Midea Industrial Tech.

NE-5000-MV-IEC
User Manual

Revision History

Version	Revision content	Revision date
V0	Initial version	2025-06-20
V1	● Updated 3.4 Main Circuit Diagram. ● Updated 6.4 Wiring Diagram.	2026-01-09

Contents

1 About This Manual

1.1 Foreword

Dear customers, thank you for selecting the NE-5000-MV-IEC medium voltage system (hereinafter referred to as “MVS”) developed by Shenzhen CLOU Electronics Co., Ltd.

In order to fully play the outstanding performances of the product and avoid personal injury or any damages related to the product, please read the manual carefully before installation.

If you have any doubts or questions about the installation of the product, please feel free to contact us.

Notes:

We reserve the right to make technical changes or modify the contents of this document without prior notice. With regard to purchase orders, the agreed particulars shall prevail. CLOU does not accept any responsibility whatsoever for potential errors or possible lack of information in this document.

1.2 Target Readers

This manual is intended for technical personnel who are responsible for the transportation, installation, commissioning and other operations of the MVS.

1.3 Abbreviations

Abbreviation	Full expression
AC	Alternating Current
AUX	Auxiliary
BAMU	Battery Array Management Unit
BCMU	Battery Cluster/String Management Unit
BMU	Battery Management Unit
BMS	Battery Management System

Abbreviation	Full expression
BESS	Battery Energy Storage System
CAN	Control Areal Network
CCP	Central Control Panel
DC	Direct Current
EMS	Energy Management System
ESS	Energy Storage System
FSS	Fire Suppression System
FAT	Factory Acceptance Test
HMI	Human Machine Interface
HVCB	High Voltage Control Box
HVAC	Heating, Ventilation and Air Conditioning
HIPOT	High Potential Test
IMD	Isolation Monitoring Device
ICM	Integrated Control Module
ICB	Incoming Circuit Breaker
LC	Local Controller
LCS	Liquid Cooling System
LFP	Lithium Iron Phosphate
LOTO	Lockout Tagout
MSD	Manual Service Disconnect
PCS	Power Conversion System
PPC	Power Plant Controller
PPE	Personal Protective Equipment
SLDs	Standard List of Devices
SOC	State of Charge
SOE	State of Energy
SOH	State of Health
SPD	Surge Protection Device
SLC	Signal Line Circuit
SMPS	Switching Mode Power Supply
TN-S	Terra Neutral–Separate
VCU	Ventilation Control Unit

2 Safety Precautions

2.1 Symbol Description

This manual provides relevant safety signs to ensure the safety of users and property when using the product.

Danger

Indicates a high potential hazard that, if not avoided, could result in death or serious injury.

Warning

Indicates a moderate potential hazard that, if not avoided, could have resulted in serious injury.

Caution

Indicates a low potential hazard that, if not avoided, could result in moderate or minor injury to a person.

Note

Indicates a situation which, if not avoided, could result in equipment malfunction or property damage.

Pay attention to the warning signs on the product. The specific instructions are as follows:

	High voltage risk of electric shock
	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
	Indicates high surface temperature. Do not touch!
	Protective earthing (PE) terminal
	Indicates that the installation manual and maintenance manual are available for reference.
	Lifting heavy objects may lead to injury. Use lifting aids.

	Risk of explosion
	Risk of chemical hazard
	Read instruction manual before any manipulation of the product.
	No leaning
	No smoking
	No open flames
	No climbing
	No admittance
	Do not dispose of this product as household waste.
	Keep the product away from fire.
	Personal protective equipment
	Miscellaneous dangerous goods

2.2 General Safety

The operation and maintenance of the product must be carried out by professional technicians in accordance with local regulations. The technicians shall meet the following requirements:

- Equipped with certain electrical, mechanical and wiring knowledge and able to read relevant schematic diagrams
- Familiar with the construction and working principle of the energy storage system
- Familiar with the construction and working principle of the MVS upstream and downstream equipment
- Trained specifically for electrical device operation, installation and commissioning
- Able to cope with the dangerous and emergency situations during installation and commissioning
- Familiar with the country/regional standards and specifications
- Familiar with this manual

2.3 Electrical Safety

Danger

There is a risk of electric shock when touching live parts. Before installing the MVS, follow the steps below to power off the system.

1. Turn off following breakers:
   - The breaker on the ACB1 cabinet
   - The breaker on the ACB2 cabinet
   - The breaker between the RMU and the switch cabinet
2. Ensure that there is no voltage existing.
3. Ensure that the MVS is grounded reliably.

Danger

Dangerous voltage may exist even though the main AC switches are disconnected. Please follow the steps below to ensure safety.

1. Wait at least 5 minutes after the ACB cabinet is powered off.
2. Ensure that there is no voltage existing.

2.4 Personal Safety

Danger

Improper operation may cause electric shock. Only staff trained and qualified with relevant knowledge can perform operations on the MVS. Before installation, observe following instructions to ensure personal safety.

- Follow the methods described in this manual.
- Follow all the safety instructions.
- Follow the circuit diagram during electrical connection.
- Keep the manual and related documents at hand and available for easy reference.

Warning

- The surface of some components will rise during operation. Please be careful.
- Wear safety gloves during operation and maintenance.

2.5 Equipment Safety

Caution

Electrostatic discharge may damage the module. Observe the following instructions to ensure equipment safety.

- Follow the protective regulations of ESD and wear protective gloves during maintenance.
- Discharge static electricity by touching grounding parts (such as the PE connection part of the door).

Note

Unauthorized personnel can’t open the door. Make sure to remove the key from the lock and switch, and keep it in a safe place.

3 Product Description

3.1 System Overview

The SKID solution consists of battery energy storage system (BESS), medium voltage system (including transformer), metering and monitoring devices, and power distribution system. The medium voltage system can be perfectly applied in large and medium-scale energy storage power stations. The AC power can be put into the grid by the supporting of isolation transformer and power distribution system. More details are shown in the figure below.

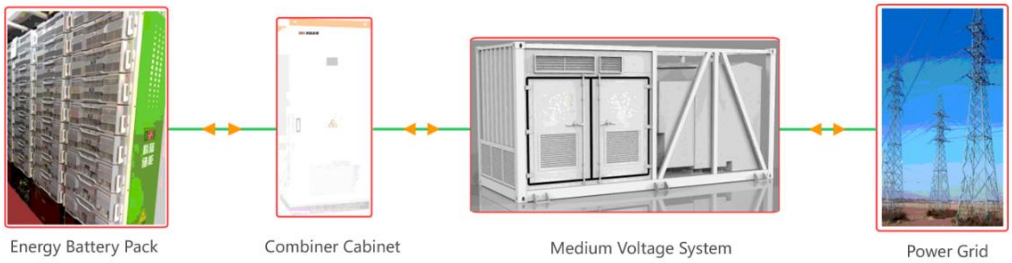


Figure 3-1 Components of energy storage system

3.2 Product Introduction

The medium voltage system consists of a 5.25 MVA oil-immersed transformer, a RMU, an auxiliary transformer, a low voltage control cabinet, and two ACB cabinets. All components are placed in a 20 ft high container. The protection level of the container is IP54, and the overall layout is shown in the figure below.

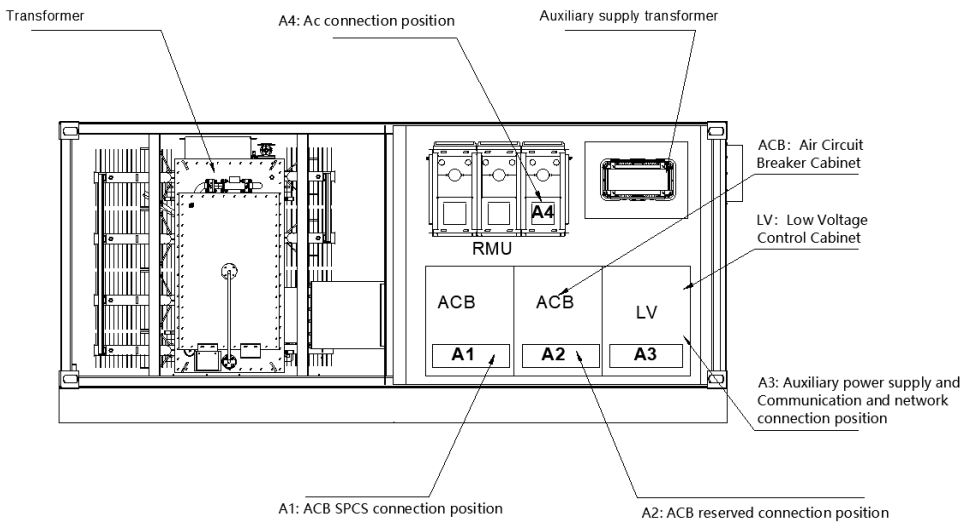


Figure 3-2 Layout of the medium voltage system

3.3 Model Description

NE-5000-MV-IEC
1 2 3 4

Figure 3-3 Model example

Table 3-1 Model description

No.	Designation	Description
1	Product category	NE: CLOU new energy product
2	Product power	5000: 5000 kVA
3	Product voltage	MV: medium voltage
4	Standard/region	IEC: compliant with IEC standards

3.4 Main Circuit Diagram

The main circuit of the medium voltage system is shown in the figure below.

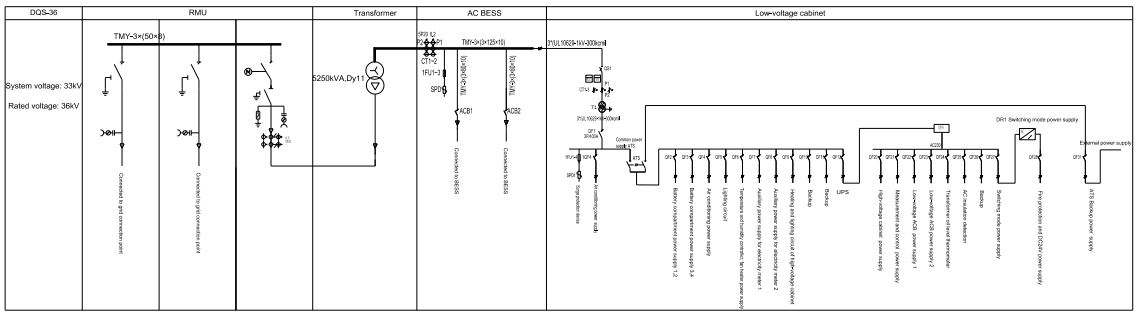


Figure 3-4 Main circuit diagram

3.5 Structure Instructions

3.5.1 Outline Dimensions

The mechanical dimension of the medium voltage system is 6058 × 2438 × 2896 mm (W × D × H) and the weight is approx. 19000 kg. The mechanical dimension is shown in the figure below (unit: mm).

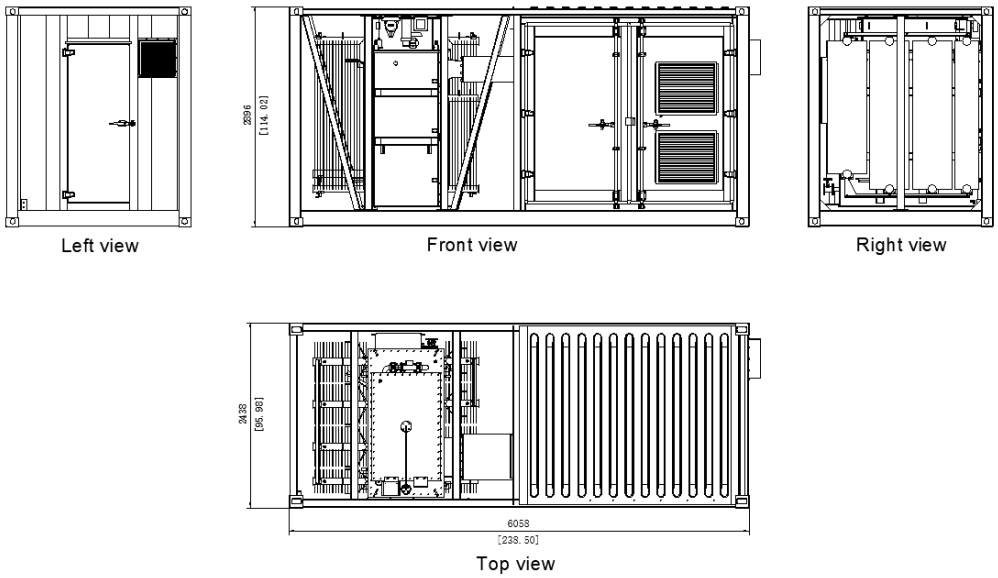


Figure 3-5 Outline dimensions

3.5.2 Cable Entry Design

All cables between the medium voltage system and external devices are routed from the bottom.

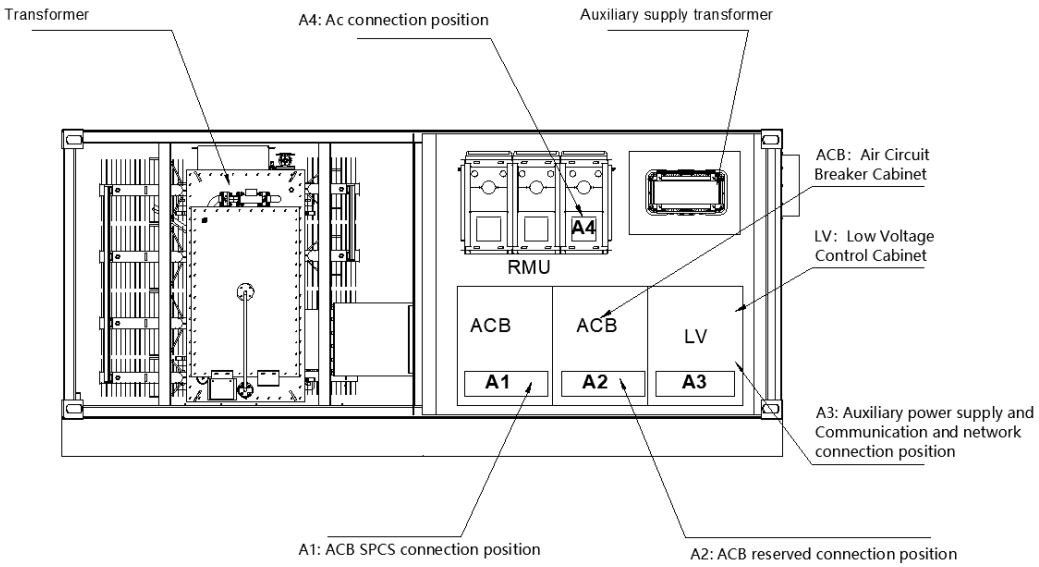


Figure 3-6 Cable entries of the medium voltage system

3.5.3 Ventilation Design

The ventilation schematic diagram is shown in the figure below.

- The transformer circulates heat through the heat sink.
- The Low Voltage Control Cabinet (LV) is cooled by an air conditioning cycle.
- The auxiliary transformer is cooled by fans.

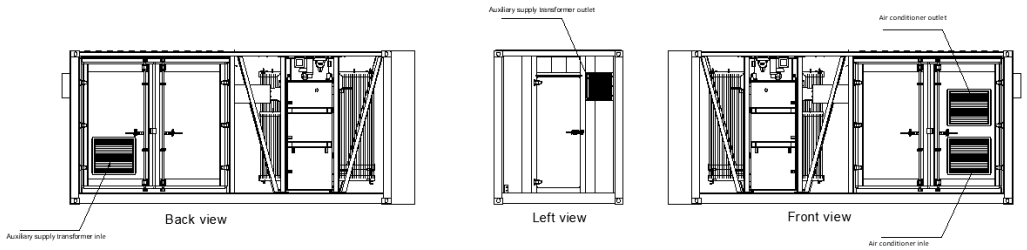


Figure 3-7 Ventilation schematic diagram

3.6 Transformer Protection Functions

The transformer features following protection functions:

- High oil level alarm
- Low oil level alarm
- High oil temperature alarm
- Light gas alarm
- Heavy gas tripping
- Pressure valve tripping

3.7 MV Switchgear Protection Functions

The MV switchgear features following protection functions:

- High set three-phase non-directional overcurrent protection
- Low set three-phase non-directional overcurrent protection
- Low set non-directional earth-fault protection
- High set non-directional earth-fault protection
- SF6 low pressure alarm

4 Transportation and Storage

4.1 Transportation Requirements

The MVS container is transported to the project site by the freight company, and site manager will be notified in advance to negotiate delivery and unloading. After delivery, the MVS container is moved to the final location and need to be operated by professional engineer.

Warning

During the entire process of loading, unloading and transportation, follow the safety regulations of the country/region where the project is located.

- All equipment used in the operation should be maintained.
- All personnel engaged in loading, unloading and bolting should receive corresponding training, especially safety training.

Caution

During the entire process of loading, unloading and transportation, it is necessary to keep in mind the mechanical parameters of the MVS container:

- Dimension (W × D × H): 6058 × 2438 × 2896 mm
- Weight: ≤ 19000 kg

The transportation of the MVS container must satisfy the following conditions:

- All doors of the MVS container are locked tightly.
- According to the site conditions, select the appropriate crane or lifting tool. The selected tools must have sufficient load-bearing capacity, arm length and radius of rotation.
- If you need to move on slopes, additional traction devices may be required.
- Clear all obstacles, such as trees and cables, that exist or may exist during the movement.
- The MVS container should be transported and moved under better weather conditions.
- Warning signs or warning tapes must be installed to prevent non-workers from entering the lifting and transportation area to avoid accidents.

4.2 Hoisting Requirements

4.2.1 Safety Instructions

Warning

In the whole process of hoisting, the safety operation regulations of the crane must be strictly followed.

- No one is allowed to stand within 5–10 m of the operating area. In particular, it is strictly forbidden to stand under the MVS during the hoisting process.
- In case of severe weather conditions, such as heavy rain, fog, strong wind, etc., the hoisting must be stopped.

When hoisting the MVS container, the following requirements must be satisfied:

- The site safety must be ensured when hoisting.
- A professional instructor is needed during the whole process.
- Each sling can carry a load of over 10 tons.
- Ensure that all sling connections are safe and reliable, and the lengths of the slings connected to the corner fittings are equal.
- The crane should have sufficient arm length and radius of rotation.
- The length of the sling can be adjusted appropriately according to the requirements.
- The MVS container must be stable and not deflected during the whole hoisting process.
- Hoist the MVS container by connecting the four corner fittings.
- Some accessories may be needed to ensure the hoisting safety.
- The following figure shows the crane operation during the lifting process. The dotted circle on the inner layer represents the crane operating range. When the crane is working, it is strictly forbidden to stand within the outer solid circle.

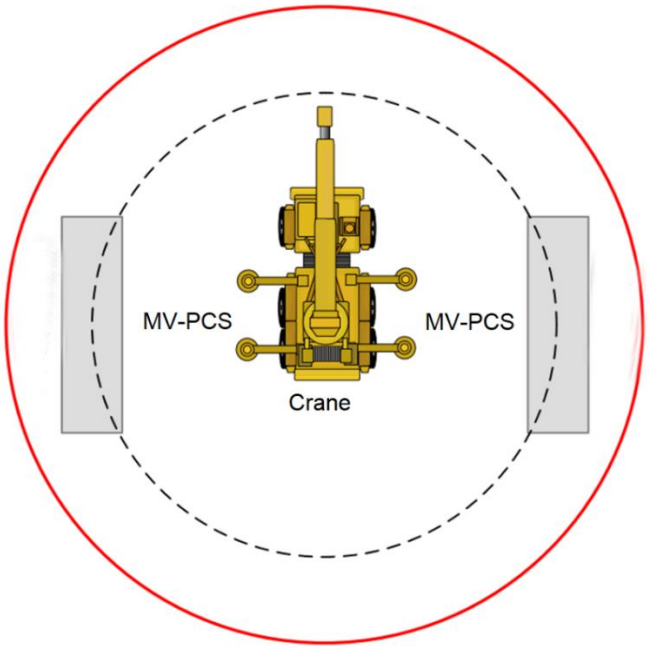


Figure 4-1 Schematic diagram of crane operation

4.2.2 Hoisting Operation

In the process of lifting the MVS container, each operation link should be carried out according to the following requirements:

- The MVS container should be lifted vertically, but it can't be dragged on the ground or on top of the lower container, in other words, it can't be dragged on any surface.
- The MVS container should be suspended after being moved 300 mm away from the supporting surface, and the connection between the spreader and the container should be checked. After confirming the connection is firm enough, it can be lifted.
- After the MVS container is ready, it should be placed gently and landed steadily. It is absolutely forbidden to shake the spreader.
- The area where the MVS container is placed should be solid, flat, well drained, and free of obstructions; on the site, the MVS container can only be supported by the four bottom corner pieces. Due to the site conditions, please use non-vertical force to lift.

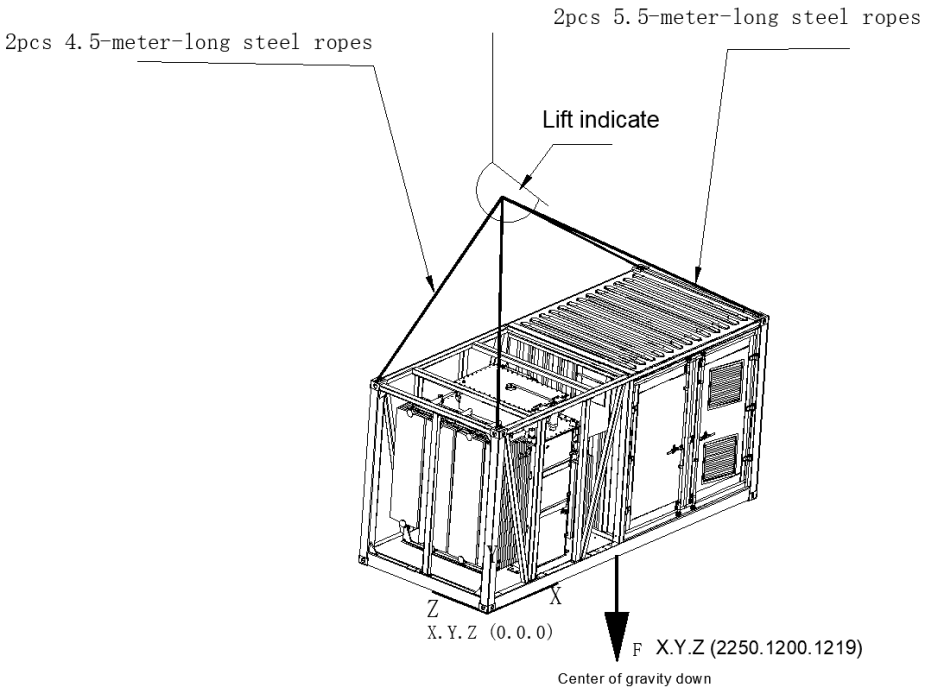


Figure 4-2 Hoisting from top fittings

4.2.3 Fastening Connectors

Using slings with hooks or U-hooks to hoist the MVS container. The hoisting devices should be connected to the MVS container correctly.

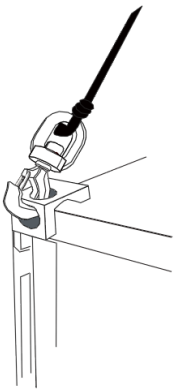
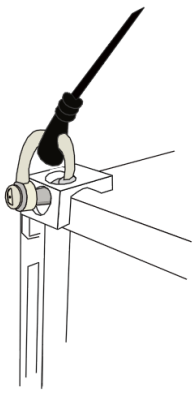
Lifting device	Hook	U-hook
Connections		
Notice	Insert the hook from inside to outside.	Lateral pin of the U-hook should be tightened.

Figure 4-3 Fastening connectors

Warning

- When lifting and transporting, all safety operation standards and regulations of the country/region where the project is located must be strictly followed.
- Shenzhen CLOU Electronics Co., Ltd. will not be responsible for personal injury or property damage caused by violation of relevant requirements or other safety regulations.

4.3 Storage Requirements

Caution

If the product is not to be installed immediately upon reception, the MVS should be stored appropriately according to following instructions.

- Keep the desiccant in the package.
- Store the MVS indoors, such as in a large warehouse or workshop.
- Store the MVS on a dry, clean and solid ground with sufficient load-bearing capacity. The ground should be flat without water, bumps or vegetation cover.
- Pay attention to ventilation and relative humidity without condensation.
- Check regularly, usually once a week, to see whether the package is in good condition. Avoid insect and animal bites.
- The package should be opened every six months for inspection, repackaging and desiccant replacement.

Caution

When installing the equipment that has been stored for a long time, open the door of the cabinet and test the equipment by a professional to check whether the equipment is in good condition before installation.

5 Mechanical Installation

The overall installation procedure of the medium voltage system is shown as follows.

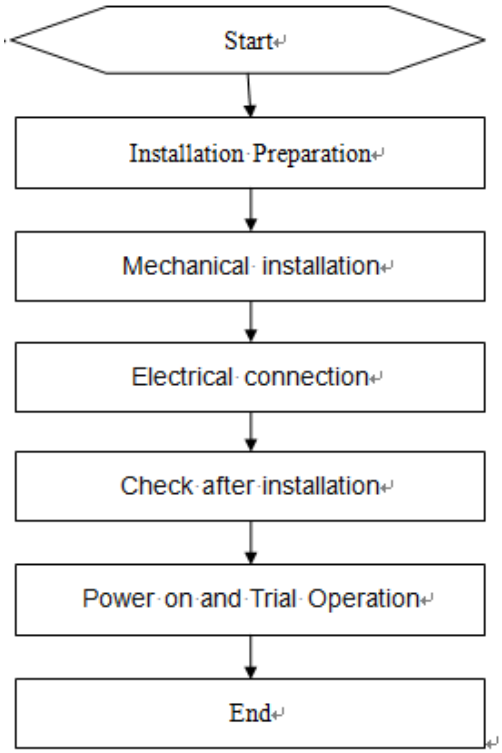


Figure 5-1 Installation procedure

Table 5-1 Installation procedure specification

Process	Item	Chapter reference
Preparation before installation	Check whether all accessories are available.	5.1 Checking before Installation
	Check whether the installation tools and other parts are available.	5.2 Preparing Installation Tools
Mechanical installation	Installation and securing of the MVS	5 Mechanical Installation
Electrical connection	Open the front door and remove the protective cover.	6 Electrical Connection
	AUX power connection	
	AC side connection	
	Grounding connection	
	Communication line connection	
Check after installation	Mechanical installation check	7 Post-Installation Check
	Electrical installation check	

Process	Item	Chapter reference
	Others	
Power on and trial run	Check before trial run	-
	Preparation before startup	
	First run steps	
	Complete the trial run.	

5.1 Checking before Installation

After receiving and unpacking the package, check whether the deliverables are intact and complete.

Table 5-2 Deliverables of the medium voltage system

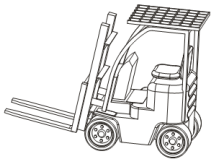
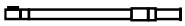
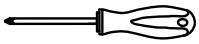
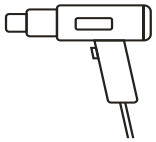
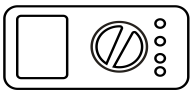
No.	Item	Quantity	Note
1	NE-5000-MV-IEC medium voltage system	1 set	The key of cabinet door and other accessories are included.
2	User manual	1 pc	Electronic file
3	Warranty card	1 pc	-
4	Certificate	1 pc	-
5	Test report	1 pc	-

Although careful test and inspection have been conducted before delivery, damages may still occur during the transportation. Therefore, please check the MVS carefully before installation and contact the shipping company or Shenzhen CLOU Electronics Co., Ltd. If any damages are found, pictures of damaged parts will be truly helpful.

5.2 Preparing Installation Tools

Before installation, prepare installation tools including but not limited to following ones.

Table 5-3 List of installation tools

 Lifting crane	 Fork lift	 Torque wrench
 Wire stripper	 Screwdriver	 Alcohol blast burner (heat blower)
 Multimeter	 Hydraulic tong	 Crimping pliers

5.3 Installation Requirements

5.3.1 Installation Environment Requirements

To ensure that the equipment can work normally, the installation environment shall meet following requirements.

- Place the equipment in the environment that complies with its protection level of IP54.
- Ensure good ventilation around the equipment.
- Avoid direct sunshine irradiation. Otherwise, high temperature will affect the performance.
- Install the equipment as far as possible from the residents as it will generate some noise during operation.
- Ensure that the installation floor is flat and will not cause any shaking to the equipment during working.

- Determine the installation position properly to ensure that the LED indicators and LCD screen can easily observed.
- Ensure that the ambient temperature is within the required range (–25℃ to +50℃).
- Leave enough space between the machine and the wall to ensure sufficient space for ventilation, heat dissipation, installation, maintenance, and safe escape.
- Install the equipment in a dry and clean environment. Besides, water leakage must be taken into consideration.
- The equipment can also be installed in an industrial environment which satisfies the EMC requirements and noise level requirements.
- The sliding plate of wire in/out holes should be put to the corresponding positions. Also, polyurethane foam can be used to seal the gap to prevent rats biting.

5.3.2 Installation Design Requirements

The medium voltage system should be installed in a control room. The design for the floor, space, cable trench, air duct, ventilation and protective measures should meet the following requirements.

Please consult the company's engineers for detailed design requirements of the control room used to install the medium voltage system.

5.3.2.1 Floor Requirements

The medium voltage system needs to be installed on a flat and fire-retardant floor or on a structure supported by steel channels. No sinking or tilting is allowed.

Make sure that the floor foundation is strong, safe, reliable, and capable of bearing the weight of the equipment.

5.3.2.2 Space Requirements

When installing the medium voltage system, an appropriate distance must be kept between the wall and other equipment to meet the narrowest space request for maintenance channel, escape route and ventilation.

There should be a distance of at least 2500 mm around the installation location to ensure installation, heat dissipation and maintenance. (The space shall be determined according to the environmental conditions of the specific project.)

5.3.2.3 Cable Trench Requirements

The medium voltage system wires in and out from the bottom. It's strongly suggested that the cable connection between the medium voltage system and external devices wired in the cable trench, making it convenient for maintenance and installation. In addition, the electrical control room needs to be pre-installed with concrete cable trench, or the floor needs to be placed with steel bracket to raise the installation surface for laying cables.

The design and construction of cable trench shall be in accordance with related standards, and the weight and dimensions of the MVS shall also be taken into full consideration.

The cross section of the cable trench is shown in the figure below. You can decide the quantity of cable brackets based on actual needs. When laying the cables, the communication cable, control cable and power cable must be separated from each other. Besides, the AC circuit and DC circuit need to be laid separately for convenient installation and maintenance, and reducing the interference on communication and control signals.

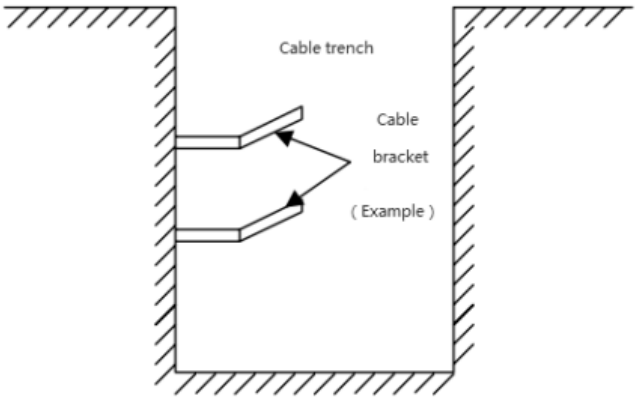


Figure 5-2 Cross section diagram of cable trench

5.3.2.4 Ventilation Requirements

Since the temperature will rise during the operation of the medium voltage system, the high temperature will affect the electrical performance. Therefore, heat dissipating must be considered during designing the control room to ensure safe and efficient operation.

In order to meet ventilation requirements of medium voltage system, its installation environment must meet the following conditions:

- Do not install the medium voltage system in places with poor ventilation and low air flow. Larger ventilation volume can be obtained by adding air supply grille or fan.
- Sufficient fresh air should be supplied from the air inlet.
- Ensure air quality. If the suspended matters such as sand and dust are too much, measures should be taken to improve air quality (such as adding a filter to the air supply grille).

- The operating temperature needs to be controlled within the allowed range. So proper ventilation equipment must be added for heat dissipation.
- The electrical control room should be equipped with ventilation equipment to improve heat dissipation. This can be realized by adding exhauster (such as a fan or air conduit).
- The direction of air outlet shall be determined by the practical local wind direction.
- The dimension of air conduit shall be designed by professionals according to the outlet air volume.

5.4 Foundation Construction Requirements

5.4.1 Selection of Installation Site

When choosing the installation site, the following principles must be followed:

- The climatic environment and geological conditions (such as stress wave emission, groundwater level) and other characteristics of the installation site should be fully considered.
- The surrounding environment is dry and well ventilated, away from flammable and explosive areas.
- No trees shall be around the installation site to prevent container doors and air inlets from damages caused by falling branches or leaves.
- The soil at the installation site needs to be firm. It is recommended that the relative density of the soil is ≥ 98%. If the soil is loose, measures must be taken to ensure the stability of the foundation.

5.4.2 Foundation Requirements

Warning

The MVS container is quite heavy, so the various conditions of the installation site (geological conditions, environmental and climatic conditions, etc.) should be investigated in detail before the foundation is constructed. Only on this basis can the foundation designing and construction work begin.

Unreasonable foundation construction plans will bring greater difficulties to the placement of MVS container, door opening and closing, and the follow-up operation and maintenance. Therefore, the installation foundation must be designed and constructed in advance based on certain standards.

The following requirements need to be satisfied when constructing the foundation:

- The bottom of the foundation pits must be compacted and filled.

- The foundation should provide adequate load-bearing support for the MVS container. Besides, the foundation height should be relatively raised in case of erosion caused by rain and water. And we recommend that the height is at least 300 mm above the ground level.
- Build a cement foundation with proper cross-sectional area and height. The height of the foundation should be determined by the builder according to the site situation.
- Cable routing should be considered when constructing the foundation.

5.4.3 Recommended Foundation Construction

The MVS is installed on a 4-column base (welded)/6-column base (bolted). The foundation design reference is shown below.

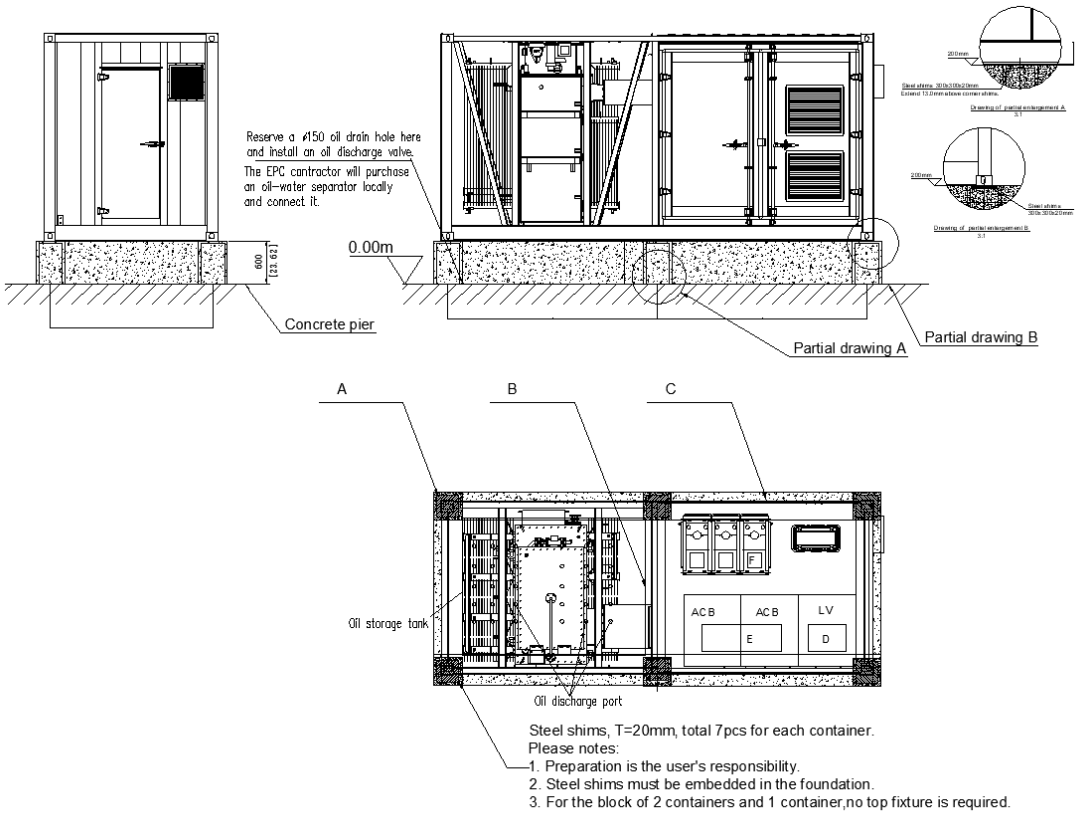


Figure 5-3 Foundation design diagram

Table 5-4 Reference for foundation design description

Serial number	Description
A	Pile foundation (embedded with 300 × 300 × 20 mm steel plate, fixed by welding)
B	Oil tray
C	Outline of the MVS
D	Cables from/to other equipment
E	AC cables from the battery container
F	Medium voltage cables to the substation
Notice	
According to the drawings, suggest making holes in the foundation for the high-voltage side. If it is necessary to pre-embed wires and pipes in this area during construction, please communicate with CLOU 's design personnel for the specific locations of the pre-embedded wires and pipes.	

- In excavation foundation, the foundation should be reinforced with rammed earth and wet loose soil. The highest point of the surrounding terrain should be chosen for the foundation construction site to prevent water damage.
- The grounding resistance is less than 4 Ω. We suggest using 50 × 5 mm galvanized flat steel, and the length depends on the site condition. The grounding point are located in the four symmetrical soldering.
- Adopt galvanized steel pipe for inlet and outlet cables. Cable trenches are also good choice to lay cables, and detailed construction drawings are needed.
- Levelling instrument shall be used to ensure the foundation surface is level. The wall height should be higher than the highest local flood record.
- Drainage gutters must be arranged around the foundation and connected to the site drainage ditch nearby.
- This foundation drawing is only for reference. It should be modified to meet seismic and wind resistance requirement based on the exact weight of container.
- All embedded pipes need to be temporarily blocked at each end to prevent litters from entering. Otherwise, it is not conducive to cable laying later.
- When all electrical collection, the position of cable collection should be blocked to prevent insects, rats or other small animals from entering.

6 Electrical Connection

6.1 Safety Instructions

Caution

Only professional electricians or staff with professional qualification can conduct electrical installation.

Before electrical connection, observe following instructions to ensure safety.

- Don’t touch conductive parts.
- Ensure the AC/DC side is uncharged before any operation.
- Since the temperature of some parts on the equipment is relatively high, do not place it together with inflammable and explosive materials.
- The system can only be connected to the grid after the local utility permits.
- All electrical installations must comply with the local installation standards.

6.2 Wiring Requirements

The cables used in the system can be generally divided into power cables, power supply cables and data cables.

When laying communication cables, keep them away from the power cables, and communication cables should be as short as possible.

The power cable, power supply cables and data cables must be separately laid in different cable trenches to avoid long-distance parallel wiring, and reduce electromagnetic interference.

The distance among power cables, power supply cables and data cables should be longer than 0.2 m. More detailed recommendations are shown in the table below.

Table 6-1 Distance between signal cable and power cable

The length of parallel cable (m)	Min. distance (mm)
200	0.3
300	0.5
500	1.2

Data cables should be enclosed with the ground, or laid with other some supports, such as beams, steel channels and metal rails.

6.3 Fastening and Protection of Cables

6.3.1 Cable Fastening

In order to prevent the connectors from loosening, which may cause poor contact, high temperature, or even fire, the screws used to fasten the wiring copper need to satisfy the following torque requirements.

Table 6-2 Table toque requirements

Screw size	M4	M5	M6	M8	M10	M12	M16
Torque (N·m)	2	3.5	7	12	24	48	96

6.3.2 Cable Protection

Cable protection includes the protection for communication cables and power cables. The protection methods are as follows.

- The protection of communication cable

Since the communication cable is very thin, it’s easy to break under stress or fall off from the connecting terminal during construction. Therefore, it is highly recommended to connect the power circuit before communication cable. Besides, it’s better to lay the communication cable in the cable trench. If there is no cable trench, fasten the cable with belt.

Heating elements and strong electric field circuit cables should be avoided when routing.

- The protection of power cable

Since strong current exists in the power cable, scratches and damages on insulation cable need to be avoided. Otherwise, it may lead to short circuit. The power cable should also be perfectly fastened.

6.4 Wiring Diagram

The wiring diagram of the medium voltage system is shown in the figure below, which needs to be strictly followed.

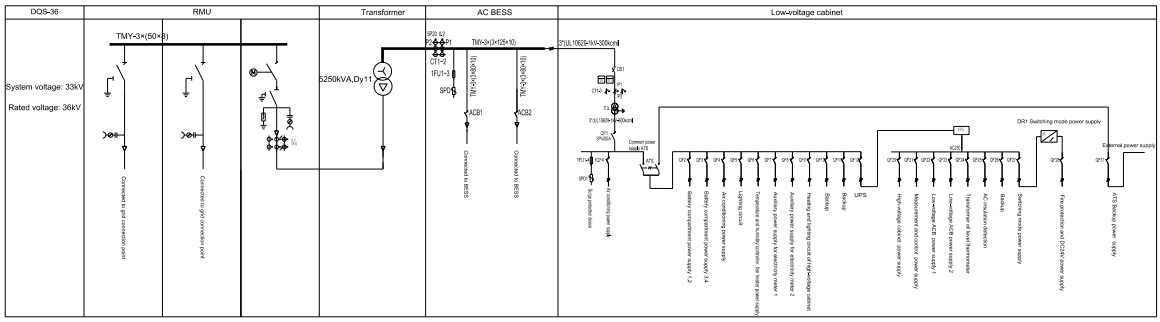


Figure 6-1 Wiring diagram

6.5 Preparations before Electrical Wiring

Before electrical wiring, conduct following preparations.

1. Open the front door.

The PCS cabinet door is equipped with a door lock. When it's locked, use a key to open the cabinet door.

2. Ensure that the AC main circuit is disconnected.

3. Open the wiring hole.

Outlet holes for AC cables, communication cables, and grounding cables are reserved at the bottom of the container. Open the sealing plate and you can see the square connection holes. After wiring, the gap should be sealed with polyurethane foam to prevent animals from entering.

6.6 Cable Wiring

6.6.1 Wiring Sequence

Warning

Connect the cables in accordance with the correct order to avoid accidents.

Warning

- Do not connect all the AC switches at the same time.
- Before powering on the AC side, ensure that the AC switches are off.

Warning

- Do not connect all the DC switches at the same time.
- Before powering on the DC side, ensure that the DC switches are off.

When connecting cables, following the wiring sequence: ground wiring → AC side wiring → energy storage battery wiring → communication wiring.

6.6.2 Wiring Rules

For ground wiring, ensure that the grounding copper bar of the MVS is perfectly connected to the public grounding device provided by the power station. The cross-sectional area of grounding cable should be no less than 95 mm^2, and the contact resistance should be less than 4 Ω.

For AC side wiring, the superior breaker should be disconnected first, then use a multimeter to confirm that there is no electricity existed before wiring. Connect the cables in strict accordance with the phase sequence marked on the connection cable.

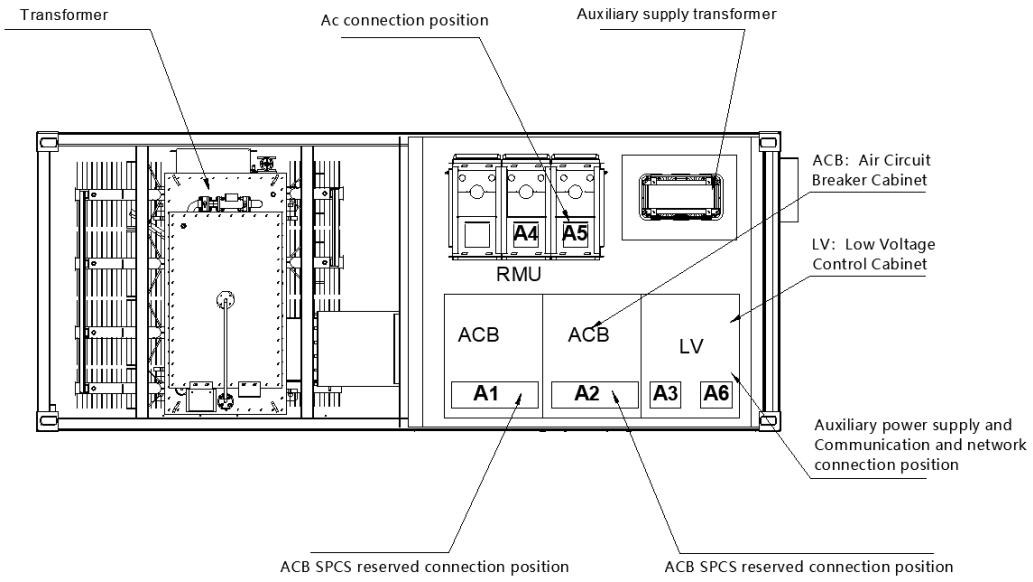


Figure 6-2 Wiring connection diagram

Table 6-3 List of cables for primary and secondary sides (for reference)

Cable	Start point	Start terminal	End point	End terminal	Qty	Screw spec	Displayed in figure above
UL44-RHW-2-500Kcmil-1000V	Battery Box 1 - Main Control Cabinet QF1-AC-L3	TLAPH325-2A12	Molded Case Circuit Breaker Cabinet 1 - QF1-AC-L3	TLAPH325-2A12	4	M12	A1
UL44-RHW-2-500Kcmil-1000V	Battery Box 1 - Main Control Cabinet QF1-AC-L2	TLAPH325-2A12	Molded Case Circuit Breaker Cabinet 1 - QF1-AC-L2	TLAPH325-2A12	4	M12	
UL44-RHW-2-500Kcmil-1000V	Battery Box 1 - Main Control Cabinet QF1-AC-L1	TLAPH325-2A12	Molded Case Circuit Breaker Cabinet 1 - QF1-AC-L1	TLAPH325-2A12	4	M12	
UL44-RHW-2-500Kcmil-1000V	Battery Box 1-Central Control Cabinet QF2-AC-L3	TLAPH325-2A12	Molded Case Circuit Breaker Cabinet 1 - QF1-AC-L3	TLAPH325-2A12	4	M12	
UL44-RHW-2-500Kcmil-1000V	Battery Box 1-Central Control Cabinet QF2-AC-L2	TLAPH325-2A12	Molded Case Circuit Breaker Cabinet 1 - QF1-AC-L2	TLAPH325-2A12	4	M12	
UL44-RHW-2-500Kcmil-1000V	Battery Box 1-Central Control Cabinet QF2-AC-L1	TLAPH325-2A12	Molded Case Circuit Breaker Cabinet 1 - QF1-AC-L1	TLAPH325-2A12	4	M12	

Cable	Start point	Start terminal	End point	End terminal	Qty	Screw spec	Displayed in figure above
UL44-RHW-2-500Kcmil-1000V	Battery Box 2-Central Control Cabinet QF1-AC-L3	TLAPH325-2A12	Circuit Breaker Panel 2-QF2-AC-L3	TLAPH325-2A12	4	M12	A2
UL44-RHW-2-500Kcmil-1000V	Battery Box 2-Central Control Cabinet QF1-AC-L2	TLAPH325-2A12	Circuit Breaker Panel 2-QF2-AC-L2	TLAPH325-2A12	4	M12	
UL44-RHW-2-500Kcmil-1000V	Battery Box 2-Central Control Cabinet QF1-AC-L1	TLAPH325-2A12	Circuit Breaker Panel 2-QF2-AC-L1	TLAPH325-2A12	4	M12	
UL44-RHW-2-500Kcmil-1000V	Battery Box 2-Central Control Cabinet QF2-AC-L3	TLAPH325-2A12	Circuit Breaker Panel 2-QF2-AC-L3	TLAPH325-2A12	4	M12	
UL44-RHW-2-500Kcmil-1000V	Battery Box 2-Central Control Cabinet QF2-AC-L2	TLAPH325-2A12	Circuit Breaker Panel 2-QF2-AC-L2	TLAPH325-2A12	4	M12	
UL44-RHW-2-500Kcmil-1000V	Battery Box 2 - Central Control Cabinet QF2 - AC - L1	TLAPH325-2A12	Circuit Breaker Panel 2-QF2-AC-L1	TLAPH325-2A12	4	M12	
ZRC-YJV22-0.6/1KV-3*70 Two	User Side Station Power Supply L3	SC70-10	MV Box Distribution Cabinet: QF5 - AC - L3	SC70-10	2	Single Hole M10	A3
	User Side Station	SC70-10	MV Box Distribution Cabinet:	SC70-10	2	Single Hole M10	

Cable	Start point	Start terminal	End point	End terminal	Qty	Screw spec	Displayed in figure above
	Power Supply L2		QF5 - AC - L2				
	User Side Station Power Supply L1	SC70-10	MV Box Distribution Cabinet: QF5 - AC - L1	SC70-10	2	Single Hole M10	
ZRC-YJV22-0.6/1KV-1*70	Station Side Primary Grounding Bar	SC70-10	MV Box Distribution Cabinet: LN2	SC70-10	1	Single Hole M6	
YJV22-26/35-3*150, XLPE/Cu	Medium Voltage Compartment Ring Main Unit C1 Cabinet-AC-L3	DT 150-12	Customer Site Connection Point 1-L3	DT 150-12	1	Single Hole M12	A4
	Medium Voltage Compartment Ring Main Unit C1 Cabinet-AC-L2	DT 150-12	Customer Site Connection Point 1-L2	DT 150-12	1	Single Hole M12	
	Medium Voltage Compartment Ring Main Unit C1 Cabinet-AC-L1	DT 150-12	Customer Site Connection Point 1-L1	DT 150-12	1	Single Hole M12	

Cable	Start point	Start terminal	End point	End terminal	Qty	Screw spec	Displayed in figure above
YJV22-26/35-3*150, XLPE/Cu	Medium Voltage Compartment Ring Main Unit C2 Cabinet-AC-L3	DT 150-12	Customer Site Connection Point 2-L3	DT 150-12	1	Single Hole M12	A5
	Medium Voltage Compartment Ring Main Unit C2 Cabinet-AC-L2	DT 150-12	Customer Site Connection Point 2-L2	DT 150-12	1	Single Hole M12	
	Medium Voltage Compartment Ring Main Unit C2 Cabinet-AC-L1	DT 150-12	Customer Site Connection Point 2-L1	DT 150-12	1	Single Hole M12	
Cat 6 Shielded Network Cable	Battery Compartment SW2 Switch	RJ45 Connector	Medium Voltage Control and Relay Protection Device Network Port	RJ45 Connector	1	RJ45 Connector Socket Fixing	A6

Note: Cables are supplied by CLOU.

6.7 Power-On Inspection

After all the cable connection work is completed, please strictly follow the steps below for power-on inspection.

Caution

The DC breaker in the PCS can be connected after confirming that the polarity and voltage are correct, and the difference between the busbar voltage and the DC input voltage does not exceed DC30V.

Step 1. Check whether BAT+ and BAT- are correctly connected.

Step 2. Turn on the AC input power, and check whether the AC voltage and phase sequence are correct.

Step 3. Keep the AC/DC main switch (QF1/QF2) at off state and the rest of the switches at on state.

Step 4. Confirm that the voltage of energy storage battery and AC voltage are normal by the touchscreen again.

Step 5. Disconnect the equipment AC/DC power after all checks are passed.

Step 6. Close the door and lock it.

7 Post-Installation Check

Before operation, the MVS installation should be checked by at least two staff according to the following checklist.

Mechanical inspection		
1	There is no deformation or damage on the MVS.	☐
2	The bottom is fixed and the support is reliable for the MVS.	☐
3	Enough space is reserved around the MVS.	☐
4	The temperature, humidity and ventilation comply with requirements.	☐
5	There is smooth flow for cooling air.	☐
6	The cabinet of the MVS is sealed and complete.	☐
Electrical inspection		
1	The grounding of the MVS is reliable and complete.	☐
2	The grid voltage is matched with rated input voltage of the MVS.	☐
3	The phase sequence is connected correctly, and tightening torque complies with requirements.	☐
4	The DC inputs are connected to the negative and positive terminals correctly, and tightening torque complies with requirements.	☐
5	The communication cables are connected correctly and reasonable distance are reserved with other cables.	☐
6	Cables are marked correctly and clearly.	☐
7	There is complete and reliable insulated protective cover, and the warning marks are clear and fixed.	☐
Others		
1	All useless conductive parts are tightened up with insulated tape.	☐
2	No tools, components or conductive dust produced by hole-drilling are left inside of the cabinet.	☐
3	No humidity or freezing occurs inside of the cabinet.	☐

8 Appendix

8.1 Technical Parameter

Model	NE-5000-MV-IEC
MV transformer	
Nominal power	5250 kVA
MV/LV	11–33 kV/0.69 kV
Transformer vector	Dy11
Insulation level	A
Rated frequency	50 Hz/60 Hz
Impedance	7.5% (tolerance ±10 %)
Material of winding (MV/LV)	Aluminum/Aluminum
Cooling method	ONAN KNAN (optional)
Efficiency	≥ 99% @ 100% load EU548/2014 Tier 2 (optional)
IP rating	IP54
Smart control cabinet	
Protection	AC breaker
Surge protection	Type II
Meter for main circuit	Optional
AC insulation detection	Support (optional)
Temperature control method	Air cooling and HVAC
UPS	0.5 h 2 h (optional)
RMU	
Rated voltage	12 kV/24 kV/36 kV
Rated current	630 A (50 Hz)/600 A (60 Hz)
Rated short-time withstand current	20 kA/3s or 25 kA/1s
Standard compliance	IEC 62271
General data	
Dimension (W × D × H)	6058 × 2438 × 2896 mm
Weight	≤ 19000 kg

Model	NE-5000-MV-IEC
Cable entry	Wiring in from bottom
IP rating	IP54 IP55 (optional)
Anti-corrosion degree	C4 C5 (optional)
Seismic level	IEEE 693 Moderate seismic level qualification IEEE 693 High seismic level qualification (optional)
Operating temperature range	–35℃ to +60℃ (> 45℃ derating)
Operating humidity range	0%–100% (non-condensing)
Max. operating altitude	2000 m 3000 m (optional)
Communication	RS485, CAN, Ethernet
Standard compliance	IEC 62271-202, IEC 61439

8.2 Quality Warranty

Shenzhen CLOU Electronics Co., Ltd. will give free maintenance or change the product for free if some faults occurred during the warranty period.

Invoice:

The customer is required to present the invoice and date of purchasing during the warranty period. Meanwhile, trademarks displayed on the product should be clear and readable; otherwise, Shenzhen CLOU Electronics Co., Ltd. reserves rights not to provide quality guarantee.

Conditions:

The unqualified products need to be handled by the company after changing.

The customer should give some appropriate time for troubleshooting.

Exempt from Duties:

Under these conditions, Shenzhen CLOU Electronics Co., Ltd. reserves rights not to provide quality guarantee.

- The overall unit or parts beyond the warranty period
- Damaged during transportation
- Inappropriate installation, modification or operation
- Operation in harsh environment beyond the regulations in the manual

- Damages caused by the person beyond Shenzhen CLOU Electronics Co., Ltd. during installation, maintenance, change and disassembly
- Damages or faults on the PCS caused by using non-standard or not CLOU's parts or software
- Any installation and use beyond the scope of relevant international standards
- Damage caused by abnormal natural environment

As for damages or faults caused by the situation above-mentioned, if customers request for maintenance service, we can provide paid service if agreed by the company. Without prior notice if there are any changes in the manual, please subject to the latest documents.

Software Licensing

The company does not take any responsibility for the losses caused by the software products provided with the products.

- It is forbidden to use some or all data in the firmware or software developed by the company for commercial purposes in any way.
- It is forbidden to decompile, decrypt or otherwise destroy the original program design of the software developed by the company.

8.3 Contact Information

If you have any questions about this product, please contact us. In order to provide you with faster and better services, we need your assistance in providing the following information:

- Product model
- Product ID
- Fault code and name
- Fault description

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