Lesson 1 – Hybrid inverter overview

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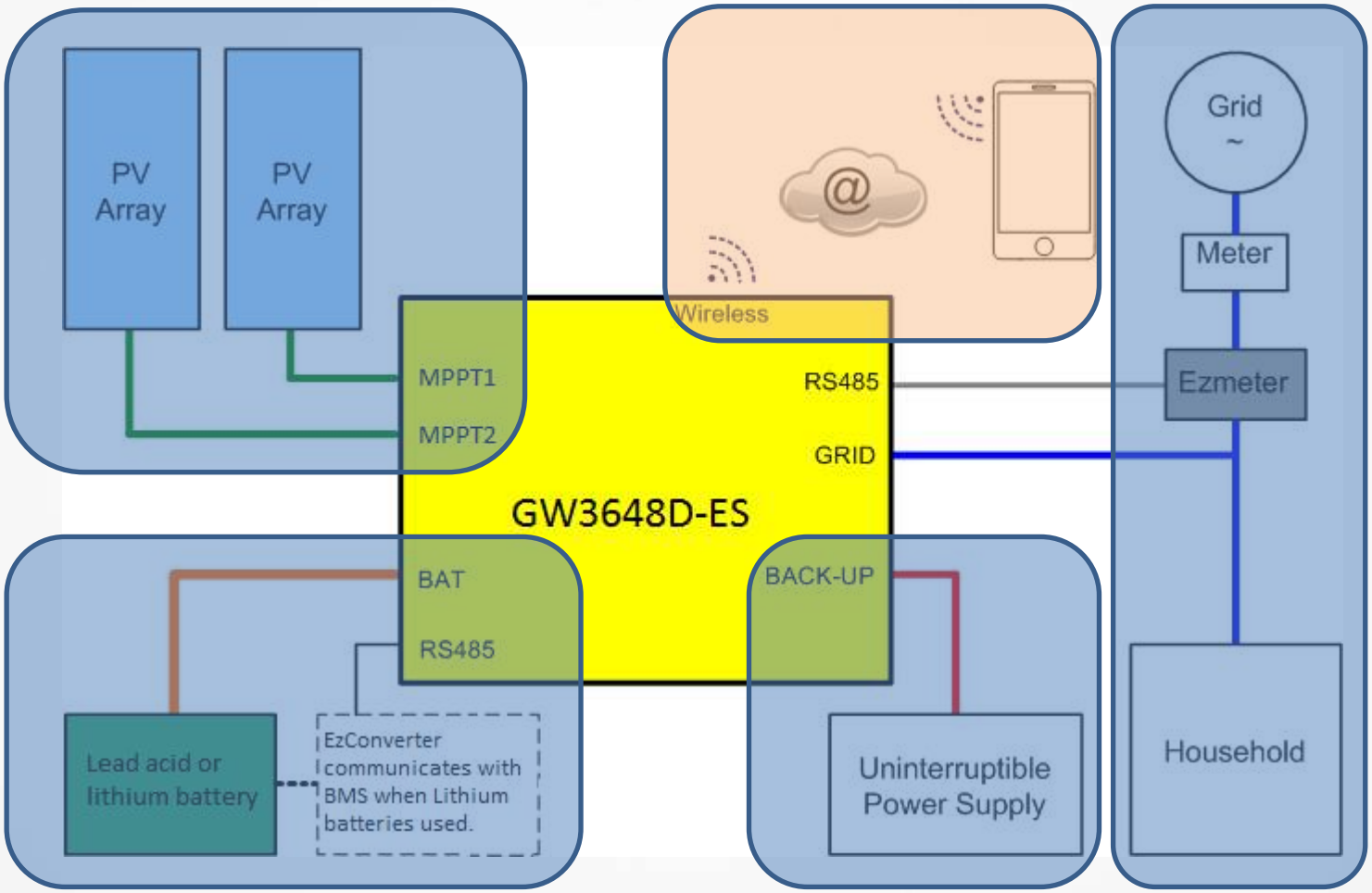
Key features

- Grid-interactive or grid-independent
- Compatible with both Lead-acid and Li-Ion battery
- Charge controller and inverter integrated
- Intelligent battery management function
- Automatic back-up power supply
- Limit the power exported to the grid
- App controlled
- Data monitoring on portal and Apps

Lesson 1 – Hybrid inverter overview

❑ Block diagram of ES series

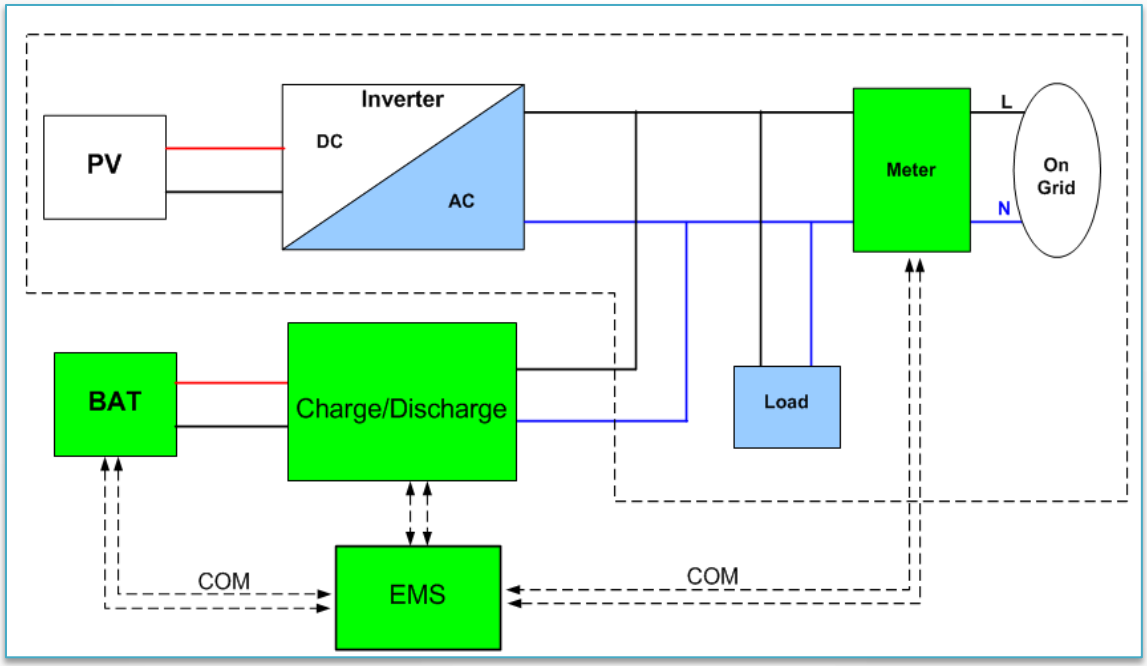


Lesson 1 – Hybrid inverter overview

❑ ES System Development Background

Traditional Energy Storage Solutions:

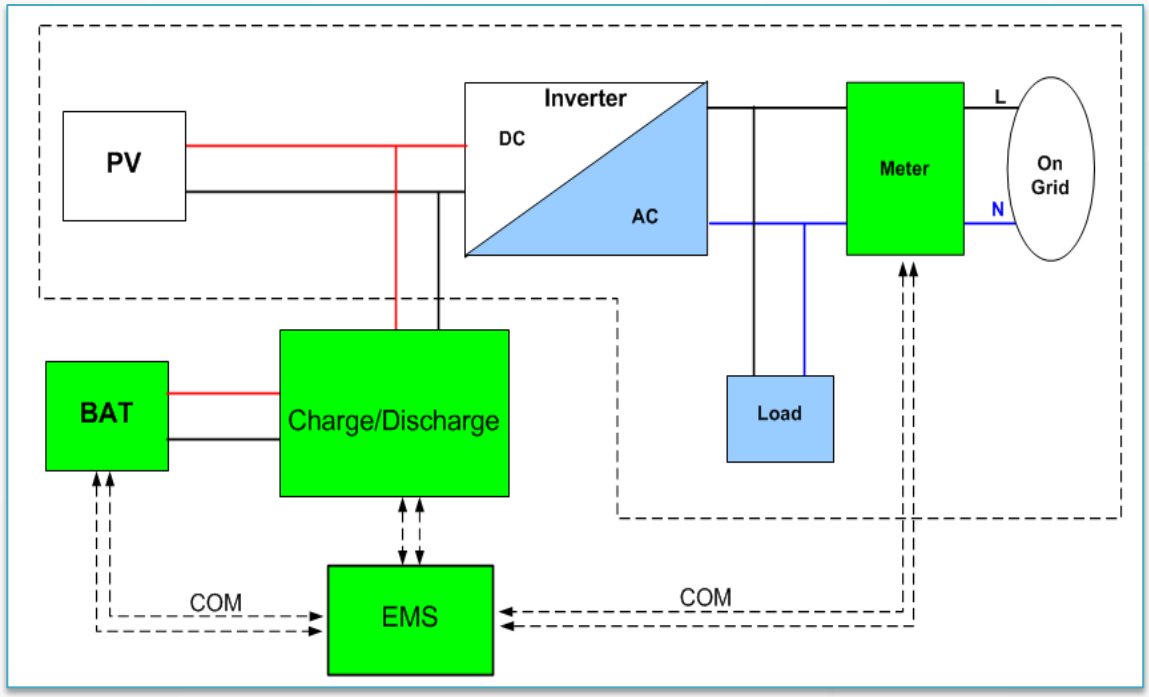
Common AC BUS system comprises the following additional equipment: BAT, EMS, Charge-Discharge Controller and Meter.



Lesson 1 – Hybrid inverter overview

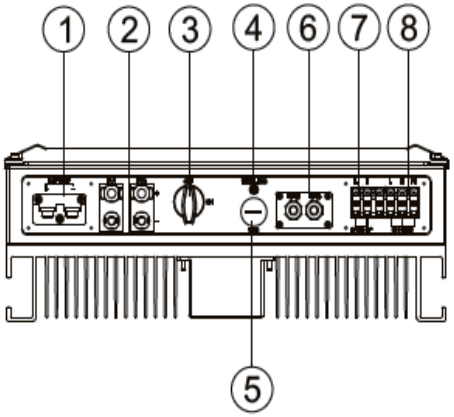
❑ ES System Development Background

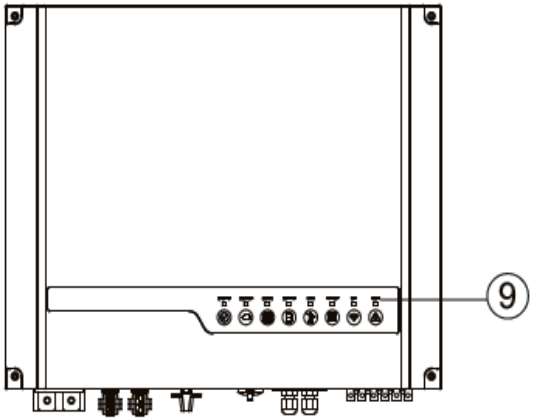
The GoodWe Solution: Common DC BUS system, which is compatible with most inverters in the market, also with lower cost, higher efficiency and easy installation.
We introduce you GoodWe ES series inverter.



Lesson 1 – Hybrid inverter overview

❑ ES function identification

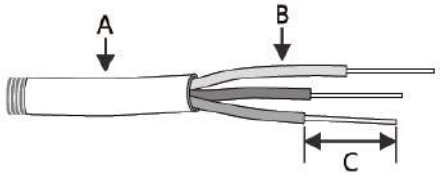




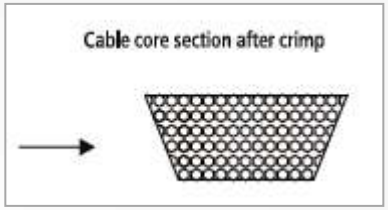
1. Battery input terminals
2. PV input terminals
3. DC Switch (Optional)
4. Wi-Fi antenna port
5. USB port
6. RS-485 port
7. Back-Up port
8. On-Grid port
9. LED lights

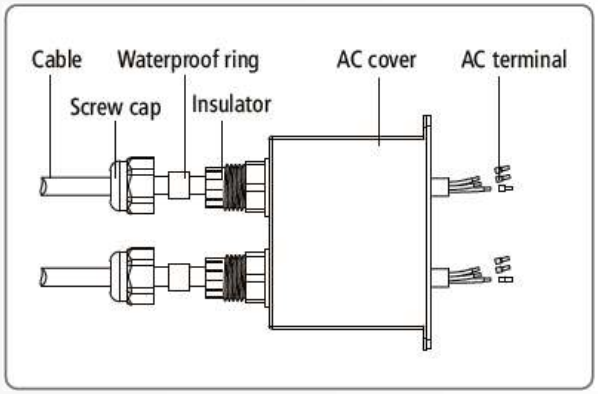
Lesson 1 – Hybrid inverter overview

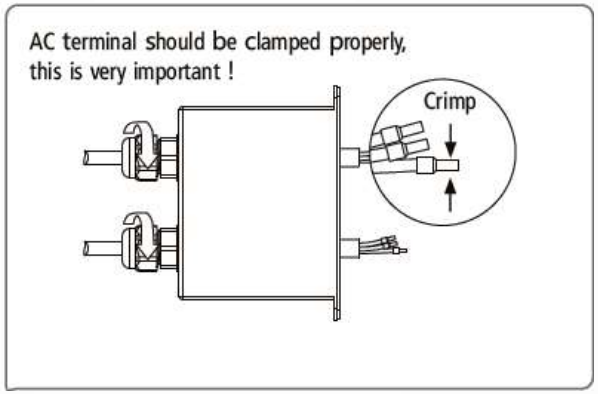
❑ AC Terminal connection

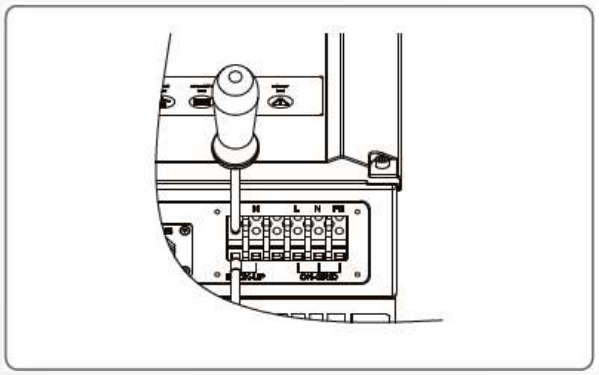


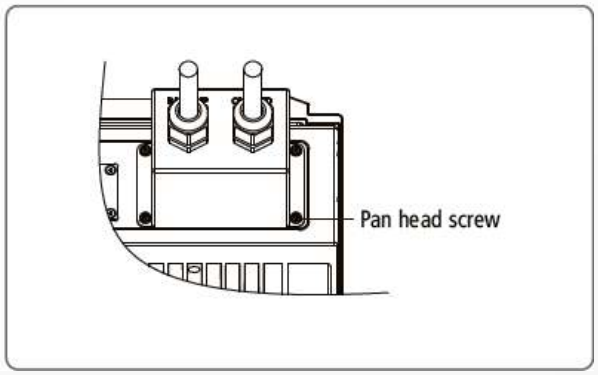
Grade	Description	Value
A	O.D.	11~12mm
B	Conductor Material Sectional Area	6mm²
C	Bare Wire Length	10mm around





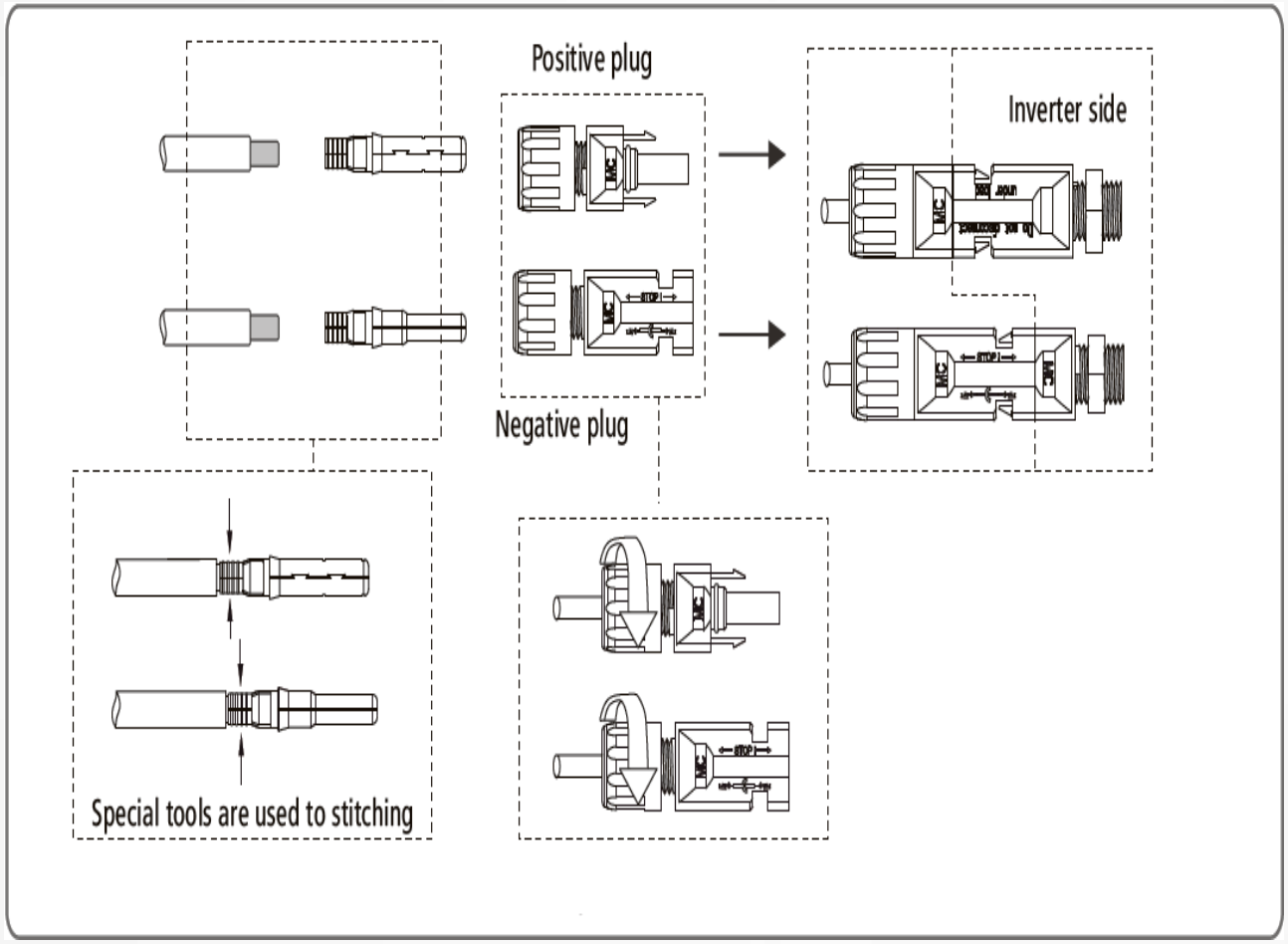






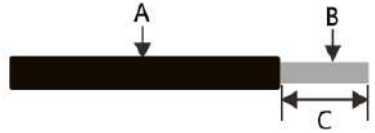
Lesson 1 – Hybrid inverter overview

❑ PV Terminals Connection

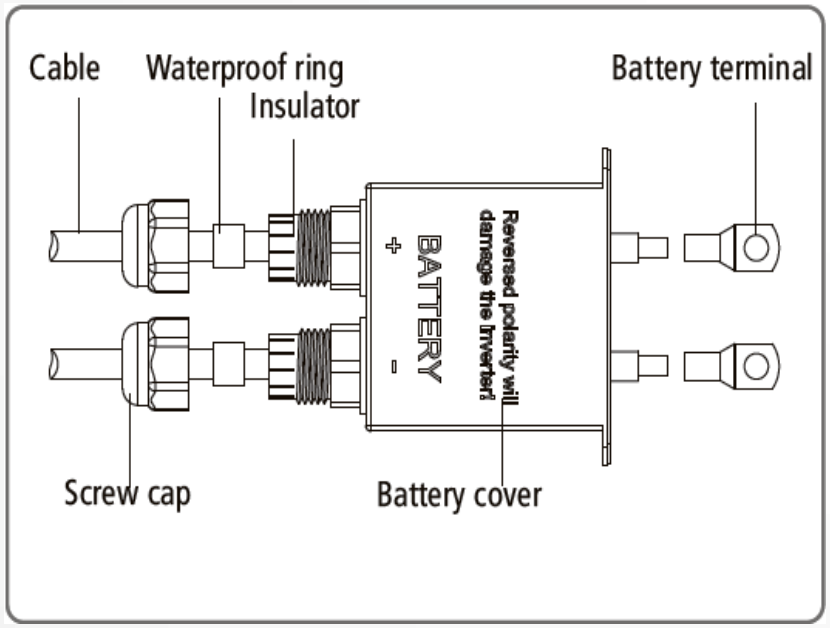


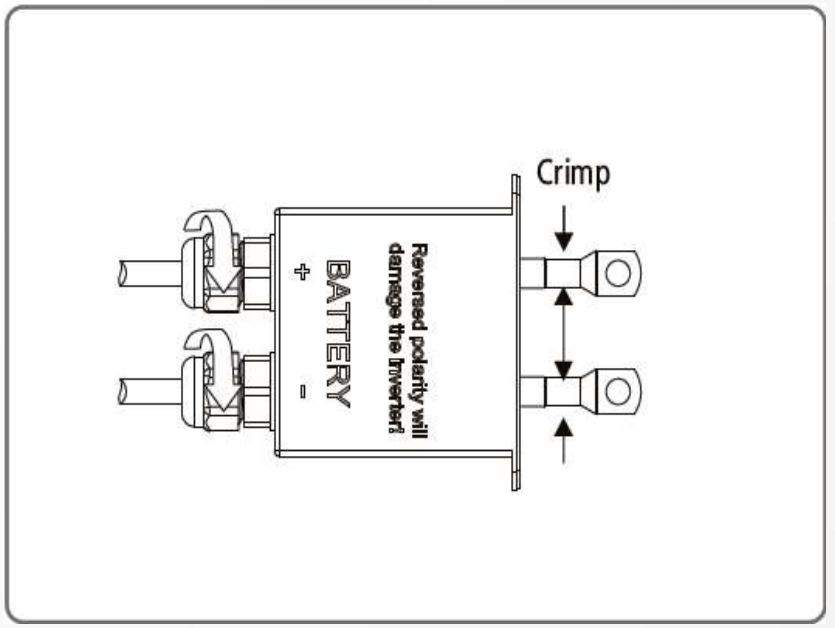
Lesson 1 – Hybrid inverter overview

❑ Battery Terminals Connection



Grade	Description	Value
A	O.D.	10~12mm
B	Conductor Material Sectional Area	20~25mm²
C	Bare Wire Length	10mm around





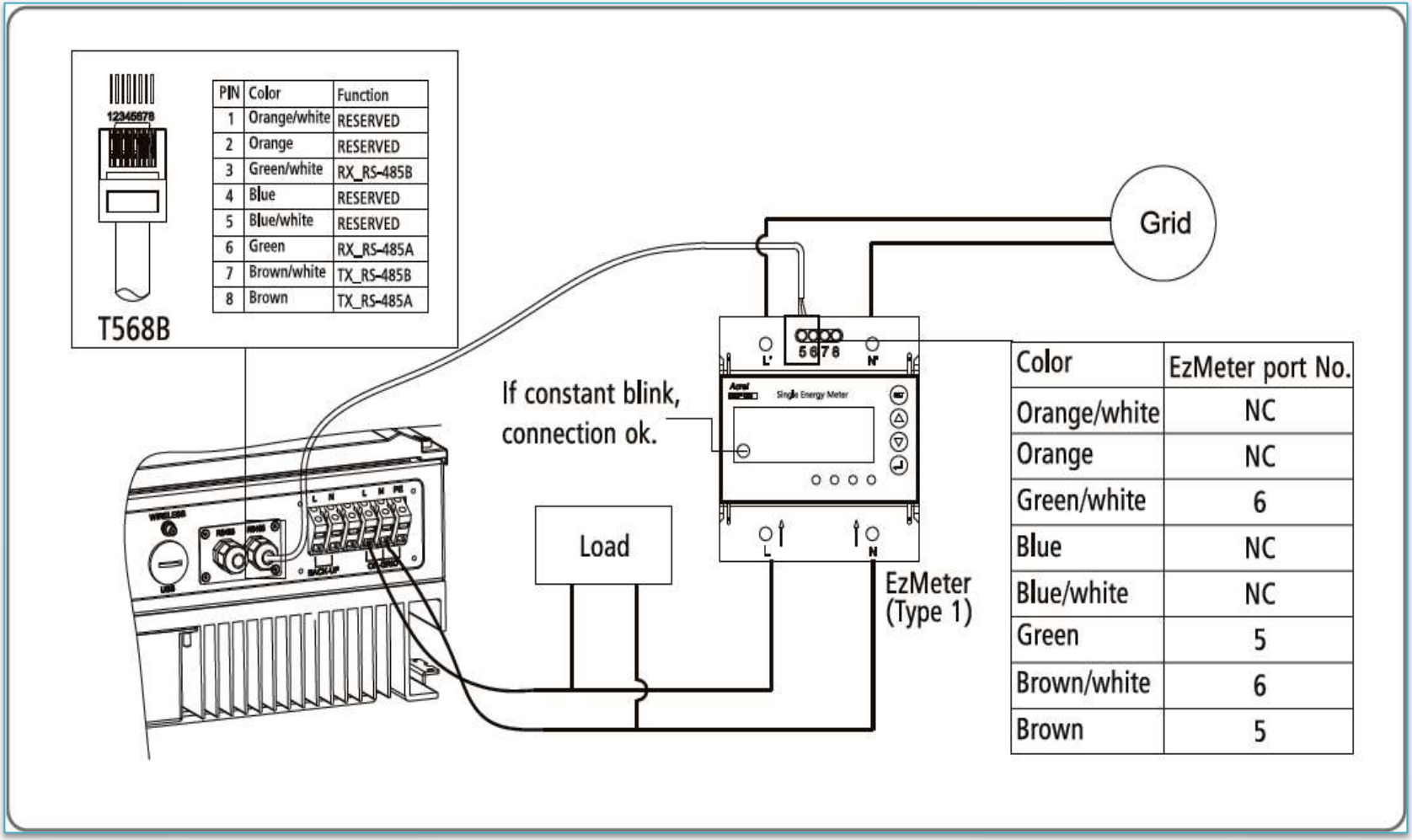
Lesson 1 – Hybrid inverter overview

❑ EzMeter

- Standard accessory with the inverter.
- Controls energy exported to the grid and the work modes of the Energy Storage system.
- Communicates with the ES inverter via a RS485 cable.
- Meter reading NOT used, treat this device as a Black Box.
- LED on the bottom left blinks to indicate the system is running.

Lesson 1 – Hybrid inverter overview

❑ EzMeter connection



Lesson 1 – Hybrid inverter overview

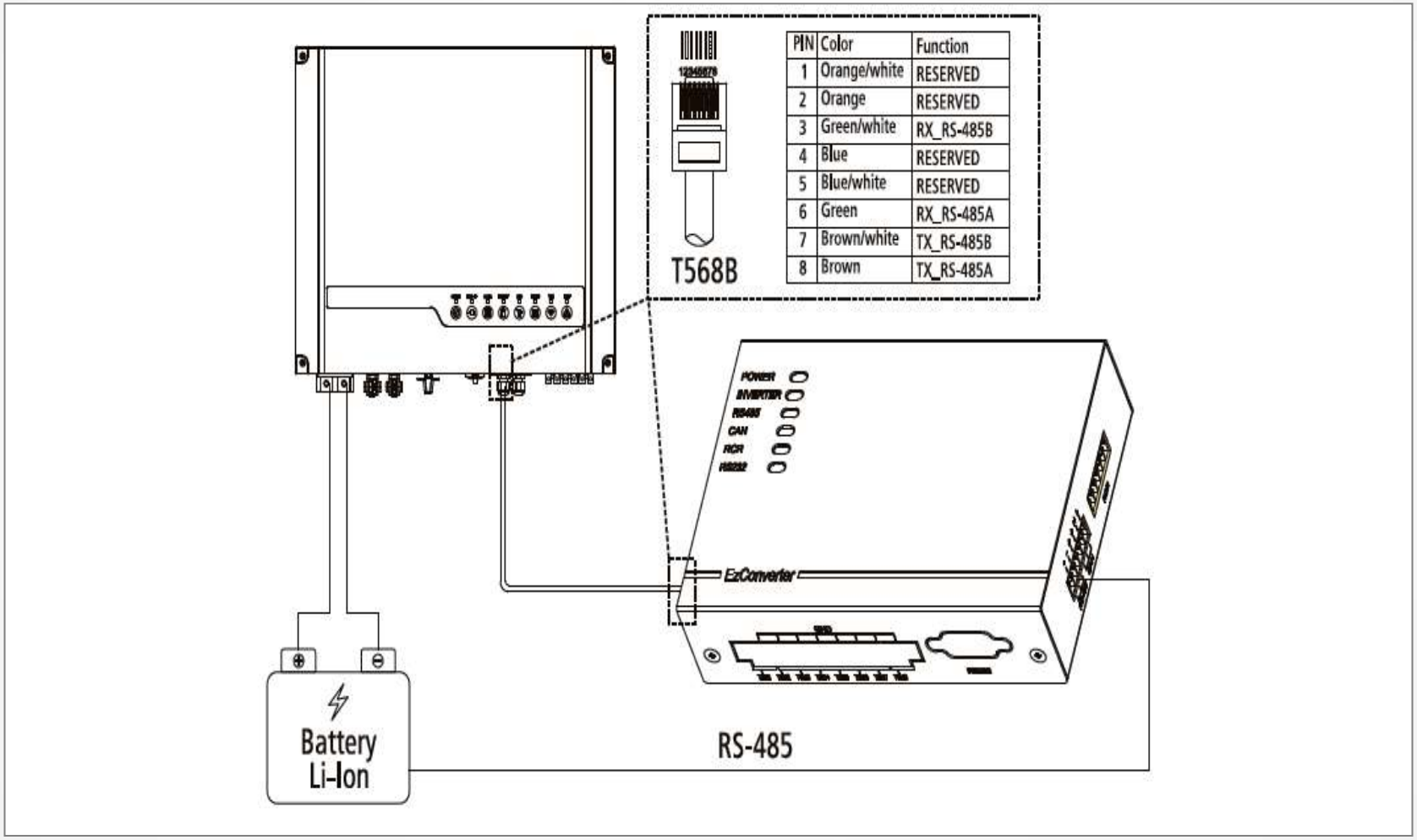
❑ EzConverter

- If a lithium battery is connected to the ES system, the EzConverter should be configured.
- Inverter and EzConverter communicate via RS485.
- 3 types of battery protocol supported.
  - ❑ RS485
  - ❑ CAN
  - ❑ RS232
- Choose corresponding dial-up circuit of lithium battery, please refer to table below to dial-up protocol comparison.

Switch State					Function
Switch 1	Switch 2	Switch 3	Switch 4	Switch 5	
OFF	OFF	OFF	OFF	OFF	Reserved
OFF	ON	ON	ON	ON	BMS communication protocol for Alpha lithium battery

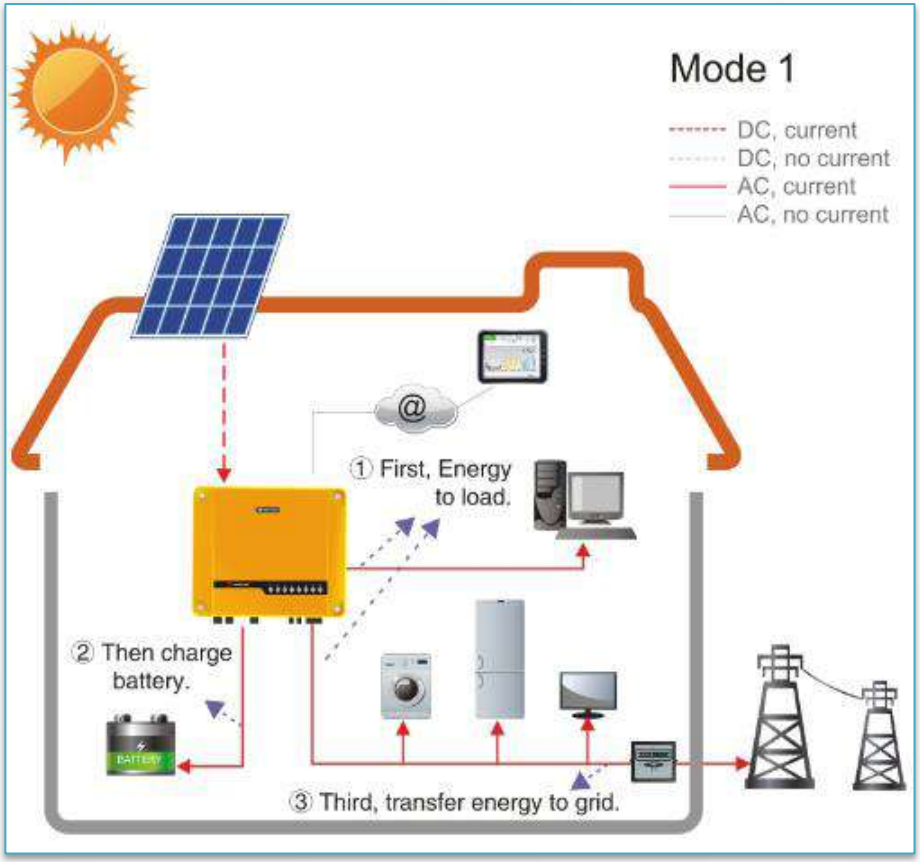
Lesson 1 – Hybrid inverter overview

❑ EzConverter connection with Lithium battery RS485



Lesson 2 – Six work modes

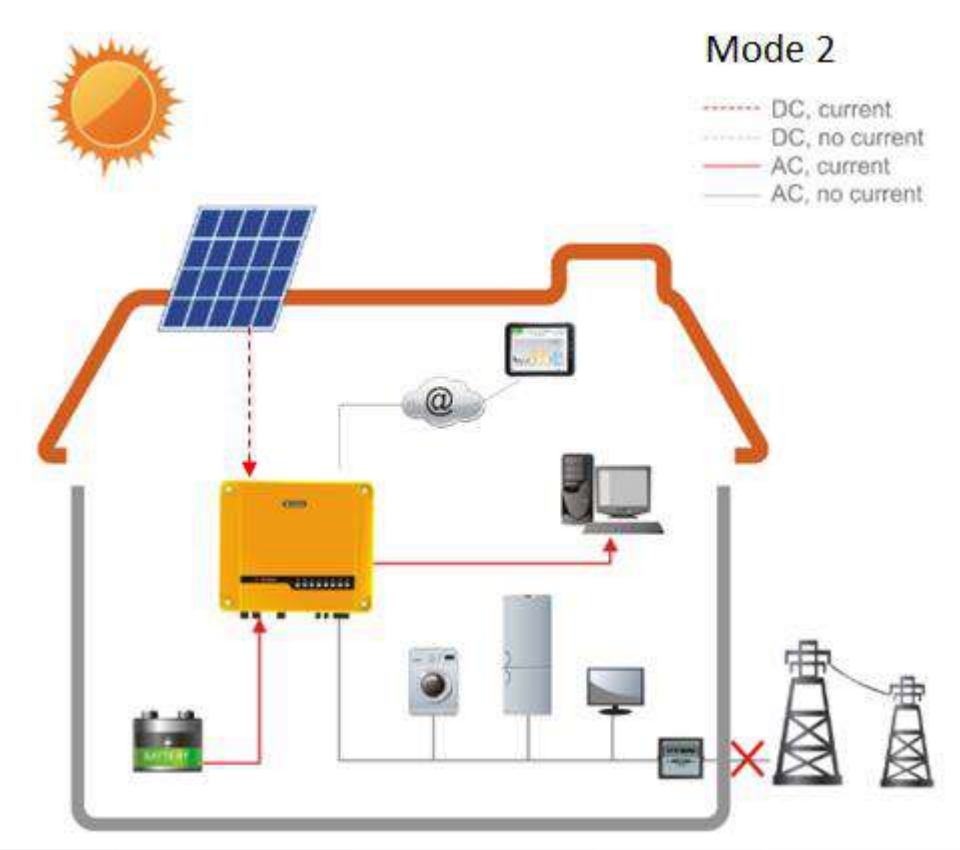
Lesson 2 - Six Work Modes



Mode 1
Condition: PV ON; Peak Generation

Energy produced by the PV system is for self-consumption optimization. Solar energy will firstly support the load, secondly it will charge the battery and finally export to the grid or draw from the grid, if the load demands more energy.

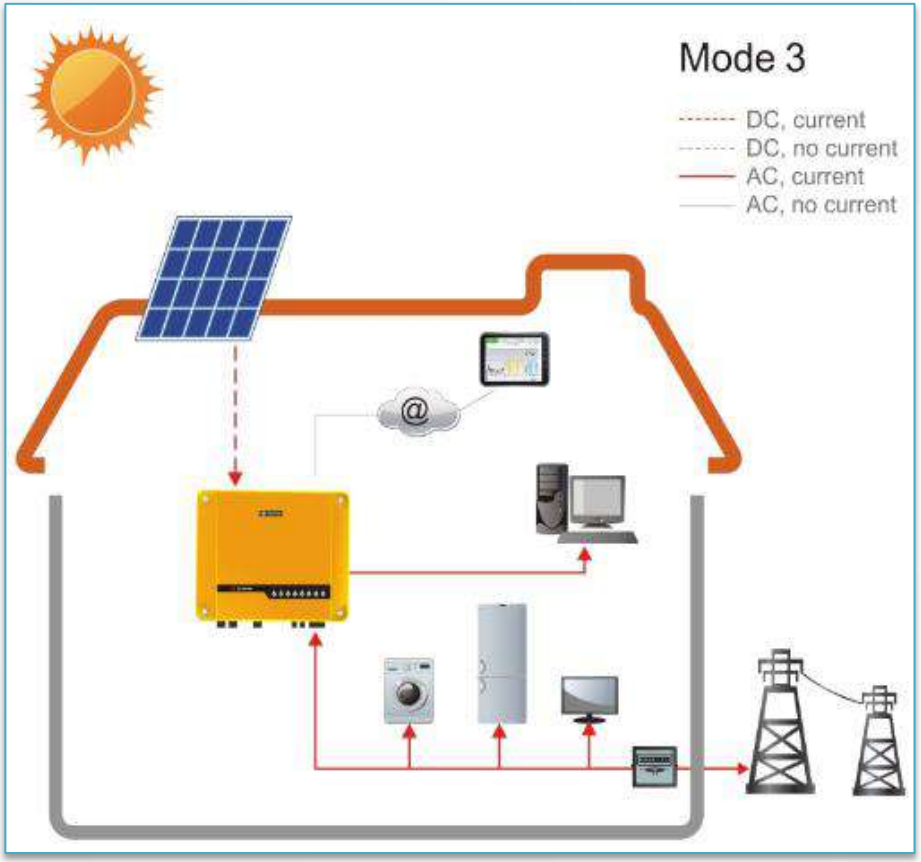
Six Work Mode



Mode 2
Condition: Day time, grid fails

The system **automatically** switches to back-up mode. Solar energy will first support the load connected to the back-up side. If more energy is generated, it will be used to charge the battery.

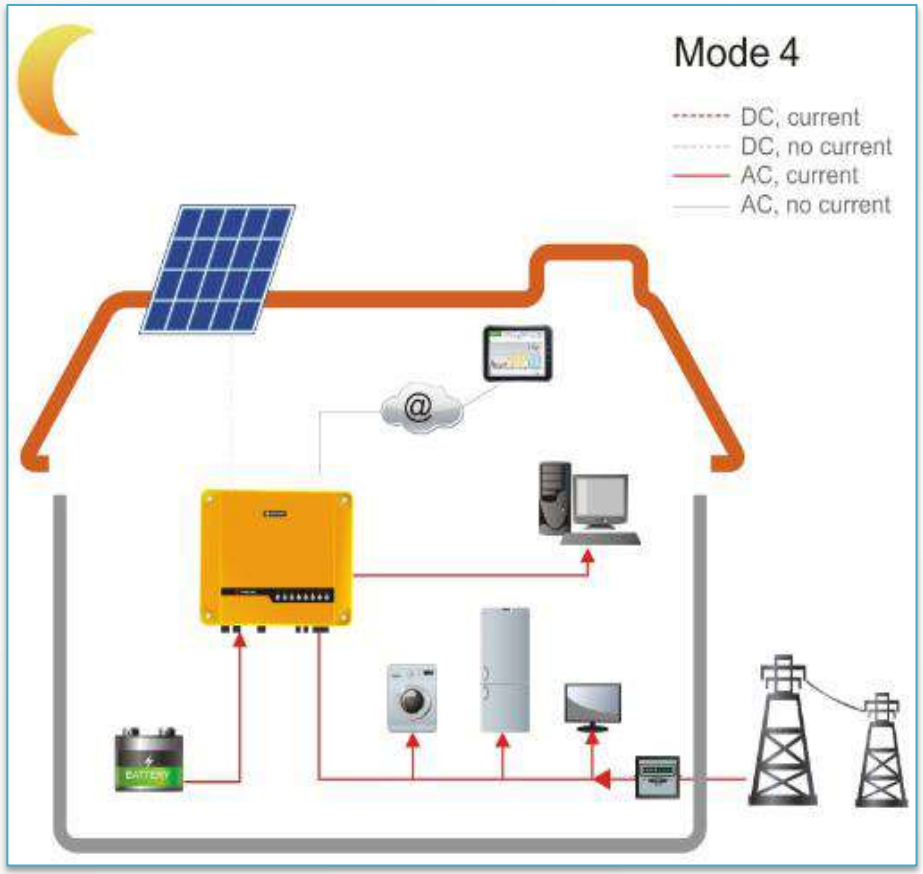
Lesson 2 - Six Work Modes



Mode 3
Condition: System without Battery

Solar energy will first support the load, excess power will be exported to the grid. If generation level is too low, power will be imported from the grid.

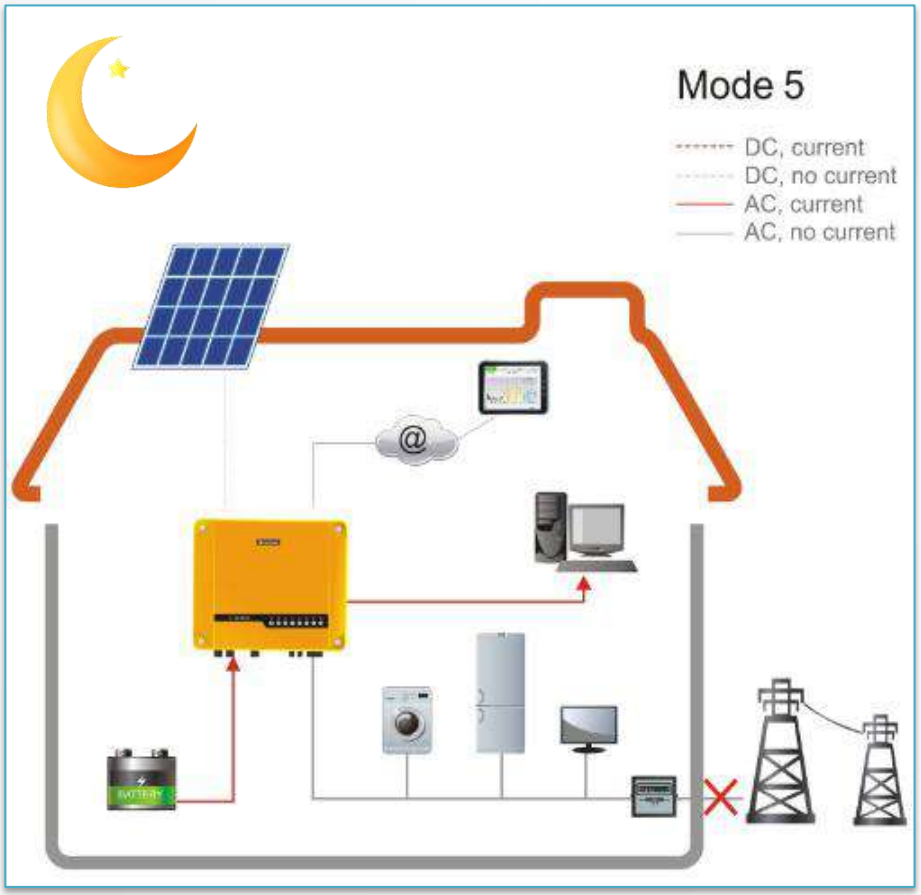
Lesson 2 - Six Work Modes



Mode 4
Condition: Night-time

ES inverter will discharge the battery to support the load. If battery stored energy is not enough, the rest of the power will be supplied from the grid.

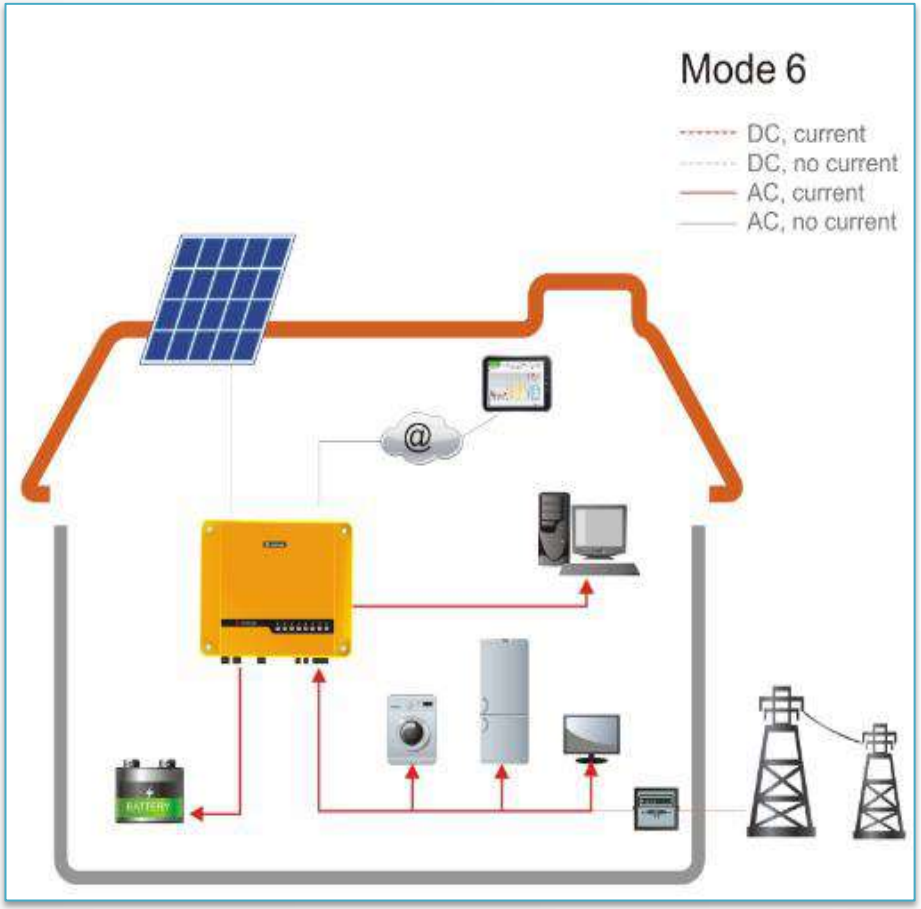
Lesson 2 - Six Work Modes



Mode 5
Condition: Night time, grid fails

Once the grid fails, the system automatically switches to back-up mode. ES inverter will discharge the battery to support the load.

Lesson 2 - Six Work Modes



Mode 6
Condition: Use as UPS

If the customer wants to use the system as UPS, the inverter can also be set to charge the battery by the grid.