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# Config Explorer

## Section 1 Overview

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As the work platform of system configuration, VFExplorer is associated with VFIOBuilder, VFTAGBuilder, VFFBDBuilder and VFHMICfg, and supports functions of offline download, online download, online configuration, offline configuration, parallel configuration, configuration publish, single control station configuration backup and load, simulate, etc.

VFExplorer is applied in engineer station, connecting both configuration server and each control station. After building the system structure in VFSysBuilder, configuration of hardware, tag, custom program, custom function block and HMI can be done in VFExplorer, and online download and online publish of configuration are available too.

### 1.1 Function Features

1. **Parallel Configuration:** when connected with configuration server, several engineers can configure the same project in different engineer stations simultaneously. For monitoring configuration, parallel configuration can be done in unit of single operation domain (or single file when the objects are resources files such as graphics or schedule).
2. **Online Download:** check the configuration in unit of single control station to make sure it can pass compilation and find out the part which should be downloaded by comparing with the configuration in control station, then download online. The memory of each configuration in control station is fixed and independent from each other, thus can be edited and compiled separately while configuring, and the minimum unit to download is a hardware module, a tag or a custom program.
3. **Offline Download:** when the version of configuration in control station is different from that in engineer station, online download will not be allowed, and offline download can be used which will skip over the configuration comparison if the devices are safe, to completely download the correct configuration of engineer station directly.
4. **Online Configuration:** the real-time value (including parameters of function block, hardware and tag) in controller can be modified directly when it is connected with controller.
5. **Control Station and HMI:**
  - Start up VFIOBuilder to configure hardware of control station.
  - Start up VFTAGBuilder to configure tag of control station.
  - Build or delete custom program, adjust the execute sequence of custom program by modifying the running cycle and phase.

- Build or delete custom function block, start up VFSTModule.
- Start up VFHMICfg to configure monitoring in operation domain.
- 6. **Single Control Station Configuration backup and load** : make a backup of single control station configuration and load the backup of historic configuration easily.
- 7. **Configuration Publish**: publish updated configuration to operation domain. Operation node obtains updated configuration from configuration server.
- 8. **Online or Start up/Stop Custom Program**: connect with custom programs to view running status, running time, inactive/ active of input/ output, etc of all custom programs; stop/ start up any program.
- 9. **Phase Load**: view the phase load and running time of current controller.
- 10. **Global Tag Search**: search and accurately locate tags and domain variables in all control domains and operation domains of current project.
- 11. **Control Station Read-only**: when the control station is locked by some engineer stations, engineers with configuration authority can view the configuration in normal or online debug status, but can not configure or write value.
- 12. **Download Log**: view latest 500 download records of selected controller.
- 13. **Page Footer Settings**: set the template of page footer in printing of custom program.
- 14. **Status View**: select a node in project configuration tree, then the information of selected node would be showed in property bar on the right.
- 15. **Simulation**: debug configuration without real controller.

## 1.2 Technical Specification

### The minimum unit of parallel configuration:

- Single control station for control configuration.
- Single operation domain for HMI configuration
- Single file for resource such as graphics or schedule.

### The minimum unit of compile and download:

- One (or a redundant couple) module for hardware configuration.
- One tag for tag configuration.
- One program for custom program.
- One parameter for the initial value of function block parameter.
- All function blocks in the control station for custom function block.
- The whole configuration of module for Profibus master communication module.
- The whole configuration of module for serial communication module.

### Control scheme

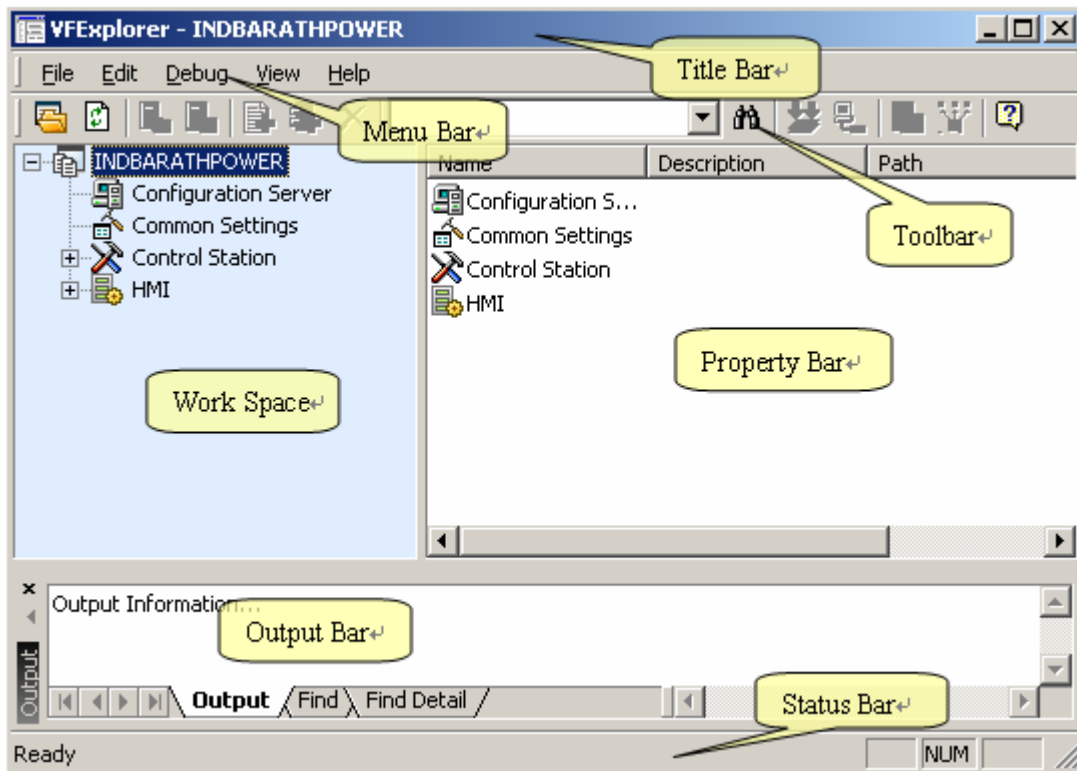
- At most 200 custom programs in single station.
- Space, \, /, and single quote mark, double quote mark, comma and colon in English status are not allowed in custom program name; name can not be repeated and at most 64 English characters; descriptions can use any character and at most 256 English characters. Both name and descriptions can be modified.
- The number of custom function blocks in single station is at most 250, and the code can't exceed 512k.
- At most 16 English characters in custom function block name, and it must start with letter and consist of English letter, number and underline, no repeated name (can't have the same name with system function block), no modification, try to use the least characters to express the meaning of function block; at most 64 English characters in descriptions, modification is available; the length of parameter name is at most 8 characters.
- Custom function blocks that have been used can't be deleted, and the modification of pin, parameter name and memory shift is not allowed.

Search and locate tag in whole project, check renamed tag in whole project.

## Section 2 Introduction to Interface

### 2.1 Main Interface

The main interface of VFExplorer is as shown in Figure 2-1.



**Figure 2-1 Interface of VFExplorer**

Title Bar---displays the name of the software and project.

Menu Bar---include menus of File, Edit, Debug, View, Help, etc, and each menu contains several submenu items.

Toolbar---list frequently used menu function in the form of icon, in order to make it easy to use. Click the menu [View/Toolbar] to decide whether to show the bar or not.

Work Space---on the left and display the tree structure of configuration information ("Configuration Tree").

Property Bar--on the top right and display the basic property of current selected node.


Output Bar---at the bottom and display output information such as configuration check of control station. Click [View/Output Bar] to decide whether to show the bar or not.


Status Bar---display current operation information and some prompt information. Click

[View/Status Bar] to decide whether to show the bar or not.

## 2.2 Introduction to Menu Bar/ Toolbar

**Table 2-1 Menu and function instructions**

Menu	Submenu	Icon	Function
File (F)	Open Project (Ctrl+O)		Connect to configuration server and open project
	Close Project		Close project
	Refresh (F5)		Refresh project
	Exit (X)		Exit
Edit (E)	Open from Configuration Server (Ctrl+D)		Open the configuration from configuration server and lock the control station to configure
	Save to Configuration Server (Ctrl+S)		Save the configuration to configuration server and unlock it
	Save to Configuration Server (Locked)		Save the configuration to configuration server and keep locked
	View		View configuration information of control station not locked by local station
	Save As		Make a backup (locked by local station) of the current control station configuration
	Load History Version		Load the backup configuration (locked by local station) of the current control station
	Compile		Compile current control station configuration
	Online Download (F7)		Download configuration of the control station after comparing with controller configuration
	Offline Download		Download without comparing configuration of controller, download all.
	Upload Parameter		Upload current parameter to configuration.
	New Custom Program (Ctrl+N)		Build a new custom program
	New Custom Function Block		Build a new custom function block
	Custom Program Scheduling		Adjust the execution sequence of program
	Open VFHMICfg		Open VFHMICfg to configure operation domain
	Publish		Publish updated information of configuration to operation domain
	Delete		Delete custom program or function block
	Find (Ctrl+F)		Find tags in the whole project
Debug (D)	Online (Ctrl+L)		Connect current custom program to controller
	Start up Custom Program		Start up selected custom program
	Stop Custom Program		Stop the selected custom program
	Phase Load		Connect controller to display phase execution time and load
View (V)	Download log		View download log of selected controller
	Configuration Load Log		View load log of historical configuration of selected controller
	Toolbar (T)		Show or hide Toolbar
	Status Bar (S)		Show or hide Status bar
	Output Bar (O) Alt+2		Show or hide Output bar

Menu	Submenu	Icon	Function
Help (H)	About (A)		Display program information, version and copyright

Toolbar lists frequently used menu function in the form of icons shown in the table above, in order to make it easy to use.

## 2.3 Right-click Menu

Right click in VFExplorer to pop up right-click menu, and the menus are different according to different selected nodes, as shown in Table 2-2.

**Table 2-2 Functions of right-click menu**

Selected Node	Menu Item	Function	Enable or Not
<b>Right-Click Menu in Work Space</b>			
Control Station	Open from Configuration Server	Open control configuration from configuration server and lock the controller for configuration	Enable only when selected node is controller with configuration authority and unlocked
	Save to Configuration Server	Save control station configuration to configuration server and unlock it	Enable only when selected node is controller with configuration authority and locked by local station
	Save to Configuration Server (Locked)	Save control station configuration to configuration server and keep locked	Enable only when selected node is controller with configuration authority and locked by local station
	View	Open control configuration from configuration server in read-only mode	Enable only when selected node is controller with configuration authority and unlocked
	Simulation (only when software key of corresponding authority is connected)	Start up or close simulation controller	Enable only when selected node is controller with configuration authority and locked by local station
	Save As	Make a backup (locked by local station) of the current control station configuration	Enable only when the selected node is controller with configuration authority and locked by local station
	Load History Version	Load the backup configuration (locked by local station) of the current control station	Enable only when the selected node is controller with configuration authority and locked by local station
	Compile	Compile configuration of current controller	Enable only when selected node is controller with configuration authority and locked by local station
	Online Download	Download configuration after comparing with controller configuration	Enable only when selected node is controller with configuration authority and locked by local station
	Synchronize Global Function Block	Synchronize global function block from global function block library to the control station function block library.	Enable only when selected node is controller with configuration authority and locked by local station



Selected Node	Menu Item	Function	Enable or Not
	Modify Alarm Priority in Batch	Modify alarm priority of control station tags in batch.	Enable only when selected node is controller with configuration authority and locked by local station
	Print Custom Program	By this command, the custom program in the control station can be printed to one PDF file in batch.	Enable only when selected node is controller with configuration authority and locked by local station
System Function Block Library	New	Build a new system sub-function block library.	Enable only when selected node is system function block library
	Import	Import existed system function block library.	Enable only when selected node is system function block library
	Export	Export current system function block library.	Enable only when selected node is system function block library
System Sub-function Block Library	New	Build a new system function block.	Enable only when selected node is system sub-function block.
	Delete	Delete specified system function block.	Enable only when selected node is system sub-function block.
	Import Function Block	Import specified system function block.	Enable only when selected node is system sub-function block.
System Function Block	Open From Configuration Server	Open system function block from configuration server and lock the global function block for configuration.	Enable only when selected node is system function block not locked locally.
	Save to Configuration Server	Save system function block to configuration server and unlock it.	Enable only when selected node is system function block locked locally.
	Save to Configuration Server (Locked)	Save system function block to configuration server and keep locked.	Enable only when selected node is system function block locked locally.
	View	Open system function block from configuration server in read-only mode, via the system function block.	Enable only when selected node is system function block locked locally.
	New Panel	Build a new panel of system function block.	Enable only when selected node is system function block locked locally.
	New Symbol	Build a new symbol of system function block.	Enable only when selected node is system function block locked locally.
	Delete	Delete the panel of system function block.	Enable only when selected node is system function block locked locally.
	Undo Delete	Undo delete the panel of system function block.	Enable only when selected node is system function block locked locally, and after deleting.
	Import Panel	Import the panel of system function block.	Enable only when selected node is system function block locked locally.
	Import Symbol	Import the symbol of system function block.	Enable only when selected node is system function block locked locally.
Export Function Block	Export selected system function block.	Enable only when selected node is system function block locked locally.	
New Password	Create a new password for system function block.	Enable only when selected node is system function block locked locally.	
Global Function Block Library	New	Build a new global function block folder	Enable only when selected node is global function block library
Global Function	New	Build a new global function block	Enable only when selected node is global function block folder

Selected Node	Menu Item	Function	Enable or Not
Block Folder	Delete	Delete selected new global function block	Enable only when there is no global function block under the folder, otherwise, a prompt of deleting all function blocks first will pop up.
	Import Function Block	Import selected new global function block	Enable only when selected node is global function block folder
	Properties	Modify the description of global function block folder.	Enable only when selected node is global function block folder
Global Function Block	Open From Configuration Server	Open global function block from configuration server and lock the global function block for configuration	Enable only when selected node is unlocked global function block
	Save to Configuration Server	Save global function block to configuration server and unlock it	Enable only when selected node is global function block and locked by local station
	Save to Configuration Server (Locked)	Save global function block to configuration server and keep locked	Enable only when selected node is global function block and locked by local station
	View	Open global function block from configuration server in read-only mode	Enable only when selected node is unlocked global function block
	New Panel	Build a new panel of global function block	Enable only when selected node is global function block and locked by local station
	New Symbol	Build a new symbol of global function block	Enable only when selected node is global function block and locked by local station
	Delete	Delete the panel of global function block	Enable only when selected node is global function block and locked by local station
	Undo Delete	Undo delete the panel of global function block	Enable only when selected node is global function block and locked by local station, and it has been deleted before.
	Import Panel	Import the panel of global function block	Enable only when selected node is global function block and locked by local station
	Import Symbol	Import the symbol of global function block	Enable only when selected node is global function block and locked by local station
	Export Function Block	Export selected global function block	Enable only when selected node is global function block and locked by local station
	Use	View usage information of selected global function block	Enable only when selected node is global function block and locked by local station
Properties	Set property of global function block	Enable only when selected node is global function block and locked by local station	
Custom Program	New	Build a new custom program	Enable only when selected node is custom program whose controller is locked by local station
	Compile	Compile all custom programs of current control station	Enable only when selected node is custom program (the number is larger than 0 ) whose controller is locked by local station
	Scheduling	Adjust the running sequence of program	Enable only when selected node is custom program,(the number is larger than 0) whose controller is locked by local station
	Import	Import custom program as CSV.	Enable only when selected node is custom program, whose controller is locked by local station.
Custom Function Block	New	Build a new custom function block	Enable only when selected node is custom function block whose controller is locked by local station

Selected Node	Menu Item	Function	Enable or Not
	Compile	Compile custom function block	Enable only when selected node is custom function block (the number is larger than 0) whose controller is locked by local station
Operation Domain	Open from Configuration Server	Open monitoring configuration from configuration server and lock the operation domain for configuration	Enable only when selected node is operation domain with configuration authority and unlocked
	Save to Configuration Server	Save monitoring configuration of the operation domain to configuration server and unlock it	Enable only when selected node is operation domain with configuration authority
	Save to Configuration Server and Keep Locked	Save monitoring configuration of the operation domain to configuration server and keep locked	Enable only when selected node is operation domain with configuration authority and locked by local station
	Edit	Open monitoring configuration software of the operation domain for configuration	Enable only when selected node is operation domain with configuration authority
	Publish	Publish configuration to current operation domain	Enable only when selected node is operation domain with configuration authority
<b>Right-Click Menu in Property Bar</b>			
Custom Program	Edit	Open selected custom program	Always enable
	Compile	Compile selected custom program (single program)	Always enable
	Delete	Delete selected custom program	Always enable
	New/ Modify Password	Set or modify the password of custom program	Always enable ("Modify Password" is not available when the custom program has no password; "New Password" is not available when it has password)
	Delete Password	Delete password	Always enable (not available when the custom program has no password)
	Property	Set program property	Always enable
Custom Function Block	Edit	Open selected custom function block	Always enable
	Delete	Delete selected custom function block	Always enable
	New/ Modify password	Set of modify the password of custom function block	Always enable ("Modify Password" is not available when the custom function block has no password; "New Password" is not available when it has password)
	Delete password	Delete password	Always enable (not available when the custom function block has no password)
	View the usage	View usage information of selected custom function block	Always enable
	Property	Set property of custom function block	Always enable

## Section 3 Instructions

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Configuration files are saved in configuration server (D:\SUPCON\_PROJECT\project name). When configuring, first get a local copy of configuration project from configuration server by VFEExplorer, and then configure the project in the local station.

The control station will be “locked” by the engineer when configuring, thus other engineers can’t configure the control station anymore and only some information (lock time, engineer station and lock user, etc.) of the controller are available, but engineers with configuration authority of the control station can still view and debug the configuration.

Local configuration can be conveyed to configuration server by configuration management software when users finish configuration at local engineer station. The configuration of control station will be in “unlocked” status only when configuration file is saved to server, in this case, all engineers with configuration authority of the control station may edit configuration of the control station.

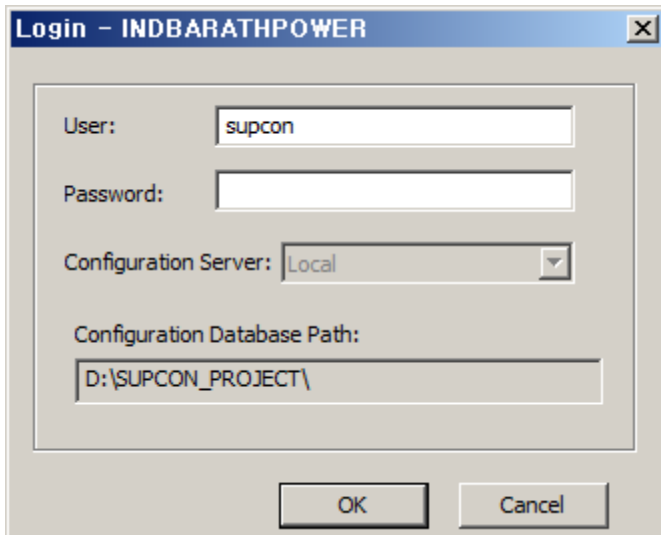
### 3.1 Open Project

Configuration management software can’t build new project, it can only connect to configuration server, and copy project which is set as default project and built by system structure configuration software in server to local configuration directory of engineer station.

After successfully connecting with configuration server, project will be opened automatically and the configuration tree information of the project will be displayed on the work space of left. Project configuration includes two components of control configuration and monitoring configuration. Control configuration contains all the control domains, and each control domain has several control stations (the number in front of the name of control station means the address of corresponding controller). Monitoring configuration contains all the operation domains.

The specific method to connect to configuration server and open project is described as follows.

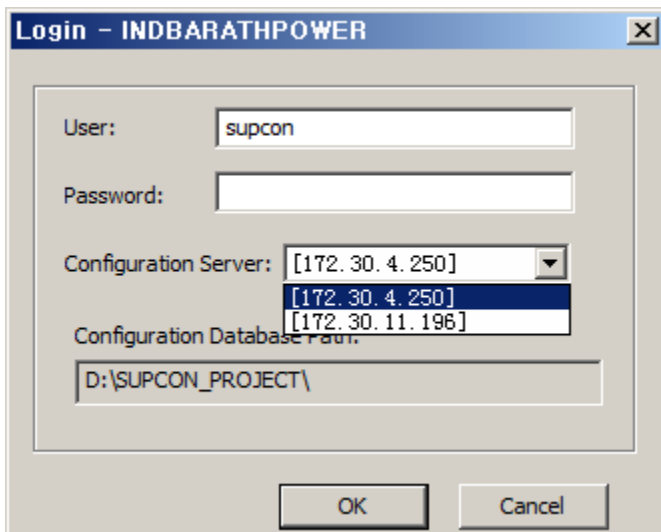
Start up Configuration Management Software and the login window will pop up automatically. (Click “Open Project” button in the toolbar to pop up login window).



**Figure 3-1 Window of login**

- The project to be opened is the default project (please refer to *System Builder User Manual* for the operation of setting default project) in system structure configuration software, and the name of the project will be displayed on the title bar of dialog box.
- The user is the engineer added in system structure configuration software (the user name of last login will be displayed if any engineer has entered configuration management software before); it will prompt if user name or password is error.
- The path of configuration database is set in software installation or modified by [Programs/VisualField/System Tools/VFSetup] in the Start menu.

Note: if selecting multi-switch function, the login interface is different, as shown below. User can select the configuration server of remote node. The login method is same with local operation node.



**Figure 3-2 Login dialog for multi-switch function**

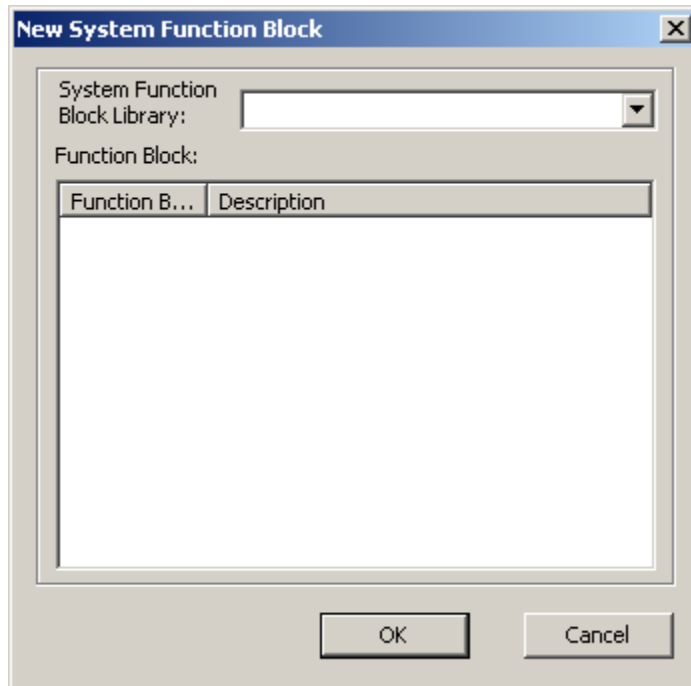
### 3.2 Configure System Function Block

User can create symbol and panel of system function block via system function library.

### 3.2.1 Create New System Function Block Library

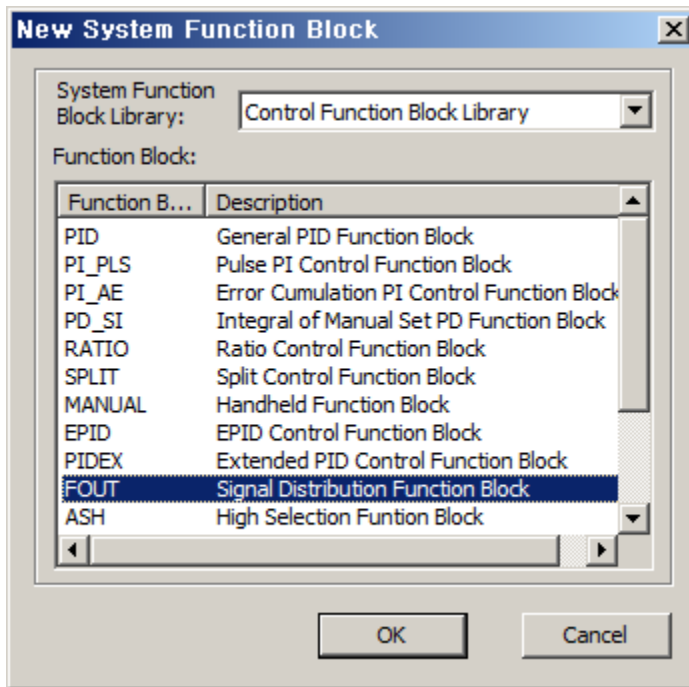
Create new system function block library by following steps:

1. Right-click “System Function Block Library” in project bar and select “New” to pop up the dialog below.

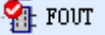


**Figure 3-3 New System Function Block 1**

2. Select a function block library (here takes “Control” as an example) from the drop-down menu of “System Function Block Library”, to show all function blocks in the library in “Function Block”.



**Figure 3-4 New System Function Block 2**

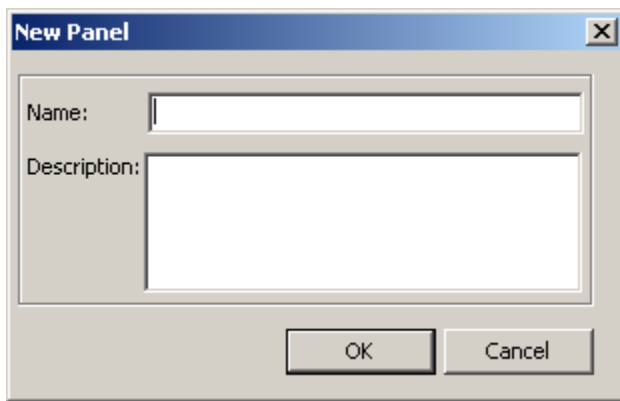
3. Select a function block (take “FOUT” as an example in above) and click “OK”.
4. Folder “Control” will be added to “System Function Block Library” in project bar, and node  will be added to the folder.

### 3.2.2 Create New Symbol and Panel

User can add system function block to “System Function Block Library”, and customize its symbol and panel. When designing user program of control project configuration, user can apply the “Default” symbol and panel or create new one.

#### Create New System Function Block Panel

1. Right-click the new system function block in work area and select “New Panel”.
2. Dialog “New Panel” will pop up as shown below. Input “Name” and “Description” of panel. The name length cannot exceed 12 characters, it also cannot be empty or have space, or contain “\:\*?\"<>|!@#%&^&=,.;[]+-~”.



**Figure 3-5 New Panel**

3. Click “OK” to pop up the VFPanel program.
4. Set the panel of system function block in VFPanel program.

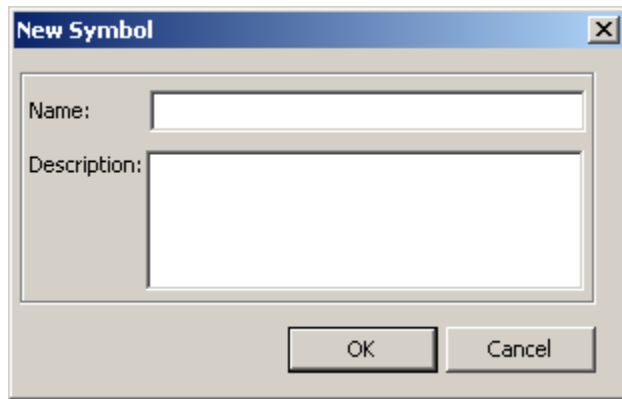
Please refer to *Graphics Builder User Manual* for details of VFPanel program.

5. User can set a custom panel as default in system function block:
  - Right-click the custom panel to set it as default. Setting a new default panel will cancel the default property of the old one.
  - User can cancel the default panel function by right-clicking it.
  - Delete the panel after setting it as default, so the fixed panel of system will become default panel of the system function block.
6. Usage of system function block instance default panel:
  - If the system function block tag has no default panel, panel option will be shown as \*, and will be shown as custom panel name later.
  - If the system function block tag has default panel, panel option will be shown as default panel.
7. For both global and system function blocks, despite the change of default panel, the original function block panel option will not be changed.

### **Create New System Function Block Symbol**

1. Right-click the new system function block in work area and select “New Symbol”.
2. Dialog “New Symbol” will pop up as shown below. Input “Name” and “Description” of panel. The name length cannot exceed 40 characters, it also cannot be empty or have space, or contain “\:\*?\"<>|!@#\$\$%^&=,.;[]+-~”.





**Figure 3-6 New Symbol**

3. Click “OK” to pop up the VFSymbol program.
4. Set the symbol of system function block in VFSymbol program.

Please refer to *Graphics Builder User Manual* for details of VFSymbol program.

### 3.3 Global Function Block Technical Specifications

1. Global function block supports 50 function block sub-libraries, and each can support 255 global function blocks. The names of global function blocks sub-library cannot repeat. The names of global function blocks cannot repeat, and cannot be the same as the names of system function blocks and custom function blocks.
2. The limit No. of all global function block parameters is 512.
3. The alias No. limit is 128.
4. Global function block can have several panels, the maximum is 256.
5. Global function block can have several symbols, the maximum is 256.
6. A single CS can support 255 custom function block types, including custom function block and global function block.
7. It supports 3 types of global function blocks FBD, ST and SFC.
8. The maximum memory of global function block is 6K.
9. The global function block multicast data limit is 100 bytes, and the redundant data bytes limit is 300 bytes.
10. The No. of global function block panels open in monitoring simultaneously is 8, the same as system panel No. limit.

### 3.4 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

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