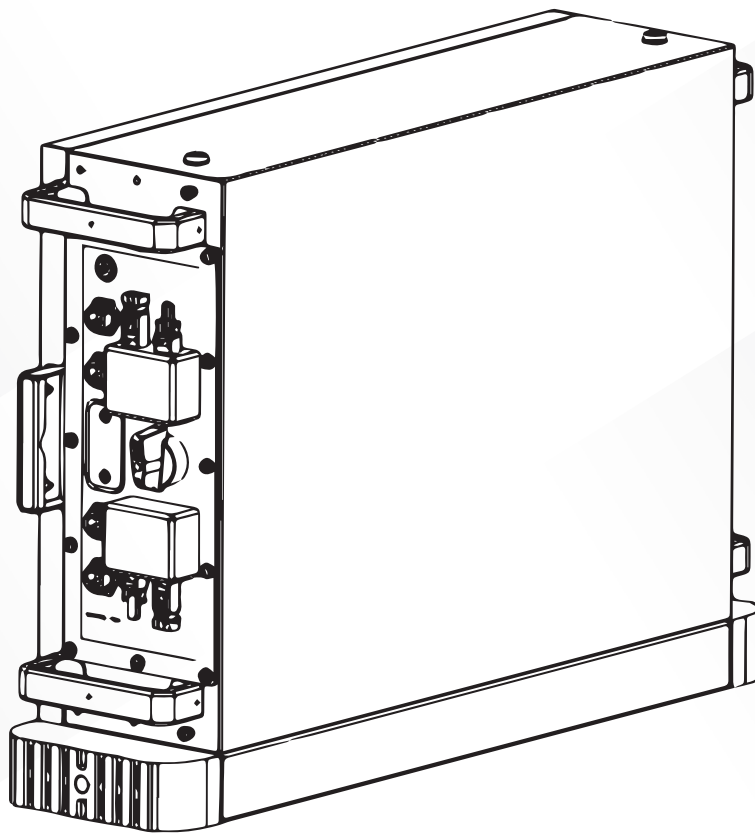


HIGH VOLTAGE ENERGY
STORAGE BATTERY

USER MANUAL



PrimePower Battery

MID-HV5



1. Installation

1.1 Application Scope

This user manual offers you the relevant informations about MidTeQ MID-HV5 battery, including product specifications, operation precautions, product maintenance and other related informations. For details on the operations, installation and use of the product, please refer to this user manual.

1.2 Applicable People

This manual is used for professional and technical staff who install, operate and maintain the MID-HV5 battery, as well as for the end-user who may need to view the relevant technical parameters. Anyone who operates must be qualified for electrical work.

1.3 User Manual

Before operating the battery module, the operator should be better trained and read the manual carefully, to ensure that the person using the product is fully understood. After reading the manual, please keep it in a safe place for future reference. Scanning the QR code below you will be redirect to MidTeQ Video tutorial how to connect the battery.



1.4 Disclaimers

Failing to operate the battery properly may cause serious injury to yourself or others, or result in damage to the product or property. Once get started, you will be deemed to have understood, acknowledged and accepted all the terms and conditions in this user manual. Users who undertakes the operations should be responsible for their own actions and all the consequences arising therefrom. Midcosta shall not be liable for any damages caused by the user's failure in accordance with the provisions of this user manual. The information in this user manual is subject to change without prior notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents, but all statements, information, and recommendations in this document do not constitute a warranty of any kind, express or implied.

2. Product Brief Introduction

Lithium-iron-phosphate is the new battery generation for green energy.

In recent years, with the rapid development of battery technology, lithium polymer batteries as well as traditional lead-acid batteries have increasingly been replaced.

MidTeQ MID-HV5 battery is suitable for residential and commercial energy storage systems. MidTeQ batteries are made from high-quality lithium iron phosphate cells and feature a high-precision BMS that detects and monitors the voltage, current, and temperature of each cell in the module. The BMS has a passive balance function, advanced control strategy that continuously optimizes the performance of the battery.

MidTeQ MID-HV5 battery consists of LFP battery module, BMS, DCDC- converter, housing and wire. The product has a complete protection function and can establish communication with external devices through CAN /RS485.

3. Safety Instruction

3.1 Labels/Symbols Descriptions

In order to ensure the user's personal safety when using this product, this manual provides relevant identification information and uses appropriate symbols .

	Potentially low risk: may result in mild or moderate impairment if not avoided
	High Risk: may result in serious injury or death if not avoided
	The battery terminals must be disconnected before commencing on the battery
	The battery could explode and/or be severely damaged if dropped or crushed
	The battery may explode if exposed to open flames or other extreme sources of heat
	Grounding: The system must be firmly grounded for operator safety
	The side should be up
	Handle with care to avoid damage
	Keep dry
	Keep the battery away from kids
	Do not short circuit
	Do not reverse connect the positive and negative
	Please read the instructions in the operation manual

Table 3-1 Label/Symbols Descriptions

3.2 Installation Tools

Tools

 Multi-meter	 Protective gloves	 ESD safety work shoes	 Safety glasses
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Installation Tools

 Electric screwdriver	 Cross screwdriver	 Socket spanner	 Slotted screwdriver	 Wire stripper
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Table 3-2 Installation Tools Required

3.3 Basic Attentions

3.3.1. User Manual Keeping

This manual contains important information about MidTeQ MID-HV5 battery. A careful reading of this manual will help you become familiar with the product, and this manual should be kept in a safe place so that it can be easily accessible to maintenance personnel at any time when needed.

3.3.2. Product Identity Protection

Warning labels, device markings, and front covers contain important safety information.

These must not be removed, covered, or damaged under any circumstances.

3.3.3. Operator Requirements

Only trained and qualified professionals should perform various operations on the product: the product operator should be fully familiar with the product, components and operating procedures, as well as understanding the product's user manual.

3.3.4. Safety Warning

⚠ During the installation, daily maintenance, overhaul and other operations of MID-HV5 battery, the following guidelines should be observed in order to prevent the accidental operation, proximity or occurrence of accidents by unrelated personnel.

3.3.5. Electric Measurement

⚠ When performing measurement operations, please make sure you have good insulation protection (such as insulating gloves).

3.3.6. Measuring Instrument

⚠ In order to ensure that the electrical installation meets the requirements, please use the relevant electrical measuring equipment, such as multi-meter, power meters, etc.

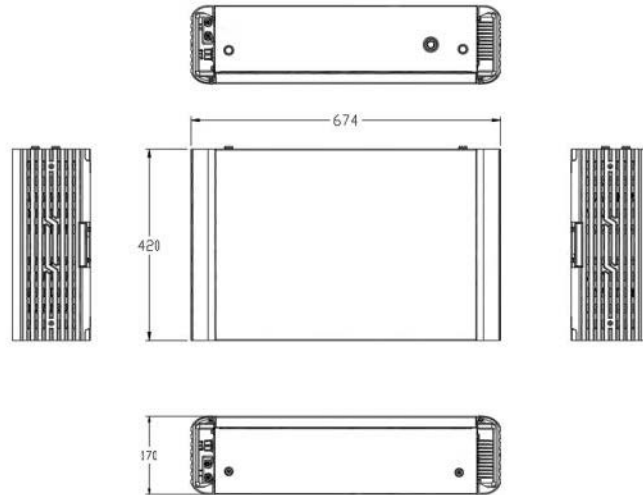
3.3.7. Operator Requirements

⚠ During maintenance and repair operations, it should be ensured that the energy storage battery modul is not accidentally charged; a multi-meter or two-pole voltage tester, should be used to ensure that there is no electricity in the energy storage battery modul; insulating materials should be used to insulate the possible electrical parts of the system; ensure that the system has necessary grounding connections.

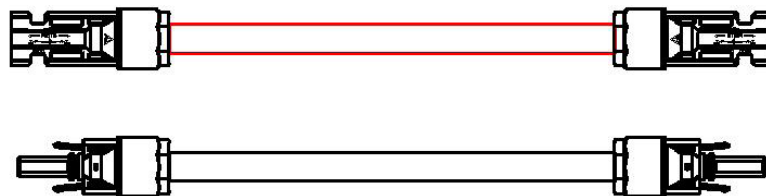
4. Main Components

The main components of the battery module are shown in Table 4-1 below:

1. MidTeQ MID-HV5 battery



2. Power Cable



3. Communication Cable



Table 4-1 Main Components List

5. Product Description

5.1 Product Description

MidTeQ MID-HV5 expandable batteries are modular products designed for energy storage applications, and are widely used in small and medium-sized energy storage systems. A single module consists of cells, BMS, DCDC converter and housing. The BMS in each module has independent voltage, current, temperature detection and protection functions.

5.2 Product Diagram

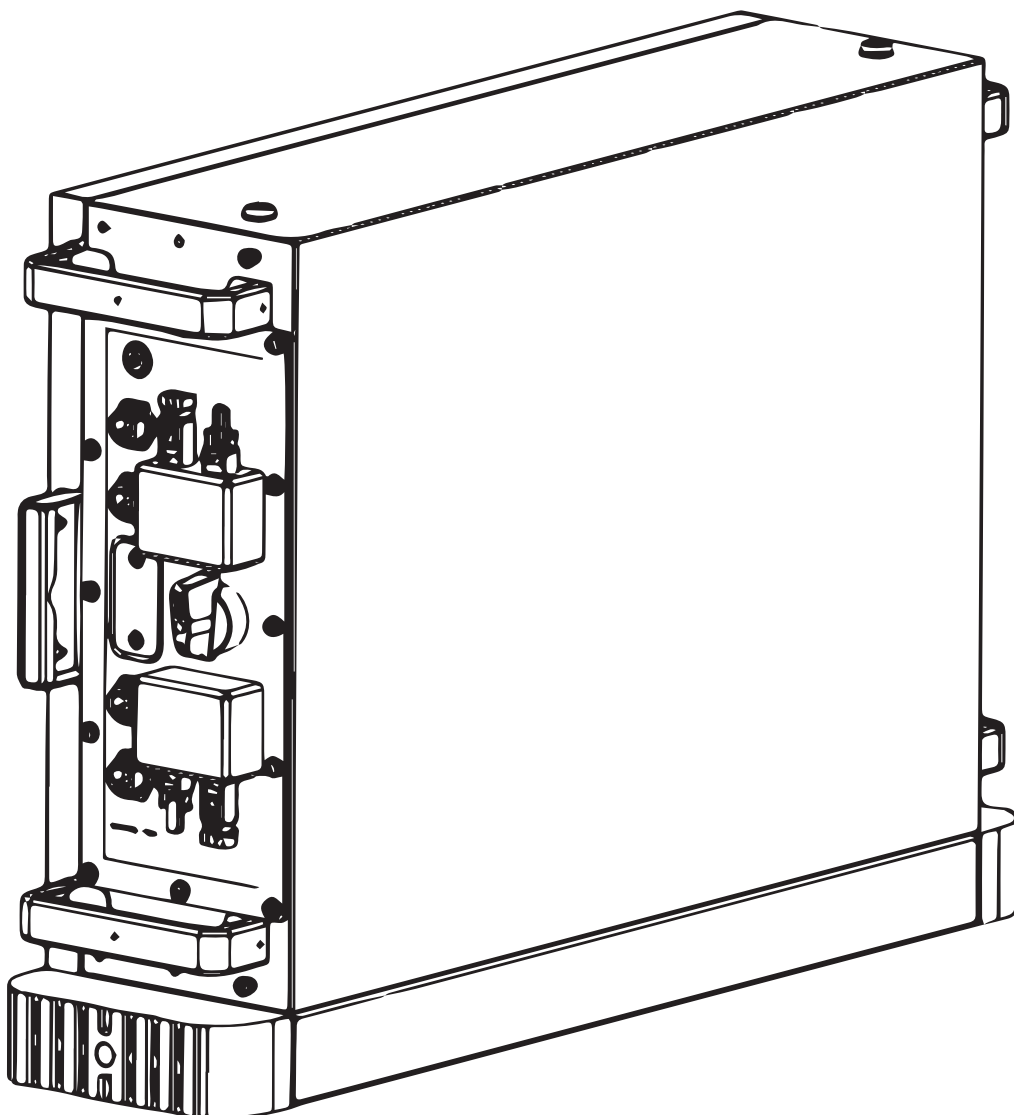


Figure 5-1 MID-HV5 Battery Diagram

6. Safety Features

6.1 Battery Specification

The battery modules are available in 5.12KWh/3KW. The following table describes related parameters.

Type	Voltage	Power	Energy	Width	Depth	Height	Weight
MID-HV5 Battery	400V	3KW	5120Wh	570mm	170mm	420mm	55±2kg

Table 6-1 MidTeQ MID-HV5 Battery Specifications

6.2 Battery Illustration and Front Panel Description

6.2.1. Battery Appearance & Dimension Schematic

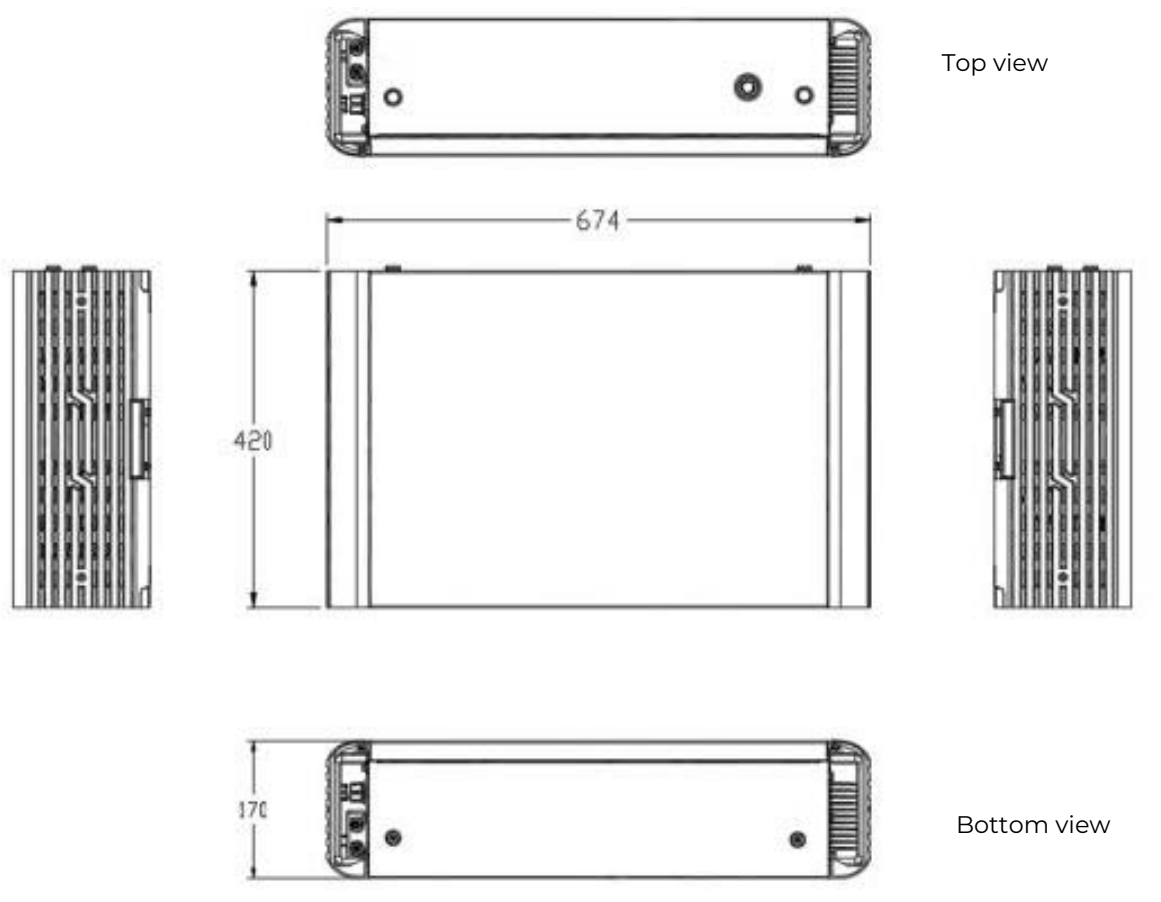


Figure 6-1 MID-HV5 Battery Appearance & Dimension Drawing(sizes are in mm)

6.2.2. Battery Connection overview

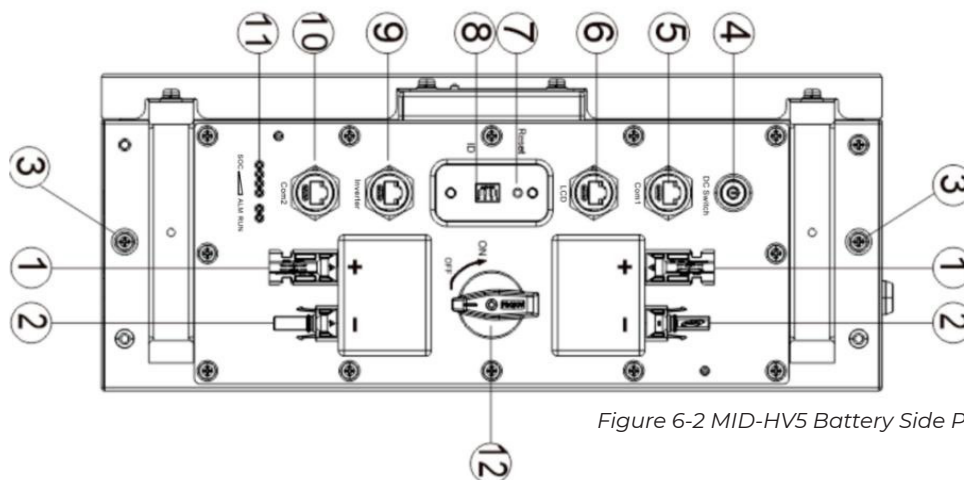


Figure 6-2 MID-HV5 Battery Side Panel Diagram

No	Item	Function Description	Remarks
1	Amphenol MC4 + (BAT+)	Battery positive	
2	Amphenol MC4 - (BAT -)	Battery negative	
3	GND	Ground point	
4	Start button (ON/OFF)	Power switch ON/OFF	
5	Comm Port 1	Communication port	For the installation of multiple batteries COM-IN
6	LCD	LCD Communication	Interface for field service
7	Reset	Reset button	
8	ID	Battery address	
9	INV-BMS	Inverter Communication port	
10	Comm Port 2	Communication port	COM-OUT for installing multiple batteries
11	SOC	Battery SOC	
12	DC DC Disconnect Switch	Battery output power ON/Off	

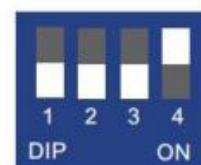
Table 6-2 MID-HV5 Battery Side Interface Descriptions

6.3 ID Setting Description

ID code bits correspond to binary digits, down represents “ON”, up represents “OFF”, the right side of the code bit is the low bit, the left side is the high bit.

NOTE:

The battery pack ID connected to the hybrid inverter must be set to ID1, indicating that it is the host, other batteries do not need to be set, and the ID1 host will automatically assign an address to the slave.



ID:1

Figure 6-3 ID Dialing
Code Address Assignment
Instructions

7. System Installation

7.1 Handling, Transportation, Storage

7.1.1. Handling



Rough handling practices may cause short-circuit or damage to the battery pack, resulting in battery leakage or fire. Forklifts or carts should be used for handling, and tools used for transporting should not exceed the width and height of aisles and doors, and should be transported at a moderate speed.

7.1.2. Transportation



Due to the heavy weight of the battery module, in order to guarantee safety, it is recommended to use a forklift that meets the requirements for moving and transporting, and should avoid dropping and throwing; the batteries should be prevented from collision and strong vibration during transportation.



Figure 7-1 Handling tool diagram

7.1.3. Storage



Short-term storage (within 3 months): If the battery won't be used in a short period of time, the battery can be fully charged and stored in an environment of dry, cool, non-corrosive gas, temperature 10-45°C, relative humidity 60±30%, no strong electromagnetic fields and should be stored without direct sunlight.



Long-term storage (over 3 months): If the battery won't be used for more than 3 months, keep the battery SOC at 50%~70%, store it in an environment of dry, cool, non-corrosive gas, temperature 20-35°, relative humidity 50 ± 15 %, without strong electromagnetic fields and direct sunlight, and ensure to charge once every 6 months to avoid irreversible capacity loss caused by long-term storage.

7.2 Open-box Inspection

The MidTeQ MID-HV5 battery was carefully tested and inspected before shipment. If any irregularities occur, please contact the Midcosta service team or your distributor.

Tools



Table 7-1 Unpacking Tools Required

7.3 Mechanical Installation

7.3.1. Storage

The installation of the battery packs has a direct impact on its safety, service life and performance. Make sure the wiring of the system is convenient, easy to maintain and operate, and should avoid placing the battery mounting base in a high temperature and high humidity environment. Make sure the installation floor is flat. As shown in the following diagram.

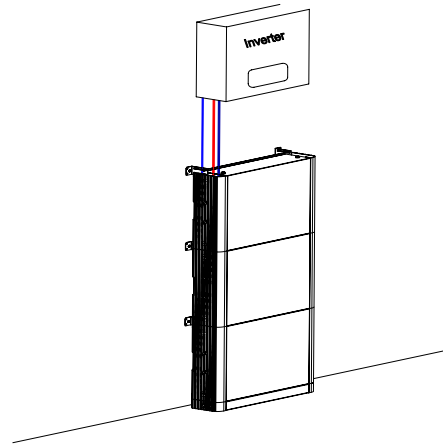


Figure 7-2 Installation Diagram

7.3.2. Mounting Base Installation

Take out the mounting base from the box and place it on flat ground. Our special design for the mounting base eliminates the need for screws to secure the base to the floor.

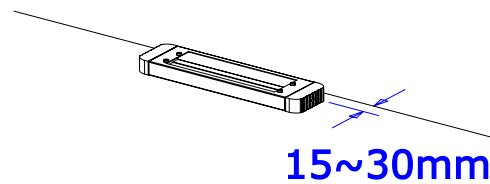


Figure 7-3 Mounting Base Installation

7.3.3. Battery Module Installation

⚠ According to the situation of the installation site, use manual or machine to move the battery pack; it is recommended that at least two people lift the battery pack, and that they are equipped with necessary personal protective equipment (PPE) during installation.

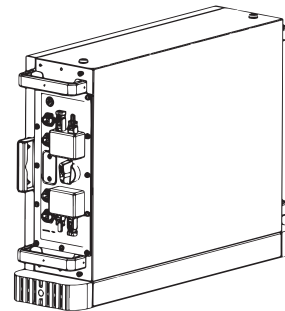


Figure 7-4 Battery Module Installation Diagram

7.3.4. Whole System Installation

⚠ Considering that our mounting base adopts a non-traditional screw fastening method, which poses a risk of tilting for the battery. Therefore, attach the wall brackets to ensure the stability of the system.

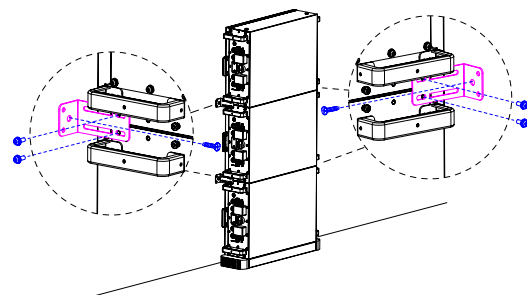


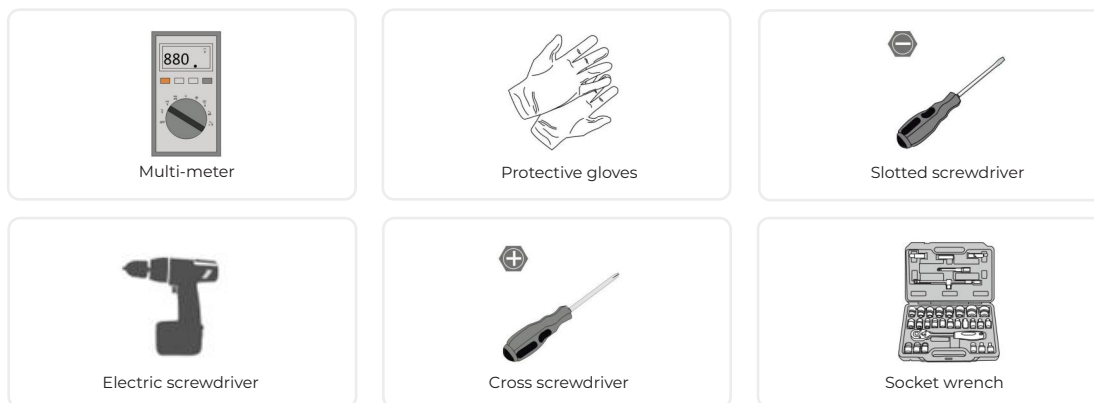
Figure 7-6 Mounting lug Installation

7.4 Electrical Installation

7.4.1. Tools Introduction

The following tools are required for electrical connections, as shown in Table 7-2:

Tools



7.4.2. MID-HV5 Battery Cable Connection

1.  Grounding. One end of the grounding cable (PVC2.5mm²) is screwed to the grounding point at the end of the chassis (M5), and the other end is connected to the grounding copper strip to ensure a solid connection.
2.  Communication cable installation. Finally, connect the RS485/CAN interface of the No.1 battery to the inverter via communication cable.
3.  Power cable installation. Use the power cable to connect each battery in parallel as the picture beside shows. Avoid short circuit and reverse connection of positive and negative terminal.
4.  Connect the inverter. Make sure the battery and inverter are powered off before connecting. Clearly identify the position of the positive and negative terminals of the system, red to the positive terminal, black to the negative terminal, to ensure no connection errors.

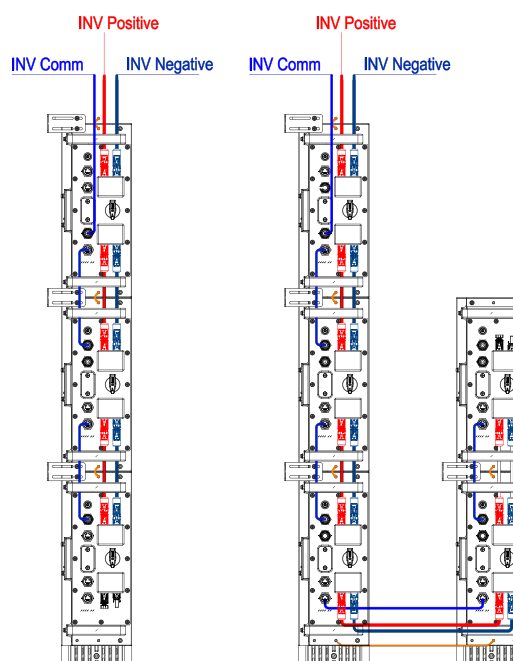


Figure 7-7 MID-HV5 Battery System Connection Schematic

7.4.3 Side Panel Installation

After all wiring harnesses are installed (power cables, communication cables), use power tools to complete the side panel installation.

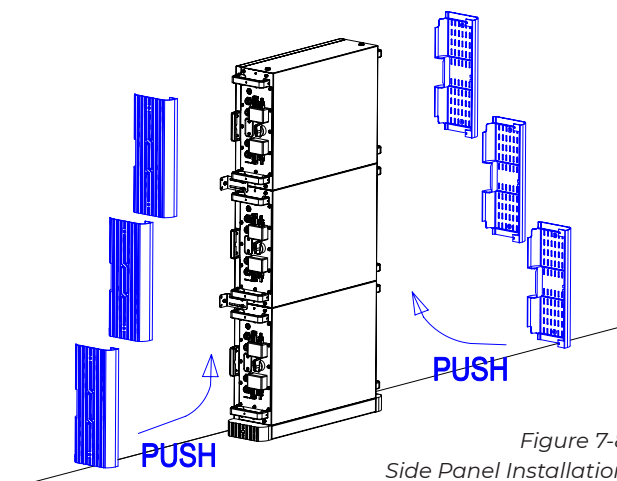


Figure 7-8
Side Panel Installation

7.5 System Starting Up

7.5.1. Start Up Checking

⚠ After installation or maintenance, the lithium battery system needs to be started up. Before starting up, please check the following precautions carefully to make sure there are no errors. All electrical connections must be made in accordance with the electrical diagrams in the manual; the cables are properly distributed, without mechanical damage, and connected and fastened correctly; No excess parts or conductive material remains.

7.5.2. System Turn On

⚠ After completing the above steps, press the ON/OFF switch on the control panel to turn on the system, then turn on the miniature circuit breaker and turn on the power of the whole system to complete the installation.

Steps to turn on the system:

1. Double check all cables are connected correctly, and make sure the grounding is proper.
2. Press and hold the Start button for 5 seconds
3. Turn on the DC|DC disconnect switch on the battery.
4. Turn on the PV rotary switch on the inverter.

7.5.3. Turn off system

Battery system has to be turned off when failure or before service, the procedures to switch off are:

1. Switch off the inverter;
2. Switch off the battery;
3. Switch off the battery switch between the battery and the inverter if there is any.

7.5.4. System Maintenance Charge

⚠ If the battery module is stored for an extended period (>3 months), the SOC (!) value of the battery may be low due to the self-discharge of the cells. The battery must be charged before commissioning. Please contact our service for this.

7.5.5. Battery Firmware Update

1. Turn on all batteries by pressing and holding the DC Switch for 5 seconds.
2. Locate the port labeled LCD on the master battery.
3. Connect the Wi-Fi dongle supplied with the batteries to the LCD port. Leave the Wi-Fi dongle connected.
4. Monitor the SOC indicator, which displays the progress of the firmware update. (After the update is successfully completed, the battery will automatically switch to RUN status.)

8. Maintenance

8.1 Common Faults (Phenomenon) and Solutions

The LED indicators on the front cover provide information about the error status of the battery.

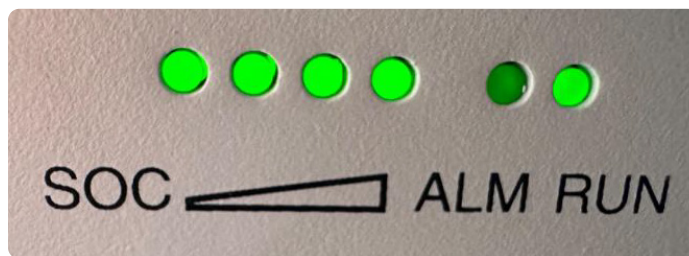


Table 8-1 Common faults(phenomenon) and solutions

The numbers 1, 2, 3, 4, ... 10 in the table refer to 10 different phenomena and represent sequential numbers. Not all of these 10 phenomena can be observed through the LED lights – only numbers 5, 7, 8, 9, and 10 are visible via the LED lights. The others must be checked using the inverter or a multimeter.

The LED display is divided into three sections:

- The four LEDs on the left indicate the state of charge (SOC) – each LED represents 25% capacity.
- The 5th LED is the warning light.
- The 6th LED is the operating indicator (Running Light).

Battery Error Description:

No	Fault phenomenon	Analysis	Solution
1	Communication failure with inverter	Communication port connection error or battery ID setting error	Check communication connection or ID settings
2	No DC output	Unclosed breaker or low voltage	Close breaker or charge the battery
3	Power supply time is too short	Battery capacity lack or not fully charged	Maintenance or replacement
4	Battery can't be fully charged	The DC output voltage of the PV modules falls below the excitation voltage	Regulation of the DC output voltage to excitation voltage
5	ALM LED always lights	DC bus short circuit	Disconnect the power cable and check all cables
6	The battery output voltage is unstable	The DC-DC converter is not operating correctly	Press the reset button to reset the system, then reboot the system
7	ALM LED flash 2 second and Green LED off	Can't be charged and discharged	Check DCDC status
8	RUN LED flash 0.5 second and ALM LED off	Can be charged and can't be discharged	Charging mode
9	RUN LED flash 2 second and ALM LED off	Can be discharged and not rechargeable	Discharged mode
10	Different SOC value of batteries in parallel	Normal Phenomenon	No operation

8.2 Maintenance, daily maintenance intervals not listed.

Routine maintenance are shown in Table 8-2 below.

Item	Maintenance Method	Maintenance Intervals
Power Cables   	1. Check whether there is mechanical damage to the power cable and whether the terminal insulation sleeve has fallen off; if there is such a phenomenon, please turn off the machine and carry out maintenance or replacement. 2. Check whether the power cable is loose; if there is any sign of looseness, please use a standard torque wrench to tighten it. 3. Check the system for loose screws or discoloration of the copper bus bar; if the screws are loose, please tighten them with a standard torque wrench; if the copper bus bar is discolored, please contact the manufacturer for after-sales replacement.	Once every 6 month
Communication Cables 	1. Check whether the parallel communication cable terminal is loose, if it is loose, tighten it properly. 2. Check whether the color of the communication cable has obvious discoloration, if discoloration, please shut down the machine to replace the communication cable.	Once a year
Cleanliness	Check the cleanliness of the front battery module, if there is obvious dusty, please clean up in time. Wipe it with a dry cloth to reduce dust.	Once 6-12 month
System Running Status 	1. Check if all parameters are normal when the system is running (system voltage, current, temperature, etc.) 2. Check whether the main core components of the system are normal, including system switches, contactors etc. are normal. 3. Check whether the air inlets and outlets as well as the air ducts of the system are free from dust and foreign objects.	Once every 6 month
Charge and Discharge Maintenance	Check whether the status of battery SOC and SOH is normal; it is recommended that charge/discharge power should not exceed 20% of the rated value. During the charging and discharging process, check the LED status on the side of the battery. If all SOC LEDs are lit green and the ALM LED is neither blinking nor illuminated, the SOH is in a normal state.	Once every 6 month

Table 8-2 Routine Maintenance

9. Cautions and Warranty

9.1 Cautions

  Please read below precautions and follow them during installation and use of the battery, incorrect installation and using of the battery may cause personal injury or damage to the product.

1. DO NOT throw the battery into water. Store batteries in cool and dry environment.
2. DO NOT put the battery into fire or heat the battery, so as to avoid explosion.
3. Use a specialized, compatible charger or inverter and follow its standardized charging procedures to charge the battery correctly.
4. DO NOT reverse positive and negative terminals, do not connect the battery directly to AC power.
5. DO NOT combine different kinds of batteries together from different manufacturers, do not mix old and new batteries.
6. DO NOT use the battery when it is hot, bulged, deformed or leaked.
7. DO NOT puncture the battery with a nail or other sharp objects; Do not throw, stamp on or hit the battery.
8. DO NOT open or try to repair the battery. Warranty is invalid if the battery has been repaired or disassembled. Only the service or field service is authorized to open devices to perform diagnostics and repairs!
9. Batteries are half charged before shipment, don't use the battery if it's hot, bulging, or smell abnormal and so on, and report to after-sales dept. immediately.
10. If you need to store the battery for a long time, please charge and discharge the battery every three months to ensure the best performance, and the best state of battery power for storage is Between 50%~60%.
11. Please use the battery in the temperature range which is defined in the manual.
12. The state of charge of batteries is 50% before shipment, please charge the battery before using.

9.2 Description of Warranty

During the valid warranty period of the product, any warranty issues such as non-human or unintentional product damage or functional failure will enjoy our free repair and replacement services. Customers need to provide a valid purchase invoice or related product warranty information. For more details of warranty, please refer to the warranty document which is provided with the product

10. Technical Specifications

The product technical specifications are shown in Table 10-1 below:

Model No.	MID-HV5
Nominal Capacity	100Ah
Nominal Input/Output Voltage	350-435VDC
Normal Operating Voltage	360-435VDC
Nominal Energy	5.12kWh
Nominal Output Power	3KW
Maximum Output Current	10A
Maximum Discharge Depth	≤90%
Voltage Range of Battery	45-57V
Maximum Charging Current	62.5A
Charging Temperature Range	0°C ~ 55°C
Discharge Temperature Range	-20°C ~ 55°C
Optimum Operating Temperature Range	20°C ~ 30°C
Storage Humidity	60±25% R.H.
Cooling mode	Natural cooling
Communication Mode	CAN Bus or RS485
Efficiency	Charge 98%; Discharge 97%
Protection Level	IP65
Product Weight	~58kg
Product Size	674*420*170mm

Table 10-1 Product Technical Specifications

MidTeQ MID-HV5 battery pack is confirmed to comply with the essential requirements of EU standards when used as intended.

The following relevant harmonized European standards were used for the assessment, the references of which were published in the Official Journal of the European Communities:

IEC 62619: 2022

EN 62477-1: 2012+A11:2014+A1:2017+A12:2021

EN IEC 61000-6-1: 2019

EN IEC 61000-6-2: 2019

EN IEC 61000-6-3: 2021

EN IEC 61000-6-4: 2019

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