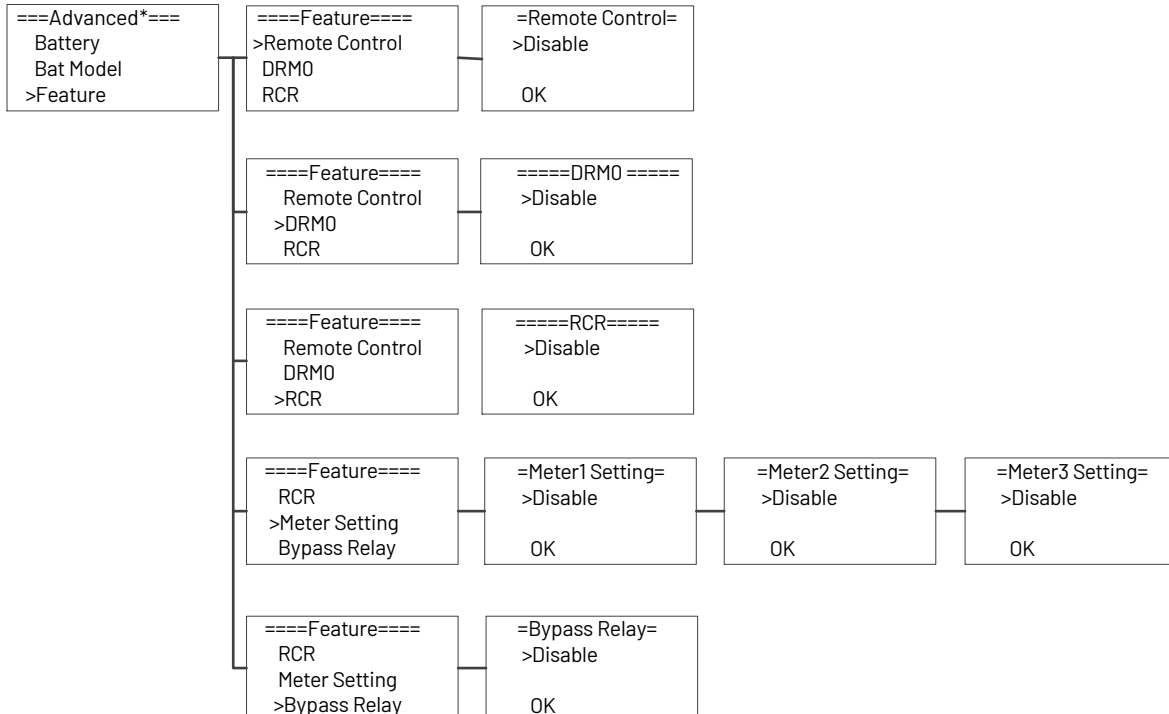
6) Relay Function

Press up or down button to set the relay function. Press 'OK' to confirm.



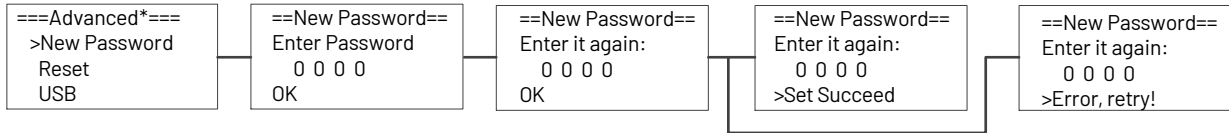
7) Feature

Press up or down button to enable or disable Remote Control, DRM0, RCR, Meter Setting, and Bypass Relay. Press 'OK' to confirm.



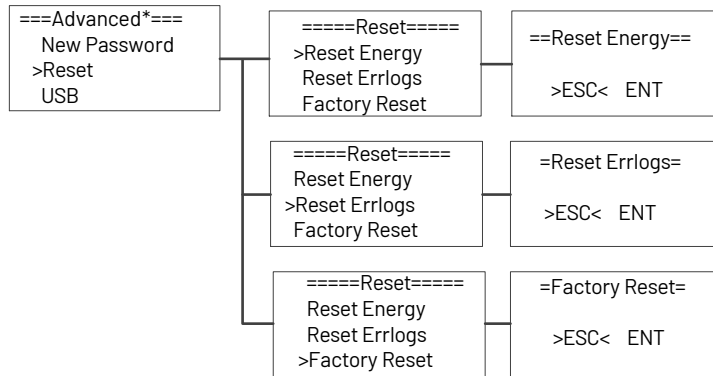
8) New Password

Press up or down button to set new password. Press 'OK' for more than 3 seconds to confirm.



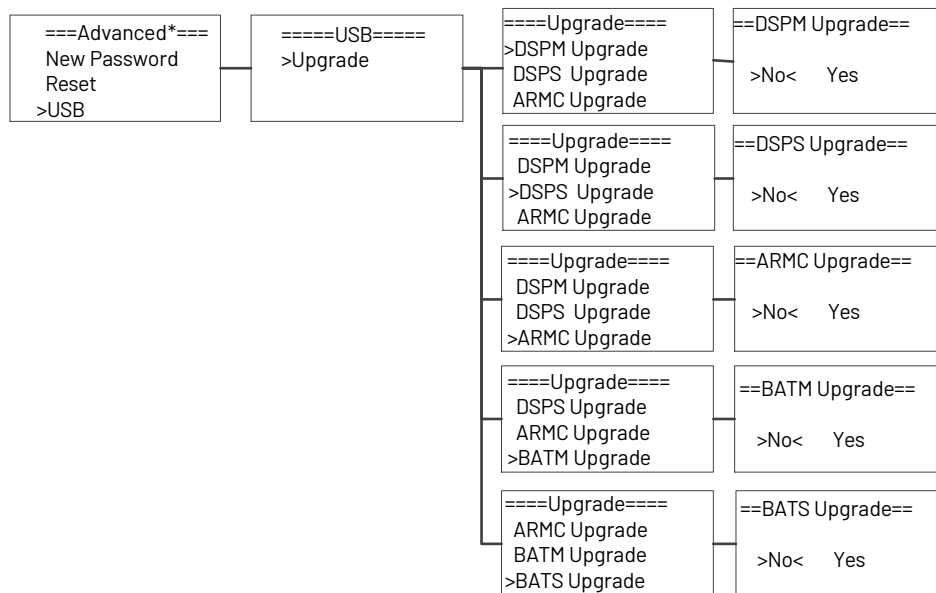
9) Reset

Press up or down button to reset energy, reset errors or factory reset. Press 'OK' to confirm.



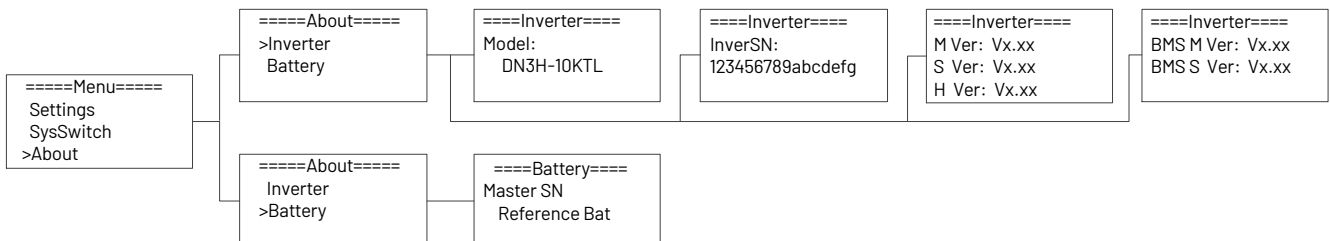
10) USB

Press up or down button to upgrade DSPM, DSPS, ARMC, BATM or BATS. Press 'OK' to confirm.



7.3.5 About

This interface shows the information of the inverter, such as series number and software version.

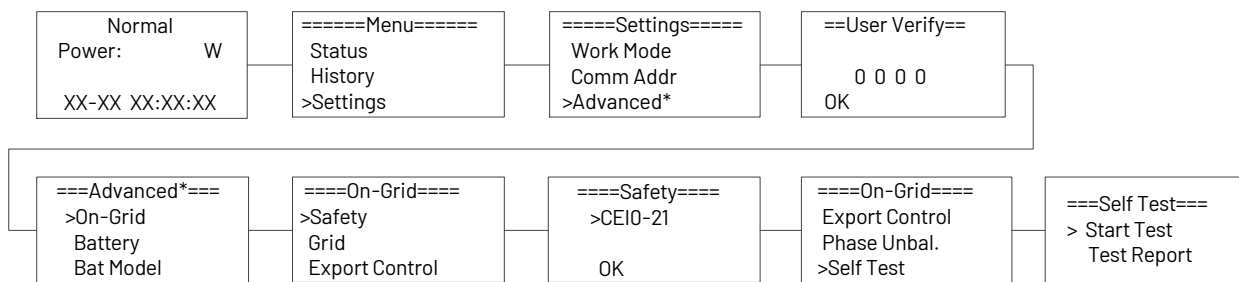


7.3.6 Self-Test in accordance with CEI 0-21 (Applies to Italy only)

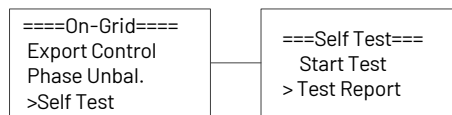
The self-test is only required for inverters, which are commissioned in Italy. The Italian standard requires that all inverters feeding into the utility grid are equipped with a self-test function in accordance with CEI 0-21. Please note that there is a self-test option only when the inverter selects CEI 0-21. During the self-test, the inverter will consecutively check the protection reaction times and values for overvoltage, under voltage, over frequency and under frequency. Self-test function is available at any time. It also allows end user get test reports shown on LCD display.

Note: Users need to set the inverter country to CEI 0-21 before testing.

Auto-Test from screen:



You can view the test report after the DN3H series has completed its self-test.



8. Parallel system

8.1 System introduction

In order to continuously deliver power to large loads in both on-grid and off-grid situations, the DN3H Series(5-10KTL) supports parallel connection. Parallel connection is divided into parallel connection in on-grid mode, which supports ten inverters in parallel, and parallel connection in off-grid mode, which supports five inverters in parallel. In system with multiple inverters, one can connect the devices in a Master/Slave configuration. In this configuration, only one energy meter is connected to the Master inverter for the system control. Users should set up the master/slave on the screen or App after the inverter is connected.



NOTE!

NOTE!

The hybrid inverters in parallel mode need to be of the same type, and the batteries connected to the inverters need to be of the same type, too.

- In on-grid mode, the system connection is schematically shown below:

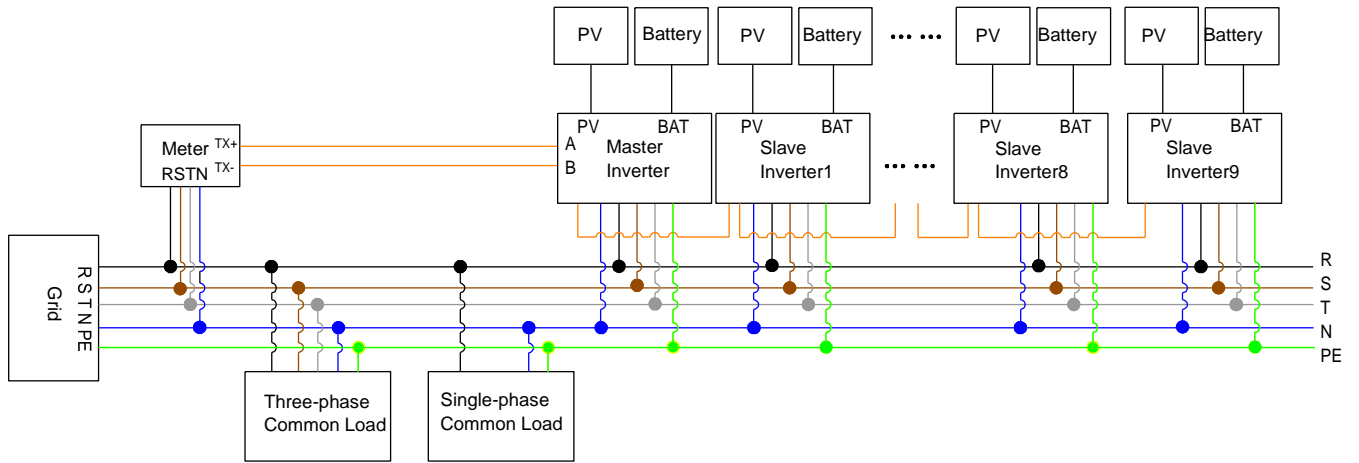


Figure 8-1 System Connection Diagram

- In off-grid mode, the system should connect a large changeover device to achieve parallel functions in any conditions. We recommend the EPS parallel box from Dunext. The system connection is schematically shown below:

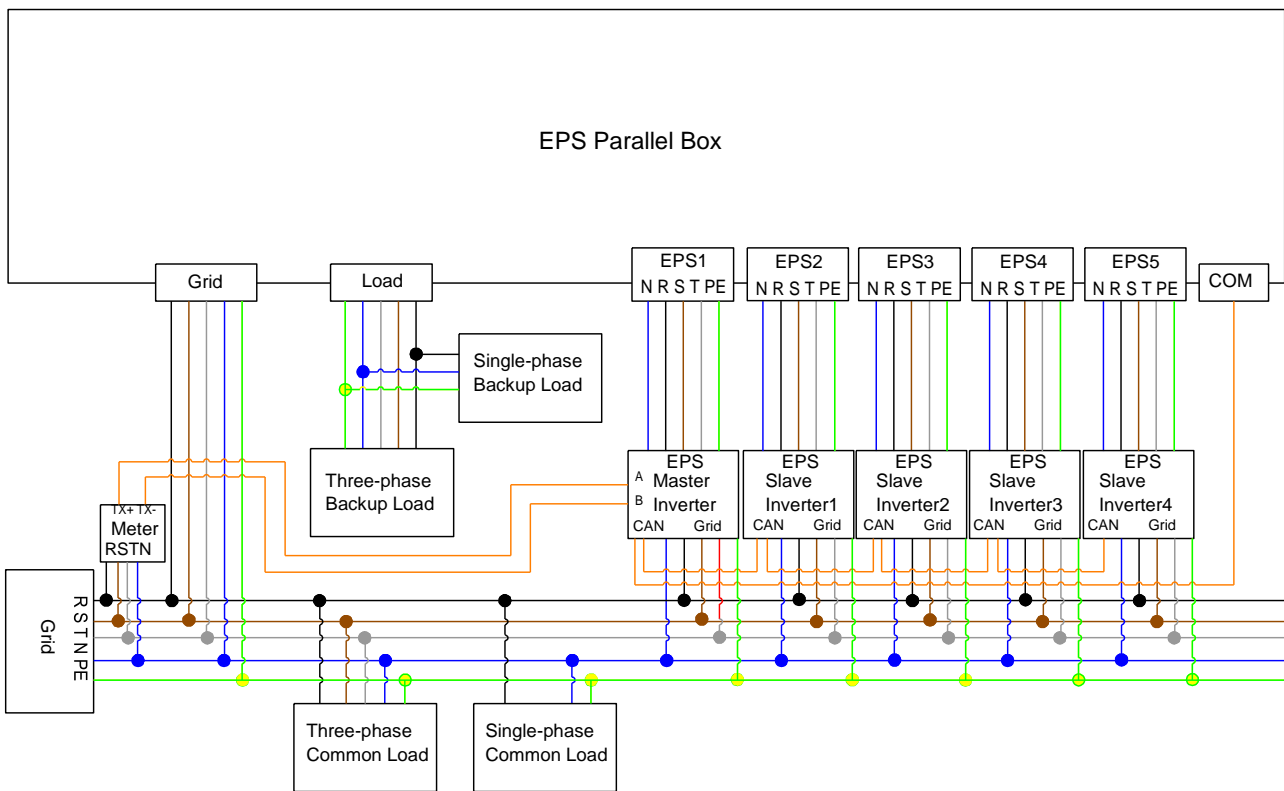


Figure 8-2 System Connection Diagram



NOTE!

In a parallel system, you need to plug the terminal resistance into the empty parallel port of the last inverter.

8.2 Work modes

There are three work modes in the parallel system, and your acknowledgment of different inverter's work modes will help you

understand the parallel system better.

- Single Mode: No one inverter is set as a "Master". All inverters are in single mode in the system.
- Master Mode: When one inverter is set as a "Master," this inverter enters master mode. The master mode can be changed to the single mode by LCD setting.
- Slave Mode: When one inverter is set as a "Master," all other inverters will enter slave mode automatically. Slave mode can not be changed from other modes by LCD setting.

8.3 Communication connection

- The communication connection between Master Inverter and meter:

Connect the meter "TX+" "TX-" to inverter RS485 A and B referring to the Section 5.7.5.

- The communication connection between the Master Inverter and the parallel box:

Insert one side of the CAT7 cable into the first inverter's Parallel port and the other side into the COM port of the parallel box.

- The communication connection between Inverters:

Insert one side of the CAT7 cable into the first inverter's CAN port and the other side into the next inverter's CAN port.

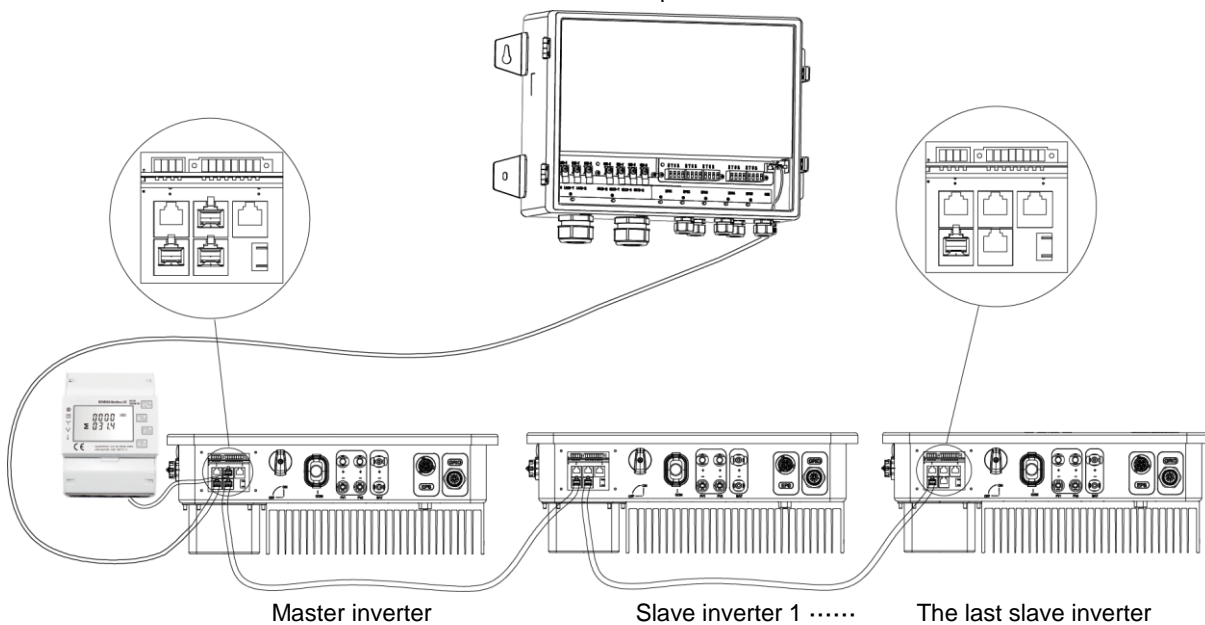


Figure 8-3



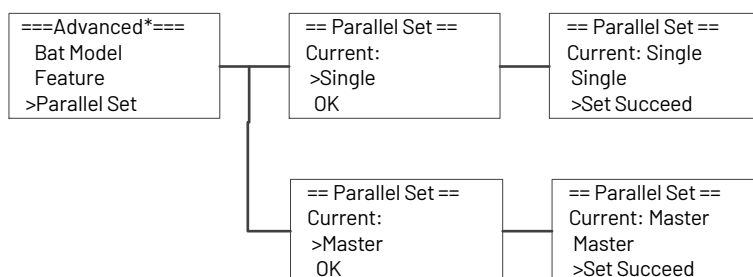
NOTE!

NOTE!

This schematic is an example of a parallel connection in off-grid mode, and the communication cable connection in on-grid mode is the same.

8.4 LCD setting

Users must turn the operation interface to "Advanced*". Press up or down button to set the parallel functional mode. Press 'OK' to confirm.



9. Troubleshooting and maintenance

9.1 Troubleshooting

This section contains information and procedures for solving possible problems with the DN3H Series(5-10KTL), and provides you with troubleshooting tips to identify and solve most problems that could occur with the DN3H Series(5-10KTL).

This section will help you narrow down the source of any problems you may encounter. Please read the following troubleshooting steps.

- Check the warning or fault messages on the System Control Panel or Fault codes on the inverter information panel. If a message is displayed, record it before doing anything further.
- Attempt the solution indicated in below table.

Fault	Cause	Solutions
HW Protect Fault	Inverter over-current, battery over-current, or PV over-current detected by hardware.	<ol style="list-style-type: none"> 1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
Grid Lost Fault	<ol style="list-style-type: none"> 1. Utility grid power fails. 2. The AC cable is disconnected, or the AC breaker is off. 	<ol style="list-style-type: none"> 1. The alarm is automatically cleared after the grid power supply is restored. 2. Check whether the AC cable is connected and the AC breaker is on.
Grid Volt Fault	<ol style="list-style-type: none"> 1. The grid voltage exceeds the permissible range, or the duration of high voltage exceeds the requirement of HVRT. 2. The grid voltage is lower than the permissible range, or the duration of low voltage exceeds the requirement of LVRT. 	<ol style="list-style-type: none"> 1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid voltage is within the permissible range.
Grid Freq Fault	<ol style="list-style-type: none"> 1. Utility grid exception. The actual grid frequency exceeds the requirement of the local grid standard. 2. Utility grid exception. The actual grid frequency is lower than the requirement of the local grid standard. 	<ol style="list-style-type: none"> 1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid frequency is within the permissible range.

Fault	Cause	Solutions
PV Volt Fault	PV voltage out of range.	Check the serial connection of the PV array. Make sure that the open circuit voltage of the PV string is not higher than the maximum operating voltage of the inverter.
Bus Volt Fault	Bus voltage out of range detected by hardware.	<ol style="list-style-type: none"> 1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
Bat Volt Fault	Battery voltage fault.	Check if the battery input voltage is within the normal range, then restart the system and confirm whether the fault persists.
Vgrid 10M Fault	The grid voltage is out of range for the last 10 Minutes.	<ol style="list-style-type: none"> 1. If the problem occurs occasionally, the utility grid may be abnormal temporarily. The inverter will recover automatically after detecting that the utility grid is normal. 2. If the problem occurs frequently, check whether the grid voltage is within the allowed range. <ul style="list-style-type: none"> • Contact the local power company if the grid voltage exceeds the permissible range. • Modify the grid overvoltage rapid protection threshold after obtaining the consent of the local power company if the grid voltage is within the permissible range.
DCI OCP Fault	DC component is out of limit in output current.	<ol style="list-style-type: none"> 1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
DCV OVP Fault	DC component is out of limit in output voltage.	
SW OCP Fault	Output current high detected by software.	
RC OCP Fault	The residual current is high.	<ol style="list-style-type: none"> 1. If the problem occurs occasionally, it may be caused by a cable exception. The inverter will recover automatically after the problem is solved. 2. Check whether the impedance between the PV string and PE is too low if the problem occurs frequently or persists.
Iso Check Fault	<ol style="list-style-type: none"> 1. The PV string is short-circuited to PE. 2. The PV system is in a moist environment and the cable is not well insulated to the ground. 	<ol style="list-style-type: none"> 1. Check whether the resistance of the PV string to PE exceeds 50kΩ. If no, check the short circuit point. 2. Check whether the PE cable is connected correctly.
Temp Over Fault	The inverter temperature is high.	Check the ventilation and the ambient temperature at the installation point. If the ventilation is poor or the ambient temperature is too high, improve the ventilation and heat dissipation.
BatConDir Fault	The battery connection is reversed.	1. Check if the positive pole and negative pole of

Fault	Cause	Solutions
		battery are correctly connected. 2. Contact the dealer or the after-sales service if the problem persists.
AD Sample Fault	The sampling value between the main and slave DSP is inconsistent.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
EPS Over Load	EPS over load.	1. Check the EPS load to ensure it does not exceed the inverter EPS Rated Power. 2. Disconnect the AC output switch and DC input switch & battery switch, then connect them 5 minutes later.
EPS OCP	EPS over current.	1. Check the EPS load to ensure it does not exceed the inverter EPS Rated current. 2. Disconnect the AC output switch and DC input switch & battery switch, then connect them 5 minutes later.
PLL Error	PLL Error.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
Parallel Fault	Inverter parallel connection fault.	1. Check if the parallel wiring is correct. 2. Check the inverter setting, ensure that only one inverter was set to "Master".
Bat Low Fault	Battery SOC is too Low.	1. Wait the battery to be recharged. 2. Disconnect the AC output switch and DC input switch, then connect them 5 minutes later. Contact the dealer or the after-sales service if the problem persists.
Ground Conn.	Inverter grounding issue.	1. Check whether the PE cable of the inverter is connected properly. 2. Check whether the L cable and N cable are connected reversely if output of the PV string is grounded.
BMS Lost	The communication between BMS and Inverter is interrupted.	Check if the communication cable between BMS and inverter is connected correctly.
Other Dev Fault	Other device fault.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the
M/S DspCommFault	The communication between master and slave is fault.	

Fault	Cause	Solutions
Fan Fault	Internal fan Device failure.	problem persists.
HCT Fault	AD sampling failure.	
Inv EEPROM Fault	DSP EEPROM failure.	
RCD Fault	Leakage current detection circuit fault.	
EPS Relay Fault	1. The relay is abnormal or short-circuited. 2. The control circuit is abnormal. 3. The AC cable connection is abnormal, like a virtual connection or short circuit.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
Grid Relay Fault		
Byps Relay Fault		
HMI EEPROM Fault	HMI eeprom failure.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
Meter1 Lost Fault	The communication between smart meter1 and Inverter is interrupted.	1. Check if the communication cable between smart meter and Inverter is connected correctly. 2. Check if the smart meter is powered on.
Meter2 Lost Fault	The communication between smart meter2 and Inverter is interrupted.	
Meter3 Lost Fault	The communication between smart meter3 and Inverter is interrupted.	
Dsp Lost Fault	The communication is fail between ARM and master DSP.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
BMS AD_AFE Fault	The difference between the total voltage of battery AD and AFE is too large.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
BMS Tepr Fault	Battery temperature sensor fault.	
BMS InCom Fault	Battery internal communication fault.	Disconnect battery, check wiring between inverter and battery, battery internal wiring then reconnect.
BMS PreChg Fault	Battery pre charge fault.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
BMS Relay Fault	The battery relay is fault.	
BMS Cell Fault	Battery cell error.	
BMS Other Fault	Other battery fault.	
BMS Protect OV	Battery over voltage protection.	
BMS Protect LV	Battery under voltage protection.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
BMS Protect ChgOC	Battery over current charging protection.	
BMS Protect DsgOC	Battery over current discharging protection.	
BMS Prot TemHigh	Battery temperature is high.	
BMS Prot TemLow	Battery temperature is low.	

Fault	Cause	Solutions
BMS Volt Fault	Battery voltage sensor fault.	1. Disconnect the AC output switch, DC input switch & battery switch, then connect them 5 minutes later. 2. Contact the dealer or the after-sales service if the problem persists.
BMS OutCom Fault	BMS external communication fault.	
BMS ISO Fault	Battery insulation test failed.	
BMS Check Fault	Battery self-test failed.	
BMS Prot TemDiff	The difference in battery cell temperature is too large.	
BMS Prot AD_AFE	The difference between the total voltage of battery AD and AFE is too large, triggering protection.	
BMS Prot Hard OC	Battery hardware overcurrent protection.	

Remark

If you find the inverter has serious problems, including but not limited to the above content, please call Dunext dealer or the after-sales service. Please provide the following information to service@dunext.com for better service.

- 1) Customer Name
- 2) Contact Info
- 3) Project Name and Location
- 4) Project Scale
- 5) Quantity of Faulty Inverters
- 6) Problem Description
- 7) Inverter Model
- 8) Inverter SN

9.2 Maintenance

Inverters generally do not need any daily or routine maintenance. Heat sink should not be blocked by dust, dirt or any other items. Before the cleaning, make sure that the DC switch is turned off and the circuit breaker between inverter and electrical grid is turned off. Wait at least for 5 minutes before the cleaning.

During the process of using the inverter, the manager shall examine and maintain the machine regularly. The concrete operations are as follows.

- 1: Check that if the cooling fins on the rear of house are covered by dirty, and the machine should be cleaned and absorbed dust when necessary. This work shall be check time to time.
- 2: Check that if the indicators of the inverter are in normal state, check if the keys of the inverter are in normal state, check the display of the inverter is normal. This check should be performed at least every 6 months.
- 3: Check that if the input and output wires are damaged or aged. This check should be performed at least every 6 months.
- 4: You should keep the inverter panels clean and their security checked at least every 6 months.

• Inverter cleaning

Please clean the inverter with an air blower, a dry & soft cloth or a soft bristle brush. Do not clean the inverter with water, chemicals, detergent, etc.

• Heat sink cleaning

For the long-term proper operation of inverters, ensure there is enough space around the heat sink for ventilation, check the heat sink for blockage (dust, snow, etc.) and clean them if they exist. Please clean the heat sink with an air blower, a dry & soft cloth or a soft bristle brush. Do not clean the heat sink with water, corrosive chemicals, detergent, etc.

10. Decommissioning

10.1 Dismounting inverter

Before dismounting the inverter, ensure you have powered off it as described in section 6.2.

- Disconnect the PV, AC, battery, and communication cables.
- Disconnect the PE cable.
- Remove the fixing screws between the inverter and the bracket.
- Remove the inverter from the bracket.
- Remove the mounting bracket.

10.2 Packing

If possible, please pack the inverter in the original packaging.

If it is no longer available, you can also use an equivalent carton that meets the following requirements.

- Suitable for loads more than 27kg.
- With handle.
- Can be fully closed.

10.3 Storage

Store the inverter in dry place where ambient temperatures are always between -40°C (-40°F) ~ $+70^{\circ}\text{C}$ ($+158^{\circ}\text{F}$).

10.5 Disposal

When the inverter or other related components need to be disposed of, have it carried out according to local waste handling regulations. Please be sure to deliver wasted inverters and packing materials to a certain site where the relevant department can dispose of and recycle them.



Innovate for a Green Future

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