Product Specifications

X65KT-E/A

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Revision Records

Revision	Date	Reasons for Revision	Revised by	Released by
1	December 8, 2024	First edition	TC.Li	V1.0

Table of Contents

1. Scope of use

This product specification sheet is applicable to ROYPOW's X65KT-E/A intelligent portable energy storage system. The specification describes the overall system performance indicators of the product and defines and describes specific parameters. ROYPOW reserves the right to modify and update this specification based on product upgrades and optimizations, without further notice.

2. Product model

X65KT-E/A.

3. Terms and Definitions

1) Cell

The most basic unit that provides direct current, containing a positive electrode, negative electrode, electrolyte, separator, and shell. It can be used individually or assembled into a battery module.

2) Battery PACK

Housed in a dedicated enclosure, this unit comprises multiple lithium-ion cells connected in series and parallel. It includes a Battery Management Unit (BMU) for gathering battery data.

3) Battery Cabinet

An assembly of several low-voltage battery packs connected in series, equipped with a Battery Cluster Unit (BCU).

4) Battery Stack

A comprehensive power input and output system, created by connecting multiple battery cabinets in parallel to a single energy conversion system, managed by a backend monitoring system.

Battery Management Unit (BMU)

This unit oversees the voltage and temperature of individual cells within a battery module. It safely regulates the module's charging and discharging process and serves as a communication interface for the storage battery. System (BCU) via a communication interface. As the smallest component of the Battery Management System (BMS), the BMU supplies internal battery pack data to the Battery Cluster Management (BCU).

Battery Cluster Management System (BCU)

A real-time electronic monitoring and management system that efficiently controls the charging and discharging of battery clusters. It provides alerts and emergency responses to potential issues, ensuring the battery's safety, reliability, and stability. The BCU, functioning at an intermediate level in the battery management system, gathers information from the Battery Management Unit (BMU) and relays it to the higher-level Battery Stack Management System (BAU).

7) Battery Management System (BMS)

This system manages the charging and discharging of storage batteries to enhance their

lifespan and provide user-relevant information. Comprising BMU, BCU, BAU, and other units, it can be structured in two or three tiers, depending on the system's configuration.

8) Special Bidirectional Converter (SPCS)

Enables two-way energy transfer between DC batteries and the AC grid, supporting both charging and power feedback.

9) Microgrid Energy Controller (EMS3000)

Manages and schedules energy within the microgrid system. It collects and processes information from lower-tier devices and interacts with local human-machine interfaces and digital cloud platforms.

4. System Introduction

4.1 System Composition

The X65KT-E/A intelligent mobile energy storage station consists of a lithium iron phosphate battery, a special bidirectional inverter, a battery management system, a microgrid energy controller, a distribution system, a container, and auxiliary systems (firefighting, emergency lights, air conditioning, etc.). The system schematic diagram is illustrated in Figure 4-1:
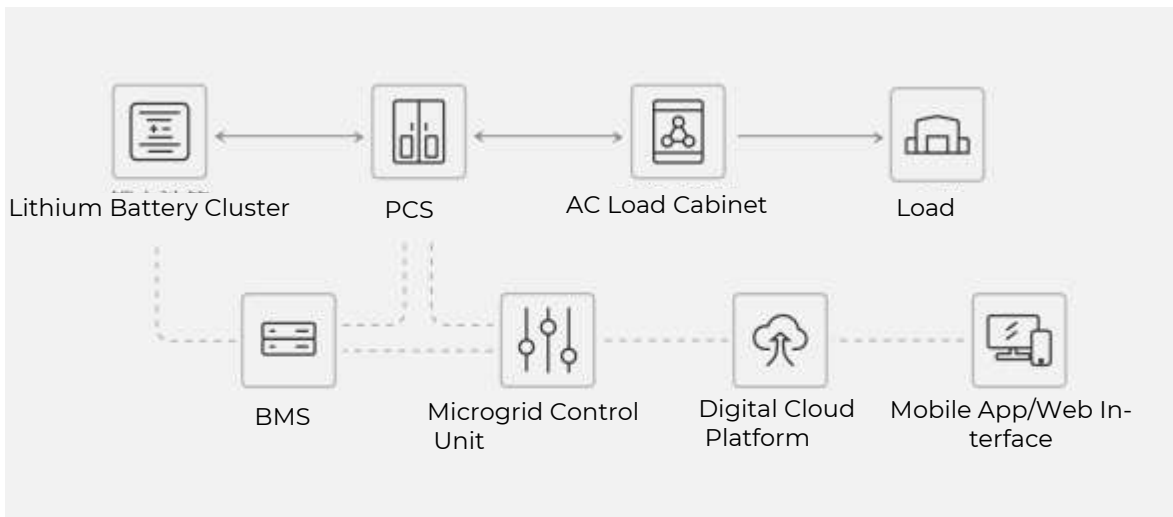
Figure 4-1: System Schematic Diagram

4.2 System Configuration

The core equipment of the system includes a 65KW/153KWh energy storage setup, featuring a 153kWh lithium iron phosphate battery and a 65KW specialized bidirectional inverter, alongside an intelligent microgrid control cabinet. The container is additionally equipped with temperature and smoke sensors, fire extinguishing systems, air conditioning, and emergency lighting. These auxiliary components are crucial for maintaining a secure and stable operational environment for the lithium batteries and facilitate remote monitoring capabilities.

SN	Device name	Specifications	Unit	Set

1	Lithium Iron Phosphate Battery	768V/76.8kWh	Set	1
2	Energy Storage Bidirectional Inverter	65KW	unit	1
3	Air conditioner	Cooling capacity 2000W; Heating capacity 1000W	unit	1
4	Container	Includes an external wiring box, 1070×1250×2000 (mm)	Set	1
5	Intelligent Microgrid Control Cabinet	Equipped with an energy management system	unit	1
6	Firefighting	Aerosol	Set	1

# 5. Energy Storage System Specifications

5.1 Battery

This product uses mature and reliable lithium iron phosphate batteries, with specifications of 3.2V/100Ah. The battery is shown in Figure 5-1:

Figure 5-1: Battery Cell

5.2 Battery PACK

The Battery PACK consists of 24 lithium iron phosphate single cells arranged in 1 parallel and 24 series configurations, integrated with a BMU. The nominal voltage of the Battery PACK is 76.8V, with a capacity of 7.68kWh. The BMU collects data from all 24 cells within the module and uploads it to the MBMS. It also balances individual cells within the module based on instructions from the MBMS. The battery module is shown in Figure 5-2:
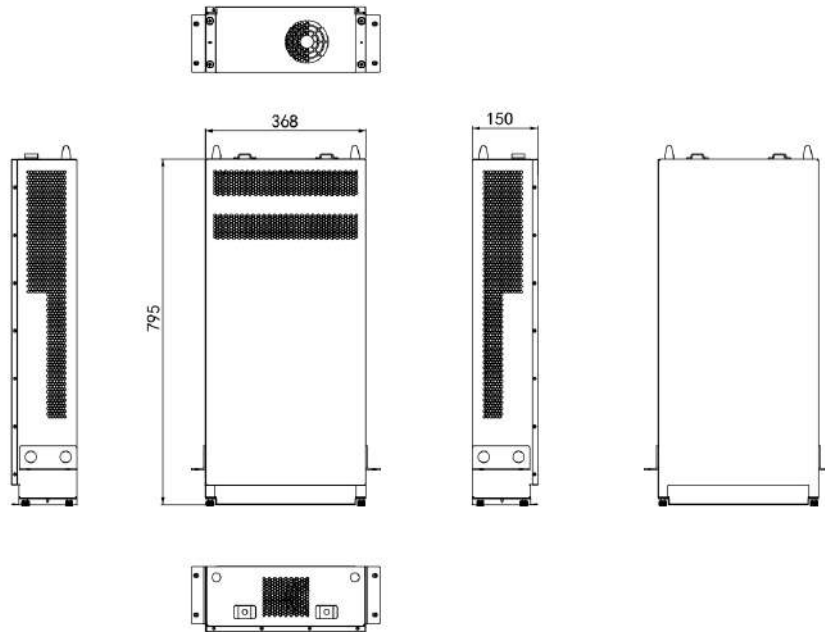
Figure 5-2: Battery Module

5.3 Battery Cabinet

The battery cabinet is composed of 10 battery packs connected in series, integrated with a high-voltage control box. The nominal voltage of the battery cabinet is 768V, and its capacity is 76.8KWh. The BCU, located inside the high-voltage control box, manages the battery cabinet, receiving detailed data from the 10 BMUs inside, sampling voltage and current of the battery cluster, calculating and adjusting SOC and SOH, managing pre-charging and charging/discharging of the battery cluster, and interacting with PCS and EMS systems. The battery cabinet is shown in Figure 5-3:
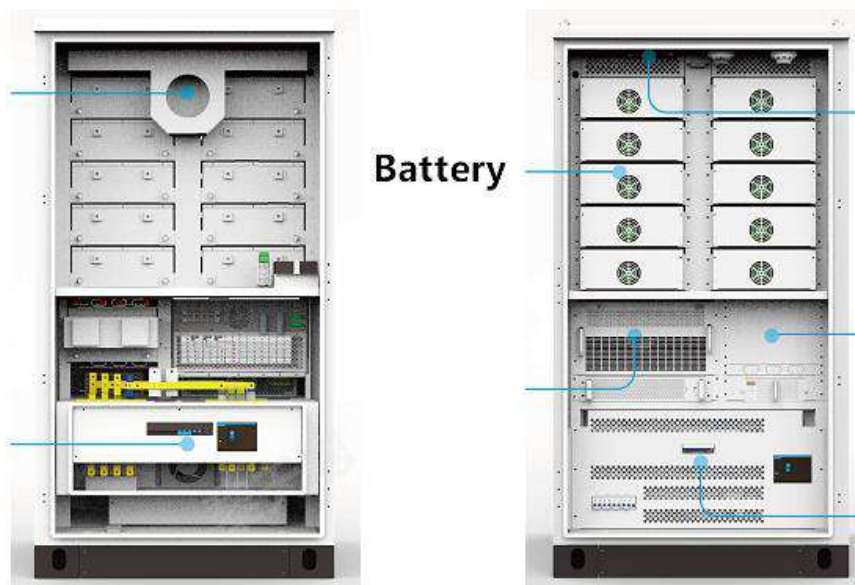
Figure 5-3: Battery Cabinet

5.4 Battery System

The battery system consists of one set of battery cabinets, with a nominal voltage of 768V and a total capacity of 76.8kWh. The main performance parameters of the energy storage battery are as follows:

SN	Name	Performance parameters	Remark
1	Battery configuration capacity (kWh)	76.8kWh	
2	Rated capacity (Ah)	100	
3	Rated voltage (V)	768V	
4	Operating voltage range (V)	600V-876V	
5	Maximum continuous charge/discharge rate (C)	1C/1C	
6	System charge/discharge efficiency (%)	>90%	
7	Cell discharge depth (%)	90%	
8	System discharge depth (%)	90%	
9	Number of individual cells (pieces)	240	
10	Number of battery modules (units)	10	
11	Series and parallel connection method of the battery cluster	(1P24S) * 10S	
12	Cell Parameters	Rated capacity (Ah)	100	
		Rated voltage (V)	3.2	
		Operating voltage range (V)	2.5V-3.65V	
		Cycle Life	≥4000 cycles at 100% DOD	Under Standard Conditions
13	Battery Module Parameters	Rated capacity (Ah)	100	
		Rated voltage (V)	76.8V	
		Operating voltage range (V)	60.0V-87.6V	
		Number of cells contained (pieces)	24	
		Dimensions	800*368*150	Length × Width × Height (mm)

		Rated capacity (Ah)	100	
14	Battery Cluster Parameters	Rated voltage (V)	768V	
		Operating voltage range (V)	600V-876V	
		Number of battery modules contained (units)	10	
		Dimensions	1350×1130×890	Height × Width × Depth (mm)
		Weight (kg)	680kg	
15	Temperature	Operating Temp. Range (℃)	Charging: 0℃~55℃ Discharging: -20℃~55℃	
		Storage Temp. Range (℃)	-30℃~60℃	
16	Communication	With PCS	One dry contact/CAN	
		With EMS	RS485, ETH	
		With Diesel Engine	RS485, ETH	

5.5 Special Bidirectional Converter

The special bidirectional converter is designed to enable efficient two-way energy transfer between DC batteries and the AC power grid. Its key roles include managing the battery system's charging and discharging, as well as providing power feedback. The converter is adept at monitoring and adjusting the power flow to and from grid-side loads, ensuring optimal control of the energy storage system's charge and discharge cycles. Additionally, it maintains stable grid-side voltage under both standard operating conditions and in islanding modes. Key parameters for the 65KW energy storage converter are as follows:

Model	PCS-250KTL (Includes Isolation Transformer)
AC Grid Parameters	
Rated output capacity	71kVA
Rated output power	65KW
Rated grid voltage	400V
Grid voltage range	± 10%
Rated grid frequency	50Hz/60Hz

Grid frequency range	±2.5Hz
AC rated current	93A
Output THD	≤3%
Grid-tied power factor	-1~+1
Isolation transformer	Yes

AC Off-Grid Parameters

AC off-grid voltage	400V
Adjustable range of AC voltage	± 10%
AC off-grid frequency	50Hz/60Hz
Off-grid output THD	≤3% (linear load)

DC Side Parameters

DC voltage range	650~900V
Maximum DC current	109A
Maximum DC power	71KW
DC voltage accuracy	≤1%
DC current accuracy	≤1% (rms)

System Parameters

Maximum overall efficiency	≥97.2%
Isolation method	Frequency isolation
Cooling mode	Air cooling
Noise level	70dB
Temperature range	-20℃~50℃
Protection grade	IP20
Altitude	4000m (derating above 2000m)
Humidity range	0~95%
Dimensions (W×H×D)	703×440×256.5 mm
Weight	50kg

Grid/off-grid switching	≤10ms for diesel grid, ≤20ms for utility grid
110% overcurrent capacity	Long time
PV Solar panel (optional)	
MPPT Max input power	30KW
PV Voltage	400V~680V
PV current	50A
Communication method	
Display	Touch-screen
Upper-level communication method	Modbus TCP/IP
Communication interface	Ethernet, RS485, CAN

5.6 Diesel-Storage Hybrid Energy Controller

In this system, the MEMS communication topology is structured into two layers. The top layer is the centralized monitoring system (local monitoring and remote cloud platform monitoring), while the bottom layer consists of devices like diesel generators, special bidirectional inverters, Battery Management System (BMS), environmental monitoring equipment, fire systems, air conditioning, and access control systems. A dedicated video surveillance unit is also part of this system. It provides visual monitoring of the containerized energy storage setup, all accessible through the cloud platform. A detailed schematic of the energy management communication system is shown in Figure 5-6:
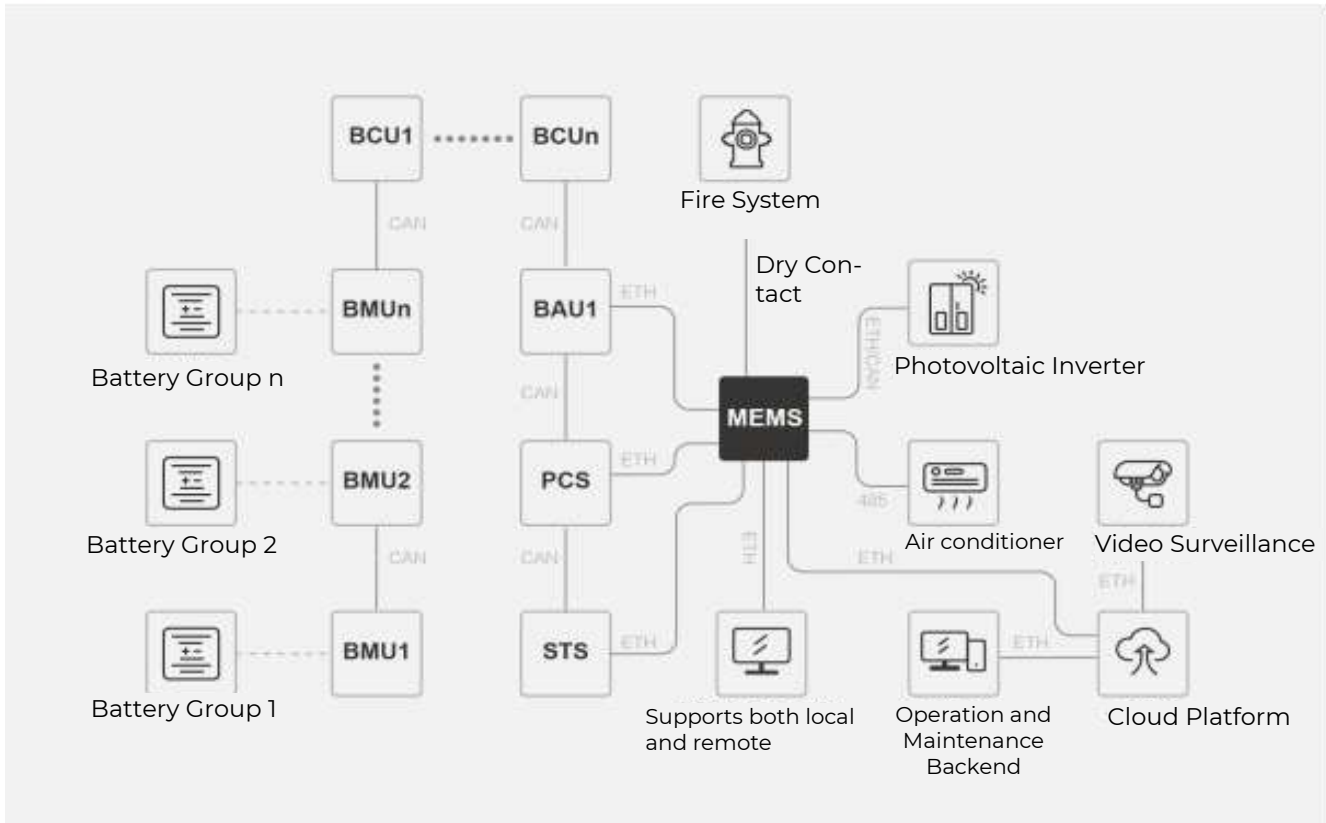
Figure 5-6: Diesel-Storage Hybrid Energy Controller Schematic Diagram

5.7 Product Parameters

Model	X65KT-E/A
Energy Storage Parameters	
Battery capacity	76.8kWh
Rated voltage	768V
Voltage range	600V-876V
Energy Storage Grid-Connected Mode (connected to diesel generator or utility power)	
Rated power	65kW
Rated voltage	400V
Voltage range	400±15% (adjustable)
Output Overload Capacity	1.1 (long-term)
Rated frequency	60Hz
Frequency Range	60±3Hz
Power Factor	-1~+1

Energy Storage Independent Off-Grid Mode (diesel generator & utility power outage)	
Rated power	65kW
Rated voltage	400V
Voltage range	400±10% (adjustable)
Rated frequency	60±1Hz
Power Factor	-1~+1
/	/
Maximum Output Capacity	
Energy Storage	71.5kW (long time)
System Parameters	
AC Connection Mode	Three-phase four-wire
Container Size (Depth × Width × Height)	1070×1250×2000
Weight	2 tons
Protection grade	IP54
Noise level	＜65B
Operational Environmental Temperature	-20℃~50℃
Storage Environment Temperature	-40℃~65℃
Usage Altitude	<3000m
Permitted Relative Humidity	5%~95%
Communication method	Ethernet, RS485, CAN2.0, 4G Wireless

5.8 Product Features

1) Modular Integration
The product is designed with an external containerized approach, with modules supporting parallel connection for flexible and easy capacity expansion anywhere, anytime.

2) High Load Capacity
Equipped to handle significant overloads, the system is well-suited for a wide range of fluctuating and inductive loads.

3) Versatile Connectivity
With built-in interfaces for solar power, utility grids, and diesel generators, the product offers customizable networking options tailored to customer requirements.

4) Simple Installation
Featuring standardized, plug-and-play interfaces, the system is designed for quick and effortless installation and deployment.

5) Intuitive Human-Machine Interface

The system includes an externally accessible control screen for maintenance, enabling straightforward switching between automatic and manual modes. Its simple one-touch power operation is designed for ease of use, eliminating the need for specialized personnel.

5.9 Layout of the Containerized System

The container includes the battery system, SPCS, control cabinet, air conditioning, and other auxiliary systems. The system arrangement is illustrated in Figure 5-9:
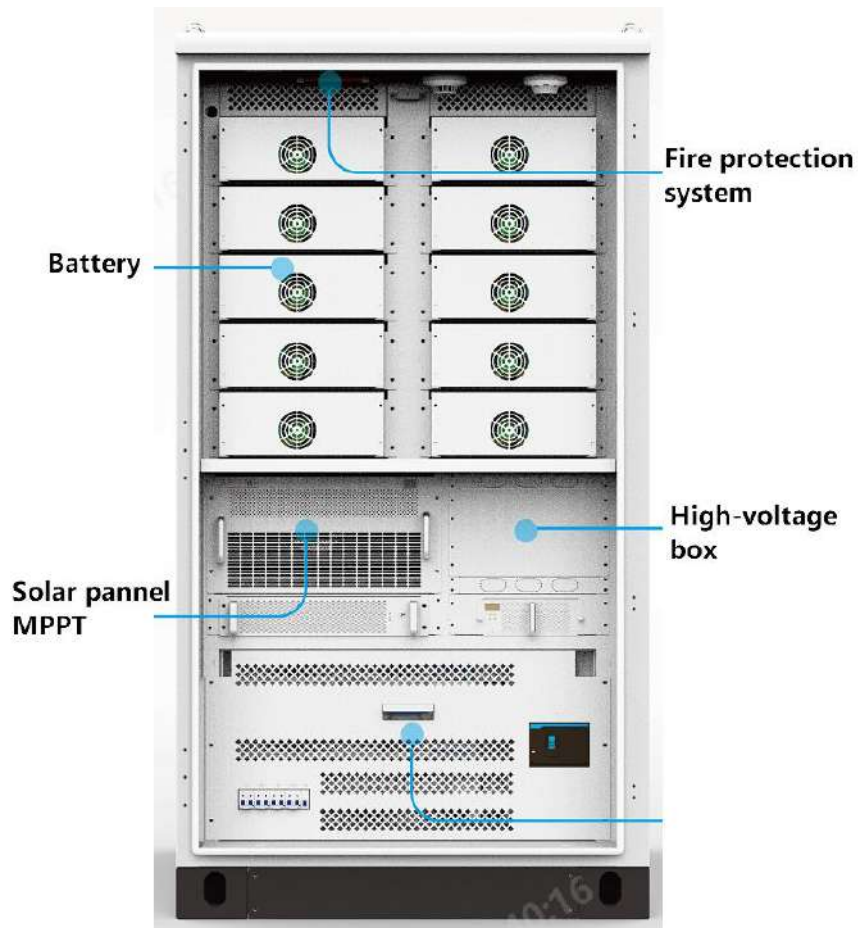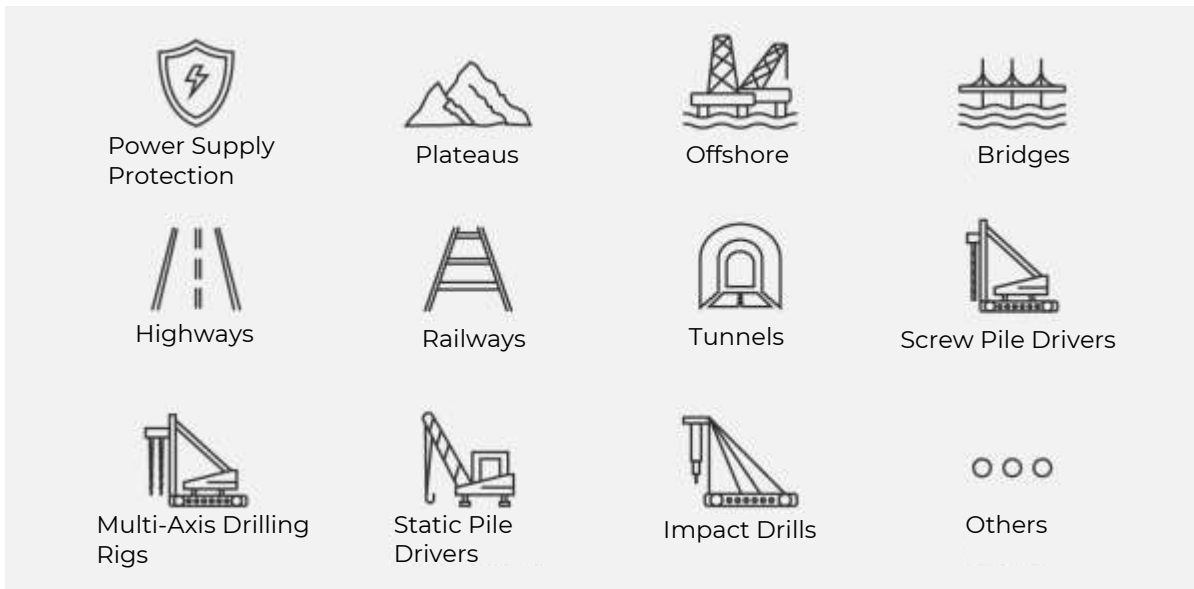

**Figure 5-9: System Arrangement**

5.10 Power input & output interface

6. Application Scenarios

Power Supply Protection	Plateaus	Offshore	Bridges
Highways	Railways	Tunnels	Screw Pile Drivers
Multi-Axis Drilling Rigs	Static Pile Drivers	Impact Drills	Others

7. Digital Energy Operation and Maintenance Platform

Local data from MEMS3000 connects to our company's intelligent digital monitoring cloud platform via wired or wireless networks. Users can access and monitor the operational status of power station facilities and electrical equipment via the cloud platform's web portal, mobile app, or mini-program. This setup enables data analysis and management, providing vital support for power safety, energy efficiency management, and operational maintenance. The operation of the intelligent cloud platform is shown in Figure 7-1:
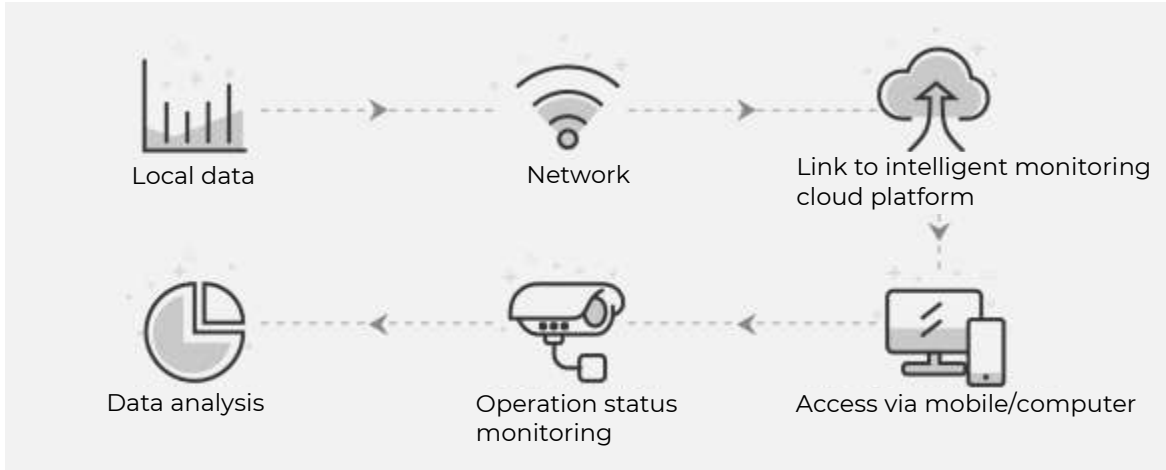
Figure 7-1: Diagram of the Digital Energy Cloud Management Platform

The cloud platform offers comprehensive monitoring and alarm management, operational maintenance management, and data statistical analysis functions. Users can log in through the web portal or mobile mini-app (App) to view the operating status and related information of their equipment. The system features comprehensive data display capabilities for monitoring, allowing users to swiftly access detailed operating information for specific equipment. Its backend system is capable of automatically sending maintenance instructions to responsible personnel based on alarm levels, ensuring timely resolution of on-site faults. Additionally, the data analysis module supports horizontal and vertical data comparison, allowing customers to compare different dimensions of data according to on-site equipment configurations, obtaining key data. This data enables equipment energy efficiency management, safety and health management, and optimizing power supply solutions, providing a strong scientific basis for these activities. The user interface of the intelligent digital monitoring cloud platform is shown in Figure 7-2.

Figure 7-2: User Interface of the Digital Energy Operation and Maintenance Platform

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