



USER GUIDE

T-REX-3KLP1G01/3K6LP1G01/
4KLP1G01/4K6LP1G01/
5KLP1G01/6KLP1G01

Hybrid inverter



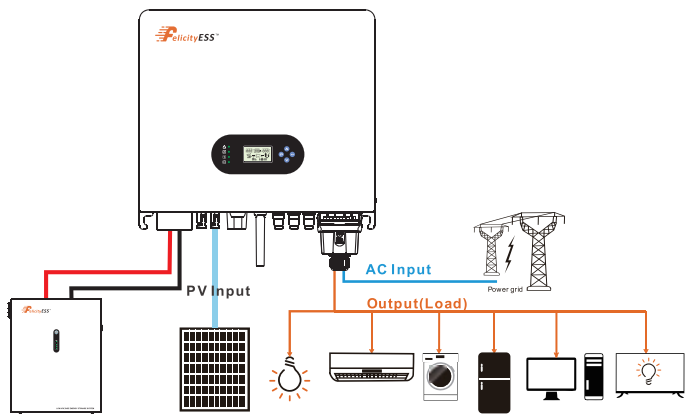


Figure 2 Block diagram of hybrid solar inverter system

2.1 Products overview

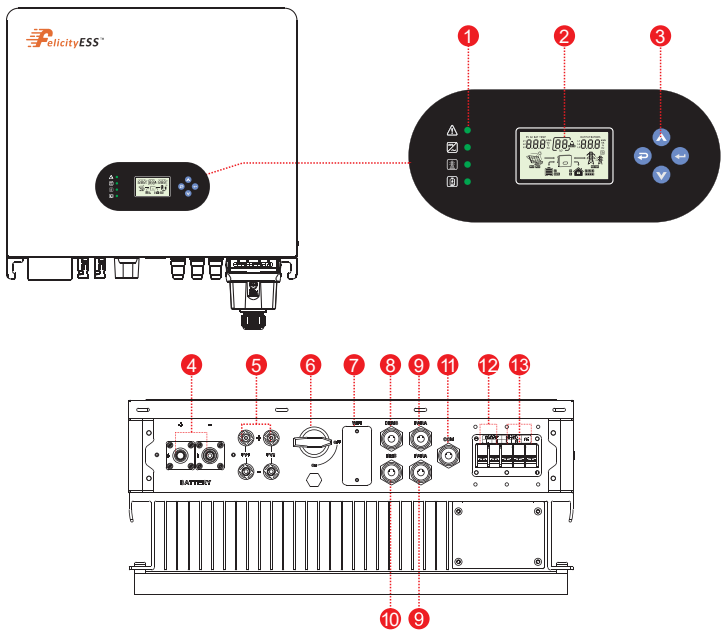


Figure 2.1-1 Products overview

1. Inverter Indicators

2. LCD display

3. Button

4. Battery connection port

5. PV input connection port
6. DC switch

7. WIFI Communication port

8. DRMS port

9. PARA port
10. BMS port

11. COM port

12. Back-up terminal

13. On-grid terminal

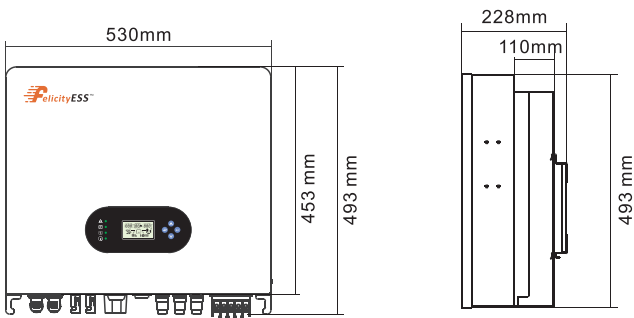


Figure 2.1-2 Inverter dimensions

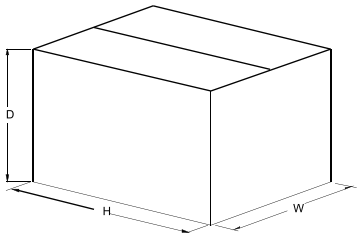


Figure 2.1-3 Paper packages dimension

Table 2.1-3 Packages dimension and gross weight

Model	H (mm)	W (mm)	D (mm)	Net Weight (KG)	Gross Weigh (KG)
T-REX-3KLP1G01/T-REX-3K6LP1G01 T-REX-4KLP1G01/T-REX-4K6LP1G01 T-REX-5KLP1G01/T-REX-6KLP1G01	632	570	315	32. 4	39. 1

3 Installation

3.1 Packing List

The inverter 100% strictly inspected before package and delivery. Please check the product package and fittings carefully before installation.

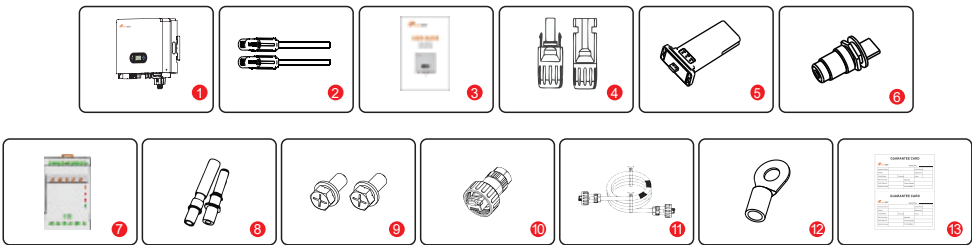


Figure 3.1-1 Packing List

Table 3.1-1 Detailed delivery list

No.	Name	Quantity
1	Inverter	1
2	Battery connector	1 pair
3	Operation manual	1
4	DC connector	2 pairs
5	WiFi module	1
6	COM connector	2
7	Meter+CT(Optional)	1
8	Expansion Bolts	4
9	M5 combination screw	2
10	Parallel connector	1
11	Parallel cable	1
12	OT terminals	6
13	Guarantee card	1

3.2 Installation tools



Figure 3.2-1 Installation tools

3.3 Installation Environment

- ◇ Choose a dry, clean, and tidy place, convenient for installation
- ◇ Ambient temperature range: $-25^{\circ}\text{C} \sim 60^{\circ}\text{C}$
- ◇ Relative humidity: $0 \sim 100\%$ (non-condensed)
- ◇ Install in a well-ventilated place
- ◇ No flammable or explosive materials close to inverter
- ◇ The AC overvoltage category of inverter is category III
- ◇ Maximum altitude: 2000m



• Inverter cannot be installed near flammable, explosive or strong electro-magnetic equipment.

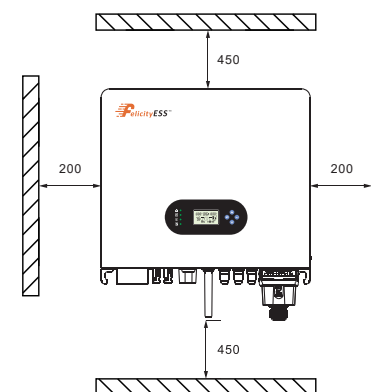


Figure 3.3-1 Installation space of one inverter

Ensure there is sufficient space for heat-releasing. Generally, space requirement should be met as below:

Table 3-3-1 Detailed installation space

	Minimum clearance
Lateral	200mm
Top	450mm
Bottom	450mm

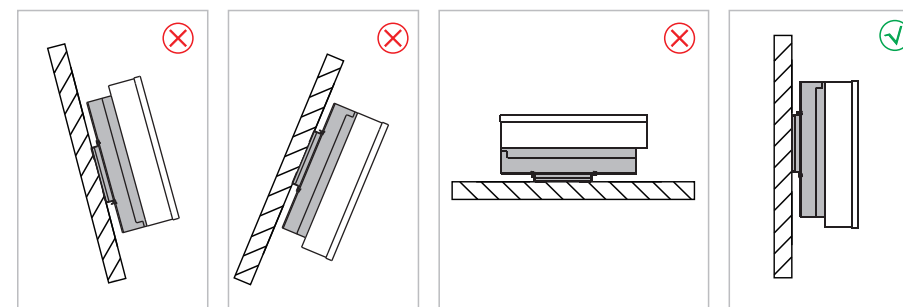


Figure 3.3-2 Installation position



• Do not open the cover of the inverter or replace any part as incomplete inverter may cause electric shock and damage the device during operation.

The installation of inverter should be protected under shelter from direct sunlight or badweather like snow,rain, lightning etc.

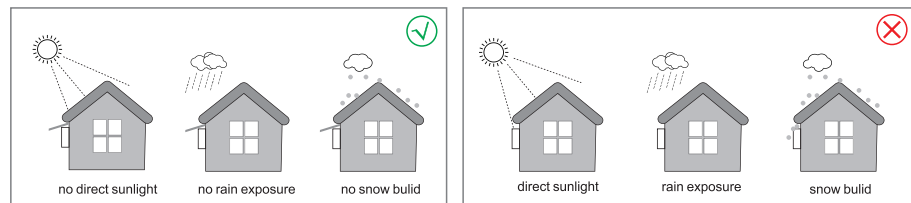


Figure 3.3-3 Installation position

3.4 Mounting



•The inverter is heavy, please be careful when removing it from the package.

The inverter is suitable for mounting on concrete or other non-combustible surface only.

Step 1. Please use the mounting bracket as a template to drill 4 holes in the right positions (10mm in diameter, and 80mm in depth). Use M8 expansion bolts in accessory box and fix the mounting bracket with a 12mm drill bracket onto the wall tightly. The installation of inverter support is shown in Figure 3.4-1.

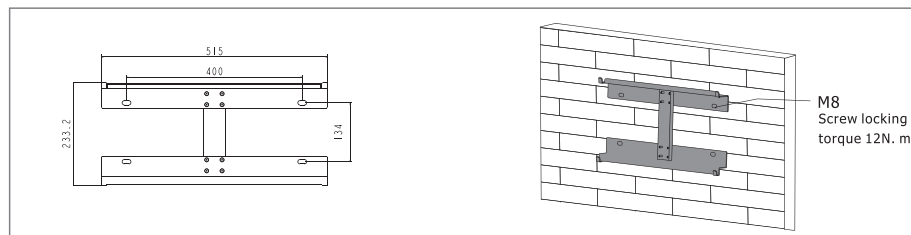


Figure 3.4-1 Install the inverter hanging plate

Step 2. Lift the inverter to fix it on the installation bracket, We can prevent theft by locking. See Figure 3.4-2.

NOTE

•Be careful when mounting because the inverter is very heavy.

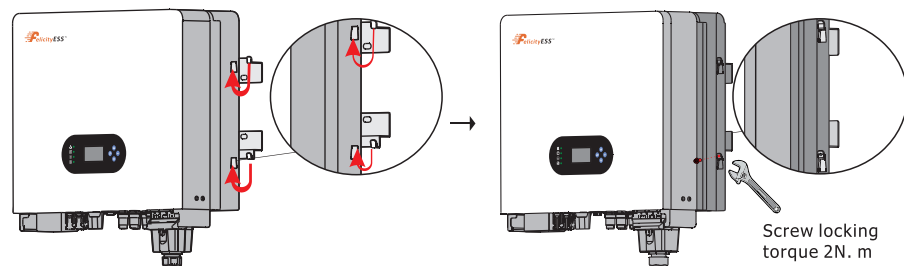
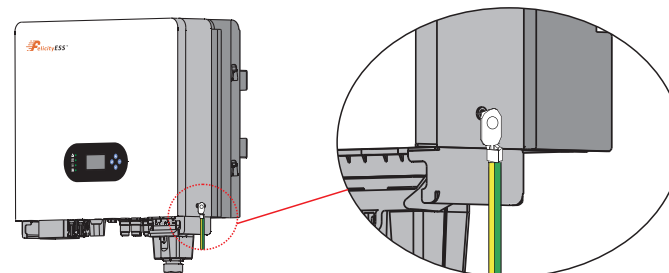


Figure 3.4-2 Installing an Inverter



Screw locking torque 2N. m

Figure 3.4-3 Rack earth (Ground wire locked by M5)

4 Electrical Connection

- ◇ High voltages in power conversion circuits. Lethal hazard of electric shock or serious burns.
- ◇ All work on the PV modules, inverters, and battery systems must be carried out by qualified personnel only.
- ◇ Wear rubber gloves and protective clothing (protective glasses and boots) when working on high voltage/high current systems such as INVERTER and battery systems.

4.1 PV Connection

Before connecting PV panels/strings, please make sure requirements are followed as below:

- (1) The total short-circuit current of PV string must not exceed inverter's max DC current.
- (2) The minimum isolation resistance to ground of the PV string must exceed 19.33kΩ in case of any shock hazard.
- (3) PV string could not connect to earth/grounding conductor.
- (4) Use the right PV plugs in the accessory box.

Wire Size	Cable(mm)
10~12AWG	7

Step 1. Prepare PV positive and negative power cables

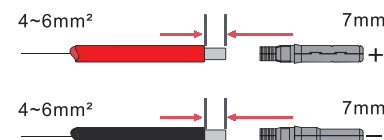


Figure 4.1-1 pv cables and pv plugs

Step 2. Connect PV cables to PV connectors. See Figure 4.1-2.

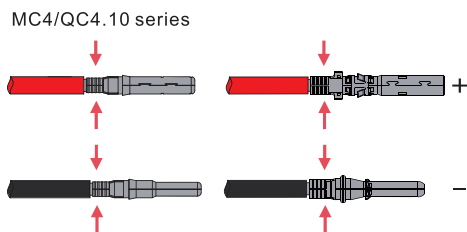


Figure 4.1-2 PV cables to PV connectors

NOTE

- PV cables must be tightly crimped into the connectors.
- For Amphenol connector, the limit buckle cannot be pressed.
- There will be a "click" sound if connectors are inserted correctly into PV plugs.

Step 3. Screw the cap on and plug it onto inverter side. There will be a click sound if connectors are inserted correctly into PV plugs. See Figure 4.1-3.

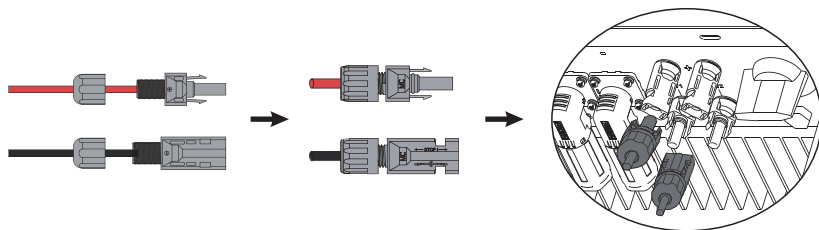


Figure 4.1-3 The PV plug is connected to the inverter



- The polarity of PV strings cannot be connected reversely, otherwise the inverter could be damaged.

4.2 Battery Connection

Please be careful about any electric shock or chemical hazard. Make sure there is an external DC breaker (125A) connected to the battery without build-in DC breaker.



- The polarity of battery cannot be connected reversely, otherwise the inverter could be damaged.

Inverter Model	Wire Size	Strip length
T-REX-3KLP1G01/T-REX-3K6LP1G01 T-REX-4K6LP1G01/T-REX-4K6LP1G01 T-REX-5KLP1G01	4AWG	15mm
T-REX-6KLP1G01	3AWG/4AWG, suggest 3AWG	

Step 1. Prepare battery cables and accessories, and route the battery power cable through the battery cover. Use accessories box accessories, and cut the battery power cable according to the model.

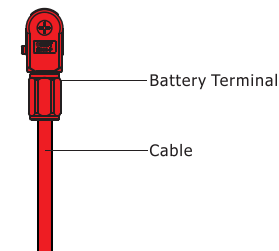


Figure 4.2-1 Battery cable and battery case

Step 2. Make battery terminals. Strip cable coat. Use special crimper to compress battery terminal tightly.

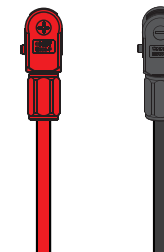


Figure 4.2-2 The battery terminal

Step 3. Connect the battery terminal to the inverter. Ensure that the battery polarity is connected correctly.

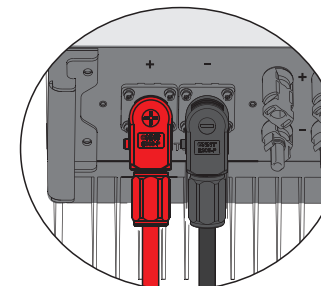


Figure 4.2-3 The battery terminal is connected to the inverter

4.3 On-Grid & Back-Up Connection

An external AC breaker is needed for on-grid connection to isolate from grid when necessary. The requirements of on-grid AC breaker are shown as below.

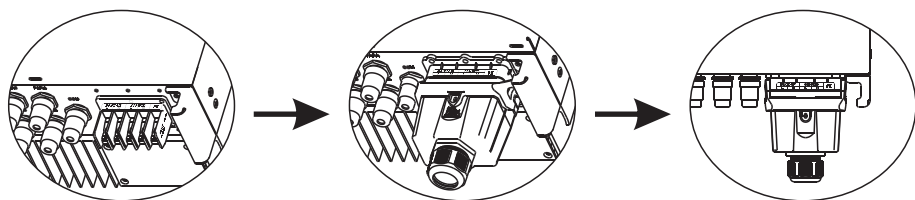


Figure 4.3-1 Install AC cables for the inverter



• Don't connect the PE wire wrong.

Table 4.3-1 : Recommended table of AC circuit breakers

INVERTER MODEL	AC BREAKER SPECIFICATION
T-REX-3KLP1G01/T-REX-3K6LP1G01/T-REX-4KLP1G01 T-REX-4K6LP1G01/T-REX-5KLP1G01/T-REX-6KLP1G01	40A/230V,2P

NOTE

• The absence of AC breaker on back-up side will lead to inverter damage if an electrical short circuit happens on back-up side.

1. On the AC side, the individual breaker should be connected between inverter and Grid but before loads. See Figure 4.3-2.

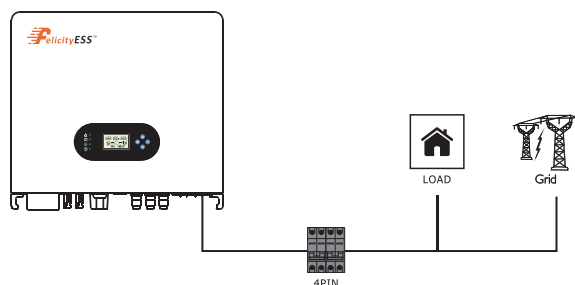


Figure 4.3-2 Ac breaker connection



• Make sure the inverter is totally isolated from any DC or AC power before connecting AC cable.

Step 1. Prepare the terminals and AC cables as below. See Figure 4.3-3.



Figure 4.3-3 Ac connection line

Table 4.3-2 : Ac cable specifications

Grade	Description	Value
A	Outside diameter	13-18 mm
B	Separated wire length	20-25 mm
C	Conductor wire length	7-9 mm
D	Conductor core section	4-6 mm

Step 2. Using the terminals in the accessory box, pass the AC cable through the terminal cover. See Figure 4.3-4.

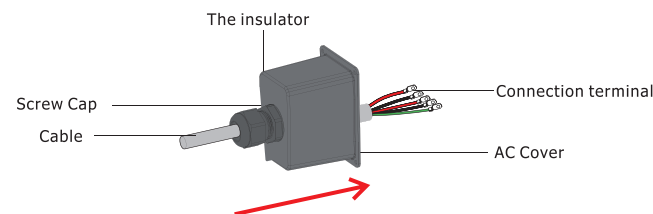


Figure 4.3-4 The AC cable passes through the terminal cover

Step 3. Install the AC connection terminal on the cable. See Figure 4.3-5.

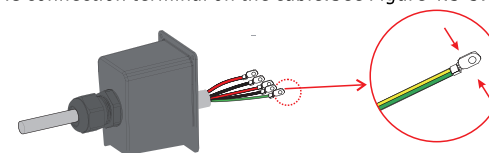


Figure 4.3-5 Install ac connection terminals

NOTE

• The absence of AC breaker on back-up side will lead to inverter damage if an electrical short circuit happens on back-up side.

Step 4. Connect the combined AC cable to the AC terminal of the inverter, tighten the cable to a torque of 2.0 N.m to 2.5 N.m, and then lock the AC cover. See Figure 4.3-6.

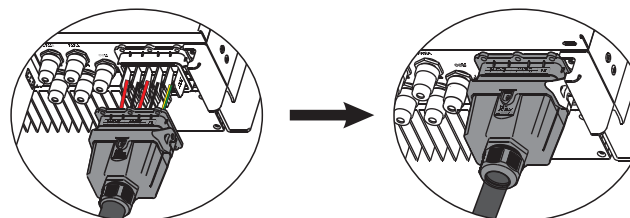


Figure 4.3-6 Install ac connection terminals

4.4 Smart Meter & CT Connection

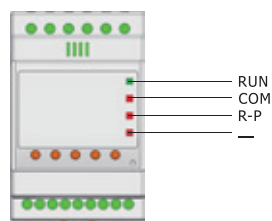


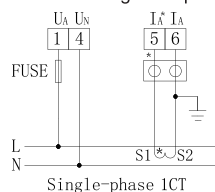
Figure 4.4-1 Smart Meter

Table 4.4-1 : Smart Meter LED Indications

STATUS	OFF	ON	Blinking
Run (Green)	The instrument is not running	/	The instrument is running normally
Com (Red)	The instrument is not communicating	/	The instrument is in communication status
R-P (Red)	Positive power	Negative power	/
— (Red)	/	Negative value indicator lamp	/

Connection Mode

The connection diagram on the instrument housing shall prevail in case of any discrepancies with it.



It is recommended to use 0.5A or 3A for the fuse in the connection diagram;



•Make sure the inverter is totally isolated from any DC or AC power before connecting AC cable.

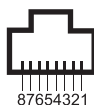


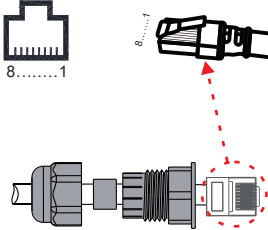
Figure 4.4-2 RS485 interface

Table 4.4-2 : RS485 interface

NO.	8	7	6	5	4	3	2	1
Function	485A	485B	485A	GND1	GND1	485B	NC	NC

The Smart Meter with CT in product box is compulsory for T-REX system installation, used to detect grid voltage and current direction and magnitude, further to instruct the operation condition of T-REX inverter via RS485 communication. See Table 4.4-3.

Table 4.4-3 : Detailed Pin Function Of COM Port On T-REX

Position	Function	Note	
1	485_A2	RS485-2 For Meter	
2	485_B2		
3	485_A3	RS485-3 For Remote Monitor	
4	485_B3		
5	485_B3		
6	485_A3		
7	RY_4	Dry Signal	
8	RY_5		

Note : The cable should be made refer to Figure 4.4-4

Make sure Meter & CT are connected between house loads and grid, and follow the Smart Meter direction sign on CT, refer to Figure 4.4-4.

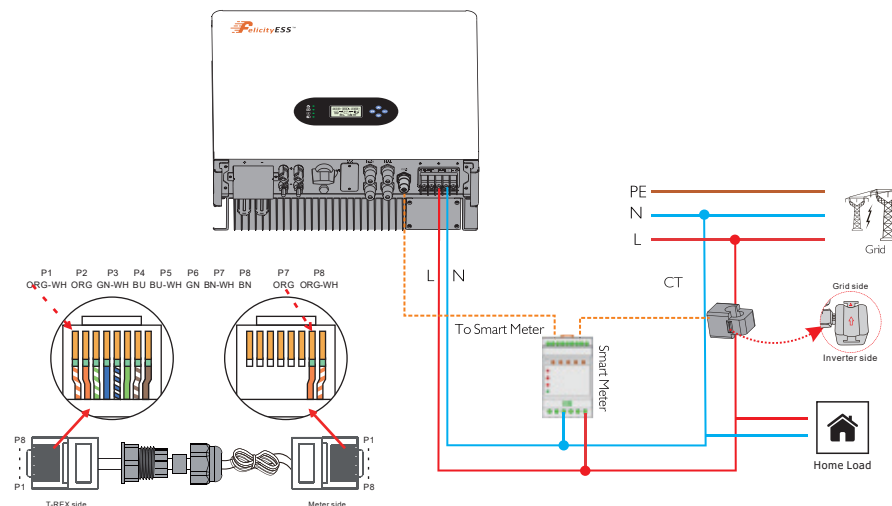


Figure 4.4-4 Smart meter connection

4.5 DRMS Connection

DRMS(Demand response enabling device) is used for Australia and New Zealand installation (also used as remote shutdown function in European countries), in compliance with Australia and New Zealand safety requirements(or European countries). Inverter integrates control logic and provides an interface for DRMS. The DRMS is not provided by inverter manufacturer. Detailed connection of DRMS & Remote Shutdown are shown below:

Step 1. Screw this plate off from the inverter. See Figure 4.5-1.

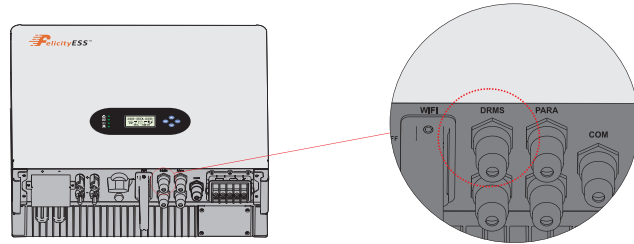


Figure 4.5-1 DRMS interface

Step 2. Plug out the RJ45 terminal and dismantle the resistor on it. Plug the resistor out, leave the RJ45 terminal for next step.

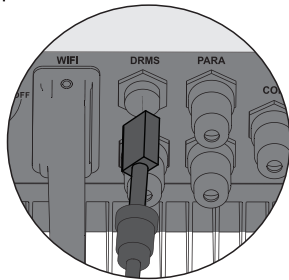


Figure 4.5-2 operating steps

NOTE

•The RJ45 terminal in the inverter has the same function as DRED.
Please leave it in the inverter if no external device is connected.

Step 3-1 Pass the RJ45 cable through the steel plate and connect the DRED cable to the RJ45 terminal. As shown in Figure 4.5-3, Table 4-9 describes the 6-pin port definition.

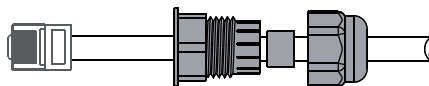


Figure 4.5-3 operating steps

Table 4.5-3 :Port pin allocation table

NO.	1	2	3	4	5	6	7	8
Function	DRM1/5	DRM2/6	DRM3/7	DRM4/8	REFGEN	COM/DRMO	-	-

Step 3-2 For Remote Shutdown. Run the cable through the steel plate . Then wire from pins 5 and 6. Table 4.6-1 describes the 6-pin port definition, Wiring is shown in Figure 4.5-4.

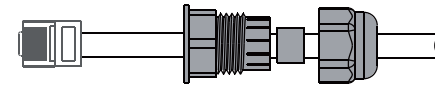


Figure 4.5-4 Remotely close the cable connection

Step 4. Connect RJ45 terminal to the right position onto the inverter. See Figure 4.5-5.

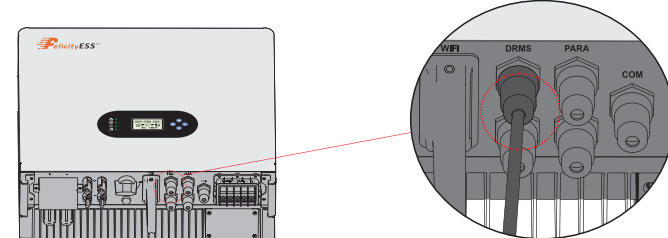


Figure 4.5-5 RJ45 interface

4.6 Lithium Battery Communication

It's allowed to connect lithium battery and build communication only which it has been configured. Please follow bellow steps to configure communication between lithium battery and inverter.

1. Connect power cables between lithium battery and inverter. Please pay attention to the terminals of positive and negative. Make sure the positive terminal of battery is connected to the positive terminal of inverter, and the negative terminal of battery is connected to the negative terminal of inverter.
2. The communication cable is bundled with lithium battery. Both sides are RJ45 port. One port is connected to the BMS port of inverter and another one is connected to the COMM port of lithium battery.

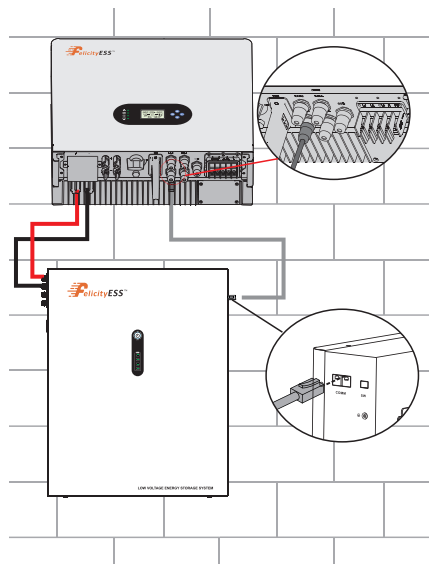
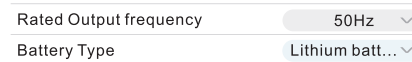


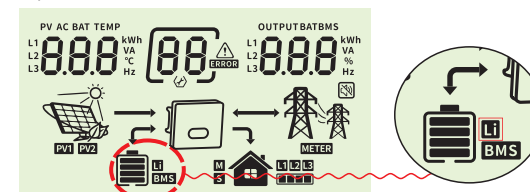
Table 4.6-1 :Detailed Pin Function Of BMS Port On T-REX

Position	Function	Note	
1	/	/	
2	/		
3	+VCC	Power Supply	
4	COM-GND		
5	RS485-B1	Lithium Battery Communication	
6	RS485-A1		
7	CANL1		
8	CANH1		

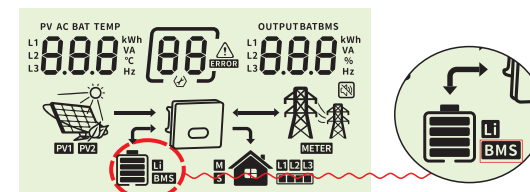
3. Configure battery type to lithium battery on the app



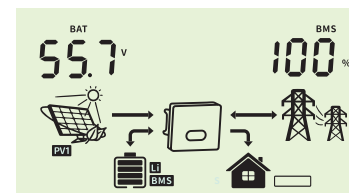
And then LCD will show you "Li" icon.



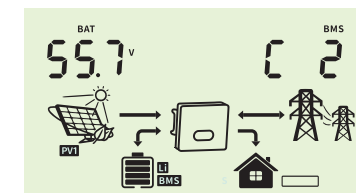
4. Power up lithium battery and inverter. Wait a moment, if the communication is built between them, LCD will show you "BMS" icon as below.



5. Roll LCD real time information pages by pressing "UP" or "DOWN" button, as below page, you can see the parameters of SOC, battery pack units and other informations in the communication system. LCD will be rolled these parameters or informations automatically.



Battery SOC is 100%



Battery pack units are 2

When it displays :

- "b50" means BMS doesn't allow inverter to charge battery
- "b51" means BMS doesn't allow inverter to discharge battery
- "b52" means BMS require inverter to charge battery

4.7 Installation of WIFI module

The WiFi communication function applies only to the WiFi module. For details, see Figure 4.7-1 installing a WiFi module.

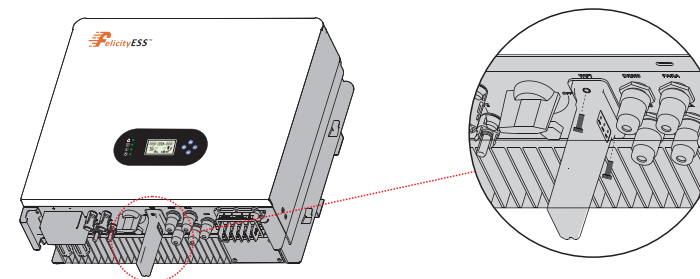


Figure 4.7-1 WiFi Module installation

4.8 Wiring System

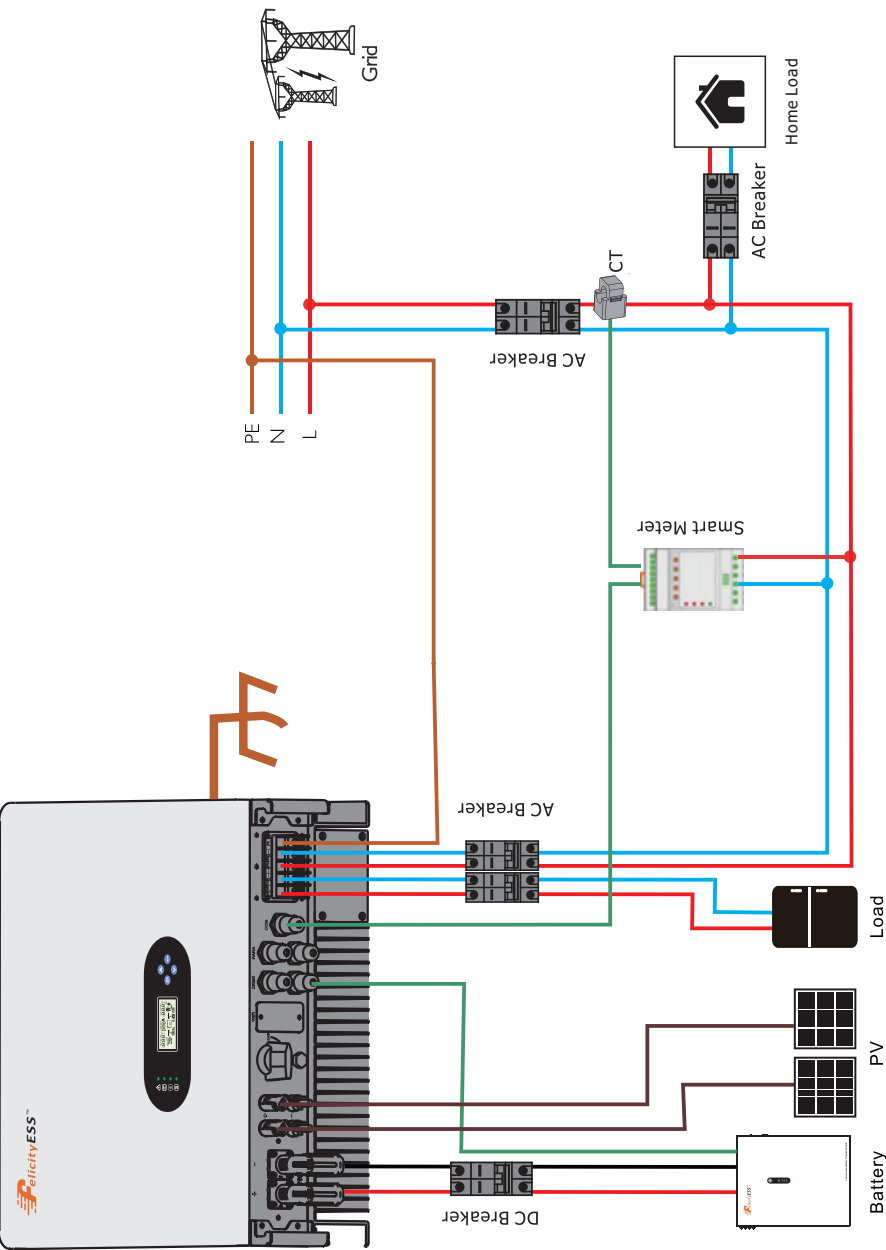
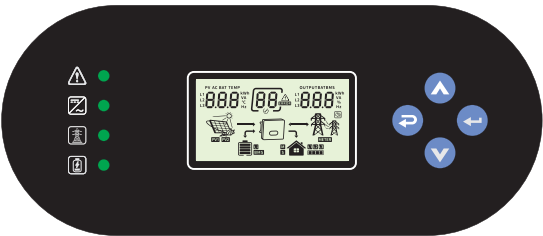


Figure 4.8-1 Inverter wiring system

5.Display and operation


This chapter describes the panel displaying and how to operate on the panel, which involves the LCD display, LED indicators and operation panel.

5.1 Operation and Display Panel



Function Key	Icon	Description
ESC		Hold on the "ESC" button last for 3S to turn off the inveter
UP		To go to previous selection
DOWN		To go to next selection
ENTER		Hold on the "ENTER" button last for 3S to turn on the inveter
LED Indicator	Icon	Description
Battery		Charging the battery, the LED light flash. If battery is full, the LED light will always-on. The battery is not charged, the LED light will go out.
Utility		Inverter running in utility mode, the LED will always-on. Inverter is not running in utility mode, the LED will go out.
Inverter		Inverter running in off-grid mode, the LED light will always-on. Inverter is not running in off-grid mode, the LED light will go out.
Fault		If inverter in fault event, the LED light will always-on. If inverter in warning event, the LED light will flash. Inverter work normally, the LED light will go out.
Buzzer Information		
Buzzer beep	Turn on/off the inverter, the buzzer will last for 2.5s. Press any button, the buzzer will last for 0.1s. Hold on the "ENTER" button, the buzzer will last for 3s. If in fault event, the buzzer will keep going. If in warning event, the buzzer will beep discontinuous (Check more information on the chapter of "Warning Code Table").	

8.Warning Code Table

When fault event happens, the fault LED is flashing. At the same time, warning code, icon  is shown on the LCD screen.

Warning Code	Warning Information	Audible Alarm	Trouble Shooting
07	Low battery		The battery voltage is too low, it should be charging.
09	Overload	Beep twice every second	Reduce the loads.
25	Phase Sequence Errors		Check that the input and output power lines correspond
51	BMS doesn't allow inverter to discharge battery.		Inverter will stop discharging battery automatically.
52	BMS require inverter to charge battery.		Inverter will charge battery automatically.
60	BMS firmware version is not matched.		Upgrade the firmware of BMS.

9.Troubleshooting

This chapter describes the fault alarm and fault code for quick troubleshooting.

Table 7-1 Fault code

Fault Code	Fault information	Trouble Shooting
01	PV voltage is too high	Reduce the number of Pv modules in series.
02	Over current happen at PV port	Restart the unit, if the error happens again, please return to repair center.
04	Stort circuit happen at PV port	Check if wiring is connect well.
06	Pv current sensor failed	Restart the unit, if the error happens again, please return to repair center.
07	Battery voltage is too high	Check if spec and quantity of batteries are meet requirements.
10	Abnormal LLC	Restart the unit, if the error happens again, please return to repair center.
11	Over current happen at Buckboost	Restart the unit, if the error happens again, please return to repair center.
14	BuckBoost is out of balance	Restart the unit, if the error happens again, please return to repair center.
15	Buckboost current sensor failed	Restart the unit, if the error happens again, please return to repair center.
16	NO.2 Buckboost current sensor failed	Restart the unit, if the error happens again, please return to repair center.

17	Overload time out	Reduce the connected load by switching off some equipment.
19	Output short circuited	Check if wiring is connected well and remove abnormal load.
20	Input output reverse	Confirm that the input and output wiring is correct.
21	OP current sensor failed	Output current sensor failed
22	Output voltage is too low	Reduce the connected load.
23	Output voltage is too high	Restart the unit, if the error happens again, please return to repair center.
24	Over current or surge detected by Software	Restart the unit, if the error happens again, please return to repair center.
25	Hardware detect over current at inverter port	Restart the unit, if the error happens again, please return to repair center.
26	Invert soft start failed	Internal components failed. Restart the unit, if the error happens again, please return to repair center.
28	The DC component of the inverter current is abnormal	Restart the unit, if the error happens again, please return to repair center.
29	Inverter current sensor failed	Restart the unit, if the error happens again, please return to repair center.
30	Bus voltage is too low	Restart the unit, if the error happens again, please return to repair center.
31	Bus voltage is too high	AC Surge or internal components failed. Restart the unit, if the error happens again, please return to repair center.
33	Bus soft start failed	Internal components failed. Restart the unit, if the error happens again, please return to repair center.
34	Over temperature happen at heat sink	Check whether the ambient temperature is too high.
35	The inner temperature over	Check whether the ambient temperature is too high.
36	Internal fan locking fault	Restart the unit, if the error happens again, please return to repair center.
38	Leakage current fault	Restart the unit, if the error happens again, please return to repair center.
39	Leakage current sensor failed	Restart the unit, if the error happens again, please return to repair center.
40	Isolation resistance to ground of the PV string is too low	Restart the unit, if the error happens again, please return to repair center.
42	Relay check failure	Restart the unit, if the error happens again, please return to repair center.

43	Parallel CAN COMM abnormality	Test the parallel communication line, restart still have problems please contact the after-sales service.
44	Loss of parallel hosts	
45	Parallel Synchronisation Signal Abnormal	
46	Inconsistency in parallel versions	1. Update all inverter firmware to the same version. 2. Check the version of each inverter via the LCD settings to ensure that the CPU versions are the same. If it is not the same, please contact after-sales personnel to update the firmware. 3. After updating, if the problem still exists, please contact after-sales.
47	Inconsistent parallel settings	Single-phase parallel system and group three-phase system setup error
48	Failure of the parallel system as a whole	Specific faults in other machines in the parallel system
49	Parallel negative power protection	Restart the unit, if the error happens again, please return to repair center.
50	EEPROM failure	Restart the unit, if the error happens again, please return to repair center.
51	DSP1 communication failure	Restart the unit, if the error happens again, please return to repair center.
52	DSP2 communication failure	Restart the unit, if the error happens again, please return to repair center.
53	PV parallel failure	Please confirm whether PV1 and PV2 need to be set to parallel mode. If not, please turn off this function in APP. If necessary, please confirm whether the wiring of PV1 and PV2 is connected to parallel mode.
54	Temperature sensor disconnected	Restart the unit, if the error happens again, please return to repair center.
87	Battery input circuit failure	Restart the unit, if the error happens again, please return to repair center.

Appendix

Model	T-REX-3KLP1G01	T-REX-3K6LP1G01	T-REX-4KLP1G01	T-REX-4K6LP1G01	T-REX-5KLP1G01	T-REX-6KLP1G01
Battery Input Data						
Battery Voltage Range	40V~60V					
Max. charging and discharging current	100A/100A					120A/120A
Max. charging and discharging power	3000W	3600W	4000W	4600W	5000W	6000W
Battery type	Li-Ion /Lead-acid					
DC Input Data (PV side)						
Max. recommended PV power	3900W	4700W	5200W	6000W	6500W	7800W
Max. PV voltage	550V					
Start voltage	130V					
PV voltage range	90V~550V					
MPPT voltage range	100V~500V					
MPPT Voltage Range for Full Load	140V~500V	160V~500V	175V~500V	200V~500V	220V~500V	260V~500V
Nominal voltage	360V					
Max. input current	15A/15A					
Max. shorted curent	18A/18A					
Number of MPP trackers /strings per MPP tracker	2/1					
Grid Data						
Nominal Input Voltage	230Vac					
Input Voltage Range	184~264.5Vac					
Nominal grid frequency	50/60Hz					
Max. input current	40A					
Max. Charge Current	100A					120A
Max. AC output power	3000W	3600W	4000W	4600W	5000W	6000W
AC Output Rated Current	13A	15.6A	17.4A	20A	21.7A	26A
Max. output current	16.3A	19.5A	21.7A	25A	25A	30A
Max. Continuous AC Passthrough	30A					

Hybrid inverters

Power factor	>0.99					
Displacement power factor	0.8leading...0.8lagging					
THDI	<3%					
AC Output Data(Back Up)						
Rated output power	3000VA/3000W	3600VA/3600W	4000VA/4000W	4600VA/4600W	5000VA/5000W	6000VA/6000W
Max. Output current	30A					
Rated AC output voltage	230Vac					
Rated AC output frequency	50/60Hz					
AC Output Data(Back Up)						
Max. efficiency	97.5%	97.5%	97.5%	97.6%	97.6%	97.6%
Euro efficiency	96.7%	96.7%	96.8%	97%	97%	97%
MPPT efficiency	99.9%					
Protection						
Output over current protection	Integrated					
Output over power protection	Integrated					
Output shorted protection	Integrated					
Anti-islanding protection	Integrated					
GFCI Protection	Integrated					
Insulation Resistor Detection	Integrated					
General Data						
Operating temperature range	-25°C~60°C,>45°C Derating					
Protection degree	IP65					
Relative humidity	100%					
Cooling concept	Nature					Intelligent Air Cooling
Altitude	2000m					
Communication	RS232/RS485					
BMS Communication	CAN/RS485					
Monitor module	WiFi/GPRS					

Hybrid inverters

Display	LCD+LED
Installation Style	Wall-mounted
Warranty	10 years
Grid Regulation	VDE-AR-N 4105; G99/1; EN50549-1; CEI 0-21; AS 4777.2; NRS 097-2-1;
Safety Regulation	IEC 62109-1/2 , IEC 62040-1
EMC	EN61000-6-1 , EN61000-6-3
Net Weight	32.4KG
Gross Weight	39.1KG
Product Dimension	530*493*228MM
Package Dimension	632*570*315MM
[1]Conditions apply,refer to FelicityESS Warranty policy.	

* According to local grid-connected standards

Features:

- Support WiFi for mobile monitoring
- 48V low voltage battery, transformer isolation topology
- Max. charging/discharging current of 120A
- AC couple to retrofit existing solar system
- Support storing energy from diesel generator
- Power supply can be switched automatically and switching time within 20ms