

# iHome-INV3K-6K- L1h02 User Manual

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# About This Manual

The manual mainly describes the product information, guidelines for installation, operation and maintenance. The manual cannot include complete information about the photovoltaic (PV) system.

#### How to Use This Manual

Read the manual and other related documents before performing any operation on the inverter. Documents must be stored carefully and be available at all times.

Contents may be periodically updated or revised due to product development. The information in this manual is subject to change without notice.

# **1. Safety Introductions**

- $\cdot$  This chapter contains important safety and operating instructions. Read and keep this manual for future reference.
- Before using the inverter, please read the instructions and warning signs of the battery and corresponding sections in the instruction manual.
- $\cdot$  Do not disassemble the inverter. If you need maintenance or repair, take it to a professional service center.
- · Improper reassembly may result in electric shock or fire.
- $\cdot$  To reduce risk of electric shock, disconnect all wires before attempting any maintenance or cleaning. Turning off the unit will not reduce this risk.
- $\cdot$  Caution: Only qualified personnel can install this device with battery.
- · Never charge a frozen battery.
- · For optimum operation of this inverter, please follow required specification to select appropriate cable size. It is very important to correctly operate this inverter.
- · Be very cautious when working with metal tools on or around batteries. Dropping a tool may cause a spark or short circuit in batteries or other electrical parts, even cause an explosion.
- Please strictly follow installation procedure when you want to disconnect AC or DC terminals. Please refer to "Installation" section of this manual for the details.
- Grounding instructions this inverter should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this inverter.
- $\cdot$  Never cause AC output and DC input short circuited. Do not connect to the mains when DC input short circuits.

# 2. Product Introductions

This is a multifunctional inverter, combining functions of inverter, solar charger and battery charger to offer uninterruptible power support with portable size. Its comprehensive LCD display offers user configurable and easy accessible button operation such as battery charging, AC/solar charging, and acceptable input voltage based on different applications.

#### 2.1 Product Overview and Size



- 1: Inverter Indicators
- 2: LCD display
- 3: Function Buttons
- 4: Battery input connectors
- 5: RS485/CAN Port

- 6: Meter Port
- 7: Function Port
- 8: Parallel port
- 9: Generator input
- 10: Load
- 11: Grid
- 12: Power on/off button
- 13: DC Switch

- 14: PV input with two MPPT
- 15: Battery
- 16: Temperature sensor
- 17: WiFi Interface
- 18: DRM Port

## iHome-INV(3-5)k-L1H02







- 1: Inverter Indicators
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- 14: Battery
- 15: Temperature sensor
- 16: WiFi Interface
- 17: Fan
- 18: DRM Port





#### 2.2 Product Features

- Self-consumption and feed-in to the grid.
- Auto restart while AC is recovering.
- Programmable supply priority for battery or grid.
- Programmable multiple operation modes: On grid, off grid and UPS.
- Configurable battery charging current/voltage based on applications by LCD setting.
- Configurable AC/Solar/Generator Charger priority by LCD setting.
- Compatible with mains voltage or generator power.
- Overload/over temperature/short circuit protection.
- Smart battery charger design for optimized battery performance
- With limit function, prevent excess power overflow to the grid.
- Supporting WIFI monitoring and build-in 2 strings of MPP trackers
- Smart settable three stages MPPT charging for optimized battery performance.
- Time of use function.
- Smart Load Function.

#### 2.3 Basic System Architecture

The following illustration shows basic application of this inverter.

It also includes following devices to have a Complete running system.

- Generator or Utility
- PV modules

Consult with your system integrator for other possible system architectures depending on your requirements.

This inverter can power all kinds of appliances in home or office environment, including motor type appliances such as refrigerator and air conditioner.

#### 2.4 Maintenance of the System

The inverter is low maintenance, however, it is important that at least twice a year (for dusty environments this may need to be carried out weekly) all the cooling fans, air ducts are cleaned and dust free. Check if there are no fault codes and Lithium battery communication is correct. Weekly cleaning statement: Suggest micromesh filters as an available option.



# 3. Installation

#### 3.1 Parts List

Check the equipment before installation. Please make sure nothing is damaged in the package. You should have received the items in the following package:



### **3.2 Mounting instructions**

#### **Installation Precaution**

This Hybrid inverter is designed for outdoor use(IP65), Please make sure the installation site meets below conditions:

- $\cdot$  Not in direct sunlight
- $\cdot$  Not in areas where highly flammable materials are stored.
- $\cdot$  Not in potential explosive areas.
- $\cdot$  Not in the cool air directly.
- $\cdot$  Not near the television Antenna or antenna cable.
- $\cdot$  Not higher than altitude of about 2000 meters above sea level.
- · Not in environment of precipitation or humidity(>95%)

Please AVOID direct sunlight, rain exposure, snow laying up during installation and operation. Before connecting all wires, please take off the metal cover by removing screws as shown below:



#### Considering the following points before selecting where to install:

- Please select a vertical wall with load-bearing capacity for installation, suitable for installation on concrete or other non-flammable surfaces, installation is shown below.
- · Install this inverter at eye level in order to allow the LCD display to be read at all times.
- $\cdot$  The ambient temperature is recommeded to be between -40~60  $^\circ C$  to ensure optimal operation.
- Be sure to keep other objects and surfaces as shown in the diagram to guarantee sufficient heat dissipation and have enough space for removing wires.



For proper air circulation to dissipate heat, allow a clearance of approx. 50cm to the side and approx. 50cm above and below the unit. And 100cm to the front.

#### Mounting the inverter

Remember that this inverter is heavy! Please be careful when lifting out from the package. Choose the recommend drill head(as shown in below pic) to drill 4 holes on the wall, 82-90mm deep.

- 1. Use a proper hammer to fit the expansion bolt into the holes.
- 2. Carry the inverter and holding it, make sure the hanger aim at the expansion bolt, fix the inverter on the wall.
- 3. Fasten the screw head of the expansion bolt to finish the mounting.



Inverter hanging plate installation



#### **3.3 Battery connection**

For safe operation and compliance, a separate DC over-current protector or disconnect device is required between the battery and the inverter. In some applications, switching devices may not be required but over-current protectors are still required. Refer to the typical amperage in the table below for the required fuse or circuit breaker size.

Model Wire Size		Cable(mm <sup>2</sup> )	Torque value(max)
3/3.6/5/6Kw	2AWG	35	5.2Nm

Chart 3-2 Cable size

All wiring must be performed by a professional person.



Connecting the battery with a suitable cable is important for safe and efficient operation of the system. To reduce the risk of injury, refer to Chart 3-2 for recommended cables.

Please follow below steps to implement battery connection:

- 1. Please choose a suitable battery cable with correct connector which can well fit into the battery terminals.
- 2. Use a suitable screwdriver to unscrew the bolts and fit the battery connectors in, then fasten the bolt by the screwdriver, make sure the bolts are tightened with torque of 5.2 N.M in clockwise direction.
- 3. Make sure polarity at both the battery and inverter is correctly connected.



DC Battery Input

4. In case of children touch or insects go into the inverter, Please make sure the inverter connector is fasten to waterproof position by twist it clockwise.



Installation must be performed with care.



Before making the final DC connection or closing DC breaker/disconnect, be sure positive(+) must be connect to positive(+) and negative(-) must be connected to negative(-). Reverse polarity connection on battery will damage the inverter.

### 3.3.2 Function port definition



#### 3.3.3 Temperature sensor connection for lead-acid battery



# 3.4 Grid connection and backup load connection

- Before connecting to the grid, a separate AC breaker must be installed between the inverter and the grid, and also between the backup load and the inverter. This will ensure the inverter can be securely disconnected during maintenance and fully protected from over current. For the 3/3.6/5/6KW model, the recommended AC breaker for backup load is 40A. For the 3/3.6/ 5/6KW model, the recommended AC breaker for grid is 40A. In final installation, breaker certified according to AS60947.3 shall be installed with the equipment.
- There are three terminal blocks with "Grid" "Load" and "GEN" markings. Please do not misconnect input and output connectors.



Model	Wire Size	Cable(mm <sup>2</sup> )	Torque value(max)
ЗКw	10AWG	4	1.2Nm
3.6Kw	10AWG	6	1.2Nm
5Kw	10AWG	6	1.2Nm
6Kw	8AWG	8	1.2Nm

Chart 3-3 Recommended Size for AC wires

#### Please follow below steps to implement AC input/output connection:

- 1. Before making Grid, load and Gen port connection, be sure to turn off AC breakeror disconnector first.
- 2. Remove insulation sleeve 10mm length, unscrew the bolts, insert the wires according to polarities indicated on the terminal block and tighten the terminal screws. Make sure the connection is complete.





Be sure that AC power source is disconnected before attempting to wire it to the unit.

- 3. Then, insert AC output wires according to polarities indicated on the terminal block and tighten terminal. Be sure to connect corresponding N wires and PE wires to related terminals as well.
- 4. Make sure the wires are securely connected.
- 5. Appliances such as air conditioner are required at least 2-3 minutes to restart because it is required to have enough time to balance refrigerant gas inside of circuit. If a power shortage occurs and recovers in short time, it will cause damage to your connected appliances. To prevent this kind of damage, please check manufacturer of air conditioner if it is equipped with time-delay function before installation. Otherwise, this inverter will trigger overload fault and cut off output to protect your appliance but sometimes it still causes internal damage to the air conditioner

# 3.5 PV Connection

The PV modules used to connected to this inverter shall be Class A rating certified according to IEC 61730.

Before connecting to PV modules, please install a separately DC circuit breaker between inverter and PV modules. It is very important for system safety and efficient operation to use appropriate cable for PV module connection. To reduce risk of injury, please use the proper recommended cable size as below.

Model	Wire Size	Cable(mm )
3/3.6/5/6Kw	12AWG	4

#### Chart 3-4 Cable size



To avoid any malfunction, do not connect any PV modules with possible current leakage to the inverter. For example, grounded PV modules will cause current leakage to the inverter. When using PV modules, please ensure the PV+ & PV- of solar panel is not connected to the system ground bar.

It is requested to use PV junction box with surge protection. Otherwise, it will cause damage on inverter when lightning occurs on PV modules.

#### 3.5.1 PV Module Selection:

When selecting proper PV modules, please be sure to consider below parameters:

- 1)Open circuit Voltage (Voc) of PV modules not exceeds max. PV array open circuit voltage of inverter.
- 2) Open circuit Voltage (Voc) of PV modules should be higher than min. start voltage.

Inverter Model	ЗКШ	3.6KW	5KW	6KW
PV Input Voltage	370V (125V~500V)			
PV Array MPPT Voltage Range	150V-425V			
No. of MPP Trackers	1	1 2		
No. of Strings per MPP Tracker	1	1+1	1+1	1+1





#### Note:

This inverter complies with IEC 62109-2 clause 13.9 for earth fault alarm monitoring. If an Earth Fault Alarm occurs, the inverter will not connect to the grid and will report an error F04 on its LCD. At the same time, the buzzer will sound.

#### 3.6 CT Connection



#### 3.6.1 Meter Connection





Note:

linverter has built-in leakage current detection circuit, If an external RCD is required, a type-A RCD with rated residual current of 300mA or higher is suggested. Otherwise inverter may not work properly

## 3.7 Earth Connection(mandatory)

Ground cable shall be connected to ground plate on grid side this prevents electric shock. if the original protective conductor fails.



#### **3.8 WIFI Connection**

For the configuration of Wi-Fi Plug, please refer to illustrations of the Wi-Fi Plug. The Wi-Fi Plug is not a standard configuration, it's optional.

#### 3.9 Wiring System for Inverter



# 4. OPERATION

#### 4.1 Power ON/OFF

Once the unit has been properly installed and the batteries are connected well, simply press On/Off button(located on the left side of the case) to turn on the unit.When system without battery connected, but connect with either PV or grid, and ON/OFF button is switched off, LCD will still light up(Display will show OFF), In this condition, when switch on ON/OFF button and select NO battery, system can still work.(NOTE: Choose the correct country code. (refer to section 5.8 of this manual) Notice: Different distribution network operators in different countries have different requirements regarding grid connections of PV grid connected inverters. Therefore, it's very important to make sure that you have selected the correct country code according to requirements of local authority. Please consult qualified electrical engineer or personnel from electrical safety authorities about this.)

#### 4.2 Operation and Display Panel

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes four indicators, four function keys and a LCD display, indicating the operating status and input/output power information.

L	ED Indicator	Messages	
DC	Green led solid light	PV Connection normal	
AC Green led solid light		Grid Connection normal	
Normal Green led solid light		Inverter operating normal	
Alarm	Red led solid light	Malfunction or warning	

#### Chart 4-1 LED indicators

Function Key	Description
Esc	To exit setting mode
Up	To go to previous selection
Down	To go to next selection
Enter	To confirm the selection

#### Chart 4-2 Function Buttons

# 5. LCD Display Icons

#### 5.1 Main Screen

The LCD is touchscreen, below screen shows the overall information of the inverter.



1. The icon in the center of the home screen indicates that the system is Normal operation. If it turns into "comm./FXX", it means the inverter has communication errors or other errors, the error message will display under this icon(FXX errors, detail error info can be viewed in the System Alarms menu).

2. At the top of the screen is the time.

3. System Setup Icon, Press this set button, you can enter into the system setup screen which including Basic Setup, Battery Setup, Grid Setup, System Work Mode, Generator port use, Advanced function and Li-Batt info.

4. The main screen showing the info including Solar, Grid, Load and Battery. Its also displaying the energy flow direction by arrow. When the power is approximate to high level, the color on the panels will changing from green to red so system info showing vividly on the main screen.

- · PV power and Load power always keep positive.
- · Grid power negative means sell to grid, positive means get from grid.
- · Battery power negative means charge, positive means discharge.

#### 5.1.1 LCD operation flow chart



#### 5.2 Solar Power Curve



Batt	
Stand-by	
SOC: 36%	
U:50.50V	
I:-58.02A	
Power: -2930W	
Temp:30.0C	Li-BMS

This is Battery detail page.

if you use Lithium Battery, you can enter BMS page.

#### Li-BMS

Mean Voltage:50.34V Charging Voltage :53.2V				
Total Current:55.00A E	ischarging Voltage :47.0V	Sum		
Mean Temp :23.5C	Charging current :50A	Data		
Total SOC :38%	Discharging current :25A			
Dump Energy:57Ah				
		Data		

L	.i-BN	٨S						
			Temp		Energy	Charge	Fault	
						Volt Curr		
1	50.38V	19.70A	30.6C	52.0%	26.0Ah	0.0V 0.0A	0 0 0	
2	50.33V	19.10A	31.0C	51.0%	25.5Ah	53.2V 25.0A	0 0 0	Sum
3	50.30V	16.90A	30.2C	12.0%	6.0Ah	53.2V 25.0A	0 0 0	
4	0.00V	0.00A	0.0C	0.0%		0.0V 0.0A	0 0 0	Data
5						0.0V 0.0A		
6								
7								$\equiv$
8						0.0V 0.0A		
9								
10								Details
11						0.0V 0.0A		Data
12						0.0V 0.0A		
13						0.0V 0.0A		
14								
15								

#### 5.3 Curve Page-Solar & Load & Grid





Solar power curve for daily, monthly, yearly and total can be roughly checked on the LCD, for more accuracy power generation, pls check on the monitoring system. Click the up and down arrow to check power curve of different period.

#### 5.4 System Setup Menu



#### 5.5 Basic Setup Menu



Factory Reset: Reset all parameters of the inverter. Lock out all changes: Enable this menu for setting parameters that require locking and cannot be set up. Before performing a successful factory reset and locking the systems, to keep all changes you need to type in a password to enable the setting.



## 5.6 Battery Setup Menu



**Battery capacity:** it tells hybrid inverter to know your battery bank size.

Use Batt V: Use Battery Voltage for all the settings (V).

Use Batt %: Use Battery SOC for all the settings (%).

Max. A charge/discharge: Max battery charge/discharge current(0-140A for 3KW-24 model,0-70A for 3KW model, 0-90A for 3.6KW model,0-120A for 5KW model, 0-135A for 6KW model). For AGM and Flooded, we recommend Ah battery

size x 20%= Charge/Discharge amps. . For Lithium, we recommend Ah battery size x 50% = Charge/Discharge amps.

. For Gel, follow manufacturer's instructions.

**No Batt:** tick this item if no battery is connected to the system.

Active battery: This feature will help recover a battery that is over discharged by slowly charging from the solar array or grid.



This is Grid Charge, you need select. (2)

Start =30%: No use, Just for customization.

Grid Charge: It indicates that the grid charges

= 40A: It indicates the Current that the

This is Battery Setup page. (1)(3)

**Start =30%:** Percent S.O.C at 30% system will AutoStart a connected generator to charge the battery bank.

**A** = **40A:** Charge rate of 40A from the attached generator in Amps.

**Gen Charge:** uses the gen input of the system to charge battery bank from an attached generator.

**Gen Signal:** Normally open relay that closes when the Gen Start signal state is active.

Gen Max Run Time: It indicates the longest time Generator can run in one day, when time is up, the Generator will be turned off. 24H means that it does not shut down all the time.

Gen Down Time: It indicates the delay time of the Generator to shut down after it has reached the running time.

Grid Signal: Disable.

the battery.

Grid charges the Battery.

Δ



This page tells the PV and diesel generator power the load and battery.

Generator		
Power: 1392W	Today=0.0 KWH Total =2.20 KWH	This page tells generator output voltage, frequency, power. And, how much energy is used from generator.
L1: 228V		
Freq:50.0Hz		



Lithium Mode: This is BMS protocol.Please reference the document(Approved Battery).

**Shutdown 10%:** It indicates the inverter will shutdown if the SOC below this value.

Low Batt 20%: It indicates the inverter will alarm if the SOC below this value.

**Restart 40%:** Battery voltage at 40% AC output will resume.



#### Recommended battery settings

Battery Type	Absorption Stage	Float Stage	Torque value (every 30 days 3hr )	
AGM (or PCC)	14.2v (57.6v)	13.4v (53.6v)	14.2v(57.6v)	
Gel	14.1v (56.4v)	13.5v (54.0v)		
Wet	14.7v (59.0v)	13.7v (55.0v)	14.7v(59.0v)	
Lithium	Follow its BMS voltage parameters			

#### 5.7 System Work Mode Setup Menu



#### Work Mode

Selling First: This Mode allows hybrid inverter to sell back any excess power produced by the solar panels to the grid. If time of use is active, the battery energy also can be sold into grid.

The PV energy will be used to power the load and charge the battery and then excess energy will flow to grid. Power source priority for the load is as follows:

- 1. Solar Panels.
- 2. Grid.

3. Batteries (until programable % discharge is reached).

**Zero Export To Load:** Hybrid inverter will only provide power to the backup load connected. The hybrid inverter will neither provide power to the home load nor sell power to grid. The built-in CT will detect power flowing back to the grid and will reduce the power of the inverter only to supply the local load and charge the battery.



Zero Export To CT: Hybrid inverter will not only provide power to the backup load connected but also give power to the home load connected. If PV power and battery power is insufficient, it will take grid energy as supplement. The hybrid inverter will not sell power to grid. In this mode, a CT is needed. The installation method of the CT please refer to chapter 3.6 CT Connection. The external CT will detect power flowing back to the grid and will reduce the power of the inverter only to supply the local load, charge battery and home load.





#### Note:

Customer can only use export limit control function by CT or meter.

Solar Sell: "Solar sell" is for Zero export to load or Zero export to CT: when this item is active, the surplus energy can be sold back to grid. When it is active, PV Power source priority usage is as follows: load consumption and charge battery and feed into grid.

Max. sell power: Allowed the maximum output power to flow to grid.

Zero-export Power: for zero-export mode, it tells the grid output power. Recommend to set it as 20-100W to ensure the hybrid inverter won't feed power to grid.

Energy Pattern: PV Power source priority.

**Batt First:** PV power is firstly used to charge the battery and then used to power the load. If PV power is insufficient, grid will make supplement for battery and load simultaneously.

**Load First:** PV power is firstly used to power the load and then used to charge the battery. If PV power is insufficient, grid will make supplement for battery and load simultaneously.

Max Solar Power: allowed the maximum DC input power.

Grid Peak-shaving: when it is active, grid output power will be limited within the set value. If the load power exceeds the allowed value, it will take PV energy and battery as supplement. If still can't meet the load requirement, grid power will increase to meet the load needs.



System W	ork Mo	de			
Grid Charge <sup>Gen</sup>		<b>/</b> Time Time	Of Use Power	Batt	Work
	01:00	5:00	5000	80%	Mode
	05:00	8:00	5000	40%	$\left[ \prod \right]$
	08:00	10:00	5000	40%	
	10:00	15:00	5000	80%	
	15:00	18:00	5000	40%	
	18:00	01:00	5000	35%	

Time of use: it is used to program when to use grid or generator to charge the battery, and when to discharge the battery to power the load. Only tick "Time Of Use" then the follow items (Grid, charge, time, power etc.) will take effect.

**Note:** when in selling first mode and click time of use, the battery power can be sold into grid.

Grid charge: utilize grid to charge the battery in a time period.

**Gen charge:** utilize diesel generator to charge the battery in a time period.

Time: real time, range of 01:00-24:00.

**Power:** Max. discharge power of battery allowed. **Batt(V or SOC %):** battery SOC % or voltage at when the action is to happen.

#### For example:

During 01:00-05:00, when battery SOC is lower than 80%, it will use grid to charge the battery until battery SOC reaches 80%. During 05:00-08:00 and 08:00-10:00, when battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%.

During 10:00-15:00, when battery SOC is higher than 80%, hybrid inverter will discharge the battery until the SOC reaches 80%. During 15:00-18:00, when battery SOC is higher than 40%, hybrid inverter will discharge the battery until the SOC reaches 40%. During 18:00-01:00, when battery SOC is higher than 35%, hybrid inverter will discharge the battery until the SOC reaches 35%.

#### 5.8 Grid Setup Menu

#### **5.8.1 Commissioning Procedure**

If all physical connection is checked ok, please follow the steps below.

1.Turn on AC circuit breaker.

- 2. Turn on DC circuit breaker on PV strings and battery.
- 3. Turn on circuit breaker on battery pack.
- 4. Turn on DC switch on the inverter
- 5. Check the inverter status by inverter indicators and battery status by battery indicators.



#### Note:

Inverters cannot be installed in multiple combinations.

### 5.8.2 Grid Standard Selection



Grid Mode: General Standard、UL1741 & IEEE1547、 CPUC RULE21、SRD-UL-1741、CEI 0-21、EN50549\_CZ、 Australia A、Australia B、Australia C、NewZealand、 VDE4105、OVE\_Directive\_R25、EN50549\_CZ\_PPDS\_L16A、 NRS097、G98、G99.

Please follow the local grid code and then choose the corresponding grid standard.

For The Australian Market:

For compliance with AS/NZS 4777.2:2020 please select from

Australia A
 Australia B
 Australia C
 New Zealand

Please contact your local grid operator for which option to select Note: By selecting Australia A, Australia B or Australia C the power quality response mode and grid protection settings will be reset to their default values for Australia RegionA, B, C respectively.

#### Default volt-watt settings for different regions are shown in the following table:

Region	Default value	Vw <sub>1</sub>	Vw₁-ch	Vw <sub>2</sub>	Vw2-ch
	Voltage	253V	207V	260V	215V
Australia A	Inverter maximum active power output level(P) % of Srated	100%	20%	20%	100%
	Voltage	250V	195V	260V	215V
Australia B	Inverter maximum active power output level(P) % of Srated	100%	0%	20%	100%
	Voltage	253V	207V	260V	215V
Australia C	Inverter maximum active power output level(P) % of Srated	100%	20%	20%	100%
	Voltage	242V	216V	250V	224V
New Zealand	Inverter maximum active power output level(P) % of Srated	100%	20%	20%	100%

Default volt-var settings for different regions are shown in the following table:

Region	Default value	Vv <sub>1</sub>	Vv <sub>2</sub>	Vv <sub>3</sub>	Vv4
	Voltage	207V	220V	240V	258V
Australia A	Inverter maximum active power output level(P) % of Srated	44%supplying	0%	0%	60%absorbing
Australia B	Voltage	205V	220V	235V	255V
	Inverter maximum active power output level(P) % of Srated	30%supplying	0%	0%	40%supplying
	Voltage	215V	230V	240V	255V
Australia C	Inverter maximum active power output level(P) % of Srated	44%supplying	0%	0%	60%supplying
New Zealand	Voltage	207V	220V	235V	244V
	Inverter maximum active power output level(P) % of Srated	60%supplying	0%	0%	60%supplying



**Normal connect**: The allowed grid voltage/frequency range when the inverter first time connect to the grid. **Normal Ramp rate**: It is the startup power ramp.

**Reconnect after trip**: The allowed grid voltage /frequency range for the inverter connects the grid after the inverter trip from the grid.

Reconnect Ramp rate: It is the reconnection power ramp.

**Reconnection time**: The waiting time period for the inverter connects the grid again **PF**: Power factor which is used to adjust inverter reactive power

- HV1: Level 1 overvoltage protection point;
  1 HV2: Level 2 overvoltage protection point;
  2 0.10s—Trip time.
  HV3: Level 3 overvoltage protection point.
  LV1: Level 1 undervoltage protection point;
  LV2: Level 2 undervoltage protection point;
  LV3: Level 3 undervoltage protection point;
  HF1: Level 1 over frequency protection point;
  HF2: Level 2 over frequency protection point;
  HF3: Level 3 over frequency protection point;
  LF1: Level 1 under frequency protection point;
  LF2: Level 2 under frequency protection point;
  LF2: Level 2 under frequency protection point;
  - LF3: Level 3 under frequency protection point.

**FW**: this series inverter is able to adjust inverter output power according to grid frequency. **Droop** f: percentage of nominal power per Hz For example, "Start freq f > 50.2Hz, Stop freq f < 50.2, Droop f = 40%PE/Hz" when the grid frequency reaches 50.2Hz, the inverter will decrease its active power at Droop f of 40%. And then when grid system frequency is less than 50.2Hz, the inverter will stop decreasing output power.

For the detailed setup values, please follow the local grid code.



Grid Setting/IP Protection

Grid Setti	ng/F(W	)		
	F(W)			
Over frequenc	y	Droop f	40%PE/Hz	Grid
Start freq f	50.20Hz	Stop freq f	50.20Hz	Set4
Start delay f	0.00s	Stop delay f	0.00s	
Under frequen	icy	Droop f	40%PE/Hz	
Start freq f	49.80Hz	Stop freq f	49.80Hz	
Start delay f	0.00s		0.00s	



V(W): It is used to adjust the inverter active power according to the set grid voltage.
 V(Q): It is used to adjust the inverter reactive power according to the set grid voltage.
 This function is used to adjust inverter output power (active power and reactive power) when grid voltage changes.

Lock-in/Pn 5%: When the inverter active power is less than 5% rated power, the VQ mode will not take effect. Lock-out/Pn 20%: If the inverter active power is increasing from 5% to 20% rated power, the VQ mode will take effect again.

For example: V2=110%, P2=20%. When the grid voltage reaches the 110% times of rated grid voltage, inverter output power will reduce its active output power to 20% rated power.

For example: V1=90%, Q1=44%. When the grid voltage reaches the 90% times of rated grid voltage, inverter output power will output 44% reactive output power.

For the detailed setup values, please follow the local grid code.



P(Q): It is used to adjust the inverter reactive power according to the set active power.
 P(PF): It is used to adjust the inverter PF according to the set active power.

For the detailed setup values, please follow the local grid code.

Lock-in/Pn 50%: When the inverter output active power is less then 50% rated power, it won't enter the P(PF) mode.

**Lock-out/Pn 50%**: When the inverter output active power is higher then 50% rated power, it will enter the P(PF) mode.

Note : only when the grid voltage is equal to or higher than 1.05times of rated grid voltage, then the P(PF) mode will take effect.

**Reserved:** This function is reserved. It is not recommended.



**Basic Setting** Beep 🗸 Auto Dim Time Syncs Month Basic Yeaı Dav Set + + + 17 -Hour Minute + +  $\overline{\checkmark}$ 

After setting grid parameters, please select "Lock out all changes" and enter password. If the engineer does not know the password, please contact your distributor.

#### 5.8.2 Grid Parameter Check

After steps above, customers can see firmware version on main page grid parameters in grid settings on LCD.

#### 5.9 Generator Port Use Setup Menu



Generator input rated power: allowed Max. power from diesel generator.

GEN connect to grid input: connect the diesel generator to the grid input port.

Smart Load Output: This mode utilizes the Gen input connection as an output which only receives power when the battery SOC and PV power is above a user programmable threshold.

e.g. Power=500W, ON: 100%, OFF=95%: When the PV power exceeds 500W, and battery bank SOC reaches 100%, Smart Load Port will switch on automatically and power the load connected. When the battery bank SOC < 95% or PV power < 500w, the Smart Load Port will switch off automatically.

#### Smart Load OFF Batt

• Battery SOC at which the Smart load will switch off.

#### Smart Load ON Batt

• Battery SOC at which the Smart load will switch on. Also, the PV input power should exceed the setting value (Power) simultaneously and then the Smart load will switch on.

On Grid always on: When click "on Grid always on" the smart load will switch on when the grid is present.

Micro Inv Input: To use the Generator input port as a micro-inverter on grid inverter input (AC coupled), this feature will also work with "Grid-Tied" inverters.

\* Micro Inv Input OFF: when the battery SOC exceeds setting value, Microinveter or grid-tied inverter will shut down. \* Micro Inv Input ON: when the battery SOC is lower than setting value, Microinveter or grid-tied inverter will start to work.

AC Couple Fre High: If choosing "Micro Inv input", as the battery SOC reaches gradually setting value (OFF), During the process, the microinverter output power will decrease linear. When the battery SOC equals to the setting value (OFF), the system frequency will become the setting value (AC couple Fre high) and the Microinverter will stop working. \* MI export to grid cutsoff: Stop exporting power produced by the microinverter to the grid.

\* Note: Micro Inv Input OFF and On is valid for some certain FW version only.

- \* AC couple on load side: connecting the output of on-grid inverter at the load port of the hybrid inverter. In this situation, the hybrid inverter will not able to show the load power correctly.
- \* AC couple on grid side: this function is reserved.
- \* Note: Some firmware versions don't have this function.

#### 5.10 Advanced Function Setup Menu



Solar Arc Fault ON: This is only for US. System selfcheck: Disable. this is only for factory. Gen Peak-shaving: Enable When the power of the generator exceeds the rated value of it, the inverter will provide the redundant part to ensure that the generator will not overload.

DRM: For AS4777 standard Backup Delay: Reserved

**BMS\_Err\_Stop:** When it is active, if the battery BMS failed to communicate with inverter, the inverter will stop working and report fault.

Signal ISLAND MODE: when "signal island mode" is checked and the inverter connects the grid, the ATS port voltage will be 0. When "signal island mode" is checked and the inverter disconnected from the grid, the ATS port voltage will output 230Vac voltage. With this feature and outside NO type relay, it can realize N and PE disconnection or bond.

More details, please refer to left side picture.



**Ex\_Meter For CT:** when in Three phase system with CHNT Three phase energy meter (DTSU666), click corresponding phase where hybrid inverter is connected. e.g. when the hybrid inverter output connects to A phase, please click A Phase.



**ATS:** It is related with ATS port voltage. it is better in "uncheck" position.

#### 5.11 Device Info Setup Menu



#### 6. Mode Mode I:Basic



#### Mode II: With Generator



### Mode III: With Smart-Load



#### Mode IV: AC Couple





The 1st priority power of the system is always the PV power, then 2nd and 3rd priority power will be the battery bank or grid according to the settings. The last power backup will be the Generator if it is available.

# 7. Fault information and processing

The energy storage inverter is designed according to the grid-connected operation standard and meets the safety requirements and electromagnetic compatibility requirements. Before leaving the factory, the inverter undergoes several rigorous tests to ensure that the inverter can operate reliably.



If any of the fault messages listed in Table 6-1 appear on your inverter and the fault has not been removed after restarting, please contact your local dealer or service center. You need to have the following information ready.

- 1. Inverter serial number;
- 2. Distributor or service center of the inverter ;
- 3. On-grid power generation date;
- 4. The problem description (including the fault code and indicator status displayed on the LCD) is as detailed as possible.
- 5. Your contact information. In order to give you a clearer understanding of the inverter's fault information, we will list all possible fault codes and their descriptions when the inverter is not working properly.

Error code	Description	Solutions
F08	GFDI _Relay_Failure	<ol> <li>When inverter is in Split phase(120/240Vac) or three-phase system(120/208Vac)system, the backupload portNine needs to connect ground;</li> <li>If the fault still exists, please contact us for help.</li> </ol>
F13	Working mode change	<ol> <li>When the grid type and frequency changed it will report F13;</li> <li>When the battery mode was changed to "No battery" mode, it will report F13;</li> <li>Forsomeold FW version, it will report F13 when the system mode</li> <li>Generally, it will disappear automatically when shows F13;</li> <li>If still same, and turn off the DC switch and AC, switch and wait for one minute and then turn on the DC/AC switch;</li> <li>Seek help from us, if can not go back to normal state.</li> </ol>
F18	AC over current fault of hardware	<ul> <li>AC side over current fault</li> <li>Please check whether the backup load power and common load power are within the range;</li> <li>Restart and check whether it is in normal;</li> <li>Seek help from us, if can not go back to normal state.</li> </ul>
F20	DC over current fault of the hardware	DC side over current fault 1. Check PV module connect and battery connect; 2. When in the off-grid mode, the inverter startup with big power load, it may report 20. Please reduce the load power connected; 3. Turn off the DC switch and AC switch and then wait one minute, then turn on the DC/AC switch again; 4. Seek help from us, if can not go back to normal state.
F22	Tz_EmergStop_Fault	Please contact your installer for help.
F23	AC leakage current is transient over current	Leakage current fault 1. Check PV side cable ground connection. 2. Restart the system 2~3 times. 3. If the fault still exists, please contact us for help.
F24	DC insulation impedance failure	PV isolation resistance is too low 1. Check the connection of PV panels and inverter is firmly and correctly; 2. Check whether the PE cable of inverter is connected to ground; 3. Seek help from us, if can not go back to normal state.
F26	The DC busbar is unbalanced	<ol> <li>Please wait for a while and check whether it is normal;</li> <li>When the hybrid in split phase mode, and the load of L1 and load of L2 is big different, it will report the F26.</li> <li>Restart the system 2~3 times.</li> <li>Seek help from us, if can not go back to normal state.</li> </ol>
F29	Parallel CANBus fault	<ol> <li>When in parallel mode, check the parallel communication cable connection and hybrid inverter communication address setting;</li> <li>During the parallel system startup period, inverters will report P29, when all inverters are in ON status, it will disappear automatically;</li> <li>If the fault still exists, please contact us for help.</li> </ol>

Error code	Description	Solutions
F34	ACOvercurrent fault	<ol> <li>Check the backup load connected, make sure it is in allowed power range;</li> <li>If the fault still exists, please contact us for help.</li> </ol>
F35	No AC grid	No Utility 1. Please confirm grid is lost or not; 2. Check the grid connection is good or not; 3. Check the switch between inverter and grid is on or not; 4. Seek help from us, if can not go back to normal state.
F41	Parallel system stop	<ol> <li>Check the hybrid inverter working status. If there's 1 pcs hybrid inverter is in OFF status, the other hybrid inverters may report F41 fault in parallel system.</li> <li>If the fault still exists, please contact us for help.</li> </ol>
F42	AC line low voltage	<ul> <li>Grid voltage fault</li> <li>1. Check the AC voltage is in the range of standard voltage in specification;</li> <li>2. Check whether grid AC cables are firmly and correctly connected;</li> <li>3. Seek help from us, if can not go back to normal state.</li> </ul>
F47	AC over frequency	Grid frequency out of range 1. Checkthe frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F48	AC lower frequency	Grid frequency out of range 1. Check the frequency is in the range of specification or not; 2. Check whether AC cables are firmly and correctly connected; 3. Seek help from us, if can not go back to normal state.
F56	DC busbar voltage is too low	Battery voltage low 1. Check whether battery voltage is too low; 2. If the battery voltage is too low, using PV or grid to charge the battery; 3. Seek help from us, if can not go back to normal state.
F58	BMS communication fault	<ol> <li>it tells the communication between hybrid inverter and battery BMS disconnected when "BMS_Err-Stop" is active;</li> <li>if don't want to see this happen, you can disable "BMS_Err-Stop" item on the LCD;</li> <li>If the fault still exists, please contact us for help.</li> </ol>
F63	ARC fault	<ol> <li>ARC fault detection is only for US market;</li> <li>Check PV module cable connection and clear the fault;</li> <li>Seek help from us, if can not go back to normal state.</li> </ol>
F64	Heat sink high temperature failure	Heat sink temperature is too high 1. Check whether the work environment temperature is too high; 2. Turn off the inverter for 10mins and restart; 3. Seek help from us, if can not go back to normal state.

Under the guidance of our company, customers return our products so that our company can provide service of maintenance or replacement of products of the same value. Customers need to pay the necessary freight and other related costs. Any replacement or repair of the product will cover the remaining warranty period of the product. If any part of the product or product is replaced by the company itself during the warranty period, all rights and interests of the replacement product or component belong to the company.

Factory warranty does not include damage due to the following reasons:

- · Damage during transportation of equipment;
- · Damage caused by incorrect installation or commissioning;
- Damage caused by failure to comply with operation instructions, installation instructions or maintenance instructions;
- · Damage caused by attempts to modify, alter or repair products;
- · Damage caused by incorrect use or operation;
- · Damage caused by insufficient ventilation of equipment;
- Damage caused by failure to comply with applicable safety standards or regulations;
- Damage caused by natural disasters or force majeure (e.g. floods, lightning, overvoltage, storms, fires, etc.)

In addition, normal wear or any other failure will not affect the basic operation of the product. Any external scratches, stains or natural mechanical wear does not represent a defect in the product.

# 8. Limitation of Liability

In addition to the product warranty described above, the state and local laws and regulations provide financial compensation for the product's power connection (including violation of implied terms and warranties). The company hereby declares that the terms and conditions of the product and the policy cannot and can only legally exclude all liability within a limited scope.

# 9. Datasheet

Model	iHome-INV3k- L1H02	iHome-INV3.6k- L1H02	iHome-INV5k- L1H02	iHome-INV6k- L1H02		
Battery Input Date	attery Input Date					
Battery Type		Lead-acid	or Li-lon			
Battery Voltage Range(V)	40-60V					
Max. Charging Current(A)	70A	90A	120A	135A		
Max. Discharging Current(A)	70A	90A	120A	135A		
Charging Curve		3 Stages / E	qualization			
External Temperature Sensor		Optional				
Charging Strategy for Li-lon Battery		Self-adapti	on to BMS			
PV String Input Data						
Max. DC Input Power(W)	3900W	4680W	6500W	7800W		
PV Input Voltage(V)		370V (125	5V~500V)			
MPPT Range(V)		150~4	425V			
Full Load DC Voltage Range		300~4	425V			
Start-up Voltage(V)		125	5V			
PV Input Current(A)	13A	13A+13A	13A+13A	13A+13A		
Max.PV lsc(A)	19.5A	19.5A+19.5A	19.5A+19.5A	19.5A+19.5A		
No. of MPPT Trackers	1	2	2	2		
No. of Strings Per MPPT Tracker	1	1+1	1+1	1+1		
AC Output Data						
Rated AC Output and UPS Power(VA)	3000	3600	5000	6000		
Max. AC Output Power(W)	3000	3600	5000	6000		
Peak Power(off grid)		2 times of rate	d power, 10 S			
AC Output Rated Current(A)	13A	15.7A	21.7A	26.1A		
Max. AC Current(A)	13A	15.7A	21.7A	26.1A		
Max. Continuous AC Passthrough(A)		35A		40A		
Power Factor		0.8 leading to	o 0.8 lagging			
Output Frequency and Voltage		50Hz; 230V/240	√ 0.85Un-1.1Un			
Grid Type		Single	Phase			
Total Harmonic Distortion (THD)		<3% (of nom	inal power)			
DC current injection		<0.59	% In			
Efficiency						
Max. Efficiency		97.6	60%			
Euro Efficiency		96.5	0%			
MPPT Efficiency		>99	9%			
Protection						
PV Arc Fault Detection		Integr	ated			
PV Input Lightning Protection		Integr	ated			
Anti-islanding Protection		Integrated(Active	Frequency Shift)			
PV String Input Reverse Polarity Protection		Integr	ated			
Insulation Resistor Detection	Integrated					
Residual Current Monitoring Unit	Integrated					
Output Over Current Protection	Integrated					
Output Shorted Protection	Integrated					
Surge Protection		DC Type II /	AC Type II			
Over Voltage Category		DC Type II /	AC Type III			

Model	iHome-INV3k- L1H02	iHome-INV3.6k- L1H02	iHome-INV5k- L1H02	iHome-INV6k- L1H02		
Certifications and Standards		-	•			
Grid Regulation	VDE4105,IEC617 G98,G99	VDE4105,IEC61727/62116,VDE0126,AS4777.2,CEI 0 21,EN50549-1, G98,G99,C10-11,UNE217002,NBR16149/NBR16150				
EMC/Safety Regulation	IEC/EN 6 IEC/EN 61	IEC/EN 62109-1,IEC/EN 62109-2, IEC/EN 61000-6-1, IEC/EN 61000-6-2,IEC/EN 61000-6-3,IEC/EN 61000-6-4				
General Data						
Operating Temperature Rande( $^{\circ}$ C)	-40~60°C, >45°C Derating					
Cooling	Smart cooling					
Noise(dB)		<30 d	B(A)			
Communication with BMS		RS485;	CAN			
Weight(kg)	1	.4	15	5.1		
Cabinet size(mm)	330W×433	H×238D (Excludin	g connectors and	l brackets)		
Protection Degree	IP65					
Installation Style	Wall-mounted					
Warranty		5 ye	ars			

# 10. Package and transport inverter

Usually placed inverter in the packing box with tape sealing, if the inverter cannot reoccupy, you can choose a cheap carton for packaging. Carton requirements must meet the size of the inverter and can support inverter machine overall weight.

Series frequency converter in the process of moving, please note: handle with care, do not touch the inverter, put as flat as possible.

#### 11. Disposing of the inverter

Do not dispose of inverter together with household waste. Please accordance with the disposal regulations for electronic waste which apply at the installation site at that time. Ensure that the old unit and, where applicable, any accessories are disposed of in a proper manner.

# 12. Appendix I

Definition of RJ45 Port Pin for BMS

No.	RS485/CAN Pin			
1	485_B			
2	485_A			
3	GND_485			
4	CAN-H			
5	CAN-L			
6	GND_485			
7	485_A			
8	485_B			



#### RS485/CAN Port



#### Meter port

4

5

6 7

8

This port is used to connect the energy meter.



NetDRM_7	

DRM4/8

REF-GEN/0 D-GND

NetDRM\_7

DRM port

## 13. Appendix II

- 1. Split Core Current Transformer (CT) dimension: (mm)
- 2. Secondary output cable length is 4m.







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