User Manual

Mars-100~125KT-LP

Liquid-cooled

Power Conversion System V_01.04

Contents

About This Manual

This manual describes the energy storage converter in terms of its product information, installation, operation and maintenance. More information is available from YUNT's official website or sales channels.

Scope of Application

This manual mainly targets the following equipment:

- Mars-125KT-LP energy storage converter
- Mars-110KT-LP energy storage converter
- Mars-100KT-LP energy storage converter

Intended Readers

- End users
- Installation engineers
- Maintenance engineers

Manual Usage

Please read the manual carefully before using the product, and keep it in an accessible place.

The manual content will be continuously updated and corrected, but there may be discrepancies or errors compared to the actual product. The purchased product shall prevail. The latest manual version is available from the YUNT's official website or sales channels.

Revision History

Version	Revision Content	Date
01.00	First release	May 2024
01.01	Changed the structural drawings.	June 2024
01.02	Modified the information and optimized the drawings.	August 2024
01.03	Corrected the wiring terminal model.	December 2024
01.04	Corrected the protection level.	February 2025

Safety Precautions

Safety Statement

- Please read and comply with the safety precautions in this manual when installing, operating and maintaining the product.
- To ensure personal and equipment safety, please follow all safety precautions indicated on the product and described in the manual when installing, operating, and maintaining the product.
- The “Caution,” “Warning,“ and “Danger“ notices in the manual do not represent all the safety precautions that must be observed; they serve only as supplements to all safety instructions.
- This product should be used under the environment meeting design specifications; otherwise, malfunctions may occur. Functional abnormalities or component damage caused by failure to comply with related regulations are not covered by the product quality guarantee.
- Our company shall assume no legal responsibility for personal injury or property loss caused by improper product operation.

Safety Level Definition

indicates that failure to follow the instructions may result in minor bodily injury or equipment damage.

Indicates that serious bodily injury or damage to critical equipment may result if instructions are not followed.

indicates that failure to follow the instructions may result in death or serious bodily injury.

Safety Warning Sign Settings

During installation, operation, routine maintenance, and repair of the energy storage converter, please ensure relevant safety measures to prevent unauthorized personnel from accidental operation or accidents. Please follow these guidelines:

- Place clear signage at the front and rear switches of the energy storage converter to prevent accidents caused by accidental switching on.
- Erect warning signs or safety warning tapes near the operation area.
- After maintenance and repair operations, be sure to check that the front and rear switches of the energy storage converter are in the off position and that there is no power.

Safety Precautions

Unpacking Inspection

- Do not install the product if product or accessory damage, rust, or signs of prior use are found upon unpacking.
- If internal water ingress, missing parts, or damaged components are found upon unpacking, do not install the product!
- Check the packing list carefully; if the product name does not match, do not install the product.

- Before unpacking, inspect the outer packaging for damage, water ingress, dampness, deformation, etc.
- Upon unpacking, check the device and accessories for damage, rust, or dents.

- After unpacking, carefully compare the packing list to verify the quantity of devices and accessories, and completeness of documentation.

Installation and Wiring

Danger

- Non-professionals are strictly prohibited from installing, wiring, maintaining, inspecting, or replacing parts of the equipment.
- Before wiring installation, disconnect all power sources of the equipment. Ensure the energy storage converter's front and rear stages are disconnected and unpowered. Measure the voltage on both sides of the DC relay to ensure it is at a safe voltage to prevent electric shock.
- Ensure proper grounding of the equipment to avoid electric shock hazards.

Warning

- Before installation, carefully read the product user manual and safety precautions.
- Before installation, ensure the mechanical strength of the installation location can support the equipment weight to avoid mechanical hazards.
- Disassembling internal structural parts of the energy storage converter without authorization is strictly prohibited. Prevent screws from accidentally falling causing electric shock hazards.
- Use the torque values specified in the manual for terminal screw tightening. Insufficient or excessive torque may cause overheating, damage, or fire hazards.
- After wiring, check all wiring to ensure input/output and phase sequence are correct and normal.

Power On and Operation:

Danger

- Before powering on, confirm the product is properly installed, wiring is secure, and external devices allow startup.
- Non-professionals are strictly prohibited from operating the product to avoid injury or death risks.
- It is forbidden to open the door of the product cabinet or the protective cover of the product, touch any terminals of the product, or disassemble any device or parts of the product under power or running condition; otherwise, there is a risk of electric shock.

Warning

- After wiring and parameter setting, conduct trial operation to ensure the machine operates safely; otherwise, injuries or equipment damage may occur.
- Before powering on, ensure the rated voltage of the product matches the power supply voltage. Incorrect power voltage usage may cause fire hazards.
- During operation, do not touch the equipment enclosure or fans to prevent unnecessary personal injury.

After Power Off

Danger

- Turn off the front and rear switches of the energy storage converter in a timely manner, and ensure the power is off before performing any inspection.
- Wait 20 minutes or use discharge equipment to consume residual voltage, ensuring no internal voltage before touching internal components.

1 Product Information

1.1 Model Description

Models: Mars-125KT-LP, Mars-110KT-LP, and Mars-100KT-LP

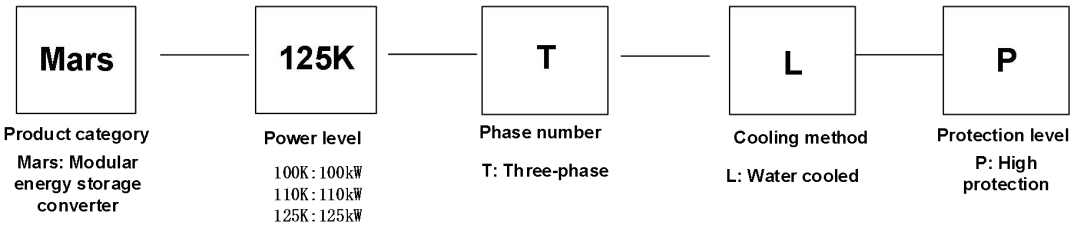


Figure 1-1 Product model description

1.2 Introduction to the Energy Storage System

The energy storage system primarily achieves energy conversion between the grid and battery, applicable in generation, transmission, distribution, and consumption stages. It supports peak-shaving, valley-filling arbitrage, demand response, backup power, and disaster recovery modes.

Its main components include energy storage converter, battery, BMS, EMS, as shown in the following figure.

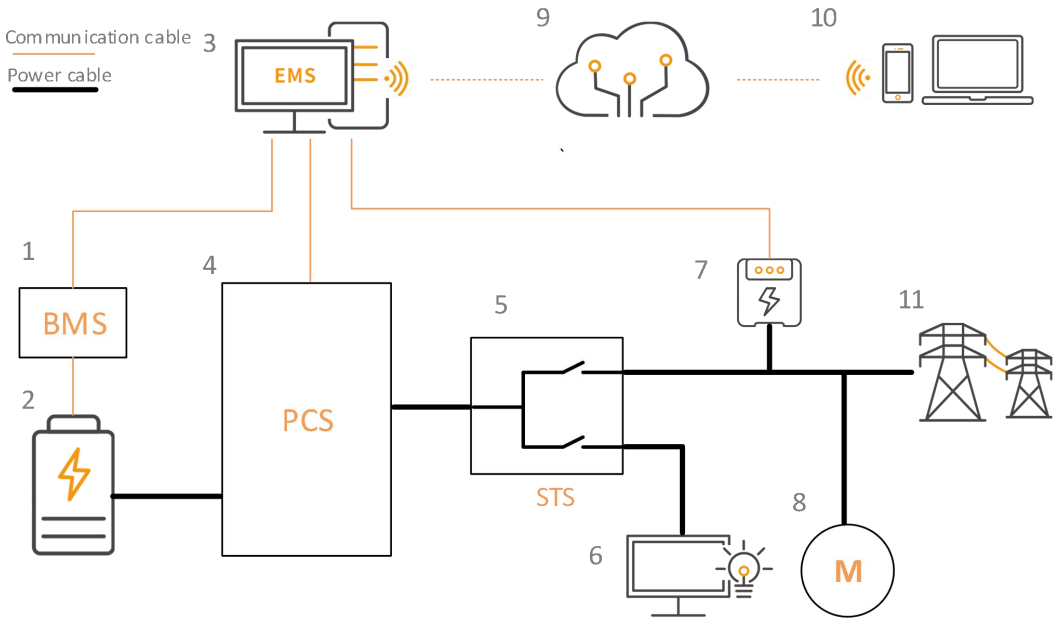


Figure 1-2 Application scenario for automatic switching between grid-connected and off-grid modes

Application scenario for automatic switching between grid-connected and off-grid modes:

When the grid is powered, during off-peak electricity usage, the PCS charges the battery; during peak usage, the battery discharges to the grid via PCS. This achieves peak shaving and valley filling, saving electricity costs.

When the grid power fails, the PCS and STS cooperate to switch to off-grid mode, continuing power supply for critical loads and avoiding losses caused by power outages.

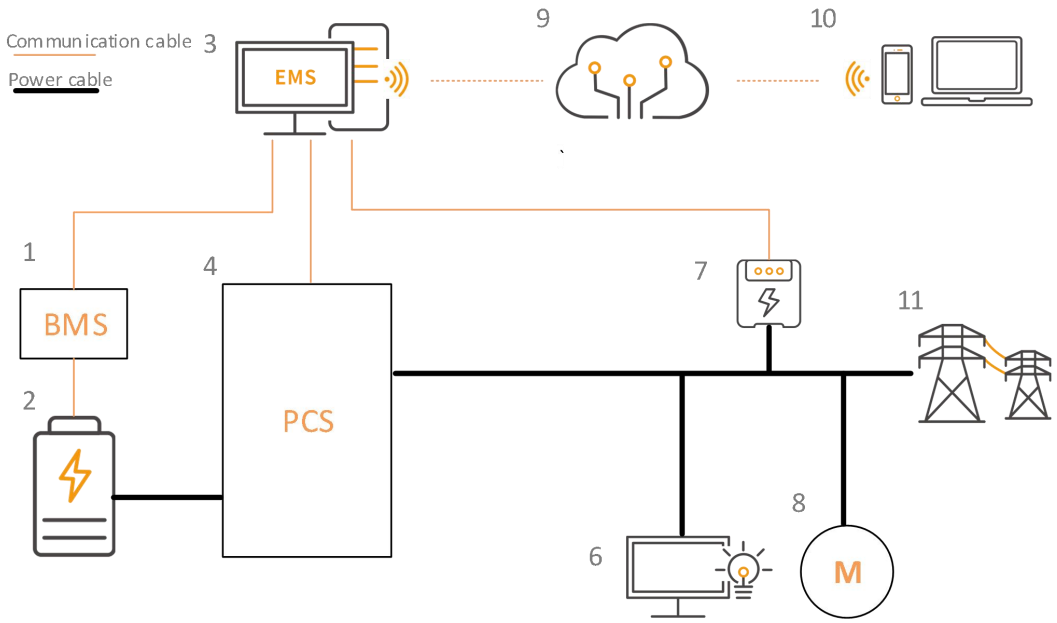


Figure 1-3 Grid-connected application

Grid-connected application:

For scenarios with stable grid or no backup power need, the STS can be omitted to reduce system cost.

Table 1-1 Description of energy storage system components

No.	Name	Description
1	BMS	The battery management system (BMS) is responsible for battery pack management, protection, and monitoring.
2	Battery	Applicable to various types of batteries.
3	EMS	The energy management system (EMS) is responsible for overall system energy scheduling and monitoring.
4	Energy storage converter	Responsible for energy conversion between battery and grid.
5	STS	The static transfer switch (STS) is used for automatic switching between grid-connected and off-grid modes; not required for purely grid-connected applications.
6	Critical loads	Loads such as IT equipment and lighting that need to continue operating during grid power outages.
7	Smart meter	Measures the grid-connected point voltage, current, power, etc.
8	Non-critical loads	Loads such as fans and pumps that can stop during grid outages.
9	Cloud platform	Remote monitoring platform.
10	Client	Accesses the cloud platform through mobile APP, PC WEB, etc. to monitor the energy storage system.
11	Grid	In grid-connected mode, the AC side must be connected to the grid.

1.3 Principle of the Energy Storage Converter

The energy storage converter uses internal power electronic devices to convert the battery's DC power into AC power to supply other devices (discharging); it can also convert AC power into DC to recharge the battery (charging). The converter can switch between charging and discharging states according to its own configuration or control commands from external devices such as the EMS.

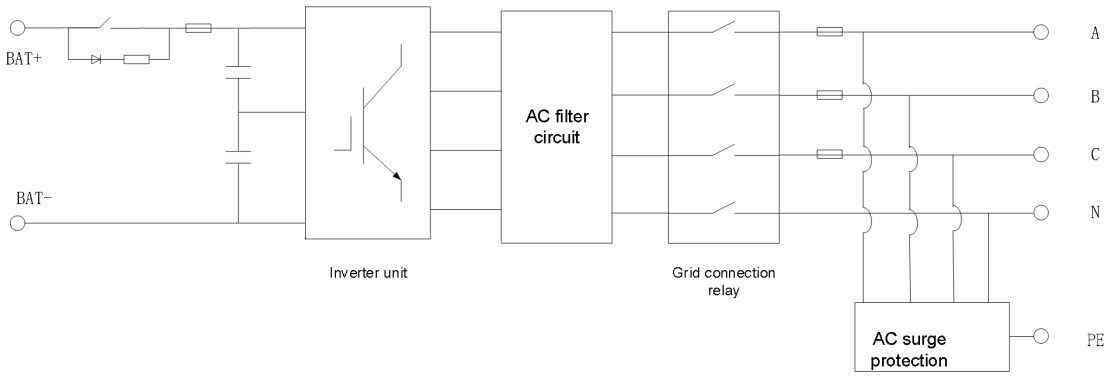


Figure 1-4 Circuit diagram of the energy storage converter

1.4 Component Description

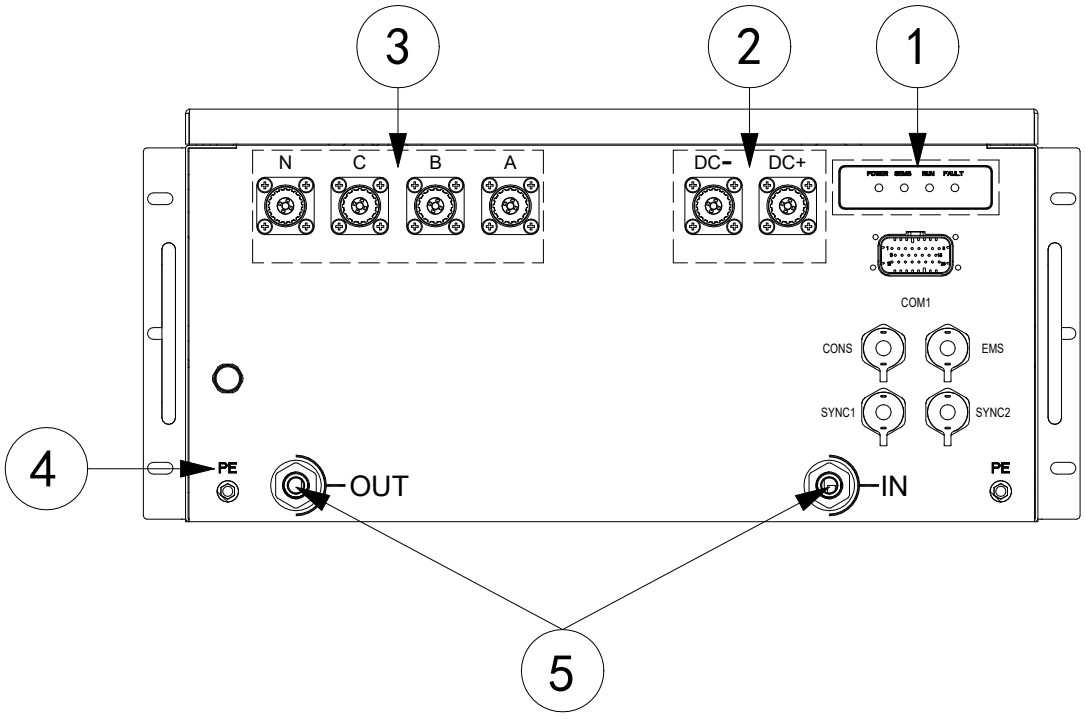


Figure 1-5 Components

Table 1-2 Component description

No.	Description
1	Indicators
2	DC terminal block
3	AC terminal block
4	Ground terminal (M6)
5	Coolant inlet and outlet (CQC14 quick plug equipped)

1.5 Product Dimensions

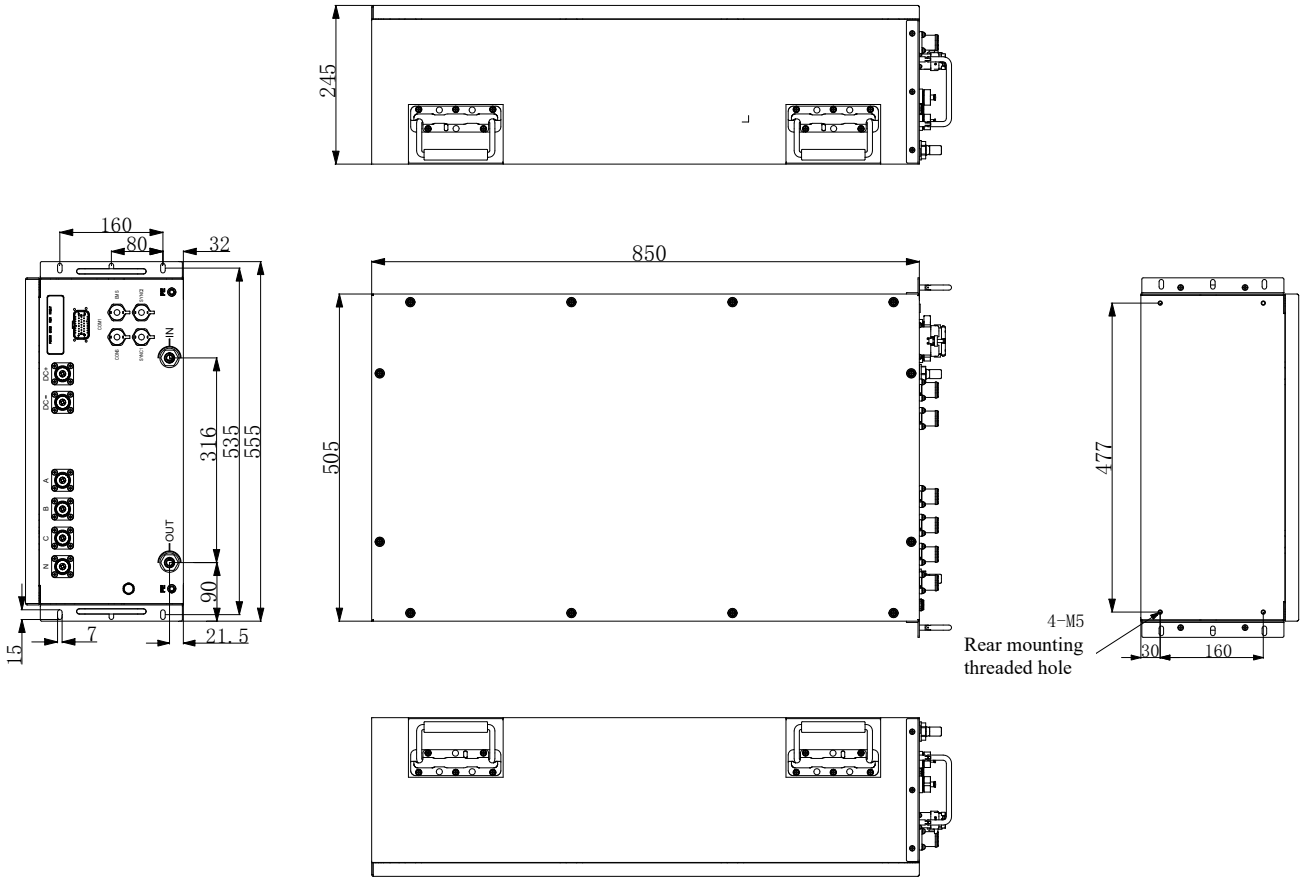


Figure 1-6 Overall dimensions

1.6 LED Indicators on the Panel

There are indicators on the front panel of the energy storage converter. The panel and indicator definitions are as follows.

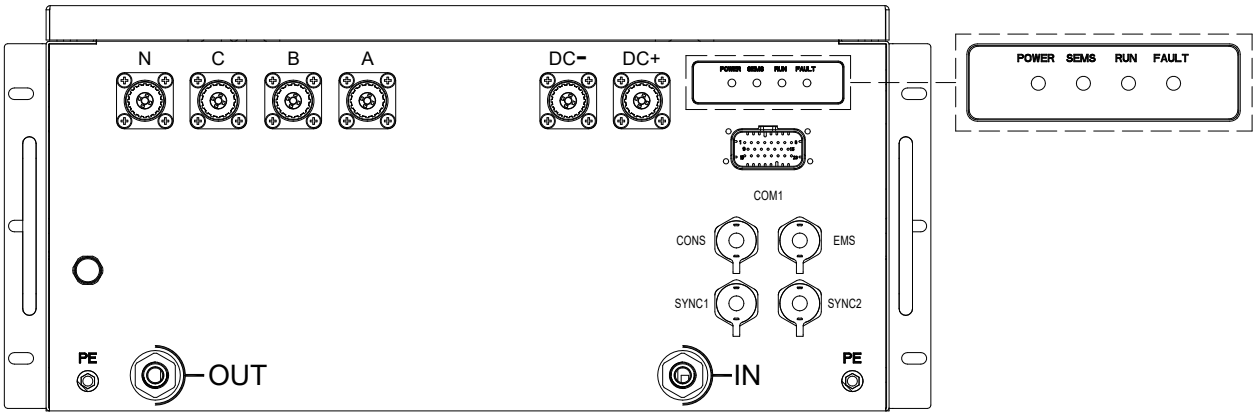


Figure 1-7 LED indicators on the panel

Table 1-3 Indicator definitions

Indicators	Status	Description
POWER (green)	Steady on	Both battery and grid connected
	Fast flash	Battery not connected
	Slow flash	Grid not connected
	Off	Both battery and grid not connected
SEMS (green)	Fast flash	Normal communication
	Off	Communication fault
RUN (green)	Off	The PCS is shut down.
	Steady on	PCS in standby mode
	Fast flash	Indicates that the PCS is in running state.
FAULT (red indicator)	Slow flash	Alarm
	Steady on	Fault and shutdown status

[1] The fast flash cycle is 1 second; the slow flash cycle is 3 seconds;

[2] Shutdown status: The PCS is powered on but not operating;

[3] Standby status: The PCS is grid-connected running with zero grid power;

1.7 Technical Specifications

Table 1-4 Technical specifications

Model	Mars-125KT-LP	Mars-110KT-LP	Mars-100KT-LP
DC side parameters			
Maximum DC voltage	1,000 V	1,000 V	1,000 V
Minimum DC voltage[1]	580V	580V	580V
DC voltage operating range	580-1000 V	580-1000 V	580-1000 V
Maximum DC current	216A	190A	173A
AC side parameters (grid-connected)			
Rated charging/discharging power	125kW	110kW	100kW
Maximum charge and discharge power	150kW	132kW	120kW

Model	Mars-125KT-LP	Mars-110KT-LP	Mars-100KT-LP
Rated charge and discharge current	182A	160A	145A
Maximum charge-discharge current	217A	192A	174A
Rated grid voltage	400V	400V	400V
Permissible grid voltage range	300-460 V	300-460 V	300-460 V
Rated grid frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz
Current total harmonic distortion rate	< 3% (at rated power)	< 3% (at rated power)	< 3% (at rated power)
Power factor	> 0.99	> 0.99	> 0.99
Power factor range	-1~1	-1~1	-1~1
Overload capacity	1.2 Pn, continuous for 1 minute	1.2 Pn, continuous for 1 minute	1.2 Pn, continuous for 1 minute
AC side parameter (off-grid)			
Rated input voltage	400V	400V	400V
Voltage deviation	±2%	±2%	±2%
Voltage total harmonic distortion rate	<3% (linear load)	<3% (linear load)	<3% (linear load)
Efficiency			
Maximum efficiency	98.90%	98.90%	98.9%
Protection			
DC reverse polarity protection	Supported	Supported	Supported
AC short-circuit protection	Supported	Supported	Supported
AC output overcurrent protection	Supported	Supported	Supported
Surge protection	Level 2	Level 2	Level 2
Insulation resistance monitoring	Supported	Supported	Supported
Temperature protection	Supported	Supported	Supported
Basic parameters			
Dimensions (H*W*D)	245mm (height) x 505mm (width) x 850mm (depth) without terminals	245mm (height) x 505mm (width) x 850mm (depth) without terminals	245mm (height) x 505mm (width) x 850mm (depth) without terminals
Weight	≤ 78kg	≤ 78kg	≤ 78kg
Topology	Without transformer	Without transformer	Without transformer
Ambient temperature	-40°C ~ +60°C	-40°C ~ +60°C	-40°C ~ +60°C
Protection level	IP66	IP66	IP66
Operating environment Mechanical conditions	Sine steady-state vibration: 2Hz ≤ f < 9Hz, 1.5mm displacement; 9Hz ≤ f < 200Hz, acceleration 5m/s2. GB/T 4798.3-2007 3M2	Sine steady-state vibration: 2Hz ≤ f < 9Hz, 1.5mm displacement; 9Hz ≤ f < 200Hz, acceleration 5m/s2. GB/T 4798.3-2007 3M2	Sine steady-state vibration: 2Hz ≤ f < 9Hz, 1.5mm displacement; 9Hz ≤ f < 200Hz, acceleration 5m/s2. GB/T 4798.3-2007 3M2
Cooling method	Water cooling	Water cooling	Water cooling
Maximum operating altitude	4,000m (derating when > 3,000m)	4,000m (derating when > 3,000m)	4,000m (derating when > 3,000m)
Standby power consumption	< 12W	< 12W	< 12W
Characteristics			
DC interface	Plug-in terminal	Plug-in terminal	Plug-in terminal
AC port	Plug-in terminal	Plug-in terminal	Plug-in terminal
Display	LED	LED	LED
Communication mode	Ethernet, RS485, CAN	Ethernet, RS485, CAN	Ethernet, RS485, CAN

[1] Minimum DC voltage: For off-grid operation scenarios, the minimum DC voltage requirement is no less than 680 Vdc.

1.8 Cooling system requirements

Table 1-5 Cooling system requirements

Cooling medium	Inlet and outlet pressure loss	Maximum medium temperature at the water inlet	Flow	Cooling capacity
50% ethylene glycol + 50% water	＜0.6bar	45℃	12L/min	＞3.6kW

The flow resistance and flow rate curve is as follows:

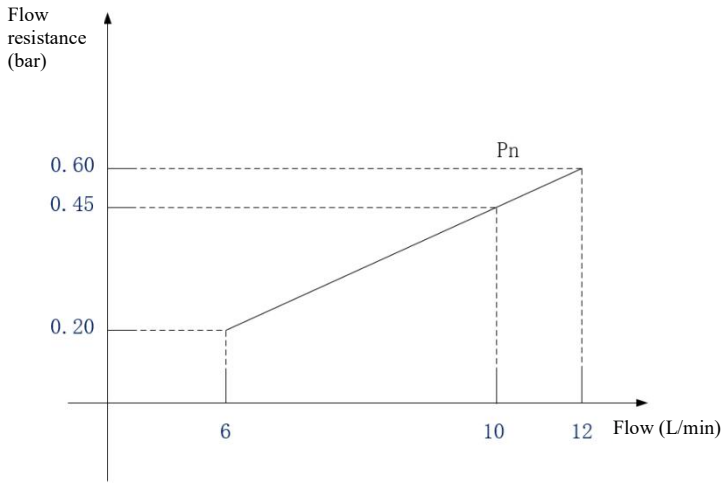
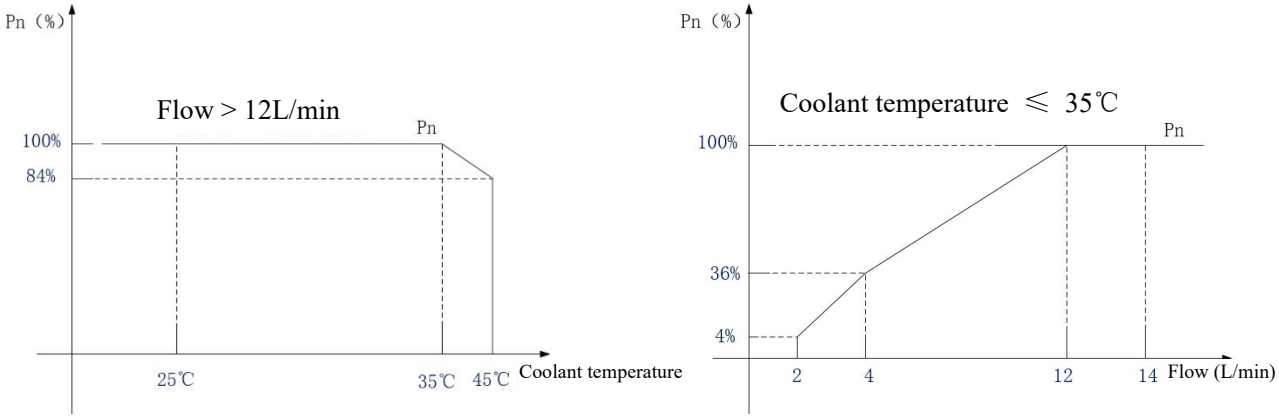


Figure 1-8 Flow resistance and flow rate curve

Coolant temperature and flow rate power derating curves:



(a) Coolant temperature vs. power derating curve (b) Coolant flow rate vs. power derating curve

Figure 1-9 Coolant temperature and power derating curve

Table 1-6 lists the full load conditions under different inlet water temperatures and flow rates

Table 1-6 Full load conditions under different inlet water temperatures and flow rates

Inlet water temperature (℃)	Flow rate (L/min)	Power (kW)
20	9	125
25	10	125
30	11	125

Note: (1) Under startup conditions, a flow rate of at least 2 L/min is required; otherwise, long-term standby will easily trigger overheating faults.

(2) After shutdown during load operation, a flow rate of 10 minutes is required to continuously cool down the module to prevent overheating failure due to heat accumulation after shutdown.

(3) Maximum coolant flow rate: 18L/min

1.9 Voltage Derating

Voltage derating curve

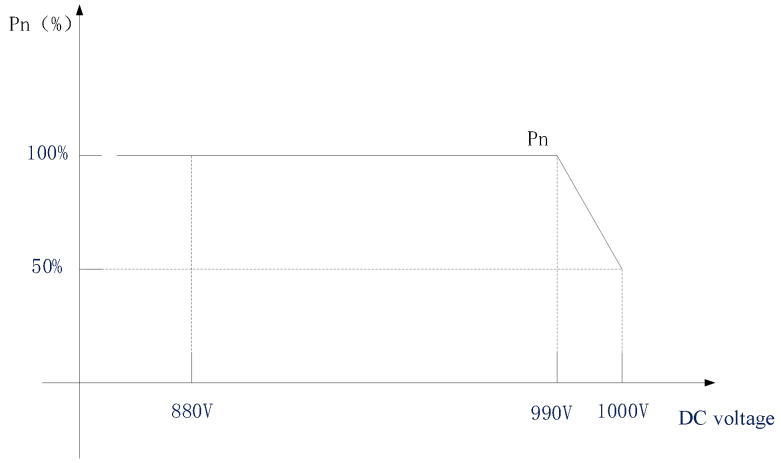


Figure 1-10 Voltage drop power curve

2 Unpacking and Handling

2.1 Transportation and Storage

Pay attention to the markings on the packaging box during transportation and storage. Transportation and storage must meet the following requirements:

- Do not remove the outer packaging of this product;
- No corrosive gases in the surroundings;
- Storage temperature maintained between -30℃ and +60℃, ambient temperature changes < 1℃/min, relative humidity 0% RH to 95% RH;
- Protect from water, moisture, dust, and avoid direct sunlight;
- Regularly inspect during storage, if insect or rodent damage is found, replace packaging materials immediately;
- Comply with fire protection requirements;
- If storage exceeds six months, professional inspection and testing are required before use;

- Avoid transporting this product during rain or adverse weather; if unavoidable, take necessary protective measures.
- During storage, try to pack the product into the original packaging box.
- The equipment must not be left for extended periods in humid, high-temperature, or direct sunlight conditions.
- Long-term storage will cause the deterioration of the electrolytic capacitor. It must be powered on once within 1 year for at least 5 hours. The input voltage must be slowly increased to the rated value using a voltage regulator.

2.2 Unpacking

2.2.1 Precautions for Unpacking

- Energy storage converter packaging must not be removed during storage; remove only before installation.
- Upon receipt from transport company, carefully and thoroughly inspect the product.
- Check each item against the delivery note. Immediately notify the transport company if any items are missing or damaged.

2.2.2 Unpacking

Steps for unpacking:

1. Remove all ties, and open the carton.
2. Remove all packing fillers.
3. Take out the module, and remove packaging film and accessories.
4. Inspect and ensure no damage signs.

Dispose or recycle packaging according to local regulations.

2.2.3 Unpacking Inspection

After unpacking, the following must be inspected:

Table 2-1 Unpacking inspection items

No.	Check Item	Completion
1	No damage, scratches, dents on appearance.	□
2	All ordered items are complete.	□
3	Nameplate information matches the ordered product model.	□
4	Warning labels are intact, with no damage, scratches, or blurring.	□
5	Included accessories: 1) Active mineral desiccant - 5g pack; 2) Product user manual; 3) Warranty label; 4) 1,000mm network cable_off-white_1000mm; 5) Orange plug-in terminal 4PCS 6) Black plug-in terminal 2PCS 7) 23-pin plug terminal at the signal port 8) Cold-press terminals for signal port wiring 9) RJ45 Ethernet cable protective caps, 4 PCS 10) 23-pin signal terminal blind plugs, 20 PCS	□

2.3 Handling Precautions

- At least 4 people are required to carry the product. After holding the handle of the energy storage converter, carry it to a suitable location, or use a forklift to carry it.
- During handling, keep the energy storage converter's vertical movement as low as possible.
- Avoid large amplitude shaking; ensure smooth handling of the equipment.
- Handle gently during lifting and lowering to avoid impact or vibration. Ensure the product is not stepped on.
- When moving, ensure the ground is level and free of sharp objects.

3 Installation

3.1 Installation Environment Requirements

Danger

- The installation location should have necessary shading to avoid direct sunlight.
- The installation location should have good ventilation to prevent heat dissipation issues affecting performance.
- Place safety warning signs around the installation area for high temperature, high voltage, and other hazards.
- The installation area should be away from flammable and explosive materials and free of strong electrical interference equipment.
- The mounting rack or wall should have fire resistance complying with fire safety standards.
- Installation is recommended in areas relatively insensitive to noise; use sound insulation if installed in sensitive areas.

For installation personnel safety, necessary electrical protection measures must be taken during electrical installation. The following procedures must be strictly followed during electrical installation:

- All power connected to the product must be disconnected to ensure no voltage.
- Warning signs must be placed at the disconnected points to prevent accidental re-energizing during installation, ensuring operator safety.
- Necessary grounding connections must be made.
- Live parts must be properly insulated to prevent injury.
- Only qualified personnel may install and operate this product, strictly following the user manual during installation.
- Installation personnel must comply with the electrical operation regulations of their country or region.

Table 3-1 Installation environment requirements

Item	Environmental Requirements
Installation site requirements:	This product is designed for cabinet installation and must be installed in the final system.
Pollution class	2
Altitude	4000m (derating if above 3000m)
Temperature	-40℃ to +60℃ (derated above +45℃)
Humidity	0%-95% RH
Corrosion status	Special assessments required for strong acid, alkali, and high-salt environments based on site conditions.

3.2 Installation Tool Requirements

Table 3-2 Installation tool requirements

No.	Tool	No.	Tool
1	Sleeve	5	Cross screwdriver
2	Adjustable wrench	6	Measuring tape

No.	Tool	No.	Tool
3	Wire stripper	7	Multimeter (range ≥ 1000V)
4	Crimping pliers	8	Safety gloves
Note: Installation personnel must prepare insulated safety shoes, insulated gloves, goggles, masks, etc.			

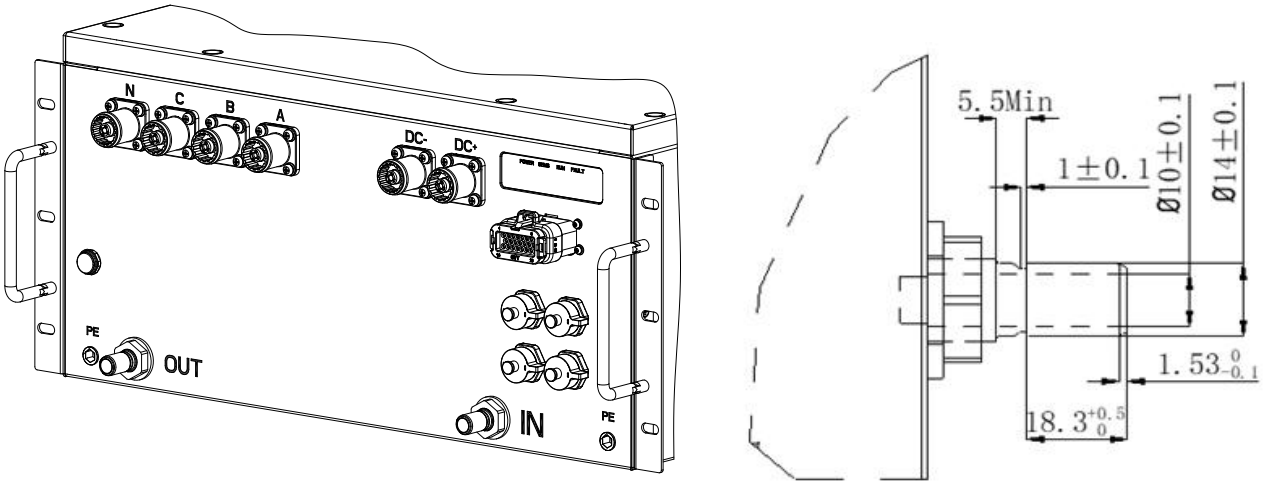
🕮 **Note**

Table 3-2 lists common tools used for wiring and installation; other specialized tools should be adjusted by onsite technicians as needed.

3.3 Installation Steps

3.3.1 Water Nozzle Installation

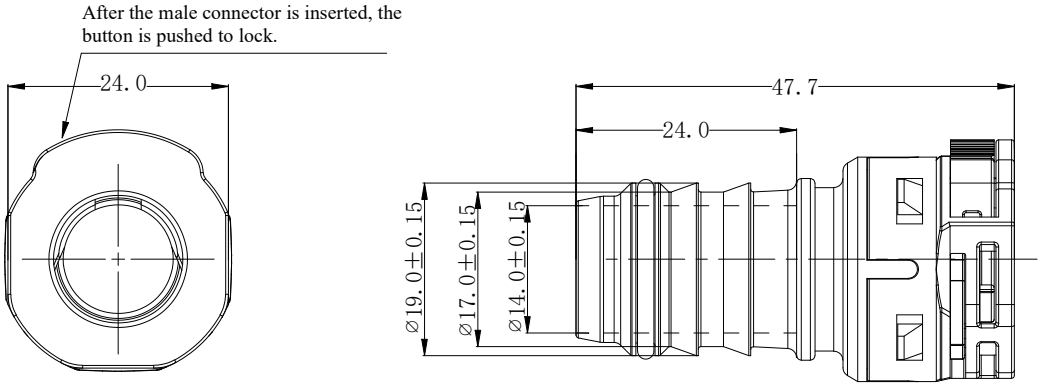
1. The terminal locations on the module front panel are shown in Figure 3-1(a); 2. Extended water nozzle dimensions are shown in Figure 3-1(b). (Unit: mm); 3. When the module is installed sideways, the water inlet must be positioned at the bottom.



（a） (b)

Figure 3-1 Water nozzle location

2. Use matching quick-connect fittings, which are laser-welded to the water pipes. The inner diameter of both the quick-connect fittings and the water pipes should be no less than 10 mm. 180° fitting dimensions are shown in the following figure (units: mm):



90° fitting dimensions are shown in the following figure (units: mm):

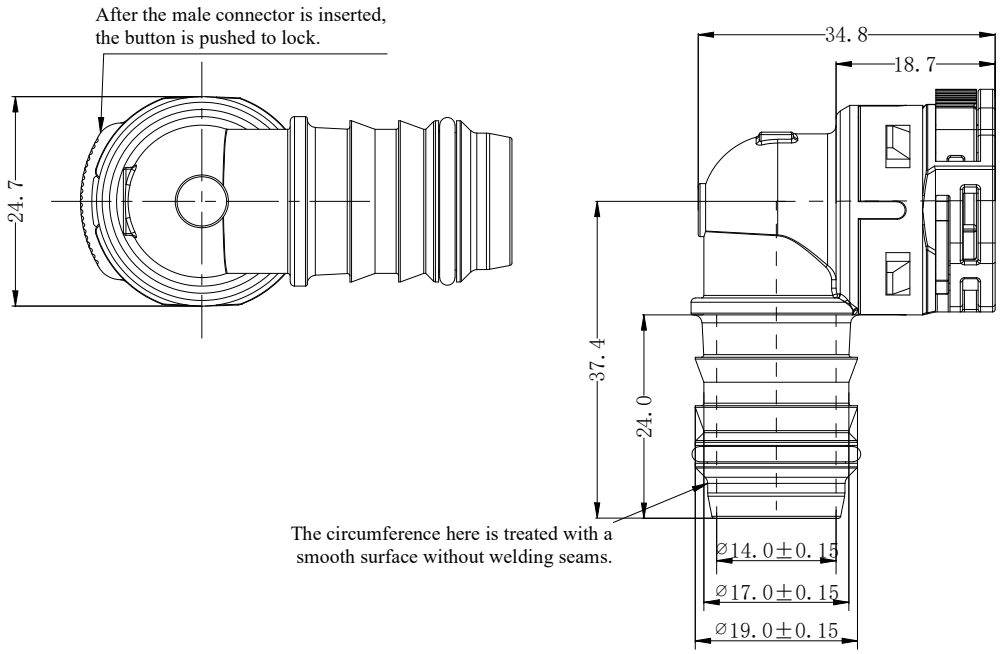
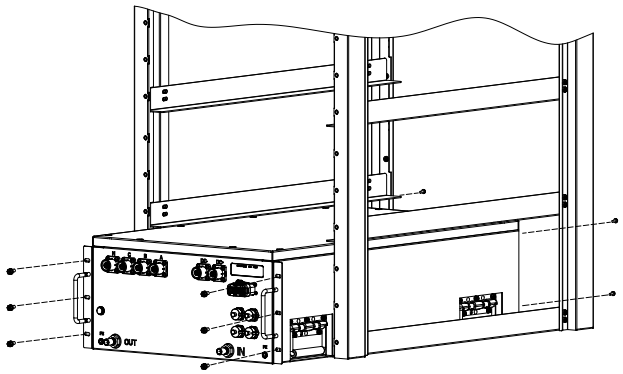


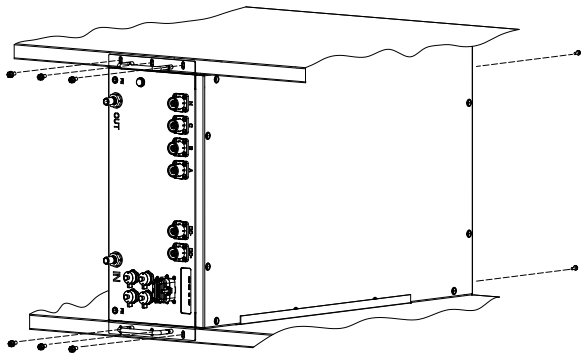
Figure 3-2 Water nozzle dimensions

3.3.2 Energy storage converter installation steps:

1. Hold the energy storage converter by its handles with both hands, support it from underneath, and insert it into the corresponding position in the cabinet or directly use a lifting cart.
2. Slowly push the converter completely into the slot;
3. Tighten the six M6*16 combination screws on the module panel and the four M5*14 combination screws at the chassis rear to secure to the cabinet. Torque values: 6 N·m (M6*16 screws) and 2.5 N·m (M5*14 screws).
4. Install the energy storage converter into the cabinet sequentially from left to right or from top to bottom.



Option 1: Module horizontal installation



Option 2: Module vertical installation (inlet must be at the bottom)

Figure 3-3 Installation

3.4 Cable Preparation

Table 3-4 lists the recommended crimping cable specifications. The power terminal crimping steps are detailed in appendix.

Table 3-4 Cable specifications

Wiring Location	Rated Voltage/Current		Terminal Specifications	Recommended Cable (Minimum)
	Mars-125KT-LP	**Mars-110KT-LP**		
DC+	1000V/220A	1000V/190A	Orange terminal (accessory)	70mm^2
DC-	1000V/220A	1000V/190A	Black terminal (accessory)	70mm^2
A/B/C	400V/182A	400V/160A	Orange terminal (accessory)	70mm^2
N	400V/182A	400V/160A	Black terminal (accessory)	70mm^2
PE	-	-	OT terminal M6	16mm^2
23-pin signal terminals	-	-	23-pin plug terminals (accessory)	20AWG
SYNC1/SYNC2	-	-	Network port	Category 5e cable
EMS/ETH	-	-		
CONS	-	-		

Wiring Location	Rated Voltage/Current	Terminal Specifications	Recommended Cable (Minimum)
	Mars-100KT-LP		
DC+	1000V/175A	Orange terminal (accessory)	50mm^2
DC-	1000V/175A	Black terminal (accessory)	50mm^2
A/B/C	400V/145A	Orange terminal (accessory)	50mm^2
N	400V/145A	Black terminal (accessory)	50mm^2
PE	-	OT terminal M6	16mm^2
23-pin signal terminals	-	23-pin plug terminals (accessory)	20AWG
SYNC1/SYNC2	-	Network port	Category 5e cable
EMS/ETH	-		
CONS	-		

3.5 Notes for wiring

Danger

- Before installation, ensure all front-stage switches external to the energy storage converter are disconnected to guarantee no power inside external cables and converter.
- After the energy storage converter is powered off, wait naturally 20 minutes or use discharge equipment to ensure the converter is completely de-energized before further operation.
- Live installation is prohibited.

3.6 Power Terminal Wiring

The module front end has AC wiring terminals (grid side) and DC wiring terminals (battery side), as shown in the following figure.

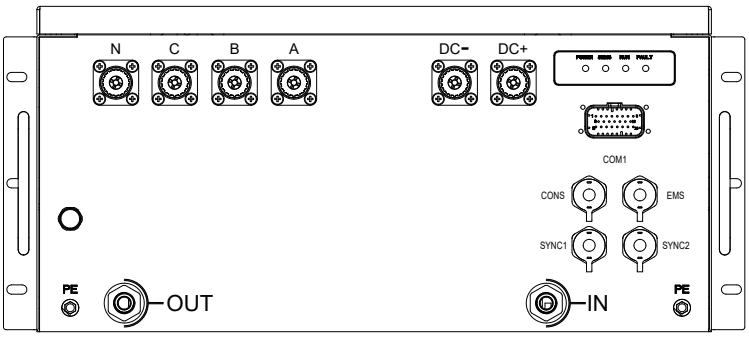


Figure 3-4 Power terminals

Table 3-5 Power terminal definitions

Name	Description	Specifications
DC+	Battery positive	Accessory C-ES09-P70S-02-OR (orange) or Accessory C-ES09-P50S-02-OR (orange)
DC-	Battery negative	Accessory C-ES09-P70S-02-BK (black) or Accessory C-ES09-P50S-02-BK (black)
A	Grid phase A	Accessory C-ES09-P70S-02-OR (orange) or Accessory C-ES09-P50S-02-OR (orange)
B	Grid phase B	Accessory C-ES09-P70S-02-OR (orange) or Accessory C-ES09-P50S-02-OR (orange)
C	Grid phase C	Accessory C-ES09-P70S-02-OR (orange) or Accessory C-ES09-P50S-02-OR (orange)
N	Grid neutral	Accessory C-ES09-P70S-02-BK (black) or Accessory C-ES09-P50S-02-BK (black)
PE	Protective earth	16mm² cable recommended

3.7 Signal Terminal Wiring

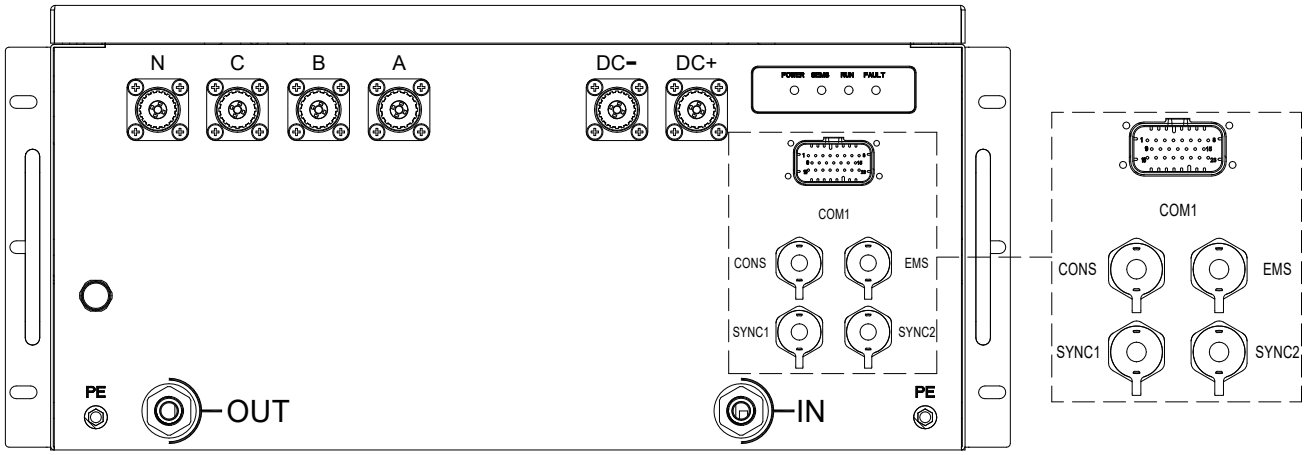


Figure 3-5 Signal terminals

Table 3-6 23PIN signal terminal definitions

PIN	Signal Name	Purpose	Remarks
1	Meter_RS485_A	Connect to BMS	Default to 1-to-1 wiring method with 120Ω termination resistor enabled
2	Meter_RS485_B		
3	EMS_RS485_A	Connect to EMS	
4	EMS_RS485_B		
5	BMS_CAN_H	Connect to BMS	
6	BMS_CAN_L		
7	VCC_12V	External power supply	
8	IOT_GND	Power ground	
9	Reserved	Reserved	
10	Reserved		
11	DO1_KA	Example: External system fan control	
12	DO1_KB		
13	DO2_KA	Example: System fault signal lamp drive control	
14	DO2_KB		
15	DI1_EPO	Example: Emergency stop	
16	DI2	Example: BMS fault	
17	DI3	Reserved	
18	DI4	Reserved	
19	DI_GND	DI ground	Users must provide external power supply
20	Reserved		
21	Reserved		
22	Reserved		
23	Reserved		

Table 4-3 RJ45 signal terminal definitions

Interface	Function	Description
SYNC1	Multi-unit parallel synchronization signal	Daisy chain networking
SYNC2	Multi-unit parallel synchronization signal	
EMS	Ethernet communication	
CONS	Debug interface	Connect to Smart Assistant

Note: The emergency stop wiring (usually using normally closed contacts) is shown in the following figure:

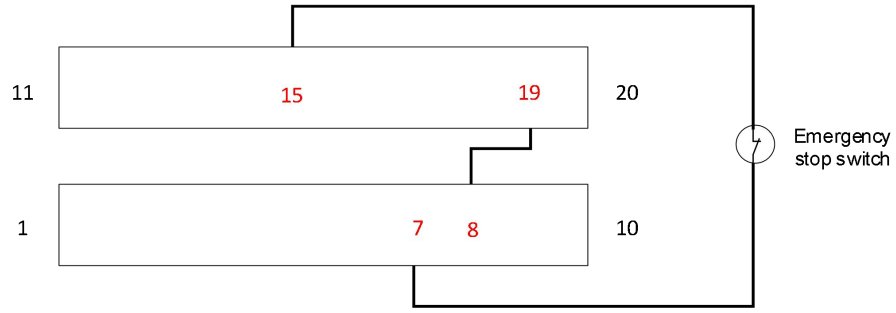


Figure 3-7 Single unit internal power supply emergency stop wiring diagram

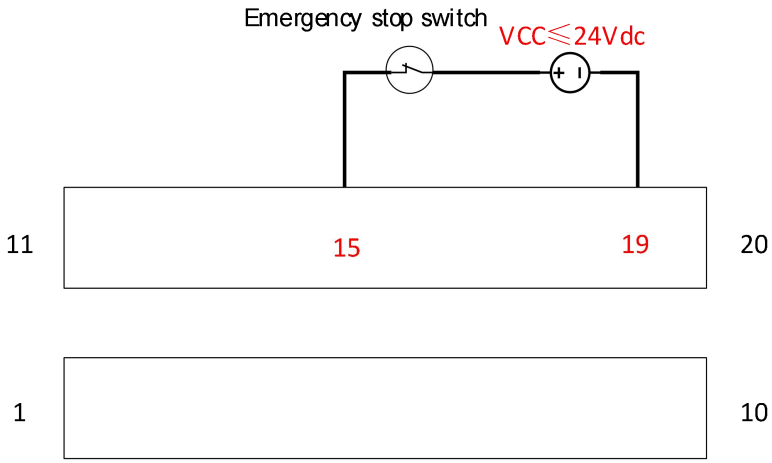


Figure 3-8 Single unit external power supply emergency stop wiring diagram

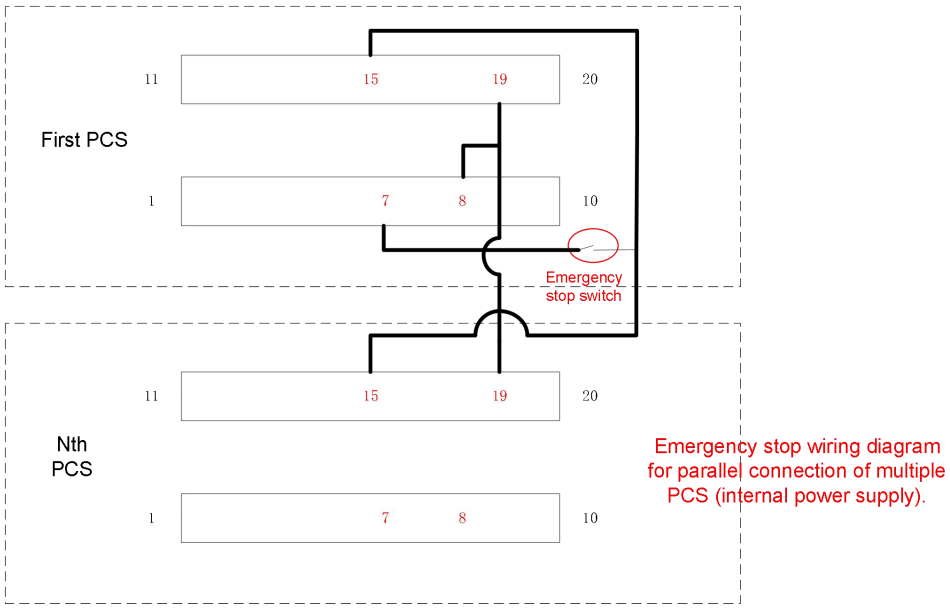


Figure 3-9 Multi-unit parallel internal power supply emergency stop wiring diagram

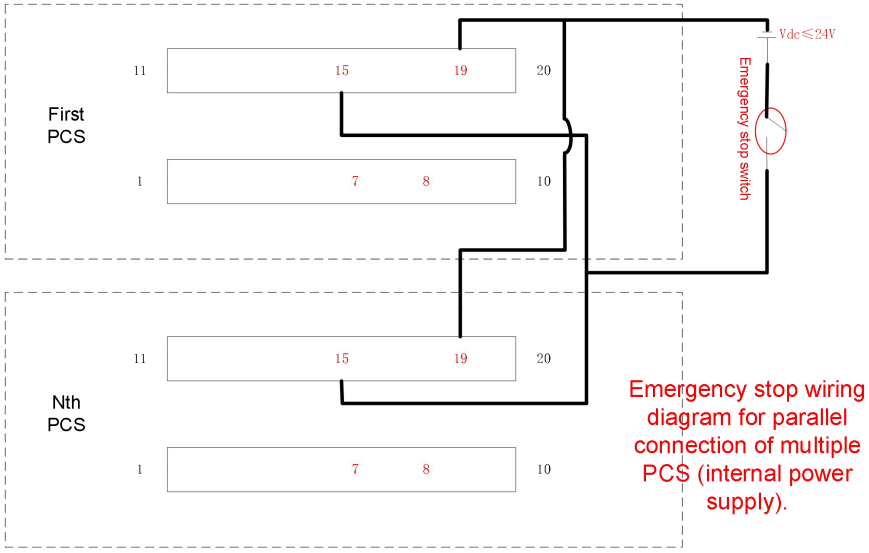


Figure 3-6 Multi-unit parallel external power supply emergency stop wiring diagram

Attention

Emergency stop using internal power supply wiring method is not recommended for multi-unit parallel setups. Internal power emergency stop wiring has the drawback that if the "first PCS" fails and loses power, all parallel PCS units will report emergency stop faults and cannot operate. ! !

4 First Power-On and Operation

4.1 Power-On Guide

Before power-on, check the external power supply is normal; after confirmation, proceed as follows:

1. Disconnect AC and DC power supplies of the energy storage converter.
2. Check AC/DC strong power wiring, emergency stop signal wiring, and EMS communication wiring of the energy storage converter.
3. Connect AC and DC power supplies of the energy storage converter.
4. If no faults are detected, the EMS sends the "power on" command to the energy storage converter.

Notes:

- The energy storage converter must be powered on strictly following the above startup procedures; otherwise, the converter may be damaged or malfunction.
- After power-on, the energy storage converter defaults to stopped state; both AC and DC side switches are off.

4.2 Power-Off Guide

4.2.1 Normal Shutdown

Normal shutdown steps for the energy storage converter:

1. The EMS sends the "stop" command.
2. The energy storage converter automatically turns off internal AC and DC relay switches.
3. The fan runs continuously for 5 minutes to cool the energy storage converter.
4. Disconnect external AC and DC power switches of the energy storage converter.

Notes:

- After shutdown, wait 20 minutes before touching the energy storage converter.
- Place warning signs at disconnected switches to prevent accidental re-energizing.

4.2.2 Emergency Shutdown

In an emergency, operate the energy storage converter as follows:

1. Manually press the emergency stop button directly.
2. Disconnect external AC and DC power switches of the energy storage converter.

Notes:

- Under normal conditions, shutdown is controlled by EMS commands.
- In emergencies, use emergency stop to ensure rapid response and protect equipment and personnel safety.
- After shutdown, wait 20 minutes before touching the energy storage converter.
- Place warning signs at disconnected switches to prevent accidental re-energizing.

5 Maintenance and Troubleshooting

5.1 Routine Maintenance

Since the PCS often works outdoors, and the outdoor environment is changeable and harsh, it is easy to cause device aging during PCS operation. In addition, due to vibration, the power wiring may become loose, resulting in excessive temperature rise of the copper busbar. In order to ensure long-term stable and efficient operation, regular inspection and maintenance become particularly important.

Danger

- The product's input and output are high voltage and high current, posing direct life safety risks. Necessary safety precautions must be taken before maintenance.

1. Only qualified personnel can perform maintenance on this product. Before performing maintenance, the correct operating procedures must be strictly followed.
2. Before maintenance, ensure DC and AC power supplies are disconnected; verify with a multimeter if necessary.
3. After the power is disconnected, a warning sign should be hung at the disconnection point to prevent accidental power on during maintenance, which may cause safety accidents.
4. Internal energy storage capacitors require waiting at least 20 minutes after power-off to ensure zero internal voltage before maintenance.

- To avoid accidents, maintenance personnel must wear insulated protective gear during maintenance.

Warning

- Shorter maintenance intervals are recommended under severe ambient conditions.
- DC and AC distribution components are more affected by harsh environments; assess maintenance intervals based on site conditions.
- Regular visual inspections are recommended to determine maintenance needs.
- If the product is unused for over 6 months, consult our after-sales engineers or specialists for inspection and testing before use. Non-professionals must perform inspections and tests under the guidance of professionals.

5.2 Daily Inspection

Routine inspection items should be carried out according to the following points:

Table 5-1 Daily inspection checklist

No.	Daily inspection items	Confirmation
1	Monitor input/output voltage, current, and operating status in real time, with dedicated personnel observing fixed points. Maintain timely maintenance upon abnormal operation or abnormal voltage/current.	□
2	Listen for abnormal sounds from the product.	□
3	It is recommended to read internal module temperature and verify it is within normal range.	□

5.3 Regular Inspection

Some problems require a long time to accumulate before becoming apparent. It is recommended to check regularly every three months, focusing on areas difficult to inspect during daily checks and operation.

Table 5-2 Regular inspection checklist

No.	Regular inspection items	Confirmation
1	Check for any damage or rust on the product's exterior.	□
2	Check that ventilation, ambient temperature, humidity, dust, and other environmental factors around the product meet requirements.	□
3	Inspect cables for insulation aging or damage; if present, add insulation measures or replace cables.	□
4	Inspect wiring bolts for signs of aging or burn marks; when powered off, use the appropriate calibrated torque screwdriver to confirm bolts are properly tightened.	□

5.4 Fault List

The Mars-125KT-LP energy storage converter has a complete fault protection function. Once a fault occurs, it will automatically stop, and you can read the fault information on the EMS.

Users can perform preliminary self-checks of faults using the prompt information in the table below, observe fault phenomena, analyze causes, and attempt solutions. Note: In case of self-check faults, do not unpack the energy storage converter. If faults persist, please contact your sales channel or YUNT.

Table 5-3 Faults

No.	Fault Name	Possible cause	Solution
1	Grid not energized	External grid switch not closed	Close the external grid switch
2	Battery overvoltage	AC side input voltage too high	Check whether the grid voltage is normal
3	Battery undervoltage	AC side input voltage too low	Check whether the grid voltage is normal
4	Grid over-frequency	AC side input voltage frequency too high	Check whether the grid voltage is normal
5	Grid under-frequency	AC side input voltage frequency too low	Check whether the grid voltage is normal
6	Grid phase sequence error	AC side input voltage phase sequence reversed	Adjust the AC side input voltage phase sequence
7	Grid phase loss	AC single-phase input voltage too low	Check whether the grid voltage is normal
8	Grid voltage imbalance	AC input phase-to-phase voltage difference too high	Check whether the grid voltage is normal
9	Grid islanding state	AC side input voltage fluctuation	Check whether the grid is disconnected
10	Module hardware overcurrent	AC load too large or impact load	Please contact manufacturer
11	Pulse current limiting exceeded	AC load too large or impact load	Please contact manufacturer
12	Busbar hardware overvoltage	Grid voltage/battery voltage too high	Check the grid/battery status
13	Power failure	Power board supply abnormal	Please contact manufacturer

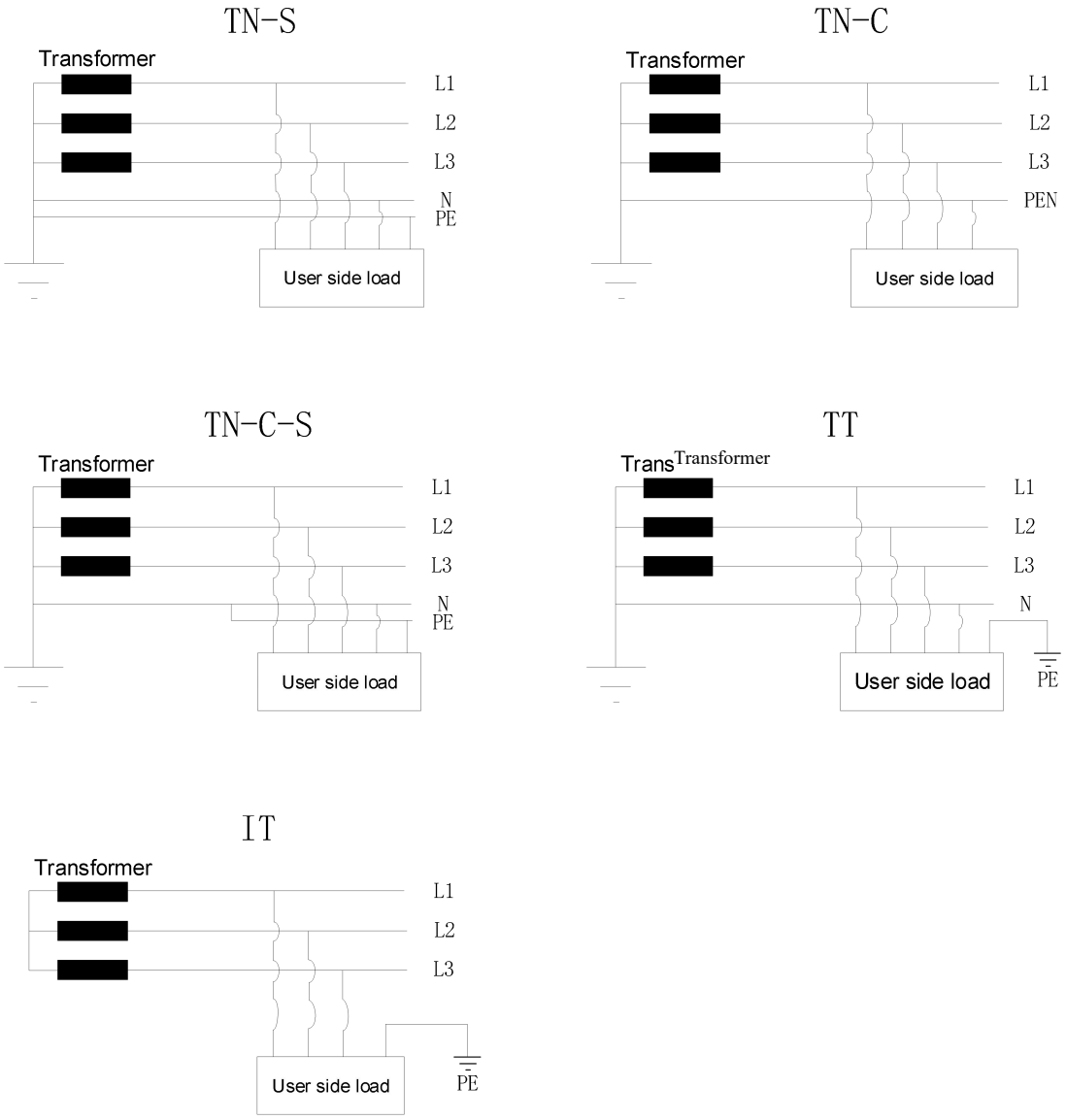
No.	Fault Name	Possible cause	Solution
14	Battery current hardware overcurrent	AC load too large or impact load	Please contact manufacturer
15	BMS communication failure	BMS communication line disconnected	Reconnect the BMS communication line
16	EMS communication failure	EMS communication line disconnected	Reconnect the EMS communication line
17	Slave unit fault	The slave unit reports faults	Troubleshoot the slave unit
18	Carrier synchronization failure	PCS master-slave communication lost	Check whether communication cables are normal
19	Device fault	Master unit fault	Troubleshoot the master unit
20	Master unit communication fault	PCS master-slave communication lost / master unit not powered	Check communication line and power status
21	Slave unit communication fault	PCS master-slave communication lost / slave unit not powered	Check communication line and power status
22	STS communication failure	PCS-STS communication lost / STS not powered	Check communication line and power status
23	Abnormal automatic switching command between grid-connected and off-grid modes	Mode not issued after status switch	EMS issues switched mode command within 5 seconds
24	STS fault	STS fault	Troubleshoot STS faults
25	Precharge timeout	Precharge bus voltage not rising	Please contact manufacturer
26	Bus overvoltage	Grid voltage too high	Check whether the grid voltage is normal
27	Bus undervoltage	Severe AC side overload	Check AC phase-to-phase insulation
28	Positive and negative bus imbalance	AC load imbalance	Check AC load distribution uniformity
29	DC power supply not ready	DC input voltage low	Check DC input voltage status
30	Battery voltage polarity reverse connection detection abnormal	DC side positive/negative voltage reversed	Check DC side wiring polarity correctness
31	Battery overvoltage	DC input voltage too high	Check DC input voltage status
32	Battery undervoltage	DC input voltage too low	Check DC input voltage status
33	Battery overcurrent	AC side overload	Derating operation
34	Module overcurrent	AC side overload	Derating operation
35	Grid-side module current imbalance	AC load imbalance	Check AC load distribution uniformity
36	Module overheating	Overload operation / fan fault	Please contact manufacturer
37	Capacitor overvoltage	AC side input voltage too high	Check whether the grid voltage is normal
38	Capacitor undervoltage	AC side input voltage too low	Check whether the grid voltage is normal
39	Active power too high	Overload operation	Derating operation
40	Active power reaches limiting value	Overload operation	Derating operation
41	Derating due to overtemperature	Overload operation Fan fault	Please contact manufacturer

No.	Fault Name	Possible cause	Solution
42	AC and DC power mismatch	Current sensor fault	Please contact manufacturer
43	Active power deviation large	Current sensor fault	Please contact manufacturer
44	External fan fault	External fan stopped	Please contact manufacturer
45	Emergency stop	Emergency stop switch opened	Reset the emergency stop switch
46	DC-to-ground insulation resistance failure	DC-to-ground insulation resistance abnormal	Please contact manufacturer
47	Internal ambient temperature too high	Internal fan abnormal	Please contact manufacturer
48	AD sampling zero drift too large	Current sampling AD value abnormal	Please contact manufacturer
49	DC main contactor fault	DC main contactor command and status feedback mismatch	Please contact manufacturer
50	Main contactor fault	Main contactor command and status feedback mismatch	Please contact manufacturer
51	BMS fault	The BMS issues the command	Check the BMS
52	Charge termination	BMS current limit	Check the current limiting cause
53	Discharge termination	BMS current limit	Check the current limiting cause

6 Appendix

6.1 Grid Types

There are five common types of grid, as shown in the following figure:



[1] The first letter indicates the relationship between the power source and ground:

T – Power transformer neutral directly grounded.

1 – Power transformer neutral not grounded or grounded through high impedance.

[2] The second letter indicates the relationship between the exposed conductive parts of the electrical device and the ground.

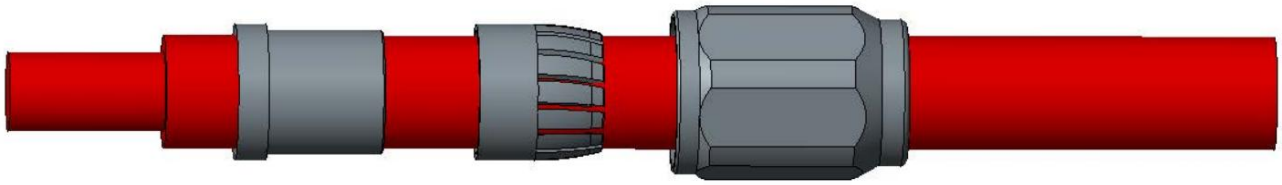
T – Exposed conductive parts directly grounded; this grounding point is electrically independent from power source neutral grounding.

N – The exposed conductive parts of the electrical device are directly electrically connected to the power supply's neutral point (grounding point).

6.2 Power Terminal Crimping

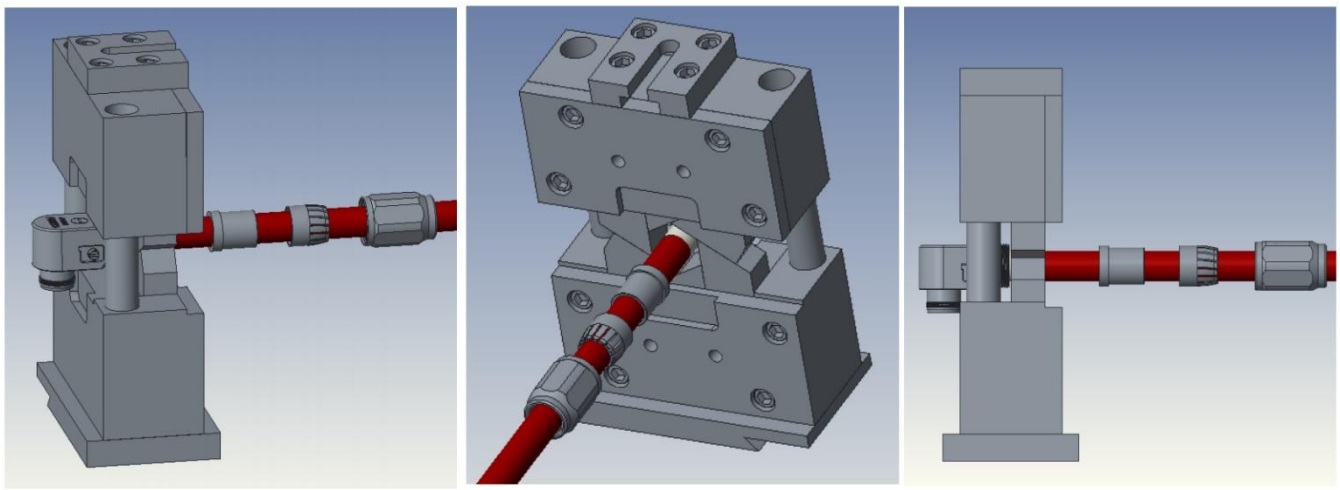
Step 1: Select cable according to Table 3-4 specifications; strip 26mm–28mm insulation at the cable end.

Step 2: Seal ring, seal ring bushing (if the cable sheath is thick enough to prevent installation of the bushing, this part can be omitted without affecting performance), end cover, thread in the cable.

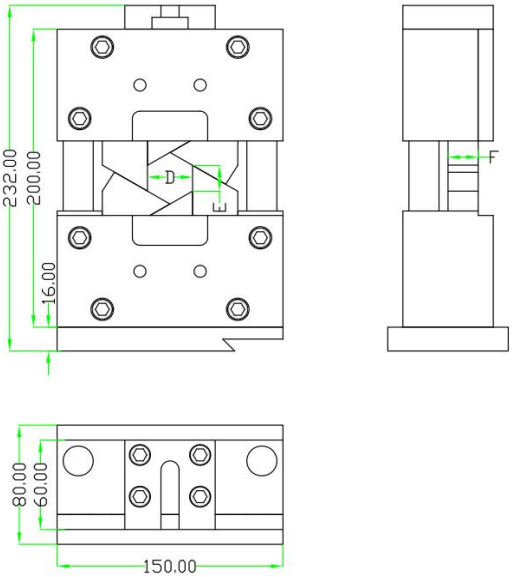


Sealing ring Seal ring bushing Tail cover

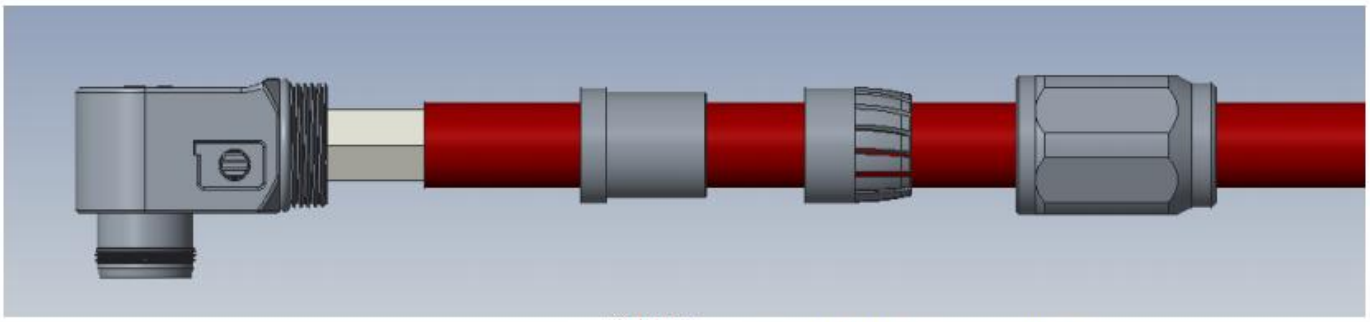
Step 3: Crimp terminal; the recommended harness crimp height is in the table below.



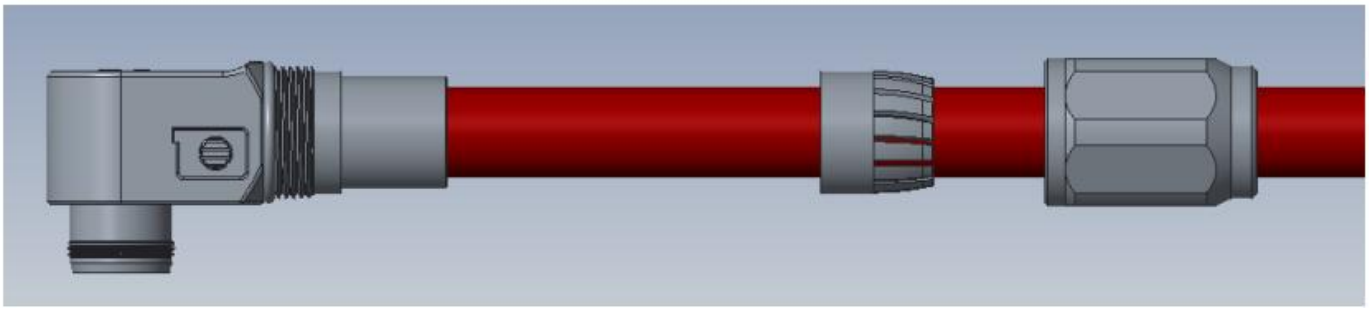
Wire gauge (AWG)	D(mm)	E(mm)	F(mm)
4/0	-	-	-
3/0	13.0	7.5	10
2/0	13.5	7.8	10
1/0	14.5	8.4	10
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-

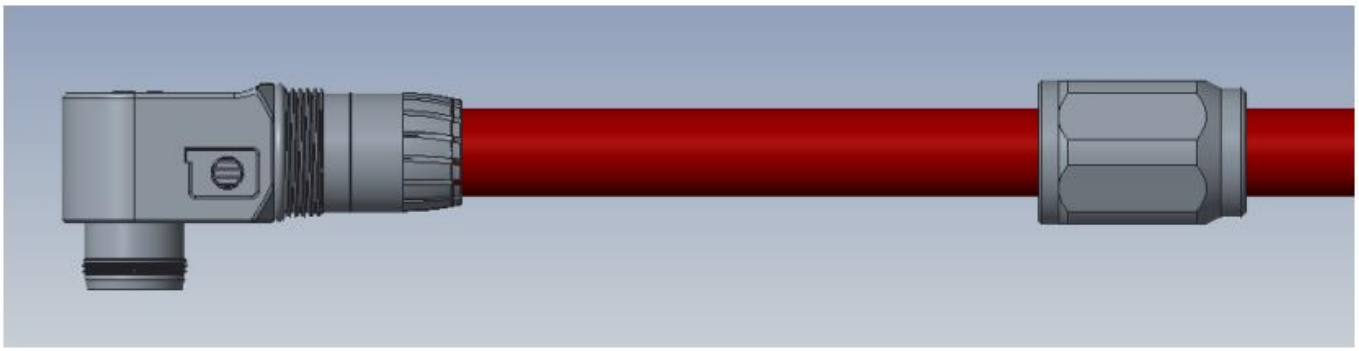


Step 4: Assemble the sealing ring, sealing ring sleeve, and end cover.

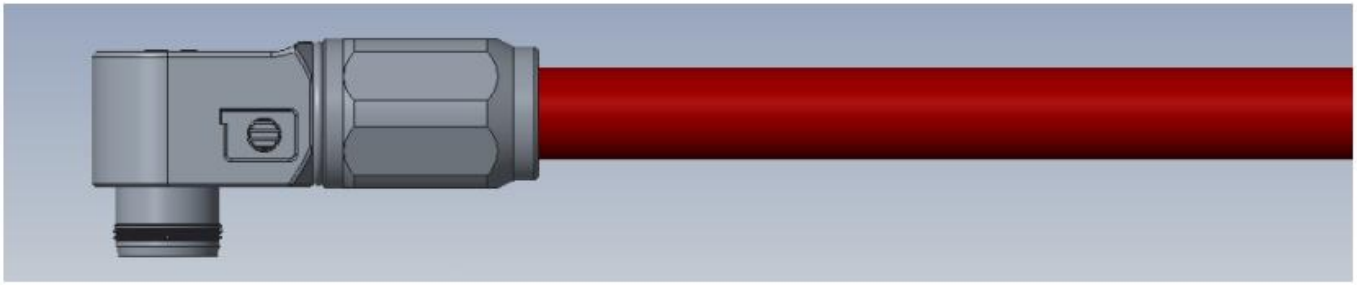


Sealing ring Seal ring bushing Tail cover





Tighten the tail cap with 2.5N.m torque



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