



WEEE Number: 80133970

INSTRUCTION MANUAL

HYBRID SOLAR INVERTER SINGLE PHASE



INTRODUCTION

Thank you for selecting and buying V-TAC Product. V-TAC will serve you the best. Please read these instructions carefully & keep this user manual handy for future reference. If you have any another query, please contact our dealer or local vendor from whom you have purchased the product. They are trained and ready to serve you at the best.



Multi-Language Manual QR CODE

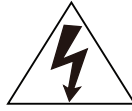
Please scan the QR code to access the manual in multiple languages.

WARNING

1. Please make sure to turn off the power before starting the installation.
2. Installation must be performed by a qualified electrician.



This marking indicates that this product should not be disposed of with other household wastes.



Caution, risk of electric shock.



- Danger to life due to high voltages in the inverter!
- All work must be carried out by qualified electrician.
- The appliance is not to be used by children or persons with reduced physical sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children should be supervised to ensure that they do not play with the appliance.
- Danger of burn injuries due to hot enclosure parts!
- During operation, the upper lid of the enclosure and the enclosure body may become hot.
- Only touch the lower enclosure lid during operation.
- Possible damage to health as a result of the effects of radiation!
- Do not stay closer than 20 cm to inverter for any length of time.
- Ensure input DC voltage \leq Max. DC voltage.
- Over voltage may cause permanent damage to inverter or other losses, which will not be included in warranty
- Authorized service personnel must disconnect both AC and DC power from inverter before attempting any maintenance or cleaning or working on any circuits connected to inverter.



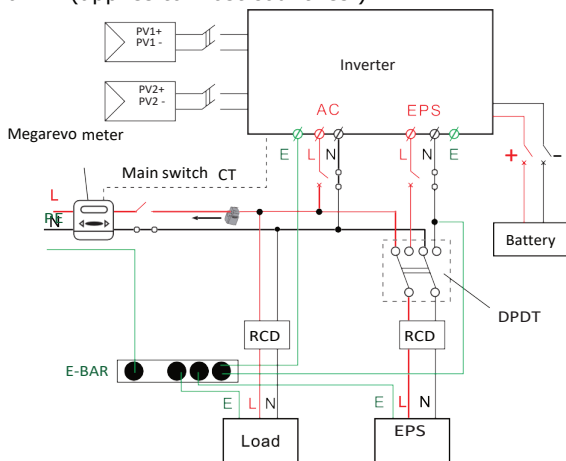
- Grounding the PV generator.
 - Comply with the local requirements for grounding the PV modules and the PV generator. It is recommended connecting the generator frame and other electrically conductive surfaces in a manner which ensures continuous conduction and ground these in order to have optimal protection of system and persons.
-

- Accessories only together with the inverter shipment are recommended here. Other wise may result in a risk of fire, electric shock, or injury to person.
 - Make sure that existing wiring is in good condition and that wire is not undersized.
 - Do not disassemble any parts of inverter which are not mentioned in installation guide. It contains no user-serviceable parts. See Warranty for instructions on obtaining service.
 - Attempting to service the inverter yourself may result in a risk of electric shock or fire and will void your warranty.
 - Keep away from flammable, explosive materials to avoid fire disaster. The installation place should be away from humid or corrosive substance.
 - Authorized service personnel must use insulated tools when installing or working with this equipment. PV modules shall have an IEC 61730 class A rating.
 - Never touch either the positive or negative pole of PV connecting device. Strictly prohibit touching both of them at the same time.
 - The unit contains capacitors that remain charged to a potentially lethal voltage after the MAINS , battery and PV supply has been disconnected.
- Hazardous voltage will present for up to 5 minutes after disconnection from power supply.
- CAUTION-RISK of electric shock from energy stored in capacitor, Never operate on the inverter couplers, the MAINS cables, Battery cables, PV cables or the PV generator when power is applied. After switching o ffthe PV , battery and Mains, always wait for 5minutes to let the intermediate circuit capacitors discharge before unplugging DC , battery inplug and MAINS couplers.
 - When accessing the internal circuit of inverter, it is very important to wait 5 minutes before operating the power circuit or demounting the electrolyte capacitors inside the device. Do not open the device before hand since the capacitors require time sufficiently discharge!

INTRODUCTION

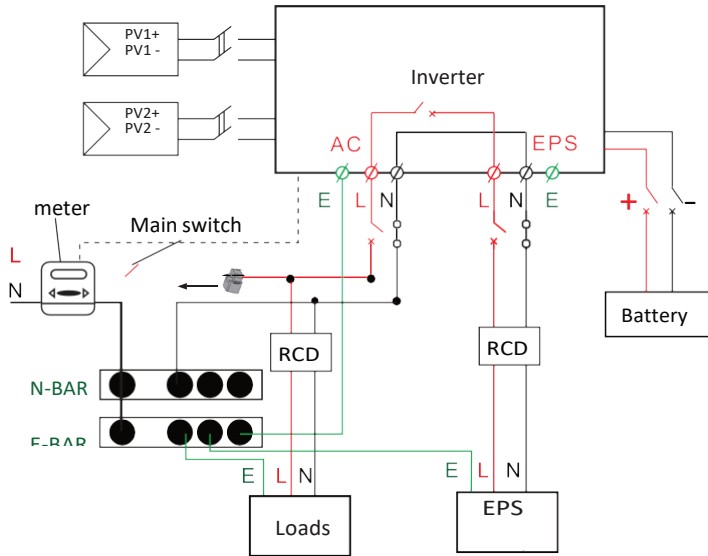
The inverter can be used to optimize self consumption, store in the battery for future use or feedin to public grid. Work mode depends on PV energy and user's preference. It can provide power for emergency use during the grid lost by using the energy from battery and inverter (generated from PV).In addition, the parallel function is available (off grid model).

System Diagram 1 (applies to most countries)



System Diagram 2

(applies to wiring rules AS/NZS_3000:2012 for Australia and New Zealand)



Work Modes

Hybrid Inverter provides multiple work modes based on different requirements

Work modes: Self-use

1. When PV, Grid, Battery is available:



A. Solar energy provides power to the loads as first priority, if solar energy is sufficient to power all connected loads, solar energy excess power will provides to charge battery, and then redundant power will feed to grid.



B. Solar energy provides power to the loads as first priority ,if solar energy is not sufficient to power all connected loads, battery energy will supply power to the loads at the same time.

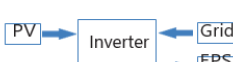


C. Solar energy provides power to the loads as first priority ,if solar energy and battery are not sufficient to power all connected loads, utility energy (Main Grid) will supply power to the loads with solar energy at the same time.



2 .When PV, Grid is available (without battery):

A. Solar energy provides power to the loads as first priority ,if solar energy is sufficient, the excess power will feed to grid.



B. Solar energy provides power to the loads as first priority, if solar energy is not sufficient to power all connected loads, Grid energy will supply power to the loads at the same time.



3 .When PV, Battery is available (Grid is disconnected):

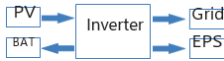
A. Solar energy provides power to the loads as first priority ,if solar energy is sufficient to power all connected loads, solar energy will provides to charge battery.



B. Solar energy provides power to the loads as first priority ,if solar energy is not sufficient to power all connected loads, battery energy and solar energy will supply power to the loads at the same time.

Work modes: Peak shift

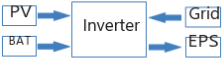
1. When PV, Grid, Battery is available:



A. On charge time, solar energy will charge battery as first priority. The excess energy will supply power to the loads. If solar energy is sufficient to supply loads and charge battery, and if there's still some extra energy, then the excess power will feed the power to grid



B. On charge time, solar energy will charge battery as first priority. Then the excess solar energy will supply power to loads. If solar energy is not sufficient to charge battery and supply loads, grid will supply all the connected loads with solar energy together.



C. On discharge time, solar energy provides power to the loads as first priority, if solar energy is sufficient to supply loads, and if there's still some extra energy from solar energy, then the excess power and battery will deliver the power to the grid at the same time.



D. In the period of no charge or discharge, the solar power supply loads at first priority, excess energy to the grid.

2. When Grid, Battery is available (PV is disconnected):



A. On charge time, grid will charge battery and supply power to the connected loads at the same time.



B. On discharge time, if load power is less than battery power, battery will supply power to loads as first priority, the excess power will be feed to grid.



C. On discharge time, if load power is more than battery power, battery and grid will supply power to the loads at the same time.

Work modes: Bat priority

1. When PV, Grid, Battery is available:



A. Solar energy will charge battery as first priority, if solar energy is excess, the excess power will supply load. If there's still some extra energy, then the excess power will feed the power to grid.



B. Solar energy will charge battery as first priority, if solar energy is excess, the excess power will supply load. If solar energy is not sufficient to charge battery and supply loads, grid will supply power to loads.



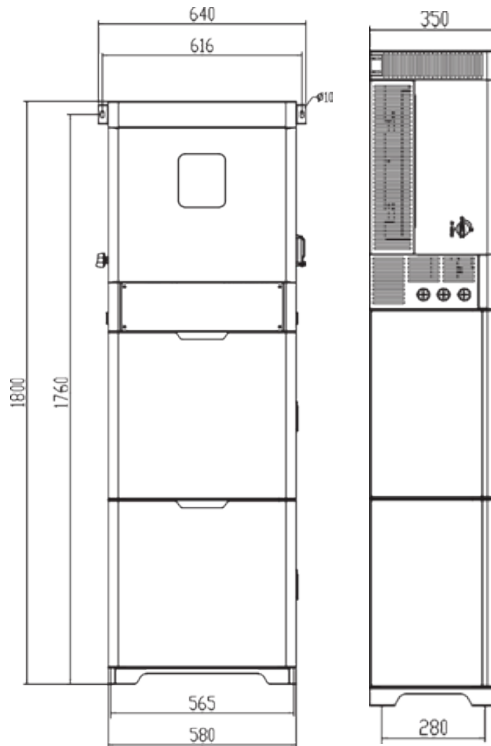
2. When Grid, Battery is available (PV is disconnected):

Grid will supply power to load and charge battery at the same time.

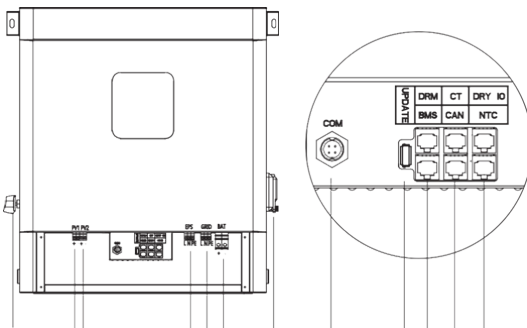


If set anti-Reverse function allowable, Once on the work mode of Self-use, Peak shift, battery priority, the system will not feed power to grid.

DIMENSION



INTERFACE DEFINITION



Object	Description
A/B	PV1+/PV1-/PV2+/PV2-
C	WiFi port for external WiFi
D	USB port for upgrading
E/F	DRM/BMS
G/H	CT /CAN
I/J	DRY IO /NTC
K	EPS output
L	Grid
M	Battery +/Battery -
N	PV switch
O	Battery switch

TECHNICAL DATA

Model	VT-6605103
DC input	
Max. recommended DC power [W]	7000
Max. DC voltage[V]	550
Norminal DC operating voltage[V]	360
MPPT voltage range [V]	125-500
MPPT voltage range@full load [V]	220-500
Max. input current [A]	14/14
Max. short circuit current [A]	17.5/17.5
Start input voltage [V]	125
No. of MPP trackers	2
Strings per MPP tracker	1
Max. inverter backfeed current to array	0
DC disconnection switch	/
AC output	
Norminal AC power[VA]	5000
Max. apparent AC power[VA]	5000
Rated grid voltage(range)[V]	230 (176 to 270)
Rated grid frequency[Hz]	50/60
Norminal AC current[A]	21.7
Max.AC current[A]	21.7
Displacement power factor	0.99 leading. 0.99 lagging
Total harmonic distortion(THDI)	< 2%
Load control	optional
AC input	
Norminal AC power[VA]	5000
Rated grid voltage(range)[V]	230(176 to 270)
Rated grid frequency[Hz]	50/60
Norminal AC current[A]	21.7
Max.AC current[A]	21.7
Displacement power factor	0.99 leading. 0.99 lagging
AC inrush current	35

EPS output	
EPS rated power[VA]	5000
Max. EPS power[VA]	5000
EPS rated voltage, Frequency	230VAC, 50/60Hz
EPS rated current[A]	21.7
Max. EPS current[A]	21.7
Switch time[s]	<500ms
Total harmonic distortion(THDv)	<2%
Parallel operation	Yes
Compatible with the generator	Yes(signal provided only)
Battery parameter	
Battery type	Lithium battery/Lead-ACID
Battery voltage range[V]	40-58
Recommended battery voltage[V]	48
Cut Off Voltage[V]	40
Max. charging Voltag[V]	58
Max. Protective Voltage[V]	59
Max. charge/discharge current[A]	95/104.2
Peak charge/discharge current[A]	95/104.2
Communication interfaces	CAN/RS485/Wifi/LAN/DRM
Reverse connect protection	YES
Efficiency	
MPPT efficiency	99.90%
Euro efficiency	97%
Max. efficiency	97.60%
Max. Battery charge efficiency	95%
Max. Battery discharge efficiency	95%

Safety & Protection	
Over/under voltage protection	YES
DC isolation protection	YES
Monitoring ground fault protection	YES
Grid protection	YES
DC injection monitoring	YES
Back feed current monitoring	YES

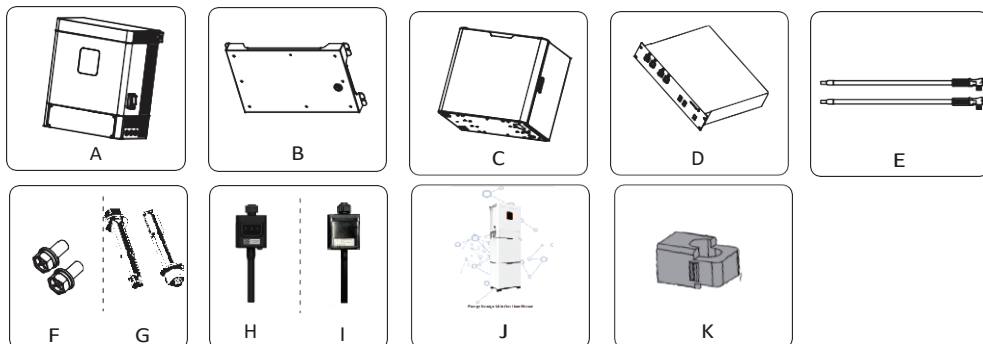
Safety & Protection	
Residual current detection	YES
Anti-islanding protection	YES
Over load protection	YES
Over heat protection	YES
Max. output fault current	55A
Max. output over current	28.7A

Model	VT-6605103
Dimension [W/H/D](mm)	580*1800*350
Dimension of packing [W/H/D](mm)	805*820*675/805*460*675
Net weight [kg]	82
Gross weight [kg]	86
Installation	console mode
Operating temperature range[°C]	-25~+60 (derating at 45)
Storage temperature [°C]	-25~+60
Storage/Operation relative humidity	4%~100% (Condensing)
Altitude [m]	<2000
Ingress Protection	IP20(for outdoor use)
Protective Class	I
Night-time consumption	<3W
Over Voltage Category	I II (MAINS), II (PV,Battery)
Pollution Degree	II
Cooling	Natural
Noise level	< 40dB
Inverter Topology	non-isolated
Active anti-islanding method	Power variation
Communication interface	CAN/RS485/Wifi/LAN/DRM

NOTE: Check for Physical Damage

Make sure the inverter is intact during transportation. If there is any visible damage,such as cracks, please contact your dealer immediately.

PACKAGE DIAGRAM



PACKAGE DESCRIPTION

Object	Description
A	Inverter
B	Base
C	Battery box*2
D	Battery*6 (optional)
E	Wire rod

Object	Description
F/G	Expansion screws and hexagonal screw
H	Wi fimodule (optional)
I	GPRS module (optional)
J	User manual
K	CT

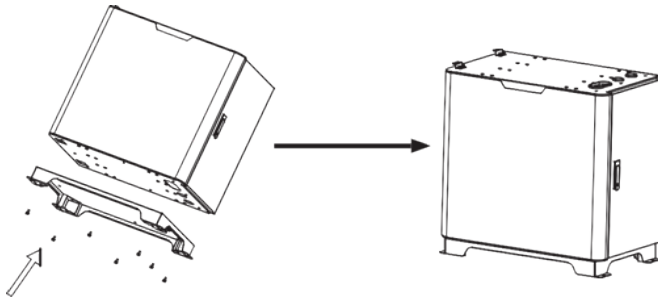
TOOLS REQUIRED FOR INSTALLATION

Installation tools : crimping pliers for binding post and RJ 45, screwdriver, manual wrench etc

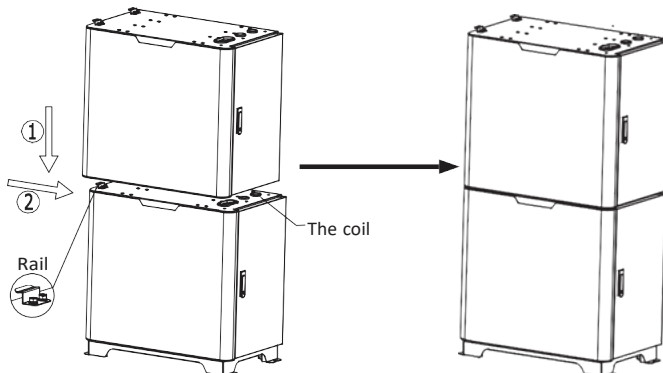


INSTALLATION STEP

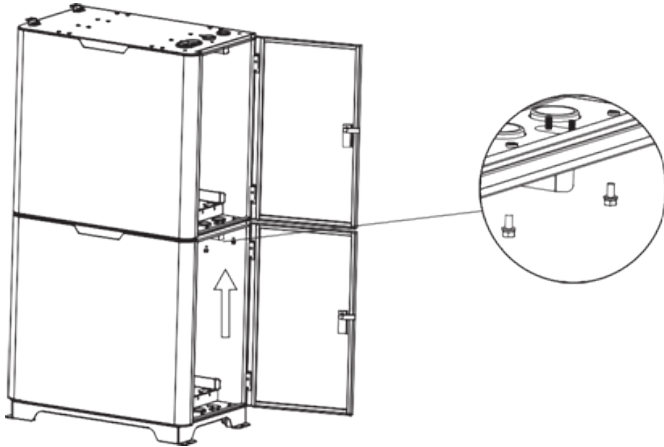
Step 1: Fixing the bottom with the battery box 1, using 8 M5*12 screws



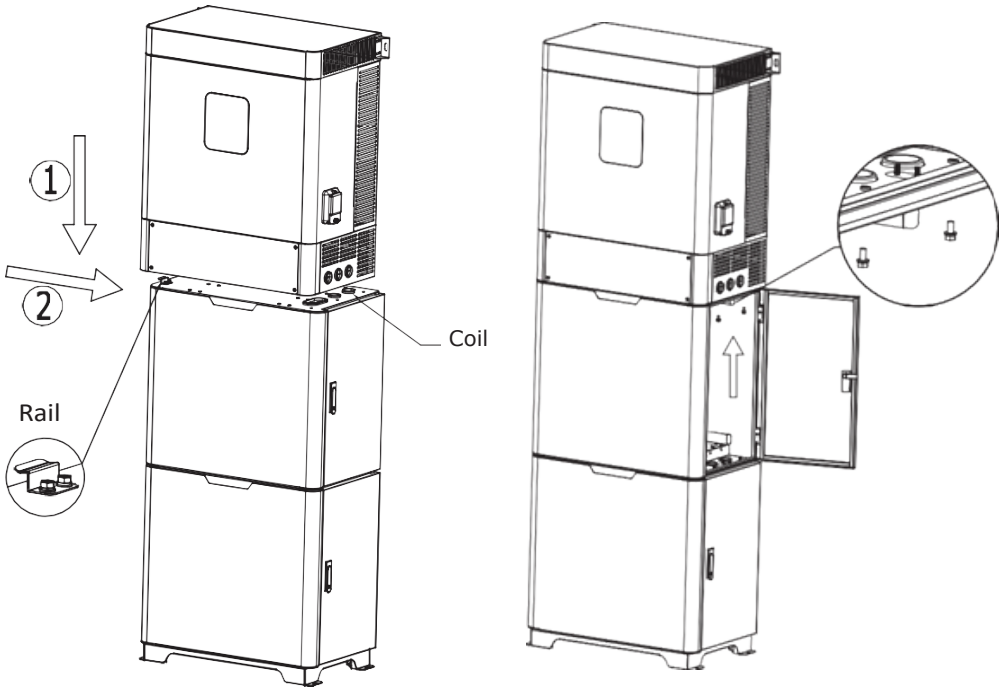
Step 2: The battery box 2 fixed. Align the lower notch of battery box 2 with the upper guide of battery box 1, lower it and push it to the right. Facilitate pushing to the right, the coil can be removed before assembly.



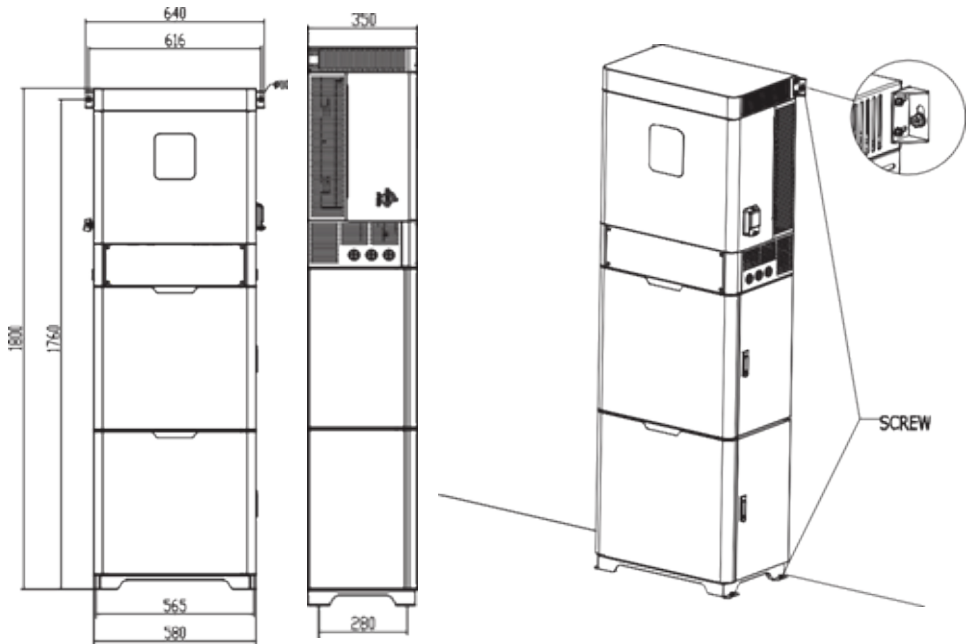
Step 3: Two sets of battery boxes are fixed, open the battery box door, and use 3 M5*12 screws to fix it upward.



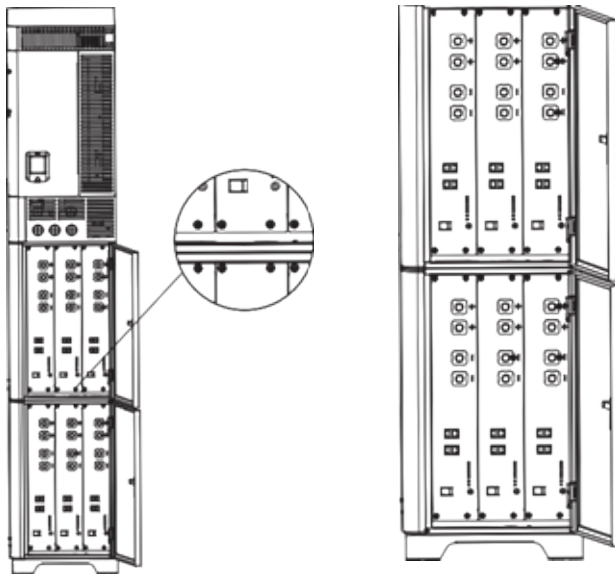
Step 4: PCS is fixed, the method is the same as step 2&step 3. To facilitate pushing to the right, the coil can be removed before assembly.



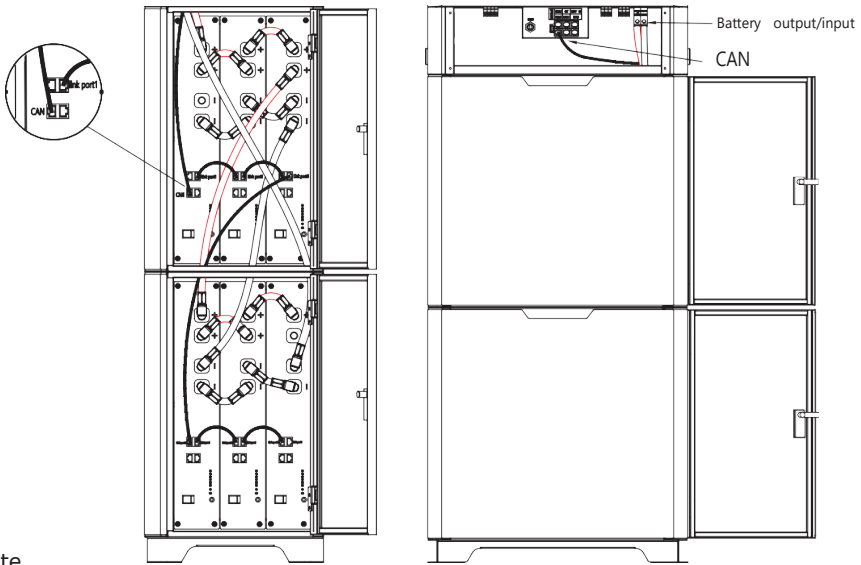
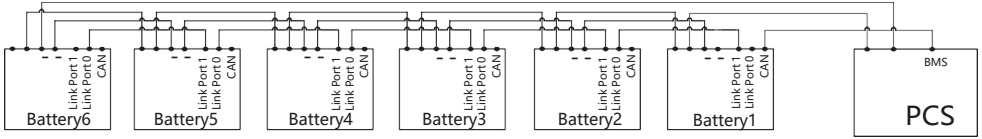
Step 5: All-in-one machine fixing, the top is fixed to the wall, and the bottom is fixed to the ground, using M6 Expansion screws.



Step 6: The battery fixing, as shown in the figure, push from the right, and a total of 24 M5*12 screws are used. Please pay attention to the direction when assembling the battery.



BATTERY CONNECTION

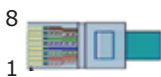


Note

1. Before choosing battery, please note the maximum voltage of battery can not exceed 59V and the rated voltage of battery can not exceed 48V, and the battery communication should be compatible with Hybrid inverter.
2. The one with empty link port 0 is the master battery module, others are slaves.
3. The connecting cable between the battery and the inverter shall be at least 4AWG.
4. The battery communication can only work when the battery BMS is compatible with the inverter.
5. To replace the battery, you need to turn off all switches and unplug the system communication line.
6. All the above wiring and operations must be carried out after the whole machine is powered down, and all of them need professional personnel to complete

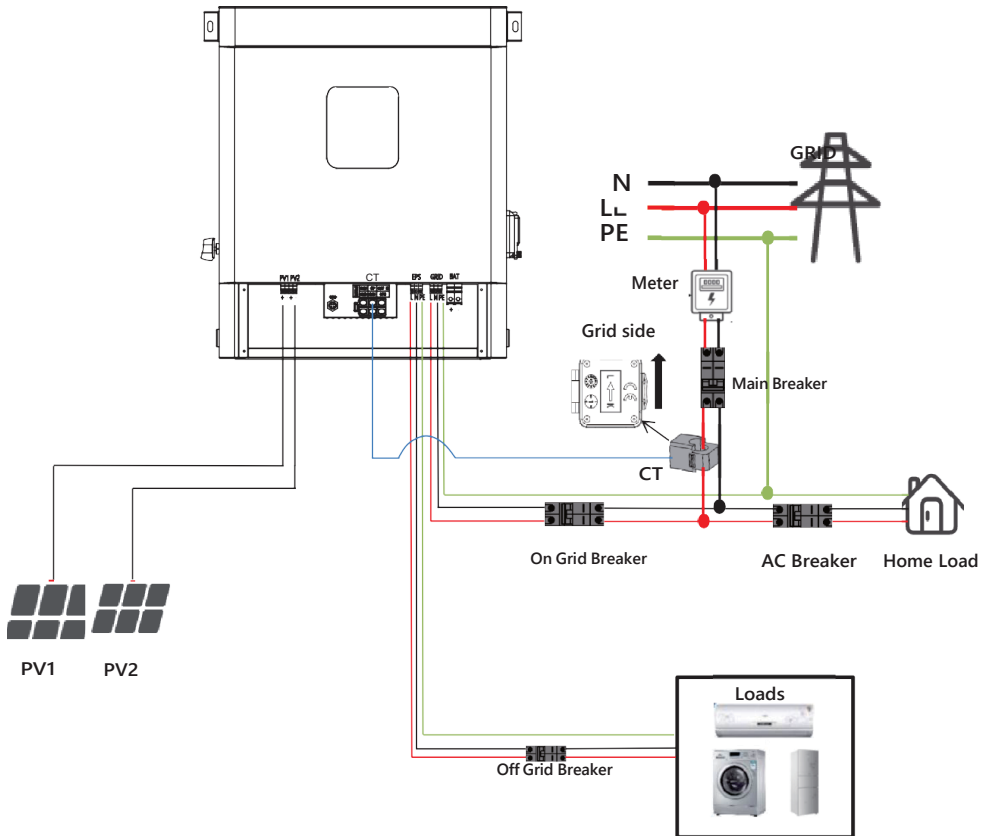
BMS PIN Definition

Communication interface between inverter and battery is RS485 or CAN with a RJ45 connector. The wiring sequence of the crystal head conforms to the 568B standard: orange white, orange, green white, blue, blue white, green, brown white and brown.



	PIN	1	2	3	4	5	6	7	8
CAN	Definition	X	X	X	BMS_CANH	BMS_CANL	X	X	X
Rs485	Definition	X	X	X	X	X	GND	BMS_485A	BMS_485B

GRID AND LOAD CONNECTION



Hybrid inverter are designed for single phase grid. Voltage is 220/230/240V, frequency is 50/60Hz. Other technical requests should comply with the requirement of the local public grid.

Table of cable and Micro-breaker recommended

Model	VT-6605103
Cable	5-6mm ²
Micro-breaker	32A

Micro-breaker should be installed between inverter and grid, any load should not be connected with inverter directly

Step1. Check the grid voltage.

1.1 Check the grid voltage and compare with the permissive voltage range

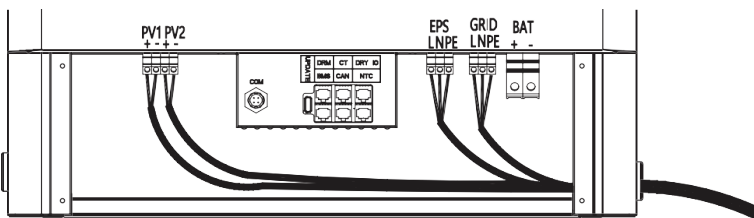
(Please refer to technical data).

1.2 Disconnect the circuit board from all the phases and secure against re-connection.

Step2. Select suitable cables and cold-pressed terminals, remove the insulation layer of 18 mm at the end of the wire, and then press the cables and terminals with wire crimping pliers.



Step3. Connect the completed cable to the power grid and eps interface, and tighten the screws.



PV CONNECTION

Hybrid Inverter can be connected in series with 2-strings PV modules for VT-6605103

Select PV modules with excellent function and reliable quality. Open-circuit voltage of module arrays connected in series should be <Max. DC input voltage; operating voltage should be conformed to MPPT voltage range.

Max.DC Voltage Limitation

Model	VT-6605103
Max. DC Voltage (V)	550
MPPT Voltage Range(V)	125-500



Warning!

PV module voltage is very high, which already achieve dangerous voltage range, please comply with electric safety rules when connecting.

Please do not make PV positive or negative ground!

Connection Steps:

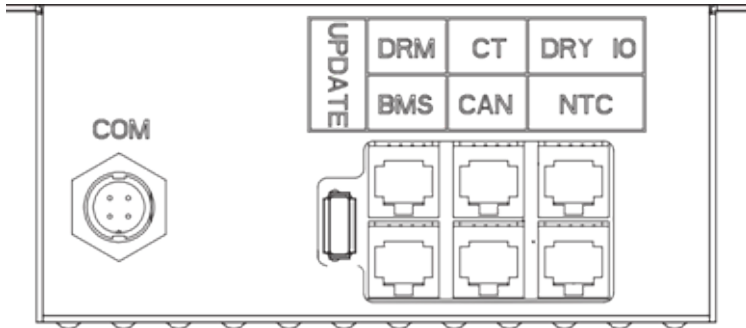
Step 1. Checking PV module, ensure the PV+ and PV- ports of the PV string are correct.

Step 2. Separate PV connector to ensure PV is in open circuit state.

Step 3. Select suitable cables and cold-pressed terminals, remove the insulation layer of 18 mm at the end of the wire, and then press the cables and terminals with wire crimping pliers.

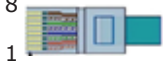
Step 4. Connect the completed cable to the PV interface, and tighten the screws.

Communication interface definition



BMS PIN Definition

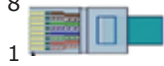
Communication interface between inverter and battery is RS485 or CAN with a RJ45 connector. The wiring sequence of the crystal head conforms to the 568B standard: orange white, orange, green white, blue, blue white, green, brown white and brown.



	PIN	1	2	3	4	5	6	7	8
CAN	Definition	X	X	X	BMS_CANH	BMS_CANL	X	X	X
Rs485	Definition	X	X	X	X	X	GND	BMS_485A	BMS_485B

DRY_IO (RJ45 PIN) Definition

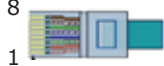
Communication interface between inverter and meter is RS485 with a Rj45 connector.



	1	2	3	4	5	6	7	8
	DRYO_1A	DROY_1B	DRYO_1C	DRYI_1	DRYI_1B	DRYO_2A	DRYO_2B	DRYO_2C

DRM Connection

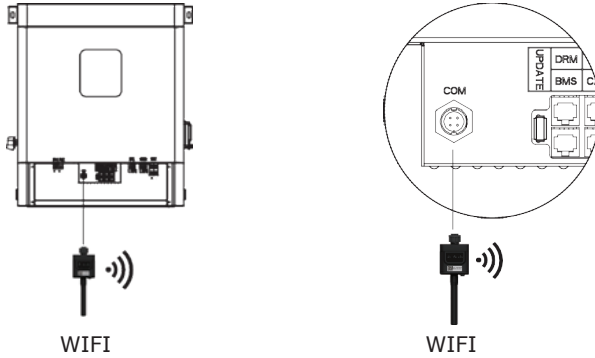
DRM is provided to support several demand response modes by emitting control signals as below. Note: Only PIN6(DRM0) is available now, and other PIN functions are being developed.



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

WiFi And GPRS Connection(optional)

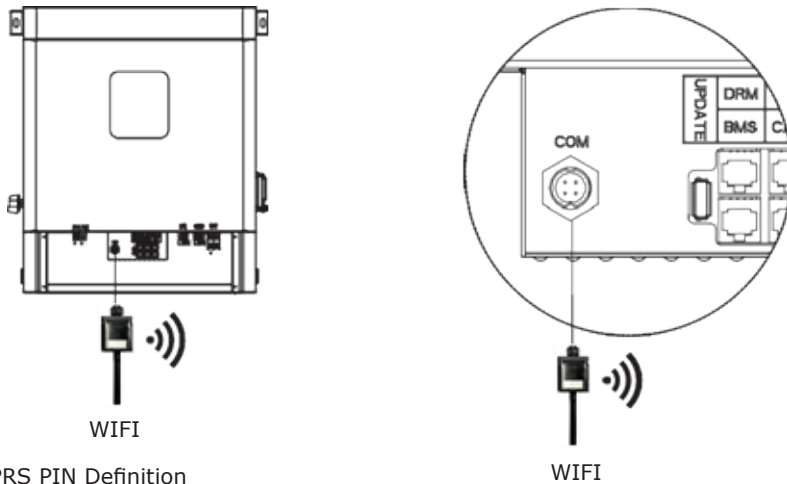
Inverter provides a WiFi port which can collect data from inverter and transmit it to monitoring-website by WiFi.



- Step1. Plug Wifi into "WiFi" port at the bottom of the inverter. Step2. Build the connection between the inverter and router.
- Step3. Create a user account online.(Please check the WiFi user manual for more details).

GPRS CONNECTION

GPRS connection interface is consistent with WIFI interface,Please refer to the GPRS user manual for detailed connection steps



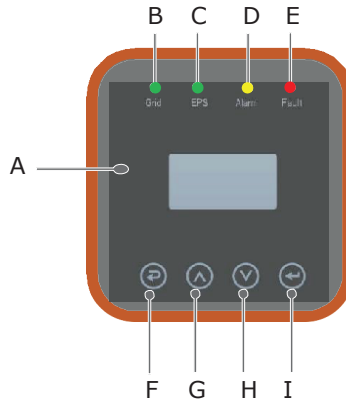
WIFI/GPRS PIN Definition



1	2	3	4
+5V	RS485_A	RS485_B	GND

SETTING

Control Panel

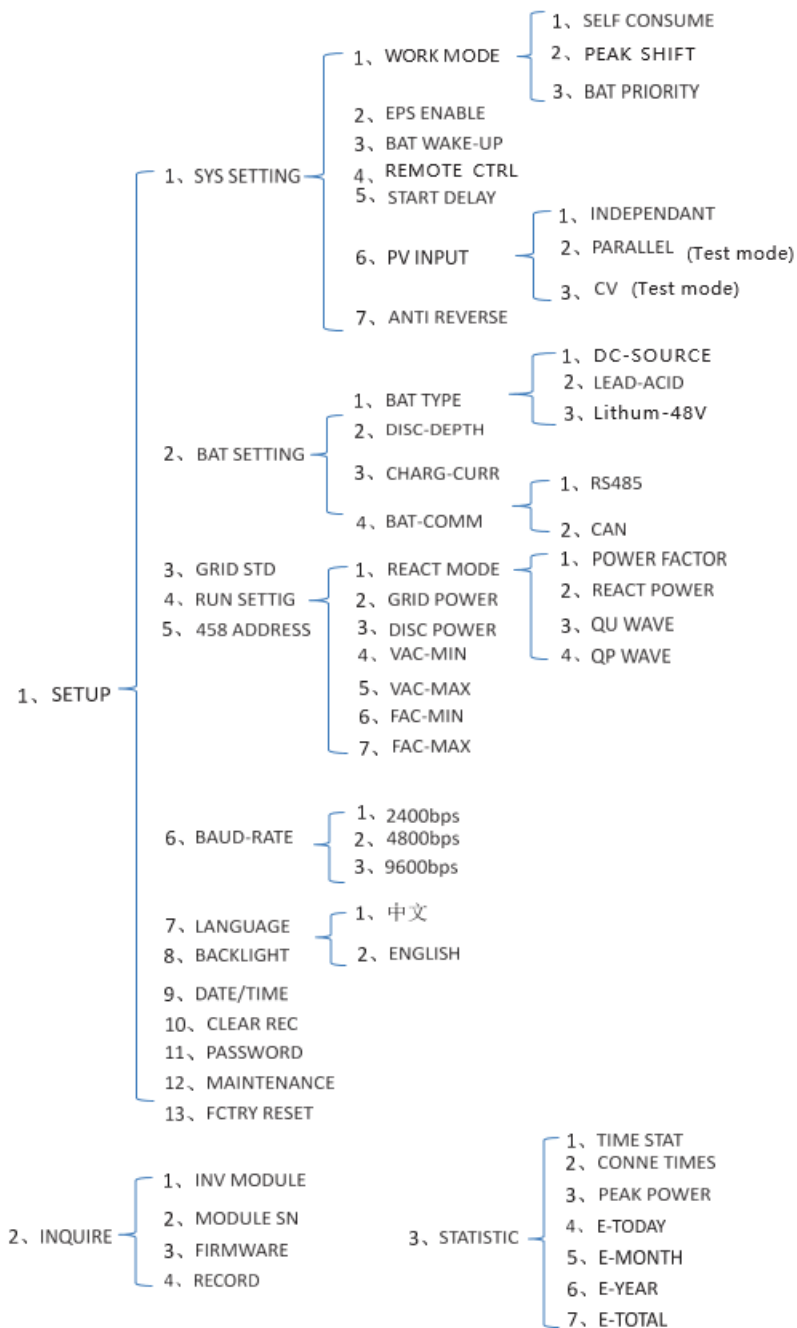


Object	Name	Description
A	LCD	Display the information of the inverter.
	Screen	
B	Indicator LED	lit in green: The inverter is in grid mode. Off: The inverter is in not in grid mode.
C		lit in green: The inverter is in off-grid mode. Off: The inverter is in not in off-grid mode.
D		lit in Yellow: The inverter is in Warning. Off: The inverter has no Inverter Warning
E		lit in red: The inverter is in fault status. Off: The inverter has no errors.
F	Function Button	Esc: Return from current interface or function.
G		Up: Move cursor to upside or increase value.
H		Down: Move cursor to downside or decrease value.
I		Enter: Confirm the selection.

Instructions for LED Indicator

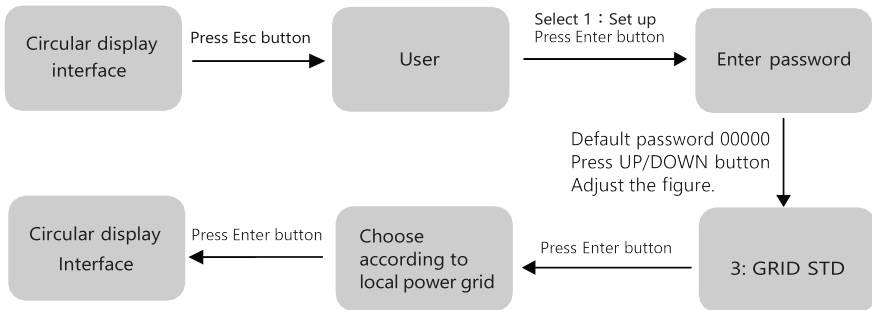
	Grid	EPS	Alarm	Fault
	(Green)	(Green)	(Yellow)	(Red)
Initialization	off	off	off	off
Stand-by	off	off	off	off
Grid mode	on	off	off	off
Off-Grid	off	on	off	off
Bypass of mains	off	on	on	off
Fault	off	off	off	on

Instructions for the use of three modes

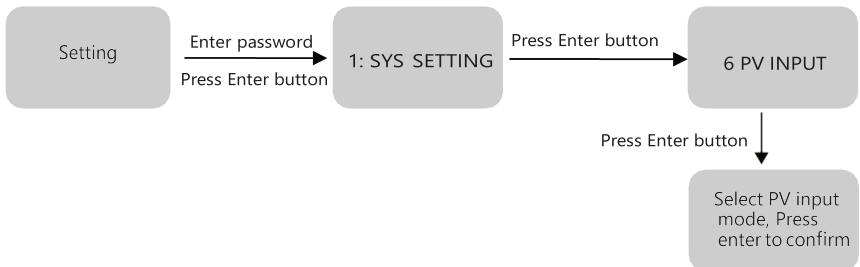


For example, Before selecting the mode, you can set it up according to the local power grid, PV input mode and battery type

Power grid :



PV input mode :



Battery parameters :



FAULT DIAGNOSIS AND SOLUTIONS

The inverter is easy to maintain. When you encounter the following problems, please refer to the Solutions below, and contact the local distributor if the problem remains unsolved. The following table lists some of the basic problems that may occur during the actual operation as well as their corresponding basic solutions.

Fault diagnosis table

Content	Cause	Solutions
Over load	The load power exceeds the inverter power or the output port is short-circuited.	1. Check whether the load is in compliance with the maximum power of the machine.
		2. Cut off all the power and shut down all the machines; disconnect the load and plug in to restart machines, then check whether the load is short circuited if the fault has been eliminated.
Bat Disconnect	The battery is not connected to the inverter or the battery port has no output voltage.	Check whether there is voltage at BAT port of measuring inverter.
Bat under vol	1. The battery charge is too low.	1. If the battery is too low, charge it in time.
	2. The battery BMS sends an instruction to prohibit discharging.	2. Check the battery communication protocol
Bat low vol	The battery voltage is lower than the normal working voltage value.	Charge the battery as soon as possible
Bus over vol	1. The PV input voltage exceeds the MPPT voltage.	1. Check whether PV input voltage is within MPPT voltage range.
	2. The load port and the power grid port are connected inversely.	2. Power down the whole machine, and then power up after the display screen goes out.
BMS Comm.fail	There is no normal communication between the battery and the inverter.	Check whether the communication between inverter and battery is normal.
Fan Fail	Poor contact of fan	Power down the whole machine, and then power up after the display screen goes out.