



Automation for a Changing World

# Delta **DIA**view SCADA System User Manual

 **DELTA**  
Smarter. Greener. Together.

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# 1. Introduction

## 1.1 Introduction to Delta Industrial Automation View

With the development of industrial and social economy, information technology based on computers and high speed Internet is becoming more and more mature and advanced; its application range includes industrial manufacturing, import and export trading, transportation, -power energy, oil, chemical industry, metallurgy and the everyday life, culture and entertainment of people etc. Information technology is also gradually developing towards automation and intelligence, promoting productivity revolution and increasing people's living standards.

The SCADA (Supervisory Control And Data Acquisition) system is a data acquisition and surveillance system. It is a computer-based automated production process control and management system that can monitor and control the executing devices on-site in order to realize functions including data acquisition, device control, measurement, parameter control, various signal alarms and generate charts and reports etc. The SCADA system has significant effects for increasing the reliability, safety, economic benefits and work efficiency of industrial production and management control; it reduces personnel burden and labor, realizing automation and modernization.

Since releasing its first inverter in 1995, Delta continued to increase the reliability and precision of its products, and focused on innovative development of inverters and the power quality control, sensing, control and sporting goods fields. As its product lines become more and more complete, Delta also integrated the PLC, HMI, inverter, network communication devices, video and other industrial automation products manufactured by itself to provide comprehensive industrial automation solutions. With the gradual promotion and global distribution of Delta's own brand development strategy, and to further increase Delta's influence in the industrial automation field, adapt to the customers' need for Delta's industrial automation products and market development features, Delta developed its own brand of SCADA system -- the Delta Industrial Automation View system, abbreviated as DIAView.





## ■ Functions features

- » Based on the Windows operating system and has wide, flexible and reliable applications.
- » Supports the communication and networking of domestic and international mainstream PLC, DCS, PAC and IPC devices.
- » Based on the DotNet technology platform; uses WPF (Windows Presentation Foundation) technology to display beautiful images and fully supports the XML technology.
- » Friendly user interface, rich graphic elements, easy operations, easy configurations, easy usage and easy maintenance.
- » Decentralized layout with powerful expandability.
- » Stable industrial communication design
- » Powerful alarm management
- » Easy-learning and easy-to-use scripting language (VBScript)
- » Highly efficient recipe management
- » Reliable user management

# 2. DIAView Software Installation

## 2.1 DIAView Installation Requirements

Configuration Items	Minimum System Requirements
CPU	2.0GHz or above
Memory	2GB or above
Hard disk	20GB or above
Display	1024 x 768 resolution or above
Operating System	Windows XP SP3, Windows 7 Professional/Ultimate Edition, Windows 8 Professional/Ultimate Edition 32/64 bit
	-
	Language: Simplified Chinese, Traditional Chinese, English
System Privilege	Windows users must have administrator privileges
Execution Platform	Installation of Microsoft .NET Framework4.0 or above is required

Note: Users must prevent the computer system from entering standby or hibernation modes while the DIAView configuration software execution environment is executing in order to avoid "Unrecognized Encryption -dongle" anomalies from occurring.

## 2.2 DotNet Installation

DIAView is based on the Microsoft .NET Framework environment; .NET Framework4.0 or above must first be installed before using DIAView. Installation steps are as follows (Using Windows7 Professional Edition as the example):

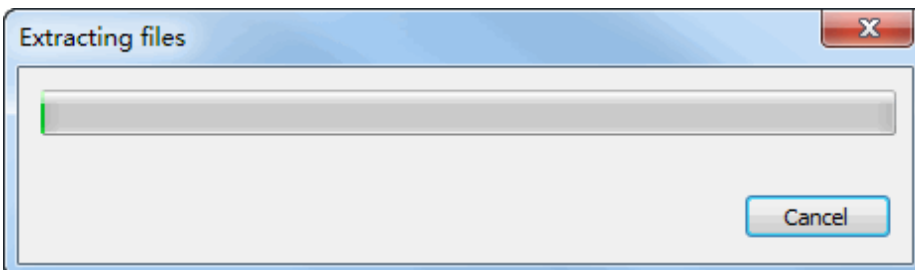
- **Step 1:** Start the computer and insert the DIAView installation disc into the CD-ROM drive, then click the DIAViewSetup.exe file on the disc to execute the installation program, as shown in the figure below:



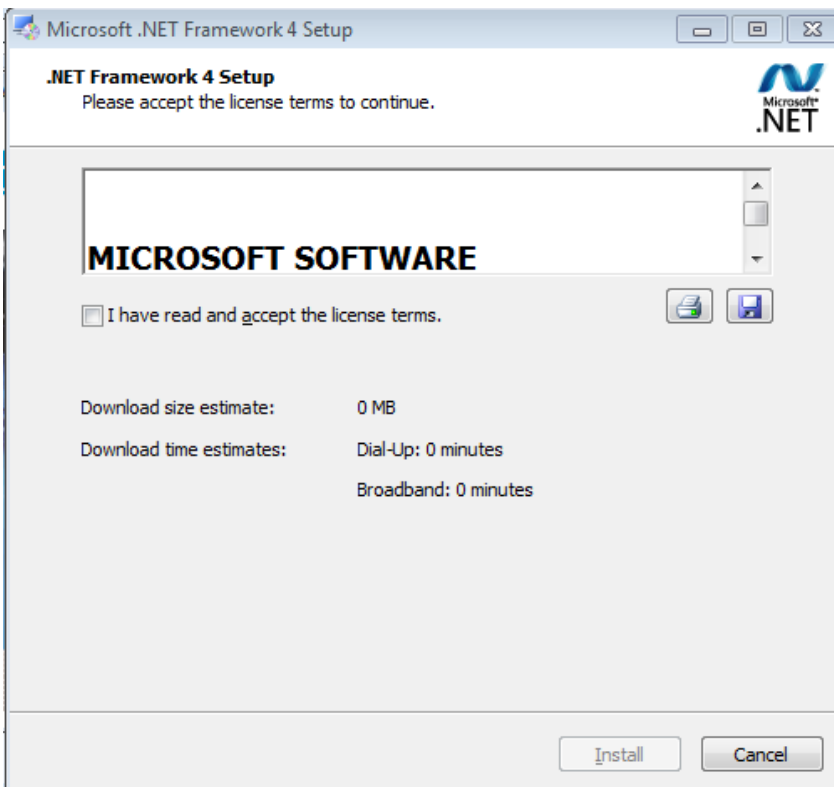
Once the installation program has started, it will enter the install navigation interface; there is a list of buttons on the right of the install navigation interface, when you move the mouse cursor onto one of the buttons, the text of the button will change from white to yellow. The functions of each button are as follows:

- **Installation guide:** Includes the system requirements for installing DIAView, problems that might encounter during the installation and the features of the new version.
- **DIAView:** Installing DIAView main program
- **Encryption -dongle:** Installs an encryption -dongle drive (the encryption -dongle driver will automatically be installed when installing the DIAView main program).
- **DotNet:** Installs Microsoft .NET Framework (version 4.0 and above).

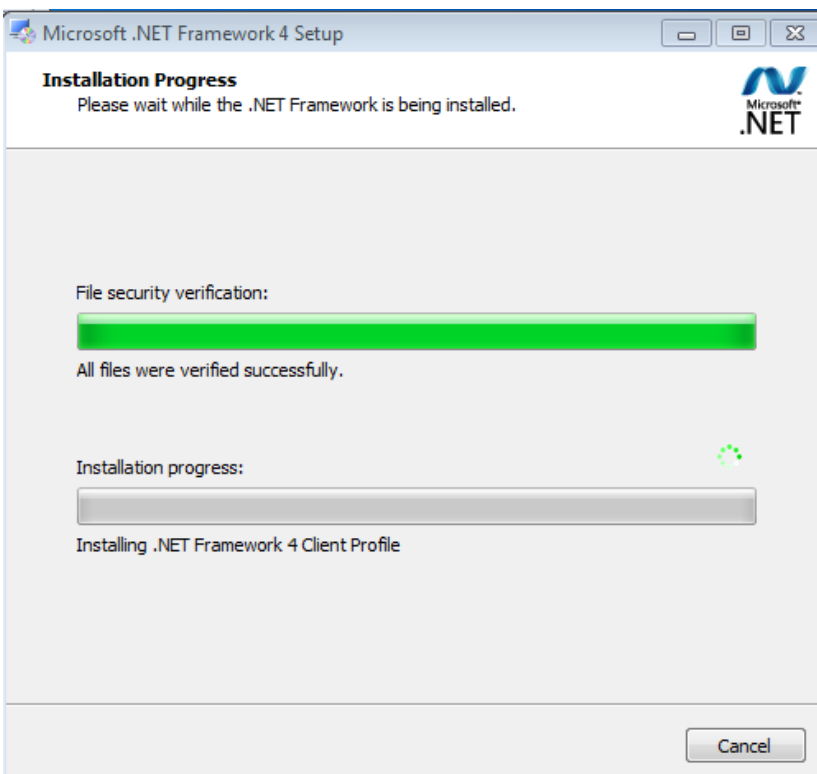
- **Step 2:** Click the “DotNet” button to enter the installation interface of Microsoft .NET Framework, as shown in the figure below:



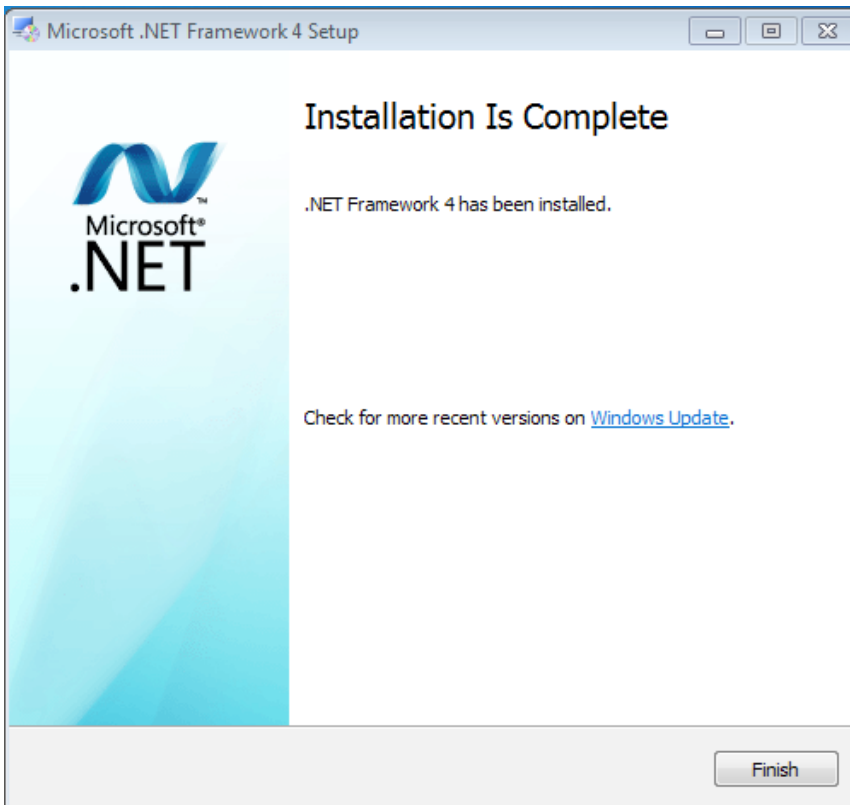
- **Step 3:** The “-License Terms-” dialog will appear as shown in the figure below. If the user agrees to the terms in this agreement, check the “-I have read and accept the license terms-” checkbox and then press the “-Install-” button to continue the installation. If user does not agree, press the “-Cancel-” button to exit the installation program.



- **Step 4:** Select accept license agreement and then press the “-Install-” button to continue installation and enter the installation stage:



- **Step 5:** When installation is complete, the dialog shown in the figure below will appear; click the “-Finish-” button to complete the installation of -DotNet Framework:



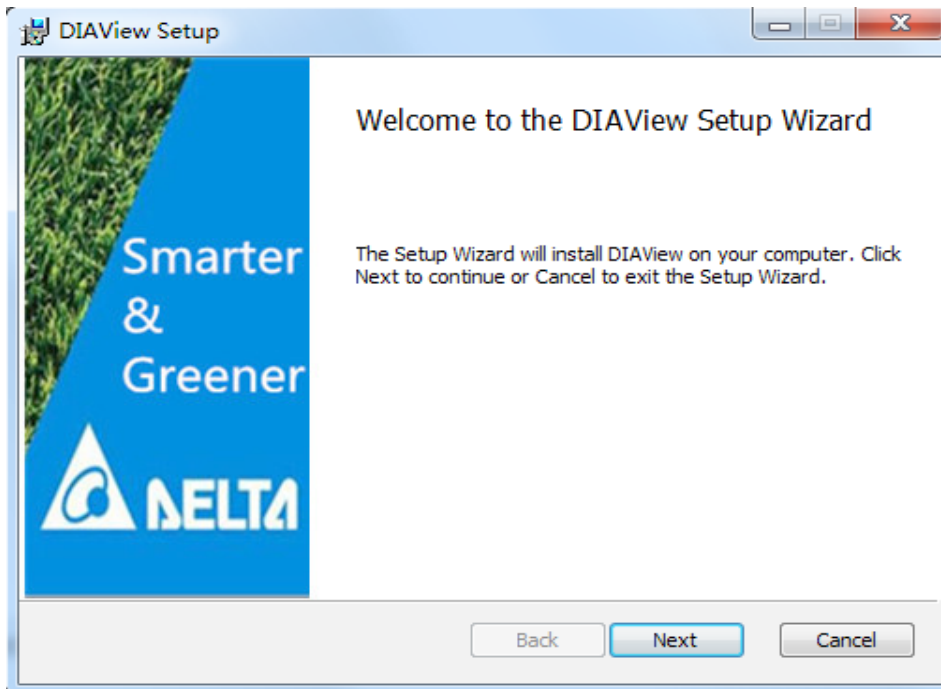
## 2.3 Installing DIAView main program

Installation steps are as follows (Using Windows7 Professional Edition as the example):

- **Step 1:** Start the computer and insert the DIAView installation disc into the CD-ROM drive, then click the DIAViewSetup.exe file on the disc to execute the installation program, as shown in the figure below:



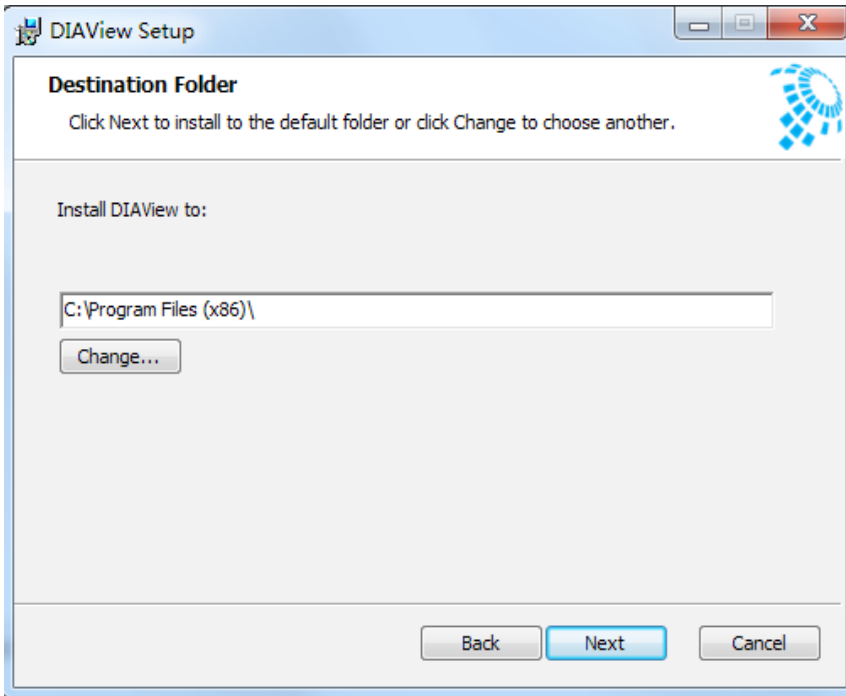
- **Step 2:** Click the “DIAView” button to enter the DIAView main program installation interface, as shown in the figure below:



- **Step 3:** Click “-Next-” and the “-User License Agreement-” dialog will appear. The content of the dialog is the legal agreement between “-Delta Electronics,Inc.-” and the DIAView software user. If the user agrees to the terms in this agreement, check the “-I accept the terms in the license agreement-” checkbox and then press the “-Next-” button to continue the installation; users can also press the “-Print-” button to print this agreement. If user does not agree, press the “-Cancel-” button to exit the installation program.

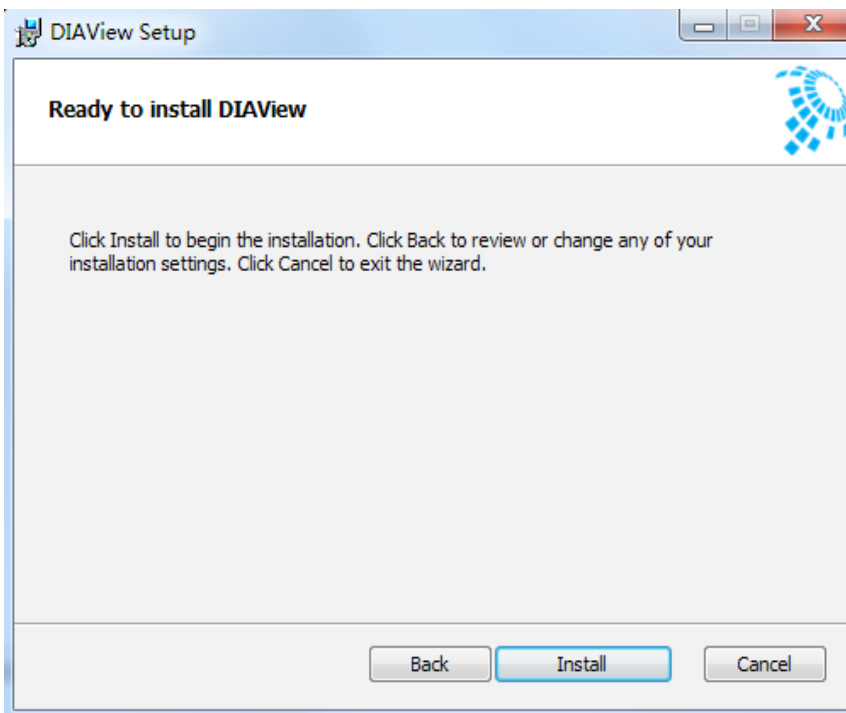


- **Step 4:** Select accept license agreement and then press the “-Next-” button to continue installation; the select installation folder dialog will appear:

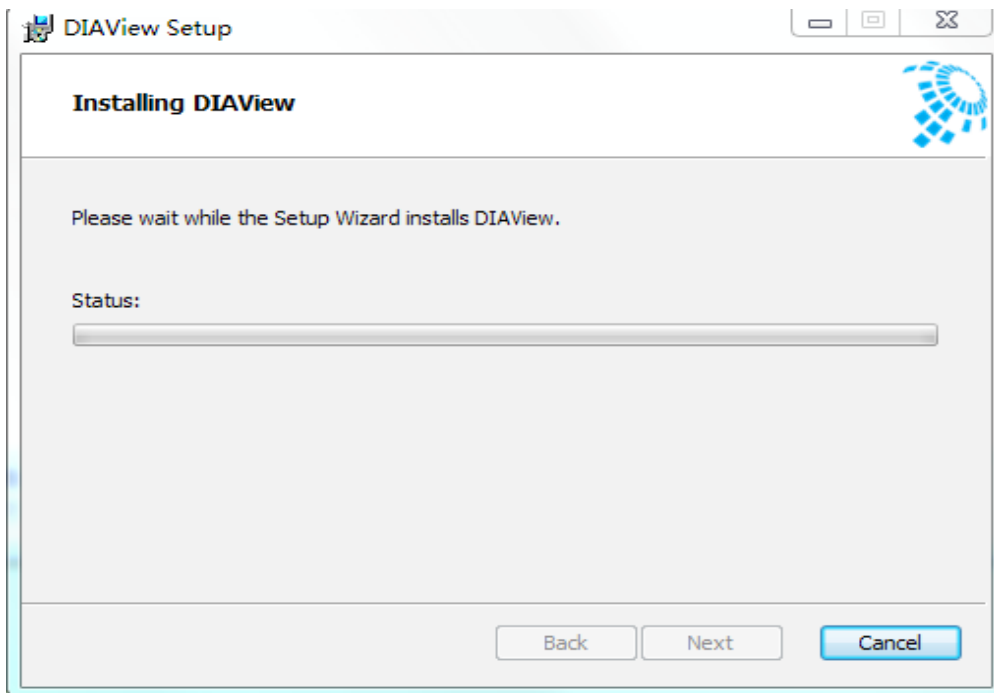


The system's -default installation path is: C:\Program Files\DIAView\, if the user wants to change the installation folder, press the “-Change-” button to select the installation path.

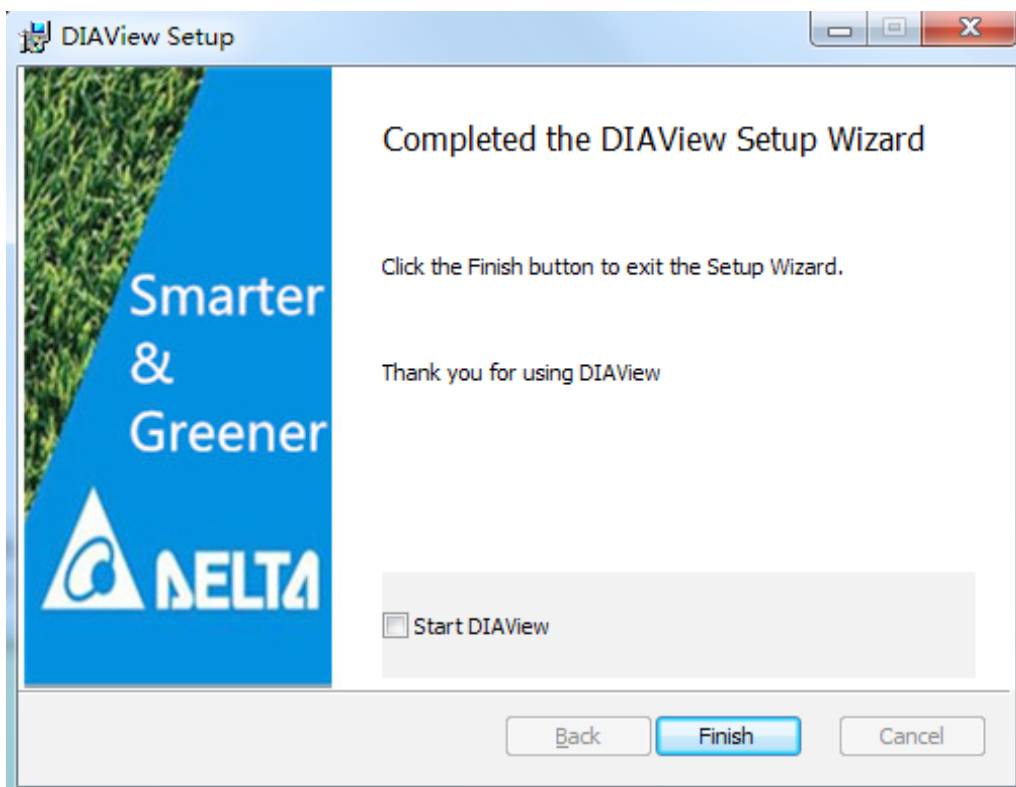
- **Step 5:** Press “-Next-” and the installation program will analyze the installation environment and then the following window will appear:



- **Step 6:** Click “-Install-” to start installing the DIAView main program; the installation progress window will appear:



- **Step 7:** When installation is complete, the dialog shown in the figure below will appear; click the “-Finish-” button to complete the installation of the DIAView software. If user checked the “-Start DIAView-” checkbox, then the DIAView software will start when the “-Finish-” button is pressed.

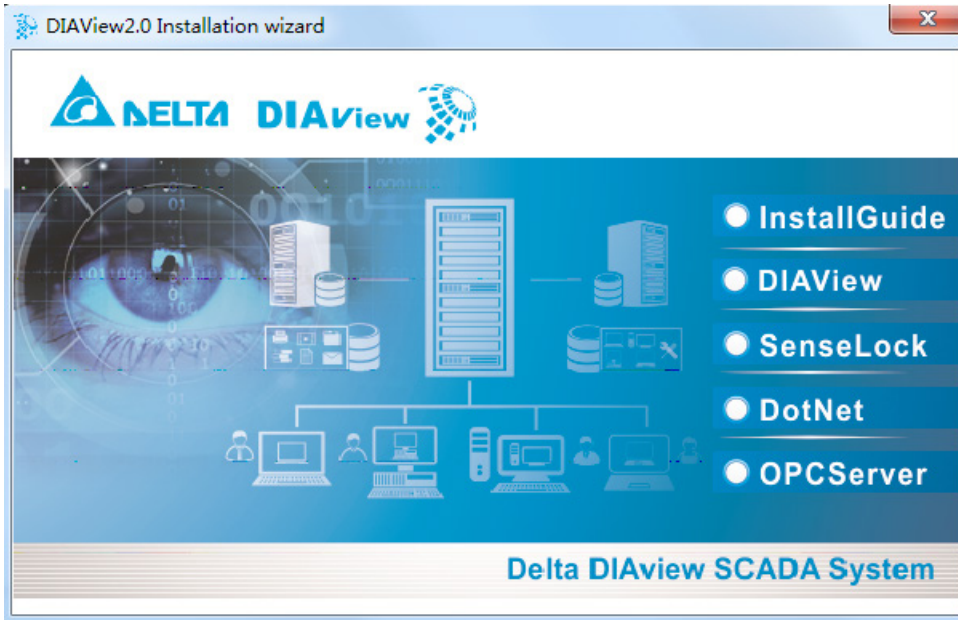




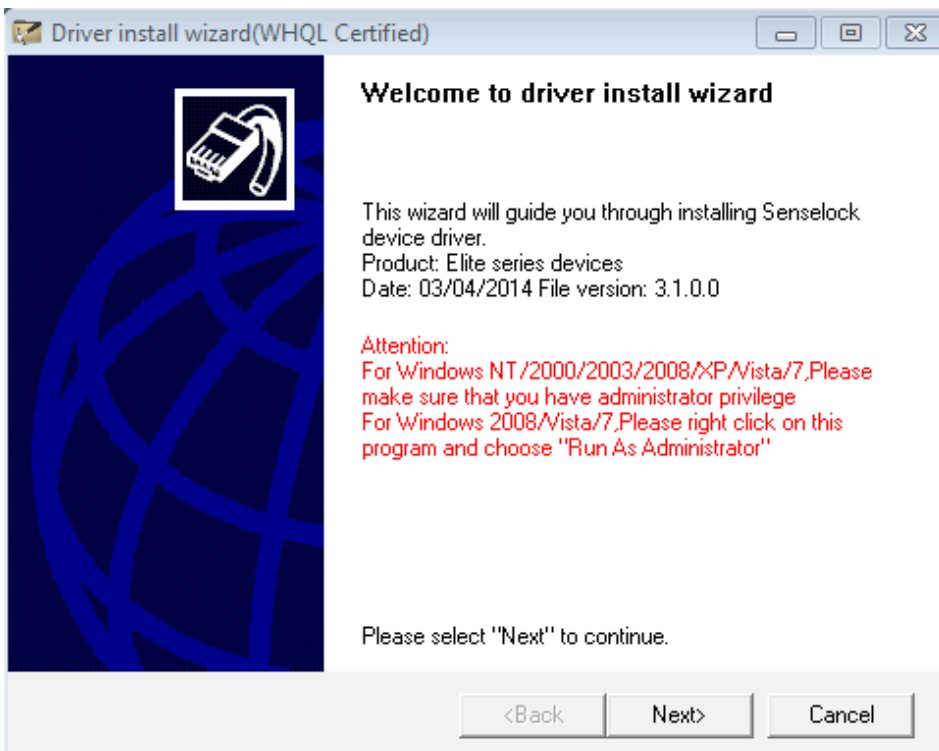
## 2.4 Installing encryption dongle driver

Installation steps are as follows (Using Windows7 Professional Edition as the example):

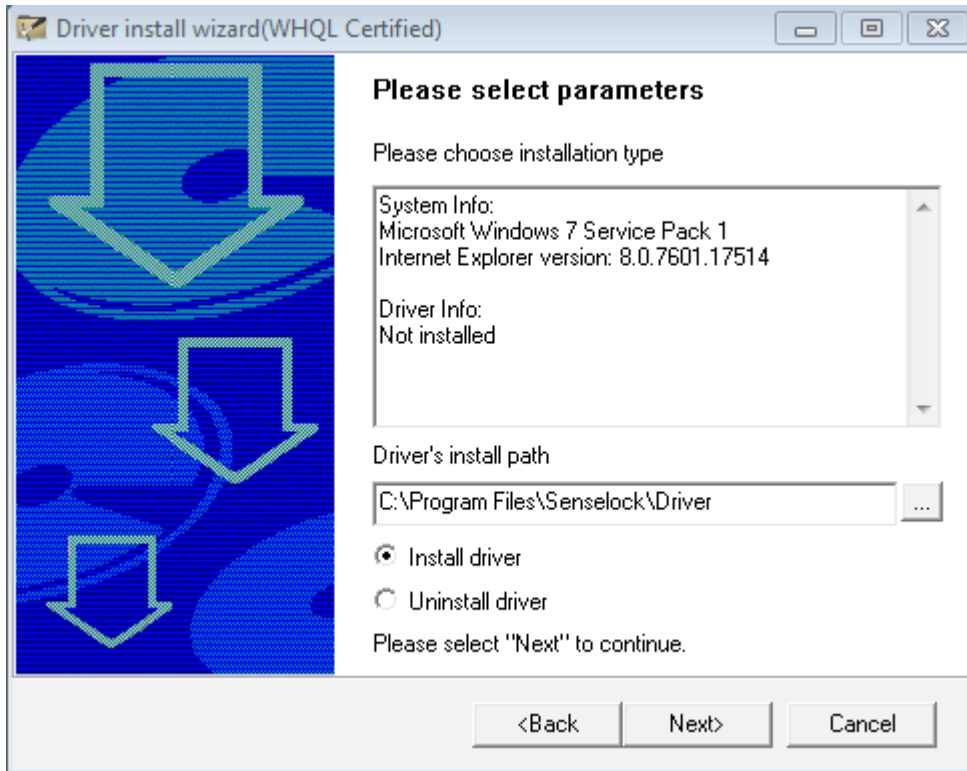
- **Step 1:** Start the computer and insert the DIAView installation disc into the CD-ROM drive, then click the DIAViewSetup.exe file on the disc to execute the installation program, as shown in the figure below:



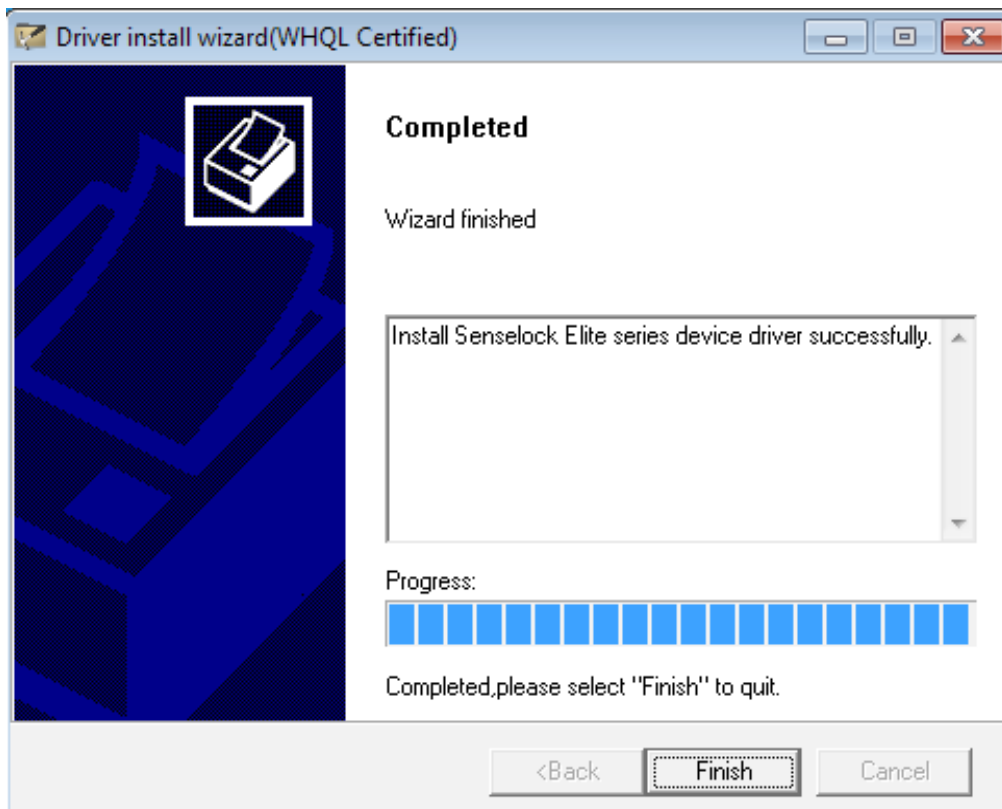
- **Step 2:** Click the “-Encryption dongle-” button to enter the installation navigation interface, as shown in the figure below:



- **Step 3:** Click “-Next-” and select install parameters:



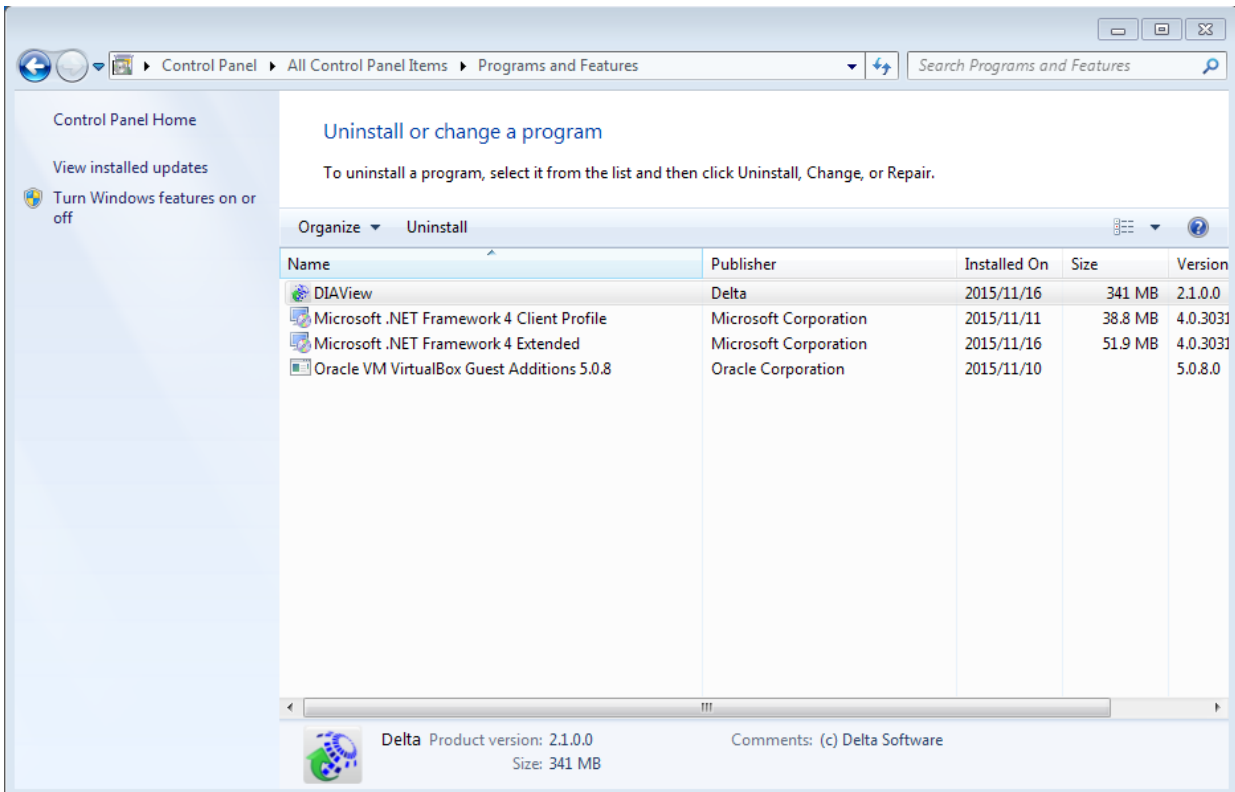
- **Step 4:** Click the “-Next-” button to enter the program installation stage; when installation is complete, the screen will appear as shown in the figure below:



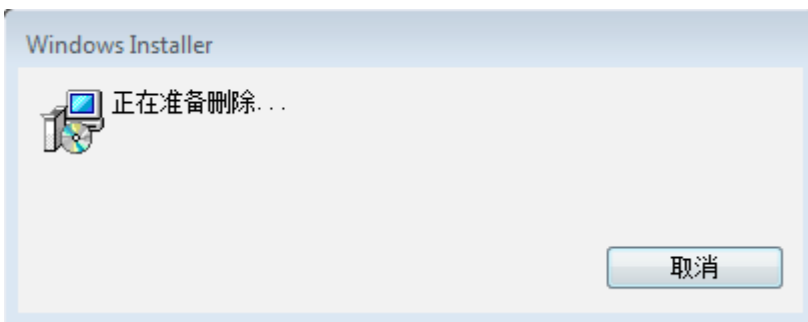
## 2.5 Uninstalling DIAView main program and encryption dongle driver

1. There are three ways to uninstall the DIAView main program; the steps are as follows (using Windows 7 Professional Edition as the example):

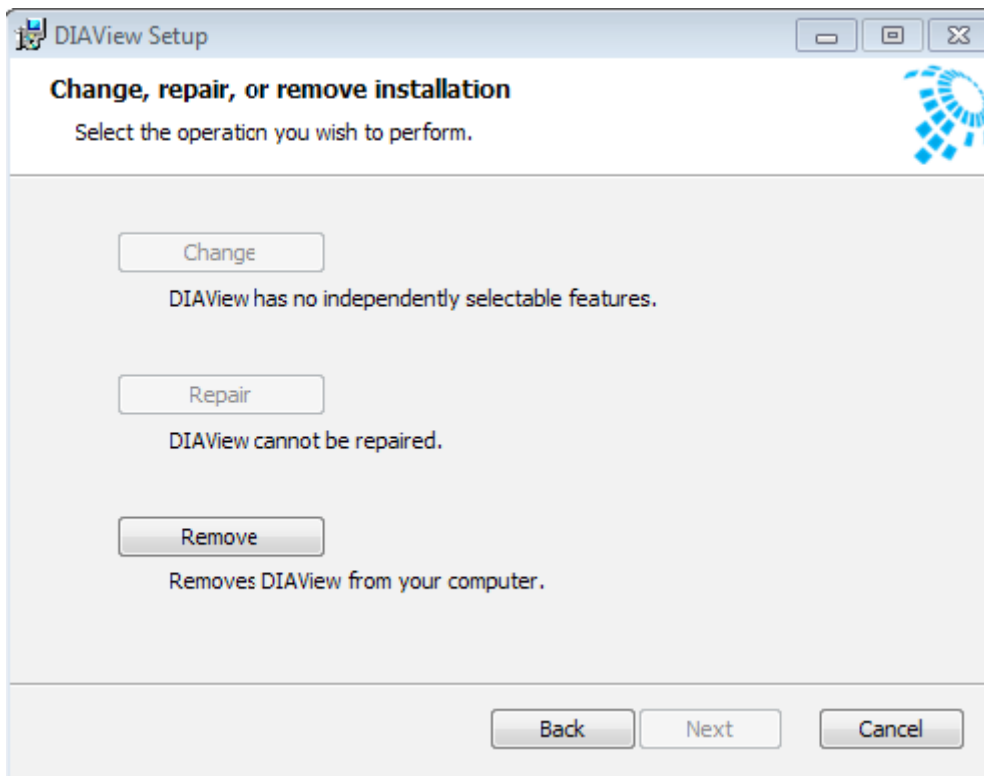
- **Method 1:** Go to the “Control Panel” and select “Programs and Features,” then select “DIAView” and use your mouse to right-click on it. The right-click menu will appear as shown in the figure below:



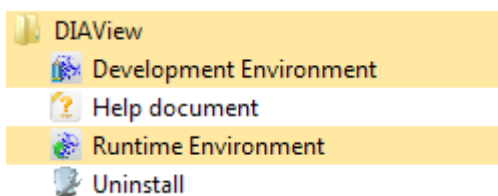
Select “-Uninstall-” from the right-click function menu and the system will automatically uninstall the program, as shown in the figure below:



- **Method 2:** Insert the DIAView software installation disc in the CD-ROM drive, then click the DIAViewSetup.exe file on the disc to execute the installation program. Select “DIAView” from the navigation window that pops up, and then select “-Delete-” from the next screen that appears; the system will automatically uninstall the program:

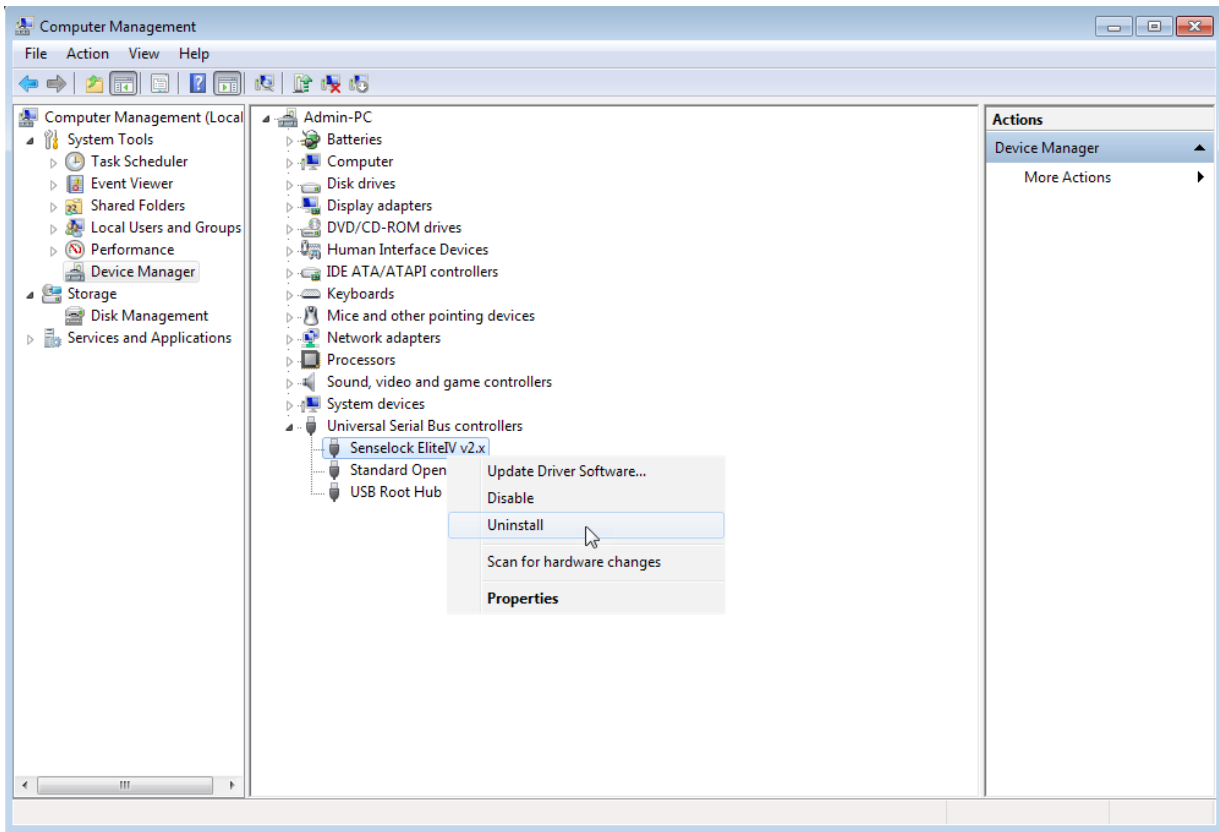


- **Method 3:** Open the “Start” menu → All Programs → DIAView → Uninstall:

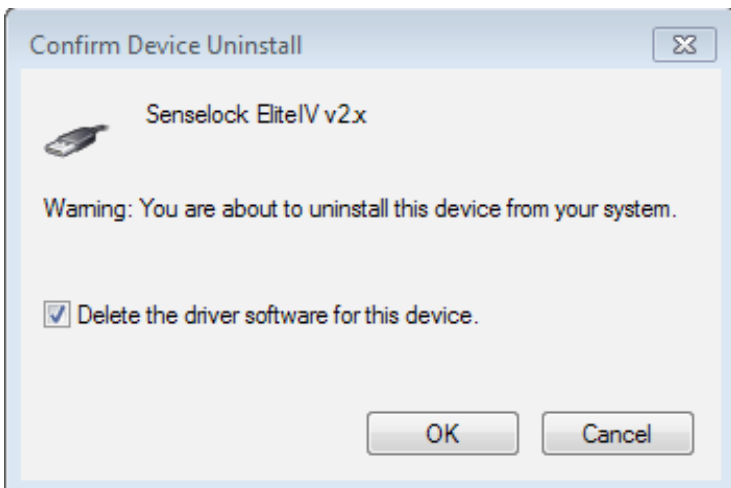


**2. Uninstalling encryption dongle driver (the encryption dongle must be inserted):**

Open “Computer Management”→ search for “Senselock EliteIV v2.x” in “Device Manager” and then right-click on it:



Select “-Uninstall-” and the “-Confirm device uninstall-” window will appear; check “-Delete driver software for this device-” and then click “-OK-” to uninstall it:



# 3. DIAView software development environment

## 3.1 Common terms and concepts

This chapter introduces common technical terms used in the DIAView software to help users properly learn how to use the DIAView software.

### ■ Engineering, project

A project is a set of automated application system developed with the DIAView software according to user needs; it mainly includes a collection of the development of automated surveillance and control systems and its configuration information. A project includes graphic window interface, IO communication, alarm, variable and other parts, and the project developer can perform centralized and unified management for each part of the project. A “Project” is also called “Engineering”.

### ■ Development environment and execution environment

The DIAView software is composed of the two parts development environment and execution environment.

The development environment is the operating platform for system users to perform project design development, including designing graphical interface, setting IO communication parameters and configuring functions etc.

The user creates projects through the development environment, and then creates IO communication and channels, and defines variable dictionaries in the project. Users also use a sketchpad to draw the analogy pictures of on-site sceneries, configure animations, events, alarm information, configure reports and curves etc.; they can even write backstage scrips according to the data and calculation formula to perform logic processing.

The execution environment is the platform where engineering items are dynamically executed; it provides an execution display and control interface. The system user uses the execution environment to perform real-time surveillance.

### ■ IO communication, channel, equipment

IO communication refers to collecting data information of on-site equipment, and use communication media to input/output the information to other equipment or save it to the system database to analyze and process the data.

In which the communication media is what is called a “channel”; it is the bridge for the DIAView software and other equipment to connect and achieve data information transmission. It is an abstract concept.

Equipment: This is the hardware products that the DIAView software uses to perform data acquisition; common equipment includes: PLC programmable logic controllers, inverters, boards, digital instrumentations, smart controllers and monitoring probes etc.

IO communication connections currently supported by the DIAView software includes serial port and Ethernet; supported communication interface standards include: Modbus TCP/IP, Modbus RTU, Modbus ASCII, OPC, Delta DVP TCP/IP, Delta DVP RTU, Delta DVP ASCII, Delta AH TCP/IP, Delta AH RTU, Delta AH ASCII and simulators etc.

### ■ Variable dictionary, variables

The variable dictionary is a collection of variables in the project; it manages the following variables:

Variables are values of the engineering items that can change at any time; they are important participants for system data information handshakes.

The variable dictionary of the DIAView software can perform group management for variables; multiple variable groups can be created and multiple variables can be created under a variable group.

### ■ Window

The window is a core component of the DIAView software for users to draw on-site analogy pictures, configure parameters and display information. It is the basis to realize real-time visualization of the DIAView software -- it provides various drawing elements including basic graphic tools, window control units and advanced control units etc., system's built-in graphics and the customized graphics library that users can add on their own; it also provides windows that allow configuring of image object properties, animations and events. In the DIAView software, one window is one screen.

### ■ Properties

In the DIAView software, properties describe the features or characteristic information that an image object has; for example name, size and background color etc.

### ■ Animation

Animation refers to the process of setting the properties of a graphic object, including the size, color, rotation angle and position, to change according to the changes in the variable data while the project is executing.

### ■ Event

An event refers to the process of specifying the properties of a graphic object, including the size, color, rotation angle and position, to change with mouse or keyboard operations.

### ■ Alarm, alarm variable

Alarms refer to related notifications or warnings (such as: E-mail or sound) triggered to remind related personnel to pay attention when a certain data or status of the system is over or under the preset value during the project execution process. The alarm is composed of alarm variables and alarm configurations.

Alarm variables: Generates alarm information variables, sets the related variables that the alarm variables must connect to, and sets the alarm level and related alarm configuration information. The DIAView software performs group management for alarm variables; each alarm variable belongs to a certain alarm group.

Alarm configuration: Configures and alarm method--E-mail or sound alarm.

### ■ Operation variables

Refers to saving the operation record to the database when the values of certain variables in the variable dictionary changed due to user operations in order to query and check user operations.

### ■ Historic record variables

Refers to saving the changing record of certain variable values in the variable dictionary and defines the recording method for data statistics and analysis.

### ■ Security level/security

Refers to dividing and setting the graphic objects, control units and equipment etc. in the project to specific security levels so that only users in that security level can access them. It is a method to control user rights in order to guarantee the reliability and security of the DIAView software execution.

### ■ User

System operators and administrators with related operating authorities set for the project development and execution. Different authorities can be set for different users in order to achieve specialization so that the DIAView software and execute securely.

### ■ Recipe, ingredients

Recipes refer to the ratio of raw materials and automated management of process control provided for specific production processes. The use of recipes can increase the efficiency of automated production.

The recipe of the DIAView software is composed of two parts: recipe item and recipe ingredient.

The recipe ingredients are the main components of the recipe item. The recipe ingredient is controlled by the engineering variables of the engineer. The adjustment of recipe ratio is completed by changing the variable values.



### ■ User program

The user program of the DIAView software is mainly divided into “condition program” and “time program.”

Condition program refers to executing related program functions when the conditions set matches the engineering variables.

Time program refers to executing related program functions when the system time reaches the time condition set for the program.

### ■ Engineering configuration

Engineering configuration includes the configuring of the database, configuring of the execution screen and the configuration of the starting screen. Users can achieve handshakes between real-time data of the project and other commercial databases through engineering configuration by setting related configurations of the execution environment of the DIAView software.

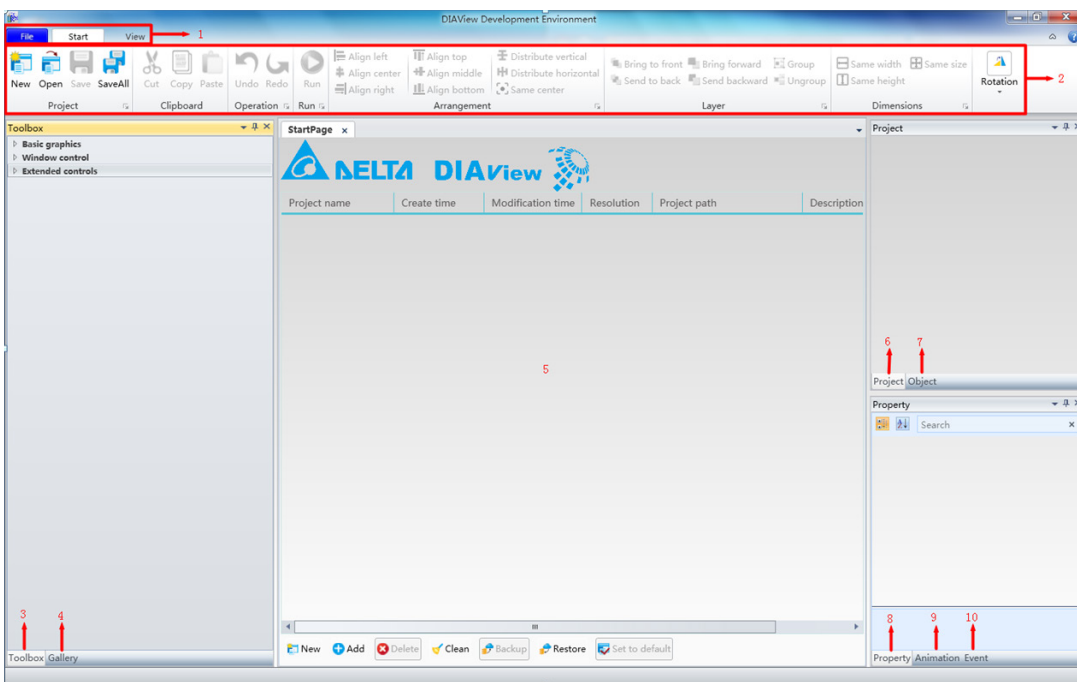
### ■ Execution

Execution refers to dynamically running the project completed in the development environment in the execution environment according to the development design requirements and configured parameters, achieving real-time data acquisition of the system, dynamic display of the screen, real-time response of commands, automatic display of reports and manual dispatching and control in order to exert the functions and effects of the various parts of the project.

## 3.2 DIAView development Environment introduction

### 3.2.1 Framework composition of the development environment

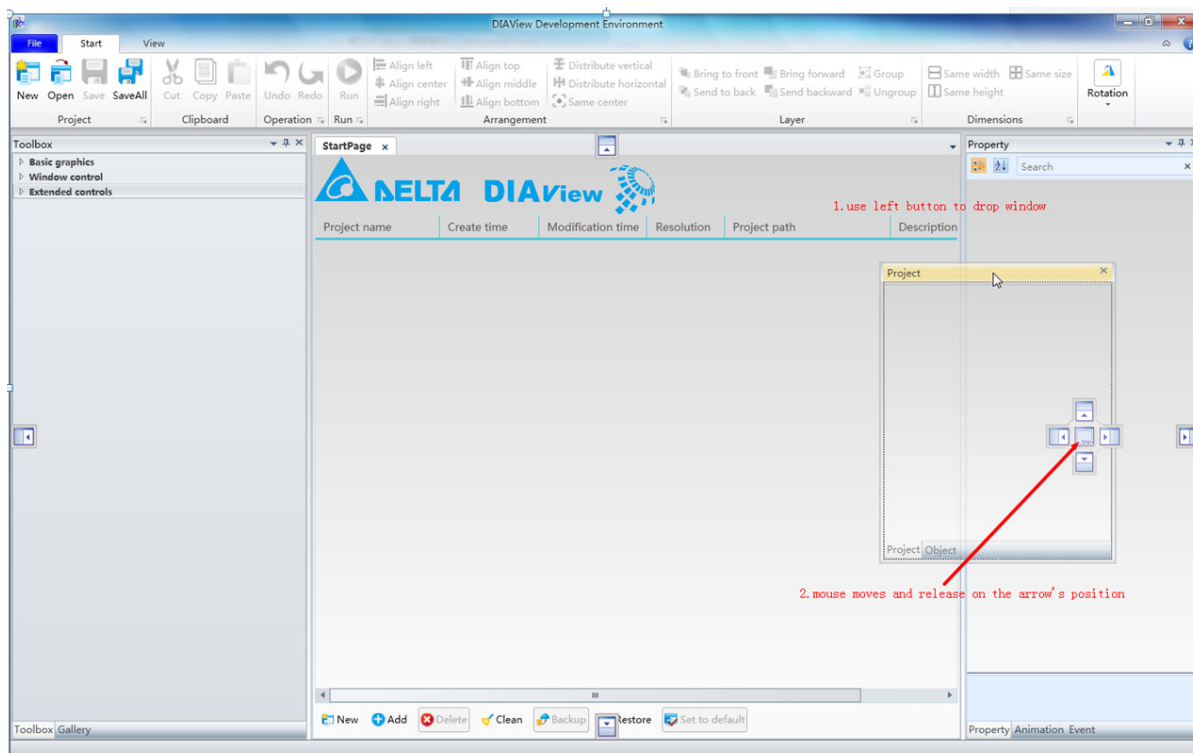
Start the DIAView software development environment and enter the main interface of the system, as shown in the figure below:



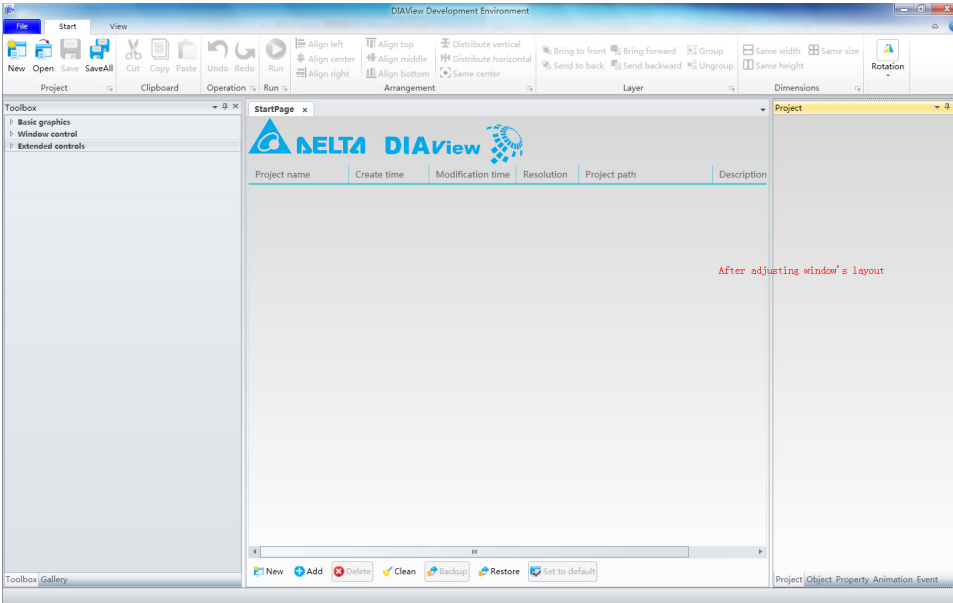
Composition of the DIAView software development environment:

1. **Menu bar:** Provides various basic operation functions for project development.
2. **Tool buttons:** Shortcut buttons for operating commands.
3. **Toolbox:** Provides frequently used basic graphic elements and control units for drawing.
4. **Gallery:** Frequently used graphic elements built-in the system and containers for users to freely expand customized graphics.
5. **Sketchpad area:** The area for project management, graphic image drawing and editing.
6. **Project window:** Tree index display window of the project; displays various compositions of the project and provides various portals for operation and configuration functions.
7. **Object browser window:** Displays all object members in the window.
8. **Property window:** Displays the properties of the object; provides an operating portal to modify properties.
9. **Animation configuration window:** Portal to configure animations for objects.
10. **Event configuration window:** Portal to configure events for objects.

The windows of the DIAView software development environment can also be rearranged by dragging them with the mouse, as shown in the figure below:



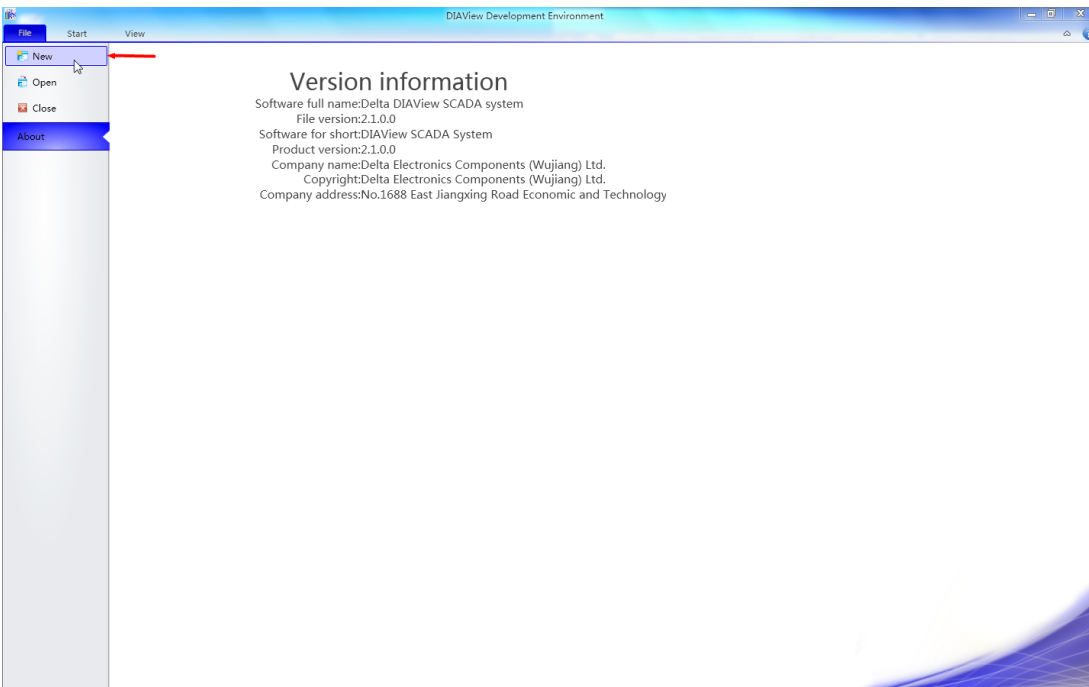
The rearranged windows are as shown in the figure below:



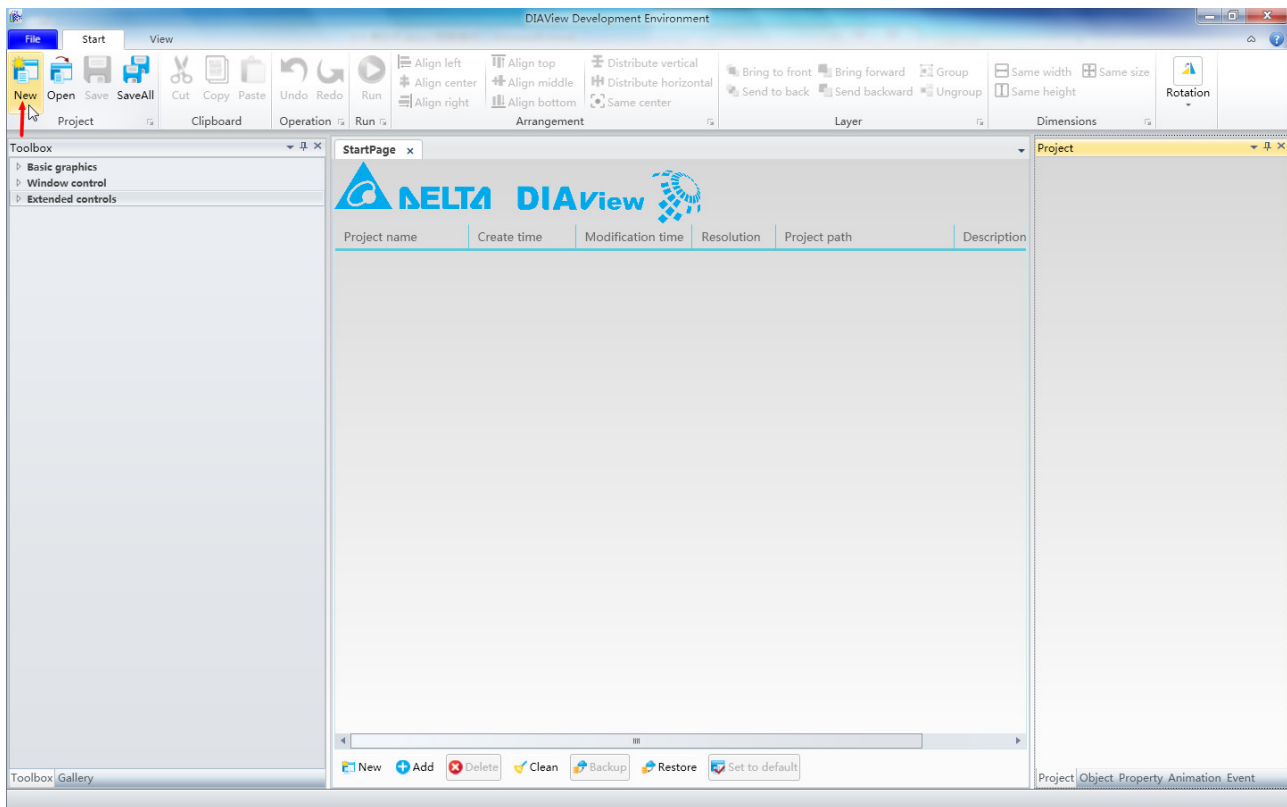
### 3.2.2 Adding projects

There are four main ways to add new projects in the DIAView software development environment.

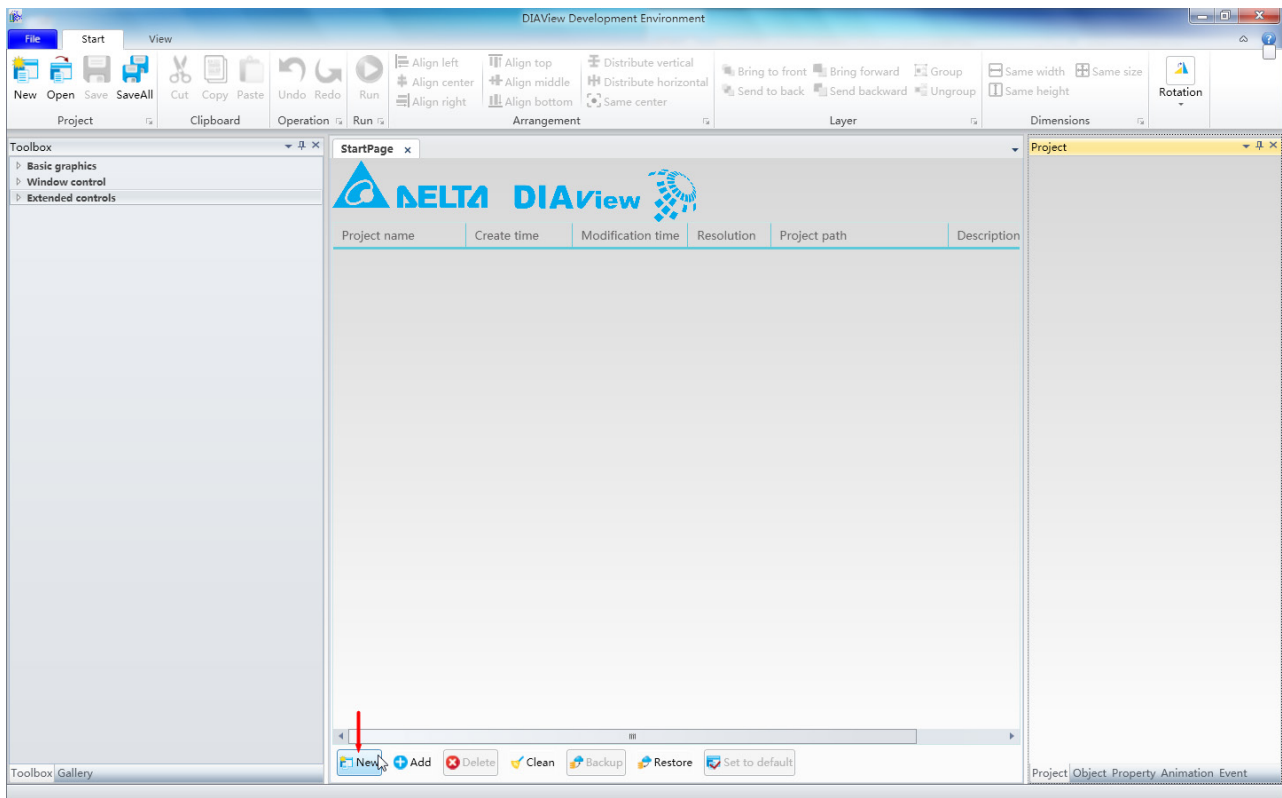
- **Method 1:** Select the “File” menu of the DIAView software development environment and then press “New”.



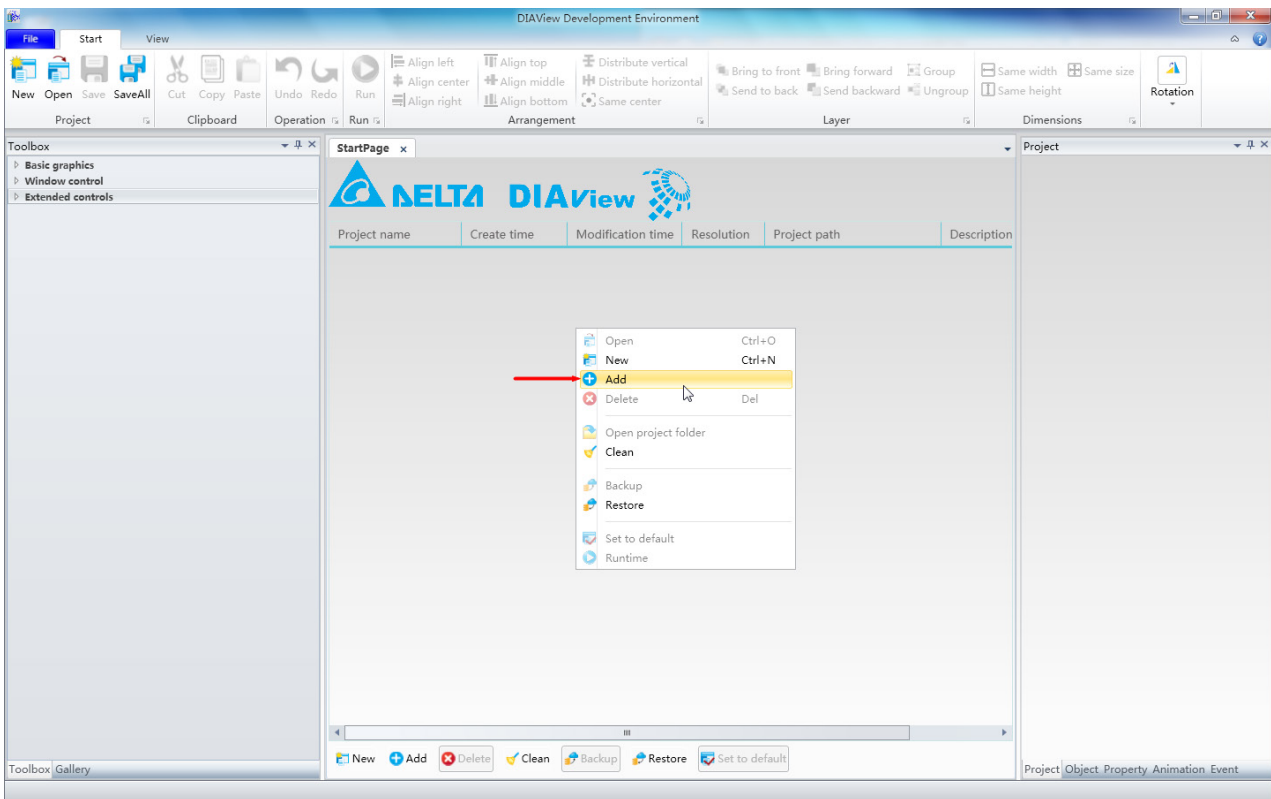
- **Method 2:** Select the “Start” menu of the DIAView software development environment and then press “New Project”.



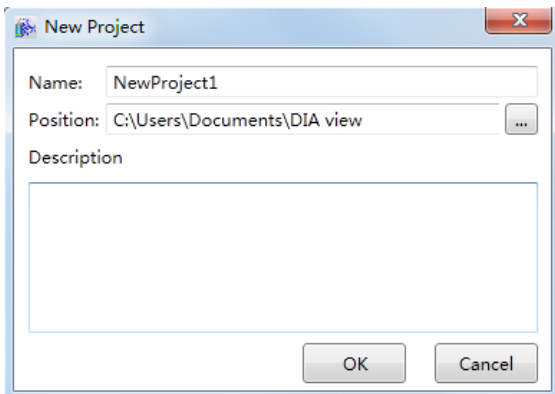
- **Method 3:** Press the “New” button in the toolbar on the starting page of the DIAView software development environment to add a new project.



- **Method 4:** Right-click the mouse on the starting page of the DIAView software development environment and then select “Add” from the right-click menu to add a new project.



Clicking the add project button adds a new project and related information on project configuration, as shown in the figure below:



**Name:** Name defined for the project (required); the system will preset a name but the user can also customize it. The project name customized by the user must comply with the naming rules of the VB Script scripting language:

1. The name must start with a letter.
2. Spaces, periods, exclamation marks and special characters such as @,\$#&\*? etc. cannot be used in the name.
3. The length of the name cannot exceed 255 characters.
4. The name cannot be repeated with the object and function names in the VB Script language.

5. The name of the project cannot be repeated as other created projects placed under the same project folder.

**Position:** Specified the storage path of the project; press the  button to select the path.

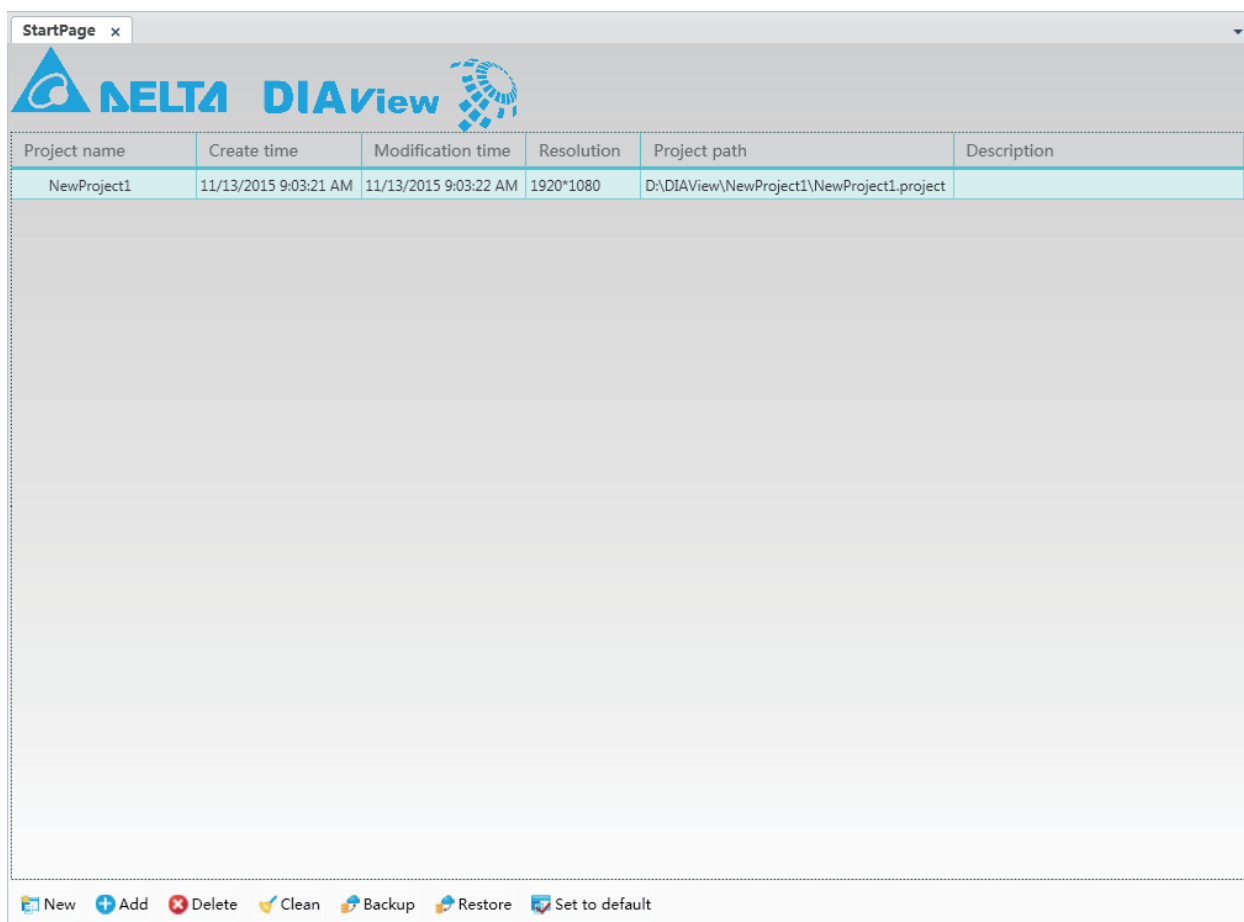
**Description:** Allows users to define project-related explanation or description information.

### 3.2.3 Project management

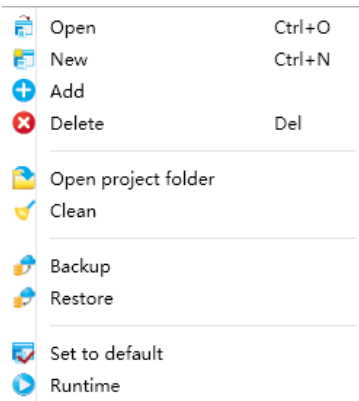
Project management refers to performing centralized management of the projects in the DIAView software to make it easier for users to perform related operations to the projects. There are two methods to manage the projects in the DIAView software: One is through the starting page of the development environment and two is through operating the function menu (please refer to “3.3.1 File menu”).

#### ■ Start page

Open the DIAView software development environment and the starting page will be opened on the main interface by default. Project item information will be opened if a project was previously being developed, including project name, time of creation, modification time, resolution, project path and project description information. Operations such as add new, add, delete, clear, backup, restore and set project as preset project etc. can be performed on the starting page, as shown in the figure below:

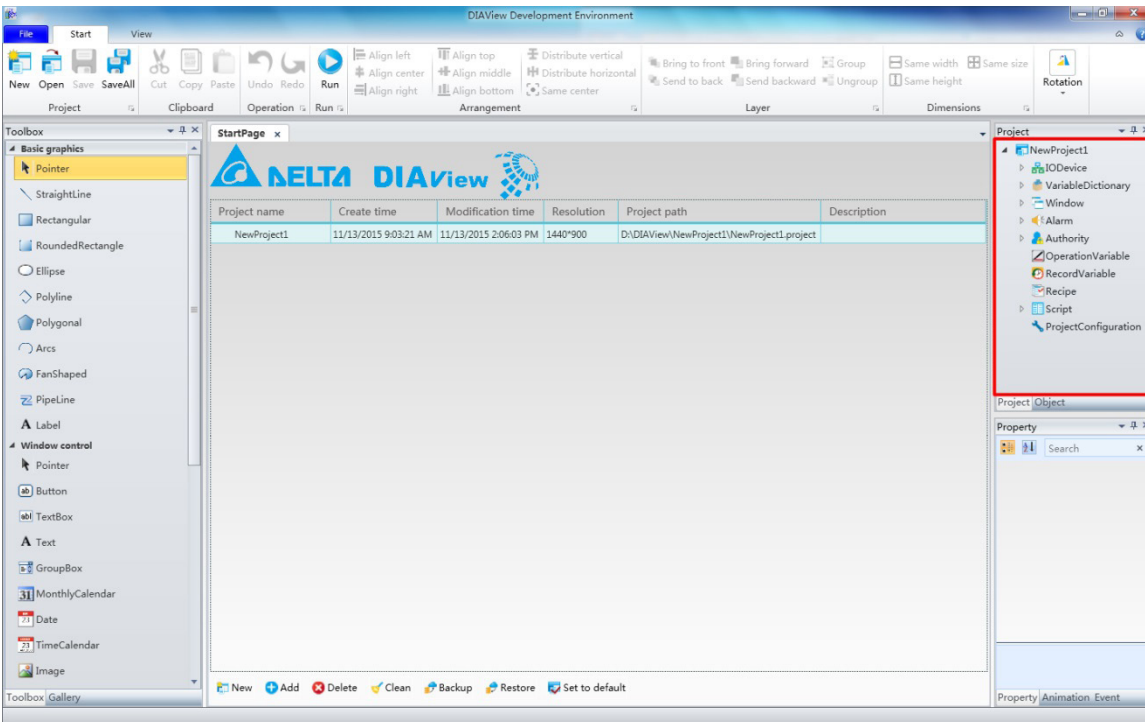


Related right-click menu operations can also be performed on the starting page, as shown in the figure below:



Introductions to the buttons and right-click menu item functions on the starting page:

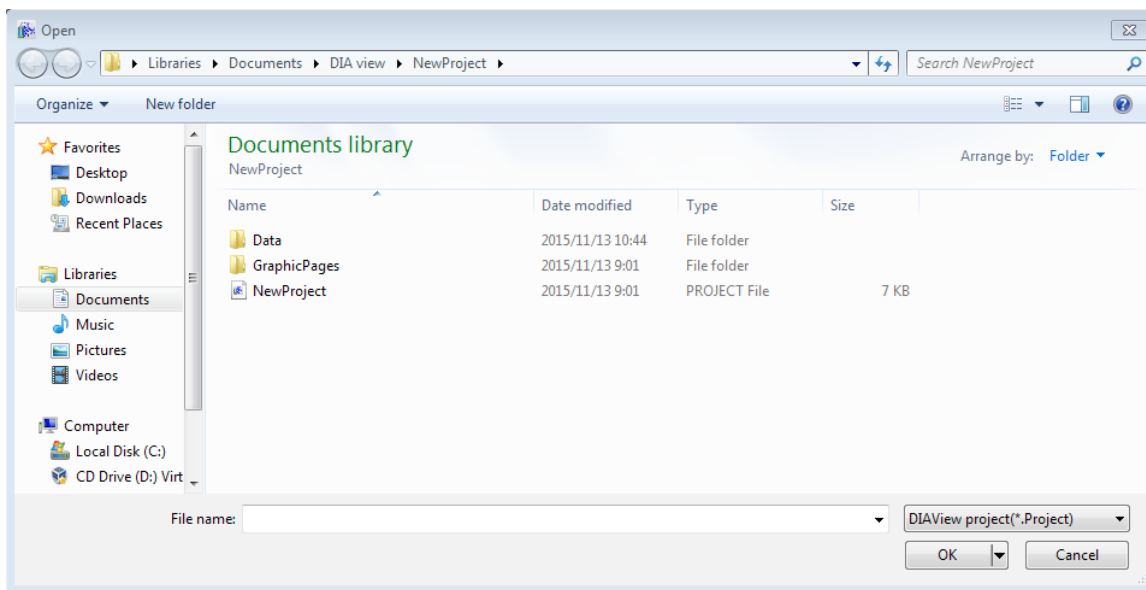
**1. Open:** Opens the project selected from the project list on the starting page; this can also be achieved by double-clicking the row of project to be opened in the project list. Once the project is opened, the project tree index will be displayed in the project window to the right as shown in the figure below:



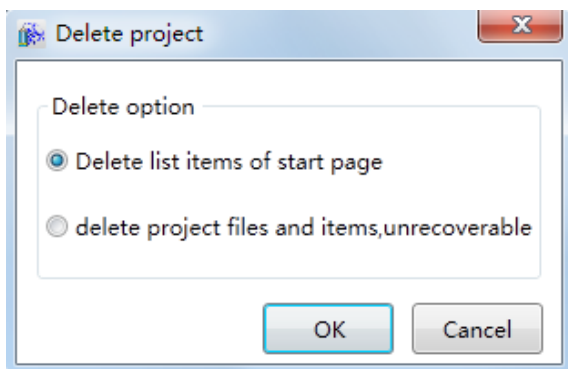
**2. New:** Adds a new project; the created project will be added to the project list on the starting page, and be opened in the project window. Please refer to “3.2.2 Add project”.

**3. Add:** Adds a project that already exists under the specified path into the starting page project list.

Click the “Add” button or right-click menu to open the folder selection box:



**4. Delete:** Deletes the selected project on the starting page project list. Click the “Delete” button or right-click menu to open the project deletion selection box:



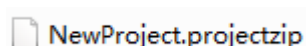
There are two delete options:

- Delete list items of start page: Deletes the project information from the starting page, but the project file is not deleted.
- Delete project file and item, unrecoverable: Deletes the project from the starting page list and also deletes the project file completely.

**5. Open project folder:** Opens the folder where the project is located.

**6. Clean:** Clean the project information on the starting page list. It will be cleared if the project file was already deleted but still exists in the project list.

**7. Backup:** Backs up the selected project. The backed up project file will have the extension “.projectzip”, as shown in the figure below:



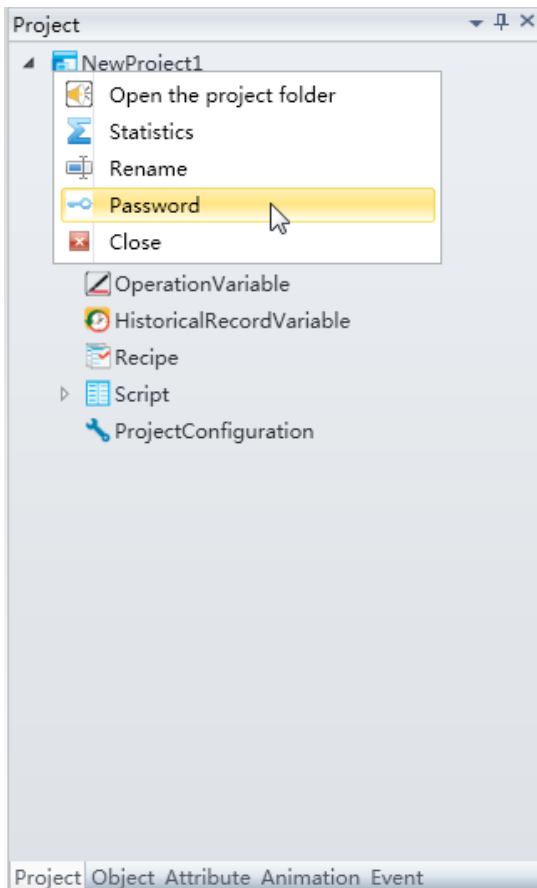


**8. Restore:** Restores the backed up project file.

**9. Set to default:** Selects the selected project as the preset project. This project will be executed when the DIAView execution environment is enabled.

**10. Runtime:** Executes the selected project.

Once a project is successfully created, the project tree index will be displayed in the project window to the right. Right-click project name and the right-click menu will display the functions “Open project folder”, “Statistics”, “Rename”, “ Password” and “Close” as shown in the figure below:



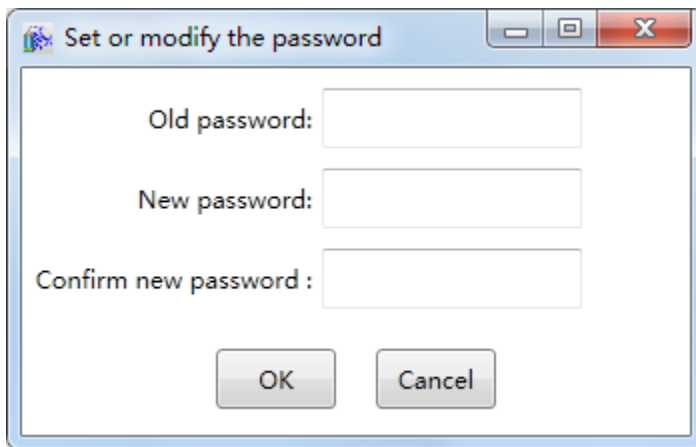
**1. Open project folder:** Opens the folder where the project is located.

**2. Statistics:** Statistics on the number of IO points, the number of variables in the variable dictionary and the number of citations.

**3. Rename:** Renames the project name.

**4. Password:** Sets a password for the project so that it can only be opened when the correct password is entered.

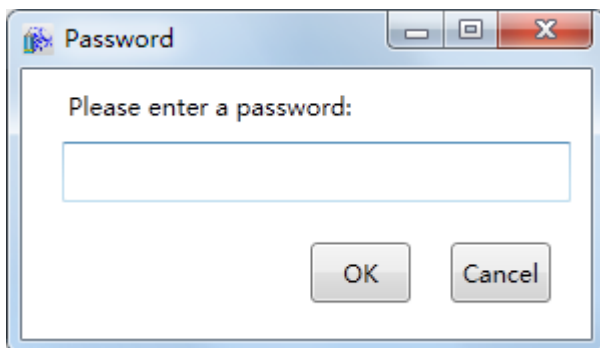
Right-click the mouse on the root of the project in the project tree index and then click “Password” to open the “Set and change password” window, as shown in the figure below:



The meanings of each setting in the configuration window are as follows:

- **Original password:** Enter the original password of the project (if setting the project password for the first time, the preset original password is empty).
- **New password:** Enter the new password.
- **Confirm new password:** Enter the new password again.

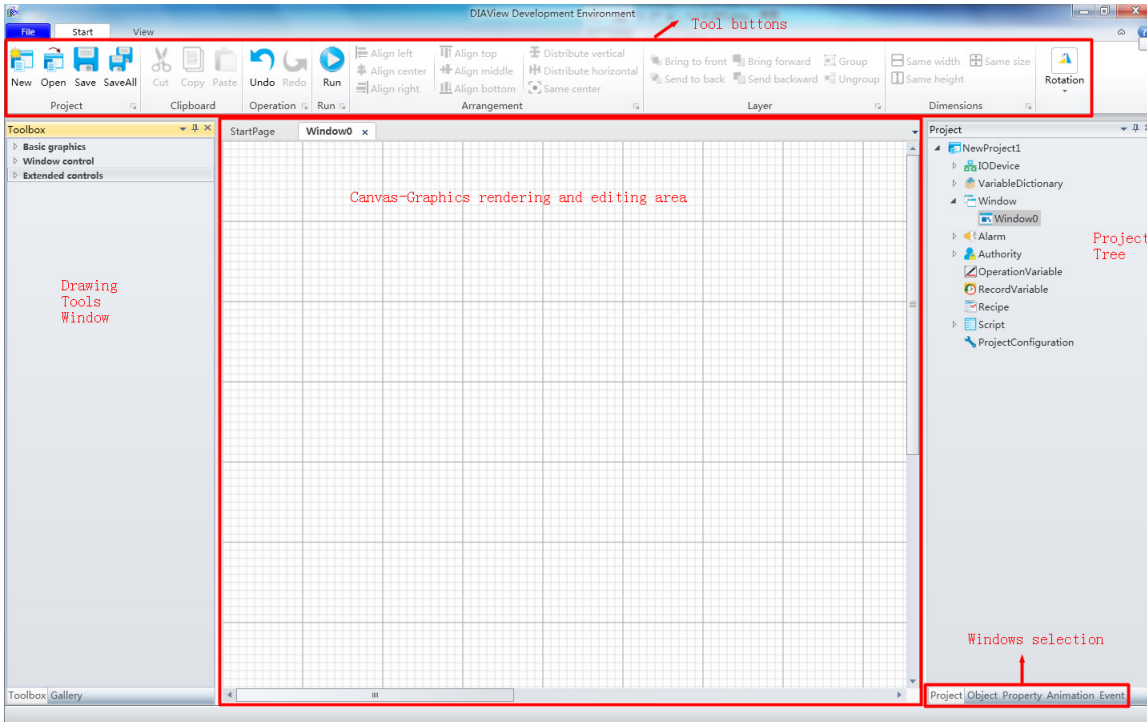
Opening encrypted projects requires entering the password, as shown in the figure below:



**5. Close:** Closes the currently opened project.

## 3.2.4 Introduction to the graphic interface development window

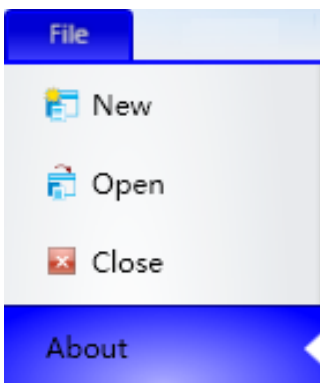
After adding a project in the DIAView software development environment, right-click on the “Window” node in the project tree index to the right → “Add window” and the system will create a window that allows graphic drawing and editing, as shown in the figure below:



Its components are based on “3.2.1 Framework composition of the development environment.”

## 3.3 File introduction

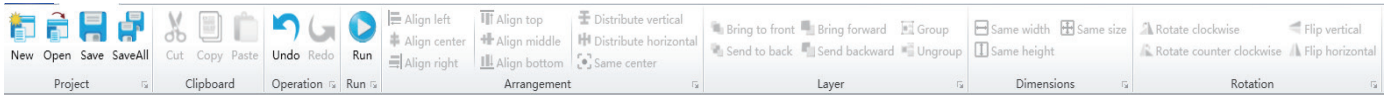
### 3.3.1 File



The file menu is used to manage the project; its function items and functions are as follows:













- **New:** Creates a new project.
- **Open:** Opens a created project in the development environment.
- **Close:** Closes an opened project in the development environment.
- **About:** Views SCADA related version information.

### 3.3.2 Start menu

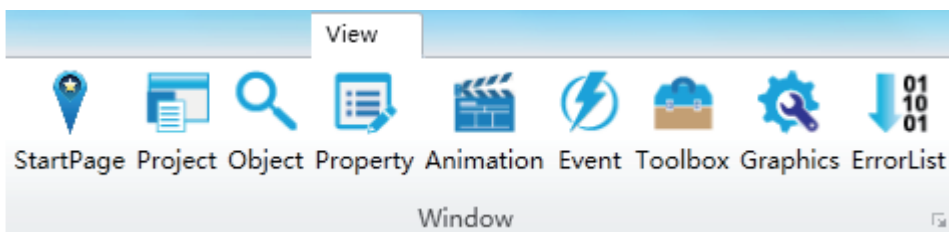


The functions in the start menu is mainly used for project management and layout operations of the location, layer and arrangement of the graphic objects in the graphic interface development. The availability of each button is determined by the selected graphic object and operations in the sketchpad. When the mouse cursor is placed on top of the button, the system will display the reminder window with the description of this button function below the mouse. The functions of each button are as follows:










Button	Command	Function description
	New	Creates a new project
	Open	Opens a created project in the development environment.
	Save	Saves the sketchpad information currently editing in the graphic interface development window.
	Save All	Saves all sketchpad and other configuration information of the current project.
	Cut	Cuts one or multiple selected graphic objects from the sketchpad onto the clipboard.
	Copy	Copies one or multiple selected graphic objects from the sketchpad onto the clipboard.
	Paste	Pastes the one or multiple graphic objects on the clipboard onto the sketchpad.
	Undo	Reverse cancels the previous operation starting from the last operation.
	Restore	Reverse cancels the previous operation starting from the last "Undo."
	Execution	Executes the project currently opened in the development environment.
	Align left	Aligns the left side of two or more selected graphic objects in the sketchpad to the left side of the graphic object that was selected first.
	Center horizontally	Aligns the geometric center of two or more selected graphic objects in the sketchpad to the same vertical line of the geometric center of the graphic object that was selected first.
	Align right	Aligns the right side of two or more selected graphic objects in the sketchpad to the right side of the graphic object that was selected first.
	Align top	Aligns the top side of two or more selected graphic objects in the sketchpad to the top side of the graphic object that was selected first.

Button	Command	Function description
	Center vertically	Aligns the geometric center of two or more selected graphic objects in the sketchpad to the same horizontal line of the geometric center of the graphic object that was selected first.
	Align bottom	Aligns the bottom side of two or more selected graphic objects in the sketchpad to the bottom side of the graphic object that was selected first.
	Vertical distribution	Distributes the geometric center of three or more selected graphic objects in the sketchpad evenly in the vertical direction.
	Horizontal distribution	Distributes the geometric center of three or more selected graphic objects in the sketchpad evenly in the horizontal direction.
	Same center	Aligns the center of two or more selected graphic objects in the sketchpad to the center of the graphic object that was selected first.
	Same width	Make two ore more selected graphic objects in the sketchpad have the same width.
	Same height	Make two or more selected graphic objects in the sketchpad have the same height.
	Same size	Make two or more selected graphic objects in the sketchpad have the same width and height.
	Place at bottom layer	Places the selected graphic object at the bottom layer when there are multiple graphic objects stacked together in the sketchpad.
	Place at top layer	Places the selected graphic object at the top layer when there are multiple graphic objects stacked together in the sketchpad.
	Move down a layer	Moves the selected graphic object down one layer when there are multiple graphic objects stacked together in the sketchpad.
	Move up a layer	Moves the selected graphic object up one layer when there are multiple graphic objects stacked together in the sketchpad.
	Group	Groups the selected multiple graphic objects into a new graphic when there are multiple graphic objects in the sketchpad.
	Cancel group	Splits the group graphic into constituent graphic objects.
	Rotate clockwise	Rotates the selected graphic object in the sketchpad 90 degrees clockwise using the center of the graphic object as the origin.
	Rotate counterclockwise	Rotates the selected graphic object in the sketchpad 90 degrees counterclockwise using the center of the graphic object as the origin.
	Flip vertically	Flips the selected graphic object in the sketchpad vertically using the Xaxis of the center of the graphic object as the axis of symmetry.
	Flip horizontally	Flips the selected graphic object in the sketchpad horizontally using the Yaxis of the center of the graphic object as the axis of symmetry.

### 3.3.3 View menu

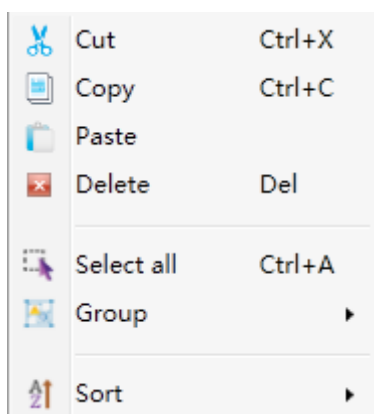


The view menu is used to open the configuration windows including the property window and project tree index etc. under the development environment; its button functions are as follows:

Button	Command	Function description
 StartPage	Start page	Opens the starting page window.
 Project	Project	Opens the project folder window.
 Object	Object	Opens the object browser window.
 Property	Property	Opens the property window.
 Animation	Animation	Opens the animation window.
 Event	Event	Opens the event window.
 Toolbox	Toolbox	Opens the toolbox.
 Graphics	Graphics	Opens the graphics library.
 ErrorList	Error list	Displays compilation error messages.

### 3.4 Right-click menu

Right-clicking the mouse in the sketchpad of the DIAView software graphic interface development window will open the right-click menu, as shown in the figure below:



The functions of the sketchpad right-click menu are as follows:

Command	Function description
Cut	Cuts the selected graphic object onto the clipboard.
Copy	Copies the selected graphic object onto the clipboard.
Paste	Pastes the graphic object on the clipboard onto the sketchpad.
Delete	Removes the selected graphic object from the sketchpad.
Select all	Selects all of the graphic objects in the sketchpad.
Group	Groups the multiple selected base graphic objects into a new graphic object.
Cancel group	Splits the group graphic into individual sub graphics.
Sort	Aligns or distributes multiple graphic objects according to different methods.

### 3.5 Shortcut keys

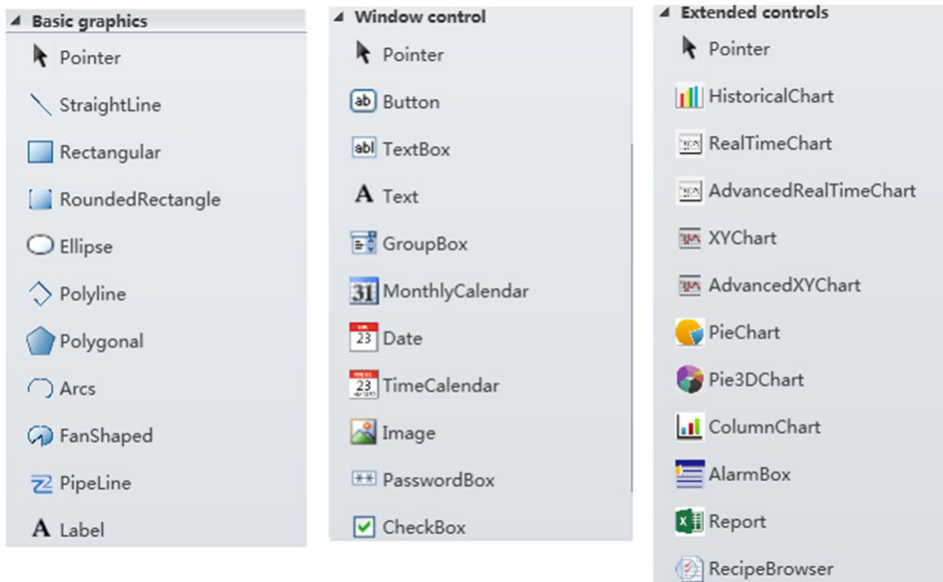
Shortcut keys are also called hot keys. It uses specific buttons or button combinations to execute an operation or command to replace certain tasks with the mouse; it is convenient and fast to use. Shortcut keys available for the DIAView software is as shown in the table below:

Shortcut keys	Function/command
F1	Opens the help document.
Ctrl + O	Open project
Ctrl + N	Adding projects
F11	Maximizes/restores execution interface
Ctrl + C	Copy
Ctrl + X	Cut
Ctrl + V	Paste
Ctrl + D	Advanced copy; equivalent to the combination of Ctrl + C and Ctrl + V.
Ctrl + Z	Undo
Ctrl + Y	Restore
Ctrl + S	Save
Ctrl+ G	Group
Ctrl + U	Cancel group
Delete	Delete
↑	Move up
↓	Move down
←	Move left
→	Move right

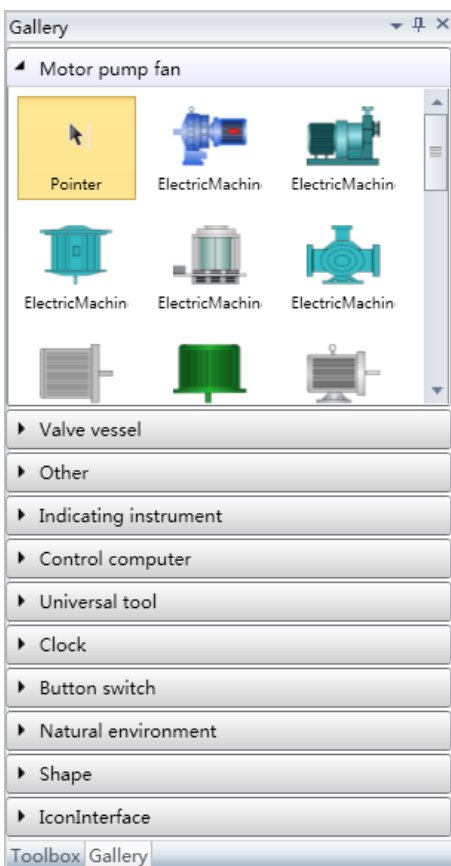
### 3.6 Introduction to the tool window

The tool window of the DIAMView software refers to the “Toolbox” in the graphic development window. They provide basic graphic elements, graphic control units and frequently used graphic components and models required for graphic drawing. Users can also develop and define graphic models on their own and add it to the graphic library. Drawing is also the basis for SCADA project development.

Basic graphic , Window controls , Extended controls in the “Toolbox” are as follows:



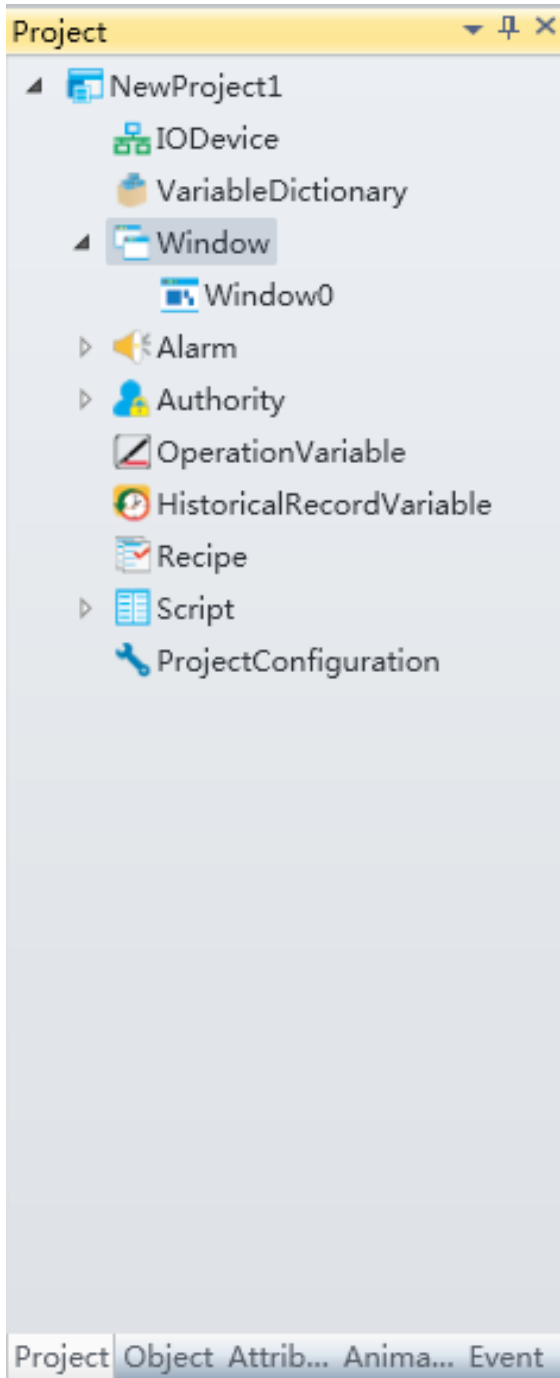
Motor pump fan models in the “Gallery” are as follows:





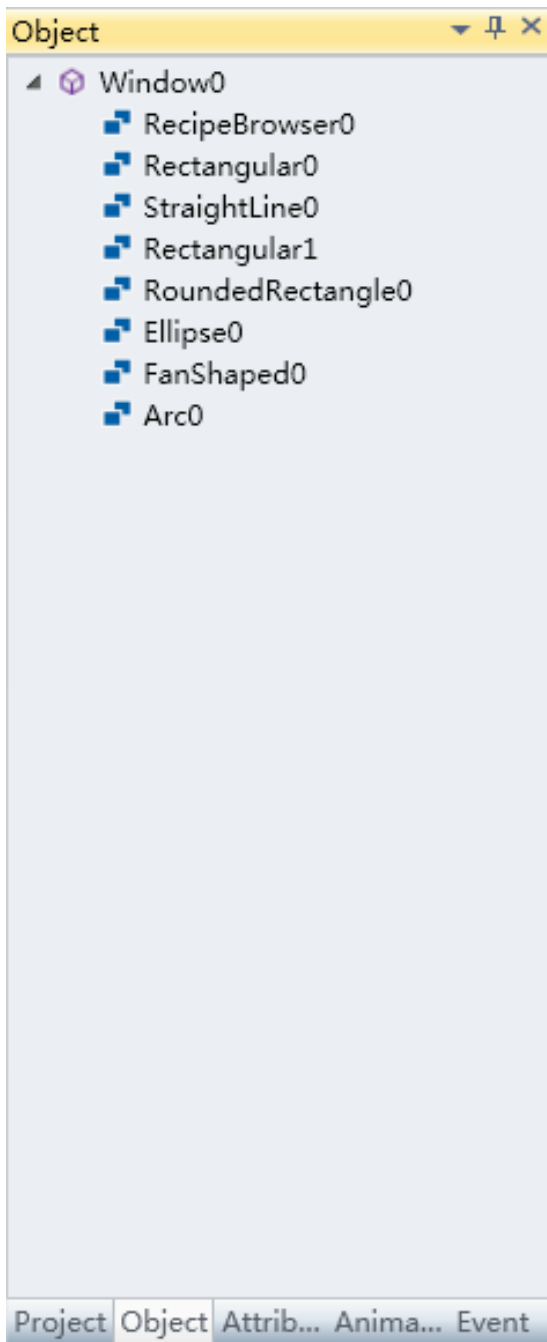
## 3.7 Introduction to the project window

The project window is the project tree index display window. It lists all of the function nodes of the project and each node is for configuring project related functions, information portals and administrators. Click a certain node and the node will be selected. Then, users can double-click on it or use the right-click menu to perform related configuration operations. If related sub-items are already configured for this node, there will be a “▶” symbol in front of the node. Click this symbol to expand the sub-items and then double-click the sub-item to open it in the sketchboard and edit configuration operations of the sub-item content, as shown in the figure below:



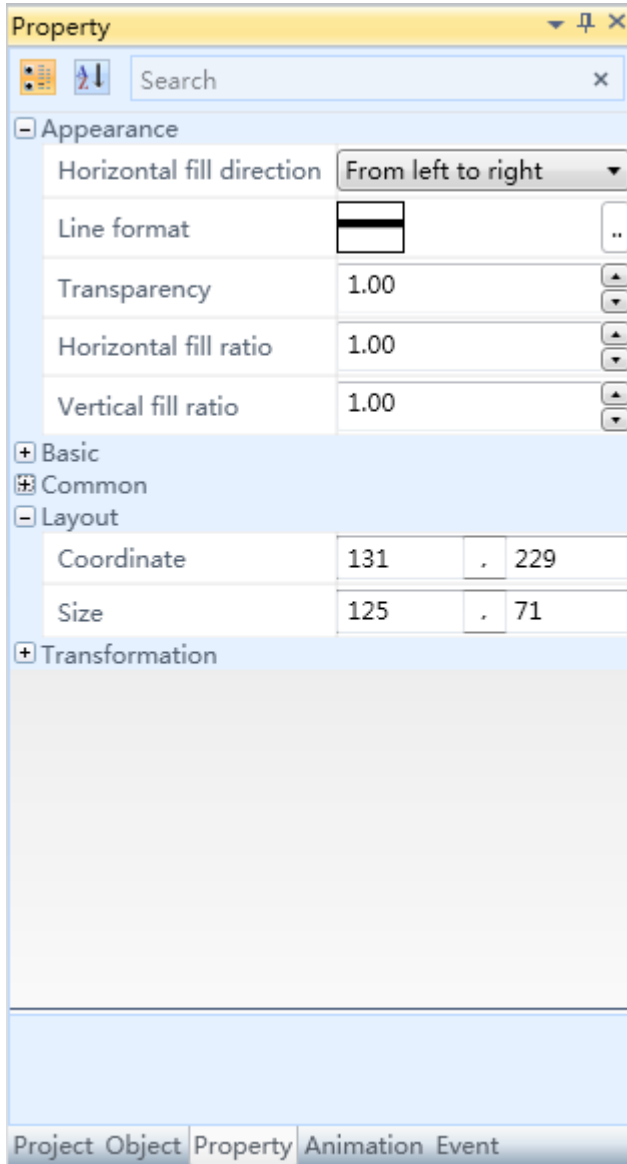
## 3.8 Introduction to the object window

The object window is mainly used to display the current graphic components of the sketchboard in the opened window. When a certain component is selected, the corresponding graphic objects of this component are also selected in the sketchboard, as shown in the figure below:



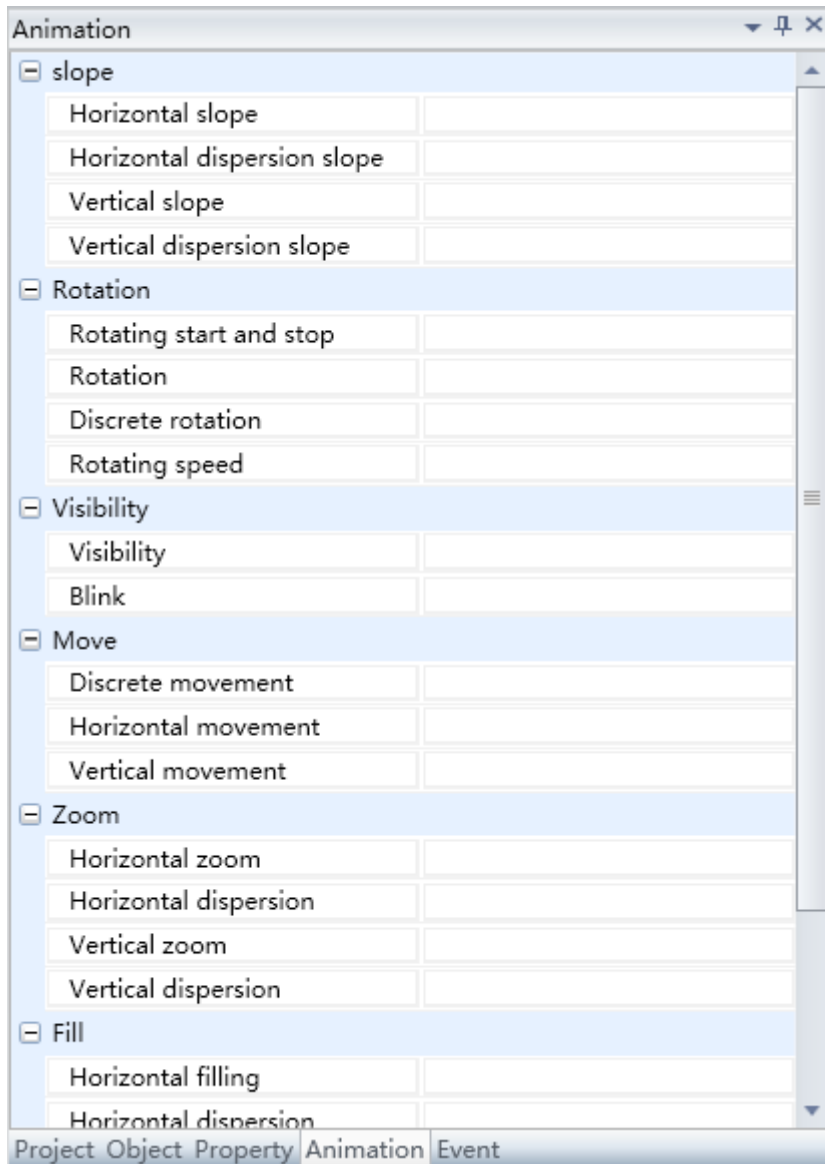
### 3.9 Introduction to the property window

The property window manages related properties of graphic objects. When any graphic is selected in the sketchboard, this window will display its corresponding properties in real-time. Properties include the name, position, size and color etc. of the graphic object. The user can modify and configure the property values in the property dialog, as shown in the figure below:



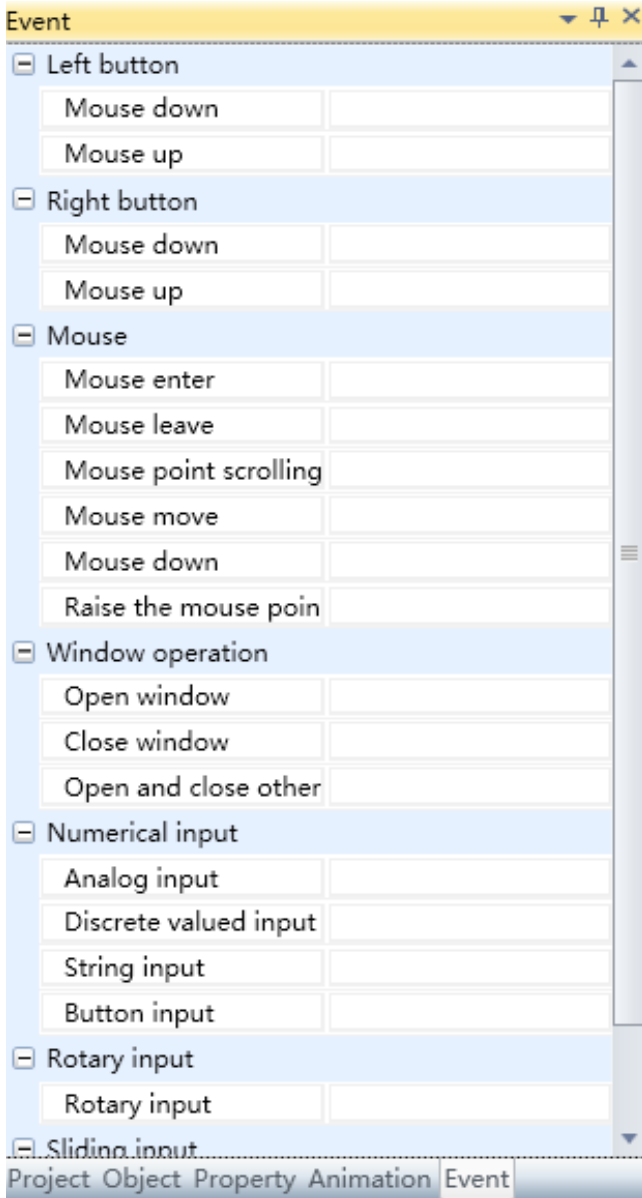
### 3.10 Introduction to the animation window

The animation window is used to manage the animation configuration information of graphic objects. Users can add or delete animations for the graphic. Animation configuration requires connecting to related properties and variable data, as shown in the figure below:



### 3.11 Introduction to the event window

The event window is used to manage the event configuration information of graphic objects. Users can add or delete graphic events. Event configuration requires connecting to related mouse and keyboard events and variable data, as shown in the figure below:



# 4. Basic steps of project development

## 4.1 Basic steps of project development

In order to quickly and skillfully use the DIAView software to develop projects efficiently, this chapter introduces the common steps used to develop projects with the DIAView software. Users may refer to these steps for common project developments, but since there are different project applications, users should select the development steps suitable for their specific needs.

Common steps of project development with DIAView are as follows:

- **Step 1:** Execute the DIAView software development environment.
- **Step 2:** Add project: Click the “Add project item from the “File” or “Start menu in the main interface of the development environment and configure information including the project name and project storage path etc., and then the system will generate and display the initial tree index in the “Project” window.
- **Step 3:** Define variables: Variables are media used to record the changes of certain data of the DIAView software in real-time. It dynamically displays the data source and display form of the controlled on-site data. Therefore, all variables participating in the information handshake of the project must be defined.
- **Step 4:** Create IO Communication: Create a physical data channel between the upper and lower machines of the DIAView software and the monitoring and control equipment on-site, and set the information including connection method, communication parameters and communication variables etc.

- **Step 5:** Create window: This means creating the graphic interface for the system. Draw the graphics for on-site analogy pictures and configure related information including properties and charts etc.
- **Step 6:** Define animations and events: Defines the changes and actions for the graphic objects in the window to take when its properties changes according to the data acquired during project execution.
- **Step 7:** User program configuration: Defines condition programs and set the project to perform special function processing script programs when related data of the project changes, and configure time program to define operation programs to execute when the screen starts/stops or at specific times.
- **Step 8:** Alarm configuration: Sets the warning value of the range of variable value changes, and specify the alarm level and related alarm configurations when the range of the changed variable value is lower than or exceeded the warning value.
- **Step 9:** Historic record variable setting: Specifies certain more important variables and record their value changes in order to use the “Historic curve” or “Report” to connect these variables to perform data summary and analysis.
- **Step 10:** Project configuration: Sets the related parameters for the connection between the DIAView software and third-party databases in order to achieve handshakes between the real-time project data and other commercial databases, and sets the project execution options and start screen.
- **Step 11:** Security level setting: Sets the project operating authority. Divides the various components in the project into different security levels. Objects have different operating authorities in different security levels.
- **Step 12:** User setting: Sets the account and authority (security level) of the system operators.
- **Step 13:** Execute: Executes the project and view whether the screen effects and functions meet the design requirements. If it does, then it can be executed and used, or else please redesign starting from Step 3 to perfect the project according to your need.

# 5. IO communication

## 5.1 Overview

IO communication refers to the DIAView software connecting to a lower equipment through specific communication protocols to perform data acquisition and transmission. It has high reliability, stability, instantaneity and powerful data processing capability.

The IO communication of the DIAView software has the following features:

- Supports various connection methods;
- Supports standard Modbus communication protocol;
- Able to test the connection status of the equipment directly during communication configuration;
- Supports communication status feedback and dynamic starting and stopping of devices;
- Supports OPC service;
- Has comprehensive troubleshooting strategies;
- Supports equipment communication gateway function to save hardware gateway costs;
- The collection of Delta's communication driver can perfectly match all Delta series products, making communication parameter configurations easier, more flexible and more efficient.

## 5.2 Channel and device

1. A channel is the data transmission media during the IO communication process; for example: cable circuit interfaces, cable mounts, hub devices and software channels etc. Channels supported by the DIAView software includes: serial port, Ethernet, OPC and simulator.



2. Device is the physical object for the DIAView software to perform IO communication. The DIAView software can read data from the device and also write data into the device.

The Device is divided into hardware device and software device, including programmable logic controllers (PLC), inverters, modules, digital instrumentation, smart controllers, monitoring sensors, distributed control systems (DCS), loop controllers, remote terminal units (RTU) and third-party software etc.

Specific device:

Device	Example
PLC	Delta PLC, Modicon etc.
OPC	Third-party OPC servers
Simulator	Simulator

### 5.3 Driver

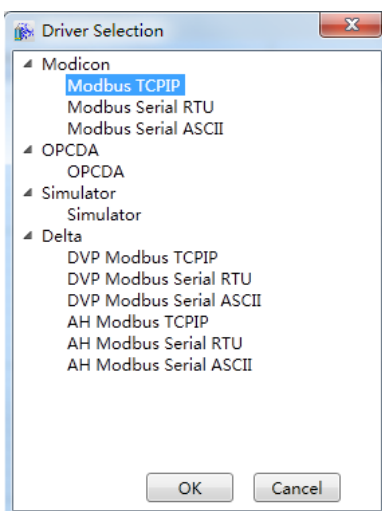
The driver is a set of program that can operate the device. It determine show to operate the device register or device memory, and it is an important bridge for communication between the DIAView software and on-site devices. Different device manufacturers support different device drivers, but they generally support standard communication protocols.

Protocols currently supported by the DIAView software includes: Modbus TCP, Modbus RTU, Modbus ASCII and OPC etc.

Frequently used drivers for the IOserver of the DIAView software are as shown in the table below:

Driver type	Example
Delta	Delta DVP series: ASCII, RTU, TCP/IP Delta AH series: ASCII, RTU, TCP/IP
Modicon	Modicon Modbus TCP/IP Modicon Modbus RTU Modicon Modbus ASCII
Simulator	Simulator
OPC	DeltaOPCServer

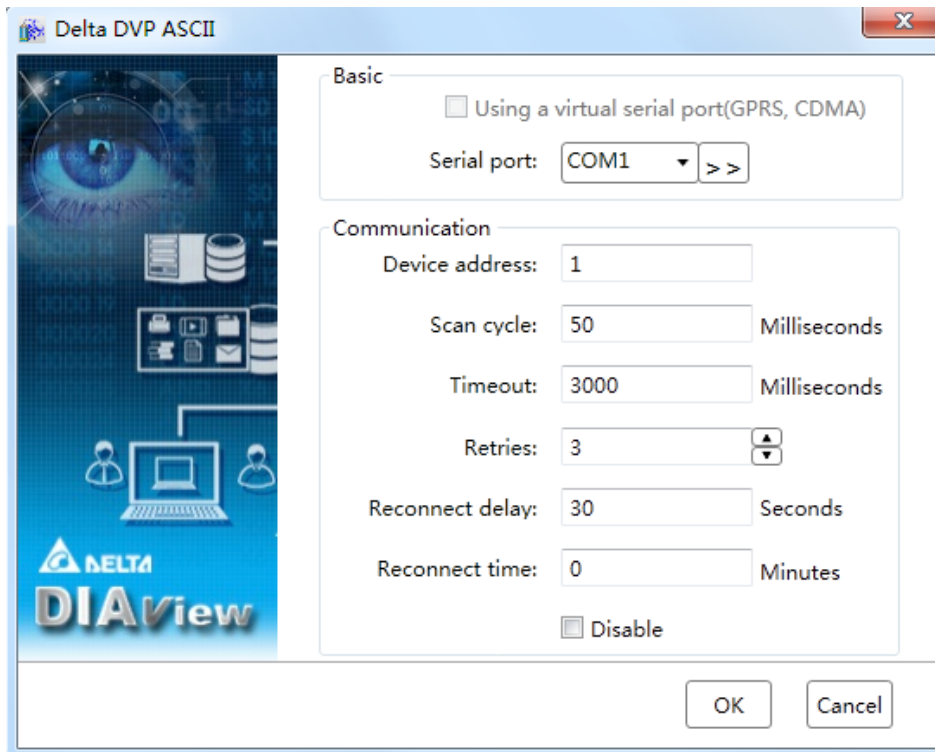
Drivers supported by the IO communication of the DIAView software are as shown in the figure below:



## 5.4 Troubleshooting strategies

When the systems executing and the communication circuit is interfered with or disconnected resulting in communication interruption, the DIAView software will try to restore the communication between devices by following the troubleshooting strategies.

The troubleshooting strategies set for the DIAView software are as shown in the figure below:



Communication property:

Properties	Property description
Device address	Address number of the lower device
Scan cycle	The update cycle of the IO communication data is preset to 100 milliseconds.
Communication timeout	If the device did not respond for an extended period of time, it will be determined to have communication timeout according to the time length set. The timeout time is preset to 1000 milliseconds.
Number of retries	This is the number of times the system will try to reconnect to the device when there is communication timeout. The preset number of retries is 3 times.
Reconnect delay	This option is used to set the period of time to delay before trying to reconnect again when the number of retries have reached the limit and reconnect was unsuccessful. The reconnect delay time is preset to 30 seconds.
Reconnect time	Preset to 0 minutes: No time limit, which means it will continually try to reconnect with the device; other value: sets the reconnect time length. If the system cannot connect and receive responds from the device within the reconnect time limit, it will discard the connection to that device.
Initial ban	Selected devices will be banned from communicating with the DIAView software.

## 5.5 IO communication configuration

### 5.5.1 Serial port driver communication configuration

The DIAView software supports communicating with devices through the serial port (RTU and ASCII) based on the Modbus communication protocol standard.

Supported devices includes:

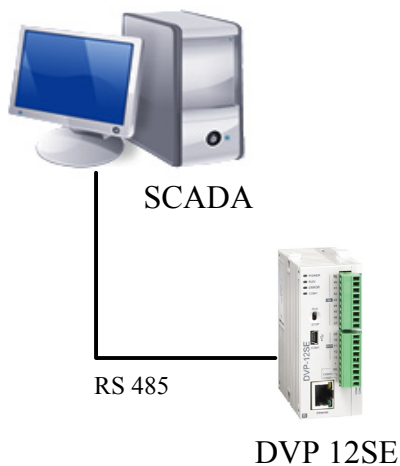
- Modicon Modbus RTU
- Modicon Modbus ASCII
- Delta DVP RTU
- Delta DVP ASCII
- Delta AH RTU
- Delta AH ASCII

Example of configuring the DIAView software to perform IO communication with devices through the serial port connection is as follows:

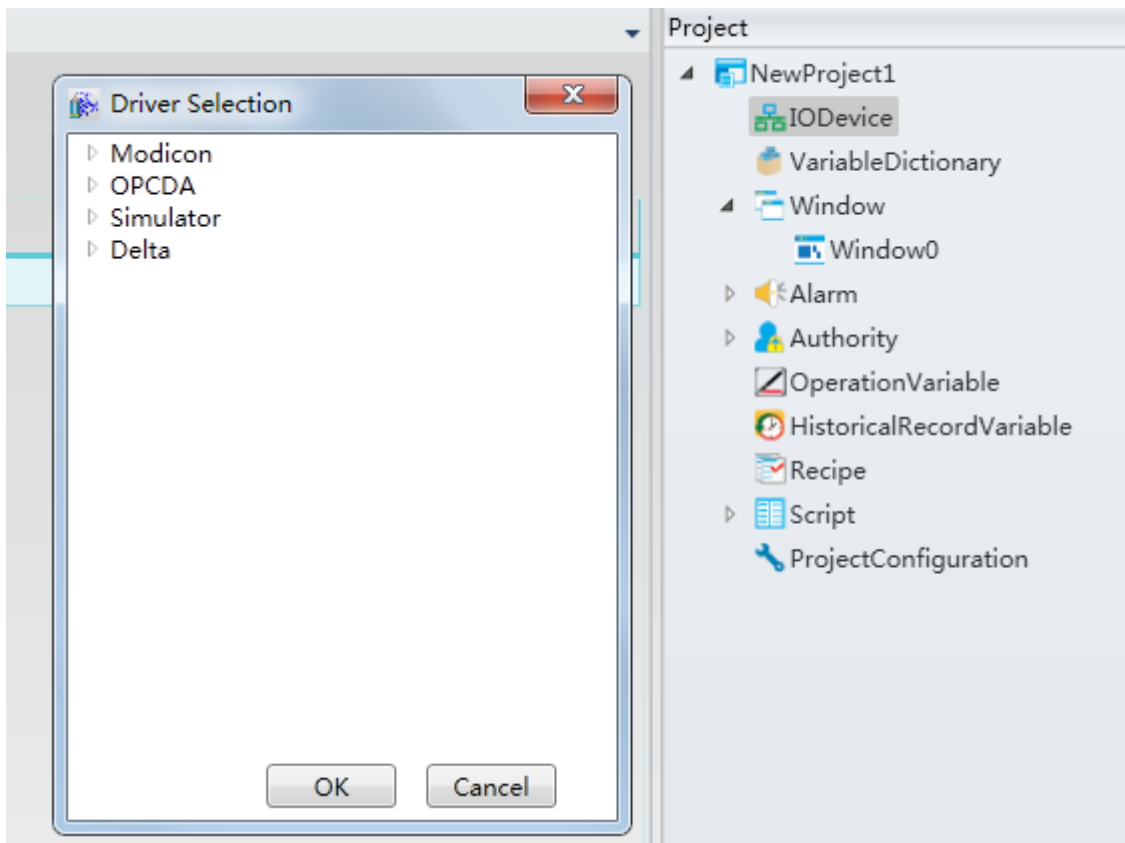
#### Creating a communication between the DIAView software and Delta PLC—DVP 12SE through serial port:

**Example 1:** Using the “Delta DVP ASCII” driver.

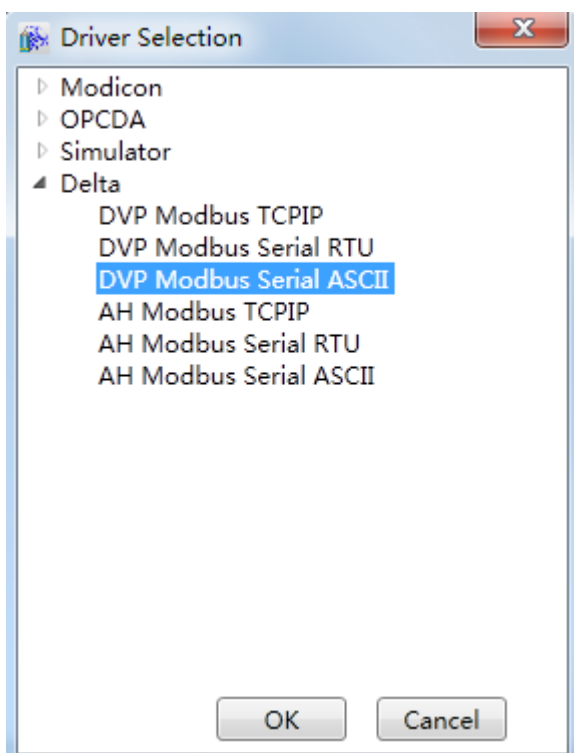
- **Step 1:** Create the following hardware architecture and set the 12SE COM2 communication port parameters as 9600,7,E,1,ASCII, station 1, as shown in the figure below:



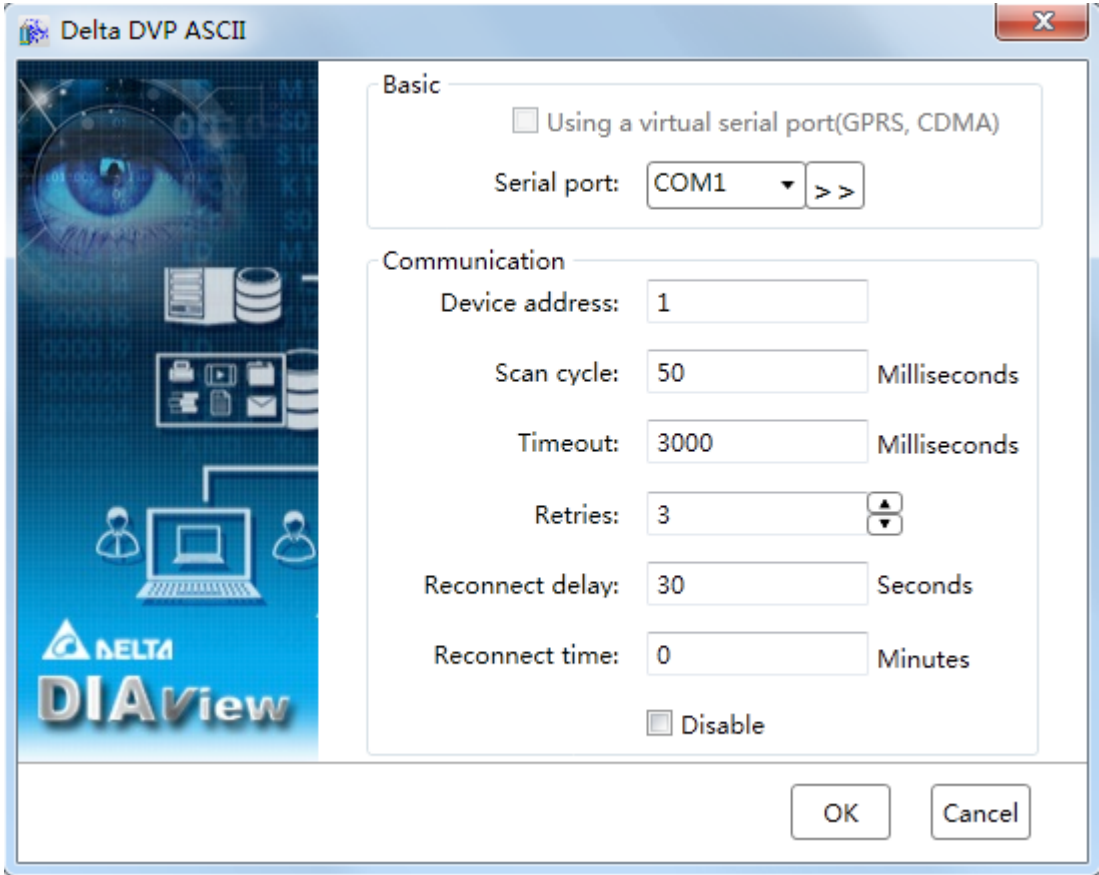
- **Step 2:** Right-click on the “IO communication” node in the tree index of the project window and select “Add device”; the menu selection in the figure below will appear:



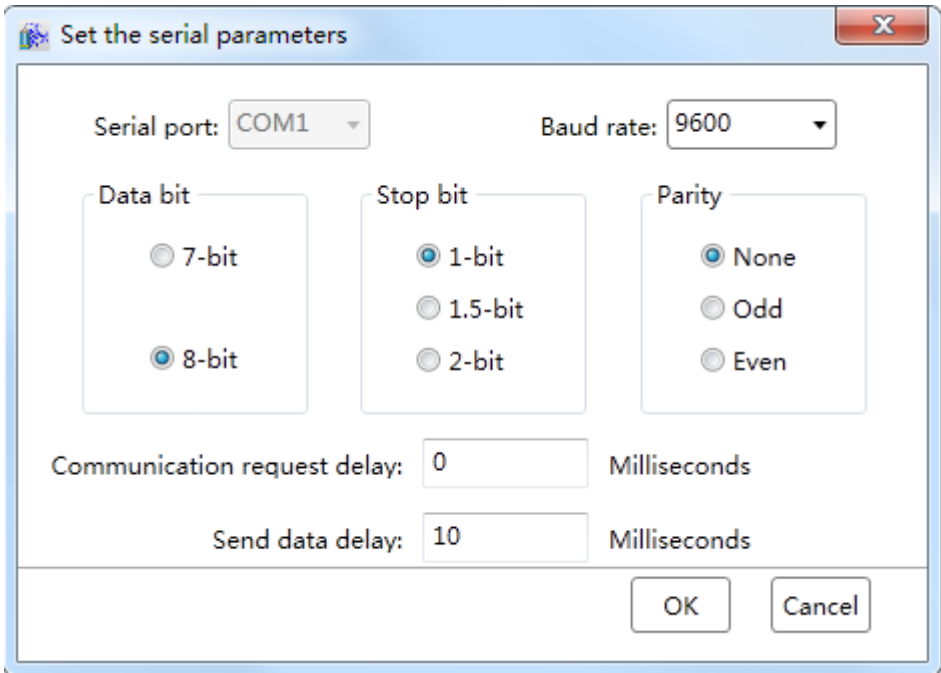
- **Step 3:** Select “Delta DVP” → “Delta DVP ASCII” in the “Driver Selection” window, as shown in the figure below:



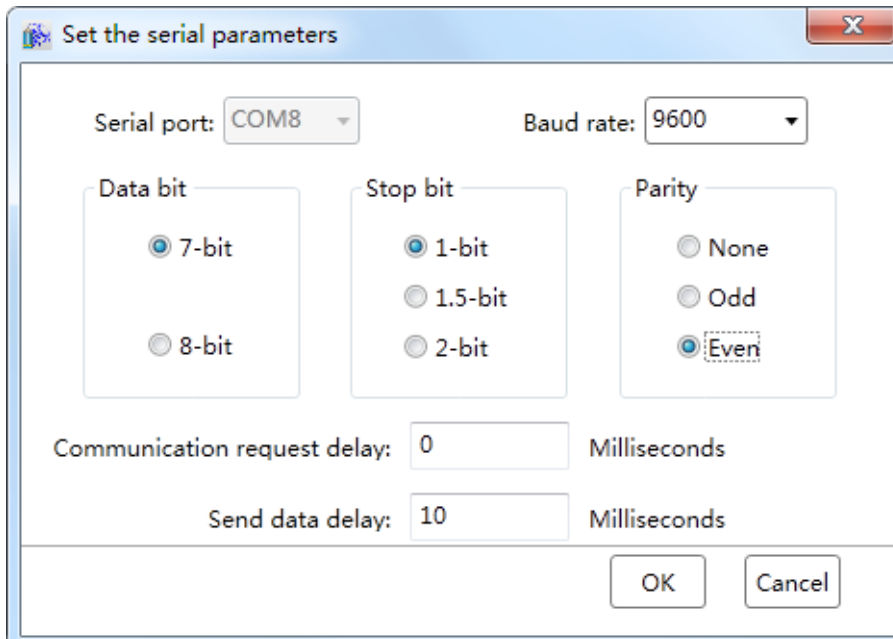
- **Step 4:** Configure the Delta DVP ASCII communication parameters, as shown in the figure below:



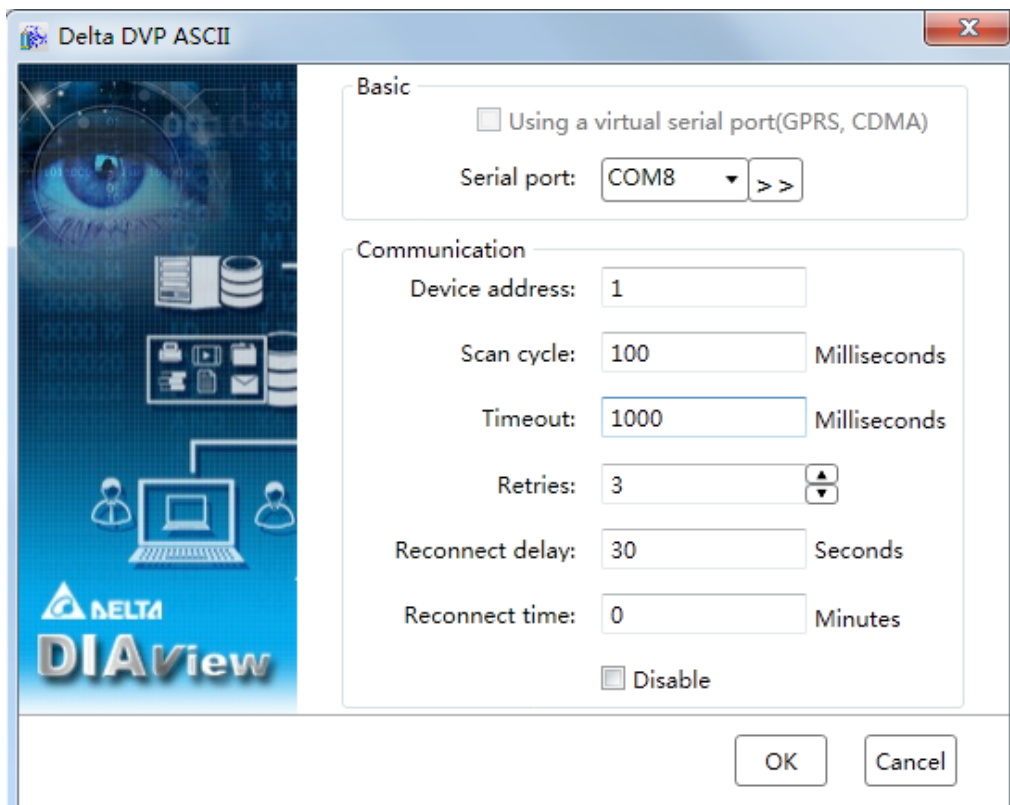
- **Step 5:** Click the button to the right of “Basic”→ “Serial port” >> and open the “Serial port parameter setting” window, as shown in the figure below:



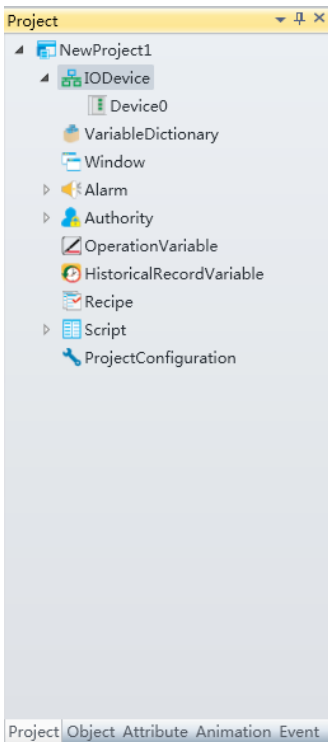
- **Step 6:** Set the serial port communication parameters: “9600,7,E,1,ASCII” and set the communication port as COM1 (you can see that the detected currently assigned serial communication port is COM1 in device manager), as shown in the figure below:



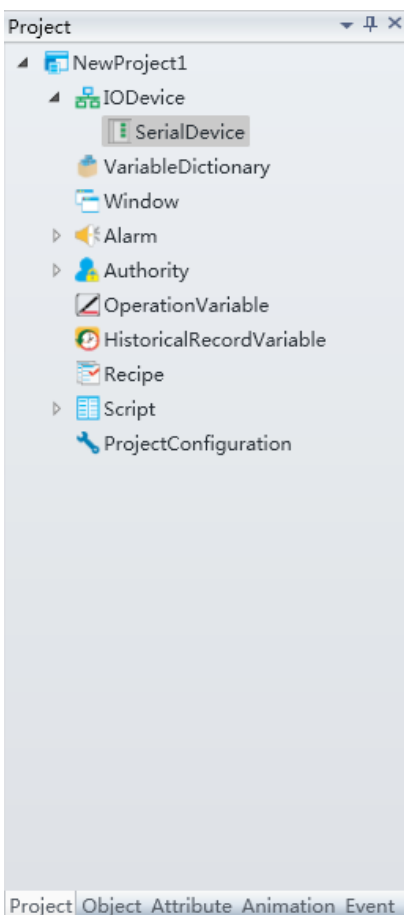
- **Step 7:** Configure the serial port communication parameters and then click the “OK” button to return to the Delta DVP ASCII communication parameter configuration window. Set the communication and troubleshooting parameters. The “Device address” must be the same as the PLC station number, therefore set it as “1”. Preset values can be used for the other options, as shown in the figure below:



- **Step 8:** Click the “OK” button when all parameters have been configured and the device with the preset name will appear under the “IO communication” node of the project tree index, as shown in the figure below:



- **Step 9:** Rename the added IO communication device to “Serial port device” and then the serial port driver communication configuration is complete, as shown in the figure below:



Note 1: The address description of the Delta Modbus DVP is as shown in the table below:

Register	Range	Preset value type	Description
CB	0~255	Bollinger	Counter
CW	0~199	Word	Counter
CDW	200~255	Double word	Counter
D	0~9999	Word	Data register
SED	10000~11999	Word	Data register
S	0~1023	Bollinger	Stepping point relay
TB	0~255	Bollinger	Timer
TW	0~255	Word	Timer
X	0~377 (Octal)	Bollinger	External input relay
Y	0~377 (Octal)~	Bollinger	External output relay
M	0~4095	Bollinger	Auxiliary relay

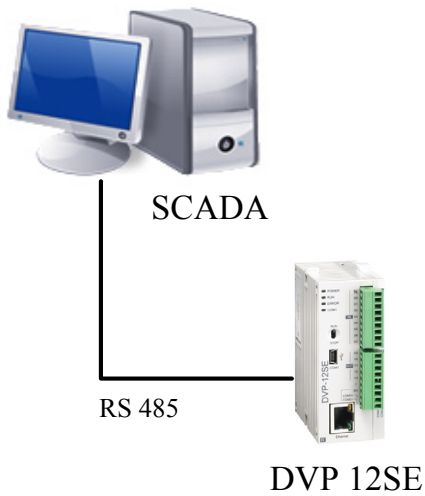
Note 2: Address description of Delta Modbus AH is as shown in the table below:

Register	Range	Preset value type	Description
CB	0~2047	Bollinger	Counter
CW	0~2047	Word	Counter
HCB	0~63	Bollinger	High-speed counter
HCDW	0~63	Double word	32bit counter HC
D	0~ 32767	Word	Data register
S	0~1023	Bollinger	Stepping point relay
SM	0~2047	Bollinger	Special auxiliary relay
SR	0~2047	Word	Special data register
TB	0~2047	Bollinger	Timer
TW	0~2047	Word	Timer
XB	0.0~511.15	Word	Input relay; bit offset must be used, For example XB:0.0
XW	0~511	Word	Input relay
YB	0.0~511.15	Word	Output relay; bit offset must be used, For example YB:0.0
YW	0~511	Word	Output relay
M	0~8191	Bollinger	Auxiliary relay
E	0~31	Word	Indirect designation register

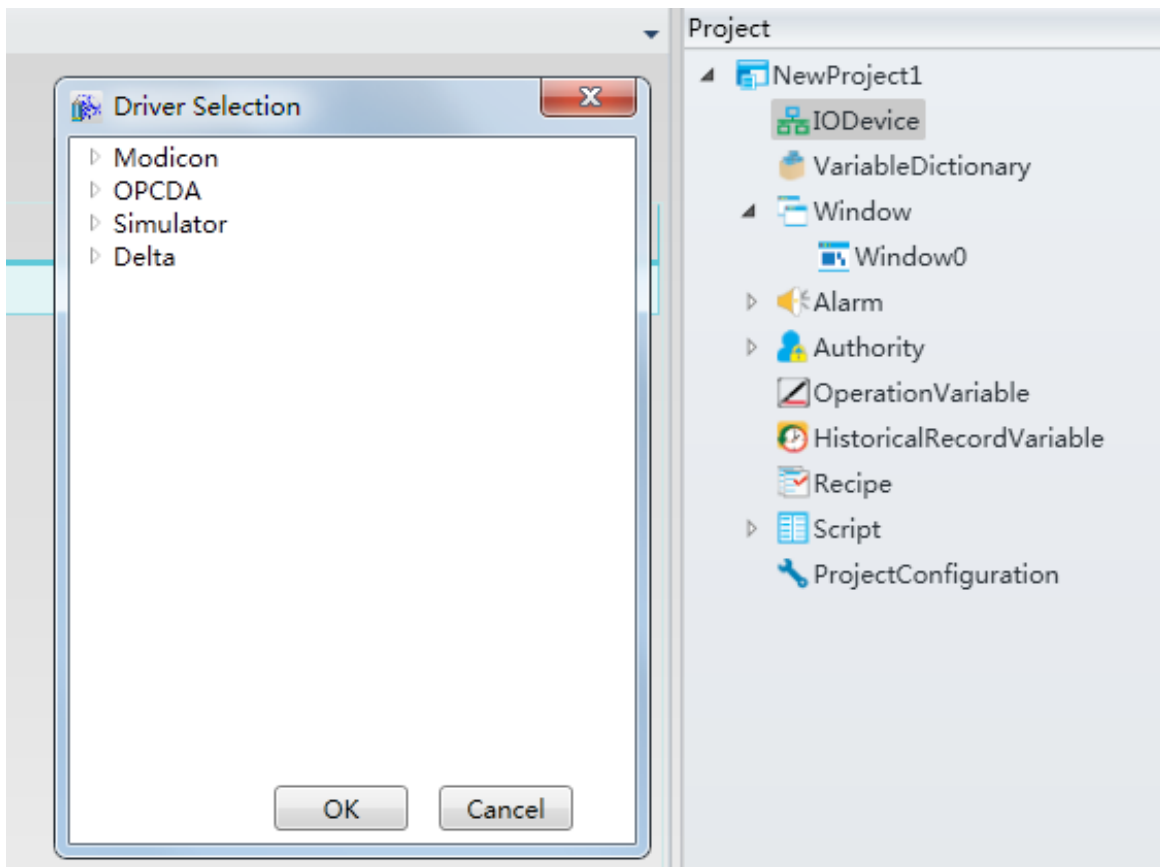


**Example 2:** Using “Modicon Modbus RTU” driver

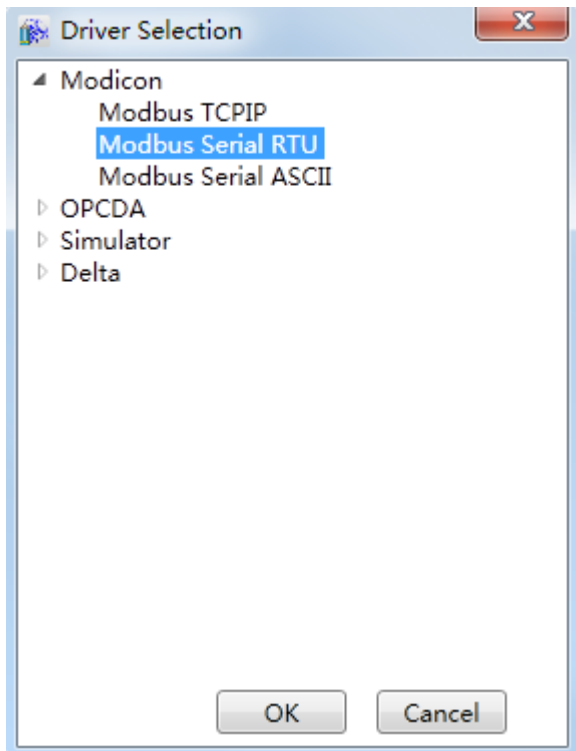
- **Step 1:** Create the following hardware architecture and set the 12SE COM2 communication port parameters as 19200,8,N,2,RTU, station 1, as shown in the figure below:



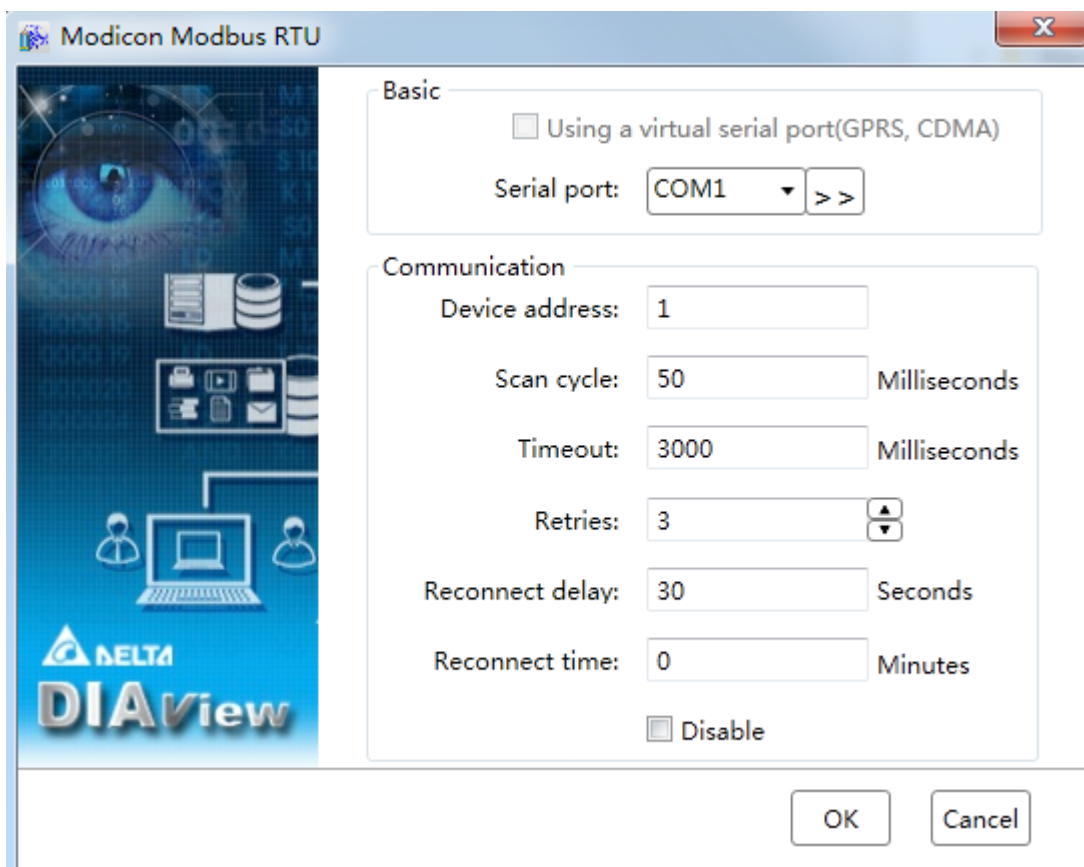
- **Step 2:** Right-click on the “IO communication” node in the tree index of the project window and select “Add device”; the menu selection in the figure below will appear:



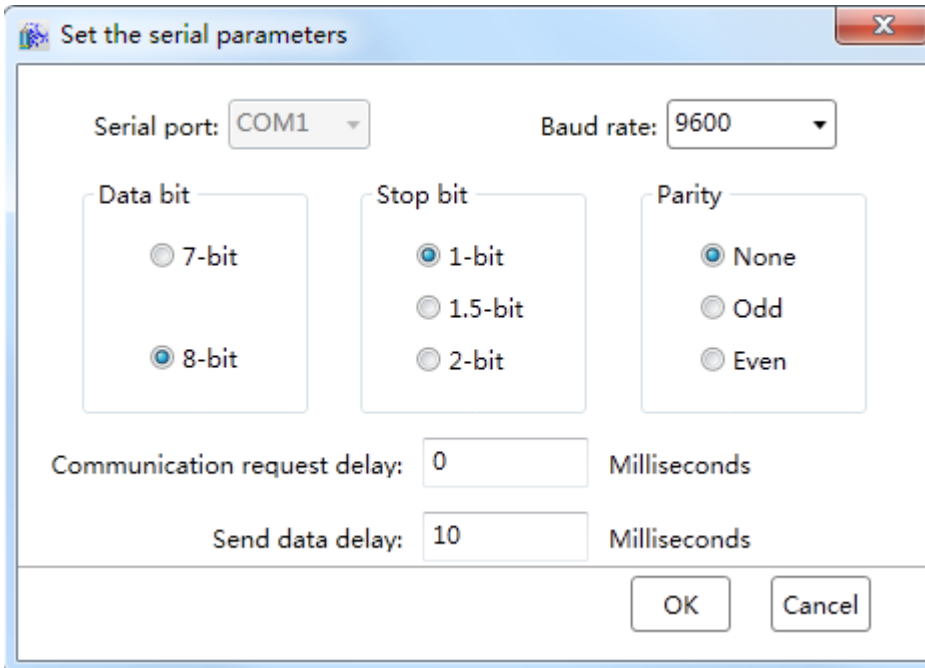
- **Step 3:** Select “Modicon” → “Modicon Modbus RTU” in the “Driver Selection” window, as shown in the figure below:



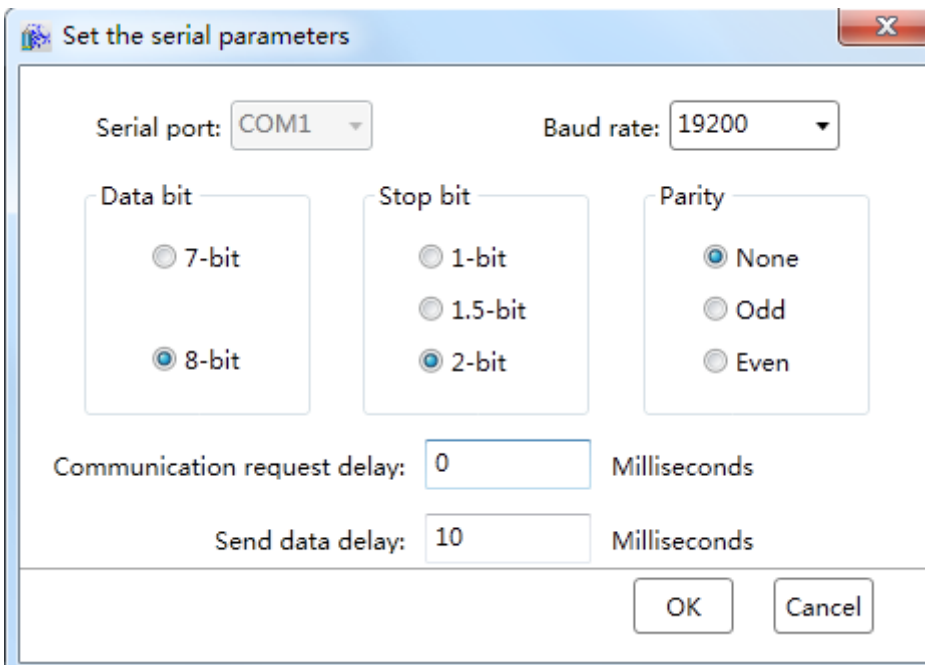
- **Step 4:** Configure the Modicon Modbus RTU communication parameters, as shown in the figure below:



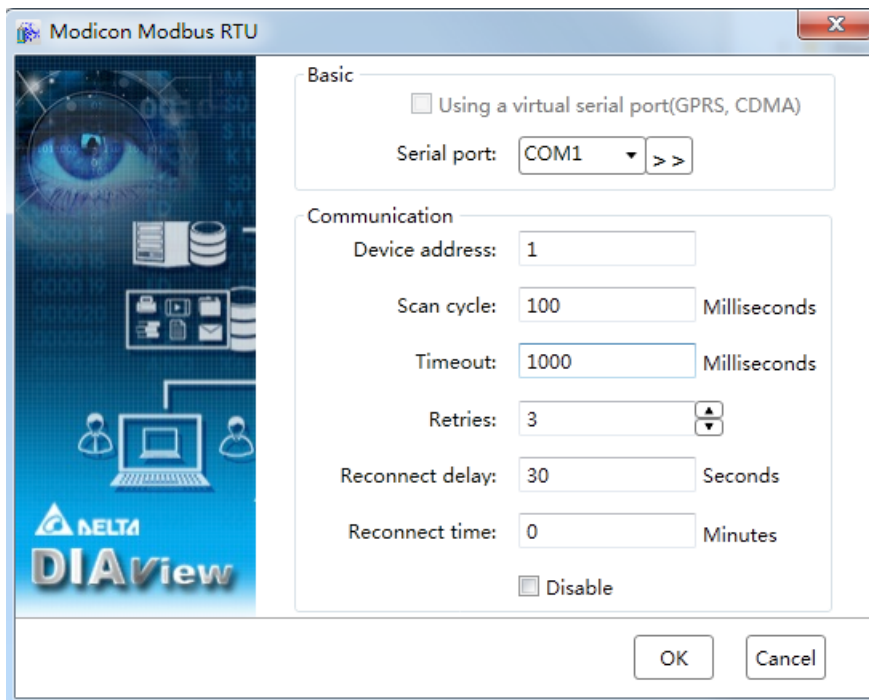
- **Step 5:** Click the button to the right of “Basic”→ “Serial port” >> and open the “Serial port parameter setting” window, as shown in the figure below:



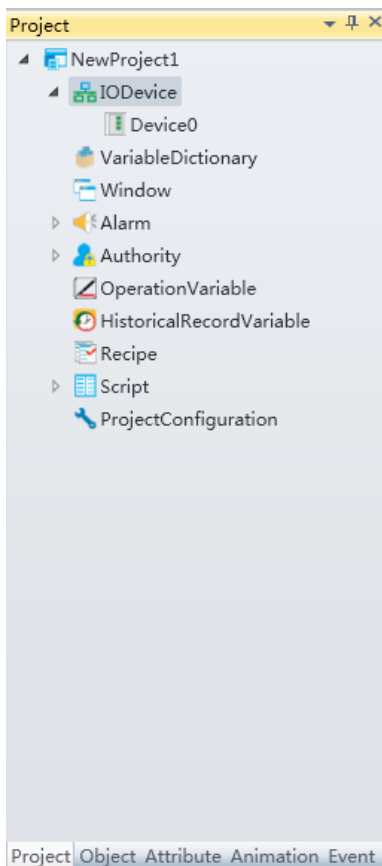
- **Step 6:** Set the serial port communication parameters: “19200,8,N,2,RTU” and set the communication port as COM1 (you can see that the detected currently assigned serial communication port is COM1 in device manager), as shown in the figure below:



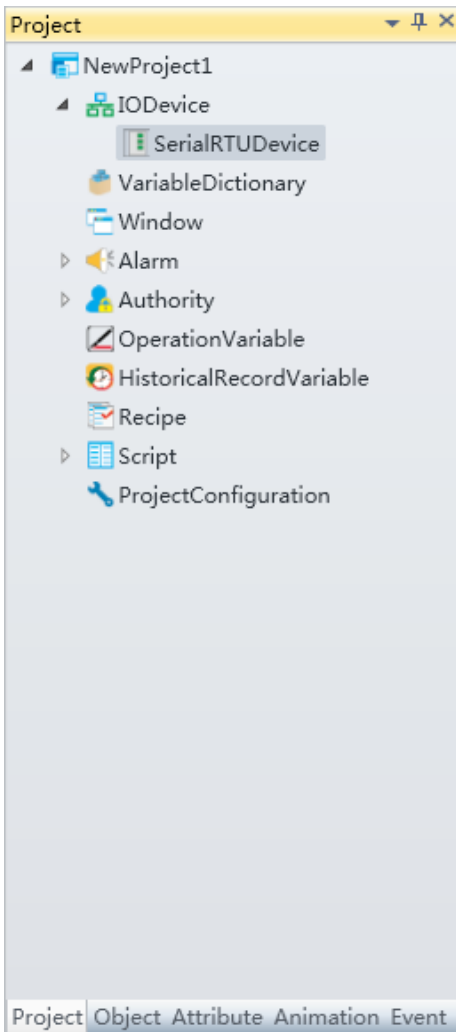
- **Step 7:** Configure the serial port communication parameters and then click the “OK” button to return to the Modicon Modbus RTU communication parameter configuration window. Set the communication and troubleshooting parameters; the “Device address” must be the same as the PLC station number, therefore set it as “1”. Preset values can be used for the other options, as shown in the figure below:



- **Step 8:** Click the “OK” button when all parameters have been configured and the device with the preset name “Device 0” will appear under the “IO communication” node of the project tree index, as shown in the figure below:



- **Step 9:** Rename the added IO communication device “Device 0” to “Serial port RTU device” and then the serial port driver communication configuration is complete, as shown in the figure below:



## 5.5.2 Ethernet driver communication configuration

The DIAView software supports communicating with devices through the Ethernet (TCPIP) based on the Modbus communication protocol standard.

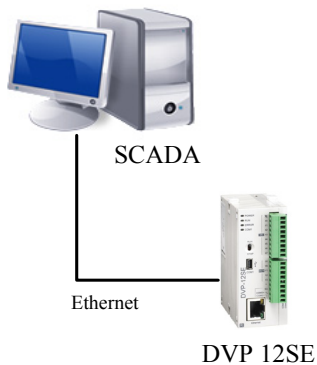
Supported devices includes:

- Modbus TCPIP
- Delta DVP TCPIP
- Delta AH TCPIP

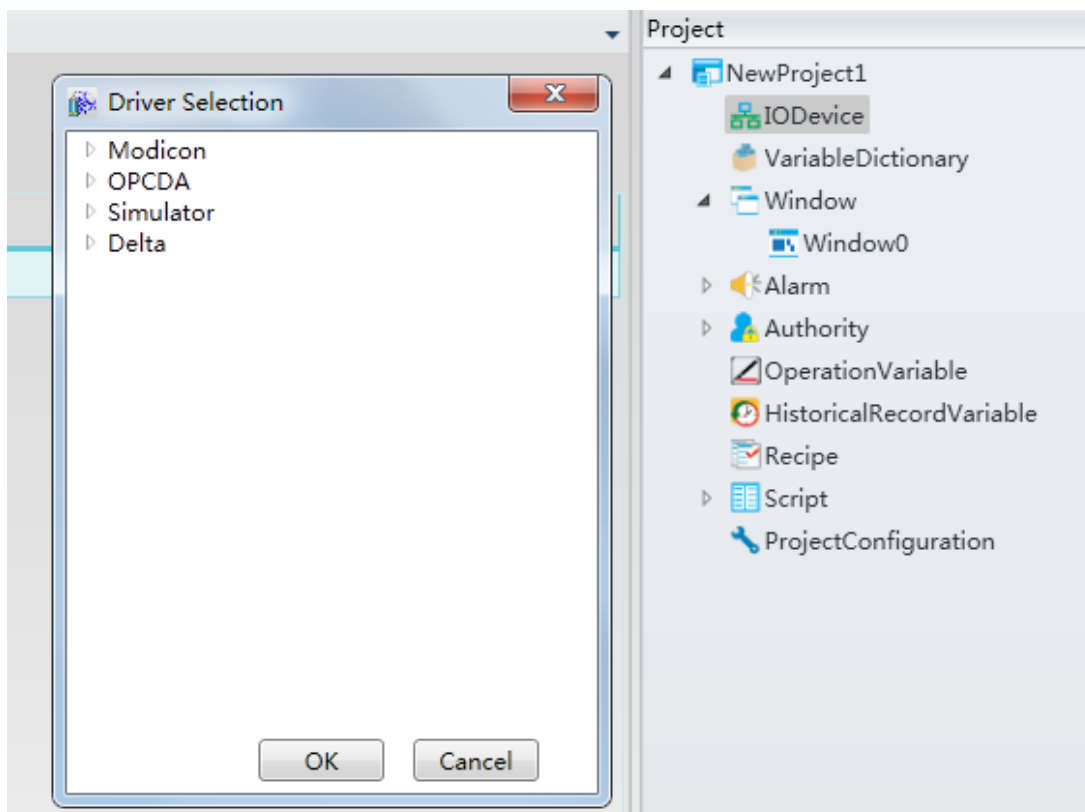
Example of configuring the DIAView software to perform IO communication with devices through the Ethernet connection is as follows:

**Creating a communication between the DIAView software and Delta PLC—DVP 12SE through Ethernet:**

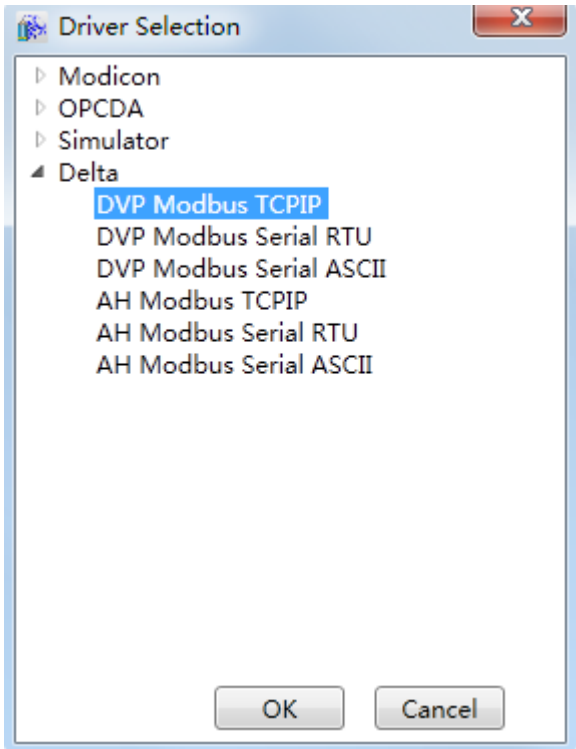
- **Step 1:** Create the following hardware architecture; set the 12SE IP address as “192.168.1.5” and the computer IP address as “192.168.1.200” (keep the PLC and computer in the same local area network ), as shown in the figure below:



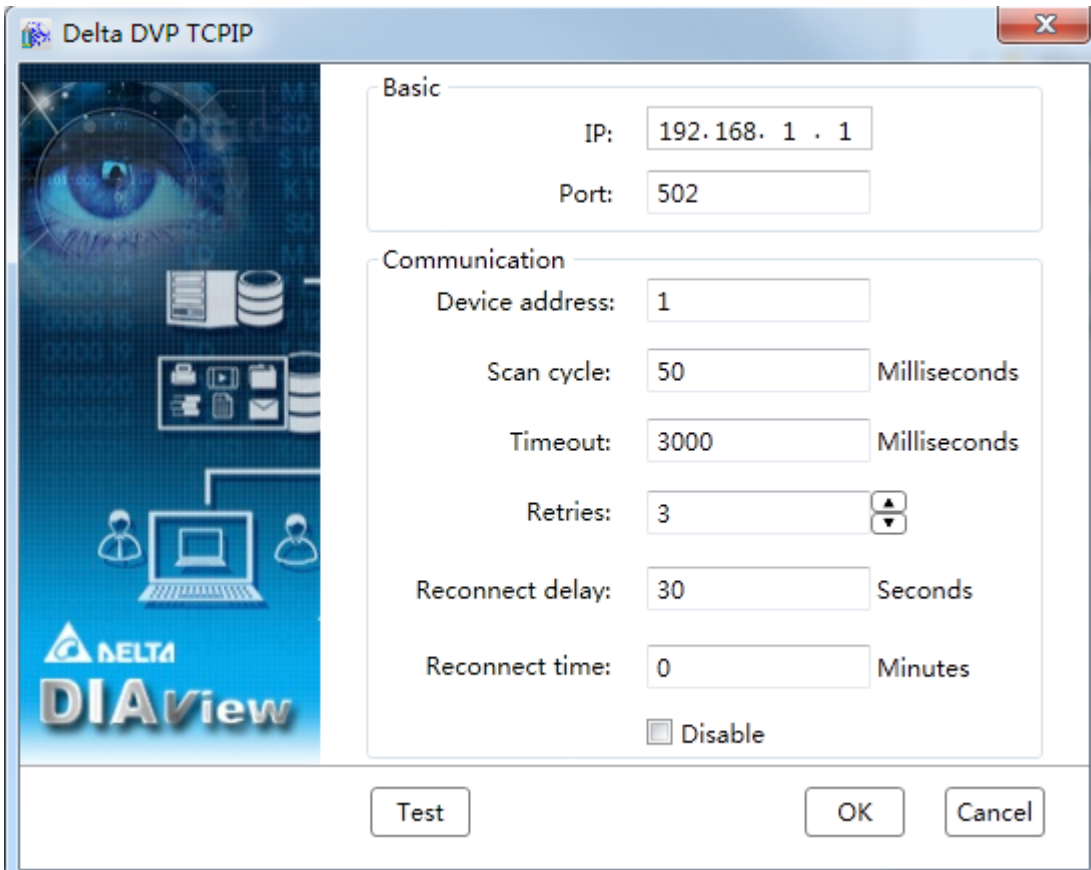
- **Step 2:** Right-click on the “IO communication” node in the tree index of the project window and select “Add device”; the menu selection in the figure below will appear:



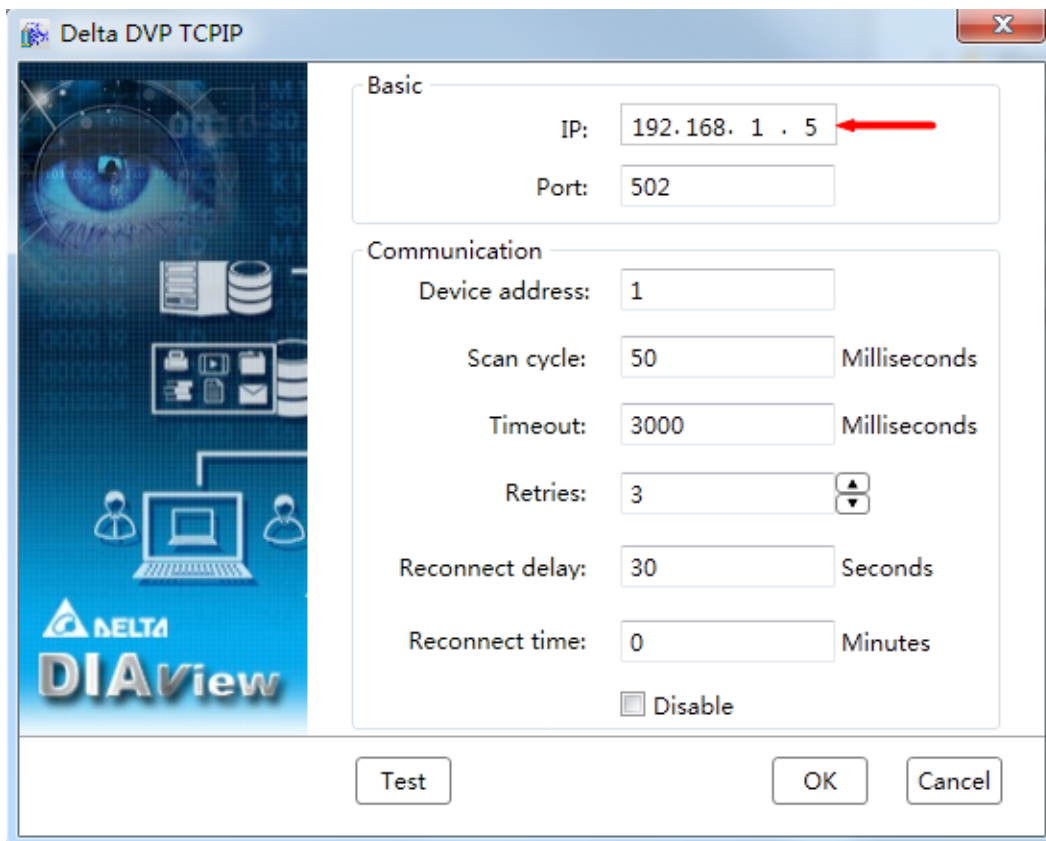
- **Step 3:** Select “Delta DVP” → “Delta DVP TCPIP” in the “Driver Selection” window, as shown in the figure below:



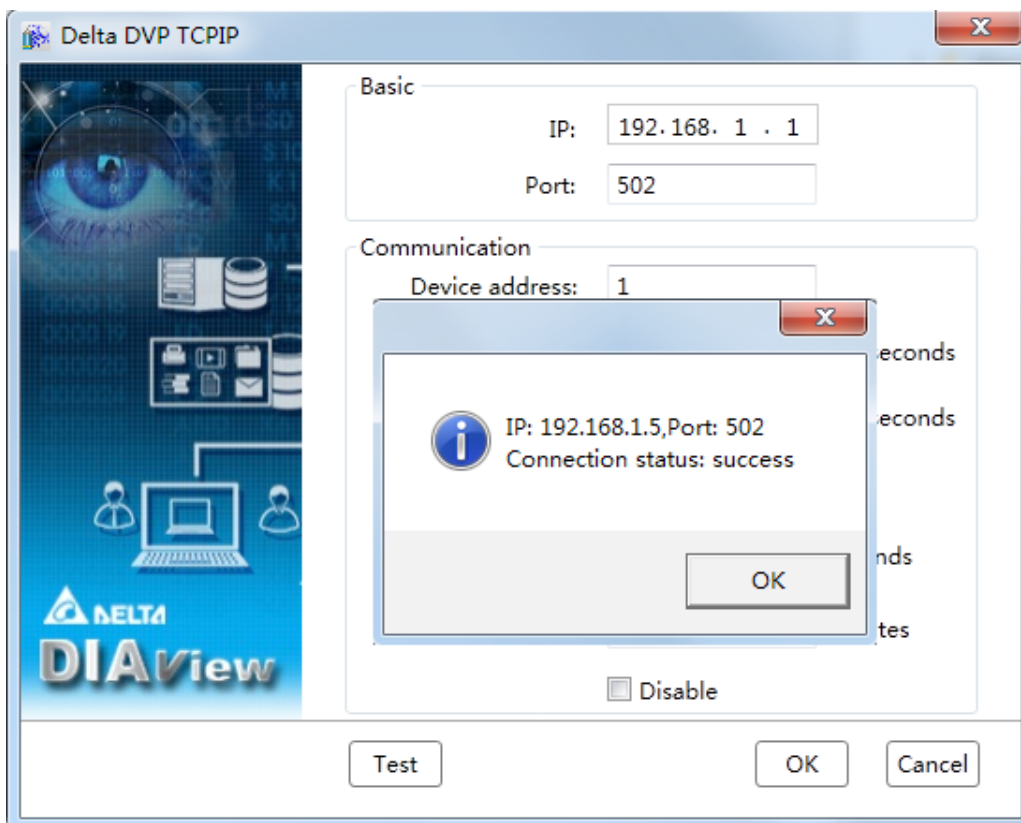
- **Step 4:** Configure the Delta DVP TCPIP communication parameters, as shown in the figure below:



- **Step 5:** Set the “IP address” in the “Basic” configuration to: 192.168.1.5 and the “port number” as: 502, as shown in the figure below:

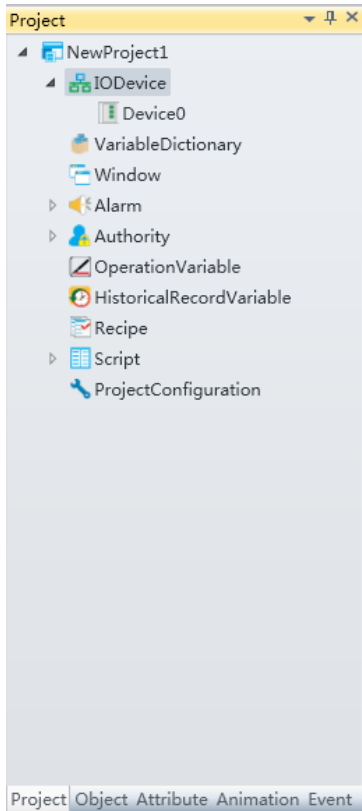


- **Step 6:** The preset values can be used for the other options. Click the “Test” button to test whether the connection is successful, as shown in the figure below:

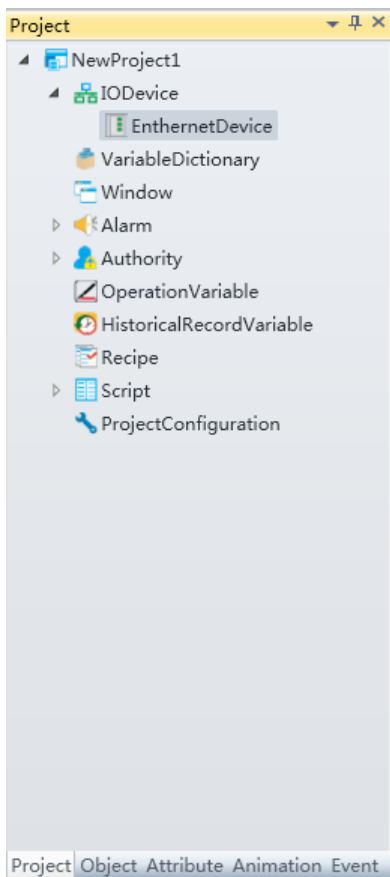




- **Step 7:** Click the “OK” button when all parameters have been configured and the device with the preset name will appear under the “IO communication” node of the project tree index, as shown in the figure below:



- **Step 8:** Rename the added IO communication device to “Ethernet device” and then the Ethernet driver communication configuration is complete, as shown in the figure below:



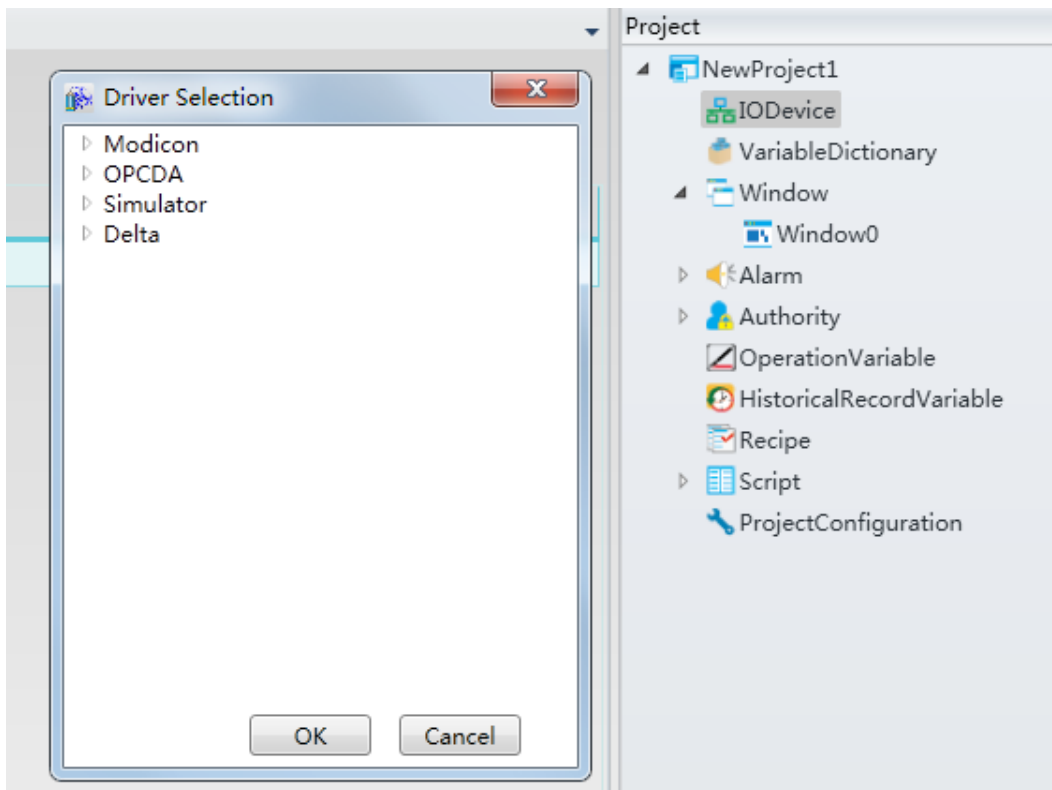
### 5.5.3 Simulator driver communication configuration

The DIAView supports communication with simulators.

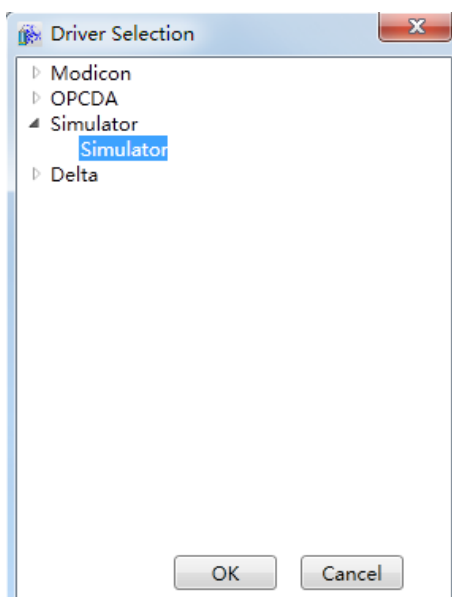
Example of configuring the DIAView software to perform IO communication with a simulator is as follows:

#### Creating communication between the DIAView software and simulator:

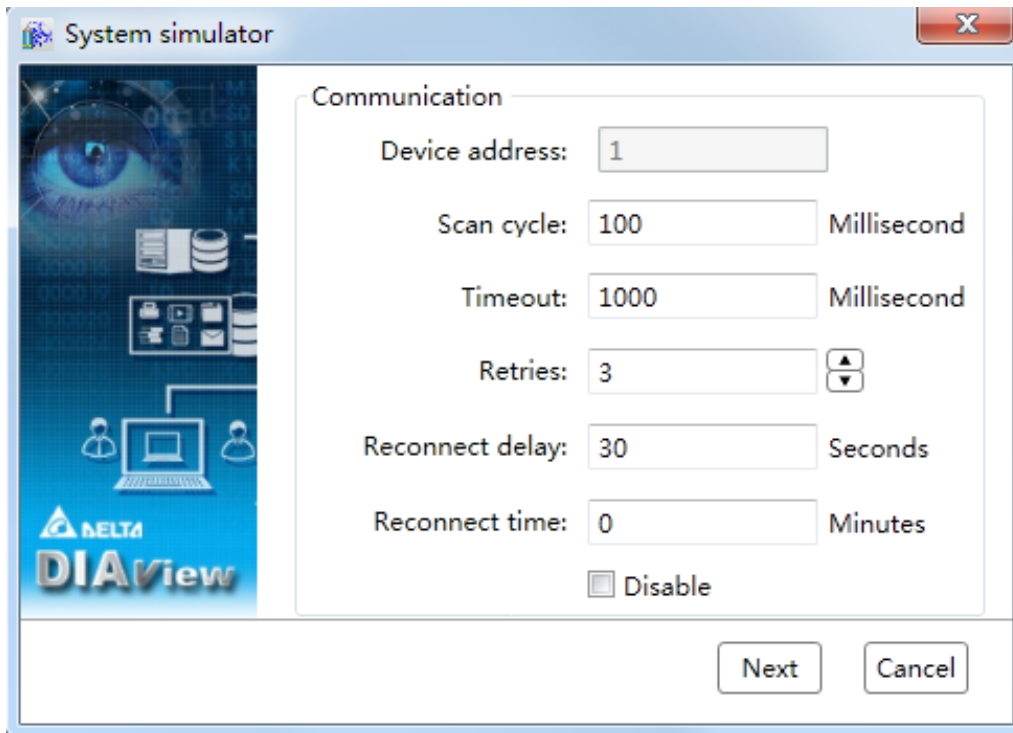
- **Step 1:** Right-click on the “IO communication” node in the tree index of the project window and select “Add device.” The menu selection in the figure below will appear:



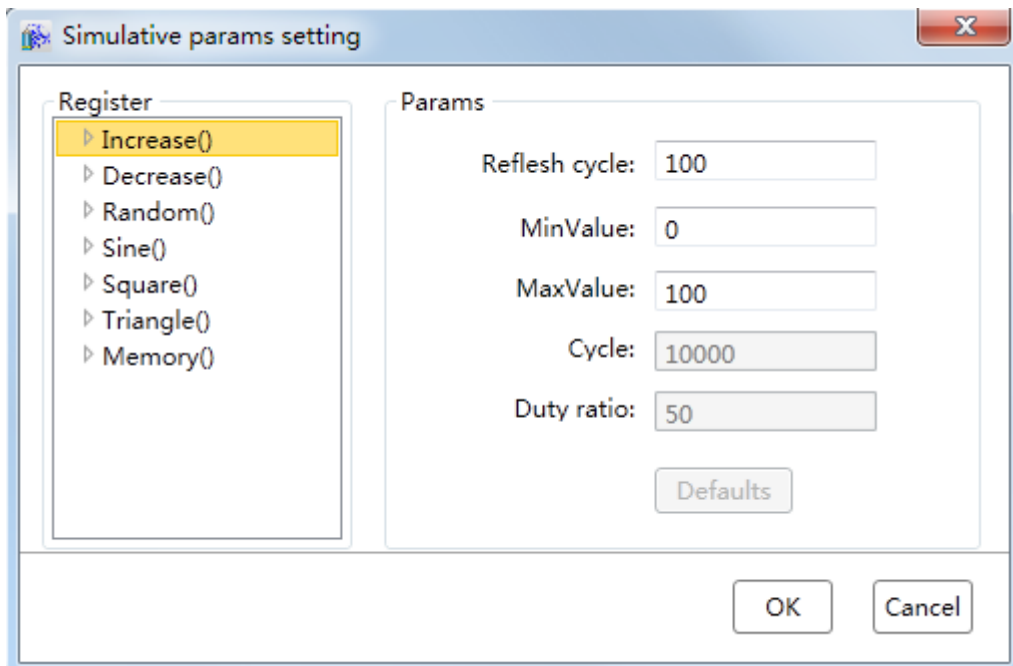
- **Step 2:** Select “simulator” → “simulator” in the “Select driver” window, as shown in the figure below:



- **Step 3:** Configure the system simulator communication parameters; preset values can be kept, as shown in the figure below:



- **Step 4:** Click "Next" and the "Simulative parameter setting" window will appear:

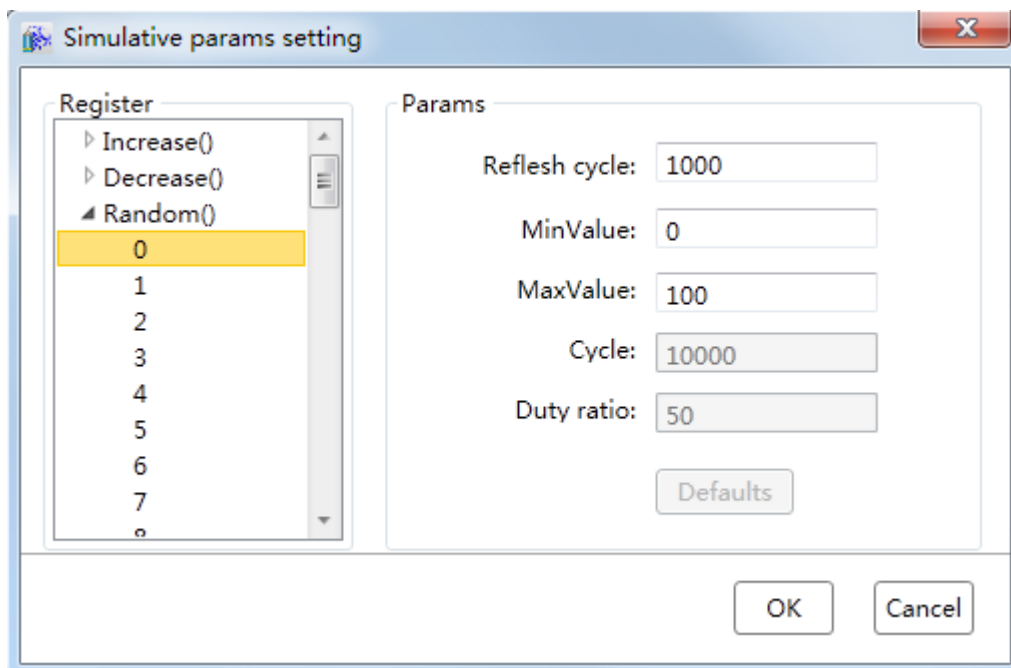


**Simulator parameters:**

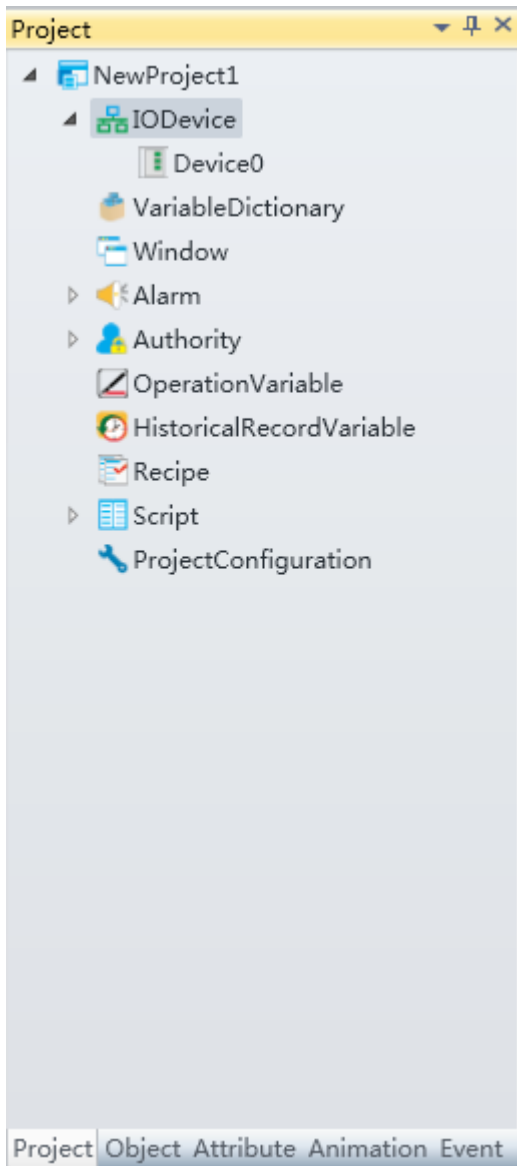
Register	Range	Description
Increase	0~63	Increase progressively
Decrease	0~63	Decrease progressively
Random	0~63	Random
Sine	0~63	Sine
Square	0~63	Square
Triangle	0~63	Triangle
Memory	0~63	Memory, readable/writable; keep unchanged.

- **Update cycle:** Data change cycle
- **Minimum value:** Lower range; minimum value of the data (Int32 type value, minimum value:-2,147,483,648)
- **Maximum value:** Upper range; maximum value of the data (Int32 type value, maximum value:2,147,483,647)
- **Cycle:** Partially used; a data loop cycle.
- **Duty cycle:** Refers to the proportion of positive pulse in the pulse cycle (can only be set for Triangle and Square).

- **Step 5:** Click the “Random” node in “register” and select “0” in the expanded sub-node; set the “Update cycle” to 1000 and keep the remaining parameter values the same, as shown in the figure below:



- **Step 6:** Click the “OK” button when all parameters have been configured and the device with the preset name will appear under the “IO communication” node of the project tree index, as shown in the figure below:



- **Step 7:** Rename the added IO communication device to “Simulator” and then the simulator driver communication configuration is complete, as shown in the figure below:

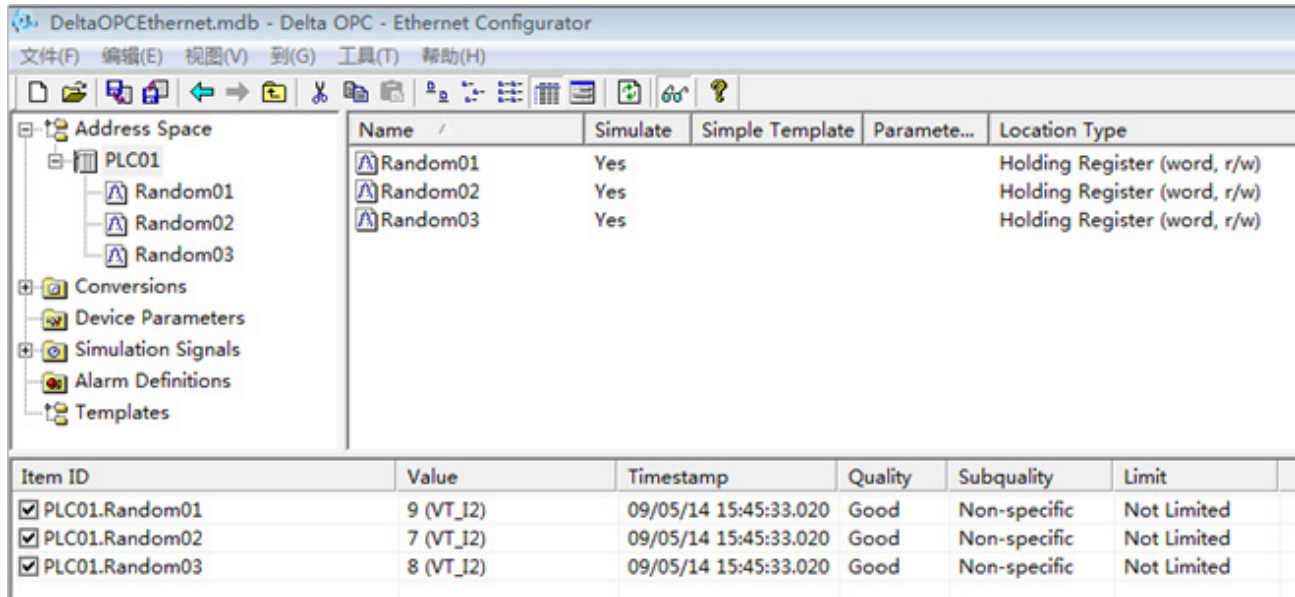
### 5.5.4 OPC driver communication configuration

The DIAView software supports communication with OPC servers.

Example of configuring the DIAView software to perform IO communication with an OPC server is as follows:

### Creating communication between the DIAView software and Delta AH500 OPC Server:

- **Step 1:** Configure the “AH500 OPC Server” and make it provide the simulated data “Simulator Signals”; this includes three set of random “Random1~Random3” analog data.

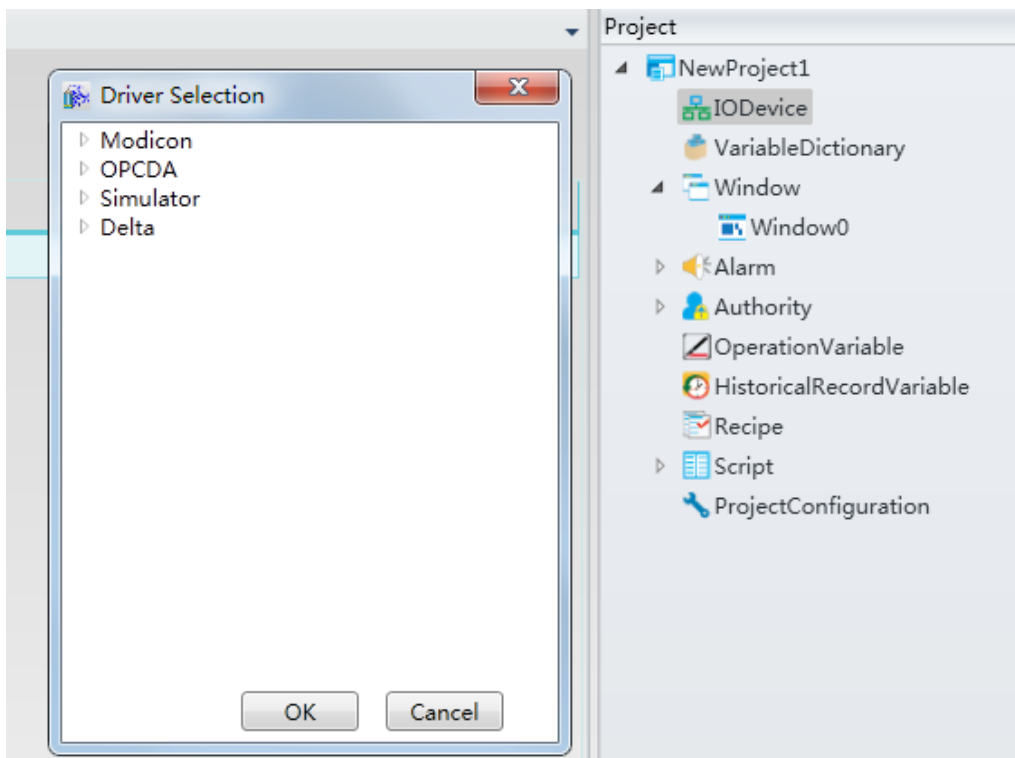


Name	Simulate	Simple Template	Paramete...	Location Type
Random01	Yes			Holding Register (word, r/w)
Random02	Yes			Holding Register (word, r/w)
Random03	Yes			Holding Register (word, r/w)

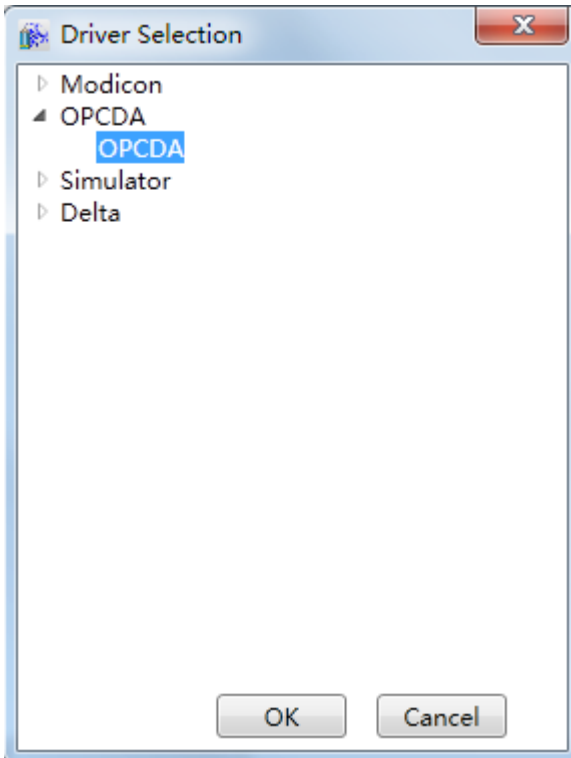
  

Item ID	Value	Timestamp	Quality	Subquality	Limit
<input checked="" type="checkbox"/> PLC01.Random01	9 (VT_I2)	09/05/14 15:45:33.020	Good	Non-specific	Not Limited
<input checked="" type="checkbox"/> PLC01.Random02	7 (VT_I2)	09/05/14 15:45:33.020	Good	Non-specific	Not Limited
<input checked="" type="checkbox"/> PLC01.Random03	8 (VT_I2)	09/05/14 15:45:33.020	Good	Non-specific	Not Limited

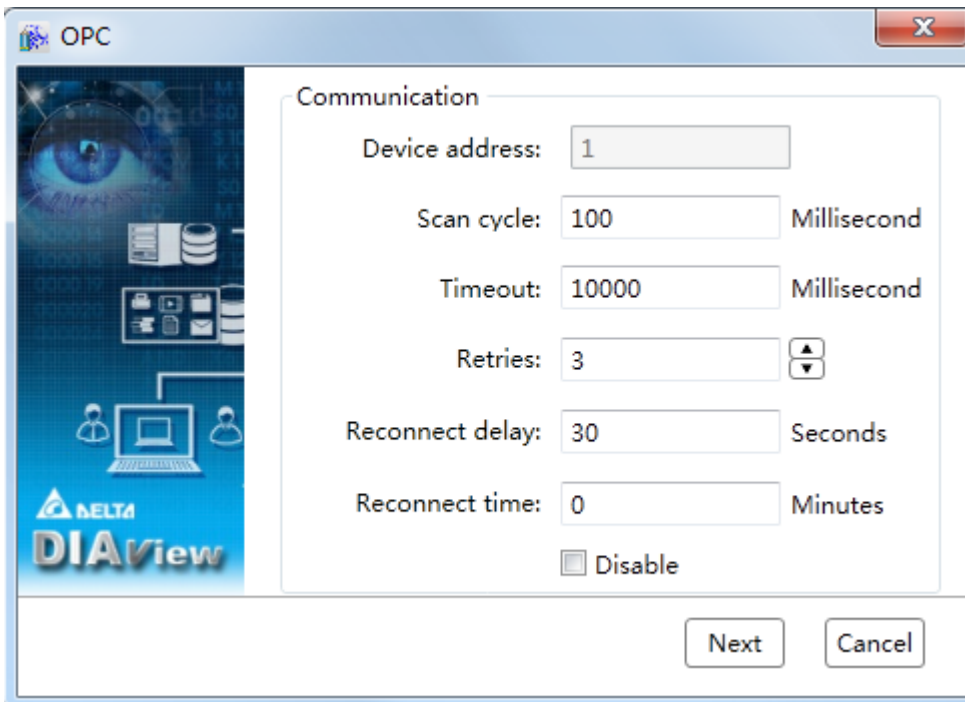
- **Step 2:** Right-click on the “IO communication” node in the tree index of the project window and select “Add device”; the menu selection will appear as shown in the figure below :



- **Step 3:** Select “OPC” → “OPC” in the “Driver Selection” window, as shown in the figure below:

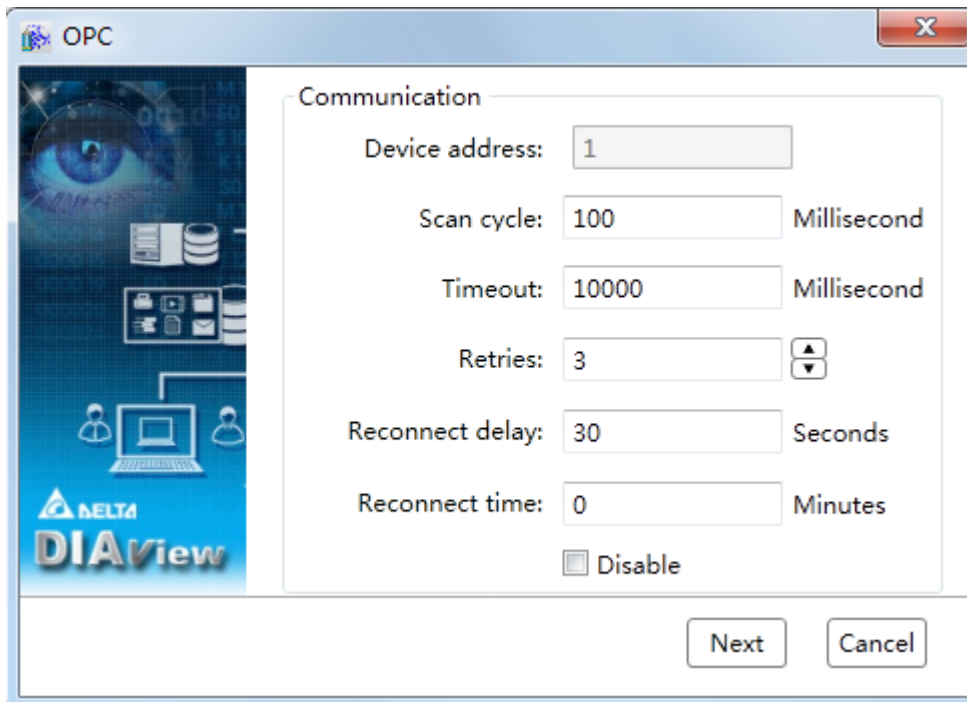


- **Step 4:** Configure the OPC communication parameters; preset values can be kept, as shown in the figure below:



- **Step 5:** Click “Next” and the “OPC server” configuration window will appear; select “Delta.

AHModbus EthernetDA.1” in the “OPC server” drop-down menu and keep the preset values for the other options:

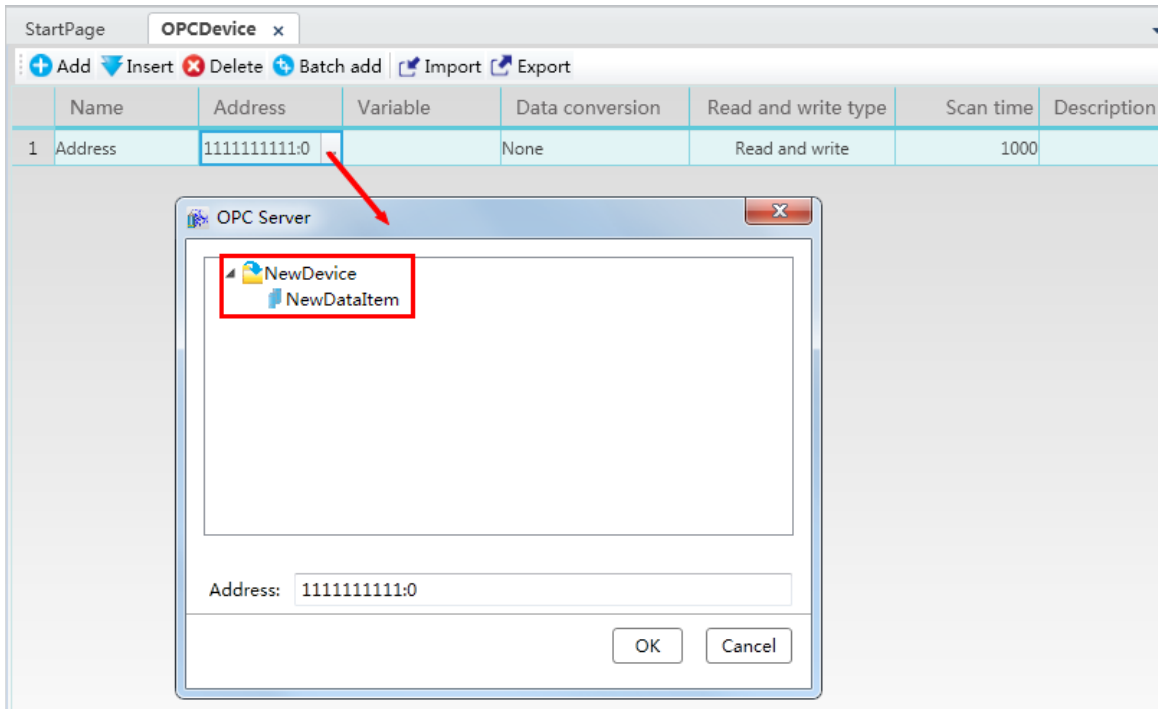


The meaning of each configuration in the window:

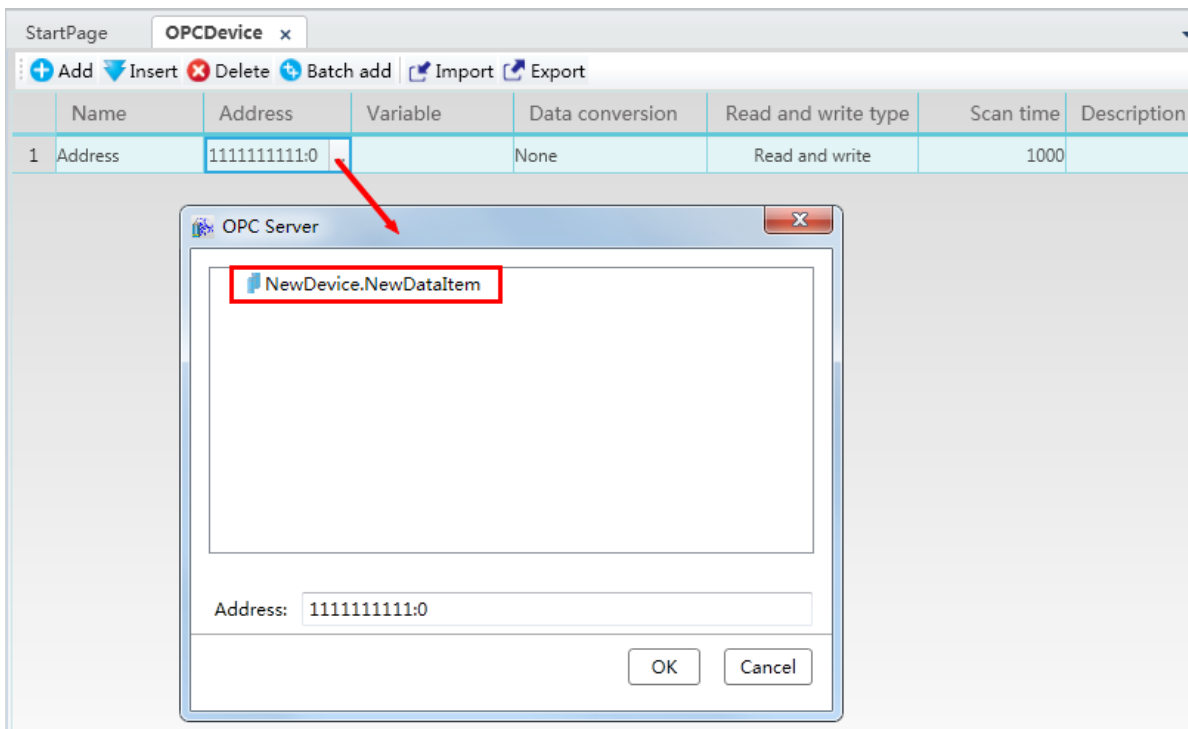
- **OPC server:** Select OPC server.
- **Computer (empty means local computer):** The computer name with the OPC server installed. If the OPC server and DIAView software is installed on the same computer, leave it as empty; if the OPC server is installed on another computer in the local area network, click the  button to select the remote computer name.
- **Use hierarchical namespace:** It will affect the display method when selecting the variables of the device under the “Address” field configuration window when creating IO variables for this driver equipment -- check it to display according to the file folder and uncheck it to display the variable path directly:



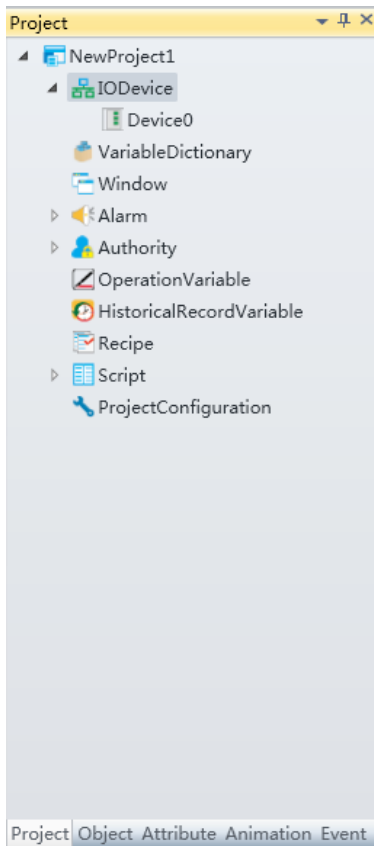
- **Checked effects:**



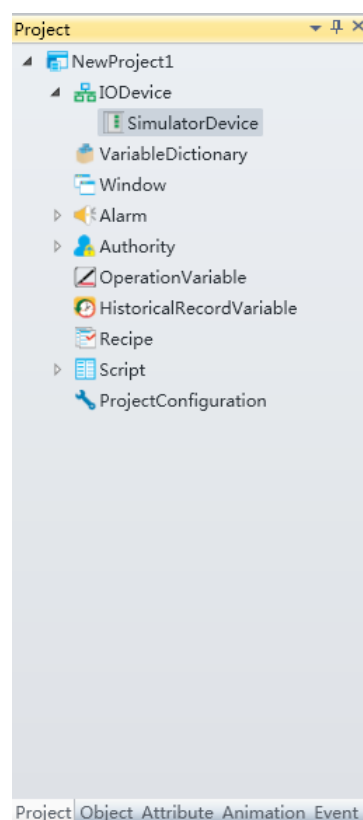
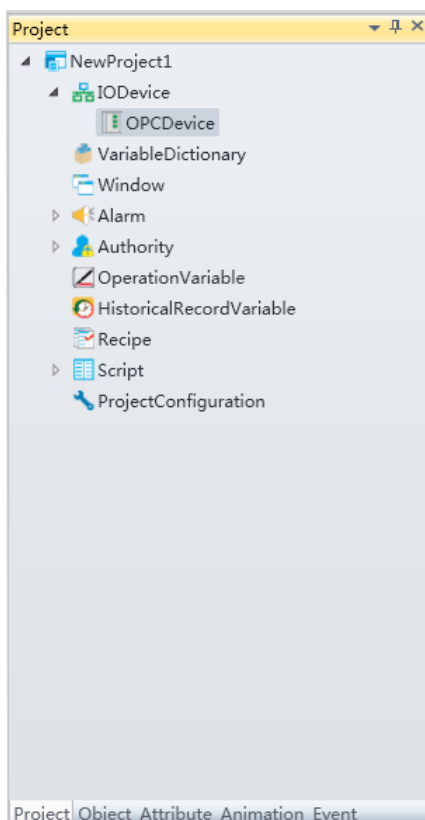
- **Unchecked effects:**



- **Step 6:** Click the “OK” button when all parameters have been configured and the device with the preset name will appear under the “IO communication” node of the project tree index, as shown in the figure below:



- **Step 7:** Rename the added IO communication device to “OPC device” and then the OPC driver communication configuration is complete, as shown in the figure below:



## 5.6 IO variables

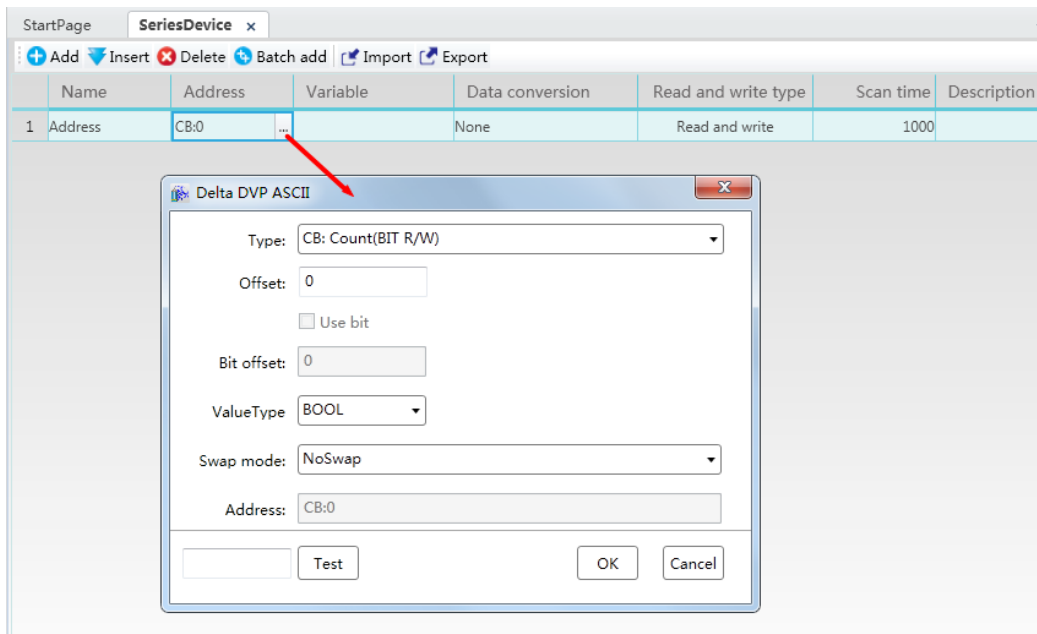
The IO variables are the external device variables created in the DIAView software. They are acquired directly from the scratchpad addresses inside related devices. Association mapping between the IO variables and the project variables inside the DIAView software is created to allow the DIAView software to connect with lower devices to perform information handshake.

The IO parameters are related to device scratchpad addresses. They have different access types including read/write, read-only and write-only, and are able to acquire linear data and root operations.

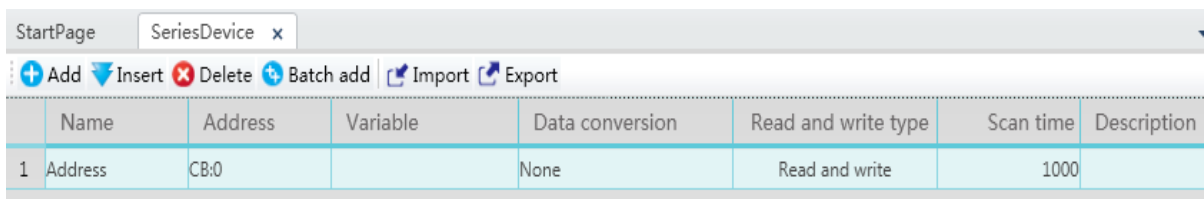
### 1. Creating IO variables:

**Example 1: Creating IO variables based on the “Serial port device” in the “5.5.1 Serial port driver communication configuration” chapter.**

- **Step 1:** Double-click the created “Serial port device” under the “IO Communication” node of the project tree index to open the serial port device IO variable configuration window, as shown in the figure below:



- **Step 2:** Click the “Add ” button to add IO variable:



- **Step 3:** Rename the IO variable name “Address” to “D0” and click the button in the [Address] field to open the address property configuration window to configure the address:

### Parameter descriptions:

- Type: Scratchpad type

Scratchpad type	Properties	Description	Remark
CB: Counter (Bit)	Read/write	Counter bit device	DVP, AH500
CW: Counter (Word)	Read/write	Counter character device	DVP, AH500
HCB: High Speed Counter (Bit)	Read/write	32 bit high speed counter bit device	AH500
HCDW: 32Bit Counter (DWord)	Read/write	32 bit high speed counter character device	AH500
D: Data scratchpad	Read/write	Data scratchpad character device	DVP, AH500
SED: DR (SE Device)	Read/write	Data scratchpad character device	DVP 12SE
S: StepSpot	Read/write	Stepping point relay bit device	DVP, AH500
SM: Special Auxiliary Relay (Bit)	Read/write	Special auxiliary flag bit device	AH500
SR: Special Data scratchpad (Word)	Read/write	Special data scratchpad character device	AH500
TB: Timer (Bit)	Read/write	Timer bit device	DVP, AH500
TW: Timer (Word)	Read/write	Timer character device	DVP, AH500
X: External Input Relay	Read-only	Input relay bit device	DVP, AH500
XB: External Input Relay (Bit)	Read-only	Input relay bit device	AH500
XW: External Input Relay (Word)	Read-only	Input relay character device	AH500
Y: External Output Relay	Read/write	Output relay bit device	DVP, AH500
YB: External Output Relay (Bit)	Read/write	Output relay bit device	AH500
YW: External Output Relay (Word)	Read/write	Output relay character device	AH500
M: Auxiliary Relay	Read/write	Auxiliary relay bit device	DVP, AH500
E: Pointer	Read/write	Indexed scratchpad	AH500

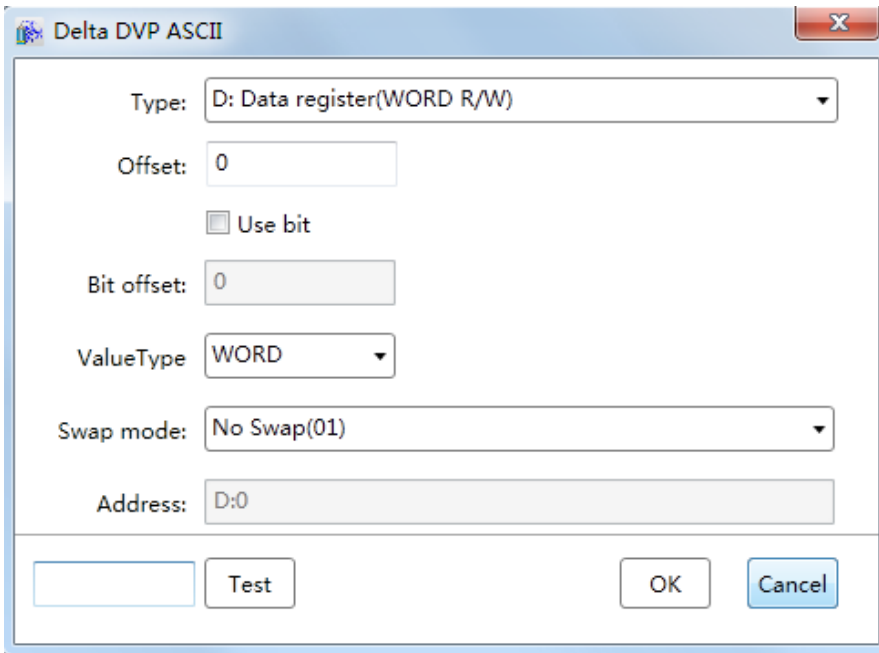
- Value type:

Value type	Description
BYTE	Byte
UBYTE	Unsigned byte
WORD	Word
UWORD	Unsigned word
DWORD	Double word
UDWORD	Unsigned double word
FLOAT	Single-precision floating point
DOUBLE	Double-precision floating point
STRING	String

- Character exchange:

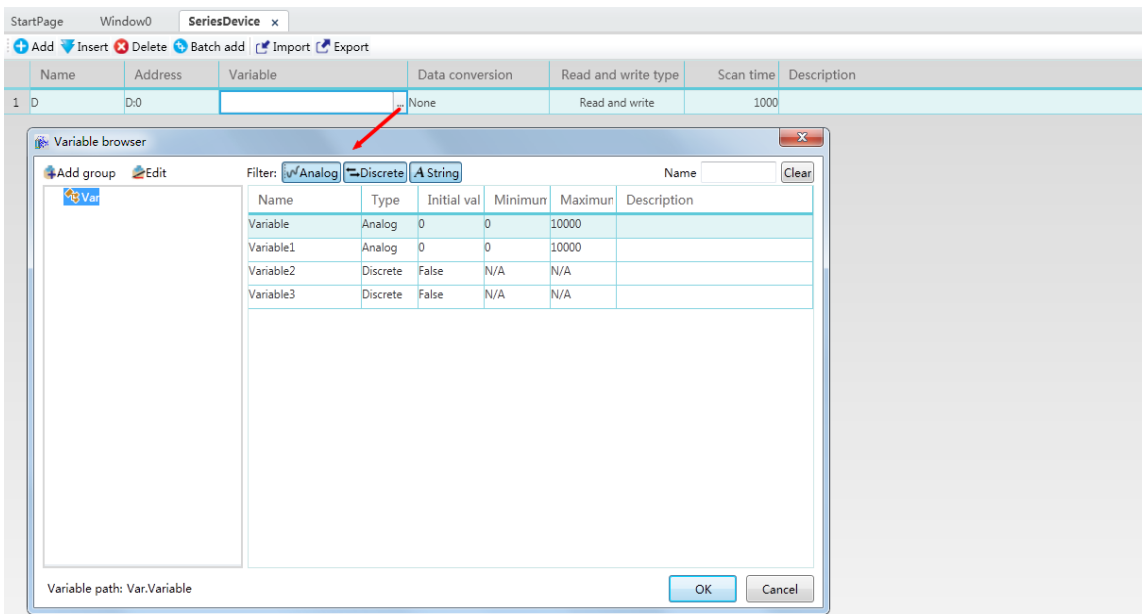
Byte exchange	Name
No Swap (01), No Swap (0123), No Swap (01234567)	No exchange
Swap BYTE (10)	Byte exchange (Word)
Swap BYTE (3210), Swap WORD BYTE (1032), Swap WORD (2301)	Byte exchange (DWord)
Swap BYTE (76543210), Swap WORD BYTE (10325476), Swap DWORD BYTE (32107654), Swap WORD (67452301), Swap DWORDWORD (23016745), Swap DWORD (45670123)	Byte exchange (Double)

- **Step 4:** Select scratchpad type: “D : WORD R/W (D: Data scratchpad (WORD R/W))”, unit number: 0, keep the preset value for other items, as shown in the figure below:

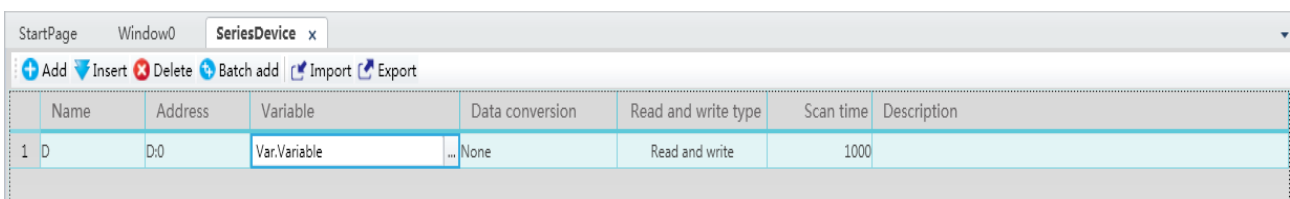


【Test】 button: Tests the address data of devices on-site.

- **Step 5:** Click the button in the 【Variable】 field to open the variable browser and select the previously created internal project variables, achieving the association mapping between the IO variables and internal project variables:

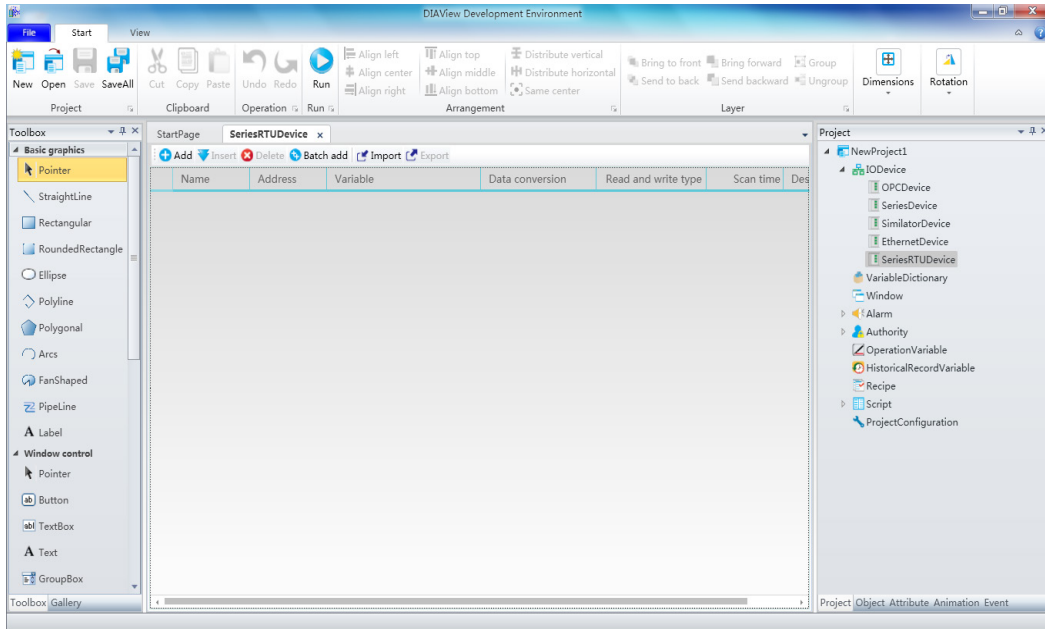


- **Step 6:** Use preset values for the bits in other fields; this completes the creation of an IO variable:



**Example 2:** Creating IO variables based on the “Serial port RTU device” in the “5.5.1 Serial port driver communication configuration” chapter.

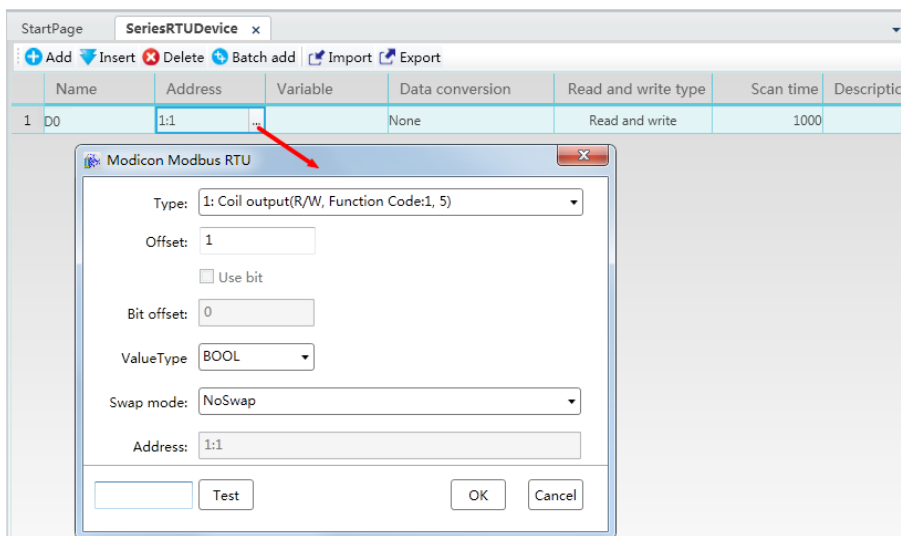
- **Step 1:** Double-click the created “Serial port RTU device” under the “IO Communication” node of the project tree index to open the serial port RTU device IO variable configuration window, as shown in the figure below:



- **Step 2:** Click the “Add” button to add IO variable:

	Name	Address	Variable	Data conversion	Read and write type	Scan time	Description
1	Address	1:1		None	Read and write	1000	

- **Step 3:** Rename the IO variable name “Address” to “D0” and click the button in the [Address] field to open the address property configuration window to configure the address:



[ Test ] button: Tests the address data of devices on-site.

**Parameter descriptions:**

- Type: Scratchpad type

Scratchpad	Description	Properties	Function code	Preset value type
1	Coil output	Read/write	1,5	Bollinger
2	Digital input	Read-only	2	Bollinger
3	Keep scratchpad	Read/write	3,16	Word
4	Analog value input	Read-only	4	Word
5	Expand output scratchpad	Read/write	21	Word
6	Expand input scratchpad	Read-only	20	Word

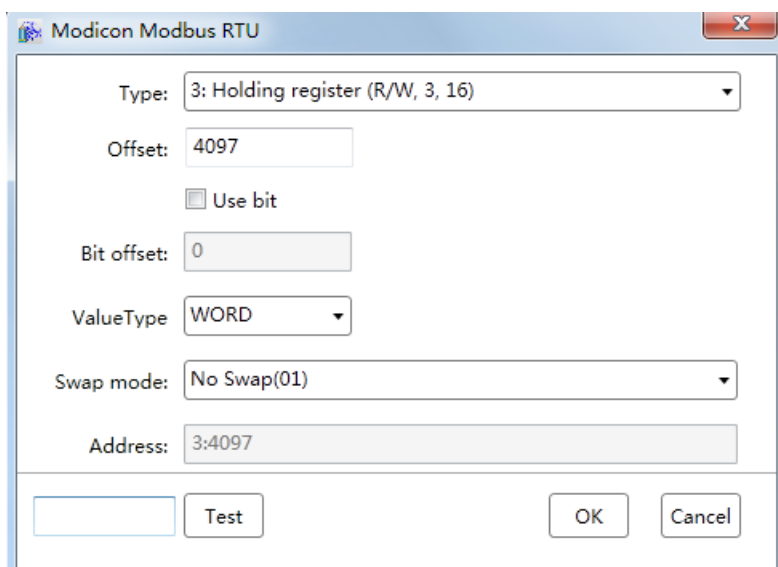
- Value type:

Value type	Description
BYTE	Byte
UBYTE	Unsigned byte
WORD	Word
UWORD	Unsigned word
DWORD	Double word
UDWORD	Unsigned double word
FLOAT	Single-precision floating point
DOUBLE	Double-precision floating point
STRING	String

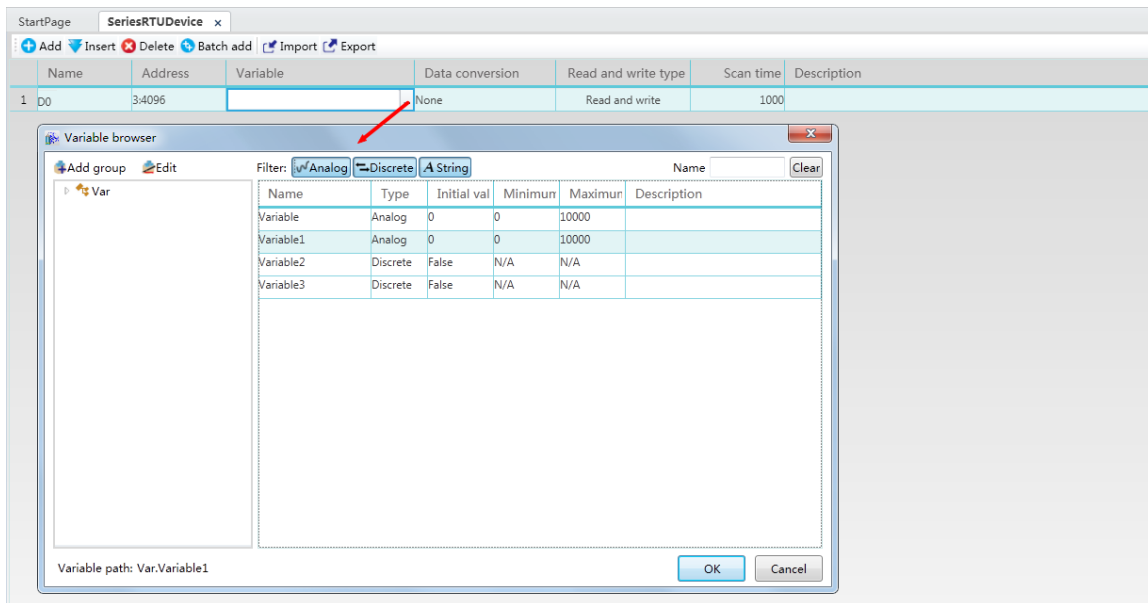
- Character exchange:

Byte exchange	Name
No Swap (01)	No exchange
Swap BYTE (10)	Byte exchange (Word)

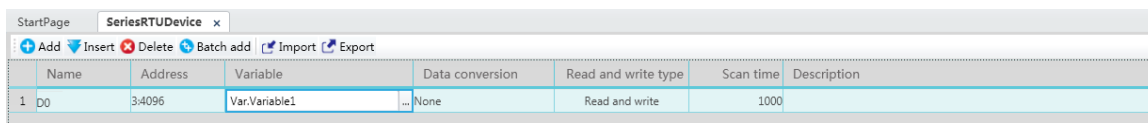
- **Step 4:** Select scratchpad type: “3 : R/W,3,16 (3: Keep scratchpad (R/W,3,16))”, unit number: 4097, keep the preset value for other items, as shown in the figure below:



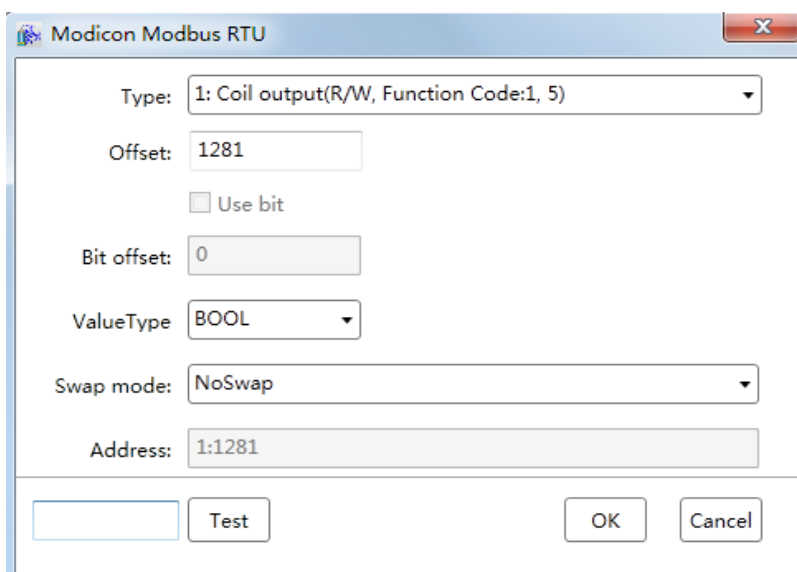
- **Step 5:** Click the button in the [Variable] field to open the variable browser and select the “Analog value” type variables:



- **Step 6:** Use preset values for the bits in other fields; this completes the creation of an IO variable D0:



- **Step 7:** Create another IO variable Y0: The other steps are the same as creating D0, only that its [Address] field parameters are as shown in the figure below:





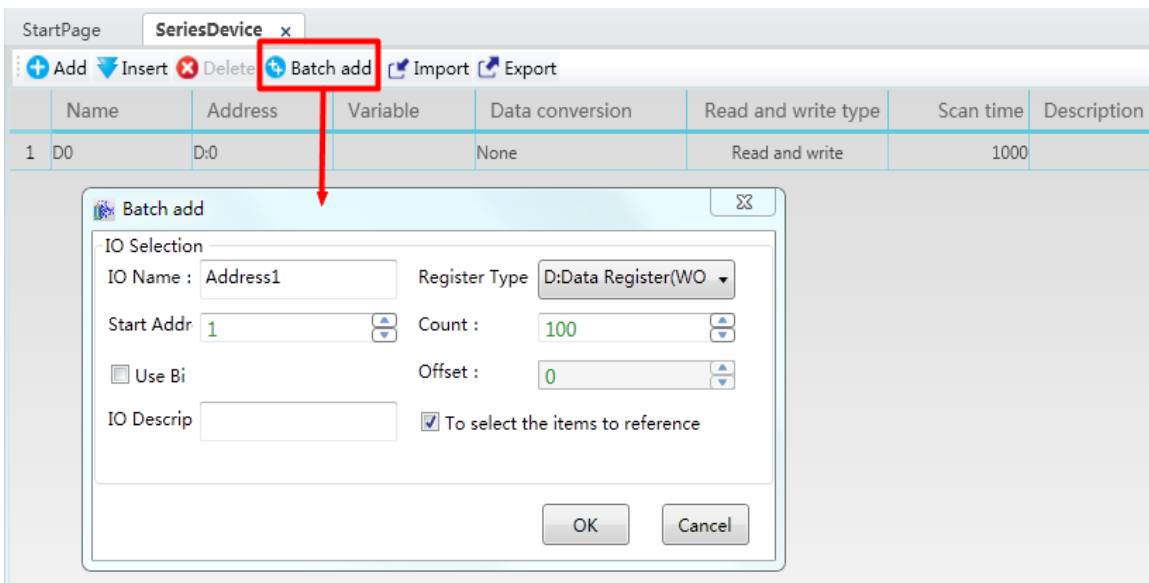
- **Step 8:** Complete the creation of the two IO variables D0 and Y0, as shown in the figure below:

	Name	Address	Variable	Data conversion	Read and write type	Scan time	Description
1	D0	3:4096	Var.Variable1	None	Read and write	1000	
2	Y0	1:1281		None	Read and write	1000	

## 2. Creating IO variables in batches

**Example 1:** Creating IO variables in batches based on the “Serial port device” in the “5.5.1 Serial port driver communication configuration” chapter.

- **Step 1:** Click the “Batch add button on the IO variable configuration window toolbar of the “Serial port device”:



Meanings of configuration items:

- **IO name:** The name of the IO variable; this name will be used as the basis with gradually increasing numbers at the end during batch add;
- **Register type:** Sets the scratchpad type;
- **Start address:** Sets the starting value of the address index for the batch creation of IO variables;
- **Count:** The number for creating IO variables in batches;
- **Use bit:** Whether to use a specified bit of the access communication address;
- **Offset:** Relative to the size of the scratchpad’s starting address;
- **IO Descrip:** Explanation information on the IO variable;
- **To selected the item to reference:** If selected, the IO name will use the selected IO variable name from the IO variable table as the basis and gradually increase; the scratchpad type will be the same as the selected IO variable type and the starting address will gradually

increase from the selected item's address. If not selected, the IO name will gradually increase using the name preset by the system, the scratchpad type will be the preset item and the starting address is 0.

- **Step 2:** Set the “Count” as: 10, and keep the remaining items the same:

- **Step 3:** Batch add 10 IO variables D1~D10, as shown in the figure below:

	Name	Address	Variable	Data conversion	Read and write type	Scan time	Description
1	D	D:0	Var.Variable1	None	Read and write	1000	
2	D1	D:1		None	Read and write	1000	
3	D2	D:2		None	Read and write	1000	
4	D3	D:3		None	Read and write	1000	
5	D4	D:4		None	Read and write	1000	
6	D5	D:5		None	Read and write	1000	
7	D6	D:6		None	Read and write	1000	
8	D7	D:7		None	Read and write	1000	
9	D8	D:8		None	Read and write	1000	
10	D9	D:9		None	Read and write	1000	
11	D10	D:10		None	Read and write	1000	

- **Step 4:** Associate the variables and set the bits in other fields; this completes the batch creation of IO variables.

### 3. Importing and exporting IO variables

The IO variables in the DIAView software can be imported or exported into Excel; the IO variables imported to Excel must be correct and valid data.

### 4. Printing IO variables

Use the “Print preview” button on the toolbar to preview the IO variable to print, and then confirm and print.

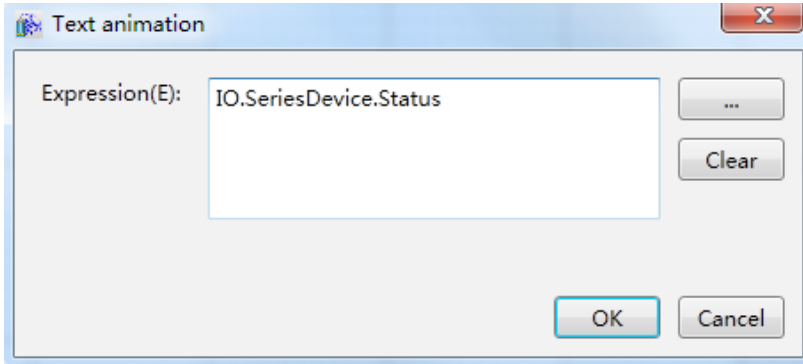
## 5.7 Communication status

There are three types of communication status: Connected, disconnected the stopped.

### View device communication status:

**Example:** Checking the communication status in “5.5.1 Serial port driver communication configuration”:

Draw a basic “text” graphic in any window of an existing project and configure “Expression(E)” in the Text animation window, as shown in the figure below:



The communication status of the “serial port device” can be checked once executed; please refer to the table blow:

Status	Flag bit status value
Communication normal	IO.serial port d evice.Status = 0
Communication disconnected	IO.serial port device.Status = 1
Communication stopped	IO.serial port device.Status > 1

## 5.8 Communication control

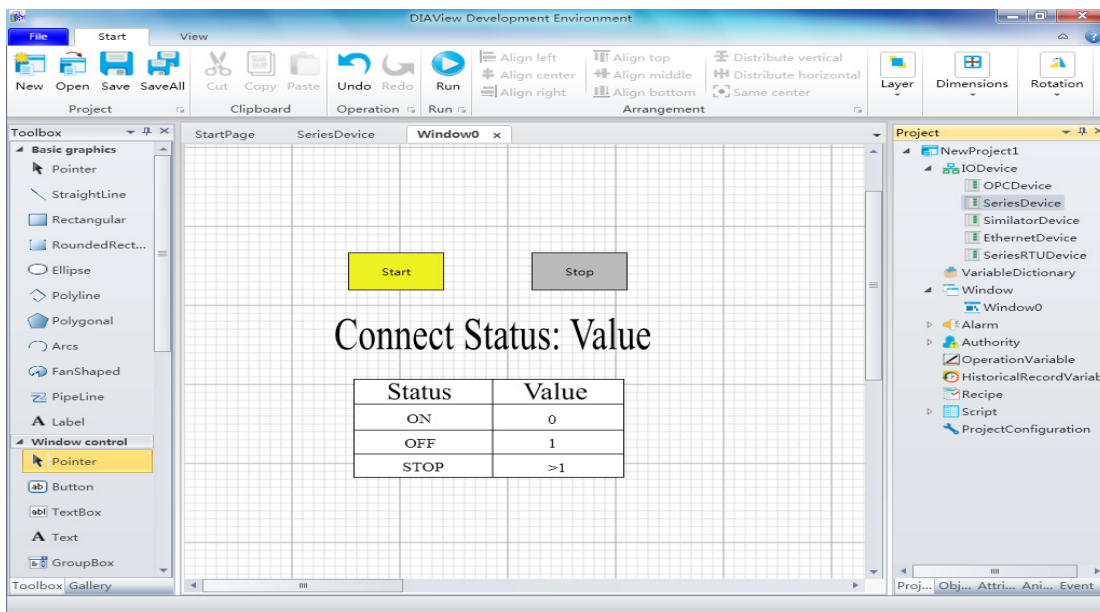
There are three types of communication status: connected, disconnected and stopped. In actual applications, the communication status returned by the DIAView software can be used to determine whether the lower device communication is normal, and dynamically control to start or stop its communication when necessary.

To perform control to the communication status, do so my changing the device communication status flag to change the property value of the status of the device; please refer to the example below:

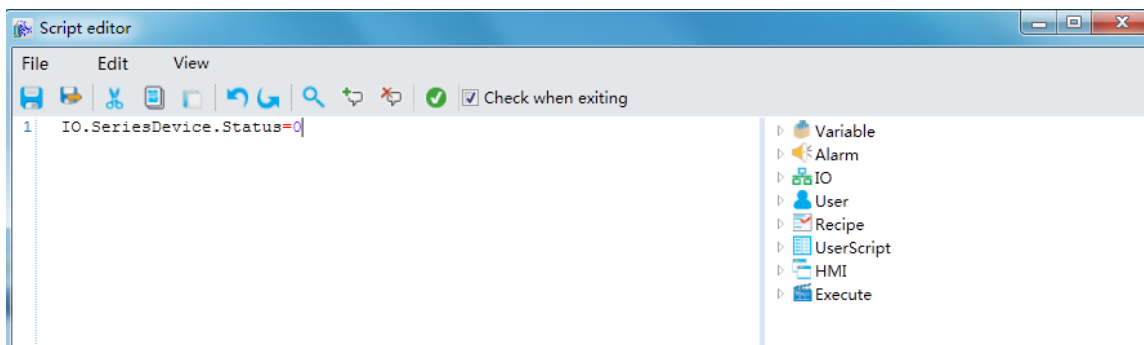
### Control device communication status:

**Example:** Controlling the communication status in “5.5.1 Serial port driver communication configuration”:

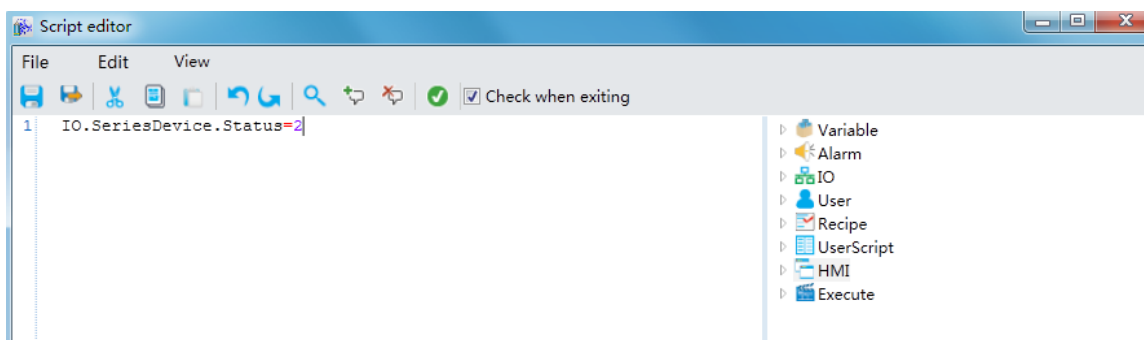
- **Step 1:** Draw two buttons and two texts in the window of an existing project, as shown in the figure below:



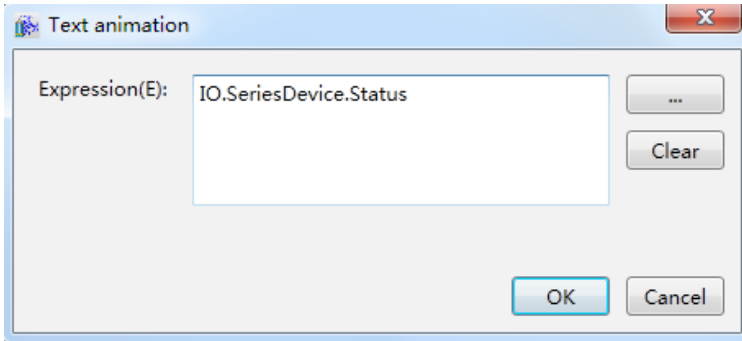
- **Step 2:** Configure a “Left-click” event for the “Start button”, as shown in the figure below:



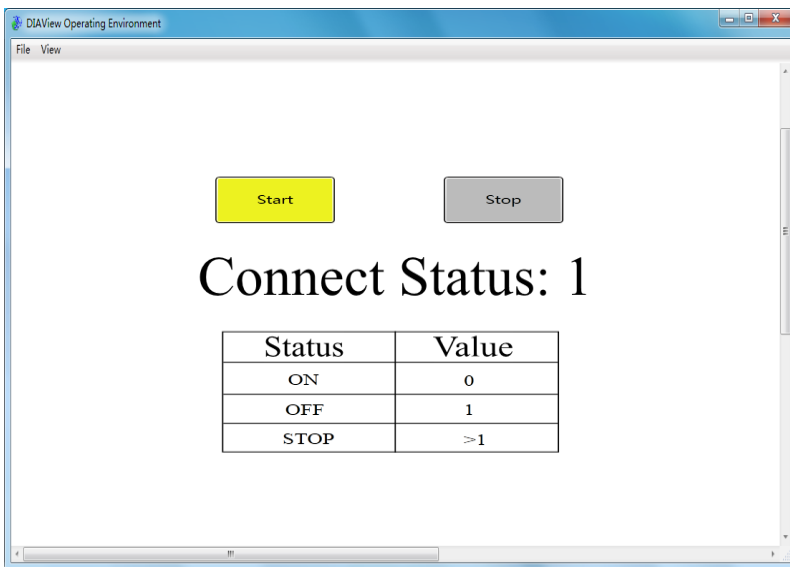
- **Step 3:** Configure a “Left-click” event for the “Stop” button, as shown in the figure below:



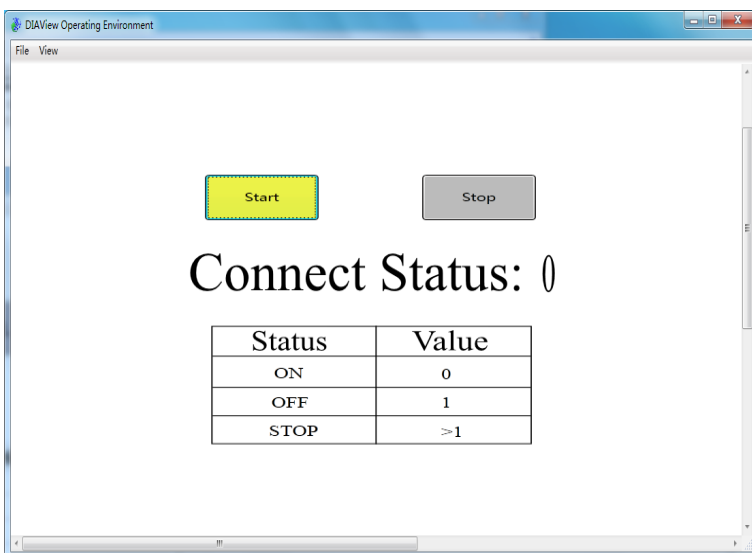
- **Step 4:** Configure a “Expression(E)” for the “Status value” text, as shown in the figure below:



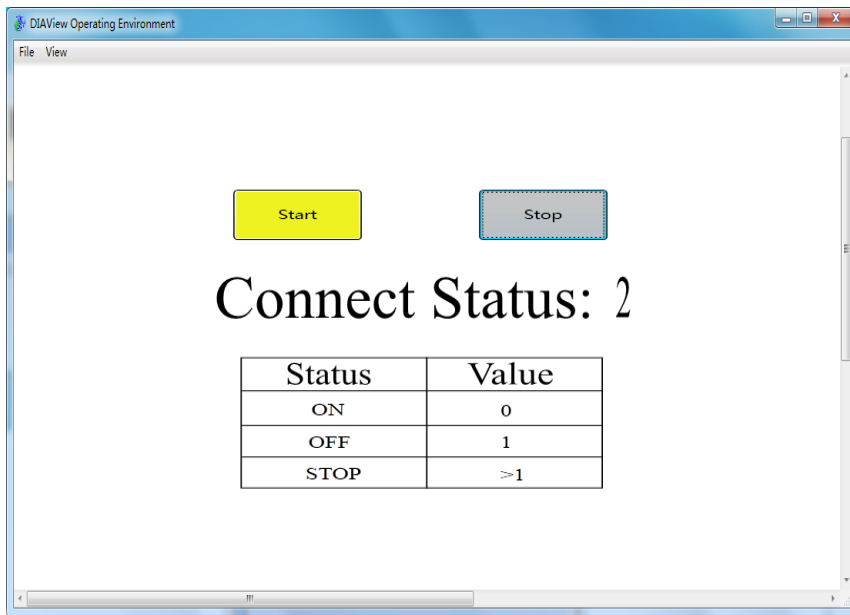
- **Step 5:** Once executed the initial communication status of the “Serial port device” is as follows:



- **Step 6:** The communication status of the “Serial port device” is as follows after clicking the “Start” button:



- Step 7: The communication status of the “Serial port device” is as follows after clicking the “Stop” button:



# 6. Variable dictionary

## 6.1 Overview

Project items created using the DIAView software requires various types of variables for information handshake in order to display and control the on-site production status in real-time.

There are two types of variables in the DIAView software: system variables and project variables. System variables are variables built-in the DIAView system and cannot be modified;

Project variables are variables customized by the user in the project, and are usually managed by the “variable dictionary” using centralized management.

The variable dictionary is a collection manager of all the variables in the system, and is able to perform uniformed and centralized management of all the variables; variable groups and variables can be created in the variable dictionary, and functions such as browsing variable references, variable statistics and variable replacement etc. Operations such as adding, deleting, copying, pasting, cutting, importing and exporting of variables can also be performed.

## 6.2 Variable group

A variable group is a unit for grouping and managing variables.

The DIAView software can group and manage the variables in the project by creating variable groups and then adding variables in the variable group. To use the variables in a variable group, the name of the variable group must first be appointed; the variable group name and variable name is separated with “.”, for example “Var.NewVariableGroup.NewVariable”.

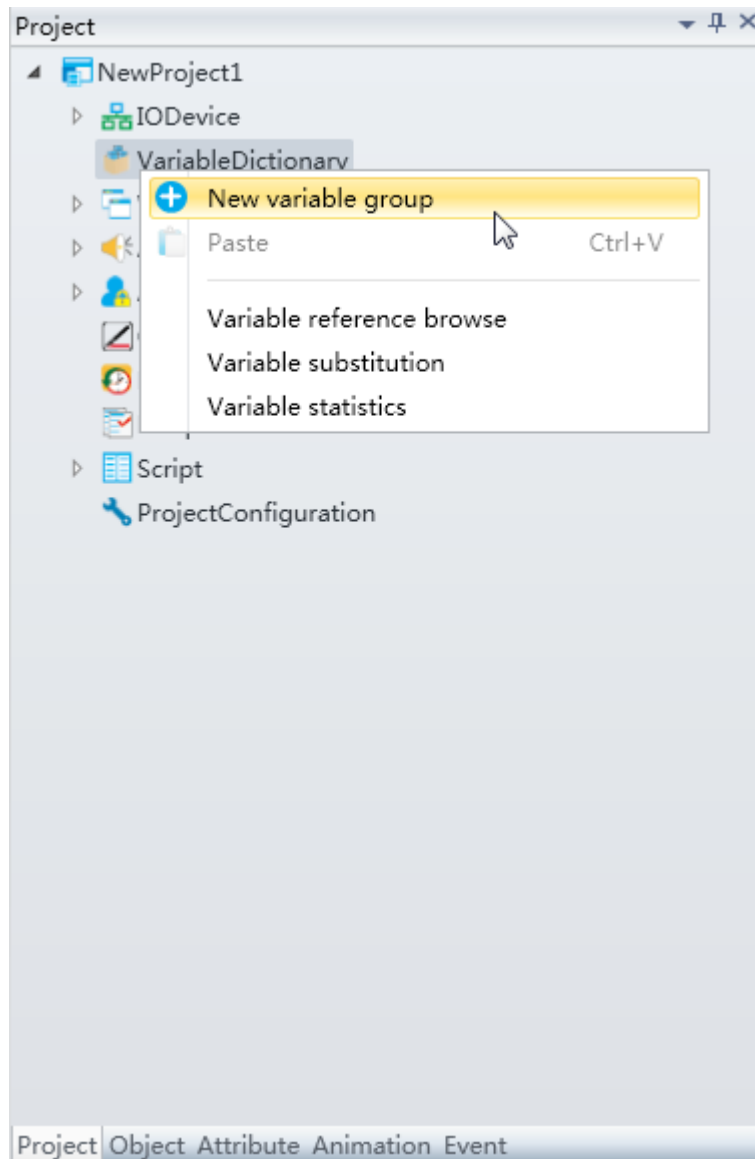
Several variable groups can be created under a variable dictionary, and variable groups can also be created under variable groups.

### ■ Variable group name naming rules:

1. Composed of English letters, numbers, Chinese characters and underscore, and can only begin with an English letter or Chinese character;
2. Not case sensitive;
3. The length cannot exceed 200 characters and cannot exceed 25 Chinese characters;
4. Variable group names cannot be repeated under similar class nodes within a project;
5. If there are variables and variable groups under similar class nodes within the same project, the variable and variable group names cannot be repeated.

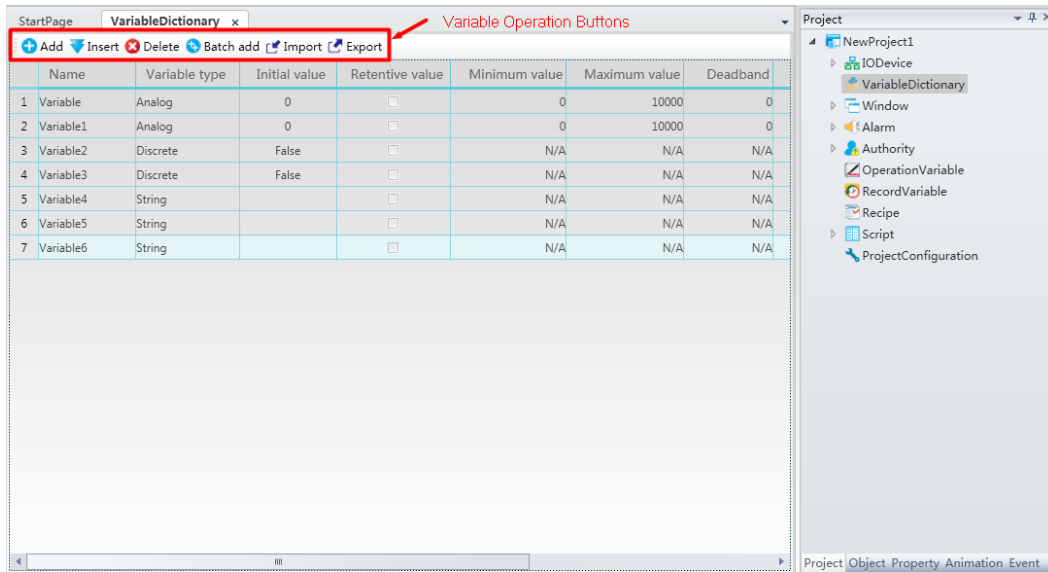
### ■ Adding variable group

- Right-click the “variable dictionary” node in the project window tree index and then click the “add variable group” from the right-click menu. The system will create a new variable group using the preset name, as shown in the figure below:

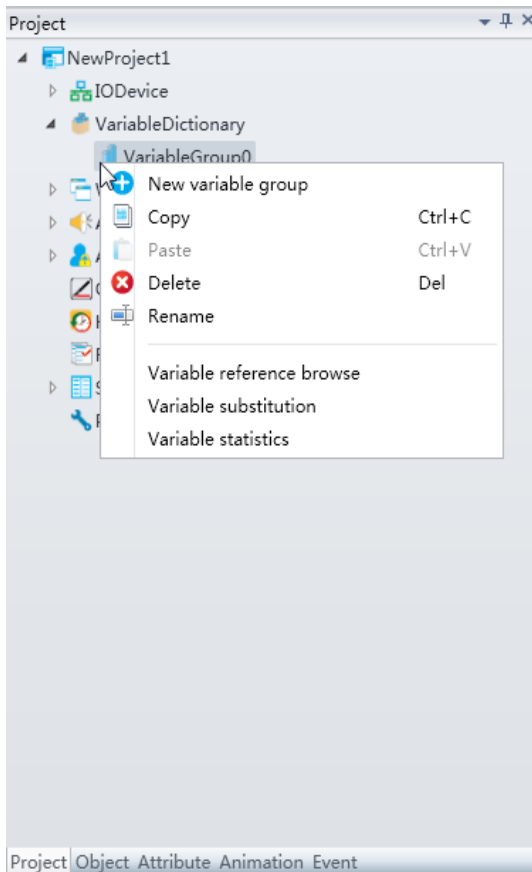




- Double-click the created “variable group” sub-node and open the variable operation window to perform operations including adding, inserting and deleting of variables, as shown in the figure below:



- Right-click the created variable sub-node to perform operations including “add variable group”, “copy”, “paste”, “delete” and “rename” etc. (file must be saved before copying), as shown in the figure below:



## ■ Adding variables directly under “variable dictionary”

- Users can also double-click on the “variable dictionary” node to open the variable configuration window without adding a variable group to perform add variable and other operations.

## 6.3 Variables

**System variables:** Fixed variables built-in the system; the DIAView software has 16 system variables which can be used directly by the users:

Name	Type	Description
Year	Integer	The current system date of year
Month	Integer	The current system of month
Day	Integer	The current system days number
Hour	Integer	The current system of hour
Minute	Integer	The current system of minute
Second	Integer	The current system of seconds
Millisecond	Integer	The current system of millisecond
DayOfYear	Integer	The current system date is in the first few days of the year.
DayOfWeek	Integer	The current system date week
Date	Character string	The current system date string
Time	Character string	Current system time string
Now	Date	The current system of date and time
StartTime	Date	Current project startup time
ElapsedTime	Real	Project running time, unit for seconds
CurrentUserName	Character string	Current login user
HasAlarm	Discrete	Whether the current system exists the alarm

Variables are values that can change at any time in a project; they are important participants for the information handshake of the system. Variable information within the DIAView software as follows:

	Name	Variable type	Initial value	Retentive value	Minimum value	Maximum value	Deadband
1	Variable	Analog	0	<input type="checkbox"/>	0	10000	0
2	Variable1	Analog	0	<input type="checkbox"/>	0	10000	0
3	Variable2	Discrete	False	<input type="checkbox"/>	N/A	N/A	N/A
4	Variable3	Discrete	False	<input type="checkbox"/>	N/A	N/A	N/A
5	Variable4	String		<input type="checkbox"/>	N/A	N/A	N/A
6	Variable5	String		<input type="checkbox"/>	N/A	N/A	N/A
7	Variable6	String		<input type="checkbox"/>	N/A	N/A	N/A

## ■ Basic properties of variables:

### 1. **Name:** Name of the variable.

Naming rules:

- (1) Composed of English letters, numbers, Chinese characters and underscore, and can only begin with an English letter or Chinese character;
- (2) Not case sensitive;
- (3) The length cannot exceed 200 characters and cannot exceed 25 Chinese characters;
- (4) Variables in the same node or variable group cannot have repeated names;
- (5) If there are variables and variable groups under the same node, the variable and variable group names cannot be repeated.

### 2. **Variable Type:** Defines the value type of the variable.

There are 3 types of variables:

**Text:** Character type (the maximum length of this type of variable is two thousand characters)

**Digital:** Digital type (False, True).

**Analog:** Integer type and real type.

### 3. **Initial value:** The initial value of the variable.

### 4. **Minimum value and maximum value:** Specifies the value range of the variable (these two properties are only available for the “analog value” type variable).

### 5. **Deadband:** Specifies a value as the deadzone value and forms a deadzone interval with the current value of the variable:

(Current variable value - deadzone value) <= deadzone interval <= (current variable value + deadzone value);

- Effect: Data filtering.
- Principle: When the next variable value acquired is within the deadzone interval range, no new values will be acquired for the variable value and the original value will remain the same. If it is not in the deadzone interval range, then acquire a new variable value and the deadzone interval will also change accordingly. It will keep looping this way. (This property is only available for the “analog value” type variable).

### 6. **Whether to save the initial value:** If checked, the “initial value of the variable” for this variable will be saved as the last acquired value when the system execution ends; or else it will remain the same.

### 7. **Decimal Digit:** Specifies the number of decimal places for the variable (this property is only available for the “analog value” type variable).

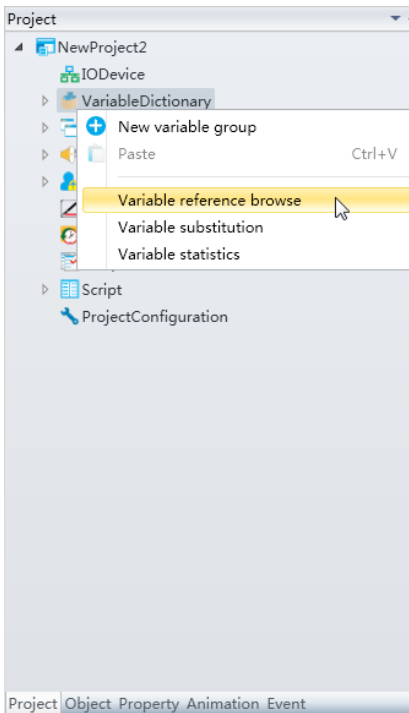
### 8. **Project unit:** Sets the unit of the variable; for example: seconds/s, milliliter/ml and kilogram/kg. Variable value can be acquired and also display this project’s unit when using variables; for example: Var.NewVariableGroup.NewVariable.ValueAndUnit (this property is only available for the “analog value” type variable).

### 9. **Description:** Add explanation information for the variable.

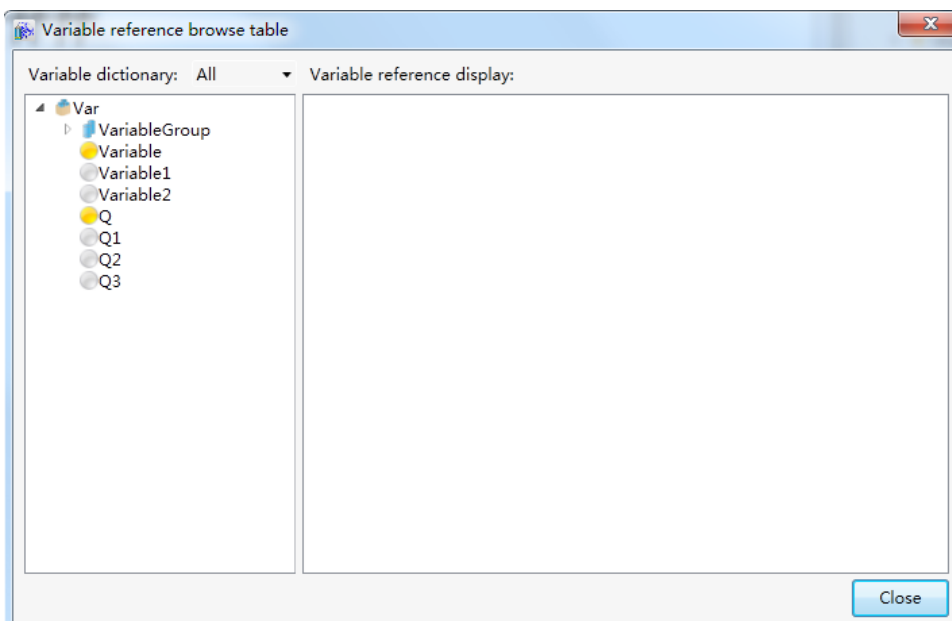
## 6.4 Variable usage browser

The variable usage browser refers to the window used to view the status of all variable references in the “variable dictionary”. It can be used to view whether a variable is referenced and information on the reference path.

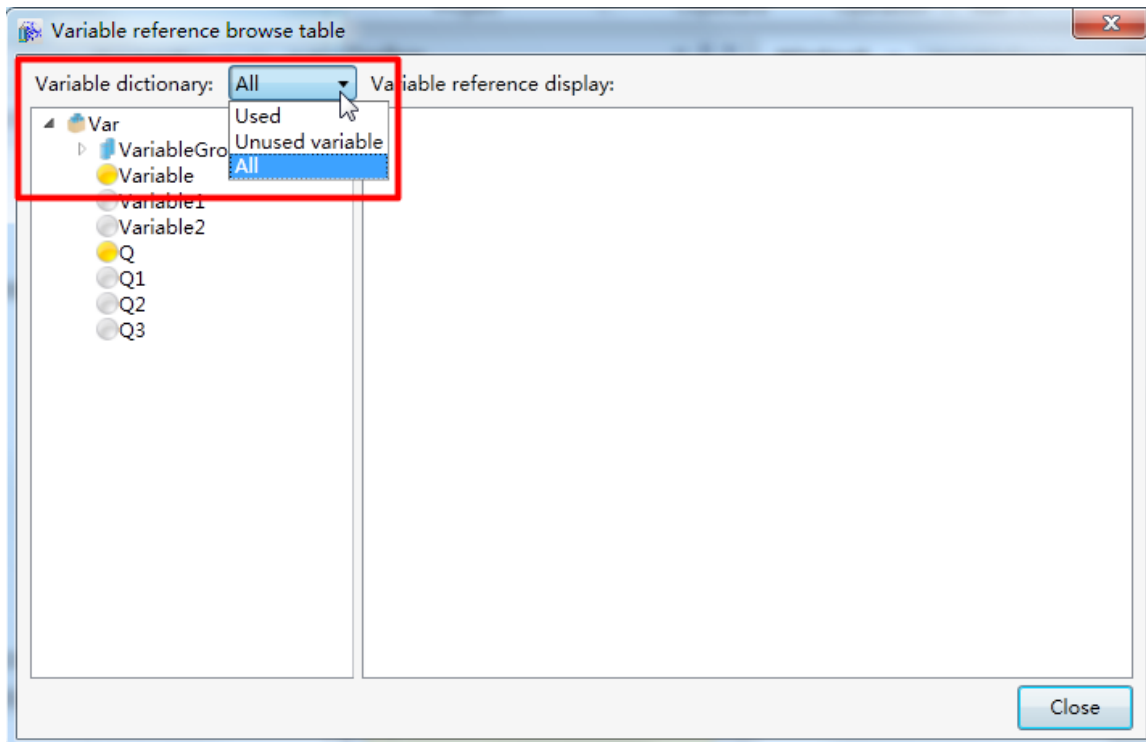
- Right-click the “variable dictionary” node in the project window tree index and then click the “Variable reference browse” from the right-click menu, or click the “Variable reference browse” in the right-click menu of the variable group node, as shown in the figure below:



- The variable usage browser will pop-up, as shown in the figure below:



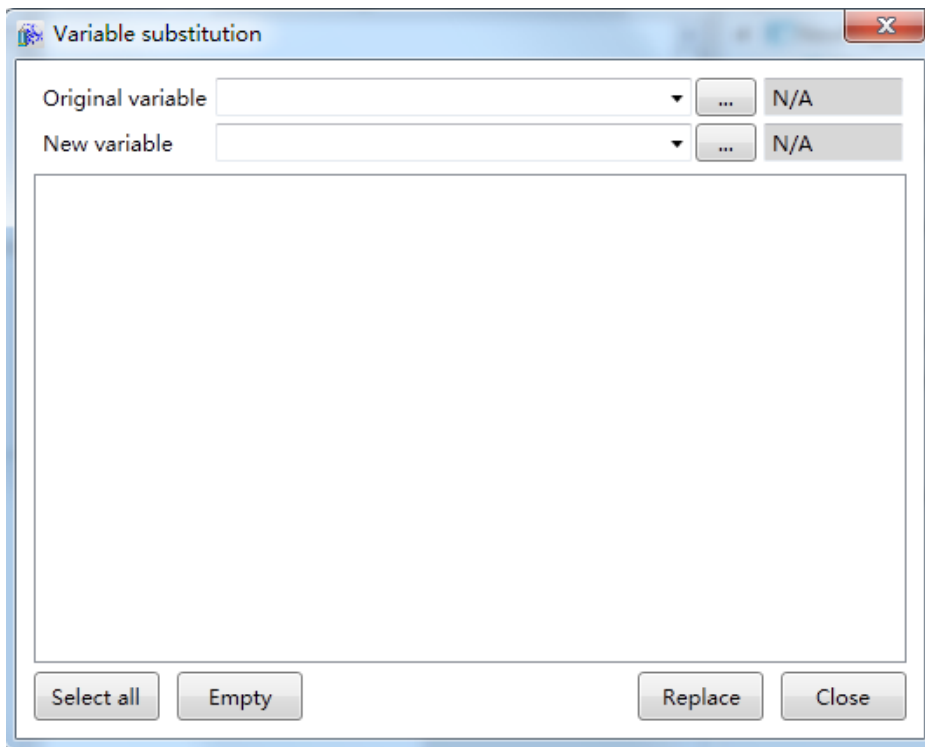
1. The left side of the variable usage browser is the tree index of the variable dictionary, and the right side is the display window of variable references.
2. In the tree index to the left, if the round symbol in front of the variable displays as “yellow”, it means that this variable is referenced. If it is “gray,” it means that it is not yet referenced.
3. Select the variable to view from the tree index to the left, and the variable reference display window on the right will display all objects in the project that uses that variable. They are displayed using an expanded tree index in order for users to pinpoint the objects that actually uses this variable.
4. Click the pull-down button to the left of the “variable dictionary” to filter the variables, as shown in the figure below:



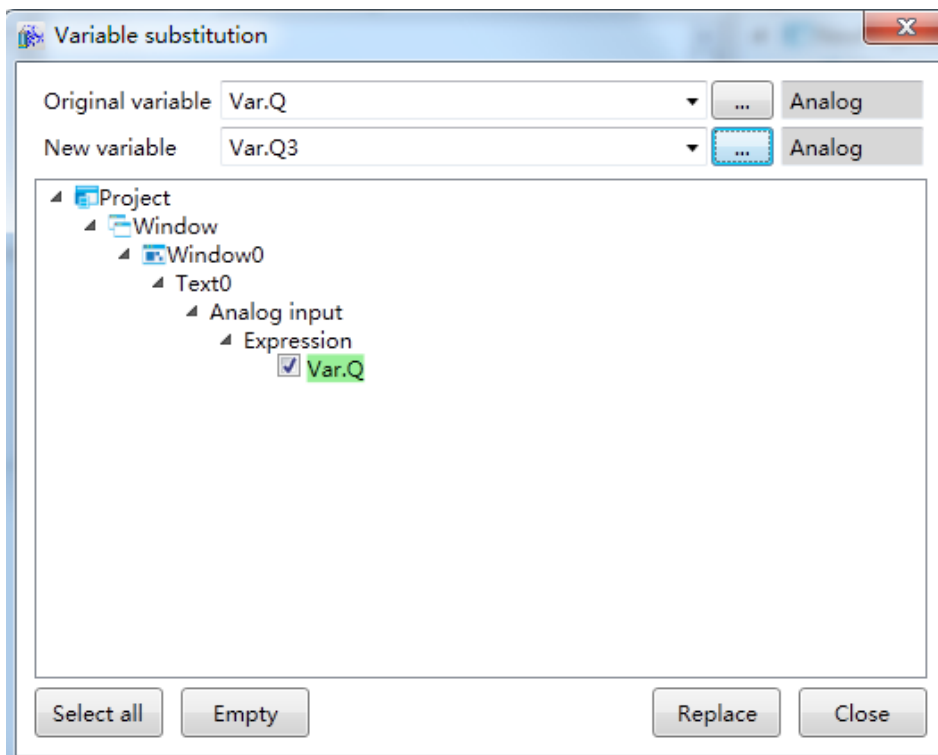
## 6.5 Variable substitution

Variable substitution refers to substituting a referenced variable in the project into another variable.

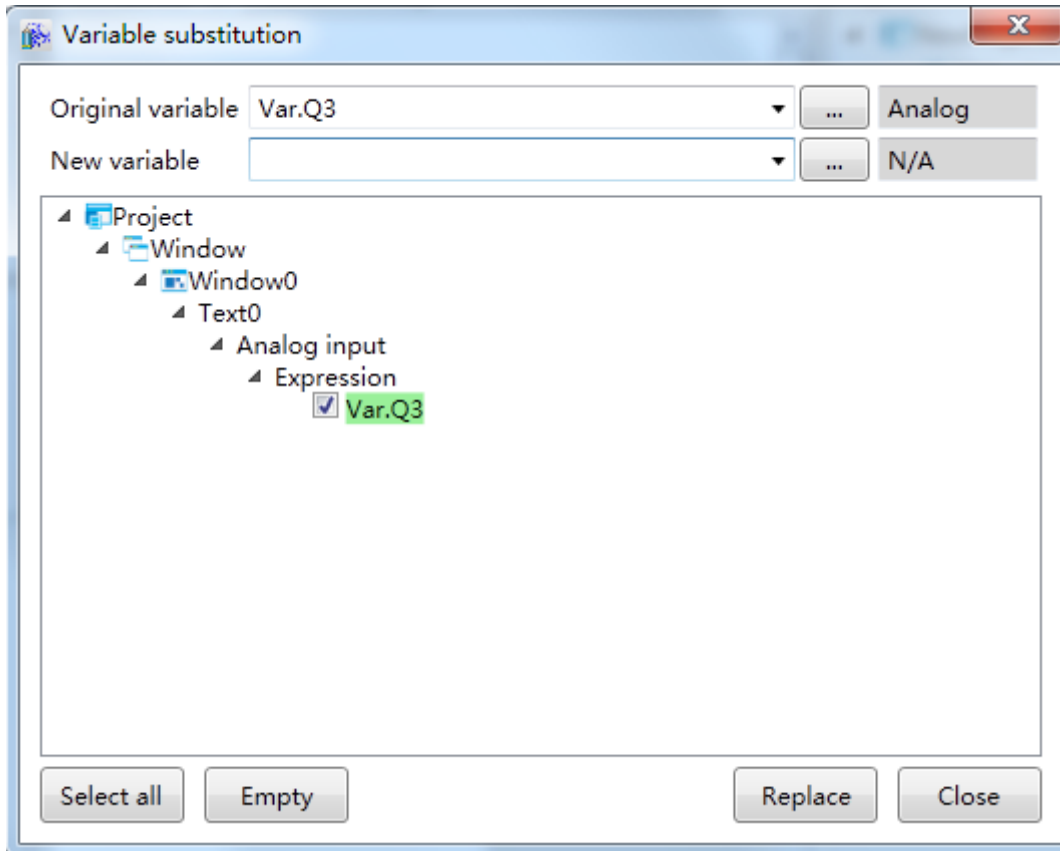
- Right-click the “variable dictionary” node in the project window tree index and then click the “variable substitution” from the right-click menu, or click the “variable substitution” in the right-click menu of the variable group node, as shown in the figure below:



Select the variable to substitute from the “Original variable” field. It can be selected by pressing the variable selection button to the right and opening the variable browser. The selected variable must be referenced in order for it to be replaced. When a variable is selected, the reference level list of this variable will be listed in the window. If there is no reference level list, then it means that this variable is not referenced, as shown in the figure below:



Select the new variable to substitute the original variable from the “New variable” field, and then select the variable to substitute in the reference level list (preset to select all). Users may press the “Select all” button to select all, and then press the “Variable substitute” button to perform variable substitution. Substituted result is as shown in the figure below:

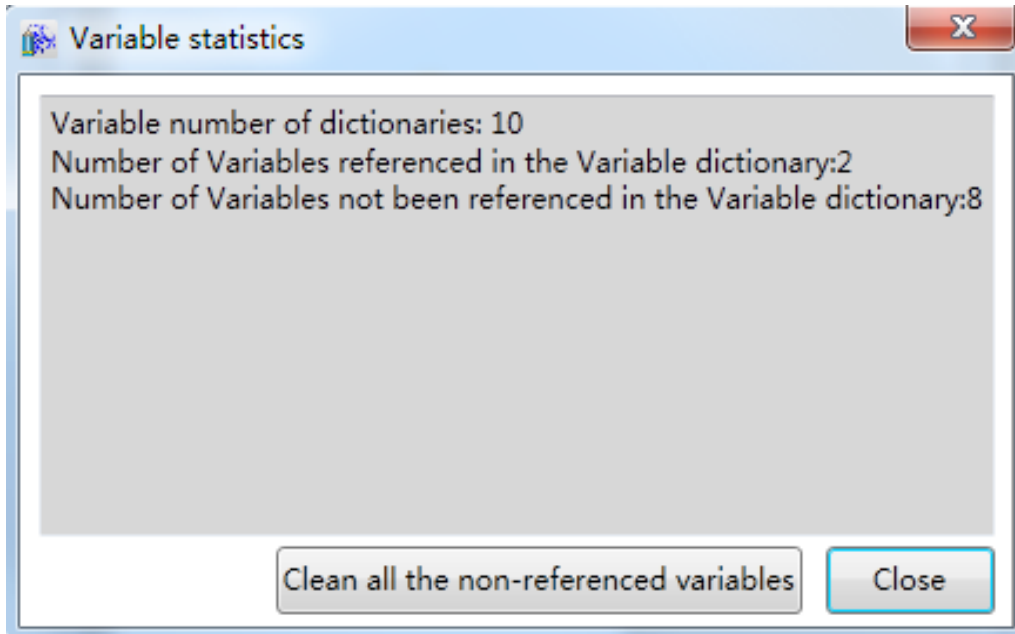


※ Variable substitution is not supported for variables associated with historic curves and reports.

## 6.6 Variable statistics

Variable statistics is the statistics for the total number of variables in the project and the usage situations of the variables.

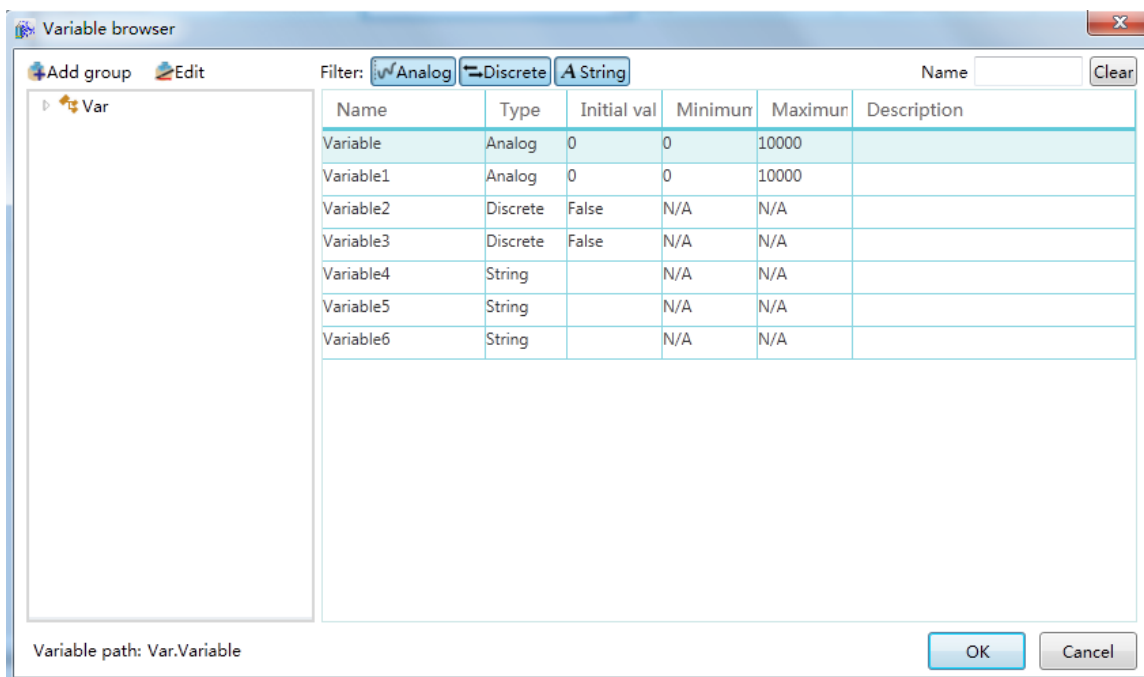
- Right-click the “variable dictionary” node in the project window tree index and then click the “Variable statistics” from the right-click menu, or click the “Variable statistics” in the right-click menu of the variable group node to open the variable statistics window, as shown in the figure below:



Click the “Clear all non-referenced variables” button to delete all unused variables in the variable dictionary.

## 6.7 Variable browser


The variable browser is the window that displays all variables in the Variable dictionary”; many functions in the DIAView engineering items need to use variables. For example, configurations such as recipes and variable operations etc. need associated variables, so when they are needed the “Variable browser” can be opened to search for the variable that needs to be used, as shown in the figure below:

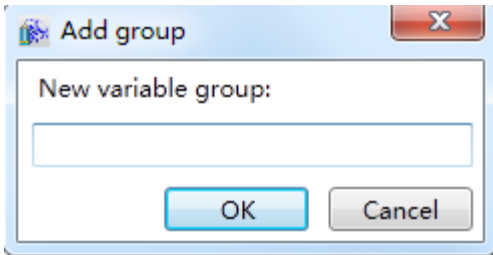





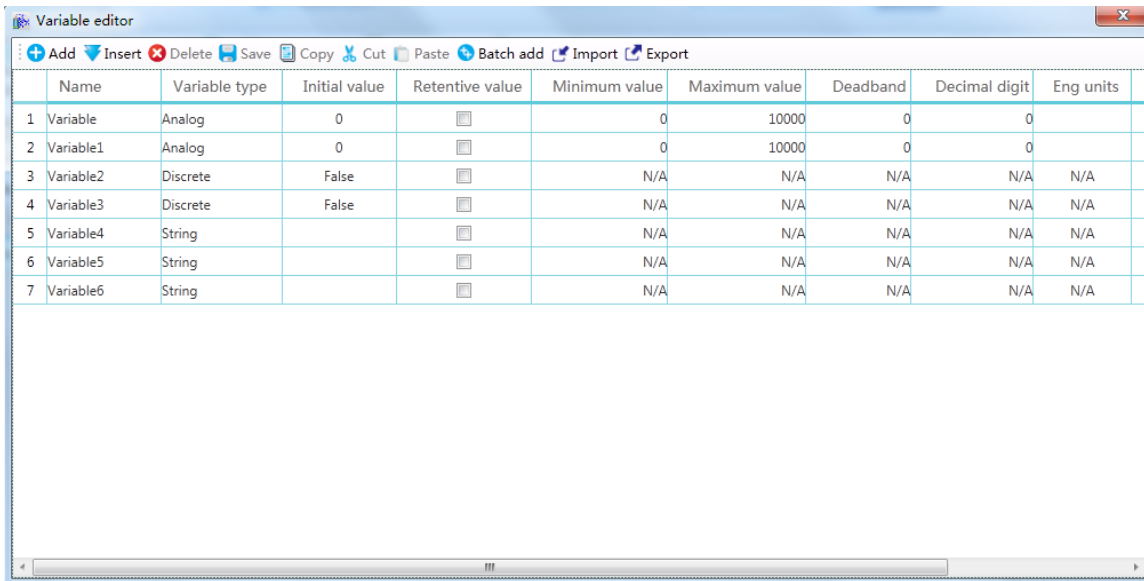
Once the “Variable browser” is opened, all variable groups in the project will be displayed in the tree index to the left; press the variable group and all variables in the variable group will be displayed in the window to the right. Click and select the variable needed and then press the “OK” button, or double-click the variable needed to select the variable and use it.

■ **Toolbar**

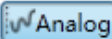

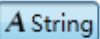
1. Add variable group, press the  Edit button and the add variable group dialog will pop-up, which allows you to add variable groups:



2. Edit variable, press the  Edit button and the variable editor window will pop-up, which allows you to perform variable operations:



3. Variable type filter, the background of the button will change to blue when selected

Filter:    , which means display all this type of variables in the variable dictionary; when it is not selected, it means do not display this type of variables:

Only browse “Analog value”

Filter:  Analog  Discrete  String Name

Name	Type	Initial val	Minimum	Maximum	Description
Variable	Analog	0	0	10000	
Variable1	Analog	0	0	10000	

- a. Browse “Analog value” and “Digital value”

Filter:  Analog  Discrete  String Name

Name	Type	Initial val	Minimum	Maximum	Description
Variable	Analog	0	0	10000	
Variable1	Analog	0	0	10000	
Variable2	Discrete	False	N/A	N/A	
Variable3	Discrete	False	N/A	N/A	

4. Search variable, Name   enter the variable name keyword in the input frame to search for variables in real-time.

## 6.8 Expressions

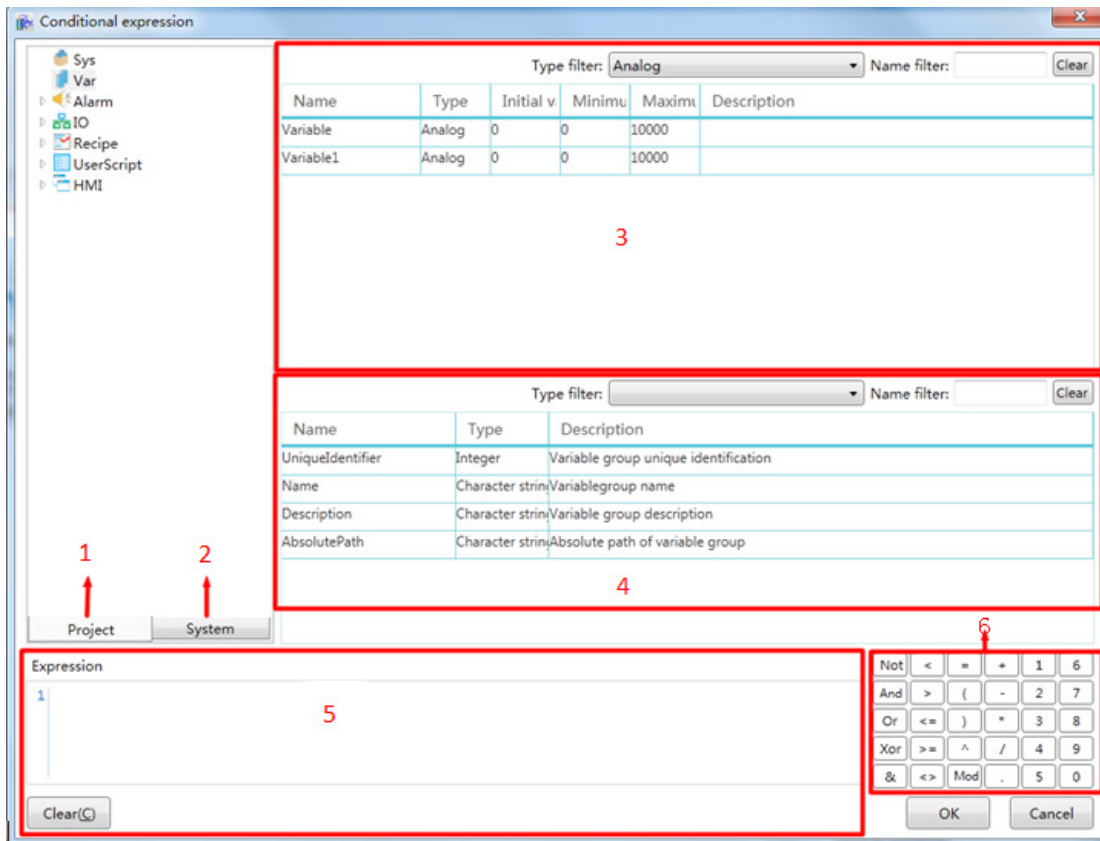
Expressions are meaningful arrangement method combinations of digits, operators, digital grouping symbols (brackets etc.) and variables used to determine a value.

Expressions are used for configuring animations and events in the DIAView software project and writing user program scripts etc. Operations such as logical operations, arithmetic operations are relational operations and performed through expressions to generate a new result for the program to use in order to satisfy the configuration needs of project animations, events and scripts, and achieve certain functions in the project.

### ■ Common operators used in expressions:

Expression editing window used for configuring animations:

Conditional expression editing window used for configuring animations and conditional programs:



The meanings of each item in the window are as follows (the “Variable dictionary” node is selected in the figure):

1. Project object tree index window: Includes objects such as system variables, project variable dictionary, alarm and communication etc.
2. System function tree index window: Includes system functions.
3. Object list: Display area of the list of variable and other objects; double-clicking an object allows it to be used.
4. Object properties list (this list is displayed according to the object selected): The display area of the object property list; double-clicking an object property allows it to be used.
5. Expression editing window: Allows editing of expressions.
6. Expression operator and digital button area: Selected operators and digits etc. can be used.

# 7. Graphical interface development

## 7.1 Overview

Graphical interface development refers to vividly drawing on-site facilities, equipment, site structure and instruments etc. on the DIAView software, forming an analogy picture of the industrial site. It can even configure and connect data acquisition equipments such as on-site equipment and instruments to display the data on the window in real-time, making it easy for workers to monitor the on-site status. Simulator switches and controllers etc in the window interface can also be used to transmit commands and control equipment on-site.

Graphical interface development is an important ring to realize surveillance and control systems; it is the core of the project that integrates various resources of the system to achieve function requirements of the project. Its effect is to make the window become the platform to display system information in real-time and allow system administrators to perform system operation controls.

The basic component of the graphical interface is called “graphics” or “graphic objects”. The DIAView software window provides a drawing sketchpad and tools for drawing, including basic graphic components, control units and graphic models etc.; it also provides windows to configure graphic object properties, animations and events, providing an operating platform for graphical interface development.

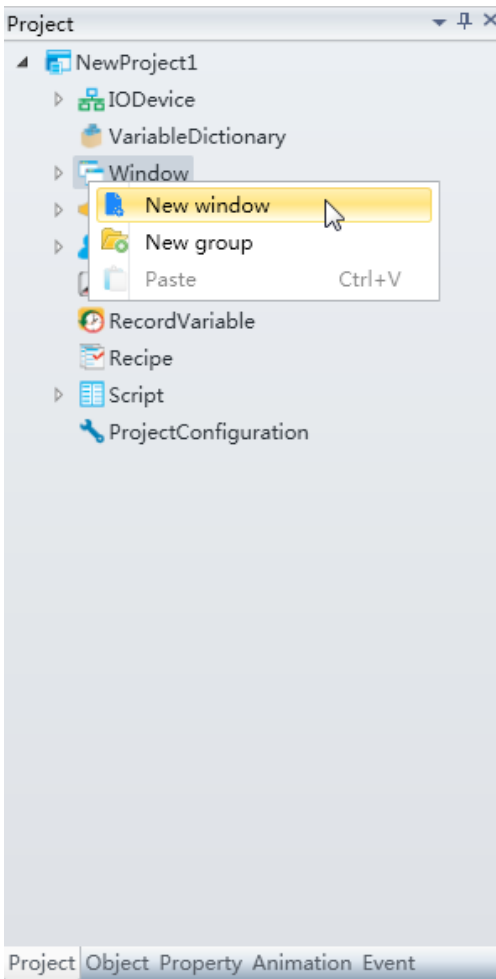
## 7.2 Window

### 7.2.1 Add window

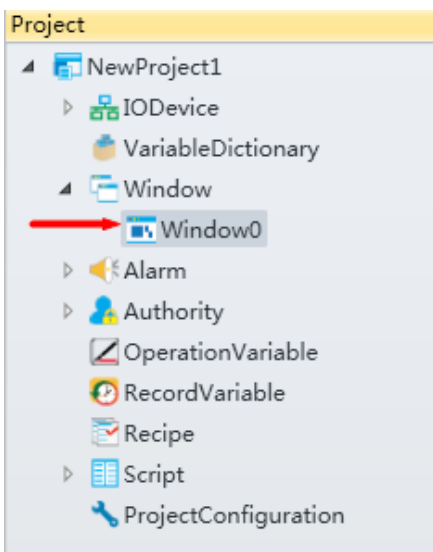
In the DIAView software, windows are core components to perform on-site analogy picture drawing, parameter configuration and data display; it is the basis to achieve DIAView software visualization.

- **Steps to add window:**

Right-click on the “Window” node in the project window tree index and then click the “New window” item in the right-click menu, as shown in the figure below:



After clicking “New window”, the system will generate a window sub-node under the “Window” node using a preset name, and the new window will be opened in the sketchpad work area, as shown in the figure below:

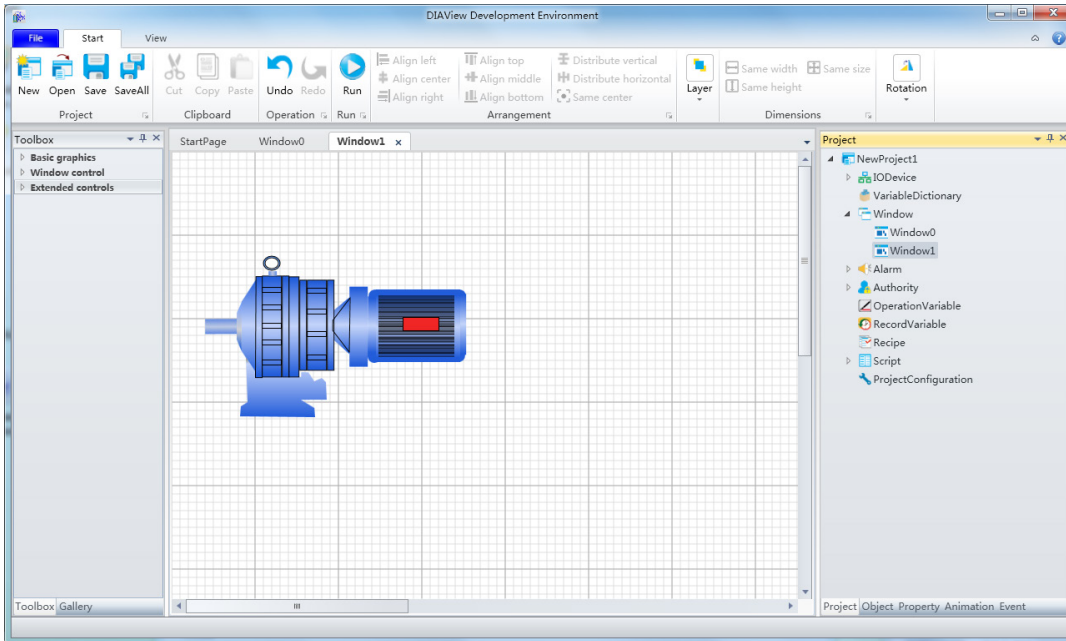


## 7.2.2 Window operation

### ■ Open window

When a new window is added, it will automatically be opened at the sketchpad work area;

If the window already exists in the “Window” node, a window sub-node can be opened by double-clicking on it. Several windows can be opened simultaneously in the sketchpad work area, as shown in the figure below:

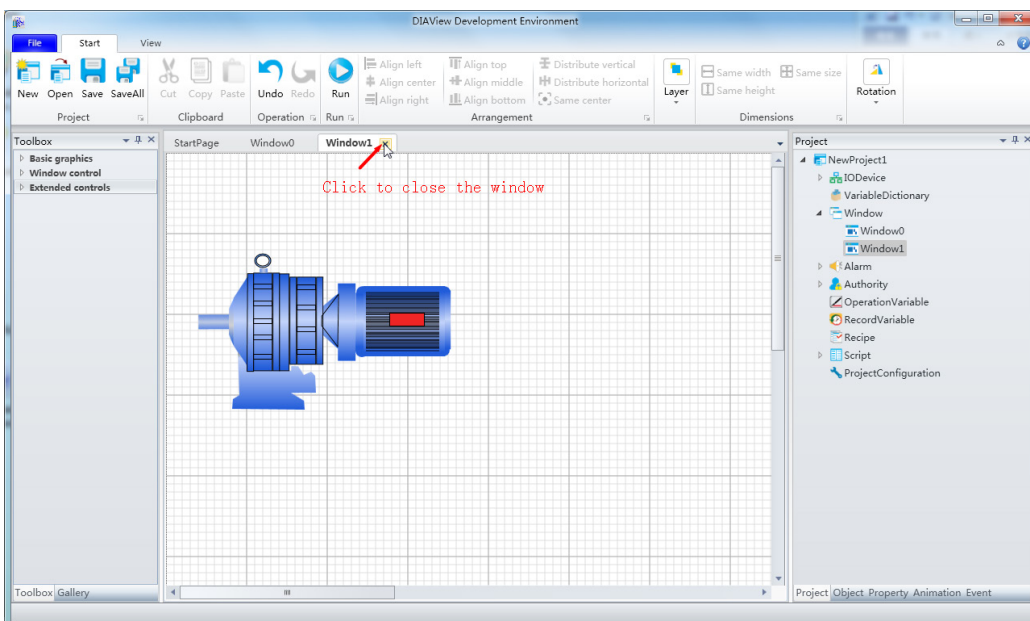


### ■ Close window

There are several ways to close a window:

#### Method 1:

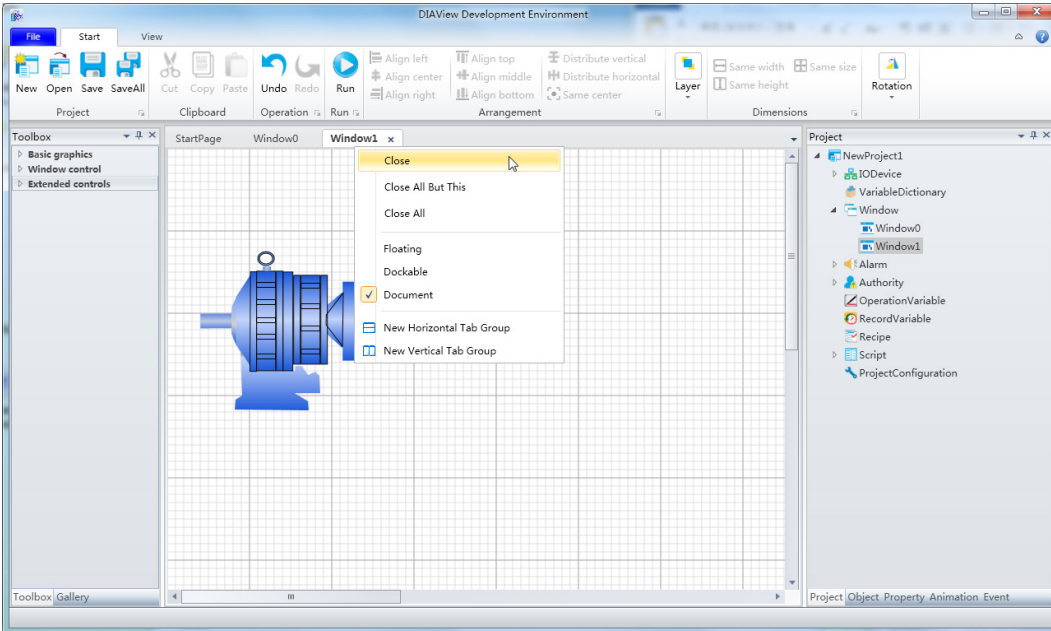
To close an opened window in the sketchpad work area, simply click the “ X ” to the right of the window name:



**Method 2:**

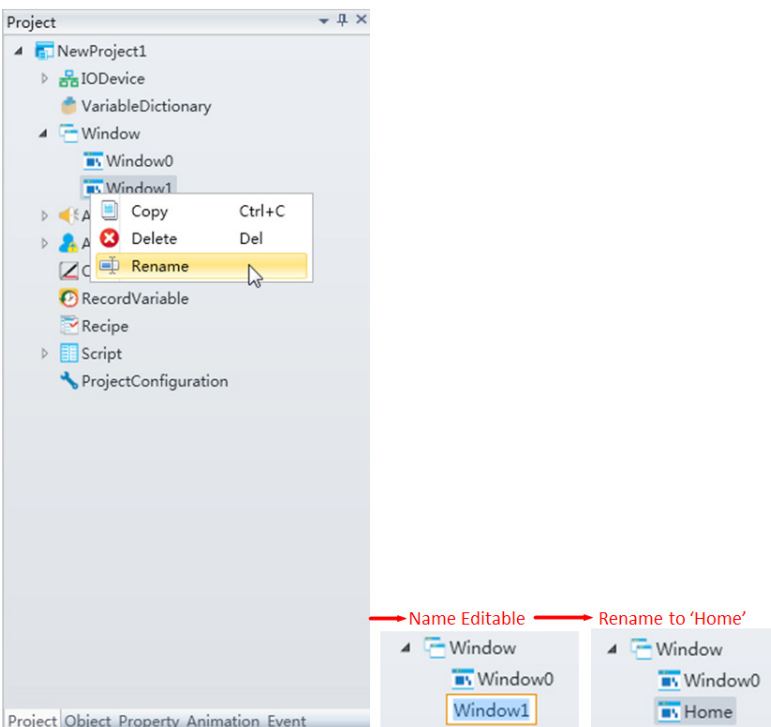
In the sketchpad work area, select the closing method (3 types) from the field to the right of the opened window:

- 1. Close: Closes the current window
- 2. Close all others: Closes all other windows besides the current window
- 3. Close all: Closes all windows



■ **Rename window**

Select the window node to rename in the project window tree index and right-click on it, and select the “Rename” item from the right-click menu. The window name will become an editable status and just input the new window name, as shown in the example in the figure below:



### ■ Window naming rules:

1. Composed of English letters, numbers, Chinese characters and underscore, and can only begin with an English letter or Chinese character;
2. Not case sensitive;
3. The length cannot exceed 200 characters and cannot exceed 25 Chinese characters;
4. The names of windows under the same node or window group cannot be repeated.

### ■ Copy window:

Select the window node to copy from the project window tree index and right-click on it, then select the “Copy” item from the right-click menu to copy all contents in the window (window must be saved before copying). Once the window is copied, it can be pasted using the right-key at the “Window” root node or other window sets, the same window as the copied window will be created.

### ■ Delete window:

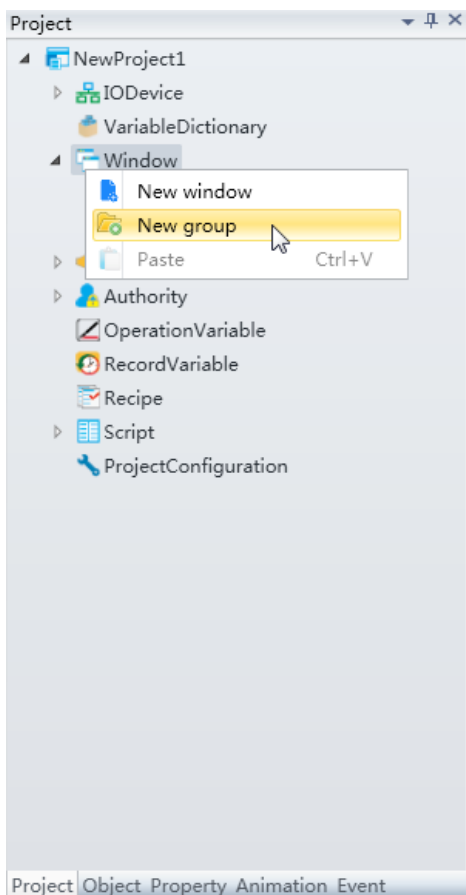
Select the window node to delete from the project window tree index and right-click on it, then select the “Delete” item from the right-click menu to delete the window.

## 7.2.3 Add new window group

The window group is a unit to perform grouped management of windows; group management can be performed to the different types and uses of windows in the project.

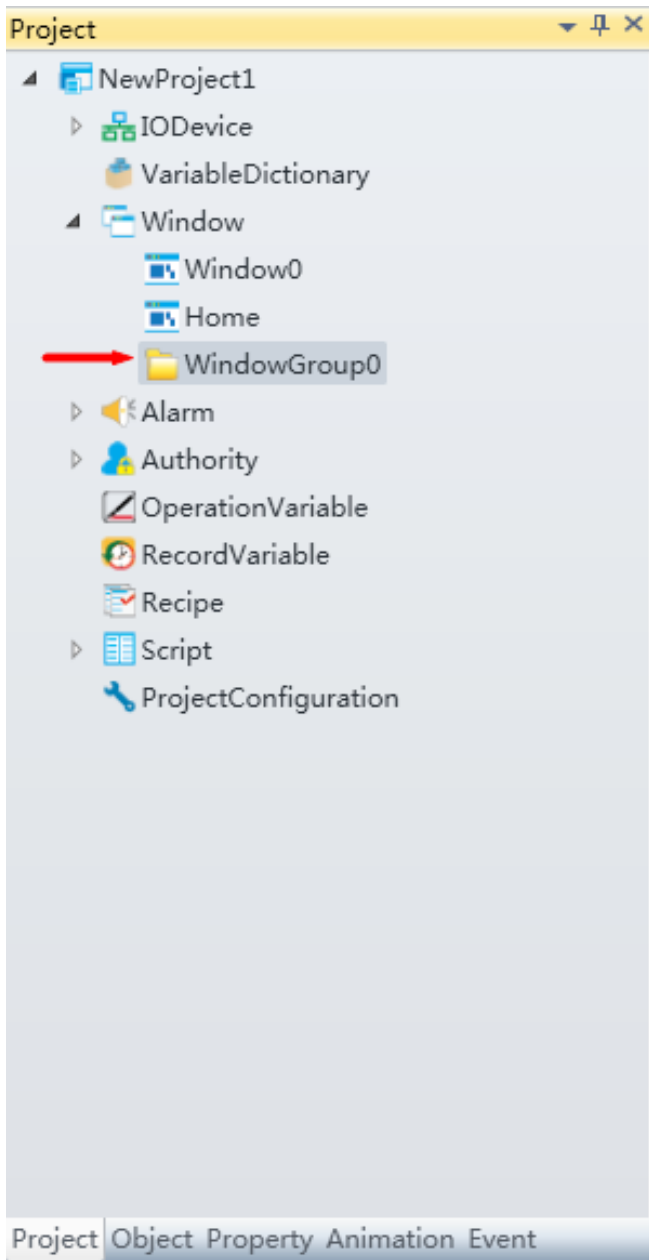
### ■ Add new window group steps:

Right-click on the “Window” node in the project window tree index and then click the “New group” item in the right-click menu, as shown in the figure below:





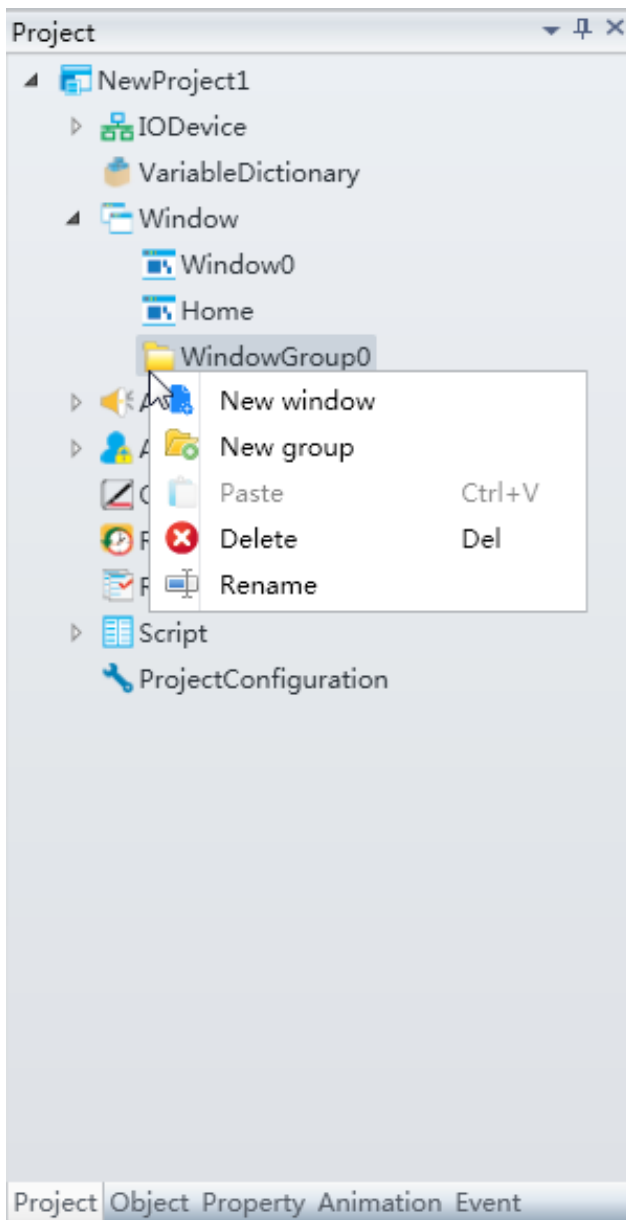
After clicking “New group”, the system will generate a window sub-node under the “Window” node using a preset name, as shown in the figure below:



## 7.2.4 Window group operations

### ■ New window

Multiple windows can be added under a window group; select the window group node, right-click on it and then click the “New window” item from the right-click menu, as shown in the figure below:



### ■ New group

This refers to nesting a created window group under a window group; select a window group node, right-click on it and then select the “New group” item from the right-click menu.

### ■ Paste

Pastes the copied window into the current window group.

### ■ Delete

Deletes a window group; select the window group node to delete right-click on it and then select the “Delete” item from the right-click menu.

### ■ Rename

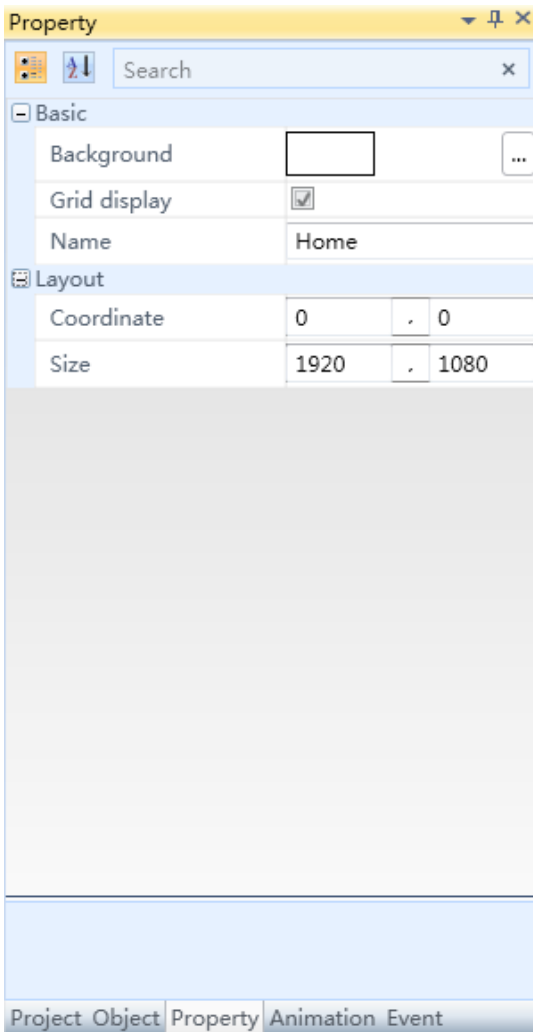
Renames the window group name. Select the window group node to rename, right-click on it and then select the “Rename” item from the right-click menu. The window name will become an editable status and just input the new window name.

**Window group naming rules:**

1. Composed of English letters, numbers, Chinese characters and underscore, and can only begin with an English letter or Chinese character;
2. Not case sensitive;
3. The length cannot exceed 200 characters and cannot exceed 25 Chinese characters;
4. Window group names cannot be repeated under similar class nodes within an engineer;
5. If there are windows and window groups under similar class nodes within an engineer, then the names of the windows and window groups cannot be repeated.

## 7.3 Window basic properties

Once a window is opened, click on an empty space on the sketchpad to display the properties of the window in the “Property window”, as shown in the figure below:



### ■ Basic properties of windows:

- » **Background:** Sets the background color of the sketchboard. Fill styles include: monochrome, icons, images, gradient brushes and radiation brushes etc.
- » **Grid display:** Whether to display grid of the window sketchpad. Displaying grids makes it easier to align and arrange the positions of graphic objects for graphic interface development. Grids are only visible in the development environment, and are invisible during system execution.
- » **Name:** Name of the window; it is the same name as the window node in the project window tree index.
- » **Coordinates:** Sets the display location of the window during execution.
- » **Size:** Sets the width and height (unit: pixels) of the window.

## 7.4 Graphic universal properties

All graphic objects have shared properties including names, coordinates, sizes and display etc., and some graphic objects have their own unique properties (graphic properties listed in section 7.5 and 7.6 are unique properties of those graphics). Universal properties of graphic objects in the DIAView software are as follows:

**Name: Name of the graphic in the sketchpad; the names of graphic objects in the same sketchpad cannot be repeated.**

**Naming rules:** (1) Can include English letters, numbers, Chinese characters and underscore.

(2) Can only begin with English letters or Chinese characters.

(3) Not case sensitive, but cannot be empty.

(4) The length cannot exceed 200 characters and cannot exceed 25 Chinese characters.

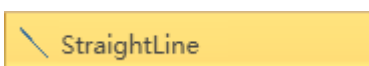
(5) Cannot use the same name as the window where the graphic object is located.

- **Display:** Whether to display or hide the graphic during execution.
- **Lock:** Whether to lock the graphic; once it is locked, mouse operations will become invalid, operations can only be performed to other properties of that graphic from the property frame. Dotted line frame will appear around the graphics that are locked.
- **Security level:** Sets operating authorities for the graphic; allows the graphic to belong to one or several security levels in order to perform user rights management.
- **Fill color:** Sets the fill color inside the graphic.
- **Fill level direction:** The horizontal fill direction when filling inside the graphic (from left to right/ from right to left/ from middle to the edges).
- **Fill level ratio:** The graphic width ratio of the part to be filled; ranges between 0 to 1 up to two decimal places. The preset value is 1.
- **Vertical fill direction:** The vertical fill direction when filling inside the graphic (from top to bottom/ from bottom to top/ from middle to the edges).

- **Vertical fill ratio:** The graphic height ration of the part to be filled; ranges between 0 to 1 up to two decimal places. The preset value is 1.
- **Coordinates:** The X coordinate and Y coordinate of the graphic in the sketchboard.
- **Size:** The width and height of the graphic (unit: pixels).
- **Horizontal distortion:** The distortion level of the graphic in the horizontal direction; ranges between -80 to 80 up to two decimal places. The preset value is 0.
- **Vertical distortion:** The distortion level of the graphic in the vertical direction; ranges between -80 to 80 up to two decimal places. The preset value is 0.
- **Horizontal zoom:** The zooming level of the graphic horizontally; ranges between 0.1 to 100 up to two decimal places. The preset value is 1.
- **Vertical zoom:** The zooming level of the graphic vertically; ranges between 0.1 to 100 up to two decimal places. The preset value is 1.
- **Horizontal offset:** Graphic position offsets to the left or right horizontally; a positive value offsets it to the right and a negative value offsets it to the left. The preset value is 0.
- **Vertical offset:** Graphic position offsets to the top or bottom vertically; a positive value offsets it to the bottom and a negative value offsets it to the top. The preset value is 0.
- **Center:** The ratio between the X and Y coordinates of the center of the graphic to the width and height of the graphic. The preset value is 0.5,0.5.
- **Rotation angle:** Rotation angle of the graphic (unit: degrees).
- **Line:** When the graphic has border lines, it sets the properties of the boarder lines including the style, thickness and color etc.
- **Transparency:** Sets the transparency of the graphic; ranges between 0 to 1 up to two decimal places. The preset value is 1.
- **Background color:** Sets the background color of the graphic.

## 7.5 Properties and rendering of basic graphics

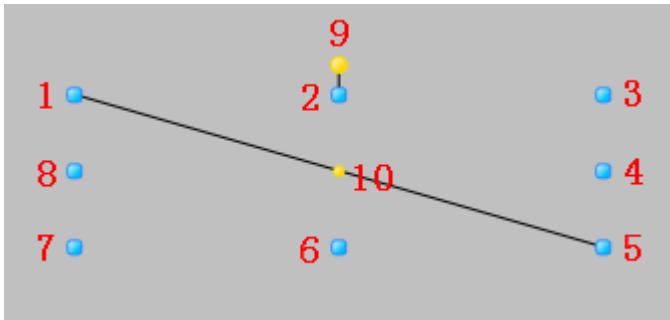
### 7.5.1 Drawing straight lines



- Open the window interface and click on “Toolbox” → “Basic graphic” → “Straight line” in the tools window to the left; the toolbar as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse (the straight line is already drawn at this point). After releasing the left mouse button, the drawing of a straight line is complete, and a straight line will be generated.

- Just repeat the steps above if another straight line needs to be drawn.

#### Graphic introduction:



- » The figure above is a straight line under editing status; press the straight line with the mouse under non-editing status to enter the editing status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

#### Straight line properties

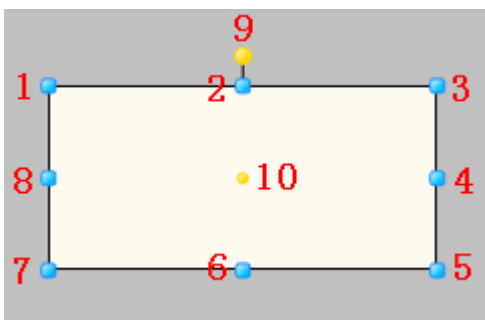
- » For property settings please refer to the section “7.4 Graphic universal properties”.

## 7.5.2 Drawing rectangles



- Open the window interface and click on “Toolbox” → “Basic graphic” → “Rectangle” in the tools window to the left. The toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right (the rectangle is already drawn at this point). After releasing the left mouse button, the drawing of a rectangle is complete, and a rectangle will be generated.
- Just repeat the steps above if another rectangle needs to be drawn.

#### Graphic introduction:

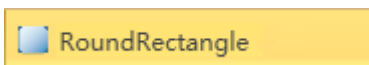


- » The figure above is a selected rectangle; click the mouse on the rectangle when under the not selected status to enter the selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Rectangle properties

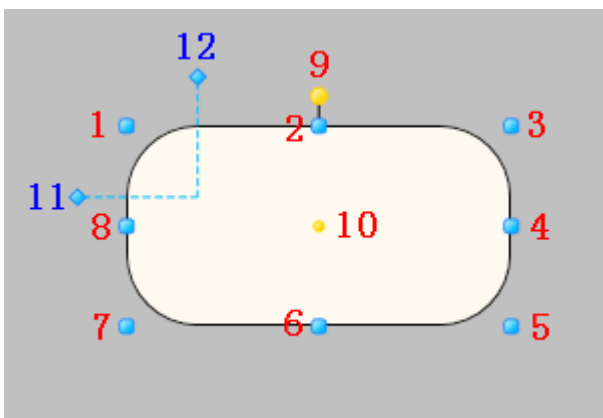
- » For property settings please refer to the section “7.4 Graphic universal properties”.

## 7.5.3 Drawing rounded rectangles



- Open the window interface and click on “Toolbox” → “Basic graphic” → “Rounded rectangle” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right (the rounded rectangle is already drawn at this point). After releasing the left mouse button, the drawing of a rounded rectangle is complete, and a rounded rectangle will be generated.
- Adjusting the round angles of the rounded rectangle: Move the mouse on top of the blue diamond adjustment point and then left-click on it and drag the adjustment point; the closer you drag it to the center of the graphic the larger the round angle will be, and when the adjustment point lines on the edge of the graphic it will become a rectangle.
- Just repeat the steps above if another rounded rectangle needs to be drawn.

### Graphic introduction:



- » The figure above is a selected rounded rectangle; click the mouse on the rounded rectangle when under the not selected status to enter the selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center, 11 and 12 are the adjustment points to adjust the shape of the round angle.

- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Rounded rectangle properties

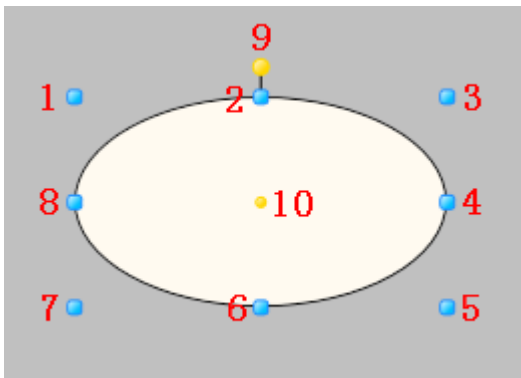
- » Arc of the horizon: Sets the ratio between the radius of the round angle and the width of the graphic (value range: 0 ~ 100).
- » Arc of the vertical: Sets the ratio between the radius of the round angle and the height of the graphic (value range: 0 ~ 100).
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.5.4 Drawing ovals



- Open the window interface and click on “Toolbox” → “Basic graphic” → “Oval” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right (the oval is already drawn at this point). After releasing the left mouse button, the drawing of an oval is complete, and an oval will be generated.
- Just repeat the steps above if another oval needs to be drawn.

### Graphic introduction:



- » The figure above is a selected oval; click the mouse on the oval when under the not selected status to enter the selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Oval properties

- For property settings please refer to the section “7.4 Graphic universal properties”.

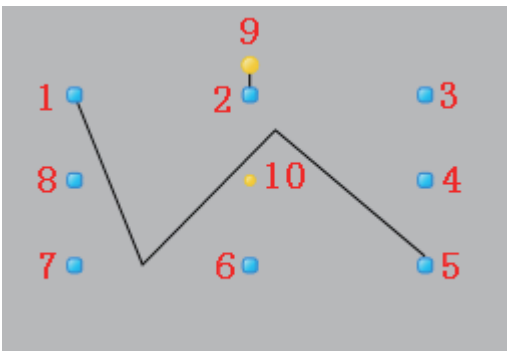


## 7.5.5 Drawing polylines

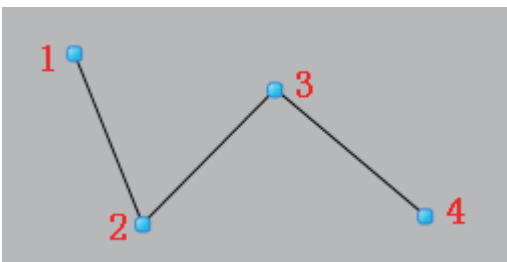


- Open the window interface and click on “Toolbox” → “Basic graphic” → “Polyline” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and click the mouse. Move the mouse to another point and left-click the mouse (the polyline is drawn at this point), left-click the mouse to generate a polyline point of the polyline and draw polyline points according to your needs. Double-click the left mouse button to end the drawing of a polyline and generate the polyline.
- Just repeat the steps above if another polyline needs to be drawn.

### Graphic introduction:



- » The figure above is a selected polyline; click the mouse on the polyline when under the not selected status to enter the selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.



- » The figure above is an adjustable polyline; double-click the mouse on the polyline when under the unadjustable status to enter the adjustable status.
- » In figure, 1 is the starting point, 2 and 3 are the polyline points and 4 is the ending point; when the mouse is moved on top of a point, the mouse cursor will change to “”. Press and hold the left mouse button and move the position of the point to adjust the shape of the polyline.

### Polyline properties

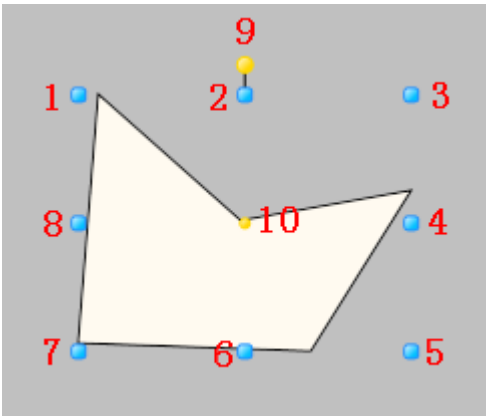
- » For property settings please refer to the section “7.4 Graphic universal properties”.

## 7.5.6 Drawing polygons

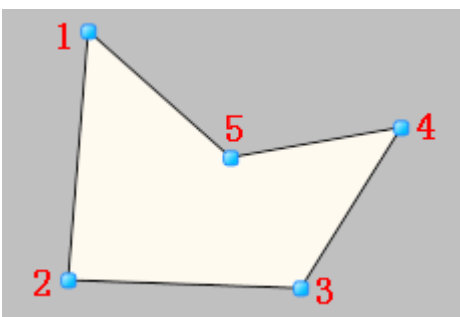


- Open the window interface and click on “Toolbox” → “Basic graphic” → “Polygon” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and click the mouse. Move the mouse to another point and left-click the mouse to draw one side of the polygon (the polygon is drawn at this point), draw the inflections according to the shape of the polygon required. Every time the left mouse button is pressed, the inflection of one side will be drawn. Double-click the left mouse button to end the drawing of a polygon and generate the polygon.
- Just repeat the steps above if another polygon needs to be drawn.


### Graphic introduction:



- » The figure above is a selected polygon; click the mouse on the polygon when under the not selected status to enter the selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.



- » The figure above is an adjustable polygon; double-click the mouse on the polygon when under the unadjustable status to enter the adjustable status.
- » In the figure, 1 is the starting point, 2 and 3 are the inflection points and 4 is the ending point;

when the mouse is moved on top of a point, the mouse cursor will change to “”. Press and hold the left mouse button and move the position of the point to adjust the shape of the polygon.

**Polygon properties**

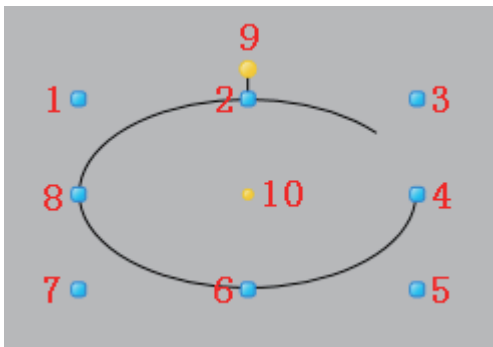
» For property settings please refer to the section “7.4 Graphic universal properties”.

**7.5.7 Drawing arcs**

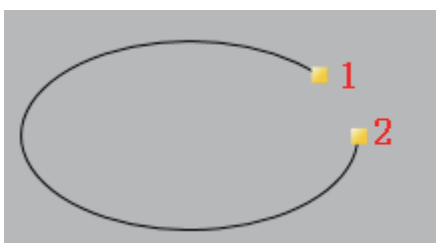



- Open the window interface and click on “Toolbox” → “Basic graphic” → “Arc” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right (the arc is already drawn at this point). After releasing the left mouse button, the drawing of an arc is complete, and an arc will be generated.
- Adjusting the length of the arc: Double click the arc to enter the adjustable status; place the mouse on any of the yellow diamond adjustment point, press and hold the left mouse button to drag the adjustment point to change the length of the arc.
- Just repeat the steps above if another arc needs to be drawn.

**Graphic introduction:**



- » The figure above is a selected arc; click the mouse on the arc when under the not selected status to enter the selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.



- » The figure above is an adjustable arc; double-click the mouse on the arc when under the unadjustable status to enter the adjustable status.
- » Points 1 and 2 in the figure are adjustment points to adjust the length of the arc; when the mouse moves on top of a point, the mouse cursor will change to “”. Press and hold the left mouse button and drag the position of the adjustment point to adjust the length of the arc.

### Arc properties

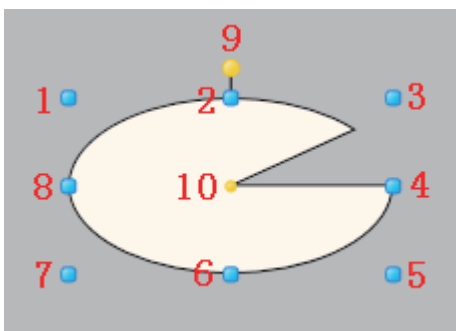
- » Starting angle: Sets the starting angle of the arc length (unit: degrees)
- » Scan angle: Sets the ending angle of the arc length (unit: degrees)
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.5.8 Drawing fan-shapes

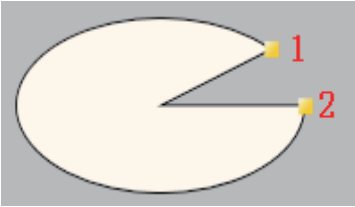



- Open the window interface and click on “Toolbox” → “Basic graphic” → “Fan-shape” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right (the fan-shape is already drawn at this point). After releasing the left mouse button, the drawing of a fan-shape is complete, and a fan-shape will be generated.
- Adjusting the angle of the fan-shape: Double click the fan-shape to enter the adjustable status; place the mouse on the yellow diamond adjustment point, press and hold the left mouse button to drag the adjustment point to change the angle of the fan-shape.
- Just repeat the steps above if another fan-shape needs to be drawn.

### Graphic introduction:



- » The figure above is a selected fan-shape; click the mouse on the fan-shape when under the not selected status to enter the selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

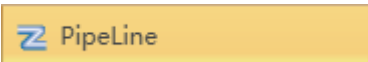


- » The figure above is an adjustable fan-shape; double-click the mouse on the fan-shape when under the unadjustable status to enter the adjustable status.
- » Points 1 and 2 in the figure are adjustment points to adjust the angle of the fan-shape; when the mouse moves on top of a point, the mouse cursor will change to “”. Press and hold the left mouse button and drag the position of the adjustment point to adjust the angle of the fan-shape.

**Fan-shape properties**

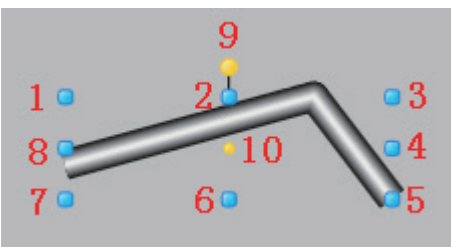
- » Starting angle: Sets the starting angle of the fan-shape angle (unit: degrees)
- » Scan angle: Sets the ending angle of the fan-shape angle (unit: degrees)
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

**7.5.9 Drawing tubes**

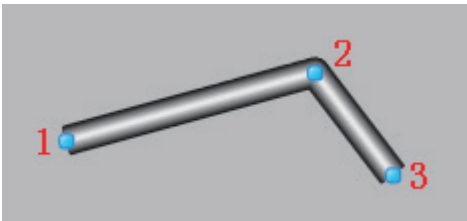



- Open the window interface and click on “Toolbox” → “Basic graphic” → “Tube” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and click the mouse. Move the mouse to another point and left-click the mouse (the tube is drawn at this point), left-click the mouse to generate an inflection point of the tube and draw inflection points according to shape of the tube needed. Double-click the left mouse button to end the drawing of a the tube and generate the tube.
- Just repeat the steps above if another tube needs to be drawn.

**Graphic introduction:**



- » The figure above is a selected tube; click the mouse on the tube when under the not selected status to enter the selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.



- » The figure above is an adjustable tube; double-click the mouse on the tube when under the unadjustable status to enter the adjustable status.
- » In the figure, 1 is the starting point, 2 is the inflection point to adjust the shape of the tube and 3 is the ending point; when the mouse is moved on top of a point, the mouse cursor will change to “”. Press and hold the left mouse button and move the position of the point to adjust the shape of the tube.

### Tube properties

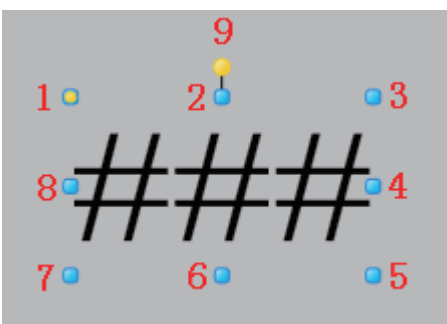
- » Whether to flow positively: Sets the direction which the liquid inside the tube flows; check it for positive flowing and uncheck for reverse flowing.
- » Liquid color: Sets the color of the liquid inside the tube.
- » Liquid width: Sets the sectional width of the liquid inside the tube, which is the liquid flow.
- » Tube color: Sets the color for the exterior of the tube.
- » Tube width: Sets the diameter of the tube.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.5.10 Drawing text



- Open the window interface and click on “Toolbox” → “Basic graphic” → “Text” in the tools window to the left; the toolbar as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right (the text outline is already drawn at this point); after releasing the left mouse button, the drawing of a text is complete, and a text will be generated.
- Just repeat the steps above if another text needs to be drawn.

### Graphic introduction:



- » The figure above is a selected text; click on the text to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points to adjust the graphic size; 9 is the rotation point.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Text properties

- » Content: Text contents of the text.
- » Auto zoom: Sets whether the text content will zoom according to the zooming size of the frame.
- » Font: Sets the font format of the text; for example font style, size and bold etc.
- » Text color: Sets the color of the text.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

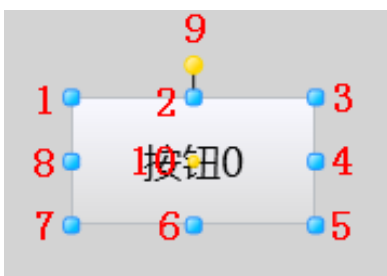
## 7.6 Properties and rendering of window objects

### 7.6.1 Drawing buttons



- Open the window interface and click on “Toolbox” → “Window controls” → “Buttons” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of a button is complete, and a button will be generated.
- Just repeat the steps above if another button needs to be drawn.

#### Graphic introduction:



- » The figure above is a selected button; click on the button to enter selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

## Button properties

- » Content: The text displayed on the button.
- » Font: Sets the font format of the text displayed on the button; for example font style, size and bold etc.
- » Text color: Sets the text color of the button's text.
- » Frame color: Sets the color of the button's frame.
- » Enable: Sets the availability of the button.
- » Reminder text: Sets the reminder content displayed when the mouse cursor moves on top of the button.
- » For other property settings please refer to the section "7.4 Graphic universal properties".

## 7.6.2 Drawing text boxes



- Open the window interface and click on "Toolbox" → "Window controls" → "Text box" in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of a text box is complete, and a text box will be generated.
- Just repeat the steps above if another text box needs to be drawn.

### Graphic introduction:



- » The figure above is a selected text box; click on the text box to enter selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Text box properties

- » **Content:** Text contents of the text box.
- » **Font:** Sets the font format of the text box; for example font style, size and bold etc.
- » **Text color:** Sets the color of the text in the text box.
- » **Frame color:** Sets the color of the text box's frame.
- » **Enable:** Sets the availability of the text box



- » **Reminder text:** Sets the reminder content displayed when the mouse cursor moves on top of the text box.
- » **Changing rows:** Sets whether it will automatically change rows when entering text in the text box.
- » **Alignment:** Sets the alignment method (align left, align right, centered, justify) of the text in the text box.
- » **Row change method:** Sets the row changing method of the text in the text box; there are 3 ways:
  - Overflow row change: When there are both English and Chinese text contents, if the length exceeds the length of the text box, change rows if the content is Chinese. If the content is in English letters, change rows if there is a space between letters and do not change rows if there is no space in between.
  - No execution row change: Do not change rows when the length of the inputted text exceeds the length of the text box.
  - Perform row change: Change rows when the length of the inputted text exceeds the length of the text box.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.
- » Difference between “text box” and “text”:
  1. The text box has frames and the color of the frame and fill color inside can be set; these cannot be done for texts;
  2. The row changing method of the text content inside the text box can be set, but automatic row change cannot be performed for texts;
  3. They have different “animation” configurations; for example “rotating” and “zooming” animations can be configured for text but these cannot be set for text boxes.

### 7.6.3 Drawing tags



- Open the window interface and click on “Toolbox” → “Window controls” → “Tags” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of a tag is complete, and a tag will be generated.
- Just repeat the steps above if another tag needs to be drawn.

#### Graphic introduction:



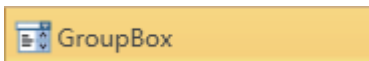
- » The figure above is a selected tag; click on the tag to enter selected status.

- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Tag properties

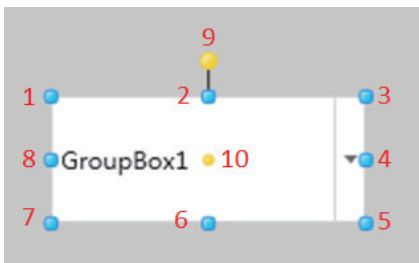
- » **Content:** Text contents of the tag.
- » **Font:** Sets the font format of the text in the tag; for example font style, size and bold etc.
- » **Text color:** Sets the color of the text in the tag.
- » **Enable:** Sets the availability of the tag.
- » **Reminder text:** Sets the reminder content displayed when the mouse cursor moves on top of the tag.
- » **Alignment:** Sets the alignment method (align left, align right, centered, justify) of the text of the tag.
- » **Row change:** Sets the row changing method of the text of the tag (overflow row change, no execution row change, perform row change).
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.6.4 Drawing drop-down menu blocks



- Open the window interface and click on “Toolbox” → “Window controls” → “Drop-down menu block” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of a drop-down menu block is complete, and a drop-down menu block will be generated.
- Just repeat the steps above if another drop-down menu block needs to be drawn.

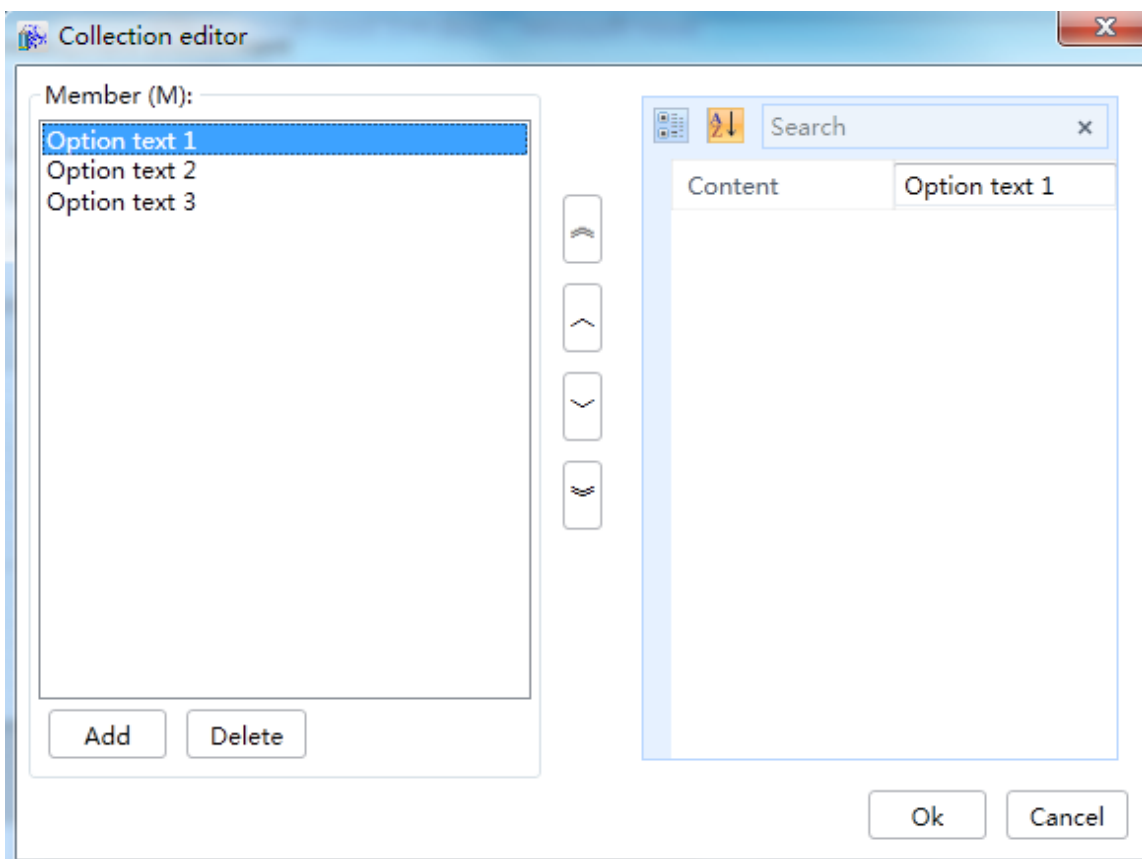
### Graphic introduction:



- » The figure above is a selected drop-down menu block; click on the drop-down menu block to enter selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Drop-down menu block properties

- » **Text:** Text content displayed in the drop-down menu block in a non-executing environment.
- » **Horizontal alignment:** Sets the horizontal alignment method for the text content of the drop-down menu block in an execution environment.
- » **Vertical alignment:** Sets the vertical alignment method for the text content of the drop-down menu block in an execution environment.
- » **Font:** Sets the font format of the text in the drop-down menu block; for example font style, size and bold etc.
- » **Text color:** Sets the color of the text in the drop-down menu block.
- » **Frame color:** Sets the color of the frame of the drop-down menu block.
- » **Enable:** Sets the availability of the drop-down menu block.
- » **Reminder text:** Sets the reminder content displayed when the mouse cursor moves on top of the drop-down menu block.
- » **Read-only:** Sets whether the drop-down menu block is read-only; it is read-only if selected.
- » **Subset:** Drop-down option contents of the drop-down menu block; click “...” and the subset editor shown in the figure below will appear:



(The “Add new” button on the left adds a new member; the “Content” on the right allows entering the text content of the member).

- » **Index:** Sets the preset option of the drop-down menu block.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.6.5 Drawing calendars

### 31 MonthlyCalendar

- Open the window interface and click on “Toolbox” → “Window controls” → “Calendar” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a position and press the mouse to generate a calendar.
- Just repeat the steps above if another calendar needs to be drawn.

#### Graphic introduction:



- » The figure above is a selected calendar; click on the calendar to enter selected status.

#### Calendar properties

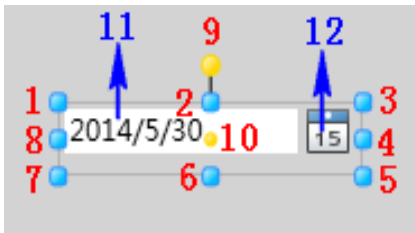
- » **Date selection:** The selected year, month and day from the calendar displayed on the calendar with a base color.
- » **Start date:** Sets the start date of the calendar.
- » **End date:** Sets the end date of the calendar.
- » **First day of the week:** Sets which day of the week is the first day of the week on the calendar.
- » **Font:** Sets the font format of the text displayed on the calendar; for example font style, size and bold etc.
- » **Text color:** Sets the color of the text on the calendar.
- » **Frame color:** Sets the color of the calendar's frame.
- » **Enable:** Sets the availability of the calendar.
- » **Reminder text:** Sets the reminder content displayed when the mouse cursor moves on top of the calendar.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.6.6 Drawing dates



- Open the window interface and click on “Toolbox” → “Window controls” → “Date” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of the date is complete, and the date will be generated.
- Just repeat the steps above if another date needs to be drawn.

### Graphic introduction:



- » The figure above is a selected date; click on the date to enter selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.
- » 11 is the text block of the date and 12 is the date selection button.

### Date properties

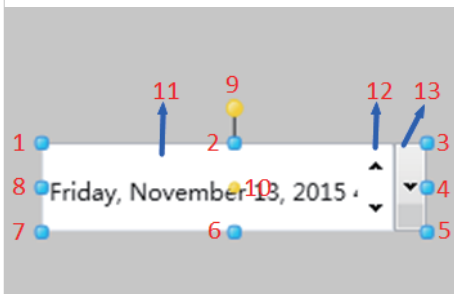
- » Text: Text contents displayed in the date text block.
- » Start date: Sets the start date of the date selection range.
- » End date: Sets the end date of the date selection range.
- » First day of the week: Sets which day of the week is the first day of the week in the date.
- » Highlight today: Highlight today's date in the date selection frame.
- » Date format: Sets the display format of the date: There are two formats: Short and Long.
- » Font: Sets the font format of the text displayed on the date; for example font style, size and bold etc.
- » Text color: Sets the color of the text of the date.
- » Frame color: Sets the color of the date's frame.
- » Enable: Sets the availability of the date.
- » Reminder text: Sets the reminder content displayed when the mouse cursor moves on top of the date.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.6.7 Drawing time calendars



- Open the window interface and click on “Toolbox” → “Window controls” → “Time calendar” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right. After releasing the left mouse button, the drawing of the time calendar is complete, and the time calendar will be generated.
- Just repeat the steps above if another time calendar needs to be drawn.

### Graphic introduction:



- » The figure above is a selected time calendar; click on the time calendar to enter selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.
- » The text box of the time calendar is 11, 12 is the add/reduce button of the date time and 13 is the date time selection button.

### Time calendar properties

- » Text: Text contents displayed in the time calendar text block.
- » Maximum value: Sets the maximum value of the time calendar’s date selection range.
- » Minimum value: Sets the minimum value of the time calendar’s date selection range.
- » Date format: Sets the date display format of the time calendar’s text block.
- » Alignment direction: Sets the date alignment direction of the time calendar’s text block.
- » Time interval: Sets the time interval of the time calendar’s time selection drop-down menu.
- » Down add/reduce button: Sets whether the add/reduce button can be used for the time calendar’s date time.
- » Read-only: Sets whether the time calendar is read-only.
- » Font: Sets the font format of the text displayed on the time calendar; for example font style, size and bold etc.
- » Text color: Sets the color of the text on the time calendar.
- » Frame color: Sets the color of the time calendar’s frame.

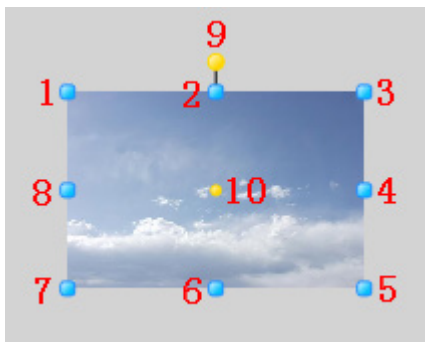
- » Enable: Sets the availability of the time calendar.
- » Reminder text: Sets the reminder content displayed when the mouse cursor moves on top of the time calendar.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.6.8 Drawing images



- Open the window interface and click on “Toolbox” → “Window controls” → “Image” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of the image is complete, and the image will be generated.
- Just repeat the steps above if another image needs to be drawn.

### Graphic introduction:



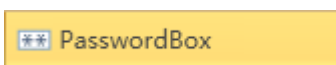
- » The figure above is a selected image; click on the image to enter selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Image properties

- » Image path: Sets the source path of the image; press the “...” button to select.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.



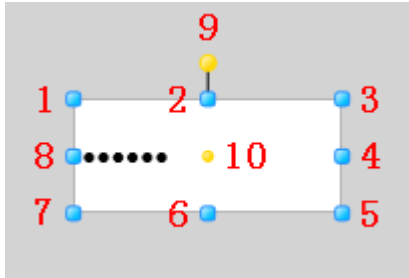
## 7.6.9 Password frame



- Open the window interface and click on “Toolbox” → “Window controls” → “Password frame” in the tools window to the left; the toolbar is as shown in the figure above.

- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right. After releasing the left mouse button, the drawing of the password frame is complete, and the password frame will be generated.
- Just repeat the steps above if another password frame needs to be drawn.

### Graphic introduction:

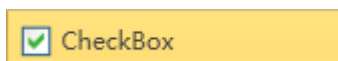


- » The figure above is a selected password frame; click on the password frame to enter selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Password frame properties

- » Password: Password content that can be entered into the password frame.
- » Font: Sets the font format of the password frame; for example font style, size and bold etc.
- » Text color: Sets the color of the password frame text.
- » Frame color: Sets the color of the frame of the password frame.
- » Enable: Sets the availability of the password frame.
- » Reminder text: Sets the reminder content displayed when the mouse cursor moves on top of the password frame.
- » Horizontal alignment: Sets the horizontal alignment method of the password frame text.
- » Vertical alignment: Sets the vertical alignment method of the password frame text.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

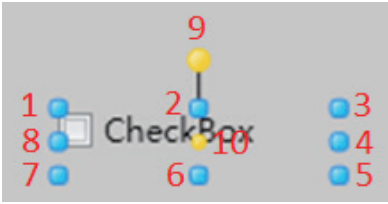
## 7.6.10 Check box



- Open the window interface and click on “Toolbox” → “Window controls” → “Check box” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of a check box is complete, and a check box will be generated.
- Just repeat the steps above if another check box needs to be drawn.



### Graphic introduction:



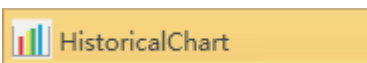
- » The figure above is a selected check box; click on the check box to enter selected status.
- » Points 1-8 in the figure are the tensile points to adjust the graphic size; 9 is the rotation point and 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Check box properties

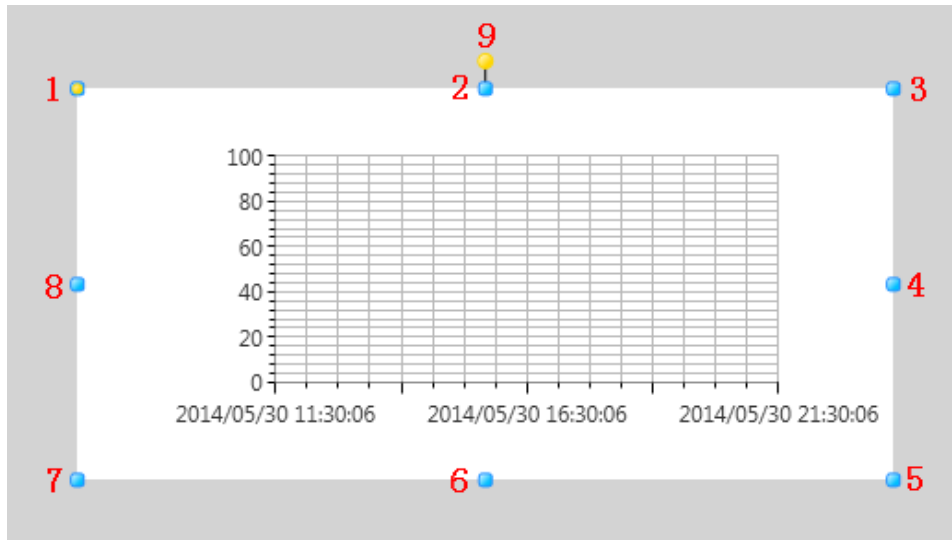
- » Content: Text content of the check box options.
- » Selected: Whether to allow the check box to be in a selected status.
- » Font: Sets the font format of the check box; for example font style, size and bold etc.
- » Text color: Sets the color of the text in the check box.
- » Enable: Sets the availability of the check box.
- » Reminder text: Sets the reminder content displayed when the mouse cursor moves on top of the check box.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.7 Properties and rendering of Extended control's

### 7.7.1 Drawing historic curve



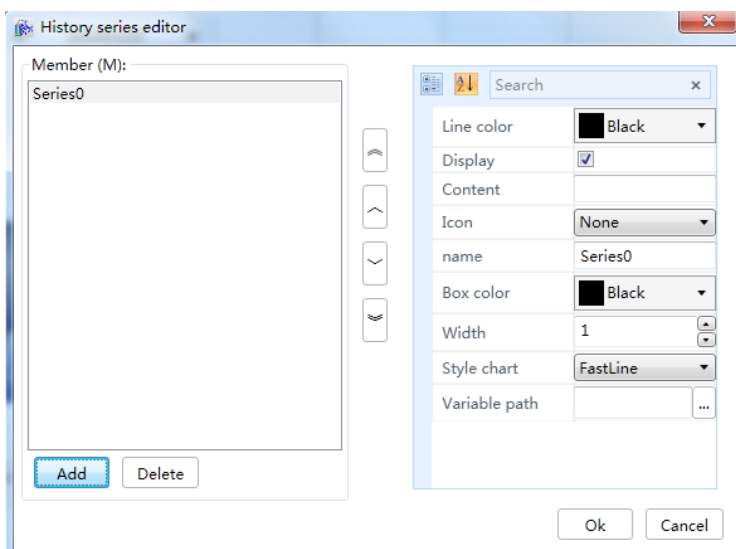
- Open the window interface and click on “Toolbox” → “Advanced control unit” → “Historic curve” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of a historic curve is complete, and a historic curve will be generated.
- Just repeat the steps above if another historic curve needs to be drawn.

**Graphic introduction:**

- » The figure above is a selected historic curve; click on the historic curve to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

**Historic curve properties**

- » **Title:** Text contents in the title list on top of the curve; it represents the displayed name of the curve, and it can be left empty.
- » **Font:** Sets the font format of the text in the historic curve; for example font style, size and bold etc.
- » **Display legend:** Sets whether to display the curve line illustrations.
- » **Zoom tool:** Sets whether to use zoom tools.
- » **Curve:** Configures the curve style and connected variables in the figure; the configuration method is as follows:
- » Click the “...” button and the historic curve editor window will appear; add a curve, as shown in the figure below:



The left part is to add or delete members, each member means a curve; the middle parts is to perform top and bottom sorting of the curves, and the right part is the properties of the selected curve. Please refer to the table below:

Properties	Description
Name	Sets the curve's name.
Variable path	Sets the historic variables associated with the curve.
Line color	Sets the color of the curve lines.
Display	Whether to display curves
Content	Text description contents corresponding to the icon.
Icon	Curve icon
Frame color	Sets the frame color of the curve icon.
Width	Sets the thickness of the curve lines.
Line graph style	Sets the style of the curve lines.

■ Y-axis

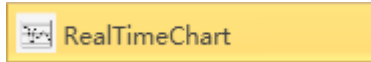
Properties	Description
Font	Sets the font style of the values on the Y-axis.
Font color	Sets the font color of the values on the Y-axis.
Title	Title of the Y-axis.
Title font	Sets the font style of the Y-axis title.
Title color	Sets the font color of the Y-axis title.
Large scale	Sets the large scale number on the Y-axis.
Small scale	Sets the small scale number between two large scales.
Display grid	Sets whether to display the horizontal grid on the Y-axis.
Scale display	Sets whether to display the Y-axis scale.
Maximum value	Sets the maximum value of the Y-axis.
Minimum value	Sets the minimum value of the Y-axis.

■ X-axis

Properties	Description
Time format	Sets the time display format on the X-axis.
Time range	Sets the time range on the X-axis.
Start time	Sets the start time of the X-axis.
Font	Sets the font style of the values on the X-axis.
Font color	Sets the font color of the values on the X-axis.
Title	Title of the X-axis.
Title font	Sets the font style of the X-axis title.
Title color	Sets the font color of the X-axis title.
Large scale	Sets the large scale number on the X-axis.
Small scale	Sets the small scale number between two large scales.
Display grid	Sets whether to display the vertical grid on the X-axis.
Scale display	Sets whether to display the X-axis scale.

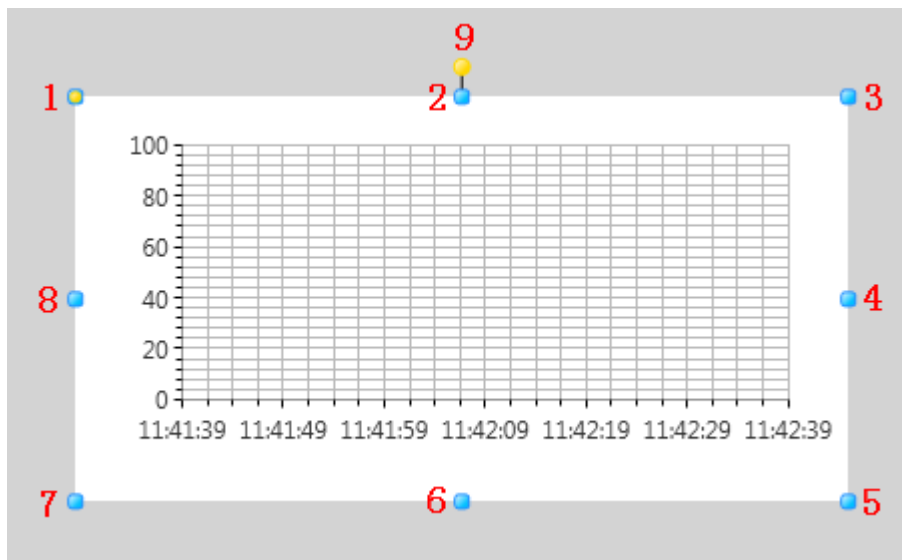
» For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.7.2 Drawing real-time curves




- Open the window interface and click on “Toolbox” → “Advanced control unit” → “Real-time curve” in the tools window to the left; the toolbar as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of a real-time curve is complete, and a real-time curve will be generated.
- Just repeat the steps above if another real-time curve needs to be drawn.

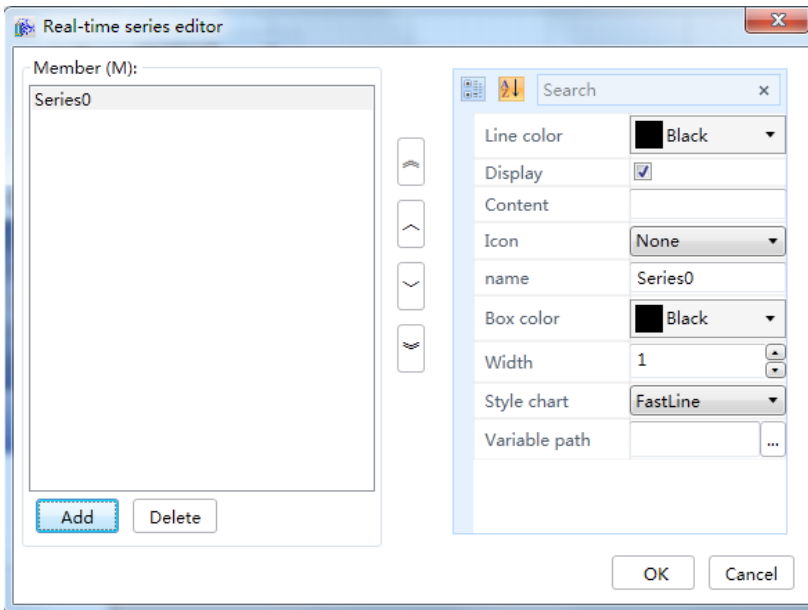
### Graphic introduction:



- » The figure above is a selected real-time curve; click on the real-time curve to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Real-time curve properties

- » Title: Text contents in the title list on top of the curve; it represents the displayed name of the curve, and it can be left empty.
- » Font: Sets the font format of the text in the historic curve; for example font style, size and bold etc.
- » Display legend: Sets whether to display the curve line illustrations.
- » Data from left to right: Sets whether the data is used to draw the curve from left to right.
- » Update time: Sets the refresh time interval of data display.
- » Real-time curve: Configures the curve style and connected variables in the figure; the configuration method is as follows:
- » Click the “” button and the real-time curve editor window will appear; add a curve, as shown in the figure below:



The left part is to add or delete members, each member means a curve; the middle parts is to perform top and bottom sorting of the curves, and the right part is the properties of the selected curve. Please refer to the table below:

Properties	Description
Name	Sets the curve's name.
Variable path	Sets the variables associated to the curve.
Line color	Sets the color of the curve lines.
Display	Whether to display curves
Content	Text description contents corresponding to the icon.
Icon	Curve icon
Frame color	Sets the frame color of the curve icon.
Width	Sets the thickness of the curve lines.
Line graph style	Sets the style of the curve lines.

■ Y-axis

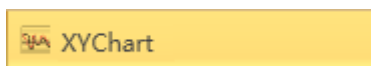
Properties	Description
Font	Sets the font style of the values on the Y-axis.
Font color	Sets the font color of the values on the Y-axis.
Title	Title of the Y-axis.
Title font	Sets the font style of the Y-axis title.
Title color	Sets the font color of the Y-axis title.
Large scale	Sets the large scale number on the Y-axis.
Small scale	Sets the small scale number between two large scales.
Display grid	Sets whether to display the horizontal grid on the Y-axis.
Scale display	Sets whether to display the Y-axis scale.
Maximum value	Sets the maximum value of the Y-axis.
Minimum value	Sets the minimum value of the Y-axis.

## ■ X-axis

Properties	Description
Time format	Sets the time display format on the X-axis.
Time range	Sets the time range on the X-axis.
Font	Sets the font style of the values on the X-axis.
Font color	Sets the font color of the values on the X-axis.
Title	Title of the X-axis.
Title font	Sets the font style of the X-axis title.
Title color	Sets the font color of the X-axis title.
Large scale	Sets the large scale number on the X-axis.
Small scale	Sets the small scale number between two large scales.
Display grid	Sets whether to display the vertical grid on the X-axis.
Scale display	Sets whether to display the X-axis scale.

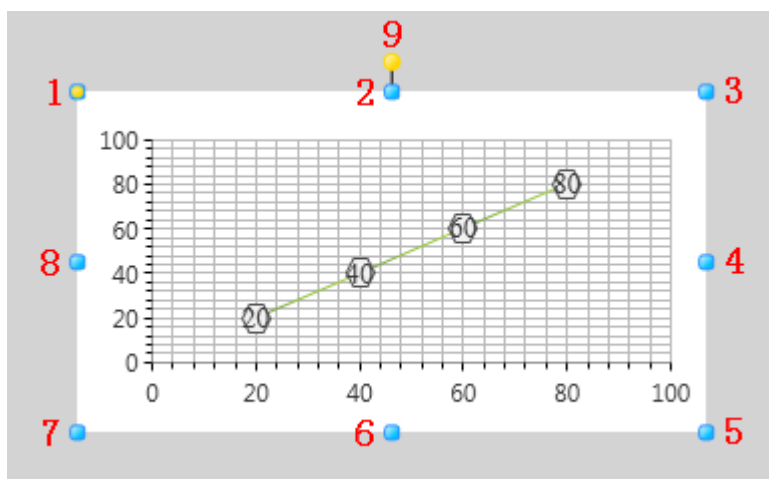
» For other property settings please refer to the section “7.4 Graphic universal properties”.

### 7.7.3 Drawing XY curves



- Open the window interface and click on “Toolbox” → “Advanced control unit” → “XY curve” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of a XY curve is complete, and a XY curve will be generated.
- Just repeat the steps above if another XY curve needs to be drawn.

#### Graphic introduction:



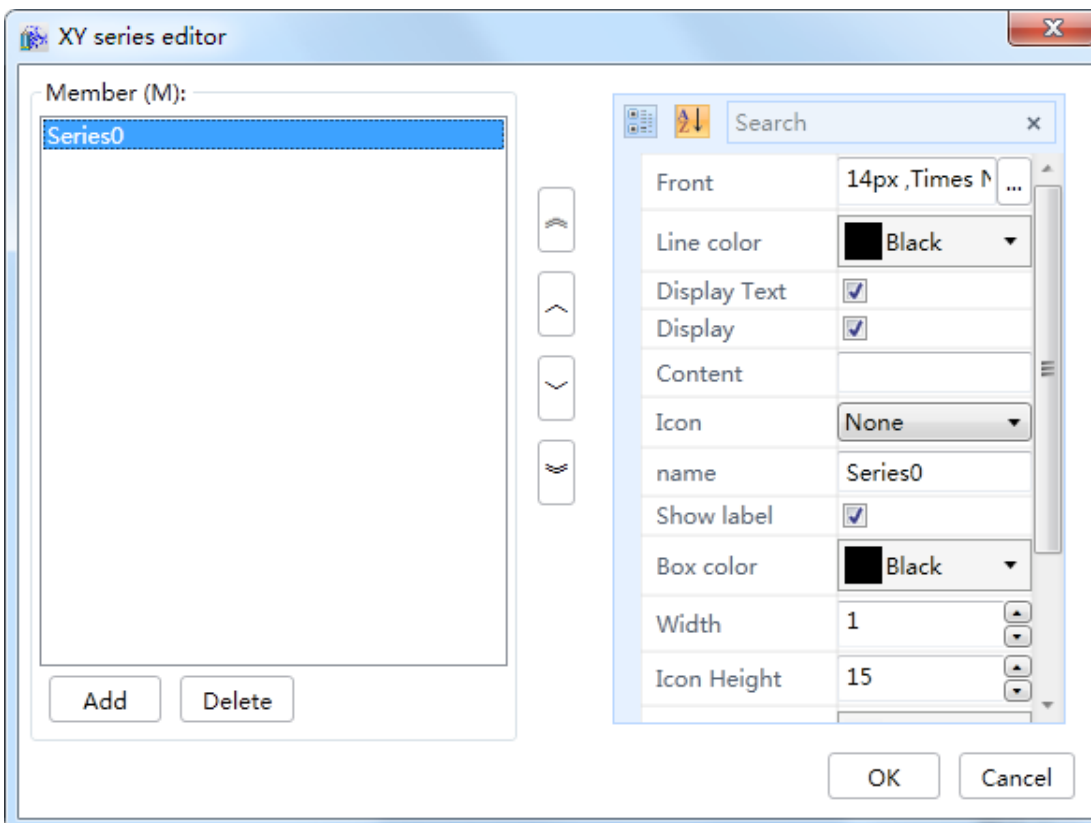
- » The figure above is a selected XY curve; click on the XY curve to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of

point 4 and the left of point 8 are the vertical distortion points.

### XY curve properties

- » **Title:** Text contents in the title list on top of the curve; it represents the displayed name of the curve, and it can be left empty.
- » **Font:** Sets the font format of the text in the historic curve; for example font style, size and bold etc.
- » **Display legend:** Sets whether to display the curve line illustrations.
- » **Update entries:** Sets how many data entries of data to acquire before updating each time.
- » **Update time:** Sets the time interval to acquire a data entry to draw a curve.
- » **Set curve:** Configures the curve that is constantly displayed in the graph for reference; the configuration method is as follows:

Click the “...” button and the XY curve editor window will appear; it has one curve preset, as shown in the figure below:

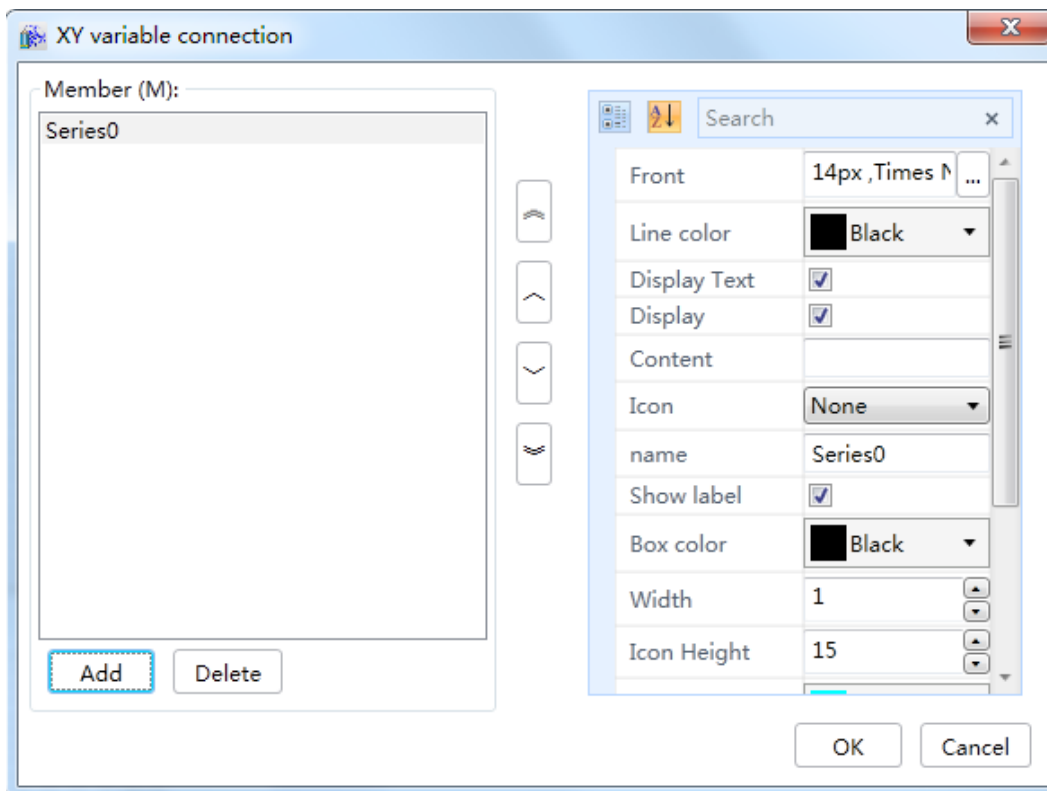


The left part is to add or delete members, each member means a curve; the middle parts is to perform top and bottom sorting of the curves, and the right part is the properties of the selected curve. Please refer to the table below:

Properties	Description
Name	Sets the curve's name.
Set	Sets the value point coordinates of the curve members.
Line color	Sets the color of the curve lines.
Display	Whether to display curves
Content	Text description contents corresponding to the icon.
Icon	Curve icon
Frame color	Sets the frame color of the curve icon and value point marks.
Width	Sets the thickness of the curve lines.
Line graph style	Sets the style of the curve lines.
Font	Sets the font style of the value points on the curve.
Mark height	Sets the height of the value point marks on the curve.
Mark width	Sets the width of the value point marks on the curve.
Mark color	Sets the "Background" color of the value point marks on the curve.

- » Real-time curve: Configures the curve that is associated with the variables to perform real-time display; the configuration method is as follows:

Click the "..." button and the XY variable connection window will appear; add a curve, as shown in the figure below:





The left part is to add or delete members, each member means a curve; the middle parts is to perform top and bottom sorting of the curves, and the right part is the properties of the selected curve. Please refer to the table below:

Properties	Description
Name	Sets the curve's name.
Connect X variable	Sets the variable associated with the value point X coordinate of the curve.
Connect Y variable	Sets the variable associated with the value point Y coordinate of the curve.
Line color	Sets the color of the curve lines.
Display	Whether to display curves
Content	Text description contents corresponding to the icon.
Icon	Curve icon
Frame color	Sets the frame color of the curve icon and value point marks.
Width	Sets the thickness of the curve lines.
Line graph style	Sets the style of the curve lines.
Font	Sets the font style of the value points on the curve.
Mark height	Sets the height of the value point marks on the curve.
Mark width	Sets the width of the value point marks on the curve.
Mark color	Sets the "Background" color of the value point marks on the curve.

■ Y-axis

Properties	Description
Font	Sets the font style of the values on the Y-axis.
Font color	Sets the font color of the values on the Y-axis.
Title	Title of the Y-axis.
Title font	Sets the font style of the Y-axis title.
Title color	Sets the font color of the Y-axis title.
Large scale	Sets the large scale number on the Y-axis.
Small scale	Sets the small scale number between two large scales.
Display grid	Sets whether to display the horizontal grid on the Y-axis.
Scale display	Sets whether to display the Y-axis scale.
Maximum value	Sets the maximum value of the Y-axis.
Minimum value	Sets the minimum value of the Y-axis.

■ X-axis

Properties	Description
Font	Sets the font style of the values on the X-axis.
Font color	Sets the font color of the values on the X-axis.
Title	Title of the X-axis.
Title font	Sets the font style of the X-axis title.
Title color	Sets the font color of the X-axis title.
Large scale	Sets the large scale number on the X-axis.

Small scale	Sets the small scale number between two large scales.
Display grid	Sets whether to display the vertical grid on the X-axis.
Scale display	Sets whether to display the X-axis scale.
Maximum value	Sets the maximum value of the X-axis.
Minimum value	Sets the minimum value of the X-axis.

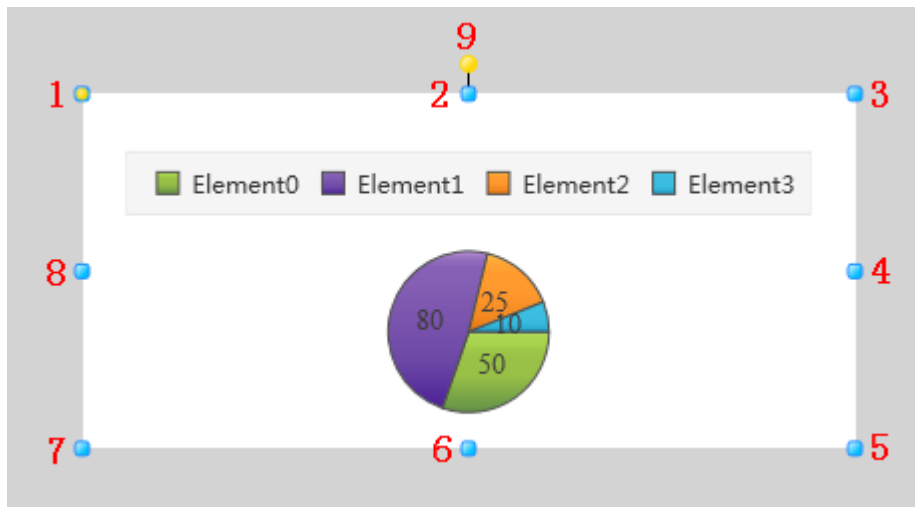
» For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.7.4 Drawing pie charts



- Open the window interface and click on “Toolbox” → “Advanced control unit” → “Pie chart” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of the pie chart is complete, and the pie chart will be generated.
- Just repeat the steps above if another pie chart needs to be drawn.

### Graphic introduction:



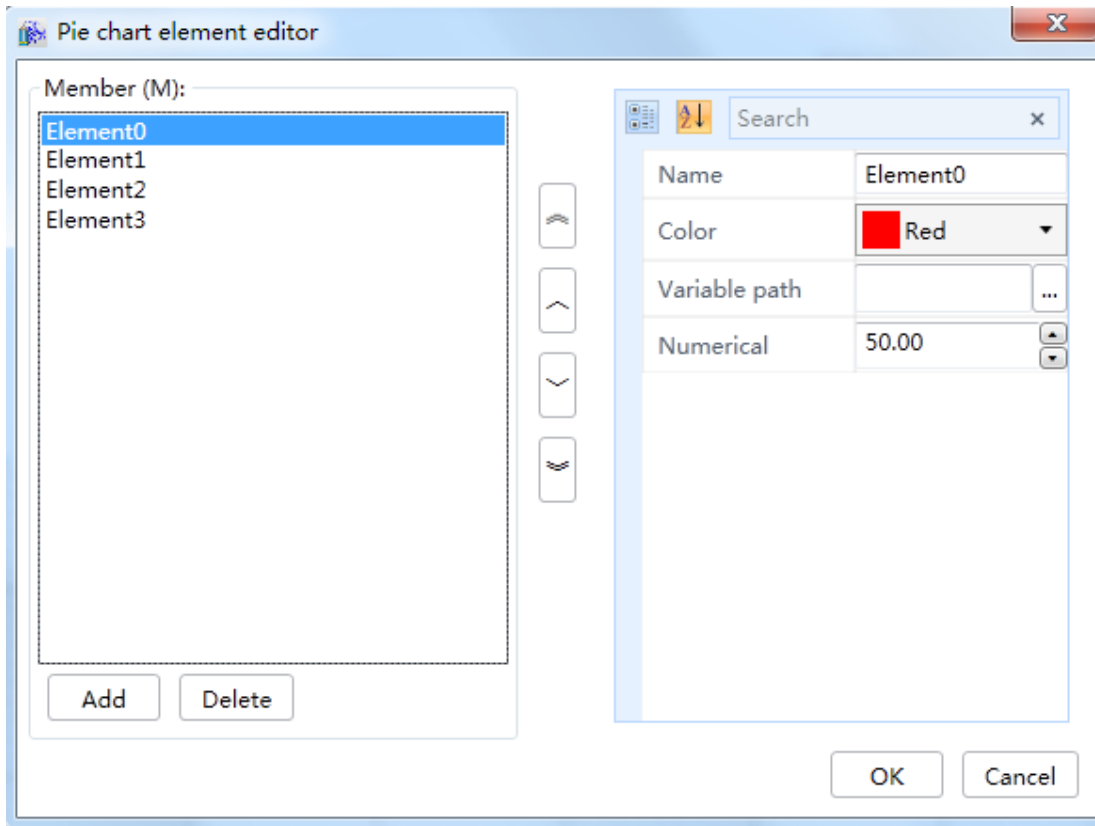
- » The figure above is a selected pie chart; click on the pie chart to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Pie chart properties

- » Title: Text contents in the title list on top of the pie chart; it represents the displayed name of the pie chart, and it can be left empty.
- » Font: Sets the font format of the text in the historic curve; for example font style, size and bold etc.
- » Display legend: Sets whether to display the pie chart illustrations.

- » Unit: Configures the components and connected variables of the pie chart; it configures each component's color and value etc. The configuration method is as follows:

Click the "... " button and the pie chart element editor window will appear; it has 4 elements preset, as shown in the figure below:

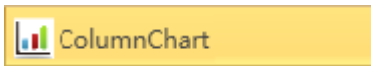


The left part is to add or delete members, each member means an element unit; the middle parts is to perform top and bottom sorting of the elements, and the right part is the properties of the selected element. Please refer to the table below:

Properties	Description
Name	Sets the name of the element unit.
Variable path	Sets the variable associated with the element unit.
Color	Sets the fill color of the element unit.
Value	Sets the initial value of the element unit.

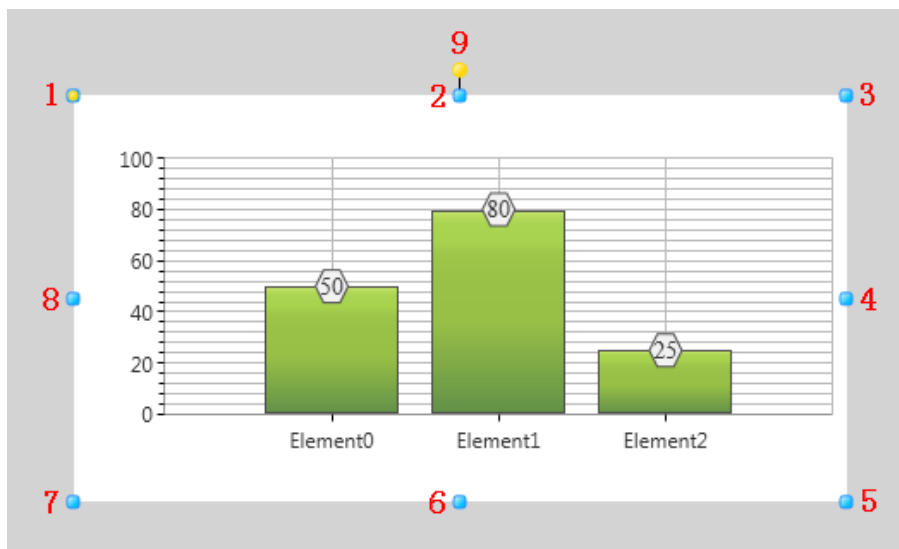
- » Palette style: Sets the palette style of the pie chart unit.
- » Real-time update time: Sets the update time interval of the metadata in the pie chart.
- » Pie chart style: Sets the pie chart style.
- » For other property settings please refer to the section "7.4 Graphic universal properties".

## 7.7.5 Drawing histograms



- Open the window interface and click on “Toolbox” → “Advanced control unit” → “Histogram” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of the histogram is complete, and the histogram will be generated.
- Just repeat the steps above if another histogram needs to be drawn.

### Graphic introduction:

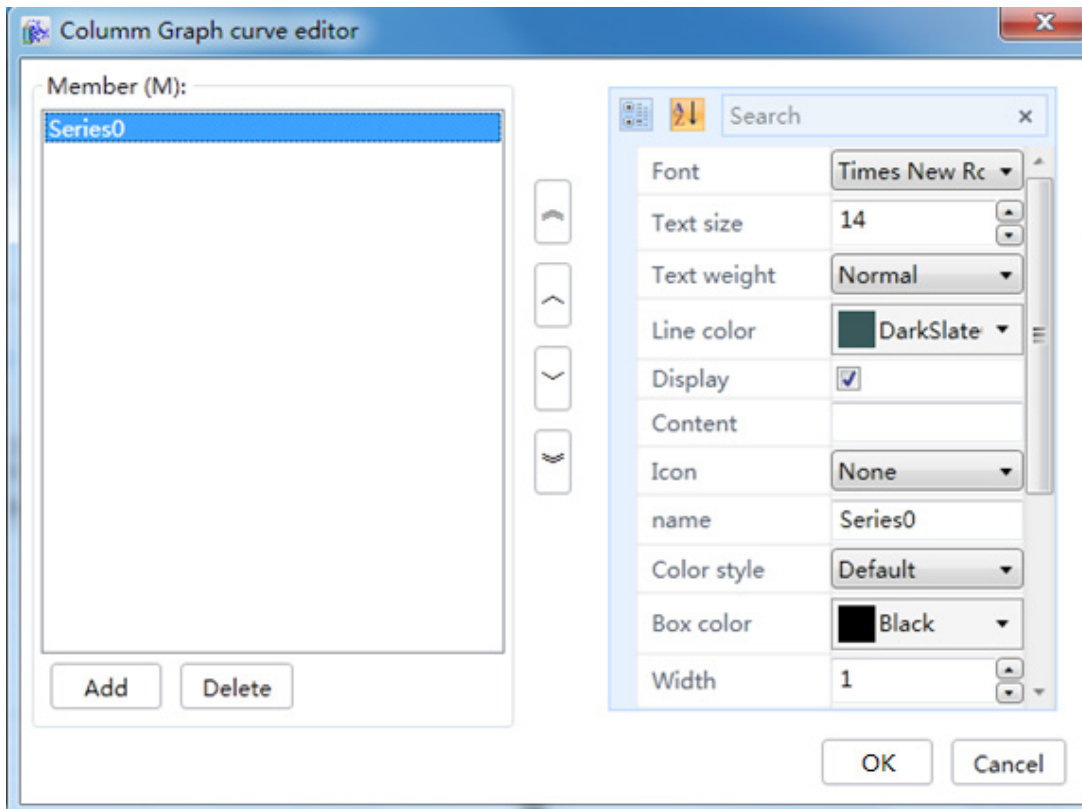


- » The figure above is a selected histogram; click on the histogram to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Histogram properties

- » **Title:** Text contents in the title list on top of the histogram; it represents the displayed name of the histogram, and it can be left empty.
- » **Font:** Sets the font format of the text in the historic curve; for example font style, size and bold etc.
- » **Display legend:** Sets whether to display the histogram illustrations.
- » **Display from left to right:** Sets whether to display the histograms side by side from left to right when there are multiple histogram elements.
- » **Update time:** Sets the time interval for updating the histogram element data.
- » **Curve:** Configures the curve in the chart that is associated with the variables to perform real-time display; the configuration method is as follows:

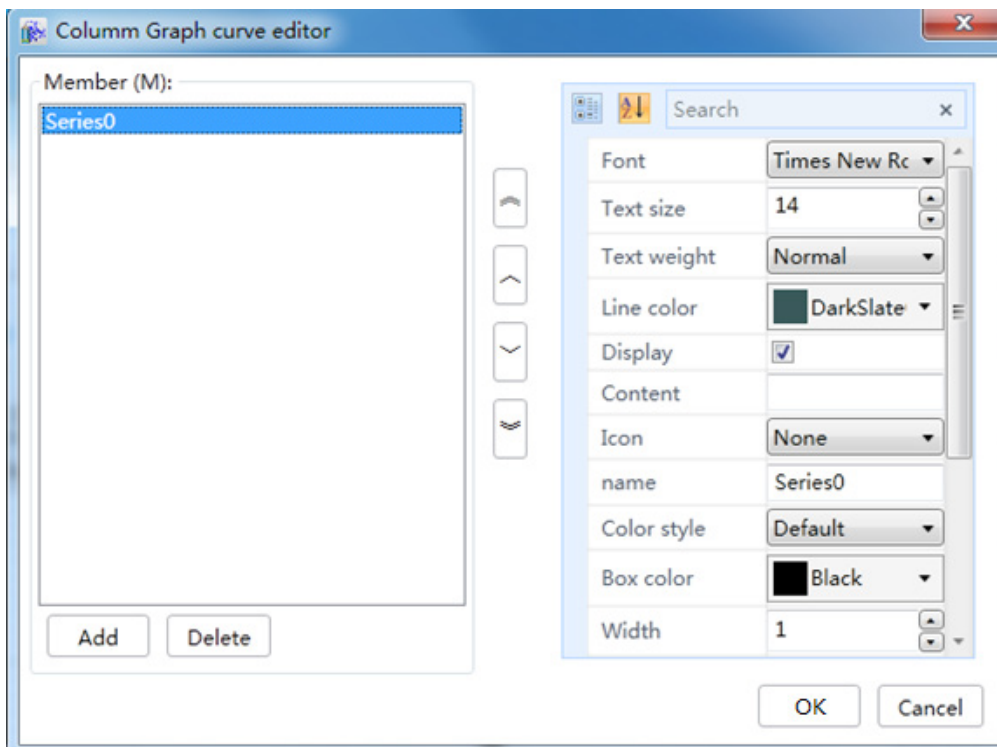
Click the “” button and the histogram curve editor window will appear; it has one curve preset, as shown in the figure below:



The left part is to add or delete members, each member means a curve; the middle parts is to perform top and bottom sorting of the curves, and the right part is the properties of the selected curve. Please refer to the table below:

Properties	Description
Name	Sets the curve's name.
Set	Sets the components of the curve; please refer to the "Histogram element editor" below.
Palette style	Sets the palette style of the histogram.
Style	Sets the display style of the histogram graphic element.
Line color	Sets the fill color of the curve element.
Display	Whether to display curve elements.
Content	Text description contents corresponding to the icon.
Icon	Curve icon
Frame color	Sets the frame color of the curve icon and value point marks.
Width	Sets the thickness of the curve frame lines and the value point mark frame.
Font	Sets the font style of the value points on the curve.
Text size	Sets the font size of the value points on the curve.
Text thickness	Sets the font thickness of the value points on the curve.
Mark	Sets the mark shape of the value points on the curve.
Mark height	Sets the height of the value point marks on the curve.
Mark width	Sets the width of the value point marks on the curve.
Mark color	Sets the "Background" color of the value point marks on the curve.

Histogram element editor: Click the configuration button of the “Set” field to open the editor and configure the histogram components, as shown in the figure below:



The left part is to add or delete members, each member means an element unit; the middle parts is to perform top and bottom sorting of the elements, and the right part is the properties of the selected element. Please refer to the table below:

Properties	Description
Name	Sets the name of the element unit.
Variable path	Sets the variable associated with the element unit.
Color	Sets the fill color of the element unit.
Value	Sets the initial value of the element unit.

#### ■ Y-axis

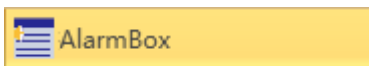
Properties	Description
Font	Sets the font style of the values on the Y-axis.
Font color	Sets the font color of the values on the Y-axis.
Title	Title of the Y-axis.
Title font	Sets the font style of the Y-axis title.
Title color	Sets the font color of the Y-axis title.
Large scale	Sets the large scale number on the Y-axis.
Small scale	Sets the small scale number between two large scales.
Display grid	Sets whether to display the horizontal grid on the Y-axis.
Scale display	Sets whether to display the Y-axis scale.
Maximum value	Sets the maximum value of the Y-axis.
Minimum value	Sets the minimum value of the Y-axis.

■ X-axis

Properties	Description
Font	Sets the font style of the values on the X-axis.
Font color	Sets the font color of the values on the X-axis.
Title	Title of the X-axis.
Title font	Sets the font style of the X-axis title.
Title color	Sets the font color of the X-axis title.
Scale	Sets the scale number on the X-axis.
Display grid	Sets whether to display the vertical grid on the X-axis.
Scale display	Sets whether to display the X-axis scale.

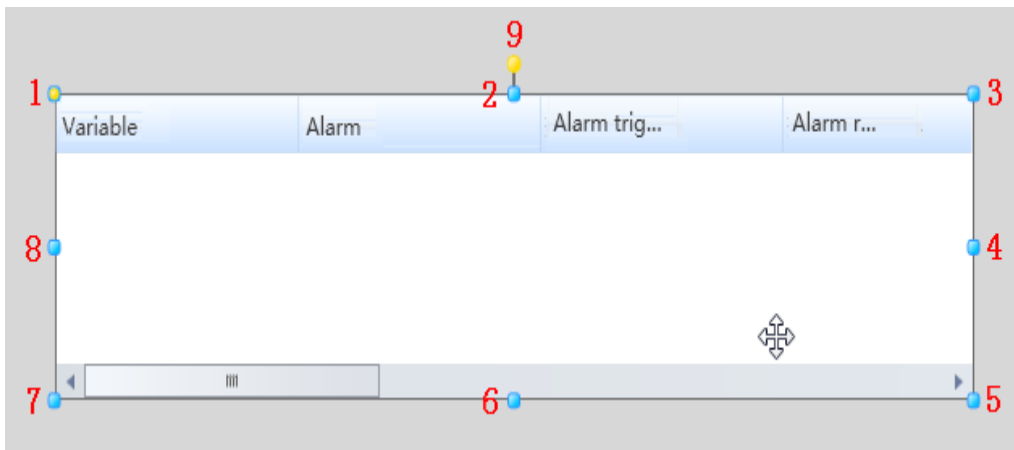
» For other property settings please refer to the section “7.4 Graphic universal properties”.

### 7.7.6 Drawing alarm windows



- Open the window interface and click on “Toolbox” → “Advanced control unit” → “Alarm window” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of the alarm window is complete, and the alarm window will be generated.
- Just repeat the steps above if another alarm window needs to be drawn.

**Graphic introduction:**



- » The figure above is a selected alarm window; click on the alarm window to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point, 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Alarm window properties

- » **Confirm background color:** Sets the background color for alarm confirm.
- » **Alarm background color:** Sets the background color of the alarm.
- » **Allow confirmation:** Sets whether to allow confirmation.
- » **Alarm level:** Sets the alarm levels displayed in the alarm window -- displays alarms that include or are higher than the level set here in the alarm window.
- » **Alarm record:** Sets the alarm displayed in the alarm window; options include: alarm, reset, confirm.
- » **Alarm type:** Sets the alarm type displayed in the alarm window, such as: High alarm, switch alarm and large deviations alarm.
- » **Display new alarm on the first row:** Sets whether to display new alarms on the first row.
- » **Reset background color:** Sets the background color for alarm reset.
- » High alarm color, super high alarm color, low alarm color, super low alarm color, small deviation color, off alarm color, on alarm color, switch alarm color, rate of change alarm color, **large deviation alarm color:** Sets the alarm colors for different alarm types.
- » **Background color:** Sets the background color of the alarm window.
- » **Row format:** Sets the alarm information field and order displayed in the alarm window.
- » **Title font:** Sets the font format of the alarm window column title.
- » **Title font color:** Sets the font color of the alarm window column title.
- » **Selected item background color:** Sets the background color of the selected item in the alarm window.
- » **First line:** Whether to display the first line.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

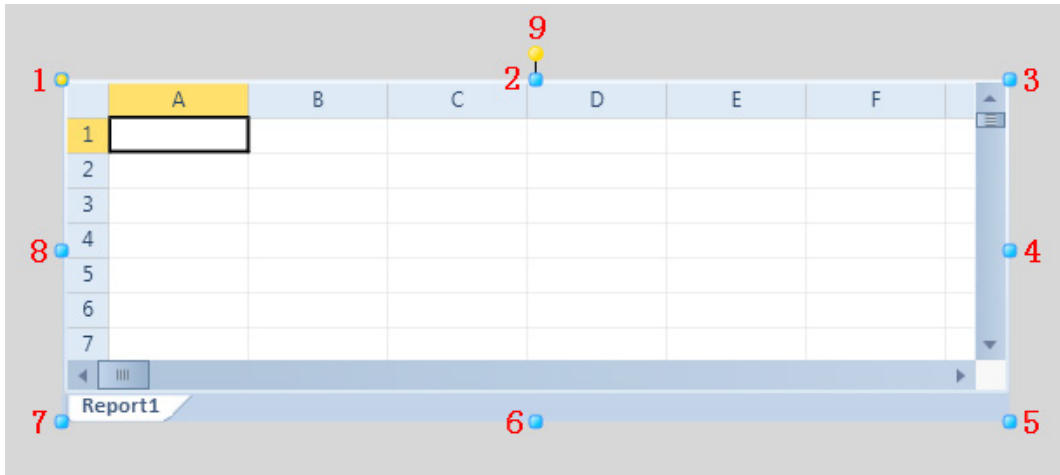
### 7.7.7 Drawing reports



- Open the window interface and click on “toolbox” → “Advanced control unit” → “Report” in the tools window to the left; the toolbar as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of the report is complete, and the report will be generated.
- Just repeat the steps above if another report needs to be drawn.



**Graphic introduction:**

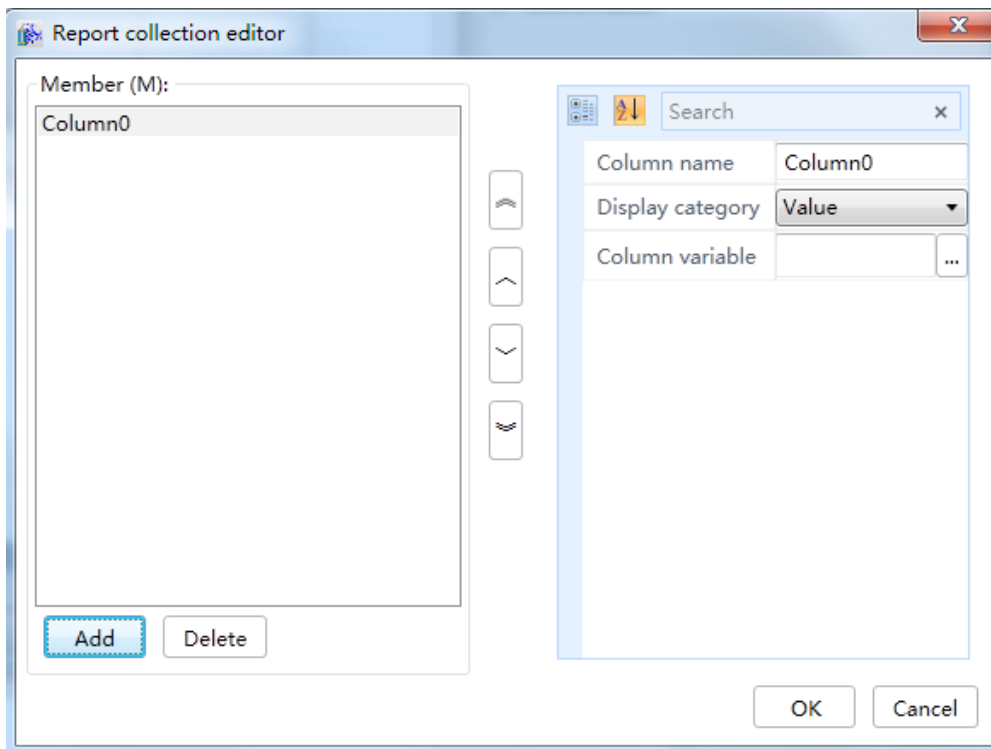


- » The figure above is a selected report; click on the report to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

**Report properties**

- » **Column set:** Displays the column set displayed in the table; sets the column and variables associated with the column, the configuration method is as follows:

Click the "..." button and the report set editor window will appear; add a column, as shown in the figure below:



The left part is to add or delete members, each member means a column; the middle parts is to perform top and bottom sorting of the columns, and the right part is the properties of the selected column.

**Column name:** Column name displayed in the report.

**Display type:** Sets the display type of the report: value (display value), TriggeringTime (displays the triggering time of the historic record variable).

**Column variable:** Sets the historic record variable associated to the column.

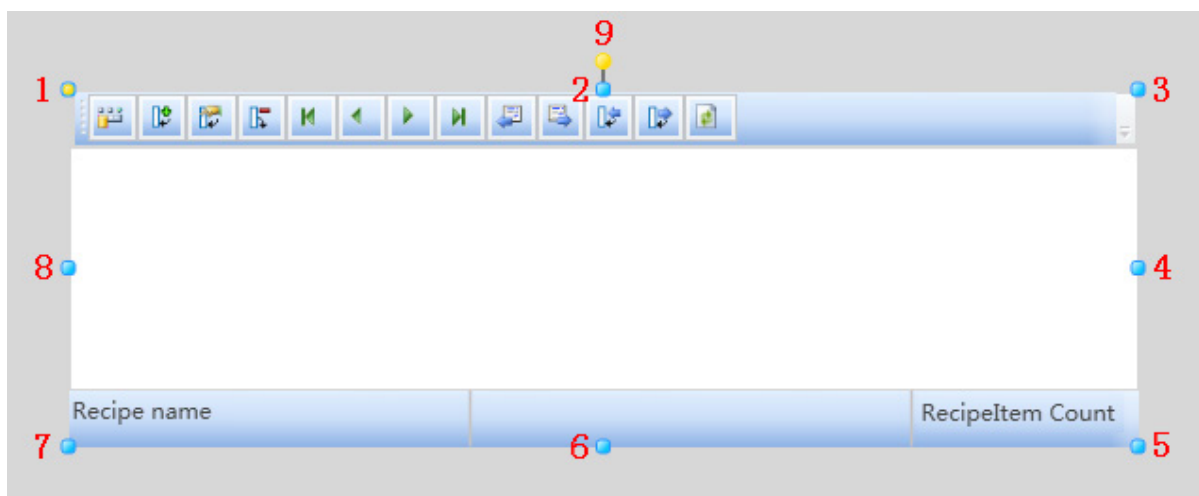
- » Time column name: The time column name of the table.
- » Display time column: Whether the display the time column of the table; if selected, the first column of the table is the time column (visible during execution).
- » Template path: Sets the table template and selects the template file path.
- » Edit block: Whether to display the toolbar used to edit the table.
- » Condition field: Whether to display the condition field of the table.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.7.8 Drawing recipe browsers



- Open the window interface and click on “Toolbox” → “Advanced control unit” → “Recipe browser” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of the recipe browser is complete, and the recipe browser will be generated.
- Just repeat the steps above if another recipe browser needs to be drawn.

**Graphic introduction:**



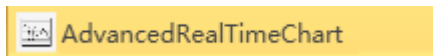
- » The figure above is a selected report; click on the report to enter selected status.
- » **There are two points on 1 in the figure above:** the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point.

- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

### Recipe browser properties

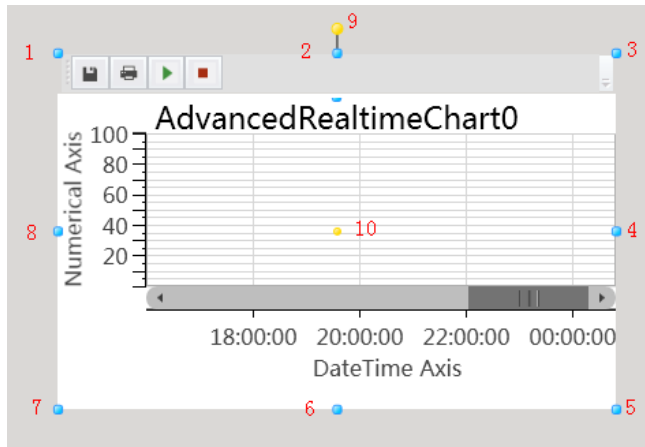
- » **Add:** Whether to display the “Add” tool button.
- » **All:** Whether to display the “All” tool button.
- » **Delete:** Whether to display the “Delete” tool button.
- » **Edit:** Whether to display the “Edit” tool button.
- » **Last:** Whether to display the “Last” tool button.
- » **First:** Whether to display the “First” tool button.
- » **Import:** Whether to display the “Import” tool button.
- » **Export:** Whether to display the “Export” tool button.
- » **Back:** Whether to display the “Back” tool button.
- » **Next:** Whether to display the “Next” tool button.
- » **Update:** Whether to display the “Update” tool button.
- » **Write in:** Whether to display the “Write in” tool button.
- » **Write out:** Whether to display the “Write out” tool button.
- » **Font:** Sets the font style and font size etc. of the recipe table.
- » **Font color:** Sets the font color of the recipe table.
- » **Status bar:** Whether to display the status bar of the recipe browser.
- » **Toolbar:** Whether to display the toolbar of the recipe browser.
- » **Recipe name:** Selects a created recipe table name as the receipt currently displaying.
- » For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.7.9 Drawing advanced real-time curves



- Open the window interface and click on “Toolbox” → “Advanced control unit” → “Advanced real-time curve” in the tools window to the left; the toolbar is as shown in the figure above.
- Move the mouse to the working area of the window, select a starting point and press the left mouse button and drag the mouse towards the bottom-right; after releasing the left mouse button, the drawing of an advanced real-time curve is complete, and an advanced real-time curve will be generated.
- Just repeat the steps above if another real-time curve needs to be drawn.

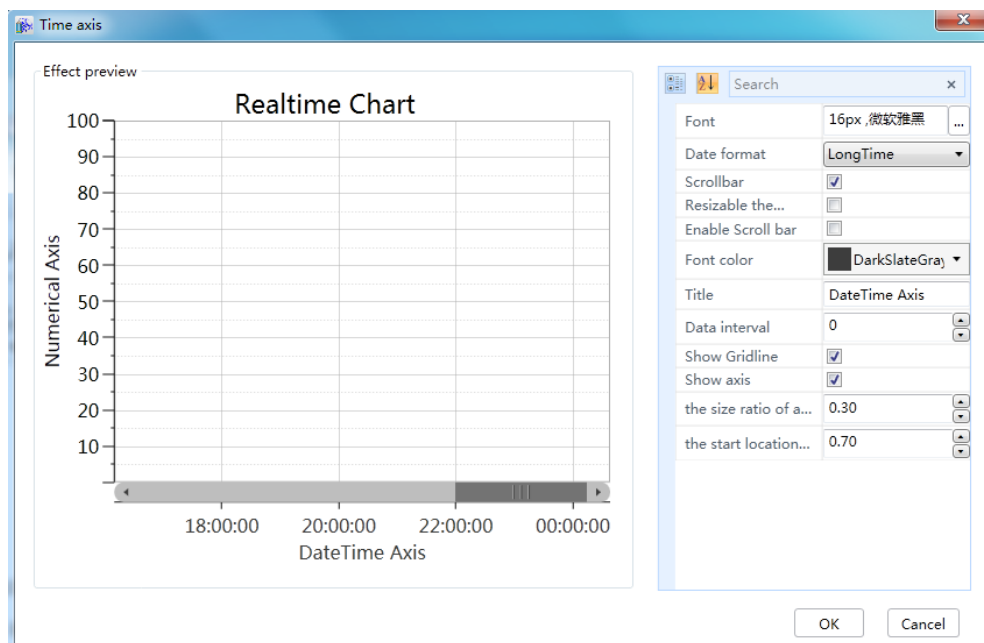
## Graphic introduction:



- » The figure above is a selected real-time curve; click on the real-time curve to enter selected status.
- » There are two points on 1 in the figure above: the tensile point and the center; 2-8 are the tensile points and 9 is the rotation point, 10 is the center.
- » Above point 2 and below point 6 in the figure are the horizontal distortion points. The right of point 4 and the left of point 8 are the vertical distortion points.

## Advanced real-time curve properties

- » **Title:** Text contents in the title list on top of the curve; it represents the displayed name of the curve, and it can be left empty.
- » **Font:** Sets the font format of the text in the historic curve; for example font style, size and bold etc.
- » **Display legend:** Sets whether to display the curve line illustrations.
- » **Data from left to right:** Sets whether the data is used to draw the curve from left to right.
- » **Update time:** Sets the refresh time interval of data display.
- » **Curve set:** Settings are the same as chapter “7.7.2 Real-time curves”.
- » **Time axis & value axis:** Sets the curve’s coordinate axis; using the time axis as an example, as shown in the figure below:



The left part is the effect preview, the effect after changing the real-time display; the right is the time axis properties. Please refer to the following table for specific introductions:

Properties	Description
Font	Sets the font of the title.
Date format	Displayed date format
Scroll bar	Whether to display the scroll bar.
Font color	Sets the font color of the title.
Data interval	Sets the data's display interval size.
Scroll bar size ratio	Sets the ratio of the scroll bar size.
Scroll bar starting position	Sets the starting position of the scroll bar.

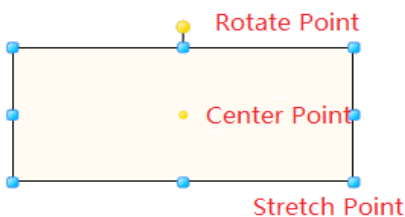
For other property settings please refer to the section “7.4 Graphic universal properties”.

## 7.8 Graphic operations

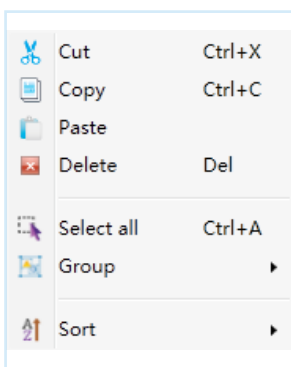
### 7.8.1 Overview

Graphic operations refers to performing operations to graphics including stretching, rotating, distorting, sorting, aligning and grouping etc., modifying the properties of the graphic to achieve the functions and effects that we need.

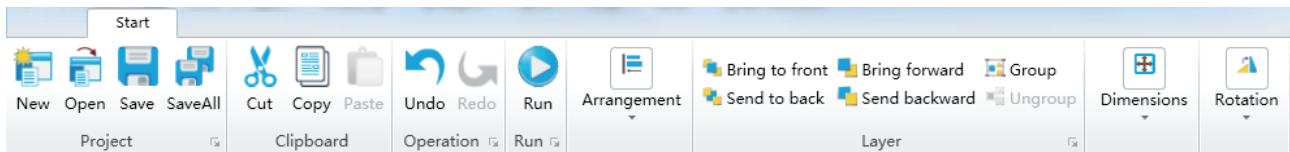
In a project development environment, not only can be acquire and modify the properties of graphics directly from the properties frame of the graphic, we can also use the mouse, right-clicking the mouse, shortcut keys and the shortcut buttons on the toolbar to edit the properties. For example, when we are drawing, we can adjust the graphic's rotation point to rotate it, or stretch the tensile points around the graphic to adjust the size of the graphic etc., as shown in the figure below:




In order to achieve “all-mouse” operations, the DIAView software has the convenient right-click menu (please refer to “3.4 Right-click menu” for the specific functions), as shown in the figure below:



In order to increase development efficiency and the convenience for operating, the DIAView software also provides shortcut buttons for frequently used operations (please refer to “3.3.2 Start menu” for the specific functions), as shown in the figure below:

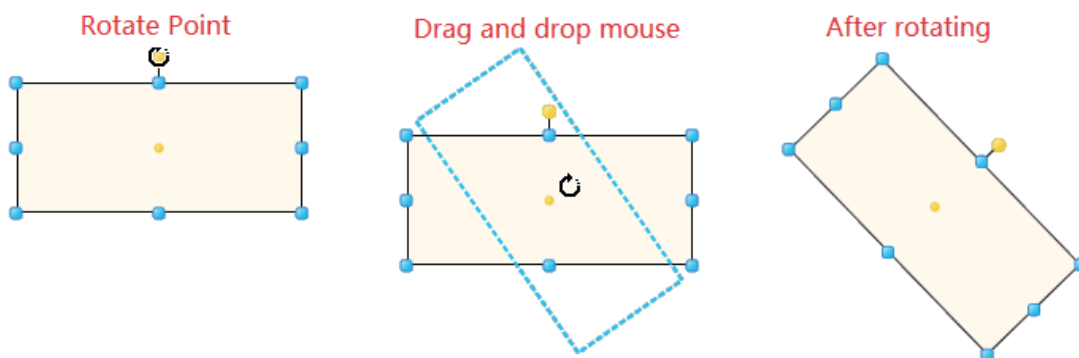


## 7.8.2 Rotating

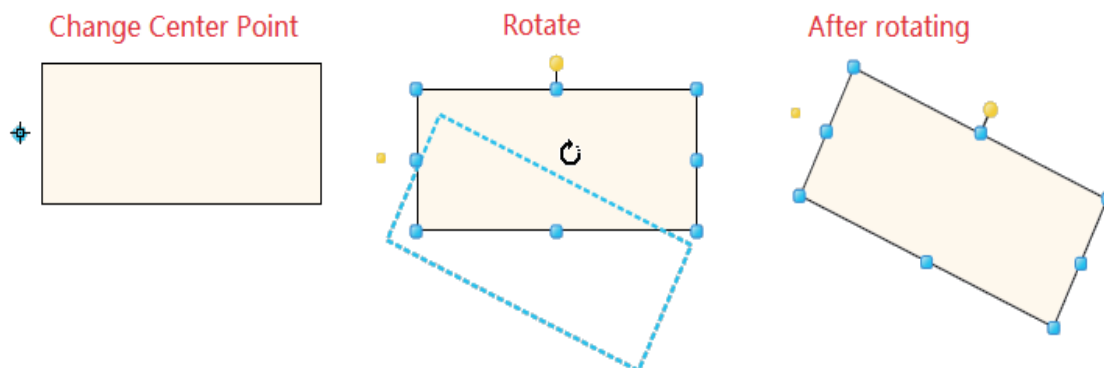
When the graphic drawn needs to be rotated, place the mouse on the “rotation point” and the mouse cursor will change to ; now you can press and hold the left mouse button and drag the rotation point to rotate the graphic.

Graphic rotation uses the center point as the center for rotating. It can be rotated using the preset center point location (the center of the graphic), or the center point can also be changed and then rotated, as shown in the figure below:

Rotating using the preset location of the center point:





Rotating after changing the location of the center point:

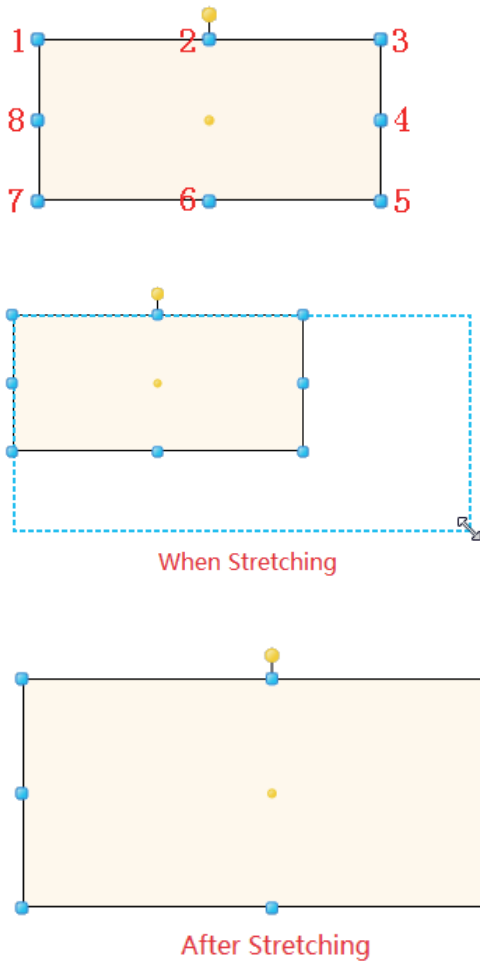


In addition, specific values (unit: degrees) can be entered directly in the “Rotation angle” properties frame of the graphic properties window to specify the rotating angle of the graphic.

### 7.8.3 Stretching

When the graphic drawn needs to be stretched (which means adjusting the size of the graphic), place the mouse on the “stretching point (when a graphic is selected, a dotted frame will appear around the graphic, and 8 rounded rectangle points filled with blue will appear on the rectangular dotted frame. These are the stretching points. For example 1 in the figure below is the first stretching point), and the mouse cursor will change to bidirectional arrows such as  or . Now you can press and hold the left mouse button to drag the stretching point to change the size of the graphic.

As shown in the figure below:



In addition, specific values can be entered directly in the “Size” properties frame of the graphic properties window to specify the width and height of the graphic.

### 7.8.4 Aligning

When there are multiple graphics, sometimes they need to be aligned according to a specific direction or by referring to one of the graphics. The DIAView software provides 7 types of alignment operations (shortcut buttons under the “Format” menu), which most of the alignment methods can only be used when two or more graphics are selected.

Alignment reference graphic rules when multiple graphics are selected: (please refer to the highlighted blue stretching points of the graphics).

1. When multiple graphics are framed with the mouse, the graphic that is first drawn in the sketchpad is the reference graphic;
2. when multiple graphics are selected by clicking with the mouse, the first graphic clicked and selected with the mouse will be used as the reference graphic.

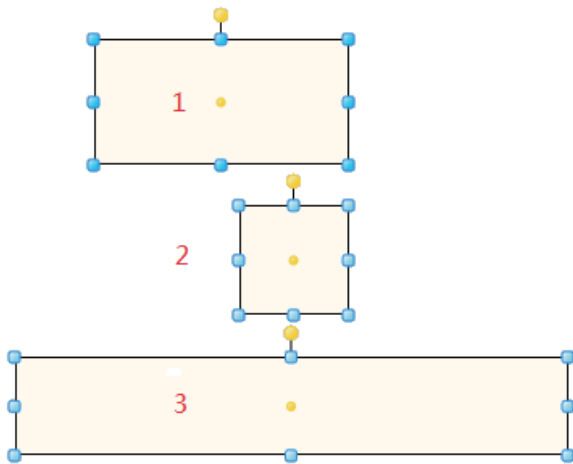
#### ■ Align left

Uses the reference graphic as the basis and make the left edge of the other selected graphics align with the left edge of the reference graphic;

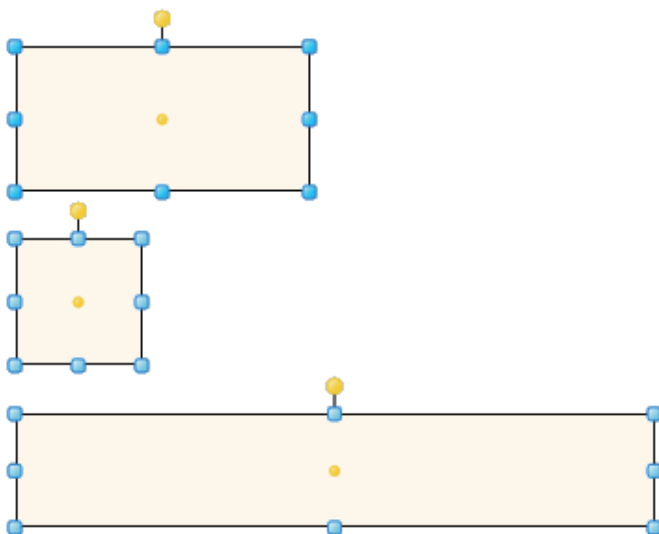
The shortcut button in the “Start” menu is .

**For example:** 3 graphics are framed in which the rectangular highlighted blue stretch points of graphic 1 is brighter, so it is the reference graphic; when the align left button in the toolbar is pressed, the other graphics will align to the left edge of graphic 1.

#### Framed graphics:



#### Aligned effects:





■ **Align right**

Uses the reference graphic as the basis and make the right edge of the other selected graphics align with the right edge of the reference graphic;

» The shortcut button in the “Start” menu is .

■ **Align top**

Uses the reference graphic as the basis and make the top edge of the other selected graphics align with the top edge of the reference graphic;

» The shortcut button in the “Start” menu is .

■ **Align bottom**

Uses the reference graphic as the basis and make the bottom edge of the other selected graphics align with the bottom edge of the reference graphic;

» The shortcut button in the “Start” menu is .

■ **Center horizontally**

Uses the reference graphic as the basis and make the X-axis of geometric center of the other selected graphics the same as the X-axis of the geometric center of the reference graphic;

» The shortcut button in the “Start” menu is .

■ **Center vertically**

Uses the reference graphic as the basis and make the Y-axis of geometric center of the other selected graphics the same as the Y-axis of the geometric center of the reference graphic;

» The shortcut button in the “Start” menu is .

■ **Same center**

Uses the reference graphic as the basis and make the X and Y-axis of geometric center of the other selected graphics the same as the X and Y-axis of the geometric center of the reference graphic;

» The shortcut button in the “Start” menu is .

## 7.8.5 Levels

Levels refers to the display order of graphics in the sketchpad; the graphic first drawn in the sketchpad of the DIAView software is at the inner level (bottom level) and the graphics later drawn is at the outer level (top level).

When multiple graphics are stacked in the sketchpad, sometimes their stacking order needs to be adjusted; for example placing a certain graphic on the top-most level for display etc.

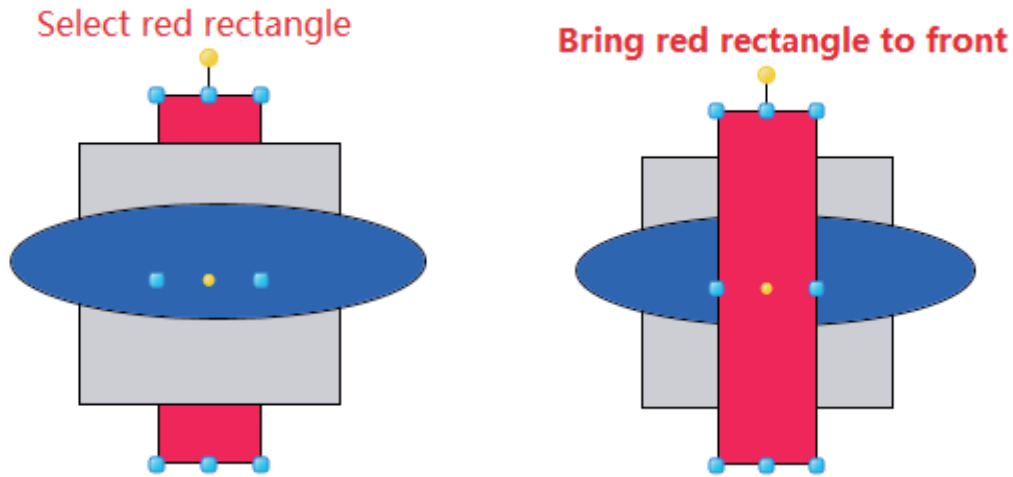
The DIAView software has 4 types of graphic level operation functions (please refer to the shortcut buttons under the “Start” menu):

### ■ Place at top level

Move the selected graphic to the top-most level of all graphics on the sketchboard for display;

» The shortcut button in the “Start” menu is .

An example is as follows:



### ■ Place at bottom level

Move the selected graphic to the bottom-most level of all graphics on the sketchboard for display;

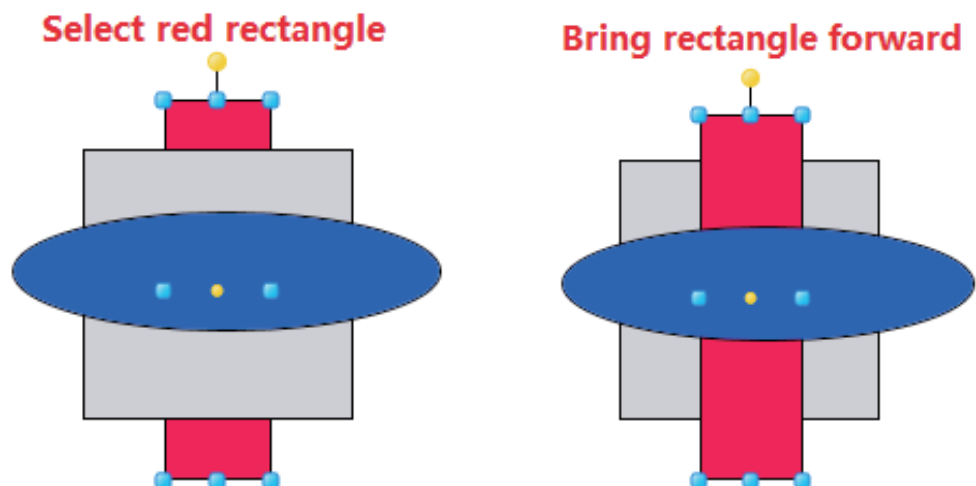
» The shortcut button in the “Start” menu is .

### ■ Move up a level

Move the selected graphic up a level for display;

» The shortcut button in the “Start” menu is .

An example is as shown in the figure below:



■ **Move down a level**

Move the selected graphic down a level for display;

» The shortcut button in the “Start” menu is .

### 7.8.6 Sorting


When there are multiple graphics in a sketchpad, sometimes their distance or size needs to be adjusted; the DIAView software provides 2 types of sorting operations and 3 types of graphic size adjustment operations (please refer to the shortcut buttons under the “Start” menu). They can only be used when two or more graphics are selected.

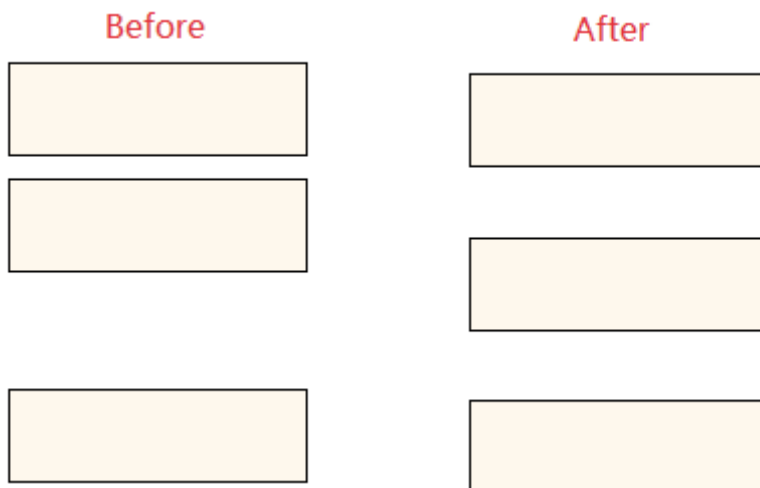
Alignment reference graphic rules when multiple graphics are selected: (please refer to the highlighted blue stretching points of the graphics).

1. When multiple graphics are framed with the mouse, the graphic that is first drawn in the sketchpad is the reference graphic;
2. When multiple graphics are selected by clicking with the mouse, the first graphic clicked and selected with the mouse will be used as the reference graphic.

■ **Vertical distribution**


Distributes the geometric center of three or more selected graphic objects in the sketchpad evenly in the vertical direction,

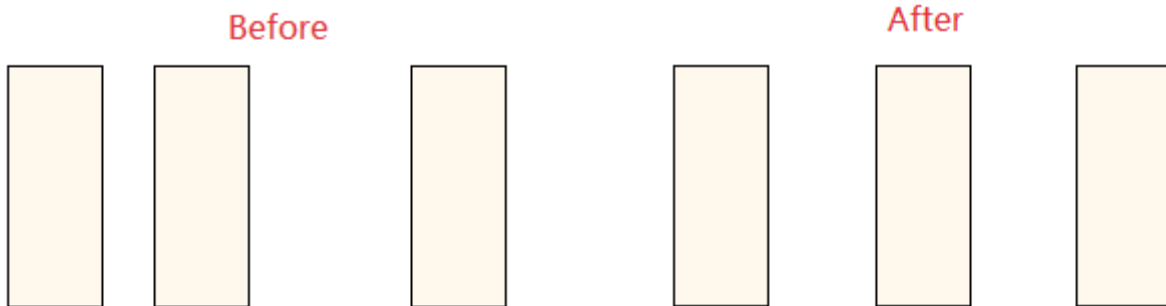
» The shortcut button in the “Start” menu is: ; as shown in the figure below:



### ■ Horizontal distribution

Distributes the geometric center of three or more selected graphic objects in the sketchpad evenly in the horizontal direction.

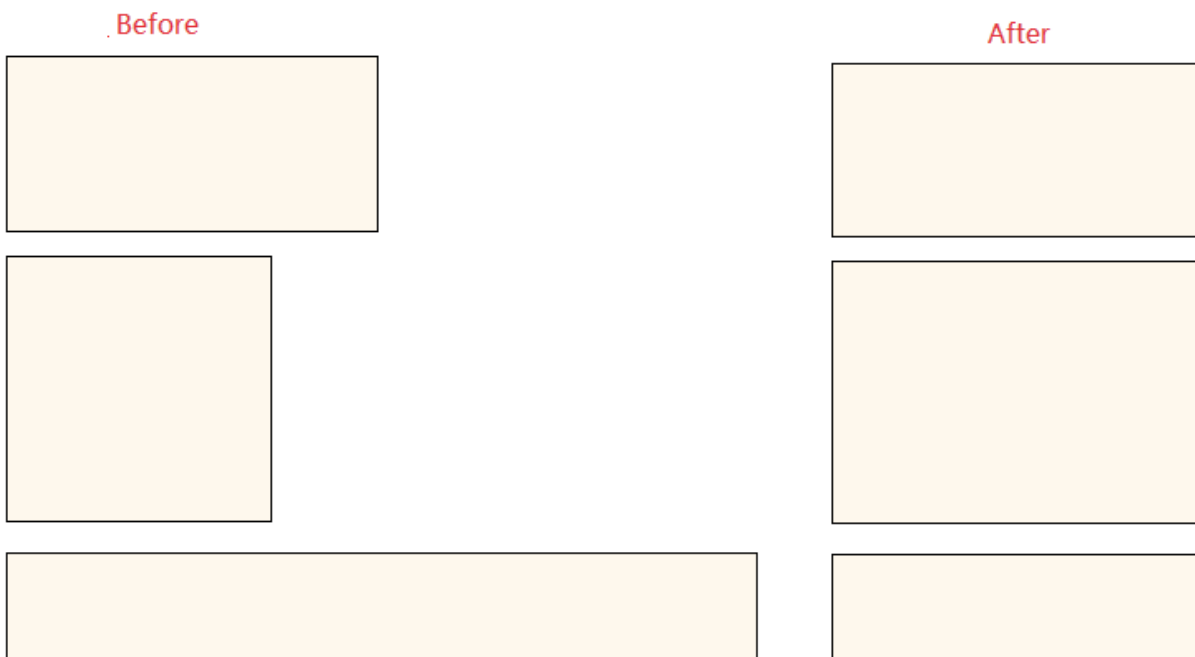
» The shortcut button in the “Start” menu is: ; as shown in the figure below:



### ■ Same width

Uses the reference graphic as the basis and make the width of the other selected graphics the same as the width of the reference graphic.

» The shortcut button in the “Start” menu is ; as shown in the figure below:



### ■ Same height

Uses the reference graphic as the basis and make the height of the other selected graphics the same as the height of the reference graphic.

» The shortcut button in the “Start” menu is .

■ Same size

Uses the reference graphic as the basis and make the size of the other selected graphics the same as the size of the reference graphic.

» The shortcut button in the “Start” menu is .


### 7.8.7 Grouping

Grouping refers to forming two or more graphics into a whole, forming a new graphic making it easier for use to use. For example: we can group graphics such as fans, motors and water tanks and place it in the image library, so we can easily access them from the image library when we need to use it again.

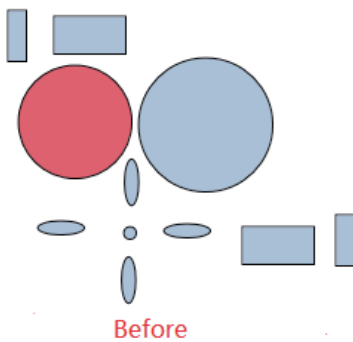
Operations such as rotation and size adjustment etc. can be performed to the grouped graphic as a new graphic.

Grouped graphics can be cancelled at any time.

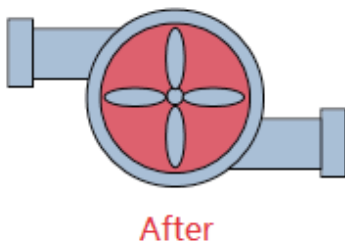
■ Grouping

» The shortcut button in the “Start” menu is .


First we draw the various sub-graphics that we want to group into a new graphic; for example, we can draw a pump by first drawing the various parts that forms it:



We adjust the sizes, positions and stacking orders of these sub-graphics and then group them together:



■ Cancel groups

» The shortcut button in the “Start” menu is .

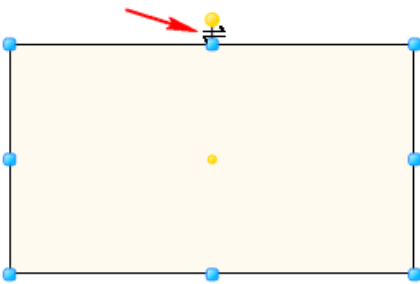
Select the grouped graphic and then click the “Cancel groups” shortcut button in the “Start” menu, and the various sub-graphics in the group will exist independently in the sketchpad.

## 7.8.8 Distorting

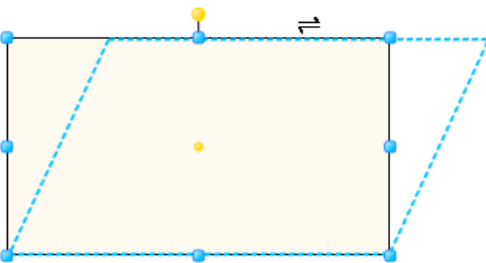
1. Distorting: Making the graphic tilt; distorting is divided into horizontal distorting and vertical distorting.
2. Using a rectangle as an example, it has two horizontal distortion points, when the mouse cursor is placed on the distortion points, the mouse cursor style will change to  $\overleftrightarrow{\square}$ . It also has two vertical distortion points, and when the mouse cursor is placed on top of the vertical distortion points, the mouse cursor style will change to  $\updownarrow$ .
3. When the graphic drawn needs to be distorted, place the mouse on the “distortion point” and the mouse status will change. Now you can press and hold the left mouse button and drag the distortion point to change the shape of the graphic.

As shown in the figure below (using horizontal distortion as an example):

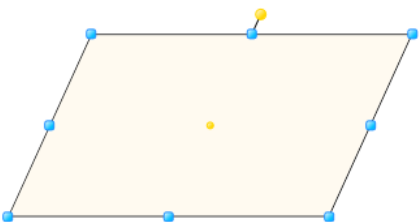
- a. Place the mouse on the horizontal distortion point, and the mouse cursor style changes:



- b. Press and hold the left mouse button and move it to the right horizontally:



- c. Distorted graphic:



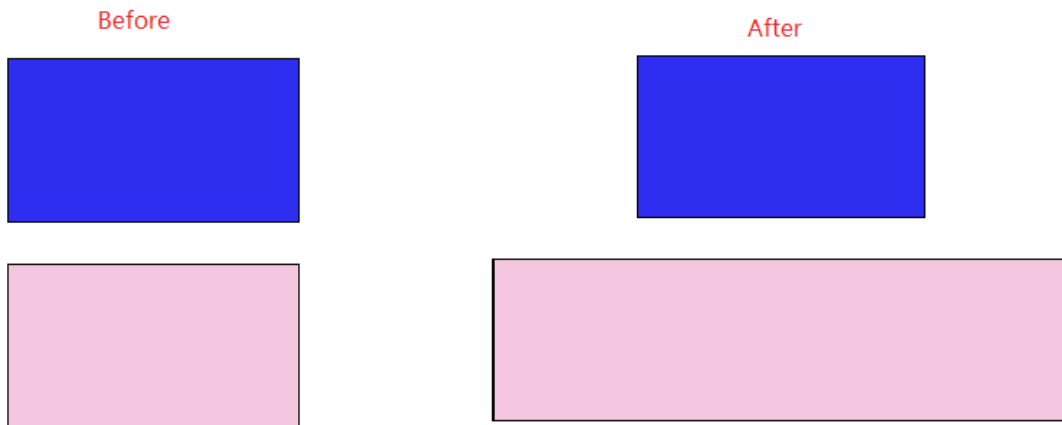
In addition, specific values can be entered directly in the “Horizontal distortion” or “Vertical distortion” property frames in the graphic property field to distort the graphic. Both of their value ranges from -89 to 89 up to two decimal places.

### 7.8.9 Zooming

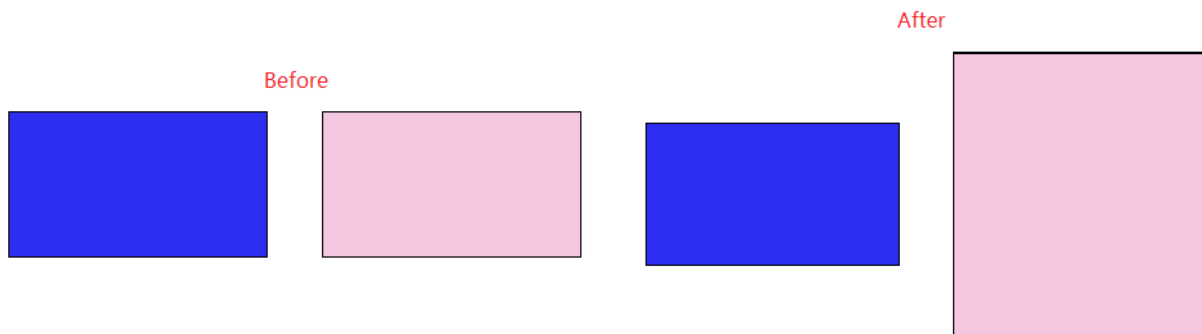
Zooming: Reduces or enlarges the graphic; zooming is divided into horizontal zooming and vertical zooming: horizontal zooming uses the center point of the graphic as the origin and zooms to both the left and right sides. Vertical zooming uses the center point of the graphic as the origin and zooms to both the top and bottom sides. Shifting the center point of the graphic affects the zooming effects.

As shown in the figure below:

1. Horizontal zooming: Draw two rectangles with identical sizes and use the preset value as the center point; set the horizontal zooming property value of the bottom rectangle to 2.



2. Vertical zooming: Draw two rectangles with identical sizes and use the preset value as the center point; set the vertical zooming property value of the right rectangle to 2.

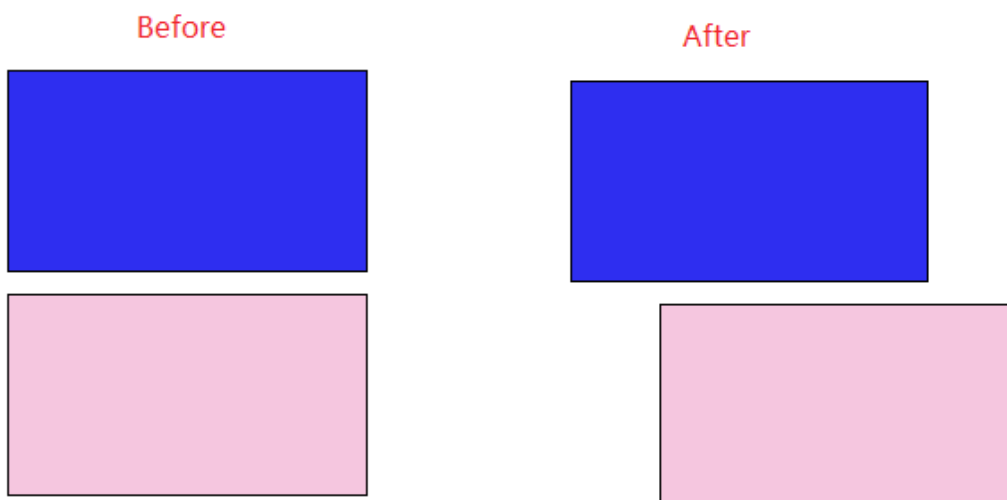


## 7.8.10 Offset

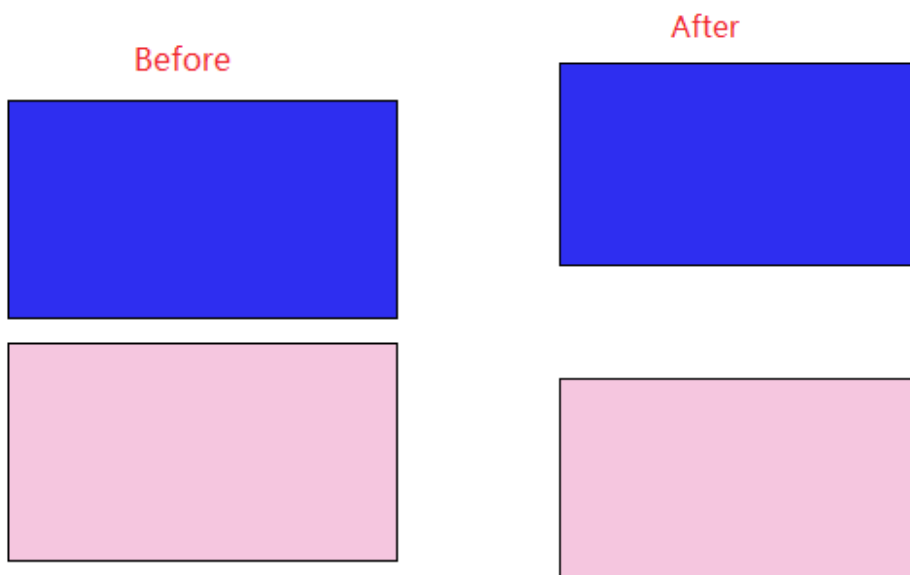
Offset: Making the position of the graphic offset: Offset is divided into horizontal offset and vertical offset. Horizontal offset uses the coordinates of the graphic as the origin and moves to both the left and right sides; vertical offset uses the coordinates of the graphic as the origin and moves to both the top and bottom sides.

As shown in the figure below:

1. Horizontal offset: Draw two rectangles with identical sizes, set the horizontal offset property value of the bottom rectangle to 50.



2. Vertical offset: Draw two rectangles with identical sizes, set the vertical offset property value of the bottom rectangle to 50.



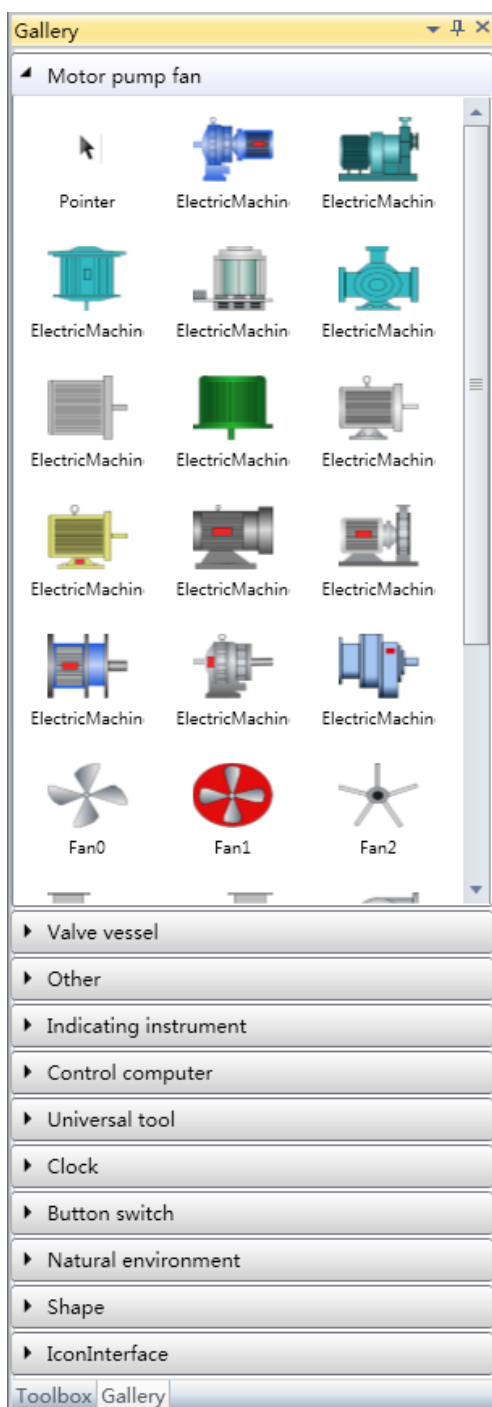


# 8. Graphics library

## 8.1 Overview

The graphics library includes the DIAView software's built-in frequently used graphic model collection and the user's customized graphics collection. Graphics include indicating instruments, button switches, valve and containers and motor pump fans etc.; users can also create their own frequently used graphic models and add them into the graphics library.

Models in the graphics library are grouped graphics; users can easily add them into the sketchpad and use them directly. It is located in the "Gallery" tool window in the toolbox, as shown in the figure below:



## 8.2 Using the graphics library

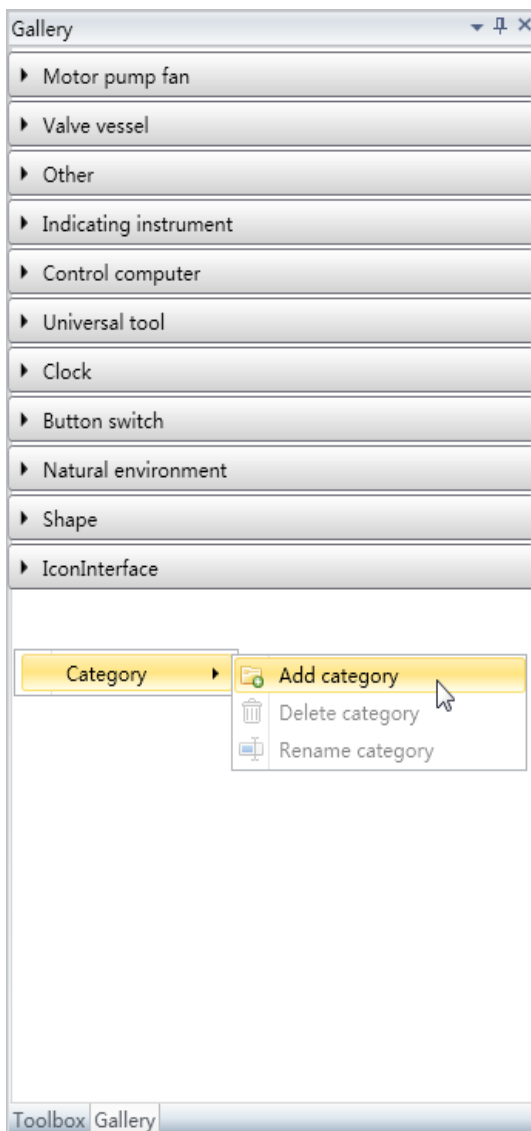
The graphics in the graphics library of the DIAView software includes the system's built-in graphic models and also allows users to define their own graphic models and add them into the graphics library. The graphics from the graphics library needs to be used in the sketchpad, the method to use them is similar to using normal graphics:

- Enter the screen window interface → open the “Gallery” window in toolbar → select the category of the graphics needed → click the model in the graphics library with the mouse → move the mouse cursor anywhere on the working area of the sketchpad and press the mouse button; then graphics will appear on the sketchpad and its properties such as position and size etc. can be adjusted.

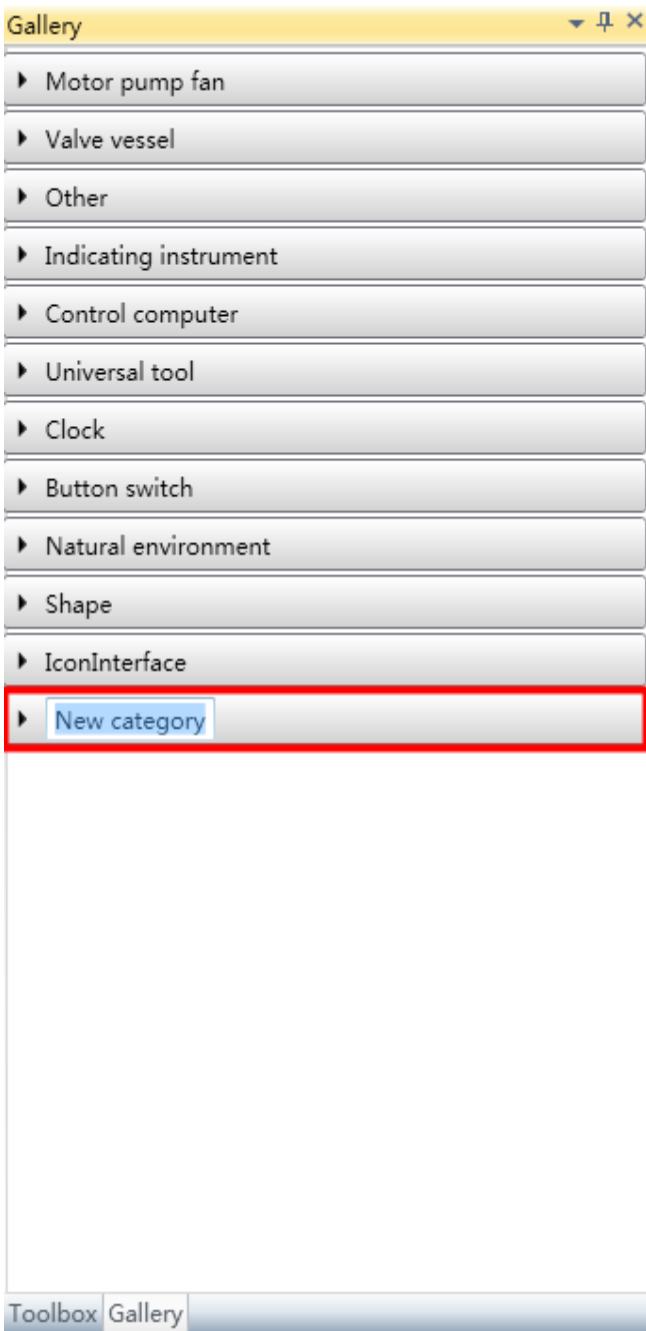
### Adding graphics library category:

Users can add their frequently used graphic models into the graphics library; usually customized graphics library categories are created for easy usage and management.

Open the “Gallery” tool window, right-click anywhere on the graphics library and then select “Category” -- “Add category”, as shown in the figure below:



After clicking “Add category”, a graphics library category with the preset name “New category” will be added in the graphics library, as shown in the figure below:



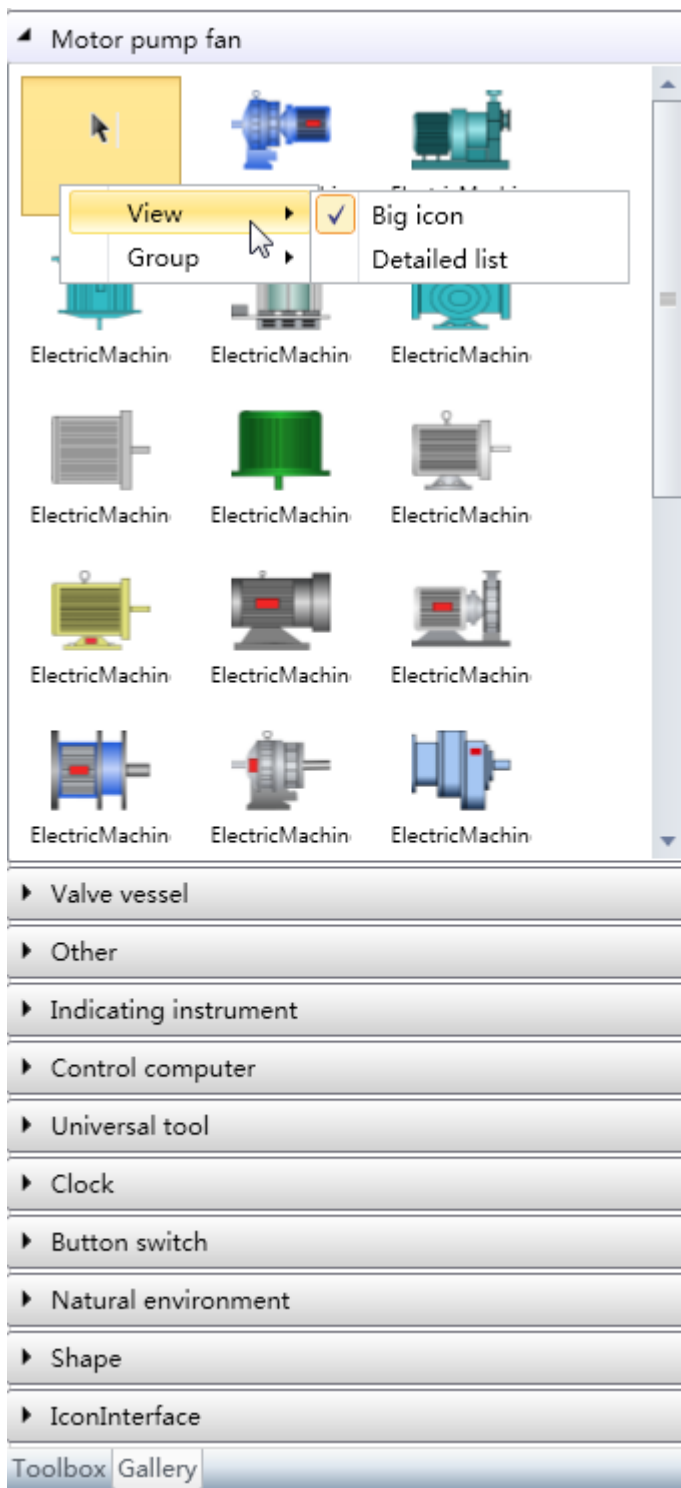
The category name added here can be edited and renamed:

Select a category and perform operations such as “Rename” and “Delete” etc. by right-clicking the mouse.

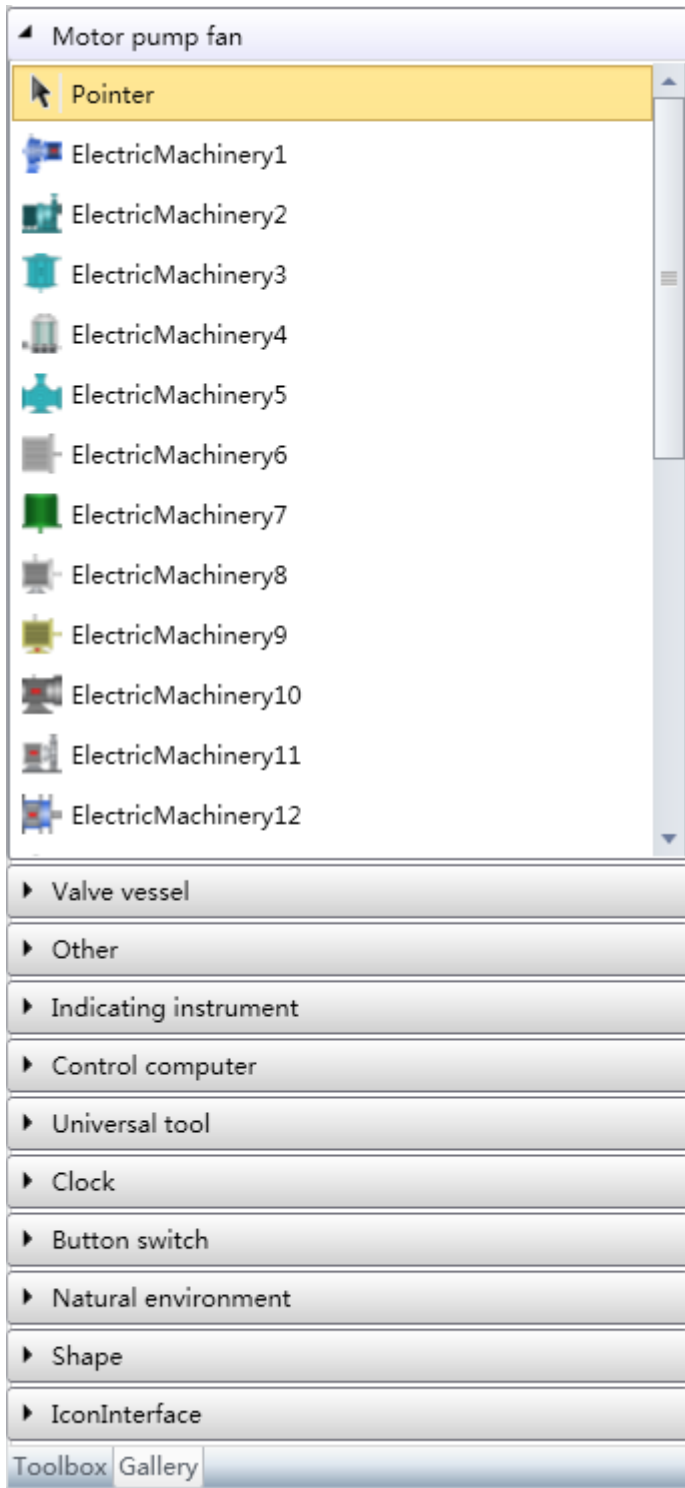
**Graphics display in the graphics library:**

Click the mouse to open a category in the graphics library, and the graphics under that category will be displayed; different display methods can be used:

If you right-click the mouse in the opened category -- there are two display methods under “View”: Big icon(preset) and detailed list, as shown in the figure below:



The figure below is the display effects of details:



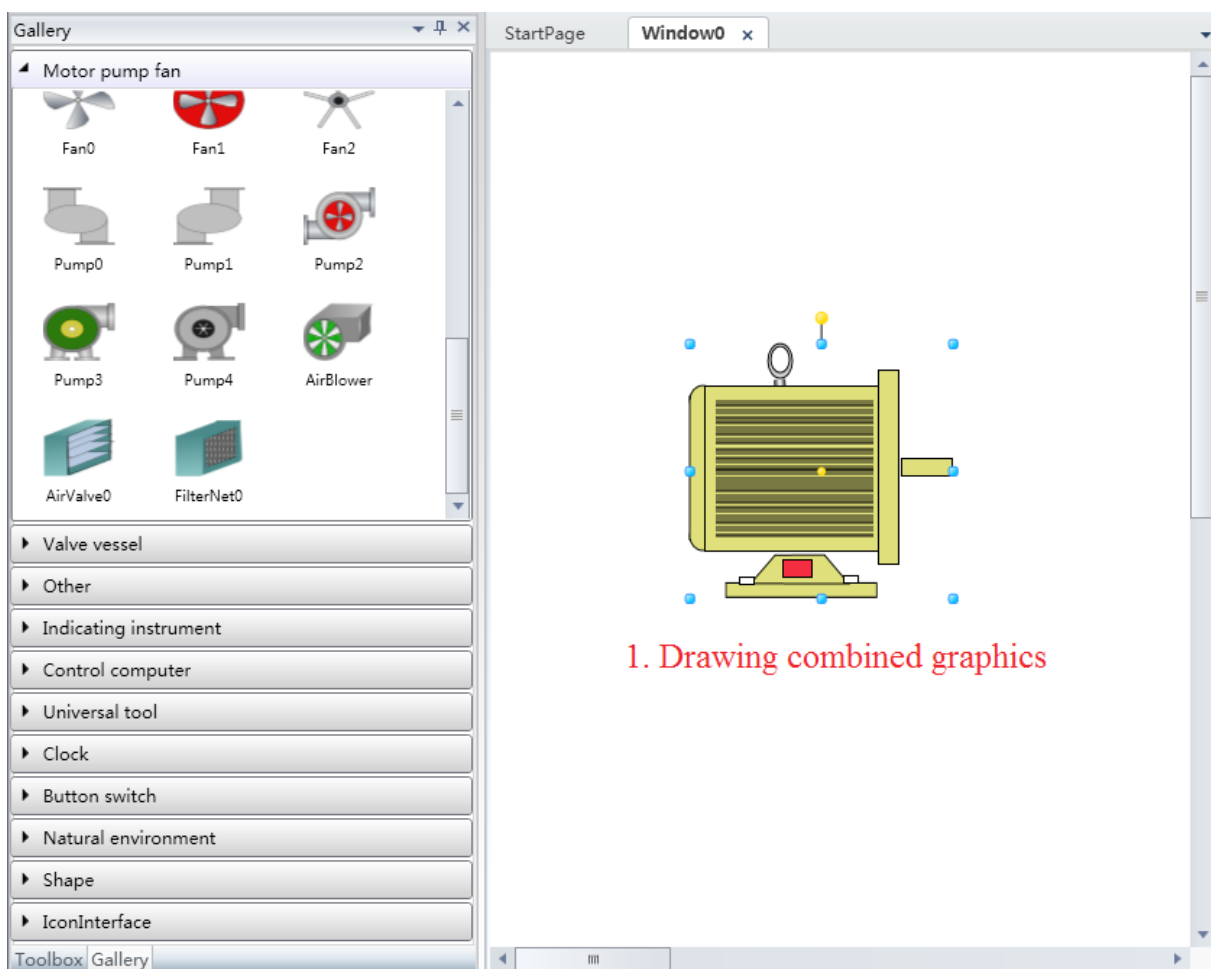
## 8.3 Expanding the graphics library

The models in the graphics library are the grouped graphics in the sketchpad; models can be drawn using the following three steps:

1. Draw the sub-graphics that forms the model.
2. Adjust the size, position and stacking levels of the sub-graphics and then group them into a graphic.
3. Add the new grouped graphic into the graphics library.

### ■ Adding the customized model into the graphics library:

Open the category inside the “Gallery” to add the new model, select the grouped graphics in the sketchpad, press and hold the left mouse button and drag the grouped graphics into the category area of the “Gallery”; the steps are as shown in the figure below:



# 9. Animation

## 9.1 Overview

Animation refers to the correspondence between the created screen element and the internal variables; it makes the properties of the screen element change dynamically according to the data acquired on-site, and truly displays the dynamic scenario of the industrial site. For example, simulation of fluid flow in the pipeline on the screen, real-time changes of instrument data, rotation of electrical machineries and the flashing of alarm signals etc.

To configure an animation so that the related properties of the graphics object on the screen change in real-time, corresponding variables must be connected and related properties must be configured according to the variable data acquired in real-time; therefore animations are driven by data.

The animation configuration function of the DIAView software is very powerful; it includes animations such as rotating, properties, filling, zooming, moving, visibility, flowing and value display etc. Only one of the same corresponding animation can be configured for the same graphic object.

## 9.2 Rotating animations

Rotating animation refers to allow graphics to perform rotating changes using the center point of the graphic as the rotation center, and changing the “rotation angle” property of the graphic.

Rotating animations are divided into four kinds: “Rotation”, “Start and stop rotation”, “Discrete rotation” and “Rotation speed”:

“Rotation” animation refers to an animation where the rotation angle of the graphic object make linear relationship changes according to the variables or the value of the expression;

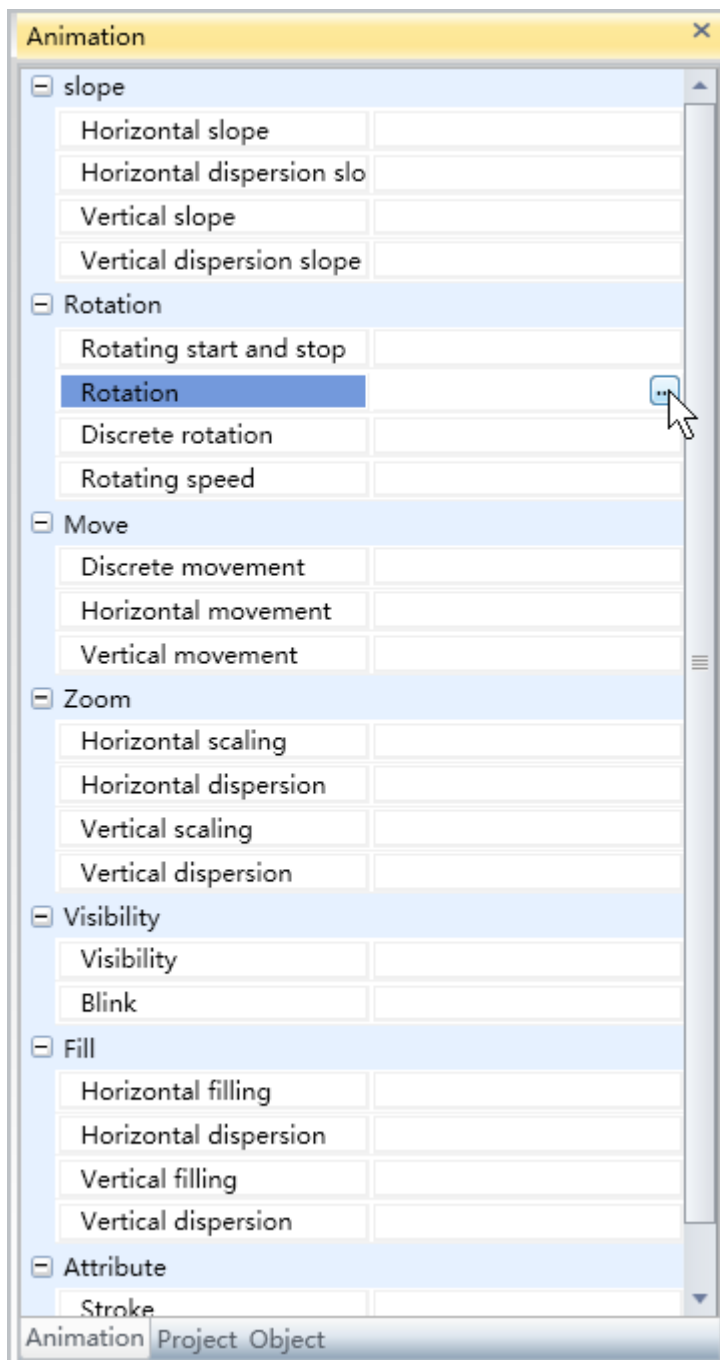
“Start and stop rotation” refers to an animation where whether the graphic object will rotate using the center point of the graphic is controlled by the variable or when the value of the expression is true or false.

“Discrete rotation” refers to the rotation angle of the graphic object being discretely related to the variable;

“Rotation speed” refers to the rotation speed of the graphic object being bound with the variable

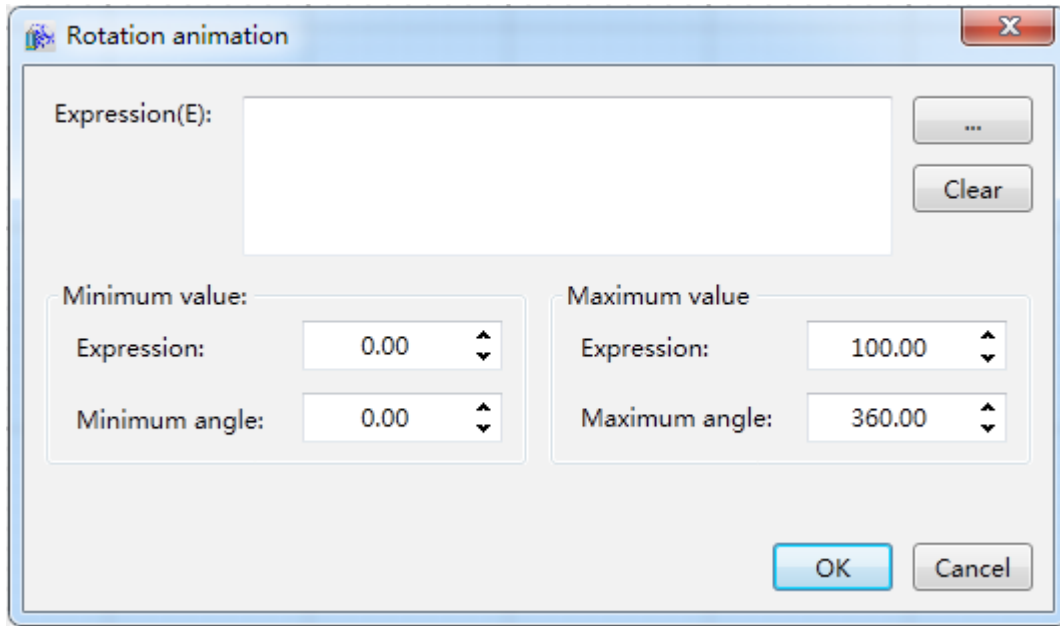
### 1. Steps to configuring rotation animation are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Rotation” → click the button in the “Rotation” field, as shown in the figure below:





- **Step 2:** The rotation animation configuration window will appear, as shown in the figure below:

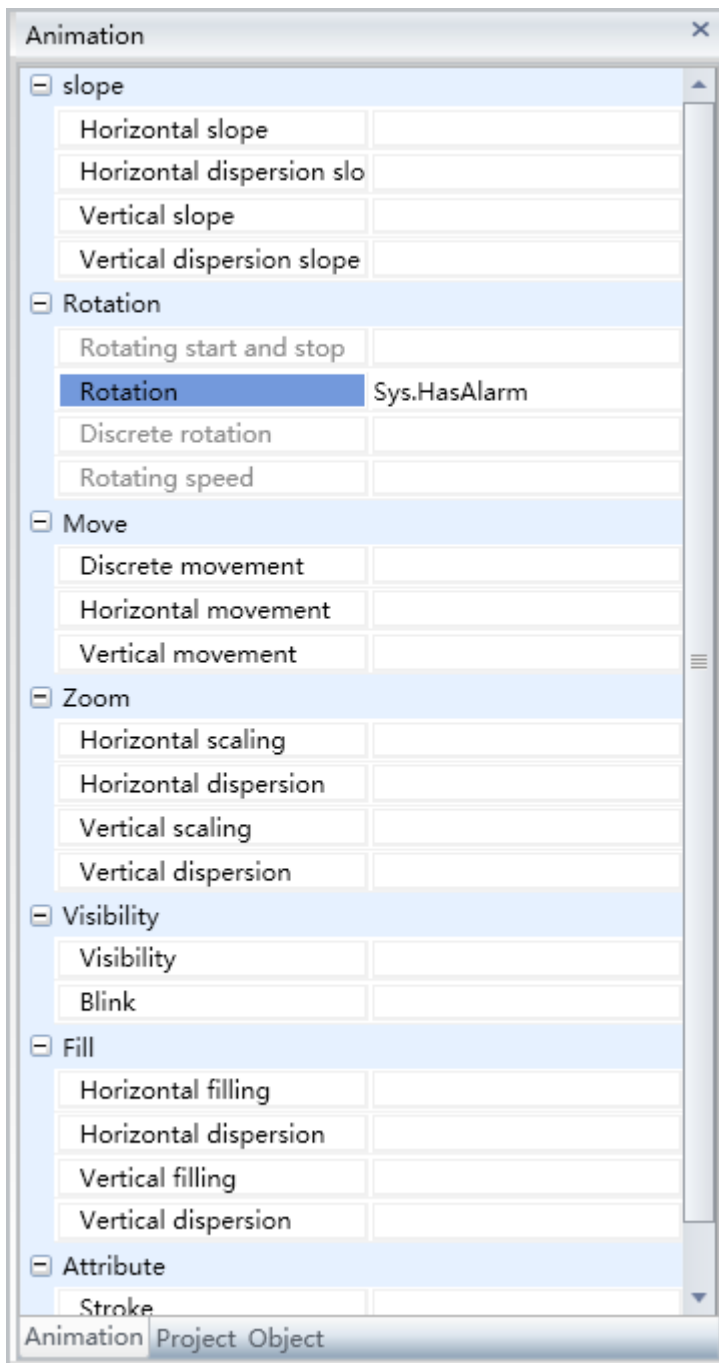


The meanings of each setting in the configuration window are as follows:

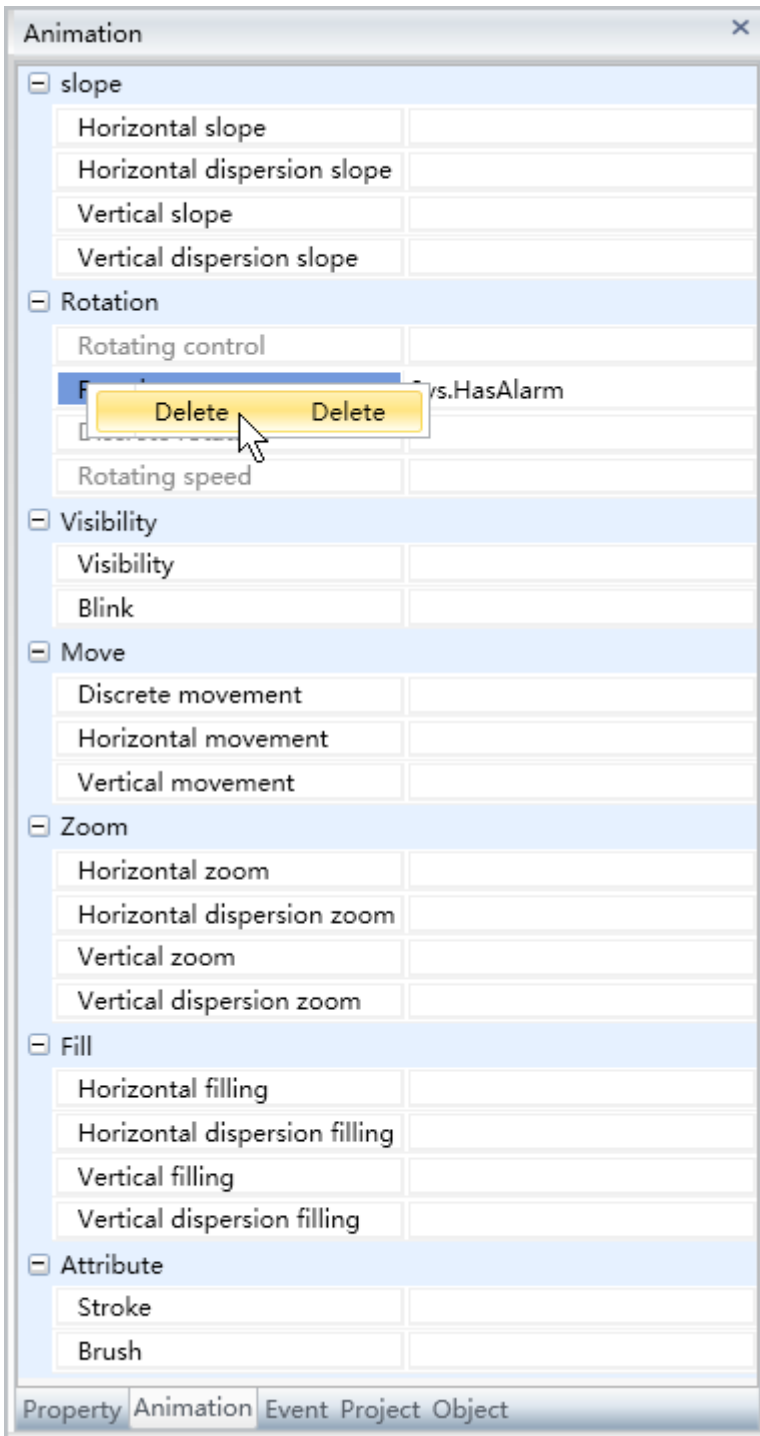
**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- **Minimum value:**
  - » Expression: Sets the minimum value of the “Expression”.
  - » Minimum angle: Sets the minimum value of the rotation angle.
- **Maximum value:**
  - » Expression: Sets the maximum value of the “Expression”.
  - » Maximum angle: Sets the maximum value of the rotation angle.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Rotation” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:

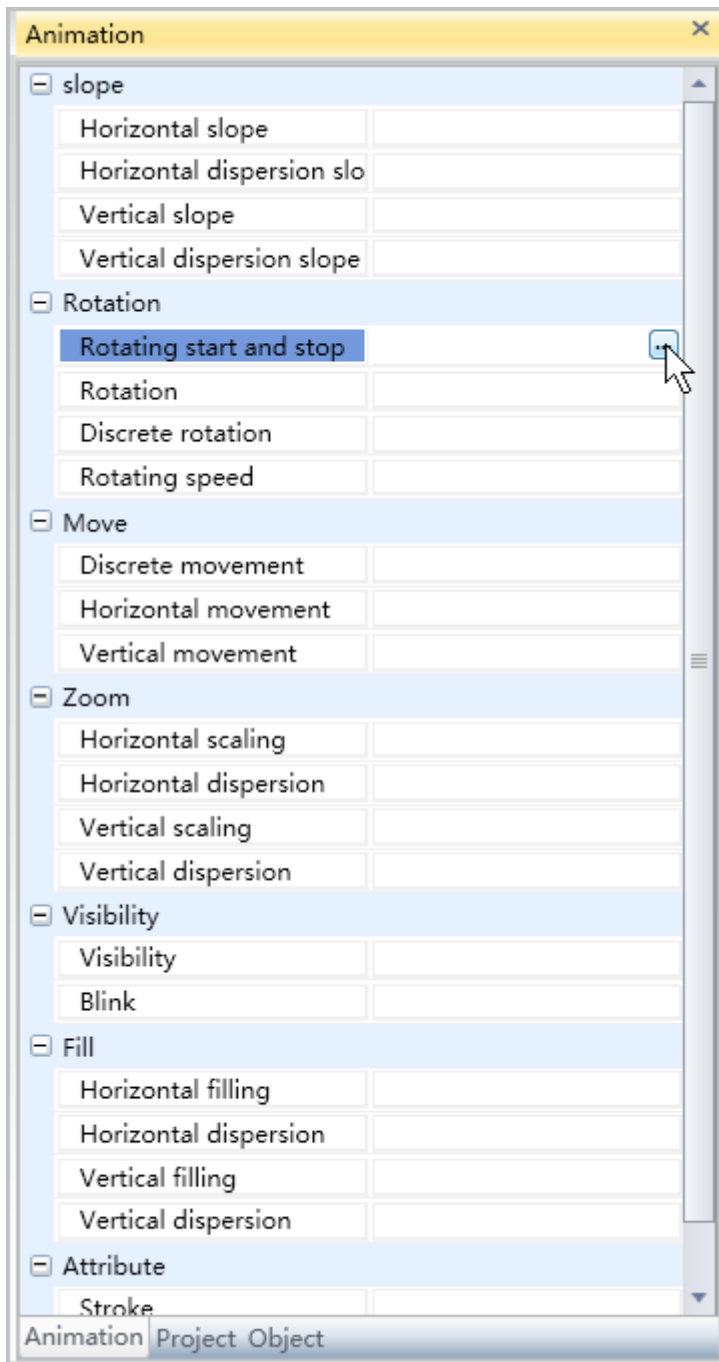


To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”, as shown in the figure below:

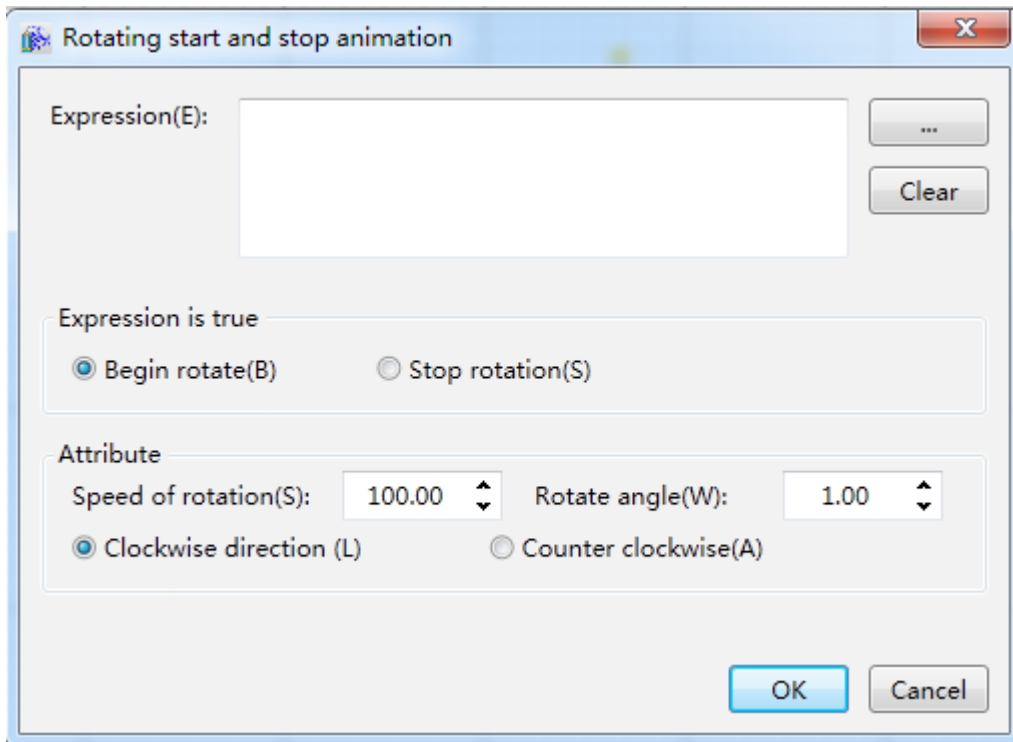


## 2. Steps to configuring start and stop rotation animation are as follows:

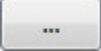
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Start and stop rotation” → click the button in the “Start and stop rotation” field, as shown in the figure below:



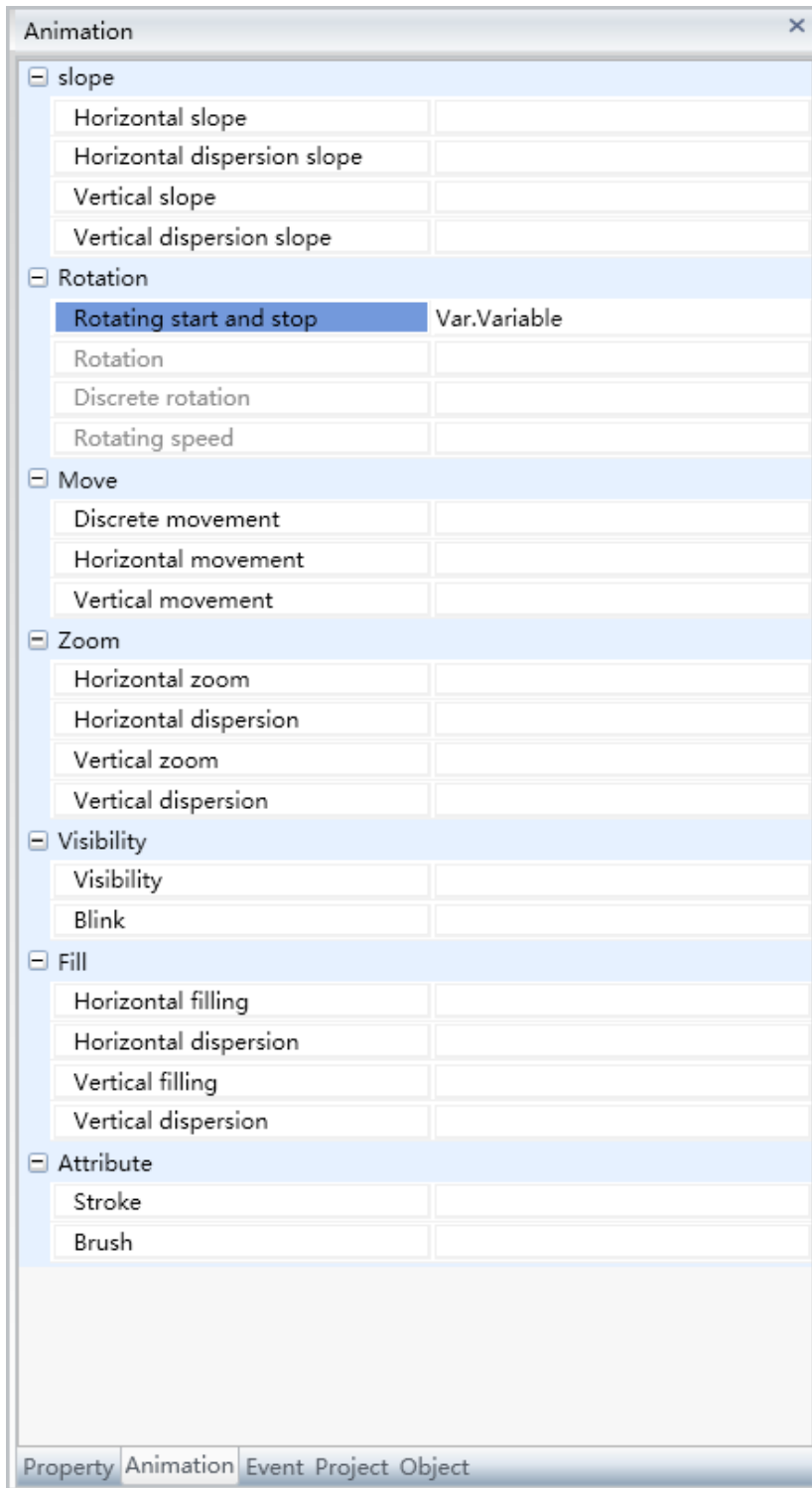
- **Step 2:** The rotation start and stop animation configuration window will appear, as shown in the figure below:



The meanings of each setting in the configuration window are as follows:

- » **Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.
- » **When expression is true:** Sets whether to start rotation or stop rotation when the condition is true.
- » **Rotation speed:** Sets the time to complete a rotation (unit: milliseconds).
- » **Rotation angle:** Sets the angle to rotate (unit: degrees).
- » **Clockwise and counter-clockwise:** Sets the rotation direction. The single selection frame has the clockwise option as the selected preset option, which means rotating in the clockwise direction.

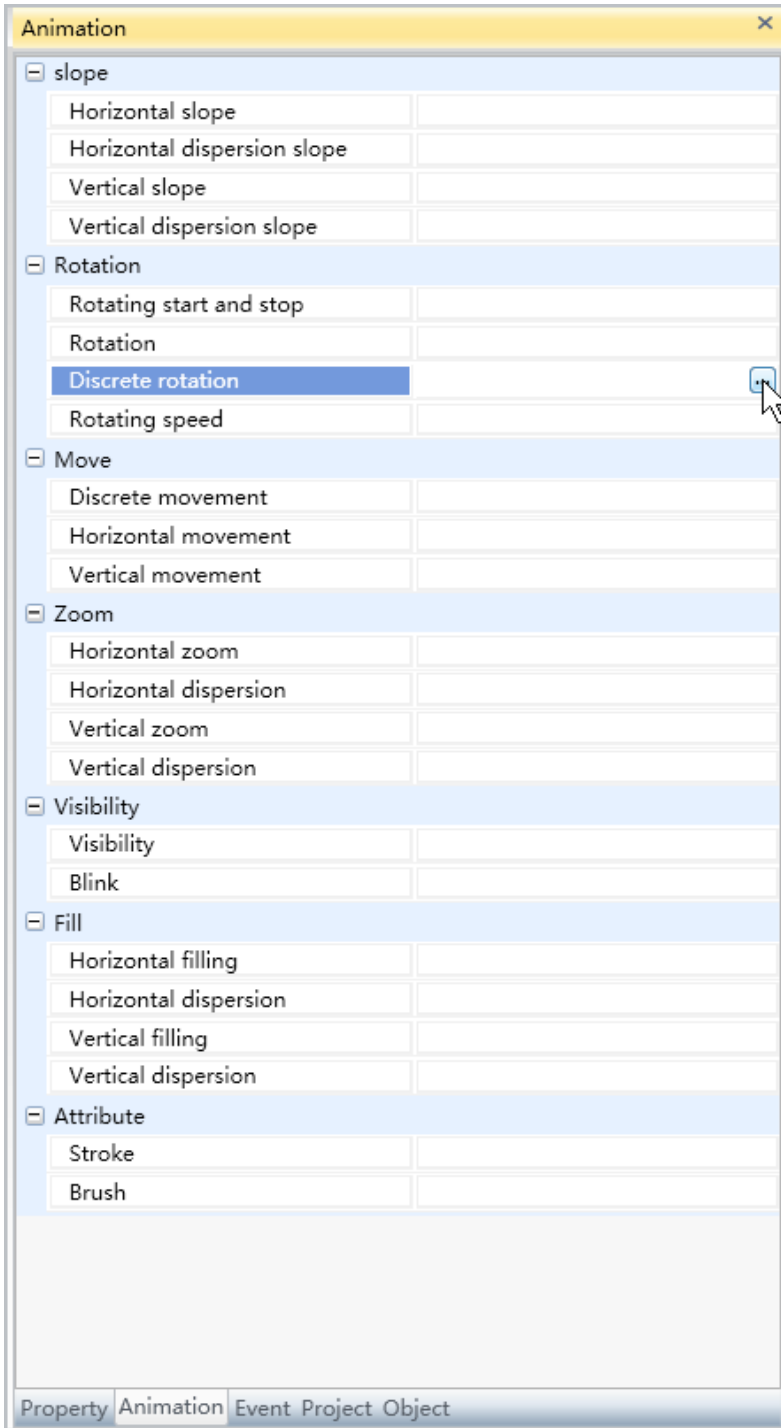
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Start and stop rotation” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



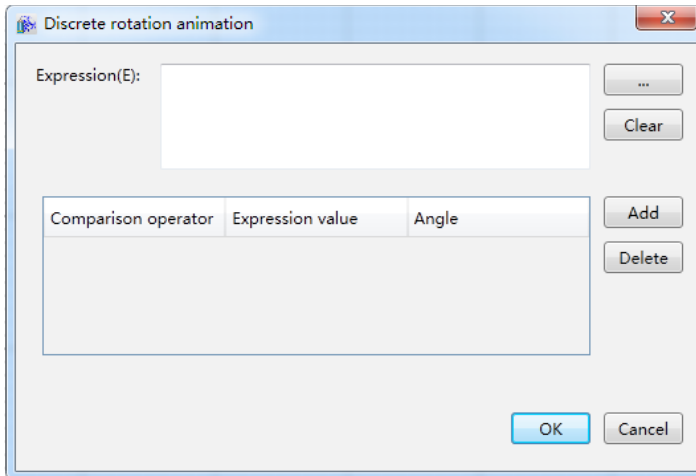
To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

### 3. Steps to configuring discrete rotation animation are as follows:

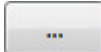
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Discrete rotation” → click the button in the “Discrete rotation” field, as shown in the figure below:



- **Step 2:** The discrete rotation animation configuration window will appear, as shown in the figure below:

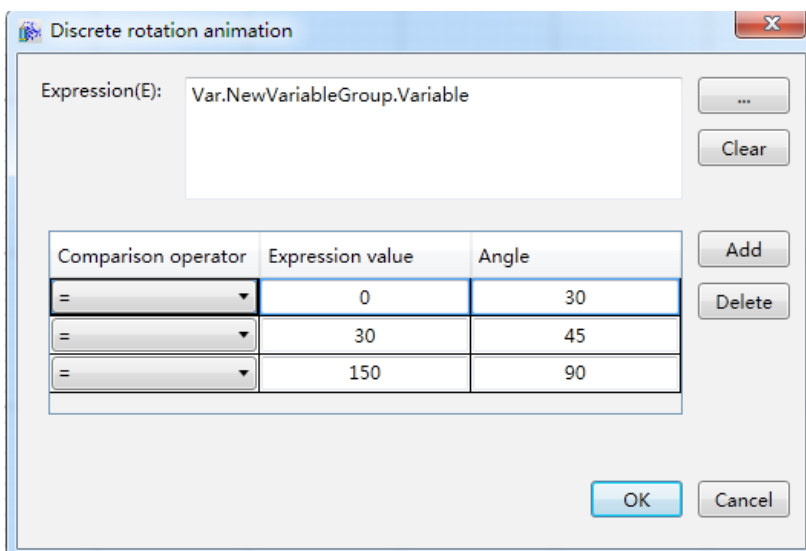


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

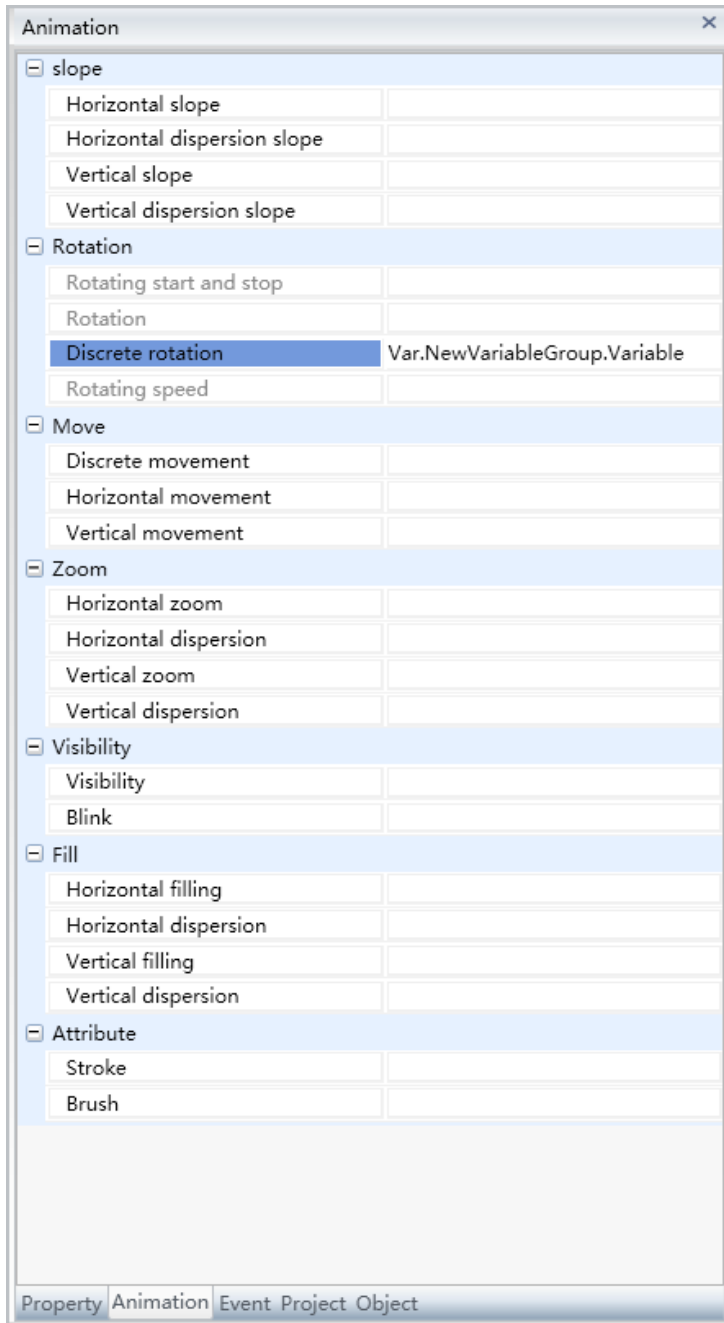
#### Filling configuration:

- » **Comparison operators:** Sets the comparison operator symbol between the “Expression” and “Expression value”; it is a drop-down menu that includes 6 options:
  - <: Less than.
  - <=: Less than or equal to.
  - =: Equal to (preset).
  - !=: Not equal to.
  - >=: Greater than or equal to.
  - >: Greater than.
- » **Expression value:** Sets the reference value for the “Expression” to compare to; it can be a whole number or decimal number.
- » **Angle:** Sets the corresponding rotation angle.
- » **“Add” button:** Press this button to add configuration items, as shown in the figure below:





- » **“Delete” button:** Pressing this button after selecting a certain configuration item will delete that configuration item.
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Discrete rotation” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

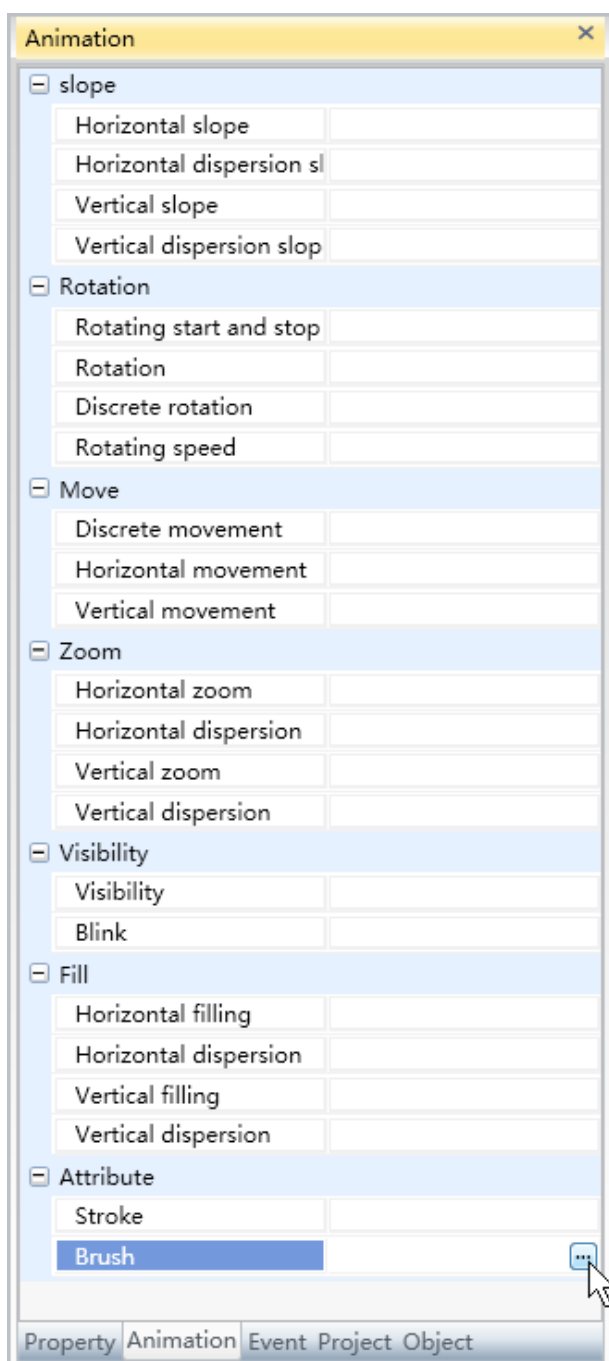
## 9.3 Property animation

Property animation refers to changing the brush and pen color of the graphic, and also changing the properties of the graphic including the “background color/fill color” and “line color/frame color”.

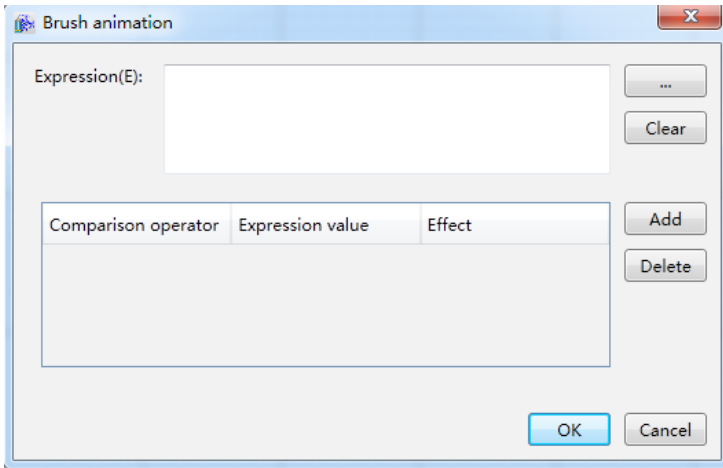
Property animations include two property animations “Brush” and “Pen”; the following is the configuration steps of the “Brush” property animation.

Configuring steps are as follows:

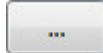
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Brush” → click the button in the “Brush” field, as shown in the figure below:



- **Step 2:** The brush fill property animation configuration window will appear, as shown in the figure below:

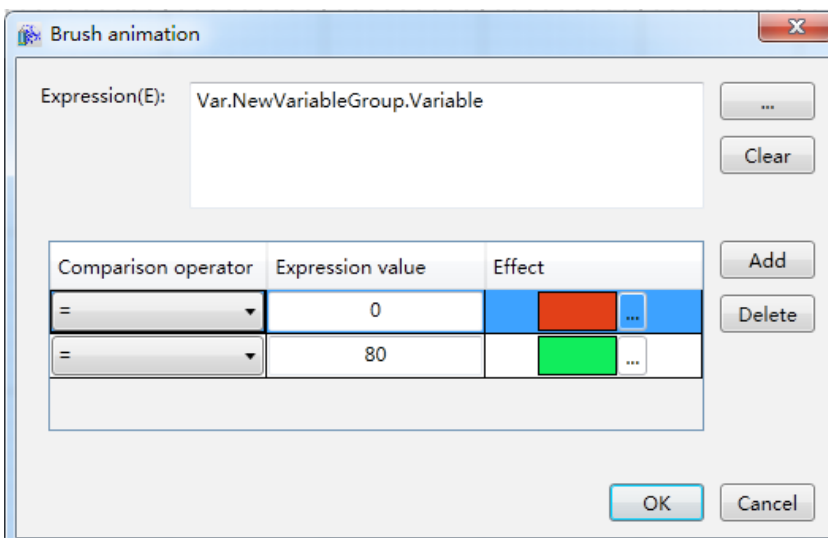


- The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

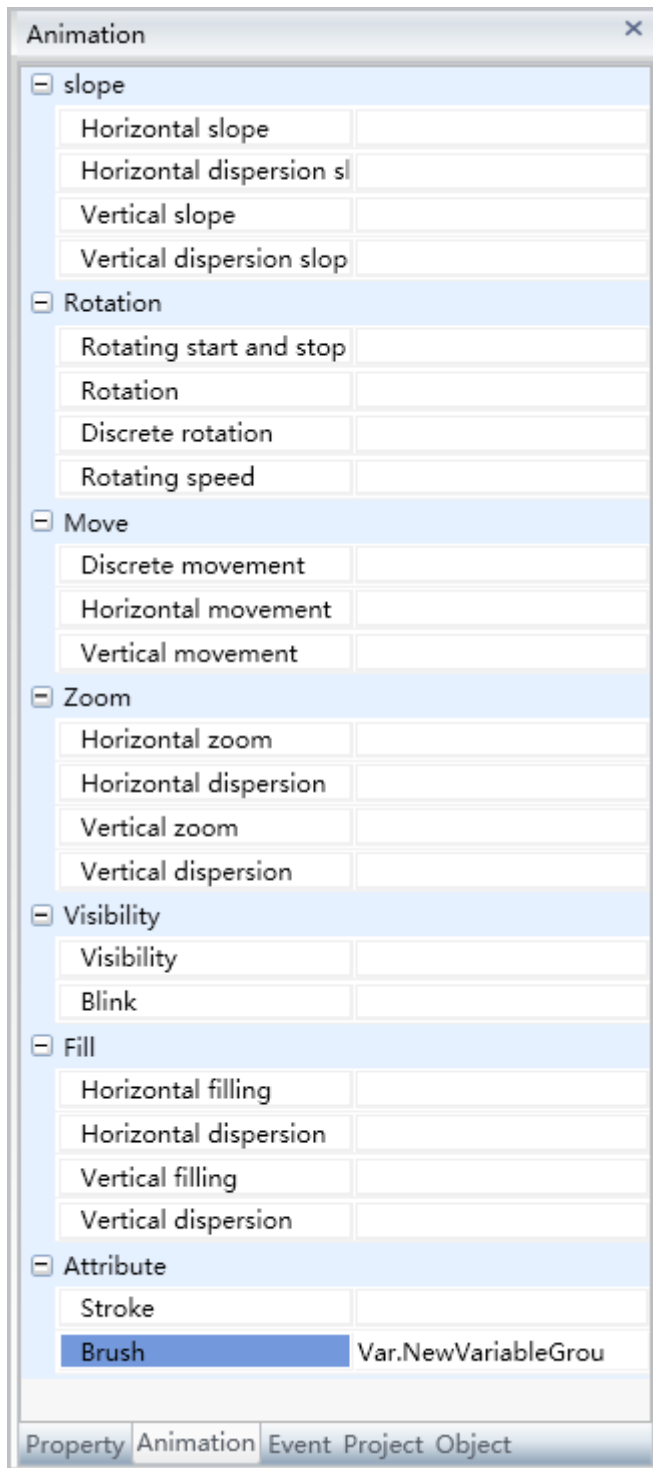
**Filling configuration:**

- » **Comparison operators:** Sets the comparison operator symbol between the “Expression” and “Expression value”; it is a drop-down menu that includes 6 options:
  - <: Less than.
  - <=: Less than or equal to.
  - =: Equal to (preset).
  - !=: Not equal to.
  - >=: Greater than or equal to.
  - >: Greater than.
- » **Expression value:** Sets the reference value for the “Expression” to compare to; it can be a whole number or decimal number.
- » **Effects:** Sets the color effects.
- » **“Add new” button:** Click this button to add a fill configuration item, as shown in the figure below:



» **“Delete” button:** Pressing this button after selecting a certain fill configuration item will delete that fill configuration item.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Brush” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

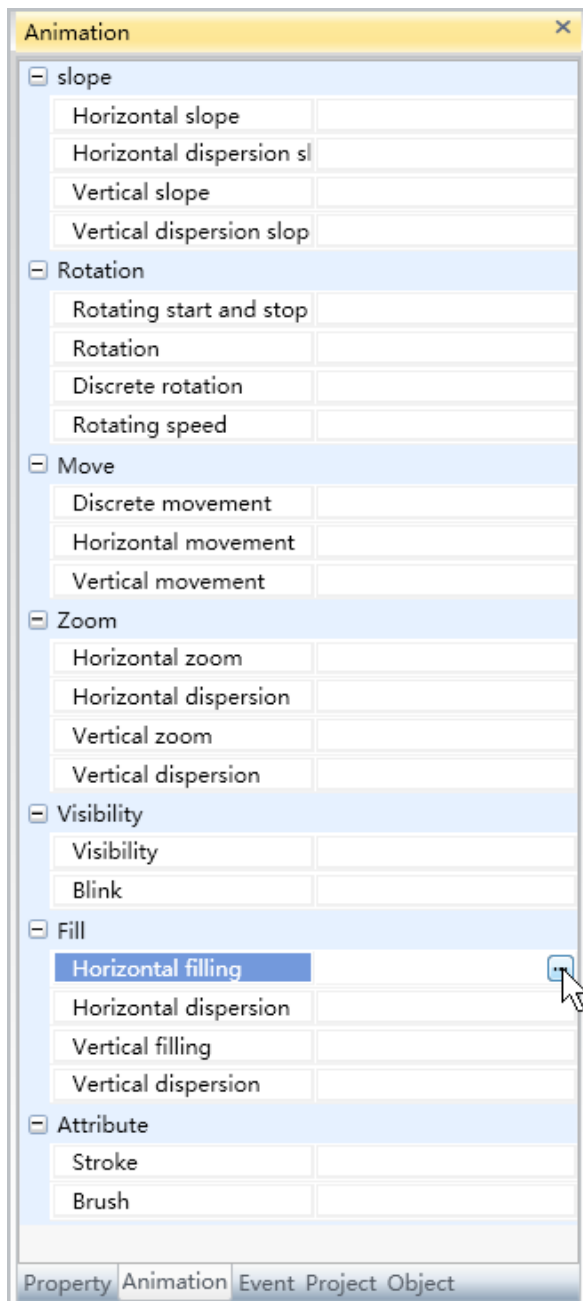
## 9.4 Fill animation

Fill animation refers to controlling the fill effect of the graphic object through variables or expression values and changing the “fill ratio” and “fill direction” properties of the graphic object .

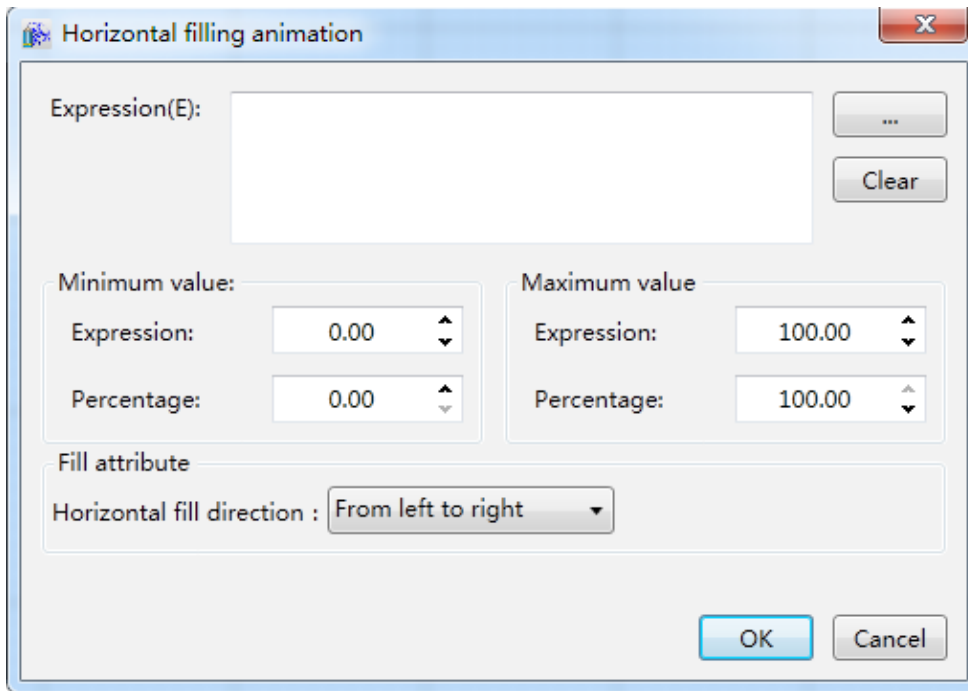
Depending on the fill direction, the fill animation is divided into four types: “Fill level”, “Horizontal discrete fill”, “Vertical fill” and “Vertical discrete fill”. The configuration steps for the horizontal and vertical directions are the same. The following are the configuration steps.

### 1. Steps to configuring “Fill level” animations are as follows:


- **Step 1:**Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Fill level”→ click the button in the “Fill level” field, as shown in the figure below:



- **Step 2:** The Fill level animation configuration window will appear, as shown in the figure below:

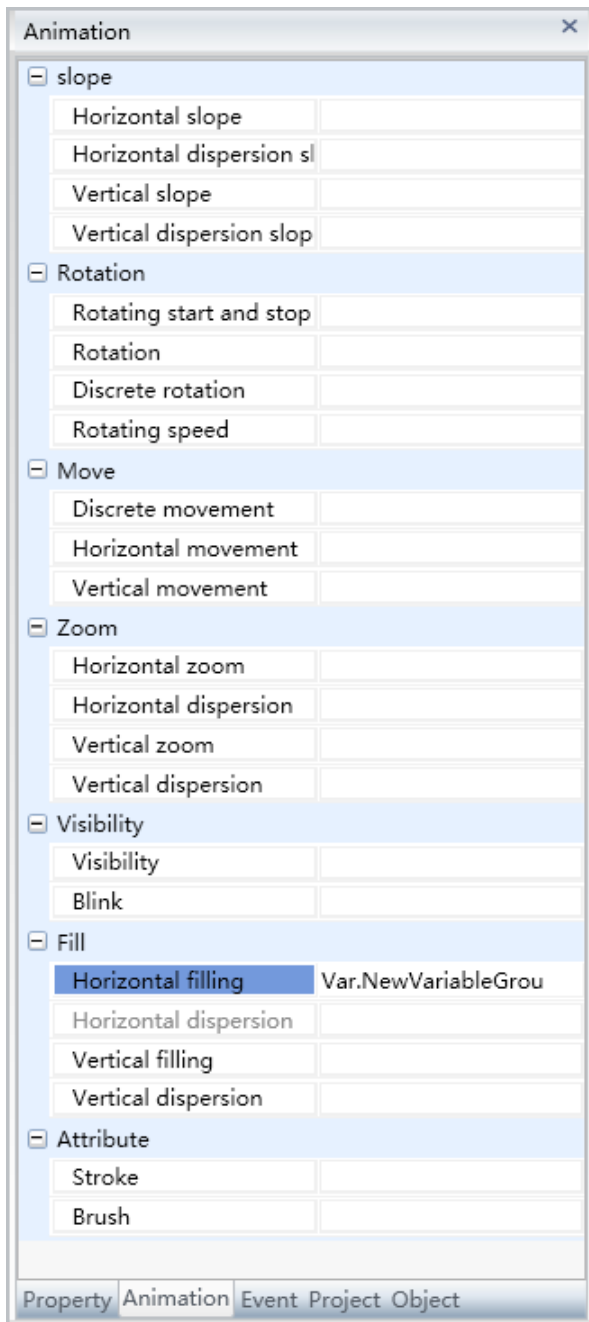


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- **Minimum value:**
  - » Expression: Sets the minimum value of the “Expression”.
  - » Percentage: Sets the minimum value for the fill percentage.
- **Maximum value:**
  - » Expression: Sets the maximum value of the “Expression”.
  - » Percentage: Sets the maximum value for the fill percentage.
  - » **Fill properties:**
    - Fill level direction: Sets the fill direction; it is a drop-down menu that includes 3 options:
    - From left to right.
    - From right to left.
    - From center to the edge.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Fill level” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:

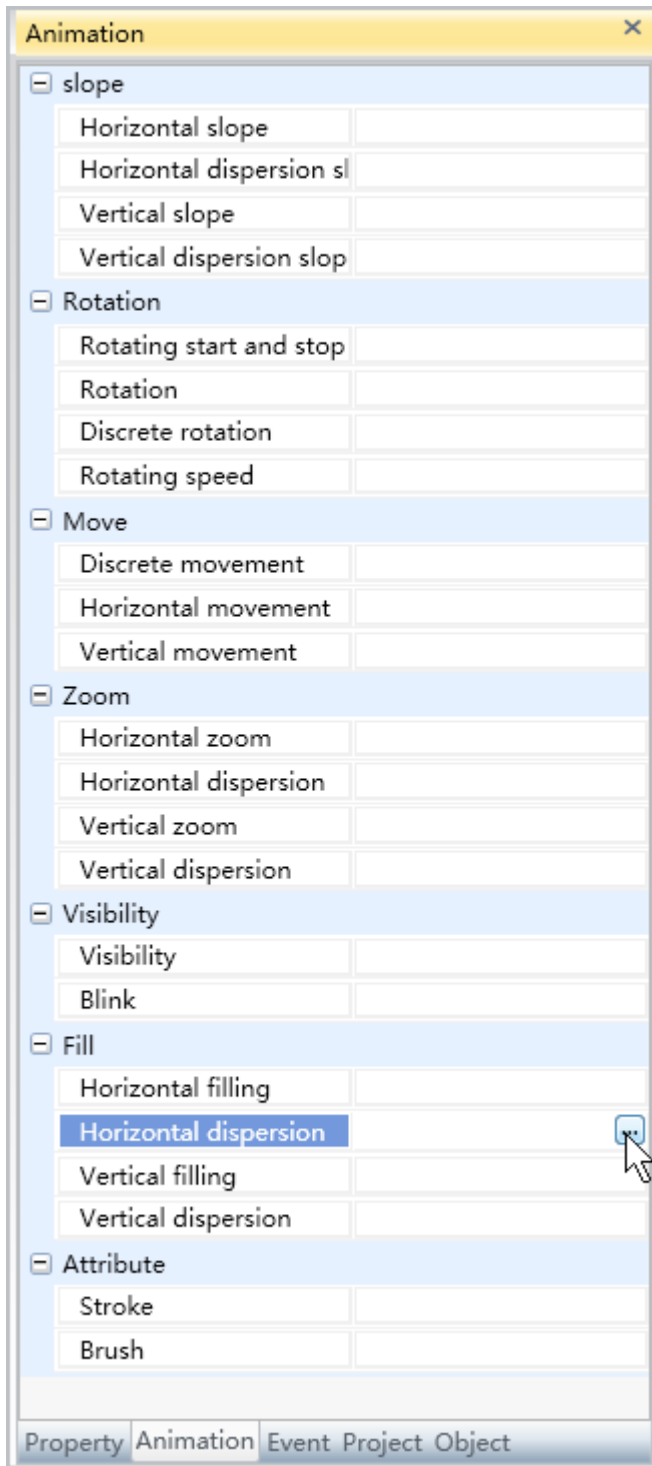


To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

- What’s different when configuring “Vertical fill” animations:
  - » Fill properties:
  - » Vertical fill direction: Sets the fill direction; it is a drop-down menu that includes 3 options:
    - From top to bottom.
    - From bottom to top.
    - From center to the edge.

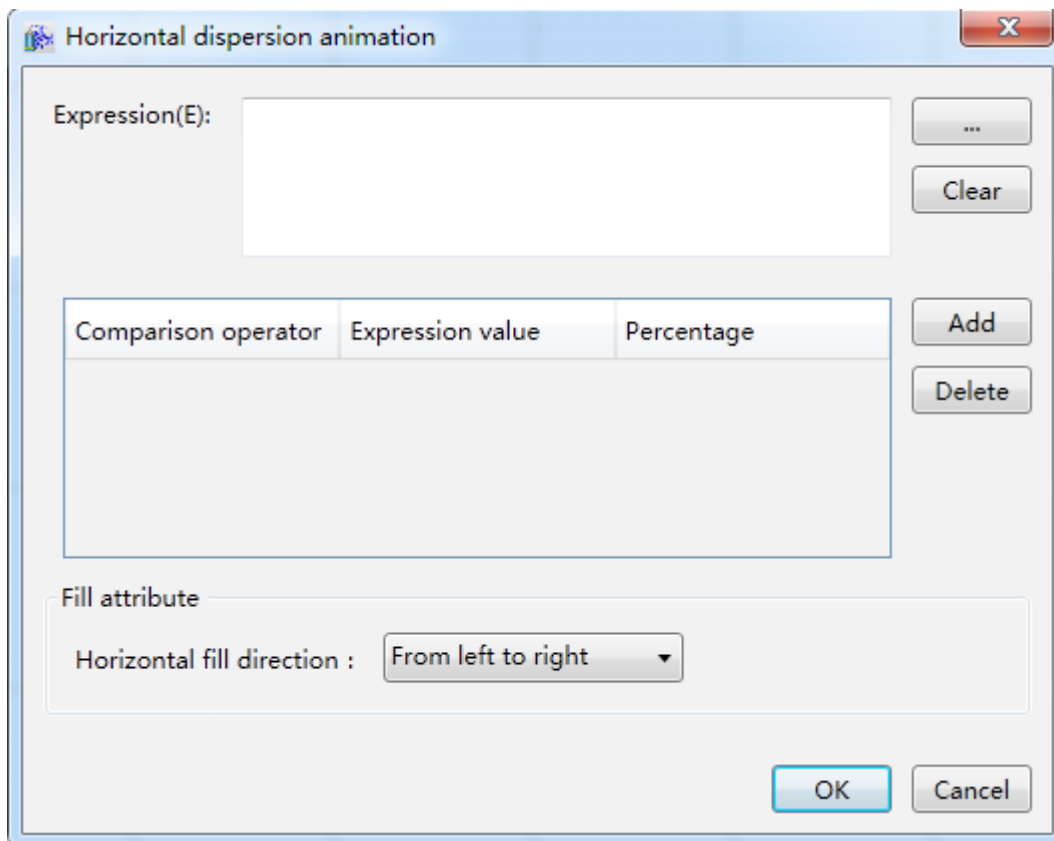
## 2.Steps to configuring “Horizontal discrete fill” animation are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Horizontal discrete fill” → click the button in the “Horizontal discrete fill” field, as shown in the figure below:






- **Step 2:** The horizontal discrete fill animation configuration window will appear, as shown in the figure below:

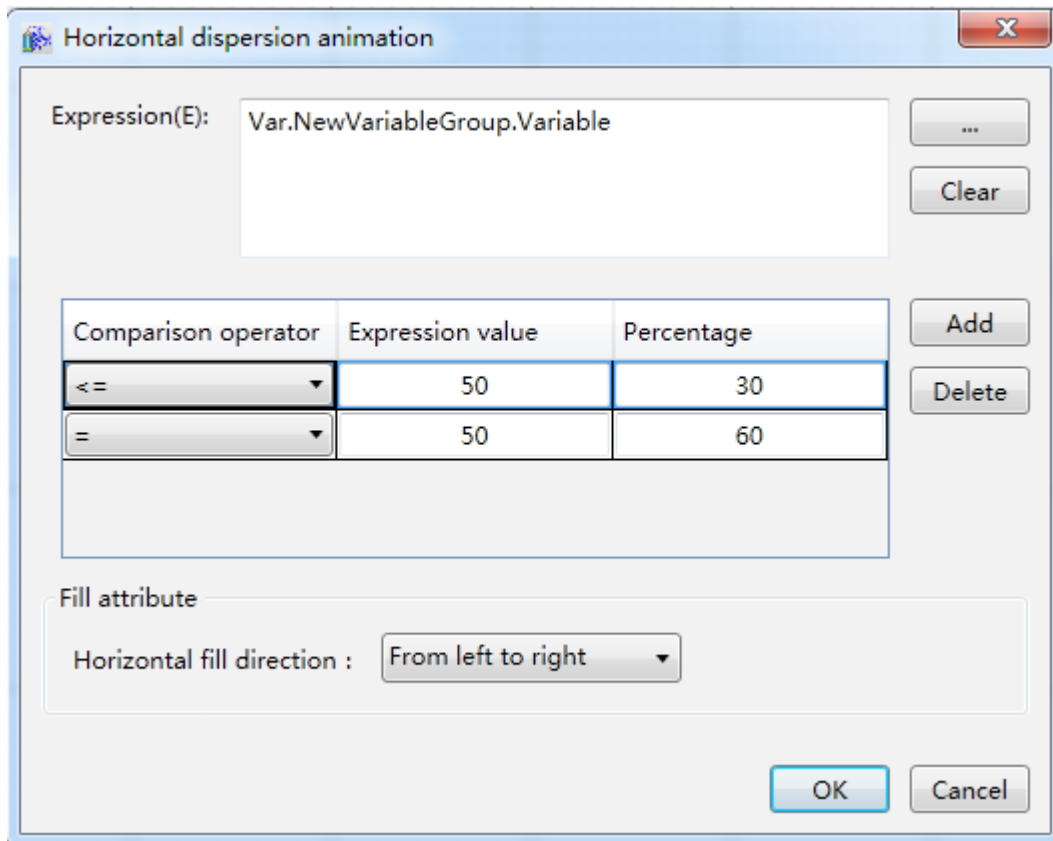


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

#### Filling configuration:

- » **Comparison operators:** Sets the comparison operator symbol between the “Expression” and “Expression value”; it is a drop-down menu that includes 6 options:
  - <: Less than.
  - <=: Less than or equal to.
  - =: Equal to (preset).
  - !=: Not equal to.
  - >=: Greater than or equal to.
  - >: Greater than.
- » **Expression value:** Sets the reference value for the “Expression” to compare to; it can be a whole number or decimal number.
- » **Percentage:** Sets the corresponding fill percentage.
- » **“Add” button:** Press this button to add configuration items, as shown in the figure below:

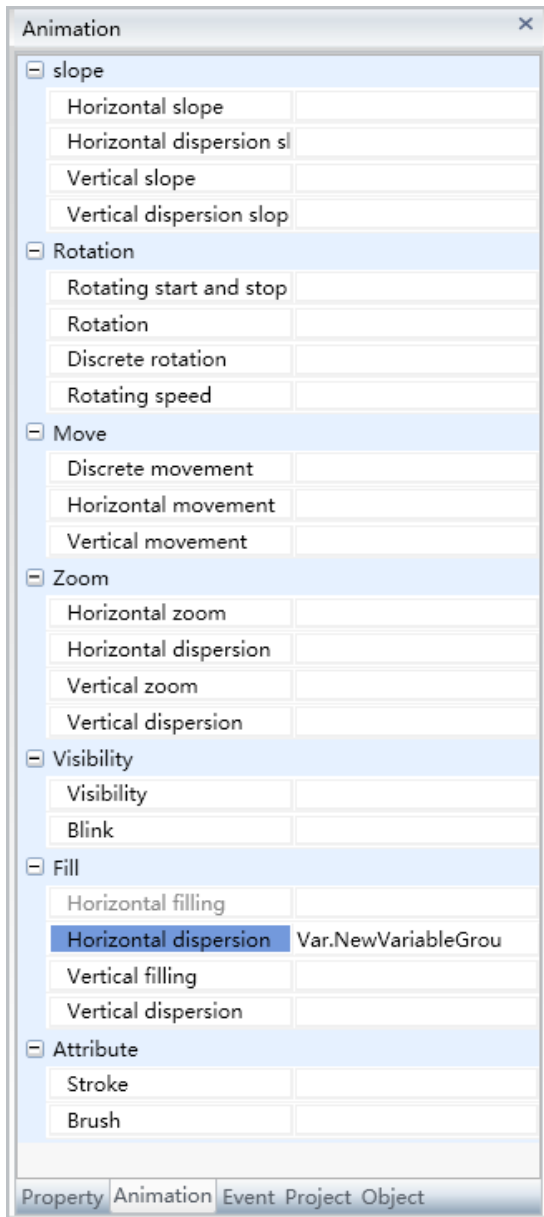


- » **“Delete” button:** Pressing this button after selecting a certain configuration item will delete that configuration item.

#### Fill properties:

- » **Horizontal discrete fill direction:** Sets the fill direction; it is a drop-down menu that includes 3 options:
  - From left to right.
  - From right to left.
  - From center to the edge.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Horizontal discrete fill” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

- What’s different when configuring “Vertical discrete fill” animations:

#### Fill properties:

» **Vertical discrete fill direction:** Sets the fill direction; it is a drop-down menu that includes 3 options:

- From top to bottom.
- From bottom to top.
- From center to the edge.

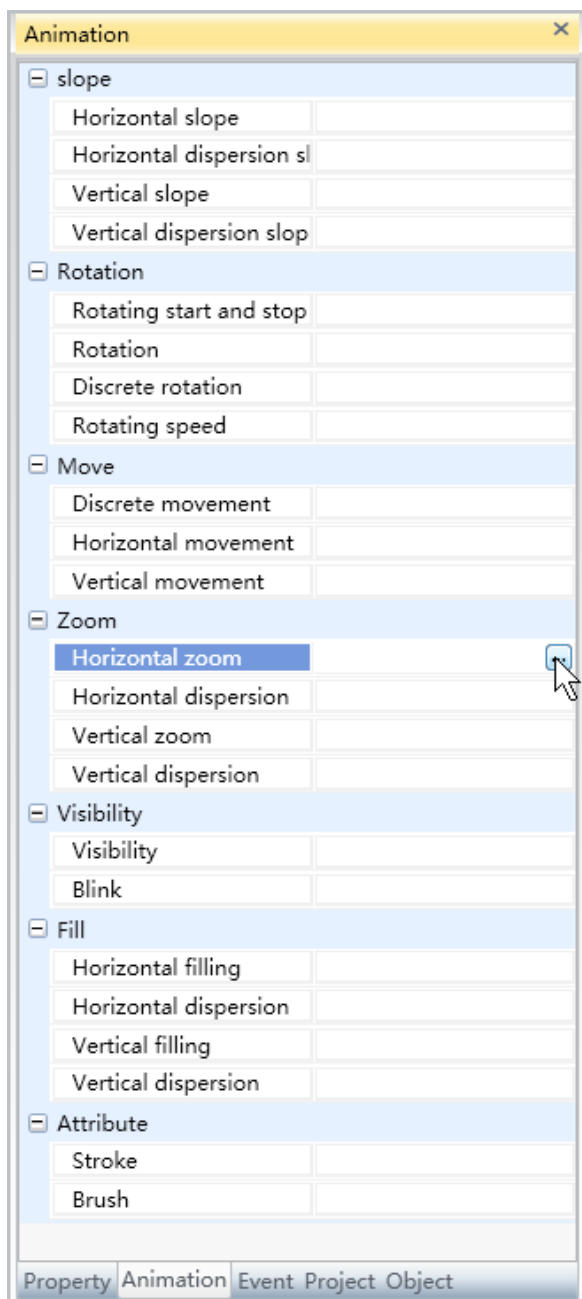
## 9.5 Zoom animations

Zoom animation refers to controlling the size of the graphic object through variables or expression values and changing the “size” property of the graphic object.

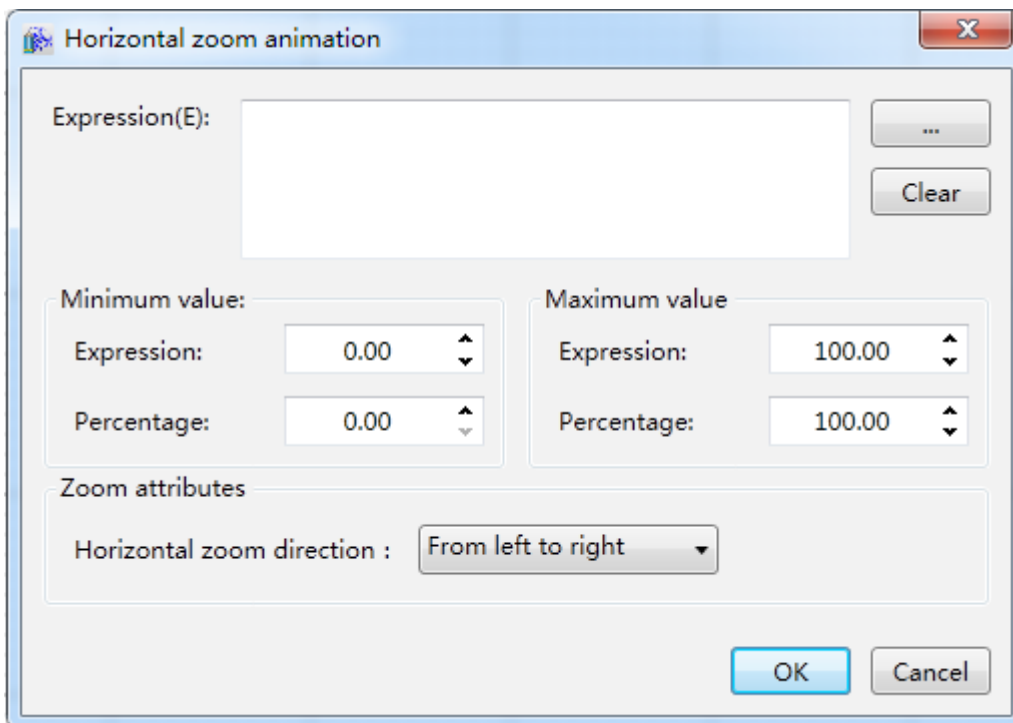
Depending on the zoom direction, the fill animation is divided into four types: “Horizontal zoom”, “Horizontal discrete zoom”, “Vertical zoom” and “Vertical discrete fill”. The configuration steps for the horizontal and vertical directions are the same. The following are the configuration steps.

### 1. Steps to configuring “horizontal zoom” animations are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Horizontal zoom” → click the button in the “Horizontal zoom” field, as shown in the figure below:



- **Step 2:** The horizontal zoom animation configuration window will appear, as shown in the figure below:



The meanings of each setting in the configuration window are as follows:

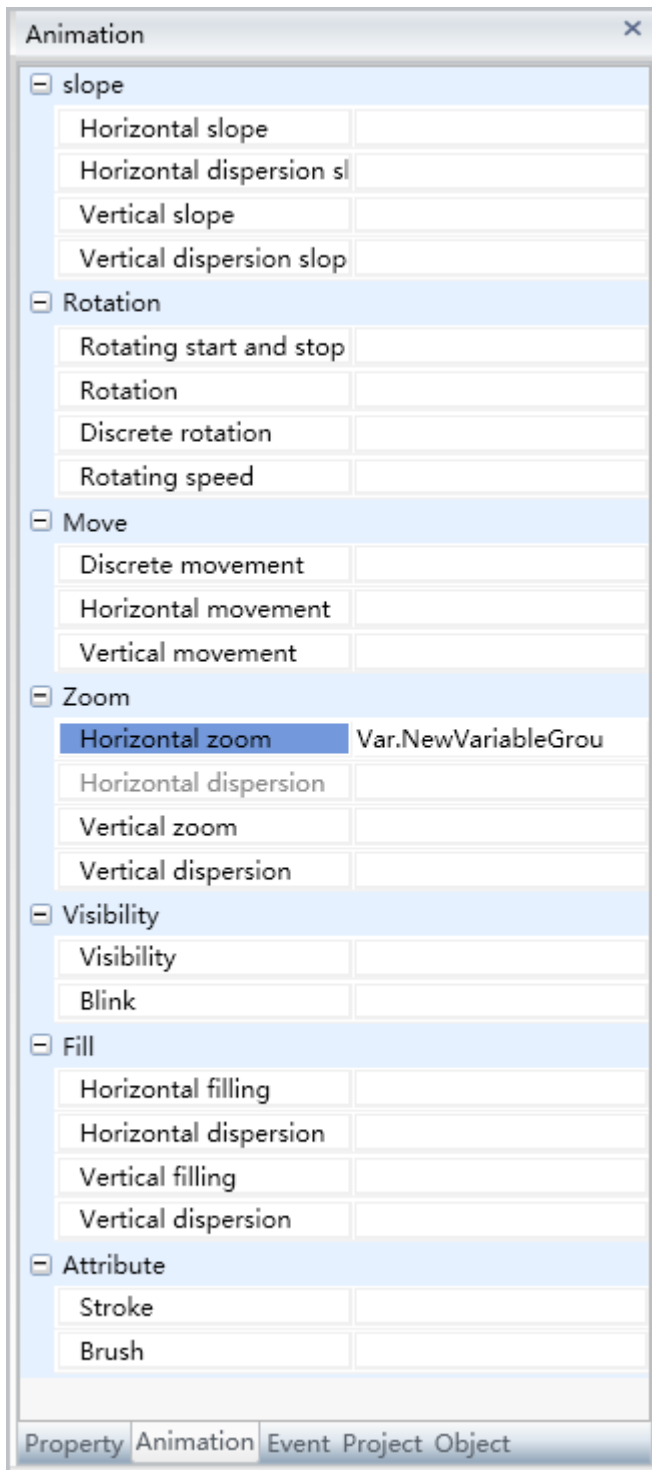
**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- **Minimum value:**
  - » Expression: Sets the minimum value of the “Expression”.
  - » Percentage: Sets the minimum value for the horizontal zoom percentage.
- **Maximum value:**
  - » Expression: Sets the maximum value of the “Expression”.
  - » Percentage: Sets the maximum value for the horizontal zoom percentage.

**Zoom properties:**

- » Horizontal zoom direction: Sets the zoom direction; it is a drop-down menu that includes 3 options:
  - From left to right
  - From right to left
  - From the center to the edge

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Horizontal zoom” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

■ What’s different when configuring “Vertical zoom” animations:

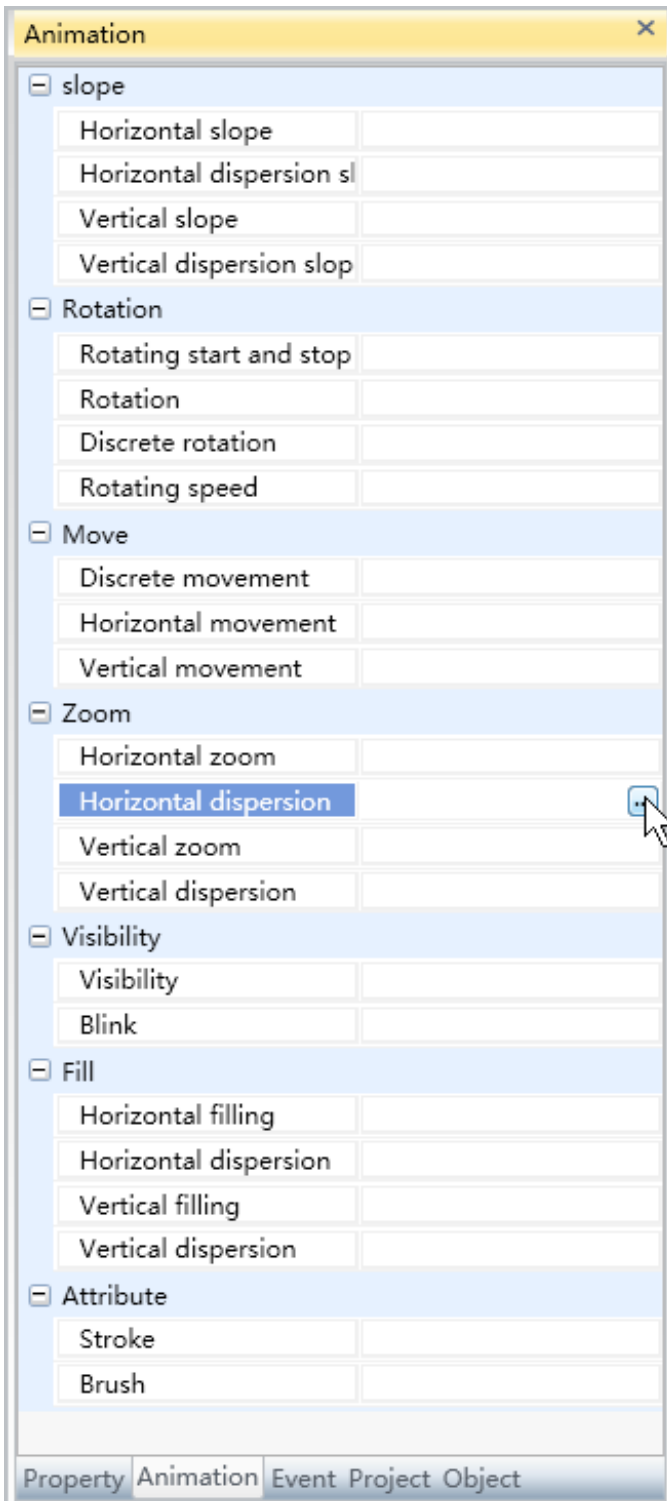
#### Zoom properties:

- » **Vertical zoom direction:** Sets the zoom direction; it is a drop-down menu that includes 3 options:

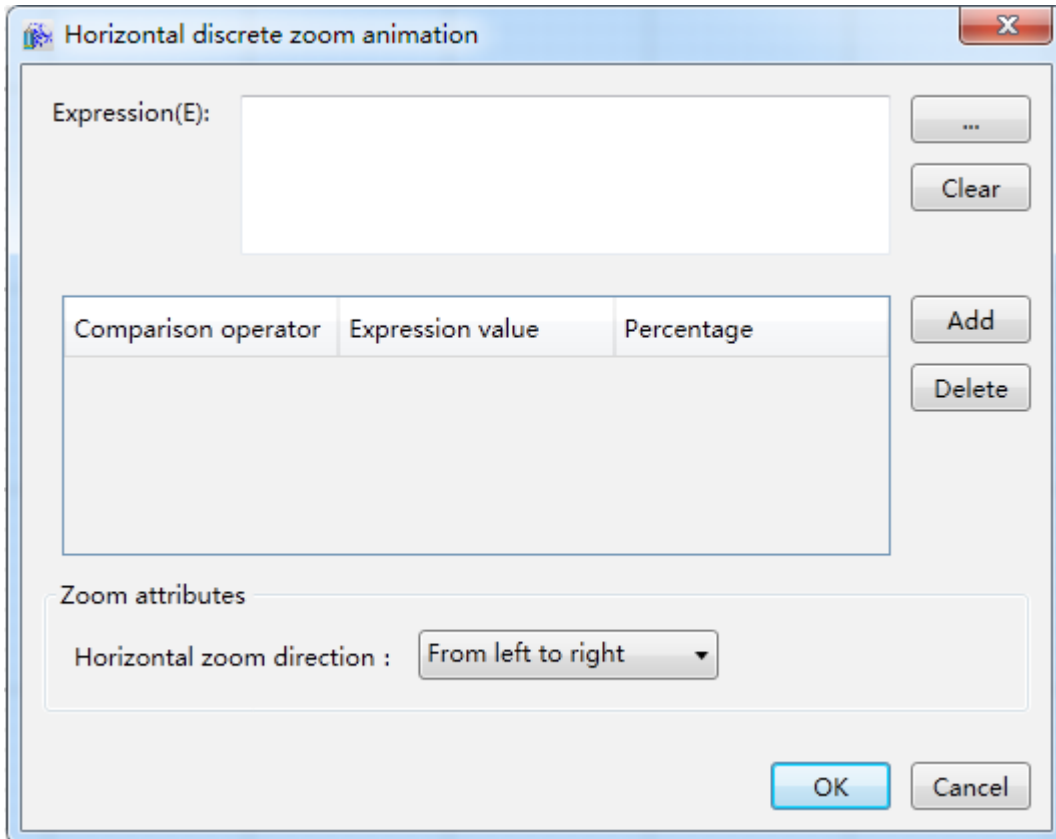
- From top to bottom.
- From bottom to top.
- From the center to the edge+

**2. Steps to configuring “Horizontal dispersion” animations are as follows:**

- **Step 1:**Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Horizontal dispersion” → click the button in the “Horizontal dispersion” field, as shown in the figure below:



- **Step 2:** The horizontal discrete zoom animation configuration window will appear, as shown in the figure below:



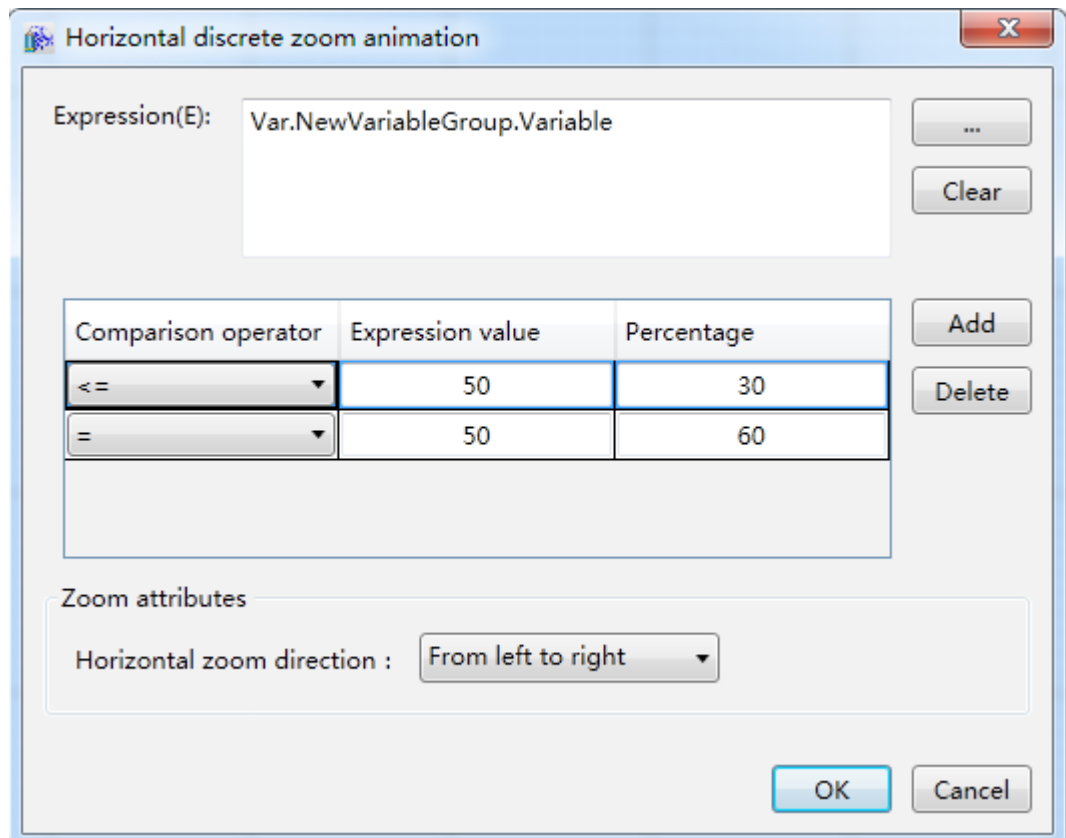
The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

#### Zoom configuration:

- » **Comparison operators:** Sets the comparison operator symbol between the “Expression” and “Expression value”; it is a drop-down menu that includes 6 options:
  - <: Less than.
  - <=: Less than or equal to.
  - =: Equal to (preset).
  - !=: Not equal to.
  - >=: Greater than or equal to.
  - >: Greater than.
- » **Expression value:** Sets the reference value for the “Expression” to compare to; it can be a whole number or decimal number.
- » **Percentage:** Sets the corresponding zoom percentage.
- » **“Add” button:** Press this button to add configuration items, as shown in the figure below:

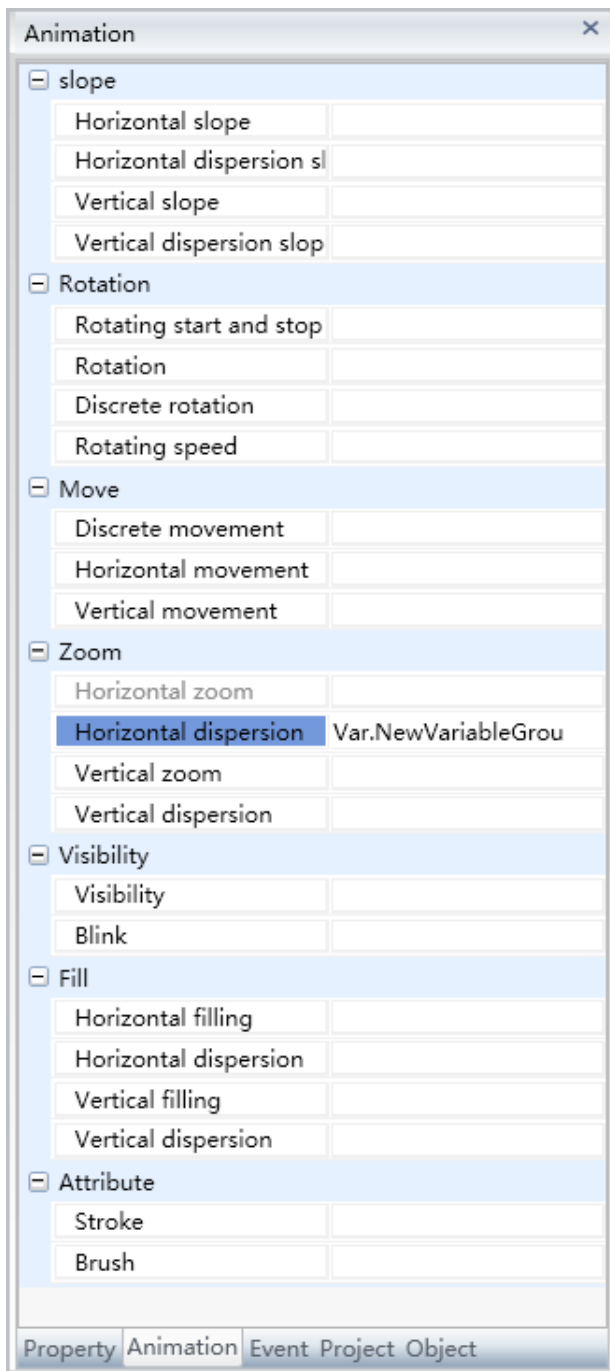




- » **“Delete” button:** Pressing this button after selecting a certain configuration item will delete that configuration item.

### Zoom properties:

- » Horizontal discrete zoom direction: Sets the zoom direction; it is a drop-down menu that includes 3 options:
  - From left to right
  - From right to left
  - From the center to the edge
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Horizontal discrete zoom” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

■ What’s different when configuring “Vertical discrete zoom” animations:

#### Zoom properties:

- » **Vertical discrete zoom direction:** Sets the zoom direction; it is a drop-down menu that includes 3 options:
  - From top to bottom.
  - From bottom to top.
  - From center to the edge.

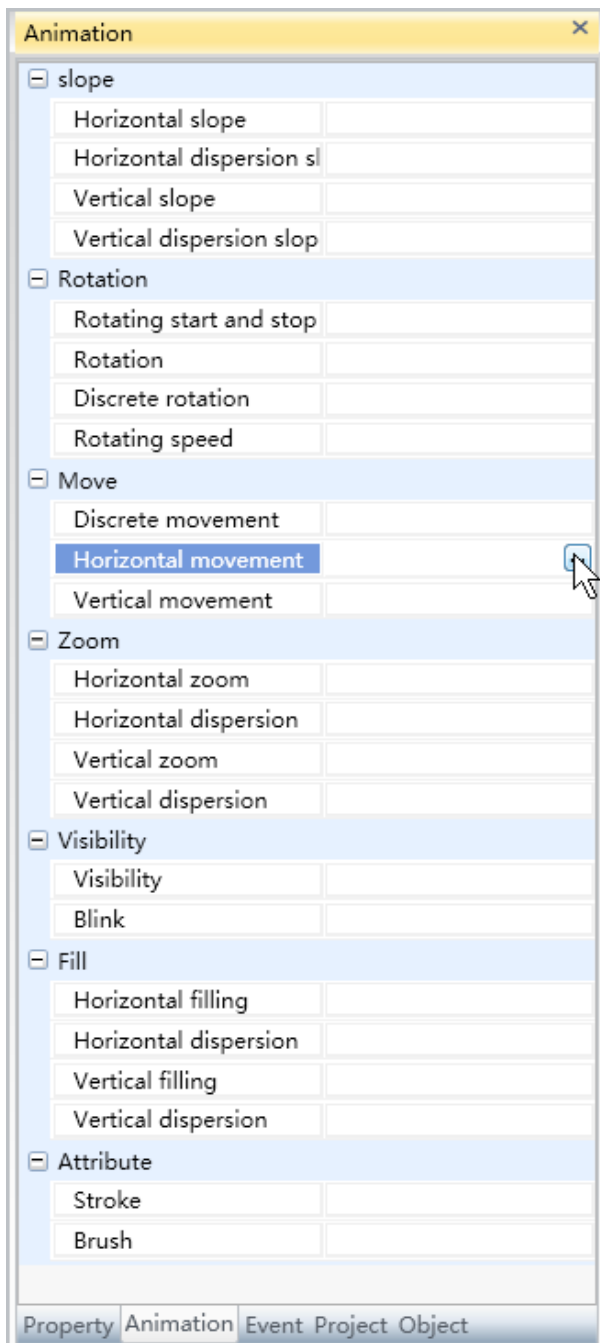
## 9.6 Shifting animations

Horizontal movement refers to controlling the position of the graphic object through variables or expression values and changing the “coordinates” property of the graphic object.

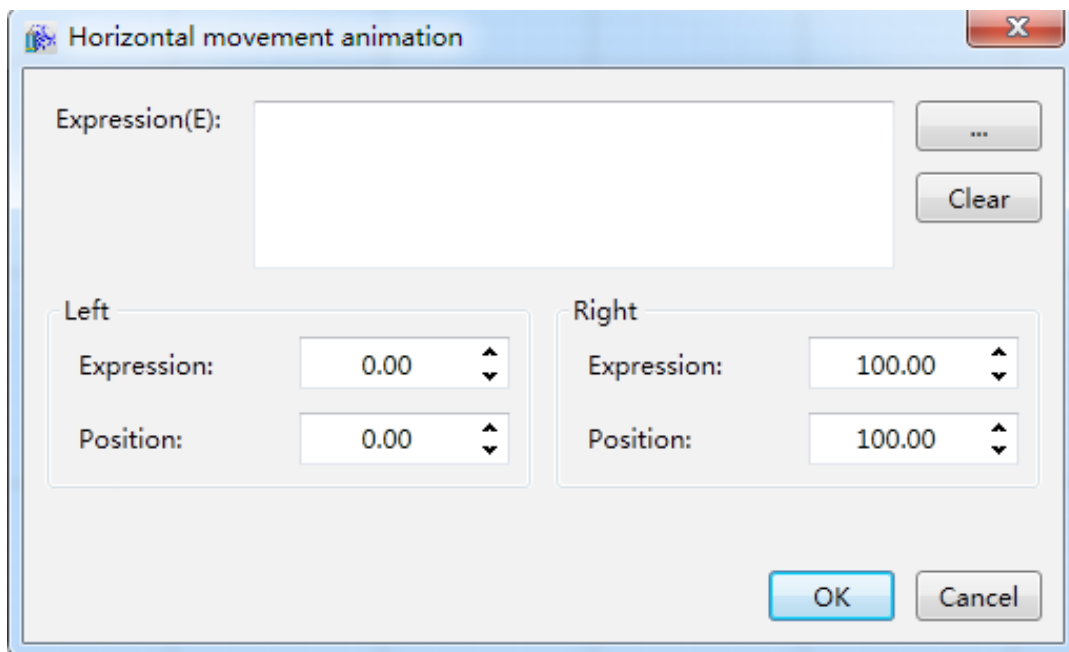
Horizontal movement is divided into three types: “Horizontal movement”, “Vertical shifting” and “Discrete shifting”, in which the configuration steps of horizontal and vertical shifting are the same. The following are the configuration steps:

### 1. Steps to configuring “Horizontal movement” animations are as follows:

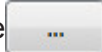
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Horizontal movement” → click the button in the “Horizontal movement” field, as shown in the figure below:



- **Step 2:** The Horizontal movement animation configuration window will appear, as shown in the figure below:

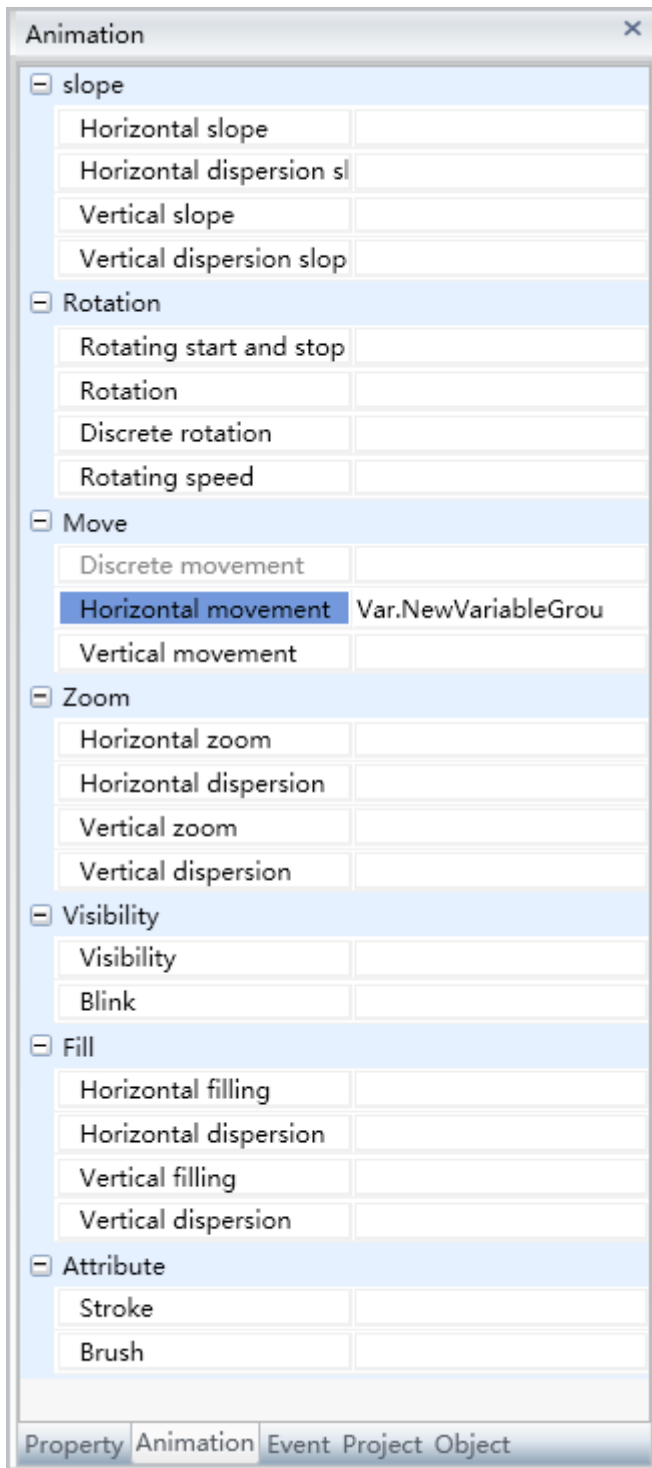


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- **Left side:**
  - » Expression: Sets the minimum value of the “Expression”.
  - » Position: Sets the coordinates of the left-most position that can be reached for Horizontal movement.
- **Right side:**
  - » Expression: Sets the maximum value of the “Expression”.
  - » Position: Sets the coordinates of the right-most position that can be reached for Horizontal movement.

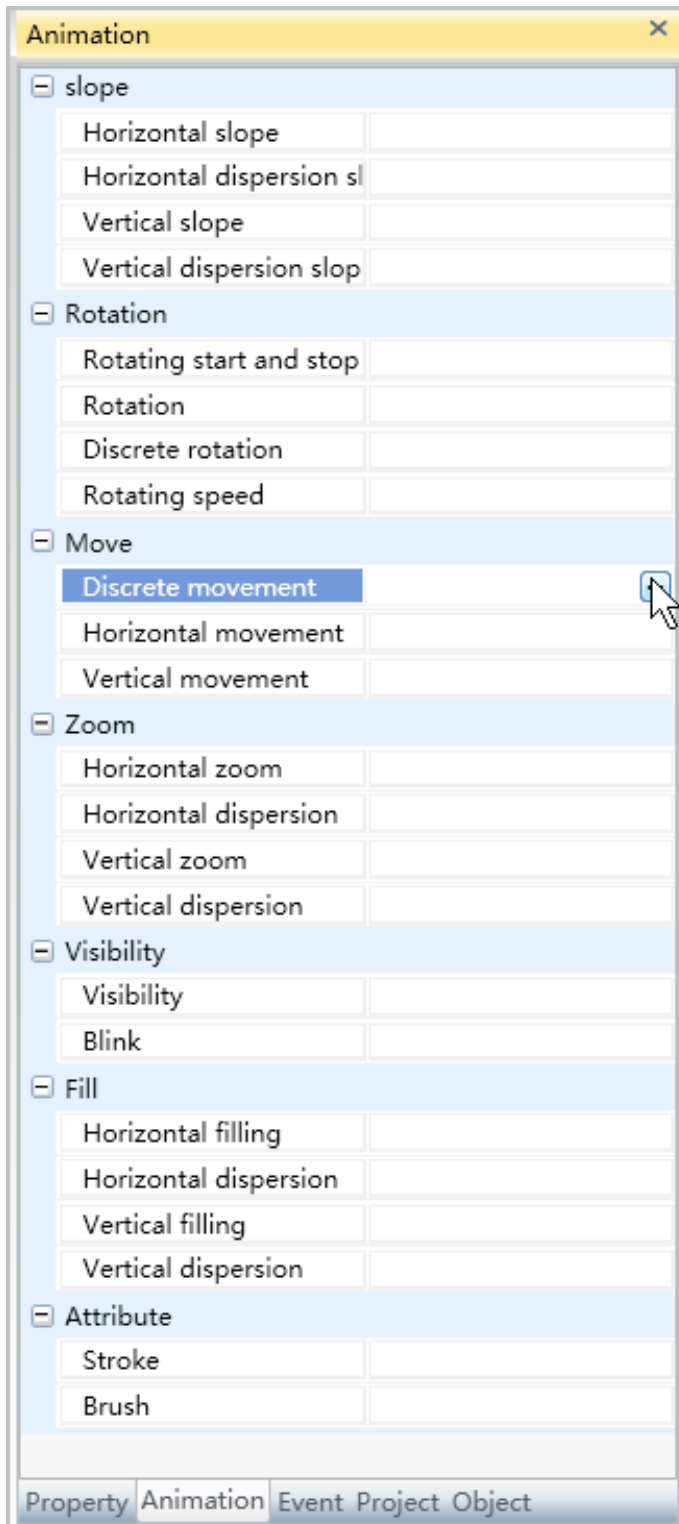
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Horizontal movement” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



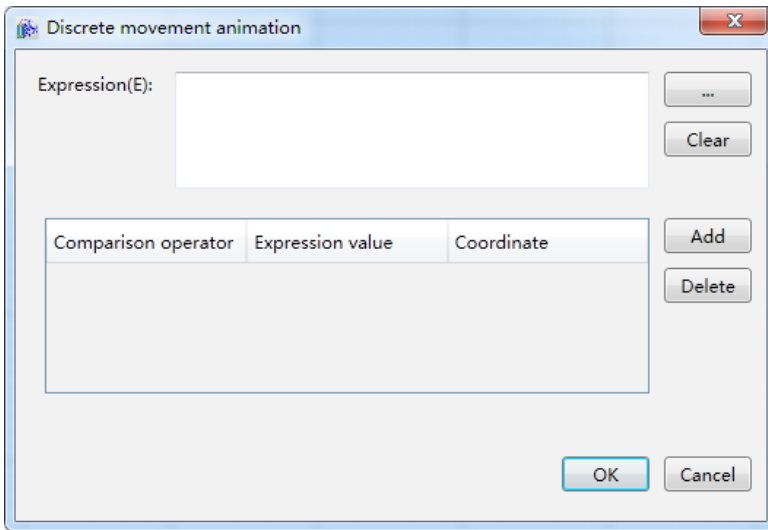
To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

## 2. Steps to configuring “Discrete movement” animations are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Discrete movement” → click the button in the “Discrete movement” field, as shown in the figure below:



- **Step 2:** The discrete Horizontal movement configuration window will appear, as shown in the figure below:

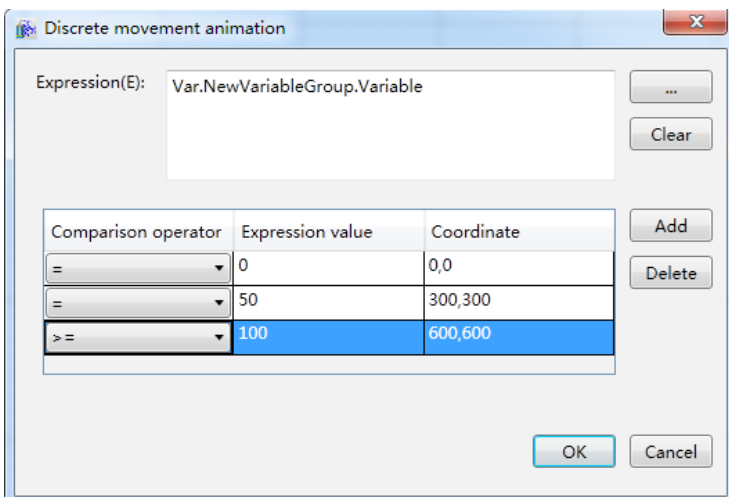


The meanings of each setting in the configuration window are as follows:

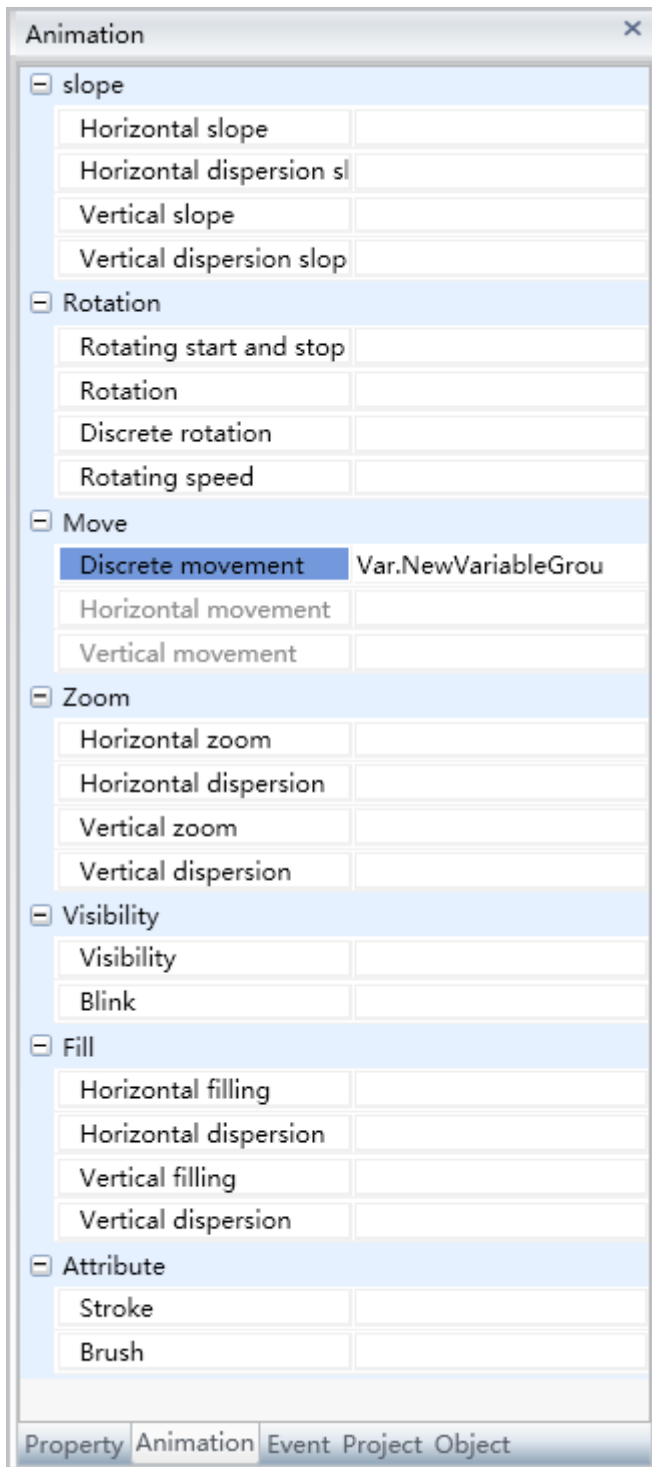
**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

**Shifting configurations:**

- » **Comparison operators:** Sets the comparison operator symbol between the “Expression” and “Expression value”; it is a drop-down menu that includes 6 options:
  - <: Less than.
  - <=: Less than or equal to.
  - =: Equal to (preset).
  - !=: Not equal to.
  - >=: Greater than or equal to.
  - >: Greater than.
- » **Expression value:** Sets the reference value for the “Expression” to compare to; it can be a whole number or decimal number.
- » **Coordinates:** Sets the corresponding position coordinates.
- » **“Add” button:** Press this button to add configuration items, as shown in the figure below:



- » **“Delete” button:** Pressing this button after selecting a certain configuration item will delete that configuration item.
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Discrete movement” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.



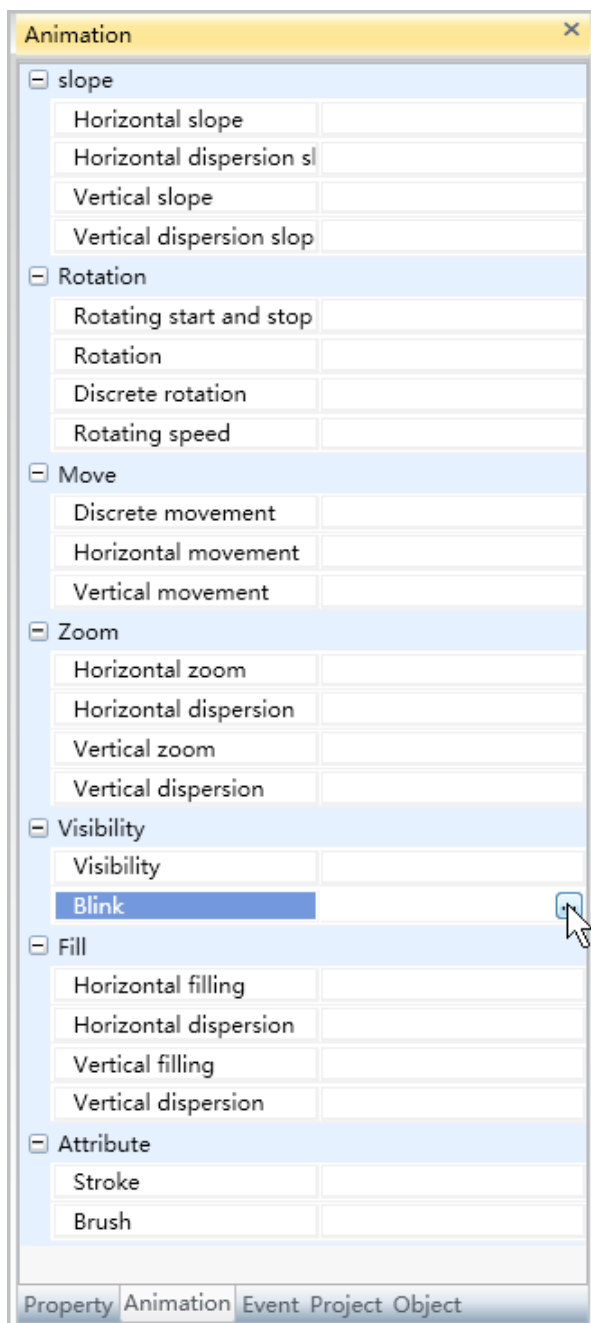
## 9.7 Visibility animations

Visibility animation refers to controlling the visibility of the graphic object through variables or expression values and changing the “display/hide” property of the graphic object.

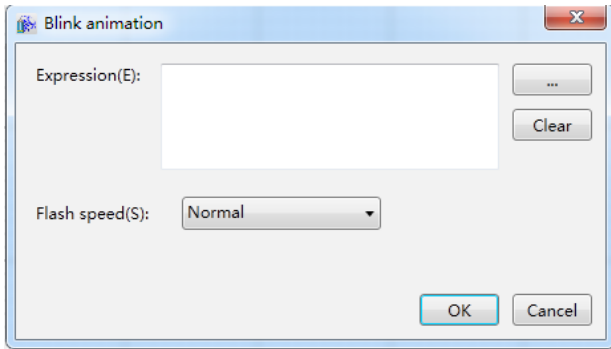
According to the visibility effect, visibility animations are divided into two types: “Flicker” and “Display hide”; the difference between them are: flickering makes the graphic switch between display/hide according to a fixed frequency in order to achieve flickering effects; display/hide changes the graphic from display to hide or from hide to display according to the conditions; it is only a single action.

### 1. Steps to configuring flickering animation are as follows:


- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Visibility” → click the button in the “Blink” field, as shown in the figure below:



- **Step 2:** The flicker animation configuration window will appear, as shown in the figure below:



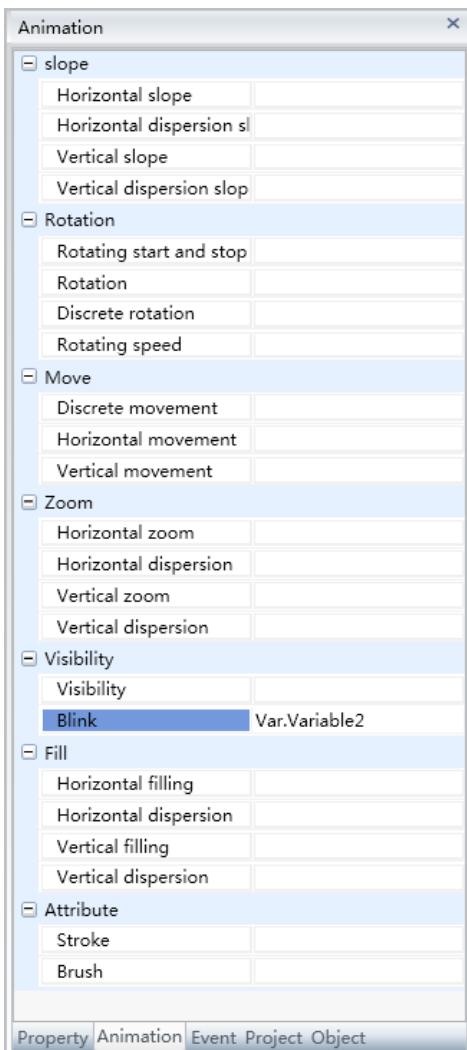
The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

» **Flicker speed:** Sets the flicker frequency; it is a drop-down menu with 3 options:

- Slow
- Normal
- Fast

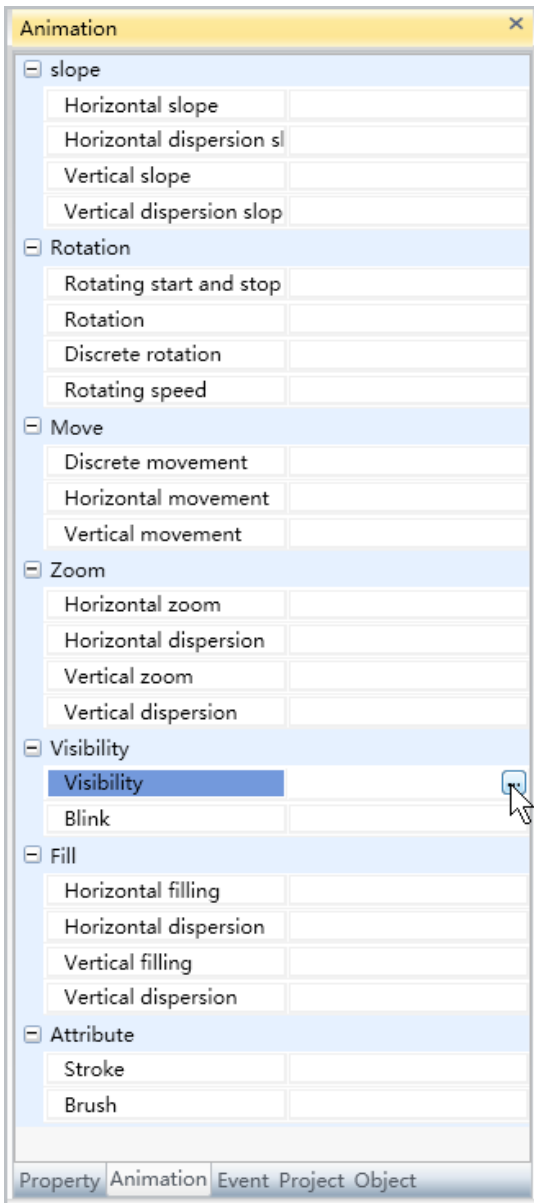
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Flicker” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



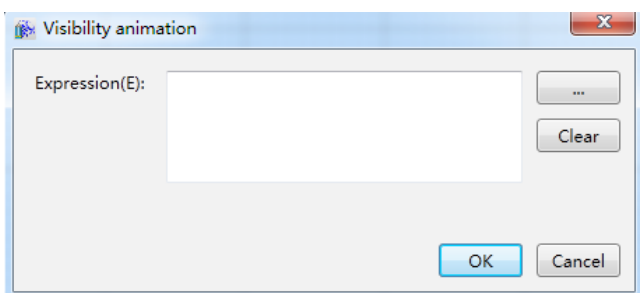
To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

**2. Steps to configuring Visibility animation are as follows:**

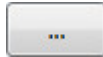
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Visibility” → click the button in the “Visibility” field, as shown in the figure below:



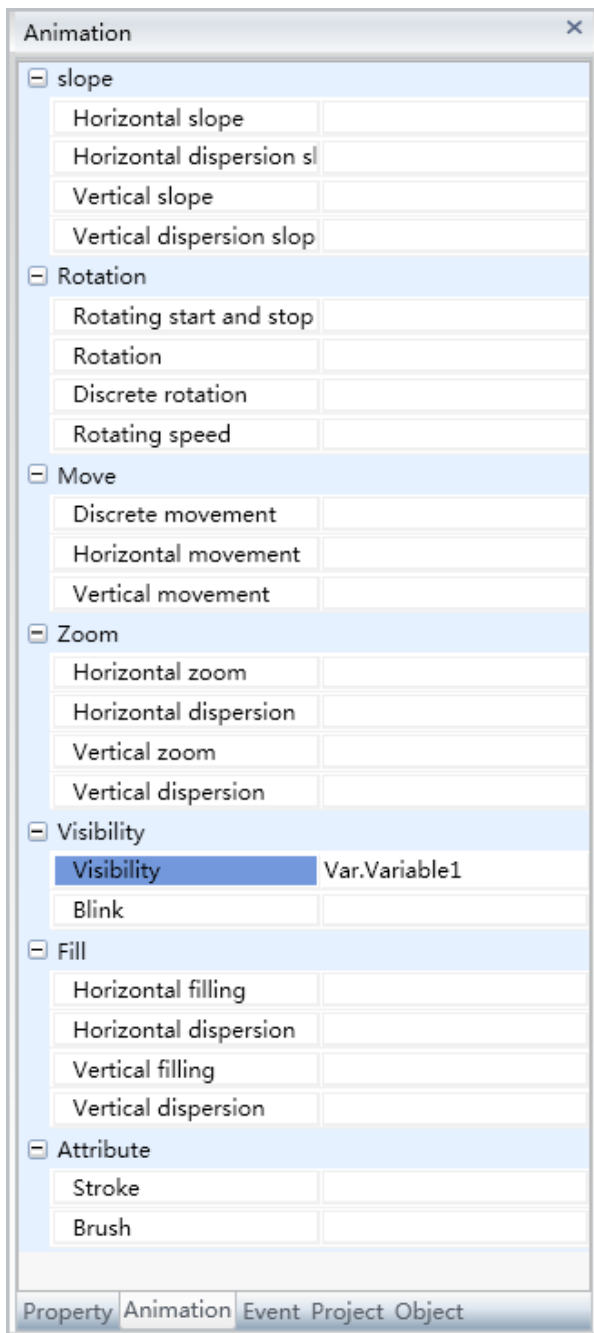
- **Step 2:** The Visibility animation configuration window will appear, as shown in the figure below:



The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

■ **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Visibility” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

## 9.8 Flowing animations

Flowing animations can only be configured for the “Pipeline” graphic object, which is changing the “Liquid” flow property of the pipeline.

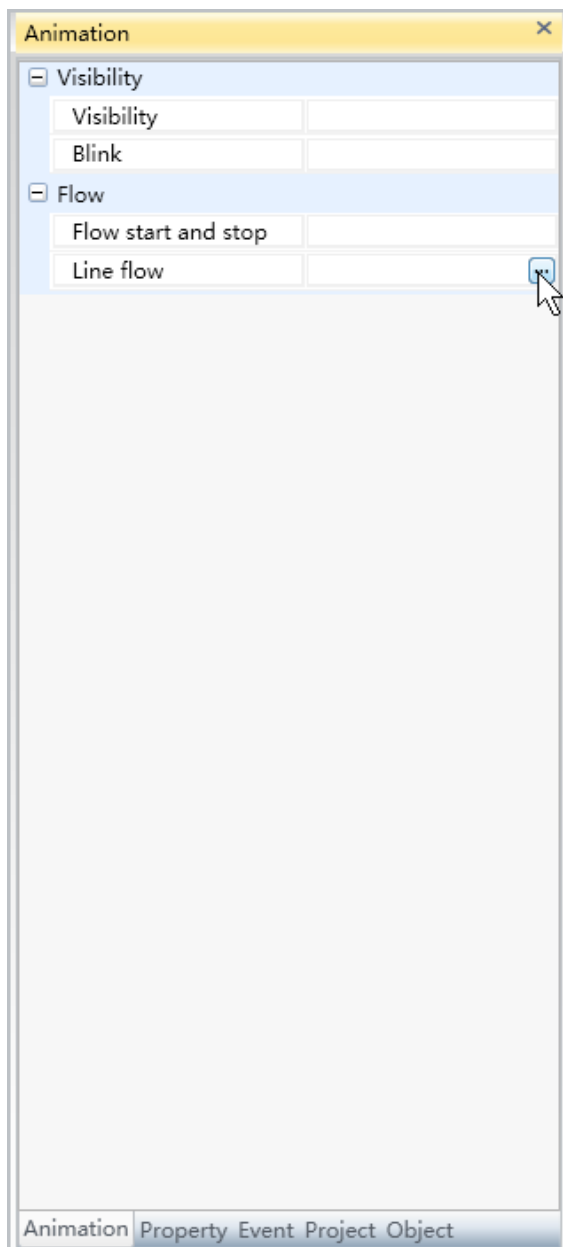
Flowing animations are divided into two types: “Line flow” and “Start and stop flow”; they cannot be configured simultaneously.

“Line flow” refers to setting a variable or expression and comparing them with the preset value. When it matches the comparison conditions set, the liquid in the pipeline will flow according to the flowing speed set;

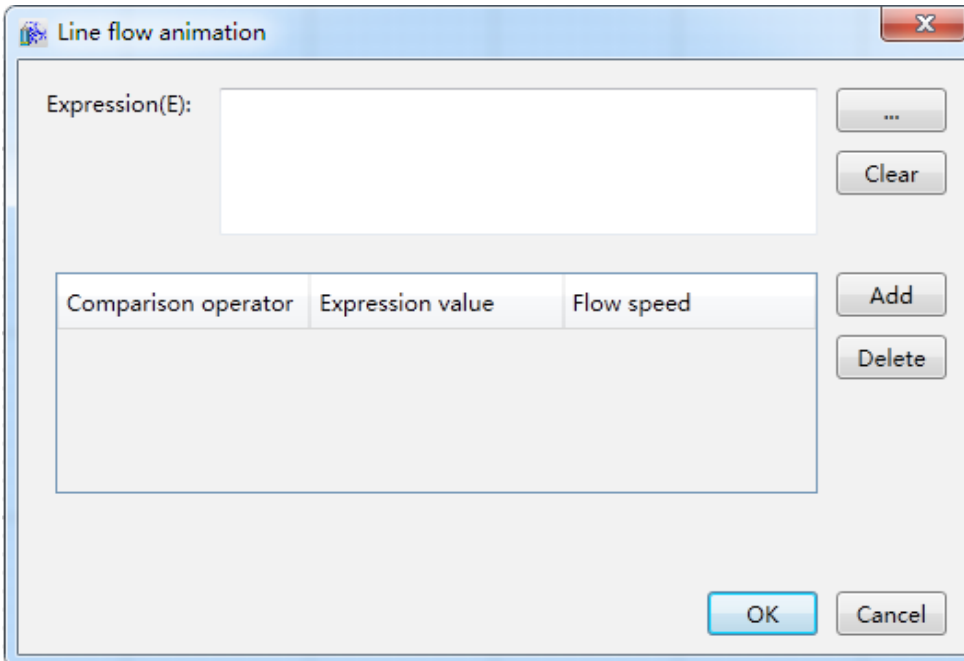
“Start and stop flow” refers to using whether expressions or discrete variable values are true or false to control whether the liquid in the pipeline will flow; the flow speed can also be set simultaneously.

### 1. Steps to configuring line flow animation are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Line flow” → click the button in the “Line flow” field, as shown in the figure below:



- **Step 2:** The line flow animation configuration window will appear, as shown in the figure below:

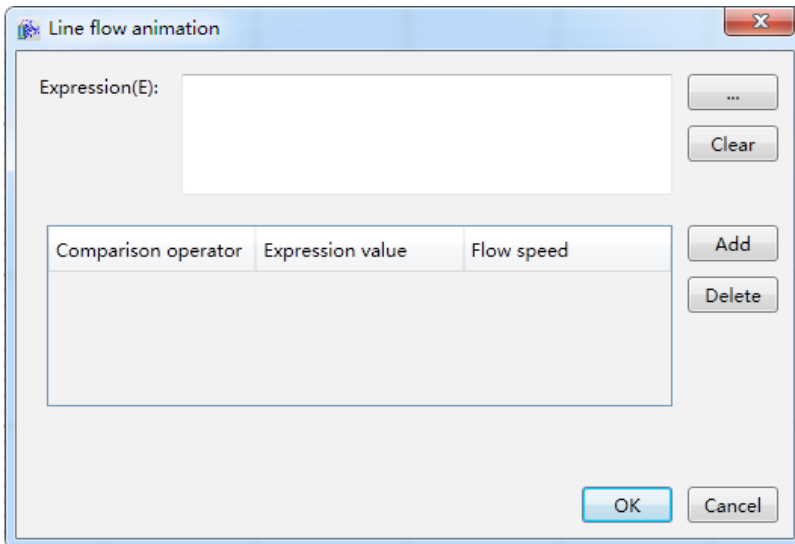


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

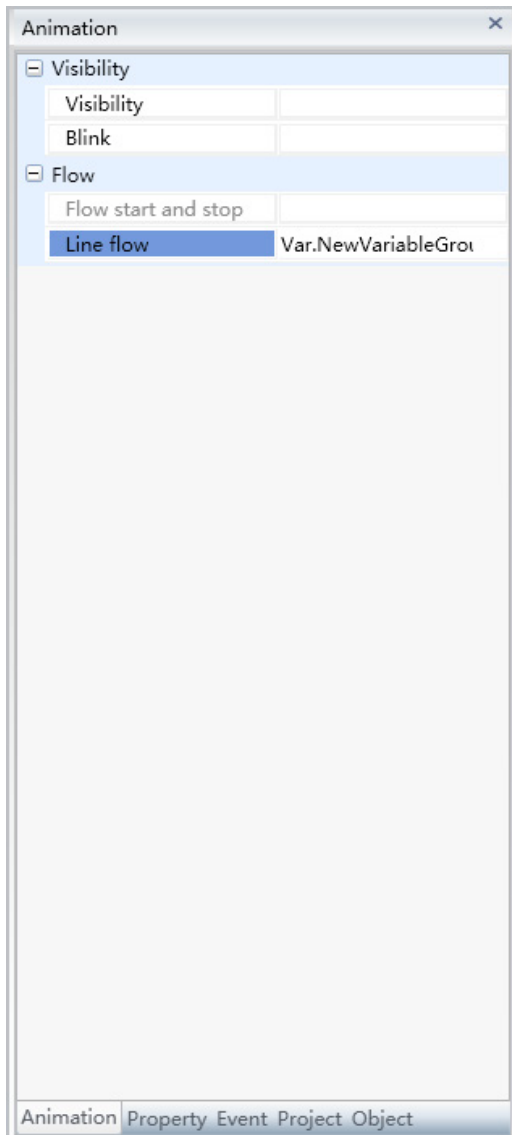
**Filling configuration:**

- » **Comparison operators:** Sets the comparison operator symbol between the “Expression” and “Expression value”; it is a drop-down menu that includes 6 options:
  - <: Less than.
  - <=: Less than or equal to.
  - =: Equal to (preset).
  - !=: Not equal to.
  - >=: Greater than or equal to.
  - >: Greater than.
- » **Expression value:** Sets the reference value for the “Expression” to compare to; it can be a whole number or decimal number.
- » **Flow speed:** Sets the flowing speed of the liquid; zoom direction; it is a drop-down menu that includes 6 options:
  - Static
  - Low speed
  - Mid/low speed
  - Mid speed
  - Mid/high speed
  - High speed
- » **“Add new” button:** Press this button to add configuration items, as shown in the figure below:



» **“Delete” button:** Pressing this button after selecting a certain configuration item will delete that configuration item.

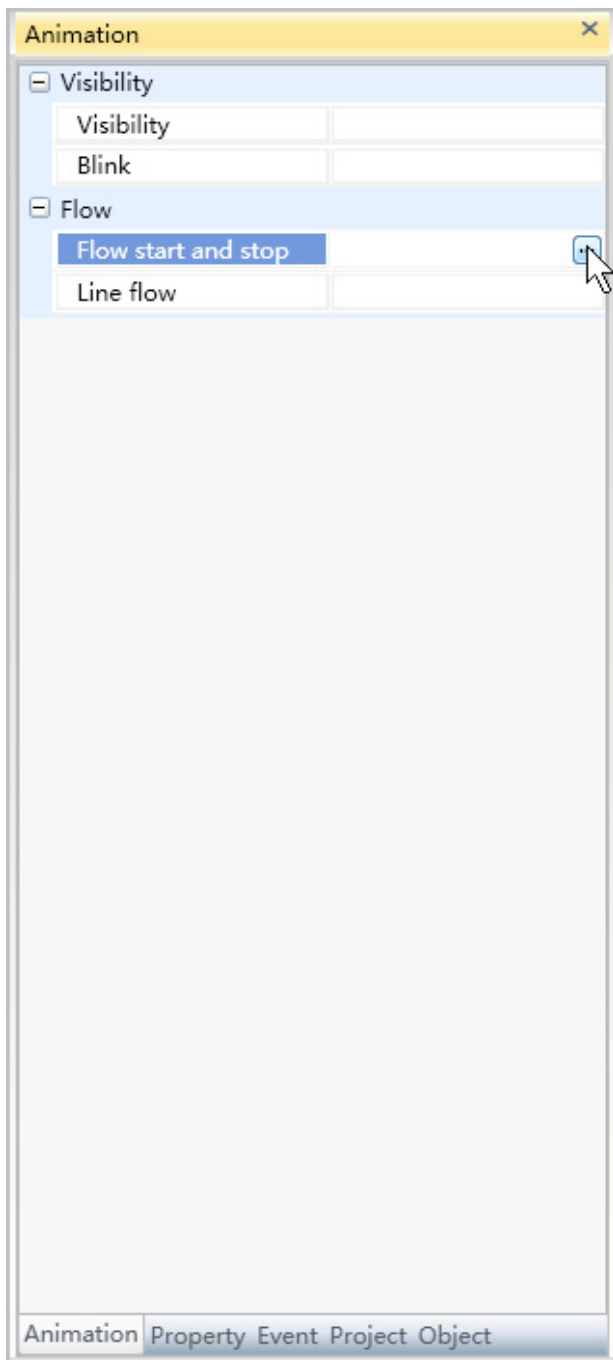
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Line flow” animation. The animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

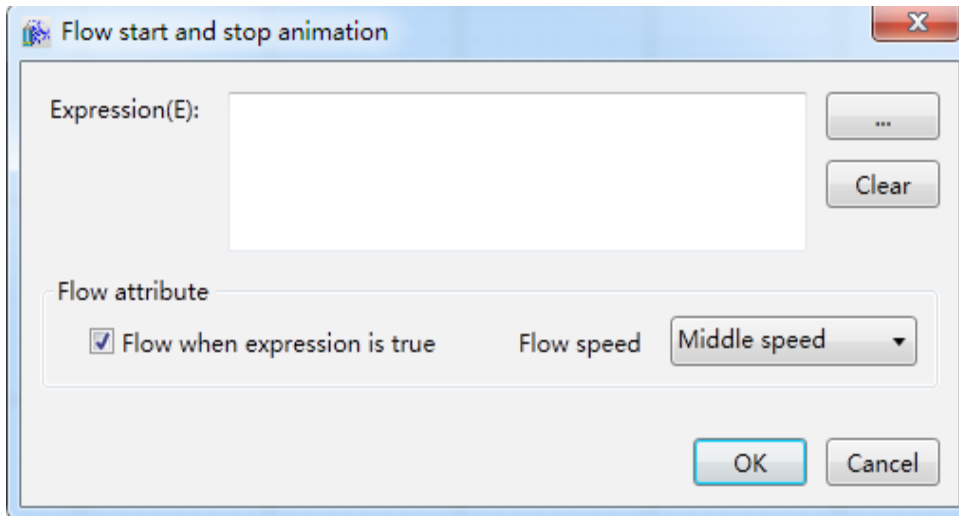
## 2. Steps to configuring start and stop flow animation are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “flow start and stop” → click the button in the “flow start and stop” field, as shown in the figure below:





- **Step 2:** The flow start and stop animation configuration window will appear, as shown in the figure below:

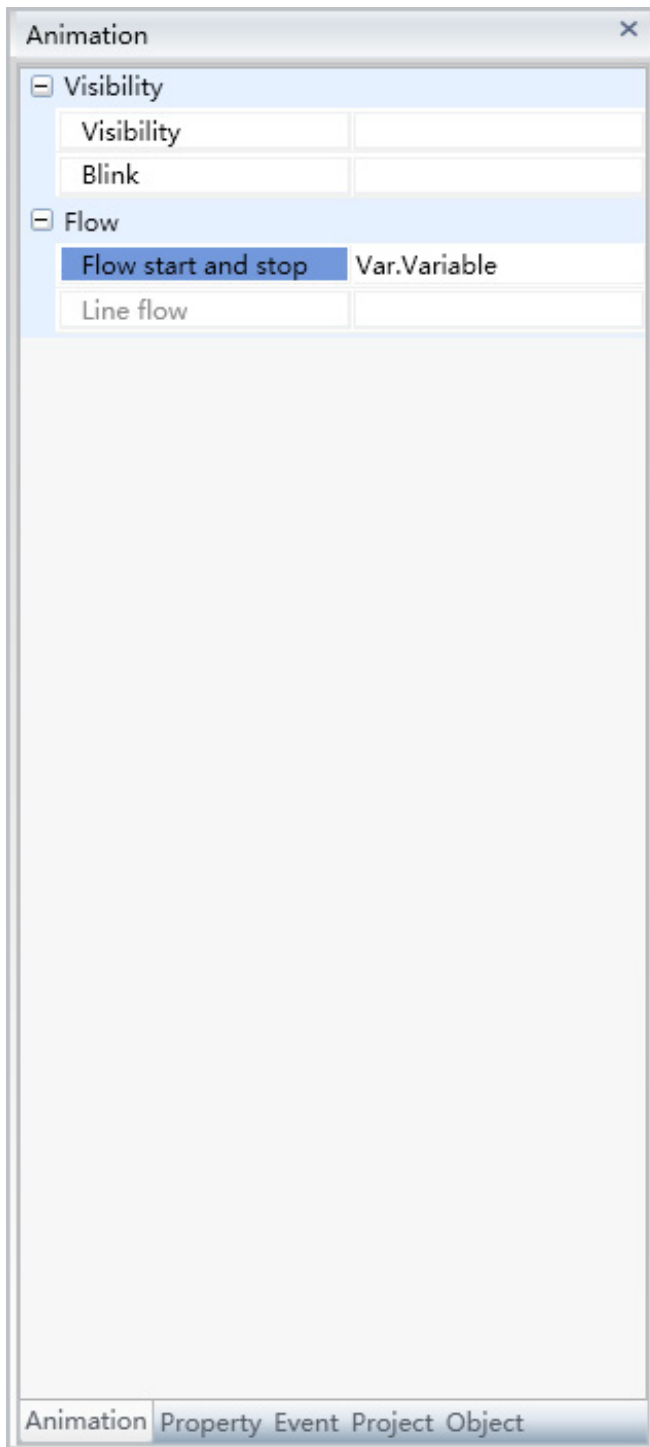


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- » **Start flow when expression is true:** Set whether to start flowing when the expression is true; when selected, the liquid will flow when the expression is true, and it will not flow when not selected.
- » **Flow speed:** Sets the flowing speed of the liquid; zoom direction; it is a drop-down menu that includes 6 options:
  - Static
  - Slow
  - Slow speed.
  - Mid speed
  - Mid/high speed
  - High speed

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “flow start and stop” animation. The animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

## 9.9 Value display animations

Value display animations can only be configured for “Text”, “Text block” and “Tag” graphic objects; changing their “Content” property will allow the text they display change according to the changes in the associated variable value and changes in the conditions set;

Value display animations are divided into four types: “Analog value string”, “Analog value”, “Digital value” and “Text content”; they cannot be configured simultaneously.

“Analog value string” display animation associates an analog (integer or real) variable and compares the variable value with the value set. When it matches the comparison conditions set, the content displayed in the graphic object is the string value set.

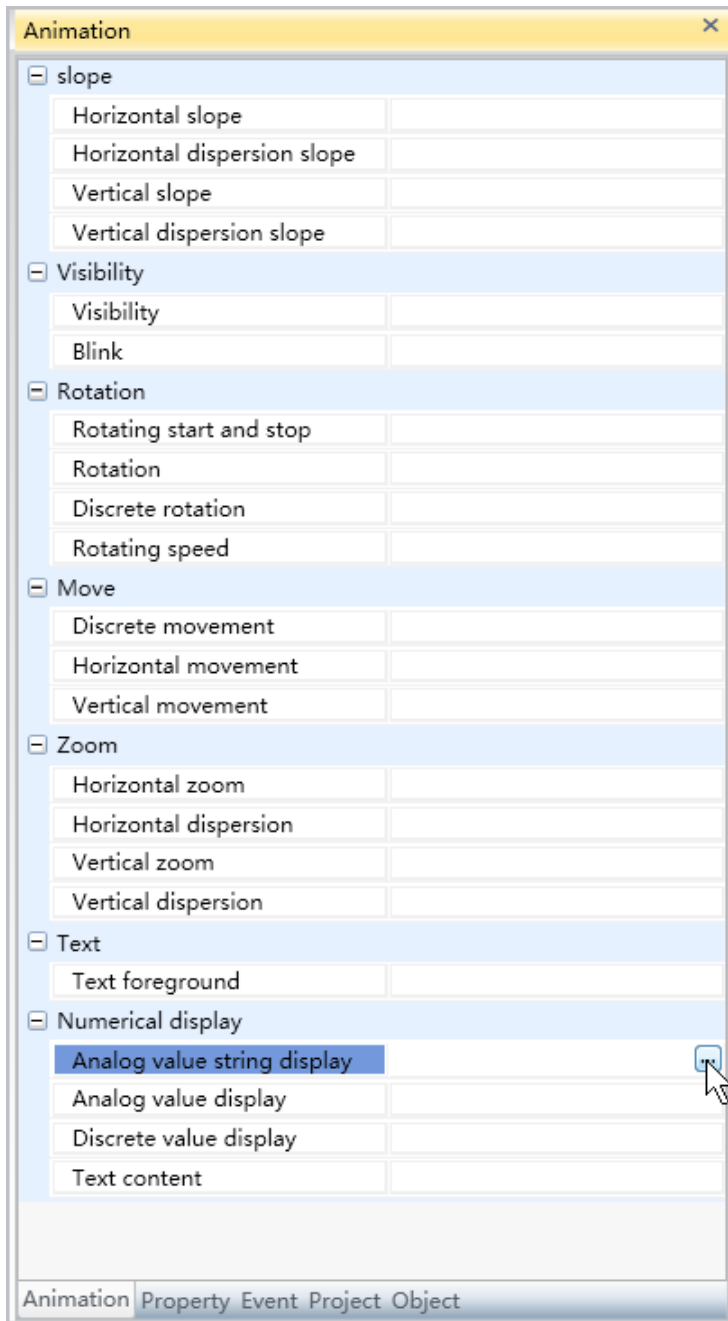
“Analog value” display animation associates an analog (integer or real) variable and sets the display format of the value so that the variable value is displayed in the graphic object according to the format set;

“Digital value” display animation associates a digital (bool) variable; different display contents are set according to when the variable value is “True” or “False”; and

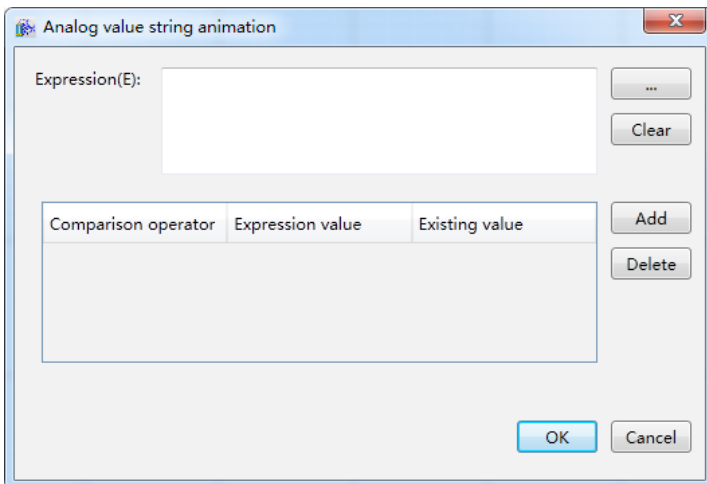
“Text content” display animation associates a variable directly or by setting strings. It allows the displayed content of the graphic object to be the associated variable value or the string set.

## 1. Steps to configuring analog value string display animation are as follows:

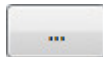
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Analog value string” → click the button in the “Analog value string” field, as shown in the figure below:



- **Step 2:** The analog value string animation configuration window will appear, as shown in the figure below:

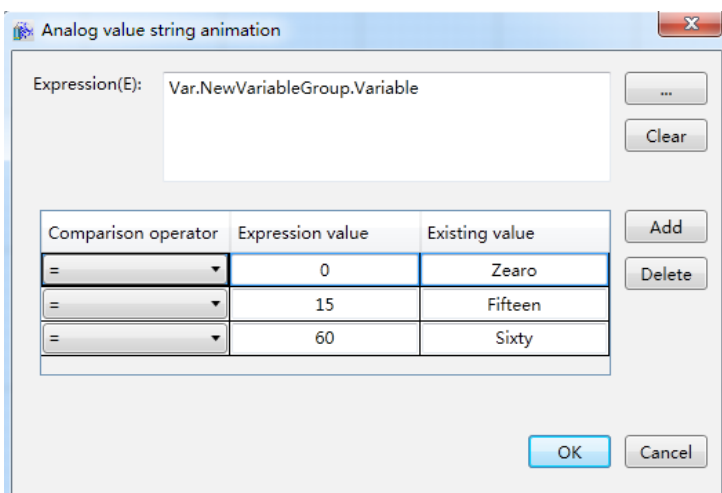


The meanings of each setting in the configuration window are as follows:

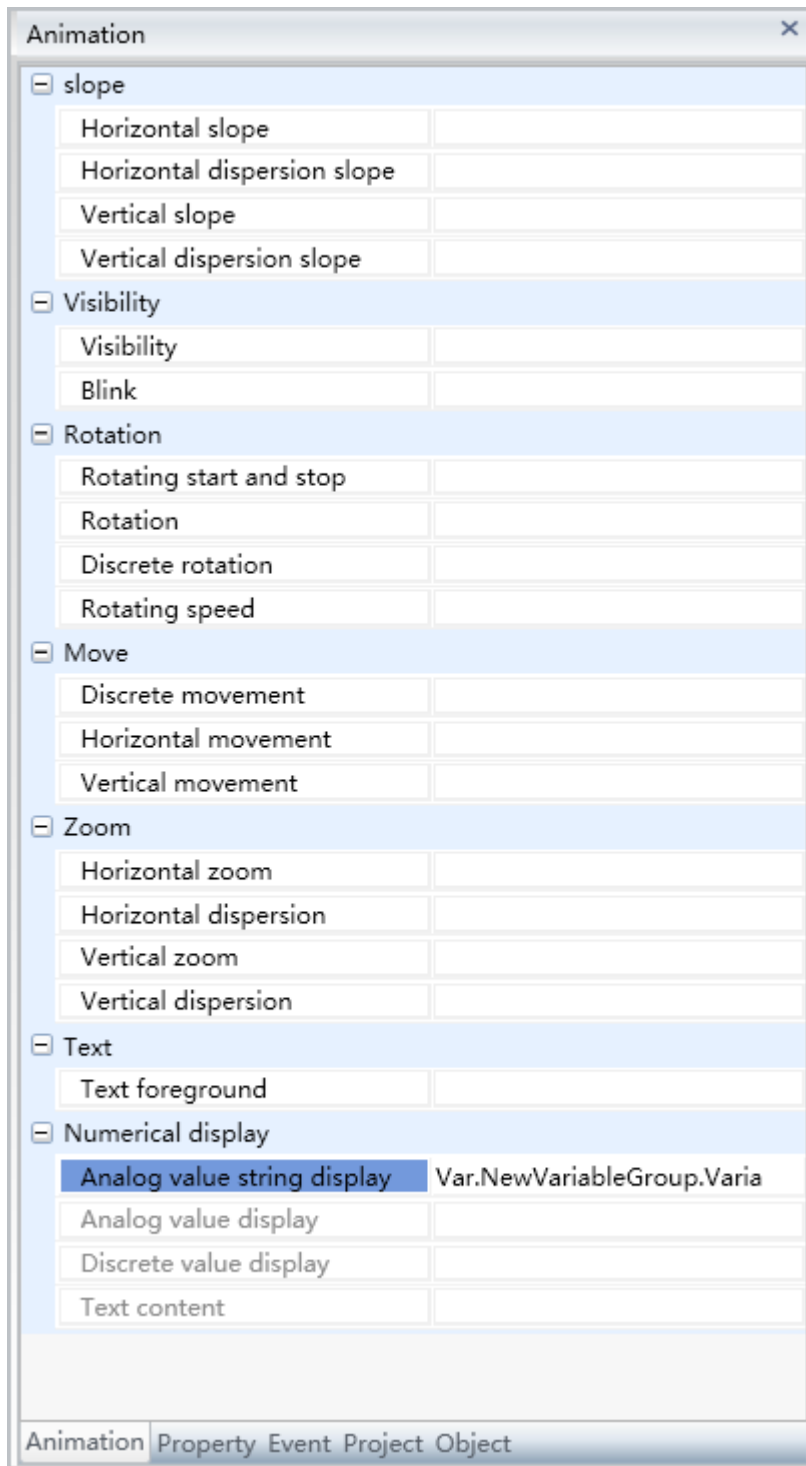
**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

**Analog value string configuration:**

- » **Comparison operators:** Sets the comparison operator symbol between the “Expression” and “Expression value”; it is a drop-down menu that includes 6 options:
  - <: Less than.
  - <=: Less than or equal to.
  - =: Equal to (preset).
  - !=: Not equal to.
  - >=: Greater than or equal to.
  - >: Greater than.
- » **Expression value:** Sets the reference value for the “Expression” to compare to; it can be a whole number or decimal number.
- » **Current value:** Sets the text content of the string; which the comparison conditions set are met, this value will be displayed in the content of the graphic object.
- » **“Add new” button:** Press this button to add a configuration item, as shown in the figure below:



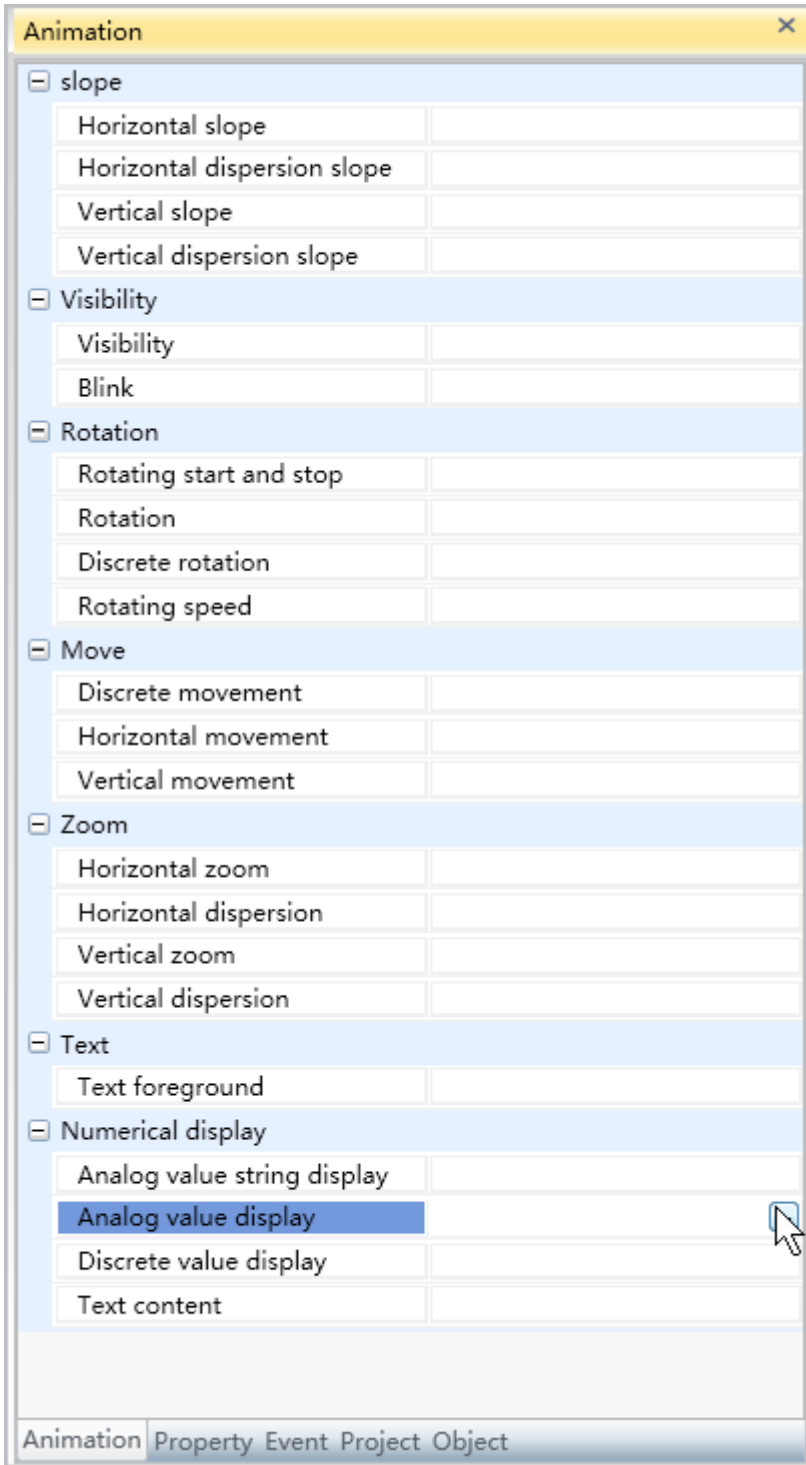
- » **“Delete” button:** Pressing this button after selecting a certain configuration item will delete that configuration item.
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Analog value string” animation; the animation configuration of this graphics will be displayed in the “Animation)” window, as shown in the figure below:



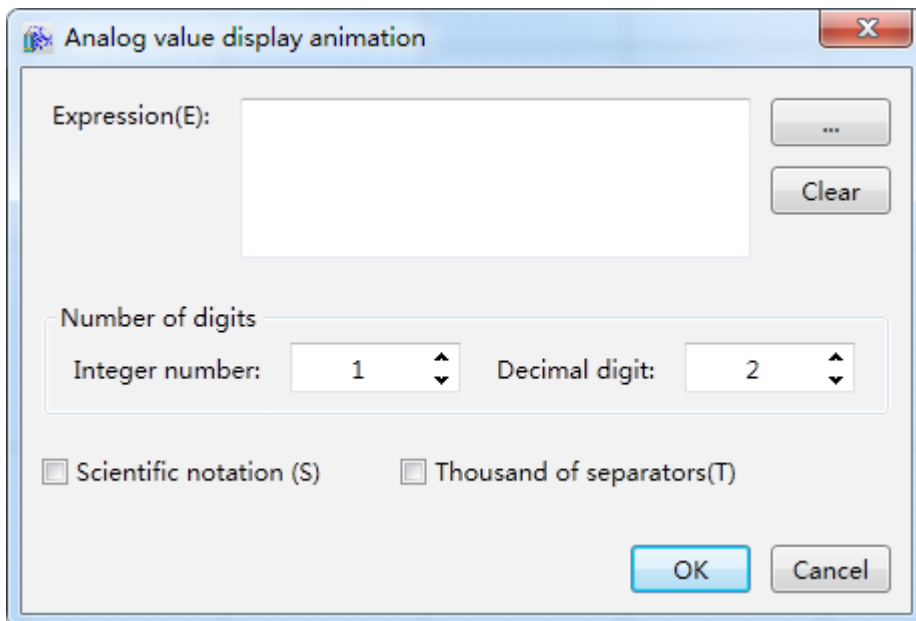
To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

## 2. Steps to configuring analog value display animation are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Analog value” → click the button in the “Analog value” field, as shown in the figure below:



- **Step 2:** The analog value display animation configuration window will appear, as shown in the figure below:

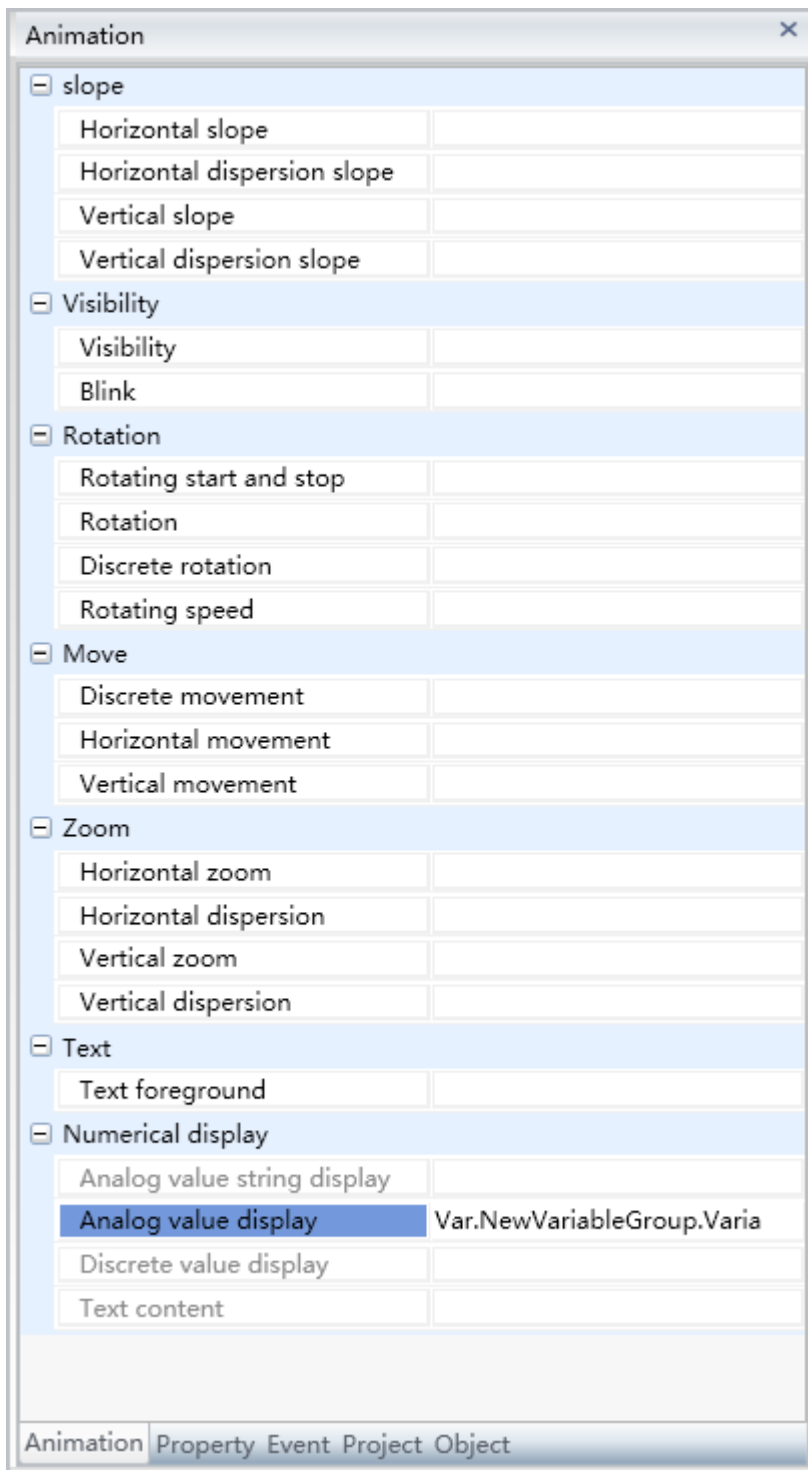


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the associated variable name; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- » **Integer digits:** Sets the number of digits for the integer; the preset value is 1. If the number of integer digits of the outputted value is less than the value set here, a zero will be added to the highest digit. If it is greater than the value set here, it will output according to the actual number of digits there are. Setting it to 0 means not adding a zero to the displayed output value. For example: Of the number of digits of the integer is set as 3 and the output value is 10, it will display 010; and if the output value is 165, it will display 165.
  - » **Decimal places:** Sets the number of places for decimal numbers; the preset value is 2. If the number of decimal places of the outputted value is less than the value set here, a zero will be added behind the lowest digit. If it is greater than the value set here, it will be rounded off to the number of decimal places set. Moreover, 1 will be added if greater than 5 and eliminated if less than 5. Setting it to 0 means do not display decimal places. Decimal places are set for all associated engineering variables; they will not affect the settings here. For example: When the number of decimal places is set to 2 and the output value is 2.3, it will display 2.30; if the output value is 0.125, it will display 0.12; if the output value is 0.126, it will display 0.13.
  - » **Scientific notation:** Sets whether to use scientific notation to display the variable value.
  - » **Thousand separator symbol:** Sets whether to use the thousand separator symbol.
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Analog value display” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:

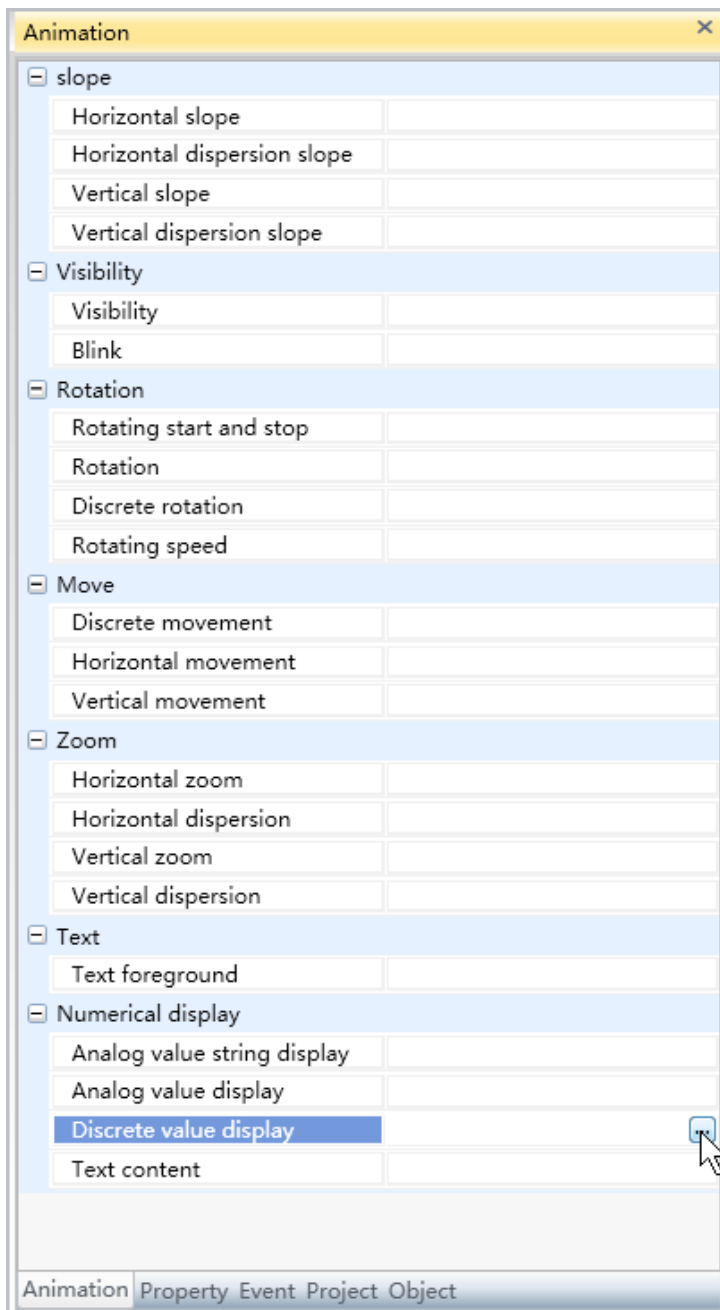




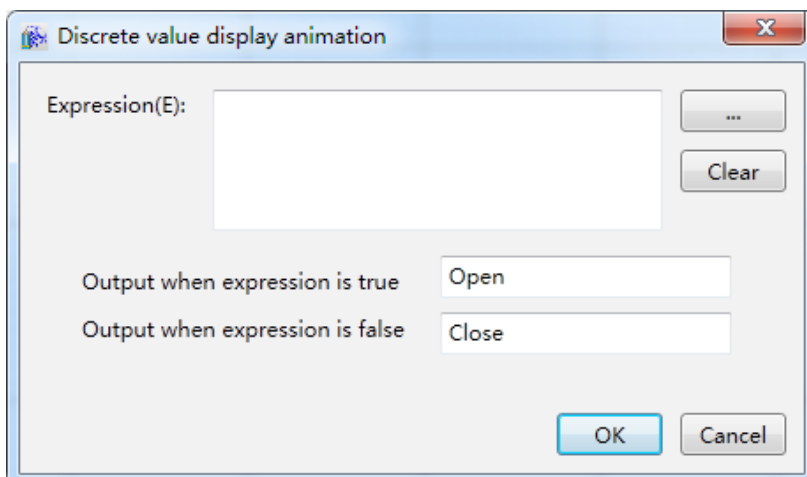
To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

### 3. Steps to configuring digital value display animation are as follows:

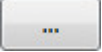
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Digital value” → click the button in the “Digital value” field, as shown in the figure below:



- **Step 2:** The digital value value display animation configuration window will appear, as shown in the figure below:

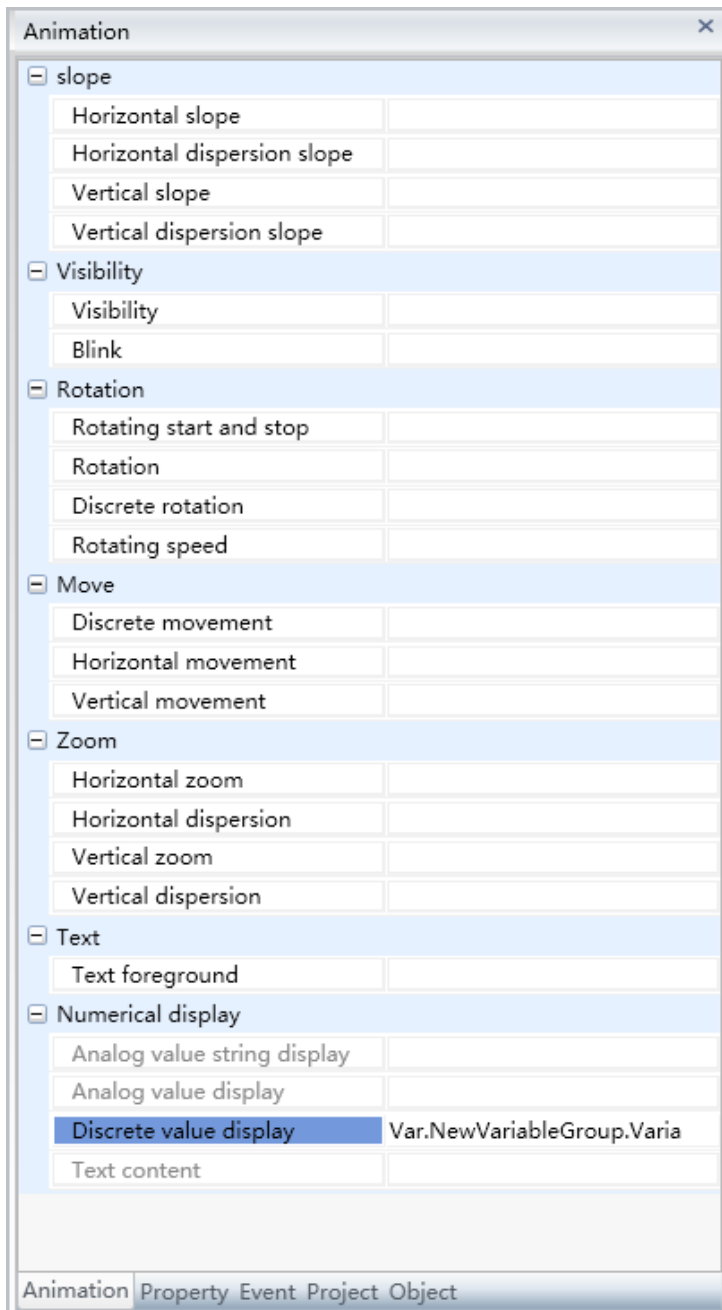


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the associated variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- » **Output content when the expression is true):** Sets the display content of the graphic object when the expression is true.
- » **Output content when the expression is false):** Sets the display content of the graphic object when the expression is false.

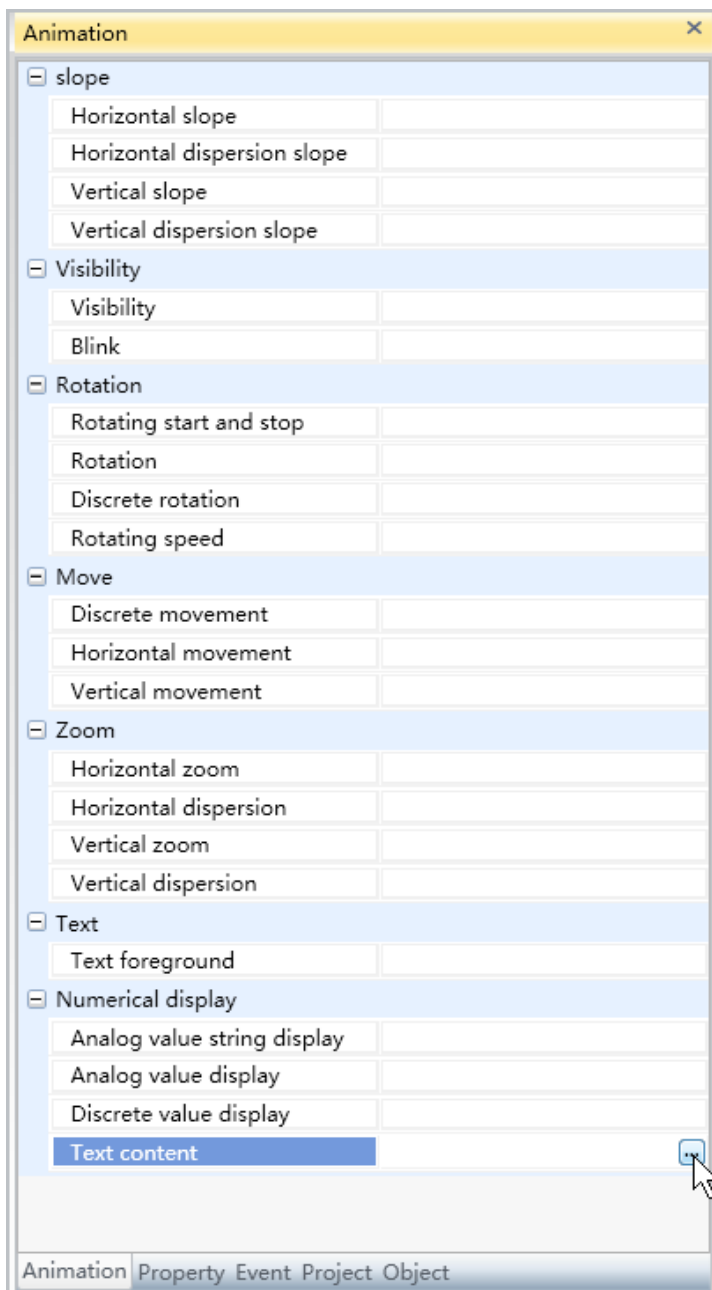
■ **Step 3:** When the configuration is complete, press the “OK” button to complete the configuration of the “Digital value display” animation. The animation configuration of these graphics will be displayed in the “Animation” window, as shown in the figure below:



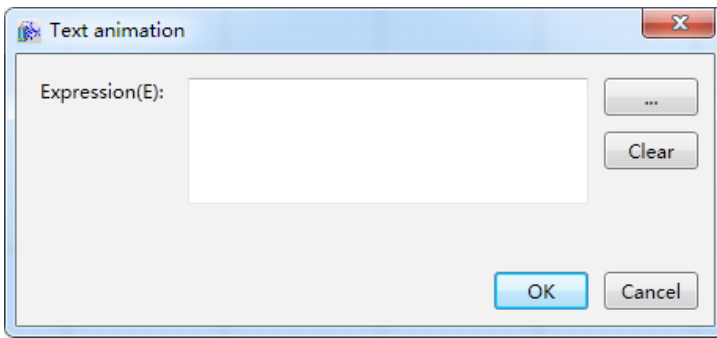
To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

#### 4. Steps to configuring text content animation are as follows:

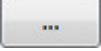
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Text content” → click the button in the “Text content” field, as shown in the figure below:



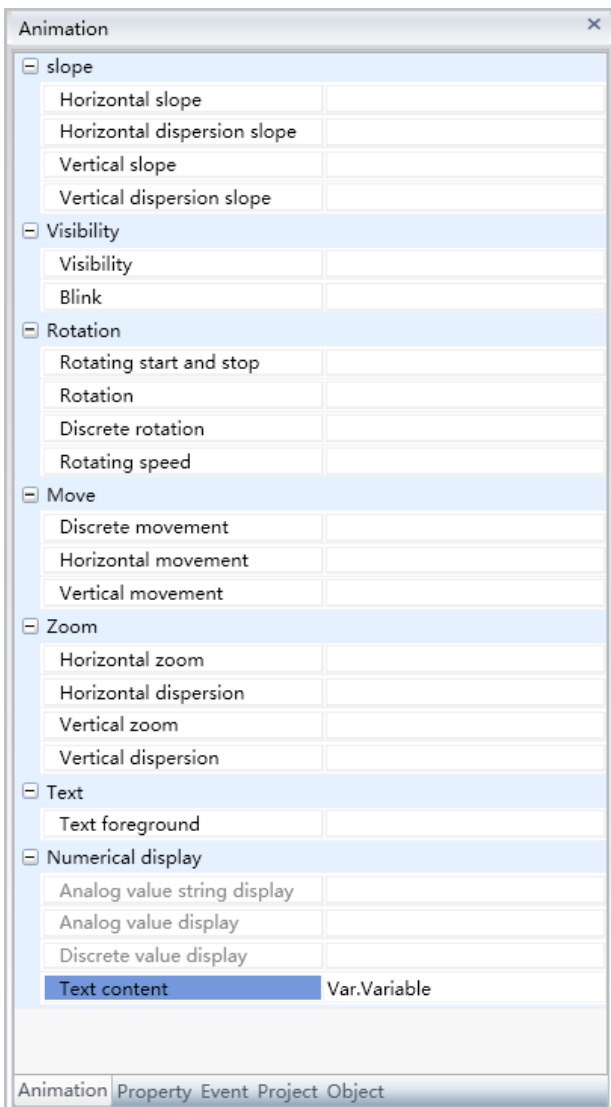
- **Step 2:** The text content display animation configuration window will appear, as shown in the figure below:



The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the associated variable name or string value; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Text content” animation. The animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

## 9.10 Tilt animations

Tilt animation refers to controlling the slope level of the graphic object through variables or expression values and changing the “slope” property of the graphic object.

Tilt animations are divided into four types: “Horizontal slope”, “Horizontal discrete slope”, “Vertical slope” and “Vertical discrete slope”.

“Horizontal slope” animation refers to the slope level of the graphic object in the horizontal direction.

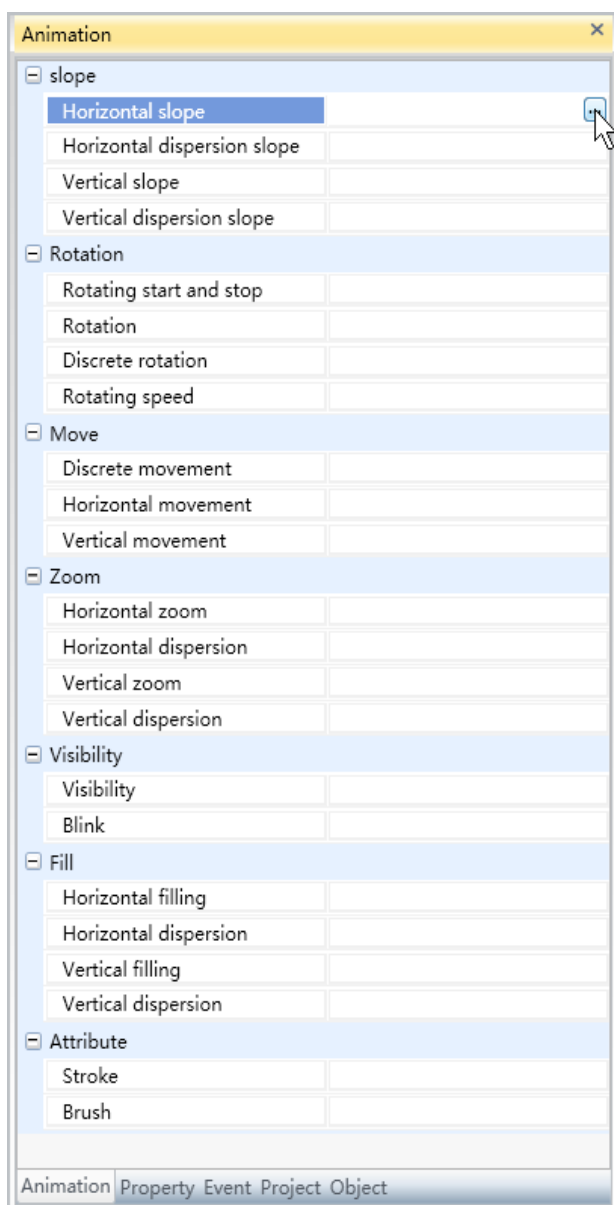
“Horizontal discrete slope” means that the horizontal slope angle of the graphic object is related to the discrete variable.

“Vertical slope” animation refers to the slope level of the graphic object in the vertical direction.

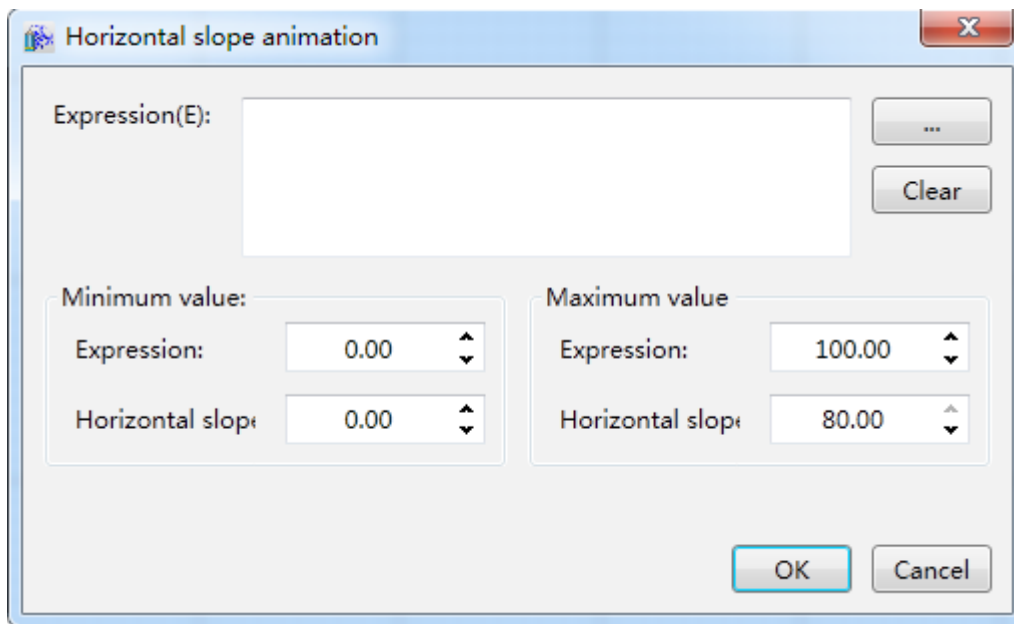
“Vertical discrete slope” means that the vertical slope angle of the graphic object is related to the discrete variable.

### 1. Steps to configuring the Horizontal slope animation are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Horizontal slope” → click the button in the “Horizontal slope” field, as shown in the figure below:



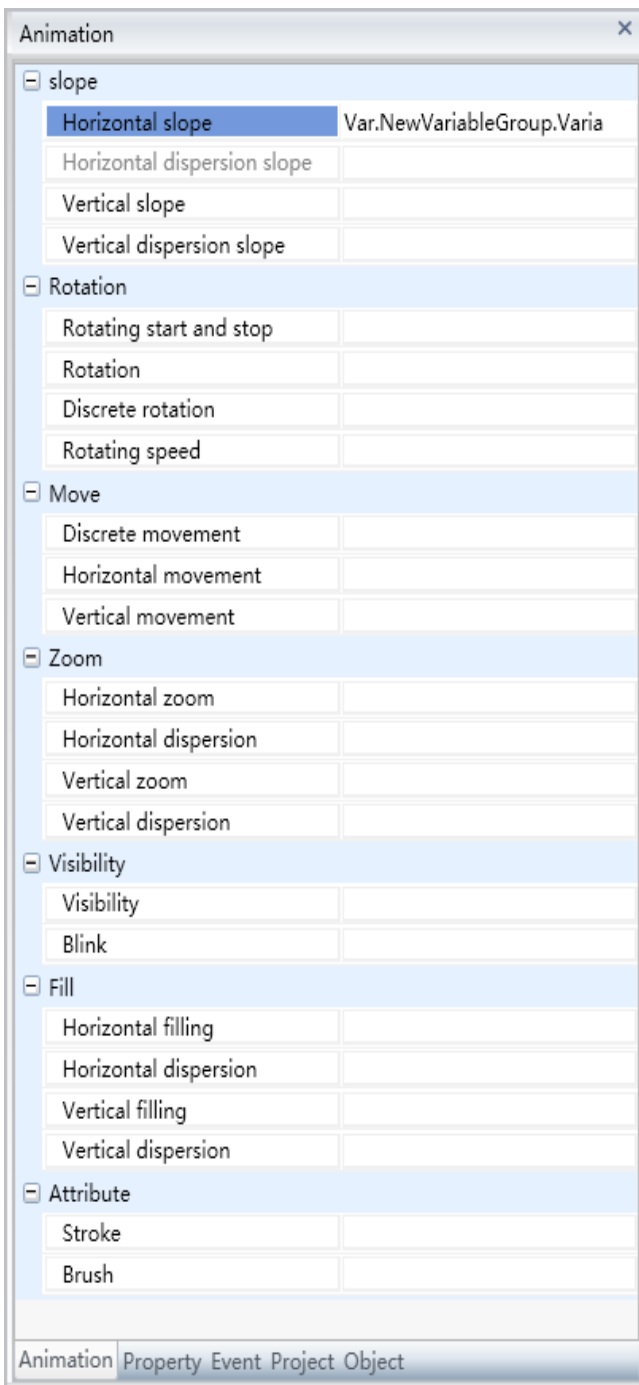
- **Step 2:** The horizontal slope animation configuration window will appear, as shown in the figure below:



The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- **Minimum value:**
  - » Expression: Sets the minimum value of the “Expression”.
  - » Horizontal slope: Sets the minimum value for the Horizontal slope.
- **Maximum value:**
  - » Expression: Sets the maximum value of the “Expression”.
  - » Horizontal slope: Sets the maximum value for the Horizontal slope.
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Horizontal slope” animation; the animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:

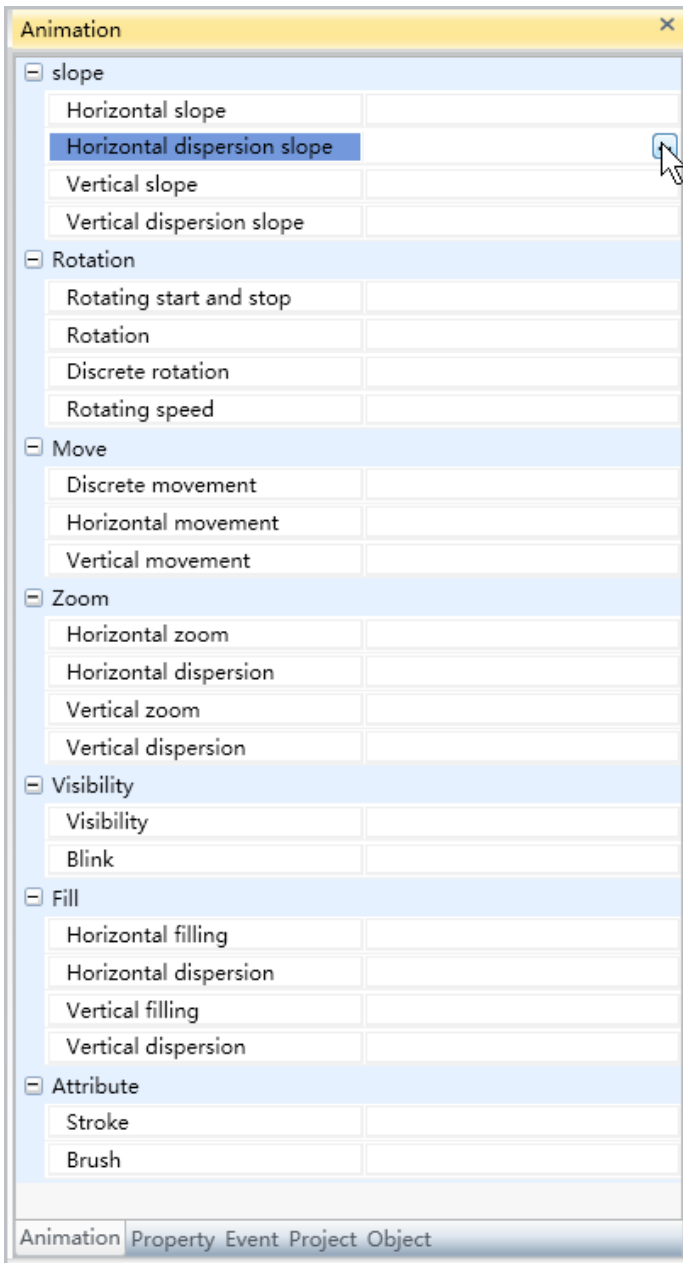


To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

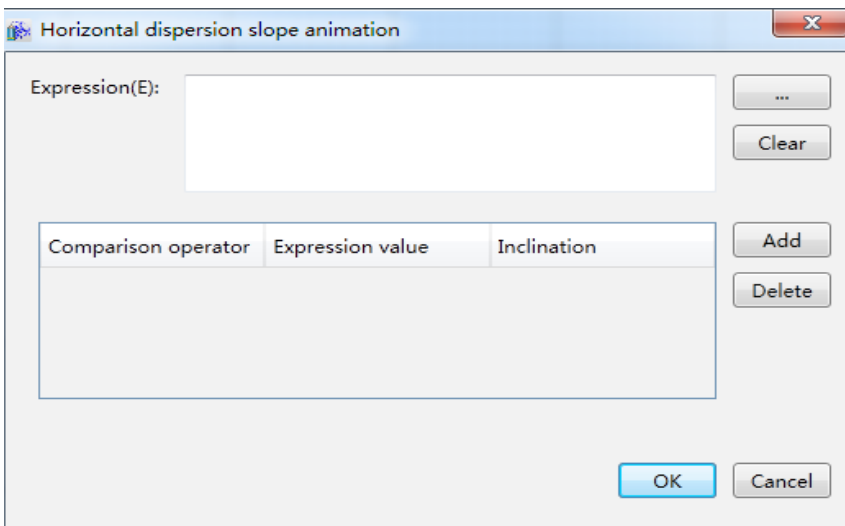
## 2. Steps to configuring the Horizontal discrete tilt animation are as follows:

- Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure animation in the sketchpad → open the “Animation” window → select “Horizontal dispersion slope” → click the button in the “Horizontal dispersion slope” field, as shown in the figure below:

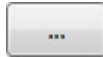




- **Step 2:** The horizontal dispersion slope animation configuration window will appear, as shown in the figure below:

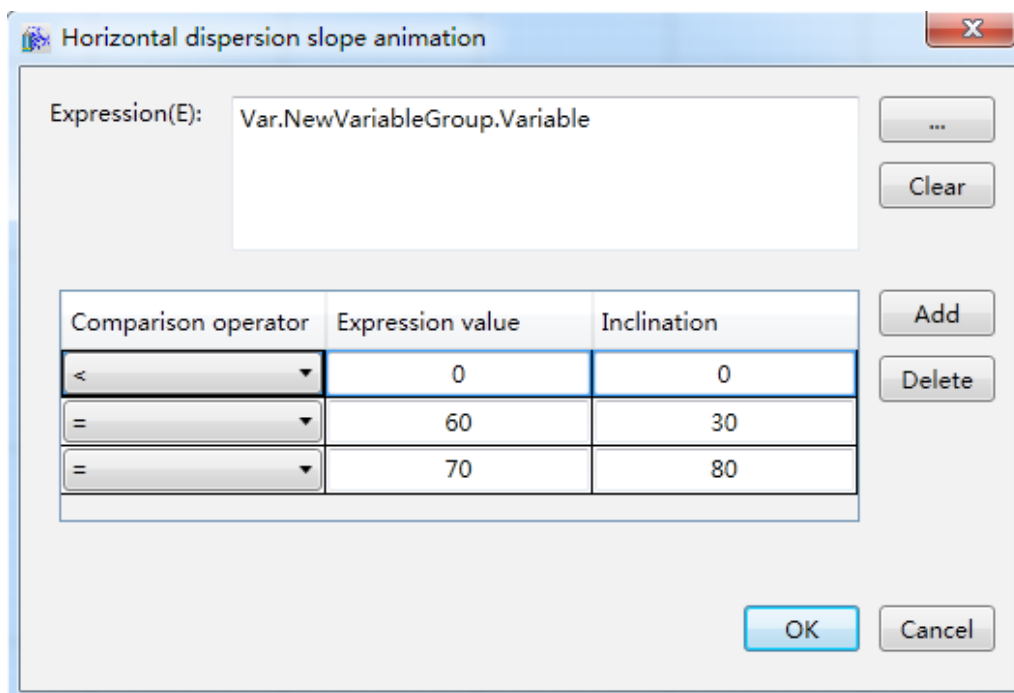


The meanings of each setting in the configuration window are as follows:

**Expression:** Enter the variable name or expression; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

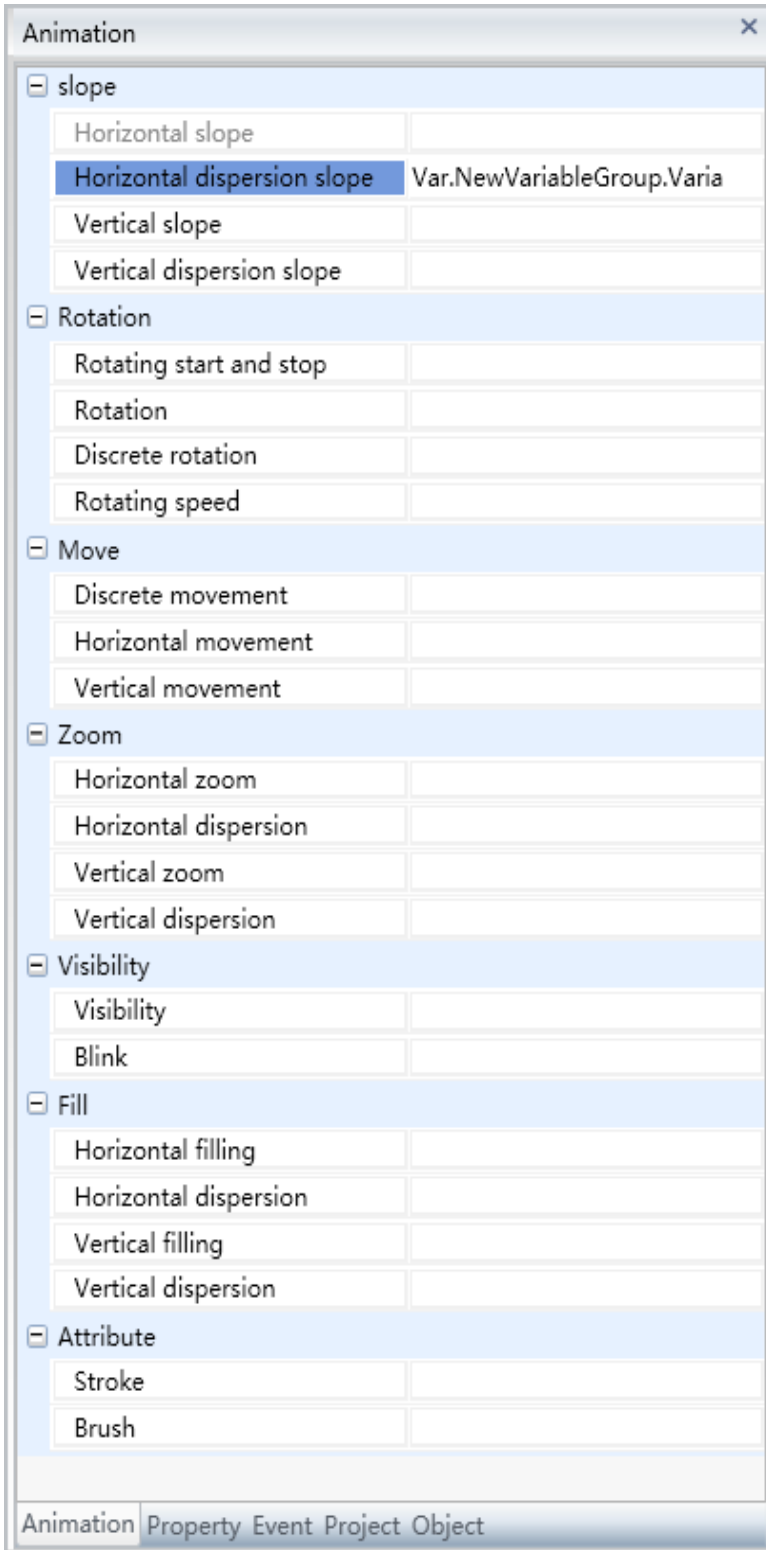
**Filling configuration:**

- » **Comparison operators:** Sets the comparison operator symbol between the “Expression” and “Expression value”; it is a drop-down menu that includes 6 options:
  - <: Less than.
  - <=: Less than or equal to.
  - =: Equal to (preset).
  - !=: Not equal to.
  - >=: Greater than or equal to.
  - >: Greater than.
- » **Expression value:** Sets the reference value for the “Expression” to compare to; it can be a whole number or decimal number.
- » **Tilt:** Sets the corresponding tilt level.
- » **“Add” button:** Press this button to add configuration items, as shown in the figure below:



- » **“Delete” button:** Pressing this button after selecting a certain configuration item will delete that configuration item.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Horizontal dispersion slope” animation. The animation configuration of this graphics will be displayed in the “Animation” window, as shown in the figure below:



To delete the animation, simply select the animation in the animation list and then right-click the mouse and select “Delete”.

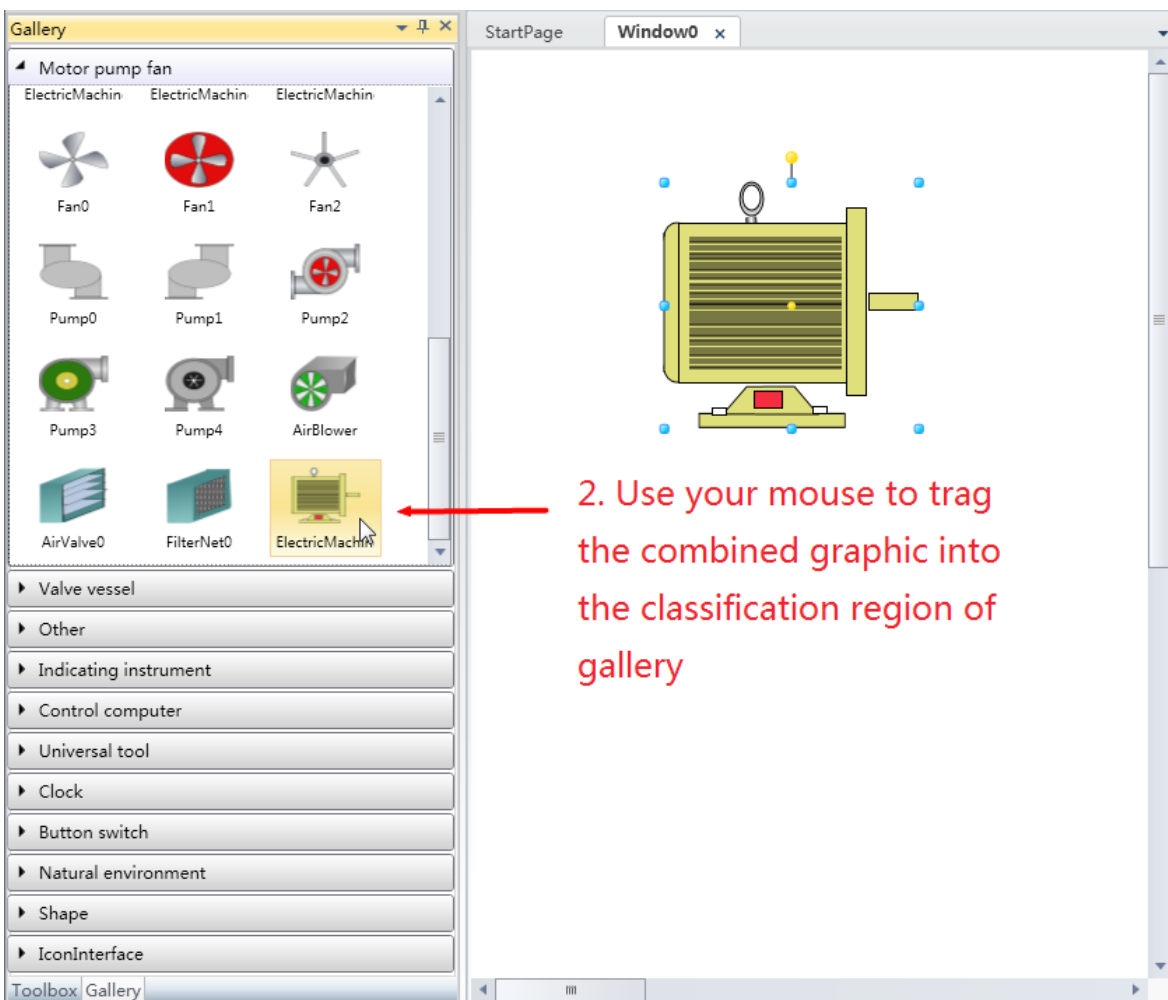
# 10. Event

## 10.1 Overview

Events are operations that can be identified and responded by graphic objects; they are divided into system events and user events. Events in the DIAView software are usually user events, which are operations that users performed to various graphic objects in the window, which further drives the graphic control unit to execute certain functions.

Events in the DIAView software refers to the related script handler that are triggered when the user performs operations to the graphic object with the mouse and keyboard etc.; therefore, event configuration is mainly using script editors to configure script programs, or use packaged programs: the script editor of DIAView includes many written commands and system functions that users can use directly in the script program.

The DIAView software has comprehensive event processing functions; events include mouse and form operations and value input etc. Each kind of event can only be configured once to the same corresponding graphic object.



At this time the model name is automatically generated by the system; users can select the model and press the right mouse button to perform operations such as “Rename” and “Delete” etc.

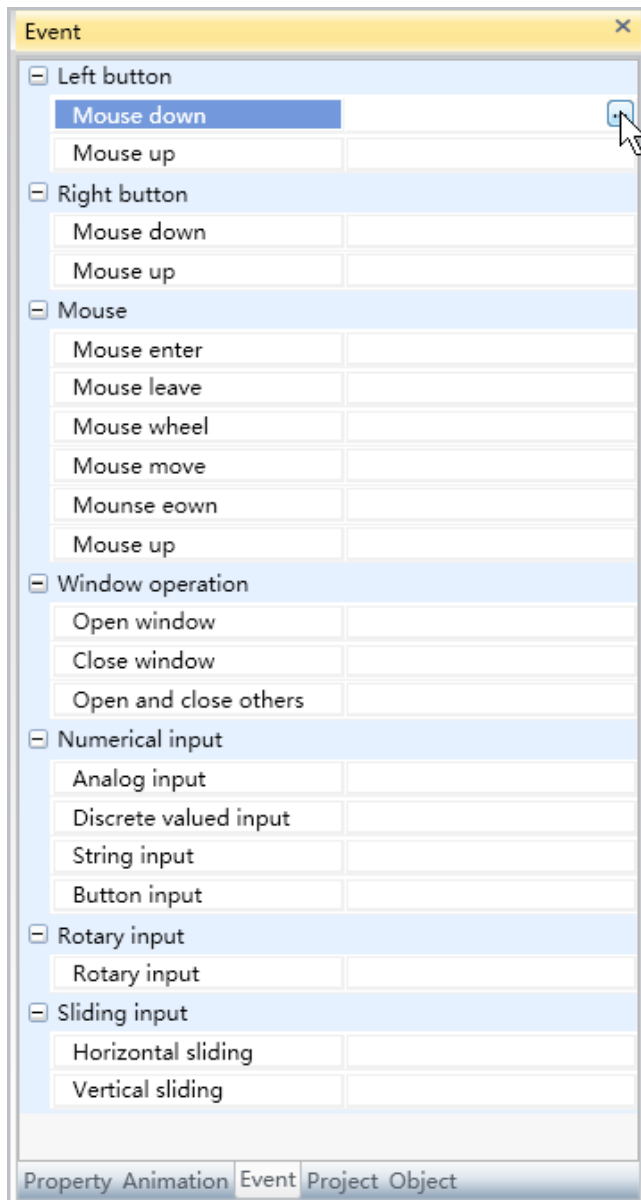
## 10.2 Left-click events

Left-click events are events triggered by performing operations with clicking the left mouse button, which will further use related script handlers to complete related functions.

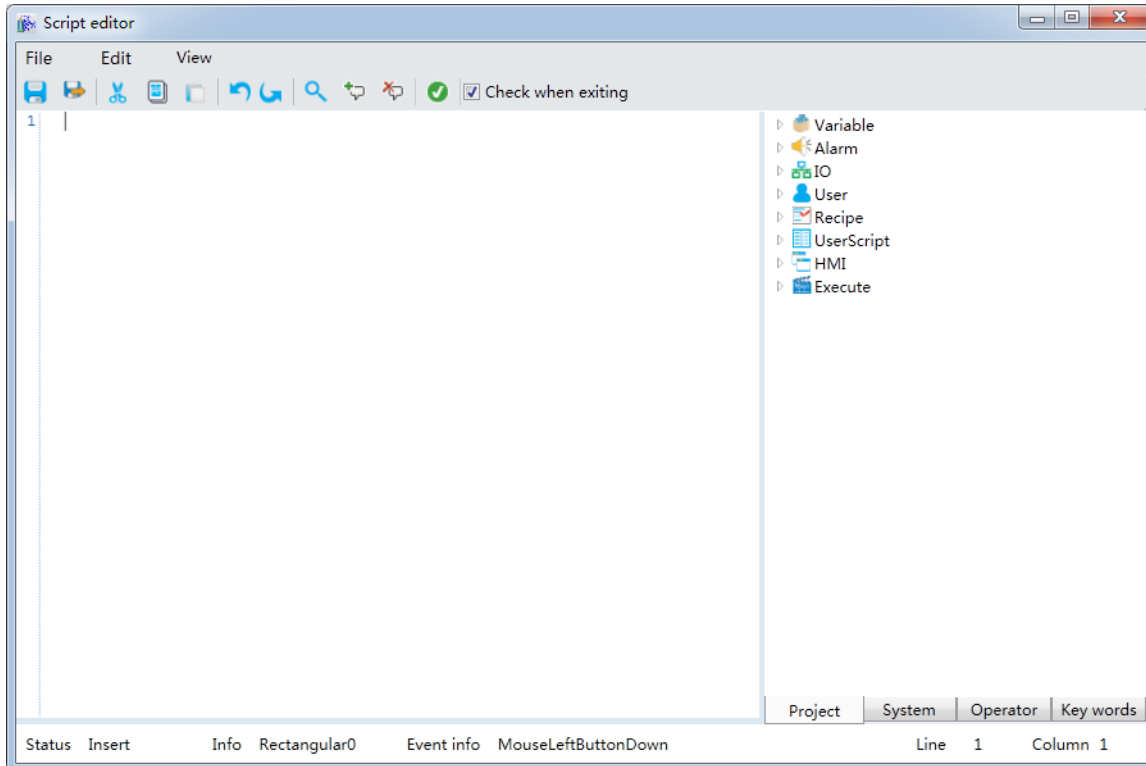
There are two types of left-click events: Pressing the left mouse button and releasing the left mouse button.

The configuration process are as follows, using “Mouse down” event as an example:

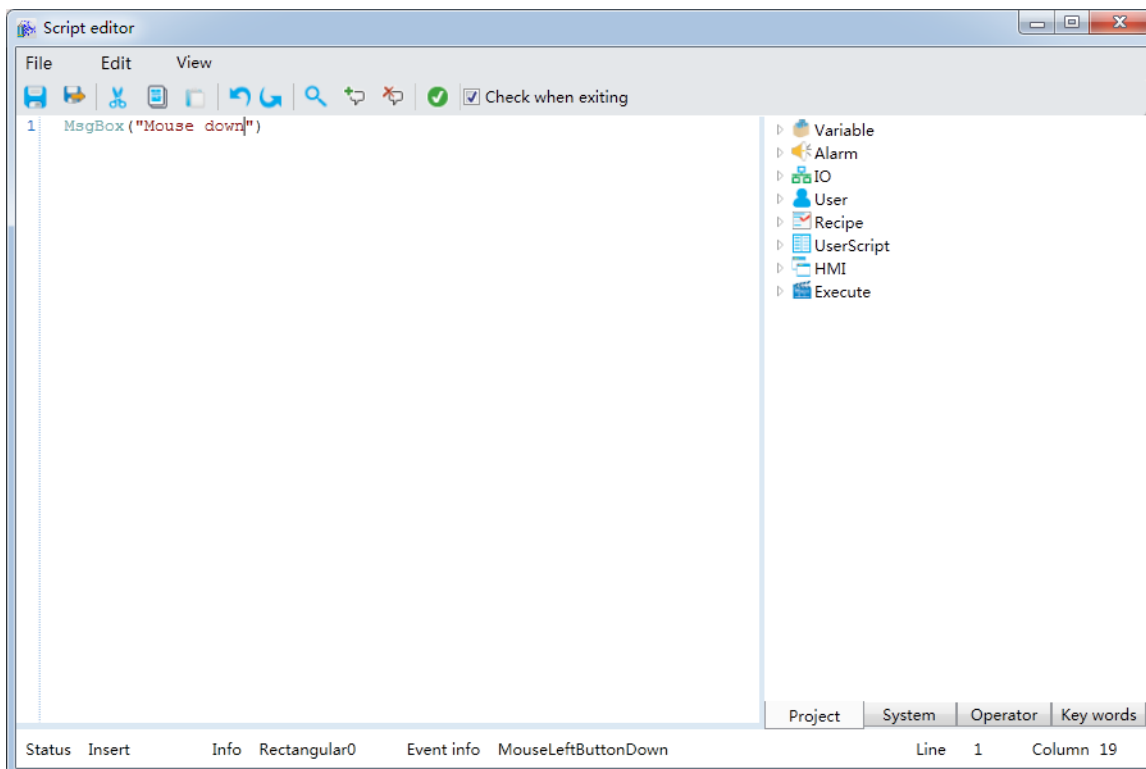
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → open the “Event” window → select “Mouse down” → click the button in the “Mouse down” field, as shown in the figure below:




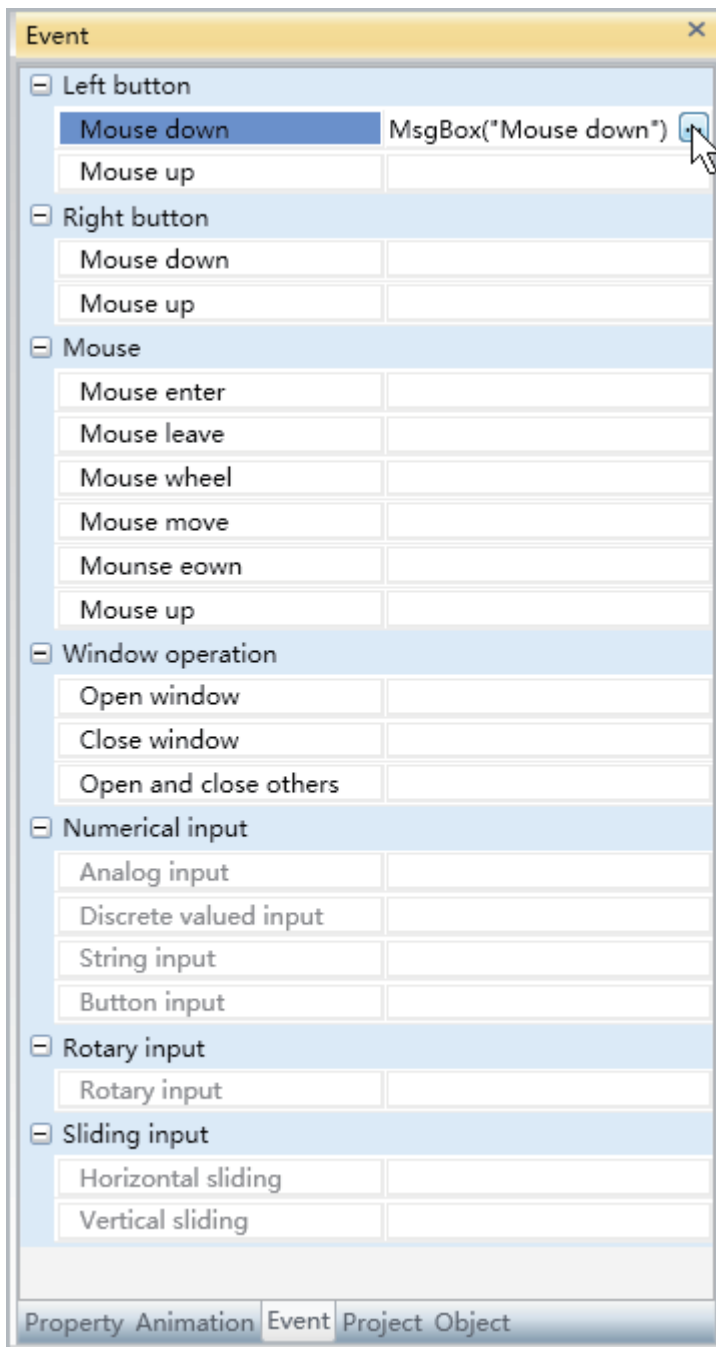
- **Step 2:** The event script editor window will appear, as shown in the figure below:



- **Step 3:** Write the script (The DIAView software uses the Visual Basic Script; the script editor will check for basic syntax errors), as shown in the figure below:



- **Step 4:** Once the script is written and checked with no errors, click “Save and exit button”  to complete event configuration; information on the configured event will be displayed in the event window, as shown in the figure below:



To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.

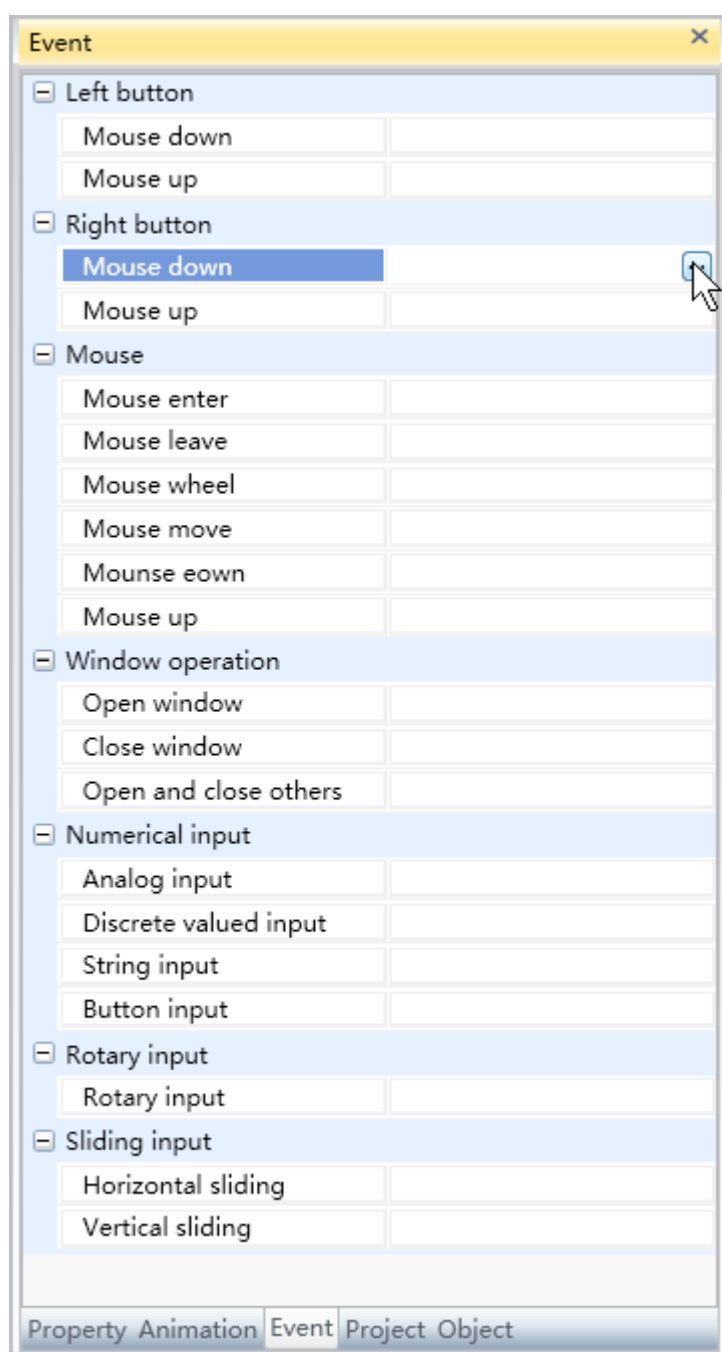
## 10.3 Right-click events

Right-click events are events triggered by performing operations with clicking the right mouse button, which will further use related script handlers to complete related functions.

There are two types of right-click events: Pressing the right mouse button and releasing the right mouse button.

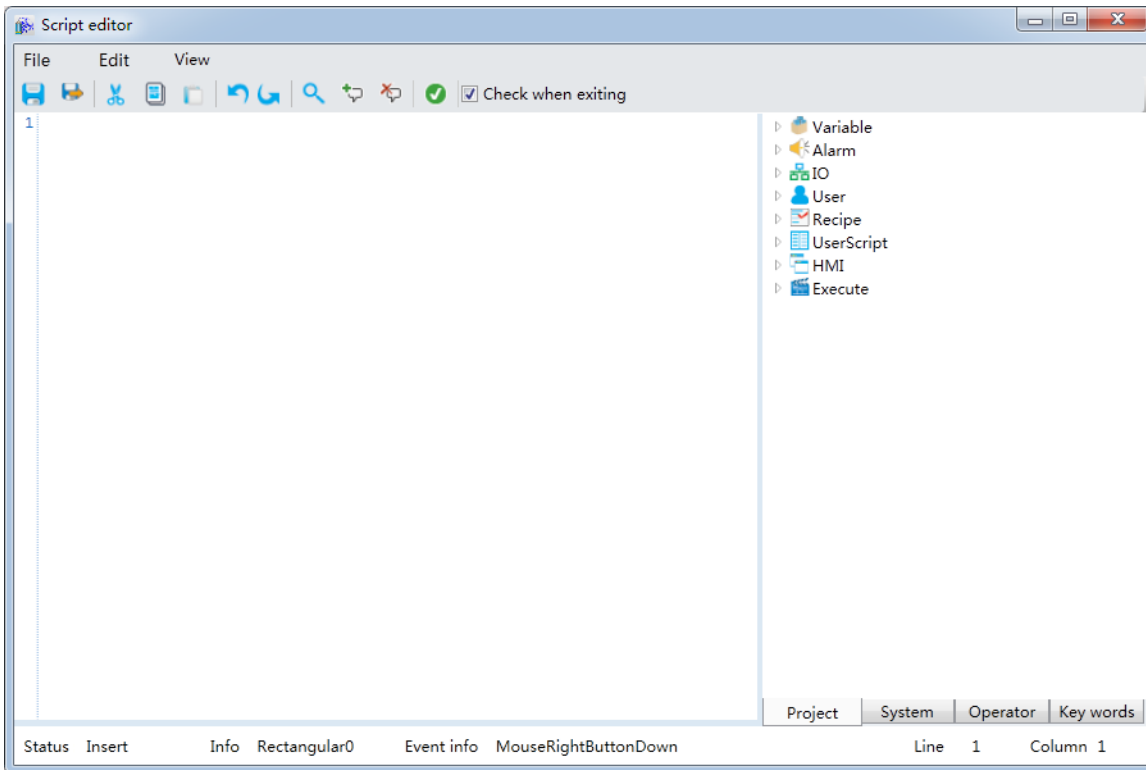
The configuration process are as follows, using the “Mouse down” event as an example:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → open the “Event” window → select “Mouse down” → click the button in the “Mouse down” field, as shown in the figure below:

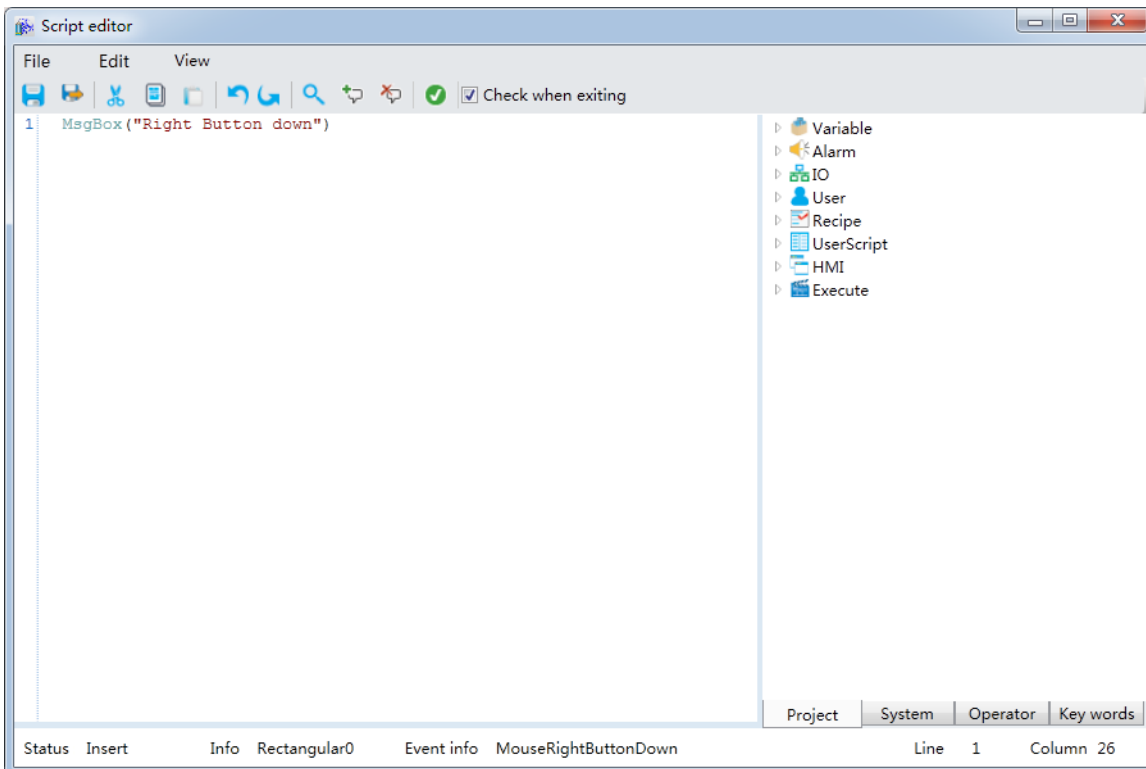





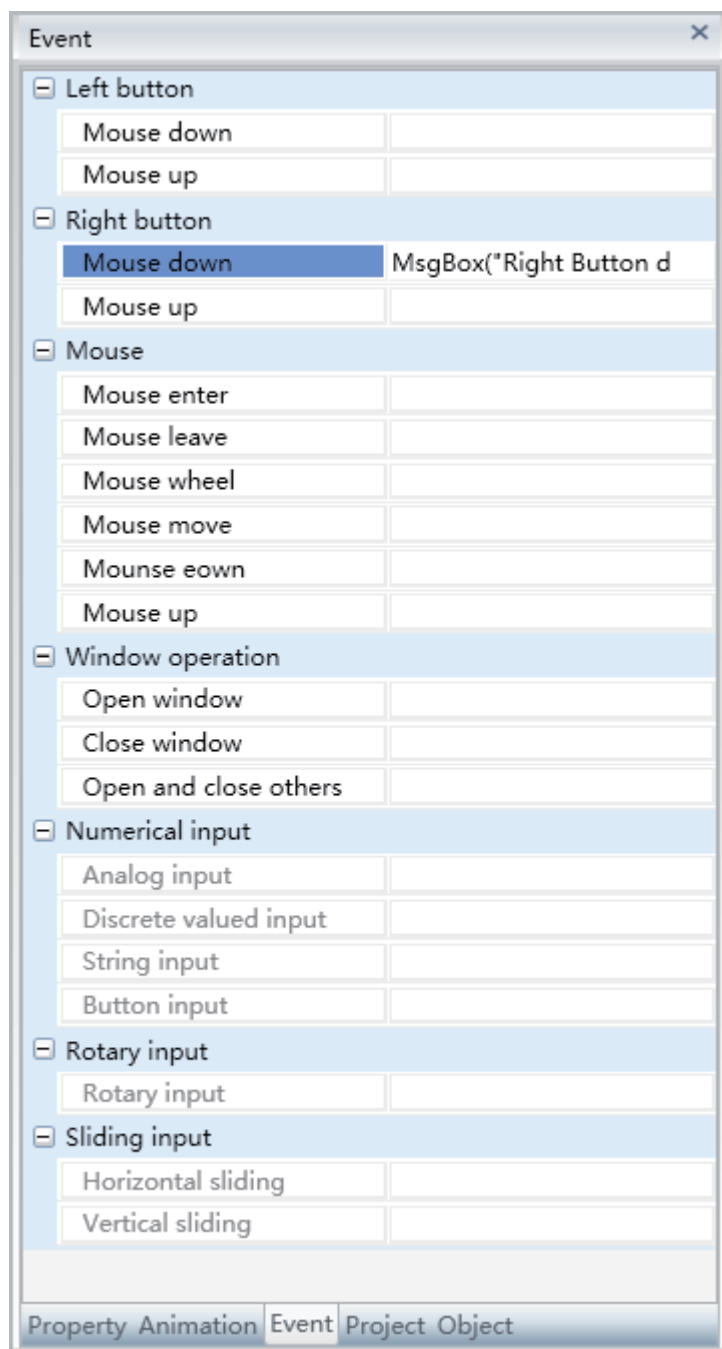
- **Step 2:** The event script editor window will appear, as shown in the figure below:



- **Step 3:** Write the script (The DIAView software uses the Visual Basic Script; the script editor will check for basic syntax errors), as shown in the figure below:



- **Step 4:** Once the script is written and checked with no errors, click “Save and exit button”  to complete event configuration; information on the configured event will be displayed in the event window, as shown in the figure below:



To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.

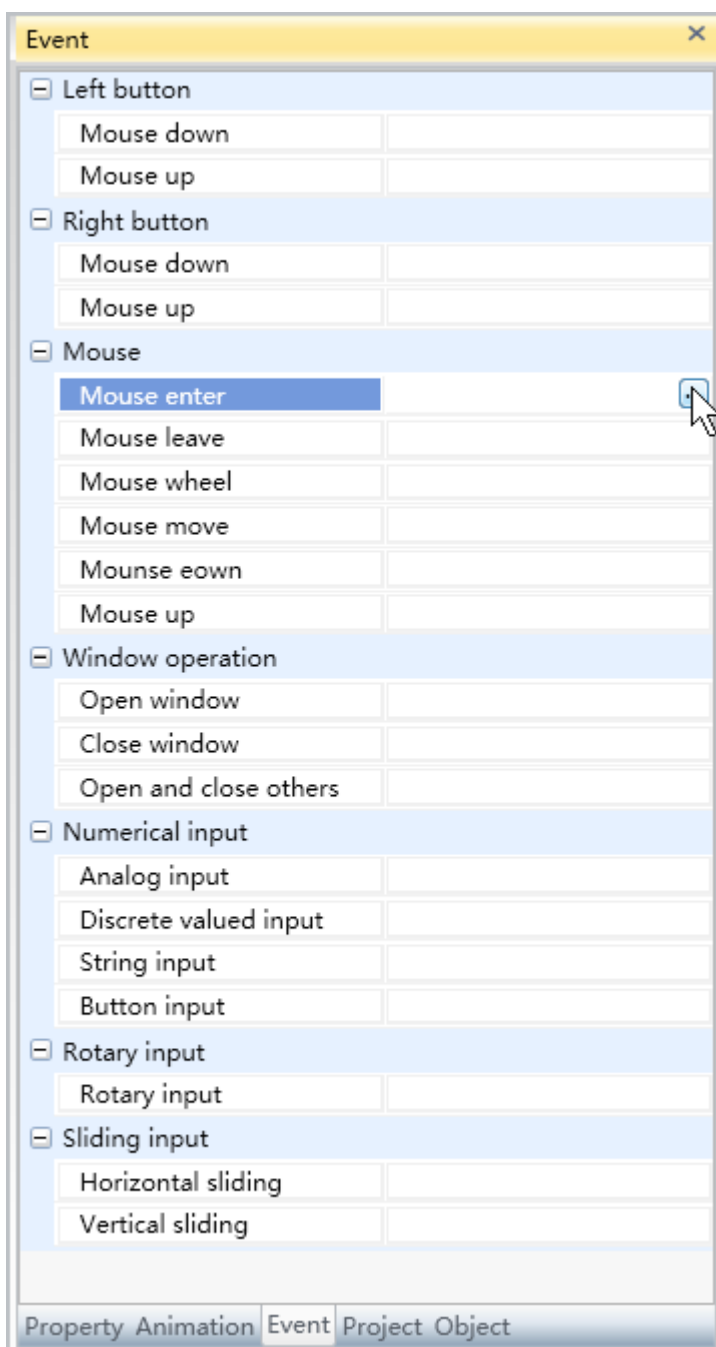
## 10.4 Mouse events

Mouse events are events triggered by performing moving and clicking operations with the mouse on the graphic object, which will further use related script handlers to complete related functions.

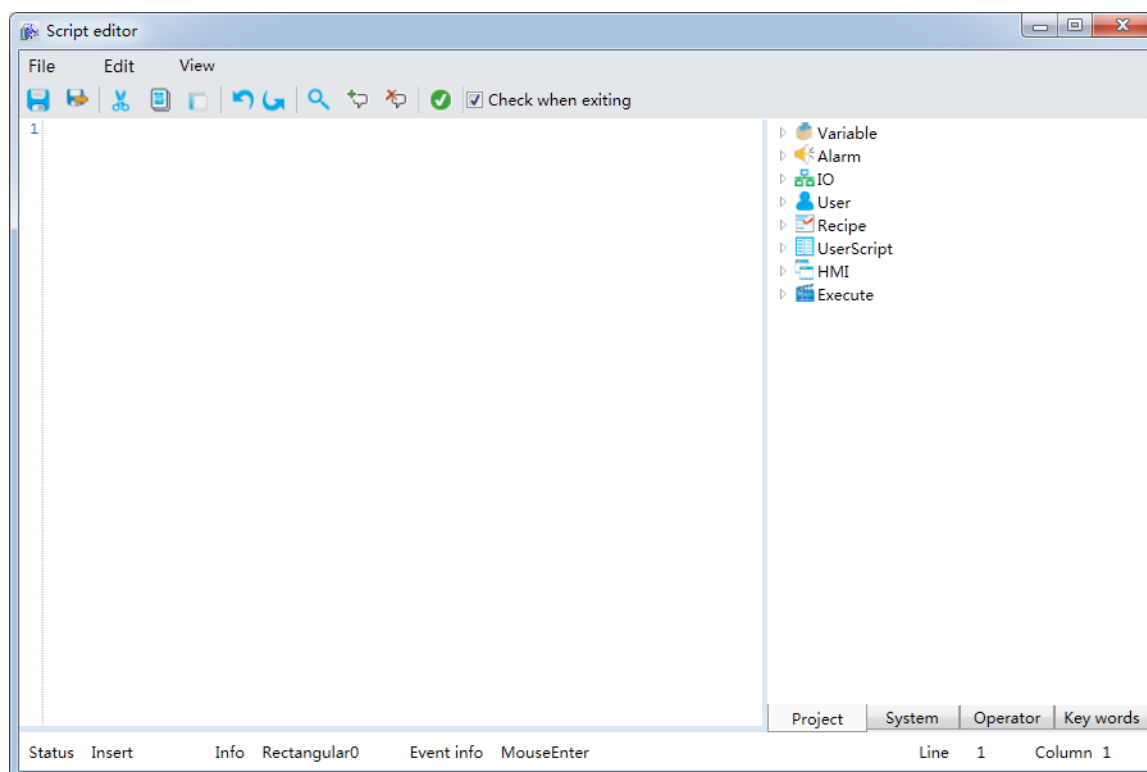
There are six types of mouse events: Mouse enter, mouse exit, mouse scroll, mouse move, press the mouse and release the mouse.

The configuration process are as follows, using “Mouse enter” event as an example:

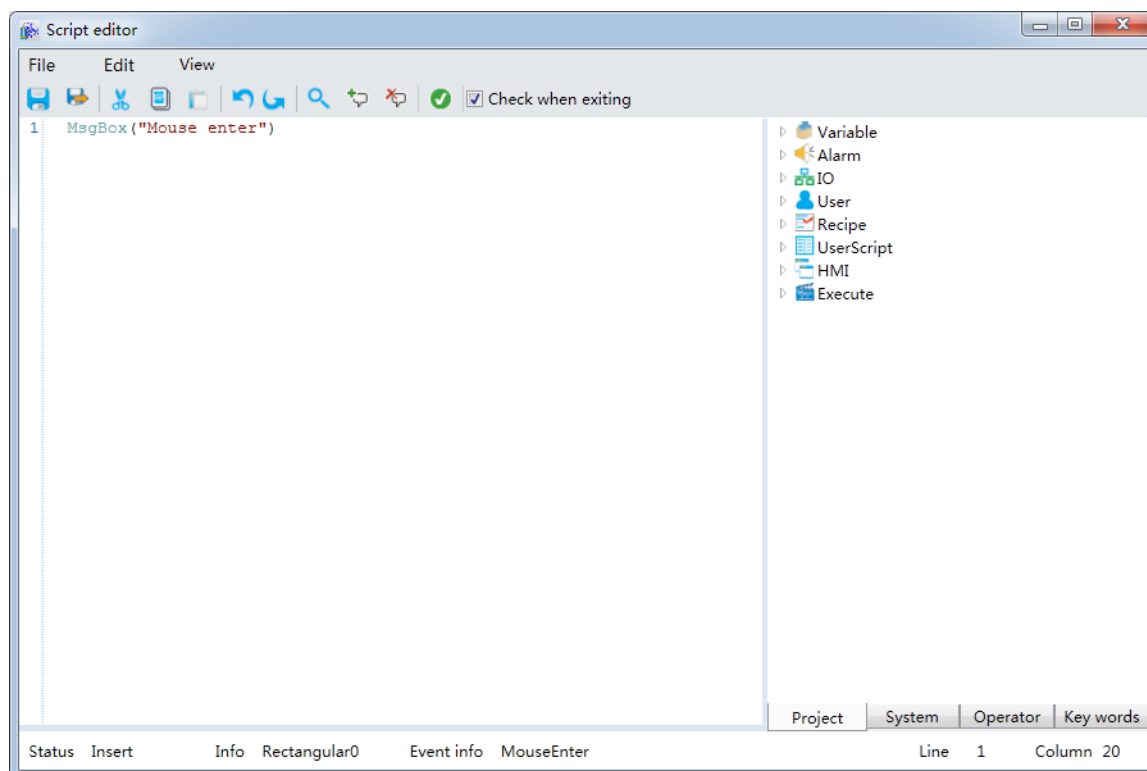
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → open the “Event” window → select “Mouse enter” → click the button in the “Mouse enter” field, as shown in the figure below:




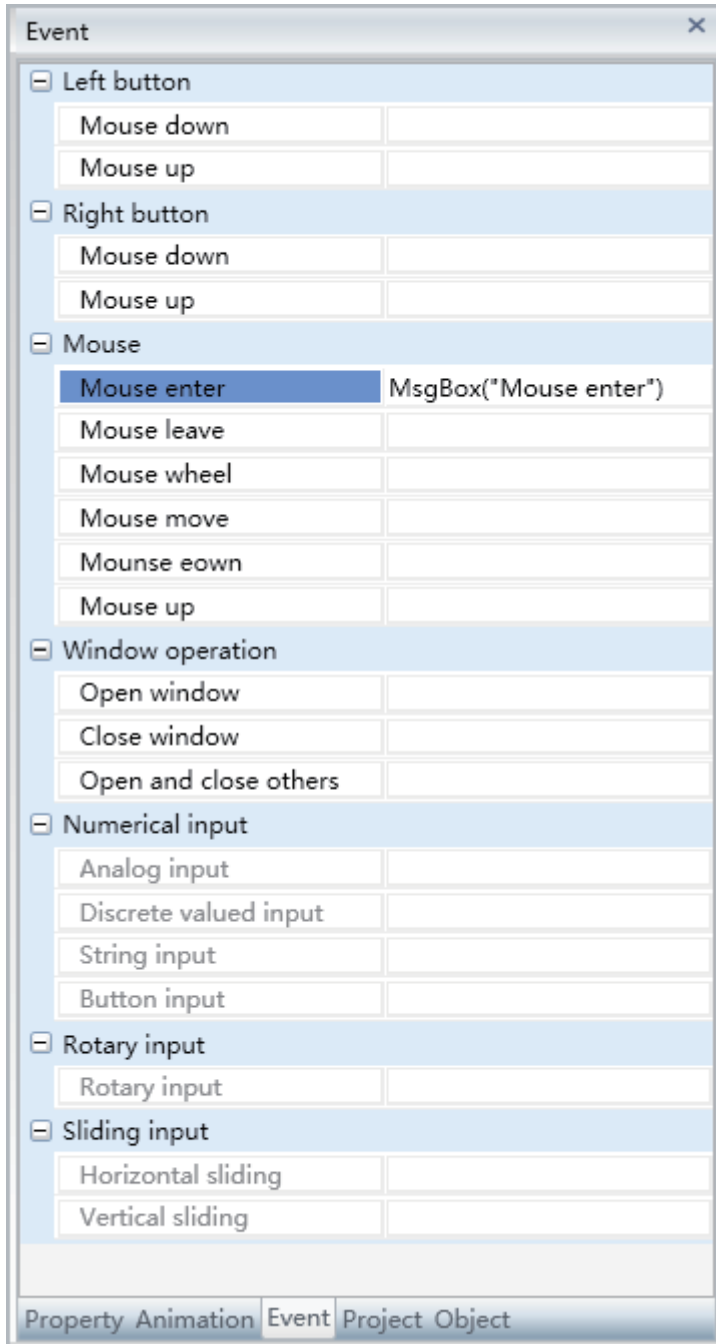
- **Step 2:** The event script editor window will appear, as shown in the figure below:



- **Step 3:** Write the script (The DIAView software uses the Visual Basic Script; the script editor will check for basic syntax errors), as shown in the figure below:



- **Step 4:** Once the script is written and checked with no errors, click “Save and exit button”  to complete event configuration; information on the configured event will be displayed in the event window, as shown in the figure below:



To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.

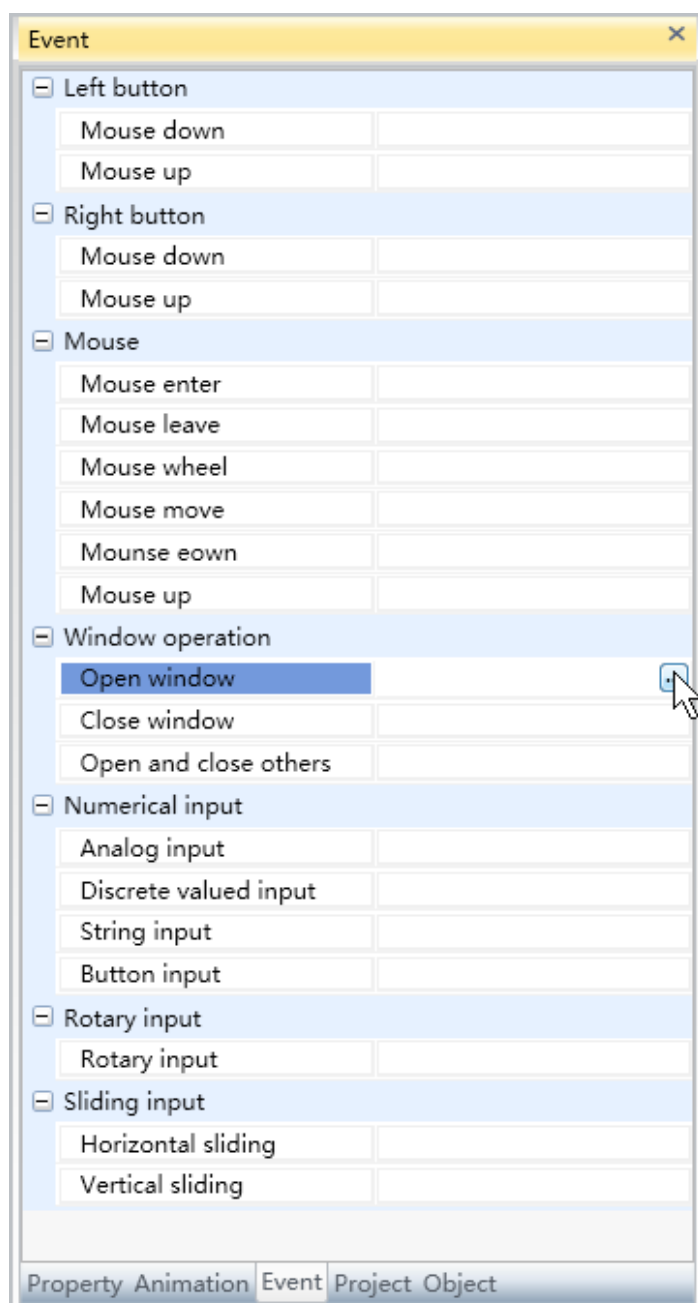
## 10.5 Window operation events

Window operation events are events where opening and closing operations are performed to Windows. There are three types of window operation events: Open Window, close Window, open Window and close others.

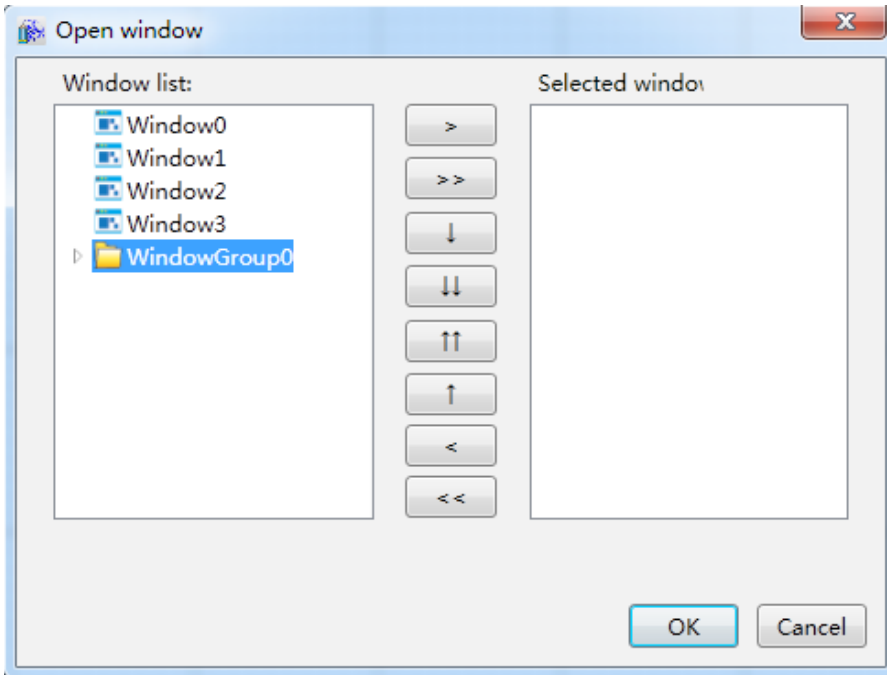
Open Windows means opening the Window set, close Window means closing the Window set and open Window and close others means opening the Window set and closing all other opened Windows besides the Windowset.

The configuration process are as follows, using “Open Window” event as an example:

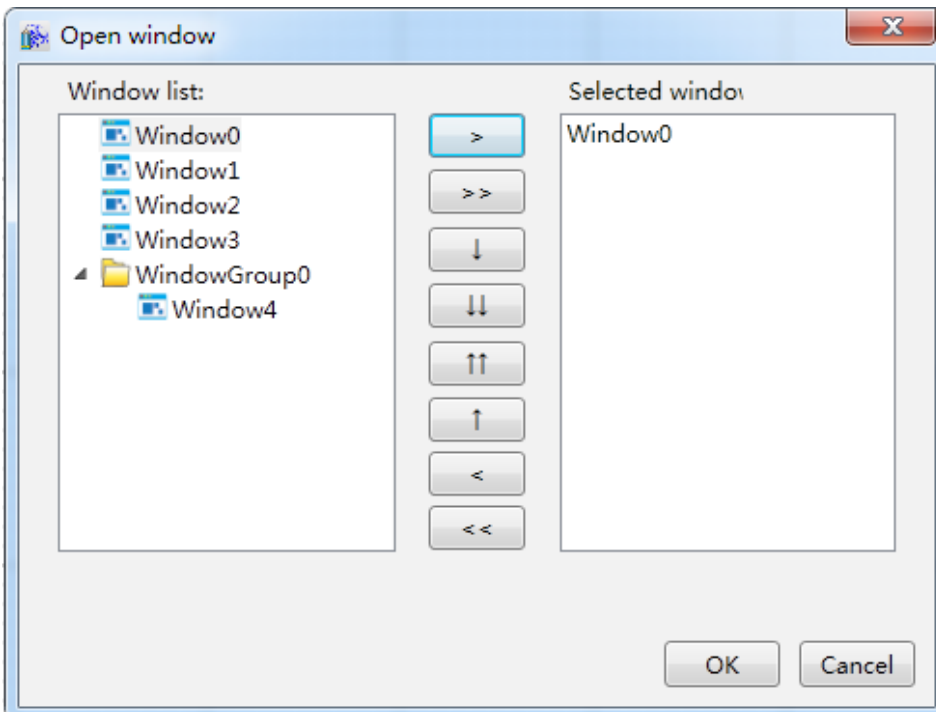
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → open the “Event” window → select “Open Window” → click the button in the “Open Window” field, as shown in the figure below:



- **Step 2:** The window configuration interface will appear, as shown in the figure below:



- **Step 3:** Select the screen window to open from the “Screen menu” to the left, and then click the “>” button to add it to the “Selected screen” list:

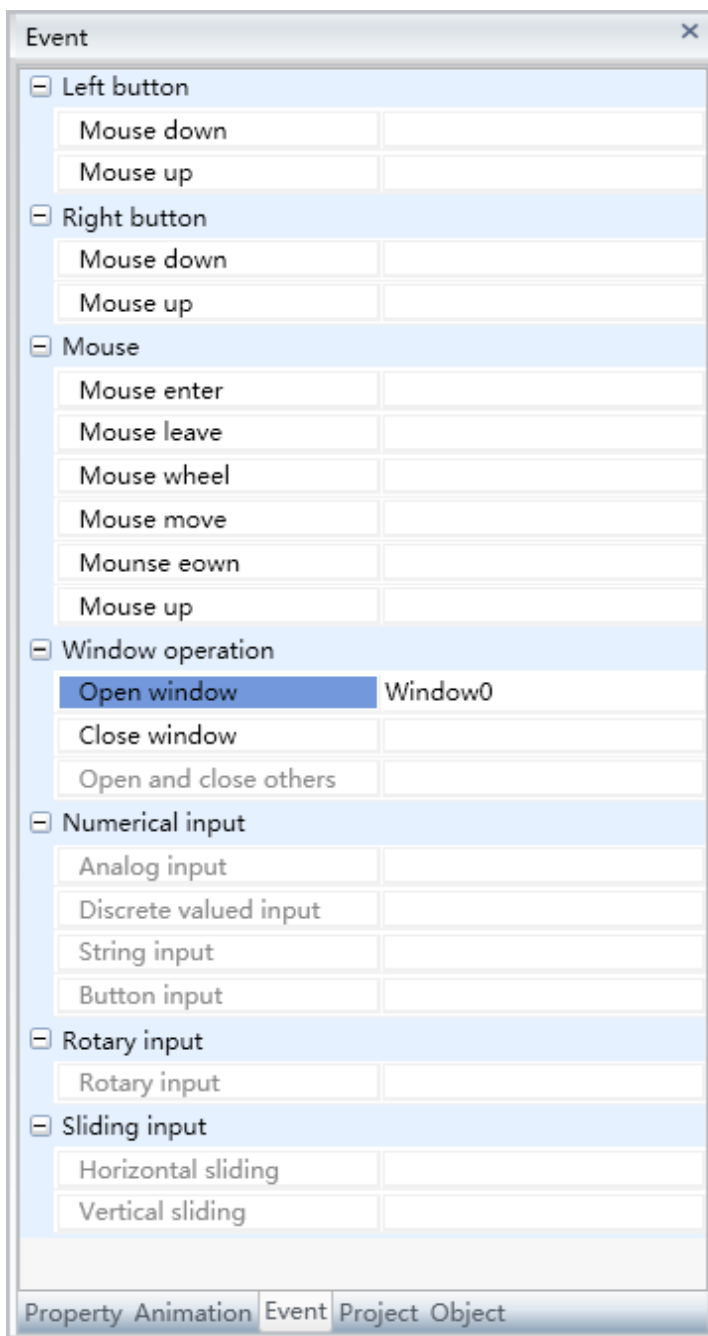


» Button functions:

- “>”: Add a screen to selected screen.
- “>>”: Add all to the selected screen.

- “↓”: Move the screen down.
- “↓↓”: Move the screen to the bottom.
- “↑↑”: Move the screen to the top.
- “↑”: Move the screen up.
- “<”: Remove a screen from selected screen.
- “<<”: Remove all screens from selected screen.

- **Step 4:** When configuration is complete, press the “OK” button; information of the configured event will be displayed in the “Event” window, as shown in the figure below:



To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.



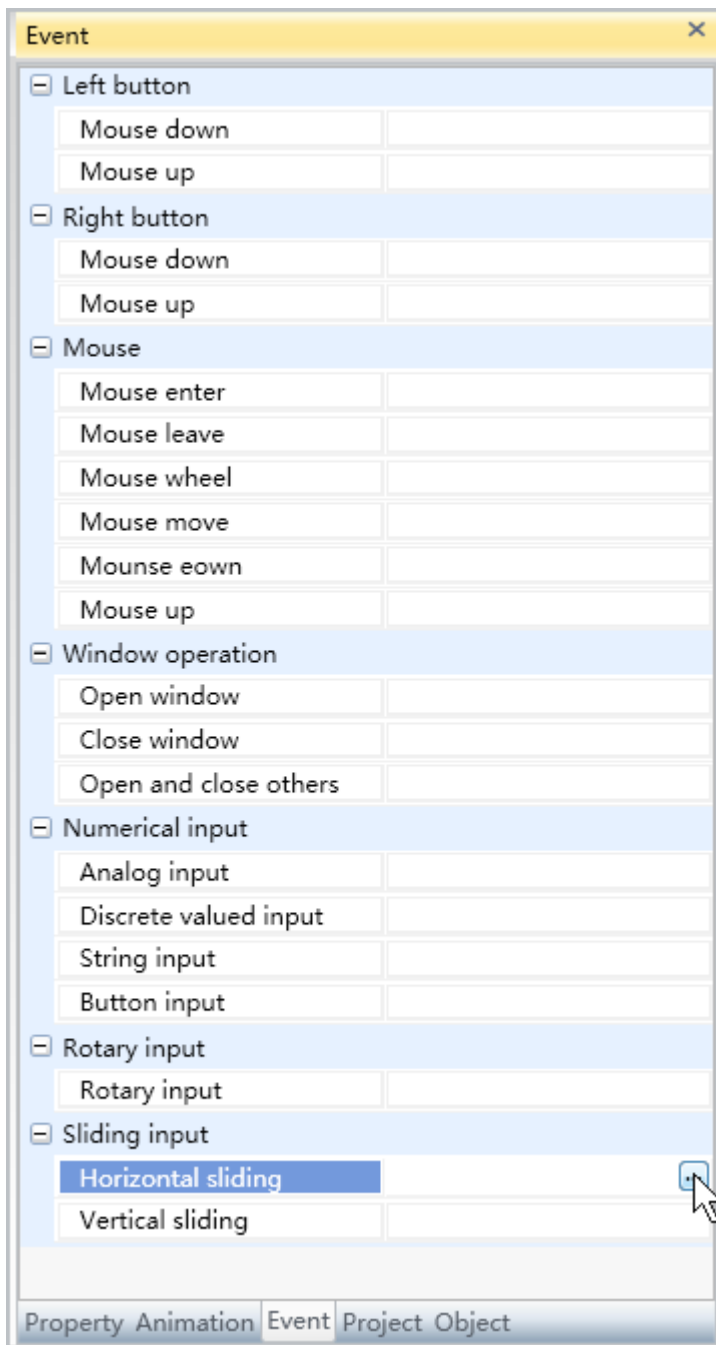
## 10.6 Sliding input events

Sliding input events are events triggered by moving the position of graphic objects in the window which changes the value of associated variables.

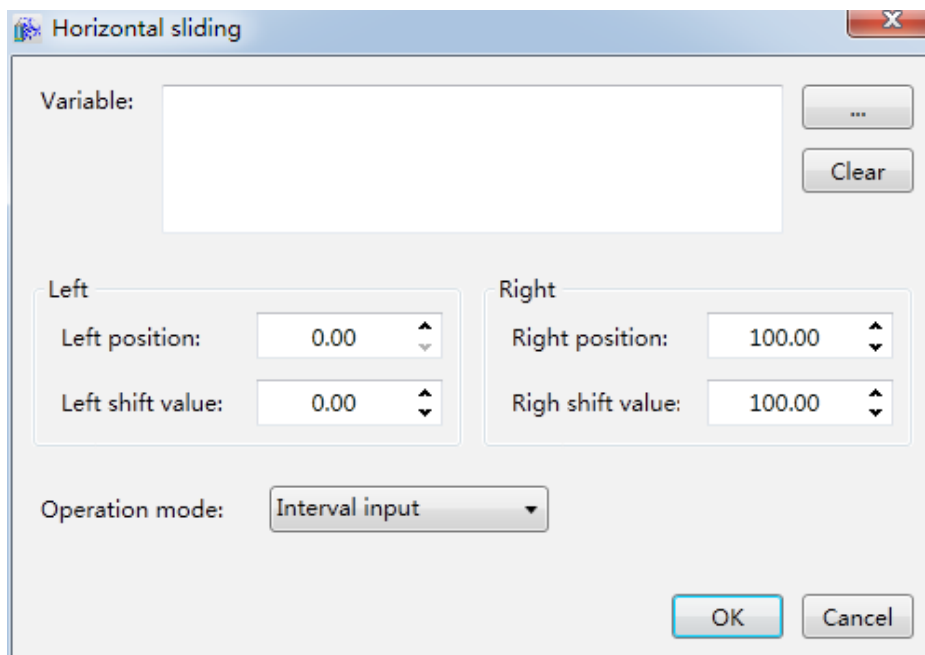
There are two types of sliding input events: Horizontal sliding and vertical sliding.

The configuration process are as follows, using “Horizontal sliding” event as an example:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → open the “Event” window → select “Horizontal sliding” → click the button in the “Horizontal sliding” field, as shown in the figure below:



- **Step 2:** The horizontal sliding configuration interface will appear, as shown in the figure below:



The meanings of each setting in the configuration window are as follows:

**Variable:** The associated variable name. You can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

» Left Position:

- Value of the left-most position: Sets the value of the left-most position when the graphic object slides horizontally.
- Left-slide value: Sets the variable value when the graphic object slides horizontally and reaches the left-most position.

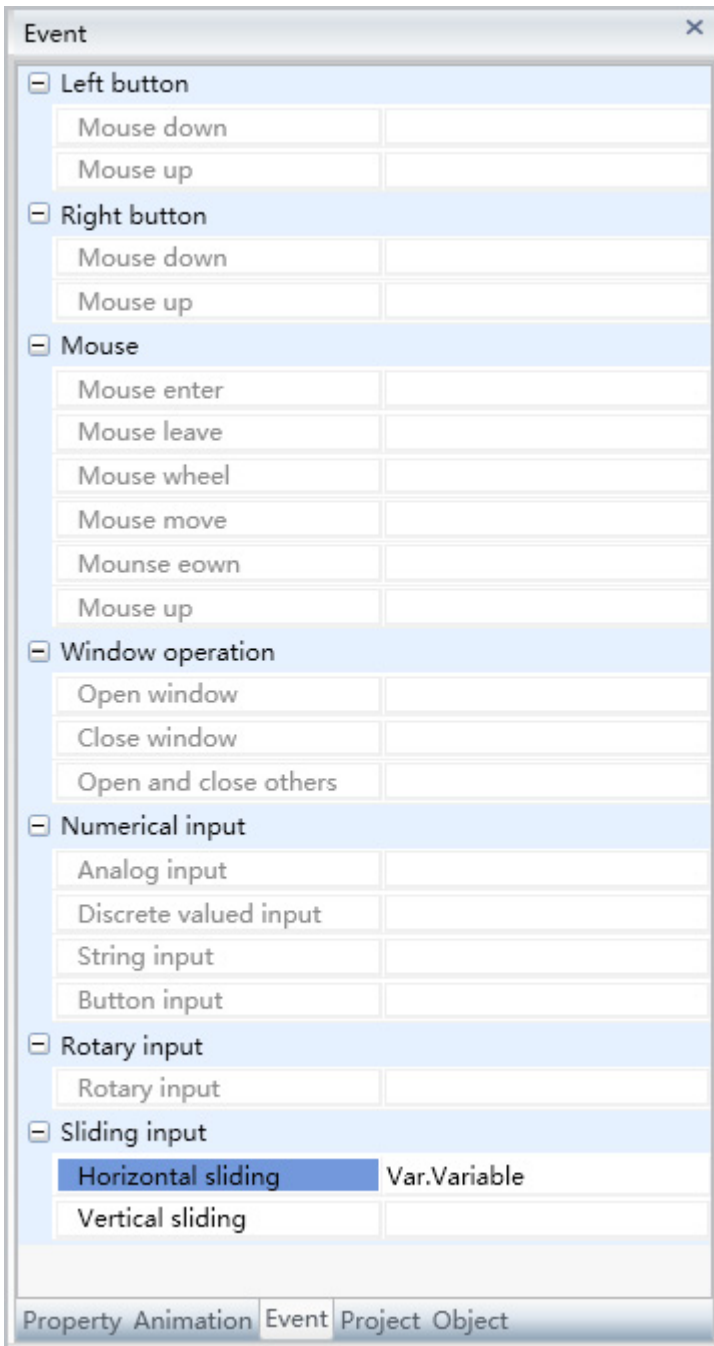
» Right Position:

- Value of the right-most position: Sets the value of the right-most position when the graphic object slides horizontally.
- Right-slide value: Sets the variable value when the graphic object slides horizontally and reaches the right-most position.

» Operation modes:

- Interval input: The input value changes in real-time with the moving position.
- One-time input: The input value changes when the moving stops.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Horizontal sliding” event; the event configuration of this graphic will be displayed in the “Event” window, as shown in the figure below:



To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.

## 10.7 Numerical input events

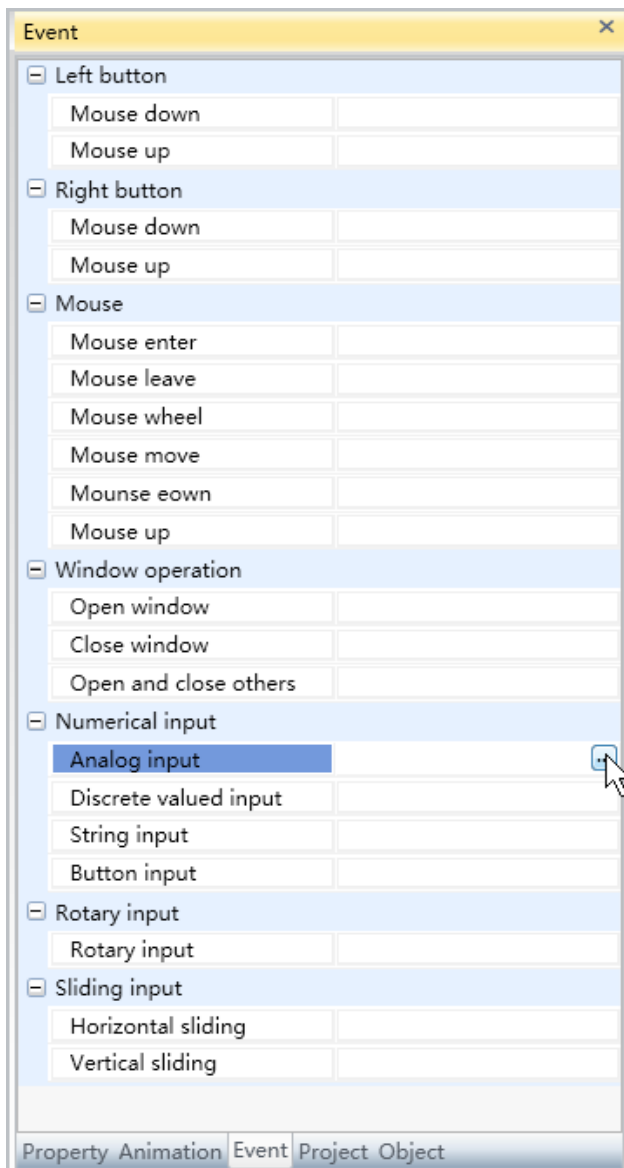
Value input events is when clicking a graphic object in the window triggers the value input window of the DIAView software to perform value input operations.

There are four types of value input events: Analog value input, digital value input, text input and button input.

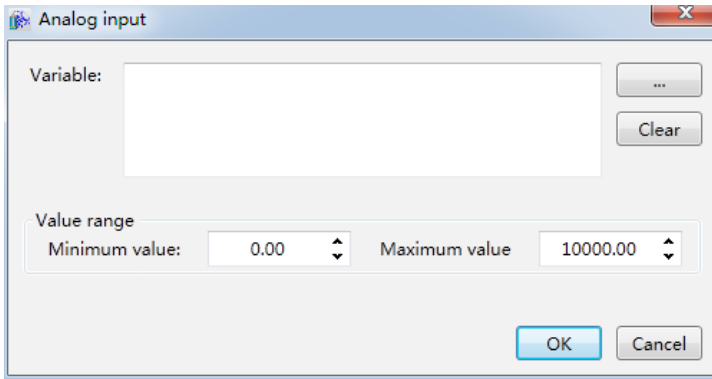
### 1. Analog input:

Makes a value input dialog appear when the graphic object is pressed, including digital buttons; users can click the button to input numbers to change the value of the associated analog variable. Configuring steps are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → open the “Event” window → select “Analog input” → click the button in the “Analog input” field, as shown in the figure below:



- **Step 2:** The Analog input configuration interface will appear, as shown in the figure below:



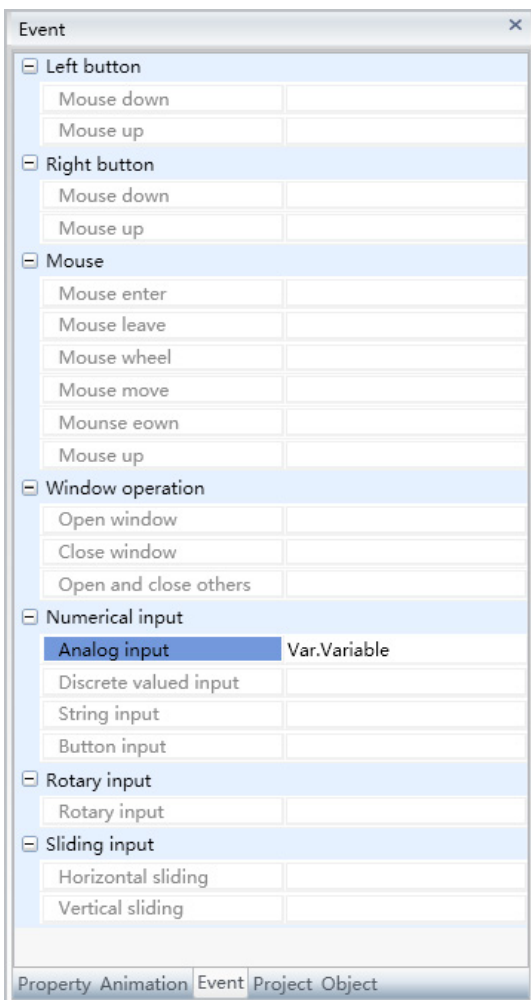
The meanings of each setting in the configuration window are as follows:

**Variable:** The associated variable name, the variable type is analog value; you can also click the  button to open the variable browser to select a variable. The “Clear” button can clear the contents in the input frame.

» Value range:

- Minimum value: Sets the minimum value that can be inputted.
- Maximum value: Sets the maximum value that can be inputted.

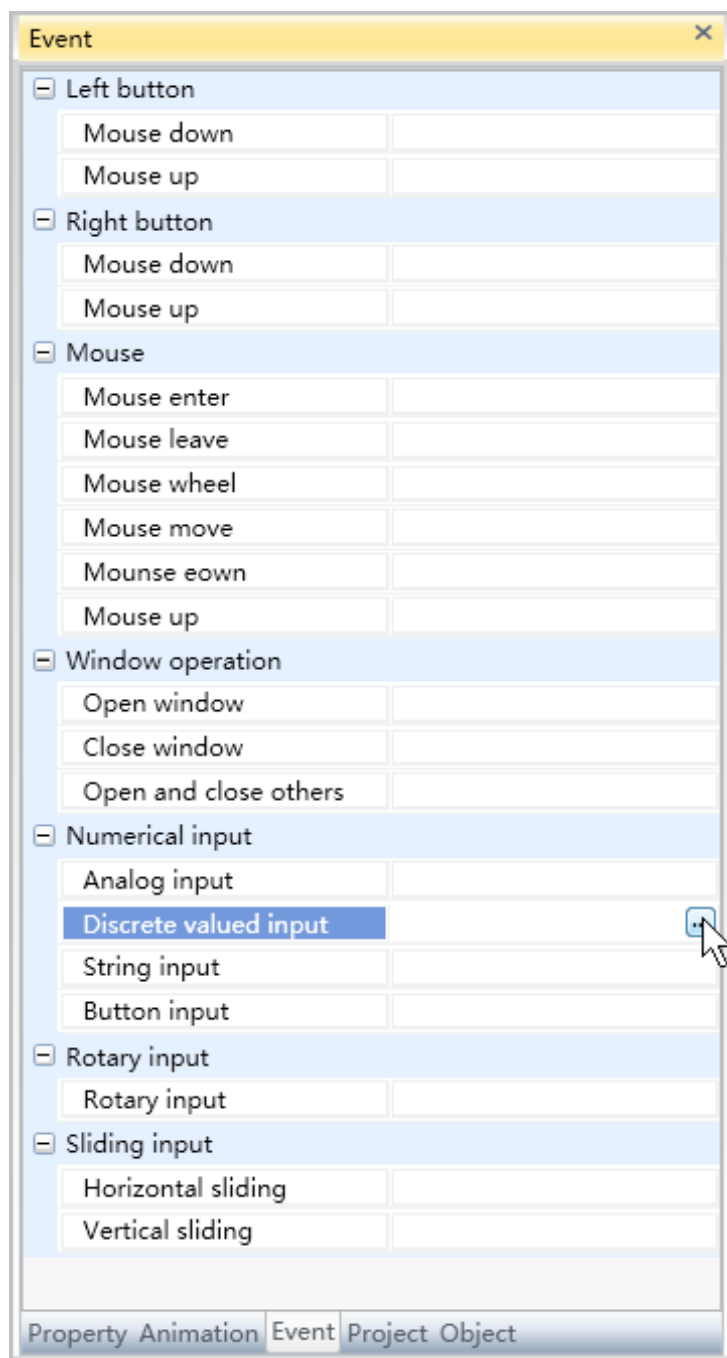
- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Analog input” event. The event configuration of this graphic will be displayed in the “Event” window, as shown in the figure below:



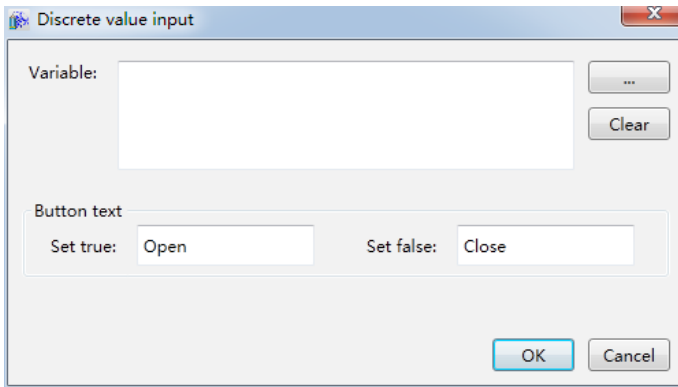
## 2. Digital value input:

When this event is set for a graphic object, a digital value input dialog will appear when this graphic object is clicked under the DIAView software execution environment. Users can set the button's text display content according to when the associated digital variable value is True or False. Configuring steps are as follows:

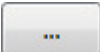
- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → click the “Value input group ” in the “Event” window → select “Digital value input” from the options→ click the button in the “Digital value input” field, as shown in the figure below:



- **Step 2:** The digital value input configuration interface will appear, as shown in the figure below:



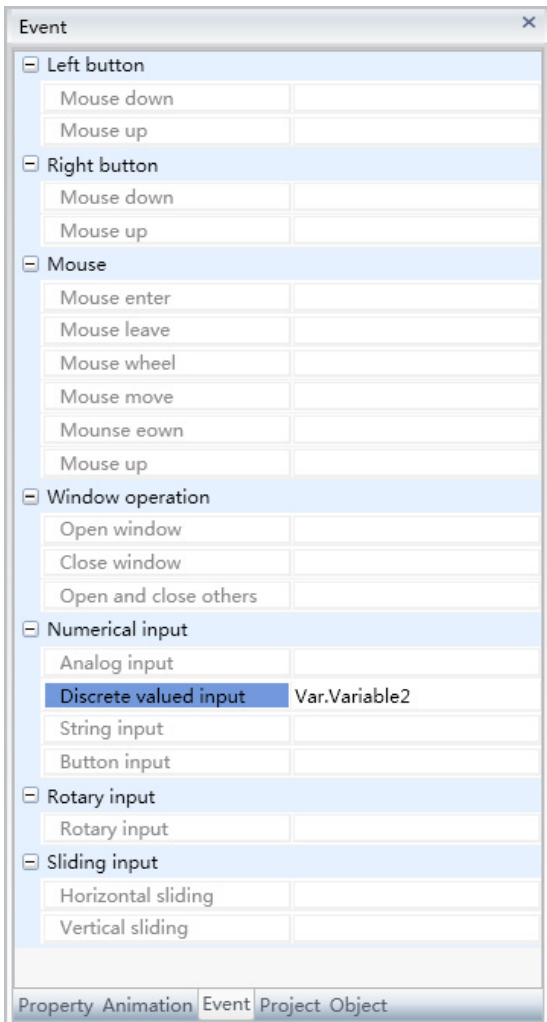
The meanings of each setting in the configuration window are as follows:

**Variable:** The associated variable name, the variable type is digital value; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

» Button text:

- For True: Text content displayed by the button when the value is True.
- For False: Text content displayed by the button when the value is False.

■ **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Digital value input” event. The event configuration of this graphic will be displayed in the “Event” window, as shown in the figure below:

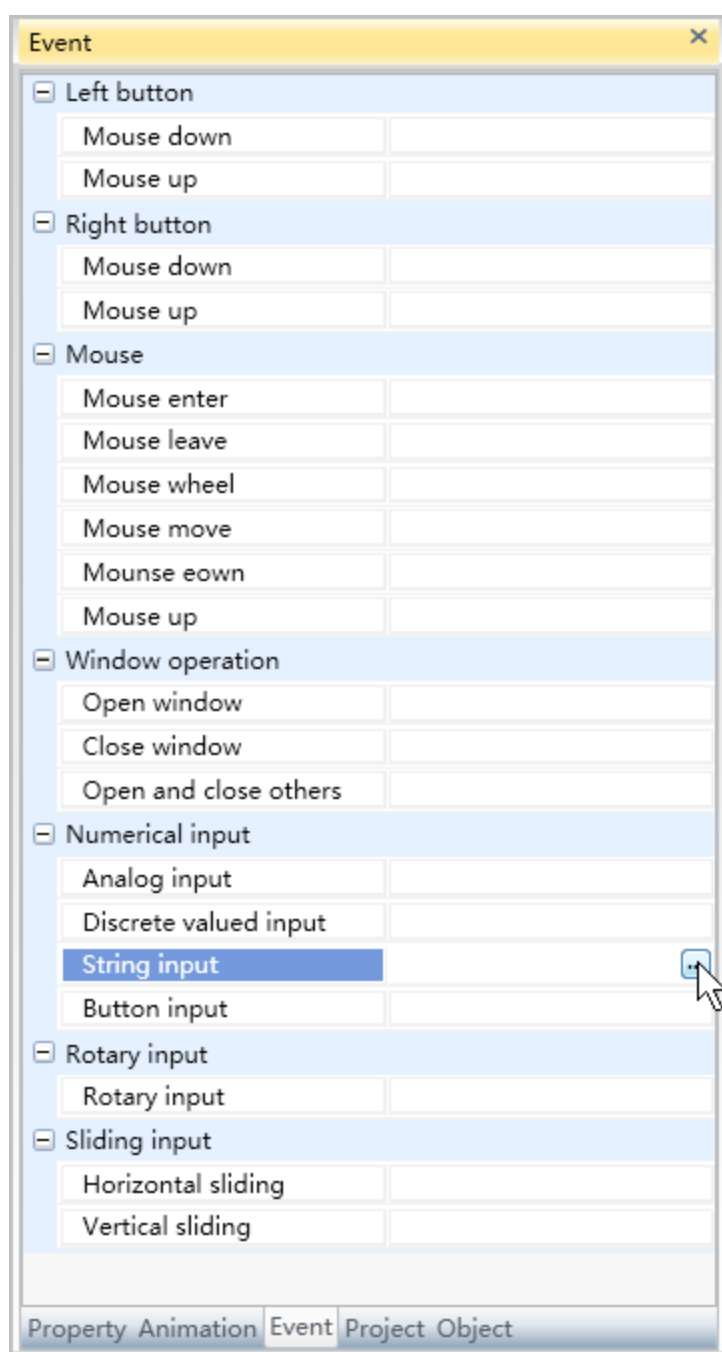


To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.

### 3. String input:

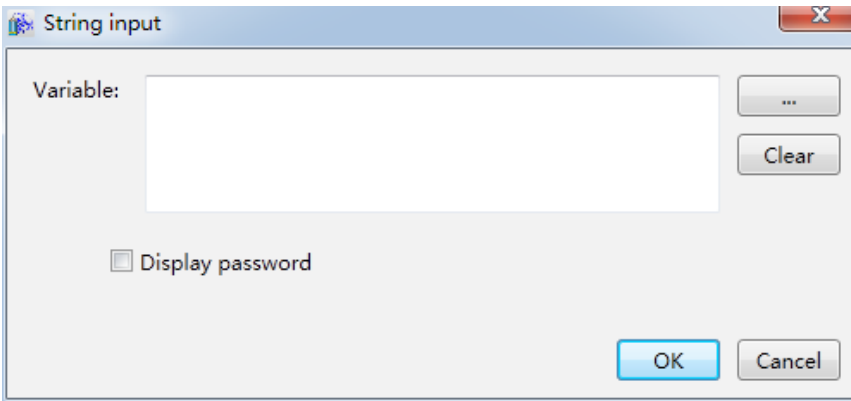
When this event is set for a graphic object, a text input dialog will appear when this graphic object is clicked with the mouse under the DIAView software execution environment; it includes letters and number input keyboards and users can click the keys to enter strings to change the value of the associated text type variable.

- **Step 1:**Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → click the “Value input group ” in the “Event” window → select “String input” from the options→ click the button in the “String input” field, as shown in the figure below:

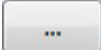




- **Step 2:** The String input configuration interface will appear, as shown in the figure below:

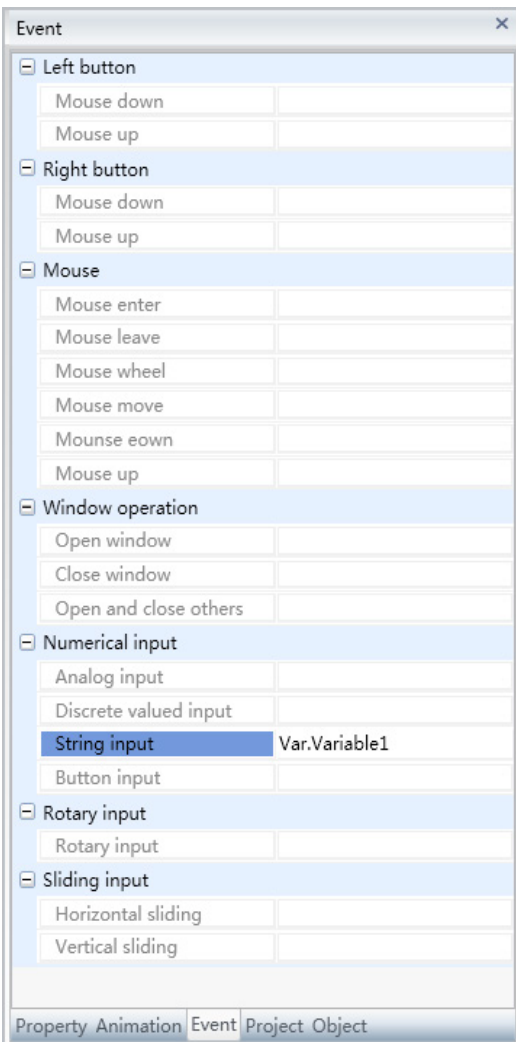


The meanings of each setting in the configuration window are as follows:

**Variable:** The associated variable name, the variable type is text amount; you can also click the  button to open the variable browser to select a variable. The “Clear” button can clear the contents in the input frame.

- » Display password: If this checkbox is selected, the input value will be displayed in a password form.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “String input” event. The event configuration of this graphic will be displayed in the “Event” window, as shown in the figure below:

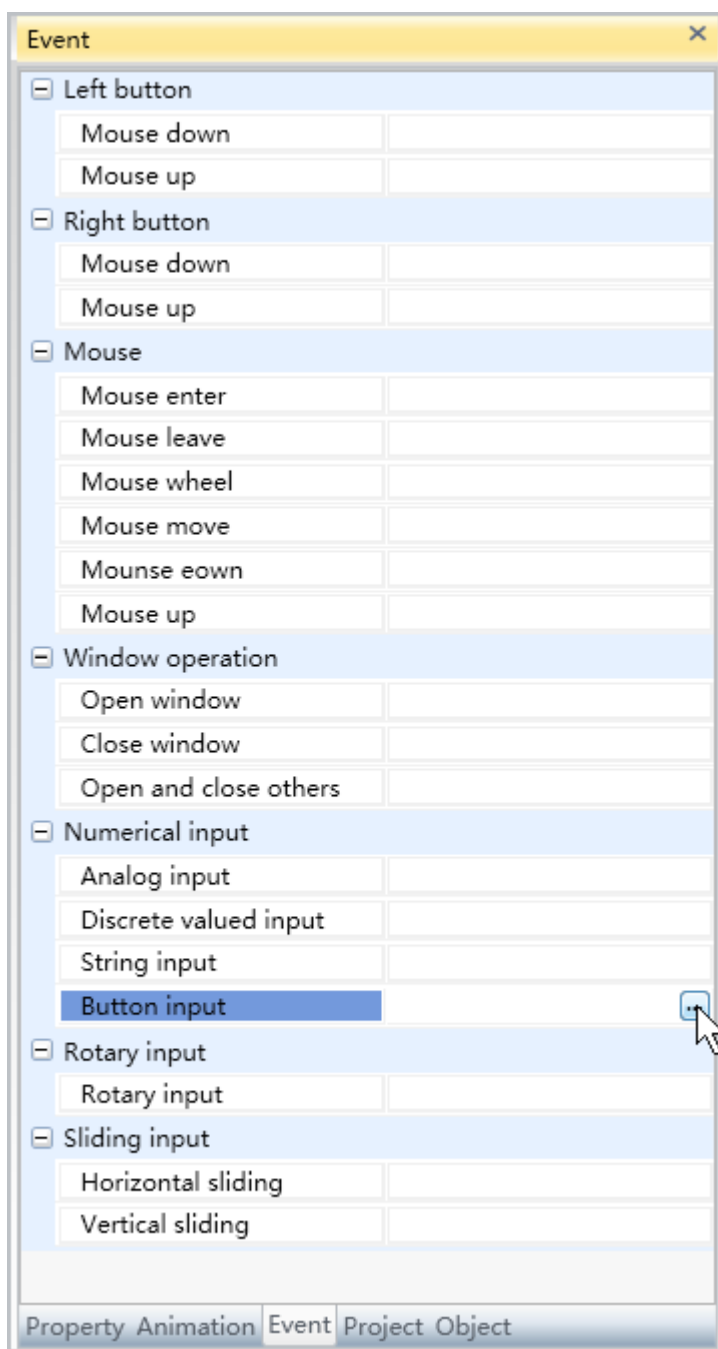


To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.

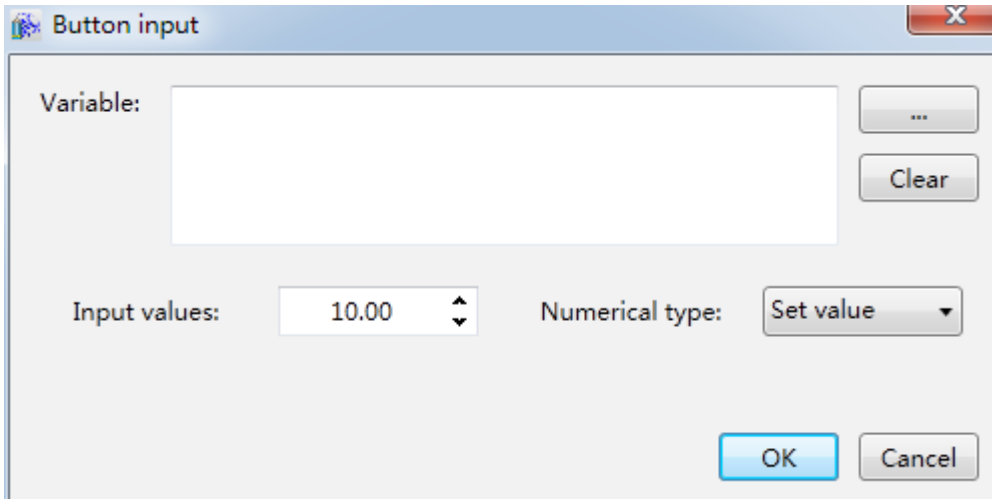
#### 4. Button input:

When this event is set for a graphic object, if this graphic object is clicked with the mouse under the DIAView software execution environment, the value of the associated variable will change according to the method set; for example reset the value or allow addition or subtraction between the variable value and the value set etc. Configuring steps are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → click the “Value input group ” in the “Event” window → select “Button input” from the options→ click the button in the “Button input” field, as shown in the figure below:



- **Step 2:** The button value input configuration interface will appear, as shown in the figure below:

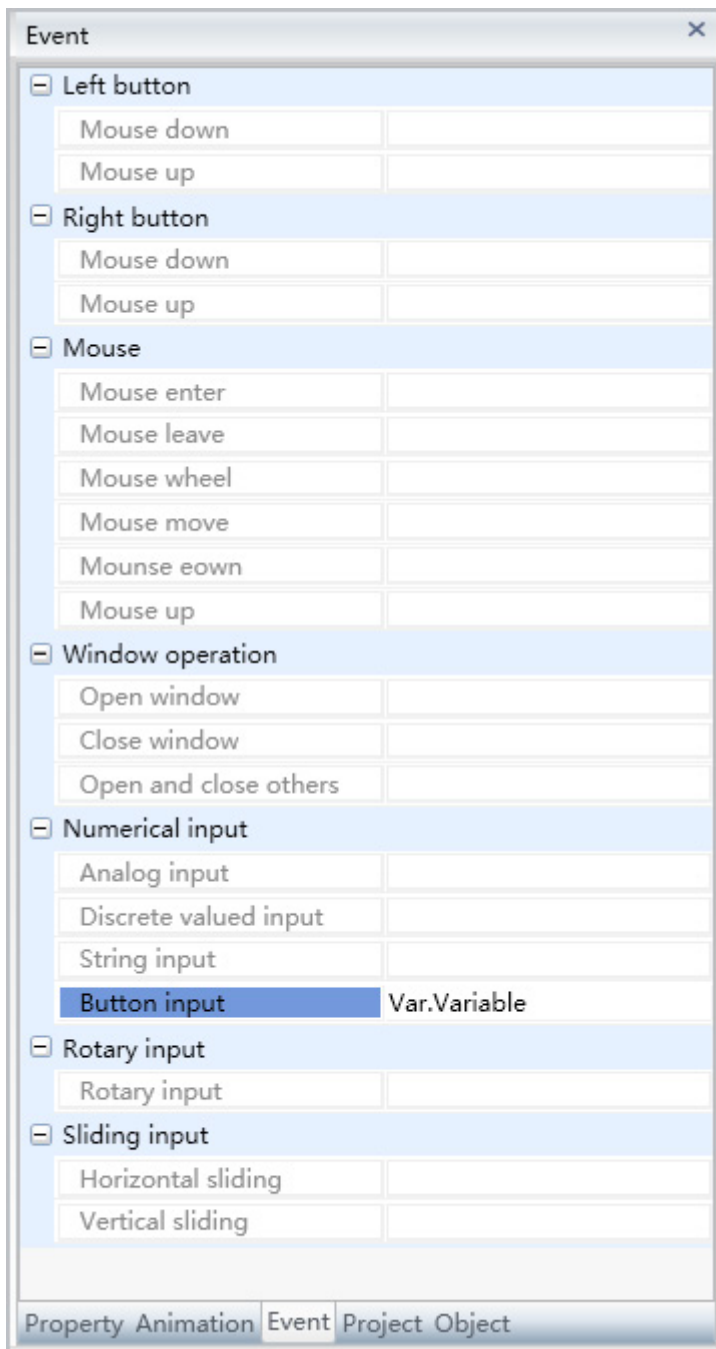


The meanings of each setting in the configuration window are as follows:

**Variable:** The associated variable name, the variable type is analog value or digital value; you can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

- » Input value: Enter the value set.
- » Value type: Changes the variable value when the graphic object is pressed; there are 6 types of changing methods:
  - Set number: Give the “Input value” directly to the associated variable; valid for analog values.
  - Increase: Adds the set value to the associated variable value and then give it to the associated variable; valid for analog values.
  - Decrease: Subtracts the set value from the associated variable value and then give it to the associated variable; valid for analog values.
  - Multiply: Multiplies the set value to the associated variable value and then give it to the associated variable; valid for analog values.
  - Divide: Divides the variable value by the set value and then give it to the associated variable; valid for analog values.
  - Set bit: The analog value switches between the two values 0 and 1, and the digital value switches between true and false.

**Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Button input” event; the event configuration of this graphic will be displayed in the “Event” window, as shown in the figure below:



To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.

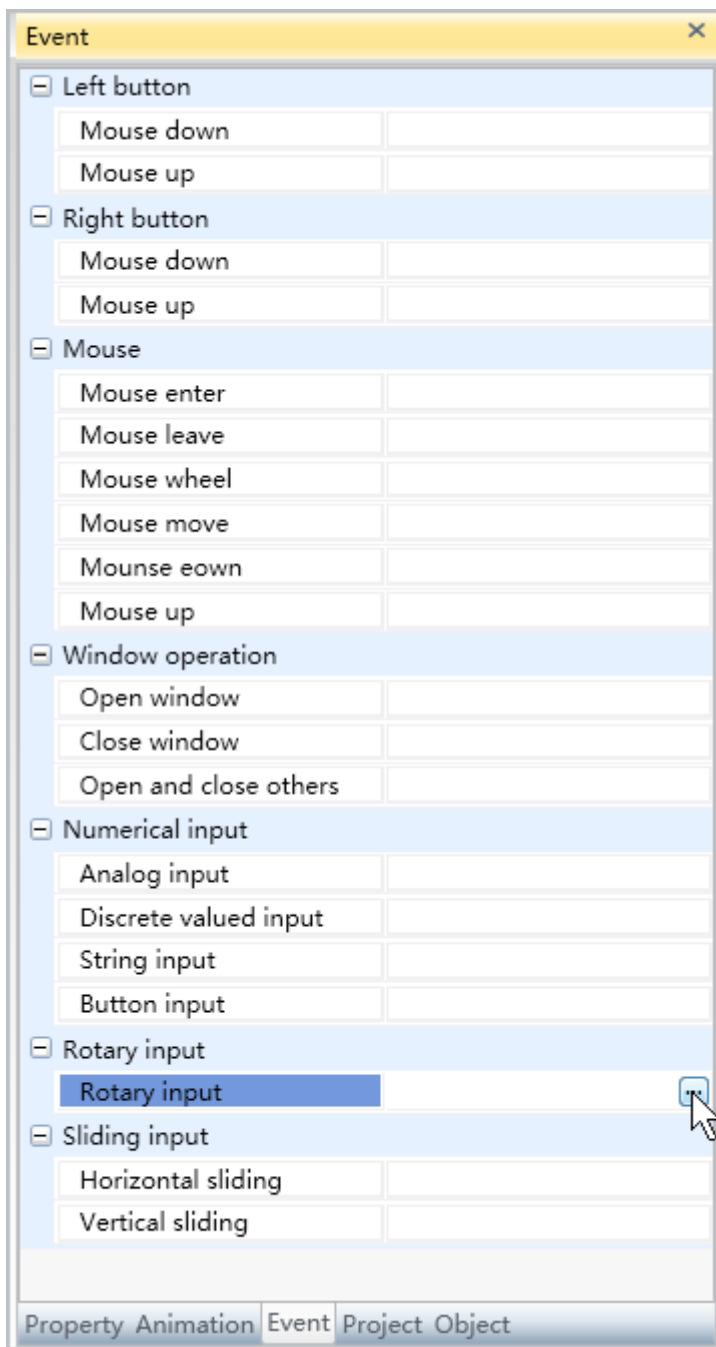
## 10.8 Rotary input events

Rotary input events are events triggered by rotating the angle of graphic objects in the window which changes the value of associated variables.

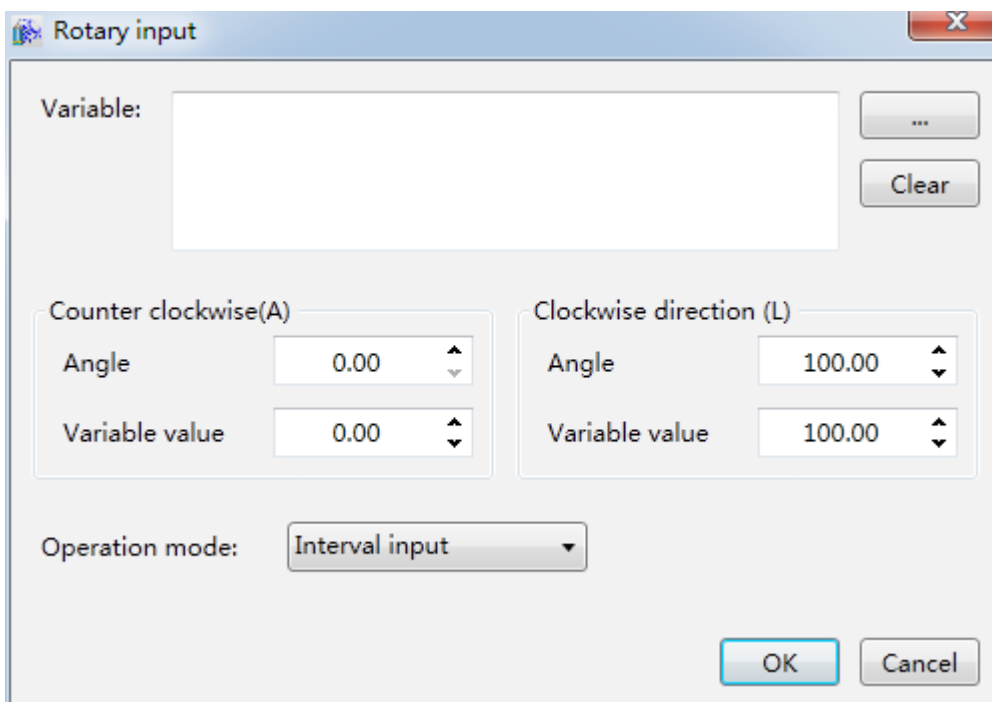
There is only one type of Rotary input event: rotating input.

Configuration steps are as follows:

- **Step 1:** Open the project window where the animation needs to be configured under the DIAView software development environment → select the graphic object to configure event in the sketchpad → open the “Event” window → select “Rotary input” → click the button in the “Rotary input” field, as shown in the figure below:



- **Step 2:** The Rotary input configuration interface will appear, as shown in the figure below:



The meanings of each setting in the configuration window are as follows:

**Variable:** The associated variable name. You can also click the  button to open the variable browser to select a variable; the “Clear” button can clear the contents in the input frame.

» Counter-clockwise:

- Angle: Sets the counter-clockwise rotation angle of the graphic object (Unit: degrees).
- Variable value: Sets the variable value for the counter-clockwise rotation angle of the graphic object.

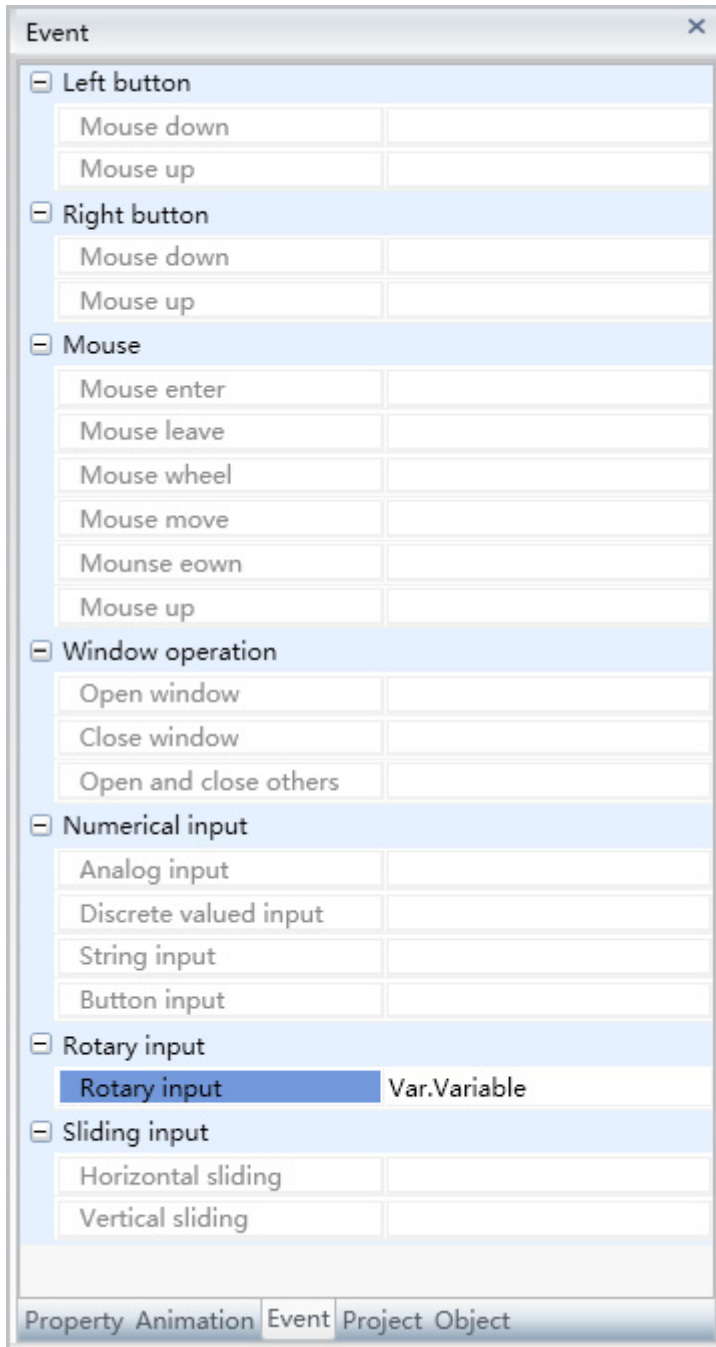
» Clockwise:

- Angle: Sets the clockwise rotation angle of the graphic object (Unit: degrees).
- Variable value: Sets the variable value for the clockwise rotation angle of the graphic object.

» Operation modes:

- Continuous input: The input value changes continuously.
- Interval input: The input value changes after a period of time.

- **Step 3:** When configuration is complete, press the “OK” button to complete the configuration of the “Rotary input” event. The event configuration of this graphic will be displayed in the “Event” window, as shown in the figure below:



To delete an event, simply select the event in the event list and then right-click the mouse and select “Delete”.

# 11. Alarm

## 11.1 Overview

An alarm is a kind of reminder when the data acquired by the system exceeds the warning value in order to achieve preventive actions, such as early warnings for dangers that might occur during the production process or equipment failures. Alarms have irreplaceable effects on system security control in industrial automation and control systems.

During the process of using the DIAView software, when the data of the on-site environment or instruments monitored and acquired by the system exceeds the system's preset range, the system will use several methods to send alarm information and display them in the alarm window, such as sending E-mails or alarm sounds so that users can know the execution status of the site and equipment immediately and perform corresponding reactions to the alarm in order to prevent malfunctions or accidents from causing losses.

The DIAView software has complete alarm functions able to ensure safe and reliable execution of the system.

## 11.2 Alarm groups

"Alarm variable" is when alarm conditions are configured for associated system variables so that the variable can generate alarms when the value of the variable changes.

Alarm groups can achieve categorized management for alarms. Related alarms can be categorized into the same alarm group making it easier for the system to perform unified management and operations for alarm groups. The alarm variables of the DIAView software usually belong to an alarm group. The alarm group is first created and then alarm variables are created in the alarm group.

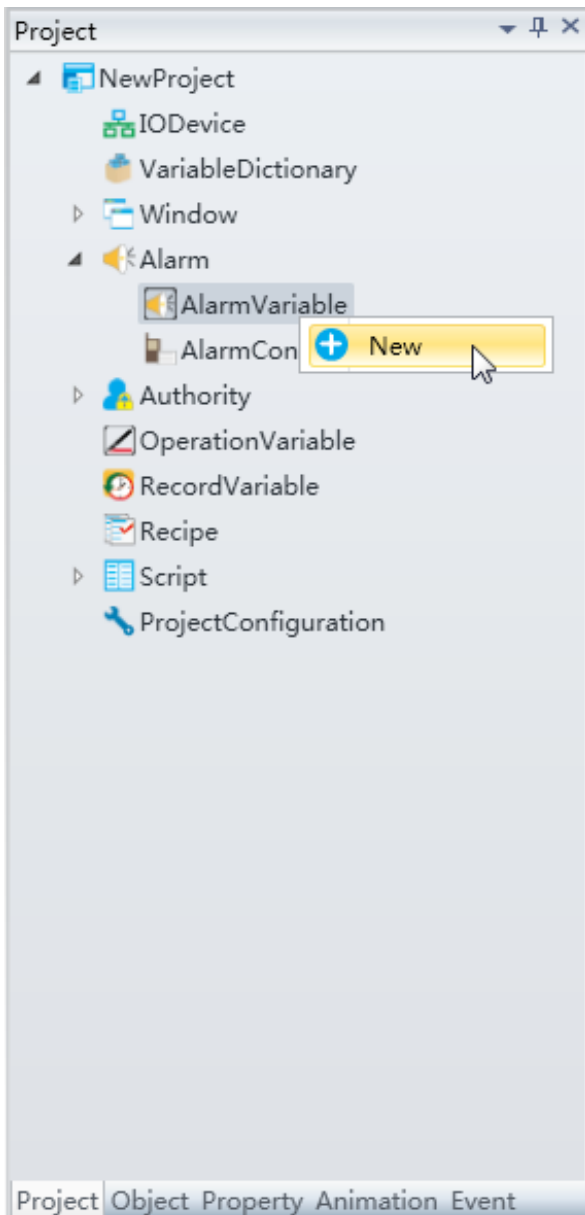


**Alarm group name naming rules:**

1. Composed of English letters, numbers, Chinese characters and underscore, and can only begin with an English letter or Chinese character;
2. not case sensitive;
3. the length cannot exceed 200 characters and cannot exceed 25 Chinese characters;
4. alarm group names cannot be repeated under similar class nodes within a project; and
5. if there are alarm variables and alarm groups under similar class nodes within the same project, 6. the alarm variable and alarm group names cannot be repeated.

**1. Add alarm groups:**

- **Step 1:**Open the project window under the DIAView software development environment → open the “Alarm” node in the project index tree → right-click on the “Alarm variable” node → click the Add new option in the right-click menu, as shown in the figure below:

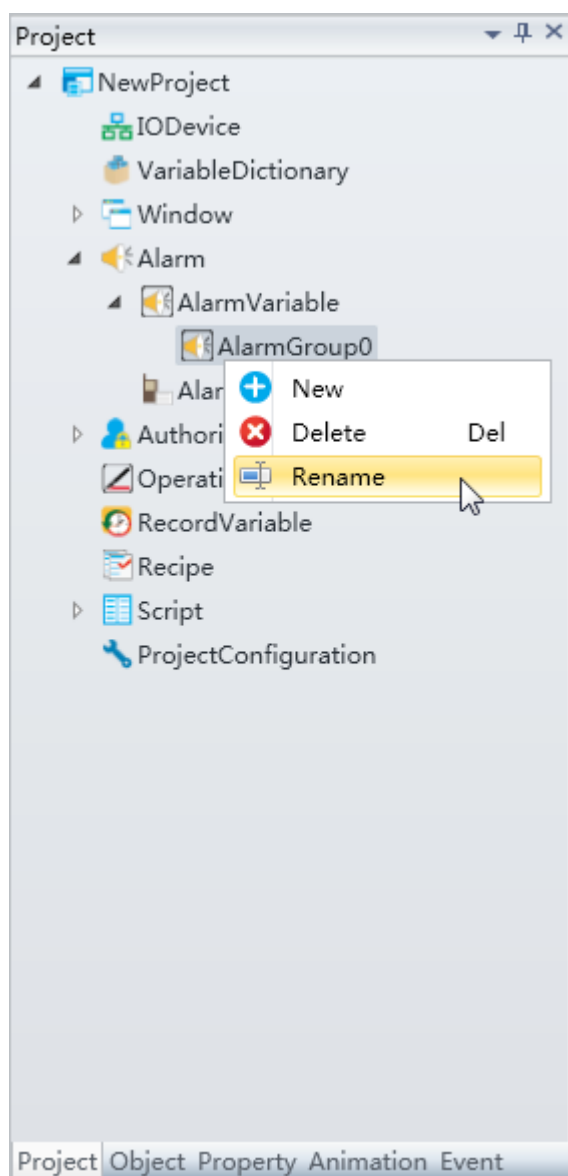


- **Step 2:** After clicking the “Add new” item, the system will create an alarm group sub-note with a preset name; double click that alarm group sub-node to open the alarm variable configuration window (please refer to the next chapter for creating alarm variables), as shown in the figure below:



## 2. Other operations for alarm groups:

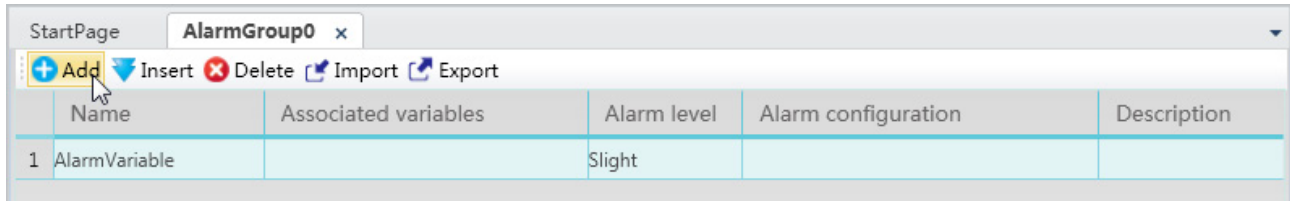
Right-click the mouse on the new created alarm group sub-node and operations including “Add new”, “Delete” and “Rename” etc. can be performed for the current alarm group, as shown in the figure below:



## 11.3 Alarm variables

### Creating alarm variables

After opening the alarm group, click the “Add” button in the window to add alarm variables; the system will give a preset name, as shown in the figure below:



The screenshot shows a software window titled "AlarmGroup0" with a menu bar containing "Add", "Insert", "Delete", "Import", and "Export". Below the menu is a table with the following structure:

	Name	Associated variables	Alarm level	Alarm configuration	Description
1	AlarmVariable		Slight		

The meanings of each setting in the configuration window are as follows:

Name: Alarm variable name.

#### ■ Naming rules:

1. Composed of English letters, numbers, Chinese characters and underscore, and can only begin with an English letter or Chinese character;
2. not case sensitive;
3. the length cannot exceed 200 characters and cannot exceed 25 Chinese characters;
4. alarm variables in the same node or alarm group cannot have repeated names; and
5. if there are alarm variables and alarm groups under the same node, the alarm variable and alarm group names cannot be repeated.

» Associate the variables created in the project, which are the corresponding variables of the data acquired by the system; they are the basic data source for alarms. Alarm variables can only be configured for analog value and digital value type variables.

» Alarm level: The severity level of alarms are divided into 5 levels: Slight, mild, normal, serious, severe.

» Alarm configuration: Sets alarm information including alarm type and the variable value limit that corresponds to the alarm levels etc.

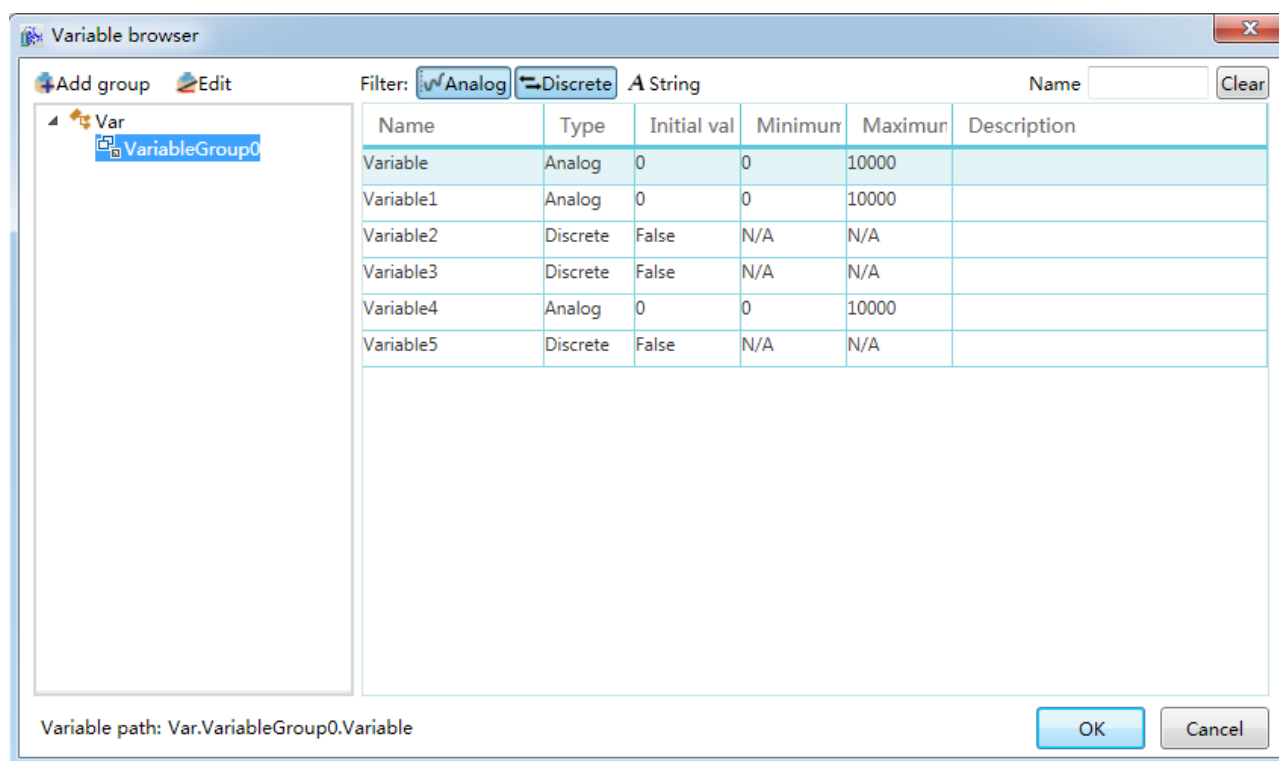
» Description: Explanation information for the alarm variable.

#### » Function button effects:

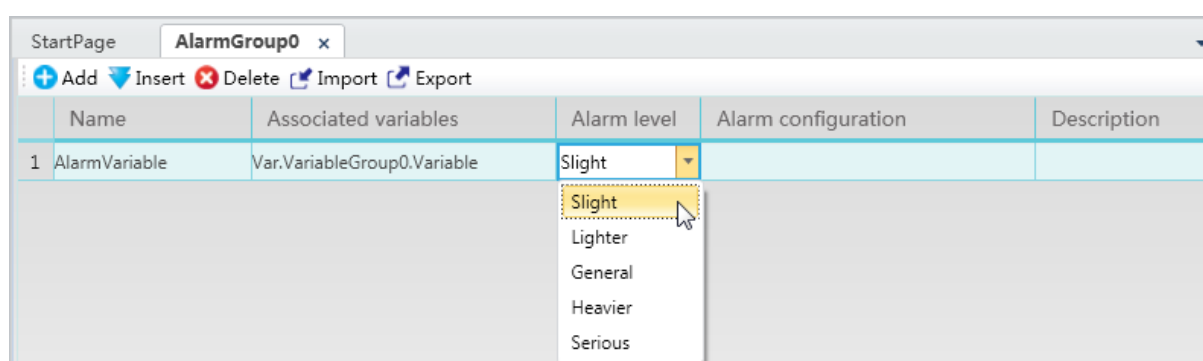
- “Insert” button: Inserts new alarm variable on the specified row.
- “Delete” button: The “Delete” button is used to delete the selected alarm variable.
- “Import” button: Imports the alarm variables in Excel to the system.
- “Export” button: Exports the alarm variables in the system to Excel.

## Configuring alarm variables

**1. Associate variable:** Click the button in the variable storage cell and select the system variable to associate (only analog value and digital value type variables can be used to set alarms), as shown in the figure below:



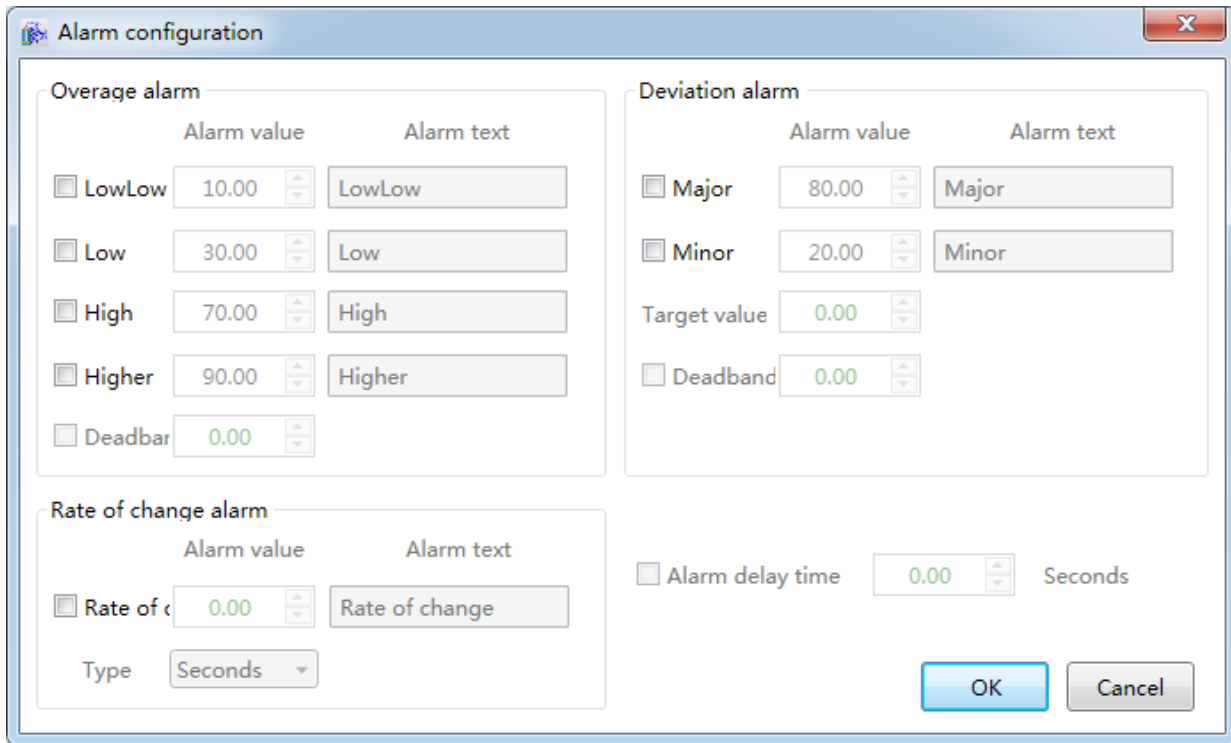
**2. Alarm level:** Click the button and a drop-down menu will appear for you to select a level, as shown in the figure below:



**3. Alarm configuration:** Click the button in the alarm configuration storage cell and the alarm configuration window will appear; the system will perform related configurations according to the variable type, as shown below:

- » Analog variable (Analog type variable) alarm configuration

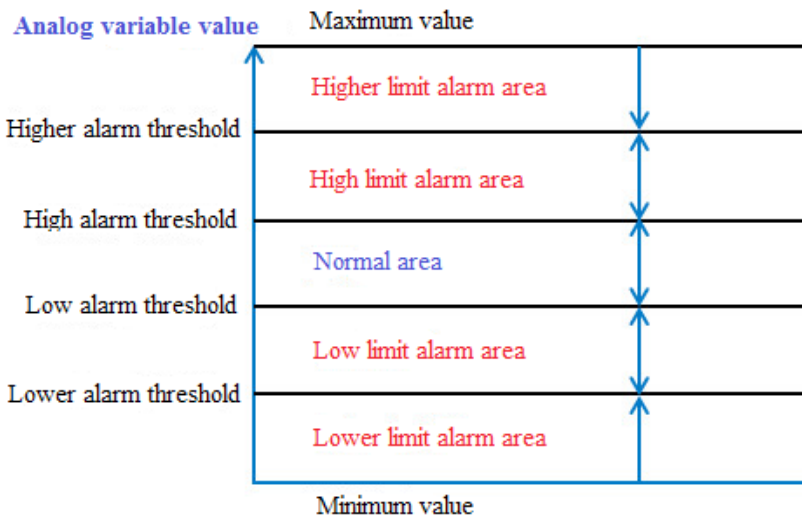
Analog variables are mainly whole number and integer type variables; click the alarm configuration button and the analog variable alarm configuration window will appear, as shown in the figure below:



- » Analog variable alarms are divided into 3 types: Overage alarm, Deviation alarm and Rate of change alarm

**(1) Overage alarm**

The alarm generated when the value of the analog value exceeds the value of the alarm threshold set. There are 4 alarm thresholds for over-limit alarms: extremely low, low, high, extremely high; their alarm threshold value should be set between the maximum value and minimum value of the variable; its alarm threshold and principles are as shown in the figure below:



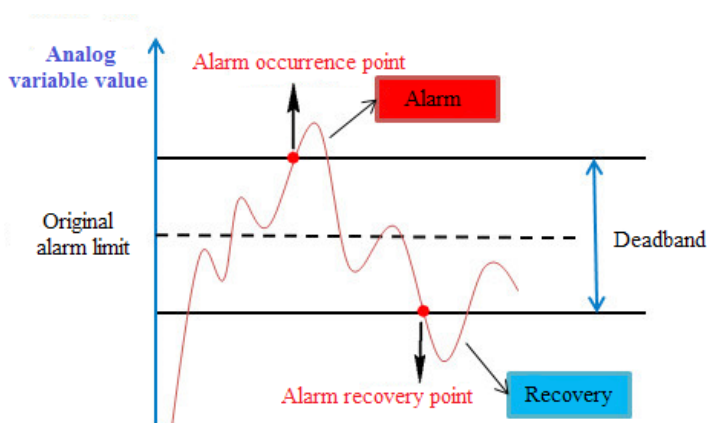
When the variable value changes, if it exceeds a certain threshold value, over-limit alarms will occur immediately. Also, only one over-limit alarm will occur for one variable. For example: If the variable value exceeds the “extremely high alarm threshold value”, the extremely high alarm will occur and not the high alarm. If it went over-limit two times, the system will first determine whether they are the same type of alarm; if they are, no new alarms will occur, or else the original alarm will be reset and then a new alarm will occur.

Over-limit alarm occurrence and reset determination rules:

- » Extremely high alarms will occur when greater than or equal to the extremely high threshold and resets when less than the extremely high threshold.
- » High alarms will occur when greater than or equal to the high threshold and less than the extremely high threshold, and resets when less than the high threshold.
- » Low alarms will occur when less than or equal to the low threshold and greater than the extremely low threshold, and resets when greater than the low threshold.
- » Extremely low alarms will occur when less than or equal to the extremely low threshold, and resets when greater than the extremely low threshold.

The over-limit alarm threshold is not selected under preset conditions, one or multiple of the check boxes in front of the alarm threshold type can be selected when needed. After which, the editing block behind will become editable and “Alarm value” and “Alarm text” settings can be performed in it. The meaning of its properties are as follows:

- » **Alarm value:** Sets the threshold value of the alarm and defines the rules that should be followed when the threshold value is reached: minimum value<=extremely low<low<high<extremely high<=maximum value.
- » **Alarm text:** Sets the descriptive text of the alarm information.
- » **Dead band:** The effect of the dead band is to prevent unrealistic alarms from being generated when the variable value changes frequently between the original maximum and minimum alarm threshold by adding a threshold value for the maximum and minimum limit of the alarm, changing the original alarm threshold from a single line to an alarm threshold band. When the value of the variable changes within the alarm threshold band range, alarms will not occur or reset; alarm information will only occur when it exceeds the alarm threshold band range. This plans an active role for eliminating invalid alarms for fluctuating signals. The dead band value must be between 0 and the value of the maximum value minus the minimum value; the dead band should also be in between the difference of any two threshold values. The principles of the alarm dead band are as shown in the figure below:

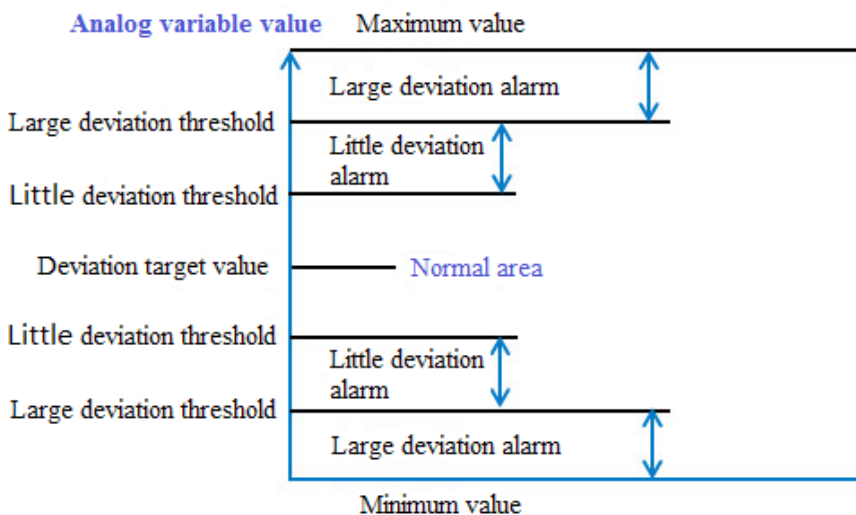


»

## (2) Deviation alarms

This is the alarm that occurs when the ratio of the analog value to the deviation target value fluctuation exceeds the changing range set. Deviation alarms are divided into two types: Large deviation and Little deviation. When the fluctuating value exceeds the Large/Little deviation range, Large deviation alarms and Little deviation alarms will occur respectively. Also, only one deviation alarm will occur for each variable; its calculation method and principle are as follows:

- » Little deviation alarm threshold value=deviation target value  $\pm$  Little deviation alarm value;
- » Large deviation alarm threshold value=deviation target value  $\pm$  Large deviation alarm value.
- » When greater than or equal to the Little deviation alarm threshold value, Little deviation alarm will occur.
- » When greater than or equal to the Large deviation alarm threshold value, Large deviation alarm will occur.
- » When less than or equal to the Little deviation alarm threshold value, Little deviation alarm will occur.
- » When less than or equal to the Large deviation alarm threshold value, Large deviation alarm will occur.



The deviation alarm is not selected under preset conditions, one or two of the check boxes in front of the types can be selected when needed. After which, the editing block behind will become editable and “Alarm value” and “Alarm text” settings can be performed for it:

- » -Little deviation: Sets the Little deviation value;
- » -Large deviation: Sets the Large deviation value;
- » -Target value: Sets the deviation target value for when the deviation alarm occurs; it is used together with the Large and Little deviations. Please refer to the calculation method of the Large and Little deviations.

Please refer to the “Over-limit alarm” settings for other items.

- » -Deadband : Sets the deviation band of the alarm threshold value, which means that when deviation alarm occurs, if the variable value is within the alarm threshold value  $\pm$  dead band value range, no new alarms will occur; or else the alarm will first be rest and then a new alarm will occur.

### (3) Rate of change alarm

This is the alarm that occurs when the change rate of the analog value exceeds the value set for a period, which means that the alarm that will occur when the variable value changes too quickly. During software execution, the changing speed of the variable value will be calculated each time to determine whether an alarm will occur. It is mainly used to monitor the change rate of the variable.

The change rate alarm uses time as the unit and is divided into 3 types: hour, minute and seconds. Its calculation method is as follows:

$$\text{Change rate} = ((\text{current variable value} - \text{previous variable value}) * 100) / ((\text{time the current value was generated} - \text{previous time the value was generated}) * (\text{maximum value of the variable} - \text{minimum value of the variable}) * \text{value that corresponds to the alarm type unit}).$$

※ Definition of the “value that corresponds to the alarm type unit” is:

- If alarm type is second, the value is 1;
- If alarm type is minute, the value is 60;
- If alarm type is hour, the value is 3600.

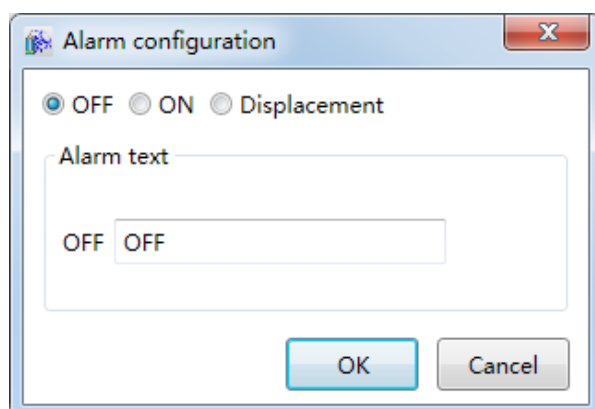
The change rate alarm is not selected under preset conditions, check boxes in front of the change rate can be selected when needed. After which, the editing block behind will become editable and “Alarm value” and “Alarm text” settings can be performed for it:

- » Change rate: Sets the change rate value.
- » Type: Sets the change rate alarm type unit; the change rate alarm uses time as the unit and is divided into 3 types: hour, minute and second.

Over-limit or deviation alarm delay: Sets a delay time (unit: second) so that when an alarm occurs the system will not display it immediately and instead performs a delay; if the alarm was reset or disappeared within the delay time, that alarm might be a false alarm and the system will automatically clear it. If the alarm still exists after the delay time, then that alarm is a real alarm and the system will display and record it. If a new alarm occurred within the delay time, the delay timer will restart.

#### ■ Digital variable (Digital type variable) alarm configuration

Digital variables are Boolean type variables; click the alarm configuration button and the digital variable alarm setting window will appear, as shown in the figure below:





There are 3 types of digital variable alarms: On alarm, Off alarm and displacement alarm.

- » “On”: Alarm will occur when the variable value changes from off to on (changes from 0 to 1);
- » “Off”: Alarm will occur when the variable value changes from on to off (changes from 1 to 0);
- » “Displacement”: Alarm will occur when the variable value changes no matter whether from off to on or on to off.

## 11.4 Alarm window

Please refer to chapter “7.7.6 Alarm window” on how to draw alarm windows.

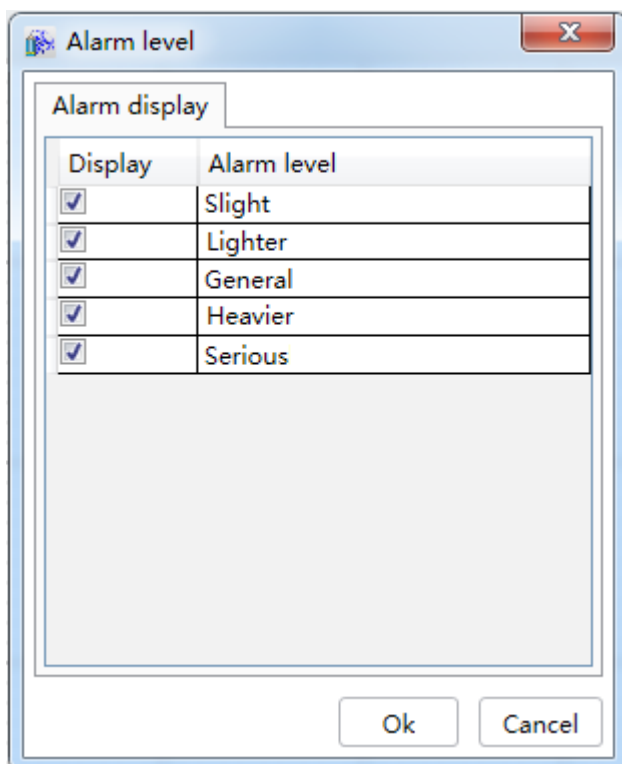
Alarm window is used to display alarm information; once an alarm is configured, the alarm window must be used to view the alarm information, therefore they must be used together. Once an alarm window is drawn, it will automatically associate with all configured alarm information without the need for other configurations. Just set the alarm type color effect and the properties of the alarm to display, such as alarm levels. etc. When the system executes, it will display alarm information in real-time and allows querying of alarm historic data, as shown in the figure below:

- Setting alarm type color:

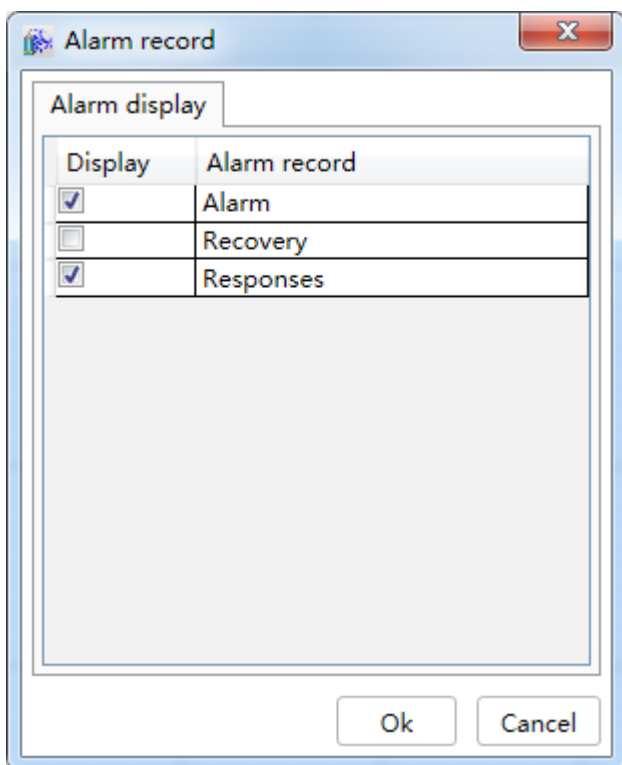
Alarm window property window → Alarm type

Alarm type	
High alarm color	<span style="color: red;">■</span> Red
Higher alarm color	<span style="color: firebrick;">■</span> Firebrick
Low alarm color	<span style="color: magenta;">■</span> MediumOrchid
Small deviation...	<span style="color: magenta;">■</span> Violet
Lower alarm color	<span style="color: cyan;">■</span> DodgerBlue
Off alarm color	<span style="color: green;">■</span> MediumSpring
Open alarm color	<span style="color: yellow;">■</span> Khaki
Switch alarm color	<span style="color: blueviolet;">■</span> BlueViolet
Change rate alarm...	<span style="color: lightsteelblue;">■</span> LightSteelBlue
Large deviation...	<span style="color: black;">■</span> Black

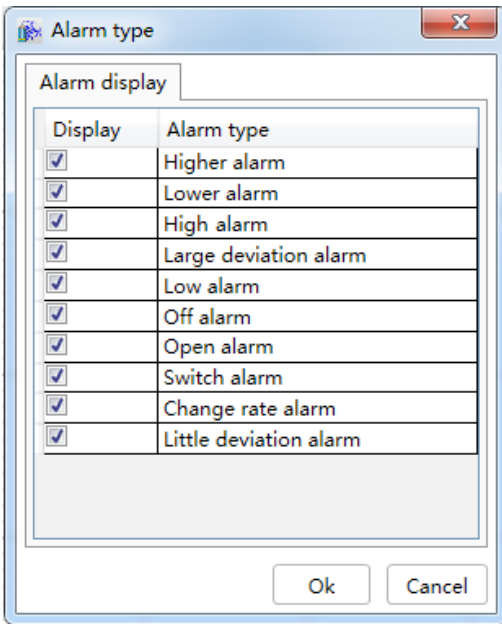
- » Sets which alarm level alarms to display in the alarm window (alarms which alarm levels are not selected will not be displayed):
- » Alarm window property window → alarm confirm → alarm level



- » Sets which alarms need to be recorded by the system:
- » Alarm window property window → alarm confirm → alarm record



- » Sets which types of alarm will be displayed in the alarm window:
- » Alarm window property window → alarm confirm → alarm type

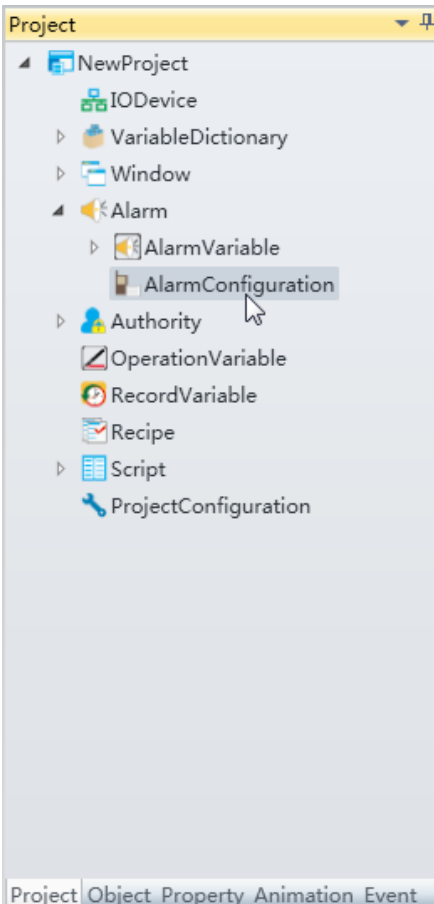


## 11.5 Configuration

Configure E-mail, sound and mobile phone SMS alarm functions for alarm and alarm groups.

### Alarm configuration:

- **Step 1:** Open the project window under the DIAView software development environment → open the “Alarm” node in the project index tree → double-click the “Configuration” sub-note, as shown in the figure below:



- **Step 2:** After double-clicking the “Configuration” node, the configuration window will appear, as shown in the figure below:

The screenshot shows a window titled "AlarmConfiguration" with three tabs: "Email", "Sound", and "SMS". The "Email" tab is selected. It contains a "Send e-mail" checkbox, an "Email address" input field, and a "Setting" button. Below this is a "User information" section with a table header containing columns: Name, Address, Alarm group, Alarm type, Alarm level, Record type, and Information format. At the bottom of the window are "New" and "Delete" buttons.

It includes three configurations, “E-mail”, “Sound” and “Mobile phone SMS”:

### 1. E-mail: Sends alarm information to related personnel through E-mail.

Open the “E-mail” option card and the configuration steps are as follows:

- **Step 1:** Check the “Send” check box; it means that the send e-mail function is enabled when selected and the next steps of the configuration can be performed;
- **Step 2:** Enter the E-mail address to send the alarm information in the “Send server” field;
- **Step 3:** Click the “Settings” button and set related information for sending E-mail; the “E-mail account settings” window will appear when the button is pressed, as shown in the figure below (using the 163 E-mail server as an example):

The screenshot shows a dialog box titled "E-mail account settings". It has three sections: "Sending interval" with a "Time interval" spinner set to 60 and "Seconds" label; "Mail server configuration" with "Send server" set to smtp.163.com and "Port" set to 25; and "Login information" with "User name" set to user and "Password" masked with asterisks. At the bottom are "Send", "OK", and "Cancel" buttons.

The meanings of each configuration in the settings window are as follows:

- » Time interval: Sets the time interval to send E-mails; the alarm information will be sent once when a new alarm occurred within the time interval.
- » Send server: Configures the address and port information etc. of the mail server to send the E-mail.
- » User name: The login user name of the E-mail account used to send the alarm information (which is the user name of the E-mail set in Step 2).
- » Password: The password used to login the E-mail account used to send the alarm information (which is the password of the E-mail set in Step 2).
- » Send: Tests whether the E-mail server settings are correct and whether the E-mail can be sent; the rest result is as shown in the figure below:

- **Step 4:** When the E-mail account setting is complete, press the “Add new” button to add the information for the user to receive alarm information:

The screenshot shows the 'AlarmConfiguration' window with the 'Email' tab selected. The 'Send e-mail' checkbox is checked. The 'Email address' field is empty. Below it is a table with columns: Name, Address, Alarm group, Alarm type, Alarm level, Record type, and Information format. At the bottom, there are 'New' and 'Delete' buttons. A red arrow points to the 'New' button.

The meanings of each field in the configuration window are as follows:

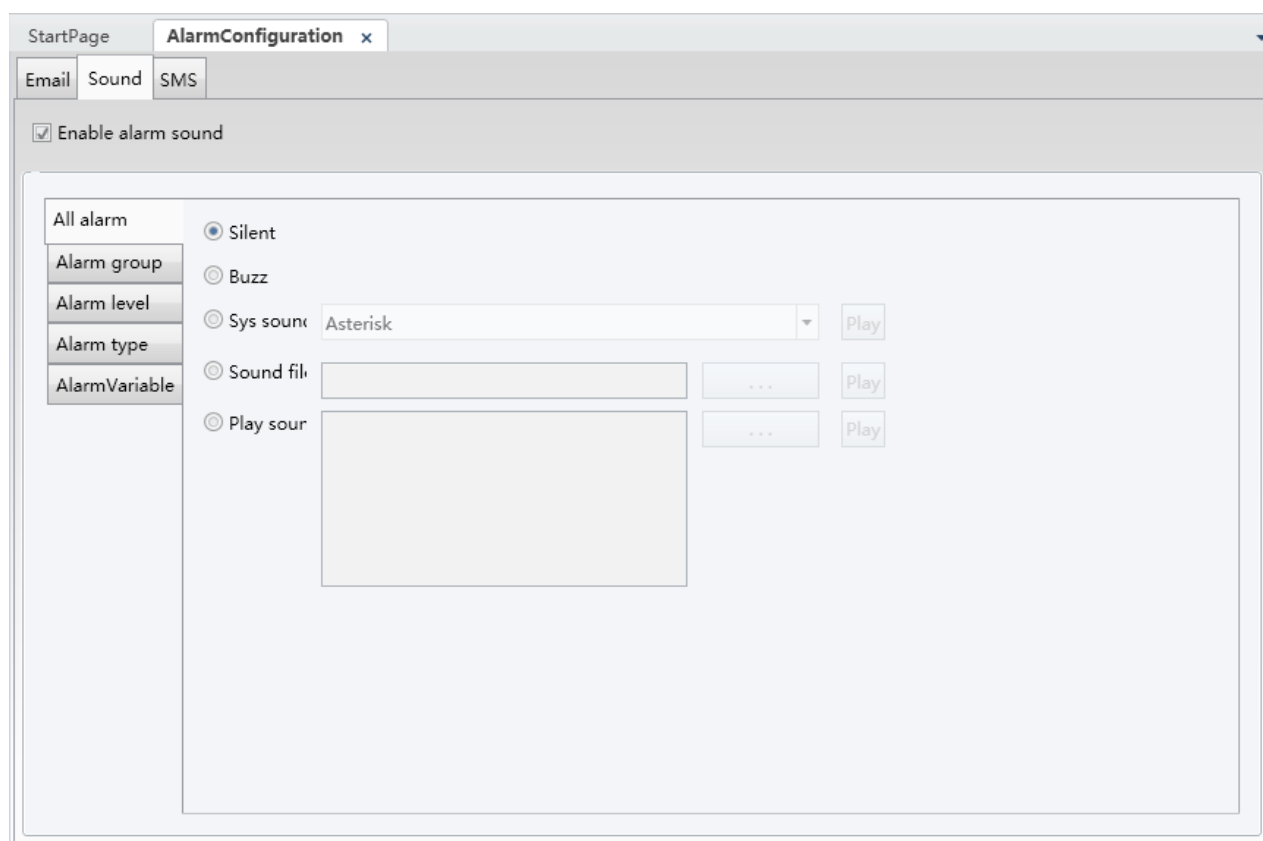
- » Name: User name of the recipient.
- » Address: E-mail address of the recipient.
- » Alarm group: Select the alarm group for alarm information to be sent when alarms occur.
- » Alarm type: Select the alarm type to send alarm information.
- » Alarm level: Select the alarm level; alarm information in this level and higher than this level will be sent.
- » Record type: There are 4 types: Alarm, confirm, reset and remove; the information of the selected types will be sent and information of the unselected types will not be sent.
- » Information format: Sets the content, order, date and time format of the alarm information sent.

## 2. Sound: Set the sounds to play for different alarm groups, alarm levels, alarm types and alarm variables when alarms occur.

Its priority is: All alarms < alarm group < alarm level < alarm type < alarm variable.

Open the “Sound” option card and the configuration steps are as follows:

- **Step 1:** Check the “Enable sound alarm” check box. It means that the enable sound alarm function is enabled when selected and the next steps of the configuration can be performed, as shown in the figure below:

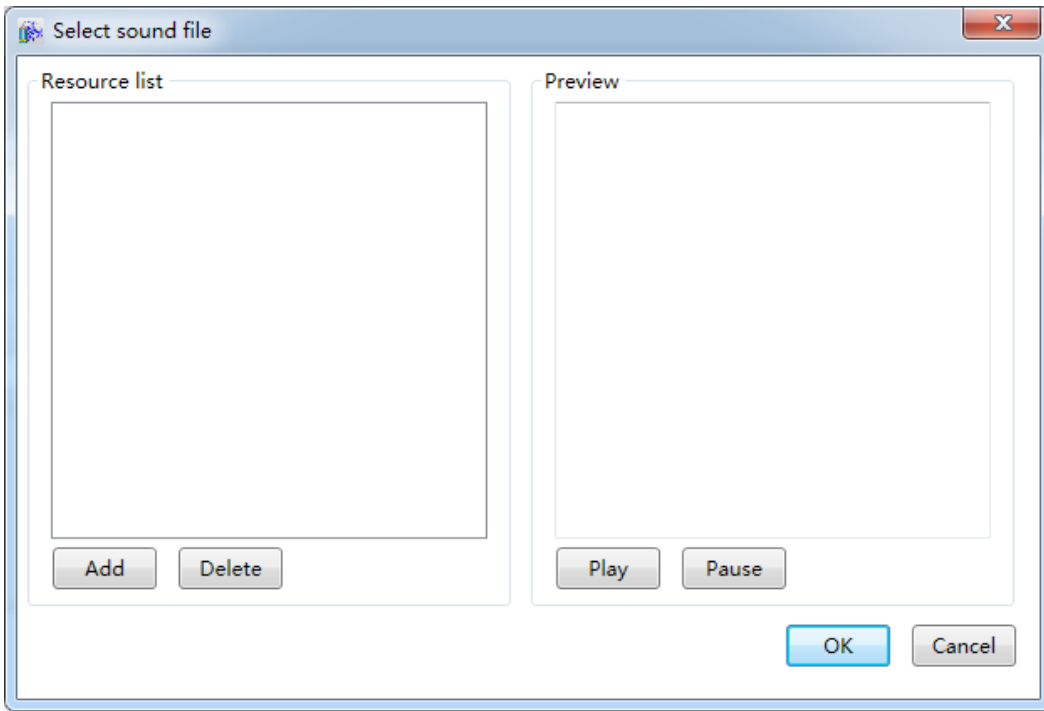


- **Step 2:** Configure the various contents in the “Sound alarm configuration”:

### » All alarms:

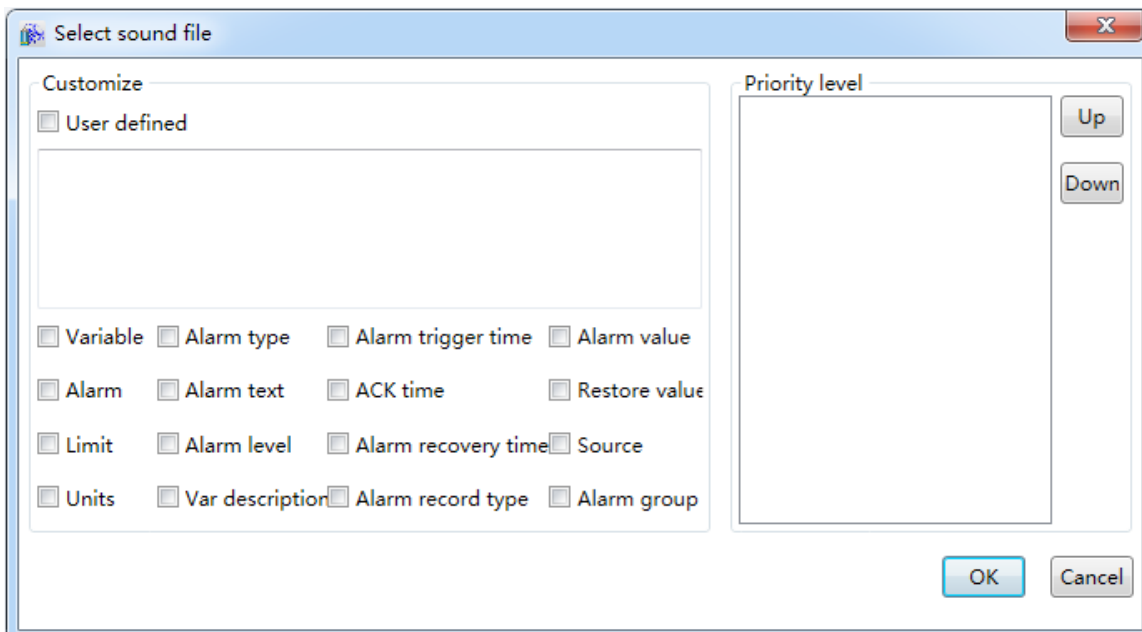
Use sound for all alarms generated by the system; methods that can be selected include: no sound, buzzer sound, system sound, audio file and play audio etc.

- No sound: No sounds are played.
- Buzzer sound: Buzzer sounds are played from the buzzer of the computer when the system generates an alarm.
- When multiple alarms are generated, the buzzer sound will sound in turns.
- System sound: Uses the sound from the Windows system, which include the following five sounds: “Asterisk (preset)”, “Beep”, “Exclamation”, “Hand and Question”.
- Audio file: Users can customize audio file sources so that the selected audio file will be played when an alarm is generated. The ... button can be pressed and the audio source selection frame will appear, as shown in the figure below:



The “Add” button can be used to import external audio files, and the “Play” button allows you to listen to the file.

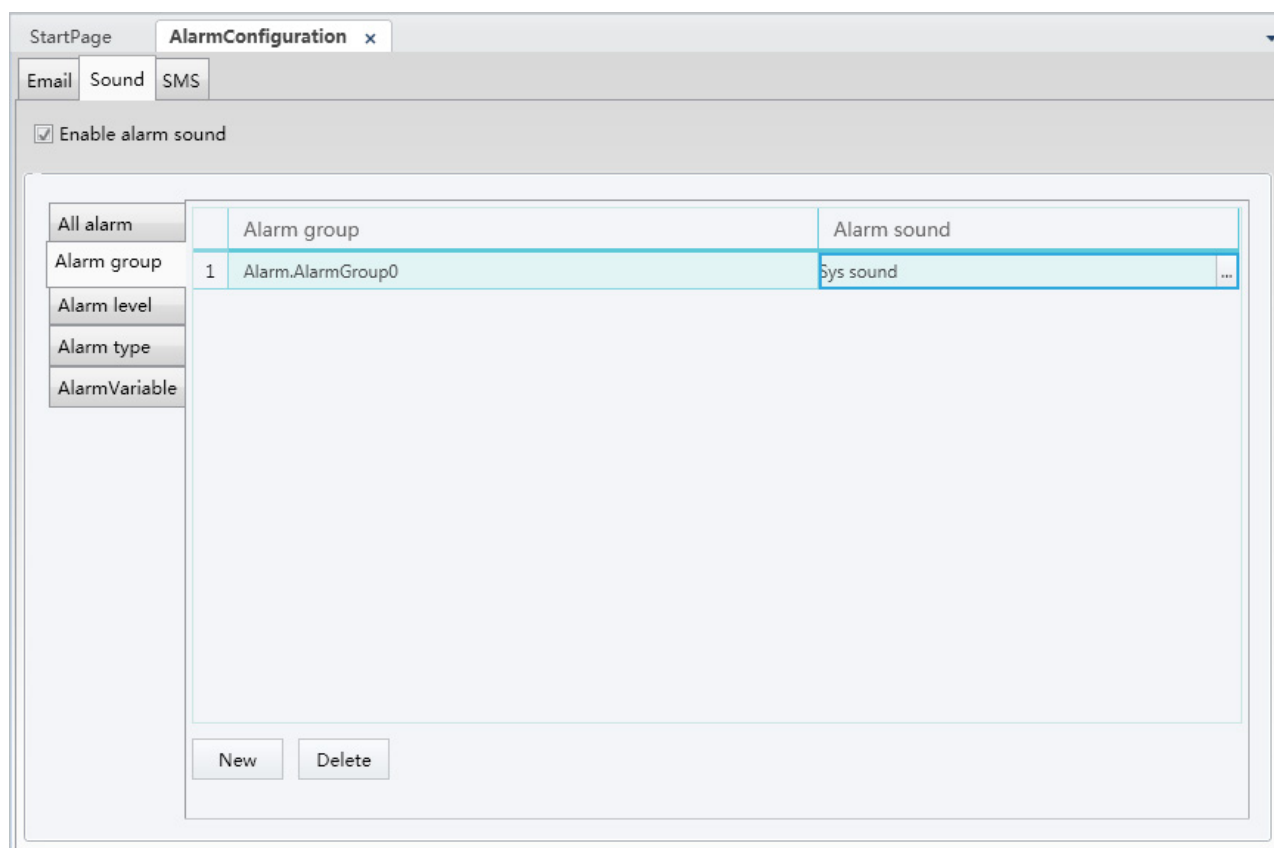
- » Play audio: Plays the customized audio content. The  button can be pressed and the audio content configuration frame will appear, as shown in the figure below:



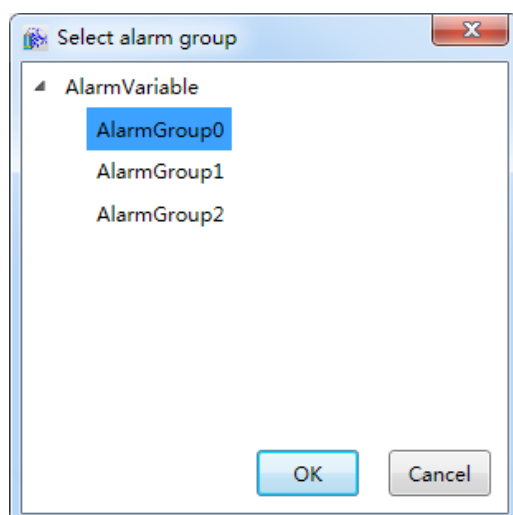
It allows customized audio contents and it supports Chinese and English. Select the alarm related configuration information and adjust the audio playback order; when an alarm is generated, the system will play the set audio contents in order.

» **Alarm groups:**

Configure the alarm groups that need sound alarm. The “Add new” and “Delete” buttons can be used to select the alarm group, and use the button in the “Alarm group” field to select the alarm group that needs to configure sound alarms; click the button in the “Alarm occurrence sound” field to configure alarm sounds, as shown in the figure below:

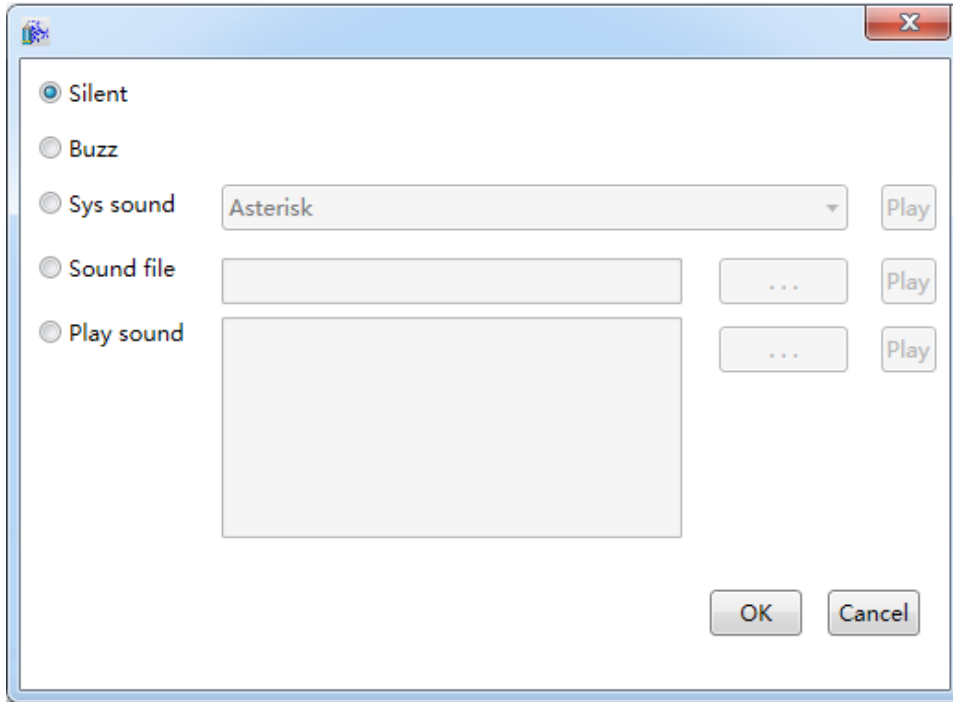


- Select alarm group, as shown in the figure below:



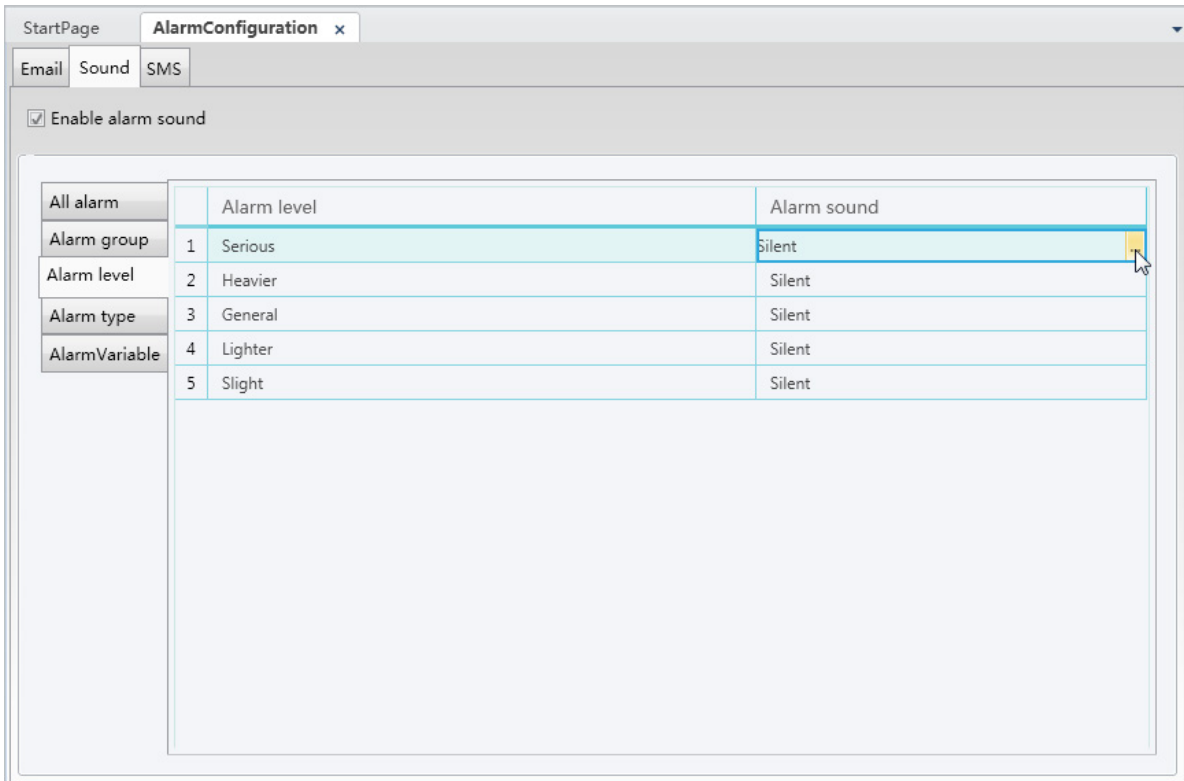


- Configure the alarm occurrence sound, as shown in the figure below:



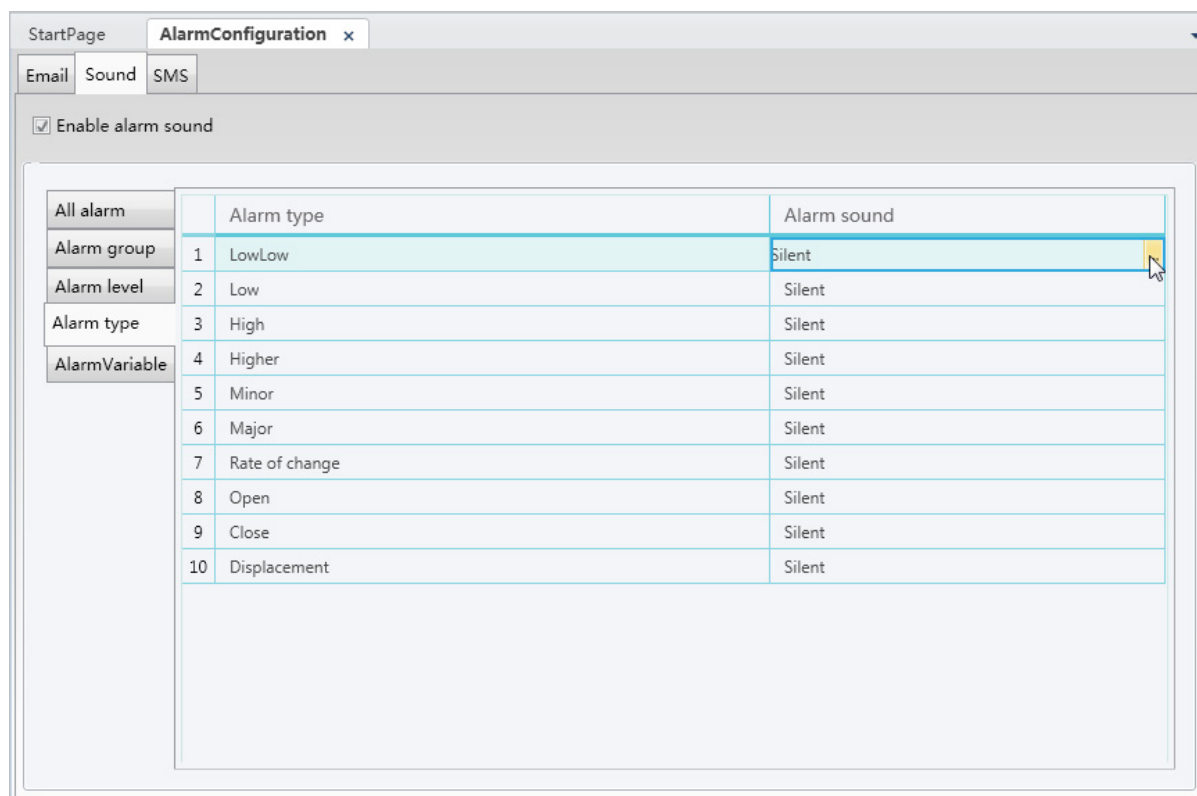
» **Alarm level:**

Sets the sound alarm when different levels of alarms occur; use the button in the “Alarm occurrence sound” field to configure alarm sounds, as shown in the figure below:

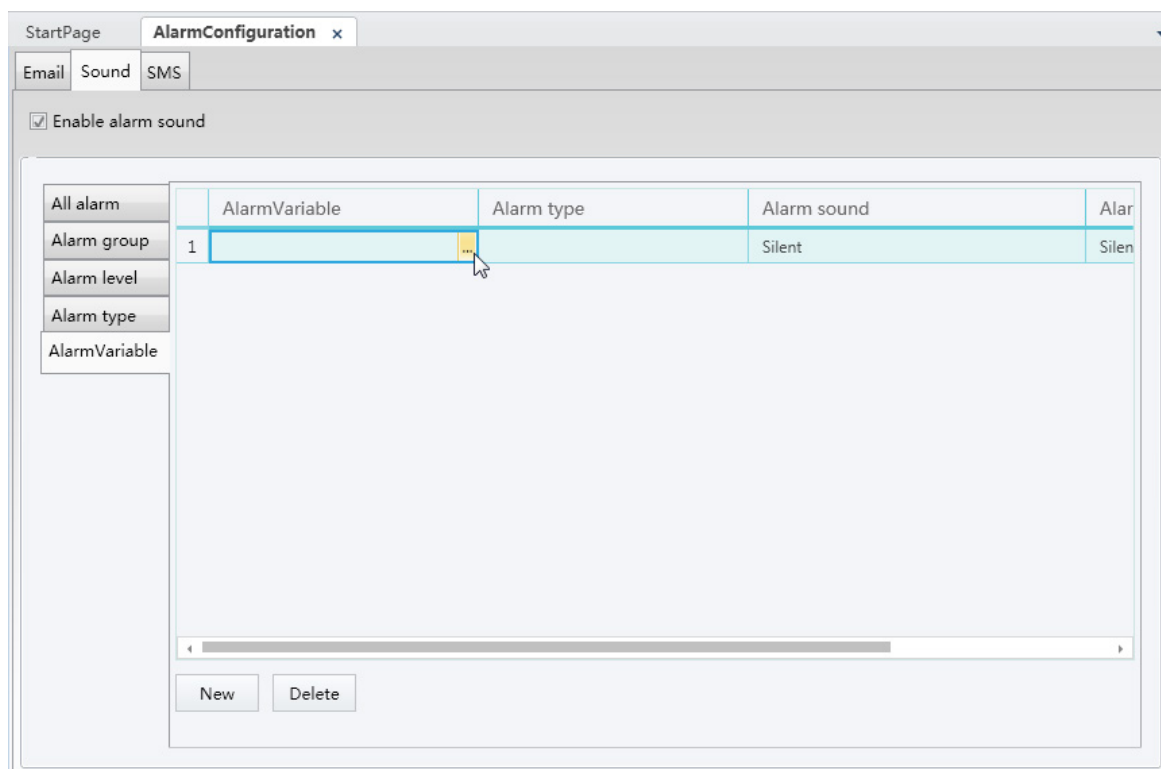


» **Alarm type:**

Sets the sound alarm when different types of alarms occur; use the button in the “Alarm occurrence sound” field to configure alarm sounds, as shown in the figure below:

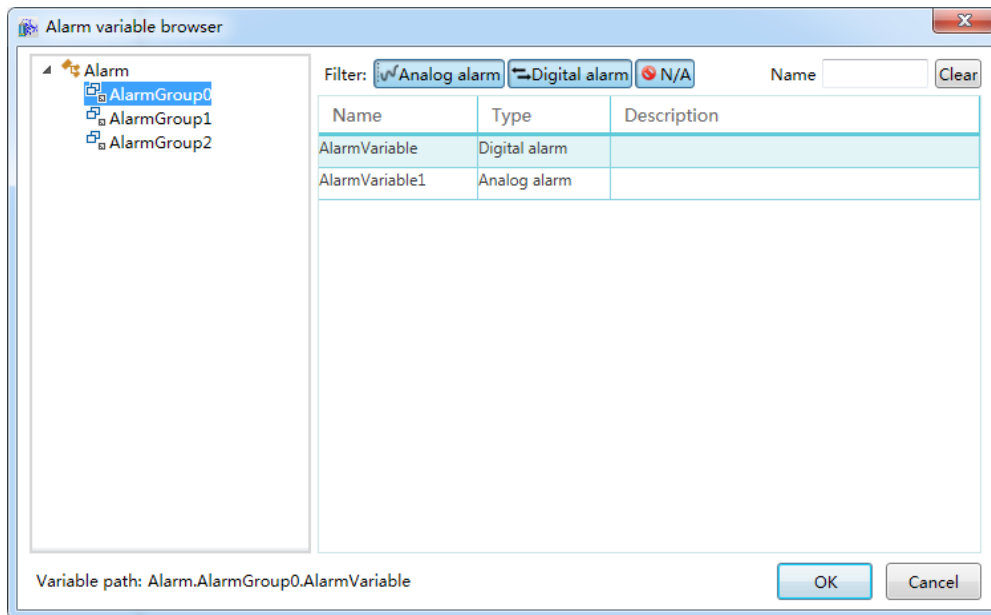
» **Alarm variables:**

Configurations can be performed here for alarm variables in the DIAView software that require additional sound alarms after an alarm occurs, as shown in the figure below:



Configuration process for each row: First use the “Add new” button to add a new alarm sound configuration row.

- » Alarm variable: Click the button in the row to open the alarm variable browser and associate an alarm variable, as shown in the figure below:

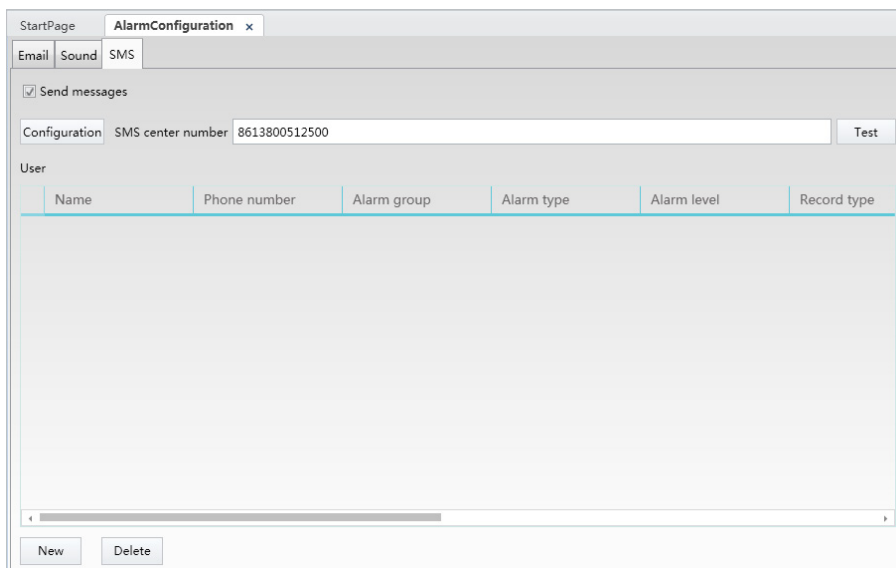


- Alarm type: Selects the alarm type that needs sound alarm; it is a drop-down menu.
- Alarm occurrence sound: Click the button in the row to configure the sound to play when an alarm occurs.
- Alarm reset sound: Click the button in the row to configure the sound to play when an alarm resets.

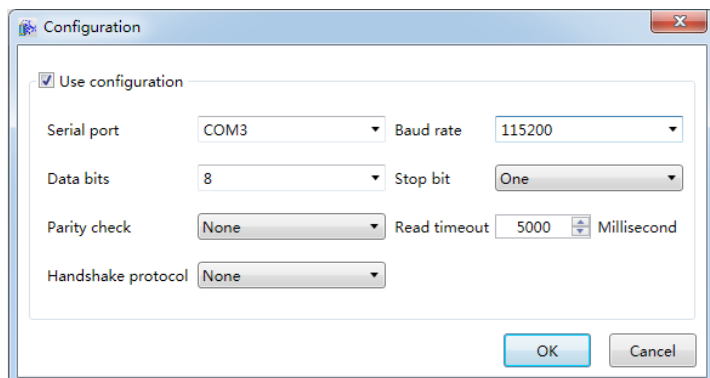
### 3. Mobile phone SMS: Sends the alarm information to related personnel through mobile phone SMS.

Open the “SMS center number” option card and the configuration steps are as follows:

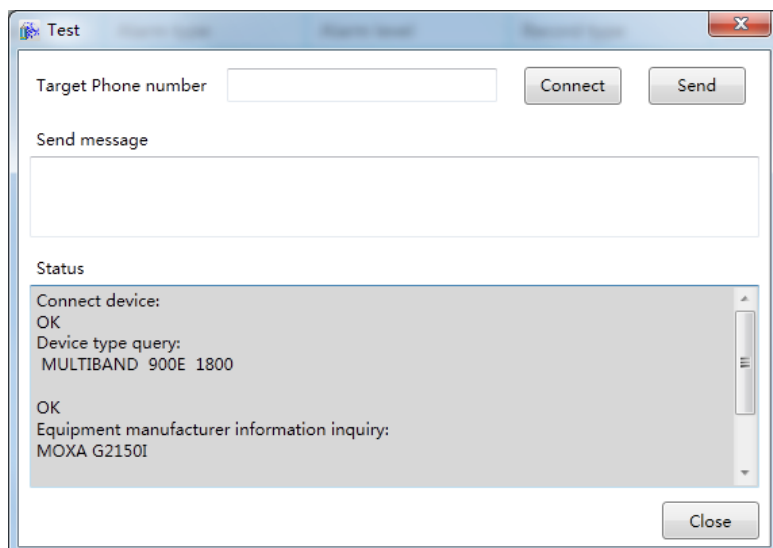
- **Step 1:** Check the “Send” check box; it means that the send SMS function is enabled when selected and the next steps of the configuration can be performed, as shown in the figure below:



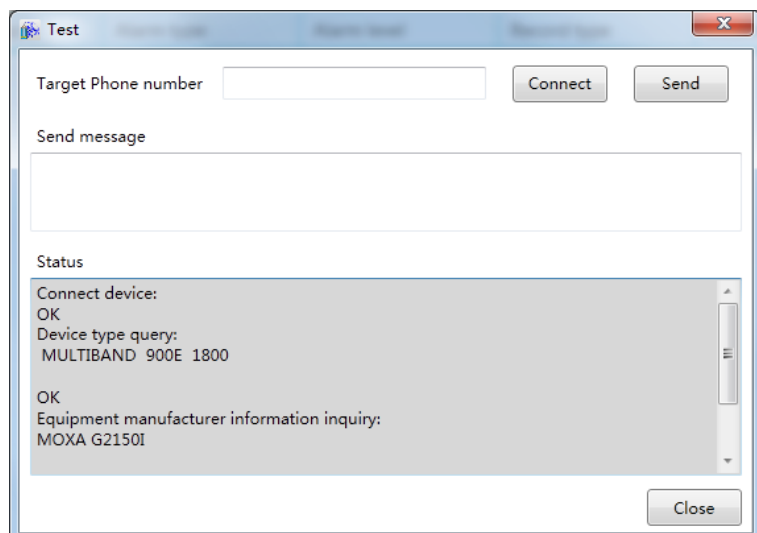
- **Step 2:** Click the “Configuration” button to configure information related to sending SMS; the “Configuration” window will appear after pressing the button, as shown in the figure below (the serial port is preset to COM3, change it to COM1: serial transmission rate is 115200):



- **Step 3:** Click the “Connect” button and the “Test” window will appear; click the “Send” button to display the current status, as shown in the figure below:



- **Step 4:** Set the “Target phone number” and related information for sending SMS; click the “Send” button to display the current status, as shown in the figure below:



the information for the user to receive alarm information:

The screenshot shows a web application window titled "AlarmConfiguration" with tabs for "Email", "Sound", and "SMS". The "SMS" tab is active. A checkbox labeled "Send messages" is checked. Below it, there is a "Configuration" section with a text input field for "SMS center number" containing the value "8613800512500" and a "Test" button. A "User" section contains a table with the following data:

	Name	Phone number	Alarm group	Alarm type	Alarm level	Record type
1				Low-LowLow-High-Higher-H	Slight-Lighter-General-Heav	Alarm-Responses-R

At the bottom of the window, there are "New" and "Delete" buttons. A red arrow points to the "New" button.

The meanings of each field in the configuration window are as follows:

- » Name: User name of the recipient.
- » Phone number: The phone number of the recipient.
- » Alarm group: Select the alarm group for alarm information to be sent when alarms occur.
- » Alarm type: Select the alarm type to send alarm information.
- » Alarm level: Select the alarm level; alarm information in this level and higher than this level will be sent.
- » Record type: There are 4 types: Alarm, confirm, reset and remove; the information of the selected types will be sent and information of the unselected types will not be sent.
- » Information format: Sets the content, order, date and time format of the alarm information sent.

# 12. User Authority

## 12.1 Overview

Users rights refers to the operating and control rights that a user has when using the DIAView software; it includes “Security level” and “User”. User rights management can be used to guarantee safe and reliable operations and stable executions in order to prevent problems such as users making wrong operations, unauthorized operations, or tampering with the project settings illegally.

Security level is a strategy to protect the security of system operations; setting security levels in the DIAView software development environment allows partition protection for the access operating authority of graphic objects. Security level is usually used together with user; a user can have 1 or multiple security level operating authorities, and each graphic object can belong to 1 or multiple security levels. During the system execution process, users can only access and operating graphic objects within the security level the user has in order to prevent users from performing wrong operations and unauthorized operations, ensuring the usage security for system executions and operations.

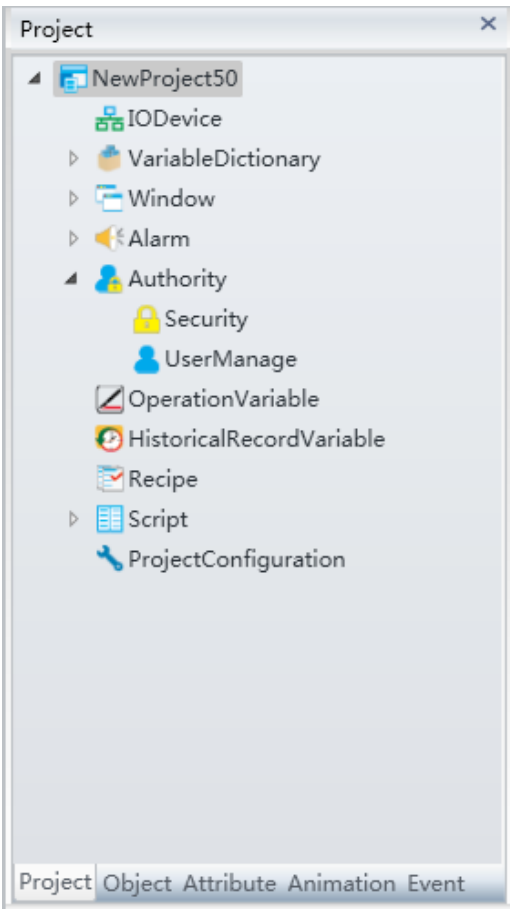
Users are operators and administrators with related operating authorities set for project development and execution; users in the DIAView software are divided into: “System administrator”, “Operator” and “Manager”. “System administrator” is preset in the project; it has all operating authorities and the highest level. Each project only has one system administrator, and cannot be deleted. “Operator” is the average project operator; its operating authority can be set by setting the security level. “Manager” not only has the operating authority to set security levels, it can also manage “Operator”; it can add, modify and delete “Operator” user information.

## 12.2 Security level

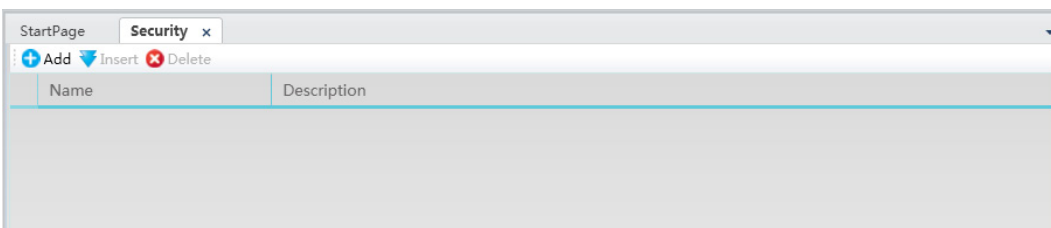
Security level is a logical partition to the security control for accessing graphic objects in the project; it should be divided according to the security control when setting. The DIAView software has no preset security level; under preset conditions, all users have the same access operating authority.

**Setting steps**

- **Step 1:** In the DIAView software development environment, open the project window tree index → open the “User rights” node in the tree index:



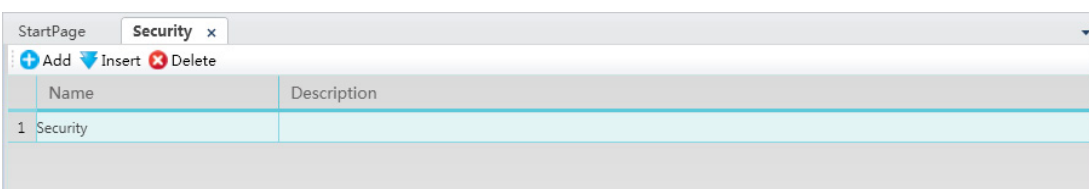
- **Step 2:** Double-click the “Security level” node to open the security level configuration window, as shown in the figure below:



The meanings of each setting in the window are as follows:

- » Name: Name of the security level.
- » Description: Related description information of the security level.

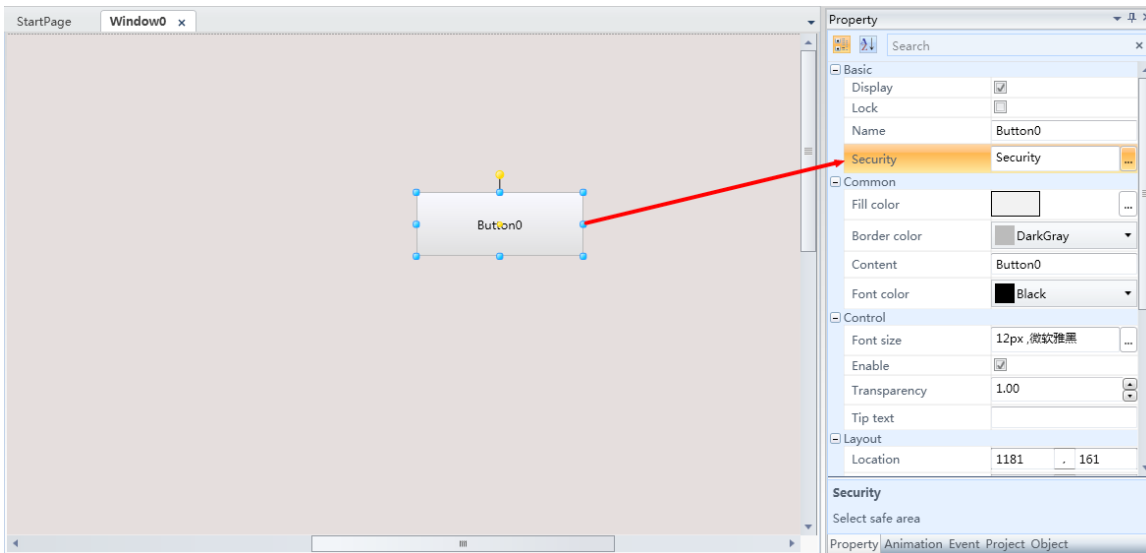
- **Step 3:** Click the “Add” button to create the security level and the system will automatically provide a preset name, as shown in the figure below:



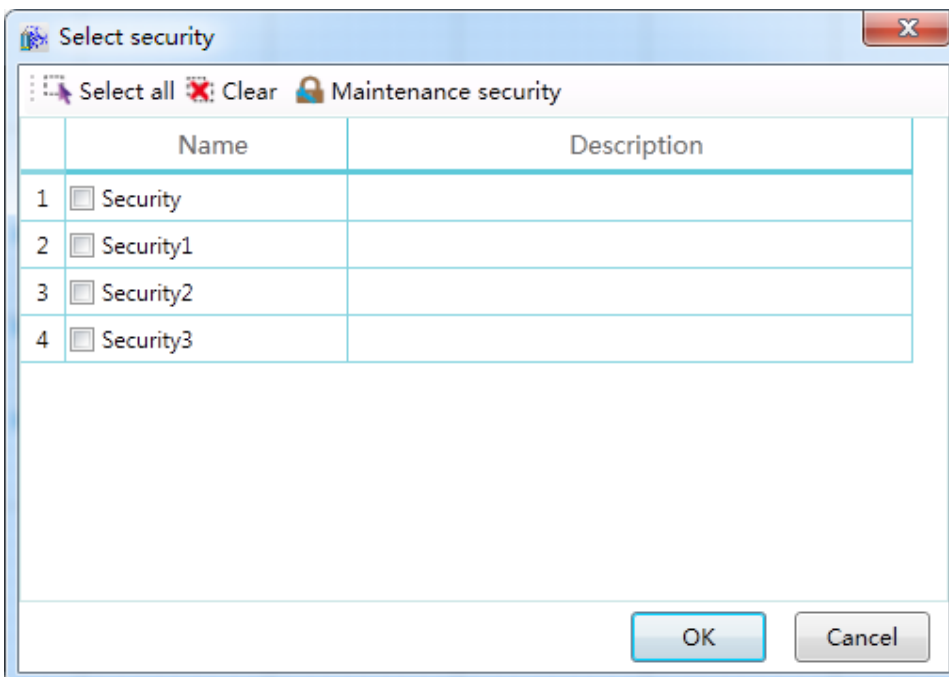
The name and description information of the security level can be edited and the setting of the security level will be completed; the “Delete” button can be used to delete the selected security level.

## Usage

Graphic objects in the DIAView software all have the “Security level” property; select the graphic object to configure access operating authority in the sketchpad window, and then press the button to the right of the “Security level” property in the property window, as shown in the figure below:



The “Security level” selection frame will appear; press the checkbox in front of a security level to selected it, as shown in the figure below:



The “Maintain security level” here can also be used to perform add or delete operations to the security level; it will be synchronized with the operations performed in the previous “Security level” window.

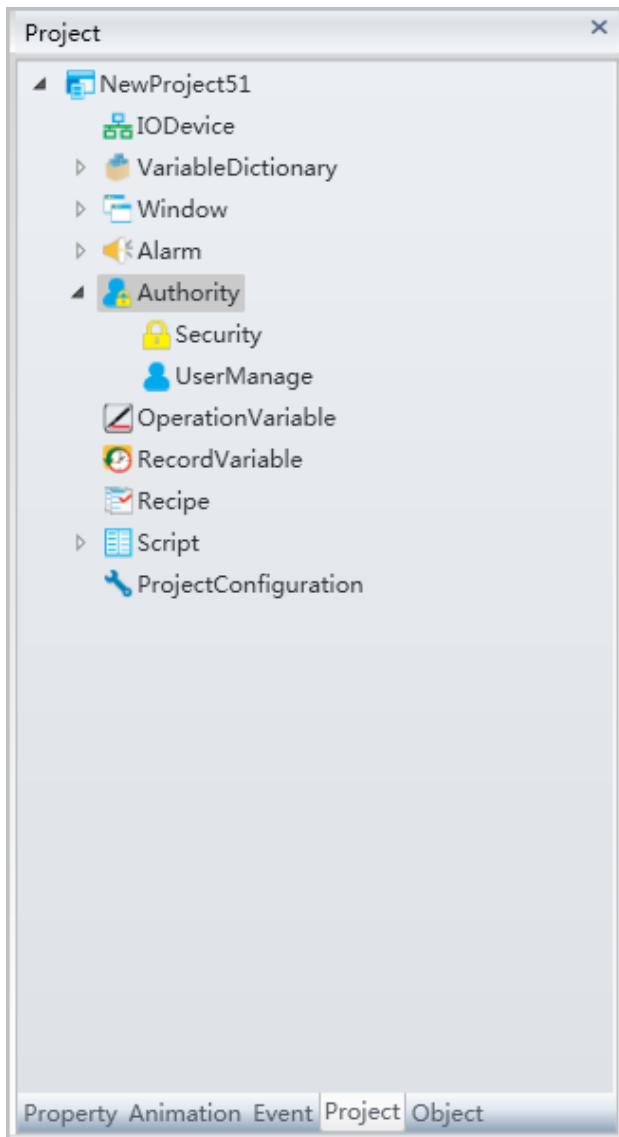


## 12.3 User

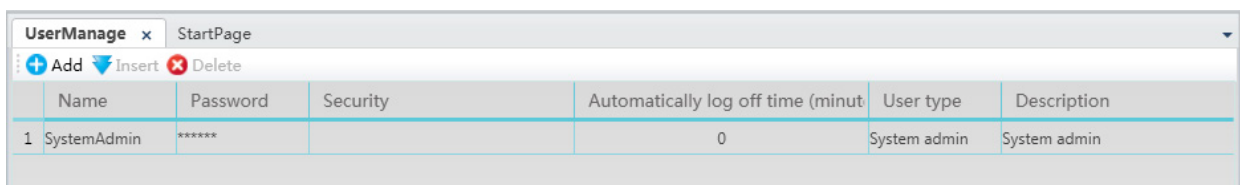
Users are the users of the DIAView software who require related access and operating authority in the project; users are granted user rights by setting security levels so that users can access and operate within the rights set for them, ensuring the security and reliability of the system.

### Setting steps

- **Step 1:** In the DIAView software development environment, open the project window tree index → open the “User rights” node in the tree index:



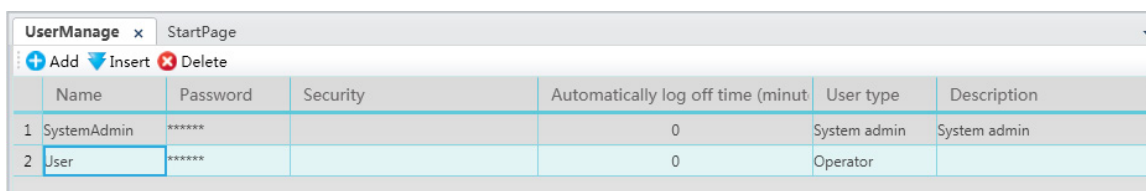
- **Step 2:** Double-click the “User” node to open the user configuration window, as shown in the figure below:



There will be a preset system administrator in the user information——“SystemAdmin”, it cannot be added or deleted. The meanings of each setting in the window are as follows:

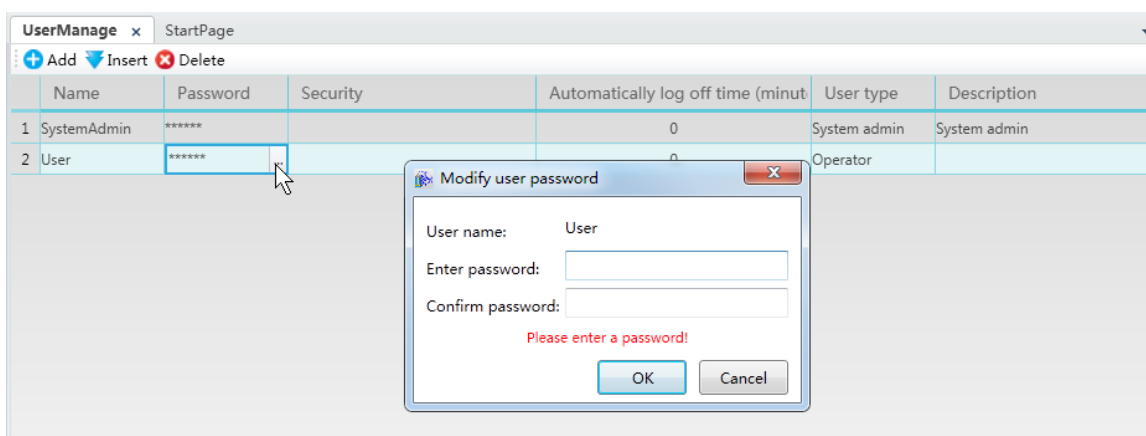
- » Name: User name.
- » Password: User account password, used for user login.
- » Security level: Sets the security level rights for user operations.
- » Automatic expiry time: Time limits can be set for user rights so that they automatically expires when the time has reached; ‘0” means always valid.
- » User type: Sets the user type; there are two types of users: Administrators and operators. System administrators automatically has all security level rights. The operating authority of administrators and operators is determined by the “Security level” that they have; they can operate the objects within their security level rights. Administrators can log into the user management interface to perform operations such as Add, Delete, Change password and set automatic logout time etc. to operators. While the project is executing, the administrator cannot delete or modify other administrators of the same level.
- » Description: User related information description.

- **Step 3:** Click the “Add” button to create the user and the system will automatically generate a preset user name, as shown in the figure below:



	Name	Password	Security	Automatically log off time (minut	User type	Description
1	SystemAdmin	*****		0	System admin	System admin
2	User	*****		0	Operator	

- **Step 4:** Click the button in the “Password” cell and the user password modification window will appear to allow changing of user password, as shown in the figure below:



	Name	Password	Security	Automatically log off time (minut	User type	Description
1	SystemAdmin	*****		0	System admin	System admin
2	User	*****		0	Operator	

**Modify user password**

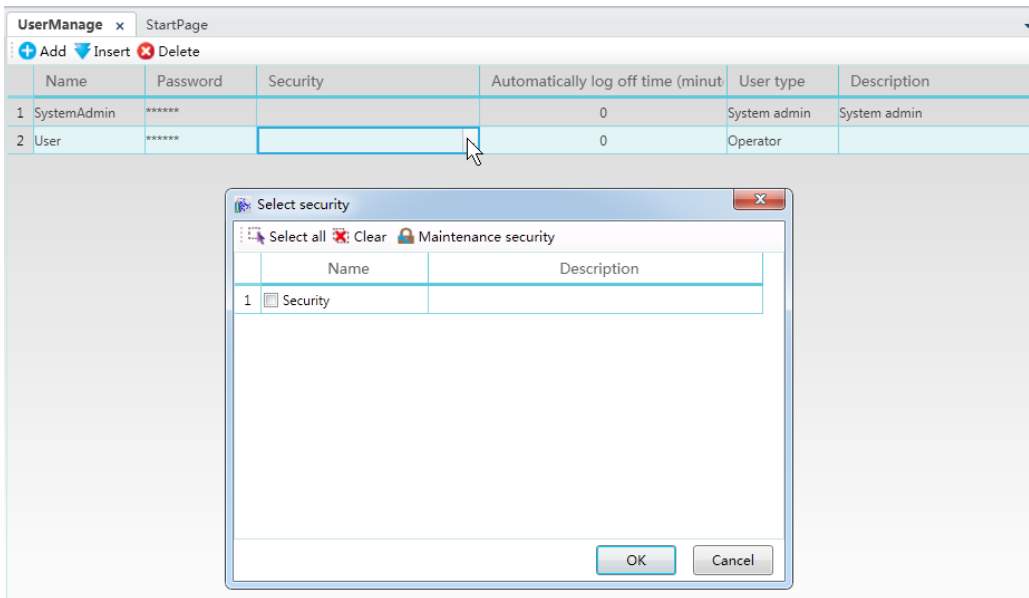
User name: User

Enter password:

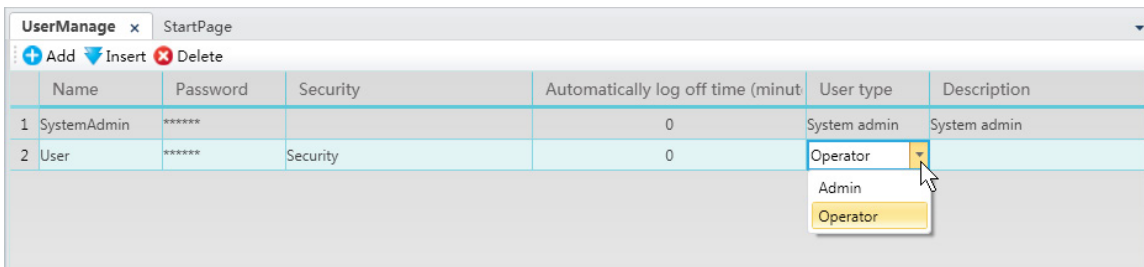
Confirm password:

Please enter a password!

- **Step 5:** Click the button in the “Security level” cell and the security level selection window will appear for setting the security level rights of user operations, as shown in the figure below:



- **Step 6:** Click the button in the “User type” cell and select a user type from the drop-down menu; the system’s preset user type is operator, as shown in the figure below:



User description information can be added in the “Description” field; this will concluding user settings; the “Delete” button can be used to delete the selected user.

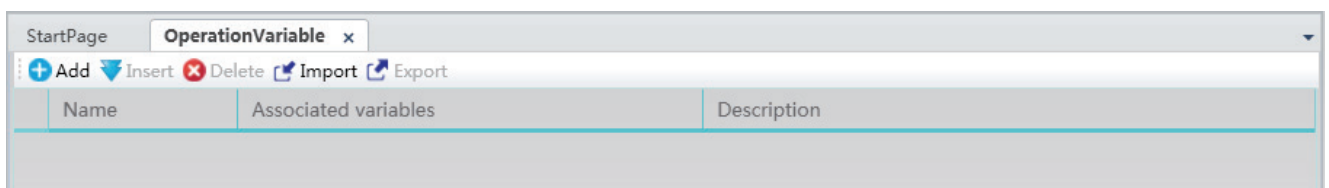
# 13. Operation variables

## 13.1 Operation variables

Operation variables are variables used to save and record project variable information during user operations; it is related to events and is used to record and track system variables operated by the user. Saved record information includes: variable name, change time, value of variable before and after changes and user information etc.

The steps to setting operation variables are as follows:

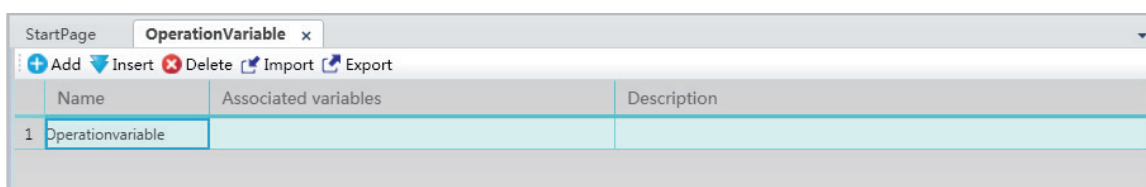
- **Step 1:** In the DIAView software development environment, open the project window tree index → double click the “Operation variable” node in the tree index to open the operation variable configuration window, as shown in the figure below:



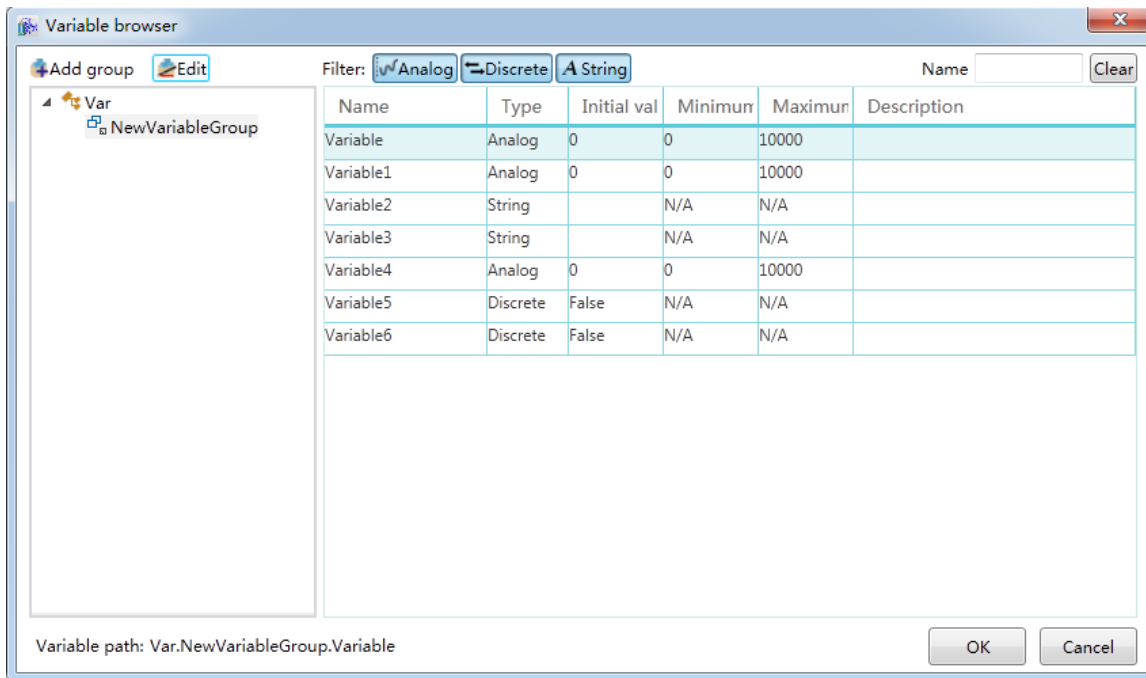
The meanings of each setting in the window are as follows:

- » Name: Name of the operation variable.
- » Variable: The associated system variable.
- » Description: Explanation information for the operation variable.

- **Step 2:** Click the “Add” button to create the operation variable and the system will automatically generate a preset name, as shown in the figure below:



- **Step 3:** Click the button in the “Variable” cell and selected the variable to associate in the variablebrowser, as shown in the figure below:



- \* Each variable can only be associated to one operation variable.

Afer setting the description information, the configuration of an operation variable is complete; the “Delete” button can be used to delete the selected operation variable and the “Import” and “Export” buttons can be used to import and export the operation variables into Excel.

### Viewing operation variables:

To view the information of the operation variable, scripts can be used to call report object functions `QueryVariableOperations()` or `QueryVariableOperations(startTime,endTime)` to query.

- » For example: Draw a report in the window: report 0 and a button: button 0;
- » Configure the event for “Button 0”: Left-click and call the operation variable query function of report 0:
  - `Report0.QueryVariableOperations()`
  - `Report0.QueryVariableOperations(startTime,endTime)`

# 14. Setting historic record variables

## 14.1 Overview

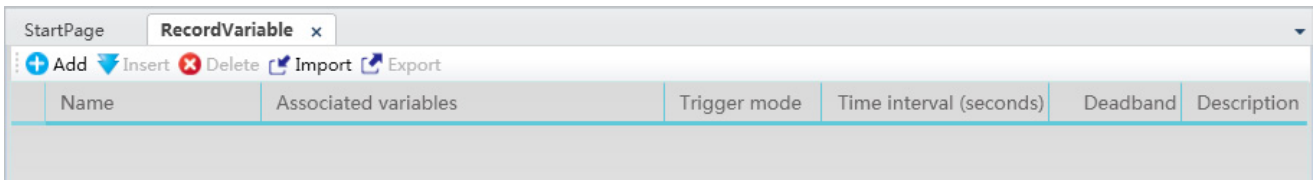
In order to display and control the on-site execution status of production, the DIAView software will create many variables that associates with on-site equipment to perform information handshake, and these variables are continually updated and changed. In order to save important production data and perform statistical analysis to the data to check production status and system execution information so that the important goals of increasing production efficiency and quality can be achieved, and to optimize the system, data of the variables during system execution need to be recorded; the variables that realizes this function is called record variables.

The record variables in the DIAView software are divided according their recording methods into two types: Timed record and change record. Timed record records the data of the variables in the system according to the time interval set; change record records the data of the variables in the system whenever the variable data changes.

## 14.2 Setting historic record variables

Setting historic record variables means setting the project variables which data needs to be saved and their recording method; the setting steps are as follows:

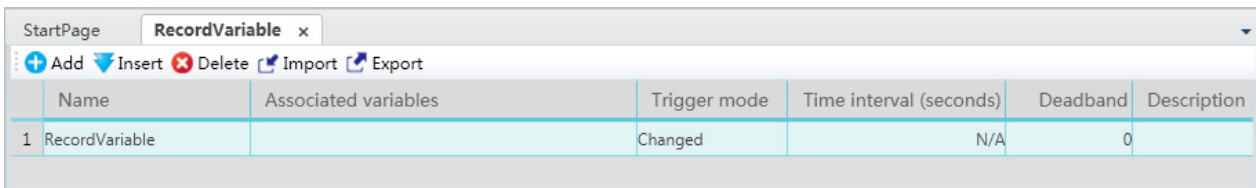
- **Step 1:** In the DIAView software development environment, open the project window tree index → double click the “Historic record variable” node in the tree index to open the historic record variable configuration window, as shown in the figure below:



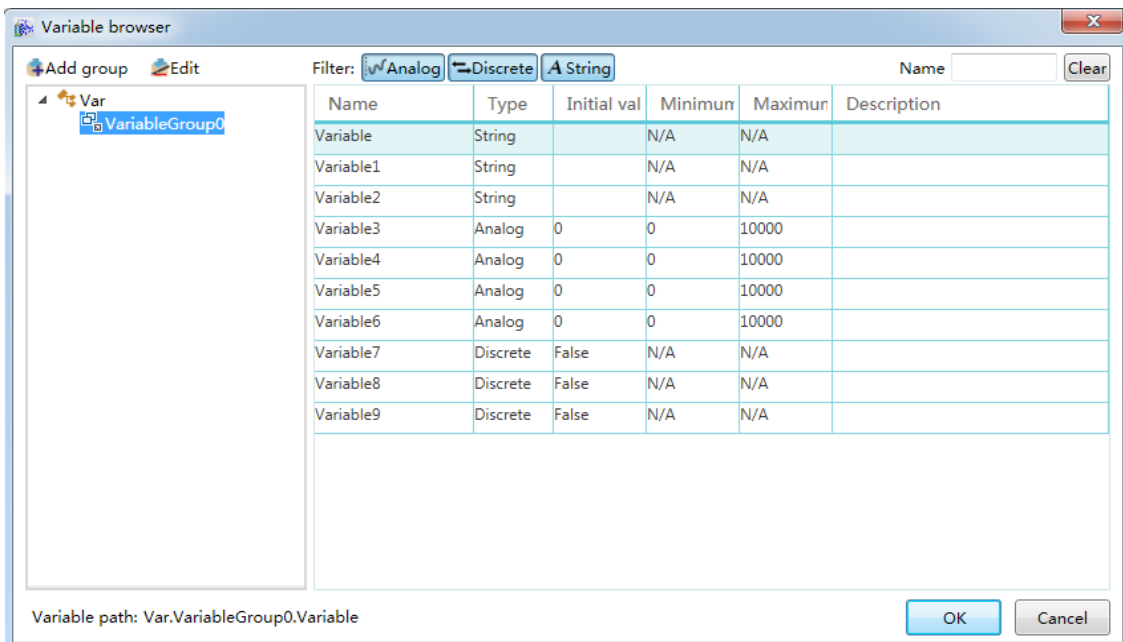
The meanings of each setting in the window are as follows:

- » Name: Name of the record variable.
- » Variable: Associated project variable, which are the project variables which data records need to be saved.
- » Record method: Sets the recording method of data; there are two types: Change record and timed record.
- » Time interval: Sets the time interval to record with the “Timed record” method.
- » Deadband: When the associated project variable is a analog value type, set a value to form a deadband interval with the current value of the variable to perform data filtering.
- » Description: Explanation information for the record variable.

■ **Step 2:** Click the “Add” button to create the historic record variable and the system will automatically generate a preset name, as shown in the figure below:

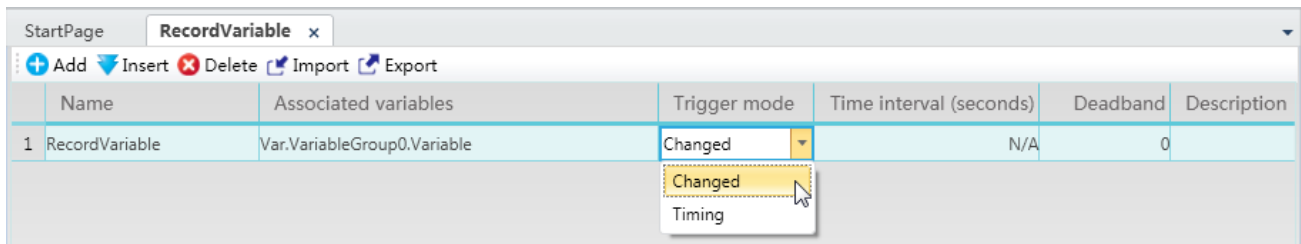


■ **Step 3:** Click the button in the “Variable” cell and selected the variable to record data in the variable browser, as shown in the figure below:



\* Each variable can only be associated to one historic record variable.

- **Step 4:** Click the pull-down button in the “Record method” cell and select the recording method, as shown in the figure below:



- » Timed record: Sets the time interval, unit: seconds; the system will record the data of the variables in the system according to the time interval set during system execution.
- » Change record: Records whenever the variable data changes during system execution;

- **Step 5:** Time interval: If the record method is “Timed record”, the time interval needs to be set;
- **Step 6:** Deadband: If the associated variable is an analog value type, and the record method is “Change record”, set a value as the deadband value to for a deadband interval with the current value of the variable:  $(\text{current value of variable} - \text{deadband value}) \leq \text{deadband interval} \leq (\text{current value of variable} + \text{deadband value})$ ;
  - » Effect: Data filtering.
  - » Principle: When the next variable value acquired is within the deadband interval range, no new values will be acquired for the variable value and the original value will remain the same. If it is not in the deadband interval range, then the record variable value will acquire a new variable value and record it into the database, and the deadband interval will also change accordingly. It will keep looping this way.

The “Delete” button can be used to delete the selected historic record variable and the “Import” and “Export” buttons can be used to import and export the historic record variables into Excel.

## 14.3 Viewing historic record variables

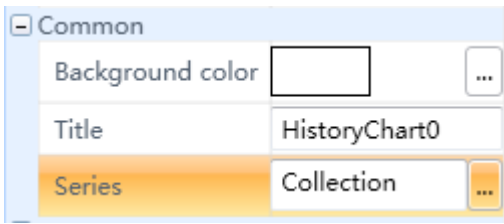
Once the historic record variable data is saved, to perform statistical analysis and process the data requires related display tools to view the historic record variable data. The DIAView software provides historic curves and reports to perform querying and analysis for the historic record variables.

### Historic curve

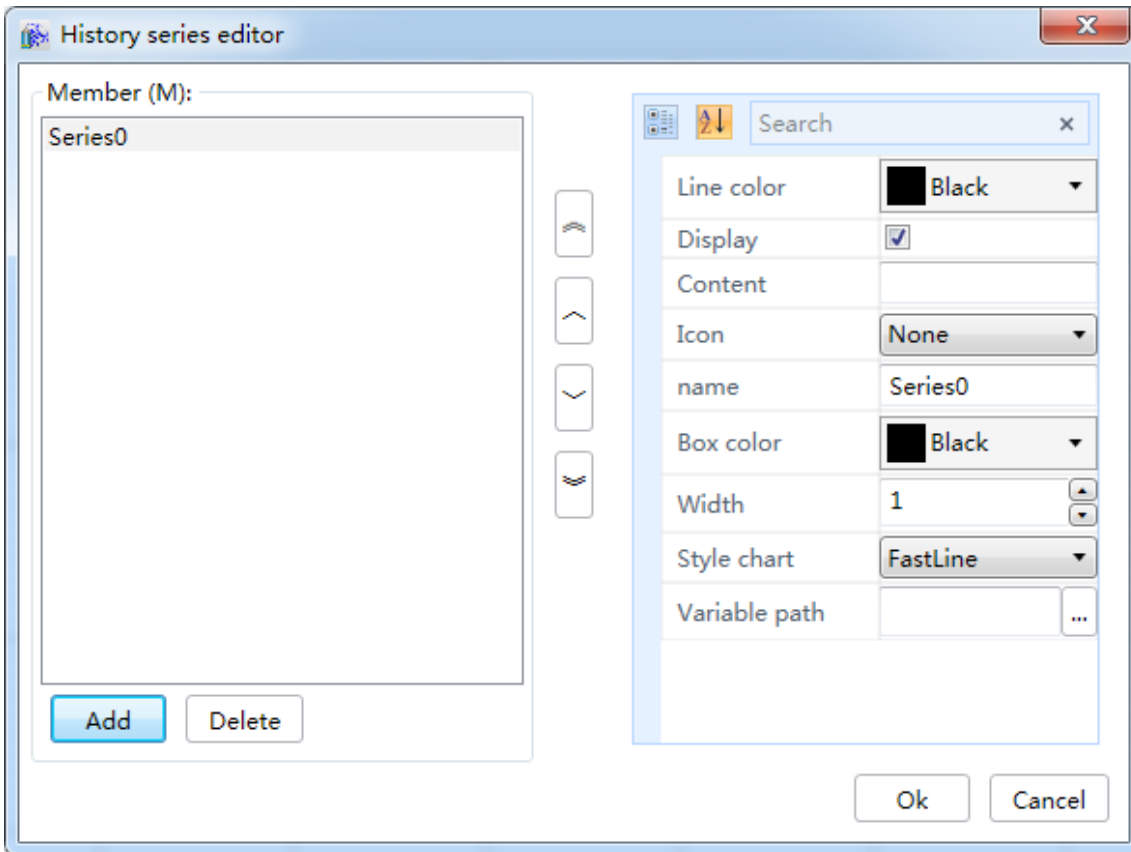
The historic curve can draw the historic record variable data within a time period into a curve and display it; it is a component. One historic record variable corresponds to one curve; multiple historic record variable curves can be configured and this is frequently used for data comparison and analysis. For the drawing of historic curves, please refer to the chapter “7.6.9 Historic curve”; steps to associate historic record variables are as follows:



- **Step 1:** After the historic curve is drawn, open its property window and click the “Charts” category item→ click the button in the “Curve” property field, as shown in the figure below:

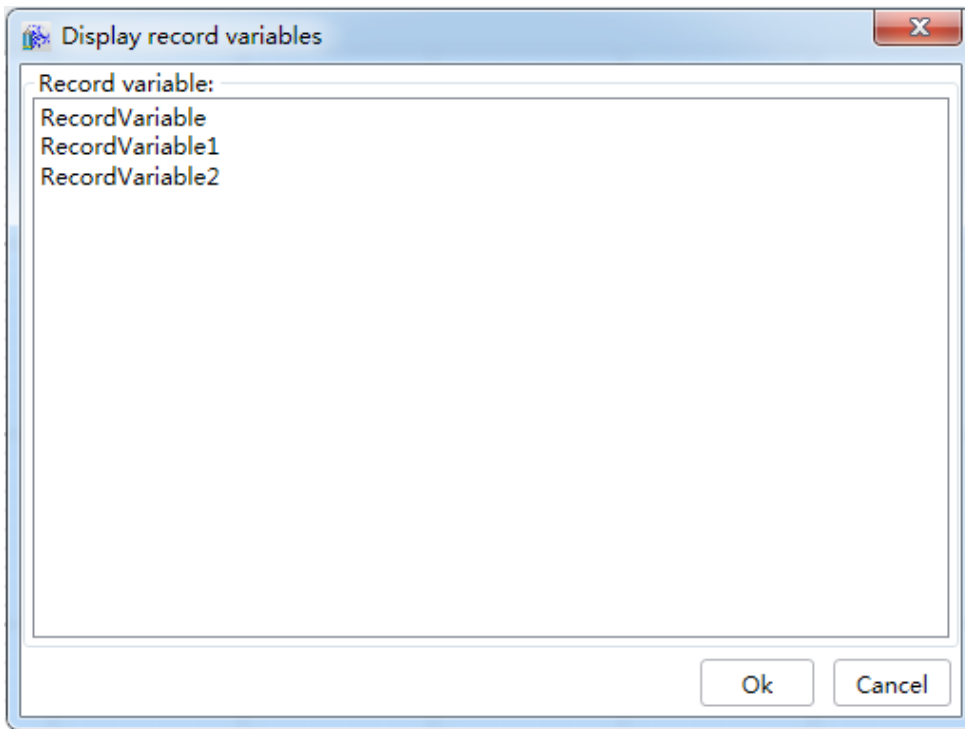


- **Step 2:** The “Historic curve editor” will appear, and then click the “Add” button to add curves, as shown in the figure below:



The system will generate a curve with a preset name; the left side of the window is the list of curve members and the right side is the corresponding curve property window.

- **Step 3:** Click the button in the “Variable path” field in the property window to the right, and the historic variable set editor window will appear, allowing you to select a historic record variable to associate with the curve, as shown in the figure below:

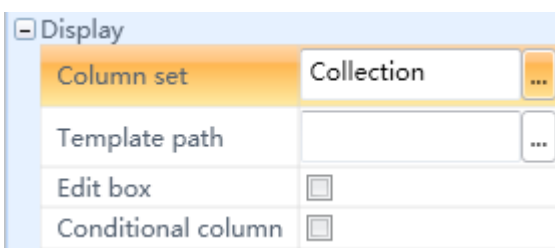


Press the “OK” button after selecting a historic record variable to return to the “Historic curve editor” window; press the “OK” button after setting the color of the curve and other properties to complete the configuration for a historic curve. The steps described above can be repeated to configure multiple historic curves.

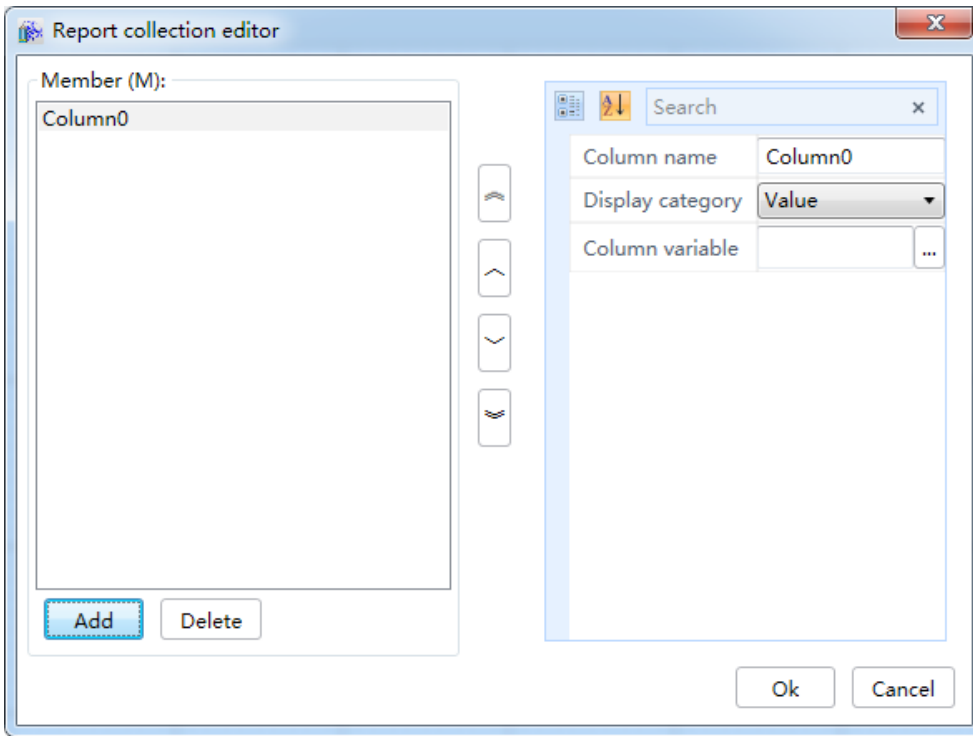
## Reports

Historic data of historic record variables can be displayed using a table format; the report component can display the historic data of multiple historic record variables using multiple rows. For the drawing of reports, please refer to the chapter “7.6.11 Reports”; steps to associate historic record variables are as follows:

- **Step 1:** After the report is drawn, open its property window and click the “Display” category item→ click the button in the “Row set” property field, as shown in the figure below:

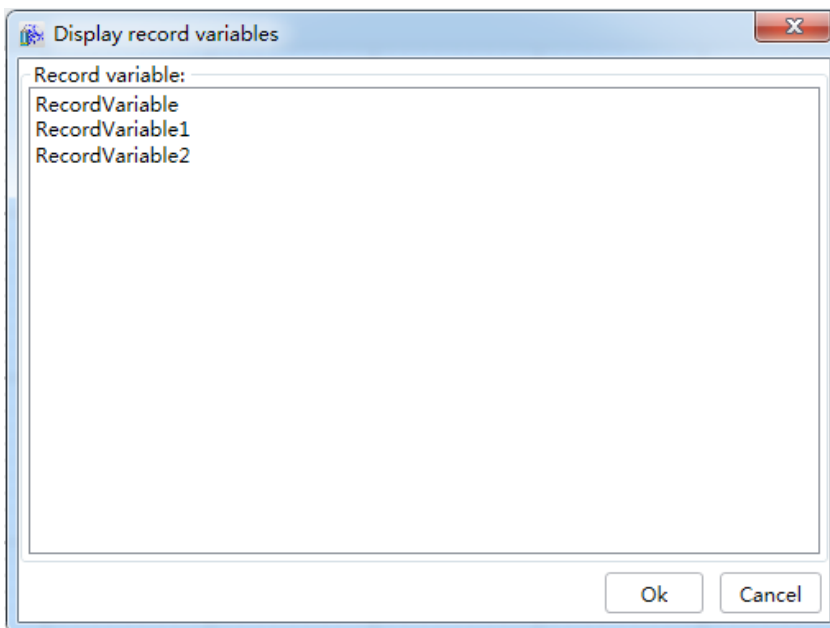


- **Step 2:** The “Report set editor” will appear, and then click the “Add New” button to add table rows, as shown in the figure below:



The system will generate a row with a preset name; the left side of the window is the list of row members and the right side is the corresponding row property window.

- **Step 3:** Click the button in the “Row variable” field in the property window to the right, and the historic variable set editor window will appear, allowing you to select a historic record variable to associate with the row, as shown in the figure below:



Press the “OK” button after selecting a historic record variable to return to the “Report set editor” window; press the “OK” button after changing the “Row name” to complete the configuration for a row in the report. The steps described above can be repeated to configure multiple rows in the report.

# 15. Recipe

## 15.1 Overview

In industrial production, recipe is the prescription that provides the method and material ratio for the ingredients of the product; in the DIAView software, recipe is the set of parameter values that corresponds to the variables during the production process. Take the basic ingredient recipe of a birthday cake for example, the recipe lists the ingredients to produce the cake (for example flour, eggs, sugar and water etc.) and the amount needed for each ingredient. Since different types of cakes need to be produced, their ingredients won't be completely the same; therefore this recipe lists all the ingredients that are used by these cakes, but the amount of ingredients used for different cakes are different. The following table is the cake recipe of a certain cake factory:

Recipe	Chocolate cake	Matcha cake	Cranberry cake
Flour	130g	100g	150g
Cocoa powder	30g	0g	0g
Egg	4eggs	3eggs	3eggs
White sugar	110g	60g	50g
Salad oil	45ml	0ml	0ml
Olive oil	0ml	0ml	50ml
Raisin	25g	0g	0g
Cream	50g	0g	0g
Butter	0ml	40ml	0ml
Water	300ml	200ml	100ml
Salt	0g	1g	0g
Matcha	0g	3g	0g
Cranberry	0g	0g	100g

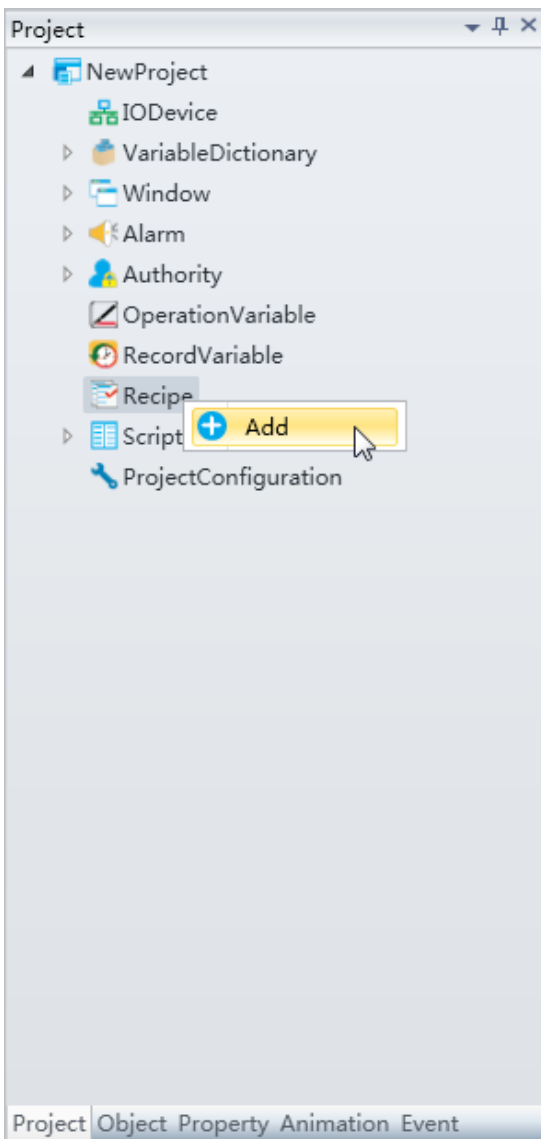
Recipe is the collection of various constituents, and each ingredient has its own parameter item. The recipe in the DIAView software are the recipe "ingredients" that corresponds to the variables in the project; the parameter of each specific recipe item is composed by acquiring variable values. Recipes can be preset value tables of ingredients and the various recipe items, or it can be maintained during the execution of the DIAView software.

The control unit “Recipe browser” in the DIAView software can be used to view and maintain recipes; it is easy to operate and highly efficient.

## 15.2 Recipe configuration

Configuring recipe means defining the ingredients of the recipe, the specific project and the value of the mount to use; configuration steps are as follows:

- **Step 1:** Open the project window tree index under the DIAView software development environment → open the “Recipe” node in the project index tree and click on “Add new” in the right-click menu; the system will create a recipe table with the preset name “Recipe 0”, as shown in the figure below:



- **Step 2:** Right-click on the added “Recipe 0” node and rename it to “Cake recipe”; double-click it to open the recipe table and click the “Add ingredient” button to add an ingredient, as shown in the figure below:

	Name	Recipe type	Associated variables	Description
1	RecipeElement	Analog		

The meanings of each setting in the window are as follows:

- » Name: Name of the recipe, which is the name of the ingredient.
- » Recipe type: Recipe ingredient type; there are 3 types: analog value, digital value and text amount.
- » Associated variable: Project variable associated to the recipe ingredient.
- » Description: Explanation information for the recipe ingredient.

The functions of each button in the toolbar of the recipe window are as follows:

- » Add ingredient: Adds an ingredient at the bottom of the recipe table using a name preset by the system. Each ingredient is a row in the recipe table.
- » Insert ingredient: Inserts an ingredient on top of the row selected in the recipe table using incremented naming of the selected row.
- » Delete ingredient: Deletes the selected recipe ingredient.
- » Add item: Adds recipe items, which means adding rows in the recipe table; double-click the title of the row to change the name of the row. Rows in the recipe table such as “Name”, “Recipe type”, “Associated variable” and “Description” are components of every ingredient recipe; their row names cannot be changed.
- » Insert item: Inserts a recipe item to the left of the selected row; the row name uses incremented naming of the selected row.
- » Delete item: Deletes the selected recipe item.
- » Import: Imports external recipe data in Excel into the recipe table.
- » Export: Exports the data in the recipe table to an Excel table.

- **Step 3:** Change the ingredient name, select the recipe type and associate project variables etc. to complete the configuration of a recipe table, as shown in the figure below:

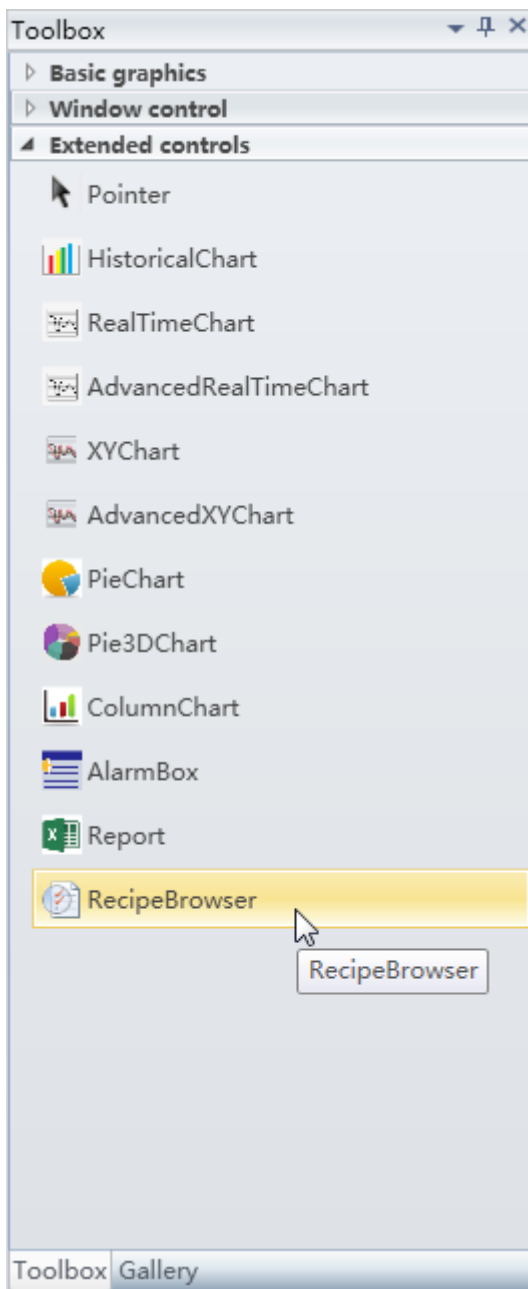
	Name	Recipe type	Associated variables	Description	ChocolateCake	StrawberryCake
1	flour	String	Var.VariableGroup0.Variableg		130	110
2	egg	String	Var.VariableGroup0.Variable		3	4
3	sugar	String	Var.VariableGroup0.Variableg		30	50
4	edibleoil	String	Var.VariableGroup0.Variableml		43	51
5	raisin	String	Var.VariableGroup0.Variableg		20	30
6	cream	String	Var.VariableGroup0.Variableg		60	55
7	water	String	Var.VariableGroup0.Variableml		200	210
8	strawberry	String	Var.VariableGroup0.Variableg		0	12
9	chocolate	String	Var.VariableGroup0.Variableg		10	0

## 15.3 Recipe browser

The recipe browser in the DIAView software is dedicated to browsing and operating visualized components of recipe; it can automatically identify recipe tables created in the system and only requires matching of recipe names in the property to view and maintain recipes. It is very easy to use and highly efficient.

### Using recipe browser:

In the toolbox on the main interface of the DIAView software development environment, open the advanced control unit group and click on “Recipe browser”:



Draw a “Recipe browser” on the sketchpad and select a recipe table in its “Recipe name”

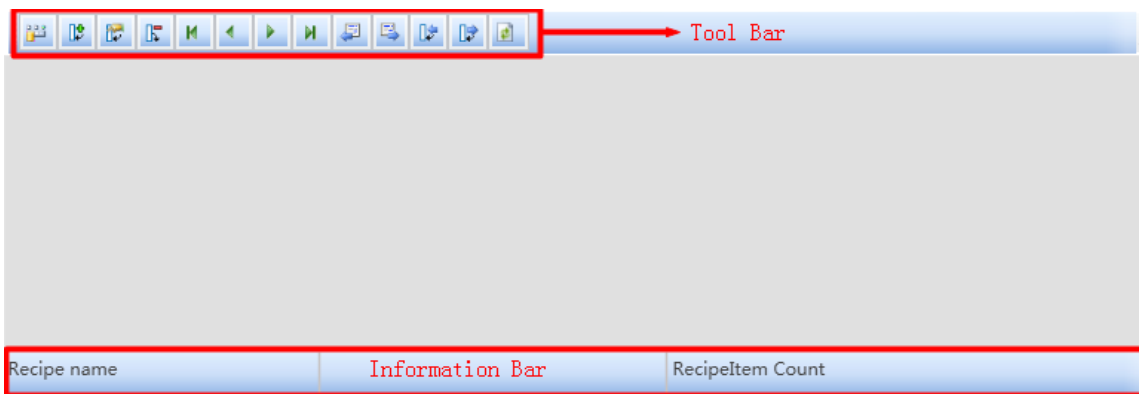
property; adjust its other properties including size, background color and toolbar etc. The effect once the configuration is complete is as shown below:

	SweetCake	FruitCake	WheatCake
water	10	10	10
salt	5	5	5
milk	20	20	20
flour	20	20	20
fruit	5	40	0
Suger	30	10	10

Recipe name	Recipe0	RecipeItem Count	6
-------------	---------	------------------	---

### Composition of recipe browser:











The toolbar includes tool buttons to operate the recipe table, including “Add recipe item”, “Edit recipe item”, “Write variable value to recipe item” and “Import recipe” etc.;






The display area of the recipe table displays recipe data that are already configured in the project;

The information field displays relative information of the recipe.

### Functions of recipe browser toolbar buttons:

- »  Switches between displaying information on the currently selected recipe item or displaying information of all recipes.
- »  Adds a recipe item in the currently selected recipe table.
- »  Edits the value of the currently selected recipe item.
- »  Deletes the currently selected recipe item.
- »  Shifts the focus to the first recipe item of the current recipe table.
- »  Shifts the focus to the previous recipe item of the current recipe item.
- »  Shifts the focus to the next recipe item of the current recipe item.
- »  Shifts the focus to the last recipe item of the current recipe table.



- »  Imports data from Excel and overwrites the current recipe table.
- »  Exports the current recipe table to Excel.
- »  Writes the variable value into the currently selected recipe item.
- »  Writes the currently selected recipe item to the variable.
- »  Updates the data in the recipe browser.

Performing operations to the recipe browser using the buttons in the toolbar during execution and changing the data of the recipe table will not affect the data in the development environment directly. To save the recipe data modified during current execution, the DIAView software development environment must be closed before modifying the data; once modification is complete, restart the DIAView software development environment and load the project and the updated data can be seen in “Recipe”.

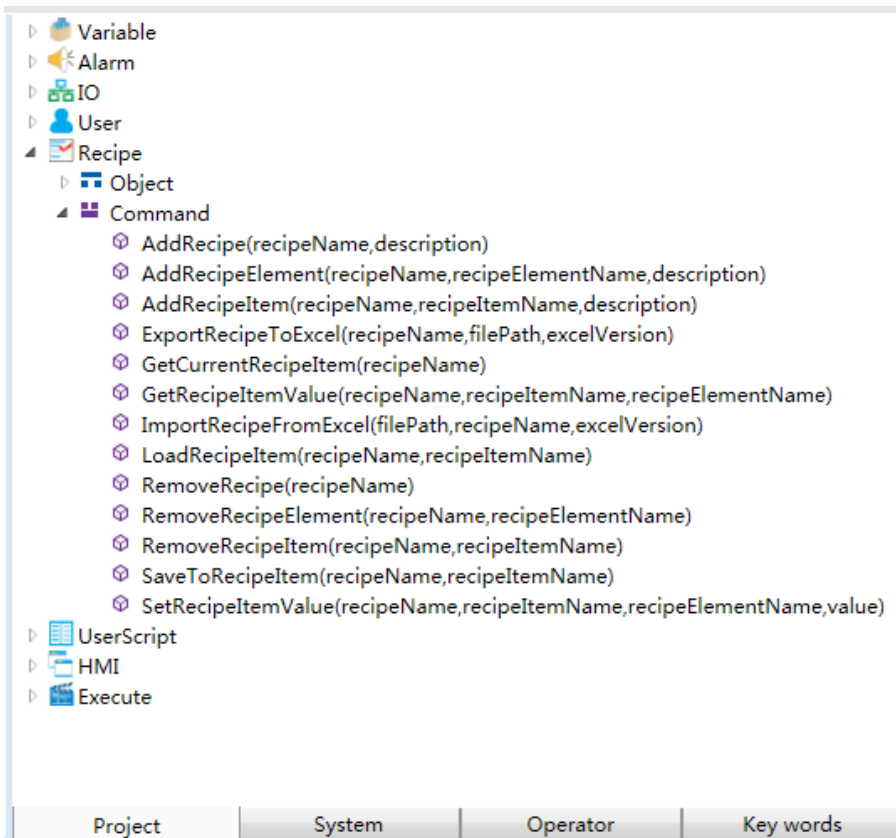
### Recipe browser properties:

Properties	Effect
(Display)	Whether to display during execution.
Lock	Once locked, it cannot be moved, deleted, cut or make size adjustments.
(Name)	Recipe browser name
Security level	Sets the security level that has recipe browser operating authority.
Add	Whether to display the “Add” tool button.
All	Whether to display the “All” tool button.
Delete	Whether to display the “Delete” tool button.
Edit	Whether to display the “Edit” tool button.
Last	Whether to display the “Last” tool button.
Export	Whether to display the “Export” tool button.
First	Whether to display the “First” tool button.
Import	Whether to display the “Import” tool button.
Next	Whether to display the “Next” tool button.
Previous	Whether to display the “Previous” tool button.
Update	Whether to display the “Update” tool button.
Write in	Whether to display the “Write in” tool button.
Write out	Whether to display the “Write out” tool button.
Coordinates	The X and Y coordinates of the recipe browser.
Rotation angle	The rotation angle of the recipe browser.
Size	The length and width size of the recipe browser.
Center point	Center point coordinates and size ratio.
Background color	The background color of the recipe browser.
Font	Sets the font style and font size etc. of the recipe table.
Status bar	Whether to display the status bar of the recipe browser.
Toolbar	Whether to display the toolbar of the recipe browser.
Font color	Sets the font color of the recipe table.
Recipe name	Selects a created recipe table name as the recipe currently displaying.
Horizontal zoom	The horizontal zoom level of the recipe browser; ranges between 0.1 to 100 up to two decimal places. The preset value is 1.
Vertical zoom	The vertical zoom level of the recipe browser; ranges between 0.1 to 100 up to two decimal places. The preset value is 1.
Horizontal distortion	The level of distortion of the recipe browser in the horizontal direction; ranges between -80 to 80 up to two decimal places. The preset value is 0.

Vertical distortion	The level of distortion of the recipe browser in the vertical direction; ranges between -80 to 80 up to two decimal places. The preset value is 0.
Horizontal offset	Left and right offset of the recipe browser in the horizontal direction; a positive value offsets it to the right and a negative value offsets it to the left. The preset value is 0.
Vertical offset	Up and down offset of the recipe browser in the vertical direction; a positive value offsets it to the bottom and a negative value offsets it to the top. The preset value is 0.

### Recipe command:

Recipe commands can be used in event scripts to perform operations to the recipe, as shown in the figure below:



For specific effects of each command function, please refer to the “DIView software script and function manual”.

# 16. Users scripts

## 16.1 Overview

Users scripts are programs with special functions written by users; it can complete and expand the functions of the DIAView software. When a user writes programs in the project, it can flexibly use and control the various resources of the DIAView software such as graphic objects and commands etc., and is able to improve and optimize system workflow and increase the efficiency of execution.

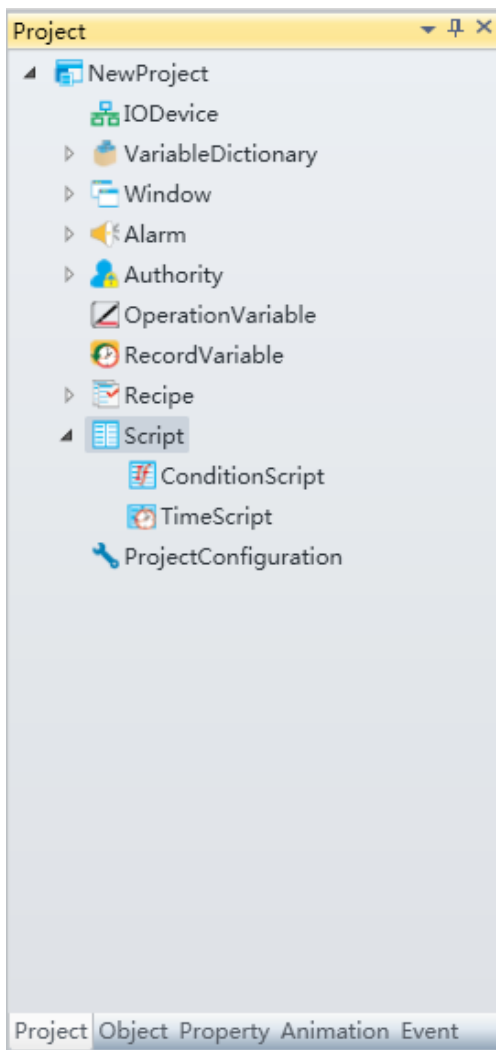
The DIAView software has a built-in script editor provided for users to write customized programs; it uses the VB Script language. VBS is a featherweight interpreted scripting language that is easy to learn and has powerful functions; the script editor has flexible and intelligent reminder function that allows users to write programs more easily, conveniently and highly efficiently.

The DIAView software has two types of user programs: condition program and time program.

## 16.2 Condition Script

Condition programs are customized programs that the system will execute when items in the project satisfies the conditions set; configuration steps are as follows:

- **Step 1:** In the DIAView software development environment, open the project window tree index → open the “User program” node, as shown in the figure below:



- **Step 2:** Double-click the “Condition program” sub-node to open the condition program window; click the “Add” button to add a program configuration row, as shown in the figure below:

The screenshot shows the 'ConditionScript' configuration window with the following table:

	Name	IsEnable	Expression	Trigger mode	Time interval (ms)	Script content	Description
1	ConditionScript	<input checked="" type="checkbox"/>		Value change	N/A		

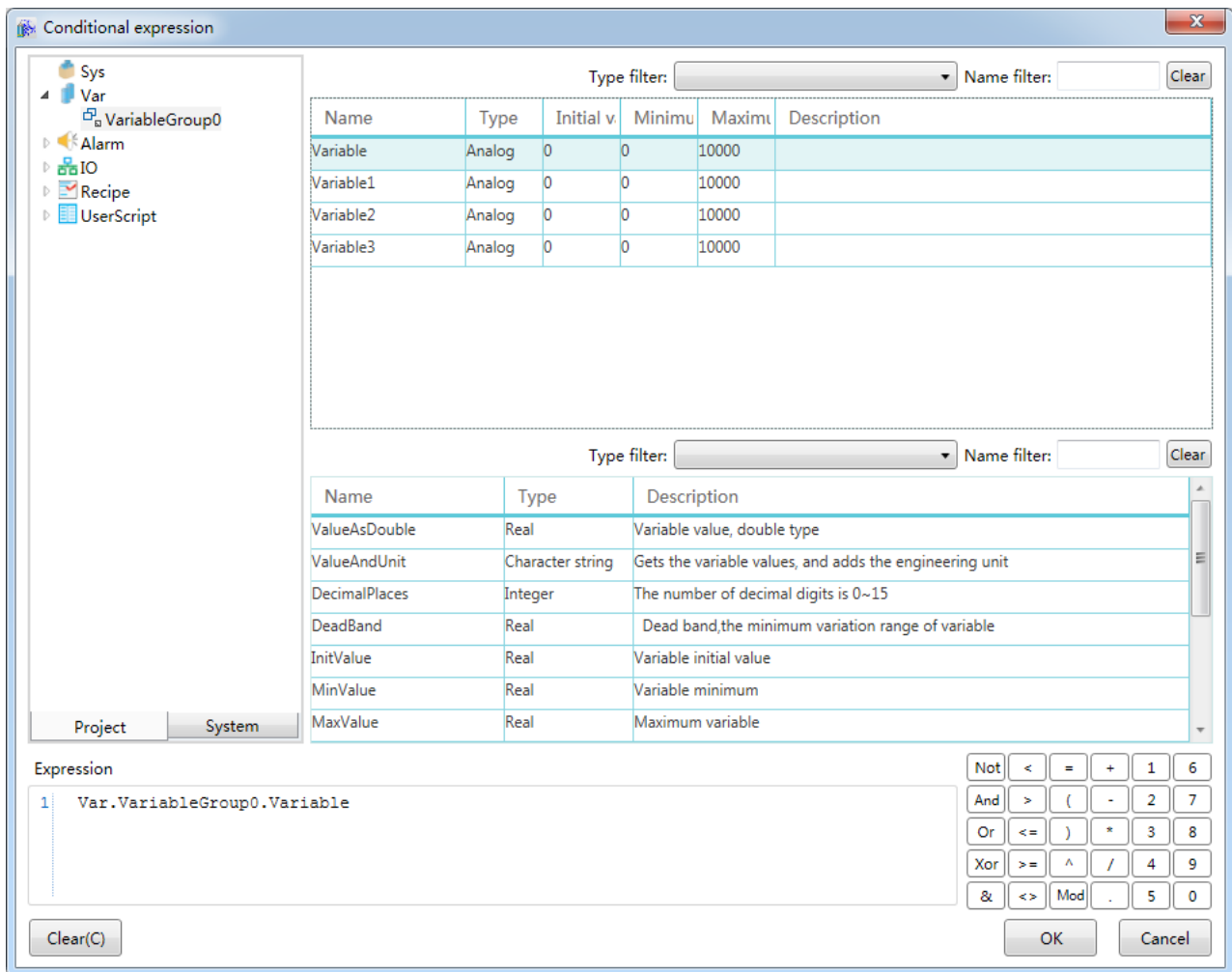
Buttons: + Add, ▾ Insert, ✖ Delete

The meanings of each field in the condition program are as follows:

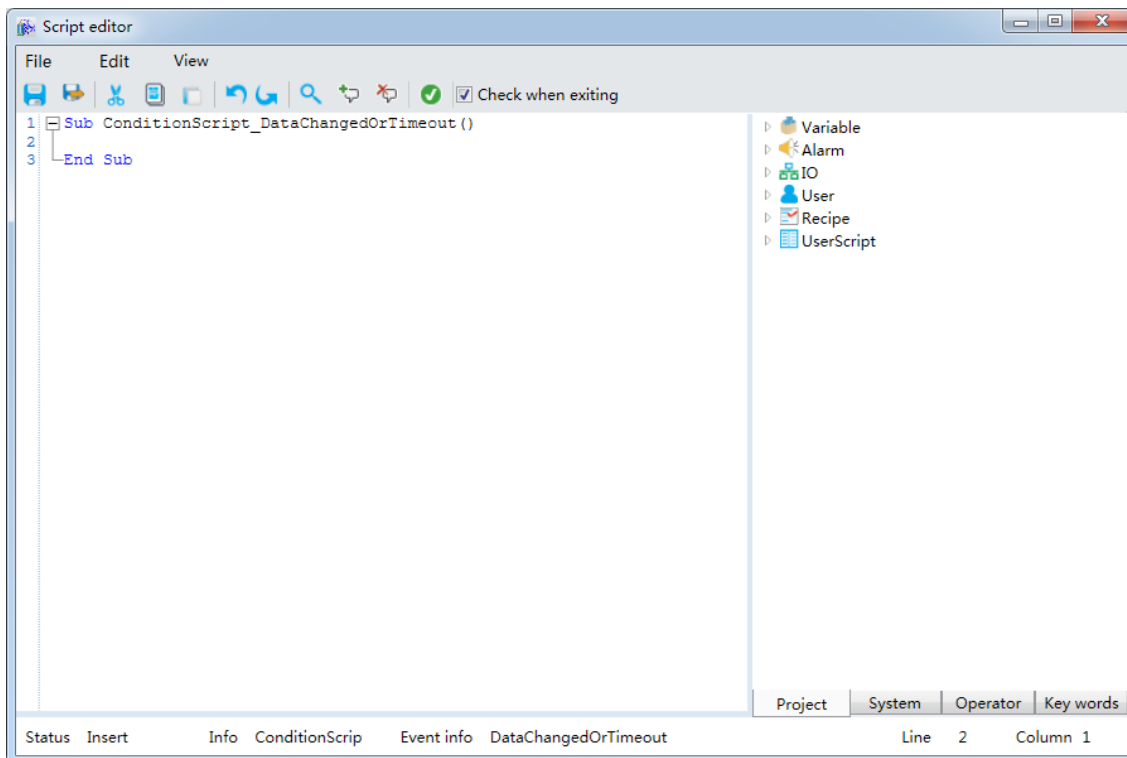
- » Name: Name of the condition program (this name cannot be the same name as in the “time program”).
- » Whether to enable: Selecting the checkbox means enabling this condition program, or else it means not enabled (preset to enabled).
- » Expression: Sets the condition expression.
- » Trigger method: There are 5 types: when the value changes, when value changes to true, when value changes to false, when the value remains as true and when the value remains as false. Which are the conditions that the expression needs to satisfy; only when this condition is satisfied will the system be triggered to execute the configured program.

- » Time interval: Sets the time interval for the system to execute the configured program; this can only be set when the trigger method is “value remains as true” and “value remains as false”.
- » Script content: Writes the script program.
- » Description: Explanation information of the condition program.

- **Step 3:** Click the button in the “Expression” field to open the condition expression configuration window and set the expression, as shown in the figure below:



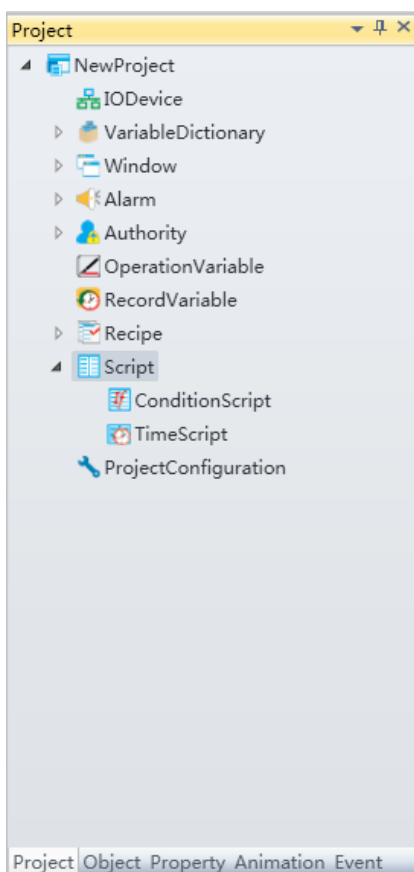
- **Step 4:** Select the trigger method; when set as “value remains as true” or “value remains as false”, the time interval must also be set (unit: milliseconds);
- **Step 5:** Click the button in the “Script content” field to open the script editor and write the script program, as shown in the figure below:



## 16.3 Time Script

Time programs are user customized programs that the system executes when the project starts, during project execution or when the project stops; configuration steps are as follows:

- **Step 1:** In the DIAView software development environment, open the project window tree index → open the “User program” node, as shown in the figure below:



- **Step 2:** Double-click the “Time program” sub-node to open the time program window; click the “Add” button to add a program configuration row, as shown in the figure below:

	Name	IsEnable	Trigger mode	Configuration	Script content	Description
1	TimeScript	<input checked="" type="checkbox"/>	Startup	N/A		

The meanings of each field in the time program are as follows:

- » Name: Name of the time program (this name cannot be the same name as in the “condition program”).
- » Whether to enable: Selecting the checkbox means enabling this time program, or else it means not enabled (preset to enabled).
- » Trigger method: There are 6 types: When started, when stopped, one-time, continual, weekly and monthly. Which is the time for triggering the system to execute the configured program.
- » Configuration: Sets the time condition for the system to execute the configured program; this can only be set when the trigger method is “one-time”, “continual”, “weekly” and “monthly”.
- » Script content: Writes the script program.
- » Description: Explanation information of the time program.

- **Step 3:** Select the trigger method; time conditions must also be set when the trigger method is set as “one-time”, “continuous”, “weekly” and “monthly”. The figure below is the configuration window that appears when the trigger method is set as “one-time” and the button in the “Configuration” field is pressed:

	Name	IsEnable	Trigger mode	Configuration	Script content	Description
1	TimeScript	<input checked="" type="checkbox"/>	One time	11/13/2015 00:00:00		

**Configuration**

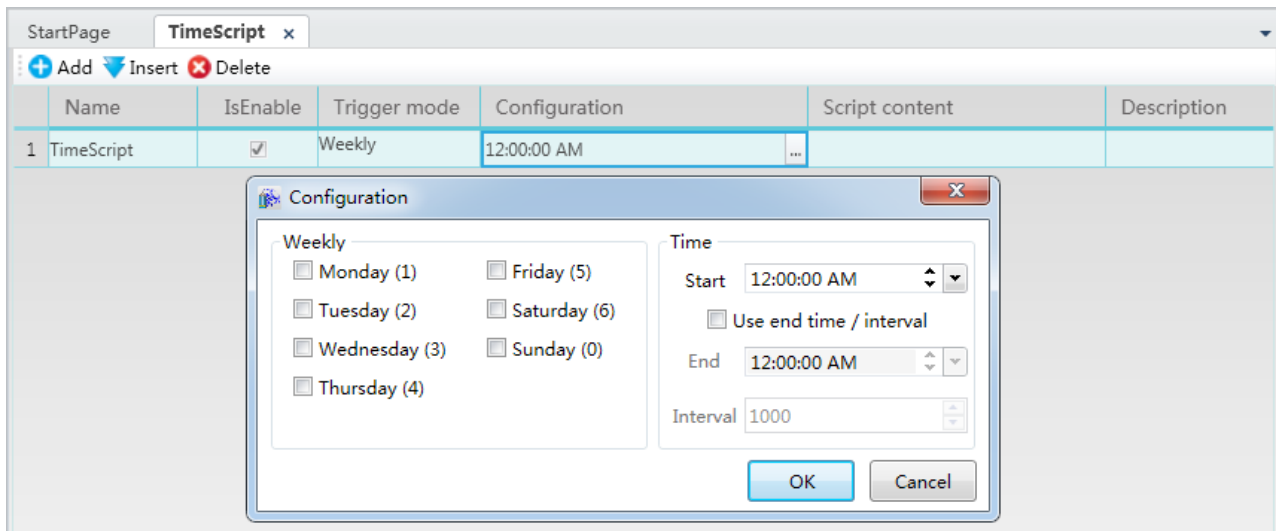
One time

Date: 11/13/2015

Time: 12:00:00 AM

OK Cancel

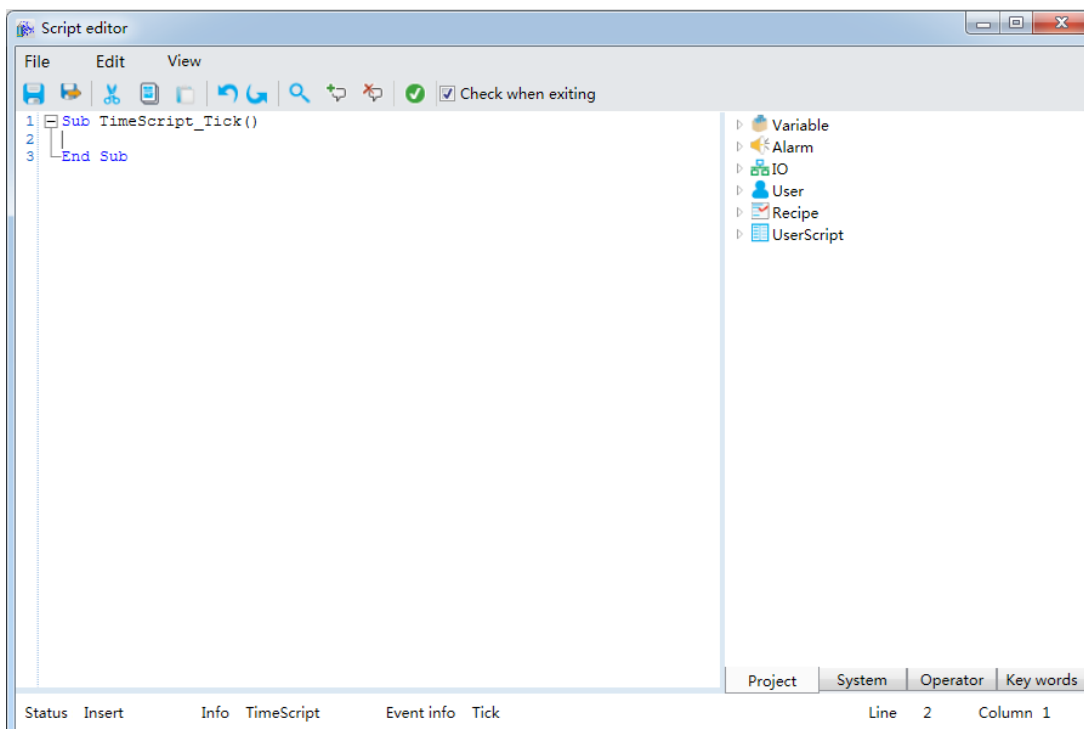
The following figure is the configuration window that appears when the trigger method is set as “weekly” and the button in the “Configuration” field is pressed.



The meanings of each configuration in the window are as follows:

- » Weekly: Selects the weekly triggering time.
- » Start: Sets the start time.
- » Whether to use end time/interval: If checked, the two settings “End” and “Interval” can be set; or else they cannot be set.
- » End: Sets the end time (if the set start time > end time, the trigger period will be: starts from the start time set and ends at the end time set on the following day. If the set start time < end time, the trigger period will be: starts from the start time set and ends at the end time set).
- » Interval: Sets the interval time, unit: milliseconds (ms).

- **Step 4:** Click the button in the “Script content” field to open the script editor and write the script program, as shown in the figure below:





# 17. Project configuration

## 17.1 Overview

In the DIAView software, the main function of project configuration is to configure the database for the execution environment, the shortcut keys of the execution environment, and the screen that opens when executing a project.

Databases are configured to realize connection with external databases, and further allow the DIAView software to perform information handshake with frequently used commercial databases (Compact, SQL Server, Oracle); data information of record variables, alarms and events etc. in the system can be saved into the database to achieve data sharing between the DIAView software and the user's ERP or MES systems etc.

Shortcut key configuration is mainly to set shortcut keys that can be used during project execution.

Screen configuration is to set the screen to open and the display order of the screens during project execution.

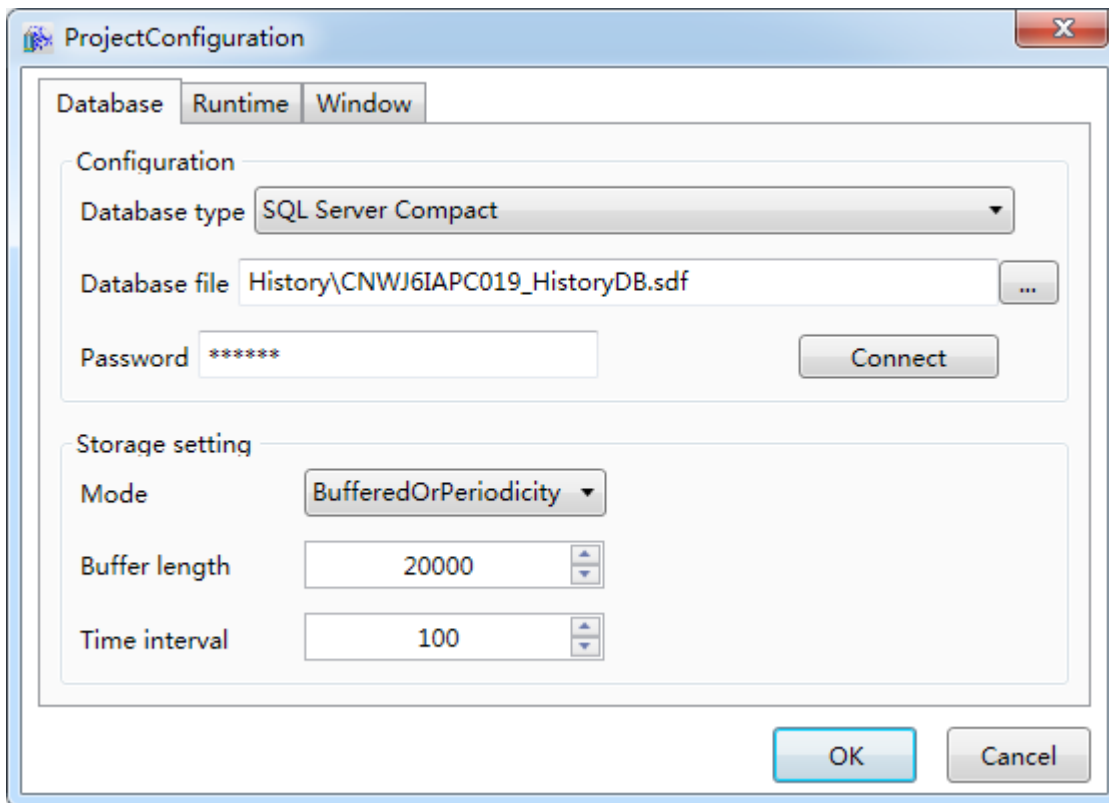
## 17.2 Project configuration

### Database

Mainly used to configure related setting files for connecting to external databases.

Configuring steps are as follows:

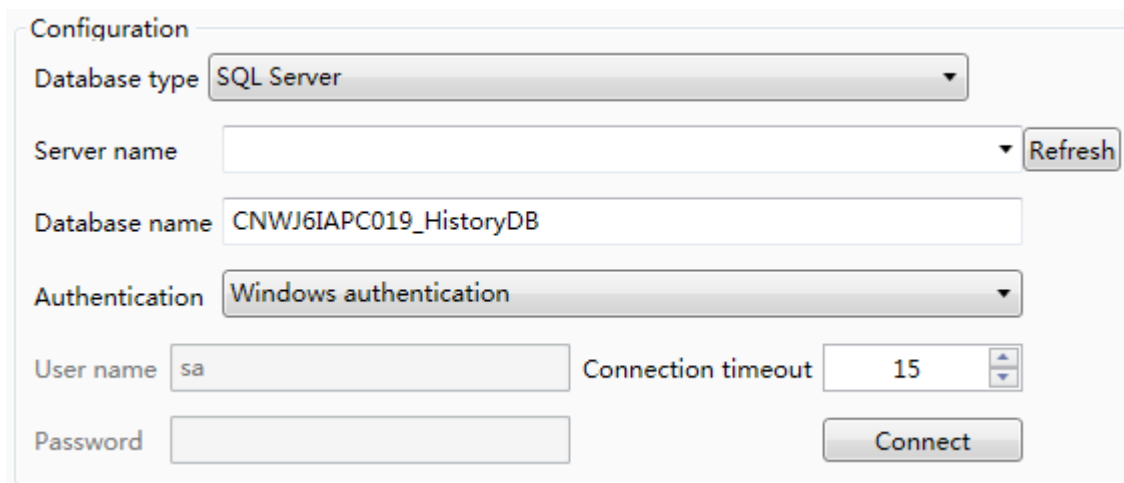
- **Step 1:** In the DIAView software development environment, open the project window tree index → double click the "Project configuration" node in the tree index to open the project configuration window, as shown in the figure below:



■ **Step 2:** Set related properties in the “Database configuration” field;

**Data source type:** Select the data source type to use; the DIAView software currently supports two types: SQL Server and SQL Server Compact.

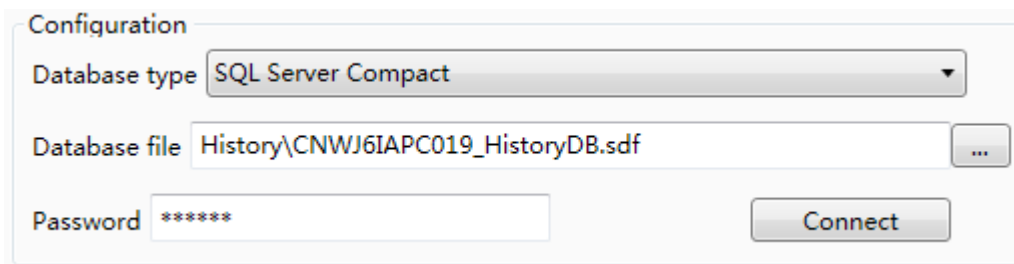
» When “SQL Server” is selected, the database configuration is as shown in the figure below:



- » Server name: Enter the server name or IP address of the database to connect to; click the pull-down button to automatically search for servers within the network.
- » Database name: Enter the database name to use (length: 2 thousand words).
- » ID authentication: The method to authenticate the ID when logging in the server; there are two methods: Windows ID authentication and SQL ID authentication; if the database is configured on a local host, select “Windows ID authentication”; if the database is configured on a remote computer, select “SQL ID authentication”.

- » User name: Sets the user name for SQL ID authentication login.
- » Password: Sets the user password used for SQL ID authentication login.
- » Connection timeout: Sets the time for the database to switch connection or reconnect after connection has failed, and report an error if exceeded this time; unit: seconds.
- » Connection test: Tests whether it can connect to the database server.

When “SQL Server Compact” is selected, the database configuration is as shown in the figure below: The second field is the “Database file”, enter the database file path and the file name, as shown in the figure below:



The screenshot shows a configuration window titled "Configuration". It contains three main fields: "Database type" is a dropdown menu currently showing "SQL Server Compact"; "Database file" is a text input field containing the path "History\CNWJ6IAPC019\_HistoryDB.sdf" and a browse button (three dots) to its right; "Password" is a text input field containing six asterisks. A "Connect" button is positioned to the right of the password field.

- » Database file: Enter the database file path and file; the button to the right can be pressed to select the folder.
- » Password: Database password; leave empty if not password is required.
- » Connection test: Tests whether it can connect to the database.

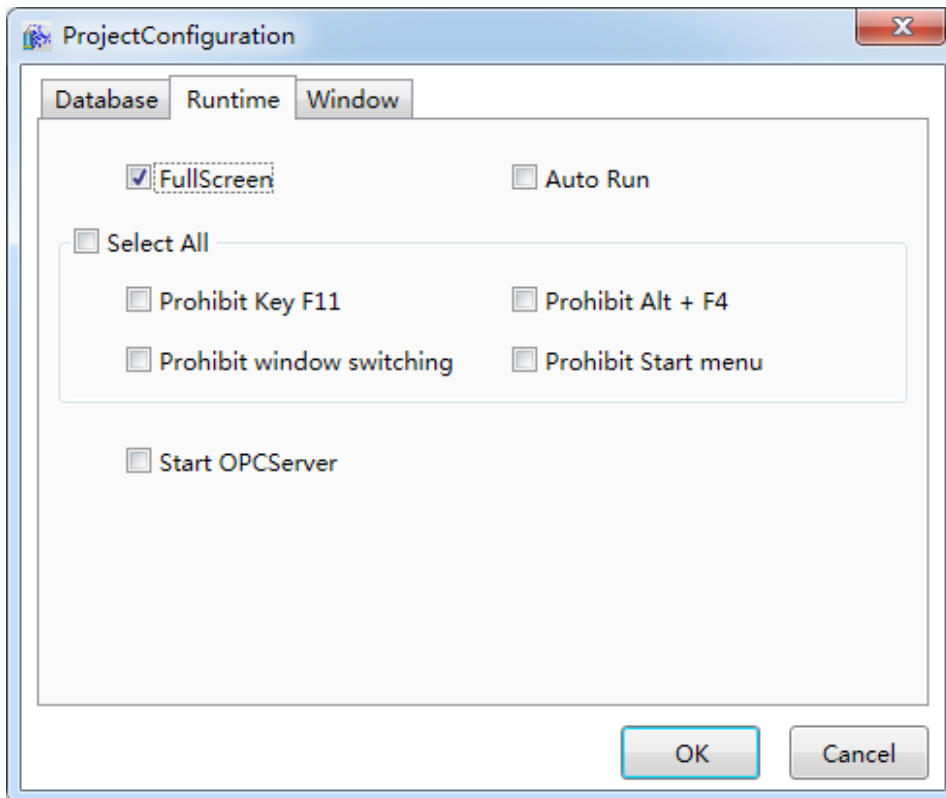
■ **Step 3:** Set related properties in the “Save settings” field;

- » Save mode: Sets the save mode of the database; there are four modes: Buffered, Periodicity, BufferedOrPeriodicity and SingleInsert.
- » Buffer length: Sets the number of records for buffer save, unit: entries; this property can only be used when the save mode is Buffered and BufferedOrPeriodicity.
- » Save time interval: Sets the time interval for periodic saves, unit: seconds; this property can only be used when the save mode is Periodicity and BufferedOrPeriodicity.

Once setting is complete, press the “OK” button to save project configuration information.

## Execution

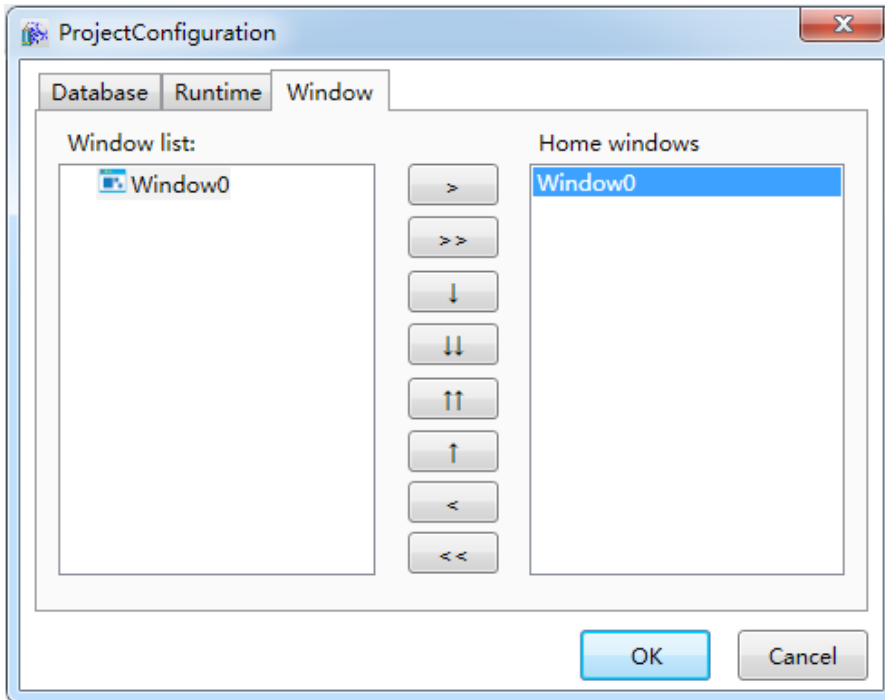
Sets the shortcut keys etc. during execution, as shown in the figure below:







- » Self-adjustment full-screen: The execution window size automatically adjusts to full screen.
- » Auto execution upon power on: Set the computer to automatically execute this project once powered on.
- » One-button prohibits following shortcut keys: Once selected, all checkbox in the group block will be selected.
- » Prohibit F11 key: During project execution, prohibiting the use of the F11 key to switch to full screen mode.
- » Prohibit closing: During project execution, prohibit the use of “Alt + F4” to close the project.
- » Prohibit window switching: During project execution, prohibit the use of “Alt + Tab”/“ Windows key + Tab” buttons to switch between windows.
- » Prohibit start menu: During project execution, prohibit the use of the “Windows” key to open the start menu.

## Screen

Sets the screen to open and the display order of the screens during project execution, as shown in the figure below:



Select the screen window to open when the project executes from the “Screen list” field, and then click the  button to add the selected screen window into the “Initial screen” field; press the  button to add all screen windows into the “Initial screen” field. The initial screen can be one or multiple screens, the newly added screen window is located at the bottom; if there are multiple screens, the  button can be used to move the screen up and the  button can be used to move the screen down.

Screen open order: The screen windows in the “Initial screen” list will be opened in the order from top to bottom; the window opened last (which is the bottom-most window in the list) will be displayed at the front.

Once setting is complete, press the “OK” button to save execution configuration information.

# 18. Script editor

## 18.1 Overview

The DIAView software functions are comprehensive and powerful, but customers need different functions; some functions require additional customization according to user needs. The DIAView software can use the script editor to write related programs to complete certain special tasks and functions.

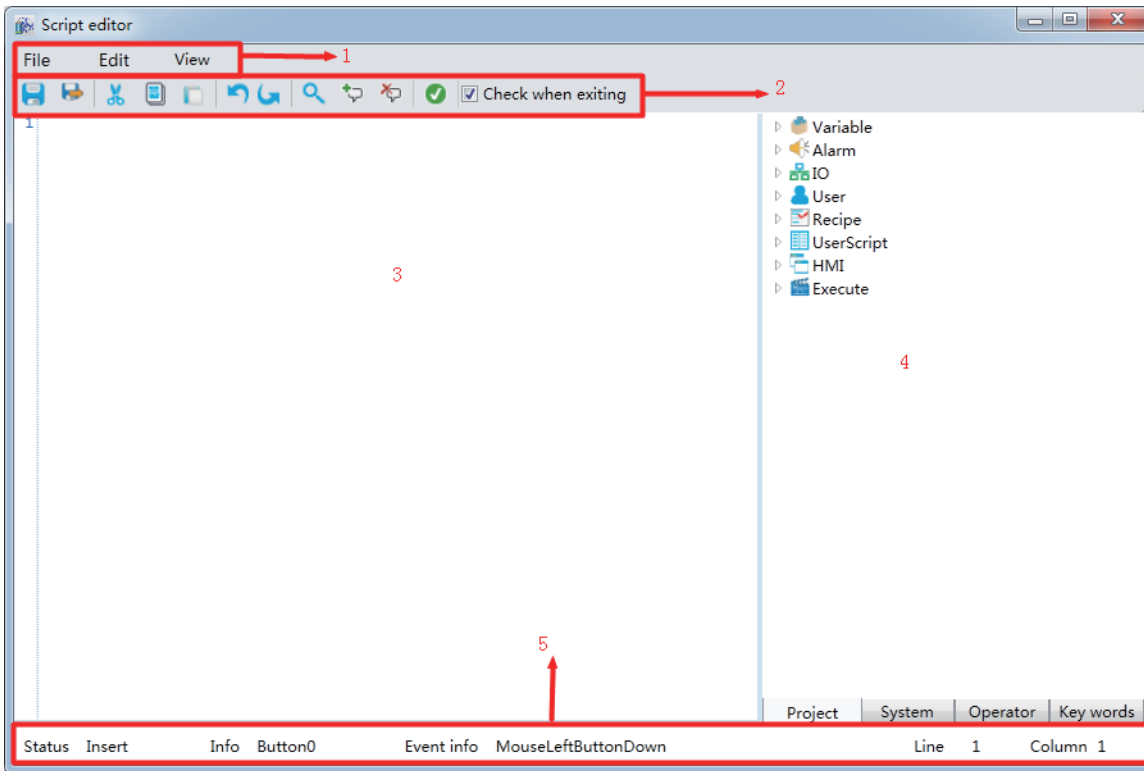
Event configuration and user program etc. in the DIAView software all require the script editor to write scripts. The DIAView software uses the VB Script language; users can write logic control programs according to VB Script language specifications to complete special functions and enhance the availability of the system.

## 18.2 Introduction to script editor functions

The writing of scripts are achieved in the script editor; in order to help users accurately edit scripts, the script editor not only provides functions such as intelligent reminders, highlighted syntaxes, one-key typesetting and precise positioning etc., it also provides the syntax check function.

The script editor of the DIAView software has basically the same interfaces, structures and functions that common editors have. The following methods can be used to open the script editor.

Select “Window” in the project window tree index of the DIAView software development environment → right-click “Add window” → draw any graphic in the window sketchpad → select the graphic and open a button in the event configuration field of the “Event” window, and the script editor will appear, as shown in the figure:









Script editor components:

1. Menu bar: A menu that provides basic functions of various operations.
2. Toolbar: Operation function shortcut buttons.
3. Script editing area: The area where the script program is written.
4. Project/system/operator/key word tree index window: Directory window for various operations.
5. Message bar: Displays the editing status and operation information etc.











## 18.2.1 Menu bar

The menu bar of the script editor includes the following menu and menu items.

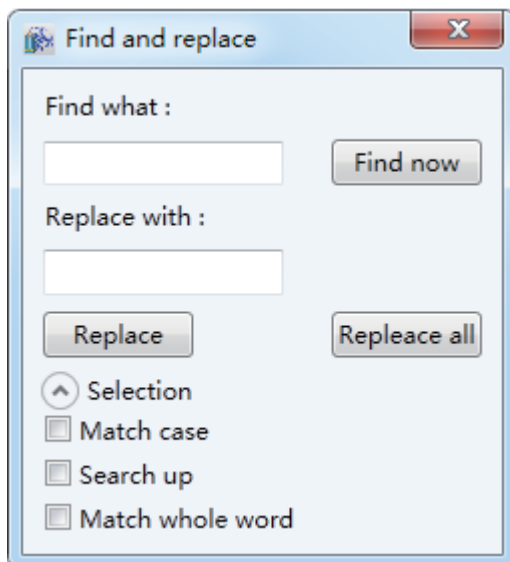
(1) File menu

Command button	Function
 Import	Imports external instruction file.
 Export	Saves the current script content to an external instruction file.
 Save	Saves the current script content.
 Save and exit	Saves the current script content and exits the script editor.
 Check	Perform syntax check for the contents of the current script; the check results will be displayed in the "Output window".
 Exit	Discards the edited script content and exits the script editor.

## (2) Edit menu

Command button	Function
 Undo	Press this command to cancel previously executed commands and start from the last operation.
 Reset	Press this command to reset the previous undo command and start from the last operation.
 Cut	Select the text within the script editing area and press this command to delete the text and copy it into the clipboard.
 Copy	Select the text within the script editing area and press this command to keep the text and copy it into the clipboard.
 Paste	Pastes the content in the current clipboard into the script editing area.
 Delete	Select the text within the script editing area and press this command to delete the text.
 Select all	Press this command and all text in the script editing interface will be selected.
 Find and replace	Press this command and a secondary menu will appear. It includes three commands: Find, replace and replace all. Please refer to below for details.
 Switch to row	Achieves quick positioning function; enter the row number in the dialog block that appears and then press "OK", the system cursor will move to the end of the row and select that line of script.
 One-key typesetting	Press this command and the text in the script editing area will automatically perform format arrangement.

**Find and replace:** Press this command and the following dialog block will appear:



- » Find: Enter the text to search for in this editing block.
- » Case sensitive: If this item is selected, it will only display examples that have exactly the same cases as the string content in "Find target".
- » Find upwards: Select this item and it will start searching upwards from the current location of the cursor.





- » Match whole word: Select this item and only examples that matches all words in the “Find target” string will be displayed.

For example, find “aaa” and the result will return “aaa”; it will not return “baaa” or “aaac”.

- » Replace: First enter the search content and then enter the replace content, and then simply press the “Replace” button.
- » Replace all: Enter the search content and replace content, and then simply press the “Replace all” button.

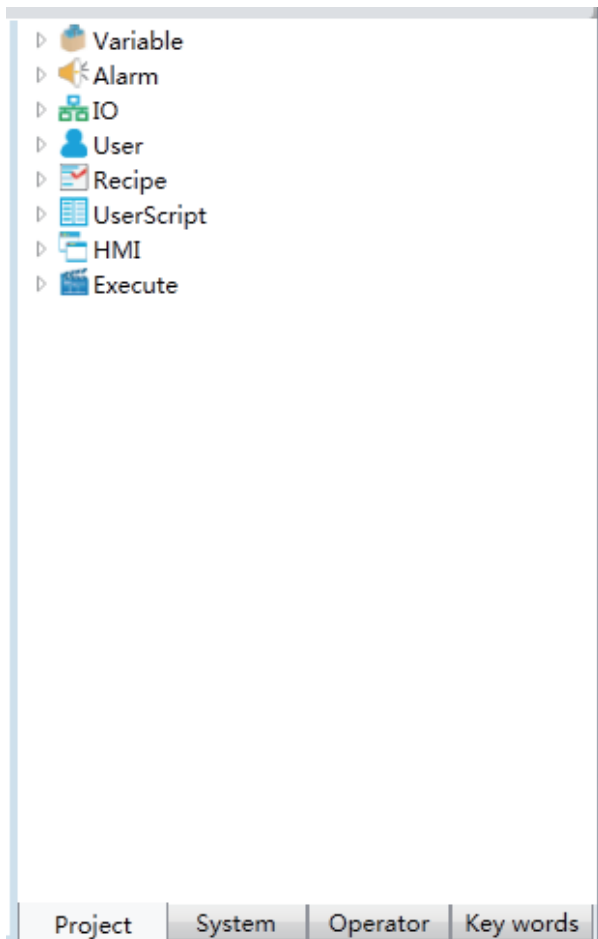
The options of “Replace” and “Replace all” have the same effects as the “Find” option.

(3) View menu

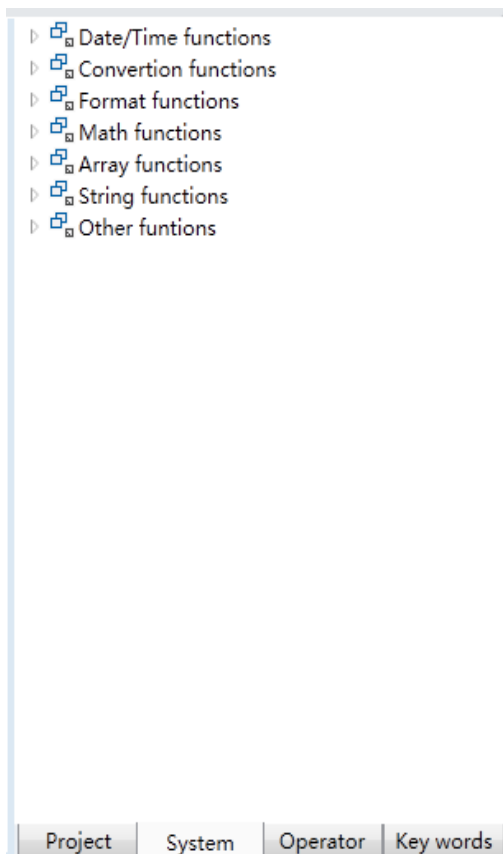
Command	Function
 Font setting	Press this command and a secondary menu will appear used to set the font style and font size.
 Display/hide output window	Press this command will display or hide the output window.

## 18.2.2 Project/system/operator/key word tree index window

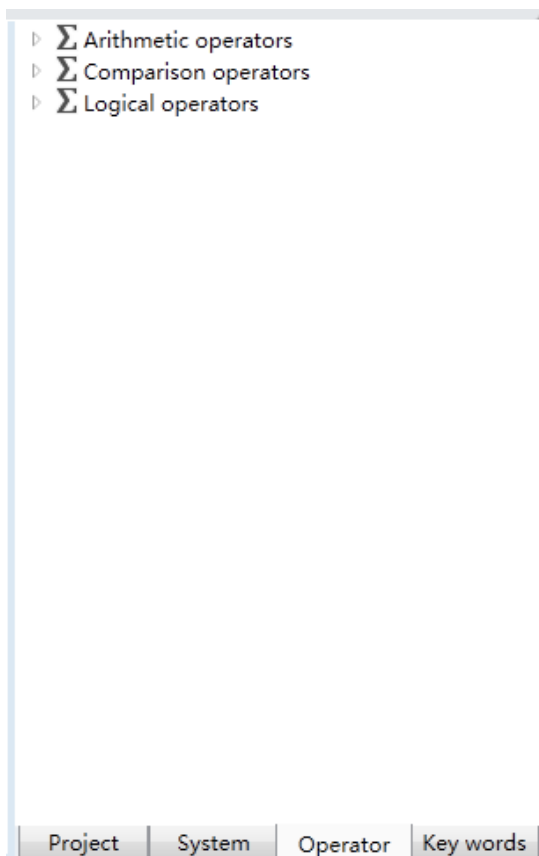
(1) **Project tree:** Includes most information of project development, including variable information, alarm information, communication information and user information etc.



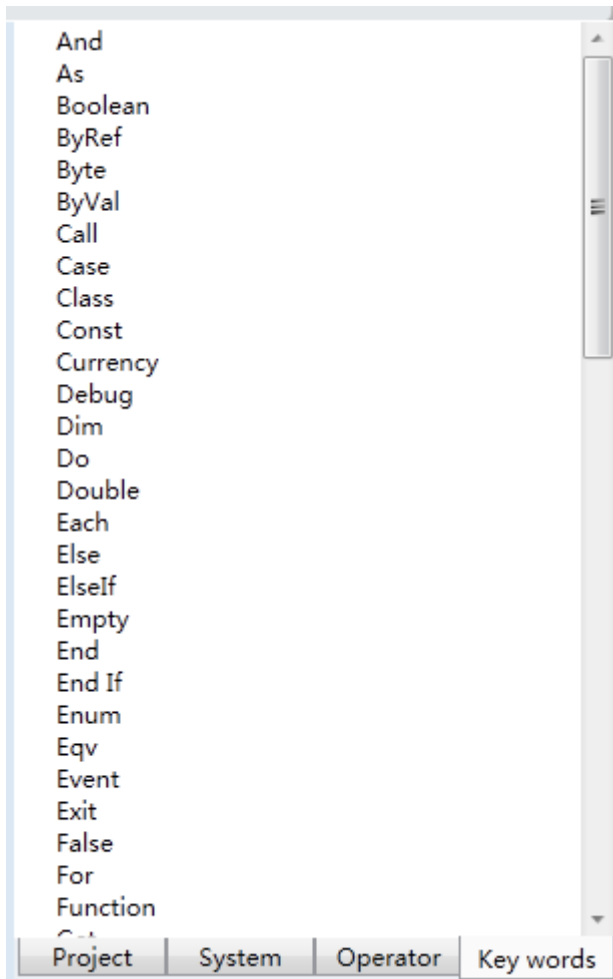
**(2) System tree:** There are 7 groups including date and time, conversion, format etc.; each group includes several functions.



**(3) Operator tree:** There are three groups including arithmetic operator, comparison operator and logical operator. There are several operators under every group; double-click the operator and the operator will be entered into the script editor interface.



**(4) Keyword tree:** Includes all keywords for the script syntax. Double-click the keyword and it will automatically be entered into the script editor interface.



### 18.2.3 Highlighted syntax function

In order to allow users to edit scripts more conveniently and clearly, the script editor will use different colors to distinguish different syntax parts. As shown in the table below:

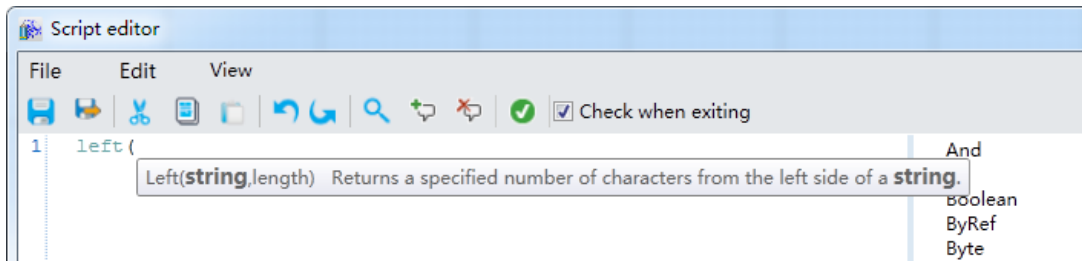
Content	Color
Preset	Black
Number	Purple
String	Dark brown
Mathematical symbol	Red
Note	Green
Keyword	Blue

### 18.2.4 Intelligent reminder function

#### (1) Tip reminder

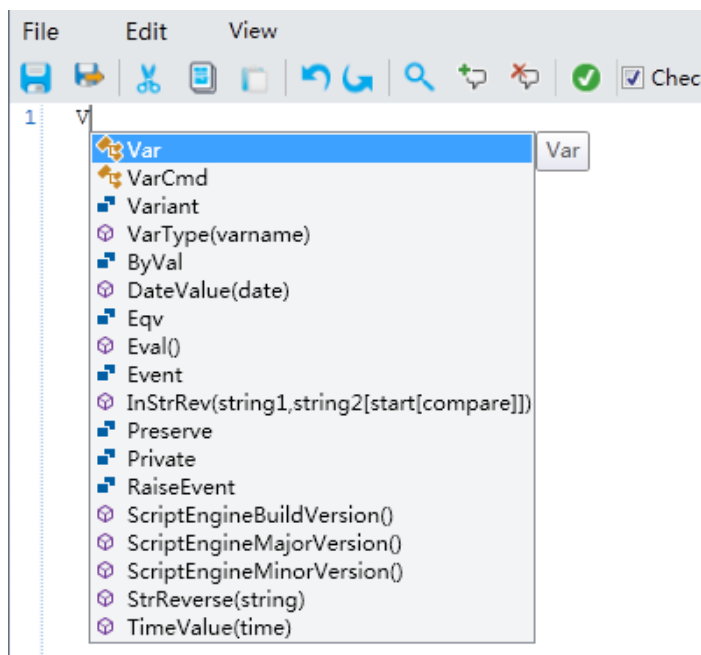
When the user enters a system function and enters “(“, the automatic reminder frame will remind

the function name and parameters of that function and also the description of the function. In the Tip reminder frame, the bold, black parameters represents the number of the parameter that is currently being entered. As shown in the figure below:

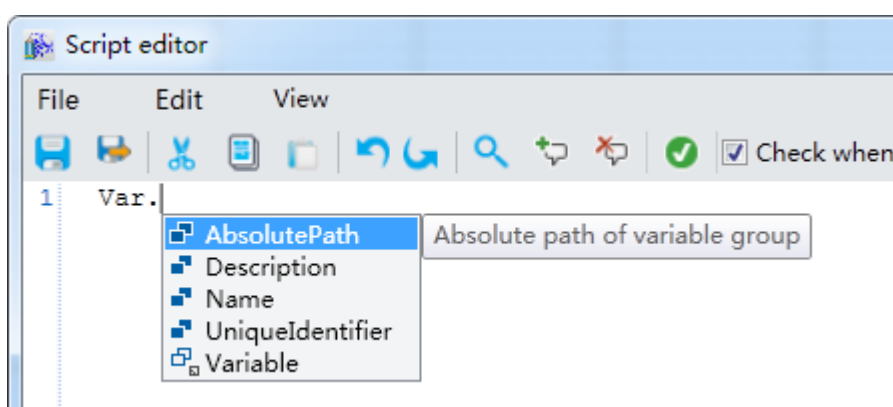


## (2) List block display

When users enter a letter, the reminder frame will automatically display. This reminder frame lists the results of fuzzy matching letters, including objects, properties and methods etc. As shown in the figure below:



When the user enters ".", the system will display the reminder frame according to the content before the "."; the remind frame may include property and variable group etc. As shown in the figure below:



## 18.2.5 shortcut keys

Available shortcut keys in the script editor are as follows:

Command	Shortcut keys
Copy	Ctrl + C
Cut	Ctrl + X
Paste	Ctrl + V
Select all	Ctrl+A
Undo	Ctrl + Z
Reset	Ctrl + Y
Switch to row	Ctrl+ G
Find and replace	Ctrl+F
One-key typesetting	Alt+F8
Syntax check	Alt+C
Exit	Alt+F4
Font setting	Alt+S
Display/hide output window	Ctrl + O
Switch to definition	F12

# 19. DIAView software execution environment

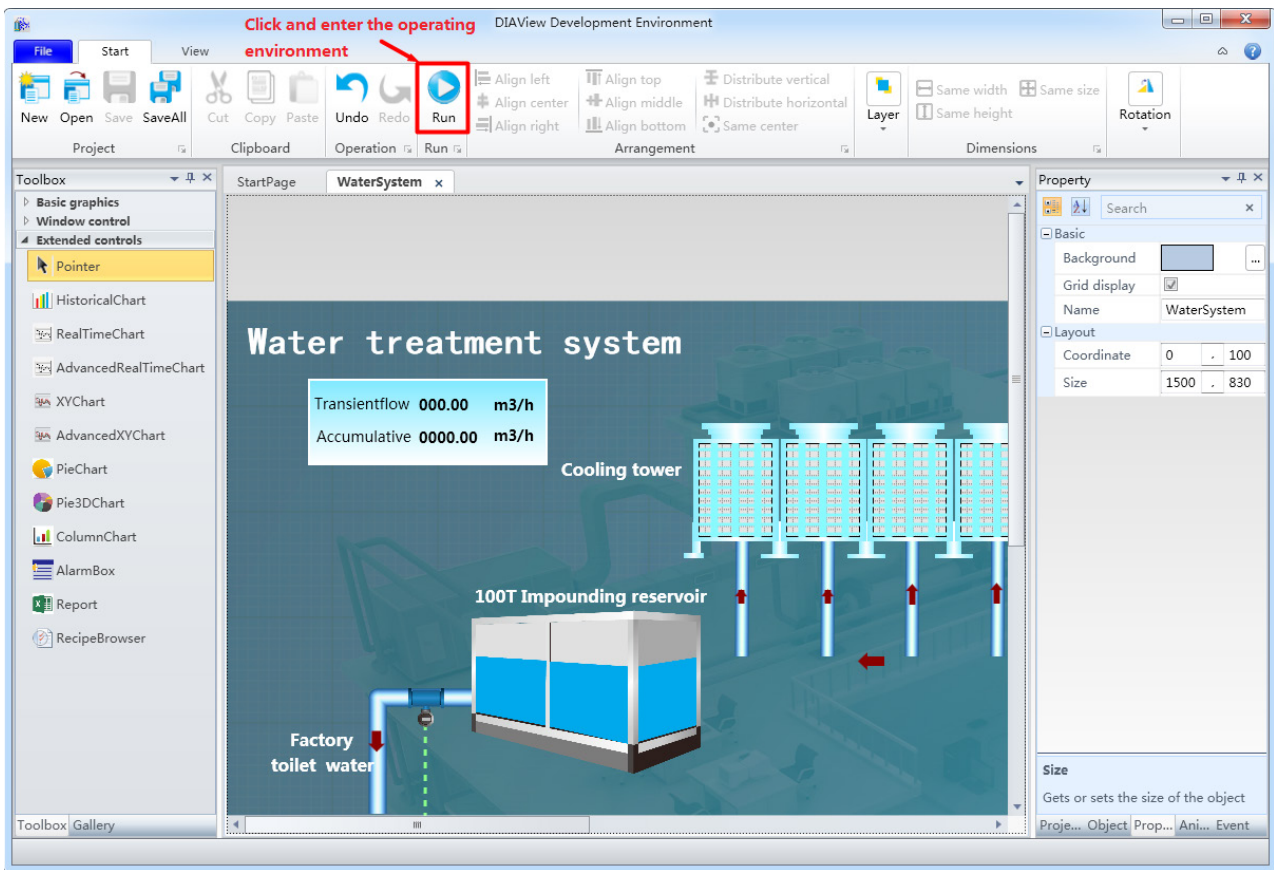
## 19.1 Overview

The DIAView software is composed of the two parts development environment and execution environment. The project IO communications created in the development environment, the graphic interfaces drawn and the scripts edited etc. can only fully operate various functions including display screens dynamically and achieve real-time monitoring in the execution environment. The execution environment of the DIAView software can dynamically display the graphic objects drawn, and the animations and events configured for graphic objects and control units, achieving information handshake and real-time controlling between the screen and on-site equipment.

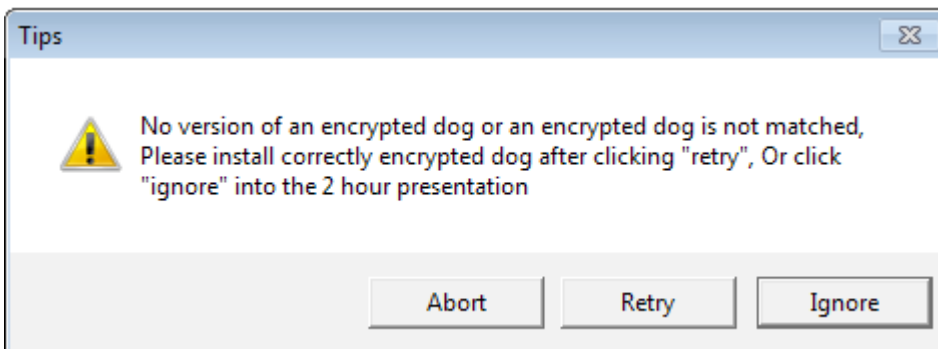
## 19.2 Introduction to the execution environment

To execute a project, project configuration (refer to chapter 17) must first be performed; once the execution screen is configured, the execution environment can be enabled. The steps are as follows:

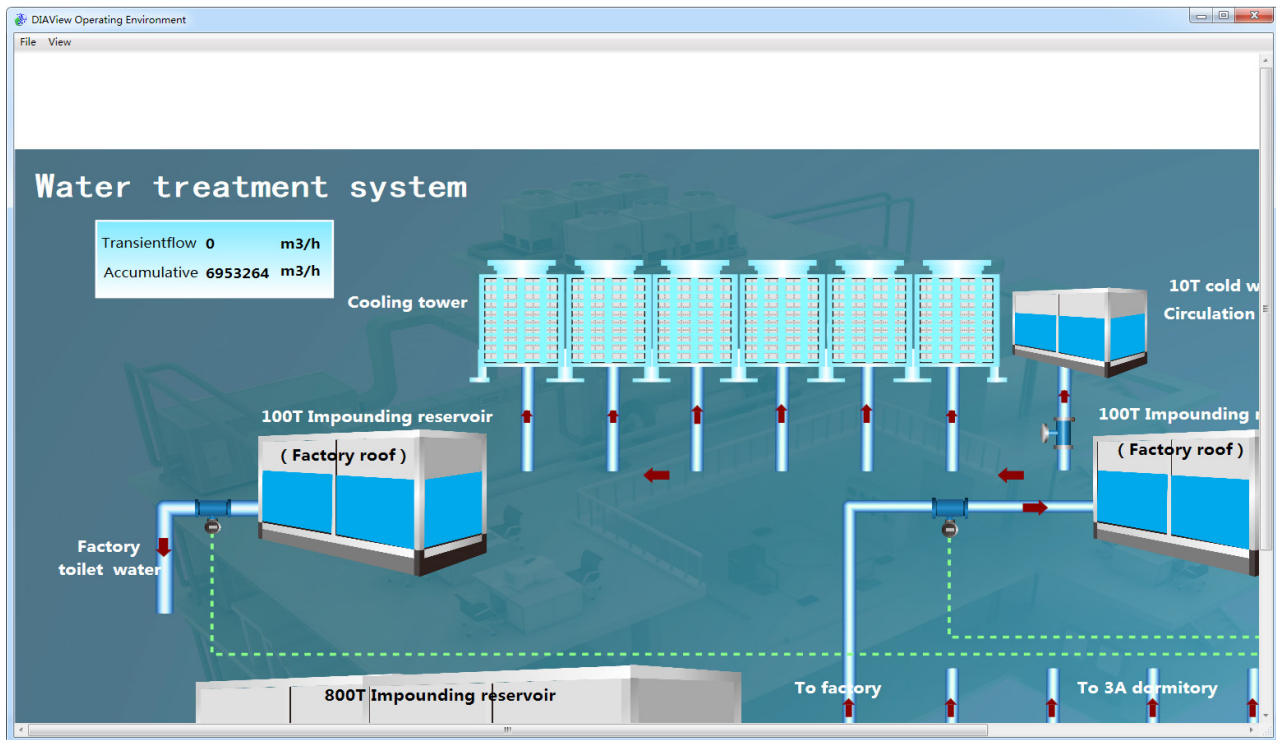
- Click the main interface of the DIAView software development environment → “Start” menu → “Execute” button to enter the execution environment, as shown in the figure below:



- System prompts that a dongle is not detected, the DIAView software execution environment requires authorization to use:



- Click “Ignore” to enter the 2 hour trial (this reminder will not appear if a dongle was purchased and used):



\* The F11 button can be used to switch to full screen mode.

Includes two menus “File” and “View”:

### 1. File menu items and functions:

- » Exit: Exits the execution environment.

Exite can also be achieved by calling the window command “HMICmd.ExitApplication()”.

### 2. View menu items and functions:

- » Full screen: Full screen view display execution environment.



