CYG深瑞

User Manual for

PRS-3000 Distribution Master Station System

Ver1.6 (English Edition)

CYG SUNRI CO., LTD.

September, 2016

CYG深瑞

User Manual for

PRS-3000 Distribution Master Station System

Ver1.6 (English Edition)

Prepared by: **Zeng Junqiang** **Ma Deyang**

Dong Lei **Xu Tao**

Reviewed by: **Hou Lin** **Sun Zhengwu**

Approved by: **Xu Chengbin**

CYG SUNRI CO., LTD.

September, 2016

This Manual is applied to PRS-3000 Distribution Master Station System, matching with V1.6 English edition and its compatible version procedure.

This Manual is prepared and published by CYG SUNRI CO., LTD., who enjoys the right of final interpretation to concerned products. As the product may be slightly different from that of this manual due to subsequent upgrade and the manual update may not be informed in time, we hereby express our apology to you. Please check the consistency between actual product and manual version.

Please visit http://www.sznari.com for more product information.

Welcome to call our toll-free hotline for service: 400-678-8099

Table of Contents

1. General

This Manual for PRS-3000 Distribution Master Station System is prepared for dispatching and maintenance personnel, including eight tools frequently used in day-to-day work of dispatchers such as Masconsole, Gmmi, DA, Ealarm, Dbquery, Rdbmon, Gcurve and WEB etc.

As the corresponding software functions are continuously upgraded, this manual will be updated and renewed accordingly.

1.1. System installation

The manual for PRS-3000 Distribution Master Station System describes the installation of operating systems, commercial database and system platform depending on operating systems such as IBM-AIX, HP-UX, SUN-Solaris, Windows, Red Hat and NeoKylin by classifications. The installation complexity varies from platform. Details refer to *Installation Manual for PRS-3000 Series Master Station*.

1.2. System settings

Operating system: Windows series /Linux series/UNIX series products.

Configuration environment variable: system environment variable (%MASENV%)

- %MASENV%/bin: main program directory.
- %MASENV%/dll(lib) : package dynamic library directory.
- %MASENV%/plugin: plugin library directory.
- %MASENV%/dbinfo: data table information interpretation directory.
- %MASENV%/sp: script running directory.
- %MASENV%/dat: debug information directory.
- %MASENV%/resource: system resource file directory.
- %MASENV%/ini: configuration file directory.
- %MASENV%/graph: graph file directory.
- %MASENV%/symbol: symbol library directory.
- %MASENV%/custom: icon library directory.
- %MASENV%/gasp: auto-save default directory.

1.3. System startup

Click “start” from the tool “masconsole” to start up all service processes.

2. Console (Masconsole)

2.1. Overview

Console (masconsole) is the graphical interface developed by Qt, which can be run in different operating systems including Unix, Linux and Windows etc.

All processes of PRS-3000 Distribution Master Station System are concentrated on console (masconsole), on which the operators are able to start all kinds of services and processes.

2.2. Introduction of interface

Console consists of system marked area, application configuration area and start zone. System marked area contains system icon and clock; application configuration area includes different application groups with different apps; start zone covers service start and stop button.

The interface of console is shown as follows.

2.3. Function description

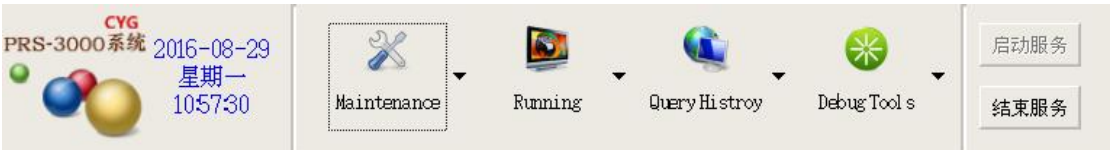
1) Start in Windows system: “start” →“run”, enter “masconsole”, and a carriage return;

Start in Unix/Linux system: open the terminal, enter “masconsole”, and give a carriage return.

2) Indent, unfold

By double clicking “PRS-3000” icon, the console can be switched between indent and unfold status. Click the selected icon, and move it to any position.

Unfold status:



Indent status:

3) Start service

Click “start service” in the start zone to start all service processes; click “stop service” to stop all service processes (note: different types of service have different start/stop time, generally 5-20 s).

When the service has not been started, “start service” button is available and “stop service” button is unavailable;

When the service has been started, “stop service” button is available and “start service” button is unavailable.

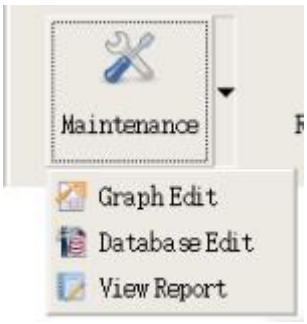
4) Start application

In the application configuration zone, the common view and maintenance tools software for operator can be run.

For example: to run “Dispatcher Platform” process, it shall click the arrow on the right of “Running” group, and select “Dispatcher Platform” in the application popup.

The console with default setting has 5 categories of functions as follows:

- Maintenance: including Graph Edit, Database Edit, View Report etc.;



- Running: including Dispatcher Platform, Event Alarm, Real-time Data etc.;

- Query History: including View Curve, Query History Event etc.;

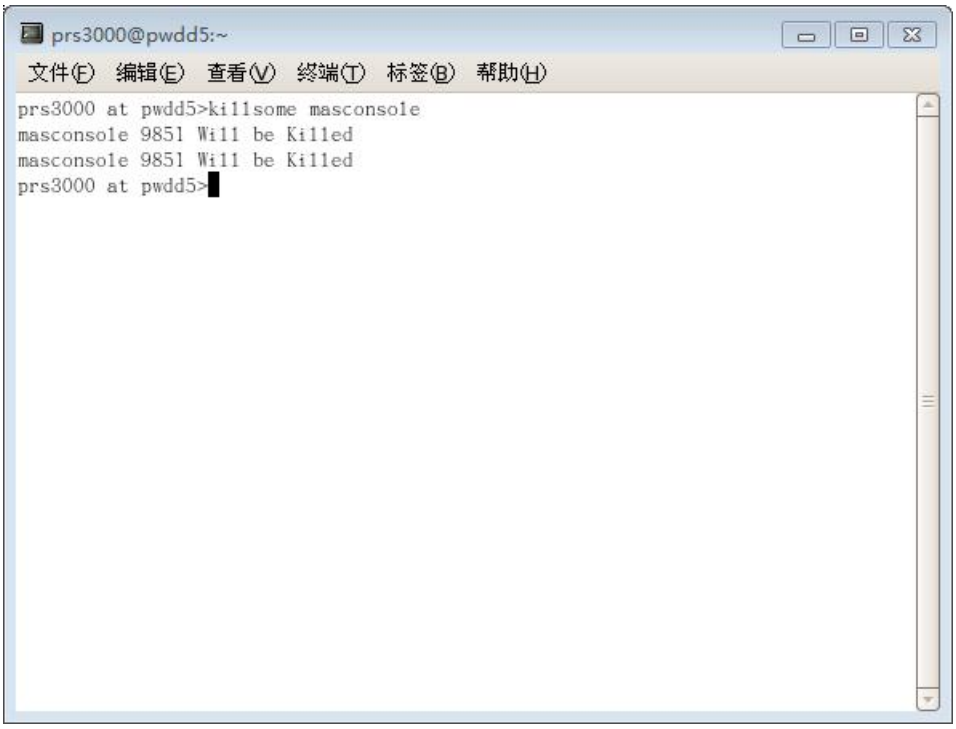
- Debug Tools: including Debug information, Message View, Raw View etc.;

5) Program exit

No exit button is set on the console, which will not exit in general condition. When required, the different platforms may adopt different ways for ending.

- Windows: open the task manager, find “masconsole.exe”, and click “End Process”;

- Unix: open a terminal and run “killsome masconsole” to exit from console.



2.4. Configuration description

The configuration file of console is located under the directory "$MASENV/ini/", named as "masconsoleconfigure.ini". By changing "masconsoleconfigure.ini", the starting program of application configuration area can be flexibly defined.

Customized contents include apps group icon, starting program icon, starting program name etc. (Note: non-maintenance personnel are prohibited to modify configuration files as possible).

The configuration file format is as follows: use tab to separate lines and items.

****

*********Configuration of first button (use tab to separate lines and items)*

**Format of first line: tbutton1 icon name number of menu items width*

**Format of other lines: name icon starting program name*

tbutton1 /resource/tools.png Maintenance 3 80

Graph Edit /resource/graph.png ./gpaint

Database Edit /resource/dboper.png ./dboper

View Report /resource/report.png ./report

********* Configuration of second button (use tab to separate lines and items)*

** Format of first line: tbutton2 icon name number of menu items width*

** Format of other lines: name icon starting program name*

tbutton2 /resource/run.png Running 3 80

Dispatcher Platform /resource/gmmi.png ./gmmi

Event Alarm /resource/ealarm.png ./ealarm

Real-time Data /resource/rdbmon.png ./rdbmon

********* Configuration of third button (use tab to separate lines and items)*

** Format of first line: tbutton3 icon name number of menu items width*

** Format of other lines: name icon starting program name*

tbutton3 /resource/hisquery.png Query History 2 80

View Curve /resource/curve.png ./gcurve

Query History Event /resource/dbquery.png./dbquery

********* Configuration of fourth button (use tab to separate lines and items)*

** Format of first line: tbutton4 icon name number of menu items width*

** Format of other lines: name icon starting program name*

tbutton4 /resource/dbgtools.png Debug Tools 3 80

Debug Information /resource/masinfo.png./masinfo

Message View /resource/msgview.png ./msgview

Raw View /resource/rawview.png./rawview

********* Configuration of fifth button (use tab to separate lines and items)*

** Format of first line: tbutton5 icon name number of menu items*

** Format of other lines: name icon starting program name*

tbutton5 /resource/advance.png Advanced Application 2 80

*****************Configuration of system icons*

**Format: symbol icon iconsize*

symbol /resource/syslogo.png 100 100

******************Setting of time display*

** Format: time color1 color2 color3*

time 0 0 255

****

3. Dispatcher HMI Interface (Gmmi)

3.1. Overview

Dispatcher HMI Interface (gmmi) UI is the graphical interface developed by Qt, which can be run in different operating systems including Unix, Linux and Windows etc.

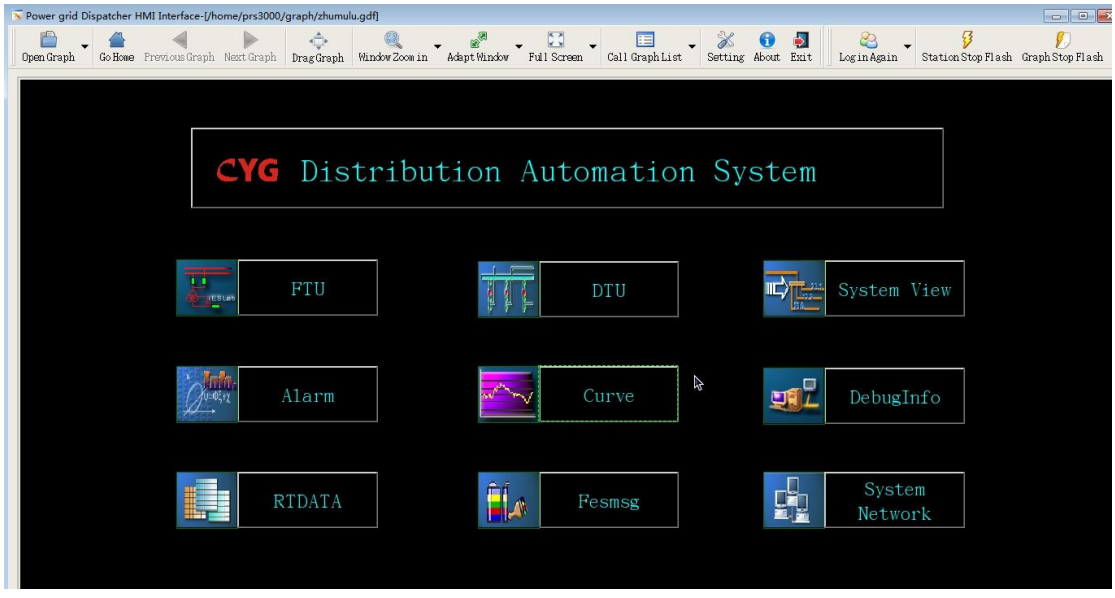
Dispatcher HMI Interface (gmmi) is a distributed all-graphic HM interface developed based on network windows system X-Window and according to industrial standards OSF/Motif and Windows. The system design fully considers different demands of applications such as EMS and MIS. With object-oriented openness handling mechanism, the system provides unified cross-application graphic platform for display access. All operations of system are absolutely based on human-machine interface by mouse, showing more convenience, flexibility, quickness and intuition. Besides, the shortcut keys are also defined to simplify operations. Any operation can be done either by mouse only or by combining mouse and keyboard.

Dispatcher HMI Interface (gmmi) adopts object-oriented technology. All graphs and power system symbols are treated as objects. Graphic system not only displays three-dimensional figures in high quality, but also displays images full of reality. In addition, the system also supports multi-monitor display.

3.2. Interface description

3.2.1.General interface

The dispatcher HM interface includes Title Bar, Browser Tools Bar, Function Tools Bar, Working Area and Status Bar etc.

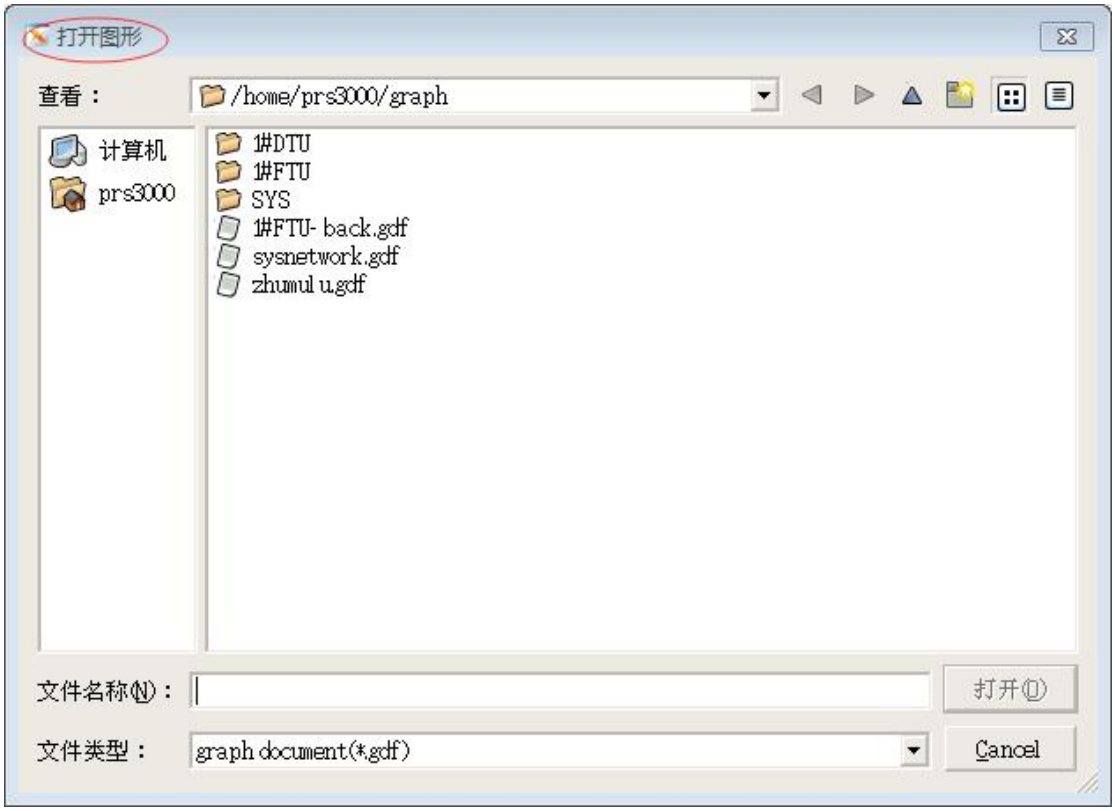


3.2.2.Browser Tools Bar

1) 

Open Graph

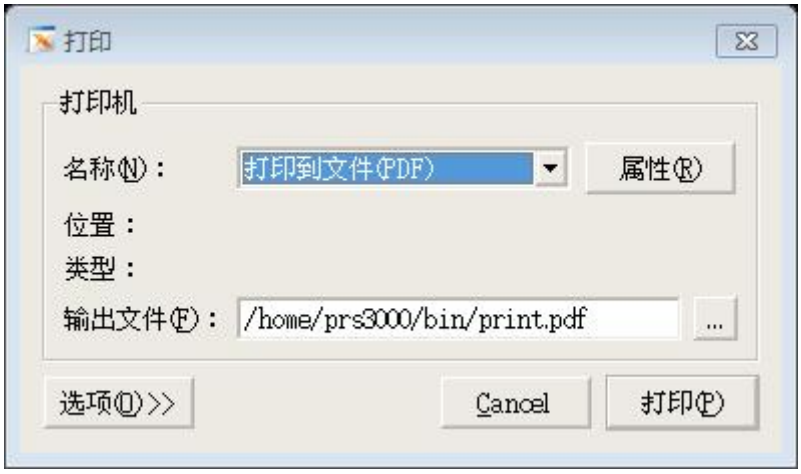
Open a new graph in current window;



2) 

Print Graph

Print current graph;



3) 

Go Home

Open the home graph set in configuration file;

4) 

Previous Graph

The previous graph of current graph;

5) 

Next Graph

The next graph of current graph;

6) 

Drag Graph

If the function is selected, graph can be moved by holding left button of mouse;

7) 

Zoom In

Max magnification times depend on configuration;

8) 

Zoom Out

Min minification times depend on configuration;

9) 

Window Zoom In

If the function is selected, dragging and selecting the part of graph to be zoomed in will adapt the selected part to current window;

10) 

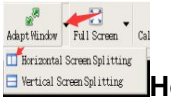
Actual Show

Display graph in the size of drawing tool;

11) 

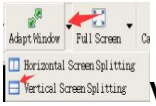
Adapt Window

Automatically adjust scaling to display full graph in the window;

12) 

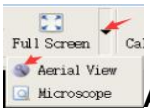
Horizontal Screen Splitting

Split screen by graph width;

13) 

Vertical Screen Splitting

Split screen by graph height;

14) 

Aerial View

If the function is selected, a small window will appear to display full graph. Drag mouse in the small window to move graph in main window;

15) 

Full Screen

Display graph in full screen;

16) 

Microscope

If the function is selected, a window will appear at mouse location to zoom in the mouse location. Window size and magnification times depend on configuration;

17) 

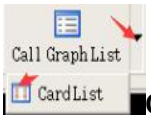
Setting

Clicking this button, the system setting window will appear;

18) 

Call Graph List

Clicking this button, the call graph list window will appear;

19) 

Card List

Clicking this button, the card list window will appear;

20) 

About

21) 

Exit

Clicking this button, a dialog box for confirmation will pop up. Click “Yes” to exit from dispatcher HMI interface; click “No” to cancel.

3.2.3.Function Tools Bar

1) 

Login Again

2) 

Modify Password

3) 

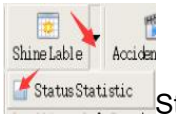
Station Stop Flash

4) 

Graph Stop Flash

5) 

Shine Label

6) 

Status Statistic

7) 

Accident Recur

8) 

Accident Recall

9) 

Load Parameter

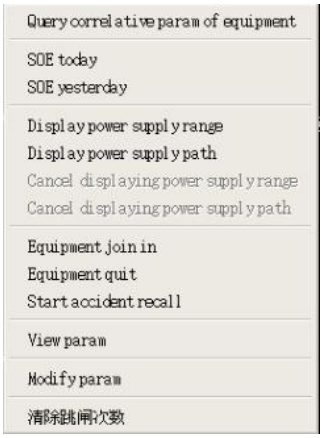
10) 

DA Scheme Setting

11) 

Operations Board

3.2.4.Context menu



1) **Query correlative parameter of equipment**

View all telemetering and telecommand information related to selected entity.

2) **SOE today**

View all SOE information today pertaining to selected entity.

3) **SOE yesterday**

View all SOE information yesterday pertaining to selected entity.

4) **View parameter**

View the parameters of selected entity. This menu is available only when the selected entity has real-time data.

5) **Modify parameter**

Modify the parameters of selected entity. This menu is available only when the selected entity has real-time data.

6) **Clear trips**

Clear the trips of selected entity. This function can be extended. The field value of current equipment in real-time database can be modified.

3.2.5.Status bar

From left to right:

1) Tooltip for mouse

2) Current operating state

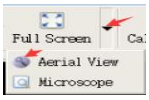
3) Remaining valid time of operation login

4) Current login user

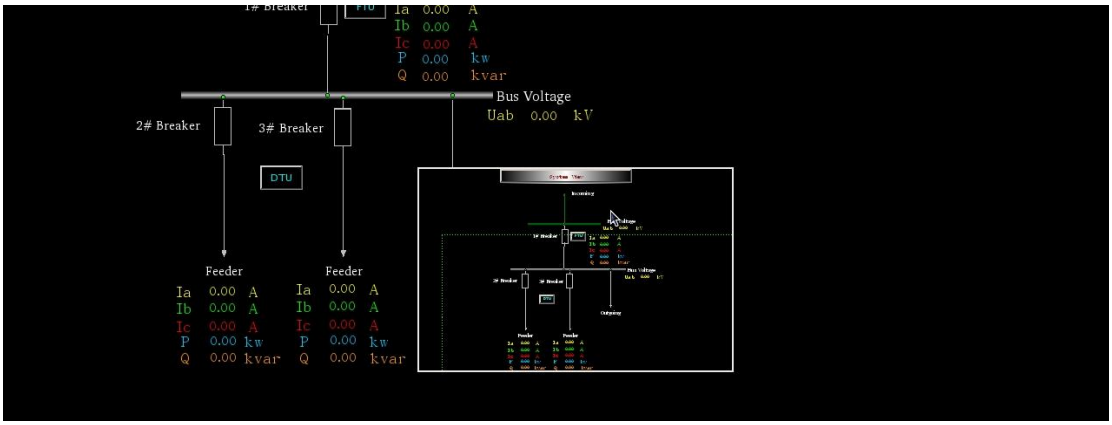
5) Current time

3.3. Function description

3.3.1.Aerial View

Clicking 

in the Browse Tools Bar, a small window will appear to display full graph. Drag mouse in the small window, the graph in the main window will move as follows:

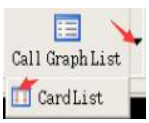


3.3.2.Microscope

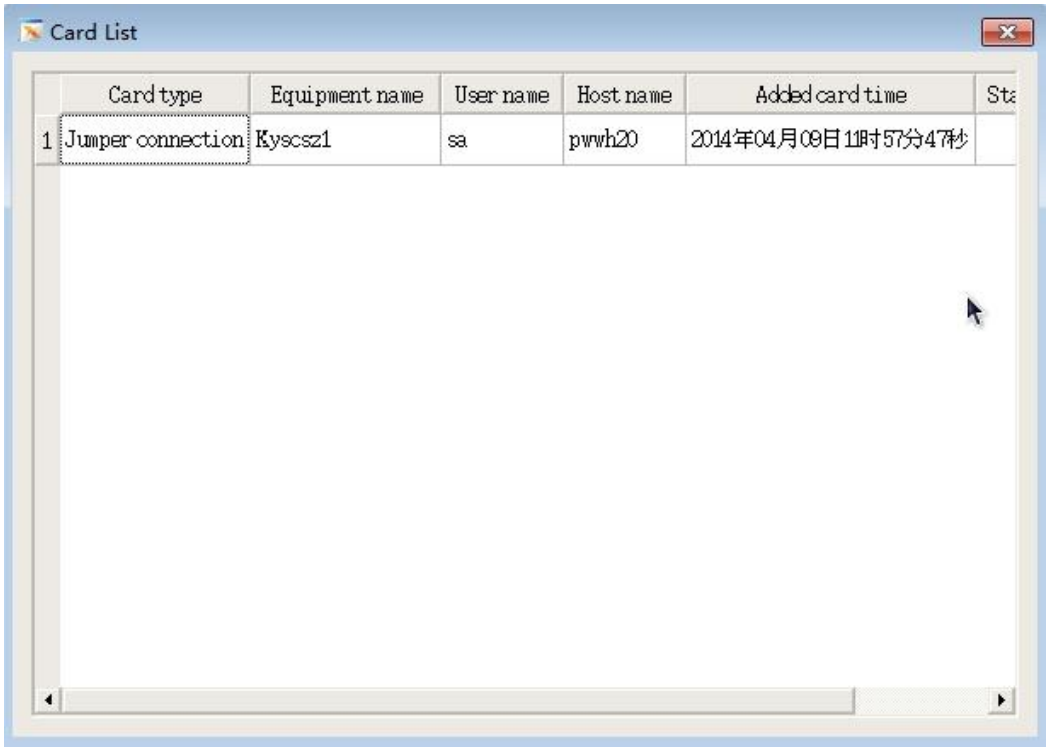
Clicking 

in the Browse Tools Bar, a window will appear at the location of mouse to zoom in the mouse location. Window size and magnification times depend on configuration. Close microscope window with ESC key.

3.3.3.Card List

Clicking 

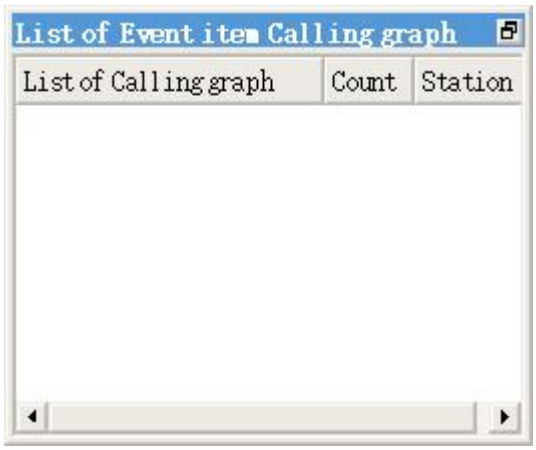
in the Browse Tools Bar, all cards information of system will be listed as follows.



3.3.4.Call Graph List

Clicking 

in the Browse Tools Bar, all call graph lists of system will be shown as follows.



Click 

again in the Browse Tools Bar, the window will disappear.

3.3.5.Auto Login

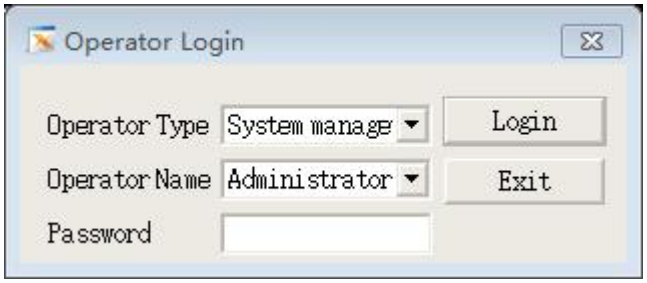
Entering gmmi-U (user name)-P (password) graphic path in the command line, the dispatcher HMI interface will be started automatically, and the graph corresponding to graphic path will be opened. If the graphic path is empty, the main interface of graph will be opened automatically. For example, to open the

wiring diagram of switching station A, it shall enter “gmmi –Usa –Psnr D:\prs3000\graph\A switching station\ wiring diagram of A switching station.gdf” in the command line.

3.3.6.Login Again

Selecting 

in the operations toolbar, the login window will appear:



Select Operator Type, Operator Name and enter password to log in.

Note: user list in the login box has been filtered depending on user rights.

3.3.7.Modify Password

Users can modify password here.

3.3.8.Signal Stop Flash

Signal stop flash includes station stop flash, current graph stop flash and single signal stop flash.

1) **Station Stop Flash:**

Selecting 

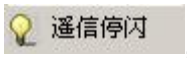
in the toolbar, all station signals where the graph is located will stop flash, on condition that the associated station has been assigned when drawing this graph.

2) **Graph Stop Flash:**

Selecting 

in the toolbar, all signals on current graph will stop flash.

3) **Single Signal Stop Flash:**

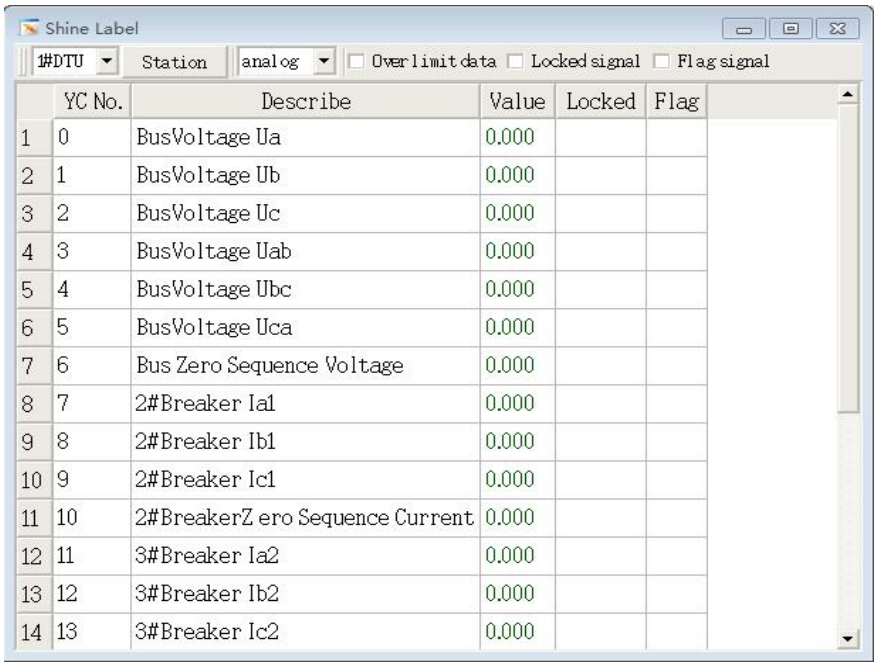
Moving the mouse to the shining entity and right clicking 

, this signal will stop flash:

3.3.9.Shine Label

Selecting 

in the toolbar, the main window of Shine Label will appear:



	YC No.	Describe	Value	Locked	Flag
1	0	BusVoltage Ua	0.000		
2	1	BusVoltage Ub	0.000		
3	2	BusVoltage Uc	0.000		
4	3	BusVoltage Uab	0.000		
5	4	BusVoltage Ubc	0.000		
6	5	BusVoltage Uca	0.000		
7	6	Bus Zero Sequence Voltage	0.000		
8	7	2#Breaker Ia1	0.000		
9	8	2#Breaker Ib1	0.000		
10	9	2#Breaker Ic1	0.000		
11	10	2#BreakerZ ero Sequence Current	0.000		
12	11	3#Breaker Ia2	0.000		
13	12	3#Breaker Ib2	0.000		
14	13	3#Breaker Ic2	0.000		

It defaults to list all station protection data related to the graph displayed in main window.

1) Browse protection value:

Select the station to be viewed in the station list, and select the protection value in the type list.

2) Browse breaker value:

Select the station to be viewed in the station list, and select the breaker value in the type list.

3) Browse switching value:

Select the station to be viewed in the station list, and select the switching value in the type list.

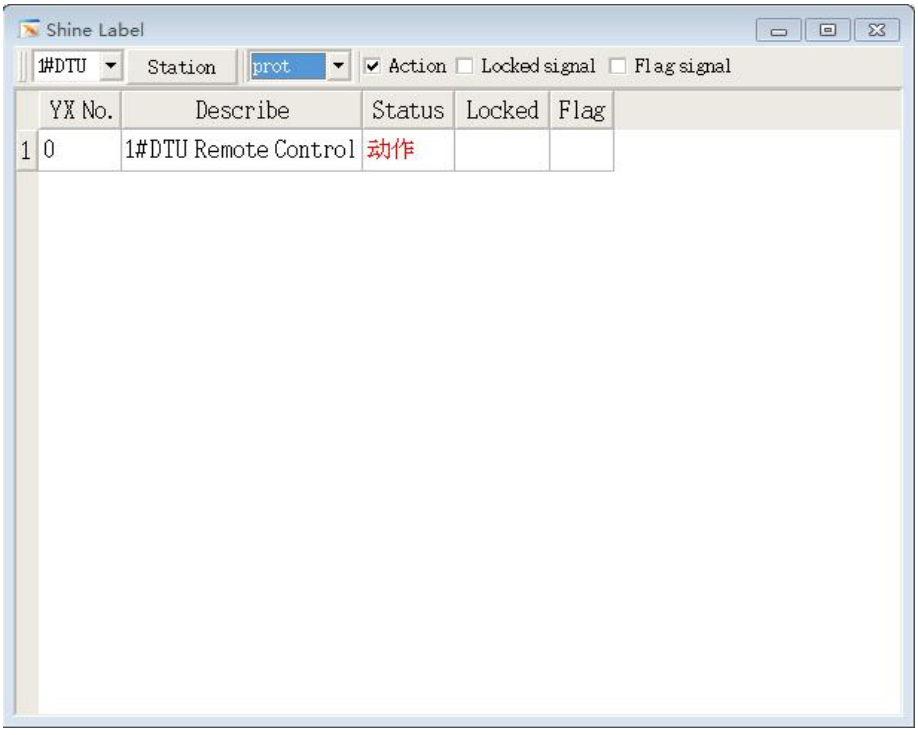
Double click the switching value displayed to open the primary wiring diagram.

4) Browse status value:

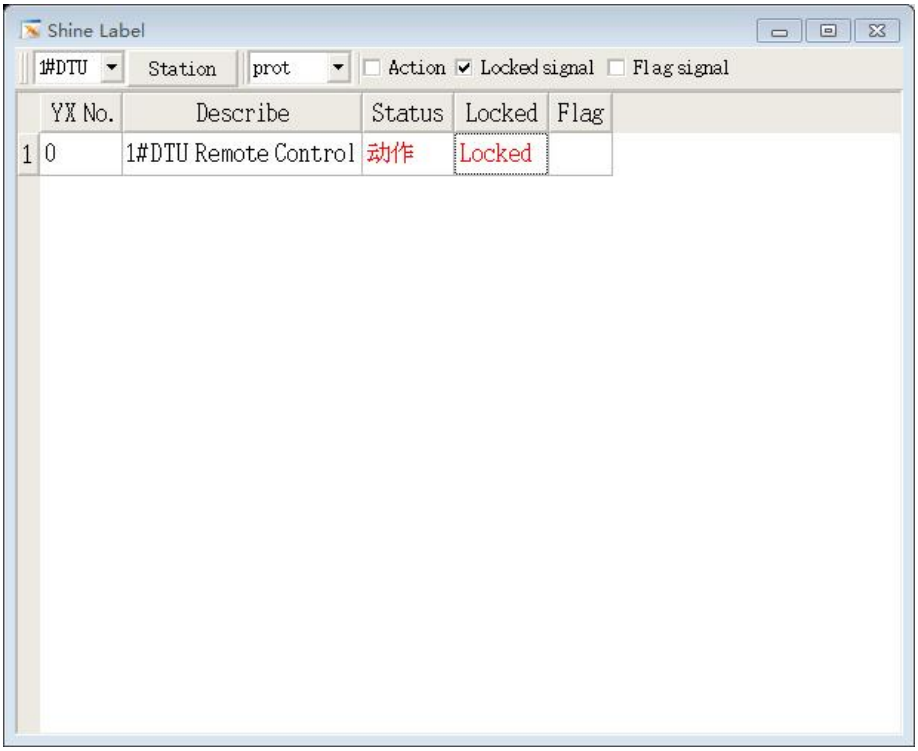
Select the station to be viewed in the station list, and select the status value in the type list.

5) Screen

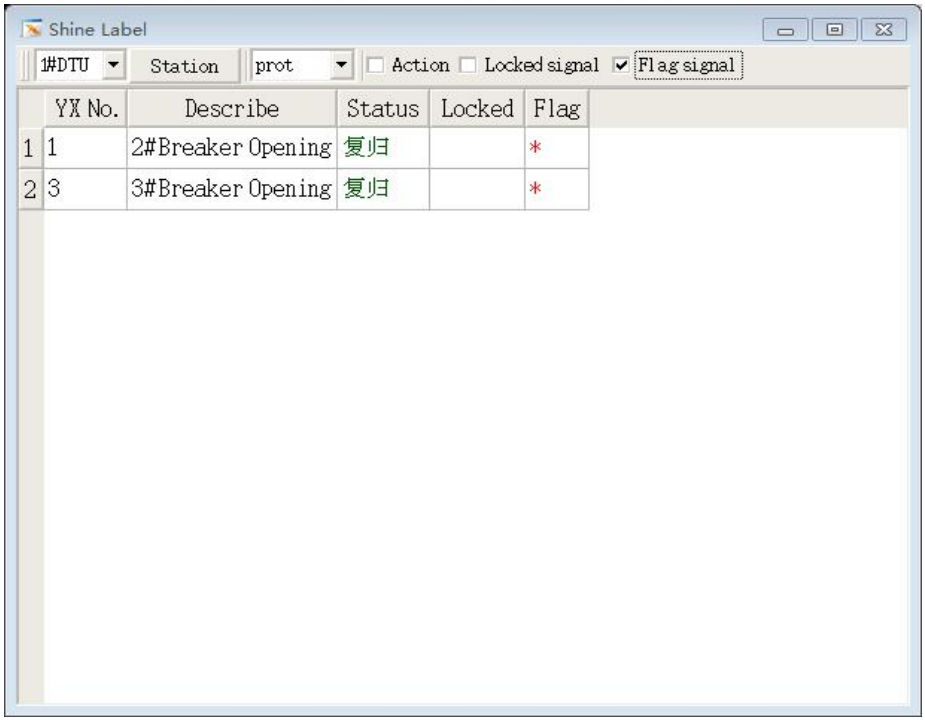
Selecting action signal in the toolbar, the action signal will be listed only as shown in the following figure:



Selecting “Locked”, the locked signals will be listed only as shown in the following figure:

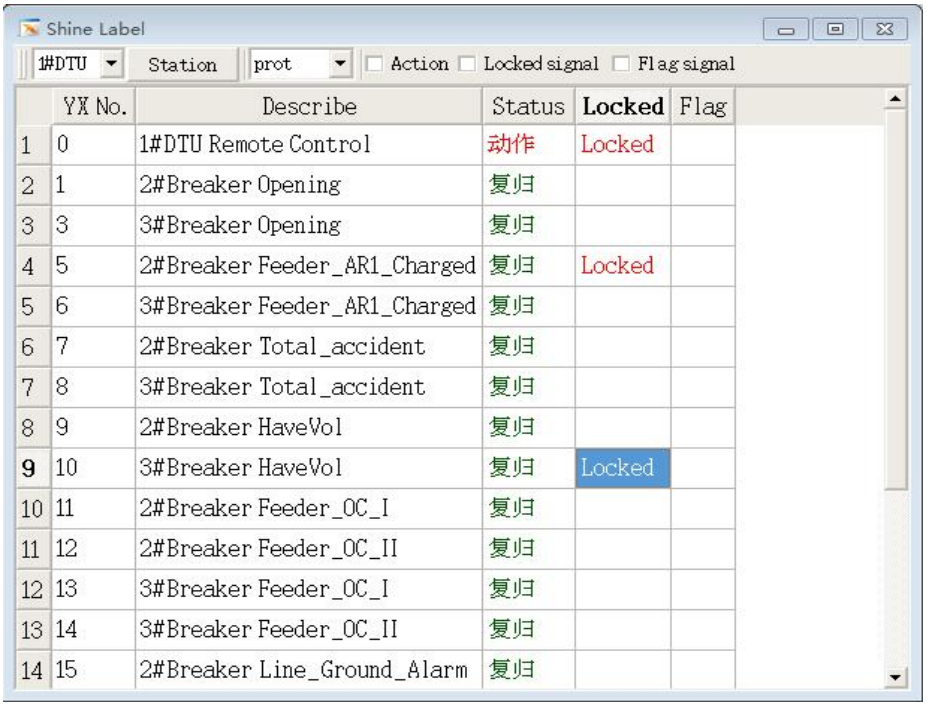


Selecting “Flag”, the signals with flag will be listed as shown in the following figure:



6) Signal locked：

Double click the column for locking signal. If “locked” appears in this column, it indicates the signal is locked successfully as shown in the following figure.

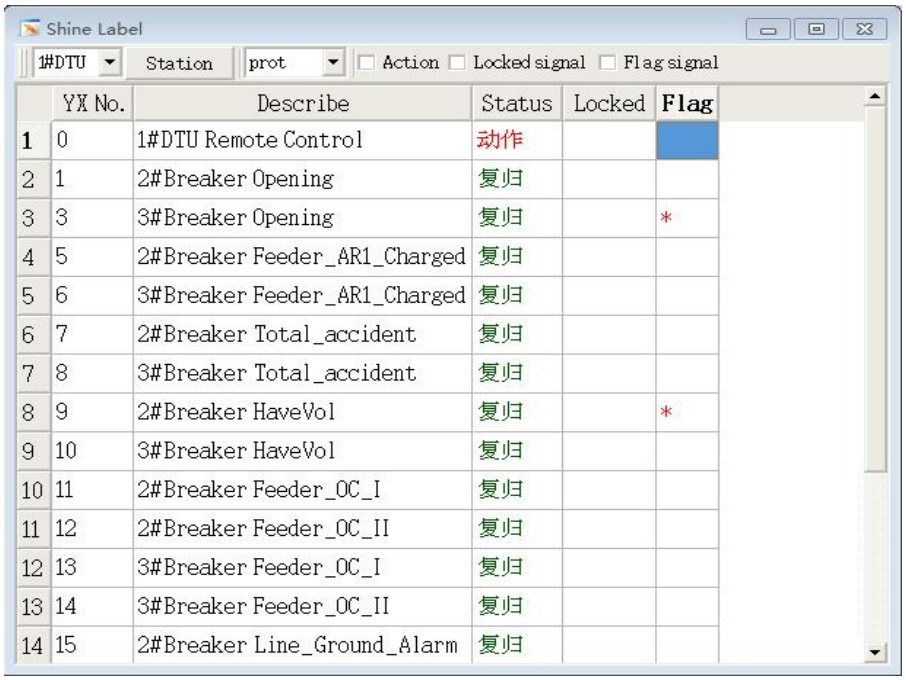


	YX No.	Describe	Status	Locked	Flag
1	0	1#DTU Remote Control	动作	Locked	
2	1	2#Breaker Opening	复归		
3	3	3#Breaker Opening	复归		
4	5	2#Breaker Feeder_AR1_Charged	复归	Locked	
5	6	3#Breaker Feeder_AR1_Charged	复归		
6	7	2#Breaker Total_accident	复归		
7	8	3#Breaker Total_accident	复归		
8	9	2#Breaker HaveVol	复归		
9	10	3#Breaker HaveVol	复归	Locked	
10	11	2#Breaker Feeder_OC_I	复归		
11	12	2#Breaker Feeder_OC_II	复归		
12	13	3#Breaker Feeder_OC_I	复归		
13	14	3#Breaker Feeder_OC_II	复归		
14	15	2#Breaker Line_Ground_Alarm	复归		

Double clicking the locked signal, “Locked” will disappear, which indicates the signal has been de-locked.

7) Signal Flag:

Double click the column of flag. If “*” appears in this column, it indicates the signal is marked successfully as shown in the following figure.



	YX No.	Describe	Status	Locked	Flag
1	0	1#DTU Remote Control	动作		
2	1	2#Breaker Opening	复归		
3	3	3#Breaker Opening	复归		*
4	5	2#Breaker Feeder_AR1_Charged	复归		
5	6	3#Breaker Feeder_AR1_Charged	复归		
6	7	2#Breaker Total_accident	复归		
7	8	3#Breaker Total_accident	复归		
8	9	2#Breaker HaveVol	复归		*
9	10	3#Breaker HaveVol	复归		
10	11	2#Breaker Feeder_OC_I	复归		
11	12	2#Breaker Feeder_OC_II	复归		
12	13	3#Breaker Feeder_OC_I	复归		
13	14	3#Breaker Feeder_OC_II	复归		
14	15	2#Breaker Line_Ground_Alarm	复归		

Double clicking the signal with flag, “*” will disappear, which indicates the signal flag has been removed.

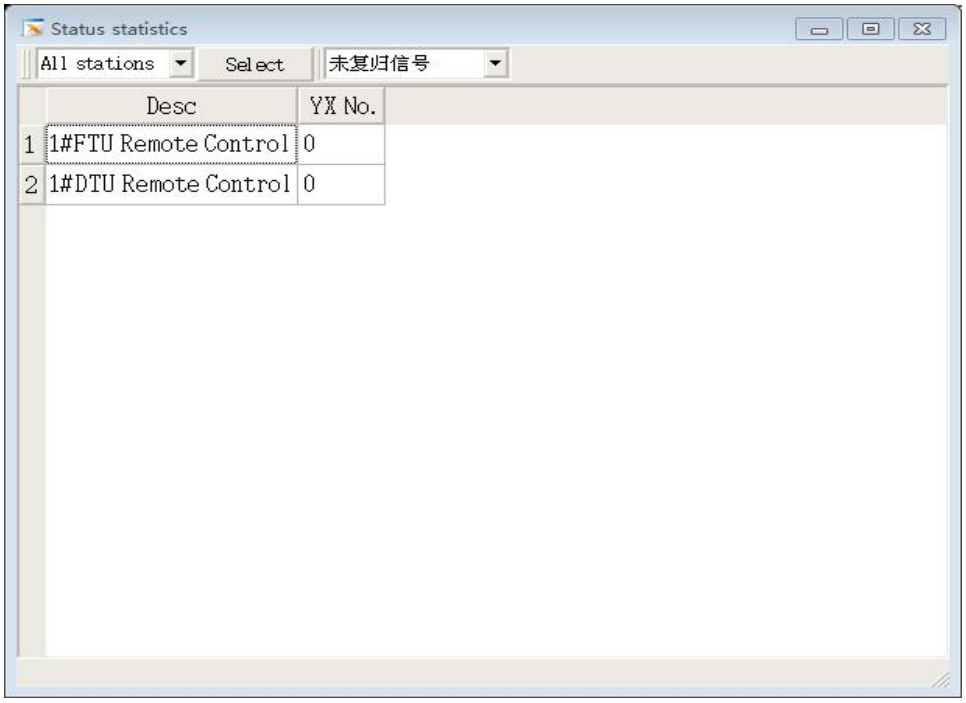
8) Status description:

Status description of protection value, breaker value and switching value can be configurable in the configuration file: $(MASENV) /ini/ gshinev2d.ini.

3.3.10. Status Statistics

Selecting 

in the toolbar, the main window of status statistic will appear:

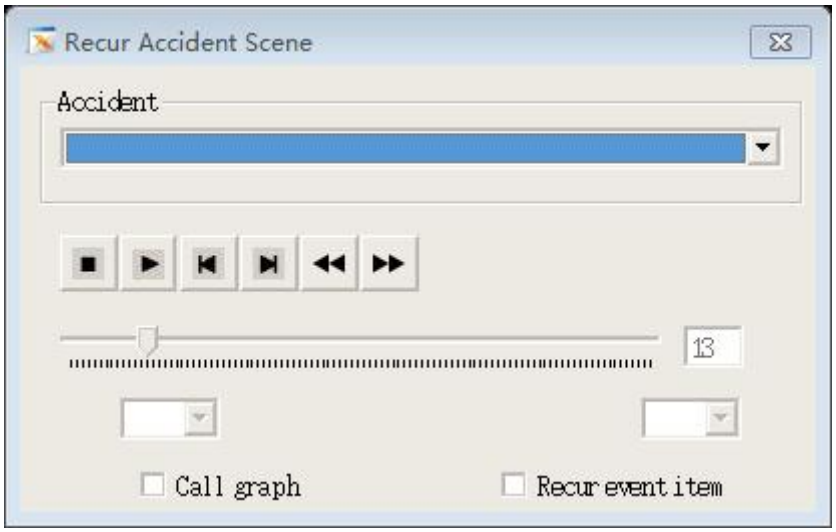


Display some status requiring statistic according to station types. As shown in the above figure, all un-reset signals of stations are displayed. Statistics such as telemetering times and un-reset signals can be set in “$(MASENV) /ini/statistic.ini”.

3.3.11. Accident Recur

Selecting 

in the toolbar, the following window will appear:



It comes into accident recur status. Main window displays accident history rather than real-time data.

1) **Select accident**

List all accidents in the accident list, and select the accident to recur. After selecting an accident, the progress bar will display dot marks at the starting and ending position of progress bar according to recorded points of accident. Negative means the point before accident, and positive means the point after accident.

2) **Adjust recur speed**

When adjusting the play speed, the recur interval of every point can be adjusted.

3) **Recur accident scene**

Clicking play button, the real-time data on main screen reflects true and real situation before and after accident.

4) **Call graph or not**

After selecting this function, the screen will be switched to the graph where the equipment is located.

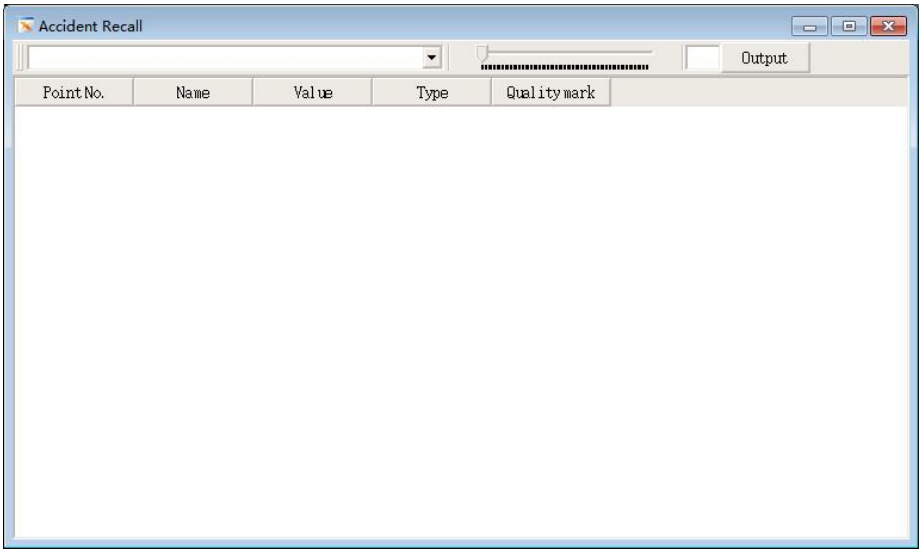
5) **Recur event item or not**

After selecting this function, the list will display the events of equipment in accident.

3.3.12. Accident Recall

Selecting 

in the toolbar, the following window will appear:



Accident recall is similar to accident recur. The difference is that accident recur reflects changes of real-time data before and after accident on wiring diagram, while accident recall reflects real-time data changes before and after accident in table or sheet.

3.3.13. Load Parameter

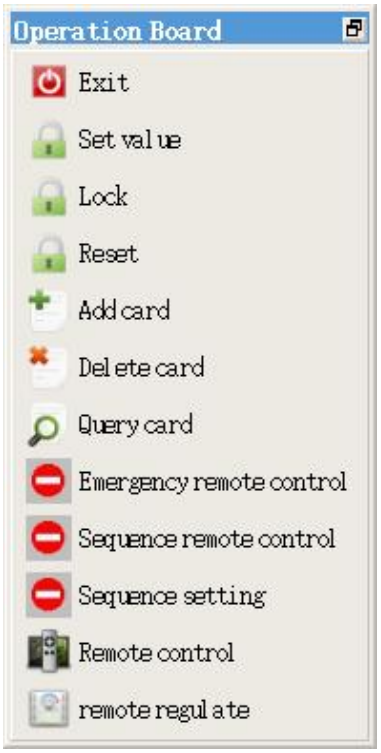
If the database is modified from interface, the database contents shall be loaded to real-time database via 

.

3.3.14. Operations Board

Selecting 

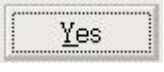
in the toolbar, a floating window will appear:



Common operation functions will be listed. These functions are of status property, and their permissions shall be strictly controlled. Pattern and description of buttons in operation board can be configured in the file “$(MASENV) /ini/gmmi.ini”.

Click 

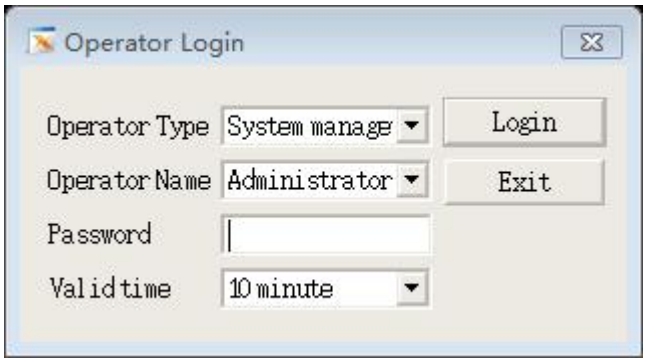
again in the toolbar. If there is no operation status at present, the operation board will disappear. If any, the following prompt will appear:

Clicking 

, the operation board will disappear.

3.3.14.1. Log in operation

Every operation on operation board shall be logged in and have valid time. Once timeout, the operation will automatically exit. Clicking any operation on the operation board, if there is no operator login or login timeout currently, the following operator login interface will appear:

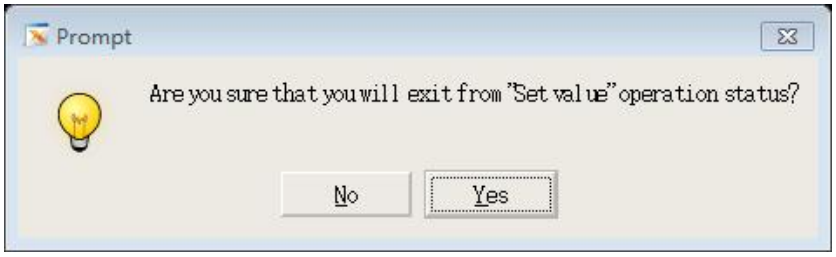


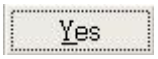
Select “Operator Type”, “Operator Name” and “Valid Time”, enter the password, and click “Login”. Operator list is obtained based on node permissions of this equipment. If the user has no right of operation, he will not appear in the operator list. If the operator has no operation right or the password is incorrect, the corresponding prompt will be given after “login”. If the login has succeeded, but the current user has no operation right, the same prompt will also be given. During valid time of login, other operations require no login any more.

3.3.14.2. Exit from operation

Clicking 

on the operation board, the following window will appear:

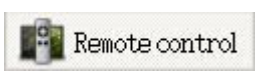


Click 

to exit from current operation. For other operations, it shall require login again.

3.3.14.3. Remote control

Remote control operation includes general remote control and emergency remote control. General remote control will check the current object is closed or not before remote control. If the object is closed, the remote control command cannot be sent. Emergency remote control will not check the object is closed or not before remote control, and send command directly. Both of them have same operation process and interface.

Click 

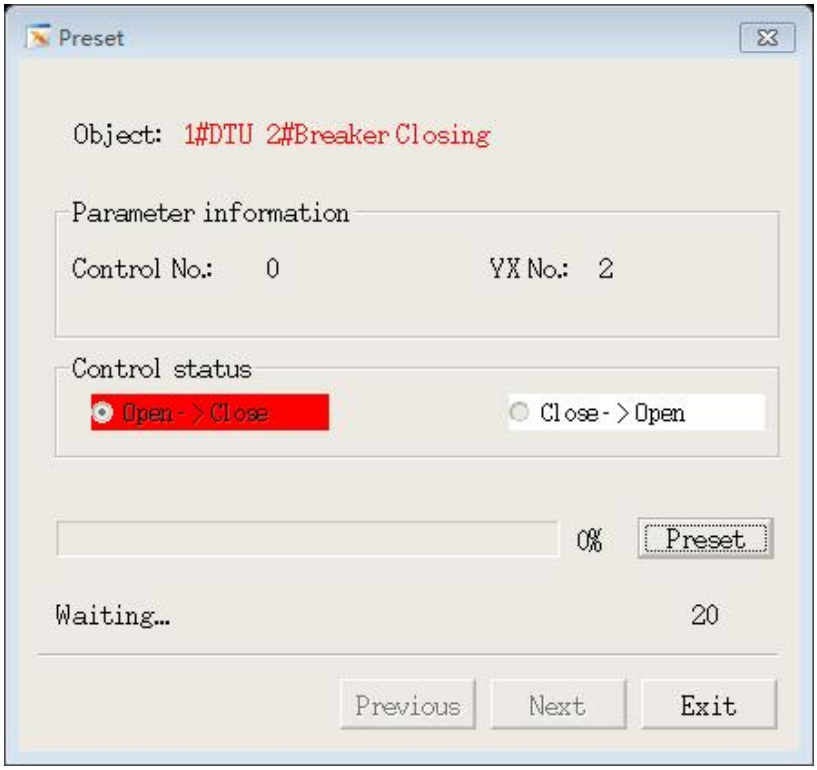
or 

on operation board, and left click the remote control object on wiring diagram after login. If the current equipment cannot be remote controlled, the following prompt will appear:

You have to select equipment again.

After selecting the equipment capable of remote control, security restraint system verification for remote control will appear. If no verification is set, this window will not appear:

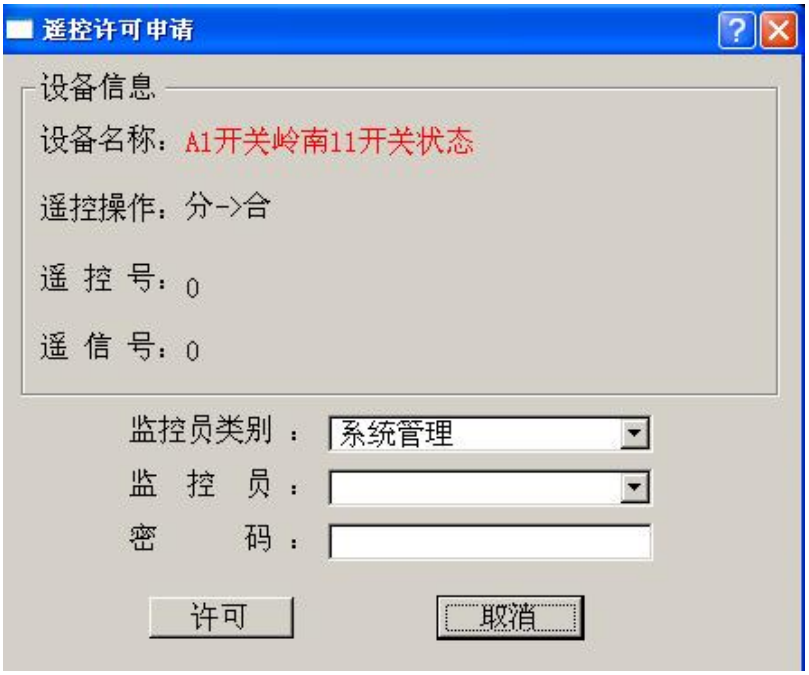
After verifying security restrain successfully, the remote control verification window will appear. If the check code for remote control object is not set in the database, this window will not appear.



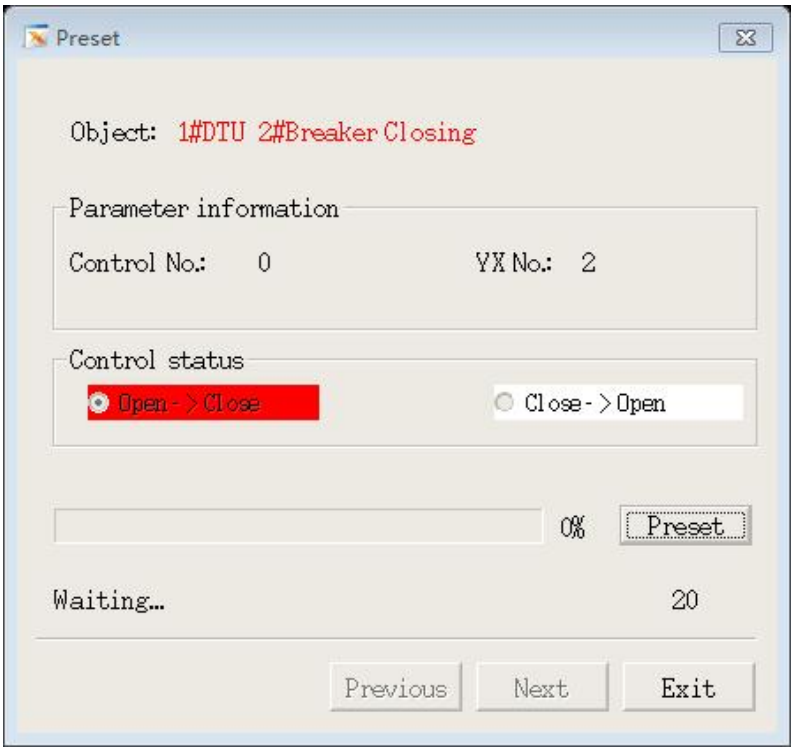
Enter the check code of remote control object, and click “check”. If the code is correct, “next” button will be available. Clicking “next”, the remote control application window will appear. If the remote control dispatching adopts one unit and single dispatching, this window will not appear:

If the dispatching mode adopts two units and dual dispatching, select the equipment to be monitored in the list and click “application”. If the dispatching mode adopts one unit and dual dispatching, this

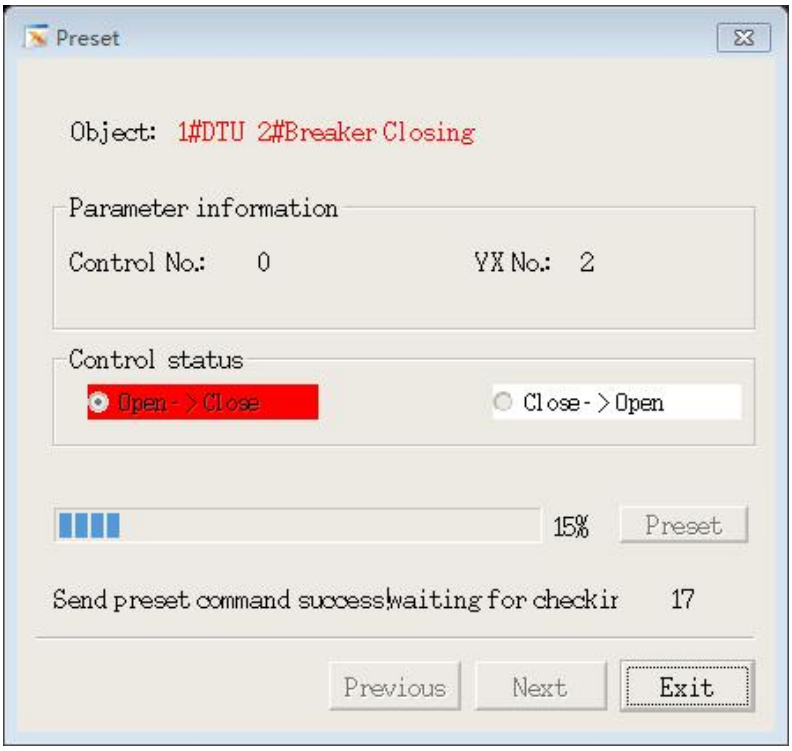
equipment will be monitor, which will display remote control application window:



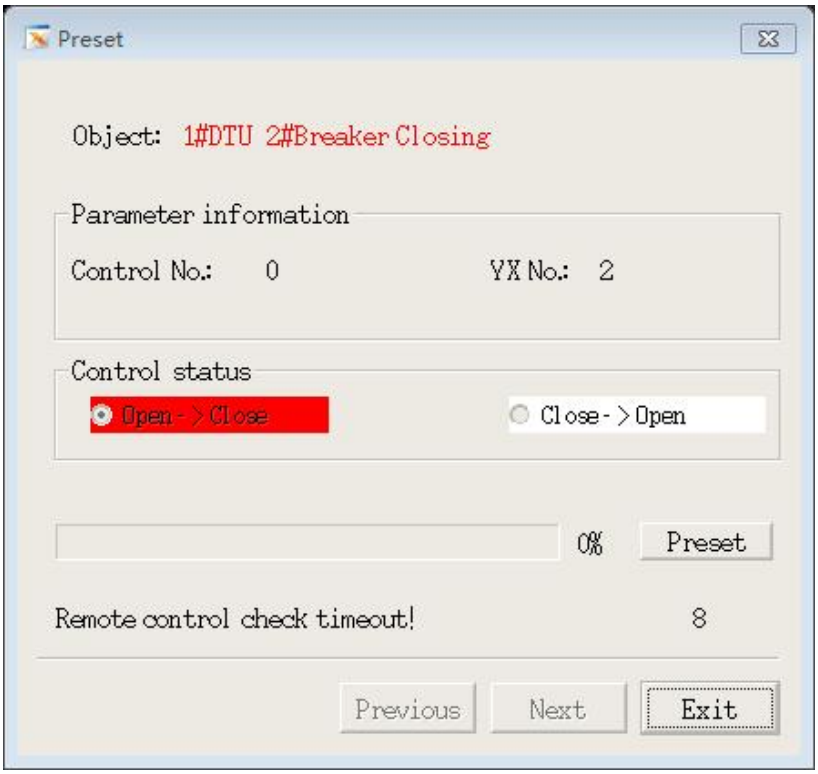
After checking correctness, the monitoring person will enter password and click “Approve”. As obtaining approval of remote control, “Next” button on remote control application window will be available. Clicking “Next”, the preset window will appear:



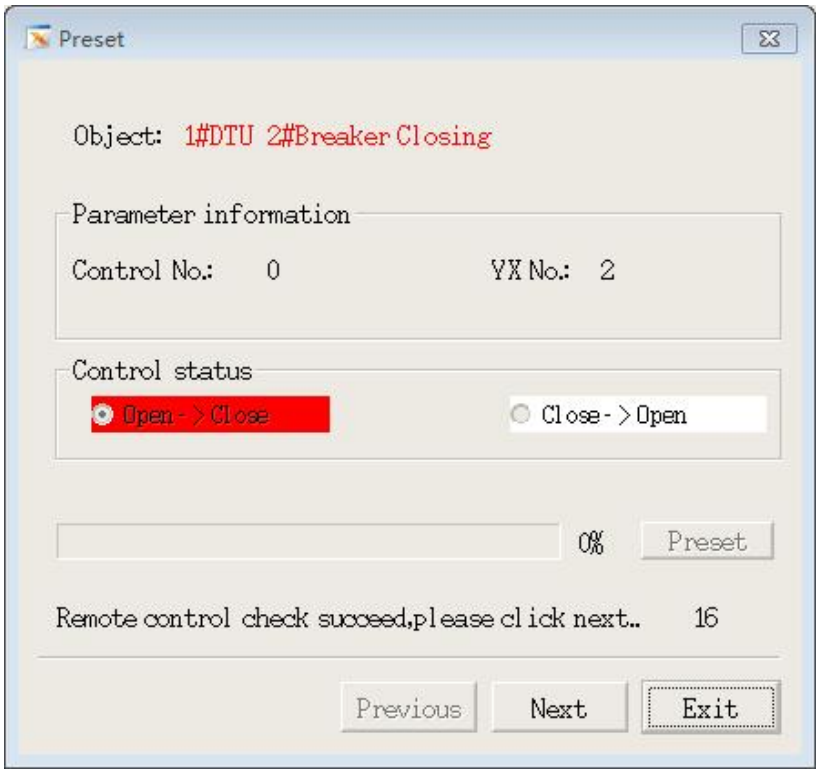
Click “Preset” and wait for presetting:



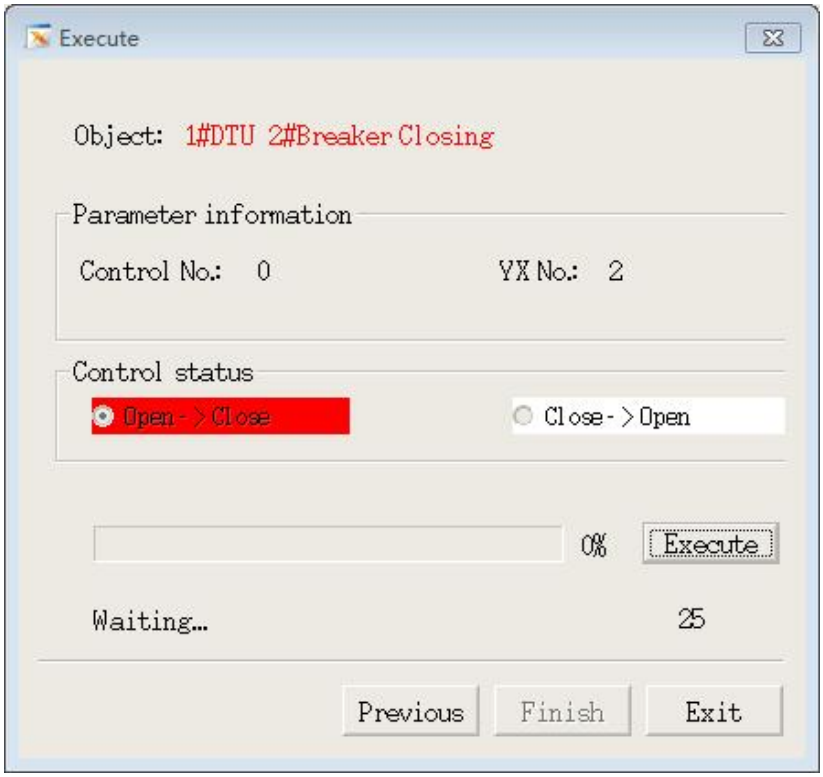
After sending preset command successfully, if return message has not been received for a long time, it means remote control check becomes timeout.



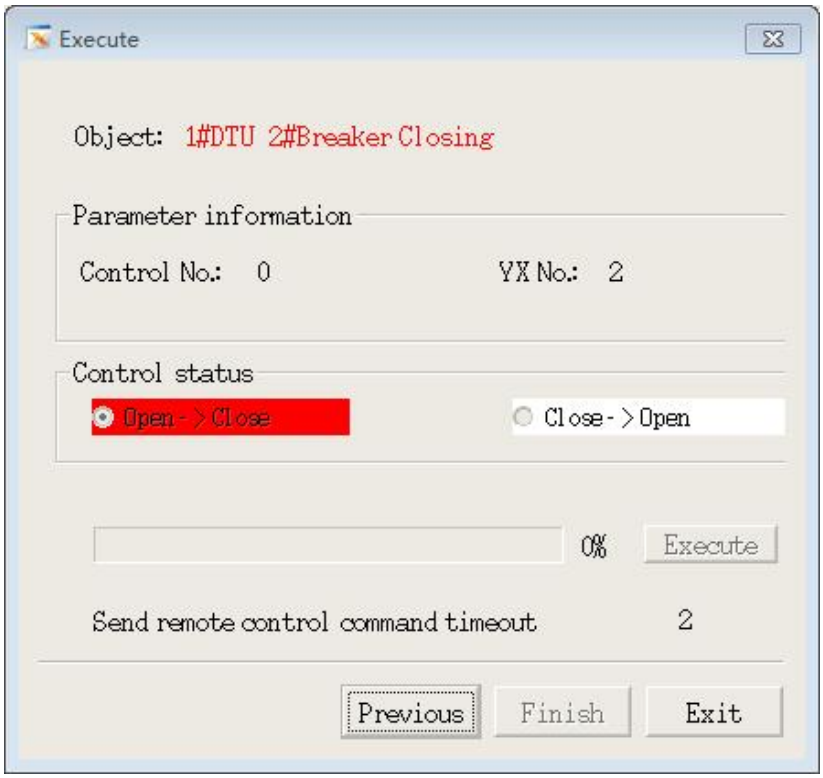
If the check message is received, it means check is correct. Please click “Next” for further operation:



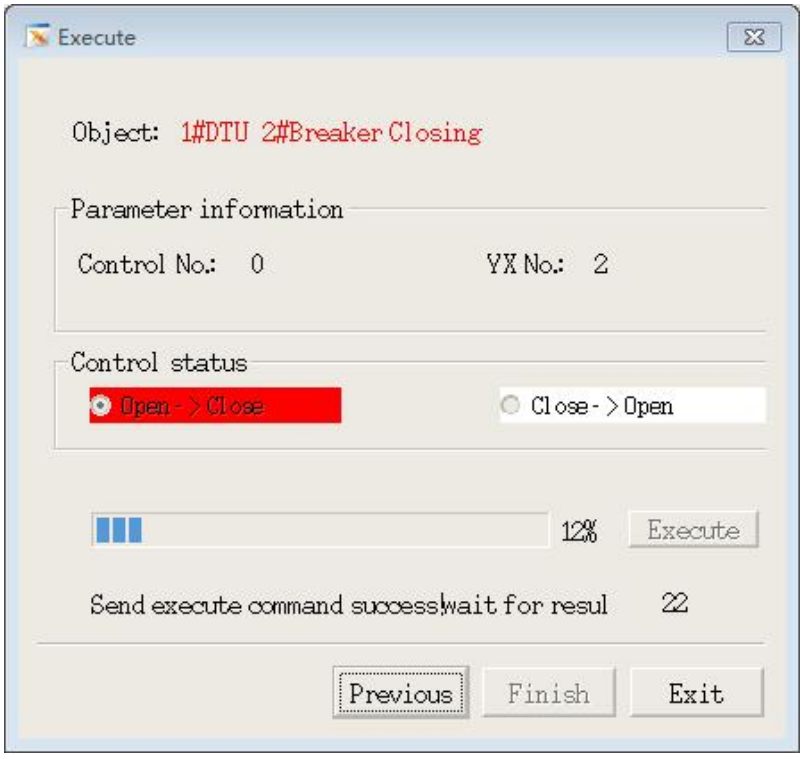
Click “Next” to go to “Execute” interface:



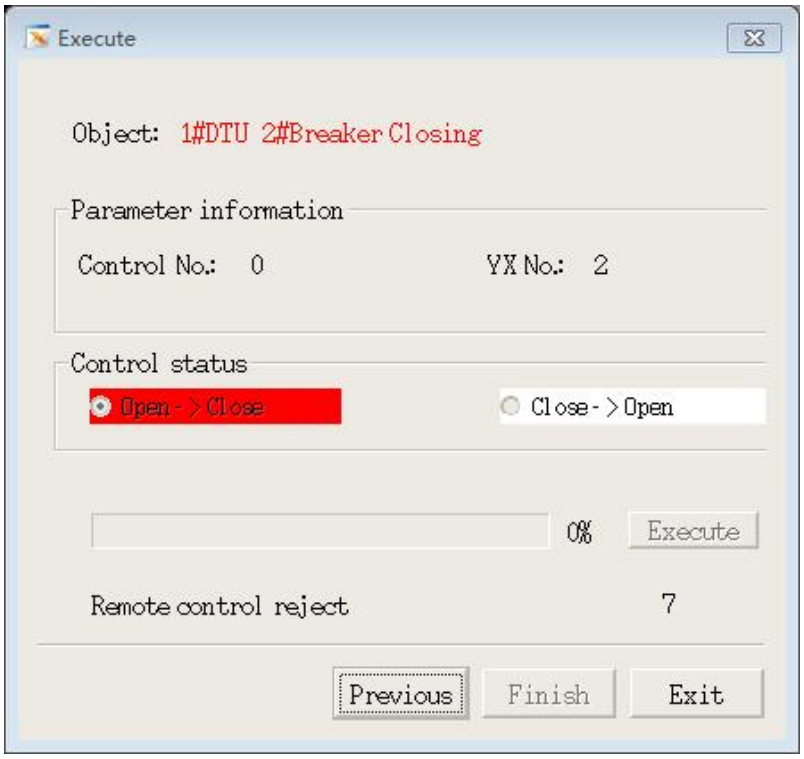
If there is no operation for a long time after check success, the command timeout will occur:



Click “Execute” to send remote control command:



If the switch with remote control has no change of position for a lont time after sending command, the remote control will be rejected:



If the switch has action in setting time, the remote control succeeds:

Clicking “Exit” or exiting from remote control interface in any process of remote control, the system will send remote control cancel command.

3.3.14.4. Remote regulate

Remote regulate operation can be achieved by clicking real-time data of remote regulate or transformer

entity. Clicking 

in operation board, and selecting the object to be remote regulated on the wiring diagram after login, the remote regulate verification window will appear. If the check code of remote regulate object is not set in database, this window will not appear:n ju

Enter the check code of remote regulate object, and click “check”. If the code is correct, “next” button will be available. Clicking “next”, the remote regulate application window will appear. If the remote regulate dispatching adopts one unit and single dispatching, this window will not appear:

If the dispatching mode adopts two units and dual dispatching, select the equipment to be monitored in the list and click “application”. If the dispatching mode adopts one unit and dual dispatching, this equipment will be monitor, which will display remote regulate application window:

After checking correctness, the monitoring person will enter password and click “Approve”. As obtaining approval of remote regulate, “Next” button on remote regulate application window will be available. Clicking “Next”, the preset window will appear:

Click “Preset” and wait for presetting. If the preset succeeds, “Next” button will be available. Clicking “Next”, the Execute window will appear:

Click “Execute” to start remote regulating. This window has time limit. If the remote regulate command is not sent within specified time, the operation will be cancelled automatically.

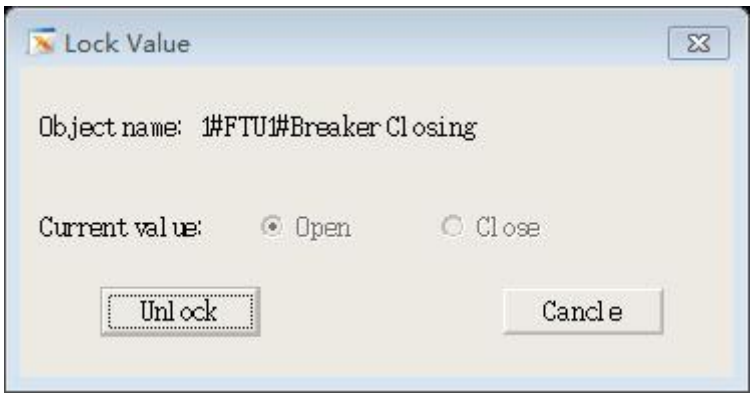
3.3.14.5. Manual locking

Value lock includes remote signal lock, remote signal unlock, remote metering lock and remote metering unlock. Click 

on the operation board and go into locking status.

1) Remote signal lock

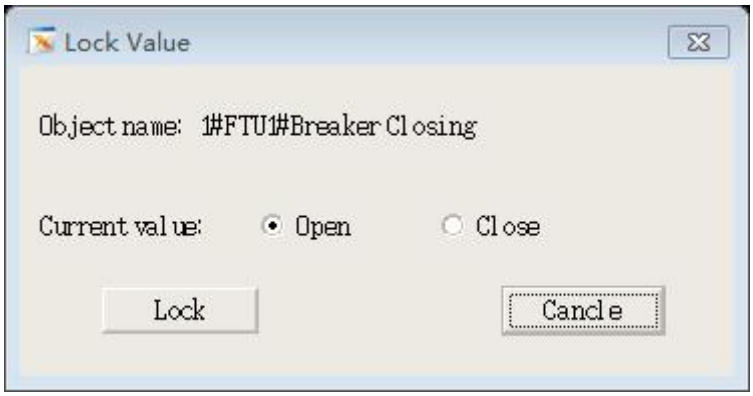
Selecting the remote signal object to be locked, the lock window will appear:



Selecting the remote signal status to be locked, and clicking “Lock”, the remote signal will be locked.

2) Remote signal unlock

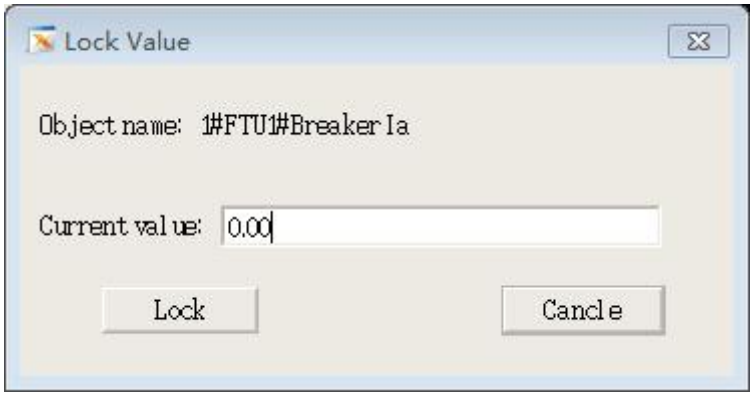
Selecting the remote signal object to be unlocked, the unlock window will appear:



Clicking “unlock”, the remote signal will be unlocked.

3) Remote metering lock

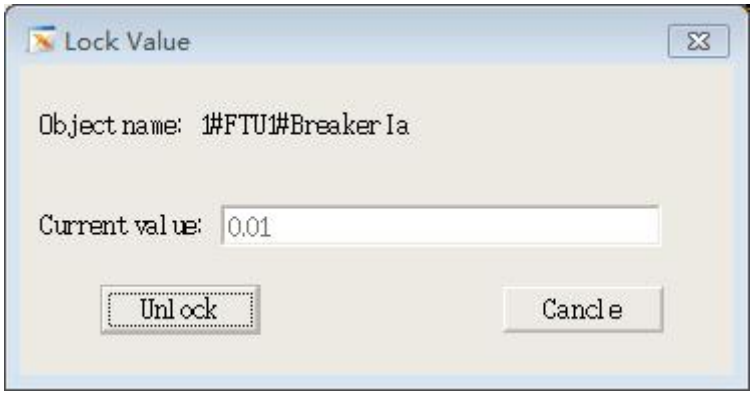
Selecting the remote metering object to be locked, the lock window will appear:



Entering the remote metering value to be locked and clicking “Lock”, the remote metering will be locked.

4) Remote metering unlock

Selecting the remote metering object to be unlocked, the unlock window will appear:

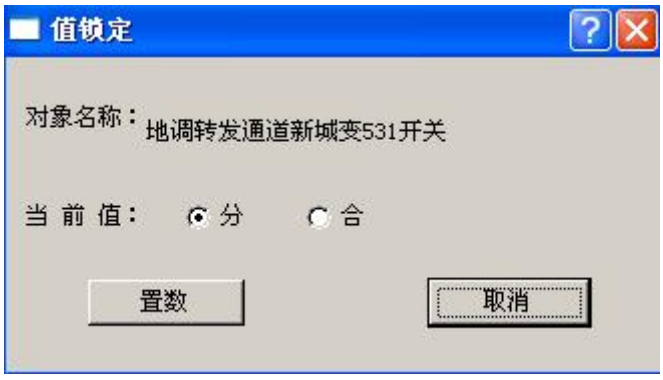


Clicking “unlock”, the remote metering will be unlocked.

3.3.14.6. Manual reset

Click 

on the operation board and go into reset status. Selecting the remote signal status to be locked and clicking “Reset”, the remote signal status will be changed.



Selecting the remote metering object to be reset, the following window will appear:

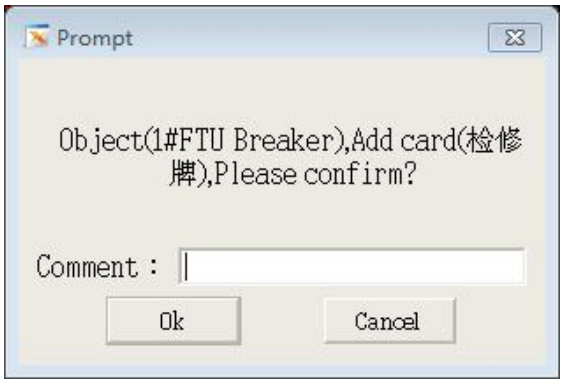
Entering the remote metering value to be reset and clicking “Reset”, the remote metering will be changed.

3.3.14.7. Add card

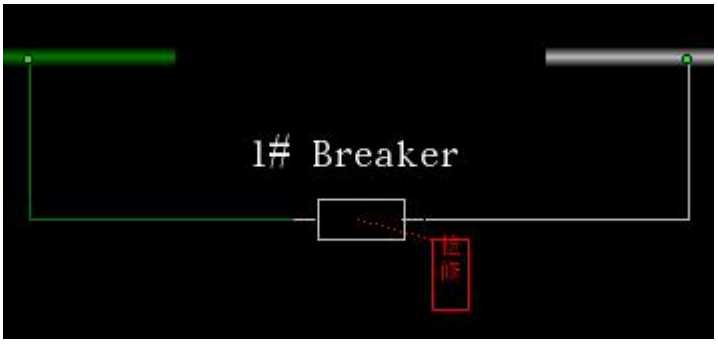
Selecting 

on the operation board, the card list window will appear:

After selecting card to be added, click the position to add card on the wiring diagram of main interface, and a window for confirming add card will appear:



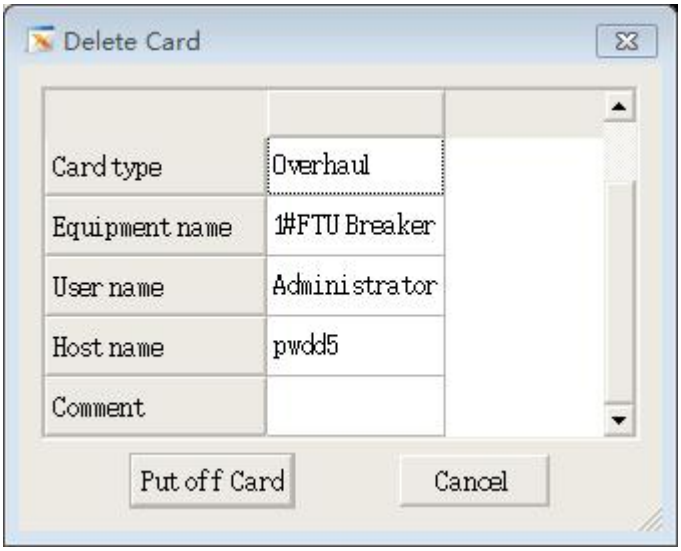
After confirmation, the card will appear at the corresponding position of wiring diagram, which means card adding success. A dotted line will connect card and equipment. Click card to move current graph up and down as follows:



3.3.14.8. Delete card

Selecting 

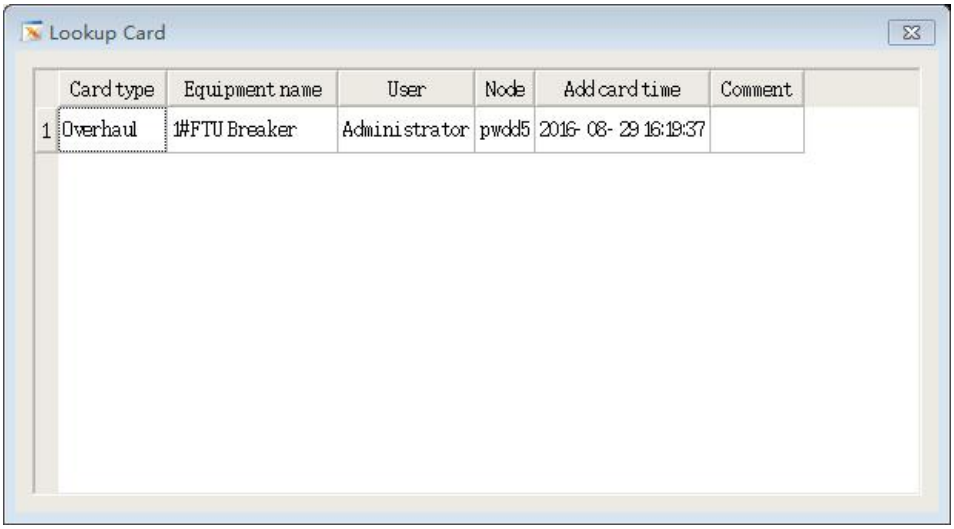
on the operation board and clicking card on wiring diagram, a confirmation window will appear:



Clicking “Delete Card”, the card will disappear from wiring diagram. Then card is deleted successfully.

3.3.14.9. Lookup card

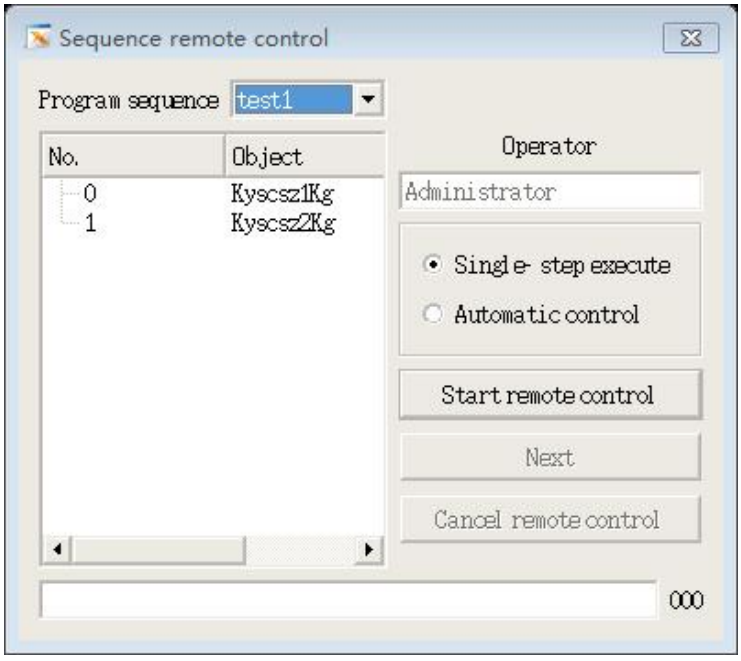
Clicking the card to be looked up on wiring diagram, a window containing card information will appear. If no card is at clicking position, all cards on the diagram will be listed.



3.3.14.10. Sequence remote control

Selecting 

on the operation board, the sequence remote control window will appear:

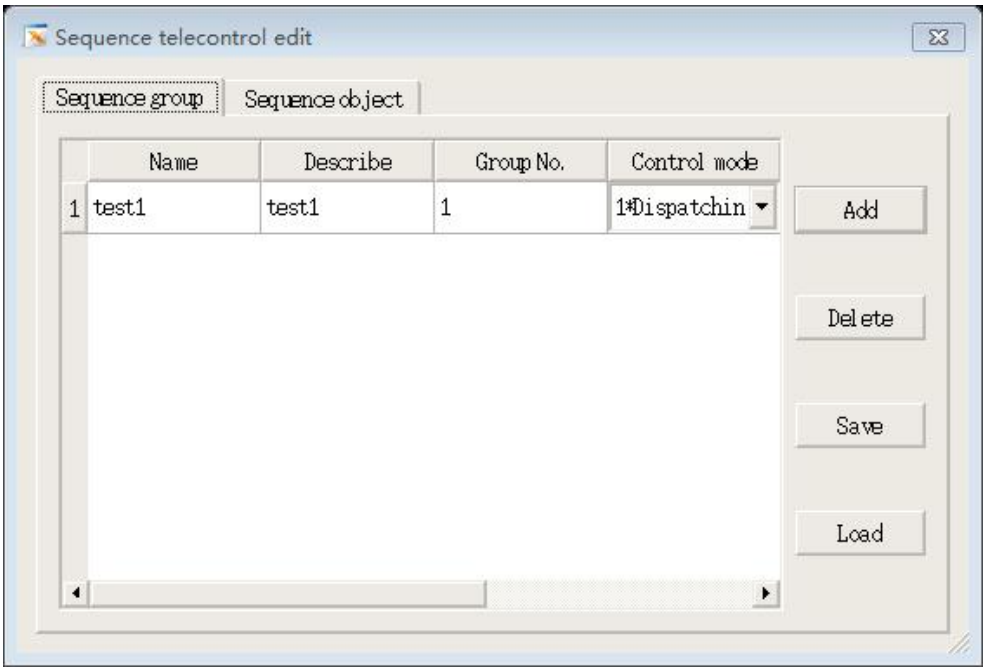


Select program sequence group and click “start remote control” for sequence remote control. Single-step execute and automatic control are available.

3.3.14.11. Sequence setting

Selecting 

on the operation board, the sequence telecontrol edit window will appear, from which the sequence telecontrol group and object can be edited.



3.3.15. Event item calling graph

There are two ways for event item calling graph:

Calling graph by main window:

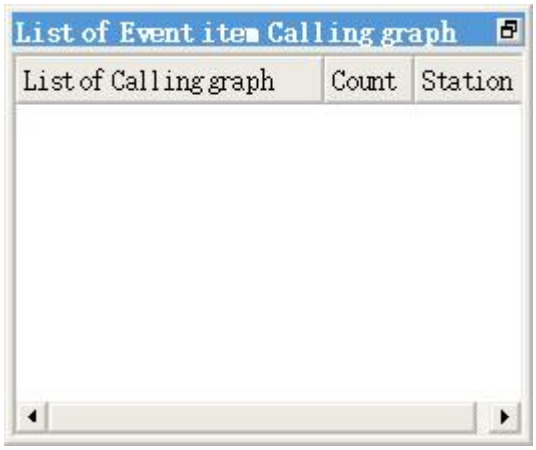
When the event item requires calling graph, open the graph to be called on the main interface.

Calling graph by child window:

When the event item requires calling graph, open the graph to be called on the child interface.

Calling list:

When the event item requires calling graph, the following list window will appear:



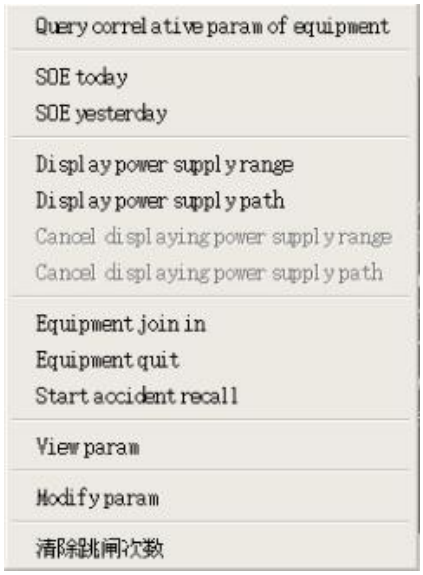
Double click a column in the list to switch to corresponding graph.

3.3.16. Cross-graph view

The incoming or outgoing line on wiring diagram is connected to another station. If such incoming or outgoing line is drawn in overhead line and the overhead line has been related to equipment with start and end station set, clicking the overhead line will jump to the wiring diagram of another station.

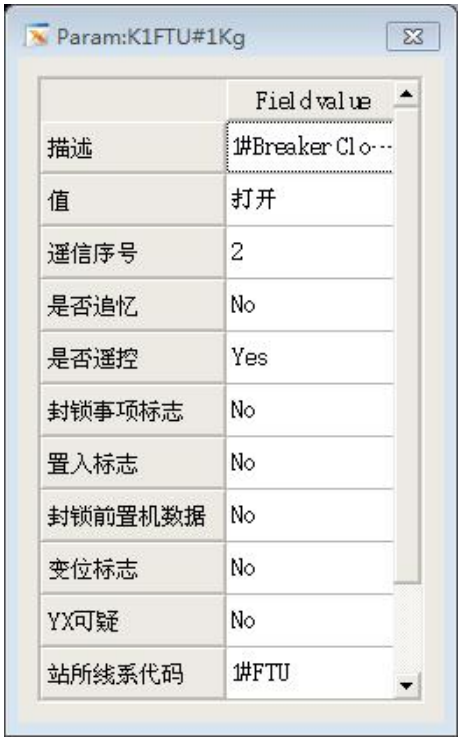
3.3.17. View parameter

Left clicking the parameter object on the wiring diagram or right clicking the entity object, a menu will appear:



Selecting 

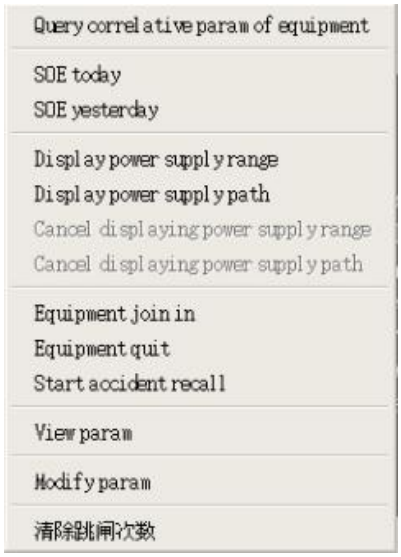
, the following window will appear:

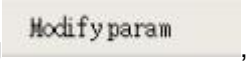


Columns listed in the window can be configurable. All real-time data have different file names depending on real-time database name. For example, if the name of real-time database corresponding to a switch is break, the definition of columns in the window will depend on “$(MASENV) \ini\break.ini”.

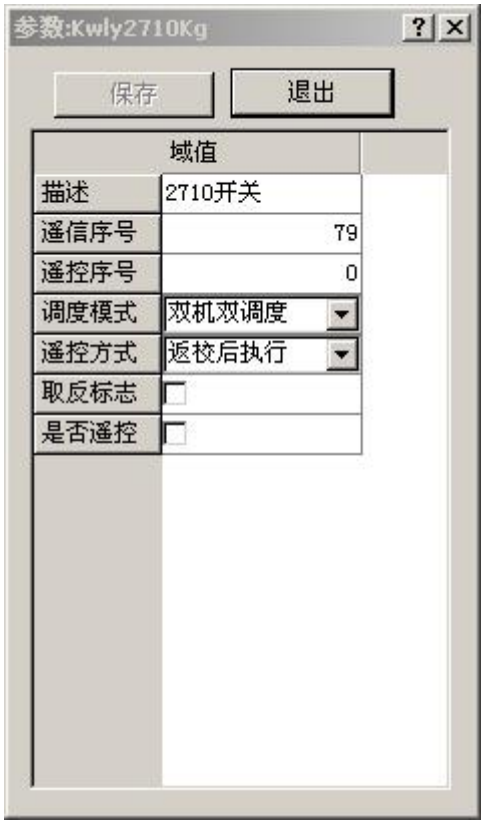
3.3.18. Modify parameter

Right clicking the parameter object on the wiring diagram, the following menu will appear:



Clicking 

, the following window will appear:



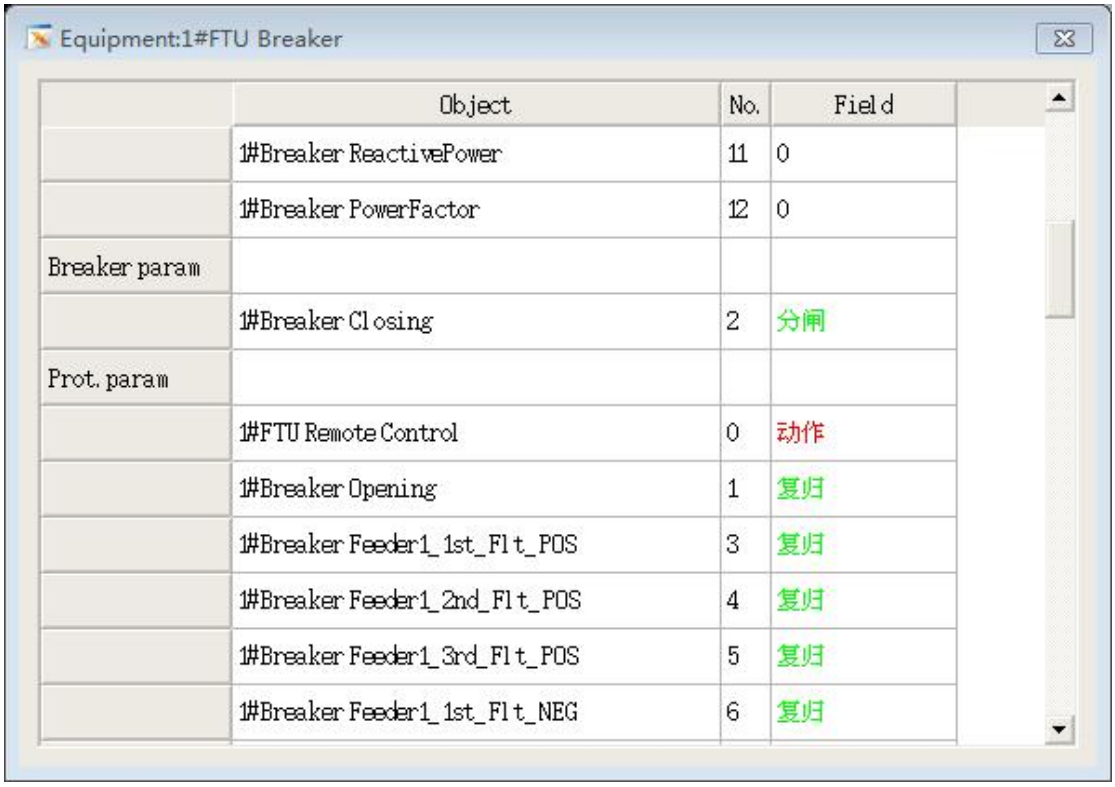
Columns listed in the window can be configurable. All real-time data have different file names depending on real-time database name. For example, to click and view a switch, the corresponding history database name is the switching value view. The definition of columns in the window depends on "$(MASENV) \ini\switching value view.ini". After saving modified parameter, select 

on the toolbar to load parameter.

3.3.19. Query correlative parameter of equipment

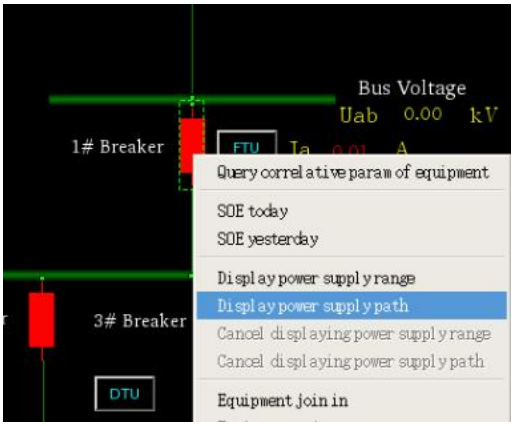
Right clicking the parameter object on the wiring diagram, the following menu will appear:

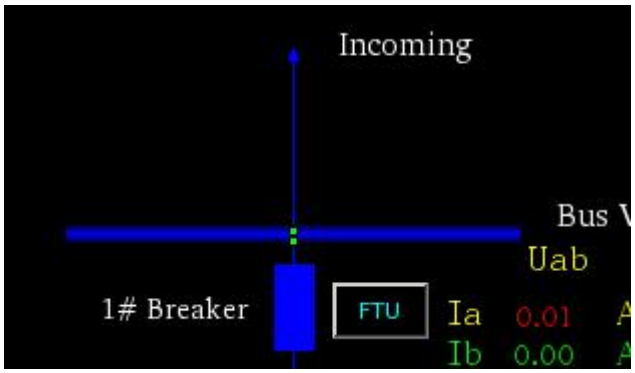
Clicking Query correlative param of equipment, all remote metering value, switching value, protection value, status value and power value correlated to equipment will list as follows:



3.3.20. Display power supply path

Right click a load and select “Display power supply path” in the menu to mark the power supply path of load in color:

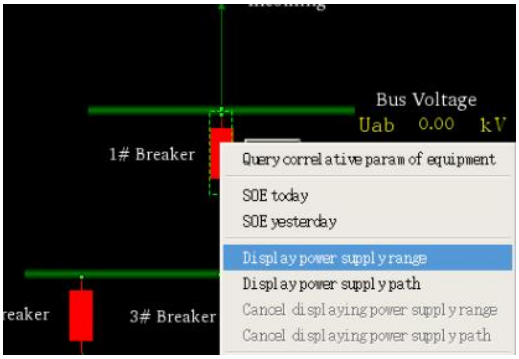


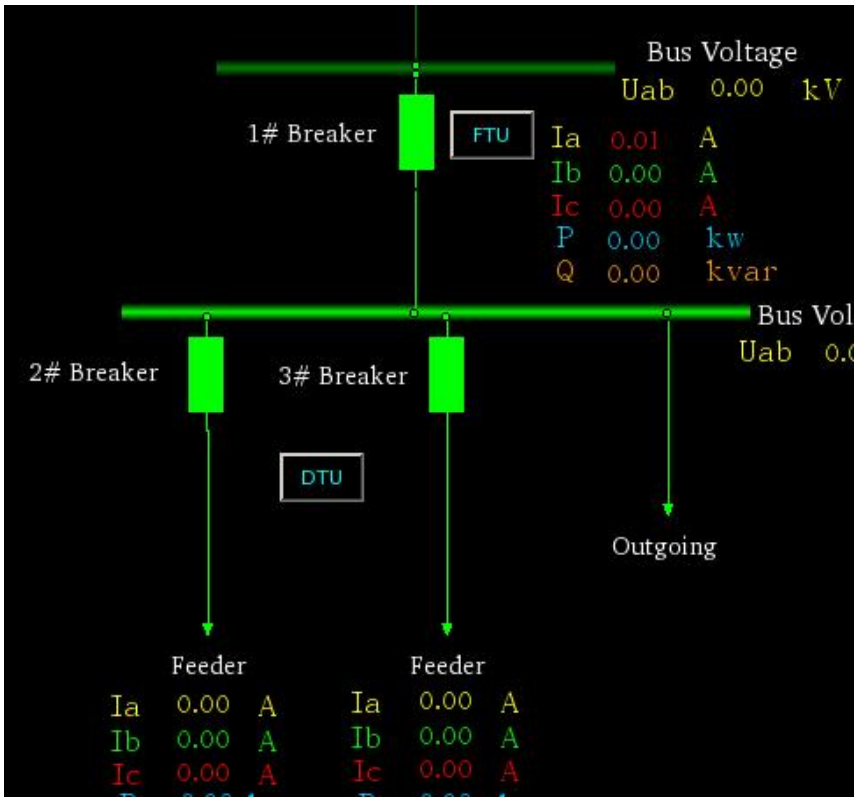


Right click a load and select “Cancel display power supply path” in the menu to cancel the power supply path display in color:

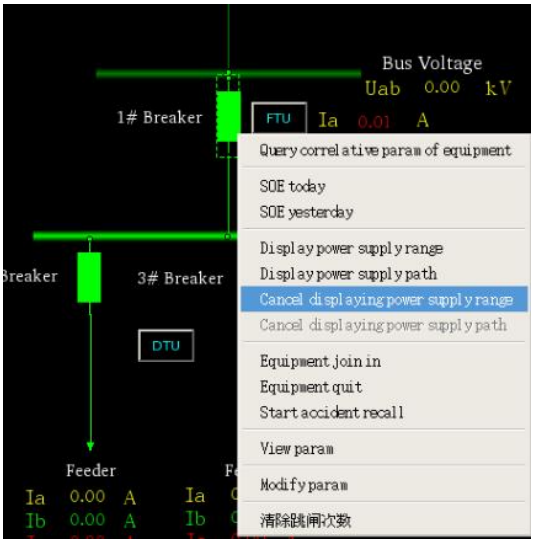
3.3.21. Display power supply range

Right click equipment and select “Display power supply range” in the menu to display the power supply range of equipment:





Right click equipment and select “Cancel display power supply range” in the menu to cancel the power supply range display of equipment:



3.3.22. Intelligent Info Board

3.3.22.1. Overall interface

With data mining technology, the system interface becomes more humanized. Select 

in gmmi toolbar and display intelligent info board interface, consisting of four modules: system capacity analysis, running status and online device statistics, switching action statistics, and information publish:

3.3.22.2. System capacity analysis

Click the button on the system capacity analysis page as follows:

	名称	遥测总数	遥信总数	遥控总数	遥脉总数
1	转发1	0	0	0	0
2	转发2	0	0	0	0
3	集中DTU2	24	28	1	1
4	系统站	9	0	0	0
5	#1柜	12	10	2	0
6	#9柜	12	10	2	0
7	集中DTU1	27	43	12	0
8	总计	84	91	17	1

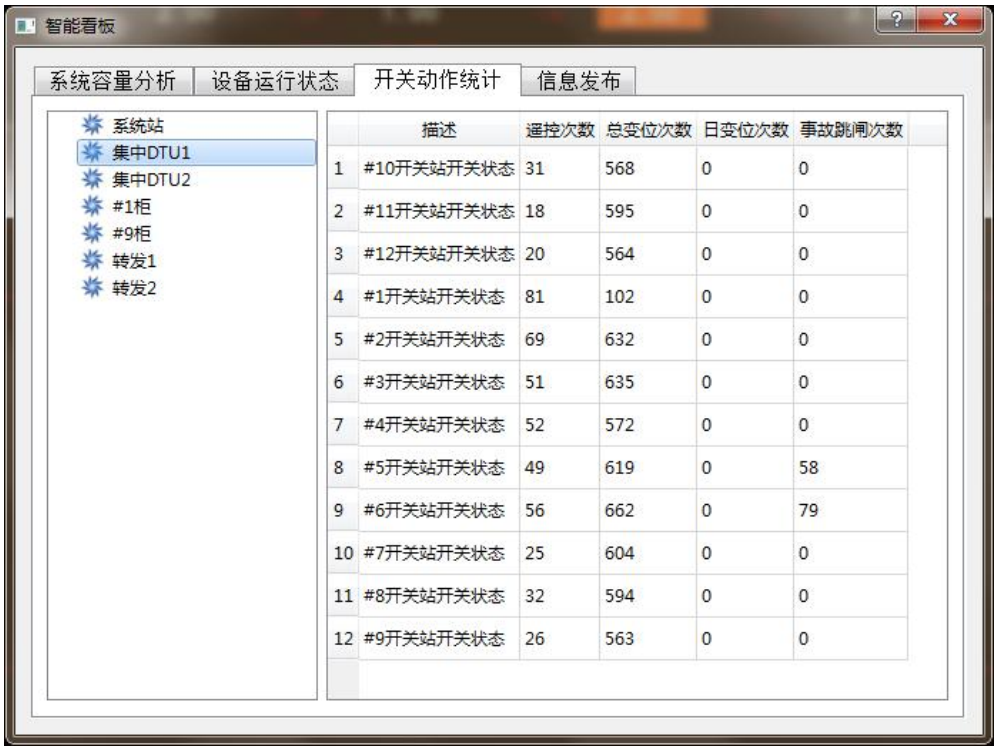
3.3.22.3. Running status of equipment

Select equipment running status page as follows:

	描述	使用状态	故障次数	日运行时间	运行时间
1	转发1	运行	0	05时47分37秒	4天17时12分57秒
2	转发2	运行	0	05时47分37秒	4天17时24分13秒
3	#1柜	运行	0	05时44分20秒	73天17时52分22秒
4	系统站	未使用	0	0	30天04时43分44秒
5	#9柜	运行	0	05时44分20秒	82天13时08分12秒
6	集中DTU1	运行	0	05时44分20秒	84天14时54分27秒
7	集中DTU2	停运	0	0	73天18时45分01秒

3.3.22.4. Switching action statistics

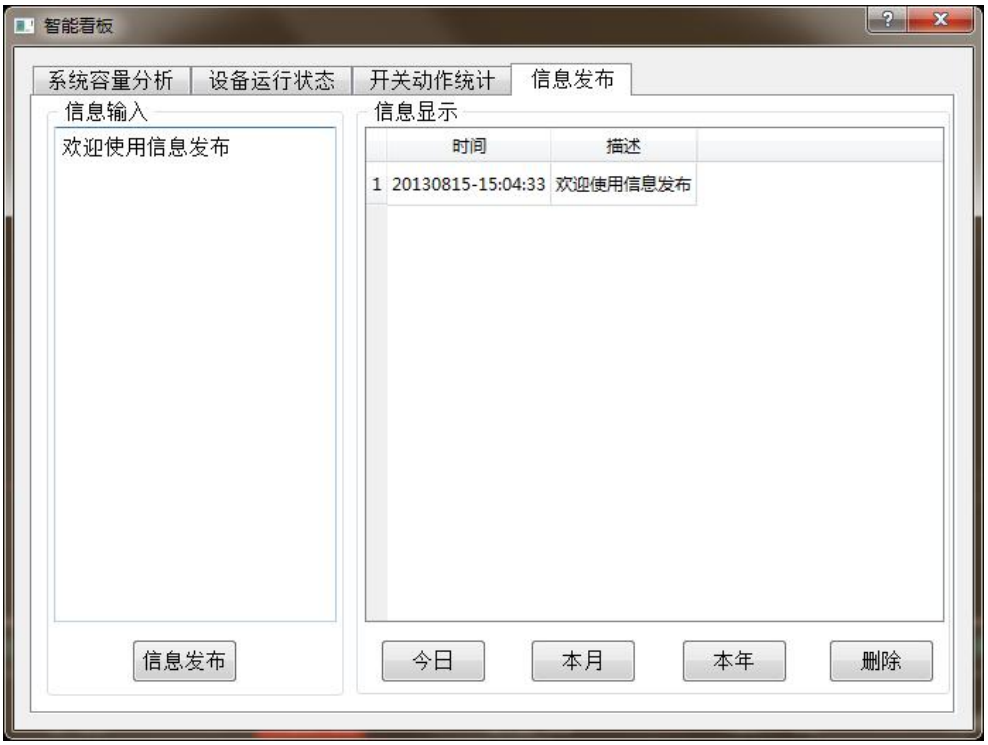
Click the terminal to be viewed on the page of switching action statistics as follows:



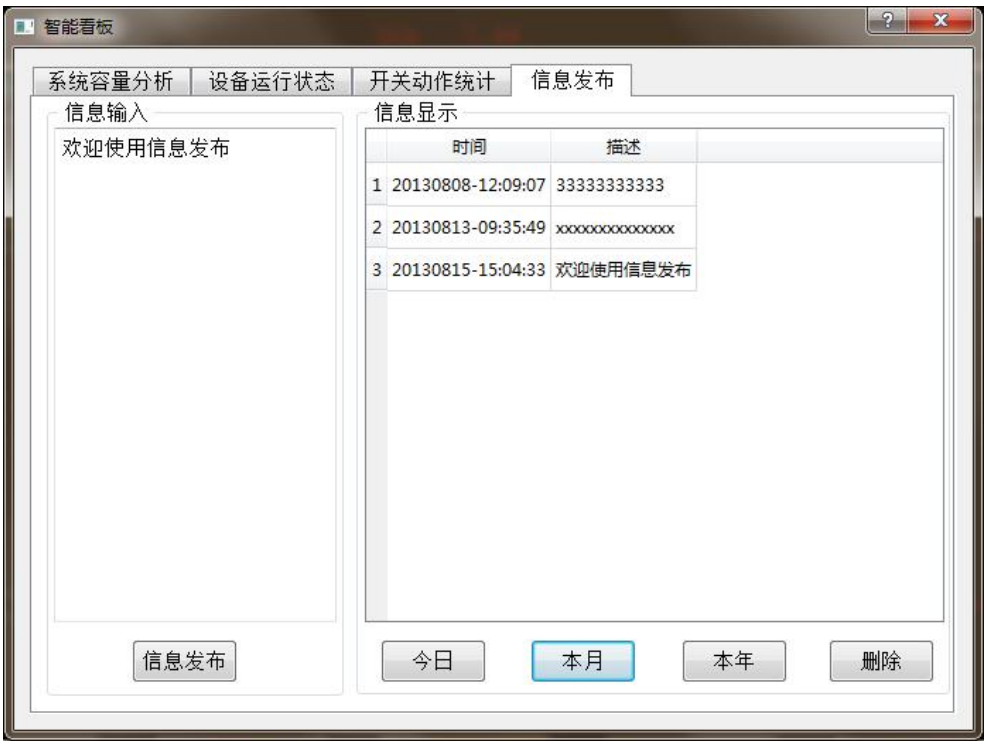
	描述	遥控次数	总变位次数	日变位次数	事故跳闸次数
1	#10开关站开关状态	31	568	0	0
2	#11开关站开关状态	18	595	0	0
3	#12开关站开关状态	20	564	0	0
4	#1开关站开关状态	81	102	0	0
5	#2开关站开关状态	69	632	0	0
6	#3开关站开关状态	51	635	0	0
7	#4开关站开关状态	52	572	0	0
8	#5开关站开关状态	49	619	0	58
9	#6开关站开关状态	56	662	0	79
10	#7开关站开关状态	25	604	0	0
11	#8开关站开关状态	32	594	0	0
12	#9开关站开关状态	26	563	0	0

3.3.22.5. Information publish

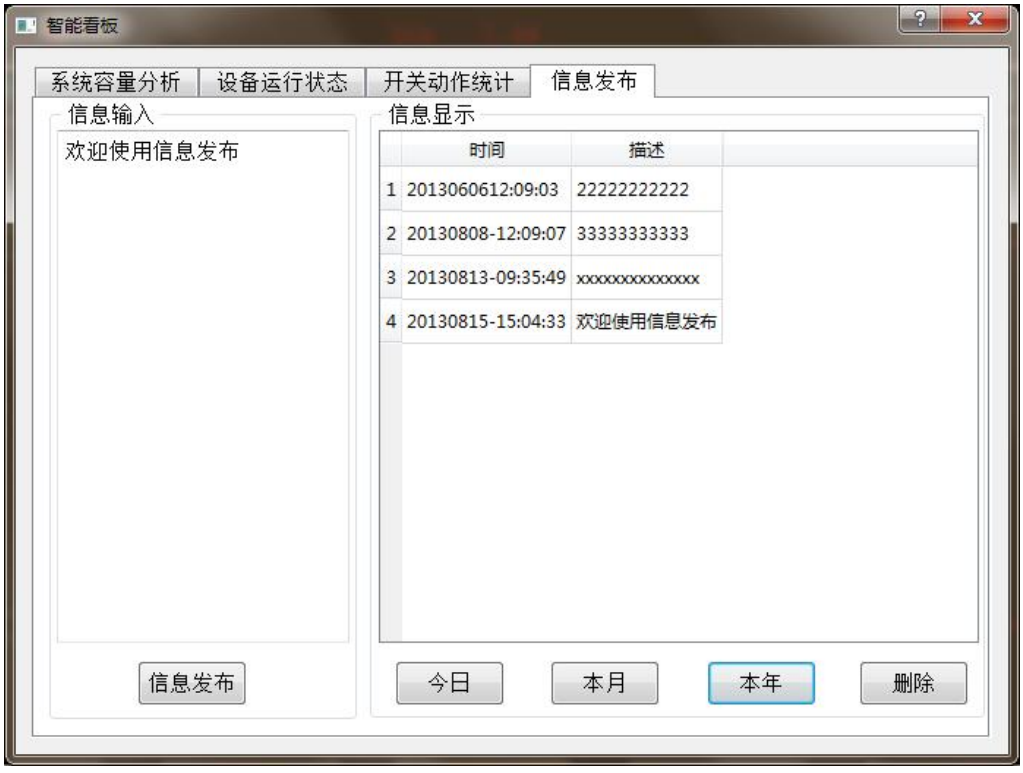
Enter the information to be published in the input box and click “Publish Info” button. Selecting “Today” in the right box, the information published today will display as follows:



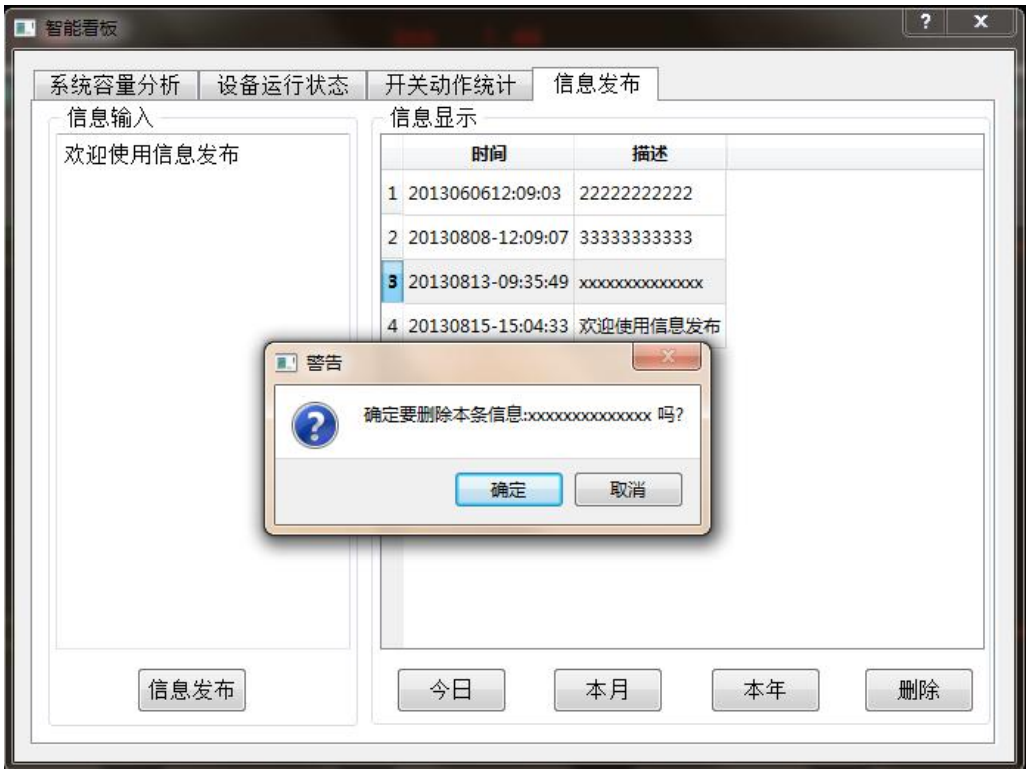
Click “This month” button to display the information published in this month as follows:



Click “This year” button to display the information published in this year as follows:



Selecting the published information and clicking “Delete” button, this information will be deleted as follows:



After information publish, the information published today will scroll in the bottom toolbar of gmmi interface as follows:

3.4. Configuration description

Master configuration file: $(MASENV) /ini/ gmmi.ini

Curve configuration file: $(MASENV) \ini\hiscurve.ini

Configuration file of shine label:$(MASENV) \ini\gshinev2d.ini

Configuration file of status statistics: $(MASENV) \ini\statistic.ini

Configuration file of SQL operation: $(MASENV) \ini\sql.txt

Configuration file of View Parameter:$(MASENV) \ini\break.ini

$(MASENV) \ini\switch.ini

$(MASENV) \ini\ prot.ini

$(MASENV) \ini\ status.ini

$(MASENV) \ini\ kwh.ini

Configuration file of Modify Parameter:$(MASENV) \ini\Breaker view.ini

$(MASENV) \ini\Energy view.ini

$(MASENV) \ini\Switching value view.ini

$(MASENV) \ini\Analog value view.ini

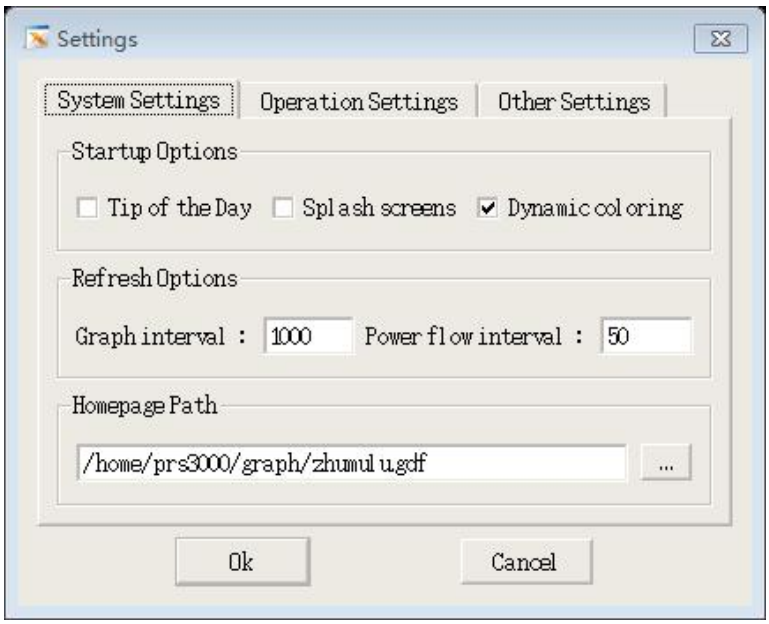
$(MASENV) \ini\Status value view.ini

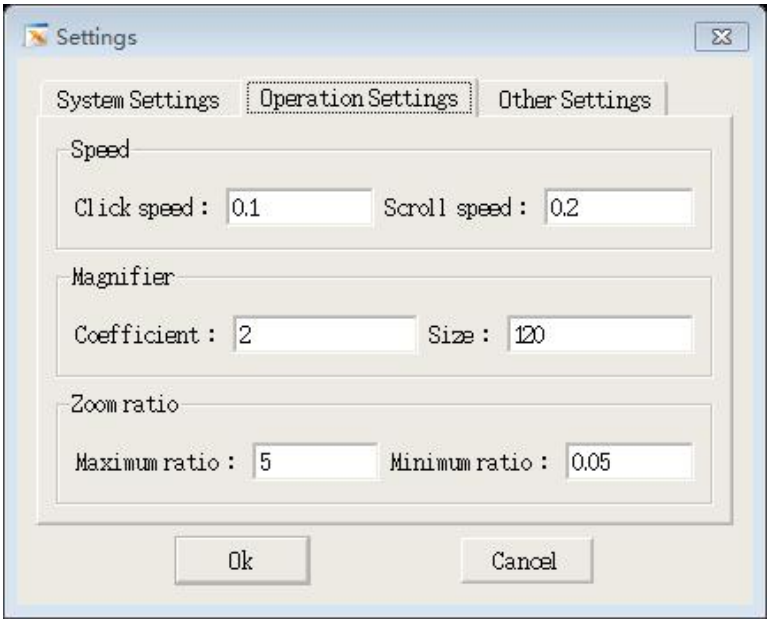
3.4.1.Master configuration

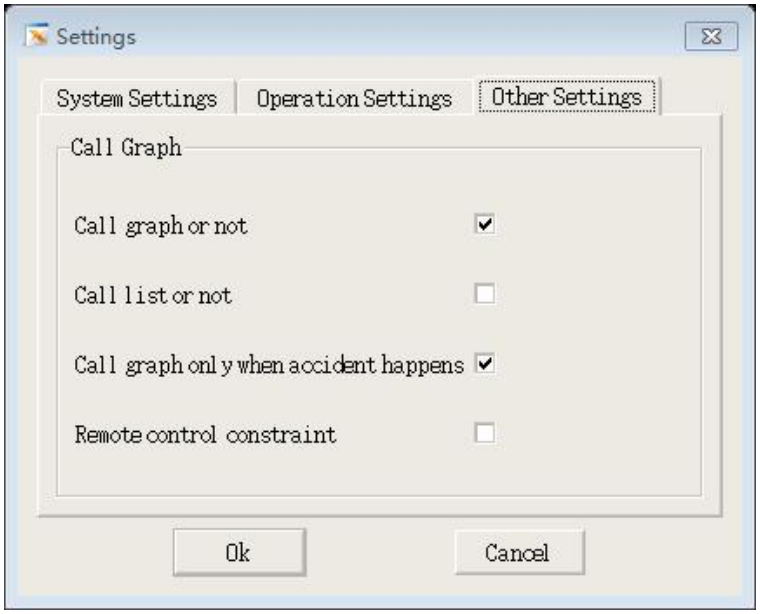
3.4.1.1. System configuration

Some common configurations can be set from 

in the toolbar:







Tip of the Day: display tip or not when program starting. 1 means Yes, 0 means No.

Splash screens: display LOGO screen or not when program starting. 1 means Yes, 0 means No.

Dynamic coloring: make dynamic coloring or not. 1 means Yes, 0 means No.

Refresh graph interval: the graph refresh frequency.

Homepage path: full path of homepage graph.

Magnifier coefficient: magnification factor of magnifier. This factor is relative to original graph size.

Magnifier size: the size of magnifier.

Maximum ratio: the maximum zoom-in ratio of graph. Keep constant if exceeding this ratio.

Minimum ratio: the minimum zoom-out ratio of graph. Keep constant if below this ratio.

Splash screen path: the path of LOGO splash screen.

Flow refresh library path: the path of flow plugin.

Dynamic display configuration into database: get dynamic display configuration of graph from database or not.

Number of button: maximum number of buttons in the operation board. If the number is exceeded, they shall be displayed in more pages.

Call graph: call graph or not.

Call graph only when accident happens: call graph only when accidental trip happens.

Remote control constraint: the remote control requires security restrain verification or not.

Call graph list in main interface: call list or not.

Min interval of calling graph: graph will not be called if the min interval is less than this interval.

Number of calling graph window: the number of windows that call graph. If the calling graph windows are less than setting value, a new window will appear for calling graph. If the calling windows are more than setting value, the graph will be opened in the window called earliest.

Call graph in main interface: call graph in main interface or not.

SQL operation: the designation of SQL operation, such as clear trips.

Add card to the center of equipment: center the card added or not.

3.4.1.2. System plugins

Platform=$(MASENV) /plugin/plamas

Login=$(MASENV) /plugin/plalogin

SCADA =$(MASENV) /plugin/plascada

View Parameter=$(MASENV) /plugin/plareal

Modify Parameter =$(MASENV) /plugin/platbl

Shine Label=$(MASENV) /plugin/plaslable

View Curve=$(MASENV) /plugin/plahiscurve

Replace bypass =$(MASENV) /plugin/plabkrep

DA Scheme Setting=$(MASENV) /plugin/plafa

Query correlative parameter of equipment=$(MASENV) /plugin/pladevreal

Function plugin route configuration. Function name on the left of equal sign cannot be modified. If modified, the plugin will not be loaded correctly. The part on the right of equal sign is the full path of plugin file. Users may make modification as needed. At present, the functions include:

Platform, login, SCADA, view parameter, modify parameter, shine label, view curve, and replace bypass.

3.4.1.3. Function plugins

Remote control=$(MASENV) /plugin/playk

Remote regulate=$(MASENV) /plugin/playt

Lock =$(MASENV) /plugin/plalockvalue

Add card=$(MASENV) /plugin/placard

Sequence remote control=$(MASENV) /plugin/plasyk

Function plugin route configuration. Function name on the left of equal sign cannot be modified. If modified, the plugin will not be loaded correctly. The part on the right of equal sign is the full path of plugin file. Users may make modification as needed. At present, the functions include:

Remote control, remote regulate, lock, add card and sequence remote control.

3.4.1.4. Function buttons

Idle=Exit from operation,$(MASENV) /bmp/ctrlidle.jpg

Grouping=Yes

Setting=Manual setting,$(MASENV) /bmp/valuelock.jpg

Lock=Manual lock,$(MASENV) /bmp/valuelock.jpg

Grouping=Yes

Reset=Reset,$(MASENV) /bmp/valuelock.jpg

Grouping=Yes

Add card=Add card,$(MASENV) /bmp/addcard.jpg

Delete card= Delete card,$(MASENV) /bmp/delcard.jpg

Find card=Find card,$(MASENV) /bmp/findcard.jpg

Grouping=Yes

Emergency remote control= Emergency remote control,$(MASENV) /bmp/superyk.jpg

Grouping=Yes

Sequence remote control= Sequence remote control,$(MASENV) /bmp/superyk.jpg

Sequence modification=Sequence setting,$(MASENV) /bmp/superyk.jpg

Grouping=Yes

Remote control= Remote control,$(MASENV) /bmp/yk.jpg

Remote regulate= Remote regulate,$(MASENV) /bmp/yt.jpg

Function buttons configuration refers to operation board setting. When Gmmi program is started, the function buttons will be generated in sequence depending on configuration. Function name on the left of equal sign cannot be modified. If modified, the function will not be matched correctly. The part on the right of equal sign is the description and image of button. Users may make modification as needed. At present, the functions include:

Exit from operation, manual setting, manual lock, reset, add card, delete card, find card, emergency remote control, sequence remote control, sequence setting, remote control and remote regulate.

Grouping is a special name. If the grouping is configured at corresponding position, a split line will generate to separate front and rear button.

3.4.2. Curve configuration

Display mode=CURVE Display table or curve when viewing curve

Table interval=5 Interval of displaying table

Background color=16777215 Background color of curve

Title color =0

Title size =20

Footer color =0

Footer size =12

Cursor color =0

Coordinate axis color =0

Draw zero =1

Coordinate line width =2

Save identification =0

Logo color =65280

Curve line width =2

Maximum number =10

Allow cursor =0

Upper limit color =255

Lower limit color =255

Color of today curve =16733440

Color of yesterday curve =65535

Color of planning curve =43690

Color of maximum =0

Font size of maximum=12

Color of minimum=0

Font size of minimum=0

Maximum ratio=1.200000

Minimum ratio=0.800000

3.4.3.Configuration of shine label

[Protection Value Table]

0=Reset

1=Action

[Switching Value Table]

0=Opening

1=Closing

[Breaker Value Table]

0=Opening

1=Closing

[Status Value Table]

0=Opening

1=Closing

To display shine label, the status description of protection value, switching value, breaker value and status value will be displayed. Take an example of switching value, 1 mean closing and 0 mean opening.

3.4.4.Configuration of status statistics

[Statistics 1]

Description= Non-reset signal

Table name=prot

Condition=value=1

[Statistics 2]

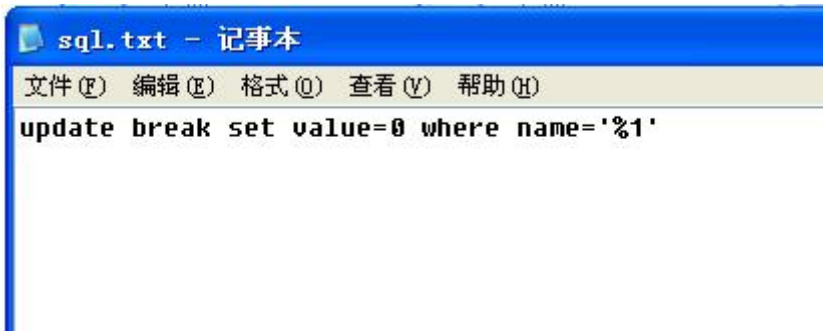
Description = Dead telemetering

Table name =analog

Condition=deadf=1

Configuration of real-time data statistics is as above. Name in statistics 1 is non-reset signal, making statistics of status with value = 1 in prot table. Name in statistics 2 is dead telemetering, making statistics of analog with deadf field = 1 in analog table.

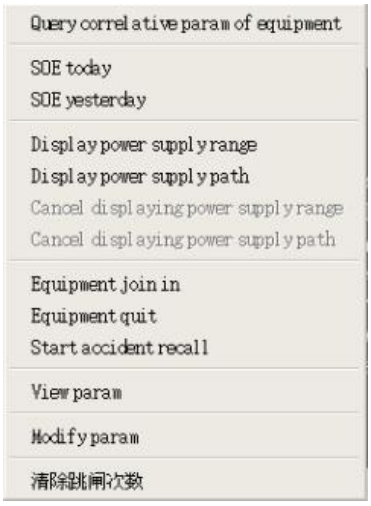
3.4.5.Configuration of SQL operation



Represent SQL statement for SQL operation.

Name of SQL operation is set in master configuration file.

For example, right clicking an equipment, the following menu will appear:



Clear trips mean the name of SQL operation. Write SQL statement in sql.txt.

3.4.6. Configuration of parameter view

When viewing parameter, the fields listed in the window can be configured. Each real-time data has different file name depending on real-time database table name. For instance, to view a switch, the corresponding real-time database name is break. All field definitions in the window depend on the file “$(MASENV) \ini\break.ini”.

Configuration file content is as follows:

The window in viewing parameter displays as follows:

3.4.7.Configuration of parameter modification

When modifying parameter, the fields listed in the window can be configured. Each real-time data has different file name depending on historical database table name. For instance, to view a switch, the corresponding historical database name is switching value view. All field definitions in the window

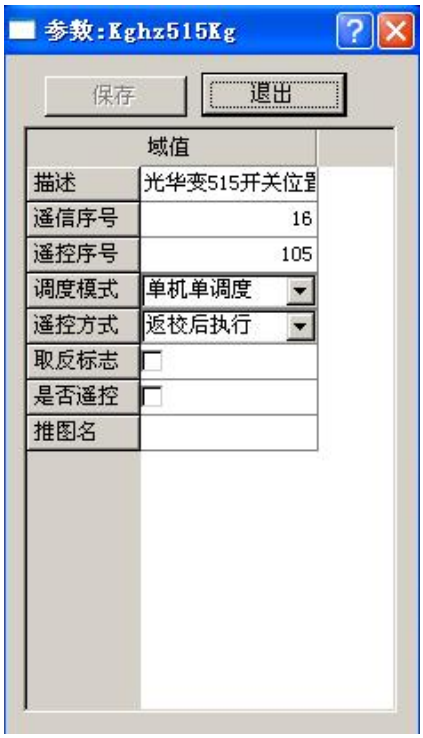
depend on the file “$(MASENV) \ini\switching value view.ini”.

Configuration file content is as follows:

Dispatch mode=COMBOBOX means the edit mode of dispatch mode field is combo box and the value is read from “$(MASENV) \ini\remote signal parameter list_ dispatch mode.ini”.

Remote control mode=COMBOBOX means the edit mode of remote control mode field is combo box and the value is read from “$(MASENV) \ini\remote signal parameter list_ remote control mode.ini”.

The window in modifying parameter displays as follows:



4. DA

4.1. Overview

DA (Distribution Automation) refers to automatic processing of fault on distribution line, mainly helping to isolate fault regions on distribution line and restore power supply of non-faulty regions. Under normal circumstances, it makes real-time monitoring of feeder switch, feeder voltage and current at remote place, obtains failure records when the distribution line has faults, automatically locates failure position and region, make remote closing of switch to isolate breakdown region, and give remote closing for interconnection switch between non-faulty region and normal power supply region to recover power.

4.2. Operation mode

Current DA function involves terminal layer and master station layer. The terminal layer is responsible for acquiring and processing remote metering, remote signaling and remote control data of primary equipment in power distribution network; master station layer is the control layer, obtaining remote signals of terminal layer and responsible for data processing and analysis, control of distribution network as well as determination of operation mode.

As a subsystem of distribution automation system, DA mainly consists of several functional modules: fault collection, fault location, fault isolation, and non-fault region recovery. Its functions are distributed in all layers of distribution automation system. DA module processing results have to be interacted with SCADA.

DA mainly adopts operational mode of master station isolation and recovery. DA system provides real-time operation and simulation study mode for fault diagnosis, isolation and recovery. At the real-time mode, the system makes switchgear operation automatically depending on power grid status to achieve fault diagnosis and isolation, brings forward viable recovery scheme and executes scheme accordingly. At the study mode, fault can be set manually. System auto demonstrates fault processing process, including rehearsal of fault location, isolation and recovery strategy.

4.3. Function description

Master program dasrv: this program accomplishes distribution accident diagnosis & isolation and non-fault region recovery. DA program supports dynamic loading of parameter. Being modified in dboper, the parameter will be loaded to real-time database. Program will identify new settings and topology parameter automatically. Real-time status and study status can be switched mutually. One device in the system may apply for study status to DA server. If succeeding, DA will come to study status to simulate DA processing. If several faults occur simultaneously at multiple points, DA program can operate correctly. If multiple points have fault in sequence, when DA is processing one of faults, the new fault will not be abandoned and will be processed successively. Limited failure to report will not affect correct

processing. Failure to report any accident on distribution line that fault current flows through feeder switch (except the first switch before faulty point) will not affect DA to process faults normally.

4.3.1.Parameter configuration

Database parameter includes DA Initialization Parameter List, DA Node Parameter List, DA Switch Parameter List, DA Fault Indicator Parameter List, Remote Signal Parameter List etc.:

1) DA Initialization Parameter List

Processing mode	0-Not for backup 1-Isolate backup 2-Recover backup 3-All for backup
Protective feature	0-Invalid 1-Valid
Working state	0—Real-time status, 1—Debug state
Execution mode	0-Manually execute 1-Auto execute 1st scheme 2- Execute optimal scheme
Extend isolation	0-Not extend isolation 1-Level-1 isolation 2- Level-2 isolation
Disconnect no-load device	0-Invalid 1-Valid
Detect fault direction	0-Invalid 1-Valid
Acquire leading time	Unit (s)
Acquire lag time	Unit (s)
Remote control mode	0-Group control 1-Sequence remote control
Optimization objective	0-Most 1-Best
Overload analysis	0-Invalid 1-Valid
Communication fault analysis	0-Invalid 1-Valid
Card adding analysis	0-Invalid 1-Valid
Line priority analysis	0-Invalid 1-Valid
Auto split of overload	0-Partly split 1-Totally split
Recover to state before fault	0-Control closing in priority 1- Control opening in priority
Extend field	0-Locate but not isolate only 1-Manual isolation 2-Auto isolation

This list mainly defines general working mode of DA program:

Processing mode: 0 means not for backup. Backup means that the master station achieves DA function when the substation isolation is failed or the function is not activated.

Protective feature: this item will be filled when the face protection is available.

Working state: the initial working state after program startup. At real-time status, the switching operation will be actually isolated; at study status, the interface will make application. After DA server accepts application, the system will go into study status and the program will start isolation. Actual remote control operation will not carried out in the process of recovery, but the remote signal of relevant real-time database will be modified to simulate DA processing.

Execute mode: the execution way to recover scheme.

Extend isolation: expand faulty region when the switch is not isolated successfully. For the failed switch, the higher level switch will be isolated. Support to expand the isolation range of second level.

Disconnect no-load device: if the higher line of switch adjacent to fault position is cable or transformer (and it is operating at no-load state), the no-load device will be disconnected from power grid.

Detect fault direction: it means FTU is able to detect power flow direction in case of failure. If this item is valid, the fault on the looped network can be located.

Acquire leading time: how many seconds of events shall be saved in the program memory when the matter for accident judgment occurs. Such time defaults to 5s.

Acquire lag time: it is similar to leading time and defaults to be 10s.

Remote control mode: default to 0.

Optimization objective: the optimization way to recover scheme, including most and best scheme.

Overload analysis: make overload analysis of power supply recovery scheme for non-faulty regions so as to avoid causing overload to other lines in the process of recovery.

Communication fault analysis: check the communication fault on FTU terminal.

Line priority analysis: make priority analysis of power supply recovery scheme for non-faulty regions. The line with highest priority will be covered first.

Auto split of overload: if there are several standby power, split regions to recover power supply depending on loading capacity of power supply points.

Recover to state before fault: the state before fault can be recovered. If there are multiple fault states, every recovery will restore to previous state before latest fault. 0 means control closing first and opening later; 1 means control opening first and closing later.

Extend field: reserved, and now used to control the way to send DA remote control command. 0 means group control. If the value is not 0, it will send commands one by one.

2) DA Node Parameter List

Node Number	Node Type	Description	Processing Mode	Extend Field
	0 – power supply point 1 – overhead line 2 – cable 3 – connecting line 4 – transformer		0 — Master station isolation, master station recovery	

DA has to consider add the points of power grid into this list. The node abstractly represents equipment connection relation.

Node number: not repeated, node differentiation sign.

Node type: according to definition

Description: user defined

Processing mode: DA processing mode if the node occurs fault

Extend field: reserved

3) DA Switch Parameter List

Switch number	Switch code	Switch description	Left node number	Right node number	Switch type	Rated current _KA	Extend field
			Taken from DA Node Parameter List	Taken from DA Node Parameter List	0— main line switch 1 — 10000 branch line switch 10000 — ring main unit and switching station switch		

Switch number: number record of switches in the power grid in the communication process between master station and sub-station.

Switch code: taken from SCD Device Parameter List. It shall be the corresponding device code; or the remote signal cannot be obtained. Switchgear must have remote control permission; or the isolation cannot be carried out.

Switch description: taken from SCD Device Parameter List.

Left & right node number: taken from SCD Device Parameter List. Do not distinguish left and right elaborately.

Switch type: for branch line switch, the type number shall reflect “parent ＜ child relation, equal brotherhood” (both relationships adopt topology tree. Switches on different branches can be repeated. If switch A belongs to branch switch, the type of A switch should always be branch switch.

Extend field: reserved

4) Fault Indicator Parameter List

Device number	Device code	Device description	Node number located	Left device	Right device	Extend field
			taken from DA Node Parameter List			

Device number: the identification for defining fault indicator

Device code: taken from SCD Device Parameter List. It shall be the corresponding fault indicator code; or the real-time remote signal cannot be obtained.

Device description: taken from SCD Node Parameter List.

Left & right device: device code.

Extend field: reserved

5) Remote Signal Parameter List

It mainly covers the distribution accident diagnosis signals (such as phase over-current, short-circuit signals etc.) with remote signal type of accident total, distribution accident total and type number >4000 &<5000. FTU accident total signal is changed to 4001 distribution accident total signal; A-phase grounding signal, SOE and event sentence are modified to “distribution network fault diagnosis”.

The real-time remote signal code “invalid” corresponding to switchgear shall not be 1, indicating the switch position is valid.

4.4. User interface

There are two kinds of user interface in DA program: program running information and processing information

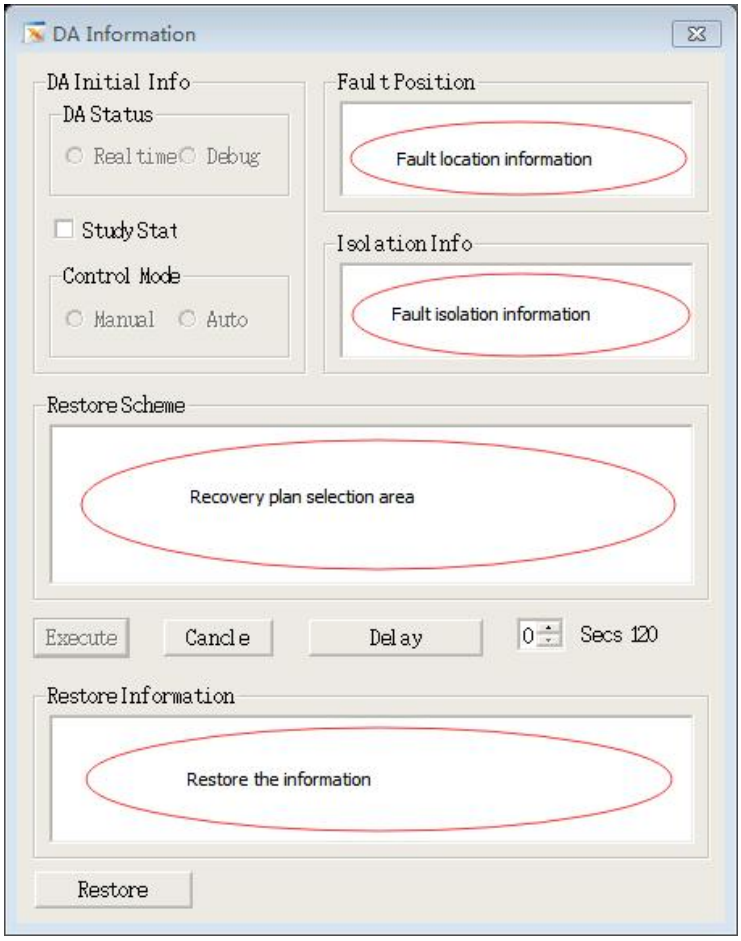
Program running information: refer to some basic parameters that DA program limits its working mode at normal monitoring state, i.e. basically the mapping of DA Initialization Parameter List in DA real-time database and program memory.

Processing information: some information released to users or about users’ intervention that DA programs locates and isolates fault after distribution network has fault and in the process of non-faulty region recovery.

4.4.1.Interface description

DA is a background running procedure, which makes interaction with operator by dispatcher’s interface (gmmi) and real-time event alarm (elarm).

The following is a DA function window, including fault location information, fault isolation information, recovery plan selection area, restore information, DA status information, control mode etc.



4.4.2.Real-time status and study status

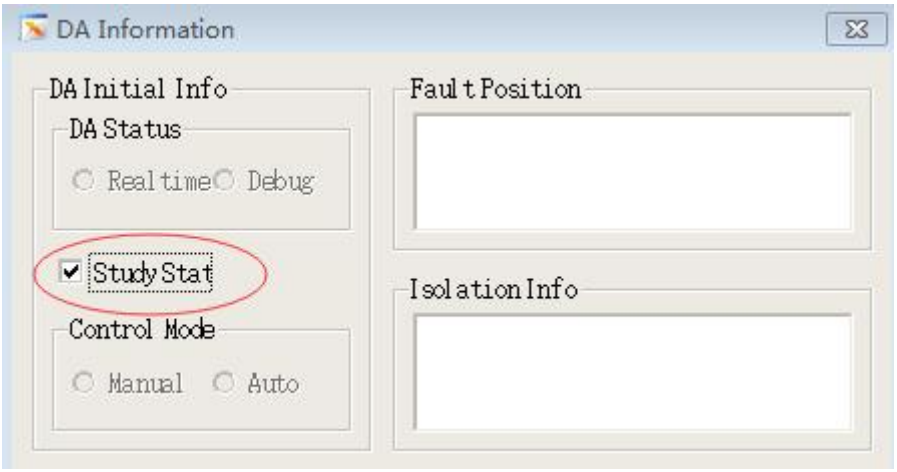
Real-time status means the status that power grid makes real-time monitoring. If there is short-circuit fault, dasrv service program will help FTU, DTU and TTU for fault location, isolation and recovery; if “master station isolation and recover” mode is selected, it will open relevant faulty switches and close tie switch by remote control so as to restore power supply path.

At study status, the program will make real-time remote commanding by locking switch and recur plan. In this case, the remote control command will not be sent but the corresponding alarm information will output.

Real-time status and study status can be mutually switched. Any device in the system may apply for study status to DA server. If succeeding, DA will be switched to study status to simulate DA process.

Clicking “DA scheme setting” icon 

on the toolbar of “Dispatcher’s interface”, the following figure will appear:

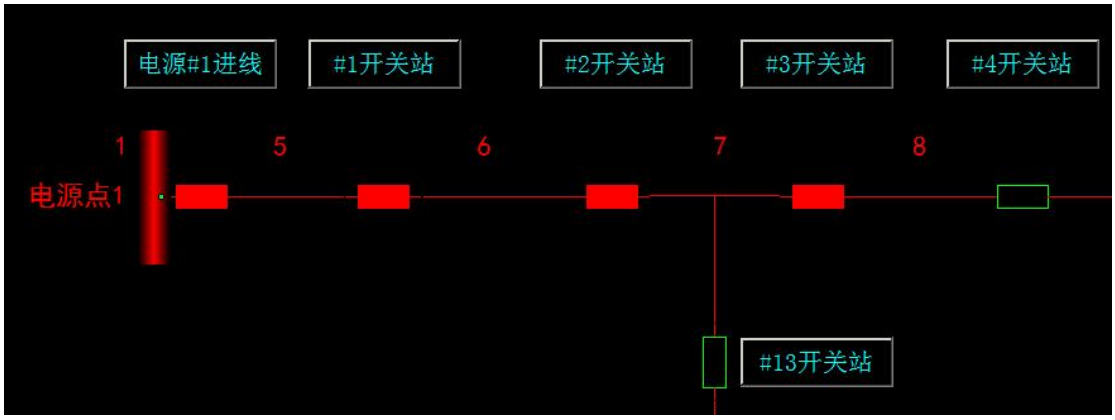


Check “study status”. If the setting is correct, the following figure will appear in “real-time event alarm” window, indicating DA is switched to study status.

DA应用事件 DA工作方式转换 工作站dd2申请DA研究态成功，DA服务转入DA研究态

4.4.3.Processing information

As shown in the following figure, fault occurs between #1 switch station and #2 switch station:

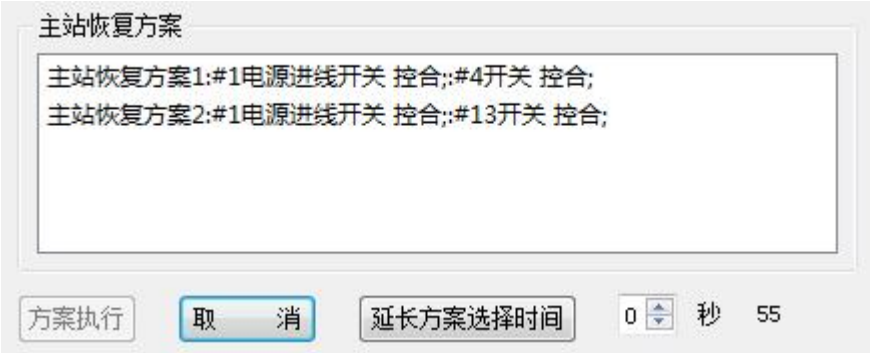


In case of short-circuit fault, “real-time event alarm” window will give “accident trip” prompt to operator as follows. When the line has permanent fault, 1# power supply has reclosing failure. DA service program will locate fault between #1 switch station and #2 switch station through computation, and remind location success by alarm information.

序号	事件分类名	事项类型	事项时间	事项描述
待确认 1	SCADA事件	保护信号变位	2013.11.14--14:25:24:525	#1进线开关站事故总 动作
待确认 2	SCADA事件	保护信号SOE	2013.11.14--14:25:25:539	RTUSOE: #1进线开关站事故总 合 遥信号:24
待确认 3	SCADA事件	开关正常变位	2013.11.14--14:25:25:571	#1进线开关站开关位 分
待确认 4	SCADA事件	变位次数越限	2013.11.14--14:25:25:571	#1进线开关站开关位变位次数越限(共230次)
待确认 5	SCADA事件	开关事故变位	2013.11.14--14:25:25:571	#1进线开关站开关位 事故跳闸
待确认 6	SCADA事件	开关SOE	2013.11.14--14:25:26:585	RTUSOE: #1进线开关站开关位 分 遥信号:0
待确认 7	配电事件	配网事故总信号/...	2013.11.14--14:25:26:600	#1开关站事故总 故障发生
待确认 8	配电事件	配网事故总信号/...	2013.11.14--14:25:27:614	RTUSOE: #1开关站事故总 故障发生 遥信号:13
9	DA应用事件	DA故障定位	2013.11.14--14:25:37:598	故障定位成功,1个故障点,故障点在#1开关至#2开关
10	DA应用事件	DA智能分析	2013.11.14--14:25:38:612	隔离开关包括,#1开关,#2开关
11	DA应用事件	DA主站管理区域...	2013.11.14--14:25:38:628	隔离主站管理区域故障完成，进行了隔离操作的开关为2个
12	DA应用事件	DA恢复方案生成	2013.11.14--14:25:38:690	非故障区域恢复方案生成,方案个数2个
13	操作事件	人工置数	2013.11.14--14:25:38:690	人工置入#1开关站开关状态 分, 操作员:系统管理员
14	操作事件	人工置数	2013.11.14--14:25:38:690	人工置入#2开关站开关状态 分, 操作员:系统管理员
15	DA应用事件	DA恢复方案选定	2013.11.14--14:25:44:837	工作站:zxm 选定执行第1号恢复方案
16	操作事件	人工置数	2013.11.14--14:25:44:930	人工置入#1进线开关站开关位 合, 操作员:系统管理员
17	操作事件	人工置数	2013.11.14--14:25:46:022	人工置入#4开关站开关状态 合, 操作员:系统管理员
18	DA应用事件	DA非故障区域恢复	2013.11.14--14:25:46:896	恢复方案执行完成

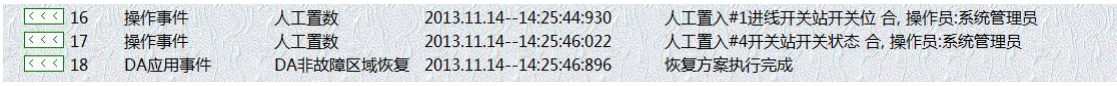
At the mode of “master station isolation and recover”, the switch of faulty region will be controlled opening by remote control, and the following DA fault alarm window will display fault location information. At the mode of “substation isolation and master station recovery”, the switch of faulty region will be controlled opening by remote control and display fault location information.

After the program has collected all information, it will propose recovery plan. At manual mode, the operator may select suitable master station recovery plan. Click “execute plan” to finish operation. The following shows a DA recovery plan.



The plan recovery result will display in DA recovery information as follows:

The relevant alarms will display as follows:



4.5. Other functions introduction

DA can realize single-point and multi-point fault location, isolation and power supply recovery of non-faulty regions. Besides, it is provided with functions of fault indicator location, extend isolation, overload analysis, communication fault analysis, card sign analysis, auto split of overload etc.

4.5.1.Fault indicator location

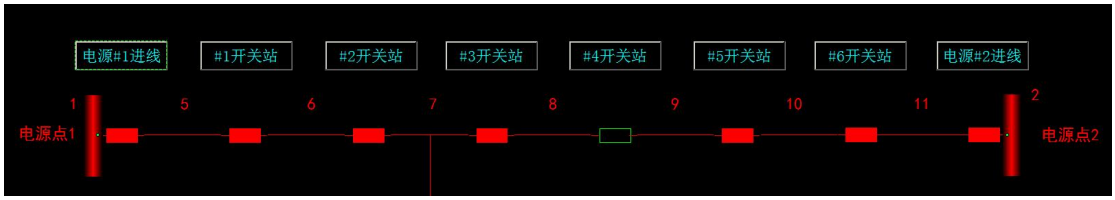
Fault can be accurately located according to signal of fault indicator on circuit. SCD device type list is added with fault indicator with type value of 25, code of indicator and prefix of g. SCD object type list is added with fault indicator with type value of 401 and type code of Zt. DA fault indicator parameter list saves fault indicator in the sequence of location, left and right device will be corresponding device code. DA switch parameter list, DA node parameter list and DA fault indicator parameter list are automatically generated by DA topology in gpaint.

4.5.2.Extend isolation

Extend isolation covers Level-1 isolation and Level-2 isolation. Level-1 isolation means a higher level switch is set to be isolation switch when the isolating switch has fault or remote control is failed. Level-2 isolation means the isolation extended can reach to the switch two levels higher. If level-1 switch is isolated successfully, the isolation will not be expanded to level-2 switch.

4.5.3.Overload analysis

If the sum of max load current of living island and recovery island exceeds the rated current of incoming switch of living island, so the recovery plan has overload. As shown in following figure, when 5# & 6# switching station has fault, the living island is the point line of power supply point 1 (node 1, 5, 6, 7 and 8 in the diagram), the recovery island is 5# & 6# switching station (node 10 in the diagram), and the incoming switch of living island power is the incoming switch of #1 power supply. Judge the rated current meets overload condition or not.



4.5.4.Auto split of overload

Condition for auto split of overload:

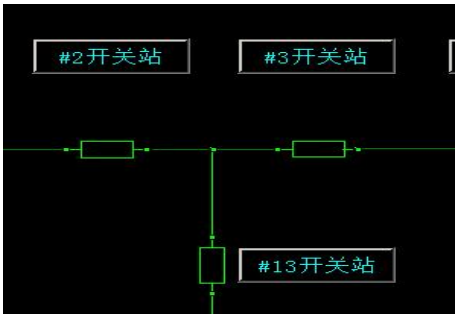
One recovery island can be split only. Two schemes must be provided for the island to be recovered, and shall have different power supply points. If both schemes have overload, the switch in the island to be recovered will be selected as split switch. After splitting this switch, if both recovery schemes have no overload and the remote control of split switch is successful, it indicates the overload splitting has succeeded.

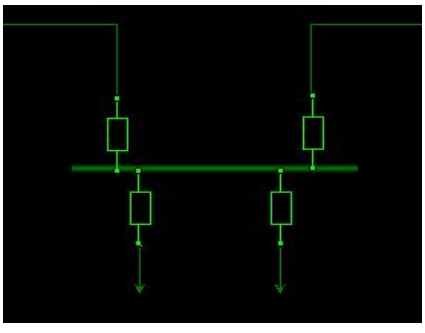
4.6. Auto creation of DA topology model

With the help of graph maintenance tool, the parameter information pertaining to DA nodes can be automatically generated, which avoids manual input errors and reduces workload.

4.6.1.DA topology paint

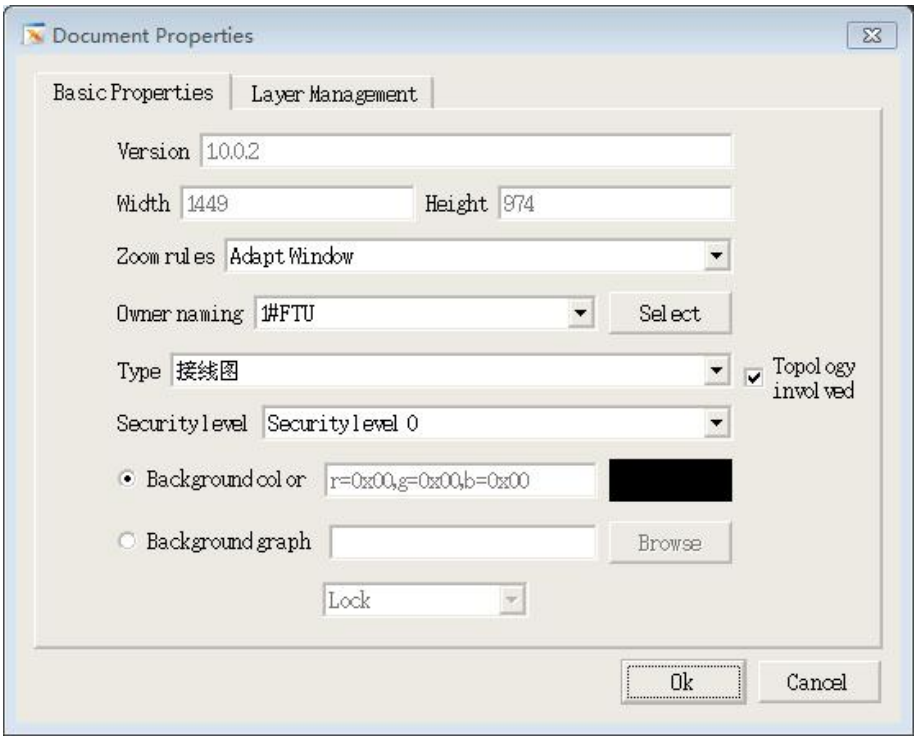
When the topology graph contains T-type connection or a switch connects several conducting devices, if the switchgears on DA topology graph is painted in direct connection as shown in the left figure, the conducting device under “Topology Configuration – Switch Connection” in the configuration file “gpaint.ini” is 0, indicating the topology process will not check the relation of switch connecting several conducting devices. If the conducting device under “Topology Configuration – Switch Connection” in the configuration file “gpaint.ini” is 1, DA topology graph shall be painted in the manner that switchgear passes bus connection as shown in the right figure.



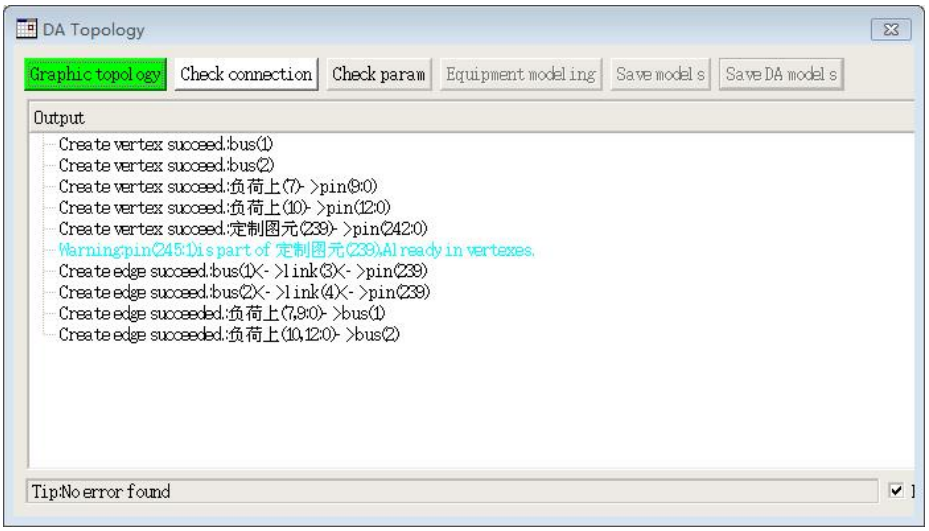


4.6.2.Steps for auto creation of DA topology model

(1) Paint DA topology graph in gpaint, save it, select Property->Document Properties, and check Topology involved as follows:



(2) Select Topology ->DA topology model creation, and click Graphic topology, Check connection, Check parameter, Equipment modeling, Save models and Save DA models in sequence on the window of DA Topology as follows:



Check output information during the auto creation of topology model to see creation success or not.

(3) After creating DA topology model, select Property->Document Properties again to remove “Topology involved”. Then, DA topology graph will not involve creation of topology model in SCADA any more.

(4) Check DA topology parameter list from dboper. The parameter list created from DA topology model includes SCADA static DA topology structure record in SCADA application type, DA switch parameter list in DA application type, DA node parameter list and DA fault indicator parameter list.

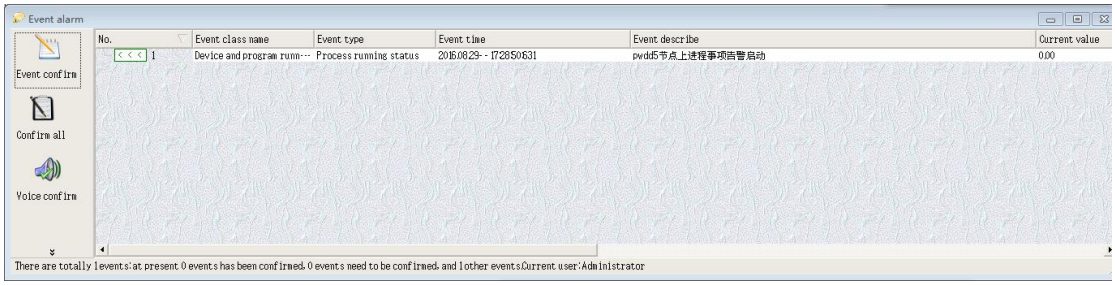
5. Real-time Event Alarm (Ealarm)

5.1. Overview

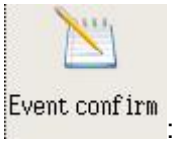
Real-time event alarm (ealarm) UI is developed by Qt platform, which can be run in different operating systems including Unix, Linux and Windows etc.

Real-time event alarm function provides prompts on system event, operation event, historical power event in the forms of list, voice alarm and message alarm so as to provide important information for mastering of system running conditions by the dispatcher.

5.2. Interface introduction



5.2.1.Toolbar



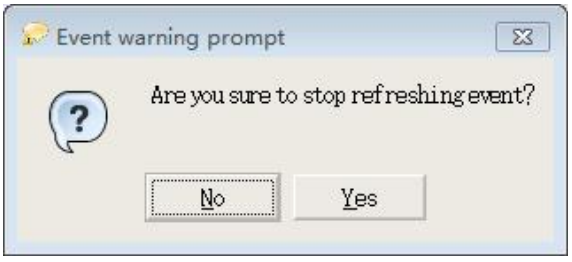
: confirm the event needing to be confirmed in the selected events.

: confirm the event needing to be confirmed in all events.

: confirm the event needing to be confirmed in voice in selected events. If confirming, no voice will be made any longer.

: deleted the selected event. If “reserve event to be confirmed” is valid in system configuration, the event to be confirmed shall not be deleted.

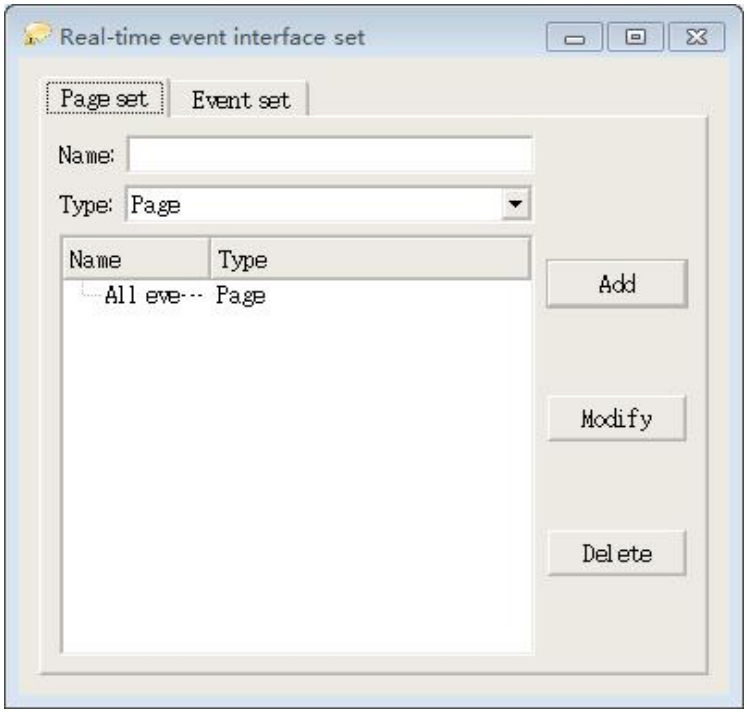
: stop refreshing real-time event. Clicking this button, the following prompt will appear:



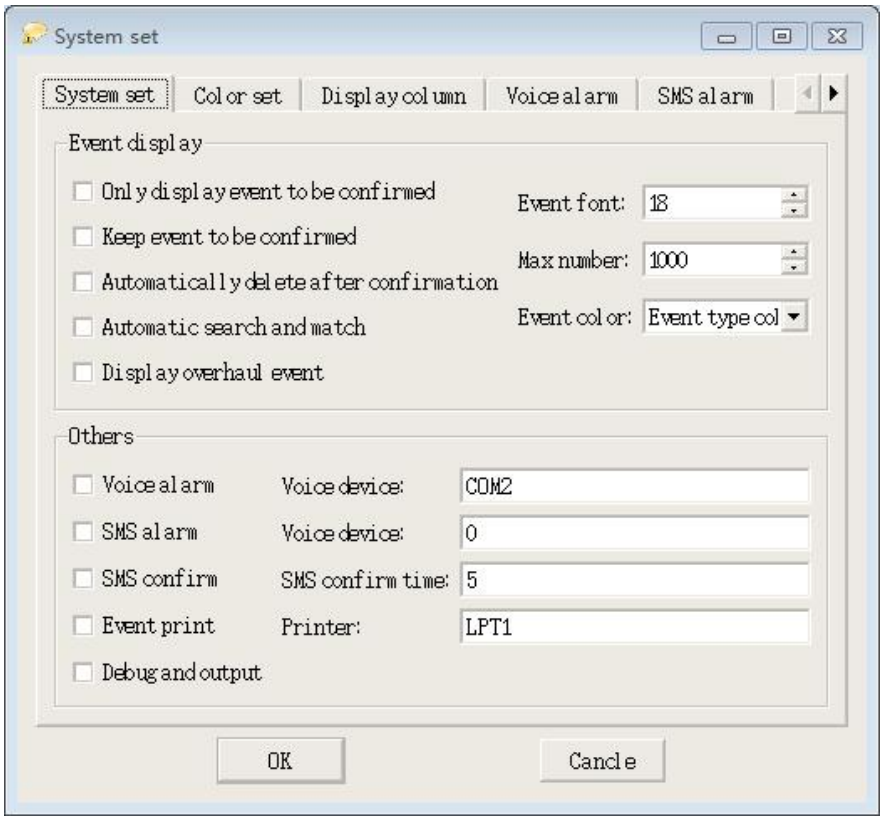
Click “Yes” to stop refreshing event.

: the window is always front most.

: add and delete list page & window, and set window filtration conditions. Details refer to Section 5.3 Function description.



: set the system parameters:



Details refer to Section 4.3 Function description.

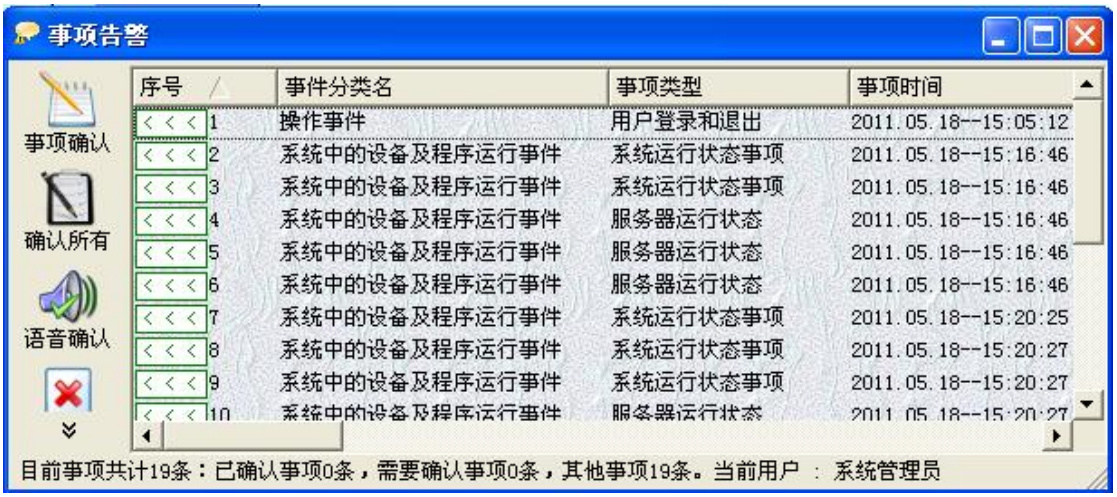
: the voice test button, playing the file ”$(MASENV) / wav/test.wav”.

: quit from the program.

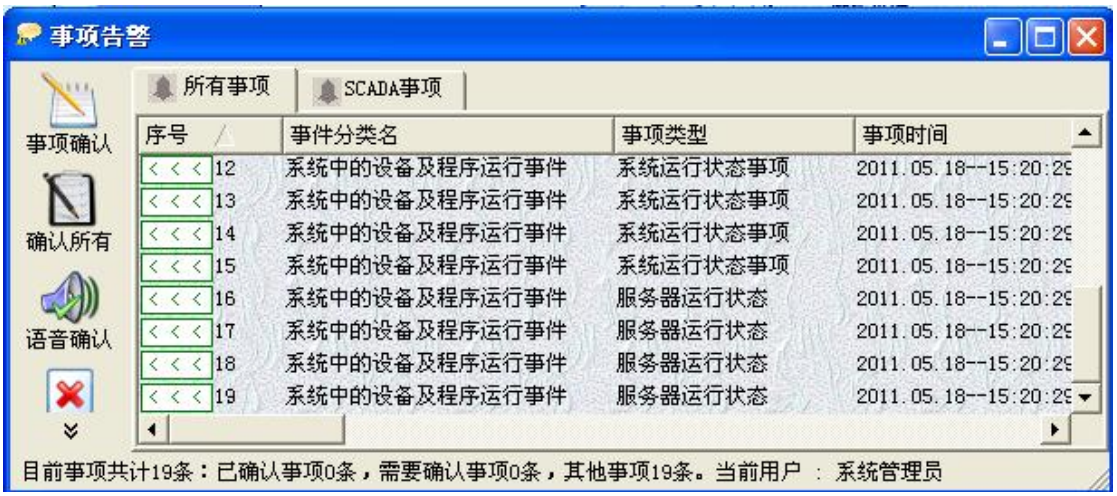
5.2.2.Event list column

Event list column displays events in different pages and windows:

- **Single page mode**



- **Multi-page mode**



- **Multi-window mode**

- **Multi-page and multi-window mix mode**

5.2.3.Status bar

目前事项共计19条：已确认事项0条，需要确认事项0条，其他事项19条。当前用户 ： 系统管理员

Display total of events, event confirmed, event to be confirmed, event not to be confirmed and login user.

5.2.4.Context menu

- Event confirm: the function is same to toolbar button.
- Confirm all: the function is same to toolbar button.
- Delete event: the function is same to toolbar button.
- View curve: selecting telemetering out-of-limit event, the corresponding curve of event will be opened. (The user with real-time event alarm will be logged in automatically).
- Wiring diagram: use gmmi to pen the file of call graph of event in browser mode.

5.3. Function description

5.3.1.Event confirm

- **Single event confirm** (“automatic search and match” in system set is invalid; details refer to 4.3.1 System set): when there is new event, the one to be confirmed will be marked with 待确认:

Selecting the event and clicking “Event confirm” button, the icon will be changed to 已确认.

Click “Confirm all” to confirm all events to be confirmed.

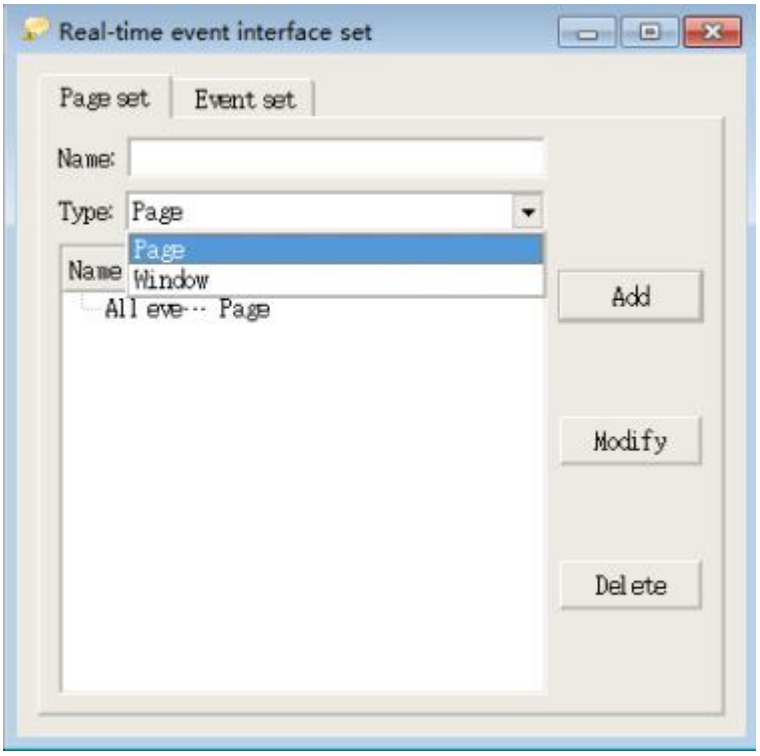
- **Match confirm** (“automatic search and match” in system set is valid; details refer to 4.3.1 System set):

When there is new event, the one to be confirmed will have 匹配中 icon, and the matching signal displays 已匹配.

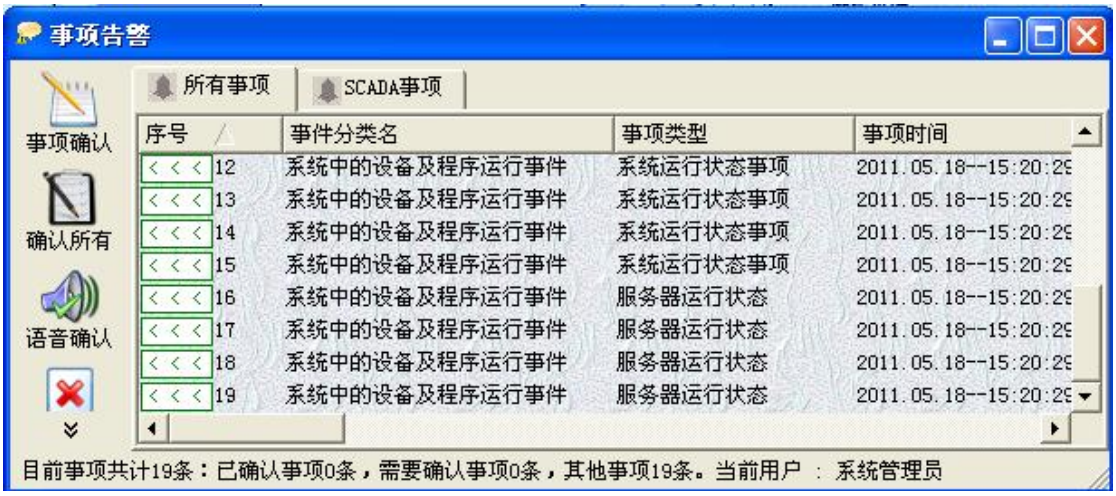
Confirming the events with 匹配中 icon will confirm the event only. Confirming the events with 已匹配 icon will confirm the event and the matching event.

5.3.2.Window set

5.3.2.1. Page set



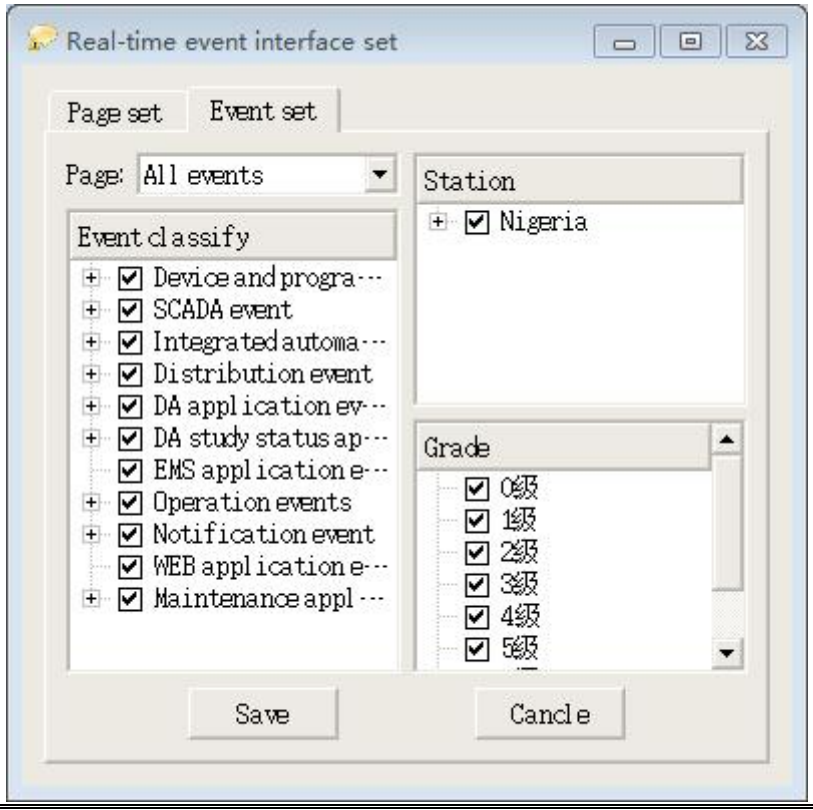
- **Add page:** fill in page name and select type. Click “Add”. The type and effect of page adding are as follows:



The type and effect of window adding are as follows:

- **Modify page:** double click the page in the list. The page name will display in the name column and the page type will display in the type column. After modifying name or type, click “Modify”.
- **Delete page:** select the page to be deleted on the list, and click “Delete”.

5.3.2.2. Event set

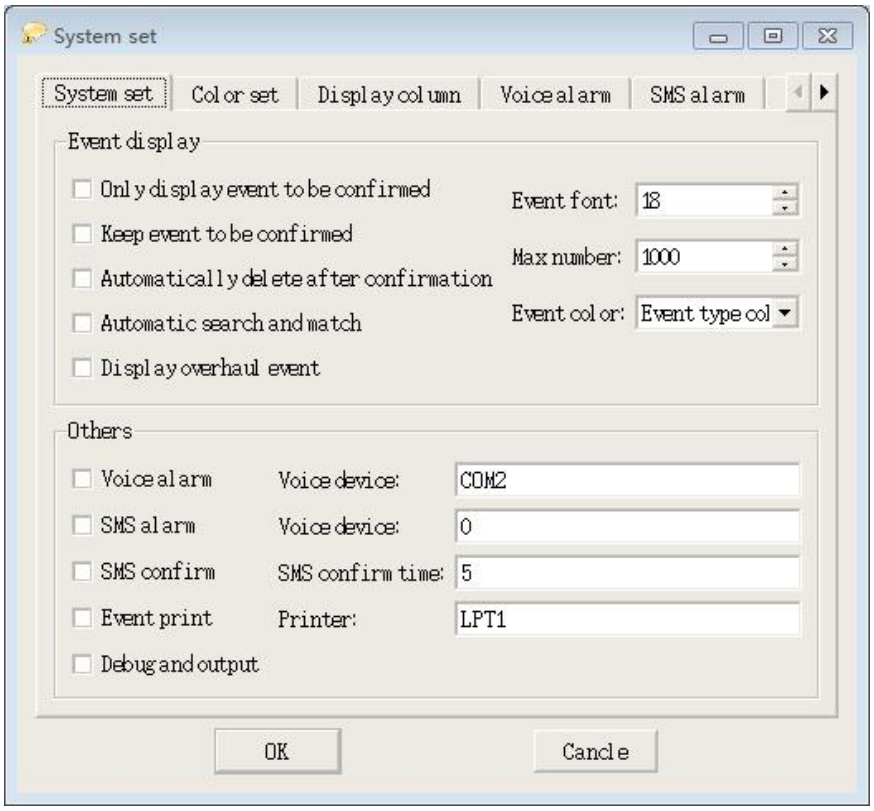


Event set is to set the display conditions of event on pages, including:

- **Event type**: to set the type of event displayed on pages.
- **Station**: to set the stations displayed on pages where the event is located.
- **Grade**: to set the grade of event displayed on pages. Event is divided into 8 grades. The grade is mainly for power event. Event grade is set in “Event processing mode” field of remote metering and remote signal parameter list. The event processing mode parameter list contains relevant records for event grade setting.

5.3.3.System set

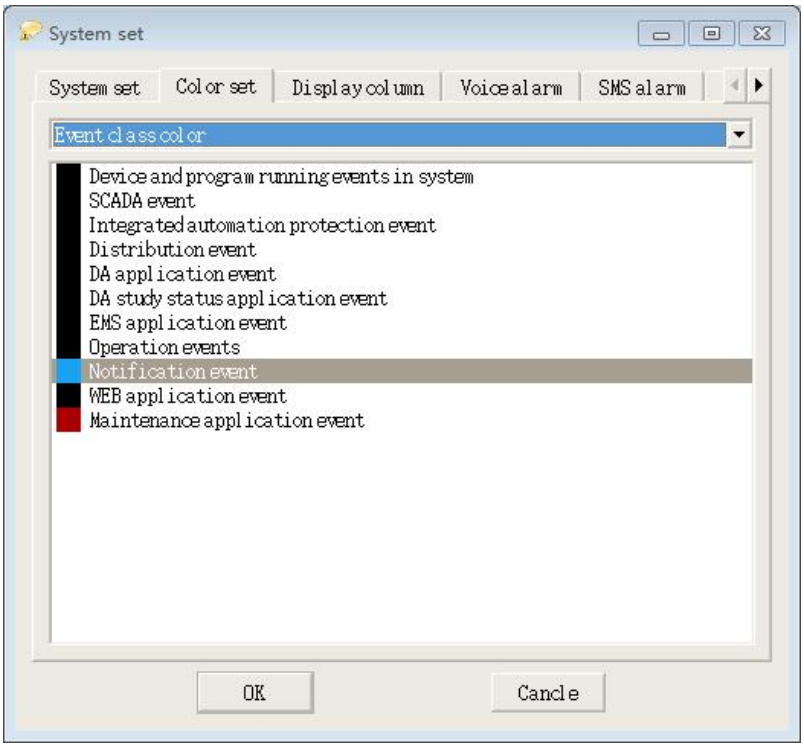
5.3.3.1. System set



- **Only display event to be confirmed:** the event not to be confirmed will not be displayed.
- **Keep event to be confirmed:** when the event quantity reaches upper limit, the event not to be confirmed will be deleted only, and all events to be confirmed will be kept for confirmation.
- **Automatically delete after confirmation:** the event to be confirmed will be deleted from list after confirmation.
- **Automatic search and match:** automatically search the paired signals such as COS signal. Match switch opening and closing, and match the action and reset of protective signal.

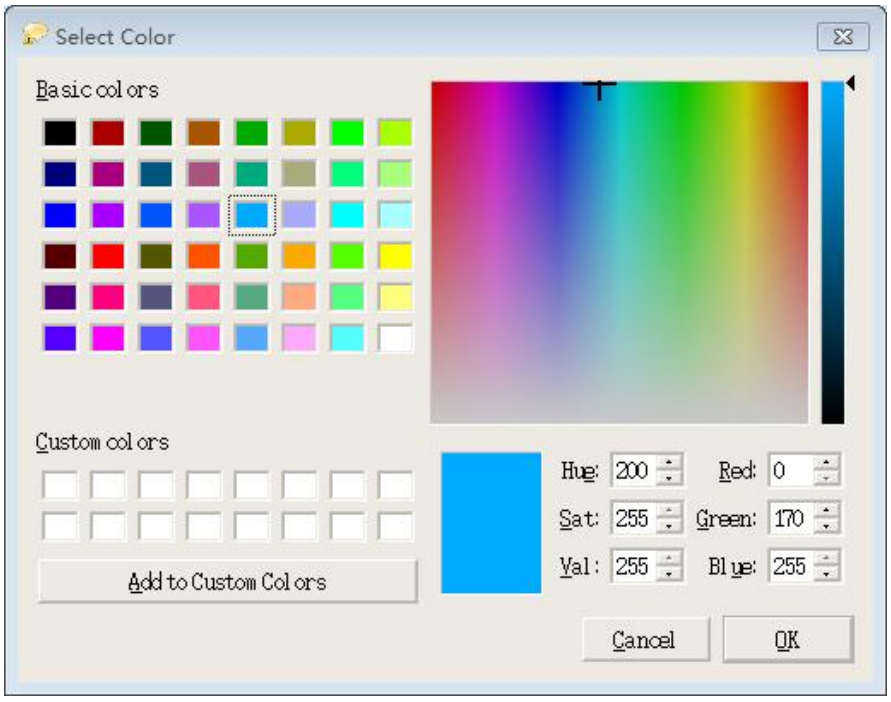
- **Display overhaul event:** when a device is attached with overhaul sign for maintenance, the device information generally will not be displayed, unless this option is valid.
- **Event font:** to set the size of font displayed in the event list.
- **Max number:** to display the upper limit of total events.
- **Event color:** there are four kinds of color setting: event class color, event type color, event station color and event level color. If selecting “event type color”, the event list will display the same type of event in a color. Color setting refers to Section 4.3.3.2 for details.
- **Voice alarm:** to set voice alarm or not, intelligent voice alarm or not.
- **Debug and output:** to debug program, unavailable in the process of running.
- **SMS alarm:** send event in SMS message to mobile phone or not. Mobile number is set according to Section 4.3.3.5 SMS alarm. SMS device will be the device connected for sending message. For example, if this machine connects a SMS group sending device via serial port com1, “com1” shall be filled in “SMS device” column.
- **Event print:** to set printing event or not. The events to be printed are set in “Event processing mode” from parameter library. Print device will be the printer connected. For example, if a printer is connected via parallel port, “Print device” shall be “LPT1”. “Event print” always prints single event, so the connected printer must be stylus printer.

5.3.3.2. Color set



- Event class color:

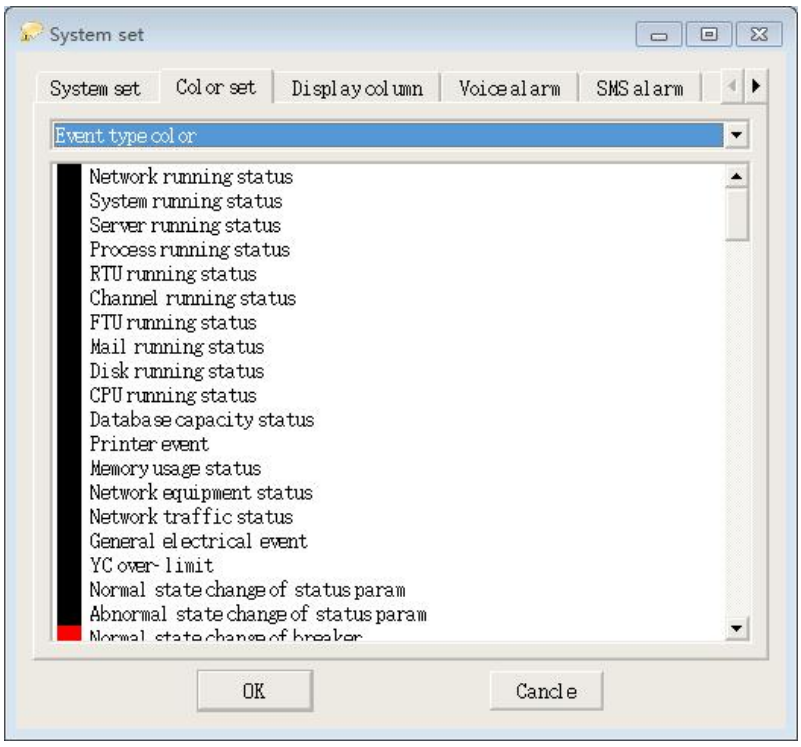
  It is to set the event classes. Double clicking the event type to be set, the window for selecting color will appear:



  Selecting color, the corresponding event type color will be the selected color. Click “OK” and finish setting. Event list window will update event color depending on settings.

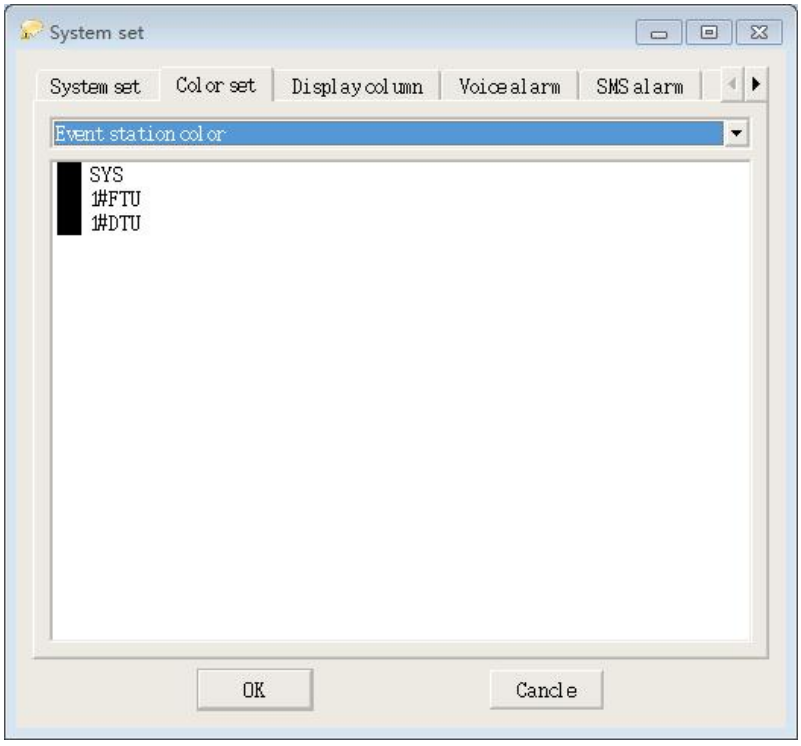
- Event type color:

  It is mainly to set the specific type color of event and the setting method is as mentioned above.



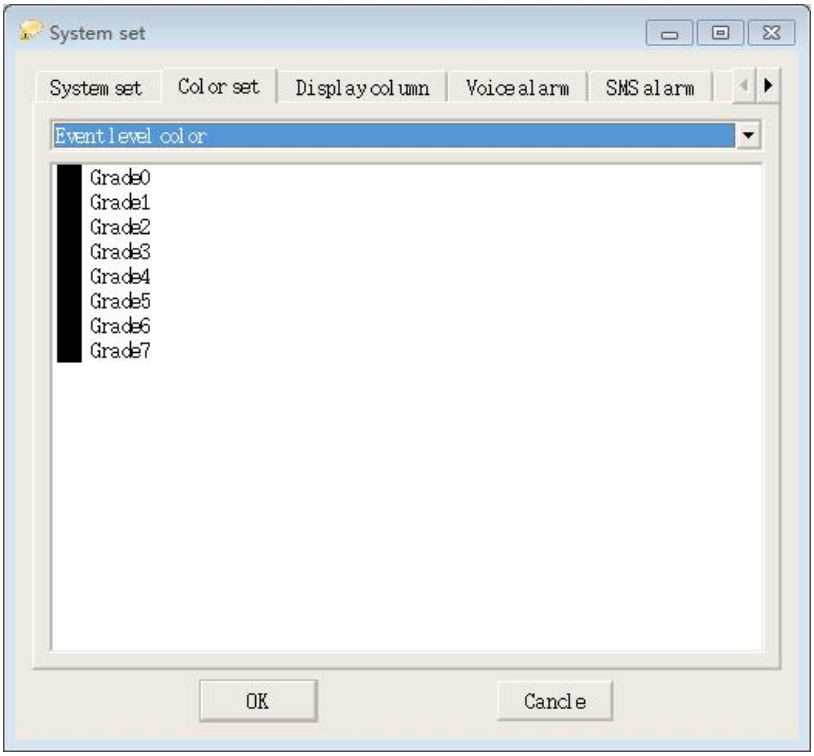
- Event station color:

  It is to set the event station color and the setting method is as mentioned above.

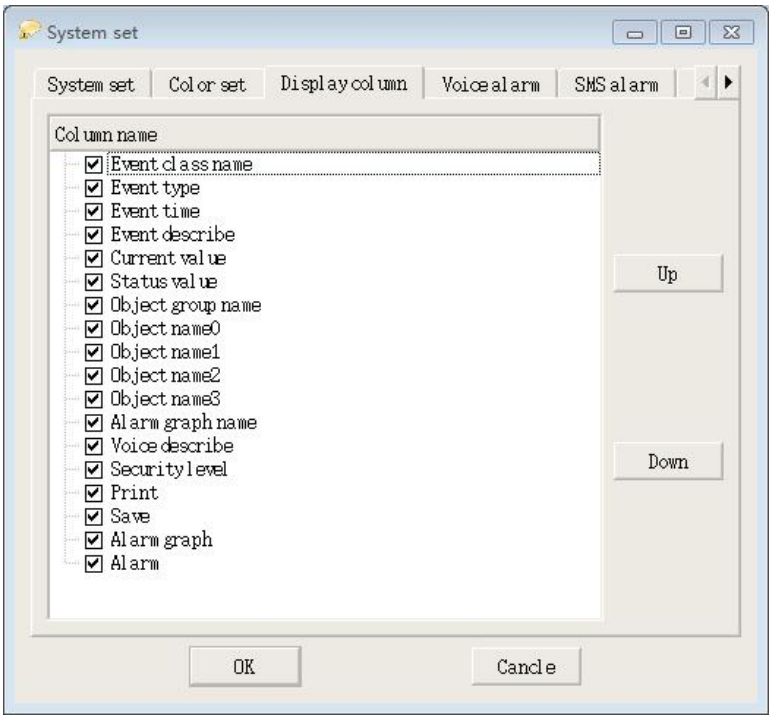


- Event level color:

  It is mainly to set the event color of all levels and the setting method is as mentioned above.

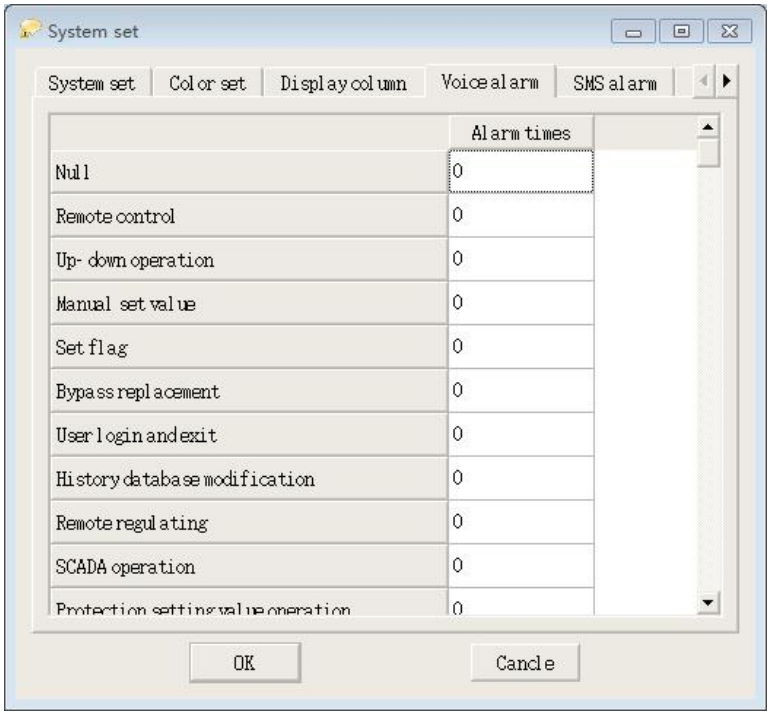


5.3.3.3. Display column



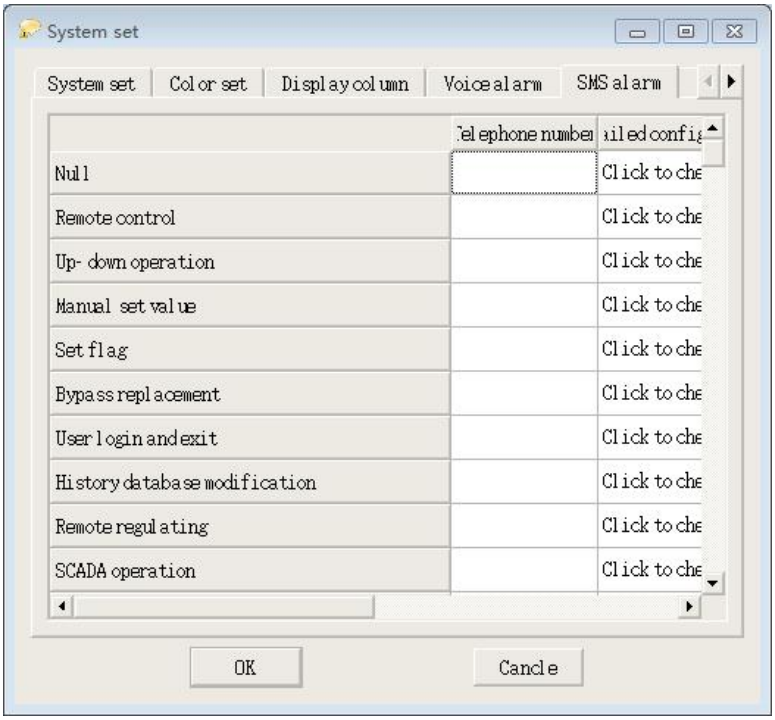
All information of event will be listed. Tick means the column displayed. “UP” and “Down” button are used to adjust the column display sequence. After setting, click “OK”. Then, the event will event list window will be updated based on setting.

5.3.3.4. Voice alarm



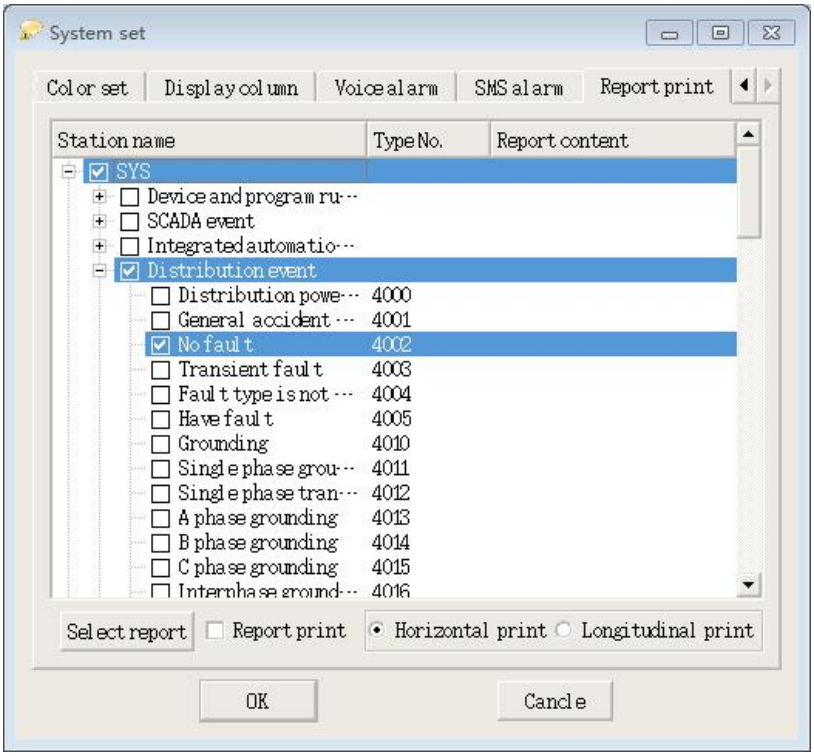
“Alarm times” shall be filled with voice alarm times when the event occurs. 0 means no voice alarm; 1 means alarm once; -1 means continuous alarm until user’s confirmation. Generally, continuous alarm will be used for accident signal so as to give special remind to users. If the alarm time of event is -1, it means the voice alarm shall be made first when the event occurs.

5.3.3.5. SMS alarm



“Telephone number” column is used to set the number for receiving SMS alarm. If there are multiple telephone numbers, they shall be separated by comma. For instance, 13888888888, 13999999999.

5.3.3.6. Report print



Selecting station name, event type number and specified report correlation, the event will automatically trigger to print all associated reports.

5.4. Configuration description

Configuration file of this program: $(MASENV) /ini/ealarm.xml

This file will be save in xml format, containing window set and system set mentioned in Section 5.3 Function description. If you are familiar with the system, the file can be modified directly. Considering system stability and integrity, it is suggested not to modify file directly. All contents to be configured can be set on the interface.

If two workstations have the same event configuration, you can make setting on one workstation, quit from elarm on the other workstation, copy ealarm.xml to the same directory, and start ealarm again to copy event setting.

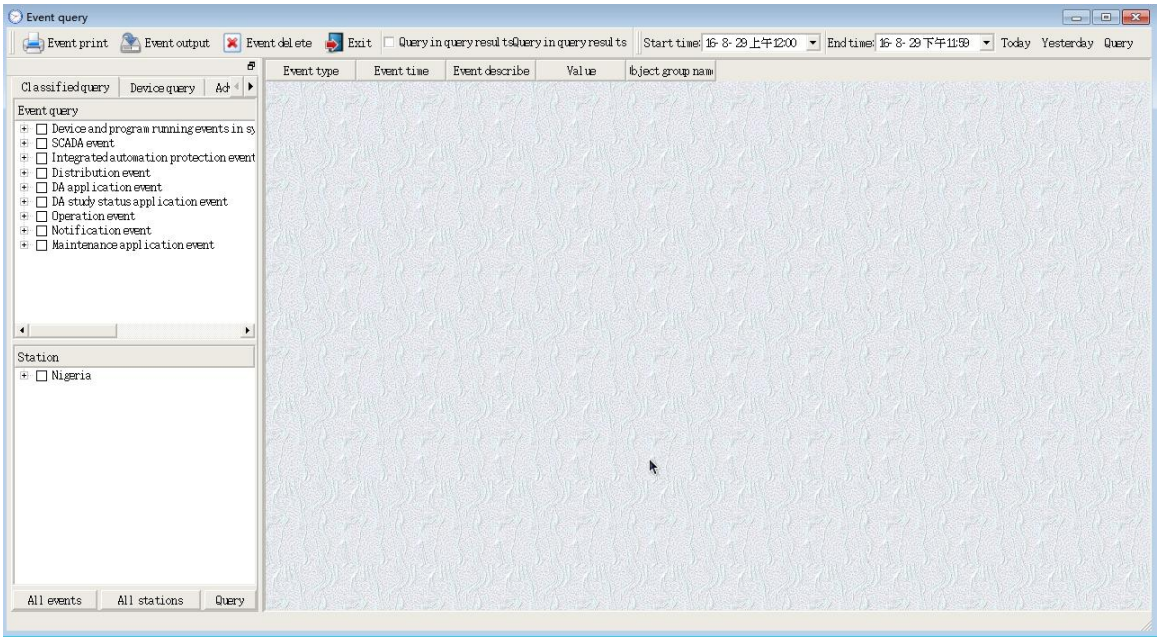
6. Historic Event Query (Dbquery)

6.1. Overview

Historic event query (dbquery) UI is developed by Qt platform, which can be run in different operating systems including Unix, Linux and Windows etc.

Query historic events quickly by type query, device query, fuzzy query and query in query results.

6.2. Interface description



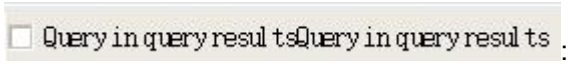
6.2.1.Toolbar

: print the query result.

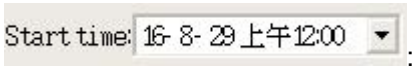
: output query result in text format.

: delete the selected event in the query result (directly delete the record in historic database). This operation requires user authentication every time.

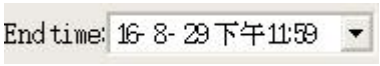
: exit from the program.



: make second query in the query results.



: the start time of event query.



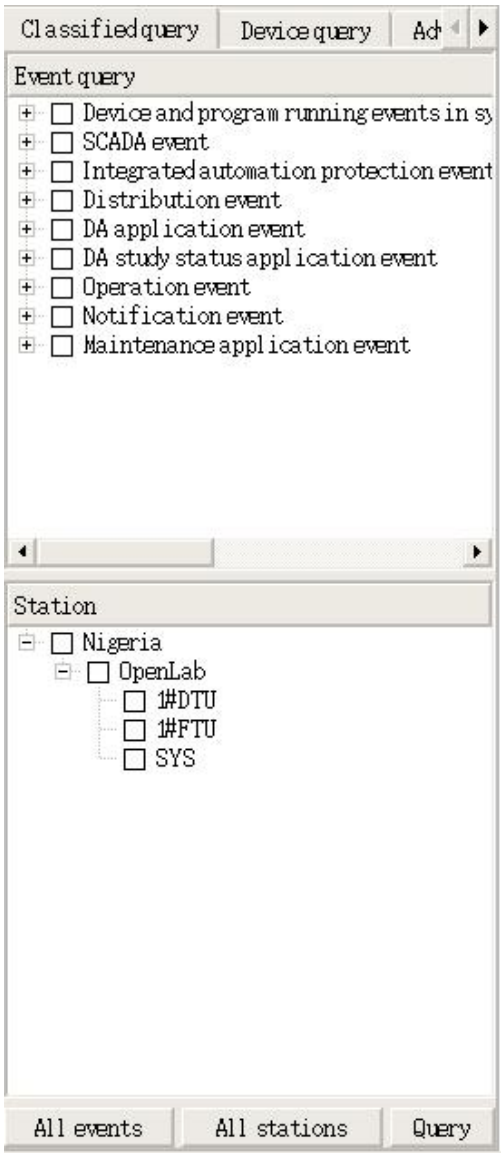
: the end time of event query.

Today : set 0 o'clock as start time and 23:59:59 as end time of today.

Yesterday : set 0 o'clock as start time and 23:59:59 as end time of yesterday.

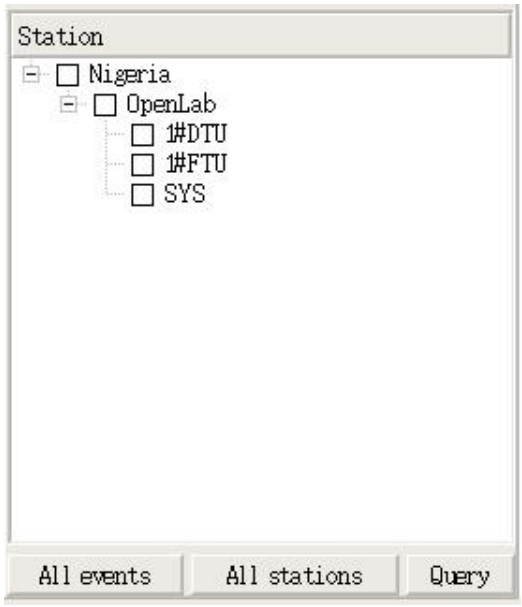
Query : query conditions depending on set conditions.

6.2.2.Condition set column



The condition setting column includes contents as follows:

: the window of classified query can be used to set the selected type of event;

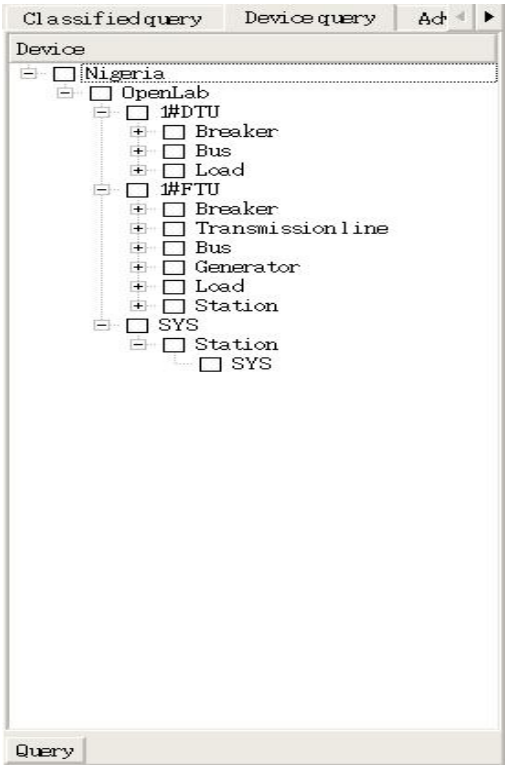


: the window of station can used to set the event of slave station and selected station;

All events : click “all events” under “classified query”;

All stations : click “all stations” under “classified query”;

Query : click “station and event type” under “classified query”;



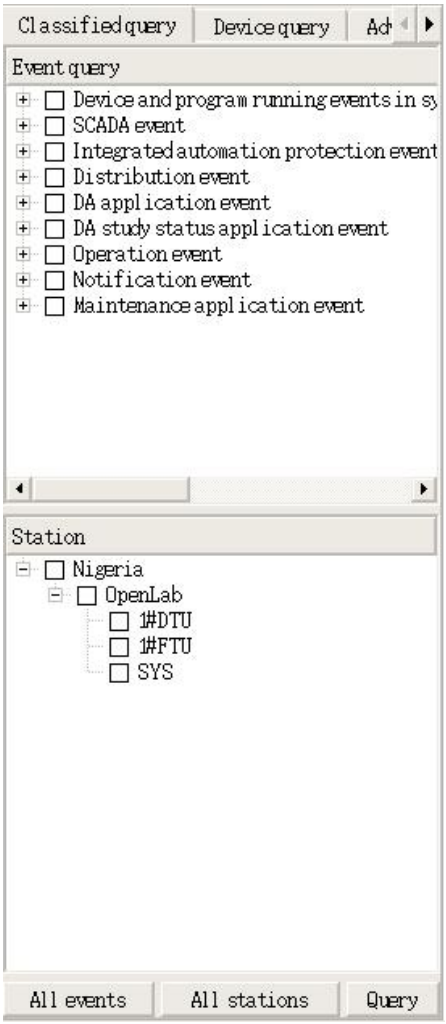
: the window of device query can be used to set the event associated to selected device;

Query: click “Query relevant events of device” under “Device query”;

: advanced query can be entered with texts to search matching events.

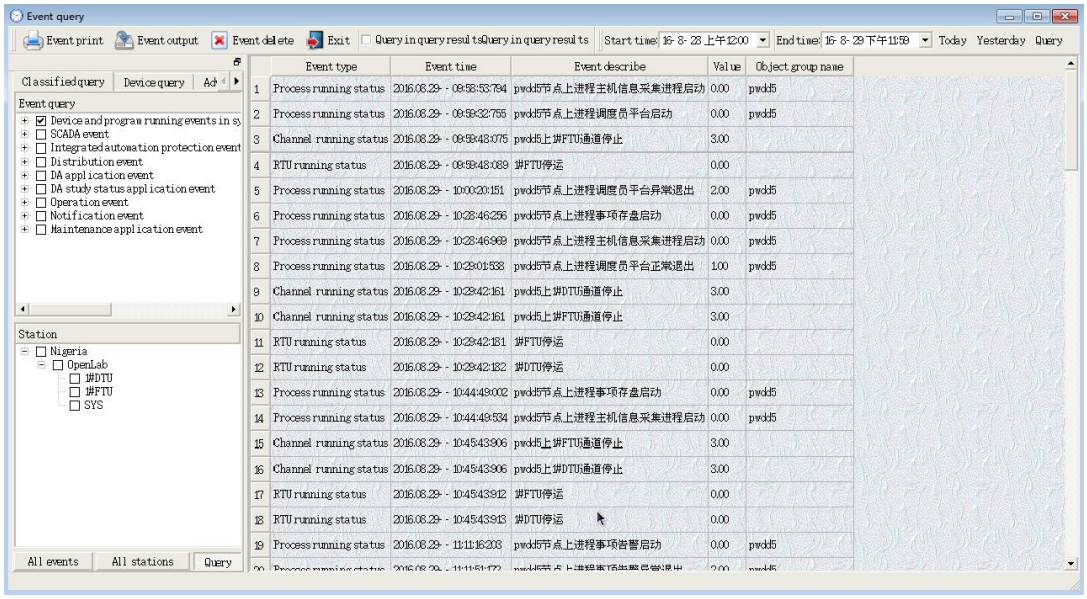
6.3. Function description

6.3.1.By classified query

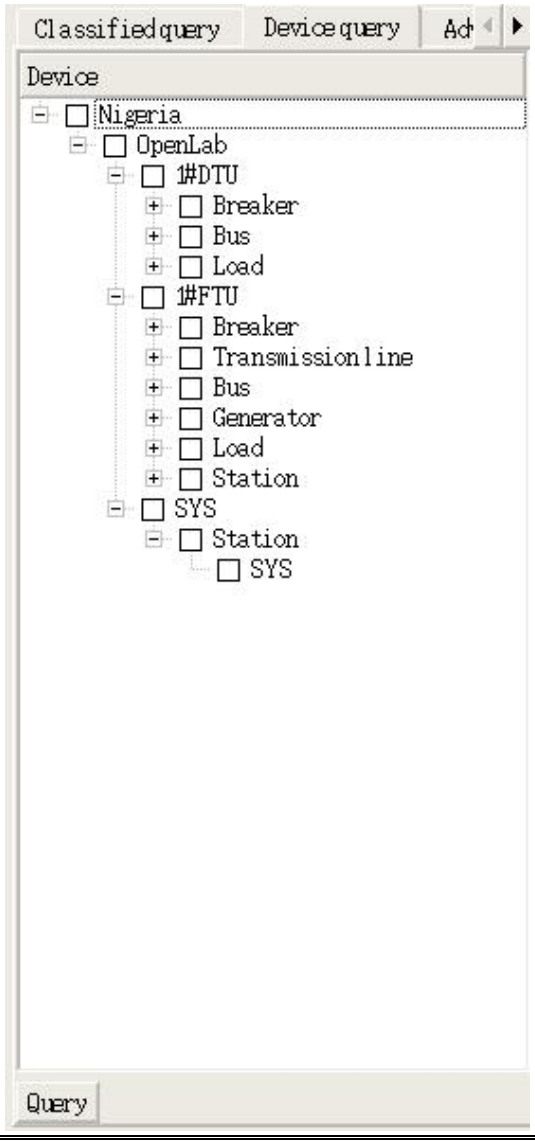


Select the event type to be queried in the event sort tree structure, select the station to be queried in the list of station, set time bucket of query event in the toolbar and click “Query” (“Query” button in above and that in toolbar has the same function). Then, the queried historic event corresponding to event type will display in the list. If “Query in query results” button in toolbar is available, it will display the selected event in previous query. Press “All events” button to select all event types in event type structure. If “All events” button is not pressed down, all event types in event type structure will not be selected. Press “All stations” button to select all stations in the list. If “All stations” button is not pressed down, all stations types will not be selected.

For example, in order to query SCADA events of Baihao Line - Keqi Coal-to-gas factory station from 2015-01-1 0:00 to 2015-01-31 24:00, it shall select station and event type as required, enter query time and click “Query” to get required events.

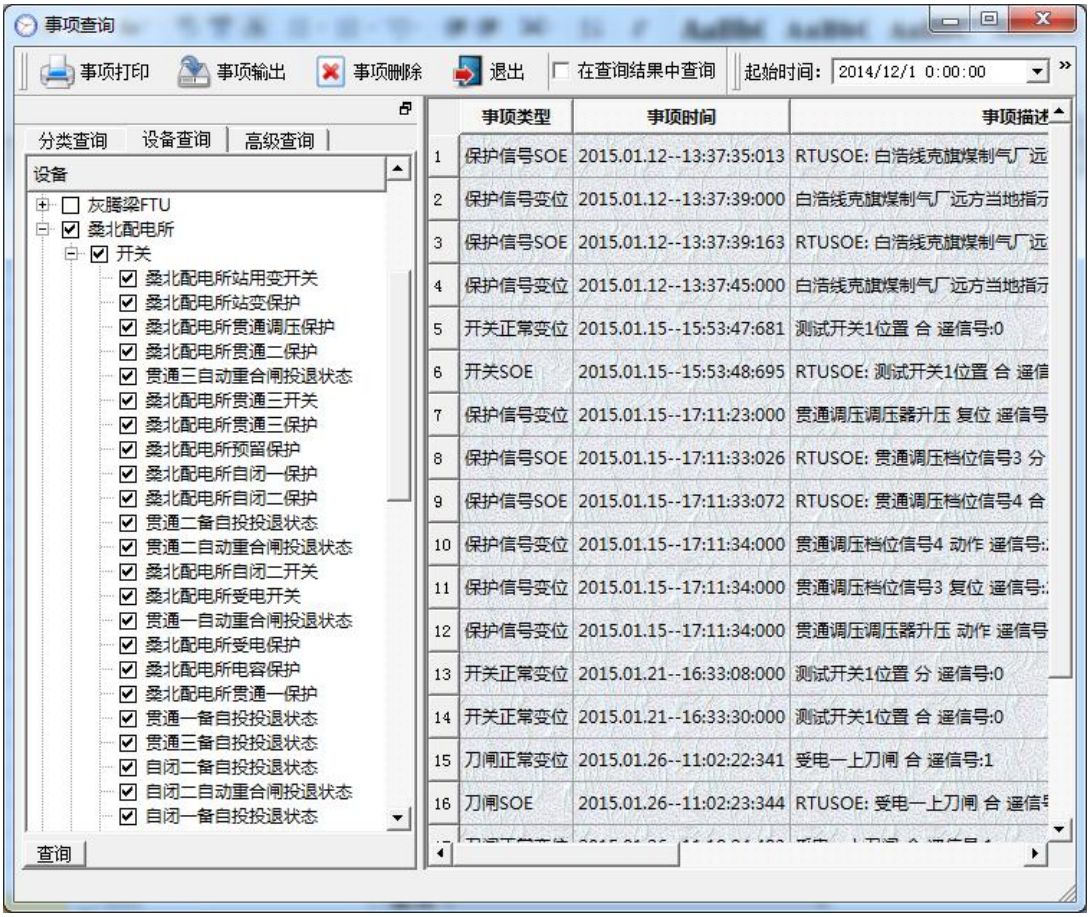


6.3.2.By device query



Device list has listed all devices by stations and device types. Select the device to be queried, set time bucket of query event in the toolbar and click “Query” (“Query” button in above and that in toolbar has the same function). Then, the historic event corresponding to device will display in the event list. If “Query in query results” button in toolbar is available, it will display the selected event corresponding to device in previous query.

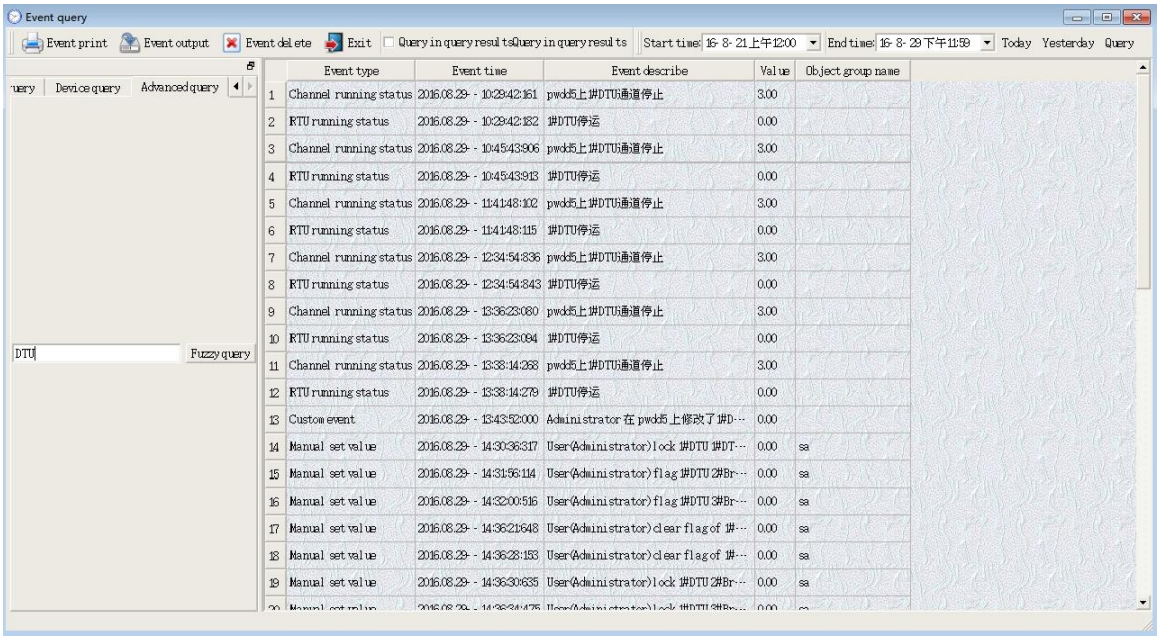
For example, in order to query all relevant events of Sangbei distribution station from 2015-12-1 0:00 to 2015-12-1 24:00, it shall select corresponding device in device query, enter query time and click “Query” to get required events.



6.3.3.Fuzzy query

Enter the specified string in the input box, set time bucket of query event in the toolbar and click “Query” (“Query” button in above and that in toolbar has the same function). Then, the historic event containing specified string in database will display in the event list. If “Query in query results” button in toolbar is available, it will display the selected event containing specified string in previous query.

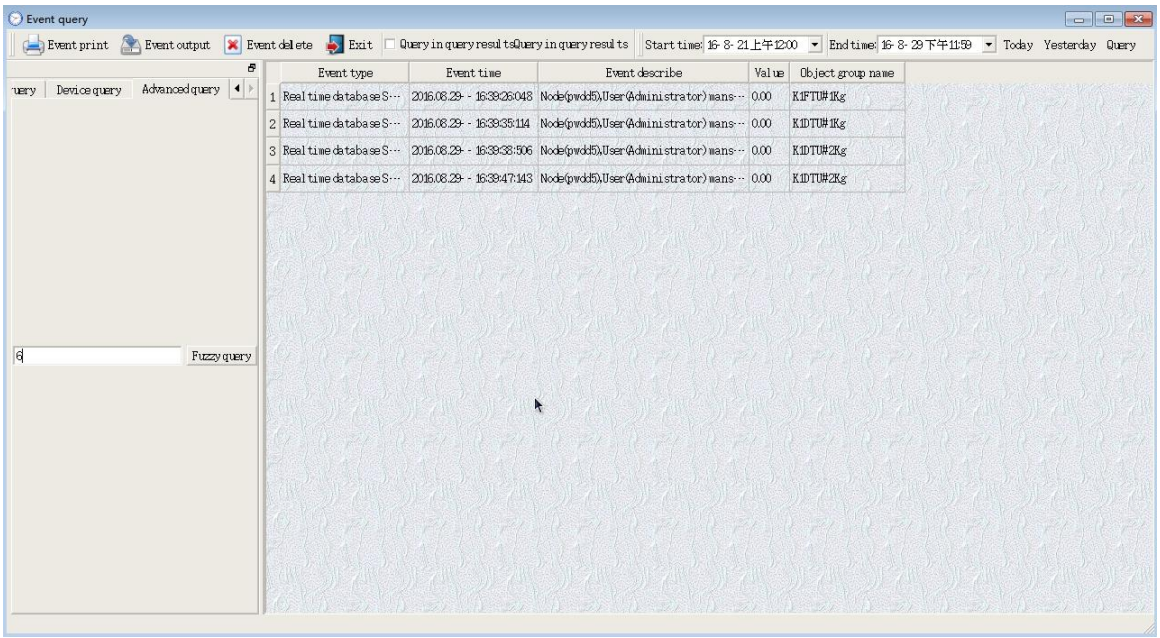
For example, in order to query the event containing “cable branch box” of Guanghua 1# & 2# station from 2011-6-15 11:00 to 2015-6-15 13:00, it shall input “cable branch box” in fuzzy query, enter query time and click “Fuzzy query” to get required events.



6.3.4. Query in query results

After a query completes, check “Query in query results”, and set other query conditions to realize query in query results.

If the query in 6.3.1 has finished and the event with remote signal number 8 is required, it shall tick “Query in query results” and go to fuzzy query, entering 8 and clicking “Fuzzy query” to get required event.



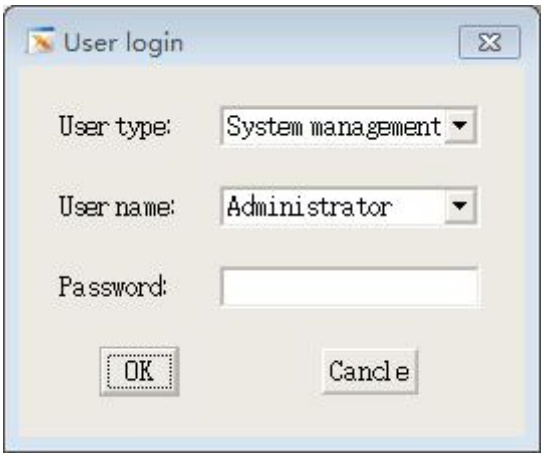
Too many events alarm:

If the queried events at set conditions are too many, it will appear alarm window to remind users to select

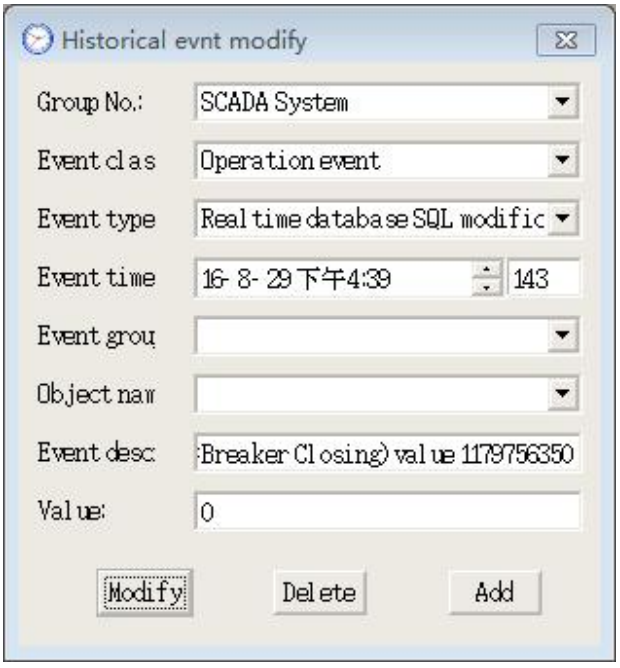
continuing display or changing query condition:

6.3.5.Edit event

Double clicking the queried event, the following login window will appear:



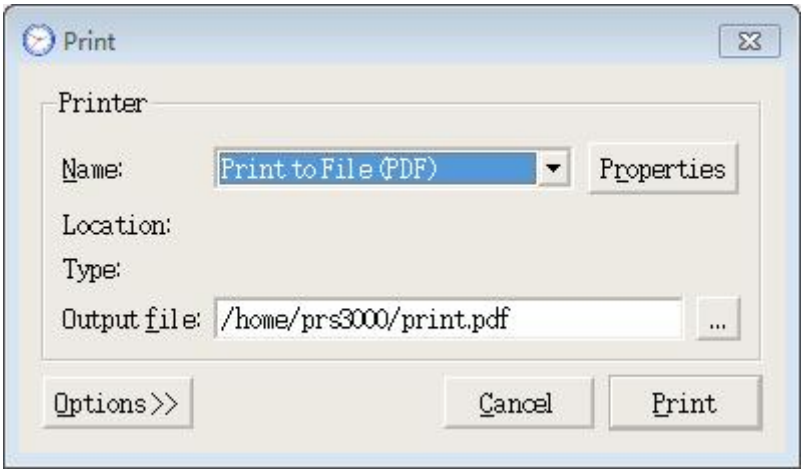
In this case, you can log in as a user with modification right to modify historical event:



Modify the event parameter and click “Modify” to complete event modification; clicking “Delete”, the event will be deleted; modify the event parameter and click “Add” to add an event manually.

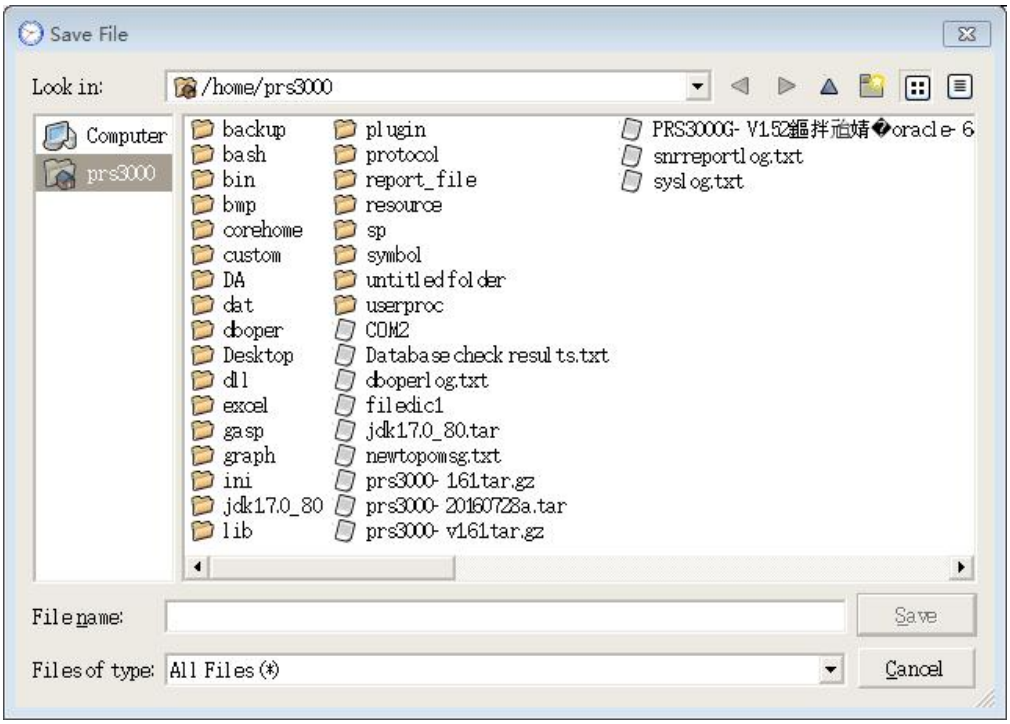
6.3.6.Print event

After querying events with conditions, click “Event print” and print out queried event list.



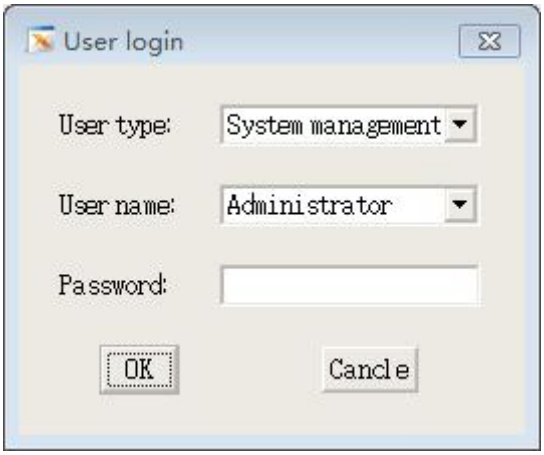
6.3.7.Output event

After querying events with conditions, click “Event output” and save queried event list to text.



6.3.8.Delete event

After querying events with conditions, select one or more events and click “Event delete”. Then a login window will appear. Log in as a user with right to delete the selected event.


User login
User type:
System management
User name:
Administrator
Password:
OK
Cancle

7. Real-time Data View (Rdbmon)

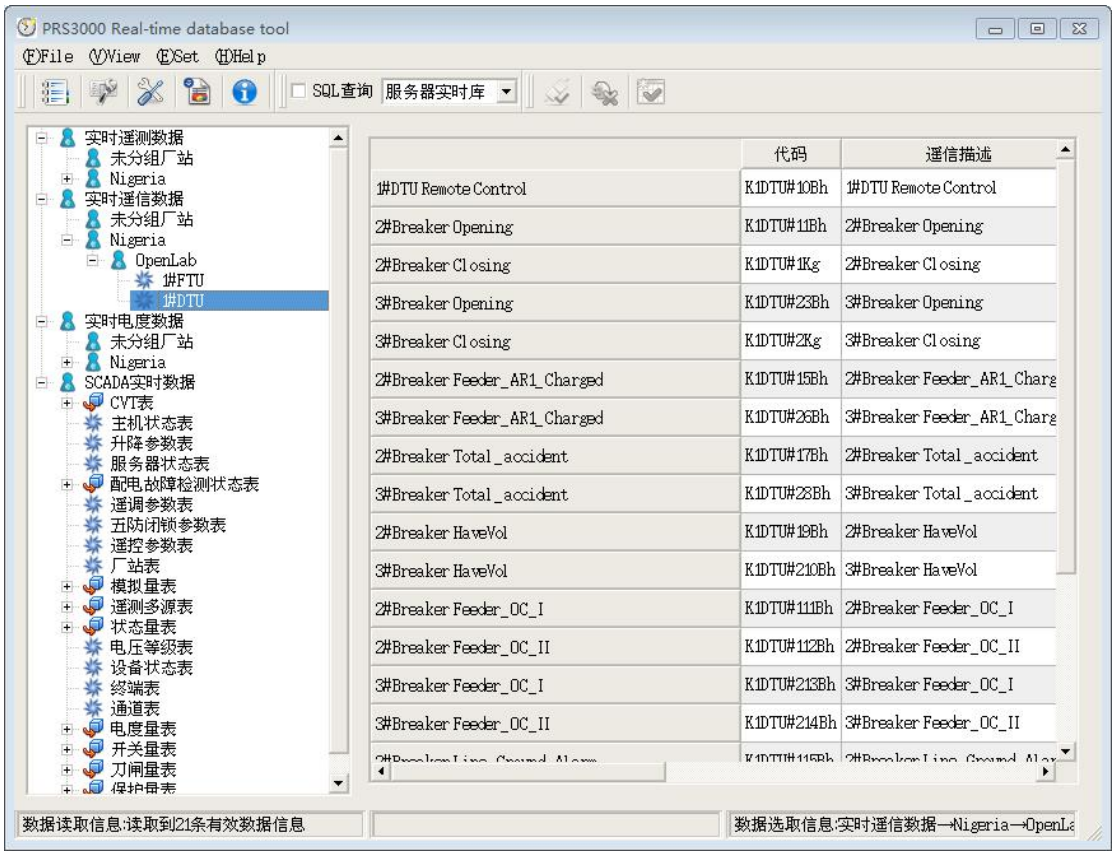
7.1. Overview

Real-time data view (rdbmon) is a tool for viewing all measured values by stations developed by Qt platform, which can be run in different operating systems including Unix, Linux and Windows etc.

7.2. Interface description

7.2.1.General interface

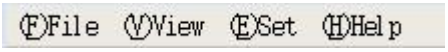
The real-time database tool interface consists of title bar, menu, component bar, toolbar, data table area and status bar, as shown in following:



7.2.2.Title bar

Display the name of program module.

7.2.3.Menu

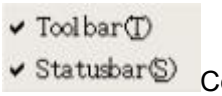


7.2.3.1. File

Export the queried real-time data in text form;

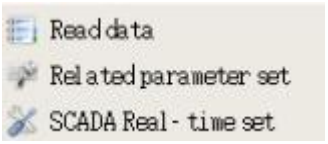
Exit from the program.

7.2.3.2. View



Control the display of toolbar and status bar.

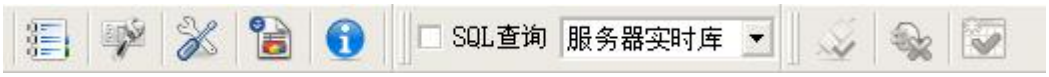
7.2.3.3. Set



1) **Read data:** call real-time data by manual;
2) **Related parameter set:** set the display way of remote metering, remote signal and electric energy in data table;
3) **SCADA Real-time set:** set the display way of SCADA real-time data in data table.

7.2.3.4. Help

7.2.4.Toolbar



1)  read data;

2)  related parameter set;

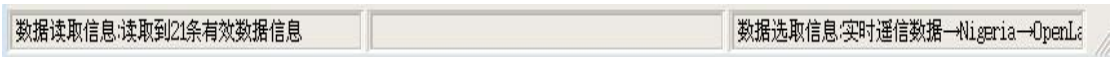
3)  SCADA real-time set;

4)  help;

5) 

SQL statement query.

7.2.5.Status bar



From left to right:

Information on reading data: read the item of data in selected table;

Information on selecting data: name of selected table.

7.3. Function description

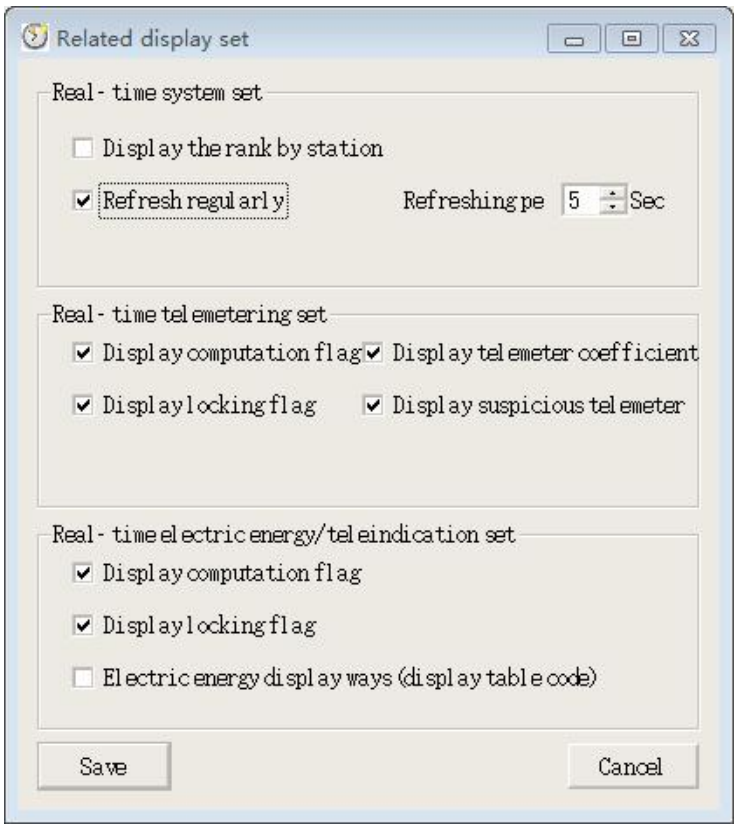
Clicking the table to be queried in the left component bar, the corresponding real-time data will display in the right data table.

7.4. Configuration description

Master configuration file: $(MASENV) /ini/rdbmon.ini

7.4.1.Related parameter set

The display way of real-time telemetering, telesignaling and electric energy can be set by  in toolbar:



Display the rank by station: the left component bar will screen station upon selected;

Refresh regularly or not: the right data table area will refresh data automatically upon selected;

Display computation flag or not in real-time telemetering set: display computation flag column or not when displaying real-time telemetering data;

Display telemeter coefficient or not in real-time telemetering set: display telemeter coefficient column or not when displaying real-time telemetering data;

Display suspicious telemeter or not in real-time telemetering set: display suspicious telemeter column or not when displaying real-time telemetering data;

Display locking flag or not in real-time telemetering set: display locking flag column or not when displaying real-time telemetering data;

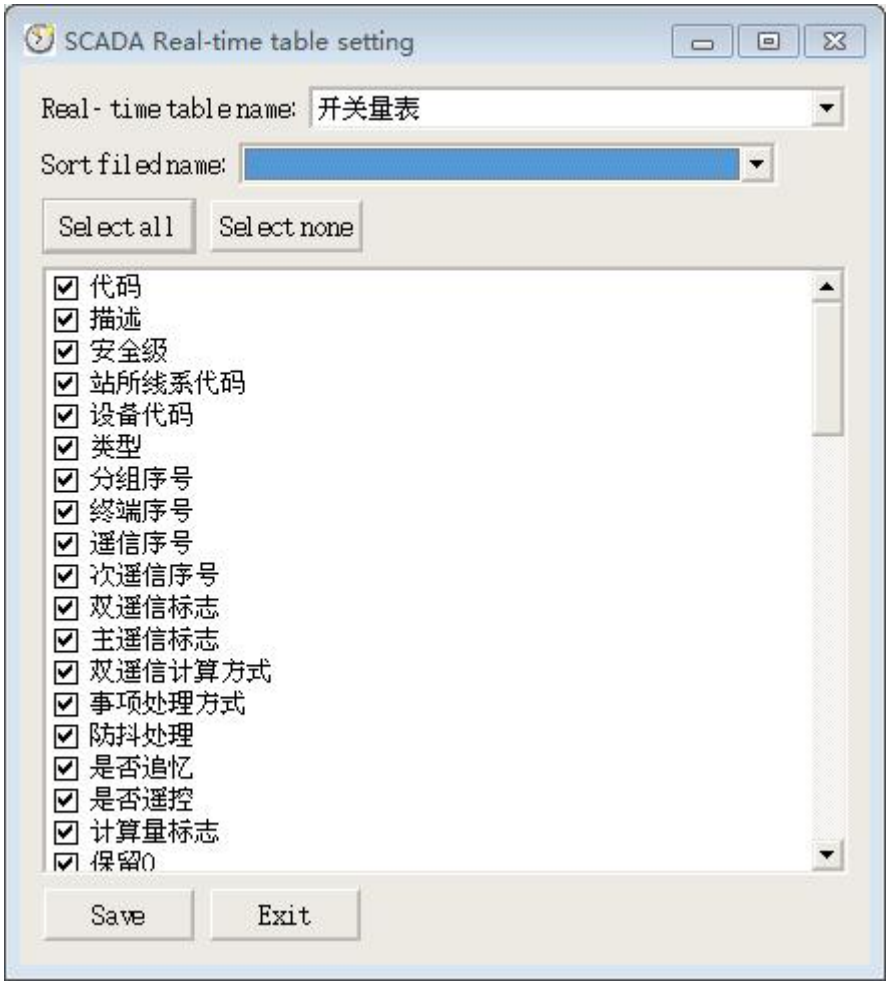
Display computation flag or not in real-time electric energy/teleindication set: display computation flag column or not when displaying teleindication and electric energy data;

Display locking flag or not in real-time electric energy/teleindication set: display locking flag column or not when displaying teleindication and electric energy data;

Display electric energy in table code or not: display table code or not when displaying electric energy data.

7.4.2.SCADA Real-time table set

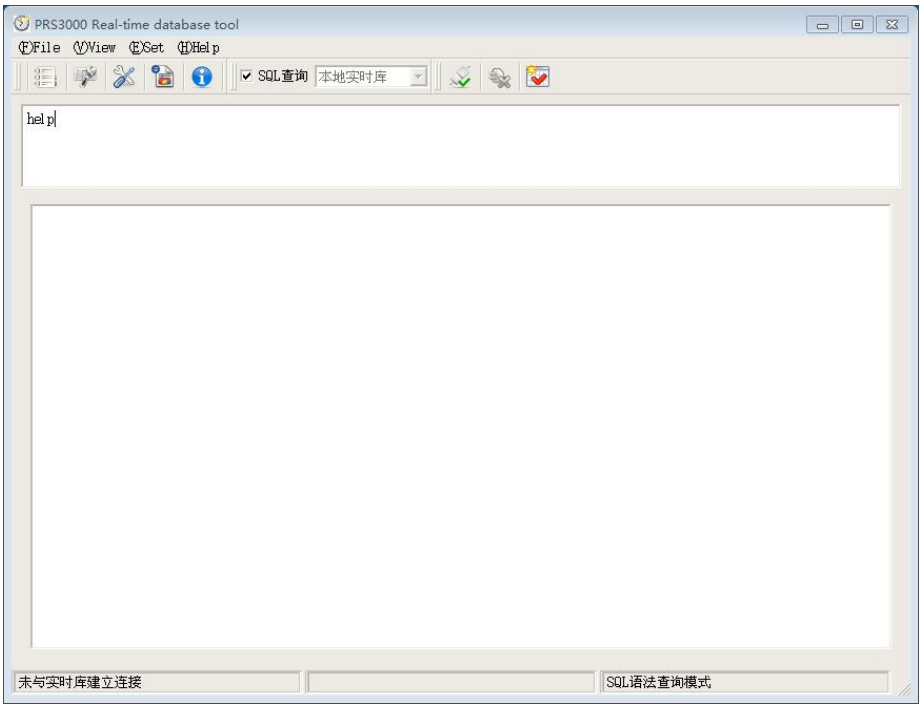
The display way of SCADA real-time table can be set by  in toolbar:



Select a real-time table. If the column field is not selected, the column will not be displayed when displaying current SCADA real-time table.

7.4.3.SQL statement query

Check “SQL query” and appear “server real-time database or local real-time database” window and “Connect”, “Disconnect” and “Execute” button. First, select the real-time database to be connected, and click “Connect”. Enter the statement for executing, and click “Execute”. You will see statement execution result as follows.


PRS3000 Real-time database tool
(F)File (V)View (E)Set (H)Help
SQL查询
本地实时库
help
未与实时库建立连接
SQL语法查询模式

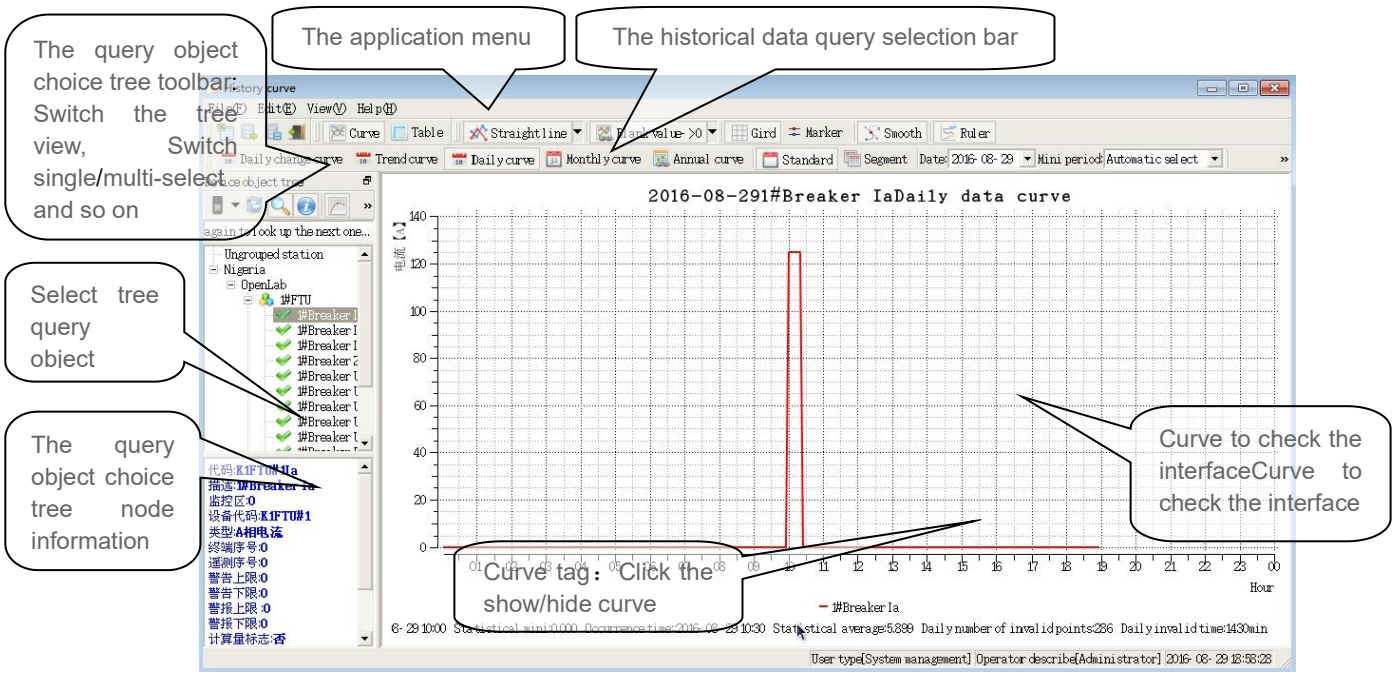
8. Curve View (Gcurve)

8.1. Overview

Curve view (gcurve) is a tool developed by Qt platform, which can be run in different operating systems including Unix, Linux and Windows etc., with a view to provide historical data analysis and processing for users. With the help of the tool, users may browse historical data in database in table and graph forms, edit and modify some defective data and planned value.

8.2. Interface description

8.2.1.General interface

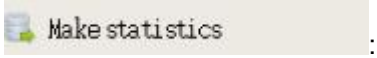


Curve view tool consists of title bar, menu bar, toolbar, query object choice toolbar, object choice tree, object information and curve view interface.

8.2.2.Menu bar

8.2.2.1. File

: export, supporting export to excel only;



: make statistics of min telemetering points selected again;

: save the modified data in database;

: exit from curve view.

8.2.2.2. Edit

: undo previous edit operation;

: redo the cancelled edit operation;

: copy the curve data;

: paste the curve data.

8.2.2.3. View

: use curve view;

: use table view.

8.2.2.4. Help

: click it to display information related to gcurve.

8.2.3.Main toolbar


Export EXCEL:

Windows platform is available. Export current data in XLS file, which can be opened, edited and processed with EXCEL.


Execute statistics:

Save and make statistics of select object and date.


Save modified data into database:

After users modify table data, they will click this button to save the modified curve data into database.

 Exit:

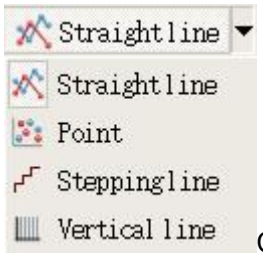
Exit from current application program.

Curve view:

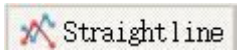
Switch to view data in curve upon selected.

Table view:

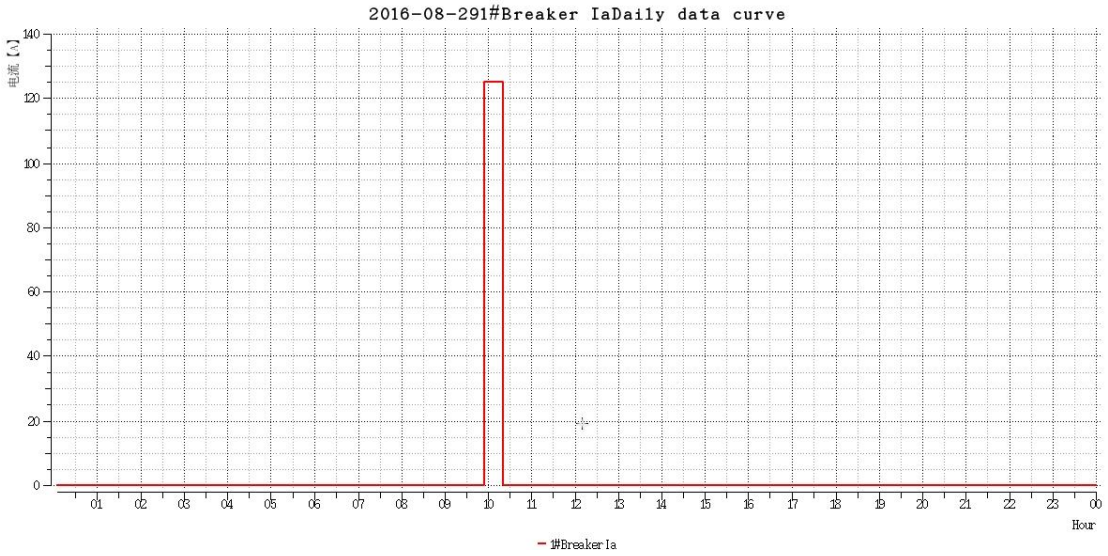
Switch to view historical curve data in table upon selected.



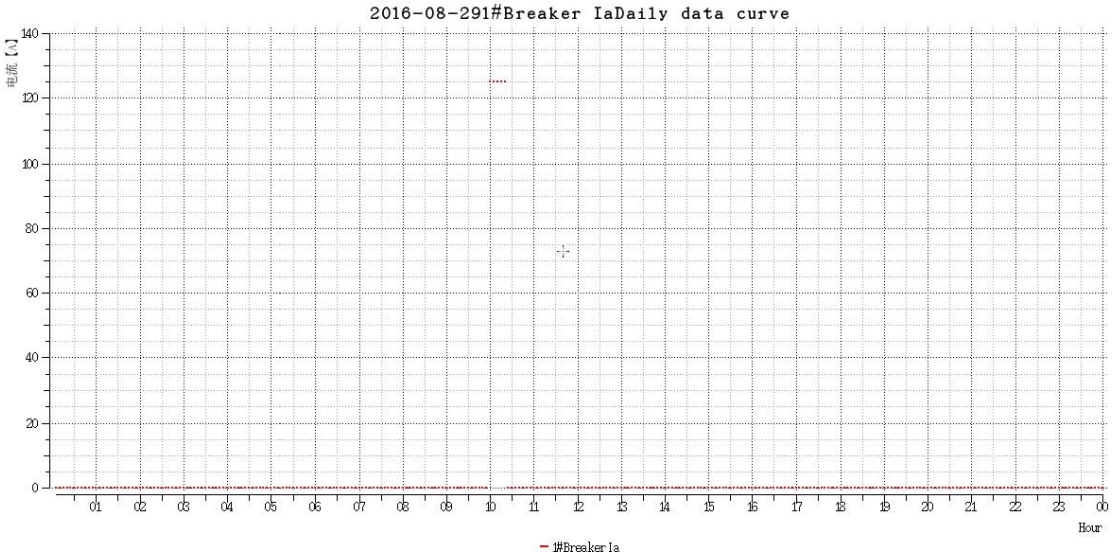
Curve type choice

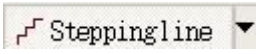


Use straight line to display curve data point.

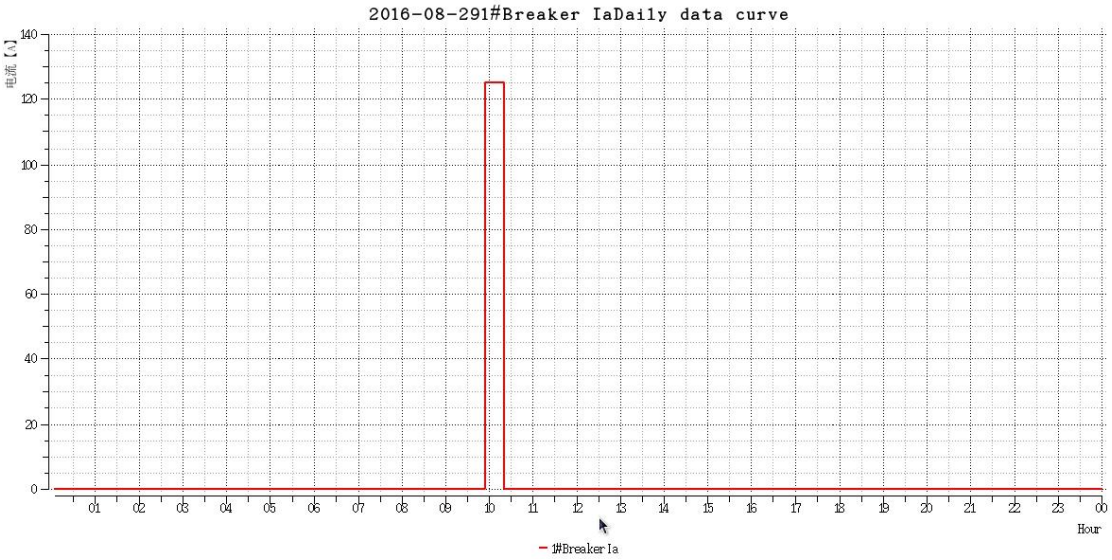


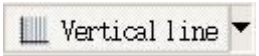
Use point to display curve data point.



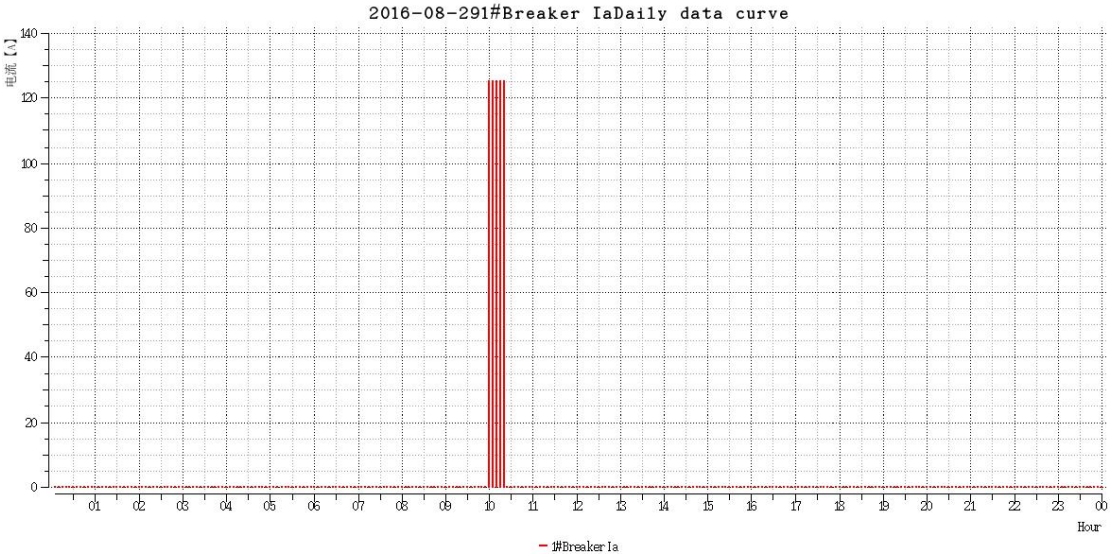


Use stepping line to display curve data point.





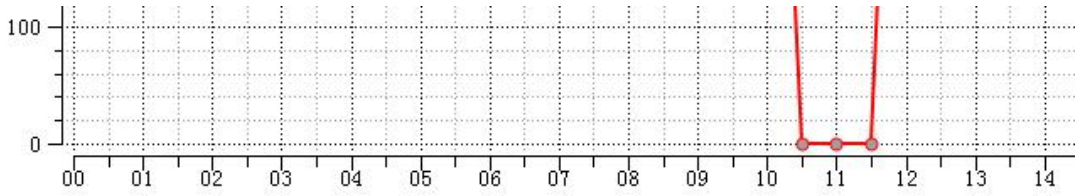
Use vertical line to display curve data point.



Display way of blank value of curve

: represent blank value with average value of other points on curve.

: represent blank value with 0 on graph.

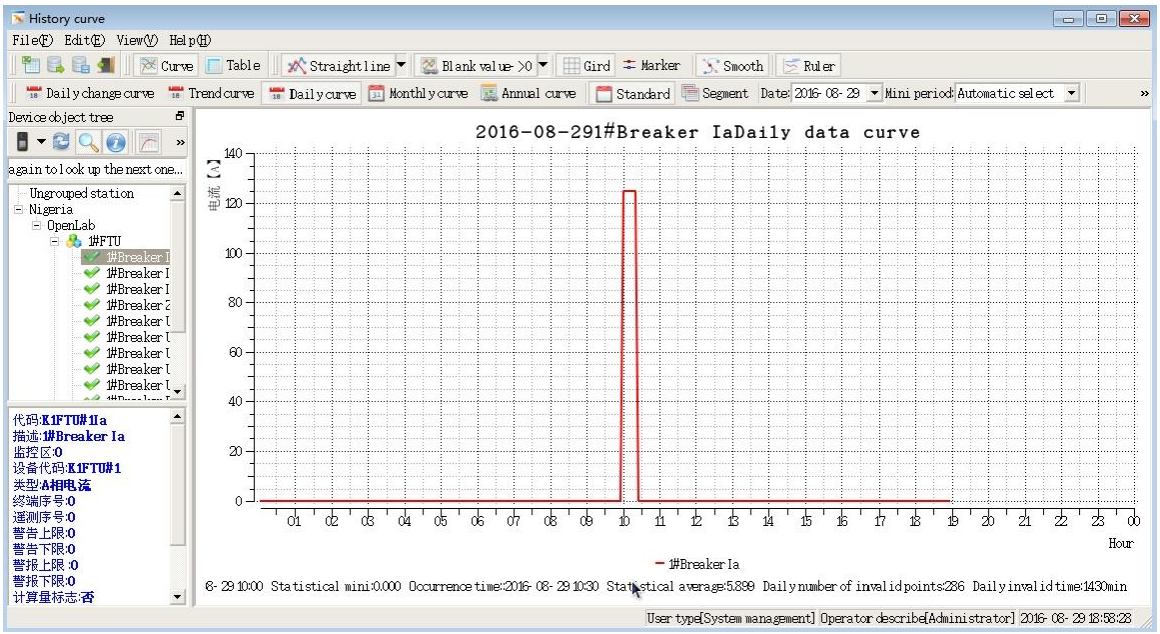


: represent blank value with the value of previous data point or next data point in curve.

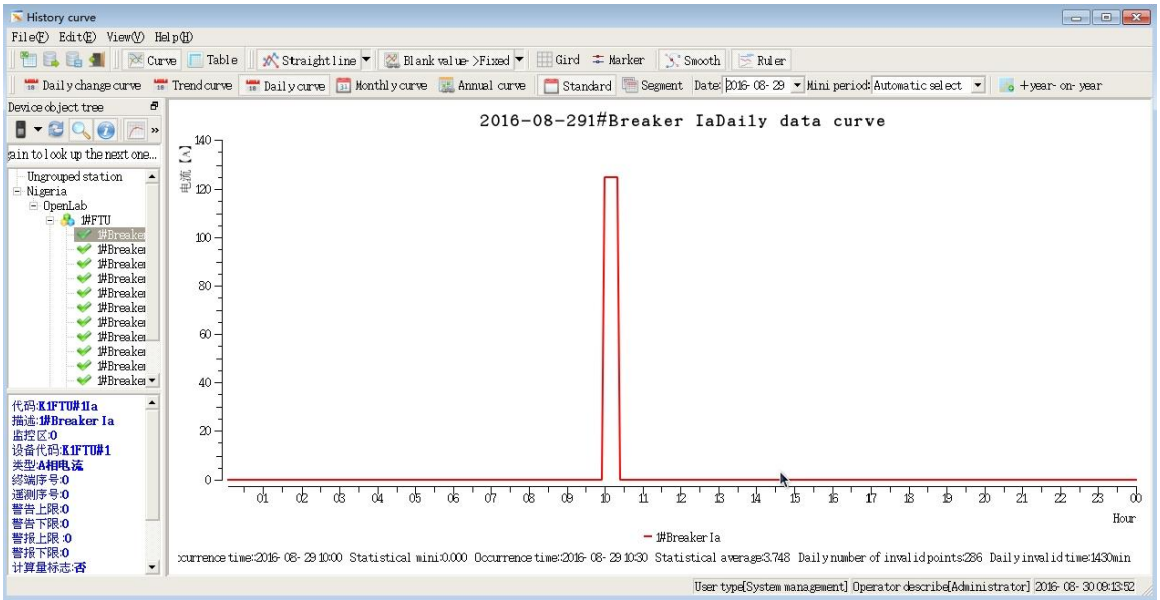
Gird: show/hide grid.

Show or hid grid in curve view or not.

Show grid mode:



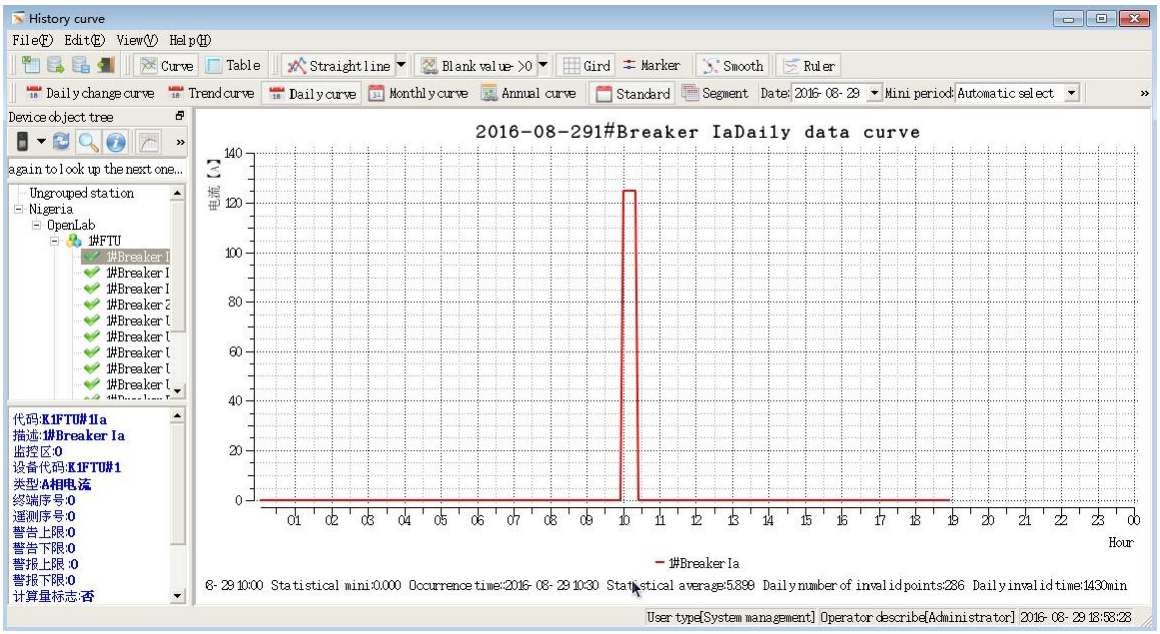
Hide grid mode:



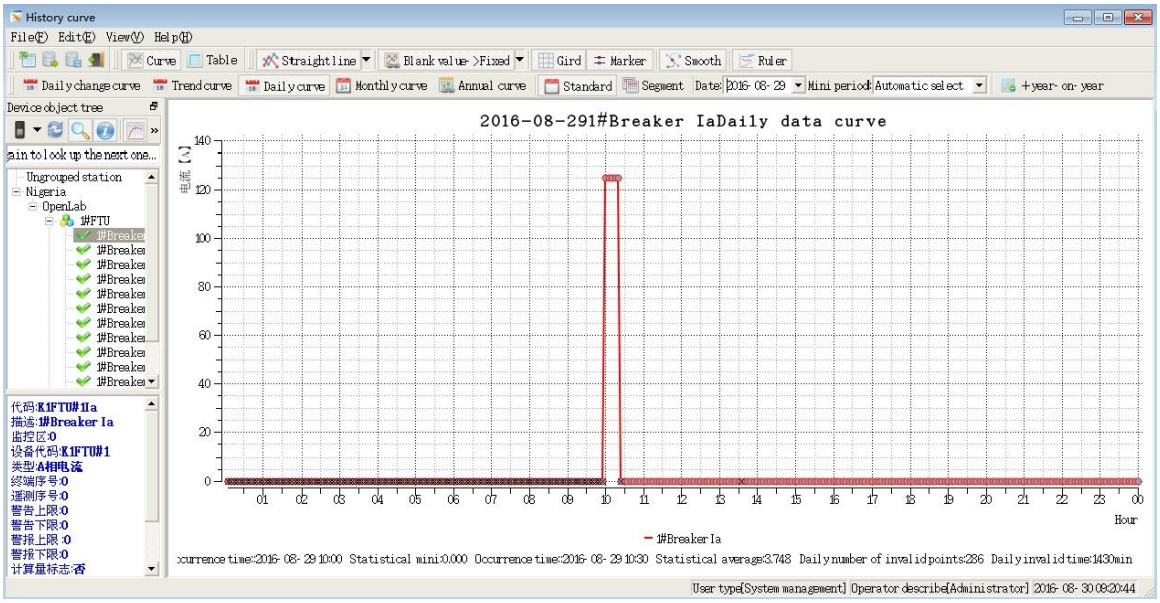
Marker Show/hide data marker

Show or hide marker of data point in curve view or not.

Hide marker mode:



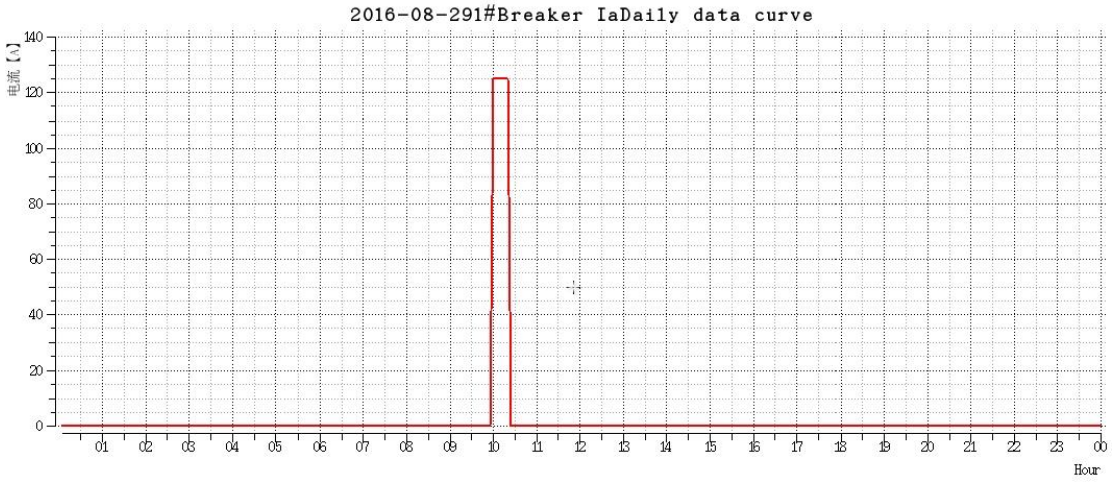
Show marker mode:



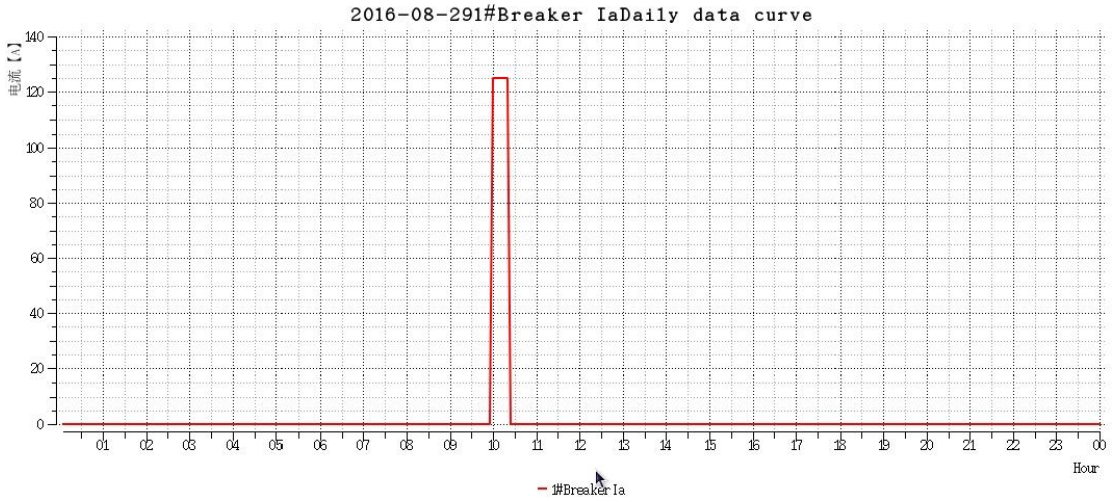
Open/close smooth:

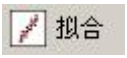
Open smooth function in curve view or not when displaying curve.

After closing smooth:



After opening smooth:

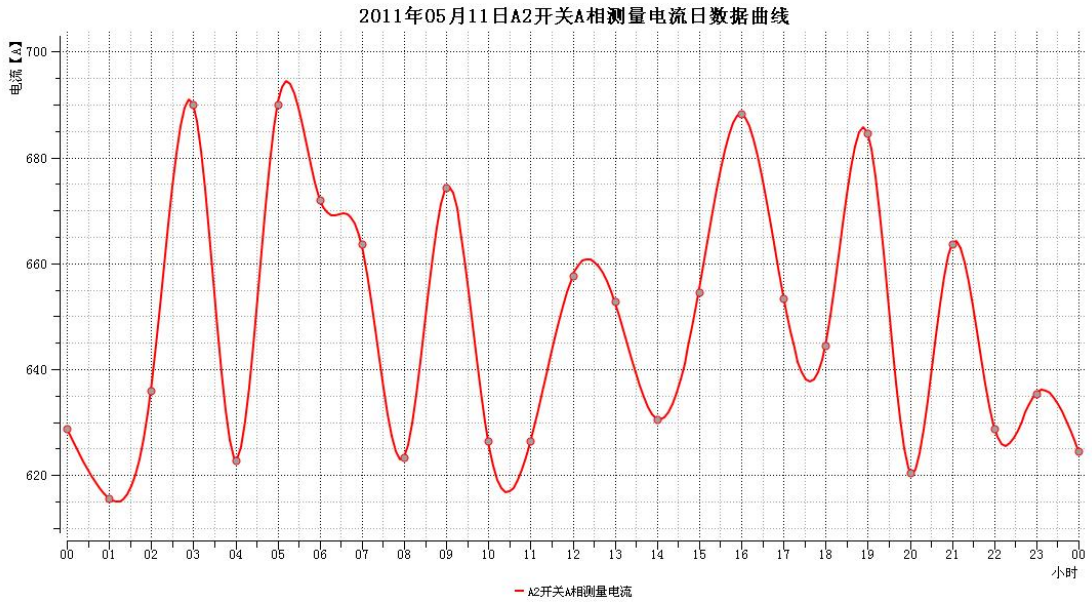




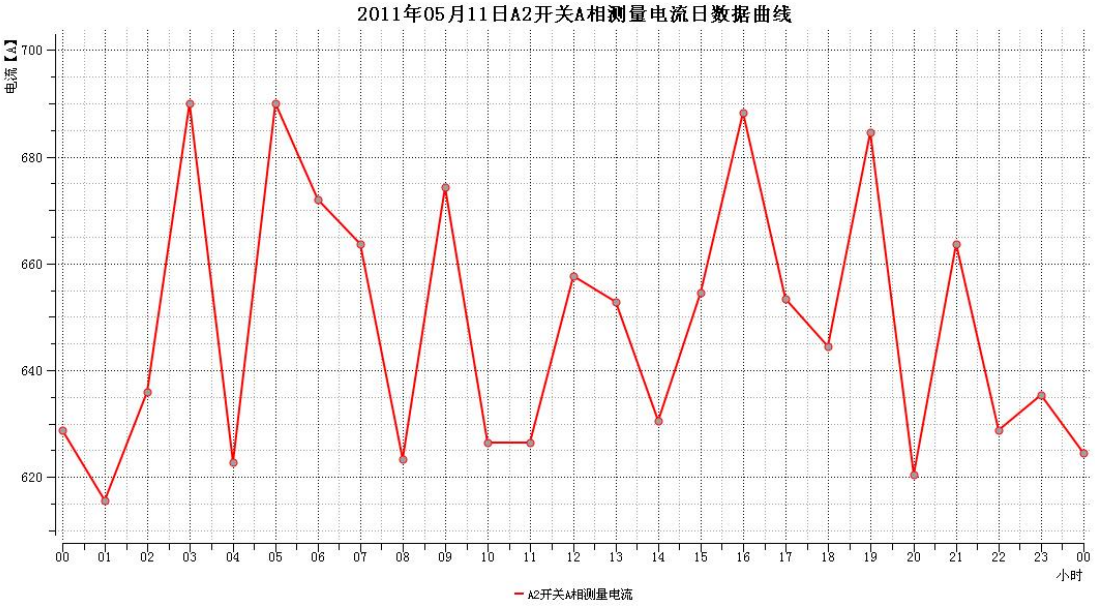
Open/close curve data fit:

Open the curve data fitting function in curve view or not when displaying curve. The fit curve will become more smooth.

Open fit:

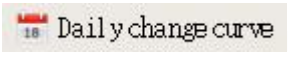


Close fit:



Auto/custom Y-coordinate ruler;

Auto/custom function of Y-coordinate ruler

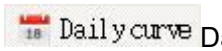


Daily change curve:

Select it to view daily change curve data;

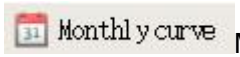
Trend curve:

Select it to view trend curve data;



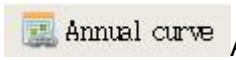
Daily curve:

Select it to view daily curve data;



Monthly curve:

Select it to view monthly curve data;



Annual curve:

Select it to view annual curve data;

Standard date selection mode:

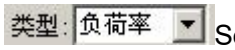
Select curve data by days, months or years;

Segment date selection mode:

Select any start or end date and time by date segments;

Selection of date and time:

Select the start/end date and time of curve;



Selection of statistic type:

Select the curve data type in monthly and annual curve;

Such types as load rate, maximum, minimum, average and yield are available for option;

Selection of min period:

Select the min period in daily curve;

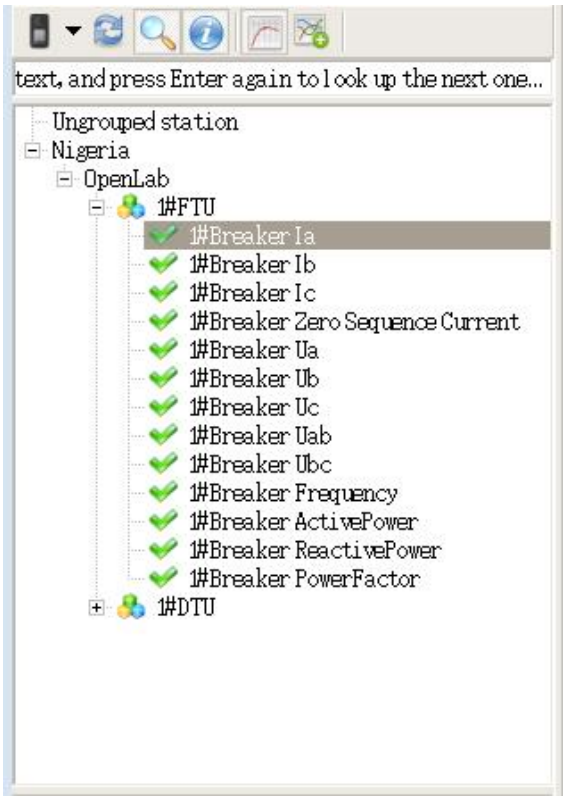
Such time intervals as automatic select, 5 minutes, 15 minutes, 30 minutes and 60 minutes are available for option.

8.2.4. Object choice toolbar

Provide curve data contents for choice.

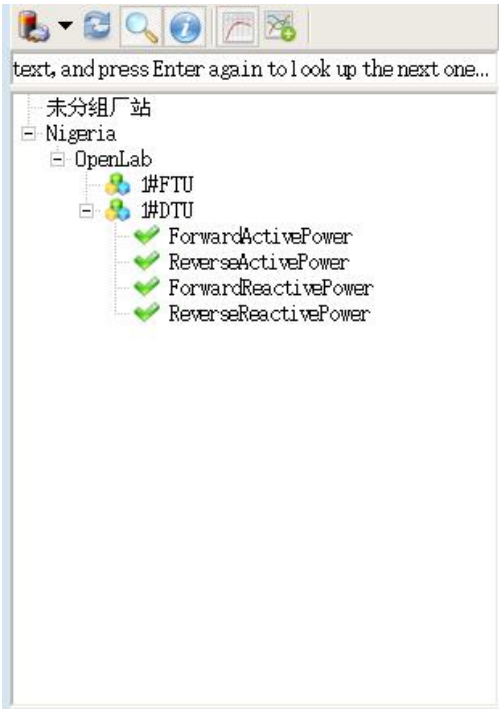
 Telemetering curve

Tree view provides all telemetering points of system for choice.



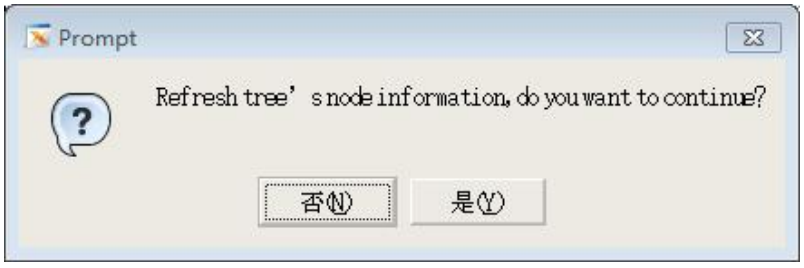
 Electricity curve

Tree view provides all electricity data points of system for choice.



 Refresh:

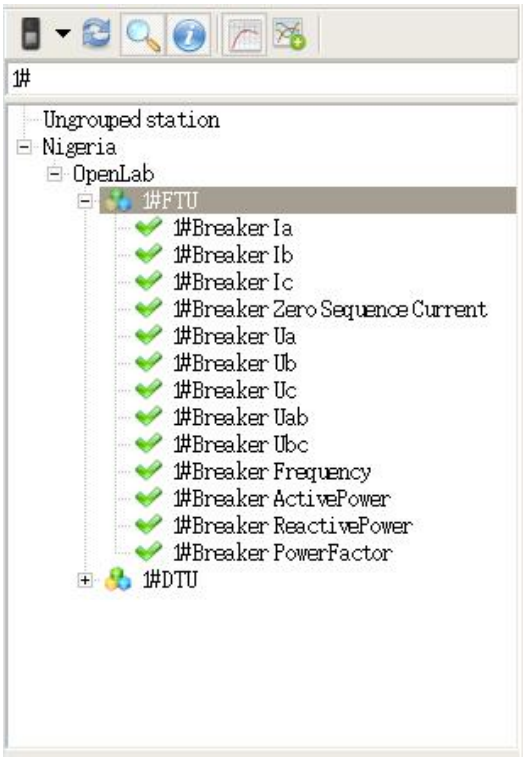
Refresh tree's node information in database again and re-initialize tree's node.



After clicking refresh, the prompt will be given. Selecting "Yes", the tree's node will use relevant tables in database for initialization.

 Search:

Show/hide the search box. Enter text in the search box, give a carriage return to search the node containing text in the tree. Give another carriage return to search next.

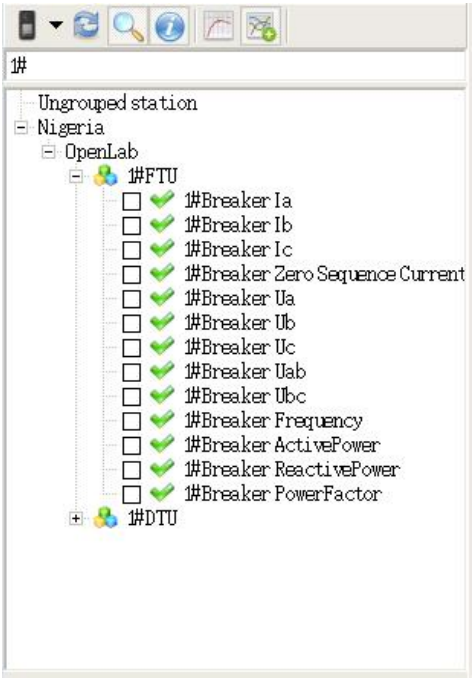


 Node information

Show/hide the node information prompt box.

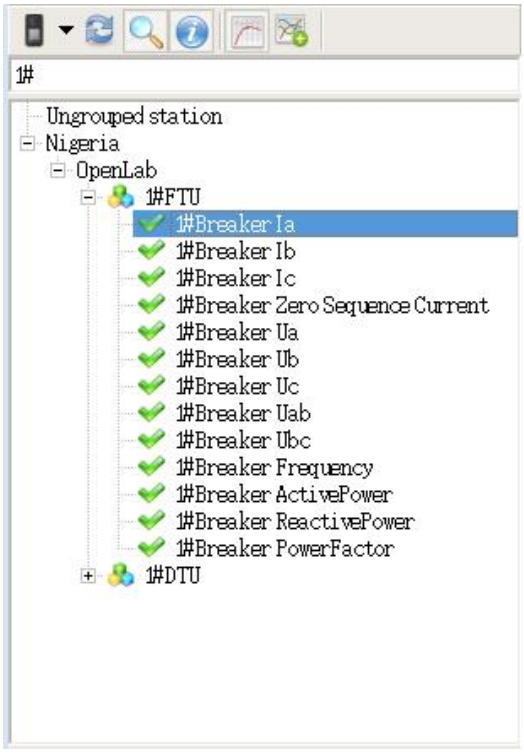
 Select single curve or multiple curves

Switch the selection mode of tree view to single choice or multiple choices.

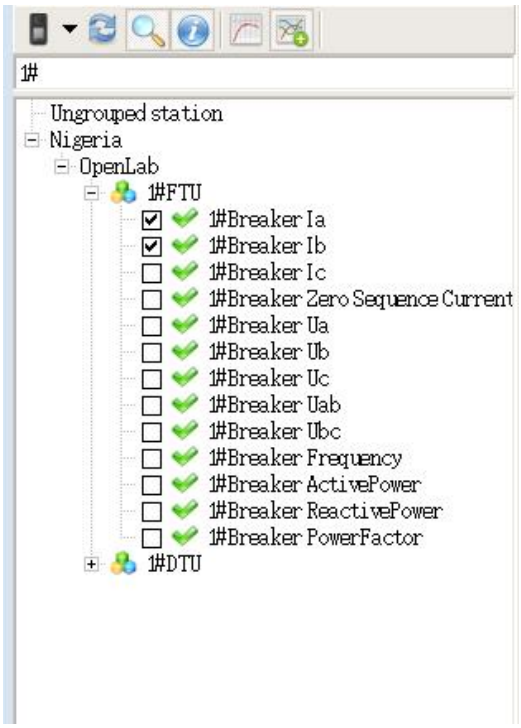


8.2.5. Object choice tree

At single-curve display mode, one telemetering point can be selected once. Click it to display the telemetering point curve;



At multi-curve display mode, several telemetering points can be selected. Every curve will be displayed in different colors.



8.2.6.Object information

Display the general information of object selected.

8.3. Typical operating environment

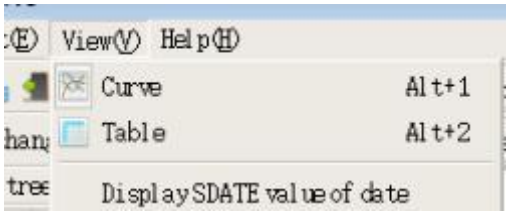
Database: Oracle, SQLServer, DB2, Sybase, Dermal, Kingbase etc.;

Platform: common operating systems such as Windows, Unix and Linux.

8.4. Function use

8.4.1.Switching of curve and table view

Curve tool supports table and curve view. Use “View” menu to select the data view, or use shortcut key to switch view as follows.



Curve view:

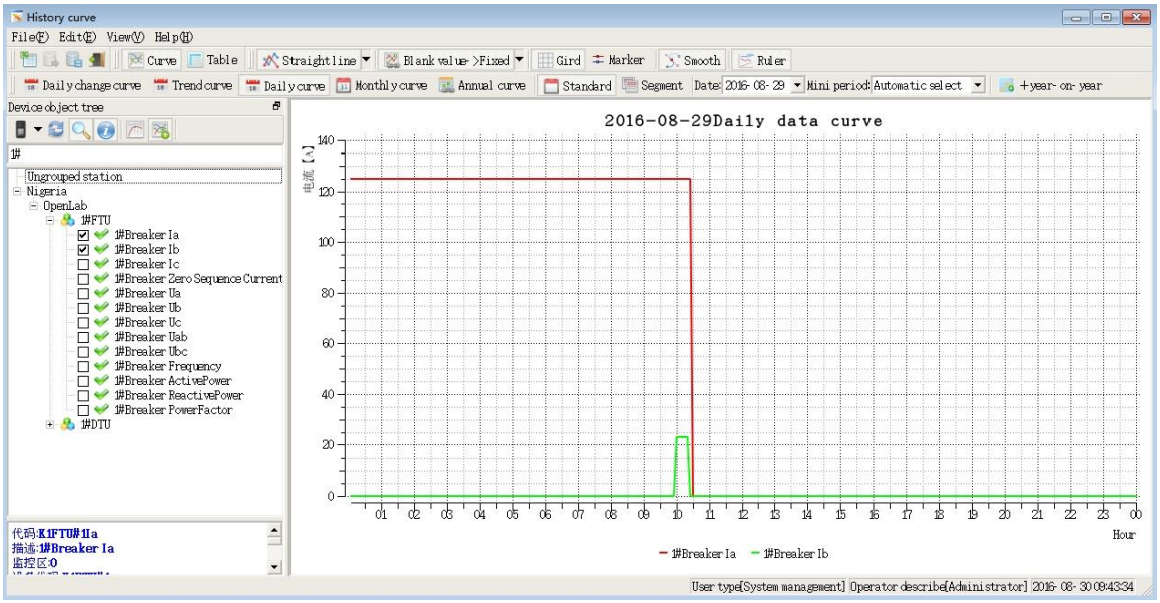
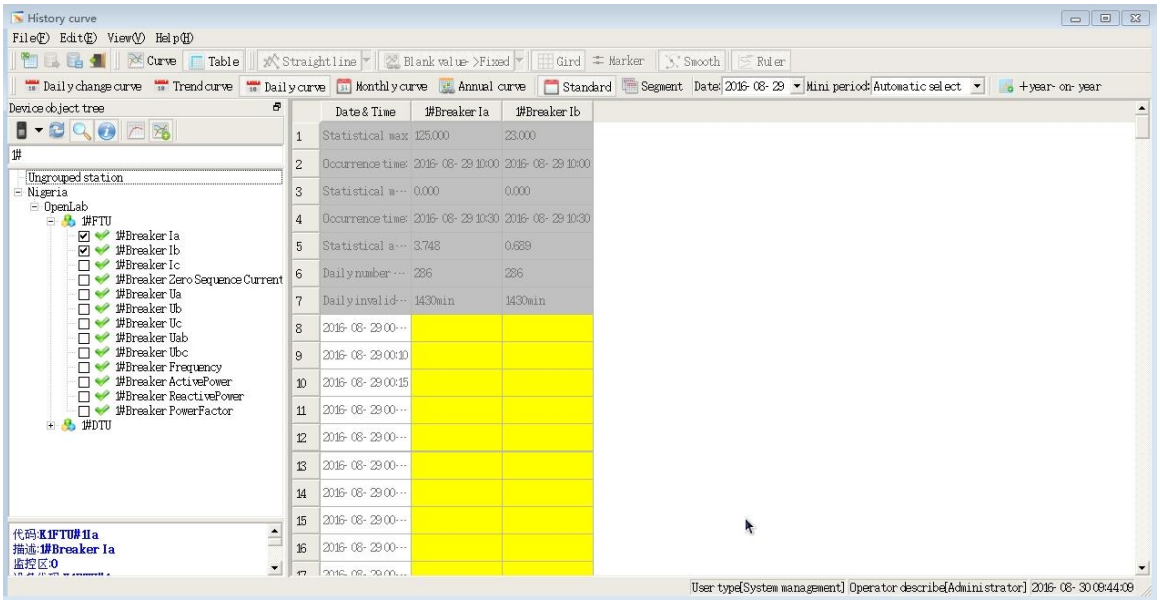
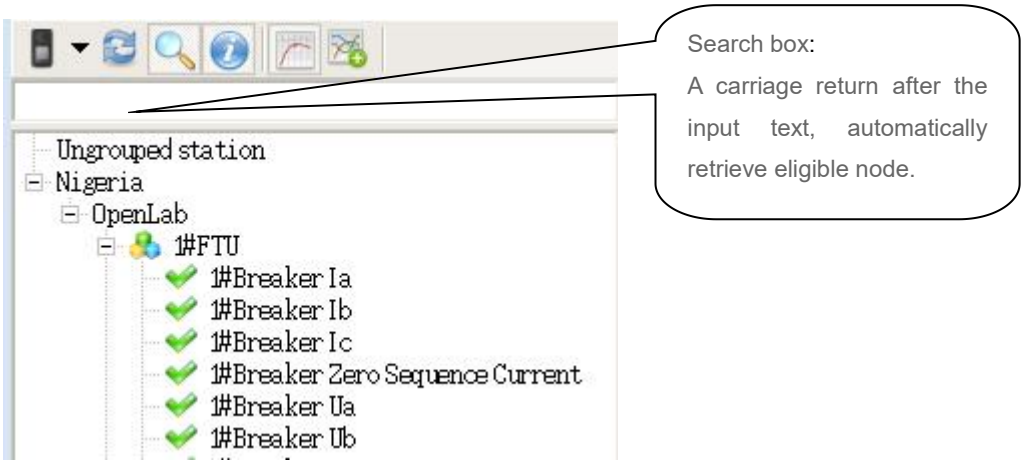


Table view:



8.4.2.Selection and operation of query object

Curve tool supports to query telemetering and electricity data. Select object from the toolbar at the top of device object tree.



Curve tool provides single-curve and multi-curve display mode. Use single-curve/multi-curve button in above figure to switch selection mode. The max number of curve at multi-curve mode is limited.

Input content in the search box, give a carriage return to retrieve tree (support fuzzy search) automatically, and locate to matching node. Then, give another carriage return to search next node.

Refresh: recover file information from database, and re-initialize tree structure.

8.4.3.Selection and operation of query date/time

Use the search condition bar in main toolbar to select data query condition.

Curve data supports search by days, months and years.

Day: view daily data curve.

Month: select monthly curve after making daily statistics of data.

Year: select annual curve after making monthly statistics of data.

Curve data can also be selected by segments, non-standard query date and time. User selects start/end date and time.

Data type choice displays in the statistical way by months and years only, used to select the statistical data type displayed on curve.

Min period is used to select min time interval of data point in daily curve.

8.4.4.Curve display

Select curve display and processing way in the main toolbar, valid for curve view only.

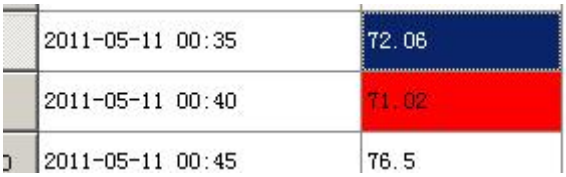
Curve type available includes connection point line, display data point only, stepping curve and vertical line.

Curve control includes show/hide curve grid, show/hide curve data point marker, blank value display, ruler type etc.

Curve paint control includes open/close anti-aliasing for curve paint (effectively improve smoothness of curve so that the curve becomes more beautiful), open/close curve fit (the missing data point in curve will be automatically fitted).

Ruler option is used to make auto/customized operation for Y-axis ruler.

8.4.5.Modify, edit and save data



At the table mode, the curve point data can be modified, selected, copied and pasted by users.

Double click the table cell to go into edit mode. In this case, you can input digits by manual or increase/decrease value in cell by mouse:

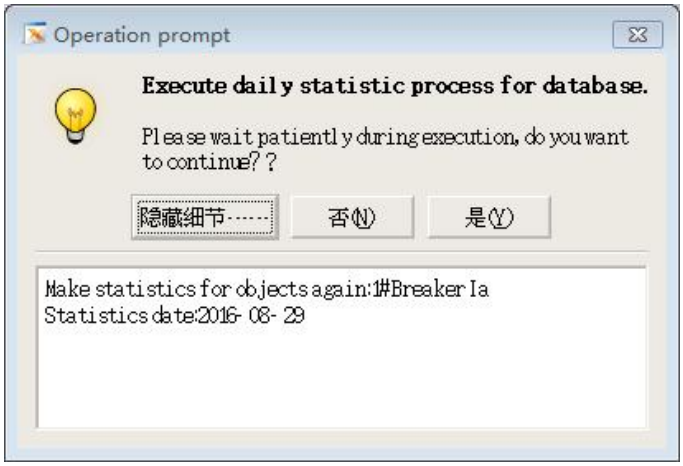
The color of modified data will become red.

If the modified data has to be written into database, please use “save modified data in database” in edit menu. System will give prompt. Selecting “Yes”, the modified data will be written into database permanently.

If a lot of modification is made, please be patient for executing.

8.4.6.Execute statistic process

Selecting “Execute statistic process” button in main toolbar, the system will give the following prompt. Clicking “Show details”, the statistical object and date will be displayed.



If selecting “Yes”, the data statistic process will be executed automatically. As the process may cost much time, please be patient for waiting.

8.4.7.Exit from program

Clicking “Exit” in “File” menu or standard quit button in title bar, the program will give following prompt:

Clicking “Yes” will quit the program; click “No” will not quit the program.

9. Web Browse

9.1. Overview

PRS-3000 series master station products supports powerful WEB browsing, and realize browser-based information view, data alarm and report consistent with security region-I.

It also supports multiple clients. With the help of WEB server, all levels of administrations of electric power company can view distribution automation system information, and learn real-time operating status, including real-time data, static data, graph, curve, report and alarm events. When the operation administrators carry out maintenance, the graph and parameter modifications to SCADA system can be synchronized to Web server automatically, which assures maintenance-free to clients and reduces the workload.

9.2. Function use and description

As long as installing standard NetScape, the clients can realize graph view, view and operation of historical curve and real-time events, creation and download of system reports and query of historical event in WEB server:

User administration and permission assignment;

Report view function can view the real-time monitoring of primary wiring diagram, bar graph, curve, table graph and trend curve as well as relevant real-time data;

View correlative parameter of equipment;

Two operation modes of hyperlink and menu are provided to graph for viewing historical events and receiving real-time event & data;

Support to print reports and primary graph etc.;

Display topology coloring;

Online help.

9.2.1.Access site and login

First, run the browser on the desktop, and enter the address of WEB server of dispatching system in the address bar. General format: “http://IP address of host”. Wherein, the address of host is the host address of WEB server assigned depending on user’s network environment.

Enter the username and password assigned by administrator for login. As the system is verified, it will go

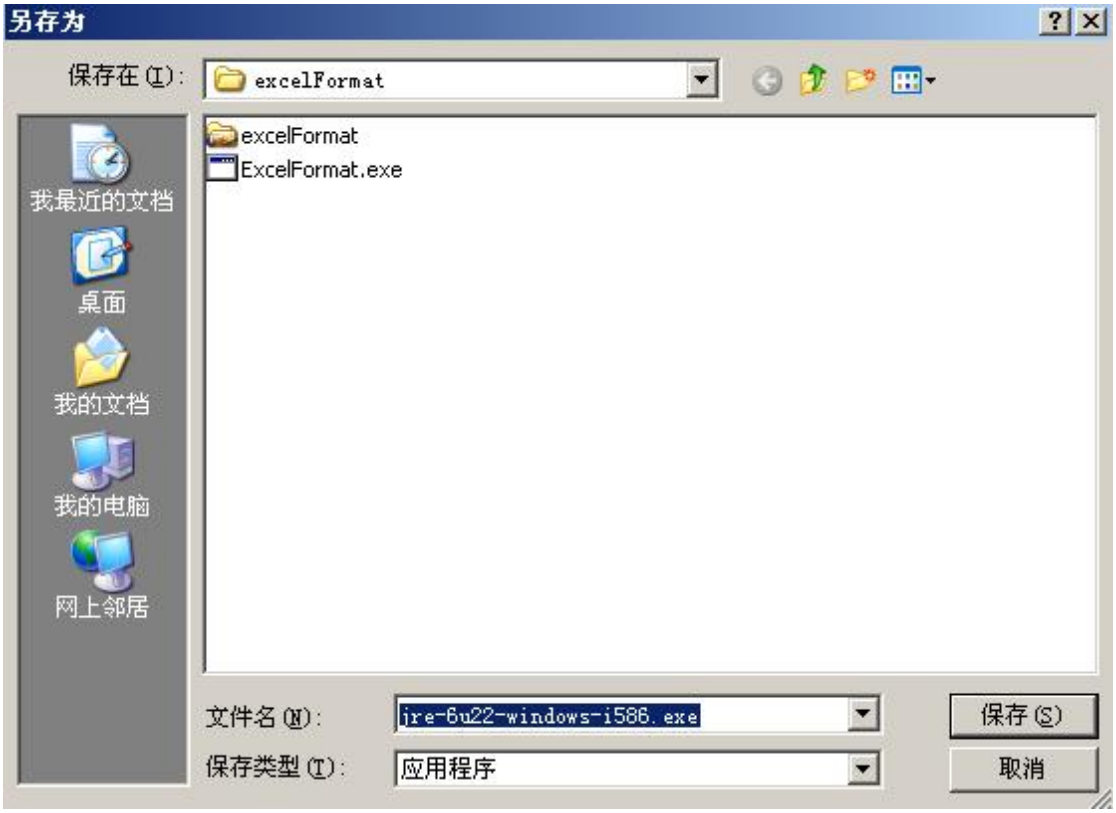
to main interface of application.

9.2.2. Install JAVA operating environment at client

After going to main interface (as follows), click “Client Installation” and download JAVA installation package.

Appear the download window.

Select “Save” and appear “Select Path” window. Save JAVA installation program to local. Then, double click the installation file to install JAVA.



Select “Run” in “File Download” directly, and appear a system alarm. Selecting “Run”, the system will automatically install this software.

9.2.3.View and operate WEB graph

After going to main interface, click “WEBSCADA” button to enter WEB graph interface (as follows).

Main toolbar function includes: graph zoom-in, graph zoom-out, display original graph, refresh current graph, back to homepage, view historical curve, monitor real-time event, print graph. Checking “layer management” means show the graph layer; otherwise, hide it. The general dispatching graph is shown as follows, on which users can view real-time value, remote signal value and card sign etc.

Zoom-in

Zoom in the current graph.

Zoom-out

Zoom out the current graph.

Display original graph

Resume current graph to original size.

Refresh

Refresh current graph.

Back to homepage

Back to homepage of WEB graph system.

View curve

Open the curve view interface.

Real-time event

Open the real-time event monitoring interface.

Print

Send current graph to printer for printing.

Layer selection

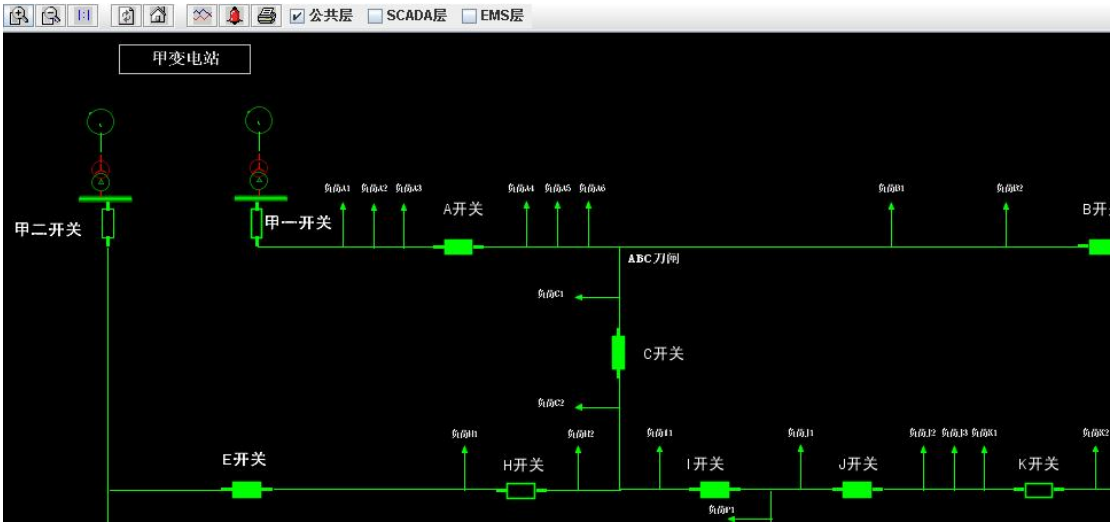
Show/hide relevant layer of graph. Checking it means to show designated layer.

Open common layer:

Close common layer:

Open SCADA layer:

Close SCADA layer:

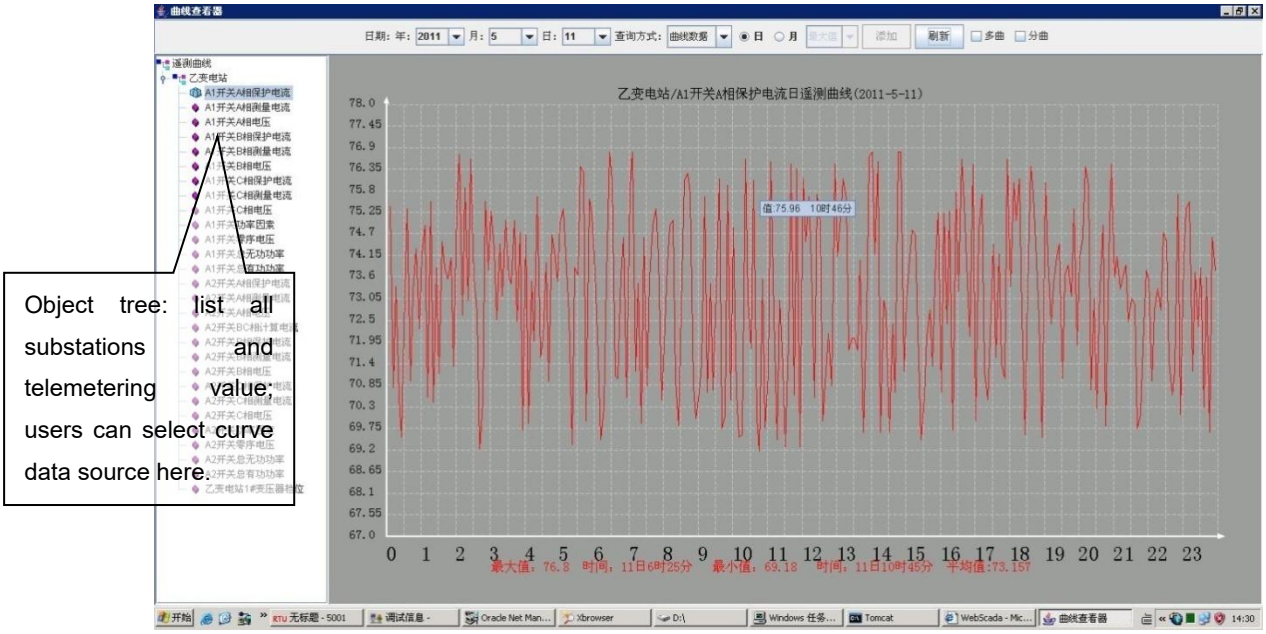


9.2.3.1. View historical curve

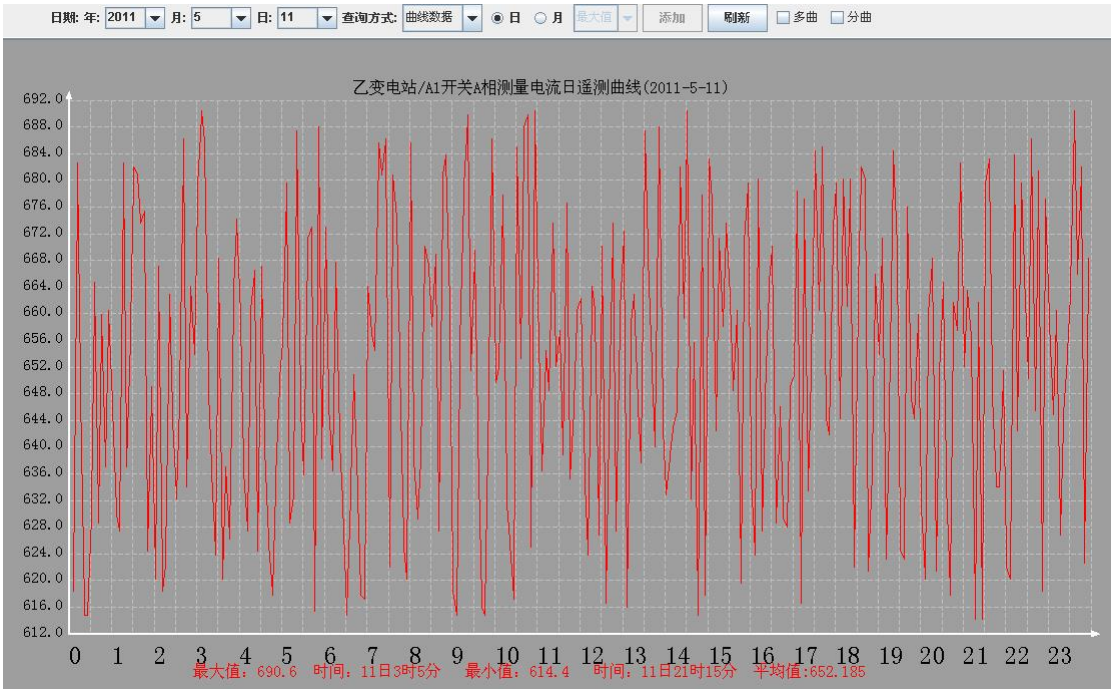
Selecting curve view button on main toolbar, it will go to historical curve view interface as follows:

The interface top is the date selection bar, used to select curve date, curve type (day, month), and provide multi-curve display (upon selecting it, the multiple choice of telemetering nodes is available on the left) and single-curve display (it can select a date and press “Add” to add the selected curve into

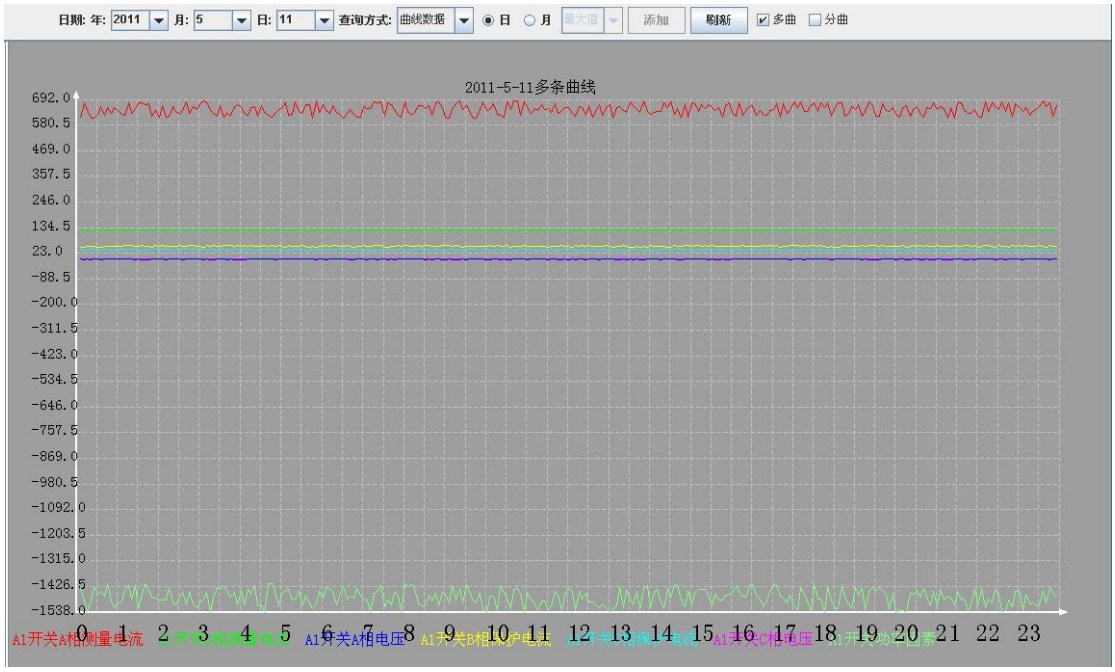
interface).



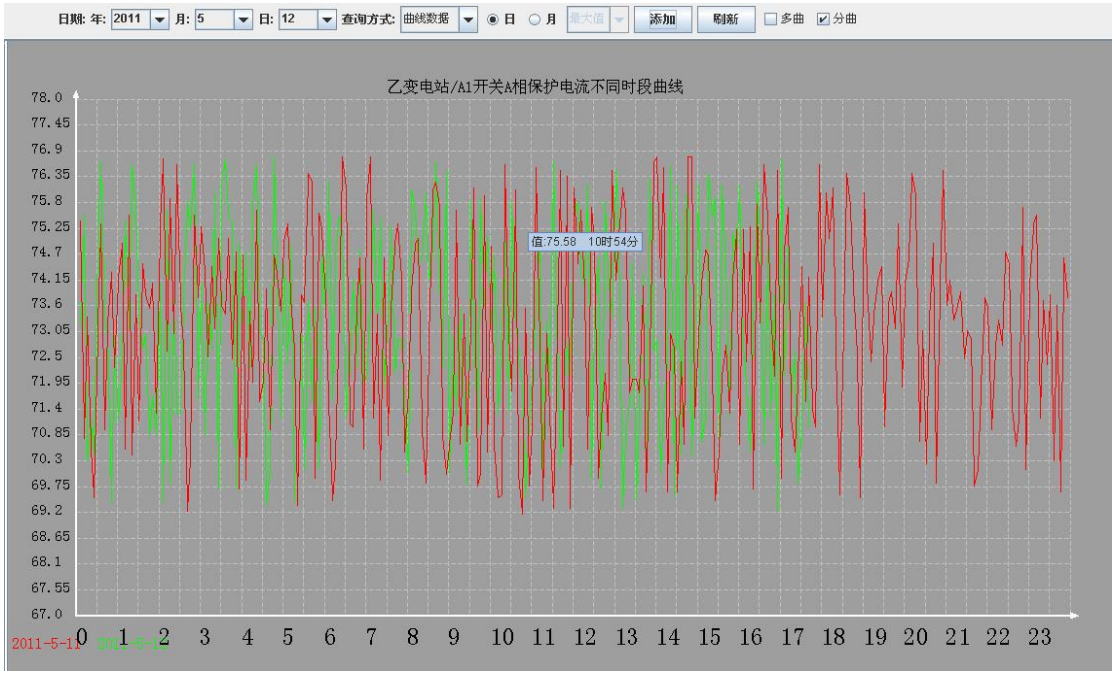
Single-curve display interface:



Multi-curve display interface:



Fractal curve display interface:

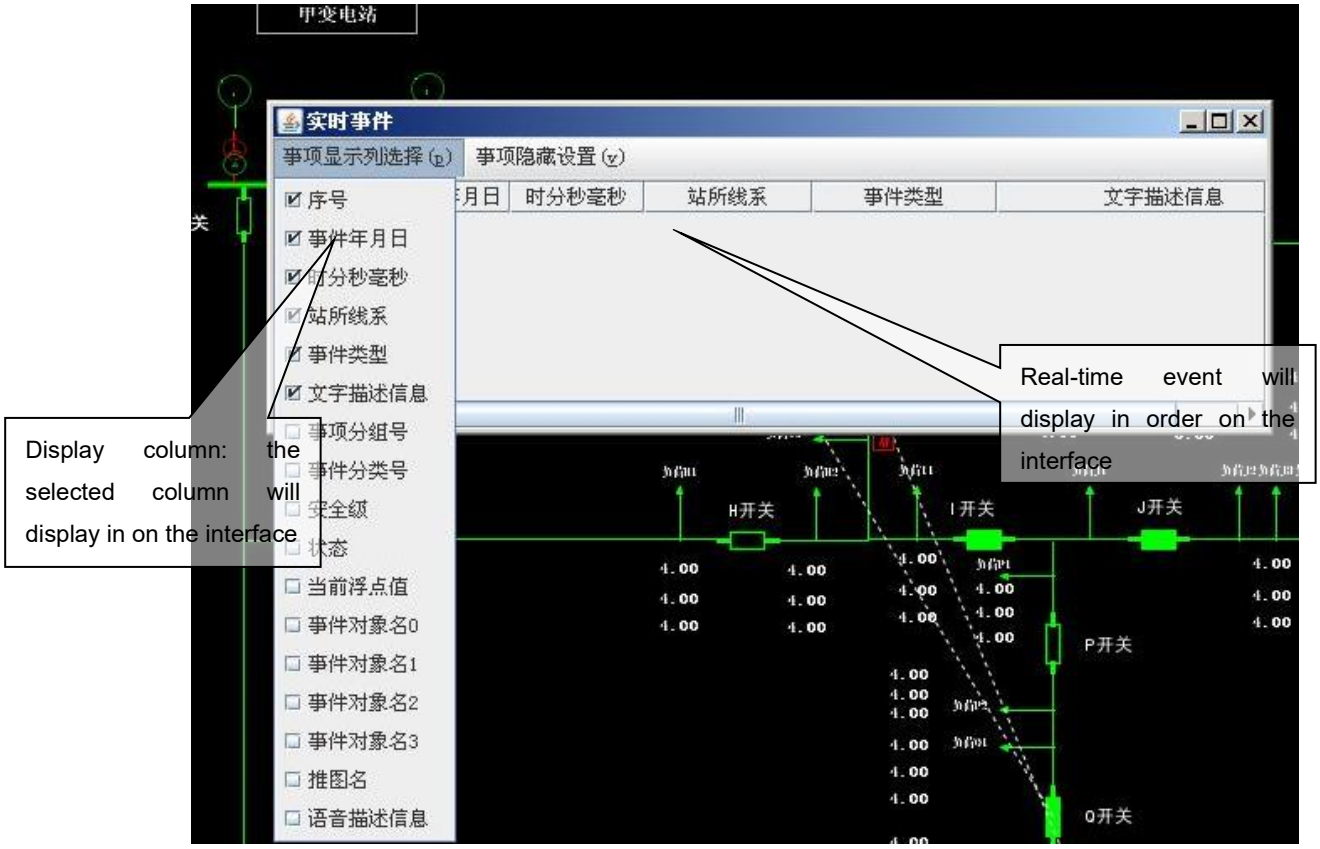


9.2.3.2. Monitor real-time event

Click “Real-time event” button on main toolbar and go to real-time event view interface as follows:

You can show/hide display column in the list.

Real-time event is generated from internal network and transmitted to WEB server after isolation. Upon receiving new event, WEB server will notify users for unified refresh.

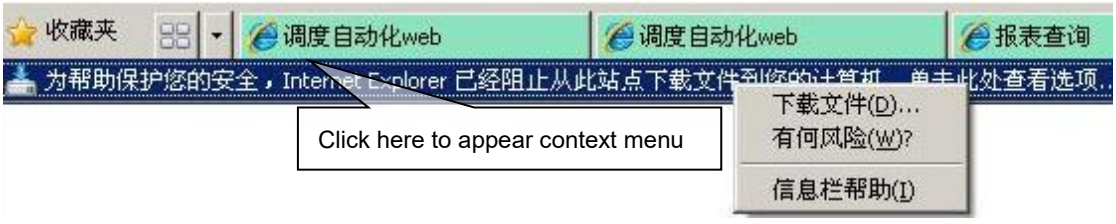


9.2.4. Create and print report

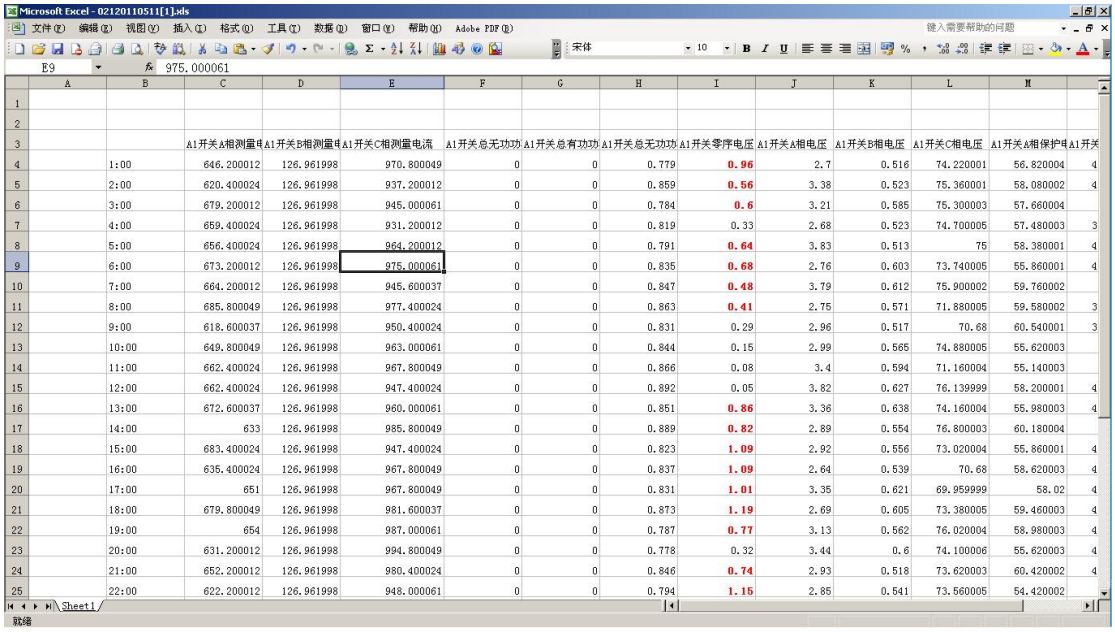
Select “Report” view on the WEB main interface and go to report selection and download page as follows:

Click “Create” button as required.

Select “Download file” on the following IE interface.



You can open or save download file EXCEL to local to facilitate user's modification and print. The typical report form opened is as follows.



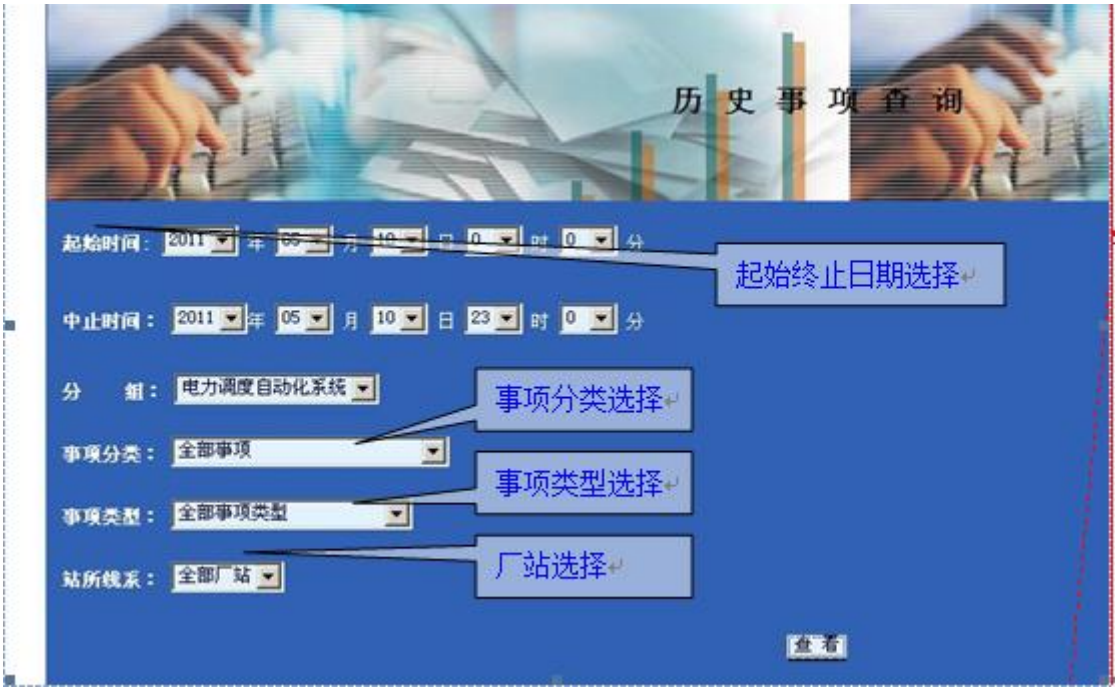
	A	B	C	D	E	F	G	H	I	J	K	L	M	
1														
2														
3			A1开关A相测量电	A1开关B相测量电	A1开关C相测量电流	A1开关总无功功	A1开关总有功功	A1开关总无功功	A1开关零序电压	A1开关A相电压	A1开关B相电压	A1开关C相电压	A1开关A相保护电	A1开关
4		1:00	646.200012	126.961998	970.800049	0	0	0.779	0.96	2.7	0.516	74.220001	56.820004	4
5		2:00	620.400024	126.961998	937.200012	0	0	0.859	0.56	3.38	0.523	75.360001	58.080002	4
6		3:00	679.200012	126.961998	945.000061	0	0	0.784	0.6	3.21	0.585	75.300003	57.660004	
7		4:00	659.400024	126.961998	931.200012	0	0	0.819	0.33	2.68	0.523	74.700005	57.480003	3
8		5:00	656.400024	126.961998	964.200012	0	0	0.791	0.64	3.83	0.513	75	58.380001	4
9		6:00	673.200012	126.961998	975.000061	0	0	0.835	0.68	2.76	0.603	73.740005	55.860001	4
10		7:00	664.200012	126.961998	945.600037	0	0	0.847	0.48	3.79	0.612	75.900002	59.760002	
11		8:00	685.800049	126.961998	977.400024	0	0	0.863	0.41	2.75	0.571	71.880005	59.580002	3
12		9:00	618.600037	126.961998	950.400024	0	0	0.831	0.29	2.96	0.517	70.68	60.540001	3
13		10:00	649.800049	126.961998	963.000061	0	0	0.844	0.15	2.99	0.565	74.880005	55.620003	
14		11:00	662.400024	126.961998	967.800049	0	0	0.866	0.08	3.4	0.594	71.160004	55.140003	
15		12:00	662.400024	126.961998	947.400024	0	0	0.892	0.05	3.82	0.627	76.139999	58.200001	4
16		13:00	672.600037	126.961998	960.000061	0	0	0.851	0.86	3.36	0.638	74.160004	55.980003	4
17		14:00	633	126.961998	985.800049	0	0	0.889	0.82	2.89	0.554	76.800003	60.180004	
18		15:00	683.400024	126.961998	947.400024	0	0	0.823	1.09	2.92	0.556	73.020004	55.860001	4
19		16:00	635.400024	126.961998	967.800049	0	0	0.837	1.09	2.64	0.539	70.68	58.620003	4
20		17:00	651	126.961998	967.800049	0	0	0.831	1.01	3.35	0.621	69.959999	58.02	4
21		18:00	679.800049	126.961998	981.600037	0	0	0.873	1.19	2.69	0.605	73.380005	59.460003	4
22		19:00	654	126.961998	987.000061	0	0	0.787	0.77	3.13	0.562	76.020004	58.980003	4
23		20:00	631.200012	126.961998	994.800049	0	0	0.778	0.32	3.44	0.6	74.100006	55.620003	4
24		21:00	652.200012	126.961998	980.400024	0	0	0.846	0.74	2.93	0.518	73.620003	60.420002	4
25		22:00	622.200012	126.961998	948.000061	0	0	0.794	1.15	2.85	0.541	73.560005	54.420002	

9.2.5. Query and view event

Select "Event query" on main WEB interface and go to historical event query page as follows:

Select start/end time and relevant filtration condition on page as required, and click "View".

The system will search relevant eligible records in the historical database and return results on page.



序号	年月日	时分秒毫秒	变电所	事项
1	2011-05-10	19:27:33:737	乙变电站	A1开关A相电压越上限 值:200.000
2	2011-05-10	19:19:13:658	server1	server1主机状态运行->备机
3	2011-05-10	19:19:19:671	server1	1组 server1 A网 状态 正常 ->异常
4	2011-05-10	19:19:19:671	server1	server1主机状态备机->停机
5	2011-05-10	19:20:37:500	wh2	1组 wh2 A网 状态 异常 ->正常
6	2011-05-10	19:20:37:500	wh2	wh2主机状态停机->运行
7	2011-05-10	19:20:37:515	WEB	节点wh2成为主WEB服务器
8	2011-05-10	19:27:23:558	server1	server1节点上进程生数据流启动
9	2011-05-10	19:27:24:091	server1	server1节点上进程计算量处理进程启动
10	2011-05-10	19:27:24:642	server1	server1节点上进程保护事件处理进程启动
11	2011-05-10	19:27:25:195	server1	server1节点上进程SCADA处理主进程启动
12	2011-05-10	19:27:25:740	server1	server1节点上进程数据服务启动
13	2011-05-10	19:27:26:252	server1	server1节点上进程事故追忆进程启动
14	2011-05-10	19:27:27:790	server1	server1节点上进程fepsrv启动
15	2011-05-10	19:29:23:765	server1	1组 server1 A网 状态 异常 ->正常
16	2011-05-10	19:29:23:765	server1	server1主机状态停机->备机
17	2011-05-10	19:29:23:780	FEP	节点server1成为主FEP服务器
18	2011-05-10	19:29:23:796	DB	节点server1成为主DB服务器
19	2011-05-10	19:29:23:812	FILE	节点server1成为主FILE服务器
20	2011-05-10	19:29:34:952	SCADA	节点server1成为主SCADA服务器
21	2011-05-10	19:30:16:874	SCADA	节点dd1成为主SCADA服务器
22	2011-05-10	19:30:49:015	dd1	dd1主机状态主控->运行
23	2011-05-10	19:30:49:015	server1	server1主机状态备机->主控

9.2.6.Common problems and solutions

a) Entering username and password on login page, the system prompts that the user does not exist or the password is incorrect:

Check the username and password is correct or not. User's WEB login is initially configured, and

assigned with username, password and rights by administrator. If they are not set, the login must be failed.

b) Click “WEBSCADA” on homepage, but there is no response:

Check that the client has installed JAVA or not. If not, install JAVA directly according to this instruction.

c) The report downloaded cannot be opened:

Check the client has installed EXCEL or not. The report downloaded to client is in the format of “xls”, which requires OFFICE (or compatible program) for opening.