# Acrel-2000MG Microgrid Energy Management System Instruction Manual

Acrel Co., Ltd.

# Declaration



Our company reserves the right to modify the product specifications described in this manuall without prior notice.

Before placing an order, please consult your local agent to obtain the latest specifications of this product.

# Directory

# Acrel-2000MG Microgrid Energy Management System

# Instruction Manual

# Part I Acrel-2000MG System Manual

## Chapter 1 System Overview

### 1.1 System Introduction

According to the requirements of new power systems and the target of carbon peak and carbon neutrality, Acrel Co., Ltd. has specially developed a new generation microgrid energy management system Acrel-2000MG after summing up foreign and domestic research and production experiences. The system of Acrel-2000MG can orderly manage and optimally control the sources (e.g. electricity, distributed photovoltaic and micro wind generator), the grid (enterprise internal distribution grid), the loads (fixed and adjustable loads), energy storage system and charging load of new energy vehicles of enterprise microgrids, realizing flexible interaction among resources, such as the power sources, the grid, the loads and the stored energy, under various objectives, and increasing the stable runtime of the system under multi-strategy control. Meanwhile, it implements a sound strategy of peak load shifting to promote the consumption of new energy, reduce the investment in power grid construction, and improve the power utilization by enterprises at lower operating costs, for energy saving and consumption reduction.

The microgrid energy management system is deployed using a tiered information architecture, in which the monitoring system consists of station control layer and bay layer. The station control layer is deployed with cluster control units for data processing, storage, monitoring and control of photovoltaic, wind generator, energy storage, rectifier and charging units in the station. The bay layer is deployed equipment with measurement and control functions (e.g. photovoltaic, wind generator and energy storage controllers, charging monitoring systems and billing control unit) to acquire and forward data and respond to commands from the station control layer. The network communication layer is responsible for communication between the bay layer and station control layer. The communication network uses standard Ethernet and TCP/IP communication protocols. The physical media can choose optical fiber, network cable, shielded twisted pair cable et al. The system supports Modbus RTU, Modbus TCP, CDT, IEC60870-5-101, IEC60870-5-103, IEC60870-5-104, MQTT, and other communication protocols.

### 1.2 Technical Standard

The solution comply with the following criteria, codes, industry standards and national standards:

GB/T7424.1-2003 *The Part 1 of Optical Fiber Cables: Total Specifications*

GB/T14549-1993 *Power Quality: Harmonics Generated by the Public Grid* GB/Z17625.6-2003

GB/Z17625.6-2003 *The Electromagnetic Compatibility Threshold Limits Harmonic Currents Generated in Low-Voltage Supply Systems by Equipment with a Rated Current Greater than 16 A*

GB50052-2009 *Power Supply and Distribution System Design Specifications*

GB50054-2011 *Low Voltage Power Distribution Design Specifications*

GB50065-2011 *Grounding Design Specifications of AC Electrical Equipment*
GB50150-2006 *Electrical Equipment Installation Project: Electrical Equipment Handover Test Standards*
GB50168-2006 *Electrical Equipment Installation Project: Cable Line Construction and Acceptance Specifications*
GB50169-2006 *Electrical Equipment Installation Project: Grounding Equipment Construction and Acceptance Specifications*
GB50208-2011 The *Acceptance Specifications* of *Underground Waterproofing Project Quality*
GB50217-2007 Electrical *Project: Cable Design Specifications*
DL/T5161.1～5161.17-2002 *Electrical Equipment Installation Project: Quality Inspection and Evaluation Procedure*
JGJ118-2012 *Design Specifications for Building Foundations in Permafrost Regions*
DLGJ154-2000 *Cable Fire Prevention Measure Design and Construction Acceptance Standards*
GA161-1997 *Performance Requirements and Experimental Methods for Fire Blocking Materials*
Q/GDW0214031-2014041-2010 *Distribution Automation Technology Principles*
Q/GDW0214035-2012010 *Distribution automation remote terminal (DTU) technical specifications (I)*
Q/GDW0214036-2012010 *Distribution automation remote terminal (DTU) technical specifications (II)*
Q/GDW553.1-2010 *Based On Ethernet Passive Optical Network (EPON) – Part 1: Technical Conditions*
*Order No. 5 of the State Electricity Regulatory Commission: Electricity Secondary System Safety Prevention Regulations*
Q/GDW1807—2012 *Typical Design Specification for Terminal Communication Access Network Engineering*

## 1.3 Applicable Occasion

Acrel-2000MG is suitable for enterprise microgrids such as industrial parks, resident communities, islands, charging stations, steel mills, chemical plants, cement mills, data centers, hospitals, and other places.

## 1.4 Procedure of Use

Acrel-2000MG microgrid energy management system is convenient and simple to use.Create the corresponding monitoring system according to the actual situation of the project. If the running environment has been set up, skip this step.

Build the operating environment:

1) Install SQL Server 2008 R2.
2) Run SQL Server Management Studio.
3) Attach, restore or create a database.
4) Configure ODBC.
5) Configure communication.
6) Insert the dongle.
7) Run the AServer startup program.

After the environment is built, the system can be customized according to the actual project.

Project system production:

1) Run the database management ADBM.exe to make the database according to the point table.

2) Run AServer.exe to start the program.

3) Start the graphics configuration ADraw.exe, draw the graphics configuration according to the primary wiring diagram and associate the corresponding points.

4) Start communication management, configure communication parameters, and detect whether the communication is normal.

5) Start the HMI and check whether the HMI display is normal.

6) Copy the database and wiring diagram to the site for installation after confirmation.

# Chapter 2 System Architecture and Basic Requirement

## 2.1 System Architecture

The system is designed with the hierarchical distributed structure (including equipment layer, network communication layer, and station control layer). The topology structure is detailed below:

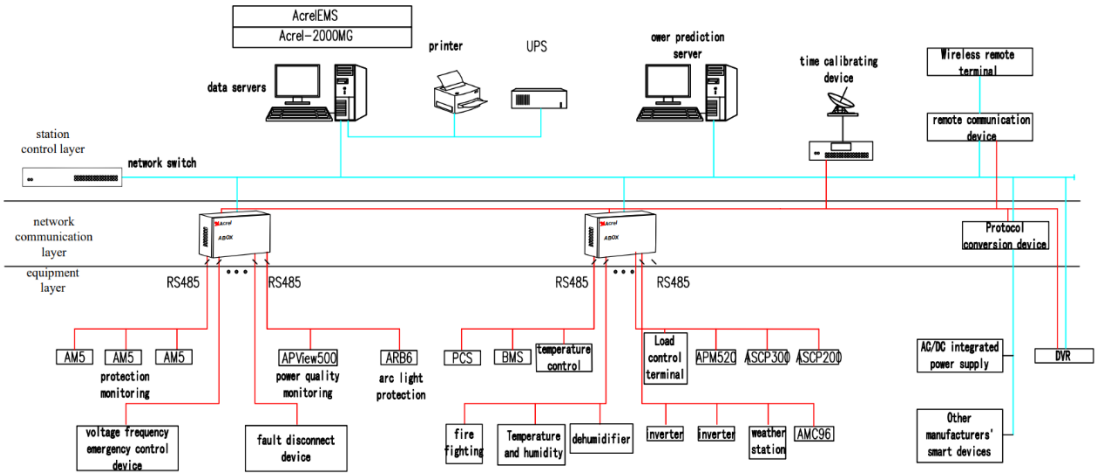



Fig. 2.1 Typical Networking of Microgrid Energy Management System

The microgrid energy management system mainly consists of a server, a switch, a communication management machine and other devices. It communicates with PV system, wind generation system, charging system or energy storage system via Ethernet for comprehensive energy management, device monitoring and other purposes.

The system has perfect battery management functions and rich external communication interfaces, which can realize real-time monitoring and control of the operation information of the energy storage system, charging system, photovoltaic system, wind turbine system and other intelligent equipment, including the collection of information such as voltage, current, temperature, pressure, flow rate and so on in the energy storage system, real-time monitoring, optimal management, intelligent maintenance and information query functions. Compared with conventional microgrids, the system needs to consider the energy storage system's service life. Therefore, try the best to prevent deep charging/discharging of the energy storage system.

In conjunction with the project's comprehensive considerations, the energy management strategy focuses on optimal economic operation. Develop an energy storage control plan based on real-time dynamic tariffs so that it charges when tariffs are low and discharges when tariffs are high, maximizing the revenue of the energy storage system. Control AC/DC module output power based on comparison of electricity demand and energy management unit information. Limit distribution power through energy coordination management to achieve economical operation, improve service capability, and reduce the distribution capacity of the previous level.

Design principles：

1)Extend the service life of energy storage system. In principle, implement one charge-discharge cycle every day.

2)Minimize the impact on the grid with the peak power lower than the setting value.

3)Sharply cut the electricity costs and consume the electricity during off-peak or normal hours as much as possible.

## 2.2 Basic Requirement

### 2.2.1 Hardware Requirement

For the Acrel-2000MG microgrid energy management system to work properly, the host computer where the system software is installed needs to meet the following hardware conditions:

**CPU**: 3.0GHz or above

**Memory**: 4GB or above

**Hard disc**: 1T or above

**Graphics card**: 1920*1080 resolution

### 2.2.2 Software Operating Environment

The software of microgrid energy management system Acrel-2000MG mainly runs on the Windows OS platform. And Windows 10 64-bit SQL Server 2008 R2 is compatible.

Software is authorized through an encryption lock, authorized software can run for long periods of time, and unauthorized software is limited to 8 hours of online running time.

### 2.2.3 Requirements of Container

The lightning protection and grounding design of the container in which this monitoring system is located shall meet the requirements of personal safety and normal operation of the electronic information system and shall comply with the relevant provisions of the current national standards "*Lightning Protection Design Code for Buildings*" GB50057 and "*Lightning Protection Technical Specification for Electronic Information Systems in Buildings*" GB50343. The environment in which the monitoring computer and communication collection device are located shall meet the following requirements:

**Altitude**: ≤2500m

**Ambient temperature**: 5℃-＋30℃

**Maximum daily temperature difference**: 25K

**Relative humidity**: 10%-80%, without condensate

# Chapter 3 System Function

## 3.1 Management of Supervisory Control

Acrel-2000MG microgrid energy management system meets the access of photovoltaic system, wind power generation, energy storage system and charging pile, conducts data collection and analysis around the clock, monitors the operation status and health condition of photovoltaic, wind power generation, energy storage system and charging pile, which is a management system integrating monitoring system and energy management. The system aims at economic optimization of operation on the basis of safety and stability, promoting the application of renewable energy, improving the stability of grid operation and compensating for load fluctuations; effectively realizing user-side demand management, eliminating the peak and valley differences between day and night, smoothing loads, improving the operating efficiency of power equipment and reducing the cost of power supply. It provides a new solution for enterprise microgrid energy management to provide safe, reliable and economical operation.

The system homepage provides real-time supervision of microgrid operation, including utility, photovoltaic, wind power, energy storage, charging piles and electricity loads, as well as revenue data, weather conditions, energy saving and emission reduction information.

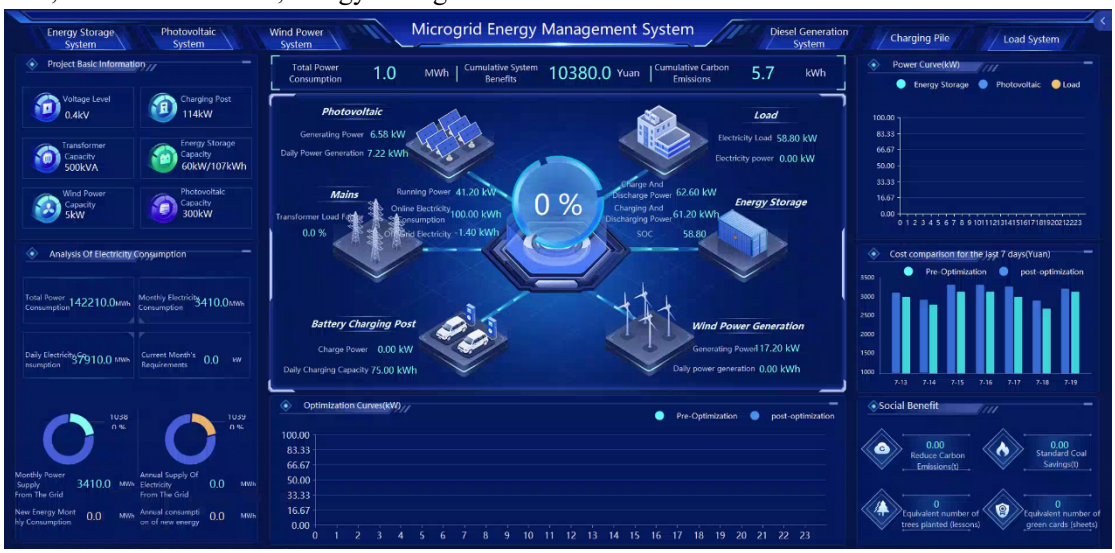



Fig. 3.1 Main Interface of Acrel-2000MG Microgrid Energy Management System

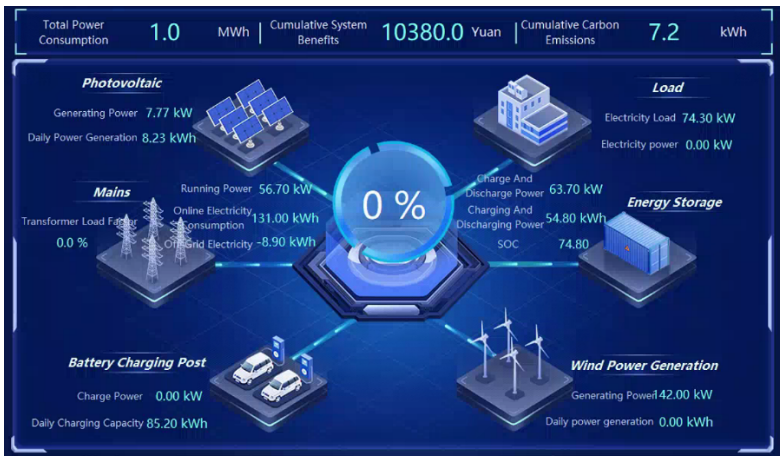



Fig. 3.2 Display of Microgrid Important Data

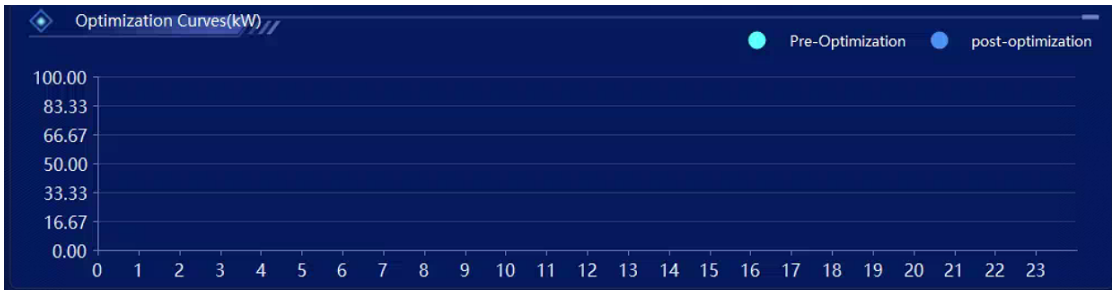



Fig. 3.3 Display of Optimization Curves


Fig. 3.4 Analysis of Electricity Consumption

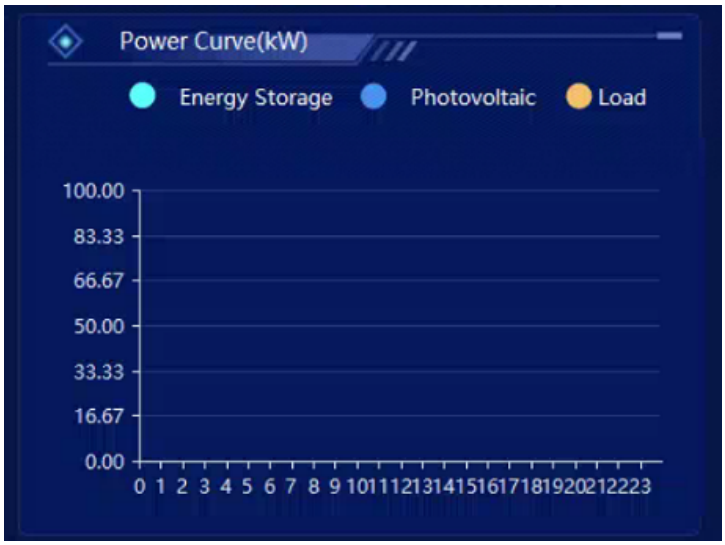



Fig. 3.5 Display of Power Curve


Fig. 3.6 Display of Project Basic Information

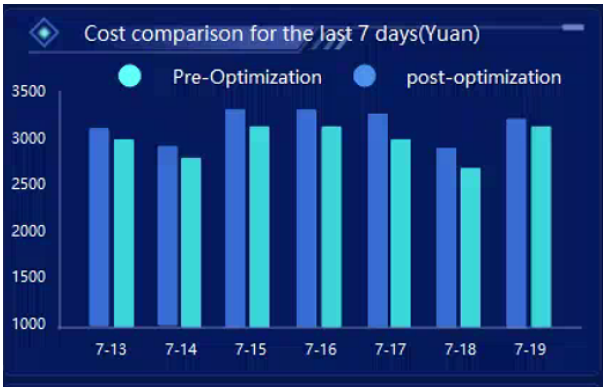



Fig. 3.7 Display of Cost Comparison


Fig. 3.8 Display of Social Benefit

### 3.1.1 Energy Storage System

For application with lithium iron phosphate(LPF) battery, the system provides some functions of online monitoring of energy storage battery, PCS bidirectional inverter et al to guarantee the residual capacity within a reasonable range as well as safe and scientific use of the battery.

- Measurement and monitoring: operation mode, power control mode, predefined value information such as power, voltage, current, frequency, etc., storage battery charging and discharging voltage, current, SOC, temperature, pressure, and capacity of energy storage battery.
- Status alarm data: charging/discharging status, AC/DC over-voltage/ under-voltage, AC/DC over-current, over-frequency/ under-frequency alarm, over-temperature, over-load, leakage

protection and other parameters of energy storage battery.

- Power data: battery capacity
- Setup data: PCS on/off, power setting, running parameter setting


Fig. 3.9 Main Monitoring Interface of Energy Storage System

### 3.1.2 Photovoltaic Power System

For application in the microgrid with PV generator, the system provides the online monitoring of the PV arrays, environmental monitoring, combiner boxs, inverters, and other devices to guarantee the safe operation of PV generator.

- Measurement monitoring: environmental information such as sunshine, temperature, and wind speed, PV panel temperature, DC voltage, DC current, DC power, inverter power, etc.
- Status monitoring: AC/DC over-voltage/ under-voltage, AC/DC over-current, over-frequency /under-frequency alarm, over-temperature, over-load, leakage protection, etc.
- Capacity monitoring: real-time generating capacity of PV, total generating capacity, etc.
- Remote control: inverter start, stop


Fig. 3.10 Main Monitoring Interface of PV Power System

### 3.1.3 Wind Power System

For the microgrid system configured for wind power generation, it has the function of online monitoring of wind turbines, wind power grid-connected controllers, grid-connected inverters, etc., to ensure the safe operation of wind power generation.

- Measurement monitoring: temperature, wind speed and other environmental information, DC voltage, DC current, DC power, inverter power and so on.
- Status monitoring: AC/DC overvoltage/undervoltage, AC/DC overcurrent, frequency over/under alarm, over-temperature, overload, leakage protection, etc.
- Power monitoring: wind turbine real-time power generation, total power generation, etc.
- Remote control: inverter start, stop.


Fig. 3.11 Main Monitoring Interface of Wind Power System

### 3.1.4 Charging Pile System

1) Charging monitoring

The microgrid energy management system shall have the functions of providing various types of measurement monitoring, status monitoring and power monitoring of the charging pile.

- Measurement monitoring: charging current, charging voltage, charging power, charging time, SOC, battery voltage, battery temperature and so on.
- Status monitoring: charging pile status, connection confirmation switch status, output relay status, charging interface electronic lock status.
- Power monitoring: real-time charging volume during charging, charging table bottom value, transaction records.

2) Charging control

The microgrid energy management system has the function of providing all kinds of remote control of charging pile and data setting.

- Charging control: start, stop.
- Remote control: restart, upgrade.
- Data setting: time period parameter, emergency card list.


Fig. 3.12 Main Monitoring Interface of Charging Pile System

### 3.1.5 Diesel Generation System

For the microgrid system configured with diesel generators, it has the function of on-line monitoring of diesel generator sets, etc. to ensure the safe operation of diesel generators.

- Measurement monitoring: speed, water temperature, oil pressure, oil level, etc.
- Status monitoring: overspeed, frequency over/under alarm, over-temperature, overload, leakage protection, etc.
- Power monitoring: diesel real-time power generation, total power generation, etc.
- Remote control: start and stop of diesel engine.


Fig. 3.13 Main Monitoring Interface of Diesel Generation System

## 3.2 Data Acquisition

Acquire and process real-time information such as analog data and digital data via measurement and control unit, energy storage unit, battery management system, charging pile, wind generator inverter and PV inverter.

Acquired and processed information:

- Charging power of charging pile
- Power of PV inverter、wind generator inverter
- Real-time data of battery cells such as voltage and temperature
- Current and leak current of battery module
- Fault alarm signals and protection enabling signals

Uploaded information of energy storage unit:

- Digital data: status of contactors and breakers at AC and DC sides, operating modes (e.g. on-grid, off-grid, charging, discharging and standby), status of local control handle, etc.
- Analog data: voltage and current at the DC side, 3-phase voltage, current, active power and reactive power at the AC side
- Non-electricity data: temperature of IGBT, electric reactor, isolation transformer, etc.
- Operating conditions: protection enabling signal of energy converter, incident alarm signal

## 3.3 Event Alarm

The microgrid energy management system has incident alarm function and the forewarning function. Incident alarms relate to the breaker tripping caused by abnormal operations and the enabling signal of protective devices. forewarning cover the deviation of general equipment, abnormal status, over-voltage, over-current, excess pressure, abnormal flow, software /hardware abnormal of monitoring system and other problems. Classify and filter relevant alarm signals as needed and assign alarm signals to various alarming windows.

The system can also send alarms for deviation of remote signaling, protection enabling, abnormal tripping and other incidents of breakers, isolators and grounding switch in the distribution circuit.

1) Primitives alarm
2) Alarm dialog
3) Real-time voice alarm for all incidents
4) SMS alarm to the defined cell phone (It need to match SMS mode)
5) Dialing alarm to the defined cell phone (It need to match call box)
6) Visible and audible alarm

Fig. 3.14 Event Alarm Interface

## 3.4 Query of Historical Event

Acrel-2000MG microgrid energy management system can store and manage the event records of remote signaling displacement, protection action, accident trip, and voltage, current, power, power factor overrun, etc., which is convenient for the user to trace the system events and carry out the historical tracing, query statistics, and accident analysis. It can be queried and sorted by time, type and equipment.

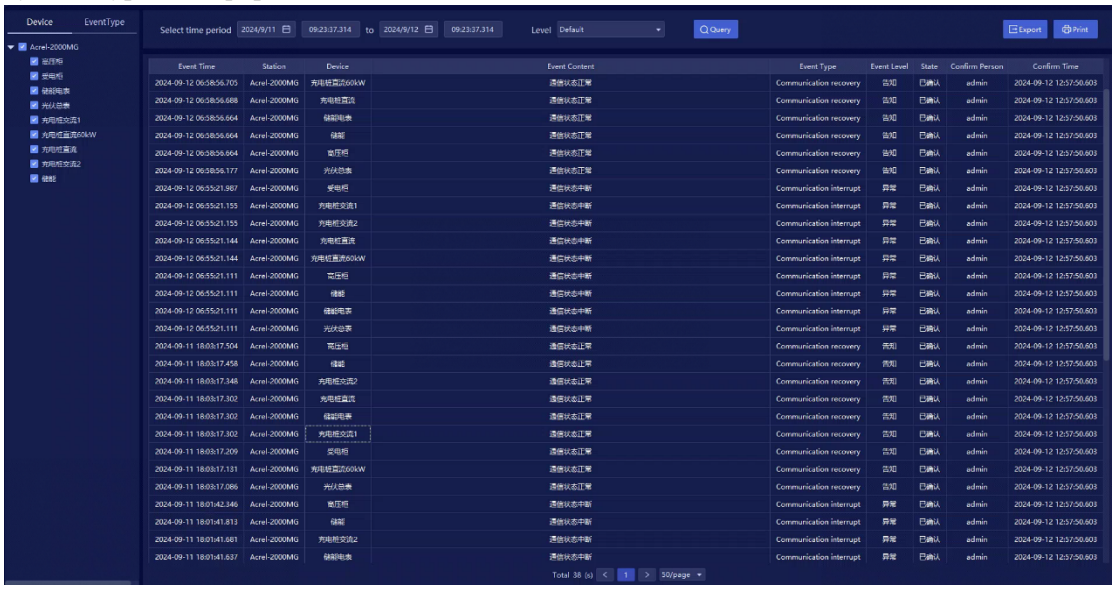



Fig. 3.15 Query of Historical Event Interface

## 3.5 Curve Query

Acrel-2000MG provides a curve query interface for direct access to various electric parameter curves (e.g. 3-phase current, 3-phase voltage, active power, reactive power, power factor and temperature) and statistics of the curve within the query range of the maximum value, the time of the maximum value, the minimum value, the time of the minimum value, the average value and so on.


Fig. 3.16 Real-time Curve Query Interface


Fig. 3.17 Historical Curve Query Interface

## 3.6 Operation Report

Model Acrel-2000MG allows the query of running parameters of various circuits or devices within the defined time. A running report shall indicate the following electric parameters: phase current, 3-phase voltage, total power factor, total active power, total reactive power, forward active energy, temperature and others. Running reports can be searched, output or printed by day, month or year.

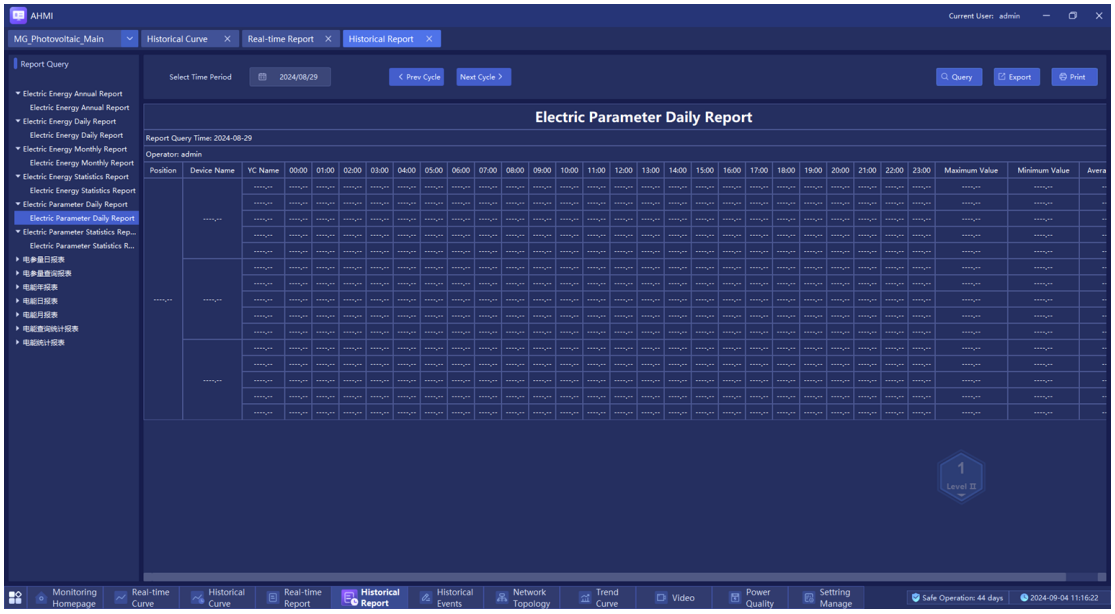



Fig. 3.18 Report Query Interface

## 3.7 Report Statistics

Acrel-2000MG is equipped with the function of regular meter reading and summary statistics, which allows users to query the power consumption of each distribution node for any period of time since the normal operation of the system, i.e. the statistical analysis report of the power consumption of the node's incoming power supply and that of the power consumption of each

branch circuit.

- Statistics and calculation of various general operating parameters (generated power et all) of microgrid, including daily, monthly and yearly maximum and minimum values and the occurrence time, maximum and minimum values of a defined period and the occurrence time, average value, over-limit times, over-limit time, over-limit rate, pass rate, etc.
- Statistical calculations should be carried out on the power generation and total power generation of each distributed power source operating in the microgrid system, including the comparison of power generation by time period, day, month and year.
- Statistical calculations should be made on the operating conditions of the main equipment of the microgrid system, including the number of normal operations and accidental trips of circuit breakers, and the number of times capacitors/reactors are switched on and off.
- Through reports, it analyses the operating parameters of the power supply system and each loop, and forms daily and monthly operating reports, and daily, monthly and annual reports of power statistics.

## 3.8 Network Topology

Model Acrel-2000MG can monitor the communication status of devices connected in a micro-grid in real-time, display the complete micro-grid network structure, and identify the faulty device or component and fault location via the online diagnostics of communication status if the micro-grid runs abnormally.

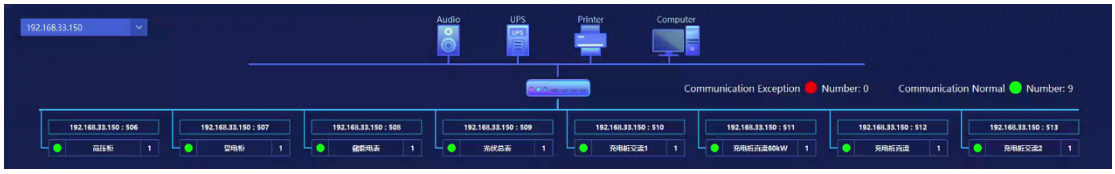



Fig. 3.19 Network Topology

## 3.9 Remote Control and Setup

Acrel-2000MG is capable of remote control operation for equipment throughout the entire system range. For example, the maintenance personnel of the distribution system can click the corresponding circuit breaker remote signal point to call out the remote control operation interface through the main interface of the monitoring system and can execute the corresponding operation orders of the dispatching system or the station in time.

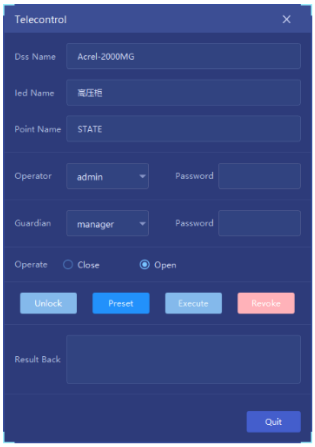



Fig. 3.20 Remote Control Interface

## 3.10 Communication Management

Acrel-2000MG microgrid energy management system can manage, control, and real-time monitoring of data for equipment communications within the scope of the entire microgrid system. Users can view the communication and data messages of a certain device.

It can complete the communication and data forwarding with all kinds of converters, charging piles, inverters, and intelligent electronic devices, including microcomputer protection, power instrumentation, intelligent manipulation, DC screens, analog screens, five prevention systems, and dispatching.

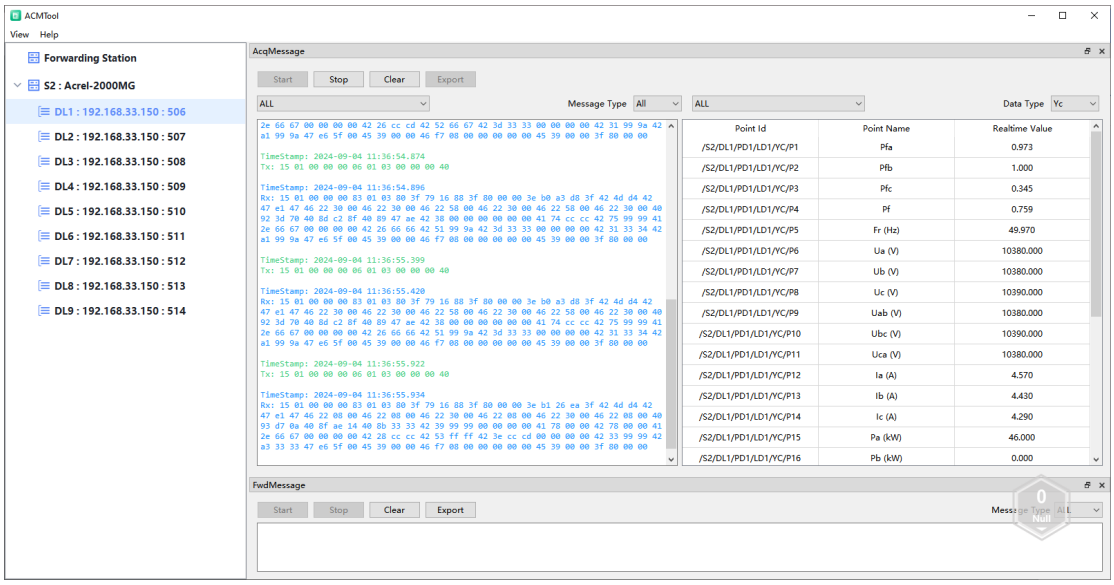



Fig. 3.21 Communication Management Interface

## 3.11 Energy Management

Acrel-2000MG can acquire running data of utility, PV system, energy storage system and loads. The following example describes the system operation when the utility works normally and abnormally. The system operates as follows:

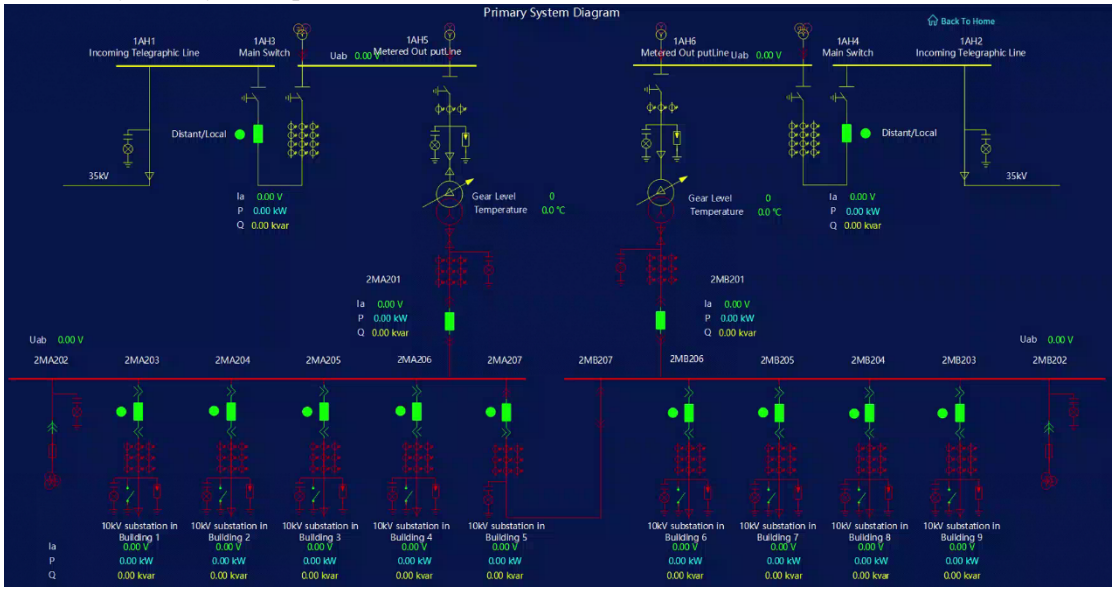



Fig. 3.22 Primary System Diagram

（1）Grid-connected mode

➢ When a 33kV grid works normally

① Charging: inverter power> load power and the energy storage system is not fully charged

When the sunshine is sufficient, the PV system will transmit power to loads preferentially. If there is remaining power, the PV system will charge the energy storage system. After the energy storage system is fully charged, the output power of the inverter will be reduced to avoid to transmitting power back to the 33kV grid.

② Discharging: inverter power < load power (initial discharging depth of the energy storage system is 80%)

When the sunshine is insufficient and the PV system cannot satisfy the demands of loads. The energy storage system will work with the PV system to energize loads. If the combination of energy storage system and PV system still cannot satisfy the demands of loads, the PV system, the energy storage system and the utility grid will transmit power to loads together.

Considering extreme weather conditions, the energy storage system must reserve certain power. The reserved value can be defined on the platform configuration screen.

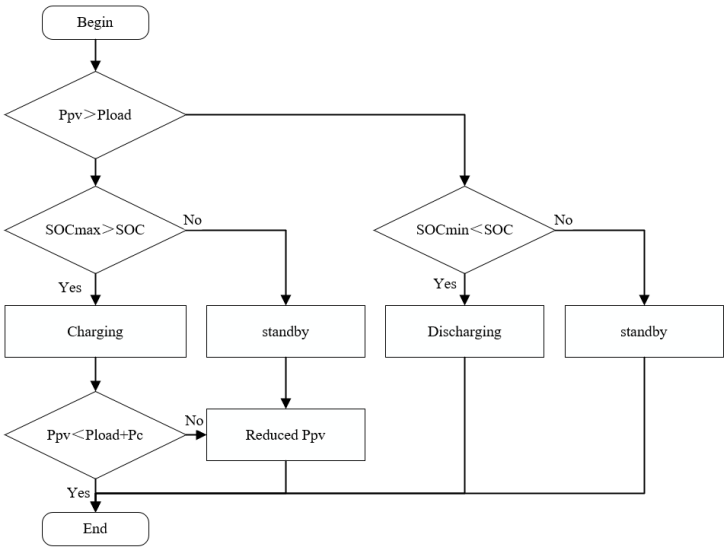



Fig. 3.23 Logical Control Flow of On-grid Running Mode

（2）Grid-islanded mode

The grid-islanded mode is classified into the scheduled grid-islanded mode and unscheduled grid-islanded mode.

➢ In the scheduled grid-islanded mode, send commands to breakers and PCS via Acrel-2000MG for mode switching.

➢ In case of unscheduled grid-islanded, the system runs the following control logic

If the voltage or frequency of the 33kV utility grid turns abnormal or there is any other fault in the grid, the islanding detector AM5SE-IS will trigger the circuit breaker in the grid-connected cabinet to open the circuit of the PV energy storage system. Second, the incoming circuit breaker of the 33kV utility grid is triggered and opened according to the data from the ABB combined protective relay. Third, Acrel-2000MG sends commands to PV circuit AMC96L to trigger the PV circuit breaker. Fourth, model Acrel-2000MG controls PCS to switch to the off-grid mode (by sending an off-grid enabling command to PCS, with reference to grid-connected / grid-islanded Switching Method and Process of Energy Storage Converter). Last, Acrel-2000MG sends a

command to the distributed power circuit AMC96L and closes the circuit breaker of the PV energy storage system. Then loads run in the off-grid mode.

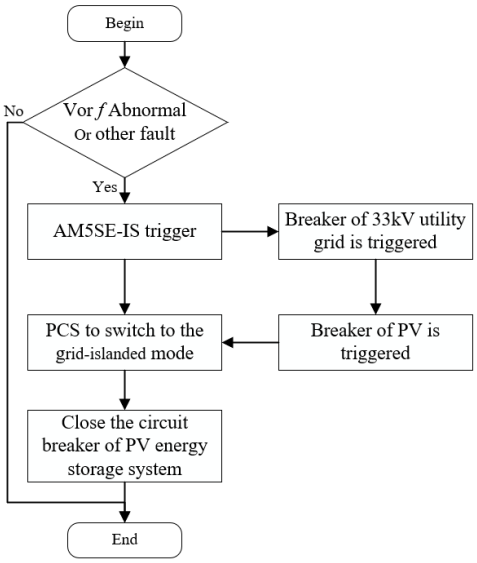



Fig. 3.24 Logical Control Flow of Grid-islanded Running Mode

When the ABB protection detects that the 33kV voltage is normal, it will back to the Acrel-2000MG. First, the system sends a command to AM5SE-IS to trip the circuit breaker of the PV energy storage system. Second, the system sends an grid-islanded shutdown command to PCS. Third, the system sends a command to the ABB protective relay to close the incoming circuit breaker in the 33kV utility grid. Fourth, Acrel-2000MG sends a command to AM5SE-IS to close the circuit breaker of the PV energy storage system. Fifth, the system sends an on-grid enabling command to PCS to switch to the grid-connected mode (see *On-grid/ off-grid Switching Method and Process of Energy Storage Converter*) Last, the system sends a command to AMC96L to close the breaker of PV circuit.

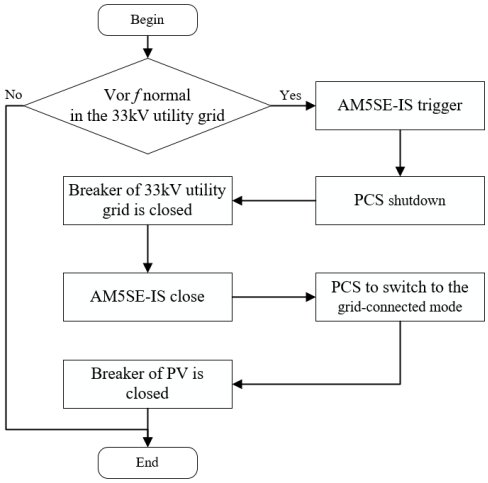



Fig. 3.25 Logical Control Flow of Grid-islanded Running Mode

## 3.12 User Authority Management

To ensure safe and stable operation, Acrel-2000MG boasts the function of user authority management to prevent any unauthorized operation (e.g. remote control, database modification, etc.). Define login names, passwords and authorities of different levels of users for reliable

security of system operation, maintenance and management.

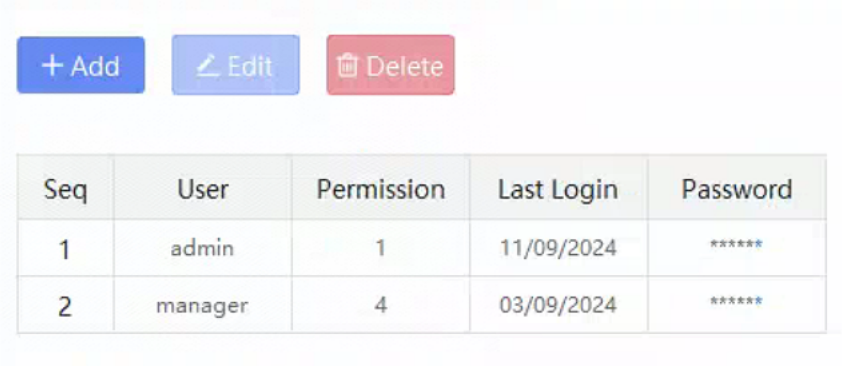



Fig. 3.26 User Management Interface

## 3.13 Self-diagnostics and Self-healing

- With online diagnostic capability, diagnose the system's own hardware and software operation, alarm and record when abnormalities are found, and take automatic recovery measures when necessary.
- Extend the online diagnostics function to PCBs of local equipment
- The Self-restoring should be: The system automatically resumption of operation if the general abnormal status software. When the device has a backup configuration, the online device can automatically switch to the standby configuration when a hardware or software failure occurs. The self-restoring time shall not exceed 30s.

## 3.14 Maintenance Function

- Online maintain the database, and add, delete or modify various data
- Offline maintain the database, and re-generate the database with reasonable initialization value
- Easily transfer historical data upon request for long-term storage
- Simply generate and edit screens

## 3.15 Interface With Other Devices or Systems

- The microgrid energy management system should establish communication interfaces with charging piles, energy storage PCS equipment, energy storage battery BMS equipment, wind turbine inverters, photovoltaic inverters and other individually set up equipment or systems within the microgrid system, and connect this equipment or systems to the microgrid energy management system for centralised monitoring and control, and the communication protocols should satisfy the requirements of standard communication protocols for power systems.
- The microgrid energy management system shall ensure data consistency and functional integrity when implementing interfaces with the above devices or systems.

# Part II Instructions for Using the System Software

## Chapter 4 Operating Environment and Configuration

### 4.1 Operating Environment

**Hardware**: Memory 4G, hard disk 1T, Ethernet port.
**Monitor**: 21 inches, resolution 1920*1080.
**Operating system**: Windows 10 Professional Edition.
**Database system**: Microsoft SQL Server 2008 R2.

### 4.2 Environment Setting

**Before using the system for the first time, perform necessary Settings. If the system is running properly, skip this step.**

1)Open [Control Panel], find [Power option], select [High Performance], and click [Change plan Settings], as shown in figure2.1

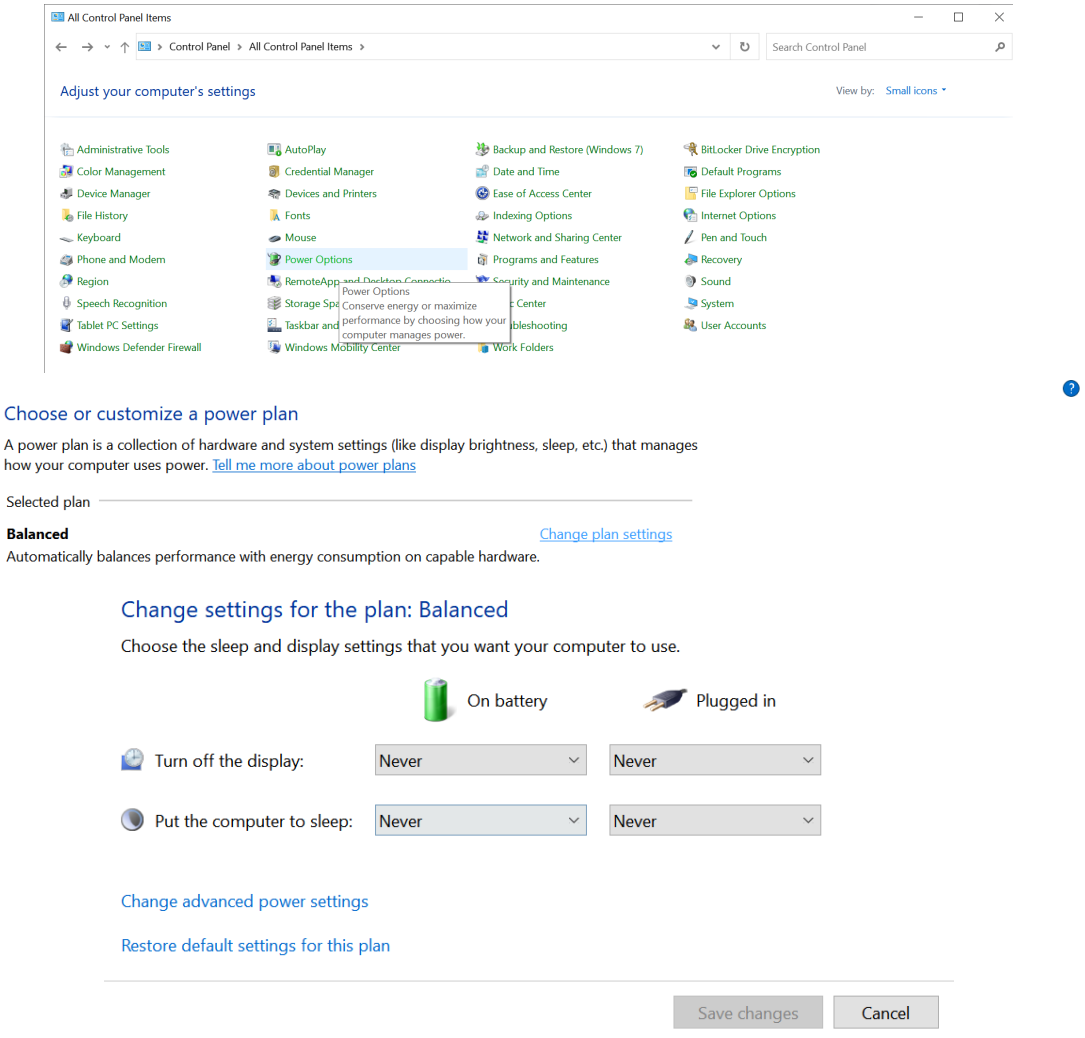



Fig. 4.1 Change your computer's power mode

2).Open Control Panel - Change User Account control Settings, select to Never notify,as shown in the figure2.2.

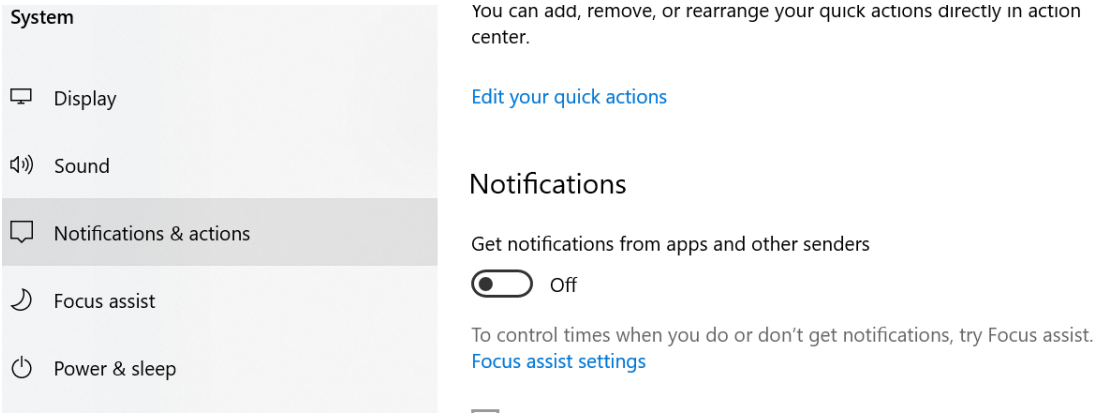



Fig. 4.2 Change user account control Settings

## 4.3 ODBC Configuration

1), 64-bit operating system, go to the C:\Windows\SysWOW64 directory, click odbcad32.exe to open the data source configuration tool.

2), 32-bit operating system, enter the C:\Windows\System32 directory, click odbcad32.exe to open the data source configuration tool. the configuration procedure is as shown in the figure2.3 and Figure 2.4.

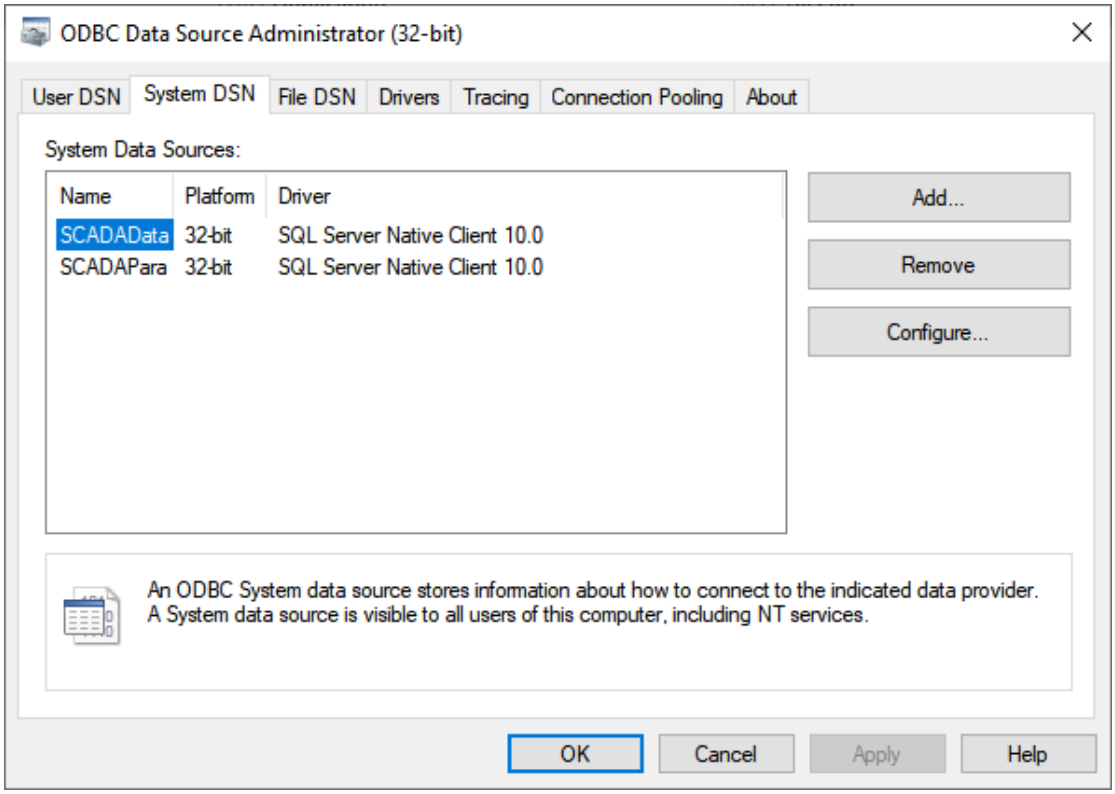



Fig. 4.3 ODBC Data source manager

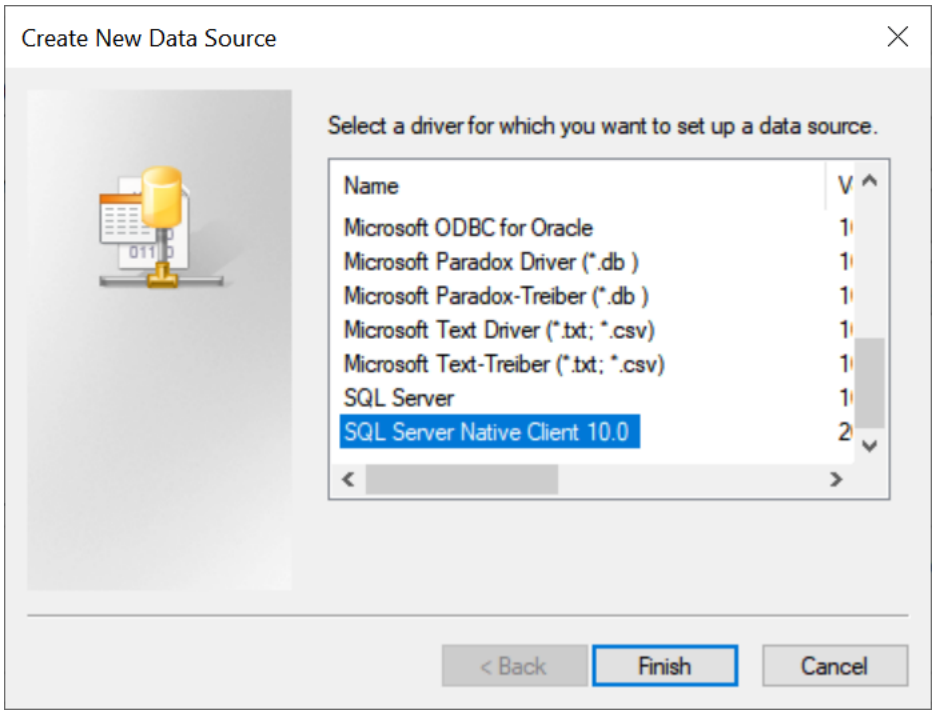



Fig. 4.4 Select the new data source you want to create

As shown in the figure2.5 Enter the data source Name and connected Server.

**Name**:Input data source Name SCADAData.

**Server** :Click the drop-down box to select the newly installed instance name, if none can be filled in (local).

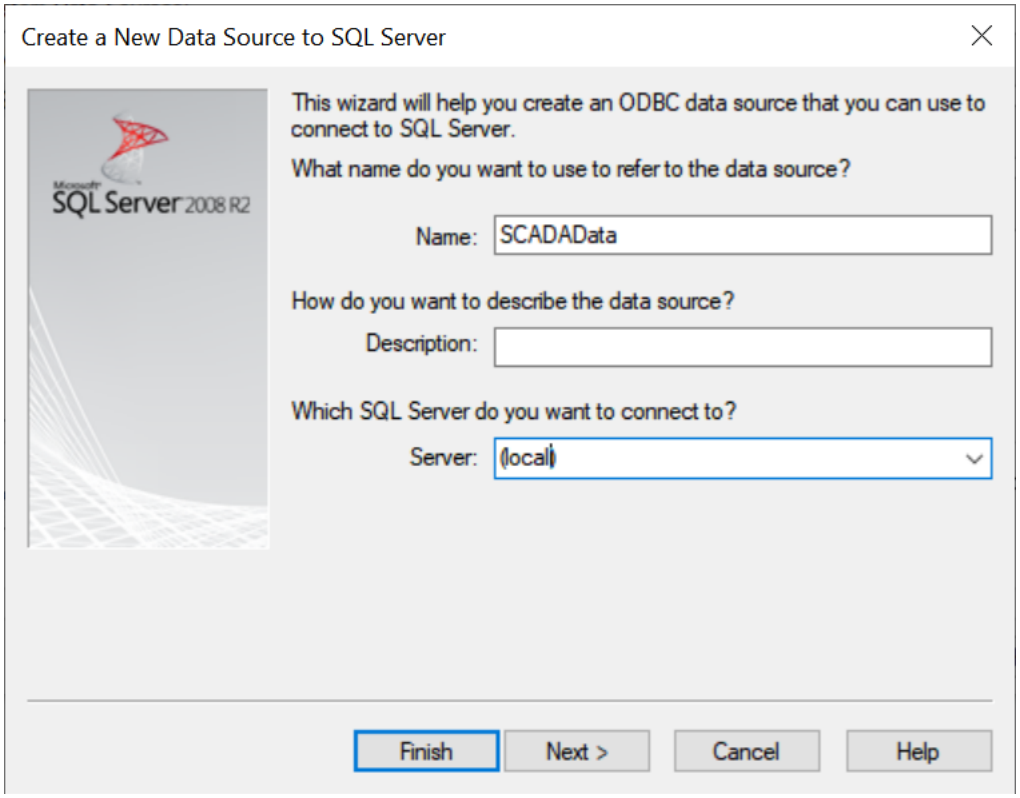



Fig. 4.5 Enter the data source Name and connected Server

As shown in the figure2.6Set the login ID and password.

**Login ID:**sa

**Password:**Acrel001

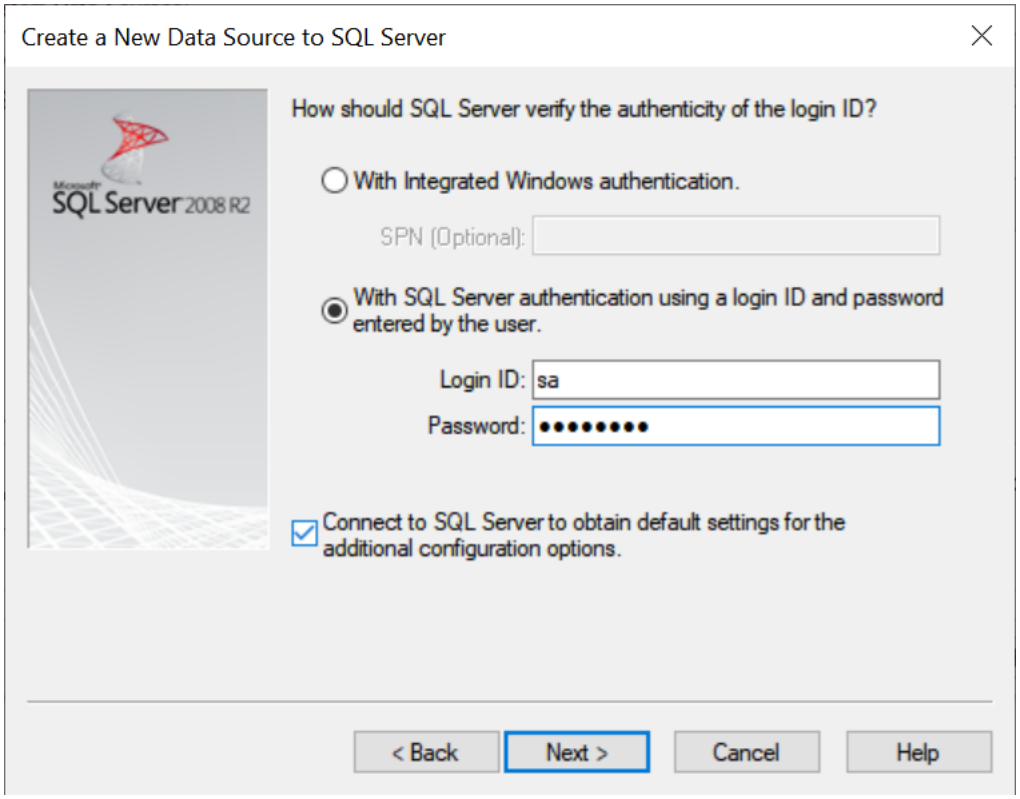



Fig. 4.6 Select the Mode to verify the authenticity of the login ID

As shown in the figure2.7 To change the default database, click the drop-down box and select the database SCADAData.

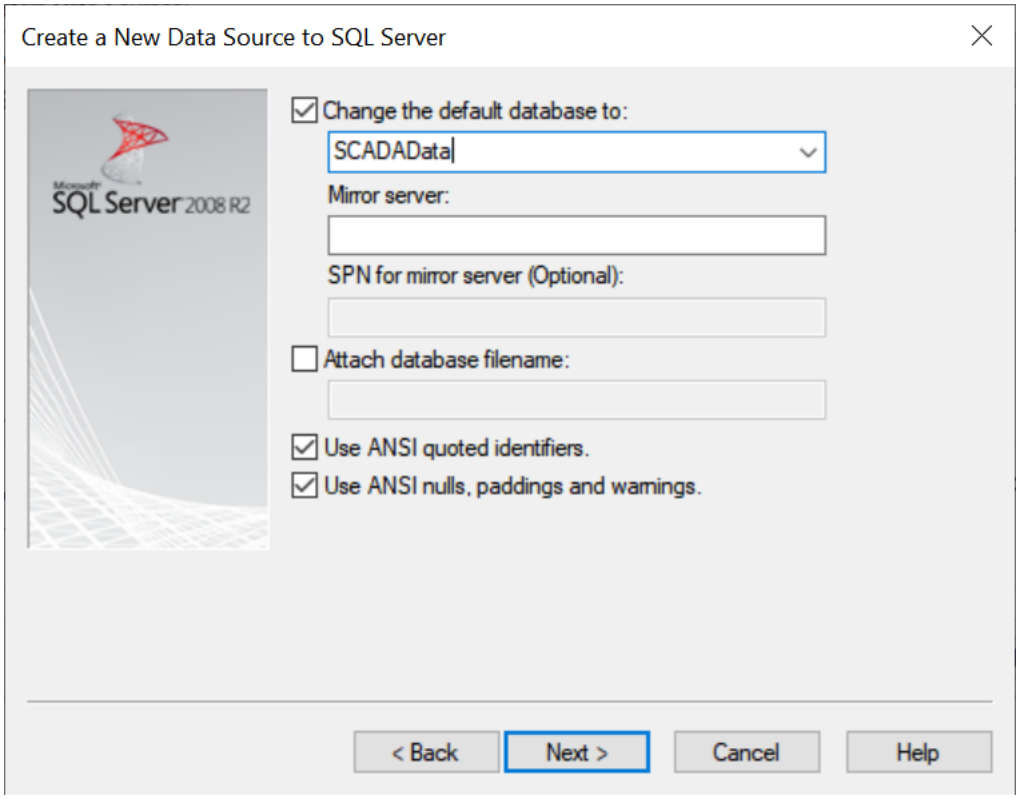



Fig. 4.7 Change the default database

As shown in the figure2.8 After the data source is created and configured, the data source can be tested, as shown in the figure2.9 and Figure 2.10.

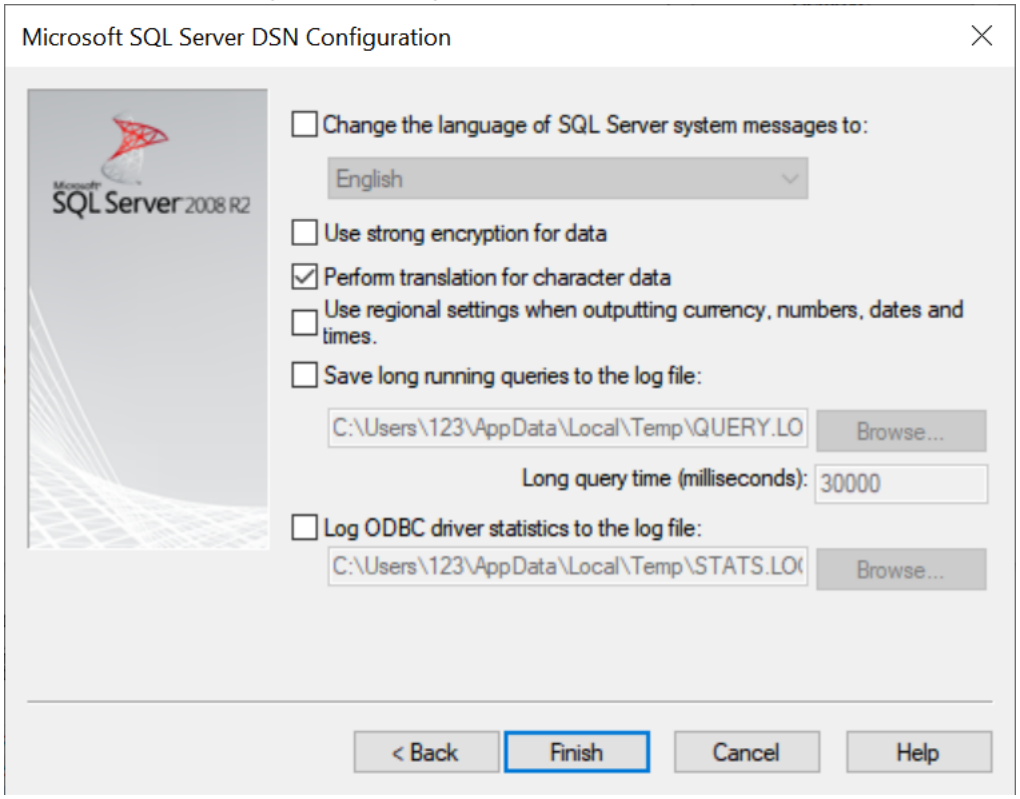



Fig. 4.8 Data source creation complete

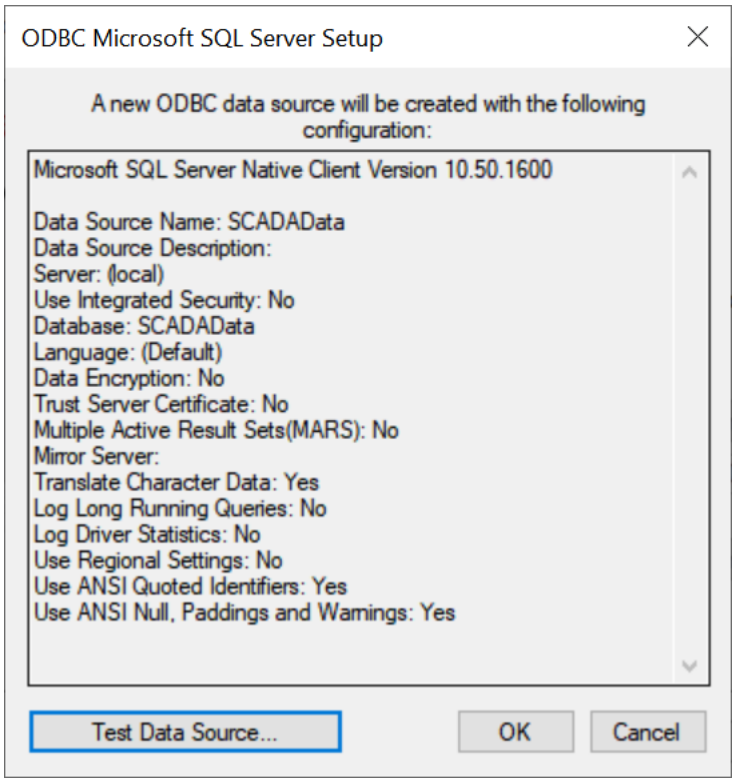



Fig. 4.9 Testing the data source

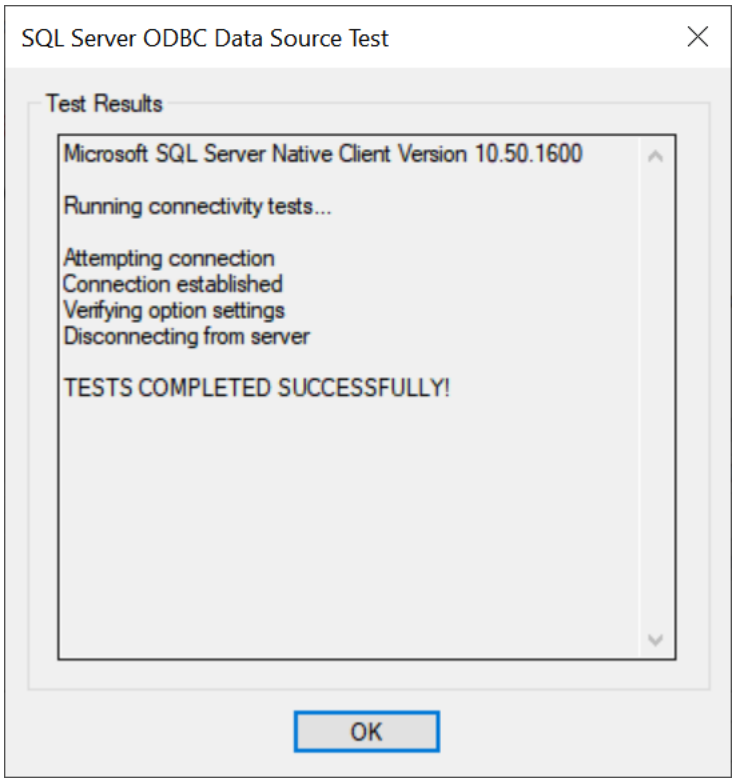



Fig. 4.10 Data source test results

Follow the previous steps to create a data source with the Name SCADAPara for connecting to SQL SERVER's ODBC.

## 4.4 Configuration File and Description

### 4.4.1 Basic System Configuration

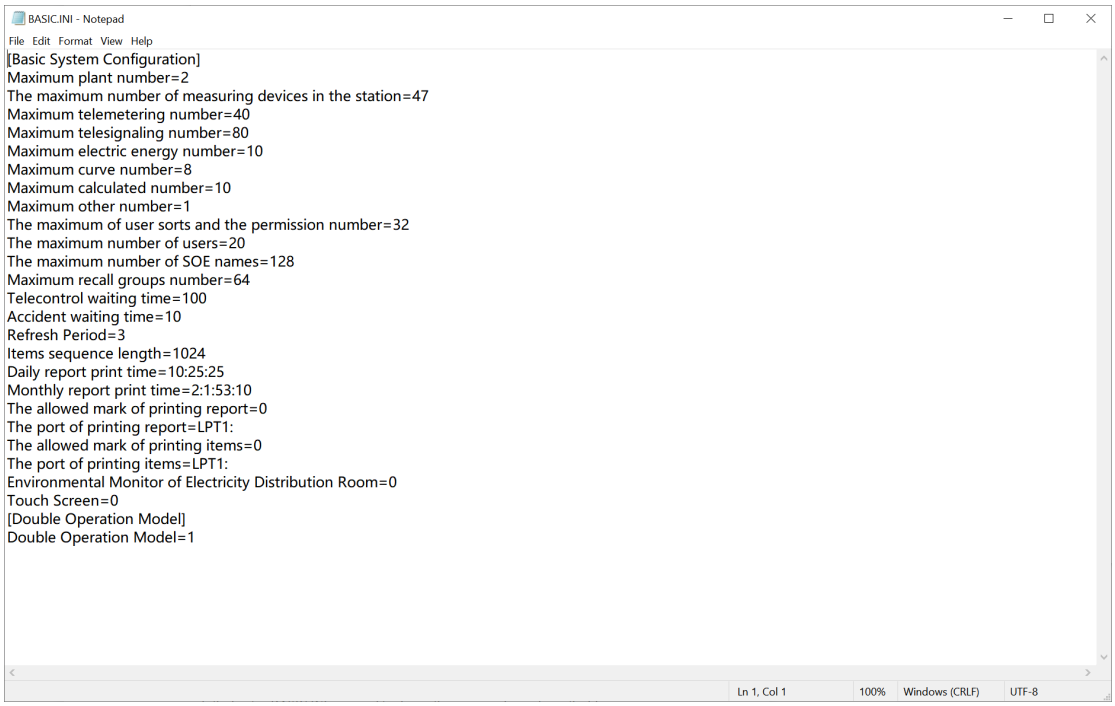



Fig. 4.11 Basic system configuration

The BASIC configuration of the system is shown in Figure 2.11. Open the basic.ini file in the

D:\ACREL2000\INI folder.

The maximum Number of plant stations, the maximum Number of measuring equipment in the station, the maximum Telemetering Number, the maximum Telesignaling Number, the maximum Electric Energy Number, and the maximum Other when the database is built according to the point table The Numbers cannot be greater than the data set in BASIC.INI. If the number exceeds the limit in BASIC.INI, you need to change the corresponding value in the file.

The periodic Print report is set as follows:

**Print time of daily report=:**Fill in the Print time (e.g. 10:05:30 stands for 10:5:30).

**Monthly report Print time=:**Enter the specific Print time (for example :08:10:05:30 represents 10:5:30 seconds on the 8th).

**Report Print allows annotation=:**0(0: Print is allowed. 1: Print is not allowed).

**Report Print port=:**LPT1(Connect the Print machine port)

### 4.4.2 Remote Signaling Change Flicker Number Setting

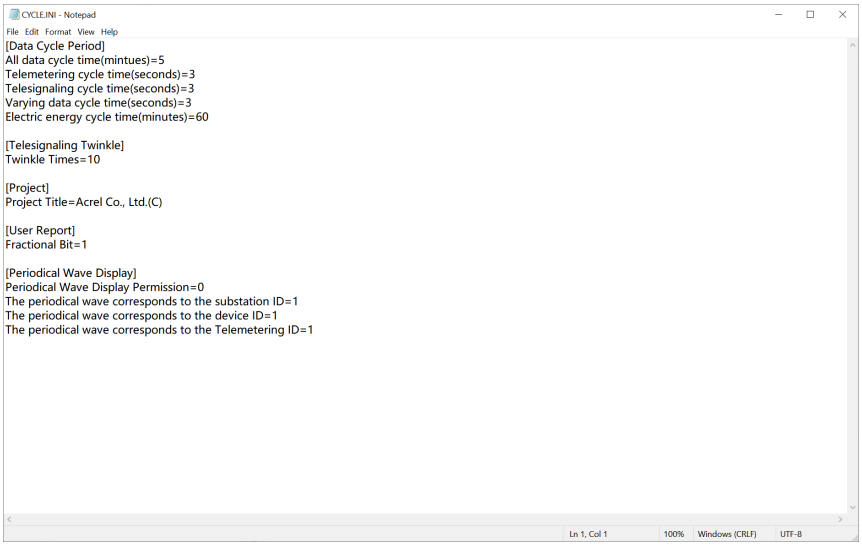



Fig. 4.12 Remote message blinking times profile content

**Twinkle Times=10**:Remote change will blink 10 times, can be modified. (Note: If you set too many times, you can cancel through the human-machine interface - right-click - remote message flash stop).

### 4.4.3 Network Configuration

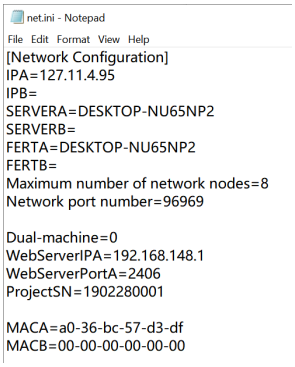



Fig. 4.13 Network profile content

(1)Single-machine mode

By default, the system works in single-node mode and does not need to be configured.

(2)Active/standby mode

To configure the network as shown in Figure 2.12, open the net.ini file in the D:\ACREL2000\INI folder.

**IPA=**:Filling host IP Address.

**IPB=**:Enter the standby IP Address.

**SERVERA=**:Filling host computer Name.

**SERVERB=**:Enter the standby computer Name.

**FERTA=**:Filling host computer Name.

**FERTB=**:Enter the standby computer Name.

**Maximum number of network nodes=**:4.

**Network Port ID=**:96969.

**Dual-machine=**:1.

### 4.4.4 Main Wiring Diagram Configuration File

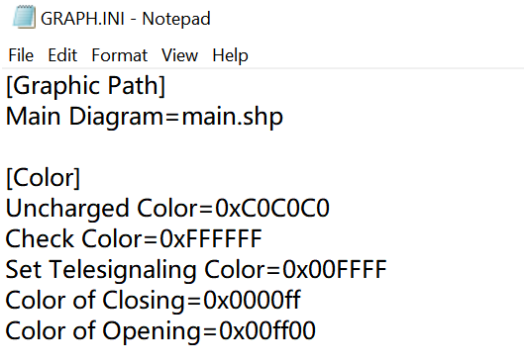



Fig. 4.14 Graphic profile contents

As shown in Figure 2.14, open the graph.ini file in the folder D:\ACREL2000\INI to view the storage path of the main wiring diagram (D:\ACREL2000\GRAPH\ main wiring diagram).shp is the main interface when the HMI is running.

**Color of Closing=:**0x0000ff (red), modifiable.

**Color of Opening=:**0x00ff00(Green) can be modified.

### 4.4.5 History Curve Color Profile

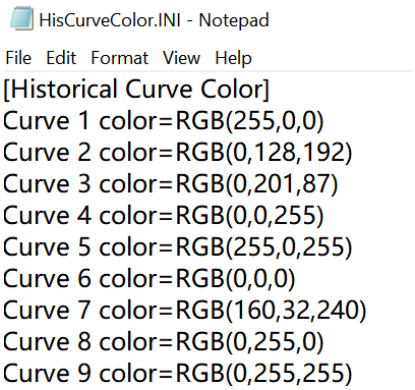



Fig. 4.15 History Curve Color profile content

As shown in Fig. 4.15, open the His-Curve Color file in the D:\ACREL2000\INI folder to view the Color of each curve, and modify the corresponding RGB value to modify the corresponding curve Color. You can also click the corresponding curve Color on the curve Query interface to modify it after running the system.

### 4.4.6 Set whether the Login User Logs Out Automatically

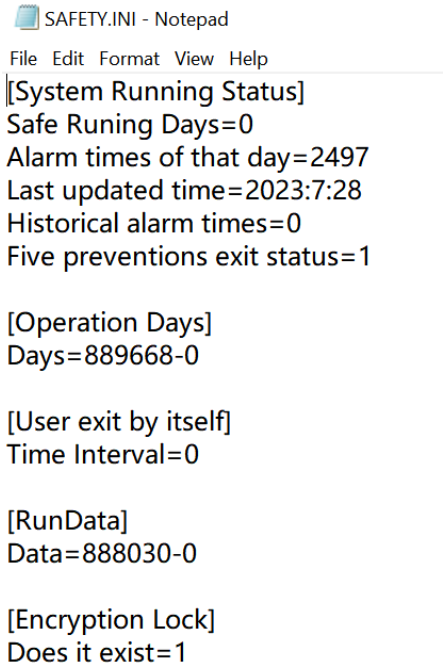



Fig. 4.16 Setting users to automatically exit profile content

**Time Interval**=0(0: manually exits. 1: Automatically logs out after 3 minutes).

After all configurations are complete, run the monitoring software.

Double-click the desktop Server program AServer.exe or D:\ACREL2000\BIN\AServer.exe and wait for a moment to find the program icon in the lower right corner of your desktop. Fig. 4.17.

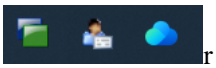
 r

Fig. 4.17 AServer.exe running display

Right-click the icon of AServer.exe to appear the **AHMI** function, **ACMU** function, **ADraw** function and **ADBM** function options of the system, as shown in the figure2.18.

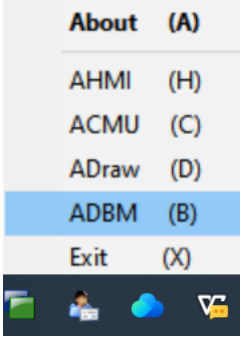



Fig. 4.18 Right-click the AServer.exe feature option

## 4.5 Set the Startup Delay to Start the Program

The Window scheduling task allows you to set a delayed startup of the application after startup. Search for "**Scheduled task program**" in the program list, as shown in the figure2.19

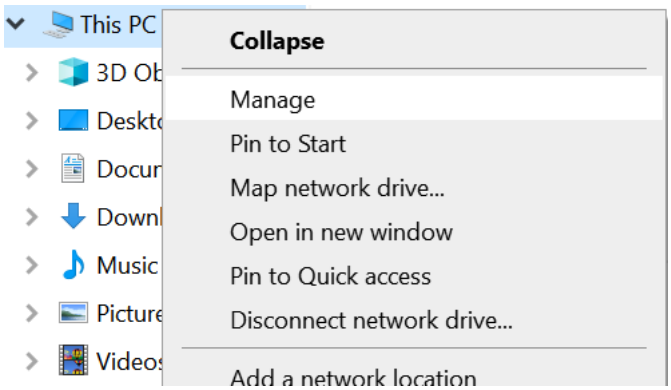



Fig. 4.19 Schedule task procedures

Open the scheduled task and select Create Basic Task, as shown in the figure2.20.

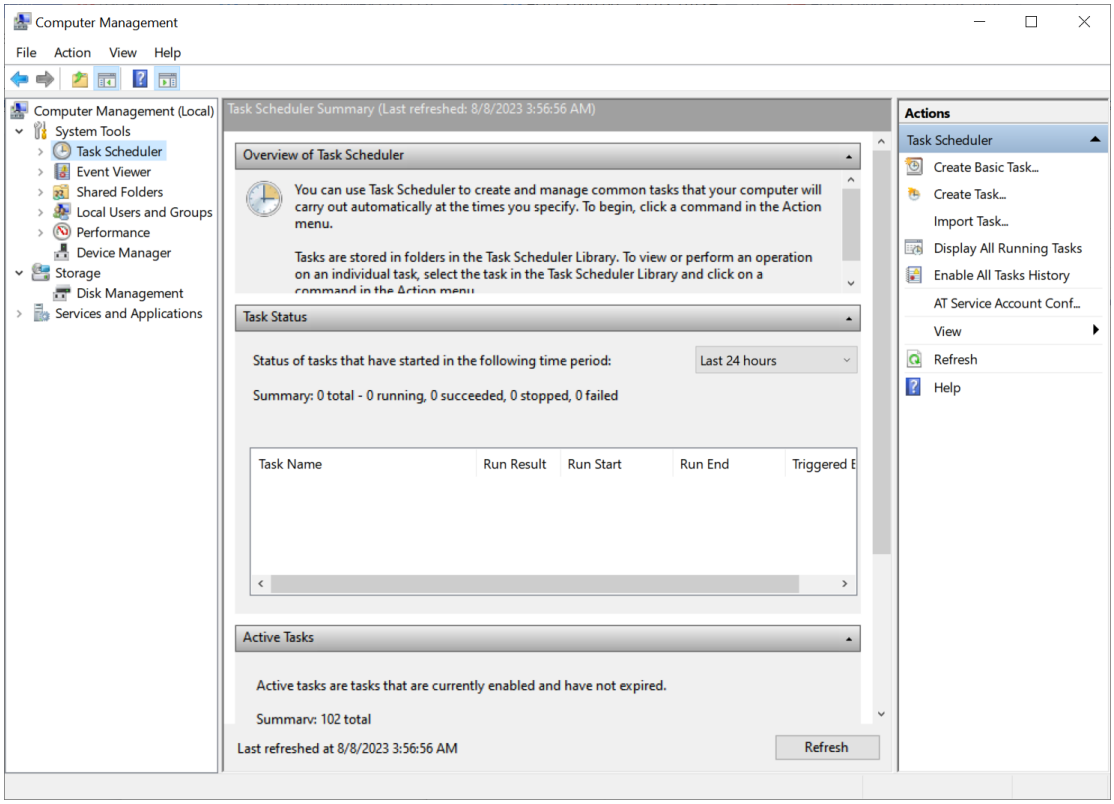



Fig. 4.20 Creating basic tasks

Enter the task Name and click "Next", as shown in the figure2.21.

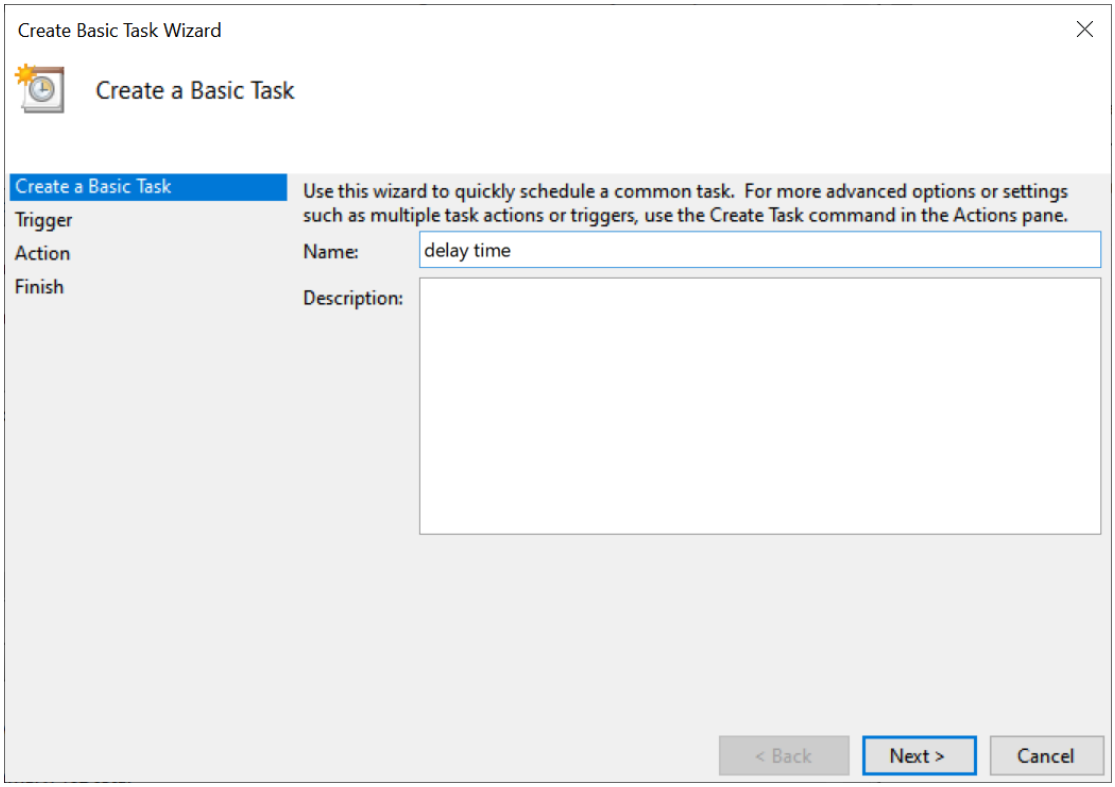



Fig. 4.21 Enter the task Name

Trigger Select "When the computer starts" and click "Next", as shown in the figure2.22.

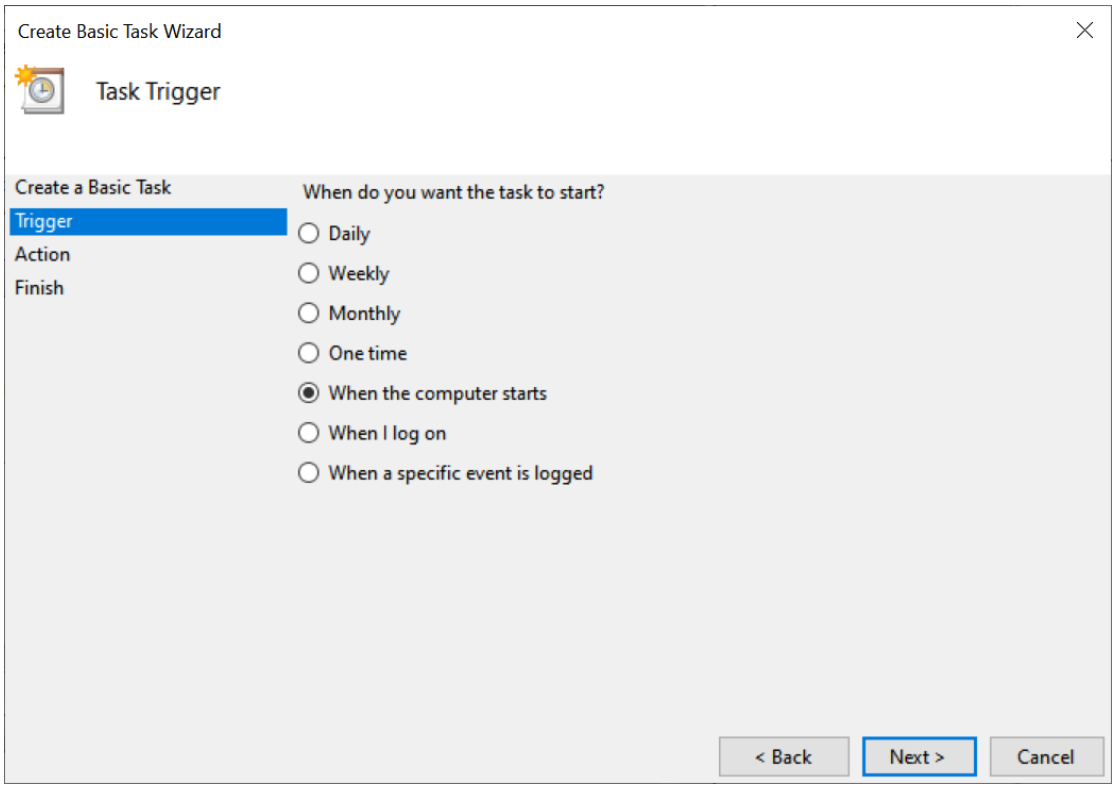



Fig. 4.22 Setting the trigger

Select Start Program and select Next, as shown in the figure2.23.

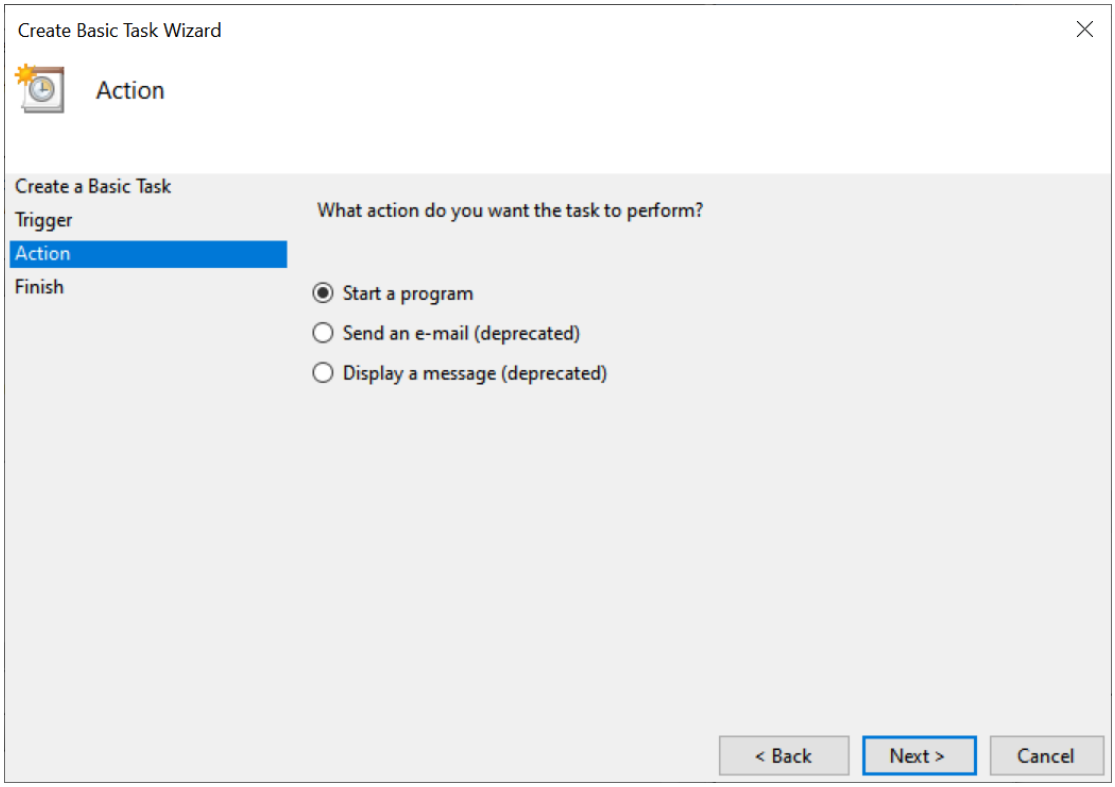



Fig. 4.23 Starting the program

Select the installation path of the application and click "Next", as shown in the figure2.24.

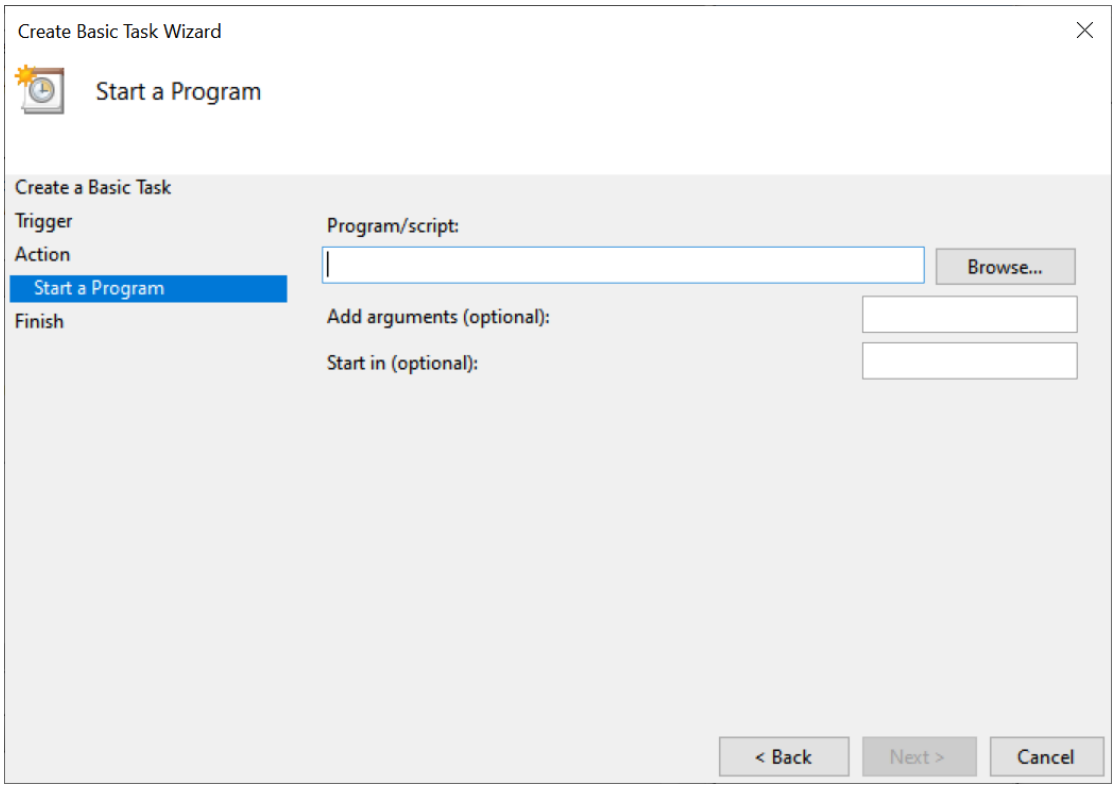



Fig. 4.24 Selecting a program

Check "When click Finish, open the dialog box for this task property" and click "Finish", as shown in the figure2.25.

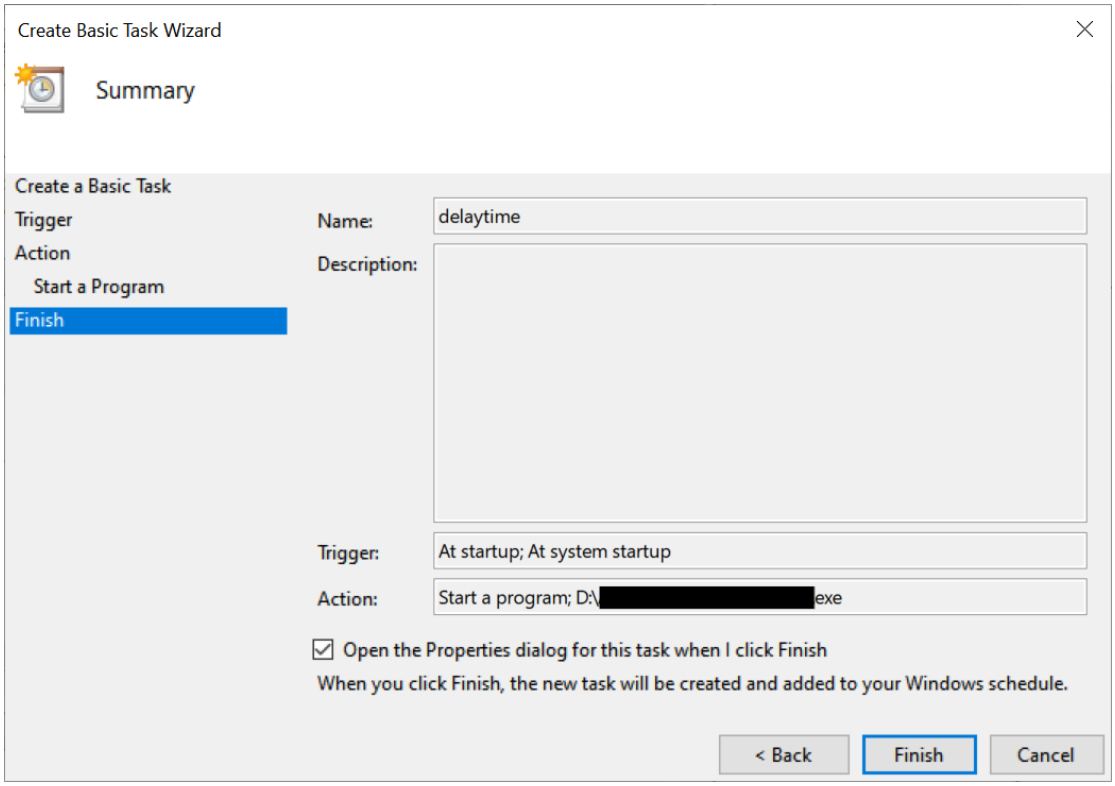



Fig. 4.25 completed

Select Properties > Trigger and click Edit, as shown in the figure2.26.

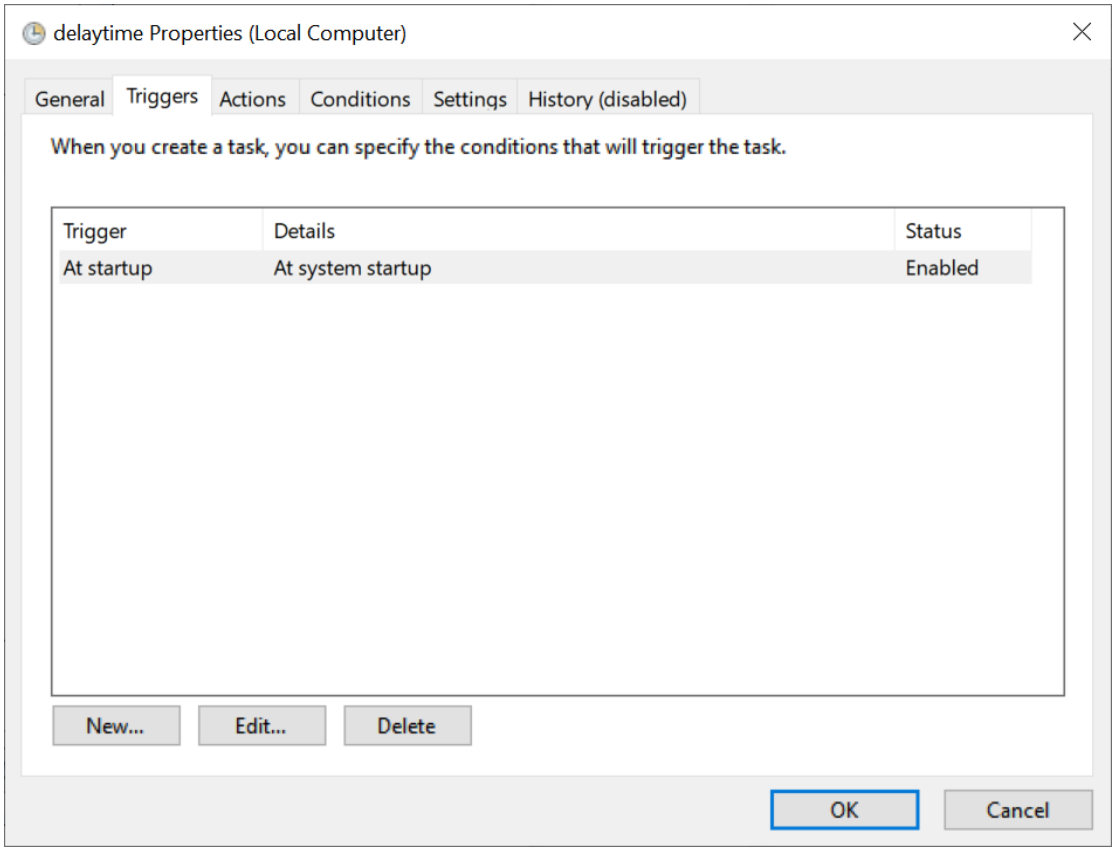



Fig. 4.26 Edit trigger

Select "Delay task Time" in Edit Trigger > Advanced Settings, select "1 minute" here, and

click "OK", as shown in the figure2.27.

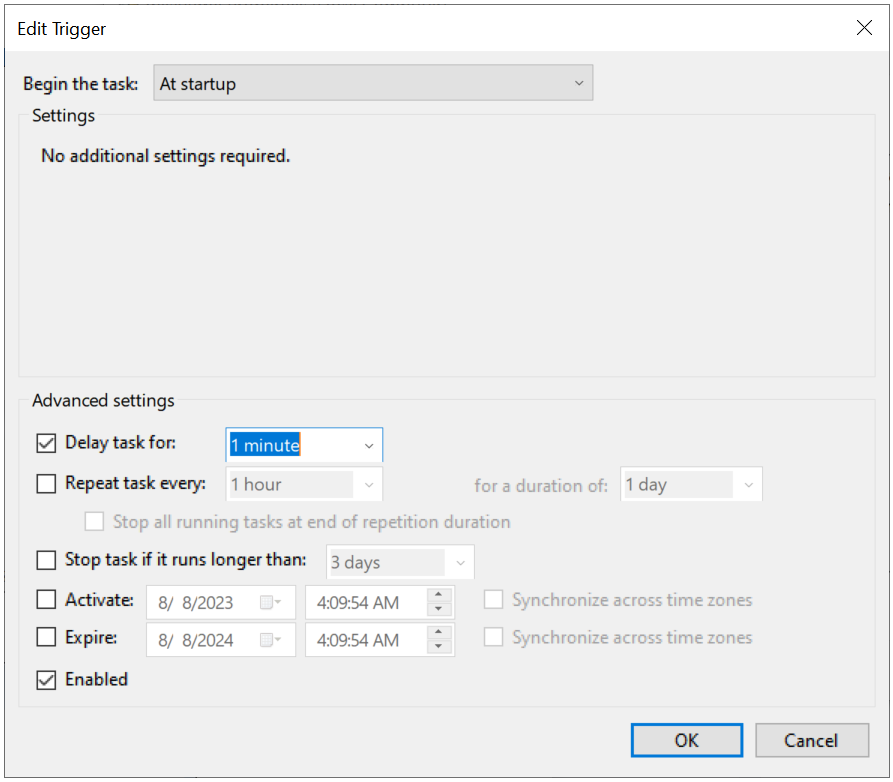



Fig. 4.27 completed

# Chapter 5 Database Management(ADBM)

## 5.1 Overview

ADBM is one of several components of Acrel-2000 power monitoring system, its main function is to complete the configuration of system operating parameters. Configure the database plant site table, device point table, and parameter point table. You need to log in to modify the table. Otherwise, you can only browse the table. To modify the information of a cell, double-click the corresponding cell.

## 5.2 Function Introduction

The functions of data management module are:

1) Create and maintain monitoring system operating parameters.
2) User management.
3) Historical curve management.
4) Calculation of formula quantity.
5) Maintenance of equipment templates.

## 5.3 Interface Description

Data management software interface as shown in the figure3.1.

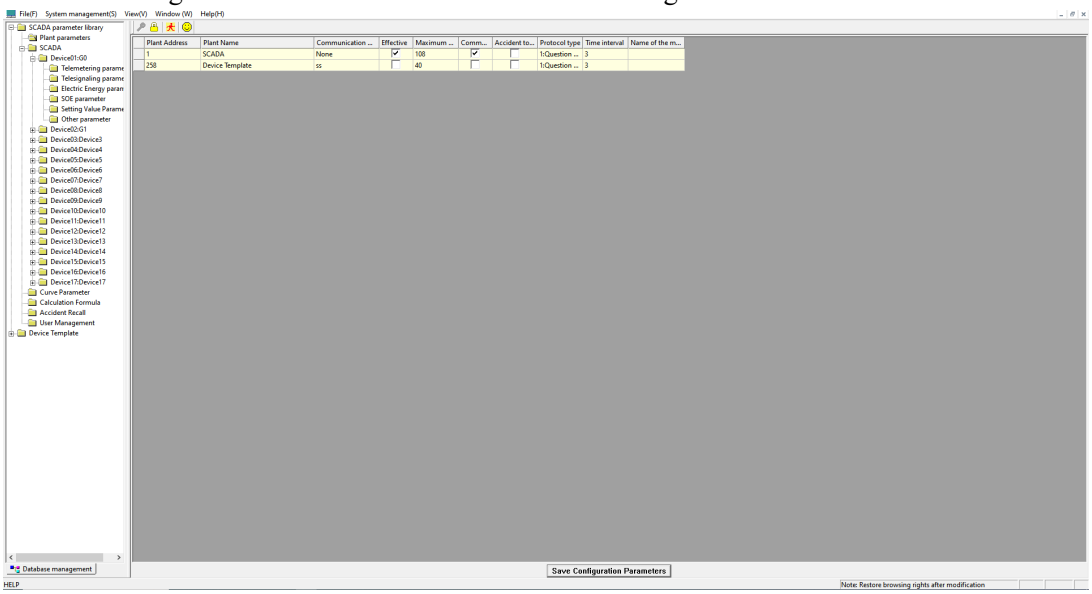



Fig. 5.1 Data service module interface

The menu provides all the operating functions of the system; Toolbar corresponding to the simple operation of the menu; The status bar displays the current status of the system. The display area displays the database tables. The following menus and functions are described in detail.

### 5.3.1.System Menu

When the database table is not open, the system menu shown in Fig. 5.2 is displayed.

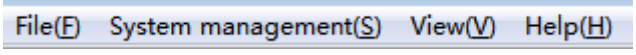



Fig. 5.2 Initial system menu

When the database table is opened, the system menu shown in Fig. 5.3 is displayed.

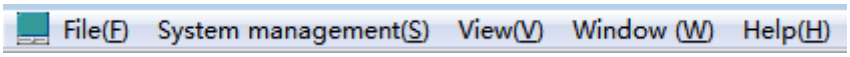



Fig. 5.3 System menu after opening the table

### 5.3.2.Tree Bar

The tree column displays various tables in the database in a structured and hierarchical manner. It is convenient to operate the database tables in the tree bar. Click "+" to display the table Name under each type of table, and click "-" to hide the table Name. To open a database table, find its name in the field and click, and the contents of the table are displayed in the display area.

The core part of the ADBM database management software contains the database shown in Fig. 5.4.

(1)**SCADA Parameter Library**.

(2)**Device Model Library**.

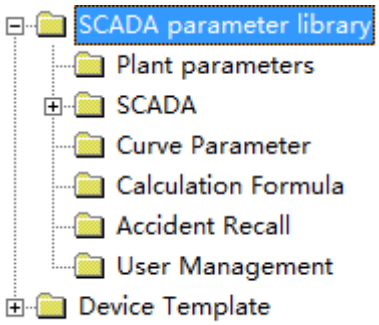



Fig. 5.4 Tree bar

### 5.3.3.Toolbar

ADBM has one toolbar, as shown in Fig. 5.5.

Fig. 5.5 Toolbar

The toolbar provides a quick operation Mode, and these functions are reflected in the menu; Place the mouse over the corresponding tool icon and wait for a moment, the Chinese description of the tool will appear.

### 5.3.4.Menu Detail

The menu is divided into five items: **File, system management, View, window, and Help**.

#### 5.3.4.1.File Menu

Clicking the **file** menu brings up the drop-down menu shown in Fig. 5.6.

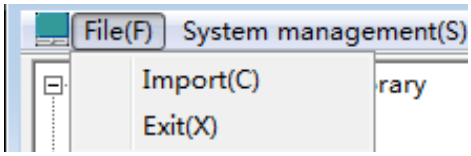



Fig. 5.6 File Menu

Click **Exit** (X) to exit the database maintenance tool.

**5.3.4.2.System Administration**

Click the **System Administration** menu to drop down the menu shown in Fig. 5.7.

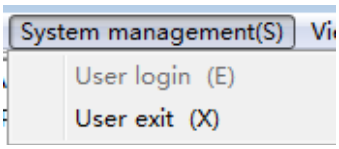



Fig. 5.7 System administration menu

a)User Login

After a user logs in correctly, it has the rights of the user group to which the user belongs and can modify or view the database parameter table.

b)User Exit

After clicking, the system recovers all the permissions of the user, only the browsing function, can not be modified.

**5.3.4.3.View**

Clicking the View menu brings down the menu shown in Fig. 5.8.

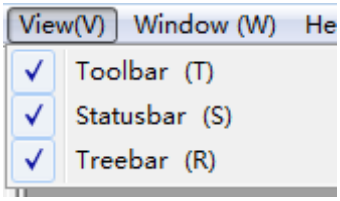



Fig. 5.8 View Menu

a)**Toolbar**

This parameter is used to select whether to display the toolbar. If there is a check mark in front of the toolbar menu item, the toolbar is displayed. Otherwise, the toolbar is hidden. The toolbar is described below.

b)**Status bar**

This parameter is used to select whether to display the status bar. If there is a check mark in front of the status bar menu item, the status bar is displayed. Otherwise, the status bar is hidden. The status bar is at the bottom of the database maintenance tool.

c)**Tree bar**

This parameter is used to select whether to display the tree bar. If there is a check mark before the menu item of the tree bar, the tree bar is displayed. Otherwise, the tree bar is hidden.

**5.3.4.4.**Window

The **window** menu opens as shown in Fig. 5.9. The database on the left is currently the data of the plant station under the selected Server, and the display window has three modes: **stacking, tiling,** and **arranging ICONS**.


Fig. 5.9 window menu

**5.3.4.5.Help**

Open the Help menu as shown in the figure3.10.

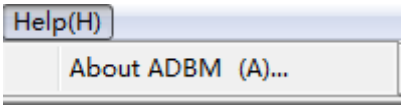



Fig. 5.10 Help menu

### 5.3.5.Description of the Toolbar

As shown in Fig. 5.11, the toolbar can facilitate the operation of users. There are the most commonly used operations of users on the toolbar, and most of the functions corresponding to these operations have corresponding menu items in the system menu. Using the toolbar to operate is more convenient and faster than selecting a single item from the menu.

Fig. 5.11 toolbar

From left to right: **User login, restore default browsing status, log out**, About.

#### 5.3.5.1.Function Description:

a) User login

When the button is pressed, the dialog shown in Fig. 5.12 pops up.

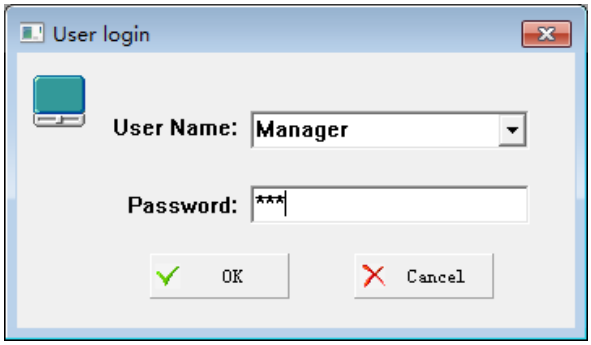



Fig. 5.12 User Login

b) Restore the default browsing status

The function is the same as restoring the default browsing identity in the system management menu.

c) Exit

Exit ADBM data management software.

d) About

When the button is pressed, information about the software is displayed.

#### 5.3.5.2.Right-click Menu Description

Function description:

Like the toolbar, the right-click menu is also easy to operate, and the menu items in the right-click menu have the most commonly used operations.

a) Right-click menu description in the tree bar

After entering the software, click the right mouse button in the tree bar, and the right menu will automatically pop up. Fig. 5.13.

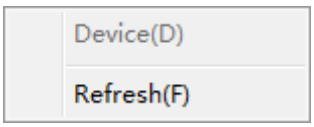



Fig. 5.13 Tree bar right-click menu

The tree bar right-click menu includes:

(1) Device: Right-click Plant Name/Device Name in the tree to activate this menu.

(2) Refresh: refresh the entire tree to get the latest data of the database. After modifying the plant or equipment table, refresh it.

b) Right-click menu description in the display area 1

When the user opens the database table, in the display area of the current form, the left-most fixed column of the right mouse button will automatically pop up the right menu. Fig. 5.14.

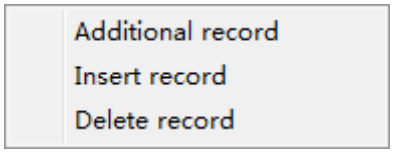



Fig. 5.14 Display area right-click menu 1

Display area right-click menu 1 includes:

(1) **Adding records**: The operation of adding records after the last record is used when adding points.

(2) **Insert record**: The operation of adding a record after a record, used when adding a dot.

(3) **Delete records**: The operation of deleting one or more records is used when deleting points.

c) Right-click menu description in the display area 2

When the database table is opened, in the current form display area, right-click the column header or select mo**re th**an 2 cells at a time, the right-click menu will pop up. Fig. 5.15.

Display area right-click menu 2 includes:

(1) **Batch modification**: Modify the content of multiple cells in the selected column at a time.

(2) **Hexadecimal display**: Standby.

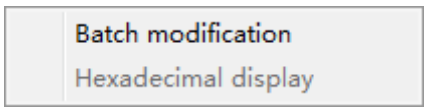



Fig. 5.15 Display area right-click menu 2

Click batch modification as shown in figure3.16, where the Base Value can be a number or a character. It can be set to the same value, or increasing and decreasing in sequence, and the interval between increasing and decreasing can only be a positive number, which can quickly modify the contents of multiple cells.

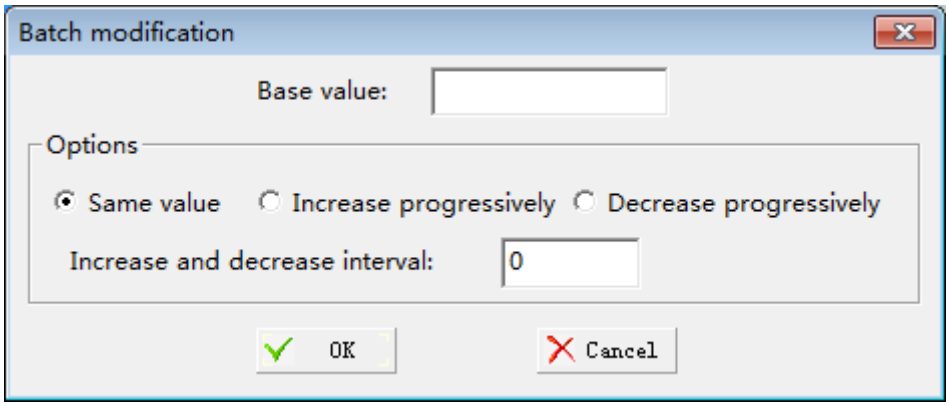



Fig. 5.16 Batch modification

### 5.3.6.Save Parameter Table

the Save configuration button is displayed at the bottom of the interface, as shown in the figure3.17.

After each modification of the database parameter table, be sure to click the Save configuration parameter button to save the modified content.


Fig. 5.17 Save the configuration parameter button

### 5.3.7.Shortcut Key Operation

Ctrl+C, Ctrl+V can copy and paste data in a similar sequential format from an excel or word or text file into the current parameter table. You can copy multiple columns at the same time. as shown in the figure3.18 and Fig. 5.19.

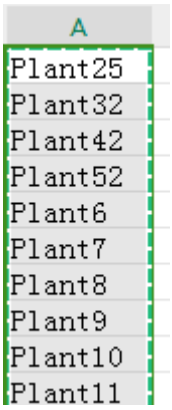



Fig. 5.18 excel table

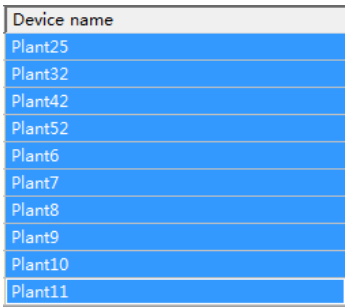


Fig. 5.19 Paste function

### 5.3.8.Device Model Base

You can see the parameter table of common model devices in the model library. If this model device is used in the project, you can use the device menu to quickly create a point table. If you use a certain type of equipment for the first time, you can do it in the model library according to the point table in the equipment manuall, and then import it into the corresponding plant equipment.

## 5.4 SCADA Parameter List

### 5.4.1.Plant Parameters

A maximum of 255 devices can be configured for a Plant station. If the number of monitored devices is greater than 255, multiple plants can be configured. The default Plant Address starts from 1. The field marked with [*] is required, as shown in Fig. 5.20.

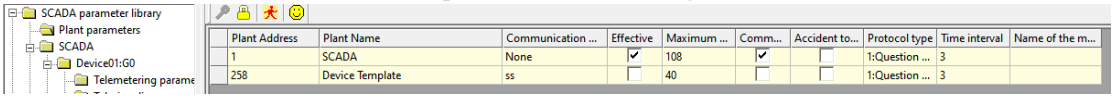



Fig. 5.20 Plant station parameter setting table

***Plant Address**:Set the Plant Address starting from 1. This parameter is automatically generated and cannot be modified.

***Plant Name**:The station name of the monitoring software is set based on the actual station.

**Communication Manager**:Use the actual network configuration. This parameter is the default and is not required.

***Valid**:Check whether the plant is valid. If checked, it is valid, and if unchecked, it is invalid. In Default unchecked state, this item is selected.

***Maximum Device Number**:Set this parameter to the maximum number of devices that can communicate in the plant and station.

***Communication**:Communication status: valid if selected, invalid if unselected, and in Default unchecked state, this item is an optional item.

**Accident Total**:Indicates that the switch is an accident trip, and start the accident sound to remind the operator to pay attention. This item is selected.

***Protocol Type**:1 indicates the question-and-answer protocol, and 0 indicates the round-robin protocol. 1 is selected by default.

**Time Interval**:The unit is seconds. The value is Default to 3.

**Main Wiring Diagram Name**:Filling in the main wiring diagram file Name of the plant station can realize the adjustment diagram when the event is generated, you can not fill.

After login, when the left fixed column of the right mouse button selects a row in the plant table, the operation of adding, modifying and deleting can be completed through the following figure, as shown in Fig. 5.21.

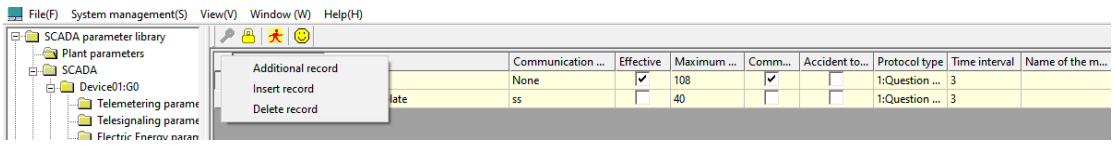



Fig. 5.21 Add and delete plant parameters

**Note: The Plant Address is unique and cannot be repeated. The operations for adding,**

**modifying, and deleting the following tables are the same.**

### 5.4.2.Device Parameter

The Device parameter table is used to describe the devices in the plant station. Device Address is the device address of the actual device, and Device Name is the circuit Name, which must correspond to the actual devices on site. You can also configure the device point table by referring to the item data dictionary. If the address in the data dictionary starts with 2, you can reserve address 1 in the database device table as a backup. Fields marked with [*] are required.

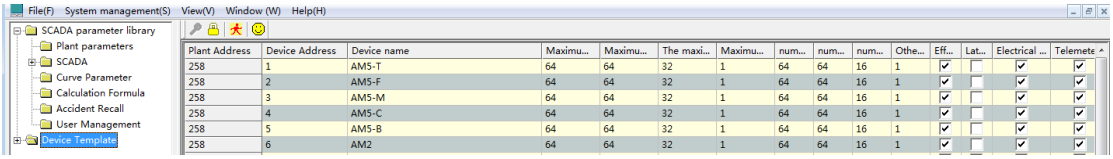



Fig. 5.22 Device parameter List

Click Plant Name to view the equipment parameters in the plant station, as shown in Fig. 5.22.

**Plant Address**:Set in the plant Settings table, this item is the default.

***Device Address**:Enter the decimal Address of the Device. The Device Address of the same factory station cannot be repeated. This parameter is automatically generated and cannot be modified.

***Device Name**:Enter Device Name or loop Name.

***Maximum Telemetering Number**:The maximum Telemetering Number of data assigned by the device in the database is entered.

***Maximum Telesignaling Number**:The maximum Telesignaling Number of data allocated by the device in the database is entered.

***Maximum Electric Energy Number**:The maximum Electric Energy Number data allocated by the device in the database is entered.

***Maximum Other Numbers**:The maximum number of Other Numbers allocated by the device in the database is the entry.

***Telemetering Number**:The Number of Telemetering devices must be less than or equal to the maximum Telemetering Number.

***Telesignaling Number**:The Number of remote messages of the device must be less than or equal to the maximum Telesignaling Number.

***Electric Energy Number**:The Number of electrical hours of the device must be less than or equal to the maximum Electric Energy Number.

***Other Numbers**:The number of Other devices must be less than or equal to the maximum Other Numbers. This parameter is entered.

***Valid**:If the device is Valid, if it is selected, it is Valid. If it is not selected, it is invalid. This parameter is selected by default.

***Latch**:According to the actual Settings, this item is unchecked and unchecked. In Default unchecked state, this item is unchecked.

***Electrical energy multiply factor**:Whether the Coefficient is required for power consumption data, if it is selected, the Coefficient is unchecked, and if it is unchecked, the Coefficient is not unchecked.

***Telemetering multiplication factor**:Whether to multiply Coefficient is required for

telemetry data, if this parameter is selected, and if this parameter is unchecked, this parameter is selected. In Default unchecked state, this parameter is selected.

***Electrical Energy Attribute**:The power data is stored in the time format in Default to 4.

a)0 indicates the accumulated power level in one hour.

b)1 indicates the cumulative electricity level in one day.

c)2 indicates the accumulated electricity value in January.

d)3 indicates the cumulative electricity value of 1 year.

e)4 indicates the cumulative electrical value up to now.

**Device Type:**Default to 0: This parameter is entered.

**Number of subdevices**:Default to 0: This parameter is entered.

**Note: The maximum telemetry number, maximum telephony number, maximum power number, maximum other number cannot be greater than the data set in BASIC.INI.**

### 5.4.3.Telemetering Parameter

The point table for storing telemetry information is shown in FIG. 3.23 and FIG. 3.24. Generally, a point table with corresponding number of Telemetering points is created according to the number of telemetering points on the device, and the telemetering serial number starts from 0 by default. Usually, it is only necessary to modify Telemetering Name and keep other parameters as default values. You can modify the value of the Alarm Upper Limit if a telemetry overlimit alarm is required. Fields marked with [*] are required.

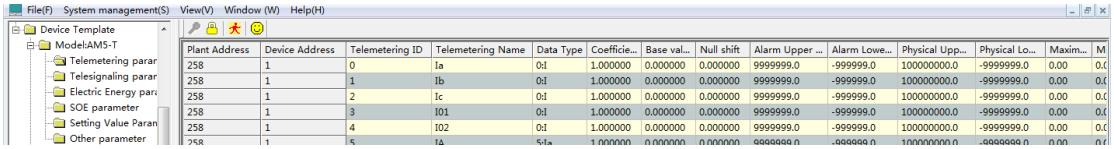



Fig. 5.23 Telemetry parameter table

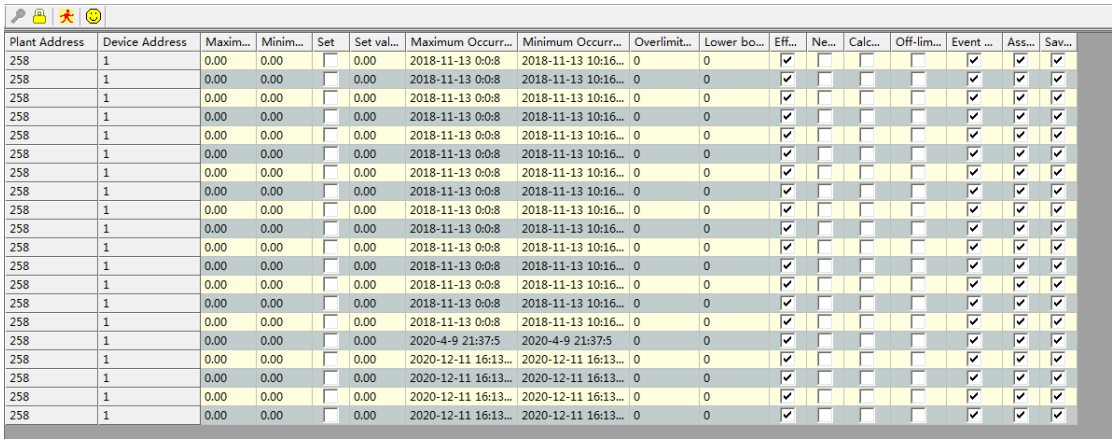



Fig. 5.24 Telemetry parameter table

**Plant Address**:This parameter is set in the factory Settings table and cannot be modified. This parameter is the default one.

**Device Address**:This parameter is set in the device Settings table and cannot be modified. It is the default parameter.

***Telemetering ID**:Number of telemetry data stored. The value starts from 0 by default. This parameter is the default value.

***Telemetering Name**:Set this parameter based on the device telemetry information point

table.

**Data Type**:Including current, voltage, active power, reactive power, power factor, etc., this item is optional.

***Coefficient**:The Coefficient for storing telemetry data is Default to 1. This parameter is mandatory.

***Base Value**:Default to 0, this parameter is entered.

***Null Shift**:Processing zero drift data,Default to 0, this parameter is entered.

***Alarm Upper Limit**:When the telemetry real-time value is greater than this value, the telemetry exceeds the Alarm Upper Limit. This parameter is entered.

***Alarm Lower Limit**:When the real time value of the telemetry is less than this value, the telemetry exceeds the Alarm Lower Limit. This parameter is entered.

***Physical Upper Limit**:When the telemetry real time value is greater than this value, the telemetry Physical Upper Limit will be reported. This parameter is entered.

***Physical Lower Limit**:When the real time value of telemetry is less than this value, the telemetry Physical Lower Limit will be alerted. This parameter is entered.

**Maximum Value**:Maximum Value of telemetry data collected by the monitoring system. This parameter is the default value.

**Minimum Value**:Minimum Value of telemetry data collected by the monitoring system. This parameter is the default value.

***Set**:Whether it is manuall Setting Value, if it is checked, Set is Set, if it is not checked, no set is set. This item is an option.

**Setting Value**:manuallly Set telemetry data value, this is the entry.

**Maximum Occurrence Time**:Time when the Maximum Value of telemetry data collected by the monitoring system occurs. This parameter is the default value.

**Minimum Occurrence Time**:The Minimum Value of the telemetry data collected by the monitoring system occurs. This parameter is the default value.

**Exceed Upper Limit Number**:The default value is the number of times the telemetry value exceeds the upper limit measured by the monitoring system.

**Exceed Lower Limit Number**:The default value is the number of times that the telemetry value exceeds the lower limit measured by the monitoring system.

***Valid**:If the telemetry item is Valid, it is Valid if it is selected and invalid if it is not selected. This item is selected by default.

***Take the opposite number**:Whether to Take the opposite number of telemetry data. If Take the opposite number is selected, and if Take the opposite number is not selected, do not take the opposite number.

***Calculated Amount**:Whether the telemetry is Calculated by a calculation formula, if it is checked, the value Calculated Amount is obtained; if it is not checked, the value Calculated Amount is not obtained. Default is unchecked and this option is an option.

***Overlimit Print**:If the telemetry Overlimit is Print, select Overlimit Print, and unchecked, select no Print. The Default unchecked state is unchecked, and this item is unchecked.

***Event Process**:Event Process is selected. If this parameter is not selected, the event process is not processed. This parameter is selected by default.

***Assign Map**:If the telemetry event is assigned, Assign Map is selected. If it is not selected, Assign Map is not assigned. This parameter is selected by default.

***Storage**:Whether telemetry data is stored in the local Storage. If this parameter is selected, Storage is selected. If this parameter is not selected, Storage is not selected.

### 5.4.4.Telesignaling Parameter

The point table for storing telemetry information is shown in FIG. 3.25 and FIG. 3.26. Generally, create a corresponding number of point tables based on the number of remote signal points on the device. Telesignaling ID starts from 0 by default. Generally, you only need to change the Telesignaling Name and keep other parameters as default values. Fields marked with [*] are required.

If you need remote control function, you need to set [**Data Type**] to 0: switch, tick [**Telecontrol**], and fill in [**Telecontrol ID**].

| Plant Address | Device Address | Telesignaling ID | Telesignaling Name | Data Type | Telesigna... | Set | Set v... | Eff... | Calc... | Event ... | Event ... | Ass... | Ne... | Sav... | Tel... | Telec... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | 0 | Telesignaling Name0 | 2:Digital Input Ev... | 0 | ☐ | 0 | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | 0 |
| 2 | 1 | 1 | Telesignaling Name1 | 2:Digital Input Ev... | 0 | ☐ | 0 | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | 0 |
| 2 | 1 | 2 | Telesignaling Name2 | 2:Digital Input Ev... | 0 | ☐ | 0 | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | 0 |
| 2 | 1 | 3 | Telesignaling Name3 | 2:Digital Input Ev... | 0 | ☐ | 0 | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | ☑ | ☐ | 0 |

Fig. 5.25 telesignaling parameter information

| Plant Address | Device Address | Event ... | Ass... | Ne... | Sav... | Tel... | Telec... | Recall ... | Recall ... | Recall ... | Ope... | Closi... | Accident di... | Normal ... | Accident ... | Ope... | Closi... | Upper limit... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ☐ | ☑ | ☐ | ☑ | ☐ | 0 | ☐ | 0:Accid... | 0 | 0 | 0 | 0 | 0 | 0 | Open | Close | 256 |
| 2 | 1 | ☐ | ☑ | ☐ | ☑ | ☐ | 0 | ☐ | 0:Accid... | 0 | 0 | 0 | 0 | 0 | 0 | Open | Close | 256 |
| 2 | 1 | ☐ | ☑ | ☐ | ☑ | ☐ | 0 | ☐ | 0:Accid... | 0 | 0 | 0 | 0 | 0 | 0 | Open | Close | 256 |
| 2 | 1 | ☐ | ☑ | ☐ | ☑ | ☐ | 0 | ☐ | 0:Accid... | 0 | 0 | 0 | 0 | 0 | 0 | Open | Close | 256 |

Fig. 5.26 telesignaling parameter information

**Plant Address**:This parameter is set in the factory Settings table and cannot be modified. This parameter is the default one.

**Device Address**:This parameter is set in the device Settings table and cannot be modified. It is the default parameter.

***Telesignaling ID**:Remote data storage number. The default value is 0.

***Telesignaling Name**:Enter this parameter based on the device information point table.

***Telesignaling Type**:Including switch, brake, emergency general, lock, over current, over voltage, no voltage, other, this option is optional.

**Telesignaling Subtype**:Set Telesignaling Subtype, Default to 0, non-zero for special devices. This item is the default.

***Set**:Whether it is manuall Setting Value, if it is checked, Set is Set, if it is not checked, no set is set. This item is an option.

**Setting Value**:Remote data value of manuall Set, which is the entry.

***Valid**:If the remote message item is Valid, if it is selected, it is Valid. If it is not selected, it is invalid.

***Calculated Amount**:Whether the remote message is Calculated by the calculation formula, if it is checked, the value Calculated Amount is obtained; if it is not checked, the value Calculated Amount is not obtained. In Default unchecked state, this option is an option.

***Event Process**:Whether a remote message Event is generated during remote message change is selected. If this parameter is selected, the Event Process is selected. If this parameter is not selected, the event is not processed.

***Event Print:**Whether to Print when a remote message event is generated, select Print and unselect no Print. The Default unchecked state is unchecked.

***Assign Map:**Assign Map Specifies whether to Assign Map. If this parameter is selected, Assign Map is selected. If this parameter is not selected, Assign map is not selected.

***Take the opposite number**:Whether to Take the opposite number of remote data, if this parameter is selected, Take the opposite number is selected. If this parameter is not selected, do not Take the opposite number.

***Storage**:If remote data is stored in the local Storage, Storage is selected and no Storage is selected. This parameter is selected by default.

***Telecontrol**:Remote control is allowed. If this parameter is selected, remote control is allowed. If this parameter is not selected, remote control is not allowed.

***Telecontrol ID**:this parameter is entered according to the remote control Point table. Default to 0, this parameter is entered.

**Recall Mark**:Whether to recall, if checked, recall is allowed, if not checked, recall is not allowed. This item is an option.

**Recall Condition**:Select Recall Condition, which is the selection.

**Recall Group Number**:Select the Recall Group Number. This is the option.

**Opening Times**:The number of remote messages collected by the monitoring system. This parameter is the default.

**Closing Times**:This parameter is the default value for the number of remote correspondence counted by the monitoring system.

**Accident Displacement Times**:Number of remote message changes collected by the monitoring system. This parameter is the default value.

**Normal Opening Time**:The default value is the cumulative time of the teleconference normal minutes collected by the monitoring system.

**Accident Opening Time**:This parameter is the default value for the cumulative time of the remote message accident collected by the monitoring system.

***Opening Description**:The text content displayed in the human-machine interface when the remote message is divided into Default to the point, the item is filled in.

***Closing Description**:When the human-machine interface displays the text content, Default to combine, this is the entry.

**Action Times Upper Limit**:When the number of actions (divided times + combined times) is greater than this value, an alarm event will be generated, and this item is the default item.

## 5.4.5.Telecontrol Setting

Add a new remote point to the remote parameter table,as shown in the figure3.27.

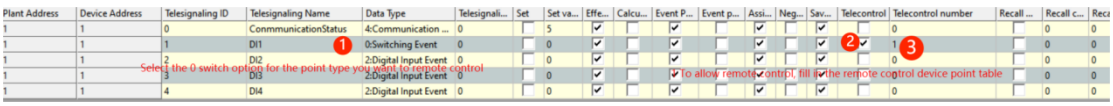



Fig. 5.27 Telecontrol Setting

Telecontrol operation Settings:

(1) Select the point to be remote controlled and set its remote signal Type to 0 switch option.

(2) Check the remote control bar at the back.

(3) Set the remote control number to 1.

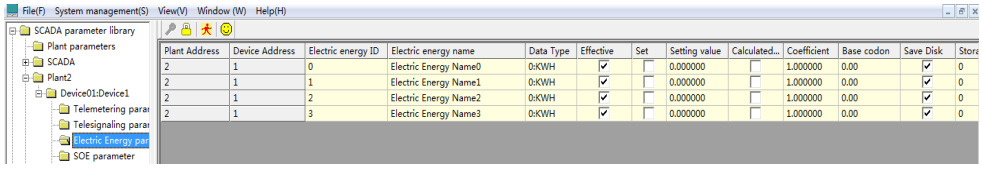
(4) During drawing, the remote control is associated with the corresponding remote point through the remote index. For the operation of the remote association, please refer to the

description of adding a remote signal in 4.5.2 in Chapter 4 or the description of the remote image element attributes in 4.4.2.

(5) Remote control is carried out on the man-machine interface through remote control operation on the main wiring diagram. For man-machine interface operation, please refer to the remote control operation description under 6.4.2 in Chapter 6.

### 5.4.6.Electric Energy Parameter

The point table for storing power information is shown in Fig. 5.28. Generally, create a point table based on the number of power points of the device. The power point number starts from 0 by default. Generally, you only need to change the Electric Energy Name and keep the default values of other parameters. Fields marked with [*] are required.




| Storage mode | Full codon |
|---|---|
| 0 | 0.00 |
| 0 | 0.00 |
| 0 | 0.00 |
| 0 | 0.00 |

Fig. 5.28 Electric Energy Parameter

**Plant Address**:This parameter is set in the factory Settings table and cannot be modified. This parameter is the default one.

**Device Address**:This parameter is set in the device Settings table and cannot be modified. It is the default parameter.

***Electric Energy ID**:The value starts from 0 by default. This parameter is mandatory.

***Electric Energy Name**:Set this parameter based on the power point table of the device.

**Electric Energy Type**:Indicates that the point is active power, reactive power, apparent active power, apparent reactive power. This option is an option.

***Valid**:If the power is Valid, if it is selected, it is Valid. If it is not selected, it is invalid. This parameter is selected by default.

***Set**:Indicates whether it is Setting Value. If it is selected, Set is Set. If it is not selected, set is not set.

**Setting Value**:Represents the value size of the manuall Set. This is the entry.

***Calculated Amount**:Whether the electrical metric is calculated by a calculation formula. If it is checked, the value of the calculated amount is taken; if it is unchecked, the value of the calculated amount is not taken.

***Coefficient**:The Coefficient of the electrical measurement is Default to 1. This parameter is entered.

***Base Code**:Default to 0, this parameter is entered.

***Storage:**Whether the battery data is stored in the local Storage, if Storage is selected, and if no Storage is selected, this parameter is selected by default.

***Storage Mode:**Default to 0, this parameter is entered.

***Full Codes:**Default to 0, this parameter is entered.

## 5.4.7.SOE Event Parameter

A table of points to store event information, as shown in Fig. 5.29. Generally, a corresponding Number of Point tables is created based on the number of device event points. The event sequence number must correspond to the event Point Number in the device point table. Generally, you only need to modify the event Name and keep the default values of other parameters. Fields marked with [*] are required.

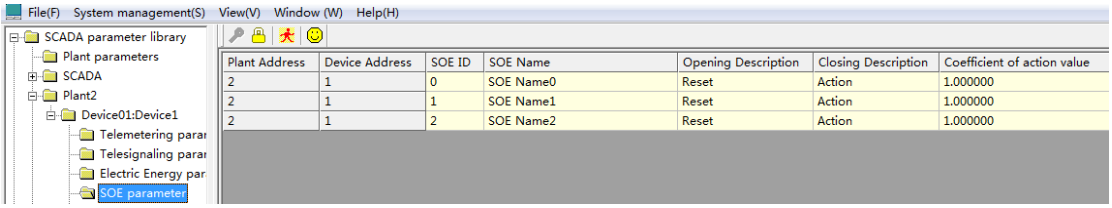



Fig. 5.29 SOE Event parameter

**Plant Address**:Set in the plant Settings table, this item is the default.

**Device Address**:Set this parameter in the device Settings table.

***SOE ID**:Event data store ID. The value must correspond to the event Point Number in the device point table.

***SOE Name**:Set this parameter based on the device event point table.

***Opening Description**:Indicates the text content reported by the HMI when the event returns. Default to return. This parameter is entered.

***Closing Description:**Indicates the text content reported by the HMI during the event action. The Default to action is entered.

**Action Coefficient**:Coefficient of the event action value, Default to 1. This parameter is entered.

## 5.4.8.Setting Value Parameter

The point table for Setting Value information is shown in Fig. 5.30. Generally, a Point table with the corresponding Number of device Setting Value points is created based on the number of device Setting Value points. The Setting Value sequence number needs to correspond to the Setting Value point number in the device point table one by one. Usually, only the setting value Name needs to be modified. Keep the default values for other parameters. Fields marked with [*] are required.

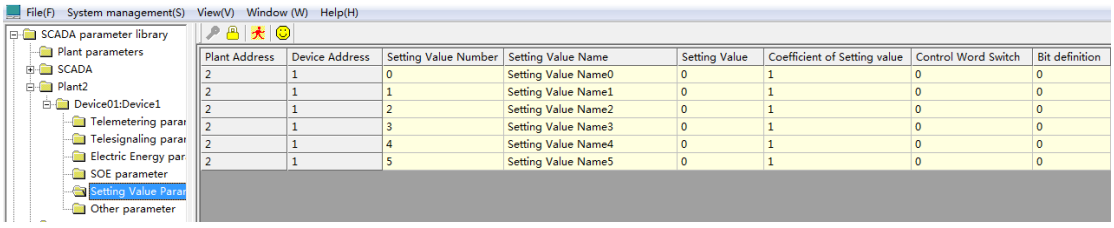



Fig. 5.30 Setting Value parameter

**Plant Address**:This parameter is set in the factory Settings table and cannot be modified. This parameter is the default one.

**Device Address**:This parameter is set in the device Settings table and cannot be modified. It is the default parameter.

***Setting Value ID**:The value Number must correspond to the value Point Number in the device point table. This parameter is entered.

***Setting Value Name**:Set this parameter to the actual device Name.

**Setting Value** :0.The set value is based on the actual value called up. The set value is not saved in the database. This item is the default.

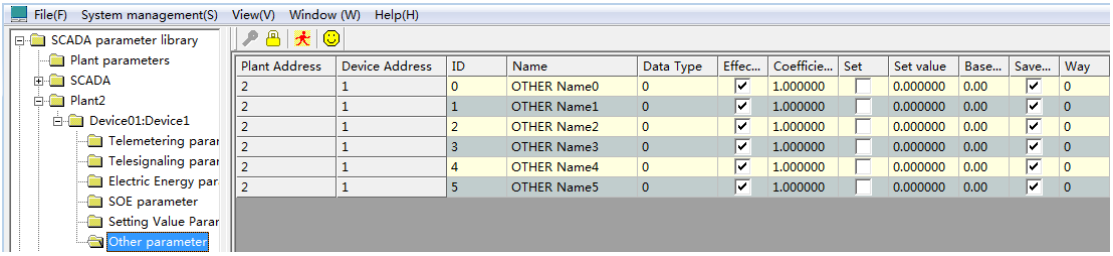
***Setting Value Coefficient**:Coefficient of a fixed value. This parameter is entered.

**Control Word Switch**:Default to 0, this parameter is entered.

**Bit Definition**:Default to 0, this parameter is entered.

## 5.4.9.Other Parameter

Other parameters are displayed as shown in the figure3.31 page. This table is not used and does not need to be configured. Fields marked with [*] are required.




| Plant Address | Device Address | ID | Name | Data Type | Effec... | Coefficie... | Set | Set value | Base... | Save... | Way |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | 0 | OTHER Name0 | 0 | ☑ | 1.000000 | ☐ | 0.000000 | 0.00 | ☑ | 0 |
| 2 | 1 | 1 | OTHER Name1 | 0 | ☑ | 1.000000 | ☐ | 0.000000 | 0.00 | ☑ | 0 |
| 2 | 1 | 2 | OTHER Name2 | 0 | ☑ | 1.000000 | ☐ | 0.000000 | 0.00 | ☑ | 0 |
| 2 | 1 | 3 | OTHER Name3 | 0 | ☑ | 1.000000 | ☐ | 0.000000 | 0.00 | ☑ | 0 |
| 2 | 1 | 4 | OTHER Name4 | 0 | ☑ | 1.000000 | ☐ | 0.000000 | 0.00 | ☑ | 0 |
| 2 | 1 | 5 | OTHER Name5 | 0 | ☑ | 1.000000 | ☐ | 0.000000 | 0.00 | ☑ | 0 |

Fig. 5.31 Other parameter

**Plant Address**:This parameter is set in the factory Settings table and cannot be modified. This parameter is the default one.

**Device Address**:This parameter is set in the device Settings table and cannot be modified. It is the default parameter.

***ID**:Other quantity numbers, starting from 0 by default, are entered.

***Name**:Set this parameter to the actual device Name.

**Data Type**:Default to 0, this parameter is entered.

***Valid**:If the value is Valid, if it is selected, it is Valid. If it is not selected, it is invalid. The value is selected by default.

***Coefficient**:Default to 1, this parameter is entered.

***Set**:Indicates whether it is Setting Value. If it is selected, Set is Set. If it is not selected, set is not set.

**Setting Value**:Represents the value of the manual Set, Default to 0, this is the entry.

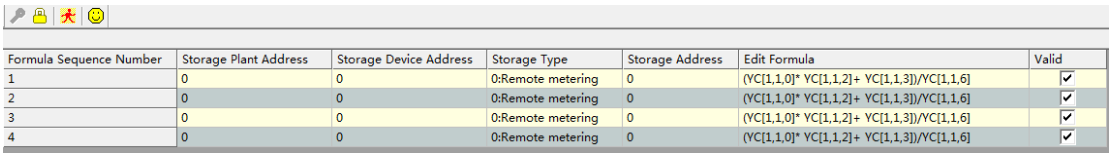
**Base Value**:Default to 0, this parameter is entered.

***Storage:**If the data is saved, Storage is selected and no Storage is selected. This parameter is selected by default.

**Mode:**Default to 0, this parameter is entered.

## 5.4.10.Calculation Formula

A point table storing Calculated Amount information. Sometimes Telemetering Data and Telesignaling Data need to be converted, which needs to be completed by using calculation formulas.as shown in the figure3.32.



| Formula Sequence Number | Storage Plant Address | Storage Device Address | Storage Type | Storage Address | Edit Formula | Valid |
|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 0:Remote metering | 0 | (YC[1,1,0]* YC[1,1,2]+ YC[1,1,3])/YC[1,1,6] | ☑ |
| 2 | 0 | 0 | 0:Remote metering | 0 | (YC[1,1,0]* YC[1,1,2]+ YC[1,1,3])/YC[1,1,6] | ☑ |
| 3 | 0 | 0 | 0:Remote metering | 0 | (YC[1,1,0]* YC[1,1,2]+ YC[1,1,3])/YC[1,1,6] | ☑ |
| 4 | 0 | 0 | 0:Remote metering | 0 | (YC[1,1,0]* YC[1,1,2]+ YC[1,1,3])/YC[1,1,6] | ☑ |

Fig. 5.32 Calculation Formula

***Store Plant Address**:Set in the Plant station setting table, this item is filled in according to the actual Plant Address.

***Store Device Address**:Set this parameter in the Device configuration table. Set this parameter based on the actual Device Address.

***Store Type:**This is an option, with four types to choose from, 0 for telemetry, 1 for telemetry, 2 for electricity, 3 for other quantities.

***Storage Address:**Set this parameter to the Type of the data collected by the device.

***Edit Formula:**Edit the calculation formula according to the requirements; The operators supported by the formula are >= (greater than or equal to), <= (less than or equal to), == (equal to),! = (not equal to), && (and), || (or), + (add), - (subtract), * (multiply), / (divide), % (remainder), ^ (bit and), () (parentheses, representing operation priority),? (ternary operator), ~ (invert), & (and), | (or),! (not), sqrt (square root, case insensitive, the same below), sin (trigonometric function), cos (trigonometric function).

***Valid**:If the value is Valid, if it is selected, it is Valid. If it is not selected, it is invalid. The value is selected by default.

For example, if the formula YC[1,2,0]>30 indicates that Plant Address1 device address 2 Telemetry number 0 is greater than 30, Plant Address1 device address 2 telemetry number 1 is set to 1, and vice versa.

## 5.4.11.User Management

Used to add, delete, and manage user rights, as shown in Fig. 5.34.

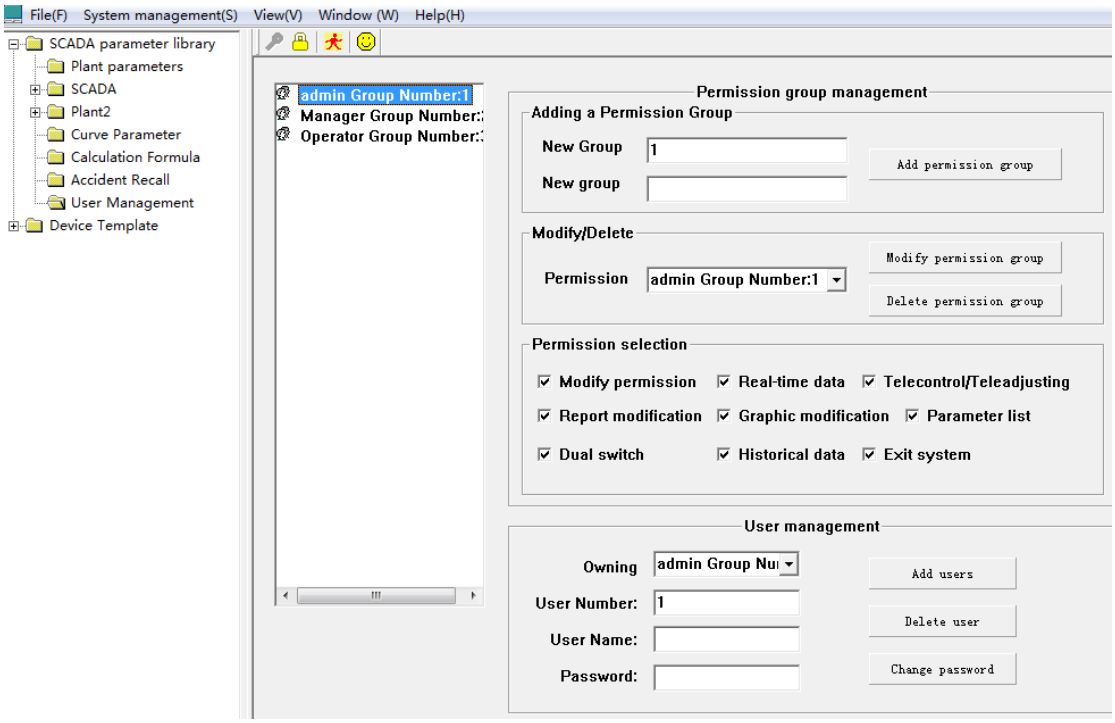



Fig. 5.34 User management interface

Click the yellow key icon in Fig. 5.35 to log in. After logging in, you can add, modify and delete operations.

Fig. 5.35 Toolbar

### 5.4.12.1 Changing User Password

After login, double-click the **Administrator Group Number** to display the account under the group, as shown in Fig. 5.36, there are two accounts.

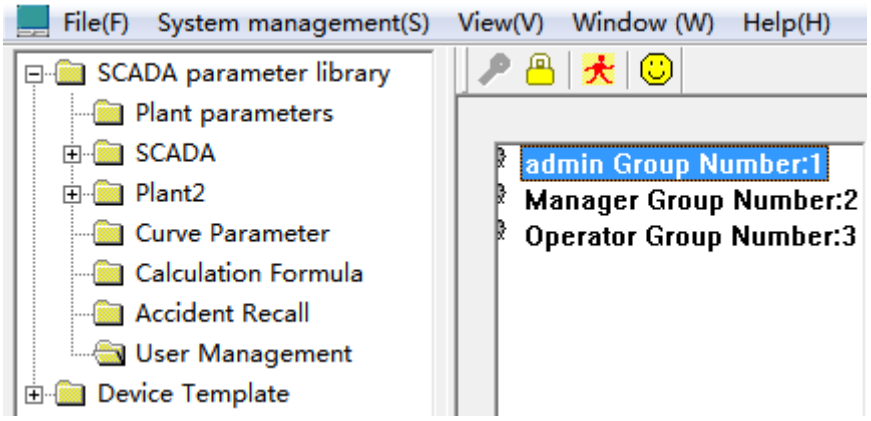



Fig. 5.36 User management

Click **1 Account: 1**, enter the new password in the password field, click to **change the password**, click yes to complete the password change.

Note: The password can only be digits, not other symbols or letters. The user name cannot be changed here, which will cause the password modification operation to fail. As shown in Fig. 5.37, the pop-up page for confirming the change of user password is shown in Fig. 5.38. When changing another user's password, the page shown in Fig. 5.39 will pop up.

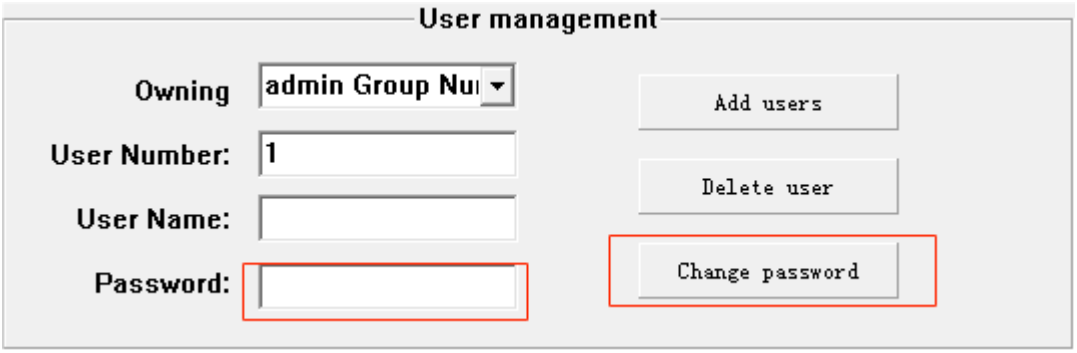



Fig. 5.37 Changing a User Password

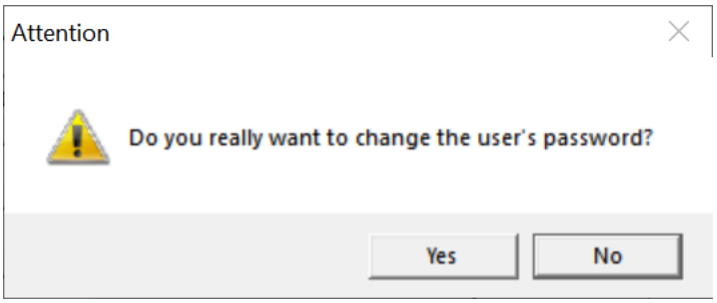



Fig. 5.38 Confirm to change the user password

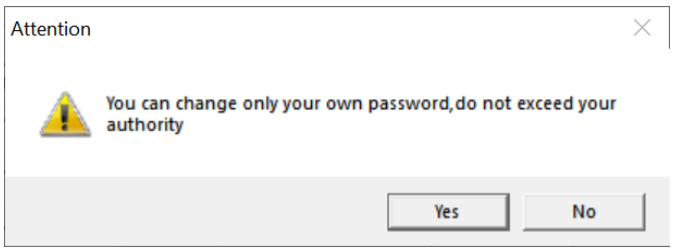



Fig. 5.39 Refusing to change the user password

### 5.4.12.2 Add a User

Enter the new user number (must not be the same as the existing user number), enter the user name (must not be the same as the existing user name), password, click the following figure to add a user.as shown in the figure3.40.

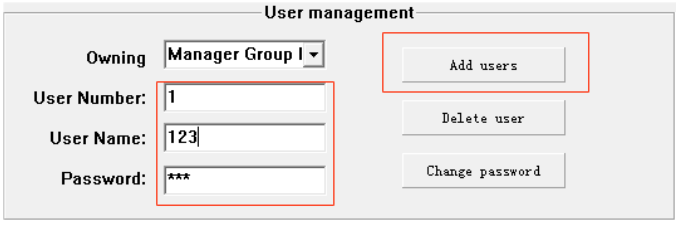



Fig. 5.40 Add users

Click Add User to finish adding a user. You can double-click administrator Group Number to view the newly added user.

### 5.4.12.3 Modifying a User Name

The user name cannot be changed directly. You can delete the user first and enter a new user name when adding the user.

### 5.4.12.4 Delete a User

Select a user, click the Delete User button, and click OK to complete the operation. Fig. 5.41.

Note: You cannot delete the first user when deleting a user. The system requires one user by default.

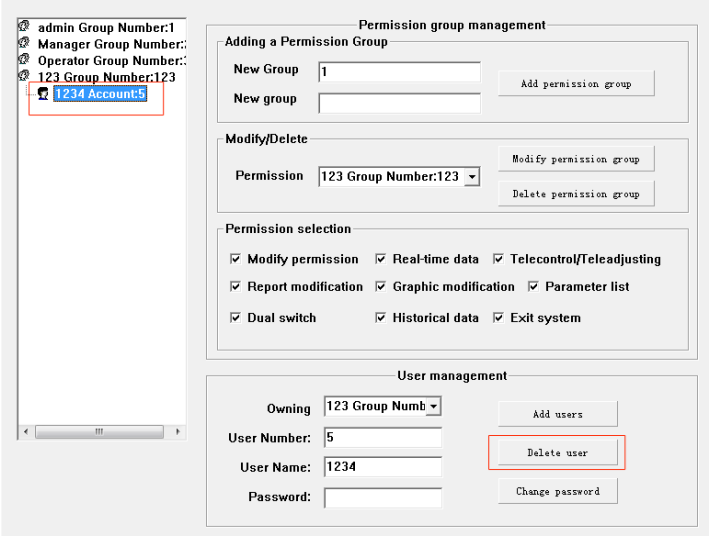



Fig. 5.41 Delete user function

### 5.4.13.Device Model Library

You can use the device template to quickly add **telemetry parameters, remote communication parameters, SOE parameters, power parameters, and Setting Value parameters**. For example, if a new AM5-T device is added to plant station 1, you can right-click the device menu as shown in the figure3.42 and Fig. 5.43.

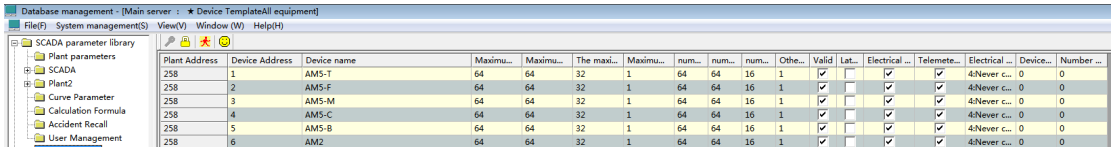



Fig. 5.42 Device model library

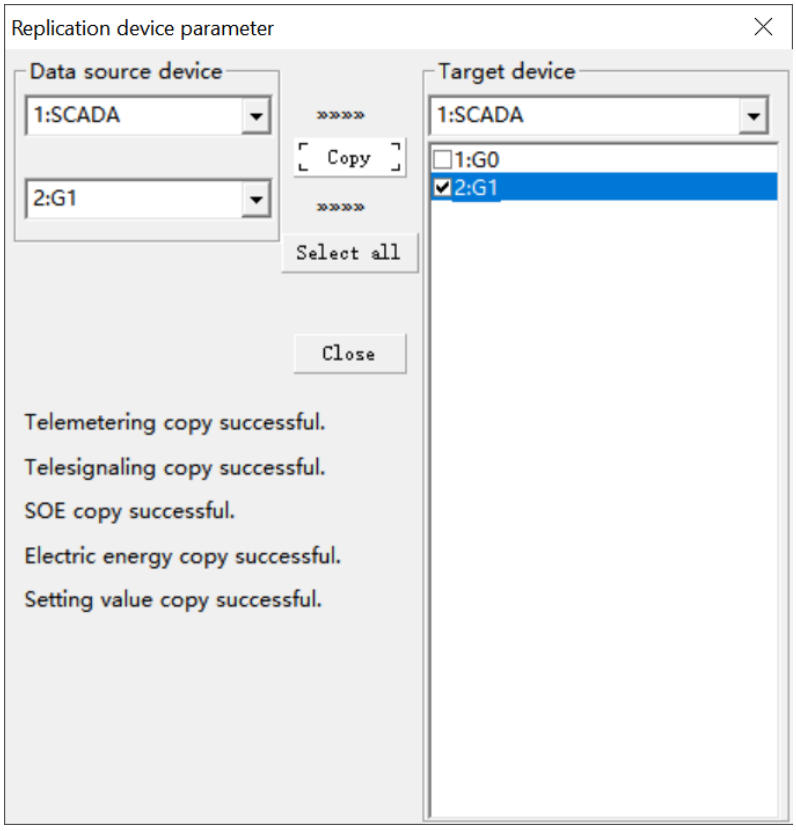



Fig. 5.43 Replication device parameter

Click the Copy button to complete the operation.

## 5.5 Database Making

The actual project database production steps are as follows:

(1) Establish a Device template in the Device model library according to the usage of the project device.

(2) Fill in the plant station information and equipment parameters according to the project requirements.

(3) Import device parameters from the device template.

(4) Change the actual equipment parameters according to the project point table.

# Chapter 6 Graphic Configuration(ADraw)

## 6.1 Overview

ADraw is Acrel-2000 power monitoring system one of the several components of software,as a part of the Acrel-2000 power monitoring system software, its main function is to complete the drawing of various remote measurements, remote signaling, reports, curves, bar charts, and other graphics. It is mainly divided into several parts, such as menu bar, tool bar, main display window, and status bar. Below is a specific introduction to its use.

## 6.2 Function Introduction

The graphical configuration module has a friendly interface, simple and fast operation, and is easy to use. It mainly has the following functions:

1)Draw the main wiring diagram and its required elements such as telemetry, remote signaling, electrical degree, reports, transformers, tap heads, etc.

2)Draw a network topology diagram.

3)Create curve templates.

4)Create reports.

## 6.3 Interface Description

ADraw can draw the wiring Figure, topology Figure and curve Figure that the user wants. the results are as shown in the figure4.1.


Fig. 6.1 ADraw Module interface

### 6.3.1.Menu Introduction

As shown in figure4.2, the drawing menu includes **File, View, Window, and Help**.

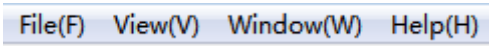



Fig. 6.2 Drawing menu

#### 6.3.1.1 File(F)

The functions of the **file menu** are mainly used for **new, open, Close, save, save as, Print, Print preview, Print Settings**, four recently viewed graphs, exit operations, etc. When you **exit**, you will be prompted whether to save the current file.

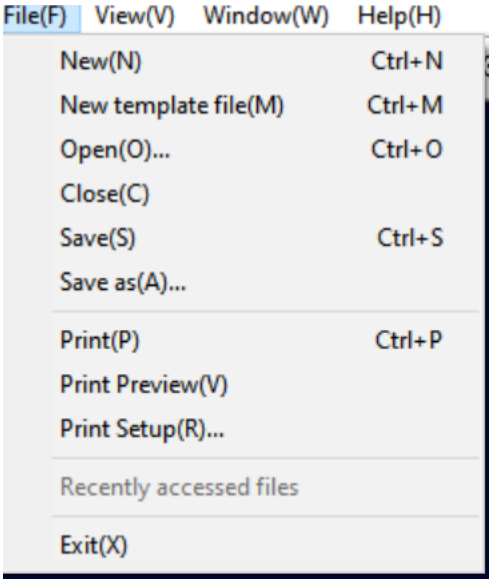



Fig. 6.3 file menu

1) After selecting the **file**, click the left mouse button, that is, the drop-down menu as shown in the figure4.3 will appear.

2) If the user wants to create a new file, click **new** with the left mouse button, the system can open a blank file, the user can draw their own graphics in this blank area. Click **Storage.** The file is saved. You can also click **Save As**, then the file is saved before the system prompts what name, the user only needs to type the predetermined file name.

3) If the user wants to use the existing file as a template, click **the new template file** with the left mouse button, the system can open the existing file, and the user can modify and draw their own graphics on this file. Click **Storage.** The file is saved. You can also click **Save As**. The system prompts you for the name of the file before it is saved. You only need to enter the desired file name, and the original file will not be replaced.

4) When the user wants to open an existing file, just click **Open**, the system will prompt the name of the existing file, as shown in the figure4.4. After you open the file, click **Save.**

5) **Close** Closes the current window file.

6) **Print, Print preview, Print Settings** are the functional Settings of the Print machine.

7) Click on any of the four recently opened files to bring up its corresponding surface.

8) File editing is completed, click **exit** with the mouse, the system will exit ADraw.

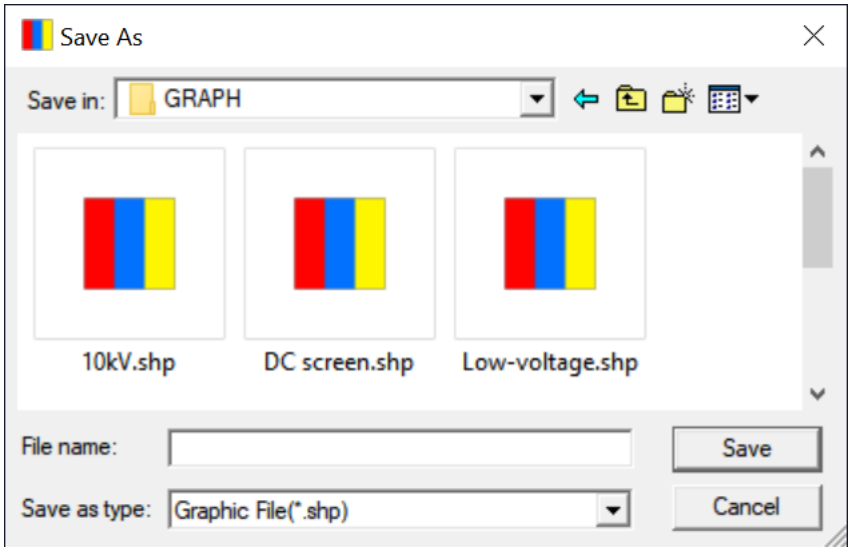



Fig. 6.4 Save the wiring diagram as

**6.3.1.2 View(V)**

As shown in figure4.5, views are mainly used to provide tools for drawing.

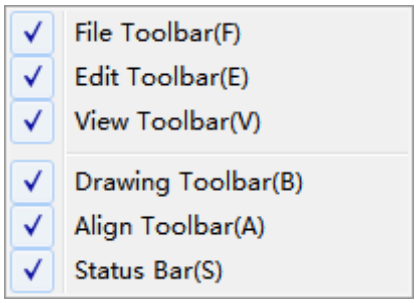



Fig. 6.5 View Menu

**File Toolbar, Edit Toolbar, View Toolbar, Drawing Toolbar, Alignment Toolbar, Status bar:** current ✔ surface, corresponding toolbar is displayed in the window.

**6.3.1.3 Window(W)**

The left side of the window menu is the current operation page, the window menu as shown in the figure4.6.

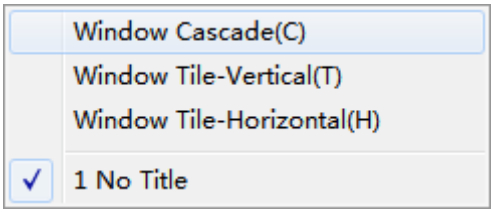



Fig. 6.6 window menu

1)**Cascade:**as shown in the figure4.7,Displays the currently open Windows in a cascading Mode.

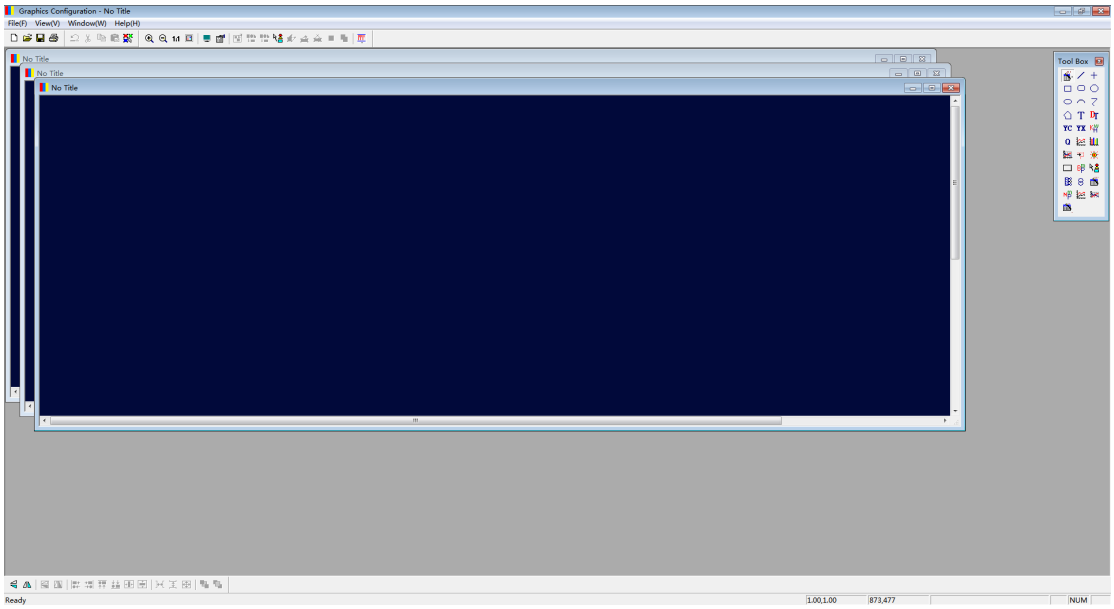


Fig. 6.7 Cascade

2)**Vertical tiling:**as shown in the figure4.8,Displays the currently open window in portrait tile Mode.

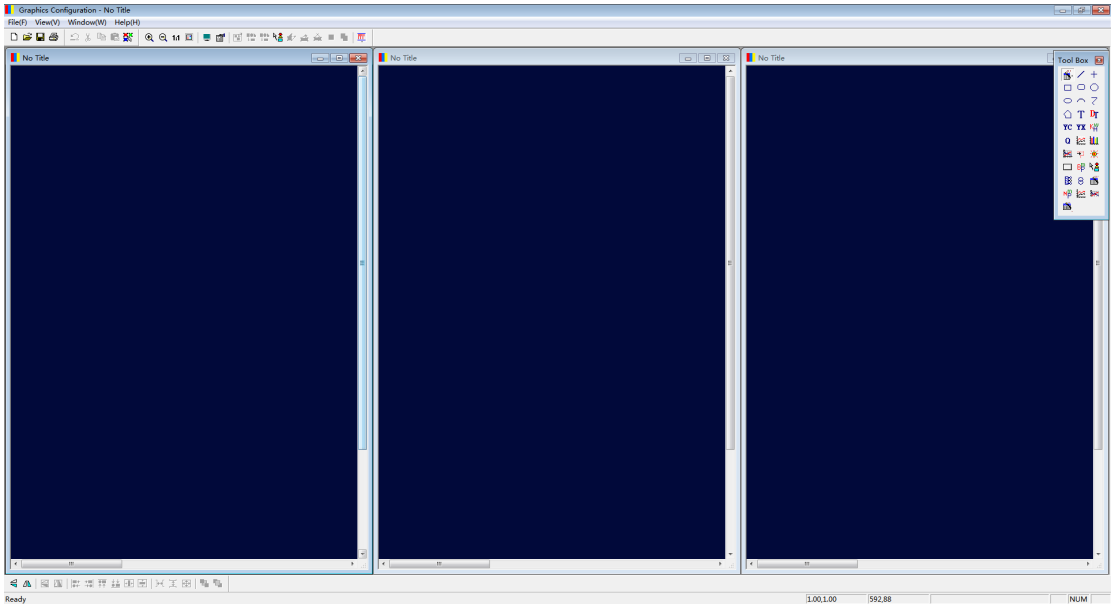


Fig. 6.8 Tile the window lengthwise

3)**Horizontal tiling:**as shown in figure4.9, the currently open window is displayed in horizontal tile Mode.

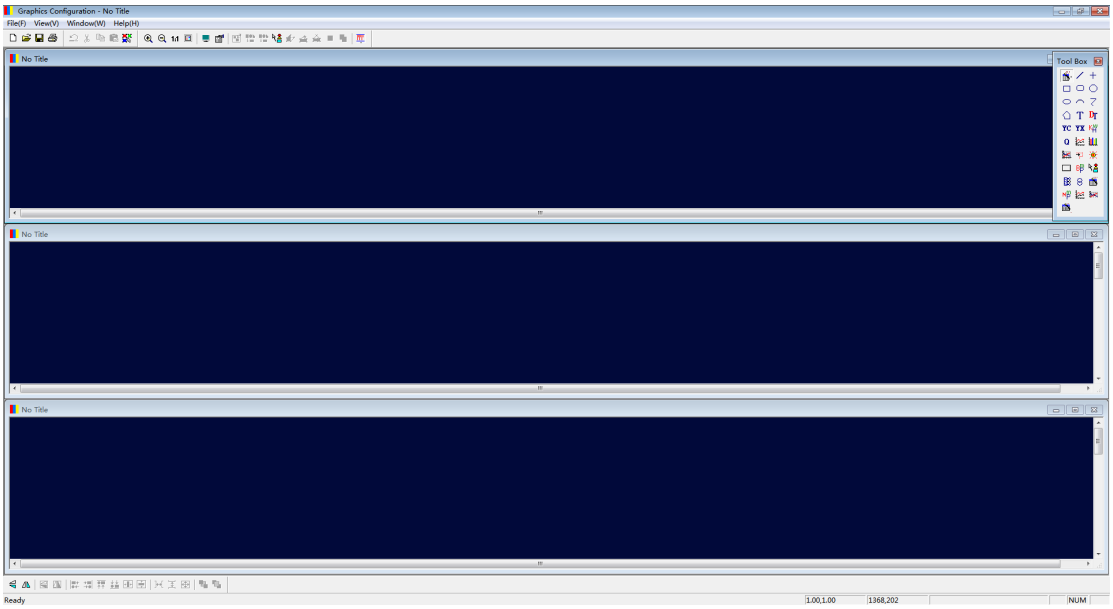


Fig. 6.9 Horizontal tiling

## 6.3.2.Tool Bar

Below is a detailed introduction to each toolbar.

### 6.3.2.1 File Toolbar

As shown in the Fig. 6.10

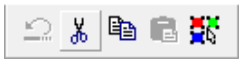
Picture 4.10 File Toolbar

Function Description:

**The file toolbar** is used for creating, opening, saving, and printing files (as shown in Fig. 6.10).

### 6.3.2.2 Edit Toolbar

As shown in the Fig. 6.11



Picture 4.11 Edit Toolbar

Function Description:

**The editing toolbar** is used for processing primitive operations (as shown in Fig. 6.11).

Operation method:

1)When an action is completed and feels inappropriate, you can use (undo) to restore it. When using this command, an operation must be performed once before (undo) can be activated. You can only undo the most recent operation.

2)When users need to reuse a certain element or transfer it to another location, selecting this element activates the (cut) and (copy) commands,when or with a mouse click, the (paste) command is activated, and then click on the appropriate location to .

3) It means selecting all objects in the window.

#### 6.3.2.3 View Toolbar

As shown in the Fig. 6.12

Picture 4.12 View Toolbar

Function Description:

The main functions of the **view toolbar** include zooming in and out of graphics, attributes of graphics and elements, and modification of graphics and elements, as shown in Fig. 6.12.

Operation method:

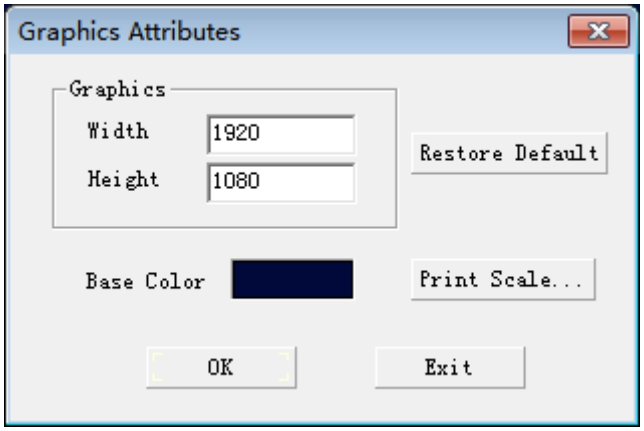
1)  **:**Enlarge the graphics displayed in the window.

2)  **:**Zooms out the graphics displayed in the window.

3)  **:**Change the displayed graphics to the default 1:1 size.

4)  **:**Adjust the displayed graphics to the size of the window, and you can see all the graphics in the window.

5)  :Set the width, height, background color, Print scale, and other properties of the graph(as shown in the figure4.13).




Picture 4.13 Graphics Attributes

6)  :View or modify the specific properties of the selected primitives.

7)  :Combine to create a new symbol or decompose an already combined symbol.

8)  :Adds the new symbol generated by the combination to the symbol library.

9)  :Select the primitives of the token library.

10)  :Adjust the selected polyline.

11)  :Add an inflection point.

12) :Remove an inflection point.

13) :And check the size of the primitives (check).

14) :And the size of selected primitives (execute).

#### 6.3.2.4 Drawing Bar

As shown in the Fig. 6.14


Picture 4.14 Drawing bar

Function description

Draw power wiring diagram and required diagrams, etc(As shown in the Fig. 6.14).

Operation method:

1) :Selective state.

2) :Draw straight lines. When using, press the left mouse button and drag the mouse to draw a straight line. The following primitives are drawn in the same way.

3) :Draw horizontal and vertical lines.

4) :Draw a rectangle.

5) :Draw a rectangle with rounded corners.

6) :Draw a circle.

7) :Draw the ellipse.

8) :Draw an arc.

9)  :Draw a polyline.

10)  :Draw polygons.

11)  :Used to set static text, do some explanatory text editing.

12)  :Used to set dynamic text. The text can be associated with the actual plant, device, data type, etc. This text is automatically updated when the name of the plant, device, or data type changes.

13)  :Used to draw graphs. The past curve, current curve, and forecast curve can be displayed at the same time, and if you do not want to display a curve, you can change its visibility in its properties. The graph property can also set the upper and lower limits, the maximum and the minimum values, and will be immediately checked when the limit is exceeded. In addition, the graph can contain several groups of curves, which can be set by the number of curves to show which groups can be set by the curve index. The curve index can be set in the database management software.

14)  :Used to draw rod diagrams. Rod diagram is a way to describe the real-time quantity in rod shape. Users can make the remote measurement in the form of rod diagram to enhance visual sense. There are three bar chart types, rectangular, stereorectangular and cylindrical, which can be selected according to your needs.

15)  :Used to generate remote measurements. Its index can be defined in its element attributes, that is, station number, device number, telemetry type and display format.

16)  :Used to generate teleconferences. You can set its attribute and remote signal index in its element attribute. The display types include switch, knife brake, hand car, custom icon, etc. In the index attribute of remote message extension, set the plant station number, device number, remote message and so on.

17)  :Used to generate electrical measurements. Usage and remote measurement.

18)  :Used to draw tide lines. The current, power and other directional quantities can be dynamically expressed, so that people can see at a glance. It can set the associated plant station number, device number, measurement serial number, etc.

19)  :Used to map hot spots. Enter the file name to call in the index of its properties dialog. In the human-machine interface, just click the hot spot, you can call up the corresponding graph.

20)  :Used to draw buttons. There are similarities with hot spots.

21)  :This command can be used to invoke the bitmap. In the properties dialog box, type

the name of the bitmap to be adjusted, and the bitmap can be displayed under the current interface. Bitmaps must be placed in the D:\ACREL2000\GRAPH\ folder.

22) :Symbol library, select the use of tokens in the symbol library.

23) :Draw the gear position of the transformer.

24) :Used to draw transformers.

25) :Used to automatically generate reports.

26) :This command can be used to call png images. In its properties dialog box, type the name of the image you want to adjust to display the bitmap in the current interface. The bitmap must be placed in the D: ACREL2000 GRAPH folder.

27) :Used to draw electrical energy curves.

**6.3.2.5 Tool(T)**

Picture 4.15 Tool Bar

Align, resize, and distance multiple elements. Used to quickly arrange the objects selected by the user. As shown in Fig. 6.15.

Operation method:

1) :Flip the entire shape vertically.

2) :Flip the entire shape horizontally.

3) :Flip the selected element vertically.

4) :Flip the selected element horizontally.

5) :Align the selected elements horizontally to the left.

6) :Align the selected elements horizontally to the right.

7) :Align the selected elements vertically upwards.

8) :Align the selected elements vertically downwards.

9) :Align the selected element horizontally with the center of the element.

10) :Align the selected element vertically with the center of the element.

11) :Make the selected set of pixels horizontally equidistant.

12) :Make the selected set of pixels vertically equidistant.

13) :Make the selected set of elements the same size.

14) :Place the selected element behind other elements in the same position.

15) :Place the selected element in front of other elements in the same position.

## 6.4 Element Attribute

There is only one common attribute of linear primitives (line, rectangle, circle), and the common attribute of all primitives is as shown in the figure4.16.

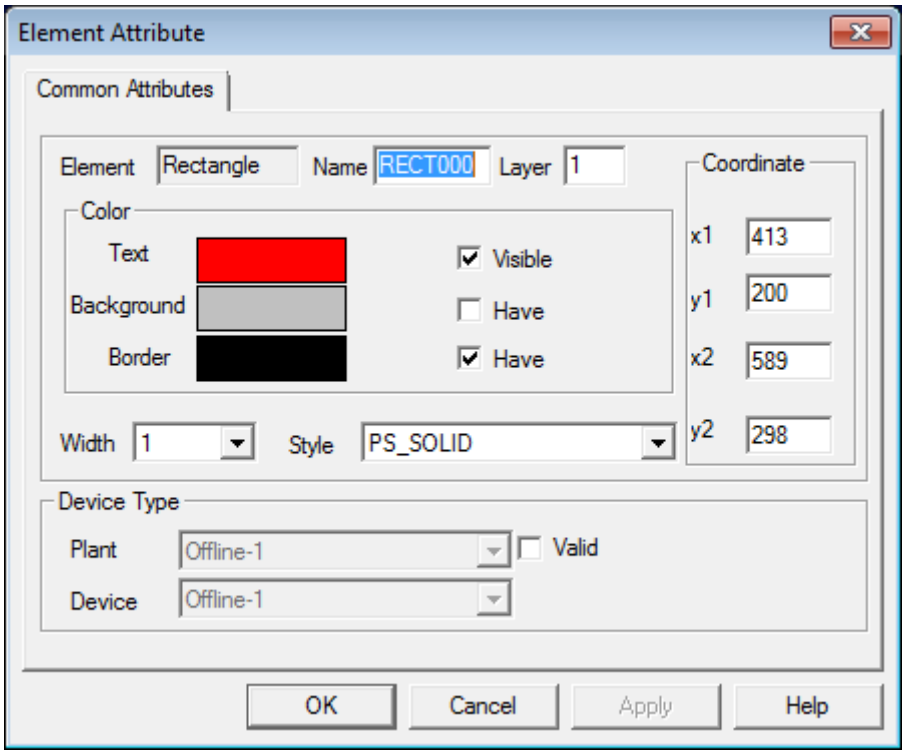



Fig. 6.16 Element Attribute

**Element Type**:Displayed based on the selected element, this item is the default.

**Name**:Name the selected element, which is a fill in item.

**Layer**:Multiple entities can be placed in the same location, with an additional layer added by 1. This is the default and can be modified.

**Text**:On the right side, you can choose a color, which is a selection item.

**Background**:On the right side, you can choose a color, and whether there is a background is optional.

**Border**:On the right side, you can choose a color, and whether there are boundaries is optional (only text, background, and boundaries are displayed when visibility is selected).

**Width**:You can set the width of the element yourself, which can be selected from the drop-down box. This is a selection option.

**Style**:Select the corresponding line style, which is a selection item.

**x1**:Starting point abscissa.

**y1**:Starting point ordinate.

**x2**:End point abscissa.

**y2**:End point ordinate.

**Plant Name**:Add a factory source to the database factory parameters, which can be selected independently through the drop-down box. This item is a selection item.

**Device Name**:Adding a device source to the database device parameters can be selected independently through the drop-down box, which is a selection option.

**Valid**:Used for batch modification across factories and stations, invalid by default.

### 6.4.1.File Primitive Attributes

**Text defined** attribute as shown in the figure4.17.

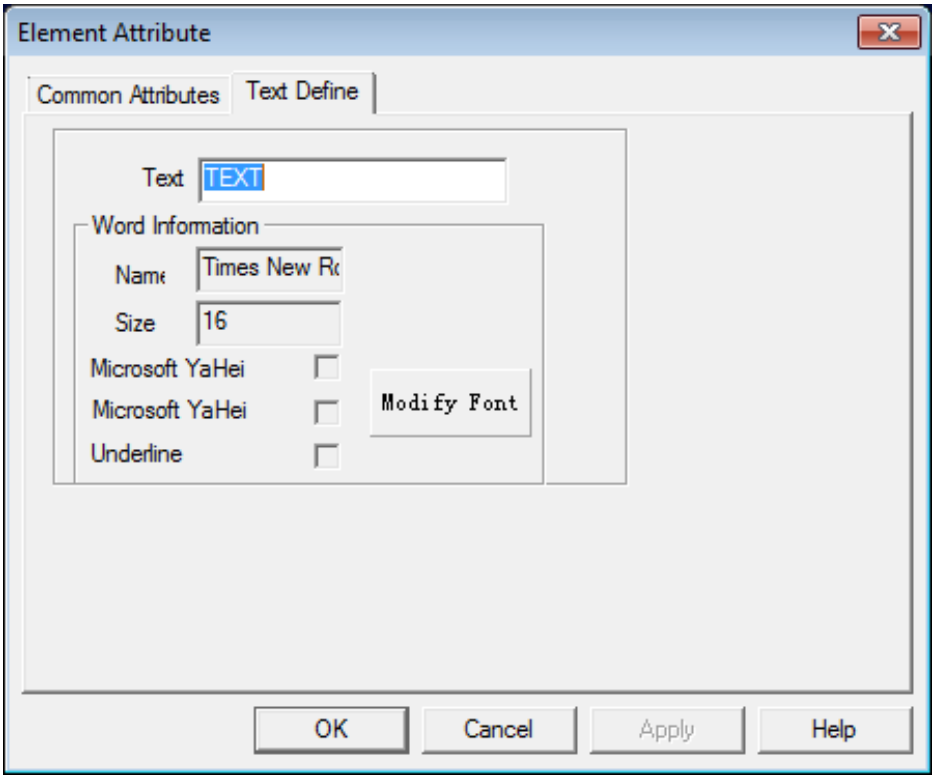



Fig. 6.17 File primitive attributes

**Text Content**:Edit the text as needed, this item is for filling.

**Name**:You can modify it in the font modification section at the bottom right, which is the default item.

**Size**:You can modify it in the font modification section at the bottom right, which is the default item.

**Bold**:You can modify it in the font modification section at the bottom right, which is the default item.

**Italic**:You can modify it in the font modification section at the bottom right, which is the default item.

**Underline**:You can modify it in the font modification section at the bottom right, which is the default item.

### 6.4.2.Dynamic Text Primitives Property

**Dynamic text properties** are shown as shown in the figure4.18:

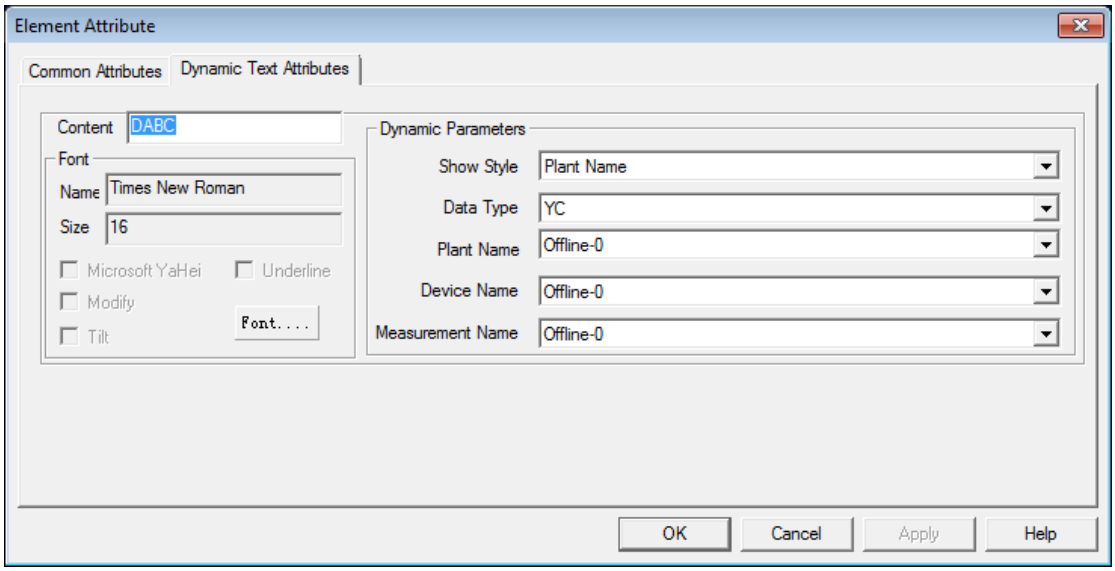



Fig. 6.18 Dynamic text primitives property

**Content**:Displayed based on the dynamic parameter settings on the right, this item is the default.

**Name**:You can modify it in the font modification section at the bottom right, which is the default item.

**Size**:You can modify it in the font modification section at the bottom right, which is the default item.

**Boldface**:You can modify it in the font modification section at the bottom right, which is the default item.

**Incline**:You can modify it in the font modification section at the bottom right, which is the default item.

**Underline**:You can modify it in the font modification section at the bottom right, which is the default item.

**Correct**:You can modify it in the font modification section at the bottom right, which is the default item.

**Display Method**:It can be selected through the drop-down box, which is a selection item.

**Data Type**:It can be selected through the drop-down box, which is a selection item.

**Plant Name**:You can select it from the drop-down box. This item is an option.

**Device Name**:It can be selected through the drop-down box, which is a selection item.

**Measurement Name**:It can be selected through the drop-down box, which is a selection item.

### 6.4.3.Telemetry Element Attribute

The text definition is the same as the text primitive attribute, the **telemetry attribute** as shown in the figure4.19.

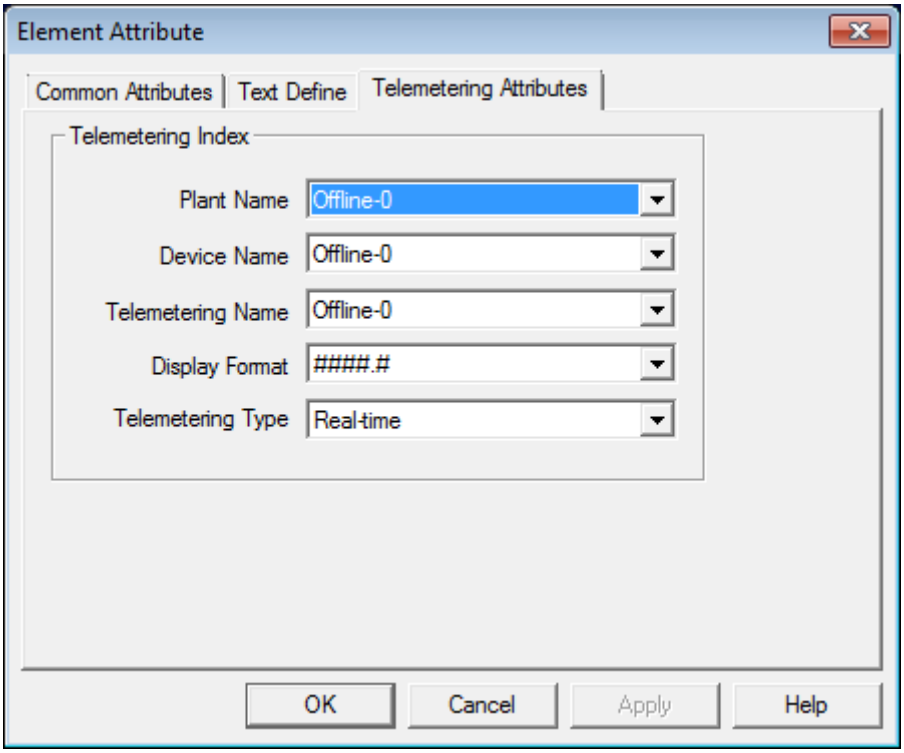



Fig. 6.19 Telemetry element attribute

**Plant Name**:You can independently select the telemetry station you want to associate with, which can be selected through the drop-down box. This option is a selection option.

**Device Name**:You can independently select the telemetry device you want to associate with, which can be selected through the drop-down box. This option is a selection option.

**Telemetering Name**:You can independently select the telemetry point you want to associate, which can be selected through the drop-down box. This option is a selection option.

**Display Format**:The number of digits after the Decimal separator can be selected independently through the drop-down box. This is an option.

**Telemetering Type**:The telemetry type includes real-time value and input value, which can be selected through the drop-down box. This item is a selection item.

### 6.4.4.Telesignaling Element Attribute

**Telesignaling attribute** as shown in the figure4.20.

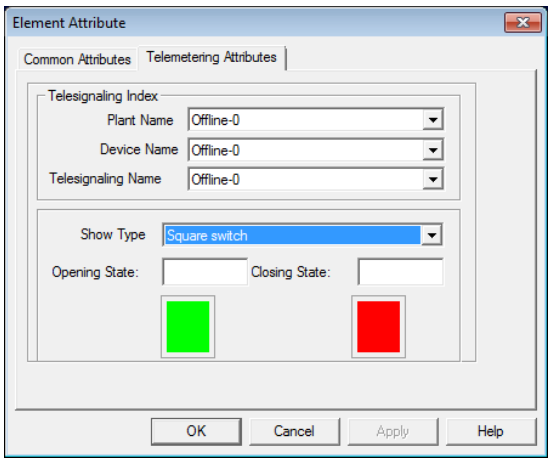



Fig. 6.20 Telesignaling element attribute

**Plant Name**:You can independently select the remote signaling factory station you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Device Name**:You can independently select the remote signaling device you want to associate with, which can be selected through the drop-down box. This option is a selection option.

**Telesignaling Name**:You can independently select the remote communication point you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Display Type**:The display type includes switch, knife switch, handcart, or self-defined shape, which can be selected through the drop-down box. This item is a selection item.

**Open State**:Green represents the open state.

**Closed State**:Red represents the closed state.

### 6.4.5.Electric Energy Element Attribute

The text definition is the same as the text primitive attribute,**Electric Energy attribute** as shown in the figure4.21.

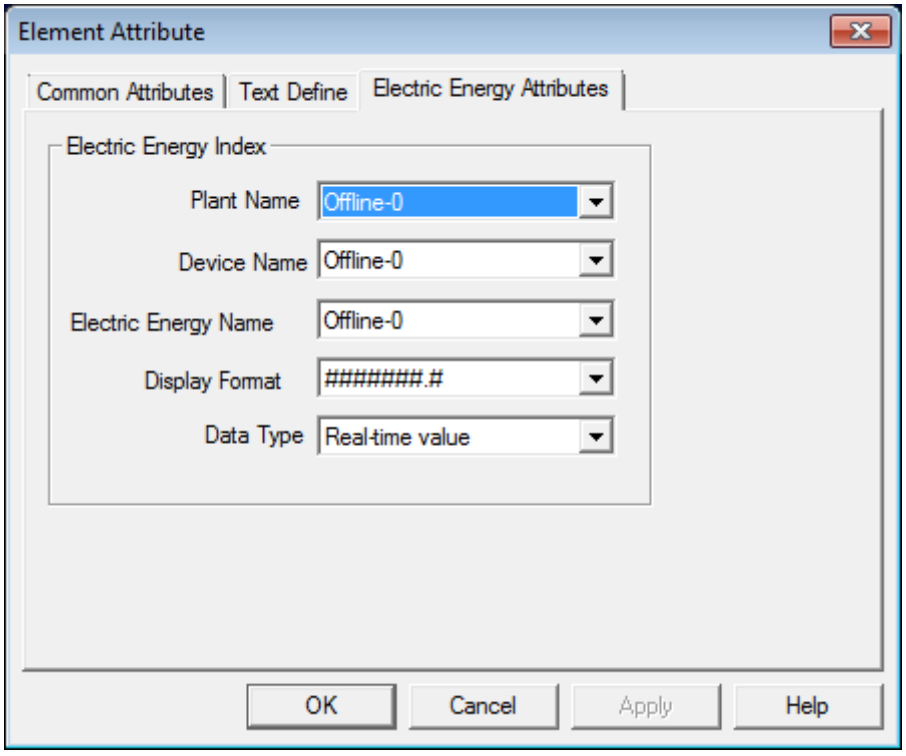



Fig. 6.21 Electric Energy element attribute

**Plant Name**:You can independently select the factory station you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Device Name**:You can independently choose the device you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Electric Energy Name**:You can independently select the electrical degree point you want to associate, which can be selected through the drop-down box. This item is a selection item.

**Display Format**:The number of digits after the Decimal separator can be selected independently through the drop-down box. This is an option.

**Data Type**:There are two types of values: real-time value and embedded value, which can be selected through the drop-down box. This option is a selection option.

### 6.4.6.Other Quantities Primitive Attribute

The **text definition** is the same as the text primitive attribute,Other Quantities element's Other Quantities attribute as shown in the figure4.22.

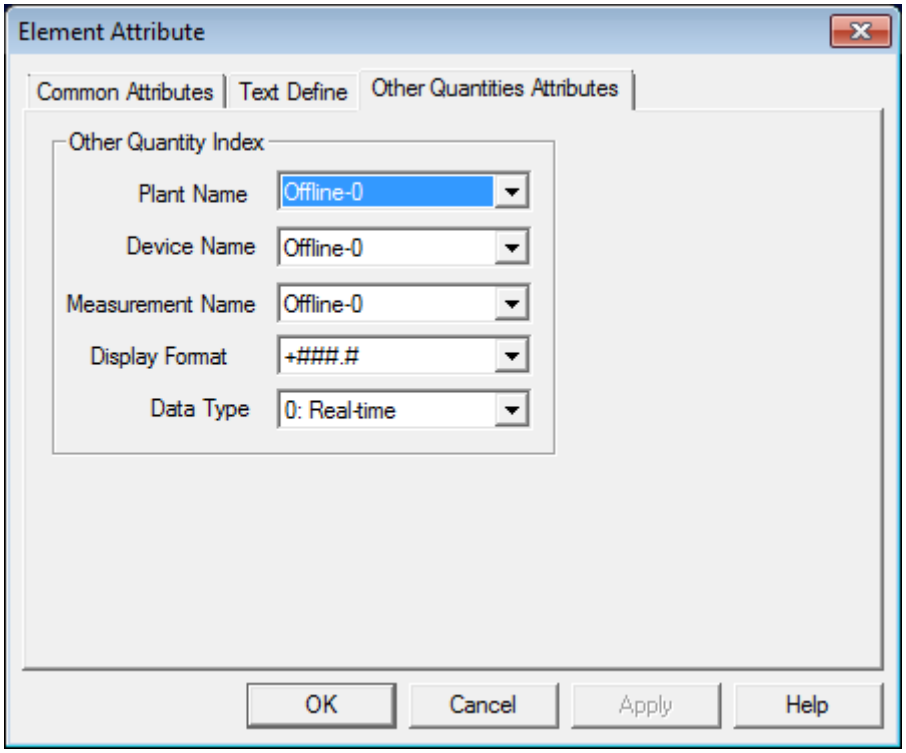



Fig. 6.22 Other Quantities Public attribute of an element

**Plant Name**:You can independently select the factory station you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Device Name**:You can independently choose the device you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Measurement Name**:You can independently select points of other quantities you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Display Format**:The number of digits after the Decimal separator can be selected independently through the drop-down box. This is an option.

**Data Type**:There are two types of values: real-time value and embedded value, which can be selected through the drop-down box. This option is a selection option.

### 6.4.7.Attributes of the Curve Element

Can automatically generate graphs,**Curve Parameter** as shown in the figure4.23,**Curve attribute** as shown in the figure4.24.

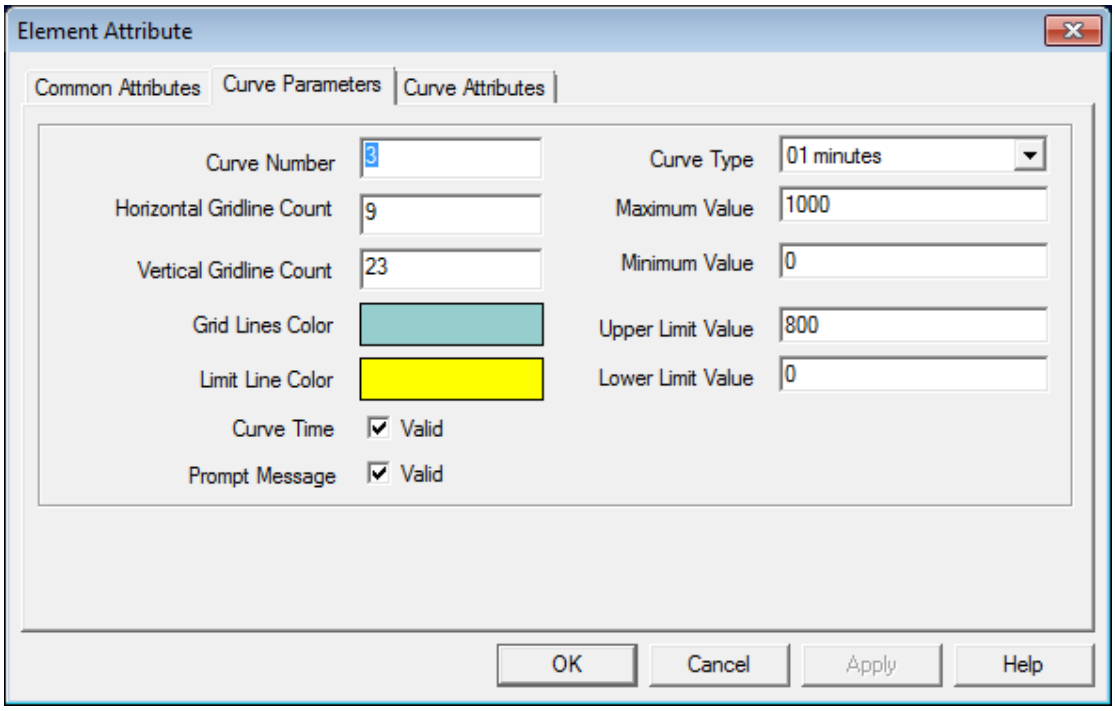



Fig. 6.23 Curve Parameter

**Number of curves**:Set the number of displayed curves, which is the setting item.

**Curve Type**:Select the curve data update time, which is a selection option.

**Number of horizontal grids**:Set the number of horizontal lines in the graph, which is the setting item.

**Number of vertical grids**:Set the number of vertical lines in the graph, which is the setting item.

**Grid Lines Color**:Select the color of the grid in the graph, which is a selection item.

**Limit Line Color**:Select the color of the limit line in the graph, which is a selection item.

**Maximum Value**:Set the maximum value of the vertical coordinate of the curve, which is the setting item.

**Minimum Value**:Set the minimum value of the vertical coordinate of the curve, which is the setting item.

**Upper Limit Value**:Set the maximum value of the data displayed on the graph, which is the setting item.

**Lower Limit Value**:Set the minimum value for displaying data in the graph, which is the setting item.

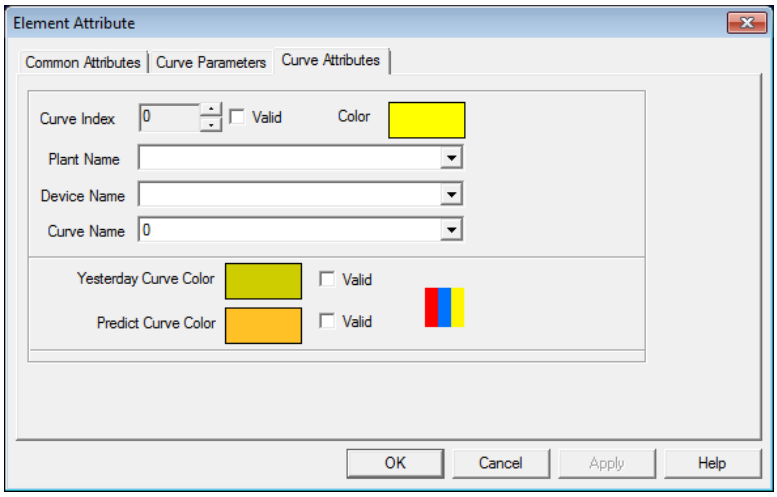



Fig. 6.24 Curve attribute

**Curve Index**:Set different colors for different curve indexes to distinguish, which is the default option and the color is the selection option.

**Valid**:Is the index valid? This option is a selection.

**Plant Name**:You can independently choose the factory station you want to associate with, and the data source is configured in the database. This option is a selection option.

**Device Name**:You can independently choose the device you want to associate with, and the data source is configured in the database. This is a selection option.

**Curve Name**:You can independently select the curves you want to associate, and the data source is configured in the database. This option is a selection option.

**Yesterday's Curve Color**:Set the color independently and choose whether it is valid. This is a selection option.

**Forecast Curve Color**:Set the color independently and choose whether it is valid. This is a selection option.

### 6.4.8.Bar Pattern Element Attribute

**Bar pattern attribute** as shown in the figure4.25.

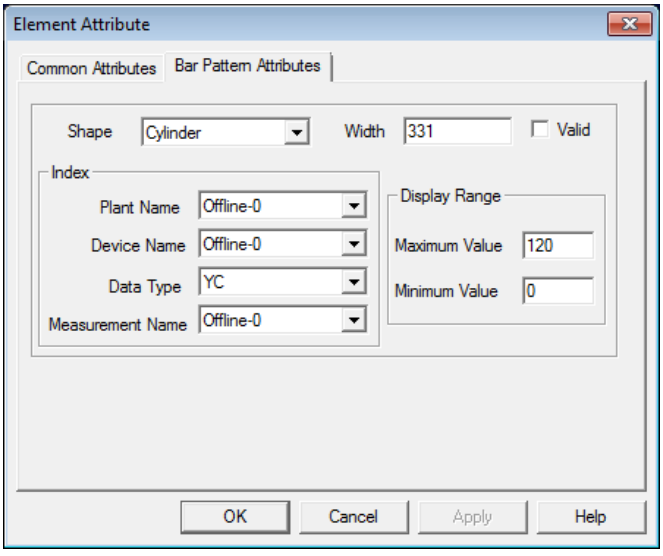



Fig. 6.25 Bar pattern attribute

**Shape:**The shape you can freely like can be selected through the drop-down box, which is a selection item.

**Width:**You can independently set the appropriate width, which is a setting item.

**Valid**:Determine whether the bar chart is valid, this option is a selection item.

**Plant Name**:You can independently select the factory station you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Device Name**:You can independently choose the device you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Measurement Name**:You can independently select the points you want to associate with, which can be selected through the drop-down box. This item is a selection item.

**Data Type**:There are two types of telemetry and electrical measurement, which can be selected through the drop-down box. This option is a selection option.

**Maximum Value**:Set the maximum value of the bar chart display data, which is the setting item.

**Minimum Value**:Set the minimum value for displaying data in the bar chart, which is the setting item.

### 6.4.9.Trend Chart Element Attribute

Automatically generate trend charts,**Trend chart attribute** as shown in the figure4.26,**trend line attribute** as shown in the figure4.27.

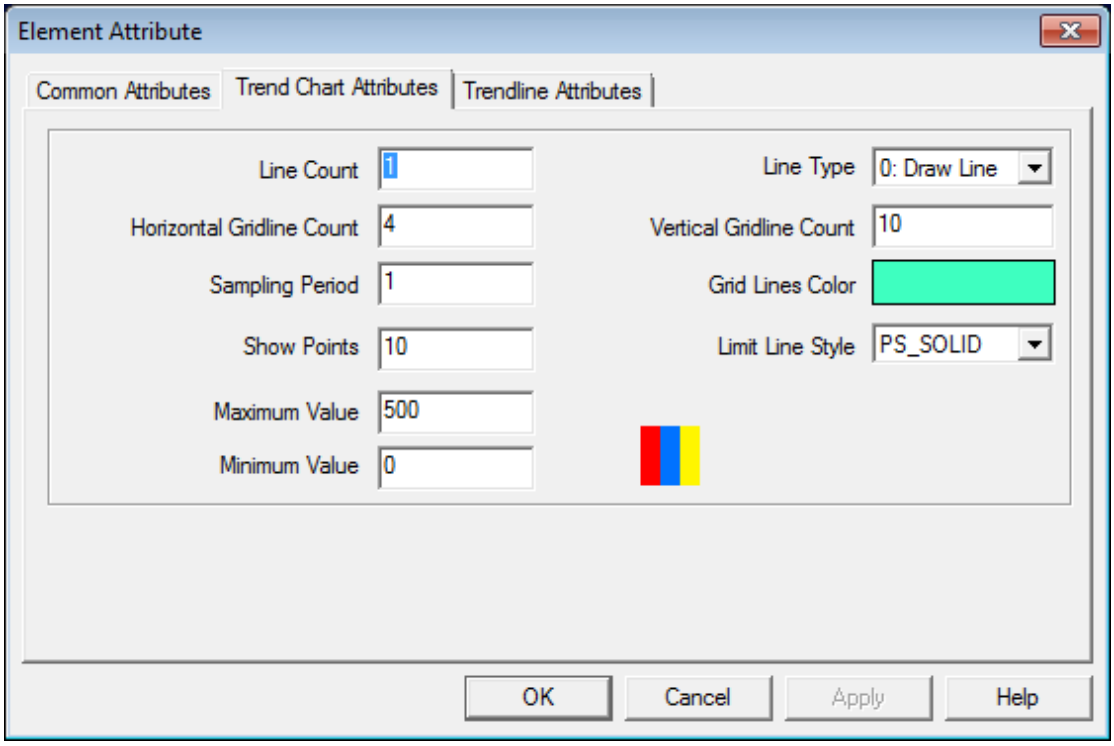



Fig. 6.26 Trend chart attribute

**Line Count**:Set the number of displayed trend lines, which is the setting item.

**Line Type**:Choose the type of trend line, there are two types: line drawing and point drawing, and this option is a choice.

**Number of horizontal grids**:Set the number of horizontal lines in the Run chart. This is a setting item.

**Number of vertical grids**:Set the number of vertical lines in the Run chart. This is a setting item.

**Sampling Period**:Set the sampling period of Run chart. This is a setting item.

**Grid Lines Color**:Select the color of the trend chart grid line. This is an option.

**Show Points**:Select the number of points displayed in the Run chart, which is a setting item.

**Limit Line Style**:Select the style of the limit line of the Run chart. This is an option.

**Maximum Value**:Set the maximum value of the vertical coordinate of the Run chart. This is a setting item.

**Minimum Value**:Set the minimum value of vertical coordinate of Run chart, which is a setting item.

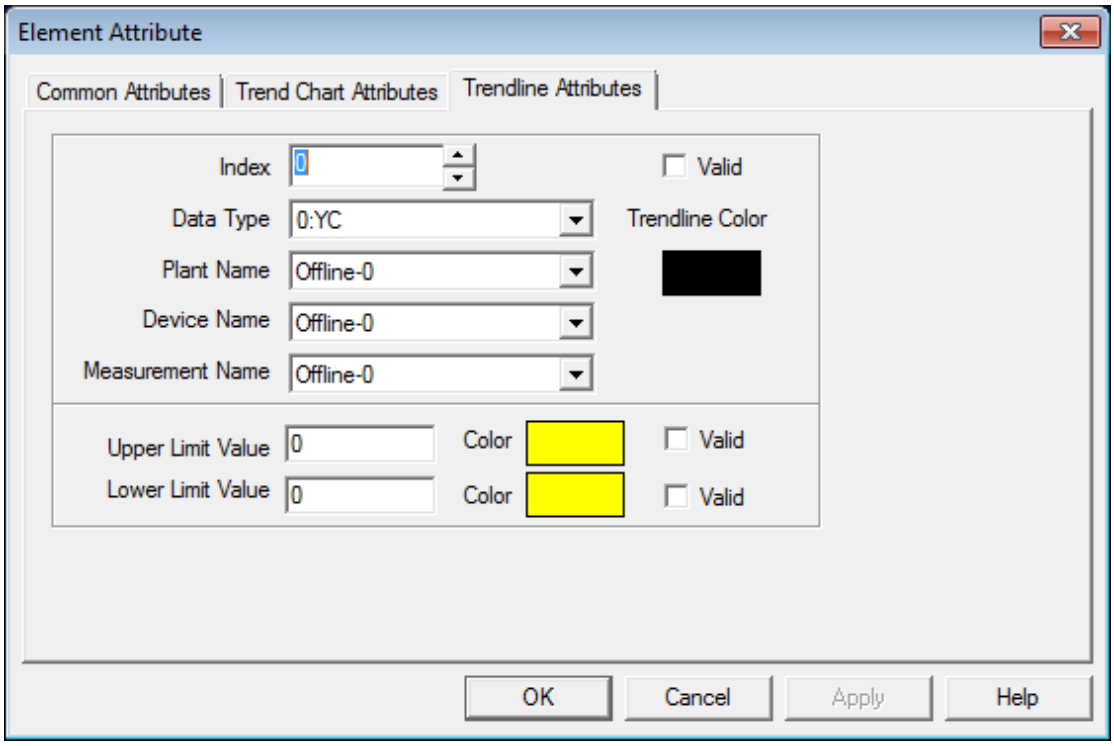



Fig. 6.27 Trend line attribute

**Index**:0 represents drawing lines, 1 represents drawing points, and different trend lines are selected for indexing. This option is a selection option.

**Valid**:Determine whether the index is valid, this option is optional.

**Data Type**:Select the data type associated with the trend line, which includes telemetry and electrical degree. This option is a selection option.

**Plant Name**:You can independently choose the factory station you want to associate with, and the data source is configured in the database. This option is a selection option.

**Device Name**:You can independently choose the device you want to associate with, and the data source is configured in the database. This is a selection option.

**Measurement Name**:You can independently select the points you want to associate with, and the data source is configured in the database. This item is a selection item.

**Trendline Color**:Set colors independently, which is a selection option.

**Upper Limit Value**:Set the maximum value and color displayed in the Run chart and whether it is valid. This is a setting item.

**Lower Limit Value**:Set the minimum value and color displayed in the Run chart and whether it is valid. This is a setting item.

### 6.4.10.Power Flow Line Element Attribute

The power flow line is a vector, which can dynamically express the directional quantity such as current and power, and its properties as shown in the figure4.28.

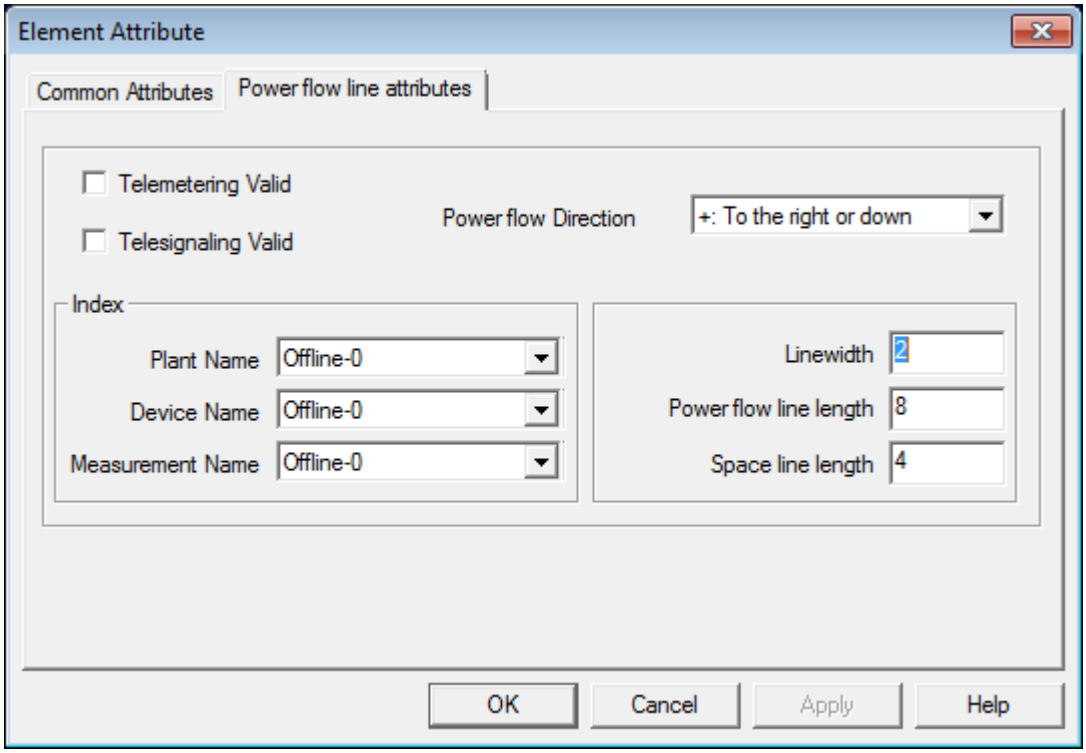



Fig. 6.28 Power Flow Line Attribute

**Telemetering Valid**:Select the type of power flow line, telemetry effective and remote signaling effective are mutually exclusive options, and this option is a selection option.

**Telesignaling Valid**:Select the type of power flow line, telemetry effective and remote signaling effective are mutually exclusive options, and this option is a selection option.

**Power Flow Direction**:Choose the direction of the trend line, which can be left or up as positive and right or down as positive. This option is a choice.

**Plant Name**:Select the factory station that needs to be associated, and configure the data source in database management. This item is a selection item.

**Device Name**:Select the device that needs to be associated, and configure the data source in database management. This is a selection item.

**Measurement Name**:Select the measurement point that needs to be associated, and configure the data source in the database. This item is a selection item.

**Linewidth:**Set the width of the tide line, which is the setting item.

**Power flow line length**:The tidal current line is a dashed line, and the line length of the tidal current line is set as a setting item.

**Space line length**:Set the length of the space in the middle of the trend line, which is a setting item.

### 6.4.11.Hotspot Element Attribute

as shown in the figure4.29.

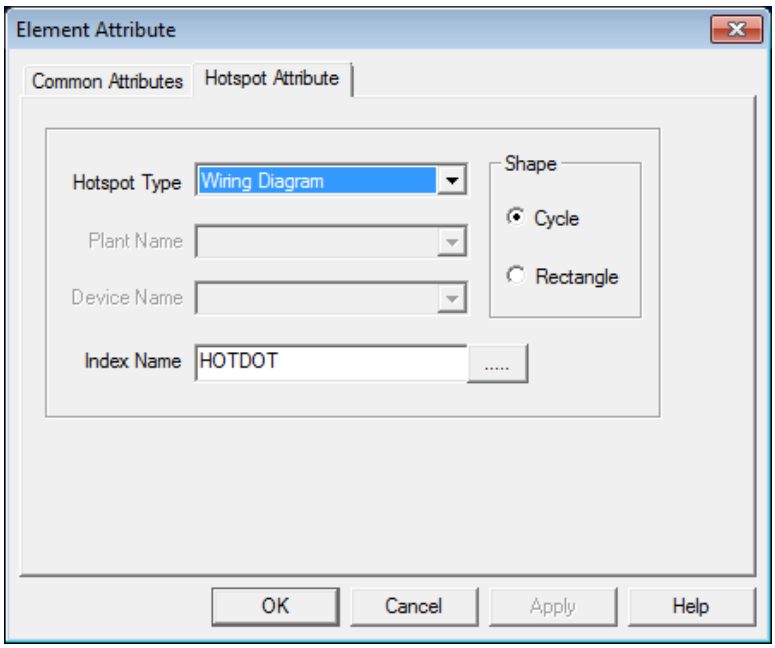



Fig. 6.29 Hotspot Attribute

**Hotspot Type**:There are two types of hotspots: wiring diagram and device status, which are optional options.

**Index**:When clicking on a hotspot, it will jump to the corresponding graph based on the index, which is a setting item.

**Shape**:There are two types of hot spot shapes: circle and rectangle, which are optional options.

### 6.4.12.Button Element Attribute

The function of the button is similar to the hotspot function, and its properties as shown in the figure4.30.

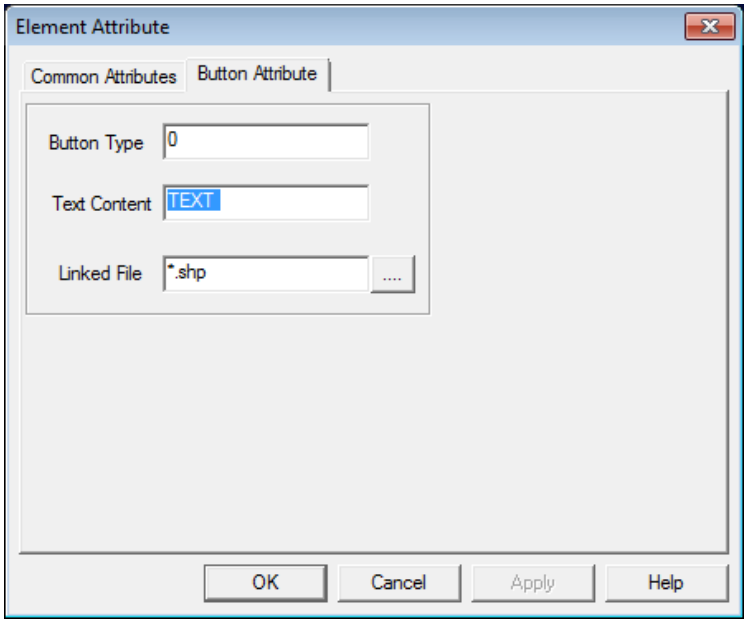



Fig. 6.30 Button Attribute

**Button Type**:There are two types of buttons: 0 and 1, which are filled in items.

**Text Content**:Edit the text as needed, this item is for filling.

**Linked File**:When the button type is 0, clicking the button will jump to the corresponding graph based on the index. When the button type is 1, clicking the button will trigger the corresponding functions (such as login, historical events, report query, curve query, video monitoring, event window, etc.), which is a setting item.

### 6.4.13.Bitmap Element Attribute

Click on a bitmap to insert a picture with its properties as shown in the figure4.31.

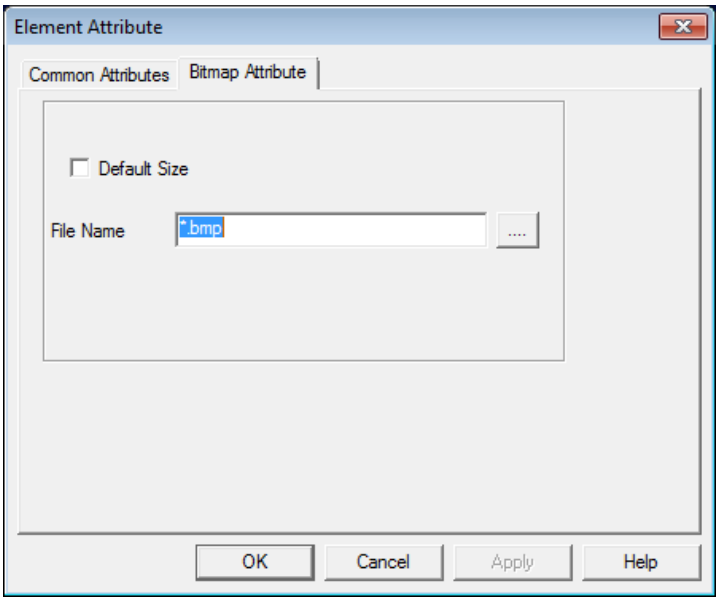



Fig. 6.31 Bitmap Attribute

**Default Size**:This item is a setting item.

**File Name**:Link to the corresponding graph, which is a selection item.

### 6.4.14.Taps Element Attribute

As shown in the figure4.32.

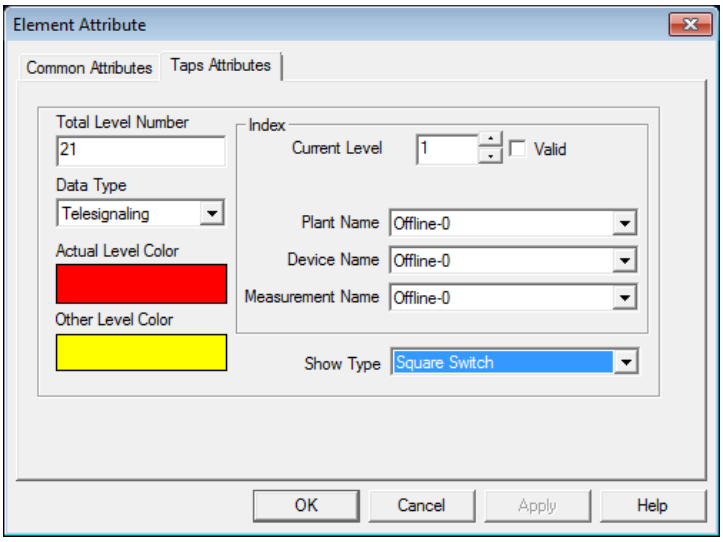



Fig. 6.32 Taps Attribute

**Total Level Number**:The number of gears for this tap, which is an optional item.

**Data Type**:There are two types of data: remote signaling and telemetry, which are optional options.

**Plant Name**:You can independently choose the factory station you want to associate with, and the data source is configured in the database. This option is a selection option.

**Device Name**:You can independently choose the device you want to associate with, and the data source is configured in the database. This is a selection option.

**Measurement Name**:You can independently select the points you want to associate with, and the data source is configured in the database. This item is a selection item.

**Show Type**:There are two display types: square switch and circular switch, which are optional options.

### 6.4.15.Transform Element Attribute

as shown in the figure4.33.

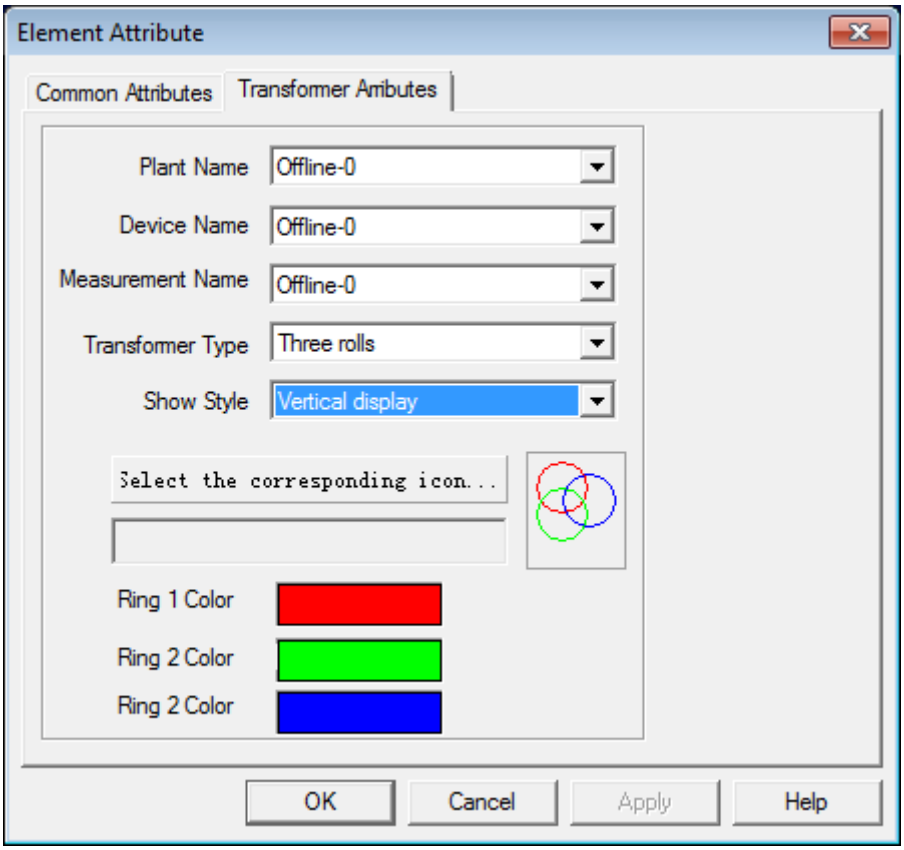



Fig. 6.33 Transformer properties

**Plant Name**:You can independently choose the factory station you want to associate with, and the data source is configured in the database. This option is a selection option.

**Device Name**:You can independently choose the device you want to associate with, and the data source is configured in the database. This is a selection option.

**Measurement Name**:You can independently choose the measurement point you want to associate with, and the data source is configured in the database. This option is a selection option.

**Transformer Type**:There are two types of transformers, two rolls and three rolls, which are optional options.

**Show Style**:There are two display methods: vertical display and horizontal display, and this option is optional.

**Select the corresponding icon**:You can choose the desired transformer shape from the symbols you have drawn, which is a selection option.

## 6.4.16.PNG Image Properties

As shown in the figure4.34.

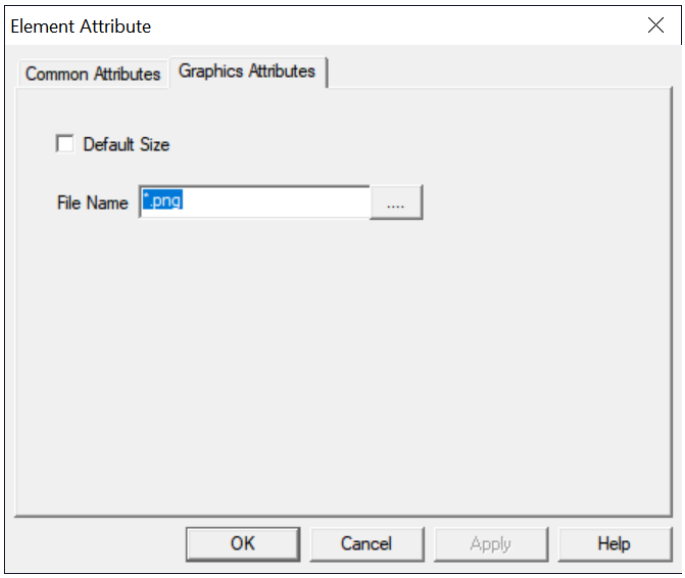



Fig. 6.34 PNG Image Properties

**Default Size**:This item is a setting item.

**File Name**:Link to the corresponding graph, which is a selection item.

## 6.4.17.Power curve element attributes

The power curve can be generated automatically, and the **curve parameters** are as shown in the figure4.35, **curve attributes** as shown in the figure4.36.

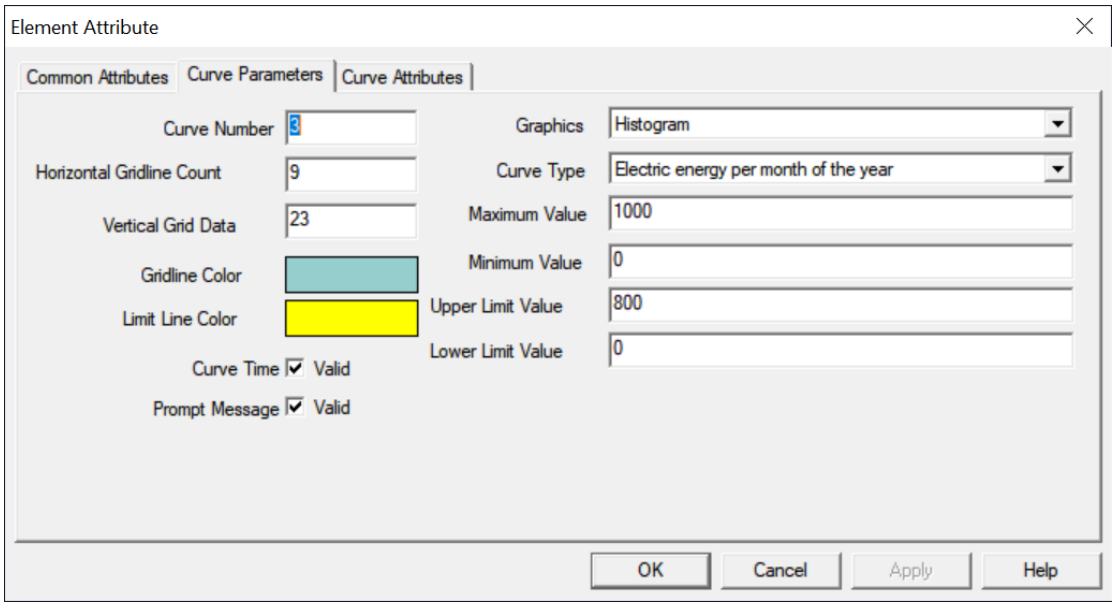



Fig. 6.35 curve parameter

**Number of curves**:Set the number of displayed curves,This item is a setting item.

**Curve Type**:Select the curve display type, which is a selection option.

**Number of horizontal grids**:Set the number of horizontal lines in the graph,This item is a setting item.

**Number of vertical grids**:Set the number of vertical lines in the graph,This item is a setting item.

**Grid Lines Color**:Select the color of the grid in the graph, which is a selection item.

**Limit Line Color**:Select the color of the limit line in the graph, which is a selection item.

**Maximum Value**:Set the maximum value of the vertical axis of the graph,This item is a setting item.

**Minimum Value**:Set the minimum value of the vertical coordinate of the curve graph,This item is a setting item.

**Upper Limit Value**:Set the maximum value of the data displayed on the graph,This item is a setting item.

**Lower Limit Value**:Set the minimum value for the data displayed on the graph,This item is a setting item.

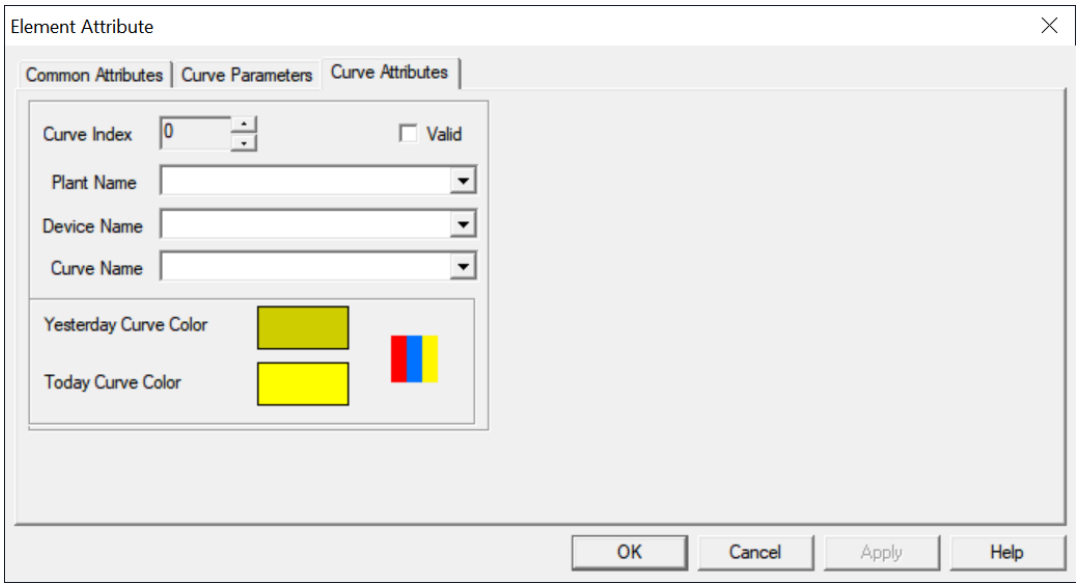



Fig. 6.36 curve attributes

**Curve Index**:Set different colors for different curve indexes to distinguish, which is the default option and the color is the selection option.

**Valid**:Is the index valid? This option is a selection.

**Plant Name**:You can independently choose the factory station you want to associate with, and the data source is configured in the database. This option is a selection option.

**Device Name**:You can independently choose the device you want to associate with, and the data source is configured in the database. This is a selection option.

**Curve Name**:You can independently select the curves you want to associate, and the data source is configured in the database. This option is a selection option.

**Yesterday's Curve Color**:Set the color independently and choose whether it is valid. This is a selection option.

**Forecast Curve Color**:Set the color independently and choose whether it is valid. This is a selection option.

## 6.5 Graphical Interface Rendering

Graphical interface drawing is drawn in ADraw, the specific ADraw menu function can refer to 4.3 graphics drawing module.

### 6.5.1Add a Remote Measurement

Click YC in the tool box, and then click the left mouse button in Figure and stretch, the remote measurement of +0.0 will be generated. Right-click the **remote measurement and select the primitive property, and select the public property** in the primitive property, which can define the **text, background, border Color, text width, layer**, etc. as shown in the figure4.37.

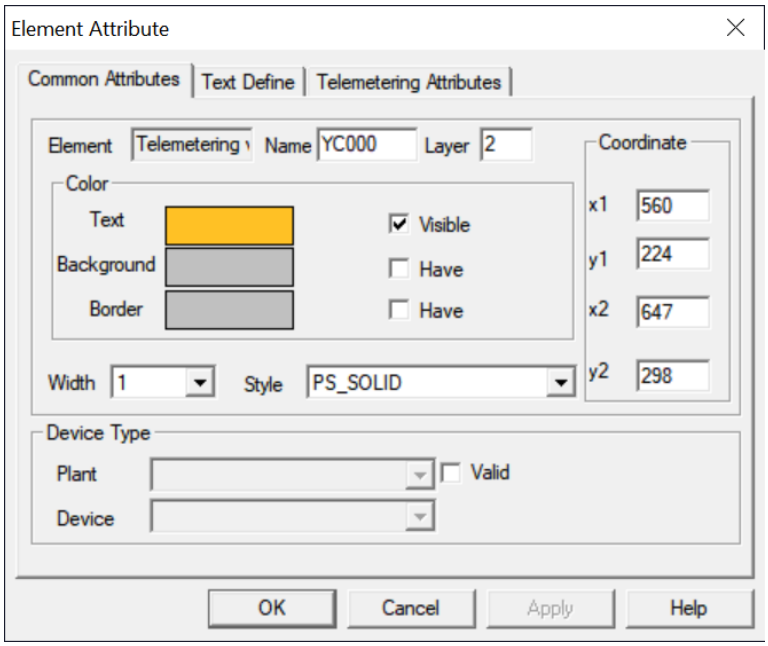
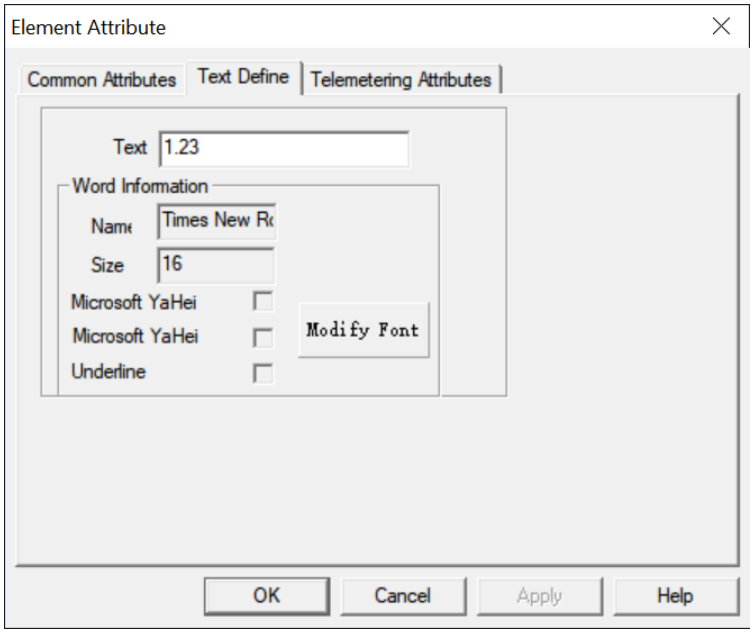



Fig. 6.37 The public property of the primitive property

Click the **text definition, the text content** is useless, **click Modify** font can modify the **font, font, size,** etc., as shown in the figure4.38.



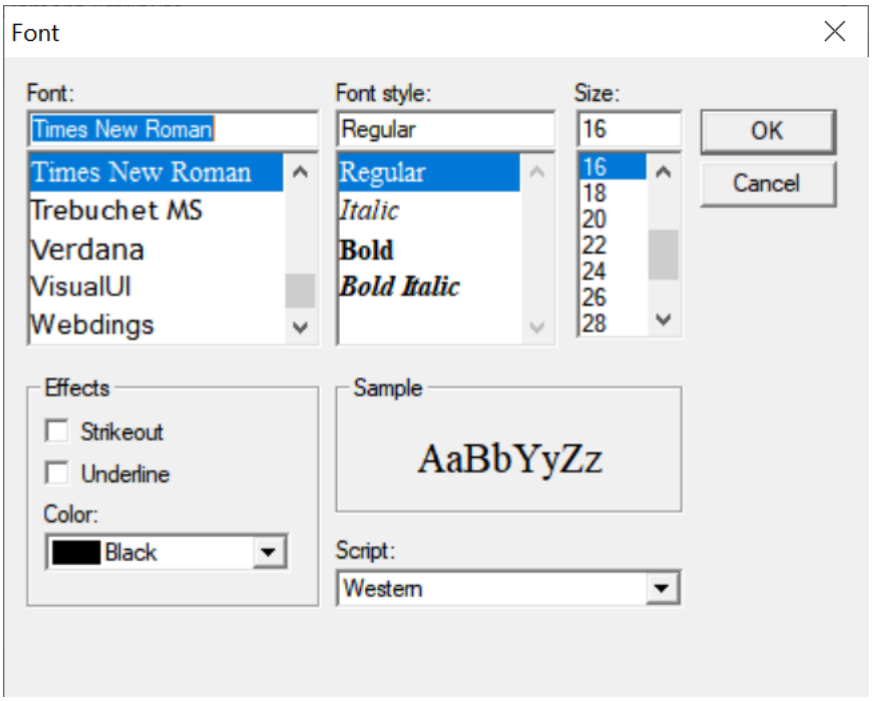



Fig. 6.38 Modify font interface

Click **Modify Index** and select **Telemetering Data, display format and telemetering Type** to be associated with the remote measurement. Click the OK button to save the exit. as shown in the figure4.39.

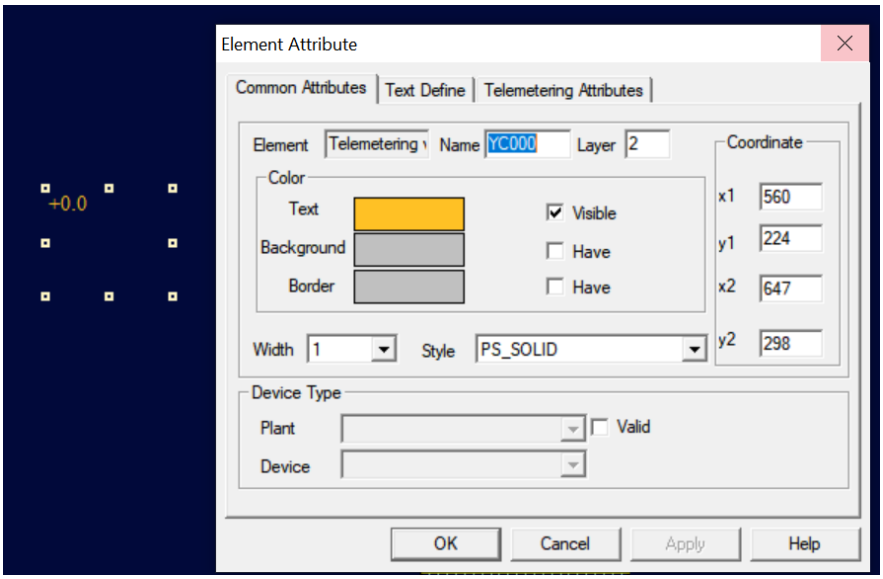



Fig. 6.39 Modify index interface

### 6.5.2 Add a Remote Credit

Click YX in the tool box, hold the left mouse button in Figure, and **stretch.** Right-click the remote signal, select the **element property**, click the **remote signal extension**, associate the remote signal point to be displayed, **display Type square switch**, **round switch, custom** and so on. as shown in the figure4.40.

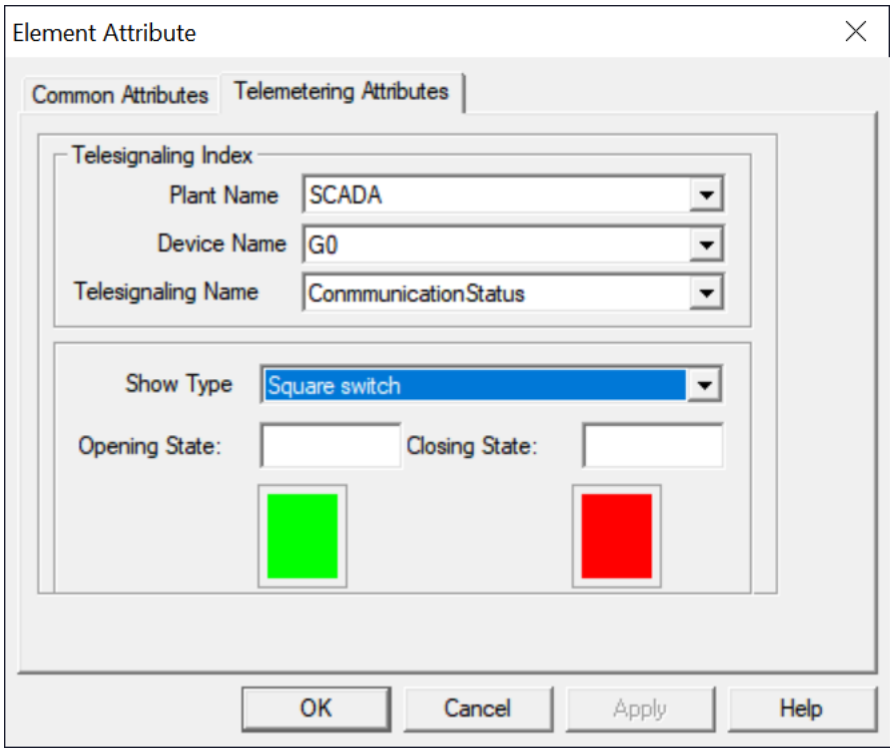



Fig. 6.40 Telesignaling Attribute

### 6.5.3 Add an Electric Energy

Same as adding a telemetering.

### 6.5.4 Add a Text

Click T in the tool box, and then click the left mouse button in the figure, stretch, generate a TXT text, right-click the text to select the primitive property, public properties are the same setting method, click the text definition, fill in the text content, such as remote measurement, click to modify the font can modify the text font, font, size and so on.

### 6.5.5 Add a Hotspot

Click the F  igure icon in the tool box, left click and stretch to create a hot spot. Right-click the hotspot and select the pixel attribute, click the hotspot attribute, select the wire Figure for the hotspot Type, select a circle or rectangle for the shape, and fill in the index XXXXX.shp, indicating that clicking the hotspot can navigate to XXXXX.shp, *.shp is the suffix name of the graphic screen, and the visibility of the general hotspot public attribute is not checked. as shown in the figure4.41 and Fig. 6.42.

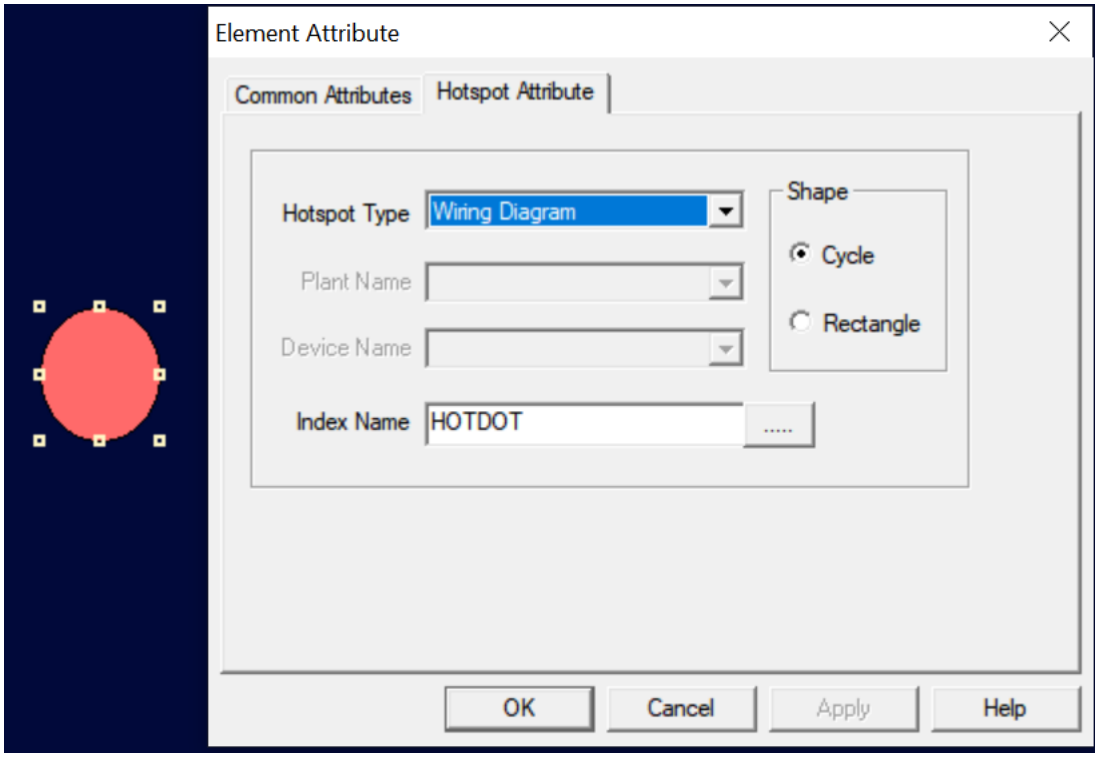



Fig. 6.41 Add hotspot

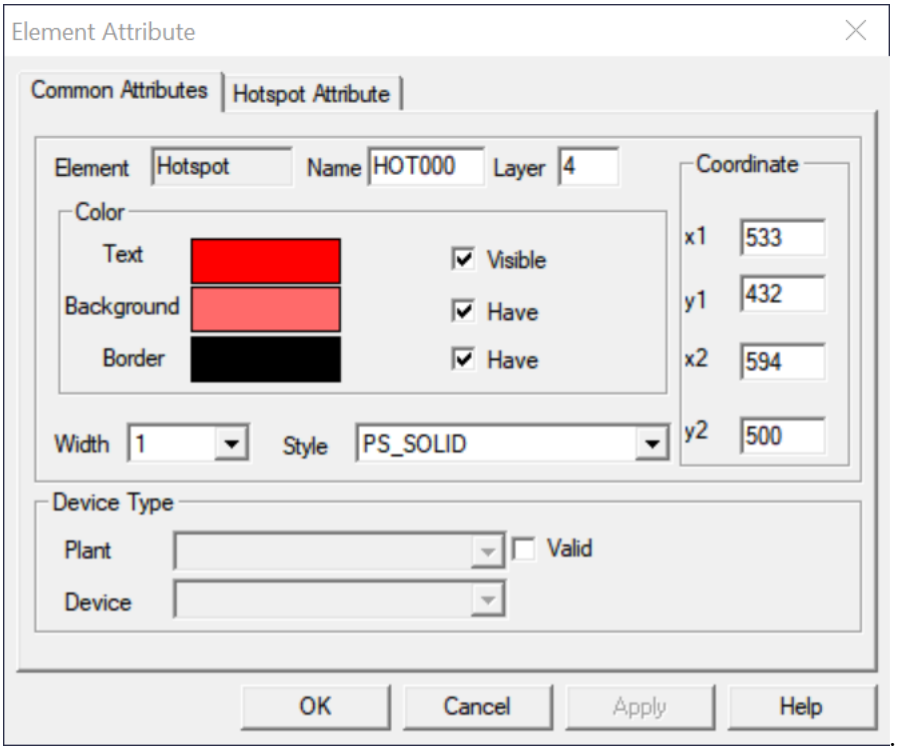



Fig. 6.42 Hotspot public attribute

### 6.5.6 Add a Report

Click the  Figure icon in the tool box, as shown in the Fig. 6.43, you can set the column

width, row spacing, etc

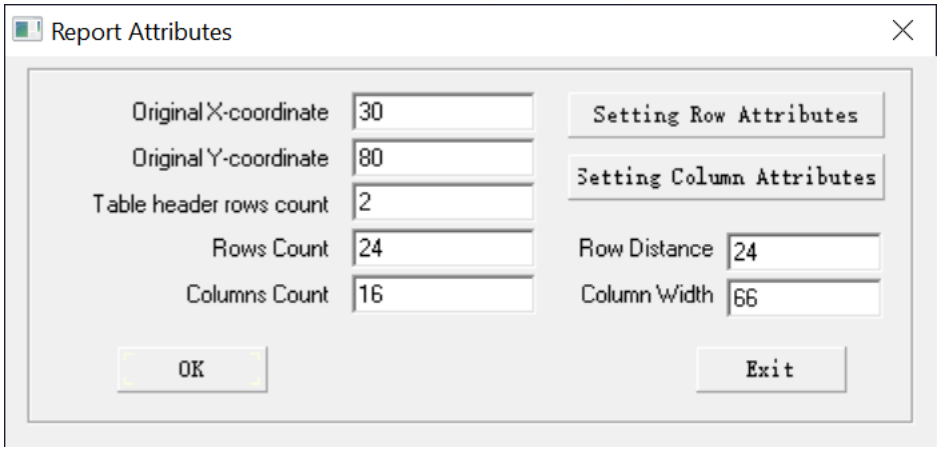



Fig. 6.43 Add report

Click to **set the line properties**, click the line serial number up arrow to set the properties of each line of 24 lines and the text of the line. as shown in the figure4.44.

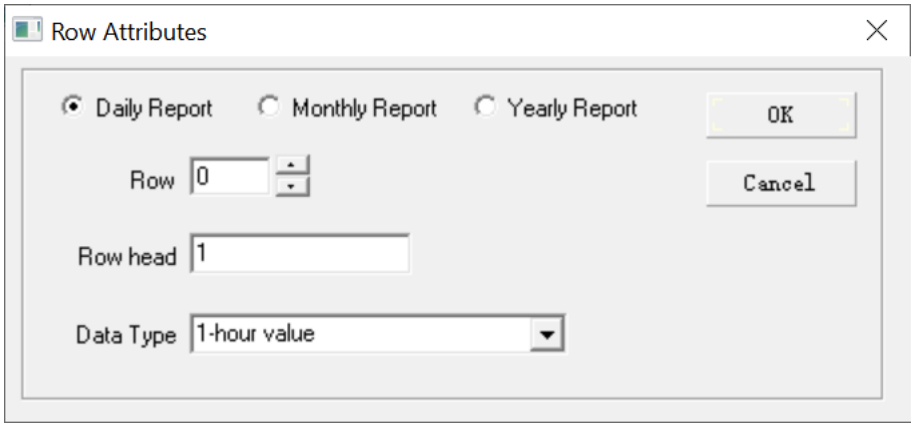



Fig. 6.44 Report row attribute

Click to set **column properties**. Similarly, the Data Type of each column can be associated, including Telemetering, Telesignaling, Electric Energy, Other Quantities, **Plant Name, Device Name**, etc. **Measurement Name, Display Format**, as shown in the figure4.45. After each item is set, click the **OK button** to save it and a report will be generated.

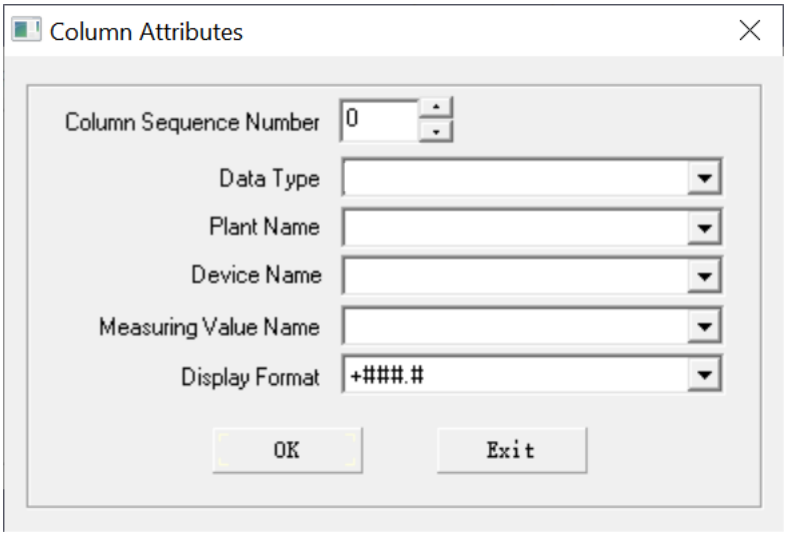


Fig. 6.45 Report Column Attribute

## 6.6 Graphic Configuration Design

The actual graphic configuration production steps are as follows:

(1) Based on the wiring diagram provided by the project, draw the overall framework and replace the acquisition data type elements corresponding to the device location.

(2) Map all devices and databases one by one and accurately associate them.

(3) Associate the drawn wiring diagram, topology diagram, and curve diagram with hotspots or buttons.

# Chapter 7 ACMU(ACMU)

## 7.1 Overview

Communication Management (ACMU) is an important component of the Acrel-2000 power monitoring system, mainly responsible for data acquisition and forwarding of the monitoring system. It is a management software that uploads and distributes data.

## 7.2 Function Introduction

The main functions of the communication management module include:

(1) acquisition parameter configuration.

(2) Network parameter configuration.

(3) Collect and forward message viewing.

(4) Real time data viewing.

(5) Telecontrol testing.

## 7.3 Interface Description

When the ACMU module is running, as shown in figure5.1.

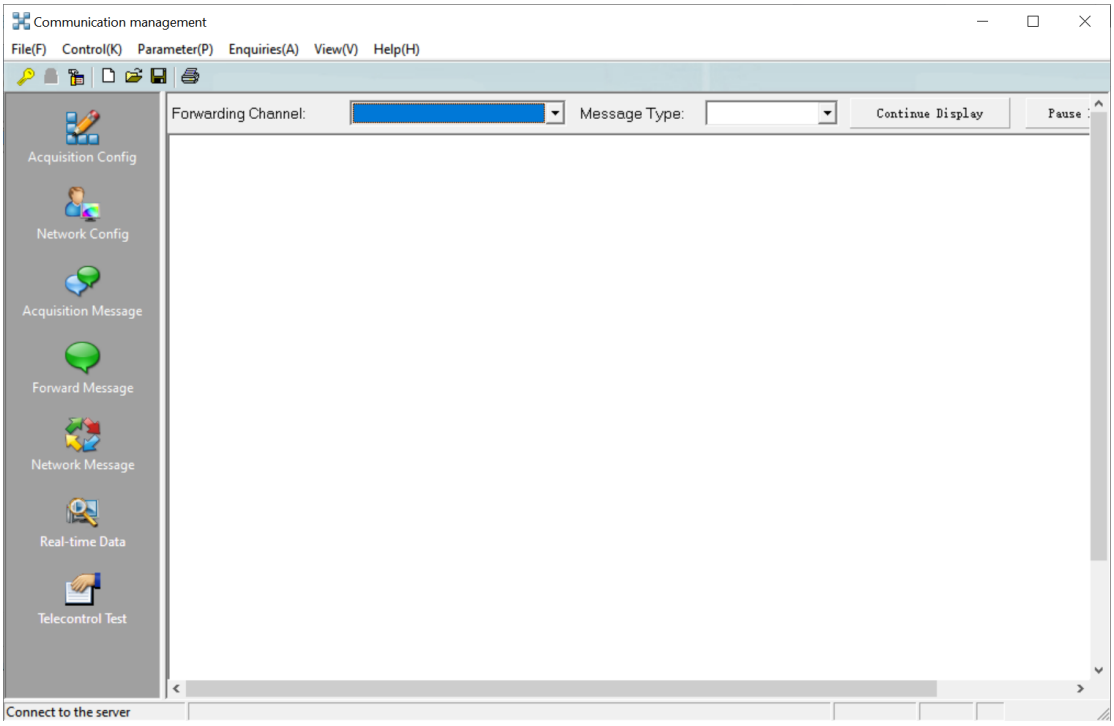



Fig. 7.1 ACMU interface

### 7.3.1.System Menu

Under the System Menu, there are five submenus: **File, Control, Parameter, Query, View and Help,** which complete different specific functions respectively.

### 7.3.2.File Menu

As shown in the figure5.2.

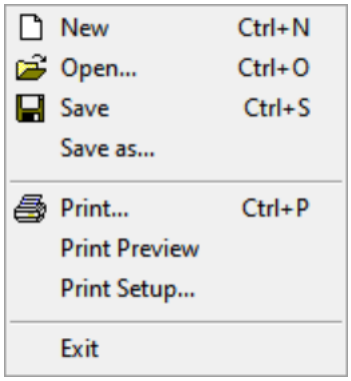



Fig. 7.2 File Menu

### 7.3.3.Control Menu

As shown in the figure5.3.

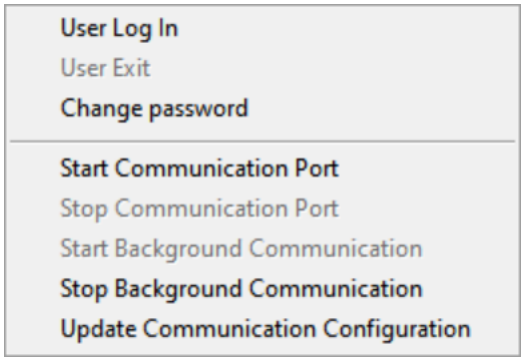



Fig. 7.3 Communication Control Menu

**Start Communication Port:**Used to activate all valid ports to complete communication functions.

**Stop communication port:** Used to stop all running ports.

**Start background communication**:Used to initiate a connection with the server in order to display the data exchanged with the server.

**Stop background communication**:Used to stop the connection with the server and terminate its data exchange.

**Update communication configuration**:Used to update communication configuration parameters.

### 7.3.4.Parameter Setting Menu

As shown in the figure5.4.

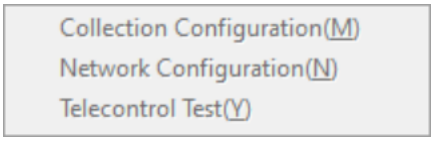



Fig. 7.4 Parameter Setting Menu

### 7.3.5.Query Menu

As shown in the figure5.5.

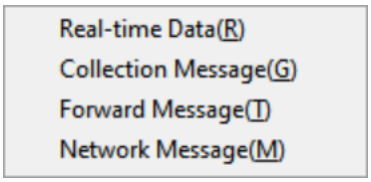



Fig. 7.5 Communication Control Menu

### 7.3.6.View Menu

Click the View Menu to select whether to display the toolbar and status bar, as shown in the figure5.6.

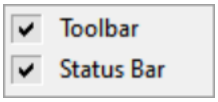



Fig. 7.6 View Menu

### 7.3.7.Help Menu

Click Help Menu to View ACMU information, as shown in the figure5.7.

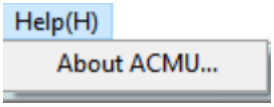



Fig. 7.7 Help Menu

### 7.3.7.Toolbar

As shown in the figure5.8.

Fig. 7.8 Toolbar

### 7.3.8.User Login

After User Login, you can configure the toolbar using information. When the button is pressed, a dialog box will pop up asking for a password, as shown in the figure5.9.

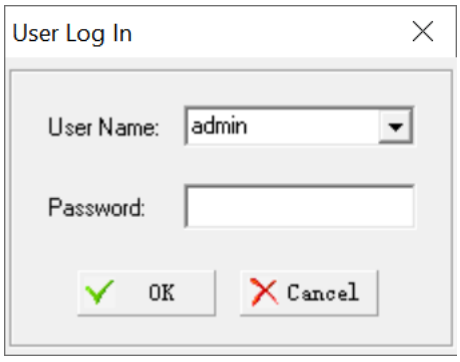



Fig. 7.9 User Login Interface

Follow the prompts to enter the correct password and click **OK**. Click **Cancel** to undo the operation.

### 7.3.9.User Exit

If you press this button, the User Exit will lock the ACMU information configuration toolbar.

### 7.3.10.Change Password

User passwords can only be changed in the database management tool.

### 7.3.11.New

When you press this button, a dialog box will pop up, as shown in the figure5.10.

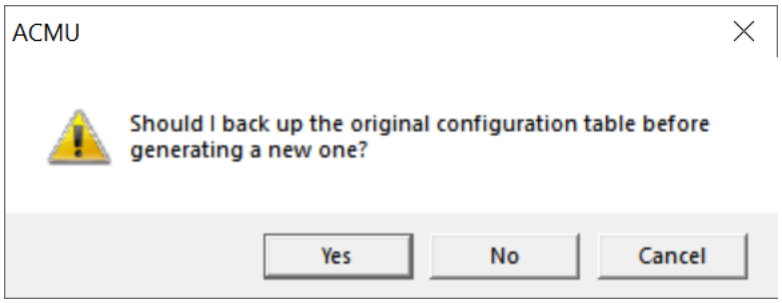



Fig. 7.10 New Interface

Click Yes to create a new configuration table and save the original configuration table. Click "No" to create a new configuration table, but do not save the original configuration table. Click "Cancel", no modification occurs.

### 7.3.12.Open

Open a configuration table.

### 7.3.13.Save

It is used to save the Parameter information of ACMU so that it can be directly loaded when the ACMU is run next time. Remember to save the modified Parameter and then restart the ACMU program for the modified Parameter to take effect.

### 7.3.14.Information configuration Toolbar

As shown in the figure5.11.

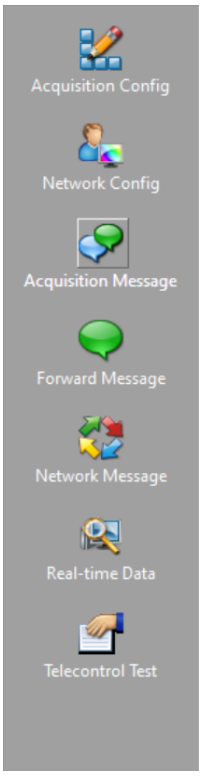



Fig. 7.11 Information configuration toolbar

Before the monitoring system runs, configure the necessary information.

Note: You must be **logged in** before using this toolbar.

## 7.4 Parameter Configuration

### 7.4.1Acquisition channel configuration

Click the tree bar to **collect the channel**, right-click the channel number in the table on the right, choose **Add record**, add the number of records, **modify the channel Parameter** after adding, finally click the button at the bottom to **save the configuration Parameter**, and click **File** to save.

As shown in the figure5.12.

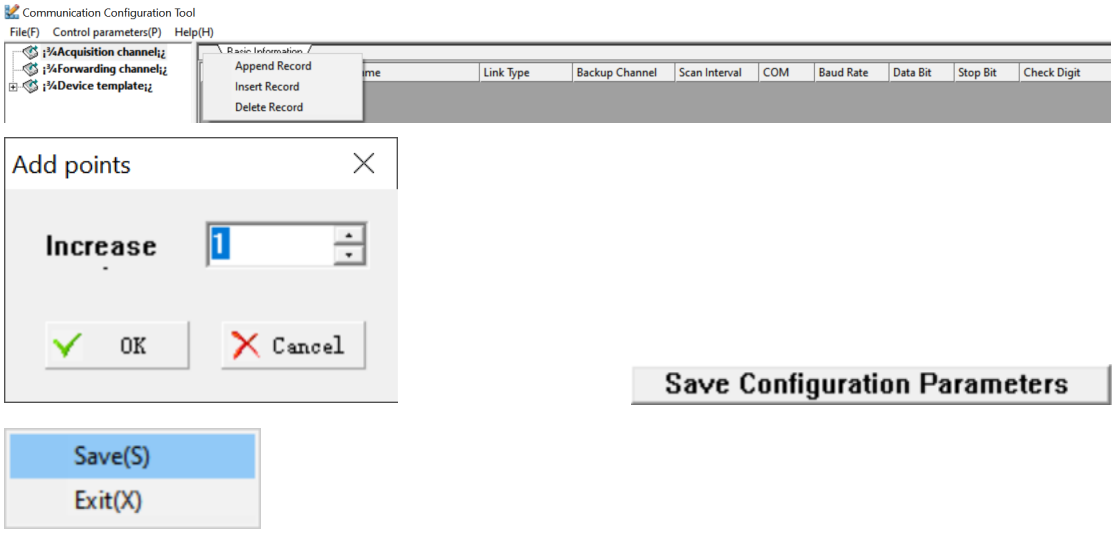



Fig. 7.12 Acquisition channel configuration

#### 7.4.1.1Channel Parameter Configuration

As shown in the figure5.13.

Basic Information

| Channel Number | Channel Name | Link Type | Backup Channel | Scan Interval | COM | Baud Rate | Data Bit | Stop Bit | Check Digit |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1:Channel | 0:COM | | 100 | 1 | 9600 | 8 | 1 bit | 0:No validation |
| 2 | 2:Channel | 0:COM | | 100 | 2 | 9600 | 8 | 1 bit | 0:No validation |
| 3 | 3:Channel | 0:COM | | 100 | 3 | 9600 | 8 | 1 bit | 0:No validation |

Fig. 7.13Channel Parameter Configuration

Link types include the following, as shown in the figure5.14:

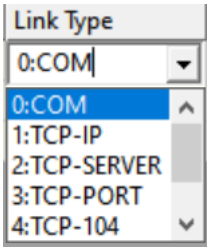



Fig. 7.14Link Type Select

a) Serial Mode Setting

Scan interval: default 100MS;

COM number: refers to the actual serial port number, which can be changed according to the actual situation;

Baud: 9600 by default, 19200 is recommended according to the actual situation;

Data bit: default to 8, changed according to actual situation;

Stop bit: default 1, changed according to actual situation;

Check digit: default to 0, changed according to actual situation.

b) TCP/PORT Mode Configuration

Scan interval: default 100MS;

The remaining items are meaningless. Used for serial server IP+PORT communication mode.

c) TCP/IP Mode Configuration

Scan interval: default 100MS;

The remaining items are meaningless.

d)TCP/104Mode Configuration

Scan interval: default 100MS;

The remaining items are meaningless.

#### 7.4.1.2 Device Parameter Configuration

Click the Channel Name under the **Acquisition Channel** in the tree bar to configure the Device Parameter. After the Device Parameter is configured, save it in the same way.as shown in the figure5.15

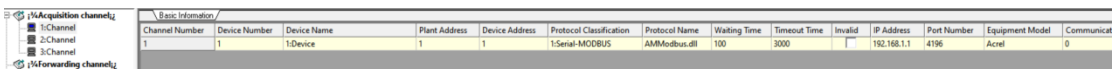



Fig. 7.15 Device Parameter Configuration

a) Serial Port Mode Configuration

Device number: default;
Device Name: Custom, usually filled in with circuit name;
Plant address: corresponds to the factory address in the database;
Device address: corresponds to the database device address;
Protocol classification: Select the corresponding classification;
Protocol Name: Select the corresponding device protocol name;
Waiting time: default to 100, the interval between cyclic sending and the waiting time to read data after sending, which can be changed according to the actual situation;
Timeout time: default to 3000, the timeout time when reading data, which can be changed according to the actual situation;
Invalid: default to valid, check as invalid, and change according to actual situation;
Device model: defaults to Acrel and can be changed according to actual situation;
Communication address: Instrument address, to be changed according to actual situation;
Stop communication: default communication, check to not communicate, change according to actual situation;
The remaining items are meaningless.

b) TCP/PORT Mode Configuration

Device number: default;
Device Name: Custom, usually filled in with circuit name;
Plant address: corresponds to the factory address in the database;
Device address: corresponds to the database device address;
Protocol classification: Select the corresponding classification;
Protocol Name: Select the corresponding device protocol name;
Waiting time: default to 100, the interval between cyclic sending and the waiting time to read data after sending, which can be changed according to the actual situation;
Timeout time: default to 3000, the timeout time when reading data, which can be changed according to the actual situation;
IP address: The IP address of the corresponding gateway or serial server (such as 192.168.1.136), which can be changed according to the actual situation;
Port number: corresponds to the port number address of the gateway or serial server (such as 4008), which can be changed according to the actual situation;
Device model: defaults to Acrel and can be changed according to actual situation;
Communication address: Instrument address, to be changed according to actual situation;
Stop communication: default communication, check to not communicate, change according to actual situation;
The remaining items are meaningless.

c) TCP/IP Mode Configuration

Device ID:Default;

Device Name:Customize, usually fill in the circuit name;

Plant Address:Corresponds to the plant address in the database;

Device Address:Corresponds to the database device address;

Protocol Classification:Select the corresponding category;

Protocol Name:Select the corresponding device protocol name;

Waiting Time:Default 100,The interval time for cyclic transmission and the waiting time to read data after transmission can be changed according to the actual situation;

Timeout:The default is 3000, and the timeout when reading data can be changed according to the actual situation;

IP Address:Change the IP address of the corresponding gateway or serial server (such as 192.168.1.136) according to the actual situation;

Port ID:Change the port number and address of the corresponding gateway or serial server (such as 4008) according to the actual situation;

Device model:Default to Acrel,change according to actual situation;

Communication Address:Instrument address, change according to actual situation;

Stop Communication:Default communication, check to not communicate, change according to actual situation;

The remaining items are meaningless.

#### 7.4.1.3 Collects Device Point Table Configurations

a) Telemetering Parameter Table Settings

Click Channel Name under Acquisition Channel in the tree bar, click Device Name under channel Name, click the expanded Telemetering table, add a new point in the table, and perform the same saving operation after configuration. as shown in the figure5.16.

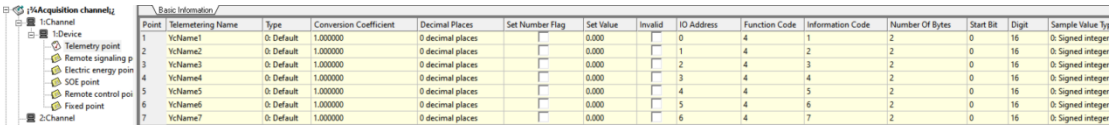



Fig. 7.16 TelemeteringParameter Configuration

Telemetering Name:For roll calling, usually fill in the name of the actual telemetry;

Type:You can choose default or corresponding name,as shown in the figure5.17:

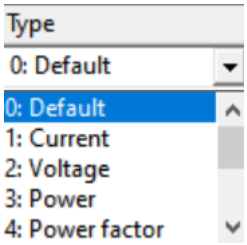



Fig. 7.17TelemeteringType

Conversion Coefficient:Default 1;

Decimal Places:Default 0;

Setting flag:Uncheck;

Set value:Default to 0;

Invalid No:Default unchecked;

IO Address:Is a point index, usually starting from 0;

Function Code:Enter the communication function code according to the protocol;

Information Code:Default 0;

Bytes:Bytes for data width;

Starting tag number:Default 0;

Digit:Default 0;

Sample value Type:为 Data Type,选择对应的 Data Type.as shown in the figure5.18:

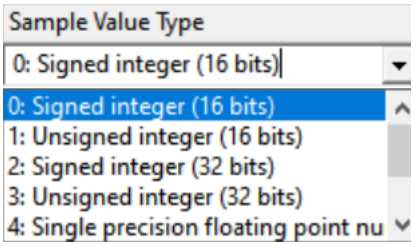



Fig. 7.18AcquisitionData Type

b) Telesignaling Parameter Table Settings

Click the Channel Name under the Acquisition Channel in the tree bar, then click the Device Name under the channel Name, click the expanded Telesignaling table, and add new points in the table. After the configuration is complete, the same saving operation is performed. By default, the first point in the Telesignaling table is the device Communication status point. as shown in the figure5.19:

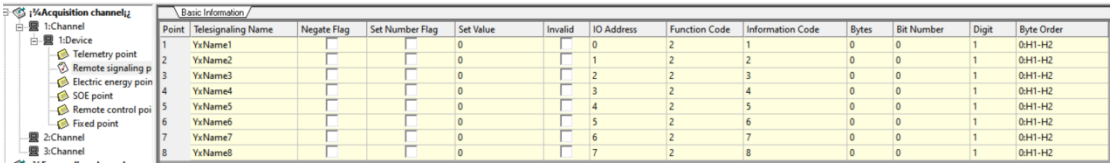



Fig. 7.19TelesignalingParameter Configuration

Telesignaling Name:For actual roll call, usually fill in the actual telesignaling communication name;

Negate flag:Default unchecked,

Setting Flag:Default unchecked;

Set value:Default 0;

Invalid No:Check according to actual situation;

IO Address:Is a point index, usually starting from 0;

Function Code:Communication function code, configured according to protocol;

Information Code:Same IO address;

Bytes:Default 0;

Tag Number:Default 0;

Digit:Default 0.

c) Electric Energy Parameter Table Configuration

Click Channel Name under Acquisition Channel in the tree bar, then click Device Name under channel Name, click the expanded Electric Energy point table, add points in the table, and perform the same saving operation after configuration. as shown in the figure5.20.

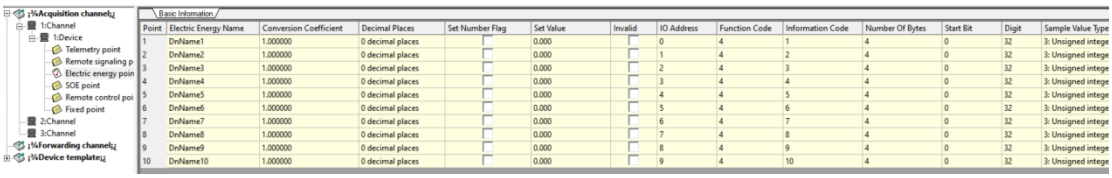



Fig. 7.20 Electric Energy Parameter Configuration

Electric Energy Name:Is the actual information name,Enter the actual Electric Energy Name;

Conversion Coefficient:Default to 1;

Decimal Places:Default to 0;

Setting Flag:Default unchecked;

Set value:Default to 0;

Invalid No:Default unchecked;

IO Address:Is a point index, usually starting from 0;

Function Code:Communication function code, configured according to protocol;

Information Code:Default to 0;

Bytes:Actual data byte width;

Starting tag number:Default to 0;

Digit:Default to 0;

Sample value Type:For the actual Data value Type, select the corresponding Data Type.as shown in the figure5.21:

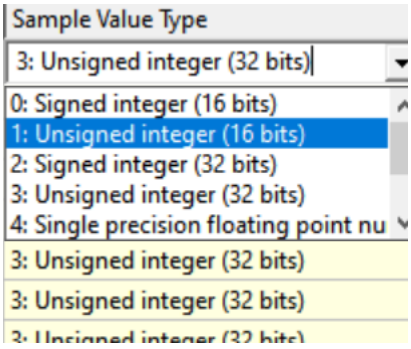



Fig. 7.21Electric Energy Parameter Type

d) SOE Event Parameter Table

Click Channel Name under Acquisition Channel in the tree bar, then click Device Name under channel Name, click the expanded SOE point table, and add points in the table. After configuration, the same saving operation will be performed. as shown in the figure5.22:

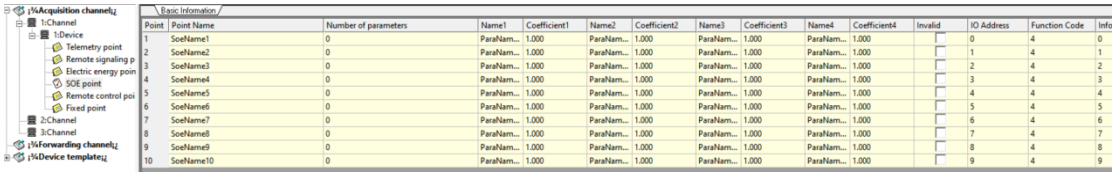



Fig. 7.22 SOE Parameter Configuration

Point Name:For the event name, usually fill in the actual event name;

Number of parameters:Default to 0;

Name1:Default ;

Coefficient1:Default ;

Name2:Default ;

Coefficient2:Default ;

Name3:Default ;

Coefficient3:Default ;

Name4:Default ;

Coefficient4:Default ;

Invalid No:Uncheck;

IO Address:Is a point index, usually starting from 0;

Function Code:Communication function code, configured according to protocol;

Information Code:Address for SOE point table.

e) Telecontrol Parameter Table Configuration

Click Channel Name under Acquisition Channel in the tree bar, then click Device Name under channel Name, click the expanded Telecontrol point table, and add a new point in the table. After the configuration is completed, the same saving operation will be performed. as shown in the figure5.23:

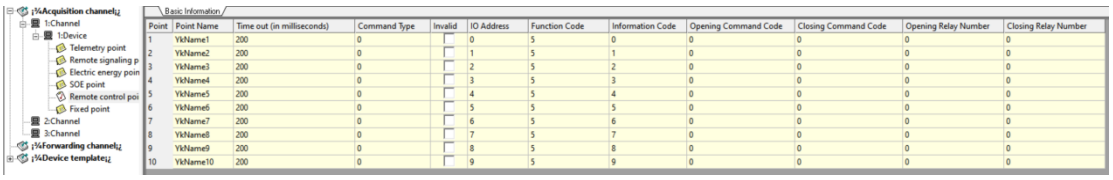



Fig. 7.23Telecontrol Parameter Configuration

Note: The Point Number corresponds to the Telecontrol Point Number of Telesignaling points in the database.

Point Name:Default ;

Timeout:Default ;

Command Type:Select the corresponding command type,Default 0;as shown in the figure5.24:

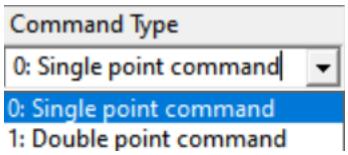



Fig. 7.24 Telecontrol Command Type

Invalid No:Default unchecked;

IO Address:Point number for remote control;

Function Code:Communication function code, configured according to protocol;

Information Code:Same IO address;

Opening Command Code:The specific configuration depends on the protocol type and is divided into command codes;

Closing Command Code:To match the command code, the specific configuration depends on the protocol type;

Opening relay number:Open command register number;

Closing relay number:Closed command register number.

f) Setting Value Parameter Table Configuration

Click the Channel Name under the Acquisition Channel in the tree bar, click the Device Name under the channel Name, click the expanded Setting Value point table, and add points in the table. After the configuration is completed, the same saving operation will be performed. as shown in the figure5.25:

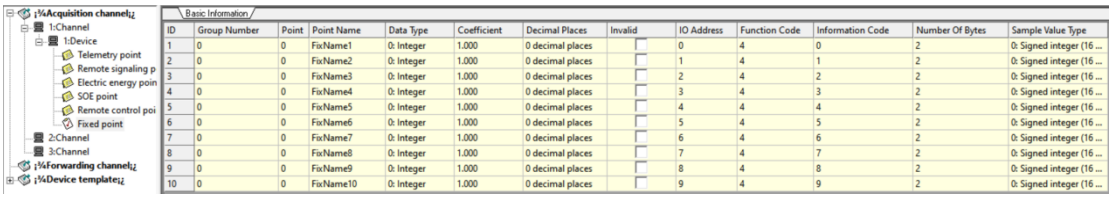



Fig. 7.25 Setting Value Parameter Configuration

Group Number:Number of fixed value group;

Point Number:Point number for fixed value;

Point Name:Name of fixed value point;

Data Type:Default 0;as shown in the figure5.26:

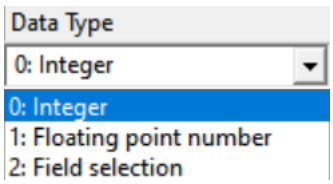



Fig. 7.26 Setting Value Data Type

Coefficient:Default 1;

Invalid No:Default unchecked;

IO Address:Point number for fixed value;

Function Code:Communication function code, configured according to protocol;

Information Code:Default to 0;

Bytes:For data width;

Sample value Type:Is the Data Value Type.as shown in the figure5.27:

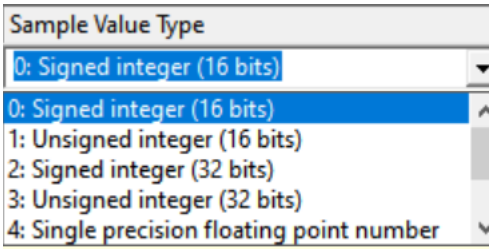



Fig. 7.27Setting Value Sample value Type

## 7.4.2 Forwarding Channel Configuration

Right-click **Forwarding Channel** in the tree bar, click **Configure forwarding**, click Save configuration Parameter button at the bottom, and click File to save. as shown in the figure5.28:

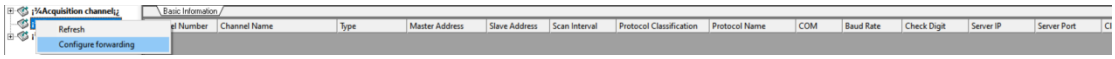



Fig. 7.28 Forwarding Channel Configuration

### 7.4.2.1.Forwarding Channel Parameter Configuration

as shown in the figure5.29

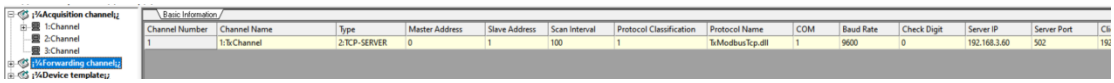



Fig. 7.29 Forwarding Channel Parameter Configuration

Types include the following:as shown in the figure5.30:

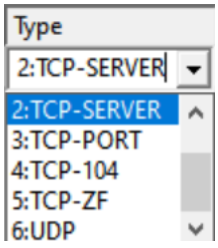



Fig. 7.30Forwarding Channel Type

### a) Serial port mode

**Channel Name:**For customization;

**Master Station Address:**To configure according to protocol type and actual situation;

**Slave Address:**To configure according to protocol type and actual situation;

**Protocol Classification:**Meaningless;

**Protocol Name:**Select the corresponding protocol;

**COM Number:**Is the actual port number;

**Baud Rate:**Is the actual Baud;

**Check Bit:**Is the actual number of verifications;

The rest is meaningless in serial mode.

**b) TCP/IP Ethernet mode**

**Channel Name:**For customization;

**Master Station Address:**To configure according to protocol type and actual situation;

**Slave Address:**To configure according to protocol type and actual situation;

**Protocol Classification:**Meaningless;

**Protocol Name:**Select the corresponding protocol;

**COM Number:**Meaningless;

**Baud Rate:**Meaningless;

**Check Bit:**Meaningless;

**Server IP:**Is the local IP address;

**Server PORT:**Is the local port number;

**Client IP:**For client IP address;

**Client PORT:**Meaningless.

Additionally, UDP and CAN are temporarily meaningless.

### 5.4.3 Protocol configuration

#### 7.4.3.1 Acquisition Channel Protocol configuration

In the ACREL2000 / CMU/ProtocolFile folder, OpenProtocolOfGetDevice. Ini configuration. as shown in the figure5.36:

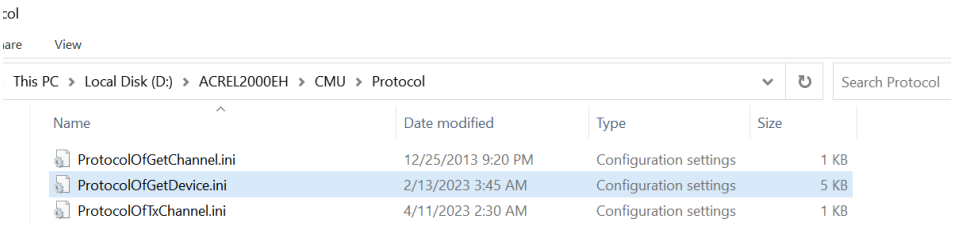



Fig. 7.36 Protocol configuration File

**Parameter Description**:as shown in the figure5.37:

**ClassCount=4:**Indicates a device classification;

**GetDeviceClassName1:**Indicates device classification 1;

**ClassName:**Indicates the device classification name;

**ProtocolCount=5:**Indicates that there are 5 communication protocols under this device category;

**ProtocolDescr1:**Description of the first acquisition protocol;

**ProtocolName1:**The protocol name representing the first acquisition protocol.

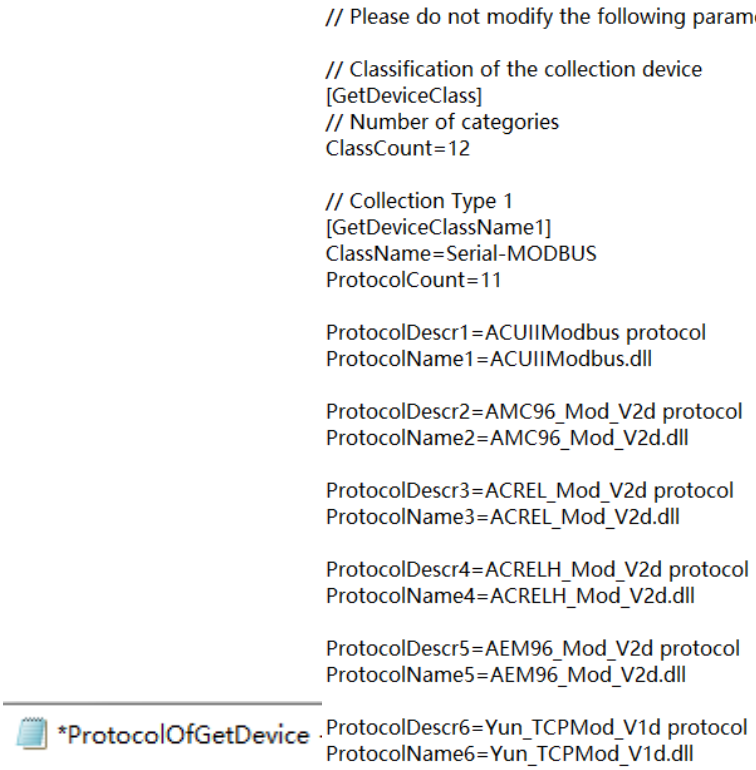



Fig. 7.37 Acquisition Protocol configuration

**a) Add a new collection protocol**

Change the ProtocolCount in the configuration File to 6 (originally 5), make a copy of ProtocolDescr1 and ProtocolName1 and change it to ProtocolDescr6 and ProtocolName6, Then change the description and Protocol Name after the = sign to the Protocol Name you want to add.

**b) Example Delete a collection protocol**

Change the ProtocolCount in the configuration File to 4 (originally 5), and delete ProtocolDescr5 and ProtocolName5.

### 7.4.3.2 Forwarding Channel Protocol configuration

In the ACREL2000 / CMU/ProtocolFile folder, OpenProtocolOfTxChannel. Ini configuration. as shown in the figure5.38.

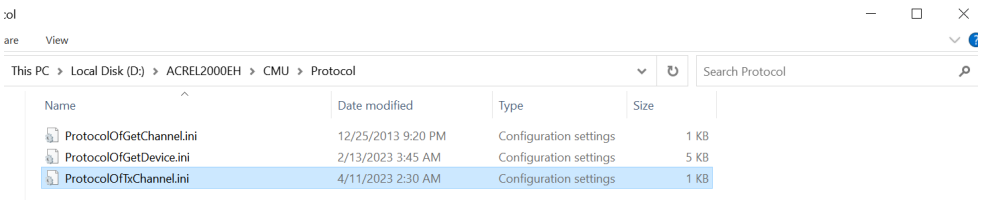



Fig. 7.38 Forwarding protocol File

**Parameter Description:**as shown in the figure5.39:

**TxProtocolCount=5:**Indicates that there are 5 forwarding communication protocols;

**TxProtocolDescr1:**Description of the first forwarding protocol;

**TxProtocolName1:**The protocol name representing the first forwarding protocol.

```
// Please do not modify the following parameters

[TxProtocol]
TxProtocolCount=5

TxProtocolDescr1 indicates the uplink TCP-Modbus protocol
TxProtocolName1=TxModbusTcp.dll

TxProtocolDescr2= Uplink serial port Modbus protocol
TxProtocolName2=TxModbusCom.dll

TxProtocolDescr3= Upstream TCP-IEC104 protocol
TxProtocolName3=TxIec104.dll

TxProtocolDescr4= Indicates the IEC101-02 upstream serial port protocol
TxProtocolName4=TxIEC101_02.dll

TxProtocolDescr5= Upstream serial port CDT protocol
TxProtocolName5=TxCDTWF_RBC.dll
```

Fig. 7.39 Forwarding Protocol configuration

**a) Add a new forwarding protocol**

Change the TxProtocolCount in configuration File to 6 (originally 5), make a copy of TxProtocolDescr1 and TxProtocolName1, and change it to TxProtocolDescr6 and TxProtocolName6. Then change the description and Protocol Name after the = sign to the Protocol Name you want to add.

**b) Example Delete a forwarding protocol**

Change TxProtocolCount in configuration File to 4 (originally 5) and delete TxProtocolDescr5 and TxProtocolName5.

### 5.4.4 Five prevention system configuration methods

If a five-defense system is configured in a project, the first Channel in the Forwarding Channel must be configured with five-defense. Protocol Select the corresponding five-defense protocol, which is usually the serial port 232-CDT protocol. as shown in the figure5.40:

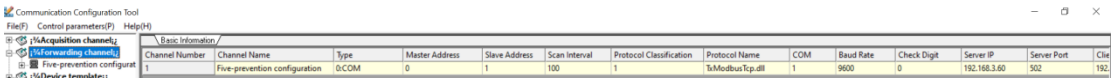



Fig. 7.40 Five-prevention configuration

Note: The Five-prevention Forwarding Channel must be in the first channel. Other configurations are the same.

### 5.4.5 Device Template

In actual use, it may be necessary to communicate with external manufacturers' devices. At this time, a new template can be added through the device point table (referring to the communication protocol) for future use.

#### 7.4.5.1 Add a Template

in the D:\ACREL2000\CMU\TemplateFile folder, OpenTempIndex.iniFile,as shown in the figure5.41:

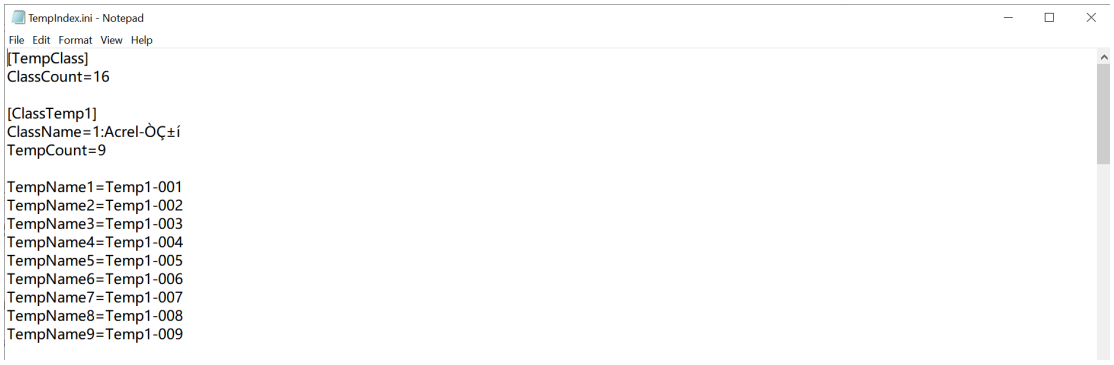
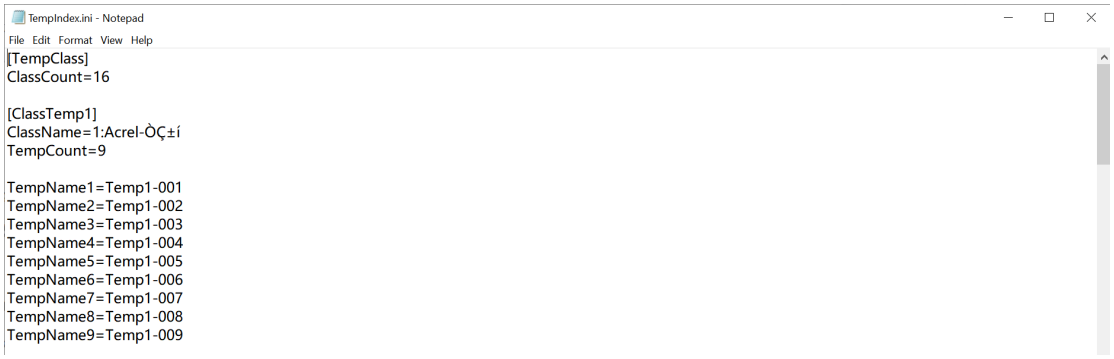



Fig. 7.41TempIndexFile

In class ClassTemp1, add the TempCount entry by 1 and add a line below TempName8, then make a copy of Temp1-001.datFile and rename it Temp1-008.dat. Finally, as shown in the figure5.42:



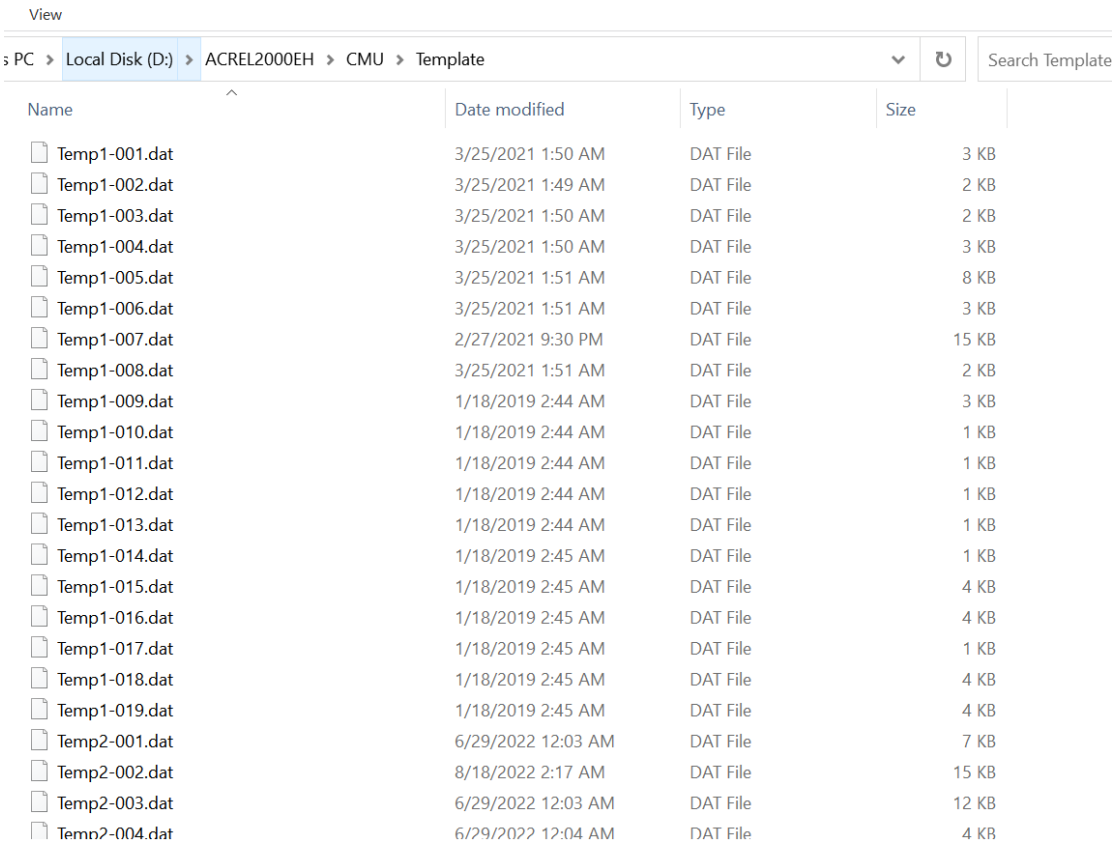



Fig. 7.42 Add a template

### 7.4.5.2 Configuration Template

OpenCommunication configuration tool, click Device Template, click **Acrel-instrument**, double-click the newly added Device Name, as shown in the following Figure: Modify template Name and protocol on this page. Then click the template YC point table and other labels to add Telemetering point and other information. After the configuration is complete, click the Save information button, and then click the Save Template button. as shown in the figure5.43:

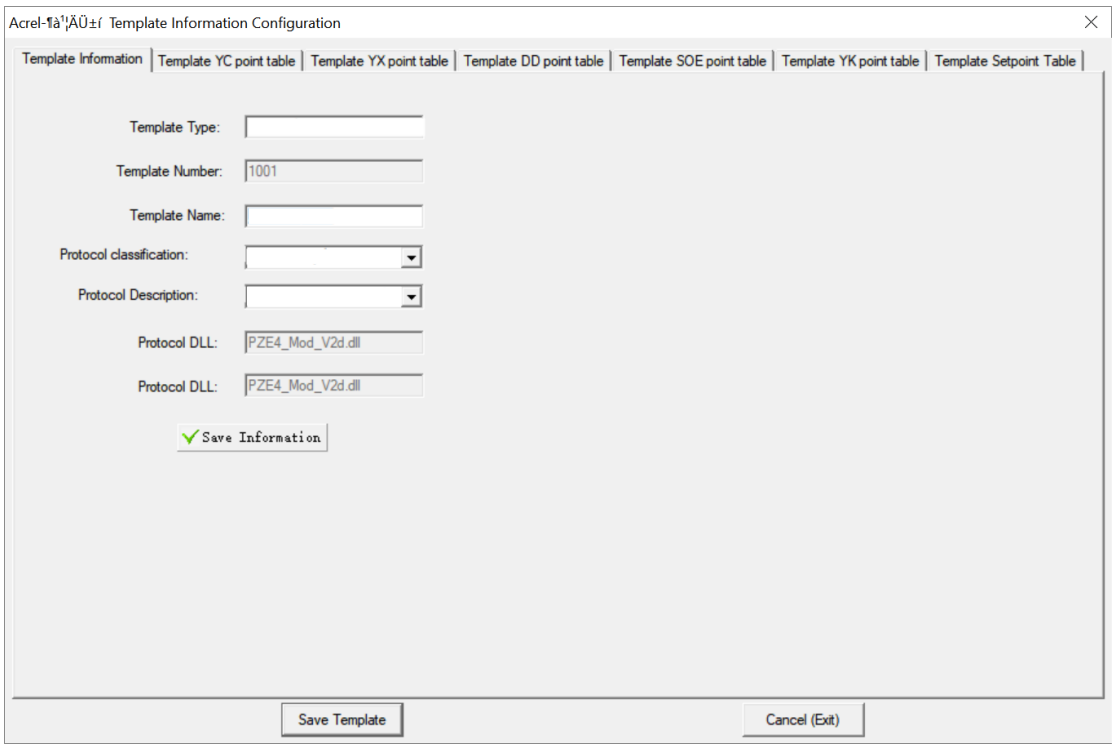



Fig. 7.43Template added successfully

## 5.4.6 Network Configuration

### 7.4.6.1Communication Status

View the running status of the ACMU process, as shown in the figure5.44ACMU process running on the host.


Figure 5.44

### 7.4.6.2 Network Information Configuration

as shown in the figure5.45:

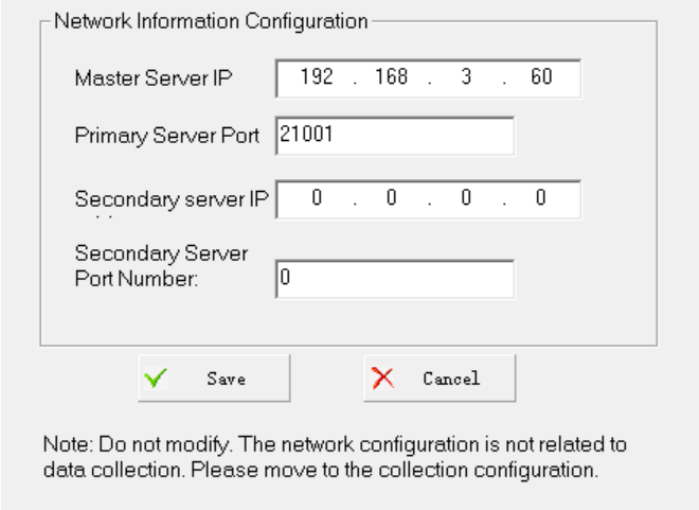



Fig. 7.45 Information configuration toolbar

Enter the IP Address and Port ID of the corresponding Server.

### 5.4.7 Acquisition Message

It is used to display information about packets such as Telemetering and Telesignaling of a collection device. as shown in the figure5.46:

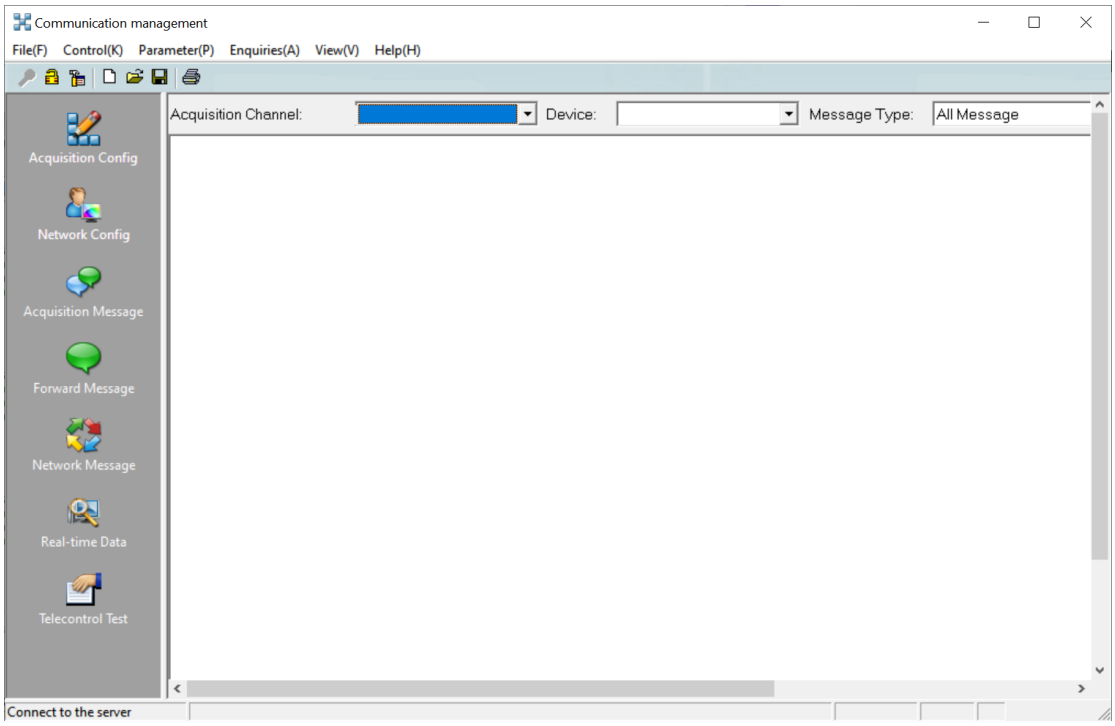



Fig. 7.46

**Acquisition Channel Name:**Select the corresponding acquisition channel name;

**Device Name:**Select the device name that needs to be collected,Default to 0;

**Message Type:**Select the message to be displayed, default to displaying all messages;

### 5.4.8 Forward Message

Displays the data to be forwarded.as shown in the figure5.47:

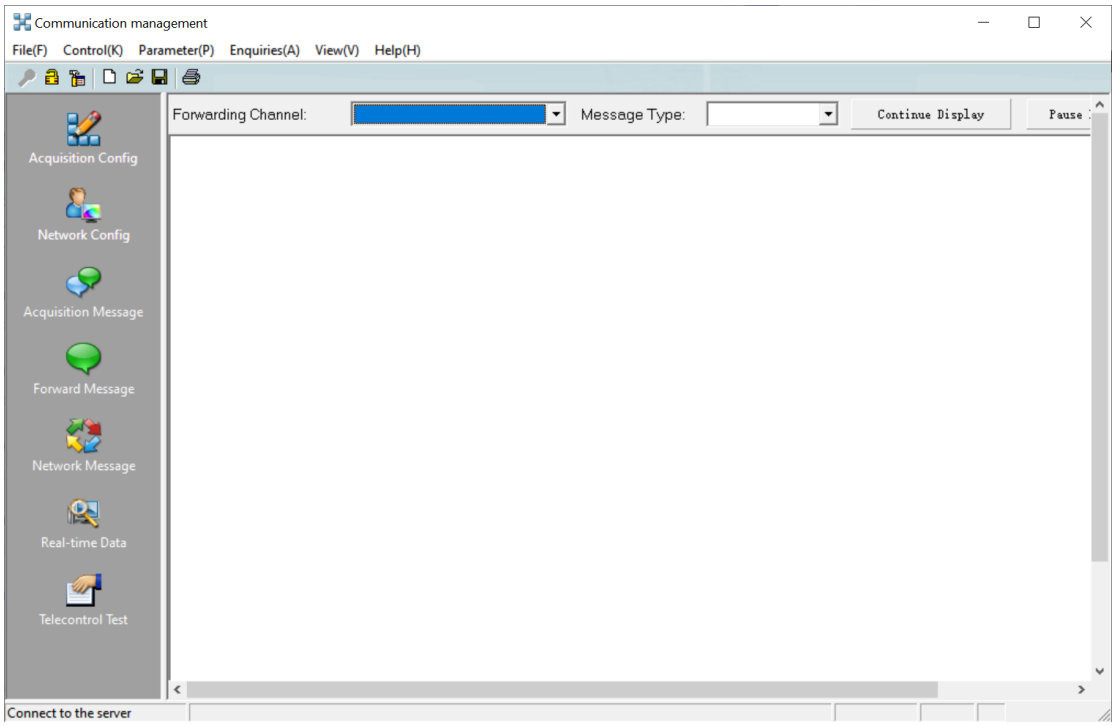



Fig. 7.47Forward Message Interface

**Forward Channel Name:**Select the corresponding acquisition channel name;

**Message Type:**Select the message to be displayed, default to displaying all messages;

### 5.4.9 Network Message

As shown in the figure5.48:

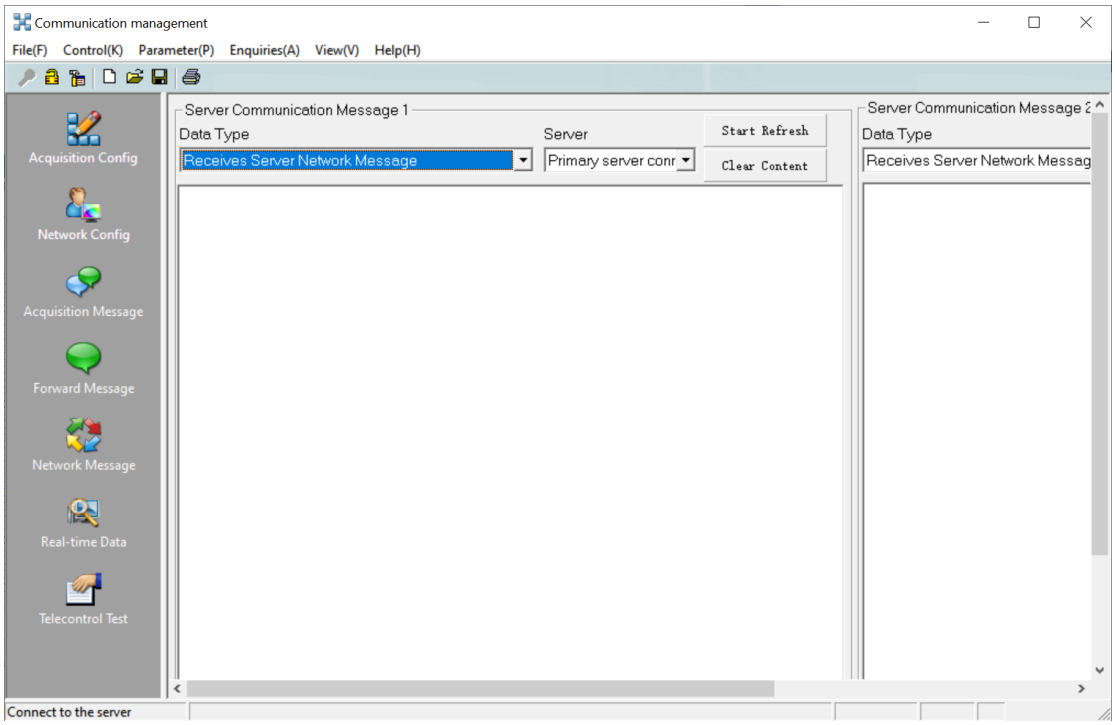



Fig. 7.48Network Message Display

### 5.4.10 Real-time data

It is used to display the real-time data of a device in the factory station, that is, the original value of the Communication message data. as shown in the figure5.49:

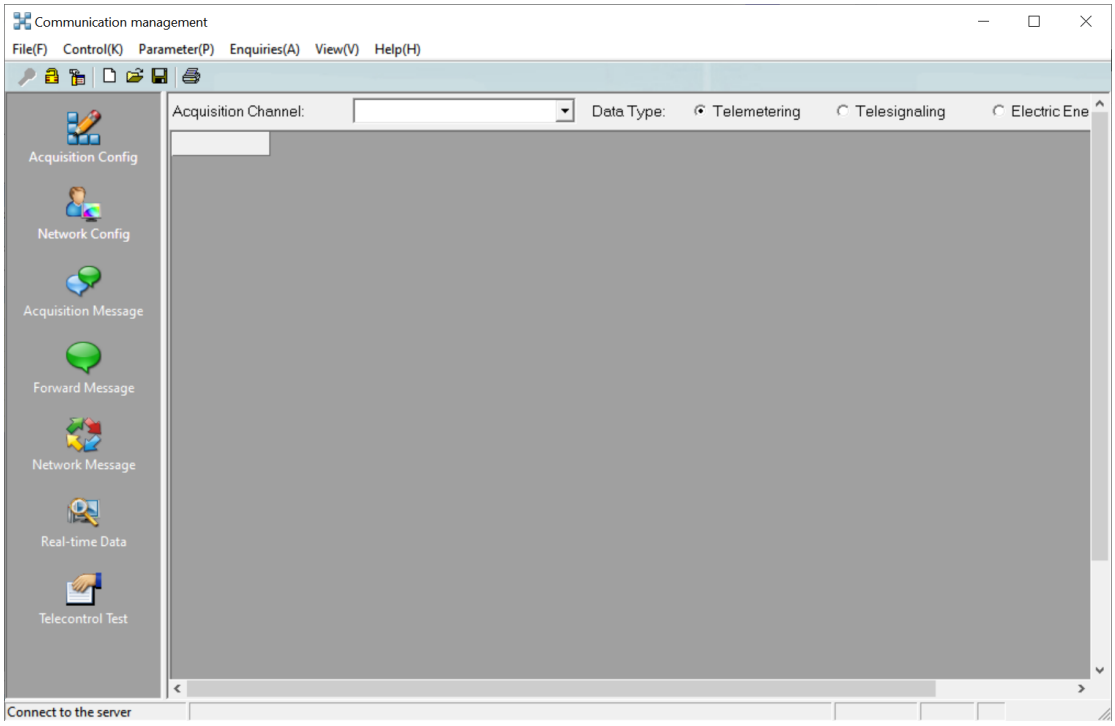



Fig. 7.49Real-time data display Interface

**Acquisition Channel Name:**Select the corresponding acquisition channel name;

**Data Type:**Select the message to be forwarded, and the telemetry message will be displayed by default.

### 5.4.11 Telecontrol testing

This parameter is used to split and close the Telecontrol device

If you click the **Telecontrol test**, the **Telecontrol password** will be displayed. Enter the password to access the Telecontrol Interface. as shown in the figure5.50, Fig. 7.51.

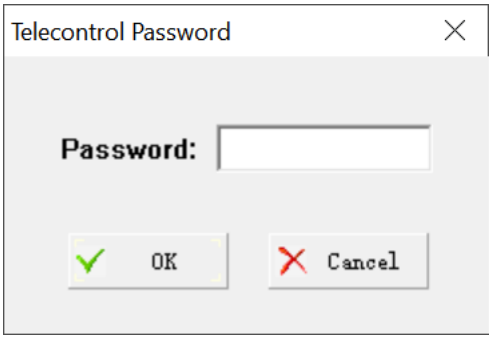



Fig. 7.50Telecontrol Password input dialog box

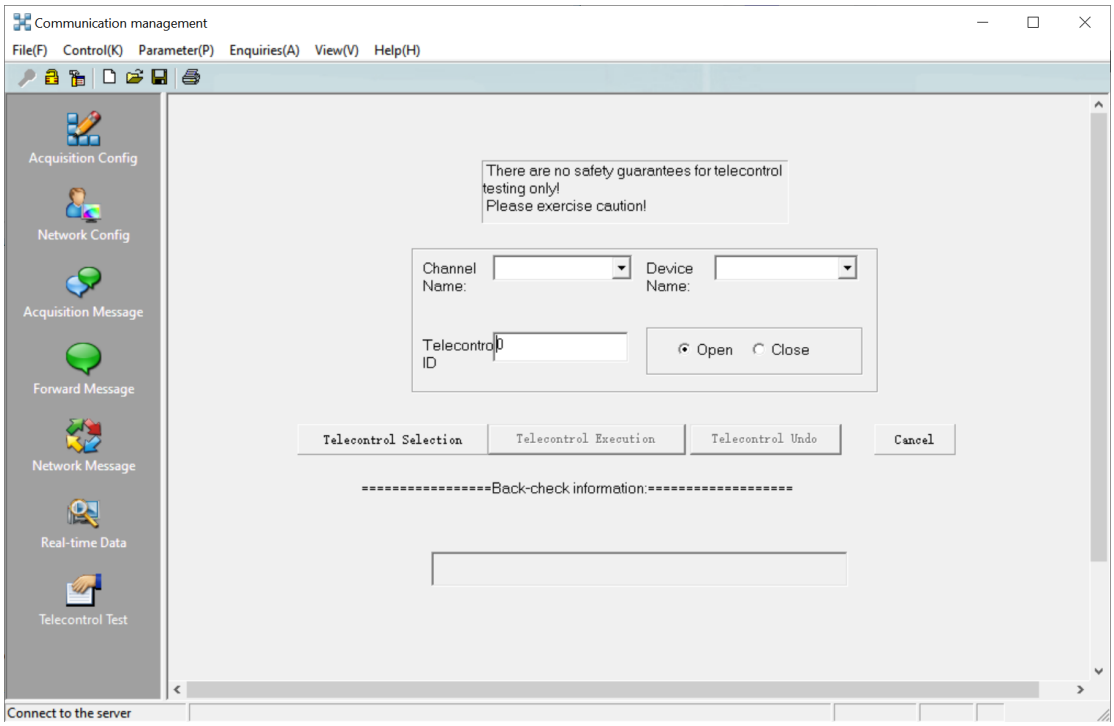



Fig. 7.51Telecontrol Execution dialog

# Chapter 8 Human-computer Interface(AHMI)

## 8.1 Overview

AHMI is one of the several components of the Acrel-2000 power monitoring system. Its main function is to complete human-machine dialogue, such as telemetry and remote signaling monitoring, remote control operations, report printing, browsing and printing of various event records, etc. The human-machine interface of the entire monitoring system provides flexible and

convenient means of human-machine communication for operators. Implement the monitoring and control functions of the entire monitoring system. The main wiring screen displays the wiring and operation mode of the system, and real-time displays the operating status of various devices within the system.

## 8.2 Function Introduction

The interface of the main control module is friendly, easy to operate, and easy to master. At the same time, it fully considers the needs of users and provides comprehensive work. It has the following functions:

1) Real time data display: Real time display and dynamic update of telemetry, electrical degree, and remote signaling data.

2) Processing of alarm information: Automatically display accident images and flashing of accident objects.

3) User login: Any control and setting operations on the interface must be logged in first and then operated. Login is divided into single seat and dual seat modes.

4) Event handling: remote control operation, remote adjustment operation, fixed value operation, reset operation, set Bitwise operation operation, screen switching operation, exit operation; External program call operations, etc.

5) Query of historical and real-time curves.

6) View the bar diagram and monitoring system network topology diagram.

## 8.3 Interface Description

After the operator enters the local operating system, run AServer first, then AHMI; Open AHMI, the system automatically opens the default main cable Figure. as shown in the figure6.1.


Fig. 8.1 AHMI

Click the title in most monitoring charts to return to the main Interface of the system, and click the title in Report charts to return to the Report index chart. Click the history curve in the diagram to switch to the **history curve** Interface. Click the button on the **home page** of the function panel to switch to the main Interface.

Set the main wiring diagram displayed on the **home page** of the monitoring system FileName in D:\ACREL2000\INI\GRAPH.INI File:

Main diagram = **main wiring diagram.shp**.

### 8.3.1 Introduction

The title bar displays system information.

The right-click menu provides all the operating functions of the system.

The status bar displays the current status of the system.

The human-machine interface displays images and real-time data.

### 8.3.2 View Telesignaling

The Attribute for the measurement is displayed when the left mouse click on the Telesignaling quantity element. After login, you can modify the **Data Type** of the Telesignaling quantity, as shown in the Fig. 8.3.

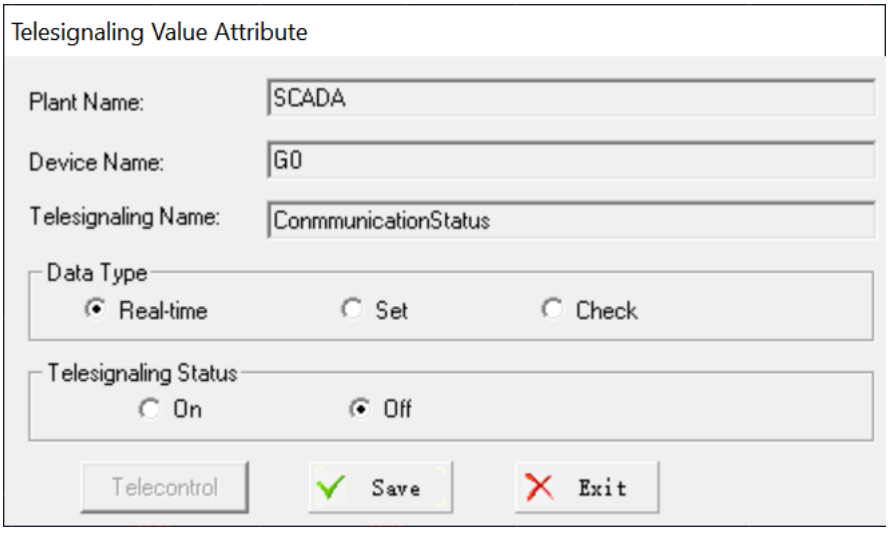



Fig. 8.3 Telesignaling Value Attribute

**Parameter Description:**

(1)**Plant Name**.**Device Name**.**Telesignaling Name**:The specific location of the remote signal quantity is indicated.

(2)**Data Type**

**Real-time**:That is, the current state of the Telesignaling quantity.

**Set**:manuallly Set the Telesignaling state.

**Inspection & Repair**:Inspection & Repair switch, change to system setting color.

(3)**Telesignaling Status**:The Telesignaling measures whether the current state is split or combined.

### 8.3.3 View Telemetering

The Attribute of the Telemetering value is displayed when the left mouse button is clicked on the Telemetering quantity element. After login, you can modify Telemetering data, as shown in figure6.4.

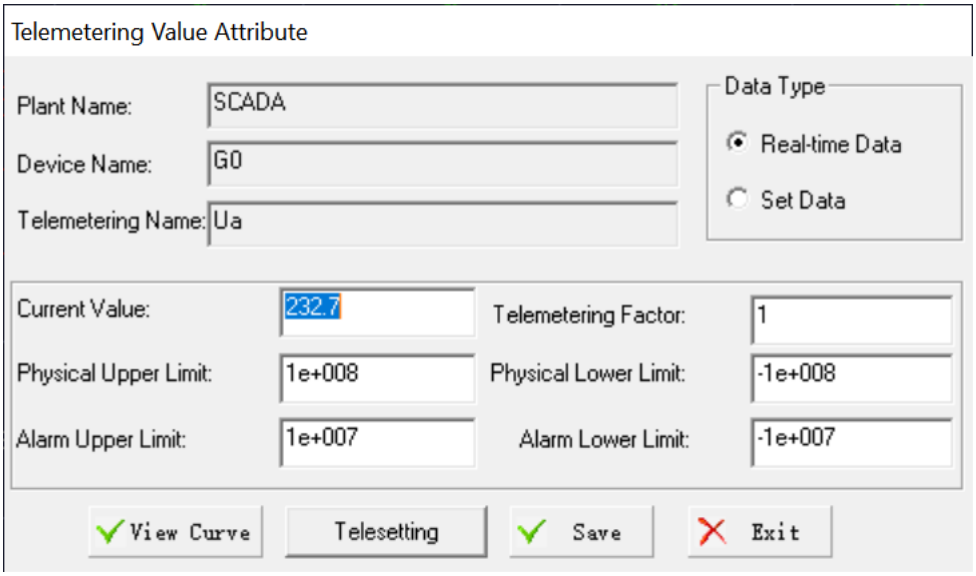



Fig. 8.4 Telemetering Value Attribute

**Parameter Description:**

(1)**Plant Name.Device Name.Telemetering Name:**Indicate the specific location of this remote measurement.

(2)**Current Value:**The displayed value is the real-time value of the remote measurement.

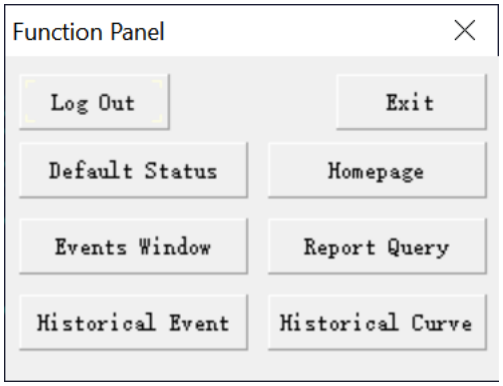
(3)**Data Source:**Does this data refer to real-time data or manuallly inserted data.

(4)**Physical Upper Limit.Physical Lower Limit.Alarm Upper Limit.Alarm Lower Limit:**This remote measurement can set two different levels of alarm range values.

You can modify the Current Value, Physical Upper Limit, Alarm Upper Limit, Coefficent, Physical Lower Limit, Alarm Lower Limit, real-time data, and embedded data values here. Finally, click 'Save' to save the modified parameters to the database.

### 7.3.4 View Curve

Click the **Report Query** button from the Interface, or click the **history curve** button in the function panel, or click the **View curve** button in the **Telemetering Value Attribute dialog box**. as shown in the figure6.5, the Query Interface of the historical curve is displayed, as shown in figure6.6.

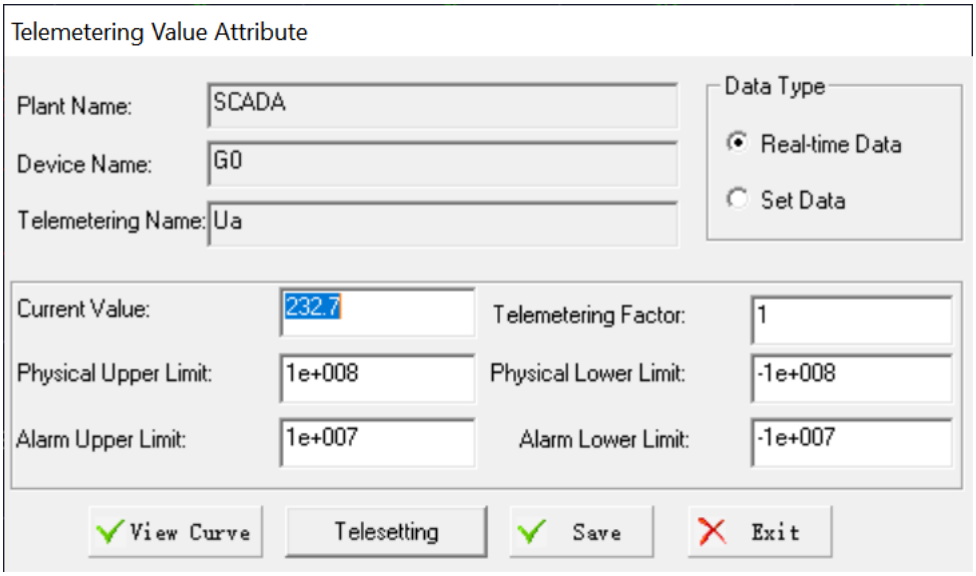



Fig. 8.5 history curve Query

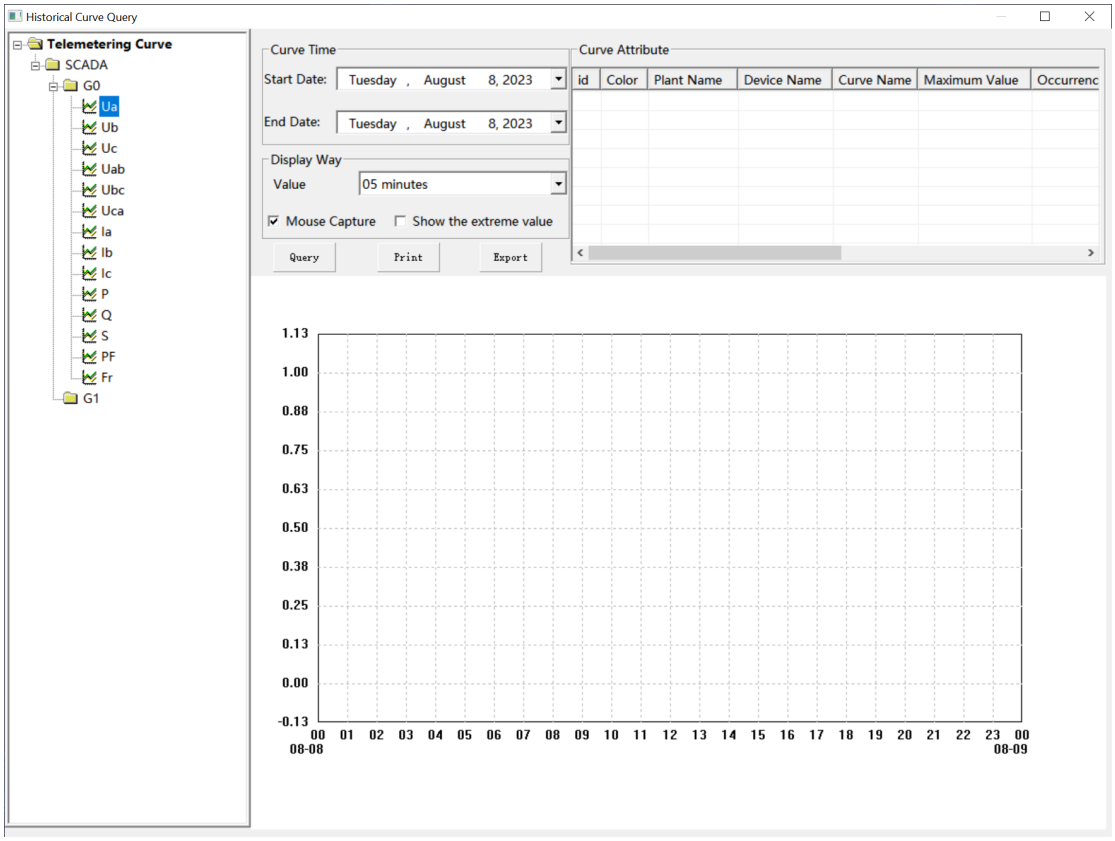



Fig. 8.6 History Curve

Function description:

(1) Curve selection box

To select a curve to be displayed, double-click the left key in the Telemetering Name, as shown in the figure6.7

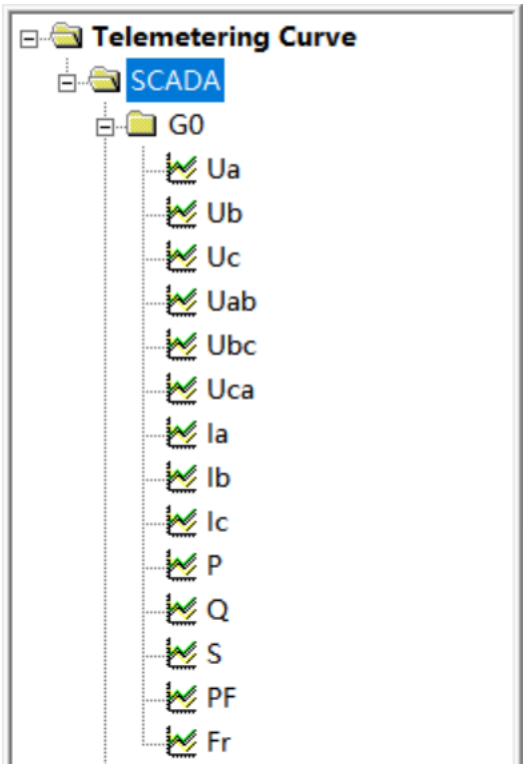



Fig. 8.7 Curve selection box

(2)Curve time selection

This parameter is used to set **Start Date** and **End Date** for the display curve. You can Query any data curve for 31 consecutive days, as shown in figure6.8

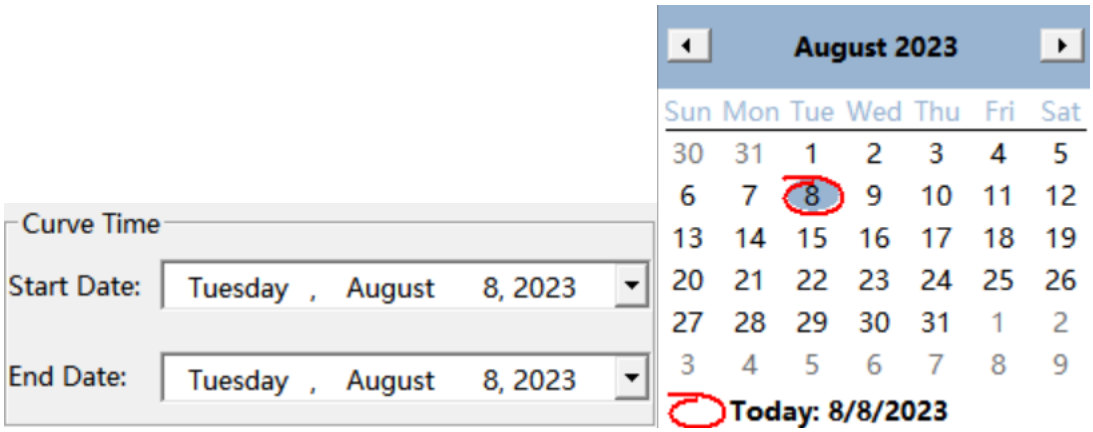



Fig. 8.8 Curve time selection

(3)the curve is displayed in Mode, as shown in the figure6.9

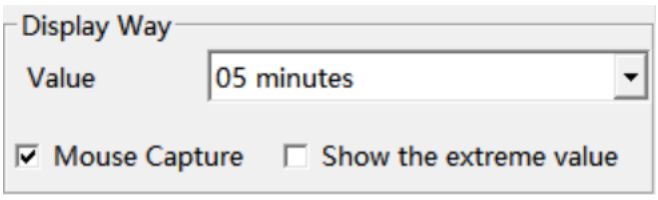



Fig. 8.9 Curve display Mode

**Value Period:**You can select 1 minute, 5 minutes, 30 minutes, or 60 minutes, and the default

display is the 5 minute curve.

**Mouse Capture:**Used to display mouse cursor position and current mouse position curve data,as shown in the figure6.10

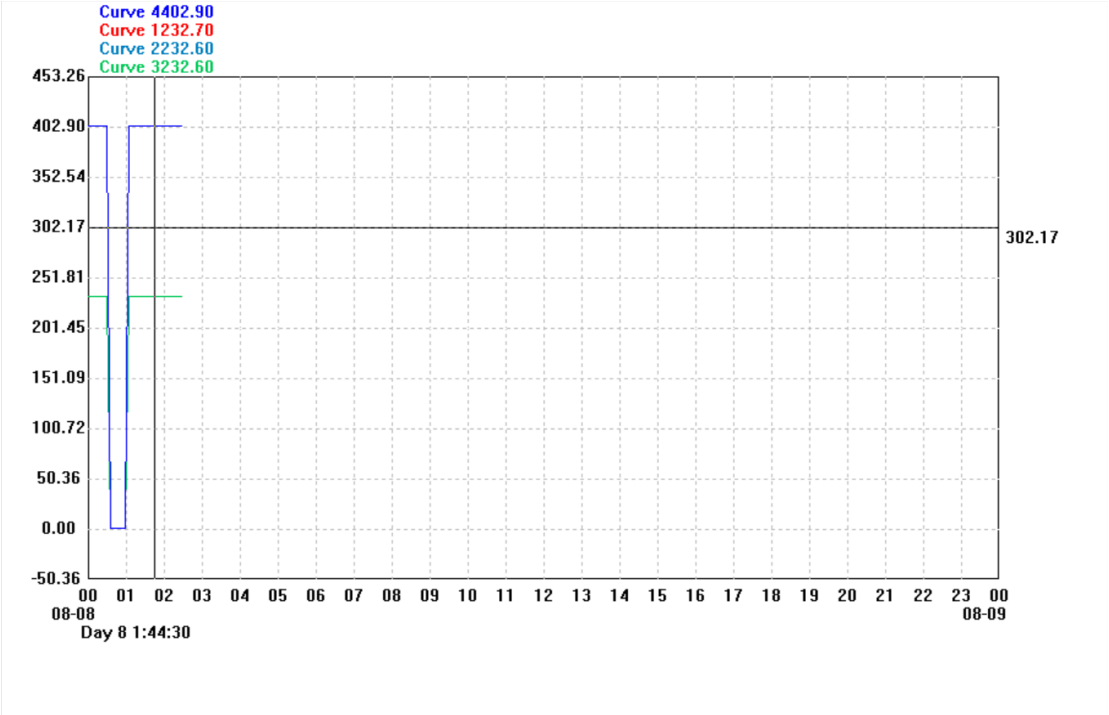



Fig. 8.10 Mouse Capture

**Display maximum value:**Used to display the Maximum Value and Minimum Value points of the current Query curve data,as shown in the figure1.7

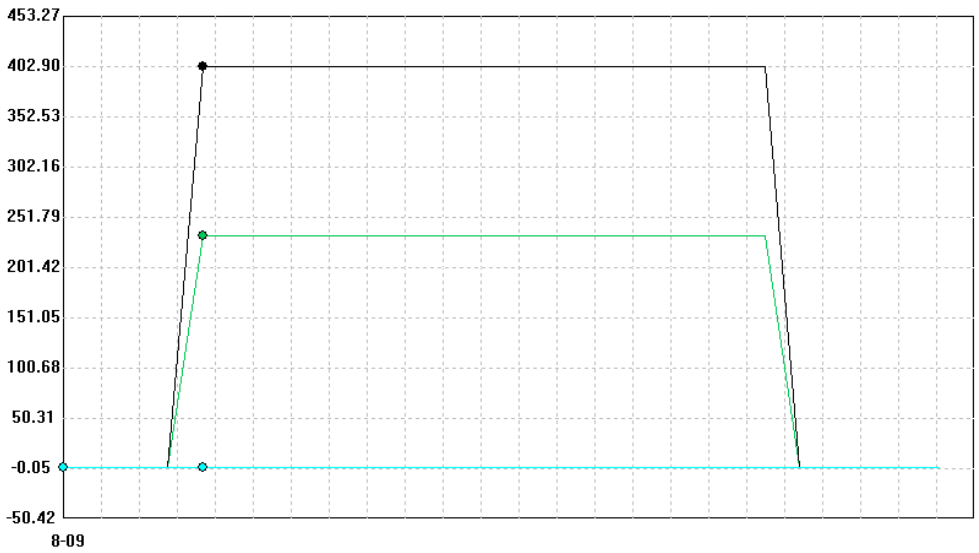



Fig. 8.11 Maximum display

**Query:**Click the Query button to display the selected curve.

**Close:**Click the Close button to open the Close History Curve Query dialog box.

**Print:**Click the Print button to print the current Query curve.

(4)Curve Attribute, can display up to 9 curves at the same time,as shown in the figure6.12

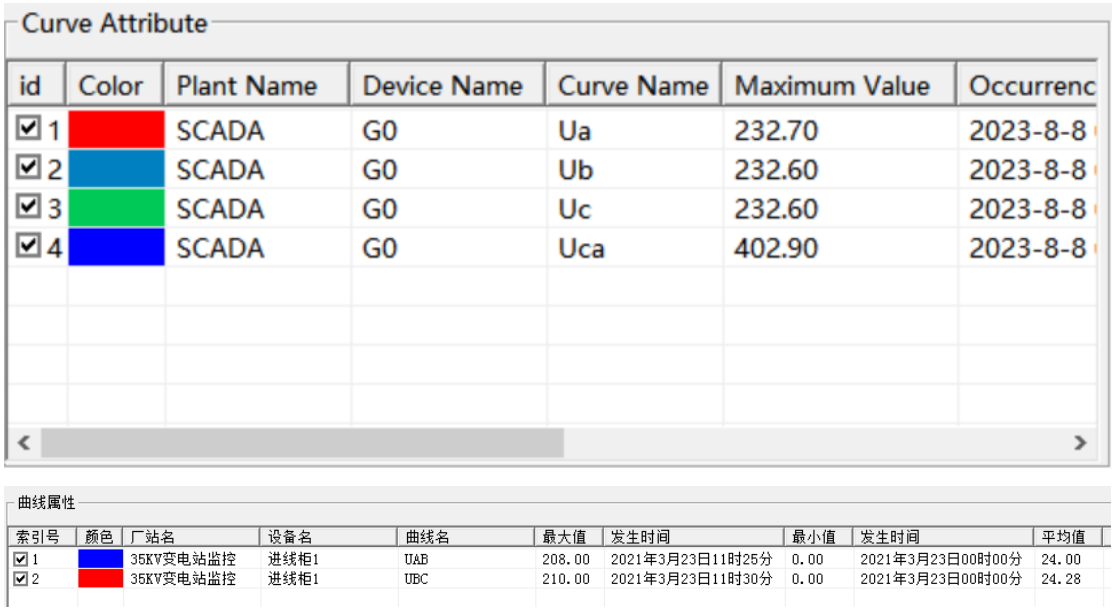



Fig. 8.12 Curve Attribute

**Index Number:**Corresponding curve number; Among them, represents displaying the current curve and ☐represents hiding the current curve.

**Color:**Display the current curve Color, left click "double click" to modify the current curve Color and save it.

**Plant Name:**Display the Plant Name corresponding to the current curve.

**Device Name:**Display the current curve Device Name.

**Curve Name:**Display the current curve circuit name.

**Maximum Value:**Display the maximum value of the current curve data.

**Maximum Occurrence Time:**Display the maximum occurrence time of the current curve data.

**Minimum Value:**Display the current curve data Minimum Value.

**Minimum Occurrence Time:**Display the minimum occurrence time of the current curve data.

**Mean Value:**Display the current curve data Mean Value.

**Delete Curve:**Double click on the corresponding curve Device Name or Curve Name.

(5)The curve display interface displays the historical data, Maximum Value, Minimum Value, and corresponding date and time of the current Query curve,as shown in the figure6.13.

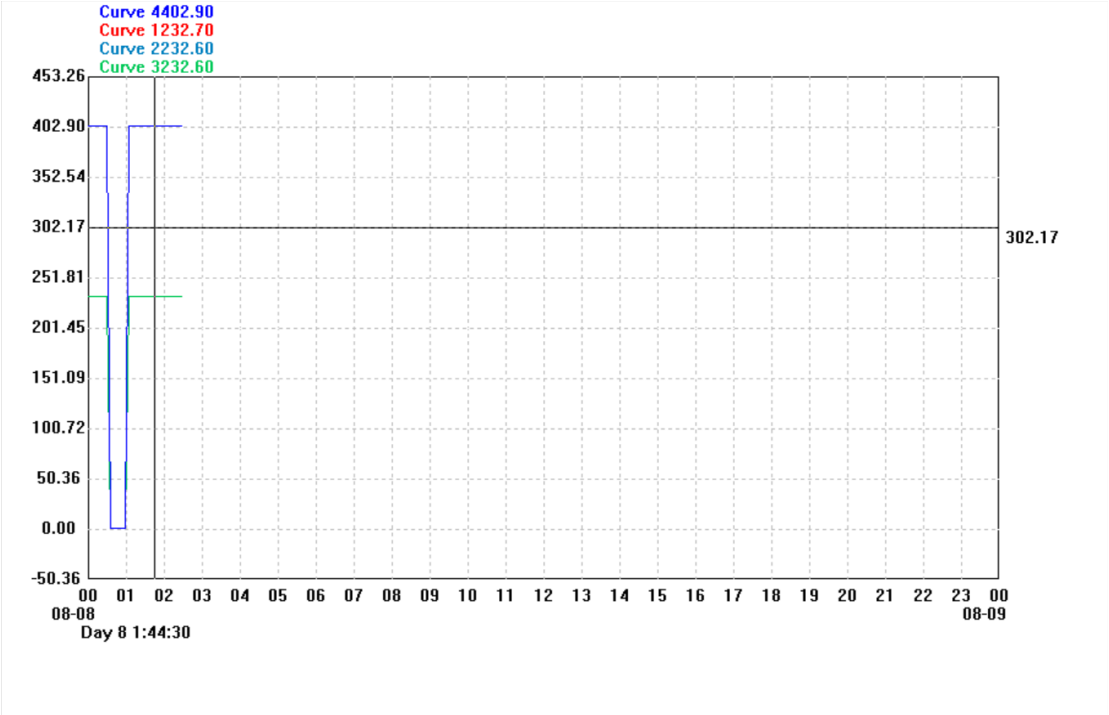



Fig. 8.13 Curve display

Hold down the left mouse button and slide to the right to zoom in on the curve,as shown in the figure6.14.

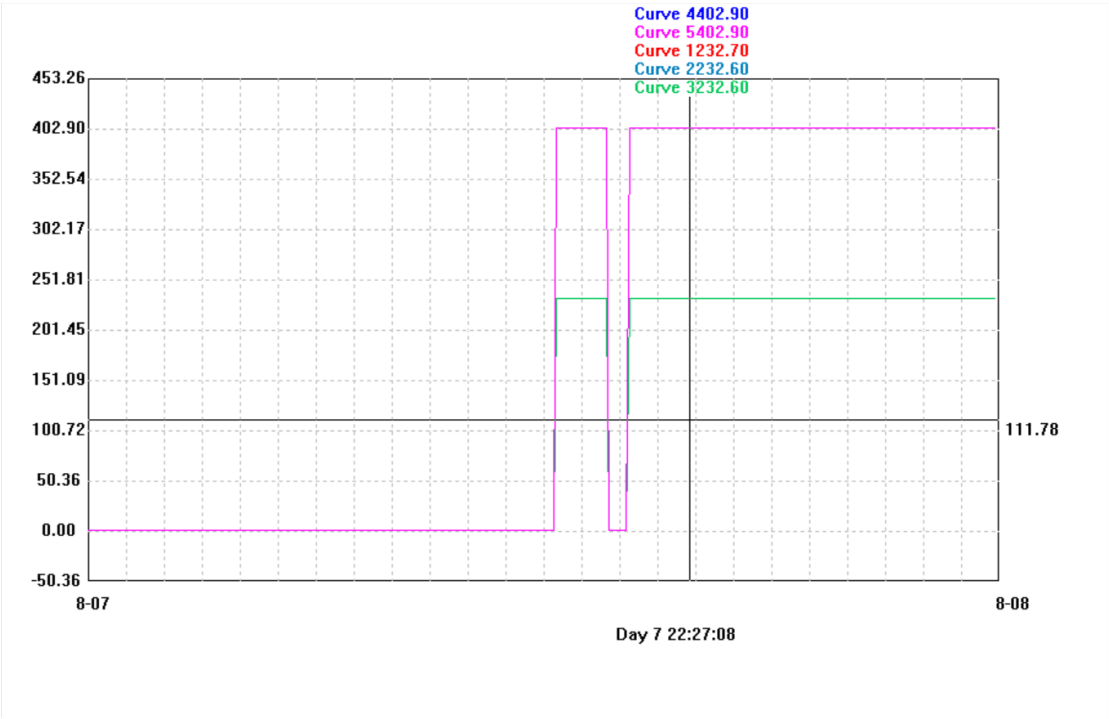



Fig. 8.14 Magnifying curve display

Click the right mouse button to restore the original state display.

### 6.3.5 View Report

as shown in the figure6.15,Click the Report Query button on the interface, or click Report

Query in the function panel to open the Report Query interface. Select the corresponding start and end times, and click Query to display the corresponding report. You can also choose to export or print.

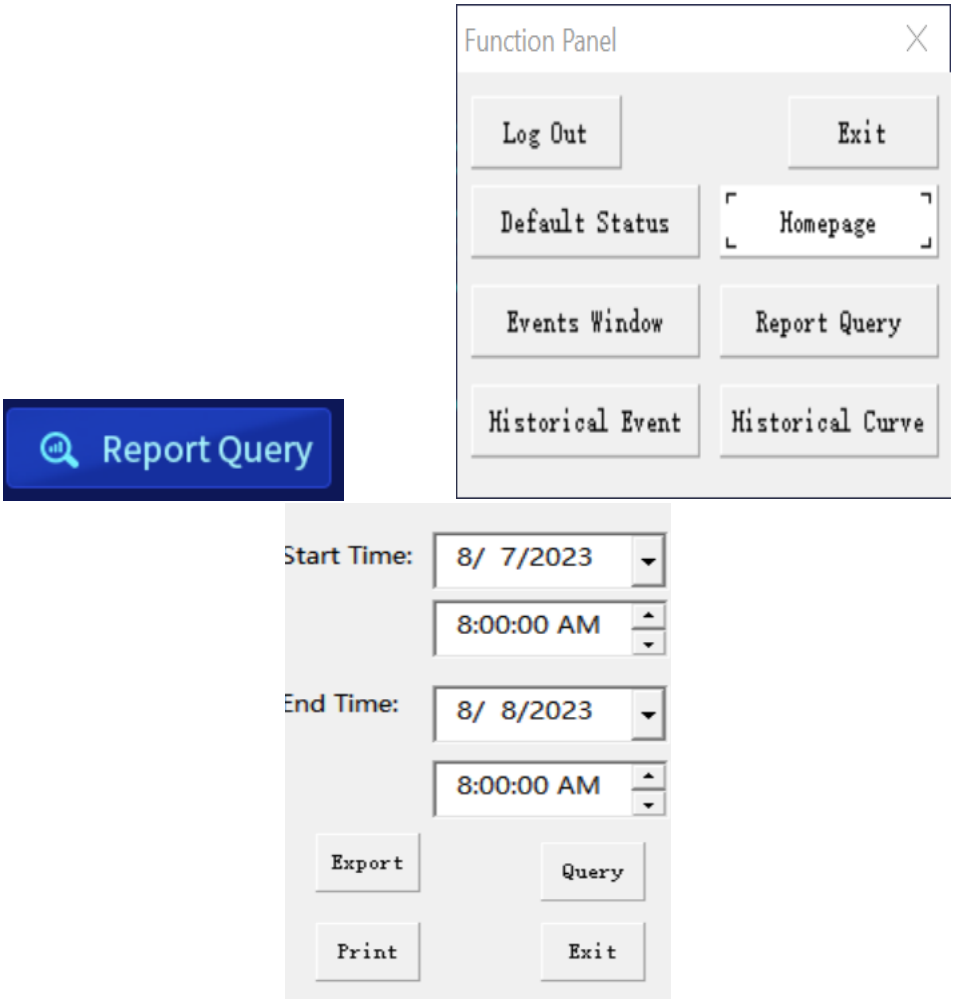



Fig. 8.15 Report function

### 6.3.6 Help Documents

Click the help document button on the interface to display the corresponding help file. Help documents include system software user manuall, maintenance manuall, database installation guide manuall, debugging manuall, etc. The documents support retrieval, indexing, and printing.


## 8.4 Right Click Function

Right-click in the display area to pop up a drop-down menu as shown in Fig. 8.16. All system operations are performed through this menu.

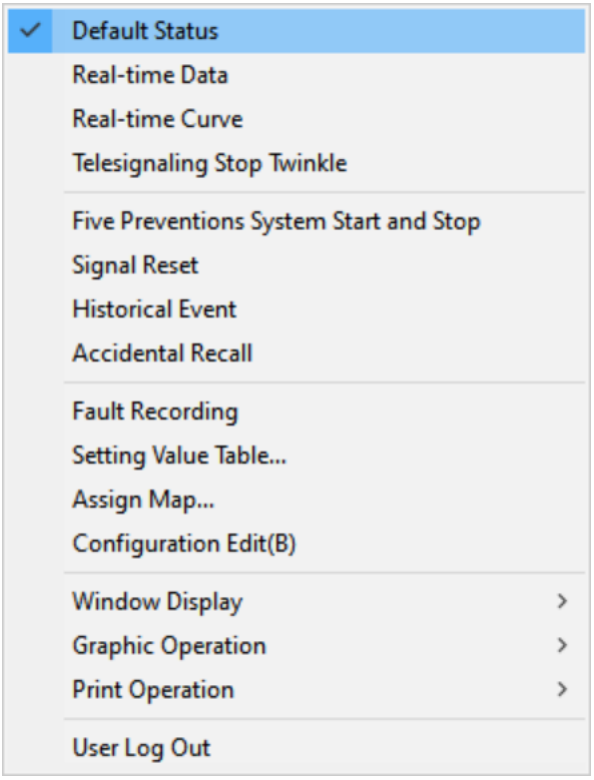



Fig. 8.16Right-click Menu

### 8.4.1.Defaults Status

After executing this menu item, the system returns to its default state. After completing remote control and remote setting operations, it is necessary to restore to the default state before proceeding with other operations.

### 8.4.2.Remote Operation

After clicking on the remote signal on the wiring diagram with the left mouse button, click on remote control to enter the remote control state of the system, as shown in the dialog box in Fig. 8.17. (When performing remote control operations, it is necessary to ensure that the device can be remotely controlled, and it is necessary to set it in the remote control parameters in the database in advance. The setting steps refer to the remote control settings in Chapter 3.)

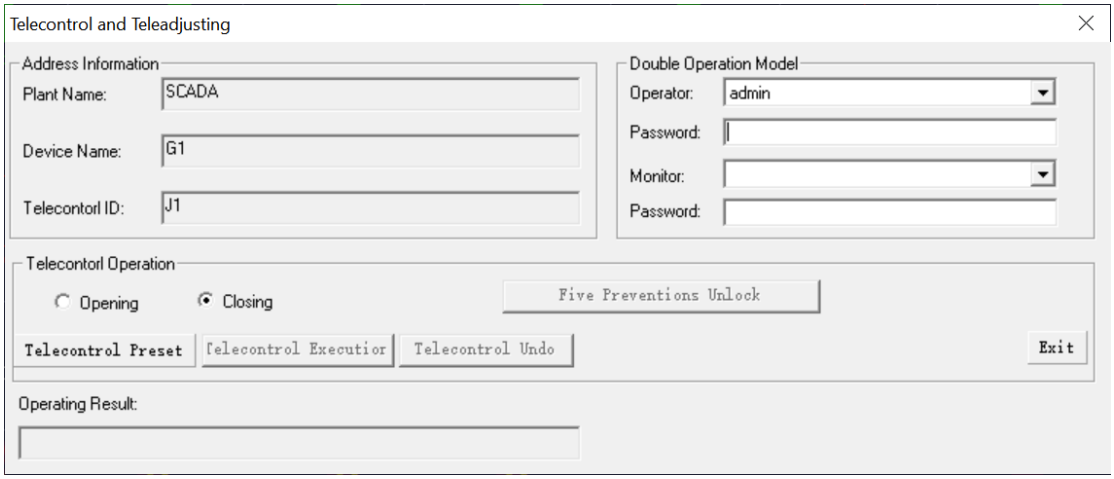



Fig. 8.17 Telecontrol operation

**Function description:** Remote control of circuit breakers or disconnectors, etc. Remote

control execution can only be performed after the remote control preset is correctly returned to school.

**Parameter Description:**

**(1) Remote control preset:** specifies the status of remote control operations.

**(2) Remote control execution:** Execute the specified remote control command.

**(3) Remote control cancellation:** After the remote control preset is correct, if you do not want to perform remote control execution, you can execute the remote control cancellation command and exit.

**(4) Dual seat operation:** The operator and supervisor are different duty personnel.

**(5) Five prevention unlocking:** After connecting to the five prevention system, you need to first click on the five prevention unlocking button, and then perform remote control operations after success.

### 8.4.3.Telesetting Operation

**Function description:** You can modify the parameter values of remote devices on the interface, such as Device Address, Baud Rate, inverter output power, etc.

In the right-click menu, click on Remote Settings Parametersas shown in the figure6.18.

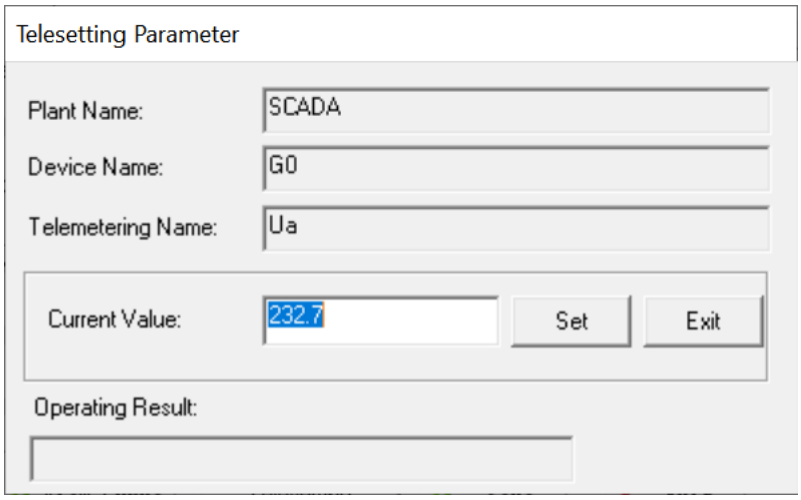



Fig. 8.18 Telesetting Parameter

### 8.4.4.View Real-Time Data

1) Click on Real Time Data in the function panel or right-click menu, select Plant and Equipment to view the real-time telemetry, real-time remote signaling, and real-time electricity consumption of different devices.as shown in the figure6.19.

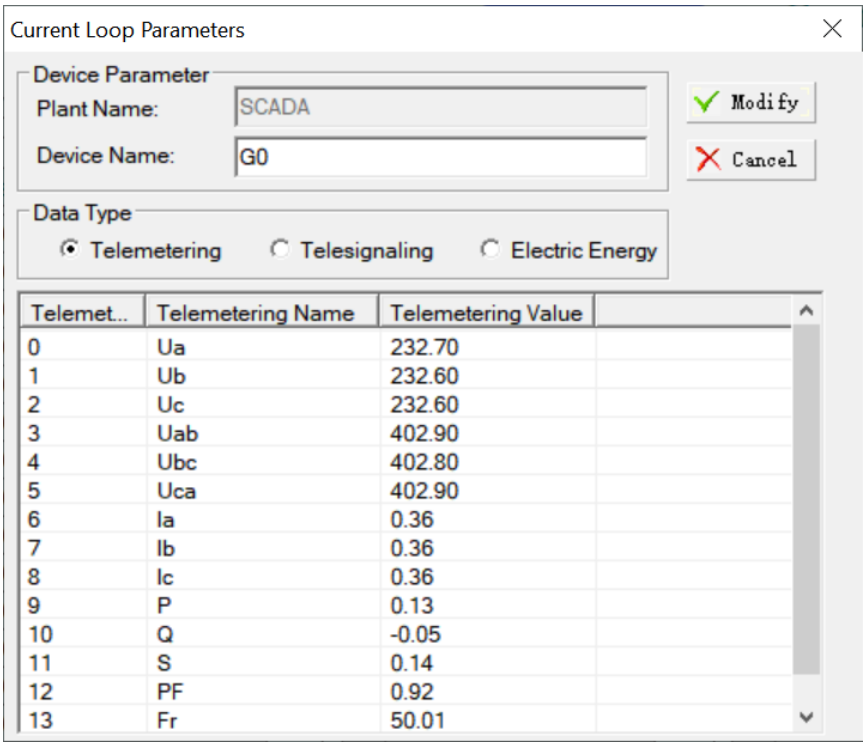



Fig. 8.19 Real-time data

2)Click on the circuit name on the interface to view the real-time telemetry, real-time remote signaling, and real-time electricity consumption of the modified circuit,as shown in the figure6.20.

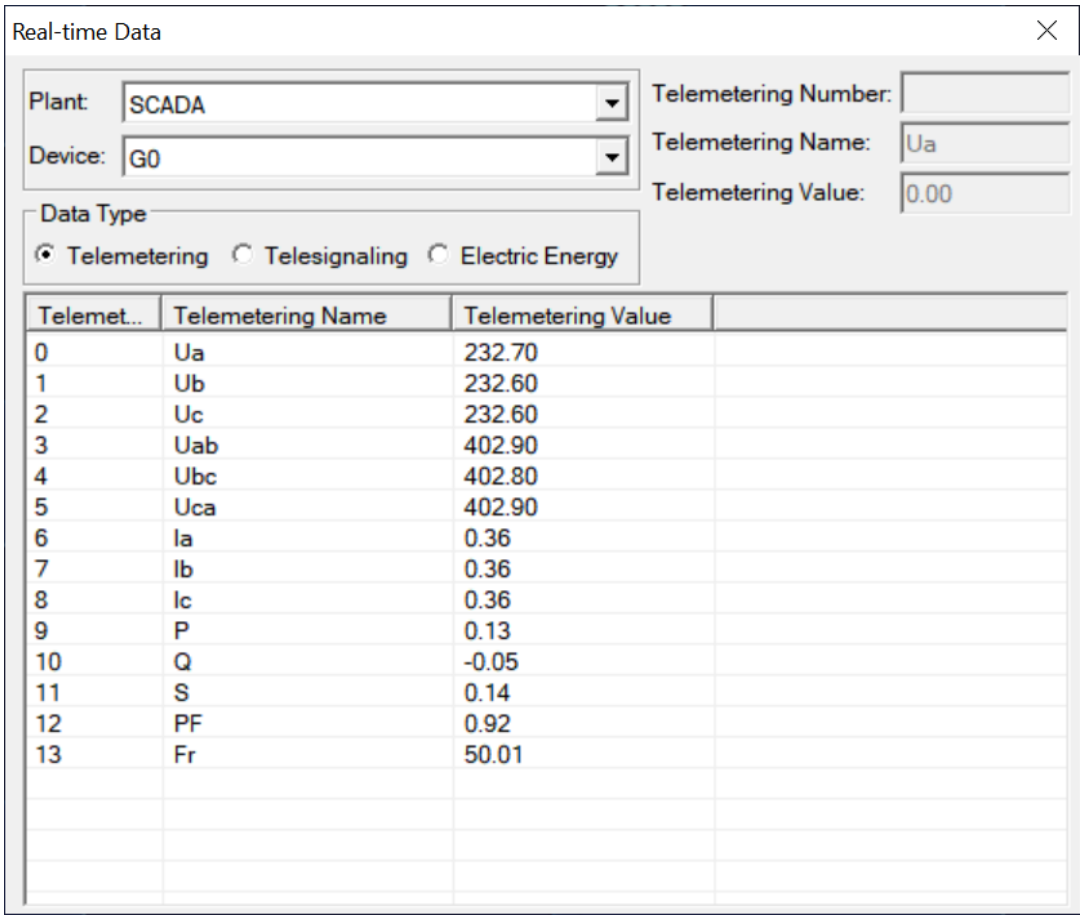



Fig. 8.20 Current loop Parameter

### 8.4.5.Telesignaling Message Stop Flashing

When the status of a remote message in the figure changes, it will blink for a certain period of time, during this blinking process, execute the "telesignaling message stop flashing", the remote message will immediately stop blinking.

### 8.4.6.Signal Reset

Reset Device:Reset the selected individual device to reset the alarm light on the device.

Reversion Plant:Restore all the device in the whole plant station, and restore the alarm lights on the device.as shown in the figure6.21.

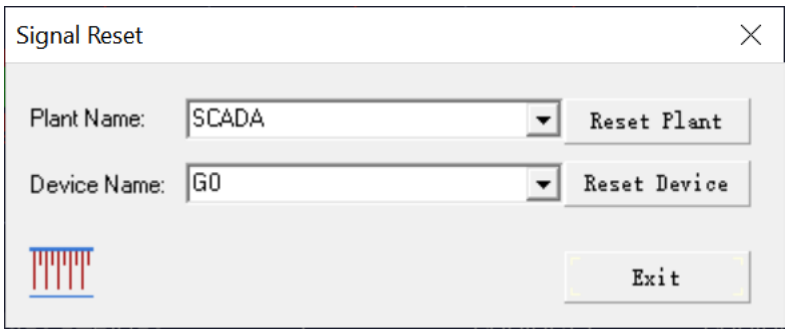



Fig. 8.21 Signal Reset

### 8.4.7.Historical Event

The **Historical Event** is used for **View Historical events** and displays different colors depending on the nature of the Event. When the **Interface Event Log button** is clicked, the dialog box that pops up is as shown in the figure6.22. You can Query and sort by time, Type, and device.

Operation steps:

(1) First set the time range of the event. The system defaults to the current date.

(2) Click the left mouse button to set the event Type to View from the "Event Type box".

(3) Press the **display button** to display the selected items in the "Event display box".

(4) Click the **Exit button** to Close the **Event Query dialog**.

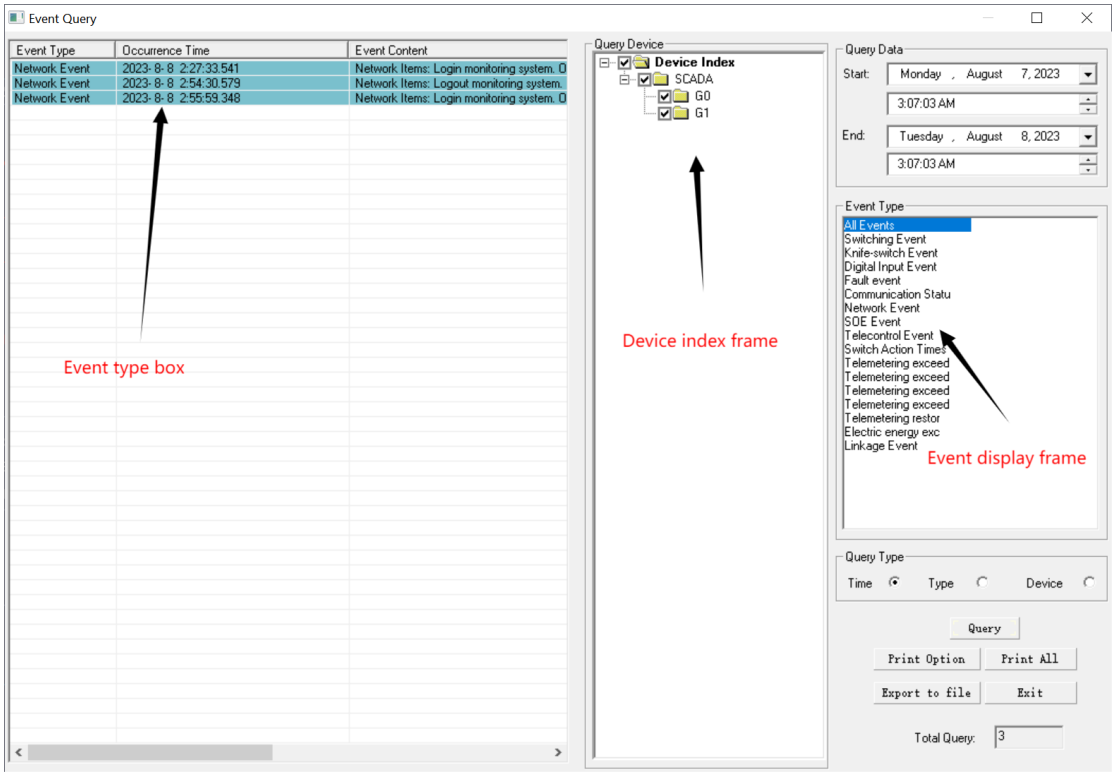



Fig. 8.22 Historical Event Figure

## 8.4.8.Setting Value Table

Click the **Setting Value table** to bring up the dialog as shown in the figure6.23.

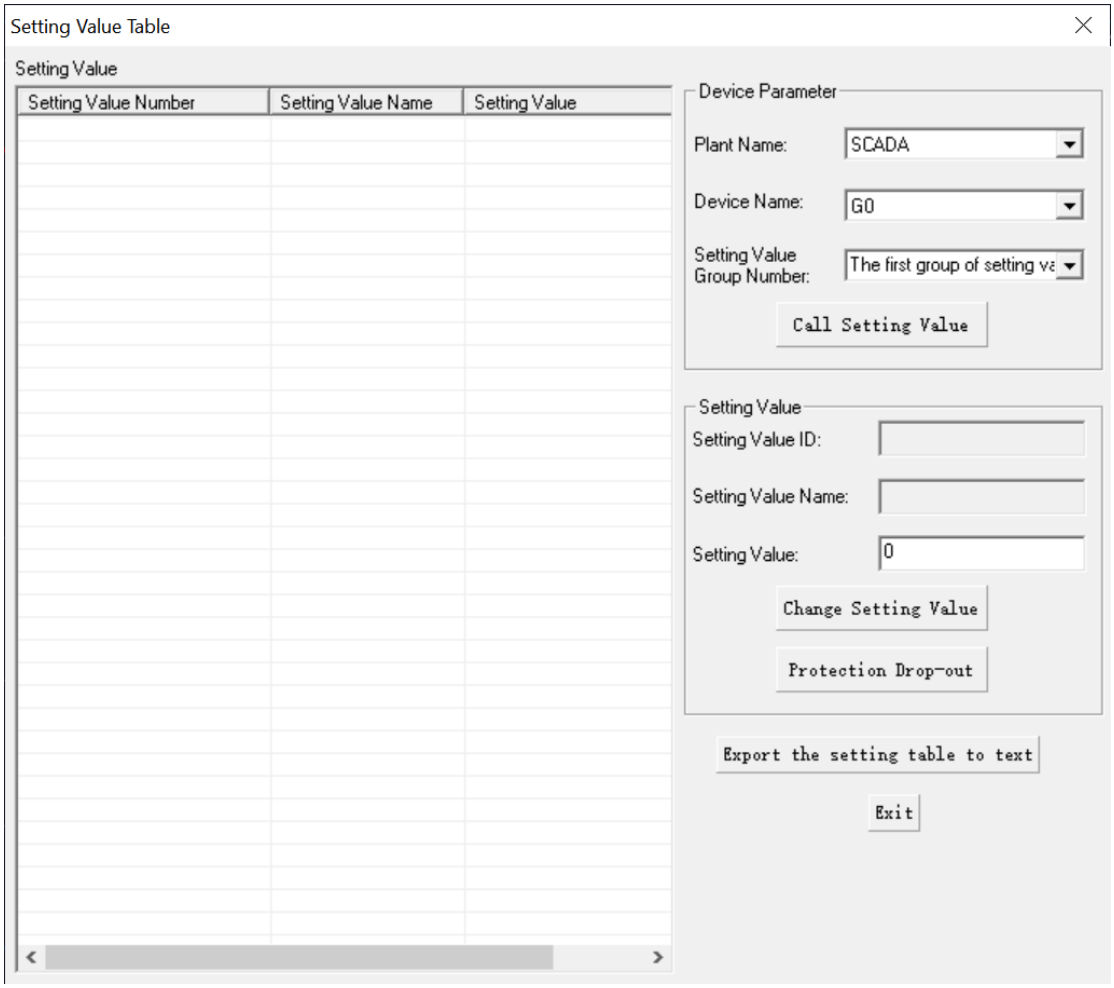



Fig. 8.23 Setting Value Table

Through this dialog box, functions such as **calling Setting Value, modifying Setting Value and protecting returning** can be realized.

## 8.4.9.Window Display

Click the window to display, as shown in the figure6.24.

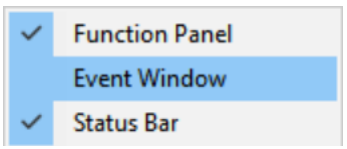



Fig. 8.24 Window display Menu

1)Event window

Used to select whether to display the **event window**. When the event window Menu item ✔ is in front, it indicates that the event window is displayed; otherwise, it indicates that the event window is hidden. the event window is as shown in the figure6.25.

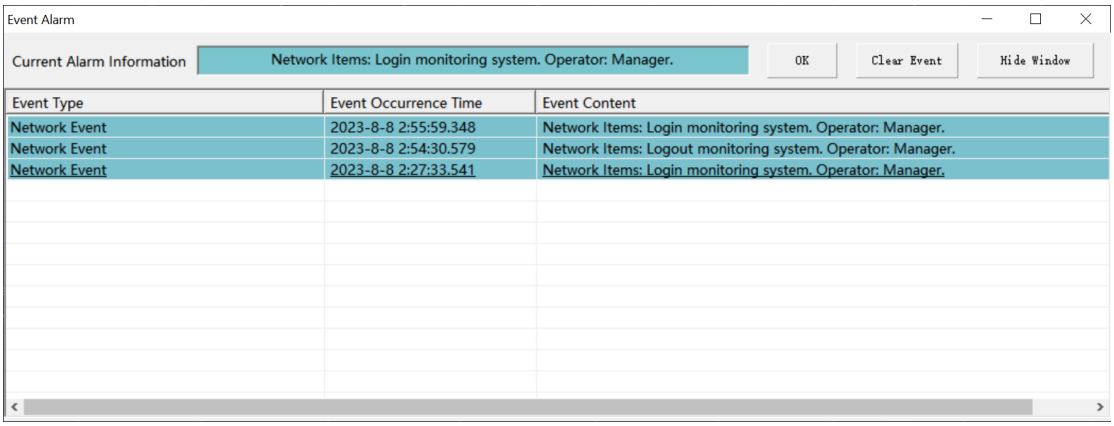



Fig. 8.25 Event window

2)Status bar

Used to select whether to display the status bar. If there is a check mark in front of the Menu item of the status bar, the status bar is displayed. Otherwise, the status bar is hidden, as shown in the figure6.26.

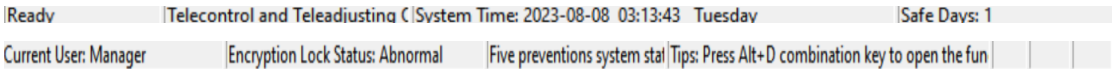



Fig. 8.26 Status bar

The display from left to right is as follows:

a) Get ready.

b) Current software version.

c) System time.

d) Safe days: indicates the safe days for the system to operate.

e) Current user: Displays the currently logged in user.

f) Dongle status: Displays the dongle status.

g) Prompt: Press Alt+D to Open Function panel

## 8.4.10.Graphic Operation

Click the graph on the Left button, and the figure shown in Fig. 8.27 is displayed.


Fig. 8.27 Graphic operation Menu

1) **Default (1:1)**

Function description: Click the graph back to the original size.

2) **Magnification**

Function description: Click the image to enlarge 25%.

3) **Zoom Out**

Function description: Click the graph to reduce 25%.

4) **Full window**

Function description: Click the graph and the window is the same size.

5) **Full screen display**

Function description: Click to display graphics in full screen state.

## 8.4.11.Print Operation

Click the Menu item to bring up the submenu:

1)**Print Settings**

In the Print Settings, you can set the Name of the Print machine, the size and source of the paper, and the direction of the Print.

As shown in the figure6.28.

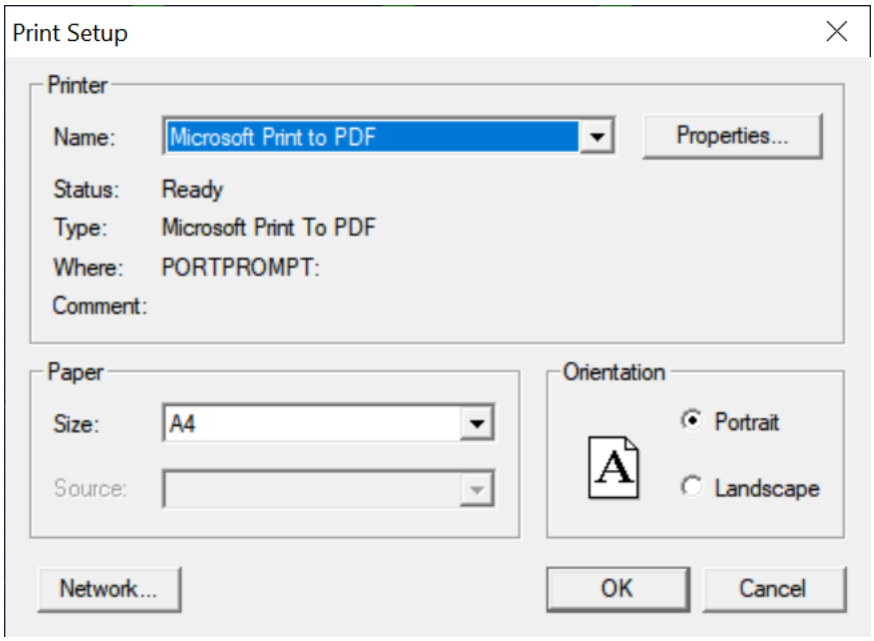



Fig. 8.28 Print Settings

2)**Print Preview**

This item is used to preview the effect of Print. In the preview window, you can zoom in and out, or you can directly Print the graph you are previewing in the preview window. Click the Close button to exit the preview window.

3)**Print**

Function Description:

Print the graph in the current display area.

Operation procedure: Click Print Menu to display the window as shown in figure6.29. Select Print machine Name, page range and number of copies to Print the graphics in the current display area.

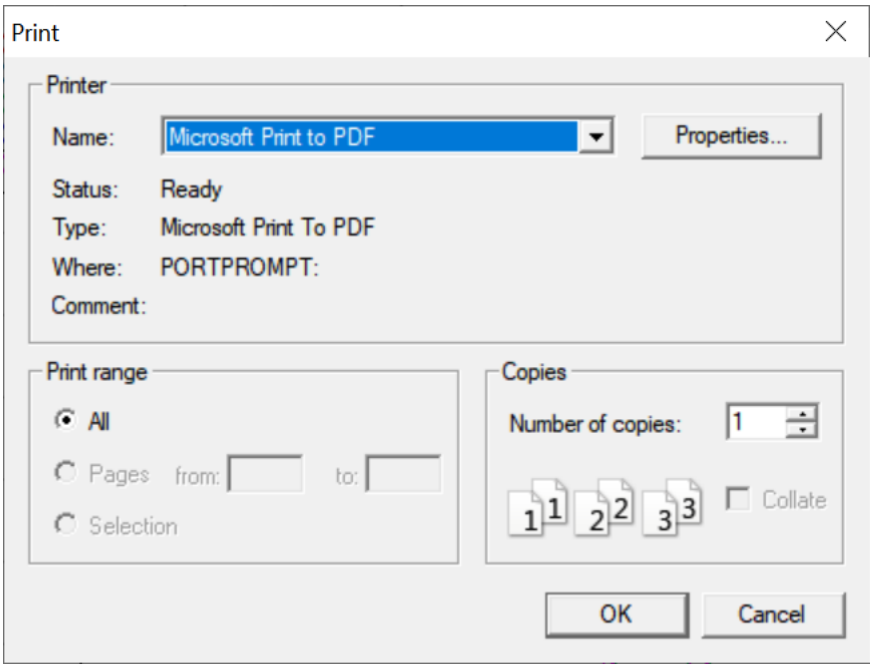



Fig. 8.29 Print Function

## 8.5 Left Button Function

### 8.5.1.Click on Telesignaling Value

The mouse Left button Telesignaling quantity, Telesignaling value is displayed Attributeas shown in the Fig. 8.30.

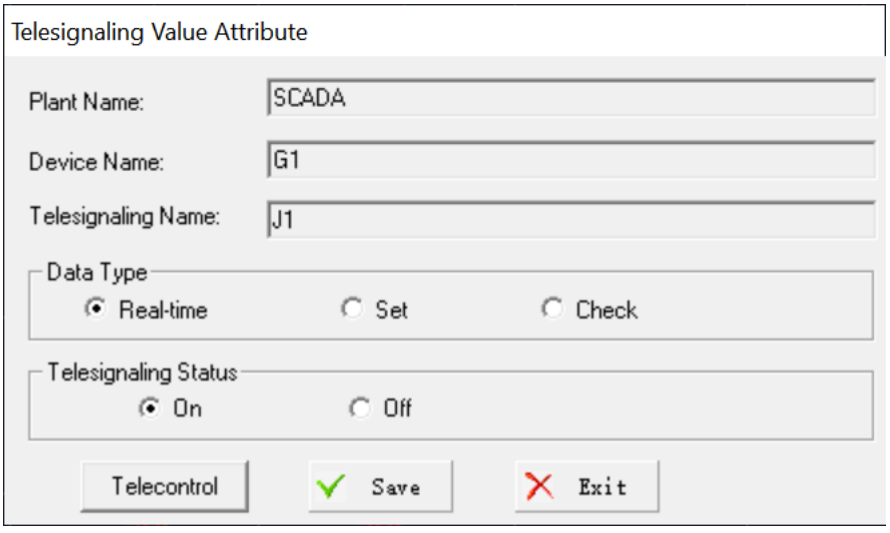



Fig. 8.30 Left button Telesignaling Function

**Parameter Description:**

1) **Plant Name**.**Device Name**.**Telesignaling Name**:The specific location of the remote letter is indicated.

2) **Data Type**

**Real time**:This is the current state of the teleconferences.

**Place**:manually place the status of the Telesignaling.

**Overhaul**:Overhaul the switch and change the color to the system setting.

3) **Telesignaling Status**:Whether the current status of the Telesignaling is split or combined.

4) **Telecontrol**:Perform telecontrol.

After login, you can modify the Data Type of the remote credit.

### 8.5.2.Click-to-remote Measurement

Left mouse button Telemetering, Telemetering value is displayed Attributeas shown in the Fig. 8.31.

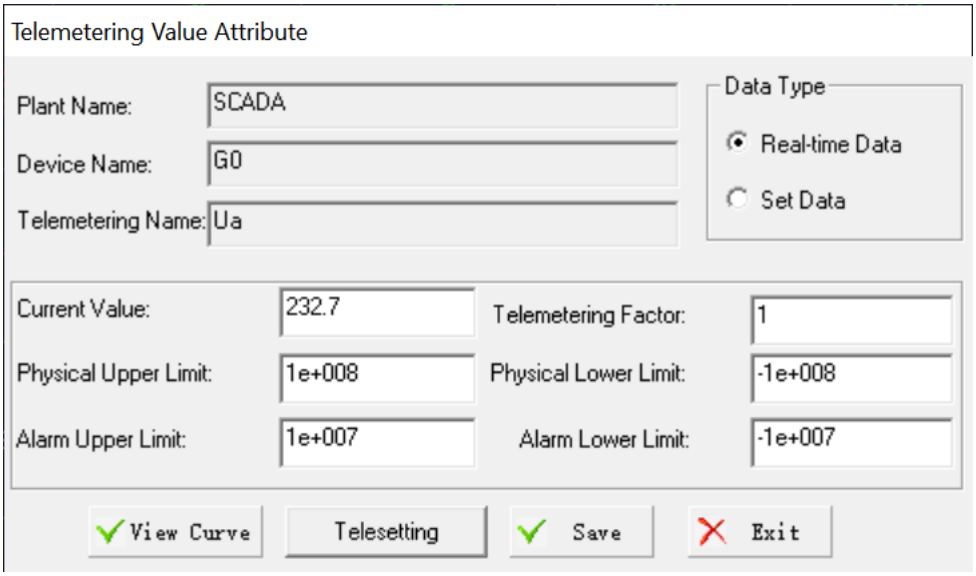



Fig. 8.31 Left button Telemetering Function

Parameter description:

1) Plant Name.Device Name.Telemetering Name:Indicate the specific location of this remote measurement.

2) Current Value:The displayed value is the real-time value of the remote measurement.

3) Data Source:Does this data refer to real-time data or manuallly inserted data.

4)Physical Upper Limit.Physical Lower Limit.Alarm Upper Limit.Alarm Lower Limit:The remote measurement can set two different degrees of alarm range values.

5)View Curve:Displays the current remote measurement history curve.

After login, you can modify it here,for example:Current Value.Physical Upper Limit.Alarm Upper Limit.Coefficient.Physical Lower Limit.Alarm Lower Limit.Real-time data and embedded data Etc.value,Click Save. The modified parameters can be saved to the database.

### 8.5.3.Click Electric Energy

Left mouse button Electric Energy, the Electric Energy value is displayed Attributeas shown in the Fig. 8.32.

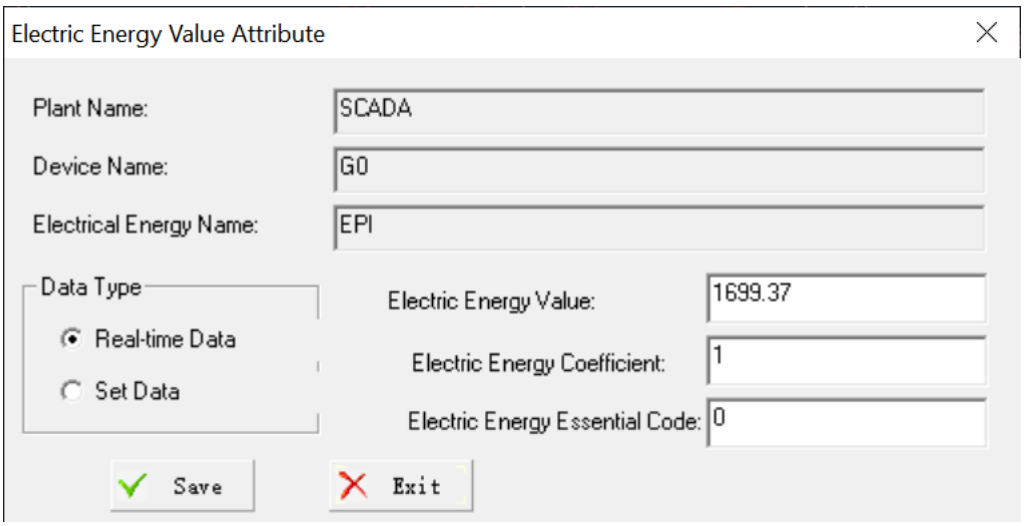



Fig. 8.32 Left button Electric Energy function

**Parameter Description**:

1)**Plant Name**.**Device Name**.**Electric Energy Name**:Specify the specific location of this electrical metric.

2)**Current Value**:The real time value of the electrical metric is displayed.

3)**Data Source**:Does this data refer to real-time data or manuallly inserted data.

After login, you can modify the **Current Value, Coefficient, real-time data, and inserted data equivalence** here. Click Save to save the modified parameters to the database.

### 8.5.4.Modify Loop Name

After logging in to the system, click the loop Name on the Interface, enter the content to be modified in the **Device Name** edit box, and click the **Modify button**, as shown in the figure6.33.

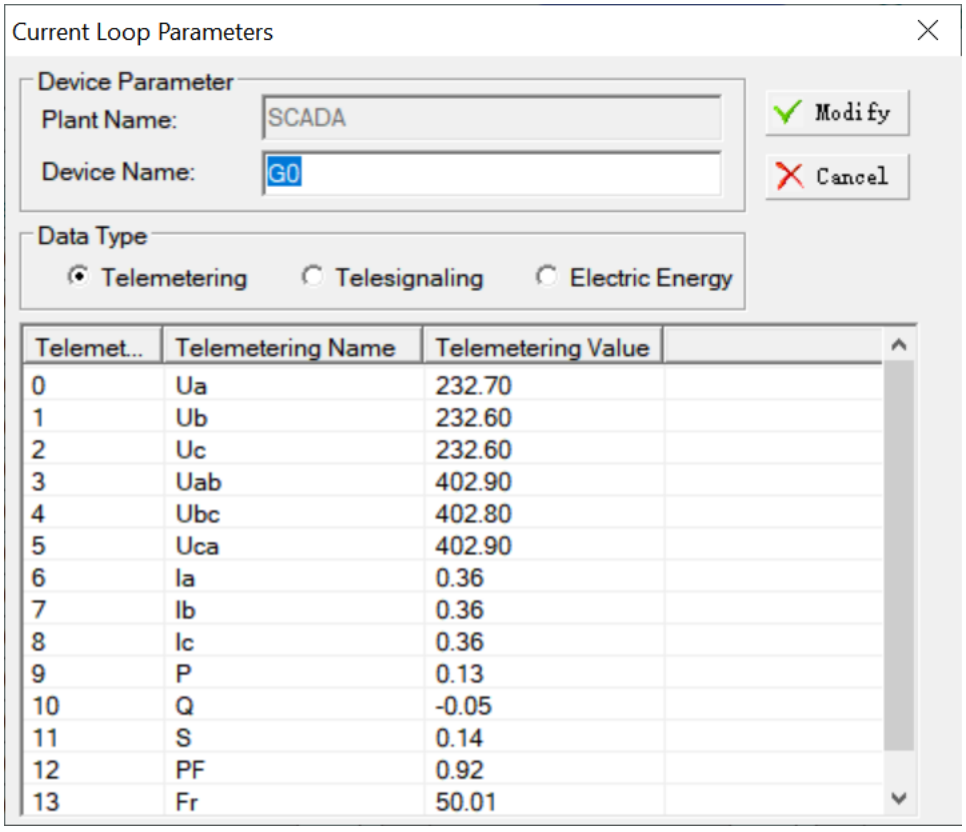


Fig. 8.33 Modify loop Name

## 8.6 Function Panel

### 8.6.1.Open Function panel

When the AHMI program is opened for the first time, the Function panel is hidden, and with the key combination Alt+D, the Function panel is also shown in the figure6.34. The Function panel operates the same as the Interface button.

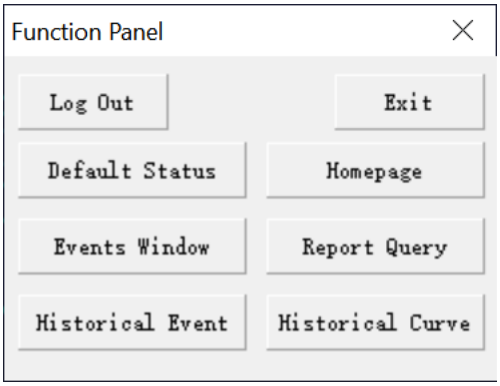



Fig. 8.34 Function panel

### 8.6.2.Hide the Open Function Panel

There are two ways to hide or Open the function panel:

1) Use the key combination Alt+D to Open or hide the function panel.

Use the right Menu, as shown in the figure6.35.

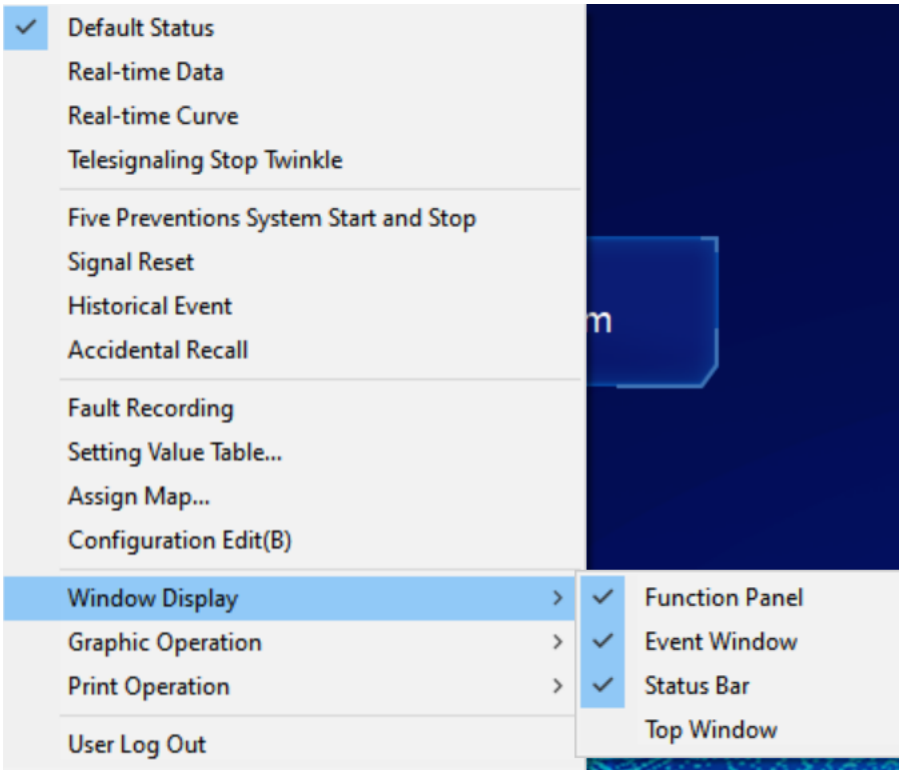



Fig. 8.35 OpenCloseControl panel window

# Chapter 9 Report Function

## 9.1 EXCEL Report Edit

The report template is in the **ACREL2000/ Report template folder,** and must have a certain format when making reports.

### 9.1.1. Report Format specification

1. The first behavior report Name must be consistent with the template file name
Name format:
a) Daily report: XXXXXX daily report of electric energy/electrical parameters.
b) Monthly report: XXXXXXX Electrical energy monthly report.
c) Annual report: XXXXXXX Electric energy annual report.
d)Query report: XXXXXXX Power/electrical parameter statistics report.
e) Remote report: XXXXXXX remote statistical report.
2. Time display of the second behavior report
No need to fill it out.
3. The Name of the third column
a) The common column name should be a string, cannot be a time format such as 1:00, cannot be a number.
b) Subtotal column name is the string + [SUM], SUM is the symbol, indicating the subtotal or total column of this column.
c) Total column The name of the column is the string + [SUM]. SUM is a symbol, indicating the subtotal or total column of this column.
4, the first column location information column
Format: Consists of 1 or more combined unit information. At least 1 piece of information must be entered and all rows in this column must be merged.
5. Plant Address column
Enter the factory ID. The value cannot be 0 or empty.
6. Device address column
Enter the device address. The value cannot be 0 or empty.
7. Loop Name column
Enter the loop Name.
8, electrical degree or electrical parameter Point Number
Enter the electrical degree or Point Number of the electrical parameter.
9. Subtotal column
Fill in [#].
10. Total column
Fill in the column number of the subtotal column, which is required to be capitalized. The characters are different for different total columns.
In the power statistics report, enter G for the total start and end power, and K for the total start and end peaks.
Enter AD in the daily energy report.
Total AK in the monthly electric energy report.

Fill R in total in the annual report of electric energy.

11. Daily monthly annual report

The information points in the daily monthly annual report are not required.

The overall style of electric energy daily report is shown in figure 7.3, the overall style of electric energy monthly report is shown in Figure 7.4, the overall style of electric energy annual report is shown in Figure 7.5, and the overall style of electric parameter daily report is shown in Figure 7.6.

12. Statistical reports

Information in the statistics report is set to the electrical degree/electrical parameter Point Number. The overall style of the electrical parameter statistical report is shown in Figure 7.7, and the overall style of the electrical measurement statistical report is shown in Figure 7.8.

13, remote report

The information filling in the remote information report is basically the same as that in the electrical parameter report. Statistics of the number of daily commencing times, daily subdivision times, daily disconnected time, daily disconnected time, daily combined time, monthly combined times, monthly subdivision times, monthly disconnected time, monthly divided time, and monthly combined time, and the overall style of the remote message report is shown in Figure 7.9.(Note: In the database management, the Data Type of the remote point is a switch event)

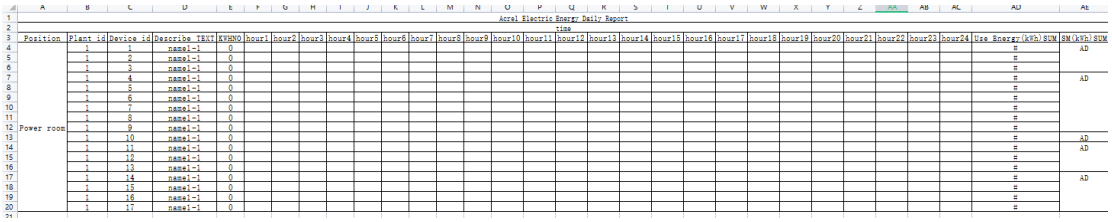



Fig. 9.3 Electric Energy Daily Report

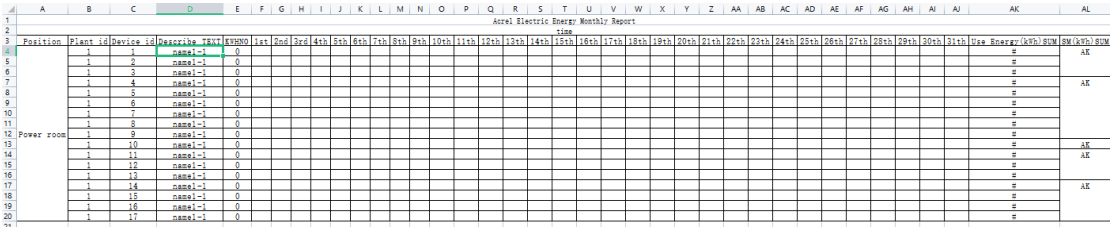



Fig. 9.4 Electric Energy Monthly Report

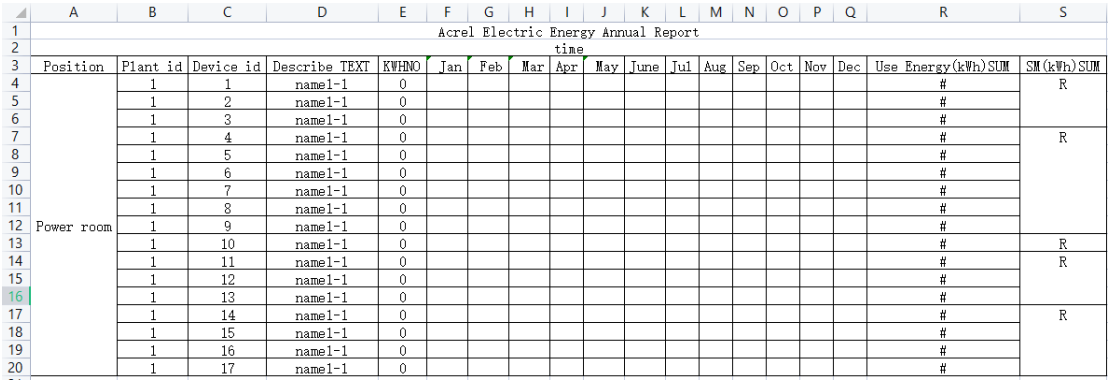



Fig. 9.5 Electric Energy Annual Report

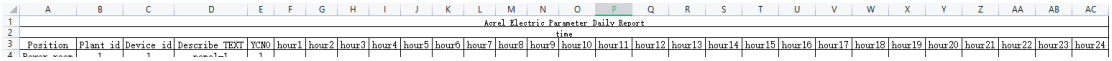


Fig. 9.6 Electric Parameters Daily Report

| | A | B | C | D | E | F | G | H | I | J | K | L | M |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Acrel Electric Parameter Statistics Report | | | | | | | | | | | | |
| 2 | time | | | | | | | | | | | | |
| 3 | Position | Plant id | Device id | Describe TEXT | Ia(A) | Ib(A) | Ic(A) | Uab(V) | Ubc(V) | Uca(V) | P(kW) | Q(kVA) | COS |
| 4 | | 1 | 1 | name1-1 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 5 | | 1 | 2 | name1-2 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 6 | | 1 | 3 | name1-3 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 7 | | 1 | 4 | name1-4 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 8 | | 1 | 5 | name1-5 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 9 | | 1 | 6 | name1-6 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 10 | Power room | 1 | 7 | name1-7 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 11 | | 1 | 8 | name1-8 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 12 | | 1 | 9 | name1-9 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 13 | | 1 | 10 | name1-10 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 14 | | 1 | 11 | name1-11 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 15 | | 1 | 12 | name1-12 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |
| 16 | | 1 | 13 | name1-13 | 6 | 7 | 8 | 3 | 4 | 5 | 9 | 10 | 13 |

Fig. 9.7 Electric Parameters Statistical Report

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Acrel Electric Energy Statistics Report | | | | | | | | |
| 2 | time | | | | | | | | |
| 3 | Position | Plant id | Device id | Describe TEXT | Start Energy(kwh) | End Energy(kwh) | Use Energy(kwh)SUM | SM=(kwh)SUM | ALL=(kwh)SUM |
| 4 | Power room | 5 | 1 | name1-1 | 0 | 0 | # | G | G |
| 5 | | | | | | | | | |

Fig. 9.8 Electric Energy Statistical Report

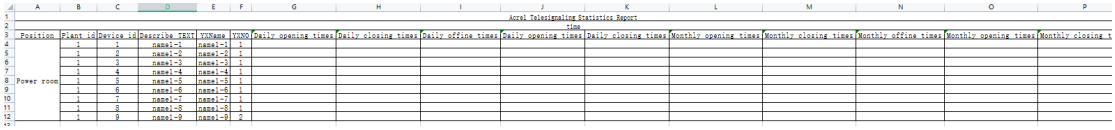


Fig. 9.9 Telesignaling Statistical Report

## 9.2 AHMI Report Function

Click the Query button of the interface report or the Query button of the function panel to view the statistical data of electrical parameters, such as the daily report of electric energy, that is, the statistics of electric energy in 24 hours, and the daily report of electric energy, as shown in Fig. 9.10.

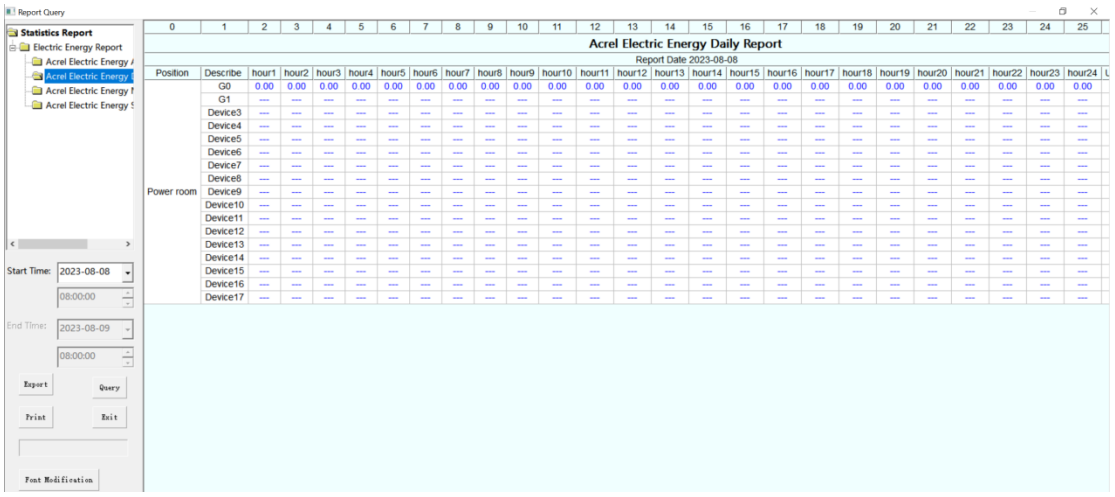



Fig. 9.10 AHMI Electric Energy Report

Headquarters:Acrel Electric Co., Ltd
Address:253 Yulu Road, Madong Industrial Park, Jiading, Shanghai
Tel:(86)021-69158300 69158301 69158302
Fax:(86)021-69158303 69158339
Service hotline:800-820-6632
Http://www.acrel.cn E-mail:ACREL001@vip.163.com
Zip code :201801

Production base:Jiangsu Ankorei Electrical Appliance Manufacturing Co., Ltd
Address:No. 5, ASEAN Road, ASEAN Industrial Park, Nanzha Town, Jiangyin City
Tel:(86)0510-86179966 86179967 86179968
Fax:(86)0510-86179975 86179970
E-mail:JY-ACREL001@vip.com
Zip code:214405