






**OMC**

**AlarmManagement**

**User manual**

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Symbol Definition	
	WARNING: Indicates information that a potentially hazardous situation which, if not avoided, could result in serious injury or death.
	RISK OF ELECTRICAL SHOCK: Indicates information that Potential shock hazard where HAZARDOUS LIVE voltages greater than 30V RMS, 42.4V peak, or 60V DC may be accessible.
	ESD HAZARD: Indicates information that Danger of an electro-static discharge to which equipment may be sensitive. Observe precautions for handling electrostatic sensitive devices
	ATTENTION: Identifies information that requires special consideration.
	TIP: Identifies advice or hints for the user.

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## Section 1 Introduction

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In the actual production process, the complex on-site environment will generate many alarms, but only some important alarms are helpful for the on-site production. Too many alarms will interfere with the operator's identification of important alarms and deduct the effectiveness of solving production problems.

Through the alarm management system(hereinafter referred to as AM), it is possible to carry out unified management and classified statistics of on-site alarms, to help operators quickly locate important alarms under the condition of frequent alarms, and effectively process alarm information according to priority, thus intervene in production problems in a timely manner to prevent production risks.

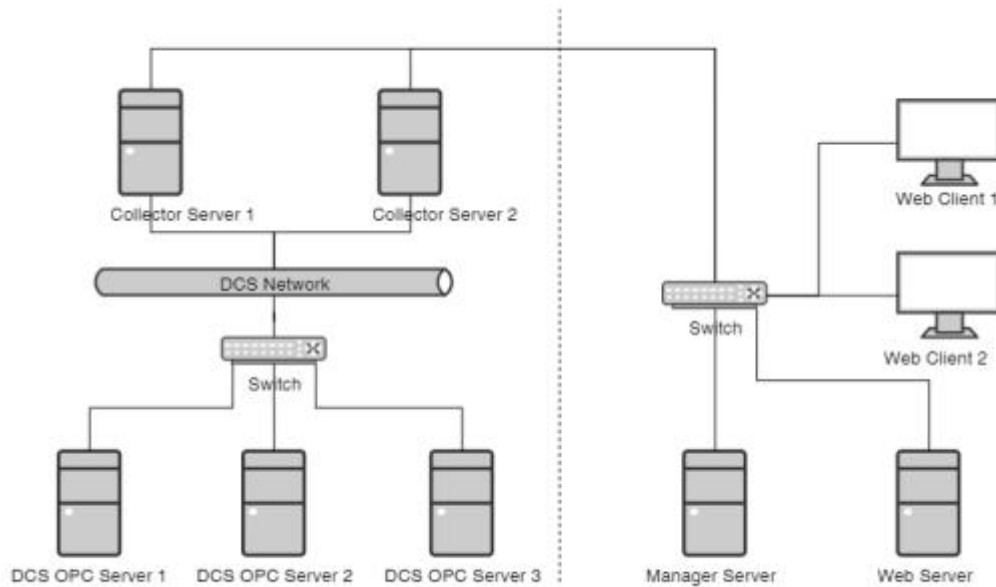
### 1.1 Main Functions

Through the AM system, the following main functions can be realized:

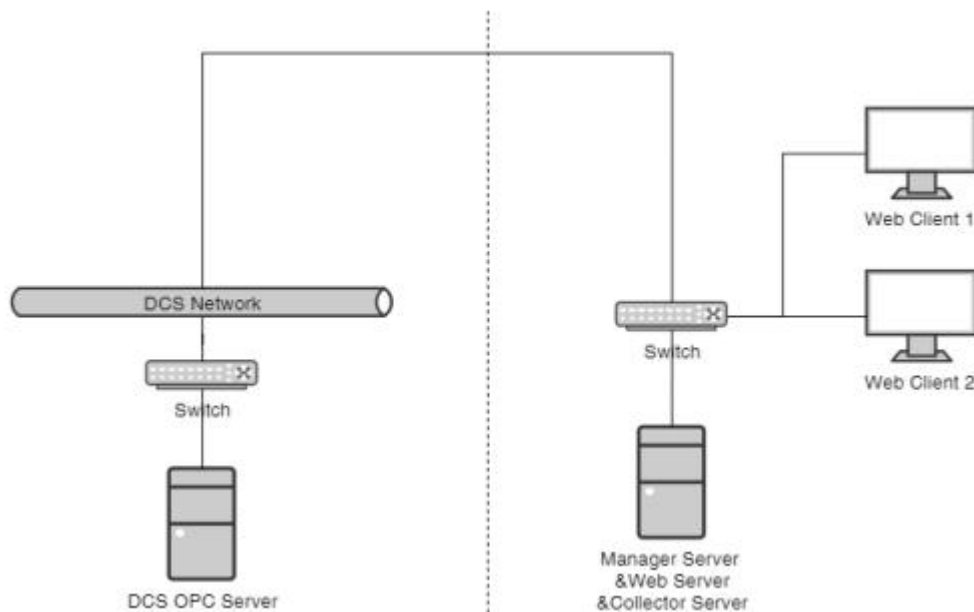
- Data acquisition: It obtains the real-time value of tags in the DCS system configuration through the OPC protocol.
- Alarm configuration: It defines alarm tags that need attention, and configure the statistical rules of various alarms.
- Alarm shelving: It supports users to customize the setting of the shelving conditions in the alarm management configuration, and shelving real-time alarm data, so as to prevent frequent alarms, alarm flooding and other conditions from viewing real-time alarms.
- Multi-state processing: It helps establish the relationship between states and alarms, and defines the alarm operations required under different states.
- Alarm statistics and analysis: The system will classify the alarms that meet the conditions according to the configuration, and display the statistical results in a simple and clear form in graphs or tables.
- Alarm Examination: It compares the alarm tag data of the AM system and DCS system, and supports manual synchronization of the audit results.
- Production status monitoring: By comparing the real-time values of specified indexes, it effectively enhances the sense of the control of the operator's behaviour to the production indexes, thereby improving the efficiency of enterprise operation and maintenance management.
- Stability rate: The ratio of the standard deviation of process indexes to the corresponding average reflects the degree of process index fluctuation and determines the stability of process indexes. This method is applicable to the stability rate statistics of process indexes that can be monitored in real time by the DCS system. In principle, all controlled variables of the control loop need to be included in the stability rate statistics.

## 1.2 System Structure

The networking diagram shown in Figure 1-1 and Figure 1-2 contains the main equipment and networks in the AM system.



**Figure 1-1 Network Structure of Medium and Large Scale System**



**Figure 1-2 Network Structure of Small Scale System**

### System composition

The AM system contains at least one main server software and one Web server, which can be deployed on the same computer.

According to the authorized number and deployment requirement of the collection service and storage service, there can be one main server software, one Web server, multiple extension server software, and multiple clients used to log on to the server in the system. For detailed service deployment instructions, please refer to the *Service Deployment* section.

## Data Exchange

- The alarm management data comes from the DCS system. The DCS system needs to run the OPC server to collect DA (real-time data of the production process) and A&E (alarm and event) data.
- Through the OPC client and the data collection service of the AM system, the AM system can obtain the OPC data of the DCS system. The AM system is able to contain multiple data collection services, and the corresponding relationship between the collection service and the OPC client can be realized through the configuration of the client.
- After the data is collected to the collector, the collector service will analyze the alarm, and send the alarm record to the collector database and store service database respectively according to the tag configuration, and display it on the real-time alarm page.

## 1.3 Authorisation Illustration

The authorisation of the AM software is divided into three categories:

- Hardware service authorisation: Including basic service authorisation (AM-Master), storage service authorisation (AM-Storage) and collector software authorisation (AM-Collector). Without authorisation, you cannot add collectors or storage service.
- Authorized the number of tags: Representing the number of tags that AMt supports to detect tag status, including 1 thousand, 3 thousand, 5 thousand, 10 thousand and 20 thousand, 30 thousand, 50 thousand and unlimited (Unli) and other orders of magnitude of authority.
- Software function authorisation: The authorisations of software operation status monitoring, tag alarm management and information push function, including monitoring of production status (AM-Production Status), management of real-time alarm (AM-Realtime Management).

In the AMt software, select the menu command System Information > Authority", you can view the currently owned authorisation and the authorized content that has been used.

When the software has no authorisation, it will include 1 basic service license, 1 storage service license, 1 collector license and 50 tags for trail. The trial lasts for 120 minutes and when the trial ends, the collector will be out of service.



## Section 2 Interface Introduction

The AM client offers the main operating interface of the AMt system, providing functions such as real-time alarm viewing, historical alarm query, statistical analysis and result display.

### 2.1 Configuration Preparation

- DCOM configuration(Optional)

DCOM configuration is required before you log in to the platform. For detailed instructions, please refer to *DCOM Configuration Manual*.

- Equipment connection

According to the requirements of the System Structure, complete the physical connection among the equipments and ensure that the communication is fault-free.

- Preparation for software authorisation

Please confirm that the dongle has been used correctly, and the authorisation type of the collection service and storage service meets the actual requirements on site. For details, please refer to *Authorisation Illustration*.

### 2.2 Configuration Workflow

The workflow of the AM platform is shown in Figure 2-1.

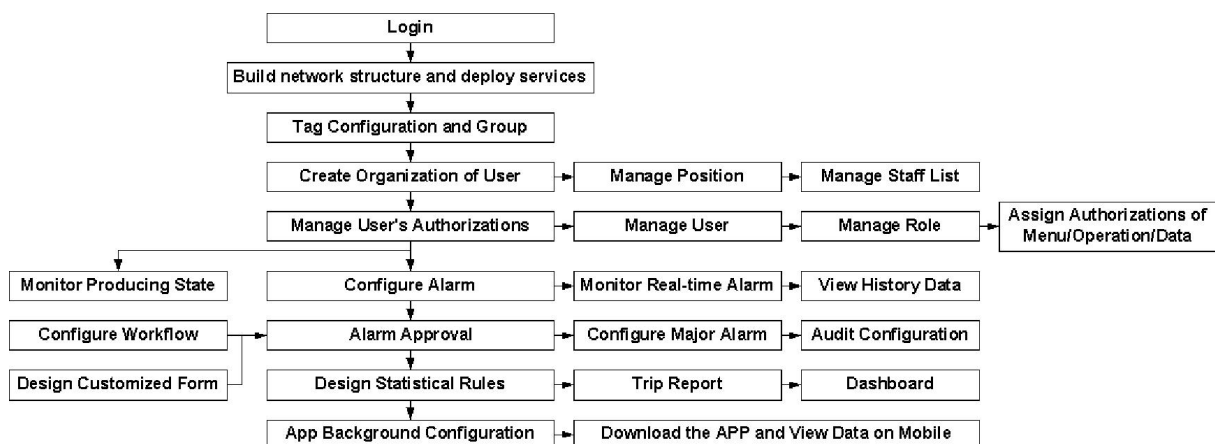


Figure 2-1 Configuration Workflow

## 2.3 Login



### Tip:

Before using the AM system, please make sure that the browser's Daylight Saving Time setting is consistent with the server's Daylight Saving Time setting.

Complete the physical connection between each equipment according to the network structure diagram shown in Figure 1-1, and after installing each software according to the *OMC Software Installation Guide*, start the Web browser on the AM client, enter the Web server address, and the login box of the OMC platform will pop up.

Before logging in, the user cannot perform any operations. Enter the user's name and password in the login box to log in. The default user name is "Admin" and default password is "admin"..



### Tip:

After logging in to the software for the first time, please change the password in time and configure the login account for other users. For the detailed description of user and authorisations, please refer to "Organization" and "AM Authority Management".

After you are successfully logging in the system, the main interface of the OMC platform is shown in the figure below.

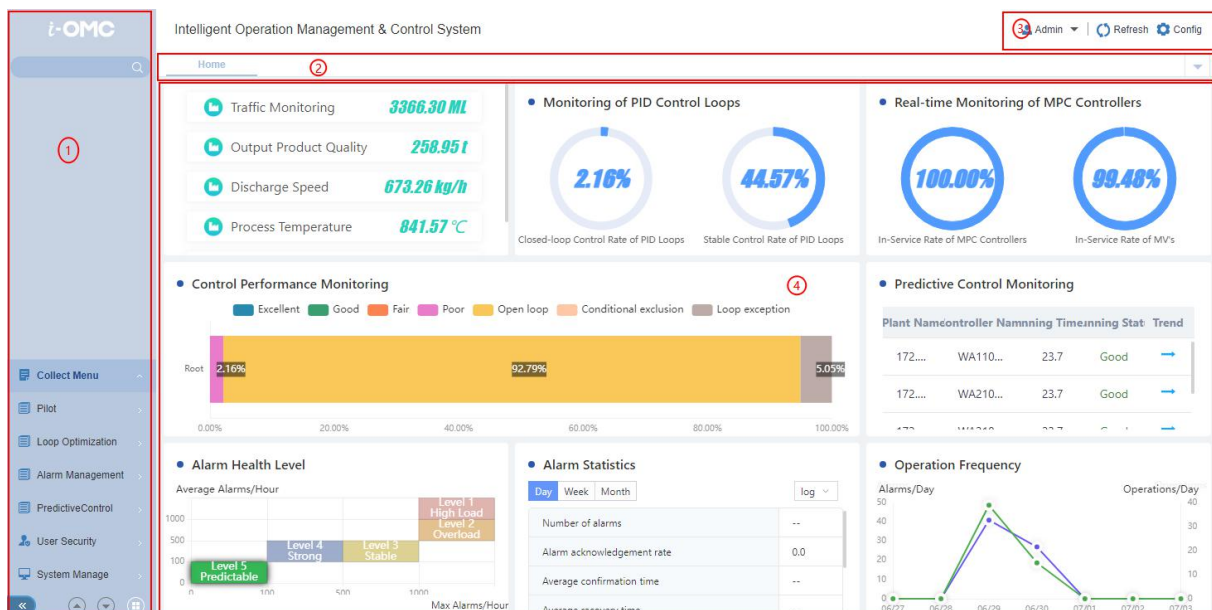


Figure 2-2 The Main Interface of OMC Platform

Table 2-1 shows the functions of each area shown in the figure above.

**Table 2-1 alarm management are description table**

Area or button	Functions
①	Navigation bar, all functions can be accessed by finding the menu item in the navigation bar.
②	This area allows you to switch between the opened function screens.
③	The currently logged in user is displayed and the current user can be logged out. In addition, click on the current user to jump to the Person info, Person setting, HomePage Change and About screen.
④	Detailed screens for displaying functions.

## Section 3 System Configuration

The system configuration includes service deployment and tag management. The shortcut buttons are located at the bottom right of the main interface. This section mainly explains the setting steps of each system configuration.

### 3.1 Service Deployment

In the navigation bar, select the menu command “System Management > Service Deployment”, click the **Service Deployment**, the “Service Deployment” window appears, as shown in the following figure.

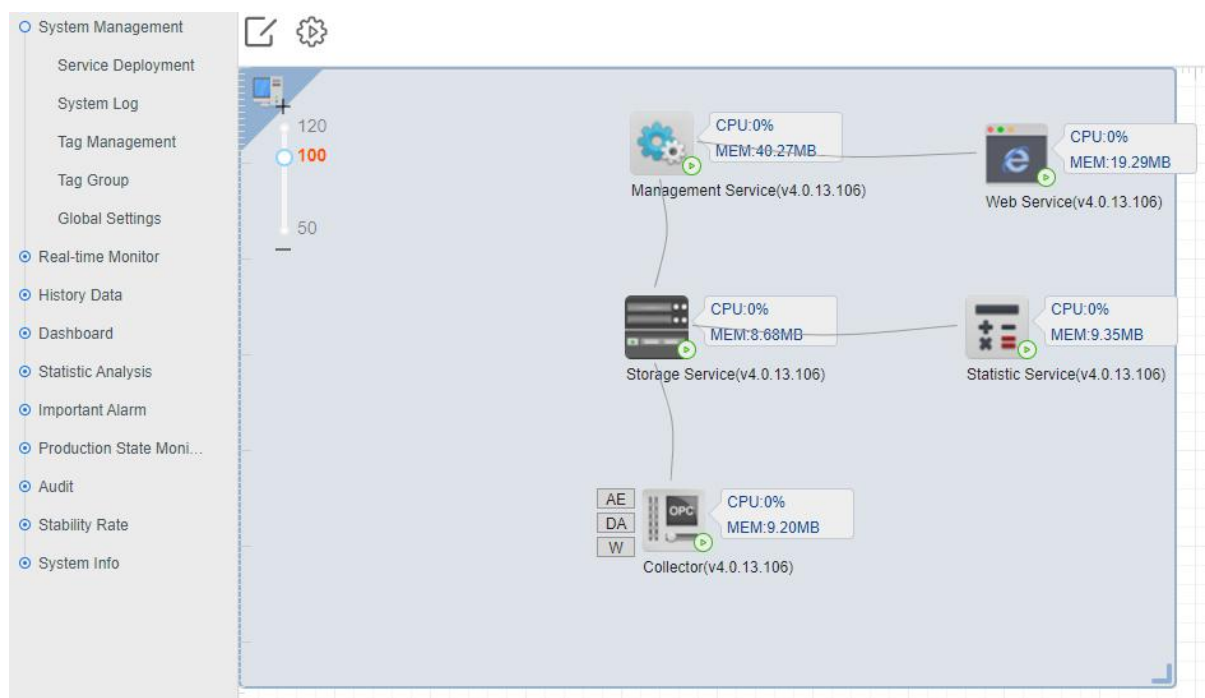


Figure 3-1 Service Deployment Window



**Tip:**

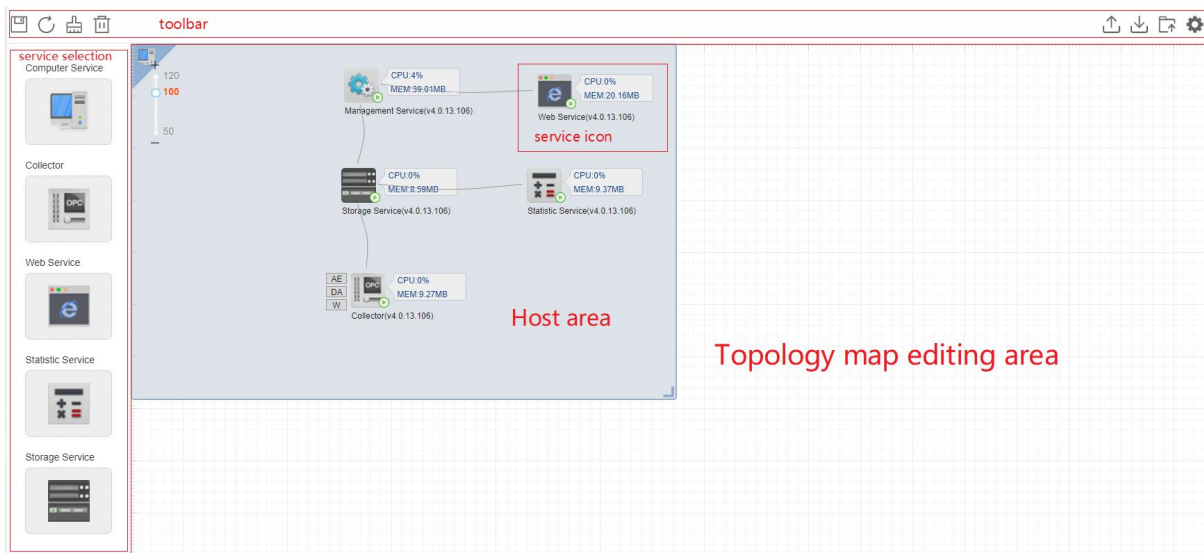
The main frame shows a solid green line indicating that the computer is online, and a gray dashed line indicates offline. If the host is not online, you can check the following:

1. On the expansion server, confirm that the SubNode program has been correctly installed and the AASGuardService service is running normally.
2. Check whether or not the expansion server's port 13911 is restricted by the firewall.


### 3.1.1 Configuration Illustration





In the initial service topology diagram, the system adds the local server's local information and management services by default. Through the following steps, you can configure the service topology map.

Click the “Edit Service Map” button at the top of the page, and the service deployment window becomes editable, as shown in Figure 3-2.





**Figure 3-2 The Editing Interface of Topology Diagram**


The right area is the area for editing the topology. After the main frame is selected, a right-angle mark  will appear at the lower right corner. You can adjust the size of the main frame by dragging it with the mouse. The description of the toolbar and image operation is as follows:

- Save : Save modification of service map.
- Restore : Before saving the service map, you can restore the service map to the last saved state, and the operations performed by this editing will be withdrawn. At the same time, you will exit the edit state.
- Selection: When the mouse is moved to the application icon and the mouse icon changes to , hold down the left mouse button and drag to move the position of the service icon.
- Connection: When the mouse is moved to the application icon and the mouse icon changes to , and the service can be connected in the editing area: Click and drag the left mouse button on a service, and a grey prompt line will appear. Release the mouse on the target service. Therefore, a thin grey line indicating the connection between the two services will be added.


Note: When you are connecting, the system will judge the correctness of the connection, and this operation can only be executed on the services allowable for connection.






- Empty : After clicking, you can delete all services in the editing area, generally used when you need to redeploy all services. Before clearing, all hosts and services should be shut down.
- Delete : Select the service or bounding box you want to remove, or right-click the icon and select **Remove**, then click **OK** in the pop-up secondary confirmation box.

Note: Please turn off the service before removing the service. The main server's bounding box and management service are not allowed to be removed.

1. Hold the left mouse button on the service icon and drag it to the editing area. Thus a bounding box will be created. Services located in the same bounding box are deployed on the same computer by default. For details, see Service Deployment Rules.
2. Repeat the operation "Connect" to connect the various services.
3. After completing the configuration, click the "Save Changes" button.
4. Return to the interface shown in Figure 3-1, click  in the bar above. After the installation is completed, the system will automatically start the service, the green icon appears in the lower right corner of the service icon, and the server operating data appears on the right.
5. After deploying the service, select the service and right-click it, select **Service Settings** in the right-click menu, and set the service parameters in the pop-up dialog box. The parameter descriptions are shown in Table 3-1. Refer to Right-click Menu for the introduction of right-click menu commands of each service.

**Table 3-1 Parameter Illustration for Service Property**

Service Parameters	Parameter Illustration	Configuration Illustration
<b>General property</b>		
Name	Name for service icon	Input in the text box. Before you run the service, you can change the name.
Port	Port number for service	The default setting is adopted generally and can be modified as per the actual situation. In the same bounding box, the ports of each service cannot be repetitive.
IP	IP address for the master server	It is filled automatically as per the IP configuration in the master computer. It is not allowed to be modified.
File name	File name for service	It is a default setting and not allowed to be modified.
DCS type	DCS type	Select it in the drop-down menu.
<b>Collector configuration/DCS information:</b> To configure DCS system parameters viewed as the alarm data source		
<b>A&amp;E</b>		
Connect type	Methods for collecting data	Switch among DCOM connection, OPC UA mode
<b>DCOM</b>		
IP	IP address of OPC server in the DCS system	Input in the text box.
service	A&E server for DCS system	Click the select box and select OPC A&E server in the pop-up dialog box. After the configuration is completed, the label on the left side of the service will turn grey to blue as  .

Service Parameters	Parameter Illustration	Configuration Illustration
OPC UA		
IP Port	IP address and port number where the OPC UA A&E service is located	After switching to OPC UA mode, enter in the text box. When both are successfully configured, the label to the left of the service icon will change from grey to blue as  .
DA		
Connect type	Methods for collecting data	Switch among DCOM connection, OPC UA mode and OMC Platform
DCOM		
IP Service	DA server in DCS system	Input in the text box. Click the select box, and select OPC DA server in the pop-up dialog box. After the configuration is completed, the label on the left side of the service will turn grey to blue as  .
OPC UA		
IP Port Namespace ID	IP address and port number where the OPC UA DA service is located.	After switching to OPC UA mode, enter in the text box. When both are successfully configured, the label to the left of the service icon will change from grey to blue as  .
OMC Platform		
IP	OMC Platform IP	Input in the text box
Service Port	OMC Platform service port(default 17100)	Input in the text box
Config Port	OMC Platform config port(default 17107)	Input in the text box
Username	OMC Platform username(default admin)	Input in the text box
Password	OMC Platform password(default Supcon@1304)	Input in the text box
<b>Collector Configuration/DA writing permission option:</b> For tags used for enabling or disabling AAS writing function, see Tag-writing Configuration.		
Enable DA write-back	Whether to enable DA write-back function	 means enable,  means disable. After enabling, you can make subsequent settings
Automatically disable	When the OPC connection is disconnected for a specified period of time, the DA write-back function is automatically disabled.	Tick it means enable, and you need to set the countdown time to automatically disable the DA write-back function after the OPC connection is disconnected
Tag name	Tag name for digital tags.	Input it in the text box and it is recommended to use digital tags.
Tag extension	Extension pin property of digital tags	Input it in the text box.
Checking value	Values of digital tags on AM side. When the real-time value of the selected bit number pin is the same as the set position, the DA write-back function is enabled, otherwise it is disabled.	Input it in the text box. If the value is a digital tag, set it as 0 or 1.
<b>Storage Service</b>		
Alarm retention Days	The maximum storage time of A & E alarm data in the database.	Input in the textbox. The range is 32-9999 and it's 3 by default. The unit is day. No default values.

Service Parameters	Parameter Illustration	Configuration Illustration
Operation retention Days	The maximum storage time of A & E operation logs in the database.	Input in the textbox. The range is 32-9999 and it's 3 by default. The unit is day. No default values.
Enable/Disable DA Data Retention	Whether to enable the DA data retention function.	Check to enable, uncheck to disable; the "DA data retention days" text box will be greyed out when disabled.
DA Data retention Days	The maximum storage time of DA alarm data in the database includes statistical data such as PID operation, PID set value, PID output value, PID parameters and so on.	Input in the textbox. The range is 32-9999 and it's 3 by default. The unit is day. No default values.
Data backup settings	Set data backup intervals.	Selectable from "None", "Weekly" and "Monthly"
Backup path	Set the storage path for data backup.	Select from the drop down box, default is D drive

**Attentions:**

- After modifying the port number of service, you need to turn off and restart the service by the right-click menu.
- Data storage time should not be too long, please combine the remaining capacity of the disk where the database is located to set.

After completing all the configuration of service deployment, close the "Service Deployment" window.

### 3.1.2 Right-click Menu

**Table 3-2 The Right-click Menu of the Service Deployment**

Menu Item	Menu Item Illustration	Operation Illustration
General Configuration Items		
Execute Installation	Install service	After click it, you can start service installation.
Start service	Start service	After click it, you can start the stopped service.
Close service	Close service	After click it, you can close the running service.
Service Settings	Configure property parameters of service	For parameter illustration, see Table 3-1 .
Remove Service	It is as the same as the "Remove selection" button.	Please close service first before removing it.
Collector Service Configuration Item		



Menu Item	Menu Item Illustration	Operation Illustration
Tag Exclusion	To configure tags of which alarm information doesn't need to be collected by AM system. The alarm data of the selected tags won't be recorded into the AM database.	In "Tag Exclusion" dialog box, click "Export Template" to export the configuration module tag_statistic_exclusion_template.csv. Refer to the already existed tag AI1, you can fill in the tag name, alarm type, start time and the end time of unnecessary tags. After completing the configuration of the tag list, save it as .csv file. In "tag exclusion" dialog box, click "import" button and select .csv file just edited in the pop-up dialog box and click "Open". Click "Save" after tags are imported.
Data Import	It is used to import the history data of DCS system and currently only supports to import the historical data of process alarm of VisualField.	Click "Upload" and select database files you need to upload. After you click "Open", the prompt "uploading succeeded" will pop up. Set the time range you need to import and click "Import" button. The importing file should be smaller than 200 MB.

### 3.1.3 Service Deployment Rules

A service deployed by a AM system generally follows the following rules:

- Management service: Use global configuration for alarm storage and statistical analysis. Generally, there is only one management service in the system, which is deployed on the main server.

Note: When multiple AM systems are deployed in parallel, only one management service is required.

- Collector: Data collection service, the number is determined by the software authorisation, see "Authorisation Illustration".

Under normal circumstances, each collector software can collect up to 1000 alarms per minute. It is recommended to deploy a AM collector service for the OPC server of each control system.

Note: When the total points of multiple collectors do not exceed 10,000 points, they can be deployed on the same computer.

- Storage service: It is used to store the alarm data obtained from the OPC client. When multiple sets of AM systems are deployed in parallel, each system needs to deploy a storage service. Each storage service uses an individual database, and the duration of the data store can be configured in the parameters of the storage service, which is introduced in Table 3-1 . The number of deployable services is determined by the software authorisation, see Authorisation Illustration.

Note: It is recommended that the number of collectors connected to one storage service is not more than 5, or the number of connected alarms is not more than 1 million per day, and the alarm number of the whole month should be less than 5 million.

- Compute service: It is used for statistical analysis of alarm data, and send statistical plan to Web service for storage. When the statistical speed is acceptable, multiple AM systems can share a compute service. If there are multiple compute services in the system, it is recommended to deploy at most one compute service on each computer.
- Web service: In general, only one web service is deployed in the system, which can be deployed on the main server or other computers in need.


**Table 3-3 Typical Cases of Service Deployment**

Application Scenarios	Service Map Configuration	
	Service master server deploys	Service extended server deploys
Minimum System	Management service, storage service, compute service, Web service and collector	Null
Web service needs to be deployed on the computer able to visit the Internet	Management service, storage service, compute service and collector	Take computer visits Internet as the extended service server as well as deploying Web service.
OPC server locates in multiple different network sections (when the collector locates in different network sections, AM clients must include all the network sections.)	Management service, storage service, compute service and Web service	One collector is deployed on each extended server.
The capacity of master server is limited (10 million items of alarm occupies about 4G storage room)	Management service, compute service and Web service	One storage service and one collector are deployed on each extended server.
The calculation capacity of the master computer is limited. (it is determined by the computer configuration and the actual statistical speed)	Management service and Web service	One storage service, one compute service and one collector are deployed on each extended server.

### 3.1.4 Import/Export

Through the Import / Export button in the upper right corner of the interface, you can export the completed topology map (without data) to a .json file for backup, which is used for the initial deployment of other servers.

### 3.1.5 Monitoring Settings

As shown in Figure 3-2, click the button in the upper right corner  and the “Monitor Settings” dialog box will pop up, as shown in Figure 3-3. Set the CPU warning threshold and the memory warning threshold in the dialog box, and click “OK” to complete the configuration.

Capability Limit ✕

\* CPU warning threshold (%) :

\* Memory threshold (MB) :

Cancel

Figure 3-3 “Monitor Settings” dialog box

Normally, the system operational data on the right side of the service icon is displayed in blue; when the actually detected value exceeds the set value, the data is displayed in red.

### 3.1.6 DCS Adaption

By setting up DCS adaptations, you can more quickly adapt the acquisition service to the DCS you are using, making it easy for AM to interface with a variety of different manufacturers' DCS. In the navigation bar select **Alarm management > System management > Global Settings > DCS Adapter** to open “DCS Adaption” interface as shown in the figure below. The system default scheme is the VisualField adaptation.

MES Setting  
Unknown Tag  
DCS Adapter  
Sequence of Events  
Stable

+ New Edit

Delete

Default


Switch

PID


Description	Type	Tag Condition	Option Type	Default Value	Sup Attribute	Operation
高限	Alarm	H	Value	0	HSUP	Edit Delete
高高限	Alarm	HH	Value	0	HHSUP	Edit Delete
高三限	Alarm	HHH	Value	0	HHHSUP	Edit Delete
低限	Alarm	L	Value	0	LSUP	Edit Delete
低低限	Alarm	LL	Value	0	LLSUP	Edit Delete
低三限	Alarm	LLL	Value	0	LLLSUP	Edit Delete
高限抑制	Suppress	HSUP	Binomial	0 1		Edit Delete
高高限抑制	Suppress	HHSUP	Binomial	0 1		Edit Delete
高三限抑制	Suppress	HHHSUP	Binomial	0 1		Edit Delete
低限抑制	Suppress	LSUP	Binomial	0 1		Edit Delete
低低限抑制	Suppress	LLSUP	Binomial	0 1		Edit Delete
低三限抑制	Suppress	LLLSUP	Binomial	0 1		Edit Delete
高优先级	Priority	HPRI	Multiple	0 1 2 3 4 5		Edit Delete
高高优先级	Priority	HHPRI	Multiple	0 1 2 3 4 5		Edit Delete
高三优先级	Priority	HHHPRI	Multiple	0 1 2 3 4 5		Edit Delete
低优先级	Priority	LPRI	Multiple	0 1 2 3 4 5		Edit Delete
低低优先级	Priority	LLPRI	Multiple	0 1 2 3 4 5		Edit Delete
低三优先级	Priority	LLLPRI	Multiple	0 1 2 3 4 5		Edit Delete
屏蔽	AOI	AOI	Binomial	0 1		Edit Delete

Figure 3-4 DCS Adapter


### Add DCS Adaption

1. Click  , the "Add Scheme" dialog box will appear.
2. Enter the name of the scheme, which cannot be empty and must exceed 16 characters.
3. If you need to copy an existing scheme by reference, select the scheme to be referenced from the drop-down menu of the reference copy.
4. Click **Submit** to save the scheme.

### Edit DCS Adaption

1. Select a scheme, click  and open the "Edit Scheme" dialog box.
2. Modify the name of the scheme.
3. Click **OK** to save the scheme.

### Delete DCS Adaption

1. Select a scheme, click .
2. Click **OK** in the secondary confirmation dialog box that pops up to delete the scheme.




---

#### Attentions:

The default scheme cannot be deleted.


---

### Add Tag Extend

1. Select a tag extend type (the following is an example of the default type of tag extend) and click  , the "Add Tag Extend" dialog box shown below will pop up.

**Figure 3-5 Add Tag Extend**

2. Fill in the text boxes in turn with the description, type, tag attribute, default option and suppression attribute, each of which is described in the table below.

Item	Method	Illustration
Description	Type in the text box	The name and description of this tag extend.
Type	Select from the drop-down menu	Select the type of this tag extend. Four options are available: alarm, suppression, priority, and AOF.
Tag Attribute	Type in the text box	Parameter name for this tag in the DCS.
Default Option	Add text box for input Click the  after to remove it	This tag extend the default display mode in the multi-state alarm configuration.
Suppression Attribute	Select from the drop-down menu	The corresponding suppression attribute for this tag extend.



**Tip :**

- When the selected type is alarm, the default option can only be filled with one item value.
- Only tag extend of type Alarm can select the corresponding suppression attribute.

3. Click **Submit**, the new tag extend will be displayed in the list.

### Edit Tag Extend

1. Click **Edit** to the right of a tag extend, the “Edit Tag Extend” dialog box will pop up.
2. You can modify description, default option and suppression attribute here.

3. Click **Submit**, the updated tag extend will be displayed in the list.

### Delete Tag Extend

Click **Delete** to the right of a tag extend and delete it.

### Save Tag Extend Scheme

Click **Save**, the modified configuration will be saved to the DCS adaption scheme.



---

**Attention :**

When you add, modify or delete a tag extend you must click Save.

---

### Enable Tag Extend Scheme

1. In the edit mode of the “service deployment”, open the “service settings” dialog for the collector whose DCS type needs to be changed.
2. Select your new DCS adaption from the DCS type drop-down menu in the "DCS information" section.
3. Click **OK** in the secondary confirmation dialog to complete the DCS type switch.



---

**Attention :**

After switching between DCS types, all configurations for alarms shelving and multi-state alarms will be cleared, so please complete a backup of your configurations before switching.

---

## 3.2 Tag Management

After AM obtains the alarm data from the DCS system, it will push the corresponding alarm information to the storage service according to the tag list set in the AM “Tag Number Management” window to complete the subsequent real-time alarm Display and alarm information statistics work.

In the navigation bar, select the menu command “System Management > Tag Management”, the “Tag Management” window appears, as shown in the following figure. On the left, a tree list of the equipment organization structure is displayed, and on the right, the tags that have been added under the selected node are displayed.

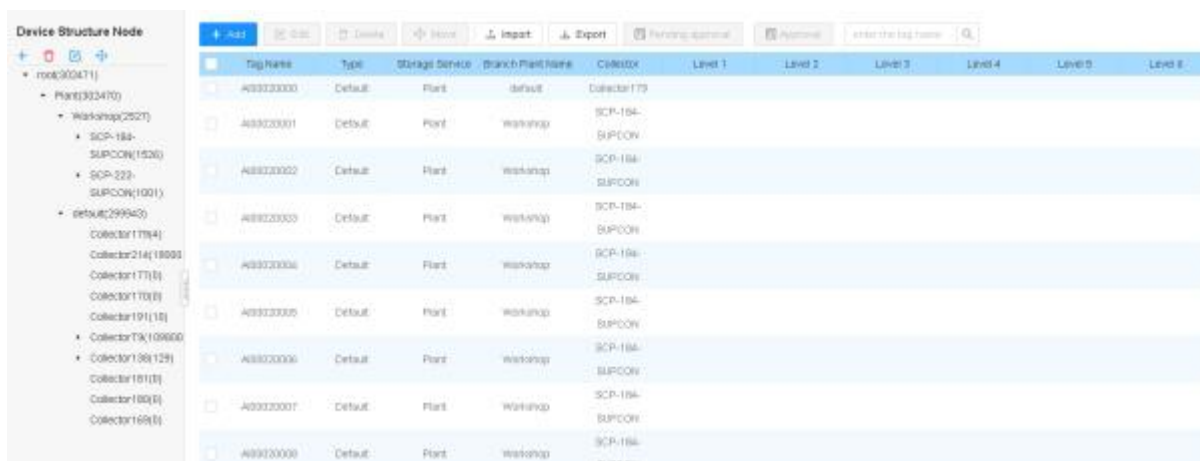



Figure 3-6 “Tag management” window


### 3.2.1 Organization Structure

Through the organization structure, you can configure the equipment organization information corresponding to the DCS system and provide a reference for the tag associated alarm equipment. As shown in Figure 3-6, there are four layers of nodes in the equipment organization tree on the left of the window by default. The “collector” node generally corresponds to the DCS system. Up to six layers of customized nodes can be added under it. It is recommended to create layers as per the following sequence: The factory information (Plant), plant information (Site), equipment area information (Area), equipment unit information (Unit), and specific equipment information (Equipment).

#### Add an organization node

1. Select any node except for root and default in the equipment organization structure tree, click the “Add” button  above, and the “Add Node” dialog box will pop up.
2. Enter the node name in the dialog box and click “OK”.

#### Delete an organization node


1. Click the “Delete” button  above and the “Delete” dialog box will pop up.
2. Select the customized node to be deleted and click “OK”.
3. In the secondary confirmation box, click “OK” to delete the node.




#### Attentions:

- When you are deleting a node, the alarm history data of the node and its tag, child node and its tag, and tag will be deleted along side with the node. Please be cautious.
- The default node is not allowed to be deleted.

## Edit organization nodes

Select the customized node to be edited, click the “Edit” button  above, modify the node name in the pop-up dialog box, and click “OK” to save the modification.

## Mobile organization nodes

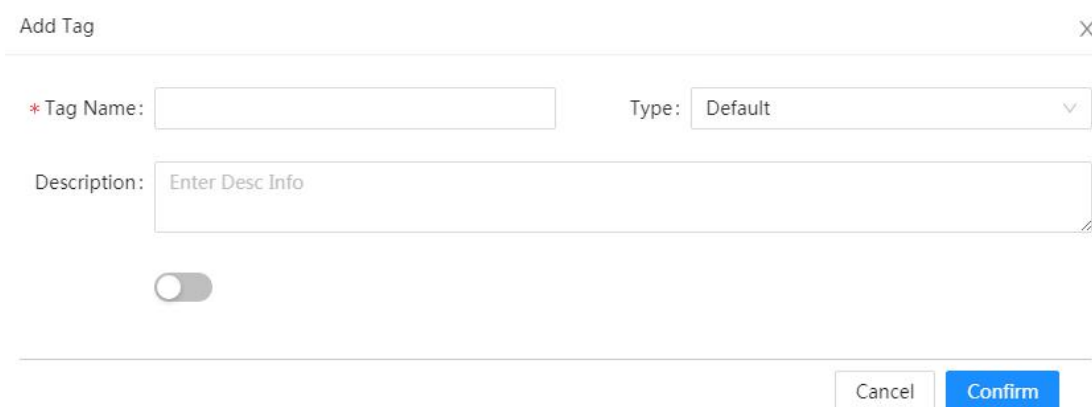
Select the customized node to be moved, click the “Move” button  above, select the template node in the pop-up dialog box, and click “OK” to move the selected node to the target node.

### 3.2.2 Tag Configuration

AM system takes single node as unit and analyze statistics related to the alarm information of tags. As such, it is required to configure tag list under the node after the organization structure is completely configured.

#### Add tag

1. In the organization structure tree, select the node that needs tags to be added from the “collector” node or from the customized nodes under it. After selecting a node, the right side will display the existed tags of the node. If the collector used “tag enum” in “System Management > Global Settings”, prompt of tag names from DCS will show.
2. Click the “Add” button above the tag list and the “Add Tag” dialog box will pop up as shown below.



**Figure 3-7 “Add tag” dialog box**

3. Enter the tag name and description information and select the tag type. The name of the tag in AM should be consistent with the name of the tag in the DCS system. The maximum length is 30 characters. Chinese accounts for two characters.
4. Check whether a rational analysis is required. For details, see Tag Rationalized Analysis.
5. Click “OK” to save.

#### Import Tag

If you want to add multiple tags at a time, you can use the “import tag” function, the steps are as



follows:

1. On the page shown in Figure 3-6, click the “Import” button above the list of right-side tags and the “Import Tag” configuration page will pop up as shown in Figure 3-8.

Import Tag   Import Rules   Error List

Your have a tag table

Import Tag

☒ Add Mode  
1. Add tags that do not exist in AAS 2. Update the information of the existing tags in AAS

☐ Cover Mode  
1. Add tags that do not exist in AAS 2. Update the information of the existing tags in AAS 3. Delete tags that do not exist in the tag table in AAS

Your have no tag table

Download template

If you don not have a tag table, click the "Download Template" button above to download the template file, and fill in the tags as shown in the figure below

Tag Name	Storage Service	Branch Plant Name	Collector	Level 1
AI1	storage1	default	dcs1	CRC

Cancel   Confirm

**Figure 3-8 “Import tag” dialog box**

2. Click the “Download template” button and select the save path in the pop-up dialog box, and click the “Save” button.
3. Open the template document by Excel and fill in tags and the information of organization that they belong to, and save the document after it is completed. When complete the tag list in the template, please follow the rules below:
  - The tag name should be as the same as the tag name in the DCS system.
  - In the organization information of the tag number, the names of each layer should be consistent with the names of the nodes on the left in Figure 3-6. If the tag needs to be imported to a new layer, please first create the node in the organization tree.
4. In the interface shown in Figure 3-8, select the import method according to the prompt information.
5. Click “Import Tag”, select the document to be imported in the pop-up dialog box, and then click the “Open” button.
6. The import progress is displayed in the import progress bar. After the progress bar reaches 100%, a prompt box of “Import Succeeded” pops up and click “OK”.
7. If the imported files have tags with a duplicated name, the system will prompt a message

and click “OK”. The tags with the duplicated name in the document will not be imported, and other tags will be added to the list.

### **Delete tags**

In the tag list, tick check box(s) in front of the tag name to select one or more tags, click the “Delete” button, and click the “OK” button in the secondary confirmation box that pops up.

### **Move tags**

In the tag list, tick check box(s) in front of the tag name to select one or more tags, click the “Move” button, select the target node in the pop-up dialog box, and click the “OK” button.

### **Enable unknown tags**

The AM system has acquired the data, but the tag that the user did not add to the tag management list is called “unknown tag”. If user wants to view the data and alarm of unknown tags, they can select the menu command “System > Global Setting > MES Setting” to enable the unknown tags.

After selecting to enable, a new node “Unknown” will appear under the collector, which is used to display the unknown tag under the collector node, when the unknown tag has an alarm.

The user can manually move the tag to the appropriate node. For steps, see “Move tags”. The tags that are moved out of the Unknown node will be added to the tag management.

After turning off the “Enable unknown tag” setting, the unknown node and the existed unknown tags under it will be retained, but the system will no longer receive new unknown tags data. Users can manually delete the extra nodes or tags.

### **3.2.3 Tag Rationalized Analysis**

The rationalized analysis of tags means to help users determine a proper alarm priority by the specific template illustration or configuration guide the system provides.

### **Application Scenarios**

When the on-site scenarios meet the following two situations, it is recommended for users to conduct a rationalized analysis on tags:

- Before enforcing new equipment into implementation, rationalized analysis on the alarm configuration is necessary to ensure that alarms enter a stable and reasonable state as soon as it starts to run.
- If the number of alarms of old equipment is too large or the alarm priority is not rational leading to a badly requirement for optimization, it is recommended to run a rationalized analysis.

### **Rules of importing**

In the tag management page shown in Figure 3-6 click “Import” button and select “Import Rules” in the “Import” dialog box that pops up. As shown in the following figure, you can set maximum response time, personal safety, environmental safety and economical safety in the drop-down menu of “Modify Rationalized Content Analysis”.

Import Tag   **Import Rules**   Error List

Import Rules   Export Rules

Max Response Op Time:

+   -

0~5min  
5~15min  
15~30min

Sort from short to long from top to bottom

Consequence Severity:

+   -

L  
H

Sort from short to long from top to bottom

Priority:

+   -

Low  
High

Sort from short to long from top to bottom

Consequence Severity	L	H
Max Response Op Time		
0~5min	Low	Low
5~15min	Low	High
15~30min	Low	Low

Click the cell to select the priority

Cancel   Confirm

**Figure 3-9 Settings of importing rules**

- Maximum allowable response time: After the alarm is issued, the maximum time reserved for operators to deal with the abnormal state.
- Severity of consequences: It defines the severity of effects, such as minor, normal, and severe.
- Alarm priority: It determines the priority based on the consequences and the maximum response time as well as operators' action order.

Click the “Export Rule” button on the interface, the rules configured on the page can be exported as Excel files for backup.

### Rationalized analysis

In the “Add Tag” dialog box shown in Figure 3-7, check “Rationalized Analysis”, and the interface is shown below.

Figure 3-7, check “Rationalized Analysis”, and the

Add Tag

\* Tag Name:  Type:

Description:

1 ☒

Alarm Condition

H X 2 + Add

3 + Add Edit Delete

Enable	State Name	Alarm Value	Cause	Response Action	Cause Related Tag	Consequence
<input checked="" type="checkbox"/>	Overload	780	F-1101 gas pressure is large	Turn down gas valve		F-1101 is dem.

Cancel Confirm

**Figure 3-10 New Tag dialog box (enable rationalization analysis)**

- 1) Click the “Add” button under “Alarm Condition” to add an alarm condition.
- 2) Select an alarm type and click the “Add” button, the rationalized analysis configuration interface will pop up, as shown below. According to the ISA 18.2 or EEMUA 191 standard, fill in the parameters of the alarm priority and click “Confirm”.

Add D&R Content
X

State Name:	Overload	Alarm Value:	780
ACK:		Cause:	F-1101 gas pressure is large
Response Action:	Turn down gas valve	Cause Related Tag:	
Consequence:	F-1101 is damaged	Consequence, Related Tag:	
Consequence, Severity:	Large effect	Maximum Response, Time:	0~1min
Health Severity:	None effect	Health Impact:	None
ENV Severity:	Small effect	ENV Impact:	Small
Economic Severity:	Large effect	Economic Impact:	Large
Remarks:			

Cancel
Confirm

**Figure 3-11 New rationalization content analysis**

- 3) Returns the interface as shown in Figure 3-10, the addition of the tag is completed. AM will generate the corresponding alarm priority according to the alarm value, which provides a reference for the user to configure the alarm attributes in the DCS system.



**Tip:**

**After rationalized analysis is configured, when importing or exporting tags, rationalized analysis parameters will be imported or exported together.**

## Application cases

For example, in the production process of a coal chemical enterprise, the tag for the air temperature at the inlet entrance of C-1102 regenerator charcoal tank is 300TI\_1139, and it needs to be monitored as high temperature alarm may occur. Through rationalized analysis, combined with the operating experience of the technical personnel, it is acknowledged that the cause for triggering the alarm is the high pressure of the F1101 fuel and the fuel gas volume is too large. Under normal circumstances, the operator must adjust the fuel pressure within 5 minutes and close the fuel gas valve. If it is not handled in time, it will cause damage to F-1101 equipment and the nearby distributed pipes, resulting to the effectiveness decrease, and cause economic losses.

Make the following settings in the AM system, and the results are shown in Figure 3-11. Through the proof of the maximum response time and the severity of the consequences, the

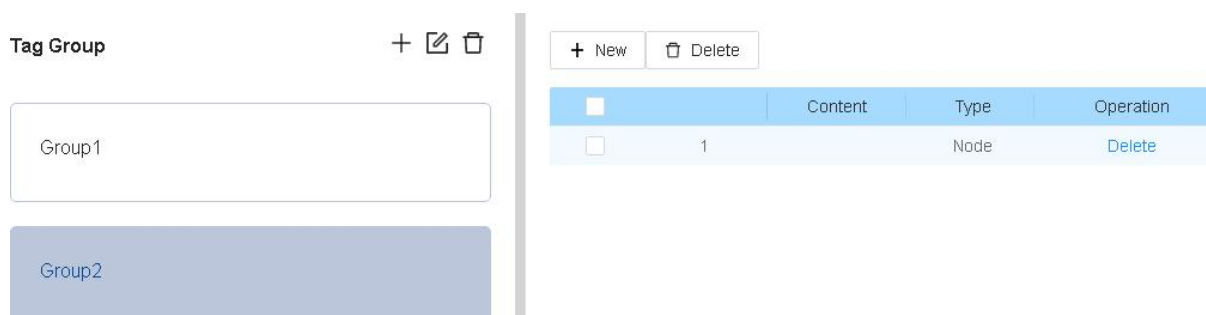
system set the priority of the alarm as high (P4).

Tag	Alarm Type	Tag Description	Alarm Value	Cause	Response	Consequence	Max Response Time	Personnel Severity	Environmental Severity	Economical Severity	Consequence Severity	Priority	Remark	Confirm
300TI_1139	H	air temperature at the inlet entrance of C-1102 regenerator charcoal tank	780	high pressure of the F1101 fuel and the fuel gas volume is too large	adjust the fuel pressure	it will cause damage to F-1101 equipment and the nearby distributed pipes	5 minutes	free effect	small effect	large effect	large effect	P4		

**Figure 3-12 Parameter settings**

### 3.2.4 Tag Group

In the navigation bar, select the menu command “System Management > Tag Group” in the navigation bar , and the “Tag Group” window will appear, as shown in the figure below. When performing statistical analysis, you can choose to group the alarm information under the corresponding group according to the tag group. Among them, the alarm equipment, the alarm overview, and the alarm summary table do not support the statistics for tag group.



**Figure 3-13 Tag group**

In the list on the left, click the “+” button above, enter the “Group Name” in the pop-up dialog box, and set the associated post and remarks. Then select a group, click the “Add” button on the right, and select the device to be associated from the “Device Organization Structure” list on the right.

## 3.3 Global Settings

### 3.3.1 MES Setting

After AM binded to MES, can read schedule data from MES and save to MES Settings. Click ‘System Management > Global Settings > MES Settings’. Open ‘MES Settings’ tab, display like bottom figure.

MES Setting

Tag Management

DCS Adapter

Storage Settings

Alarm Reason

History Alarm Config

Mail Setting

MES Info Setting ☐ Enable

\* Address:

\* Port:

Username:

Password:

**Figure 3-14 MES settings**

### 3.3.2 Tag Management

The following figure shows the tag management interface.

MES Setting

Tag Management

DCS Adapter

Storage Settings

Alarm Reason

History Alarm Config

Mail Setting

Enable Unknown ☐

Import Tag

Enable Tag Upload Cover Mode ☒

Tag Enum

Collector	Operation
Collector	<a href="#">View</a> <a href="#">Tag Enum</a>
Collector1	<a href="#">View</a> <a href="#">Tag Enum</a>

**Figure 3-15 Tag Management**

The global settings for tag management consist of three settings:

- Check "Unknown Tag" to enable the "Unknown Tag" function. When no tag alarm is added to the tag table collected by the collector, an Unknown node is created under the corresponding collector and the corresponding tag is added to the node.
- After selecting "Tag Import (Overlay Mode)", the option of "Override Mode" will be added when importing in Tag Management.
- Tag enumeration, which can use the collector's "tag enumeration" function. The "tag enumeration" function is only available to collectors that use the digital base connection method, and after the tag enumeration is completed, when adding tags to the tag management, you can search for the relevant tags in the collector.

### 3.3.3 DCS adapter

By setting up DCS adaptation, you can adapt the collection service to the DCS you use more quickly, and facilitate AM to connect with DCS from various manufacturers. In the navigation bar, choose the menu command 'System Management > Global Settings > DCS Adapter' to open the DCS adaptation interface, as shown in the following figure. The system comes with ECS700, JX300XP and DeltaV three default DCS solutions.

Description	Type	Tag Condition	Tag Mapping	Option Type	Default Value	Sup Attribute	Enable Value	Operation
HH	Alarm	HH	HH	Value	0	HHSUP	10	Edit Delete
HHH	Alarm	HHH	HHH	Value	0	HHHSUP	12	Edit Delete
L	Alarm	L	L	Value	0	LSUP	9	Edit Delete
LL	Alarm	LL	LL	Value	0	LLSUP	11	Edit Delete
LLL	Alarm	LLL	LLL	Value	0	LLLSUP	13	Edit Delete
HSUP	Suppress	HSUP	HSUP	Binomial	0 1			Edit Delete
HHSUP	Suppress	HHSUP	HHSUP	Binomial	0 1			Edit Delete
HHHSUP	Suppress	HHHSUP	HHHSUP	Binomial	0 1			Edit Delete
LSUP	Suppress	LSUP	LSUP	Binomial	0 1			Edit Delete
LLSUP	Suppress	LLSUP	LLSUP	Binomial	0 1			Edit Delete
LLLSUP	Suppress	LLLSUP	LLLSUP	Binomial	0 1			Edit Delete
HPRI	Priority	HPRI	HPRI	Multiple	0 1 2 3 4 5			Edit Delete
HHPRI	Priority	HHPRI	HHPRI	Multiple	0 1 2 3 4 5			Edit Delete
HHHPRI	Priority	HHHPRI	HHHPRI	Multiple	0 1 2 3 4 5			Edit Delete
LPRI	Priority	LPRI	LPRI	Multiple	0 1 2 3 4 5			Edit Delete
LLPRI	Priority	LLPRI	LLPRI	Multiple	0 1 2 3 4 5			Edit Delete
LLLPRI	Priority	LLLPRI	LLLPRI	Multiple	0 1 2 3 4 5			Edit Delete
AOF	AOF	AOF	AOF	Binomial	0 1			Edit Delete

Figure 3-16 DCS Adapter

### 3.3.4 Storage Settings

In the navigation bar, choose the menu command 'System Management > Global Settings > DCS Adapter' to open 'Storage Settings' tab, as shown in the following figure.

Sequence of Events | Stable | Push Log

Data Reserve

\* Data Reserve Days: 1

Data Backup

Enable Backup: ☐

Max Backup Count: 1

Backup Recycle Range: ☒ Every Day ☐ Every Week ☐ Every month

Backup Path: D:\909 68GB

Save

Figure 3-17 Storage Settings

### Sequence of events

The storage settings interface for the event sequence is shown in Figure 3-17




- Data retention: Enter a number in the Number of days to retain data text box to set how long the data is retained for the event series. Event series data that is past the retention days is automatically eradicated. Data retention days range from 1-60.
- Data backup: Set data backup rules for event sequences.

Check "Enable" to enable the event series data backup function.

Enter a number in the Maximum number of backups text box to set the maximum number of backups for data backups. The maximum number of backups ranges from 1-10.

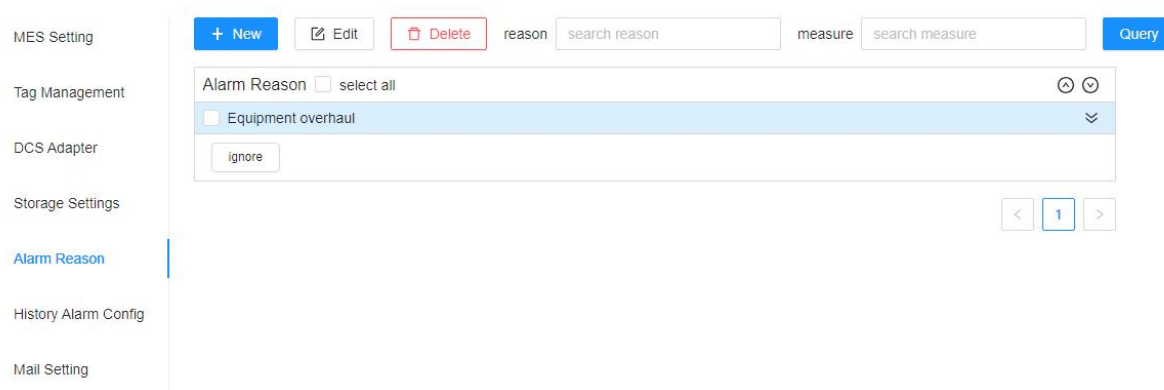
Select a backup period. You can select Daily, Weekly, or Monthly

AM will automatically detect the hard disk partition of the Management Service computer and generate a backup path in the Backup Path drop-down menu. You can select a path in the drop-down menu as the backup path for the event sequence.

When you are finished setting up, click  to save.

### 3.3.5 Alarm Reason

By presetting the alarm reason and corresponding measures in the "Alarm Reason" setting interface, you can quickly select the alarm reason and disposal action of the historical alarm in the historical alarm function. In the navigation bar, select System Management > Global Settings > Alarm Reason to open the Alarm Reason setting interface, as shown in the following figure.



**Figure 3-18 Alarm Reason**

### 3.3.6 History Alarm Config

The historical alarm configuration is used to insert time or employee information columns after historical alarms. Select 'System Management > Global Settings > History Alarm Config' in the navigation bar to open the 'History Alarm Config' setting interface.

MES Setting

Column Settings

Data Source Settings

Tag Management

Name	Data Source	Data Source	Operation
Reserve	<div></div>		<a>Edit</a>
Reserve	<div></div>		<a>Edit</a>
Reserve	<div></div>		<a>Edit</a>
Reserve	<div></div>		<a>Edit</a>
Reserve	<div></div>		<a>Edit</a>

DCS Adapter

Storage Settings

Alarm Reason

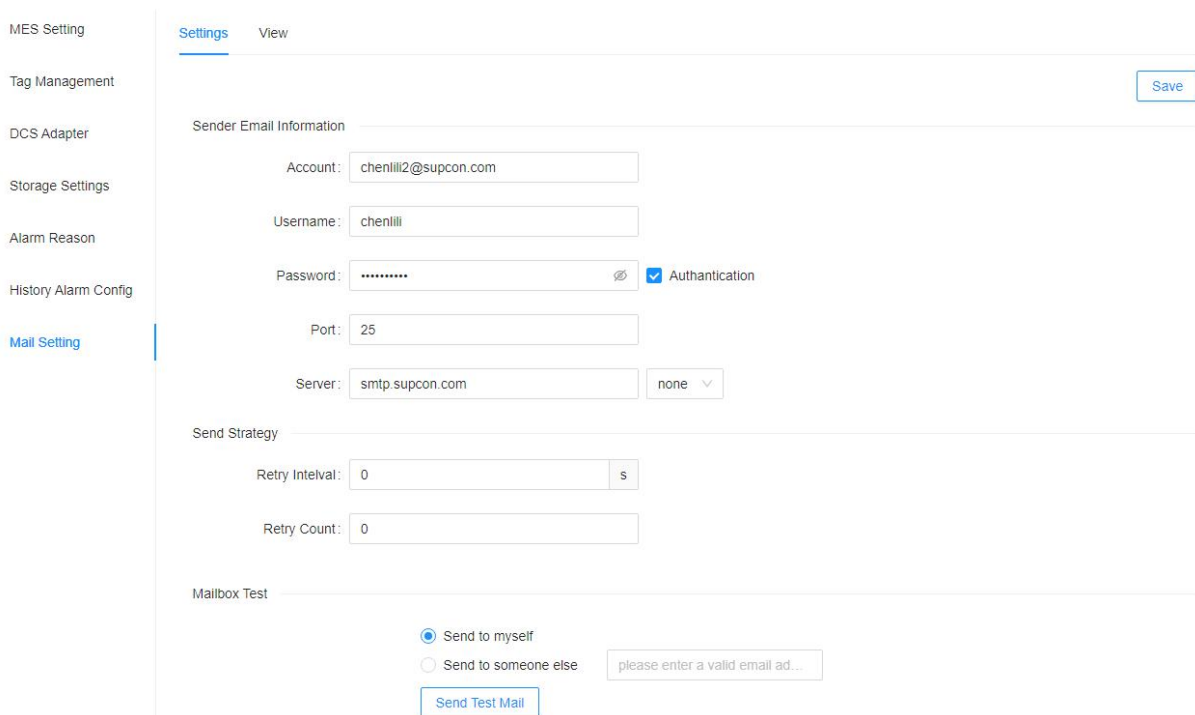
History Alarm Config

Mail Setting

**Figure 3-19 History Alarm Config**

### 3.3.7 Mail Settings

Mailbox settings are used to set sender information, and the function module that uses the Send to Mail function uses the information in mailbox settings to send messages to configured recipients. The following figure shows the mailbox settings page.



MES Setting

Tag Management

DCS Adapter

Storage Settings

Alarm Reason

History Alarm Config

Mail Setting

Settings View

Save

Sender Email Information

Account: chenlilil2@supcon.com

Username: chenlilil

Password: \*\*\*\*\* ☒ Authentication

Port: 25

Server: smtp.supcon.com none

Send Strategy

Retry Interval: 0 s

Retry Count: 0

Mailbox Test

☒ Send to myself

☐ Send to someone else please enter a valid email ad...

Send Test Mail

**Figure 3-20 Mail Settings**

### View email sending history

Click in the interface shown in Figure 3-20 , Open the Email Sending History page, as shown in the following figure.

MES Setting
Tag Management
DCS Adapter
Storage Settings
Alarm Reason
History Alarm Config
Mail Setting

Settings View

Time 2023-07-03 00:00:00 → 2023-07-04 19:00:31 Status ▼ Query Resend All

<input type="checkbox"/>	Mail Subject	Sender	Receiver	Status	Task Create Time	Attachment	Detail
<input type="checkbox"/>	Statistic Analysis Finished:qqq	chenlii2@supcon.com	Test@123<iomc@supcon.com>	Failed Resend	2023-07-04 10:17:19	Alarm Duration_Collector1_20...	<a href="#">View Detail</a>
<input type="checkbox"/>	Important System Alarms	chenlii2@supcon.com	kong<->	Failed Resend	2023-07-04 05:39:51		<a href="#">View Detail</a>
<input type="checkbox"/>	Important System Alarms	chenlii2@supcon.com	kong<->	Failed Resend	2023-07-04 05:39:47		<a href="#">View Detail</a>
<input type="checkbox"/>	Important System Alarms	chenlii2@supcon.com	kong<->	Failed Resend	2023-07-04 05:36:54		<a href="#">View Detail</a>
<input type="checkbox"/>	Important System Alarms	chenlii2@supcon.com	kong<->	Failed Resend	2023-07-04 05:36:51		<a href="#">View Detail</a>
<input type="checkbox"/>	Statistic Analysis Finished:qqq	chenlii2@supcon.com	Test@123<iomc@supcon.com>	Failed Resend	2023-07-03 10:17:18	Alarm Duration_Collector1_20...	<a href="#">View Detail</a>

<
1
>
10 / page

Figure 3-21 Mail Settings View

- Query sending history: Select the time period or sending status. Click Query to display the e-mail sending records that meet the query criteria.
- One-click retransmission: Select one or more sending records. Click Resend All and AM will automatically resend the selected message.
- Resend one by one: Click Resend in the Status column of a record, and the record will change to the "To Send" state and resend it.
- View Details: Click View Detail in a Record Details column to open the dialog box shown in the following figure. You can view the delivery time, status, and description of the email sending record here.

## Section 4 Real-time Alarm Monitoring

After completing the tag configuration, the AM system supports viewing the tag alarm information of the DCS system through the AM client.

In the navigation bar, select the menu command “Real-time Monitor > Real-time Alarm”, the “Real-time alarm” page appears, as shown in the following figure, showing the current real-time alarm information collected.





Status	Tag Name	Description	Priority	Type	Active Time	ACK Time	Recovery Time
●	1919_CT_810			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	1919_DP_810			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	1919_NM_810		Low	HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	1919_UM_810			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	AI12340009			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	114_CT_514			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	114_DP_514			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	114_NM_514			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	AI12340008			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43
●	AI12340010			HHH	2021-12-24 14:21:29		2021-12-24 14:22:43

Figure 4-1 “Real-time monitoring” interface

### 4.1 Real-time Alarm

As shown in Figure 4-1, the left side of the “real-time monitoring” screen displays the alarm organization tree. The number next to the node name indicates the number of alarms under the node and its sub-nodes.

Select a node in the structure tree on the left, and the real-time alarm information list under the node will be displayed on the right interface. The current status index is on the far left of the list.

- If the index light is displayed as , indicating that the alarm has been generated, has not been acknowledged or eliminated;
- If the index light is displayed as , indicating that the alarm has been acknowledged but not eliminated, and the generation and acknowledgment records of the same alarm are displayed side by side in the list;
- If the index light is displayed as , indicating that the alarm has been eliminated but not acknowledged, and the records of alarm generation and elimination are displayed side by side in the list.
- If the index light is displayed as , indicating that the alarm has been acknowledged and eliminated.

### 4.1.1 Priority Filtering

Find the priority in the middle of the status bar. Click to open the drop down menu which will show all the priorities in the priority mode you are currently using. Select one or more priorities and the system will automatically display the filtered results in the alarm list. You can also filter by entering a priority at the bottom.

### 4.1.2 Alarm Sound

Whenever you open the “Real-time Alarm”, you will be asked at the top of the alarm list if you want to allow sound to be played, where you can turn the alarm sound on or off, or enable or disable it in Alarm Settings. You can turn the alarm sound on or off here, or enable or disable it in the "Alarm Settings".

For alarm sound settings please refer to *Alarm Level*.

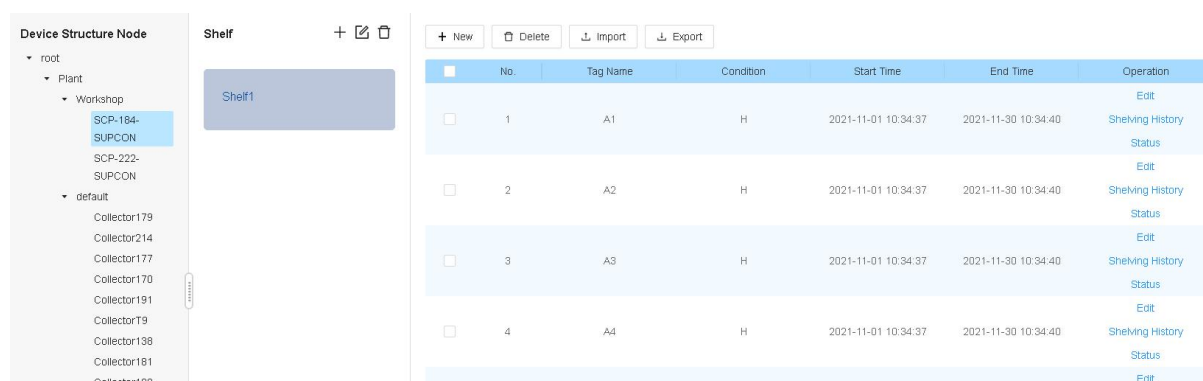
### 4.1.3 Page Refresh Interval

In the "Alarm Settings" dialog box, you can set the page refresh interval in the range of 10-30 seconds.

## 4.2 Alarm Shelving

Through alarm shelving, the operator can set an automatic shelving strategy to temporarily shelve real-time alarms that cause disturbance. After the shelving time ends, the shelved alarm will be automatically restored to the alerting condition.

In the navigation bar, select the menu command “Real-time Monitor > Shelf Alarm”, the interface is shown in the following figure. The left side shows the equipment organization structure, and the middle part is the alarm shelving shelf set under the selected node. The automatic shelving strategy has been set in the selected shelf.



**Figure 4-2 The setting interface of shelving alarms**

### 4.2.1 Alarm Shelf Settings

Through the following steps, you can complete the configuration of the alarm shelving shelf.

- 1) Select a collector node, click the “Add” button at the top of the shelving list and the “Add Shelf” dialog box, as shown in the figure below.

**New Shelf** X

\* Shelf name:

Description:

Close Submit

**Figure 4-3 “Add shelf” dialog box**

- 2) Configure the parameters of alarm shelves as per the illustration below.

Configuration Item	Usage	Configuration Illustration
Shelf Name	It will be viewed as a mark for the alarm shelving as the real-time alarm is being shelved.	Input it in the text box. The alarm shelves' names cannot be duplicated.
Illustration	Cause of alarm shelving.	Input it in the text box.

- 3) Click “OK” and the new shelf will be displayed in the shelving list.

Using Tehran buttons "Export" and "Import" at the top of the list, you can export the settings of shelves for next use, or import existing settings.



**Tip :**

**Only the collector nodes can add shelves.**

## 4.2.2 Set Auto-shelving Strategy

After the auto-shelving strategy is set, the tag alarms met with requirements during the limited period will be shelved automatically.

### Add shelving strategy

1. Pre-configuration: The tag number that needs to be set aside strategy has been added to the tag number table of “Tag Number Management”. Please refer to “Tag Management”.
2. In the interface shown in Figure 4-2, after selecting a shelf, click the “Add” button at the bottom of the tag list and the “Add Shelf Information” dialog box will pop up, as shown in

the following figure.

**Figure 4-4 “Add shelving information” dialog box**

3. Enter the tag name, select the alarm level to be suppressed in the “Tag extension” item, and set the start time and end time.
4. Click the “OK” button to save the changes.



**Attention :**

The alarm types in the tag extend drop-down menu are derived from the DCS adaption scheme to which the collector on the shelf is bound, see *DCS Adaption* for details.

### Cancel Shelving Strategy

Select a tag in the tag list and click the “Delete” button at the bottom to cancel the automatic shelving strategy for the tag.

#### 4.2.3 View Shelved Alarms

When a newly generated alarm meets the automatic shelving strategy, the alarm will be automatically shelved and will not be displayed on the real-time alarm page of AM.


In the tag information list, there are operation commands on the right side of the tag information, which are used to edit tag attributes, view pending records, and view the current status of tag numbers, as shown in Figure 4-5.

	No.	Tag Name	Condition	Start Time	End Time	Operation
<input type="checkbox"/>	1	A1	H	2021-11-01 10:34:37	2021-11-30 10:34:40	<a href="#">Edit</a> <a href="#">Shelving History</a> <a href="#">Status</a>

**Figure 4-5 Shielding tag list**

Tag shelving record: Click it and the record dialog box will pop up, as shown in the left figure below, showing the record and time when the alarm was placed on hold.

Shelving History (Tag Name: A3, Condition: H) ×

No.	Type	Time
 No Data		

Close

**Figure 4-6 Shelving history**

Status: After clicking it, a monitoring dialog box will pop up, as shown in the right figure below, which shows the status of the alarm suppression in the DCS system.

Status ×

No.	Tag Name	Condition	Time	Status value
1	INT001	HHHSUP		bad

Close

**Figure 4-7 Record**

Shelving alarm supports import and export.

#### 4.2.4 Effects on DCS System

Effects on DCS alarm: When the alarm on the AM side is shelved, the corresponding alarm in the DCS system won't be suppressed until the alarm in the AM system returns to normal. As for the performance when the alarm is suppressed in the DCS system, please refer to "Alarm suppression illustration". For details, please refer to the relevant manuals for DCS system monitoring or alarm management.



## 4.3 Multi-State Alarms

States refer to common work scenes in field work, such as start up and shut down. To cooperate with different states on site, multiple state alarms need to be developed to customize the alarm property and actions for different states.

In the navigation bar, select the menu command “Real-time Monitor > Multi-state Alarm”, the interface is shown in Figure 4-8. The left side shows the equipment organization structural tree, and the right side shows the list of multi-state alarms of the selected node.

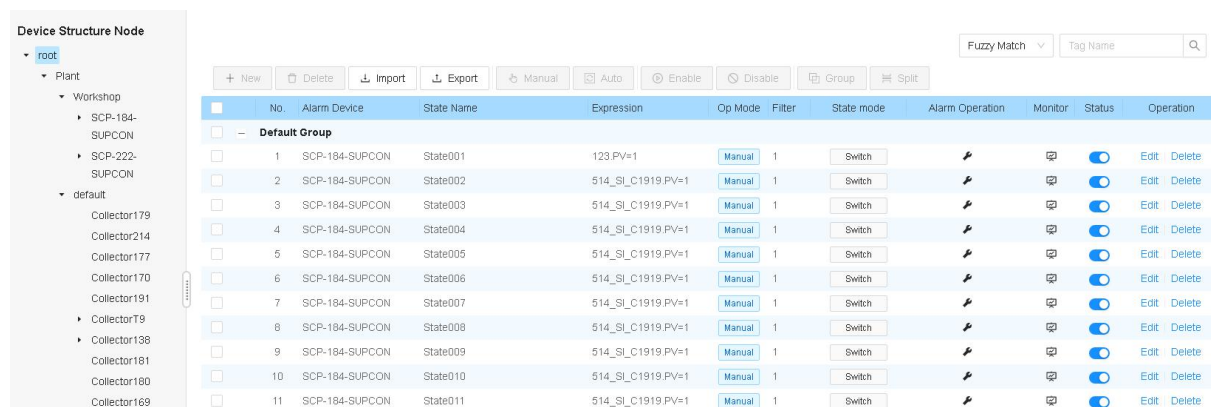


Figure 4-8 Multi-working alarm configuration

Table-4 List of shortcut buttons

Button	Description	Instructions
Add	Create a new state.	Click the button and set in the pop-up dialog box. Refer to “Create Equipment State”.
Delete	Delete the selected states in batches.	Select the check box of the state and click the button.
Enable/Disable	Enable or disable the selected states in batches.	
Manual/ Auto	Set the status switching mode of selected states to manual or automatic.	
Group	Add the selected working conditions to the specified group	Click the check box in front of the working condition, click the button, and select or add a new group in the pop-up dialog box
Split	Split the selected working condition from the group and display it under the default group	Click the check box in front of the working condition and click the button
Import Data/ Export Data	Import or export the data of state configuration.	Refer to “Import/Export State Configuration”.

### 4.3.1 Create Equipment State

Through the following steps, you can add state information and configure the corresponding state alarm:

- 1) Select an equipment node in the organizational structure and click the “Add” button on the right. The dialog box shown below will pop up.

New State Item
✕

\* State Name:

Group Name:

\* Expression:

Op Mode:

☒ Manual
☐ Auto
☐ Detection only

Filter:

1s

Cancel

Confirm

**Figure 4-9 Information of the newly added state**

- 2) Configure state parameters according to the table below.

Parameters	Parameter Illustration	Configuration Illustration
Name	Mark states	Input it in text box. It supports up to 32 characters
Expression	To confirm the state's generation	Input it in text box. It supports 500 characters. Such as TAG("A.VALUE")AND TAG("B.VALUE") For details, please refer to "Illustration for State Expression".
Mode	Mode switching as expression is established	<ul style="list-style-type: none"> <li>● Select "Auto": When satisfying state expression, perform the state action automatically and record the result</li> <li>● Select "Manual": When satisfying state expression, state button in alarm bar will flash. Click "Confirm Switch" to switch to the state manually</li> <li>● Select "Detect Only": When satisfying state expression, enter into detect mode, while not perform the state action</li> </ul>
Filter	Perform state action only when the results of expression for continuous several-second values are satisfied.	Input in the text box and the range is 1-1000 seconds.

- 3) After the configuration of state is completed, then click **OK**.




**Tip :**

Only the collector and lower level nodes can add multi-states, none of the higher levels can add them.

### 4.3.2 Alarm Actions in Configuring State

In state management, you can associate tags with states and define them. After alarm action is configured, alarm threshold, alarm suppression, alarm level or alarm shielding of the tag can be modified.

- 1) Pre-configuration: In the tag number table of “Tag number management”, the tag number that needs to be set for multiple working conditions alarms has been added. See “Tag Management”.

*In the interface shown in Figure 4-8, select a condition information from the right state list, click the button  in the “Alarm Action” column, and a dialog box will pop up as shown in Figure 4-10.*

No.	Tag Name	Operation
1	AI00020000	Edit Properties
2	AI00020001	Edit Properties
3	AI00020002	Edit Properties
4	AI00020003	Edit Properties
5	AI00020004	Edit Properties
6	AI00020005	Edit Properties
7	AI00020006	Edit Properties
8	AI00020007	Edit Properties
9	AI00020008	Edit Properties
10	AI00020009	Edit Properties
11	AI00020010	Edit Properties



  

AI00020000		
Type	Value	Enable
H	60.00	<input checked="" type="checkbox"/>
HH	70.00	<input checked="" type="checkbox"/>
HHH	80.00	<input checked="" type="checkbox"/>
L	40.00	<input checked="" type="checkbox"/>
LL	30.00	<input checked="" type="checkbox"/>
LLL	20.00	<input checked="" type="checkbox"/>
Suppress		
Condition	Value	Enable
HSUP	Suppress	<input checked="" type="checkbox"/>

**Figure 4-10 “Add tags” dialog box**

- 2) Click the “New” button on the upper left, check the tag in the pop-up dialog box, and click the “OK” button. The associated tags will be displayed in the list on the left.
- 3) After adding the tag, you can click the command “Edit Properties” and write values on the right side of the parameters provided by the OPC service of the DCS system, including threshold parameters, suppression parameters, priority parameters, and shielding parameters, see the table below.

Configuration item	Parameter illustration	Configuration illustration
--------------------	------------------------	----------------------------

Configuration item	Parameter illustration	Configuration illustration
Type	For configuring alarm threshold values	<ul style="list-style-type: none"> <li>● Enable configuration items, and enter the alarm threshold in the “Value” column corresponding to the operating condition alarm. After the state is generated, the alarm threshold of the tag will change to the input threshold.</li> <li>● Without enabling configuration items, you can disable the modification of the alarm limit.</li> </ul>
Suppression	For configuring alarm suppression parameters	<ul style="list-style-type: none"> <li>● Enable configuration items, and select “Suppress” or “No Suppression” in the “Value” column to specify the suppression of specific alarms under operating conditions.</li> <li>● If the configuration item is not enabled, the alarm suppression operation can be disabled.</li> </ul>
Priority	For configuring alarm priority parameters	<ul style="list-style-type: none"> <li>● Enable configuration items and enter priority parameters in the “Value” column to specify the priority configuration of specific alarms under operating conditions.</li> <li>● Without enabling configuration items, you can disable the alarm priority modification operation</li> </ul>
Shield	For configuring alarm shielding parameters	<ul style="list-style-type: none"> <li>● Enable the configuration item, and select “shield” or “unshield” in the “Value” column to specify whether to enable the alarm shield under states.</li> <li>● Without enabling configuration items, you can disable the modification operation of alarm masking parameters</li> </ul>
Enable	Whether or not to enable this configuration parameter	 means to enable.  means to disable.

4) After the configuration is completed, then click “Save”.



#### Attentions:

- For tags involved in the case expression, if the tag type is modified, you need to modify or re-import the state configuration.
- In order to execute the condition write value, two conditions must first be met: 1. Set the condition write value permission through the “DA write permission control option” in “Service Deployment / Collector Configuration” 2. OPC DA is connected, and the write parameter has been added to the OPC DA list. For details, please refer to Tag-writing Configuration.

### 4.3.3 Import/Export State Configuration

After configuring the case management for all projects, you can export the state configuration to

an .xlsx files. In addition, the state configuration in the .xlsx file format can also be imported into the system. Through the importing and exporting operations, you can reduce the repetitive state configuration.



---

**Tips:**

- If it is “Empty import”, which will overwrite the information in the current list. Before importing, please export and archive the information.
  - When using the import function for the first time, please follow the prompts to export the multi-state template, edit the state configuration file according to the template requirements, and then perform the importing operation.
  - The state configuration file is an .xlsx file. Therefore, make sure that Office 2007 and above are installed on the computer.
- 

- Import: Click “Export Case” in Figure 4-8 and the “Export” dialog box will pop up. After selecting the save path and file name of the exported file in the dialog box, click “Save” and the prompt message “Export Succeeded” will pop up. The default file name of the state configuration file is “state configuration\_equipement organization structure node name\_state name.xlsx”.
- Export: Click “Import state” in Figure 4-8 and the “Import” dialog box will pop up. Click the “Browse” button, and select the .xlsx document you want to import in the pop-up dialog box. Click the “Open” and “Start Import” buttons in a row, and the prompt message “Import Succeeded” will pop up.

#### 4.3.4 Illustration for State Expression

When defining the states, you need to configure the expressions of state generation. State expression supports operators, values and functions.

##### Operators that expression supports

- BNOT (bit not), BAND (bit AND), BOR (bit OR), BXOR (bit XOR), MASK (mask), GETB (get bit).
- AND (AND), OR (or), XOR (XOR), NOT (not).
- + (addition), -(subtraction), \* (multiplication), / (division), MOD (remainder), ^ (power).
- <(less than), > (greater than), <= (less than or equal to), >= (greater than or equal to), <> (not equal to), = (equal to).

##### Values that expression supports

- Numeric constants, such as 12.5
- String constants, such as “abc”
- Logical constants, including TRUE and FALSE

- Tag must be expressed in the form of Tag ("XXX"), such as Tag ("AI001")

### Functions that expression supports

SIN (sine), COS (cosine), TAN (tangent), LN (natural logarithm), ASIN (arc sine), ACOS (arc cosine), ATAN (arc tangent), LOG (common logarithm), INT (take Integer), ABS (take absolute value), SQRT (square root), EXP (power of e).

### Priority classification

The order of priority of each operator from high to low is:

Brackets

Functions

NOT // logical not

^ // power

\*, /, MOD // Multiply, divide, modulo

+, - // add and subtract operations

<, <=, >, > = // relational operation

=, <> // equal to, not equal to

AND // logical AND

XOR // logical XOR

OR // logical OR

### 4.3.5 View Multi-state Alarm

In the multi-state alarm list shown in Figure 4-8, all configured states and alarm operation conditions are listed. The column of "To calculate state mode" is to display that the equipment state is switched to the mode.



---

**Tip:**

For the expression of "calculating state" and the mode configuration of the state switching, please refer to Create Equipment State for details.

---

### State Illustration

The status of the state is reflected by the background color, including the following three situations:

- Red: The state is not configured correctly. Please troubleshoot according to the prompt information in the “Status” column.
- Yellow: The expression has not obtained the correct tag value. Please check the connection status of the DA service.
- Green: The operating condition has been activated.

### Auto Switching Rules

Equipment state switches automatically by rules below:

- A state expression is satisfied and the switch mode is “Auto”. It will enter into the state automatically.
- A state expression is satisfied and the switch mode is “Manual”. After you confirm to switch modes, all operational stations will switch to this state.
- A state expression is satisfied and the switch mode is “Only Detect”, both “Current State” and “Calculation State” are shown as “Calculation State”, but not perform alarm operation in state, i.e. not perform configured alarm suppression, alarm threshold modification and alarm priority modification.

### Alarm suppression illustration

Suppress alarm, i.e. eliminate alarm dynamically. After suppressing alarm or eliminating suppression, changes below will be shown in monitoring windows such as alarm list and graphics, etc.

- Alarm sound

After suppressing alarm, alarm stops to make sound. After suppress is eliminated, alarm makes sound again.
- Alarm in alarm list

After suppressed, alarm will no more be shown in list. After eliminating suppression, alarm will be shown in the alarm list again.
- Alarm in graphics

After suppressing alarm, tag alarm in graphics will not flash any more. After suppress is eliminated, tag flashes again.
- Alarm statistics

After suppressing alarm, suppressed tag will not be counted in alarm statistics. After suppress is eliminated, tag alarm statistics will be restored.

### Modify Alarm Threshold

Modify alarm threshold, i.e. modify alarm threshold from X to Y, and it will become effective when alarm generated next time. After modifying alarm threshold, alarm will be generated in monitoring

by new alarm threshold.

### **Modify Alarm Priority**

Modify alarm priority, i.e. modify alarm priority from X to Y, and it will become effective when alarm generated next time. After modifying alarm priority, changes below will happen in monitoring:

- After modifying priority, tag alarm generated later will be shown and make sound by modified priority.
- Re-alarms will be performed by new alarm priority.
- Alarm latching will be performed by new alarm priority.

#### **4.3.6 Effects on DCS System**

Whether the state parameters in the AM system will affect the DCS system is determined by the DA write permission control tag:

- If the value of the tag in the DCS system is consistent with the check value set in the AM system, AM will perform a write-back function, synchronize the multi-operation alarm operation to the DCS system, and modify the DCS related bit variable.
- If they are inconsistent, you cannot rewrite DCS related variables.

For the configuration description of the DA write permission control tag, refer to Table 3-1 in the Configuration Illustration.

For the impact of operating condition alarm operation on DCS system monitoring and alarm, please refer to the relevant manual of DCS system monitoring or alarm management.

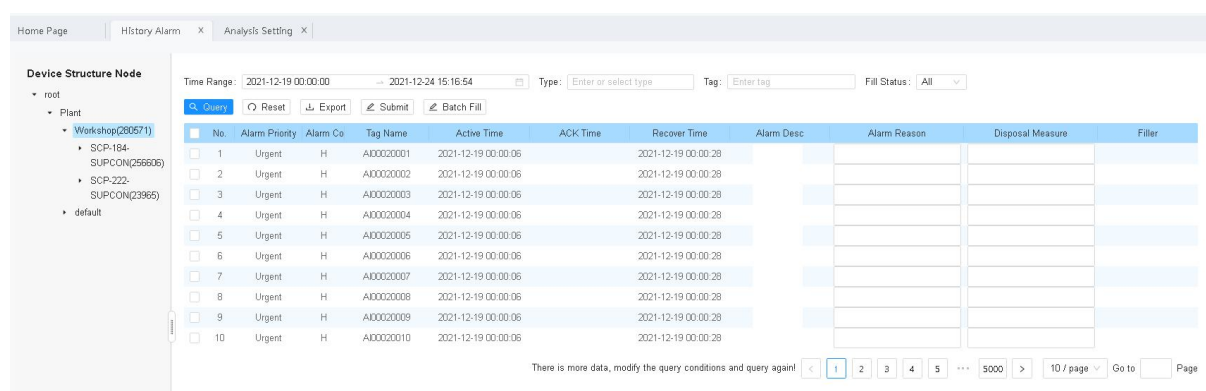


## Section 5 Historical Data

The historical data in the AM system includes two parts: Historical Alarm Data, Historical Operation Record and Sequence of Events.

### 5.1 Historical Alarm

AM supports viewing historical alarms of nodes at various levels according to organizational structure. In the navigation bar, select the menu command “History Data > Alarm History”, and the “Historical Alarm” window will appear, as shown in the following figure.



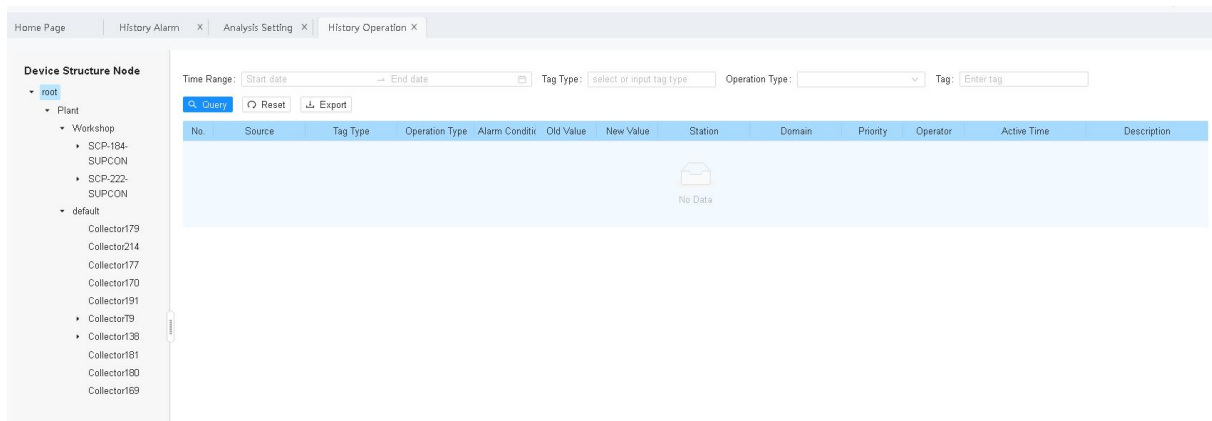
**Figure 5-1 Historical alarm interface**

Select a node in the structure tree on the left, and the historical alarm information under the node will be displayed in the interface on the right. Users can fill in alarm cause and disposal measure in the columns of “Alarm Reason” and “Disposal Measure” within one day of the alarm. At the top of the page, you can filter historical alarm information by setting filter conditions, by setting a time range, by selecting an alarm type, or by entering a tag name keyword.

Click **Export** to export the historical alarms under the current filtering conditions to a CSV file.

### 5.2 Historical Operation

In the navigation bar, select the menu command “History Data > Operation History” button at top to switch to the historical operation page to view the operation records of the monitoring platform of the DCS system.



**Figure 5-2 Historical operation list**

Click **Export** to export the historical operations under the current filtering conditions to a CSV file.

## 5.3 Sequence of Events

### 5.3.1 Configure SOE

Select **Alarm management > Global Settings > Sequence of Events** in the navigation bar, open SOE Configuration interface.

#### Data Storage

Enter the number of days the data needs to be retained in the text box, the number of days ranges from 30-60 days, the default is 60 days.

#### Data Backup

Here you can enable or disable the SOE data backup policy, fill in the maximum number of backups, select the backup period and choose the backup path as shown in the figure below. The maximum number of backups ranges from 1-10.

Data Backup

Enable Backup: ☒

\* Max Backup Count:

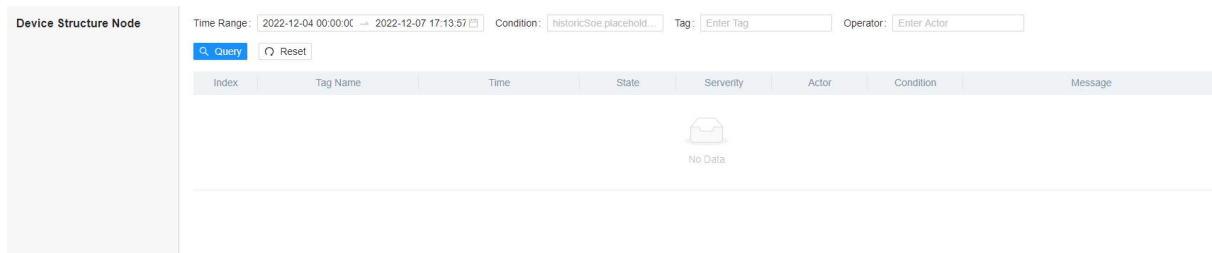
\* Backup Recycle Range: ☐ Every Day ☐ Every Week ☐ Every month

\* Backup Path:

**Figure 5-3 Data backup**

### 5.3.2 Search SOE

Select **Alarm management > History data > Sequence of Events** in the navigation bar and open “Sequence of Events” interface.



**Figure 5-4 Sequence of Events**

Select a node in the node tree on the left and information on the sequence of events under that node will be displayed in the right-hand interface.

### 5.3.3 Filtering Search

At the top of the page, you can filter historical alarm information by setting a time range, selecting an alarm type, entering a tag or entering an operator to set filter condition. You can clear all filter condition by clicking **Reset**.

## Section 6 Alarm Approval

### 6.1 Configure Major Alarm

Through major alarm configuration, the alarm approval flow can be released according to the specified alarm rules. The operation steps are as follows:

- 1) Select “Major Alarm > Major Alarm Configuration” in the navigation bar, the interface is as shown in the figure below.
- 2) The list on the left shows the hierarchy of the device organization structure. Select a node, and the middle list shows the duplicate alarm groups that already exist under this node. You can add, modify, delete, enable or disable groups through the upper button and the buttons on the right side of the group block. When adding a new group, you need to set the group name, first / second / third level alarm time and remarks.
- 3) Select a tag group, and the list on the right shows the tag major belonging to the group. Select a tag number, the right side of the list displays the upgrade rules for the alarm level of major alarms that have not been confirmed.

Click **Add** above to add new upgrade rules for tag alarms, select tag names and tag attributes, and set the upgrade rules for alarm levels of major alarm parameters without confirmation.

- Click the “Edit” command on the right side of the tag to modify the alarm rules.

The screenshot displays the 'Major alarm configuration' interface. On the left, the 'Device Structure Node' tree shows a hierarchy from 'root' to 'Plant' to 'Workshop' to 'SCP-184-SUPCON'. The 'Group' section shows 'Group1' with an 'Enable' button. The central table lists alarm tags with columns for 'No.', 'Tag Name', 'Tag Condition', 'Current Level', 'Notified', and 'Operation'. The right side features three alarm rule cards: 'Level 1 Alarm' (1 second), 'Level 2 Alarm' (2 seconds), and 'Level 3 Alarm' (3 seconds), each with a description of the rule.

No.	Tag Name	Tag Condition	Current Level	Notified	Operation
1	AI00020001	HH	3	✓	Edit
2	AI00020010	L	3	✓	Edit
3	AI00020022	L	3	✓	Edit
4	AI00020000	H	3	✓	Edit
5	AI00020006	LL	3	✓	Edit
6	AI00020031	HH	3	✓	Edit

**Figure 6-1 Major alarm configuration**

Secondly, you also need to configure the operation permissions of workflow approval for relevant approvers.

## 6.2 Configuration Examination

The target objects of alarm examination are AM tag configuration and DCS tag configuration. Through the “configuration audit” node, you can set up an examination plan as well as view the audit tasks and audit results.

### 6.2.1 Preparation

Before conducting an alarm examination, the following configuration needs to be completed:

- Add tags of AM system into “Tag Management”, and add the corresponding rationalized analysis content (at least add the alarm type and the corresponding alarm value), please refer to Tag Management for details.
- To examination the write value, you need to set the DA write permission control option and complete the tag write configuration on the computer where the OPC server is located. For details, see Tag-writing Configuration.



#### Tip:

It is recommended that a specific staff dedicated to manage the examination task and the write-back operation of the audit results to avoid repetitive operations.

### 6.2.2 Plan

In the navigation bar, select the menu command “Configuration Audit > Audit Scheme Setting”, and then it will jump to the examination plan configuration interface. In the following figure, the list shows the configured automatic examination plan.

<div> <div>+ New</div> <div>Delete</div> <div>Manual Audit</div> </div>							
<input type="checkbox"/>	No.	Scheme Name	Trigger Time	Creator	Active Time	Enable	Operation
<input type="checkbox"/>	1	Scheme1	Everyday 10:43	admin	2021-11-05 11:07:19	<input checked="" type="checkbox"/>	Edit

**Figure 6-2 Plan designing list**

## Auto Examination

Through the following steps, you can create a new automatic examination plan:

- 1) Click the “Create Plan” button at the upper right, and the “Create Plan” dialog box will pop up, as shown in the figure below.

New Scheme

X

Name:

Scheme2

DCS:

SCP-184-SUPCON

513 Items

Structure

Select Node:

SCP-184-SUPCON

Uno1

Som

Thalatha

Quatre

0 Item

Selected Nodes

No Data

Everyday

14:42

Every week

Every month

Period:

Cancel

Confirm

**Figure 6-3 Create automatic examination plan**

- 2) Fill in the name of the automatic examination plan.
- 3) In the “DCS” item, select the collector node to be examined, and the detailed organizational structure information is displayed below. Select a node and click the button “>” to add the node to the list of “Selected Nodes” on the right.
- 4) Select the triggering period and time for the automatic examination.
- 5) After completing the configuration, click “OK”.

## Manual Examination

To create a new manual examination plan, the steps are as follows:

- 1) Click the “Manual Examination” button on the upper right side, and a “New Plan” dialog box similar to Figure 6-3 will pop up.
- 2) Set the examination plan name and select the examination node. For details, see Auto Examination.
- 3) After completing the configuration, click “OK”.

### 6.2.3 Audit Tasks

In the navigation bar, select the menu command “Configuration Audit > Task Progress” to the “Audit tasks” interface, as shown in the following figure.

No.	Scheme Name	Trigger Time	Progress	Status	Operation
1	scheme3	2021-12-24 14:48:44	<div style="width: 100%;"></div>	Completed	<a href="#">Results</a>

**Figure 6-4 Examination Progress List**

The “Audit tasks” interface displays the execution progress of all examination tasks in a list, including the examination tasks triggered by the automatic examination program and the manually created examination tasks. Click “Go to Results” button in the “Action” column, and a new tab of “Audit results” will pop up.

### 6.2.4 Audit Results

In the interface shown in Figure 6-4, click the “Results” button at top, or select “Configuration Audit > Audit Result” in the navigation bar, the interface will be shown in the figure below, which will display the detailed information of the task. You can manually synchronize the audit results to the DCS system through the commands ‘DCS->Database’, or synchronize the results to AM system through the commands ‘Database->DCS’.

<div> <span>Sync all to AAS</span> <span>Sync all to DCS</span> <span>Export</span> <span>Pending Approval</span> <span>Approval</span> </div>					
<b>scheme3_Audit</b> 2021-12-24 14:48:44    Audit Scheme: scheme3    Collector: SCP-184-SUPCON    Node Info: SCP-184-SUPCON;    Creator: admin					
No.	Tag Name	Tag Condition	AAS Value	DCS Value	Cfg Sync
21	AI00020021	HHH	90	91	DCS→AAS    AAS→DCS
22	AI00020022	HHH	90	92	DCS→AAS    AAS→DCS
23	AI00020023	HHH	90	93	DCS→AAS    AAS→DCS
24	AI00020024	HHH	90	94	DCS→AAS    AAS→DCS
25	AI00020025	HHH	90	95	DCS→AAS    AAS→DCS
26	AI00020026	HHH	90	96	DCS→AAS    AAS→DCS
27	AI00020027	HHH	90	97	DCS→AAS    AAS→DCS
28	AI00020028	HHH	90	98	DCS→AAS    AAS→DCS

**Figure 6-5 Audit results interface**

In the alarm examination, the AM server obtains the configured tag property value from the OPC DA collection client, and then compares it with the existing tag property configuration in the AM database, and sends the comparison results to “Alarm examination”. At this time, the user can

view the value of AM tag and DCS tag on the examination page, and perform the examination operation:

- Click the “Database → DCS” button to confirm that the tag value is correct on the pop-up examination sheet page. You can write the tag value of the AM configuration to the DCS configuration.
- Click the “DCS → Database” button to confirm that the tag value is correct on the pop-up examination page. You can write the tag value of the DCS configuration into the AM configuration.
- Click the “Sync all to AM “ or “Sync all to DCS “ button above to perform batch operations on the approval results displayed on the page



**Tips:**

- **On the viewing page of the examination result, click “Export” button in the upper right corner to export the result to a local file in PDF format.**
  - **The viewing time of the examination result is 2 hours. After 2 hours, the page needs to be refreshed.**
-

## Section 7 Statistical Analysis

---

After the AM system obtains the alarm information, it can archive and rationally analyze the alarm according to the importance and priority of the alarm, filter the alarm records according to the statistical settings, and display them in the form of statistical charts to help the operator quickly screen and obtain the Information you need.

The following kinds of statistical analysis are supported: Alarm Frequency, Alarm Duration, Alarm Priority, Alarm Type, Alarm Confirm Rate, Alarm Device, Related Alarm, Alarm Flooding, Old Alarm, Interval Alarm, Instantaneous Alarm, YMW Analysis, KPI Statistics, Team Statistics, Switch Operation and etc.



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**Tip:**

**The statistic interval for related alarms should not exceed 1 month, or the total number of alarms should not exceed 100000.**

---

This chapter will introduce the setting methods and statistics analysis of the alarm statistics.

### 7.1 Statistics Settings

Through the alarm statistics setting, various statistical conditions and statistical rules can be configured for the multi-category statistical information on the statistical analysis page, mainly including statistical parameter settings, team evaluation settings and KPI settings.

#### 7.1.1 Statistical Parameters

In the navigation bar, select the menu command “Statistic & Analysis > Statistical Settings” to enter the “Statistical Parameters” setting page, and configure various statistical parameters according to the category of statistical analysis, as shown in Figure 7-1.



Statistic Parameters

Team Setting

Schedule Setting

KPI Setting

Tag Exclusion

Alarm Priority

Mail Setting

Other Settings

Relational Alarms

If predictability > ②: 1 % (0~100) , means related

If significance > ②: 1 % (0~100) , means related

If the number of relational alarms >: 1 (0~10000) , means related

If the interval between two alarms <: 5 second (0~21600) , means related

Alarm flooding

If the interval between two alarms ≤: 10 minutes, means continuous alarm

Number of continuous alarms ≥: 10 means flooding begins

Number of continuous alarms <: 5 means flooding ends

Stale Alarm

Duration ≥: 20 minute Alarms that have not been recovered are stale alarms

Chattering Alarm

Time interval ≤: 5 minutes, alarm numbers ≥ 20 means chattering alarm

Fleeting alarm

Duration ≤: 60 seconds, means fleeting alarm

**Figure 7-1 Setting Interface of Statistical Parameters**

Instructions: Click the number or character to modify. After finishing the configuration, click “Save”.

## Associated alarms

Definition: Within a certain time interval, the occurrence of an alarm triggers the occurrence of other alarms, and when alarm occurrence reaches a certain frequency, the system views that these alarms are related to each other by default.

1. Parameters that need to be configured: Set the exclusion conditions for associated alarms.

## Relational Alarms

If predictability > ?:	<input type="text" value="1"/>	% (0~100) , means related
If significance > ?:	<input type="text" value="1"/>	% (0~100) , means related
If the number of relational alarms >:	<input type="text" value="1"/>	(0~10000) , means related
If the interval between two alarms <:	<input type="text" value="5"/>	second (0~21600) , means related

**Figure 7-2 “Related alarm” parameter settings**

- Predictability refers to the possibility that the child alarm will appear immediately after the parent alarm appears.
- Significance refers to the probability that when a child alarm appears, its parent alarm has appeared in the most recent time period.
- associated alarm logarithm refers to the number of alarm pairs whose predictability and significance meet the setting.
- If the time interval between two alarms is  $\geq T$  second, it is considered as unrelated, otherwise it is regarded as an associated alarm.  
T: Define the time interval of the associated alarm in second.
- Exclusion condition 1: Alarms that account for  $\leq P\%$  of the total alarms are not included in the statistics.  
P%: One of the filter conditions. The associated alarm is an alarm whose proportion is greater than P%.  
 $P\% = \text{number of certain alarms} / \text{total number of alarms} \times 100\%$
- Exclusion 2: The alarms that meet the definition of associated alarms, but if the number of alarm occurrence is less than N, they will not be counted into the statistics of associated alarms.

**Alarm flooding**

1. Definition: Alarms are generated continuously and exceed a certain number of times within a certain period of time. Such a situation is called “alarm flooding”.

Parameters to be configured: Set time interval, start and end conditions for alarm flooding.

Continuous alarms that meet the start and end conditions will be counted as an alarm flooding.

Alarm flooding

If the interval between two alarms  $\leq$ :  minutes, means continuous alarm

Number of continuous alarms  $\geq$ :  means flooding begins

Number of continuous alarms  $<$ :  means flooding ends

**Figure 7-3 “Alarm flooding” parameter settings**

- Time interval T: Used to define the time interval of continuous alarm, the unit is minute.
- The start condition of alarm flooding: The number of consecutive alarms exceeds ( $\geq$ ) N1 alarms.
- The end condition of alarm flooding: The number of consecutive alarms is less than ( $<$ ) N2 alarms.

### Old alarms

1. Definition: Stale alarm refers to an alarm that has not been restored after a time.
2. Parameters that need to be configured: Alarms that have not been recovered for duration ( $\geq$ ) N days (hours / minutes / seconds) are stale alarms.
  - N: Define the time interval of stale alarm.
  - Day / Hour / Minute / Second: The unit of duration, select through the drop-down menu.

### Intermittent alarms

1. Definition: Intermittent alarm refers to an alarm that occurs repeatedly within a certain period of time.
2. Parameters to be configured: Time interval  $\leq$  T minutes, and alarms with frequency  $\geq$  N times are intermittent alarms.
  - T: Time interval of intermittent alarm, the unit is minute.
  - N: The number of alarm occurrences in the time interval. Alarms exceeding N times will be recorded as intermittent alarms.

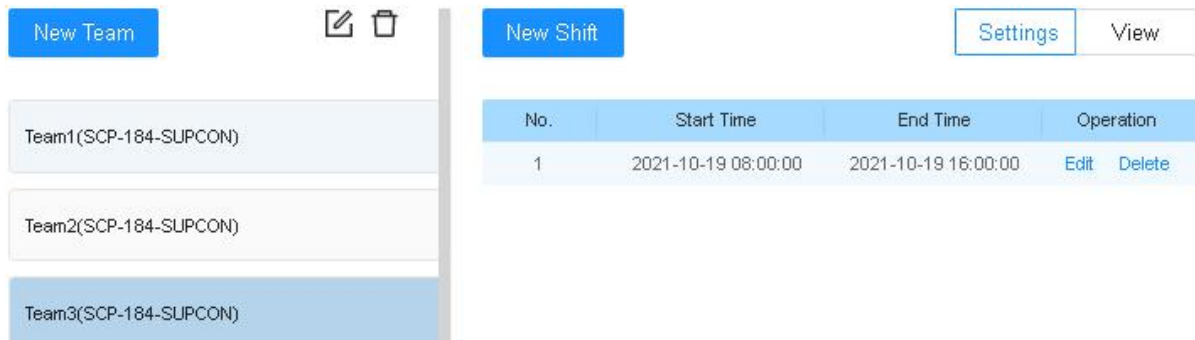
### Flashing alarms

1. Definition: “Instant flash alarm” refers to an alarm with a very short duration, such as an alarm that resumes normal when the duration is only a few seconds.

- Parameters to be configured: Duration is less than ( $\leq$ ) T seconds. T: Define the time range of flashing alarm in seconds.

### 7.1.2 Shift Settings

For teams that need to be evaluated, you can establish a team and set a time period. In the interface shown in Figure 7-1, select “Team and Team Settings” from the menu on the left. The interface is shown in Figure 7-4. The list of teams and groups is displayed on the left and the start and end time of the selected team assessment is displayed on the right.



**Figure 7-4 Shift assessment settings**

- Add shifts: Click the “Add” button above the left list and enter the name of the team in the pop-up dialog box, and click “OK”.
- Add time period: Select a shift, click the “Add” button above the list on the right, modify the start time and end time in the pop-up dialog box, and click “OK”.
- Modify the group or time period: Select the item to be modified, click the “Modify” button above the corresponding list, modify the parameters in the pop-up dialog box, and click “OK”.
- Delete a shift or time period: Select the item to be deleted, click the “Delete” button above the corresponding list, and click “OK” in the second confirmation box that pops up.

Note: When deleting a shift group, the time period set under the shift group will be deleted together, please be cautious.

#### Tip:



If you want to use the team configuration of the information management system MES , select “System > Global Settings > MES Setting” in the navigation bar , check the “Enable” option of “ MES Information Configuration”, and set the address, port, user name and password.

### 7.1.3 Schedule Setting

After you setting shifts, you can check schedules in “Schedule Setting”.

#### Step:

1. Choose the Position, the Shift of the data you want to search, then click **Query**, the list will show the eligible schedule information, as shown in the below.

Statistic Parameters

Team Setting

**Schedule Setting**

KPI Setting

Tag Exclusion

Alarm Priority

Mail Setting

Equipment Setting

Other Settings

Select Console: organization.p... Select Team: All Teams Date: 2022-12-07

No.	Schedule	Team	Console	Employee	Update Time	Update User
No Data						

**Figure 7-5 Schedule Settings**

2. Click the “People” drop-down menu, and select a replacement, the people information will be saved automatically.
3. Select one or more schedule information and click **Delete**, click **OK** in the secondary confirmation dialog, the selected information will be deleted.

#### 7.1.4 KPI Settings

Statistics are made according to the set alarm statistics parameters and priorities, and a comparison chart of expected values and actual values is displayed to facilitate the user to optimize the production process and alarm settings.

In the interface shown in Figure 7-1, select “KPI Settings” from the menu on the left. The interface is shown in the figure below.

Reference Standard ☐ EEMUA191 ☐ ISA18.2 ☒ Custom

\* Avg Alarm Count/h:

\* Max Alarm Count/h:

\* Chattering Alarm Count/d:

\* Stale Alarm Count/d:

\* Alarm Flood Count/d:

**Figure 7-6 KPI setting interface**

Operation instruction: Double-click the cell to modify the parameter value. Click the “Add” button below the list to add a customized priority. After completing the settings, click the “Save” button

above.

Checking “Update Existing Plan” will update the parameters in the existing plan to the latest parameters; if not checked, the existing plan will continue to use the old parameters, and the newly generated plan will use the latest parameters.

### 7.1.5 Tag Exclusion

The “tag exclusion” node is used to configure the AM system statistical alarm information, but the alarm data does not need to be added to the statistical analysis of the tag, the steps are as follows:

- 1) In the interface shown in Figure 7-1, select “Tag Exclusion” from the menu on the left. The interface is shown in the figure below.

Tag name	Alarm Condition	Start Time	End Time	Submit Time	Submitter	Operation
<input type="checkbox"/> AI1203	HHH	2021-09-01 09:45:00	2021-10-22 09:45:00	2021-11-01 13:36:20	mur	Edit Delete
<input type="checkbox"/> AI1204	HHH	2021-09-01 09:45:00	2021-10-22 09:45:00	2021-11-01 13:36:20	mur	Edit Delete
<input type="checkbox"/> AI1205	HHH	2021-09-01 09:45:00	2021-10-22 09:45:00	2021-11-01 13:36:20	mur	Edit Delete
<input type="checkbox"/> AI1206	HHH	2021-09-01 09:45:00	2021-10-22 09:45:00	2021-11-01 13:36:20	mur	Edit Delete
<input type="checkbox"/> AI1207	HHH	2021-09-01 09:45:00	2021-10-22 09:45:00	2021-11-01 13:36:20	mur	Edit Delete
<input type="checkbox"/> AI1208	HHH	2021-09-01 09:45:00	2021-10-22 09:45:00	2021-11-01 13:36:20	mur	Edit Delete
<input type="checkbox"/> AI1209	HHH	2021-09-01 09:45:00	2021-10-22 09:45:00	2021-11-01 13:36:20	mur	Edit Delete

Figure 7-7 Tag exclusion list

- 2) According to the existed tag AI1 in the template, fill in the tag name, alarm type, start time and end time that do not need to be counted.
- 3) After configuring the tag list, save it as the .csv file.
- 4) Select the collector node, click the “Import” button, select the .csv document you just edit in the pop-up dialog box, and click “Open”.
- 5) After the tag is imported, click the “Save” button.

### 7.1.6 Alarm Level

In the interface shown as Figure 7-1, select “Alarm Level” from the left menu. The interface is as shown in the figure below. You can choose to use the alarm priority of the DCS system or customized priority (AM alarm priority).

Priority Name	Priority Value	Upper limit	Lower limit	Exclusion	Operation
Low	1	0%	0%	<input type="checkbox"/>	Edit Delete
Medium	30	0%	0%	<input type="checkbox"/>	Edit Delete
High	60	0%	0%	<input type="checkbox"/>	Edit Delete

Figure 7-8 Alarm levels setting

- New alarm priority: Click this button and set the priority name, level, upper limit and lower limit.
- Exclude: The priority of enabling “Exclusion” will not be added to the alarm statistics.


### 7.1.7 Mail Settings

The system can periodically send the results of automatic statistics to the user's mailbox. Here is used to set the sender's mailbox information, as shown in Figure 7-9; the recipient's mail information is set in the automatic statistical plan, see the description of Automatic Statistics.

Sender Email Information

Account:

Username:

Password:  

Port:

Server:

Mailbox Test


☒ Send to myself  
☐ Send to someone else

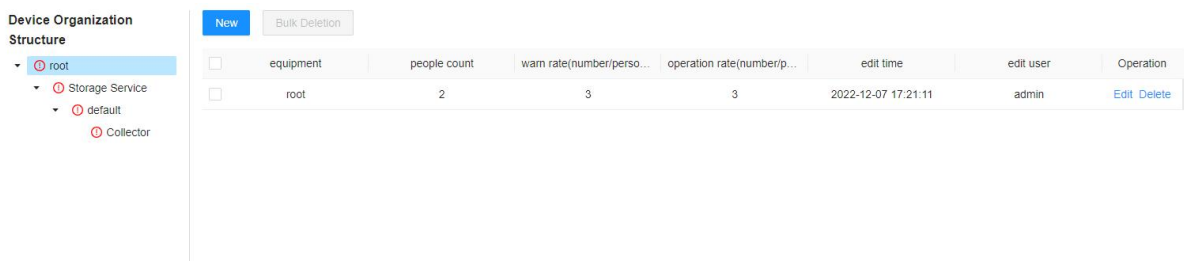
**Figure 7-9 Email sender settings**

- User name: The login user name of the sender's mailbox.
- Mailbox server: Outgoing mail server (SMTP) of the sender's mailbox.
- Port: The SMTP port of the mail server for the sender. It is 25 by default.
- Email address: Sender's email address.
- Mailbox password: The login password of the sender's mailbox.
- Mailbox test: Click the “Send test mailbox” button, the system will send a test email to the mailbox selected in the “mailbox test” through the set sender mailbox, and the receipt of the test email indicates the sender mailbox information setting correct.
- Mailbox test: Select “Use sender email address”, then the recipient of the test email is the

sender mailbox set above; select “Use other email address”, you can enter the recipient’s email address on the right side of the option.

### 7.1.8 Device Settings

Device Setting are used to configure the number of operators and the alarm and operation rate expectation. The alarm and operation rate expectations and for devices will be used for the “Device Shift Alarm Statistics” and “Device Shift Operation Statistics”. In the interface shown in Figure 7-1, select **Device Settings** from the left-hand menu, the interface is shown below. The node marked  are nodes that are not configured with devices.



**Figure 7-10 Device Settings**

- Add Device

1) Select a node, click **Add**, open the dialog box as shown in the below.

**Figure 7-11 Add Device**

2) Enter the number of people, alarm rate and operation rate in the dialog box and lick OK to save.

- Edit Device

Click **Edit** to the right of the device information, change the number of people, the alarm rate and operation rate in the edit dialog box, then click **OK** to save the modification.

- Delete Device

Click **Delete** to the right of the device information, click **OK** in the secondary confirmation pop-up to delete this device information.



You can also select multiple device information, then click **Batch Delete**, and click **OK** in the secondary confirmation bubble to delete all the selected device information,

### 7.1.9 Other Settings

In the interface shown in Figure 7-1, select “Other Settings” from the menu on the left. The interface is shown in the following figure. You can set the report browsing mode and report permission mode.



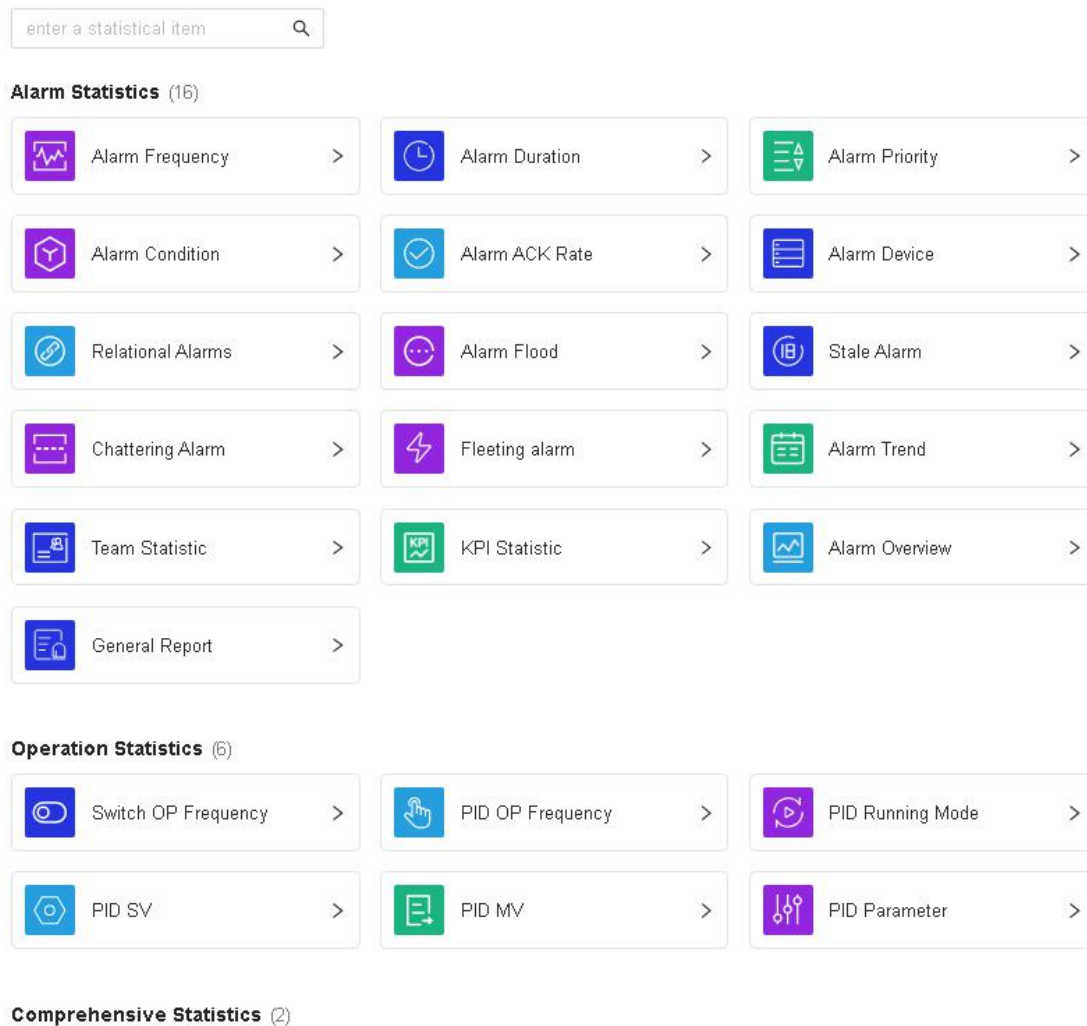
**Figure 7-12 Other Settings**

- Sharing mode: In this mode, you can view reports from all users.
- Exclusive mode: In this mode, you can only view reports triggered by yourself.

## 7.2 Manual Statistics

The AM system can analyze the alarm data, identify the disturbance alarms by analyzing the data and execute appropriate alarm change management procedures, thereby reducing the occurrence of disturbance alarms.

In the navigation bar, select the menu command “Statistic & Analysis > Manual Analysis”, the interface is shown below. The alarm statistics in the AM system are all the alarm information collected by the OPC server in the DCS system, and the alarm records can be filtered and counted according to various rules.



**Figure 7-13 Manual Statistics**

### 7.2.1 Statistical Type

The statistical types and rules of manual statistics are as follows:

- Execute statistics according to the frequency of alarm generation: Count the number of alarm occurrences for each tag within a specified time.
- Execute statistics according to the duration of alarms: Count the average duration of each alarm from generation to recovery within the specified time.
- Execute statistics according to alarm priority: Count the number of times each type of alarm is generated within a specified time.
- Execute statistics according to alarm type: Count the number of times each type of alarm occurs within a specified time.
- Execute statistics according to alarm acknowledgment rate: Count the confirmation rate of each type of alarm within a specified time.
- Execute statistics according to alarm equipment: Count the number of alarms under each alarm equipment within a specified time.

- Associated alarms: In a period of time, the occurrence of one alarm has triggered the occurrence of other alarms, and when the number of triggers reaches a certain frequency, the system defaults these alarms as associated alarms.

Statistical rules: 1. Generate alarms with a time interval of less than T minutes and a percentage of occurrence  $\geq P\%$ ; 2. Among the alarms satisfying Rule 1, if the number of alarm occurrences is less than ( $\leq$ ) N times, the alarm will be excluded, Statistics related to alarms are not recorded.

The statistical parameters T, P%, and N are configured through the “Statistic Parameters” page. For details, see “Associated Alarms”.

- Alarm flooding: An alarm occurs frequently and exceeds a certain number of times within a certain time interval. Such a situation is called “Alarm flooding”.

Statistical rules: 1. Alarm interval time T. 2. Start condition: The number of continuous alarms exceeds ( $\geq$ ) N1. 3. End condition: The number of continuous alarms is less than ( $<$ ) N2.

After the start condition is met, alarm flooding starts to be counted until it meets the end condition. The statistical parameters T, N1, N2 are configured through the “Statistic Parameters” page. For details, see “Alarm flooding”.

- Stale alarm: Refers to an alarm that remains active (does not return to normal) within a certain time interval.

Statistical rules: Alarms that are not recovered beyond ( $\geq$ ) N days (hours / minutes / seconds) are stale alarms.

The statistical parameter N and its unit are configured through the “Statistical Parameter” page. For details, see “Old Alarms”.

- Intermittent alarm: Within a specified period of time, statistics will repeatedly occur for a certain number of alarms.

Statistical rules: Within the specified time interval (T minutes), alarms that occur more than N times will be recorded as intermittent alarms.

The statistical parameters T and N are configured through the “Statistical Parameters” page. For details, see “Intermittent Alarms”.

- Fleeting alarm: The alarm with a very short statistical duration within a specified time.

Statistical rules: Alarms with statistical duration less than ( $\leq$ ) T seconds. The statistical parameter T is configured through the “Statistical Parameters” page. For details, please refer to “Flashing Alarms”.

- Alarm trend statistics: Take the month, week, day or hour as the unit time to count the number of alarms generated in each unit time.

- Shift Assessment: This statistic is mainly used to count the number of alarms generated, the number of alarms acknowledged, the number of alarm resumed and the number of unacknowledged alarms during the shift of each team.

- Shift evaluation statistics: It is mainly used to count the number of alarms generated during each shift, the number of alarms confirmed, the number of alarms recovered and the number of unacknowledged alarms.

Statistical rules: According to the setting of the start and end date and time of the statistics in the “shift group settings”, the system will automatically calculate the duty time of each shift group according to the shift rules, and count the number of alarms generated and processing operations during each shift period.

- KPI statistics: Statistics are made according to the alarm statistics parameters and priorities set in “KPI Settings”, and a comparison chart of expected and actual values is displayed to facilitate the user to optimize production links and alarm settings.
- Full view of alarms: Count all the tag alarms under a certain range of nodes by tag top and reflect the overall situation in a report, and fill in the reasons and measures for each alarm.
- Total summary table of alarms: The alarm summary table provides comprehensive information on the alarms of the entire installation over a period of time and a comparison of the alarms of the installation.
- Device alarms statistic with shift: The alarm rate or number of alarms for the target device over a period of time is counted and compared to the desired value in the device settings.
- Operation frequency statistics: Count the number of operations of switching digits and operation times of PID tag within a specified time.
- PID operation mode statistics: Within a specified time, the proportion of time the PID is in each operation mode is counted, including automatic, manual, cascade, and others. For this statistic mode, the system needs to connect to the DA service.
- PID setting value statistics: Statistic the change of PID SV value within a specified time, including the times of changes, maximum value, minimum value and final value. For this statistic mode, the system needs to connect to the DA service.
- PID output value statistics: Statistic the change of PID MV value within a specified time, including the number of changes, maximum value, minimum value and final value. For this statistic mode, the system needs to connect to the DA service.
- PID parameter statistics: Statistics of the modification of PID parameters within a specified time, including P, I, D and the original and current values of positive and negative effects. For this statistic mode, the system needs to connect to the DA service.
- Operation trend statistic: Take the month, week, day or hour as the unit time to count the number of operations generated in each unit time.
- Schedule Statistic: Alarm statistics are carried out through the dimensions of personnel, post and shift. This statistic needs to first configure personnel, positions, teams, and shift scheduling plans, and associate positions in user-defined tag number groups.
- Alarm Response Time: Statistics of alarm response time in position dimension within a


specified time. You need to configure the position first and associate the position in the user-defined tag number group.

## 7.2.2 Statistical Steps

The manual statistical steps for each statistical type are similar, and the setting steps are as follows:

Select a statistical type in the interface shown in Figure 7-13 and click the corresponding icon. Then the statistic node selection dialog box will show in the right. (taking executing statistics as per occurrence rate as example)

**Figure 7-14 Statistical Parameter Settings (taking executing statistics as per occurrence rate as example)**

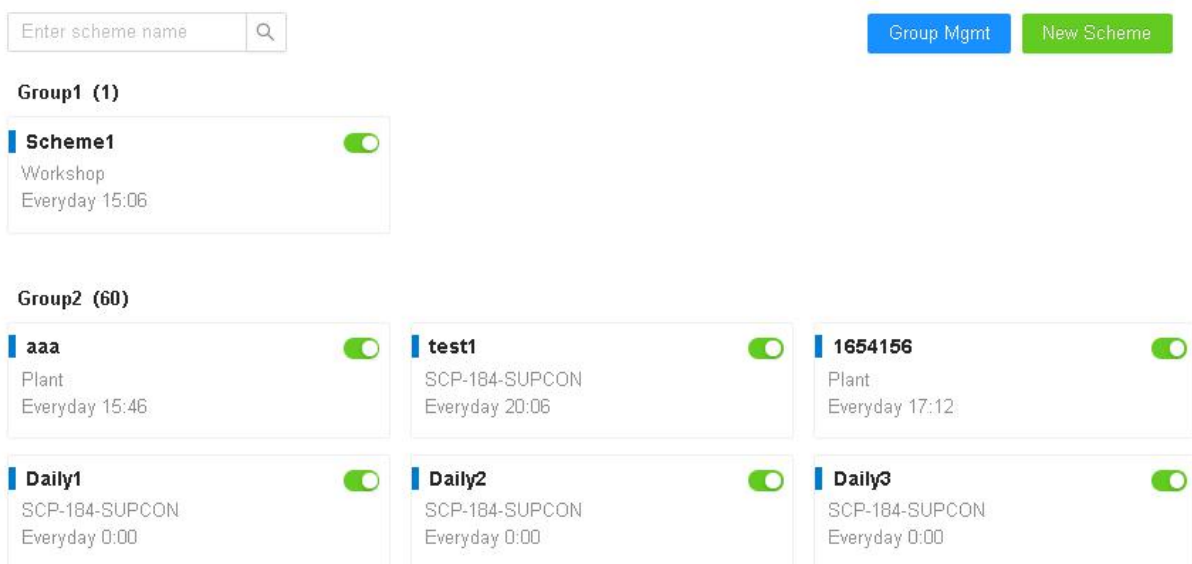
1. Select the statistical method as “Device Organization Structure” or “Tag Group”.
2. If the statistical method is “ Device Organization Structure”, select the equipment node in the list on the left below to be counted in the equipment organization structure. The equipment node should be the collector or its subordinate nodes. If the statistical method is “ Tag Group “, select the tag group that needs to be counted in the list on the left below.
3. Click the button  to add the selected device node or tag group from the to-be-selected list on the left to the selected list on the right.
4. Set the start time and end time of the statistical alarm: Click directly to enter the time, or click the drop-down arrow to set in the pop-up calendar page.

5. Set the number of statistics. The available options are TOP10, TOP20, TOP30 or All.
6. Set additional parameters of the statistics type, such as the level of statistics in the “Alarm Equipment” statistics. If it isn’t necessary, this step can be skipped.
7. Set whether the statistical results need to be added to the approval report.
8. Click the “Start” button and the prompt message “Setup successfully” appears on the interface, indicating that the statistical parameter settings have been completed.

## 7.3 Automatic Statistics

Through automatic statistics configuration, you can configure the parameters of statistical analysis and send the statistical plan to the specified mailbox.

In the navigation bar, select the menu command “Statistic & Analysis > Automatic Statistics” to enter the automatic statistical plan setting interface, as shown in the following figure.






**Figure 7-15 Automatic statistical plan**

### 7.3.1 Statistical Groups

You can manage different types of statistical schemes by grouping. In the interface shown as Figure 7-15, click the “Manage Group” button in the upper right corner to pop up the group setting dialog box, as shown in the figure below, the dialog box displays the existing statistical scheme grouping.



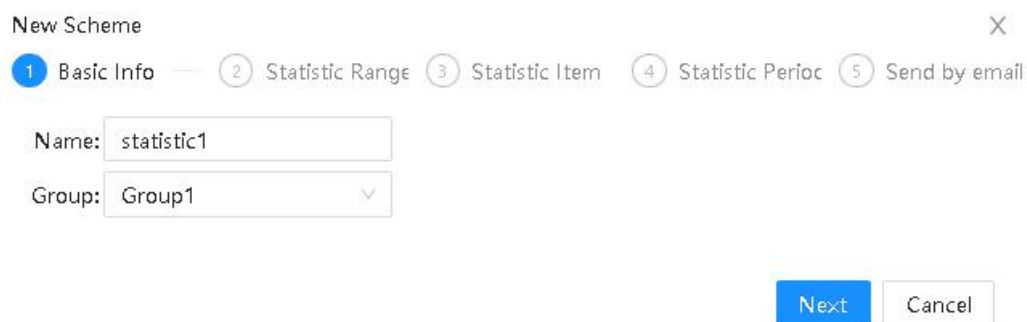
**Figure 7-16 Statistics group management**

- Add new group: Click “New Group” button, an editable blank text box will appear at the top of the list. Enter the group name in the text box, and then click the mouse in the blank space outside the text box. When the icon on the right changes from  to , it means that the newly created group has been saved.
- Delete group: Click the delete button  on the right side of the group, and click “OK” in the pop-up prompt box to delete the selected group. If there is a statistical scheme in the group when deleting, the group can still be deleted, and the statistical schemes under it will be displayed in the “ungrouped” category, and the group can be reselected on the statistical scheme edit page.

## Statistical Plans

Through the following steps, you can create a new automatic statistical plan:

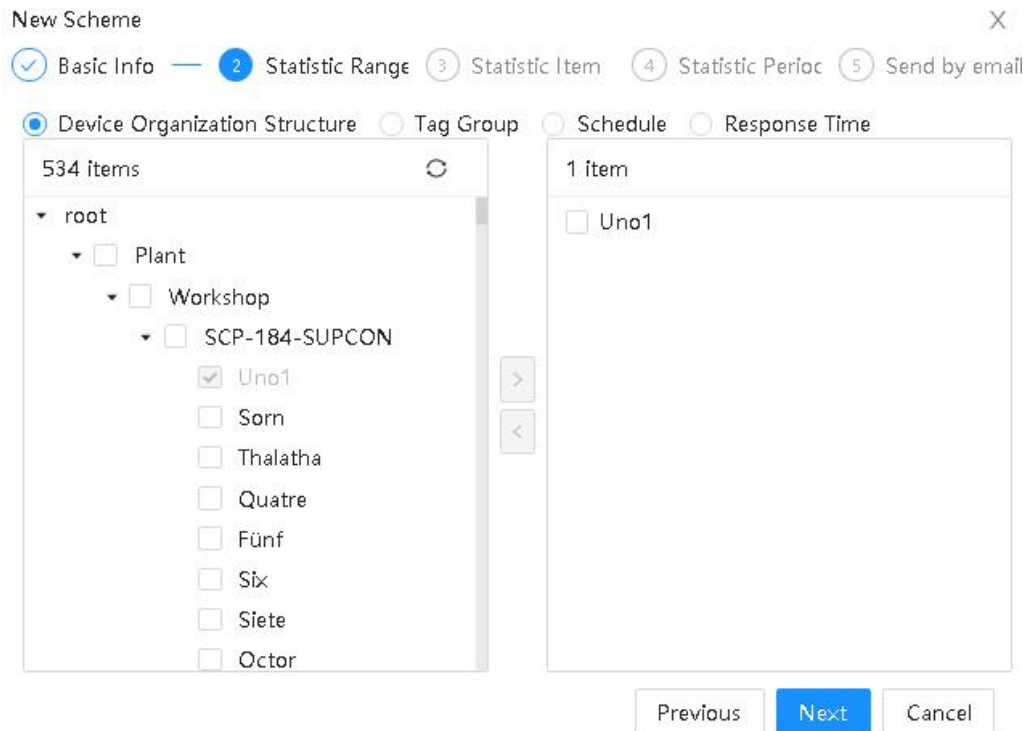
1. Click the “New” button above the list and the “New Plan” dialog box will pop up, as shown in the following figure.



**Figure 7-17 Create a new plan (equipment selection)**

On the “Basic Information” page, enter the plan name, select the group to which the statistical scheme belongs, and click “Next”.

2. The “Statistic Range” page is shown in the figure below. After selecting the statistical method, set the corresponding statistical parameters, and then click “Next”.



**Figure 7-18 New Program (statistical range)**

3. select the equipment node (collector and its lower nodes) that need to be alarmed in the “Statistic Item” list, and click the button to add it to the list of selected nodes on the right.
4. Click “Next” to enter the “Statistical Algorithm” configuration, as shown in Figure 7-18, check the required statistical type, and set the statistical quantity and additional parameters of some types, double click the cell to modify.

The additional parameters to be set are described as follows:

Alarm equipment statistics: it needs to set equipment nodes and statistical layers. Click the “Settings” button. In the dialog box that pops up, double click the cell in the “Node” column on the left to modify the node name of the start node of the statistics; Select the number of statistical layers from the drop-down box.

- Year, month and week analysis: Double click the cell in the “Additional parameters” column, you can select the statistical time span in the drop-down box.



New Scheme X

☒ Basic Info — 
 ☒ Statistic Range 
 ☒ 3 Statistic Item 
 ☐ 4 Statistic Period 
 ☐ 5 Send by email

2 items selected

<input type="checkbox"/>	Statistic Type	Statistic Range	Extra Params
<input checked="" type="checkbox"/>	Alarm Frequency	10 ▾	
<input checked="" type="checkbox"/>	Alarm Duration	10 ▾	
<input type="checkbox"/>	Alarm Priority	10 ▾	
<input type="checkbox"/>	Alarm Condition	10 ▾	
<input type="checkbox"/>	Alarm Confirm Rate	10 ▾	
<input type="checkbox"/>	Alarm Device	10 ▾	Setting
<input type="checkbox"/>	Relational Alarms	10 ▾	
<input type="checkbox"/>	Alarm Flood	10 ▾	
<input type="checkbox"/>	Stale Alarm	10 ▾	
<input type="checkbox"/>	Chattering Alarm	10 ▾	

**Figure 7-19 Create a new plan (statistical item)**

4. Click “Next” to configure the trigger period, as shown in the figure below. Select the statistical period and set the triggering time.

New Scheme X

☒ Basic Info — 
 ☒ Statistic Range 
 ☒ Statistic Item 
 ☒ 4 Statistic Period 
 ☐ 5 Send by email

☒ Everyday 
 ☐ Every week 
 ☐ Every month

Start Time  🕒

Statistic Duration  Hour  Min

Tip: data before this time point 24 h 0 min will be counted


Initiate Flow:  ▾

**Figure 7-20 Create a new plan (set trigger period)**

Click “Next” to enter the mailbox list settings, as shown in Figure 7-20, click the “New” button, enter the user name and recipient’s email address in the text box and click the “Add” button to add the recipient mailbox of the automatic statistical plan document. Repeat this step to add multiple

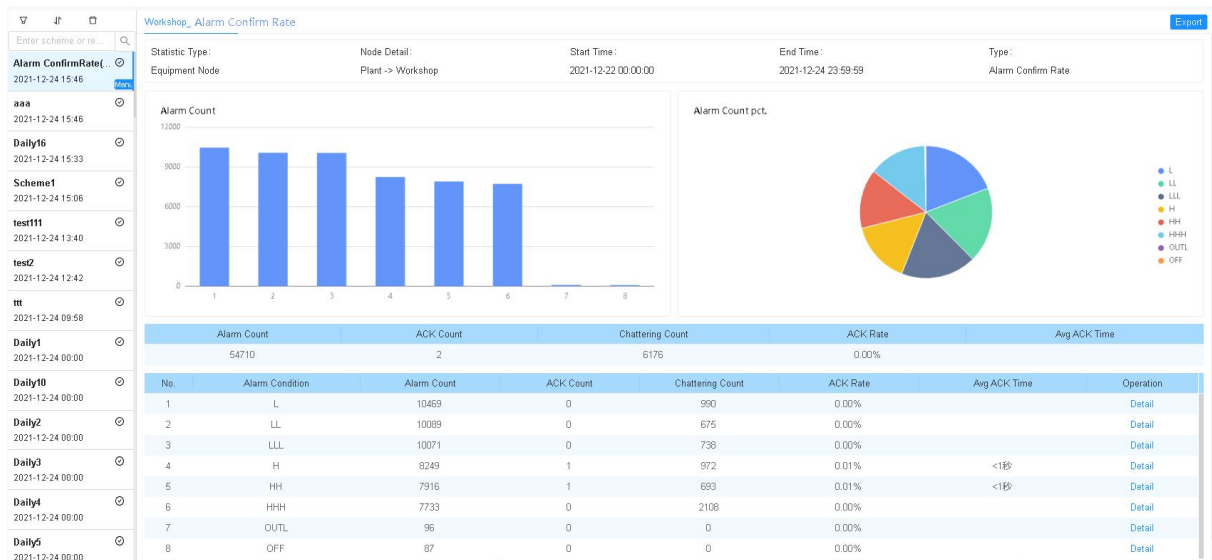
recipients.

**Figure 7-21 Create a new plan (mailbox list)**

- After completing the setting of the recipient's mailbox, click the “Confirm” button, the new statistical plan is displayed in the list shown in Figure 7-15, through the “Enable” column button  to switch the automatic statistical plan on and off. When the mouse is moved to the statistical scheme, the “Details”, “Edit” and “Delete” command buttons will appear. Click the command buttons to view the detailed information of the statistical scheme, modify the parameters of the statistical scheme, or delete the statistical scheme.

## 7.4 Statistical Results

After completing manual statistics or executing an automatic statistical plan, you can view the statistical results on the “Statistical Results” page. In the navigation bar, select the menu command “Statistic & Analysis > Statistic Results” to enter the statistical plan list interface as shown in the following figure.



**Figure 7-22 Statistical plan list**

As shown in the figure above, the list on the left shows the completed statistical schemes. Click the “Filter” button above the list on the left and select the time range to filter the records displayed in the list. Select a plan, the corresponding statistical report will be displayed on the right, and you can view the statistical chart information and statistical alarm data.



**Tips:**

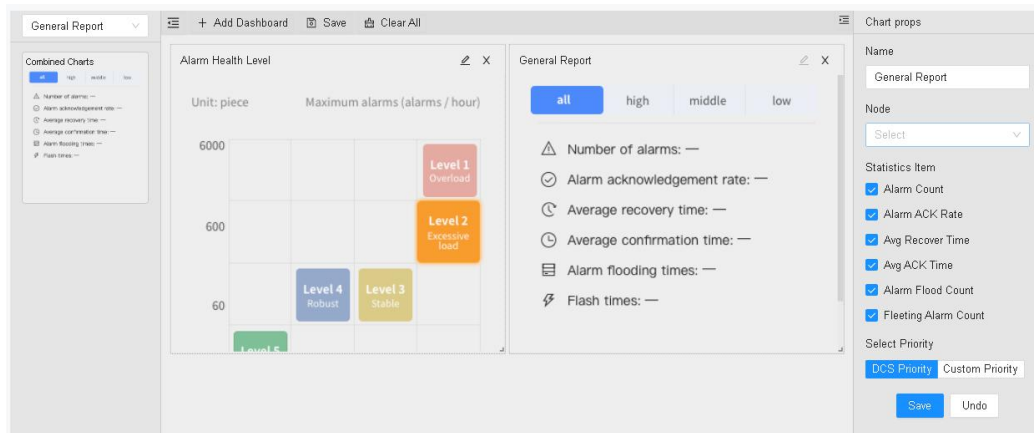
On the viewing page of the statistical report, click “Export” in the upper right corner to export the report to a local file in zip format, including the PDF and CSV files of the report.

## 7.5 DashBoard


Through the dashboard menu, you can freely select the module data that needs to be displayed, so that you can view or monitor the associated data on the same interface at the same time.

### Configuration Period

1. Select “Statistical Analysis > Dashboard > Edit Interface” in the navigation bar , as shown in the figure below, with the dashboard display area in the middle.



**Figure 7-23 Dashboard**

2. Click the “Add Panel” button above to add a blank panel in the display area.
  3. Select the type of panel to be added from the left, and select a panel, then hold down the left mouse button and drag the selected panel to the blank panel.
  4. Click the edit button  on the upper right of the panel in the display area, and set the panel properties in the property setting area that appears on the right, and click “Save” after completing the settings.
- Alarm overview map: You can select multiple statistical items for display, and the parameter settings will be synchronized from the parameter settings in the statistical analysis.
  - Alarm health level: Confirm the current alarm health level based on two parameters: The maximum number of alarms per hour and the average number of alarms per hour. You can set the scale of the x/y axis.
  - Number of unrecovered alarms and number of unacknowledged alarms: They are real-time alarms, and the refresh interval can be set.
  - Alarm health index: It consists of the maximum number of alarms per hour and the average number of alarms per hour. You can customize the start time and end time. The final statistics and display time are subject to this time.
  - Real-time alarm frequency: Real-time alarm data, the user can choose the refresh interval.
  - Historical alarm trend: You can define the query start time and query end time of the chart, and the final statistics and display time are subject to this time.
  - Operation events statistic: Count and display the total number of same-day operations for the target node for the last few days (the number of days is the number of days you set for search) in a bar chart, in days.
  - KPI statistic: The KPI statistics provides 3 types of dashboard: number of alarms alarm response and average number of alarms.

- Number of alarms contains 5 statistical item: Total number of alarms, total number of operations, number of intermittent alarms and number of fleeting alarms.
  - Alarm response contains 4 statistical items: Average response time, acknowledgement rate, percentage of alarm flooding time, percentage of total number of TOP10 alarms.
  - The average number of alarms contains 4 statistics item: Number of alarms per day, number of alarms per hour, number of alarms per 10 minutes, and maximum number of alarms in 10 minutes.
5. Repeat the above steps to complete all editing operations on the dashboard interface, and then click the “Save Settings” button above the display area.

### Monitoring Period

Select **Statistical Analysis > Dashboard > Display Interface** in the navigation bar to view the configured dashboard interface and real-time data, as shown in the figure below.

## Section 8 Stable Rate

---

The stable rate reflects the degree of fluctuation of process index and judges the stability of process index by the ratio of the standard deviation of process index to the corresponding average.

### 8.1 Set Stable Rate

Select **System Management > Global Settings > Stable** in the navigation bar, open the “Set Stable Rate” interface.

The screenshot shows the 'Set Stable Rate' interface with three configuration fields:

- \* Data Reserve:** A text input field followed by a unit selector dropdown menu currently set to 'Day'.
- \* Sampling Cycle:** A text input field followed by a unit selector dropdown menu currently set to 'Min'. The dropdown menu has up and down arrow buttons.
- \* Caculate Cycle:** A text input field followed by a unit selector dropdown menu currently set to 'Hour'.

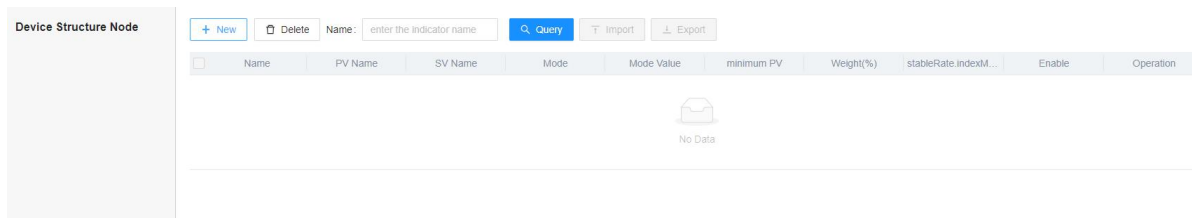
**Figure 8 - 1 Set Stable Rate**

You can set the retention time of the stable rate history, the DA data sampling period and the

stable rate calculation period.

## 8.2 Manage Index

Select **System Management > Stable > Index Management** in the navigation bar and open the interface as shown in the figure below.



**Figure 8 - 2 Manage Index**

### Add Index

1. Select a node in the node tree on the left, click **New**, and a “Add Index” dialog will pop up.
2. Fill in the index name, the PV tag, the lower limit of the PV, the weighting of the index, the description and whether the index is enabled immediately. If the index object is a PID type tag, you also need to fill in the SV tag, the control mode and the automatic mode value.
3. After completed the form, click **OK** to save the index. The saved index will be displayed in the list.


### Search Index

Enter the name of the index you are searching for in the “Index name” text box and click **search**. Fuzzy search is supported for searching indexes.

### Edit Index

Click **Edit** after the index to open the “Modify Index” dialog. Here you can change the index name, lower limit of the PV, the weight, the description and the enabling states. The PV tag, SV tag, control mode and automatic mode value cannot be modified.

### Enable/Disable Index

The index can be enabled or disabled by clicking  in the list of indexes or in the “Modify Index” dialog .

### Import Index

Click **Import** to open the “Import Index” dialog box where you can select a local index file and click **Start Importing** to up load. You can also download the template and edit it before uploading. The list of indexes will be updated automatically after a successful import.

## Export Index

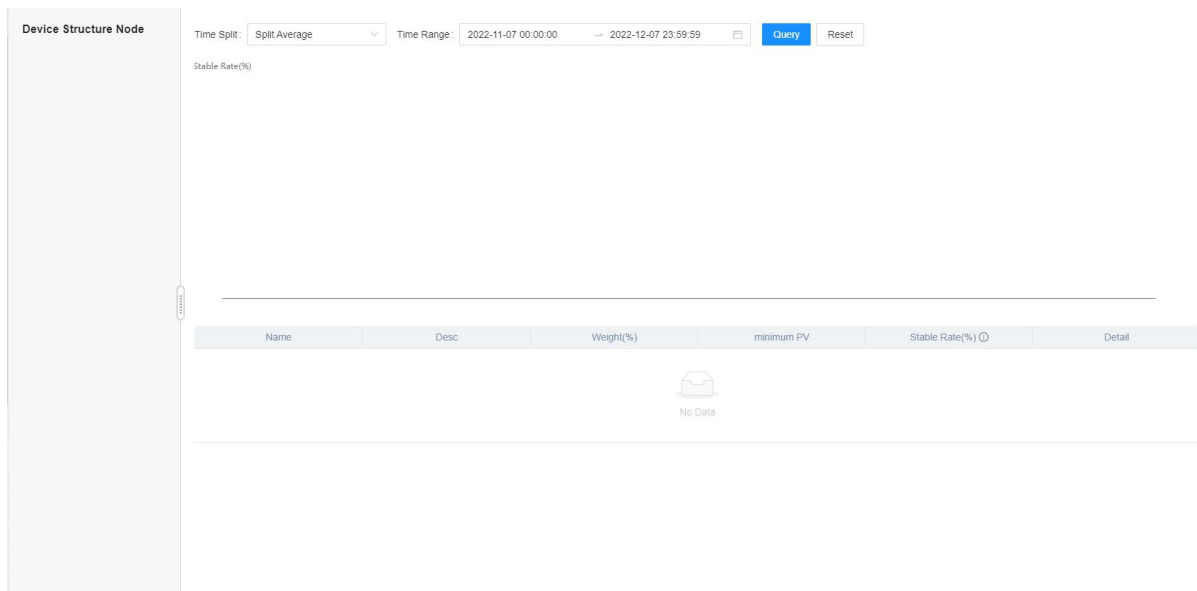
Click **Export** to export all current indexes to an excel file. You can edit this file, then import it into the Index Management.

## Delete Index

Check one or more indexes and click **Delete**, click **OK** in the secondary confirmation dialog box that pops up to remove the selected indexes.

## 8.3 Search History

Select **System Managerment > Stable Rate > Search History** in the navigation bar, open the “Search History” interface as shown in the figure below.



**Figure 8 - 3 Search History**

### Steps:


1. Select the node you want to search on the left, the right-hand interface will automatically display a line graph of the total stable rate averaged over a month, along with a list containing all indexes under that node.
2. Click the **Time Interval** drop-down menu to choose the divided line chart by hour or by day.



#### ATTENTION:

- When choosing to divide evenly, the search time will be divided into 25 time points.
- When choosing to divide by hour, the search time range cannot exceed 100 hours.
- When choosing to divide by day, the search time range cannot exceed 100 days.

3. Select the time range and click **Search**. The line graph and index information will be updated automatically.

4. Click **Reset** to clear all search conditions.
5. Hover over the line graph node and a bubble will pop up showing the total stable rate at that point in time.
6. The list of indexes will show the name, description, weight, lower limit of PV and stable rate for each index under the selected node. The formula for calculating the stable rate can be found by hovering over the  next to the stable rate.
7. Click **Detail** for an individual index in the list to open the details dialog shown below. The detail will show the individual stable rate for the index in a line chart.

## Section 9 Production Status Monitoring

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In the navigation bar, select the three command menus under “Production Status Monitoring” to enter the production status monitoring interface, which is mainly for enterprise management to monitor the stable rate of the production process in real time, and to quantitatively display the status of various indexes. By means of comparison, it effectively enhances the operator’s behavior to control the production indexes, thereby improving the efficiency of enterprise operation and maintenance management.

- Index value management

The index value configuration of the corresponding collector is addition, deletion, or modification.

- Real-time monitoring

Display the specified interval to refresh the current index curve.

- History query

Query all index values and summary index values under the selected level in the specified time period.

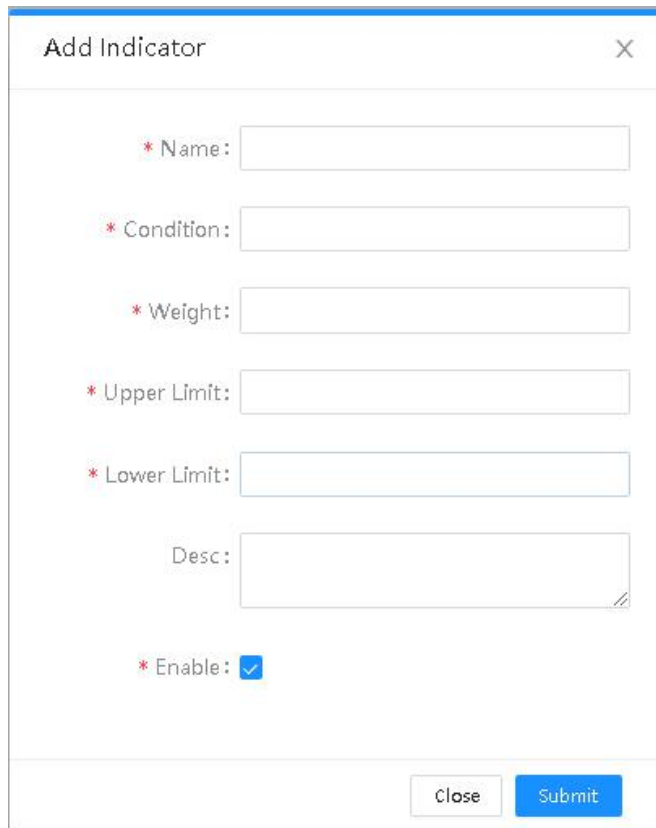
### 9.1 Index Management

For the collector to create, delete and modify the stable rate index, the index is the value calculated by the calculation expression. The index value has a qualified upper limit, a qualified lower limit, and index weight parameters, which are used for the calculation of the plateau rate.

Select “Production Status Monitoring > Index Management” in the navigation bar, and configure the index items that need to be monitored. The steps are as follows:

- 1) Select a device node in the device organization structure on the left, and then click the “Add” button on the right and a dialog box for adding indexes pops up, as shown in the figure below.



A screenshot of a web-based 'Add Indicator' dialog box. The dialog has a title bar with the text 'Add Indicator' and a close button (X). Inside the dialog, there are several input fields, each preceded by a red asterisk indicating it is required. The fields are: 'Name:', 'Condition:', 'Weight:', 'Upper Limit:', and 'Lower Limit:'. Below these is a 'Desc:' field with a text area. At the bottom of the form is an 'Enable:' checkbox, which is currently checked. At the very bottom of the dialog are two buttons: 'Close' and 'Submit'.

**Figure 9-1 New index**

- 2) Fill in the index name, expression, weight, and upper and lower limits of the index value, select whether to enable the index, and then click the “Submit” button to complete the addition of a new index.
- 3) Repeat the above steps to add all the indexes that need to be monitored.

## 9.2 Real-time Monitoring

The real-time monitoring interface is used to display the smooth rate curve formed by the index values of the refresh interval. The curve has a qualified upper limit area and a qualified lower limit area. Select “Production Status Monitoring > Real-time Monitoring” in the navigation bar , the interface is as shown in the figure below. The index row under the specified node on the left is displayed at the bottom, select an index row, and the statistical data of the corresponding index is displayed at the top.



Figure 9-2 Real-time monitoring

## 9.3 View History Data

In the navigation bar, select “Production Status Monitoring > Historical Query”, you can query the node stable rate in the specified time period, and the interface is similar to that in

Figure 9-1. The real-time monitoring screen shown is similar, the index row under the specified node on the left is displayed at the bottom, and the stable rate of the corresponding index is displayed at the top after selecting an index row.

The calculation formula of the stable rate is as follows:

- Stable rate calculation formula:  $1 - \frac{\text{over-upper limit time} + \text{over-lower limit time}}{60}$
- The formula for calculating the total stationary rate:  $\sum \text{sub-stable rate} * \text{weight}$

## Section 10 System Log

On the interface shown in Figure 2-2, click the “System Log” button to view system log information such as user login records, multiple operating condition alarms, DA operational records, and configuration examination, as shown in the following figure.

Time range: 2022-12-04 00:00:00 -- 2022-12-07 23:59:59		Type: All types	Subtype: All subtypes	Query	Reset
No.	Type	Subtype	Time	User	Content
1	DCS Adaptation	DCS Adaptation Settings	2022-12-07 17:07:27	admin	Add schem:11111 success
2	Multistate	Management	2022-12-07 13:53:38	admin	Add State Name: 压力压力 Expression: eqwrgdsag Mode: Manual Filtering: 1.

**Figure 10-1 System Log**

### Log Type

There are 5 types of logs: Multi-states, DA operation, Configuration Audit, Statistical analysis, DCS adaption. You can select in the Type menu whether you want to search for all or specific types of logs. The 5 log types and their subtypes are described below.

- Multi-states
  - 1) Multi-states management: Adding multi-states, editing multi-states, deleting multi-states, enabling multi-states, disabling multi-states and switching states mode.
  - 2) Multi-states operation configuration: Adding multi-state operations, editing multi-state operations, deleting multi-state operations.
  - 3) Multi-states activation: Including normal or abnormal conditions resulting in a change of service states to active or inactive.
  - 4) Multi-states write-back success: Logs recorded when a state has successfully operated on an object tag after a state switch.
  - 5) Multi-states write-back failed: Logs recorded when a state has failed to operate successfully on an object tag after a state switch.
- DA operation
  - 6) DA write-back failed: DA write-back of object tags via alarm shelving, multi-states and audit has failed.
  - 7) DA write-back success: DA write-back of object tags via alarm shelving, multi-states and audit has succeeded.
  - 8) DA connection states: Monitoring of connection and disconnection records between the collector and the DA service.
  - 9) Automatic disabling of DA write-back: Monitoring of automatic disabling of DA write-back when the collector is disconnected from OPC.

10) Alarm enable synchronisation.

- Audit

11) Scheme setting: Including adding, editing, enabling, disabling and deleting audit schemes; manually initiating audits, stopping ongoing audit tasks, and synchronising between the DCS and AM databases.

12) Audit results: Successful execution of an automated audit or manual audit, of failure of execution and reasons for failure.

- Statistic analysis

1) Send email failure.

2) Statistics failure (function is disabled and can be ignored).

3) KPI scheme setting: Contains information on adding, editing and deleting KPI schemes, as well as binding the scheme to the device organisation node or tag groups.

- DCS adaption

Log information on adding, editing and deleting DCS adaption schemes, binding schemes to collectors.

## Search Steps

By selecting the start and end time, unselecting or selecting the search type and subtype, then click **Search**, you can search the corresponding logs for a specific time period.

Click **Reset** to clear all search conditions.

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## Section 11 Tag-writing Configuration

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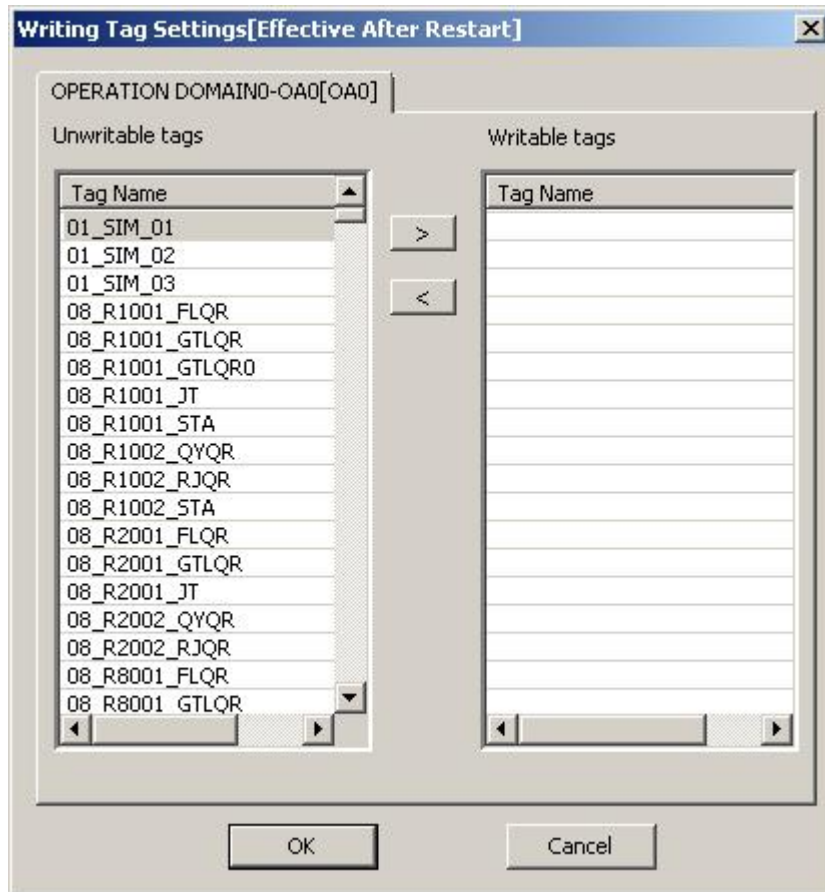
In the AM system, whether the value-writing operation in AM can or not affect the DCS system can be set by configuring DA's permission to write in collector service. The configuring steps are as follows.

1. On the service deployment page, right-click the collector service and select "Service Settings" from the right-click menu.
2. Configure DA's permission to write. For parameter descriptions, please refer to Configuration Illustration.



The DA's permission to write is used to specify a certain tag in the DCS system as a tag to enable or disable the function to write back in AM system. If the value of the tag in the DCS system is consistent with the check value set in the AM system, the AM will perform a write-back operation and synchronize the modification of the alarm parameters (such as multi-state alarm operations) to the DCS system. It is recommended to use digital tags.

After completing the configuration of AM, you need to configure the tag on computers where the OPC server locates. The steps are as follows:

- 1) After the OPC server is running, right click the ECSDASvr and select “Tag Writing Configuration” in its right-click menu. The “Tag Writing Configuration” dialog box will pop up as shown below.



**Figure 11-1 Tag writing configuration**

- 2) Select a tag in the “Not allowed to write” list and click  to add it to the “Allow to write” list, which means it is going to be a tag able to be written. In addition, by clicking , you can move a tag in “Allow to write” list to “Not allowed to write” list, which means it is going to be a tag not able to be written.
- 3) Click “OK” to complete the setting.
- 4) Restart the OPC client to execute value writing operation on tags in 11-1.

Figure

## Section 12 System and Monitoring Configuration

AM supports online switching accounts or logging out.

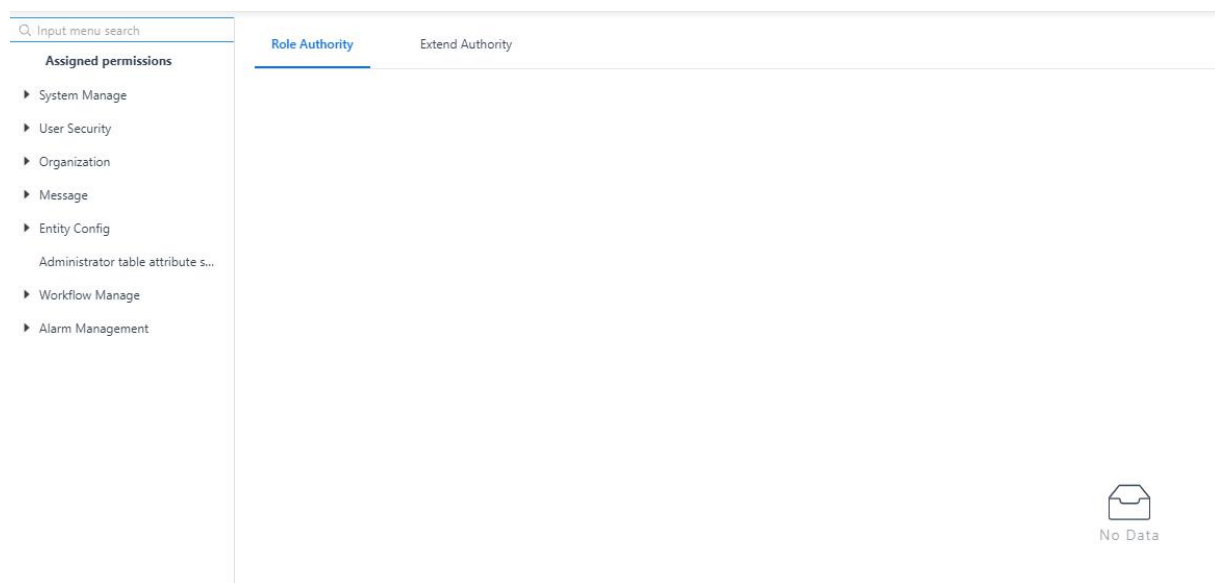
### 12.1 Organization and User Configuration

Refer to *OMC Software User Manual*.

### 12.2 AM Authority Management

AM authorities include both menu authorities and node authorities. By setting AM authorities for a specific user you can control the functional modules and nodes that can be viewed by that user in AM.

Select **User Security > User Manage**, hover over the role you need to adjust authorities for and click on **authority** to bring up the “User Authority Manage” tab shown below.



**Figure 12-1 User Manage**

#### 12.2.1 Menu Authorities

Select Alarm Management from the list on the left and the right will change to the interface shown below.

Q Input menu search

Assigned permissions

System Manage

User Security

Organization

Message

Entity Config

Administrator table attribute s...

Workflow Manage

**Alarm Management**

Role Authority

Extend Authority

Unassigned

Assign permissions

menu	Operation item	Data permissions							unlimited	Select all
		Post restrictions	Sector restrictions	Designated position	Designated department	Designated personnel	Handler			
<input type="checkbox"/> Alarm Management	-	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> System Management	-	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Service Deployment	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> System Log	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Tag Management	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Tag Group	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Global Settings	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Real-time Monitor	-	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Real-time Alarm	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Alarm Shelving	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Multi-state Alarm	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> History Data	-	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> History Alarm	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> History Operation	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Sequence of Events	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Dashboard	-	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Configure Dashboard	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Display Dashboard	操作	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> Statistic Analysis	-	-	-	-	-	-	-	<input type="checkbox"/>	<input type="checkbox"/>	

**Figure 12-2 User Management Interface**

Here you can select the functions that can operated for the selected role, check the box and click **Assign Permissions** on the right to complete the binding of authorities, or you can also bind the same authority to other roles by using the “Assign to role at the same time” on the right.

Once the authorities have taken effect, only the bound function modules will be displayed in the interface of the corresponding role.

### 12.2.2 Node Authorities

Click **Alarm Management** interface at the top to open the “Data Authority” interface as shown below.

administrator role permission settings

Function Authority

**Alarm Management**

Pilot Permissions

Save

Data Access

- root
  - Storage Service
    - default
      - ☒ Collector
      - ☒ aa
      - ☐ Collector1

**Figure 12-3 Node Authorities**

Here you can bind the nodes of the node tree that you are allowed to view and manipulate for the role you have selected, click **Save** in the top right corner to complete the binding of the role to the node. Once the authority is in effect, the corresponding role can only view and operate the bound nodes.

## Section 13 Revision

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*Table 13-1 Retrofit list of the version*

Document Version	Applicable Product Version	Remarks
V1.0 (20211227)	VxAAS V3.00.04.00-M	The first edition
V2.0 (20221129)	InPlant AAS V4.0	
V3.0 (20230831)	OMC V1.2	OMC