itel Energy

User Guide

All-in-One **IESS-05K10N**

EN Version: V1.0

Table Of Contents

1. Information on this Manual

1.1 Validity

This manual is valid for the following devices:

IESS-05K10N

1.2 Scope

This manual describes the assembly, installation, operation and troubleshooting of this energy storage system (Hereinafter referred to as ESS). Please read this manual carefully before installations and operations.

1.3 Target Group

This document is intended for qualified persons and end users. Tasks that do not require any particular qualification can also be performed by end users. Qualified persons must have the following skills:

- Knowledge of how an ESS works and is operated
- Training in how to deal with the dangers and risks associated with installing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of the applicable standards and directives
- Knowledge of the compliance with this document and all safety information

1.4 Label Description

In order to ensure the user's personal safety when using this product, the ESS and manual provides relevant identification information and uses appropriate symbols to alert the user, who should carefully read the following list of symbols used in this manual.

Labels on Inverter

	CAUTION Do not disconnect under load!
	Danger: High Voltage! Danger: Electrical Hazard!
	Start maintaining the INVERTER at least 5 minutes after the INVERTER disconnected from all external power supplies.
	Read instructions carefully before performing any operation on the INVERTER.
	Grounding: The system must be firmly grounded for operator safety.

Labels in the documentation

⚠ WARNING!	A high level of potential danger, which, if not avoided, could result in death or serious injury to personnel.
⚠ CAUTION!	A moderate or low level of potential danger, which, if not avoided, could result in moderate or minor injuries to personnel. In some bad situation, it could result in death or serious injury to personnel.

1.5 Safety Instructions

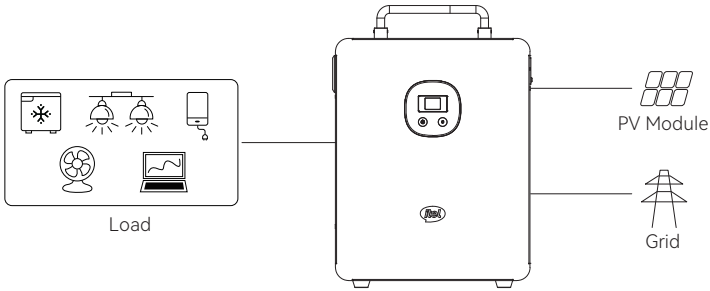
WARNING!

This chapter contains important safety and operating instructions. Read and keep this manual for future reference.

01. Before using the unit, read all instructions and cautionary marking on the unit, the batteries and all appropriate sections of this manual. The company has the right not to quality assurance, if not according to the instructions of this manual for installation and cause equipment damage.
02. All the operation and connection please professional electrical or mechanical engineer.
03. All the electrical installation must comply with the local electrical safety standards.
04. When install PV modules in the daytime, installer should cover the PV modules by opaque materials, otherwise it will be dangerous as high terminal voltage of modules in the sunshine.
05. CAUTION–To reduce the risk of injury, maintain and use the ESS according to the instructions.
06. Do not disassemble the unit. Take it to a qualified service center when service or repair is required. Incorrect re-assembly may result in a risk of electric shock or fire.
07. To reduce risk of electric shock, disconnect all wirings before attempting any maintenance or cleaning.Turning off the unit will not reduce this risk.
08. NEVER charge a frozen battery.
09. For optimum operation of the inverter, please follow required spec to select appropriate cable size. It's very important to correctly operate this inverter.
10. Be very cautious when working with metal tools on or around batteries. A potential risk exists to drop a tool to spark or short circuit batteries or other electrical parts and could cause an explosion.
11. 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.
12. GROUNDING INSTRUCTIONS –This ESS should be connected to a permanent grounded wiring system. Be sure to comply with local requirements and regulation to install this unit.
13. NEVER cause AC output and DC input short circuited. Do NOT connect to the mains when DC input short circuits.
14. Make sure the ESS is completely assembled, before the operation.

2. Introduction

2.1 Scope of Application



In daytime, solar power supports the loads first while the surplus power will be stored by system, to improve self-consumption rate.

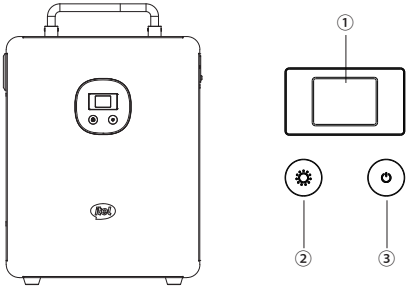
At night, batteries can be used to power the load.

In case of grid fault, system will make sure no outage in the loads, achieving UPS function.

2.2 Features

- Rated power 500W , power factor 1
- MPPT ranges 11V~60V
- High frequency inverter with small size and light weight
- Pure sine wave AC output
- Solar and utility grid can power loads at the same time

2.3 Product Overview



① LED Display	② Battery SOC Button	③ AC ON/OFF Button

- Digital battery SOC on the screen.
- The green icon in the upper right corner constant light indicates that the inverter output is normal.

3. Installation

3.1 Safety Tips

DANGER!

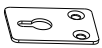
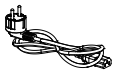
- Potential fires and electric shocks that are life threatening.
- Do not place any flammable or explosive materials beside system.
- Equipment connected to high-voltage power generation equipment must be performed by qualified personnel in compliance with national and local standards and regulations.

NOTE!

- The pollution level applicable to system is Class II.
- Inappropriate or inconsistent installation environment can shorten the life of system.
- Do not install IESS-05K10N directly by exposing it under strong sunlight.
- Please do not install in damp places.
- The installation location must be well ventilated.

3.2 Packing List

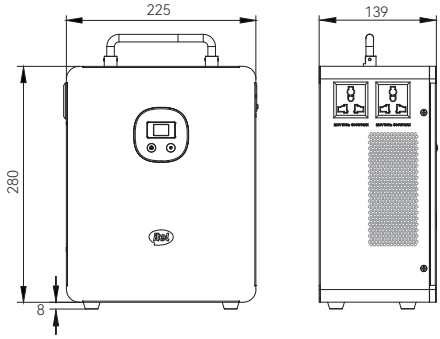
This manual is an integral part of IESS-05K10N.

					
IESS-05K10N Energy Storage System × 1 Pcs	Mounting Bracket × 2 Pcs	Expansion Screw × 2 Pcs	Sunk Screw × 4 Pcs	RNB2-4L × 1 Pcs	AC power supply cord① × 1 Pcs
					
Photovoltaic DC power cable × 1 Pcs	Fuse × 2 Pcs	User Manual × 1 Pcs	Warranty Form × 1 Pcs	Qualified Certificate × 1 Pcs	Packing List × 1 Pcs

① The illustration is for reference only, subject to receipt of the actual object.

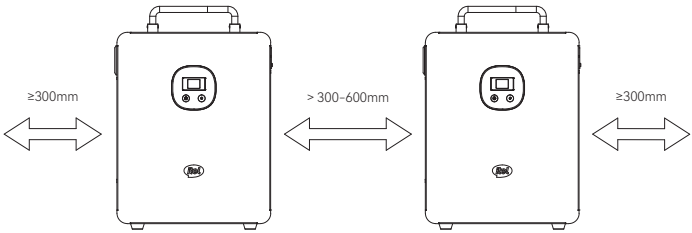
3.3 Mounting Unit

IESS-05K10N Dimension (mm):



IESS-05K10N dissipates heat through fan cooling. It is recommended to install in indoors or sheltered areas to avoid direct sunlight, rain and snow.

Please ensure that the air at the installation point is circulated. Bad air ventilation will affect the working performance of internal electronic components and shorten the service life of IESS-05K10N.



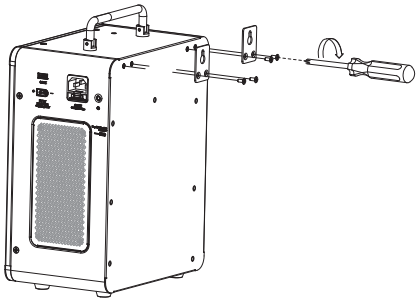
The following sites are not allowed for installation:

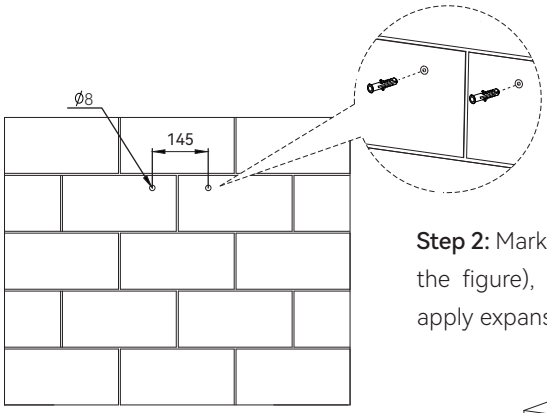
- within 300mm of any exit.
- within 300mm of any vertical side of a window or building ventilation that ventilates a habitable room.
- in celling spaces.
- in wall cavities or under stairways.
- on roofs, except for were specially deemed suitable.
- under access walkways.
- sites where the freezing point is reached, like garages, carports or other places.
- places with plenty of salt.
- flooded areas.
- within 300mm of any hot water unit, air conditioning unit or any other appliance associated with the pre-assembled integrated battery energy system.

3.4 Installation Tools

Installation Tools	Multi-meter 	Protective gloves 	Insulated anti-smashing shoes 
	Safety glasses 	ESD wrist strap 	Hammer drill 
	Electric screwdriver 	Cross screwdriver 	Rubber mallet 
	Spirit level 	Wire cutter / stripper 	Terminal crimping tool 

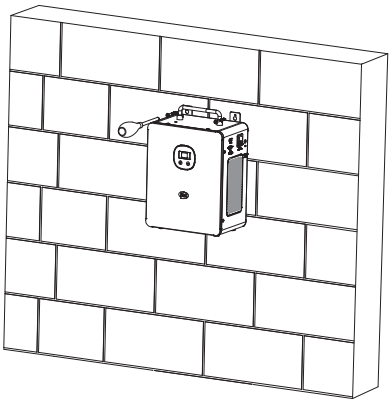
Step 1: Install the chassis hanging ears.

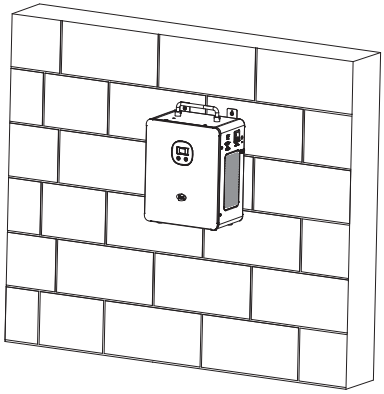




Step 2: Mark two holes on the wall (as shown in the figure), drill two holes on the wall, and apply expansion rubber plugs.

Step 3: Align the hanging ear on the back of the product with the hole on the wall and tighten the screw.

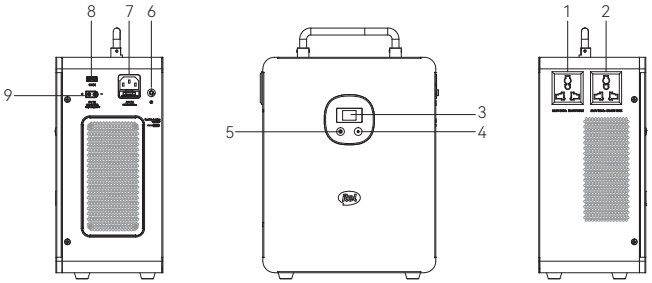




Step 4: Installation completed.

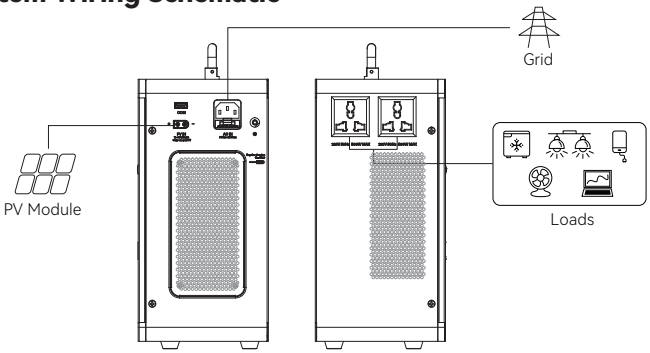
4 Electrical Connections

4.1 Electrical Interface Description

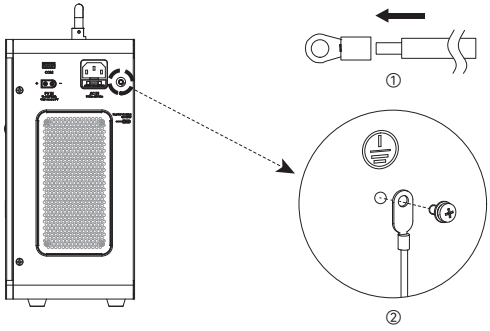


Object	Description	Object	Description
1	AC Output 1	6	Grounding Screw
2	AC Output 2	7	AC Input
3	LED Display	8	COM (USB)
4	AC ON/OFF Button	9	PV Input
5	Battery SOC Button	10	/

4.2 System Wiring Schematic



4.3 Connect the Ground Wire With M4 Screw



4.4 PV Input Wiring

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 start-up voltage.

INVERTER MODEL	IESS-05K10N
Max. PV Array Open Circuit Voltage	60Vdc
Start-up Voltage	11Vdc
PV Array MPPT Voltage Range	11Vdc~60Vdc

WARNING!
Please do not connect any DC switches or AC/DC circuit breakers before completing the electrical connections.

WARNING!
It's 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. The cable color mentioned below is for typical reference.

Cable Type	Core Cross Sectional Area (mm^2)
12AWG	3~4

WARNING!
- Make sure that the DC voltage of each PV string is less than 60V and the polarity of PV cables are correct.
- Ensure wiring is not energized.

CAUTION!
Before connecting to PV modules, please install a separate DC circuit breaker between unit and PV modules.
The recommended spec of DC breaker is 25A with a maximum operating voltage greater than 60 VDC for IESS-05K10N

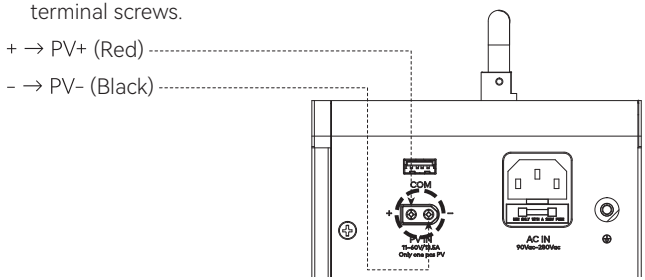
WARNING!
Do not ground the positive or negative terminals of the PV modules, as this can severely damage the ESS.

WARNING!
Exposure to sunlight can generate lethal high voltages in photovoltaic strings, so strictly adhere to the safety precautions listed in the photovoltaic string and related documents.

WARNING!
Make sure to connect the PV terminals to the corresponding ports on the unit, as reversing the polarity can damage the ESS.

WARNING!
All wiring must be performed by a qualified personnel.

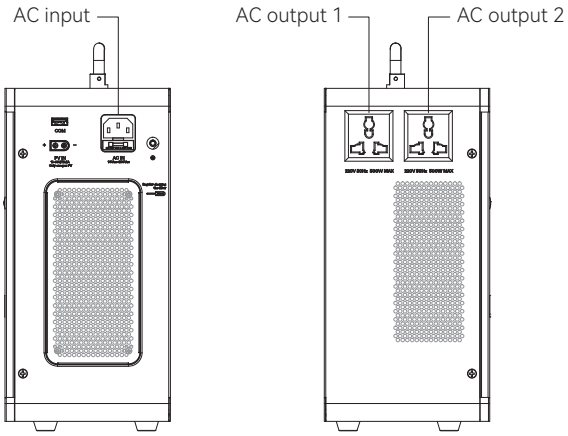
3. Use multi-meter check to ensure the polarities are correct.
4. Insert PV cables according to polarities indicated on terminal block and tighten the terminal screws.



5. Make sure the cables are securely connected.

4.5 AC in/AC out Wiring

WARNING!
- Turn off the external AC breaker after unpacking in any cases before and during wiring in case of electric shock.



This model adopts plug and play mode for AC input/output, without the need for wiring.

4.6 Use of USB interface

The USB interface on the device is tightly used for program upgrades. Please remove the USB drive after the program upgrade operation is completed to avoid interrupting the program upgrade and causing the device to malfunction.

4.7 System Commissioning

4.7.1 Turn On the System

1. Once the device is installed correctly,simply press the AC ON/OFF Button to turn on the device.
2. Wait for 30s and observe the LED to check the running status.
3. Turn on the PV if there is PV access.
4. View battery level and machine status on the screen.

4.7.2 Shut Down the System

System shall be turned OFF in the correct sequence as follows:
Turn off the PV SWITCH (if there is PV access).
Simply press the AC ON/OFF Button to turn off the system.
The LED screen turning off indicates that the system has stopped working.

5. Fault Codes and Common Troubleshooting

Fault class	Specific fault	Fault code display	Remarks
PV fault\p	PV overvoltage protection	p0	% definiton: If there is no ""%"", it means the number in front is a fault coad; If there is ""%"", it means the number in front is a battery level; 188 display code definition: The first 1: The top half is shown as an unrecoverable fault; The bottom half is shown as an unrecoverable fault; The second 8: P: PV fault d: DCDC fault L: Load fault n: Inverter fault c: Charging fault b: Battery fault A: Grid interface fault F: Fan fault; The third 8: 0: Overvoltage 1: Undervoltage 2: Overcurrent 3: Overload 4: Over temperature 5: Short circuit 6: Abnormal voltage 7: No connection 8: Reverse connection 9: Abnormal circuit, soft start fault A: Over frequency b: Under frequency c: Abnormal communication d: Low temperature F: Fan fault
	PV undervoltage protection	p1	
	PV overcurrent protection	p2	
	PV over temperature protection	p4	
	PV short circuit protection	p5	
	PV reverse connection protection	p8	
	PV middle bus overvoltage protection	p9	
DCDC fault\d	Bus overvoltage protection	d0	
	Bus undervoltage protection	d1	
	LLC overcurrent protection	d2	
	Bus soft start failure protection	d9	
Load fault\L	Load short circuit protection	L5	
	Load overload protection	L3	
Inverter fault\n	Inverter overcurrent	n2	
	Inverter over temperature protection	n4	
	Output voltage abnormal	n9	
Charging fault\c	PFC overcurrent protection	c2	
	Over temperature protection	c4	
Battery fault\b	Battery high temperature protection	b4	
	Battery low temperature protection	bd	
	Battery overcurrent protection	b2	
	NTC no connected protection	b7	
	Aluminum plate contact voltage difference protection	b9	
	Battery overvoltage protection	b0	
	Battery undervoltage protection	b1	
Grid fault\A	Grid overvoltage protection	A0	
	Grid undervoltage protection	A1	
	Grid overcurrent protection	A2	
	Grid overfrequency protection	AA	
	Grid underfrequency protection	Ab	
Fan fault\F	Fan fault protection	FF	

6. Specifications

Model	IESS-05K10N
Efficiency	
MPP Tracking Efficiency	99.0%
Max. Battery Mode Conversion Efficiency	87.0%
PV Input	
Max. PV Input Power	400W
Max. PV Input Voltage	60V
MPPT Voltage Range	11~60V
Start-up Voltage	11V
Number of MPP Trackers	1
Max. PV Access Power	720W
Max. PV Input Current	13.5A
Max. Input Short-Circuit Current	20A
AC Input	
Max. Grid Input Voltage (Absolute Maximum Ratings)	550Vpeak
Input Voltage Range	90-280Vac
OVP Voltage	280±10Vac
Maximum AC Input Power (Bypass Mode+Battery Charge)	1000W
Maximum AC Input Current (Bypass Mode+Battery Charge)	6A
Nominal Operating Frequency	50Hz/60Hz
AC Output	
Nominal AC Output Power (Inverter Mode)	500W
Max. Output Apparent Power (Inverter Mode)	600VA
Nominal AC Output Voltage(Inverter Mode)	230VAC
Total Voltage Harmonic Distortion (Inverter Mode)	<3%
Nominal AC Output Current (Inverter Mode)	2.2A
Max. Output AC Output Current Limit (Inverter Mode)	3.0A
Nominal AC Frequency	50Hz
Switch Time	≤20ms
Surge Power	600VA
Overload Capacity	CC 3.0A output @ >500W Latch output @ <165Vac
Battery	
Battery Type	$LiFePO_4$
Rated Battery Voltage	3.2VDC
Rated Capacity	314Ah
Battery Energy	1004.8Wh
Cycle Life	6000
General Data	
Operating Temperature Range	-10~+60℃, >40℃ Power Derating
Max. Operating Altitude	4000m, >2000m Power Derating
SOC Display	LED
Cool Method	Intelligent fan Cooling
Noise	＜45dB(1m)
Authentication Level	IEC62619/IEC62368/UN38.3
Protection	
Battery Fuse	Yes
Grid OVP	Yes
PV Over Voltage Protection	Yes
Overload Protection	Yes
Short Circuit Protection	Yes
Over-Temperature Protection	Yes
Surge Protection	AC:Type III DC:Type III

7. System Maintenance

7.1 Transportation

Lithium batteries are dangerous goods. Passed the test of UN38.3, this product meets the transportation requirements for dangerous goods for lithium batteries. After the installation of the unit on site, the original packaging (contains the lithium battery identification) should be kept. When the unit needs to be returned to the factory for repair, please pack the unit with the original packaging to reduce unnecessary trouble.

7.2 Storage

After purchasing the system, please store it with following instructions:

1. Please store it in a dry and ventilated environment, keep it away from heat sources.
2. Please keep it in an environment with storage temperature as -15 ℃ ~ 60 ℃, humidity <85% RH.
3. For long-term storage (>3 months), please put it in an environment with a temperature of 18 ℃ to 28 ℃ and a humidity of < 85% RH.
4. The system should be stored in accordance with the storage requirements mentioned above, and the system should be installed within 6 months since delivered from the factory. Failure to install beyond 6 months is not covered by the manufacturer's warranty.
5. Failure to complete the installation within 6 months from the factory is subject to recharge operation. Consult the dealer or manufacturer for details of the operation.

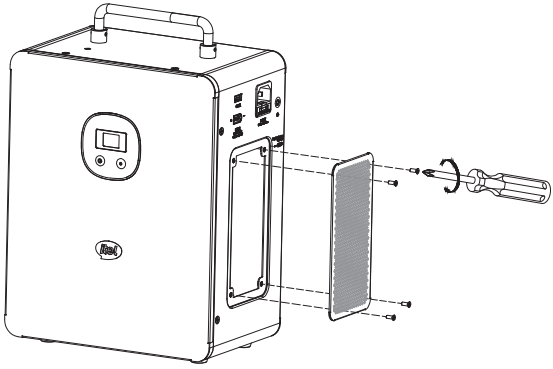
NOTE!

- The battery remains 30% power when it is sent from the factory.
- The longer the battery is stored, the DOD value is getting bigger. When the battery remaining voltage fails to reach the startup voltage requirement, the battery may be damaged.

The battery cannot be disposed of as household refuse. When the service life of the battery reaches to the limit, it is not required to return it to the dealer, but it must be recycled to the special waste lithium battery recycling station in the area.

7.3 Cleanliness

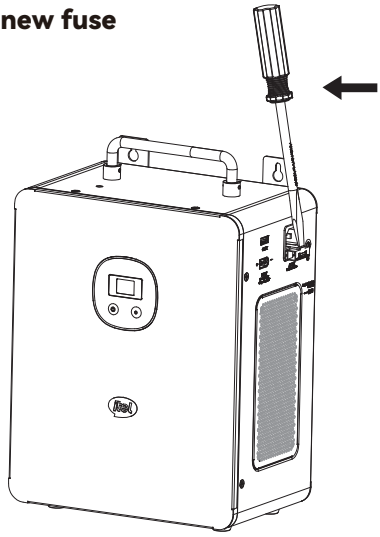
Clean the enclosure lid, LED of the inverter with moistened cloth with clear water only. Do not use any cleaning agents as it may damage the components.



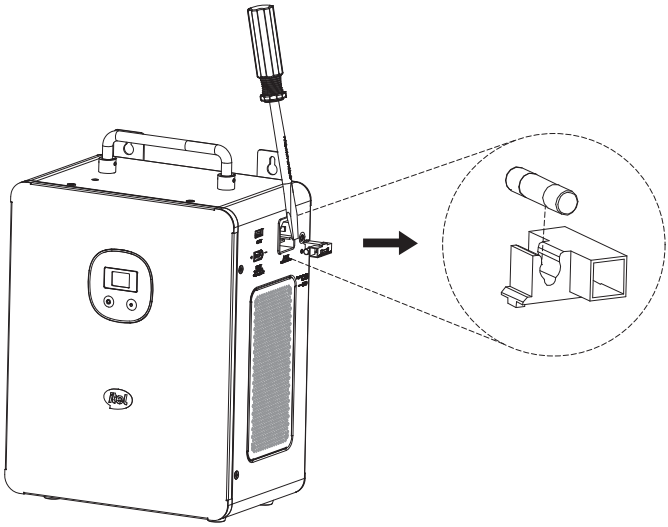
Disassemble the outer panel of the dust-proof net and clean. The steps are as follows:

1. Remove the 4 screws as shown with a Phillips screwdriver.
2. Remove the side cover and clean the adherents on the wire mesh of the side cover.
3. Put back the side cover and lock the screws.
4. Ensure that the dust screen is dry before energizing and switching on again to prevent the risk of electric shock caused by water in the dust screen.

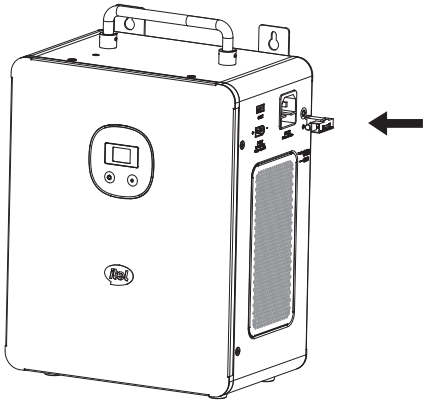
7.4 Replace with new fuse



Step 1: Use a one screwdriver to pry open the fuse box by aligning it with the slot.



Step 2: Pull out the fuse box and replace it with a new fuse.



Step 3: Align the slot back into the fuse box and the installation is complete.

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