

OMC System Software
High-performanceHMI
Project Guide
User Manual
IM41S51-E

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Project Guide

Section 1 Overview

High-performanceHMI system software is a software package designed for the control system configuration and supervision of OMC. This system software supports control domain distribution, operation domain distribution, parallel configuration, single domain import and export, single control station import and export, single control station configuration backup, on-line debugging, on-line downloading and multiple databases within the system structure.

1.1 Basic Process of Project Configuration

System configuration is the process of configuring each software and hardware parameter for control system from engineer station. Many system functions and corresponding parameters need to be assigned according to specific situation due to the generality and complexity of DCS. For example, how many control domains and operation domains does the system contain; how many control stations or operation nodes does each control domain and operation domain contain; what kinds of signal does the system collect, what kind of control scheme to adopt, how to control, what data need to be displayed during operation, how to operate, etc. In addition, in order to meet various specific demands, DCS provides abundant I/O modules; various control modules and multiple operation platforms. Hardware devices are usually chosen according to system request during configuration; when communicating with other system, the protocols and ports adopted in the system need to be provided.

DCS configuration is a step-by-step process with comprehensive application of multiple types of software. When configuring the control system with High-performanceHMI system software, it can be carried out step by step according to the technical demand.

1.2 System Configuration Work Flow Chart

The main system configuration work flow chart is shown as Figure 1-1.

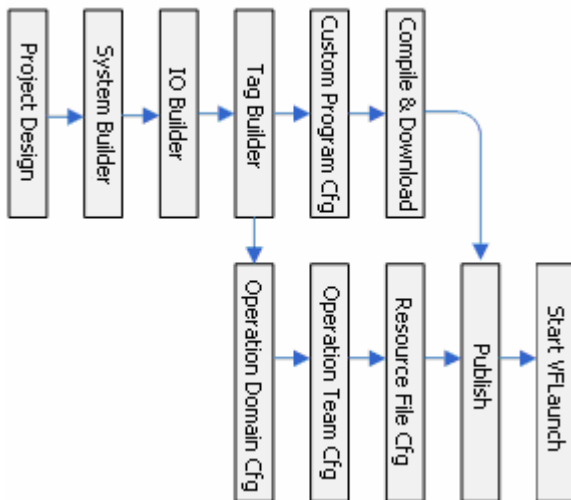


Figure 1-1 System configuration flow chart

The operations in the above flow chart are described as following.

1. Project design

Project design includes measuring points list design, regular (or complex) objects control scheme design, system control scheme design, flow charts design, report forms design and relevant documents compiling, etc. After project design is complete, *Measuring Points List*, *System Configuration Manual List*, *System Topology Figure*, *Control Cabinet Layout*, *I/O Layout*, *Control Scheme* and other technical documents should be generated.

Project design is the basis for system configuration, therefore, system configuration must be carried out after the project design is complete.

2. System Builder

System builder is achieved by VFSysBuilder. Its main duty is to configure the system structure and project management authority.

System global structure configuration is to determine system control domain, control station, operation domain, operation domain server, operator (engineer station) according to *System Configuration Manual List* and *System Topology Figure*.

After the project is built, inspection and modification of system structure, configuration of the control station and control domain can only be implemented by engineers with corresponding authority.

Once the system structure is fixed, try to avoid its modification.

3. IO Builder

Configuration of communication module and I/O module is carried out within the hardware configuration software (VFIOBuilder) according to the requirement of *I/O Module Layout* and *Measured Points List*.

4. Tag Builder

Tag build is carried out in VFTAGBuilder. I/O tag build is carried out according to the requirement of *measured point list*; variables used in the system communication are defined according to requirement of project design; variables employed to interact between program pages are defined according to the requirement of custom program.

5. Custom program configuration

The requirement of *Control Scheme* is achieved by FBD or LD, or other programming languages.

6. Compile and download

Download all the information required for control station operation to corresponding controllers.

7. Operation domain configuration

This option is to set the general configuration of operation domain, including operator authority configuration, panel authority configuration, domain variable configuration, history trend configuration, custom alarm group, shelve alarm, manage state, procedure, etc.

Operator authority configuration is mainly to assign the authority of the operator.

Different levels of users are defined in the software to ensure operation authority, namely, users of a specific level can only perform their specific operation authority.

8. Operation team configuration

Operation team configuration is to set operation teams within each operation station, so that different operation teams can observe, set and modify different standard displays, graphics report forms, custom keys, etc. Operator grouping is benefit for assigning the duty of operators, simplifying the operator's operation and emphasizing the important points of supervision.

9. Resource file configuration

Resource file mainly includes graphics and schedule. Particularly, graphics configuration takes more time, so it can be carried out independently in the early phase of project, then being integrated.

10. Publish

Publish the project configuration in the server to corresponding operation domain or operator station (engineer station).

Section 2 New Project

System configuration process and operation procedure are illustrated by the following example according to the instructions of system configuration working flow chart. The project example is just for instruction of configuration procedure and method, and doesn't guarantee the rationality of the configuration content.

2.1 Configuration Prophase Preparations

All documents and materials required in the configuration, including system structure, module layout, measuring points list, data grouping method, system control scheme, supervision display, report forms, etc. should be collected before the configuration. The system requirement in this example is as follows:

System is composed of 2 control domains, which are "Combustion" (domain address is 0) and "Turbine" (domain address is 2). There are 2 control stations in "Combustion" control domain: "Steam_Water"(address is 0.2) and "BOP"(address is 0.4). There are 2 control stations in "Turbine" control domain, which are "Turbine1"(address is 2.2), "Turbine2"(address is 2.4). Tag statistics is as follows:

Table 2-1 Tags statistics table

Tag Type Station Name	AI	AO	DI	DO	Custom tag	Total
Steam_Water	400	96	112	16	>113	>737
BOP	103	24	32	16	>23	>198
Turbine1	208	32	48		>29	317
Turbine2	384	80	48	32	>271	815
Total	995	232	240	64	>436	2067

2 operation domains are set: "MainSteamConV" and "PAttemperatorConV". It is required that "MainSteamConV" operation domain supervise "Combustion" control domain and "Turbine" control domain simultaneously while "PAttemperatorConV" only supervise "Turbine" control domain. Operation domain settings are as follows:

MainSteamConV operation domain: operates and controls 2 control domains.

- Server: [0.159] Data Server 1
- Server: [0.160] Data Server 2
- Operation Node: [0.161] Engineer Station, [0.162] Operation Station, [0.163] Operation Station, [0.254] Operation Station

PAttemperatorConV operation domain: operates and controls the Turbine control domain.

- Server: [2.159] Data Server 1
- Server: [2.160] Data Server 2
- Operation Node: [2.165] Operation Station, [2.166] Operation Station

OS162 is the configuration server.



Tip:

In principle, apart from dividing control domain according to process feature and system scale, it is mainly carried out according to the requirement of supervised control domain in the operation domain. Whether operation domain needs to be supervised can be determined in the unit of control domain. If supervision is not needed, operation nodes within this control domain would not be able to receive the data of this control domain. If an operation domain needs to supervise control station A and B, but not C, then control station A and B can be placed in the same control domain, while control station C cannot be placed in the same control domain of A and B. Operation domain is mainly divided according to the system load and supervision requirement of operation node. Operation nodes belong to the same control domain can supervise several control domains at the same time, and different operation domains can supervise the same control domain at the same time, namely, a control domain can be supervised by several operation domains at the same time.

2.2 Topological graph of the system

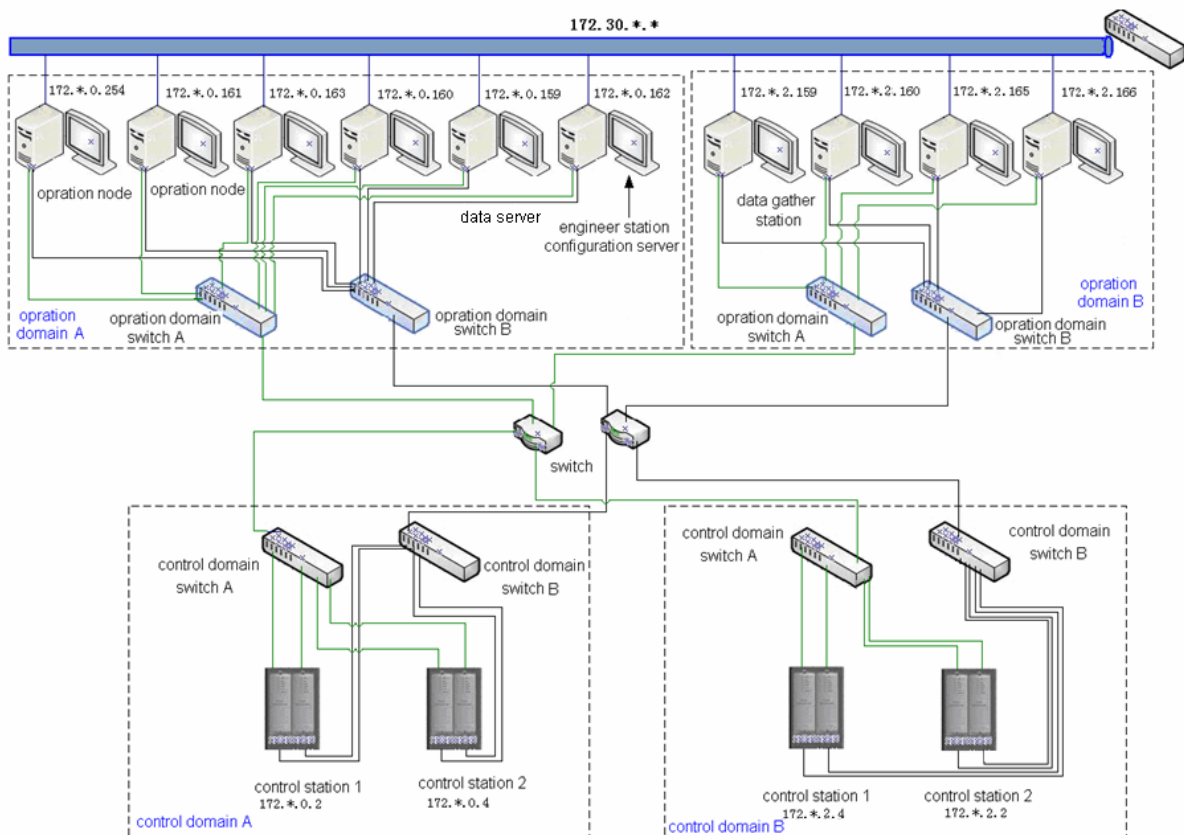


Figure 2-1 Topological graph of the system

2.3 System Builder



Tip:

For more operation instruction details of System builder, refer to the *System Builder User Manual*.

After system structure is determined, system structure can be configured in the configuration server.

System builder is mainly to configure the system structure and management authority of the project. System structure mainly includes control domain, control station, operation domain and operation node.

2.3.1 New Project



Click icon VFSysBuilder on the desktop of the configuration server to start up the VFSysBuilder,

click new project then input project name and creator, shown as Figure 2-2:

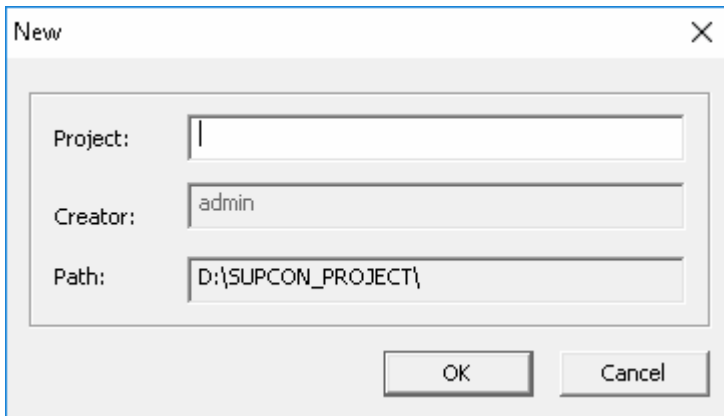
A screenshot of a 'New' dialog box. It has a title bar with 'New' and a close button. Inside, there are three text input fields: 'Project:' (empty), 'Creator:' (containing 'admin'), and 'Path:' (containing 'D:\SUPCON_PROJECT\'). At the bottom right are 'OK' and 'Cancel' buttons.

Figure 2-2 new project

Input project name in the New Project dialog box: INDBARATHPOWER; Creator: supcon, click "OK", and the new password dialog box giving choice whether to create password for "supcon" will pop up. Choose "NO", and the engineer password would be empty; choose "YES", and the user can set engineer password, the pop-up window for creating password is as Figure 2-3:

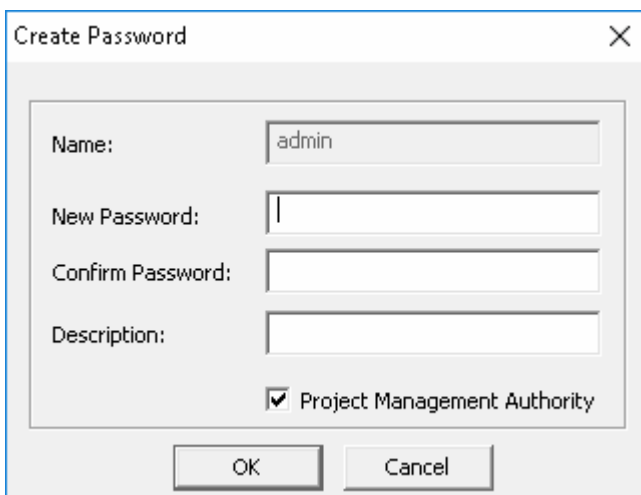
A screenshot of a 'Create Password' dialog box. It has a title bar with 'Create Password' and a close button. Inside, there are four text input fields: 'Name:' (containing 'admin'), 'New Password:' (empty), 'Confirm Password:' (empty), and 'Description:' (empty). Below these fields is a checkbox labeled 'Project Management Authority' which is checked. At the bottom are 'OK' and 'Cancel' buttons.

Figure 2-3 set the engineer password

Input engineer password and confirm password, and then click the button "OK" to start VFSysBuilder.

2.3.2 Add Reference Project

The monitoring of CCR for several FAR can be achieved by reference project via mutual reference of real-time data among projects. A project can reference 1~32 projects.

Configuration of reference project can be achieved by following steps:

1. Select "Referenced Project" in work space.
2. Right-click and select "Add Reference Project" to add a sub-node to "Referenced Project" automatically.

- Input the address of reference project in "Configuration Properties Bar" (i.e. 172.30.1.156 in the figure below). After setting successfully and the address is valid, the information of the referenced project is shown in properties bar, such as the contained operation domain and its properties.

Properties	
Name	INDBARATHPOWER
Address	172.30.1.156
Operation Domain	
Operation Domain0	
Server Address	172.30.1.156

Figure 2-4 Configure reference project

After adding successfully, the operation domain can be referenced in the operation domain configuration.



Tip:

If the operation domain in a project is referenced, the project cannot be deleted until the referenced operation domain is deleted.

2.3.3 Add Control Domains and Control Stations

After project has been created, firstly, add control domain according to system structure, right click "Control Domain ", and select "Add Control Domain", shown as Figure 2-5:

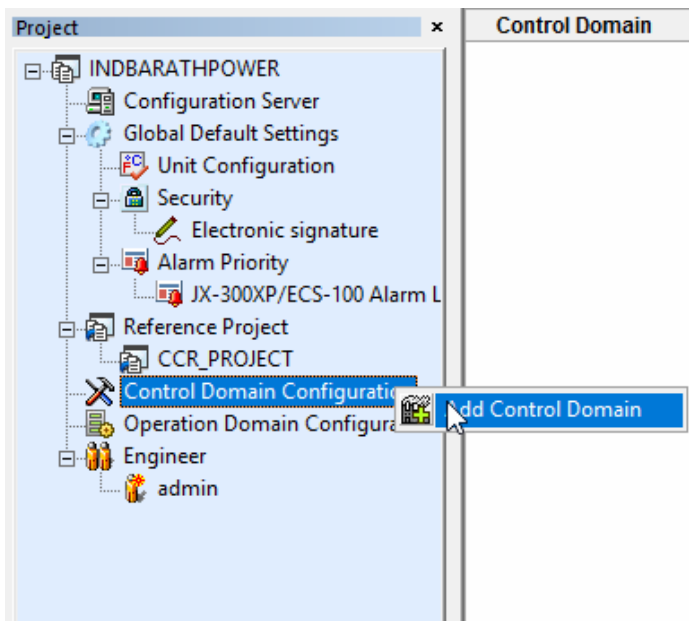


Figure 2-5 add control domain

Click the new control domain, its name and address can be modified in the right pane.

Right click the control station, and choose "Add Control Station" in right-click menu to add a control station within the control domain. Modify the control station name, address, description and type.

Follow the steps above and complete setting the control domain and control station information.

2.3.4 Add Operation Domain and Operation Node

Firstly, create an operation domain. Right click "Operation Domain", and choose "Add Operation Domain" in the right-click menu, shown as Figure 2-6:

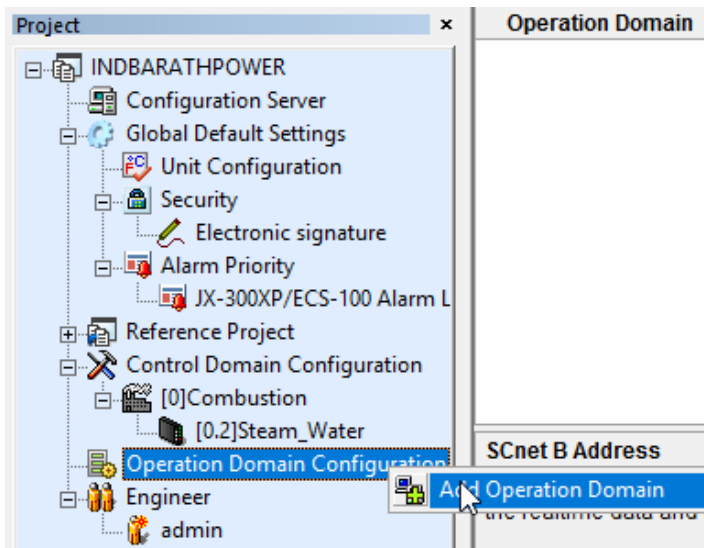


Figure 2-6 add operation domain

Modify the operation domain properties, etc., shown as Figure 2-7:

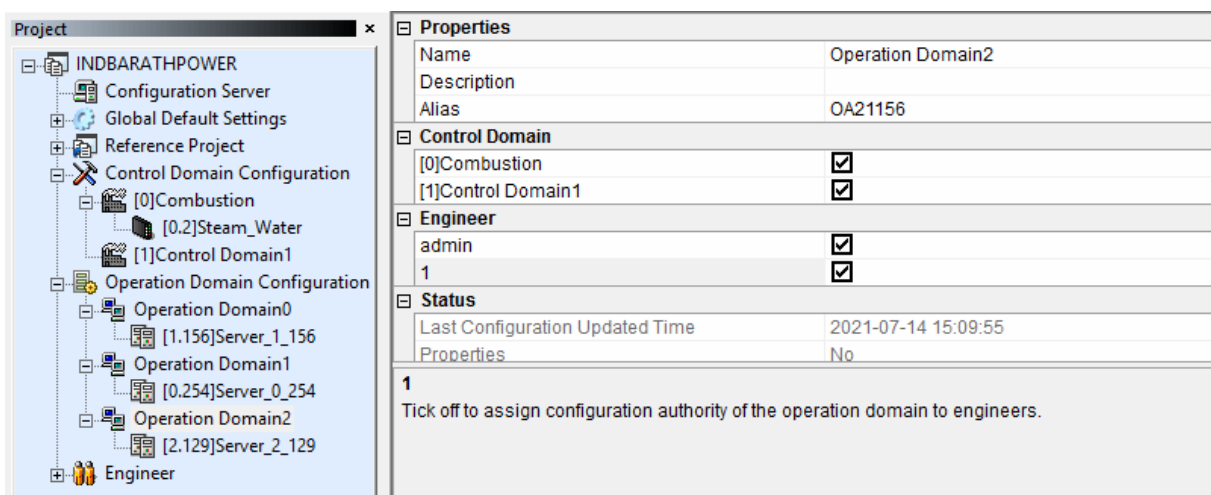


Figure 2-7 modify operation domain attributes

Set the name, network address, etc. for domain server. Right click "MainSteamConV", and then choose "Add Operation Node" in right-click menu to add an operation node in this operation domain. Modify the name and network address of the operation node, shown as Figure 2-8:

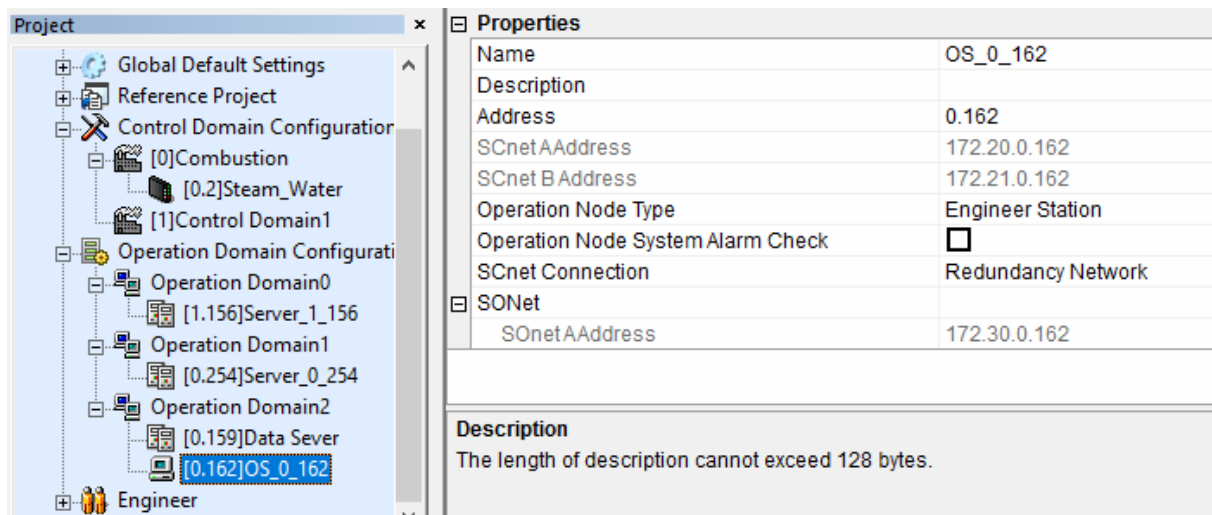


Figure 2-8 modify the properties of the operation domain node

Follow the above steps to complete all configurations of operation domain.

2.3.5 Add Reference Domain

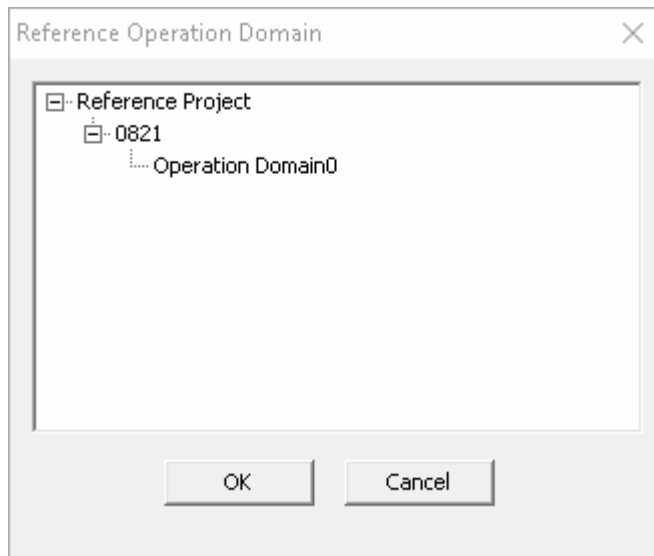
After adding reference project, user can add "Reference Domain" in operation domain. An operation domain can reference 1~128 operation domains.

User can perform following operations via reference domain:



- View and edit the graphics of the referenced domain.
- Perform HMI configuration for tag in reference domain.
- Search the history trend, history alarm and operation record of reference domain.

If the operation domain is not locked, add reference domain by following steps:

- 1) Right-click the specified operation domain in work space, and select "Add Reference Domain".
- 2) Pop up the "Reference Operation Domain" dialog, the domain inside is operation domain of reference project.



- 3) Select operation domain to be referenced and click “Ok”.

After adding reference domain successfully, a node with icon  will be added to operation domain. The name format of reference domain is “Reference Project Name. Reference Domain Alias”, such as  0821:OA2760, “0821” is the referenced project name, and “OA2760” is the referenced domain alias.

Tips:



- The locked reference domain can only be deleted after being unlocked.
 - Reference domain must be default project in configuration server of the specified address.
 - After modifying the domain alias in the referenced domain and publishing, the update of referenced domain can be checked only after open the VFSysBuilder of referenced project, and the modification can be valid only after saving them.
-

2.3.6 Configure Supervised Control Domain

If an operation domain hasn't been configured to supervise a certain control domain, the data of this control domain is invisible to the operation domain. According to the requirement of system configuration, in principle it's commended that one operation domain corresponds to one control domain, and create another operation domain that can supervise all control domain which is convenient for engineer to maintain DCS system. For example, in this project, “MainSteamConV” can supervise Combustion and Turbine simultaneously; “PAtTemperatorConV” can supervise Turbine, making it convenient for DCS maintenance.

Select the operation domain needs to be configured, and choose corresponding supervised control domain, shown as Figure 2-9:

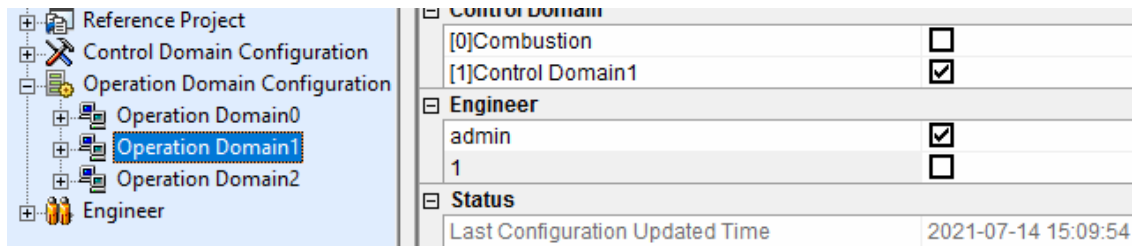


Figure 2-9 configure the supervised control domain of operation domain

2.3.7 Management of Engineer's Authority

After the basic System builder is completed, engineer's authority of the project can be assigned. Engineer's main authority includes project management authority, control station configuration authority, operation domain configuration authority.

Right click "Engineer" to add an engineer or an engineer group, shown as Figure 2-10:

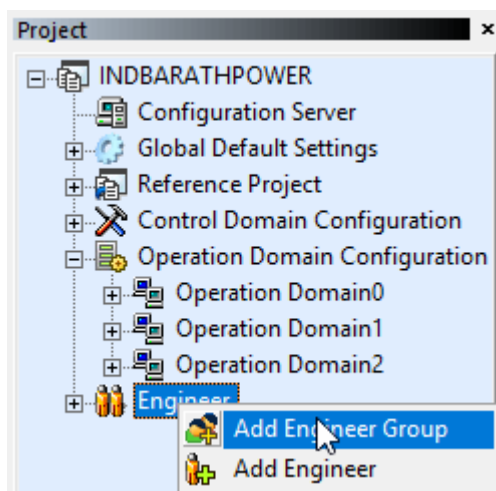


Figure 2-10 add an engineer or engineer group

Project management authority is mainly set to open VFSysBuilder. This authority allows modifying system structure and changing any other engineer's authority as well, so the engineer account with project management authority should be strictly controlled.

After engineer groups and engineer accounts have been built successfully, configuration authorities of engineer groups and engineers can be configured, mainly including configuration authority of control domain and operation domain. Engineer's authority setting is shown as Figure 2-11:

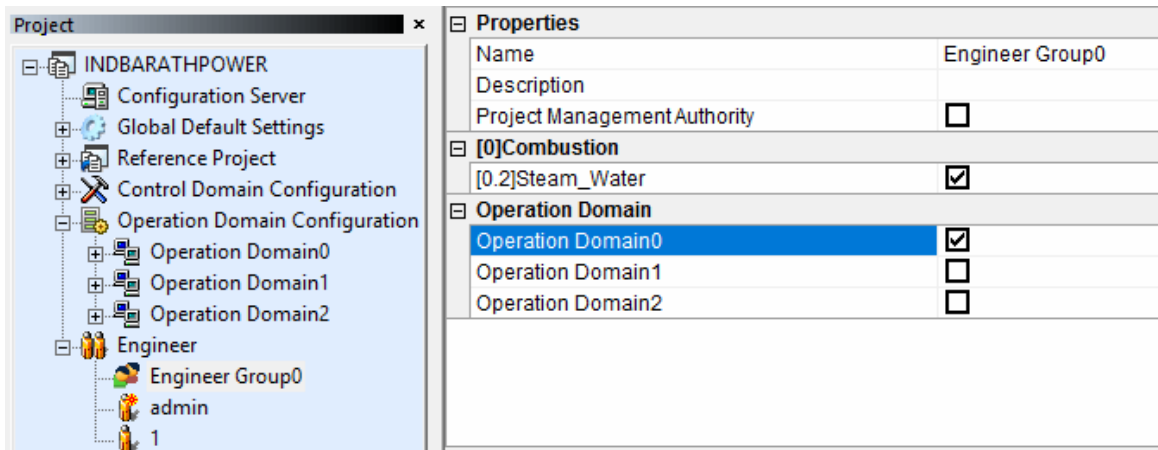


Figure 2-11 set the configuration authority

2.3.8 Global Default Settings

Select "Common Default Settings" in configuration tree, and some global parameters of the project can be configured in configuration property bar, such as the color of ON/OFF indicators, decimal digits of tag and the color of panel alarm indicators, time synchronization servers configuration, enable/disable latching alarm and alarm sort as shown in Figure 2-12.

Global Default Settings	
ON Color	
OFF Color	
Decimal Digits of Tag Template	2
Monitoring Theme	Default
QRcode	Disable
Reserved Area In Monitoring	Disable
Trend Draw Mode	General Mode
Show trend line tag info	<input type="checkbox"/>
Reference Domain Tag Info Mode	Online
Panel Alarm Color	
Normal Color	
Time Synchronization Server	
Time Synchronization Server Count	0
Alarm Setting	
Latching Alarm Color	
Latching Alarm Sound	Disable
Enable Latching System Alarm	Disable
Re-alarms Time (min)	10
Alarm Eclipsing	Enable
Alarm Shelving	Disable
State Management	Disable
Record Suppressed Alarm in History Alarm	Enable
Function Of Shielding Alarm Group And Alarm Region In Operation Domain	Disable
Alarm Status Display Rules	Default
Alarm Sort Rule	By Alarm Priority (Default)
SOnet	
SOnet Configuration	Information Network Single(172.30)
SOnetAAddress	172.30.**
IDM Server	
Server Address	

Figure 2-12 Global Default Settings**Configure Monitoring Theme**

In VFSysBuilder software, the real-time monitoring theme can be configured as:

- Select "Classical" in the dropdown list of "Monitoring Theme" to set gray as the background color of the real-time monitor.
- Select "Default" in the dropdown list of "Monitoring Theme" to set blue as the background color of the real-time monitor.

Time Synchronization Server Settings

Time synchronization server can synchronize each node in the LAN. One project must be configured with one time synchronization server. Users can configure several time synchronization servers in one project, and set one as the chief, the others as the standby at one time. Standby time synchronization servers synchronize with the chief time synchronization through information network, and client synchronizes with the chief time synchronization through control network. Time synchronization server host ID should be 254 (the fourth part of IP address). Client determines current time synchronization server node according to the principle of minimal domain address (the third part of IP address).

When multiple time synchronization server configured, the domain address and node address of the chief server should all be the minimum of the addressed of the servers.

Time synchronization server settings are shown as Figure 2-13:

Time Synchronization Server	
Time Synchronization Server Count	3
Server 0	
Type	Software Time Synchronization Server(ECS-700)
Third Byte Address	0
IP Address of Time Synchronization Server	0.254
Server 1	
Type	Hardware GPS(ECS-700)
Third Byte Address	1
IP Address of Time Synchronization Server	1.254
Server 2	
Type	Time Synchronization Server(JX-300XP/ECS-100 direct domain)
The last two addresses	2.129
IP Address of Time Synchronization Server	128.128.2.129

Figure 2-13 Time Synchronization Server Configuration**Units Configuration**

Click the "Engineer Unit" under the "Common Default Settings", the configured units will be displayed in the right property setting area, shown as Figure 2-14:

ID	Unit	ID	Unit	ID	Unit	ID	Unit
0	%	1	milli	2	°C	3	F
4	s	5	M	6	min	7	hour
8	bar	9	mmH2O	10	mmHg	11	Pa
12	kPa	13	MPa	14	kgf/cm2	15	t/s
16	t/min	17	t/h	18	L/s	19	L/min
20	L/h	21	kg/s	22	kg/min	23	kg/h
24	m3/s	25	m3/min	26	m3/h	27	Nm3/h
28	kW·h	29	MW	30	W	31	kW
32	WH	33	MHz	34	kHz	35	Hz
36	NTu	37	ug/L	38	m3	39	ug/Kg
40	L	41	mL	42	t	43	g
44	mV	45	mA	46	rpm	47	atm
48	kg	49	km	50	m	51	cm
52	mm	53	um	54	mbar	55	N·m
56	uS/cm	57	A	58	kA	59	VA
60	V	61	kV	62	r/min	63	PH
64	ppm	65	Nm3	66	KpaG	67	mg
68	Var	69	VarH	70*			

Figure 2-14 units configuration

Click the grid near the number with * in the units configuration interface, and input required units, then press Enter or switch the focus to other place, a new unit can be added (the operation should be saved in the VFSysBuilder to finish adding).

Need Confirm Settings

Click the node "Security" under "Common Default Settings" the right area of interface will display as Figure 2-15:

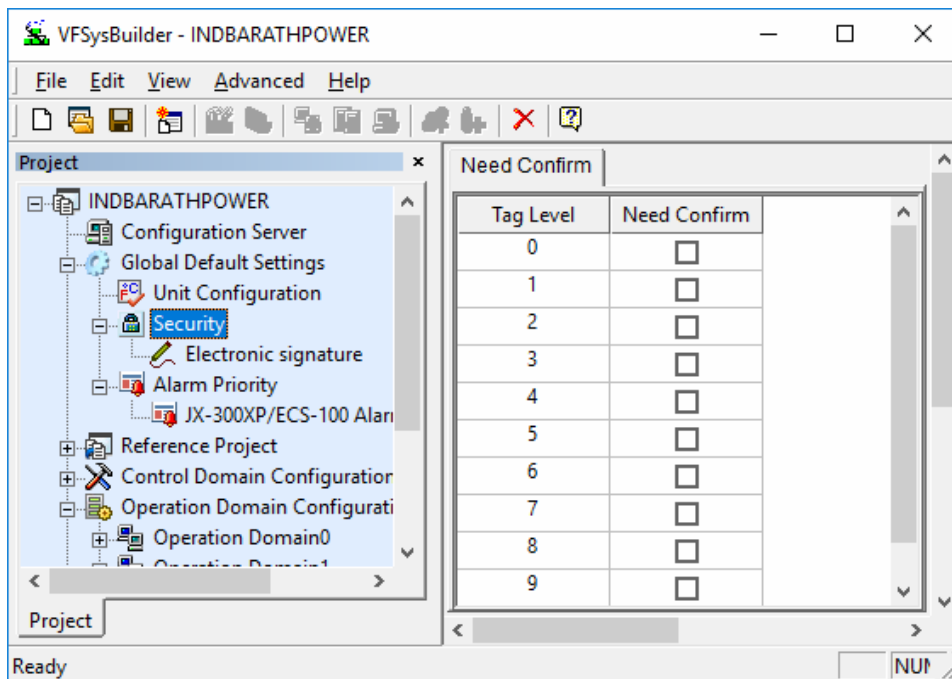


Figure 2-15 Need Confirm configuration interface

Whether modified value of tag during supervision via instrument panel need to confirm for second time can be implemented by selecting or not selecting the item in front of the tag level.

The tag level can be configured in the tag table, shown as Figure 2-16:

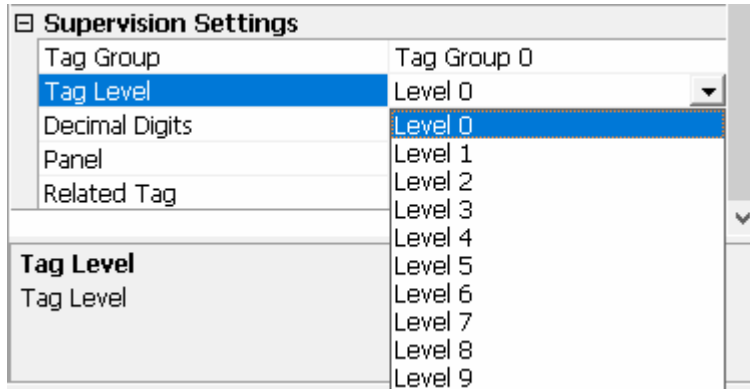


Figure 2-16 tag level configuration

Alarm Settings

User can configure the alarms in system together via alarm settings, which including latching alarm sound, realarm time, alarm conflation, shelve alarm, manage state, system alarm color and alarm sort rule.

Global alarm settings can be completed in combo box shown below.


Alarm Setting	
Latching Alarm Color	
Latching Alarm Sound	Disable
Enable Latching System Alarm	Disable
Re-alarms Time (min)	10
Alarm Eclipsing	Enable
Alarm Shelving	Disable
State Management	Disable
Record Suppressed Alarm in History Alarm	Enable
Function Of Shielding Alarm Group And Alarm Region	Disable
Alarm Status Display Rules	Default
Alarm Sort Rule	By Alarm Priority (Default)

Figure 2-17 Alarm Setting

Configure SOnet

Configure the SOnet connection in "SOnet" of "Global Default Settings" interface.

SOnet	
SOnet Configuration	Information Network Single(172.30)
SOnetAAddress	172.30.*

SOnet Configuration When operation domain is locked, the network type cannot be changed Information Network Single(172.30): information network uses dedicated network segment of 172.30 Information Network Redundant(172.30/172.31): information network uses dedicated redundant network segments of 172.30 and 172.31 ECS-700 Control Network Single(only using Net B): information network and control net use 172.21 network segment together ECS-700 Control Network Redundant(Net B taking priority): information network and control net use 172.21, 172.20 network segment together JX-300XP/ECS-100 Single Net(128.128): information network use 128.128 network segment, which is control network of JX-300XP/ECS-100	
--	--

Figure 2-18 Configure SOnet connection



Attention:

- Publish all to monitoring after modifying dual-net settings.
- If SOnet and SCnet share the same network (including single network and redundant network), system will start flow control function automatically, which will limit the SOnet data flow to ensure the normal communication of SCnet.

2.3.9 Security

By security configuration, reconfirmation of tag's written and electronic signature can be set. When running High-performanceHMI software with software dog had electronic signature, the "Electronic Signature" can be shown in the "Global Default Settings > Security". By electronic signature configuration, the operation including written to tag and acknowledged alarm can be limited by electronic signature.

**Tips:**

Publish all to monitoring after modifying dual-net settings.

Configure Reconfirmation for Tag

Set the tag level to pop up reconfirmation dialog box when the tag value is modified in supervision.

Click "Security" in "Common Default Settings", and interface on the right will be shown as follows.

Need Confirm	
Tag Level	Need Confirm
0	<input type="checkbox"/>
1	<input type="checkbox"/>
2	<input type="checkbox"/>
3	<input type="checkbox"/>
4	<input type="checkbox"/>
5	<input type="checkbox"/>
6	<input type="checkbox"/>
7	<input type="checkbox"/>
8	<input type="checkbox"/>
9	<input type="checkbox"/>

Figure 2-19Interface "Need Confirm"

Whether to pop up reconfirmation dialog box in supervision when the tag value is modified can be set by selecting in the interface of "Need Confirm".

Electronic Signature

**Attention:**

When the software dog has the privilege of electronic signature, the "Electronic Signature" node can be shown and configured as the sub-node of "Security". Otherwise, the node will not be shown.

By the configuration of electronic signature, operations privilege to tag and alarms will be defined. The privileges include electronic signature by tag level, alarm confirmation and batch processing.

Click "Global Default Settings > Security > Electronic Signature", the right area will display the electronic signature configuration as shown as figure below. In the electronic signature configuration, there are three tabs including "Tag Operation", "Other Operation" and "Predefined

Comments".

Globe Settings	Tag Operation	Other operation	Predefined comments
Tag Level	Type	re of alarm confir	
0	Unsigned	<input type="checkbox"/>	
1	Unsigned	<input type="checkbox"/>	
2	Unsigned	<input type="checkbox"/>	
3	Unsigned	<input type="checkbox"/>	
4	Unsigned	<input type="checkbox"/>	
5	Unsigned	<input type="checkbox"/>	
6	Unsigned	<input type="checkbox"/>	
7	Unsigned	<input type="checkbox"/>	
8	Unsigned	<input type="checkbox"/>	
9	Unsigned	<input type="checkbox"/>	

Figure 2-20 Electronic Signature Configure Example

2.3.10 Alarm Priorities

User can set alarm color, alarm shelve, alarm sleep and realarm for alarms in different levels.

The alarm priority amount cannot be modified after setting when creating project, while other properties of alarm priority can be configured. Here takes system default 6 alarm priorities as an example to introduce the configuration of alarm priority.

Select **Global Default Settings/ Alarm priority** in project bar, following interface will be shown in the right configuration properties pane.

Alarm Prio...	Alarm Icon	Alarm Description	Alarm Color	Alarm Icon Font C...	Data Logging Only	Alarm Shelving	Latch (v.)	Re-alarm (v.)
0	Nonshape	Log			Yes	Disable	Disable	Disable
1	Rectangle	Low			No	Disable	Disable	Disable
2	Rectangle	Medium			No	Disable	Disable	Disable
3	Rectangle	High			No	Disable	Disable	Disable
4	Rectangle	Urgency			No	Disable	Disable	Disable
5	Rectangle	Safe Related			No	Disable	Disable	Disable

Figure 2-21 Set alarm priorities

Configure alarm functions used in the current project in the above figure.

2.3.11 Set Default Project


There may be more than one project in the configuration server and VFSysBuilder can edit each project, but VFExplorer and supervision software read only the default project configuration. Therefore, if current project configuration needs to run in VFExplorer or supervision software, it must be set as default project.

When a project is open in VFSysBuilder, click the button  to set the current project as default project, and if there is a default project existed in current server, the password with the project management authority of current default project is required to modify current project to default project.

2.4 Control Configuration

Control configuration mainly includes hardware configuration, tag configuration, custom function block configuration and custom program configuration.

When System builder is completed, control configuration can be carried out

in the configuration management software (VFExplorer). Double click the icon  to start up VFExplorer. Engineer account and password of current default project are required to login VFExplorer.

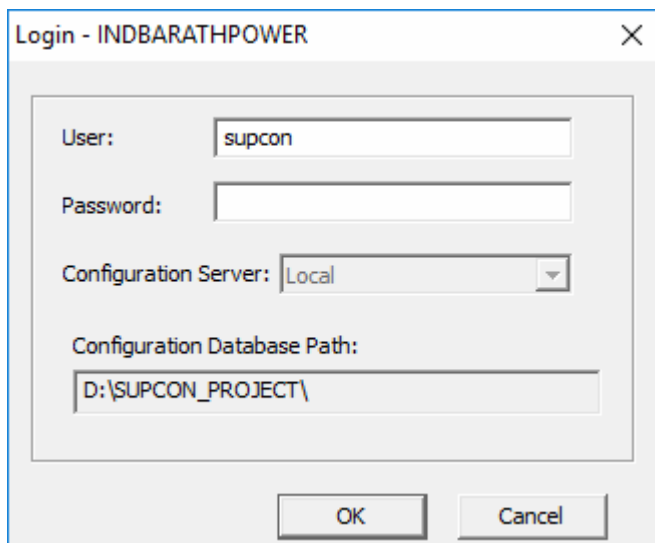


Figure 2-22 login VFExplorer

The configuration database directory should be the project configuration directory in the configuration server. If the directory is not correct, the project in the configuration server can't open in VFExplorer.



Tip:

The path of configuration database can be set in Start > OMC > Intelligent Application Management. In Intelligent Application Management, click System Global Options.

2.4.1 Open Configuration

Except global function block, other control configuration is normally stored in the configuration server, and if needs to be edited, it should be open from the configuration server. Make sure that current login engineer has the configuration authority of this control station; it can't open without the authority. The way to open the configuration is shown as Figure 2-23:

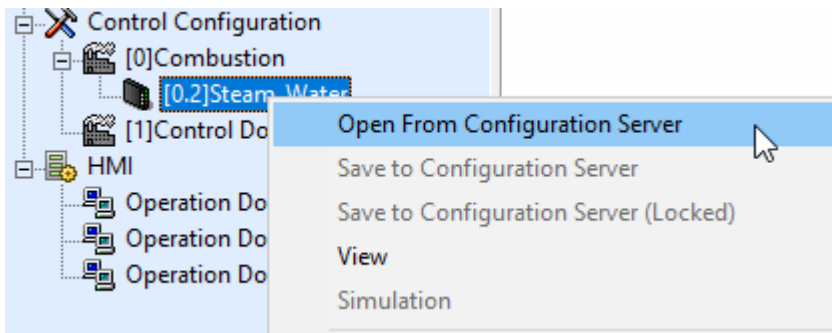


Figure 2-23 open configuration from the configuration server



Tip:

For more operation details, refer to *Config Explorer User Manual*.

2.4.2 Hardware Configuration

The task of hardware configuration is to configure the control station hardware, mainly includes parameter settings, communication module configuration, I/O module configuration of the control station. It's recommended to configure the hardware before tag build, to make it more convenient for tag build.

4. Open the control station configuration from configuration server.

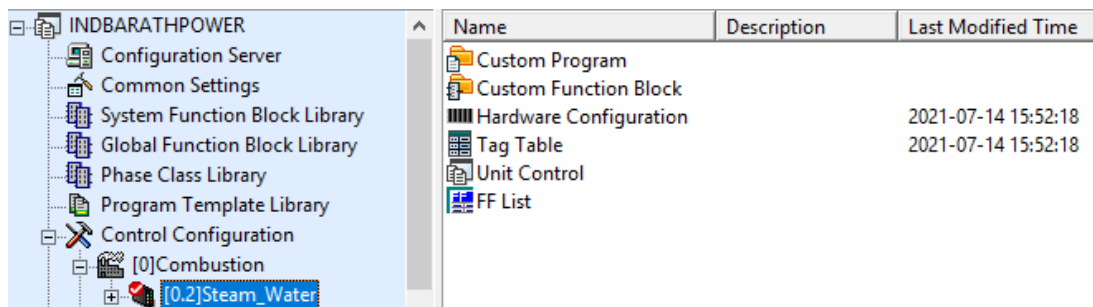


Figure 2-24 open control station configuration from configuration server

5. Double click "Hardware Configuration" in the VFExplorer to start up the hardware configuration software (VFIOBuilder).

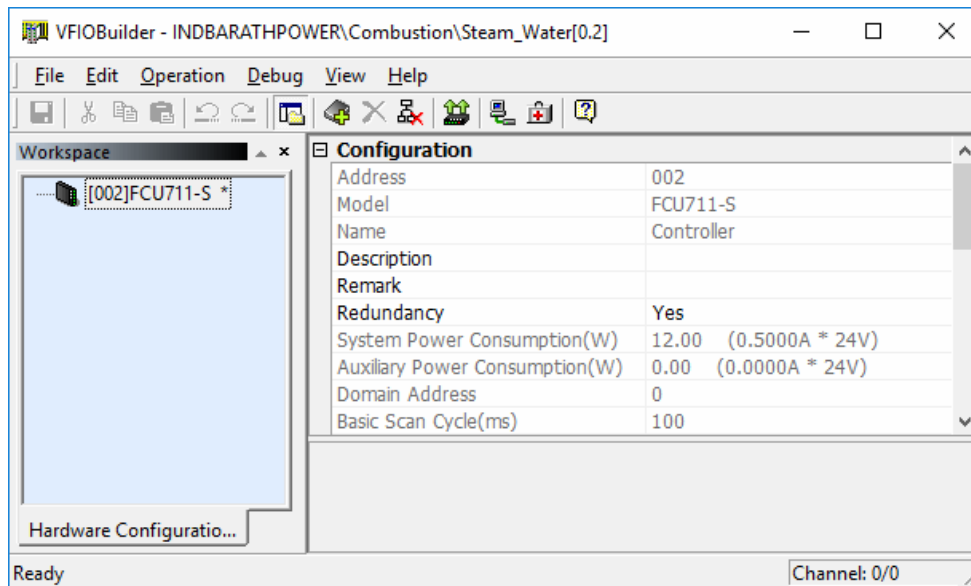


Figure 2-25 hardware configuration interface

6. Right click a controller to add an I/O link module or communication module node. A virtual I/O link module should be added to local node, and the address of local node should be 0.

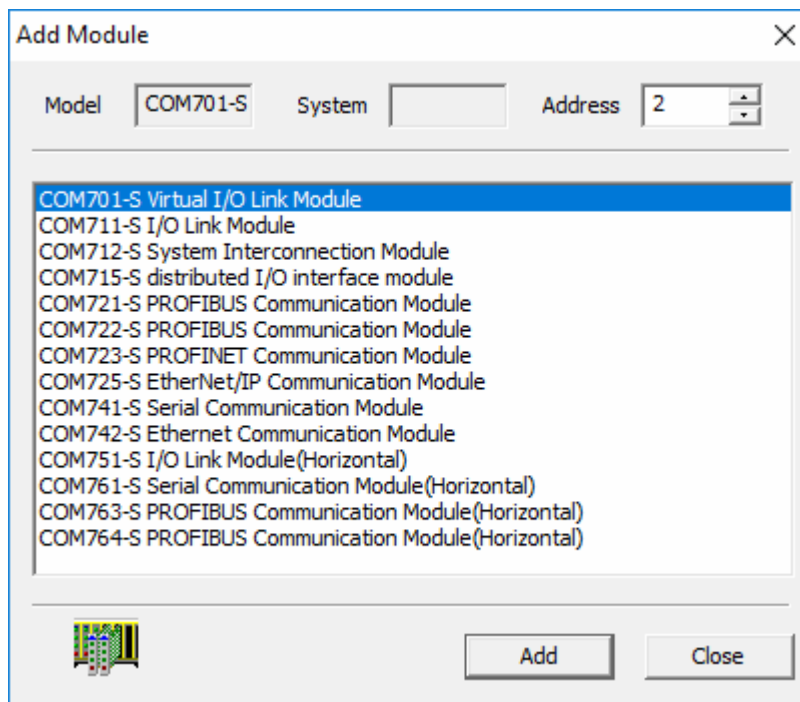


Figure 2-26 add a node

7. Right click the node to add rack, which is similar to adding a node.



Tip:

When configuration export with project export tool is needed, the format of "Remark" has to be "SC cabinet number - rack number: practical remark information."

8. Right click the rack to add an I/O module, which is similar to adding a node.
9. After finished adding I/O modules, modify the parameters of I/O modules one by one, shown as Figure 2-27:

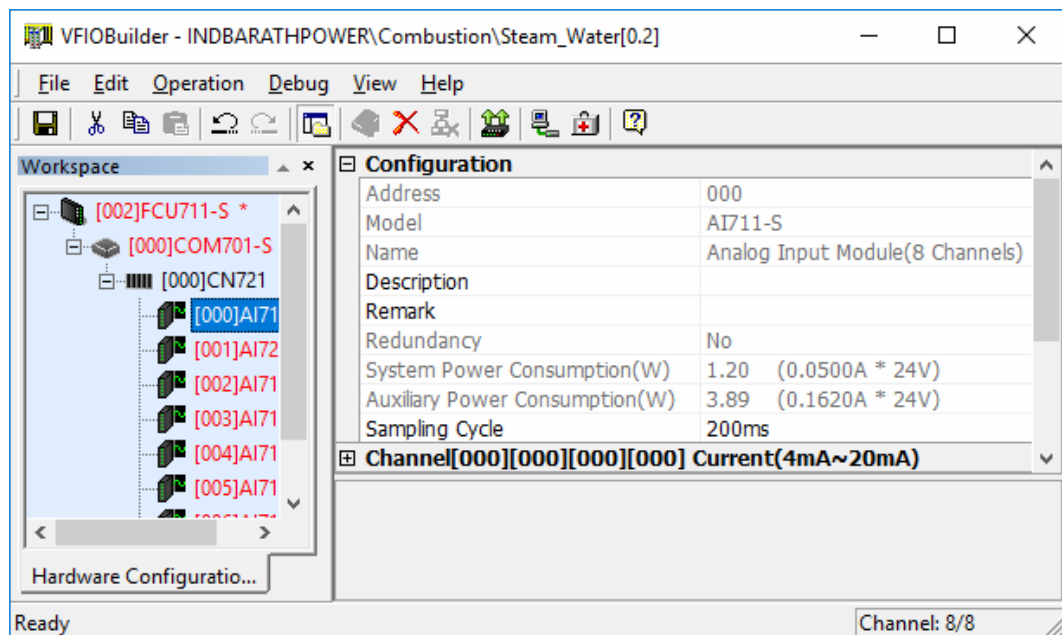



Figure 2-27 modify the parameter of I/O module

If all I/O modules hardware under the controller have been connected, configuration can also be carried out by scan and upload. Click the button , and pop up dialog box "Configuration Scan and Upload", as Figure 2-28:

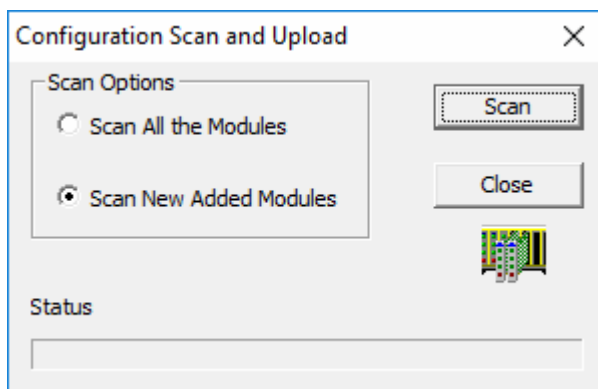


Figure 2-28 hardware scan and upload



Tip:

For more details about hardware configuration, refer to *Hardware Module Builder User Manual*.

2.4.3 Tag Build

Double click "Tag Table" in the configuration management software (VFExplorer) to start up tag build software (VFTAGBuilder), which is similar to opening hardware configuration software (VFIOBuilder).

Tag build is implemented according to single control station, mainly including I/O tag, customized variable, page exchange variables configuration. In addition, function block tags are also displayed in the tag table, but can't be added, modified or deleted in tag table. Of all tags, I/O tags, customized variables and function block tags belong to supervision exchanging variables, so they cannot have the same name in the entire project.

1. Configure I/O Tag

Import and export method is recommended when configure batch of I/O tags, especially for the first time to configure I/O tag. The format of imported file must comply with requirements and the hardware address must be in accordance with hardware configuration, so it's recommended to scan hardware channel first (this hardware channel is corresponding to each hardware configuration module instead of the channel of module actually connected to the controller), then export the tag table and modify the tag name, tag parameters, etc. in the exported tag file. After modification is finished, import the tag file again.

10. Scan hardware tags. Select menu command **Operation/ Scan Tags from channels/Scan All**
11. Export tag table. Click export, then choose the directory and input file name to save the file, shown as Figure 2-29:

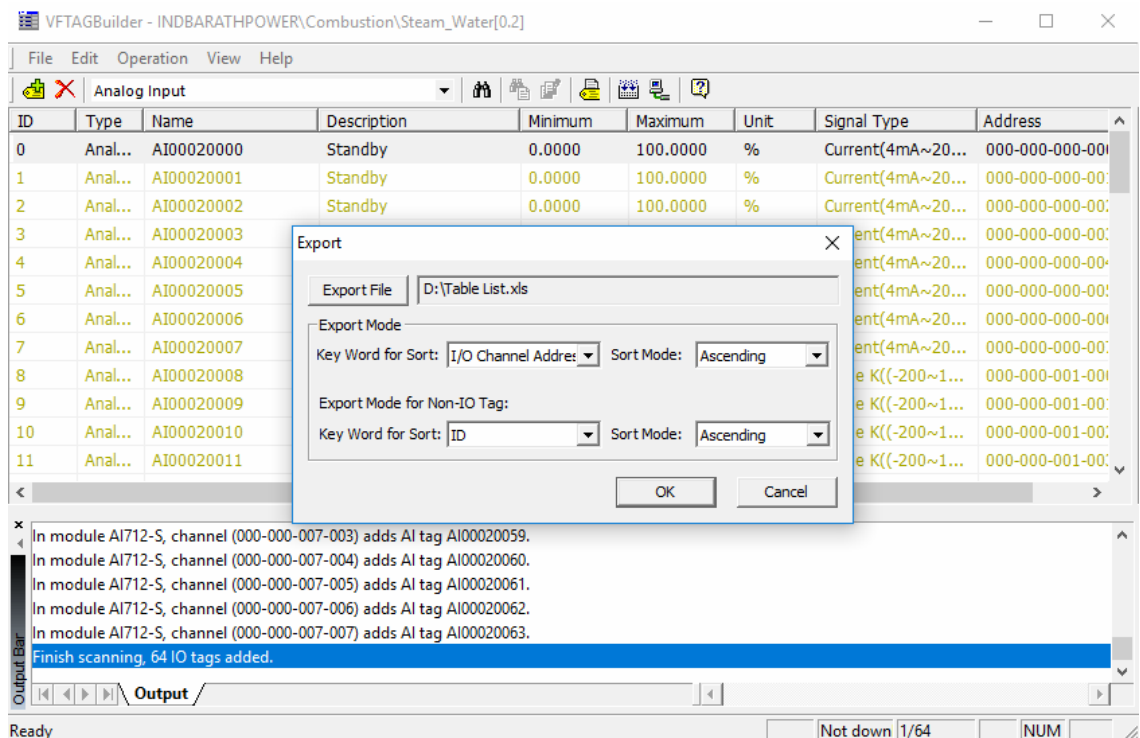


Figure 2-29 export tag table

12. Open the EXCEL file exported in the previous step, and modify tag name, description, measure range etc.
13. Import tag table.

**Attention:**

Before import tag file, delete all the tags in the tag table first.

Select the modified file to import. Small changes of tag can be achieved in the property setting area, Modification of tag name, tag description, etc. can also be achieved by double click corresponding item in the tag list.

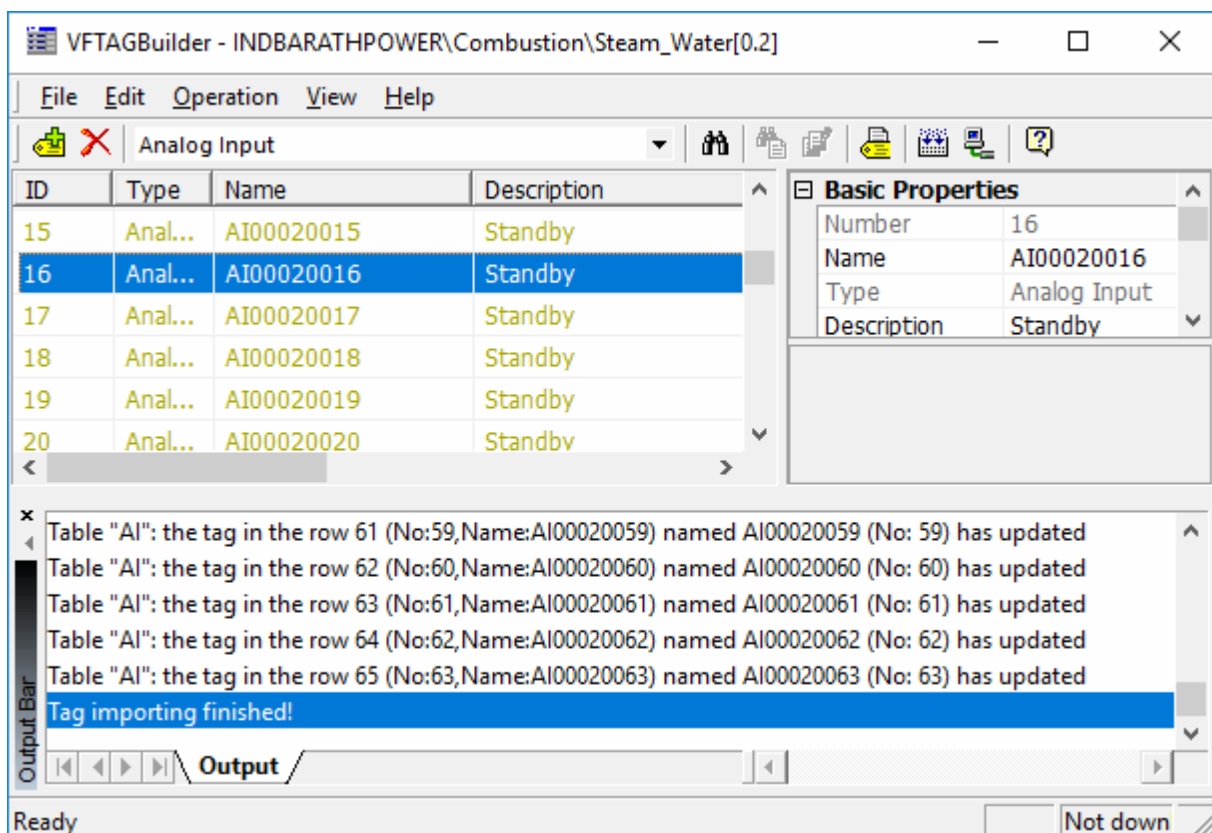


Figure 2-30 modify tag parameters

2. Customized Variables

Customized variable is mainly applied intermediate variables can be read and write during supervision, and it can be used in custom program. Normally custom variables should be designed together with I/O tags, and listed in the I/O list manual. I/O tag method can be adopted to add batch of customized variables, it is edited in the exported EXCEL table before being imported.

3. Exchange Variables between Pages

Exchange variables between pages can only be used to data exchange between program pages,

and invisible to supervision of control station.

- Choose tag types

Choose any exchange variable between pages in the tag list (Other variable type can also be added in the same way).

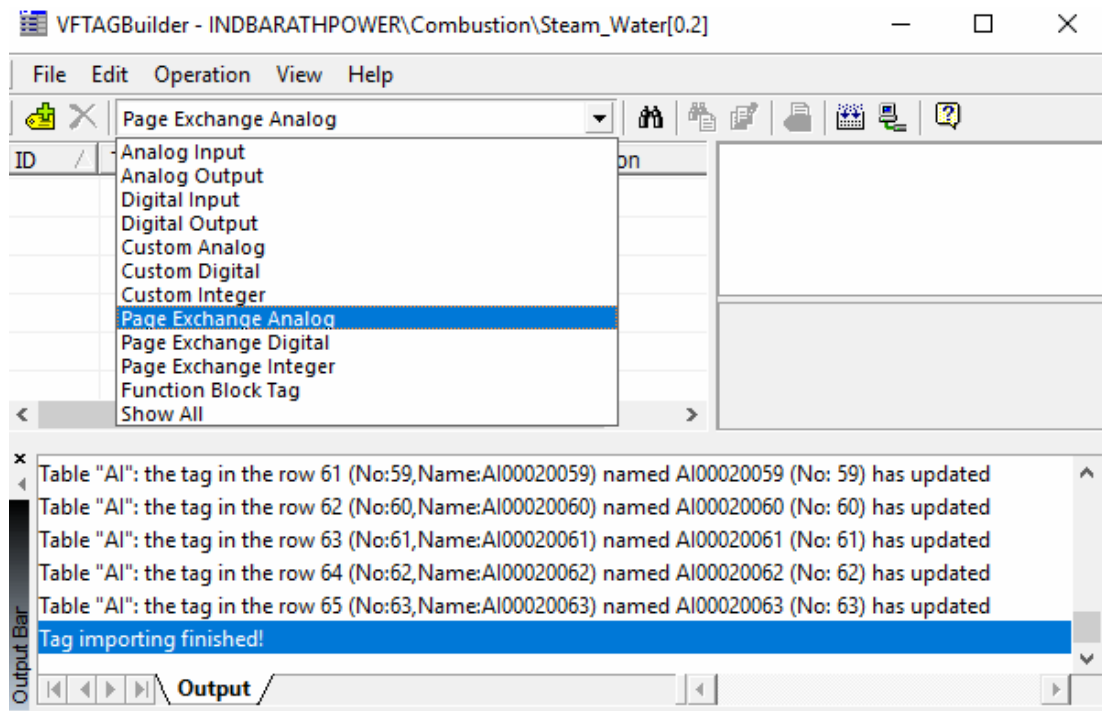


Figure 2-31 choose tag type

- Add tags

Click button  to add a tag, shown as Figure 2-32:

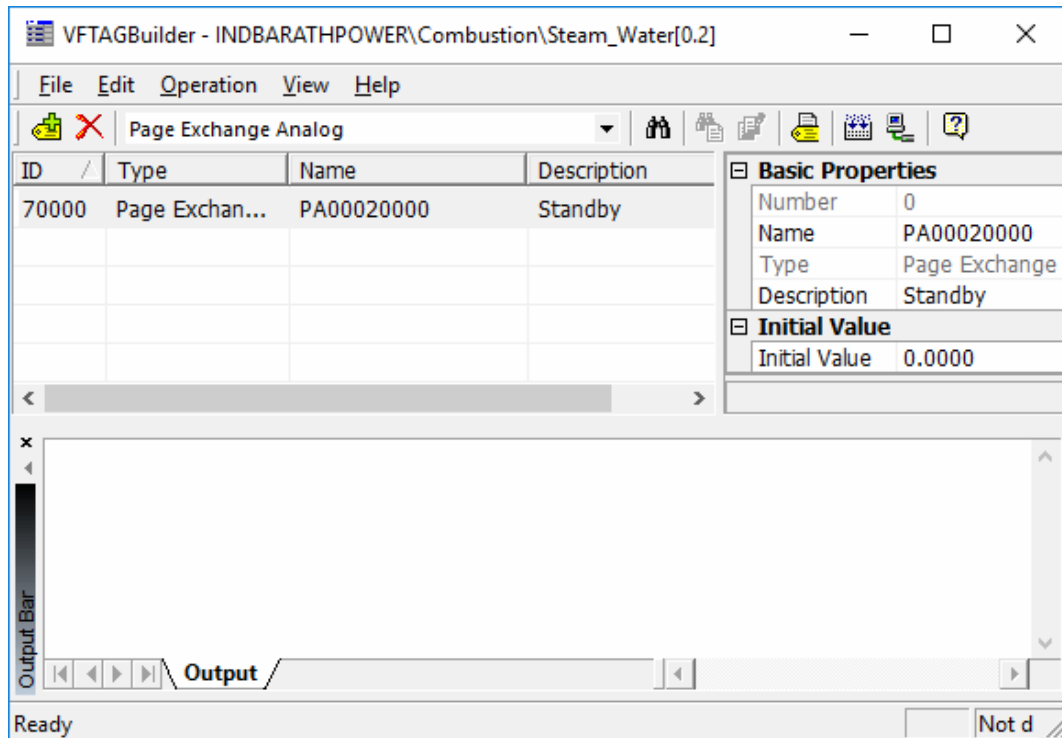


Figure 2-32 Add a tag

- Modify tags

Modify the tag parameters in the property setting area after finishing adding tags.

4. Function block tag

Some complex function blocks (such as PID loop) can pop up panels in supervision and quote the parameters in PID loop (PV, MV, etc.) as well, therefore, these function blocks also have tags. The function block tags can be added in the function block diagram programming software (VFFBDBuilder), and can only be summarized in the tag table.

For example, adding a function block PID in the function block diagram programming software (VFFBDBuilder), shown as Figure 2-33:

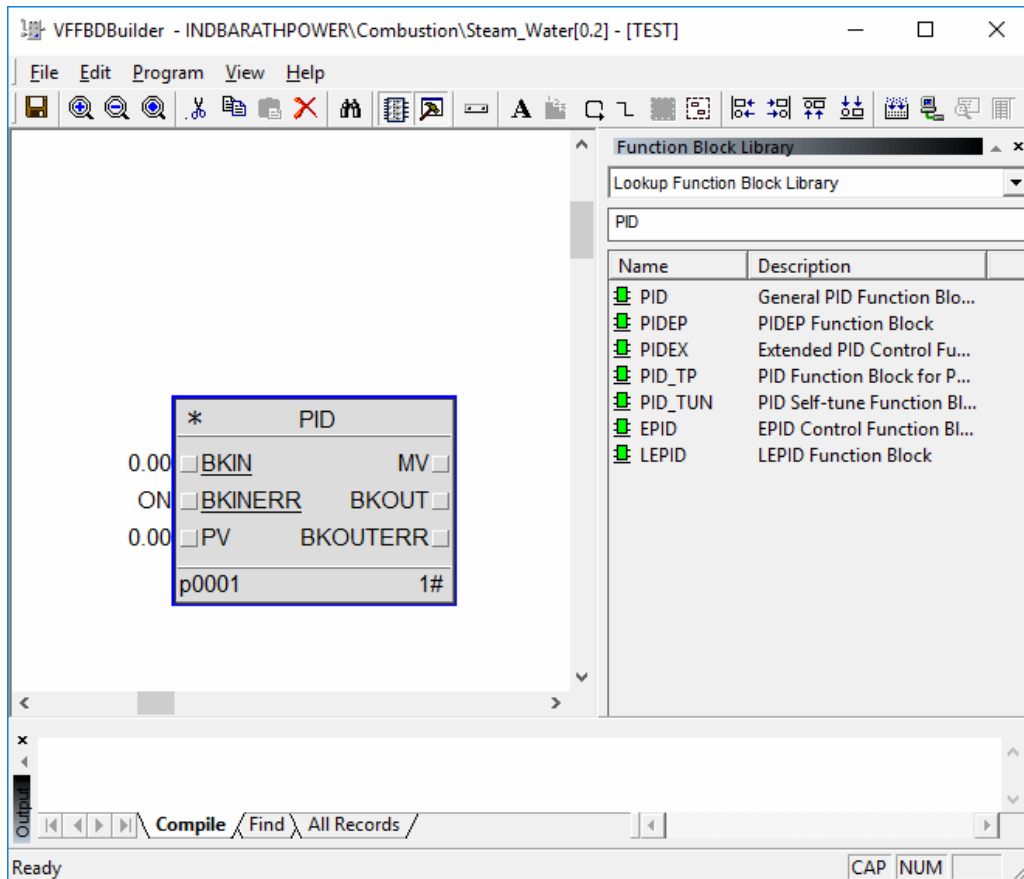


Figure 2-33 add a function block PID

Double click function block to add function block tag name, shown as Figure 2-34:

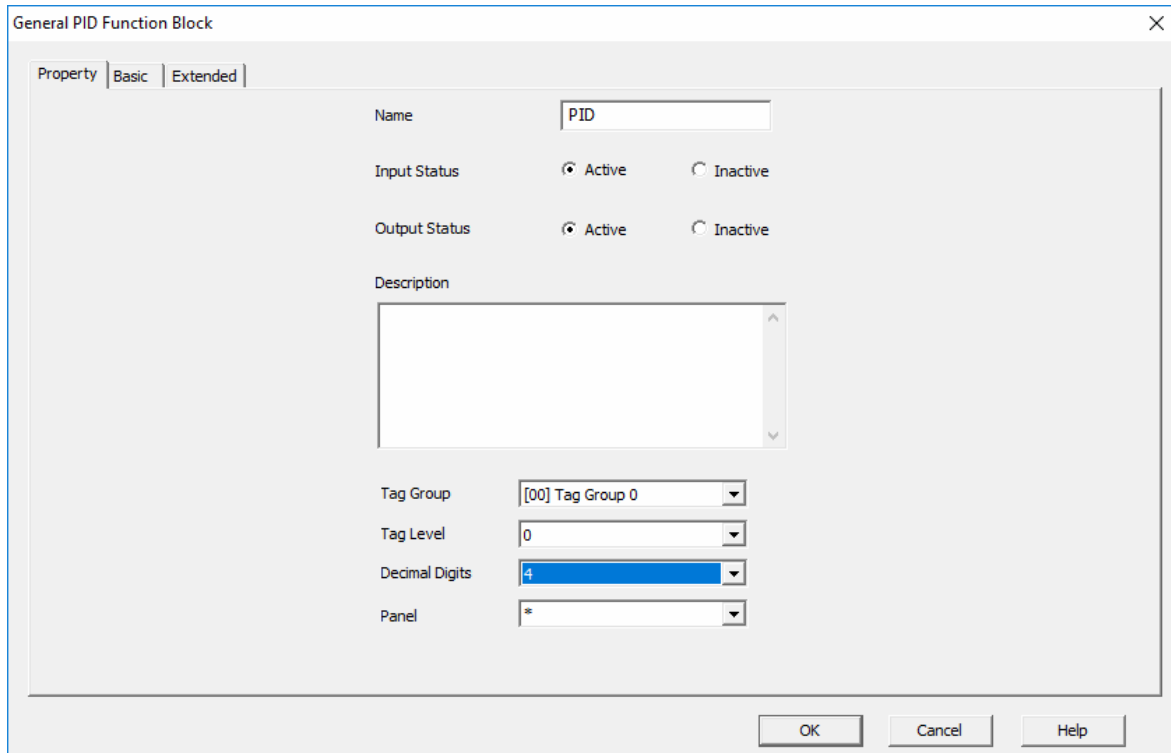
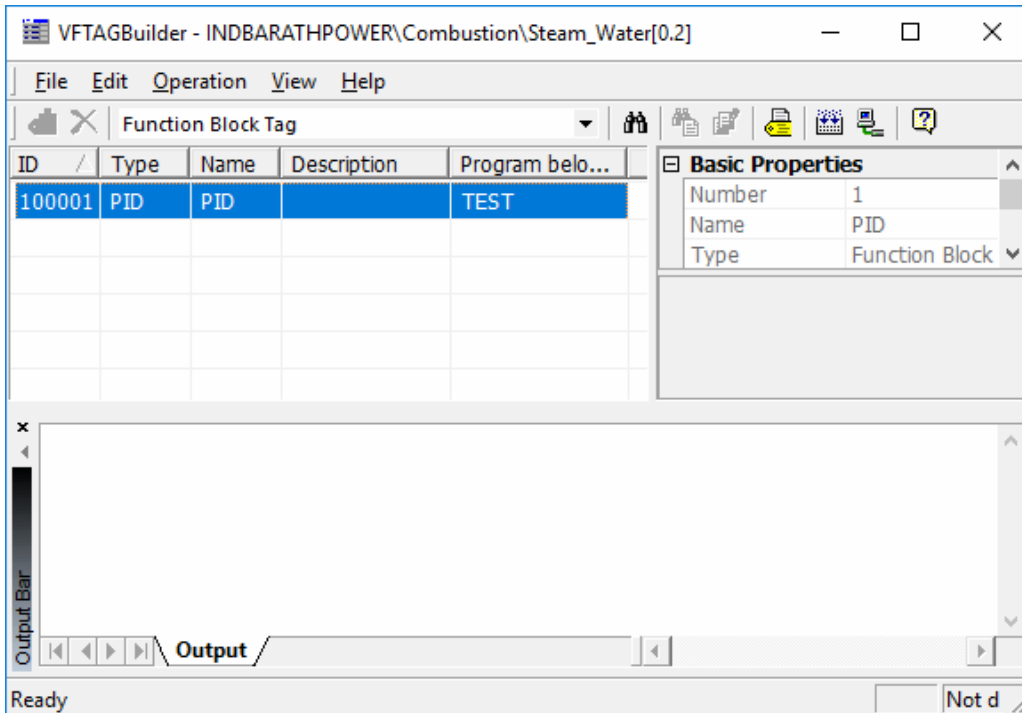


Figure 2-34 set tags of PID

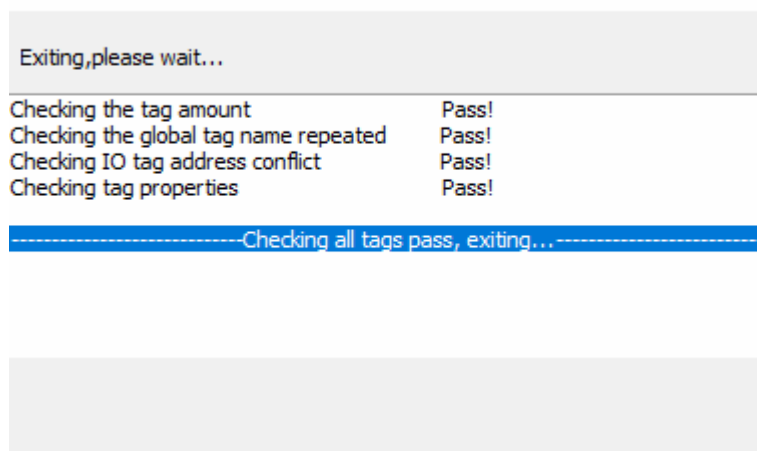
The function block tag information appears in the tag table after click "OK", shown as Figure 2-35:

**Figure 2-35 function block tags collected in the tag table**

5. Finish and exit

The program will check the entire configuration automatically before exit. If there are any configuration errors (for example, I/O tag address conflict, I/O tag mismatches the hardware channel), check result will be failed and there will be error prompt in the check result to confirm whether to ignore the error and exit. If there are repeated names between stations, exit from VFTAGBuilder is forbidden.

Exit

**Figure 2-36 Exit**

**Attention:**

Save the configuration to server after tag modification, otherwise tag modification can't be effective in the supervision.

For more details about tag build, refer to *Tag Builder User Manual*.

2.4.4 Custom Function Block Configuration

Functions or algorithms with the same logic and are frequently used in programs can be compiled into custom function blocks, and then quoted in FBD program, to improve the readability and efficiency of the program. Custom function blocks are compiled by programming languages of ST and SFC. The operation method of custom function block is introduced with the example of ST custom function block.

1. New Custom Function Block

Create a new custom function block within the VFExplorer, shown as Figure 2-37:

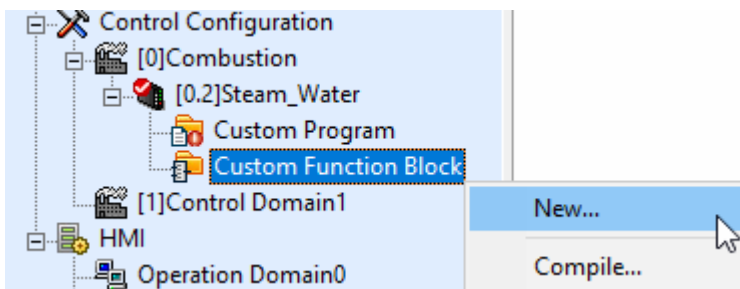


Figure 2-37 New Custom Function Block

Select type ST, and Input name and description, shown as Figure 2-38:

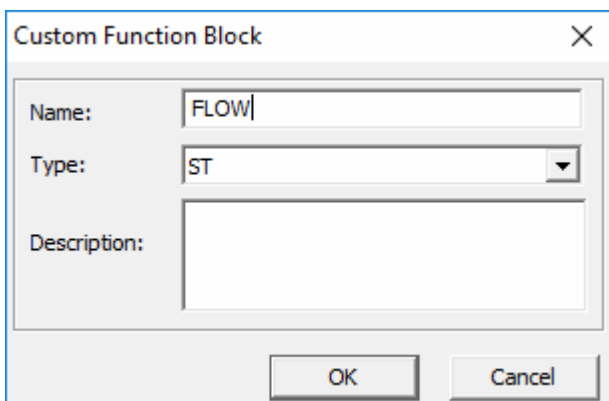


Figure 2-38 input the name and description of custom function block

Double click the program name within the VFExplorer to enter the interface of custom function block editor (VFSTModule).

2. Add parameters

Add parameters of various types according to the requirements and set their initial value, redundancy status, etc.

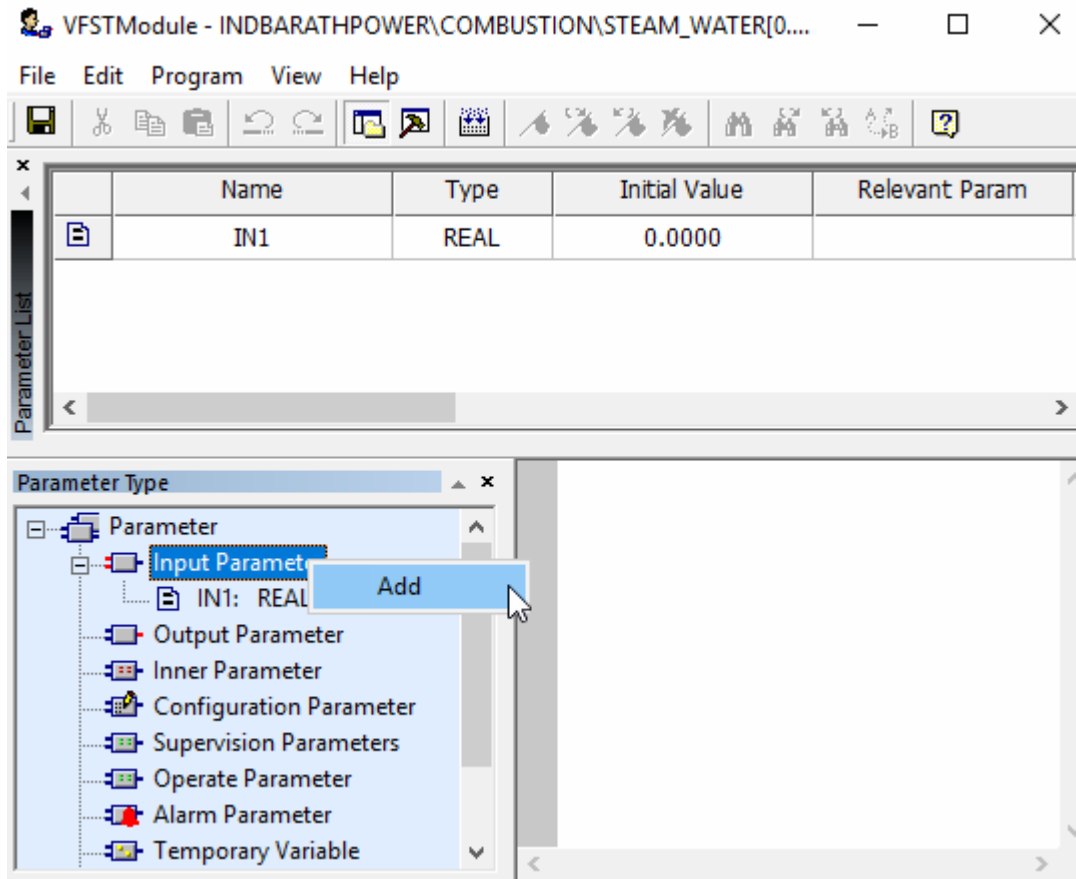


Figure 2-39 add parameters

3. Edit program

For more details about programming syntax, refer to *FBD Builder User Manual*.

4. Compile

When custom function block edit is finished, it needs to be compiled in the VFExplorer, otherwise it cannot be called in the FBD.

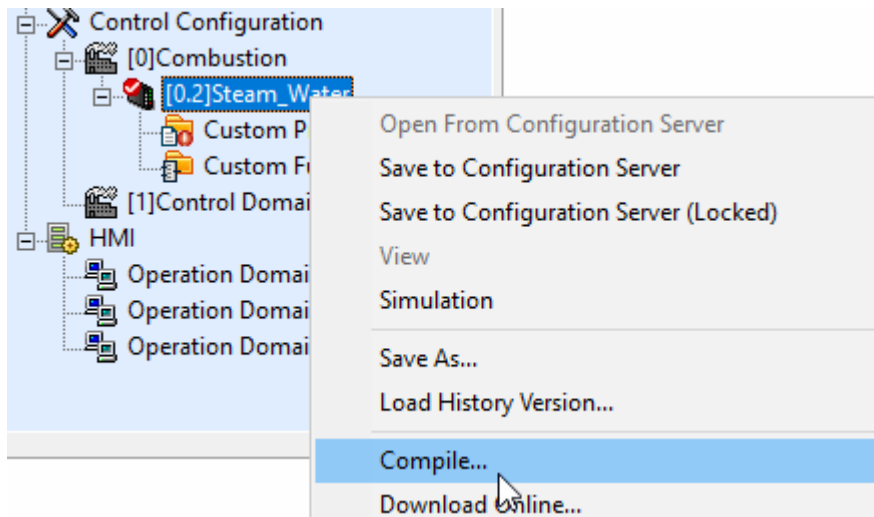


Figure 2-40 compile the custom function block

5. Call function block

Open a FBD program, select custom function block in the function block library to call the custom function block. Application of custom function block is similar to the system function block.

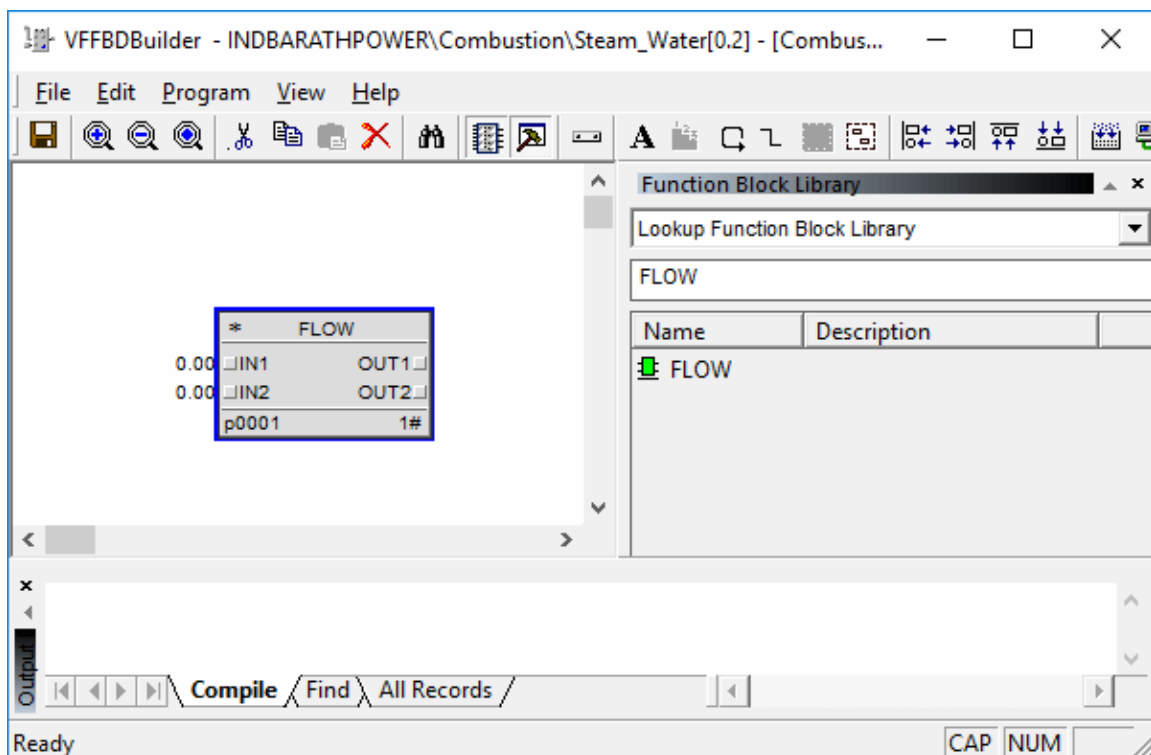


Figure 2-41 call the custom function block



Tip:

For more detailed introduction of the custom function block configuration, refer to *FBD Builder User Manual*.

2.4.5 Custom Program Configuration

All functions including control loop, interlock control, polygonal line graphic, inter-station communication, etc., can be realized in the custom program. The main types of the custom program are FBD, LD, etc.

An FBD example to illustrate the process of editing custom program configuration is as follows:

1. New program

Create a new program in the VFExplorer, shown as Figure 2-42:

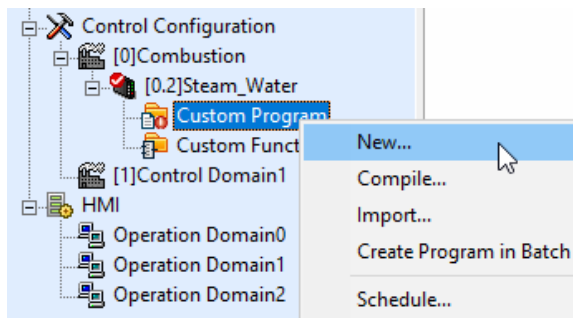


Figure 2-42 new program

Input name, type and description, shown as Figure 2-43:

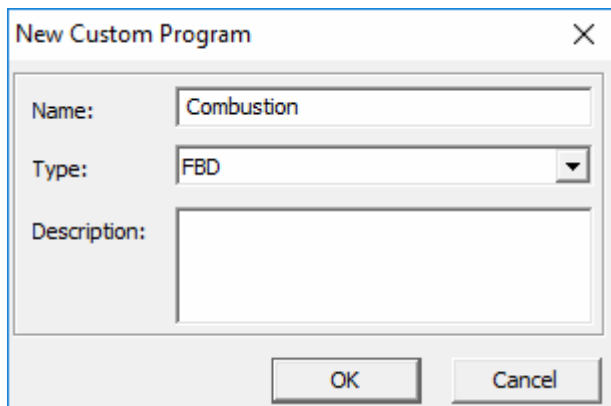


Figure 2-43 input program name and type

Double click the program name to open corresponding custom program configuration in the VFExplorer.

2. Add tags

(Configure the tags in the tag table before adding tags)

Add "Datalink" as Figure 2-44:

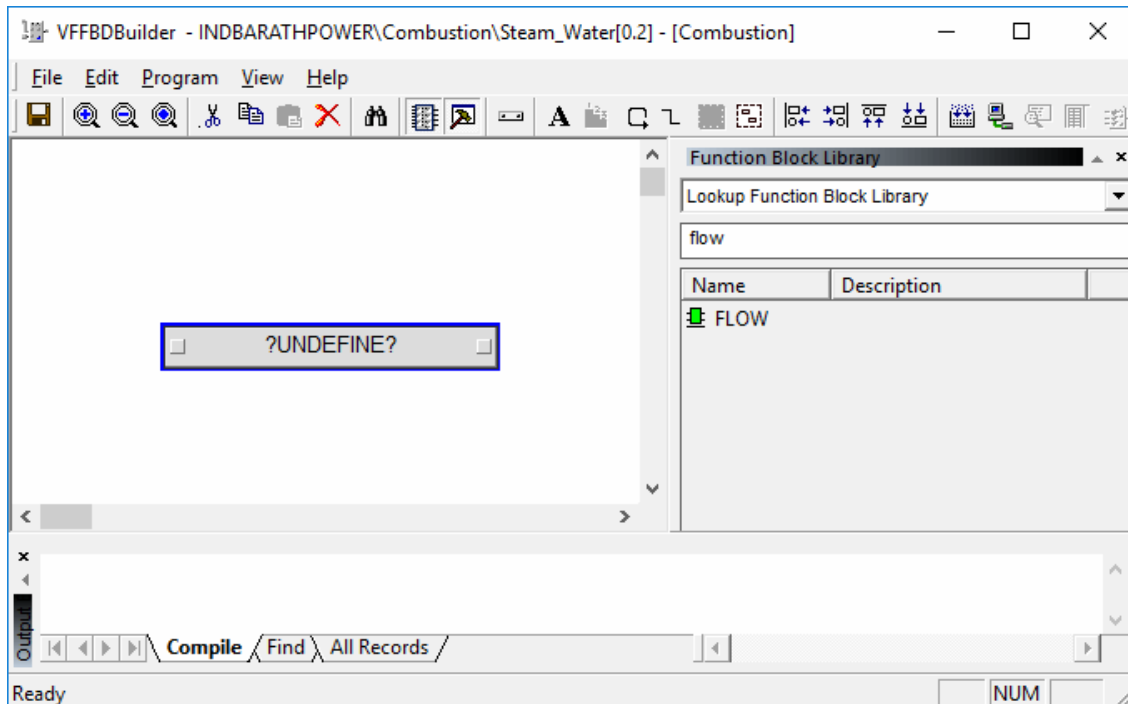


Figure 2-44 select the type of quoted tag

Double click "Datalink" to select the tag required.

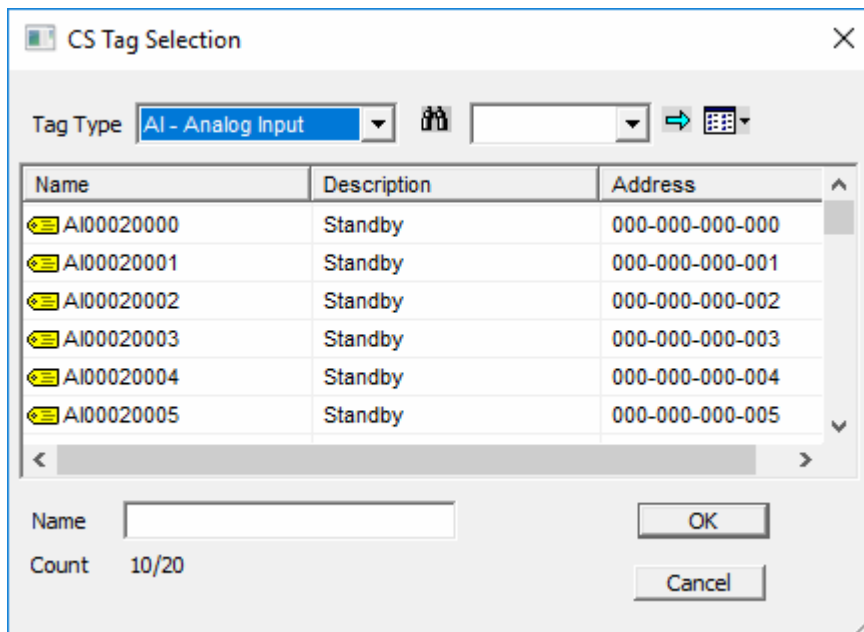



Figure 2-45 select tag

To select parameter of non-default type, click the button  after the selected tag. Selecting other parameters within the tag is shown as Figure 2-46:

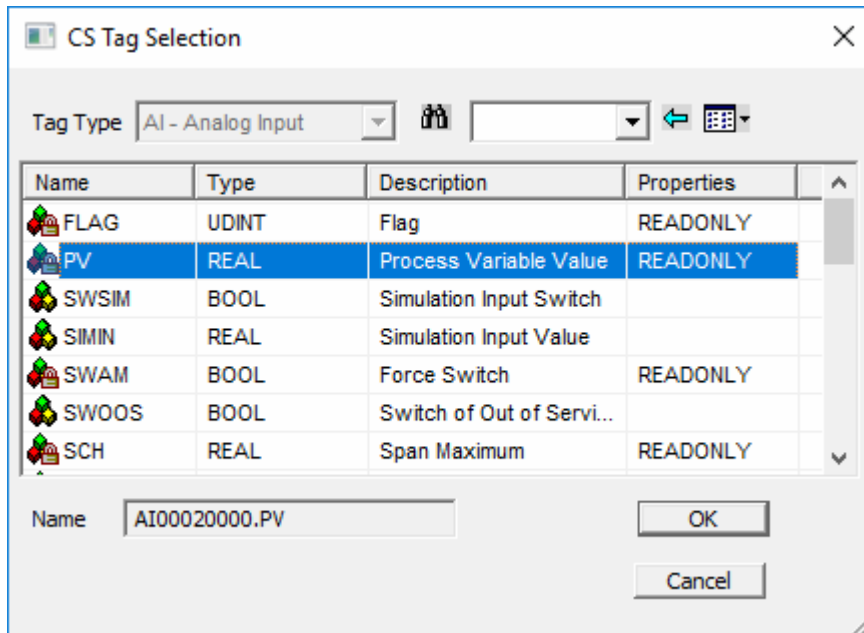


Figure 2-46 select tag parameter

3. Add function block

Select function block library first, and select function block of required type, then move the cursor to any place within editing area and click to add the function block. After the function block is added, right-click any place within editing area to exit adding status, shown as Figure 2-47:

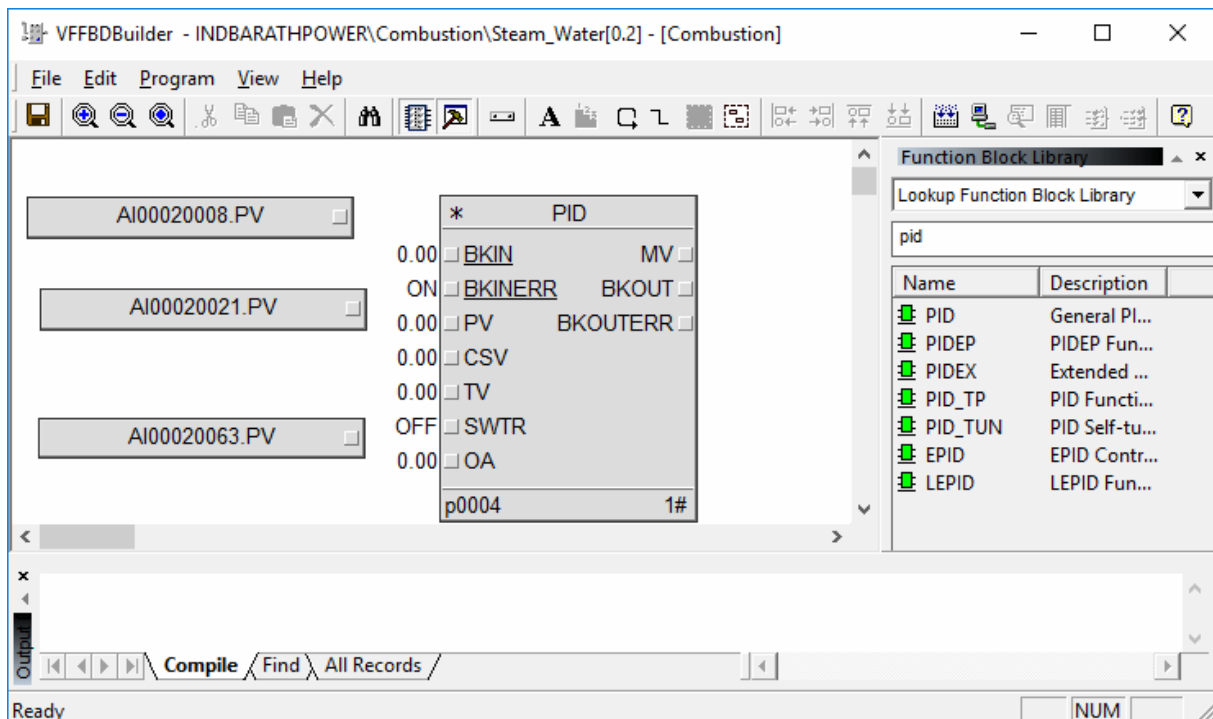


Figure 2-47 add new function block

4. Connection

Connect each output with input according to control scheme, and make sure connection from

output to input.

Move mouse to output area of function block or tag, wait till a blue box appears (or mouse display symbol "+"), shown as Figure 2-48:

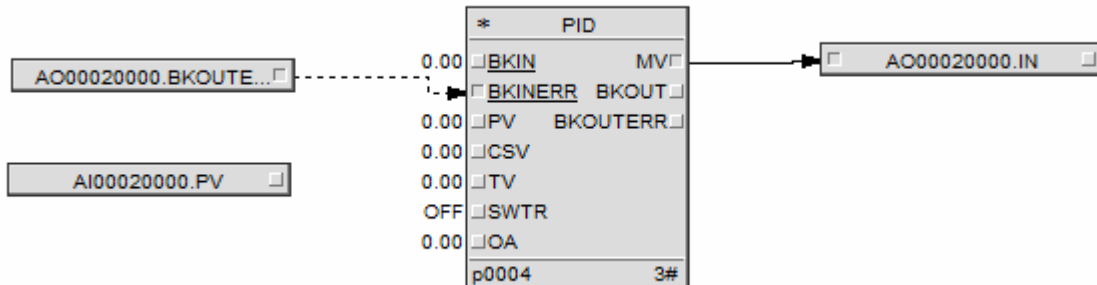


Figure 2-48 function block connection line 1

Then keep the left key of mouse pressed and start to drag the connection line, shown as Figure 2-49:

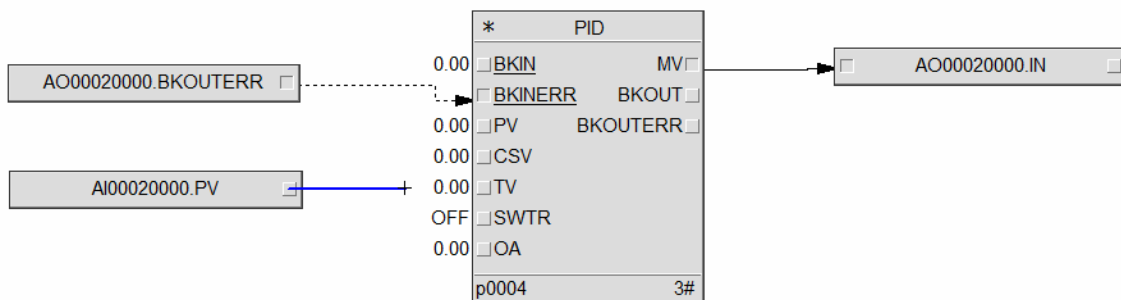


Figure 2-49 function block connection line 2

Drag mouse cursor to the input area of function block, and wait till the cursor becomes the state shown as Figure 2-50, then release mouse to complete connection.

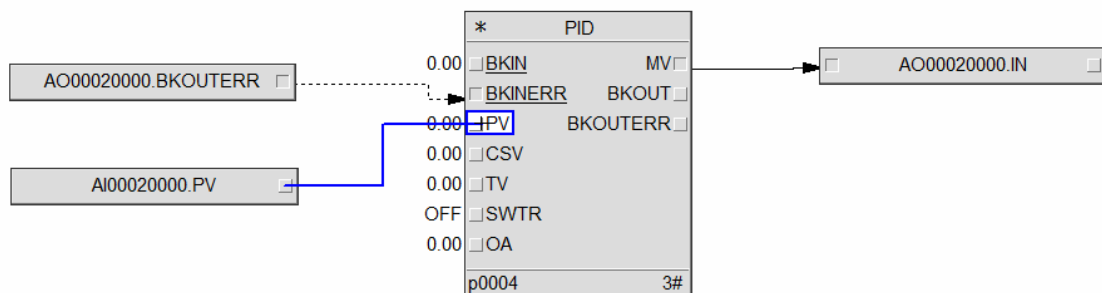

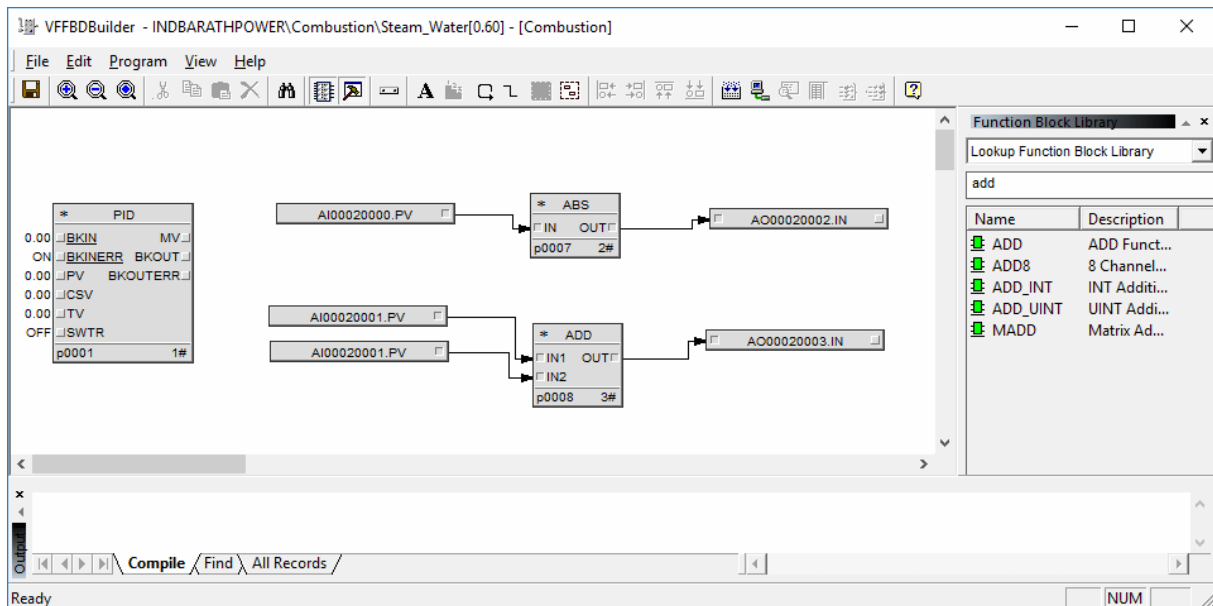



Figure 2-50 function block connection line 3

5. Adjust the execution order of function block

The execution order of function block is determined by the label like **1#** in the bottom right of function block, according to the number order from small to large. If there is special requirement for execution order, execution order of function block must be adjusted manually. Click the button  to enter function block order adjusting status. Execution order of the function block can be adjusted by clicking the blue area of the function block in the execution order, shown as Figure 2-51.

**Figure 2-51 adjust the execution order**

6. Compile

After finished editing the program, click the button  to compile. If there is any mistake, download will be failed.

7. Program scheduling

Program scheduling is to adjust the execution period and initial phase of the program. Normally, the default setting is adequate, but if there is any special requirement for program execution period (e.g., requiring the program to run in fast period), the period can be adjusted; if there are too many programs running in one phase of the controller and cause the phase overloaded, the initial phase can be adjusted. The phase is modified as follows:

Right click the program needed to adjust, and choose "Property", shown as Figure 2-52:

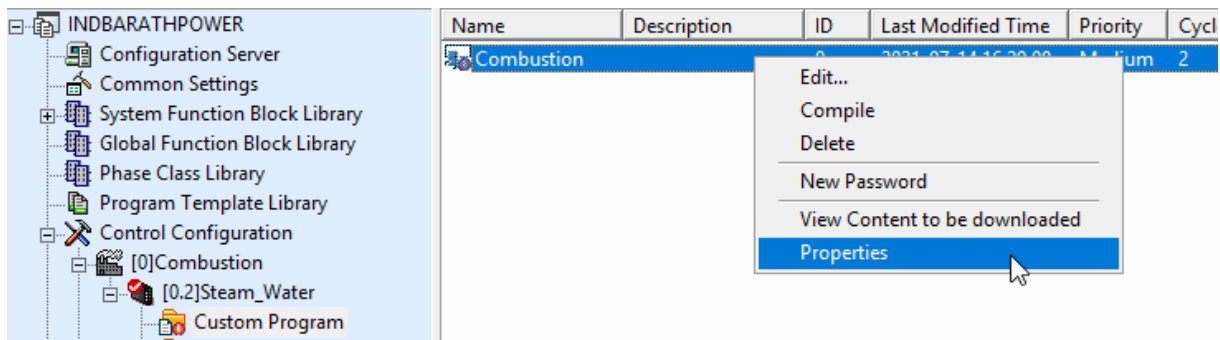


Figure 2-52 program property

Program property dialog box pops up, shown as Figure 2-53. Program running period and initial phase can be adjusted in the dialog box.

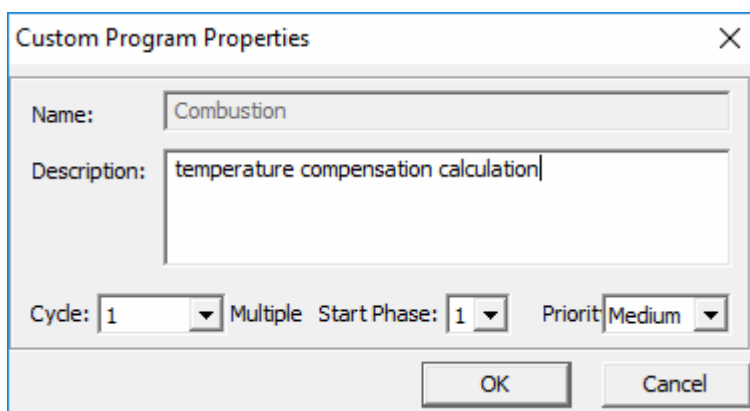


Figure 2-53 adjust the period and phase of program

If there is special requirement for execution order of programs within the same phase, right click the custom program and choose "Scheduling" in the right-click menu, shown as Figure 2-54:

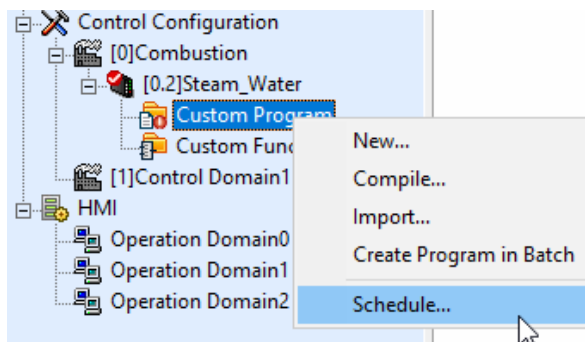


Figure 2-54 program scheduling

The execution order of programs within the same phase can then be adjusted. The program is executed according to the order of their name in the list. For example, in the following figure, when the execution phase is 0, the program "Combustion" will be executed first, then the program "Steam&Water". Click button "Shift Up" or "Shift Down" to adjust the execution order of selected program.

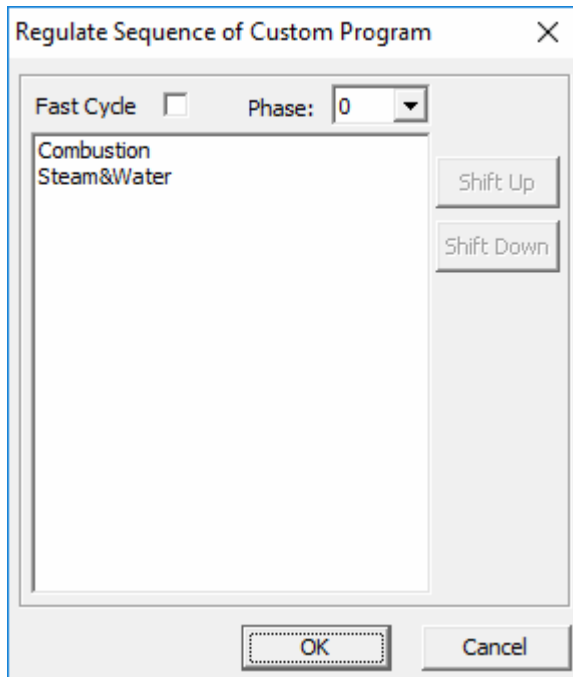


Figure 2-55 adjust the program execution order



Tips:

- For more detailed introduction of custom program configuration, refer to *FBD Programming Software User Manual*.
- For instruction of single function block, refer to the corresponding function block user manual.

2.4.6 Download Wholly

This system adopts the download method of on-line or off-line. On-line download is to download increasingly by single whole control station. The software will check whether the configuration version of the controller is in accordance with the version downloaded last time. If not, it prompts off-line download. On-line download only downloads the configuration modified, and have no influence on unchanged configuration. Off-line download is to download all configurations to the controller and may cause disturbance during download, so off-line download should be carried out cautiously and normally on-line download is adopted.

Download must be carried out in the VFExplorer. Before download, make sure that hardware configuration, tag build and program compiling are correct.

The processes of on-line download and off-line download are similar. Choose the controller requires configuration download, then choose the download method in the editing menu. (Right click the controller and choose "Online Download" in right-click menu to download online), shown as Figure 2-56:

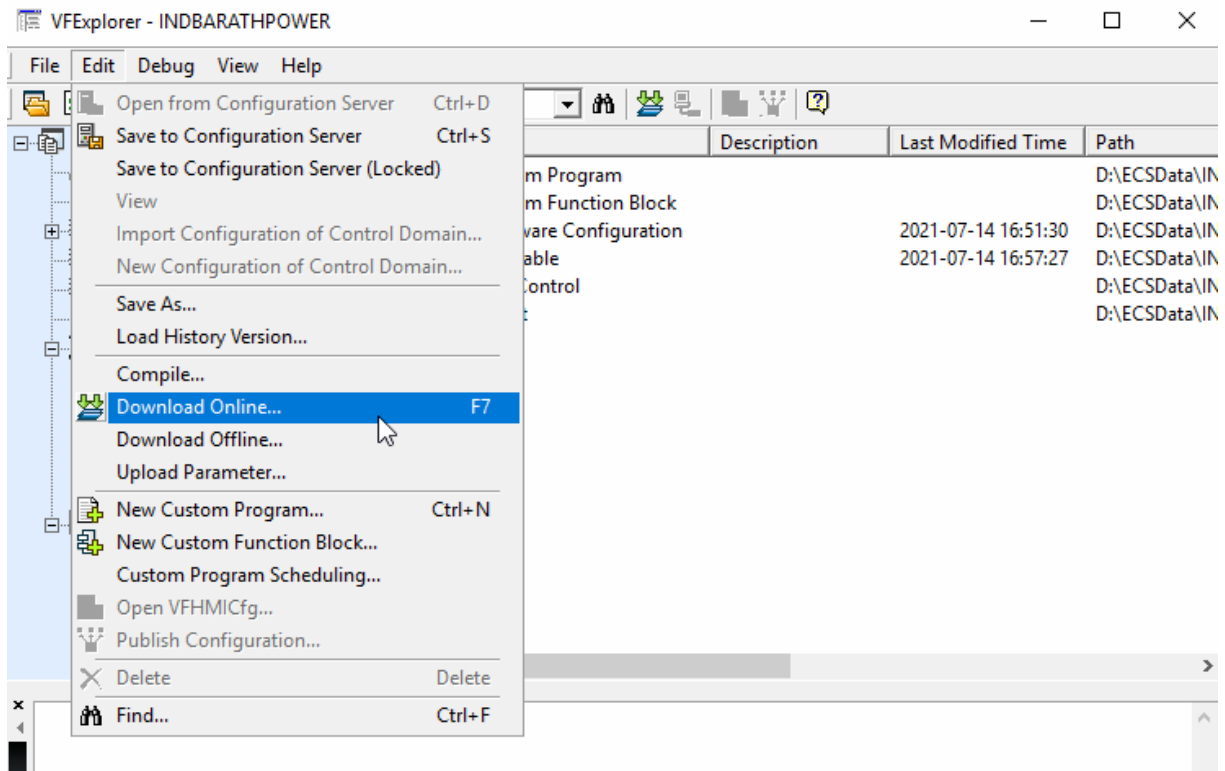


Figure 2-56 choose download method

The following dialog box pops up.

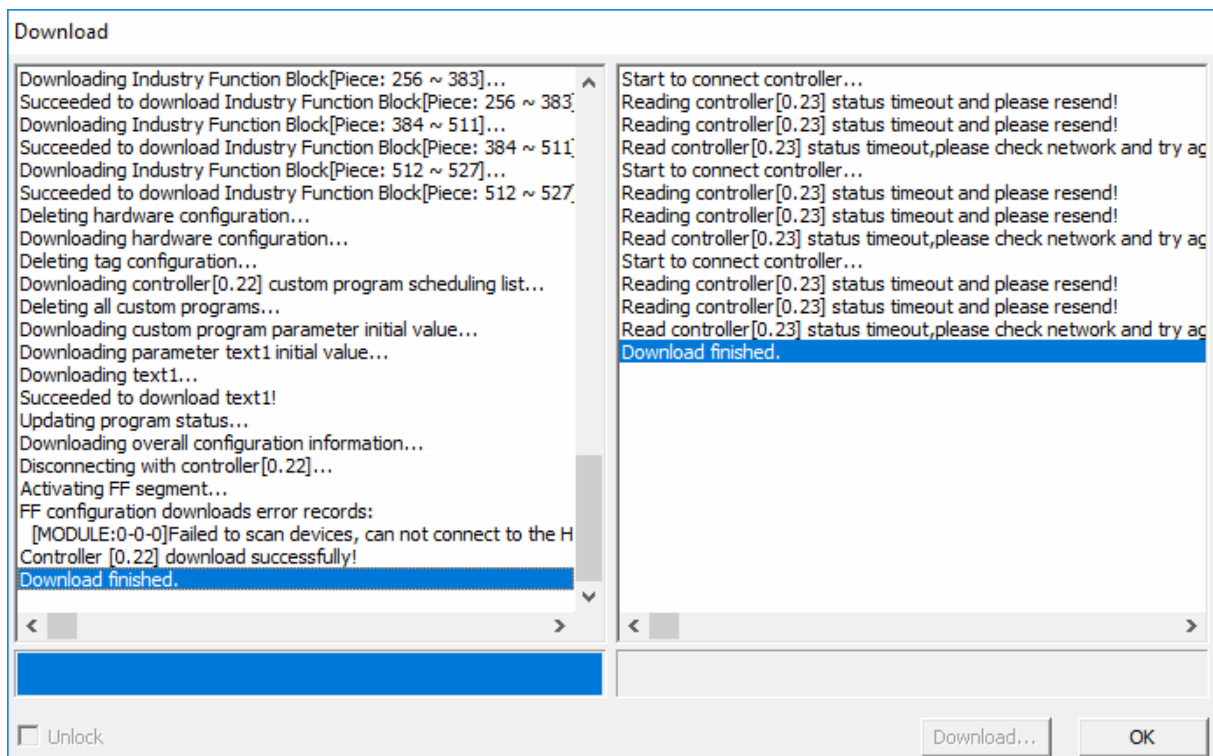


Figure 2-57 download dialog box

Click "Download" to download the configuration.

**Tip:**

For more detailed introduction about downloading, refer to *Config Explorer User Manual*.

2.4.7 Save Configuration to Configuration Server

After editing is finished, normally configuration of control station should be saved to configuration server, otherwise other engineer station can't operate with the station, and the tag information, etc., cannot be transmitted to other operation node timely.

Before saving, make sure that there is no error in hardware configuration, tag build, program and the VFIOBuilder, VFTAGBuilder, custom programs, etc., are closed, otherwise it would be unable to save. Saving procedure is shown as Figure 2-58:

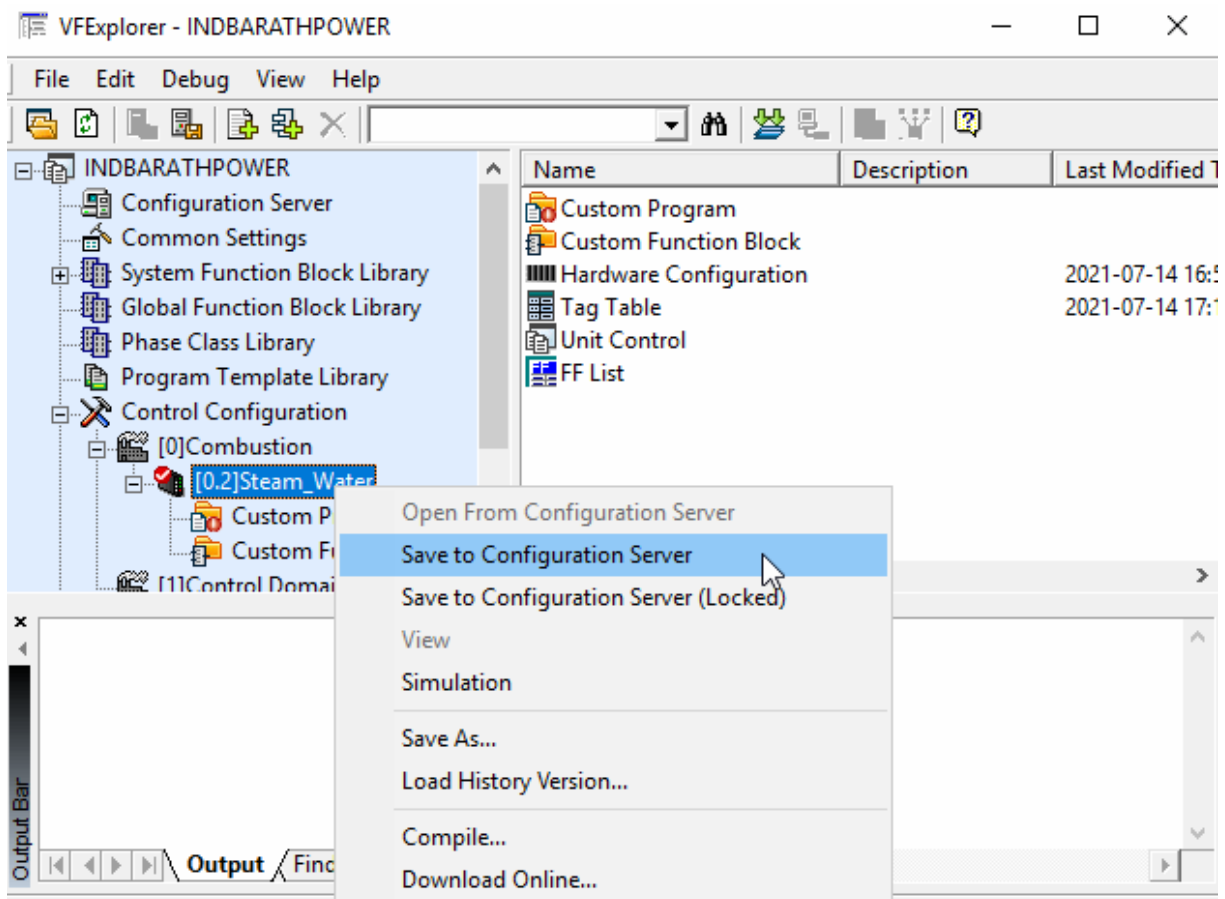


Figure 2-58 save configuration to server

**Tip:**

For more detailed introduction of saving configuration to server, refer to *Config Explorer User Manual*.

2.5 Global Function Block Configuration

Global function block can be used in any control station (instance). There are three levels in global function block library:

- Global Function Block Library
- Global Function Block Folder

Global function block folder can contain several global function blocks and manage them.

It supports operations of New, Delete and Import Function Block.

- Global Function Block

Global function block consists of Parameter, Logic, Symbol and Panel, and supports several symbols or panels.

The graphics of global function block configuration shows as Figure 2-59:

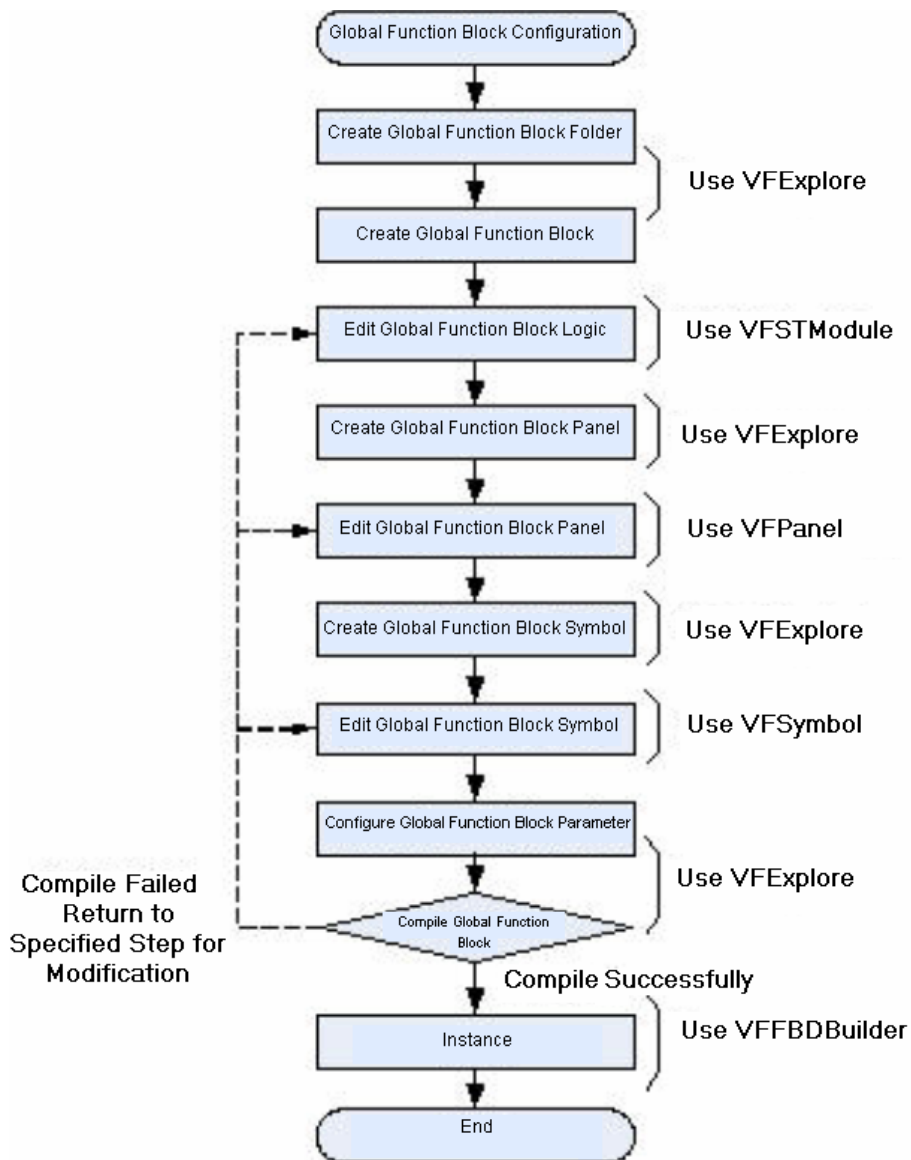


Figure 2-59 Graphics of global function block configuration

2.5.1 Create Global Function Block Folder

14. Right-click "Global Function Block Library" and select "New" in right-click menu.
15. Input name and description of the global function block folder in the dialog box shown below.

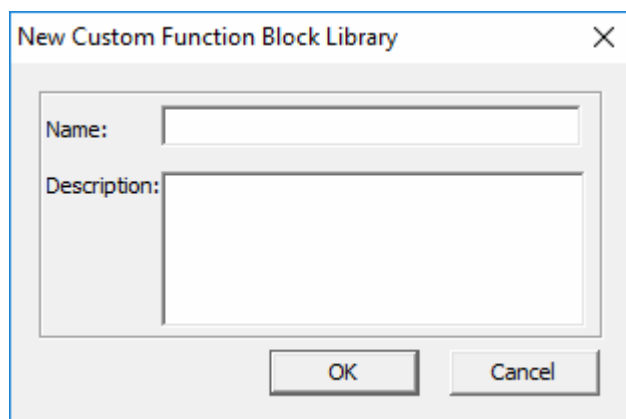
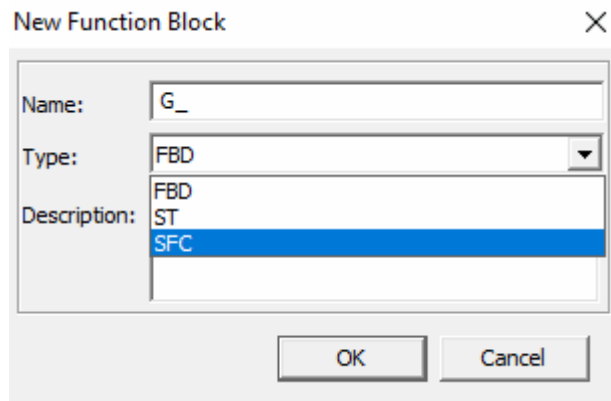


Figure 2-60 New global function block folder dialog box

- “Name” contains at most 16 capital letters, numbers or underlines.
- “Description” contains at most 64 capital letters, numbers or underlines.

2.5.2 Create Global Function Block

16. Right-click “Global Function Block Folder” and select “New” in right-click menu.
17. Input name and description of the global function block, and select its type in the dialog box shown as below:

**Figure 2-61 New global function block dialog box**

- “Name” contains at most 16 capital letters, numbers or underlines.
- “Type” can choose “FBD”, “ST” or “SFC”.
- “Description” contains at most 64 capital letters, numbers or underlines.

2.5.3 Configure Properties of Global Function Block

1. Edit Logic of Global Function Block
2. Select “Logic” in the configuration property bar of global function block, and select “Edit” in the right-click menu.
3. Pop up VFSTModule.
4. Edit the logic of global function block in VFSTModule.

Details of VFSTModule see *FBD Builder User Manual*.

Edit Parameter of Global Function Block (selectable)

1. Select “Parameter” in the configuration property bar of global function block, and select “Edit” in the right-click menu.
2. Pop up Properties Settings dialog box shown as below. Set macro of the global function block in “Macro”, which can contain at most 10 English letters, numbers or underlines, and it only can be started by character.

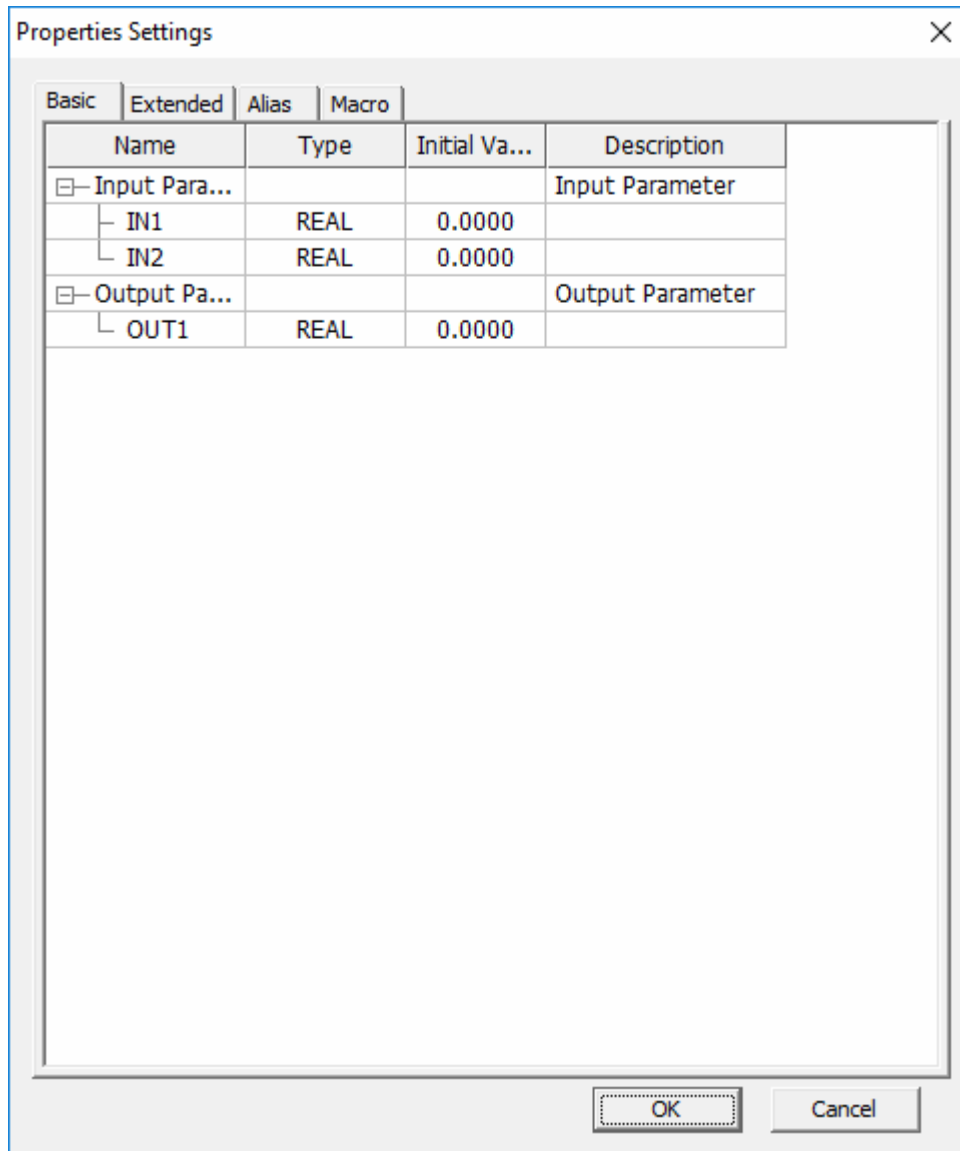


Figure 2-62 Global function block properties settings dialog box

“Basic Parameters”, “Extended Parameters” and “Alias Parameters” can only view but not modify the parameters.

Create Panel of Global Function Block (selectable)

1. Select the specified global function block in work space, and select “New Panel” in the right-click menu.
2. Pop up the “New Panel” dialog box shown as below, input the “Name” and “Description”. The panel name can contain at most 12 characters. It cannot be empty or contain any blank space and symbols like V:*?\"<>|!@#\$%^&=,.;[]+-~.

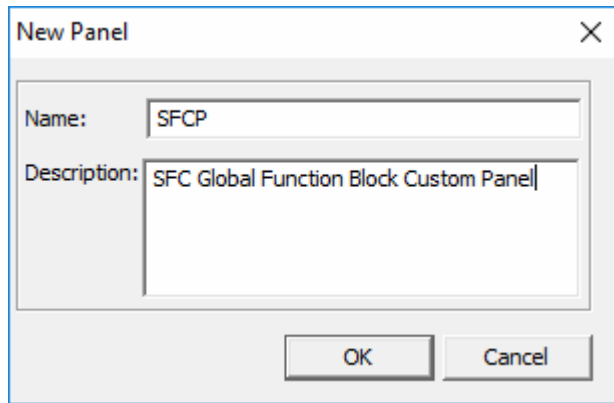


Figure 2-63 New global function block panel dialog box

3. Pop up VFPanel after clicking “OK”.
4. Set the global function block panel in VFPanel.

Details of VFPanel see Graphics Builder User Manual.

Create Symbol of Global Function Block (selectable)

Select the specified global function block in work space, and select “New Symbol” in the right-click menu.

Pop up the “New Icon” dialog box shown as below, input the “Name” and “Description”. The symbol name can contain at most 12 characters. It cannot be empty or contain any blank space and symbols like V:*?\"<>|!@#\$%^&=,.;[]+-~.

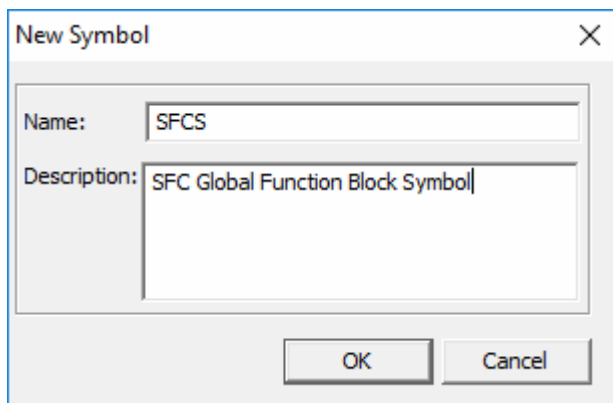


Figure 2-64 New global function block symbol dialog box

Pop up VFSymbol after clicking “OK”.

Set the global function block symbol in VFSymbol.

Details of VFSymbol see *Graphics Builder User Manual*.

2.5.4 Compile Global Function Block

Select the global function block in work space and select “Compile” in the right-click menu.

2.6 FF System Configuration

When FF system is included in project, it is necessary to configure the FF devices, control strategy, etc.

FF system configuration can be divided into two parts: offline configuration and online configuration. During the implementation of project, offline configuration can be performed at the plant first, and online configuration operation is performed after system is physically installed in the field and the FF device is physically connected. The specific FF system configuration process is shown in Figure 2-65.

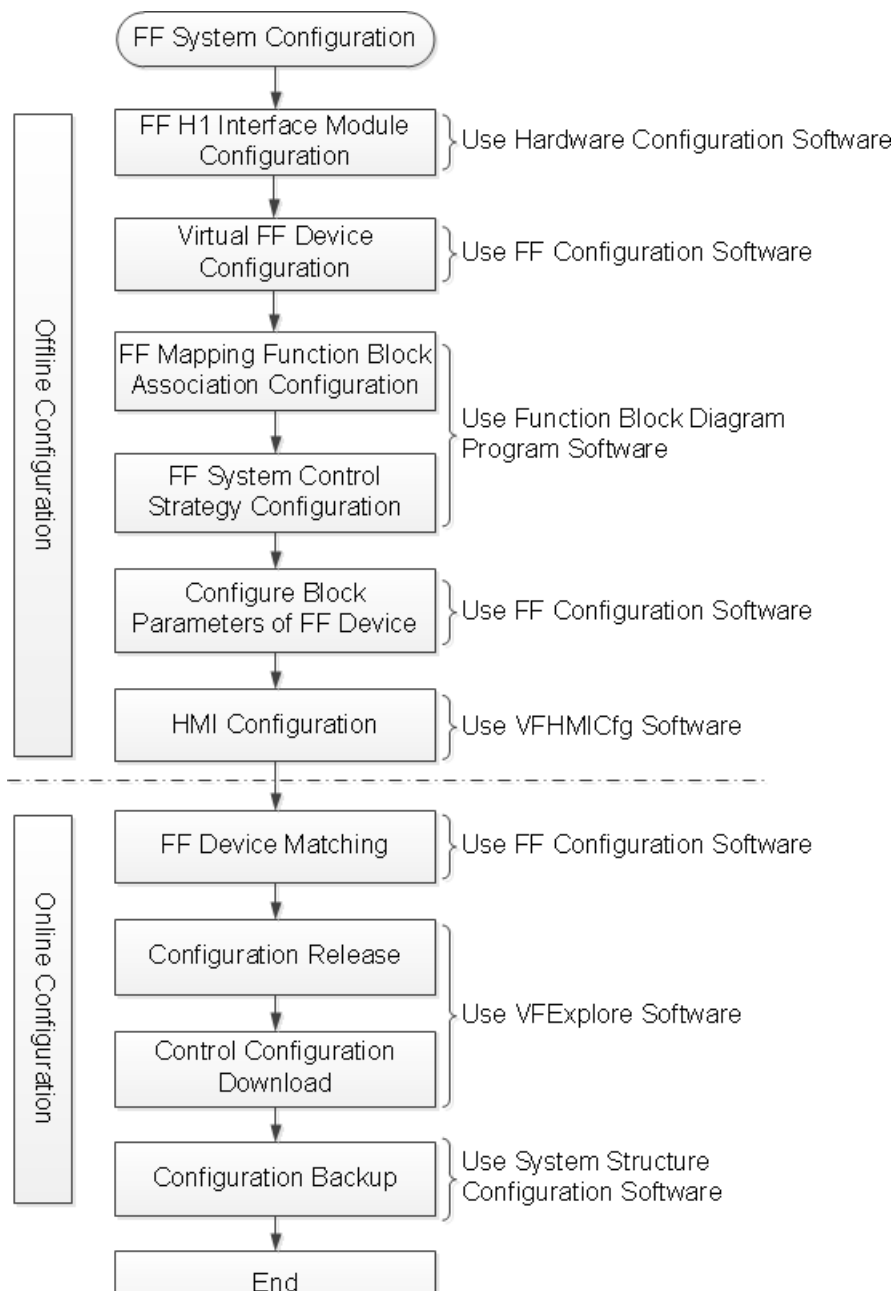


Figure 2-65 FF system configuration graphic

2.6.1 Configure FF H1 Interface Module

OMC system communicates with FF devices on FF H1 network through FF H1 interface module (hereinafter referred to as AM712-S). AM712-S configuration must be completed first to perform the FF system configuration. The configuration of AM712-S is done in the hardware configuration software of High-performanceHMI.

It is necessary to complete the creation of OMC system engineering and carry out the system structure configuration before AM712-S is performed.

The configuration process of AM712-S includes:

1. Start hardware configuration software in configure management software. Please refer to *Hardware Configuration Software* for details.
2. Add AM712-S to specified rack according to the design requirements of system hardware structure, as shown in .

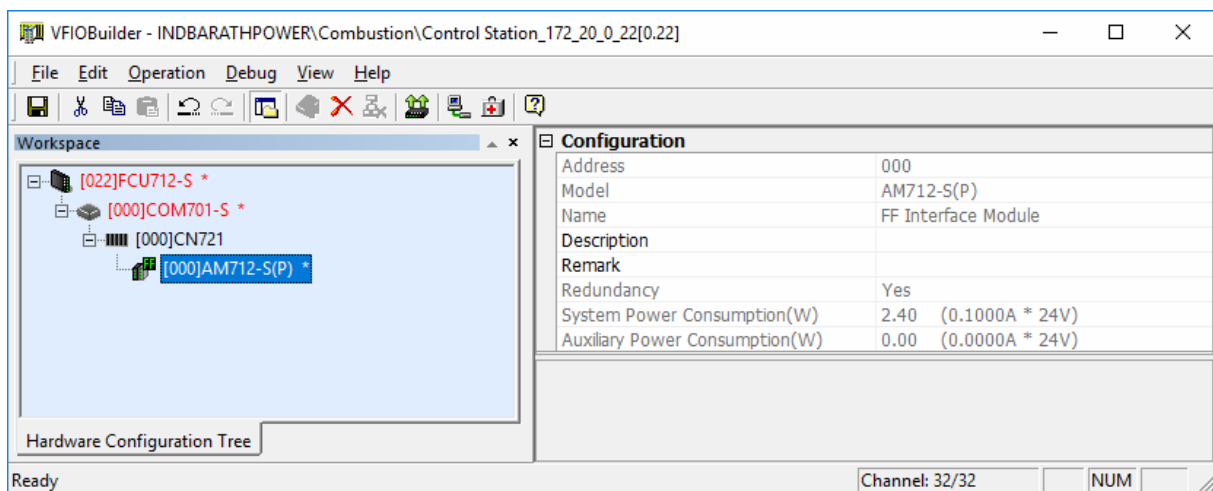


Figure 2-66 Add AM712-S



Tip:

If AM712-S is already installed in the rack and control system is powered on, user can scan upload function to scan and upload the actual connected hardware in current system to obtain hardware configuration information.

Please refer to *Hardware Configuration Software* for details.

2.6.2 Configure Virtual FF Device

Virtual FF device refers to the device that is selected by configuration software from vendor list and added to device configuration. Virtual device also needs to be physically connected before it

can work normally in system.

User can add FF device used in FF system to be specified FF H1 network, and specify the device tag and its address in FF H1 network for the virtual FF device by configuring a virtual FF device.

The following steps can be used to configure the virtual FF device after completing AM712-S hardware configuration.

1. Start VFFBuilder
Select specified AM712-S in hardware configuration software, and select "Communication Configuration" in its right-click menu to start VFFBuilder software. The interface of software is shown in Figure 2-67.
2. Add virtual FF device
As shown in Figure 2-67, select the vendor, type and version of required device from vendor list window of software interface and drag it into the "Commissioned Fieldbus Devices" of device configuration window.

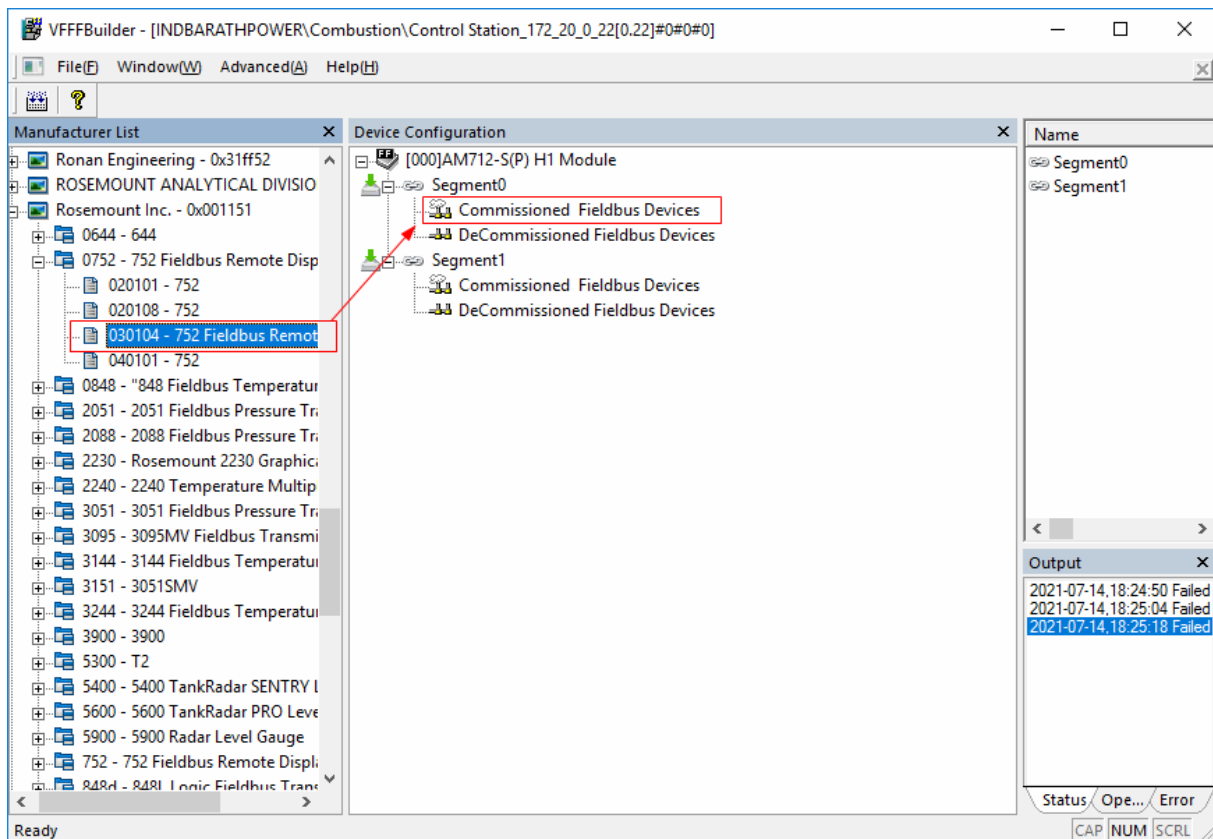


Figure 2-67 Add FF device to FF network segment

3. Set FF device properties
Enter the address and device tag in the pop-up dialog and it means that the addition of configuration meter is completed.

**Tip:**

The detailed configuration description of virtual FF device configuration can be found in *FF Configuration Software User Manual*.

2.6.3 FF Mapping Function Block Association Configuration

The association between FF device function block and FF mapping function block in High-performanceHMI system software is established by FF mapping function block association configuration.

The configuration of OMC system project, AM712-S hardware configuration, and FF device are required before FF mapping function block is configured.

The configuration process associated with FF mapping function block includes the following steps:

Serial Number	Process
1	Create FBD Custom Program
2	Start Function Block Program Software
3	Add FF Mapping Function Block to Control Program
4	<p>FF mapping function block is added to control program in VFFBDBuilder software. Specific steps are as follows:</p> <ol style="list-style-type: none"> 1. Select function block required by control strategy in the right function block library window. 2. Drag the selected FF mapping function block to program area. <p>Set FF Mapping Function Block Tag</p>
5	Assign FF Tag

Create FBD Custom Program

Select specified control station on configuration tree of configuration management software and place it in local lock status.

1. Select "Custom Program" of control station and select "New" in its right-click menu.
2. Enter program name and description in the pop-up "New Custom Program" dialog and select "FBD" as program type.

For specific operation interface and operation methods, please refer to "Custom Program" in *Configuration Management Software*.

Start Function Block Program Software

Select new program, and double click to open the function block program interface, as shown in Figure 2-68.

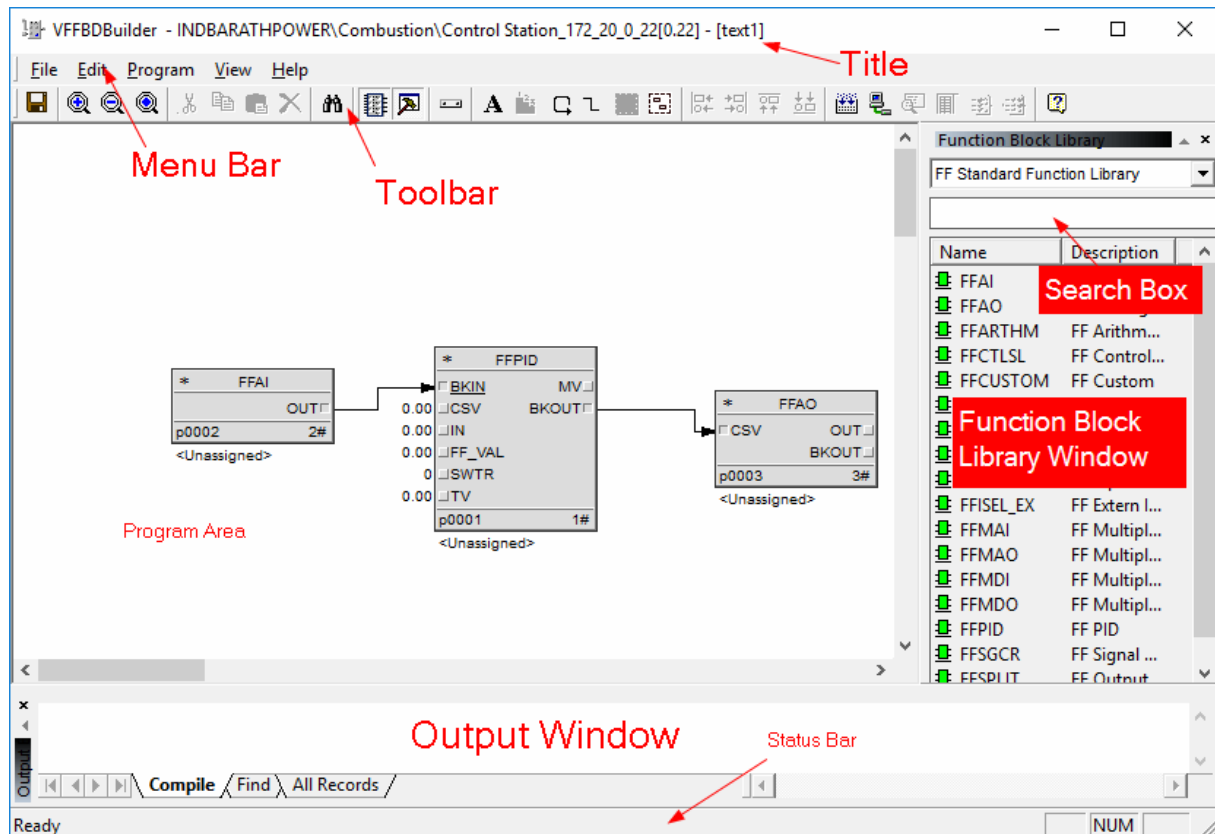


Figure 2-68 Function block program interface

Add FF Mapping Function Block to Control Program

FF mapping function block is added to control program in VFFBDBuilder software. Specific steps are as follows:

3. Select function block required by control strategy in the right function block library window.
4. Drag the selected FF mapping function block to program area.

Set FF Mapping Function Block Tag

Set FF mapping function block tag in VFFBDBuilder software. Specific steps are as follows:

1. Double click on the FF mapping function block to be named, and "Property" dialog in Figure 2-69 is displayed.
2. Enter tag name of function block in "Name" text box.

The screenshot shows the 'FF PID' dialog box with the 'Basic' tab selected. The 'Name' field contains 'FFPID001'. The 'Input Status' and 'Output Status' are both set to 'Active' via radio buttons. The 'Description' field is empty. The 'Tag Group' is '[00] Tag Group 0', 'Tag Level' is '0', 'Decimal Digits' is '2', 'Panel' is '*', and 'FF Subcycle' is '1'. At the bottom are 'OK', 'Cancel', and 'Help' buttons.

Property	Value
Name	FFPID001
Input Status	Active
Output Status	Active
Description	
Tag Group	[00] Tag Group 0
Tag Level	0
Decimal Digits	2
Panel	*
FF Subcycle	1

Figure 2-69 Function Block Property Settings dialog

Assign FF Tag

Users can assign the fieldbus shadow function block in High-performanceHMI system software to the fieldbus device in the field by the FF tag assignment.

1. Select the function block, right-click and select **Assign FF Tag**, open the Assign FF Tag dialog.

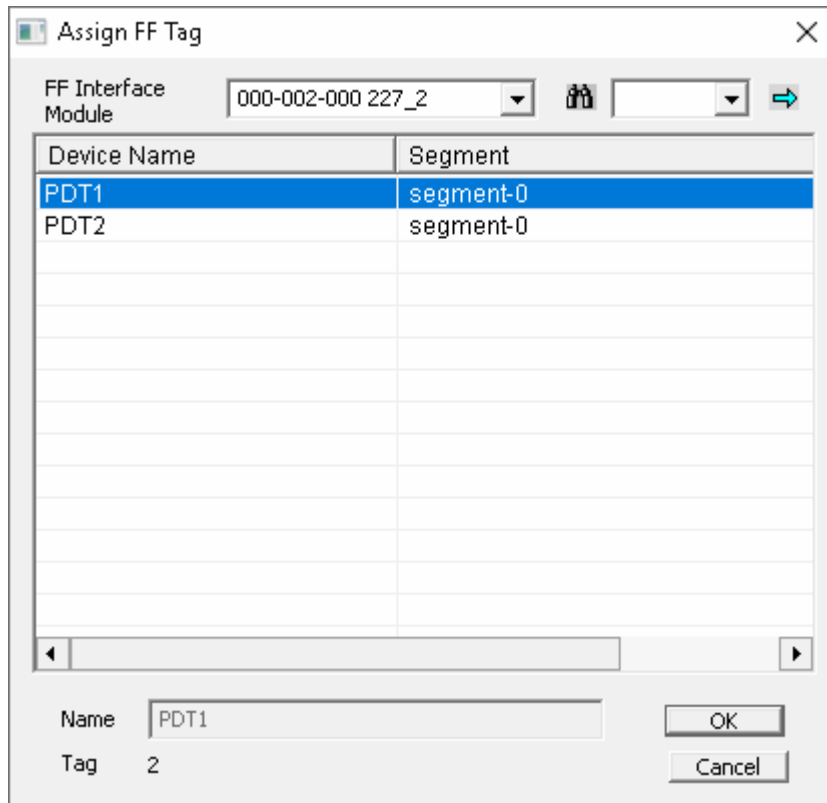


Figure 2-70 Assign the Tag of Fieldbus Shadow Function Block to Device

2. Select the device and click "OK" to open the following dialog.

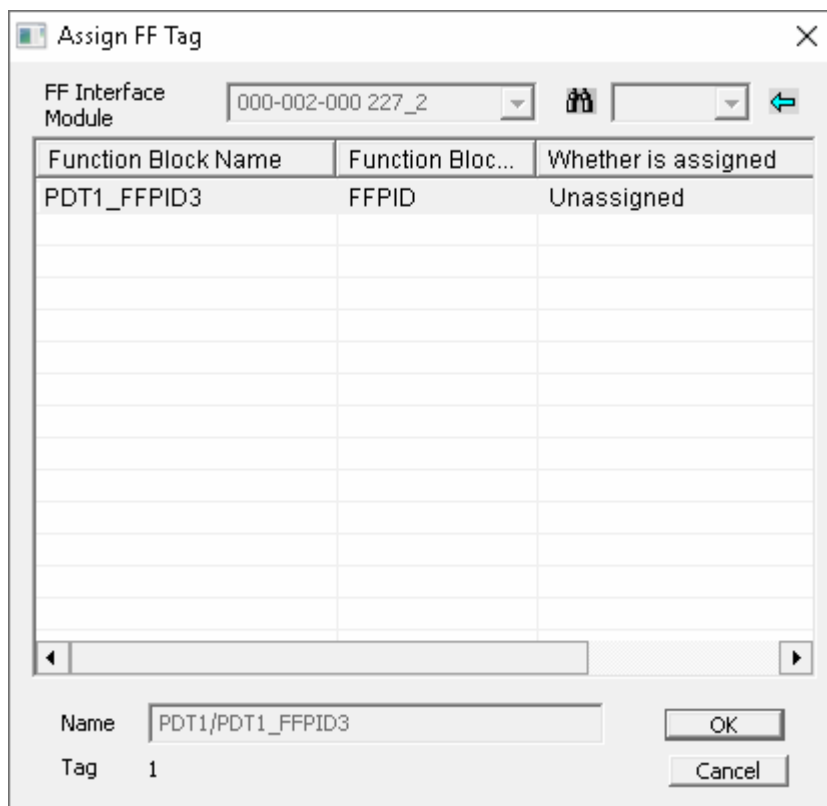


Figure 2-71 Assign the Tag of Fieldbus Shadow Function Block to function block of Device

3. Select the function block and click "OK".

**Tips:**

FF mapping function block association configuration is completed in VFFBDBuilder software. Please refer to *VFFBDBuilder Software User Manual* for details.

Foundation Fieldbus System Control Strategy Configuration Application

FOUNDATION fieldbus control strategy configuration can be completed in the VFFBDBuilder.

1. Invoke the function blocks (such as global function block, system function block and Fieldbus shadow function block) in VFFBDBuilder.
2. Execute FF Mapping Function Block Association Configuration.
3. Link the function block according to the control strategy.

The FOUNDATION fieldbus control strategy consists of field control strategy and mixed control strategy.

- Field Control Strategy

Figure 2-72 shows an example of field control strategy, in which all function blocks performing the control strategy are fieldbus shadow function blocks and must be invoked from the fieldbus shadow function library when programming. The control strategy will run in the field devices after being configured and downloaded.

The scheme of control strategy shown in Figure 2-72 in VFFBDBuilder is shown in Figure 2-73.

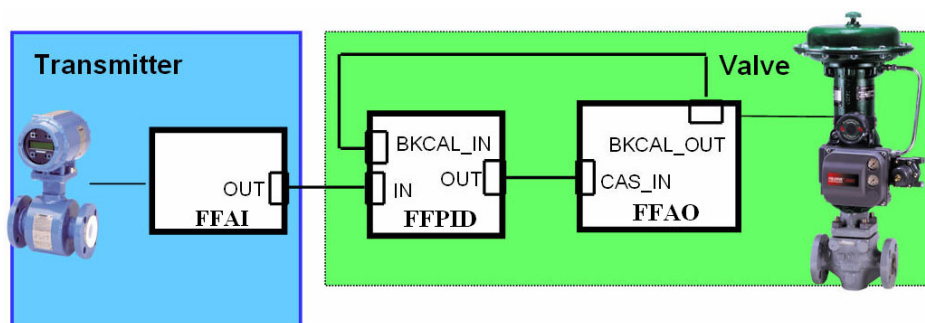


Figure 2-72 Field Control Strategy

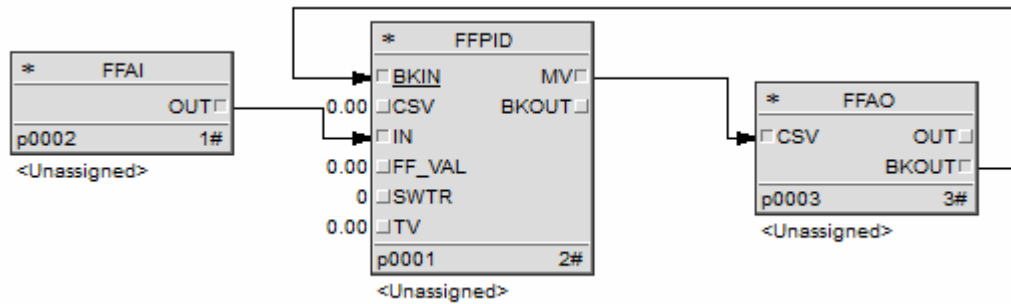


Figure 2-73 Field Control Strategy in the VFFBDBuilder

- Mixed Control Strategy

Figure 2-74 shows an example of mixed control strategy, in which the function blocks performing control strategy include fieldbus shadow function block and DCS algorithm function block. The mixed control strategy can be executed by combining fieldbus device and control system.

The scheme of control strategy shown in Figure 2-74 in VFFBDBuilder is shown in Figure 2-73.

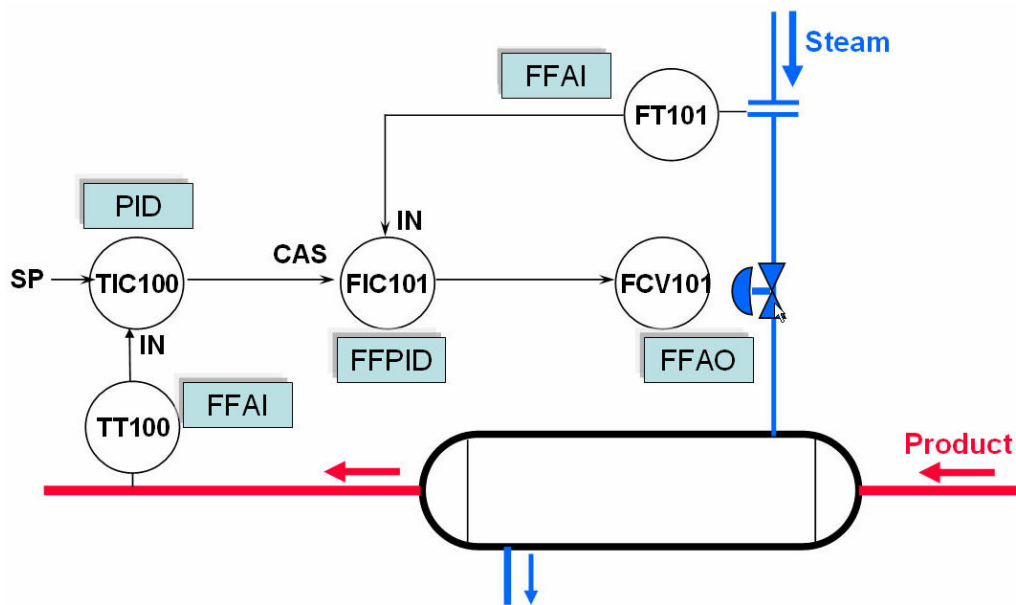


Figure 2-74 Mixed Control Strategy

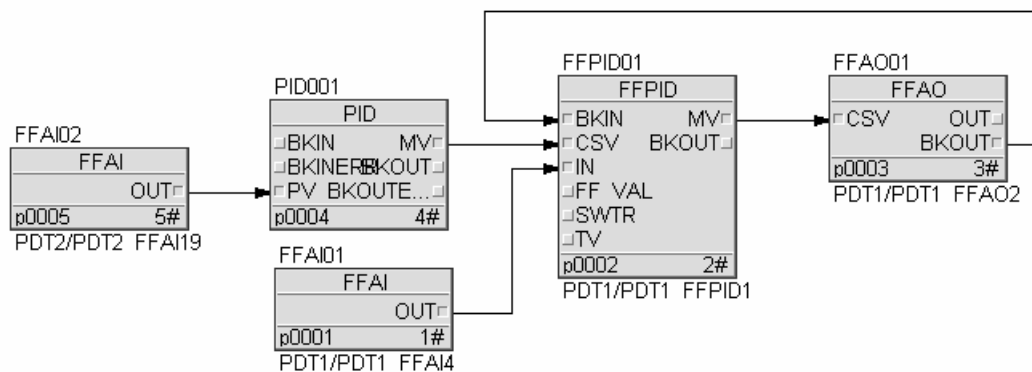


Figure 2-75 Mixed Control Strategy in the VFFBDBuilder

2.6.4 Configure Block Parameters of Fieldbus Device

The block parameters of fieldbus device can be configured in the VFFBuilder.

1. Select the fieldbus device in the Device Configuration window of VFFBuilder, right-click and select **Device Configure** to open the following dialog.

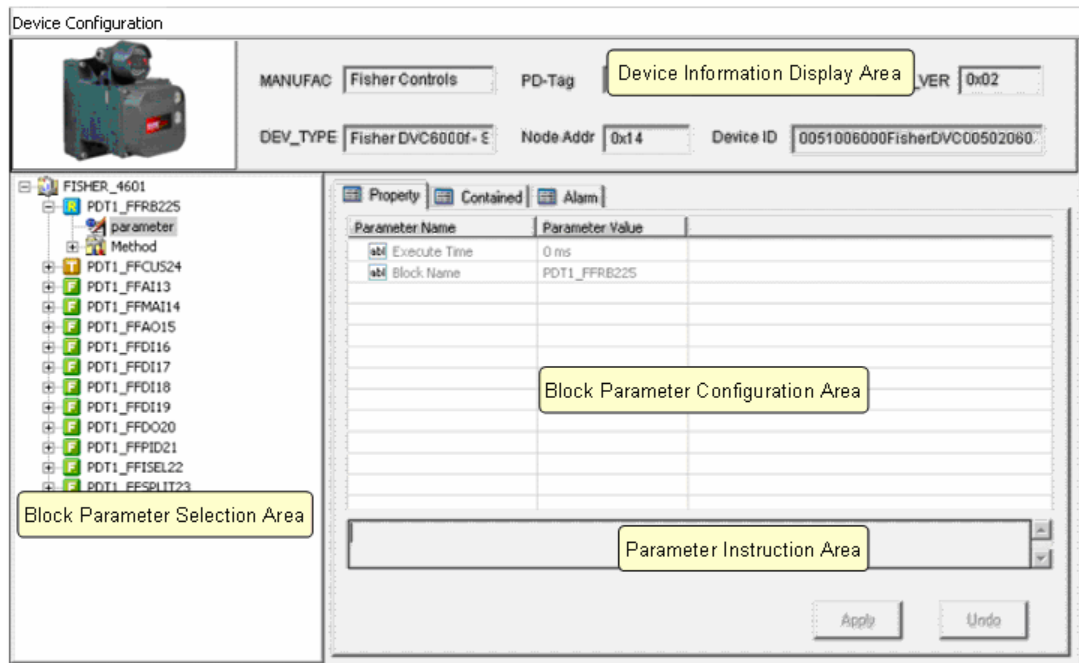


Figure 2-76 Device Configure Dialog

2. Click **Apply** after modifying the parameter.

Tips:



- Details for the block parameter configuration of fieldbus device refer to the *VFFBuilder Software User Manual*.
- Details for the block parameter of fieldbus device refer to the fieldbus device user manual.

2.6.5 FF Device Commission

Users can commission the fieldbus device in Commissioned Fieldbus Devices with the online fieldbus device. Only the commissioned fieldbus device can be managed and monitored in the system.



Tips:

FF device matching is implemented in VFFBuilder. Please refer to *FF Configuration*

Software User Manual for details.

Configuration of virtual FF device needs to be completed before FF device is matched, and FF device is already online.

Steps for matching FF devices include:

1. Select the online fieldbus device in the Decommissioned Fieldbus Devices, right-click and select **Put in Standby**.

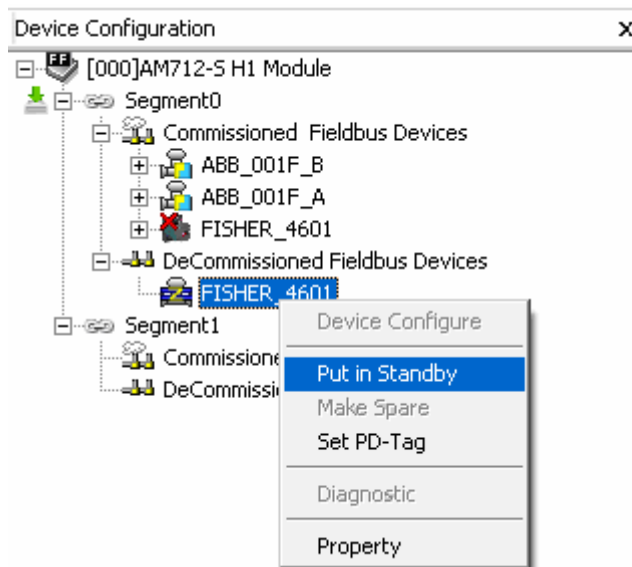


Figure 2-77 Put the Online Fieldbus Device in Standby

2. Select the configured and decommissioned fieldbus device in the Commissioned Fieldbus Devices, right-click and select **Commission**.

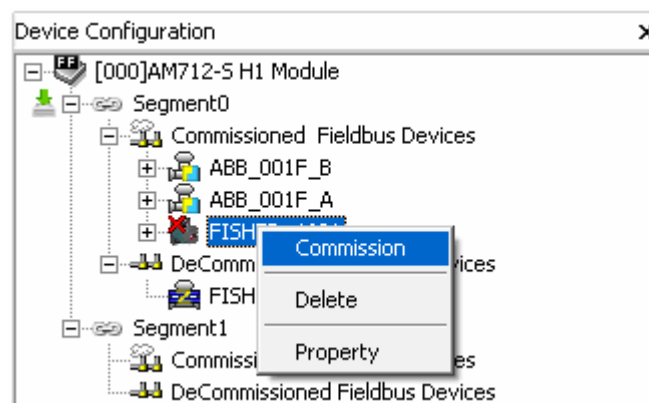


Figure 2-78 Commission the Fieldbus Device

3. The Select Device dialog appears. Select the fieldbus device in the Device List. Dragging the fieldbus device from the Decommissioned Fieldbus Devices to the Commissioned Fieldbus Devices can also achieve the commission.

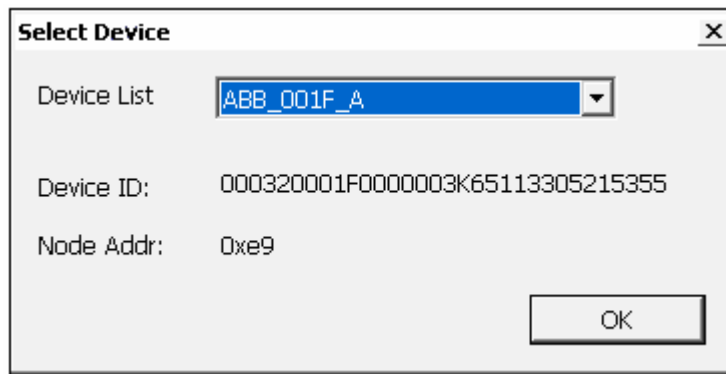


Figure 2-79 Select Device Dialog

2.7 Supervision Configuration

Supervision configuration includes operation domain configuration and operation team configuration. Operation domain configuration mainly includes operator's authority configuration, alarm color setting, domain variable configuration, history trend configuration, customized alarm grouping, panel authority, shelf alarm, manage state, procedure, etc.; operation team configuration mainly includes overview display, data summary display, control group display, trend display, graphics, report, scheduling, custom key, alarm region, alarm panel setting, alarm sound setting, tag associated graphics configuration, tag associated trend display, etc.



Tips:

- For more detailed introduction of supervision, refer to *HMI Config Software User Manual*.
- For more detailed introduction of supervision user authority, refer to *User Access Software User Manual*.
- For more details of report configuration, refer to *Report Software User Manual*.
- For more details of domain variable configuration, refer to *Domain Variable Config Software User Manual*.

2.7.1 Open Configuration

Supervision configuration is locked by unit of operation domain (not including resource files), and an operation station can only be locked and edited by one engineer station. Open the operation domain from configuration server before editing it, otherwise it is only available for viewing the configuration or editing the resource files. Make sure that the engineer has the authority to configure the operation domain; otherwise the configuration domain can't open.

Select an operation domain in VFExplorer and click "Open from Configuration Server" in the right-click menu to open supervision configuration software (VFHMICfg). (Right click and choose command "Edit" in the right-click menu, can also lead to the operation domain configuration interface), shown as Figure 2-80:

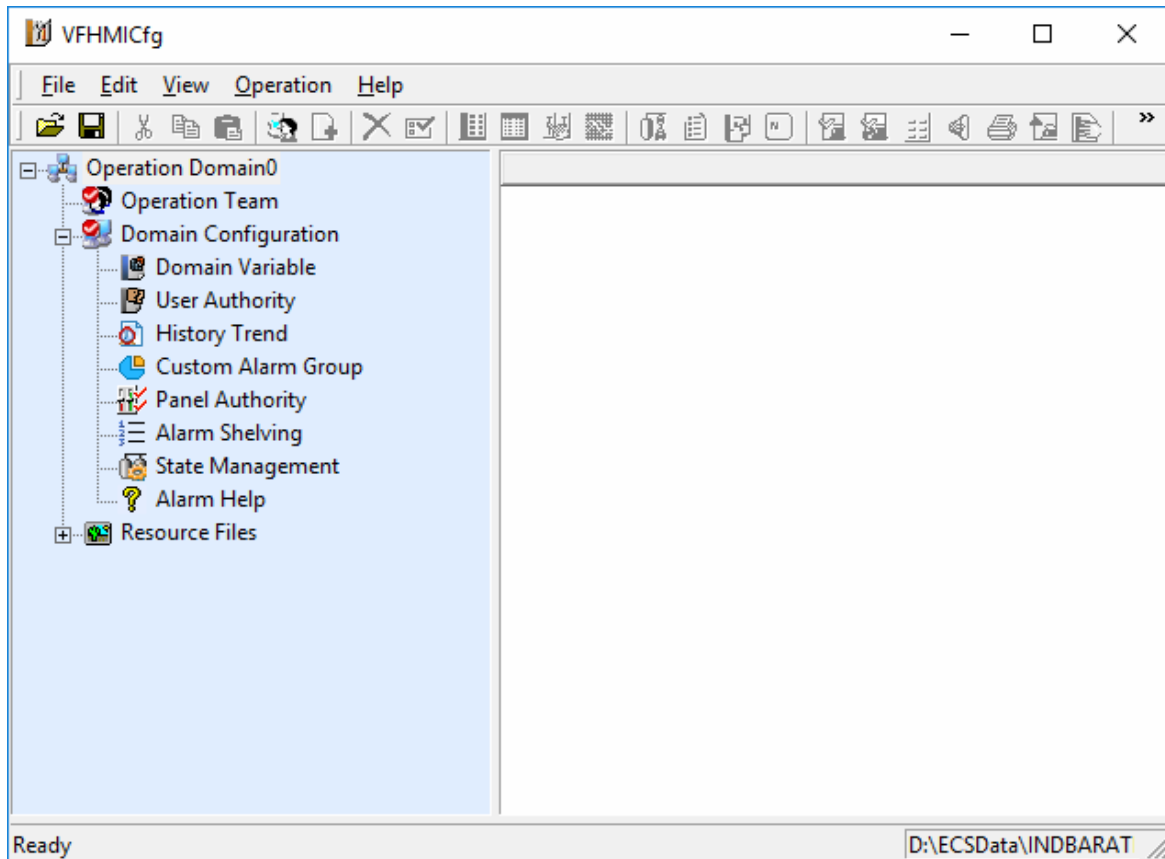


Figure 2-80 supervision configuration interface

2.7.2 Domain Configuration

1. Monitoring user authority

Supervising user authority is aimed at assigning the corresponding authority to the operator of the operation domain. Only the users assigned here can login the supervision.

1. Double click the "User Authority" under the "Domain Configuration", pop up the configuration interface of the user authority.
2. Two users Admin and Observer already exist in the user authority configuration interface. Users of required level can be added according to demand. E.g., add an engineer user with all the authority of corresponding level. Select the engineer node on the left, and choose the **Add User** command.
3. Choose **Local User** as the **User Type** and input User Name in the interface: Maintenance engineer; User Description: maintenance engineer; Password: 1111.
4. Click the button "OK" and the user "MaintenanceEngineer" would appear under the engineer rank, as Figure 2-81:

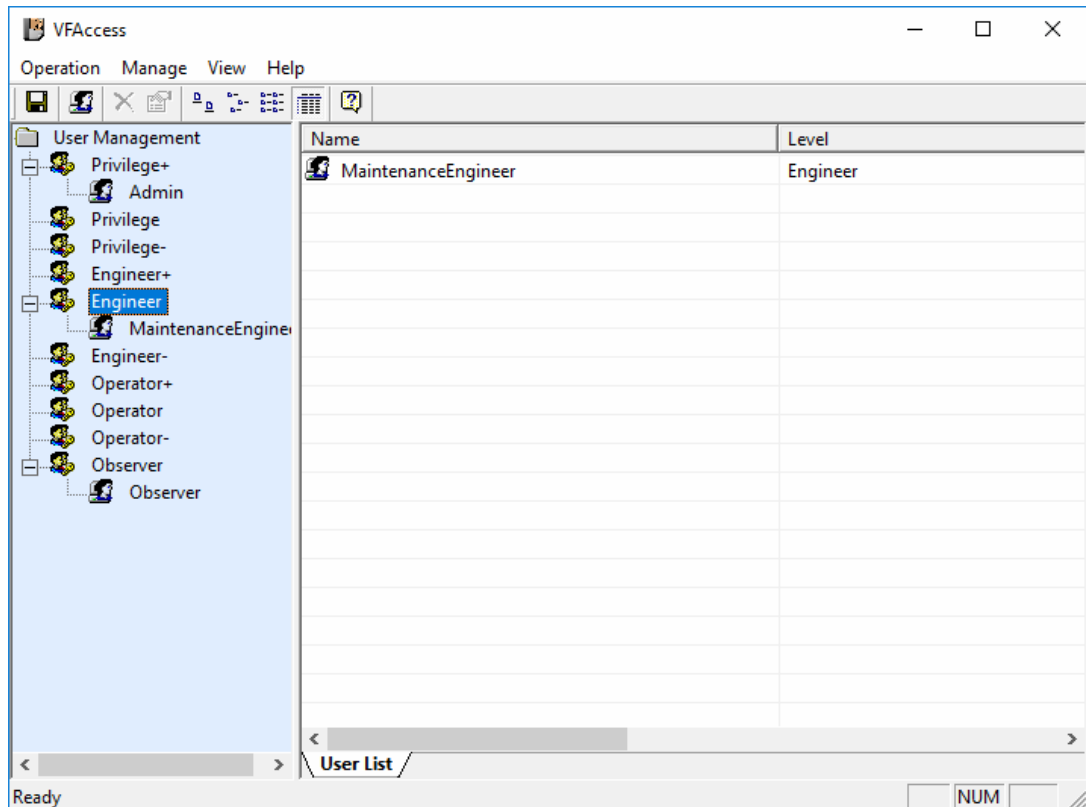


Figure 2-81 Complete creating a new user

5. Select the user "Maintenance_engineer" in the left directory tree and choose the page "Data Group" to select tag groups available for user operation, as Figure 2-82:

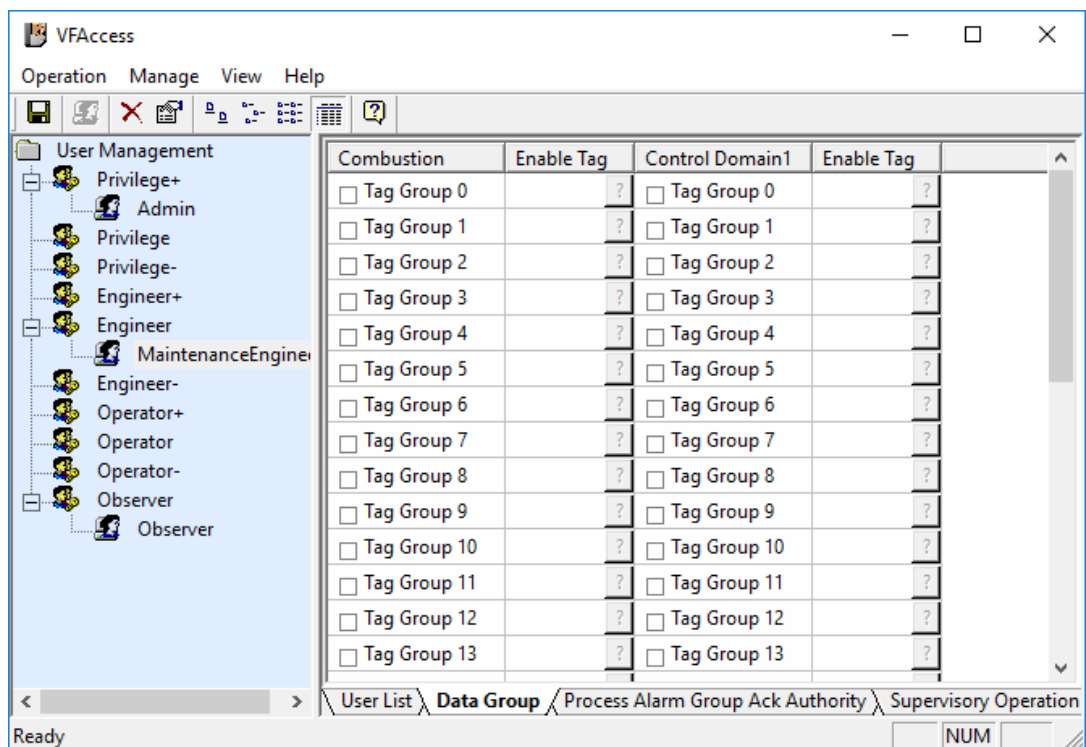


Figure 2-82 Data grouping settings

6. Choose the page "Supervisory Operation Authority", which shows the operation authority

this user chooses to supervise.

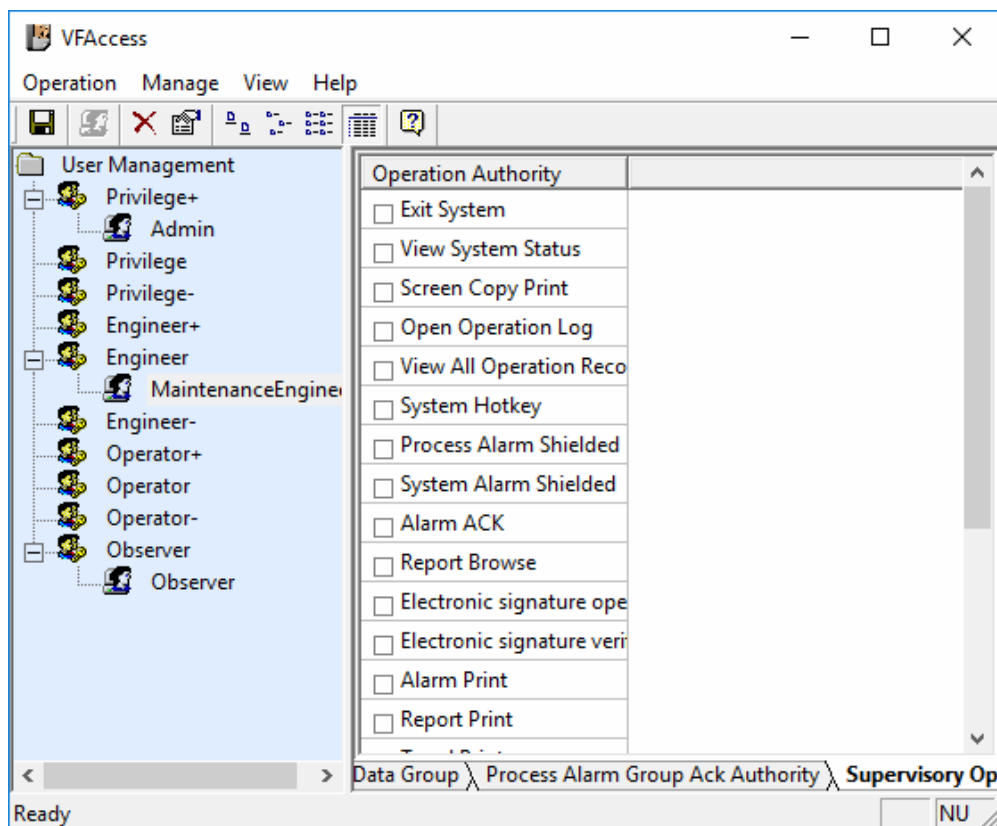


Figure 2-83 Supervisory Operation Authority settings

7. Users of other level can also be added according to requirement. After all users needed are added, check the operation teams to which this user has access, then save and exit the user configuration interface.




Tip:

It's recommended to select the operation teams to which the user has login access after completing all the configuration of operation team.

2. History trend configuration

If the history trend of a measuring point needs to be recorded, tag build should be carried out in "History Trend"

Double click the "History Trend" under "Domain Configuration", pops up the history trend configuration software (VFHisCfg). Click the button  on the toolbar and pops up the tag selector. Select the tags need to be recorded, and set the period, configuration of trend library tags in this domain can thus be achieved.

Right click: "History Data Server" to choose "Add History Data Server", and select the operator station (or engineer station) serves as history data server, shown as Figure 2-84:

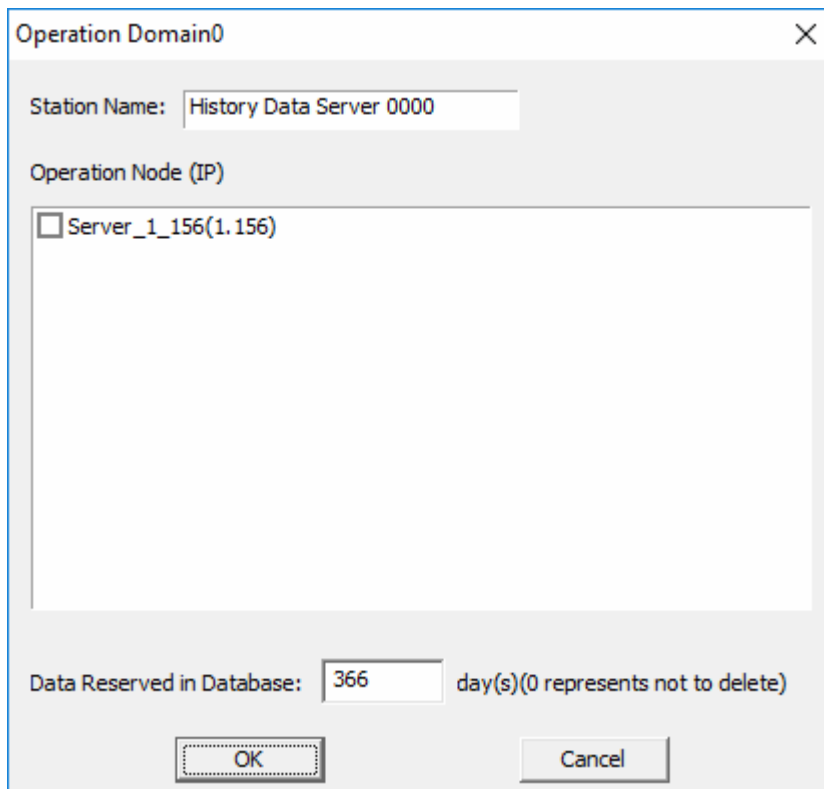


Figure 2-84 add history data servers

Then allocate the tag groups to history data server according to the load of the servers, shown as Figure 2-85:

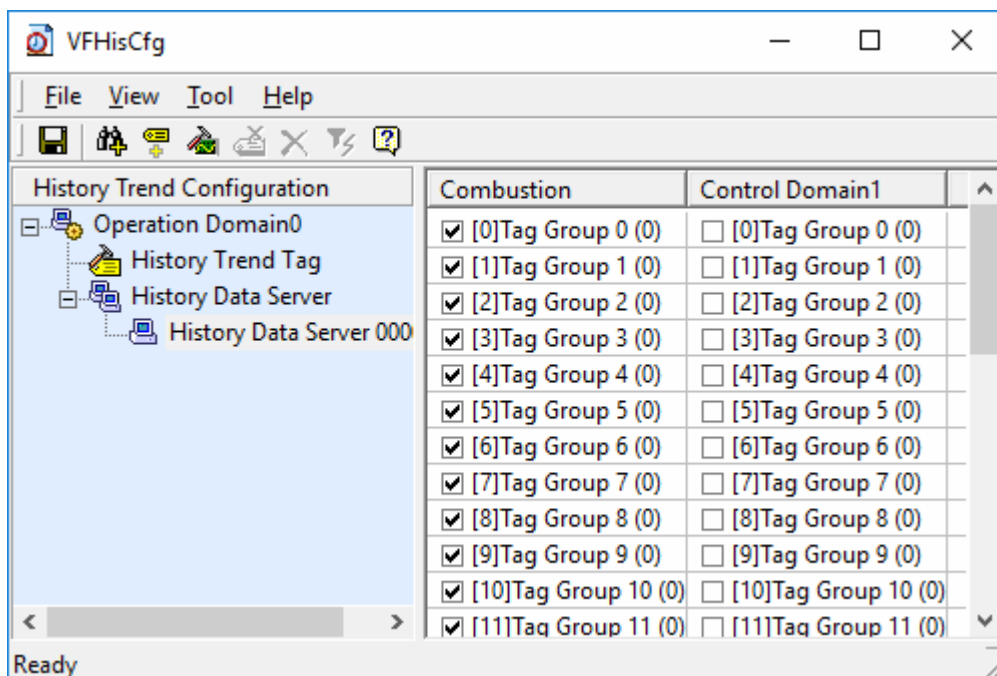


Figure 2-85 history data server settings

3. Custom alarm grouping

Alarm grouping includes default ones and custom ones. Default alarm grouping is tag grouping. If there is any special alarm grouping requirement, it can be configured in the custom alarm group.

Double click "Custom Alarm Group" under "Domain Configuration" to configure the alarm group.

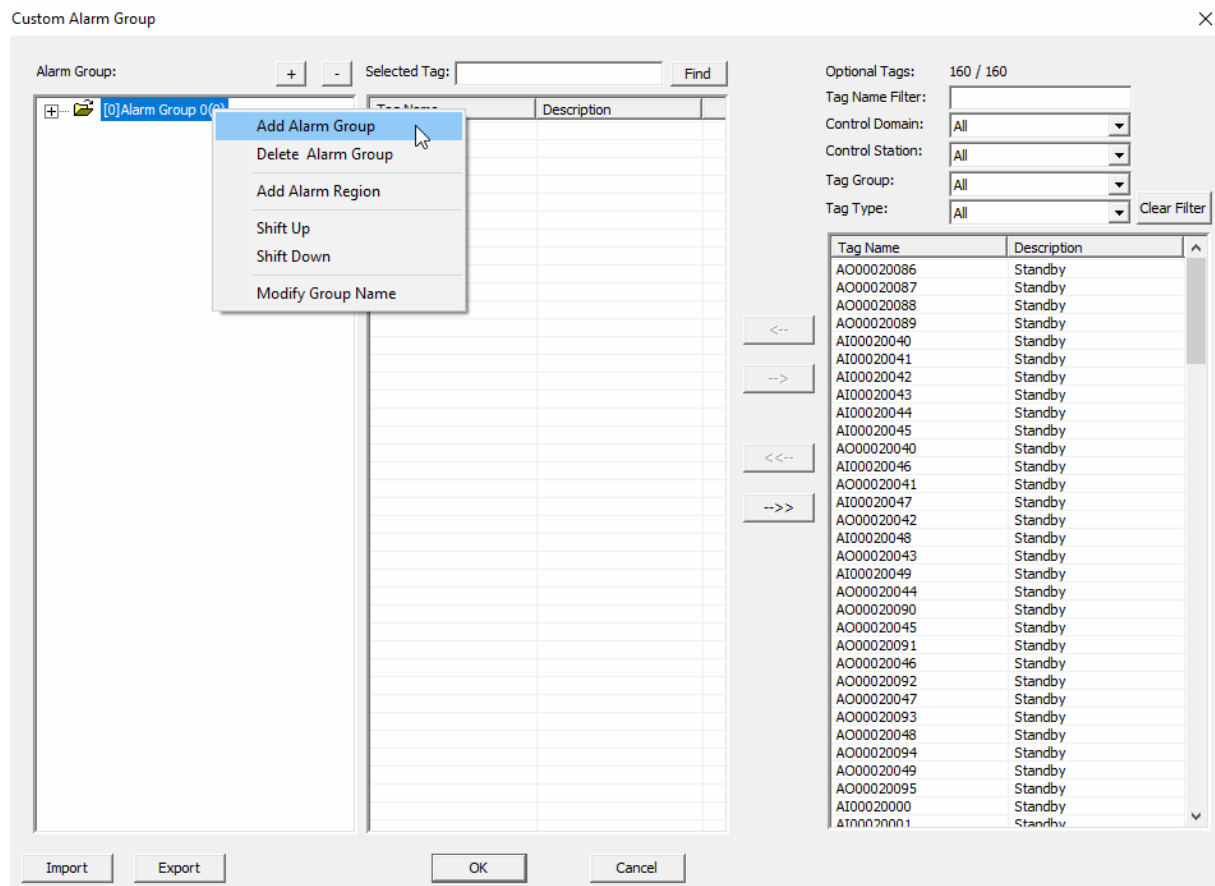


Figure 2-86 custom alarm group

4. Domain variable configuration

Domain variable configuration software is an important part of High-performance HMI configuration software package. It provides support for the third-party devices and OPC data access via I/O drivers. In addition, it also provides configuration functions of common variables (Memory driver), ModbusTCP driver, ModbusRTU and extend configuration variables and system data in OMC system and inter-domain data access.

Double click "Domain Variable" in the "Domain Configuration" to configure domain variables. The variable set here belongs to the operation node, and will not be downloaded to controller, but only can operate in operation node.

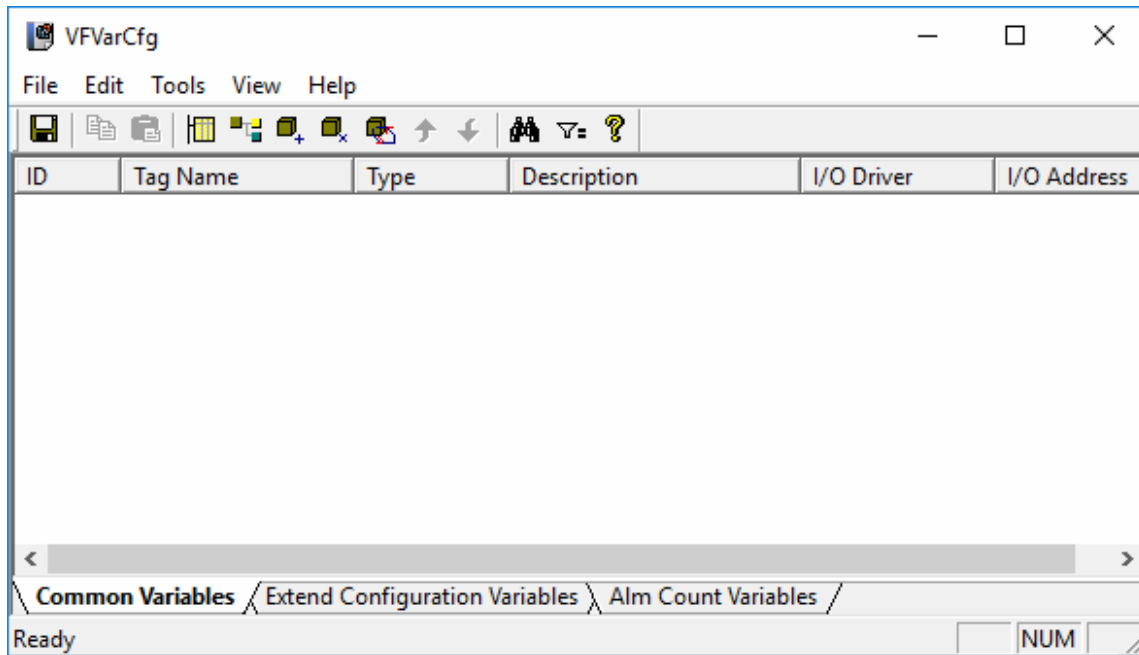



Figure 2-87 domain variable configuration

If there is third-party data or simulating variable needs to be linked from engineer station, it's necessary to add normal variable in the domain variable configuration. Driver should be added before adding variables. Click the driver configuration button , and pops up the I/O driver configuration interface to choose required driver type.

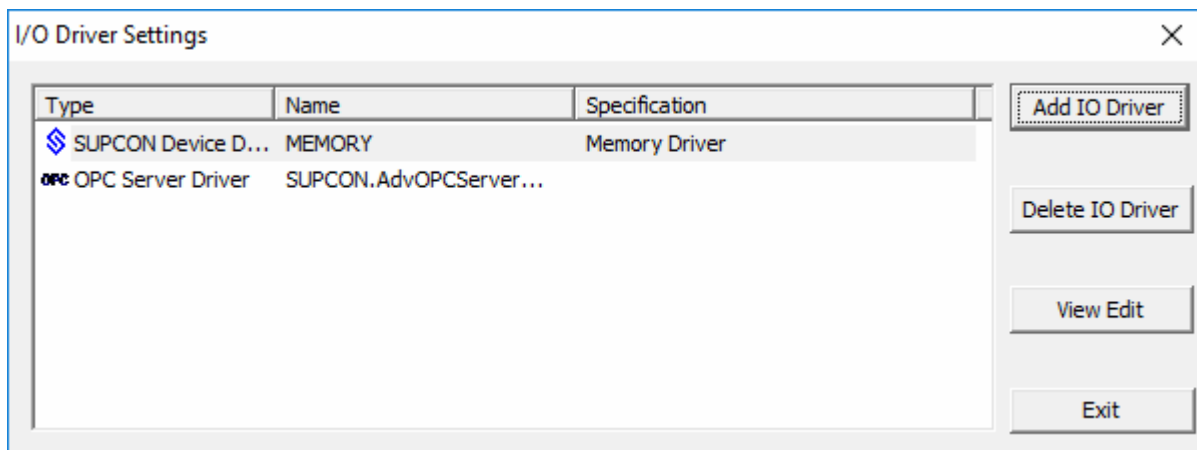



Figure 2-88 driver configuration

Regular driver types are SUPCON device driver, OPC server driver and inter-domain data driver.


SUPCON device driver consists of MEMORY driver. MEMORY driver is mainly used for signal simulation. OPC driver is mainly used for communication with other OPC server and client terminal. Inter-domain data driver let user use data in different operation domains under the same project, realizing the data accessing of cross-operation-domain.

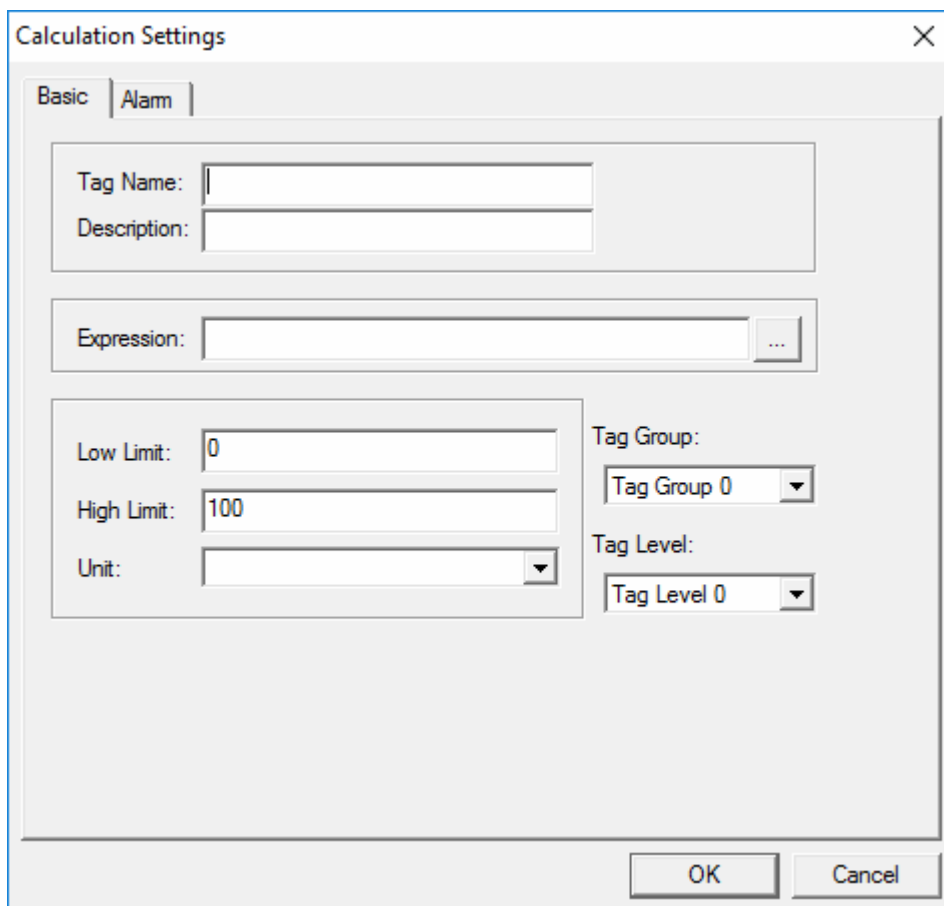
After adding driver is complete, click the adding button  to add tags. Tag type includes analog, digital and string. For more details, refer to *Domain Variable Config Software User Manual*.

**Attention:**

Name of tag added in the local domain cannot be repeat with alias of reference domain tag.

Extend configuration variables setting can solve the complicated engineering data processing problems easily and ensure the integrality and safety of system supervision by alarm setting management of tags.

As illustrated in the Figure 2-87, select "Extend Configuration Variables ", then click the adding button  on the tool bar to add a variable, shown as Figure 2-89:



The image shows a "Calculation Settings" dialog box with a close button (X) in the top right corner. It has two tabs: "Basic" and "Alarm", with "Basic" currently selected. The dialog contains several input fields and dropdown menus:

- Tag Name:** A text input field.
- Description:** A text input field.
- Expression:** A text input field with a small "..." button to its right.
- Low Limit:** A text input field containing the value "0".
- High Limit:** A text input field containing the value "100".
- Unit:** A dropdown menu.
- Tag Group:** A dropdown menu showing "Tag Group 0".
- Tag Level:** A dropdown menu showing "Tag Level 0".

At the bottom right of the dialog are "OK" and "Cancel" buttons.

Figure 2-89 add "Extend Configuration Variables"

5. Panel authority configuration

Double click the item "Panel Authority" under "Domain Configuration" to set the parameter adjusting authority of each kind of function block panel.

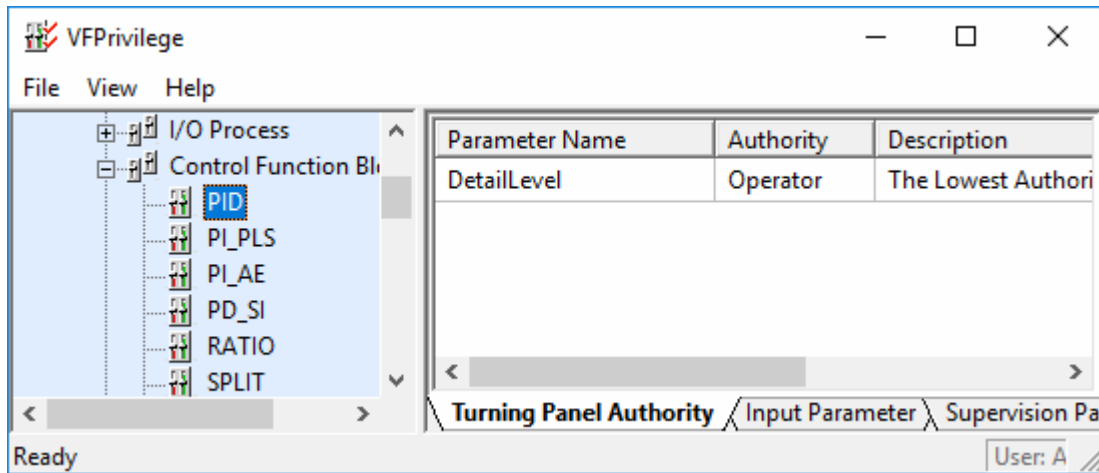


Figure 2-90 panel authority configuration

6. Shelf Alarm

Operator can shelve alarm temporarily to avoid nuisance via alarm shelve. The shelved alarm will be restored automatically when reaching the shelve time. Maximum 10 shelves reasons and 8 self-define shelves can be configured in VFHMICfg.

Select **Domain Configuration/ Alarm Shelve** to pop up **Alarm Shelve** dialog below. In the dialog, you can configure detail of shelve alarm.

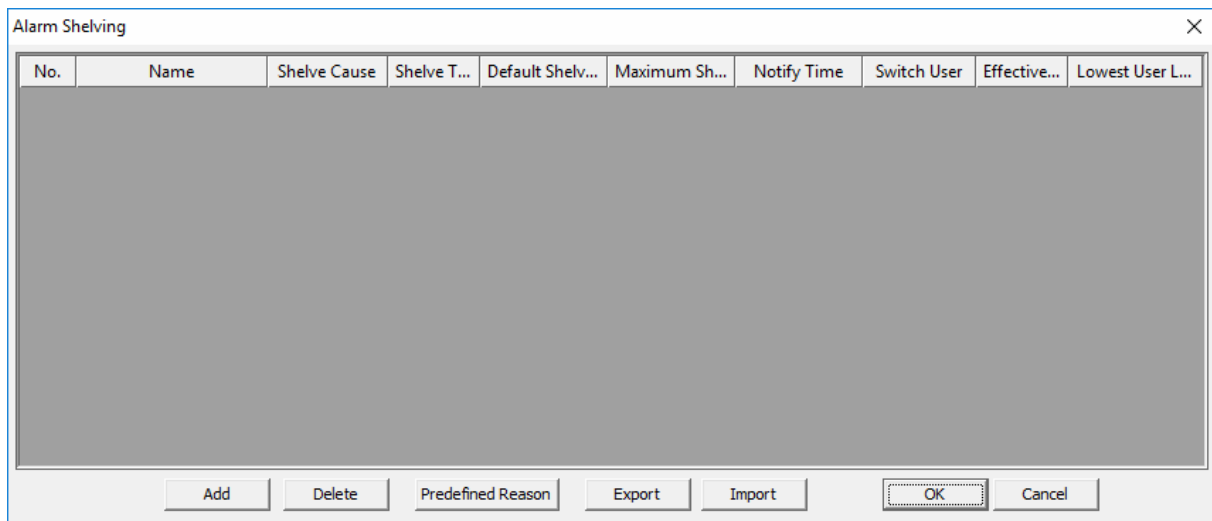


Figure 2-91 Alarm Shelve

7. Manage State

State refers to common work scene in field, such as startup, running and shut-down, etc. VFHMICfg can configure state management via defining key equipment and tag, state and alarm.

Select **Domain Configuration/ State Management** in VFHMICfg to pop up the **State Management** dialog, in which user can define key equipment, device state and related alarm operation.

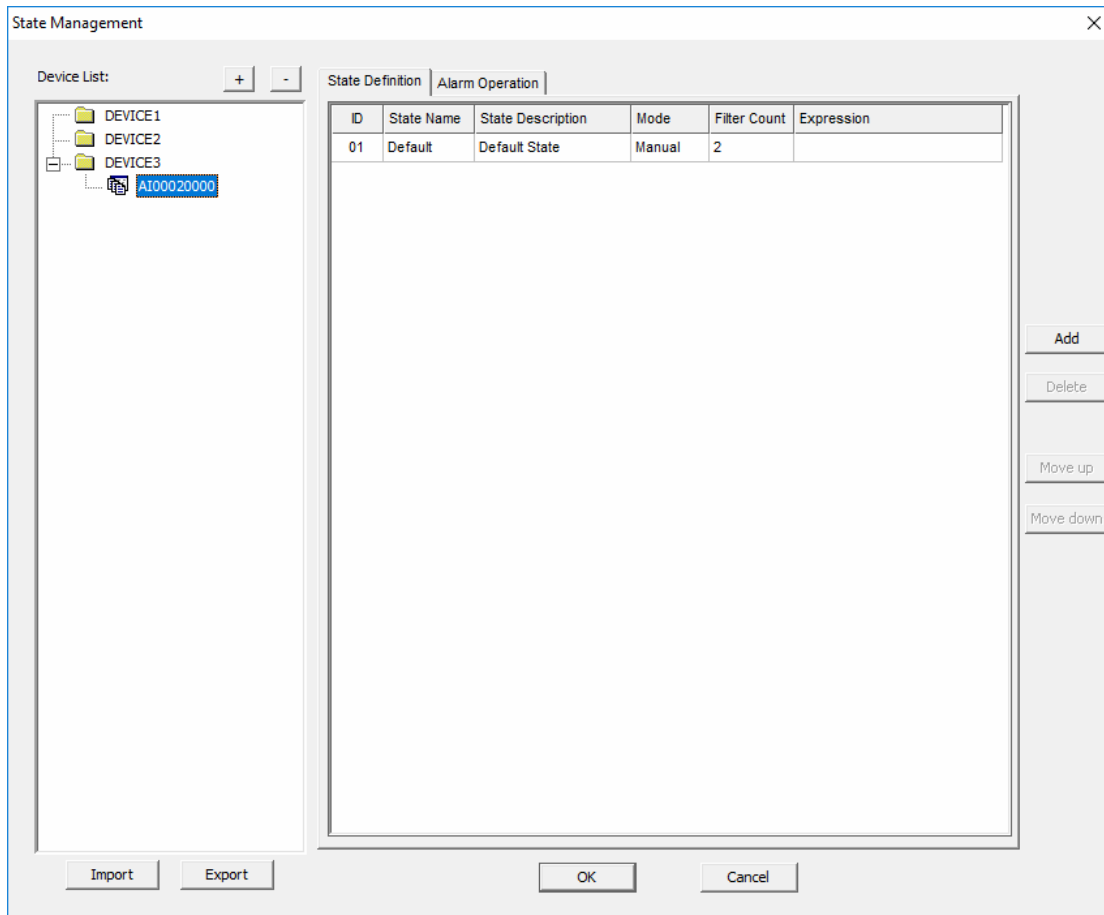


Figure 2-92 State Management

8. Alarm Help

The High-performanceHMI system software supports configuring the operation help of the alarm in the monitoring configuration, and pops up the alarm help as needed when the alarm is generated in the real-time monitoring, and then guides the processing of the alarm.

The alarm help in the High-performanceHMI system software supports the following two forms:

- Help template

The help template is used to define the display content and form of the alarm help. The High-performanceHMI system software supports two kinds of help templates, namely an HTML template (.html file) and a JSON template (.json file). After configuring the alarm help in the monitoring configuration software, after the alarm contained in the alarm help is generated in the real-time monitoring, the alarm-related help file will pop up.

- Procedure documents

Procedure documents (.doc) defines the cause, operational suggestion and possible results of tag alarms. After configuring procedures in the monitoring software and alarms included in the procedure occur in the real-time monitoring, the tag alarm-related procedure documents will pop up.

By the following steps, users can configure alarm help for High-performanceHMI projects.

- 1) Select "Domain Configuration> Alarm Help" in the navigation tree, and select "Edit" in the right-click menu. The dialog box shown in the figure below is displayed

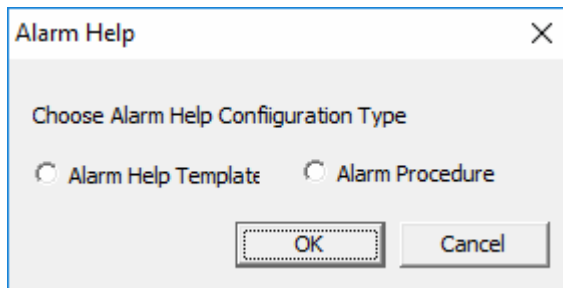


Figure 2-93


- 2) Select the type of alarm help according to actual needs.
 - Select "Alarm Help Templates" to create an alarm help based on the alarm template.
 - Select "Alarm Procedure", then create a procedure file based on the alarm procedure template and import it into the project.
- 3) Click "OK" to save the current configuration.

2.7.3 Operation Team Configuration

In control system, different operators supervise different objects, and requirements of different operators can be realized by operation team grouping. After operation teams are assigned in the configuration, select items relevant to this operation team and some items can be repeatedly assigned to different operation teams. It's recommended to set an operation team (e.g., engineer team), which includes configuration items in all operation teams. When an operation station failed, this operation team can run in an engineer station, and the running items of the failed operation team can be checked to avoid losses.

1. Create operation team

Right click "Operation Team" and choose "Add Operation Team", or choose the menu commander

Operate/Add Operation Team, or click the button  on the tool bar, a new operation team would be added under the item "Operation Team". Operation team name and switch Priority can be modified. For example, modify the name: engineer team, switch authority: privilege, shown as Figure 2-94:

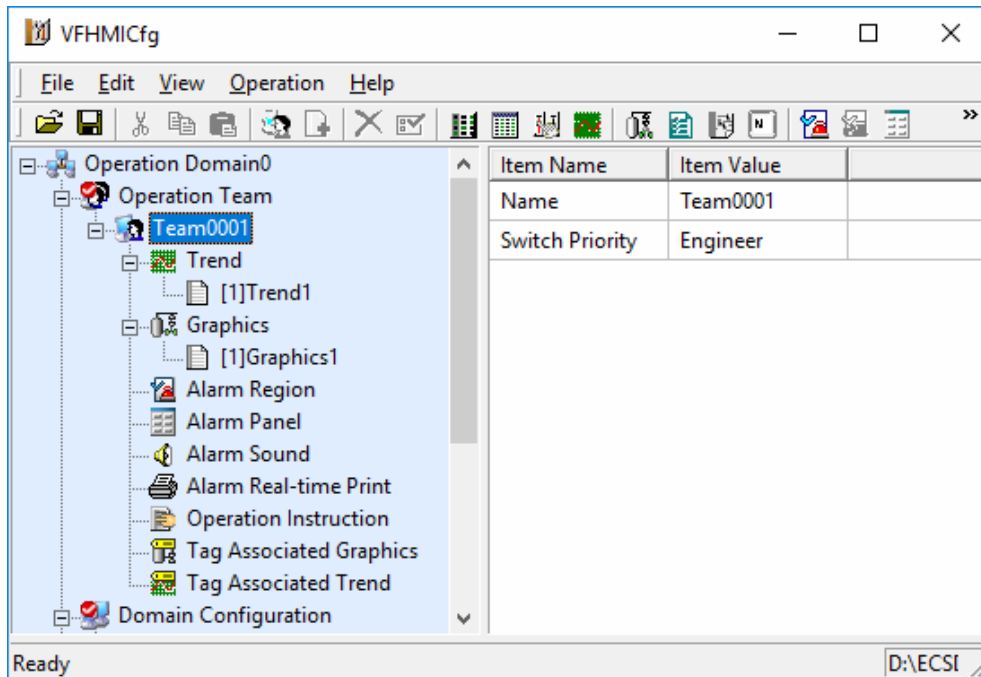


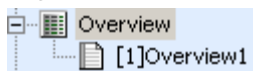
Figure 2-94 add an operation team

Switch Priority is the authority for operator to switch operation team during supervision. Switch priority is privilege in the above figure, it means only operator of privilege level can switch from other operation team to "Engineer team" during supervision.

2. Add overview window

Overview window can be used to supervise the tag value or to switch between pages.

Right-click operation team and choose "Add Overview Window", to add the overview node



to the operation team. Users can right-click the node "Overview" to add new overview window. and double-click it to edit.

Then "Overview" and the first overview page will automatically be generated under this operation team. New pages can be added from right-click menu of "Overview", and can be edited by double click the new page.

Other overviews of this operation domain can be edited in this way under the operation team.

3. Data viewer window

Data viewer window can be used to supervise tag value; relevant tags can be placed within one page according to control requirement to make observation more conveniently.

Adding data viewer window is similar to adding overview. All data viewer window of the operation domain can be set under the privilege operation team.

4. Tuning group window

Tuning group window is used to display instrument panel by group. Relevant panel can be placed within one tuning group window according to control requirement.

Adding tuning group window is similar to adding overview. Complete All tuning group windows of the operation domain can be set under the privilege operation team.

5. Trend window

Trend window is used to display tag trend. According to the relevant requirement, relevant tags can be placed within in one trend window for comparing and check.

Adding trend window is similar to adding overview. All trend windows of the operation domain can be set under the privilege operation team.

6. Graphics configuration

Graphics is one of the most important supervision and operation displays in the control system, and usually used to display technical process and operation condition of the controlled devices and objects, and can be used to operate relevant data.

Graphics support VBScript script programming language, and bitmap, ICO, GIF, FLASH, etc. can be introduced freely.

Add graphics in the same way of adding overview window, input file name, then click the button "edit" to enter the interface of graphics editing software.

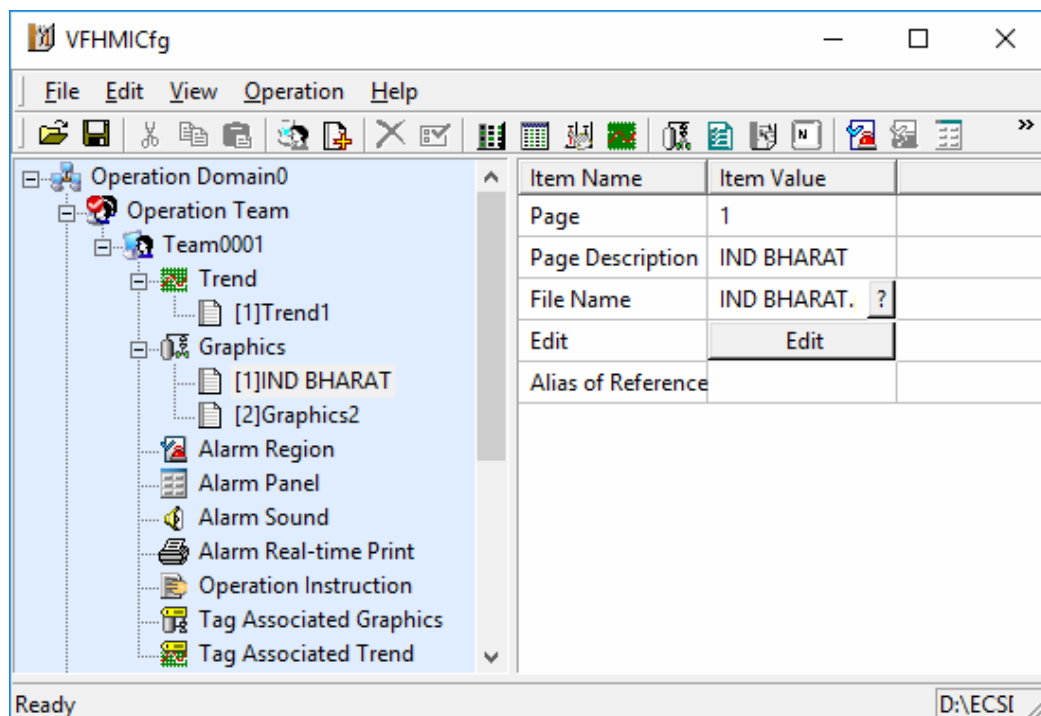


Figure 2-95 adding a graphics display

If there is completed graphics, click the "?" (as shown in the above figure) to select corresponding graphics, shown as follows:

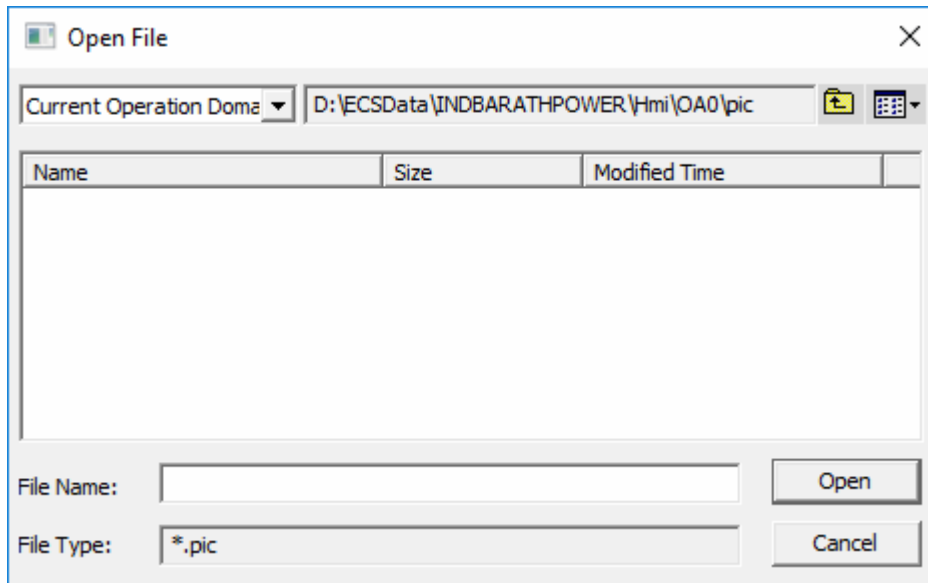



Figure 2-96 select a graphics

Complete configuring all graphics of the operation domain. Graphics belongs to resource file, and can be edited by several engineer stations at the same time. (Different graphics can be edited by several stations at the same time, but one graphics can only be edited by one engineer station at one time). All the graphics are summarized in the "Graphics" under "Resource Files".

7. Report configuration

Report is an important and frequently used tool for data recording. It's usually used to record important system data and on-site data for technicians to carry out system status inspection and process analysis. Report builder software consists two parts of report building and report data configuration according to function. Report building to establish the form of the table for data recording; report data configuration is mainly to set the event definition and report output according to requirement. After the report is configured, report would be generated by report server during supervision.

Select the Icon  on the toolbar, and pops up report mode selecting dialog box (normal report or Excel report). Choose one mode (normal report is chosen here), report node would be added after confirmation, and "Report 1" would be created by default. Then click button "Edit" to open report editing interface, for more detailed report configuration method, refer to *Report Software User Manual*.

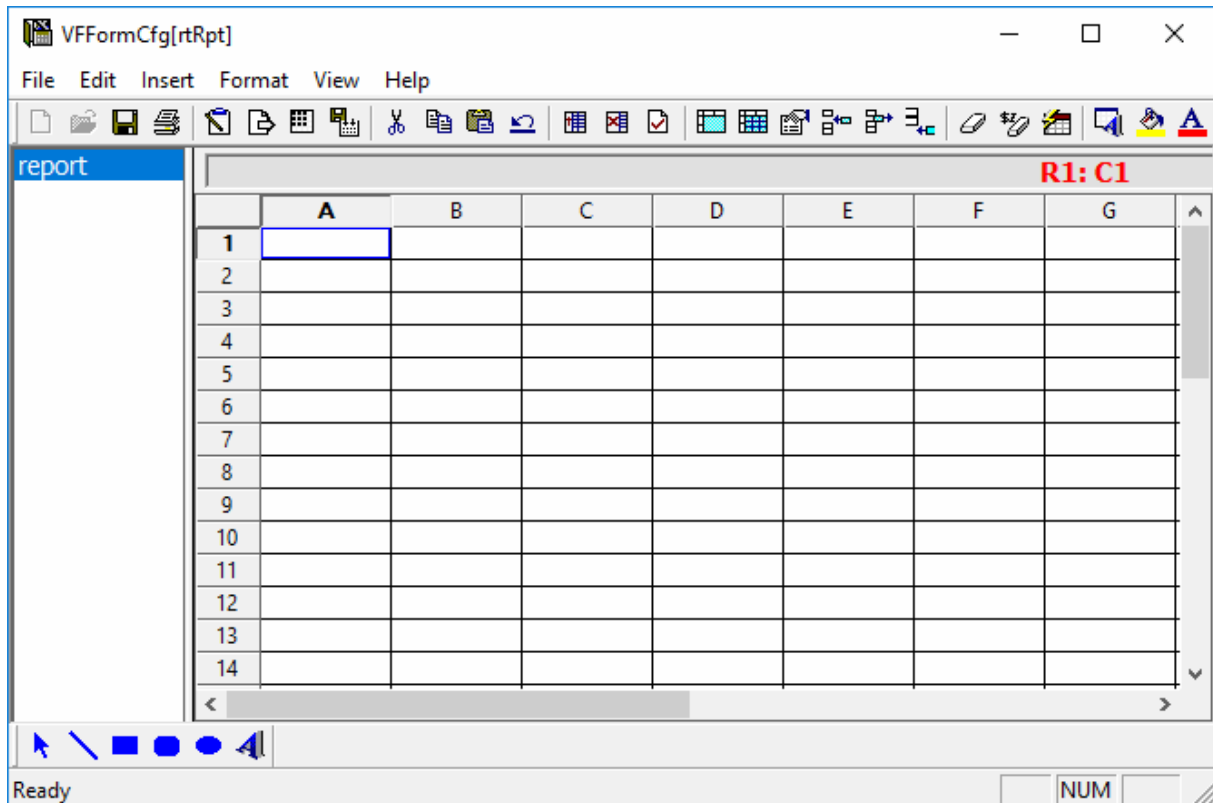




Figure 2-97 report configuration interface (normal report for example)

8. Scheduling configuration

Scheduling enables system to define and set special operation task according to certain rules, and run assigned task timely and efficiently.

Add scheduling pages in the same way as adding overview display, and input file name, then click button "Edit" to open scheduling editing software interface. The method of adding scheduling configuration is similar to adding graphics.

Scheduling mainly includes time scheduling and events scheduling. As shown in Figure 2-98, click the button  to enter time scheduling configuration, or click the button  to enter events scheduling. For more detailed configuration method, refer to chapter "scheduling configuration" in *HMI Config Software User Manual*.

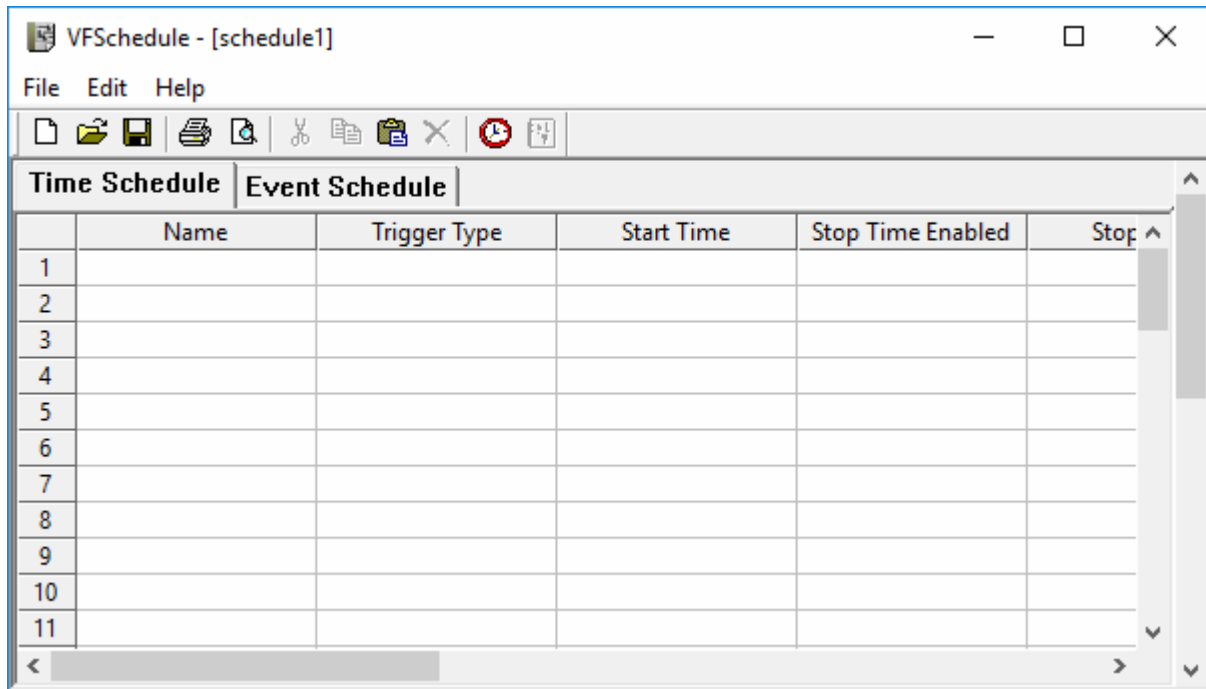


Figure 2-98 scheduling configuration interface

9. Custom keys

Custom keyboard commands configuration is to define the function of 32 (or 36, operator keyboard include 2 types, 32 and 36, maximum 36 can be defined in software) blank keys in operator keyboard, including key setting, page switching setting and value assignment setting. It's recommended to configure custom key of all the operation teams uniformly for convenient operation.

Adding custom key is similar to adding overview window. The following figure shows how to set the function of custom key 1 on the operator keyboard as jumping to trend window.

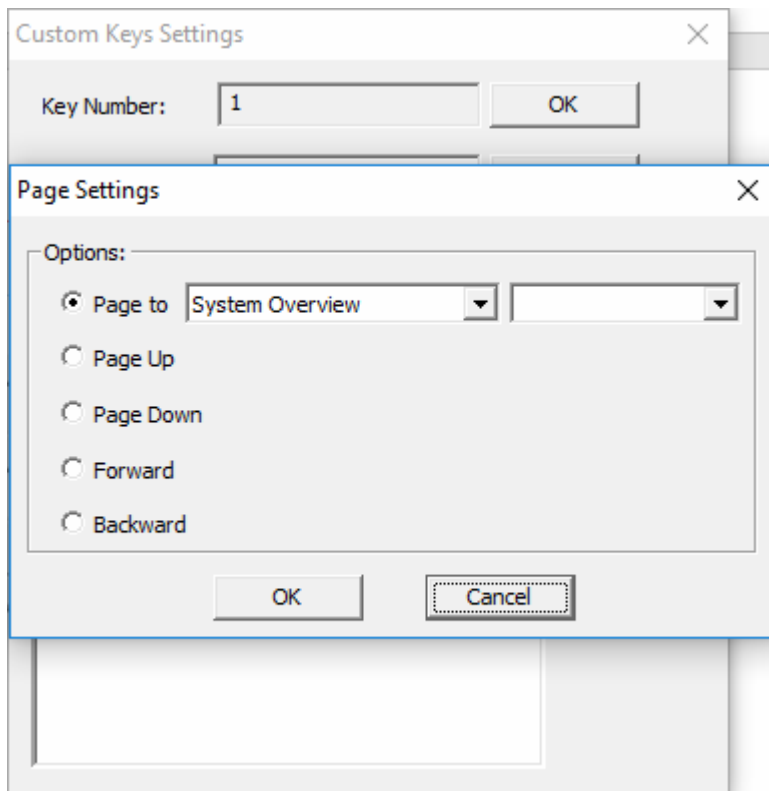


Figure 2-99 custom key setting


10. Alarm and region setting

Only the alarms of tags in alarm region selected in the alarm region setting can be shown in the supervision window; as for the unselected region, the alarm can't be displayed even if the tag is configured with alarm. Alarm grouping in the alarm region is determined by the settings in "Custom Alarm Group" of the domain configuration.

Double click the "Alarm Region" under the operation team for setting.

11. Add inter-domain alarm

User can manage the tag of reference domain if the current operation domain has referenced domain.

Right-click an operation domain in configuration tree and select "Add Referenced Domain Alarm", to add the trans-domain alarm node with the icon , double-click it to set the details of referenced domain alarm.

12. Alarm panel settings

Alarm panel is an important function on the alarm tool bar. It provides the function of displaying alarm in 3 modes by alarm region, graphics and tag, which is convenient for user to obtain current alarm status in concerning area (special alarm region, appointed graphics or relevant important tags) and address it timely.

Double click "Alarm Panel" under the operation team (after adding "alarm panel") for setting.

13. Alarm sound configuration

Alarm sound configuration is to set alarm sound for a specific alarm to draw the attention of relevant operator. If the alarms in the operation team require sound prompt, it can be set here.

Double click "Alarm Sound" under the operation team for setting.


14. Alarm real-time print settings

It requires alarm real-time print setting if real-time alarms need to print out and there is printer connected to the system.


Double click "Alarm Real-time Print" under the operation team (after adding "Alarm Real-time Print") for setting.

15. Alarm popup settings

Important tag supports popup display to inform user.

Right-click the operation team and select "Add Alarm Popup", to add the node  Pop-up Alarm, double-click it to set the details of alarm popup.

16. Tag associated graphics settings

In supervision window, if it's required to jump to the relevant graphics by clicking the graphics jumping button  on the tag panel in the supervision, it should be configured in tag associated graphics settings.

For example, the following figure shows how to jump to graphics "Cooling Water System" by clicking the button on the panel of tag AO00020016.

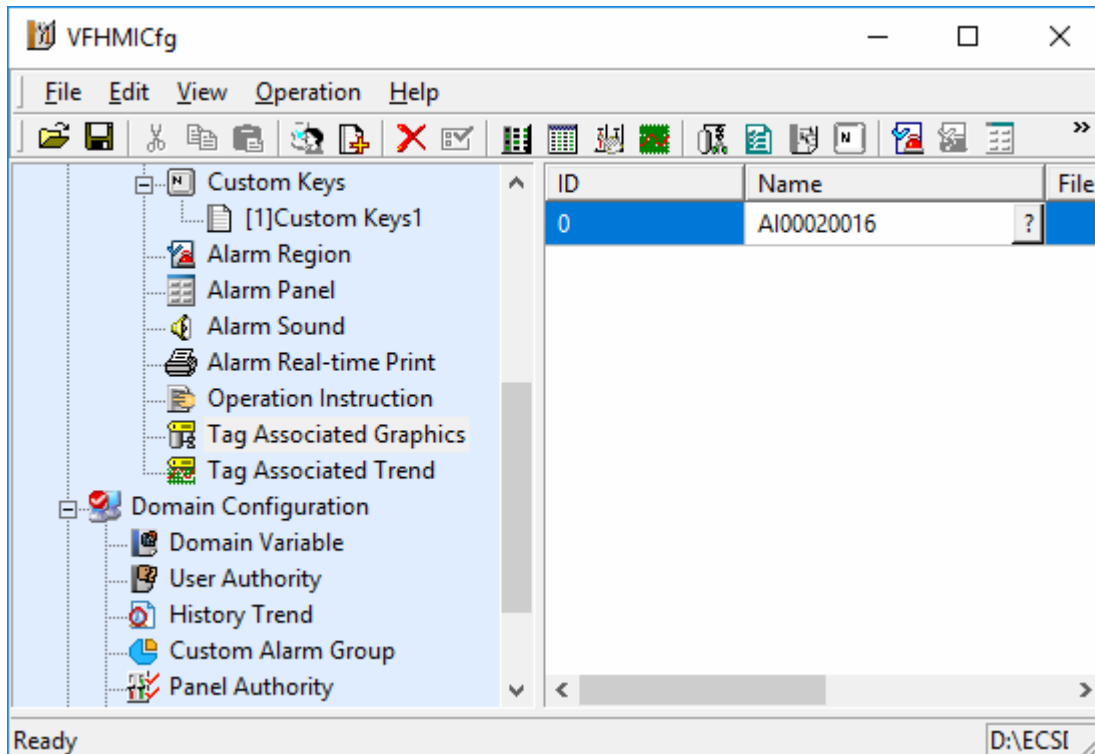



Figure 2-100 tag associated graphics settings

17. Tag associated trend window settings

In supervision window, if it's required to jump to the relevant trend window by clicking the trend jumping button  on the tag panel in the supervision, it should be configured in tag associated trend settings. The setting steps are same as that of tag associated graphics.

18. Configure other operation team

Create a new operation team first, then select the page needs to be supervised in the overview within "engineer team", and choose "Copy" in right-click menu, shown as Figure 2-101.

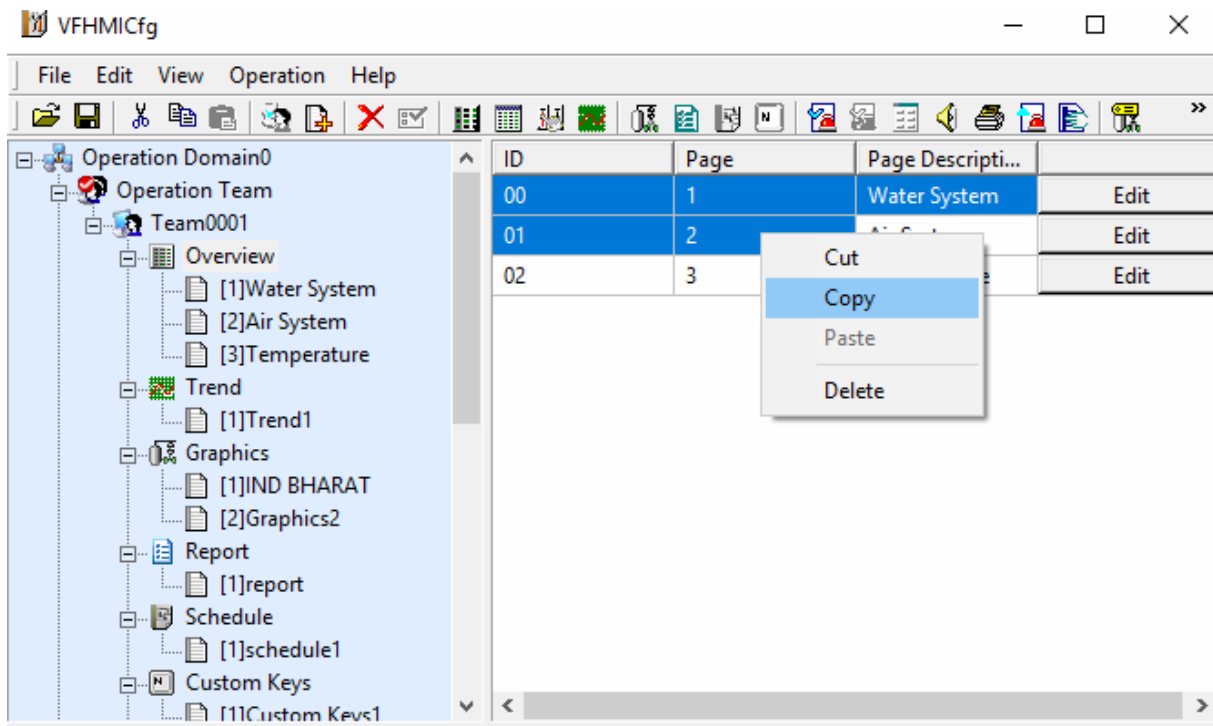



Figure 2-101 copy overview window

Then right click the new operation team and select copy or click the icon  on the tool bar, shown as Figure 2-102:

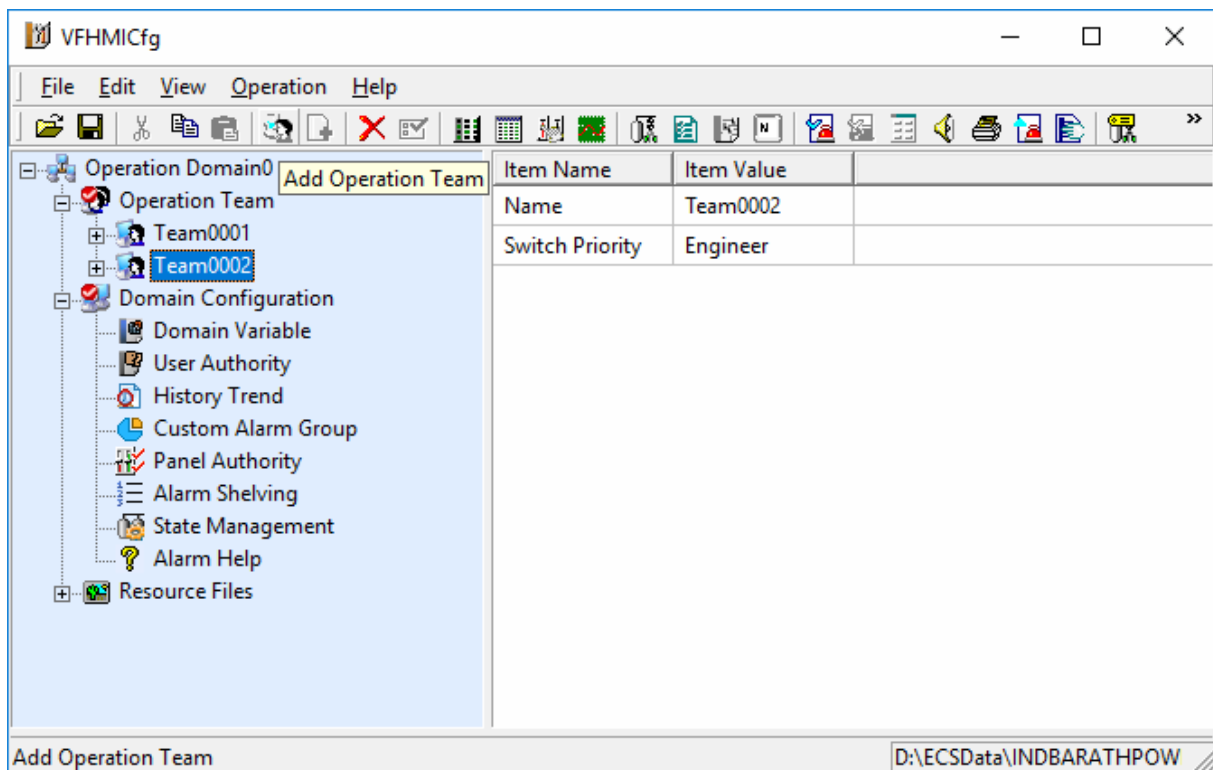


Figure 2-102 copy overview window

Thus the overview is copied to the new operation team. Other settings including data viewer,

tuning group, trend graphics configuration, report configuration, scheduling configuration, custom keyboard commands, can be added to the operation team following the same steps.

It's recommended to set graphics of each operation team identically, so it can be copied from the operation team "Engineer team". Alarm and real-time print settings can be set individually by operation team, or be set in accordance with "Engineer team".

2.7.4 Resource Files

All files in folders under the directory of local configuration, including PIC folder (graphics files), BGTemplate folder (background model of the graphics), SCH folder (scheduling), TGD (tag group) folder, Template (graphic object model) folder will be list in the corresponding resource files. Figure 2-103 lists resource files of graphics.

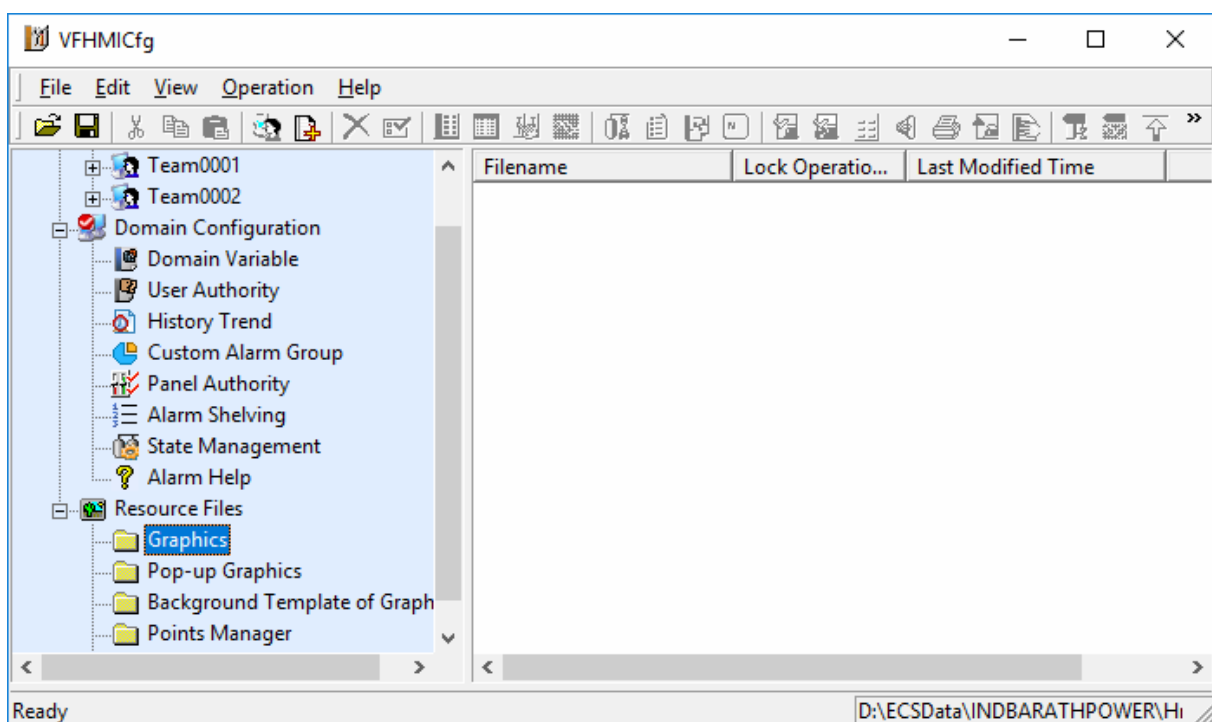






Figure 2-103 resource file list (Graphics)

Normally, these resource files cannot be edited or uploaded. If need to be edited, they should be locked first by clicking the corresponding "Edit" button, then pops up a prompt whether to lock the resource file. Click "Yes" to edit the resource file and the sign  "Red tick" will appear in front of the file name. The name of the operator station (Engineer station) that is locking the file will be displayed in the column "locking operation station". If some resource files are locked by other operator station (Engineer station),  "Blue tick" will be displayed in front of the name of the resource file and the name of the operator station (Engineer station) that is locking the file will be displayed.

When there is a resource file in local machine but not in the server, an arrow sign  will be displayed in front of the name of the resource file, indicating that this file isn't in the server and needs to be uploaded.

1. Create new resource file

Graphics (excluding back ground models of graphics and graphic objects) , tag group and scheduling files can be created by directly inputting its name in the resource list. Choose

"Graphics" under "Resource File" and click the button  , pops up the following dialog box, then input the file name.

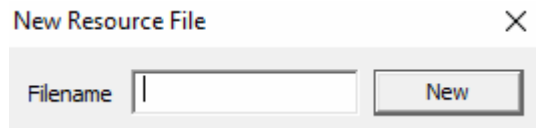


Figure 2-104 create a new resource file

Click "New", graphics editing interface pops up and can be edited (it will be locked and uploaded automatically).



Tip:

Newly created local resource file will be uploaded to server automatically (being locked while uploading).

2. Delete resource file

The unlocked resource file can be deleted, and both local file and the corresponding file on the server will be deleted at the same time. When the deleting operation is performed, if the operation domain is also locked by current user, user will be asked whether to synchronously delete quoted relations of the deleted resource file in the operation team.

3. Update resource file

Right click in the resource file list, pops up the right-click menu as follows (if the resource file is not locked, there will be only 3 items available, "upload resource file to local", "Find Resource File" and Export Res File, others will be gray and unavailable).

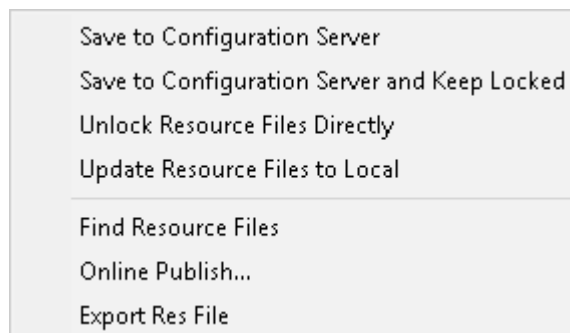


Figure 2-105 resource file right-click menu

Choose "Update Resource File to Local", and it will prompt whether to update resource. Choose "Yes" to complete updating resource file, the local resource files are then replaced by the file with the same name in the server. (When updating the resource file, if the corresponding resource file is open by the editing software, it will prompt that the software is open. Relevant software should be closed before updating resource file)

4. Find resource file

Choose "Find Resource File" and pops up the dialog box shown as Figure 2-106:

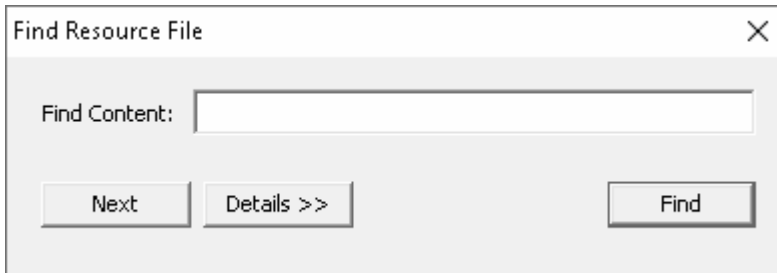


Figure 2-106 Find resource file

Input the resource file name needed to be found, and click "Find". Fuzzy search is supported. For example, there are two graphics of "Vacuum furnace" and "Vacuum tower" in the graphics resource files. Input "vacuum" in the input box and click "Find", resource files with name containing the word "vacuum" would be found. Click the button "Next" to find another one. Click the button "Details", all the resource files with name containing the word "vacuum" would be displayed and whether the resource file is locked and the last modified date would also be displayed, shown as Figure 2-107:

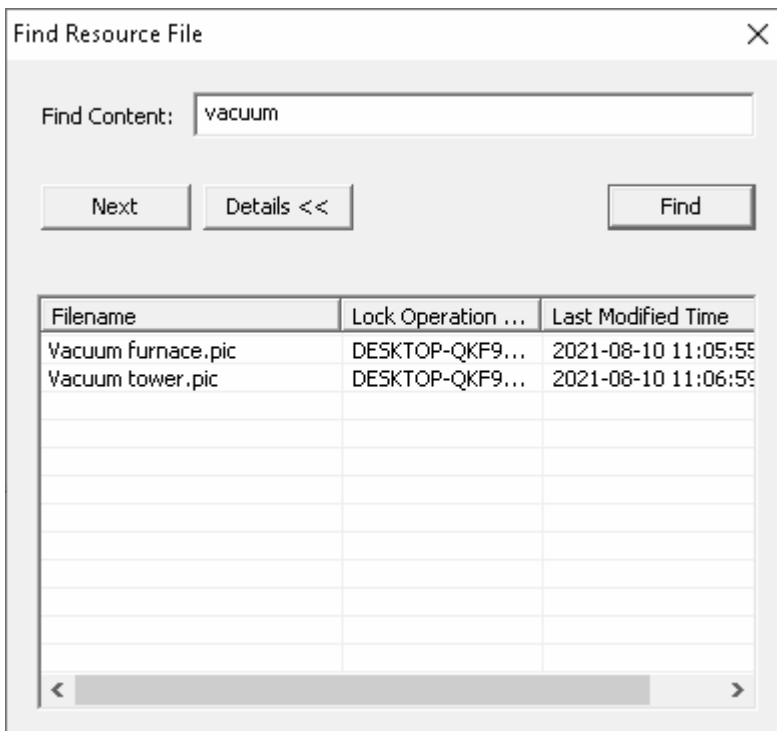


Figure 2-107 file finding and detailed information**5. Save to configuration server& Save to configuration server and keep locked**

There are 2 ways to save resource file:

- For local resource file which needs to send to configuration server, right-click it and select "Save to Configuration Server".
- For resource file locked by current user and needs to keep locked, right-click it and select "Save to Configuration Server and Keep Locked".

6. Unlock resource file directly

Choose right-click command "unlock resource files directly" and pops up prompt "the operation will lead to lost saved contents, sure to continue?" The resource file will be unlocked after confirmation. After this operation, the file being edited will be in read-only status and no longer able to be edited.

7. On-line publish

Only the resource file locked by current user can be published on line. Choose "Online Publish" (if the resource file hasn't been uploaded, it will upload automatically first), and pops up the dialog box shown as in Figure 2-108.

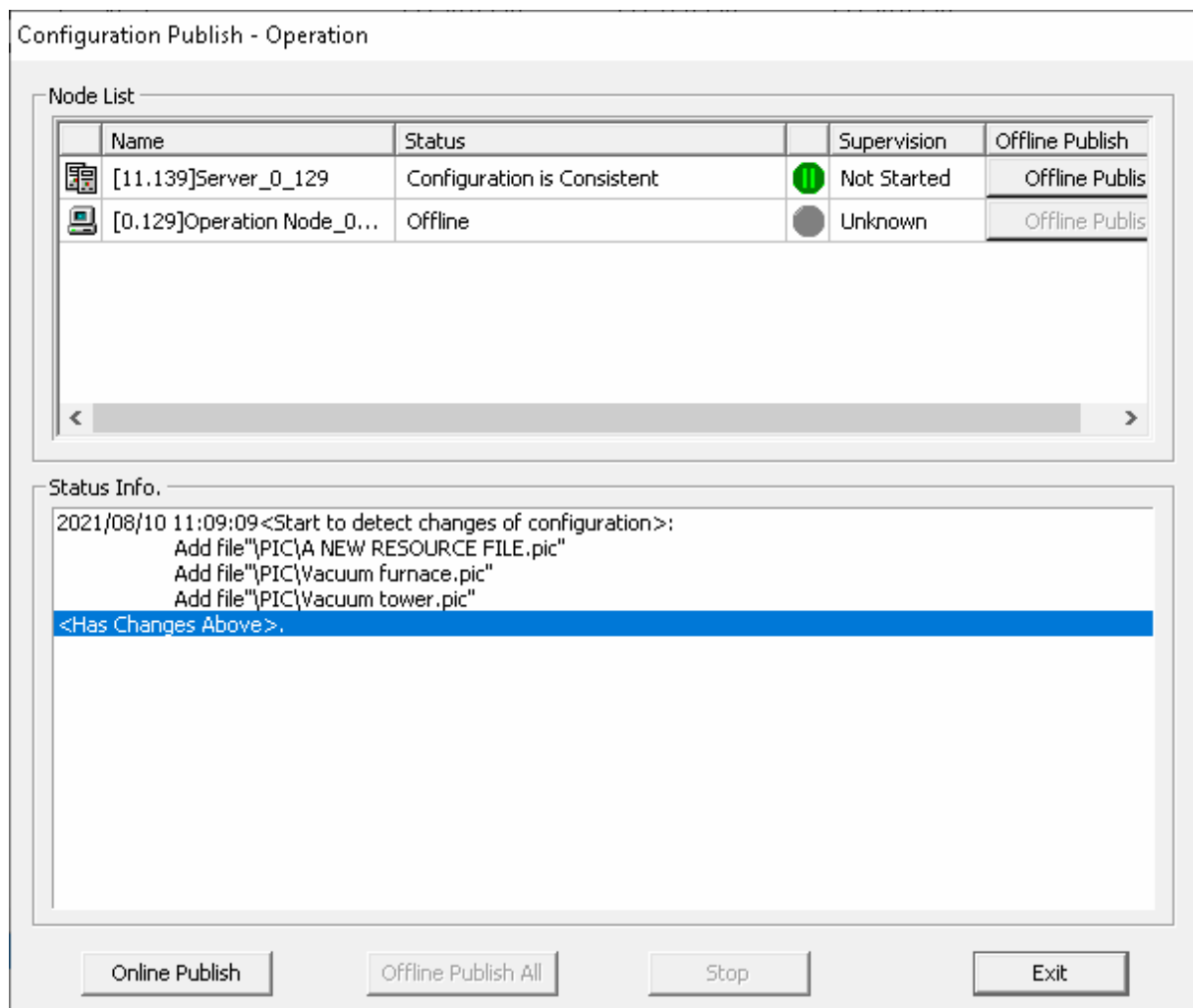


Figure 2-108 configuration publish dialog box

Then the modified part will be listed in the column "Status Information". Click button "Online Publish" to publish online directly.

**Tips:**

- Publish will not update modified tag quoted in the graphics, newly added graphics and other external configuration.
- For more details about configuration publish, refer to *Config Explorer user manual*.

8. Export Res File

Select a resource file in the list, right click and select "Export Res File", pop up Browse For Folder dialog box. Select directory and click "OK" to export the file.

9. Import Res File

Select a resource file folder, right click and select "Import File", to pop up "Import Resource Files" dialog. Multiple-selection is supported by the key Ctrl and Shift to import several files at one time.

2.7.5 Save Configuration to Server

When supervision is start-up, configuration information of supervision is read from configuration server. Therefore, after configuration is complete, it should be uploaded to server. Select domain name and right click it, pops up right-click menu, shown as follows. Choose "Save to Configuration Server" or "Save to Configuration Server and Keep Locked" to save configuration to server.

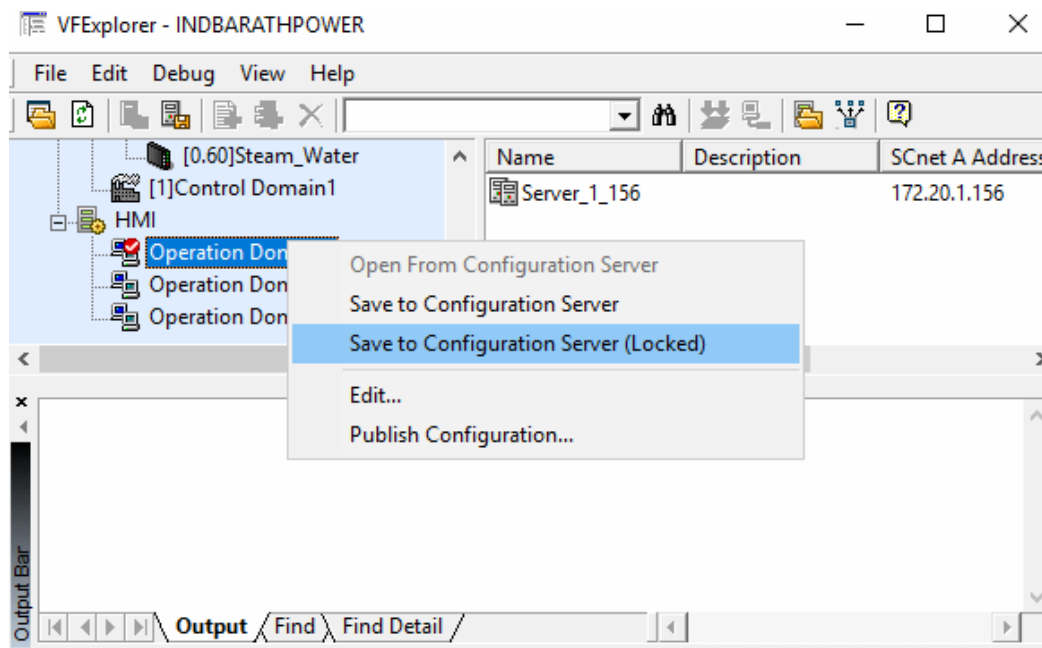


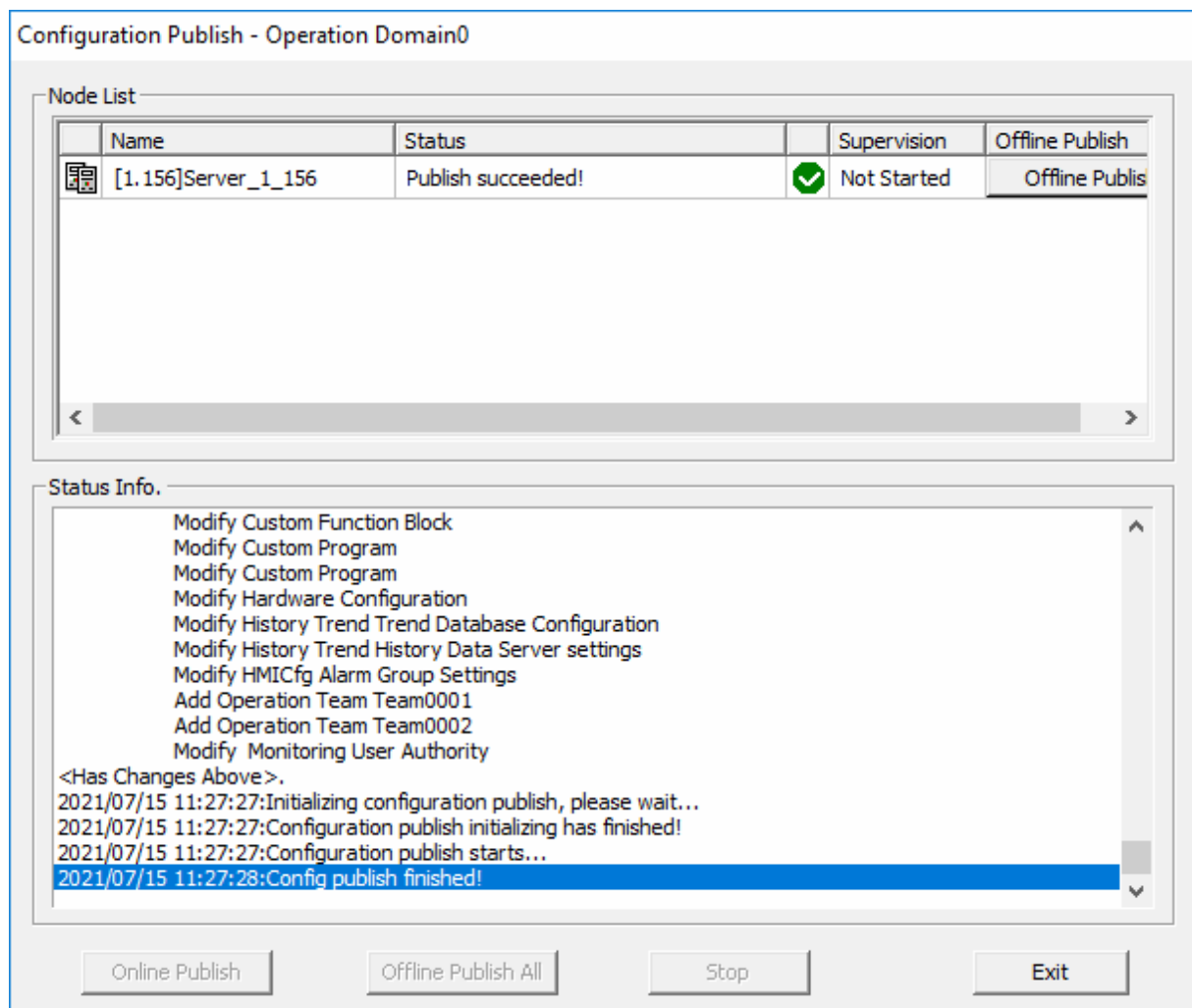
Figure 2-109 Save configuration to server

2.7.6 Publish Configuration

After configuration or modification is complete, configuration information should be published to server and each configuration node (inform nodes that there is new configuration needs to update), to make it convenient for each operation node to get latest configuration files and information. Engineer can choose one operation domain to publish configuration by sending configuration synchronization information to each server and operation node within the operation domain, and each operation node can obtain updated configuration from configuration server.

Operation procedure of Configuration Publish is shown as follows:

Choose an operation domain under “Supervision Configuration” and right click it, pops up the right-click menu, then choose “Configuration publish”, the following configuration publish dialog box would pop up.

**Figure 2-110 configuration publish**

The project configuration can be published in the mode prompted by the software according to whether the button “Online Publish” and “Offline Publish All button” are enabled or not.

**Tip:**

If online publish is allowed, it will be carried out first, then nodes that are not able to be published online will “Publish Offline All”. “Publish Offline All” won’t be effect until the supervision is reset.

2.7.7 Start up Supervision

Before start up supervision, make sure the configuration has been saved and published to configuration server; otherwise the running configuration won’t be the latest one.



Double click the supervision software icon, and if there isn’t any configuration under the local running directory, a prompt dialog box whether to synchronize the configuration will pop up; if configuration exists under the local running directory but not in accordance with the configuration in the server, a dialog box whether to update configuration will pop up. After the configuration is updated, choose the operation domain and start mode, shown as Figure 2-111:

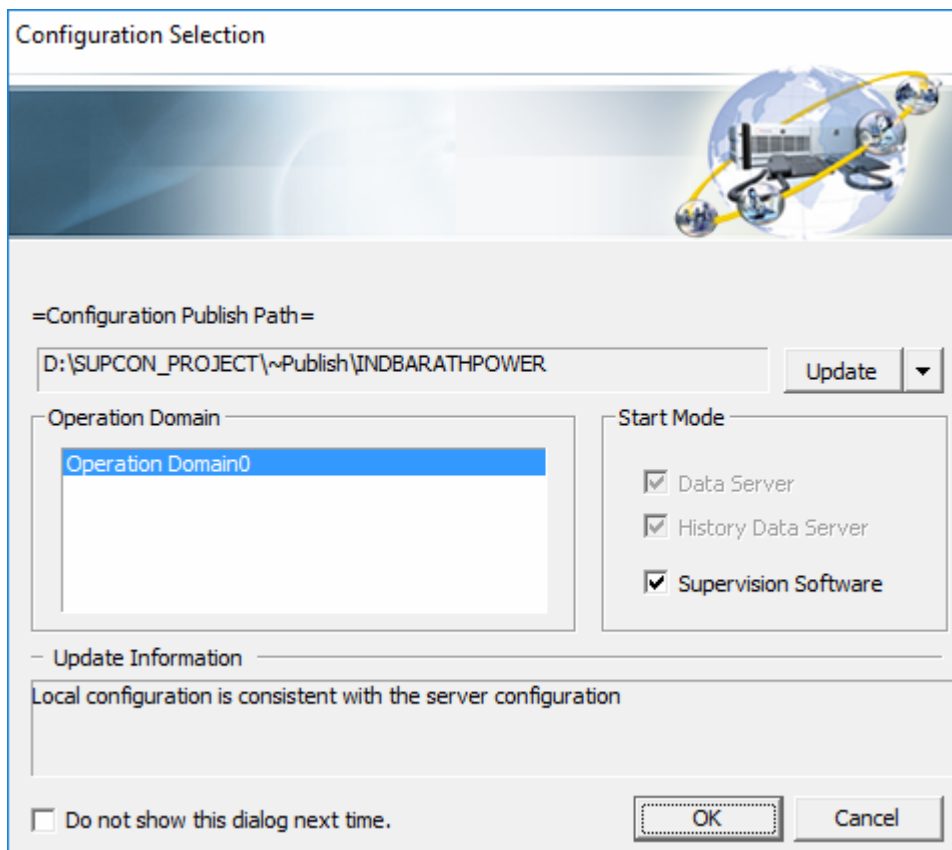


Figure 2-111 choose operation domain / start mode

After confirmation, login the supervision with authority of observer, then the operation team is empty, and user should be switched and operation team should be chosen in the supervision.

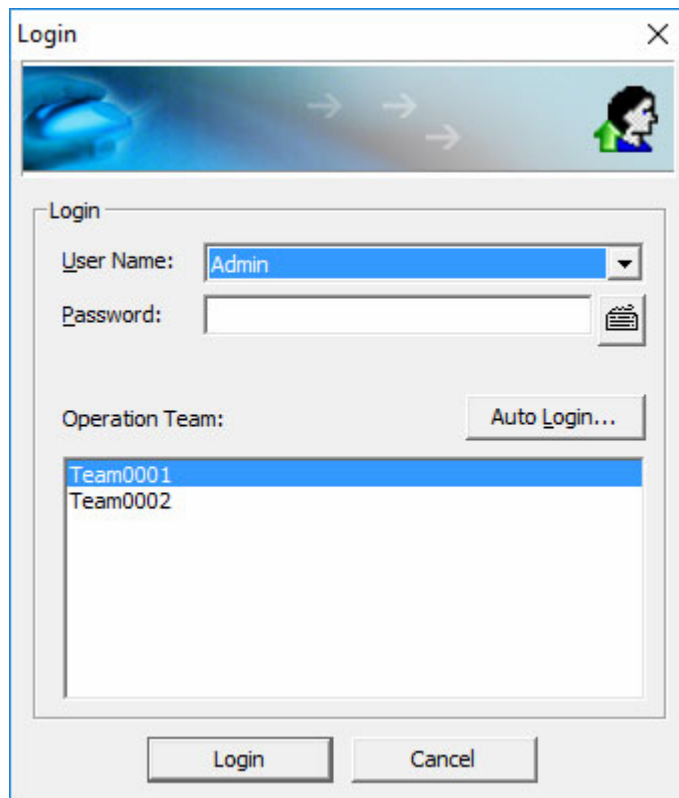


Figure 2-112 switch user and operation team

Section 3 Adjust Configuration

3.1 Steps to Adjust Configuration

3.1.1 Adjust Control Station Configuration

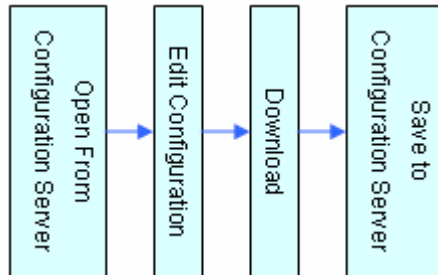


Figure 3-1 steps to modify control station configuration

3.1.2 Adjust Operation Domain Configuration

Operation domain modification not only includes operation domain modification, but also the configuration modification of control station relevant to operation domain configuration.

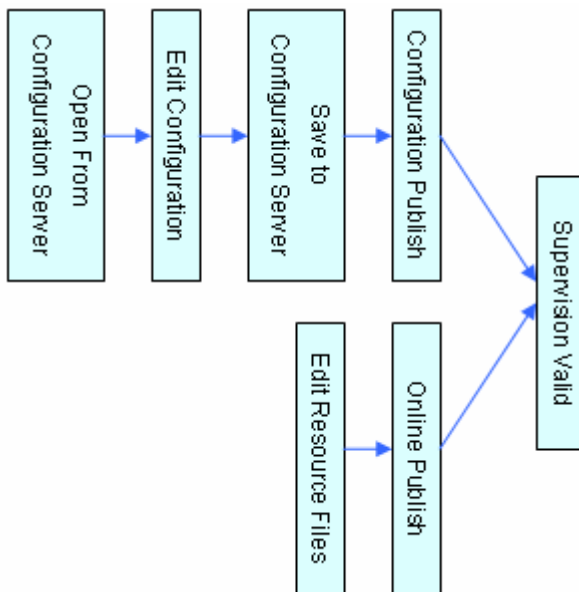


Figure 3-2 steps to modify supervision configuration

3.2 Project and Configuration Backup and Restore

Table 3-1 configuration backup and restore

Backup/Restore Items	Backup and Restore Software	Backup Operation	Restore Operation	Attentions
----------------------	-----------------------------	------------------	-------------------	------------

Backup/Restore Items	Backup and Restore Software	Backup Operation	Restore Operation	Attentions
Whole Project	System Builder Software	File-> Project Backup	File->Restore	Make sure there is no file locked in the project, otherwise backup configuration is not the latest
Single Control Domain	System Builder Software	(Select the Control Domain)Edit-> Export Domain	(Select the Control Domain)Edit-> Import Domain	Refer to the chapter "Import and export of control domain" in <i>System Builder User Manual</i>
Single Operation Domain	System Builder Software	(Select the Operation Domain)Edit-> Export Domain	(Select the Operation Domain)Edit-> Export Domain	Refer to the chapter "Import and export of operation domain" in <i>System Builder User Manual</i>
Single Control Station	Config Explorer	(Select the Control Station)Edit-> Save as	(Select the Control Domain)Edit-> Export Domain	
Hardware Configuration	Hardware Configuration Software	File-> Save as	File->Import	
Tag Configuration	Tag Builder Software	File-> Export	File-> Import	
FBD Program	FBD programming software	File-> Export	File-> Import	
LD Program	LD programming software	File-> Export	File-> Import	
ST Custom function block	ST Custom function block Software	File-> Export	File->Import	
Graphics	Manual File Copy			Select graphics in the software VFHMICfg, and select "Open" on the menu bar to open local directory of graphics.
Domain Variable	Domain Variable Configuration Software	File-> Export	File-> Import	

3.3 Adjust Hardware Configuration

Table 3-2 adjust hardware configuration

Main adjustment items	Set parameters of controller, add/delete module, set module and channel, configure communication module.
Operation following adjustment	Save → Control station on-line download → Publish configuration of corresponding operation domain.
Related effects of configuration	If the type of module is modified, relevant tags will be affected and others won't.

3.4 Adjust Tag Build

Table 3-3 Adjust tag build

Main adjustment items	Add/delete tags, adjust parameters including tag name, description, address, measuring range, alarm limits, etc.
Operation following adjustment	Save → control station on-line download → publish configuration of operation domain
Related effects of configuration	Modification type: custom program needs to be modified. Modification name: the tags used in the supervision configuration need to be modified.

3.5 Adjust Control Configuration

Table 3-4 adjust control configuration

Main adjustment items	Add / delete custom program, adjust custom program and custom function block, adjust program period or phase, modify function block tag.
Operation following adjustment	Save → control station on-line download
Related effects of configuration	Modify tag name of function block: the tags used in the supervision need to be modified.
remark	Modifying parameters of function block with tag should be carried out according to the sequence of adjusting measure point configuration, and configuration of relevant operation domain should be published.

3.6 Adjust Supervision Configuration

Table 3-5 Adjust supervision configuration

Main adjustment items	Modify graphics, operation team, panel authority, etc.
Operation following adjustment	Save → Save to configuration server → Publish operation domain configuration
Related effects of configuration	None

3.7 Configuration Test

After the abovementioned adjustment, configuration should be tested for correctness. For more details about test method, refer to relevant content in Section 4.

3.8 Adjust Configuration Parameters

Tags parameters, function block parameters, program parameters can be modified and then downloaded on line. For more information, refer to relevant contents in Configuration Adjustment.

3.9 Parameters On-line Adjustment

Tag parameters, function block parameters can be modified in the panels of tag debug, program debug and supervision function block (some parameters can only be adjusted in configuration).

3.10 Parameter Backup

3.10.1 Parameter Upload

User can upload all parameters in current configuration in VFExplorer.

Select the menu commands **Edit/ Upload Parameter**, and a prompt of “Uploading parameters, please wait” will be shown in the interface until it is completed. Then a prompt of “Whether save parameter value to configuration” will pop up. Select **Yes** to save parameter value to configuration and click **No** to stop uploading.

Process as below when prompts pop up during uploading:

- If current configuration and controller configuration are different, a prompt of “Configuration inconsistent” will pop up, and uploading will be forbidden.
- If controller is not existed, a prompt of “Cannot connect controller” when uploading parameter will pop up, and uploading will be forbidden.
- If controller versions FCU711 and FCU712 are mismatched, a prompt of “Controller types mismatch” will pop up, and uploading will be forbidden.

Tip:

If computer A opens the FCU711 simulation controller, computer B opens the same FCU711 configuration, when uploading parameter in computer B, a prompt of “Controller types mismatch” will pop up and, and uploading will be forbidden.

3.10.2 Tag Parameter Backup

Select the tags that need backup in VFTAGBuilder.

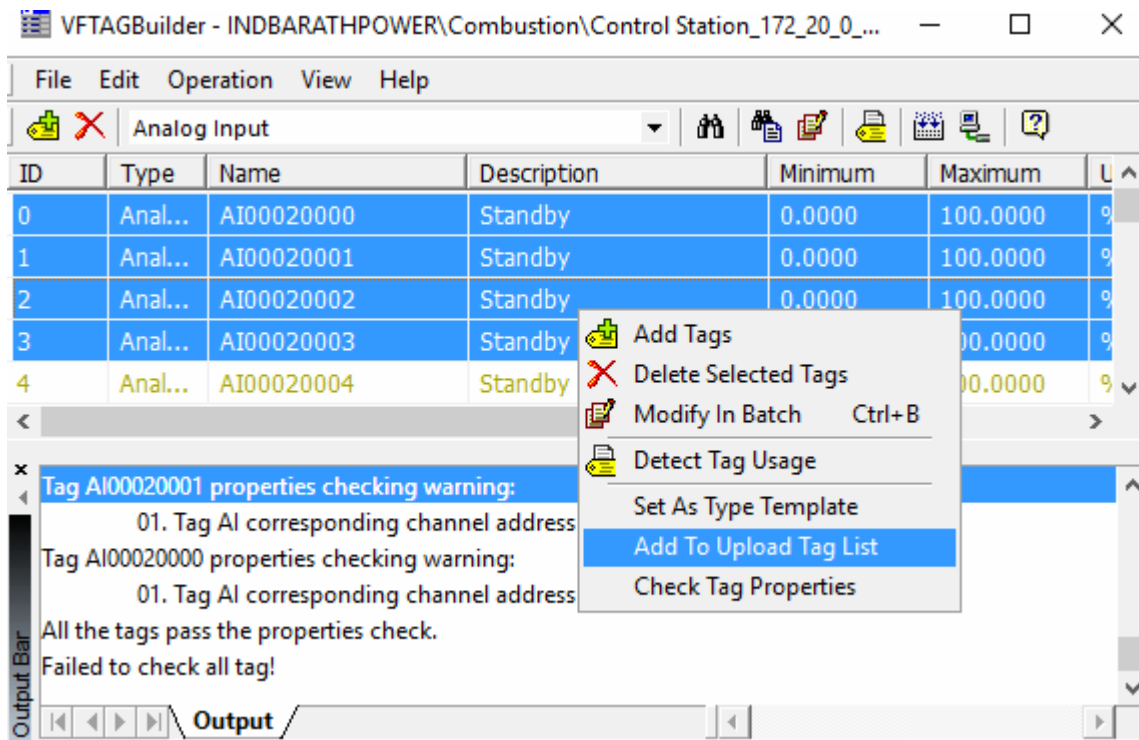


Figure 3-3 Upload tag parameters

Then upload parameters and back up. For more details, refer to the relevant part of *Tag Builder User Manual*.

3.10.3 Save Functional Parameters of Program

As illustrated in Figure 3-4, the real-time value of running program can be saved to configuration, e.g., PID parameters, alarm limits, etc.

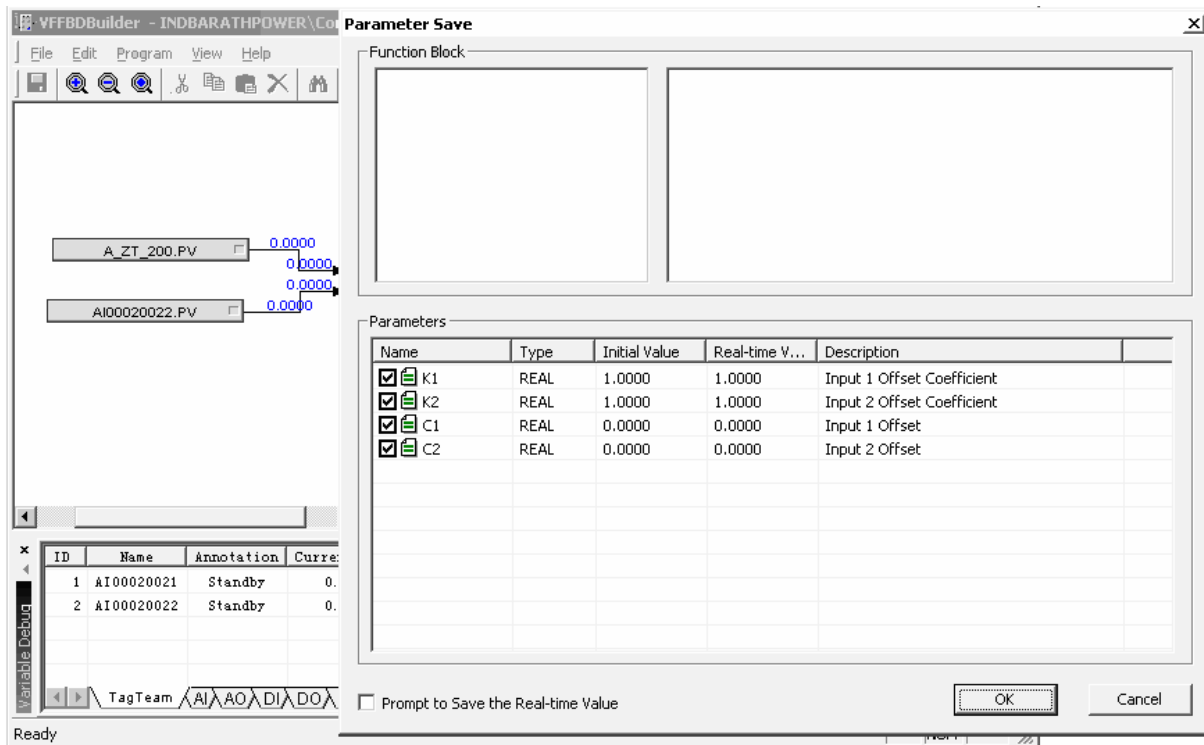


Figure 3-4 Upload program parameters

3.11 Solutions for FAQ

Problem 1: It's unable to call out the operation panel of function block.

Solution prompt: check the following items:

A: Whether the function block is equipped with a panel by system?

B: Have you defined a unique function block name for the module?

Section 4 Debug Guide


4.1 Basic Concept for Debug

After project program and graphics configuration are complete, it should be debugged. Debugging includes 2 parts of system debug and technical interlock debug. This manual mainly introduces system debug, static tag debug, program debug. Technical interlock debug will not be introduced here.

Table 4-1 debug method

Debug types	Debug purpose
Hardware channel debug	Examine whether hardware module is normal, used for factory test.
Tag parameter debug	By tag debug, tags can be assigned different values and alarm limits. It is mainly used to support program debug, and can also be used for hardware channel debug.
Program debug	Examine whether program logic is correct.
Field tag test	Observe whether field data points are in accordance with the graphics and whether the measurement and output is accurate, normally carried out in the field.
Controller load debug	Debug controller load after program debug to make control station run more smoothly.

4.2 Debug Hardware Channel

Hardware channel debug can be carried out after hardware configuration. Power the control station and open hardware configuration interface; click the button  on the toolbar to enter on-line debug status. Then input signal to the IO channel (input channel) one by one, the value of relevant channel can be viewed in the interface to check whether the channel is normal and whether accuracy of measurement satisfies requirement. Or input value to the channel (output channel) directly and observe whether channel output is normal.

It's recommended that the configuration only contains hardware configuration when debugging the module channel (factory debug). If the AO/DO tags have been configured, it's unable to set the value of AO/DO in the hardware configuration interface, and AO/DO module should be checked by tag debug. It's recommended to create a new hardware test configuration when debugging the hardware channel, and then using the auto-scan function of hardware configuration software to scan the hardware information to configuration automatically, and test the channels afterwards.

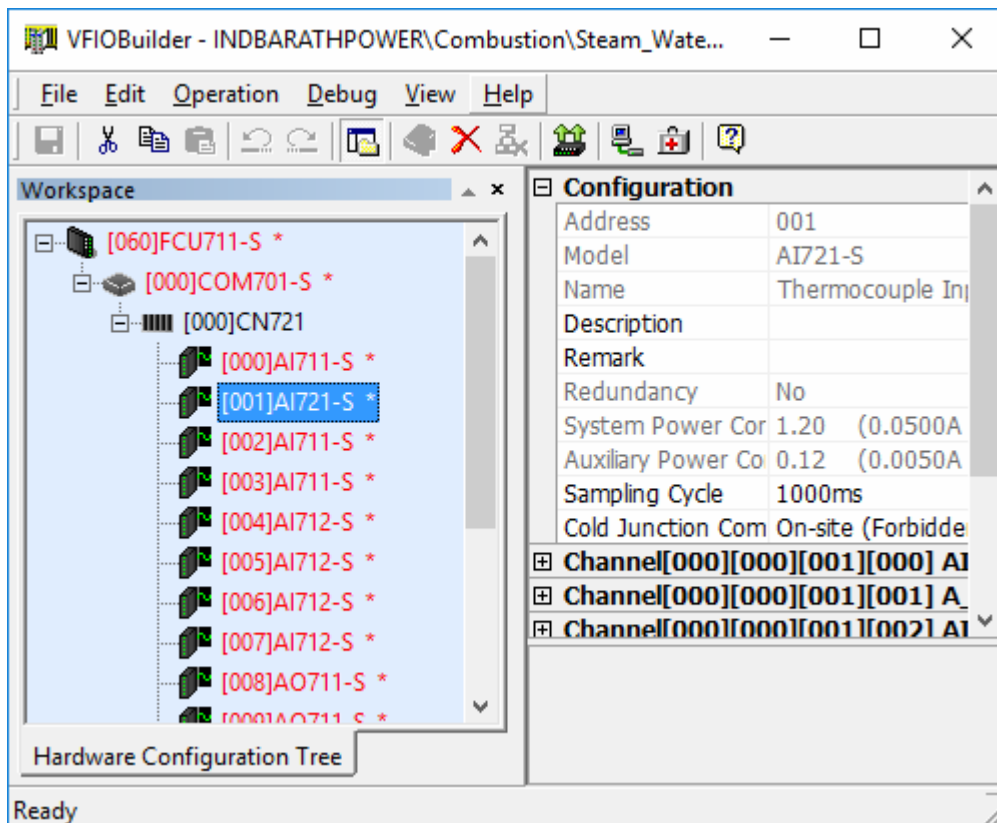


Figure 4-1 hardware debug


**Tip:**

Measuring range of analog data can be set freely when debugging hardware configuration.

4.3 Control Station Configuration Debug

4.3.1 Tag Parameter Debug

By adjusting specific parameters of the tag, tag status including alarm limits, force or not, etc can be changed. Tag debugging can be carried out in the tag build interface, program configuration interface and function block panel.

Debug in tag build interface: click the button  on the tool bar, tag build interface can enter debugging status. Then all parameter values of each tag in the interface can be viewed, and the relevant tag parameters can be set in the right window for debugging. For the meaning of each tag parameters, please refer to relevant instruction manuals.

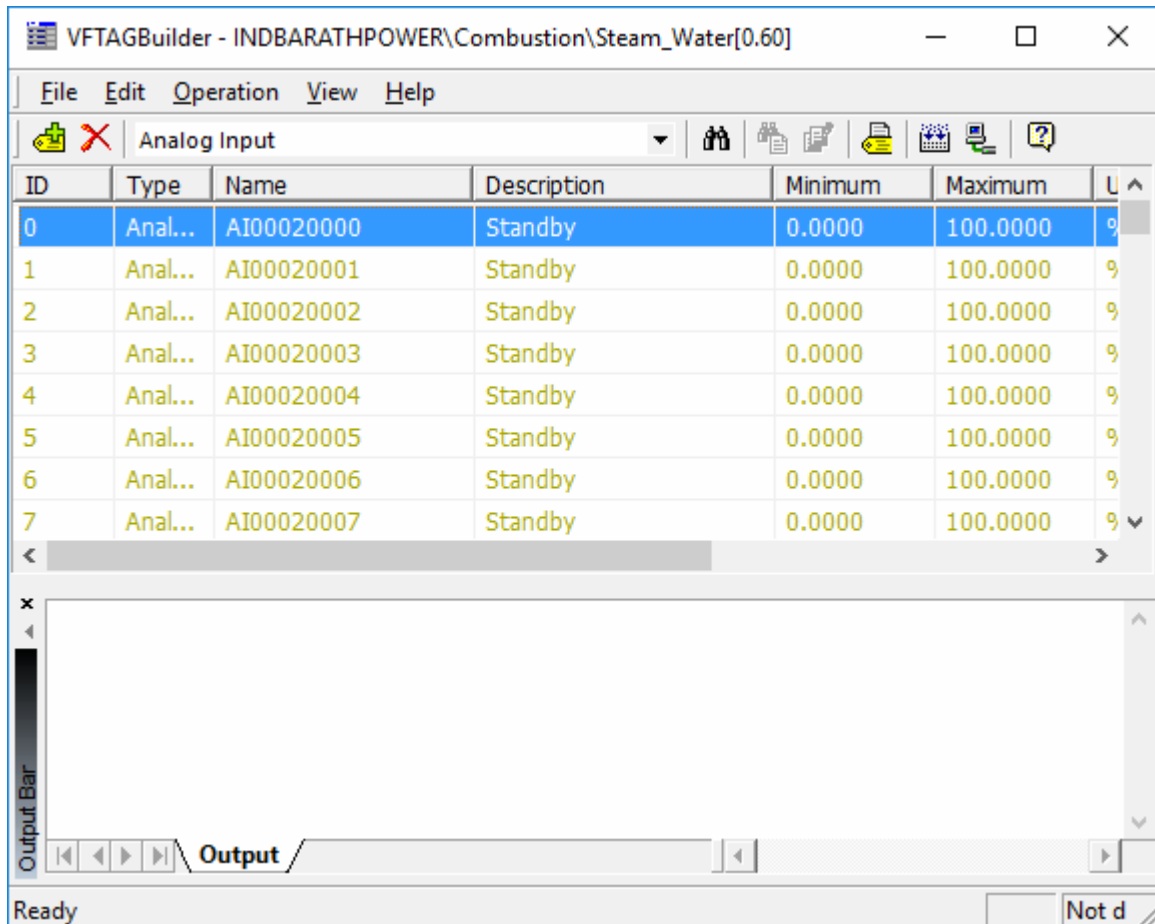






Figure 4-2 tag debug

**Tip:**

When communication between controller and AO/DO module interrupt or channel between controller and AO/DO module cut down at the state of not debugging controller, tag "AO/DO" would turn into fail_safe state. The value of tag will be the fail_safe value or lasting output value.

Debug in the program configuration interface: click button  on the tool bar in the figure below, program interface can enter on-line debug status. Buttons    correspond to program debug, function block debug, activate all input parameters and output parameters. Besides, user can select the menu commands **Program/ Variable Debug** to debugging variable.

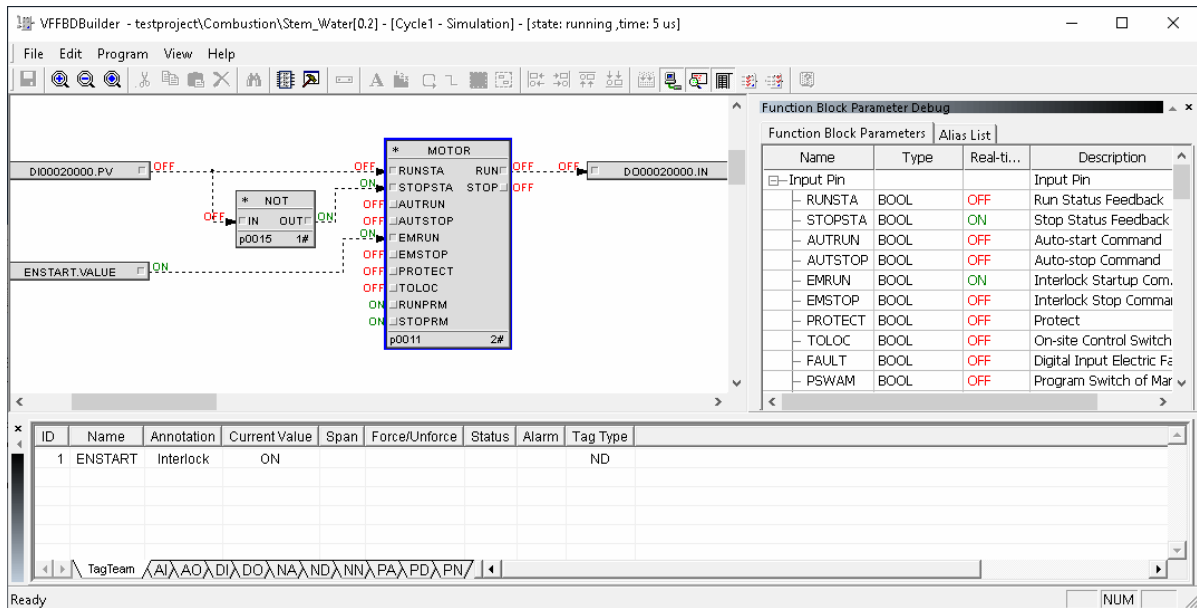


Figure 4-3 Program debug interface

Double click a tag in the interface shown in the above figure, relevant information will be displayed in the variable debug interface as follows. Double click current value, the following window will pop up to input forcible value, and then double click force or not to pop forcible window. Shown as follows:

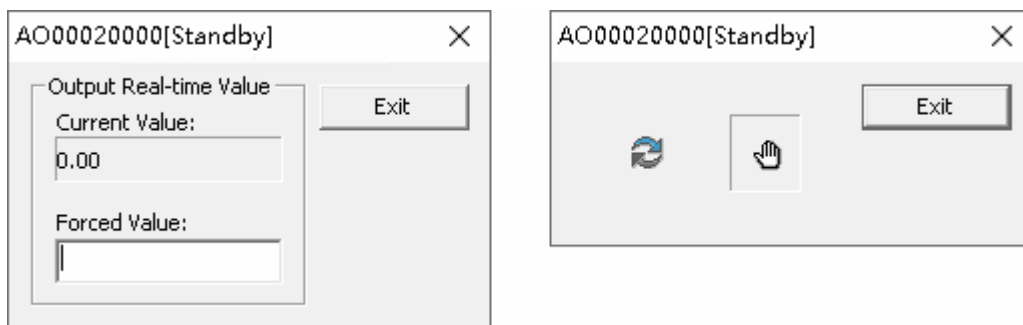


Figure 4-4 set tag value



Tip:

It's recommended to debug tag parameters in the tag panel. Corresponding tag panel can pop up in the supervision.

4.3.2 Program Debug

Modify parameters

Value of tag or parameter can be modified in the tag debug or function block debug interface.

Input forcible value

In order to test whether program function is correct when debugging program, input tag can be set to forcible, then manually input tag value to examine whether the program satisfies anticipation with different tag values.

Activate / close function block

Program paragraph unit debug. The value of function block with connection is assigned by its upper function block. It allows closing the input or output of the function block during unit debug. The input parameters of function block whose input is closed are not assigned by upper function block, and can be modified freely. The calculated value of the function block can't be transferred to downstream function block if its output is closed.

Forcible output

The value of forcible output tag is only assigned by manual output, and isn't connected to program, which allows adjusting program without worrying about abnormal output.

4.4 Items of United Debug, Tools and Method

4.4.1 Field Data Point Test

Input point: input signal from field and observe whether the corresponding data in the graphics is correct.

Output point: signal is assigned from graphics (Set the parameter in the "Debug Mode" of the controller to "Enable ". Pop up output tag panel, and set the tag to forcible, then input forcible value directly), and observe whether the corresponding signal in the field is accurate.

4.4.2 Controller Load Debug

View phase load is shown as Figure 4-5:

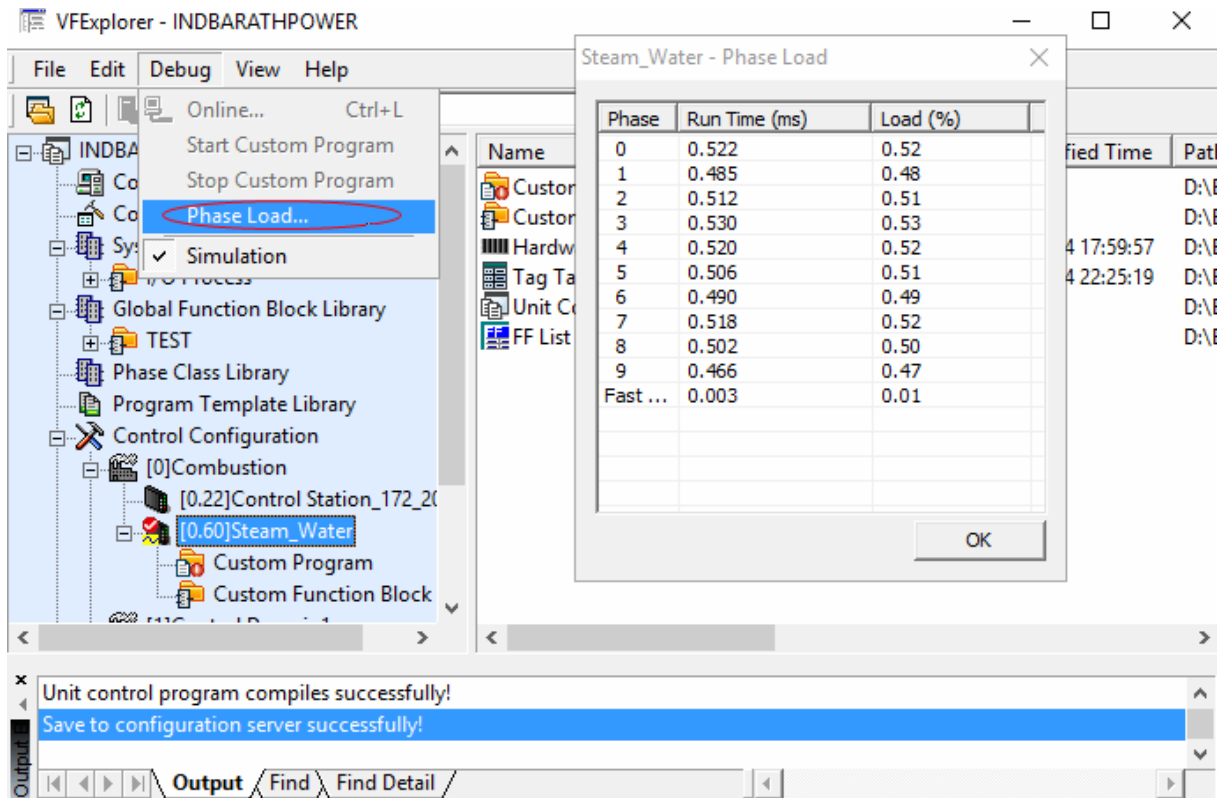


Figure 4-5 View phase load

Program phase can be adjusted if the phase load allocation of controller is unbalanced. If the phase load is too heavy (if phase load exceeds 70%, controller will alarm, and if exceeds 85% the program will stop), program function period can be adjusted in order to decrease load.

4.5 Resolutions for FAQ

4.5.1 Field Signal Abnormal

Input tag: when data is abnormal, firstly check whether corresponding channel value is correct in the hardware debug display. If the value is correct it means that the data of I/O module is correct. Then check whether tag value is correct. If not, it means that there are problems in tag settings and it's necessary to check tag settings; if correct, check relevant settings of graphics and supervision configuration. If channel data is incorrect, check channel configuration settings, wire connection and field signal.

Output tags: when data is abnormal, firstly check whether corresponding channel value is correct in the hardware debug display. If the channel value is correct, it means that the output value of the tag is correct, check hardware channel settings, tag practical output and field wire connection. If the channel value is incorrect, check whether the value and settings of the tag in the tag table is correct.

4.5.2 Program Abnormal

1. Check whether there is any closed function block in the program.



Check that the input is not too big


[Status Table](#)

[illegible]

Section 5 Configuration Download and Publish

5.1 Download Attentions

It's forbidden to download offline when plant is running, and if it prompts unable to download on line, plant should be shut-down for downloading offline.

Compiling will be carried out automatically before download, and it would be unable to download if there is any compiling error. Configuration error should be located and corrected by download prompt, and then download again.

Downloading process should not be aborted.

5.2 Configuration publish Attentions

- Make sure modified configuration has been saved to server before configuration publishes.
- Resource files should be Publish individually as possible.
- Configuration releasing process should not be aborted
- Make sure that process information network works normally before publish, because configuration publish is executed via process information network.

Section 6 Maintenance Guide

Control system is composed of system software, hardware, field instrument, etc. If any part fails, it will result in system function partly disabled or systematic failure, even result in plant shut-down. So it's necessary to treat all equipments as a whole and provide complete maintenance.



Attention:

Replacing component in maintenance must be appointed by supplier.

6.1 Control Station Maintenance

Check the working condition of module frequently to see if there's failure occurred (whether Fail light is on).

Check the working condition of DC supply frequently.

Check fastness of the grounding wire frequently.

Use anti-static brusher and blower to clean control station regularly.

Change standby module timely after fault is verified.

6.2 Operator Station Maintenance

Clean display using wet sponge regularly, but don't use alcohol and ammonia for cleaning.

Clean the meshwork of the host computer regularly.

It's forbidden to connect, remove, or move the host computer of operator station when power on.

It's forbidden to change the configuration and settings of computer system, add, delete or move files and directory in the hard disk arbitrarily.

Use external floppy disk or Compact Disc cautiously to avoid virus invasion.

Section 7 Revision

Table 7-1 Revision history

Document Version	Applied to Software Version	Remarks
V1.0(20230301)	OMC High-performanceHMI V4.70.00.00	First release
V1.1 (20230830)	OMC High-performanceHMI V5.10.00.00-M	Updated screenshots.