엠투아이
Man·Machine·Interface

TOP DESIGN STUDIO

User's Manual

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CHAPTER 1 - Main Screen

Turn on your TOP device, to open the Main Screen.
If [Menu] is selected for [Control Panel] - [Project Setting] - [2. Start Mode], the Menu Screen is displayed, if [Run] is selected, the installed project will run. This chapter describes the Menu Screen.

1.1 Menu Screen Layout

The Menu Screen consists of 9 icons and a status bar at the bottom of the screen as shown in the following figure.
The 9 icons are arranged in three rows: [Run] on the first; [VNC Viewer], [FTP], [Project Browser], and [File Browser] on the second, and [Screen Shot], [Control Panel], [Address Checker], and [Information] icons on the third.
Touch each icon to configure their respective settings.
The Status Bar on the bottom of the screen shows the TOP device's model name, date and time, Wi-Fi status, and selected language.
Touch each icon to configure Wi-Fi, language, Date / Time settings.

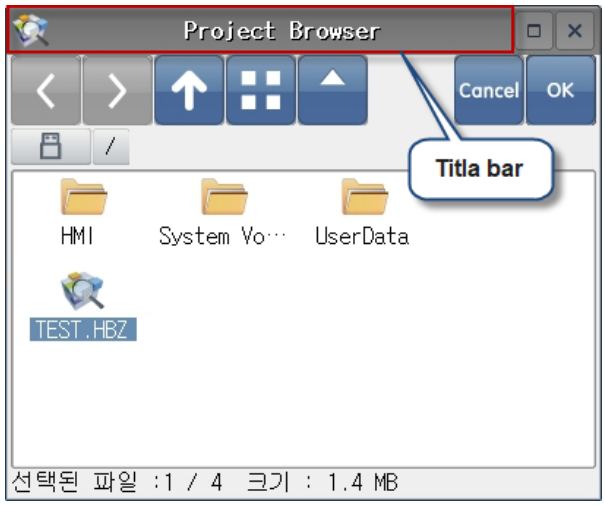
[Figure. Menu Screen]

1.2 Icons

Each icon has the following functions.

No.	Icon	Description
1	Run	Run the project loaded to the TOP device, and navigate to the Run screen.
2	VNC Viewer	Open the VNC Server login dialog.
3	FTP	Open the FTP user dialog for FTP server access.
4	Project Browser	Browse and run project files (*.HBZ) from the TOP device internal memory, installed SD cards, or connected USB memories.
5	File Browser	Browse open, copy, paste or delete files from TOP device internal memory, installed SD cards, or connected USB memories.
6	Screen Shot	Capture the current screen to an image file. Select the storage media (TOP/USB/SD) on which the captured image should be saved.
7	Control Panel	Control Panel provides a comprehensive control and settings of the TOP device. Detail control is provided for Project / System / Communication Device / Option Device / Service.
8	Address Checker	Search for invalid addresses used by a project. List of addresses that cannot communicate with PLCs configured for each project is displayed. Communication errors will occur for a project if one or more address cannot communicate.
9	Information	Information of the product including the firmware version, and file information of uploaded projects will be displayed.

Upon running each icon, the corresponding window will appear.
Common configurations of each window are described with the Project Browser window that will appear when you press the Project Browser icon.
Touch and scroll the title bar to adjust the location of [Project Browser] window.
Touch [Full Screen] on the right side of the title bar to span the window; touch [X] to close the window.

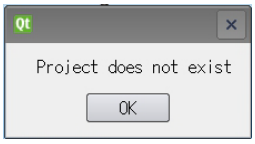


[Figure. Common window configurations]

For check boxes, [x] represents a selected or enabled option, and [ ] represents a deselected or disabled option.

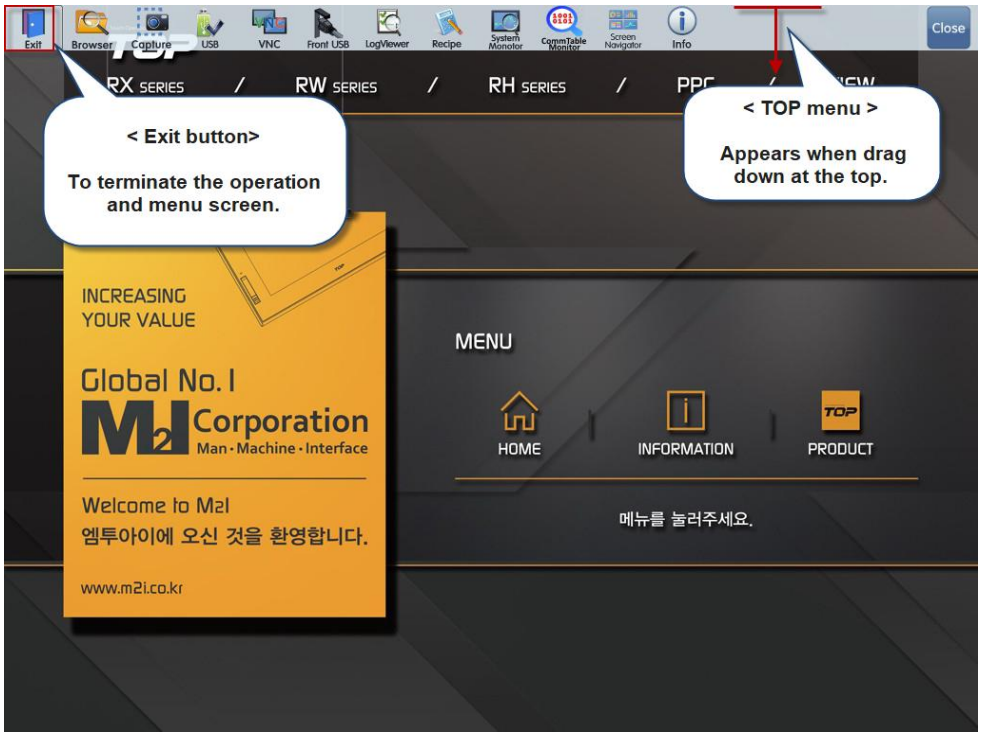
1.2.1 **Run**

Touch the Run icon to run the loaded project and navigate to the Run screen.
The screen of which number is configured at [Control Panel] - [Project Setting] - [3. Start Screen No.] will appear.
A [Project does not exist] message will appear if there is no project file.



[Figure. 'Project does not exist' message]

Touch and drag the top of the Run Screen to access the TOP Menu. Touch [Exit] to exit Run screen and go back to Menu Screen.



[Figure. TOP Menu of Run Screen]

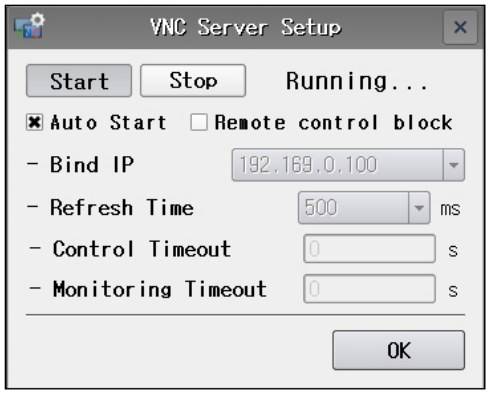
1.2.2 VNC Viewer

VNC (Virtual Network Computer) allows a user to remotely monitor and operate the screen of a TOP device that is configured as the VNC server, from another TOP, mobile device or PC.
VNC Viewer allows remote access to the screen of a TOP device that is configured as the VNC server.
VNC Viewers are installed on TOP devices as default, but can also be installed on PCs and mobile devices. Search [VNC Viewer] on your internet browser to download the program. [VNC Viewer] application is also available on Playstore for your mobile device.

To access VNC, your device must be connected to an ehternet network.
PCs assigned to the same IP range of the VNC Server can access VNC through local ehternet networks, while mobile devices can access VNC through Wi-Fi networks with wireless routers. If the product is connected with a public IP ethernet network, any PC that has access to internet can access VNC.
A single VNC Server can host multiple VNC viewers at once.
A TOP device can be employed as a VNC Server and a VNC Viewer.
Before going further with VNC Viewer, find the following instructions on VNC Server settings.

(1) Prior to activating VNC Server, configure an Administrator Password at [Control Panel] - [System] - [Security] for security purposes. Once you have an Administrator Password, you have to verify the password whenever the TOP device navigates back to the Main Screen. When you are on the Menu Screen, you have to verify the password whenever you access a function that may change settings including [VNC Viewer] / [Project Viewer] / [Control Panel] / [Wi-Fi Setting] / and [Time Setting].

(2) Go to [Control Panel] - [Service] - [VNC Server].



[Figure. VNC Server]

(3) Push the Start button The VNC server status is shown as [Stop] or [Running...]. A touch to the Start button changes the status from [Stop] to [Running...].

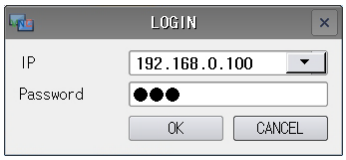
(4) Descriptions of each detail setting are provided below. Settings may be configured only when the VNC Server status shows [Stop].

No.	Detail Setting	Description
1	Auto Start	VNC Server will be automatically executed whenever the power supply to TOP device is reset and the device has rebooted.

2	Remote control block	Only monitoring is allowed, while no control is available.
3	Bind IP	Configure the VNC server's IP address. List of IPs configured at [Control Panel] - [System] - [Ethernet] and Wi-Fi wireless IPs will appear. Select the IP address of the applicable ethernet.
4	Refresh Time	Refresh Time represents the response time of VNC Viewer. Selecting a short Refresh Time may enhance the response time, but may cause a slower operation of the TOP device.
5	Control Timeout	An error is raised when there is no act of control for a selected period of time.
6	Monitoring Timeout	An error is raised when there is no act of monitoring for a selected period of time.

VNC Viewer supports remote access to a TOP device that is configured as a VNC Server.
First, here are the details of VNC Viewer on a TOP device.

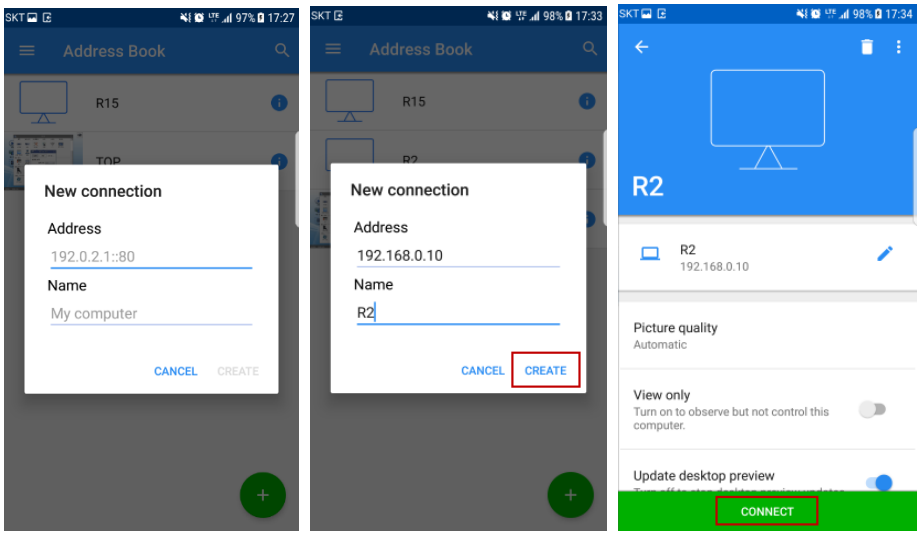
Touch the VNC Viewer icon, to access the below login dialog.
Configure the VNC server's IP address. If an Administrator Password has been configured ([Control Panel] - [System] - [Security]), verify the Password.
If the Administrator Password has not been configured, leave the text box empty.
Select [OK] to initiate monitoring.



[Figure. VNC Viewer]

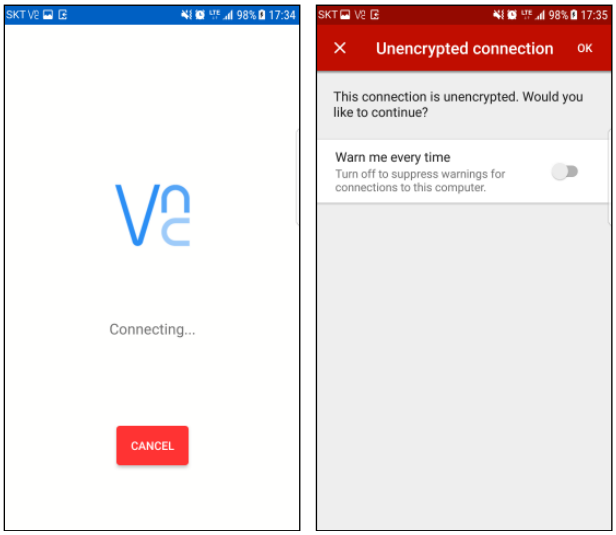
To access VNC Viewer from a mobile device or a remote PC, follow the below steps.

(1) Run VNC Viewer
(2) Press the '+' in the bottom right corner.
(3) The [New connection] window will appear. Enter the IP Address of the VNC Server. Enter the name of your selection for the server you have connected to.
(4) Select [Create] and navigate to the connection screen, then push [Connect] to activate your connection.



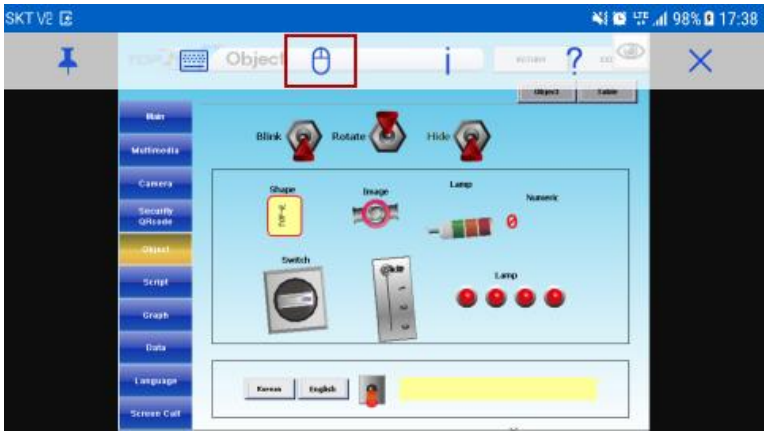
[Figure. Mobile VNC Viewer]

(5) On the Unencrypted connection screen, disable [Warn me every time] so that the Password verification message does not appear if a password is not configured.
Select [OK] to finish set up.
If a Password is configured, activate [Remember Password] to save the password for future connections.



[Figure. Mobile VNC Viewer]

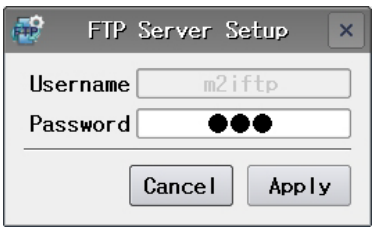
If the remote device is appropriately connected, you can monitor the screen of a TOP device that is configured as the VNC Server as shown below.
Furthermore, if the VNC Server allows [Remote Control], click the mouse icon atop the screen to conduct remote control. A mouse pointer will appear after selecting the mouse icon. Move the mouse pointer and select control functions.



[Figure. Mobile VNC Viewer]

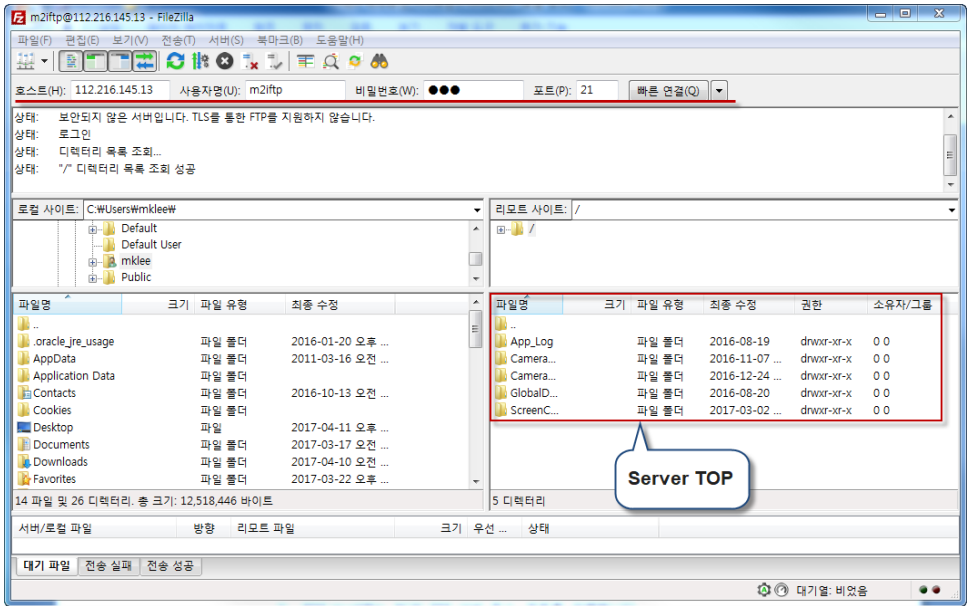
1.2.3 FTP

FTP (File Transfer Protocol) allows file transfer between the server and a client based on a TCP/IP protocol, where a client device can share and copy files from the server through ethernet networks.
TOP devices support both FTP Server and FTP Client functions.
FTP Server Setup
Configure the ethernet connection at [Control Panel] - [System] - [Etherent], the TOP device should be connected to an ethernet network during setup.
Run [Control Panel] - [Service] - [FTP Server]. Configure a password and select [Apply] to complete the FTP Server setup.



[Figure. FTP Server]

To access a TOP device configured as an FTP Server from a remote PC, install the free FTP client program, [FileZilla]. Go to http://filezilla-project.org to download the program.
After installing the program, the following screen will appear when you run the program.



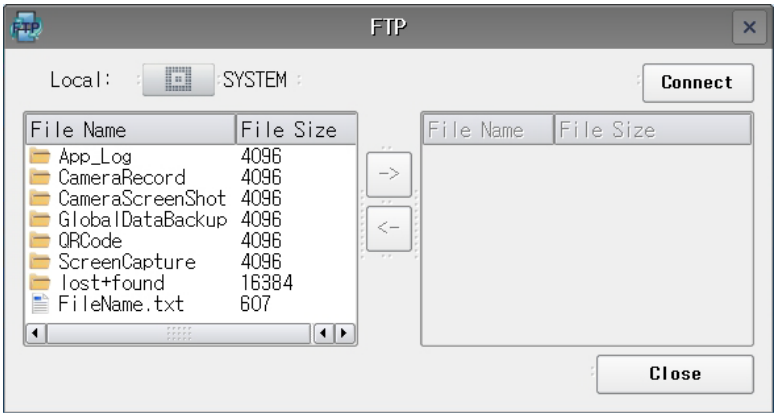
[Figure. FTP Client PC]

After configuring the following 4 settings, press [Quickconnect] to access the server.

No.	Detail Setting	Description
1	Host	Enter the IP Address of FTP Server. The IP Address of the TOP device configured as a FTP Server can be confirmed at [Control Panel] - [System] - [Ethernet].
2	Username	Username is fixed as "m2iftp".
3	Password	Enter the password configured at [Control Panel] - [Service] - [FTP Server].
4	Port	Port is fixed as 21.

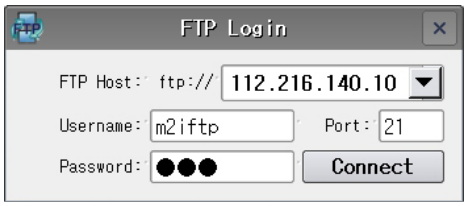
Once the client is successfully connected with the server, the folders and files of the TOP device configured as FTP Server will be displayed on the right. Files can be copied to your PC by selecting with your mouse.

Click the FTP icon to access an FTP server from your TOP device.



[Figure. FTP]

Click the [Connect] button, on the upper right corner of the FTP window, the following login window will appear.



[Figure. FTP Login window]

Configure the following 4 settings, similar to those of the FTP client from PCs, and press [Connect] to access the server.

No.	Detail Setting	Description
1	FTP Host	Enter the IP Address of FTP Server. The IP Address of the TOP device configured as a FTP Server can be confirmed at [Control Panel] - [System] - [Ethernet], if a PC is configured as the FTP server, the PC's IP can be confirmed at [Control Panel] - [Network Setting].
2	Username	Enter the FTP server name. If a TOP device is configured as the FTP server, user name is fixed as "m2iftp".
3	Port	Port is fixed as 21.
4	Password	Enter the password of the FTP Server. If a TOP device is selected as an FTP server, enter the password configured at [Control Panel] - [Service] - [FTP Server].

Once connected to the FTP server, files on the server are displayed on the right side. Use the arrows in the middle of the screen to move files.

1.2.4 Project Browser

Click the [Project Browser] icon, the Project Browser window ill appear.

With the Project Browser, you can search for [Project Files] and immediately run a Project File of your selection.

Only Project Files are shown in the Project Browser.

Project Files may also be referred as drawing files.

By creating, editing and saving a project on your TDS, a [*.TDS] file will be created.

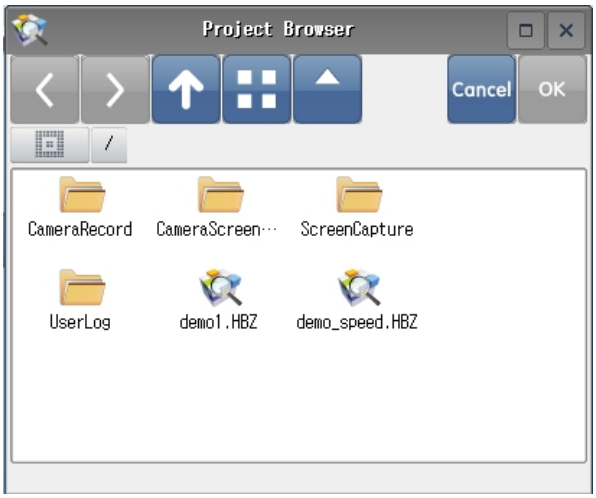
Select [Transmission] - [Project Build] when a [*.TDS] file is open to create a [*.HBZ] file. If [Transmitter auto run at build complete.] is selected at [Project Build], the project file will be automatically transmitted to the connected TOP device. In general, project files edited on a PC are transmitted to the TOP device.

Multiple exportable project files can be stored and on the TOP device internal memory, USB memories, and SD Cards, and can be easily loaded.

The [*.HBZ] file for export can be made from a TDS file by selecting [Transmit] - [Create Export File].

The new [*.HBZ] file can be saved on the TOP device internal memory, USB memories or SD Cards.

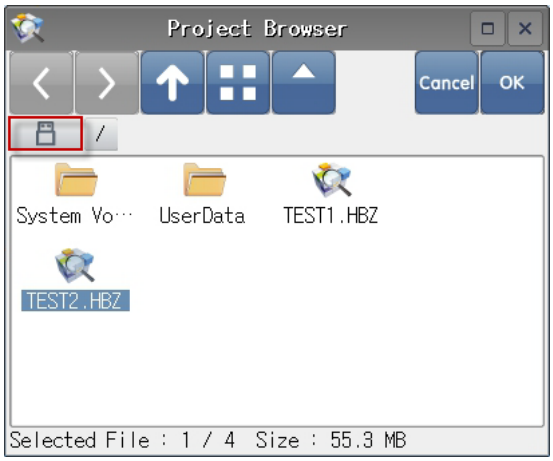
You can browse the [*.HBZ] files on the Project Browser.



[Figure. Project Browser]

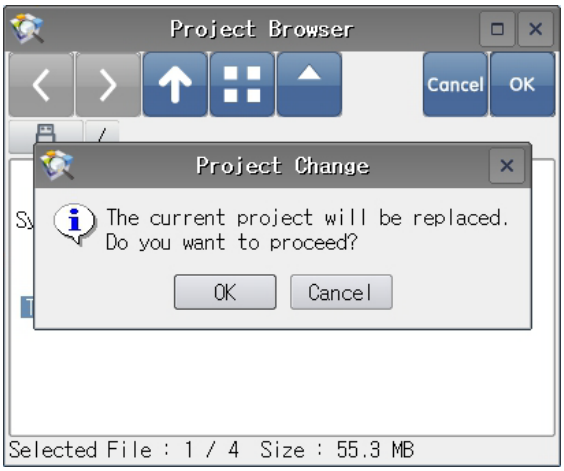
No.	Button	Description
1		Go back.
2		Go forward.
3		Go to top level directory.
4		Select whether to [View small icons] or [View list].
5		Change the method (ascending /descending order) for [Sort by list].
6		Select internal memory / external memory (USB / SD Card).

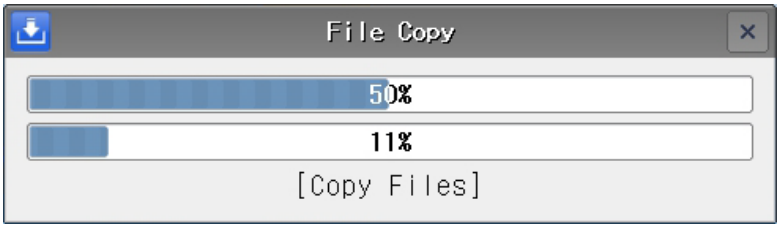
Select an [*.HBZ] project file and press [OK] to run a project file.



[Figure. Project Browser]

A message window asking you to confirm the project change will appear. Press [OK], a file copy status message will appear and the project file will run.





[Figure. Loading a project file from Project Browser]

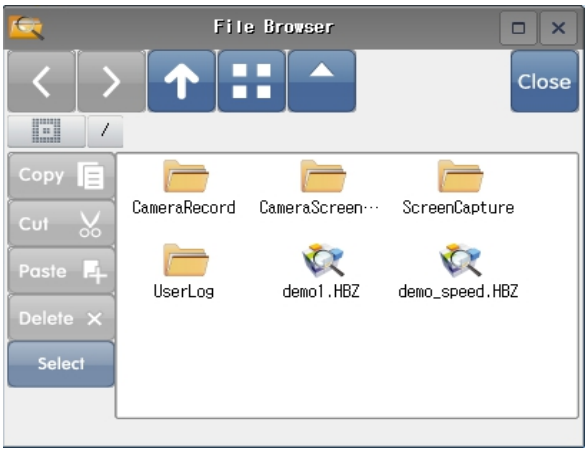
Once the file is copied, your TOP device will be rebooted and the selected project file will be loaded. If the default setting for reboot is the Menu Screen, press the [Run] button to load the project file.

1.2.5 File Browser

Press the [File Browser] button to open the file browser.

With the File Browser, you can explore files saved on the TOP device internal memory, installed SD cards or connected USB memories, and [Copy], [Cut], [Paste], [Delete] selected files.

Furthermore, you can open a file with a double-click.



[Figure. File Browser]

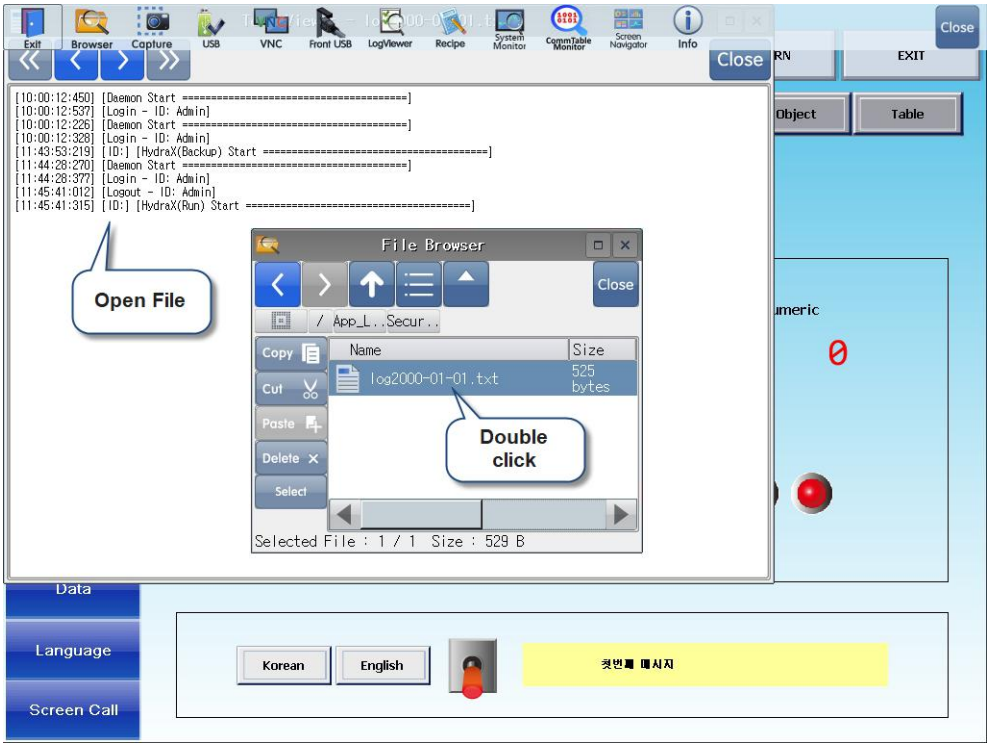
These are the functions available to explore files.

No.	Button	Description
1		Go back.
2		Go forward.
3		Go to top level directory.
4		Select whether to [View small icons] or [View list].
5		Change the method (ascending /descending order) for [Sort by list].
6		Select internal memory / external memory (USB / SD Card).

These are the functions available to edit files.

No.	Button	Description
1	Copy	Copy a selected file or folder.
2	Cut	Cut a selected file or folder.
3	Paste	Paste a selected file or folder.
4	Delete	Delete a selected file or folder.
5	Select	Select one or more files. Once one or more files are selected, the selected file(s) will be remained selected even after selecting another file.

Double-clicking a selected file will open the selected file.

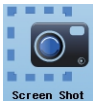


[Figure. Open a file from File Browser]

Depending on the extension of the file saved on the TOP device, five folders will be created.

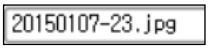
No.	Folder	Description
1	App_Log	Whenever an error occurs on the TOP device, the content of the error is logged in a [*.txt] file and saved in the [App_Log] folder under the [UserLog] folder.
2	Global Data	The [Alarm], [Logging], [Recipe] folders exist under the [HMI] folder. Alarm data, log data, and recipe data are saved in each respective folder.
3	ScreenCapture	Screenshots are save to this folder.
4	CameraRecord	Camera recording data will be saved under this folder when the video is recorded by the [Record Start] / [Record End] buttons at [Camera Object]. (Video camera function is provided in TOPR Premium models)
5	CameraScreenShot	Camera screenshot data will be saved under this folder when the screenshot is captured by the [Snap Shot] button at [Camera Object]. (Video camera function is provided in TOPR Premium models)

1.2.6 ScreenShot



Press the [ScreenShot] button to open the screenshot window. The current screen will be captured and saved. The ScreenShot window will be excluded from the captured image.

[Figure. Screen Shot]

No.	Button	Description
1		Select the medium to save the screenshot. TOP device internal memory is selected as default. If a USB memory is connected or an SD card is inserted, the medium will switch upon each click.
2		Click the button to capture the screen.
3		Screenshots are saved under a filename with the current date as prefix and a sequential suffix. Change the file name from the text box.

Screenshots are saved in the [ScreenCapture] folder if the TOP device internal memory is selected as the storage medium, which can be checked with the [File Browser] If you have selected USB memory or SD card as the storage medium, the screenshot will be saved in the [HMI] - [ScreenCapture] folder.

1.2.7 Control Panel - Project

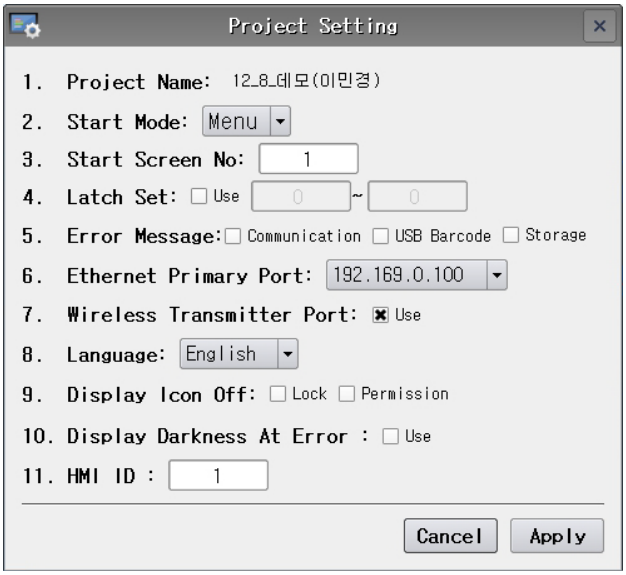
Press the [Control Panel] button to open the control panel.

The control panel provides features for Project/System/Communication Devices/Option Devices/Service.

[Figure. Control Panel]

(1) Project Settings

You can configure the project settings.



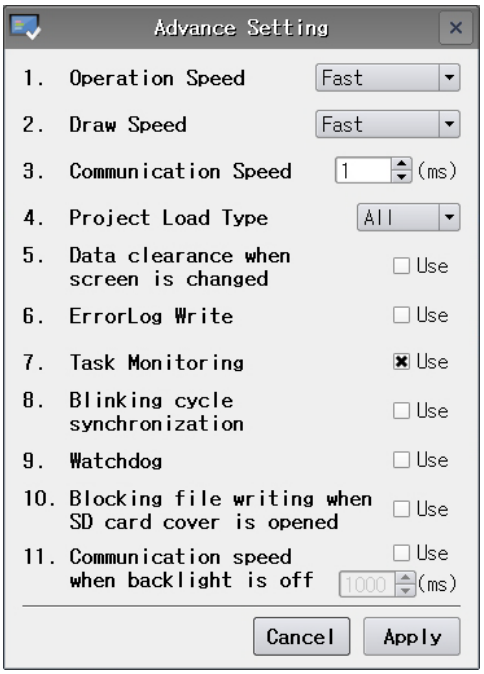
[Figure. Project Setting

No.	Sub-menu	Description
1	Project Name	The name of the project loaded on the TOP device.
2	Start Mode	Select the default screen that will appear when you turn on your TOP device. Select [Menu] for the Menu screen, or [Run] for the run screen.
3	Start Screen No.	The number of the screen that will initially appear when a project is loaded.
4	Latch Set	A TOP device has internal devices alloted to number [0] to [10239]. A single world construes one unit for internal addresses. The data saved in these addresses will be completely deleted whenever the power supply to the TOP device is reset. Therefore, addresses that store data that shall not be deleted upon a power supply reset shall be determined by this function.
5	Error Message	Select whether or not to display error messages on the bottom of the run screen. Check [Communication] to display communication errors with the PLC. Check [USB Barcode] to display communication errors with the USB barcode connected with your TOP device.

6	Ethernet Primary Port	Your TOP device has 2 ethernet ports (2 different IPs) that can support different networks. Select the IP of the primary ethernet port that you prefer as the default IP of your TOP device. (Several TOP models supports only one ethernet network.)
7	Wireless Transmitter Port	Select whether or not to use the wireless transmitter port.
8	Language	Select the system language of the Menu Screen. You can select between [Korean] and [English].
9	Display Icon Off	If you touch an icon that is configured with lock and permission functions, a lock sign and a permission sign will be shown on the upper left corner of the object. This function configures whether or not to use this display. If [Lock] or [Permission] is not selected, the icons shall be displayed in the following manner. [Lock]: If an object is configured with an interlock or touch-lock, a lock icon will appear when you run the object. [Permission]: If an object is designated to a security level, a Not Permission icon will appear when you run the object.
10	Display Darkness At Error	Select whether or not to turn the display dark when an error occurs.
11	HMI ID	Configure the ID of your TOP device to when multiple TOP devices is connected to a single PLC by forms of N:1.

(2) Advance Setting

You can configure advanced settings for a project.



[Figure. Advanced Setting]

No.	Advanced Setting Menu	Description
1	Operation Speed	Configure the operation speed of the project. Operation speed refers to the speed of the computation operated by a project. Select among [Ultra Fast], [Fastest], [Fast], [Normal], and [Slow].
2	Draw Speed	Configure the draw speed of project screens. Draw speed refers to the speed of a drawing plotted on the screen. Select among [Ultra Fast], [Fastest], [Fast],

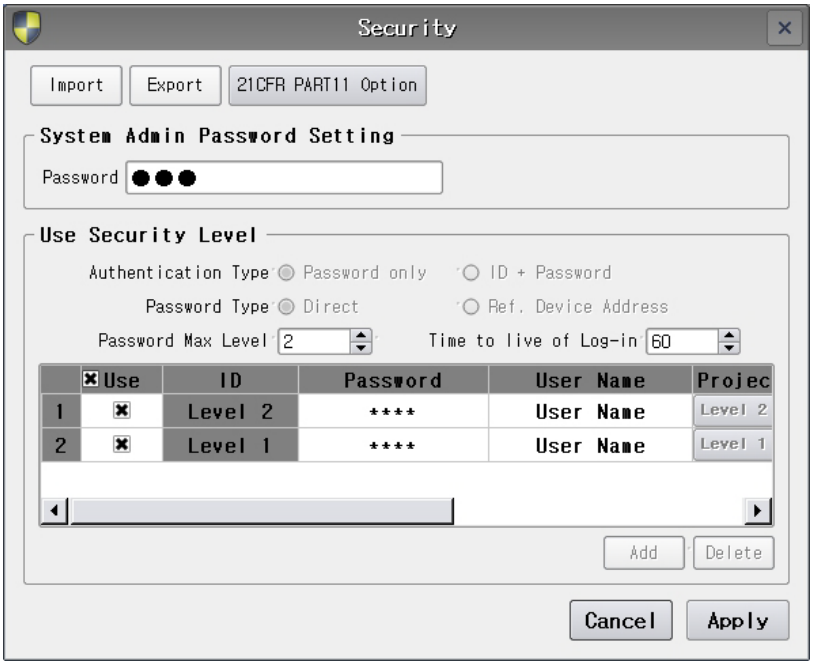
		[Normal], and [Slow].
3	Project Load Type	Select the project load type between [Screen] and [All]. Select [Screen] to load projects by screens. A single screen will be loaded when you start your project, thus, faster access is provided. Each screen will be loaded whenever you navigate to another screen. Select [All] to load all screens when you start your project. Initial loading will take time, however, faster navigation is provided since all screens are already loaded.
4	Data clearance when screen is changed	Select [Use] to delete the data of the communication table of the previous screen and display or edit data of the communication table of the new screen will be loaded from the PLC when you navigate to another screen.
5	ErrorLog Write	Select [Use] to save error logs in the [App_Log] - [UserLog] folder on your TOP device. View error logs with the File Browser.
6	Task Monitoring	Select [Use] to save system logs on an hourly basis to monitor the system status of your TOP device. System logs are saved in *.txt files by date in the [APP_Log] - [SystemLog] folder on your TOP device. You can view the content of each system log on a Text Viewer by selected a system log file from the File Browser.
7	Blinking cycle synchronization	When multiple objects that use blinking features are running simultaneously, several objects, that have the same blinking cycle may differ in timing. Select [Use] to synchronize the timing so that all objects with the same cycle appears and disappears at the same time.
8	Watchdog	Select [Use] to reload the run screen after 3 or 4 seconds when the TOP device has returned to the menu screen due to a certain reason.

1.2.8 Control Panel - System

(1) Security

You can configure and modify the security settings of the TDS from your TOP device.

Two types of Passwords can be configured: the Administrator Password and Security Level Password.

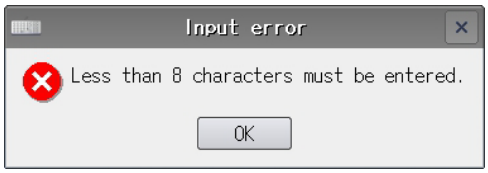


[Figure. Security]

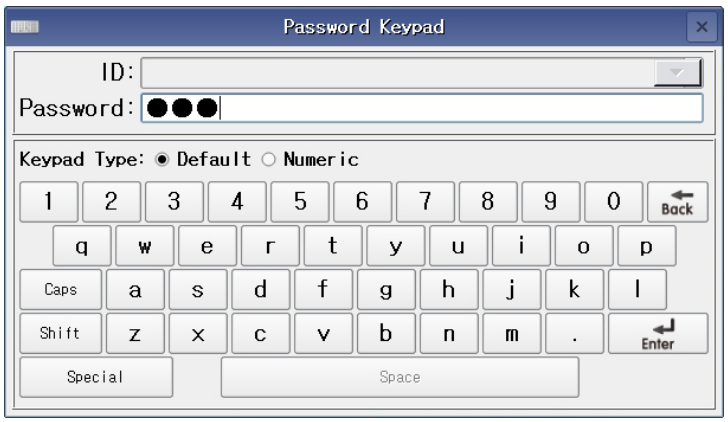
▶ Administrator Password

The Administrator Password is configured to protect the TOP device where restrictions to [Project Transmission], [Data Upload], [Access to Menu Screen], [Use Icon] can be configured. The aforementioned actions can be performed upon Administrator Password verification.

Admin Password can be configured by [Project] - [Security] from TDS, or by [Control Panel] - [System] - [Security] from the Menu Screen. Admin Password configured from the TDS can be changed or deleted from the Menu Screen.

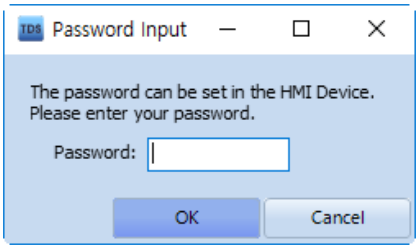
No.	Administrator Password	Description
1	Password	Enter the new Admin Password. Your password can be up to 8 characters long with a combination of numbers and upper/lowercase alphabetical letters. Uppercase and lowercase letters are distinguished whereas if you include an uppercase alphabet in your password, you must enter such letter as uppercase when you verify your password. If you attempt to verify your password with a lowercase letter, your access will be denied. The below virtual keyboard will appear when you touch the text box. [Figure. Virtual Keyboard for Password Configuration] If you try enter a password with 8 or more characters, the below error message will appear.  [Figure. Error Message]
2	21CRF PART11 Option	FDA regulation 21 CFR Part 11 is a regulation on electronic records and electronic signatures that covers a broad range of application. Refer to Chapter 4.7.4 [21 CFR Part11 Option] for more details.

Once you configure an Administrator Password, access to the Menu Screen, icons, etc. shall be granted upon password verification from the below Password Keypad window.



[Figure. Password Keypad]

Project transmission or data upload from TDS to your TOP device requires Admin password verification via the below password input window.



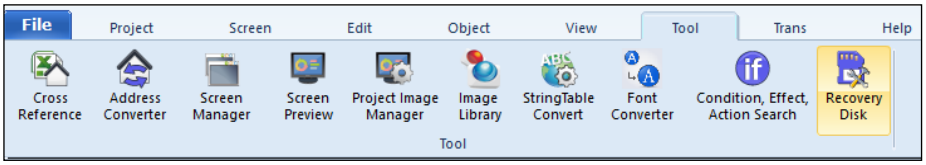
[Figure. Password Input window for transmission]

▶ In case you forget your Admin password, your TOP device can be initialized with a recovery disk you have made.

There is no method to find a forgotten password.

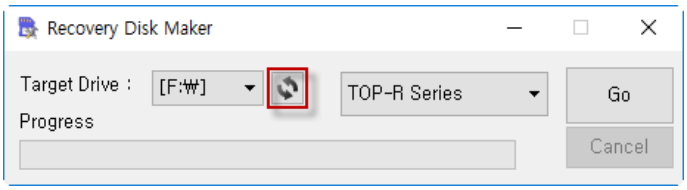
However, with a recovery disk (booting disk) made on a SD card with TDS, you can initialize your TOP device. Upon TOP recovery, your TOP device will be recovered to factory reset, where all data including project files and backup memories will be deleted, and the Menu screen configuration will be recovered to default configuration.

You can make a recovery disk in the following order.



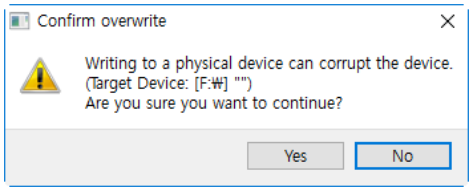
[Figure. Run recovery disk]

Insert an SD card to the PC, and select [Tools] - [Recovery Disk] from TDS.

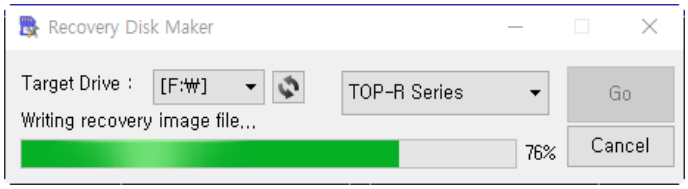


[Figure. Recovery Disk]

Press the refresh button, select the drive in which the SD card is inserted, select the TOP model series from the drop-down menu, and press [Go]. A message window asking you whether you intend to continue or not will appear. Select [Yes] to make a recovery disk.

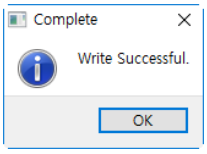


[Figure. Confirm overwrite window for recovery disk]



[Figure. Progress of making a recovery disk]

The following complete message will appear once the file has been made.

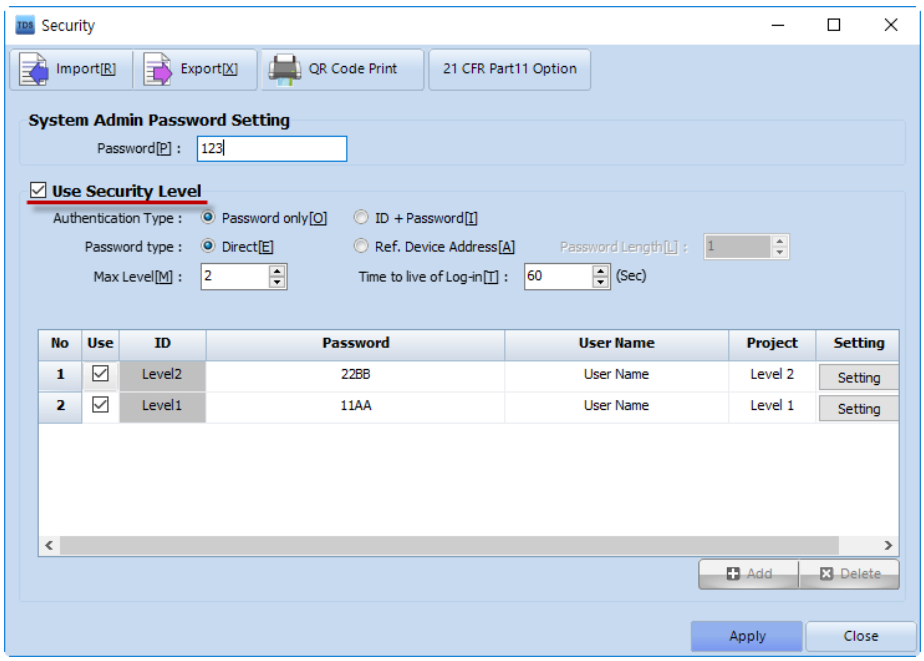


[Figure. Completion message for making a recovery disk]

Insert the SD card on which the recovery disk is stored to the SD card slot of your TOP device.
Lower the two white switches on the side of the SD card and reset the power supply to the TOP to initiate recovery.
A warning message stating [The system upgrade will take a few minutes. WARNING! Do not turn off the power] will appear on the TOP device's screen. Momentarily, a beep sound will be repeatedly made indicating that the TOP device is recovered.
Move the white switches on the side of the SD card back to the upper position, remove the SD card, and reboot the TOP device to access the initial Menu screen. Transmit the project file and proceed with your work.

▶ Security Level

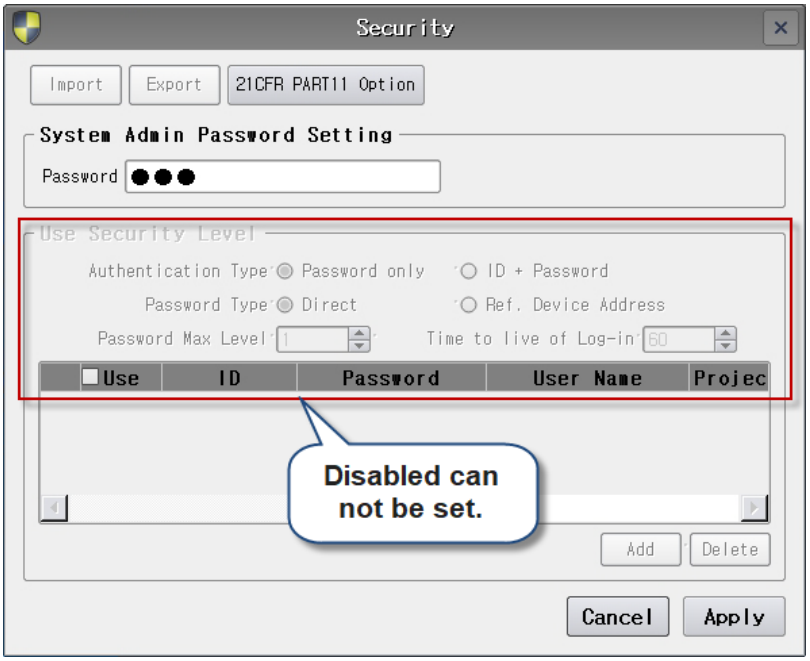
Security Levels can be configured for the Project screen and objects.
If a security level is configured for the screen, the screen can be accessed only after the password has been verified.
If a security level is configured for objects, such objects will be hidden or inactive when you are not logged in.
[Use Security Level] can be selected by [Control Panel] - [System] - [Security] of the TOP device only if [Use Security Level] is selected by [Project] - [Security] from TDS.



[Figure. TDS Security]

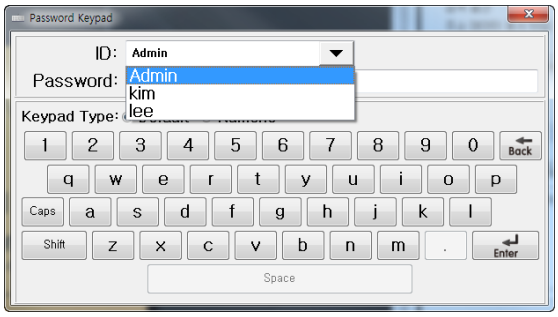
If [Use Security Level] is disabled on TDS, the function is not available on the TOP device as shown belwo. Even if [Use Security Level] is selected, if security level is not applied for [Screen] or [Object] for a project, such security level will be meaningless. Applying security levels for [Screen] and [Object] can be done only from TDS.

(Refer to Chapter 4.7.2 [User Security Level] for more details on configuring security levels on TDS)



[Figure. Security of TOP device]

No.	Security Level	Description
1	Authentication Type	Authentication Type can not be modified from the TOP device. Select between [Password Only] and [ID + Password]. Select [Password] to input only the log-in password for authentication.

		Select [ID + Password], to input User ID and password for authentication.  [Figure. ID + Password]
2	Password Type	Password Type can not be modified from the TOP device. Select between [Direct] and [Ref. Device Address]. Select [Direct] to configure a password of your selection. Select [Ref. Device Address] to configure the address as your password. A password should be configured for the selected address on the Run screen. If you select the PLC address as the password, the password can be changed from the TOP device and the PLC program.
3	Password Max Level	You can configure passwords from Level [0] to Level [25]
4	Time to live of Log-in	Configure the time to maintain the log-in status after each password authentication. Time is displayed in seconds.
5	ID	Input the User ID
6	Password	Configure the user password.
7	User Name	Input the User Name.
8	Level	Change the User Level. Higher numbers represent higher levels.
9	VNC View	Configure a user's access authority to VNC View.
10	VNC Control	Configure a user's access authority to VNC control.
11	System	Configure a user's access authority to [Control Panel], [VNC Viewer] and [Project Browser].

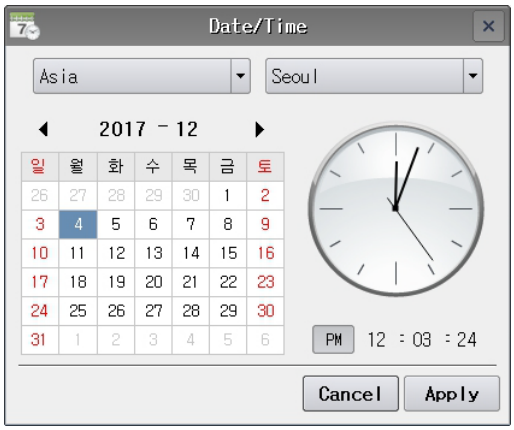
(2) Date/Time

Configure the time and date of the TOP device.

The TOP device accommodates an internal clock.

The internal clocks continues to run on the internal batter even when the TOP power is off.

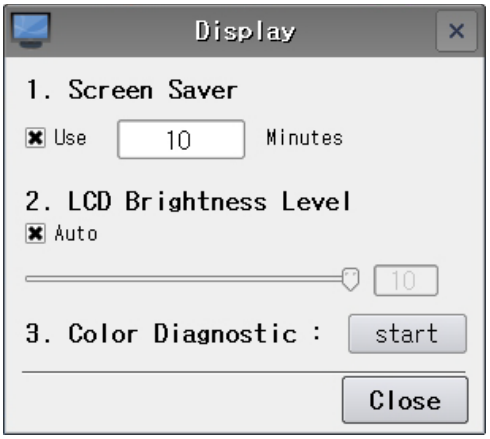
Select the [Year] and [Month] by utilizing the arrows headed left and right, and select the date of the month/year. Select AM/PM, and then the current time from the virtual clock.



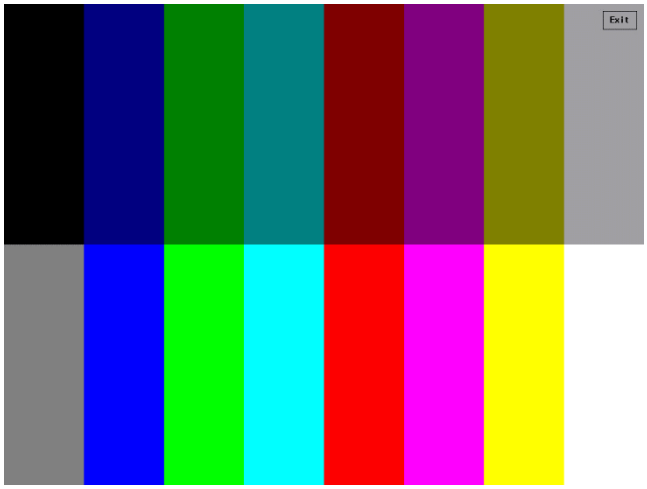
[Figure. Date/Time]

(3) Display

You can configure settings for the TOP screen including screen saver, LCD brightness, and color diagnostics.



[Figure. Display]

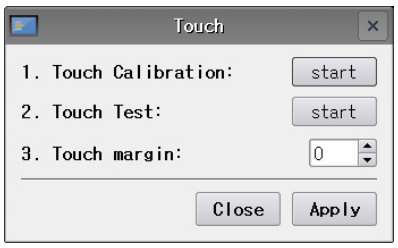
No.	Display	Description
1	Screen Saver	The Screen Saver provides a power save mode. Select [Use], and input the time you want the back light to go off after no operation on the TOP device, in minutes. The backlight will be turned on if you touch the screen when Screen Saver has been activated. The screen saver can preserve the life of the back light.
2	LCD Brightness Level	Select the LCD brightness of the LCD on a scale of 1 to 10. 1 corresponds to the darkest possible level, and 10 corresponds to the brightest possible level. For TOPR premium models which features an [Ambient light sensor] on the upper left corner in the front, select [Auto] to allow the TOP device to automatically adjust its brightness according to the surroundings.
3	Color Diagnostic	Press [Start] to check if the current display shows the correct colors by comparison to a color table. Each touch to the color diagnostic screen will allow you to proceed to the next screen to verify different colors. Press [Exit] on the upper right corner to exit color diagnostic.  [Figure. Color Diagnostic]

(4) Touch

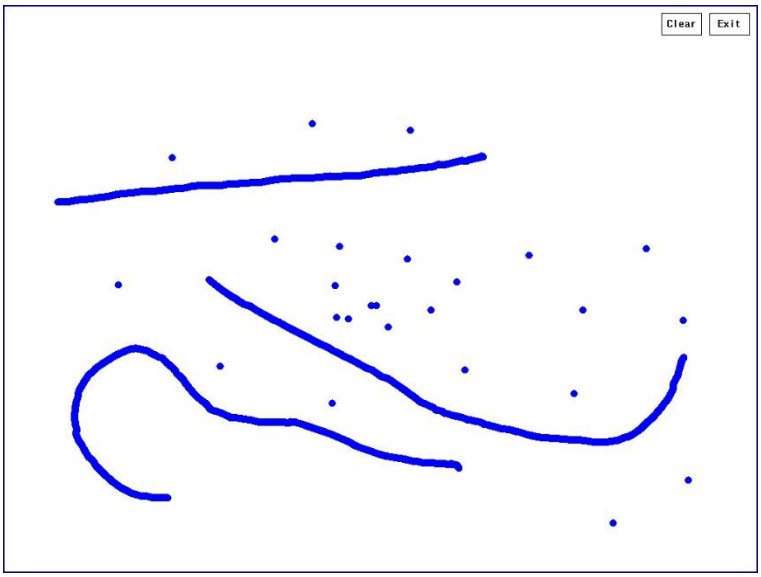
Configure settings related to the touch screen of the TOP device.

Using analogue touch may cause the exact touch location differ upon the temperature.

Confirm the touch location with [2. Touch Test], and adjust the location with [1. Touch Calibration].



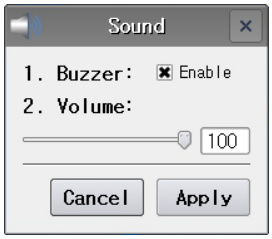
[Figure. Touch]

No.	Touch	Description
1	Touch Calibration	Press [Start] to adjust the touch location from the [Touch Calibration] window. A ten second countdown will be present, and if you do not touch the screen for ten seconds, the calibration will be completed. [If you do not have 10 seconds touch input, I will terminate automatically.] [If you do not have 10 seconds touch input, I will terminate automatically.] Push and hold the Cross with the notion [Push Here] until an [OK] message appears. Calibration is made for five points: each of the four corners and the center of the screen. Touch Calibration is completed when all 5 points are confirmed.
2	Touch Test	Press [Start] to go to the [Touch Test] window. Any part of the white screen that you touch will be turned blue. Check if the exact location you have touched turns blue. Press [Clear] in the upper right corner to clear the window, and press [Exit] to exit the [Touch Test] window.  [Figure. Touch Test]
3	Touch margin	Configure the touch margin on a scale from 0 to 5. Touch margin is shown in pixels. If you select [0] as the touch margin, only by touching a button exactly within its battery will construe a valid touch. If you select [5] as the touch margin, touching within a five pixel boundary of a button will construe a valid touch. For instance, a button will be selected if you touch a location that is 5

		pixels distant from the button.

(5) Sound

Control sound settings including enabling buzzers and controlling volume level.



[Figure. Sound]

No.	Sound	Description
1	Buzzer	Select whether or not to enable buzzers when a user touches a button. Select [Enable] to make a short beep sound upon every touch. If [Enable] is not selected, buzzers will not be used.
2	Volume	TOPR Premium models supports internal audio output ports. Audio can output can be made through speakers or headsets connected to the audio port. Volume can be controlled on a scale from 0 to 100. Level 0 represents mute, and Level 100 represents maximum volume.

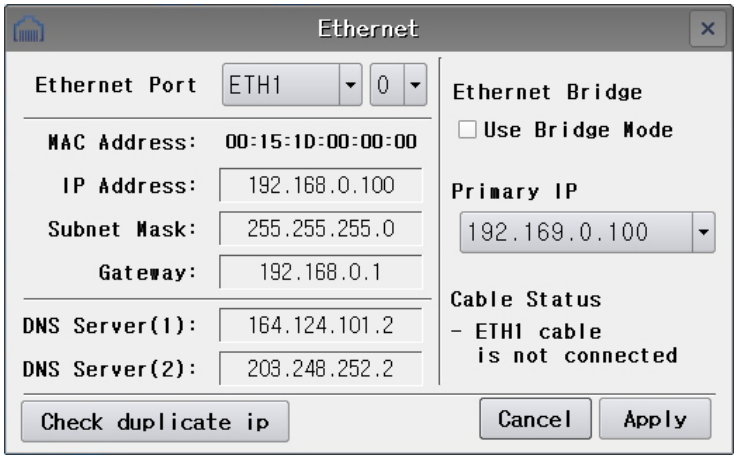
(6) Ethernet

Configure the Ethernet settings. Your TOP device may have 2 different types of ethernet ports, one ethernet port, or no ethernet port, depending on the actual model. You can configure the ethernet settings for TOP devices that support Etherenet communication.

The TOP device can communicate with a PLC, a PC or another TOP device via ethernet communication. Connect a live ethernet cable to the ethernet port.

If the ethernet is directly connected to the TOP device without an ethernet hub connection, use an ethernet cross cable. If the ethernet is relayed from an ethernet hub use an ethernet direct cable.

Configure the appropriate IP Address / Subnet Mask / Gateway corresponding to the user's network environment.



[Figure. Ethernet

No.	Ethernet	Description
1	Ethernet Port	Select the ethernet port.

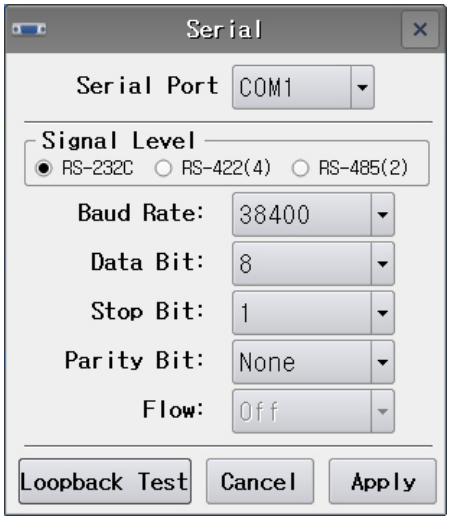
2	MAC Address	The MAC address of the connected ethernet is shown.
3	IP Address	Configure the ethernet IP address.
4	Subnet Mask	Configure the ethernet Subnet Mask.
5	Gateway	Configure the ethernet Gateway.
6	DNS Server(1)	Configure the ethernet DNS Server address.
7	DNS Server(2)	Configure the ethernet DNS Server address.
8	Ethernet Bridge	For TOP devices supporting two different ethernet ports, enabling ethernet bridge will integrate the two ports.
9	Primary IP	Select the primary IP from the drop-down menu of the three ethernet ports. This shall be the IP address of the TOP device when it is configured as a slave in the hierarchy. This function is mainly used when [Project/Data] are transmitted or uploaded to a TOP device from a PC. This function is also used when the TOP device is used as a slave when communicating with an ethernet PLC.
10	Cable Status	The state of connection is shown.
11	Check duplicate IP	You can check if the selected IP is already connected.

(7) Serial

Configure the TOP device serial port communication settings. Two or three serial ports are provided on a TOP device, depending on the exact model.

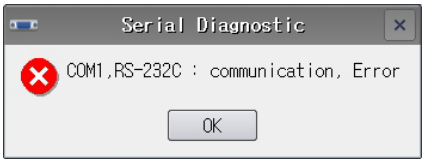
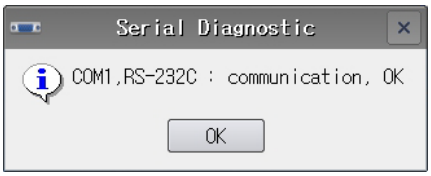
Three serial ports are provided for all TOPR series, TOPRX series 10" and above, and TOPRW 10" and above, where COM1 and COM2 supports [RS-232C], [RS-422] and [RS-485] protocols and COM3 only supports [RS-485] protocol. Two serial ports are provided for TOPRX series 8" and below, TOPRW series 8" and below, and TOPRH wired, where COM1 and COM2 both supports [RS-232C], [RS-422] and [RS-485] protocol.

Configure the communication settings with connected devices including PLC, for [COM1], [COM2] and [COM3] of your TOP device



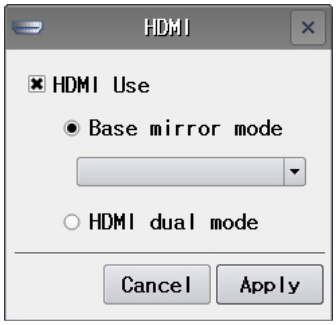
[Figure. Serial]

No.	Serial	Description
1	Serial Port	Select the serial port of interest among [COM1], [COM2] and [COM3] from the drop down menu.
2	Signal Level	Select the applicable protocol employed by PLC and the subject COM port among [RS-232C], [RS-422] and [RS-485].

3	Baud Rate	Select the baud rate (bit/sec) employed by the PLC connected to the subject serial port.
4	Data Bit	Select the data bit employed by the PLC connected to the subject serial port.
5	Stop Bit	Select the stop bit employed by the PLC connected to the subject serial port.
6	Parity Bit	Select the parity bit employed by the PLC connected to the subject serial port.
7	Flow	Select the flow control employed by the PLC connected to the subject serial port.
8	Loopback Test	Diagnose the viability of each serial port of the TOP device. Serial diagnostic is conducted by confirming the loopback of a data output from the TOP device. ▶ For RS-232C protocol, select RS-232C, connect SD-RD of the subject serial port and run the diagnosis. Thus, RS-232C protocol for COM1 and COM2 is conducted by connected Pin No.2 (RD) and Pin No.3 (SD). ▶ For RS-422 protocol, select RS-422, connect RDA-SDA, RDB-SDB of the subject serial port, and run the diagnosis. Thus, for COM1 and COM2, connect Pin No.1 (RDA) with Pin No.4 (SDA), and connect Pin No.6 (RDB) with Pin No.9 (SDB). ▶ For RS-485 protocol, a diagnosis can not be conducted due to the nature of the protocol, therefore, if RS-422 protocol is concluded to be affirmative, RS-485 is deemed affirmative. If an error message pops up, as shown below, the port shall be deemed in defect. Request for customer service on any port that shows communication errors.  [Figure. Serial Diagnostic error message]  [Figure. Serial Diagnostic confirmed message]

(8) HDMI

TOPR Premium models feature HDMI ports allowing output of the TOP screen to projectors, monitors, TVs and PCs via an HDMI cable. Select whether or not to use the HDMI port, and configure the modes when the HDMI port is used. Applying configuration to use HDMI will reboot the TOP device and activating the HDMI port.



[Figure. HDMI]

No.	HDMI	Description
1	Basic mirror mode	The TOP screen is mirrored to the device connected via HDMI.

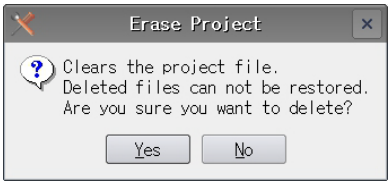
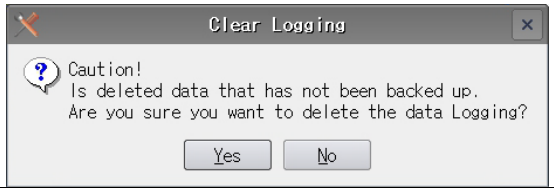
2	HDMI dual mode	A separate HDMI screen can be configured on TDS other than the TOP device

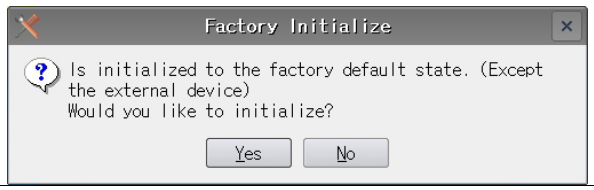
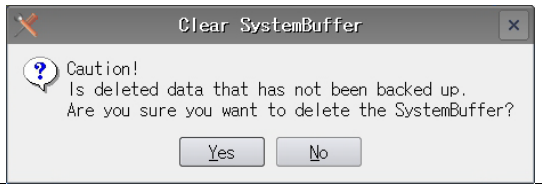
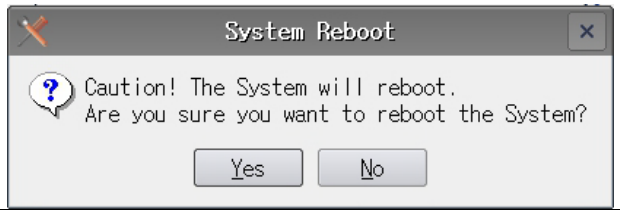
(9) Initialization

Initialize the TOP device. Once you initialize your TOP device, you can not restore the device to the previous configuration. Please take caution when you initialize your TOP device.

You can delete projects, each data, internal buffer, etc. or initialize the Menu screen configuration.

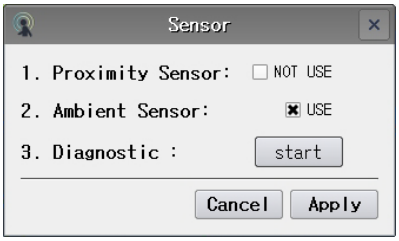
[Figure. Initialization]

No.	Initialization	Description
1	Erase Project	Erase the Project that is currently loaded to the TOP device. The below message will appear if you push the [Start] button, select [Yes] to delete project files.  After deleting project files, the TOP device will go back to the run screen and the below message will appear. Since there is no project file to open, selecting [OK] will not cause the program to navigate to the run screen. [Figure. "Project does not exist" message]
2	Clear Logging Data	Delete all log data stored on the backup memory. 
3	Clear Alarm Data	Delete all alarm data stored on the backup memory.

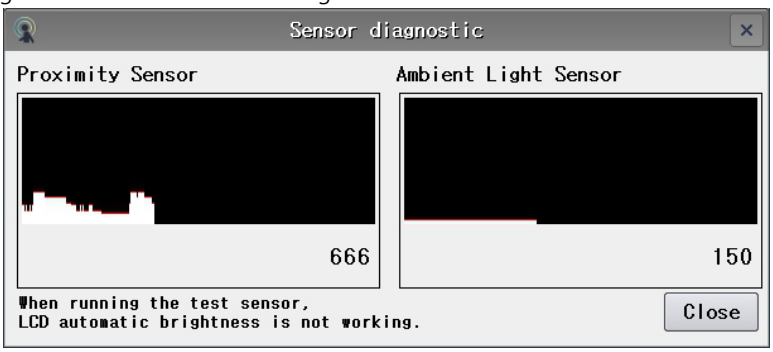
4	Clear Recipe Data	Delete all recipe data stored on the backup memory.
5	Make Factor Initialization	Delete all project files, and data, and initialize Menu screen configuration. [OS/Hydra/Daemon/Util] files shall not be initialized. External devices (USB memory / SD card, etc.) will also not be initialized. 
6	Clear System Buffer	All system buffer data of the TOP device (0~ 10239) will be initialized to 0. 
7	Clear Latch Buffer	All latch buffer data of the TOP device (0 ~ 128) will be initialized to 0.
8	System Reboot	Reboot the TOP device. 

(10) Sensor

TOPR Premium models feature sensors in the upper left corner on the front. There is a proximity sensor and ambient light sensor right below the LED light. Select whether or not to use these sensors, and diagnose the validity of these sensors.

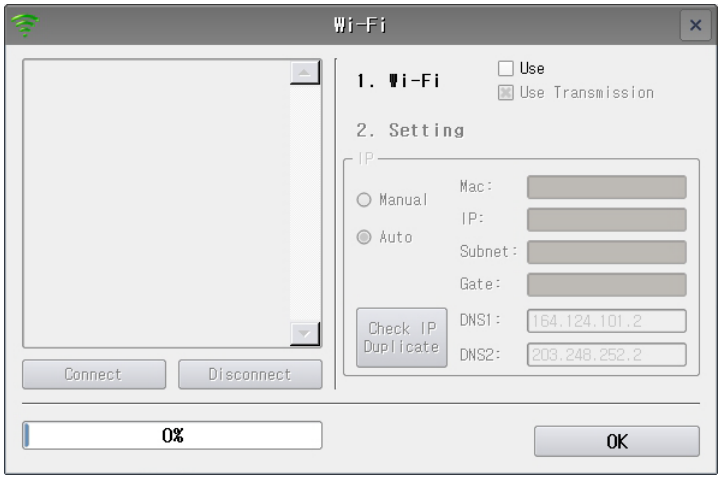


[Figure. Sensor]

No.	Sensor	Description
1	Proximity Sensor	The proximity sensor detects the presence of an operator to turn on the screen when an object is within the proximity of the TOP device, and to turn off the screen when an object is removed from the proximity of the TOP device. Thus, [Screen Saver] will be activated when no one or nothing is close to the screen, and [Screen Saver] will be dismissed when a touch is made on the screen or an object is detected within the proximity of the screen.
2	Ambient Sensor	The ambient light sensor detects the brightness of the vicinity of the TOP device, to automatically adjust the screen brightness. Thus, if the surroundings is dark, the TOP screen will be dimmed, and if the surroundings is bright, the TOP screen will be brighter.
3	Diagnostic	You can check the validity of the proximity sensor and ambient light sensor. For the proximity sensor, the readings will rise when an object gets closer to the sensor, and the readings will descend when objects go further from the sensor. For the ambient light sensor, the readings will rise if the surroundings is brighter, and the readings will descend if the surroundings is darker.  [Figure. Sensor Diagnostic]

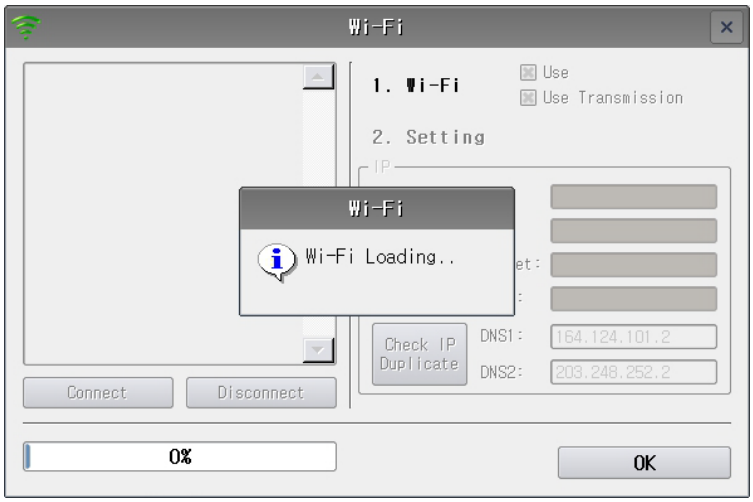
(11) Wi-Fi

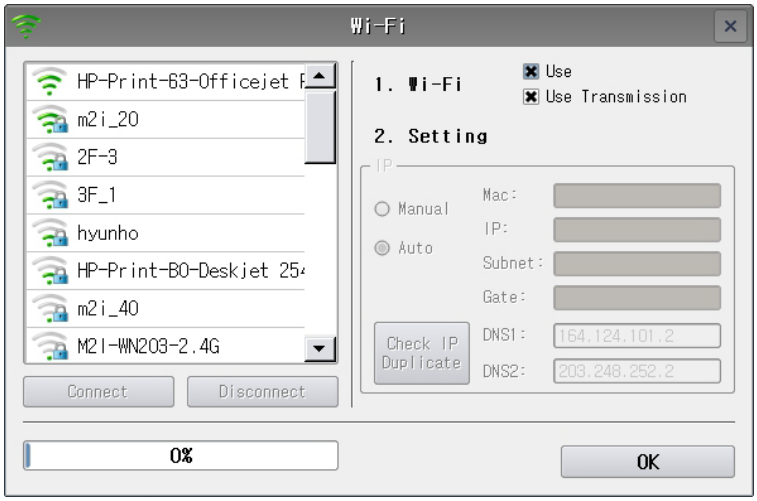
Configure the Wi-Fi settings for models that support wireless Wi-Fi TOPR Premium models / TOPRH0700WD-W model).



[Figure. Wi-Fi]

Select [Use]. Available Wi-Fi networks will be listed in the left.



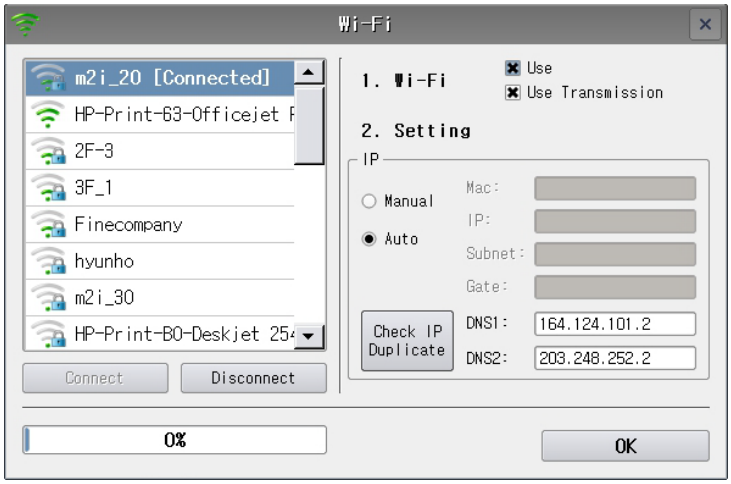


[Figure. Wi-Fi Search]

Select the Wi-Fi network you intend to connect, and select [Connect] to access the network.
For Wi-Fi networks that require password verification, the following string keypad will appear.

[Figure. Wi-Fi Password entry keypad]

Enter the correct password and press [Enter] to activate the connection.

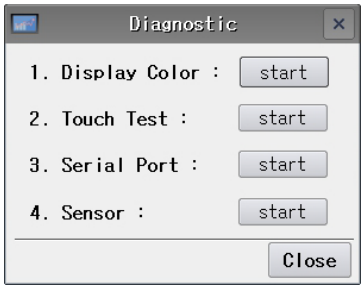


[Figure. Connecting to Wi-Fi]

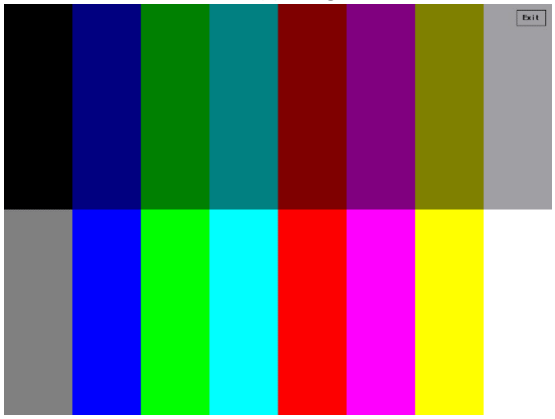
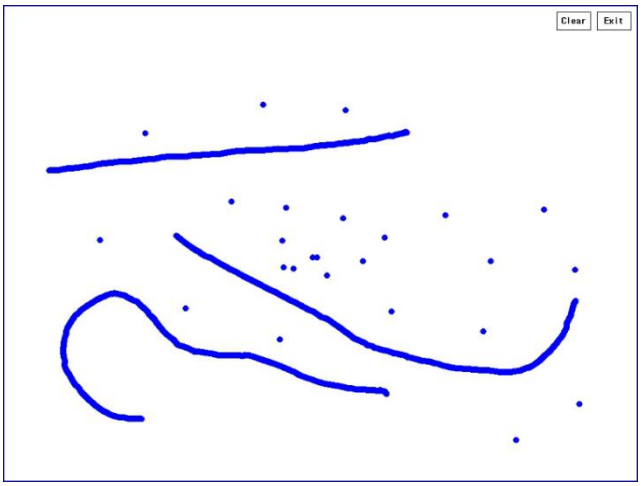
Click [Disconnect] to deactivate the Wi-Fi network.

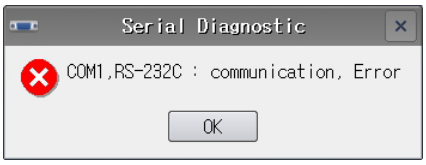
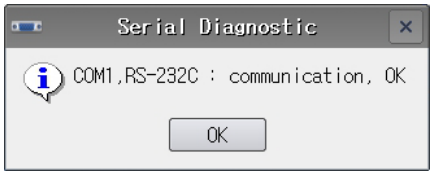
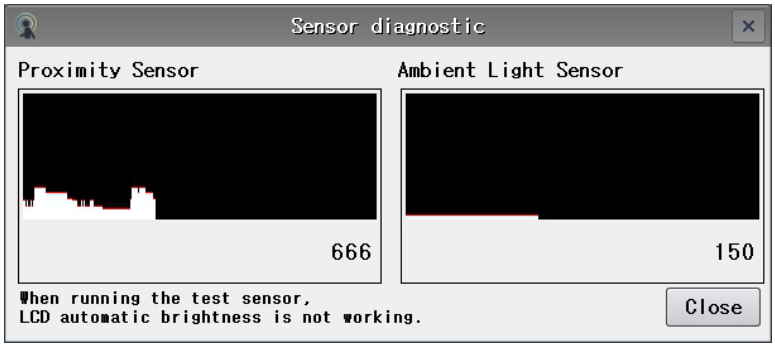
(12) Diagnostic

Check if your TOP device operates appropriately or if has a problem. Diagnose each aspect and file for customer service upon any problem (Customer service center, +82 (0)31 465 3366(3)).



[Figure. Diagnostic]

No.	Diagnostic	Description
1	Display Color	Press [Start] to check if the current display shows the correct colors by comparison to a color table. Each touch to the color diagnostic screen will allow you to proceed to the next screen to verify different colors. Press [Exit] on the upper right corner to exit color diagnostic.  [Figure. Display Color Diagnostic]
2	Touch Test	Press [Start] to go to the [Touch Test] window. Any part of the white screen that you touch will be turned blue. Check if the exact location you have touched turns blue. Press [Clear] in the upper right corner to clear the window, and press [Exit] to exit the [Touch Test] window.  [Figure. Touch Test]
3	Serial Port	Diagnose the viability of each serial port of the TOP device.

		Serial diagnostic is conducted by confirming the loopback of a data output from the TOP device. ▶ For RS-232C protocol, select RS-232C, connect SD-RD of the subject serial port and run the diagnosis. Thus, RS-232C protocol for COM1 and COM2 is conducted by connected Pin No.2 (RD) and Pin No.3 (SD). ▶ For RS-422 protocol, select RS-422, connect RDA-SDA, RDB-SDB of the subject serial port, and run the diagnosis. Thus, for COM1 and COM2, connect Pin No.1 (RDA) with Pin No.4 (SDA), and connect Pin No.6 (RDB) with Pin No.9 (SDB). ▶ For RS-485 protocol, a diagnosis can not be conducted due to the nature of the protocol, therefore, if RS-422 protocol is concluded to be affirmative, RS-485 is deemed affirmative. If an error message pops up, as shown below, the port shall be deemed in defect. Request for customer service on any port that shows communication errors.  [Figure. Serial Diagnostic error message]  [Figure. Serial Diagnostic confirmed message]
4	Sensor	Press [Start] to check the validity of the proximity sensor and ambient light sensor. For the proximity sensor, the readings will rise when an object gets closer to the sensor, and the readings will descend when objects go further from the sensor. For the ambient light sensor, the readings will rise if the surroundings is brighter, and the readings will descend if the surroundings is darker.  [Figure. Sensor Diagnostic]

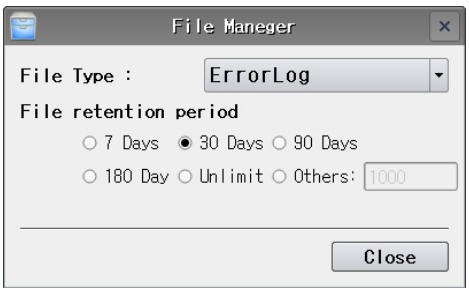
(13) File Manager

Four types of folders are automatically created on the TOP device: [ErrorLog], [SystemLog], [UserLog] and [ScreenCapture].

Select the retention period for files saved in these folders among [7 Days], [30 Days], [90 Days], [180 Days], [Unlimit], and [Others].

Select [Others] and you can key in a period of your selection from 1 to 10,000 days in the text box.

Unless selected [Unlimit], all files stored in each folder will be deleted after the retention period elapses.



[Figure. File Manager]

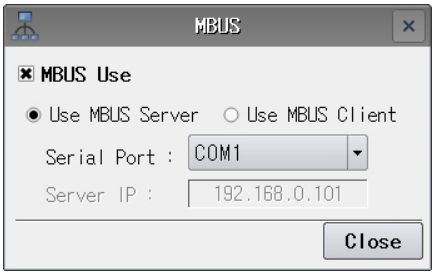
(14) MBUS

MBUS supports the serial communication between a single PLC and multiple TOP devices (N:1 communication).

The configuration shall be as follows.

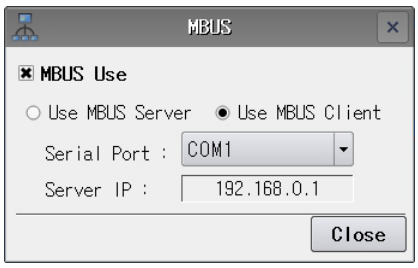
Consider that a single PLC and TOP device No.1 is communicating via a serial link (RS-232C/RS-422/RS-485), and the No.1 TOP device is assigned to be the [MBUS Server]. The other TOP devices (No.2, No.3, No.4, ...) are connected with the No.1 TOP device through ethernet, where the TOP devices other than the No.1 TOP device are assigned to be each an [MBUS Client]. There is no limit in numbers of MBUS Clients, however considering the detriment to speed, you are recommended to connect up to 4 devices at once. TOP devices using MBUS may use other projects if the selected PLC is the same one, while the project does not have to be the same. A TOP device elected to be an MBUS Client communicates with the PLC through its ethernet connection with the MBUS Server (No.1 TOP Device) that is relayed to the PLC through serial links.

For the No.1 TOP device elected as the MBUS Server, select [MBUS Server], and configure the serial port that will communicate with the PLC.



[Figure. MBUS Server]

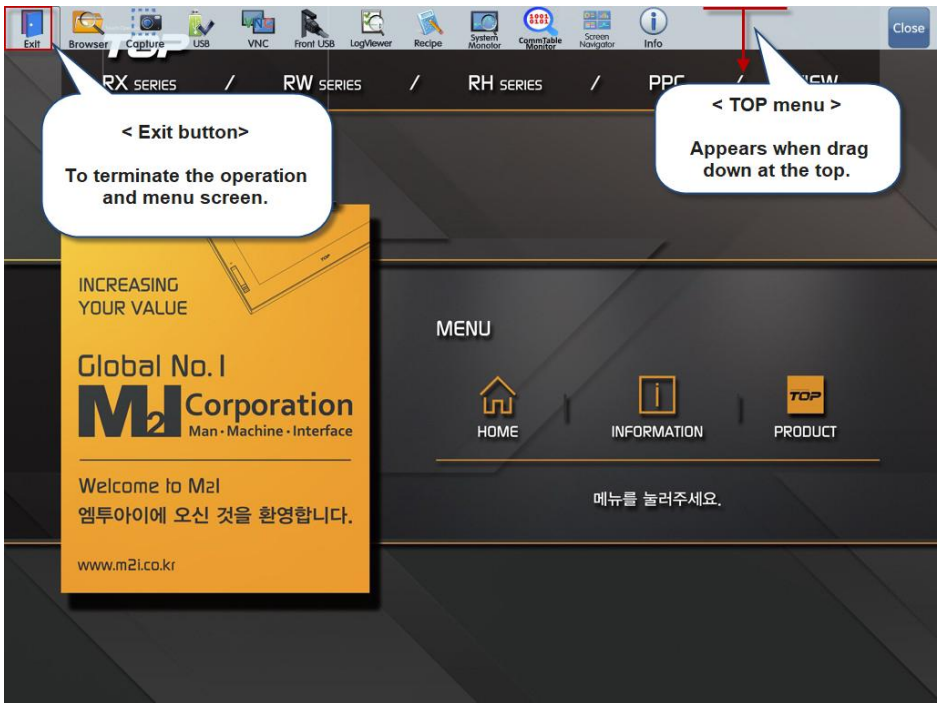
For the No.2 ~ No.N TOP devices, select [MBUS Client] and configure the IP of the MBUS Server TOP device.



[Figure. MBUS Client]

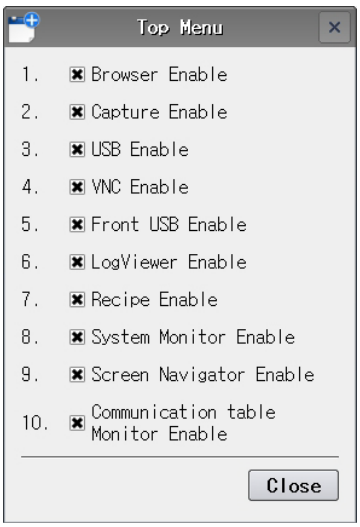
(15) TOP Menu

[TOP Menu] is provided for the Run Screen. Touch and drag the top of the Run Screen to access the [TOP Menu].



[Figure. TOP Menu of Run window]

The configuration of the TOP Menu can be changed by [Control Panel] - [System] - [TOP Menu]. Check the menus you want to be active on the TOP Menu, and menus that are not selected will appear on the TOP Menu, but will be deactivated.



[Figure. TOP Menu]

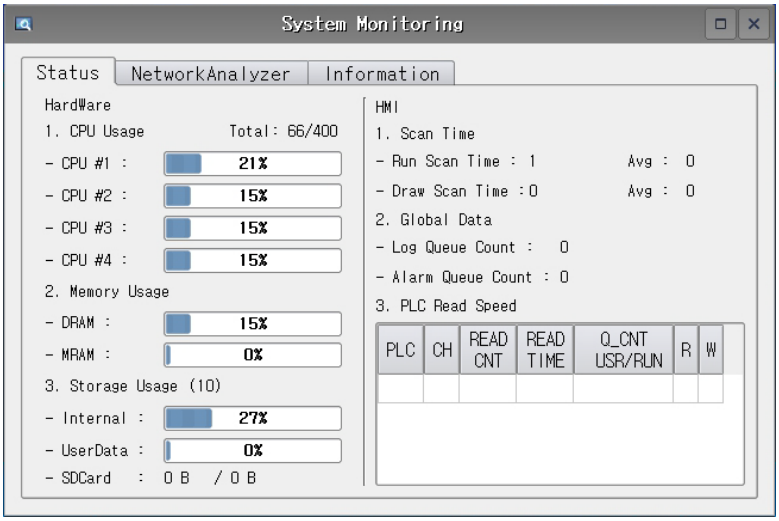
[Figure. Deactivated icons on the TOP Menu]

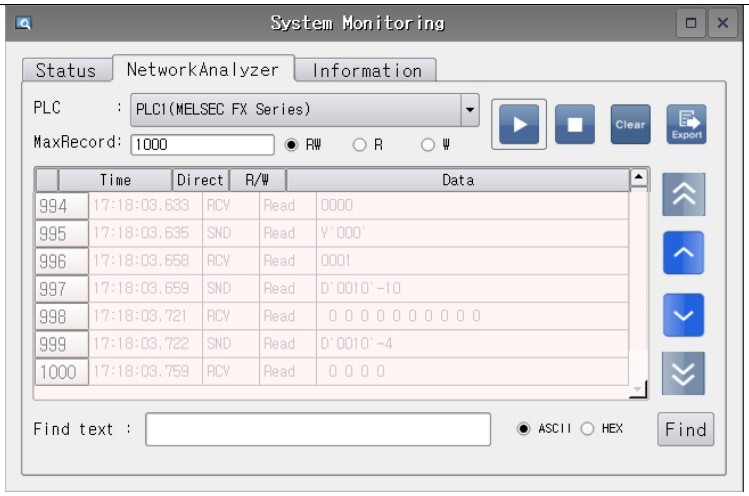
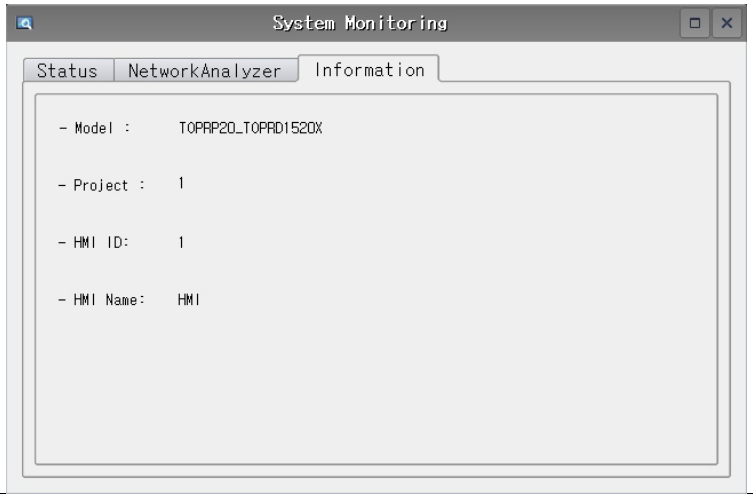
The following three essential icons on the TOP menu can not be deactivated.

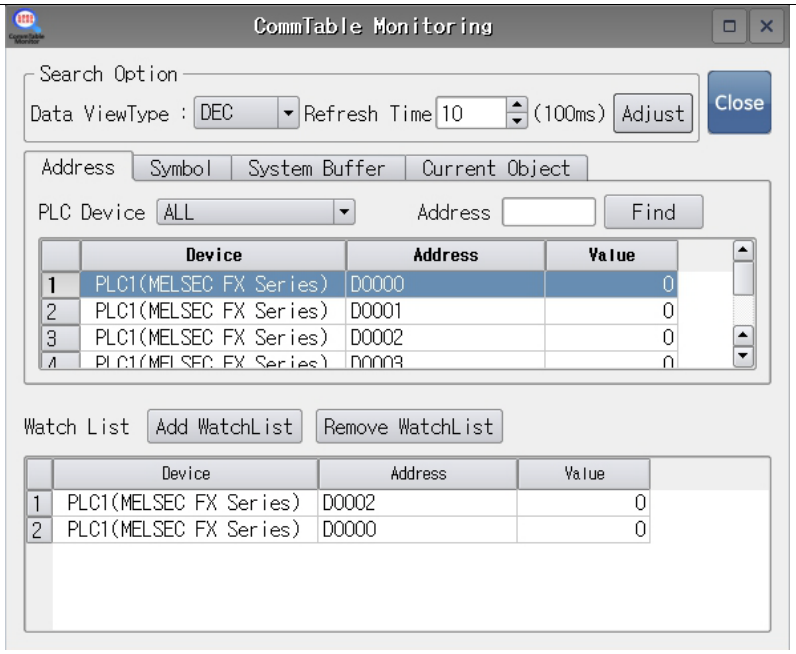
No.	TOP Menu	Description
1	Exit	Terminate the Run Screen and go back to Menu Screen.
2	Info	Information of the product including each version of the TOP device, upload information, time and date will be displayed, and a nickname for the TOP device can be entered. Basically, same functions provided by the [Information] icon on the Menu Screen are available.
3	Close	Close the TOP Menu.

The following menus can be deactivated if desired.

No.	TOP Menu	Description
1	Browser Enable	Press the [Browser Enable] button to open the File Browser. (Refer to Chapter 1.2.5 [File Browser] for more details.)
2	Capture Enable	Press the [Capture Enable] button to open the screenshot window. (Refer to Chapter 1.2.6 [Screenshot] for more details.)
3	USB Enable	Press the [USB Enable] button to open access functions for USB memory. The below window will appear on the middle of the screen. This screen will also appear when a USB memory is inserted to the USB port. Use the [Project] button to download a project file (*.HBZ) from the USB to the TOP device, or upload a project file (*.HBZ) running on the TOP device to the USB memory. Use the [Global Data] button to copy the log/alarm data of the TOP device to the USB memory. Use the [Screen Capture] button to capture the TOP device screen image to the USB memory.

		Use the [Cam Capture] button to copy a SnapShot made by a camera to the USB memory. Use the [Cam Movie] button to copy a video taken by a camera to the USB memory. Use th [Browser] button to open the [File Browser] of which USB memory is selected as its storage medium. Press [Close] to Close the USB menu window.
4	VNC Enable	Press the [VNC Enable] button to open [VNC Viewer]. (Refer to Chapter 1.2.2. [VNC Viewer] for more details.)
5	Front USB Enable	Press the [Front USB Enable] button to open [Control Panel] - [Option Device] - [Front USB]. Change the usage of the front USB port (Transmit / Host). (Refer to Chapter 1.2.10 [Control Panel - Option Device] for more details.)
6	LogViewer Enable	Press the [LogViewer Enable] button to view log history of the TOP device. (Refer to Chapter 4.2.5 [View Log Data] for more details.)
7	Recipe Enable	You can check or edit recipe data from the [Recipe Editor]. (Refer to Chapter 4.3.8 [Recipe Editor] for more details.)
8	System Monitor Enable	You can monitor the [TOP System Status/Network Analyzer/Information] with the [System Monitoring]. On the [Status] page, you can monitor [CPU Usage / RAM Usage / Storage USage], along with the [TOP Scan Time / Communication].  On the [Network Analyzer] page, you can monitor the PLC communication data by selecting a PLC from the drop-down menu. The number of [MaxRecord] will be displayed, and if the total number of records exceeds the selected MaxRecord number, old records will be deleted and substituted with the most recent data on a first-in-first-out basis.

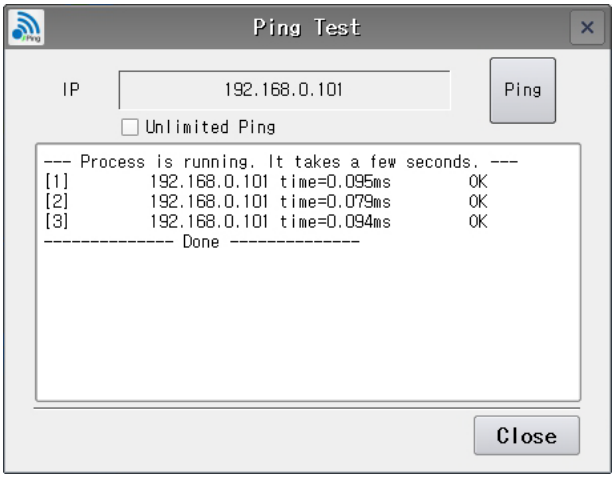
		 Press [Start] to record communication data. Press [Stop] to abort recording communication data. Press [Clear] to delete all recorded communication data. Press [Export] to save recorded communication data on a file. Press [Close] to close the System Monitoring Window. Select [RW] to record both Read and Write Data. Select [R] to record only Read data. Select [W] to record only Write data. (Read shall refer to data the TOP device had read.) On the [Information] page, you can view information of the TOP device. [Model / Project / HMI ID / HMI Name] are displayed. 
9	Communication table Monitor Enable	Press the [Communication Table Monitor Enable] button to open the [CommTable Monitoring] window. The currently occupied address is registered to the communication table. You can check the address and value of the address in real-time.

		 Select [Data ViewType] that should be shown in the [Value] column, from the drop-down menu. Addresses and values shall be updated in real-time upon the interval selected in the [Refresh Time]. Select an [Address] and press [ADD WatchList] to register a specific address to the Watch List. Addresses added to the Watch List can be monitored regardless if you change the screen.
10	Screen Navigator Enable	Display all project screens at once and select the screen of your selection to run.

(16) Ping

Ping test confirms whether or not the ethernet communication of the TOP device is affirmative.

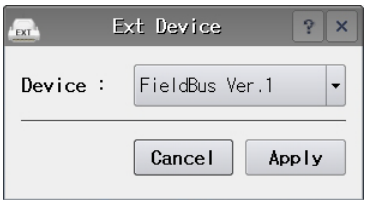
Enter the IP address of the PLC that is connected with the TOP device via ethernet, and press [Ping] to run the test.



[Figure. Ping Test]

(17) Extension Device

You can assign an extension module connected to the EXT port of the TOP device.



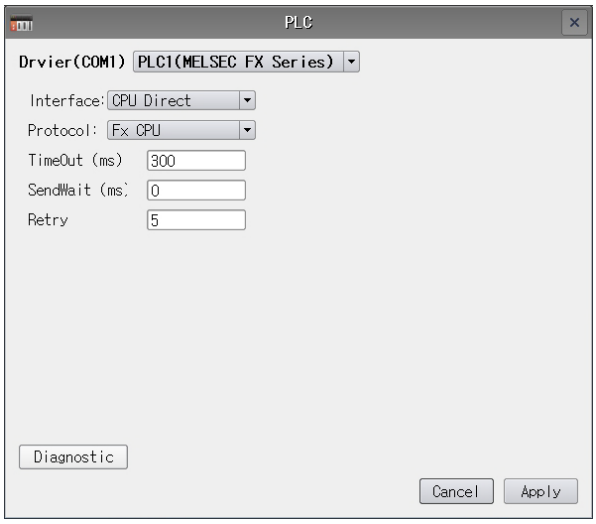
[Figure. Extension Device]

1.2.9 Control Panel - Communication Device

(18) PLC

You can check the [PLC Setting] configured by TDS project, and change all settings except the corresponding driver.

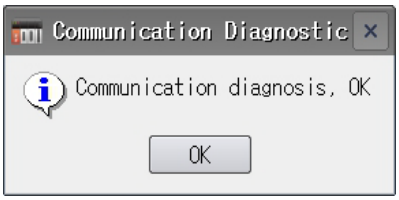
The content shown in the window may differ according to the PLC type.



[Figure. PLC]

No.	PLC	Description
1	Driver	The Driver for the PLC is shown. The Driver configured at TDS can not be changed at the TOP device.
2	Interface	The PLC interface configured by the driver is shown, and can not be changed from this menu. Example) CPU Direct, Computer Link
3	Protocol	The PLC protocol configured by the driver is shown, and can not be changed from this menu. Ex) MC Protocol, Modbus, etc.
4	TimeOut (ms)	Configure the length of time to wait for a time out error for the communication with PLC. Time out refers to the time set to wait for response from PLC. After initiating communication with PLC, the TOP device will wait for a certain amount of time for a response from PLC, and if such selected amount of time has elapsed without any response from PLC, and error will be created.
5	SendWait (ms)	Configure the delay time to wait before actual transmission for communication with PLC. After sending an initial request to PLC, and receive response to such request from the PLC the delay time before transmission prevents the TOP device to send an additional response immediately after receiving such response and sends such additional request after the predetermined amount of time so that the PLC communication is not overloaded. This function shall be used when the communication scan of the PLC is relatively slow.
6	Retry	After initiating communication with PLC if the time configured for TimeOut has elapsed with no response from PLC, the TOP will resend the communication protocol for the selected number of times. This is the number of times that the TOP will repeat the cycle of send > wait > timeover > send. If the PLC does not respond after the selected amount of cycles, an error will be created.
7	Communication Diagnostic	You can check whether or not the TOP device is properly communicating with PLC. If an error is detected, a message box as shown below will appear, recommending you to check the communication settings and cable connection. To see the corresponding [Communication

		Manual] go to [Project] - [Property] on the TDS and click the PLC name shown on the left side (PLC Setting). A [Communication Manual] button will appear. The Communication Manual provides wiring diagrams and communication settings, and other contents related to communication.



[Figure. Communication Diagnostic confirmed message]

[Figure. Communication Diagnostic error message]

(2) Roll Printer

Roll Printer is a mini-printer printing on a roll of paper.

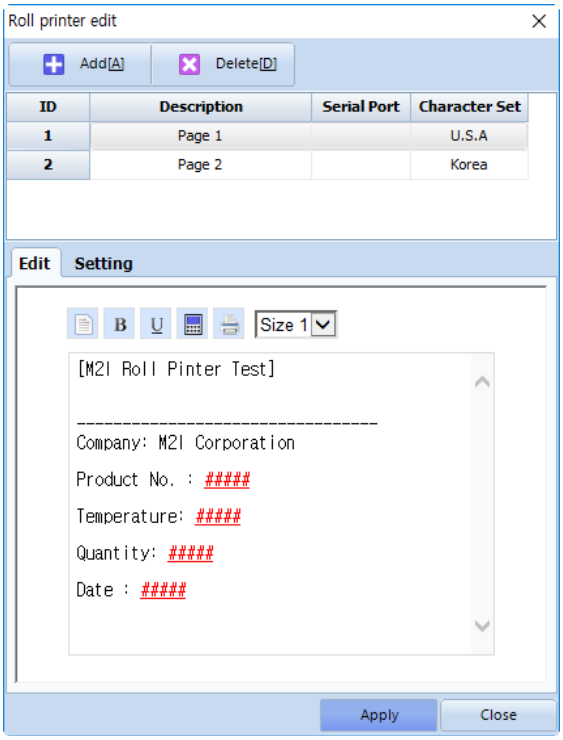
Connect a roll printer to the serial port of your TOP device and print via RS-232C communication.

▶ Roll Printer Specification

Any roll printer that supports Epson Protocol is compatible with the TOP device.

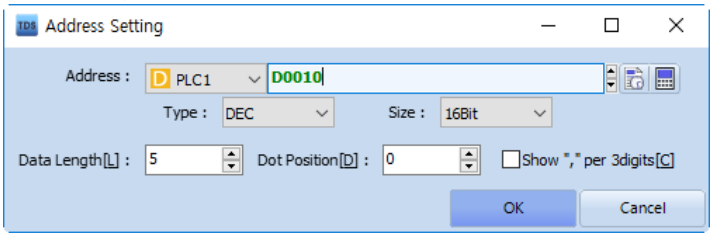
▶ Print Form

Edit the print from at [Project] - [Roll Printer].



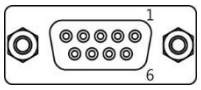
[Figure. Configure Roll Printer form]

Press [Add] to create [Page 1]. You can additionally add pages upon your needs.
Enter texts in the [Edit] field, and edit the form with the property toolbar.

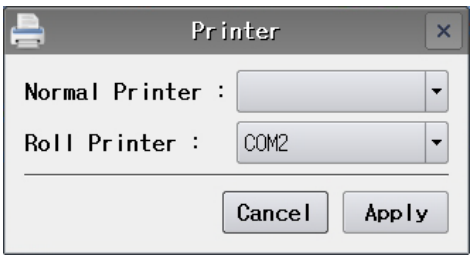
No.	Button	Description
1	Source	Source of the text is shown. Press again to go back to edit mode.
2	Bold	The select text is changed to bold.
3	Underline	An underline is created beneath the selected text.
4	Address	Add the address for output.  Configure the [Address / Type / Size / Data Length (length of an expression) / Dot Position]. Select [Show "," per 3digits] to express currency. Press [OK], then ####### will appear in the edit field. Click each ##### to edit the applicable address from the [Address && Formant Input] window.
5	Print	Run a test print.
6	Size 1	Edit the size of the selected text. Select from font size of 1 to 7. Size 1 is the smallest size, where Size 2 is 2 times larger than Size 1, Size 3 is 3 times larger, so on and so forth, Size 7 is 7 times larger than Size 1.

▶ Communication between TOP device and Roll Printer

The COM1 / COM2 port of the TOP device is configured as below.

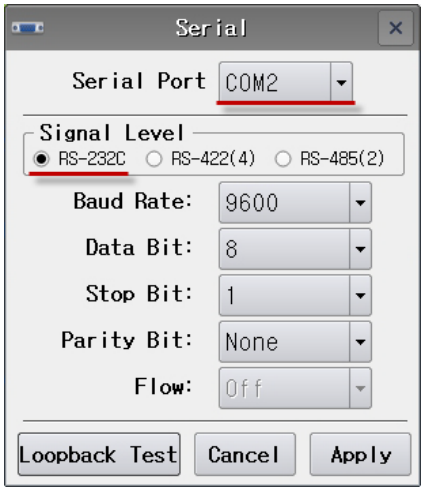
Shape	Pin No.	Signal	I/O	Description
9Pin Female 	1	RDA(RD+)	Input	Receive RS-422/485 data (+)
	2	RD(RxD)	Input	Receive RS-232C data
	3	SD(TxD)	Output	Send RS-232C data
	4	RDB(RD-)	Input	Receive RS-422/485 data (-)
	5	SG		Signal Ground
	6	SDA(SD+)	Output	Send RS-422/485 data (+)
	7	Power	Output	5V
	8	Power	Input	Power Ground
	9	SDB(SD-)	Output	Send RS-422/485 data (-)

For the cable connecting the TOP device and roll printer, the SD of the TOP device shall be connected to the RD of the roll printer, and the SG of the TOP device shall be connected to the SG of the roll printer. Select between COM1/COM2 for which the roll printer shall be connected at [Control Panel] - [Printer] from the Menu screen.



[Figure. TOP device PORT selection for Roll Printer]

Go to [Control Panel] - [Serial] from the Menu Screen and configure the communication settings for the roll printer.



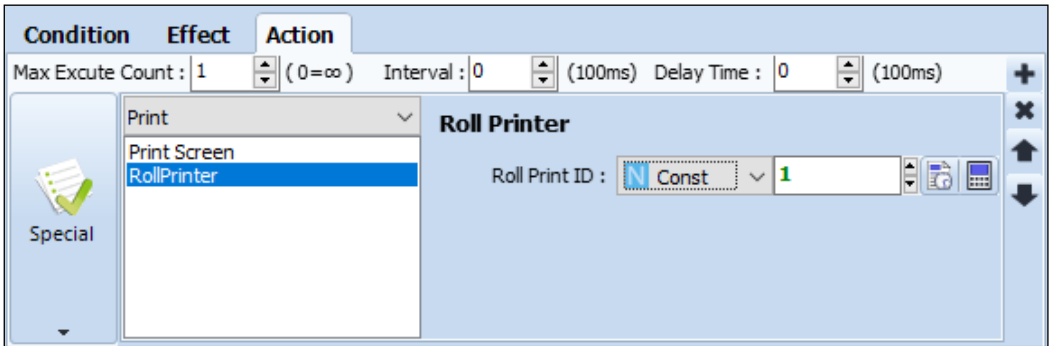
[Figure. Communication settings for Roll Printer]

▶ RollPrint Action

The button to start roll print is available on the [Action] page - [Special].

On the [Effect and Action] page, go to [Action] - [Special] - [Print] and select RollPrinter, then select the Roll Print ID for the form you have created at [Project] - [RollPrinter].

Once this action is activated, the roll printer will print records in the format of the selected ID.



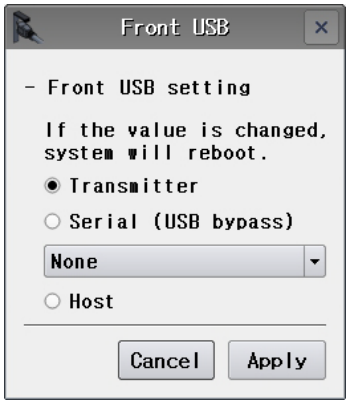
[Figure. Print Order]

(19) Front USB

The TOP device accommodates a micro 5 pin USB port on the lower right side. You can configure the usage of this USB port.

Configure the settings and press [Apply], the TOP device will reboot.

[Figure. Front USB]



[Figure. Front USB]

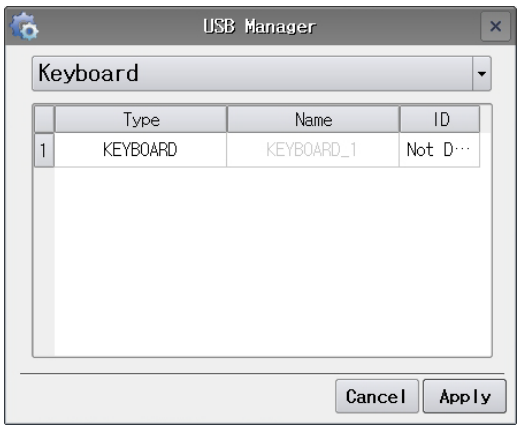
No.	Front USB	Description
1	Transmitter	Set the Front USB to transmitter mode. You can transfer project files from TDS to TOP device, or upload data from the TOP device to a PC by connecting a PC and the TOP device with a USB cable.
2	Host	Set the Front USB to Host mode. You can add on [USB Memory / USB Barcode Scanner / USB Keyboard / USB Mouse / USB Camera] via a compatible USB gender. If you connect a USB memory, you can copy data from the TOP device to the USB memory and vice versa.

(20) USB Manager

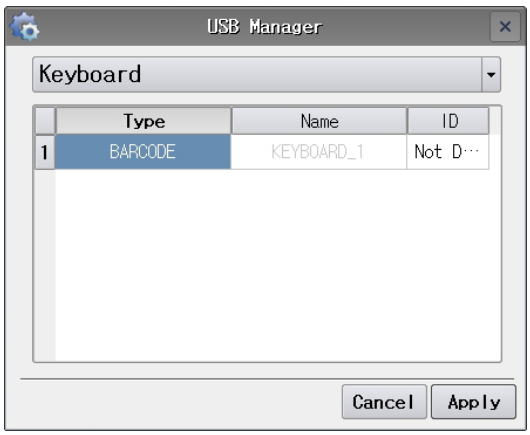
You can manage the device connected to the USB Host port. You can add on [USB Memory / USB Barcode Scanner / USB Keyboard / USB Mouse / USB Camera] to a USB Host port.

If a USB Keyboard or a USB Mouse is connected, select [Keyboard] from the USB manager that provides a drop-down menu of [Keyboard/USB Camera].

For the [Type] select Keyboard between Keyboard/Barcode, then enter the ID and press [Apply] to recognize the connected keyboard or mouse. You can input letters and numbers with the keyboard instead of the keypad, and the mouse supports click and drag movements of the courser instead of touch to the screen to operate the TOP device.



[Figure. Key board settings on USB Manager]



[Figure. Barcode settings on USB Manager]

Selecting BARCODE and CAMERA should be done in the same manner by selecting the corresponding device, entering the ID and pressing [Apply].

1.2.11 Control Panel - Service

(1) FTP Server

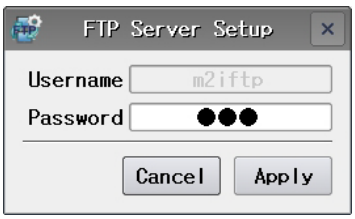
FTP (File Transfer Protocol) allows file transfer between the server and a client based on a TCP/IP protocol, where a client device can share and copy files from the server through ethernet networks.

TOP devices support both FTP Server and FTP Client functions.

FTP Server Setup

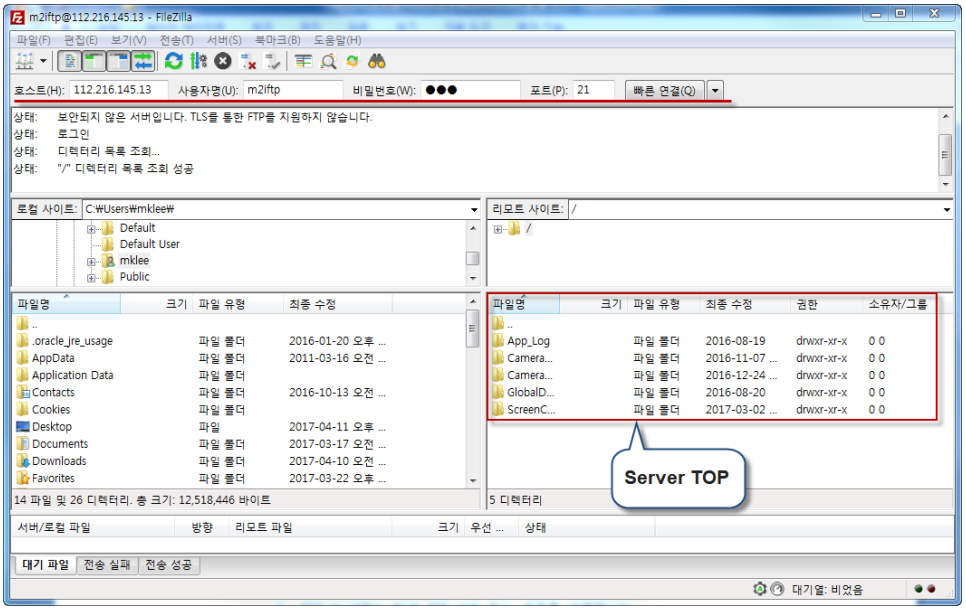
Configure the ethernet connection at [Control Panel] - [System] - [Etherent], the TOP device should be connected to an ethernet network during setup.

Run [Control Panel] - [Service] - [FTP Server]. Configure a password and select [Apply] to complete the FTP Server setup.



[Figure. FTP Server]

To access a TOP device configured as an FTP Server from a remote PC, install the free FTP client program, [FileZilla]. Go to http://filezilla-project.org to download the program. After installing the program, the following screen will appear when you run the program.

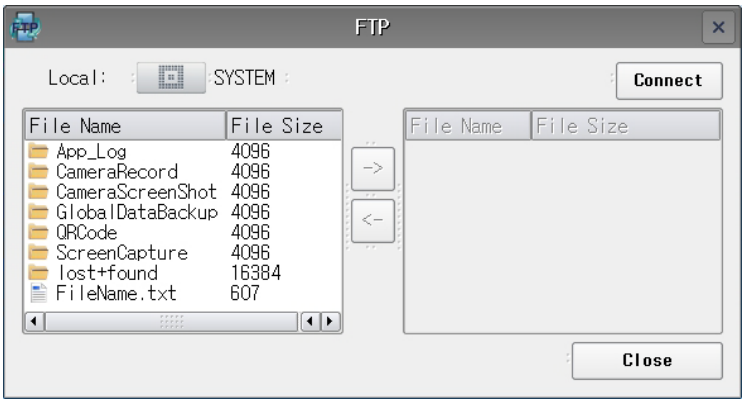


[Figure. FTP Client PC]

After configuring the following 4 settings, press [Quickconnect] to access the server.

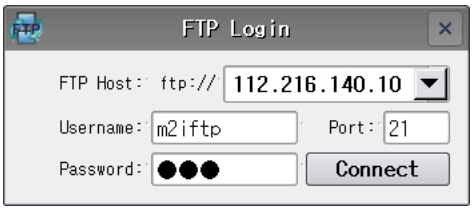
No.	Detail Setting	Description
1	Host	Enter the IP Address of FTP Server. The IP Address of the TOP device configured as a FTP Server can be confirmed at [Control Panel] - [System] - [Ethernet].
2	Username	Username is fixed as "m2iftp".
3	Password	Enter the password configured at [Control Panel] - [Service] - [FTP Server].
4	Port	Port is fixed as 21.

Once the client is successfully connected with the server, the folders and files of the TOP device configured as FTP Server will be displayed on the right.
Files can be copied to your PC by selecting with your mouse.
Click the FTP icon to access an FTP server from your TOP device.



[Figure. FTP]

Click the [Connect] button, on the upper right corner of the FTP window, the following login window will appear.



[Figure. FTP Login window]

Configure the following 4 settings, similar to those of the FTP client from PCs, and press [Connect] to access the server.

No.	Detail Setting	Description
1	FTP Host	Enter the IP Address of FTP Server. The IP Address of the TOP device configured as a FTP Server can be confirmed at [Control Panel] - [System] - [Ethernet], if a PC is configured as the FTP server, the PC's IP can be confirmed at [Control Panel] - [Network Setting].
2	Username	Enter the FTP server name. If a TOP device is configured as the FTP server, user name is fixed as "m2iftp".
3	Port	Port is fixed as 21.
4	Password	Enter the password of the FTP Server. If a TOP device is selected as an FTP server, enter the password configured at [Control Panel] - [Service] - [FTP Server].

Once connected to the FTP server, files on the server are displayed on the right side. Use the arrows in the middle of the screen to move files.

(2) VNC Server

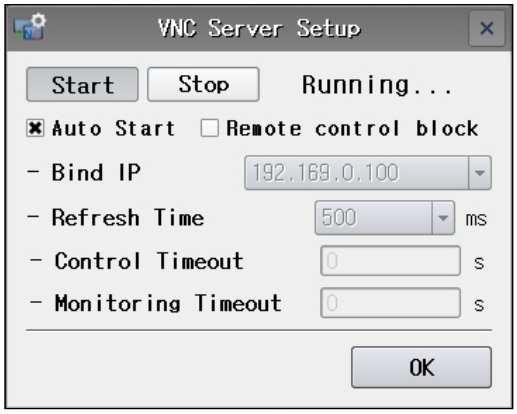
VNC (Virtual Network Computer) allows a user to remotely monitor and operate the screen of a TOP device that is configured as the VNC server, from another TOP, mobile device or PC.
VNC Viewer allows remote access to the screen of a TOP device that is configured as the VNC server.
VNC Viewers are installed on TOP devices as default, but can also be installed on PCs and mobile devices. Search [VNC Viewer] on your internet browser to download the program. [VNC Viewer] application is also available on Playstore for your mobile device.

To access VNC, your device must be connected to an ehternet network.
PCs assigned to the same IP range of the VNC Server can access VNC through local ehternet networks, while mobile devices can access VNC through Wi-Fi networks with wireless routers. If the product is connected with a public IP ethernet network, any PC that has access to internet can access VNC.
A single VNC Server can host multiple VNC viewers at once.
A TOP device can be employed as a VNC Server and a VNC Viewer.
Before going further with VNC Viewer, find the following instructions on VNC Server settings.

(1) Prior to activating VNC Server, configure an Administrator Password at [Control Panel] - [System] - [Security] for security purposes. Once you have an Administrator Password, you have to verify the password whenever the TOP device navigates back to the Main Screen. When you are on the Menu Screen, you have to verify the password whenever you access a function that may change settings

including [VNC Viewer] / [Project Viewer] / [Control Panel] / [Wi-Fi Setting] / and [Time Setting].

(2) Go to [Control Panel] - [Service] - [VNC Server].



[Figure. VNC Server]

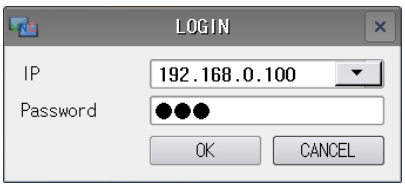
(3) Push the Start button The VNC server status is shown as [Stop] or [Running...]. A touch to the Start button changes the status from [Stop] to [Running...].

(4) Descriptions of each detail setting are provided below. Settings may be configured only when the VNC Server status shows [Stop].

No.	Detail Setting	Description
1	Auto Start	VNC Server will be automatically executed whenever the power supply to TOP device is reset and the device has rebooted.
2	Remote control block	Only monitoring is allowed, while no control is available.
3	Bind IP	Configure the VNC Server's IP address. List of IPs configured at [Control Panel] - [System] - [Ethernet] and Wi-Fi wireless IPs will appear. Select the IP address of the applicable ethernet.
4	Refresh Time	Refresh Time represents the response time of VNC Viewer. Selecting a short Refresh Time may enhance the response time, but may cause a slower operation of the TOP device.
5	Control Timeout	An error is raised when there is no act of control for a selected period of time.
6	Monitoring Timeout	An error is raised when there is no act of monitoring for a selected period of time.

VNC Viewer supports remote access to a TOP device that is configured as a VNC Server.
First, here are the details of VNC Viewer on a TOP device.

Touch the VNC Viewer icon, to access the below login dialog.
Configure the VNC Server's IP address. If an Administrator Password has been configured ([Control Panel] - [System] - [Security]), verify the Password.
If the Administrator Password has not been configured, leave the text box empty.
Select [OK] to initiate monitoring.



[Figure. VNC Viewer]

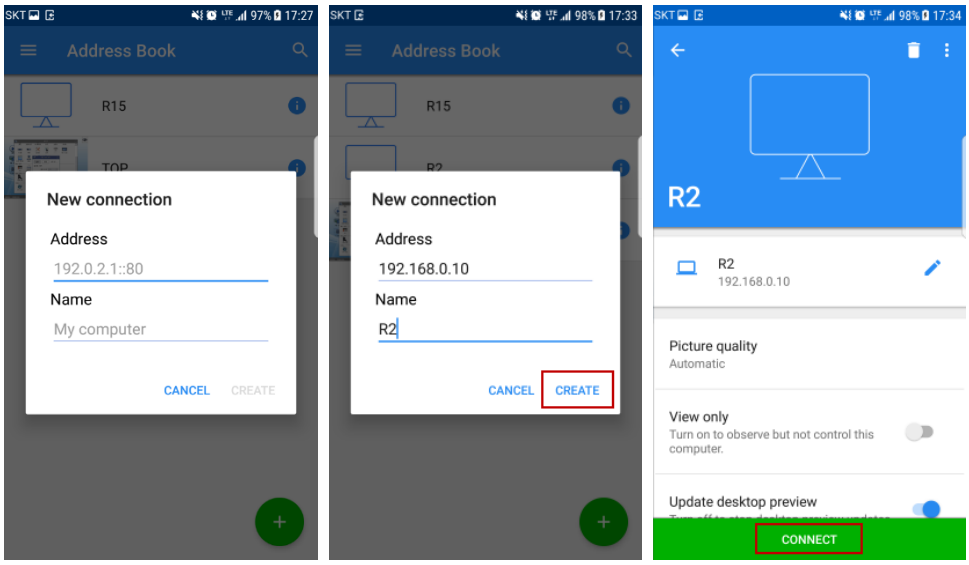
To access VNC Viewer from a mobile device or a remote PC, follow the below steps.

(1) Run VNC Viewer

(2) Press the '+' in the bottom right corner.

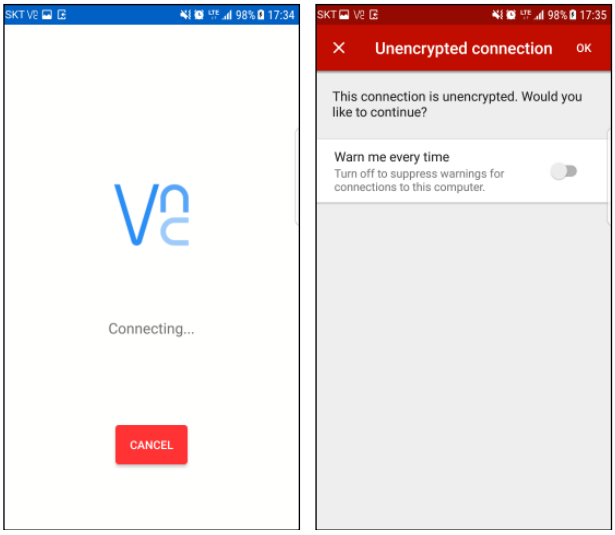
(3) The [New connection] window will appear. Enter the IP Address of the VNC Server. Enter the name of your selection for the server you have connected to.

(4) Select [Create] and navigate to the connection screen, then push [Connect] to activate your connection.



[Figure. Mobile VNC Viewer]

(5) On the Unencrypted connection screen, disable [Warn me every time] so that the Password verification message does not appear if a password is not configured.
Select [OK] to finish set up.
If a Password is configured, activate [Remember Password] to save the password for future connections.



[Figure. Mobile VNC Viewer]

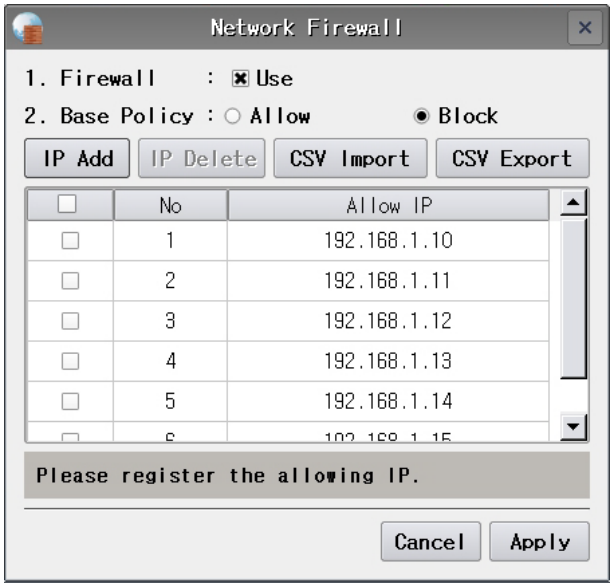
If the remote device is appropriately connected, you can monitor the screen of a TOP device that is configured as the VNC Server as shown below.

Furthermore, if the VNC Server allows [Remote Control], click the mouse icon atop the screen to conduct remote control. A mouse pointer will appear after selecting the mouse icon. Move the mouse pointer and select control functions.

[Figure. Mobile VNC Viewer]

(3) Firewall

Firewall is used to prevent access to the TOP device network.



[Figure. Firewall]

Select whether or not to use firewall at [1. Firewall].
Select between [Allow] and [Block] from [2. Basic Policy].
Selecting [Allow] will allow access to all networks except those added below. Add IPs that should be blocked in the bottom field. Selecting [Block] will deny access to all networks except those added below. ADD IPs that should be permitted in the bottom field.
Press [CSV Export] to export the list of all registered IPs to a *.CSV file.
Press [CSV Import] to import a *.CSV file created with [CSV Export].

(4) E-mail

Send an e-mail saved by [Project] - [Send Message] from the TOP device by executing a [Send Message] action.

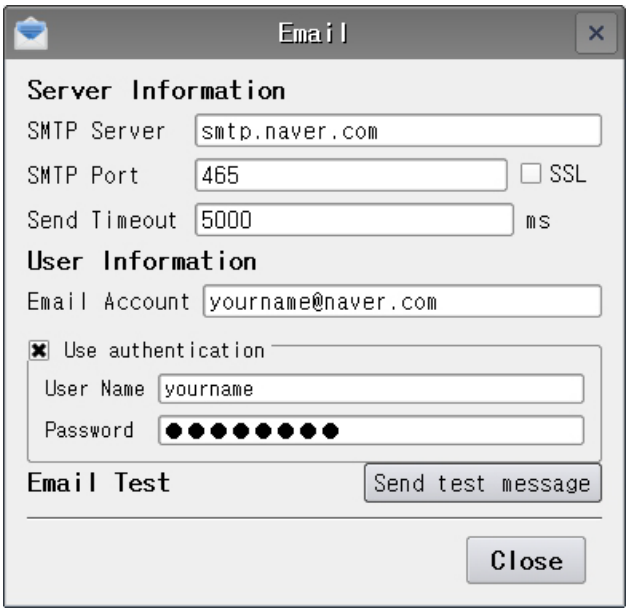
▶ Naver mail environment settings

This is a walk through of e-mail environment settings with the example with naver mail.
To allow access to Naver mail, log in to your Naver mail account and select [Environment Settings] - [POP3/IMAP Settings].

[Figure. Naver SMTP Settings]

Configure your settings as shown above, then check and confirm the SMTP Server Name / SMPT Port / User Name(ID) / Password (Naver Login Password) shown on the bottom of the screen and enter the information on your TOP device at the [Control Panel] - [Email] from the Menu screen.

▶ [Control Panel] - [Email] configuration from Menu Screen.

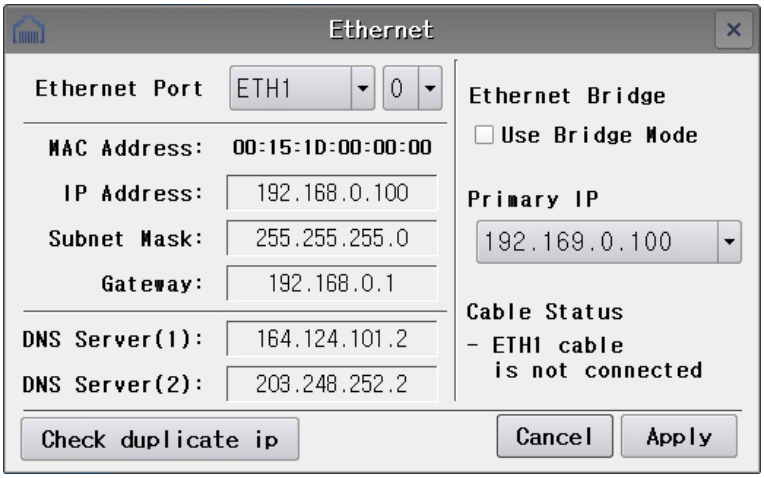


[Figure. [Menu Screen] - [Email] Settings]

Press [Send test message] for testing. The test result will be shown with a message window specifying [Sent Message] or [Failed to Connect].

▶ [Control Panel] - [Ethernet] configuration from Menu Screen

Connect the TOP device and PC with an ethernet cable, and go to [Control Panel] - [System] - [Ethernet] to configure the settings of [IP], [Subnet Mask], and [DNS Server].

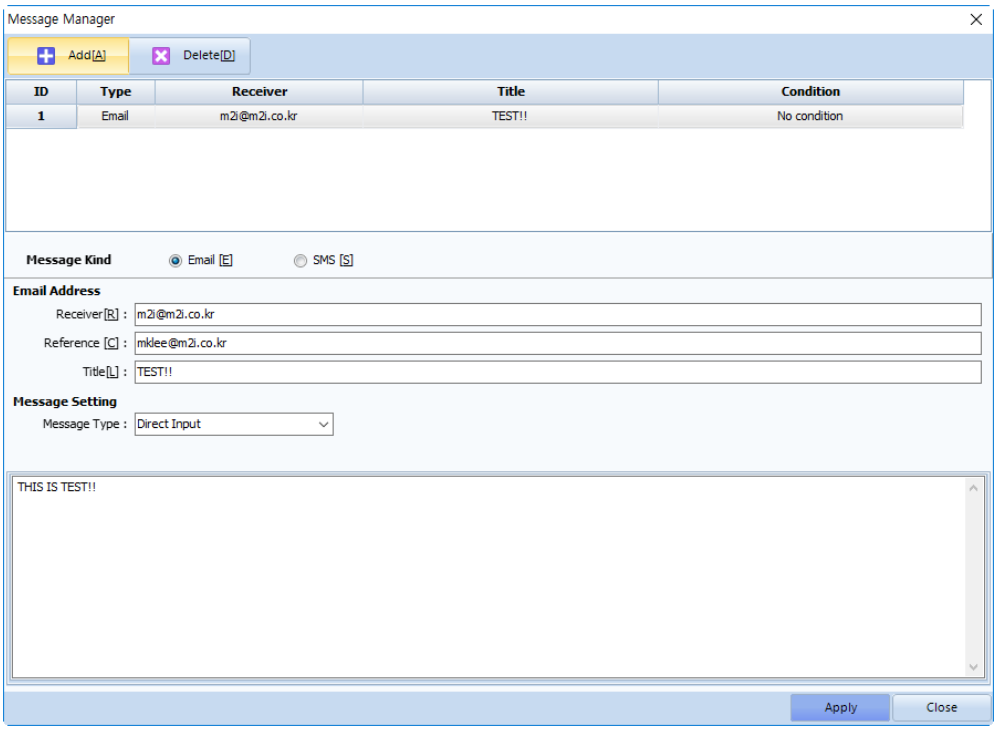


[Figure. Settings at [Menu Screen] - [Ethernet]]

If the [Gateway] is different, the TOP device can not be connected to an external network.
If there is no [DNS] address, the actual IP of Naver mail can not be found.

▶ Writing e-mails from [Project] - Send [Message]

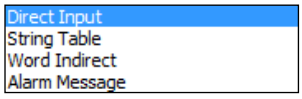
Use [Project] - [Send Message] from the TDS and send an email from the [Message Manager].



[Figure. Message Manager_Email]

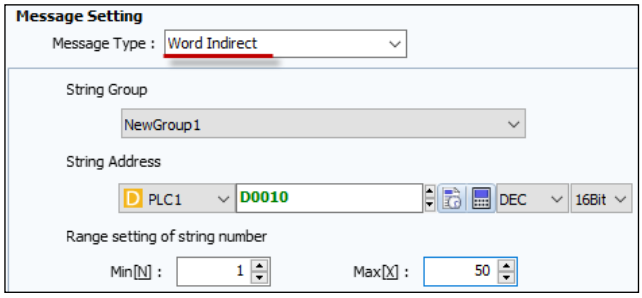
Select [Email] for [Message Kind], and press [Add] from the menu bar to register an email with [1] as its ID.

Enter the corresponding email address for [Receiver] and [Reference] (if any), and the [Title] of the email.
Select the [Message type] from the drop-down menu for the [Message Setting].



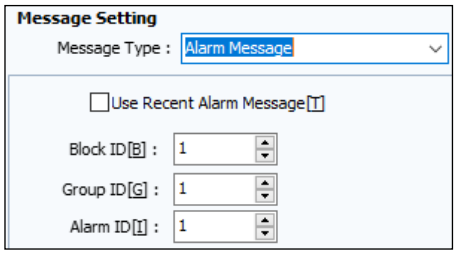
[Message Type]

Select [Direct Input] if you prefer to type in the text.
Select [String Table] to load contents from [Project] - [String].
Select [String Group], and the string that shall be imported as content from the list.
Select [Word Indirect] to load text data from the address alloted to the string selected by [Project] - [String] The data corresponding to the selected address' ID will be loaded.



[Figure. Email content_Word Indirect]

Select [Alarm Message] to load [Alarm Log] from [Project] - [Alarm Message]. The [Alarm Message] corresponding to the [Block ID] / [Group ID] / [Alarm ID] will be loaded.

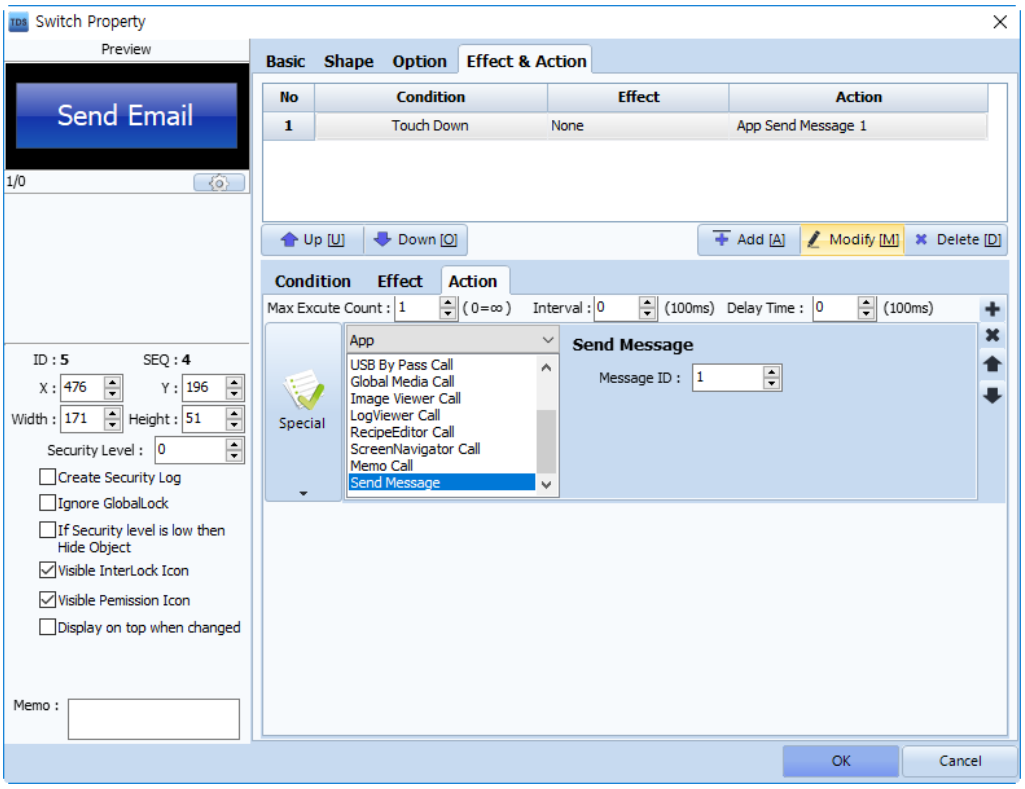


[Figure. Email Content_Alarm Message]

(5) Send Email

Send the email you have made with [Message Manager] by following the below process.

On the [Effect & Action] page, select [Special] - [App] - [Send Message] and enter the message ID.



[Figure. Send Email button]

The above action will send the email.

1.2.12 **Address Checker**

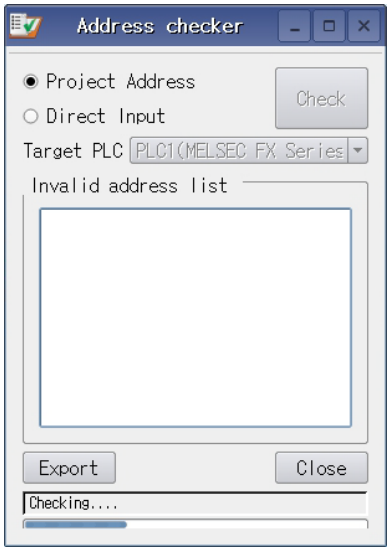
Click the [Address Checker] button, the [Address Checker Window] will appear.

The Address Checker will search and all addresses used by the [Project] for communication with the PLC selected for the project, and find wrong addresses, i.e. invalid addresses, or addresses that can not be used for communication.

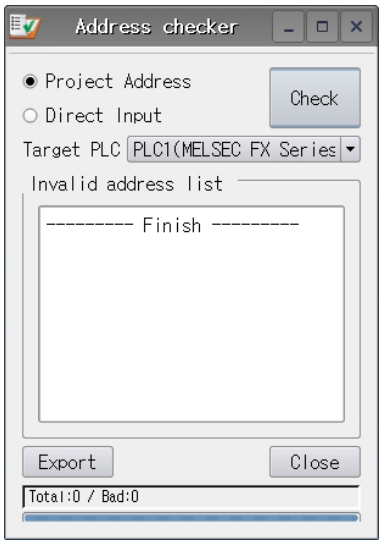
Select [Project Address] and press [Check] to run the verification through communication with PLC.

Wrong addresses will be shown on the [Invalid address list].

You can save the list to a file by pressing the [Export] button.



[Figure. Address Checker in progress]



[Figure. Address Checker completed]

If there is at least one address that can not communicate with PLC, a communication error will be generated. Therefore, all addresses on the [Invalid address list] must be changed from the Project, or check the PLC.

1.2.13 Information

Press the [Information] icon to open the Information window. Information of the TOP and version informations are displayed.

Press [OK] or the 'X' box to close the window.

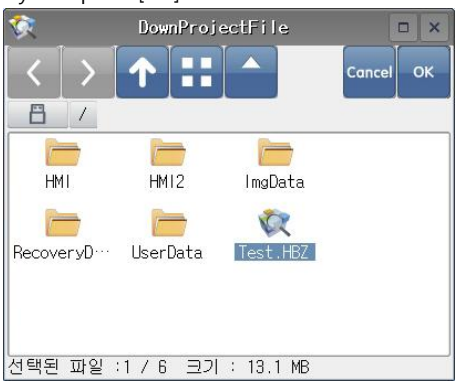
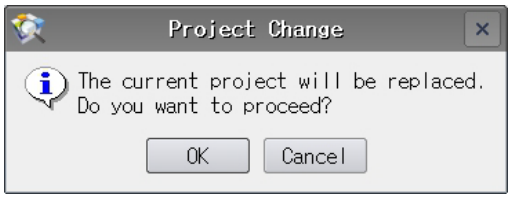
[Figure. Information]

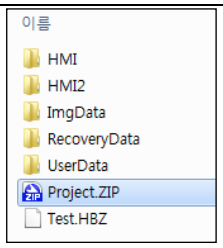
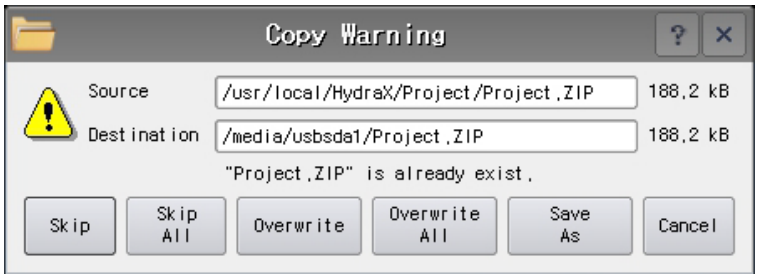
No.	Information	Description
1	Hydra Version	The version or the program executing the project.
2	Daemon Version	The version of the Menu Screen.
3	OS Version	The version of the OS.
4	Util Version	The version of the application.
5	Upload Project	The name of the project that is currently running.
6	Alias Name	The alias of the TOP device, enter alias in the text box, if any.
7	Time	The current time and date configured for the TOP device.

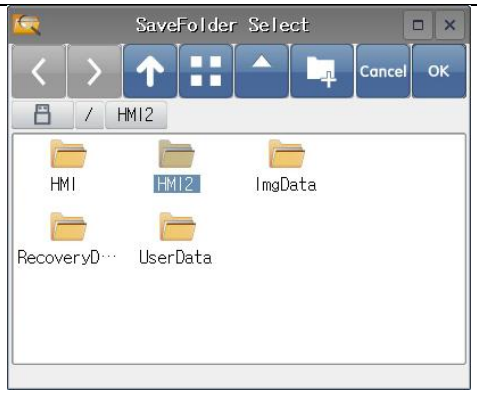
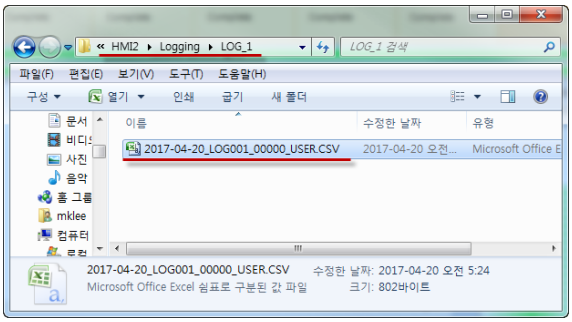
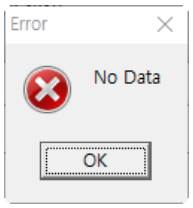
1.3 External Memory Menu

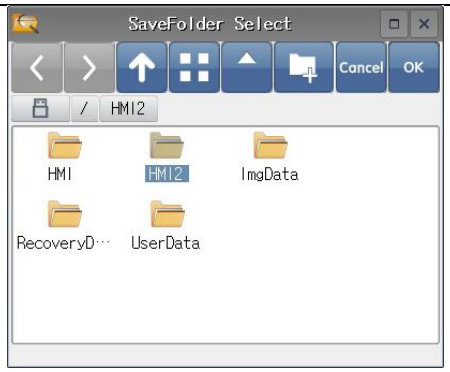
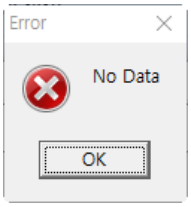
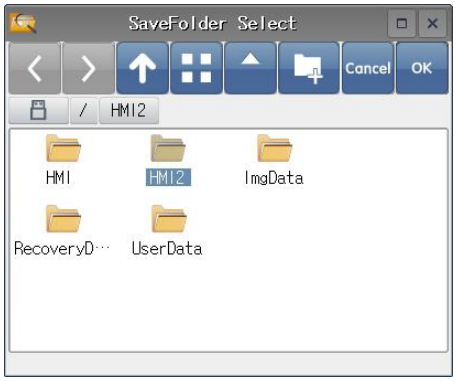
If you connect an external memory to the TOP device including USB memory or SD Card, the below menu bar will appear on the screen.

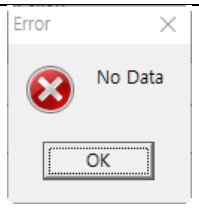
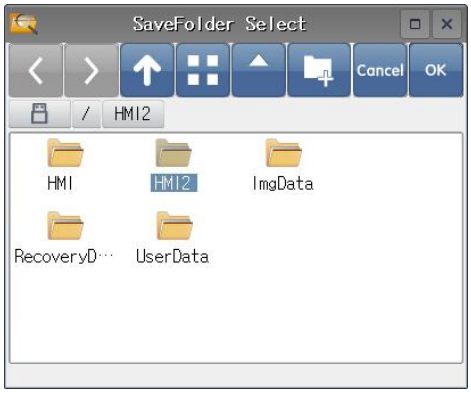
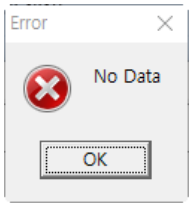
[Figure. External Memory Menu Bar]

No.	Menu	Description
1	Project	If you press the [Project] button, a [Download] button and [Upload] button will appear beneath the [Project] button. [Download]: Download a project file [*.HBZ] to the TOP device from an external memory. Press the [Download] button, the below window will appear. Select a project file [*.HBZ] from an external memory and press [OK].  [Figure. Download_Selecting a project file] Select [OK] on the Project Change message and download the selected project to change the project loaded on the TOP device.  [Figure. Project Download message] [Upload]: Upload a project file from the TOP device to an external memory. You can upload a file only if the file has been built [*.HBZ] wile the [Include Project File in Build File(Use upload data)] option selected by [Transmission] - [Project Build] on TDS, and was transmitted to the TOP device. Selecting this function will include a compressed file [*.TDS] for editing in the transmission file [*.HBZ]. Accordingly, when a project file is uploaded, a compressed file [Project.ZIP] of the editable file [*.TDS] is copied to the external memory. Unzip the file on a PC, and open the file with TDS to edit the file.

		 [Figure. Uploaded completed] If you transmit a file while [Include Project File in Build File(Use upload data)] option is not selected, the file can not be uploaded and the below warning message will appear. [Figure. Upload error message] Moreover, If there is a [Project.ZIP] file in the directory of which you intend to upload the file, the below warning message will appear, allowing you to select whether you will write over the existing file, or save the subject file with another name.  [Figure. Error Message]
2	Global Data	Use the [Global Data] button to copy the log/alarm data of the TOP device to external memory. Whenever a log data or alarm is generated by the TOP device, such data is saved under the [Global Data]-[HMI]-[Logging] directory, or the [Global Data]-[HMI]-[Alarm] directory, respectively. [Log Upload]: Copy the log data to an external memory. [Alarm Upload]: Copy the alarm data to an external memory. Press the [Log Upload] button, the SaveFolder Select window will appear. Select a folder from the external memory and press [OK] to copy the entire log data to the selected directory.

		 [Figure. Selecting External Memory Directory] Browse the external memory, you can find the logging folder of the TOP device copied to the external memory.  [Figure. Logging data saved on external memory] If there is no log data on the TOP device, the below error message will appear.  [Figure. No Data Error Message] Upload alarm data with the [Alarm Upload] button in the same method.
3	Screen Capture	Copy/move all screen shot data from the TOP device and paste such data to the external memory. Screenshot data are saved in the [ScreenCaputre] folder of the TOP device. Press [Copy All] or [Move All], the SaveFolder Select window will appear. Select the folder in which the screenshot data should be moved. Press [OK] to copy/move files.

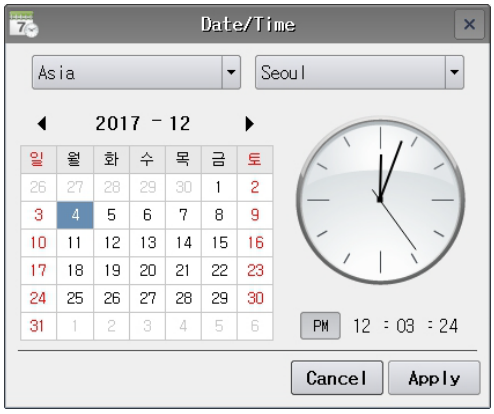
		 [Figure. Selecting External Memory Directory] If there is no screenshot data on the TOP device, the below error message will appear.  [Figure. No Data Error Message] [Copy All]: Copy all screenshots to the external memory. [Move All]: Move all screenshots to the external memory. [Browser]: Select and copy files from the File Browser.
4	Cam Capture	Copy/move camera screenshot data from the TOP device and paste such data to the external memory. Camera screenshot data are saved in the [CameraScreenShot] folder of the TOP device. Press [Copy All] or [Move All], the SaveFolder Select window will appear. Select the folder in which the camera screenshot data should be moved. Press [OK] to copy/move files.  [Figure. Selecting External Memory Directory] If there is no camera screenshot data on the TOP device, the below error message will appear.

		 [Figure. No Data Error Message] [Copy All]: Copy all Camera screenshots to the external memory. [Move All]: Move all Camera screenshots to the external memory. [Browser]: Select and copy files from the File Browser.
5	Cam Movie	Copy/move camera video data from the TOP device and paste such data to the external memory. Camera video data are saved in the [CameraRecord] folder of the TOP device. Press [Copy All] or [Move All], the SaveFolder Select window will appear. Select the folder in which the camera video data should be moved. Press [OK] to copy/move files.  [Figure. Selecting External Memory Directory] If there is no camera video data on the TOP device, the below error message will appear.  [Figure. No Data Error Message] [Copy All]: Copy all Camera video data to the external memory. [Move All}: Move all Camera video data to the external memory. [Browser]: Select and copy files from the File Browser.
6	Browser	Open [File Browser].
7	Close	Close the menu bar.

1.4 Status Bar

A Status Bar is provided on the bottom of the Menu Screen.
The model of the TOP device is shown on the left side of the Stats Bar.
The [Wi-Fi] / [Language] / [Date/Time] is shown on the right side.
Settings for Wi-Fi setting, language setting, date/time and date can be configured by touching each item.

[Figure. Status Bar on the bottom of the Menu Screen]

No.	Status Bar	Description
1	Wi-Fi	Configure the settings for Wi-Fi connection. Refer to Chapter 1.2.8(11) Wi-Fi for more details.
2	Language	Change the system language with a touch to the screen. The system language will be changed to Korean] or [English] upon every touch.
3	Date/Time	The system time clock of the TOP device will appear. Touch the Date and Time to adjust the system time clock from the below window.  [Figure. Date/Time Setting]

CHAPTER 2 - Start TOP Design Studio

TOP Design Studio is software that allows a user to create and edit projects uploaded to TOP devices.

2.1 How to install TOP Design Studio

2.1.1 TOP Design Studio Environment

The following specifications shall be met as minimum to run TOP Design Studio properly.

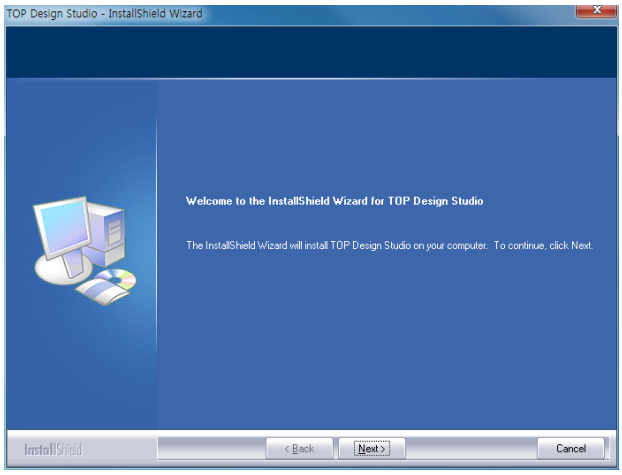
Category	Minimum Requirement	Recommended Specification
CPU	Pentium4 1GHz	Pentium4 2GHz Dual CPU or above
Memory	4GB	8GB or above
Graphic Adapter and Monitor	SVGA(800*600) 16bit color	SVGA(1024*768) 32bit color or above For laptops, we recommend you to use a model that supports separate graphic cards.
HDD Space	2GB	10GB or above
Key Board	Windows compatible Keyboard	Windows compatible Keyboard
Mouse	Windows compatible Mouse	Windows compatible Mouse
Printer	Windows compatible Printer	Windows compatible Printer
OS	Windows 2000/XP	Windows 7 or above

2.1.2 Download TOP Design Studio

Download TOP Design Studio from our the [Software Download] page available at our website (www.m2i.co.kr). Download the file [TOP Design Studio Setup (Version).exe].

2.1.3 How to install TOP Design Studio

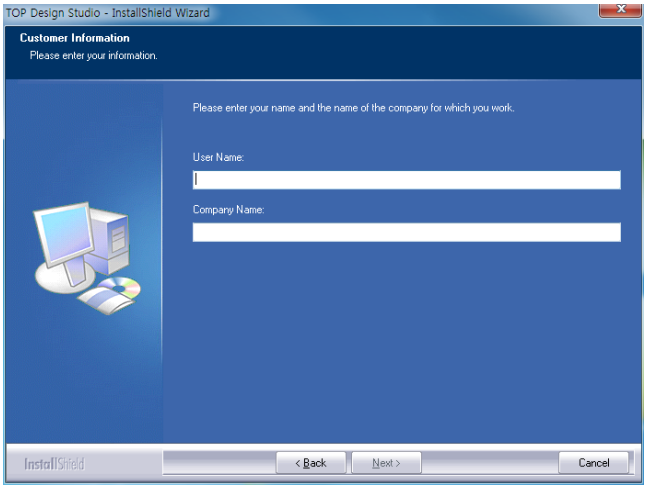
Double click the installation file, the below installation wizard will appear. Click [Next] to start installation.



[Figure. Installation Wizard]

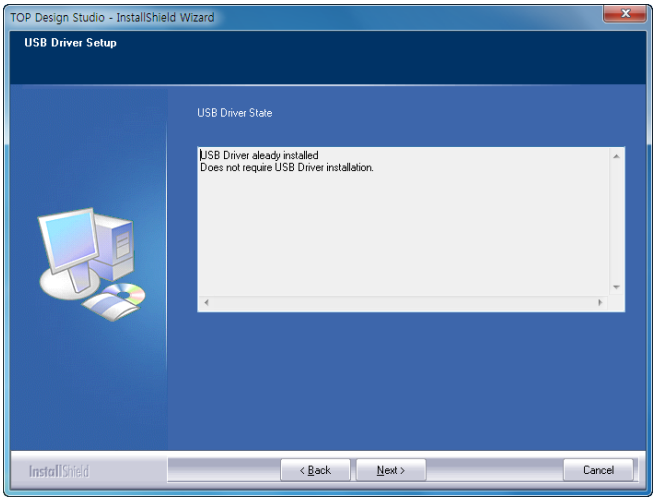
(1) Customer Information

Enter the User Name and Company name and click [Next].



[Figure. Customer Information]

(2) Search for a USB Driver (for connecting TOP device to your PC), and if a compatible USB driver is not installed, the USB driver will be automatically installed. If a compatible USB driver is installed, the presence will be notified as below. Click [Next].

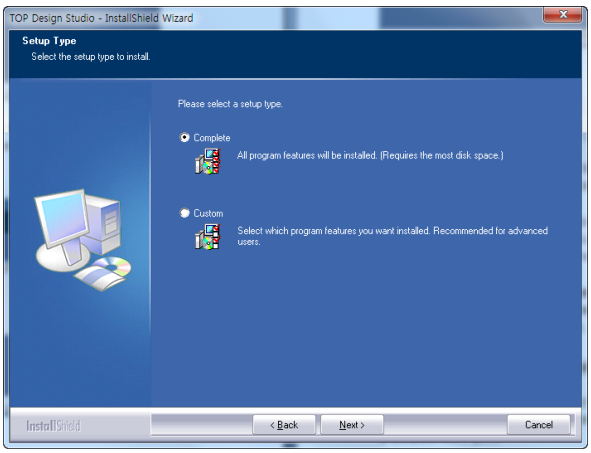


[Figure. UISB Driver Setup]

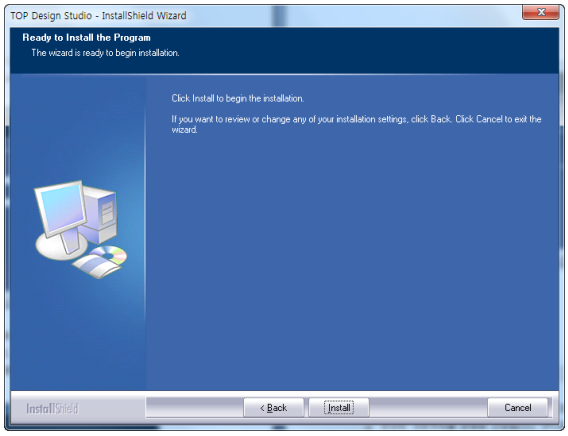
(3) Setup Type

Select [Complete] to install all items under the path of [C:₩program Files₩M2I Corp₩TOP Design Studio]. (Recommended)

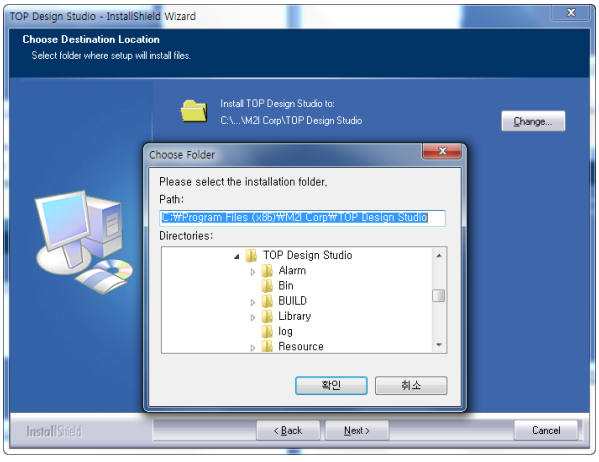
Select [Custom] to install selected items under the path of your selection.



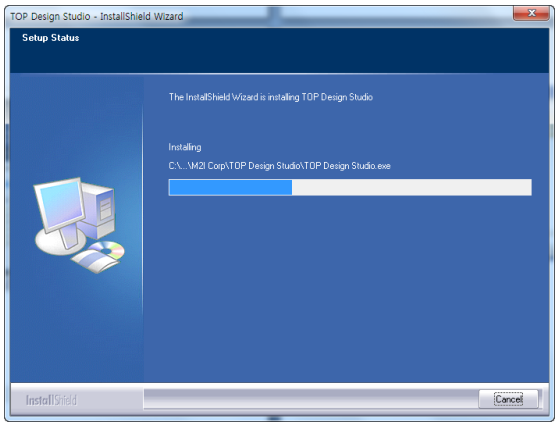
① If you have selected Complete, the installation screen will appear. Click [Next].



② I you have selected Custom, a window allowing you to select the path will appear. Select the directory path, and click [Next].



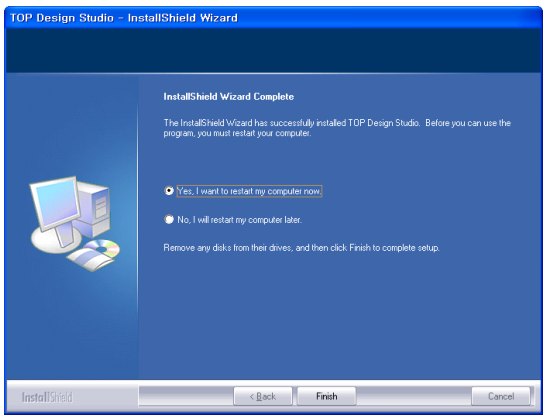
(4) Installation in progress



(5) Installation complete.

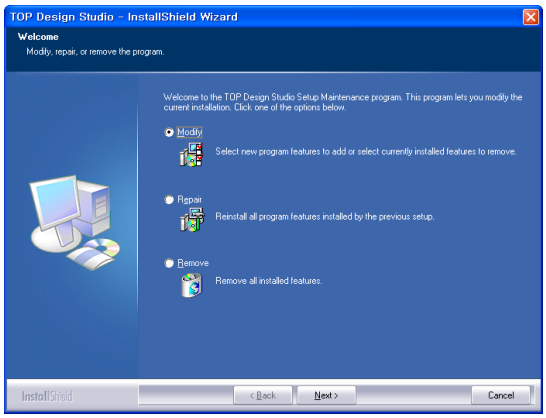
Select [Yes, I want to restart my computer now] and click [Finish], your computer will restart.

Select [No, I will restart my computer later] and click [Finish], the computer will not restart, and TOP Design Studio will be available only after you restart your PC.



2.1.4 Update TOP Studio Design

If you install a recent version of TOP Design Studio when a previous version of TOP Design Studio is already installed on your computer, the below window will appear.

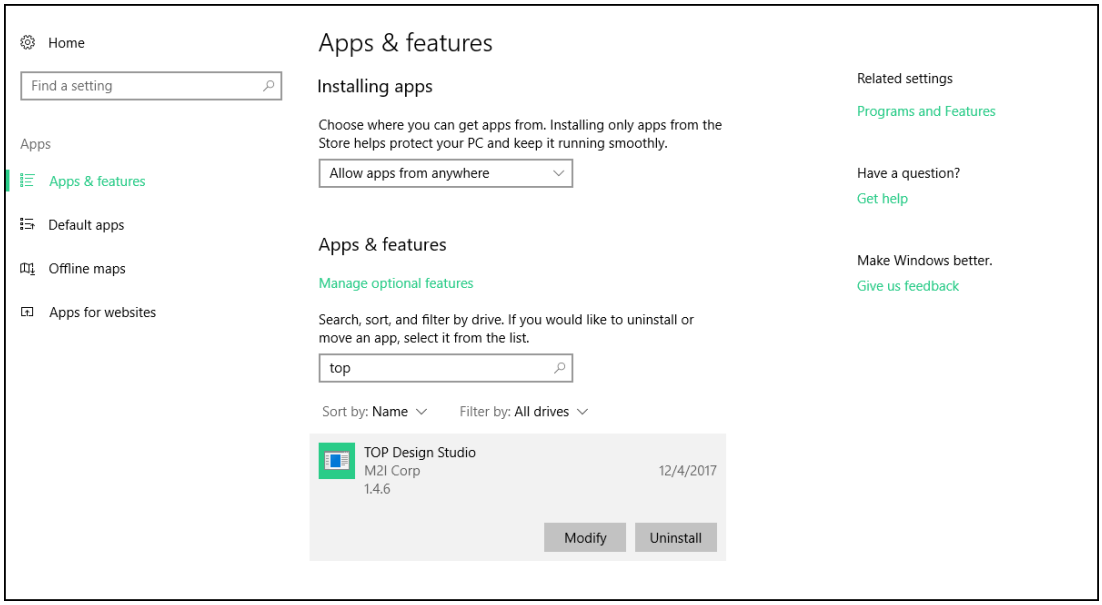


Select the option and click [Next], the new version will be installed according to the selected options.

No.	Category	Description
1	Modify	Only modified functions will be installed.
2	Repair	The program will be entirely re-installed.
3	Remove	The TOP Design Studio on your PC will be removed. Select [Remove] and click [Next], the following remove confirmation message will appear. Click [Yes] to remove TOP Design Studio.

2.1.5 Remove TOP Design Studio

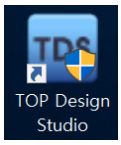
To remove TOP Design Studio from your PC, go to the [Window] - [Control Panel], select [Apps & Features], and load [Figure. Apps & features] menu.
Scroll down and select TOP Design Studio and click [Uninstall] to remove TOP Design Studio.



[Figure. Apps and features]

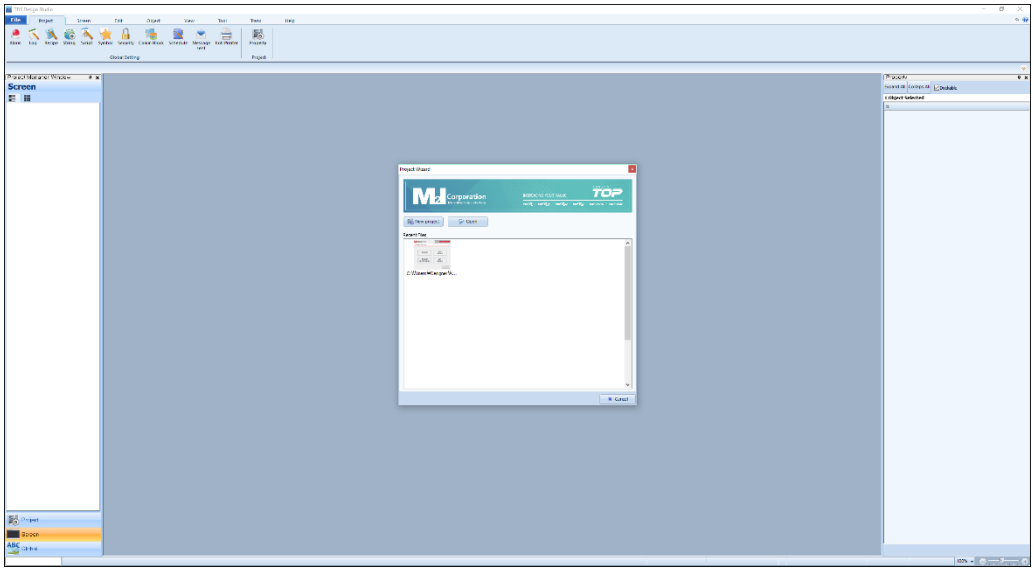
2.2 Run TOP Design Studio

A TOP Design Studio icon will be created on your Desktop.
A shortcut to TOP Design Studio will also be created under the path of [Start] - [All Programs] - [M2I Corp] - [TOP Design Studio].



[Figure. Desktop Icon]

Double click the icon or click the TOP Design Studio from the [Start] menu to run the TOP Design Studio program.

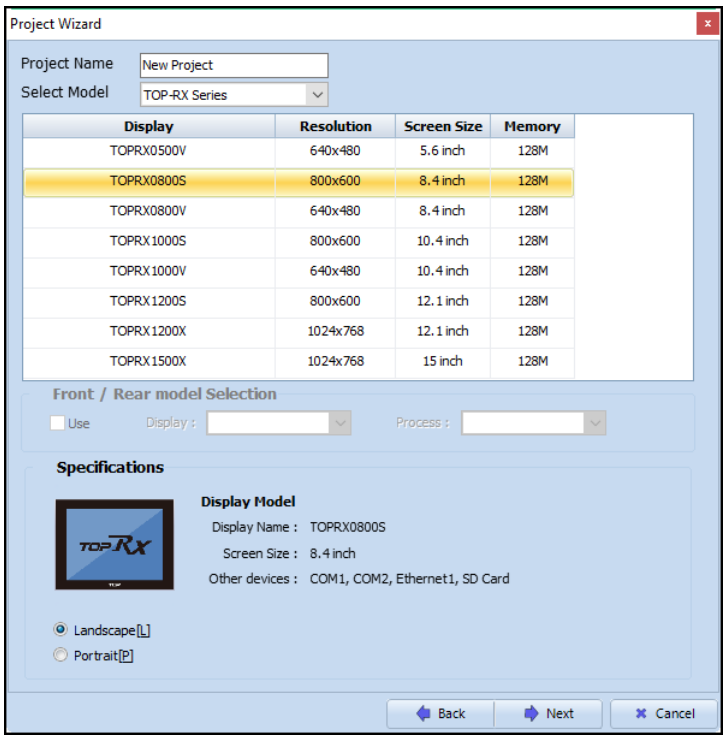


[Figure. View of TOP Design Studio]

Create a new project or open a previous project from [Project Wizard].

No.	Menu	Description
1	New Project	Enter the name of the new project.
2	Open	Click the [Open] button to open a previously saved project.
3	Recent Files	Browse the list of recently open projects. Select the project of your choice.

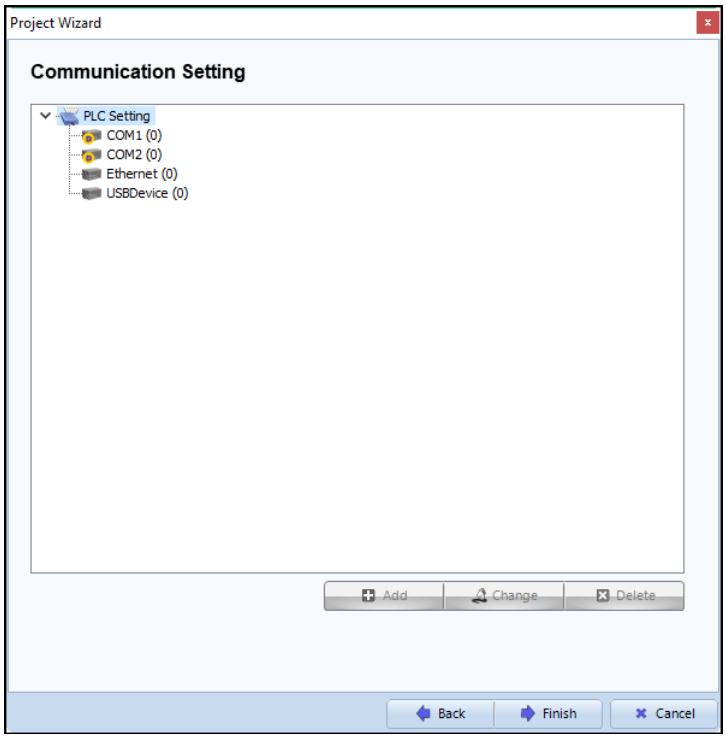
Double click a project from the list of recent files, the selected project will be open.
If you select [New Project] a window for you to enter the model of your TOP device will appear. A list of all available TOP models will appear.



[Figure. Select Model Window]

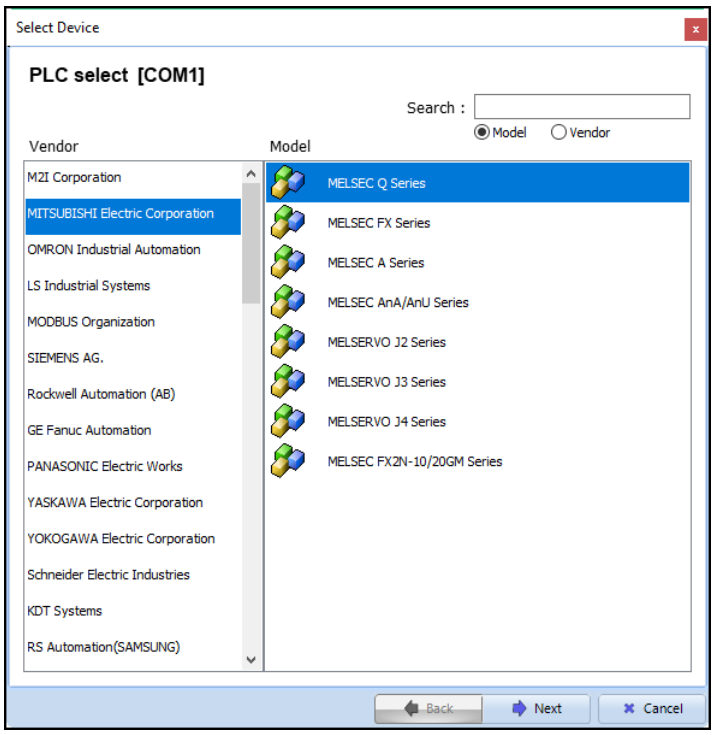
Then Project Wizard will move on to Communication Settings.

A TOP device can communicate with PLC via 2 or 3 (depending on the TOP Model) serial ports (COM1, COM2, COM3) and an ethernet port. Configure the settings for the PLC connected to the TOP device port. This configuration can be done latter from [Project Option]. If you elect not to configure communication settings, click [Finish] to create the new project.



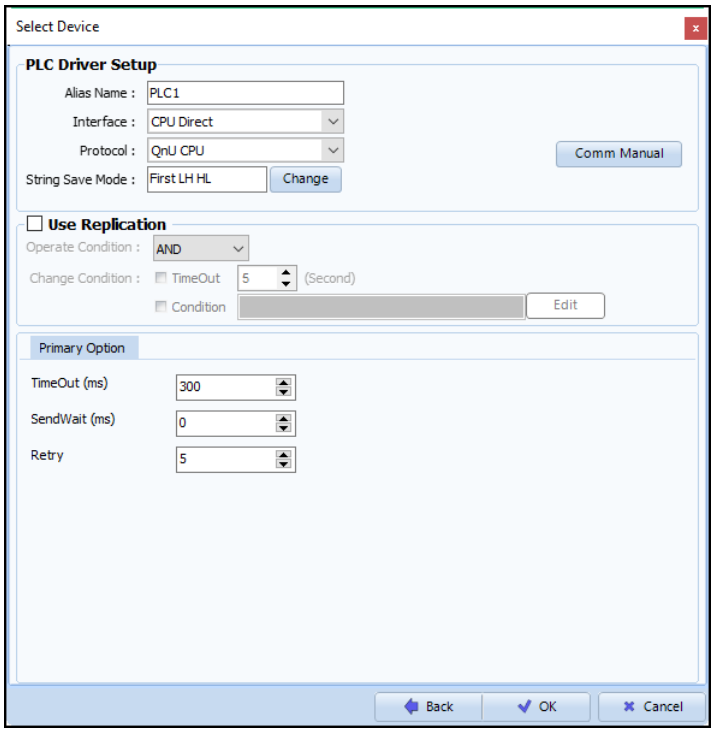
[Figure. Communication Settings]

If you elect to configure the communication settings, select the port to which the PLC is connected, and click [Add]. A [Select Device] window will appear for you to configure the PLC settings.



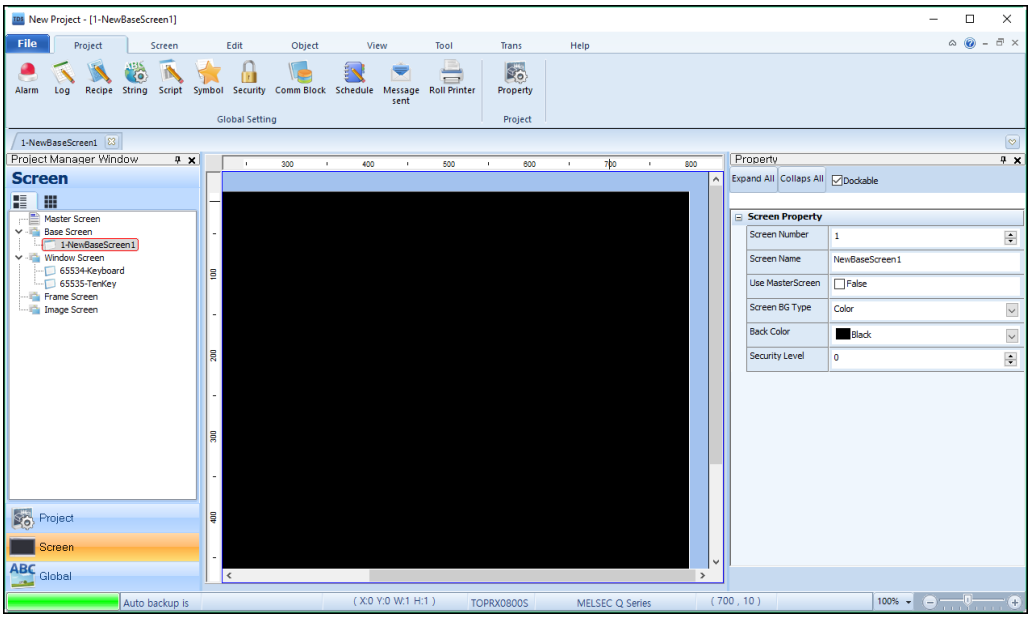
[Figure. PLC Select]

Select the manufacturer and model (series) number of the PLC and click [Next].
Configure detail settings for the PLC name, interface, protocol and other options, and click [OK] to complete the PLC settings.



[Figure. PLC Setup]

After you have completed PLC setup, click [Finish] to close the [Project Wizard] and access the new project.



[Figure. Initial display for a new project]

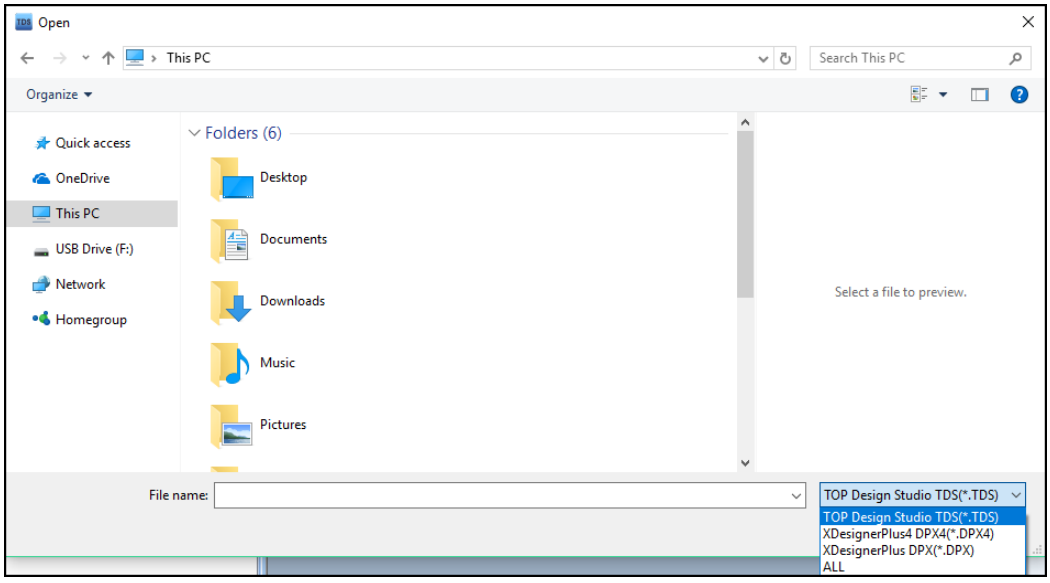
You can change the system language between Korean and English from [View] - [Language].

2.3 TOP Design Studio's Compatibility with previous softwares

TOP Design Studio is compatible with project files created by XDesignerPlus, the old software for XTOP products. In other words, you can open a [*.DPX] or [*.DPX4] with TOP Design Studio and convert / save the file to a [*.TDS] file.

Go to [File] - [Open] and change the file type to [*.DPX], [*.DPX] files created by XDesignerPlus will be shown and you can open the file with TOP Design Studio.

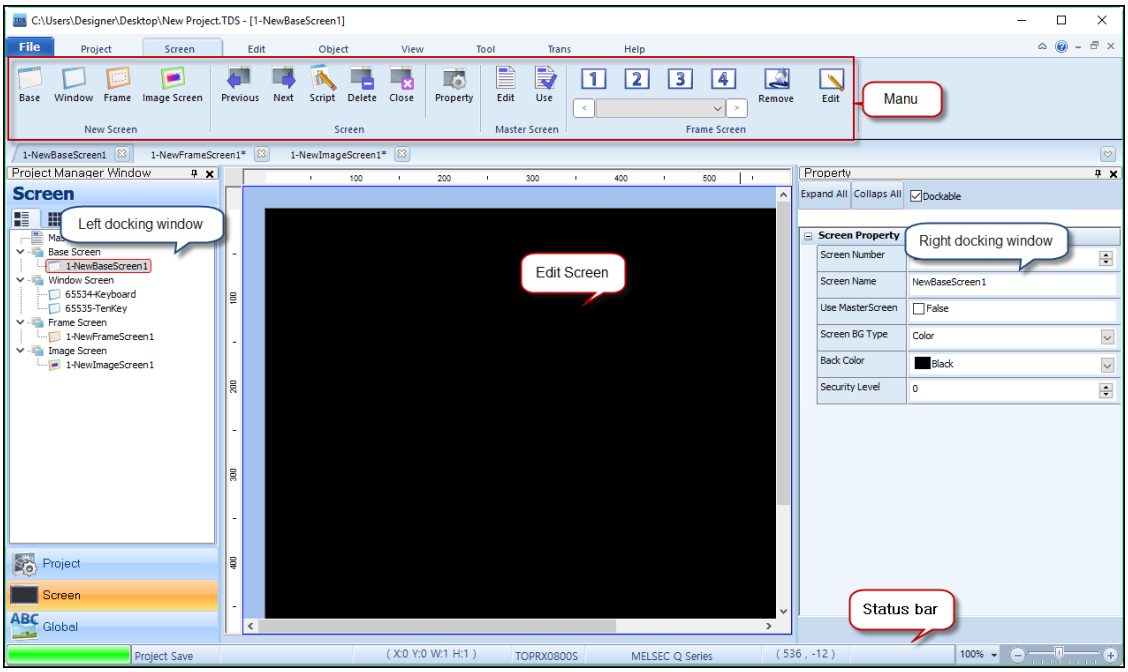
However, you cannot convert a [*.TDS] file to a [*.DPX] file.



[Figure. Opening an old project with TDS]

2.4 TOP Design Studio Layout

Get familiar with the TOP Design Studio Layout. The program features 5 major sections: Menu, Edit Screen, Docking Window (Left and Right), and Status Bar.



[Figure. Program Layout]

2.4.1 Menu

Functions required for creating, editing and exporting a project is provided in ribbon menus for user's convenience. Ribbon menu is a graphical control element in the form of a set of toolbars.

No.	Menu	Description
1	File	You can create/save/open/close projects and create/load templates.
2	Project	You can configure the global settings, that are not limited to the existing window but shall govern the entire project, by configuring settings of various types, password or scripts. You can also configure the touch model name and PLC as a project property.
3	Screen	You can create and manage Base Screen, Window Screen, Frame Screen and Image Screen.
4	Edit	You can edit objects registered under screens.
5	Object	You can access objects that configure the screen in various shapes and forms. Objects represent data or executes computation. Diagrams and tags are available as objects.
6	View	You can configure the view of the program. Configure the settings for language (English/Korea), Display State (0/1), Hint, Zoom, Dock Window, and Screen Align.
7	Tool	You can access tools for Cross Reference, Address Converter, Screen Manager, Screen Preview, Project Image Manager, Image Library, String Table Convert, Font Converter, Condition/Effect/Action Search, and Recovery Disk.
8	Trans	You can transfer files to the TOP device or upload files from the TOP device. You can simulate operation. The actual simulation performed on the TOP Design Studio is 100% identical to the operation on a TOP device. You can also simulate a project with live communication with the actual PLC.
9	Help	Access help for the software, or check the version of your TOP Design Studio.

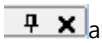
2.4.2 Edit Screen

Various types of screens are provided to materialize efficient functions.
You can add and design objects to various screens and access different functions.

No.	Screen	Description
1	Base	Base is the main screen that is actually shown on the TOP device for operation. The default base screen will be assigned to No.1 and you can add up to No.65535, configuring a total number of 65,535 screens.
2	Window	You can add windows that pop up in a base screen when certain conditions are met, window screens can be hidden or terminated when its appearance is not required. The first window screen you make will be assigned to No.1 and you can add up to No.65535, configuring a total number of 65,535 window screens. (Caution) Window screens of No. 65400 and after are assigned to add specific functions (ten key, etc.) thus these window screens can not be used as user defined.
3	Master	You can materialize the call screen function, where you can make a master screen embedding all repeating and common backgrounds or functions and apply such master screen as the base screen. Click the [Base] icon and enable [Use Master Screen] from the Screen Property window to apply the base screen as the master screen. Only one master screen can be registered. The master screen allows you to reuse common functions to enhance the efficiency of storage memory and editing.
4	Frame	You can materialize the call screen function, where you can create up to 65,535 frame screens. You can capture frames containing objects and items that can are frequently used. Created frames can be called on a base screen allowing you not to do simple recurring work, and reduce the total size of the Project. You can add up to 4 frames to the base screen.

2.4.3 Docking Window

Docking windows are literally windows that are docked to the screen as magnets are attached to a metal plate. Docking windows can be docked on the left or right side of the edit screen, or can be displayed on the screen at all times. TOP Design Studio provides docking windows on the left and right side of the edit screen. Docking Windows provides specific functions, where you can hide or close upon necessity. Project Manager / List Window / Property Window / User Library are available as docking windows.

A thumbtack button  and close button are provided on the upper right corner of a docking window. Click the thumbtack button, the thumbtack will go to a horizontal position , and the window itself will be hidden to a tab on the left side or the right side, depending on the default settings of the docking window.

Click the thumbtack icon again to put the thumbtack in a vertical position. The tab will be removed, and the docking window will be displayed. Click [X] to close the window. You can open a docking window by clicking the docking window you want at the [View] menu.

No.	Docking Window	Description
1	Project Manager	Project Manager provides an comprehensive overview and management of the project settings, screens, global settings, and resource.
2	List Window	All currently open objects are shown on a list.

3	Property Window	The properties of selected objects are shown. If no object is selected, the property of the screen is shown. Select one or more objects of the same type and change their property in a batch.
4	User Library	A user can add objects and screens to the library, and easily add such objects and screens to the project. Library can be managed in folders.

2.4.4 Status Bar

Status bar shows the status of the project on the bottom of the TOP Design Studio.
The TOP device model, PLC name and the work status is shown.
The coordinate of the cursor is shown, and you can zoom in and out of the edit screen from the status bar.

2.5 Shortcut Keys

Mainmenu	Submenu	Shortcut Key
File	New Project	Ctrl+N
	New Template	Shift+Ctrl+N
	Open Template	Shift+Ctrl+O
	Open	Ctrl+O
	Save	Ctrl+S
	Save As	Shift+Ctrl+S
	Print Project Specification	Ctrl+P
	Close	Alt+F4
	Exit	Ctrl+F4
Project	Global Setting - Alarm	Ctrl+Alt+A
	Global Setting - Log	Ctrl+Alt+L
	Global Setting - Recipe	Ctrl+Alt+R
	Global Setting - String	Ctrl+Alt+S
	Global Setting - Script	Ctrl+Alt+C
	Global Setting - Symbol	Ctrl+Alt+Y
	Global Setting - Security	Ctrl+Alt+E
	Global Setting - Communication Block	Ctrl+Alt+B
	Project - Property	Ctrl+Alt+P
Screen	New Screen - Base	Ctrl+B
	New Screen - Window	Ctrl+W
	New Screen - Frame	Ctrl+F
	Screen - Previous	PageUp
	Screen - Next	PageDown
	Screen - Script	Ctrl+Alt+T
	Screen - Delete	Alt+D
	Screen - Close	Alt+C
	Screen - Property	Alt+N
	Master Screen - Edit	Alt+E
	Master Screen - Use	Alt+U
	Frame Screen - 1	Shift+Ctrl+1
	Frame Screen - 2	Shift+Ctrl+2
	Frame Screen - 3	Shift+Ctrl+3

	Frame Screen - 4	Shift+Ctrl+4
	Frame Screen - Remove	Shift+Alt+O
	Frame Screen - Edit	Shift+Alt+E
Edit	Execute - Undo	Ctrl+Z
	Execute - Redo	Ctrl+R
	Clipboard - Copy	Ctrl+C
	Clipboard - Multi Copy	Ctrl+T
	Clipboard - Paste	Ctrl+V
	Clipboard - Paste (Same Position)	Shift+Ctrl+V
	Clipboard - Cut	Ctrl+X
	Group - Group	Ctrl+G
	Group - UnGroup	Ctrl+U
	Rotate - Left	Ctrl+,
	Rotate - Right	Ctrl+.
	Rotate - Cancel	Ctrl+/
	Align - Align Left	Shift+Ctrl+Left
	Align - Align Middle	Shift+Ctrl+M
	Align - Align Right	Shift+Ctrl+Right
	Align - Align Center	Shift+Ctrl+C
	Align - Align Bottom	Shift+Ctrl+Down
	Align - Align Top	Shift+Ctrl+Up
	Align - Align Horizontal Space	Shift+Ctrl+Z
	Align - Align Vertical Space	Shift+Ctrl+E
	Align - Align Center in Window	Shift+Ctrl+R
	Align - Align Vertical Center in Window	Shift+Ctrl+I
	Align - Align Horizontal Size to Big	Shift+Ctrl+B
	Align - Align Horizontal Size to Small	Shift+Ctrl+T
	Align - Align Vertical Size to Big	Shift+Ctrl+G
	Align - Align Vertical Size to Small	Shift+Ctrl+L
	Align - Send Front End	Ctrl+Home
	Align - Sen Back End	Ctrl+End
	Align - Sen Front	Home
	Align - Send Back	End
	Pop-up - Select All	Ctrl+A
	Pop-up - Select Same Type	Shift+Ctrl+A
	Pop-up - Delete	Delete
	Pop-up - Mirror - Mirror Vertical	Alt+,
	Pop-up - Mirror - Mirror Horizontal	Alt+.
	Pop-up - View Object List	Shift+Enter
	Edit Option - Show Grid	Ctrl+Alt+F2
	Edit Option - Snap Object	Ctrl+Alt+O
	Edit Option - Snap Grid	Ctrl+Alt+G
	Edit Option - Draw Base	Ctrl+Alt+D
	Edit Option - Option Setting	Shift+O
	Font - Bold	Alt+B
	Font - Italic	Shift+Alt+I
	Font - Underline	Shift+Alt+U
	Font - Strike Through	Shift+Alt+S
	Font - Align Left	Shift+Alt+L

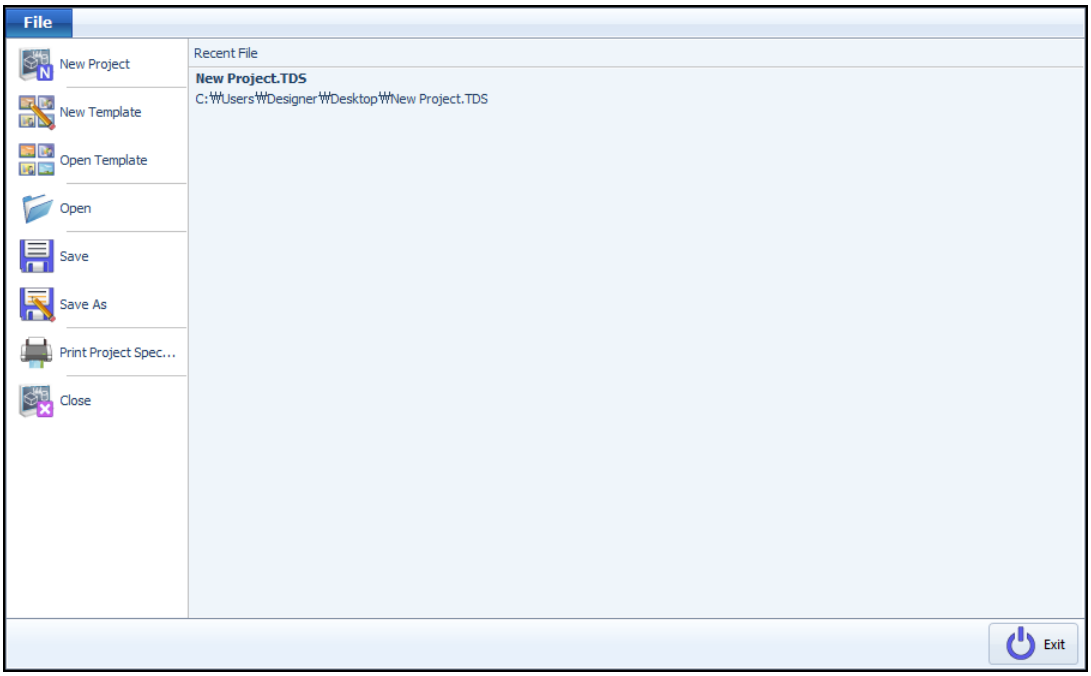
	Font - Align Center	Shift+Alt+C
	Font - Align Right	Shift+Alt+R
	Font - Align Top	Shift+Alt+T
	Font - Align Middle	Shift+Alt+M
	Font - Align Bottom	Shift+Alt+B
	Next Object	F5
	Previous Object	F6
	Cancel	Esc
	Snap Move Up	Ctrl+Up
	Snap Move Down	Ctrl+Down
	Snap Move Left	Ctrl+Left
	Snap Move Right	Ctrl+Right
	Adjust Dimension Up	Shift+Up
	Adjust Dimension Down	Shift+Down
	Adjust Dimension Left	Shift+Left
	Adjust Dimension Right	Shift+Right
	Snap Move	Space
	Modify Text	F2
View	Dock Window - Project Manager	F7
	Dock Window - List Window	F8
	Dock Window - Property Window	F11
	Dock Window - User Library	F3
	Hint - Show Hint	Ctrl+H
	Zoom - Zoom Out	Ctrl+-
	Zoom - Zoom Default	Ctrl+0
	Zoom - Zoom In	Ctrl+=
	Hint - Hint Option	Ctrl+Alt+H
	Screen Align - Minimize	Alt+[
	Screen Align - Maximize	Alt+]
	Screen Align - Cascade	Shift+[
	Screen Align - Arrange All	Shift+]
	Screen Align - Close All	Ctrl+Alt+F4
Tool	Tool - Cross Reerence	Ctrl+F2
	Tool - Address Converter	Ctrl+F3
	Tool - Screen Manager	Ctrl+F5
	Tool - Screen Preview	Ctrl+F6
	Tool - Project Image Manager	Ctrl+F7
	Tool - Image Library	Ctrl+F8
	Tool - Recovery Disk	Ctrl+F9
Trans	Simulation - Offline Simulator	F12
	Trans - Full Build & Transfer	F9
	Trans - Trans Project File (Download)	Alt+F10
	Trans - Upload Data	Alt+F11
	Trans - Build Option (Transmission Option)	Alt+F12
Help	Help - Online Update	Alt+F3
	Help - Help	F1
	Help - About (Project Information)	Shift+Ctrl+F2
Layout	Activate Menu	Ctrl+1
	Activate Project Manager Window	Ctrl+2

	Activate Object List Window	Ctrl+3
	Activate Property Window	Ctrl+4
	Activate User Library Window	Ctrl+5
	Activate Edit Screen	Ctrl+6
Docking Window	Open Dialogue	Ctrl+Enter
	Project - Property	Alt+P
	Screen	Alt+S
	Resource	Alt+R

CHAPTER 3 - File

You can create and save new projects from the [File] menu.

You can also open one or multiple existing project files.



[Figure. File menu]

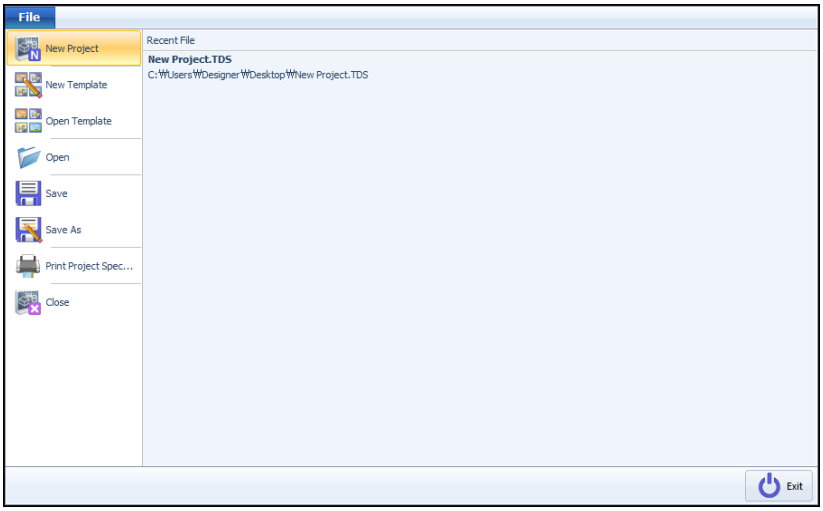
3.1 New Project (Ctrl+N)

Create a new project and screen, or open an existing project.

Select [File] - [New Project] to open the [Project Wizard].

3.1.1 How to create a new project

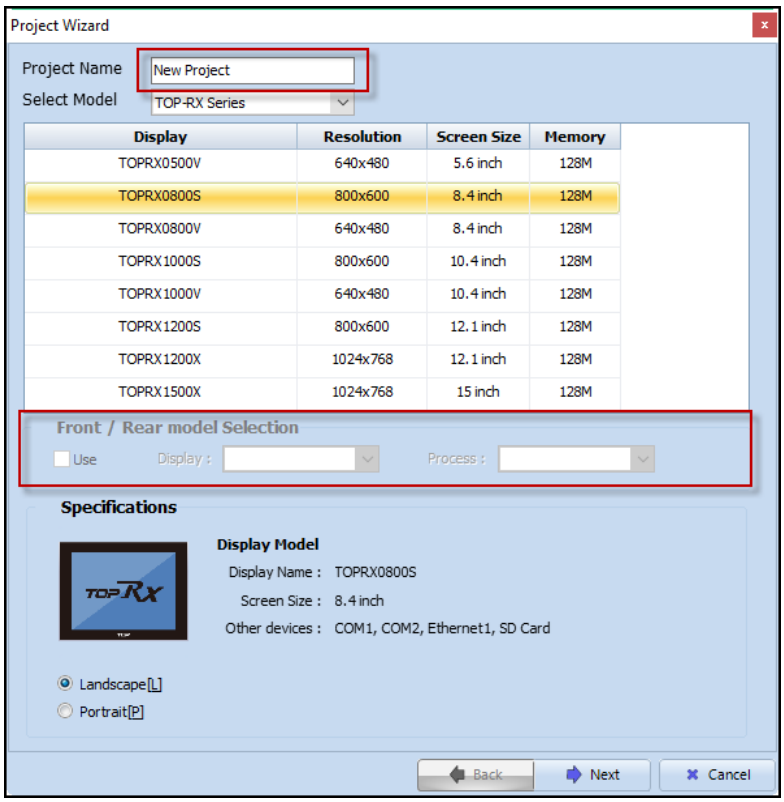
You can create a new project.



[Figure. New Project]

(1) Select TOP model

The new project will be named [New Project] as default, you can change the name from the [Project Name] text box. Enter the project name and select the series of your TOP device from the drop-down menu. Then select the corresponding model number of your TOP device from the table.



[Figure. Select Model]

No.	Menu	Description
1	Project Name	Enter the name of the new project.
2	Select Model	Select the TOP series from the drop-down menu and select the corresponding model. For certain series, you can select the display and process separately.
3	Front / Rear model selection	For TOP-R series, you can select the model for each display and process.
4	Display orientation	Select the orientation of display between landscape and portrait.
5	Specifications	The specifications of the selected model are shown.

Select the TOP model and orientation, and click [Next] to go to the Communication Setting.

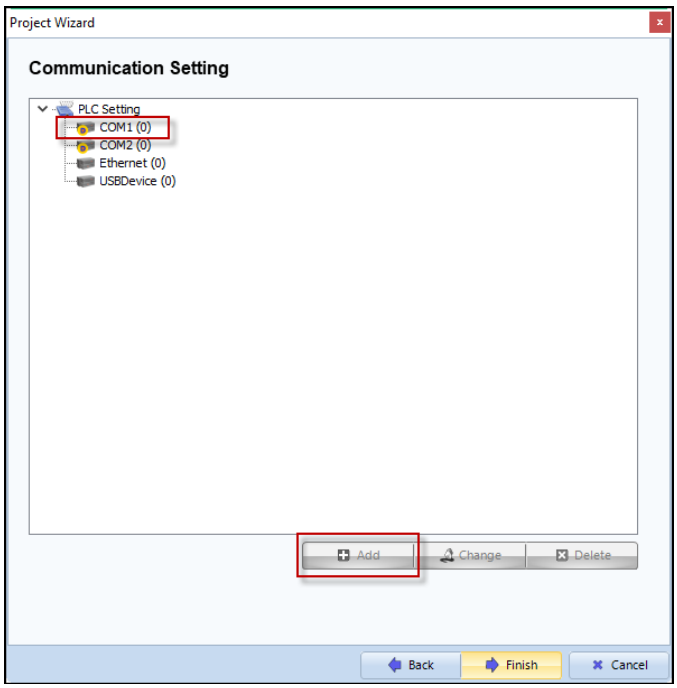
(2) Communication Setting: Add PLC

You can configure the PLC that will be connected with the TOP device.

[Communication Settings] do not have to be configured at this stage, and later configured with the [Project Settings] menu.

If you elect to configure the settings later, click [Finish].

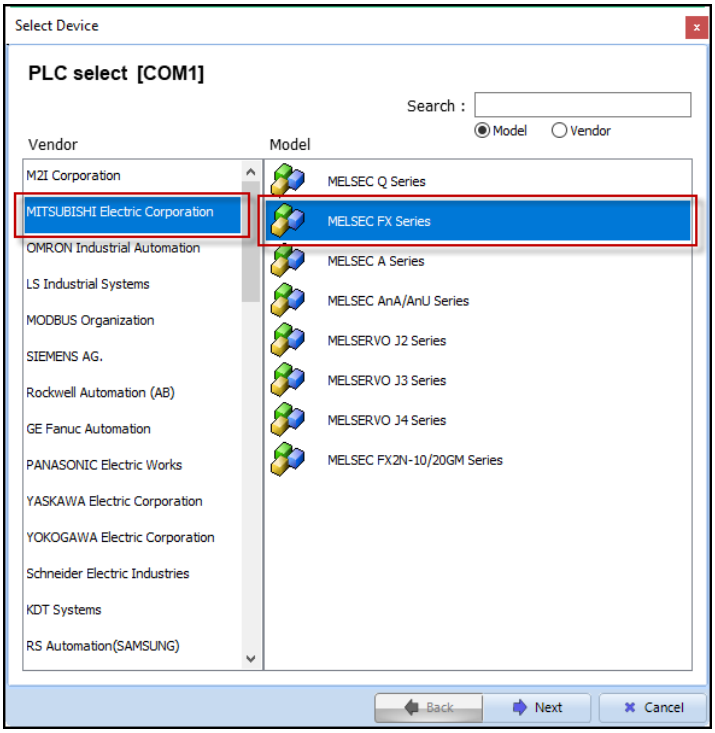
If you elect to configure the communication settings at this stage, select the port that will be connected with PLC from [COM1] / [COM2] / [COM3] (selective models only) / [Ethernet], and click [Add].



[Figure. Communication Setting]

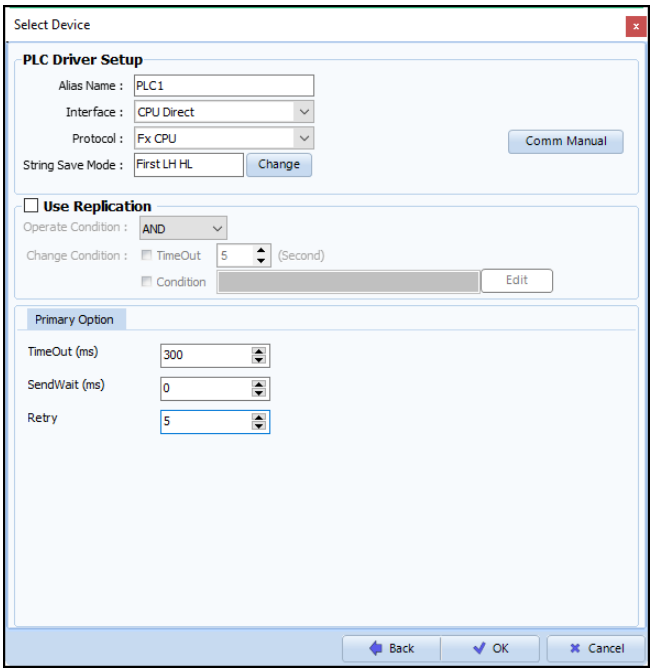
NO.	MENU	DESCRIPTION
1	Add	Add a PLC.
2	Change	Change the selected PLC to another PLC.
3	Delete	Deleted a selected PLC.

Select the communication port and click [Add] to select the specific type of PLC from the [Select Device] window. Select the PLC Vendor, model (series) and click [Next].
You can search for a specific PLC with the [Search] function.



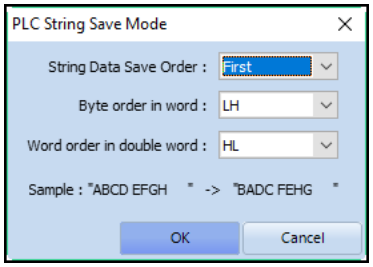
[Figure. Add PLC 1]

Enter the Alias Name of the PLC and configure detail settings corresponding to the PLC.



[Figure. Add PLC 2]

Configure the following 3 settings for the PLC.

No.	Menu	Description
1	Alias	You can assign the PLC to an alias that will be configured as the name for the PLC on the display.
2	Interface	Select the PLC communication type. Select whether the connection is made with Computer Link, communication card, etc.
3	Protocol	If the PLC supports multiple protocols, select the specific protocol that shall be applied for the project.
4	String Save Mode	 Each PLC saves strings to its PLC in different orders. You can configure the order to save strings corresponding to the string processing mode of the PLC. One character corresponds to 1 byte. Select between [First] and [Last] for the [String Data Save Order]. Select [First] to allot the first entered character to the first address. Enter "ABCDEFGH" -> the string will be saved as "ABCDEFGH". Select [Last], Enter "ABCDEFGH" -> the string will be saved as "ABCDEFGH".

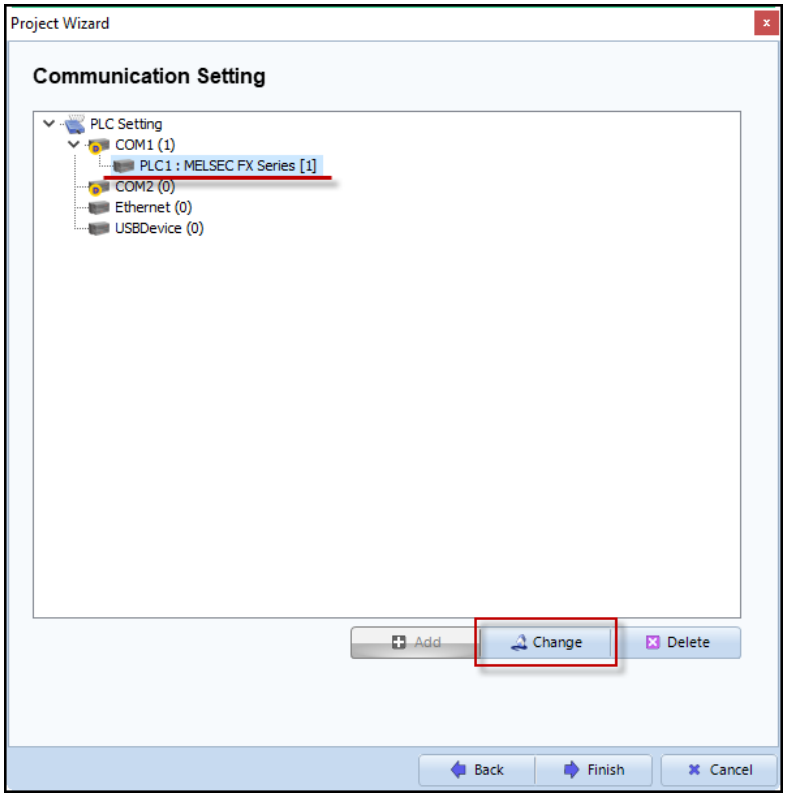
		(provided that, the byte order in word is "HL" and the word order in double word is "HL") For the [Byte order in words], H refers to high bytes, and L refers to Low bytes. Select [HL], Enter "ABCDEFGH" -> the string will be saved as "ABCDEFGH". Select [LH], Enter "ABCDEFGH" -> the string will be saved as "BADCFEHG". For the [Word order in double words], H refers to high words, and L refer to low words. Select [HL], Enter "ABCDEFGH" -> the string will be saved as "ABCDEFGH". Select [LH], Enter "ABCDEFGH" -> the string will be saved as "CDABGHEF".

Next, configure the communication settings.

NO.	MENU	DESCRIPTION
1	TimeOut	Timeout refers to the time set to wait for response from PLC.
2	SendWait	Configure the time delay (Send Wait) to wait before next transmission for communication with PLC. Default setting is 0. If the PLC has a relatively low communication / scan capacity, set SendWait to 3 ~ 10 to enhance the TOP device operation speed.
3	Retry	Configure the number of times the TOP device retries communication upon a communication error.

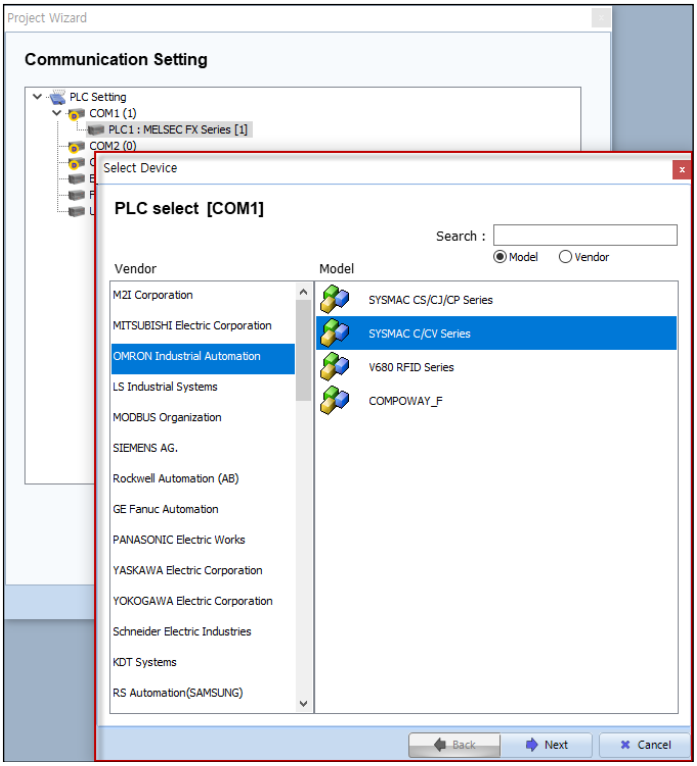
(3) Communication: Change PLC

You can change the PLC to another PLC. Select the PLC of your choice and click [Change].



[Figure. PLC Change 1]

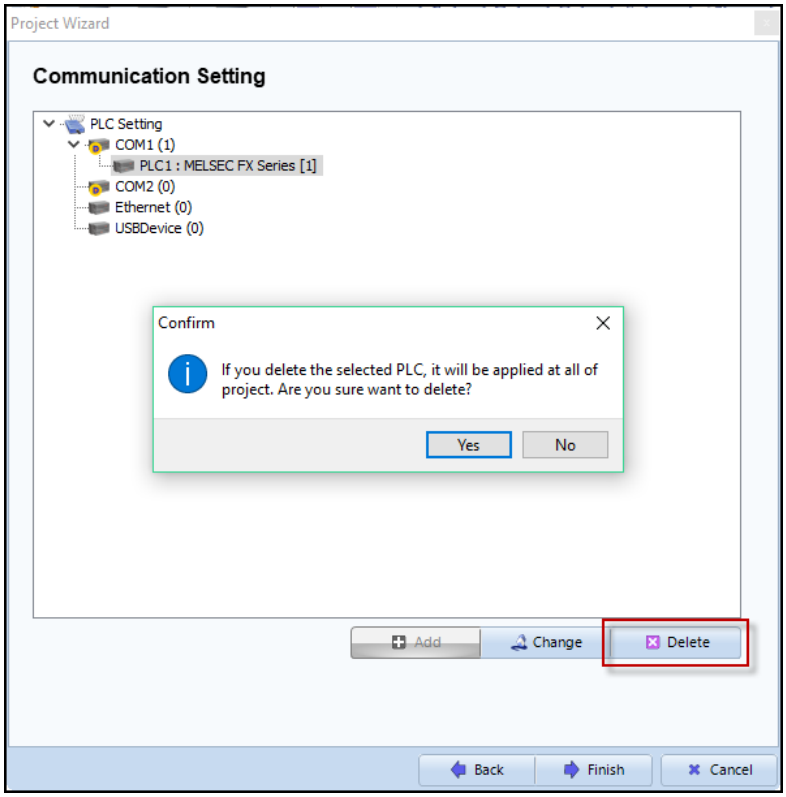
Change the PLC to another PLC from the [Select Device] window.



[Figure. PLC Change 2]

(4) Communication Settings: Delete PLC

Select the PLC to delete and click [Delete]. Click [Yes] from the confirm message window to delete the PLC.



[Figure. PLC Delete]

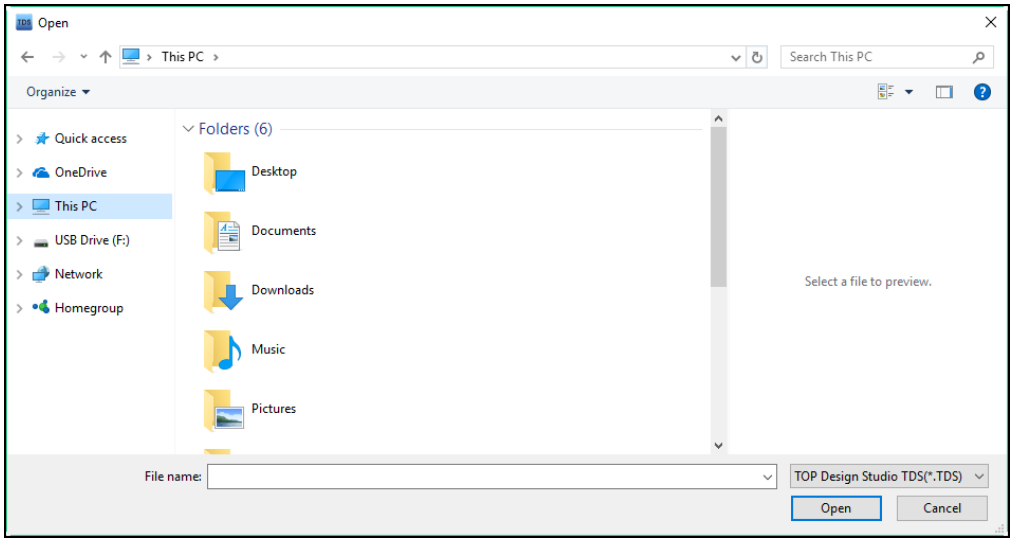
3.1.2 How to open existing projects

You can open existing project files from the [Open] menu or the Recent File tab.

(1) Open projects with file browser.

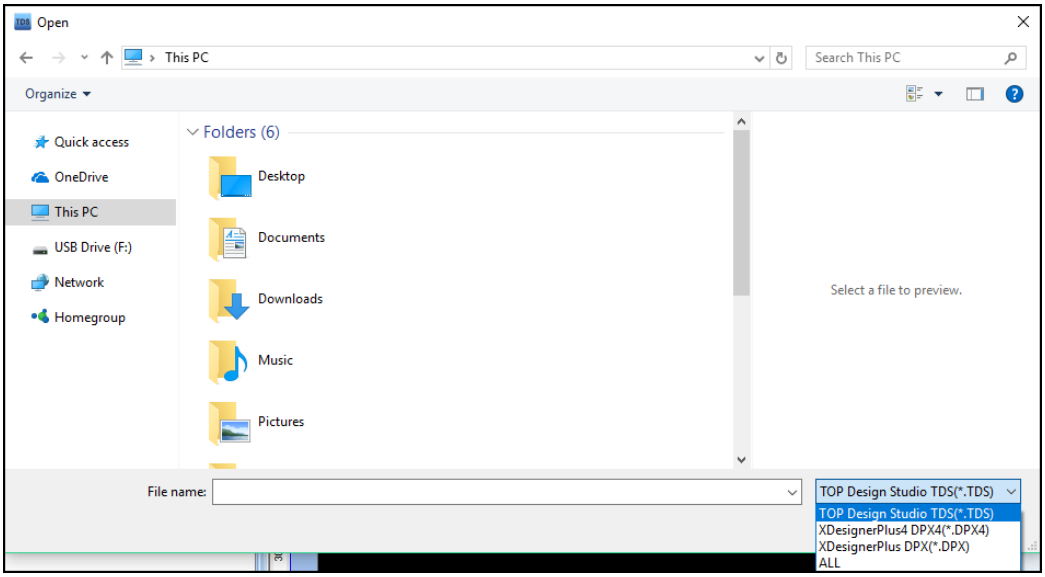
(2)

Click the [Open] icon, the [Open] window will appear. Explore through the directory in which the project is saved, select the project file, and click [Open] to open an existing project.



[Figure. Open]

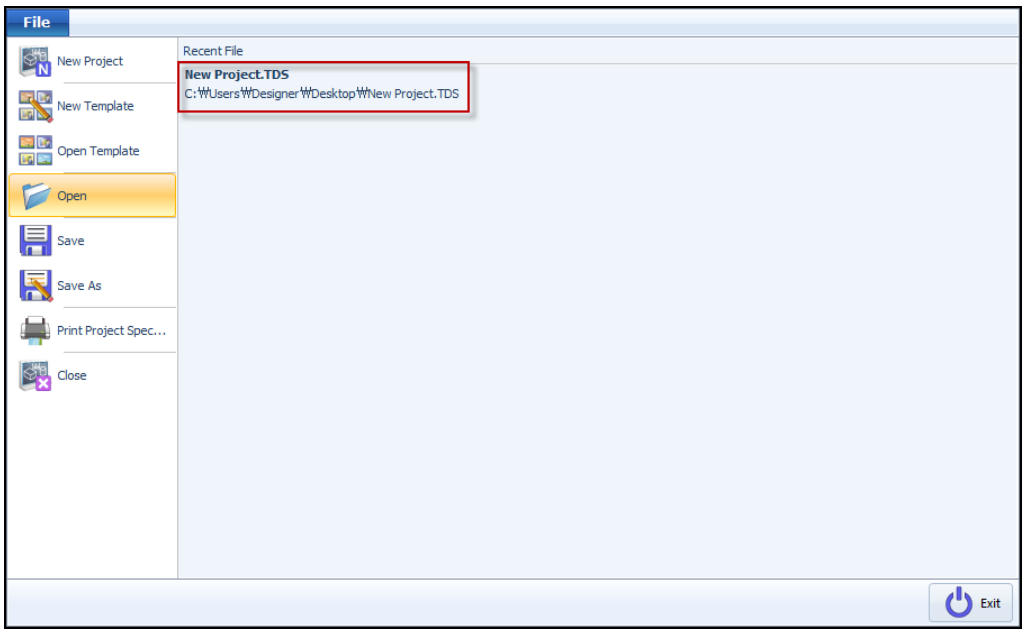
TOP project files have an extension of [*.TDS]. However, by changing the extension, you can open [*.DPX] or [*.DPX4] files created from the previous software, XDesignerPlus.



If you have opened a [*.DPX] or [*.DPX4] file, you have to save the file as a [*.TDS] for conversion, so that the file can be edited and uploaded to a TOP device.

(2) Open projects from Recent Projects

Project files recently opened or edited with TOP Design Studio are listed in the Recent File tab. Each file on the list is displayed with its directory and a thumbnail of base screen for easy access. Select and open the file of your interest.

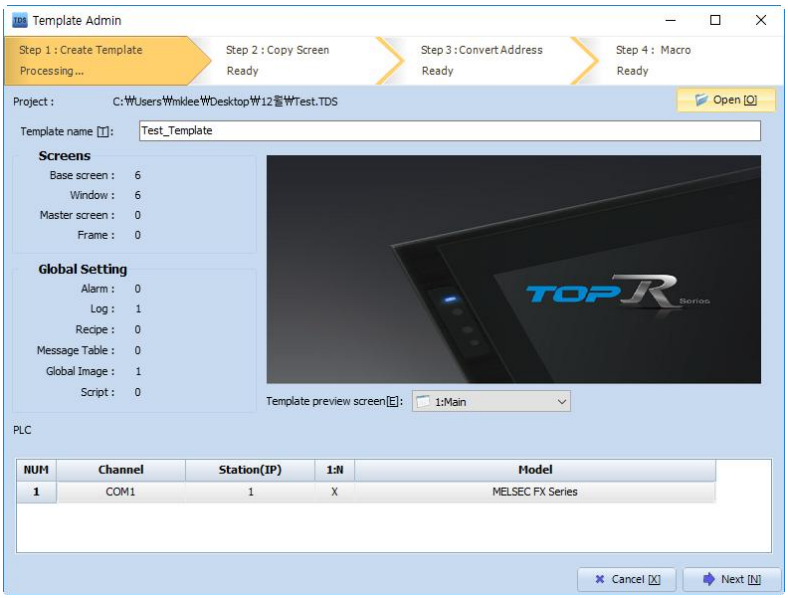


[Figure. Opening a Recent Project]

3.2 New Template

You can use templates to easily and conveniently make drawing projects with similar layouts. A template provides the basic structure of a drawing project. If you have to make multiple drawing projects with a layout similar to an existing project, we recommend you to create templates for your convenience.

You can modify and edit an existing template rather than drawing from scratch. The [File] menu features [New Template] and [Open Template]. Use [New Template] to convert the currently open project to a template, and use [Open Template] to open an existing template on the TOP Design Studio to launch a new project.

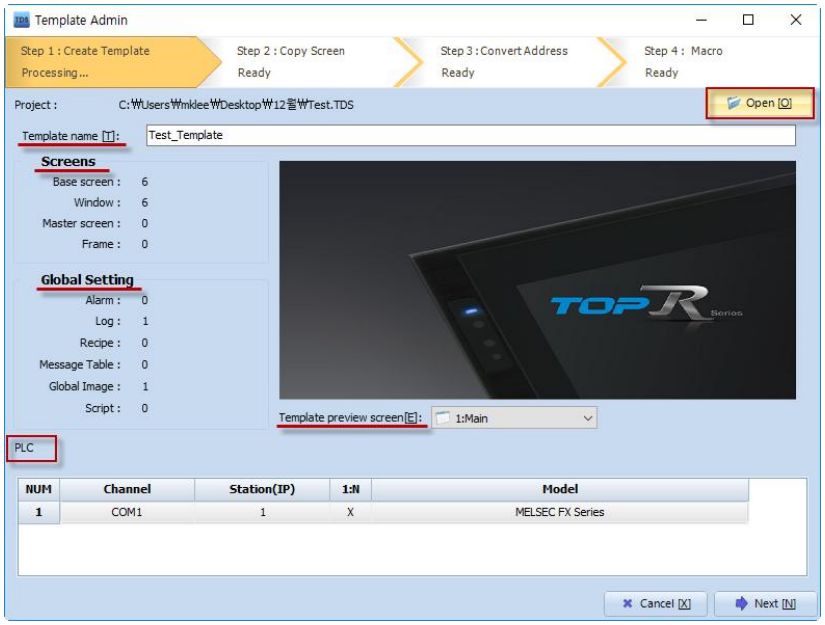


[Figure. New Template]

Select [New Template] to open the [Template Administrator] as shown below.

You can create a new template in four steps: [Create Template] - [Copy Screen] - [Convert Address] - [Macro].

3.2.1 Step 1: Create Template



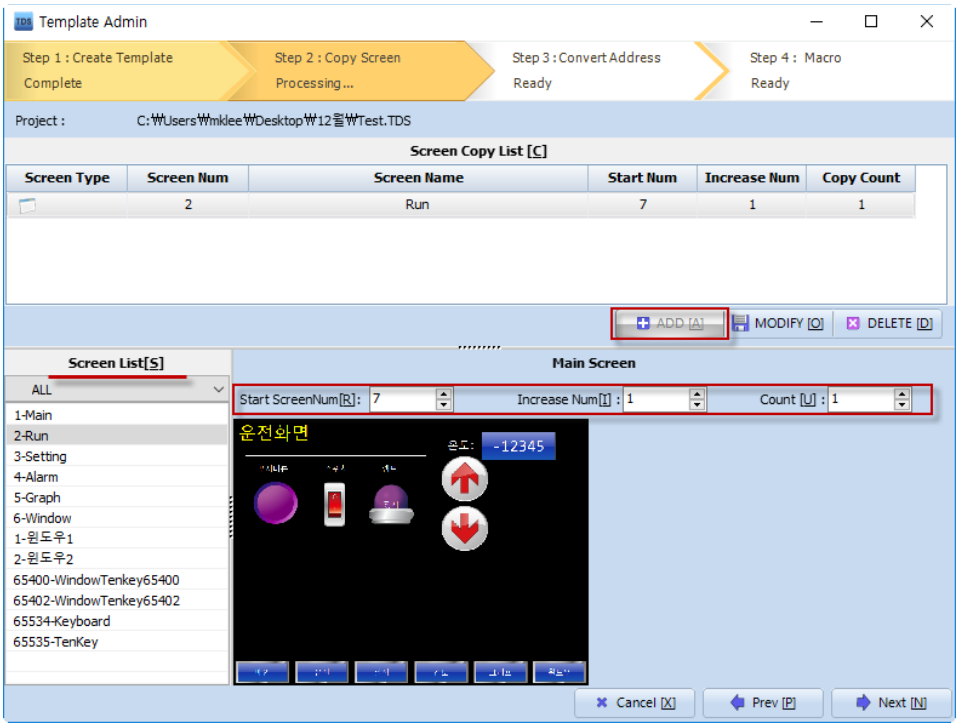
[Figure. Step 1: Create Template]

MENU	DESCRIPTION
Open	Open a [*.TDS] file. If you select [New Template] while a drawing is open on the TOP Design Studio, the currently opened drawing will be used as the template.
Template name	As default, the template name will be assigned to the current project name with a suffix of [_Template]. You can change the template name, as necessary.
Template preview screen	You can change the screen that will become the template.
Screen	The number of screens that are registered is shown.
Global Setting	Among the global settings, the enable/disable status and number of lists are shown.
PLC	The PLC configuration is shown. Channel: Communication Port, Model: PLC Model, Station(IP), 1:N Communication status are shown.

Click [Cancel] to abort making a new template, or click [Next] to continue.

3.2.2 Step 2: Copy Screen

You can copy multiple screens.



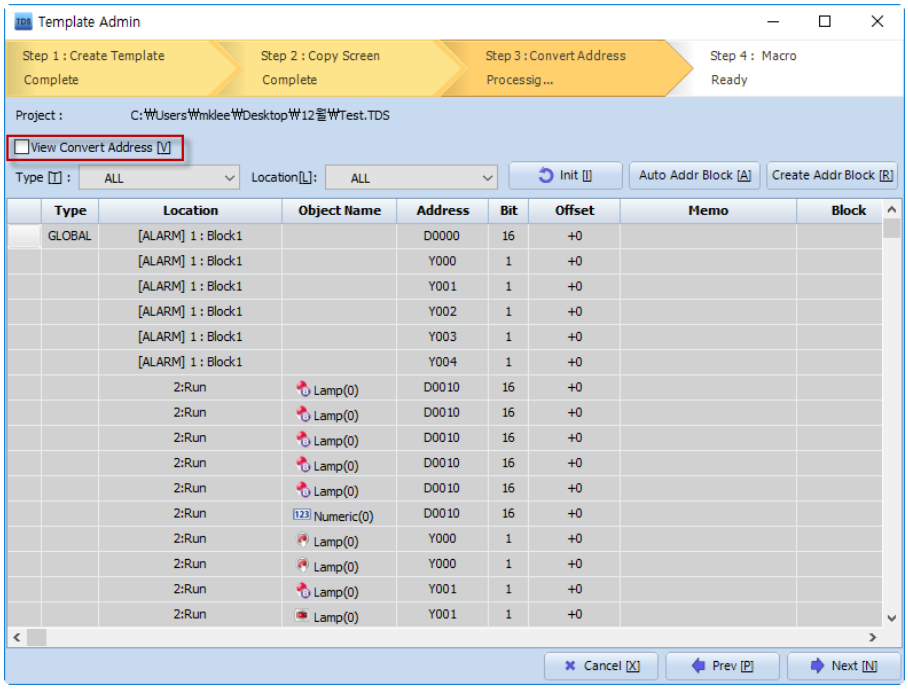
[Figure. Step 2: Copy Screen]

Select the screen you want to copy from the [Screen List] on the left. The image of the select screen will appear on the [Main Screen] n the right, and the [ADD] button will be activated. Configure the [Start ScreenNum], [Increase Num], and [Count] and click [ADD]. The copied screens will be added to the [Screen Copy List].

MENU	DESCRIPTION
Start Screen No.	The number of the first screen copied from the Screen List. Caution, make sure the Start Screen Number is different from any existing screen number.
Increase Number	Select the increment of each copy. If the increment is '1', each new copy will have a screen number with an increment of 1. For instance, if the start number is 10, and the increase number is 1, the copied screens will be alloted to 10, 11, 12, so on and so forth.
Count	Select the number of copies you will make.

3.2.3 Step 3: Convert Address

Create address blocks. Address blocks can be made only for same screens with same addresses. If addressed are grouped, the addresses in a single block can be converted in a batch. Double click each item on the list to check which object pops up.



[Figure. Step 3: Convert Address]

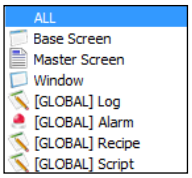
(1) View Convert Address

Addresses of which an address block has been assigned are shown.

(2) Type / Location

Select All for Type and Location to view all addresses of the project, or select specific types or locations of your interest to view the selected addresses. For [Type] select type of screen or global settings from the drop down menu.

For [Location] you can select All or a single specific location.



[Figure. Type (Drop-down menu)]

(3) Initialization

Cancel the current block configuration and go to the initial status.

(4) Auto Address Block

Automatically create blocks for all addresses.

(5) Create Address Block

Manually create address blocks.

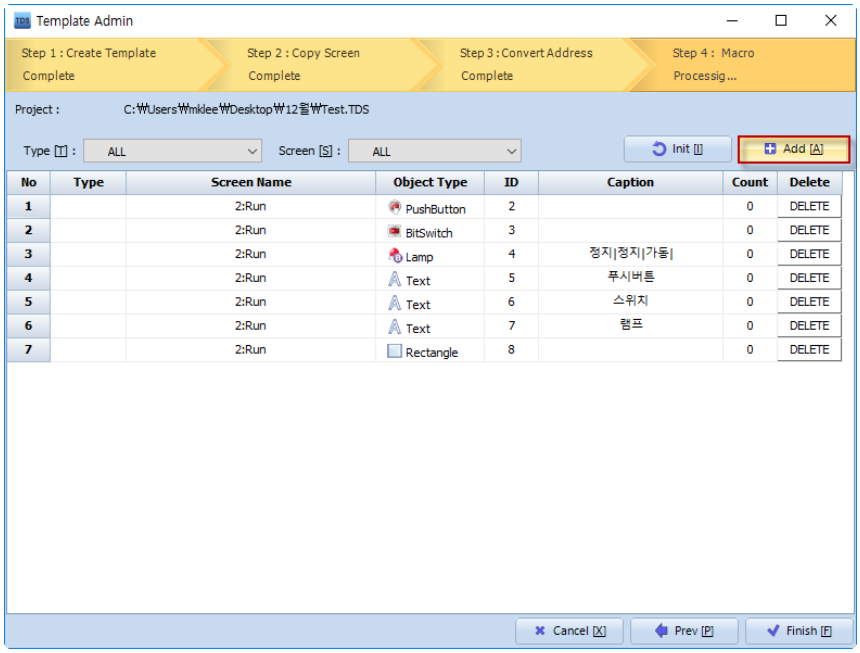
No.	Menu	Description
1	Type	The type of location and global settings are shown.
2	Location	The number and name of location is shown.

3	Object Name	The name of the object is shown. The number in bracket refers to the ID.
4	Address	The address of the object is shown.
5	Bit	The length of the address is shown in bits.
6	Offset	The difference between the block and subject address is shown.
7	Memo	You can add remarks to lists constituting a block.
8	Block	When a block has been created, an [REMOVE ALL] button will be activated. Click the button to delete the block. Lists not constituting a block will show a [REMOVE] button. Click the button to delete the item.

3.2.4 Step 4: Macro

Select multiple figures or tags from a single screen by dragging the cursor.

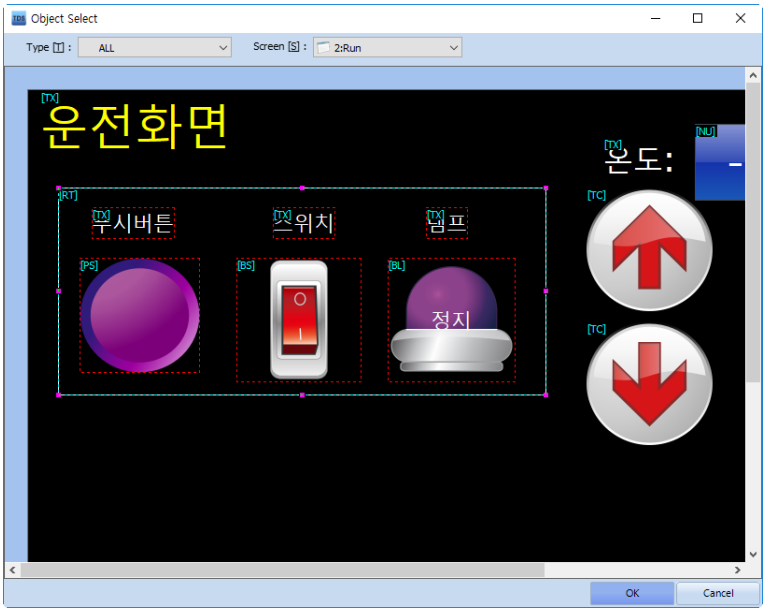
Click [Add] to open the [Object Select] window.



[Figure. Step 4: Macro]

No.	MENU	DESCRIPTION
1	No.	Object number assigned in an ascending order.
2	Type	The type of screen or global setting is shown.
3	Screen Name	The number and name of screen is shown.
4	Object Type	The type of the object is shown.
5	ID	The ID of the object is shown.
6	Caption	Change the caption of the object. Double click the cell to edit the caption.
7	Count	Select the number of copies you will make. Double click the cell to edit the count.
8	Delete	Click the delete button to delete an object.

If you select the type and screen, a screen as below will appear. Select the figures and tags you want to copy and click [OK].

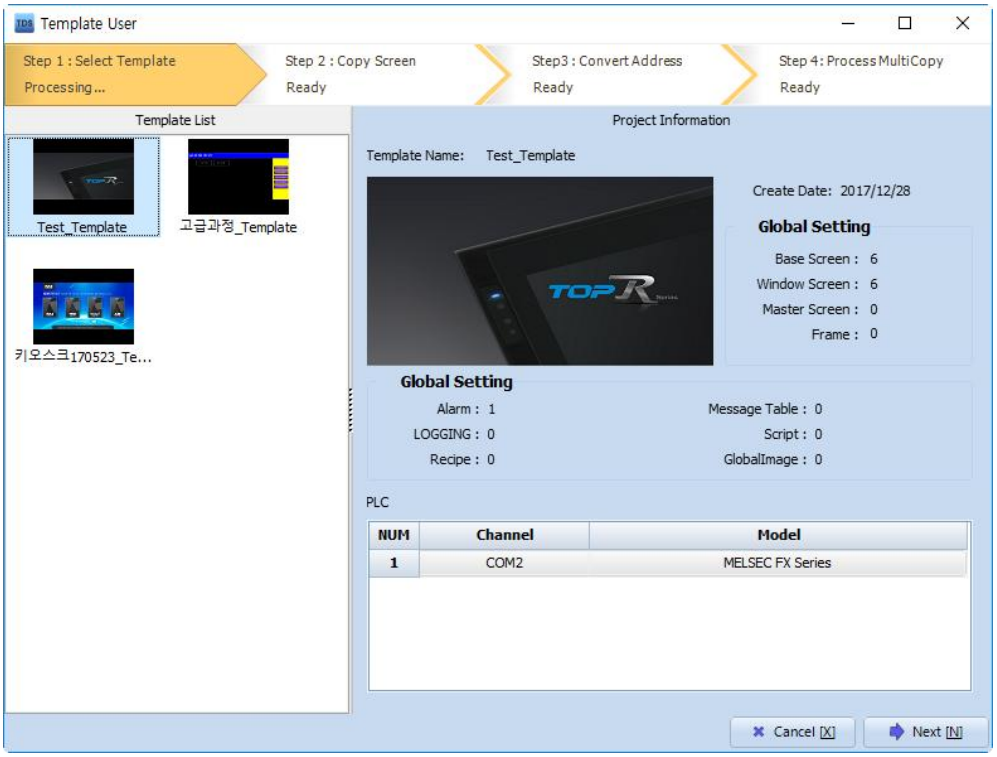


[Figure. Object Select]

The selected objects (figures and tags) will be added to the list on the Macro Screen. Edit the caption and copy counts on the list. Once you complete [Step 4: Macro], click [Finish] to save the template file. The template file, with extension of [*.tml] will be saved in the following directory of [C:₩Program Files (x86)₩M2I Corp₩TOP Design Studio₩Template].

3.3 Open Template

Open an existing template file [*.tml] and create a new drawing project from the template.



[Figure. Open Template]

3.3.1 Step 1: Select Template

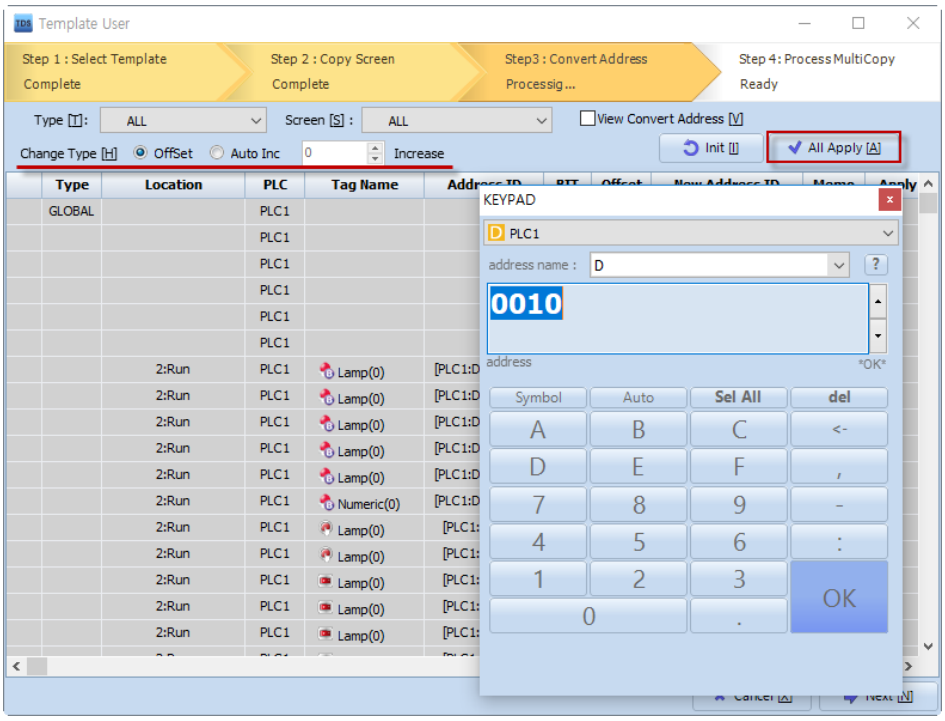
Select [File] - [Open Template], the below Template User window will appear.
Copy a template file from another PC to the directory of [C:₩Program Files (x86)₩M2I Corp₩TOP Design Studio₩Template] to access the template from the Template User. You can delete unnecessary templates from the aforementioned directory.
Select the template you intend to use from the Template List, details of the template will be shown on the [Project Information] field. Click [Next] to proceed to Step: 2.

3.3.2 Step 2: Copy Screen

[Step 2: Copy Screen] for [Open Template] is identical with [Step 2: Copy Screen] for [New Template]. You can select screens that you intend to copy from the template. You can create multiple screens from a single screen.

3.3.3 Step 3: Convert Address

Group objects from same screens and addresses, as [New Template] - [Step 3: Convert Address]. Assign addresses to such blocks. Double click each item on the list to check which object pops up.



[Figure. Stage 3: Convert Address]

(1) Type / Screen
View lists of item according to screen type / global settings.

(2) View Convert Address
Addresses of which an address block has been assigned are shown.

(3) Change Type

Select between Offset and Auto Increase.

Select [Offset] to increase the address for the amount configured in the Offset column.

Select [Auto Inc] to increase the address for the increment configured in the [Increase] box.

(4) Initialization

Initialize all modifications made to the [Convert Address].

(5) All Apply

Click [All Apply] to convert addresses according to the settings configured for address conversion.

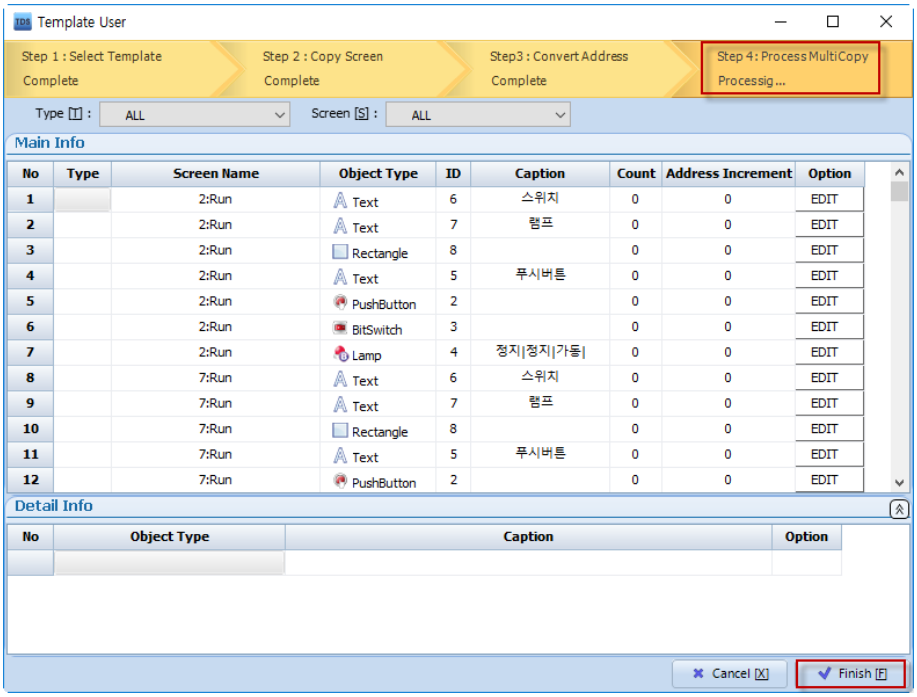
If you have manually changed the new address by double clicking the [New Address ID] column, such new addresses will be applied to all addresses assigned to the corresponding block.

No.	MENU	DESCRIPTION
1	Type	The type of screen or global setting is shown.
2	Location	The number and name of screen is shown.
3	PLC	The PLC name is shown.
4	Tag Name	The Tag Name is shown. The number in bracket refers to the ID.
5	Address ID	The address assigned to the tag is shown.
6	Bit	The length of the address is shown in bits.
7	Offset	The difference between the block and subject address is shown.
8	New Address ID	The new address is shown. Double click the cell to manually change the object address. Any invalid entry will be shown in red, and a warning message will pop-up if you click [Next].
9	Memo	Memos are shown.
10	Apply	Click [Apply] to change the address assigned to a block according to the configuration, and apply the new address to objects constituting a group.

Click [Next] to proceed to [Step: 4: MultiCopy].

3.3.4 **Step 4: MultiCopy**

The objects registered at [New Template] - [Step 4: Macro] are listed. You can change the properties of each object by clicking the [EDIT] button provided for each object. You can copy an object for multiple times using the [Count] and [Address Increment] from each list.



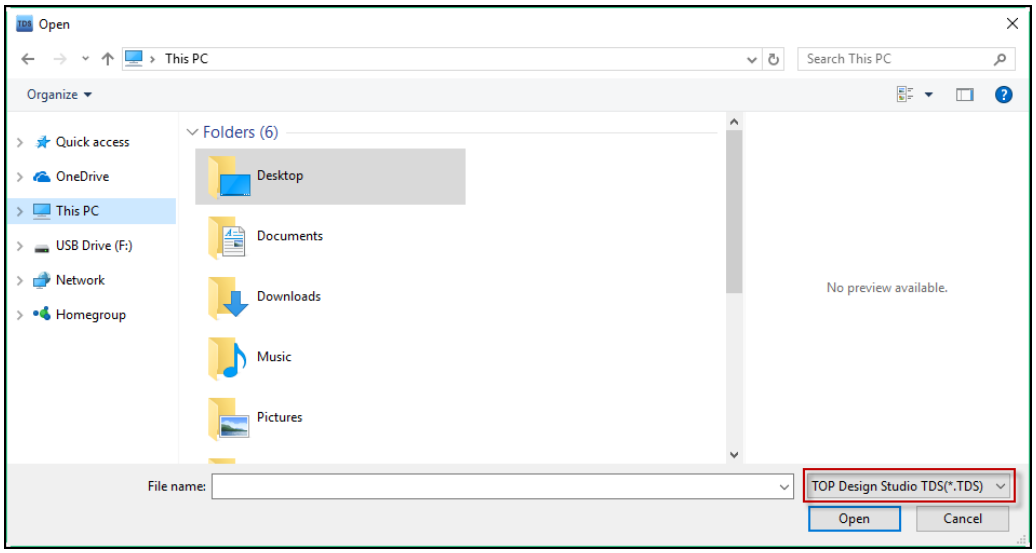
[Figure. Step 4: MultiCopy]

Click [Finish] to create a new project based on the template you have just selected and configured.

No.	MENU	DESCRIPTION
1	No.	Object number assigned in an ascending order.
2	Type	The type of screen or global setting is shown.
3	Screen Name	The number and name of screen is shown.
4	Object Type	The type of object is shown.
5	ID	The ID of the object is shown.
6	Caption	Change the caption of the object. Double click the cell to edit the caption.
7	Count	Select the number of copies you will make. Double click the cell to edit the number of copies.
8	Address Increment	Select the increment that will be applied for the address of each copy. Double click the cell to edit the increment.
9	Option	Click [Edit] to change properties of an object.

3.4 Open (Ctrl+O)

Open an existing project.



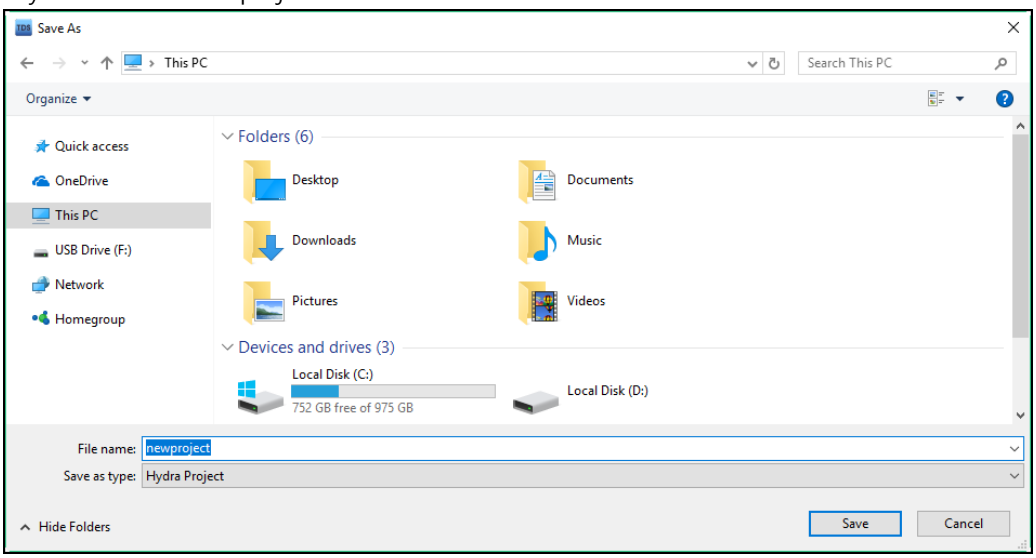
[Figure. Open]

Drawing projects are saved as [*.TDS] files. You can also open project files created by XDesignerPlus, the old software for XTOP products. Select the file you want to open and click [Open] to open the project.

3.5 Save (Ctrl+S)

Save the currently open project. If the project has already been saved, any change made to the project will be saved on the existing file.

If the project is not saved to a file, the [Save As] window will appear, allowing you to assign the directory and name of the project file.



[Figure. Save]

Select the directory and enter the file name. [File Name] will be assigned to [NewProject.TDS] as default. Change the name as required. Drawing project files has an extension of [*.TDS].

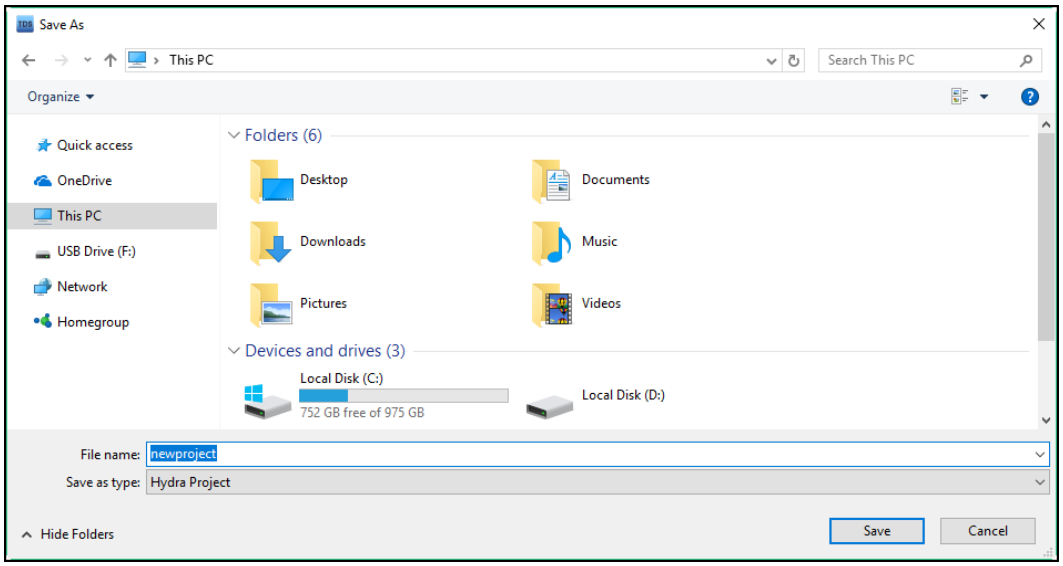
Click [Save] to save the project.

3.6 Save As (Shift+Ctrl+S)

Save the current file to another name.

Use [Save As] when you want to save an existing file as a new name, while maintaining the previous version of the open file. Click [Save As] to open the [Save As] window, and select the directory and name of the project.

As default, the current directory and name of the project file will be shown on the [Save As] window, which you can browse to another directory and enter a new name. Click [Save] to complete [Save As].



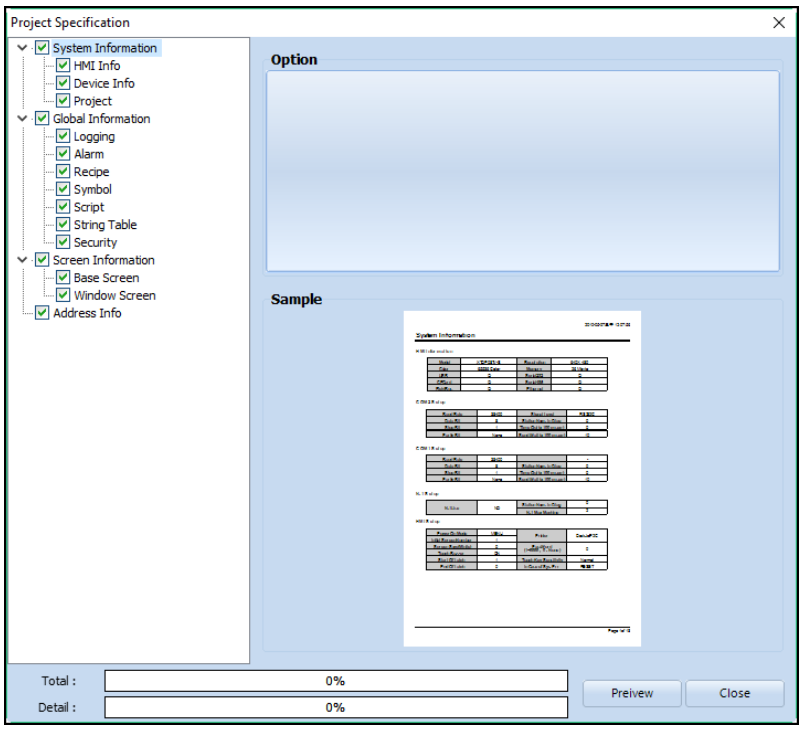
[Figure. Save As]

3.7 Print Project Specification (Ctrl+P)

Print the content of the project. Select [Print Project Specification] to open the [Project Specification] window. The reported information consolidated by forms of a list can be printed as shown in the [Sample] field, or printed according to your selection.

3.7.1 Items to print

You can print [System Information] / [Global Information] / [Screen Information] and [Address Information].



[Figure. Print]

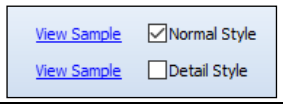
No.	PRINT	DESCRIPTION
1	System Information	Print all system information.
2	HMI Information	Print the TOP device information.
3	Device Information	Print the PLC (Controller) information.
4	Project	Print the project information configured at [Project Settings].
5	Global Information	Print all global setting information.
6	Log	Print logging settings.
7	Alarm	Print alarm settings.
8	Recipe	Print recipe settings.
9	Symbol	Print symbol settings.
10	Script	Print script content.
11	String Table	Print string table settings.
12	Security	Print passwords.
13	Screen Information	Print all screens.
14	Base Screen	Print Base Screen.
15	Window Screen	Print Window Screen.
16	Address Information	Print list of addresses employed by the project.

3.7.2 **Option**

Configure detail print options.

(1) Print options for Logging

Select Logging from the list on the left side of the window, detail options are provided in the [Option] field.



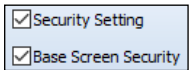
[Figure. Print options for Logging]

OPTION	DESCRIPTION
Normal Style	Logging settings are printed in normal style.
Detail Style	Logging settings are printed in detail.

Click [View Sample], a brief thumbnail will be shown in the sample field.

(2) Security

Select Security from the list on the left side of the window, detail options are provided in the [Option] field.

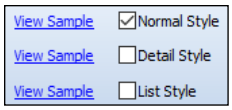


[Figure. Security Options]

Option	Description
Security Setting	Print security settings of the project.
Base Screen Security	Print security settings of the base screen.

(3) Screen Information

Base Screen and Window Screen are available from Screen Information.

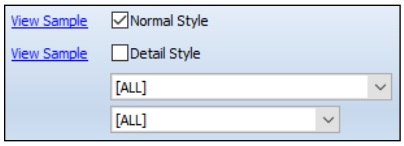


[Figure. Screen Information]

Option	Description
Normal Style	Print the project screens in normal style.
Detail Style	Print the project screens in detail with lists and information affixed to each screen.
List Style	Print project screens on a list with thumbnails.

Click [View Sample], a brief thumbnail will be shown in the sample field.

(4) Address Information



[Figure. Print options for Address Information]

Option	Description
Normal Style	Print the list of addresses employed by the project.
Detail Style	Print the list of addresses employed by the project with each tag and ID assigned to each address.
Screen	Select the range of items of which addresses should be printed from the screen.

	[ALL] [ALL SCREEN] [GLOBAL] [BASE] 1 : Main [BASE] 100 : Image [BASE] 200 : Font [BASE] 300 : Object -Preview [BASE] 320 : Object Number Select [All] to print all addresses of the project, [All Screen] to print all addresses of object shown in the current view, and [Global] to print all addresses employed by Global Settings. To print all addresses from an individual screen, select the individual screen.
Device	Select the type of address to print. Select [All] to print all addresses, [HMI] to print the TOP device internal addresses, and [PLC] to print the PLC addresses. [ALL] [HMI] [PLC1]

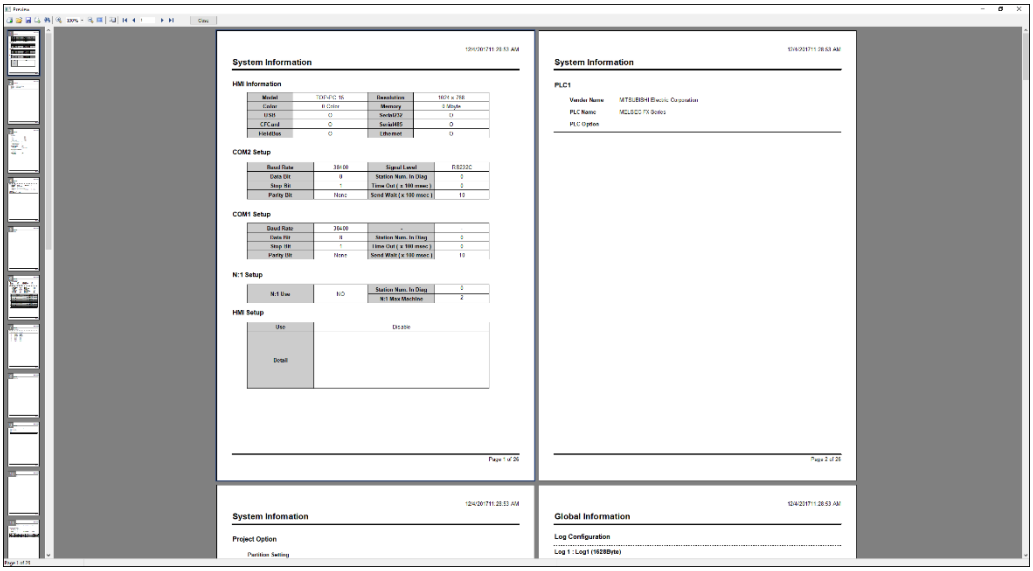
3.7.3 View Sample

After configuring each option, click [View Sample], a brief thumbnail will be shown in the sample field.

3.7.4 Preview

Select all items you want to print from the list and click [Preview]. A preview of a report containing all selected information will be shown as it will be in fine print. Configure the page format from the [Preview] window and edit the [Preview].

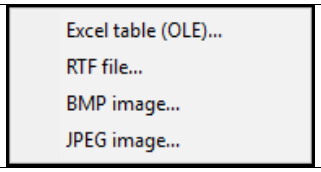
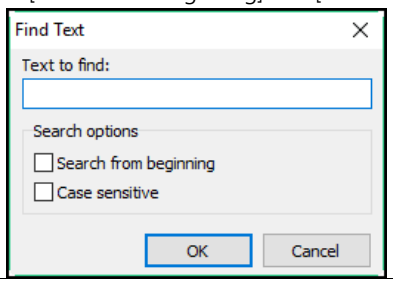
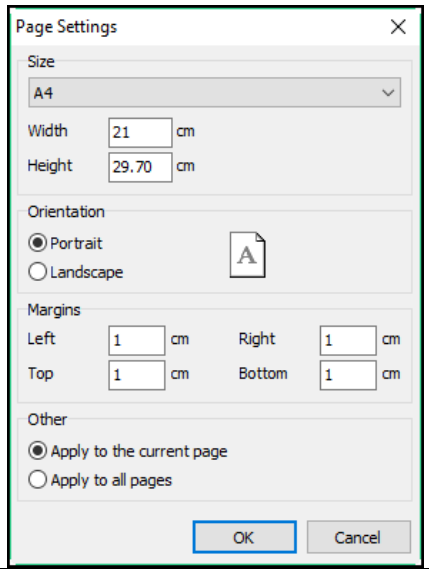
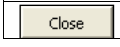
You can save the [Preview] screen, or open a saved [Preview] file.



[Figure. Preview]

Click [Print] on the [Preview] window to print the report.

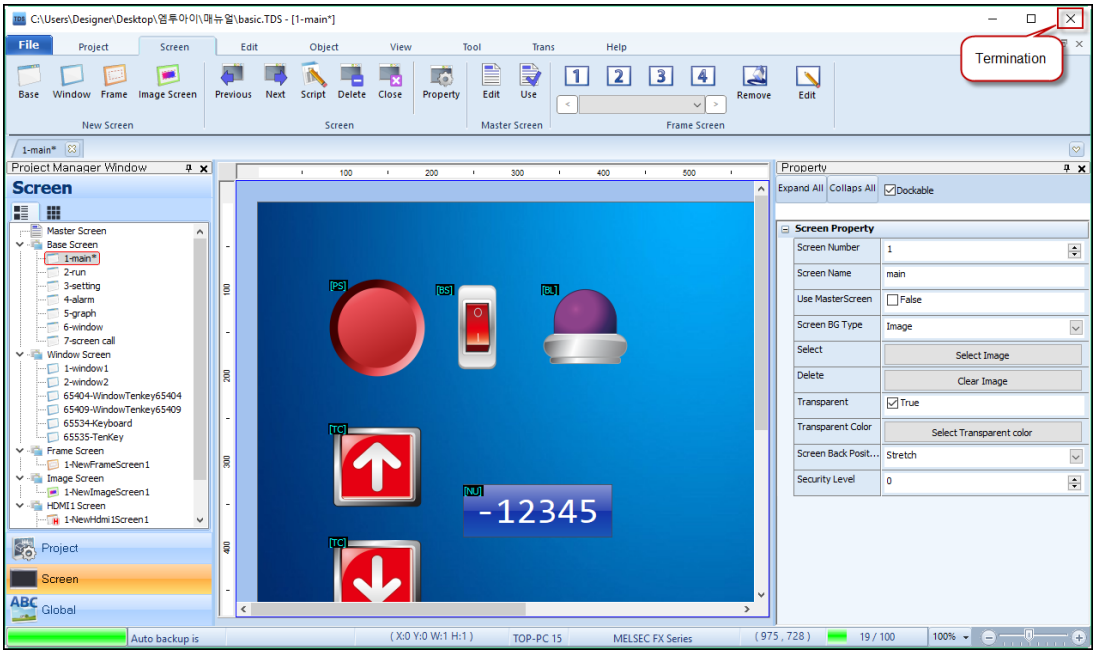
TOOLBAR	DESCRIPTION
	Print the current preview file.
	Open an existing preview file [*.FP3].
	Save the current preview file. Preview files are saved with the extension of [*.FP3].
	Export the preview to a file. You can export the preview to any of the following file types.

	
[Search]	Enter text to find in the text box, and click [OK] to search for such text. From [Search Options] you can enable/disable [Search from beginning] and [Case sensitive]. 
[Zoom]	Zoom in or zoom out of the preview. Each click on (+) and (-) will zoom in or out with an increment of 25%. You can also key in detail zoom percentage.
[Full Screen]	Display the preview on the full screen. To abort [Full Screen] right click any portion of the full screen to access the pop-up menu. Select [Full Screen] from the pop-up menu to retrieve to the [Preview] window.
[Page Settings]	Select the page size from the [Size] field. Select the page orientation between [Portrait] and [Landscape] from the [Orientation] field. Select the page margins from the [Margins] field. Select whether to print only the current page or all pages from the [Other] field. 
	Navigate through pages. The number shown in the center refers to the page number.
	Close [Preview].

3.8 Close (Alt+F4)

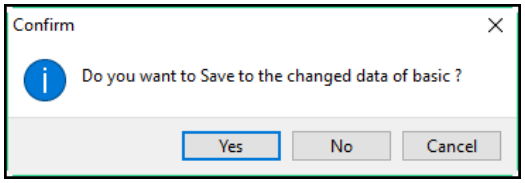
Close the TOP Design Studio program.

Select [File] - [Close] from the menu bar, or click the [X] box in the upper right corner.



[Figure. Close TOP Studio Design with [X] button]

If there are any changes to project(s) that has not been changed, a confirm message asking you whether or not to save the changes will appear in a sequential order for each applicable project.

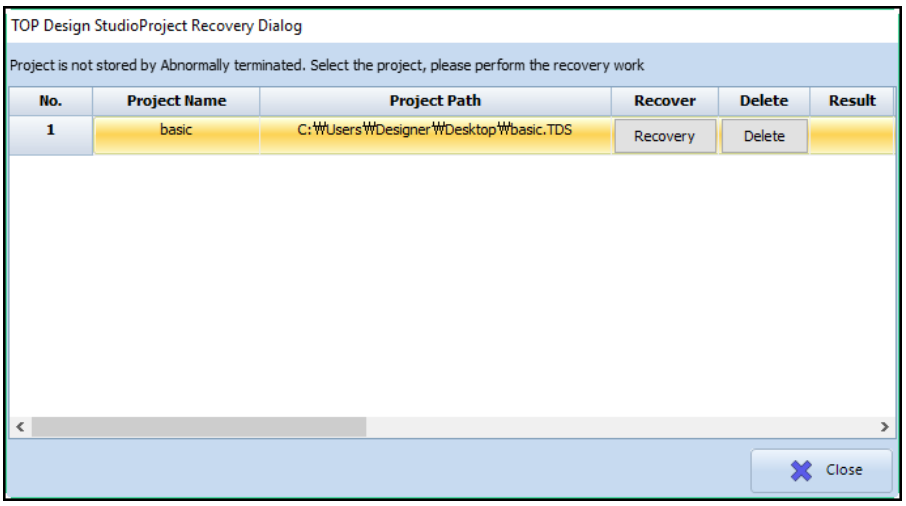


[Figure. Close confirm message]

3.8.1 Recovery Dialog

Even if the TOP Design Studio was terminated in an abnormal manner, the TDS backups each open project on 5 minutes basis, thus the previous project is not completely deleted.

However, such auto backup function is provided if the project was initially running in a normal condition, and will not be provided if the auto backup file does not exist. The following screen shows what the TDS would look like for the first time after an abnormal termination.



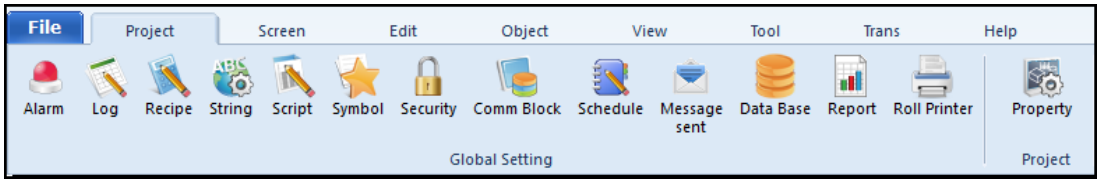
[Figure. Recovery Dialog]

Recovery Dialog Menu	Description
Save as and open [S]	The backup file is saved as another file and will be open.
Recover and open [R]	The existing program file is recovered and open.
Ignore Backup Data [I]	Ignore backup data and create a new project.

CHAPTER 4 - Project

Read the following to become familiar with the [Project] menu.

The [Project] menu features Global Settings for [Alarm / Log / Recipe / String / Script / Symbol / Security / Communication Block / Schedule / Message Sent / Data Base / Report / Roll Printer] and [Project Property].



[Figure. Project Menu]

4.1 Alarm

Alarm is the list of problems and warnings that can occur on the device.

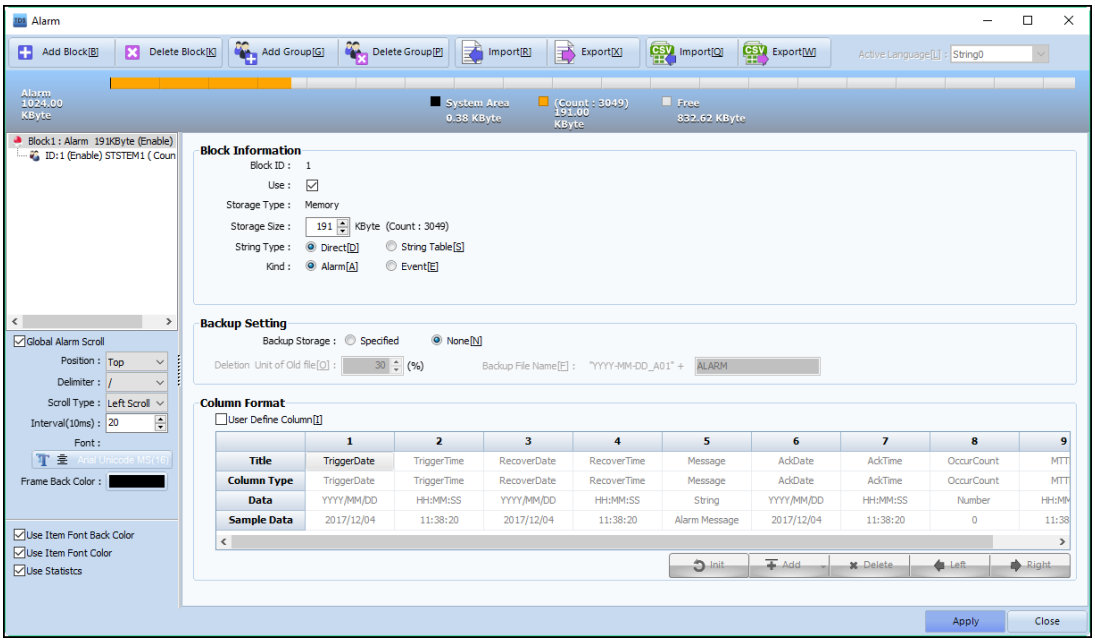
Compile the list of alarms from [Alarm], and view triggered/recovered alarm data for each object on the [Alarm View].

A single [Alarm] consists of [Alarm Condition] and [Alarm Content].

If an [Alarm Condition] is true, the corresponding alarm will be triggered.

Configure the [Alarm] list and other features of alarms from the [Project] - [Alarm] window.

Select the [Alarm] menu, the below window will appear.



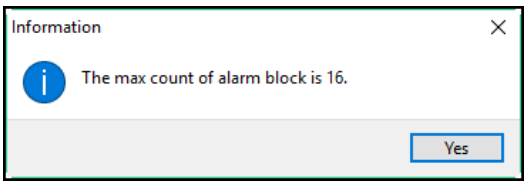
[Figure. Alarm window]

On the upper side of the Alarm window [Buttons] and [Memory Display] are provided. On the left side of the window, the [Block/Group] list and [Global Alarm Scroll] are provided. On the right side of the Alarm window, detail settings of each Block/Group selected from the [Block/Group] list are shown.

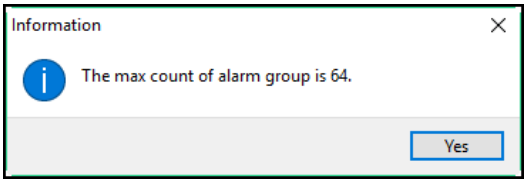
Add [Groups] to a [Block] and compile the [Alarm List] for each group.

4.1.1 Add and Delete Blocks and Groups

An alarm consists of [Block] and [Group]. Blocks have a higher hierarchy over groups.
You can configure up to 16 blocks, and each block can contain 64 groups.
Each group can facilitate up to 5,000 alarms in its alarm list.



[Figure. Maximum number of Blocks]



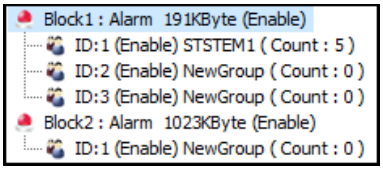
[Figure. Maximum number of Groups]

Add and delete blocks and groups with the buttons provided atop of the Alarm window.

[Figure. Add Block/Group]

No.	Alarm	Description
1	Add Block	Add a new block. Block1 will be present as default when you create a new project. Click [Add Block] to create new blocks numbered in an ascending order.
2	Delete Block	Delete a selected block.
3	Add Group	Add a new group to the selected block. Each group you create will be numbered in an ascending order; ID:1, ID:2, ID:3, so on and so forth.
4	Delete Group	Delete a selected group.

If you add a block or group, the new block or group will be shown on the [Block/Group List] on the left side of the Alarm window, providing detail information of each Block or Group.

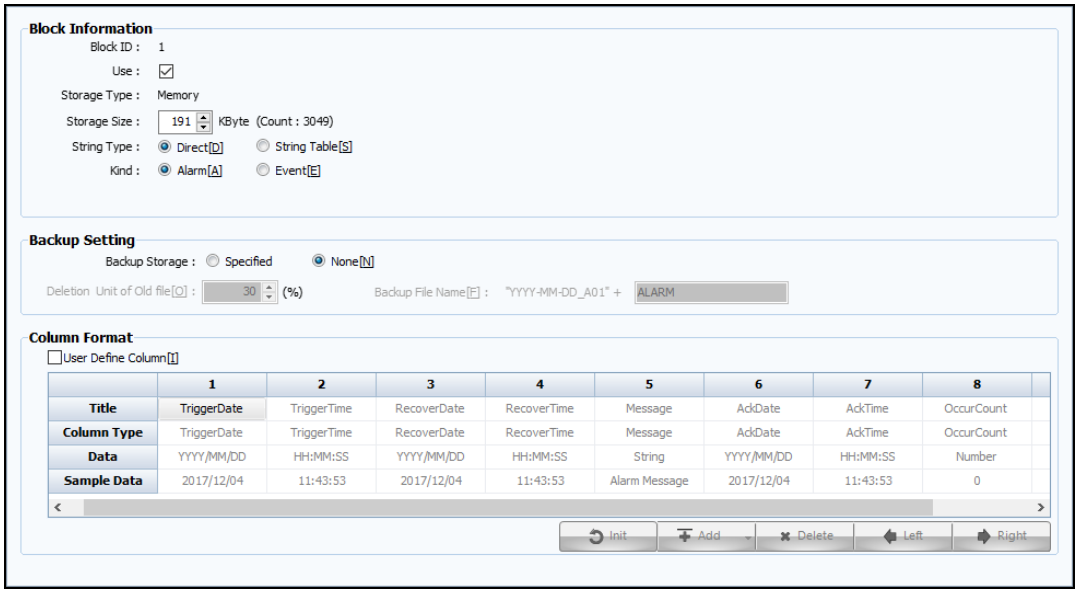


[Figure. Block / Group List]

For blocks, the block number, block type (alarm/event), memory, and Enable/Disable status are shown.
For groups, the group ID, Enable/Disable status, group name, and alarm count are shown.

4.1.2 Block Settings

Select a block from the [Block/Group List], detail information and settings of the block are shown on the right. Configure [Block Information] / [Backup Setting] / [Column Format] for the selected block.

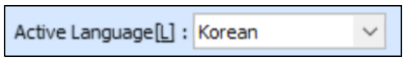
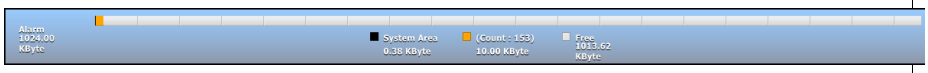
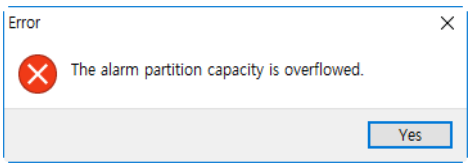


[Figure. Block Settings]

(1) Block Information

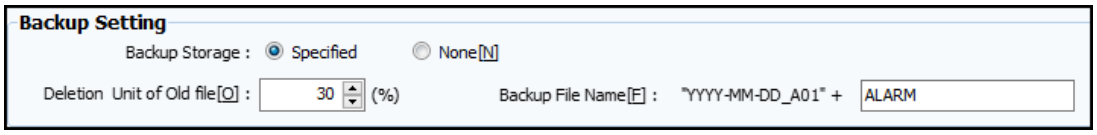
Refer to the following table for each block information.

No.	Block Information	Description
1	Block ID	Block IDs are allotted upon creating a new block. The first block will be assigned to 1, and new blocks will be assigned to their ID in an ascending order. You cannot change the Block ID. If you add a new block when there are Block1 and Block2, the new block will be assigned to Block3. If you have Block1, Block2 and Block3, and delete Block2, Block1 and Block3 will be retained, and if you then add a new block the new block will be assigned to Block2, not Block4.
2	Use	Select whether or not to use the block. If you select not to use the block, the block will be excluded from project transfer and will not be available on the TOP device. Thus, even if an [Alarm/Event] of the block occurs, the occurrence will not be saved nor displayed.
3	Kind	Select the block type between [Alarm] and [Event]. For [Alarm] both [Trigger] and [Recovery] will be recorded, and for [Event] only [Trigger] will be recorded. Thus, [Trigger Time / Alarm Message / Recover Time / Ack Time] can be recorded for alarms, and [Trigger Time / Alarm Message] will be recorded for events. Therefore, from the [Alarm View], for alarms you can select to display either [Current Alarm] or [History], but for events, there is no distinguish in type of alarm.
4	String Type	Select method to enter alarm messages. Select between [Direct] and [String Table]. Select [Direct] to manually type in alarm messages. Select [String Table] to load alarm messages from multi-language string tables. If [String Table] is selected, select the language of the alarm message from the drop down

		menu [Active Language] available on the upper right corner of the [Alarm] Window.  (Refer to Chapter 4.4. [String] for more details.)
5	Storage Type / Storage Size	Configure the memory size for the block in [KByte]. The available number of alarms for the memory size of the block will be shown in [Counts]. Count is an approximate number, and the actual available number of alarms may differ. Any alarm triggered after the entire storage assigned to the block is full will be stored while the oldest alarm data will be deleted in a first-in-first-out basis. Once you configure the storage memory, the capacity is shown in the bar graph provided beneath the menu buttons.  You can configure the storage assigned to alarm amongst the entire backup memory of the TOP device from the [Project Option] tab available at [Project Property] menu. Select [TOP Settings] from the list on the left side of [Project Option] window to access [Partition Setting]. Configure the memory that should be allotted to alarms. The entire backup memory of the TOP device is provided for [Log] / [Alarm] / [Recipe], adjust the memory for each category. [Figure. Partition Setting] Distribute the memory for alarms to each block. Caution! If you have configured the memory for a [Block] as 192KB, when the 192KB is allotted to Alarm from Partition Setting, a Error message will appear. This error is caused by the 0.3KB [System Area] assigned to the memory as shown in black area of the graph. Accordingly, a single block can have a maximum capacity of 191KB. In other words, the sum of memory allotted to all blocks cannot exceed the memory assigned to Alarm at Partition Setting. If the sum of the memory allotted to all blocks from the Alarm window exceeds the total memory allotted to Alarms, the following error message will appear once you click [Apply] on the Alarm window.  [Figure. Error message - alarm block capacity overflow]

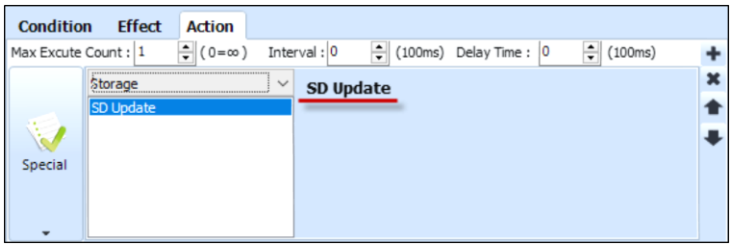
(2) Backup Setting

Use Backup Setting when you backup the alarm data from the TOP device memory to a SD card.
Whenever an alarm is triggered, the alarm information is recorded to the memory allotted to the block within the TOP device internal memory.
With a limited capacity of the TOP device memory, once the internal memory is full, new alarm data will be recorded by deleting old alarm data. If you select [SD Card] for [Backup Storage], old alarm data will not be deleted and rather backed up on the SD card to provide larger memory for alarm data.
Select [None] if you elect not to backup any alarm data.



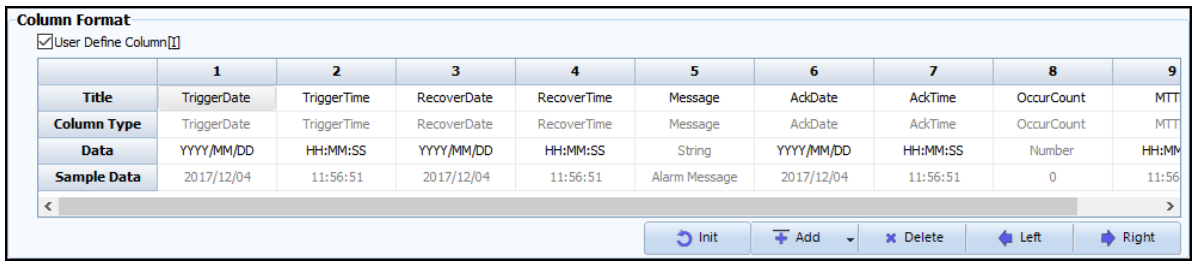
[Figure. Backup Settiing]

No.	Backup Setting	Description
1	Backup Storage	Select between [SD Card] and [None] for the storage medium of alarm backup data. ▶ If [None] has been selected, once the memory for a block is full, any new alarm triggered for the block will be saved by deleting the oldest alarm data. No backup will be performed. ▶ Use [SD Card] to backup alarm data to an SD card beyond the limited capacity of the TOP internal memory. If the TOP internal memory allotted for the block is full, the amount of alarm data configured by the [Deletion Unit of Old File] will be backed up on the SD card, and the backed up alarm data will be deleted from the TOP internal memory. Example) If settings are: 100KB for Block1, 30% for Deletion Unit of Old file, and the [Backup File Name] is ALARM, once the total alarm data of Block1 reaches 100KB on July 4th, 2017, old alarm data up to 30KB will be stored on the SD card under the file name of [2017-07-04_A01_Alarm]. After the old alarm data has been saved on the SD Card, the backed up 30KB will be deleted from the TOP internal memory allotted to the corresponding block. (Caution 1! Files saved on SD Card) Alarm data are stored on the TOP device memory in the form of [Data], however, once the alarm data is backed up on an SD Card or USB memory, the alarm data are stored in the form of a [File]. When alarm data is backed up on an SD Card, only one backup file will be created for a single date. On any given day, if backup is required for a single block for two or more times, the data backup from the second, third, so on and so forth backup will be added to the backup file created from the first backup of that given day. New backup files will be created on different dates. (Caution 2! Insert SD Card) An SD Card must be inserted to the TOP device. If an SD Card is properly inserted to the TOP device, the data value for Special Address of [SD_INSERT] will be [1]. If you remove the SD Card, the data value will be [0]

		 [Figure. Confirm SD Card connection] (Caution 3! SD Update) Prior to removing an SD Card from the TOP device, go to the [Effect and Action Page], and select [Action] - [Special] - [Storage] - [SD Update].  [Figure. SD Update] [SD Update] backs up all alarm and log data on the TOP device memory to the SD Card, and deletes the backed up data from the TOP device. (Applicable for only alarm blocks and log configured for backup to SD Card).
2	Deletion Unit of Old File	Configure the settings if you have selected [SD Card]. [Deletion Unit of Old File] is used for two purposes. ▶ The unit for backup alarm data to SD Card and delete when the block memory is full. ▶ The unit to delete old data when the SD Card memory is full. <How to calculate the number of files to be deleted when the SD card memory is full> On the TOP device memory, the data is saved as [data], thus the fraction configured will be applied to the total memory. On the SD Card, the data is saved as files, thus the fraction configured will be applied to the number of files. The number of files to delete shall be [(Deletion Unit of Old file/100) x Total number of alarm block files in the directory]. The oldest files will be deleted first. If the total number of files to delete is less than [1], one file will be deleted. Example) If the Deletion Unit of Old file is 30%, and you have two files, the number of files to delete is (30/100) x 2 = 0.6, thus one file will be deleted. If the total number of files are [1] or less, no file will be deleted.
3	Backup File Name	Configure the backup file name if you have selected [SD Card] for Backup Storage medium. AS default the backup file name shall be configured as YYYY-MM-DD_A##, where YYYY is the year, MM is the month, DD is the day, A is the initial for Alarm, and ## is the block number, with the suffix typed in the text box. Thus, an example file name may be [2017-07-04_A01_ALARM]. Only one alarm file will be created for a given day. If the alarm data is backed up on the SD card for more than twice on a given day, the alarm data from the second backup and after will be recorded on the file created upon the initial backup of that day. Furthermore, if the alarm data is not backed up on a given day, no alarm data backup file will be created for such day.

(3) Column Format

Select [User Define Column] to edit the type and form of columns to be used for the [Alarm View] object. The column format can also be configured on the [Column] page of the [Alarm View] object.



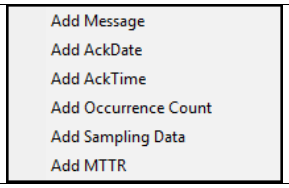
[Figure. Column Format]

You can apply the following types of columns.

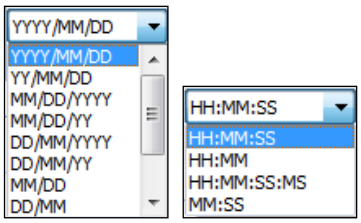
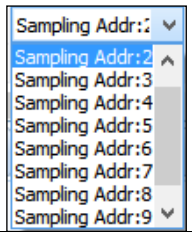
No.	Column	Description
1	Trigger Date	The date of which the alarm is triggered.
2	Trigger Time	The time the alarm is triggered.
3	Recover Date	The date of which the alarm is recovered.
4	Recover Time	The time the alarm is recovered.
5	Message	The message corresponding to the alarm.
6	Acknowledge Date	The date of which an operator acknowledged the alarm.
7	Acknowledge Time	The time an operator acknowledged the alarm.
8	Sampling Data	Sampling Data is available if you selected [Use Data Sampling] for [Group Setting]. If you use Data Sampling, the data of the data address will be recorded along with the alarm data, and will be displayed on the Alarm View. You can configure up to 10 sampling addresses.
9	Occurrence Count	The count of occurrence of the alarm is shown. This function is available if you have selected [Use Statistics] on the bottom left side of the [Alarm] window.
10	MTTR	Click the [Add] button and select [Add MTTR] from the drop down menu to add MTTR to the column format. MTTR is the time measured from the occurrence of an alarm to the recovery of an alarm. This function is available if you have selected [Use Statistics] on the bottom left side of the [Alarm] window. (Refer to Chapter 4.1.5 [Use Statistics] for more details.)

Use the following buttons to add/delete or move columns.

No.	Button	Description
1	Initialization	Cancel all changes you have made and restore the initial column format.
2	Add	Add a column.

		
3	Delete	Delete a selected column.
4	Left	Move the selected column to the left.
5	Right	Move the selected column to the right.

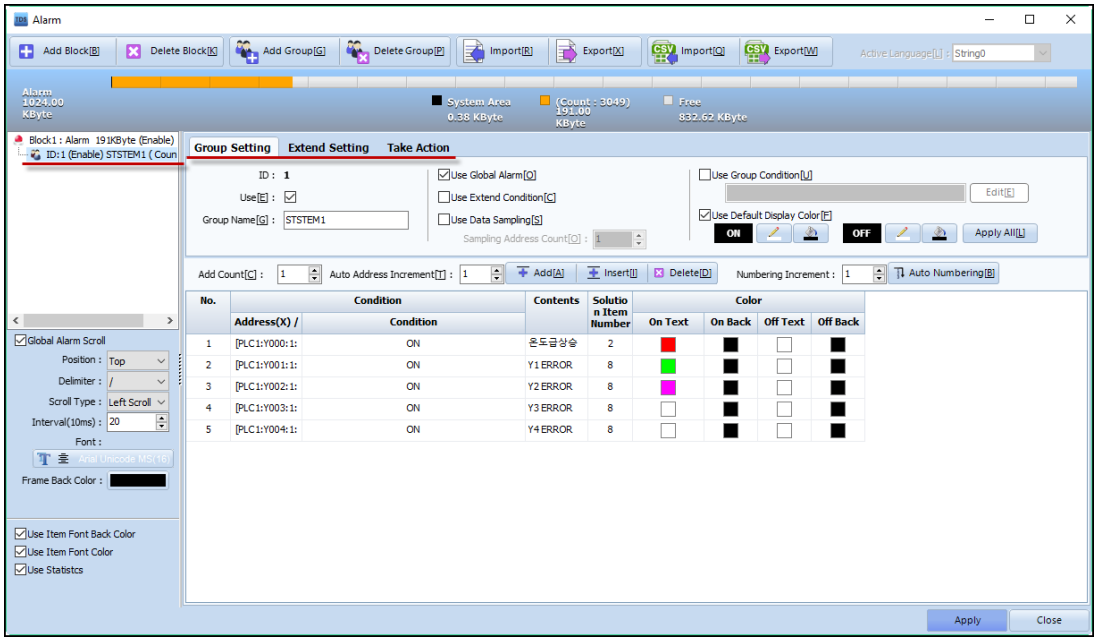
You can change the name and type of columns.

No.	Column Format	Description
1	Title	Change the title of the column.
2	Column Type	The column type is shown. TriggerDate/TriggerTime/Message/RecoverDate/RecoverTime are default columns that cannot be deleted.
3	Data	Select the display format for times and dates.  If you have selected [Use Data Sampling] select the address of the monitored data. You can configure up to 10 monitoring addresses, and select the number of which the data the alarm shall monitor. 
4	Sample Data	The format of each column is shown in samples.

4.1.3 Group Setting

After Block Setting, create groups.

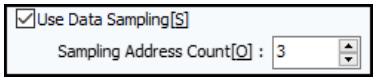
Select a group from the [Block/Group List], Group Settings are available from the right side of the Alarm window. Configure detail settings on each tab for [Group Setting] / [Extend Setting] / [Take Action].

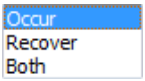
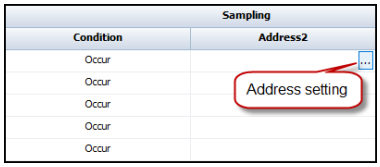
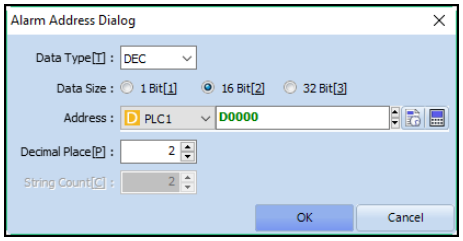
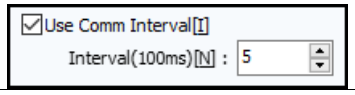
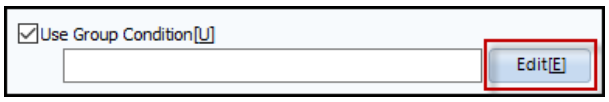
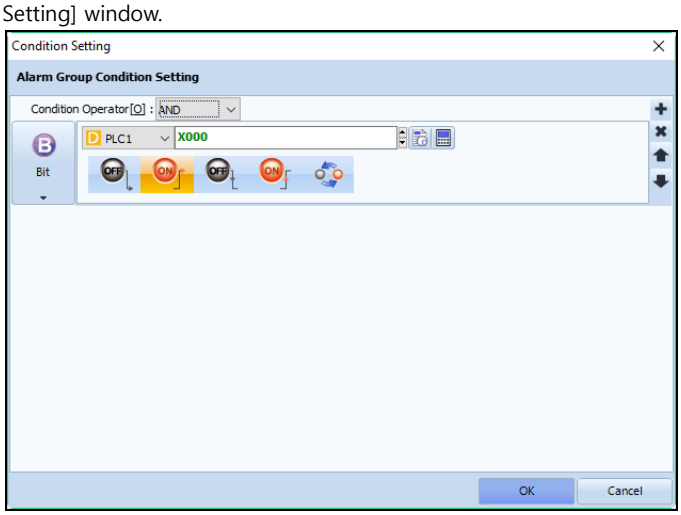


[Figure. Group Setting]

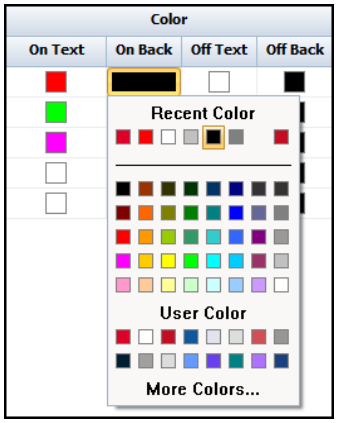
(1) Group Setting Tab

The [Group Setting] tab consists of two main fields. The upper field where you can select various settings for the selected [Group], and the lower field where you add the [Alarm List] included in the selected group. Here are the features provided in the upper field.

No.	Group Setting	Description
1	ID	The ID number assigned to each group in an ascending order. You cannot change the ID number.
2	Group Name	Define a group name.
3	Use	Select whether or not to use the Group. If [Use] is not selected, the alarm under the group will not be active transfered to the TOP device.
4	Use Data Sampling	Save the value of an address upon an alarm is triggered. The value of a selected address will be recorded upon trigger / recover of an alarm. Select [Use Data Sampling] and configure the [Sampling Address Count]. You can assign up to 10 [Sampling Address Count].  If you select [Use Data Sampling], a column to configure data sampling appears to the Alarm List. Addresses are assigned to Address1, Address2, Address3, so on and so forth up to the amount of [Sampling Address Count].

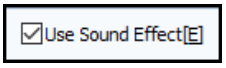
		Select [Occur] for the [Sample] - [Condition] to save the value of the sampling address when an alarm is triggered; select [Recover] to save when an alarm is recovered; and select [Both] to save both values when an alarm occurs and is recovered.  Double click the [...] button when you put the cursor on the [Address] cell, the following [Alarm Address Dialog] window will appear. You can copy a configured address to another cell.   [Figure. Alarm Address Dialog]
5	Use Communication Interval	Select [Use Communication Interval] to check alarm trigger/recover repeatedly on the basis of the [Interval] you have configured. Select [0] to check alarms in real time. 
6	Use Group Condition	Assign a condition to a group, and trigger alarms within a group only when such group condition is satisfied. If the [Group Condition] is not met, an alarm will not trigger/recover even though the individual [Alarm Condition] is true/false, respectively.  Select [Use Group Condition] and click [Edit] to configure the group condition from the [Condition Setting] window.  [Figure. Alarm Group Condition Setting] (Refer to Chapter 7.7 [Condition Tab] for more details.)
7	Use Default Display Color	Configure the color for each alarm.

<table>
<tr>
<td></td>
<td></td>
<td>

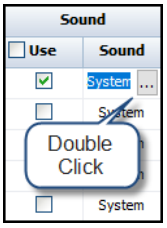
Select [Use Default Display Color] to configure the colors for [ON] and [OFF].
Text/background colors for [ON] will be used when an alarm is triggered, and colors for [OFF] will be used when an alarm is recovered.
Background color is the underlaying color of a text.
Select the representative colors, and click [Apply All] to apply the selected colors to all alarms in the Alarm List.


Double click the color in each color cell of a specific alarm on the Alarm List. the below [Color Palette] will appear, and you can select the text / background colors applicable for a triggered / recovered alarm.
If you use this function, the below [User Color Define] configured from the [Alarm View] object will not be applied.

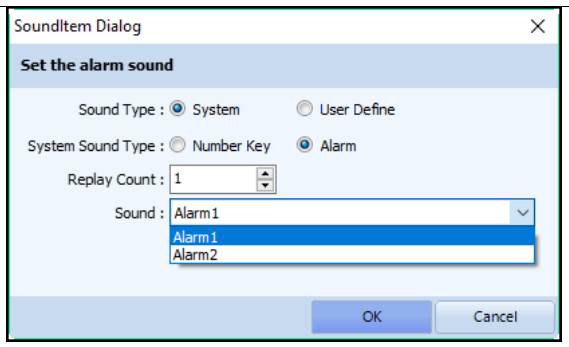
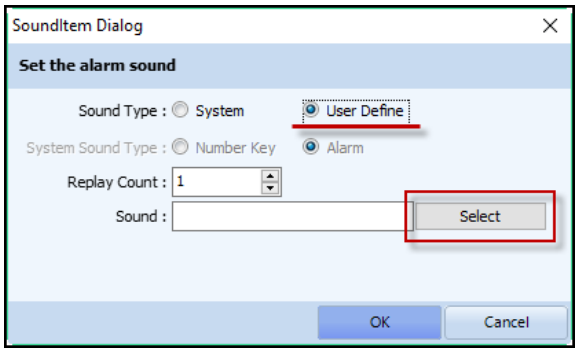
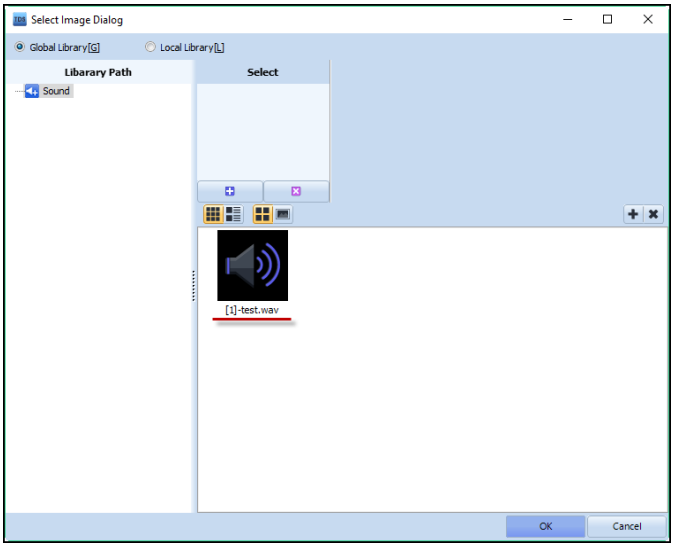
</td>
</tr>
<tr>
<td>8</td>
<td>Use Sound Effect</td>
<td>
[Use Sound Effect] enables audible notice when an alarm is triggered.
Select [Use Sound Effect] to create the [Sound] column on the Alarm List.

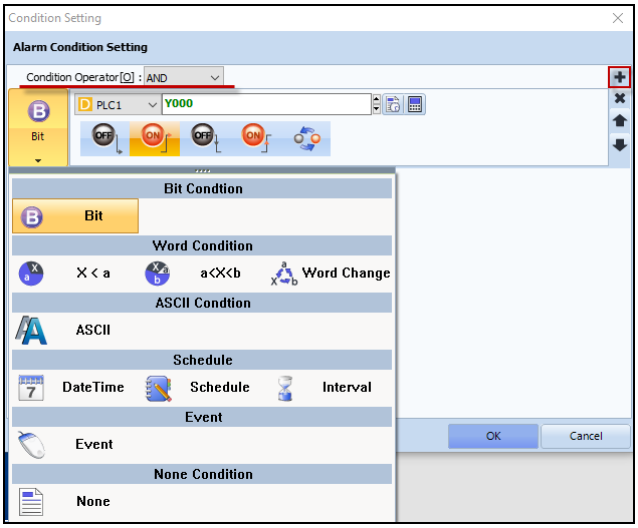


On the [Sound] column, select [Use] for each alarm that requires an audible alarm, and select the detail sound from the [Sound Item Dialog] window. As default, the sound is configured to have its type as [System] with the sound of [Alarm1].



Click the [...] box that appears when you double click the sound cell to open the [Sound Item Dialog].
</td>
</tr>
</table>

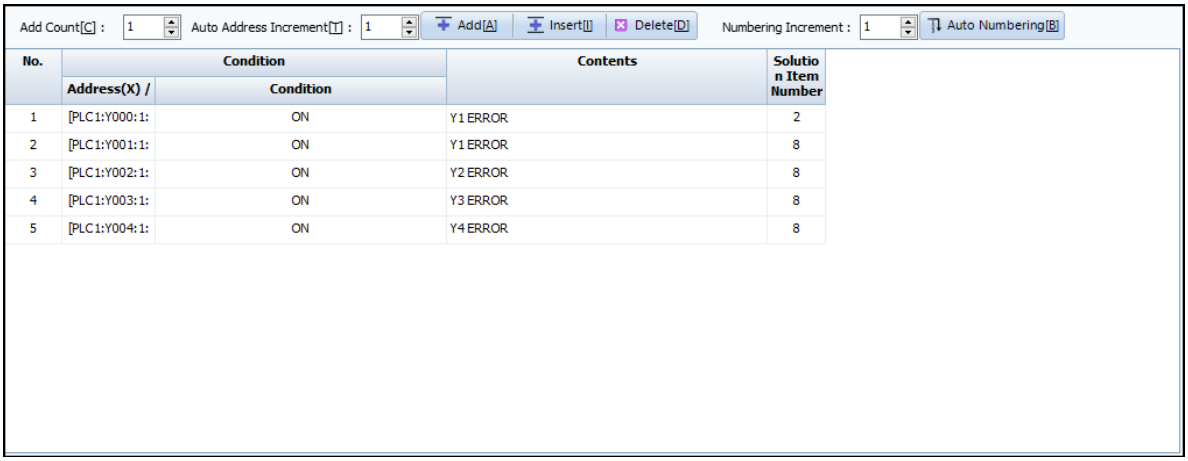
		 For [Sound Type], the option [System] provides the basic alarm sounds of the TOP device, [Alarm1] and [Alarm2]. The option [User Define] allows you to apply an existing [User Define] alarm sound. You can apply audio files with the extension of [*.wav] as alarm sounds.  Click the [Select] button to open the [Select Sound Dialog] and add a sound file.  Configure [Replay Count] to define the number of times the sound should be repeated. Once you completed the sound configuration, click [OK] to finish. ☞ The function is available only for TOPR premium models that support audio output.
9	Use Extend Condition	Extend the alarm conditions and configure various conditions other than bit conditions. If [Extended Setting] is not used, only bit conditions will be applied as alarm conditions.

		☑Use Extend Condition[C] Select [Use Extend Condition], a [Type] column will be added to the Condition Column. **Condition** **Type** / **Address(X)** / **Condition** Bit [PLC1:Y000:1: ON Bit [PLC1:Y001:1: ON Bit [PLC1:Y002:1: ON Bit [PLC1:Y003:1: ON Bit [PLC1:Y004:1: ON Double click the [Type] cell, the following 4 types of addresses are provided in the drop-down menu. Bit Word Range Word Change Multi [Bit] type triggers alarms according to the ON/OFF status of the bit address. [Word Range] type triggers alarms when the data of the word address satisfies the alarm conditions. [Word Range] conditions are checked only when the data of the corresponding word address is changed. If the conditions are met, the alarm will be triggered, and if the conditions are not met, the alarm will be recovered. Enter the word address in the [Address] column, and configure the range with the [Condition] column. [Word Change] type triggers the alarm whenever the data of the subject word address changes. [Multi] type allows you to combine multiple alarm conditions. Click the [...] box / that appears when you double click the [Address] cell to open the [Condition Setting] window. Add conditions with the [+] button provided on the right side of the [Condition Setting] window.  For the [Condition Operator] select between [AND] / [OR]. Select [AND] if the alarm should be triggered when all of the listed conditions are satisfied, and select [OR] if the alarm should be triggered whenever at least one of the listed conditions are satisfied.
10	Text Voice	Select Text Voice Conversion to generate audible messages that read the alarm message

	Conversion	upon occurrence. ☞ The function is available on TOPView(SCADA).

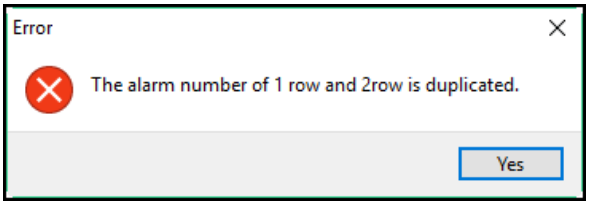
The lower field features an Alarm List.

You can add up to 5,000 alarms to a single group.



[Figure. Alarm List]

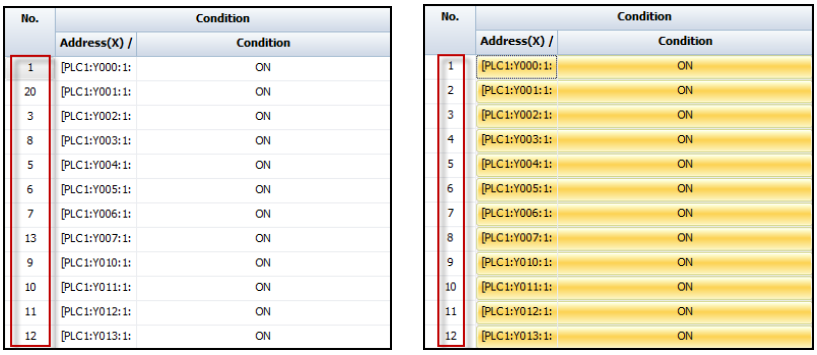
Configure the settings for Alarm No.1.

No.	Alarm	Description
1	Use	Select whether or not to use the Alarm. If you disable [USE], the alarm will not be triggered even if the conditions are met.
2	No.	The number assigned to each added alarm in an ascending order. You can change the number, yet the system is not allowed to bear two alarms with the same number in a single group. If there are two or more duplicated alarm, the following error message will appear once you click [Apply]. 
3	Condition	Configure the conditions to trigger an alarm. Configure the address in the [Address(X) / Condition Expression] column, and select between [ON/OFF] in the [Condition] column. If [Use Extended Condition] is selected from the Group Setting field, you can configure various conditions other than Bit conditions. Refer to the previous page for [Use Extend Condition].
6	Contents	Enter the alarm message that should appear when the alarm is triggered. If [String Table] is selected for the [String Type] at the Block Information, you should add the alarm message to the string table and then select among the registered texts.

After configuring Alarm No.1, [Add] / [Insert] / [Delete] alarms to the list with the corresponding buttons.

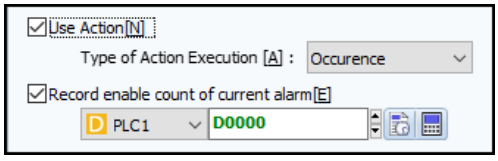
Select the number of alarms to add in the [Add Count] entry box, and click [Add].

No.	Alarm	Description
1	Add Count	Select the number of alarms to add in the [Add Count] entry box, and click [Add] to add the

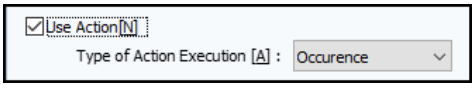
		selected number of alarms. You can add up to 1,000 alarms at once.
2	Auto Address Increment	The address number of each added alarm will be increased with the number selected for [Auto Address Increment]. If the [Auto Address Increment] is [1], and the address of the last alarm on the list is [Y100], the added alarms will have addresses of [Y101], [Y102], [Y103], so on and so forth.
3	Add[A]	Add new alarms. A new alarm(S) with the number following the last alarm will be added.
4	Insert[I]	Insert a new alarm(s) right before the selected alarm. A new alarm(s) with the number following the last alarm will be inserted above the selected alarm.
5	Delete[D]	Delete a selected alarm(s).
6	Auto Numbering[G]	Sort the alarm [No.] in am ascending order as shown below.  Select the alarms that should be sorted with a [Mouse Drag] or selecting an alarm and select the field with [Shift+Arrow Keys]. Configure the Number Increment and click [Auto Numbering]. Beginning from the alarm with the lowest number, the selected alarms will be re-numbered with the increment configured at [Numbering Increment]. If you configure [2] for the [Numbering Increment], the alarms will be numbered as [1, 3, 5, 7, 9, ...]

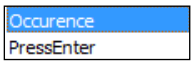
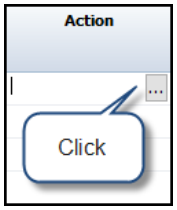
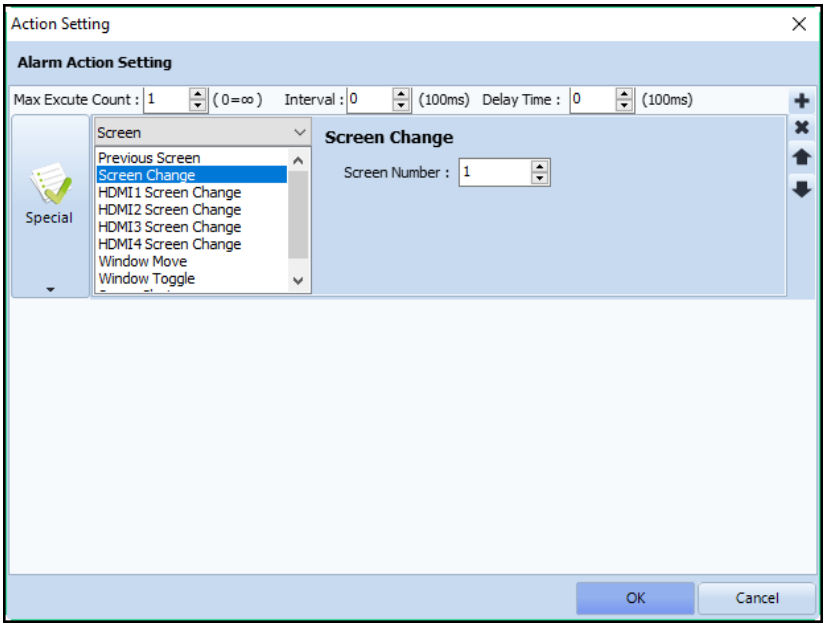
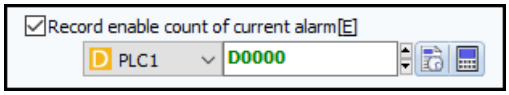
You can copy (Ctril+C) and paste (Ctrl+V) registered Alarm List from one group to another. Furthermore, you can copy and paste alarm lists from and to an excel file.

(2) Extend Setting Tab



[Figure. Extend Setting]

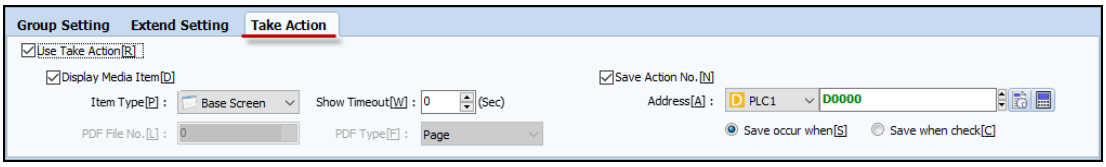
No.	Extend Setting	Description
1	Use Action	Configure the action when an alarm is triggered.  Select [Use Action], and select between [Occurrence] / [PressEnter] from [Type of Action

		Execution].  Select [Occurrence] to run the action upon occurrence of alarm. Select [Press Enter] to run the action when an operator touches the alarm from the [Alarm View]. If [Use Action] is enabled, an [Action] column is added to the [Alarm List]. Configure the actions for each alarm. Click the button that appears when you double click the [Action] column to open the [Action Setting] window.  Configure the action that should be run when an alarm is triggered from the [Alarm Setting] window. Add actions for the alarm with the [+] button on the upper right side of the Action Setting window. You can add up to 5 actions to a single alarm. (Refer to Chapter 7.9 [Action Setting Window] for more details.)  [Figure. Action Setting]
2	Record enable count of current alarm	The number of currently triggered alarms is recorded on a specific address.  If 5 alarms are currently triggered, [5] will be recorded to [D0010]. Add a [Number] object to show the value of [D0010], the number of currently triggered alarms will be shown on the TOP device.
3	Use Global Alarm	On the left side of the Alarm window, there is [Global Alarm Scroll] setting. Select [Global Alarm Scroll] to scroll the content of a triggered alarm on a banner at the top

		or bottom of the screen, regardless to which screen the TOP device is currently showing. If [Global Alarm Scroll] is selected, you must select whether or not enable [Use Global Alarm] for the alarm list of groups. If [Use Global Alarm] is selected, any alarm in the corresponding group will be displayed with [Global Alarm Scroll] when it is triggered. If [Use Global Alarm] is not selected, the alarms of the group will be excluded from [Global Alarm Scroll]. (Refer to Chapter 4.1.4 [Global Alarm Scroll] for more details.)

(3) Take Action Tab

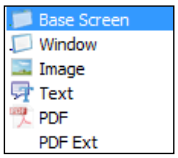
Configure actions to be taken upon alarms.



[Figure. Take Action]

Enable [Use Take Action] and [Display Media Item].

Select the [Item Type] to be displayed among the following 6 options from the drop-down menu.



[Figure. Item Type]

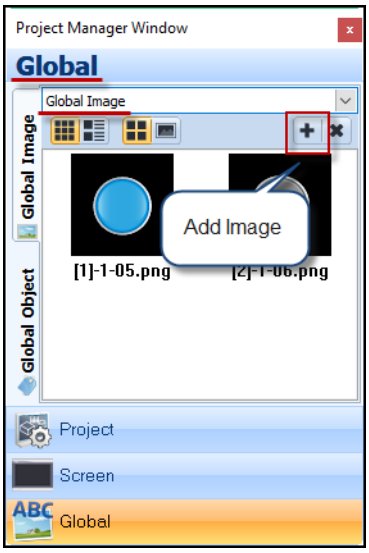
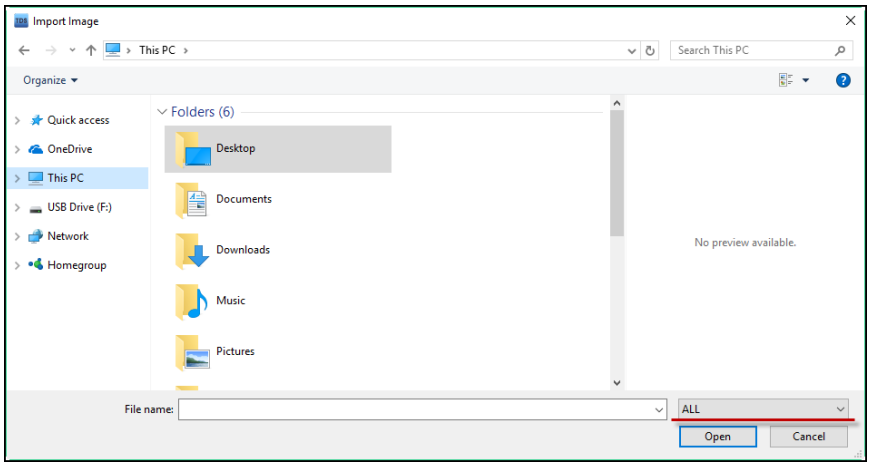
If [Use Take Action] is enabled, a [Solution Item Number] Column will be added to the Alarm List.

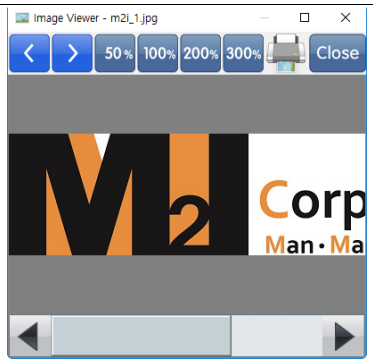
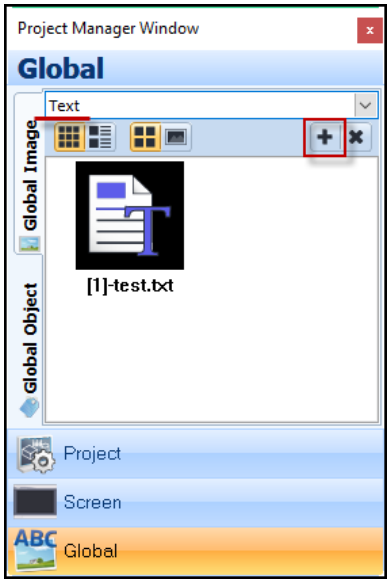
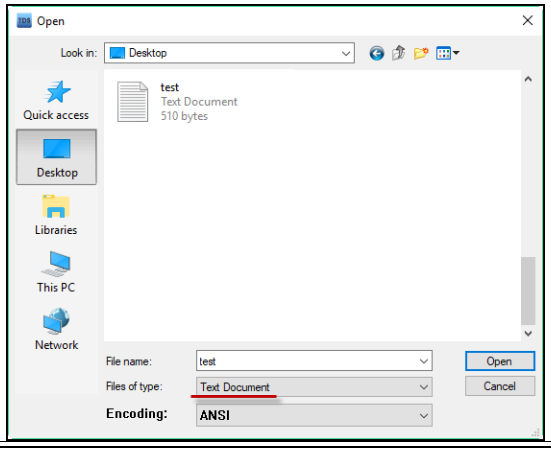
The [Solution Item Number] refers to the number of each item selected from [Item Type] for display where: [Base Screen] will show the number of such base screen, [Window] will show the number of such window, [Image] will show the corresponding [Global Image] number registered to resource, [Text] will show the corresponding [Text File] number registered to resource, and [PDF] will show the corresponding [PDF File] number registered to resource.

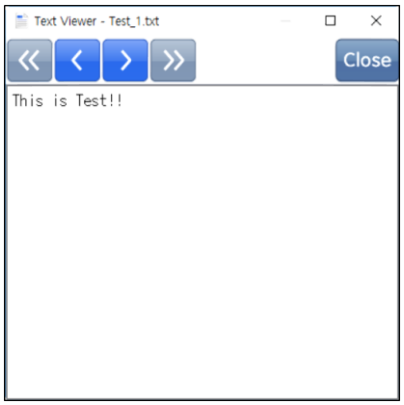
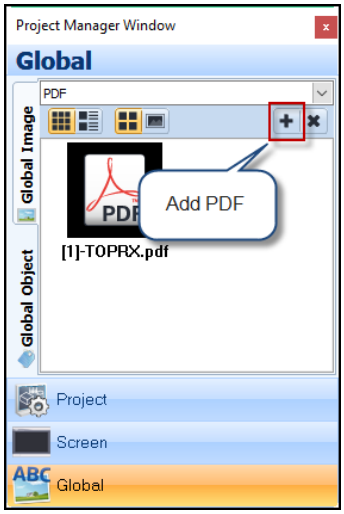
Contents	Solution Item Number
ERROR	2
Y1 ERROR	8
Y2 ERROR	8
Y3 ERROR	8
Y4 ERROR	8

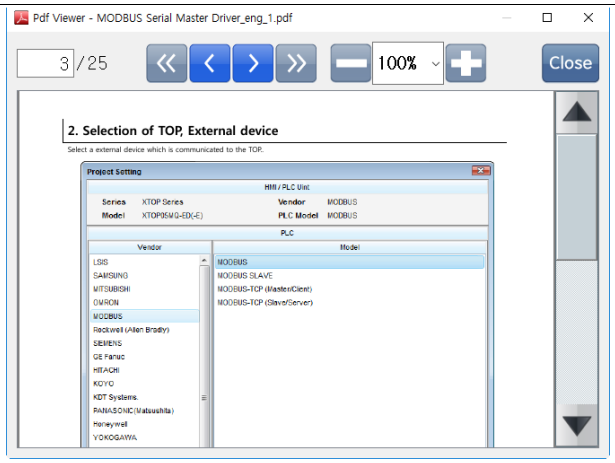
[Figure. Solution Item Number Column]

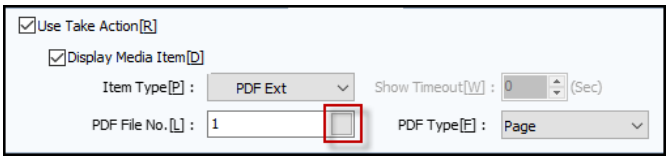
No.	Item Type	Description
1	Base Screen	As a response to the triggered alarm, the TOP device will navigate to the selected [Base Screen]. When the action is taken, the Base Screen corresponding to the [Solution Item Number] will appear.
2	Window	As a response to the triggered alarm, the TOP device will display the selected [Window].

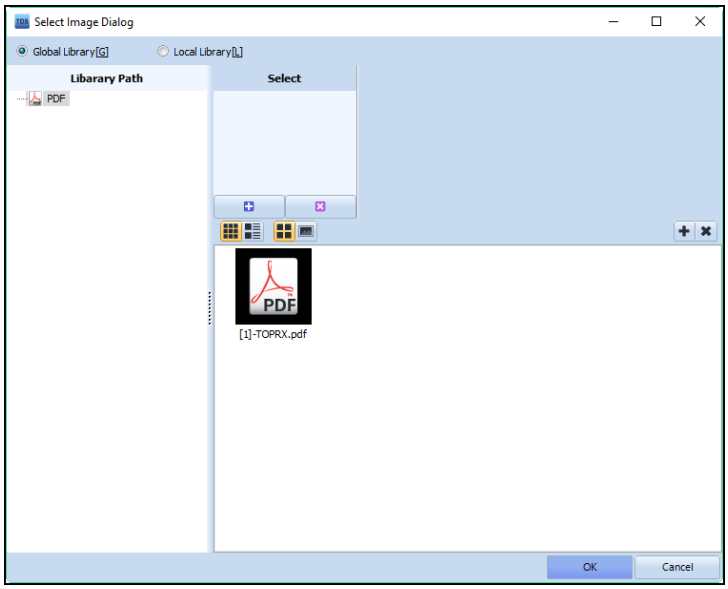
		When the action is taken, the Window corresponding to the [Solution Item Number] will pop up in the center of the screen.
3	Image	As a response to the triggered alarm, the TOP device will display an [Image] file. You can add image files to the [Resource] as below.  Go to the [Project Manager Window] and select [Global] to access the below screen. Select [Global Image] and click the [+] button on the upper right corner and add image files with extensions of [JPG / BMP / JPEG / PNG] or others while browsing through directories.  Each added image will be assigned with a prefix in an ascending order. This number cannot be changed, and whenever a new image is added, the image will have a prefix with the immediately next number of the largest existing number. When the action is taken, the image corresponding to the [Solution Item Number] will appear on the screen as the below sample.

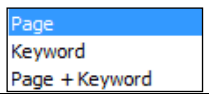
		 You can zoom in and out for percentages of [50%, 100%, 200%, 300%] with each respective button. Click [Close] to close the [Image Viewer]. Click the full screen button to enlarge the [Image Viewer] to the extremity of the TOP display, or scroll the window with the scroll bar provided on the right and bottom of the window.
4	Text	As a response to the triggered alarm, the TOP device will display the content of a selected [Text File]. You can add text files to the [Resource] as below.  Go to /the [Project Manager Window] and select [Global] to access the below screen. Select [Text] and click the [+] button on the upper right corner and add text files. 

		Each added text file will have a prefix in an ascending order. This number cannot be changed, and whenever a new text file is added, the text file will have a prefix with the immediately next number of the largest existing number. When the action is taken, the content of the text file corresponding to the [Solution Item Number] will appear on the screen as the below sample.  If the content of the text file is too long, navigate through pages with the buttons provided atop of the Text Viewer window.
5	PDF	As a response to the triggered alarm, the TOP device will display a selected [PDF] file. You can add *.pdf files to the [Resource] as below.  Go to the [Project Manager Window] and select [Global] to access the below screen. Select [PDF] and click the [+] button on the upper right corner and add a PDF file. Each added PDF file will have a prefix in an ascending order. This number cannot be changed, and whenever a new PDF file is added, the PDF file will have a prefix with the immediately next number of the largest existing number. When the action is taken, PDF file corresponding to the [Solution Item Number] will appear on the screen as the below sample.

<table>
<tr><td></td><td></td><td> 

You can zoom in / out and navigate through the PDF file with the buttons provided atop the PDF Viewer.
Click the full screen button to enlarge the [PDF Viewer] to the extremity of the TOP display, or scroll the window with the scroll bar provided on the right and bottom of the window.
Click [Close] to close the PDF viewer.</td></tr>
<tr><td>6</td><td>PDF Ext</td><td>As a response to the triggered alarm, the TOP device will display a selected [PDF] file. While [PDF] opens a PDF file corresponding to the [Solution Item Number], [PDF Ext] opens a PDF file and shows a selected page, or searches and navigates to a specific keyword.
 

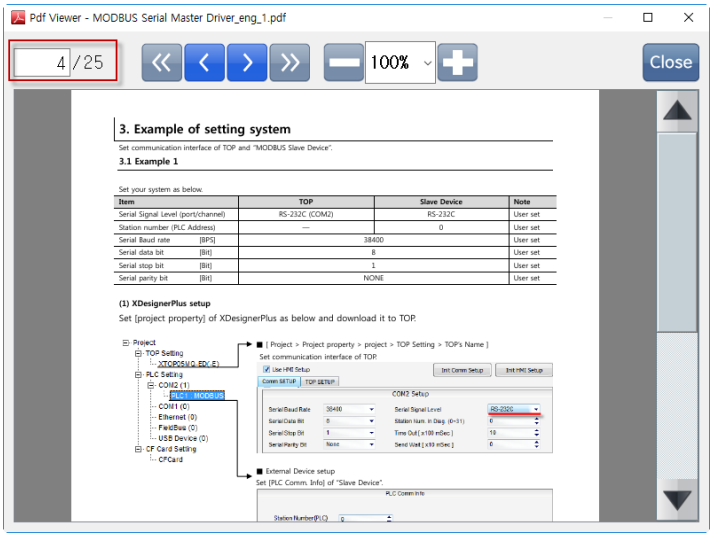
Click the button provided on the right side of the text box for [PDF fIle No.] and select the PDF file of interest.
 

Select among [Page] / [Keyword] / [Page+Keyword] from the drop-down menu of [PDF Type].
 
</td></tr>
</table>

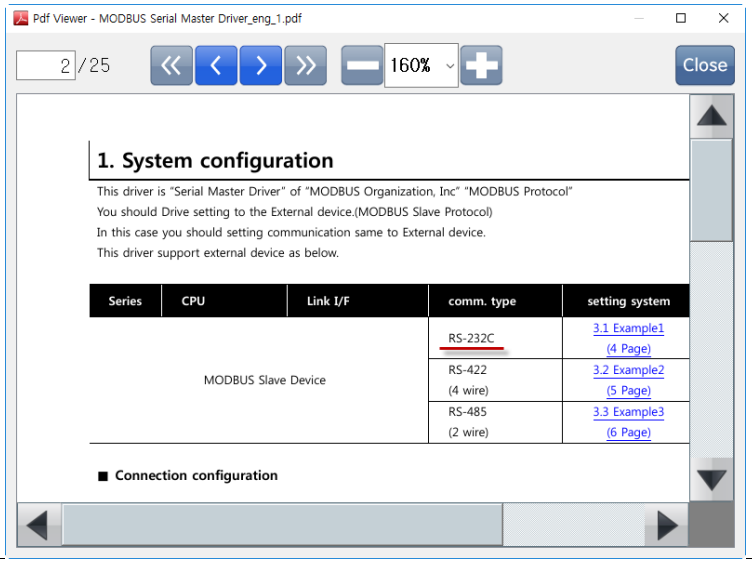
If [Page] is selected, a [Solution PDF Page] column will be added to the alarm list, and a [Solution PDF Keyword] will be added for [Keyword].
If [Page+Keyword] is selected both [Solution PDF Page] and [Solution PDF Keyword] column will be added.

Solution PDF Page	Solution PDF Keyword
4	CPU
2	232
7	ERROR
7	LAMP
7	SPEED

When the action is taken and [Page] is selected, the PDF file will open showing the corresponding [Solution PDF Page] as the below sample.

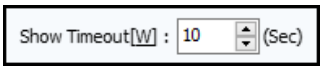


When the action is taken and [Keyword] is selected, the PDF file will open showing the corresponding [Solution PDF Keyword] as the below sample. The below sample shows a keyword entry of [232]. If the keyword is not found in the PDF file, page [1] will appear on the TOP display.

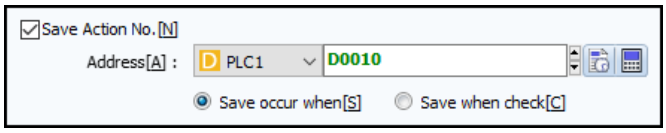


		When the action is taken and [Page+Keyword] is selected, the PDF file will open showing the corresponding [Solution PDF Keyword] on the selected [Solution PDF Page].

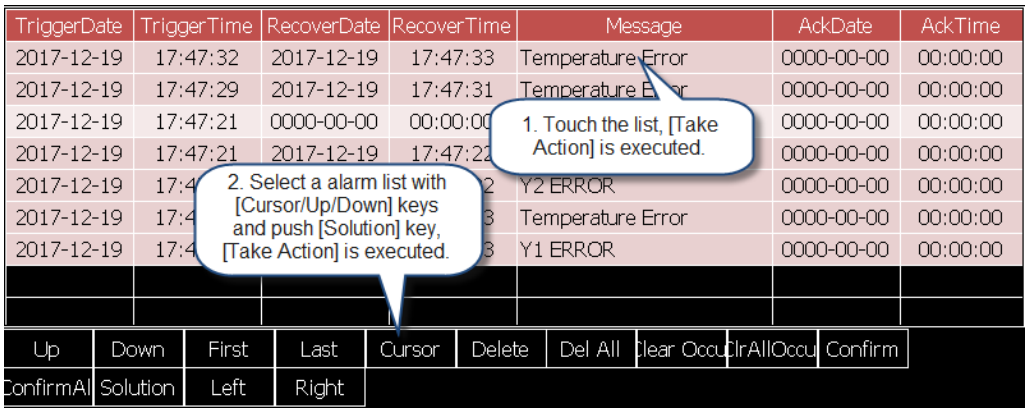
Configure the time to maintain the action with [Show Timeout] in [Seconds].
Select [0] to indefinitely maintain the action.



If [Show Timeout] is [10], and [Item Type] is [Base Screen], once the alarm is triggered, the action will be taken to display the selected base screen for 10 seconds, and the display will navigate back to the Alarm View window. If [Show Timeout] is [0] under the same circumstances, the display will not go back to the [Alarm View] window by itself.
If [Show Timeout] is [10], and [Item Type] is [Window], once the alarm is triggered, the action will be taken to pop up the selected window for 10 seconds, and the window will close after 10 seconds.
If [Show Timeout] is [0] under the same circumstances, the window will not close by itself.
If [Show Timeout] is [10], and [Item Type] is [Image] / [Text] / [PDF], once the alarm is triggered, the action will be taken to open the selected feature for 10 seconds, and the feature will close after 10 seconds. If [Show Timeout] is [0] under the same circumstances, the feature will not close by itself.
Enable [Save Action No.] to record the [Solution Item Number] to a selected [Address].



Select [Save occur when] to save the [Solution Item Number] when the alarm occurs. Thus, the item number of the most recent alarm is recorded.
Select [Save when check] to record the [Solution Item Number] when an operator touches the alarm of which he/she performs an action with a touch to the [Alarm View], or when an action is taken by selecting a [Solution] with the [Cursor] button.
To take a predetermined action touch the alarm of which you intend to take an action from the [Alarm View], or by selecting a [Solution] with the [Cursor].

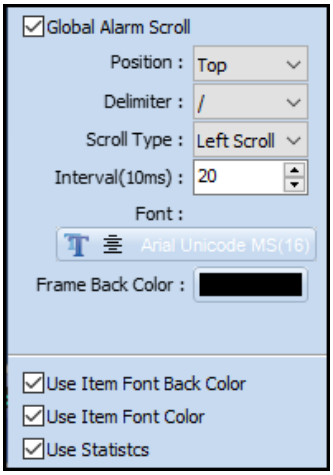


[Figure. Take Action]

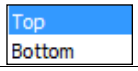
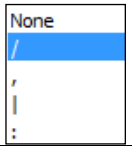
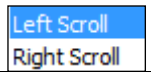
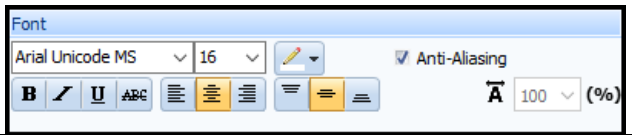
4.1.4 Global Alarm Scroll

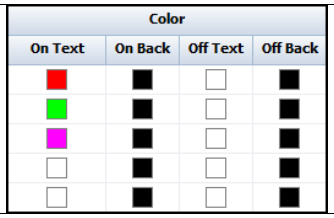
On the left side of the Alarm window, there is [Global Alarm Scroll] setting.

With the Global Alarm function, whenever an alarm is triggered, the content of the alarm will scroll on a banner on the top or the bottom of the screen, regardless of which screen the TOP device is currently showing.

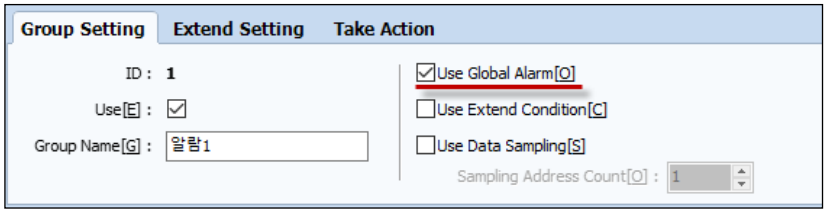


[Figure. Global Alarm Scroll]

No.	Property	Description
1	Position	Select between [Top] and [Bottom] for where the global alarm scroll should be positioned on the TOP display. Select [Top] to locate the scroll banner on the upper side of the screen, and [Bottom] for the lower side of the screen. 
2	Delimiter	Select the delimiter to distinguish multiple alarms that has been triggered. 
3	Scroll Type	Select between [Left Scroll] and [Right Scroll] for the scroll direction. [Left Scroll]: Alarm contents will flow from right to left. [Right Scroll]: Alarm contents will flow from left to right. 
4	Interval(10ms)	Configure the interval of scroll (flow) in 10ms.
5	Font	Configure the font for the alarm text scrolled on the screen. 
6	Frame Back Color	Configure the color of the banner the alarm text will scroll on. Select [Set Transparent] to apply no background color.
7	Use Item Font Color	[Use Item Font Back Color] is available when [Use Default Display Color] is selected for the Group Setting. The color for [ON] of each alarm will be used to scroll the alarm.

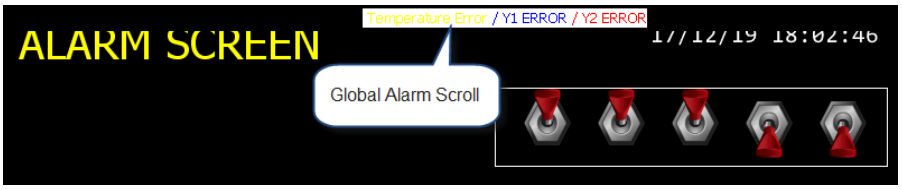
		
8	Use Item Font Back Color	[Use Item Font Back Color] is available when [Use Default Display Color] is selected for the Group Setting. The background color for [ON] of each alarm will be used to scroll the alarm.

If [Global Alarm Scroll] is enabled, you should select whether or not to apply the Global Alarm Scroll for each group with the [Use Global Alarm] function provided in [Group Setting].



[Figure. Use Global Alarm]

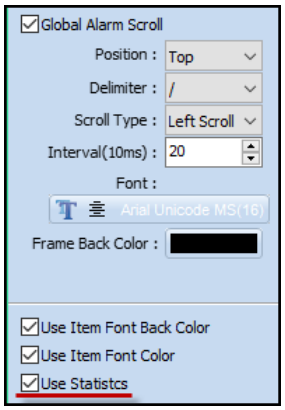
If [Use Global Alarm] is selected, any alarm in the corresponding group will be displayed with [Global Alarm Scroll] when it is triggered. If [Use Global Alarm] is not selected, the alarms of the group will be excluded from [Global Alarm Scroll].



[Figure. Global Alarm Scroll]

4.1.5 Use Statistics

Alarm history is cumulatively stored on a daily basis.



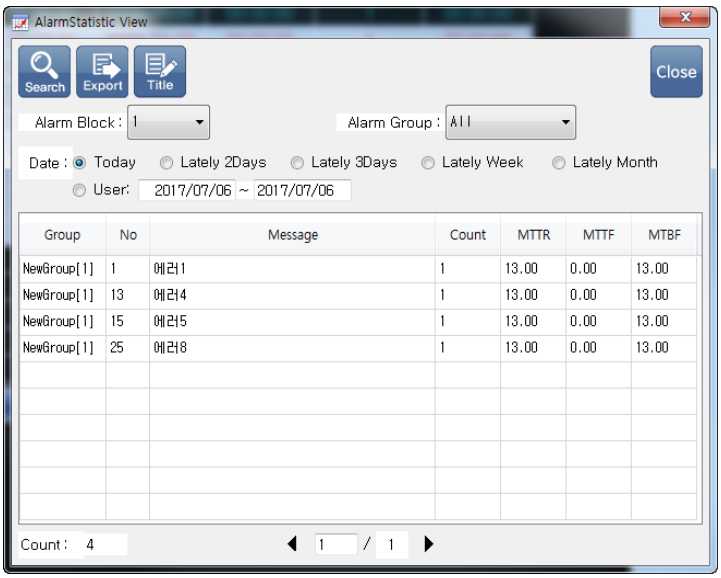
[Figure. Use Statistics]

The frequency of each alarm (OccurCount), aggregated time to repair, aggregated time to failure, aggregated time between failures, recovery time of previous alarm, time to repair, time to failure, time

between failures are recorded.

Recorded statistics are deleted after 10 days (default storage period).

Add [Statistics View] key to the [Alarm View] object, and click the [Statistics View] key to open the [AlarmStatistic View]. Detail alarm statistics are provided.

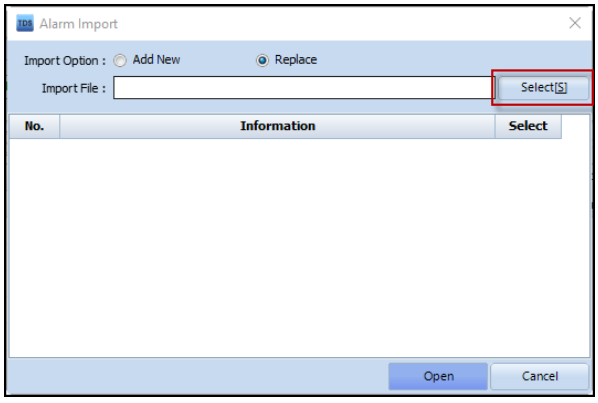


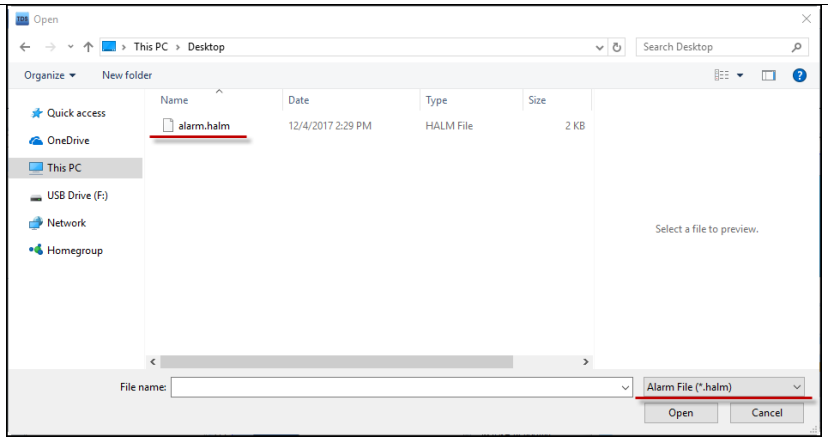
[Figure. AlarmStatistic View]

Select an alarm block / alarm group and date, and click [Search] to search for corresponding alarm data. The statistics of [Count] (number of times the alarm had been triggered), [MTTR] (Mean Time To Repair), [MTTF] (Mean Time To Failure) and [MTBF] (Mean Time Between Failures).

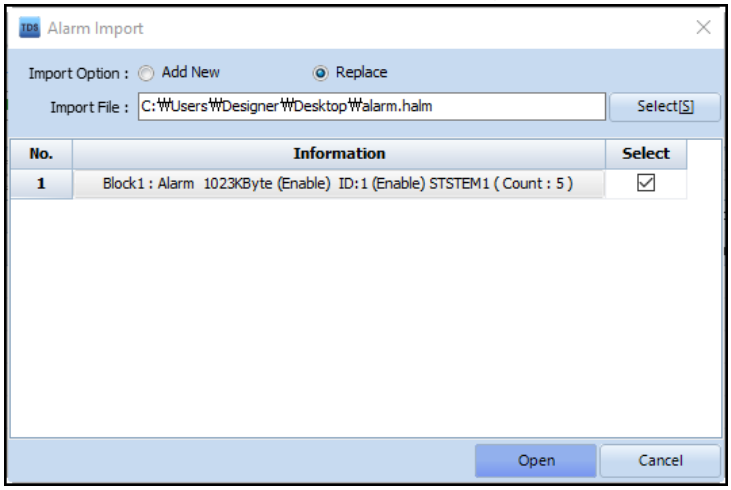
4.1.6 Import / Export Alarm Files

[Figure. Import / Export]

Alarm	Description
Import[R]	Import an existing alarm file [*.halm] and add the content to the alarm list of the current block. Click [Import] to open the [Alarm Import] window.  Click [Select], an explorer will appear. Select the [*.halm] file of your interest and click [Open].



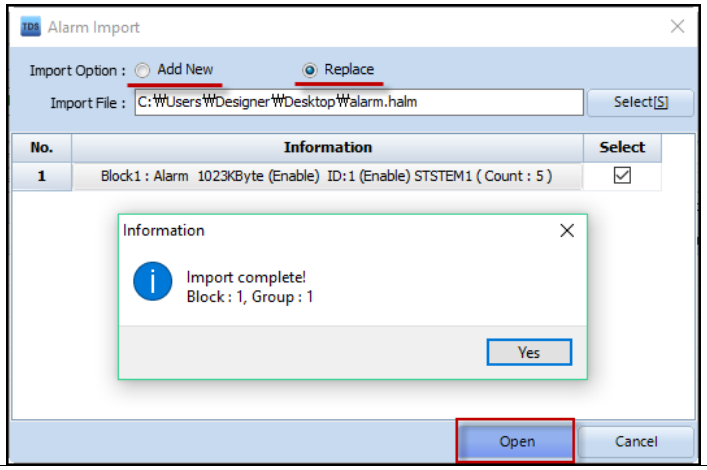
The selected file and its information is shown in the Alarm Import window.



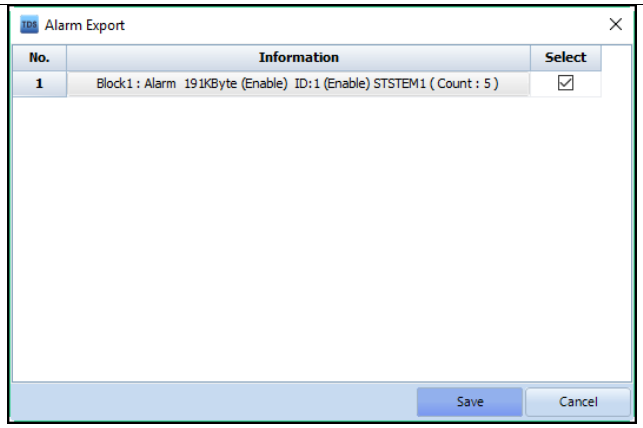
Select between [Add New] and [Replace] for the [Import Option] and click [Open] to execute the import.

Select [Add New] to add a new group to the current block, and add the alarms from the imported file to the new group.

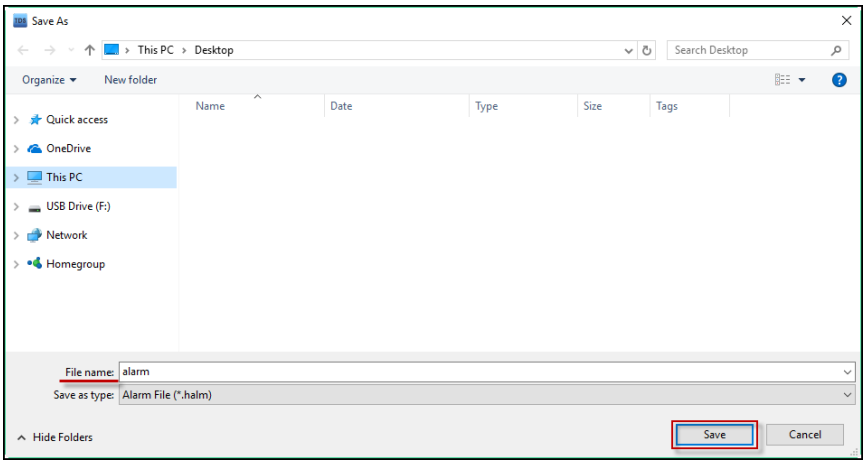
Select [Replace] to replace all groups and alarm lists of the current block and add the imported group and its alarm list to the group.



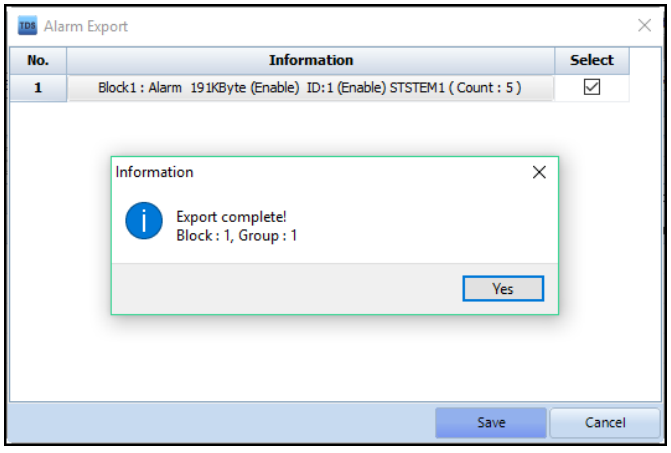
Export[X]	Save the alarm setting to an alarm file [*.halm]. You cannot edit an [*.halm] file. Click [Export] to open the Alarm Export window.



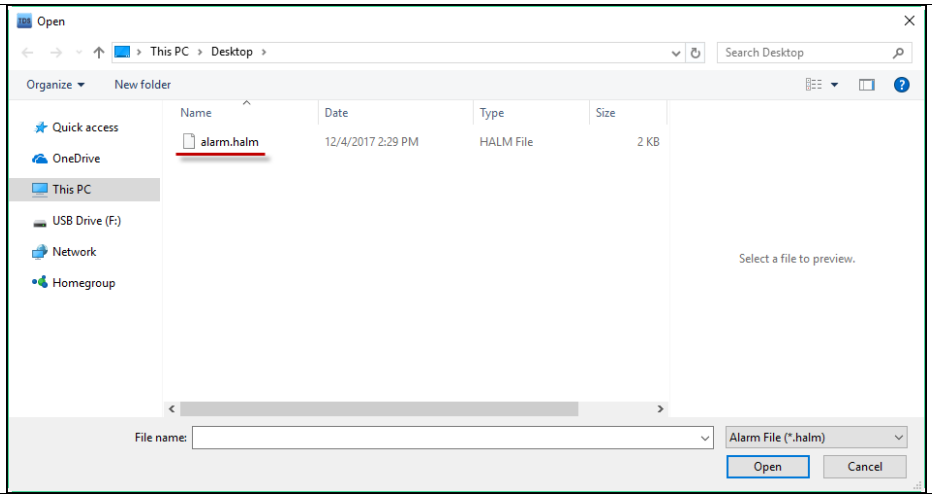
Select the group you want to export to an alarm file [*.halm], and click [Save] to open the [Save As] window. Select the directory in which the alarm file should be saved, and enter the name of the file.



Click [Save] to complete [Export].

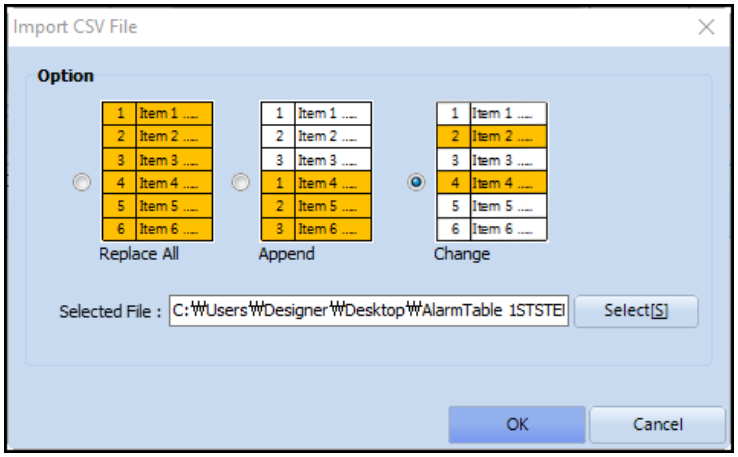


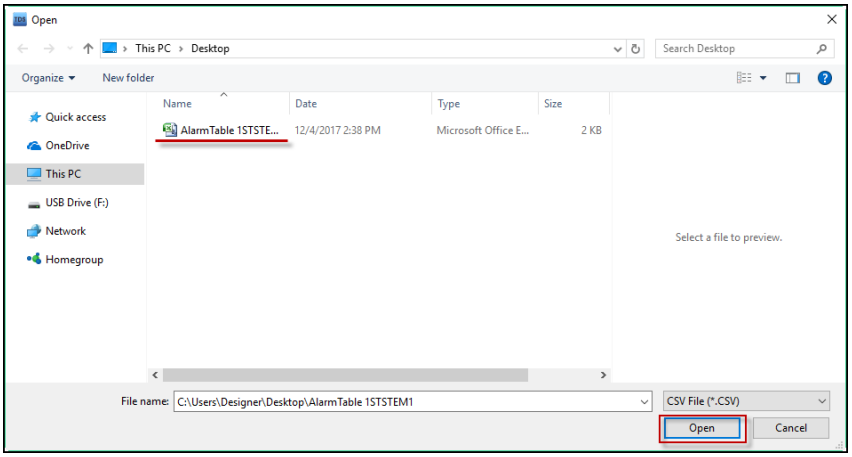
Sample - the below image is an alarm file exported to [alarm.halm].



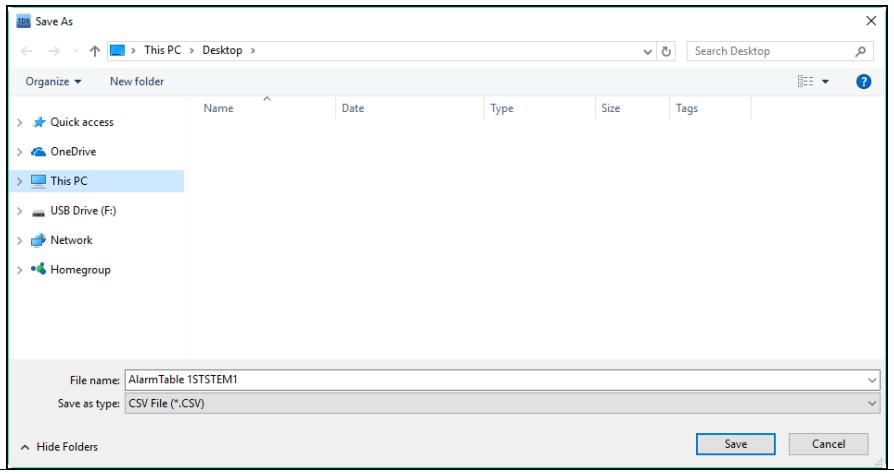
CSV Import[Q]

Import an alarm file exported with [CSV Export] to the selected group.
Click [CSV Import] to open [Import CSV File] window. Click [Select], an explorer will appear. Select a CSV alarm file created with [CSV Export], and click [Open]. Select [Replace All] / [Append] / Change for the [Option] and click [OK] to execute the import.





Select [Replace All] to delete the entire alarm list of the selected group and add the alarms from the imported file to the selected group. Select [Append] to add the alarm list of the CSV file to the bottom of the existing alarm list of the selected group.
Select [Change] to replace alarms on the existing alarm list that have the same alarm number with those on the CSV file, and add other alarms from the CSV file while maintaining alarms that are not present on the CSV file.

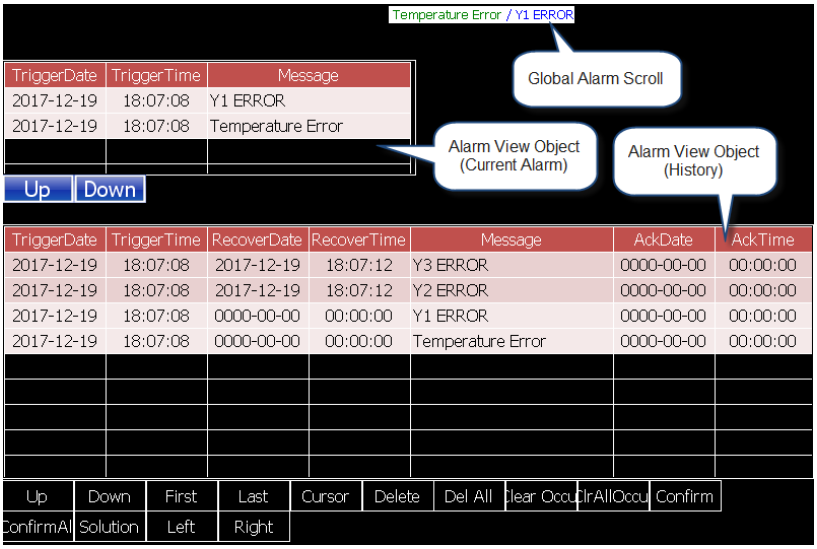
CSV Export[W]	Export the alarm list of the selected group to a [*.CSV] file. You can edit an exported CSV file with Microsoft Excel software. Click [CSV Export] to open the [Save As] window. Select the directory in which the alarm file should be saved, and enter the name of the file. Click [Save] to export the file. 

4.1.7 Display Alarm Data

You can display alarm data with an [Alarm View] object.

You can also display alarm data on the TOP device by enabling [Global Alarm Scroll], to scroll the content of alarms on the top or bottom of the screen.

(Refer to Chapter 16 [Alarm View Object] for more details.)

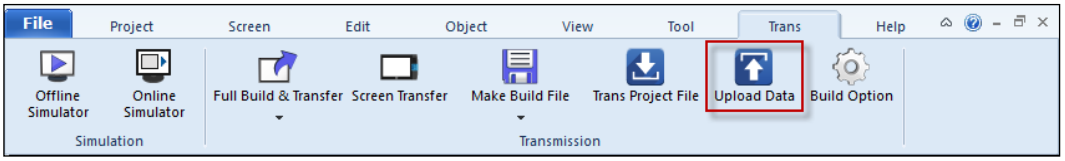


[Figure. View Alarm Data]

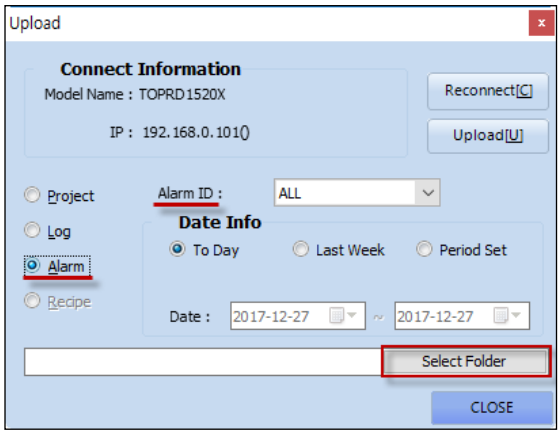
4.1.8 Copy Alarm Data

(1) How to copy alarm data from TOP device to PC.

Connect a PC with the TOP device and select [Trans] - [Upload Data].

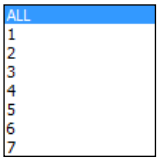


[Figure. Upload Data]

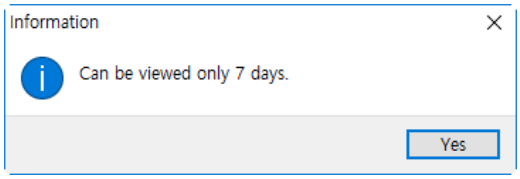


[Figure. Upload]

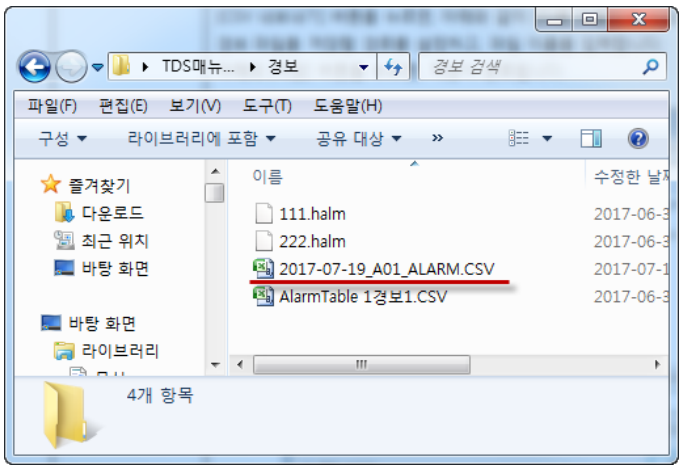
Select [Alarm] form the [Upload] window, and configure the [Alarm ID].



[Alarm ID] refers to the Alarm Block Number. Select [All] to upload all alarm data, and Select individual ID from the drop-down menu to upload the alarm data of the selected block.
Select among [Today] / [Last Week] / [Period Set] for [Date Info]. If you selected [Period Set] select a period in the below field, that does not exceeds 7 days. If you configure the period to be longer than 8 days, the below information will pop-up and the upload will be denied. If a valid period is selected, the alarm data of such period is uploaded.

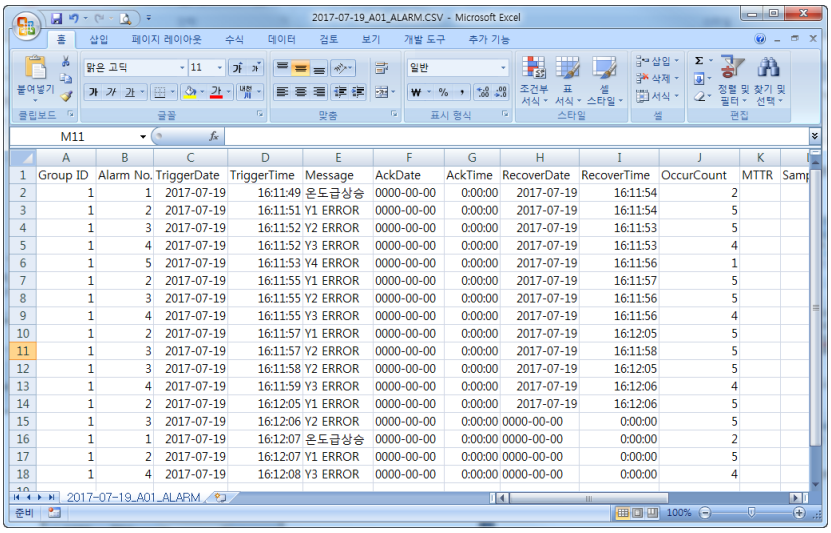


Click [Select Folder], and select the directory in which the alarm data file should be saved, and click [Upload] to save the alarm file to the selected directory.



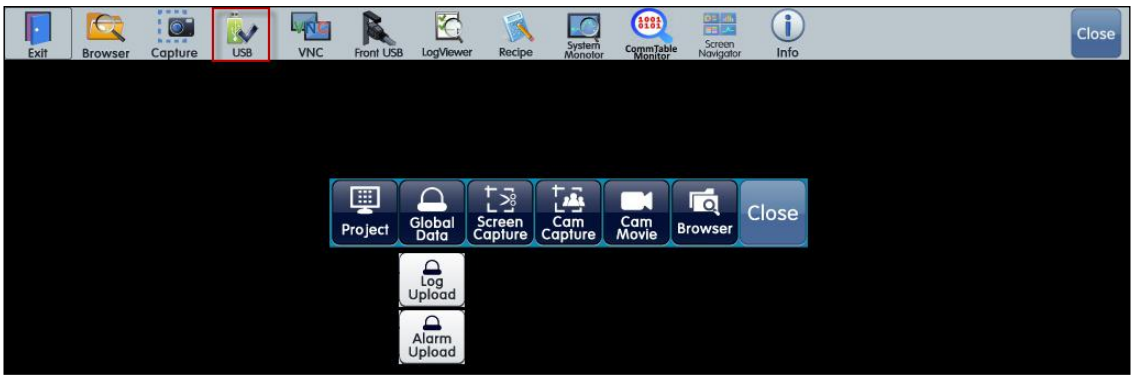
[Figure. Uploaded File]

You can open the CSV file with Microsoft Excel software.



(2) How to copy alarm data from TOP to USB memory.

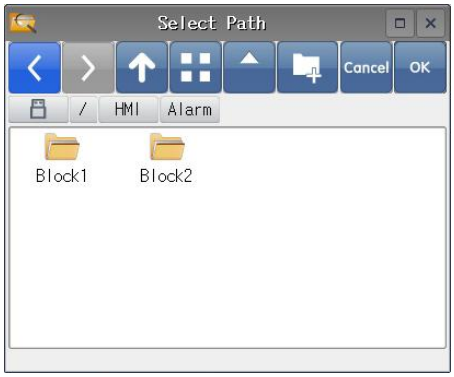
If you connect a USB memory to the TOP device, or click [USB] on the TOP Menu on the Run Screen, the USB menu will appear.



[Figure. Open USB Menu from TOP Menu]

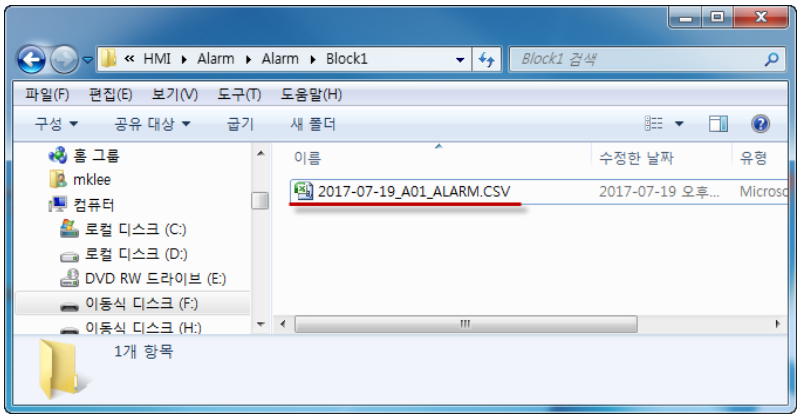
Click [Global Menu], buttons for [Log Upload] and [Alarm Upload] will appear.

Select [Alarm Upload] to open the [Select Path] window. Select the path to which the alarm file should be copied, and click [OK] to upload the file.



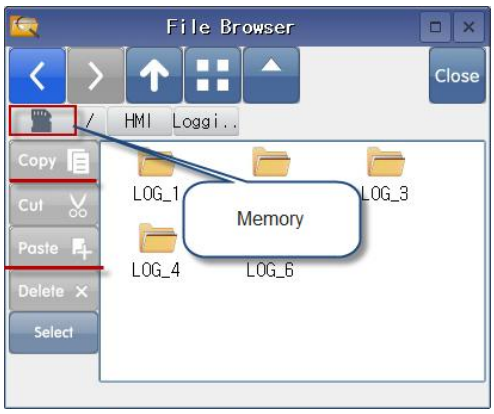
[Figure. Select Path Window]

Once the upload is complete, the alarm data is saved in the USB memory path on a CSV file.
You can open a [*.CSV] file with a text editor (Windows Notepad, etc.) or with Microsoft Excel software.



[Figure. File copied to USB memory]

(3) How to copy alarm data from SD Card to USB memory
If [SD Card] is selected as the [Storage Medium] for [Backup] of an alarm block, you can copy the alarm file from the SD Card to a USB memory.
Select the [File Browser] from the Menu Screen, and change the [Memory] to SD Card at the left side of the browser.
Select the Alarm File to copy, and click [Copy], then change the [Memory] to [USB] and click [Paste] to paste the alarm file to the selected directory.

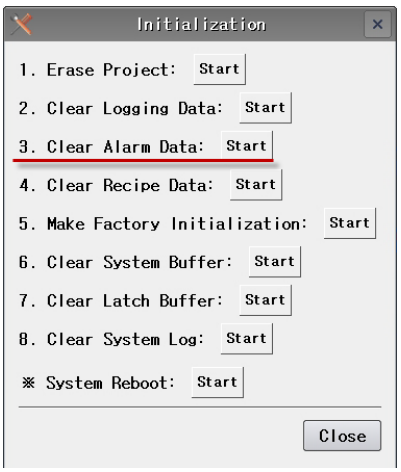


[Figure. File Browser from Menu Screen]

4.1.9 Delete Alarm Data

You can delete alarm data stored on the TOP internal memory by going to [Control Panel] - [Initialization] and click [Start] for [3. Clear Alarm Data].

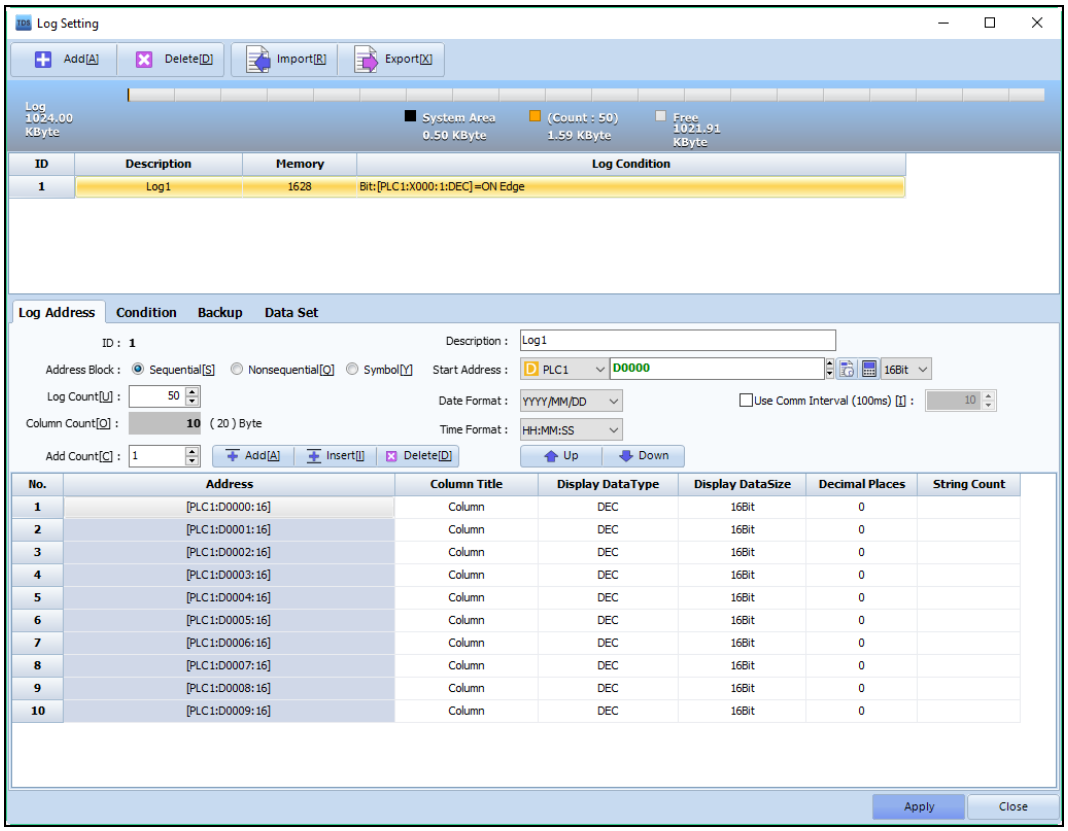
[Figure. Control Panel from Menu Screen]



[Figure. Clear Alarm Data]

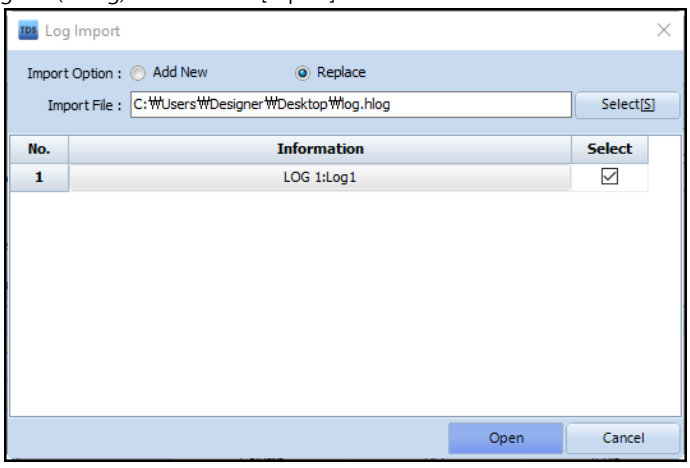
4.2 Log

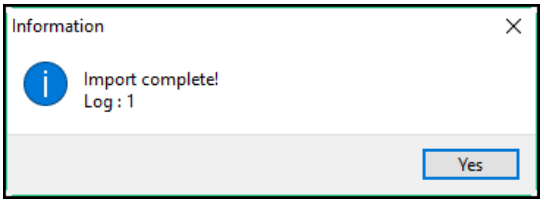
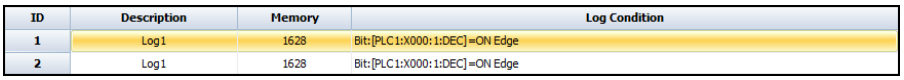
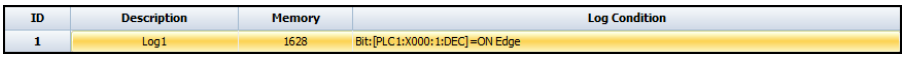
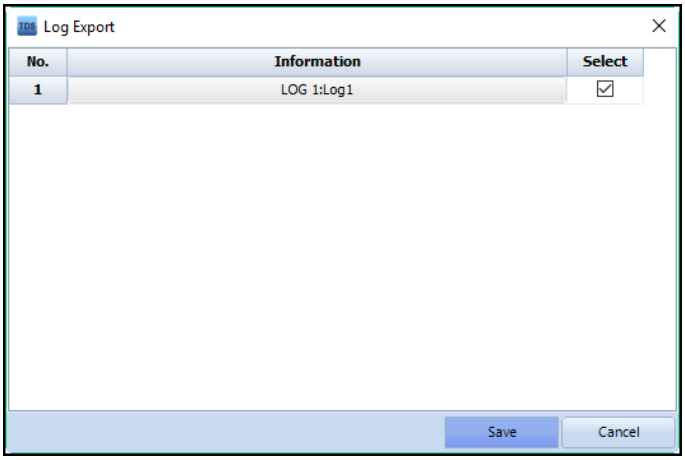
The log function records data of certain addresses according based on predetermined conditions. You can display recorded log data with a [Log View] object.

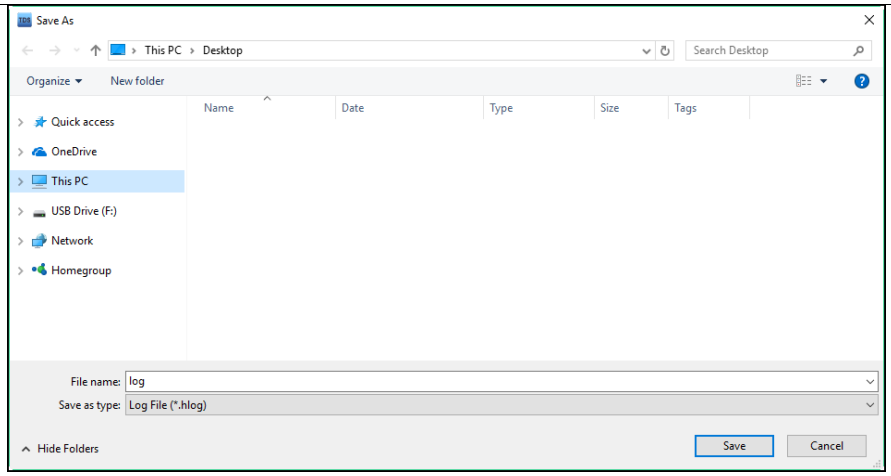


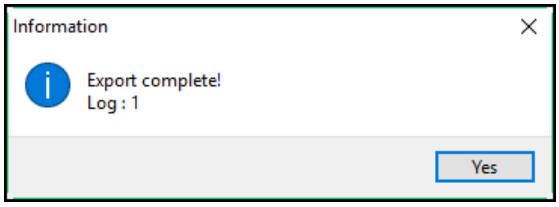
[Figure. Log Setting]

(1) Functions

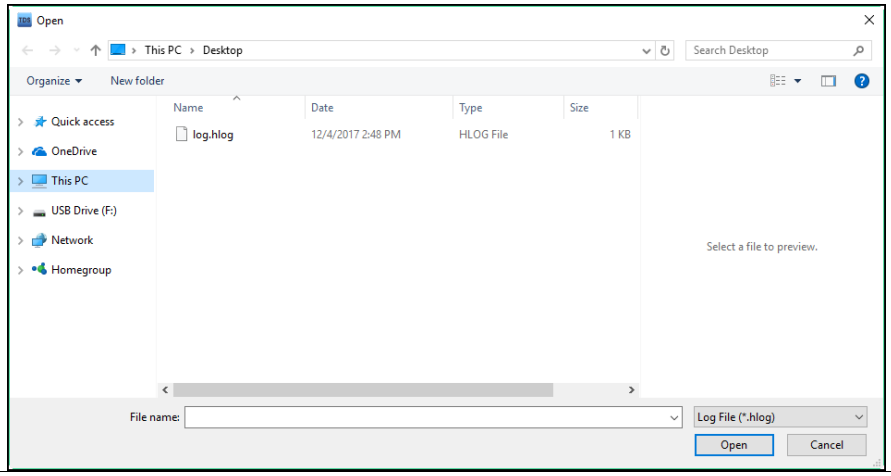
No.	Functions	Description
1	Add[A]	Add a log. You can add up to 32 logs.
2	Delete[D]	Delete a selected log.
3	Import[R]	Import a log file (*.hlog) created with [Export].  Click [Select], to open an explorer. Select the log file you want to add and click [Open]. The following message will appear upon completion of import.

		 Select [Add New] to add the logs of the log file to the end of the existing log list. If Log1 and Log2 exists, and you import a log file with [Add New] selected, Log3 and Log3 will be added to the list as shown below.  Select [Replace] to replace the existing logs with logs from the log file with identical Log IDs. If Log1 and Log2 exists, and you import a log file with [Replace] selected, the imported logs will overwrite the existing logs as shown below. 
4	Export[X]	Save the current logs to a log file [*.hlog]. You can not edit an [*.hlog] file. Click [Export] to open the Log Export window. Adjust the check boxes in the [Select] column and leave the logs you intend to save selected.  Click [Save] to open the [Save As] window. Select the path the log file should be saved, enter the file name and click [Save] to complete export.





The log file you have just exported is saved in the directory that you have configured. Refer to the below example.



(2) Log memory setting

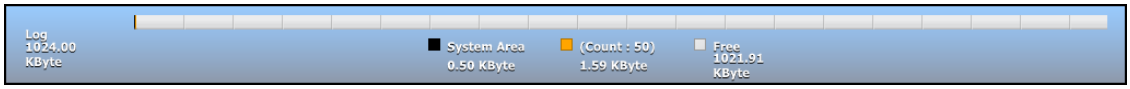
Configure the log memory at [Project] - [Property] - [Partition Setting].

The total backup memory of a TOP device is 445KB, thus you should efficiently distribute memory for each [Log] / [Alarm] / [Recipe].

[Figure. Partition Setting]

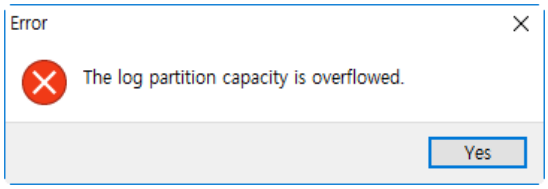
Among the 192KB allotted to Logs at [Partition Setting], the memory assigned to each log is shown in a

bar chart on the upper portion of the [Log Setting] window.



[Figure. Log Memory Setting]

If the aggregative sum of the memory assigned to each log exceeds the total memory for logs, configured at [Partition Setting] (192KB), the below error message will appear.



[Figure. Error Message - Log capacity overflow]

(3) Log List

Log list displays all logs configured for the project.

Information provided includes [ID] / [Description] / [Memory] / [Log Condition] of each log.

ID	Description	Memory	Log Condition
1	Log1	1628	Bit:[PLC1:X000:1:DEC] =ON Edge

[Figure. Log List]

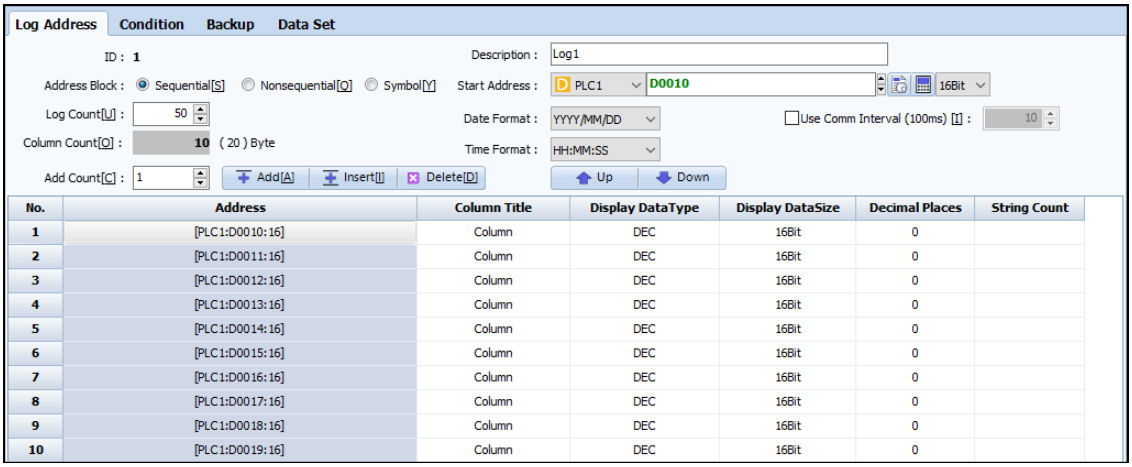
No.	Log List	Description
1	ID	The ID of the log is shown. Log IDs are assigned whenever a log is added in an ascending order, and a user can not change the log ID.
2	Description	Detail explanation of the log is shown.
3	Memory	The memory occupied by the log is shown.
4	Log Condition.	The condition of which a log will be recorded is shown.

4.2.1 Log Address Tab

Configure the log address, thus the location where data shall be recorded on.

Check the log [ID] and enter the [Description] of the selected log.

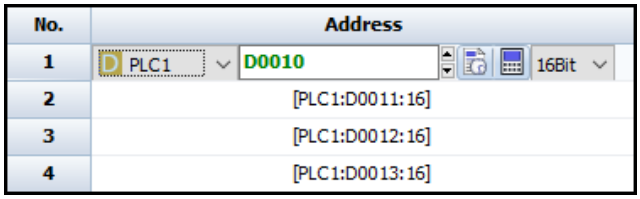
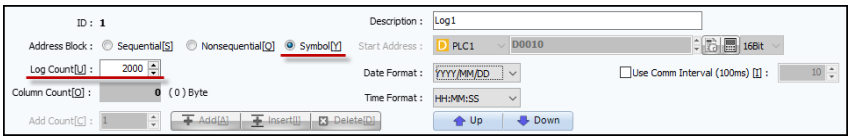
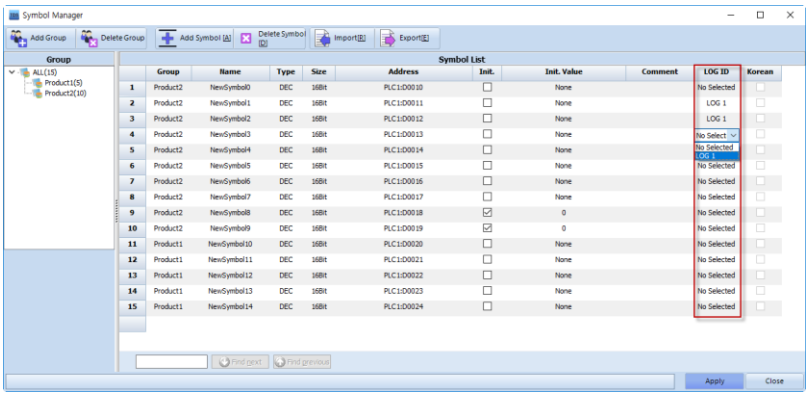
Select the format of [Date] and [Time] recorded along with the data.

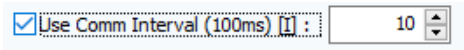
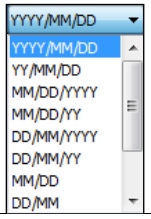
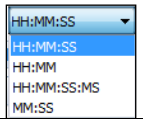


No.	Address	Column Title	Display DataType	Display DataSize	Decimal Places	String Count
1	[PLC1:D0010:16]	Column	DEC	16Bit	0	
2	[PLC1:D0011:16]	Column	DEC	16Bit	0	
3	[PLC1:D0012:16]	Column	DEC	16Bit	0	
4	[PLC1:D0013:16]	Column	DEC	16Bit	0	
5	[PLC1:D0014:16]	Column	DEC	16Bit	0	
6	[PLC1:D0015:16]	Column	DEC	16Bit	0	
7	[PLC1:D0016:16]	Column	DEC	16Bit	0	
8	[PLC1:D0017:16]	Column	DEC	16Bit	0	
9	[PLC1:D0018:16]	Column	DEC	16Bit	0	
10	[PLC1:D0019:16]	Column	DEC	16Bit	0	

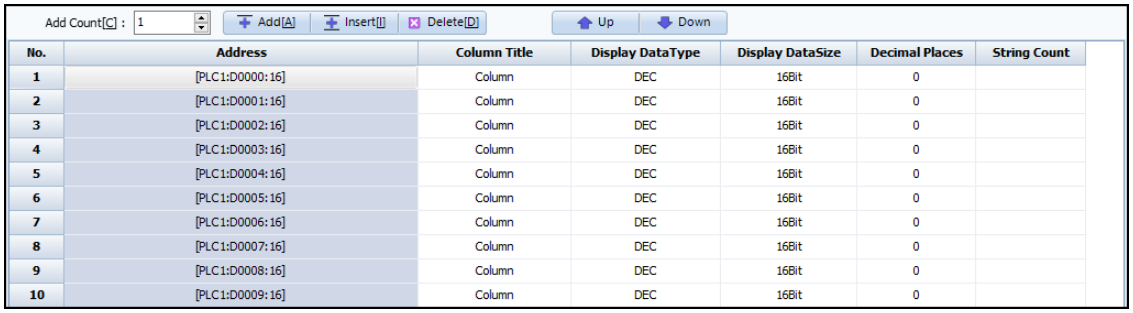
[Figure. Log Address Tab]

The following is the description of each feature provided in the upper field of the Log Address tab.

No.	Log Condition	Description
1	ID	The ID of the log is shown. Log IDs are assigned whenever a log is added in an ascending order, and a user cannot change the log ID.
2	Description	Enter the description of the selected log.
3	Address Block	Select among [Sequential] / [Nonsequential] / [Symbol]. Select [Sequential] if the log address is assigned in a sequential order. Select the first address the log should be recorded with [Start Address], and select between [16bit] and [32bit] for the address size. Since the first log address is configured go to the [Add Count] and select the numbers of address you want to add (thus, the total number of addresses -1), and click [Add], the corresponding log addresses will be added in the [Log Address List]. The [Address] column of the [Log Address List] cannot be edited. To change the log addresses, change the [Start Address], and the [Address] column will be changed. Select [Nonsequential] if the log addresses type differ, and is not in a continuous order. Enter the number of addresses you intend to add at [Add Count] and click [Add] to add log addresses. Configure and change the [Address] column from the [Log Address List]. Double click the [Address] column, and edit the address as shown below.  Select [Symbol] to configure a portion of the address of a symbol registered at [Symbol Manager] available with [Project] - [Symbol] as the log address. If you select [Symbol] for a given log, you can select the log at the [Log ID] column of the [Symbol Manager].  [Figure. Log Setting] Select the Log ID for a symbol address that shall be used as a log address.  [Figure. Symbol Manager]

		Under the above configuration, [Symbol] is selected for Log2, and Log2 will record the data from symbol addresses 1, 2, 3, and 8 according to the [Log Condition].
4	Column Count	The total number of columns added with the [Add] button is counted automatically. If the [Column Count] reads [5(10) Byte], [5] represents the number of columns and [10] represents the memory in Bytes.
5	Log Count	Configure the total number of logs to assign memory. If the Log Count is [1000], the system assigns memory to store up to 1,000 log data. Log data is accumulated whenever the [Log Condition] is true, and when 1000 log data are recorded, the oldest data will be overwritten with new log data, maintaining the total count of 1000 data.
6	Use Communication Interval	Select [Use Communication Interval] to check log conditions on the basis of the [Interval] you have configured. If [Use Communication Interval] is disabled, log conditions will be checked in real time. Under the below configuration, log conditions will be checked every 1 second (10 x 100ms). 
7	Date Format	Configure the format of the date that is recorded with the log data. 
8	Time Format	Select the format of the time that is recorded with the log data. 

The following is descriptions of the [Log Address List] provided in the bottom section of the Log Address tab.



No.	Address	Column Title	Display DataType	Display DataSize	Decimal Places	String Count
1	[PLC1:D0000:16]	Column	DEC	16Bit	0	
2	[PLC1:D0001:16]	Column	DEC	16Bit	0	
3	[PLC1:D0002:16]	Column	DEC	16Bit	0	
4	[PLC1:D0003:16]	Column	DEC	16Bit	0	
5	[PLC1:D0004:16]	Column	DEC	16Bit	0	
6	[PLC1:D0005:16]	Column	DEC	16Bit	0	
7	[PLC1:D0006:16]	Column	DEC	16Bit	0	
8	[PLC1:D0007:16]	Column	DEC	16Bit	0	
9	[PLC1:D0008:16]	Column	DEC	16Bit	0	
10	[PLC1:D0009:16]	Column	DEC	16Bit	0	

As explained previously, the [Add Count] refers to the number of address you intend to add. Click [Add] or [Insert] to add/insert the number of addresses you have entered in [Add Count]. You can add up to 1000 addresses at once.

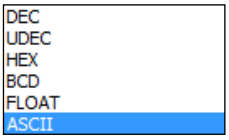
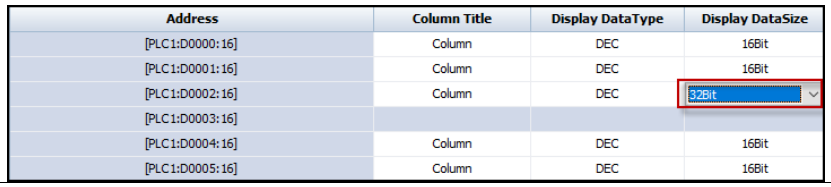
Click [Add] to add new log addresses after the last existing address.

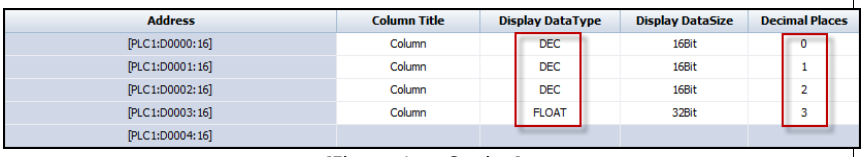
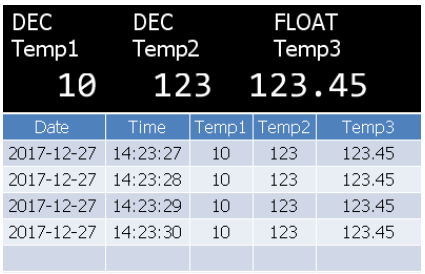
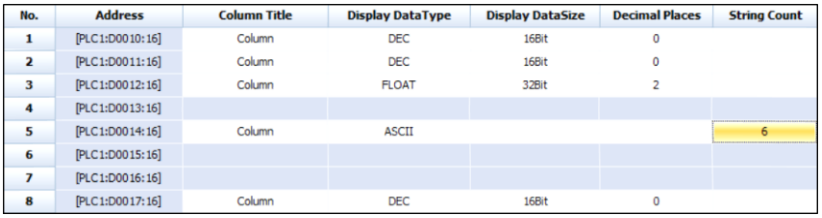
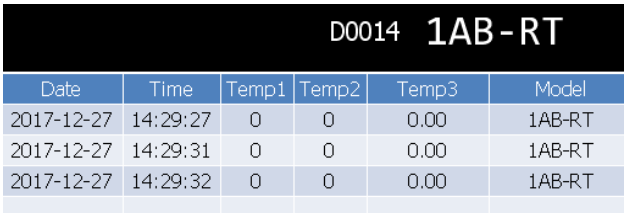
Click [Insert] to add new log addresses right above the selected log address.

Click [Delete] to delete the selected address(es).

If the [Address Block] is [Sequential], new addresses created by [Add] will be numbered in an ascending order. New address created by [Insert] are assigned as the previous address, and the existing addresses beneath the point of insertion will be renumbered to have an overall ascending order of log addresses.

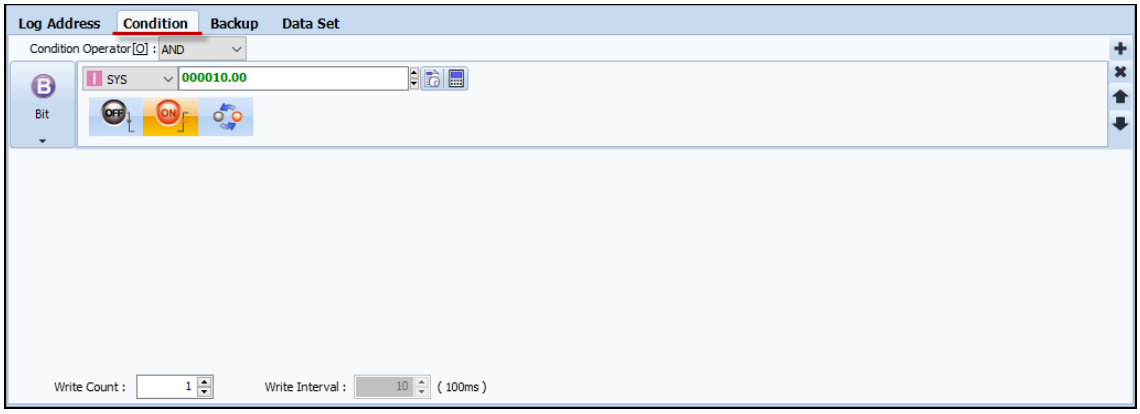
If you [Delete] address(es) from the middle of the list, the addresses beneath the deleted address(es) are renumbered to maintain a sequential order.
If [Address Block] is [Nonsequential] any new address created by [Add] or [Insert] will be assigned to the default address, and you must configure the address of each new address created by [Add] or [Insert]. Even if you [Delete] address(es) from the middle of the list, no remaining address will be renumbered.
Click [Up] to select the address above the currently selected address.
Click [Down] to select the address beneath the currently selected address.
The [Log Address List] shows the [Address] column and several other columns.

No.	Log Address Column	Description
1	Address	If [Address Block] is [Sequential] you cannot change the address. If you change the [Start Address], the address(es) will be subsequently changed.
2	Column Title	The title of each log address that shall be shown on [Log View] object.
3	Display Data Type	The data type that shall be displayed on the [Log View] object. The system will read the log data from the memory and show the data on [Log View] in the selected [Display Data Type].  Select [DEC] to show coded decimal data. Select [UDEC] to show unsigned decimal data. Select [Hex] to show hexadecimal data. Select [BCD] to show Binary-coded decimal data. Select [Float] to show floating-point number data. Select [ASCII] to show string data.
4	Display Data Size	Select the size of the data that shall be displayed on the [Log View] object. The system will read the log data from the memory and show the data on [Log View] according to the [Display Data Size]. Select [1Bit] to display the value of the first bit (0th bit) of the configured word address. Select [16Bit] to display the data of the configured address, since the word address is 16Bit. Select [32Bit] to combine the selected address and the immediately next address. Thus, as shown below, the current address will be the lower word (D0015) and the next address will be the upper word (D0016), and shall be combined to be displayed on [Log View]. 
5	Decimal Places	Select the decimal place value to be displayed on [Log View]. If the [Display Data Type] is [FLOAT], the decimal place data will be read and displayed. For a Float data of [123.45]: if the [Decimal Places] is [2], the log will be shown as [123.45]; if the [Decimal Places] is [1], the log will be shown as [123.4]; and if the [Decimal Places] is [0], the log will be shown as [123].

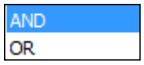
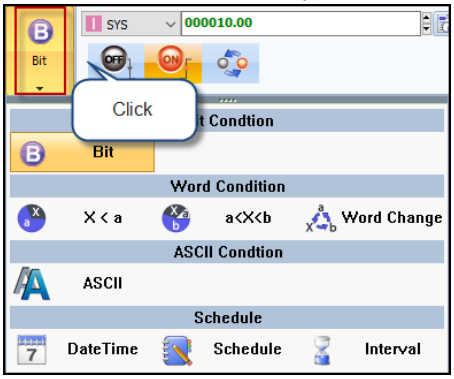
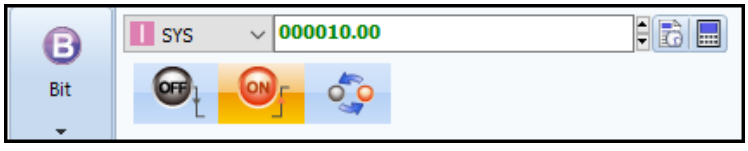
		If the [Display Data Type] is [DEC], the system will only read the integer and simply mark a decimal. For a DEC data of [123]: if the [Decimal Places] is [2], the log will be shown as [1.23]; if the [Decimal Places] is [1], the log will be shown as [12.3]; and if the [Decimal Places] is [0], the log will be shown as [123].  [Figure. Log Setting]  [Figure. Log View Object]
6	String Count	If the [Display Data Type] is [ASCII], configure the number of strings. The size of a single ASCII Code Character is 8bit. 2 characters are recorded in a word address(16Bit). If there are 6 characters in a string, 3 word addresses are required, thus [D0015/D0016] is combined to [D0014] in the [String Count] column as shown below. The string from [D0014] to [D0015] are read in the Log View.  [Figure. Log Setting]  [Figure. Log View Object]

4.2.2 Log Condition Tab

Configure the condition to record data from the Log Condition Tab.



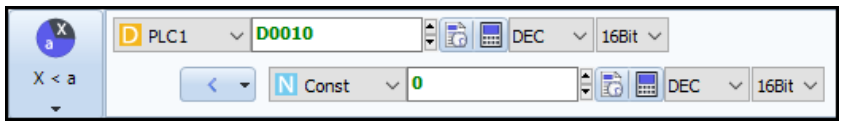
[Figure. Log Condition]

No.	Log Condition	Description
1	Condition Operator	Use [Condition Operator] when there are two or more conditions added by the [+] button provided in the upper right corner of the Condition tab.  Select [AND] to record a log when all conditions are true. Select [OR] to record a log when at least one condition is true.
2	Select Condition	Click the button on the left and select the [Condition Type] from the condition list.  The method to configure conditions is same with the features provided at [Effect and Action] - [Condition] tab. Therefore, refer to Chapter 7.7 [Condition Tab setting] for more details. ① [Bit Condition] : configure the data of the selected bit address as a condition reference point.  Select [Off edge] to record a log when the selected bit address changes from ON to OFF. Select [On edge] to record a log when the selected bit address changes from OFF to ON. Select [Reverse] to record a log when the data of the selected bit changes.

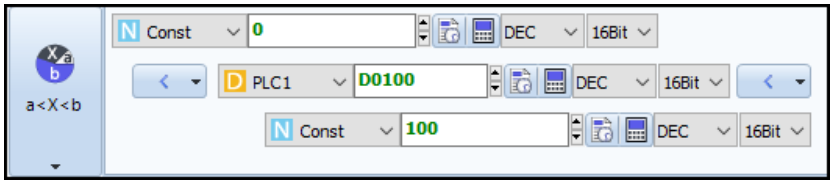
② [Word Condition] : configure the data of the selected word address as a condition reference point.

Once the condition is true, log is not continuously recorded, but the time when the value of [X] changes and such new value corresponds to the condition, a single log is recorded.

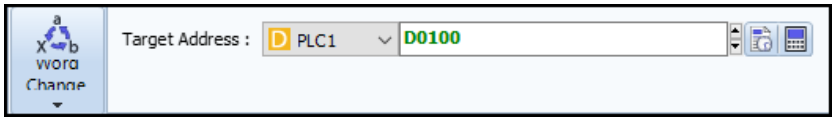
Select [X < a] to compare two data points and record a log when the condition becomes true.



Select [a<X<b] to compare three data points, and record a log when the condition becomes true.



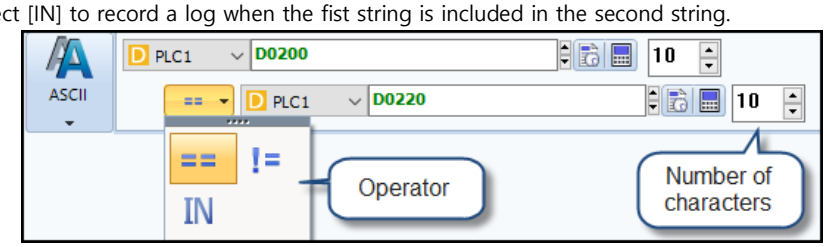
Select [Word Change] to record a log when the data of the selected address changes.



③ [ASCII]: configure a string as a condition reference point.

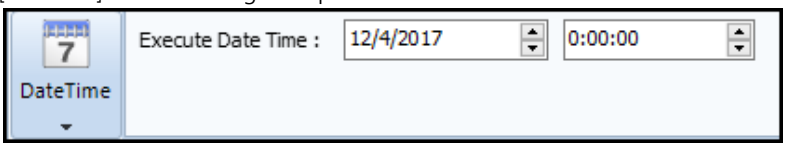
Compare two strings, and record a log when the two strings are the same / different / or includes according to the corresponding operator.

Select [IN] to record a log when the fist string is included in the second string.

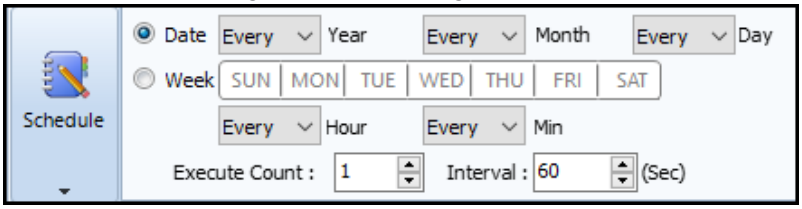


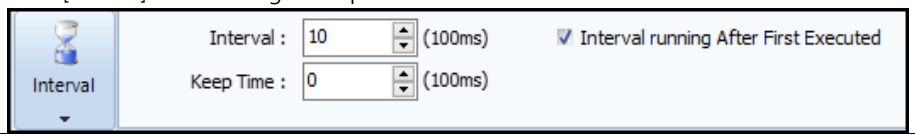
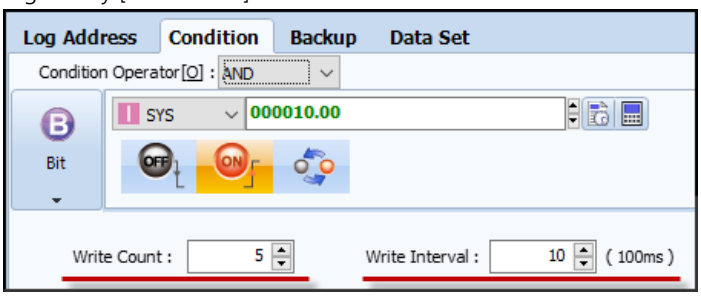
④ [Schedule]: configure the time as a condition reference point. Record a log at a predetermined time point.

Select [DateTime] to record a log at a specific time and date.



Select [Schedule] to record a log whenever the configured conditions become true.

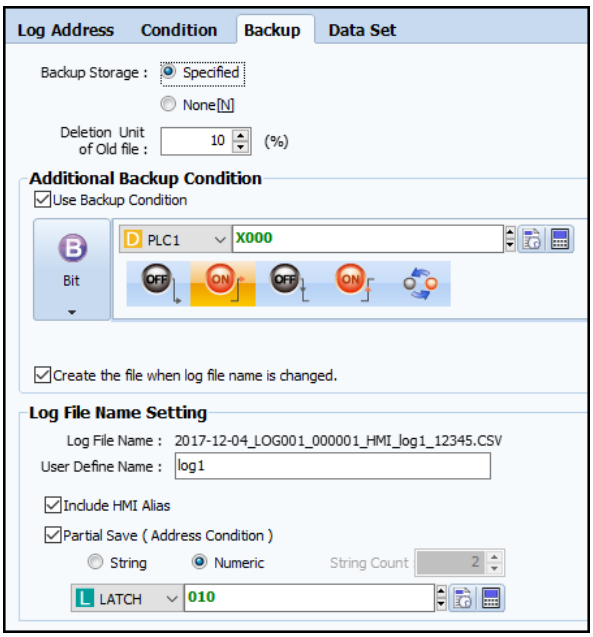


		Select [Interval] to record logs on a periodic basis. 
3	Write Count Write Interval	This function is provided only for Bit Conditions. Configure the number of times a log is recorded when the bit condition is true. If the [Write Count] is [1], a log will be recorded once when the condition becomes true. If the [Write Condition] is [2] or more, a log will be recorded when the condition becomes true, and subsequent logs will be recorded according to the [Write Interval] for the amount of times configured by [Write Count].  If [Write Count] is [5], and [Write Interval] is 10, as shown above, the first log will be recorded when the internal address of [10.00] changes from [OFF] to [ON] and four additional logs will be recorded every 1 second (10x100ms). (The internal address of [10.00] does not have to remain [ON] throughout the total period of repeated recording. Even if the address goes back to [OFF] the configured number of logs will be recorded)

Caution! If the interval of a log condition is significantly short (i.e. 100ms or shorter), several log data may be lost. Therefore, you are recommended to configure a 2 to 5 second interval in the log conditions depending on the number of log addresses.

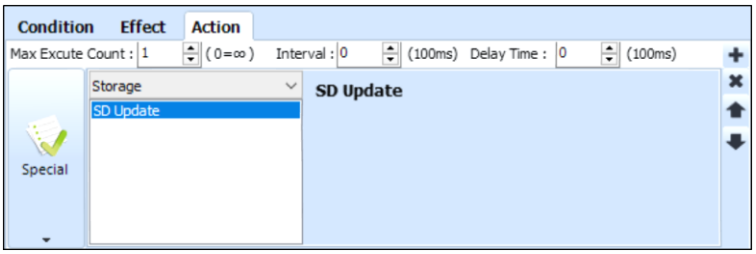
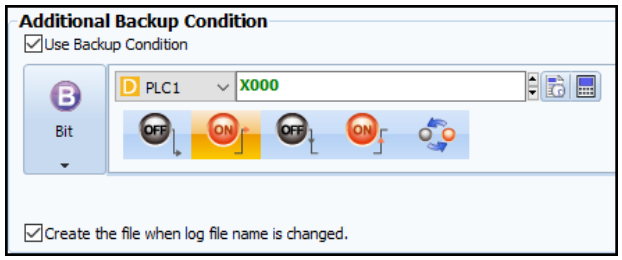
4.2.3 Backup Tab

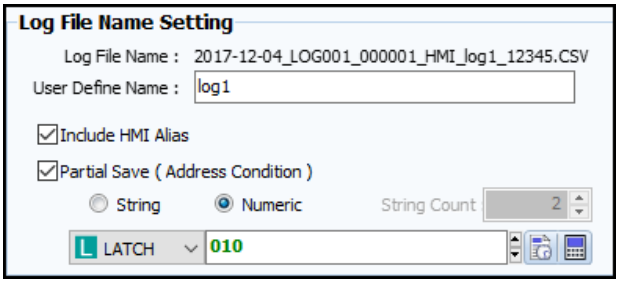
Configure the settings to save log data to an SD Card. An SD card must be inserted to the TOP device. Whenever the number of recorded logs reaches [Log Count], and the assigned TOP memory is full, old log data will be deleted and overwritten with new log data.
Configuring backup to SD Card allows the user to save old data to the SD card before deleting such data from the TOP device memory.
The amount of data corresponding to the [Deletion Unit of Old file (%)] will be copied to the SD Card as backup and the copied data will be deleted from the TOP device memory. New log data will be recorded in the empty memory equivalent to the [Deletion Unit of Old file (%)].



[Figure. Log Backup Tab]

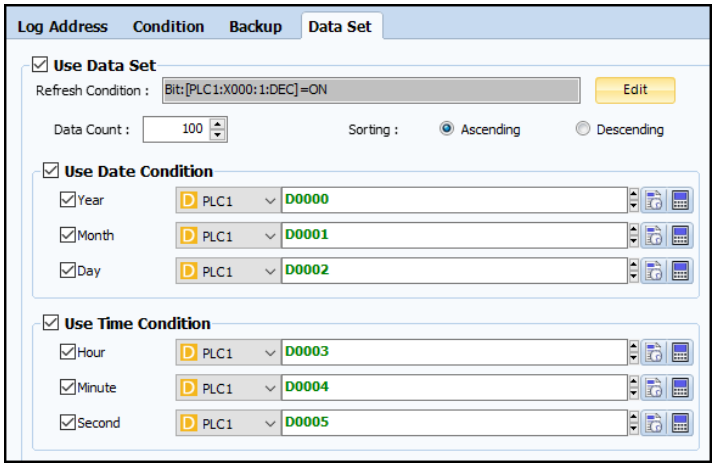
No.	Backup	Description
1	Backup Storage	Select between [SD Card] and [None] for the storage medium of log backup data. ▶ If [None] has been selected, once the memory for the log ID is full, any new log will be recorded by deleting the oldest log data. No backup will be performed. In this case, the settings for [Deletion Unit of Old file] / [Additional Backup Condition] / [Log File Name Setting] are useless. ▶ Use [SD Card] to backup log data to an SD card beyond the limited capacity of the TOP internal memory. If the TOP internal memory allotted for the log is full, the amount of log data configured by the [Deletion Unit of Old File] will be backed up on the SD card, and the backed up log data will be deleted from the TOP internal memory. (Caution 1! Files saved on SD Card) Log data are stored on the TOP device memory in the form of [Data], however, once the log data is backed up on an SD Card or USB memory, the log data are stored in the form of a [File]. When log data is backed up on an SD Card, only one backup file will be created for a single date. On any given day, if backup is required for a single block for two or more times, the data backup from the second, third, so on and so forth backup will be added to the backup file created from the first backup of that given day. New backup files will be created on different dates. (Caution 2! Insert SD Card) An SD Card must be inserted to the TOP device. If an SD Card is properly inserted to the TOP device, the data value for Special Address of [SD_INSERT] will be [1]. If you remove the SD Card, the data value will be [0]

		[Figure. Confirm SD Card connection] (Caution 3! SD Update) Prior to removing an SD Card from the TOP device, go to the [Effect and Action Page], and select [Action] - [Special] - [Storage] - [SD Update].  [Figure. SD Update] [SD Update] backs up all alarm and log data on the TOP device memory to the SD Card, and deletes the backed up data from the TOP device. (Applicable for only alarm blocks and log configured for backup to SD Card).
2	Deletion Unit of Old file (%)	Configure the settings if you have selected [SD Card]. [Deletion Unit of Old File] is used for two purposes. ▶ The unit for backup log data to SD Card and delete when the log memory is full. ▶ The unit to delete old data when the SD Card memory is full. <How to calculate the number of files to be deleted when the SD card memory is full> On the TOP device memory, the data is saved as [data], thus the fraction configured will be applied to the total memory. On the SD Card, the data is saved as files, thus the fraction configured will be applied to the number of files. The number of files to delete shall be [(Deletion Unit of Old file/100) x Total number of log files in the directory]. The oldest files will be deleted first. If the total number of files to delete is less than [1], one file will be deleted. Example) If the Deletion Unit of Old file is 30%, and you have two files, the number of files to delete is (30/100) x 2 = 0.6, thus one file will be deleted. If the total number of files are [1] or less, no file will be deleted.
3	Additional Backup Condition	This function is applicable only when [SD Card] is selected for [Backup Storage], performing log data backup to an SD Card. This function allows a user to copy log data to an SD Card even when the TOP internal memory assigned to logs is not full.  You can select between [Use Backup Condition] and [Create the backup file when log file name is changed.].

		(1) Use Backup Condition Enable [Use Backup Condition] to backup log data to an SD card when the corresponding condition is met. Log data copied to the SD card will be deleted from the TOP internal memory. Select [Use Backup Condition] and configure the [Condition]. (2) Create the backup file when log file name is changed Perform backup of upon change of name of any log file configured at [Log File Name Setting] available in the Backup tab. In other words, if the date, HMI alias, partition storage address changes, a new file will be created and the log data will be copied to the new file. Log data copied to the SD card will be deleted from the TOP internal memory. Utilizing this function will perform backup whenever the date changes, that allows the TOP memory to have only the log data of the current date. The function allows you to perform log data backup on new files in a controlled manner when the production condition is changed or the partition storage address is changed.
4	Log File Name Setting	This function is applicable only when [SD Card] is selected for [Backup Storage], performing log data backup to an SD Card. On the TOP device memory, log data is saved as data, and on the SD Card, log data is saved as files. Therefore, you can configure the file name for the backup file stored on an SD Card.  As default, the file name will be [Date_Log ID_Daily File Count_HMI alias_User Define Name_partial save address]. The [Daily File Count] will be assigned in an ascending order of the number of files created on a given day. On a general basis, one log file per day will be created for log data backup on the SD Card. If backup of log data is performed more than twice on a given day, the log data from the second and third, and so on and so forth backup will be recorded on the file created upon the initial backup of that day. Select [Partial Save] to create a new file to save the log file. Select [String] to read and include a certain number of strings configured with [String Count] from the configured address to the file name. Select [Numeric] to read and include the data of the configured address in decimal numbers. [Partial Save] performs backup of log data to a new file according to the [Log File Name Setting] whenever the configured address value changes if, and only if [Create the backup file when log file name is changed] is selected. Log data copied to the SD card will be deleted from the TOP internal memory. If [Create the backup file when log file name is changed] is not selected, backup will not be performed even if the address value configured for [Partial Save] changes.

4.2.4 Data Set Tab

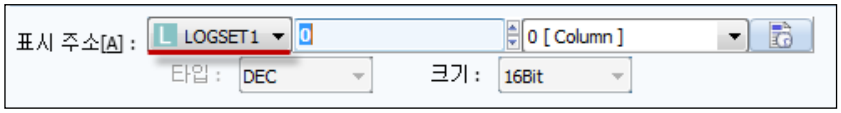
[Data Set] extracts a certain number of data defined as [Data Count] beginning from a specific date condition [Year/Month/Day] and/or time condition [Hour/Minute/Second]. Whenever the [Refresh Condition] is met a new data set is created.



[Figure. Data Set Tab]

Data sets are used to search and analyze a portion of the entire log data.

The data of Data Sets can be displayed in [Numeric/Trend/Gauge] objects by assigning the address as LOGSETs as shown below.



[Figure. Data Set Address]

4.2.5 Display Log Data

On the TOP device memory, log data are stored as data not files.

There are various ways to view, transfer or copy such log data.

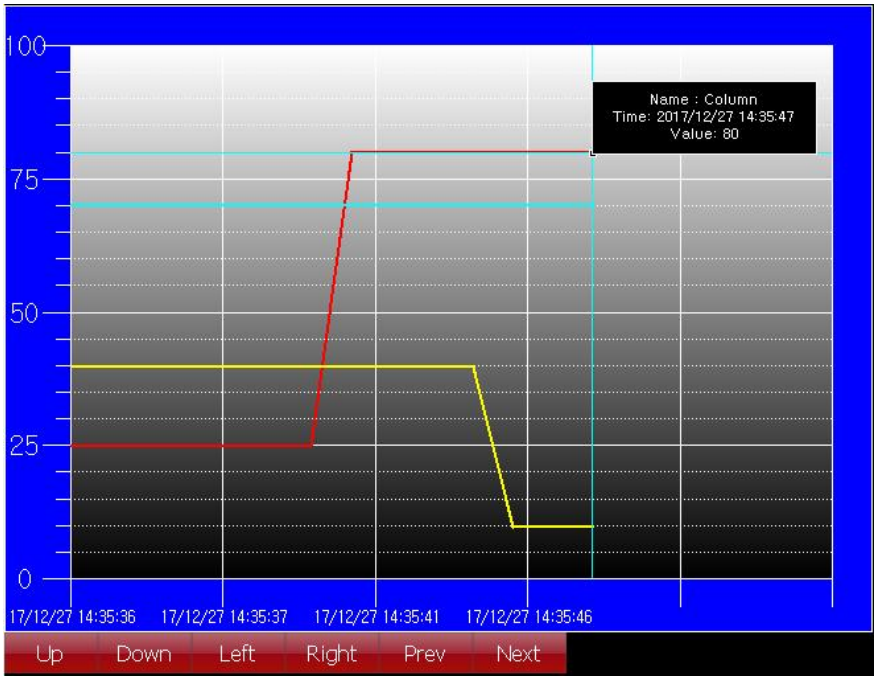
(1) How to view log data with [Log View / Log Graph] objects.

Us a [Log View] object to display the log data as it is, or use a [Log Graph] object to plot the log data on a graph.

No	Date	Time	Temp1	Temp2	Temp3	Temp4	Temp5
2	2017-12-27	14:35:36	25	40	70	70	0
3	2017-12-27	14:35:36	25	40	70	70	0
4	2017-12-27	14:35:37	25	40	70	70	0
5	2017-12-27	14:35:37	25	40	70	70	0
6	2017-12-27	14:35:37	25	40	70	70	0
7	2017-12-27	14:35:38	25	40	70	70	0
8	2017-12-27	14:35:41	80	40	70	70	0
9	2017-12-27	14:35:42	80	40	70	70	0
10	2017-12-27	14:35:42	80	40	70	70	0
11	2017-12-27	14:35:42	80	40	70	70	0
12	2017-12-27	14:35:46	80	10	70	70	0
13	2017-12-27	14:35:47	80	10	70	70	0
14	2017-12-27	14:35:47	80	10	70	70	0

Up Down

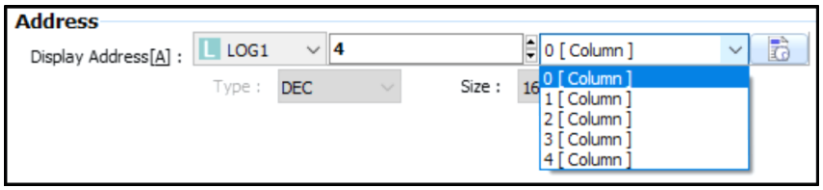
[Figure. Log View Object]



[Figure. Log Graph Object]

Refer to Chapter 15 [Log View Object] and Chapter 17.3 [Log Graph] for more details.

(2) How to display log data with [Numeric] objects.
You can display one log data on the screen by assigning the log address to a numeric object.

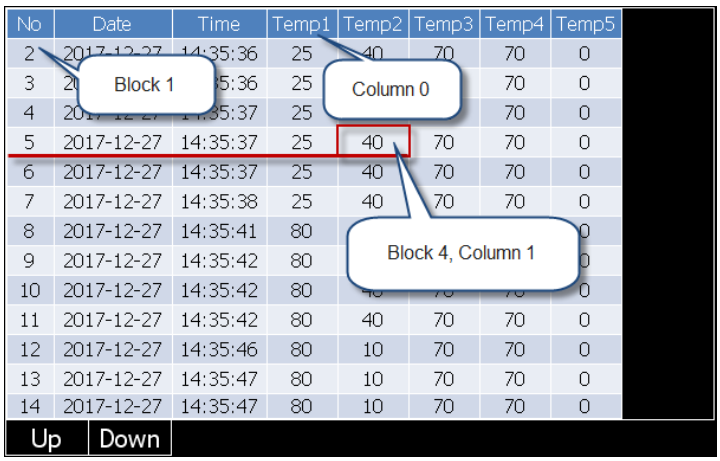


[Figure. Numeric Object]

As shown above, select a column, and block number. The corresponding log data will be displayed as shown below.

[Figure. Numeric Object]

Recorded log data consists columns and blocks as shown in the below Log View, where both columns and blocks start from [0].

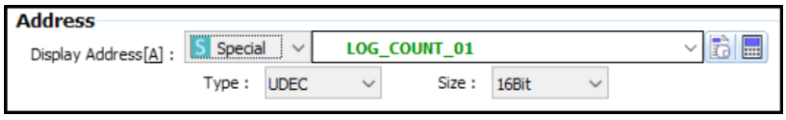


[Figure. Log View Object]

Refer to Chapter 10. [Numeric Object] for more details.

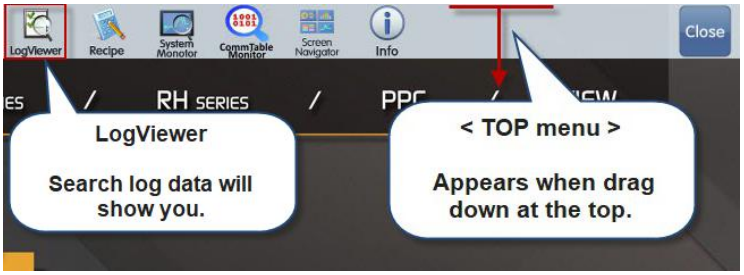
(3) How to view number of logs with [Numeric] objects.

Add a [Numeric] object and select [Special] for [Display Address] and further select [LOG_COUNT_1], the number of logs for the Log ID of [1] be displayed on the screen.



[Figure. Numeric Object]

(4) How to view log data with [LogViewer] provided on the TOP Menu of run screen.

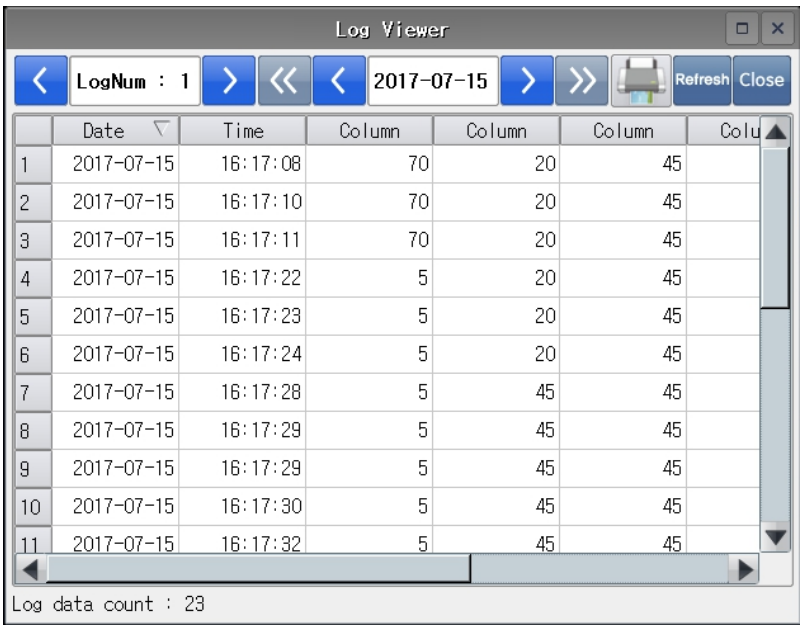


[Figure. LogViewer Menu]

Run LogViewer, the below [Log Viewer] window will appear on the screen.

From the [Log Viewer], enter the [LogID/Date], the system will search and show the corresponding log data stored on the TOP device.

You can also print the log data search result.

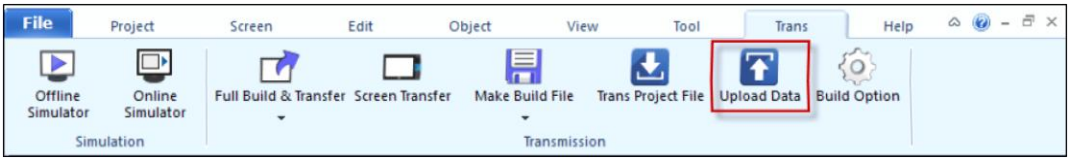


[Figure. LogViewer]

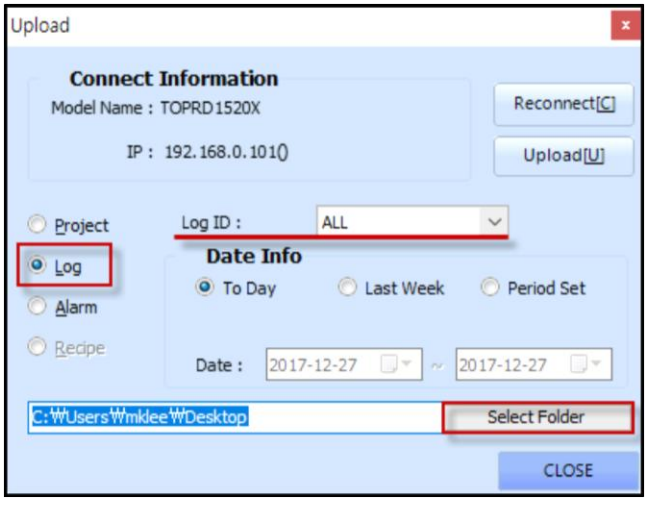
4.2.6 Copy Log Data

(1) How to copy Log Data from TOP device to a PC

Connect a PC with the TOP device and select [Trans] - [Upload Data].

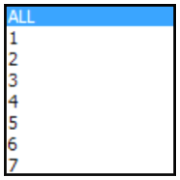


[Figure. Upload Data]

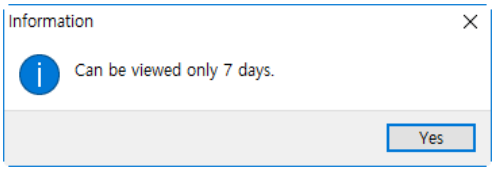


[Figure. Upload]

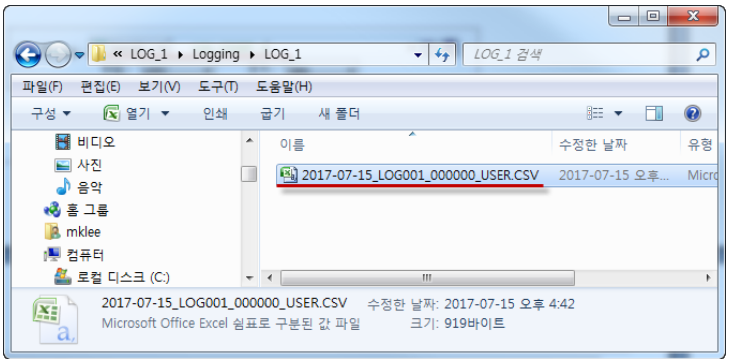
Select [Log] from the [Upload] and configure the [Log ID].



Select [All] to upload all log data, or a specific ID to upload log data only from the selected Log ID. Select among [Today] / [Last Week] / [Period Set] for [Date Info]. If you selected [Period Set] select a period in the below field, that does not exceeds 7 days. If you configure the period to be longer than 8 days, the below information will pop-up and the upload will be denied. If a valid period is selected, the log data of such period is uploaded.

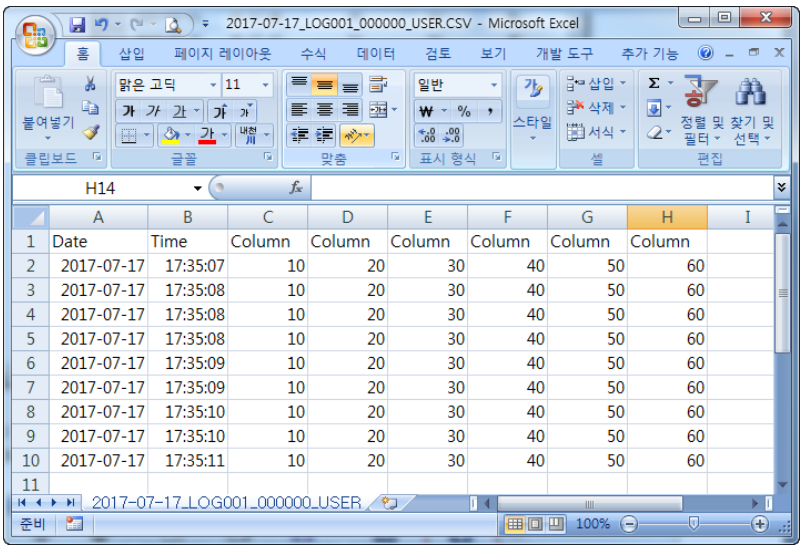


Click [Select Folder], and select the directory in which the log data file should be saved, and click [Upload] to save the log file to the selected directory.



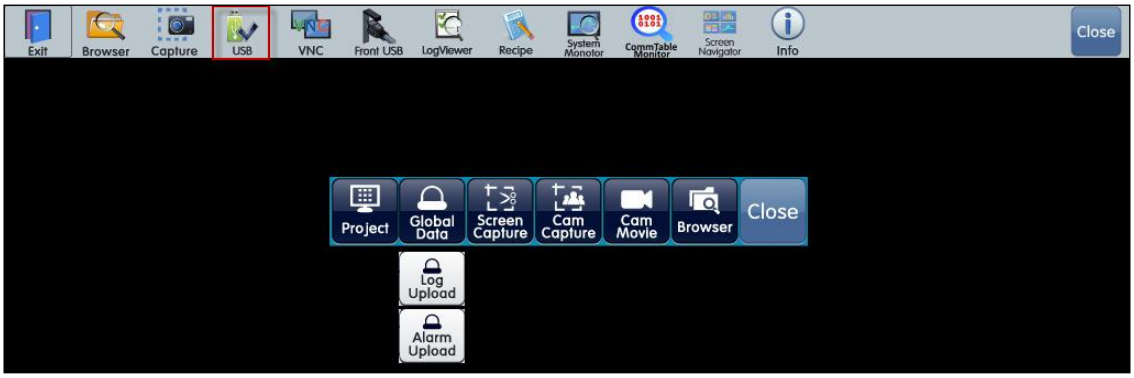
[Figure. Uploaded File]

You can open the CSV file with Microsoft Excel software.



(2) How to copy Log Data from TOP device to a USB

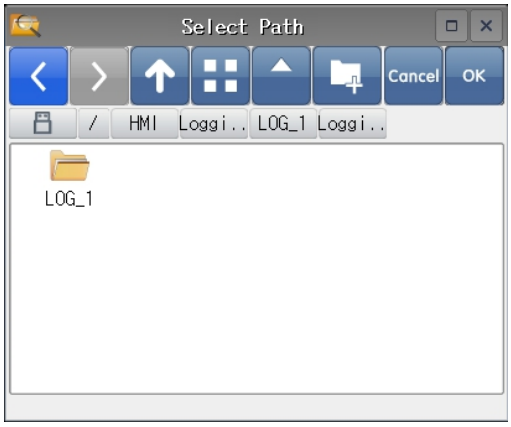
If you connect a USB memory to the TOP device, or click [USB] on the TOP Menu on the Run Screen, the USB menu will appear.



[Figure. Open USB Menu from TOP Menu]

Click [Global Menu], buttons for [Log Upload] and [Alarm Upload] will appear.

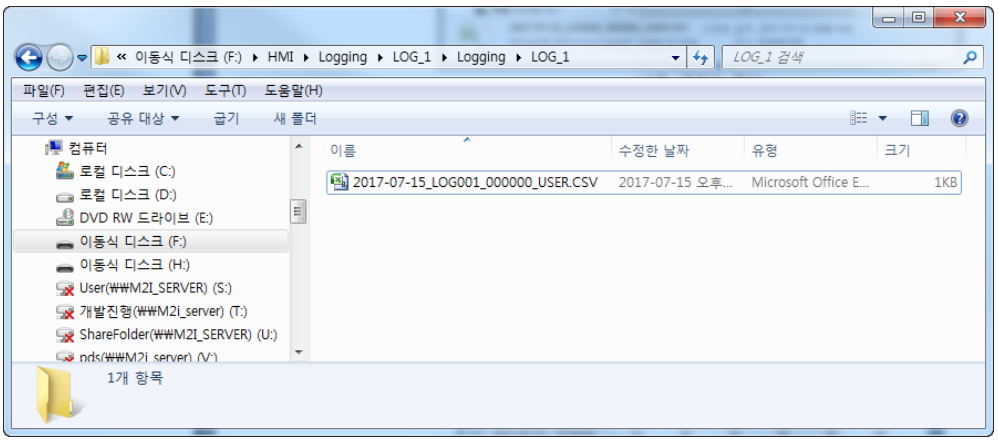
Select [Log Upload] to open the [Select Path] window. Select the path to which the log file should be copied, and click [OK] to upload the file.



[Figure. Select Path Window]

Once the upload is complete, the log data is saved in the USB memory path on a CSV file.

You can open a [*.CSV] file with a text editor (Windows Notepad, etc.) or with Microsoft Excel software.



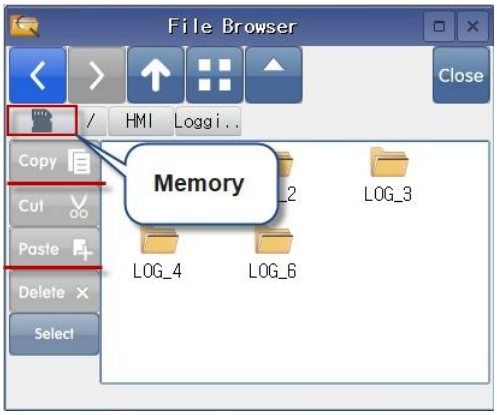
[Figure. File copied to USB memory]

(3) How to copy log data from SD Card to USB

If [SD Card] is selected as the [Storage Medium] for [Backup] at the [Backup] tab of [Project] - [Log], you can copy the log file from the SD Card to a USB memory.

Select the [File Browser] from the Menu Screen, and change the [Memory] to SD Card at the left side of the browser.

Select the Log File to copy, and click [Copy], then change the [Memory] to [USB] and click [Paste] to paste the log file to the selected directory.



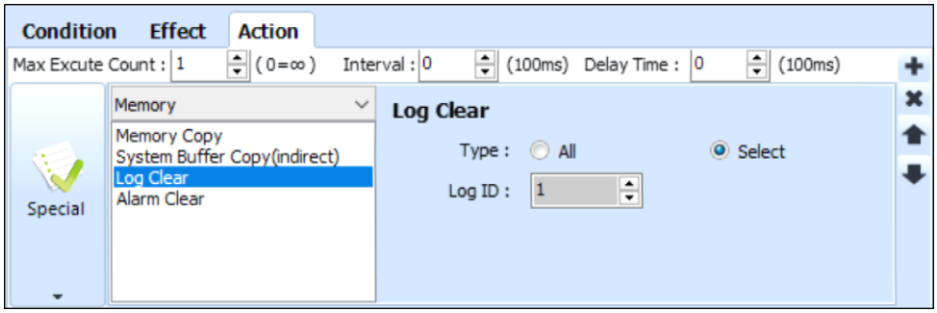
[Figure. File Browser from Menu Screen]

4.2.7 Delete Log Data

There are ways to delete log data from the TOP internal memory.

First, create a button on the screen and follow the below configuration at the [Effect and Action] page.

Select [Special] - [Memory] - [Log Clear] and select whether to delete all log data ([All]) or log data of a selected Log ID ([Select]).



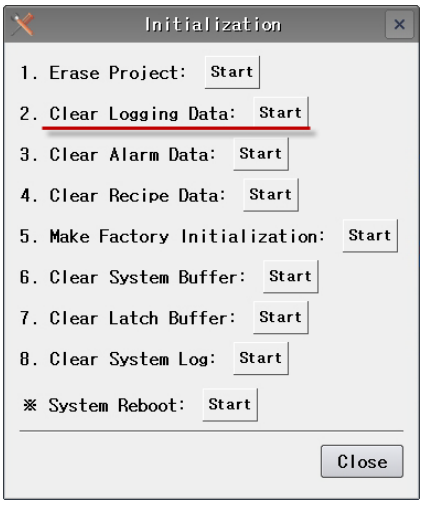
[Figure. Log Clear Action]

If you execute an action configured as above, log data will be deleted.

The second method is to initializing from the Menu Screen.

Go to [Control Panel] - [Initialization] and click [Start] for [2. Clear Logging Data] to delete all log data on the TOP device.

[Figure. Control Panel from Menu Screen]

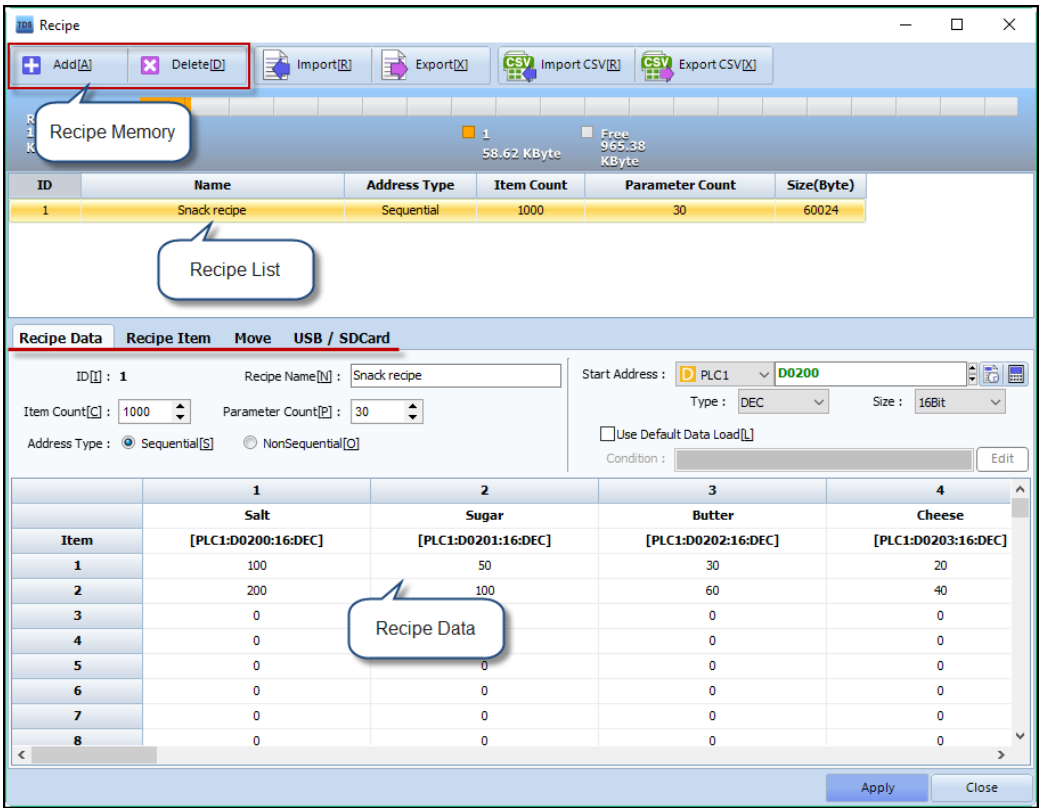


[Figure. Initialization Window]

[Figure. Delete confirm message]

4.3 Recipe

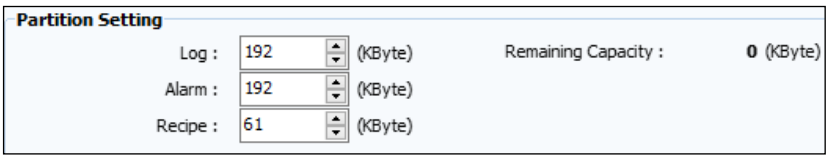
Recipe is a function that stores data on memory devices (TOP/SD Card/USB), and reads in such data to the address area of the PLC upon predefined [Conditions].



[Figure. Recipe]

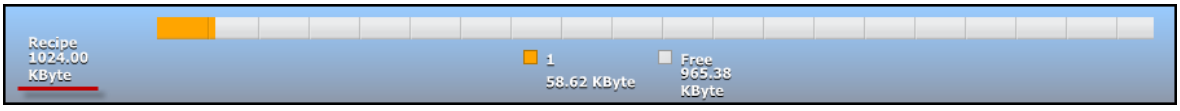
4.3.1 Recipe Memory Setting

Configure the storage assigned to recipe amongst the entire backup memory of the TOP device.
Go to [Project] - [Property] - [Partition Setting].
Assign memory for each [Log] / [Alarm] / [Recipe] in the TOP backup memory.



[Figure. Partition Setting]

On top of the [Recipe] window, the total memory assigned to recipe and the current occupation status of recipe memory are shown in a bar chart.



[Figure. Display of memory assigned to Recipe]

4.3.2 Recipe List

[Add] / [Delete] recipe to/from the [Recipe List] with the corresponding buttons. You can up to [32] recipes.

No.	Recipe	Description
1	Add	Add a recipe to the recipe list.
2	Delete	Deleted a selected recipe.

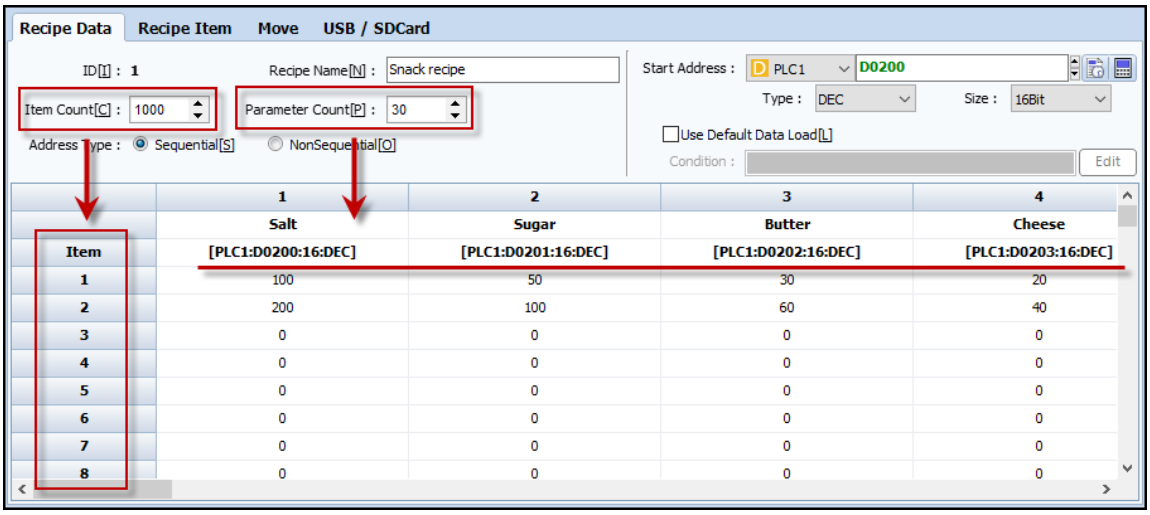
ID	Name	Address Type	Item Count	Parameter Count	Size(Byte)
1	Snack recipe	Sequential	1000	30	60024

[Figure. Recipe List]

No.	Recipe List	Description
1	ID	The ID of each recipe.
2	Name	The name of the recipe
3	Address Type	The type of address for the recipe (Sequential / NonSequential).
4	Item Count	The number of items included in the recipe.
5	Parameter Count	The number of parameters included in the recipe.
6	Size(Byte)	The size of the recipe in Bytes. The size is calculating the sum of memory for [Item Count] / [Parameter Count] / [Address].

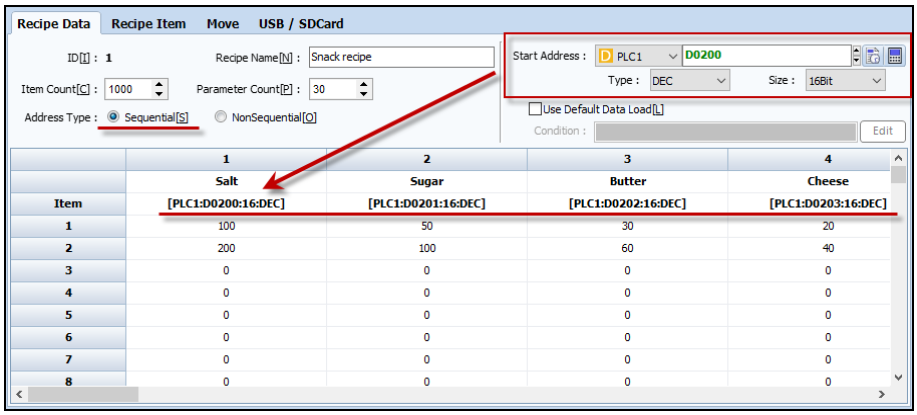
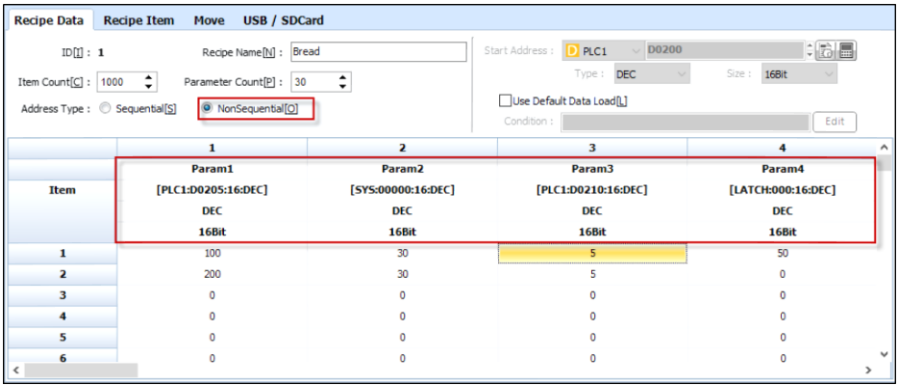
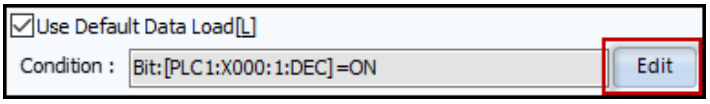
4.3.3 Recipe Data Tab

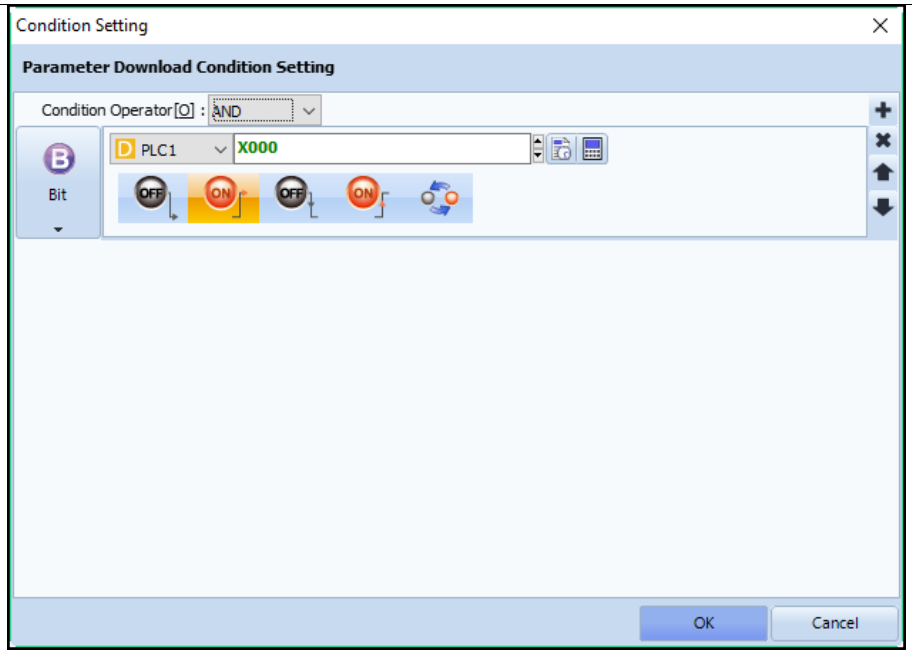
Configure settings and administrate recipe data.
Configure the [Item Count] / [Parameter Count] and select the address to which the recipe should be moved.
Furthermore, you can directly input the recipe data.



[Figure. Recipe Data Tab]

No.	Recipe Data	Description
1	ID	The ID assigned to the recipe in an ascending order whenever you [Add] a recipe.

2	Recipe Name	Enter the recipe name.
3	Item Count	Item refers to the number of parameters that should be read upon, thus the number of rows in the table. Up to 5,000 items can be included in a single recipe.
4	Parameter Count	The number of data configuring a single item, thus the number of columns in the table. Up to 100 parameters can be included in a single item.
5	Address Type	Select between [Sequential] / [NonSequential]. Select [Sequential] to assign recipes in an ascending order beginning from the [Start Address]. The addresses are automatically assigned beginning with the [Start Address], and you cannot change the address from the recipe data table provided in the lower part of the [Recipe] Window.  Select [NonSequential] to assign recipes to addresses of your selection. You can change the [Address] / [Data Type] / [Data Size] from the [Recipe Data Table]. 
6	Start Address	If the [Address Type] is [Sequential] define the start address of the sequential numbering. Configure the [Start Address] / [Type] / [Size]. If [Sequential] is selected, the same [Type] and [Size] will be applied to all sequential items.
7	Use Default Data Load	Enable [Use Default Data Load] to load a recipe data configured at [Recipe Data] tab to the TOP recipe memory of a predetermined condition is satisfied. You can change or update recipe data during operating the TOP device by going to [Move] page and using the [Parameter Upload] function. Therefore, the project recipe data and TOP device recipe data may be different. If the predetermined condition is met, the recipe data on the TOP memory is initialized with the project recipe data. 



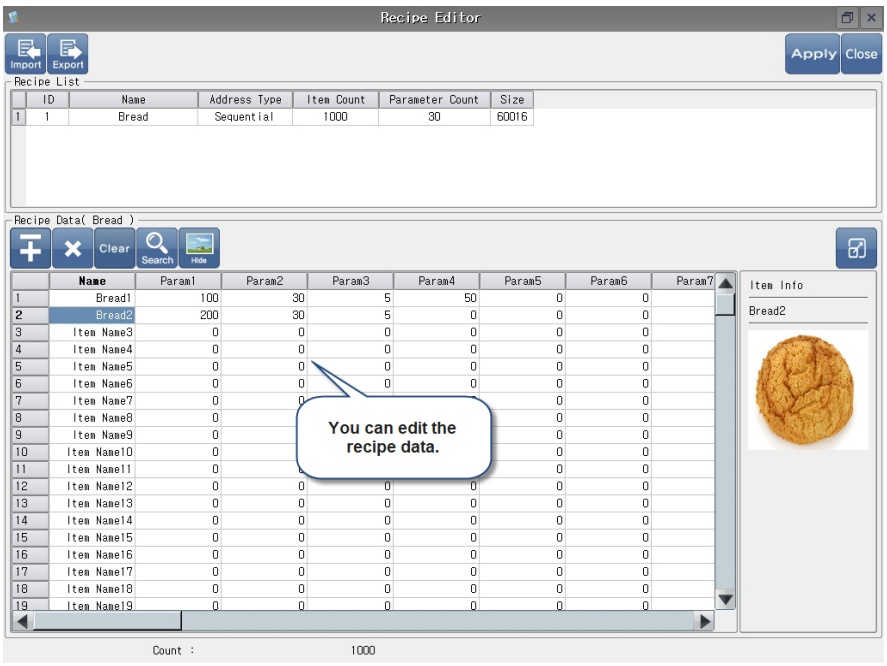
Click [Edit] to open the [Condition Setting] window.
(Refer to Chapter 7.7 [Condition Tab] for more details.)

Directly input recipe data to the recipe data table.

	1	2
	Salt	Sugar
Item	[PLC1:D0200:16:DEC]	[PLC1:D0201:16:DEC]
1	100	50
2	200	100
3	0	0
4	0	0
5	0	0

[Figure. Recipe Data Table]

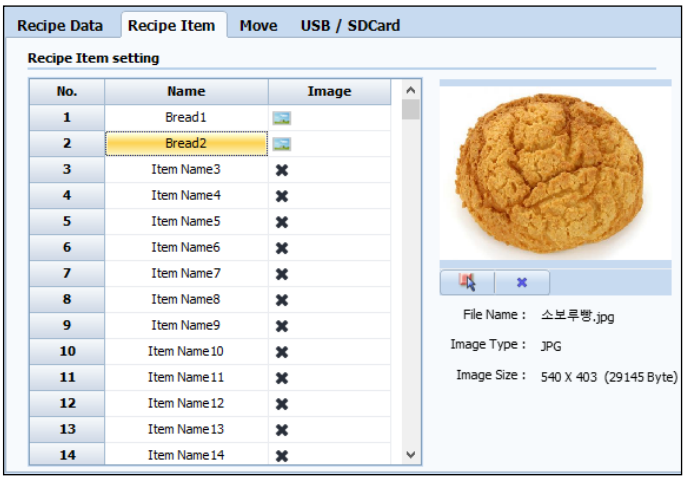
You can save recipe data while operating your TOP device with the [Parameter Upload] function provided in the [Move] page.
(Refer to Chapter 4.3.5 [Move Tab] for more details.)
Moreover, use the [Recipe Editor] available from the [Recipe] button of the TOP menu from your TOP device to edit recipe data.
(Refer to Chapter 4.3.8 [Recipe Editor] for more details.)



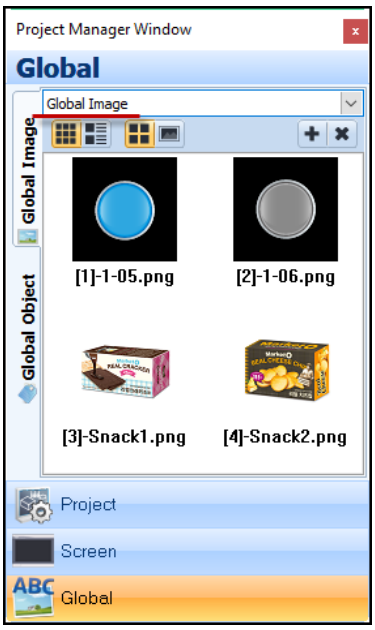
[Figure. Recipe Editor]

4.3.4 Recipe Item Tab

Enter the [Name] of each item and add [Images] to each item.



[Figure. Recipe Item Tab]



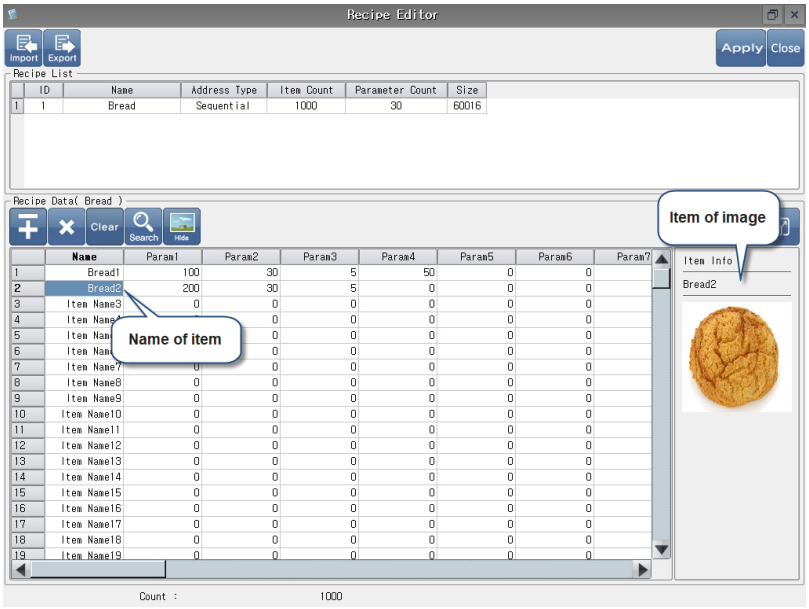
[Figure. Global Image]

You can drag & drop images form [Global Image], and use such images in various means including [Image] objects / Display Media Item from [Take Action]/[Lamp] object.

(Refer to Chapter 7.3.3 [Global Image] for more details.)

You can check the [Name] and [Image] configured in this tab from the [Recipe Editor] available from the [Recipe] function of the TOP Menu.

[Figure. Recipe on TOP Menu]

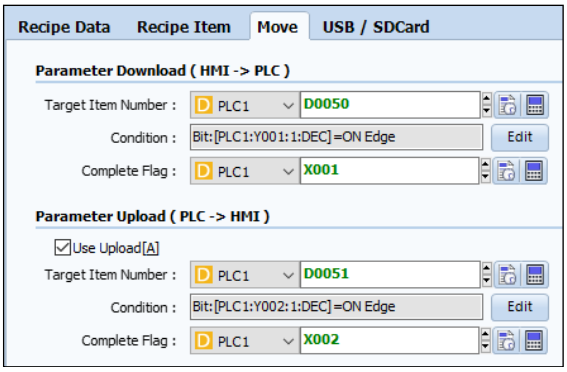


[Figure. Recipe Editor]

4.3.5 Move Tab

Configure the move conditions of recipe data.

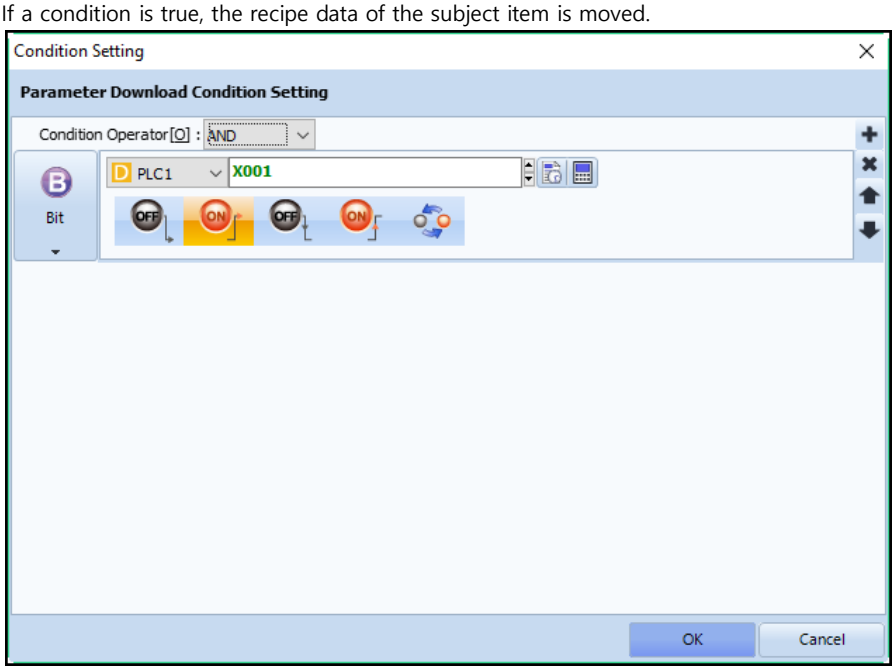
Configure the address to store the recipe data stored on the memory to a selected address area with [Parameter Download (HMI -> PLC)]. Upload data from a selected address to recipe memory with [Parameter Upload (PLC -> HMI)].



[Figure. Move Recipe]

(1) Parameter Download (HMI -> PLC)

Download a specific item of a recipe stored on the memory to a predetermined [Parameter Address].

No.	Parameter Download	Description
1	Target Item Number	The number assigned to the item that should be moved. Enter the Target Item Number in forms of address. The data of the configured address becomes the item number. In the above example, when the value of [D0050] is [2], and [Y001] changes from [OFF] to [ON], the recipe data of Item No.2 moves to the parameter address field.
2	Condition	Configure the condition to move recipe data. If a condition is true, the recipe data of the subject item is moved.  In the above example, where [Bit] condition is configured to be [On Edge], the moment that the value of [Y001] changes from [0] to [1], the recipe data of the selected item is

		moved. For [Off Edge], the recipe will be moved when the value of [Y001] changes from [1] to [0], and for [Reverse] the recipe data will be moved upon any change to the value of [Y001}. For [On Continue], recipe data will be moved whenever the [Target Item Number] is changed while the bit address is On [1]. For [Off continue], recipe data will be moved whenever the [Target Item Number] is changed while the bit address is Off[0]. (Refer to Chapter 7.7 [Condition Tab] for more details.)
3	Complete Flag	When the moving of a recipe data is completed, the value of the [Complete Flag] value becomes [1]. Once the [Complete Flag] becomes [1], it does not reset to [0] by no automatic means. Therefore to use [Complete Flag] you have to facilitate an action reset [1] back to [0].

(2) Parameter Upload (PLC -> HMI)

As the opposite function with Parameter Download, the actual data of a parameter address is uploaded as the recipe data of a specific item.

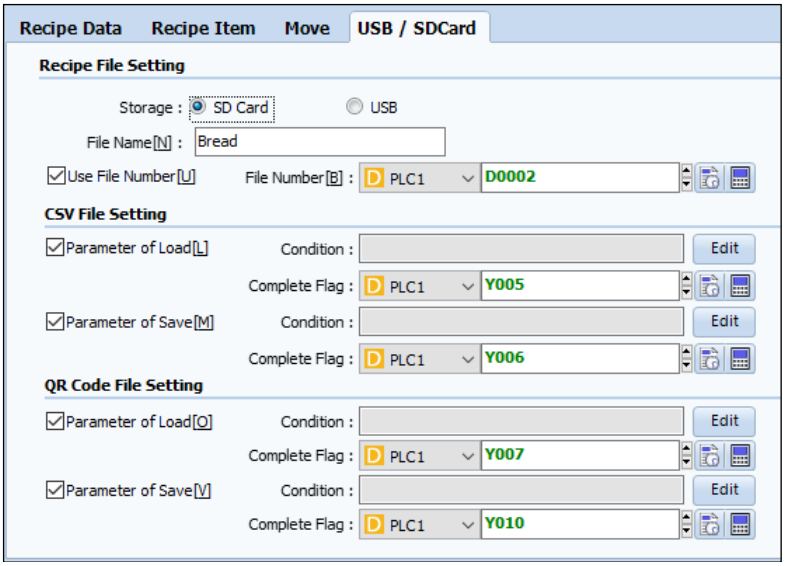
Select whether or not to [Use Upload].

No.	Parameter Upload	Description
1	Target Item Number	The number of the item to which the actual data of a parameter address should be uploaded. Enter the Target Item Number in forms of address. The data of the configured address becomes the item number. In the above example, when the value of [D0051] is [3], and [Y002] changes from [OFF] to [ON], the actual data of the parameter area is downloaded to Item No.3.
2	Condition	Configure the condition to move recipe data. If the condition is satisfied, the actual data of the parameter address is saved to the predetermined item. (Refer to Chapter 7.7 [Condition Tab] for more details.)
3	Complete Flag	When saving the recipe data is completed, the value of the [Complete Flag] value becomes [1]. Once the [Complete Flag] becomes [1], it does not reset to [0] by no automatic means. Therefore to use [Complete Flag] you have to facilitate an action reset [1] back to [0].

4.3.6 **USB / SDCard Tab**

You can copy the entire recipe data of a certain ID (all items) from the TOP internal memory to an external storage (SD Card / USB), or overwrite the TOP memory of a certain recipe ID with the memory from an external storage.

Recipe data saved to an external storage (SD Card / USB) are saved in *.CSV files.



[Figure. Recipe USB /SDCard setting]

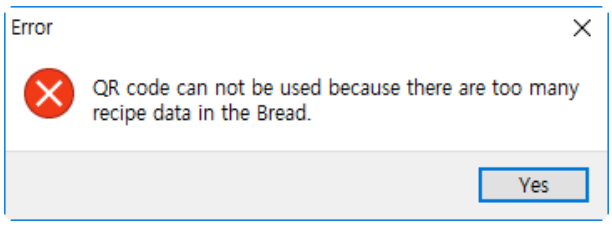
Select between [SD Card] and [USB] for [Storage Medium].
Recipe data are stored on the TOP device memory in the form of [Data], however, once the recipe data is backed up on an SD Card or USB memory, the recipe data are stored in the form of a [File].

No.	USB / SDCard	Description
1	File Name	Enter the file name to save recipe data.
2	Use File Number	Enable [Use File Number] and configure a file number to add numbers to the file name. When saving recipe data to an external storage, if the value of [D0002] is [3], the file will be saved as [Bread_3.CSV].

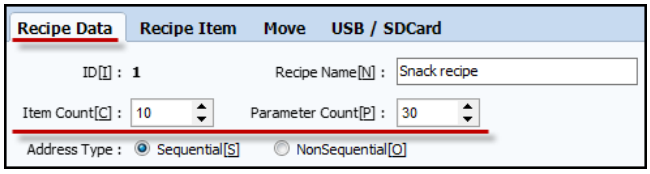
Configure [Parameter of Load] / [Parameter of Save] for [CSV File Setting].

No.	CSV File Setting	Description
1	Parameter of Load	When the predetermined [Condition] is met, the recipe of the specific file stored on the [SD Card / USB] will be loaded and overwrite the recipe memory of the TOP device. Once the recipe data is loaded, the value of [Complete Flag] becomes [1]. Once the [Complete Flag] becomes [1], it does not reset to [0] by no automatic means. Therefore to use [Complete Flag] you have to facilitate an action reset [1] back to [0].
2	Parameter of Save	When the predetermined [Condition] is met, the recipe data is saved with the file name (File Name_File Number.CSV) on the [SD Card / USB]. When saving the recipe data is completed, the value of the [Complete Flag] value becomes [1]. Once the [Complete Flag] becomes [1], it does not reset to [0] by no automatic means. Therefore to use [Complete Flag] you have to facilitate an action reset [1] back to [0].

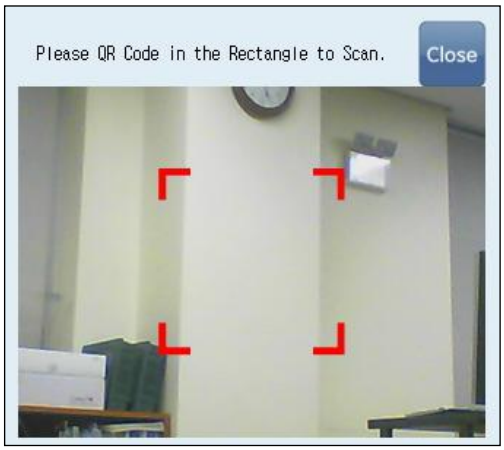
[QR Code File Setting] is available for TOPR premium models that has an integrated camera.
Save the recipe memory of your TOP device to a QR code, and load recipe data stored in a QR code to the TOP recipe memory by photographing the QR code with the integrated camera.
QR codes have limited storage, where you try to save excessive data in a QR code, the following error message will appear. In such cases, go to [Recipe Data] tab and adjust the [Item Count] and [Parameter Count].



[Figure. Error Message - Excessive data for QR Code]



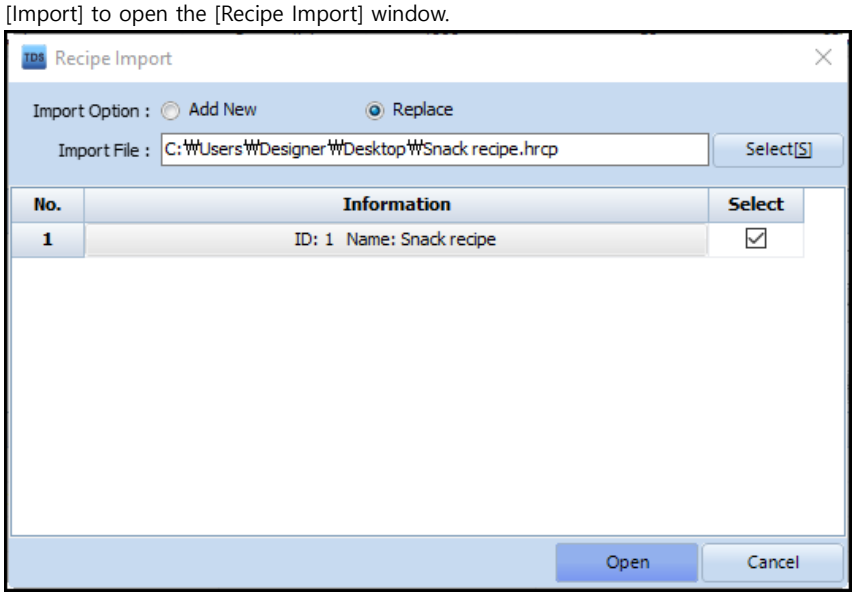
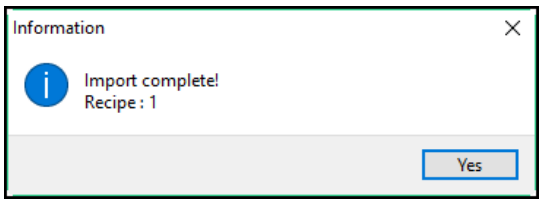
[Figure. Item Count & Parameter Count]

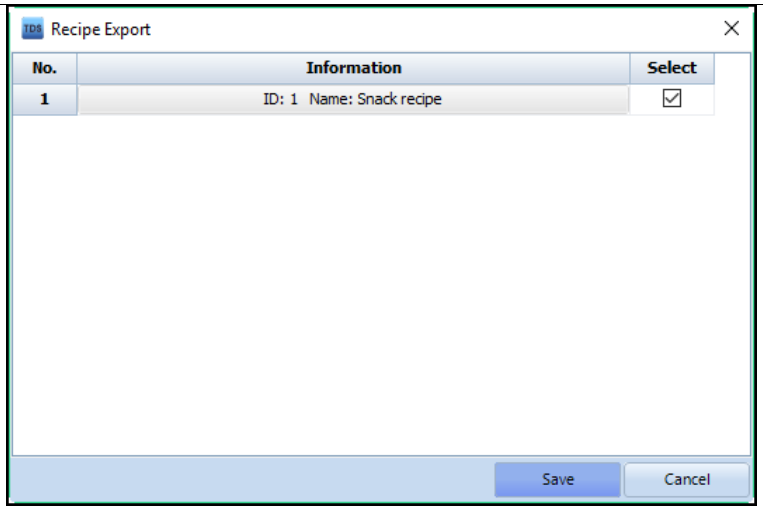
No.	QR Code File Setting	Description
1	Parameter of Load	When the predetermined [Condition] is met, the camera turns on to read a QR Code.  Fit the QR code created by [Parameter of Save] within the box. The recipe data embedded in the QR code is loaded to the TOP device recipe memory. Once the recipe data is loaded, the value of [Complete Flag] becomes [1]. Once the [Complete Flag] becomes [1], it does not reset to [0] by no automatic means. Therefore to use [Complete Flag] you have to facilitate an action reset [1] back to [0].
2	Parameter of Save	When the predetermined [Condition] is met, a QR code of which name is [FileName.jpg] is created in the [MHI-Recipe] directory of the [SD Card/ USB]. The recipe data of the TOP device is embedded to the QR code. Print the QR code, and run [Parameter to Load], read the QR code to load the recipe data embedded in the QR code to the TOP device recipe memory.

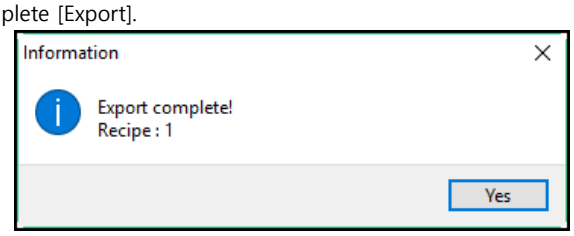
		[Figure. Recipe QR Code] When saving the recipe data is completed, the value of the [Complete Flag] value becomes [1]. Once the [Complete Flag] becomes [1], it does not reset to [0] by no automatic means. Therefore to use [Complete Flag] you have to facilitate an action reset [1] back to [0].

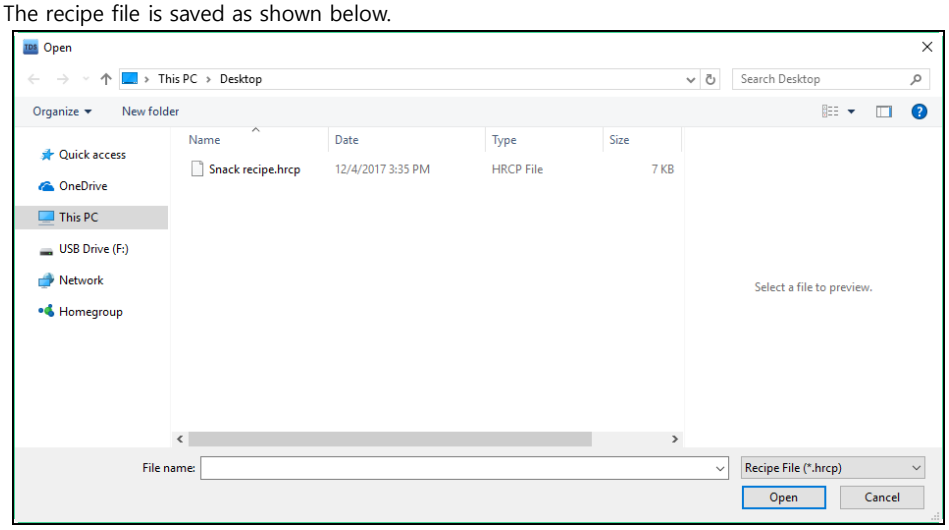
4.3.7 Import / Export Recipe Files

You can save recipe settings to a file, or load an existing recipe file.

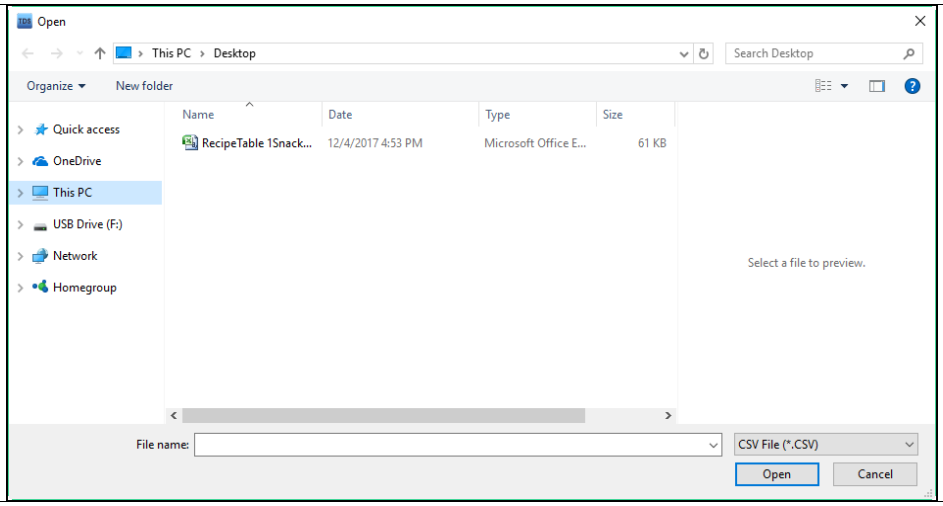
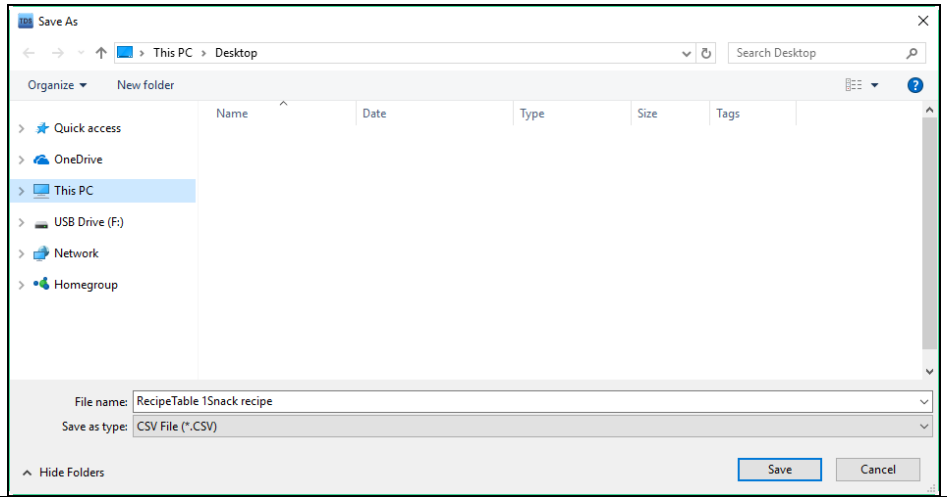
Recipe	Description
Import	Import a recipe file [*.hrcp] created with [Export]. Click [Import] to open the [Recipe Import] window.  Click [Select], an explorer will appear. Select the [*.hrcp] file of your interest and click [Open]. Select between [Add New] and [Replace] for the [Import Option] and click [Open] to execute the import.  Select [Add New] to create recipes with new IDs. Select [Replace] to overwrite the existing settings of an existing recipe.
Export	Save the recipe setting to a recipe file [*.hrcp]. Click [Export] to open the Recipe Export window.

<table>
<tr>
<td></td>
<td>


Select the recipe you want to export to a recipe file [*.hrcp], and click [Save] to open the [Save As] window. Select the directory in which the recipe file should be saved, and enter the name of the file.
Click [Save] to complete [Export].


The recipe file is saved as shown below.


</td>
</tr>
<tr>
<td>Import CSV</td>
<td>Import a recipe file exported with [Export CSV] to the [Selected Group].
Click [CSV Import] to open a browser.
Select the CSV recipe file of your interest and click [Open].</td>
</tr>
</table>

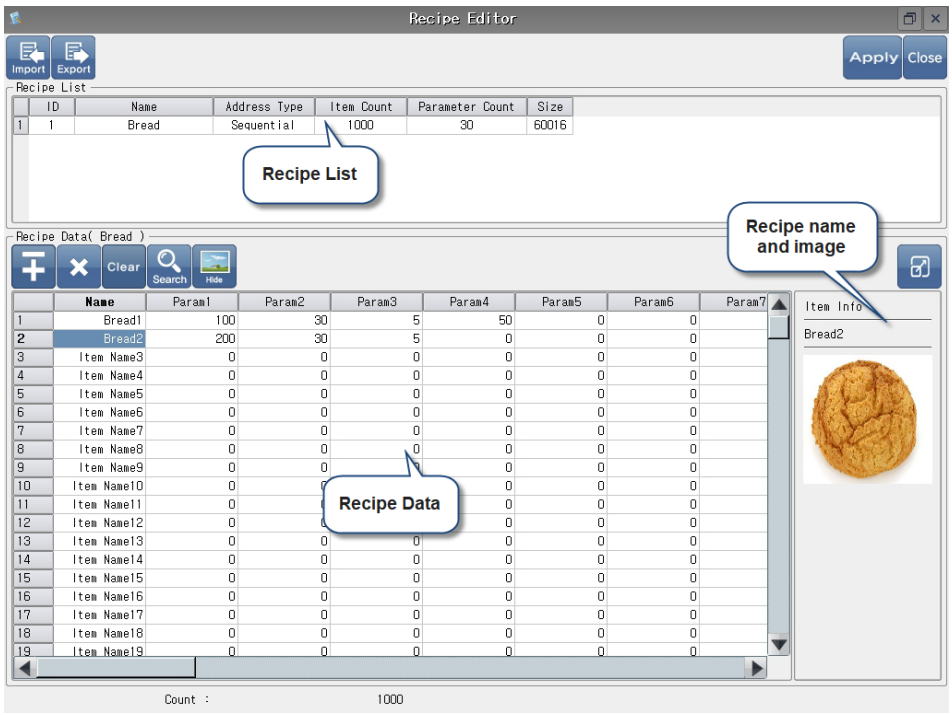
	
Export CSV	Export a configured recipe setting to a [*.CSV] file. You can edit an exported CSV file with Microsoft Excel software. Click [CSV Export] to open the [Save As] window. Select the directory in which the recipe file should be saved, and enter the name of the file. Click [Save] to export the file. 

4.3.8 Recipe Editor on TOP Menu of Run Screen.

Click [Recipe] on the TOP Menu to open the [Recipe Editor].

You can edit recipe data with [Recipe Editor].

[Figure. Recipe on TOP Menu]



[Figure. Recipe Editor]

The recipe list is provided on the upper field, and the each item and data of a selected recipe are shown on the lower field.

You cannot edit the recipe list, while the item name and recipe data are editable.

(1) Change Item Name

You can change the name of items.

Touch the item name to open the below [String Keypad]. Enter the new item name.

[Figure. String Keypad]

(2) Change Recipe Data

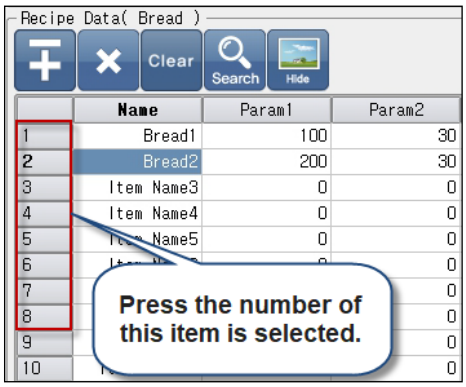
▶ Touch the data you intend to change to open the below [Numeric Keypad], enter the new data.

[Figure. Numeric Keypad]

▶

Use the [Add Item] / [Delete Item] / [Clear] menus to edit data.

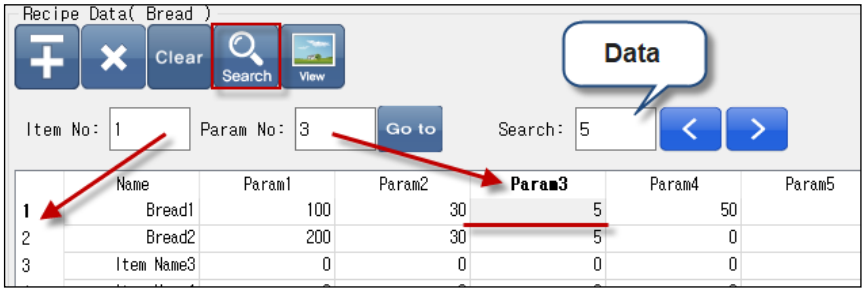
Touch the [Number] provided on the left side of the table to select an item.



[Figure. Select Item]

No.	Recipe Editor	Description
1	Add Item	A new item will be added with the item number that you have selected. Name / Param1 / Param2 / Param3 1 Bread1 100 30 5 2 New Item 0 0 0 3 Bread2 200 30 5 4 Item Name3 0 0 0 5 Item Name4 0 0 0 997 Item Name996 0 0 0 998 Item Name997 0 0 0 999 Item Name998 0 0 0 1000 Item Name999 0 0 0 Other items with numbers after the selected number will be automatically changed with the increment of one, and the last item will be deleted with a new item at the selected number. Since the last item is deleted, the total number of items do not change.
2	Delete Item	Delete the name and recipe data of a selected item.
3	Clear	Delete entire recipe data.

▶ Search Recipe Data



[Figure. Data Search]

Touch the [Search] button to open a search browser. Touch the button once again to close the search browser.

Select the [Item No.] and [Parameter No.].

Enter as shown above and touch [Go to], the display will navigate to the corresponding location.
Enter the data to search, and touch [Back], identical data located in front of the selected location will be searched and the display will navigate to such location. Touch the [Next] button, identical data located after the selected location will be searched and the display will navigate to such location.

▶ View the name and images of a selected item.

Touch [View], the icon will be changed to [Hide]

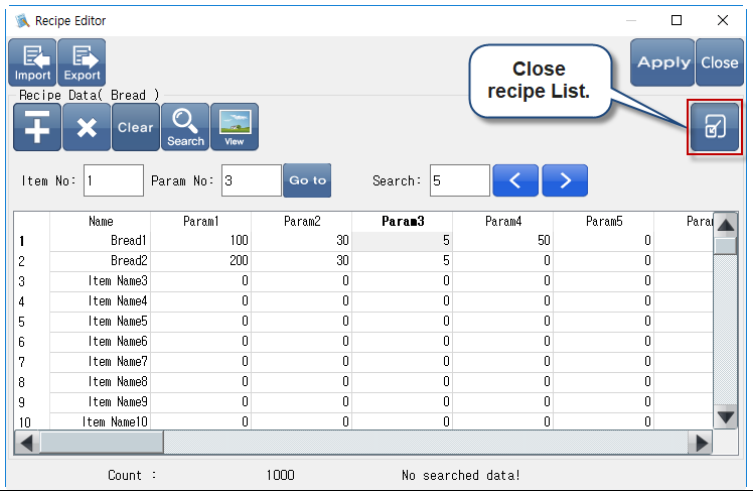
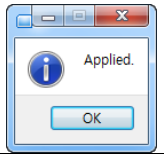
and detail information of the item will be displayed on the right.

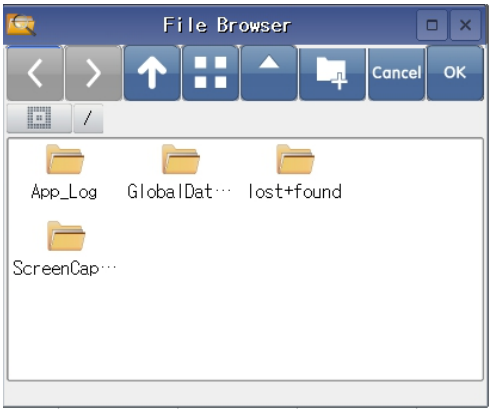
Touch [Hide], the icon will be changed to [View]

and the information window on the right side will disappear.

Select the number of the recipe item to view the name and image of the item.
The name and image of each item can be configured at [Project] - [Recipe] - [Recipe Item].

[Figure. Item Information]

No.	Recipe Editor	Description
1	Close Recipe List	Close the recipe list. 
2	Apply	Apply all modifications. 

3	Close Close	Close the Recipe Editor.
4	Import Import	Load a recipe file created with [Export].
5	Export Export	Save recipe file to an [*.CSV] file. Input the file name with the [String Keypad], and select [Enter]. Configure the directory in which the file should be saved from the [File Browser].  Click [OK] to save the recipe file in the selected directory.

4.3.9 Delete Recipe Data

You can initialize recipe data from the Menu Screen.

Go to [Control Panel] - [Initialization] and click [Start] for [4. Clear Recipe Data] to delete all recipe data on the TOP device.

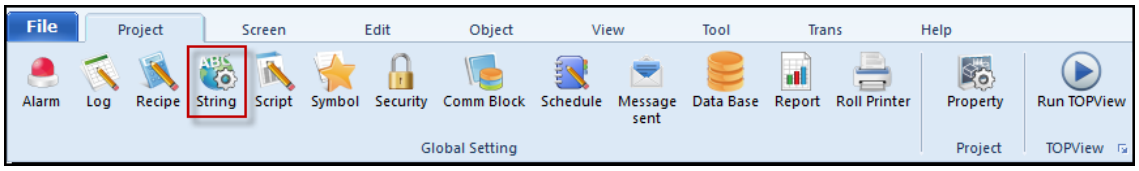
[Figure. Control Panel from Menu Screen]

[Figure. Clear Recipe Data]

4.4 String

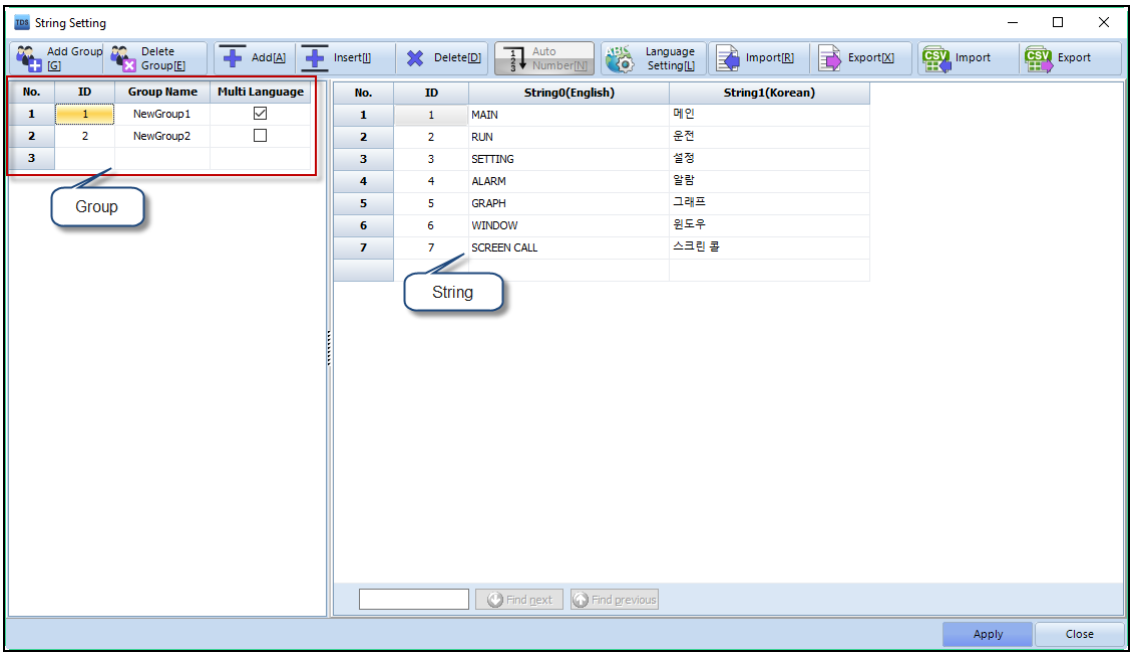
Add strings applicable for the project in forms of tables.
You can directly input strings used in the project, but for an efficient and sophisticated management, configure string settings.

1) If identical strings are applied multiple times in a project, a single modification to the string table changes all corresponding strings.
2) Strings included in String Setting can be applied in other projects with [Export] / [Import].
3) Enable [Multi Language] for tables with different languages, that allows you to change the system language of a project with a single input.



[Figure. Project - String]

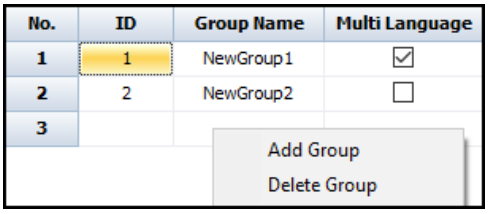
Create a group and add strings to the group.



[Figure. String Setting]

4.4.1 Edit Groups

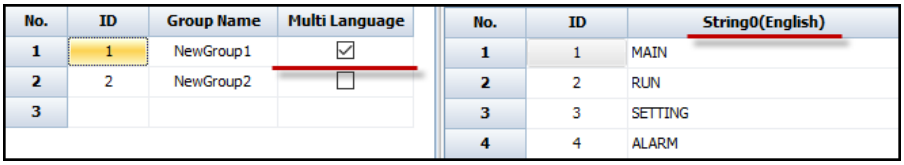
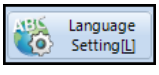
Groups are provided to categorize strings, and you can add up to 65,536 string groups.
You can add up to 50,000 strings to a single group.

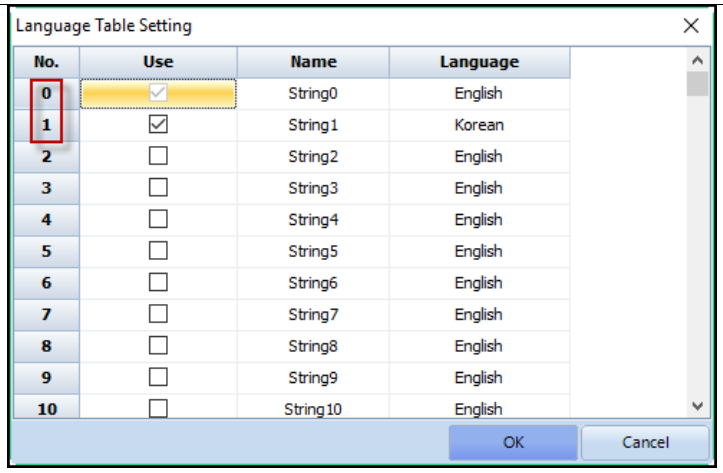


[Figure. String Group Table]

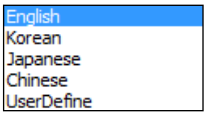
No.	Group	Description
1	Add Group	Add a new group. Click the [Add Group] button on top of the window or select [Add Group] from the pop-up menu provided with a right click.
2	Delete Group	Delete a selected group. Click the [Delete Group] button on top of the window or select [Delete Group] from the pop-up menu provided with a right click.

Groups have properties of [ID] / [Group Name] / [Multi Language].

No.	Group	Description
1	ID	The sequential number assigned to each string group. You can change the group ID.
2	Group Name	Every new group will be named as NewGroup# as default. You can change the Group Name.
3	Multi Language	Select whether or not to configure strings in two or more different languages. ▶ If [Multi Language] is not selected, strings will be entered in a single language table as below.  ▶ If [Multi Language] is selected, you can enter two or more languages.  If [Multi Language] is selected, go to [Language Setting] and configure the [Language Table Setting]. You can configure up to 16 language tables.



No. [0] refers to the default language that cannot be deleted.
Enable [Use] for Numbers [1] to [15] to add new language tables.
Enter the [Name] and select the applicable [Language]. The [Name(language)] conforms the label of the language table.
For languages, select among [English] / [Korean] / [Japanese] / [Chinese], and for other languages, select [UserDefine].



If languages are added, rows of which count corresponds to the number of languages will be added to the String Table.

No.	ID	String0(English)	String1(Korean)
1	1	MAIN	메인
2	2	RUN	운전
3	3	SETTING	설정
4	4	ALARM	알람
5	5	GRAPH	그래프
6	6	WINDOW	윈도우
7	7	SCREEN CALL	스크린 콜

4.4.2 Edit Strings

Add and edit strings.

You can [Copy (Ctrl+C)] and [Paste (Ctrl+P)] strings from excel files.

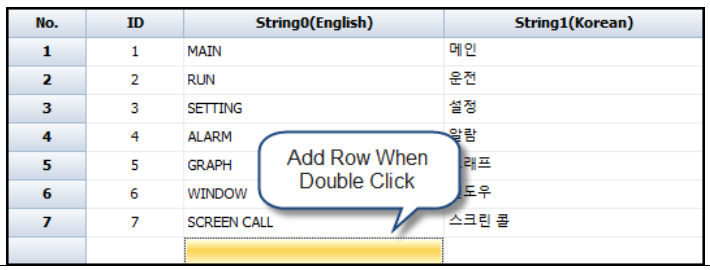
[Figure. String Table]

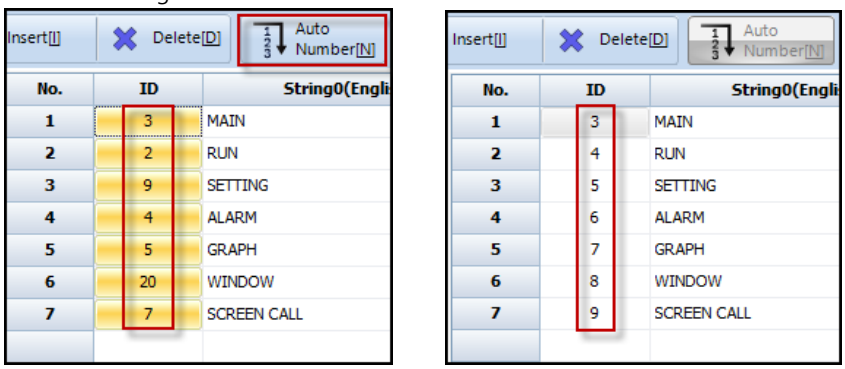
For string columns, if [Multi Language] is not selected, only two columns ([ID] / [String]) will exist, and if [Multi Language] is selected the number of columns corresponding to the multiple languages will be added to the String Table.

No.	String	Description
1	ID	The number of the String. Whenever a new string is added, the new string will be assigned to the next number of the highest existing string. You cannot change String ID.
2	String	Enter the text that shall be employed by the project. When you have selected [Multi Language] the number of string columns will correspond to the numbers of languages selected to be used.

Edit [String Table] with [Add] / [Insert] / [Delete] / [Auto Number] provided in the toolbar.

[Figure. Edit String Toolbar]

No.	Edit String	Description
1	Add	Add a new row to enter a new string. Method 1) Click [Add] on the toolbar or select [Add Row] from the pop-up menu with a right click to add a new string to the bottom of the String Table. Method 2) Double clike the last row to add a new row to the String Table. 
2	Insert	Insert a new row right above the selected row. Select the row at which you intent to add a new string, and click [Insert] from the toolbar or

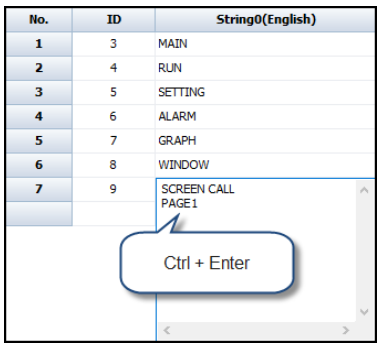
		select [Insert Row] from the pop-up menu of a right click to insert a new string to the String Table.
3	Delete	Delete a selected String.
4	Auto Number	Change the String ID in an ascending order. Drag the field in which applicable IDs are located, or select the first ID and use the [Down Key] while the [Shift] key is pressed to select the IDs that [Auto Number] should be applied. Click [Auto Number] to reassign the selected strings beginning from 1 for the first string and the others in an ascending order. 

You can edit strings as below.

No.	Edit String	Description
1	Copy	Select [Copy] from the pop-up menu of a right click, or use shortcut key [Ctrl+C]. You can copy one or more strings. You can select multiple strings with a mouse drag or navigating the table while the [Shift] key is pressed.
2	Paste	Select [Paste] from the pop-up menu of a right click or use shortcut key [Ctrl+V]. The copied string(s) is pasted to the selected area.
3	Cut	Select [Cut] from the pop-up menu of a right click, or use shortcut key [Ctrl+X]. Delete one or more strings. You can select multiple strings with a mouse drag or navigating the table while the [Shift] key is pressed. Only the string(s) will be deleted, while the row will remain. You can [Paste] a string you have [Cut] to another field.

Use [Ctril+Enter] to enter a string in multiple lines.

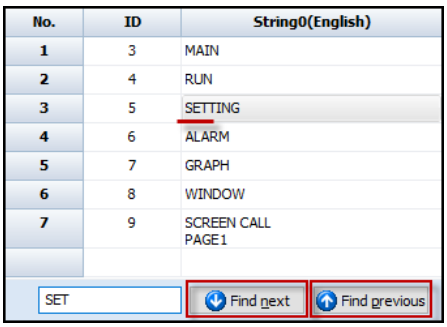
If you use [Ctrl+Enter] the cursor moves to a next line.



[Figure. Enter Strings with multiple lines]

String search function is provided on the bottom of the window.

Enter the string you want to search, the system will navigate to the first match in the table.
Use [Find next] / [Find previous] to navigate to other matching strings.



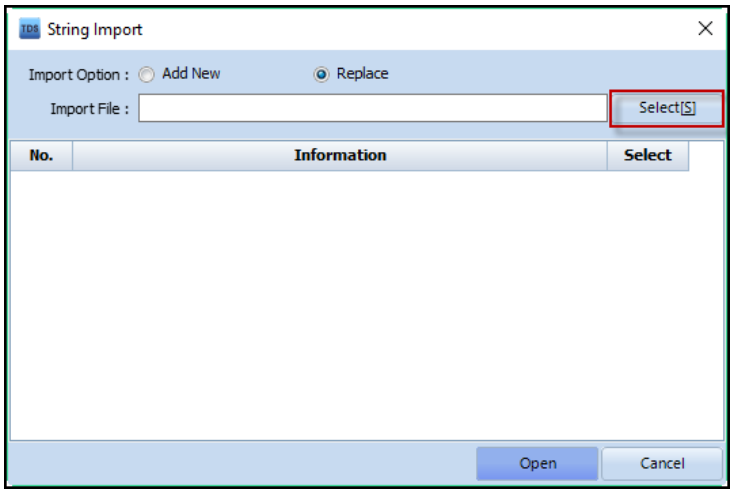
[Figure. Search Strings]

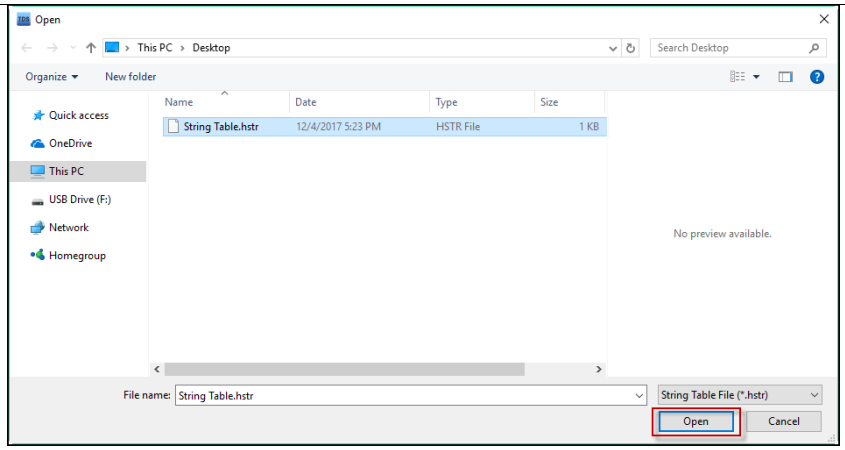
4.4.3 Import / Export String Table

You can save string tables to a file, or load string tables saved with [Export].

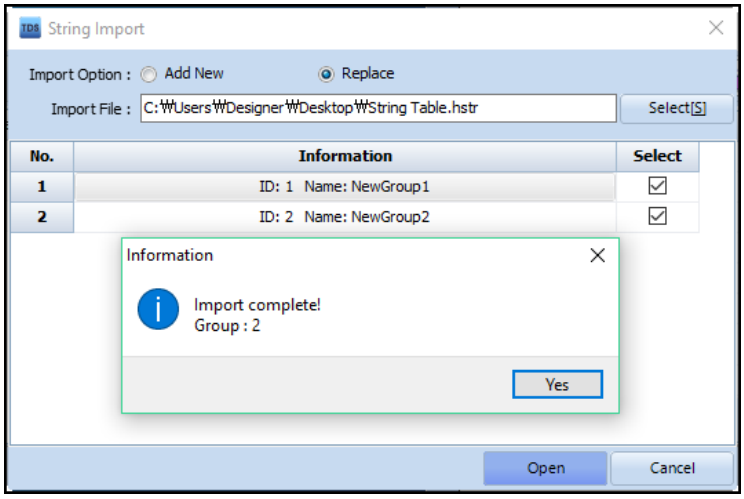
[Import] / [Export] will save string tables to an [*.hstr] file or load string tables from an [*.hstr] file. [*.hstr] files are not editable.

[CSV Import] / [CSV Export] will save string tables to a [*.CSV] file or load string tables from a [*.CSV] file. CSV files can be edited with Microsoft Excel Software.

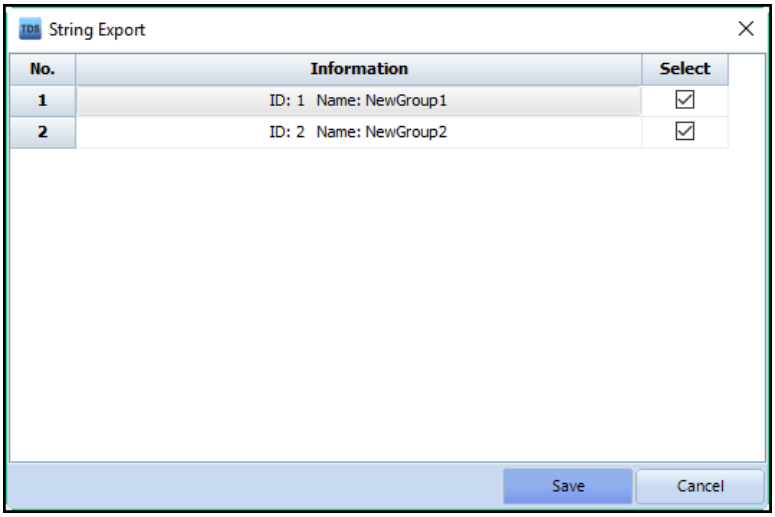
No.	String	Description
1	Import	Import a string table file [*.hstr] created with [Export]. Click [Import] to open the [String Import] window.  Click [Select], an explorer will appear. Select the [*.hstr] file of your interest and click [Open].

<table>
<tr>
<td></td>
<td></td>
<td>


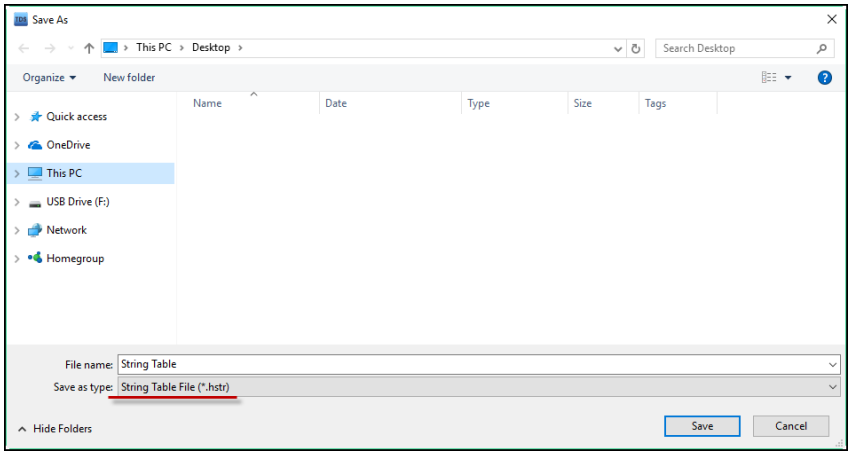
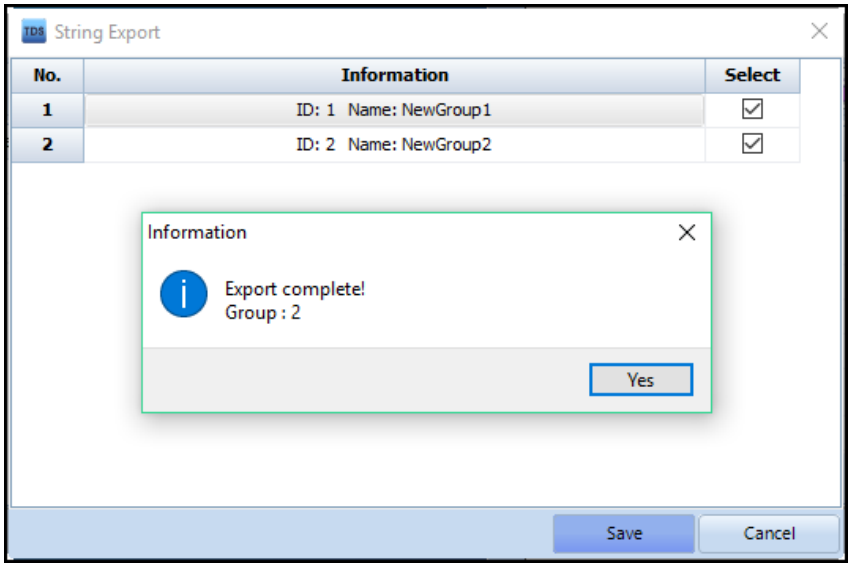
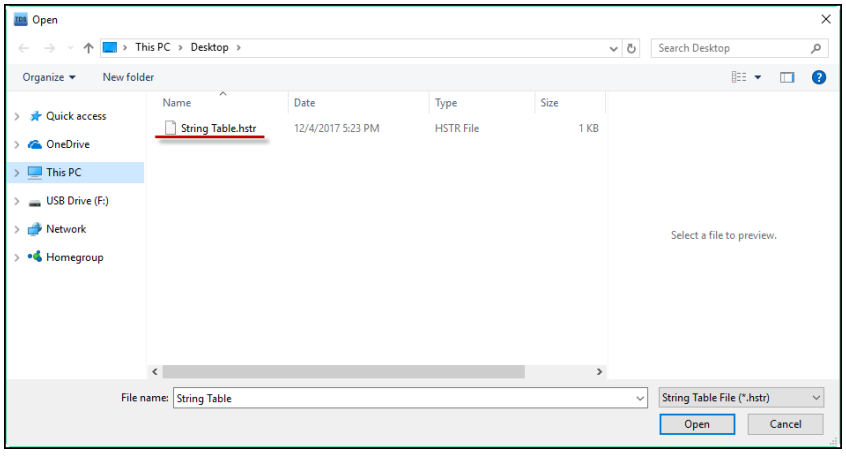
Select [Open] from the [Import Multi Language] window to complete import.

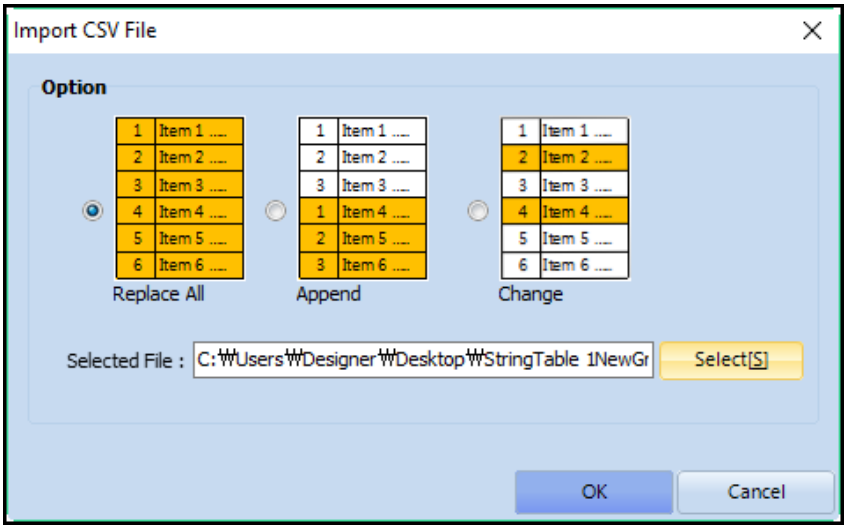
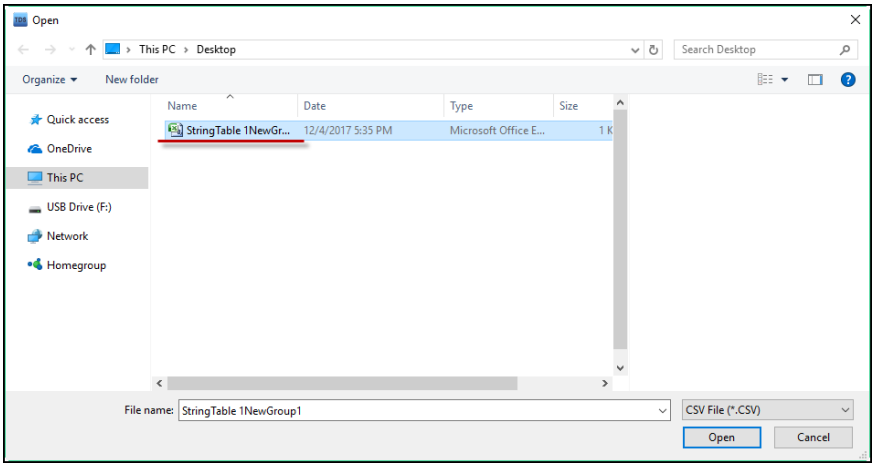


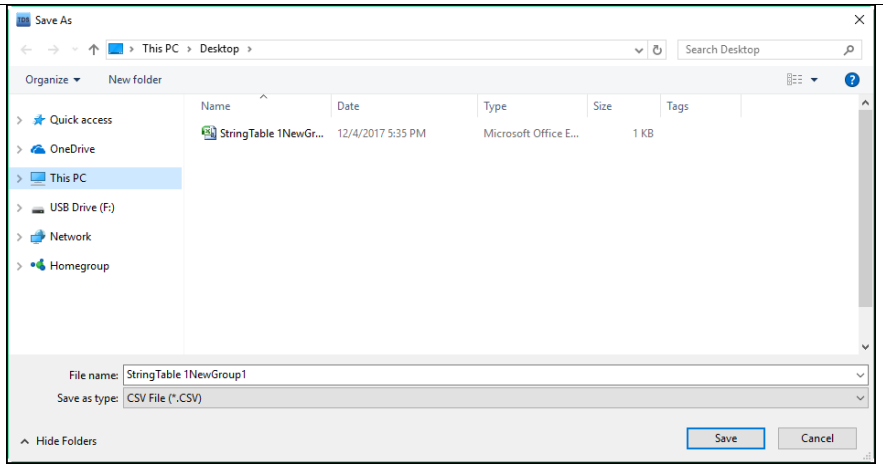
Select [Add New] to create a new group and add the string table from the imported file to the new group.
Select [Replace] to replace the existing strings with strings from the string file with identical group IDs.
</td>
</tr>
<tr>
<td>2</td>
<td>Export</td>
<td>
Export the multi language table to a string file [*.hstr].
Click [Export] to open the String Export window.



</td>
</tr>
</table>

		Select the ID to export and click [Save] to open the [Save As] window. Select the directory in which the string file should be saved, and enter the name of the file.  Click [Save] to complete [Export].  The string table is saved in the selected path. 
3	CSV Import	Import a string file exported with [CSV Export] to the selected group.

		Click [CSV Import] to open [Import CSV File] window. Click [Select], and select a string table file saved with [CSV Export] from the [Open] window.   Select [Replace All] to delete the entire string table of the selected group and add the string table from the imported file to the selected group. Select [Append] to add the string table of the CSV file to the bottom of the existing string table of the selected group. Select [Change] to replace strings on the existing string table that have the same ID number with those on the CSV file, and add other strings from the CSV file while maintaining strings that are not present on the CSV file.
4	CSV Export	Save the multi language table of the selected group to a [*.CSV] file. Click [CSV Export] to open the [Save As] window. Select the directory in which the string file should be saved, and enter the name of the file. Click [Save] to export the file.

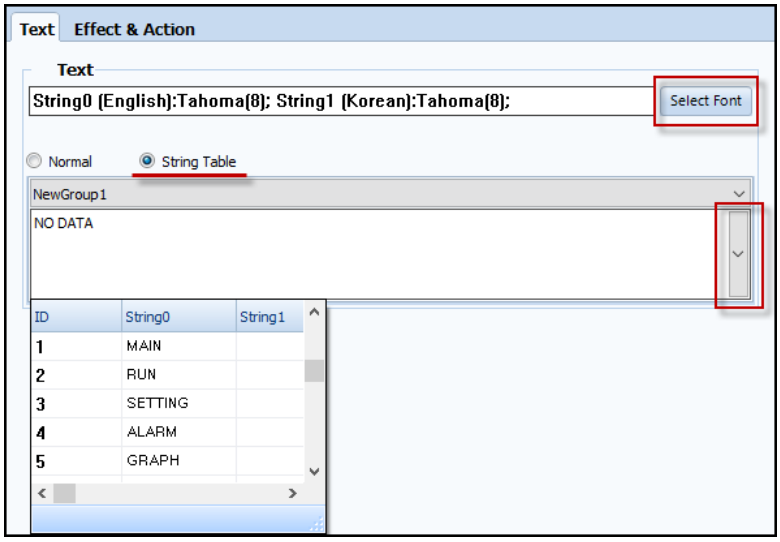


You can edit an exported CSV file with Microsoft Excel software.

	A	B	C
1	3	MAIN	메인
2	4	RUN	운전
3	5	SETTING	설정
4	6	ALARM	알람
5	7	GRAPH	그래프
6	8	WINDOW	윈도우
7	9	SCREEN CALL PAGE1	스크린 콜

4.4.4 How to use a string table in a text

To use a text included in a string table, select [String Table] as you selected [Text] from [Object/Alarm Content]. Then select the subject group and string for the corresponding [String].



[Figure. Apply string table as texts]

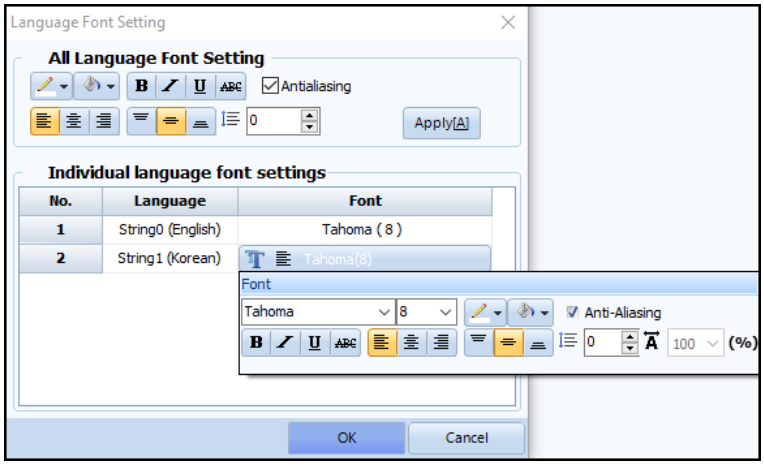
4.4.5 Multi Language

▶ How to configure string tables in multi languages.

1) Go to [Project] - [String], and select a Group from [String Setting]. Enable [Multi Language].
2) Click [Language Setting] on the [String Setting] window and create multi language string tables.
3) Enter strings corresponding to each language column.

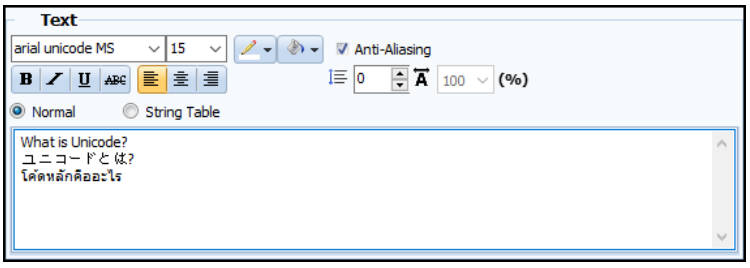
▶ How to configure fonts for multi languages.

Click [Font Setting] for a text configured as a multi language, configure the font for [Individual Language font settings] for each language from the [Language Font Setting].



[Figure. Font Setting]

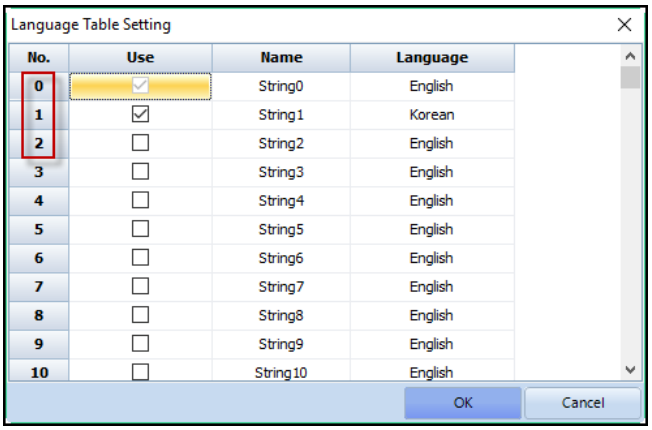
Different fonts are provided for each language, thus select an applicable font to each language.
If an inappropriate font is selected for a language, the subject text will not be displayed properly.
Select the common font from [All Language Font Setting]. Click [Apply] to solidify properties configured for all languages.
To apply different fonts for different languages, configure the font for each language with [Individual language font settings].
If multiple language should be used at the same time, select [Arial Unicode MS]. This font provides the most universal application to the majority of languages.



[Figure. Arial Unicode MS Font Setting]

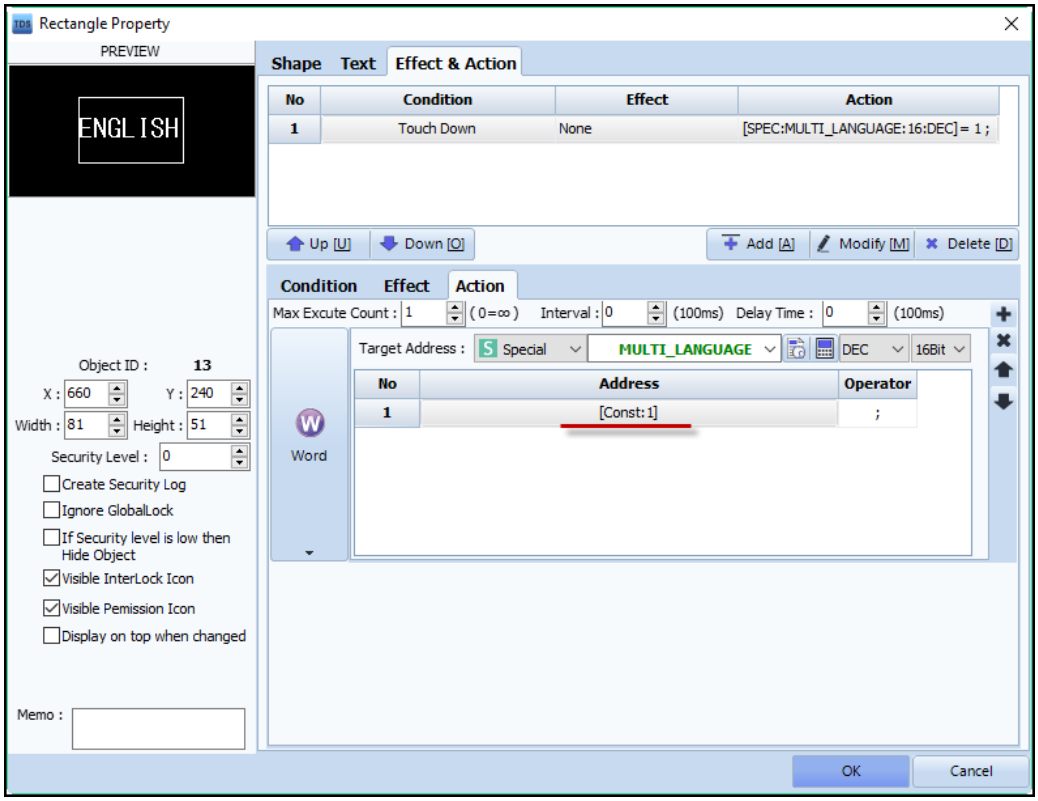
▶ Ho to change project language for a project using multiple languages.

Select [MULTI_LANGUAGE] for Special Address and enter the [Language Number], all texts referring to string tables will be converted to the selected language.
You can check each language [Number] from the [Language Setting] button.



[Figure. Language Table Setting]

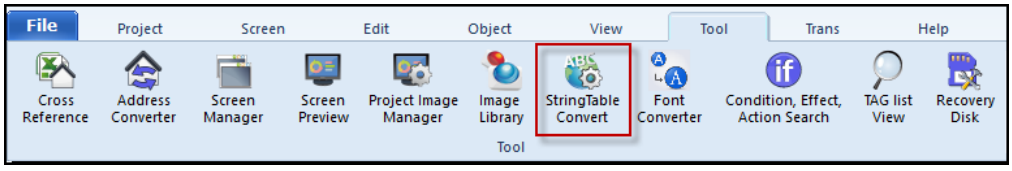
Given the above configuration, if the [MULTI_LANGUAGE] is selected to be [0], all texts will be shown in Korean, and if [1], English.



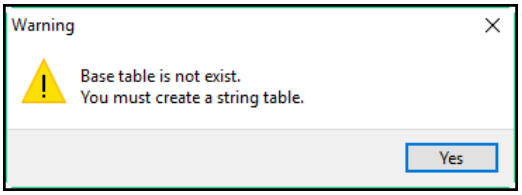
[Figure. How to change language for string tables]

4.4.6 Automatic conversion with [Tool] - [String Table Convert].

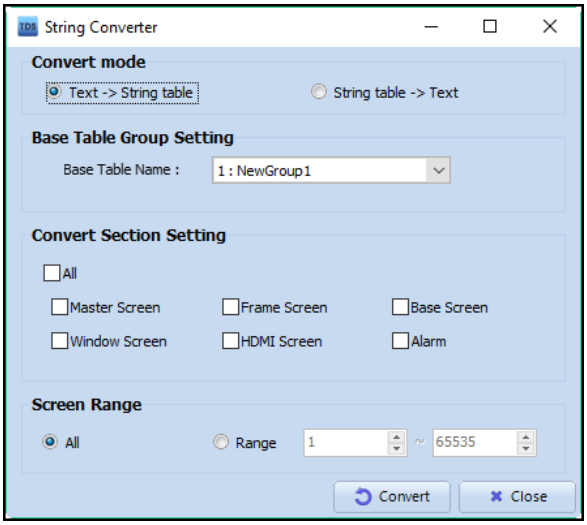
Go to [Tool] - [String Table Convert] to convert a project with no strings to a string table. You can also convert a project employing string tables to a normal text.



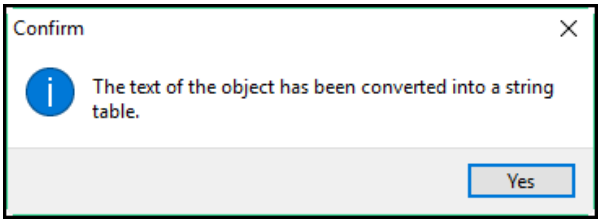
Go to [Project] - [String] and add a [Group] form the [String Setting] window.
If no group is present, the below warning message will appear and [String Table Convert] will not be executed.

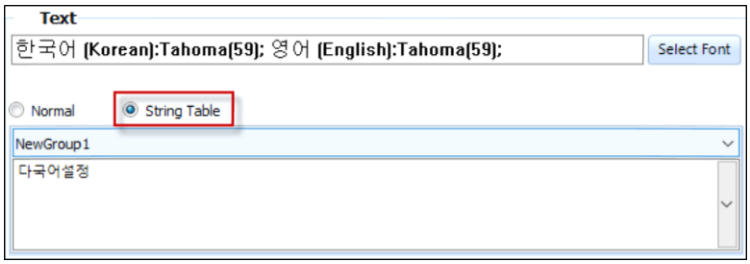
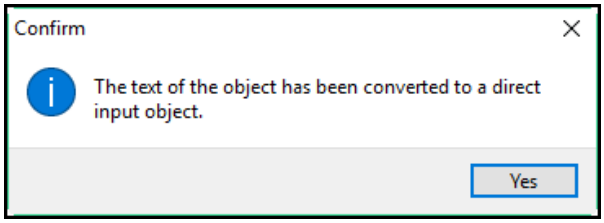
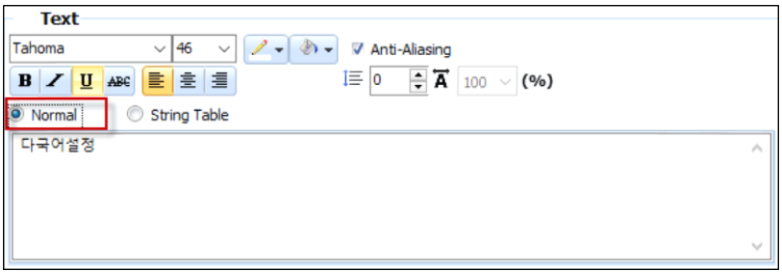


Once [String Table Convert] is executed, [String Converter] window will appear.



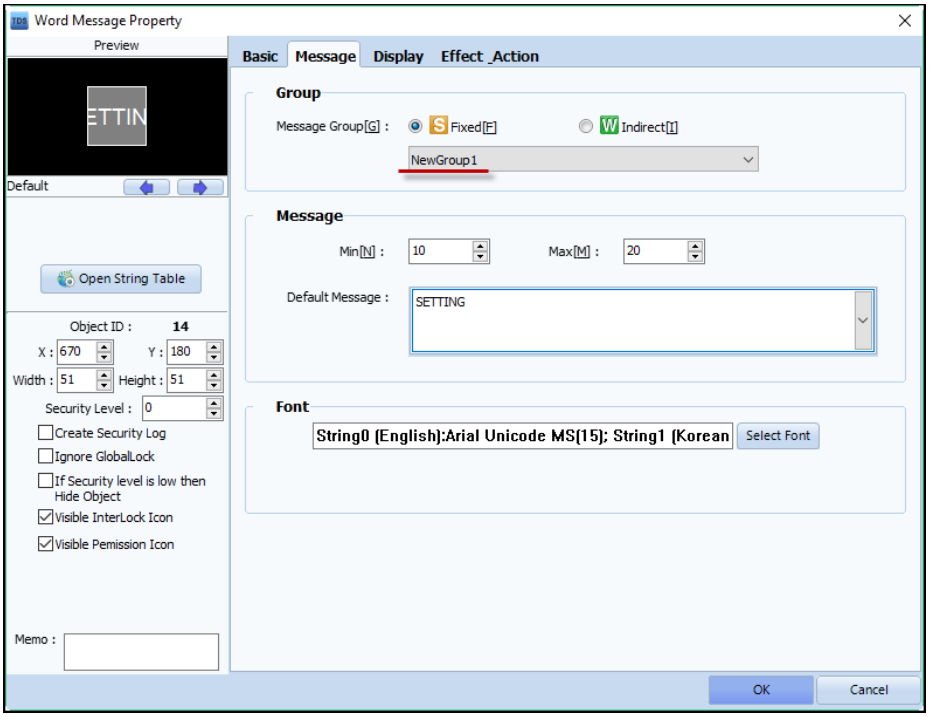
[Figure. String Converter]

No.	String Converter	Description
1	Convert Mode	▶ Select [Text -> String Table] to convert a text that does not use [Project] - [String] to a text configured as a string. 

		1) All texts in the selected project will be converted to the string table available at [Project] - [String]. 2) All texts included in the project are selected as [String Table], and are automatically selected as a string with existing texts.  ▶ Select [String Table -> Text] to convert texts configured as [String Tables] to [Direct Input].   The string table at [Project] - [String] remains present.
2	Base Table Group Setting	Select the group to which all texts of the project will be added.
3	Convert Section Setting	Select the section that should be converted. Select [All] to convert all texts included in the project. Select either [Master Screen] / [Frame Screen] / [Base Screen] / [Window Screen] / [HDMI Screen] and [Alarm] to convert the text included in each corresponding section.
4	Screen Range	If [Master Screen] / [Frame Screen] / [Base Screen] / [Window Screen] / [HDMI Screen] or [Alarm] is selected for [Convert Section Setting], configure the range of the screen number subject to conversion. Select [All] to convert the entire screen, and [Range] to convert a specific screen number.

4.4.7 How to use strings in a message object

You can show strings from a String Table on a [Message] Object according to the conditions.



[Figure. Message Object]

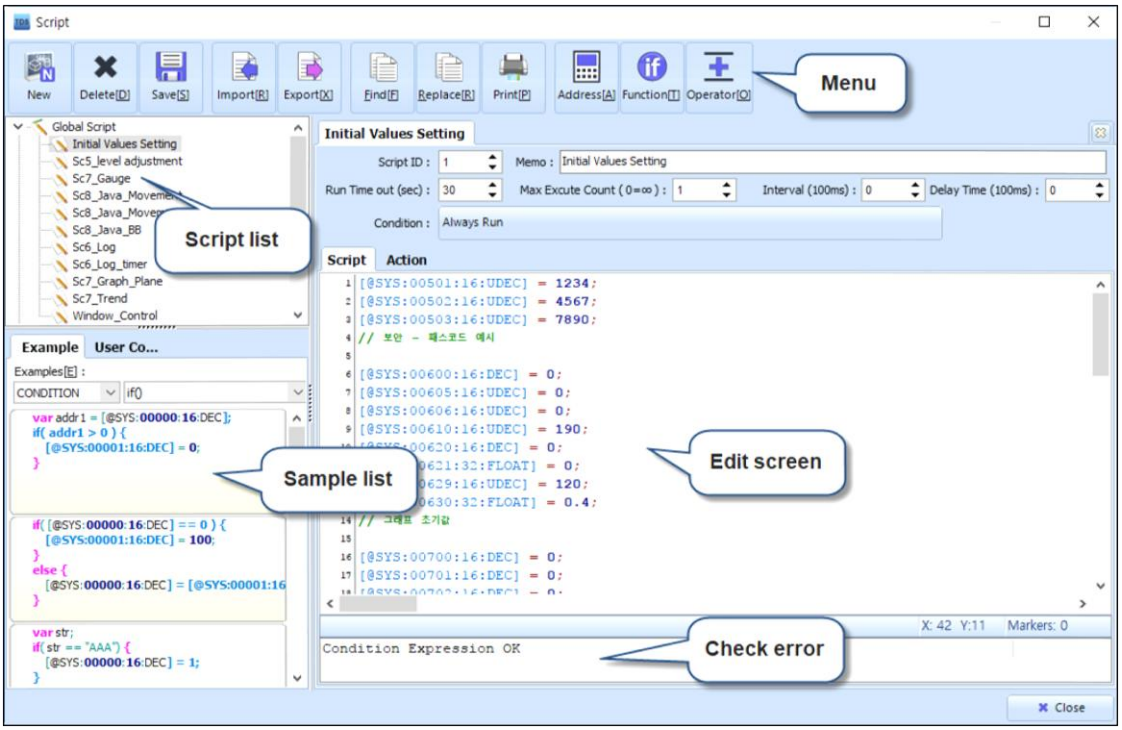
Refer to Chapter 11. [Message Object] for more details.

4.5 Script

You can add simple calculations with [Object], but for complicated conditions / calculations, [Script] provides you a more sophisticated and articulated handling.

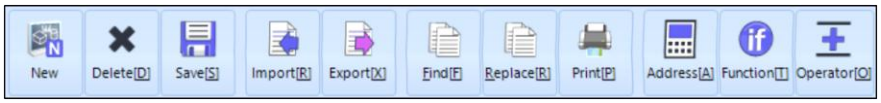
You can select among [Global(All Screens)] / [Screens] / [Object] for the applicable range for scripts. TDS employs Javascript Engine, one of the most commonly used script in internet environments. Therefore configure your script in the same grammar with [Javascript].

☞Caution! Excessive scripts caused deterioration to operation speed, and according to the communication speed between PLC and TOP device, script result values may respond in delay.

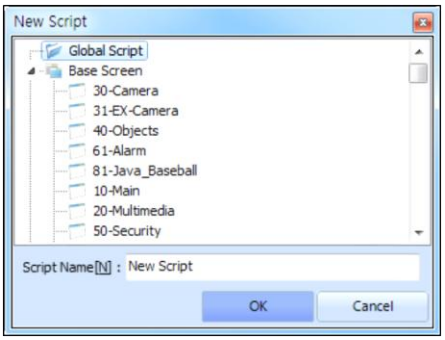
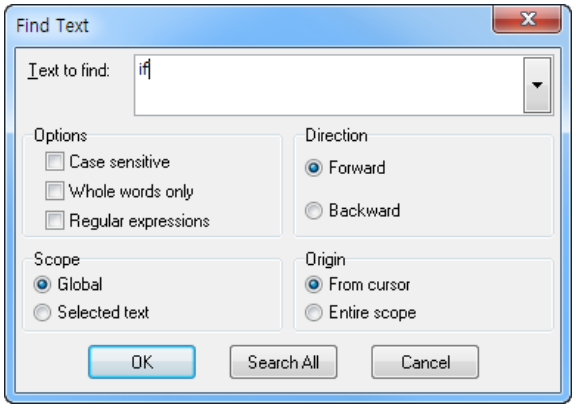


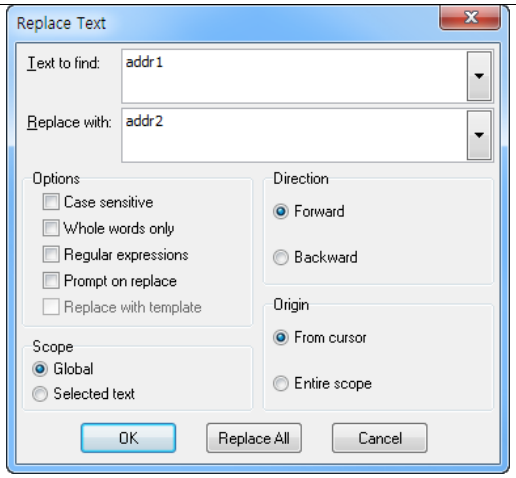
[Figure. Script]

4.5.1 Script menu bar

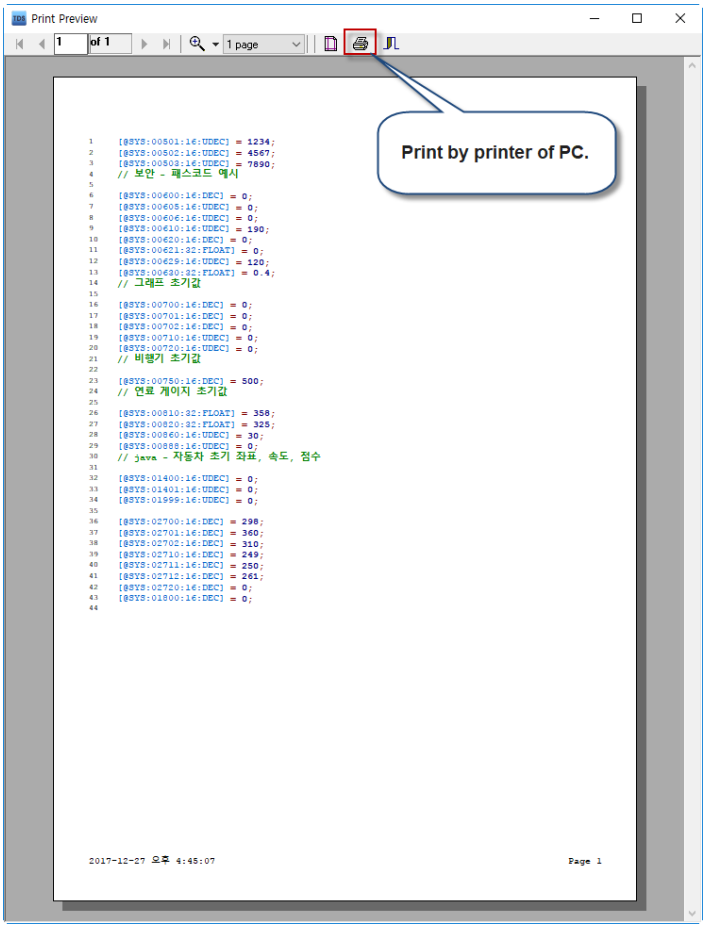


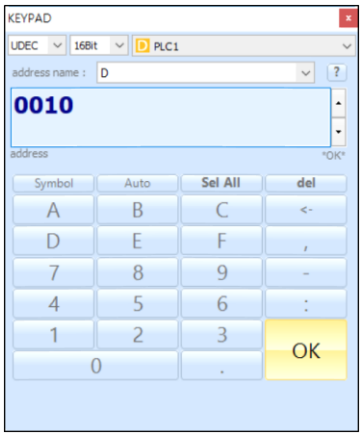
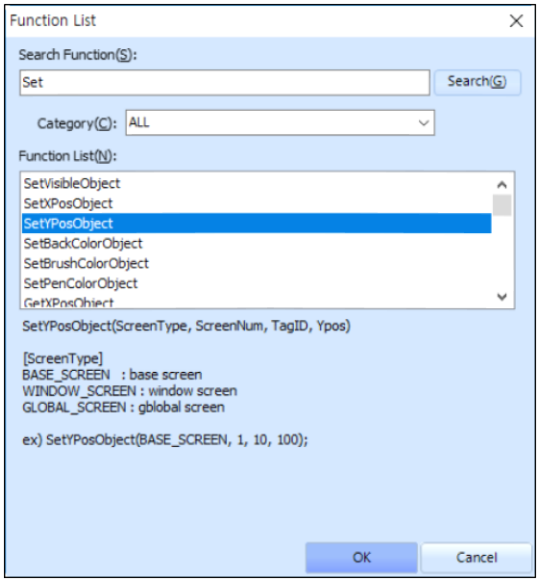
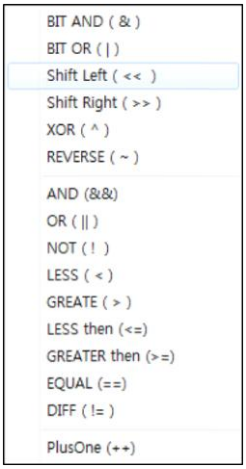
[Figure. Script Menu Bar]

No.	Menu Bar	Description
1	New	Create a new script. Click [New] to open [New Script] window.  Select [Global Script] to apply the script to all screens, or select individual screens to apply the script to a specific screen. Enter the [Script Name] and click [OK].
2	Delete	Delete a script from the script list.
3	Save	Save the current script.
4	Import	Import a script file (*.hsrt) created with [Export].
5	Export	Save all script settings to a script file [*.hsrt].
6	Find	Search a specific text from the script edit screen.  Enter the string of your interest in the [Text to find] text box. Key in the string. If you selected a string from the Edit Screen and click [Find], the selected text will be pasted to the [Text to find] text box. Configure search [Options] of [Case Sensitive] / [Whole Words Only] / [Regular expressions]. Determine the search [Direction] between [Forward] and [Backward]. Determine [Scope] between [Global] and [Selected Text]. Determine [Origin] between [From cursor] and [Entire scope]. Click [OK] to find the first match from the Edit Screen. Click [Search All] to find all strings that matches to your search from the Edit Screen.
7	Replace	Find a specific text from the Edit Screen and replace the text to another text. Enter the string of your interest in the [Text to find] text box. Key in the string. If you selected a string from the Edit Screen and click [Find], the selected text will be pasted to the [Text to find] text box. Type in the new text in [Replace with] text box.

<table>
<tr><td></td><td></td><td> 

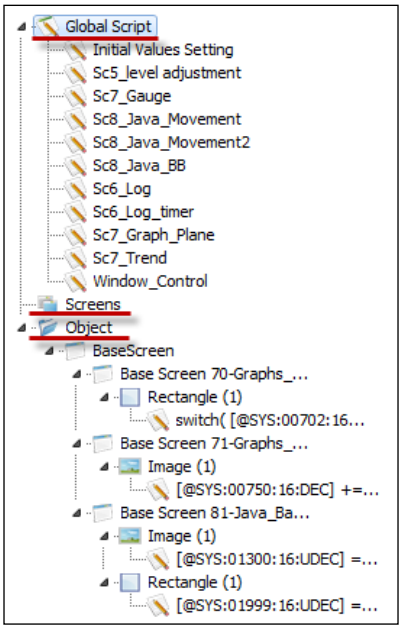
Configure search [Options] of [Case Sensitive] / [Whole Words Only] / [Regular expressions] / [Prompt on replace] / [Replace with template].
Determine the search [Direction] between [Forward] and [Backward].
Determine [Scope] between [Global] and [Selected Text].
Determine [Origin] between [From cursor] and [Entire scope].
Click [OK] to find the first match from the Edit Screen.
Click [Replace All] to find all strings that matches to your search from the Edit Screen.</td></tr>
<tr><td>8</td><td>Print</td><td>Print the script edit screen.

 
</td></tr>
<tr><td>9</td><td>Address</td><td>Click [Address] to open an address [KEYPAD].
Addresses typed in the keypad will be added to the Edit Screen.</td></tr>
</table>

		
10	Function	Click [Function] to open [Function List] and add functions to the script. Type in the function of your interest in the [Search Function(s)] text box, and click [Search] to browse the applicable functions. Select a function of your interest from the [Function List] a brief description of the function is provided in the lower field. Click [OK] to add the function to the edit screen. 
11	Operator	Click [Operator] and select an operator from the pop-up menu to add an operator to the Edit Screen. 

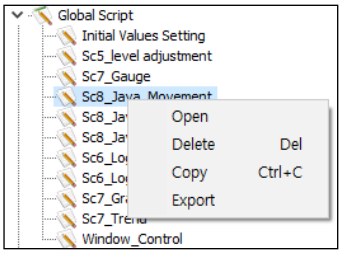
4.5.2 Script List

A script list is provided on the upper left side of the Script setting window.
Double click a script on the script list to open the content of the script in the Edit Screen provided on the right side of the window.



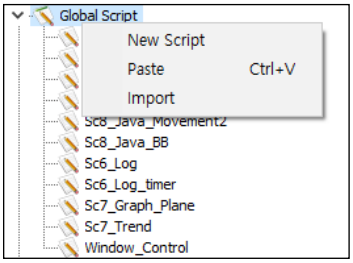
[Figure. Script List]

The script list shows you scripts added to [Global Script] / [Screen] and [Object].
[Global Scripts] are applicable to the entire project. In other words, if the condition is met, the script is executed regardless to the currently operating screen.
[Screens] scripts are applicable to the subject screen.
[Object] scripts are executed if the conditions of a specific object are met.
Select a script from the Script List, the following pop-up menu will appear upon a right click.



No.	Category	Description
1	Open	Open the selected script on the edit screen.
2	Delete	Delete the selected script.
3	Copy	Copy the selected script.
4	Export	Save a single script to a script file [*.hsrt].

The following pop-up menu will appear upon a right click to [Global Script] or an individual screen that contains a script.



No.	Category	Description
1	New Script	Create a new global script or screen script.
2	Paste	Paste a script you have copied to the selected category ([Global Script] / [Screen Script]). A new script with the copied content will be added.
3	Import	Import a script file [*.hsrt] created with [Export].

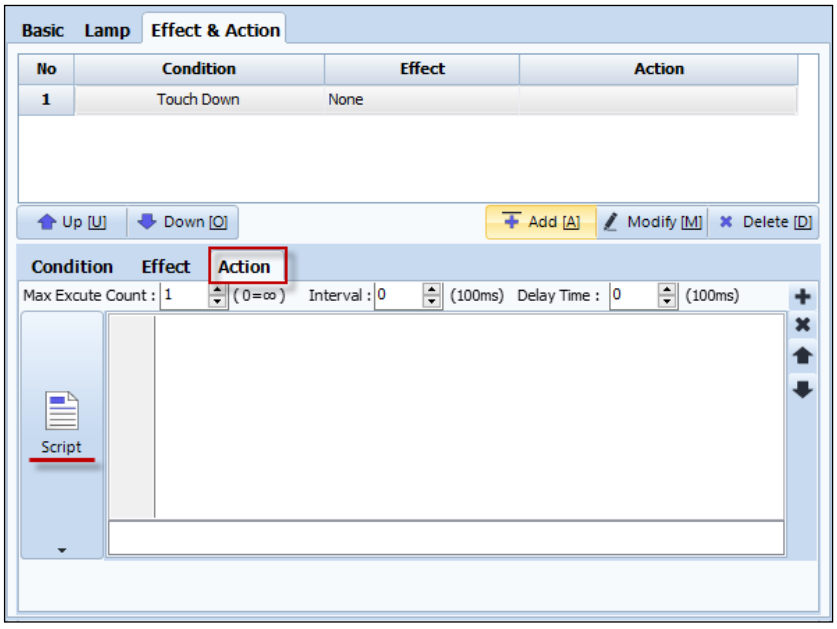
4.5.3 Add Script

(1) How to add a script on a screen

Add a script by clicking [New] on the menu bar (Refer to Chapter 4.5.1 [Script Menu Bar] for more details) or select [Global Script] or a script that contains a script from the Script List and select [New Script] from the pop-up menu upon a right click. (Refer to Chapter 4.5.2 [Script List] for more details.)

(2) How to add a script to an object

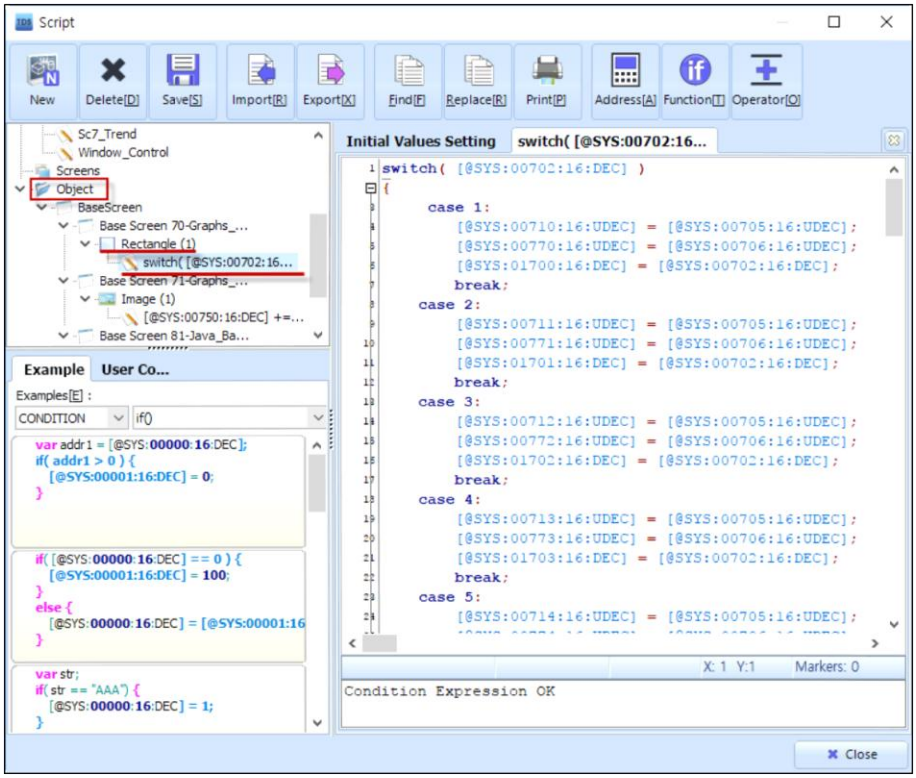
To add a script to an [Object] add a [Script Action] at the object's [Effect & Action] - [Action].



[Figure. Object Script]

You can directly code a script in the script edit field of an object.

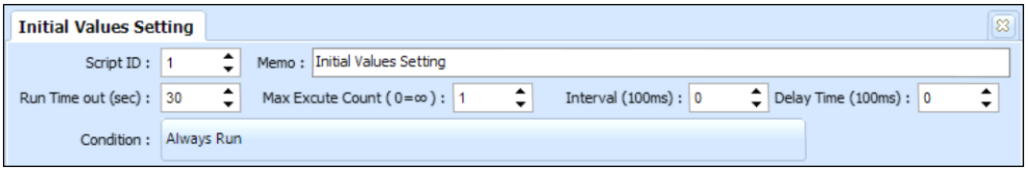
However, to use the sample codes / functions / address, etc. provided by [Script Setting], you are recommended to draft scripts from [Script Setting].



[Figure. Object Script]

4.5.4 Script Run Condition

Configure the conditions to run a script.



[Figure. Script Condition]

No.	Property	Description
1	Script ID	Configure the Identification number of the script.
2	Memo	Type in the script description.
3	Runt Time Out (sec)	Configure the maximum time to runs the script. Configure the time to terminate a script with [Run Time Out] in cases where the script is in an infinite loop or PLC response is not received throughout communication with PLC. This function is provided to prevent to terminate errors.
4	Max Execute Count/ Interval	Configure the maximum number of times the script should executed when its condition is met. If the [Max Execute Count] is [3], and the condition is met, the script will be executed 3 times with the interval defined by [Interval (100ms)]. If the [Max Execute Count] is [0], and the condition is met, the script will be repeatedly executed with the interval defined by [Interval (100ms)]. [Interval] refers to the time interval provided between each execution when the [Max Execute Count] is [2] or above.
5	Delay Time	If the [Run Condition] is met, the script will be executed after a [Delay Time (100ms)].

Click [Condition] to open [Condition Setting] window. Configure the conditions to execute the script from the [Condition Setting] window.

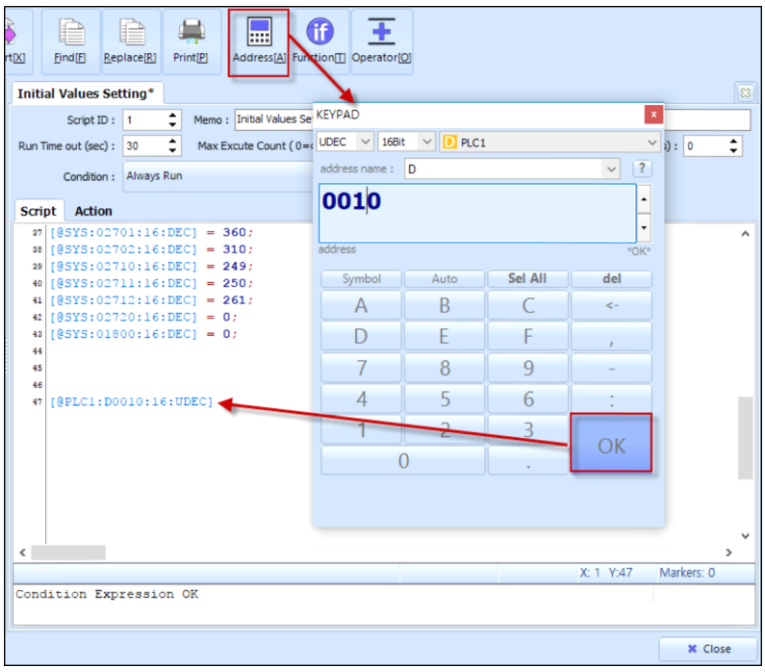
[Figure. Condition Setting Window]

4.5.5 First method of editing script: Address / Comments / Semicolon

When you use the addresses of HMI or PLC, use the Address Keypad to minimize script errors.

(1) How to enter an address

Although you can type in an address, you can use the [Address] menu featured in the menu bar to enter addresses with the Address [Keypad] for easy and correct entry.



[Figure. Address KEYPAD]

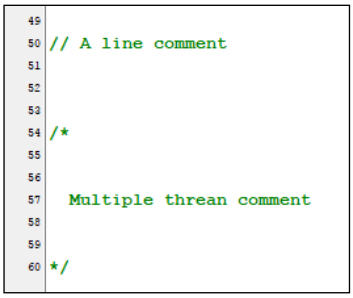
On the [Edit Screen] place the cursor where the address should be added, and click [Address] to open the Address [KEYPAD]. Select the [Data Type] / [Data Size] / [Address Type], configure the address of your interest and click [OK] to add the address to the [Edit Screen].

(2) How to enter a comment

Use comments to add remarks not related to the program on the Edit Screen.

Comments are used to provide explanations or exclude orders from the actual execution.

There are [Single Line Comments] and [Multi Line Comments].



[Figure. Comments]

(3) Semicolon (;)

In general, all sentences end with a semicolon.

Adding a semicolon is not mandated, thus, you can or do not have to add a semicolon.

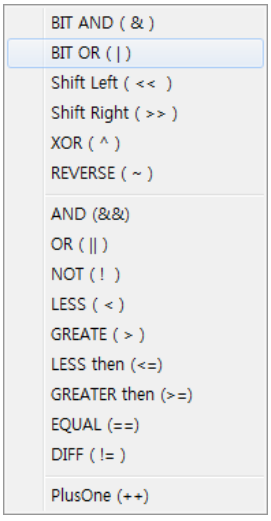
4.5.6 Second method of editing script: Operator

Add operators with the [Operator] menu.

You can also type in operators.

Click [Operator] to access the below pop-up menu.

Select an operator of your interest, and the selected operator will e added to the cursor location on the [Edit Screen].



[Figure. Operator]

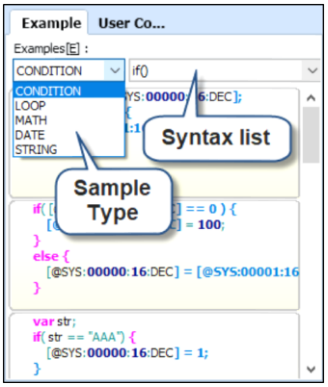
No.	Operator	Description
1	BIT AND (&)	Place this bitwise operator between two operands and execute a [Bit And] operation between the binary value of the two operands. 12 & 6 = 1100 & 0110 = 0100 = 4
2	BIT OR (|)	Place this bitwise operator between two operands and execute a [Bit OR] operation between the binary value of the two operands. 12 | 6 = 1100 | 0110 = 1110 = 14
3	Shift Left (<<)	Place this bitwise operator between two operands and execute a [Bit shift left] operation. Shift the bits of the first operand left by the number of bits specified in the latter operand. 12 << 2 = 0000 1100 << 2 = 0011 0000 = 48
4	Shift Right (<<)	Place this bitwise operator between two operands and execute a [Bit Shift Right] operation. Shift the bits of the first operand right by the number of bits specified in the latter operand. 12 >> 2 = 0000 1100 >> 2 = 0000 0011 = 3
5	XOR (^)	Place this bitwise operator between two operands and execute a [Bit XOR] operation between the binary value of the two operands. 12 ^ 6 = 1100 ^ 0110 = 1010 = 10
6	REVERSE (~)	Place this bitwise operator in front of an operand and execute a [Bit Reverse] operation to the binary value of the operand. ~ 6 = ~ 0110 = 1001 = 9
7	AND (&&)	Place this operator between two conditional statements. If both statements are true, the result is true.
8	OR (||)	Place this operator between two conditional statements. If at least one of the statements is true, the result is true.
9	NOT (!)	Place this operator in front of a conditional statement. If the statement is true, the result is false; if the statement is false, the result is true.
10	LESS (<)	Place this comparison operator between two operands to express a condition where the latter operand is larger than the first operand.
11	GREATE (>)	Place this comparison operator between two operands to express a condition where the first operand is larger than the latter operand.
12	LESS then (<=)	Place this comparison operator between two operands to express a condition where the latter operand is equal with or larger than the first operand.
13	GREATER then (>=)	Place this comparison operator between two operands to express a condition where the first operand is equal with or larger than the latter operand.
14	EQUAL (==)	Place this comparison operator between to operands to express a condition where the two operands are equal.
15	DIFF (!=)	Place this comparison operator between two operands to express a condition where the two operands are different.

16	PlusOne (++)	Add 1 to a single operand.
		Placing the operator in front and behind an operand shows different results.
		a++ // add 1 to [a].
		b = ++a // substitute [b] with the value of [a] +1.
		b = a++ // substitute [b] with [a] and add 1 to [a].

4.5.7 Third method of editing script: Examples

Examples are provided on the lower left side of the Script Setting window,.
Frequently used sentences are provided in basic [Example] and you can add user defined samples to [User CodeBlock].
Using examples allows you to conveniently create sentences and reduce the chance of error.

(1) How to use Examples
Select the [Example Type] and sentence, the corresponding examples will be listed.



[Figure. Example]

No.	Example Type	Description

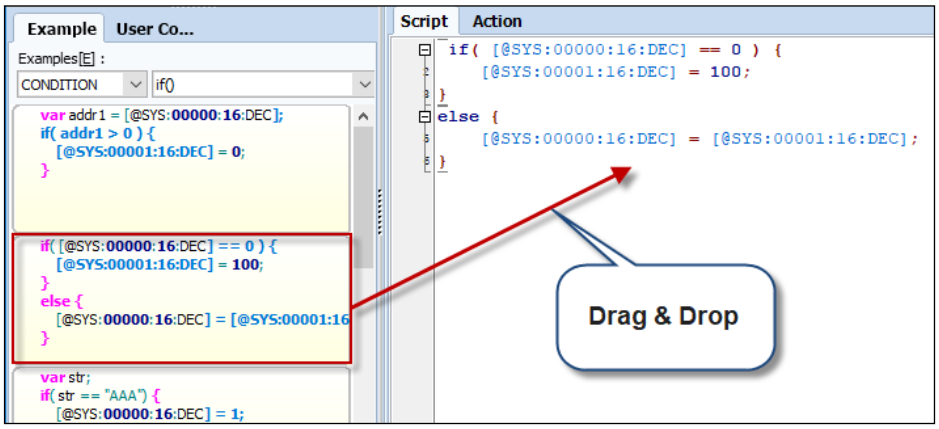
1	CONDITION	The following conditional statements are available.
		Select a sentence to view the corresponding sample list.
		if()
		if()~else if()
		switch~case

2	LOOP	The following repetitive statements are available.
		Select a sentence to view the corresponding sample list.
		for()
		while()
		do{} while()

3	MATH	The following arithmetic statements are available. Select a sentence to view the corresponding sample list. Math.PI Math.cos(n) Math.sin(n) Math.tan(n) Math.random() Math.round(n)
4	DATE	The following date methods are available. Select a sentence to view the corresponding sample list. Date() getYear() getMonth() getDate() getDay() getHours() getMinutes() getSeconds()
5	STRING	The following string methods are available. Select a sentence to view the corresponding sample list.

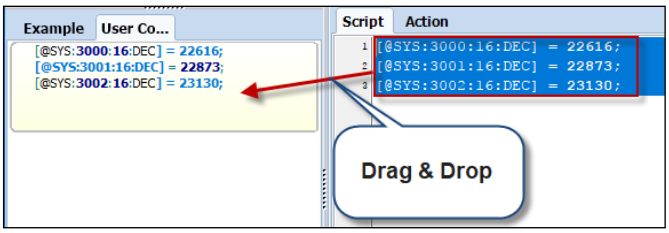
			charAt(n) charCodeAt(n) concat() fromCharCode() indexOf() lastIndexOf() split() substring()

After selecting [Example Type] and [Sentence Type], select a sentence from the example list and add the sentence to the edit field with a drag & drop.
Edit the addresses and operators of the example sentence.



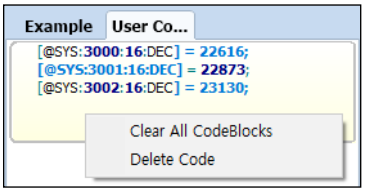
[Figure. Use Example Sentences]

(2) Add User CodeBlocks
You can save frequently used sentences to [User CodeBlocks].
Drag a frequently used sentence to select the sentence. Drag & drop the selected sentence to the [User CodeBlock].



[Figure. Add a User CodeBlock]

To delete a [User CodeBlock] select the codeblock from the [User CodeBlock] list, right click, and select [Delete Code] from the pop-up menu.

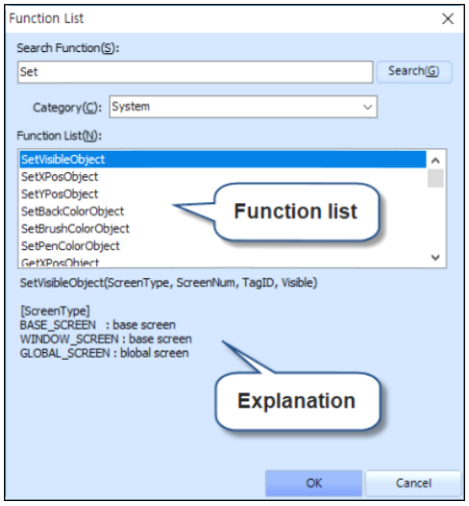


[Figure. Delete User CodeBlock]

No.	User CodeBlock	Description
1	Clear All CodeBlocks	Delete all user codeblocks.
2	Delete Code	Delete the selected codeblock(s).

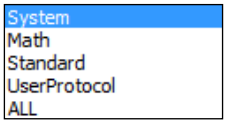
4.5.8 The 4th method of editing script: Functions / Constants

You can add functions with the [Function] menu provided in the menu bar.



[Figure. Add Function]

Type in the function of your interest in the [Search Function(s)] text box, and click [Search] to browse the applicable functions. You can limit the type of function with [Category].

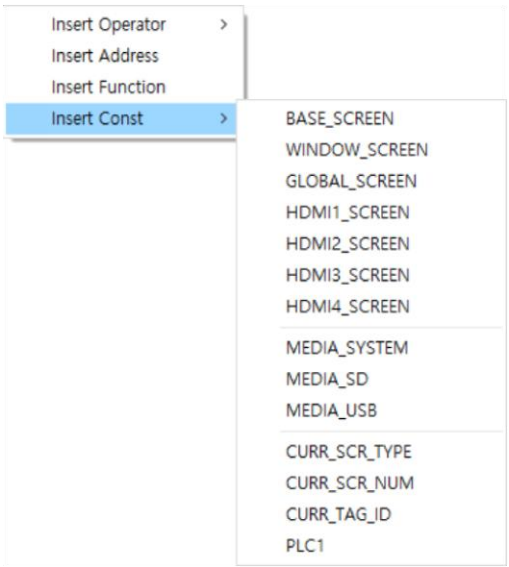


Select a function of your interest from the [Function List] a brief description of the function is provided in the lower field.

Click [OK] to add the selected function to the edit screen.

From time to time [Constant]s are used as variables of a function.

The following pop-up menu will appear upon a right click to the edit screen.



[Figure. Insert Constant]

[Insert Operator] has the same function with [Operator] menu, and the [Operator List] will appear.
[Insert Address] has the same function with [Address] menu, and the Address [KEYPAD] will appear.
[Insert Function] has the same function with [Function] menu, and the [Function List] will appear.
[Insert Constant] will show list of available constants.

Constants are used as variables of a function.

No.	Constant	Description
1	BASE_SCREEN	Base Screen.
2	WINDOW_SCREEN	Window Screen.
3	GLOBAL_SCREEN	Frame Screen.
4	HDMI1_SCREEN	Screen of HDMI1.
5	HDMI2_SCREEN	Screen of HDMI2.
6	HDMI3_SCREEN	Screen of HDMI3.
7	HDMI4_SCREEN	Screen of HDMI4.
8	MEDIA_SYSTEM	TOP internal memory.
9	MEDIA_SD	SD Card
10	MEDIA_USB	USB memory.
11	CURR_SCR_TYPE	The current screen type.
12	CURR_SCR_NUM	The current screen number.
13	CURR_TAG_ID	The current object ID.
14	PLC1	PLC1. (Alias of PLC)

Refer to the description of each function.

Function	Category	Description
SetVisibleObject	Format	SetVisibleObject(ScreenType, ScreenNum, TagID, Visible)
	Description	Represent if an object is [Hidden] or [Visible]. TagID refers to the Object ID. [Hidden]: [False] is entered to [Visible]. [Visible]: [True] is entered to [Visible]. [ScreenType]: BASE_SCREEN(base screen), WINDOW_SCREEN(window screen), GLOBAL_SCREEN(global screen) Constant
	Example	SetVisibleObject(BASE_SCREEN,15,1,true)
		Select Object No.1 of the base screen No.15 to be [Visible].
SetXPosObject	Format	SetXPosObject(ScreenType, ScreenNum, TagID, Xpos)
	Description	Move the X coordinate of an object. [Xpos] : move the object to an absolute coordinate.
	Example	SetXPosObject(BASE_SCREEN, 15, 1, 100)
		Move the [X position] of Object No.1 of base screen No.15, to 100.
SetYPosObject	Format	SetYPosObject(ScreenType, ScreenNum, TagID, Ypos)
	Description	Move the Y coordinate of an object.
		[Ypos] : move the object to an absolute coordinate.
	Example	SetYPosObject(BASE_SCREEN, 15, 1, 100)
		Move the [Y position] of Object No.1 of base screen No.15, to 100.
SetBackColorObject	Format	SetBackColorObject(ScreenType, ScreenNum, TagID, Red, Green, Blue)
	Description	Change the [Back Color] of an object.
	Example	SetBackColorObject (BASE_SCREEN, 15, 1, 255,255,255)
		Change the [Back Color] of Object No.1 of base screen No.15 to

		[255,255,255].
SetBrushColorObject	Format	SetBrushColorObject(ScreenType, ScreenNum, TagID, Red, Green, Blue)
	Description	Change the [Fill Color] of an object.
	Example	SetBrushColorObject (BASE_SCREEN, 15, 1, 255,255,255)
		Change the [Fill Color] of Object No.1 of base screen No. 15 to [255,255,255].
SetPenColorObject	Format	SetPenColorObject(ScreenType, ScreenNum, TagID, Red, Green, Blue)
	Description	Change the [Line Color] of an object.
	Example	SetBrushColorObject (BASE_SCREEN, 15, 1, 255,255,255)
		Change the [Line Color] of Object No.1 of base screen No.15 to [255,255,255].
GetXPosObject	Format	GetXPosObject(ScreenType, ScreenNum, TagID)
	Description	Read in the X coordinate of an object.
	Example	[@SYS:00011:16:UDEC] = GetXPosObject(BASE_SCREEN,15,3)
		Enter the [X Coordinate] of Object No.3 of base screen No.15 to the [Address].
GetYPosObject	Format	GetYPosObject(ScreenType, ScreenNum, TagID)
	Description	Read the Y coordinate of an object.
	Example	[@SYS:00011:16:UDEC] = GetYPosObject(BASE_SCREEN,15,3)
		Enter the [Y Coordinate] of Object No.3 of base screen No.15 to the [Address].
GetWidthObject	Format	GetWidthObject(ScreenType, ScreenNum, TagID)
	Description	Read the width of an object.
	Example	[@SYS:00011:16:UDEC] = GetWidthObject(BASE_SCREEN,15,3)
		Enter the [Width] of Object No.3 of base screen No.15 to the [Address].
GetHeightObject	Format	GetHeightObject(ScreenType, ScreenNum, TagID)
	Description	Read the height of an object.
	Example	[@SYS:00011:16:UDEC] = GetHeightObject(BASE_SCREEN,15,3)
		Enter the [Height] of Object No.3 of base screen No.15 to the [Address].
SetWidthObject	Format	SetWidthObject(ScreenType, ScreenNum, TagID, Width)
	Description	Change the width of an object.
	Example	SetWidthObject(BASE_SCREEN,1,1,100)
		Change the [Width] of Object No.1 of base screen No.1 to 100.
SetHeightObject	Format	SetHeightObject(ScreenType, ScreenNum, TagID, Height)
	Description	Change the height of an object.
	Example	SetHeightObject(BASE_SCREEN,1,1,100)
		Change the [Height] of Object No.1 of base screen No.1 to 100.
SetTouchLock	Format	SetTouchLock(VisibleMode)
	Description	Lock any touch input to a screen to which script is applied. The password to unlock touch is configured at [Project] - [Property] - [Global Touch Lock]. VisibleMode: [0: Hidden Mode, 1: Visible Mode]
	Example	SetTouchLock(1);
		Whenever a user tries to access a screen to which the script is applied, the touch function will be locked, and the lock window will not disappear until the password is verified.
GetScreenNum	Format	GetScreenNum()
	Description	Rea the current base screen number.
	Example	[@SYS:00011:16:UDEC] = GetScreenNum()

		Enter the current screen number to the [Address].
OpenWindow	Format	OpenWindow(ScreenNum)
	Description	The window screen corresponding to [ScreenNum] will pop-up. ScreenNum: Window number.
	Example	OpenWindow(1)
		[Window No.1] will pop-up on the screen.
CloseWindow	Format	CloseWindow(ScreenNum)
	Description	The window corresponding to the [ScreenNum] will close. ScreenNum: Window number.
	Example	CloseWindow(1)
		[Window No.1] will close.
CloseSystem	Format	CloseSystem()
	Description	Terminate the current project.
	Example	CloseSystem()
		The current project is terminated and the system will go back to [Menu Screen].
CopyMem	Format	CopyMem(src,dest,count)
	Description	Copy data (or constant value) beginning from the [src] address to the [des] address. The number of data to be copied is [count]. [src]: source address (address or constant value), [dest]: destination address, [count]: length of source (address or constant value).
	Example	1. CopyMem([@SYS:00021:16:UDEC], [@SYS:00016:16:UDEC], [@SYS:00030:16:UDEC]) 2. CopyMem(10, [@SYS:00011:16:UDEC], 8)
		1. If the value of [00030] is [5], copy the data from 5 addresses of [00021] ~ [00025] to [00016] ~ [00020]. 2. Enter the constant value of [10] to the 8 addresses of [00011] ~ [00018].
CopyMemEx	Format	CopyMemEx(src,dest,count)
	Description	Copy data (or constant value) beginning from the [src] address to the [des] address. The number of data to be copied is [count]. [src]: source address, [dest]: destination address, [count]: length of source (constants only).
	Example	CopyMemEx([@PLC1:D0000:16], [@SYS:00011:16:UDEC], 7);
		Copy the data of 7 addresses [D0000] ~ [D0006] to [00011] ~ [00017].
ChangeScreen	Format	ChangeScreen(ScreenNum)
	Description	Change the screen on display. ScreenNum: Base screen number.
	Example	ChangeScreen(1)
		Base Screen No.1 will appear.
ChangeScreenByname	Format	ChangeScreenByName(ScreenName)
	Description	Change the screen on display with the corresponding ScreenName. ScreenName: Base screen name.
	Example	ChangeScreen('MainScreen')
		Display the screen of which name is [MainScreen].
PlaySoundFile	Format	[@SYS:00000:16:UDEC] = PlaySoundFile(MediaType, FileName, Count)

	Description	Play an audio file, and return the ID. [MediaType]: MEDIA_SYSTEM (use an audio file on the TOP device). MEDIA_SD (use an audio file on the SD Card.) MEDIA_USB (use an audio file on the USB memory) [FileName]: directory path and name of audio file. [Count]: Number of times the audio file should be repeated.
	Example	PlaySoundFile(MEDIA_USB, "TEST", 5)
		Play the audio file on the USB memory with the name [Test] five times.
StopSoundFile	Format	StopSoundFile(ID)
	Description	Stop an audio file with the corresponding ID.
	Example	StopSoundFile([@SYS:00000:16:UDEC])
		Stop the audio file with the corresponding ID.
StopSoundFileAll	Format	StopSoundFileAll()
	Description	Stop all audio files that are currently playing.
	Example	StopSoundFileAll()
		Stop all audio files that are currently playing.
GetPLCIP1Address	Format	GetPLCIP1Address(PLCNAME)
	Description	Read the first value of the IP address of a PLC. PLCNAME: Alias of PLC.
	Example	var ip1 = GetPLCIP1Address(PLC1)
		The first value of the IP address of PLC1 will be read.
GetPLCIP2Address	Format	GetPLCIP2Address(PLCNAME)
	Description	Read the second value of the IP address of a PLC. PLCNAME: Alias of PLC.
	Example	var ip2 = GetPLCIP2Address(PLC1)
		The second value of the IP address of PLC2 will be read.
GetPLCIP3Address	Format	GetPLCIP3Address(PLCNAME)
	Description	Read the third value of the IP address of a PLC. PLCNAME: Alias of PLC.
	Example	var ip3 = GetPLCIP3Address(PLC1)
		The third value of the IP address of PLC3 will be read.
GetPLCIP4Address	Format	GetPLCIP4Address(PLCNAME)
	Description	Read the fourth value of the IP address of a PLC. PLCNAME: Alias of PLC.
	Example	var ip4 = GetPLCIP4Address(PLC1)
		The fourth value of the IP address of PLC4 will be read.
SetPLCIPAddress	Format	SetPLCIPAddress(PLCNAME, ip1, ip2, ip3, ip4)
	Description	Change the IP Address of a PLC. PLCNAME: Alias o PLC, ip1~ip4: IP address.
	Example	SetPLCIPAddress(PLC1, 192, 168, 4, 42)
		Change the IP address of PLC1 to [192,168,4,42].
GetPLCTimeout	Format	GetPLCTimeout(PLCNAME)
	Description	Read the time elapsed after a time out error for PLC communication in seconds. PLCNAME: Alias of PLC.
	Example	var timeout = GetPLCTimeout(PLC1)
		The time elapsed after a communication error has occurred with PLC1 is read in seconds.
GetPLCErrorCount	Format	GetPLCErrorCount(PLCNAME)
	Description	Read the number of errors occurred for PLC communication. PLCNAME: Alias of PLC.

	Example	var count = GetPLCErrorCount(PLC1)
		The number of errors occurred during communication with PLC1 is read.
StrToInt	Format	StrToInt(src, dest, size)
	Description	Convert strings to integer data. Src: source address, dest: destination address, size: string length (constant).
	Example	StrToInt([@SYS:0300:16:ASCII], [@SYS:0400:16:DEC], 10)
		The strings in the 5 addresses [0300] ~ [0304] are converted to numbers (integer) and entered in address [0400].
IntToStr	Format	IntToStr(src, dest, size)
	Description	Convert numbers to strings. Src: integer source address, dest: destination address, size: string length (constant).
	Example	IntToStr([@SYS:0300;16:UDEC],[@SYS:0400:16:ASCII], 4)
		Convert the number in address [0300] to a string and enter the string to addresses [0400] ~ [0401].
StrToFloat	Format	StrToFloat(src, dest, size, format)
	Description	Attain real number data from a string. src: string source address, dest: destination address, size: string length. format: string format (“%f” as default)
	Example	StrToFloat([@SYS:0300:16:ASCII], [@SYS:0400:32:FLOAT], 4, "%f")
		Convert the string in address [0300] ~ [0301] to a real number data and enter the number to address [0400].
FloatToStr	Format	FloatToStr(src, dest, size, format)
	Description	Convert real number data to strings. src: real number source address, dest: destination address, size: string length, format: string format (“%f” as default)
	Example	FloatToStr([@SYS:0300:32:FLOAT], [@SYS:1000:16:ASCII], 4, "%f")
		Convert the real number data of address [0300] to a string and enter the string to addresses [1000] ~ [1001].
SetDateTime	Format	SetDateTime(year, month, day, hour, min, sec)
	Description	Configure the system time and date.
	Example	SetDateTime(2016, 12, 25, 10, 30, 0)
		Adjust the system time clock to 10:30:00, December 25th, 2016.
SetComboListBoxIndex	Format	SetComboListBoxIndex(ScreenType, ScreenNum, TagID, Index)
	Description	Change the item index of a combo box / list box.
	Example	SetComboListBoxIndex(BASE_SCREEN, 1, 1, 0)
		Change the index of the combo box / list box with ID No.1 of base screen No.1 to 0.
GetComboListBoxIndex	Format	GetComboListBoxIndex(ScreenType, ScreenNum, TagID)
	Description	Rea the current item index from a combo box / list box.
	Example	var index = GetComboListBoxIndex(BASE_SCREEN, 1, 1)
		The current item index of the combo box / list box with ID No.1 of base screen No.1 is read.
GetComboListBoxValue	Format	GetComboListBoxValue(ScreenType, ScreenNum, TagID)
	Description	Read the value of a selected item from a combo box / list box.
	Example	var value = GetComboListBoxValue(BASE_SCREEN, 1, 1)
		The value of a selected item from combo box / list box with ID No.1 of base screen No.1 is read.

GetComboListBoxText	Format	GetComboListBoxText(ScreenType, ScreenNum, TagID)
	Description	Read the text of a selected item from a combo box / list box.
	Example	var text = GetComboListBoxText(BASE_SCREEN, 1, 1)
		The text of the selected item from combo box / list box with ID No.1 of base screen No.1 is read.
GetComboListBoxItemCount	Format	GetComboListBoxItemCount(ScreenType, SceenNum, TagID)
	Description	Read the number of items of a combo box / list box.
	Example	var count = GetComboListBoxItemCount(BASE_SCREEN, 1, 1)
		The number of items of combo box / list box with ID No. 1 of base screen No.1 is read.
SystemShutdown	Format	SystemShutdown()
	Description	Shutdown the system. The TOP device is turned off.
	Example	SystemShutdown()
		Shutdown the system. The TOP device is turned off.
SystemReboot	Format	SystemReboot()
	Description	Reboot the TOP device.
	Example	SystemReboot()
		Reboot the TOP device.
ExecuteFile	Format	ExecuteFile(file, param)
	Description	Run a file. file: name of the file to run, param: parameters attached to the file (option / can be omitted).
	Example	ExecuteFile('C:₩Run.exe')
		C:₩Run.exe is executed.
IsChanged	Format	IsChanged(addr)
	Description	Check i the value of an address has changed. addr: address.
	Example	var changed = IsChanged([@SYS:00010:16]);
		If the data at address [00010] changes, return true (1), if not return false (0).
LogOut	Format	LogOut()
	Description	Log out from the system.
	Example	LogOut()
		Log out from the system.
NowToUTC	Format	NowToUTC()
	Description	Convert the current time to TIMESTAMP(second) of coordinated universal time (UTC), and read the converted value.
	Example	[@SYS:00011:32:UDEC] = NowToUTC()
		The current time is converted to TIMESTAMP(sec) and entered in the [Address].
ParamToUTC	Format	ParamToUTC(year, month, day, hour, min, sec)
	Description	Convert a designated time to TIMESTAMP(sec) of coordinated universal time (UTC), and read the converted value.
	Example	[@SYS:00011:32:UDEC] = ParamToUTC(2015,1,1,5,18,10)
		The time of 05:18:00, January 1st, 2014 is converted to TIMESTAMP(sec) and entered in the [Address].
DayToSec	Format	DayToSec(day)
	Description	Convert a period specified in days to seconds.
	Example	[@SYS:00011:16:UDEC] = DayToSec(100)
		100 days are converted to seconds and entered in the [Address].

HourToSec	Format	HourToSec(hour)
	Description	Convert a period specified in hours to seconds.
	Example	[@SYS:00011:16:UDEC] = HourToSec(100);
		100 hours are converted to seconds and entered in the [Address].
MinToSec	Format	MinToSec(min)
	Description	Convert a period specified in minutes to seconds.
	Example	[@SYS:00011:16:UDEC] = MinToSec(100)
		100 minutes are converted to seconds and entered in the [Address].
SecToSec	Format	SecToSec(sec)
	Description	Calculate a period specified in seconds to seconds. This function is provided for compatibility with previous systems.
	Example	[@SYS:00011:16:UDEC] = MinToSec(100)
		100 seconds are converted to seconds and entered in the [Address].
UTCToYear	Format	UTCToYear(TIMESTAMP value)
	Description	Convert the TIMESTAMP(sec) of coordinated universal time (UTC) to years.
	Example	[@SYS:00011:16:UDEC] = UTCToYear (12500)
		The value of 12500 is converted to years, and entered in the [Address].
UTCToMonth	Format	UTCToMonth(TIMESTAMP value)
	Description	Convert the TIMESTAMP(sec) of coordinated universal time (UTC) to months.
	Example	[@SYS:00011:16:UDEC] = UTCToMonth (12500)
		The value of 12500 is converted to months, and entered in the [Address].
UTCToDay	Format	UTCToDay(TIMESTAMP value)
	Description	Convert the TIMESTAMP(sec) of coordinated universal time (UTC) to days.
	Example	[@SYS:00011:16:UDEC] = UTCToDay (12500)
		The value of 12500 is converted to days, and entered in the [Address].
UTCToHour	Format	UTCToHour(TIMESTAMP value)
	Description	Convert the TIMESTAMP(sec) of coordinated universal time (UTC) to hours.
	Example	[@SYS:00011:16:UDEC] = UTCToHour (12500)
		The value of 12500 is converted to hours, and entered in the [Address].
UTCToMin	Format	UTCToMin(TIMESTAMP value)
	Description	Convert the TIMESTAMP(sec) of coordinated universal time (UTC) to minutes.
	Example	[@SYS:00011:16:UDEC] = UTCToMin (12500)
		The value of 12500 is converted to minutes, and entered in the [Address].
UTCToSec	Format	UTCToSec(TIMESTAMP value)
	Description	Convert the TIMESTAMP(sec) of coordinated universal time (UTC) to seconds.
	Example	[@SYS:00011:16:UDEC] = UTCToSec (12500)
		The value of 12500 is converted to seconds, and entered in the [Address].
UTCToWeek	Format	UTCToWeek(TIMESTAMP value)
	Description	Convert the TIMESTAMP(sec) to the corresponding day of a week.
		[1:SUN], [2:MON], [3:TUE], [4:WED], [5:THU], [6:FRI], [7:SAT]

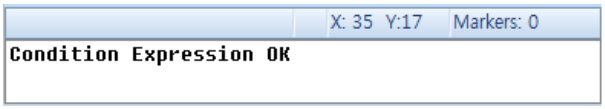
	Example	[@SYS:00011:16:UDEC] = UTCToWeek(12500)
		The value of 12500 is converted to the corresponding day of a week and entered in the [Address].
TextToSpeach	Format	TextToSpeach(Text)
	Description	Convert a string data to audio and play the string, as if someone is reading the string out loud. Text: String
	Example	TextToSpeach('Warning The temperature is high')
		The sound of some one speaking "Warning the temperature is high" will be played.
PI	Format	Math.PI
	Description	Read the PI value of 3.14...
	Example	[@SYS:00011:32:FLOAT] = Math.PI
		Enter 3.14... in the [Address].
cos	Format	Math.cos(n)
	Description	Calculate the cosine value of n (radian). Format is [Math.cos(degree x Math.PI/180)].
	Example	[@SYS:00011:16:UDEC] = Math.cos(0)
		Enter the value of cos(0) in the [Address].
sin	Format	Math.sin(n)
	Description	Calculate the sine value of n (radian). Format is [Math.sin(degree x Math.PI/180)].
	Example	[@SYS:00011:16:UDEC] = Math.sin(0)
		Enter the value of sin(0) in the [Address].
tan	Format	Math.tan(n)
	Description	Calculate the sine value of n (radian). Format is [Math.sin(degree x Math.PI/180)].
	Example	[@SYS:00011:16:UDEC] = Math.tan(0)
		Enter the value of tan[0) in the [Address].
random	Format	Math.random()
	Description	Create a random number between Float 0.000 and 0.999.
	Example	[@SYS:01000:16:DEC]=(Math.random()*10)+1
		Enter a random number between 1 to 10 in the [Address].
round	Format	Math.round(n)
	Description	Round up the value to the closest integer and read such integer. n: float address or real number.
	Example	[@SYS:00011:16:UDEC] = Math.round(10.1)
		Enter the round up of [10.1], thus [10] in the [Address].
Number	Format	Number(var)
	Description	Convert the string of [var] to numbers.
	Example	[@SYS:00011:16:UDEC] =Number("12")
		Enter the number 12 in the [Address].
String	Format	String(var)
	Description	Convert the number of var to strings.
	Example	[@SYS:00011:16:UDEC] =String(12)
		Enter the string "12" in the [Address].
CommAsciiWrite	Format	CommAsciiWrite(value)
	Description	Enter ASCII data on the TOP device. value: ASCII code value
	Example	CommAsciiWrite('Date Value')
		Enter the ASCII data for "Data Value" on the TOP device.

CommAsciiRead	Format	CommAsciiRead(size)
	Description	Read an ASCII data from the TOP device. size: number of data (string length)
	Example	var sReadData = CommAsciiRead(10)
		Read 10 ASCII data from the TOP device.
CommReset	Format	CommReset()
	Description	Reset the communication status of the TOP device.
	Example	CommReset()
		Reset the communication status of the TOP device.
CommWait	Format	CommWait(msec)
	Description	Configure the time to wait in terms of communication. msec: time to wait in msec.
	Example	CommWait(1000);
		Configure 1 sec (1000msec) as the time to wait.
CommErrorMsg	Format	CommErrorMsg(value)
	Description	Display a communication error message. value: ASCII code (String)
	Example	CommErrorMsg('time out')
		Display a communication error message of “Time Out”.
CommErrorClear	Format	CommErrorClear()
	Description	Clear the communication error message.
	Example	CommErrorClear()
		Clear the communication error message.
HsmsHeader	Format	HsmsHeader(type)
	Description	Send an HSMS protocl header. type: header type (1: Select.req, 3: Deselect.req, 5: Linktest.req, 9: Separate.req)
	Example	HsmsHeader(1)
		Send the HSMS protocl ‘Select.req’
HsmsDataMessage	Format	HsmsDataMessage(S, F, SUB)
	Description	Receive an HSMS communication data. S: Stream ID, F: Function ID, SUB: Sub ID
	Example	HsmsDataMessage(2, 6, 0)
		Receive the ID of Function No.6 of Stream ID No.2 of HSMS.
HsmsEventReport	Format	HsmsEventReport(CEID)
	Description	CEID: Event ID
	Example	HsmsEventReport(101)
		Event 101
HsmsAlarmReport	Format	HsmsAlarmReport(ALID, flag)
	Description	ALID: AlarID, flag: on(1)/off(0)
	Example	HsmsAlarmReport(200, 0)
		ALID: 200, flag: off
HsmsControlStateOFFLINE	Format	HsmsControlStateOFFLINE()
	Description	Turn the HSMS OFFLINE.
	Example	HsmsControlStateOFFLINE()
		Turn the HSMS OFFLINE.

4.5.9 Script Error Checking

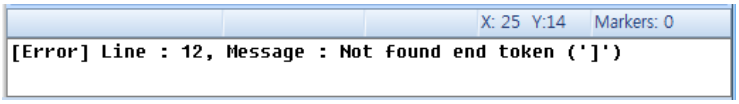
The presence of an error in the [Edit Screen] is shown in the result window in real time.

If no error is present, the below message will appear.



[Figure. No Error]

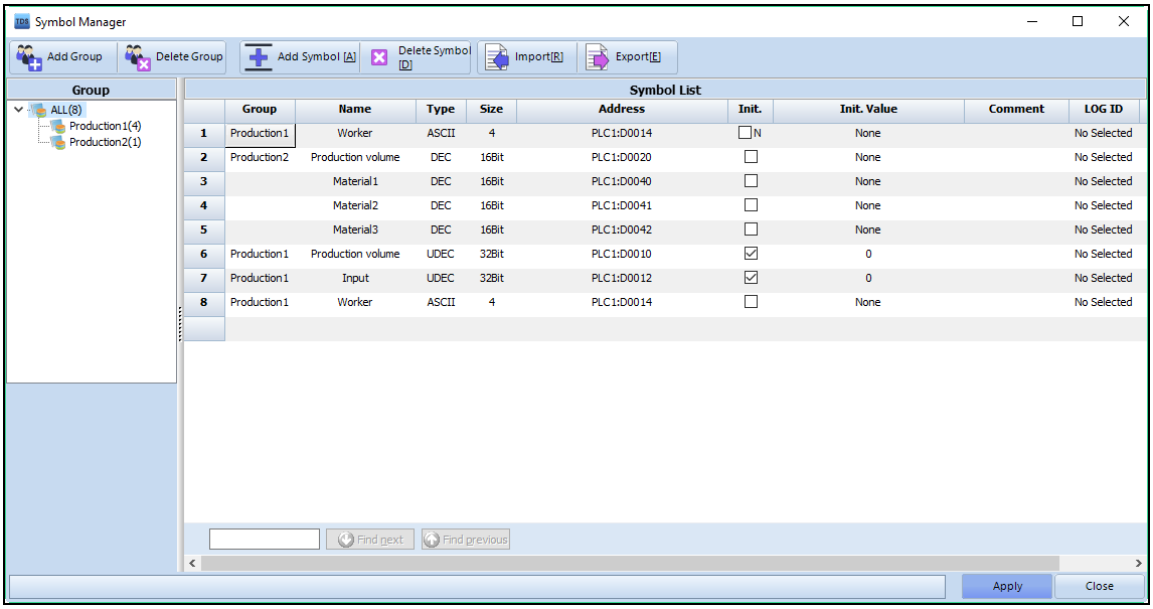
If there is an error(s), the below message will appear specifying the location and detail of such error.



[Figure. Error Message]

4.6 Symbol

A symbol address, is an address where another name is assigned to the address. You can assign names corresponding to the actual usage within the system in the [PLC / System], for convenient operation. To use a symbol address as an address type, go to [Project] - [Symbol] and make a symbol list with the [Symbol Manager].

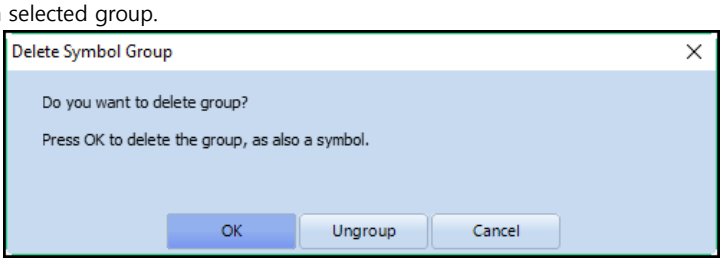
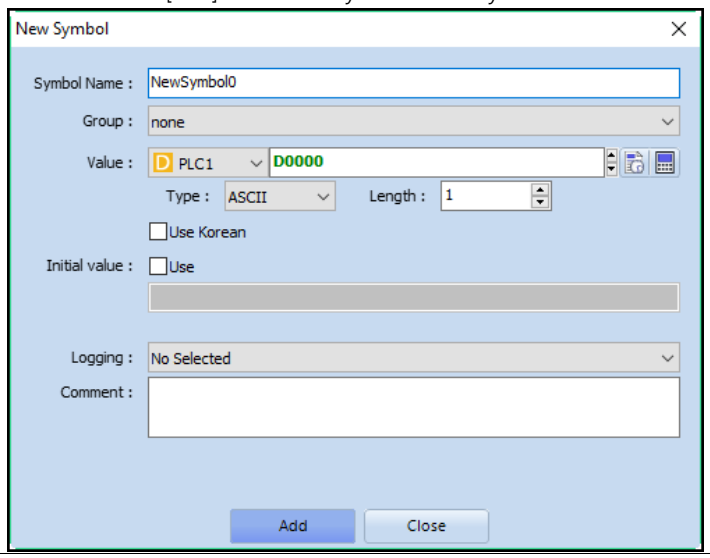


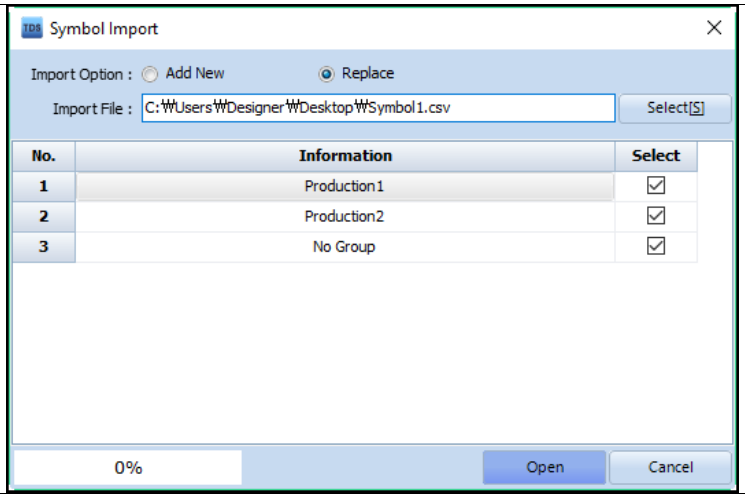
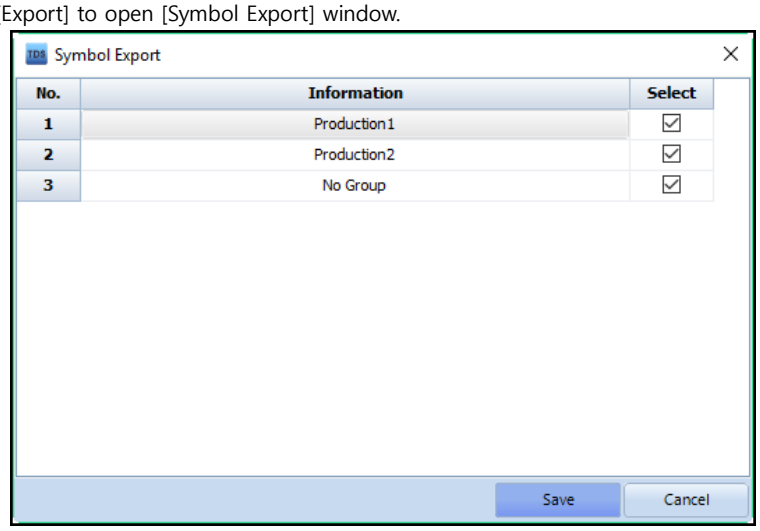
[Figure. Symbol Manager]

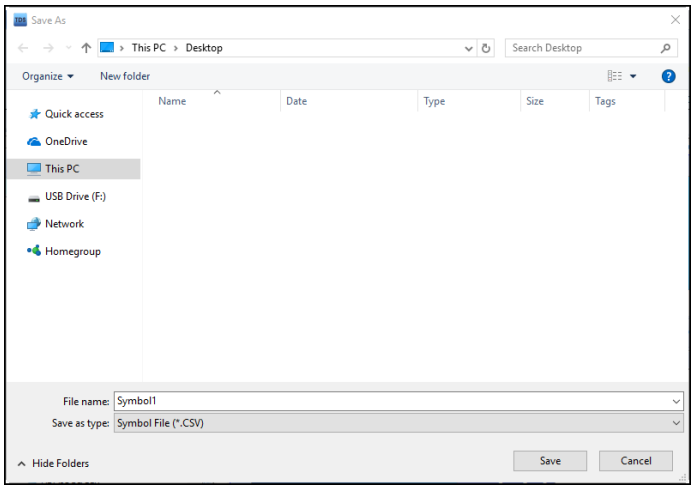
4.6.1 Menu Bar

The following functions are provided in the menu bar of Symbol Manager.

No.	Symbol Manager	Description
1	Add Group	A new group inside the selected group of the group list. Select [All] or a group in the [Group] window provided on the left side of Symbol Manager. Click [Add Group] and you can see a new group(or sub-group) inside the selected group. Add a group to [All] to make a new group, and add a group to a [Group] to make a

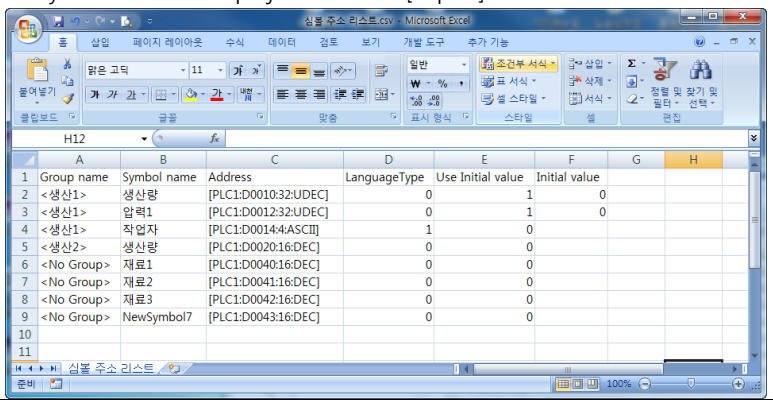
		[Sub-group] to the selected group. Select [All] to view all symbol lists from all groups.
2	Delete Group	Delete a selected group.  Click [Ungroup] to delete the group, yet maintain the symbols within the group under the [All] hierarchy.
3	Add Symbol [A]	Add a symbol to the Symbol List. You can add symbols without assigning a specific group. If a group is selected in the Group window on the left, a symbol will be added to that group. Click [Add Symbol] to open [New Symbol] window. Configure various settings of the symbol address and click [Add] to add the symbol to the symbol list. 
4	Delete Symbol [D]	Delete a selected symbol(s) from the symbol list.
5	Import[R]	Import an existing symbol list. To import a symbol list, there must be a file previously created [Export]. Click [Import] to open the below [Symbol Import] window. Select whether to add the imported symbols to the selected group or replace the symbols in the selected group with the imported symbols. If you select [Add New], the symbols from the import file will be added to the current symbol list. If you select [Replace], the symbols from the import file with identical addresses with those on the current symbol list will overwrite the existing symbols, and symbols that don not have identical symbols will be added to the list. Click [CSV] and select a symbol file in the format of [*.CSV]. Click [Open].

<table>
<tr><td></td><td></td><td> 
</td></tr>
<tr><td>6</td><td>Export [E]</td><td>Save the current symbol list to a file.
Click [Export] to open [Symbol Export] window.
 

Click [Save] to open the [Save As] window, select the directory and file name of the export file. Click [Save].
 

The following message will appear once the file has been made. Click [Yes] to close the message and the [Symbol Export] window.</td></tr>
</table>

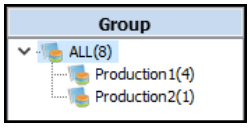
You can edit an exported CSV file with Microsoft Excel software. You can also use an exported symbol list in other projects with the [Import] function.



	Group name	Symbol name	Address	LanguageType	Use Initial value	Initial value
2	<생산1>	생산량	[PLC1:D0010:32:UDEC]	0	1	0
3	<생산1>	압력1	[PLC1:D0012:32:UDEC]	0	1	0
4	<생산1>	작업자	[PLC1:D0014:4:ASCII]	1	0	
5	<생산2>	생산량	[PLC1:D0020:16:DEC]	0	0	
6	<No Group>	재료1	[PLC1:D0040:16:DEC]	0	0	
7	<No Group>	재료2	[PLC1:D0041:16:DEC]	0	0	
8	<No Group>	재료3	[PLC1:D0042:16:DEC]	0	0	
9	<No Group>	NewSymbol7	[PLC1:D0043:16:DEC]	0	0	

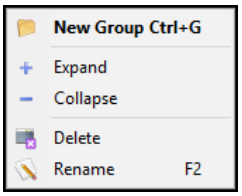
4.6.2 Symbol Group List

A [Group List] is provided in the left side of [Symbol Manager].
You can see all groups in a single list, and check details of a selected group in the symbol list on the right side.

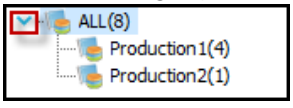
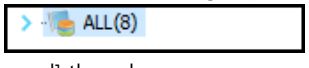


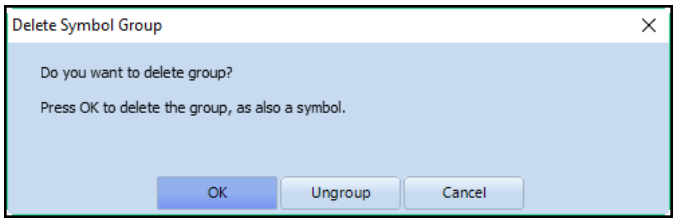
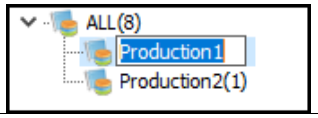
[Figure. Symbol Group]

The below features are provided in the pop-up menu upon a right click to a group in the group list.



[Figure. Pop-up menu for Symbol Group]

No.	Group Menu	Description
1	New Group	Add a new sub-group to the selected group.
2	Expand	Expand the entire sub-groups of the selected group.  Click the downward arrow to [Collapse] the sub-groups.
3	Collapse	Collapse and hide the sub-groups of the selected groups.  Click the sideway arrow to [Expand] the sub-groups.

4	Delete	Delete a selected group.  Please note that if you delete a group, all symbols allotted to the group are also deleted. If you want to only delete a group and sustain the symbols, select [Ungroup]. Select [Ungroup] to delete the group, yet leave the symbols allotted to the deleted group under [All].
5	Rename	Rename a selected group. 

4.6.3 Symbol List Columns (Detail)

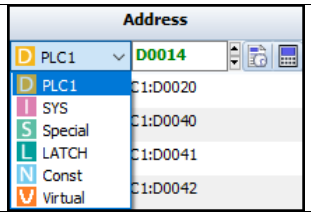
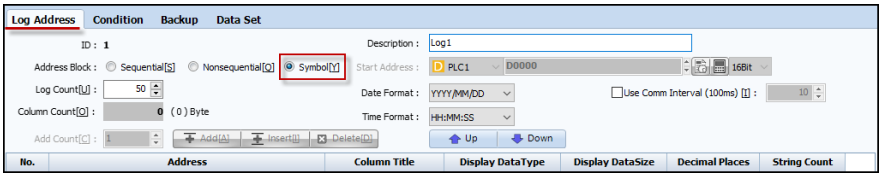
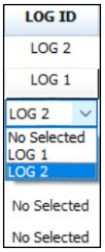
Please refer to the following explanation of each column.
You can configure the settings of each column of the symbol list.
Addresses configured in the symbol used are used in various aspects of the project. Therefore, take caution when you change a column. You can change the configuration of a symbol on with [Symbol Manager].

Symbol List

	Group	Name	Type	Size	Address	Init.	Init. Value	Comment	LOG ID
1	Production1	Worker	ASCII	4	PLC1:D0014	☐N	None		No Selected
2	Production2	Production volume	DEC	16Bit	PLC1:D0020	☐	None		No Selected
3		Material1	DEC	16Bit	PLC1:D0040	☐	None		No Selected
4		Material2	DEC	16Bit	PLC1:D0041	☐	None		No Selected
5		Material3	DEC	16Bit	PLC1:D0042	☐	None		No Selected
6	Production1	Production volume	UDEC	32Bit	PLC1:D0010	☑	0		No Selected
7	Production1	Input	UDEC	32Bit	PLC1:D0012	☑	0		No Selected
8	Production1	Worker	ASCII	4	PLC1:D0014	☐	None		No Selected

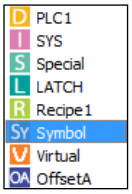
[Figure. Symbol List Column]

No.	Symbol Column	Description
1	No.	The number assigned to each symbol in an ascending order.
2	Name	Enter an alias to each address. This name is used when you create the project.
3	Type	Configure the address type. Select among [DEC, UDEC, HEX, BCD, FLOAT, ASCII].
4	Size	Configure the size of the address. For types of [DEC, UDEC, HEX, BCD], select among [1Bit, 16Bit, 32Bit]. For [FLOAT] type, the size is fixed as [32Bit]. For [ASCII] type, configure the number of characters to be used. (For Korean characters, 1 character occupies [2] units.)
5	Address	Configure the physical address.

		
6	Initialization	Select whether or not to use initialization. If [Initialization] is selected, the data will be initialized whenever you start the project.
7	Initialization Value	If [Initialization] is selected, configure the value the address should be reset to.
8	Comment	Add informative comments to each symbol address.
9	LOG ID	Use the symbol address as a log address. Go to [Project] - [Log] and select [Symbol] for the [Address Block] on the [Log Address] tab.  If the [Address Block] of Log1 is [Symbol], the data of symbol addresses that shows [Log1] in their respective [LOG ID] column will be logged whenever the [Log Condition] of [Log1] is met. 
10	Korean	You can select [Korean] only if the type is [ASCII]. Select [Korea] to enable input in Korean Characters, or use the symbol as an address to display Korean characters on the screen.

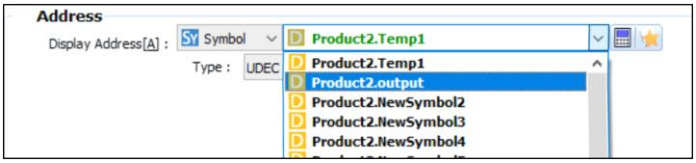
4.6.4 Application of Symbol Addresses

How to use a symbol list from the [Symbol Manager].
At the Address Field, select [Symbol] for the type of Display Address.



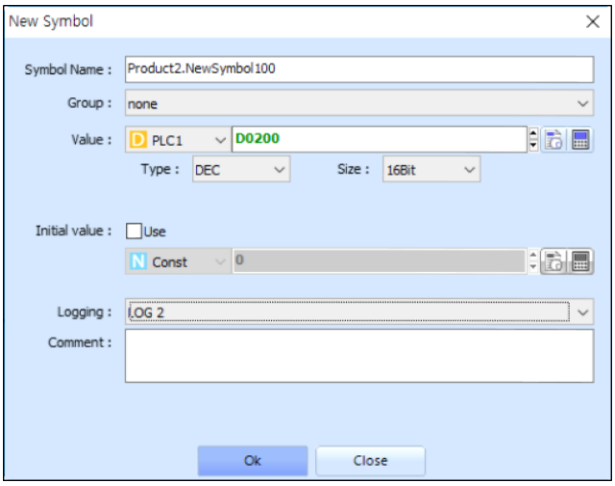
[Figure. Select Symbol]

Once [Symbol] is selected, the list of symbols is available at the address entry box.
Select the applicable symbol from the drop-down menu.



[Figure. Symbol Address]

Click the [Star] icon on the right to open the [New Symbol] window.
You can add new symbols from the [New Symbol] window.
You can not change an existing symbol address. You can change symbol addresses only from the [Symbol Manager].

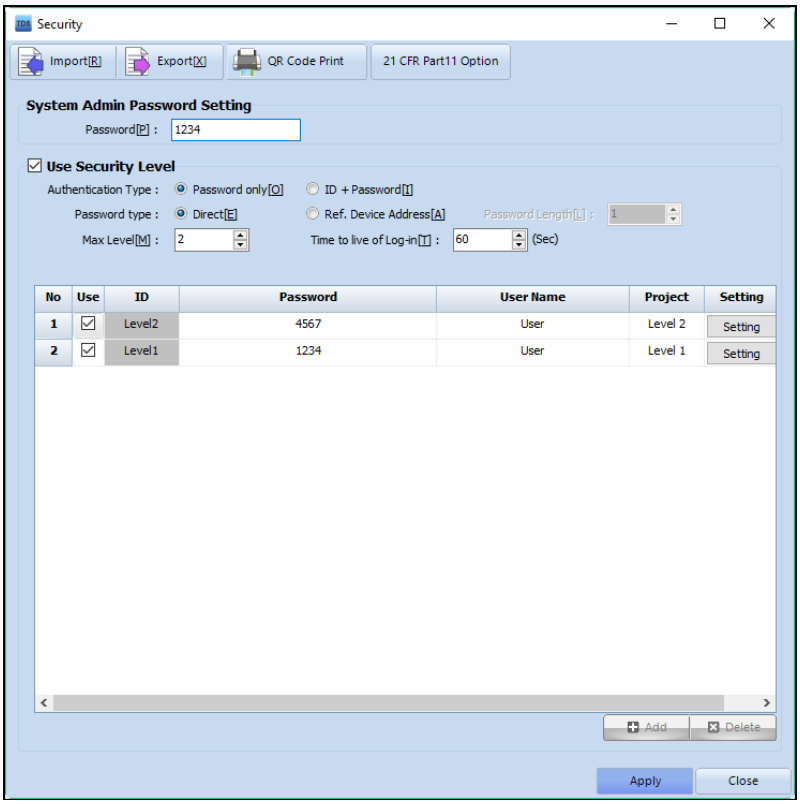


[Figure. Check and edit Symbol Addresses]

The configuration of [New Symbol] window is identical to that of the columns of [Symbol List] at the [Symbol Manager]. Refer to [Add Symbol] from the table provided in Chapter 4.6.1, Chapter 4.6.3 [Symbol List Columns (Detail)] for more details.

4.7 Security

Security features two configurations: [System Admin Password Setting] and [Use Security Level].



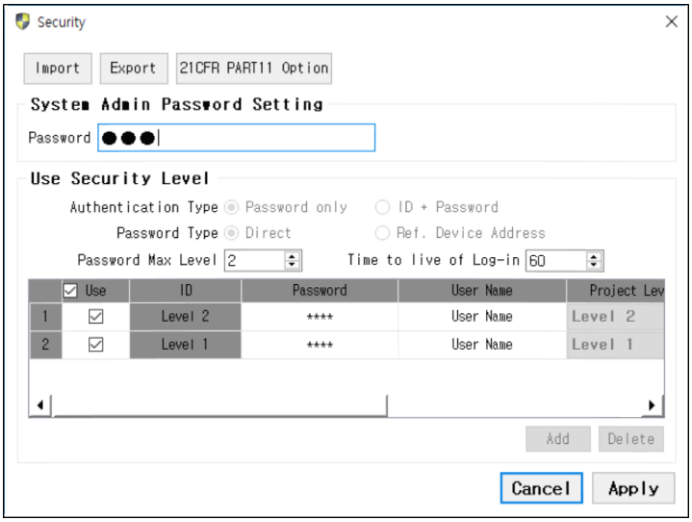
[Figure. Security]

4.7.1 System Administrator Password Setting

System Administrator Password is applicable to manage the TOP device.
You can restrict [Project Transfer] and [Data Upload] to protect your data.
You can limit access to the [Menu Screen] to preserve the settings of your TOP device.

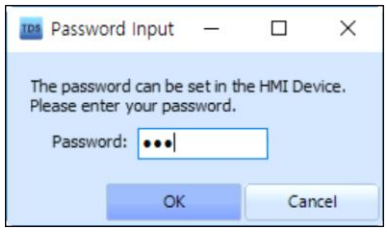
[Figure. System Administrator Password Setting]

Your password can be up to 8 characters long with a combination of numbers and upper/lowercase alphabetical letters.
If you transfer a project that the System Admin Password is configured to a TOP device, the System Admin Password will be applicable to the TOP device.
You can change / cancel the System Admin Password from the [Control Panel] - [System] - [Security] menu of the Menu Screen of your TOP device.
You can also configure a System Admin Password with the Menu Screen of our TOP device for a project that was not assigned to a System Admin Password.



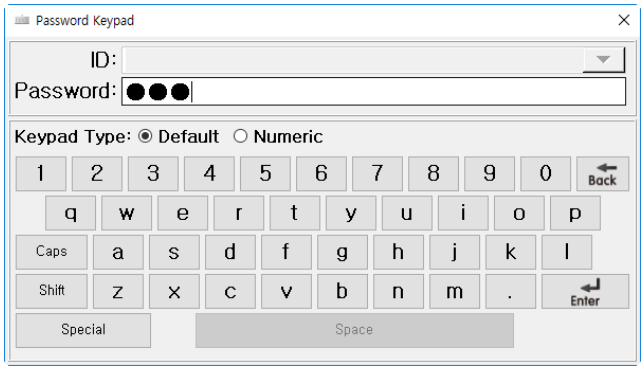
[Figure. Security Window of TOP device]

▶ The following Password Input message will appear when you transfer a project or upload data from TDS to a project. Enter the correct password and click [OK]. Once your password is confirmed, the [Transfer/Upload] will be performed.



[Figure. Password Verification (PC)]

▶ The following Password Keypad window will appear when you abort to the TOP Menu Screen. Type in the correct password and press [Enter], to go back to the Menu Screen.



[Figure. Password Keypad (TOP)]

▶ If you have forgotten your password, you cannot access the Menu Screen nor transfer / upload a project.

The only way to disable the password is to recover the TOP device.

Once you recover your TOP device, all projects and data on the TOP device will be deleted.

Follow the below steps to recover your TOP device.

Insert an SD card to your PC, and create a recovery disk from the [Tools] - [Recovery Dis] menu of TDS. Insert the SD card that you have just made as a recovery disk, lower both dip switches of the SD and reset your TOP device.

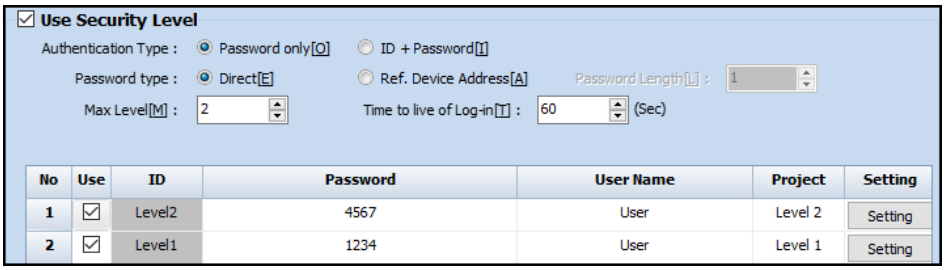
Momentarily, a beep sound will be repeatedly made indicating that the TOP device is recovered. Move the dip switches on the side of the SD card back to the upper position, remove the SD card, and reboot the TOP device to access the initial Menu screen.

(Refer to Chapter 23.8 [Recovery Disk] for more details.)

4.7.2 Use Security Level

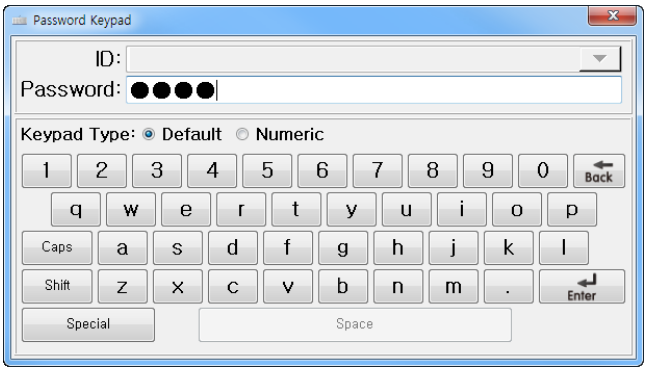
You can configure up to 16 passwords as [Level1] to [Level16].

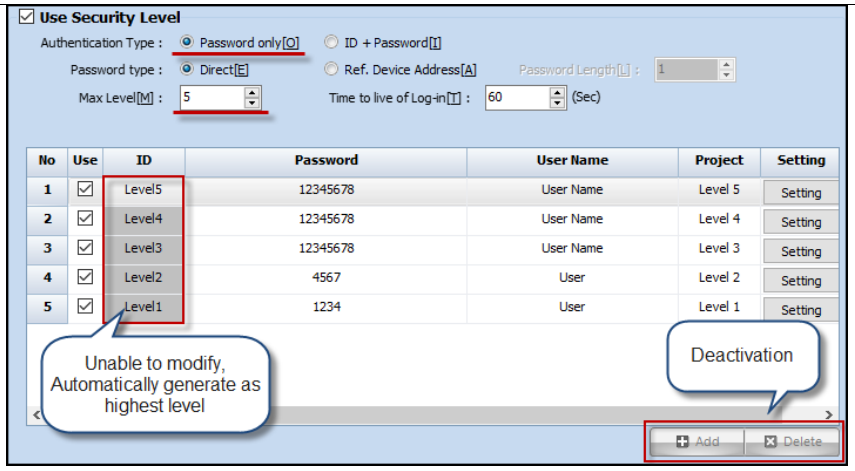
Assign [Base Screen]s and [Object]s to security levels, and allow access to each [Base Screen] or [Object] upon verification with the password of the corresponding level.



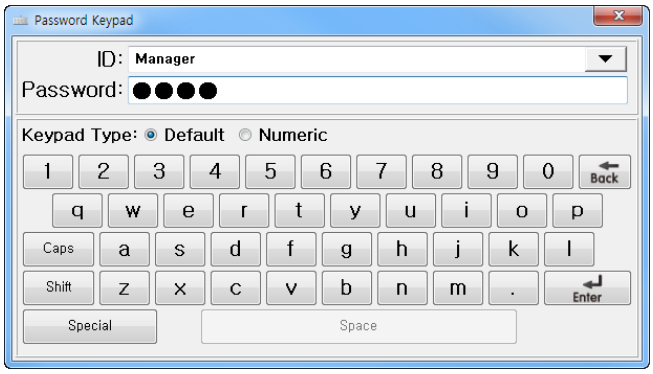
[Figure. Use Security Level]

To allow access to a specific screen, or a specific object based on password verification, check [Use Security Level] and create corresponding passwords.

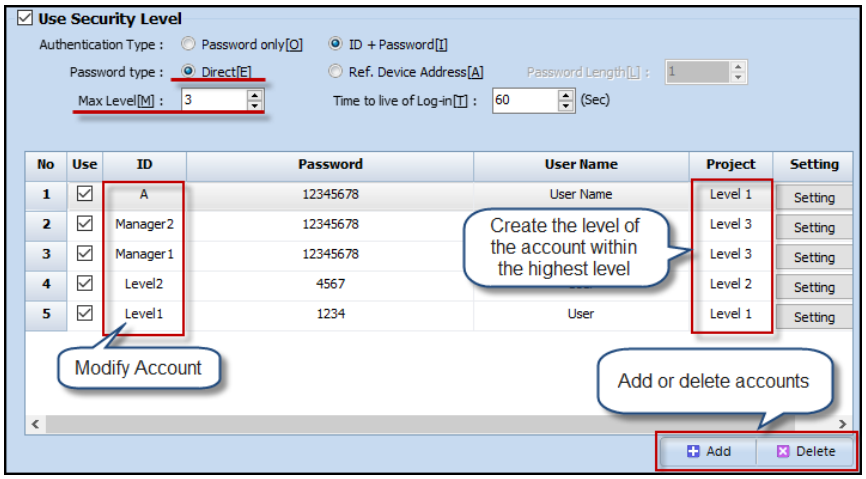
No.	Security Level	Description
1	Authentication Type	Select between [Password Only] and [ID + Password]. Select [Password] to input only the log-in password for authentication.  The columns of [ID] and [Project] cannot be edited, where each column is numbered in an ascending order from the highest existing security level. Since [ID] is not a factor for password authentication, the [Add] / Delete] button provided on the lower right side that is used to add or delete IDs are disabled.



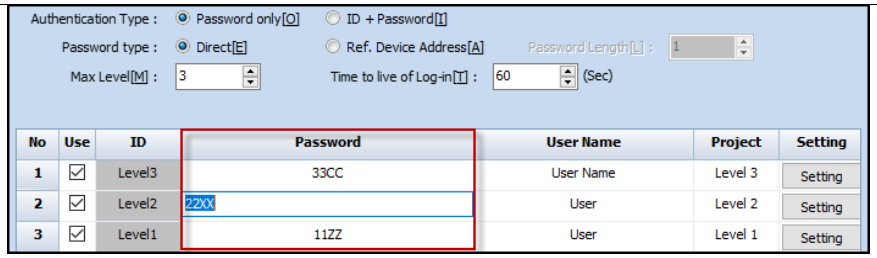
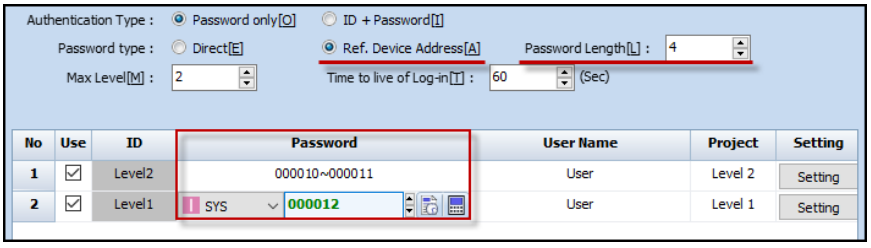
Select [ID + Password], to input User ID and password for authentication.



If [ID + Password] is selected, you can add/delete IDs with the [Add] / Delete] button provided on the lower right side, and you can add up to 65,535 IDs.
The [ID] and [Project] (Security Level) columns can be easily edited.
For [Project], select the corresponding level within [Max Level].

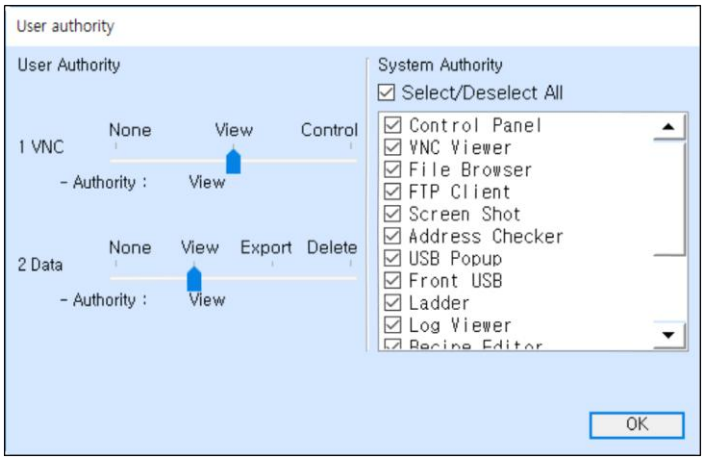


2	Password Type	Select between [Direct] and [Ref. Device Address]. Select [Direct] to configure a password of your selection.

		 Select [Ref. Device Address] to configure and address as the [Password] and select the [Password Length].  [Password Length] refers to the number of characters of the password. If the [Password Length] is [4] as above, 4 characters are employed as the password. Two characters can be saved on a 16Bit word address [D0010], therefore to read 4-characters password, the address is automatically assigned to [D0010] ~ [D0011]. The string occupying the address the time of login should be identical to the typed in string to successfully login. To login with this function, the password must be recorded in the specified address area. You can enter/change the password by entering / changing the data of the corresponding address area from the PLC or TOP program while the project is running, or perform initialization.
3	Max Level	Select the maximum level between [1] and [16]. Level 2 is higher than Level 1
4	Time to live of Log-in (sec)	Configure the time to wait for a touch input on the TOP device after a successful login to automatically log out from the account. Select [0] to disable auto log-out.

Refer to the following table for each column of [Security Level].

No.	Security Level	Description
1	Use	Select whether or not to use a security level.
2	ID	The account ID.
3	Password	Password.
4	Agent Name	User Name.
5	Project	Select the security level of each account (ID).
6	Setting	Select the user authority of each account. Features provided in this menu is available only if [FDA 21CFR PART11 (Security) Option] - [2. User Management System and Privileges] is enabled from the [21 CFR Part11 Option] provided on the menu bar. Configure the user authority and system authority settings.



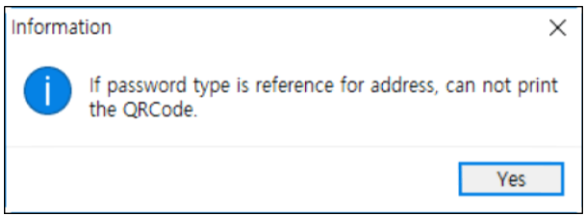
[Figure. User Authority]

Refer to Chapter 4.7.4 [21 CRF Part11 Option] for more details.)

4.7.3 QR Code Print

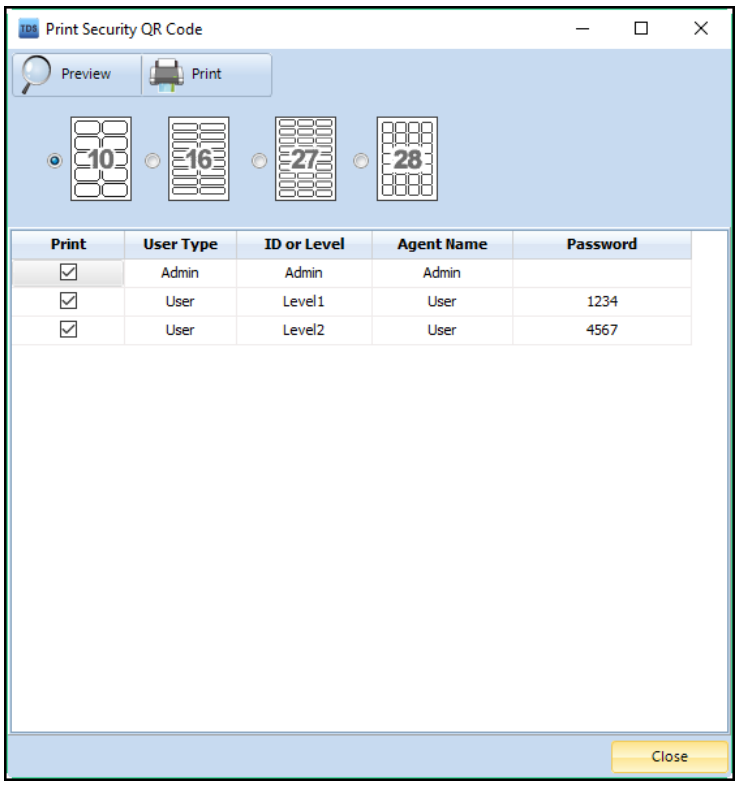
Convert passwords created by [Use Security Level] to a QR Code, and print the QR Code. The printed QR code can be used to verify your password by reading the QR code with the integrated TOP device camera.

This function is available only if [Direct] is selected as the Password Type, and applicable for TOPR premium models only, that has an integrated camera.



[Figure. Error Message - If password type is [Ref. Device Address]]

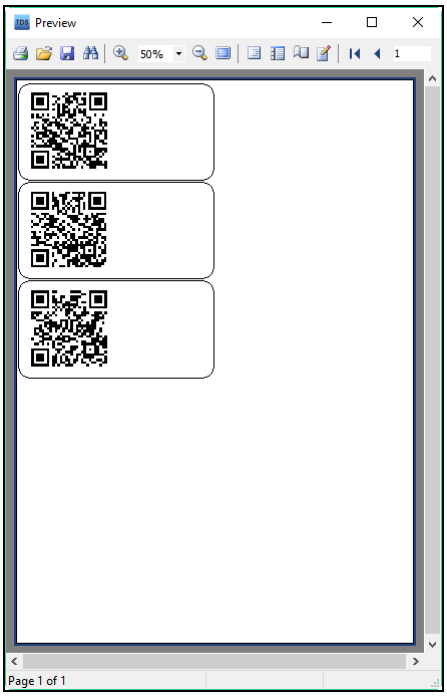
Click [QR Code Print] on the menu bar to open the [Print Security QR Code] window.



[Figure. QR Code Print]

Select the size of the QR code from the four options, and select the Level/Password you want print a QR Code for.

Click [Preview] to open the preview window. Click [Print] to print the QR code as shown in [Preview] with a printer connected to your PC.

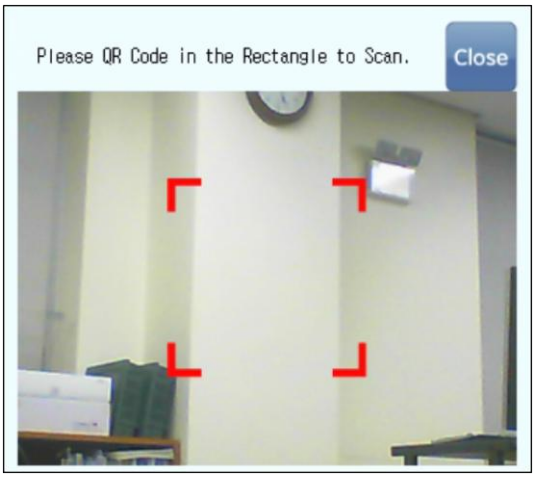


[Figure. Preview - QR Code Print]

To login with a QR code, follow the below steps.

Go to the [Effect & Action] tab of an object, select the [Action] sub-tab, and select [Special] - [System] - [Security Login] - [QR Code] to recognize a QR Code.

[Figure. QR Code Login]

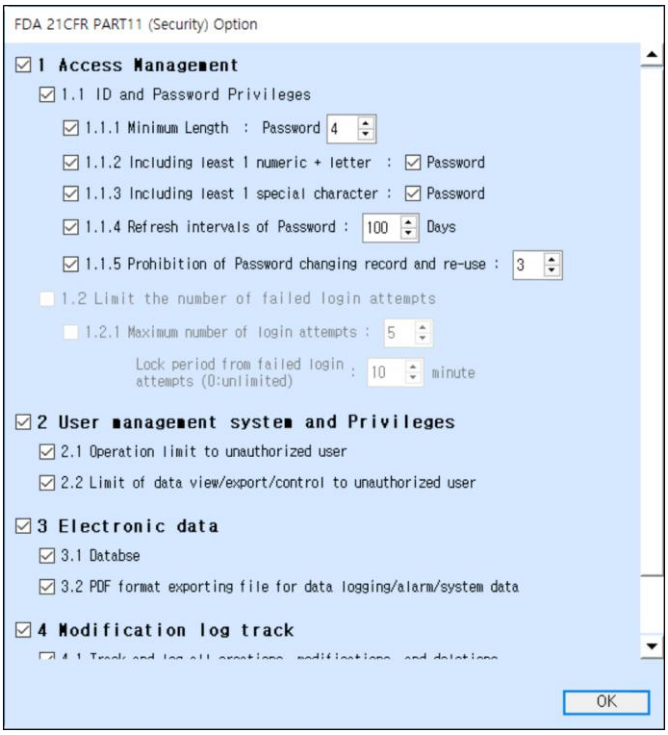


[Figure. Scanning a QR Code with the integrated camera]

Fit the QR code in the guide square. Once the QR code is scanned, and authenticated, the display navigates to the corresponding level.

4.7.4 21 CFR Part11 Option

FDA regulation 21 CFR Part 11 is a regulation on electronic records and electronic signatures that covers a broad range of application.



[Figure. FDA 21CFR PART11 (Security) Option]

Select each option to apply.

(1) Access Management

1.1 ID and Password Privileges

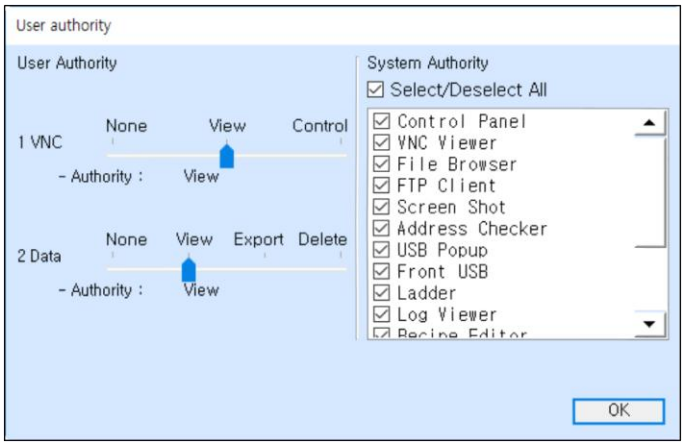
No.	ID and Password Privileges	Description
1	Minimum Length	Configure the minimum string length of passwords.
2	Including least 1 numeric + letter	Select whether or not at least one number and one letter should be included in a password.
3	Including least 1 special character	Select whether or not at least one special character should be included in a password.
4	Refresh intervals of Password	Configure the interval required to change passwords.
5	Prohibition of Password changing record and re-use	Select whether or not to record previous passwords and prohibit to configure a previously used password.

1.2 Limit the number of failed login attempt

If a user attempts more times than that allowed by [Maximum number of login attempts] and fails to enter the correct password, login window is locked for [Lock period from failed login attempts (0:unlimited)] in minutes. A user can not try to login within the lock period.

(2) User management system and Privileges

Enable [User management system and Privileges] to assign [Authority] to each levels from the [User Authority] window accessible from each [Setting] button provided in the [Setting] Column at [Project] - [Security] - [Use Security Level].



[Figure. User Authority]

2.1 Operation limit to unauthorized user

Enable and disable applications to [System Authority] according to the security level.
Only the selected applications can be accessed with the given security level.

2.2 Limit of data view/export/control to unauthorized user.

Configure the authority of [2. Data] for each level.

(3) Electronic Data

3.1 Database
Record on a file (Secuirty_YYYYMMDD.log) or on the database (Security). (Available only on TOPView(SCADA))

3.2 PDF format exporting file for data logging/alarm/system data
Alarm data is automatically converted to a PDF file when exported or copied.
Log data of security and audit trail are automatically converted to a PDF file when exported or copied.

(4) Modification log track

4.1 Track and log all creations, modifications, and deletions
Record information related to fatal hardware errors and alarms (including Not enough disk space, failed to communicate, blackout).
The previous value and new values before and after modification are recorded.

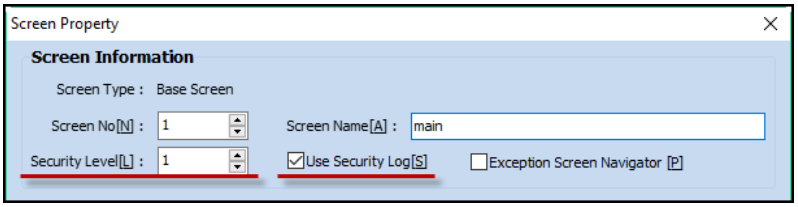
4.2 Retain all logged data for 1 year (unable to modify and delete)

Records of audit trail are stored for one year and cannot be deleted nor edited.

4.7.5 How to apply security levels

(1) Security Levels of Base Screens

Go to [Screen Property] and find [Security Level] settings.

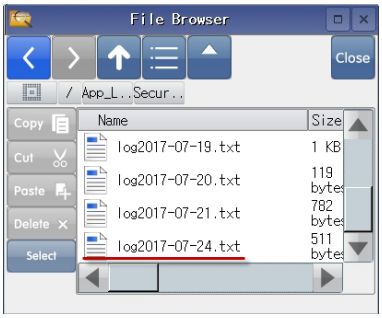


[Figure. Screen Property]

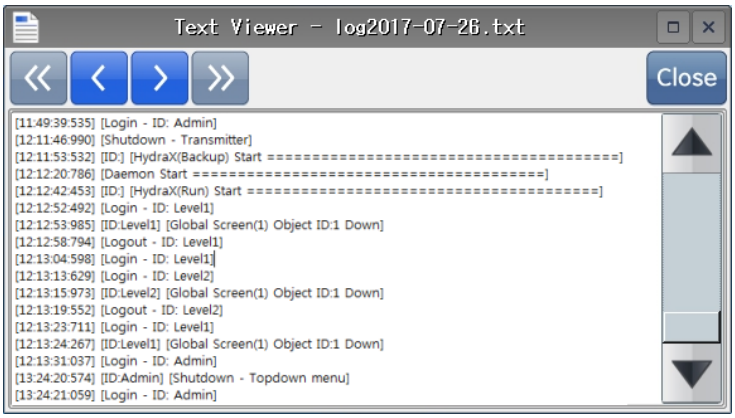
Select [0] to apply no security level or a number of [1] or above to assign the screen to a specific level, accessible upon password verification.

Enable [Use Security Log] to record security logs to the TOP internal memory.

Open the File Browser from the Menu Screen, and go to [App_Log] - [SecurityLog] folder. you can find login/logout records in text files organized on a daily basis.



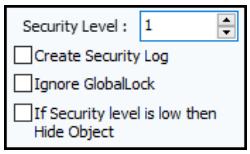
[Figure. SecurityLog folder from File Browser]



[Figure. Security Log File]

(2) Security Levels of Objects

Go to the property of any object. Every object has a security level settings field provided on the lower left side of the Property window.

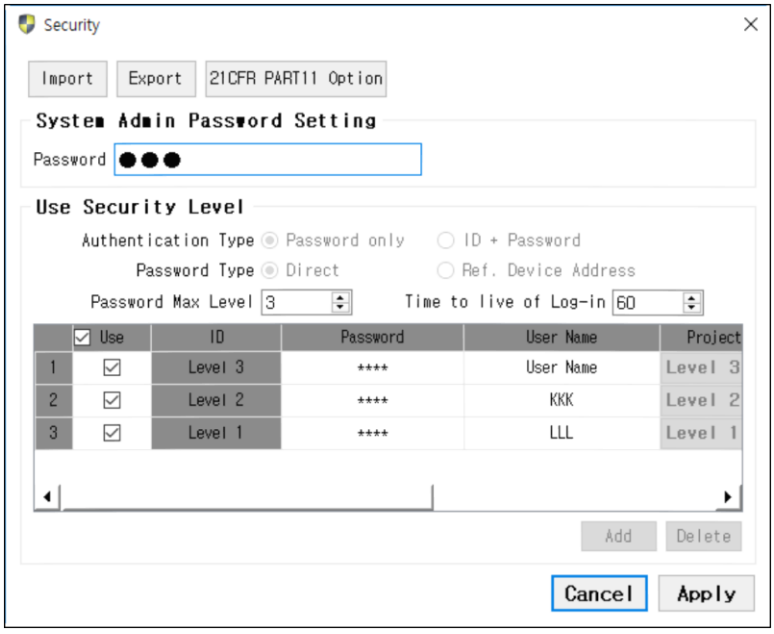


[Figure. Security Levels for Objects]

No.	Object Security Level	Description
1	Security Level	Assign the security level. The object will be active only after password verification corresponding to the security level.
2	Create Security Log	Select whether or not to record security logs on a daily text file in the [App_Log] - [SecurityLog] folder of the TOP internal memory.
3	If Security level is low then Hide Object	Select whether or not to display an object if the current user has a security level lower than the selected security level. The object will be shown when the current user's security level is equal or higher than the object.

4.7.6 [Security] Settings from TOP Menu Screen

The settings provided by [Project] - [Security] are also available from [Control Panel] - [Security] of the Menu Screen of your TOP device.
You can remove, configure and change the System Administrator Password.
For security levels, you can change the individual security levels from the TOP Menu Screen only if security levels are configured at [Project] - [Security] on TDS.
You cannot change the [Authentication Type] and [Password Type], while you can change settings for [Password Max Level] and [Time to live of Log-in].
If [Password] is the selected authentication type, you can change the columns of [Password] / [User Name] / [Authority], and if [ID + Password] is the selected authentication type, you can change the columns of [ID] / [Password] / [User Name] / [Level] / [Authority].



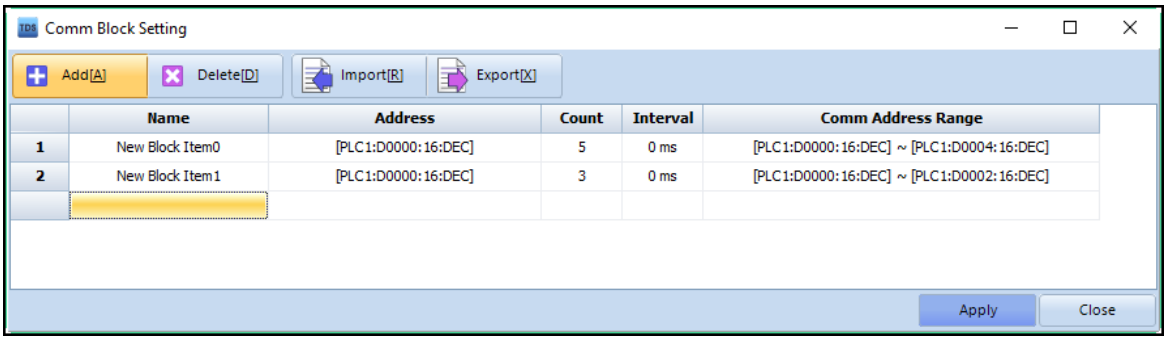
[Figure. Control Panel - Security Setting from Menu Screen]

Refer to Paragraph (1) [Security] of Chapter 1.2.8 [Control Panel - System] for more details.

4.8 Communication Block

Configure communication blocks to consolidate tables for communication between the project and PLC. During operation, the TOP device communicates with the PLC with a separately created communication table including object addresses.

Communication Blocks are different means of communication from communication tables, and communicates with the PLC on a regular basis [Interval], regardless to the current screen of the TOP device.



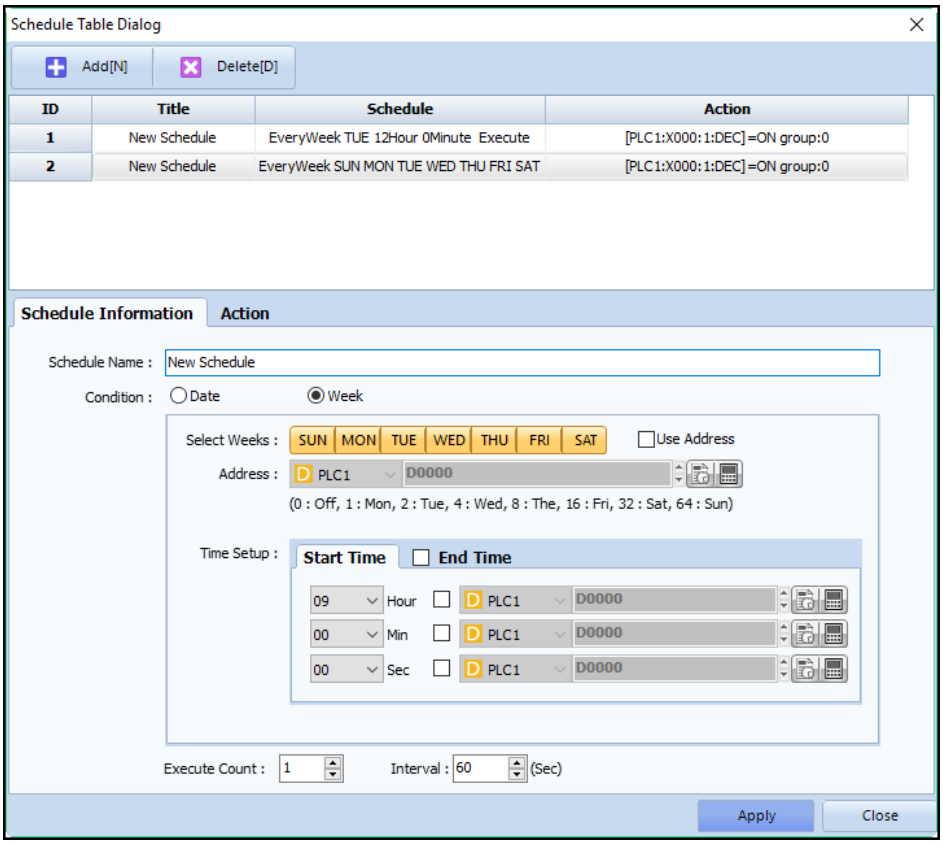
[Figure. Communication Block]

No.	Communication Block	Description
1	Add[A]	Add a communication block.
2	Delete[D]	Delete a selected communication block(s).
3	Import[R]	Import an existing communication block file [*.hcmb] to the current project.
4	Export[X]	Export the current communication block to a [*.hcmb] file.

Devices that are allowed to communicate on a longer interval than the communication scan interval may be added to communication blocks and, from the Symbol Manager, be created as symbols with the address assigned at Communication Block. If a Symbol is used for an object, communication will be performed on a longer interval than the communication scan interval. Other device addresses will experience a more frequent communication scan.

4.9 Schedule

Order an action to be performed on a predetermined time or on a regular basis.



[Figure. Schedule Table Dialog]

4.9.1 Schedule Information

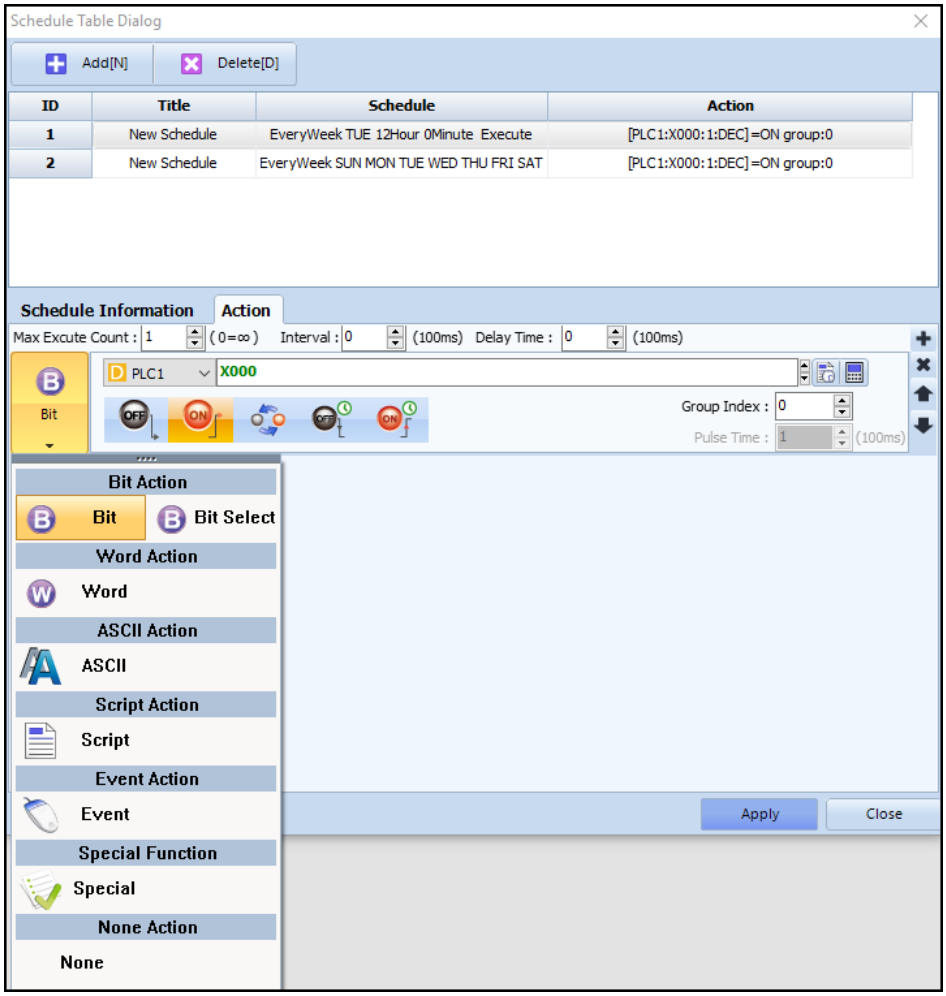
Configure the schedule information for an [Action].

No.	Schedule Information	Description
1	Schedule Name	Enter the name of the schedule
2	Condition	Configure the schedule. Select between [Date] and [Week] (day of a week). [Date] refers to a specific [Year/Month/Date], select [Every] to repeat the event every Year/Month/Date. [Week] refers to [Sunday/Monday/Tuesday/Wednesday/Thursday/Friday/Saturday]. Configure the [Hour] and [Minute]. Configure [Execute Count] from [1] to [99]. Select [1] to execute the action once. Select [2] or more to execute the action upon arrival of the schedule and repeat the action with the selected [Interval(sec)]. Configure the [Interval] in [seconds] if the [Execute Count] is two or larger.

4.9.2 Action

On the [Action] tab, configure the [Action] that should be executed upon the schedule configured at the [Schedule Information] tab.

Refer to Chapter 7.9 [Action Configuration] for more details on how to configure an action.



[Figure. Action]

4.10 Message Sent

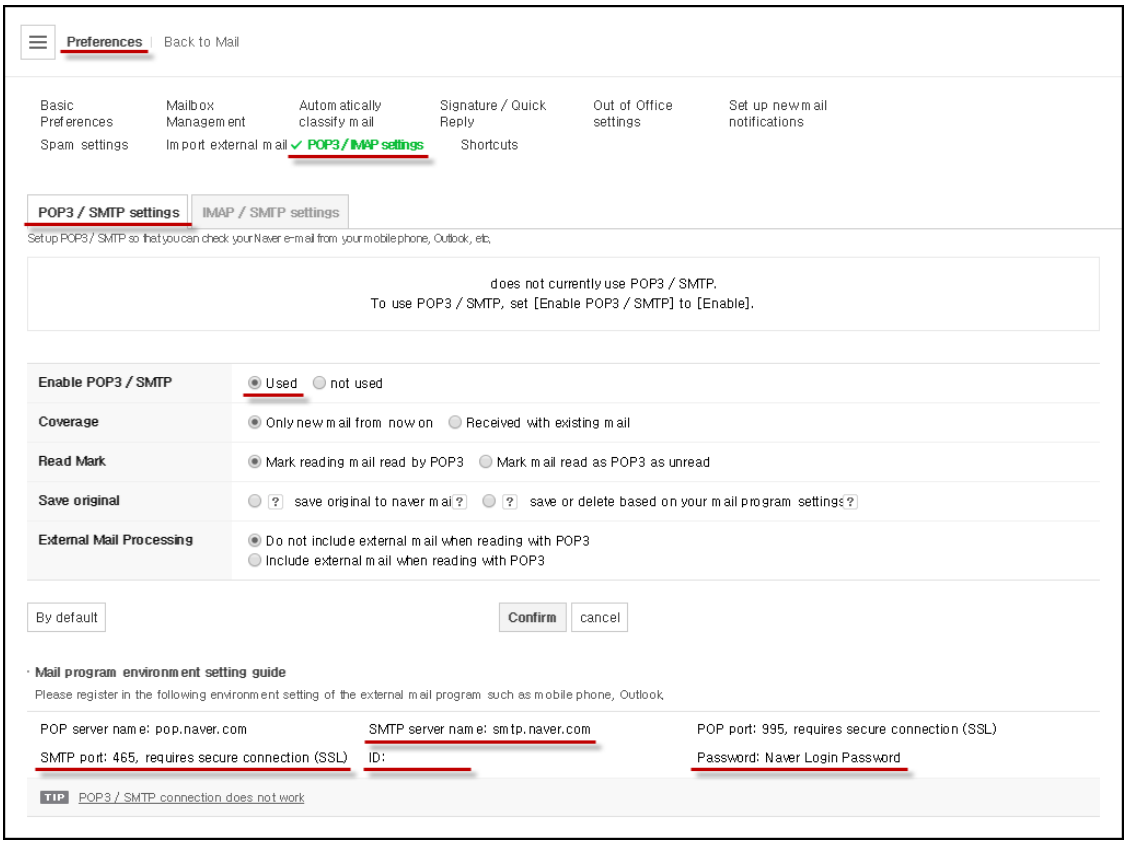
Click [Message Sent] to open the [Message Manager] window.
You can create and send an [Email] or [SMS] from the [Message Manager].
You can send a drafted [Email] or [SMS] with a [Send Message] action.

4.10.1 E-mail

Send an e-mail saved by [Project] - [Send Message] from the TOP device by executing a [Send Message] action.

(1) Naver mail environment settings

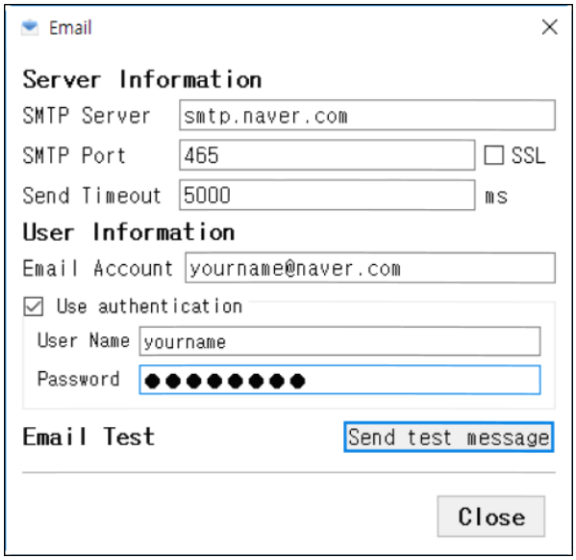
This is a walk through of e-mail environment settings with the example with naver mail.
To allow access to Naver mail, log in to your Naver mail account and select [Environment Settings] - [POP3/IMAP Settings].



[Figure. Naver SMTP Settings]

Configure your settings as shown above, then check and confirm the SMTP Server Name / SMPT Port / User Name(ID) / Password (Naver Login Password) shown on the bottom of the screen and enter the information on your TOP device at the [Control Panel] - [Email] from the Menu screen.

(2) [Control Panel] - [Email] configuration from Menu Screen.

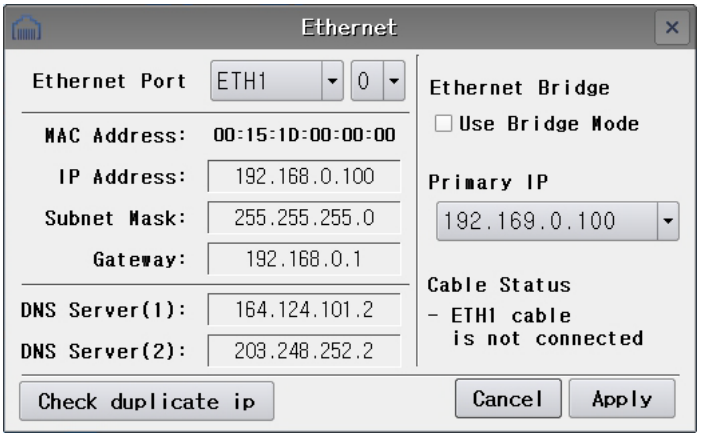


[Figure. [Menu Screen] - [Email] Settings]

Press [Send test message] for testing. The test result will be shown with a message window specifying [Sent Message] or [Failed to Connect].

(3) [Control Panel] - [Ethernet] configuration from Menu Screen

Connect the TOP device and PC with an ethernet cable, and go to [Control Panel] - [System] - [Ethernet] to configure the settings of [IP], [Subnet Mask], and [DNS Server].

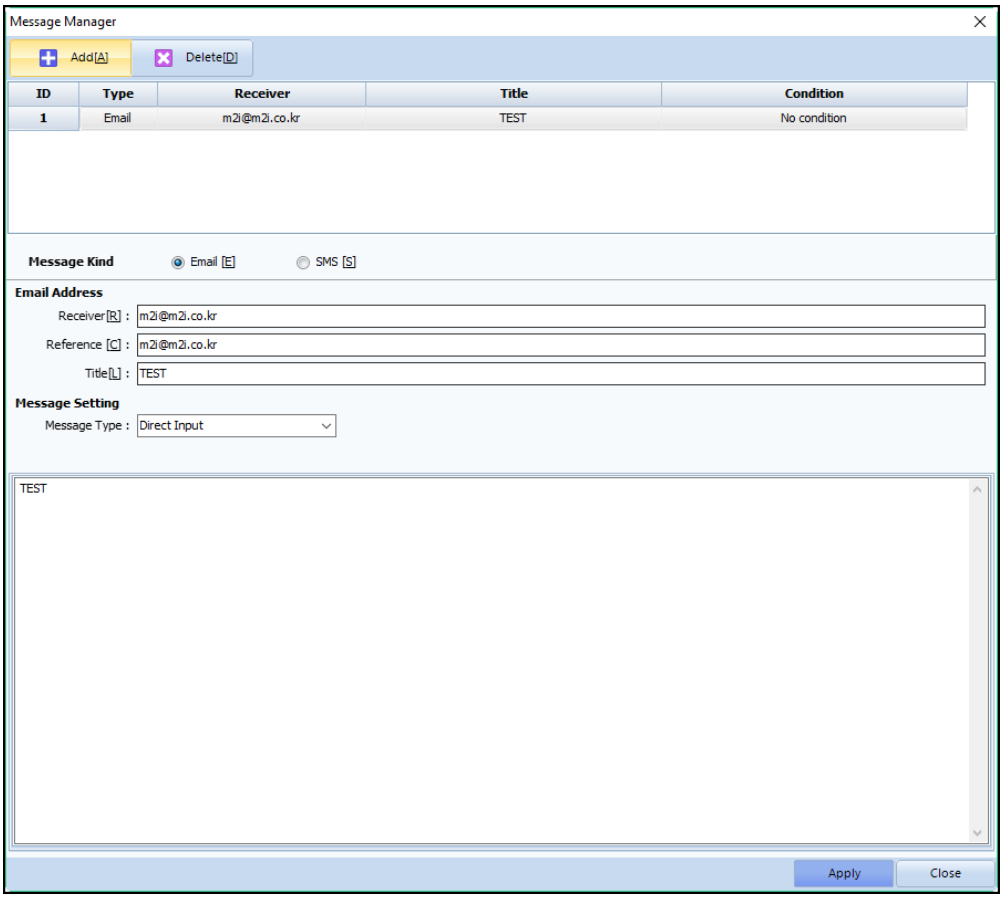


[Figure. Settings at [Menu Screen] - [Ethernet]]

If the [Gateway] is different, the TOP device cannot be connected to an external network.
If there is no [DNS] address, the actual IP of Naver mail cannot be found.

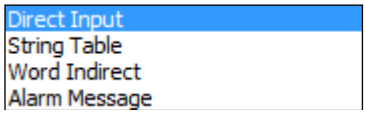
(4) Writing e-mails from [Project] - Send [Message]

Use [Project] - [Send Message] from the TDS and send an email from the [Message Manager].



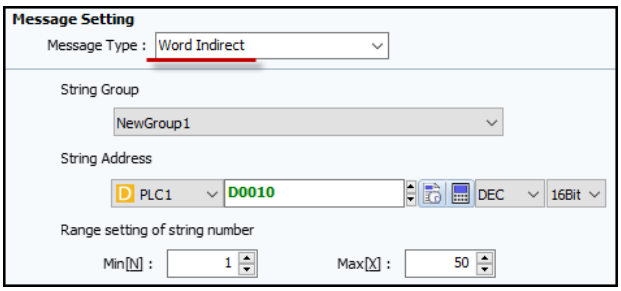
[Figure. Message Manager_Email]

Select [Email] for [Message Kind], and press [Add] from the menu bar to register an email with [1] as its ID.
Enter the corresponding email address for [Receiver] and [Reference] (if any), and the [Title] of the email.
Select the [Message type] from the drop-down menu for the [Message Setting].



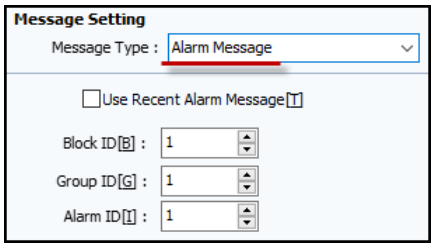
[Message Type]

Select [Direct Input] if you prefer to type in the text.
Select [String Table] to load contents from [Project] - [String].
Select [String Group], and the string that shall be imported as content from the list.
Select [Word Indirect] to load text data from the address allotted to the string selected by [Project] - [String] The data corresponding to the selected address' ID will be loaded.



[Figure. Email content_Word Indirect]

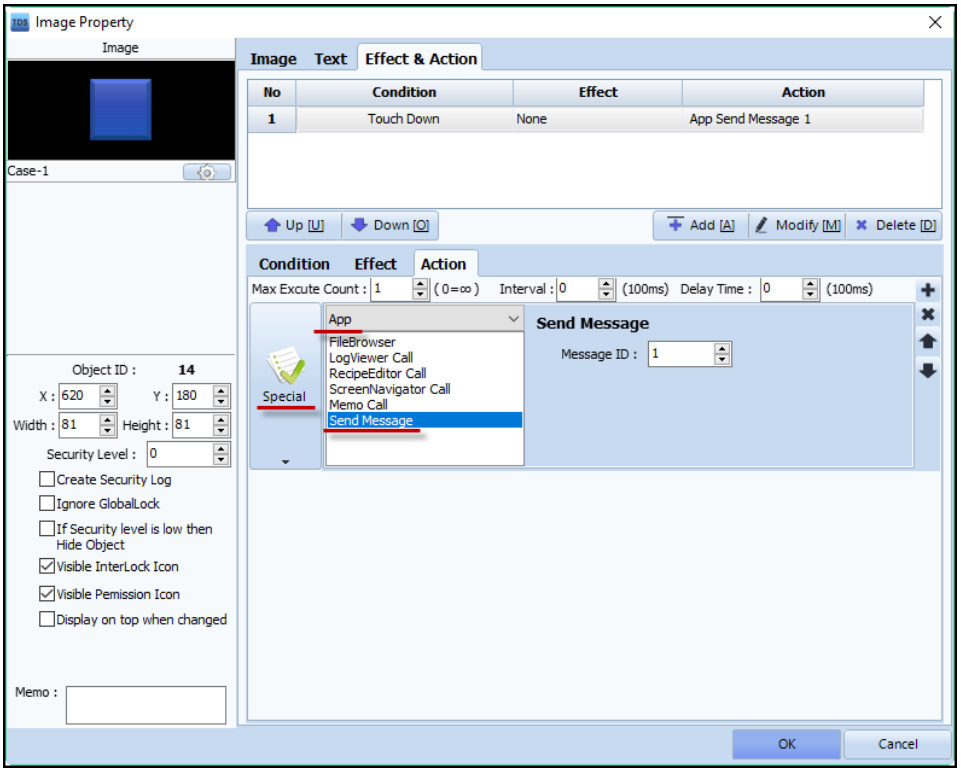
Select [Alarm Message] to load [Alarm Log] from [Project] - [Alarm Message]. The [Alarm Message] corresponding to the [Block ID] / [Group ID] / [Alarm ID] will be loaded.



[Figure. Email Content_Alarm Message]

(5) Send Email

Send the email you have made with [Message Manager] by following the below process.
On the [Effect & Action] page, select [Special] - [App] - [Send Message] and enter the message ID.



[Figure. Send Message button]

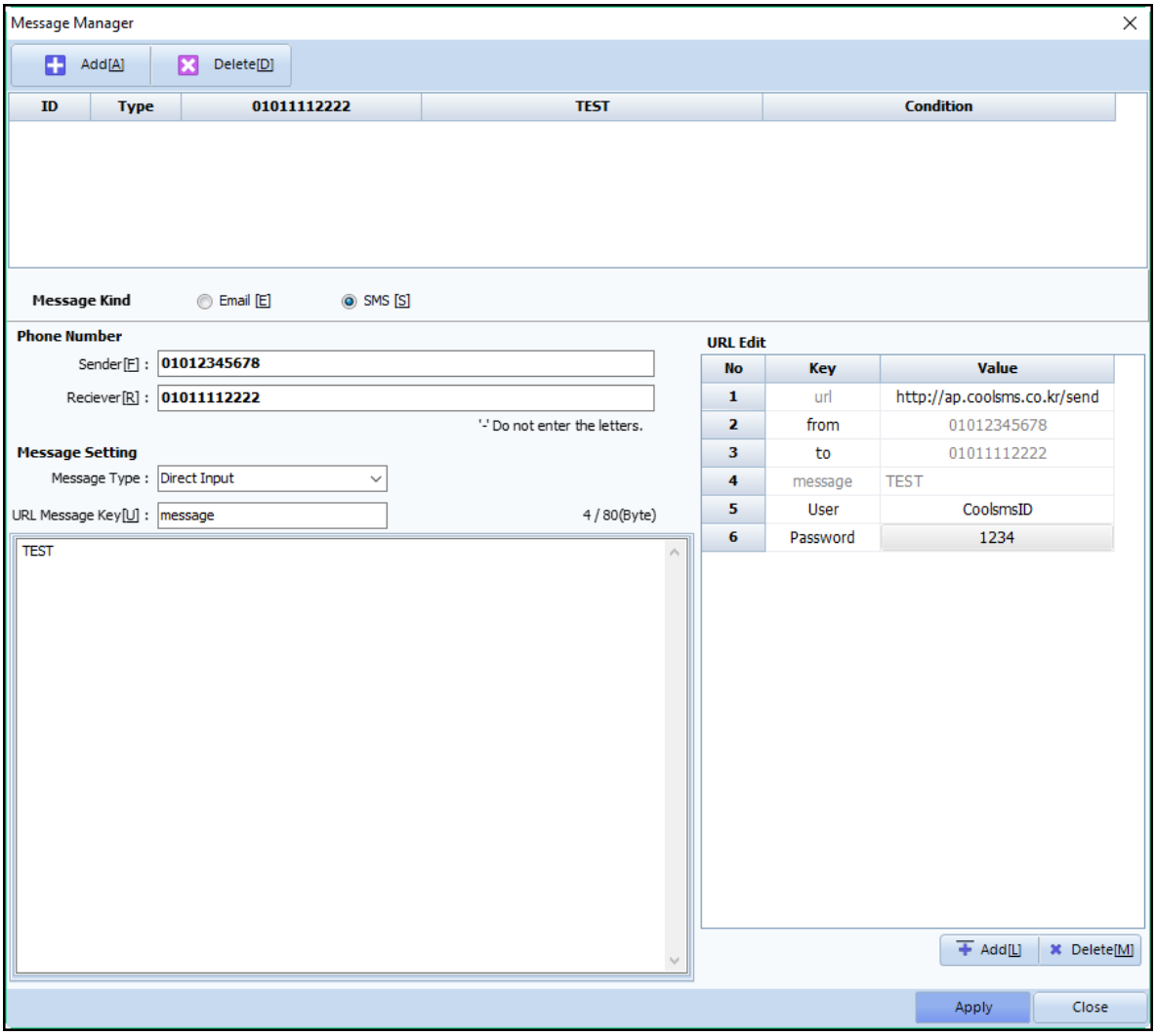
The above action will send the email.

4.10.2 SMS (Text Message)

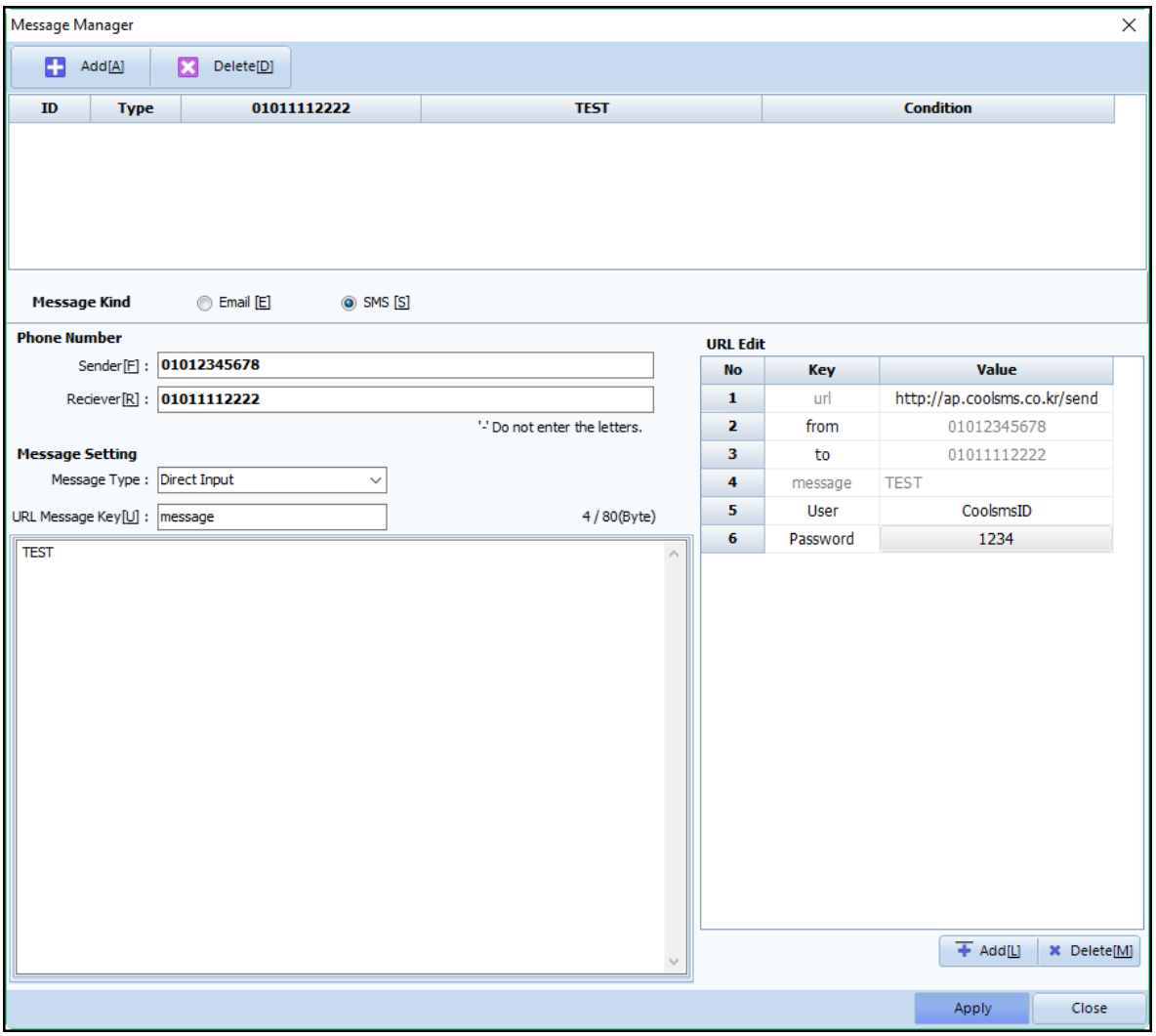
To use the SMS function, you have to employ an SMS provider.
CoolSMS and Infobank are proven compatible service providers.
The SMS function adopts API protocol, that limits the length of a message.
The sender information can not be changed, and you have to request the provider to register your information.

You also have to request your network supplier to relieve the restriction to allow sms transmission.

▶ How to use API messaging with CoolSMS /Infobank.
CoolSS(http://www.coolsms.co.kr/), Infobanck (http://www.ibizplus.co.kr/technical/datacenter/restful)
Guide to API (http://www.coolsms.co.kr/Legacy_HTTP)
Refer to the above links and enter the essential [Key Value]
Each supplier provides their service in different manners, and the payment scheme is also different.
You must enter the mandatory [Key Value] provided by the API scheme employed by the supplier.



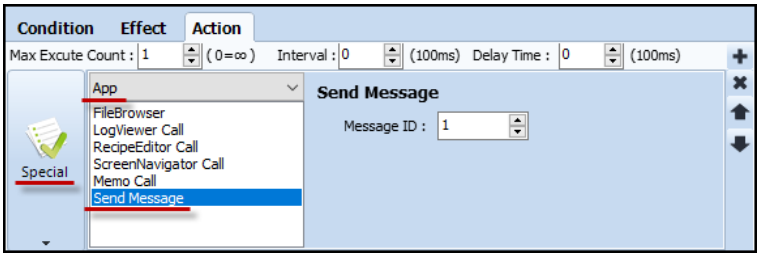
[Figure. Message Manager_SMS (CoolSMS)]



[Figure. Message Manager_SMS (Infobank)]

▶ How to send an SMS

Send the SMS you have made with [Message Manager] by following the below process.
On the [Effect & Action] page, select [Special] - [App] - [Send Message] and enter the message ID.



[Figure. Send Message button]

The above action will send the SMS.

4.11 Roll Printer

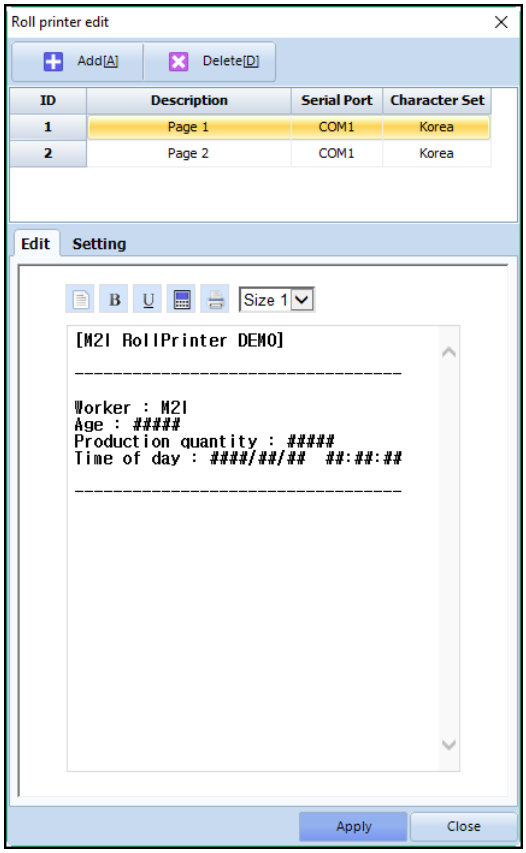
Roll Printer is a mini-printer printing on a roll of paper.
Connect a roll printer to the serial port of your TOP device and print via RS-232C communication.

4.11.1 Roll Printer Specification

You can use any type of roll printer. However, your TOP device may not support Bold/Underline fonts if the roll printer does not employ EPSON protocol.

4.11.2 Print Form

Edit the print from at [Project] - [Roll Printer].

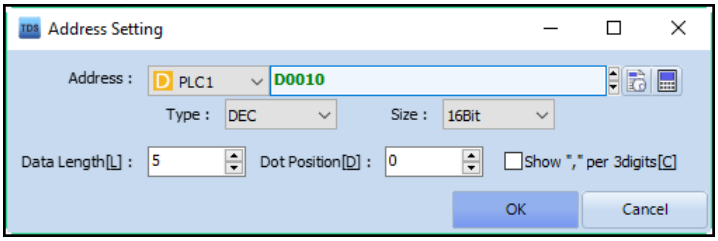


[Figure. Configure Roll Printer form]

Press [Add] to create [Page 1]. You can additionally add pages upon your needs.

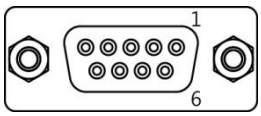
Enter texts in the [Edit] field, and edit the form with the property toolbar.

No.	Button	Description
1	Source	Source of the text is shown. Press again to go back to edit mode.
2	B Bold	The select text is changed to bold.
3	U Underline	An underline is created beneath the selected text.

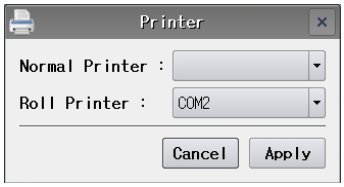
4	Address	Add the address for output.  Configure the [Address / Type / Size / Data Length (length of an expression) / Dot Position]. Select [Show "," per 3digits] to express currency. Press [OK], then ####### will appear in the edit field. Click each ##### to edit the applicable address from the [Address && Formant Input] window.
5	Print	Run a test print.
6	Size 1	Edit the size of the selected text. Select from font size of 1 to 7. Size 1 is the smallest size, where Size 2 is 2 times larger than Size 1, Size 3 is 3 times larger, so on and so forth, Size 7 is 7 times larger than Size 1.

4.11.3 Communication between TOP device and Roll Printer

The COM1 / COM2 port of the TOP device is configured as below.

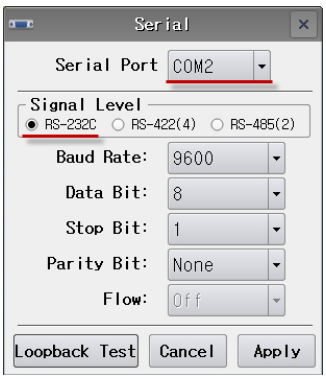
Shape	Pin No.	Signal	I/O	Description
9Pin Female  	1	RDA(RD+)	Input	Receive RS-422/485 data (+)
	2	RD(RxD)	Input	Receive RS-232C data
	3	SD(TxD)	Output	Send RS-232C data
	4	RDB(RD-)	Input	Receive RS-422/485 data (-)
	5	SG		Signal Ground
	6	SDA(SD+)	Output	Send RS-422/485 data (+)
	7	Power	Output	5V
	8	Power	Input	Power Ground
	9	SDB(SD-)	Output	Send RS-422/485 data (-)

For the cable connecting the TOP device and roll printer, the SD of the TOP device shall be connected to the RD of the roll printer, and the SG of the TOP device shall be connected to the SG of the roll printer. Select between COM1/COM2 for which the roll printer shall be connected at [Control Panel] - [Printer] from the Menu screen.



[Figure. TOP device PORT selection for Roll Printer]

Go to [Control Panel] - [Serial] from the Menu Screen and configure the communication settings for the roll printer.



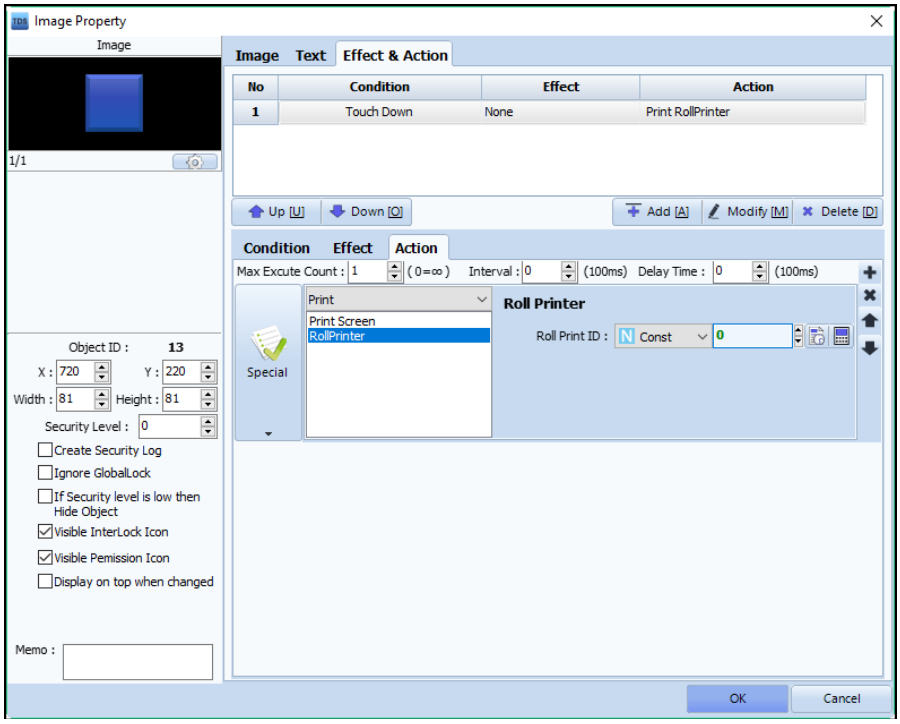
[Figure. Communication settings for Roll Printer]

4.11.4 **RollPrint Action**

The button to start roll print is available on the [Action] page - [Special].

On the [Effect and Action] page, go to [Action] - [Special] - [Print] and select RollPrinter, then select the Roll Print ID for the form you have created at [Project] - [RollPrinter].

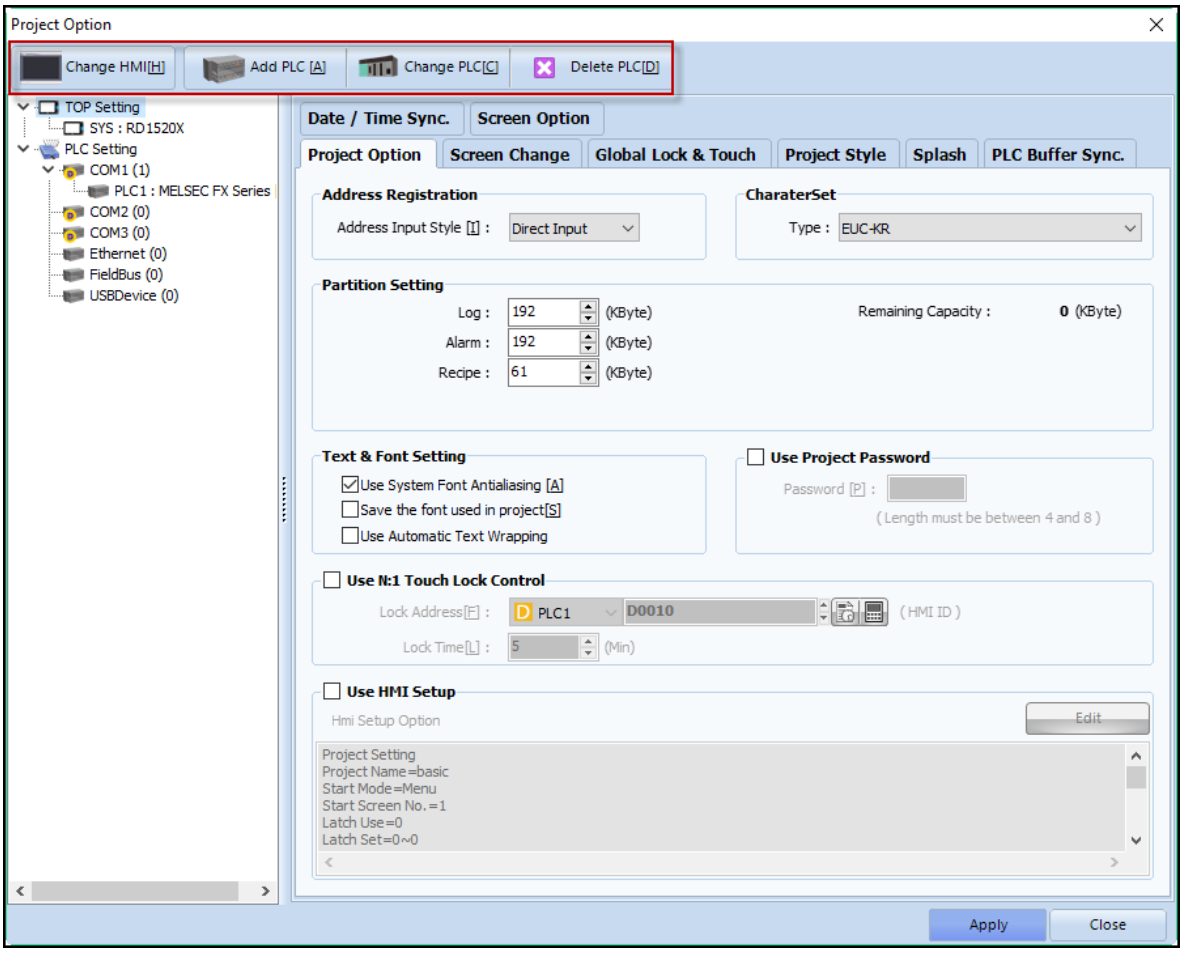
Once this action is activated, the roll printer will print records in the format of the selected ID.



[Figure. Print Order]

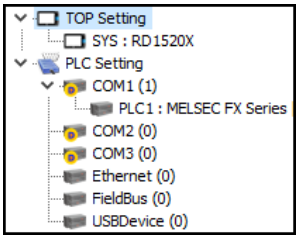
4.12 **Project Property**

From Project Property, you can configure various settings applicable to the TOP/PLC, or the entire project.



[Figure. Project Option]

On the [Project Option] window, [TOP setting] and [PLC setting] are provided on the left side.

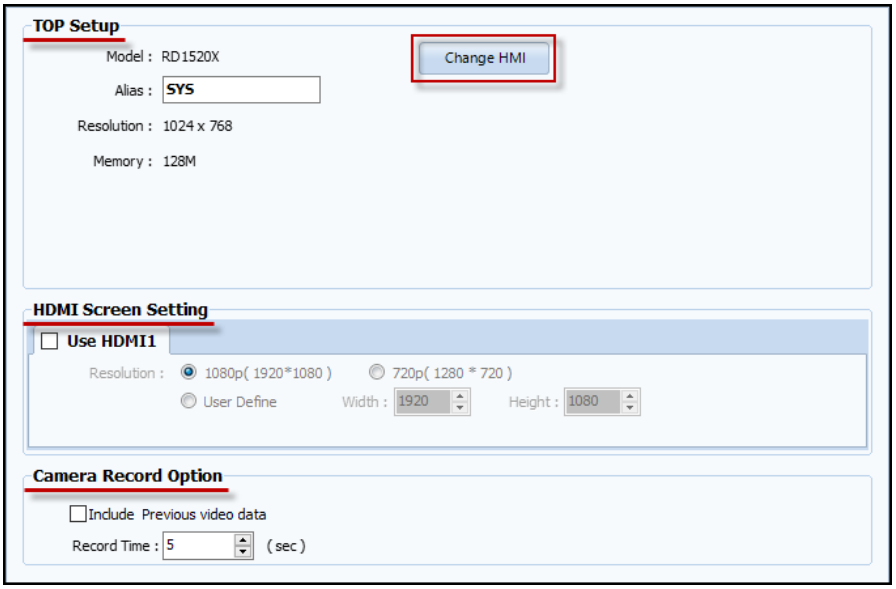


[Figure. TOP Setting / PLC Setting]

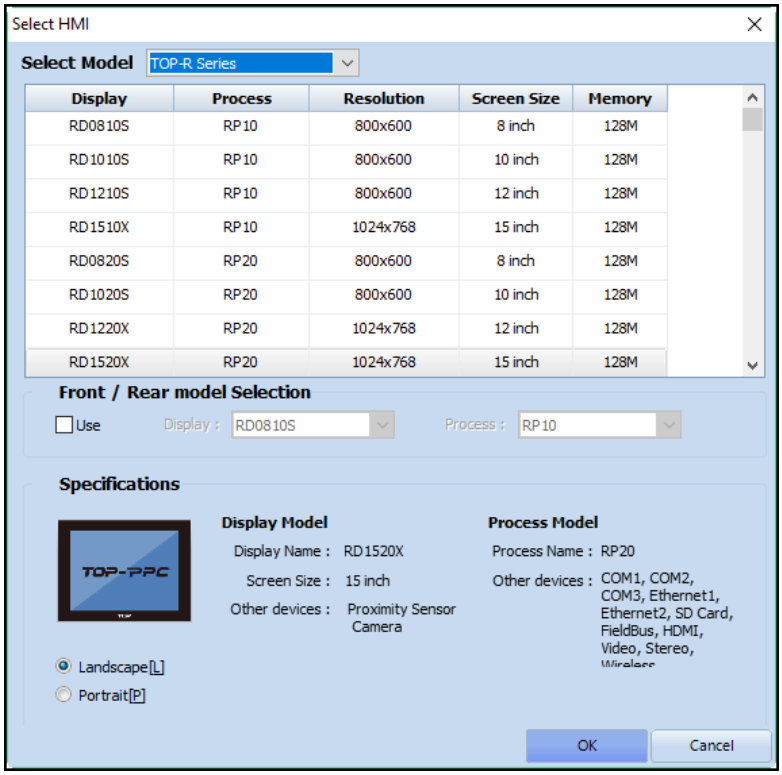
The right side of the window where you can configure detail settings vary by selecting [TOP Setting], [TOP Model], and [PLC model] on the left side.

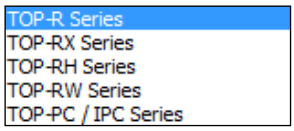
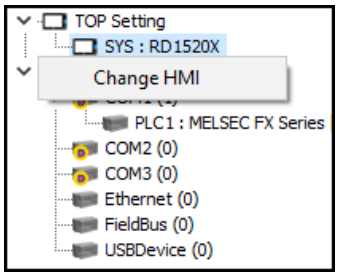
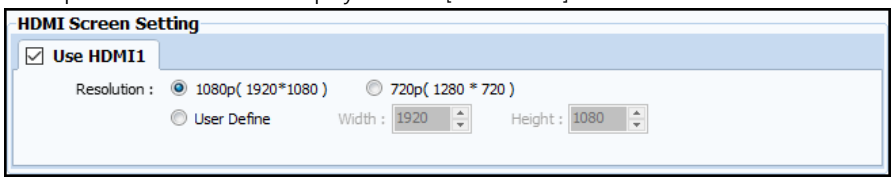
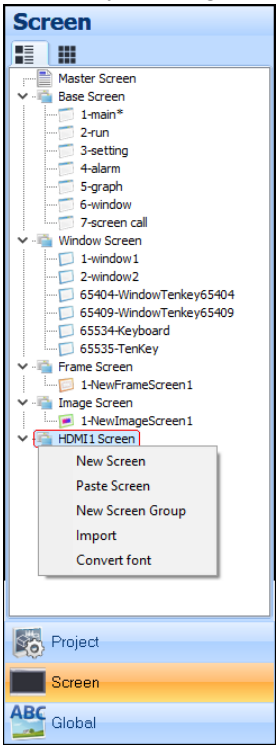
4.12.1 TOP Setting

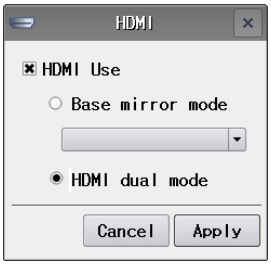
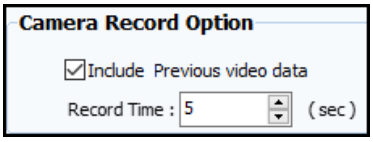
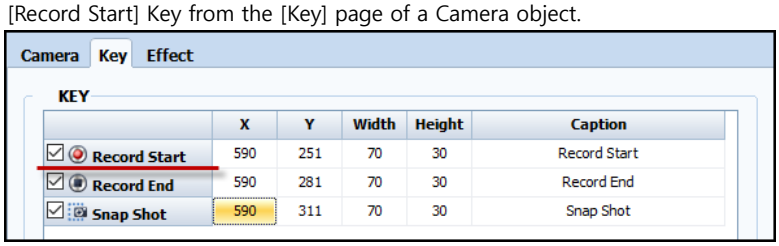
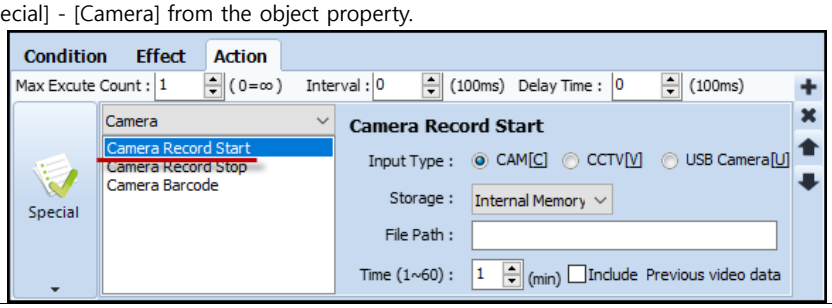
Under [TOP Setting], there is a sub-category of [TOP Model].
Select the TOP model to access the detail information of the TOP device.



[Figure. Detail Information of TOP Model]

No.	TOP Setting	Description
1	TOP Setup	View details of the [Model] / [Alias] / [Resolution] / [Memory] for the selected TOP device. [Alias] is used in address list, and you can change the alias of the selected TOP device. Click [Change HMI] to open the [Select HMI] window, and change the [TOP Model] from the window.  Select a series from the drop-down menu of [Select Model], click a specific model, and

		click [OK].  You can change the TOP model with the [Change HMI] function, or right click the model name on the right side of the [Project Option] window and select [Change HMI] from the pop-up menu.  You can also change the TOP model with the [Change HMI] function provided in the menu bar atop of the [Project Option] window.
2	HDMI Screen Setting	This function is available only for TOPR Premium models that support HDMI ports. Enable [Use HDMI1] to create a separate HDMI screen on a [Monitor/TV/Projector] connected to the HDMI port of your TOP device, other than that displayed on the TOP screen for further monitoring. The separate HDMI screen is displayed when [Use HDMI1] is selected.  Enable [Use HDMI1], configure the resolution of the display device connected to the HDMI port, to create [HDMI1 Screen] on the [Project Manager] - [Screen].  [Figure. Project Manager]

		Configure the contents to be displayed on [HDMI1 screen] by adding new screens to [HDMI1] or copy and paste an existing base screen. The configured HDMI1 screen will be shown on the display device connected to the HDMI port when [HDMI Dual Mode] is selected at [Control Panel] - [HDMI] from the TOP device Menu Screen.  [Figure. HDMI setting from Control Panel] Enable / disable HDMI and select display mode from the [Control Panel] - [HDMI] of the Menu Screen. Select [Basic Mirror Mode] to repeat the current TOP screen on the HDMI device. Select [HDMI Dual Mode] to display the configured HDMI screen, that may differ from the current TOP device display.
3	Camera Record Option	This feature is available only for TOPR premium models that support camera and Video Ports. Videos recorded from the TOPR display integrated camera, USB camera connected to the USB port, CCTV or external camera connected to the VIDEO port can be shown on the screen in real time with a [Camera] object. You can save video records captured by the camera with the [Record Start] / [Record End] keys. Enable [Include Previous video data] at [Camera Record Option] to record video prior to the actual execution of the [Record Start] button for a predetermined [Record Time] in seconds.  Thus, the above configuration will enable the system to record video images from five seconds prior to your actual touch of the [Record Start] button. Add a [Record Start] Key from the [Key] page of a Camera object.  [Figure. Record Start Key of a Camera Object] You can also enable a [Record Start] action by going to [Effect & Action] - [Action] - [Special] - [Camera] from the object property. 

		[Figure. Camera Record Start Action]

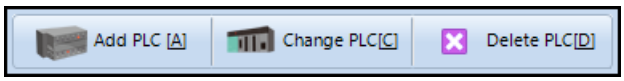
4.12.2 PLC Setting

See devices connected to the TOP device from the [PLC Setting] list provided on the left side.
In general serial ports of [COM1] / [COM2] / [COM3], ethernet port of [Ethernet Port], option module [Fieldbus] and USB port of [USBDevice] are listed as sub-devices, which may vary according to each TOP model.

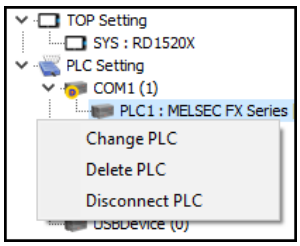
Add / change / delete PLCs from each port in the following steps.

▶ Select a PLC or port, and go to the menu bar.

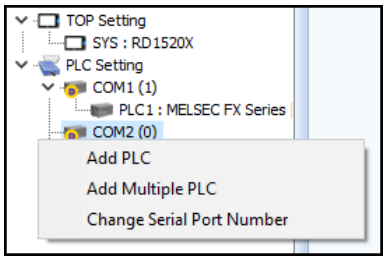
▶ Select a PLC or port and right click the PLC or port.



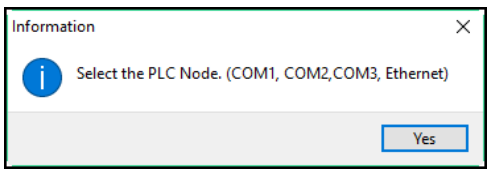
[Figure. Menu Bar]

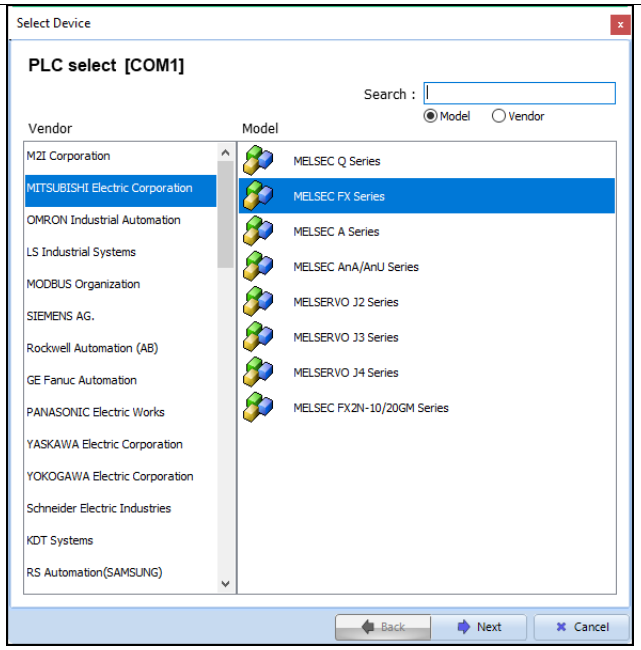
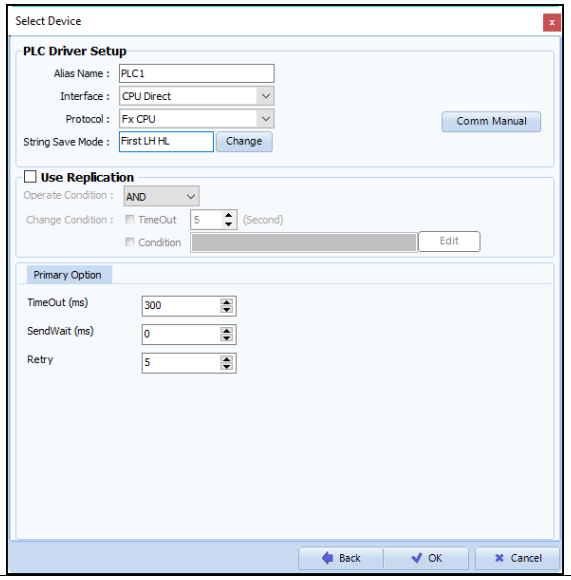
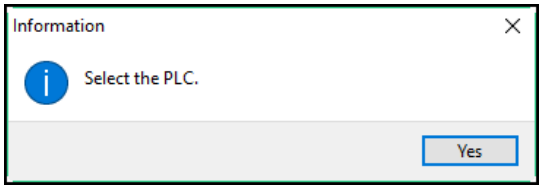


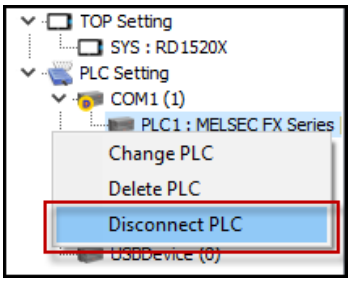
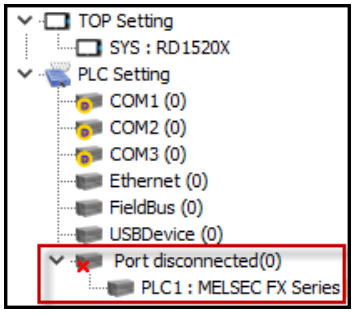
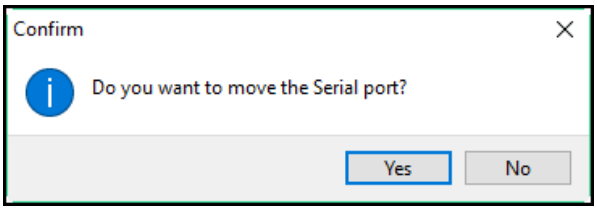
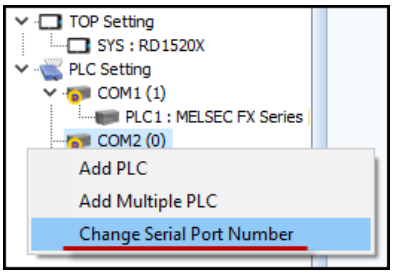
[Figure. Right Click to a PLC]

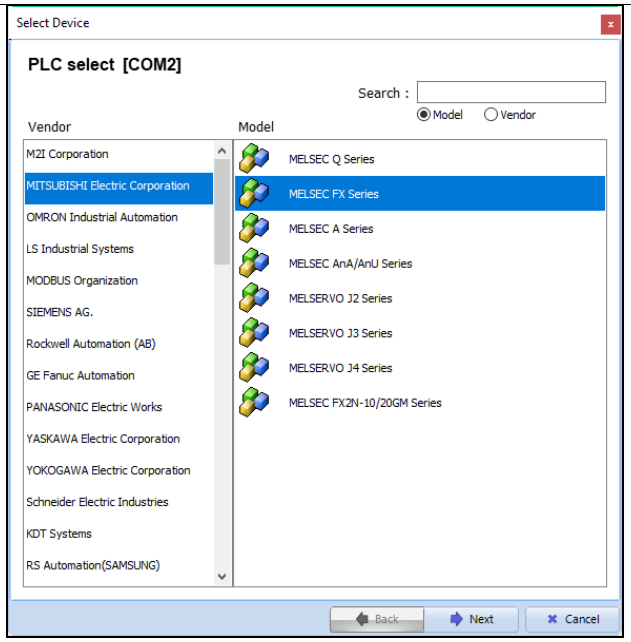


[Figure. Right Click to a Port]

No.	Project Option	Description
1	Add PLC	Select the port to which the PLC should be connected and click [Add PLC]. If you click [Add PLC] without selecting a port, the below message will appear.  Select a port and click [Add PLC] to open the [Select Device] window. Select the manufacturer and specific model of the corresponding PLC from the [Select Device] window. Click [Next] to move on to detail setup of the PLC.

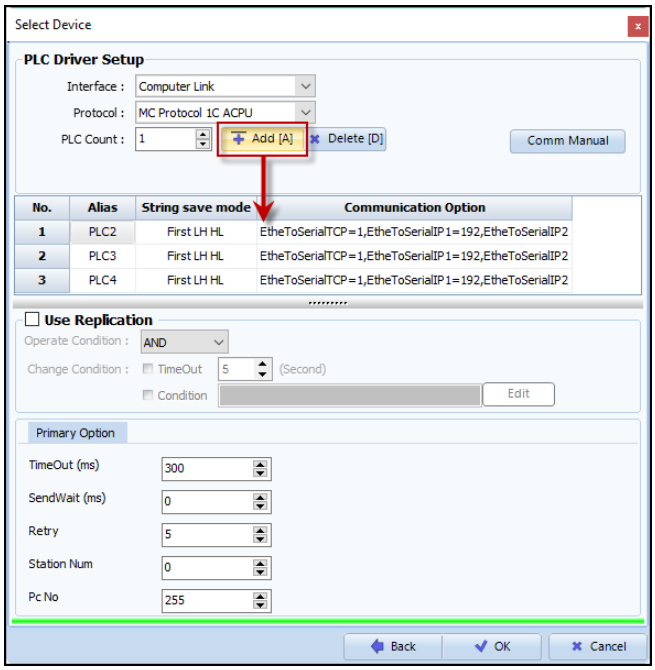
		 On the PLC Driver Setup, configure Alias Name / Interface / Protocol / String Save Mode. Click [Comm Manual] to access the terminal wiring diagram and setup scheme for communication between the TOP device and PLC. 
2	Change PLC	Change the selected PLC to another PLC. If you click [Change PLC] without selecting a PLC, the below message will appear.  Select the applicable PLC from the [Select Device] menu as explained above.
3	Delete PLC	Deleted a selected PLC.
4	Disconnect PLC	Right click a PLC and select [Disconnect PLC] from the pop-up menu. For a disconnected PLC, the configuration of the PLC will be maintained, while its location on

		the hierarchy list will be moved to beneath [Port disconnected]   Drag and drop a PLC under the [Port disconnected] branch, to a port among [COM1/COM2/COM3/Ethernet/Fieldbus/USBDevice] to relocate the PLC to the selected port.  A PLC selected as serial port can be moved only to a serial port, and a PLC selected as a ethernet port can be moved only to the ethernet port.
5	Add PLC in Batch	Add PLCs in batch when multiple identical PLCs are added to a selected port. Connecting multiple PLCs to a single TOP device is referred as [1:N] communication.  Select the vendor and model of the PLC at Select Device window, and click [Next].

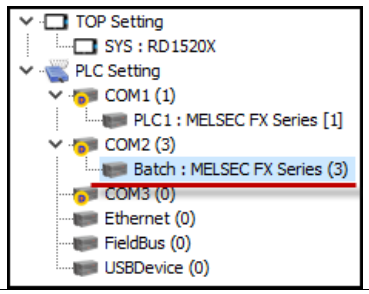


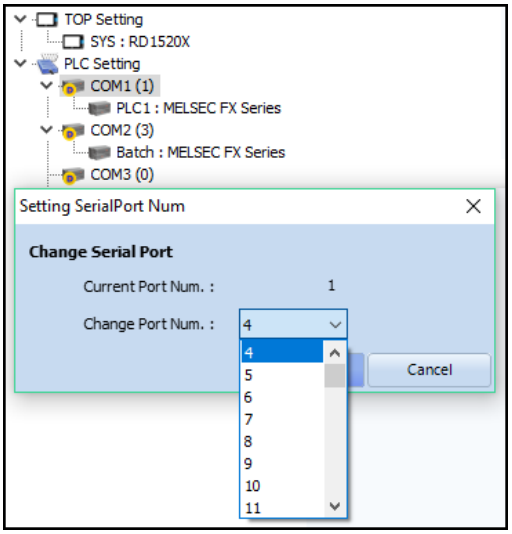
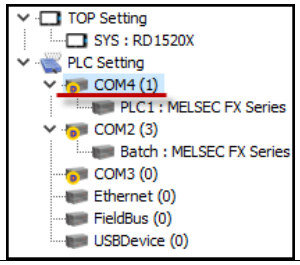
The below PLC Driver Setup window will appear.

Select the number of PLCs to be added in [PLC Count] and click [Add] to add identical PLCs to the PLC list.

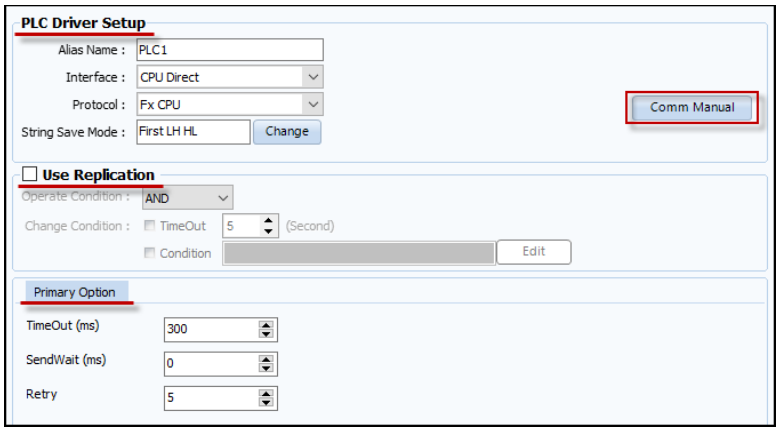


Click [OK], the PLC will be renamed with a prefix of [Batch] as shown below.

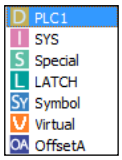
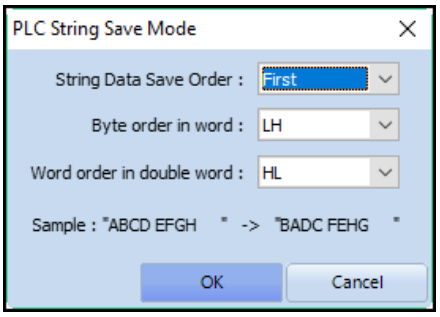


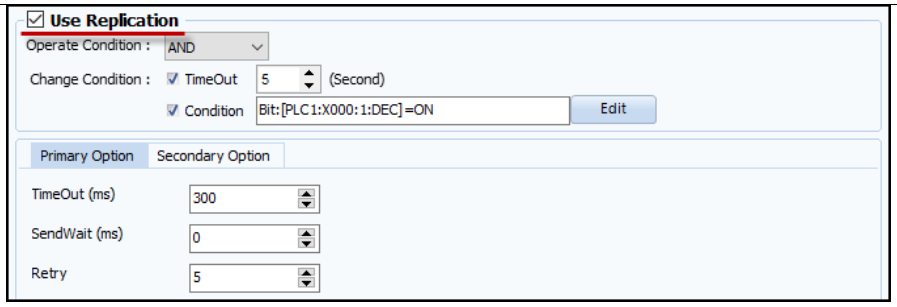
		If this procedure is performed on a PLC that does not support [1:N] communication, the below message will appear.
6	Change Serial Port Number	This function is required for TOPView(SCADA), where the port number has to be changed in cases where the PLC should be connected to a serial port on a PC. Select the serial port of which the number has to be changed, and select [Change Serial Port Number] from the pop-up menu upon a right click to the serial port.  

Select the PLC name to view detail information of the PLC.



[Figure. PLC detail options]

No.	PLC Setting	Description
1	PLC Driver Setup	Configure an Alias Name of the PLC to be used to enter addresses.  Select the [Interface] and [Protocol] of the PLC. For String Save Mode, click [Change] and configure the settings from the [PLC String Save Mode] window.  One character corresponds to 1 byte. Select between [First] and [Last] for the [String Data Save Order]. Select [First] to allot the first entered character to the first address. Enter "ABCDEFGH" -> the string will be saved as "ABCDEFGH". Select [Last], Enter "ABCDEFGH" -> the string will be saved as "ABCDEFGH". (provided that, the byte order in word is "HL" and the word order in double word is "HL") For the [Byte order in words], H refers to high bytes, and L refers to Low bytes. Select [HL], Enter "ABCDEFGH" -> the string will be saved as "ABCDEFGH". Select [LH], Enter "ABCDEFGH" -> the string will be saved as "BADCFEHG". For the [Word order in double words], H refers to high words, and L refer to low words. Select [HL], Enter "ABCDEFGH" -> the string will be saved as "ABCDEFGH". Select [LH], Enter "ABCDEFGH" -> the string will be saved as "CDABGHEF". Click [Comm Manual] to access the terminal wiring diagram and setup scheme for communication between the TOP device and PLC. Refer to Chapter 4.12.3 [Communication Manual] for more details.
2	Use Replication	[Replication] is available for RS-485 communication, allowing to connect two PLCs with identical settings to a single TOP device. The Primary PLC will operate as the duty, and the secondary PLC will operate as standby. In normal circumstances, the TOP device communicates with the primary PLC. If the [Change Condition] configured for [Use Replication] is met, the TOP device communicates with the secondary PLC.



You can configure two types of [Change Condition].
First you can select [TimeOut] admitting communication with the secondary PLC when the communication with the primary PLC is disconnected for a predetermined amount of time. And when the configured [Condition] is met, the TOP device communicates with the secondary PLC.

You can use both options together, where if the [Operate Condition] is [AND], the communication is changed when both conditions are met, and if [OR] the communication is changed when one of the two conditions is met.

Configure the communication options of the primary PLC and secondary PLC.
[TimeOut(Sec)] refers to the amount time the TOP device should wait before changing to the secondary PLC.
After initiating communication with PLC, the TOP device will wait for a certain amount of time for a response from PLC, and if such selected amount of time has elapsed without any response from PLC, and error will be created.

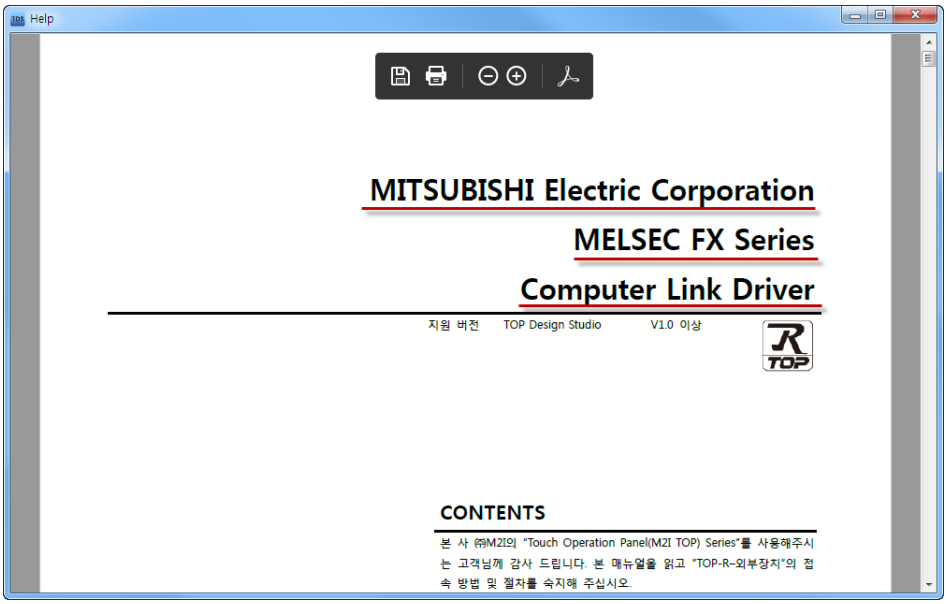
[SendWait(ms)] refers to the time delay configured for an outgoing communication from the TOP device to the PLC.
After sending an initial request to PLC, and receive response to such request from the PLC the delay time before transmission prevents the TOP device to send an additional response immediately after receiving such response and sends such additional request after the predetermined amount of time so that the PLC communication is not overloaded.
This function shall be used when the communication scan of the PLC is relatively slow.

[Retry] refers to the number of outgoing attempts made by the TOP device of communication protocol once TimeOut has elapsed after initial communication with PLC. This is the number of times that the TOP will repeat the cycle of send > wait > timeover > send. If the PLC does not respond after the selected amount of cycles, an error will be created.

4.12.3 Communication Manual

The Communication Manual provides wiring diagrams and communication settings, and other contents related to communication.
You can access the communication manual by going to [Project] - [Property] and select the corresponding PLC from the [PLC Setting] of the [Project Option] window and click [Communication Manual] button.
If you click [Communication Manual] the manual of the corresponding PLC will pop-up on your screen. The file is provided in a pdf format.

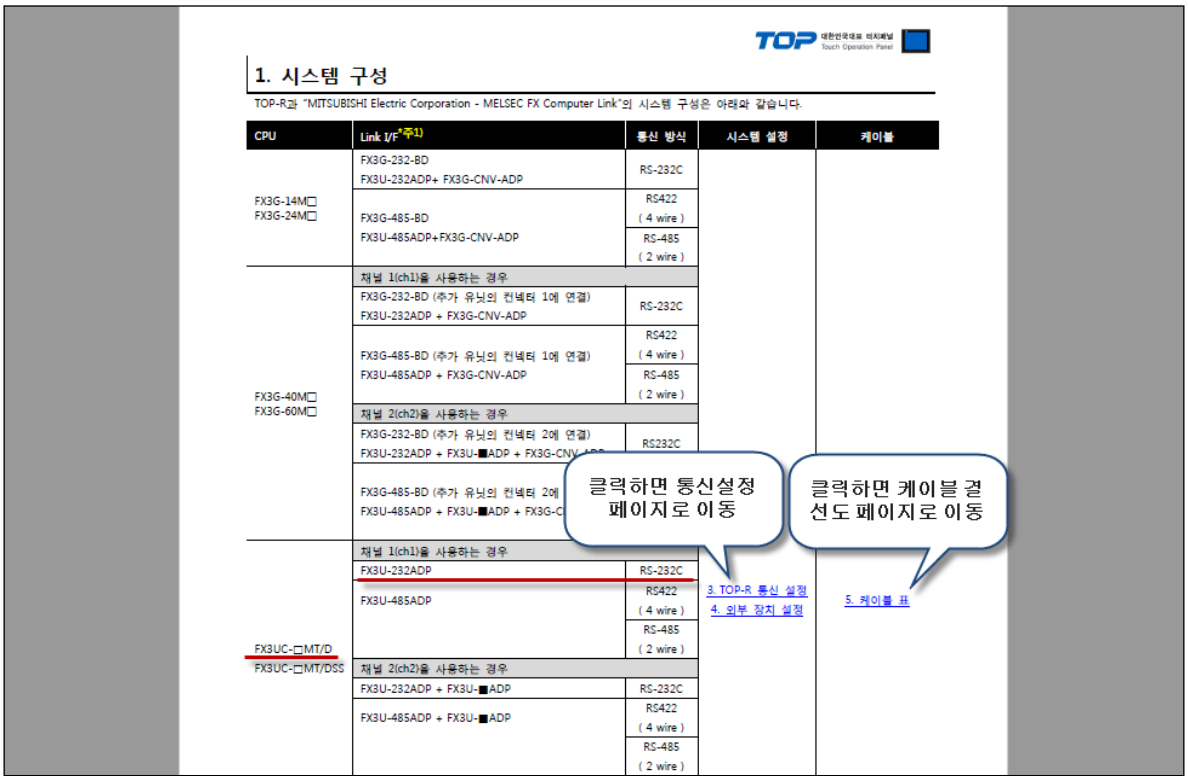
Go to the first page of the Communication Manual and confirm the PLC vendor and model number.



[Figure. 1st Page of Communication Manual]

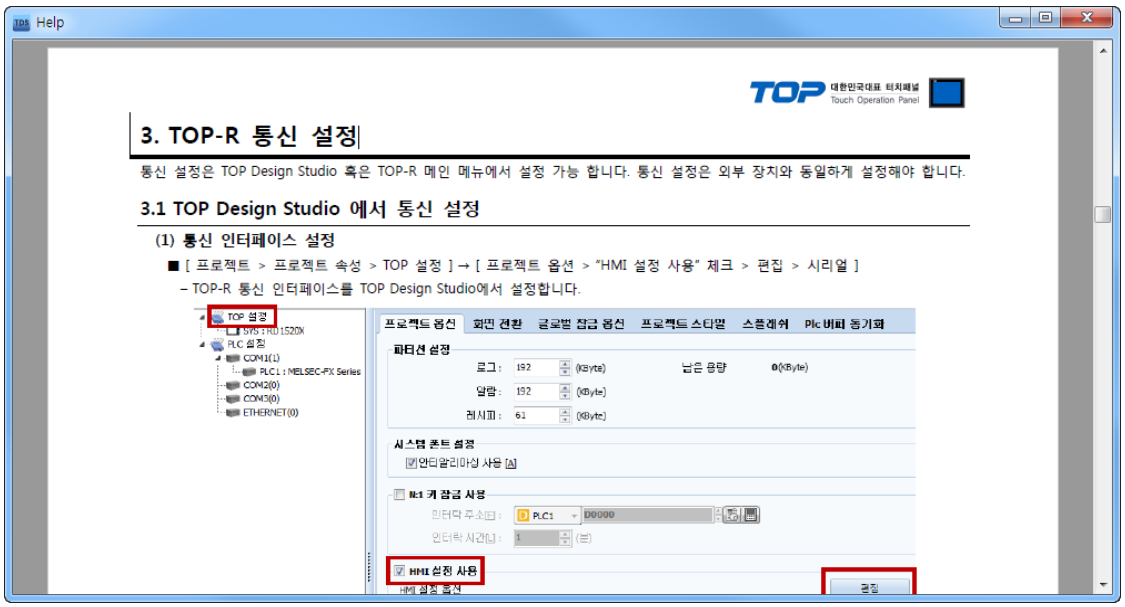
Go to the second page and find the CPU model / communication card model of the PLC of your interest from [1. System Configuration].

Follow the corresponding model and find the system configuration and cable table. Click the hyperlink to navigate to the corresponding page.



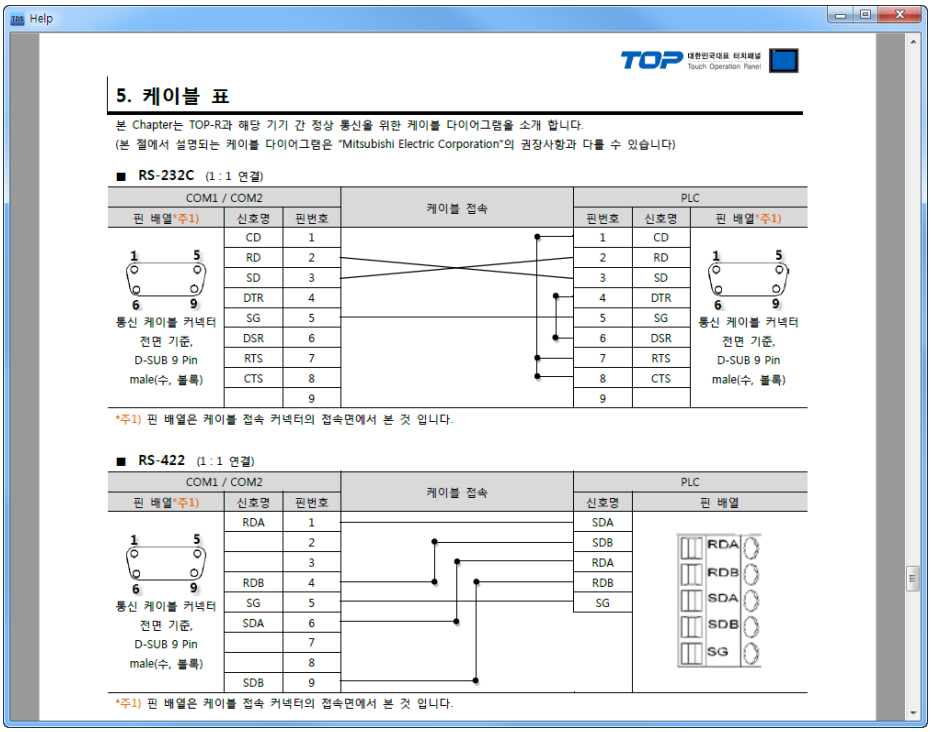
[Figure. 2nd Page of Communication Manual]

Click the [System Option] of the corresponding PLC to see detail methods to setup the communication. Step-by-step descriptions of actions to be taken on both the TOP device and the PLC are provided.



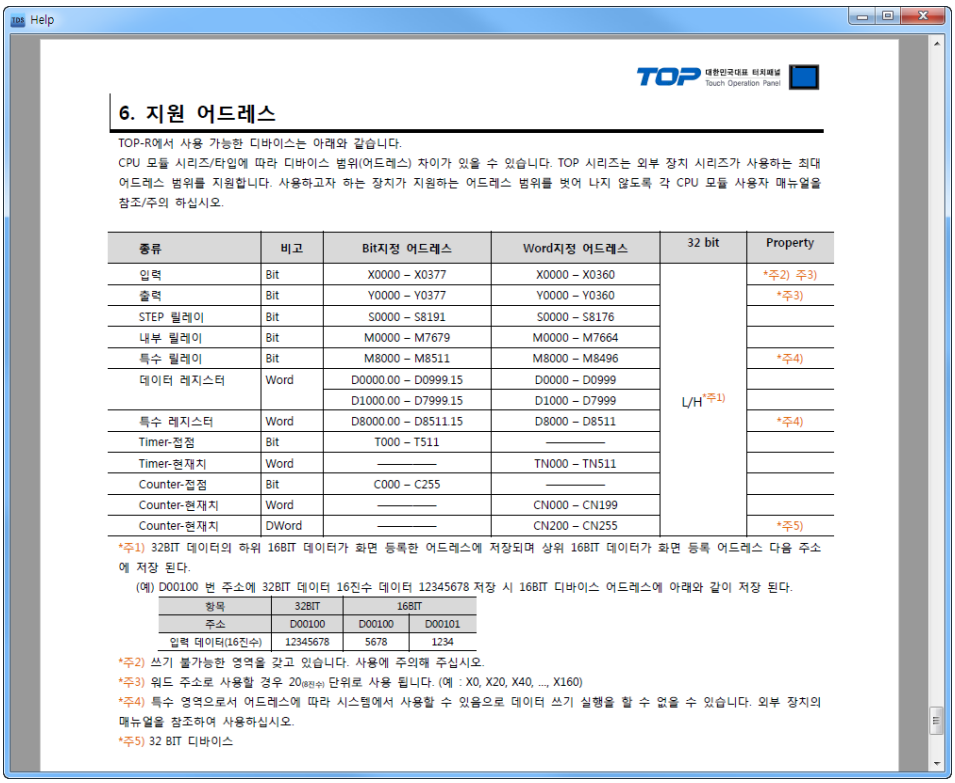
[Figure. Communication Setup]

Click the [Cable] of the subject PLC to view the wiring diagram. Check the TOP port and procure/manufacture the appropriate cable.



[Figure. Wiring Diagram]

On the last page of the communication manual, the address list and area for the PLC is provided.

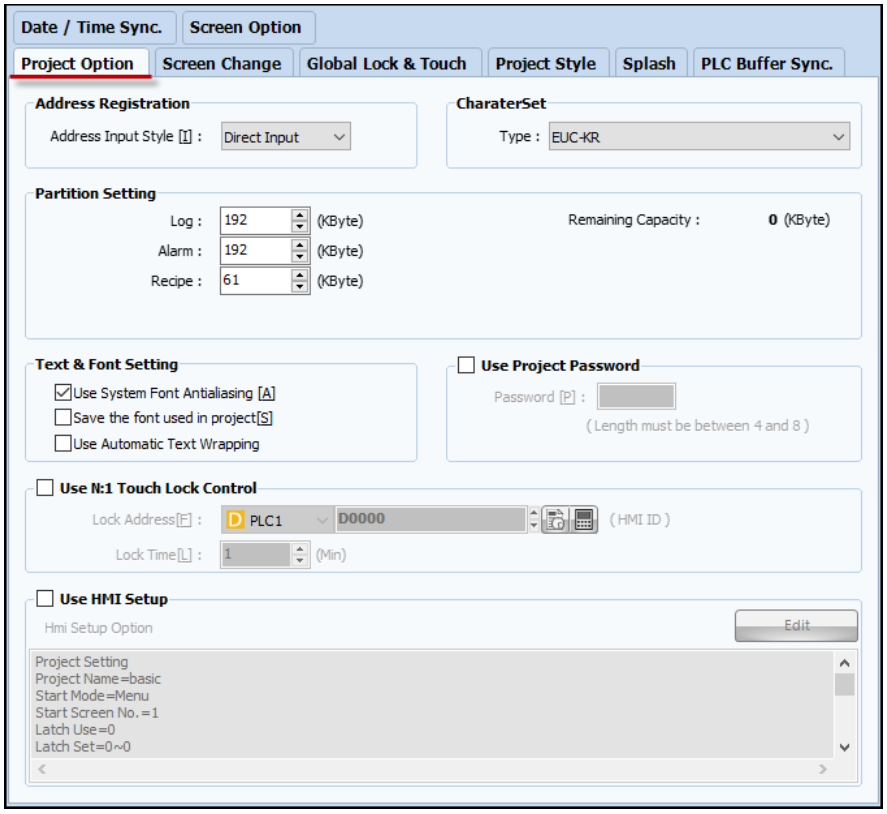


[Figure. Applicable address list]

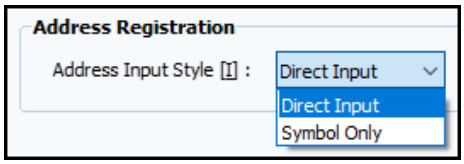
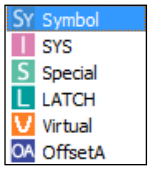
From the pop-up window of the communication manual, you can execute [Save As/Print/Zoom-in/Zoom-out] with the tool bar.

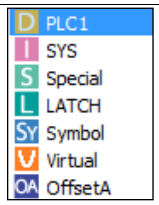
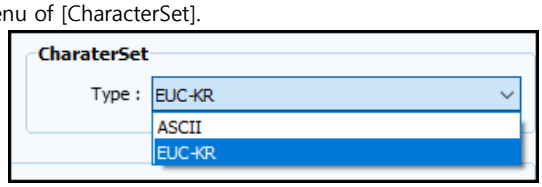
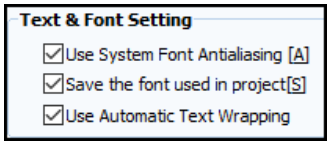
4.12.4 Project Option

Read the following to become familiar with the [Project Option] tab.



[Figure. Project Option Tab]

No.	Project Option	Description
1	Address Registration	Select the [Address Input Style] between [Direct Input] and [Symbol Only] from the drop-down menu.  [Symbol Only] allows you to input only symbol addresses registered at [Project] - [Symbol] for all PLC addresses. When you input the address, the PLC address does not appear on the list, and only the Symbol address and TOP internal address will be shown.  [Direct Input] allows you to input the PLC address for a [Symbol] registered at [Project] - [Symbol], or select [PLC1] from the address list and type in the PLC address.

		 If you change the PLC address of a symbol from [Symbol Manager], the address of all objects of the project assigned with that address will be automatically changed. If you have entered the same address configured as the PLC address from [Symbol Manager] by selecting [Direct Input], any change to the PLC address made with [Symbol Manager] will not be reflected to the [Direct Input] address, and may cause a system error. Therefore, [Symbol Only] is provided to prevent direct input of a PLC address and allowing only to apply PLC address configured from [Symbol Manager].
2	CharacterSet	Select how to process Korean characters between [ASCII] and [EUC-KR] with the drop-down menu of [CharacterSet].  The majority of PLC employ ASCII. With ASCII code, a single Korean character occupies 2 Bytes. Select [EUC-KC] to apply Unicode.
3	Partition Setting	Distribute TOP backup memory for each purpose at [Partition Setting]. The total backup memory is 512 KByte. A field for internal address worth of 10KWord is included in this memory. 445KByte is available to save [Log] / [Alarm] / [Recipe] data. Cautiously distribute the 445KByte for your project.
4	Text & Font Setting	Configure the optimal settings for text input.  (1) Use System Font Antialiasing If [Use System Font Antialiasing] is selected, the [Anti-Aliasing] check box will appear at the font setting menu when entering a text.

Large-sized text shows a stair-shape corner at its outline, where [Antialiasing] renders such corners for a smoother display.

Anti Aliasing is applicable for fonts with size 20 or larger.

(2) Save the font used in project

Enable [Save the font used in projects] to maintain the font of the PC as of the time the project was created.

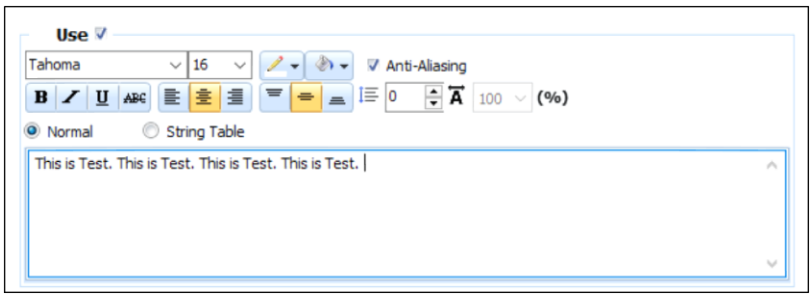
For instance, if you open a project that has been created with a Window System employing the Korean language on a Window System employing the Chinese language, the Korean texts will not properly shown due to the lack of Korean font on the Chinese Window system. In such case, enabling this feature allows the Chinese window system to properly display Korean texts.

Caution! If you change the string of an object, you can not apply the configured font on the subject object.

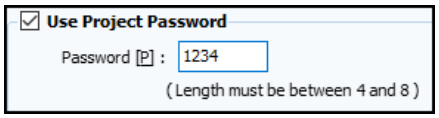
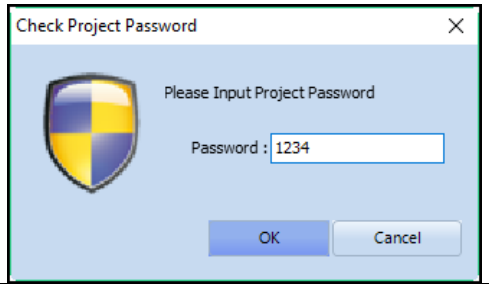
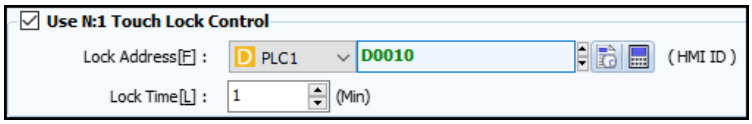
(3) Use Automatic Text Wrapping

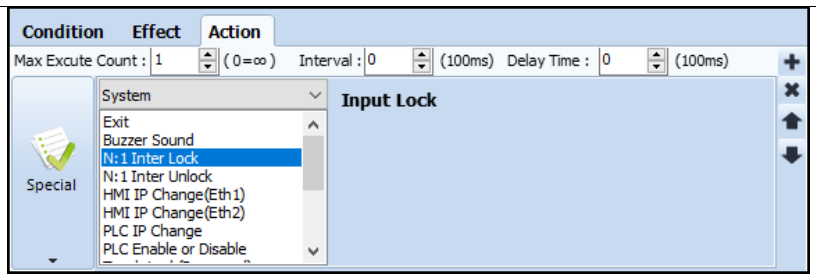
Enable [Use Automatic Text Wrapping] to automatically break the line of a text that exceeds the length of an object.

This function is also applicable to [Alarm] content from an [Alarm View] object, where a message exceeding the object length will be shown in two or more lines.



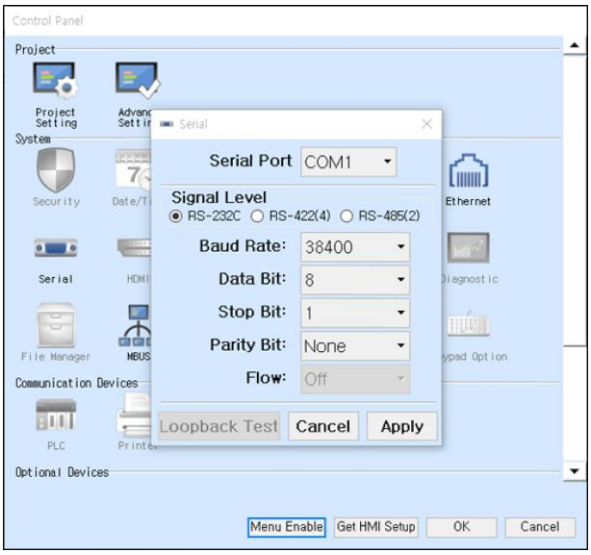
[Figure. Use Automatic Text Wrapping - Enabled]

		 [Figure. Use Automatic Text Wrapping - Disabled]
5	Use Project Password	Enable [Use Project Password] and assign a password for the project, to allow access to the project only upon password verification. Your password can be up to 8 characters long with a combination of numbers and upper/lowercase alphabetical letters.  When you [Open] the project, the system will request a password verification as shown below. 
6	Use N:1 Touch Lock Control	Connecting multiple PLCs to a single TOP device is referred as [N:1] communication. To prevent problems that may occur by simultaneously controlling multiple TOP devices from a single PLC, you should configure [Use N:1 Touch Lock Control] settings.  Enter the HMI ID for Lock Address. (Go to [Control Panel] - [Project Settings] - [11. HDMI ID] at your TOP device to check the HMI ID.) The above sample configuration will allow the data of Lock Address of [D0010] to become the HMI ID that can be controlled. TOP devices with other HDMI IDs will not be locked and no touch input will be allowed. If the value of the Lock Address of [D0010] is [0], all input is allowed from all TOP devices. For a [Lock Time] of [1] minute, the moment one minute elapses from the last touch input, [0] will be entered to the [Lock Address] and the interlock will be dismissed. This function can be enabled by going to [Effect & Action] - [Action] - [Special] - [System] - [N:1 Inter Lock] / [N:1 Inter Unlock] for an object.

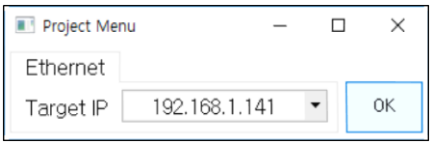
<table>
<tr>
<td></td>
<td></td>
<td>


Configure [N:1 Interlock] to apply the HMI ID of itself as the [Lock Address] to prevent input from other TOP devices.
Configure [N:1 Inter Unlock] to substitute the Lock Address with [0] and dismiss the N:1 Interlock.
</td>
</tr>
<tr>
<td>7</td>
<td>Use HMI Setup</td>
<td>
Access the [Control Panel] setting from the Project, where the setting is originally available from the Menu Screen of TOP device.
Enable [Use HMI Setup] to see the current setup.

Click [Edit] to open the [Control Panel] window.
Select each menu from the [Control Panel] and configure the setup for each menu.



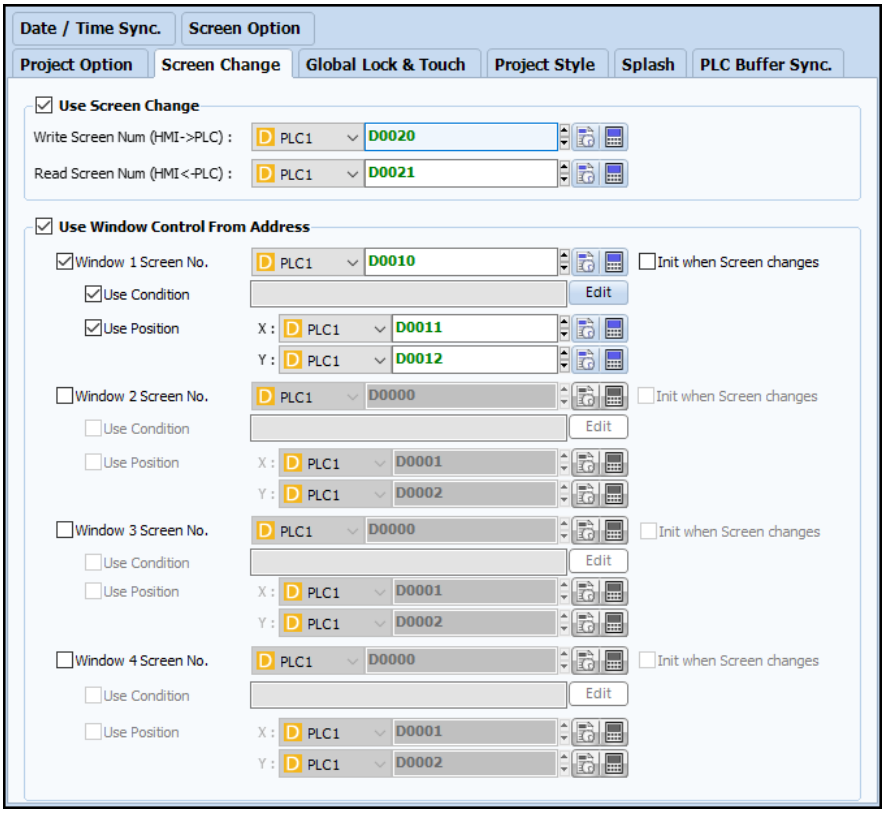
Click [Get HMI Setup] to import the Control Panel settings of a TOP device connected through ethernet. Enter the IP of the TOP device connected via ethernet and click [OK].



The [Control Panel] setup configured from [Use HMI Setup] will be applied to the TOP device once you export the project.
</td>
</tr>
</table>

4.12.5 Screen Change

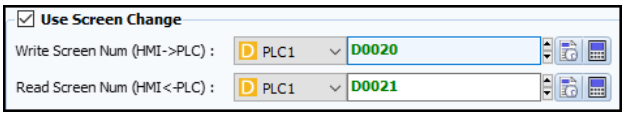
From [Screen Change] tab, you can configure to change base screen or pop-up a window depending on address data.



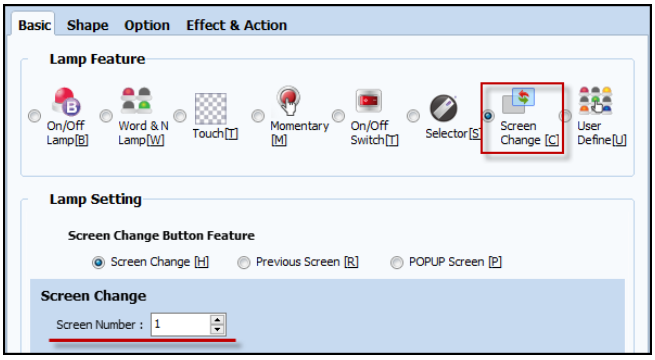
[Figure. Screen Change tab]

(1) Use Screen Change

Enable [Use Screen Change] to change the base screen depending on the data of a specific address. This function is mainly used to change the TOP screen with the PLC.
Enable [Use Screen Change] and configure the address for [Write Screen Number] and [Read Screen Number].

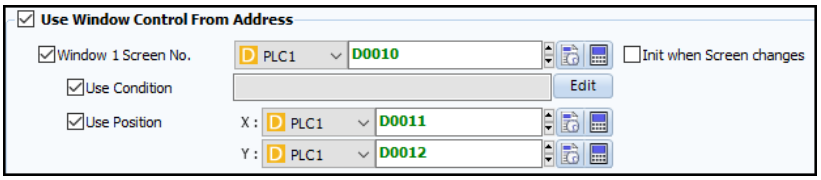


[Figure. Use Screen Change]

No.	Screen Change	Description
1	Write Screen Number (HMI -> PLC)	When a screen change occurs on the TOP device, the base screen number for the address configured as [Write Screen Num] will be written.  The PLC reads the data of this address to identify the current screen number of the TOP device.
2	Read Screen Number (HMI <- PLC)	When the PLC program intends to change the TOP base screen, the target base screen number is written to the [Read Screen Number] address (D0021). The TOP device reads the data of this address and changes to the corresponding base screen.

(2) Use Window Control From Address

You can control pop-up windows with addresses regardless of a specific screen.
You can configure up to 4 pop-up windows.

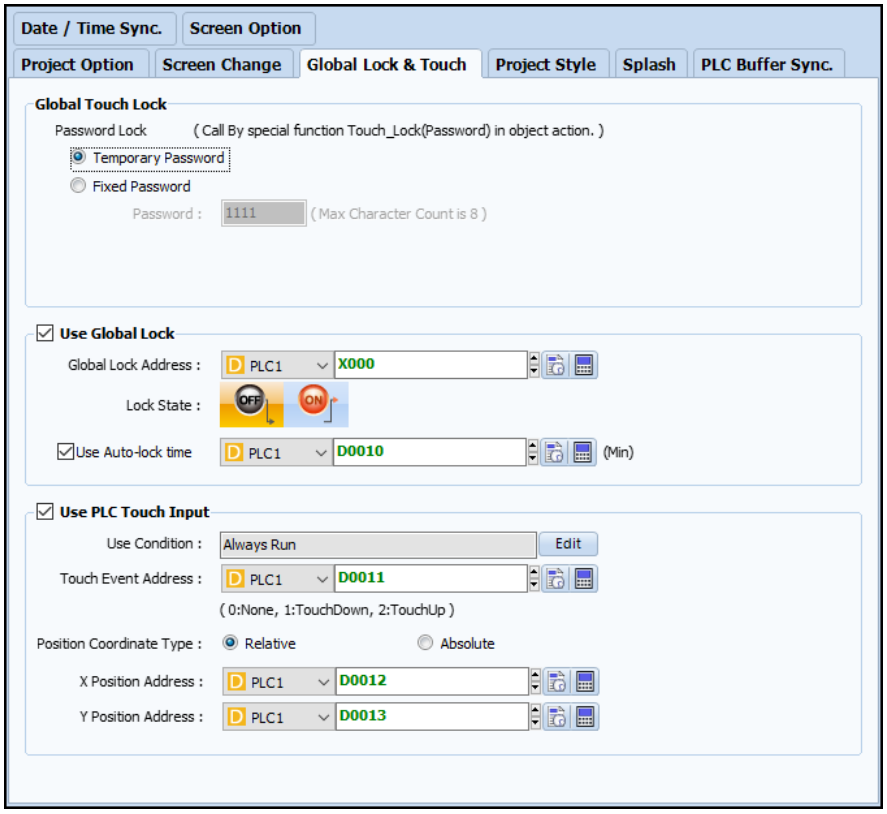


[Figure. Use Window Control From Address - Enabled]

No.	Window Control	Description
1	Window Screen No.	Enter the window screen number that should pop-up. Select [Initialize when Screen changes] to initialize the address of the window screen number to [0].
2	Use Condition	Configure the condition to pop-up the selected window. Click [Edit] to configure the detail condition. The selected window will pop-up when the condition is true. If [Condition] is disabled, the selected window will pop-up when the corresponding window number is present in the [Window Screen Number], and disappear when the value is removed.
3	Use Position	Select the [X], [Y] coordinates of the pop-up window to determine the window position. The upper left corner of the pop-up window will be located at the defined [X], [Y] coordinate.

4.12.6 Global Lock & Touch

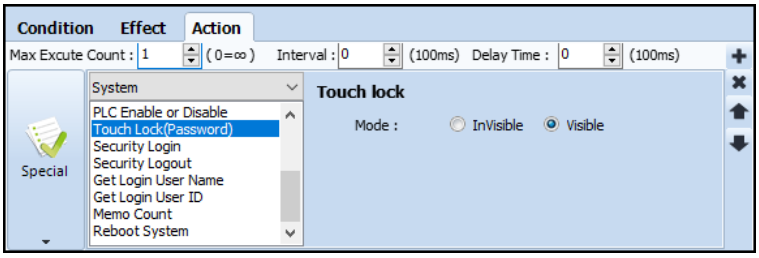
Global Lock tab is used to prohibit touch input from the TOP device, with three features of [Global Touch Lock], [Use Global Lock], and [Use PLC Touch Input].



[Figure. Global Lock & Touch tab]

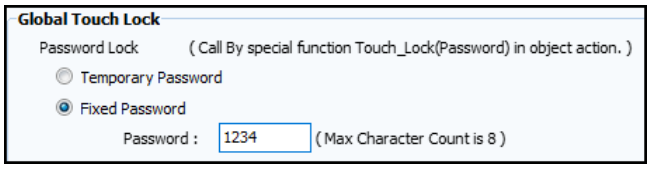
(1) Global Touch Lock

[Global Touch Lock] applies a [Touch Lock] to the display to prohibit any input.
Touch is allowed and recognized only after password verification.
Apply touch lock when a temporary on-site lock or a maintenance job is required.
To apply a [Touch Lock] during TOP device operation or disable a [Touch Lock] with password verification, go to the [Effect & Action] tab of an object, select the [Action] sub-tab, and select [Special] - [System] - [Touch Lock(Password)].



Run a [Touch Lock(Password)] action on the project to apply a [Touch Lock] on the TOP device.
The [Touch Lock] Window will appear at the same time.
Enter the correct password in the [Touch Lock] Window to dismiss the [Touch Lock].

Select between [Temporary Password] and [Fixed Password].
This password will be used to dismiss a [Touch Lock].
A password may contain up to 8 numbers.

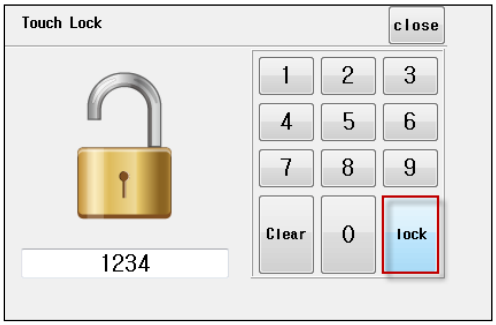


[Figure. Global Touch Lock]

▶ Temporary Password

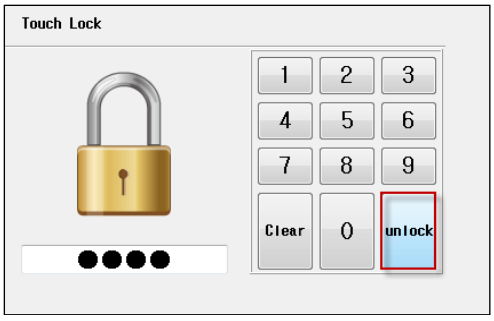
Create a password every time [Touch Lock] is configured.
Execute a [Touch Lock(Password)] action to open the below Password generating window.

[Figure. Temporary Password]



[Figure. Temporary Password]

Enter a password and click [Lock] to confirm the temporary password and activate [Touch Lock].
The [Touch Lock] window will be waiting for your input.
Once the required work is completed, enter the previously configured password and click [Unlock] to dismiss the [Touch Lock].

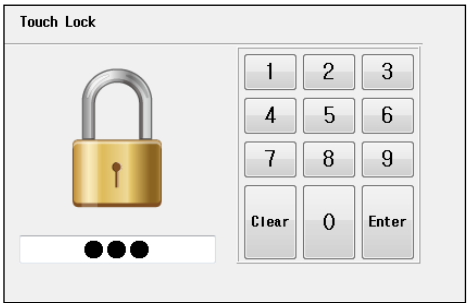


[Figure. Dismiss Touch Lock with temporary password]

▶ Fixed Password

Enable Fixed Password to apply a single fixed password.

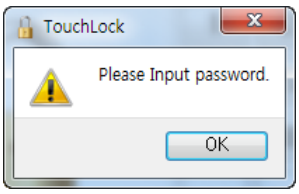
If a [Touch Lock(Password)] action is executed, the below [Touch Lock] window will appear, allowing you to enter the password.



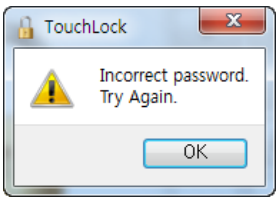
[Figure. Touch Lock Window_When selected to be visible]

Once you complete your work to be done under [Touch Lock], enter the corresponding password to dismiss the touch lock. The [Touch Lock] window will disappear accordingly.

If you click [Enter] without entering the password, the below error message will appear.



If you click [Enter] with the wrong password, the below error message will appear.



The [Mode] of the [Touch Lock] window allows you to select whether or not to show or hide the [Touch Lock] window on the screen when [Touch Lock] is applied.

If you select [보임], the [Touch Lock] window will be shown on the TOP device at all times.

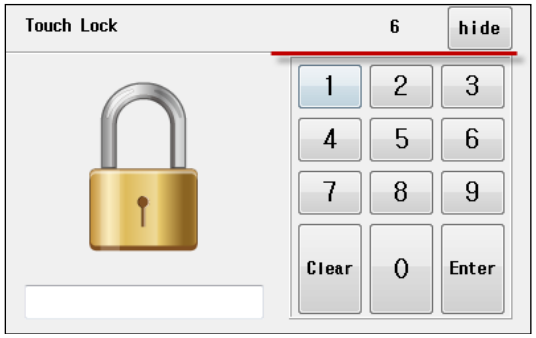
The [Touch Lock] window will disappear when you dismiss the [Touch Lock] with the correct password.

If you select [Hide], the [Touch Lock] window will be not shown on the TOP device when [Touch Lock] is applied.

Click the [Hide] button provided on the [Touch Lock] window to hide the window.

After a countdown from ten to 1, the [Touch Lock] window will disappear at the count of [0].

Press any key among [0] ~ [9], [Clear] or [Enter], the count will restore to 10.

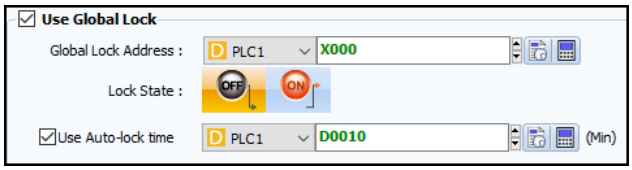


[Figure. Touch Lock window - Hidden]

Under [Touch Lock], touch the screen to display the [Touch Lock] Window. Enter the password to dismiss [Touch Lock]
When [Touch Lock] is required the [Touch Lock(Password)] action will be executed.

(2) Use Global Lock

If the condition determined for [Global Lock] is true, a [Lock] is applied to [Touch Input].



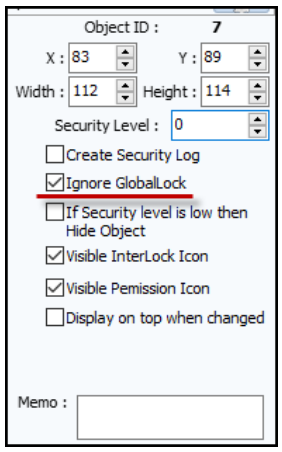
[Figure. Use Global Lock]

Configure the address to control [Lock] / [Unlock] for [Global Lock Address].
With [Lock State] select if [Lock] should be applied when data of [Global Lock Address] is [Off] or [On].
With the above configuration, the [Touch Lock] will be applied when [Y000] is [ON], and dismissed when [Y000] is [OFF].

The [Address] data configured for [Use Auto-lock time] is minutes.
When the TOP device is not under [Touch Lock], and there is no touch input for the configured amount of time, [Touch Lock] will be applied.

[Touch Lock] is applied by changing the [Global Lock Address] to [Lock].
If the [Auto-lock time] is [0], the [Global Lock Address] changes to [Lock], thus the TOP device is continuously under [Touch Lock], thus please take caution when enabling [Use Auto-lock time].

▶ If you go to the [Property] of an object, you can find [Ignore Global Lock] function on the lower left side of the property window.
If this function is enabled, touches to other objects will be denied while objects of which configuration enables [Ignore Global Lock] will be available.

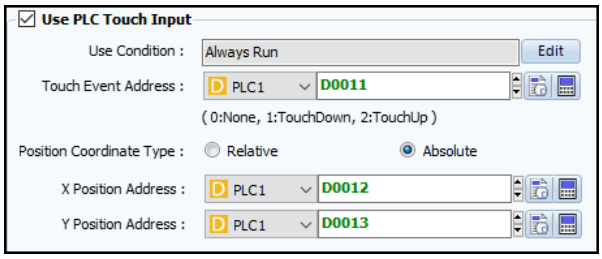


[Figure. Ignore Global Lock]

(3) Use PLC Touch Input

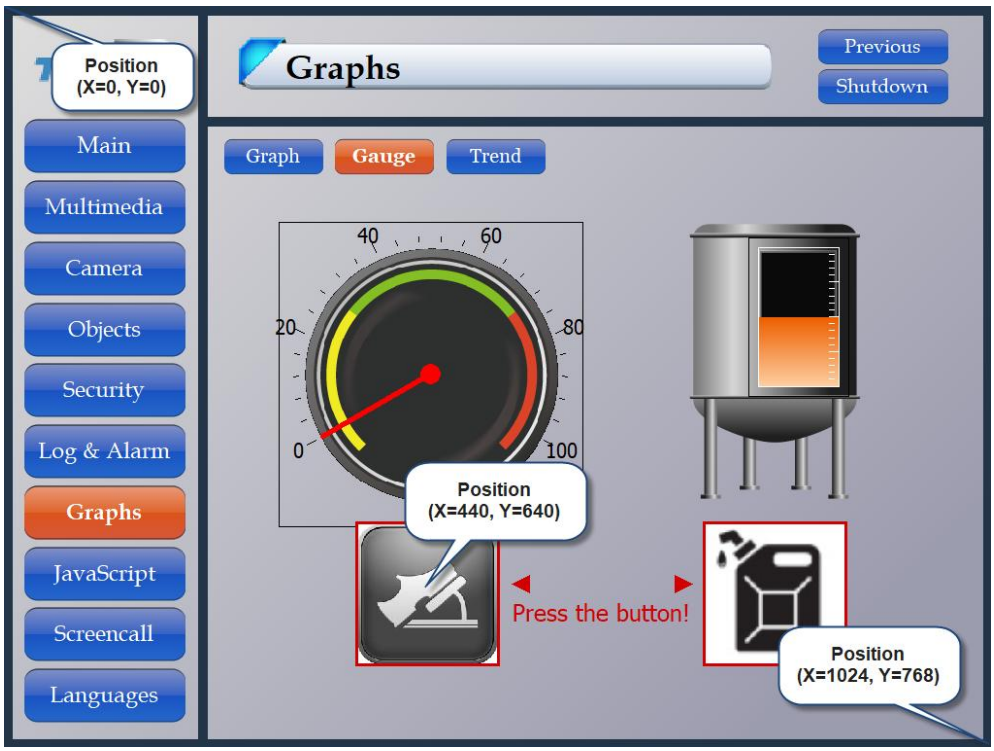
This function allows touch input from PLC.

A touch input can be made on a specific location of the TOP screen according to the data of a PLC address.



[Figure. Use PLC Touch Input]

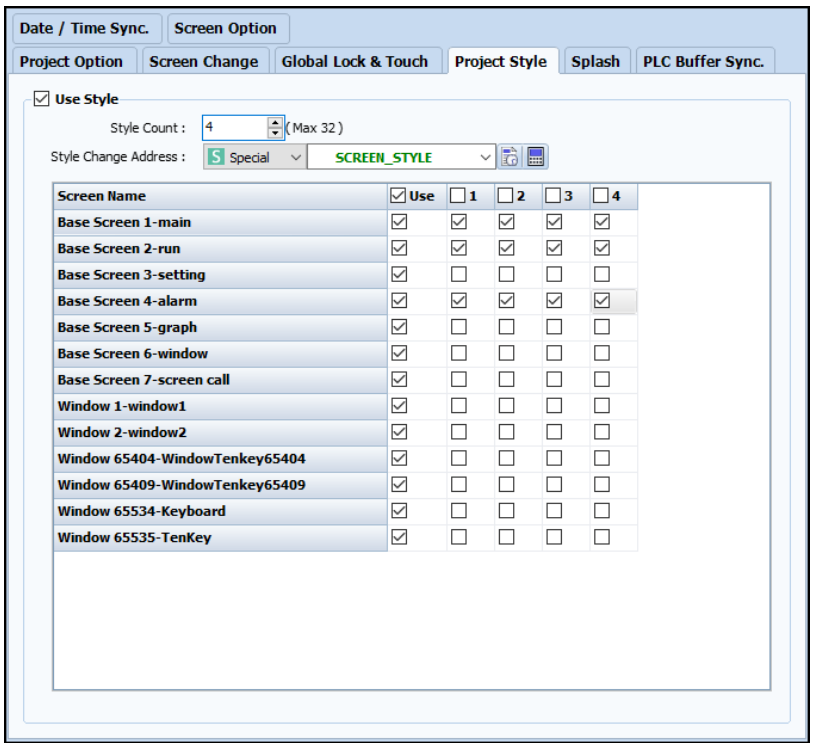
No.	PLC Touch Input	Description
1	Use Condition	Configure the condition in which the PLC touch input should be executed.
2	Touch Event Address	Configure the PLC address that will dictate the touch event. According to the data of the configured address, a touch event will be executed as below. [0]: None, no touch event is executed. [1]: TouchDown, The touch will be applied, and the next touchdown action is executed after the subject touch is back to touch up. [2]: TouchUp, a touchdown and touchup action will be executed, and the next touch action is executed after a touchdown action.
3	Position Coordinate Type	Select between [Relative] and [Absolute] for the datum point for a touch event. [Relative] : Datum Point depends on the active screen. For a [Relative] position, the upper left corner of the active window/screen will be the datum point of (0, 0). [Absolute]: Datum Point is fixed upon the entire resolution of the TOP display screen. The upper left corner of the entire screen will be the datum point of (0, 0).
4	X Position Address	Configure the PLC address that will determine the X coordinate of the touch event. The data of the address will be the X coordinate of the Touch Event.
5	Y Position Address	Configure the PLC address that will determine the Y coordinate of the touch event. The data of the address will be the Y coordinate of the Touch event.



For instance, on a 1024 x 768 display, to use a PLC touch input at (440, 640), enter [440] to [D0012] and [640] to [D0013]. The moment [1] is entered to [D0011], the TOP device will react in the same manner as if an operator touched the object at that same coordinate.
To execute repeated touch, enter [2] in [D0011] to execute a [TouchUp] action, and then enter [1] once again to execute a [TouchDown] action.

4.12.7 Project Style

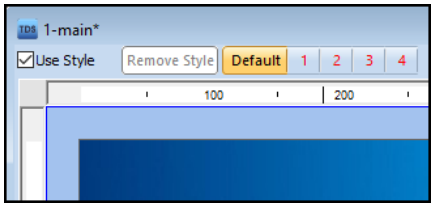
With [Project Style], you can configure a single screen in multiple styles and change the style of the screen while operating your TOP device according to the [Style Change Address].
Select the number of [Style Count]. You can configure up to [32] styles.
The special address of [SCREEN_STYLE] is selected as [Style Change Address] as default, and you can change the address.
If the [SCREEN_STYLE] data is 1, style No.1 will be applied, and if the data is 2, style No.2 will be applied.
You can change the style of the screen while operating the TOP device by changing the data for [SCREEN_STYLE].
To execute the change of style, the TOP device power will be reset.
Select [Use] for the screen the style should be applied to, and click the style number for each screen, as required. For screens that does not require multiple styles, disable [Use].



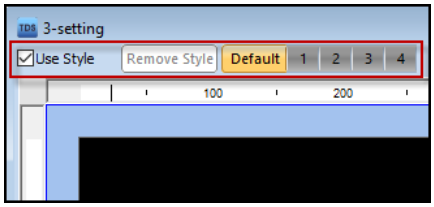
[Figure. Project Style]

You can change style application with functions provided at each screen.

If [Use Style] is enabled at [Project] - [Setting] - [Project Style], each screen will have a [Use Style] in its upper left corner.



[Figure. Use Style - Enabled]



[Figure. Use Style - Disabled]

If four styles are assigned to a screen, you can configure up to 5 screens from [Default], [1], [2], [3], [4]. Click [Default] to display the default style.

[Default] will show common contents of all styles from [1] to [4] (if any).

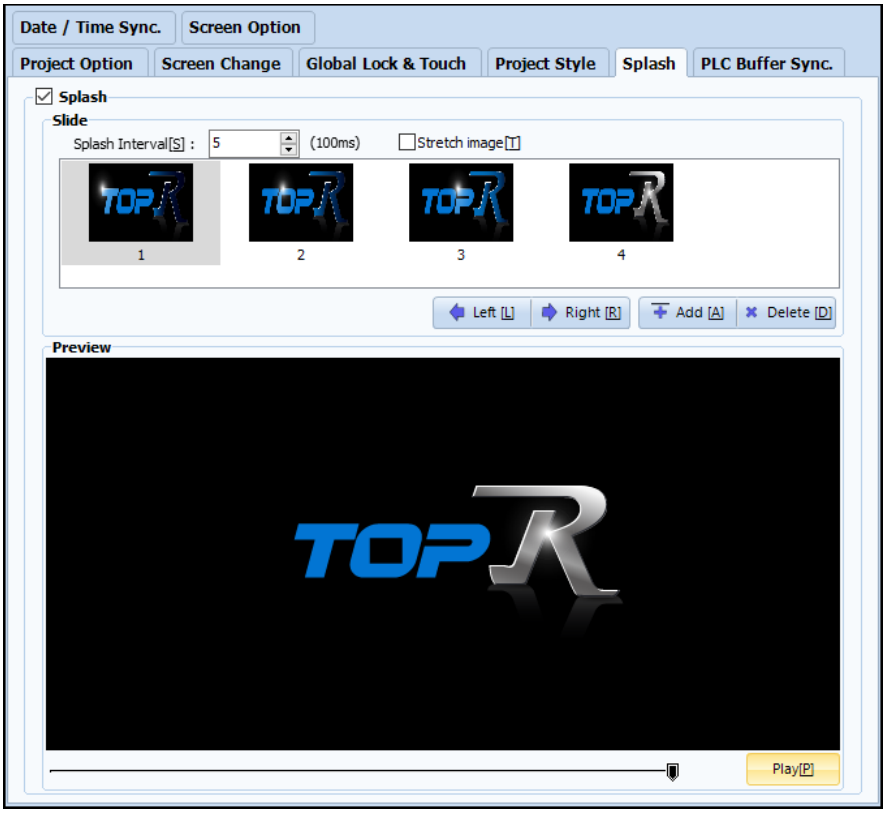
If the [Style Change Address] has a value different from any configured style number the [Default] screen will be displayed.

To create a style, go to the corresponding screen you configured to apply multiple styles and select a style among [1], [2], [3], [4] and create the style.

To delete an unnecessary style screen, select the number of such screen ant click [Remove Style].

4.12.8 Splash

Select the screen that will "Splash" on the display when the TOP device is started.



[Figure. Splash]

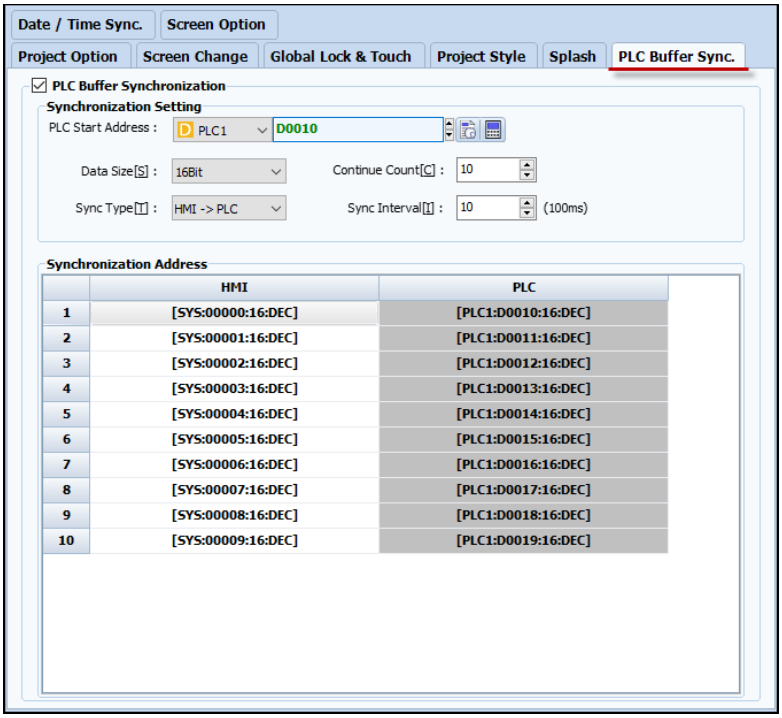
You can create an animated effect by synchronizing a sequence of images in a predetermined order with a predetermined [Splash Interval] (100ms).

No.	Splash	Description
1	Left[L]	Move a selected image to the left.
2	Right[R]	Move a selected image to the right.
3	Add[A]	Add an image. You can add up to five images. Select [Stretch Image] to adjust the size of the image to fit the entire TOP display resolution.
4	Delete[D]	Delete a selected image(s).

Click [Play] to run a [Preview] of the splash.

4.12.9 PLC Buffer Synchronization

Synchronize the address fields of the PLC and TOP device.



[Figure. PLC Buffer Synchronization]

Enable [PLC Buffer Synchronization].

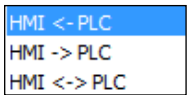
The PLC address range to synchronize should be a continuous address range.

You can individually configure TOP device internal addresses.

Accordingly, if you select [PLC Start Address], [Data Size], [Continue Count], the corresponding list will appear in the [Synchronization Address] field. Double lick an address in the HMI (TOP Device) column on the [Synchronization Address List] to change the address.

Synchronization is performed according to the selected [Sync Type] with the selected [Sync Interval] (100ms).

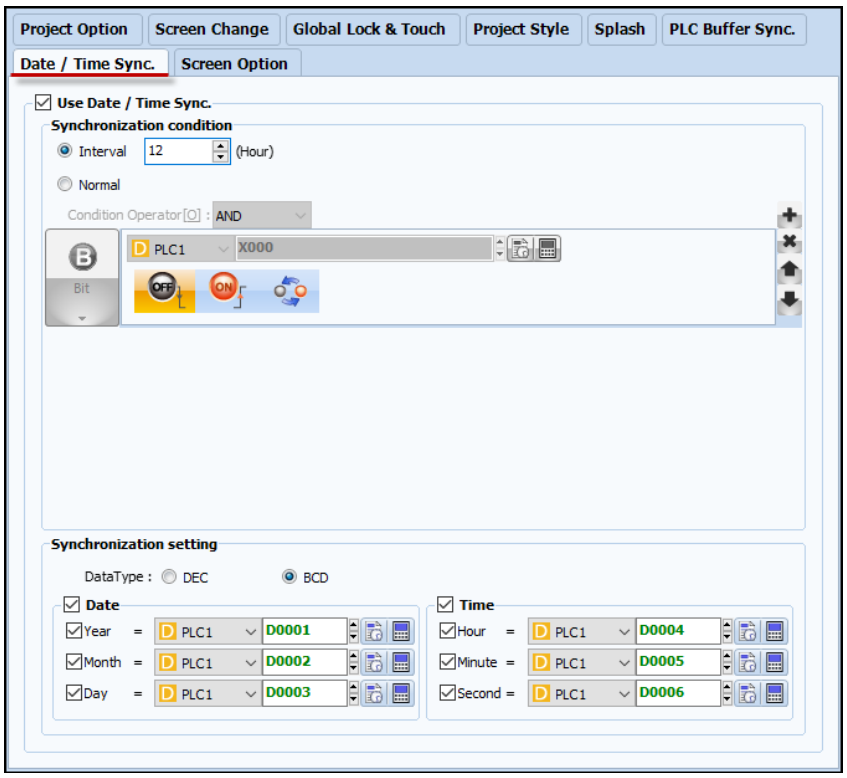
Select among the three synchronization types from the below drop-down menu.



No.	Syn. Type	Description
1	HMI<-PLC	Read the data of a PLC address to an HMI (TOP device) address.
2	HMI->PLC	Read the data of an HMI (TOP device) address to a PLC address.
3	HMI<->PLC	If the data of a PLC address or an HMI address changes, the changed data is read into the corresponding address of the other device. In other words, if a data of a PLC address is changed, the same data is read into the corresponding HMI (TOP device) address, and vice versa. If the data of both PLC and HMI changes, the last change among all changes will be saved on both devices.

4.12.10 Date / Time Synchronization

A TOP device provides three clocks.
You can configure the time of these clocks from the bottom of the Menu Screen, or at [Control Panel] - [Date/Time].
The time of the TOP device and PLC may differ therefore, [Date/Time Synchronization] should be enabled to operate both devices on the same time clock. The time clock of the PLC address is read into the TOP device.



[Figure. Date/Time Synchronization Tab]

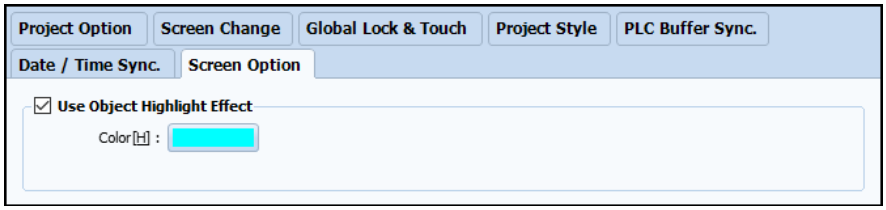
Enable [Use Date/Time Synchronization]
Select the [Synchronization Condition] between [Interval] and [Normal]. Select [Interval] to perform time synchronization on a regular basis. Select [Normal] to perform time synchronization whenever the condition is true.

Select the [Data Type] for [Synchronization Setting] between [DEC] and [BCD]. In general, BCD is applicable for time data, however if the PLC employs DEC (decimals), select DEC.
Select [Date] and [Time], and enter the PLC addresses corresponding to each [Year] / [Month] / [Day] / [Hour] / [Minute] / [Second].

Whenever the [Synchronization Condition] is true, the PLC time data is read into the TOP time.
The TOP device records the current time in special address [DATE_YYYY] / [DATE_MM] / [DATE_DD] / [TIME_HH] / [TIME_MM] / [TIME_SS].

4.12.11 **Screen Option**

The [Use Object Highlight Effect] from the [Screen Option] tab is available for TOPView(SCADA). If you move the cursor to an object that can be touched, the subject object will indicated with a [Highlight Box] with the configured [Color] for easy recognition.



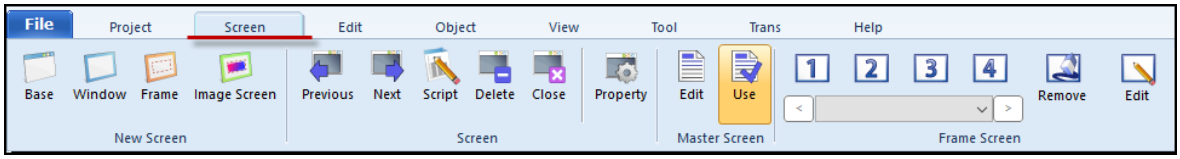
[Figure. Screen Option tab]

If the cursor is located on a touchable object, a [Highlight Box] will appear as the below sample.

[Figure. Object Highlight Effect]

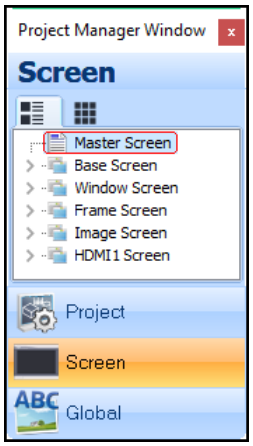
CHAPTER 5 - Screen menu

Screen menu allows you access to various administration to screen settings.



[Figure. Screen Menu]

TDS employs five types of screens: Master Screen, Base Screen, Window, Frame and Image Screen.
You can see the Screen List from the [Project Manager] window.



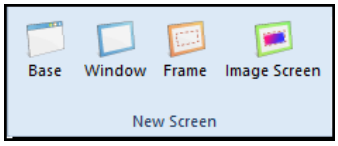
[Figure. Project Manager - Screen]

No.	Screen	Description
1	Base Screen	Base is the main screen that is actually shown on the TOP for operation. Therefore, the Base Screen employs the same size screen of the resolution of the selected TOP. The default base screen will be assigned to No.1 and you can add up to No.65535, configuring a total number of 65,535 screens.
2	Window Screen	You can add windows that pop up in a base screen when certain conditions are met, window screens can be hidden or terminated when its appearance is not required. The first window screen you make will be assigned to No.1 and you can add up to No.65535, configuring a total number of 65,535 window screens. (Caution) Window screens of No. 65400 and after are assigned to add specific functions (ten key library, etc.) thus these window screens cannot be used as user defined.
3	Master Screen	You can materialize the call screen function, where you can make a master screen embedding all repeating and common backgrounds or functions and apply such master screen as the base screen. Click the [Base] icon and enable [Use Master Screen] from the Screen Property window to apply the base screen as the master screen. Only one master screen can be registered. The master screen allows you to reuse common functions to enhance the efficiency of storage memory and editing.
4	Frame	You can materialize the call screen function, where you can create up to 65,535 frame screens. You can capture frames containing objects and items that can are frequently used. Created frames can be called on a base screen allowing you not to do simple recurring work, and reduce the total size of the Project. You can add up to 4 frames in a single base screen.
5	Image Screen	Image screens are called from Base Screens. Only figure objects can be used as image screens, and you can add up to No.65,535. Moving objects such as numbers or graphs can not be used as an Image

		Screen. In general, add an image object to a base screen, and call an image screen to the image object. This function is commonly used for Bit On/Off presentations where On and Off are expressed differently by calling different image screens.

5.1 New Screen

You can create new base screens, windows, frames, and image screens.

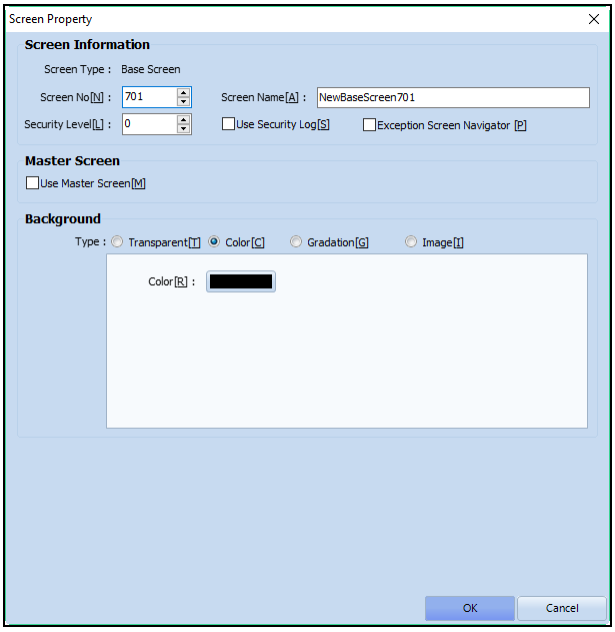


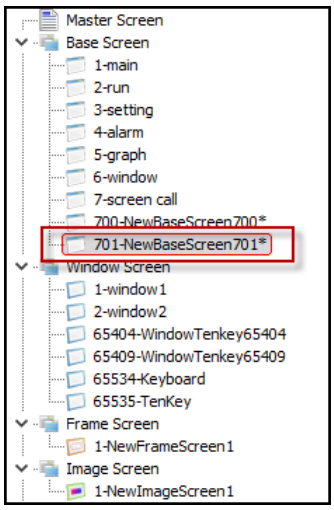
[Figure. New Screen Menu]

Create a Base Screen, Window, Frame or Image Screen by clicking each corresponding menu.
There is only one master screen that is created upon creating a new project.

5.1.1 New Base Screen

Create a New Base Screen.
Click [Base] to open the [Screen Property] window.
The next number of the highest number among existing screens will be assigned as Screen Number.
For instance, if you create a new base screen, when the base screen with the highest number is 700, the new base screen will be assigned to 701 in the [Screen Property] window.
From the [Screen Property] window, configure the [Screen No.] / [Screen Name] and other settings and click [OK] to create a new base screen.





[Figure. Screen Property - Base Screen] [Figure. New Base Screen created]

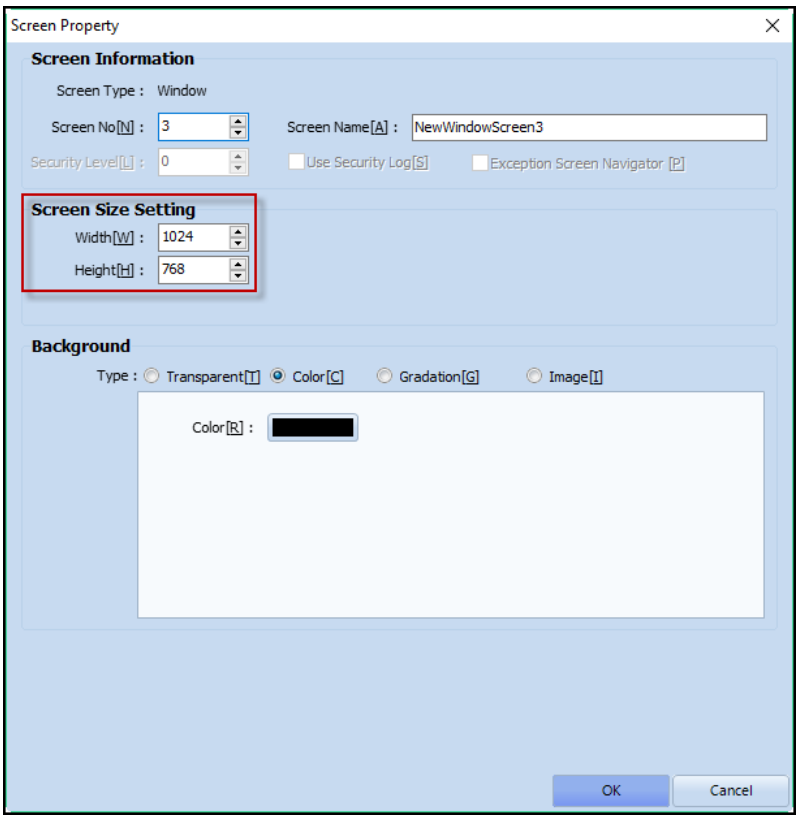
No.	Property	Description
1	Screen Type	The type of screen is shown. There are five types of screens: Master Screen, Base Screen, Window, Frame and Image Screen.
2	Screen Number	You can create up to 65,535 screens for each of Base Screen / Window / Frame / Image Screen, and assign Screen numbers between 1 to 65,535. You can not assign the same number to two screens with the same type.
3	Screen Name	Enter the name of the Screen.
4	Security Level	[Security Level] is available only if [Project] - [Security] is configured. For a security level other than 0, corresponding passwords are applied to the screen. Whenever you go to the screen, you have to verify the password to access the screen. You can configure up to 16 levels of passwords at [Project] - [Security]. Higher numbers represent higher levels. Password verification is required when changing to a screen with a higher security level, Password verification is not required when changing to a screen with a lower security level.
5	Use Security Log	If a security level is assigned, logs are recorded whenever a user accesses the screen.
6	Exception Screen Navigator.	[Screen Navigator] is available from the TOP Menu of the TOP device. The list of base screen is provided in thumbnails, for easy navigation among base screens. Select [Exception Screen Navigator] to exclude the subject screen from the screen navigator.
7	Master Screen	Enable [Use Master Screen] to call all objects of the Master Screen to the selected base screen.
8	Background	Configure the background of the screen. (1) [Transparent] refers to an empty background where TOP device default transparent color is black. (2) The selected color will be applied as the background color. (3) Select [Gradation] to apply a gradation effect with two colors as the background color. (4) Select [Image] to apply an image as the background. Applicable image file extensions are JPG, BMP, PNG and SVG. For images, you can select the position among [Center] / [Tile] / [Stretch].

5.1.2 New Window

Create a new Window.

In principle, creating a new window is identical to creating a new base screen. Please refer to the following differences.

Click [Window] menu to open the [Screen Property]. From the [Screen Property] window, configure the [Screen No.] / [Screen Name] and other settings and click [OK] to create a new Window.



[Figure. Screen Property - Window]

No.	Property		Description
1	Security Level/ Use Security Log/ Exception Screen Navigator		These functions are available only for Base Screens.
2	Screen Size Setting	Width	Configure the width of the window.
		Height	Configure the height of the window.

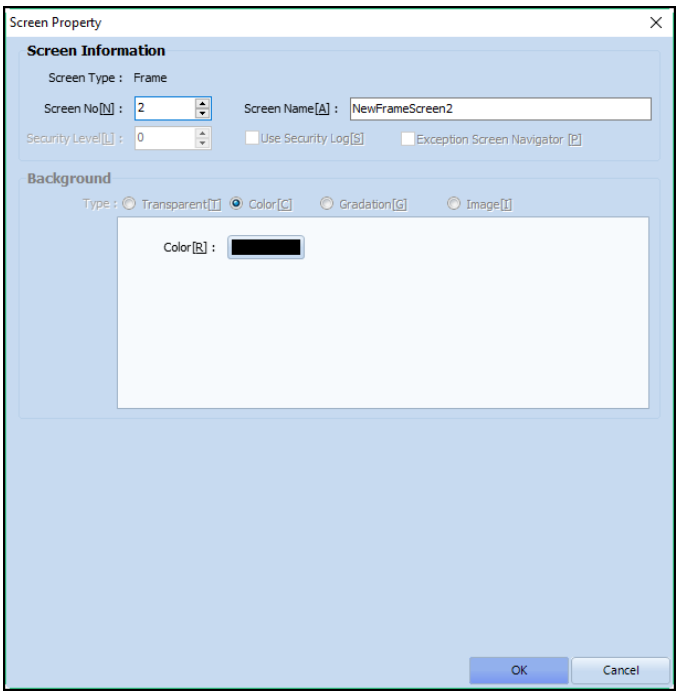
5.1.3 New Frame

Create a new frame.

In principle, creating a new frame is identical to creating a new base screen. Please refer to the following differences.

Click [Frame] menu to open the [Screen Property] window.

From the [Screen Property] window, configure the [Screen No.] / [Screen Name] and other settings and click [OK] to create a new window.

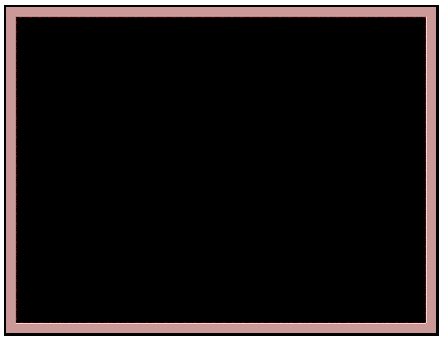


[Figure. Screen Property - Frame]

No.	Property	Description
1	Security Level/ Use Security Log/ Exception Screen Navigator	These functions are available only for Base Screens.
2	Background	Frames are a capture of a part or whole are displayed on a base screen, where you cannot assign a background.

The boundary of new frames are red as shown below.

The size and coordinate of this square frame can be adjusted. When a frame is called to a base screen, the objects within the boundaries will be displayed. You can use all types of objects in a frame including figures and tags.



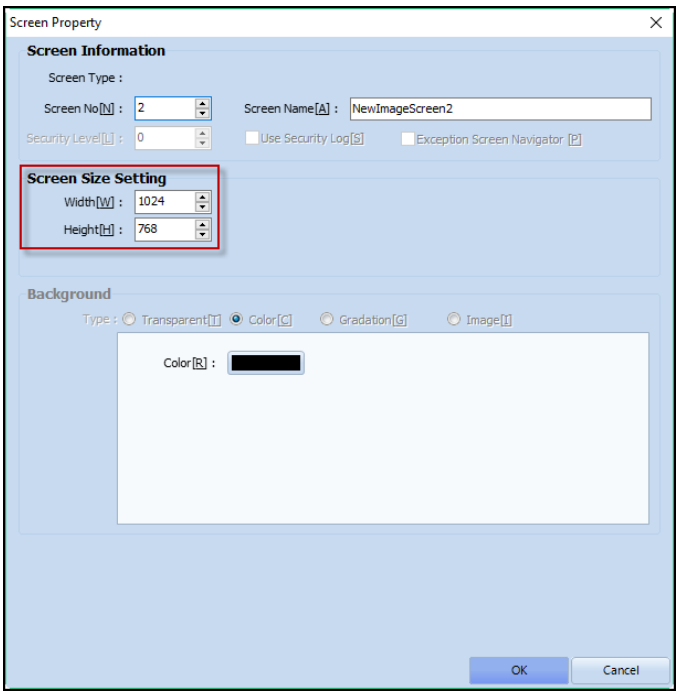
[Figure. New Frame]

5.1.4 New Image Screen

Create a new image screen. In principle, creating a new image screen is identical to creating a new base screen. Please refer to the following differences.

Click [Image Screen] menu to open the [Screen Property] window.

From the [Screen Property] window, configure the [Screen No.] / [Screen Name] and other settings and click [OK] to create a new image screen.



[Figure. Screen Property - Image Screen]

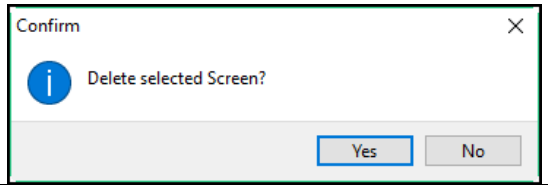
No.	Property		Description
1	Security Level/Security Log Exception Screen Navigator		These functions are available only for Base Screens.
2	Screen Size Setting	Width	Configure the width of the image screen.
		Height	Configure the height of the image screen.

Image screens are called on base screens. Only figure objects can be added to an image screen. Moving objects such as numbers or graphs cannot be used as an Image Screen. In general, add an image object to a base screen, and call an image screen to the image object. This function is commonly used to express various statuses by calling different images according to Bit On/Off or word value.

[Figure. New Image Screen]

5.2 Screen Management Menu

[Figure. Screen Management Menu]

No.	Menu	Description
1	Previous	Move to the Base Screen, Window, Frame, as applicable, of previous to the current screen.
2	Next	Move to the Base Screen, Window, Frame, as applicable, of next to the current screen.
3	Script	The [Script] window will open to configure a script to the current screen. You can configure scripts for base screens, windows, or objects added to base screens or windows.
4	Delete	Delete the current screen. Click [Yes] from the confirm message window to delete the Screen. 
5	Close	Close the current screen.

5.3 Screen Property

Click [Property] to view the properties of the current screen.
These properties are those for base screen, window, and frame, therefore refer to Chapter 5.1 [New Screen] for more details.

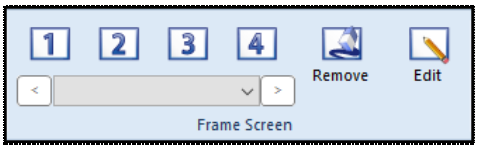
5.4 Master Screen

[Figure. Master Screen Menu]

No.	Menu	Description
1	Edit	Open the Master Screen for editing.
2	Use	Bring up the Master Screen to the current base screen.

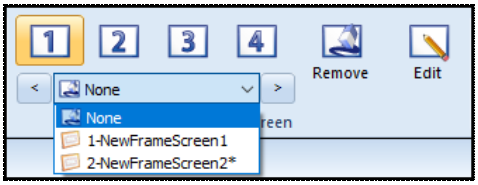
5.5 Frame Screen

Add a frame screen to be called on a base screen or window, or delete a frame screen.



[Figure. Frame Screen Menu]

You can add four frame screens numbered [1] to [4] on a screen.
To call and ad one of the existing frame screens, click [1] and select the frame that should appear on the screen from the drop-down combination box. You can add four of such frame screens, and [Remove] or [Edit] a frame screen with the given menu.

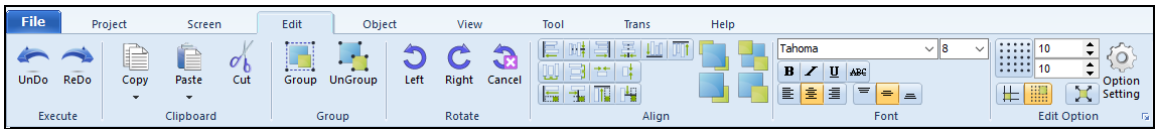


[Figure. Frame Selection]

No.	MENU	DESCRIPTION
1	Remove	You can remove a frame added to a base screen by selecting [None] from the combination box or click [Remove] button. This action will remove the frame screen from the base screen, and does not delete the frame screen itself.
2	Edit	Edit a frame existing on the current screen. To edit a frame screen, frame screens must be assigned to [1] / [2] / [3] / [4]. Select button [1] and click [Edit] to open the frame assigned to one from the frame screen.

CHAPTER 6 - Edit

Form the Edit Menu, you can conduct general object editing including [Copy] / [Paste] / [Cut] and other edit functions such as [Screen Edit] / [Designer Option Edit] / [User Define Edit].

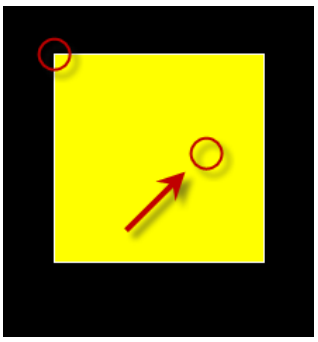


[Figure. Edit Menu]

6.1 How to select an object

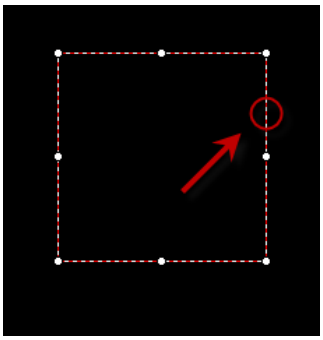
6.1.1 Normal Selection

Any object in a screen can be selected with a left click.
For figures, selection may differ depending on whether it is filled or not. Objects that are filled can be selected by a click to any part of the area.



[Figure. Selecting a filled object]

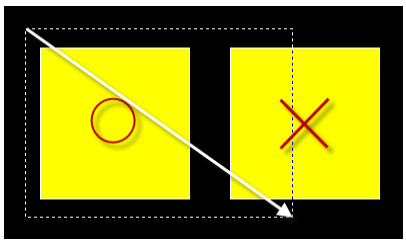
Objects that are not filled can be selected by clicking its boundaries, i.e. the line consisting the figure.



[Figure. Selecting an object that is not filled]

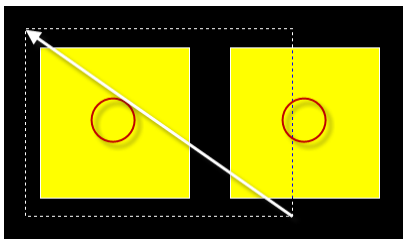
6.1.2 Object Range Selection (Drag)

Select multiple objects within a dotted box with a drag of the mouse in the edit screen.
There are two types of range selection. Properly using both types will provide you convenience in selecting or deselecting objects.
(1) If you drag the cursor from left to right, objects of which boundary is completely within the area will be selected.



[Figure. Selecting objects fully within the range]

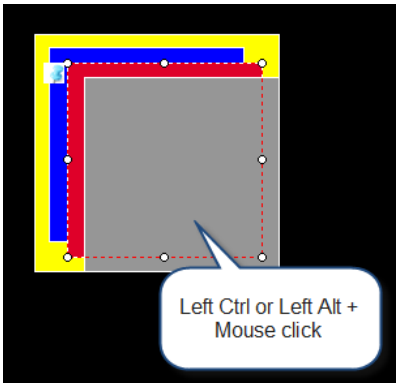
(2) If you drag the cursor from right to left, all objects that are entirely and/or partially within area will be selected.



[Figure. Selecting objects wholly and partially within the range]

6.1.3 **Selecting Layered Objects**

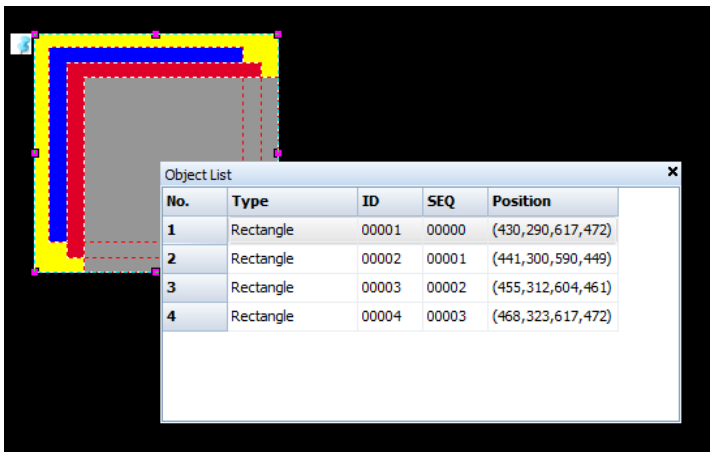
In cases where two or more objects are layered, it is difficult to correctly select the object of interest. As shown in [Figure. Selecting layered objects], if you click a layered object while pressing down the [Crtl] key on the right side of the keyboard or the [Alt] key on the left side of the keyboard, each layered object will be selected in an ascending order upon every click to the layered objects.



[Figure. Selecting layered objects]

6.1.4 **Selecting layered objects from pop-up menu.**

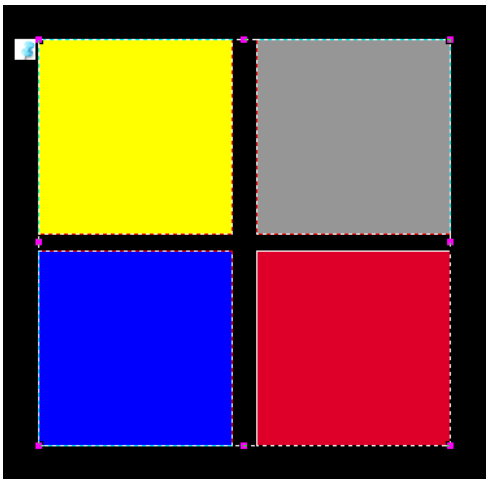
When objects are layered, you can select the object of interest by using the pop-up menu.
First, select all objects that are in the vicinity of the object of interest with a drag motion, and double click the objects to access the Object List from the pop-up menu as shown in [Figure. Pop-up Menu - Object List].
Click the objects of interest from the list to select those objects.



[Figure. Pop-up menu - Object List]

6.1.5 Multi-selection and deselection

You can select or deselect multiple objects by pressing the [Shift] key while you click an object.

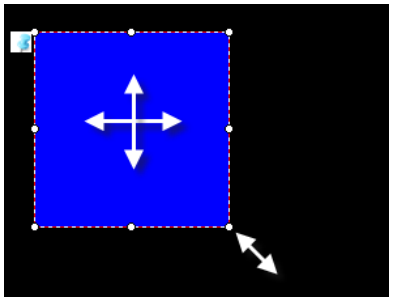


[Figure. Multi Selecton]

6.2 Moving and Changing Size

6.2.1 Moving and changing size with a mouse.

If an object is selected, a tracker appears as the below.
A tracker features 8 directions, where the user can drag the tracker while holding a left click to enlarge or shrink the size of the object.
If you put the cursor over a filled object or on the lines of a not-filled object, the cursor will be changed to an arrowed cross allowing you to drag the object while holding a left click, to the location of your intent.

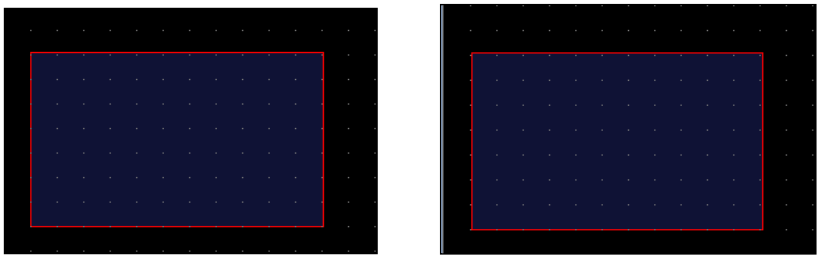


[Figure. Tracker and Mouse Cursor]

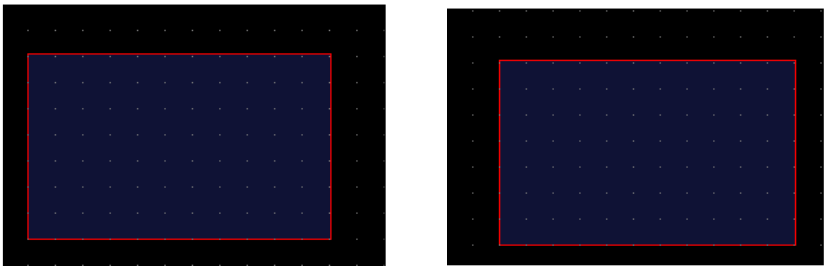
6.2.2 Moving with the Keyboard

You can move an object by selecting an object and striking the arrow keys of the keyboard.
There are two ways to move an object with the keyboard. Properly using both methods will provide you convenience in moving objects.

(1) Moving in Pixels and Grids with the Space Bar.
Upon every strike to the [Space Bar], the moving unit will alter between [Move in Pixels] and [Move in Grids] as shown below.



[Figure. Move in Pixels]



[Figure. Move in Grids]

(2) Move objects in grid with [Ctrl] key

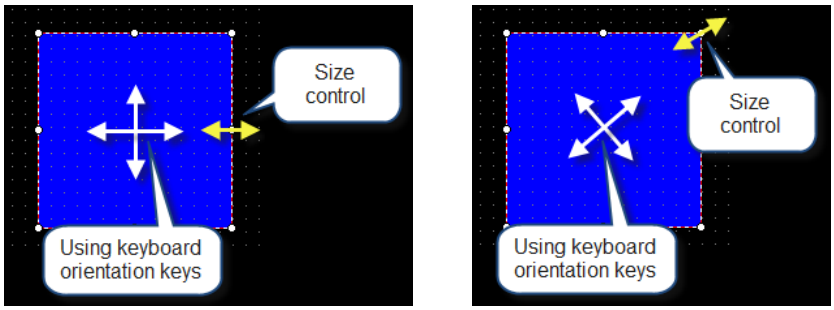
If you hold the [Ctrl] key and move an object with the arrow keys, the object will move in grids.

6.2.3 Changing size with the Keyboard

You can change the size of an object by selecting an object and using the keyboard.
There are two ways to change the size of an object with the keyboard. You can use only the keyboard, or use both the keyboard and a mouse. Properly using both methods will provide you convenience in changing the size of objects.

(1) Select an object and strike the arrow keys while holding down the [Shift] key to change the size. The object will enlarge or shrink in pixels upon each strike to an arrow key.

(2) Using the keyboard to change size while placing the cursor on the tracker.
Place the mouse to access the tracker, and strike the arrow keys to enlarge or shrink the object according to the directions shown by the tracker as below.

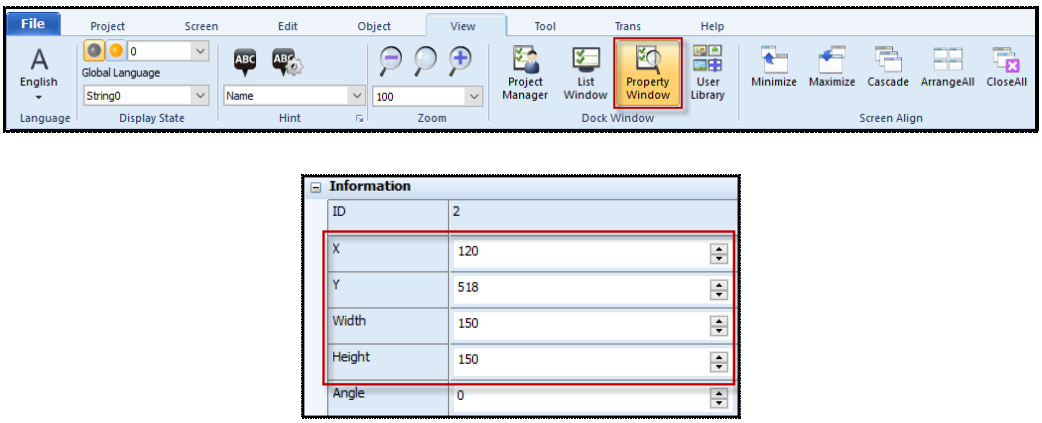


[Figure. Changing size with the keyboard and mouse]

When changing size, strike the [Space Bar] to alternate between [Pixel Unit] and [Grid Unit] as explained in Chapter 6.2.2 [Moving with the Keyboard].

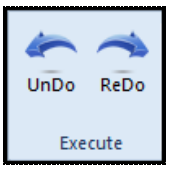
6.2.4 Moving and Changing size from Property Window]

Go to [View] - [Property Window] and change the size and/or coordinate of an object. The upper left tracker object will be the datum of the tracker, and the size is shown in pixels.



[Figure. Moving and changing size from Property Window]

6.3 Execute Menu



[Figure. Execute Menu]

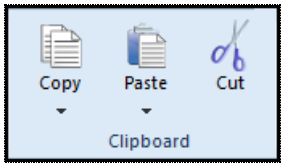
6.3.1 Undo (Ctrl + Z)

You can undo any editing performed in the Project Window including create, move, copy, paste and delete of an object in an ascending order. You can undo any execution up to 100 times in a given screen. Select [Edit] - [Undo] to cancel (undo) the previous input.

6.3.2 ReDo (Ctrl + R)

You can cancel a previously performed [Undo] in the project window to restore the screen to the immediately previous state. You can redo any execution up to 100 times in a given screen. Select [Edit] - [Redo] to execute this input.

6.4 Clipboard Menu



[Figure. Clipboard Menu]

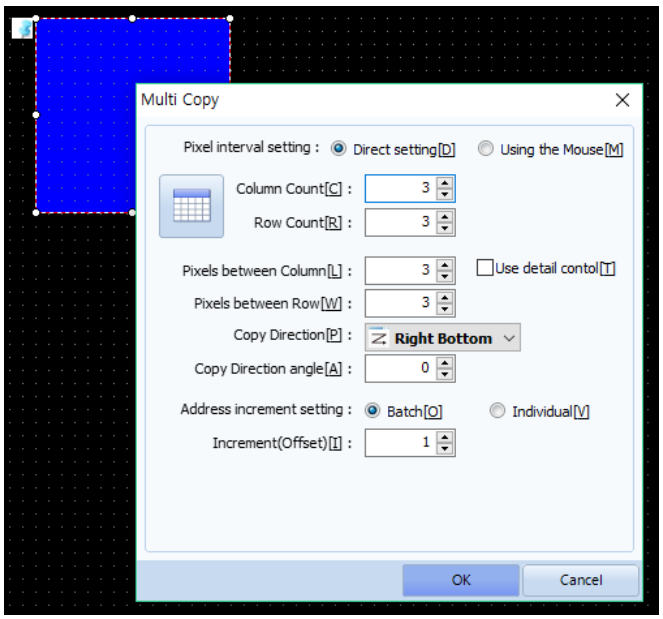
6.4.1 Copy

(1) Copy (Ctrl + C)

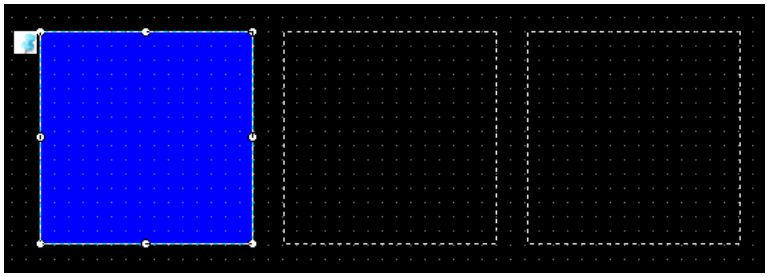
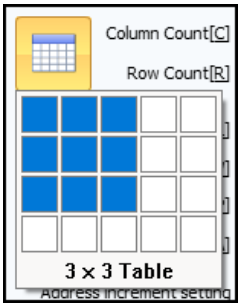
You can copy an object in ease, with this function. Select an object of interest and click [Copy] or select [Copy] from the pop-up menu upon a right click. Once you copy an object, the object data is stored on the Windows Clipboard until you copy or cut another object.

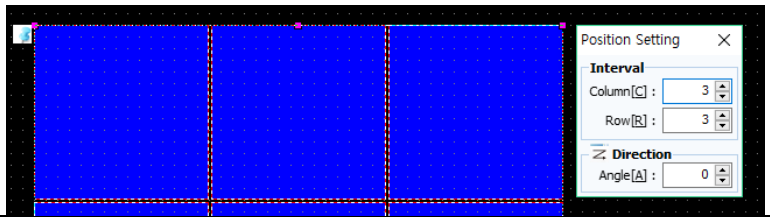
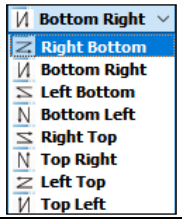
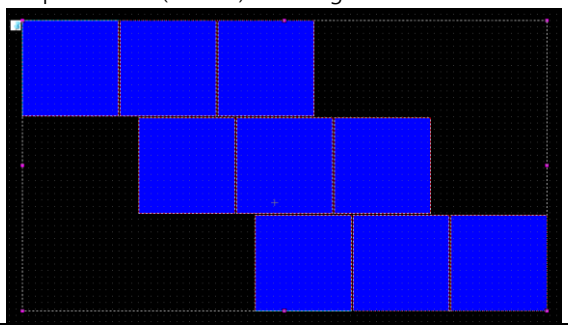
(2) Multi Copy (Ctrl + T)

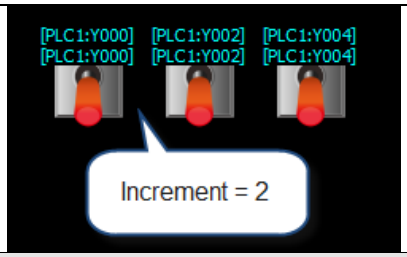
You can copy multiple objects in ease, with this function. For tags, depending on the selected options, addresses employed by tags may be increased automatically. Select a tag and go to [Edit] - [Copy] - [Multi Copy] to open the [Multi Copy] window.



[Figure. Multi Copy]

No.	Multi Copy	Description
1	Pixel Interval Setting	Select between [Direct Setting] and [Using the Mouse] to determine the interval between objects. For instance, if you select [Using the Mouse], you can define the clearance between objects with the mouse. 
2	Column/Row Count	The selected objects will be plotted as much as the columns and rows you have selected. You can click the [Table] icon on the left for an intuitive selection of columns and rows. 
3	Pixels between Column/Row	Determine the pixels that shall be provided between pasted objects for both columns and rows.
4	Use Detail Control	Enable [Use Detail Control] to access detail adjustment of clearance between pasted objects, and the angle of objects.

		
5	Copy Direction	Determine the direction of the pasted objects. (1) Bottom Right: Objects will be pasted in the precedence of top to bottom and left to right. (2) Right Bottom: Objects will be pasted in the precedence of left to right and top to bottom. (3) Left Bottom: Objects will be pasted in the precedence of right to left and top to bottom. (4) Bottom Left: Objects will be pasted in the precedence of top to bottom and right to left. (5) Right Top: Objects will be pasted in the precedence of left to right and bottom to top. (6) Top Right: Objects will be pasted in the precedence of bottom to top and left to right. (7) Left Top: Objects will be pasted in the precedence of right to left and bottom to top. (8) Top Left: Objects will be pasted in the precedence of bottom to top and right to left. 
6	Copy Direction Angle	The [Copy Direction Angle] refers to the angle between the axis of precedence and the copied object. For instance, if the [Copy Direction] is [Bottom Right] and the [Copy Direction Angle] is 47 degrees, the copied objects will be placed as shown below, where the angle of the copy direction with precedence (Bottom) is 47 degrees. 
7	Address Increment Setting	When two or more objects are copied, you can assign the address increment individually.
8	Increment (Offset)	A pasted object will have an address corresponding to the address of the copied object with a given [Increment]. For instance, if the original object has an address of [0000.00], and you paste 6 copies with the [Increment] of [2], the new objects will have addresses of [0000.00], [0000.02], [0000.04], [0000.06], [0000.08], [0000.10] in the order of its creation (Copy Direction).



6.4.2 Paste

(1) Paste (Ctrl + V)

Paste a copied or cut object saved on the Windows Clipboard, to a location of your interest.
Select an object of interest and go to [Edit] - [Paste], or select [Paste] from the pop-up menu upon a right click and further click the location where the object should be inserted to. If you did not copy or cut an object previously, no action will be made upon executing a [Paste].

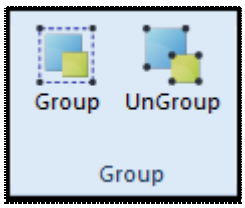
(2) Paste(Same Position) (Shift + Ctrl + V)

[Paste (Same Position)] allows you to copy an object on a given screen and paste the object on another screen at the same position. If you [Paste(Same Position] an object to the screen where the object was copied, the pasted object will be layered on top of the copied object. Open the screen that you intend to paste the copied object at the same position and go to [Edit] - [Paste(Same Position)] or select [Paste(Same Position)] from the pop-up menu upon a right click.

6.4.3 Cut

[Cut] (Ctrl + X) is a combination task of [Copy] and [Delete].
Select an object and go to [Edit] - [Cut], or select an object and click [Cut] from the pop-up menu upon a right click. Once you cut an object, the object data is stored on the Windows Clipboard.

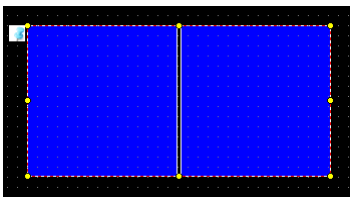
6.5 Group Menu



[Figure. Group]

6.5.1 Group (Ctrl + G)

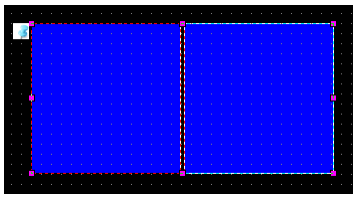
You can assign multiple objects to a group and edit the objects in batch.
Select two or more objects and go to [Edit] - [Group], or click [Group] from the pop-up menu upon a right click.
Grouped objects are shown with yellow trackers.



[Figure. Objects in a group]

6.5.2 UnGroup (Ctrl + U)

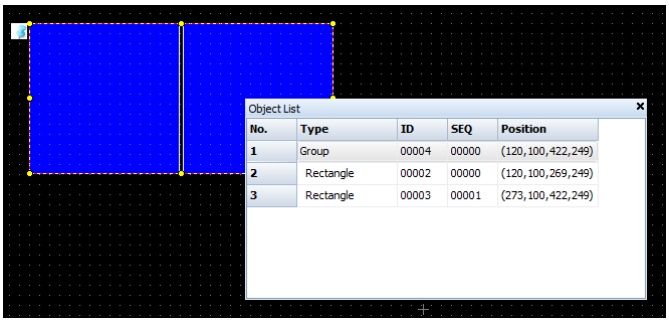
Cancel the objects assigned to a group.
Go to [Edit] - [UnGroup] or click [UnGroup] from the pop-up menu upon a right click.



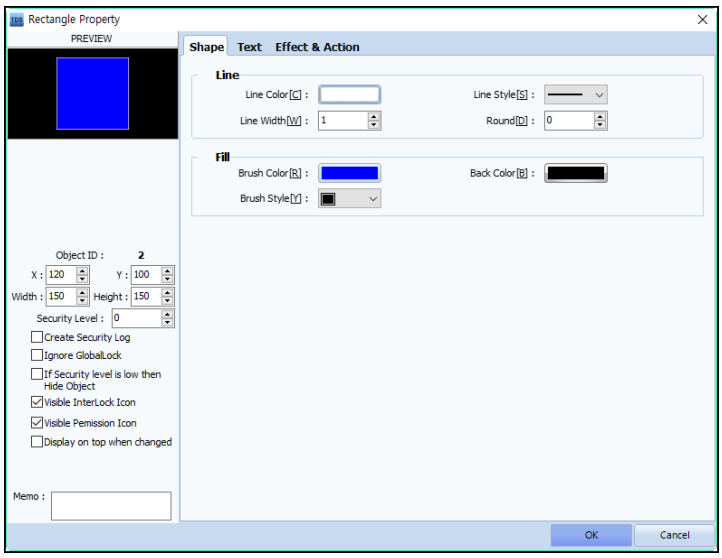
[Figure. UnGrouped Objects]

6.5.3 Edit Grouped Objects]

You can change properties of an object assigned to a group including colors or addresses.
Select a group and click [View Object List] from the pop-up menu upon a right click to open the [Object List] as shown below. Double click an object that you intend to change its property to open the object [Property] window as shown below.

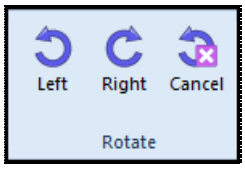


[Figure. Object List]



[Figure. Object Property Window]

6.6 Rotate Menu



[Figure. Rotate]

You can rotate an object clockwise, or counter clockwise within the range of [0°] to [359°] with an increment of [1°].
Select an object and go to [Edit] - [Rotate] -[Left]/[Right], or click [Rotate] from the pop-up menu upon a right click and select the direction to rotate the object.

6.6.1 Left (Ctrl + ,)

The selected object is turned to the [Left] (counter clockwise) from 359° to 0°.

[Figure. Rotate - Left]

6.6.2 Right (Ctrl + .)

The selected object is turned to the [Right] (clockwise) from 0° to 359°.

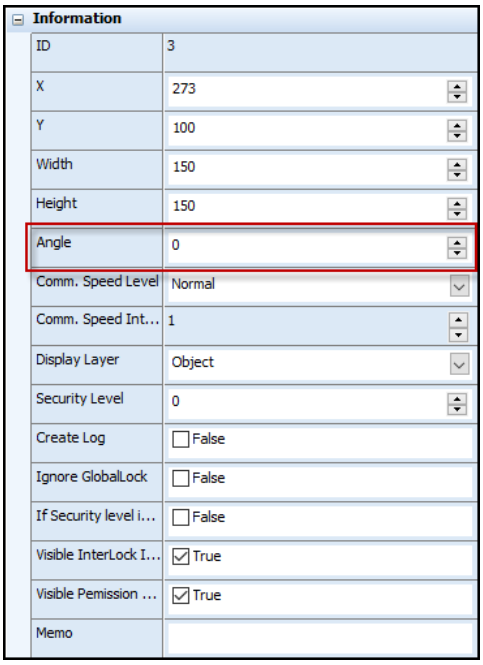
[Figure. Rotate - Right]

6.6.3 Cancel Rotate

Restore the object to state prior to the rotation.

6.6.4 Changing angle from Property Window

You can rotate an object between [0°] to [359°] from the Property Window.



[Figure. Property - Angle]

[Figure. Rotate - 45°]

6.7 Align Menu

[Figure. Align]

Top Design Studio features various alignments.

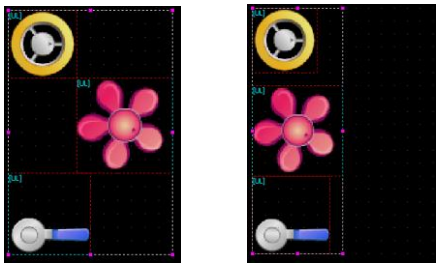
Select an object of interest, and go to [Edit] - [Align] and select the type of alignment, or select the

type of alignment from the pop-up menu upon a right click.

6.7.1 Align Left/Middle/Right/Top/Center/Bottom

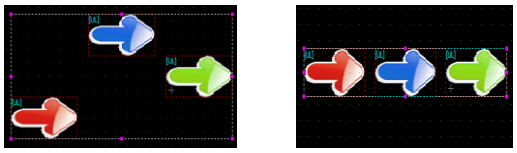
[Figure. Align Left/Center/Right/Middle/Bottom/Top]

Objects are relocated according to the datum of alignment.
The icons represents, in the order provided, alignment to the [LEFT] / [MIDDLE] (vertical) / [Right] / [Center] (horizontal) / [Bottom] / [TOP].
(1) Align Left (Shift + Ctrl + ←)
The left end of all selected objects are aligned to the furthest left end among all selected objects.



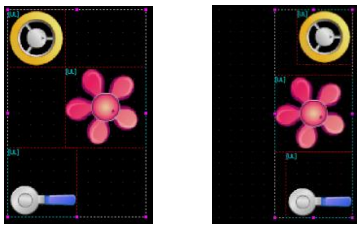
[Figure. Align Left]

(2) Align Center (Shift + Ctrl + C)
The horizontal center of all selected objects are aligned to the center of the furthest left and furthest right end among all selected objects.



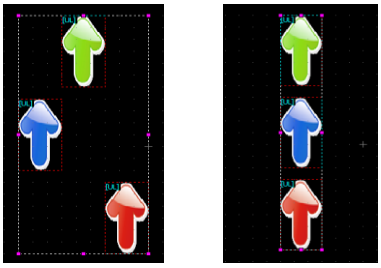
[Figure. Align Center]

(3) Align Right (Shift + Ctrl + →)
The right end of all selected objects are aligned to the furthest right end among all selected objects.



[Figure. Align Right]

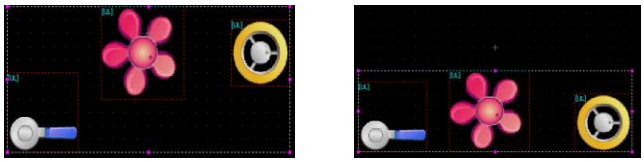
(4) Align Middle (Shift + Ctrl + M)
The vertical center of all selected objects are aligned to the middle point of the furthest top and furthest bottom end among all selected objects.



[Figure. Align Middle]

(5) Align Bottom (Shift + Ctrl + ↓)

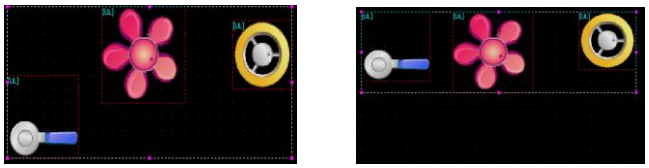
The bottom end of all selected objects are aligned to the furthest bottom end among all selected objects.



[Figure. Align Bottom]

(6) Align Top (Shift + Ctrl + ↑)

The top end of all selected objects are aligned to the furthest top end among all selected objects.



[Figure. Align Left]

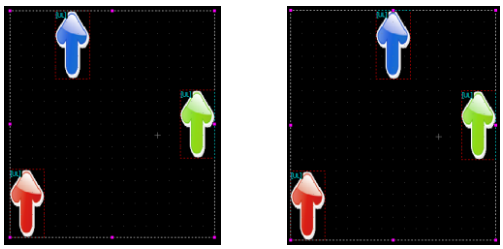
6.7.2 **Align Offset/Screen Center**

[Figure. Align Offset/Screen Center]

You can align object to have identical offsets, or move objects to the center of the screen.

(1) Align Horizontal Space (Shift + Ctrl + Z)

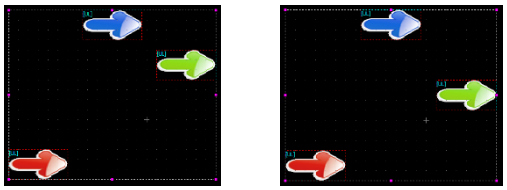
The selected objects are aligned to have identical horizontal offsets. (distance between the closest horizontal end, not the centers of objects)



[Figure. Align Horizontal Space]

(2) Align Vertical Space (Shift + Ctrl + E)

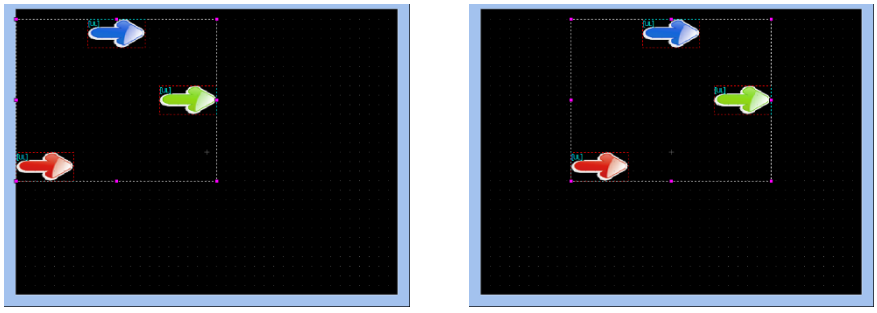
The selected objects are aligned to have identical vertical offsets. (distance between the closest vertical end, not the centers of objects)



[Figure. Align Vertical Space]

(3) Align Center of Window (Shift + Ctrl + R)

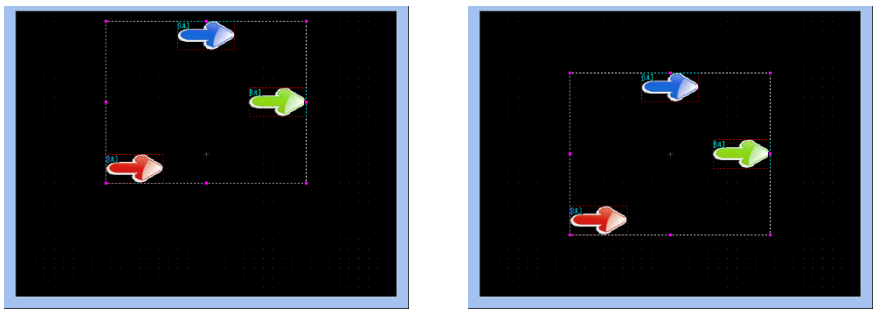
Horizontally move the selected objects to the horizontal center of the current screen.



[Figure. Align Horizontal Center of Window]

(4) Align Vertical Center of Window (Shift + Ctrl + I)

Vertically move the selected objects to the vertical center of the current screen.



[Figure. Align Vertical Center of Window]

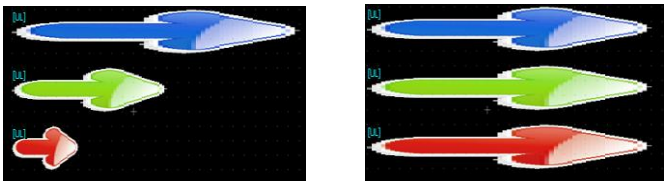
6.7.3 **Align Size**

Align the horizontal/vertical size of an object to the size of another object.

[Figure. Align Size

(1) Align Horizontal Size to Big (Shift + Ctrl + B)

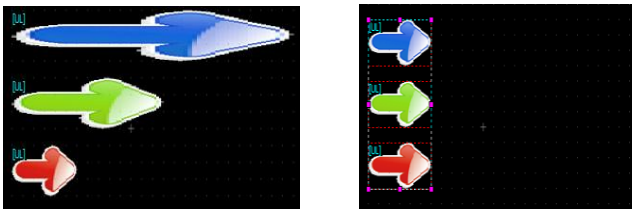
The horizontal width of all selected objects will be aligned to the object with the largest width.



[Figure. Align Horizontal Size to Big]

(2) Align Horizontal Size to Small (Shift + Ctrl + T)

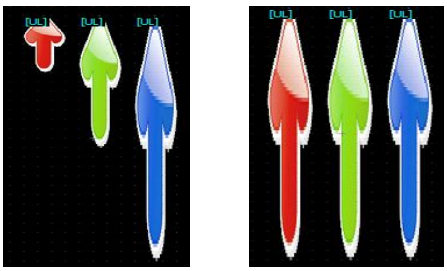
The horizontal width of all selected objects will be aligned to the object with the smallest width.



[Figure. Align Horizontal Size to Small]

(3) Align Vertical Size to big (Shift + Ctrl + G)

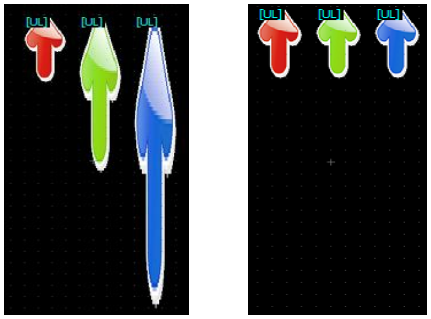
The vertical height of all selected objects will be aligned to the object with the tallest height.



[Figure. Align Vertical Size to Big]

(4) Align Vertical Size to Small (Shift + Ctrl + L)

The vertical height of all selected objects will be aligned to the object with the shortest height.



[Figure. Align Vertical Size to Big]

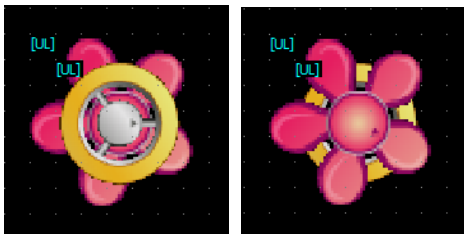
6.7.4 Send Forward/Backward

You can move a layered object forward or backward.

[Figure. Move Forward/Backward]

(1) Send Front (Home)

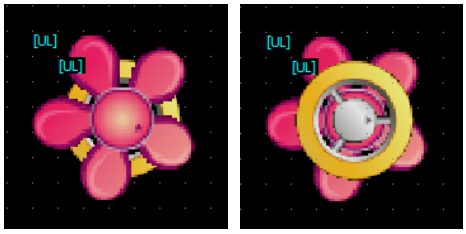
Move a layered object one step forward.



[Figure. Send Front]

(2) Send Back (End)

Move a layered object one step backward.



[Figure. Send Back]

(3) Send Front End (Ctrl + Home)

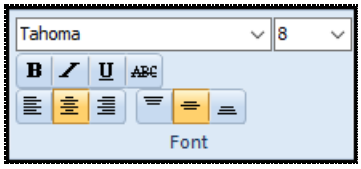
Move a layered object forward to be on top of all layered objects.

(4) Send Back End (Ctrl + End)

Move a layered object to be on the bottom of all layered objects.

6.8 Font Menu

Configure the Font setting of texts.



[Figure. Font]

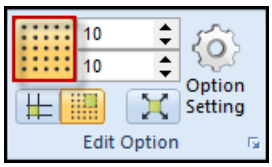
Font	Description
Tahoma	Select the font of texts. Top Design Studio provides over 400 types of different fonts.
8	Select the text size.
B I U ABC	Apply Bold/Italic/Underline/Strikethrough to texts.
	Configure the alignment of multi-lined texts.
	For texts included in a figure or image object, select where to vertically align the text within the object.

6.9 Edit Option Menu

6.9.1 Grid Options

(1) Show Grid

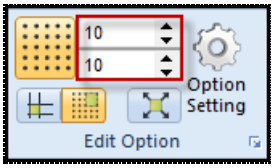
You can show or hide grids of the screen. Grids refer to the dots equally distributed throughout the screen, providing guidance to locating objects.



[Figure. Show Grid]

(2) Grid Distance

Adjust the distance between grids to provide a detail comprehension or brief understanding in design. Separately adjust the horizontal and vertical distance between dots. Adjust the number in the upper drop down menu for vertical distance and lower for horizontal distance.



[Figure. Gird Distance]

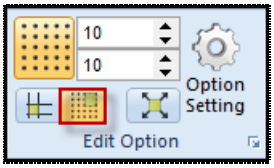
6.9.2 **Snap Type**

Snap literally means 'a sudden sharp cracking sound'. Snap function, also know as a magnet function is used as means of attaching the location like a magnet when drawing, moving or changing the size of a figure or tag.

(1) Snap Grid

Snap Grid, available when [Show Snap] is enabled, allows you to move or change the size of an object according to the unit grid.

When you move the mouse, the cursor will follow through a path of grids, rather than allowing to be placed on random pixels. When you move the mouse, one strike to an arrow key will enable the action you are making on a grid basis.

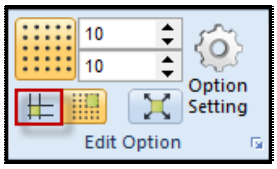


[Figure. Snap Grid]

(2) Snap Object

While Snap Grid allows you to maneuver on a grid to grid basis, Object Snap allows you to snap with freedom regardless to the grid based on the corner of an object.

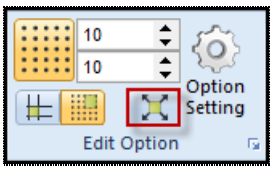
Go to [Edit] - [Option Setting] - [Screen Edit Option] and configure various options for snap. For Snap Object, you can show guidelines indicating the point of snap.



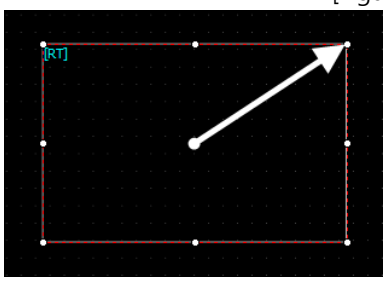
[Figure. Snap Object]

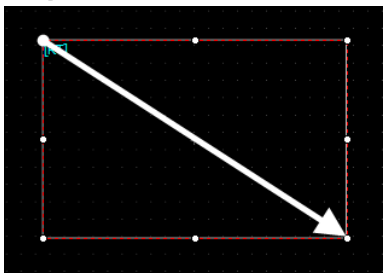
6.9.3 Draw Base (Center to Outside)

If Draw Base is enabled, the location of your initial input (click) becomes the center of a new object, expanding outwards.
If [Draw Base] is disabled, the initial point of input (click) becomes a corner of the object.



[Figure. Draw Base]

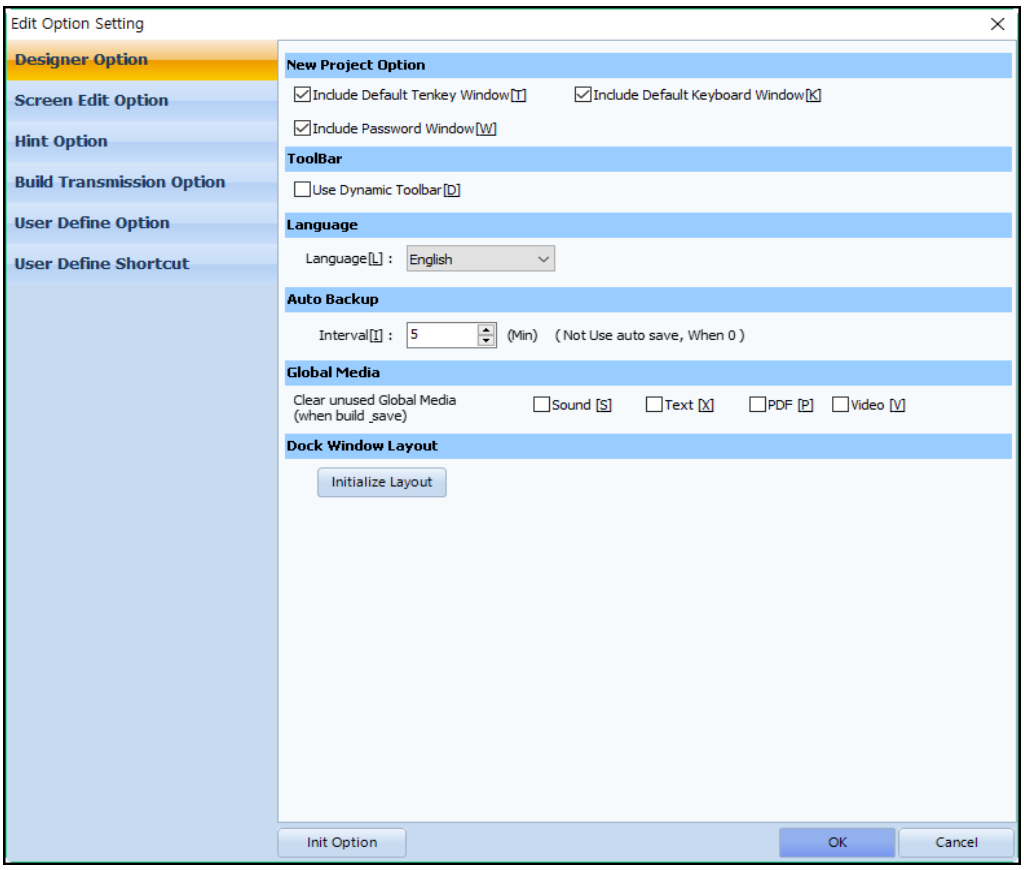




[Figure. Draw Base Enabled] [Figure. Draw Base - Disabled]

6.9.4 Option Setting

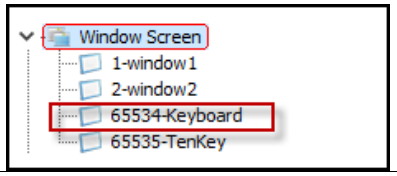
You can customize the TDS environment to your preference.
Draw Base provides options of [Designer Option] / [Screen Edit Option] / [Hint Option] / [Build Transmission Option] / [User Define Option] / [User Define Shortcut].
Any modification to the options can be canceled with a click to [Initial Option].

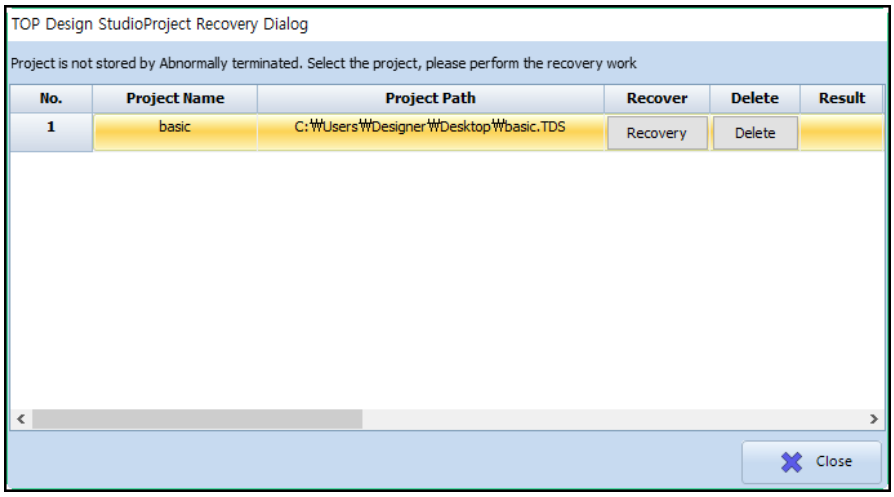
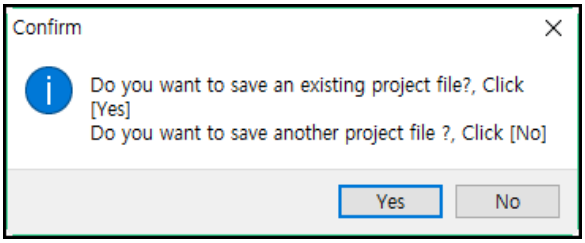
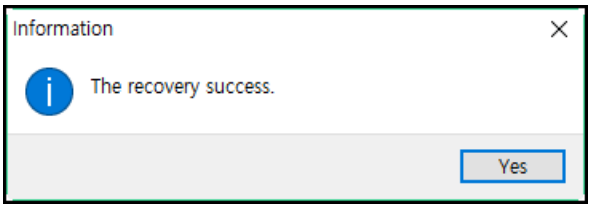


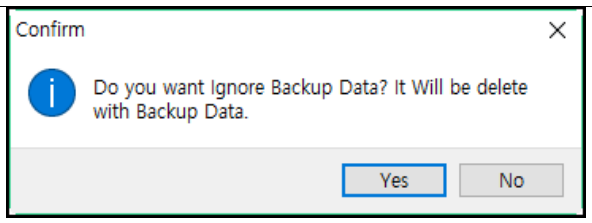
[Figure. Edit Option Setting]

(1) Designer Option

Configure options for [New Project] / [Toolbar] / [Language] / [Auto Backup] / [Global Media] / [Dock Window Layout].

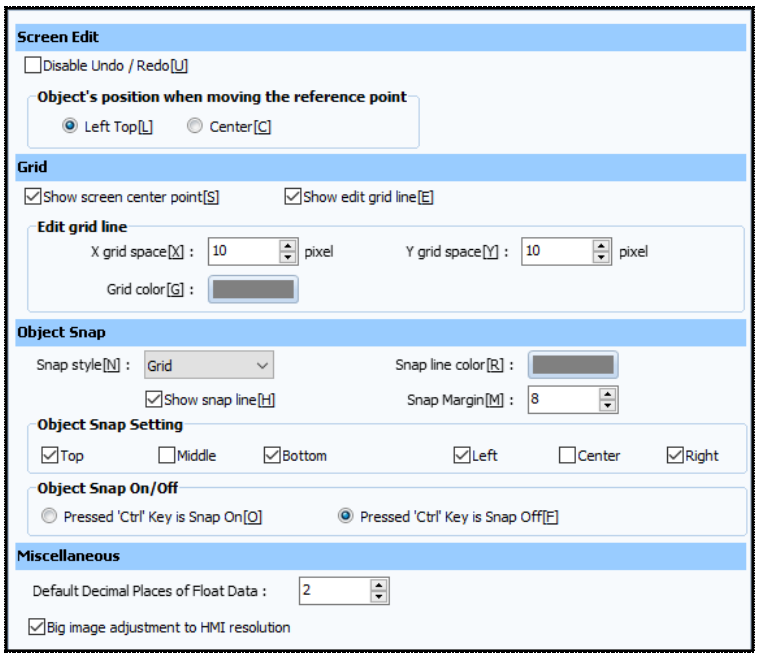
No.	Option	Description
1	New Project Option	Enable [Include Default Tenkey Window] to automatically include [65535-Tenkey] to the Window Screen whenever you create a new project. Enable [Include Default Keyboard Window] to automatically include [65534-Keyboard] to the Window Screen whenever you create a new project. 
2	Toolbar	Enable [Use Dynamic Toolbar] to allow dynamic changeover between toolbars. With this function, you can conveniently go back and forth between Edit Menu and Object

		Menu, the two most frequently used menus. If you click the Edit Screen, the [Object Toolbar] will be shown, and if you click an object, the [Edit Toolbar] will be shown.
3	Language	You can select the TDS language between Korean and English. Select [English] to show all features in English. Select [Korea] to show all features in Korean.
4	Auto Backup	Configure the backup [Interval] to backup the current project on a regular basis. If you select [0], auto backup will not be performed. If [Auto Backup] is configured, the below [TOP Design Studio Project Recovery Dialog] will appear after you start TDS after TDS was terminated in an abnormal manner.  [TOP Design Studio Project Recovery Dialog] provides you a list of abnormally terminated projects. Click [Recovery] for a project to open the below confirm message asking you whether or not to save the existing project file, or save the existing project file as a new file.  Click [Yes] to open the backup file and save the backup file as the original file.  Click [No] to open the [Save As] window and save the backup file as another file. Click [Delete] to open the below message, and click [Yes] in the message window to delete the backup project file.

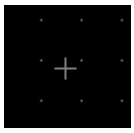
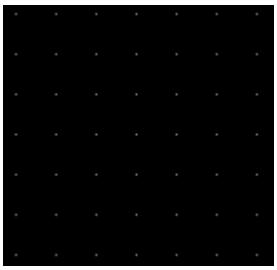
		 Caution! In the directory of the original project file, a file named [~$Project Name.Hgid] file will exist. This file will appear when a project is open (editing) and will disappear when the project is terminated in a controlled manner. However, this file will remain in the folder if the project is terminated in an abnormal manner. The backup file path information is included in this file, thus if a user deletes this file, the project will not be available for recovery when you restart TDS.
5	Docking Window Layout	Click [Initialize Layout] to initialize the location of the left and right docking windows.

(2) Screen Edit Option

Configure the options for editing.



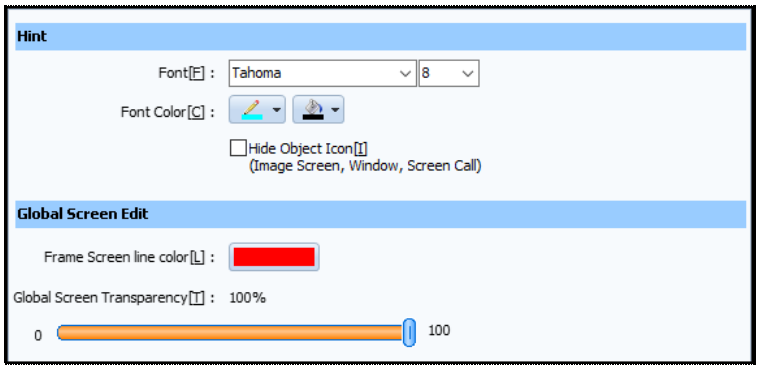
[Figure. Screen Edit Option]

No.	Option	Description
1	Screen Edit	Select [Disable Undo/Redo] to not allow [Undo] and [ReDo]. Select between [Left Top] and [Center] for [Object's position when moving the reference point].
2	Grid	Select [Show screen center point] to show the dead center of the TOP device screen in the Edit Screen.  Select [Show edit grid line] to show grids on the edit screen as below.  From [Edit Grid Line] select the [X grids space] and [Y grid space] in pixels to adjust the distance between grids. Select the [Grid Color] from the drop-down menu.
3	Object Snap	Snap allows you to move the cursor to a certain location (on a grid or according to the snap line of an object) for guidance of the action you are taking. Select [Snap Style] between [Object] and [Grid]. Select [Object] to fit the cursor to the vicinity of an object. Select [Show Snap Line] to show the vertical and horizontal guideline for snap. Select the [Snap Line Color] from the drop-down menu. Select the [Snap Margin] in pixels. With the above configuration, a snap will occur whenever the snap line is located 8 pixels or closer to an object. Select [0] to disable snap. Select the [Object Snap Setting] among [Top] / [Middle] / [Bottom] and [Left] / [Center] /

		[Right] The above configuration will allow snaps to occur when the [Top] / [Bottom] / [Left] / [Right] side of the object in edit is close to another object. With [Object Snap On/Off] configure the snap action that will occur when the Ctrl Key is held down. Select [Snap Style] of grid to snap on grids.
4	Miscellaneous	Configure the default number of decimals employed by a float data with [Default Decimal Places of Float Data]. Enable [Big image adjustment to HMI] resolution to adjust the resolution of an image of which resolution is higher than that of the HMI to the HMI resolution.

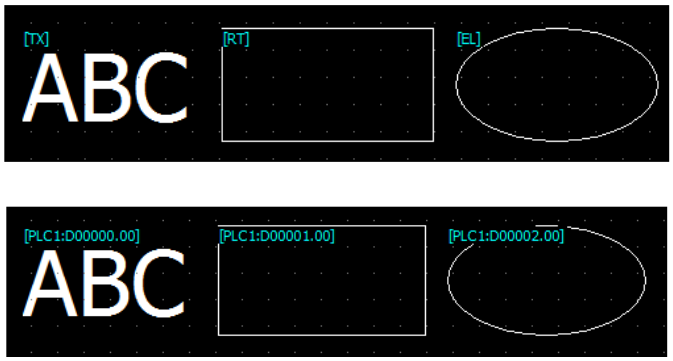
(3) Hint Option

Configure the font applicable for hints and global screen edit options (Master Screen/ Frame).



[Figure. Hint Option]

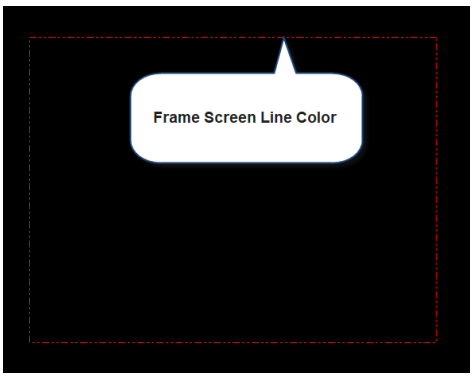
Hints are the object information shown on the upper left corner of an object.



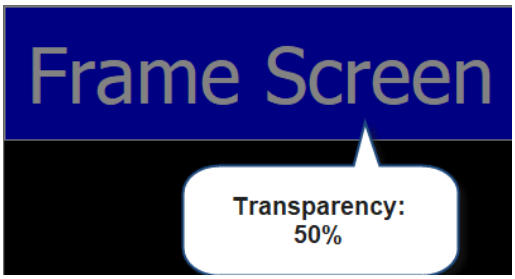
[Figure. Hints]

Configure the font, color and background color for hints.

Configure the [Frame Screen Line Color] to show the boundary of a frame shown on the screen.



Configure the [Global Screen Transparency] in % to determine the degree of transparency for displaying an object to a Master Screen / Frame.
Objects directly added to the Base Screen are shown with clarity while objects called upon Master Screen / Frame are shown transparent.

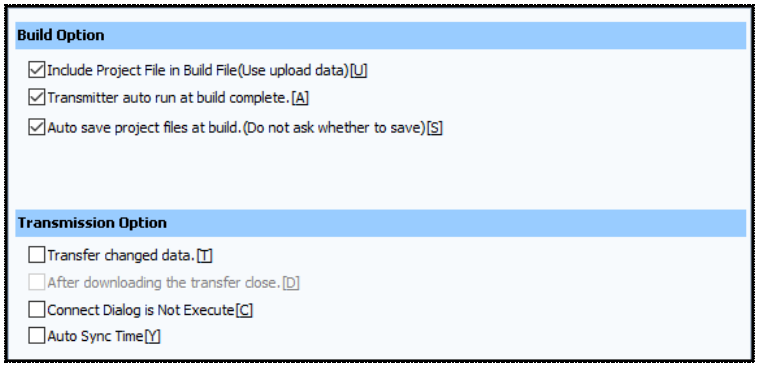


[Figure. Frame - 50% Transparency]

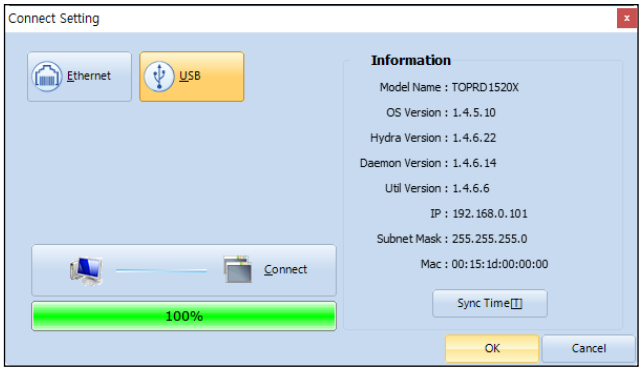
[Figure. Frame - 100% Transparency]

(4) Build Transmission Option

Configure the options for build and transmission.

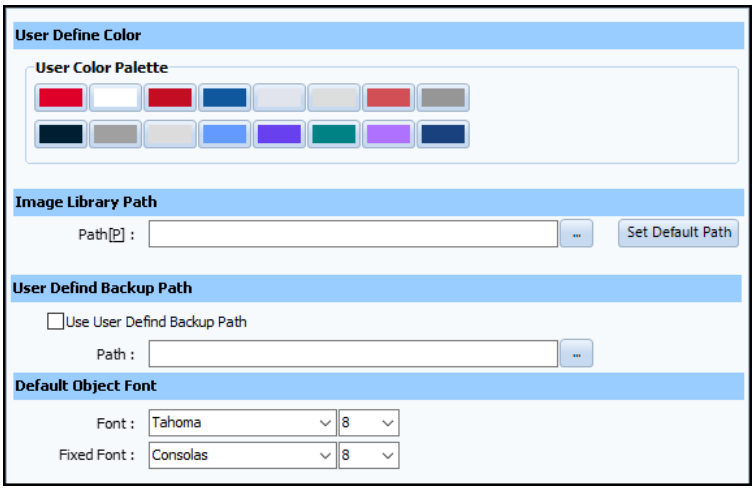


[Figure. Build Transmission Option]

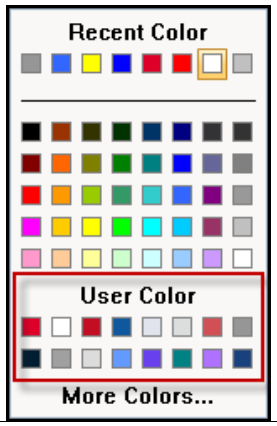
No.	Option	Description
1	Build Option	Enable [Include Project File in Build File (Use Upload Data)] to include a compressed project file (*.TDS) in the Build File (*.HBZ). If you [Build & Transfer] while this option is selected, you can upload a project file (*.TDS) that can be edited with TDS by going to [Trans] - [Upload Data] - [Project]. If you [Build & Transfer] while this option is not selected, you cannot upload the project. Enable [Transmitter auto run at build complete], to automatically transmit the build file once build is completed by [Trans] - [Build & Transfer] without clicking the [Transfer] button. Enable [Auto save project files at build. (Do not ask whether to save)] to save the current project file when build is completed.
2	Transmission Option	Enable [Transfer Changed Data] to: compare the project loaded on the TOP device, and the currently built project; and transfer only data that has been changed. If only minor modifications were made to the project file, this feature will allow you to reduce the time required for transmission. Enable [After downloading the transfer close] to close the transmitter program automatically when the transfer is completed. Enable [Connect Dialog is Not Execute] to apply the same [Connection Settings] employed by the previous transfer. In other words, the system will not ask you to configure [Connection Settings] upon every transfer. If the previous transfer was successful, the previous settings will be applied. If the previous transfer failed, the [Connection Setting] window will appear.  Enable [Auto Sync Time] to synchronize the TOP device date and time to the PC's date and time.

(5) User Define Option

Configure the settings for [User Define Color] / [Image Library Path] / [User Defined Backup Path] / [Default Object Font].

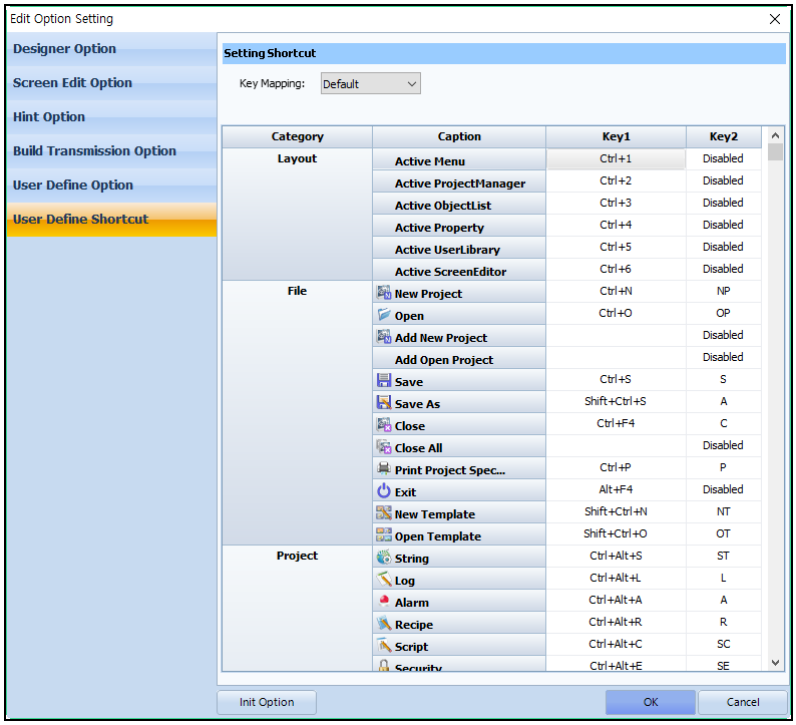


[Figure. User Define Option]

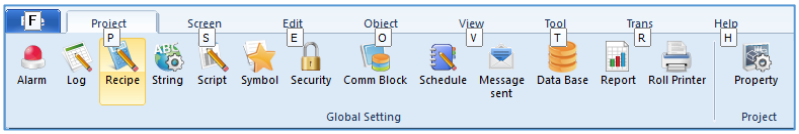
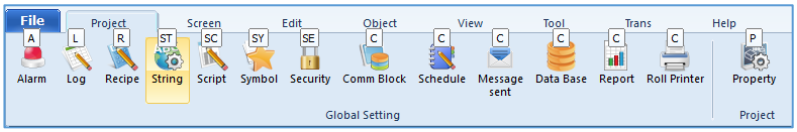
No.	User Define Option	Description
1	User Define Color	Configure the user define color palette. You can add 16 frequently used colors. When you access the color option for a project, the [User Define Color] are shown in the [User Color] field. 
2	Image Library Path	Configure the library path that is used when you add an image. If you configure the path incorrectly, the image list will not appear in the image library. In such cases, you are recommended to click the [Set Default Path] button to restore settings to default.
3	User Defined Backup Path	If [Auto Backup] is enabled at [Edit] - [Option Setting] - [Designer Option], the backup is performed for the current project with the predetermined [Interval]. If TDS is terminated in an abnormal manner while a project file is open, the [Top Design Studio Project Recovery Dialog] will appear when you restart TDS allowing you to recover a backup project file. The default backup path is determined by TDS. Enable [Use User Defined Backup Path] to save backup files to the selected directory. Caution! A backup file does not have an extension of *.TDS, and a user cannot open a backup file from Project.
4	Default Object Font	The [Font] and [Fixed Font] configured with [Default Object Font] are applicable to any new [Text] / [String] / [Number]. Configure the font and size of the texts and numbers. Configuration of [Font] is applicable to texts of a project. Configuration of [Fixed Font] is applicable for [Numbers/Characters/Clocks/Number Key/Character Key] objects. [Fixed Font] refers to the fixed width of an individual letter/character/number.

(6) User Define Shortcut

Check the shortcut keys available on TDS, and edit any shortcut key of your interest.

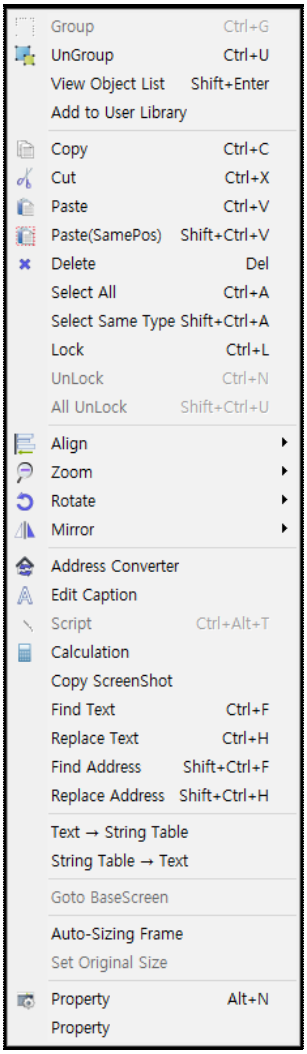


[Figure. User Define Shortcut]

No.	User Define Shortcut	Description
1	Key Mapping	Select [Default] to use default TDS shortcut keys. Select [User Define] to define shortcut keys according to your preference.
2	Key1	In principle, TDS provides default shortcut keys. To define a user shortcut key, select [Key Mapping] as [User Define], and double click the shortcut key of interest, and configure the shortcut key.
3	Key2	Enter the specified keys while holding down the [Alt] key to execute the caption. In principle, TDS provides default shortcut keys. To define a user shortcut key, select [Key Mapping] as [User Define], and double click the shortcut key of interest, and configure the shortcut key. For instance, if you hold a left click on a blank portion of the menu bar and strike [Alt], shortcuts to each menu of [File] / [Project] / [Screen] / [Edit] / [Object] / [View] / [Tool] / [Trans] / [Help] is shown on the menu bar as below. If you strike the corresponding shortcut key, the shortcut keys for each sub-menu will be displayed. Press the corresponding shortcut of your interest to execute the function.  [Figure. Shortcuts with ALT key - Main Menu]  [Figure. Shortcuts with ALT key - Sub Menu]

6.10 Pop-up Menu

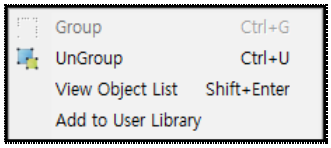
Pop-up menu refers to the menu list appearing upon a right click.



[Figure. Pop-up Menu]

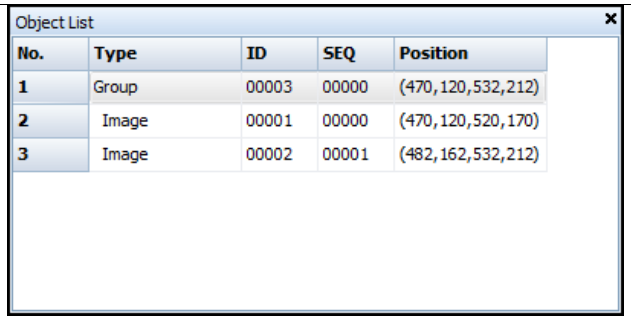
6.10.1 Group Menu

Manage groups with the pop-up menu.



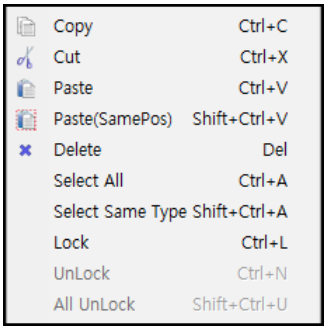
[Figure. Group Menu]

No.	Pop-up Menu	Description
1	Group	Assign the selected objects to a group.
2	UnGroup	Cancel the objects assigned to the group.
3	View Object List	View the list of selected objects if one or more objects are selected. The object type, ID, sequential number and position coordinate is provided, and you can access the property window of each object with a double click.

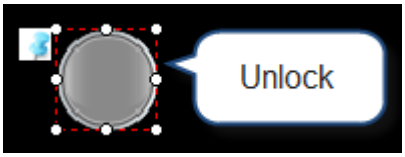
		 The sequential number represents the order of execution, which can be changed from the [Object List Management] Window.
4	Add to User Library	Add one or more selected objects to [View] - [User Library]. For more details, refer to Chapter 22.9 [User Library Window].

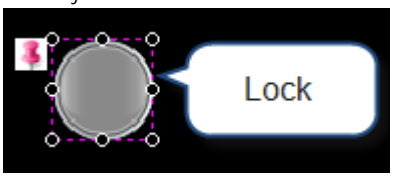
6.10.2 Clipboard/Lock Menu

Edit clipboard and configure lock settings from the pop-up menu.



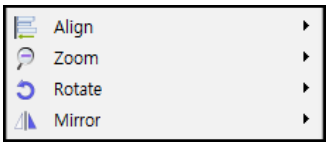
[Figure. Clipboard / Lock Menu]

No.	Pop-up Menu	Description
1	Copy (Ctrl + C)	Copy a selected object(s).
2	Cut (Ctrl + X)	Cut a selected object(s).
3	Paste (Ctrl + V)	Paste a copied or cut object saved on the Windows Clipboard, to a location of your interest.
4	Paste (Same Position) (Shift + Ctrl + V)	Paste a copied or cut object saved on the Windows Clipboard, to the same location of the original object.
5	Delete (Del)	Delete a selected object(s).
6	Select All (Ctrl + A)	Select all objects of the current screen.
7	Select Same Type (Shift + Ctrl + A)	Select all objects with the same type of the selected object.
8	Lock (Ctrl + L)	Lock a selected object to prohibit any edit. You can lock an object with a click to the circle icon that appears after three seconds since you select an object.  [Figure. Lock]

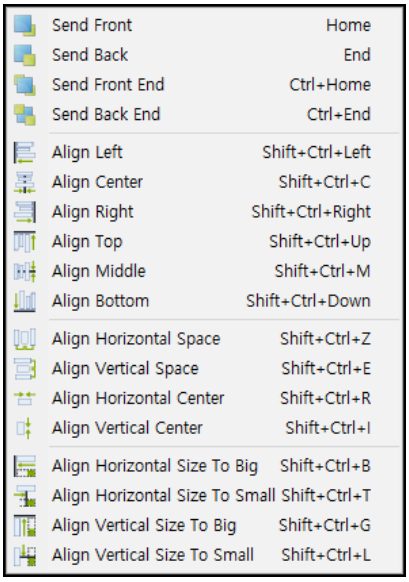
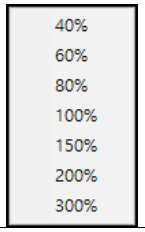
9	Unlock	Unlock a selected object. You can unlock a locked object with a click to the circle icon that appears after three seconds since you select an object.  [Figure. Unlock]
10	Unlock All	Unlock all locked objects of the current screen.

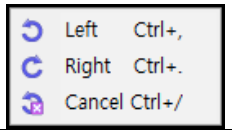
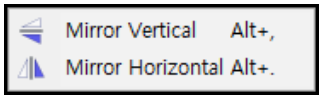
6.10.3 **Align Menu**

Align/Zoom/Rotate/Mirror objects from the pop-up menu.



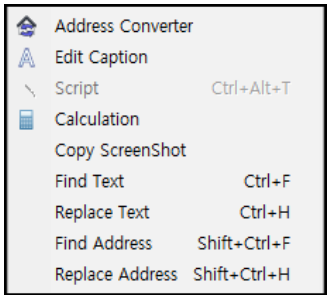
[Figure. Align Menu]

No.	Pop-up Menu	Description
1	Align	Align a selected object(s).  Refer to Chapter 6.7 [Align Menu] for more details.
2	Zoom	Zoom in and out of the screen. Select between 40% and 300%. 

3	Rotate	Rotate a selected object(s). The selected object rotates 90° upon each input. 
4	Mirror	Mirror a selected object(s) vertically/horizontally. Vertical mirror will reflect the image upside down. Horizontal will reflect the image side to side.  [Figure. Original Object, Vertical Mirror, Horizontal Mirror]

6.10.4 **Tool**

Execute [Address Converter] / [Edit Caption] / [Script] / [Calculation] / [Copy ScreenShot] / [Find Text] / [Replace Text] / [Find Address] / [Replace Address] from the pop-up menu.



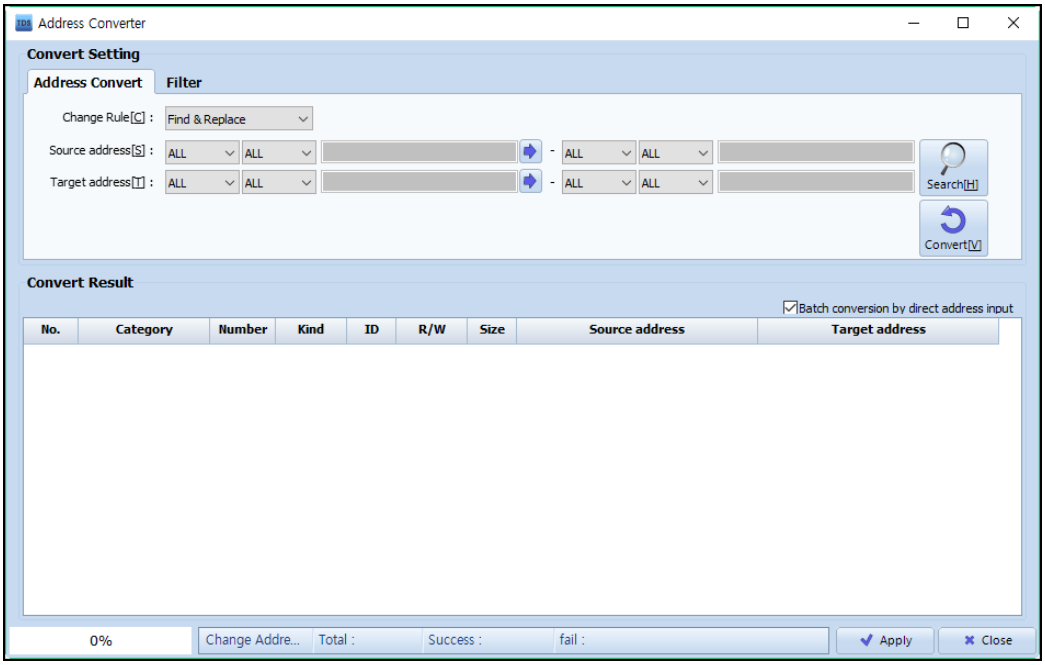
[Figure. Tool Menu]

(1) Address Converter

You can [Find] and [Convert] an address included in the project.

You can change values of addresses in a specific range in batch, or individually change an address.

Refer to Chapter 23.2 [Address Converter] for more details.



[Figure. Address Converter]

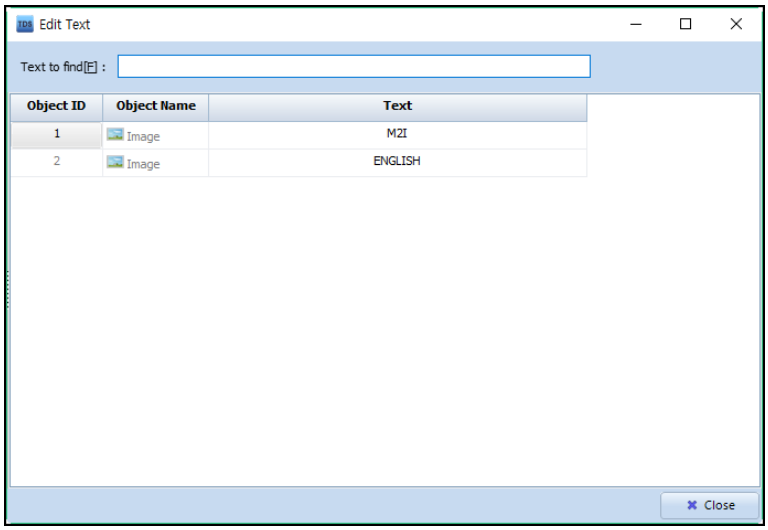
(2) Edit Caption

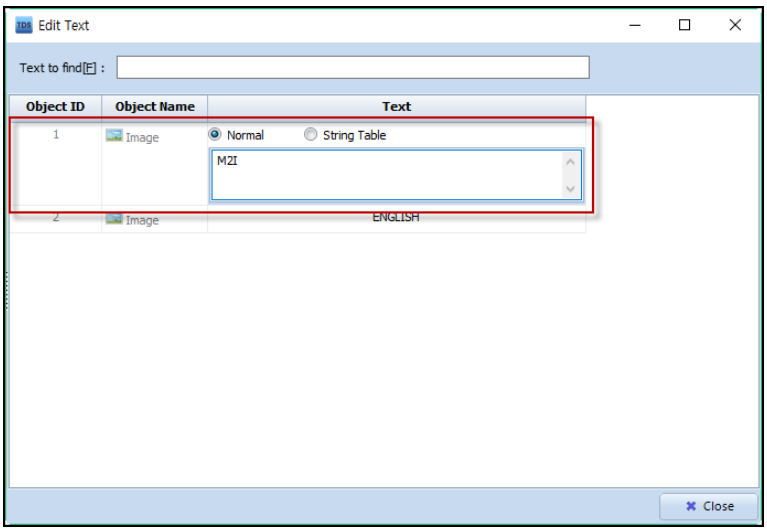
Click [Edit Caption] to open [Edit Text] window.

You can easily search for and change texts within a selected object(s).

The list of all texts included in the selected object(s) shown on the [Edit Text] window.

Search for a specific keyword, or double click a text of your interest to change the content.





[Figure. Edit Text]

(3) Calculation

Add a calculation function to the current screen. Click [Calculation] to open the [Calculation] window.
This function is identical to the input of [Object] - [Calculation].
Refer to Chapter 13 [Calculation Object] for more details.

(4) Script (CTRL + ALT + T)

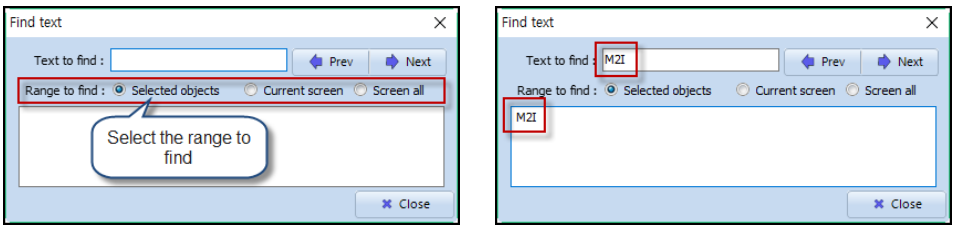
Add a script to the current screen. Click [Script] to open [Script] window.
Refer to Chapter 4.5 [Script] for more details.

(5) Copy ScreenShot

Copy the drawing screen of the current screen to the clipboard.
You can insert the copied screenshot with [Paste] to a location of your selection.

(6) Find Text (Ctrl + F)

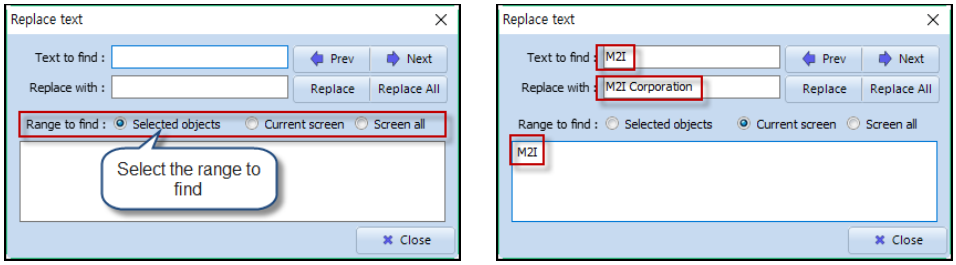
Find an object containing the text of your interest.
Type in the [Text to find], select the [Range to find] among [Selected objects] / [Current Screen] / [Screen All] and click [Next] to find corresponding objects.



[Figure. Find Text]

(7) Replace Text (Ctrl + H)

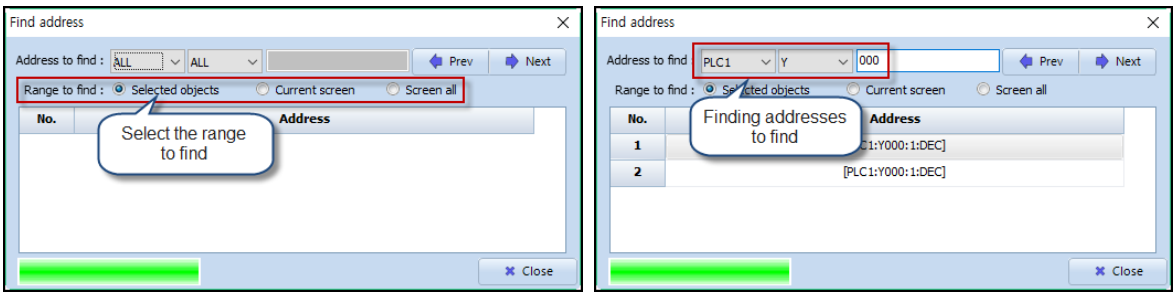
Find an object containing the text of your interest and replace such text with another string.
Type in the [Text to find], select the [Range to find] among [Selected objects] / [Current Screen] / [Screen All] and click [Next] to find corresponding objects.
Enter the new string in [Replace with] and click [Replace] or [Replace All] to replace the text of interest with the new string accordingly.
[Replace All] will replace the text of interest included in all objects with the [Replace With] string.



[Figure. Replace Text]

(8) Find Address (CTRL + SHIFT + F)

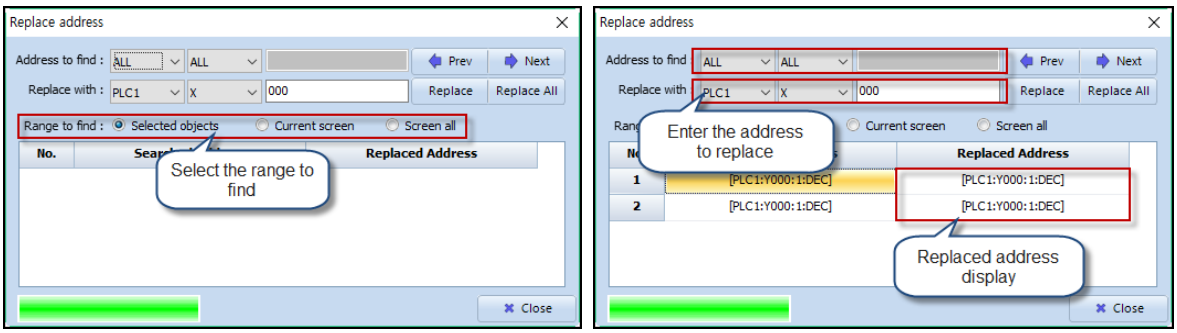
Find an object using the address of interest.
Configure the [Address to find], select the [Range to find] among [Selected objects] / [Current Screen] / [Screen All] and click [Next] to find corresponding objects.
This function provides a simplified address search, and for detail address search, refer to Chapter 23.1 [Find Address / Object]



[Figure. Find Address]

(9) Replace Address (Ctrl + Shift + H)

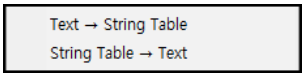
Find an object using the address of your interest and change the address of the object.
Configure the [Address to find], select the [Range to find] among [Selected objects] / [Current Screen] / [Screen All] and click [Next] to find corresponding objects.
Configure the new address in [Replace with] and click [Replace] or [Replace All] to replace the address of interest with the new address accordingly. [Replace All] will replace the address of interest included in all objects with the [Replace With] address.



[Figure. Replace Address]

6.10.5 **String Converter**

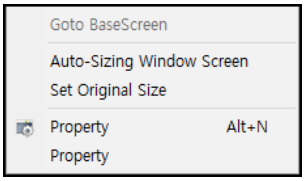
In a selected object(s) execute conversions of [Text → String Table] and [String Table → Text].



[Figure. String Conversion]

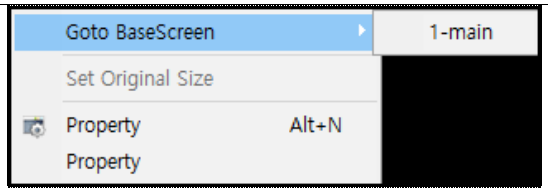
No.	Pop-up Menu	Description
1	Text → String Table	Convert the text of the selected object from [Direct Input] to [String Table]. To perform a project-wise conversion, go to [Tool] - [String Table Converter]. Caution! String Tables must be assigned to groups to execute this conversion. For details on [Project] - [String], refer to Chapter 4.4 [String].
2	String Table → Text	Convert the text of the selected object from [String Table] to [Direct Input]. To perform a project-wise conversion, go to [Tool] - [String Table Converter]. For details on string tables and multi-language tables, refer to Chapter 4.4 [String].

6.10.6 **Go to BaseScreen / Auto-sizing Window Screen / Set Original Size / Screen Property / Property**



[Figure. BaseScreen, Original Size, Screen Property, Property]

No.	Pop-up Menu	Description
1	GoTo BaseScreen	Change to the screen of which number is assigned by [Screen Change] of an object in the Edit Screen. Select an object that is elected to [Use Screen Change], and click [Goto BaseScreen]. the list of screens corresponding to the [Screen Change] assigned to the object will appear. Select the screen of your interest to show the screen.

		 Select [2-Loging Setting(2)] to change to screen No.2.
2	Set Original Size	Change the size of a selected image object to its original size.
3	Screen Property (Alt + N)	Open the [Screen Property] of the current screen.
4	Property	Open the [Property] window of a selected object.

CHAPTER 7 - Object - General

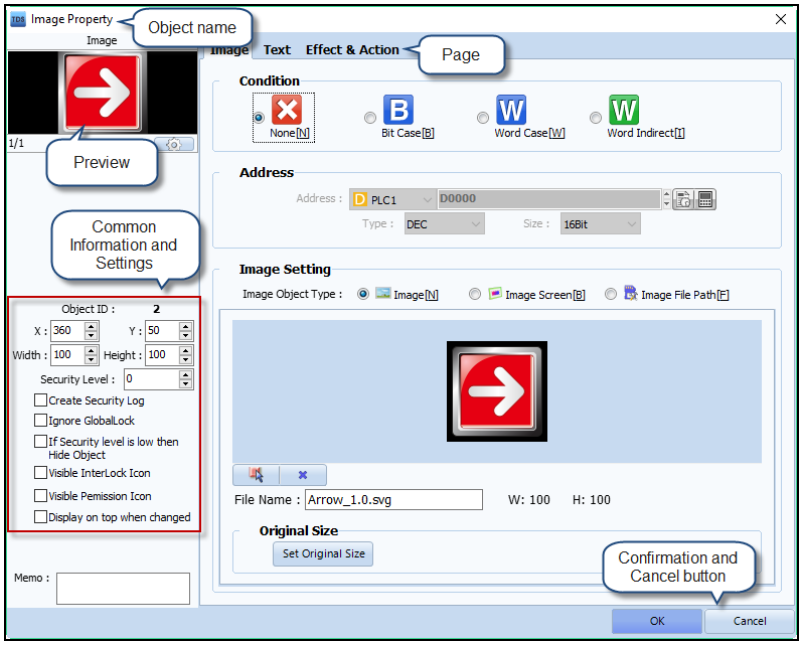
You can add objects from the [Object] menu provided in the Menu Bar.
Types of objects include [Dot] / [Line] / [Rectangle] / [Ellipse] / [PolyLine] / [Image] / [Paint] / [String] / [Ruler] and [Lamp] / [Numeric] / [Message View] / [Window View] / [Calculation] / [Screen Call] / [Log View] / [Alarm View] / [Graph] / [Slide] / [Video] / [Camera] / [Table].

Select an object of your interest from the menu bar and place it at a location of your interest on the Edit Screen, and edit the object as required.
For more details of each object, refer to Chapters 8 to 19.
This Chapter provides an overview of common aspects of objects.

7.1 Object Property Window

7.1.1 Object Property Window Layout

You can configure detail shape and functions of an object from its Property window.
Select an object from the Edit Screen and [Double Click] the object, or select [Property] from the pop-up menu upon a right click.
Each Property differs from the type of object, however, the principle layout is similar.
Object Property windows provides a fixed left field, and a right field with numbers of tabs.
The left side of the Property Window provides a preview of the object and a Common Information and Settings field allowing detail configuration of the object position / size / security / hide & show settings. This field is common for all types of objects.
The Right side of the Property window consists of number of pages, which may be common and may be object specific.

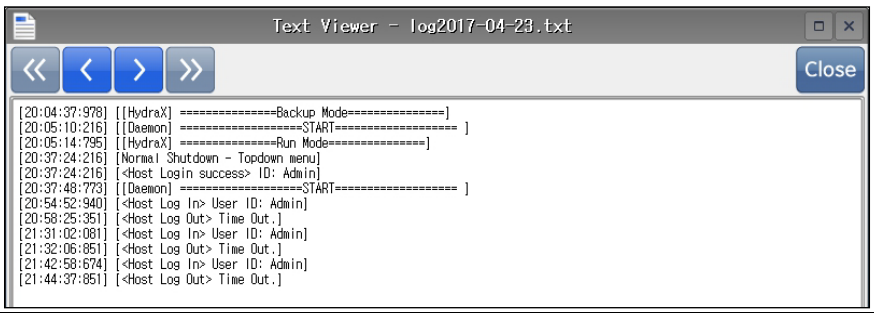


[Figure. Object Property Window Layout]

No.	Property Window	Description
1	Object Type	The object type is specified in the title bar of the Property Window.
2	Preview	A preview of the selected object is shown in the upper left corner right beneath the Object Type.
3	Common Information	In the lower left corner, information of object ID, position, size and security is provided and you can configure several settings.
4	Tab	Numbers of tabs are provided to configure various settings of each type of object.
5	OK / Cancel	Click [OK] to save and apply the current properties, and click [Cancel] to abort the property window without saving nor applying the changes made from the current iteration of the Property window.

7.1.2 Common Information and Settings

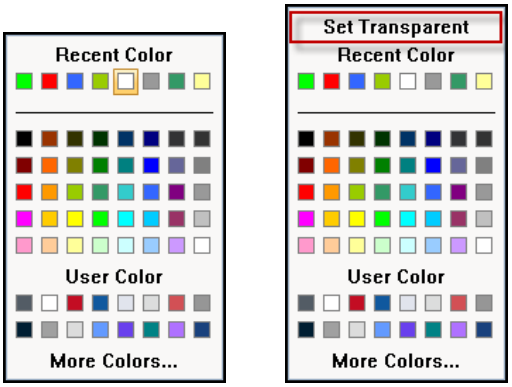
Various information of an object, and features to configure the settings of the object are provided in the lower left side of the Property Window.

No.	Property	Description
1	ID	The ID number of the object assigned in an ascending order. ID number is automatically assigned, and user cannot change the ID number.
2	X	The X coordinate of the upper left corner of the object. You can change the location of the by changing the coordinate. The upper left corner of the screen is (0,0), and the upper right corner of the screen corresponds to the screen resolution. If the TOP device has a resolution of 800 x 600, the coordinate of the upper right corner is (800, 600).
3	Y	The Y coordinate of the upper left corner of the object. You can change the location of the by changing the coordinate.
4	Width	The width of the object, you can change the width of the object by entering a different number.
5	Height	The height of the object, you can change the height of the object by entering a different number.
6	Security Level	You can change the [Security Level] if security levels are enabled at [Project] - [Security]. [0] represents that the object is not assigned to any security level, and if the security level is [1] or above, unless the user has logged in with an equal or higher security level, the object will be displayed, yet the user cannot access any action from the object. Enable [If Security level is low then Hide Object] to hide the object from the display if the login security level is lower than the object's security level.
7	Create Security Log	Enable [Create Security Log] to record login/logout information (ID, Login status, etc.) in a log file created on a daily basis in [App_Log]-[UserLog] folder. 
8	Ignore GlobalLock	This function is applicable if [Use Global Lock] is selected at [Project] - [Property]. The object will not execute any action under a [Global Lock], however, enabling [Ignore Global Lock] will allow the object to execute its action.
9	If Security level is	If the object is assigned to [Security Level] of [1] or above, the object will be hidden if a

	low then Hide Object	user has not logged in, and the object will be shown if a user has logged in with an appropriate security level. If the function is disabled, the object will be shown even if a user did not login, but will not perform any action.
10	Visible Interlock Icon	For an object configured with an Interlock, if a user clicks the object without dismissing the interlock, a [Lock] icon will appear as shown below.
11	Visible Permission Icon	If the user does not have the permission to access the current object, in other words, the user's security level is lower than the object's security level, a [Not Allowed] Icon will be shown on top of the object.
12	Memo	You can add memos to the object.

7.2 Color Palette

To select the color of a property, the [Color Palette] is commonly used for any given property tab.
The Color Palette is used in various aspects including object color, screen background, and others. Click the color selection box to open the [Color Palette]. Each color is shown in a small square. Click the color of your interest to assign the color to apply the color.



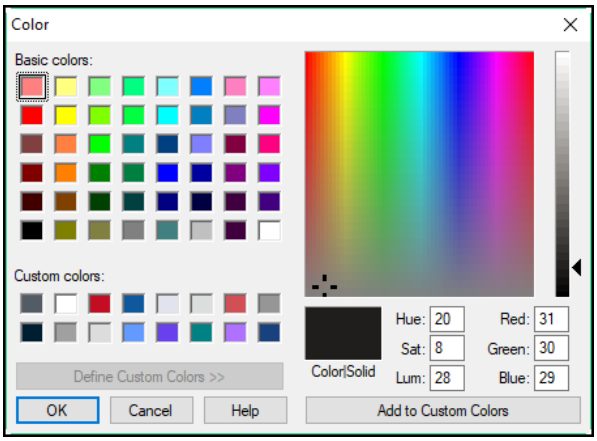
[Figure. Color Palette]

[Color Palette]s with the notion of [Set Transparent], as shown above, is available for selecting the background color of an object. Select the value for [Set Transparent] to determine the transparency of the object.
A [Color Palette] features three major fields.

No.	Color Palette	Description
1	Recent Color	The 8 most recently used colors are available.
2	Basic Color	48 commonly used colors are available.
3	User Color	User defined colors are available. You can define frequently used colors or colors other than the 48 basic colors.

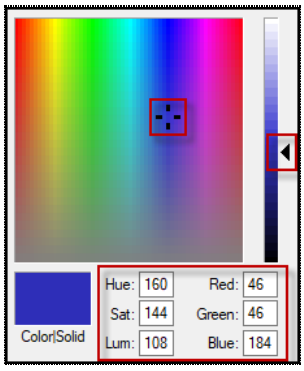
Click [More Colors...] to configure a specific color. The below Color window will appear.

7.2.1 How to select a color



[Figure. Color Selection]

You can easily select a basic color or user color. The 48 basic colors are available by default. You can assign a frequently used color not included in the basic color to the User Color for your convenience. You can select different colors from the color table provided in the right side of the [Color] window. To select a specific color: move the [Cross] icon in the color table; move the arrow icon of the brightness bar on the right; or input the values for [Hue/Saturation/Brightness] and [Red/Green/Blue] of the specific color of your interest.



[Figure. More Colors...]

The configured color is previewed in the [Color/Solid] box. Click [OK] to select the color.

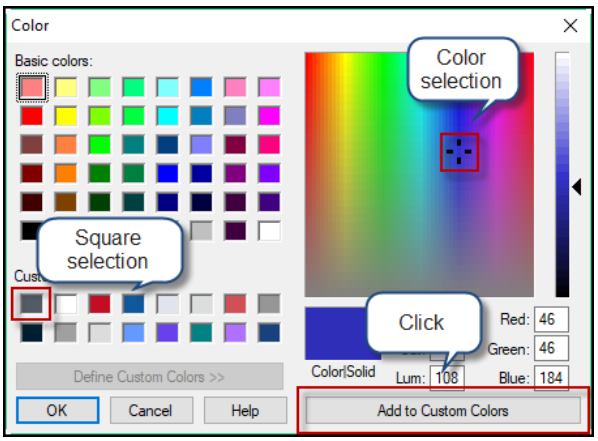
[Figure. Configured Color]

7.2.2 How to edit [User Color] palette

Follow the below steps to edit the User Color palette.

First, select among the 16 boxes provided in the [Custom Color] field.

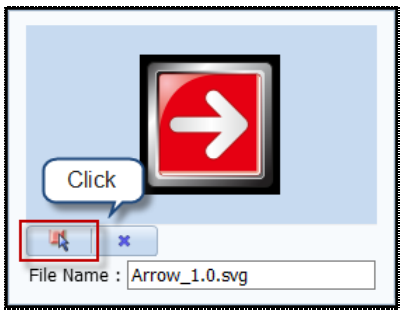
Next, configure the color of your interest from the color table provided on the right side. Last, click [Add to Custom Colors] to add the configured color to the selected box in the Custom Color field.



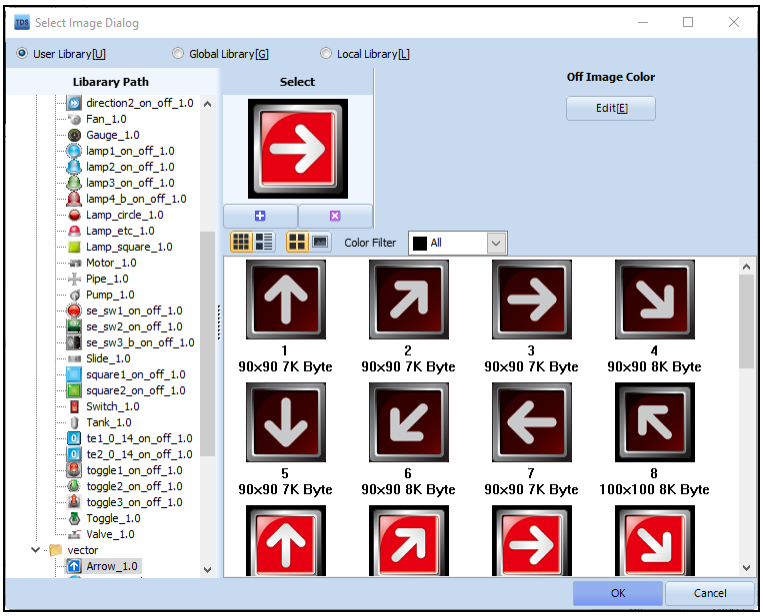
[Figure. Add to Custom Colors]

7.3 Select Image Dialog

From an object property, click the Image Select Icon to open the [Select Image Dialog].



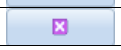
[Figure. Select Image Icon]

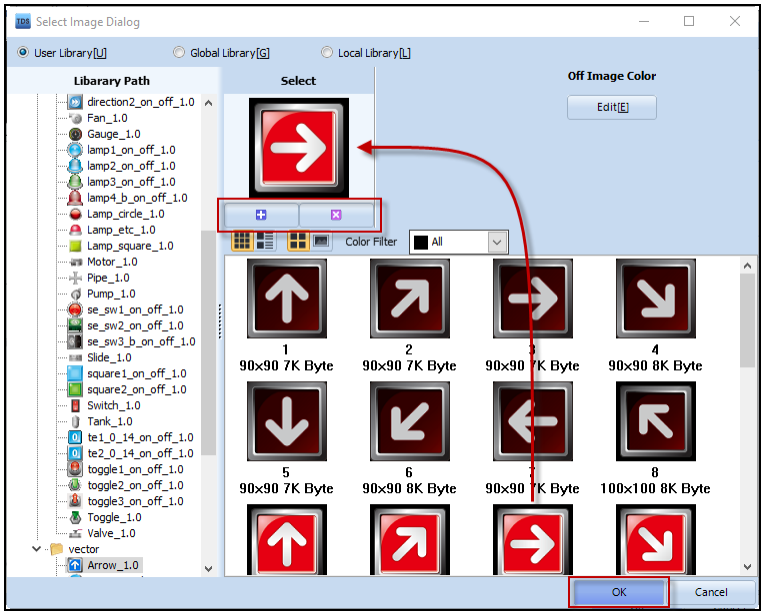


[Figure. Select Image Dialog]

7.3.1 How to select an image

You can select an image among: the User Library provided by TDS, images registered to the Global Library; and a local image from a directory within your PC.
Select the corresponding group from the [Library Path] on the left, and select the image thumbnail of your interest from the right side. Drag & drop the selected image to the [Select] box, or click the [+] button to select the image.

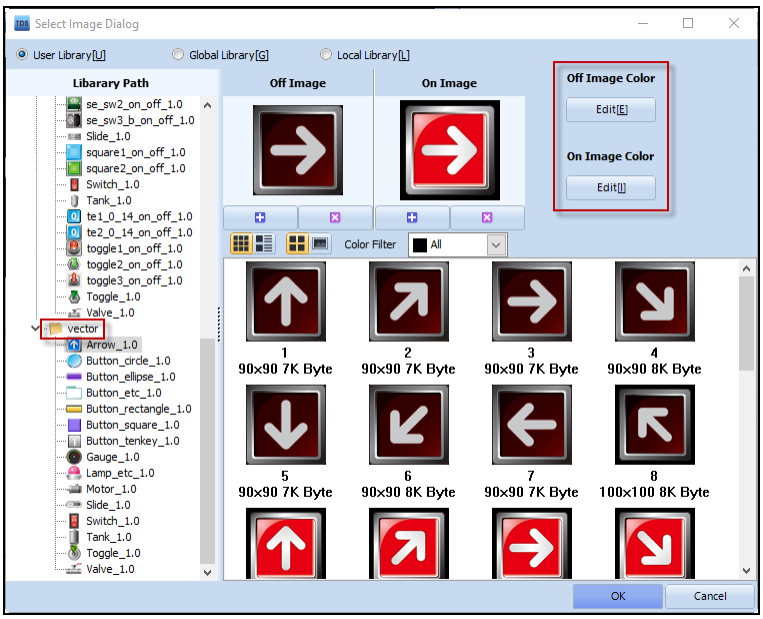
No.	Button	Description
1		Confirm the image selected from the list.
2		Remove the image.



[Figure. Select Image]

7.3.2 User Library

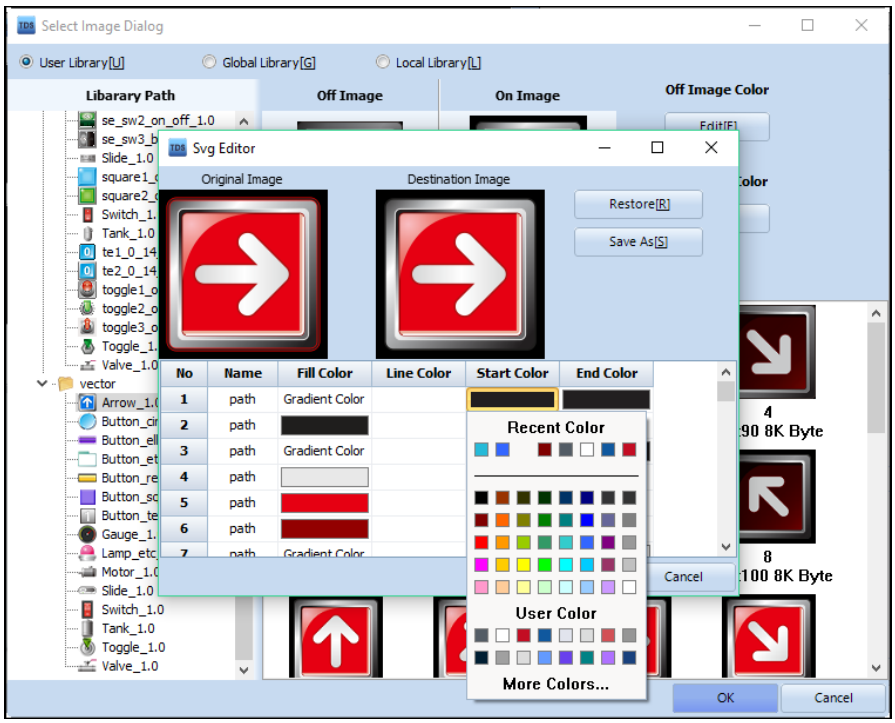
User Library is the consolidated images provided by TDS as default. This library is saved in the TDS installation path of [C:₩Program Files (x86)₩M2I Corp₩TOP Design Studio₩Library].
Groups of images are provided in the [Library Path], and if you select a specific group, the thumbnails of images within the group will appear in the list.
There are two types of images, [raster] and [vector] in the User Library.
Raster images are images in forms of BMP, PNG, JPG. These images has the best resolution when added with its original size, and enlarging or shrinking a raster image may deteriorate its resolution.
Vector images are images in forms of SVG.



[Figure. Vector image]

The resolution of vector images do not deteriorate upon enlarging or shrinking. Moreover, you can configure the color of a vector image. Select a vector and click [Edit] to edit the image.
Change the color of each aspect of the vector image from the [Svg Editor].

[Figure. SVG Image Edit]



[Figure. SVG Editor]

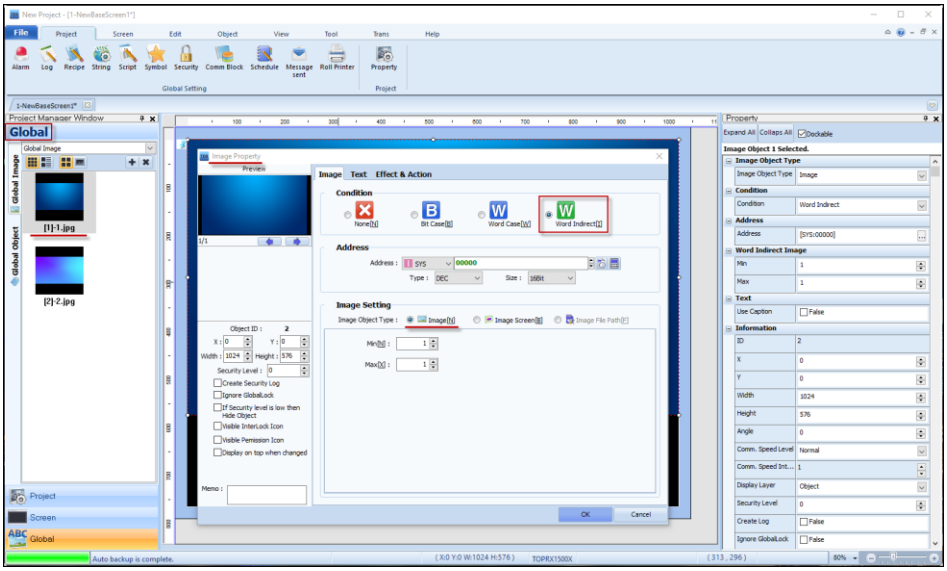
Select a color from the list, the area subject to the color is highlighted with a red outline in the [Original Image]. Configure each of [Fill Color] / [Line Color] / [Start Color] / [End Color]. Click the cell of each column and select the color of your interest from the color palette. If the [Destination Image] does not satisfy your interest, click [Restore] to restore the original image.

7.3.3 Global Library

Global Library contains images that you have added upon your needs.

(1) How to use images from Global Library

You can drag and drop a [Global Image] from the [Resource] tab of [Project Manager] docking window to the Edit Screen.
You can also use a global image from the image object as shown below.

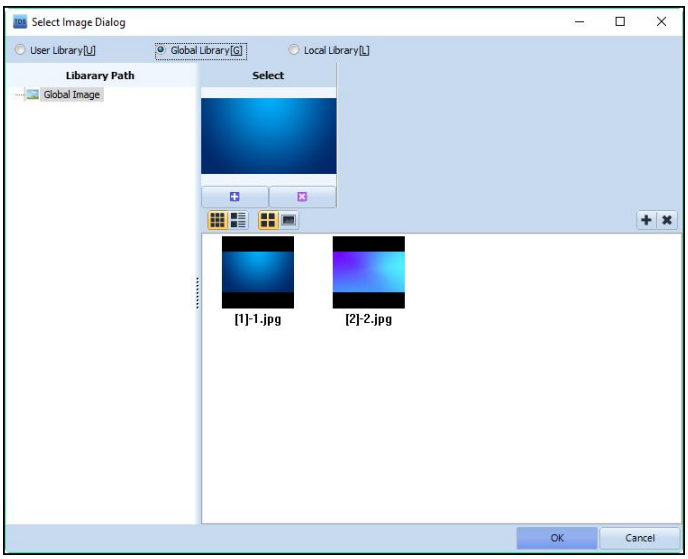


[Figure. How to use a global image]

As shown above, add an image object and open its property. Select [Word Indirect] as the [Condition], and configure the [Min] ID and [Max] ID of the global image. If the assigned address is the same with the Global Image ID, the global image will appear on the screen. You can display multiple global images that alters according to the address value.

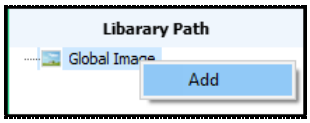
(2) How to add a global image

You can add BMP, PNG, JPG files to the Global Library. Each global images will be numbered in an ascending order.
To register a global image: go to [Resource] of [Project Manager] docking window; go to [Tool] - [Image Library]; or register a global image from the Select Image Dialog.



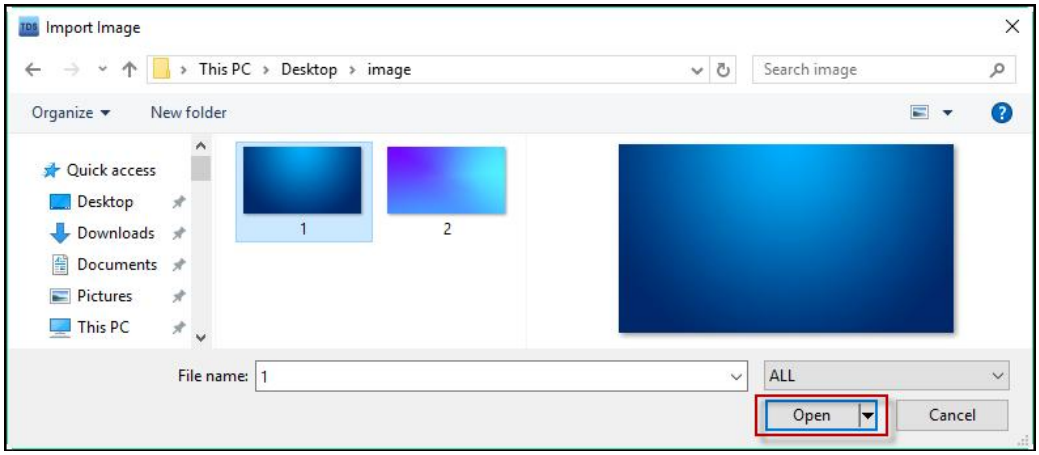
[Figure. Global Image]

Click [+] button on the Select Image Dialog or click [Add] from the pop-up menu of a right click to [Global Image] shown in the [Library Path] to open the [Import Image] browser.



[Figure. Adding a Global Image]

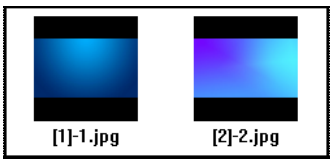
Select an image and click [Open] to register the image as a Global Image.



[Figure. Import Global Image]

No.	Button	Description
1	+	Add a global image.
2	✖	Remove a global image.

Each global image has a numeric prefix assigned in an ascending order. This ID number can be used as a [Solution Item Number] at [Alarm] - [Take Action], or for [Word indirect] of an image object.

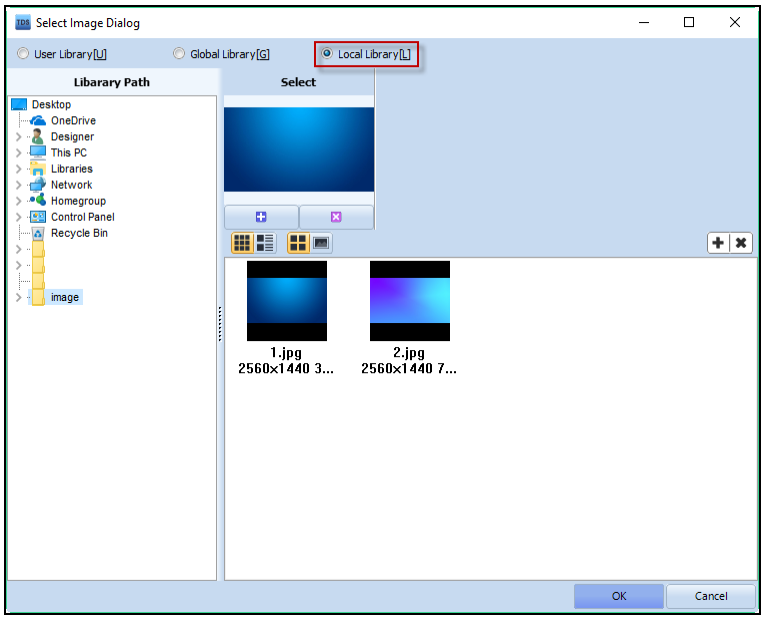


[Figure. Registered Global Images]

Select the global image you will use and click [OK] to add the global image to the application.

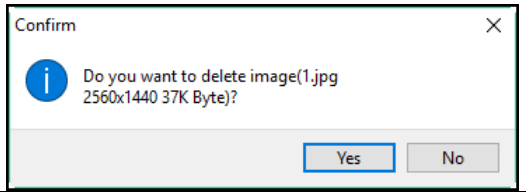
7.3.4 Local Library

Select Local Library to use an image saved on your local PC. You can add an image from your local PC without moving the image to [User Library].
Image files in forms of BMP, PNG, JPG files can be used.



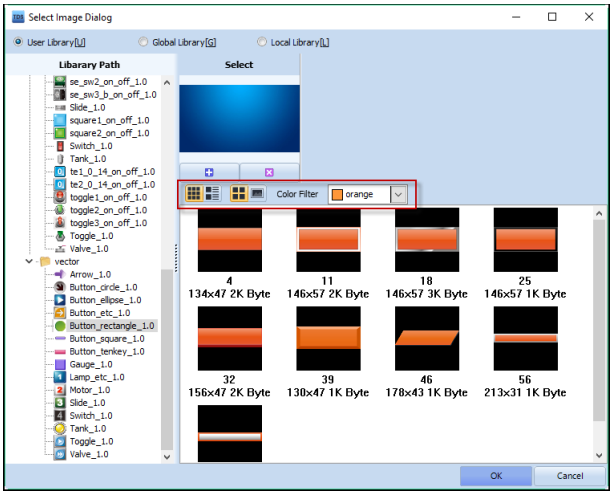
[Figure. Local Library]

The Library Path will show the path of your computer as if shown in a window explorer. Select the path and image of your interest and click [OK]

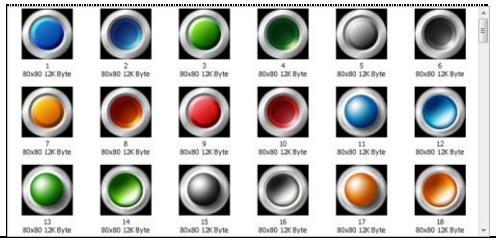
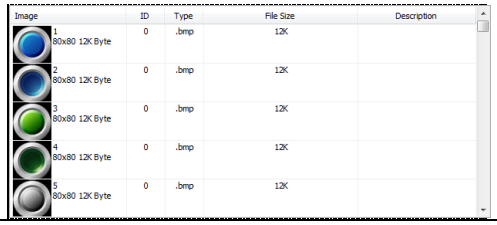
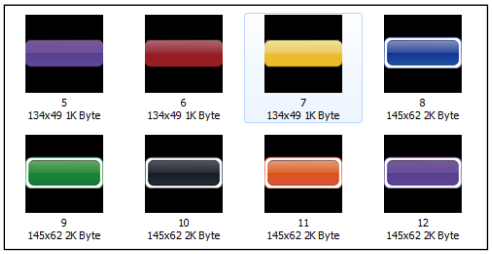
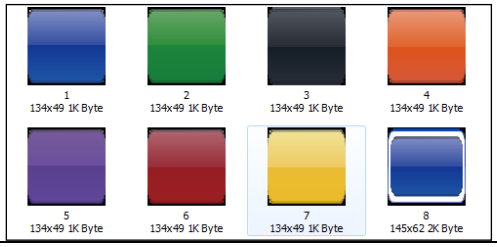
No.	Button	Description
1	+	Add an image from a path of your local PC.
2	✖	Delete a selected image. Prior to deleting the file, the below confirm message will appear. 

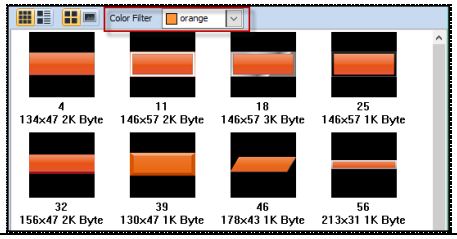
7.3.5 **Image List**

Change the image list type for your convenience.



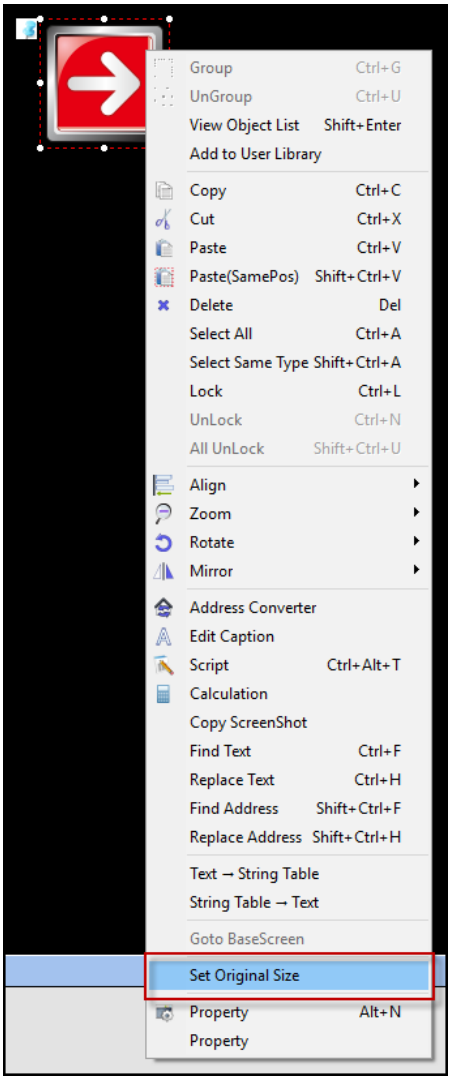
[Figure. Image List Type]

No.	View Type	Description
1		Images are listed in thumbnails. 
2		Image list provides detail information. 
3		Image list shows thumbnails with identical width to height ratio. 
4		Image list shows thumbnails spanned to a square. 

5	Color Filter	This function is available only from User Library. Select a color from the drop-down menu. Images with corresponding colors will be shown on the list. For instance, if you select Yellow from the color filter, only colors close to yellow will be shown on the list. 

7.3.6 Set Original Size

Every image is shown with the highest resolution when added at its original size.
Select an image from the Edit Screen and click [Set Original Size] from the pop-up menu upon a right click to restore the image to its original size.



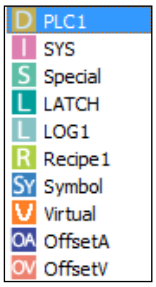
[Figure. Set Original Size]

7.4 Address

How to configure an address for a drawing project.

7.4.1 Address Type

The types of an address are [PLC] / [System] / [Special] / [LATCH] / [LOG] / [Recipe] / [Symbol] / [Virtual] / [Offset].



[Figure. Address Type]

Refer to the description of each address type.

No.	Address	Description
1	PLC Address	[D] is the abbreviation for Device. The Address of the PLC connected with the TOP device.
2	SYS Address	[I] is the abbreviation for Internal Address. The internal address of the TOP device, system buffer. System address consists of 16bit/Word addresses, between the range of [0] to [10239]. If LATCH is not enabled at [Control Panel] - [Project Setting] - [4. Latch Set], all data will be reset when the power of the TOP device is reset.
3	Special Address	[S] is the abbreviation for Special Address. The special TOP device internal address. The list of addresses assigned to names for special purposes. Special addresses consist of bit special addresses and word special addresses.
4	LATCH Address	[L] is the abbreviation for LATCH Address. The TOP internal latch addresses separately provided. LATCH addresses consist of 16bit/word addresses between the range of [0] to [128]. Data stored in Latch Addresses remain upon power reset of the TOP device.
5	LOG Address	LOG Address is available when [Project] - [Log] is configured. A log address represents a single log data. You can display the log data on a screen by assigning a block number and column number.
6	Recipe Address	Recipe Address is available when [Project] - [Recipe] is configured. A Recipe address can represent one recipe data. You can display the recipe data on a screen by assigning a recipe item number and parameter number.
7	Symbol Address	[SY] is the abbreviation for Symbol Address. The list of addresses assigned as a symbol address. Symbol addresses are available when symbol address list is created from the [Symbol Manager] at [Project] - [Symbol].
8	Virtual Address	A virtual address that you can use as a variable. Virtual addresses are volatile addresses that are deleted upon power reset of the TOP device.
9	Offset A	[OA] is the abbreviation for Offset Address.

	Address	The [Real Address] changes upon the [Value of Offset Address], where the real address is the sum of the address and the value of the offset address.
10	Offset V Address	[OV] is the abbreviation for Offset Value. The [Value of Real Address] changes upon the [Value of Offset Address], where the value of the real address is the sum of the value of the address and the value of the offset address.

7.4.2 PLC Address

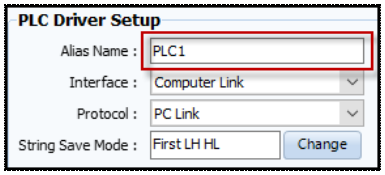
The address of the PLC communication with the TOP device. The number of PLC address lists are equal to the number of PLCs connected to the TOP device.

(1) PLC Name

You can connect multiple PLCs to a single TOP device. In general, if multiple PLCs are connected to a single TOP device, the PLC address lists are numbered in an ascending order from [PLC1], [PLC2], [PLC3], as shown below.

[Figure. PLC Name]

You can change the PLC name by going to [Project] - [Project Option] and select each PLC and change the [Alias Name] from the [PLC Driver Setup].



[Figure. PLC Name]

(2) Features of PLC Addresses

A PLC address consists of a PLC device name (identifier), followed by a series of numbers.
Each address entry has to correspond with the specific PLC address format.

For instance, MELSEC FX Series (manufactured by MELSEC FX Series) employs the following format.

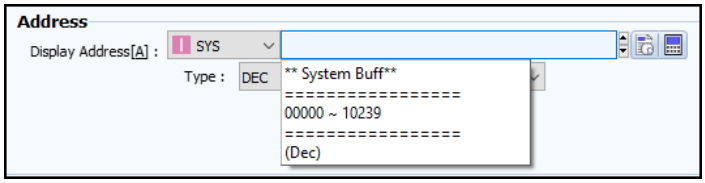
Type	Remark	Bit Address	Word Address
Input	Bit	X0000 – X0377	X0000 – X0360
Output	Bit	Y0000 – Y0377	Y0000 – Y0360
STEP Relay	Bit	S0000 – S8191	S0000 – S8176
Internal Relay	Bit	M0000 – M7679	M0000 – M7664
Special Relay	Bit	M8000 – M8511	M8000 – M8496

Data Register	Word	D0000.00 – D0999.15	D0000 – D0999
		D1000.00 – D7999.15	D1000 – D7999
Special Register	Word	D8000.00 – D8511.15	D8000 – D8511
Timer-Contact	Bit	T000 – T511	————
Timer-Current Value	Word	————	TN000 – TN511
Counter-Contact	Bit	C000 – C255	————
Counter-Current Value	Word	————	CN000 – CN199
Counter-Current Value	DWord	————	CN200 – CN255

For more details on addresses for individual PLCs, refer to [Communication Manual] provided for each PLC type.
Go to [Project] - [Property] and select the subject PLC name, you can find the [Communication Manual] on the right side of the window.
When you enter an address from TDS, TDS displays the range of available addresses, and provides error messages for invalid addresses to prevent entry of any invalid address.

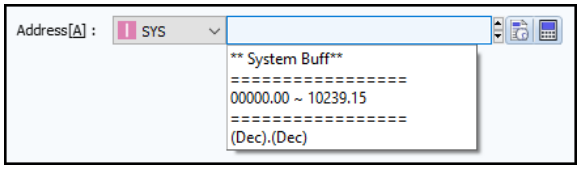
7.4.3 System Address (Internal Address)

A SYS Address refers to a TOP internal special address. TOP device provides a range of internal addresses. All internal address are [16bit] addresses, thus are in word units. Furthermore, they do not have a separate identifier.
The address range is from [00000] to [10239].



[Figure. An Internal address as a word address]

Since the unit of an internal address is a word, you can simply input the address itself.
For bit addresses, you have to input the following bit address.
For instance, to use the [6th bit] of address [10], input [10.05].



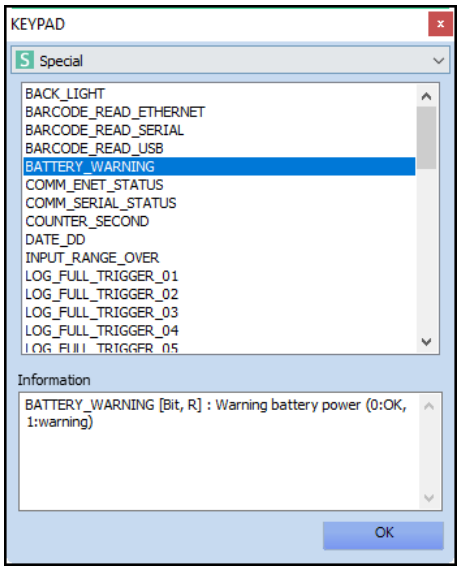
[Figure. An internal address used as a bit address]

7.4.4 Special Address

A Special Address refers to a TOP device internal special address. Special addresses are assigned to specific names to perform special functions.
Different special address lists are provided for objects employing a [Bit Address] and [Word Address]. Objects employing a bit address include Bit Lamps, Buttons, Switches, and Bit Messages. Objects

employing word addresses include Word Lamps, Strings, Numbers, and Word Messages.
If you select [Special Address] from the [Address Keypad], detail explanation on each type of special address is available from [Information].

(1) BIT Special Address



[Figure. BIT Special Address]

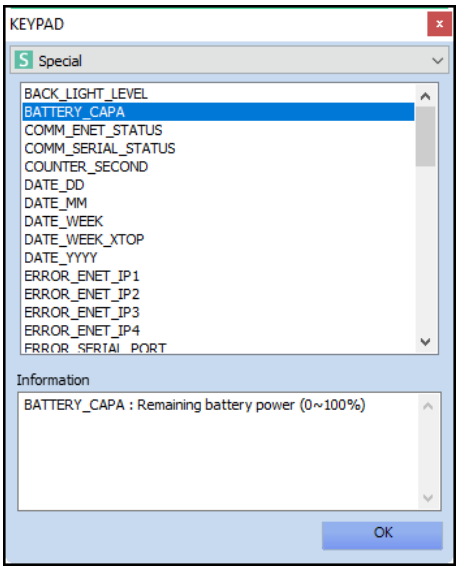
Refer to the below table for descriptions of each Bit Special Address.

No.	BIT Special Address	Read	Write	Description
1	BACK_LIGHT	O	O	Backlight will be on if the value is [1], and off if the value is not [1]. When a user touches screen when the back light is off, the back light will turn on, and the value will be changed to [1].
2	BARCODE_READ_ETHERNET	O	O	The value will change to [1] upon a successful read of the ethernet barcode reader. (The value does not automatically reset to [0].)
3	BARCODE_READ_SERIAL	O	O	The value will change to [1] upon a successful read of the serial barcode reader. (The value does not automatically reset to [0].)
4	BARCODE_READ_USB	O	O	The value will change to [1] upon a successful read of the USB barcode reader. (The value does not automatically reset to [0].)
5	BATTERY_WARNING	O	X	A warning is provided upon a low battery status. (0: Normal, 1: Warning)
6	COMM_ENET_STATUS	O	X	The status of ethernet communication is shown. (0: Normal, 1: Timeout Error) A timeout error will be triggered when the PLC connected with the TOP device via ethernet is not properly communicating.
7	COMM_SERIAL_STATUS	O	X	The status of serial communication is shown. (0: Normal, 1: Timeout Error) A timeout error will be triggered when the PLC connected with the TOP device via serial communication is properly communicating.

8	COUNTER_SECOND	O	X	The value alters between ON [1] an OFF [0] every second, throughout operation.
9	DATE_DD	O	X	The [Date] data for the Real Time Clock (RTC) of the TOP device. (Range: 1 ~ 31: [1] for the 1st day of a given month, [2] for the 2nd day of a given month, so on and so forth)
10	INPUT_RANGE_OVER	O	X	The value will change to [1] if an input from keypad exceeds the allowed input range. (The value will change to [0], when input is initiated.)
11	LOG_FULL_TRIGGER_1	O	X	The value will change to [Full] [1] if the data for [LOG1] has met its [LOG Count] and the designated memory is full.
12	LOG_FULL_TRIGGER_10	O	X	The value will change to [Full] [1] if the data for [LOG10] has met its [LOG Count] and the designated memory is full.
13	LOG_FULL_TRIGGER_11	O	X	The value will change to [Full] [1] if the data for [LOG11] has met its [LOG Count] and the designated memory is full.
14	LOG_FULL_TRIGGER_12	O	X	The value will change to [Full] [1] if the data for [LOG12] has met its [LOG Count] and the designated memory is full.
15	LOG_FULL_TRIGGER_13	O	X	The value will change to [Full] [1] if the data for [LOG13] has met its [LOG Count] and the designated memory is full.
16	LOG_FULL_TRIGGER_14	O	X	The value will change to [Full] [1] if the data for [LOG14] has met its [LOG Count] and the designated memory is full.
17	LOG_FULL_TRIGGER_15	O	X	The value will change to [Full] [1] if the data for [LOG15] has met its [LOG Count] and the designated memory is full.
18	LOG_FULL_TRIGGER_16	O	X	The value will change to [Full] [1] if the data for [LOG16] has met its [LOG Count] and the designated memory is full.
19	LOG_FULL_TRIGGER_2	O	X	The value will change to [Full] [1] if the data for [LOG2] has met its [LOG Count] and the designated memory is full.
20	LOG_FULL_TRIGGER_3	O	X	The value will change to [Full] [1] if the data for [LOG3] has met its [LOG Count] and the designated memory is full.
21	LOG_FULL_TRIGGER_4	O	X	The value will change to [Full] [1] if the data for [LOG4] has met its [LOG Count] and the designated memory is full.
22	LOG_FULL_TRIGGER_5	O	X	The value will change to [Full] [1] if the data for [LOG5] has met its [LOG Count] and the designated memory is full.
23	LOG_FULL_TRIGGER_6	O	X	The value will change to [Full] [1] if the data for [LOG6] has met its [LOG Count] and the designated memory is full.
24	LOG_FULL_TRIGGER_7	O	X	The value will change to [Full] [1] if the data for [LOG7] has met its [LOG Count] and the designated memory is full.
25	LOG_FULL_TRIGGER_8	O	X	The value will change to [Full] [1] if the data for [LOG8] has met its [LOG Count] and the designated memory is full.
26	LOG_FULL_TRIGGER_9	O	X	The value will change to [Full] [1] if the data for [LOG9] has met its [LOG Count] and the designated memory is full.
27	LOG_ON_TRIGGER_1	O	X	The value will change to [1] whenever [LOG1] is created. (The value does not automatically reset to [0].)
28	LOG_ON_TRIGGER_10	O	X	The value will change to [1] whenever [LOG10] is created. (The value does not automatically reset to [0].)
29	LOG_ON_TRIGGER_11	O	X	The value will change to [1] whenever [LOG11] is created. (The value does not automatically reset to [0].)
30	LOG_ON_TRIGGER_12	O	X	The value will change to [1] whenever [LOG12] is created. (The value does not automatically reset to [0].)
31	LOG_ON_TRIGGER_13	O	X	The value will change to [1] whenever [LOG13] is created. (The value does not automatically reset to [0].)

32	LOG_ON_TRIGGER_14	O	X	The value will change to [1] whenever [LOG14] is created. (The value does not automatically reset to [0].)
33	LOG_ON_TRIGGER_15	O	X	The value will change to [1] whenever [LOG15] is created. (The value does not automatically reset to [0].)
34	LOG_ON_TRIGGER_16	O	X	The value will change to [1] whenever [LOG16] is created. (The value does not automatically reset to [0].)
35	LOG_ON_TRIGGER_2	O	X	The value will change to [1] whenever [LOG2] is created. (The value does not automatically reset to [0].)
36	LOG_ON_TRIGGER_3	O	X	The value will change to [1] whenever [LOG3] is created. (The value does not automatically reset to [0].)
37	LOG_ON_TRIGGER_4	O	X	The value will change to [1] whenever [LOG4] is created. (The value does not automatically reset to [0].)
38	LOG_ON_TRIGGER_5	O	X	The value will change to [1] whenever [LOG5] is created. (The value does not automatically reset to [0].)
39	LOG_ON_TRIGGER_6	O	X	The value will change to [1] whenever [LOG6] is created. (The value does not automatically reset to [0].)
40	LOG_ON_TRIGGER_7	O	X	The value will change to [1] whenever [LOG7] is created. (The value does not automatically reset to [0].)
41	LOG_ON_TRIGGER_8	O	X	The value will change to [1] whenever [LOG8] is created. (The value does not automatically reset to [0].)
42	LOG_ON_TRIGGER_9	O	X	The value will change to [1] whenever [LOG9] is created. (The value does not automatically reset to [0].)
43	PROJECT_1SCAN (_1ON_RUN)	O	X	The Run Screen will open, and only the first scan will change to [1]. (The value automatically resets to [0] after first scan.)
44	REMOTE_CONTROL_BLOCK	O	O	Enter [1] to disconnect remote control via VNC.
45	SCREEN_1SCAN(_1ON)	O	X	The value at first scan will change to [1] when the Run Screen starts, or the screen is changed during a run. (The value automatically resets to [0] after first scan.)
46	SCREEN_CHANGE	O	X	The value at first scan will change to [1] when a screen change is completed. (The value automatically resets to [0] after first scan.)
47	SD_INSERT	O	X	The value will change to [1] if an SD Card is connected to the TOP device. The value will change to [0] if an SD Card is disconnected from the TOP device.
48	SECURITY_LOGIN_STATUS	O	X	The status of security login is shown. (0: Logout, 1: Login)
49	USB_INSERT	O	X	The value will change to [1] if a USB memory is connected to the TOP device. The value will change to [0] if a USB memory is disconnected from the TOP device.

(2) Word Special Address



[Figure. Word Special Address]

Refer to the below table for detail descriptions of each Word Special Address.

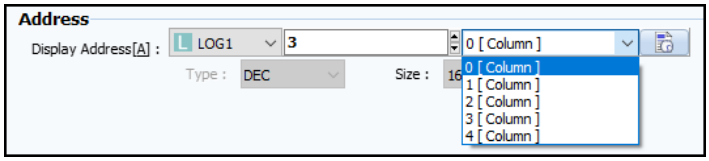
No.	Word Special Address	Read	Write	Description
1	BACK_LIGHT_LEVEL	O	O	The LCD brightness level is shown. (Range: 0 ~ 10, [0]: darkest, [10]: brightest)
2	BATTERY_CAPA	O	X	The remaining battery capacity is shown (Range: 0 ~ 100%)
3	COUNTER_SECOND	O	X	The value increases with an increment of 1 upon every second during running.
4	DATE_DD	O	O	The [Date] data for the Real Time Clock (RTC) of the TOP device. (Range: 1 ~ 31: [1] or the 1st day of a given month, [2] for the second day of a given month, so on and so forth)
5	DATE_MM	O	O	The month data of the Real Time Clock (RTC) of the TOP device. (Range: 1 ~ 12: [1] for January, [2] for February, so on and so forth)
6	DATE_WEEK	O	X	The day of a week of the TOP device. ([1] for Sunday, [2] for Monday, [3] for Tuesday, [4] for Wednesday, [5] for Thursday, [6] for Friday, [7] for Saturday)
7	DATE_WEEK_XTOP	O	X	The day of a week is saved as the same value with XTOP. ([1] for Sunday, [2] for Monday, [3] for Tuesday, [4] for Wednesday, [5] for Thursday, [6] for Friday, [7] for Saturday)
8	DATE_YYYY	O	O	The year data of the Real Time Clock (RTC) of the TOP device. (Range: 1999 ~ 2098)
9	DISPLAY_BUFFER	O	X	The key value, when a user makes input from a Key.
10	ERROR_ENET_IP1	O	X	When an ethernet communication error occurs (when Special Address [COMM_ENET_STATUS] is [1]), the first number among the four numbers for the IP address that such error occurred, will be recorded in this address.
11	ERROR_ENET_IP2	O	X	When an ethernet communication error occurs (when Special Address [COMM_ENET_STATUS] is [1]), the second number among the four numbers for the IP address that such error occurred, will be recorded in this address.
12	ERROR_ENET_IP3	O	X	When an ethernet communication error occurs (when Special Address [COMM_ENET_STATUS] is [1]), the third number among the four numbers for the IP address that such error occurred, will be recorded in this address.
13	ERROR_ENET_IP4	O	X	When an ethernet communication error occurs (when Special Address

				[COMM_ENET_STATUS] is [1]), the fourth number among the four numbers for the IP address that such error occurred, will be recorded in this address.
14	ERROR_SERIAL_PORT	O	X	The number of the serial port that most recently encountered a communication error. (0: NONE, 1: COM1, 2: COM2, 3: COM3)
15	HMI_ID	O		The HMI ID is shown.
16	INPUT_MAX_VALUE	O	X	The maximum allowable number for a numeric input is shown.
17	INPUT_MIN_VALUE	O	X	The minimum allowable number for a numeric input is shown.
18	INPUT_X_POS	O	X	The X coordinate of a touch input to the TOP device. [0] refers to the left end of the TOP screen.
19	INPUT_Y_POS	O	X	The Y coordinate of a touch input to the TOP device. [0] refers to the top end of the TOP screen.
20	LAST_ALARM_DATA	O	X	The Alarm ID of the most recent alarm triggered from an Alarm Block. This address consists of 9 digits. (32Bit, UDEC). [00 (2 figures): Block, 00 (2 figures): Group, 00000 (5 figures): Alarm ID]
21	LAST_INPUT_TIME	O	X	The time elapsed (in seconds) since the last touch input.
22	LOG_COUNT_1	O	X	The current count of logs written in [LOG1] is shown.
23	LOG_COUNT_10	O	X	The current count of logs written in [LOG10] is shown.
24	LOG_COUNT_11	O	X	The current count of logs written in [LOG11] is shown.
25	LOG_COUNT_12	O	X	The current count of logs written in [LOG12] is shown.
26	LOG_COUNT_13	O	X	The current count of logs written in [LOG13] is shown.
27	LOG_COUNT_14	O	X	The current count of logs written in [LOG14] is shown.
28	LOG_COUNT_15	O	X	The current count of logs written in [LOG15] is shown.
29	LOG_COUNT_16	O	X	The current count of logs written in [LOG16] is shown.
30	LOG_COUNT_2	O	X	The current count of logs written in [LOG2] is shown.
31	LOG_COUNT_3	O	X	The current count of logs written in [LOG3] is shown.
32	LOG_COUNT_4	O	X	The current count of logs written in [LOG4] is shown.
33	LOG_COUNT_5	O	X	The current count of logs written in [LOG6] is shown.
34	LOG_COUNT_6	O	X	The current count of logs written in [LOG6] is shown.
35	LOG_COUNT_7	O	X	The current count of logs written in [LOG7] is shown.
36	LOG_COUNT_8	O	X	The current count of logs written in [LOG8] is shown.
37	LOG_COUNT_9	O	X	The current count of logs written in [LOG9] is shown.
38	MULTI_LANGUAGE	O	O	Change the language configured for the multi-language string table. ([0]: the language of the 1st table, [1]: the language of the 2nd table, so on and so forth)
39	SCREEN_NUMBER	O	O	The current screen number is saved to the address. Furthermore, enter a number of a screen to change the display to the corresponding screen. ([2]: show screen No.2. [7]: show screen No.7)
40	SCREEN_NUMBER_HDMI1	O	O	The current HDMI1 screen number is saved to the address. Enter a number of a screen to change the display to the corresponding screen. ([2]: show screen No.2. [7]: show screen No.7)
41	SCREEN_NUMBER_HDMI2	O	O	The current HDMI2 screen number is saved to the address. Enter a number of a screen to change the display to the corresponding screen. ([2]: show screen No.2. [7]: show screen No.7)
42	SCREEN_NUMBER_HDMI3	O	O	The current HDMI3 screen number is saved to the address. Enter a number of a screen to change the display to the corresponding screen. ([2]: show screen No.2. [7]: show screen No.7)
43	SCREEN_NUMBER_HDMI4	O	O	The current HDMI4 screen number is saved to the address. Enter a number of a screen to change the display to the corresponding screen. ([2]: show screen

				No.2. [7]: show screen No.7)
44	SCREEN_SAVE_TIME	O	O	Show and change the current screen saver running time. (Unit: [Minute]) The value configured at [Control Panel] - [Display] - [1. Screen Saver] of the Menu Screen on TOP device is shown, and you can change the value with an input. Screen Saver is the function to turn off the backlight of a TOP device if a predetermined amount of time have passed since the last input, and the backlight will turn back on upon a touch to the screen.
45	SCREEN_STYLE	O	O	Show and change the screen style number of the current screen. (Range: 1 ~ 32; [1]: Style No.1, [2]: Style No.2, so on and so forth)
46	SECURITY_LOGIN_LEVEL	O	X	The security level of the current user is shown.
47	TIME_HH	O	O	The Hour data of the Real Time Clock (RTC) of the TOP device. [Data Type: DEC, Range: 0 ~ 23)
48	TIME_MM	O	O	The Minute data of the Real Time Clock (RTC) of the TOP device. (Data Type: DEC, Range: 0 ~ 59)
49	TIME_SS	O	O	The Second data of the Real Time Clock (RTC) of the TOP device. (Data Type: DEC, Range: 0 ~ 59)
50	WIFI_SENSITIVITY_DBM	O	X	The WIFI DBM value.
51	WIFI_SENSITIVITY_STATUS	O	X	The WIFI wireless reception intensity. (Range: 0 ~ 100%)

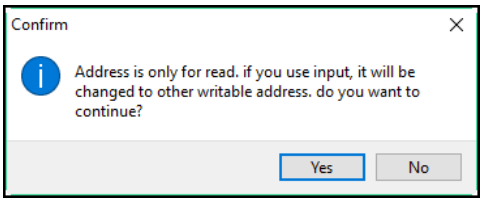
7.4.5 LOG Address

A log address represents a single log data.
LOG Address is available when [Project] - [Log] is configured. You can configure up to 16 log addresses from LOG1 to LOG16. If LOG1 is configured, [LOG1] is available from the address list.
Select the [Block Number] and [Column Number] to display the corresponding log data.



[Figure. LOG Address]

LOG data is a read only address. Therefore, no input is allowed, and if a user attempts to assign a LOG address as an input, the below error message will appear and a [Project Build] error is triggered.



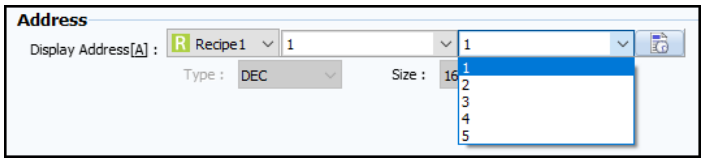
[Figure. Error Message]

7.4.6 Recipe Address

A Recipe Address represents a single recipe data.

Recipe Address is available when [Project] - [Recipe] is configured. You can configure up to 32 recipe addresses with IDs of 1 to 32. If Recipe1 is configured, [Recipe1] is available from the address list.

Select the [Item Number] and [Parameter Number] to display and change the corresponding recipe data.



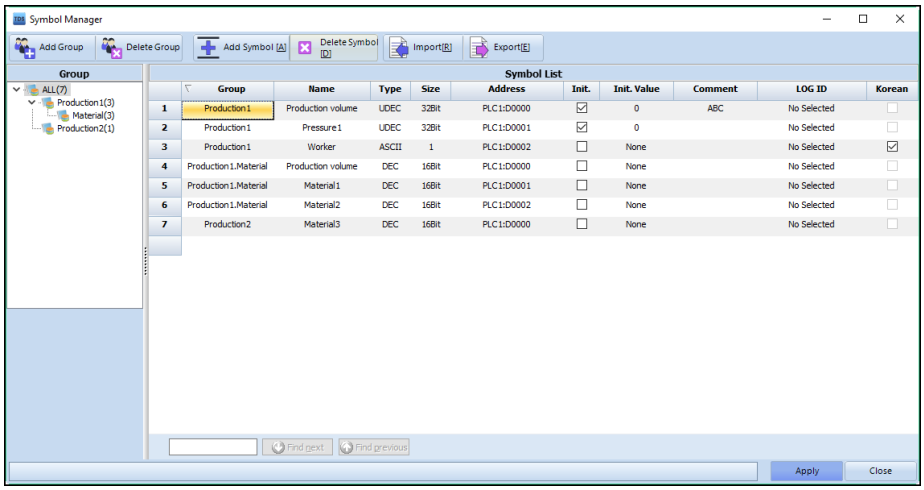
[Figure. Recipe Address]

7.4.7 Symbol Address

Symbol address allows a user to substitute the address with an alias.

(1) Create Symbol List from Symbol Manager

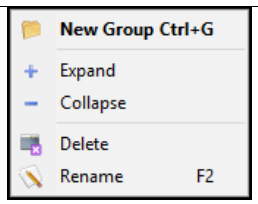
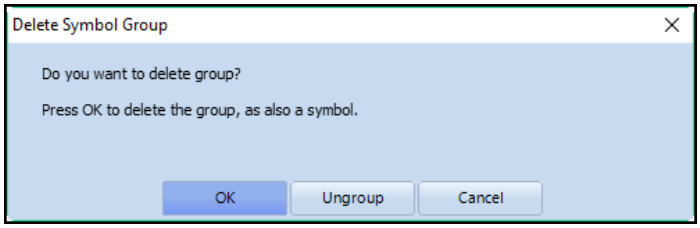
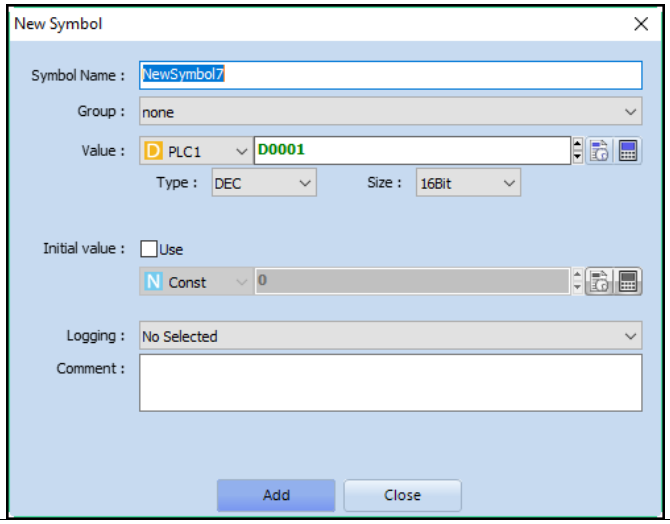
Go to [Project] - [Symbol] and create a symbol list from the [Symbol Manager].

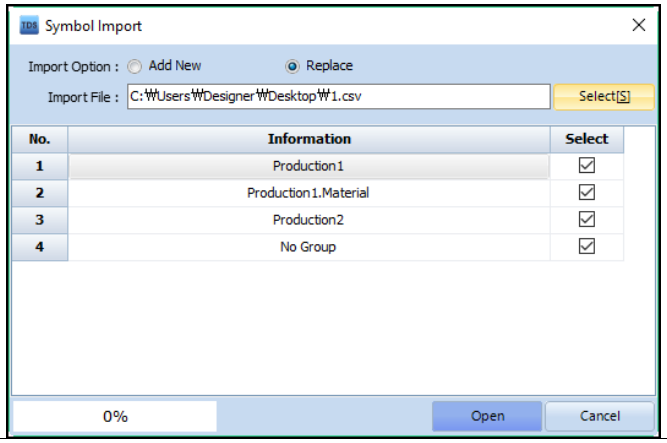
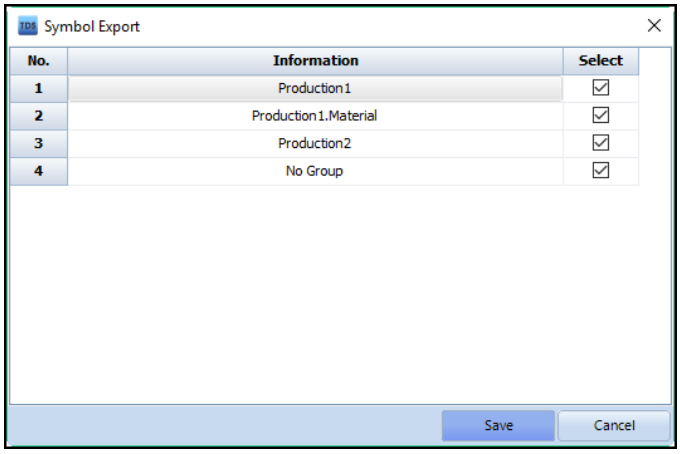
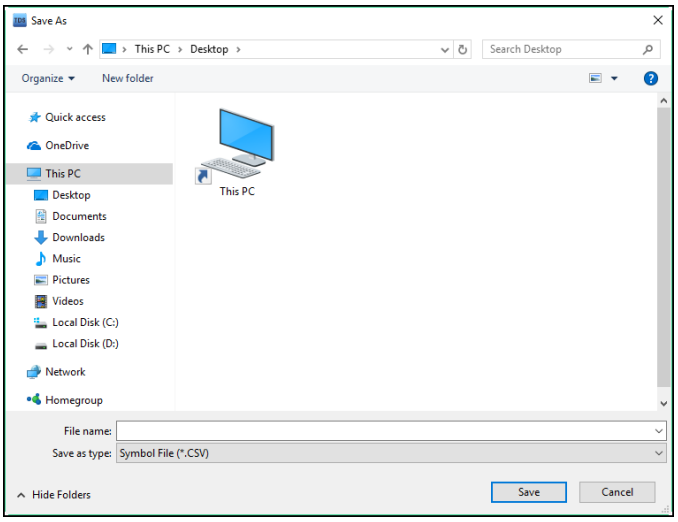


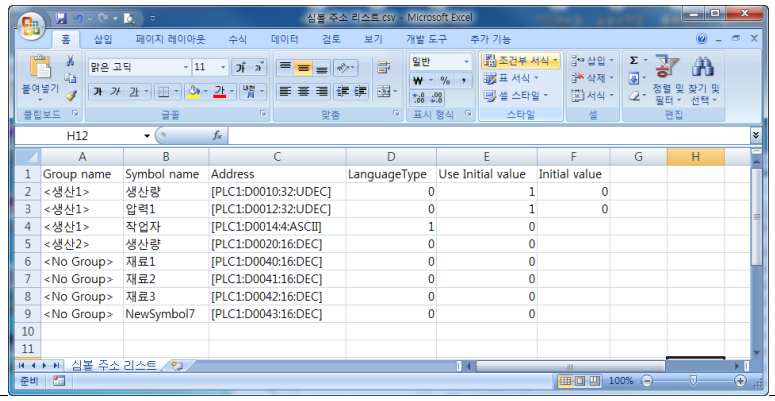
[Figure. Symbol Manager]

The menu bar of [Symbol Manager] features the following functions.

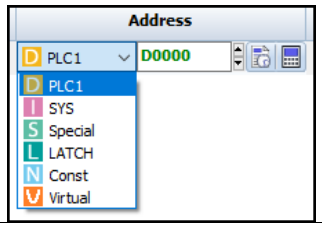
No.	Symbol Manager	Description
1	Add Group	Add a new Group. Select [All] or a group in the [Group] window provided on the left side of Symbol Manager. Click [Add Group] and you can see a new group(or sub-group) inside the selected group. Add a group to [All] to make a new group, and add a group to a [Group] to make a [Sub-group] to the selected group. Select [All] to view all symbol lists from all groups. Select a group and right click the group name to access the below pop-up menu.

		 The [New Group] is created as a sub-group of the selected group. Click [Expand] to view all sub-groups allotted to the selected group. Click [Collapse] to hide all sub-groups allotted to the selected group. Click [Delete] to delete the selected group. Click [Rename] to rename the selected group.
2	Delete Group	Delete the selected group.  Click [Ungroup] to delete the group, yet maintain the symbols within the group under the [All] hierarchy.
3	Add Symbol [A]	Add a symbol to the Symbol List. You can add symbols without assigning a specific group. If a group is selected in the Group window on the left, a symbol will be added to that group. Click [Add Symbol] to open [New Symbol] window. Configure various settings of the symbol address and click [Add] to add the symbol to the symbol list. 
4	Delete Symbol [D]	Delete a selected symbol(s) from the symbol list.
5	Import[R]	Import an existing symbol list. To import a symbol list, there must be a file previously created [Export]. Click [Import] to open the below [Symbol Import] window. Select whether to add the imported symbols to the selected group or replace the symbols in the selected group with the imported symbols. If you select [Add New], the symbols from the import file will be added to the current symbol list. If you select [Replace], the symbols from the import file with identical addresses with

		those on the current symbol list will overwrite the existing symbols, and symbols that don not have identical symbols will be added to the list. Click [CSV] and select a symbol file in the format of [*.CSV]. Click [Open]. 
6	Export [E]	Save the current symbol list to a file. Click [Export] to open [Symbol Export] window.  Click [Save] to open the [Save As] window, select the directory and file name of the export file. Click [Save]. 

		The following message will appear once the file has been made. Click [Yes] to close the message and the [Symbol Export] window. You can edit an exported CSV file with Microsoft Excel software. You can also use an exported symbol list in other projects with the [Import] function. 

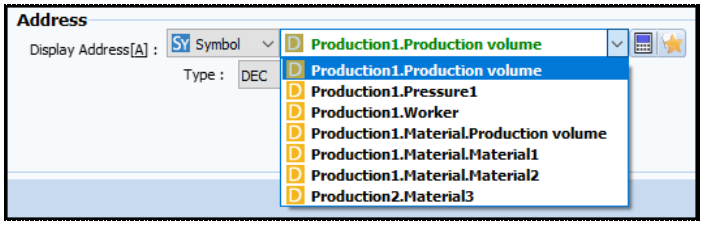
Refer the following descriptions of each item of a symbol address.

No.	Symbol Manager	Description
1	No.	The number assigned to each symbol in an ascending order.
2	Name	Enter an alias to each address. This name is used when you create the project.
3	Type	Configure the address type. Select among [DEC, UDEC, HEX, BCD, FLOAT, ASCII].
4	Size	Configure the size of the address. For types of [DEC, UDEC, HEX, BCD], select among [1Bit, 16Bit, 32Bit]. For [FLOAT] type, the size is fixed as [32Bit]. For [ASCII] type, configure the number of characters to be used. (For Korean characters, 1 character occupies [2] units.)
5	Address	Configure the physical address. 
6	Initialization	Select whether or not to use initialization. If [Initialization] is selected, the data will be initialized whenever you start the project.
7	Initialization Value	If [Initialization] is selected, configure the value the address should be reset to.
8	Description	Add informative comments to each symbol address.
9	LOG ID	[LOG ID] is available only if [Symbol] is selected as [Address Block] at [Project] - [LOG] - [LOG Address] tab. Assign a LOG ID to a symbol address that shall be employed ass the address of the LOG.

10	Korean	You can select [Korean] only if the type is [ASCII]. Select [Korea] to enable input in Korean Characters, or use the symbol as an address to display Korean characters on the screen.

(2) How to use a symbol address.

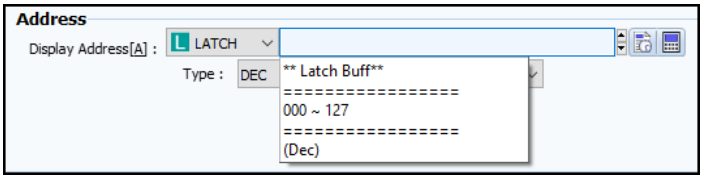
To use a symbol address, select [Symbol] as the symbol type.
The address entry text box will provide a drop-down menu of symbol address list. Select the symbol address of interest.
Click the yellow star icon provided on the right side to open the [Symbol Manager] and edit symbol addresses.



[Figure. Symbol Address]

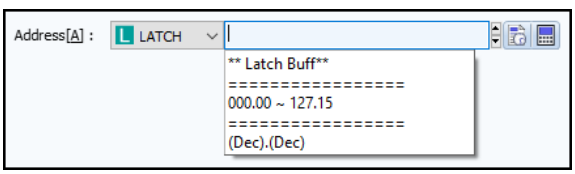
7.4.8 LATCH Address

LATCH address is a TOP device internal address of which data is not deleted upon a power reset of the TOP device.
You can assign a fraction of System Address to LATCH address from [Control Panel] - [Project Setting] - [4. Latch Set] on the TOP device, however the LATCH address described in this section is provided as an address range of which its data is not deleted upon a power reset, without separately configuring the foregoing.
A LATCH address is a [16bit] address, thus is in word units.
The address range is from [000] to [128].



[Figure. LATCH address used as a word address]

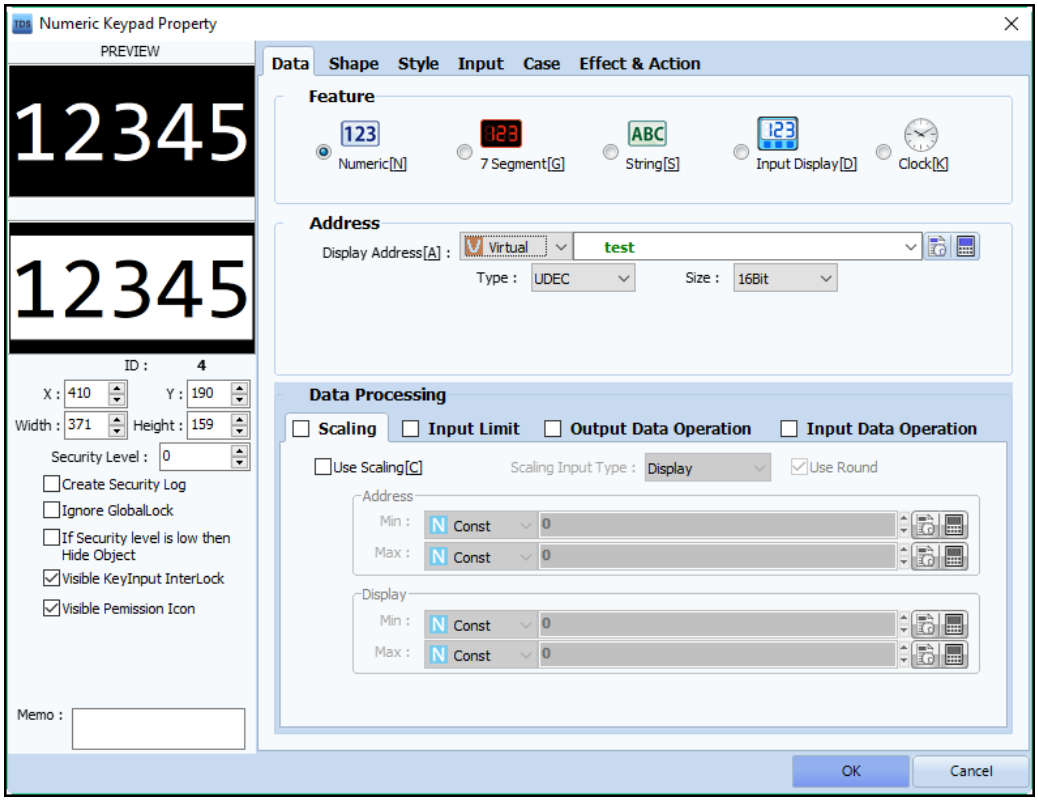
Since the unit of an LATCH address is a word, you can simply input the address itself.
For bit addresses, you have to input the following bit address.
For instance, to use the [6th bit] of LATCH address [10], input [010.05].



[Figure. A LATCH address used as a bit address]

7.4.9 Virtual Address

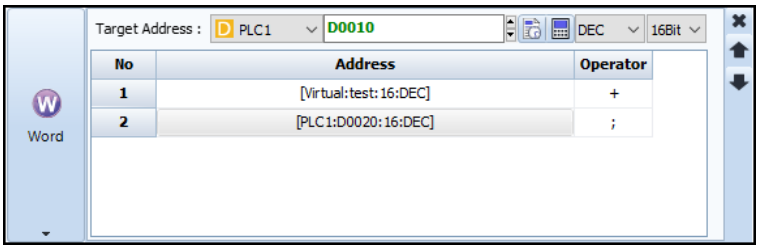
Virtual Addresses are capable to be used as a variable.



[Figure. Numeric Object]

Select [Virtual] as the address type, and enter the variable name. Configure the [Type] and [Size] to create the address. From the above example, enter data to the numeric object, and then the data is input in the address named [Test].

The virtual address named [Test] can be used in another object as shown below.



[Figure. Word calculation at the Calculation Tab]

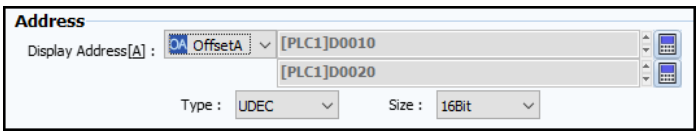
The data of all virtual addresses are reset to [0] upon a reset of the TOP device power.

7.4.10 Offset A Address

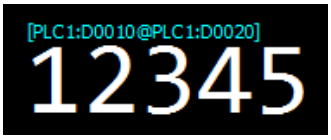
You can configure an additional Offset A address to an physical address.

There are two types of Offset Addresses: [Offset A] and [Offset B].

[Offset A] address refers to an Offset Address, that changes the physical address according to the value of the Offset Address.



[Figure. OffsetA Address]



[Figure. Numeric Object configured with an OffsetA Address]

For the above sample, the display address is [D0010], and the OffsetA Address is [D0020].

The physical display address changes upon the value of [D0020], the OffsetA address.

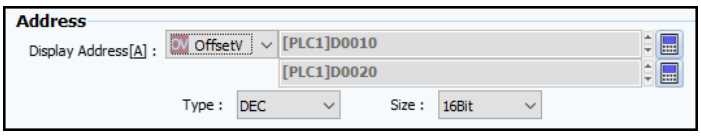
The [Physical Display Address] becomes the sum of [D0010] and the value of the OffsetA address ([D0020]), [10]. Thus, if the value of [D0020] is 0, the physical display address is [D0010] (10+0=10), and if the value of [D0020] is 3, the physical display address is [D0013] (10+3=13).

7.4.11 Offset V Address

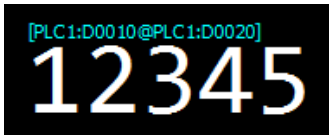
You can configure an additional Offset V address to an physical address.

There are two types of Offset Addresses: [Offset A] and [Offset B].

[Offset V] address refers to an Offset Value, that changes the value of the physical address according to the value of the Offset Address.



[Figure. Offset V Address]



[Figure. Numeric object configured with an Offset V Address]

For the above sample, the display address is [D0010], and the OffsetV Address is [D0020].

The physical display address changes upon the value of [D0020], the OffsetV address.

The value of the [Physical Display Address] becomes the sum of the value of [D0010] and the value of [D0020], the OffsetV address. Thus, if [D0010] reads [100], and [D0020] reads [20], the display value is [100+20=120].

In other words, [D0010] will show the sum of the original [D0010] value and [D0020] value.

7.5 How to enter an address

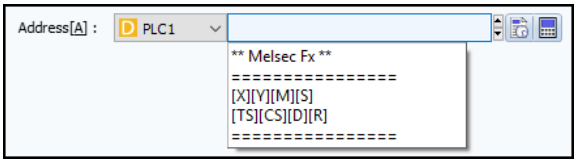
You can type in an address, or enter an address from the [Calculator] button.

7.5.1 How to enter an address with the keyboard

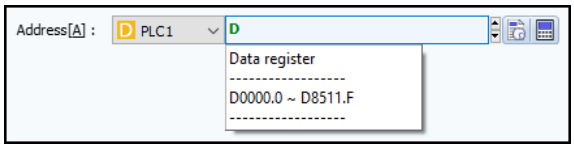
Enter an address with the keyboard.
First, select the [Address] type from the drop-down menu.

[Figure. Address Type]

Next, type in the address corresponding to the select the type with the keyboard.
(Refer to Chapter 7.4 [Address Type] for more details.)
If you click the address entry field, detail information including [Corresponding PLC / Available Devices / Address Range / Digits of Address] will pop-up to aid you entering a valid address.

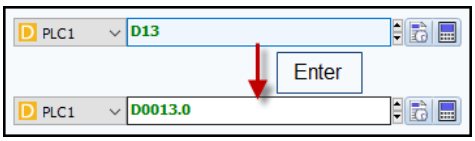


[Figure. Pop-up information for Addresses]



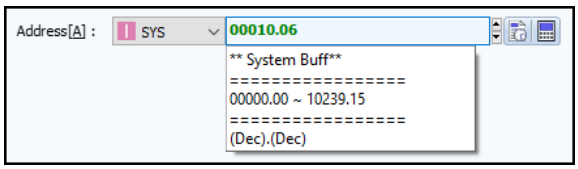
[Figure. Pop-up information for Addresses]

Type a valid address and strike [Enter] to reform the address according to its permissible digits.



[Figure. Auto-fit of address digits]

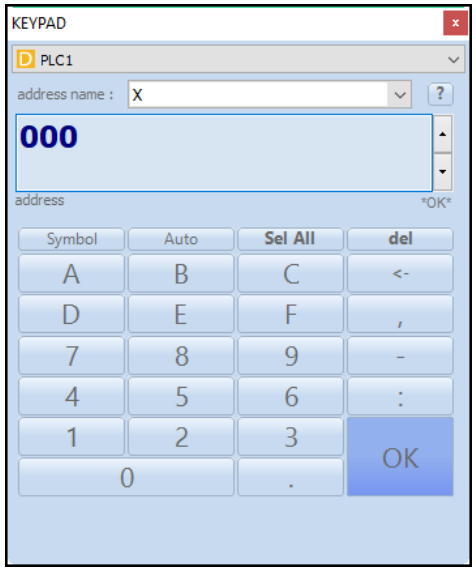
When using a Word Address (16bit) with a Bit function, you have to enter the number of figures for the bit digits between [.00] to [.15]. For instance, if you want to employ the 7th bit of address No.10, enter [00010.06] as shown below.



[Figure. Word address employed with bit function]

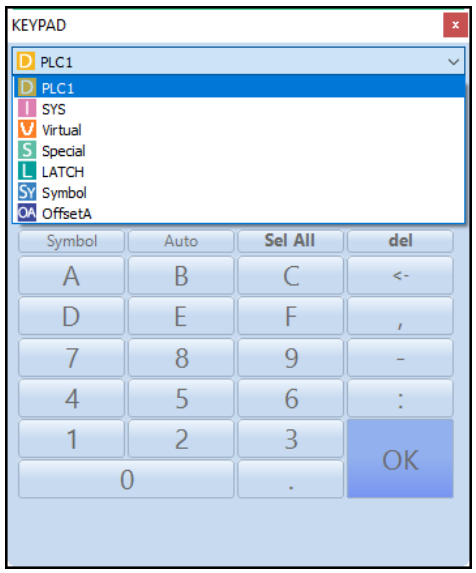
7.5.2 How to enter an address with the Address KEYPAD

Click the calculator icon on the right of the address entry field to open the below Address KEYPAD that allows you to configure an address.



[Figure. Address KEYPAD]

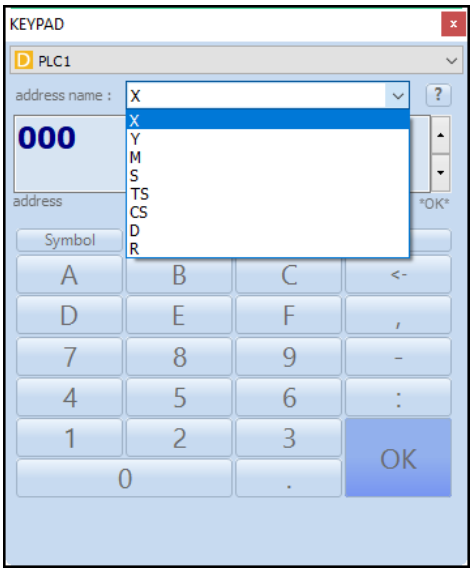
First, select the [Address Type].



[Figure. Select Address Type]

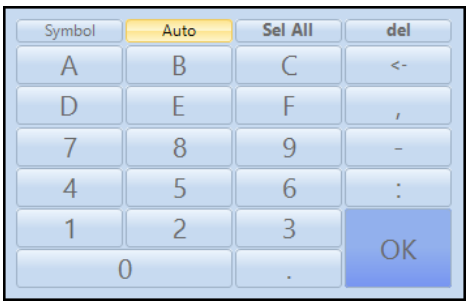
Next, select the corresponding [Address Name] (Device Name).

Once the Address is selected, the available address name are provided listed in the drop-down menu. For instance, if you select [PLC] as the [Address Type], the list of available PLC devices are provided in the [Address Name] field.



[Figure. Select Address Name]

Finally, configure the range and figures of the address with the KEYPAD.



[Figure. Numeric KEYPAD for Address Entry]

No.	KEYPAD	Description
1	A ~ F	Keys to enter 16bit data.
2	0 ~ 9	Numeric Keypad from 0 to 10.
3	.	Decimal Point.
4	OK	Configure the address and click [OK] to confirm the address.

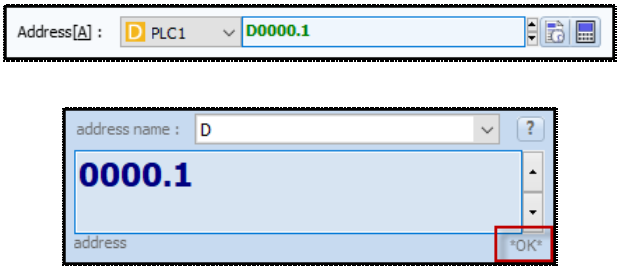
For numeric figures, you can use the PC keyboard to enter the numbers.

Please refer to the following functions provided in the KEYPAD.

Button	Description
Symbol	Add a new symbol address.
Auto	Automatically adjust the figures of an address. For instance, when you are configuring address [D0020], type in [20] and click [Auto] to convert the figures to [0020].
Set All	Select all available addresses.
del	Delete a selected address.

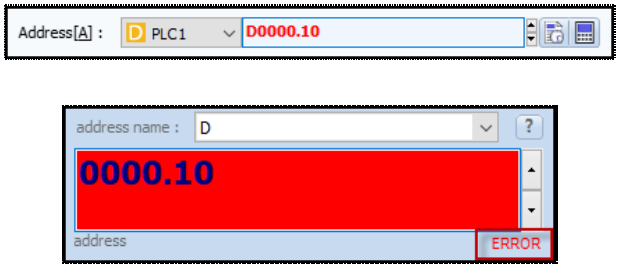
7.5.3 Valid Addresses and Recent Addresses

If one of all of the addresses configured in an address is invalid, a communication error will occur between the TOP device and PLC which prohibits the TOP device to properly operate. Therefore, configuring valid addresses is essence.
Valid addresses are shown in green texts.



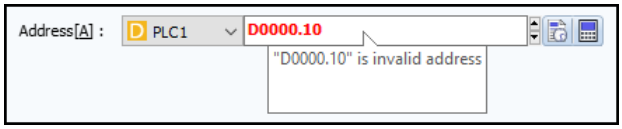
[Figure. Valid Address]

On the other hand, if you enter a device that does not exist on the PLC, or the form of the address is out of the range of the allowable addresses, the address is shown in red texts.



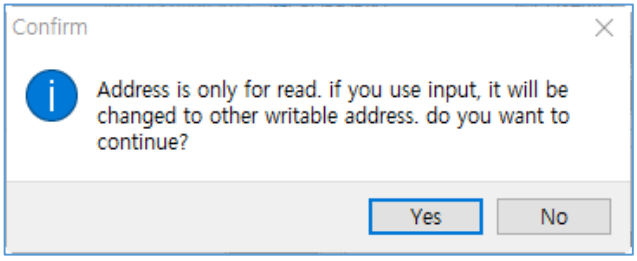
[Figure. Invalid Address]

If you configure an invalid address and click [OK] for the object, the following error message will be shown, and the [Object Property] window will not close.



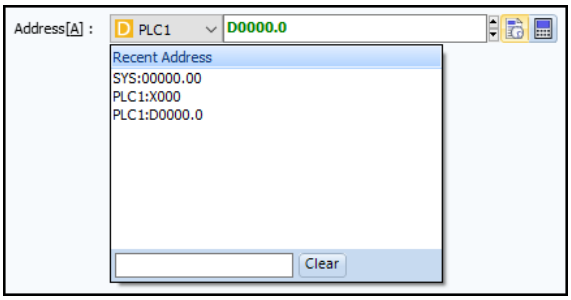
[Figure. Error Message - Invalid Address]

If you configure a read only special address for an object that should write data, the following error message will appear.



[Figure. Error Message - Read Only Address]

Click the [ ] icon to show the recent address list as below. Click [Clear] to delete the recent address list.

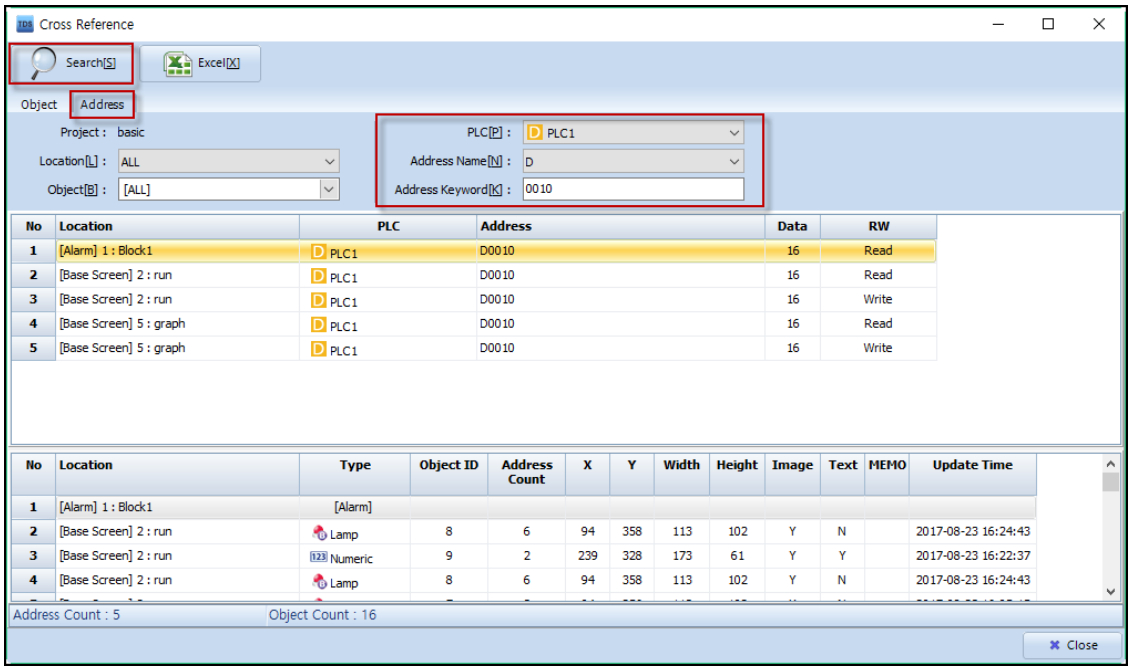


[Figure. Recent Address List]

7.5.4 Search Address

Go to [Tool] - [Cross Reference] and search for a specific address employed by the current project.
Go to the [Address] tab, select the [PLC] / [Address Name] and type in the [Address Keyword], and click [Search] to find addresses that match the search conditions.
The result list provides the [Location] (screen) and [Object] of which employ the address, and with a double click to a row, you can open the Object Property Window of a specific object.

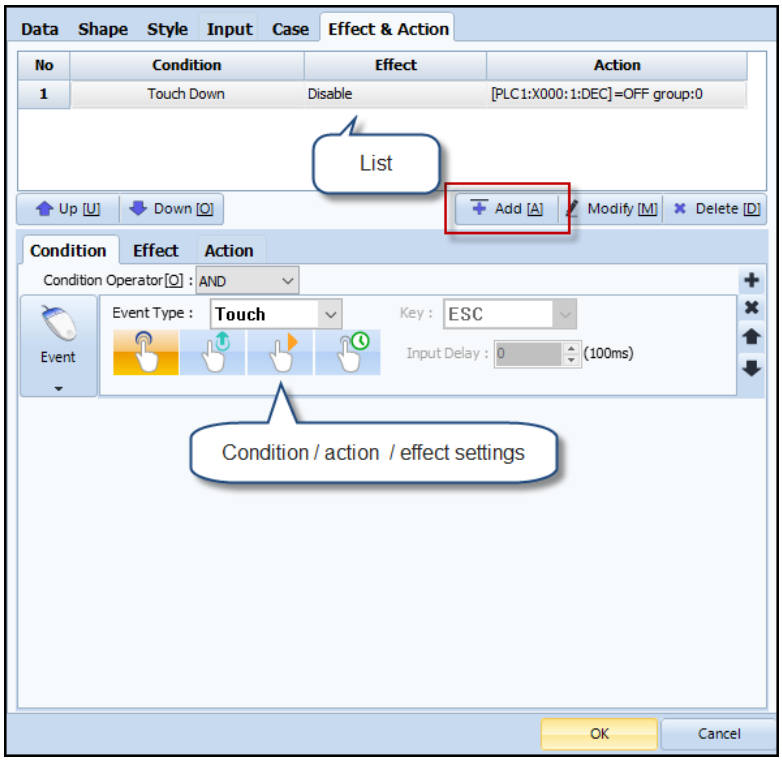
(Refer to Chapter 23.1 [Cross Reference] for more details.)



[Figure. Cross Reference]

7.6 Effect & Action

An [Effect & Action] tab is provided in the Property window of the majority of objects.
On the [Effect & Action] tab, the Effect & Action List is provided, with three sub-tabs of [Condition] / [Effect] / [Action].
First, configure the [Condition], and further configure the [Effect] or [Action] that shall be executed when the condition is true from each corresponding tab.
Configure an [Effect] to force changes to the display such as changing the location or shape of objects, and configure an [Action] to execute a specific action or operation.
Configure the [Condition] / [Effect] / [Action] and click [Add] to add the Effect & Action to the list.
You can add up to [32] Effect & Action.
Click an item of the list and access the [Condition] / [Effect] / [Action] from each sub-tab. Click [Modify] to edit a selected [Effect & Action].



[Figure. Effect & Action Tab]

No.	Button	Description
1	Up [U]	Move a selected Effect & Action one row upward from the current position on the list. Whenever the condition is satisfied, the Effect & Action will be executed in the order as presented on the list. Thus, the Effect & Action with the lowest number [1] will have the precedence in execution.
2	Down [O]	Move a selected Effect & Action one row downward from the current position on the list. Whenever the condition is satisfied, the Effect & Action will be executed in the order as presented on the list. Thus, the Effect & Action with the lowest number [1] will have the precedence in execution.
3	Add[A]	Add the configured [Condition], [Effect] and [Action] to the list. Only the [Effect& Action] added to the list are executed.
4	Modify [M]	Edit and save detail configurations for [Condition] / [Effect] / [Action] of a selected item on the list.

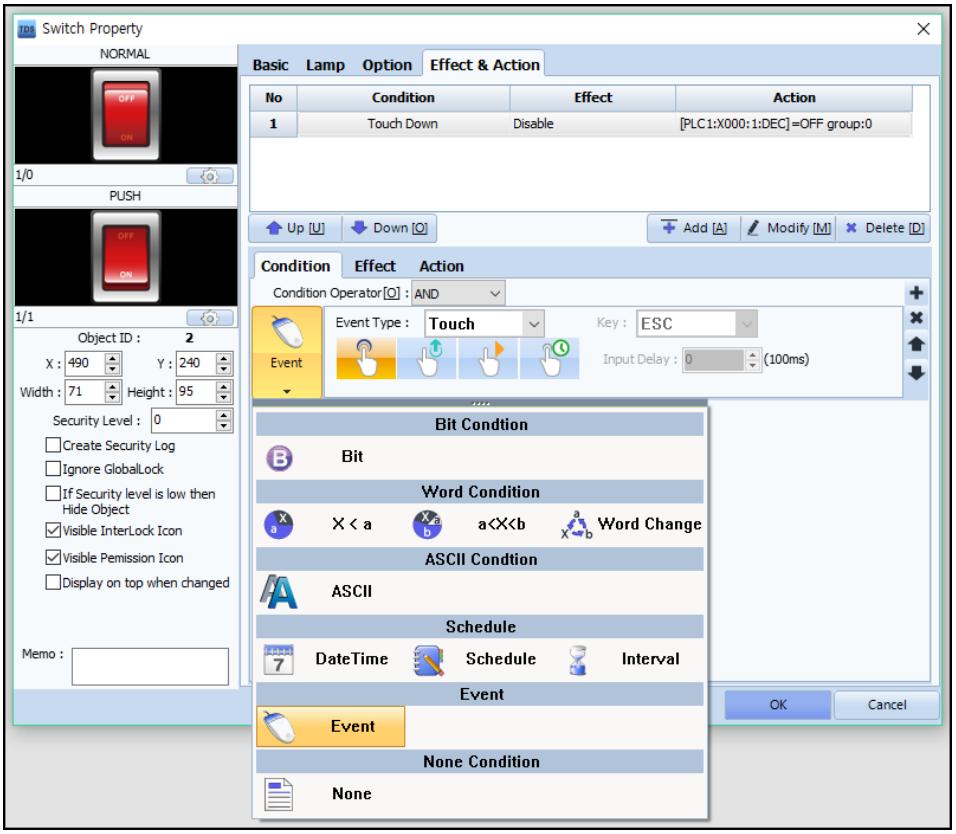
5	Delete[D]	Delete a selected [Effect & Action] from the list.

7.7 Condition Tab

Configure the [Condition] to execute an [Effect] or [Action].

If the condition is true, the corresponding [Effect] and/or [Action] will be executed.

The types of [Condition] include [Bit] / [Word] / [ASCII] / [Schedule] / [Event] / [None].

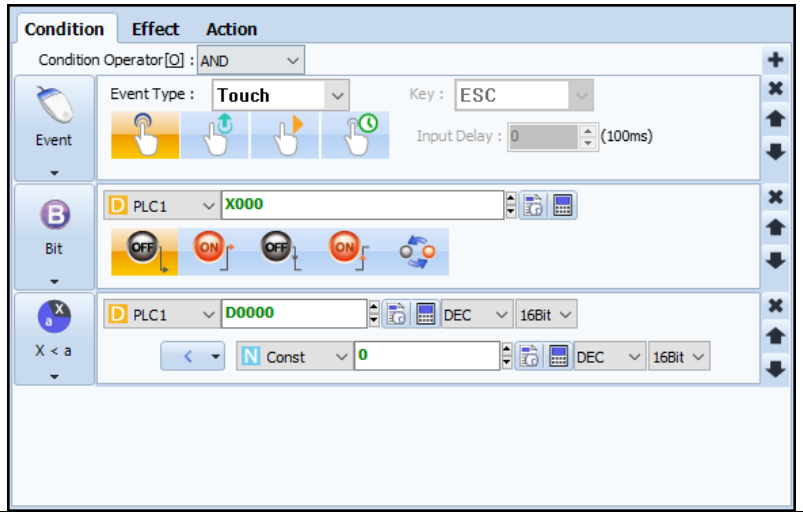


[Figure. Condition Setting]

Refer to the following table for detail descriptions of each condition type.

No.	Condition	Description
1	Bit	The ON/OFF status of a given address is used as the condition reference point.
2	Word	The word value (analogue value) of a given address is used as the condition reference point.
3	ASCII	The ASCII value (String) of a given address is used as the condition reference point.
4	Schedule	Time is used as the condition reference point.
5	Event	The touch input is used as the condition reference point.
6	None	The Effect & Action is executed at all times. The Effect & Action will be executed whenever the screen in which the object is displayed, is the running.

Refer to the following table for detail descriptions of the common buttons of the Condition tab.

No.	Button	Description
1		You can configure multiple [Condition]s with this function. You can add up to 8 conditions. 
2		Delete the subject condition.
3		Move the subject condition one row upward.
4		Move the subject condition one row downward.
5	Condition Operator	If multiple [Condition]s is configured, select the operator for the conditions. [AND]: the [Condition] will be true when all conditions allotted to the [Condition] are ture. [OR]: the [Condition] will be true when at least one of the conditions allotted to the [Condition] is ture.

7.7.1 Condition - BIT

Bit conditions employ the On/Off status of a given address as the condition reference point.

[Figure. Bit Condition]

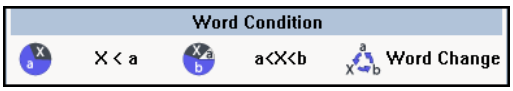
No.	Property	Description
1	Address	Configure the address that shall be used as a Bit Condition.
2		Select [OFF continue] to maintain a true status while the value of the configured address is [0].
3		Select [ON continue] to maintain a true status while the value of the configured address is [1].
4		Select [Off edge] to create a true pulse the moment the value of the configured address changes from [1] to [0].
5		Select [On Edge] to create a true pulse the moment the value of the configured address changes from [0] to [1].
		Select [REVERSE] to create a true pulse whenever the value of the configured address changes

		from [1] to [0], and [0] to [1].

7.7.2 Condition - Word

A [Word] address refers to a 16 bit address.

Word conditions employ the word value (analogue value) of a given address as the condition reference point.



[Figure. Word Condition]

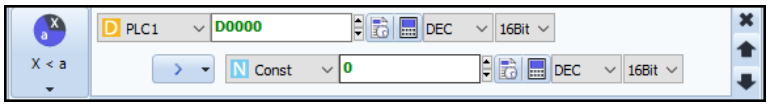
(1) X < a Condition

Compare two values and create a [True] status when the condition is satisfied.

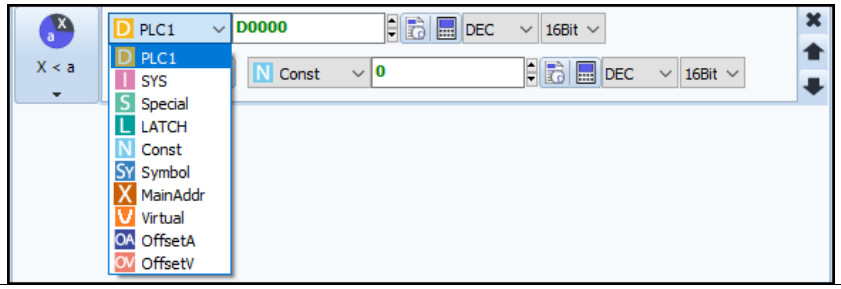
Both [X] and [a] can be assigned to an address or a constant.

There are 6 types of operators to compare [X] and [a].

The below configuration will create a true status if the value of [D0100] is larger than [0].

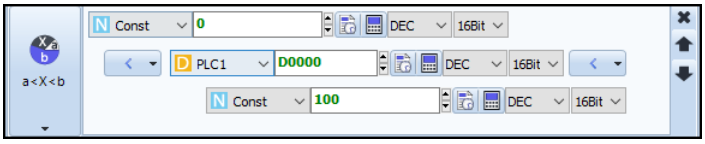


[Figure. Word Condition - X < a]

No.	Property		Description
1	[X], [a]		Configure the address or value to compare. 
2	Comparison Operator	<	The comparison operator to express a condition where the first operand is smaller than the latter operand.
		>	The comparison operator to express a condition where the first operand is larger than the latter operand.
		<=	The comparison operator to express a condition where the first operand is equal with or smaller than the latter operand.
		>=	The comparison operator to express a condition where the first operand is equal with or larger than the latter operand.
		==	The comparison operator to express a condition where the first operand is equal with the latter operand.
		!=	The comparison operator to express a condition where the first operand is different with the latter operand.

(2) a<X<b Condition

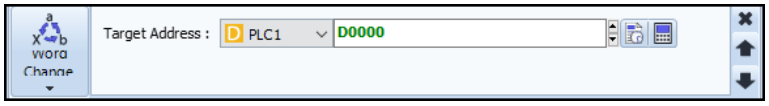
Compare three values and create a [True] status when the condition is satisfied.
All [a], [X] and [b] can be assigned to an address or a constant.
This condition is mainly used to configure a condition where [X] is between [a] and [b].
The below configuration will create a true status when the value of [D0100] is between [0] and [100].



[Figure. Word Condition - a < X < b]

(3) Word Change Condition

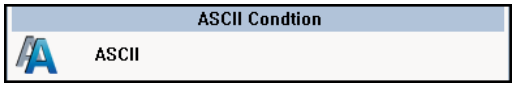
Create a [True] status when the data of the selected address changes.
The below configuration will create a true pulse when the data of [D0100] changes.



[Figure. Word Condition - Word Change]

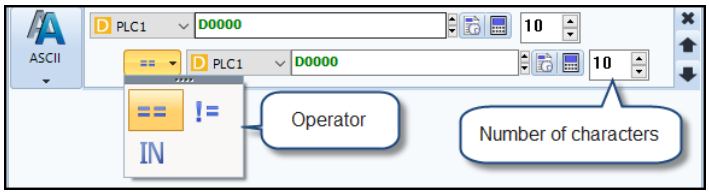
7.7.3 Condition - ASCII

The ASCII value (String) of a given address is used as the condition reference point.



[Figure. ASCII Condition]

Configure the start address for both operands, and define the number of characters subject to the operator. Configure the applicable operator. The string of both addresses are compared, and a true status is generated when the condition is satisfied.



[Figure. ASCII Condition]

Select [==] to create a true status when the string of both addresses are the same.
Select [=!] to create a true status when the string of both addresses are different.
Select [IN] to create a true status when the string of the first address is fully included in the string of the

second address.

7.7.4 Condition - Schedule

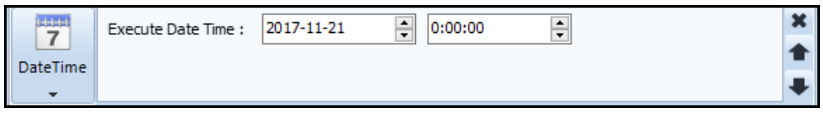
Configure a time as a condition reference point.

[Figure. Schedule Condition]

(1) Date Time

A specific date and time is used as the condition reference point.

Configure all time information including Date (Year/Month/Day) and Time (Hour/Minute/Second). A true status will be created when the configured date and time arrives.



[Figure. Date Time]

(2) Schedule

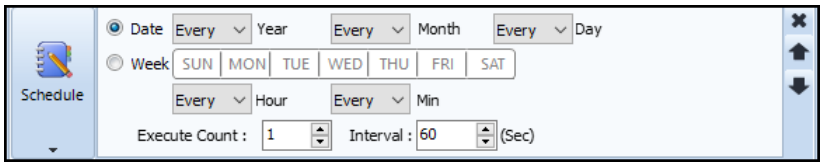
A true status is created upon a predetermined schedule.

Select between [Day] and [Week].

For [Day], if you select [Ever] for [Year] / [Month] / [Day] a true status will be repeatedly created on the configured [Hour] / [Minute] of every [Year] / [Month] / [Day] that you have selected.

For [Week], if you select a given day of the week, a true status will be repeatedly created on the configured [Hour] / [Minute] of the day you have selected.

The same logic applies to [Hour] and [Minute], where if you select [Every], a true status will be repeatedly created whenever the configured [Hour] and [Minute] arrives.



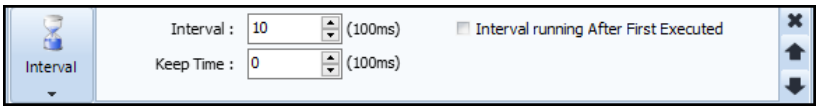
[Figure. Schedule]

If the [Execute Count] is [1], a single true pulse will be created when the predetermined [Year/Month/Day/Hour/Minute] arrives.

If the [Execute Count] is [2] or more and there is a configured [Interval] (seconds), a single true pulse will be created when the predetermined [Year/Month/Day/Hour/Minute] arrives, followed with a repeated amount of additional pulses according to the [Execute Count] with the predetermined [Interval].

(3) Interval

[Interval] is used to configure a condition on a regular basis.
The below configuration will create a true status the moment the object is executed, and will return to false after 0.5 seconds.
After two seconds (20 x 100ms = 2s) since the moment the condition becomes true, the status will be sustained for 0.5 seconds and go back to false.

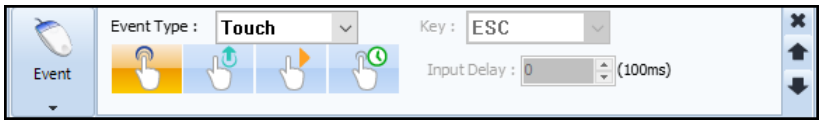


[Figure. Interval]

No.	Property	Description
1	Interval	The periodic interval between true statuses.
2	Keep Time	The time length to sustain the true status.
3	Interval running After First Executed.	Enable this function to create a true status the moment the object is executed. If this function is disabled, the first true status will be created after the [Interval] has elapsed after execution.

7.7.5 Condition - Event

Configure a touch input as a condition reference point.



[Figure. Event]

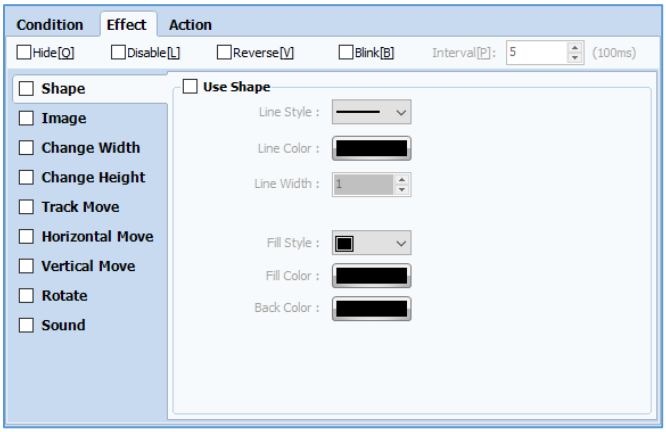
No.	Property	Description
1	Touch Down	A true status is created when the object is touched.
2	Touch Up	A true status is created when the touch is released from the object.
3	Momentary	If a touch is maintained to the object for the amount of time configured in [Input Delay] (100ms), a true status will be created, and the true status will survive until the touch is removed. If the [Max Execute Count] at the [Action] tab is [2] or more, the action will be repeatedly executed in the specified [Interval] for the times defined by [Max Execute Count], as long as this condition is true.
4	Touch Delay	A single true pulse is created when the object is touched for the amount of time configured in [Input Delay] (100ms). Even if the [Max Execute Count] at the [Action] tab is [2] or more, the action will be executed only once.

7.7.6 Condition - None

Configuring no condition refers to a condition that is always true.
Select [None] and configure an [Effect] / [Action], the [Effect] / [Action] will be repeatedly executed.

7.8 Effect Tab

[Effect] refers to the change in display including size and shape of an object, executed upon a true condition.



[Figure. Effect]

Refer to the following table for detail descriptions on each effect. To execute these effects, select the effect of your interest and configure detail settings. You can select multiple effects, and execute a combination of effects.

No.	Effect	Description
1	Hide	When the condition is true, the object is hidden from the display.
2	Disable	When the condition is true, the object is disabled, and no action assigned to the object will be executed.
3	Reverse	When the condition is true, the color of the object is reversed (XOR).
4	Blink/Interval	When the condition is true, the object blinks with the configured [Interval]. This effect is generally used to point out an object. The [Interval] is configured in 100ms, from the range of 1 to 60,000 (60,000 x 100ms = 6,000s),

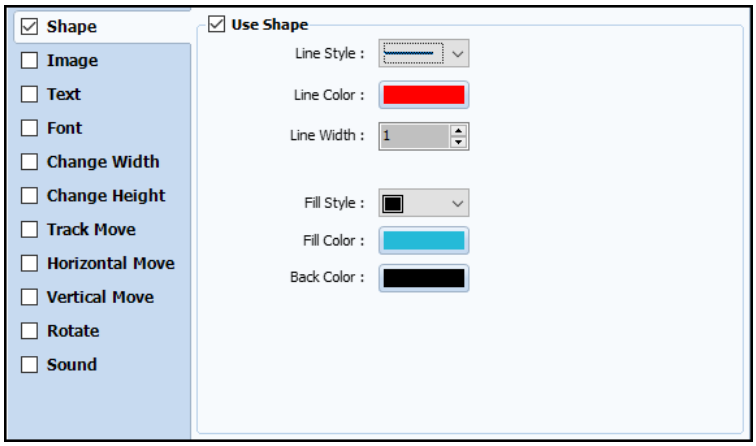
No.	Effect	Description
1	Shape	When the condition is true, the properties of [Line] and [Fill] for a [Square] / [Line] / [Rectangle] / [Oval] / [Polyline] / [Paint] object.
2	Image	When the condition is true, the image of the object is changed. (This effect is applicable for objects employing images.)
3	Text	When the condition is true, the text of the object is changed. (This effect is applicable for objects employing strings.)
4	Font	When the condition is true, the font of the object is changed. (This effect is applicable for objects employing strings.)
5	Change Width	When the condition is true, the width of the object is changed.
6	Change Height	When the condition is true, the height of the object is changed.

7	Track Move	When the condition is true, the object is moved to multiple specified positions (X, Y) in an ascending order.
8	Horizontal Move	When the condition is true, the object is moved in the horizontal direction.
9	Vertical Move	When the condition is true, the object is moved in the vertical direction.
10	Rotate	When the condition is true, the object is rotated.
11	Sound	When the condition is true, an audible sound is made. As default, TDS provides system sounds of numeric keys and alarms, and you can add user define sounds. (Sound Effects are available only on TOPR Premium models with an integrated audio port.)

7.8.1 Effect - Shape

Shape effects are applicable to change the properties of [Line] and [Fill] for a [Square] / [Line] / [Rectangle] / [Oval] / [Polyline] / [Paint] object.

Select [Shape] Configure the Line Properties (Style, Color, Width) and Fill Properties (Fill Style, Fill Color, Back Color) that shall be employed when the condition is true.



[Figure. Effect - Shape]

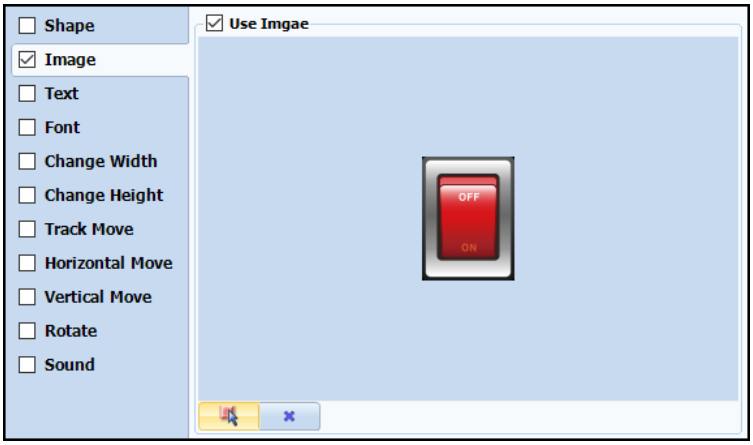
No.	Effect - Shape	Description
1	Line Style	Select the line style of your interest from the drop-down list. Select [None] to hide the line.
2	Line Color	Select the line color of your interest.
3	Line Width	Configure the thickness of the line between [1] to [10] in pixels.
4	Fill Style	Select the Fill Style of your interest. Select [ ] to not fill the object. The black part will be colored with the [Fill Color] and the white part will be colored with the [Back Color].

5	Fill color	Select the fill color of your interest.
6	Back Color	Select the background color of your interest.

7.8.2 Effect - Image

Image effects are applicable to objects that employ an image(s). When the condition is true, the image is changed.

Select [Image] and configure the image to change.



[Figure. Effect - Image]

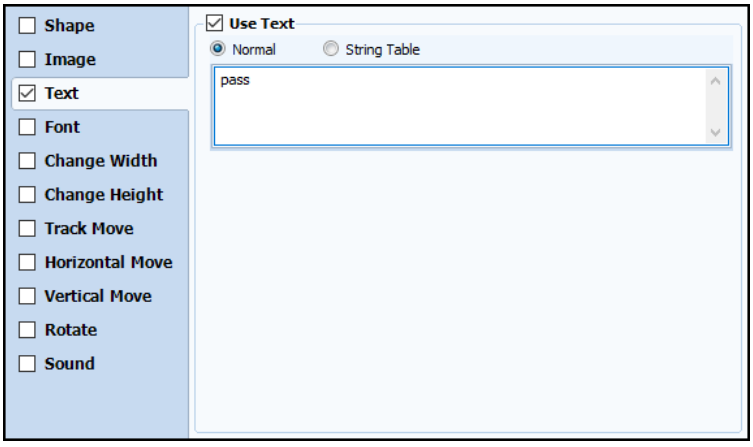
No.	Effect - Image	Description
1		Click the [Load] button and load the image of your interest from the [Select Image Dialog].
2		Click the [Delete] button to delete a configured image.
3		Click the [Transparent] button to make a specific color of the image transparent. If you select green, any portion of the image employing the same color will appear transparent.

7.8.3 Effect - Text

When the condition is true, the text of an object is changed.

This effect is applicable for objects employing strings.

Select [Text] and enter the string the text should change to.

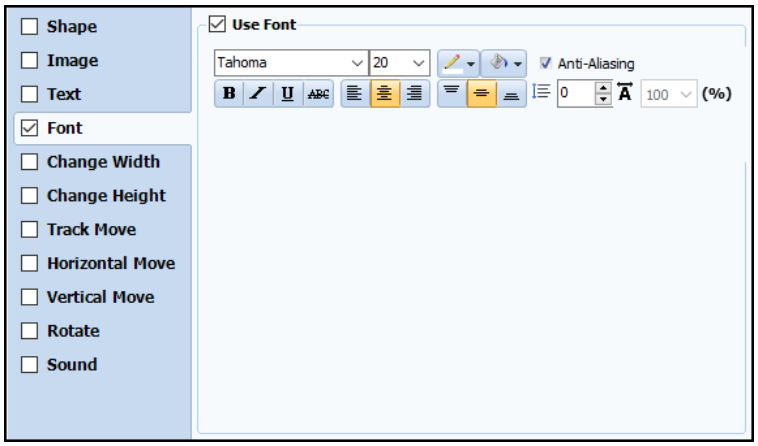


[Figure. Effect - Text]

No.	Effect - Text	Description
1	Normal	Type in the new string of your interest.
2	String Table	Load a string added to [Project] - [String] (Refer to Chapter 4.4. [String] for more details.)

7.8.4 Effect - Font

This effect is applicable for objects employing strings.
When the condition is true the font of the object is changed.
Select [Font], and configure the font of your interest.

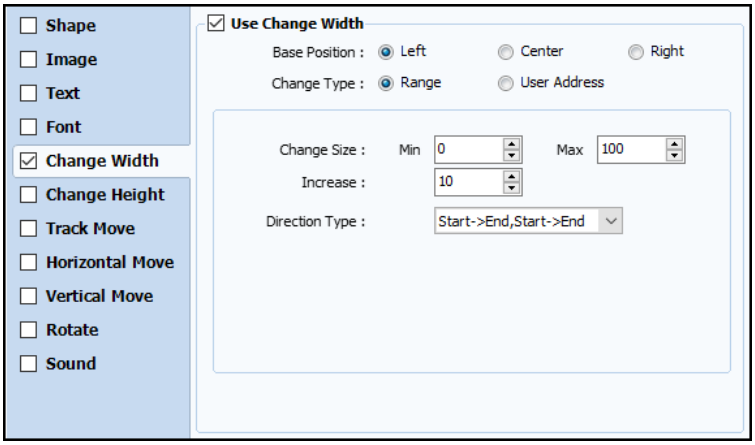


[Figure. Effect - Font]

No.	Effect - Font		Description
1	Font Type		Select the font of your interest.
2	Font Size		Select the Font Size of your interest.
3	Font Color		Select the Font Color of your interest applicable to texts.
			Select the background color of your interest applicable to texts.
4	Anti-Aliasing		Render the edge of rounded texts for low-resolution. The edges of texts that are shown in step-like shapes at low resolution are rendered for a smoother display.
5	Edit Font		Bold - show texts in a bold fashion.
			Italic - show texts in a tilted fashion.
			Underline - Add an underline to texts.
			Strikethrough - Add a strikethrough line on texts.
6	Font Align		Align strings to the left.
			Align strings to the horizontal center.
			Align strings to the right.
			Align strings to the top.
			Align strings to the vertical middle.
			Align strings to the bottom.
7	Spacing	0	Adjust the spacing between two or more lines, if applicable. Select the spacing in pixels.
		100 (%)	Change the scale (width to height ratio) of individual characters. Select 100% to apply the original scale. You can select between [20%] an [80%]. Several font styles may not supply font scale.

7.8.5 Effect - Change Width

When the condition is true, the width of the object is changed.



[Figure. Effect - Change Width]

With the above configuration, the effect will be shown as below. The width will be increased in an increment of 10 pixels from 0 pixels. Once the width becomes 100, the width will be then changed to 0, and the forgoing change will be repeated. A width of [0] will basically hide the object. When the width is [10], since the [Base Position] is [Left], the width of the object will be 10 pixels from the left end of tis original figure.

Width of [10]

Width of [20]

Width of [30]

Width of [40]

Width of [50]

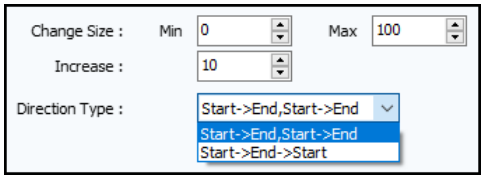
[Figure. Example - Change Width (Range)]

No.	Effect - Change Width		Description
1	Base Position	Left	The left end of the object is fixed, while the right end of the object moves to increase/decrease the width of the object.
		Center	The horizontal center of the object is fixed, while both the right and left end of the object moves in the same increment to increase/decrease the width of the object.
		Right	The right end of the object is fixed, while the left end of the object moves to increase/decrease the width of the object.
2	Change Type	Range	Select the [Min] / [Max] of the [Change Size], [Increase] value and [Direction Type] to change the width within a certain range at the predetermined [Increase]

			(increment).
		User Address	Configure an [Address] to be the width of the object. Configure [User Limit] and [User Scale].

(1) Change Type [Range]

The width of the object changes in increments of [Increase] within the predetermined range.

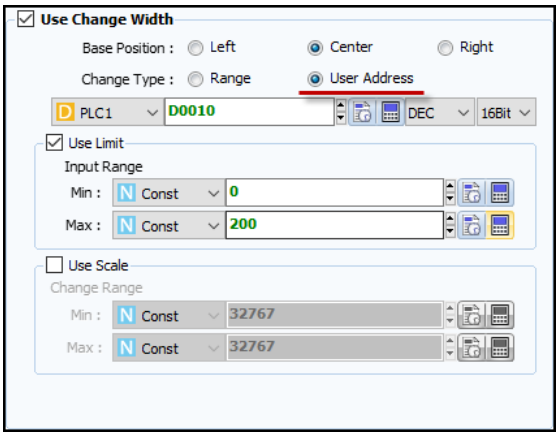


[Figure. Change Type - Range]

No.	Range		Description
1	Change Size	Min	Configure the minimum width of the object.
		Max	Configure the maximum width of the object.
2	Increase	Configure the increment of width change that should be increased when the condition is true.	
3	Direction Type	Start->End, Start->End	Once the width reaches the maximum value, the width is reset to the minimum value.
		Start->End->Start	Once the width reaches the maximum value, the width is then reduced according to the configured [Increase] value.

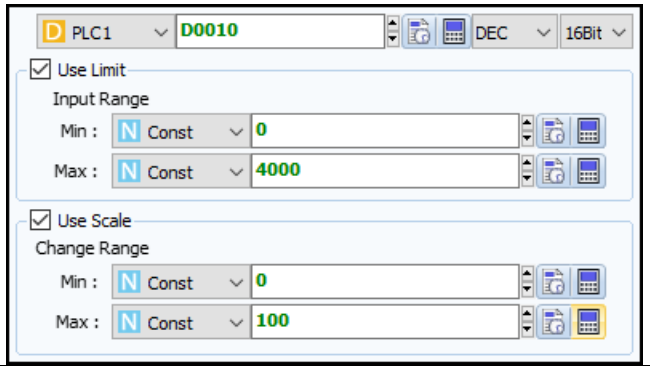
(2) Change Type [User Address]

The width of the object changes according to the data of a specific address.



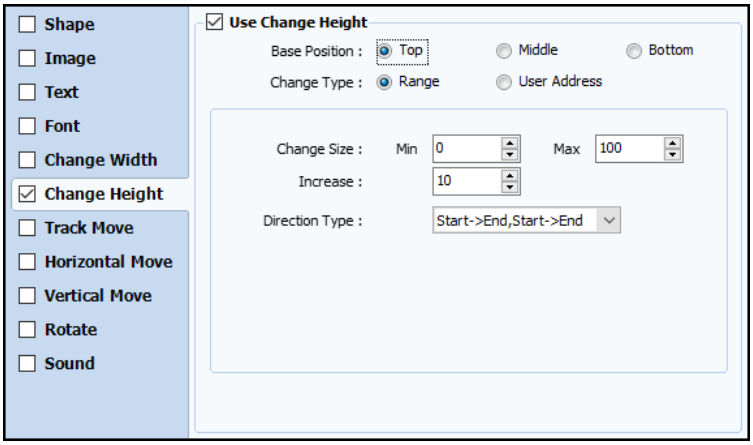
[Figure. User Address]

No.	User Address		Description
1	Address		Configure the address. The data of the selected address becomes the width of the object.
2	Use Limit	Function	Enable [Use Limit] to limit the range of the object width.
		Min	Configure the minimum width of the object. Even if the value of the address reads a value smaller than the minimum value, the width does not become smaller than the minimum value.
		Max	Configure the maximum width of the object.

			Even if the value of the address reads a value larger than the maximum value, the width does not become larger than the maximum value.
3	Use Scale	Function	[Use Scale] is applicable only if [Use Limit] is enabled. The width is calculated using the [Min] / [Max] value of [Use Scale] proportional to the [Min] / [Max] value of [Use Limit]. With the below configuration, the actual value of the address is between 0 and 4000, and the range applicable to be proportional to the address value is between 0 to 100. In other words, if [D0010] reads 1000, the actual width is 25. If [D0010] reads 2000, the width is 50, and if [D0010] reads 4000, the width is 100. If [D0010] reads a value higher than 4000, the width will be fixed at 100, and if [D0010] reads a value lower than 0, the width will be fixed at 0. 
		Min	Configure the minimum value that shall be used proportional to the address value.
		Max	Configure the maximum value that shall be used proportional to the address value.

7.8.6 Effect - Change Height

When the condition is true, the height of the object is changed.



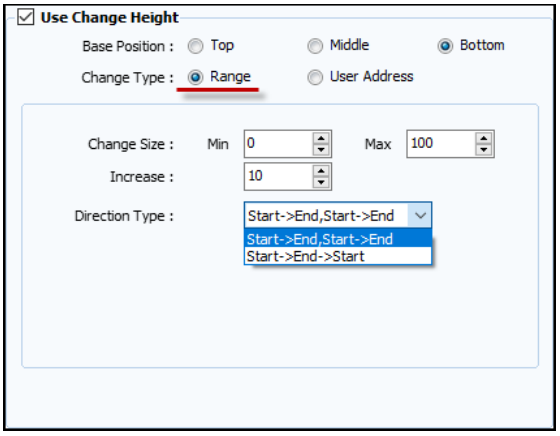
[Figure. Effect - Change Height]

No.	Change Height		Description
1	Base Position	Top	The top end of the object is fixed, while the bottom of the object moves to increase/decrease the height of the object.
		Middle	The vertical middle of the object is fixed, while both the top and bottom end of the object moves in the same increment to increase/decrease the height of the object.
		Bottom	The bottom end of the object is fixed, while the top of the object moves to

			increase/decrease the height of the object.
2	Change Type	Range	Select the [Min] / [Max] of the [Change Size], [Increase] value and [Direction Type] to change the height within a certain range at the predetermined [Increase] (increment).
		User Address	Configure an [Address] to be the width of the object. Configure [User Limit] and [User Scale].

(1) Change Type [Range]

The height of the object changes in increments of [Increase] within the predetermined range.



[Figure. Change Type - Range]

With the above configuration, the effect will be shown as below. The height will be increased in an increment of 10 pixels from 0 pixels. Once the height becomes 100, the height will be then changed to 0, and the forgoing change will be repeated. A height of [0] will basically hide the object. When the height is [10], since the [Base Position] is [Top], the height of the object will be 10 pixels toward the bottom.

Height of [10] / Height of [20] / Height of [30] / Height of [40]

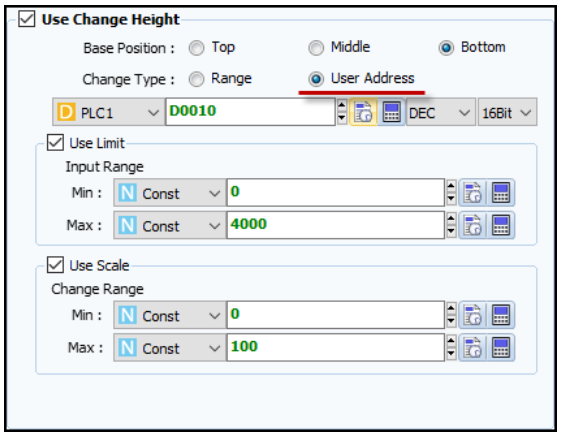
/ Height of [50]

[Figure. Example - Change Height (Range)]

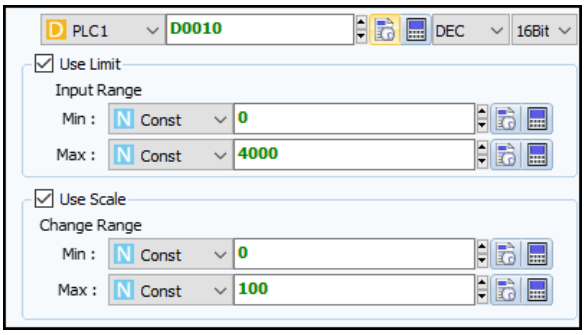
No.	Range		Description
1	Change Size	Min	Configure the minimum height of the object.
		Max	Configure the maximum height of the object.
2	Increase	Configure the increment of height change that should be increased when the condition is true.	
3	Direction Type	Start->End, Start->End	Once the height reaches the maximum value, the height is reset to the minimum value.
		Start->End->Start	Once the height reaches the maximum value, the height is then reduced according to the configured [Increase] value.

(2) Change Type - User Address

The height of the object changes according to the data of a specific address.



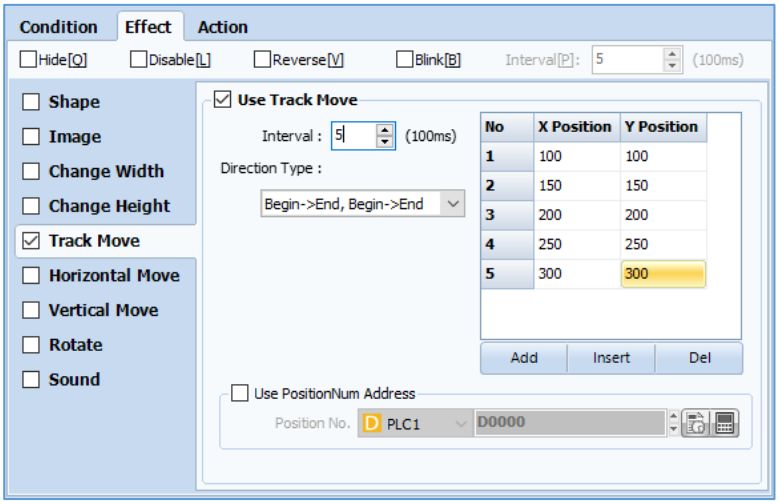
[Figure. User Address]

No.	User Address		Description
1	Address		Configure the address. The data of the selected address becomes the height of the object.
2	Use Limit	Function	Enable [Use Limit] to limit the range of the object height.
		Min	Configure the minimum height of the object. Even if the value of the address reads a value smaller than the minimum value, the height does not become smaller than the minimum value.
		Max	Configure the maximum height of the object. Even if the value of the address reads a value larger than the maximum value, the height does not become larger than the maximum value.
3	Use Scale	Function	[Use Scale] is applicable only if [Use Limit] is enabled. The height is calculated using the [Min] / [Max] value of [Use Scale] proportional to the [Min] /[Max] value of [Use Limit].  With the above configuration, the actual value of the address is between 0 and 4000, and the range applicable to be proportional to the address value is between 0 to 100. In other words, if [D0010] reads 1000, the actual height is 25. If [D0010] reads 2000, the height is 50; and if [D0010] reads 4000, the height is 100.

			If [D0010] reads a value higher than 4000, the is height is [100]; and if [D0010] reads a value lower than 0, the height is [0].
		Min	Configure the minimum value that shall be used proportional to the address value.
		Max	Configure the maximum value that shall be used proportional to the address value.

7.8.7 Effect - Track Move

When the condition is true, the object is moved to a specified position.



[Figure. Track Move]

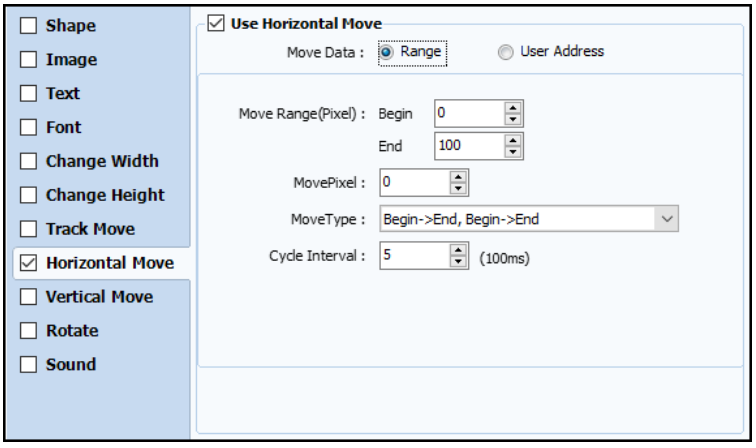
The [No] refers to the sequential order of positions where the object will be move to.
The [X Position] and [Y Position] refers to the X and Y coordinate on the screen. [X Position] refers to the horizontal coordinate, [Y Position] refers to the vertical coordinate. The upper left corner of the screen is (0,0) and the lower right corner of the screen corresponds to the screen resolution. If the TOP device has a resolution of 1024 x 768, the coordinate of the upper right corner is (1024, 768).
With the above configuration, when the condition is true, the object will move its position in a sequential order from No.1, No.2, No.3, No.4, No.5, No.1, No.2, so on and so forth, every 0.5 seconds.

No.	Effect - Track Move		Description
1	Interval		The interval to change the position of the object. Configure the interval in 100ms.
2	Direction Type	Begin->End, Begin->End	The object will move starting from position No.1 and subsequently follow the sequential order of the [No.] of each position. Once the object reaches the last position, it will move back to position [No.1]. [No.1 > No.2 > No.3 > No.4 > No.5 > No.1 > No.2 > No.3 > No.4 > No.5 > No.1 > so on and so forth]
3		End->Begin, End-> Begin	The object will move starting from the last position and subsequently follow the reverse sequential order of the [No.] of each position. Once the object reaches the last position, it will move back to the last position. [No.5 > No4. > No.3 > No.2 > No.1 > No.5 > No.4 > No.3 > No.2

			> No.1 > No.5 > so on and so forth]
4		Begin->End->Begin->End	The object will move starting from position No.1 and subsequently follow the sequential order of the [No.] of each position, once the object reaches the last position, it will retrieve to each position in a reverse sequential order. Once the object retrieves all the way back to the first position, it will repeat the aforementioned movement. [No.1 > No.2 > No.3 > No.4 > No.5 > No.4 > No.3 > No.2 > No.1 > No.2 > No.3 > so on and so forth]
5		End->Begin->End->Begin	The object will move starting from the last position and subsequently follow the reverse sequential order of the [No.] of each position, once the object reaches the first position, it will retrieve to each position in a sequential order. Once the object retrieves all the way back to the last position, it will repeat the aforementioned movement. [No.5 > No.4 > No.3 > No.2 > No.1 > No.2 > No.3 > No.4 > No.5 > No.4 > No.3 > so on and so forth]
6	Use Position Number Address		Assign an address to employ the data of the address as the position [No.]. If the address reads [3], the object will move to position [No.3]. Enable [Use Position Number Address] and configure the [Position No. Address]. If this function is enabled [Interval] and [Direction Type] will not be applied.

7.8.8 Effect - Horizontal Move

When the condition is true, the object is moved in the horizontal direction.

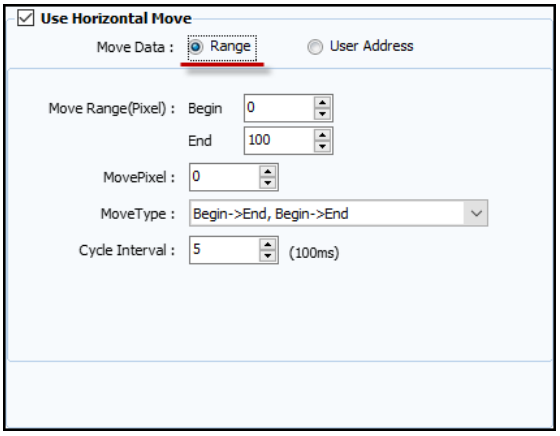


[Figure. Effect - Horizontal Move]

No.	Effect - Horizontal Move	Description
1	Range	Configure the range of the horizontal movement. The object moves to the left or right in the increment of a specific amount of pixels with the selected [Cycle Interval].
2	User Address	The data of the configured address becomes the X position of the object. Change the data of the address to move the object horizontally.

(1) Move Data - Range

Configure the range of the X position of to which the object will be moved, and move the object to the left or right in the increment of a specific amount of pixels, with the selected [Cycle Interval].



[Figure. Change Type - Range]

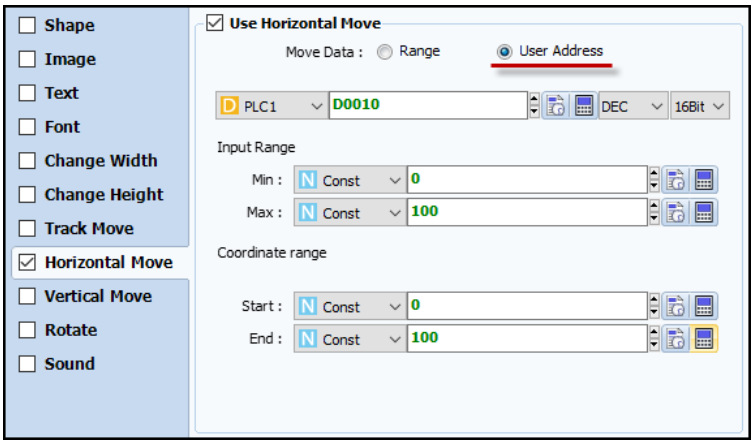
With the above configuration, when the condition is true, the object will move [10] pixels to the right starting from the X position of [0] with the interval of 0.5 seconds. Once the object arrives at the X position of [100], it will return back to [0].

No.	Range		Description
1	Move Range (Pixel)	Begin	The initial X position of horizontal move range. Configure the furthest left position for object movement.
		End	The end X position of horizontal move range. Configure the furthest right position for object movement.
2	Move Pixel	Configure the increment of movement in pixels.	
3	Direction Type	Function	Select the direction of movement.
		Begin->End, Begin->End	The object will move to the right starting from the [Begin] position to the [End] position with the increment of [Move Pixel]. Once the object reaches the End position, it will return back to the Begin position.
		End->Begin, End->Begin	The object will move to the left starting from the [End] position to the [Begin] position with the increment of [Move Pixel]. Once the object reaches the Begin position, it will return back to the End position.
		Begin->End->Begin->End	The object will move to the right starting from the [Begin] position to the [End] position with the increment of [Move Pixel]. Once the object reaches the End position, it will retrieve to the left back to the Begin position with the increment of [Move Pixel].
		End->Begin->End->Begin	The object will move to the left starting from the [End] position to

			the [Begin] position with the increment of [Move Pixel]. Once the object reaches the Begin position, it will retrieve to the right back to the End position with the increment of [Move Pixel].
4	Cycle Interval	Configure the cycle interval of each movement.	

(2) Move Data - User Address

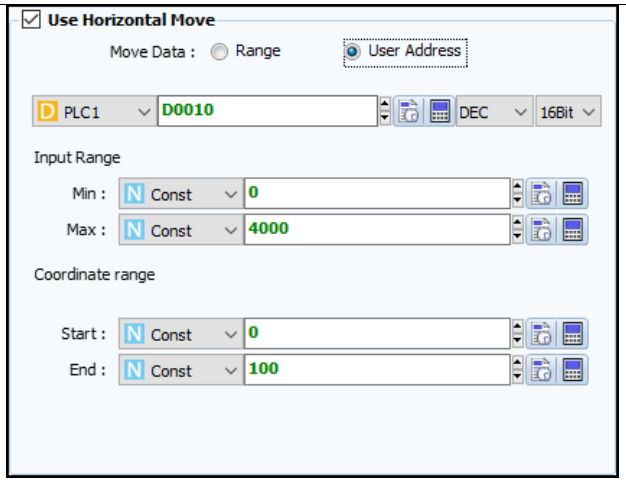
The position of the object moves horizontally according to the data of the configured address.
The data of the configured address becomes the X position of the object.



[Figure. User Address]

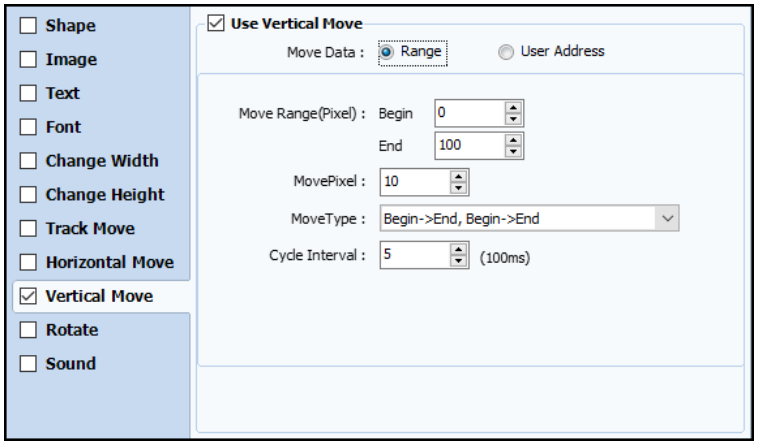
With the above configuration, the data of [D0010] becomes the X position of the object.
If [D0010] reads [30], the object horizontally moves to the X coordinate of [30].

No.	User Address		Description
1	Address		Configure the address that shall be used as the X coordinate.
2	Input Range	Min	Configure the minimum value of the address data. With the above configuration, if the address reads a value lower than [0], the object will move horizontally to the X coordinate of [0].
		Max	Configure the maximum value of the address data. With the above configuration, if the address reads a value higher than [100] the object will move horizontally to the X coordinate of [100].
3	Coordinate Range	Function	Coordinate range refers to the actual range which the object will be moved within. If the [Input Range] and [Coordinate Range] have same values, the actual data of the address will be applied as the X coordinate of the object. (If, the address value is within the Input Range.) If the [Input Range] and [Coordinate Range] have different values, the [X Coordinate] of the object will be calculated on a proportional basis.

			 With the above configuration, the actual Input Data of the address ranges between [0] and [4000], and the applicable [X coordinate] proportional to the actual address data will range between [0] and [100]. Thus, if [D0010] reads [1000], the actual X coordinate is [25]. If [D0100] reads [2000], the actual X coordinate is [50]; and if [D0010] reads [4000], the actual X coordinate is [100]. If [D0010] reads a value higher than 4000, the actual X coordinate is [100]; and if [D0010] reads a value lower than [0], the actual X coordinate is [0]. You can configure the [Input Range] and [Coordinate Range] to a fixed constant, or an address for a variable movement.
		Begin	Configure the minimum X coordinate of the range the object moves within. This coordinate refers to the furthest left point of the range.
		End	Configure the maximum X coordinate of the range the object moves within. This coordinate refers to the furthest right point of the range.

7.8.9 Effect - Vertical Move

When the condition is true, the object is moved in the vertical direction.



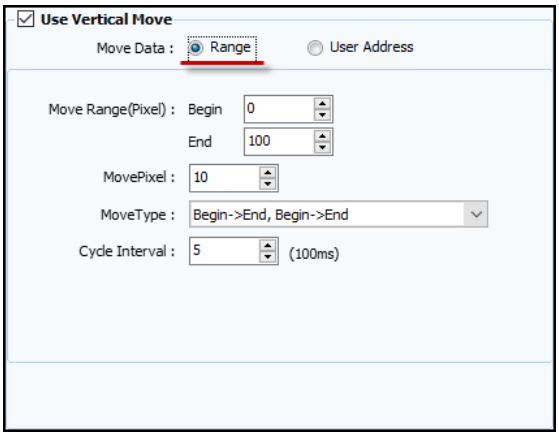
[Figure. Effect - Vertical Move]

No.	Effect - Vertical Move	Description
1	Range	Configure the range of the vertical movement. The object moves upward or downward in the increment of a specific amount of pixels with the selected [Cycle Interval].

2	User Address	The data of the configured address becomes the Y position of the object. Change the data of the address to move the object vertically.

(1) Move Data - Range

Configure the range of the Y position of to which the object will be moved, and move the object upward or downward in the increment of a specific amount of pixels, with the selected [Cycle Interval].



[Figure. Change Type - Range]

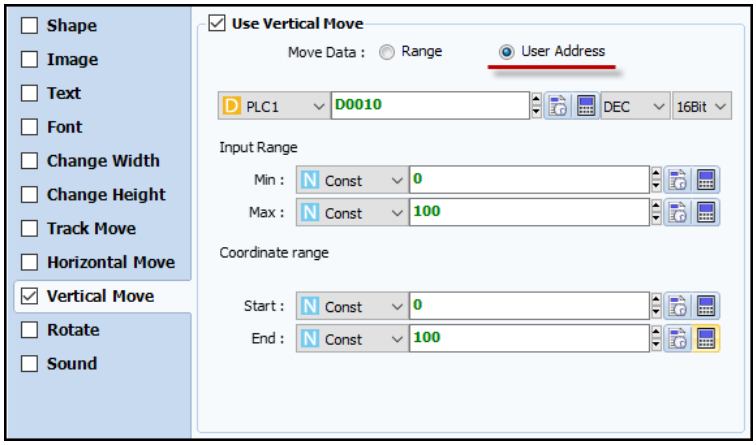
With the above configuration, when the condition is true, the object will move [10] pixels downward starting from the Y position of [0] with the interval of 0.5 seconds. Once the object arrives at the Y position of [100], it will return back to [0].

No.	Range		Description
1	Move Range (Pixel)	Begin	The initial Y position of horizontal move range. Configure the furthest top position for object movement.
		End	The end Y position of vertical move range. Configure the furthest bottom position for object movement.
2	Move Pixel	Configure the increment of movement in pixels.	
3	Direction Type	Function	Select the direction of movement.
		Begin->End, Begin->End	The object will move downward starting from the [Begin] position to the [End] position with the increment of [Move Pixel]. Once the object reaches the End position, it will return back to the Begin position.
		End->Begin, End->Begin	The object will move upward starting from the [End] position to the [Begin] position with the increment of [Move Pixel]. Once

			the object reaches the Begin position, it will return back to the End position.
		Begin->End->Begin->End	The object will move downward starting from the [Begin] position to the [End] position with the increment of [Move Pixel]. Once the object reaches the End position, it will retrieve upward, back to the Begin position with the increment of [Move Pixel].
		End->Begin->End->Begin	The object will move upward starting from the [End] position to the [Begin] position with the increment of [Move Pixel]. Once the object reaches the Begin position, it will retrieve downward to the End position with the increment of [Move Pixel].
4	Cycle Interval	Configure the cycle interval of each movement.	

(2) Move Data - User Address

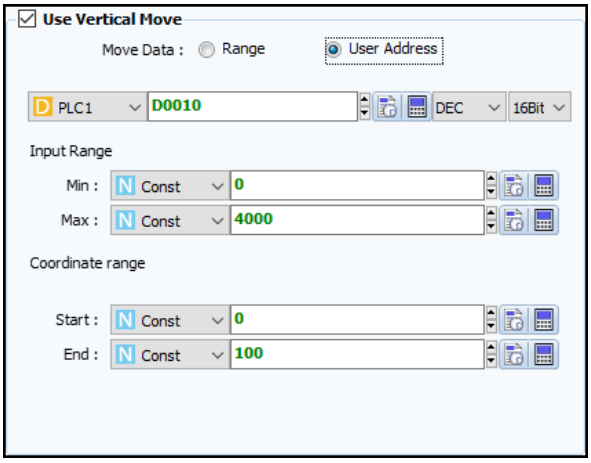
The position of the object moves vertically according to the data of the configured address.
The data of the configured address becomes the Y position of the object.



[Figure. User Address]

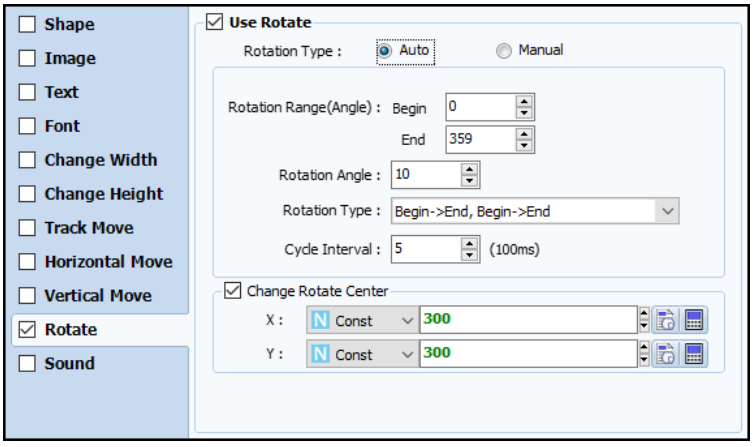
With the above configuration, the data of [D0010] becomes the Y position of the object.
If [D0010] reads [30], the object vertically moves to the Y coordinate of [30].

No.	User Address		Description
1	Address		Configure the address that shall be used as the Y coordinate.
2	Input Range	Min	Configure the minimum value of the address data. With the above configuration, if the address reads a value lower than [0], the object will move vertically to the Y coordinate of [0].
		Max	Configure the maximum value of the address data. With the above configuration, if the address reads a value higher than [100] the object will move vertically to the Y coordinate of [100].
3	Coordinate Range	Function	Coordinate range refers to the actual range which the object will be moved within. If the [Input Range] and [Coordinate Range] have same values, the actual data of the address will be applied as the Y coordinate of the object. (If, the address value is within the Input Range.) If the [Input Range] and [Coordinate Range] have different values, the [Y Coordinate] of the object will be calculated on a proportional basis.

			 With the above configuration, the actual Input Data of the address ranges between [0] and [4000], and the applicable [Y coordinate] proportional to the actual address data will range between [0] and [100]. Thus, if [D0010] reads [1000], the actual Y coordinate is [25]. If [D0010] reads [2000], the actual Y coordinate is [50]; if [D0010] reads [4000], the actual Y coordinate is [100]. If [D0010] reads a value higher than 4000, the actual Y coordinate is [100]; and if [D0010] reads a value lower than [0], the actual Y coordinate is [0]. You can configure the [Input Range] and [Coordinate Range] to a fixed constant, or an address for a variable movement.
		Begin	Configure the minimum Y coordinate of the range the object moves within. This coordinate refers to the highest point of the range.
		End	Configure the maximum Y coordinate of the range the object moves within. This coordinate refers to the lowest point of the range.

7.8.10 Effect - Rotate

When the condition is true, the object is rotated.



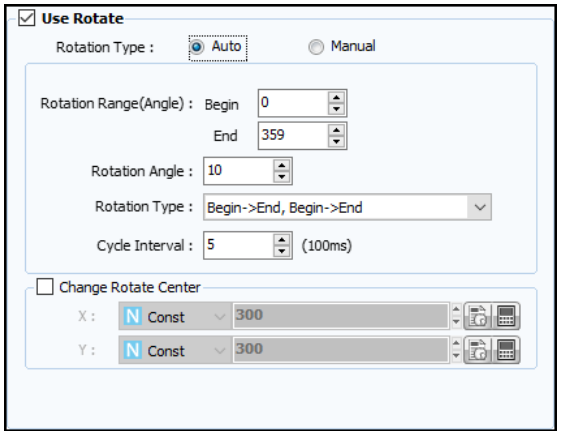
[Figure. Effect - Rotate]

No.	Rotate		Description
1	Rotation Type	Auto	The object is rotated in a specific angle within a specified range with the selected [Cycle Interval].
		Manual	The data of the configured address becomes the rotation angle of the

			object.
2	Change Rotate Center	Function	Change the center of rotation. If [Change Rotate Center] is disabled, the center of the object is the center of rotation. Thus, in this case, the object rotates with no significant change of location. If [Change Rotate Center] is enabled, and a dedicated coordinate is assigned to the center of rotation, the distance between the [Rotate Center] and the [Center of Object] becomes the rotation radius.
		X	Select the X coordinate of the new center of rotation.
		Y	Select the Y coordinate of the new center of rotation.

(1) Rotation Type - Auto

The object is rotated in a specific angle within a specified range with the selected [Cycle Interval].



[Figure. Rotation Type - Auto]

With the above configuration, the object will be rotated in the increment of 10˚ every 0.5 seconds within the Rotation Range of [0˚] to [359˚].

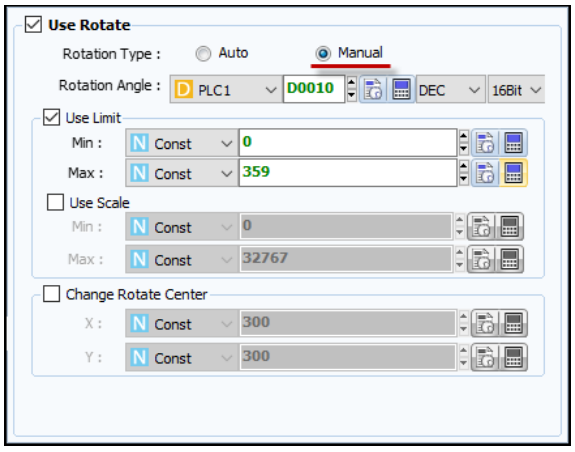
Once the object is rotated 359˚, it retrieves back to its original orientation (0˚).

No.	Auto		Description
1	Rotation Range (Angle)	Begin	The initial angle where the rotation starts. Select between [0˚] and [359˚]. For instance, if [0˚] is configured as the Begin angle, the object rotates from its original orientation. If [90˚] is configured as the Begin angle, the object will turn 90˚ and then further rotate according to other configurations.
		End	The final angle where the rotation stops. Select between [0˚] and [359˚]. For instance, if [180˚] is configured as the End angle, the object will rotate to the right up to 180˚.
2	Rotation Angle	Configure the increment angle for each rotation performed by one [Cycle].	
3	Rotation Type	Begin->End, Begin->End	Rotate the object clockwise. The object will rotate clockwise from the Begin angle to the End

			angle, and then go back to the Begin angle and rotate clockwise again.
		End->Begin, End-> Begin	Rotate the object counter clockwise. The object will rotate counter clockwise from the End angle to the Begin angle, and then go back to the End angle and rotate counter clockwise again.
		Begin->End->Begin->End	The object will rotate clockwise from the Begin angle to the End angle. Once the object reaches the End angle, it will rotate counter clockwise toward the Begin angle. Once the object retrieves back to the Begin angle, it will rotate clockwise again.
		End->Begin->End->Begin	The object will rotate counter clockwise from the End angle to the Begin angle. Once the object reaches the Begin angle, it will rotate clockwise toward the End angle. One the object retrieves back to the End angle, it will rotate counter clockwise again.
4	Cycle Interval	Configure the cycle interval of each [Rotation Angle].	

(2) Rotation Type - Manual

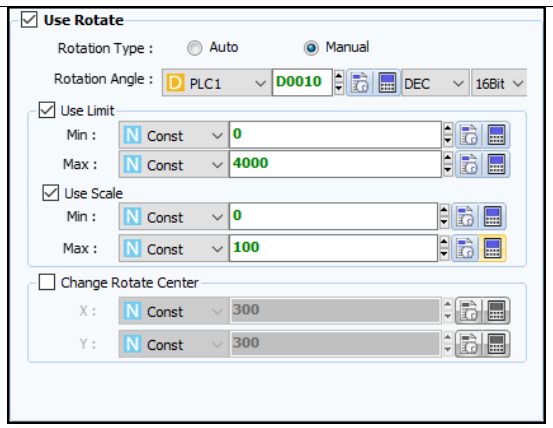
The data of the configured address becomes the rotation angle of the object.



[Figure. Rotation Type - Manual]

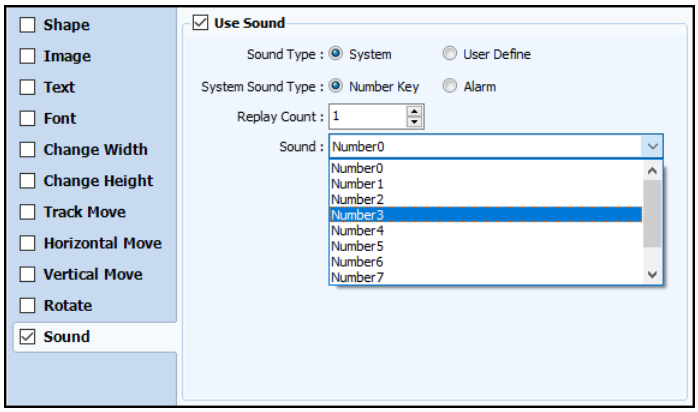
With the above configuration, the data of [D0010] becomes the Rotation Angle of the object.
If [D0010] reads [90], the object rotates [90˚] clockwise.

No.	Manual		Description
1	Rotation Angle		Configure the address that shall be used as the Rotation Angle.
2	Use Limit	Min	Configure the minimum value of the address data.
		Max	Configure the maximum value of the address data.
3	Use Scale	Function	[Use Scale] is applicable only if [Use Limit] is enabled. The [Rotation Angle] is calculated using the [Min] / [Max] value of [Use Scale] proportional to the [Min] / [Max] value of [Use Limit].

			 With the above configuration, the actual Input Data of the address ranges between [0] and [4000], and the applicable [Rotation Angle] proportional to the actual address data will range between [0] and [100]. Thus, if [D0010] reads [1000], the actual [Rotation Angle] is 25˚. If [D0010] reads 2000, the [Rotation Angle] is 50˚, and if [D0010] reads 4000, the [Rotation Angle] is 100˚. If [D0010] reads a value higher than 4000, the actual [Rotation Angle] is 100˚; and if [D0010] reads a value lower than [0], the actual [Rotation Angle] is 0˚. You can configure the [Use Limit] and [Use Scale] to a fixed constant, or an address for a variable rotation.
		Min	Configure the minimum [Rotation Angle] that shall be used proportional to the [Min] / [Max] of [Use Limit].
		Max	Configure the maximum [Rotation Angle] that shall be used proportional to the [Min] / [Max] of [Use Limit].

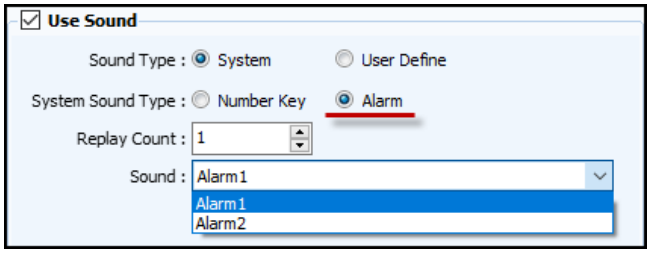
7.8.11 **Effect - Sound**

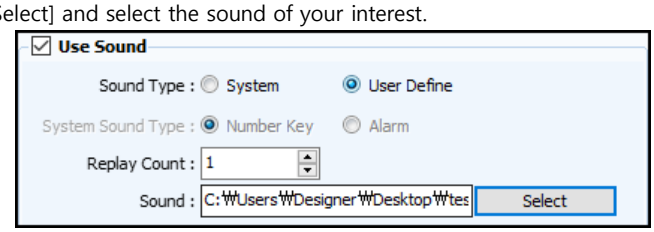
When the condition is true, an audible sound is made. Sound Effect is available only for TOPR premium models that support audio output.

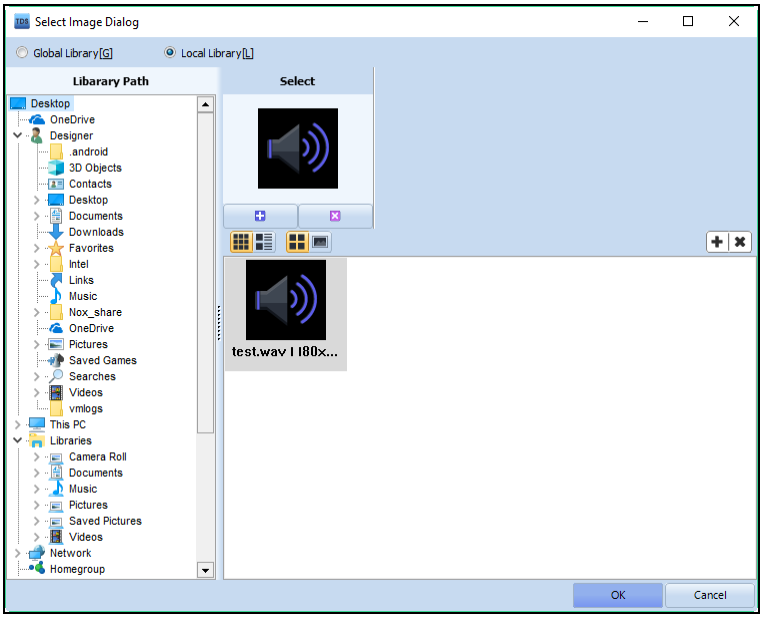


[Figure. Effect - Sound]

No.	Effect - Sound		Description
1	Sound Type	System	System sounds are the sounds provided by default. For [Sound Type] of [System], select between [Number Key] and [Alarm]. Select the [Sound] from the drop-down menu.

<table>
<tr><td></td><td></td><td></td><td>For [Number Key], 10 sounds each corresponding to [0] to [9] are available.
This function is used to create sounds upon input to each number key.
For [Sound Type] of [Alarm] two alarms of [Alarm1] and [Alarm2] are provided.
The selected sound is used to provide an audible indication of an [Alarm].
 

[Figure. System Sounds]</td></tr>
<tr><td></td><td></td><td>User Define</td><td>Select [User Define] to load a sound of your selection to be used when the condition is true. The applicable audio file type is [*.WAV].
Click [Select] and select the sound of your interest.
 

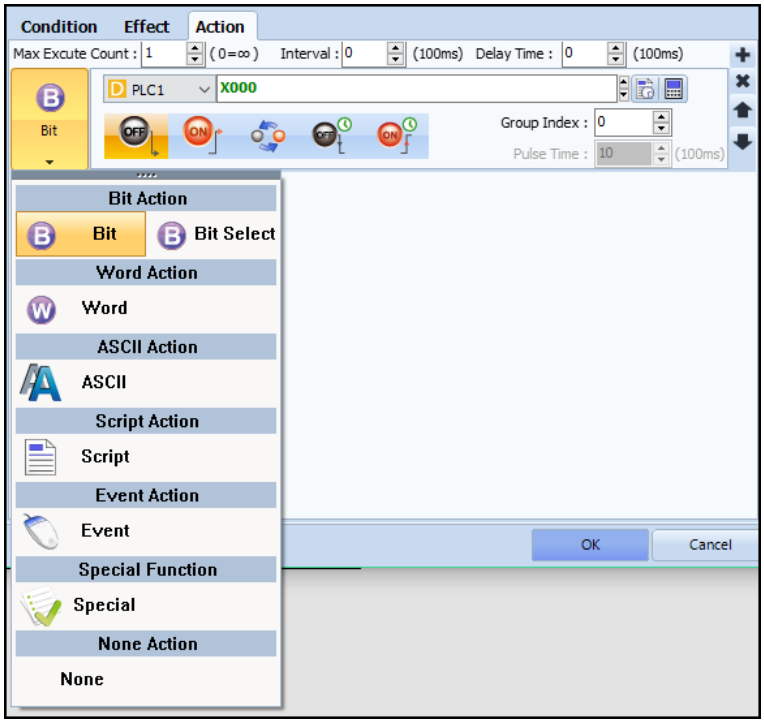
[Figure. Sound Type - User Define]
 

[Figure. Selecting a [*.WAV] file]
Caution! TOP supports PCM WAV files. Therefore, [*.WAV] that does not employ PCM audio format may not be properly played.</td></tr>
<tr><td>2</td><td>Replay Count</td><td colspan="2">Configure the number of times the sound will be repeated.
When the condition is true, the sound will be repeatedly played for the number of times configured as [Replay Count].</td></tr>
</table>

7.9 Action Tab

[Action] refers to the action that is executed upon a true condition.

As shown below, [Action] includes [Bit Action] / [Word Action] / [ASCII Action] / [Script Action] / [Event Action] / [Special Action] / [None].

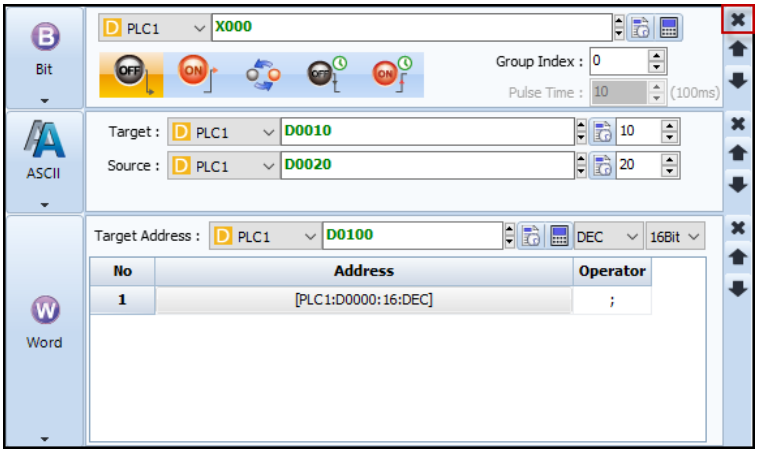


[Figure. Action Tab]

No.	Action	Description
1	Bit Action	Control the data of a Bit Address.
2	Word Action	Control the data of a Word Address.
3	ASCII Action	Enter a string to a selected address.
4	Script Action	Execute a script operation.
5	Event Action	Configure an event with the [Keyboard] / [Keypad] / [Ten Key].
6	Special Action	Execute a special action related to [Screen] / [Print] / [SD Memory] / [Memory] / [System] /

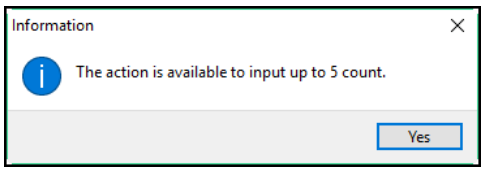
		[Application] / [Camera].
7	None Action	Assign no action to the condition.

You can add up to 5 actions with the [+] button on the upper right corner. If multiple actions are configured, each action will be executed in the order as presented when the condition is true.



[Figure. Adding an Action]

The following message will appear if the number of actions exceed 10.



[Figure. Error Message - Excessive number of actions]

Three function buttons are provided on the right side of each action.

No.	Action	Description
1	✖	Delete the subject Action.
2	⬆	When multiple actions are configured, upon a true condition, the action on the top of the list is executed first, followed by each action in the order from top to bottom. Click the move upward button to move the subject action one row upward.
3	⬇	When multiple actions are configured, upon a true condition, the action on the top of the list is executed first, followed by each action in the order from top to bottom.

		Click the move downward button to move the subject action one row downward.

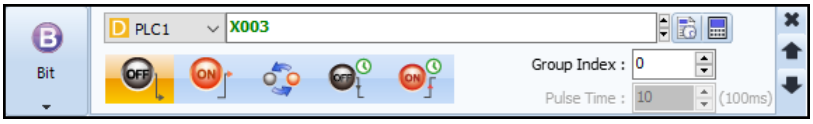
Configure the [Max Execute Count] / [Interval] / [Delay Time] that are applicable upon a true condition.

No.	Action	Description
1	Max Execute Count (0=∞)	Configure the number of time the actions should be repeated. Select [0] to continuously execute the action while the condition is true. Select [1] to execute the action a single time even the true condition is sustained.
2	Interval (100ms)	Configure the interval between actions. Select [0] to achieve the most rapid speed.
3	Delay Time (100ms)	Configure the time to delay the execution of the action. Select [0] to execute an action immediately when the condition becomes true. If [5] is selected, the action will be executed 5 seconds (5 x 100ms) after the condition becomes true.

7.9.1 Action - Bit Action

(1) Bit

Control a Bit Address upon a true condition. [ON] / [OFF] / [Reverse] are the applicable actions.



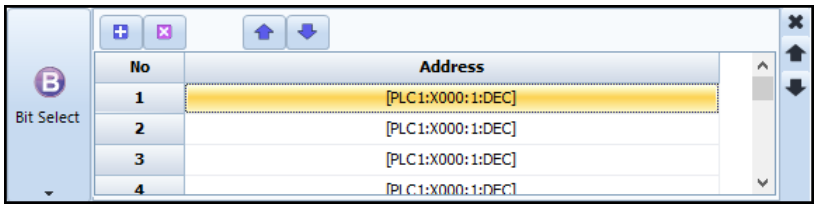
[Figure. Bit Action]

No.	Bit	Description
1	Address	Configure the Bit Address that will be controlled.
2		[OFF Continue] The data of the configured address turns OFF upon a true condition. In other words, the value will change to [0].
3		[ON Continue] The data of the configured address turns ON upon a true condition. In other words, the value will change to [1].
4		[Reverse] The data of the configured address will change from [1] to [0] or [0] to [1], whichever the previous data may have been, upon a true condition.
5		[OFF Pulse] The data of the configured address is turned OFF for the time configured as [Pulse Time]. In other words, the data will read [0] for the [Pulse Time] and retrieve back to [1] afterwards.
6		[ON Pulse] The data of the configured address is turned ON for the time configured as [Pulse Time]. In other words, the data will read [1] for the [Pulse Time] and retrieve back to [0] afterwards.
7	Group Index	Configure a group index to multiple bit addresses. To configure multiple bit addresses to a group, enter a number other than [0] in [Group Index]. Select [0] to configure no group index. The bit addresses with the same [Group Index] number will be allotted to the same group. If a bit address allotted to a group index turns ON, all other addresses of that group index turn OFF. For instance, if [X001] to [X005] are assigned to the same group index, and [X001] is turned

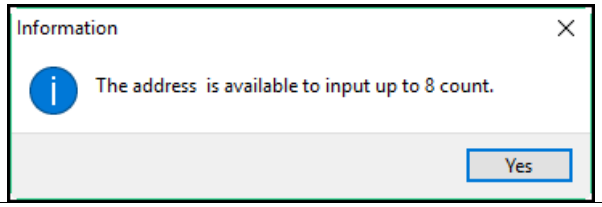
		[ON], the other addresses from [X002] to [X005] turns [OFF].
8	Pulse Time (100ms)	Pulse Time is applicable for [OFF Pulse] and [ON Pulse]. The OFF or ON status will be maintained for the configured of amount of time. Configure between [1] and [600] (100ms).

(2) Bit Select

Configure multiple bit addresses. You can add up to 8 bit addresses.
When the condition is true, each bit address turns [ON] in the sequential order of [No.].
If one bit address turns ON, all other bit addresses turn OFF.

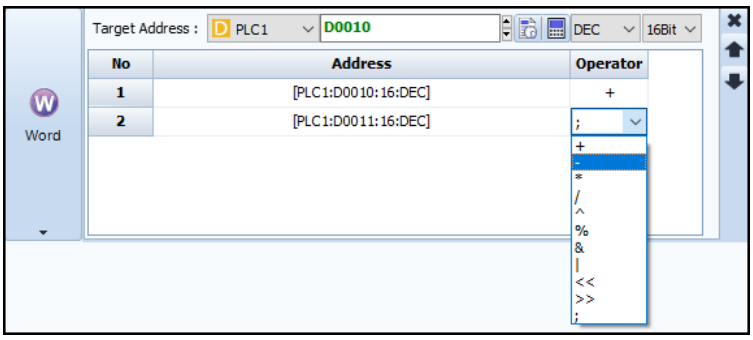


[Figure. Bit Select]

No.	Bit Select	Description
1	Address	Double click the address entry field to configure the address.
2		Add addresses to Bit Select. You can add up to 8 conditions. The following message will appear if the total number addresses exceeds 8. 
3		Delete a selected address.
4		Move a selected address to a higher precedence number.
5		Move a selected address to a lower number of precedence.

7.9.2 Action - Word Action

Control the data of a word address upon a true condition.
A Word address refers to a 16 bit address storing analog data.
Word Action is an action substituting data or the result of an operation to such address.



[Figure. Word Operation]

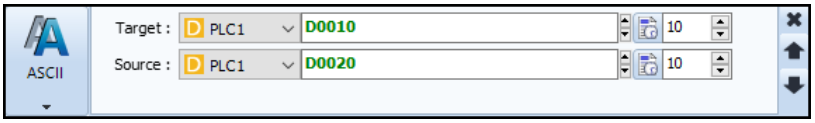
With the above configuration, when the condition is true, the sum of the values of [D0010] and [D0011] is entered to [D0010].

No.	Word Operation		Description
1	Target Address		Configure the word address in which the operation result is entered. DEC 32Bit Select the Data Type and Size from each drop down menu. DEC UDEC HEX BCD FLOAT / 16Bit 32Bit [Figure. Data Type and Size]
2	Address		Configure an address for row No. [1] Select [;] from the drop down menu of the [Operator] Column, as the operator to input the value the configured address as the value for the [Target Address]. When you select any operator other than [;], row No.[2] will be added automatically. Configure the address No.[2] subject to the operation. Execute the selected operation for the value of the selected addresses of Nos.[1] and [2], and enter the result to the [Target Address]. You can add operation equations by adding operators, and corresponding addresses. Operation will be executed in the ascending sequential order, regardless of the operator. In other words, the result of operation between [1] and [2] is used further operated with [3], and the result from that operation is then operated with [4].
3	Operator	+	Add the two operands and enter the result in the Target Address.
		-	Subtract the second operand from the first operand and enter the result in the [Target Address].
		*	Multiply the two operands and enter the result in the Target Address.
		/	Divide the first operand with the second operand and enter the result in the Target Address.
		^	Execute a Bit XOR operation between the two operands and enter the result in the Target Address.
		%	Execute an MOD operation between the two operands and enter the result in the Target Address. The modulo operation finds the remainder after division of the first operation by the second operand.
		&	Execute a BIT AN operation between the two operands and enter the result in the Target Operand.
		|	Execute a BIT OR operation between the two operands and enter the result in the Target Address.
		<<	Left Shift Operator. The left shift operator causes the bits of the first operand to be shifted to the left by the number of positions specified in the second operand.

			For instance, if the first operand [D0001] reads [1], and the second operand is a constant of [3]. For the operation of [D0001] << 3, the binary form of [1] is [0000000000000001]. Each bit of the binary form is shifted to the left 3 positions, to find [0000000000001000]. The decimal form of this result is [8].
		>>	Right Shift Operator The right shift operator causes the bits of the first operand to be shifted to the right by the number of positions specified in the second operand. For instance, if the first operand [D0001] reads [8], and the second operand is a constant of [3]. For the operation of [D0001] >> 3, the binary form of [8] is [0000000000001000]. Each bit of the binary form is shift to the right 3 positions, to find [0000000000000001]. The decimal form of the result is [8].
		;	Use [;] to terminate the operation.

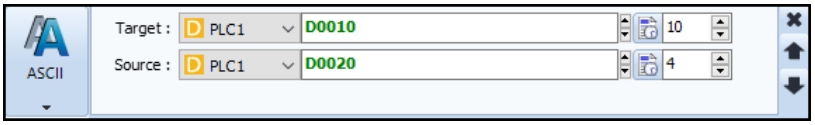
7.9.3 Action - ASCII Action

Substitute the string of the [Target] address with the string from the [Source] Address upon a true condition.

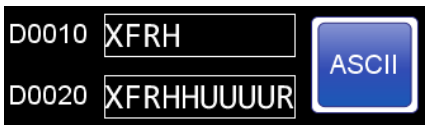


[Figure. ASCII Action]

The size of a single ASCII Code Character is 8bit. Accordingly, 2 characters are recorded in a word address(16Bit).
Configure the [Character Count] provided on the right side of each [Target] address and [Source] Address. With the above configuration, upon a true condition, the 10 characters from the five addresses of [D0020] to [D0024] are entered into the five addresses of [D0010] to [D0014].
You can configure different numbers of [Character Count] for the [Target] address and [Source] address. If the [Character Count] of [Source] address is 4, and the [Character Count] of [Target] address is 10, only 4 characters are copied, as shown below.



[Figure. Different Character Count]



[Figure. Different Character Count]

7.9.4 Action - Script Action

Execute a script upon a true condition.

You can configure scripts at [Project] - [Script].
Refer to Chapter 4.5 [Script] for more details.

[Figure. Script Action]

7.9.5 Action - Event Action

Configure an action from the keypad.

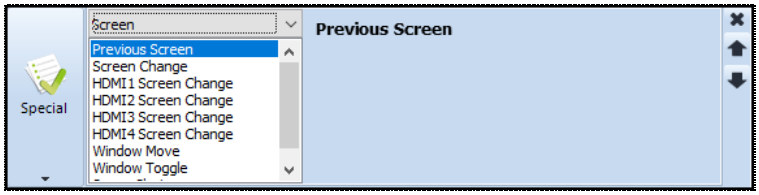
[Figure. Event Action]

No.	Event Action		Description
1	Key		Select the key of your interest.
2	Action		Touch Down, the key is virtually pushed down.
			Touch Up, a touched down key is virtually released.

You can select among various types of keys. String input keys and numeric input keys are also available.

7.9.6 Action - Special Action

Execute a special action upon a true condition.



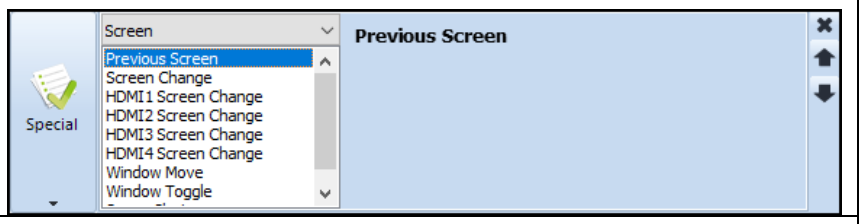
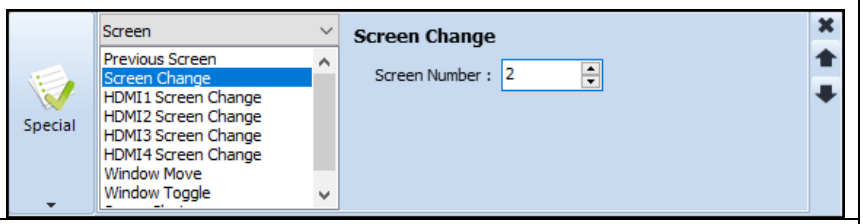
[Figure. Special Action]

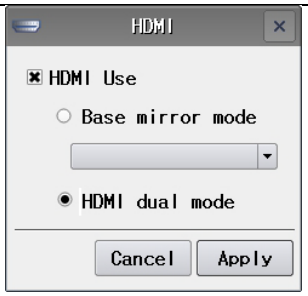
No.	Special Action	Description
1	Screen	Configure a special action related to the screen including [Previous Screen] / [Screen Change] / [HDMI Screen Change] / [Window Move] / [Window Toggle] / [ScreenShot].
2	Print	Configure actions related to Print.
3	Storage	Configure actions related to the Memory connected to the TOP device.

4	Memory	Configure actions related to [Memory Copy] / [System Buffer Copy] / [Log Clear] / [Alarm Clear].
5	System	Configure actions related to System and Security.
6	App	Configure actions that load applications from the Menu Screen.
7	Camera	Configure actions related to the TOPR Premium Model internal camera or an external camera.

(1) Action - Special Action (Screen)

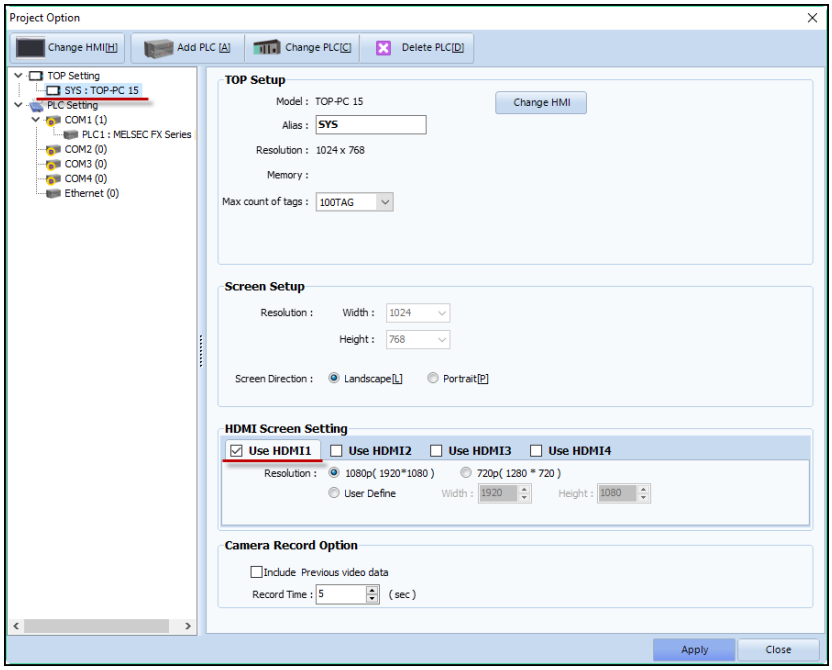
Configure a special action related to the screen including [Previous Screen] / [Screen Change] / [HDMI Screen Change] / [Window Move] / [Window Toggle] / [ScreenShot].

No.	Screen	Description
1	Previous Screen	The TOP device navigates back to the immediately previous screen. 
2	Screen Change	The TOP device navigates to the selected [Screen Number]. 
3	HDMI1 Screen Change HDMI2 Screen Change HDMI3 Screen Change HDMI4 Screen Change	Configure monitoring of the TOP device screen from a [Projector] / [PC] / [TV] connected with the TOP device via HDMI. A TOPR premium model has one HMDI output, and TOPView has four HDMI outputs. If [Base Mirror Mode] is selected at [Control Panel] - [HDMI] from the TOP device Menu Screen, the TOP device screen is copied to the HDMI device, where there is no need to configure a separate HDMI screen. If [HDMI dual mode] is selected, a separate HDMI screen can be configured for monitoring.



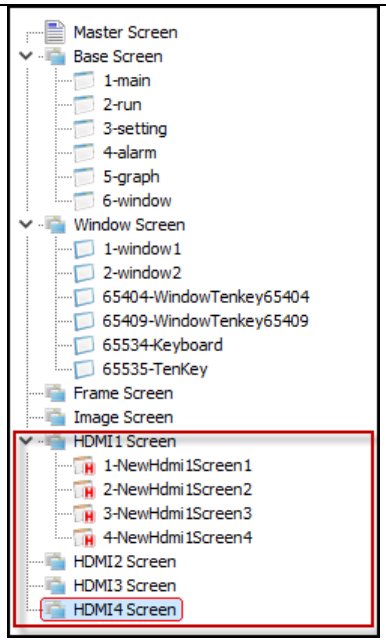
[Figure. HDMI Setting from Menu Screen]

Select [Project] - [Property] from the TDS to open the [Project Option] window. Select the TOP model from [TOP Setting] provided in the list of the left side, to access [HDMI Screen Setting] on the right field. Select the HDMI that should display a screen different with the TOP device employing [HDMI dual mode]. With the below sample, TOPView is selected for the project, and you can configure up to 4 HDMI connections.

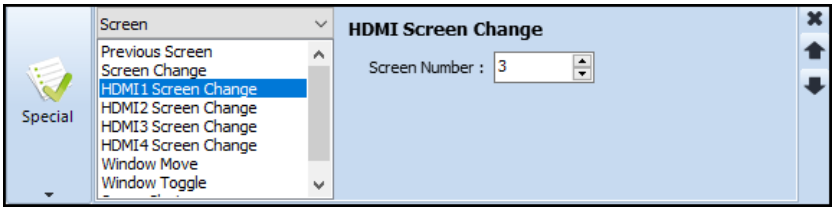


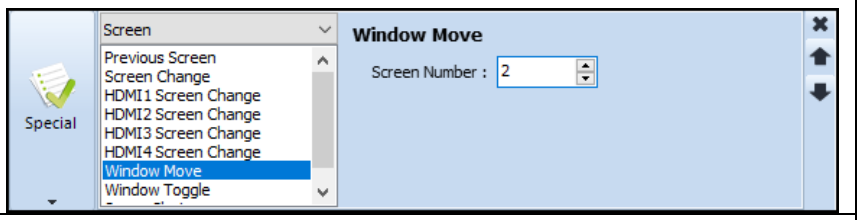
[Figure. Project Option]

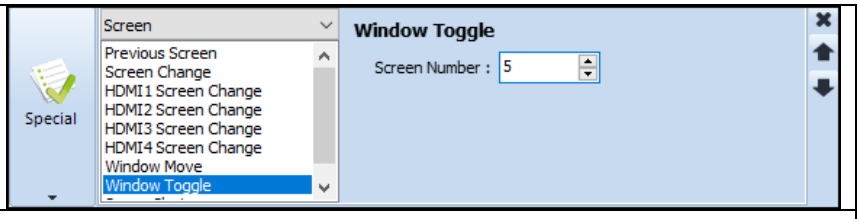
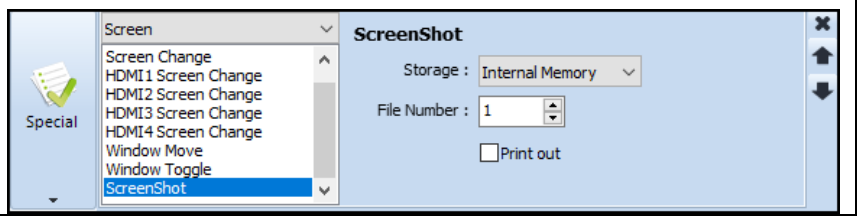
With the above configuration, the lists of screens for HDMI1 to HDMI4 are shown in the [Project Manager] window. Select and configure each HDMI screen.

<table>
<tr><td></td><td></td><td> 

[Figure. Project Manager]

With the above configuration you can change the screen with [HDMI1 Screen Change]. The display will change the corresponding HDMI1 [Screen Number] upon a true condition.
 

The same method is applicable for HDMI2, HDMI3, HDMI4.</td></tr>
<tr><td>4</td><td>Window Move</td><td>Move the location of a pop-up window.
With a [Touch] object, configure the [Condition] as [Event] - [Touch Down], and select [Action] - [Special] - [Window Move], and configure the number of the window screen you intend to move.
This [Touch] object may be included to the window screen you intend to move, or on the base screen.
While operating the TOP device, touch the [Touch] object, then touch the location to where you intend to move the pop-up window, the upper left corner of the window screen will be moved to the selected location.
 
</td></tr>
<tr><td>5</td><td>Window Toggle</td><td>The window screen assigned to the configured [Screen Number] will pop-up upon a true condition.</td></tr>
</table>

		
6	ScreenShot	The current screen is captured and saved to a [*.JPG] file upon a true condition. Select [Internal Memory] / [SD Card] / [USB] for [Storage]. Select [Internal Memory] to save the image on the TOP internal memory. Go to [Menu Screen] - [File Browser] and open the [ScreenCapture] folder to access the captured image. Select [SD Card] to save the image on the SD Card inserted to the TOP device. Select [USB] to save the image on the USB memory connected to the TOP device. Go to [UserData] - [ScreenCapture] to access the captured image saved on the [SD Card] or [USB] device. The format of the file name is [Current Date - File Number]. The [File Number] will be the number employed by the first screen shot captured on a given day. In other words, with the below configuration, the capture image is saved as a [*.JPG] file in the path of [SD Card] - [UserData] - [ScreenCapture], where the first capture is named as [20170530-1.jpg], the second capture is [20170530-2.jpg], the third capture is [20170530-3.jpg], so on and so forth. 

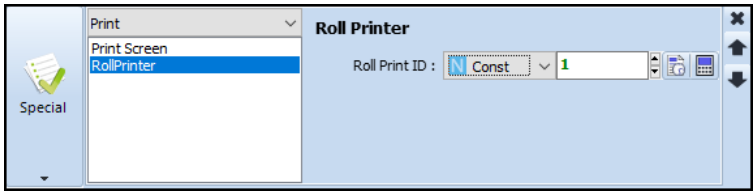
(2) Action - Special Action (Print)

Configure actions related to Print.

Once you run a TOPView, you can connect a roll printer to the PC and print in the configured format.

Refer to Paragraph (2) [Printer] of Chapter 1.2.9 [Control Panel - Communication Device] and Chapter 4.11 [RollPrinter] for more details.

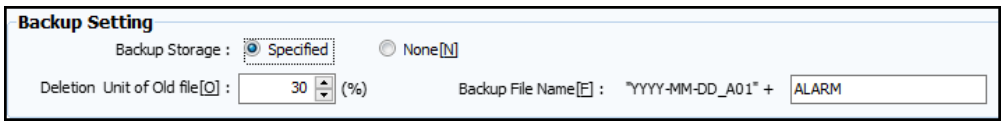
Select [RollPrinter] as below, and configure the [Roll Print ID], the [Print] will be executed upon a true condition. [Roll Print ID] refers to the page ID that will be printed, as configured at [Project] - [RollPrinter] from TDS.



[Figure. Special Action - RollPrinter]

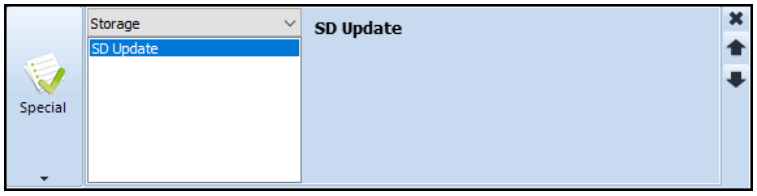
(3) Action - Special Action (Storage)

Configure actions related to storage devices connected to the TOP device.
If back up to SD Card is configured for Alarm and Log Data saved on the TOP device, once the memory allotted to each Alarm / Log Data is full, the fraction of such data according to the configured [Deletion Unit of old file(%)] is saved to the SD Card, and the copied data is deleted from the TOP internal memory.



[Figure. Backup to SD Card]

[SD Update] action copies all Alarm / Log data that has not been previously backed up to the SD card, and deletes the backed up Alarm / Log Data from the TOP memory.

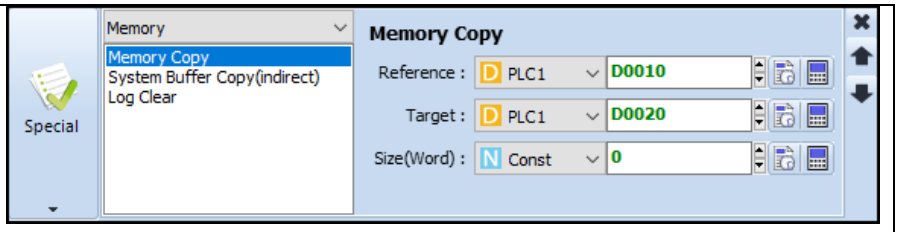
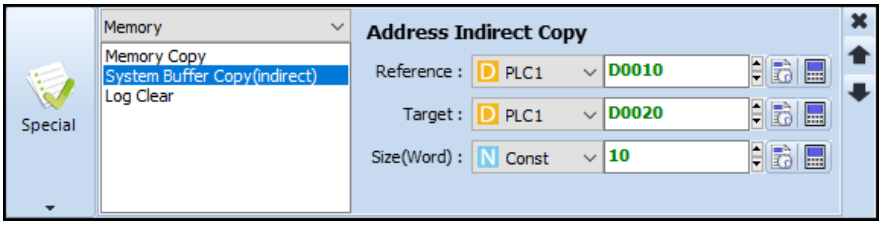
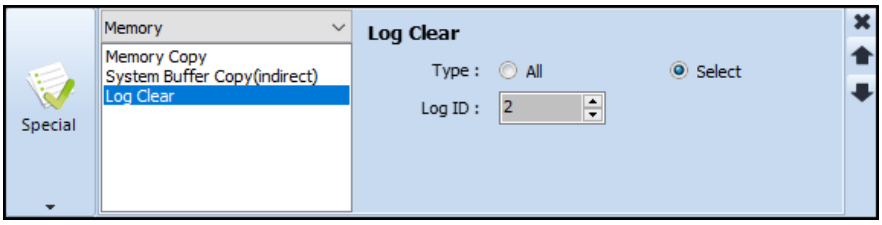


[Figure. Special Action - SD Update]

(4) Action - Special Action (Memory)

Configure actions related to [Memory Copy] / [System Buffer Copy] / [Log Clear] / [Alarm Clear].

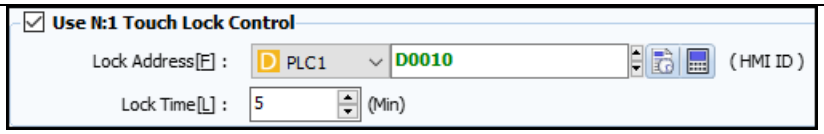
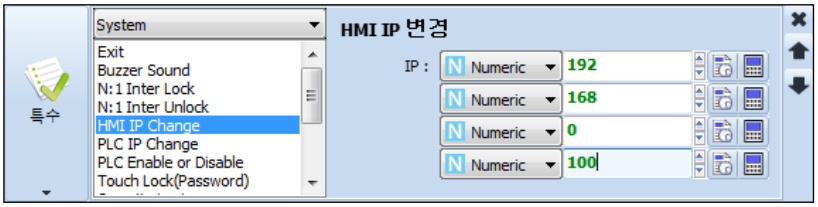
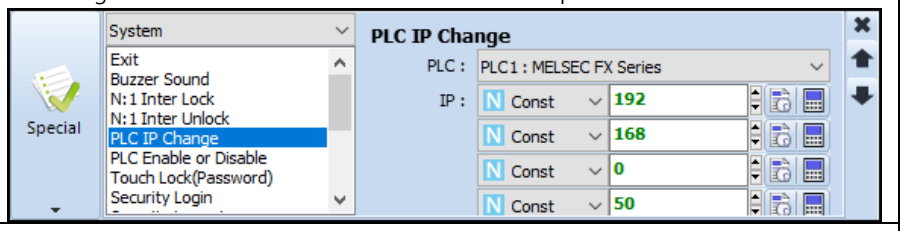
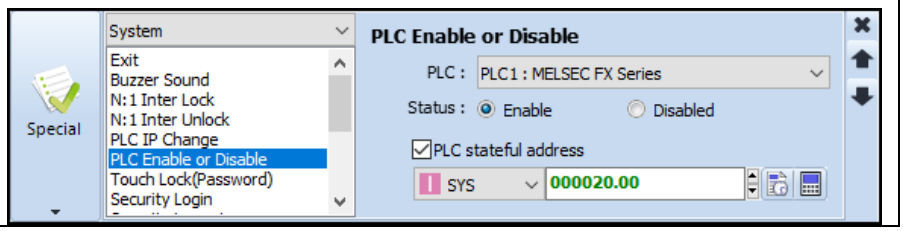
No.	Memory	Description
1	Memory Copy	Copy the data from the [Reference] address to the [Target] address. Configure the number of addresses to copy each data with [Size(Word)]. The configured [Reference] address and [Target] address are the start address. The data of addresses beginning from the [Reference] address up to the address that conforms the [Size(Word)] is copied. With the below configuration, the data between [D0010] to [D0019] are copied to [D0020] to [D0029]. In other words, D0020=D0010, D0021=D0011, D0022=D0012, ... , D0029=D0019.

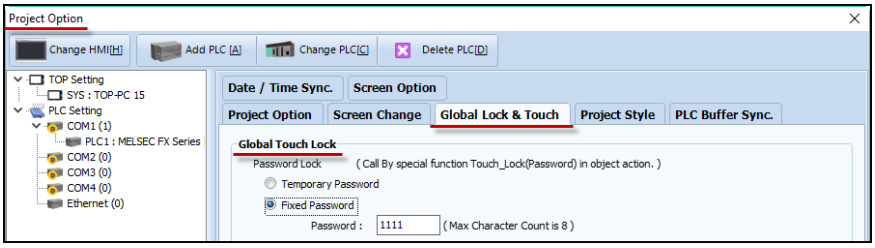
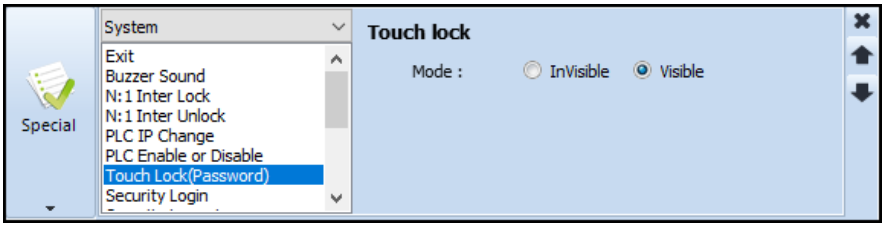
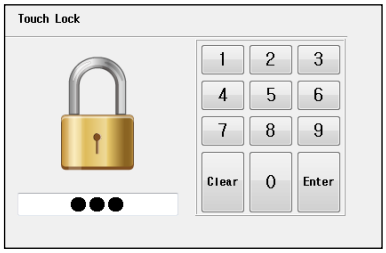
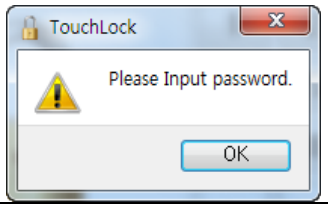
		
2	System buffer Copy (indirect)	Copy the data of the TOP internal address (System Buffer). The data for [Reference] address and [Target] address, are indirect addresses of the TOP internal address. Configure the number of addresses to copy each data with [Size(Word)]. With the below configuration, if [D0010] reads 20, and [D0020] reads 40, each value of the ten internal addresses from [00020] to [00029] is copied to the ten internal addresses from [00040] to [00049]. In other words, [00040]=[00020], [00041]=[00021], [00042]=[00022], ... , [00049]=[00029]. 
3	Log Clear	Delete log data stored on TOP internal memory. You can configure up to 16 logs wit Log IDs from [1] to [16]. Select [All] to delete all log data. Select [Select] and configure a specific [Log ID] number to delete the corresponding log data. 

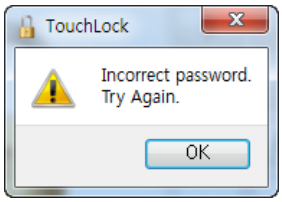
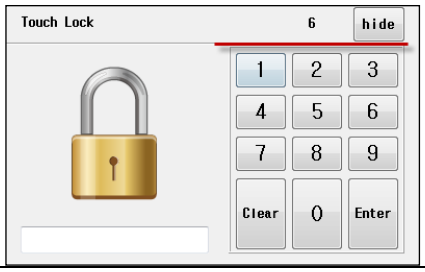
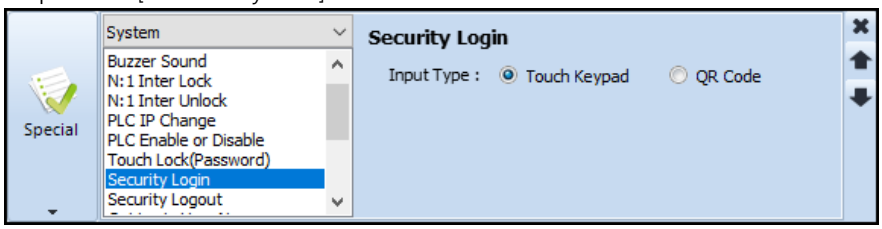
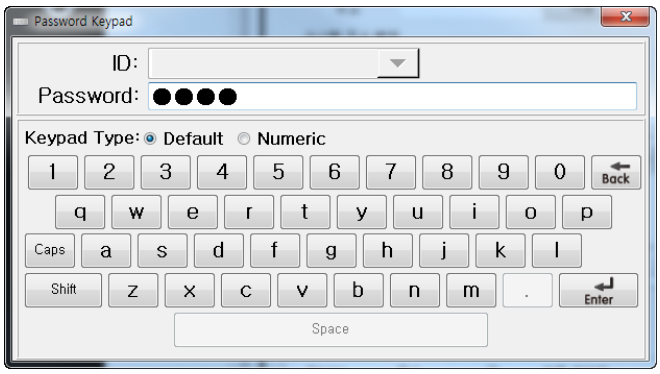
(5) Action - Special Action (System)

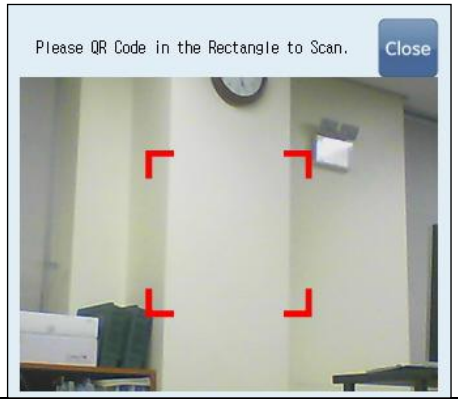
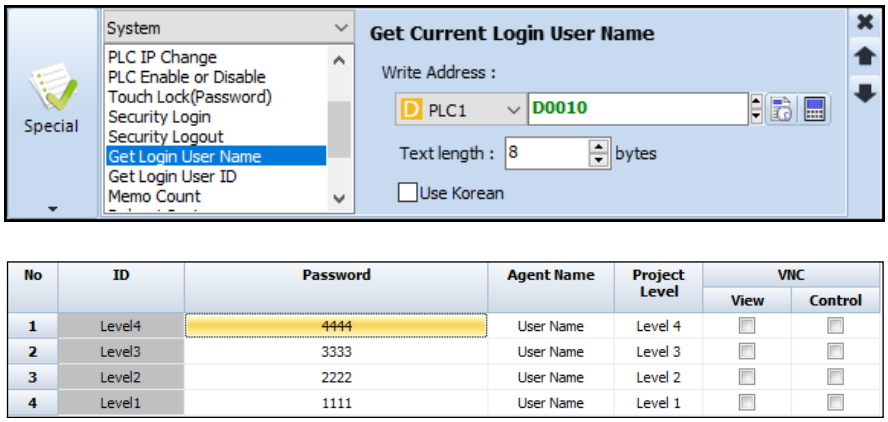
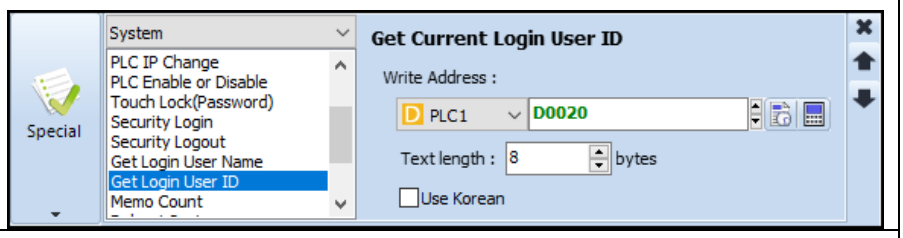
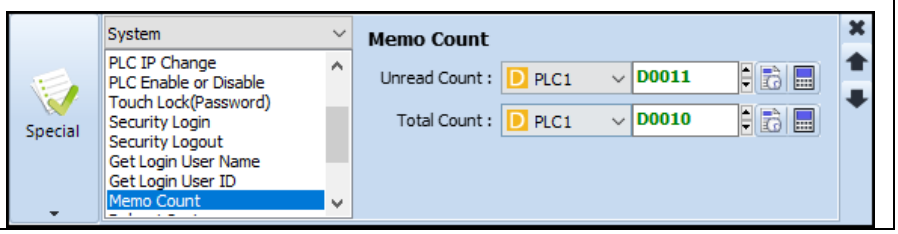
Configure actions related to System and Security.

No.	Memory	Description
1	Exit	Terminate the Run Screen and go back to Menu Screen.
2	Buzzer Sound	Play the buzzer sound upon a true condition.
3	N:1 Inter Lock	Connecting multiple PLCs to a single TOP device is referred as [N:1] communication. To prevent problems that may occur by simultaneously controlling multiple TOP devices from a single PLC, you should configure [Use N:1 Touch Lock Control] settings. Go to [Project] - [Property] to open [Project Option]. Enable [Use N:1 Touch Lock Control] to create an [N:1 Interlock Action].

		 [Figure. Use N:1 Touch Lock Control] The above sample configuration will allow the data of Lock Address of [D0010] to become the HMI ID that can be controlled. TOP devices with other HDMI IDs will not be locked and no touch input will be allowed. (Go to [Control Panel] - [Project Settings] - [11. HDMI ID] at your TOP device to check the HMI ID.) If the value of the Lock Address of [D0010] is [0], all input is allowed from all TOP devices. For a [Lock Time] of [5] minutes, the moment one minute elapses from the last touch input, [0] will be entered to the [Lock Address] and the interlock will be dismissed. Configure [N:1 Interlock] to apply the HMI ID of itself as the [Lock Address] to prevent input from other TOP devices. Caution! If there is another device with the same HMI ID with the operating TOP device, the interlock may not be properly applied. Configure the HMI ID from the [Information] menu of the Menu Screen of the TOP device, or go to [Info] provided on the Top Scroll menu.
4	N:1 Inter Unlock	Configure [N:1 Inter Unlock] to substitute the Lock Address with [0] and dismiss the N:1 Interlock.
5	HMI IP Change	Change the IP Address of the TOP device. The configured IP address becomes the TOP device IP address upon a true condition.  Caution! Changing the IP address during operation may require a significant amount to time (several seconds, in general) to be fully reflected according to the network configuration.
6	PLC IP Change	Change the IP address of the PLC. The configured IP address becomes the PLC IP address upon a true condition. 
7	PLC Enable or Disable	Configure whether to enable or disable a PLC upon a true condition. Select [Enable] to permit communication. Select [Disable] to deny communication. 

		The PLC Enable/Disable status is recorded at [PLC Stateful Address]. If the selected address reads [1] the PLC is enabled, and if the address reads [0], the PLC is disabled.
8	Touch Lock(Password)	Execute this action to apply a touch lock, or dismiss the touch lock via login, if a [Global Touch Lock] is enabled at [Project] - [Property] - [Global Lock & Touch].  [Figure. Global Touch Lock enabled] [Global Touch Lock] applies a [Touch Lock] to all objects added to the screen to prohibit any input. Touch is allowed and recognized only after password verification. Apply touch lock when a temporary on-site lock or a maintenance job is required. (Refer to Chapter 4.12.6 [Global Lock & Touch] for more details.) Touch Lock is not applied when a project is executed.  With the above configuration, executing [Touch Lock(Password)] will apply a touch lock, while the [Touch Lock Password Keypad], as shown below, will pop-up.  [Figure. Touch Lock Password Keypad] Do any work required to be done under touch lock, and enter the password in the above window to dismiss the [Touch Lock] and terminate the password keypad. If a situation where touch lock is required occurs, execute the [Touch Lock(Password)] action. If you click [Enter] without entering the password, the below error message will appear. 

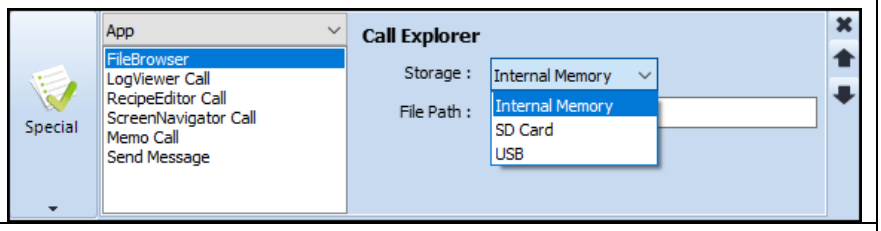
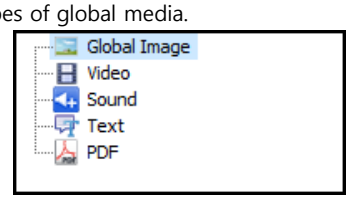
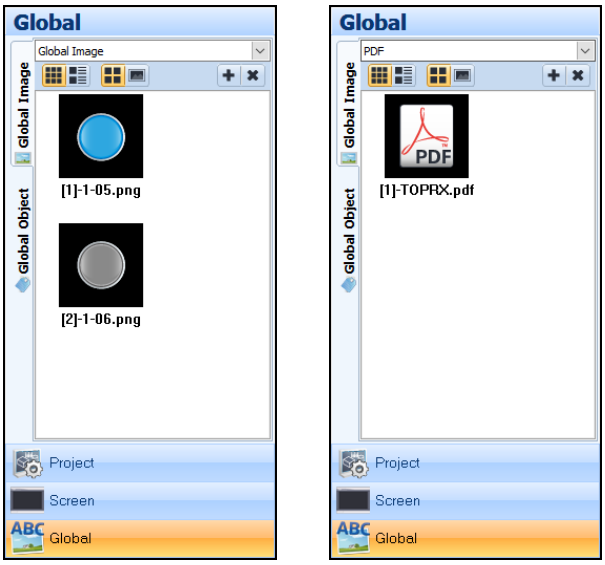
		If you click [Enter] with the wrong password, the below error message will appear.  If you forgot the Temporary Password, press the key icon for five or more seconds, the password will appear right beneath the keypad. If you select [Visible], the [Touch Lock] window will be shown on the TOP device at all times until the password is verified. If you select [Invisible], the [Touch Lock] window will be not shown on the TOP device without password verification when [Touch Lock] is applied. As shown below, a [Hide] button will be shown with a countdown from 10. Click [Hide] to close the login window. Once the countdown is finished at [0], the login window will close. Press any key among [0] ~ [9], [Clear] or [Enter], the count will restore to 10. 
9	Security Login	Login with this action if [Use Security Level] is enabled from [Project] - [Security]. Refer to Chapter 4.7.2 [Use Security Level] for more details.  Select [Touch Keypad] for [Input Type] to open the below keypad upon execution of the action. Type in the corresponding password and press [Enter]. 

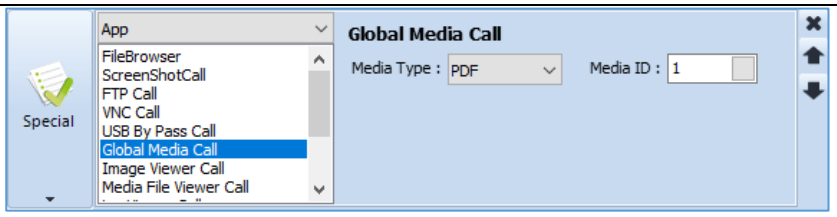
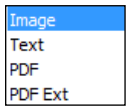
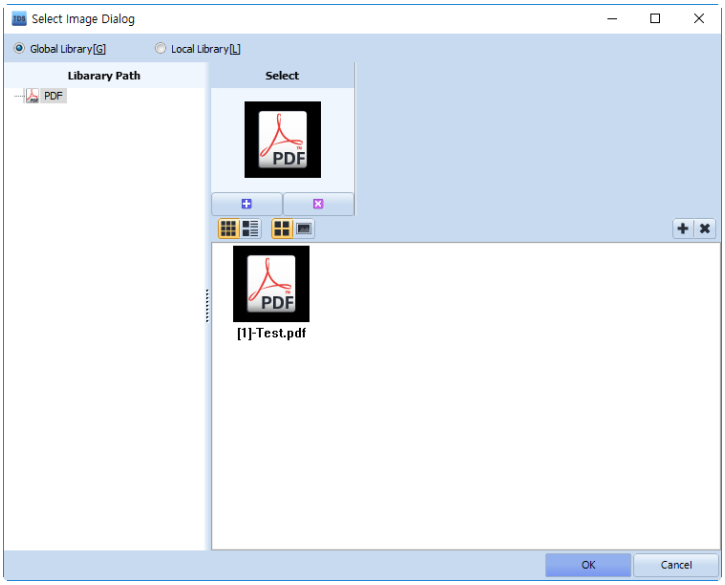
		Select [QR Code] for the [Input Type], and recognize the QR code to the front camera of the TOP device. (A front camera is provided for TOPR Premium models.) Once the action is executed, the below screen appears, to fit the QR code in the red square. 
10	Security Logout	Logout from the currently logged in User. The security level will be reset to [0].
11	Get Login User Name	Save the User Name of the currently logged in Security Level to [Write Address]. Configure the length of the User Name with [Text Length].  [Figure. Security]
12	Get Login User ID	Save the I of the currently logged in Security Level to [Write Address]. Configure the length of the ID with [Text Length]. 
13	Memo Count	Save the number of memos to a specific address. Save the number of unread messages to the address configured for [Unread Count]. Save the number of total messages to the address configured for [Total Count]. 

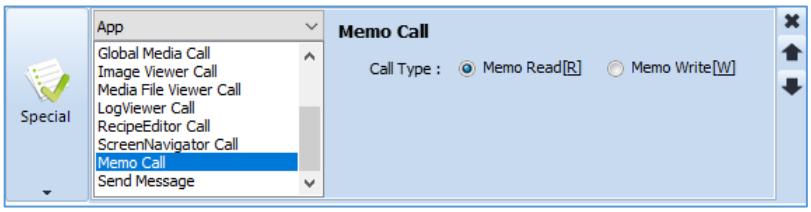
14	Reboot System	Reboot the TOP device.

(6) Action - Special Action (App)

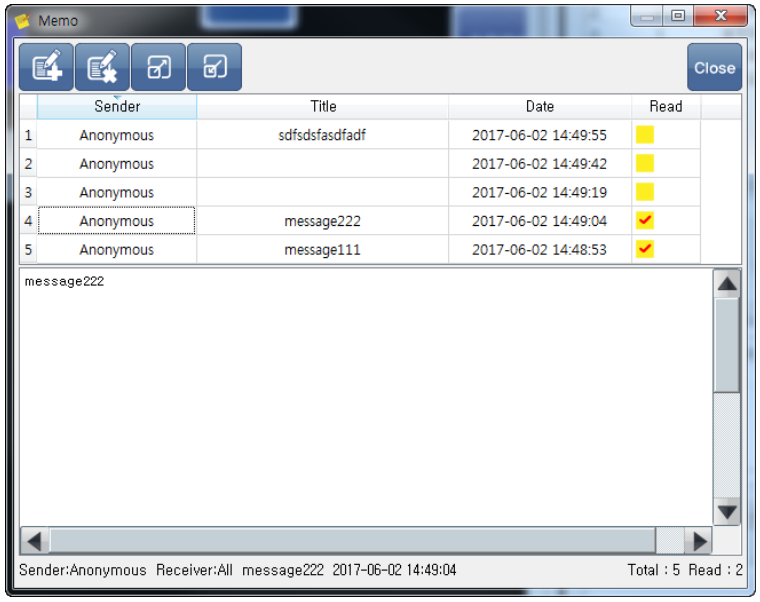
Call and run an application from the Menu Screen.

No.	Memory	Description
1	FileBrower	Load the File Browser application. Select [Internal Memory] / [SD Card] / [USB] for [Storage]. Once the File Browser is loaded, the device selected for [Storage] will be show as default. 
2	ScreenShotCall	Load the Screen Shot application.
3	FTP Call	Load FTP.
4	VNC Call	Load VNC Viewer.
5	USB By Pass Call	Load the front USB.
6	Global Media Call	Load a global media registered to resource during project running. Add and manage global media at [Project Manager] - [Resource]. Refer to the following types of global media.  [Figure. Types of global media] Click the [+] button provided on the upper right side of [Project Manager] - [Resource].  [Figure. Project Manager - Resource]

		 Select among [Image] / [Text] / [PDF] / [PDF Ext] for [Media Type].  Click the ▢ square box on the right side of the [Media ID] input field to open the [Select Image Dialog]. Select the media to open, and click [OK].  [Figure. Select Media] With the above configuration, the selected media is displayed upon a true condition. Refer to Chapter 22.6.3 [Resource] for more details.
7	LogViewer Call	Load LogViewer.
8	RecipeEditor Call	Load the Recipe Editor.
9	ScreenNavigator Call	Load the ScreenNavigator.
10	Memo Call	Load the [Memo Read] window or [Memo Write] window. You can leave a message on site, or read a message left on site.



Select [Memo Read] to open the below memo window and read memos.



[Figure. Memo Read]

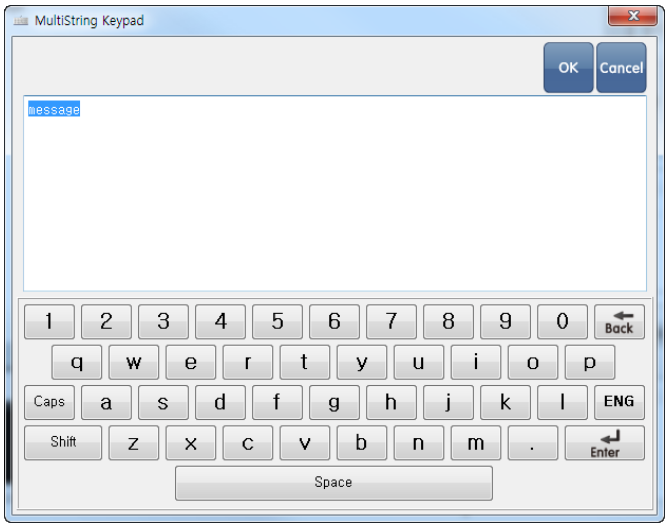
Open the Memo Write window to leave a memo.

Delete a selected message.

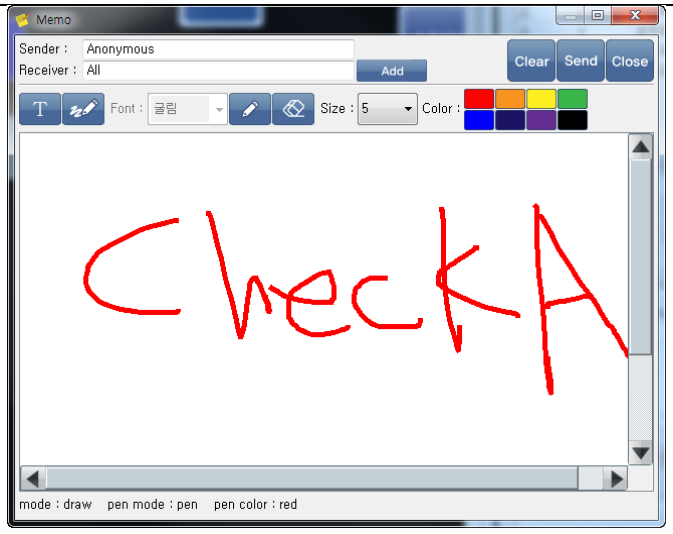
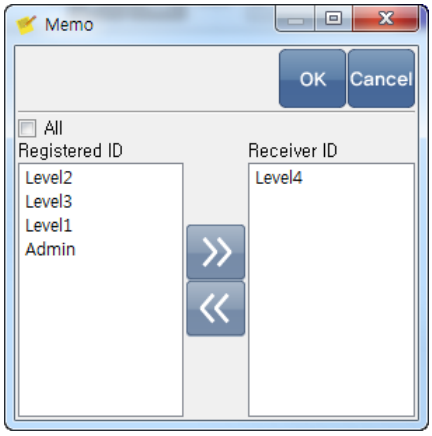
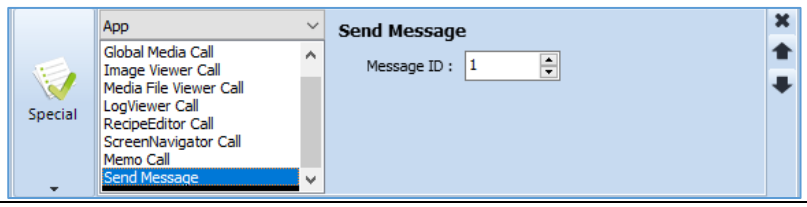
Hide the memo list and only show the contents of the memo.

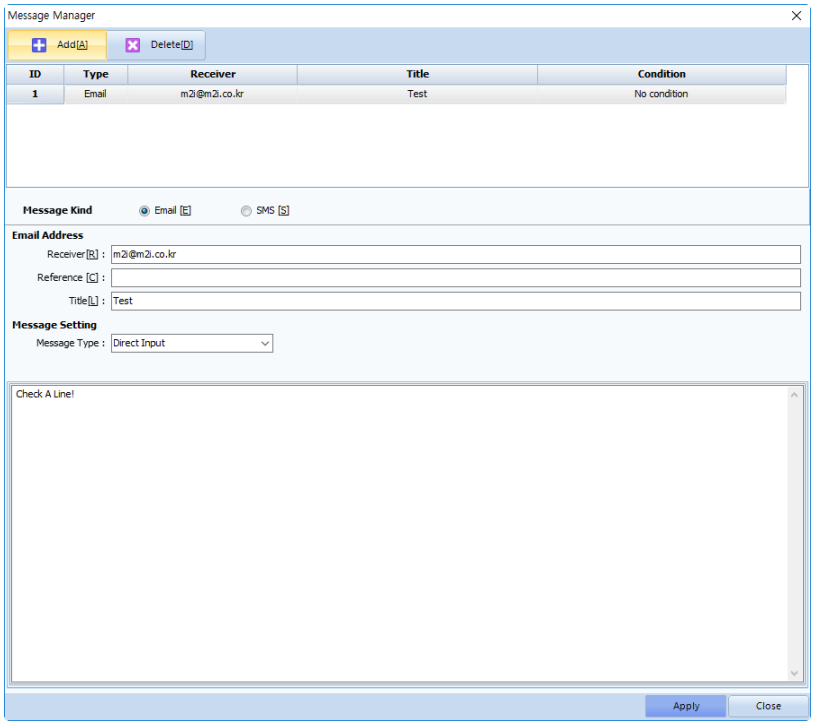
Show the memo list on the top, and the contents of the memo in the bottom.

Select [Memo Write] to open the below Memo Write Window and write a memo.



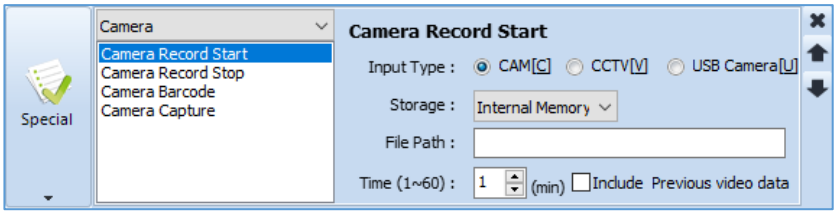
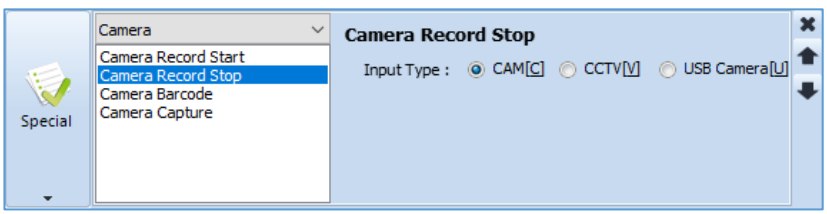
[Figure. Memo Write Window]

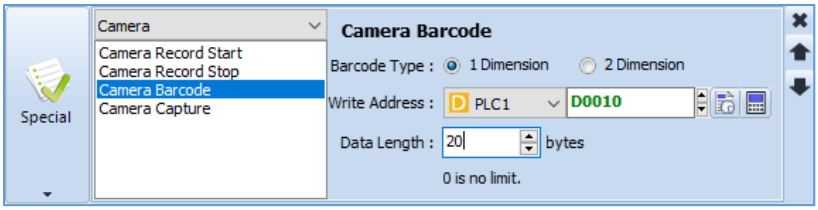
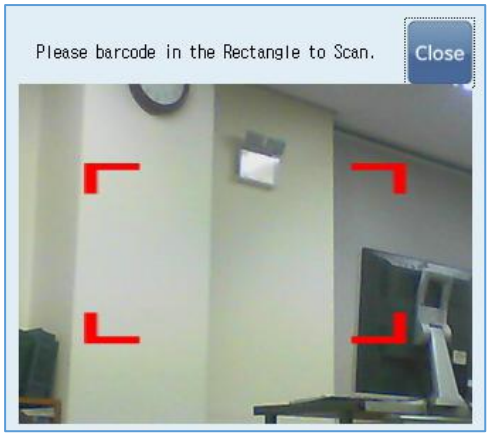
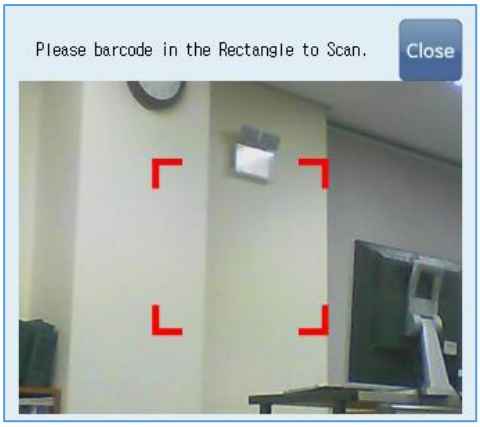
		 [Figure. Memo Write Window] Sender is the name of the user who writes the memo. Receiver is the recipient of the memo. Click [Add] to add a recipient.  [Figure. Add button] Select between [Write Text] and [Draw]. Configure the Font setting of texts. Select between [Write] and [Erase]. Configure the text size. Configure the color of text/drawing. Click [Clear] to delete the memo; [Send] to send the memo; and [Close] to close the Memo Write Window.
11	Send Message	Send a message registered at [Message Manager]. Select the [Message ID] of your interest. 

		Go to [Project] - [Message Sent] to open the [Message Manager].  [Figure. Message Manager] Refer to Chapter 4.10 [Message Manager] for more details.

(7) Action - Special Action (Camera)

Configure actions related to the TOPR Premium Model internal camera or an external camera connected via video port / USB port..

No.	Camera	Description
1	Camera Record Start	Start to video record with the camera. A video file with the file name of the current date will be saved in the [CameraRecord] folder. 
2	Camera Record Stop	End video recording. 

3	Camera Barcode	Recognize a barcode with the front camera. Select between [1 Dimension] (conventional barcode, and [2 Dimension] (QR code) for the [Barcode Type]. The recognized barcode is saved in the [Write Address]. Configure the barcode length with the bit unit configured in [Data Length].   [Figure. 1 Dimension barcode (conventional)]  [Figure. 2 Dimension (QR code)]

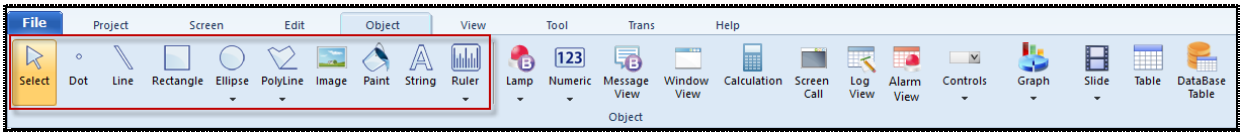
7.9.7 **Action - None**

Configure no action to be executed upon a true condition.

[Figure. Action - None]

CHAPTER 8 - Object (1)

Object refers to items added to the screen for comprehension, or for executing an action.
Add an object to the screen, and configure its properties, size, and location.
Each object has properties of [Effect & Action], where such configured [Effect] and/or [Action] is executed upon a true [Condition].
This chapter provides an overview of figure objects.



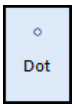
[Figure. Object (1)]

Detail instructions for the [Effect & Action] tab for Object Properties are provided in Chapter 7 [Object - General], therefore, instructions not provided in Chapters 7.6 through 7.8 are described below.
Instructions for the [Text] tab for Object Property are provided in Chapter 8.10 [Text Object], refer to the said chapter for detail instructions on texts. Refer to Chapter 8.10 [Text Object] for more details on the Text Tab.

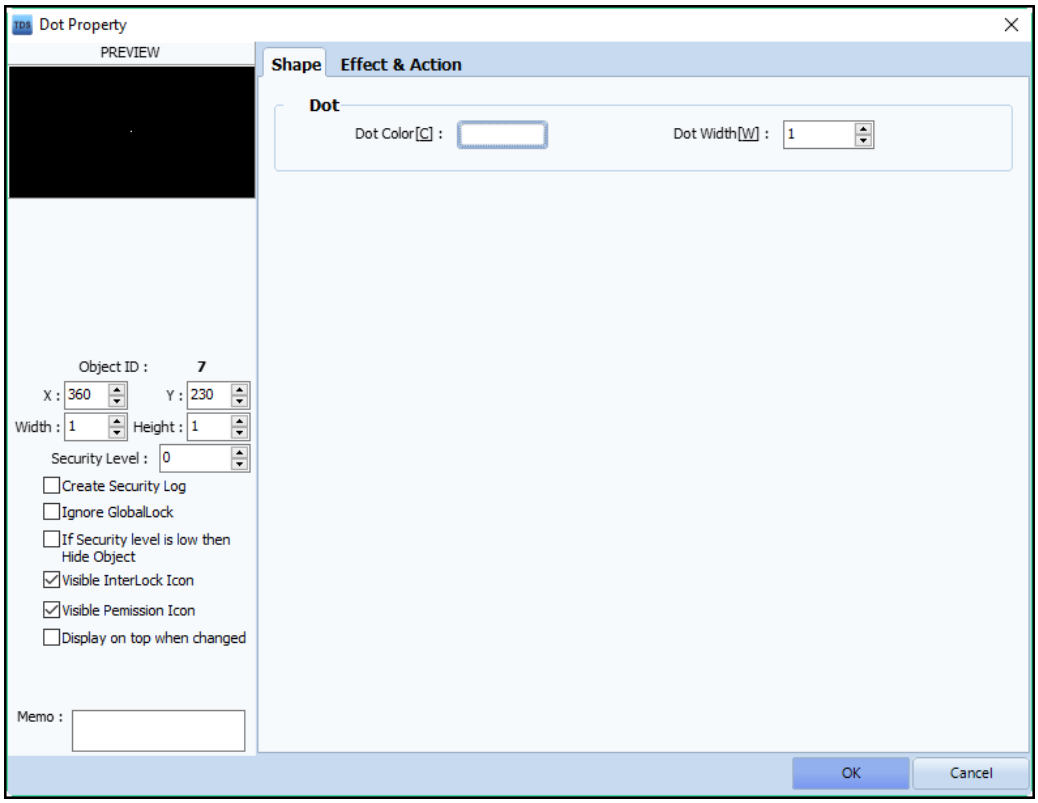
8.1 Select

Use [Select] to choose and activate an object from the current screen.
Once an object(s) is selected, strike [ESC] key to deselect the object and abort back to [Select].
After adding an object to the screen, the system aborts back to [Select].

8.2 Dot Object



Draw a Dot.



[Figure. Dot Object]

8.2.1 Shape Tab

You can draw dots in sizes from [1] to [10] with various colors.

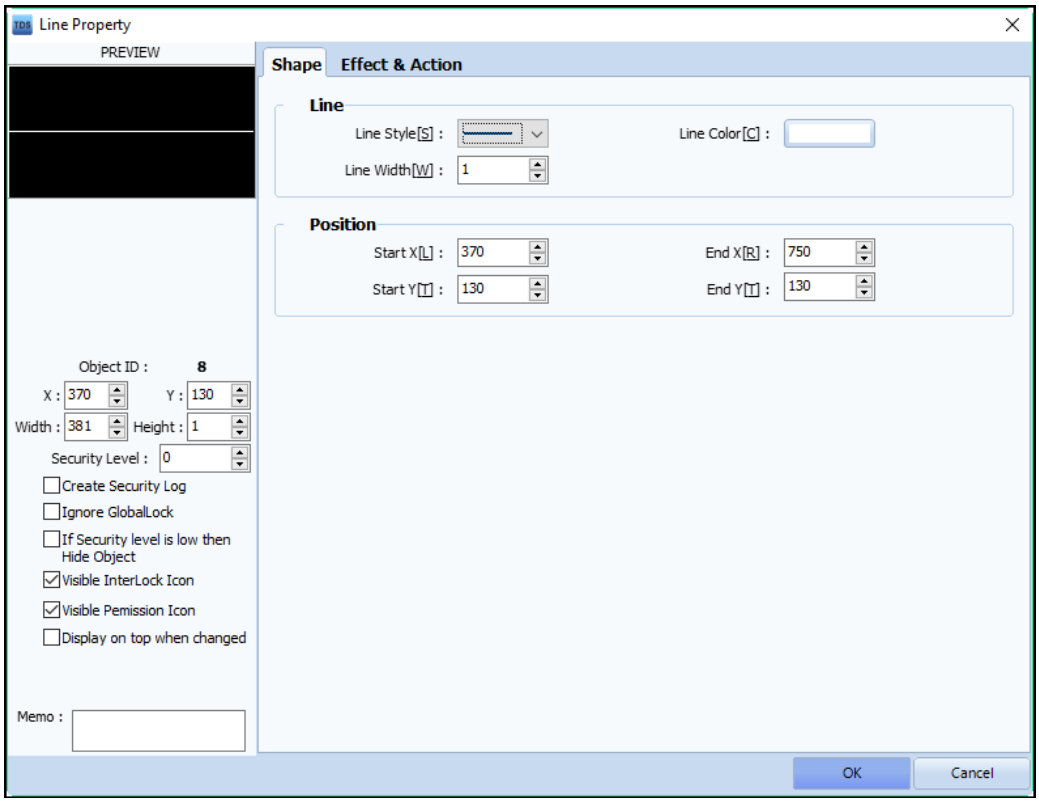
No.	Dot	Description
1	Dot Color	Configure the dot color from the color palette.
2	Dot Width	Configure the dot size from [1] to [10].

8.3 Line Object

Draw a line.

Drag the mouse cursor from the start point of the line to the end point of the line.

Hold the [Shift] key while dragging the mouse cursor to draw a horizontal or vertical line.



[Figure. Line Object]

8.3.1 Shape Tab

You can draw lines in widths from [1] to [10] with various colors and shapes.

Configure the [Line Style] / [Line Color] / [Line Width], or adjust the [Start Point] / [End Point] of the line.

(1) Line

No.	Line	Description
1	Line Style	Configure the line style from the combination box.
2	Line Color	Configure the line color from the color palette.
3	Line Width	Configure the line width from [1] to [10] dot

(2) Position

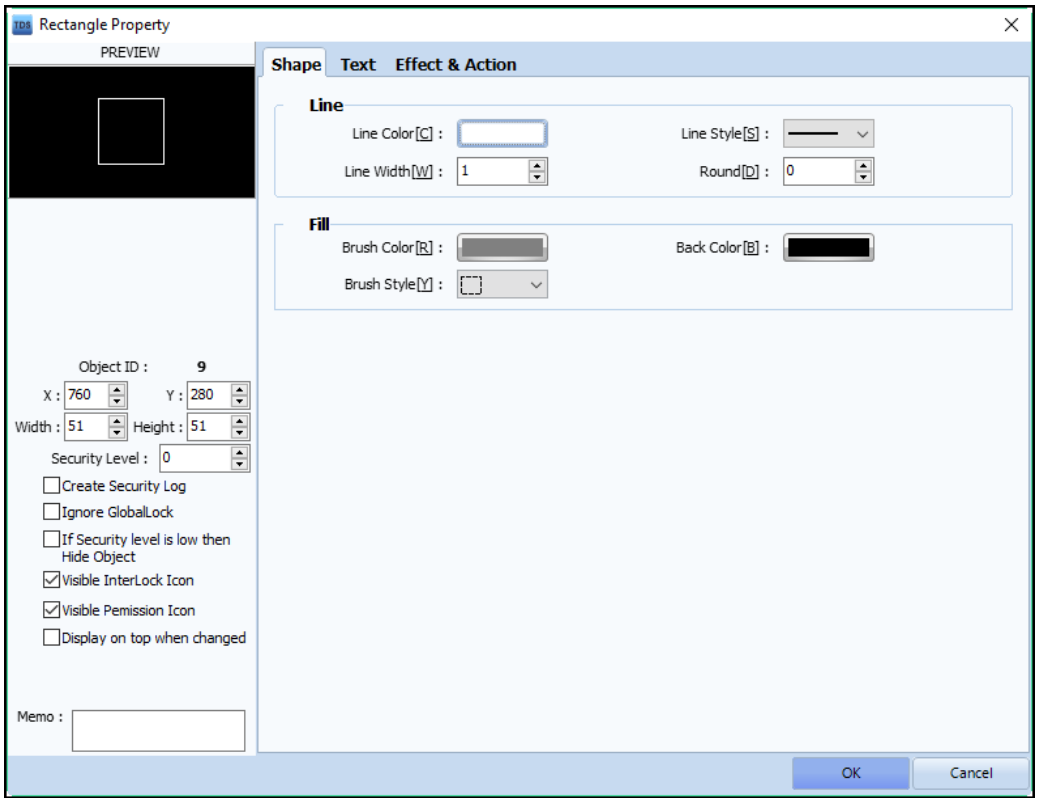
No.	Position	Description
1	Start X	Configure the X coordinate of the start point.
2	Start Y	Configure the Y coordinate of the start point.
3	End X	Configure the X coordinate of the end point.
4	End Y	Configure the Y coordinate of the end point.

8.4 Rectangle Object

Draw a Rectangle.

Drag the mouse cursor from the start point of the rectangle to the end point of the rectangle.

Hold the [Shift] key while dragging the mouse cursor to draw a square.



[Figure. Rectangle Object]

8.4.1 Shape Tab

(1) Line

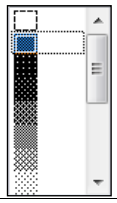
Configure the [Line Color] / [Line Width] / [Line Style] / [Round] for the lines conforming the rectangle.

No.	Line	Description
1	Line Color	Configure the line color from the color palette.
2	Line Style	Configure the line style from the combination box.
3	Line Width	Configure the line width from [1] to [10] dot
4	Round	Select [0] to adjoin lines at the corner with a right angle; enter a number other than [0] to have a round corner. The entry range differs from each rectangle size, and a larger number will result in a rounded corner with a larger radius.

(2) Fill

Fill the rectangle with a color(s).

Configure [Brush Color] / [Back Color] / [Brush Style] to add patterns to the object.

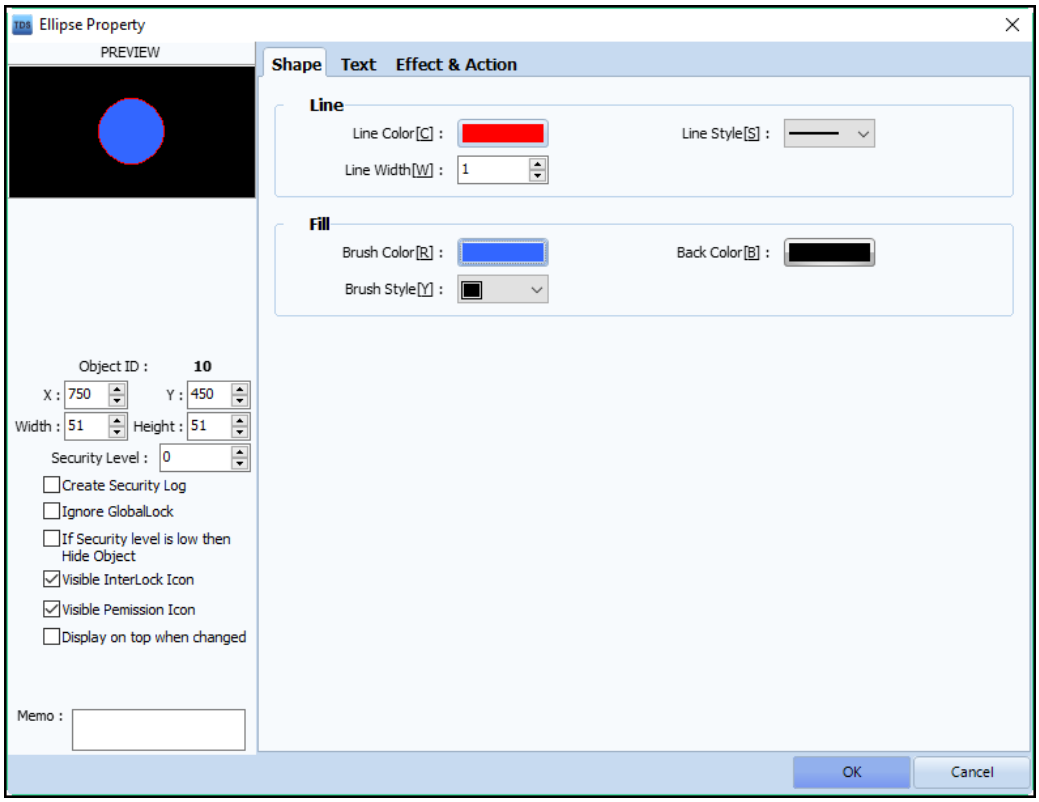
No.	Fill	Description
1	Brush Style	Select the pattern of your interest from the drop-down menu. 
2	Fill color	Configure the color applicable for the black images from the [Brush Style].
3	Back Color	Configure the color applicable for the white background form the [Brush Style].

8.5 Ellipse Object

Draw an Oval.

Drag the mouse cursor from the start point to the end point of the oval.

Hold [Shift] while dragging the mouse cursor to draw a circle.



[Figure. Ellipse Object]

8.5.1 Shape Tab

You can draw ovals with lines of various shapes and colors, and fill the oval with patterns.

(1) Line

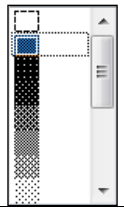
Configure the [Line Color] / [Line Width] / [Line Style] for the line conforming the rectangle.

No.	Line	Description
1	Line Color	Configure the line color from the color palette.
2	Line Style	Configure the line style from the combination box.
3	Line Width	Configure the line width from [1] to [10] dot

(2) Fill

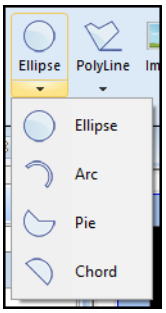
Fill the oval with a color(s).

Configure [Brush Color] / [Back Color] / [Brush Style] to add patterns to the object.

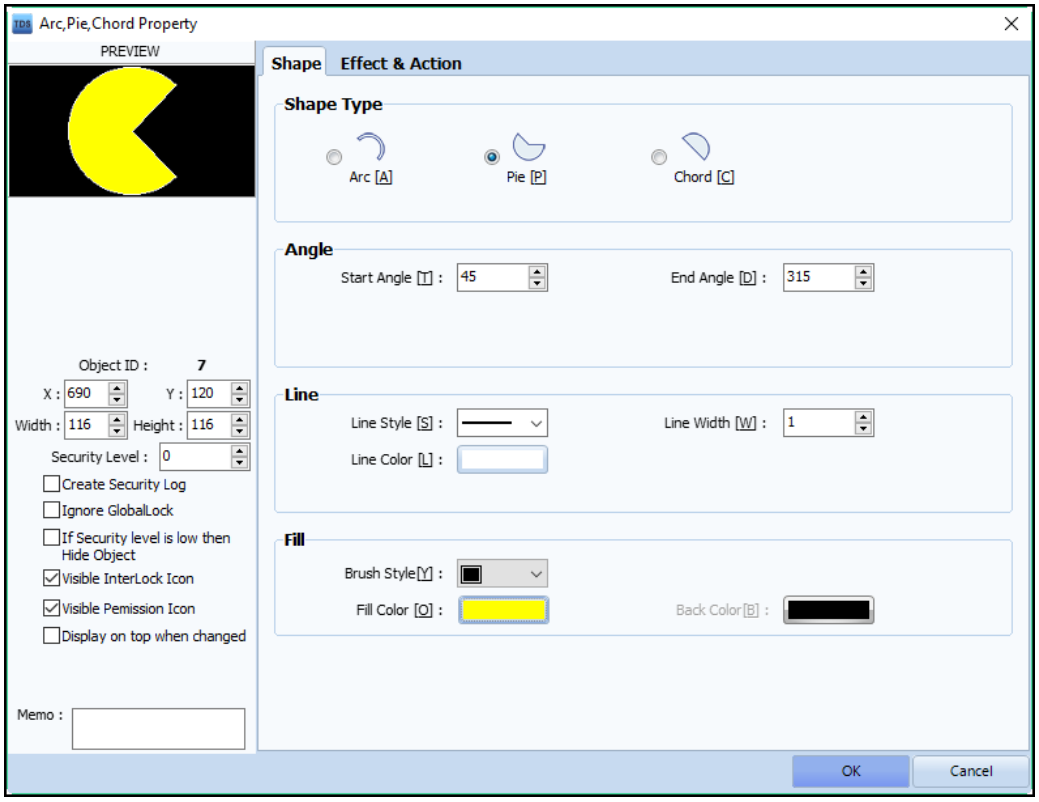
No.	Fill	Description
1	Brush Style	Select the pattern of your interest from the drop-down menu. 
2	Fill color	Configure the color applicable for the black images from the [Brush Style].
3	Back Color	Configure the color applicable for the white background form the [Brush Style].

8.6 Arc / Pie / Chord Object

Click the arrow beneath the Ellipse Object to access the expansion menu for Arc / Pie / Chord objects.

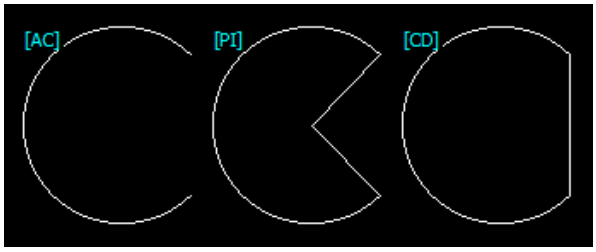


[Figure. Arc / Pie / Chord Object]



[Figure. Arc / Pie / Chord Object]

An [Arc] is an open ended figure, and a [Pie] and [Chord] is a closed figure.
Please find the below example for each [Arc] / [Pie] / [Chord].



[Figure. Arc, Pie, Chord]

Add an [Arc] / [Pie] / [Chord] object to the screen, and select the object, you can find white trackers and yellow trackers.

Drag a [White Tracker] to adjust the size of the object; drag a [Yellow Tracker] to adjust the angle of the object.

8.6.1 Shape Tab

Configure [Shape Type] / [Angle] / [Line] / [Fill] settings.

(1) Shape Type

Select among [Arc] / [Pie] / [Chord].

(2) Angle

Configure the [Start Angle] and [End Angle].

The [Start Angle] is the counter clockwise angle from 0° of the orientation of 3 o'clock direction.

The [End Angle] is the clockwise angle from 360° of the orientation of 3 o'clock direction.

(3) Line

No.	Line	Description
1	Line Style	Configure the line style from the combination box.
2	Line Width	Configure the line width from [1] to [10] dot
3	Line Color	Configure the line color from the color palette.

(4) Fill

Fill the Pie or Chord with a color(s).

An arc is not a closed figure, and [Fill] is not applicable.

Configure [Brush Color] / [Back Color] / [Brush Style] to add patterns to the object.

No.	Fill	Description
1	Brush Style	Select the pattern of your interest from the drop-down menu.
2	Fill color	Configure the color applicable for the black images from the [Brush Style].
	Back Color	Configure the color applicable for the white background form the [Brush Style].

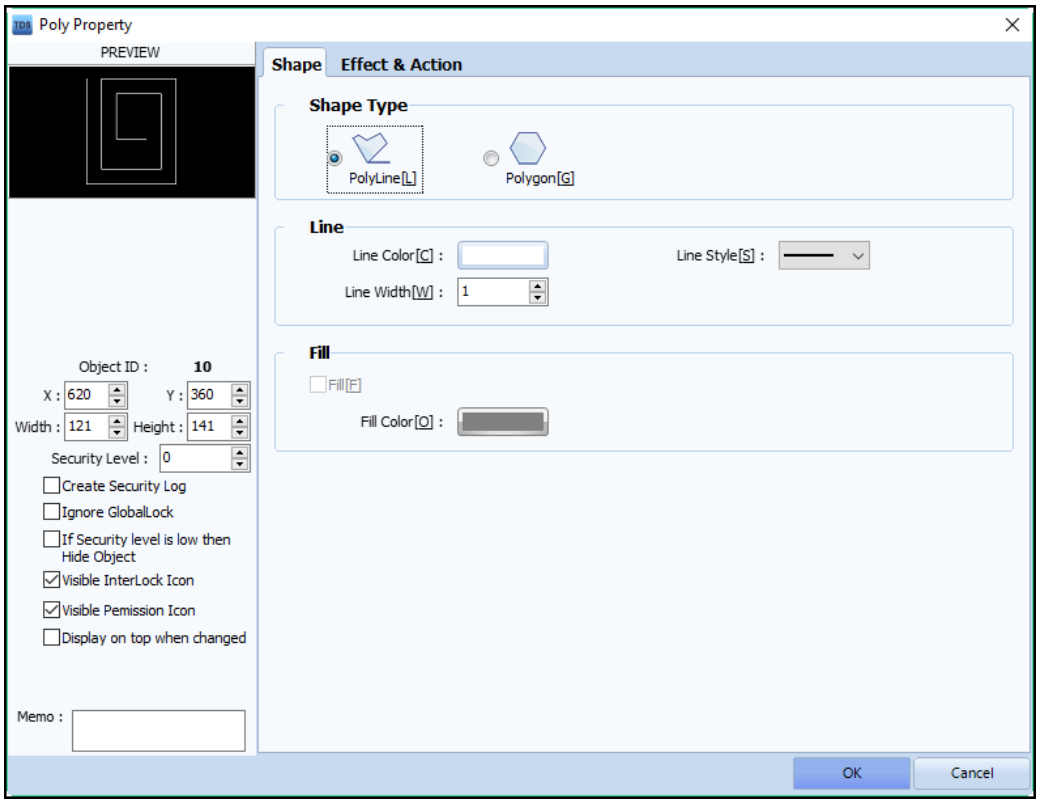
8.7 PolyLine / Ploygon Object

Draw a PolyLine / Polygon.

A PolyLine or Polygon is a line or closed figure, respectively, conformed with multiple lines. Polygons are closed figures.

Left Click the location of each vertex of the PolyLine/Polygon.

Right Click anywhere of the screen to end drawing the PolyLine/Polygon.



[Figure. PolyLine/Polygon Object]

Select a [PolyLine] or [Polygon], you can find white trackers and yellow trackers.

Drag a [White Tracker] to adjust the size of the object; drag a [Yellow Tracker] to adjust the shape of the object.

8.7.1 Shape Tab

Configure [Shape Type] / [Line] / [Fill] settings.

(1) Shape Type

Select between [PolyLine] and [Polygon].

A [PolyLine] is a set of continuous lines with multiple vertexes; a [Polygon] is a closed figure consists of multiple vertexes.

(3) Line

No.	Line	Description
1	Line Color	Configure the line color from the color palette.
2	Line Style	Configure the line style from the combination box.
3	Line Width	Configure the line width from [1] to [10] dot

(3) Fill

Fill the [Polygon] with a color(s).

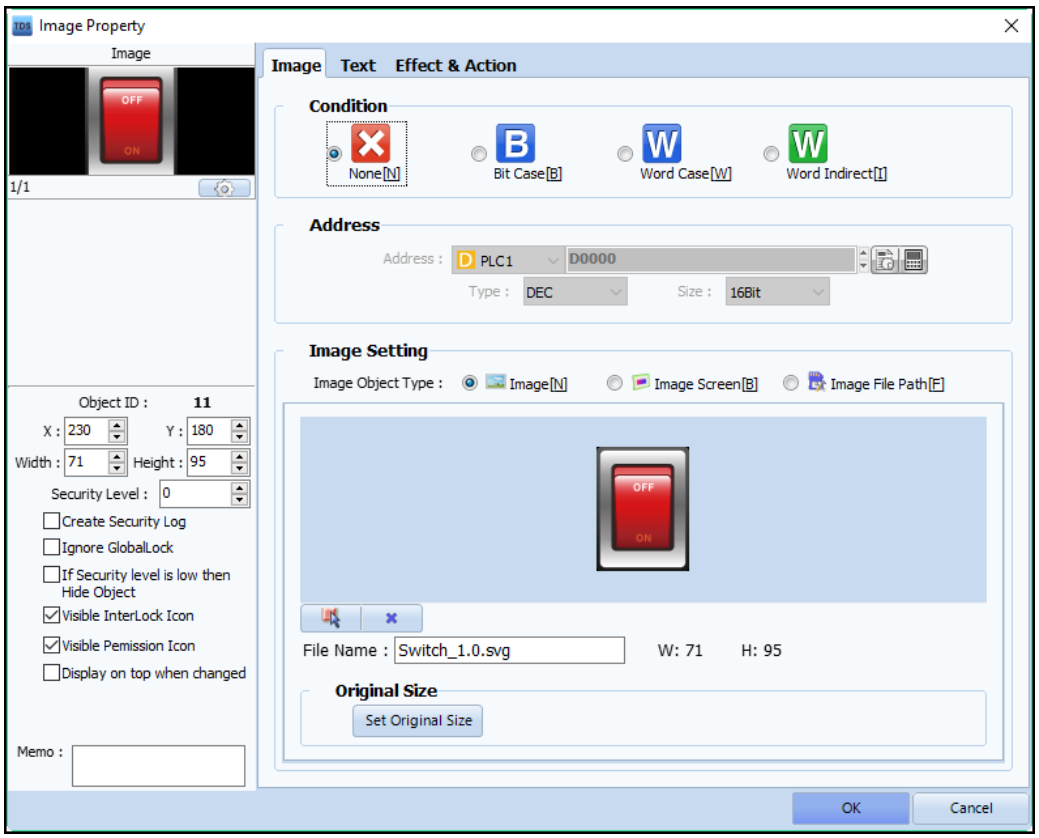
A [PolyLine] is not a closed figure, and [Fill] is not applicable.

Enable [Fill] and configure the [Fill Color].

8.8 Image Object

Add an Image.

Applicable extensions for images are [*.JPG], [*.BMP], [*.PNG], [*.SVG].

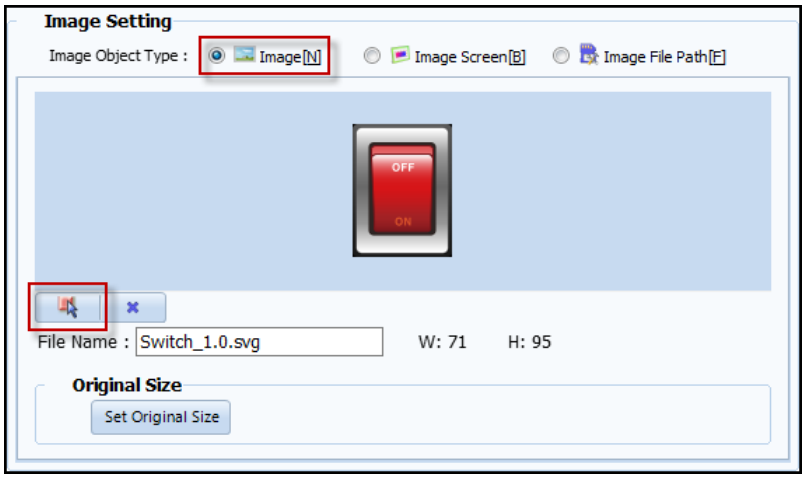
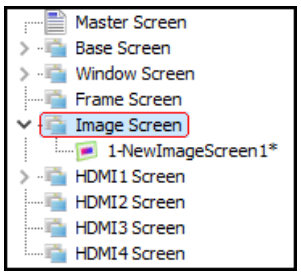


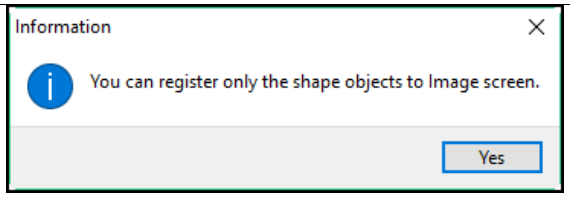
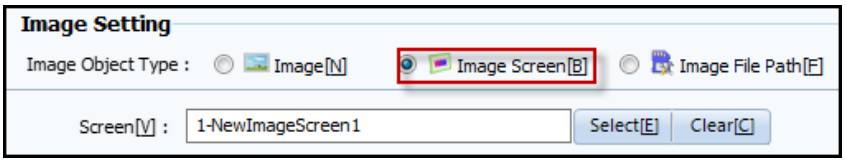
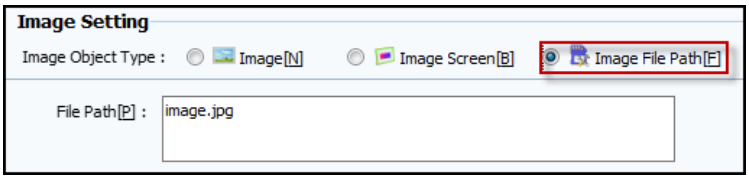
[Figure. Image Object]

8.8.1 Image Setting: [Image] / [Image Screen] / [Image File Path]

Select the Image Object Type among [Image] / [Image Screen] / [Image File Path].

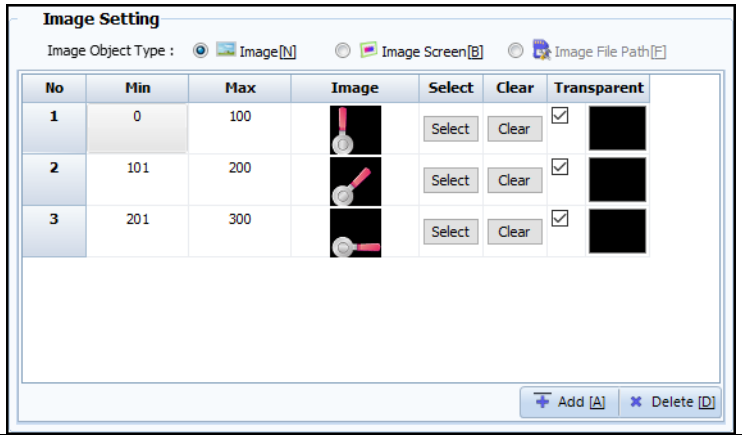
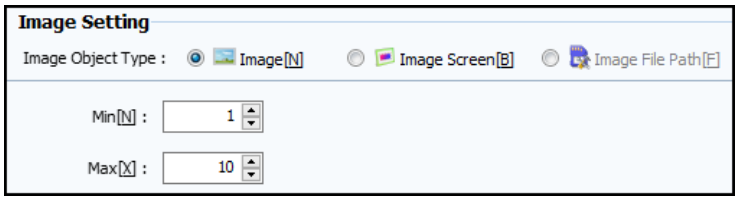
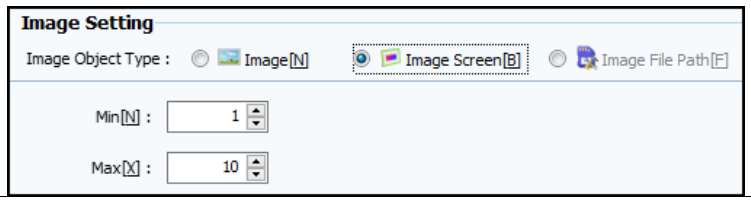
[Figure. Image Object Type]

No.	Image Setting	Description
1	Image	Select [Image] to select an image from [Select Image Dialog].  Click the [Select] button to open the [Image Select Dialog]. (Refer to Chapter 7.3 [Image Select Dialog] for more details.) Click [x] to delete a selected image. Use the combination box to make the image [Transparent]. The selected colors will appear transparent in the screen. The name of the image file is shown in the [File Name] text box. [W] refers to the horizontal width of the image in pixels; [H] refers to the vertical height of the image in pixels. Click [Set Original Size] to enlarge/shrink the size of the image object to the original size of the image file regardless to the object size.
2	Image Screen	[Image Screen] is one type of screens.  (Refer to Chapter 5.1.4 [New Image Screen] for more details.) Image screens allows a user to draw images without an [Action]. Therefore, if an object assigned to an [Action] is added, the below message will appear.

		  Click [Select] to load an existing Image Screen from the [Screen Select] window. Click [Clear] to dismiss the selected Image Screen.
3	Image File Path	Select [Image File Path] to load an image from the SD Card.  Save the image that should appear on the screen on the SD Card. The correct path and file name, file extension should be entered in the [File Path] as shown above. If the corresponding file exists on the SD Card connected to the TOP device, the selected image will appear on the screen. If an SD card is not inserted, or if the image does not exist on the SD Card, the Image Object will be displayed as below. If you remove the SD Card and then re-insert the SD Card, the image of the SD Card will be properly shown only after the TOP device is rebooted, or after terminating and restarting the project. If [Image File Path] is selected, [Word Case] and [Word Indirect] are not available for a [Condition].

8.8.2 Image Condition: None / Bit Case / Word Case / Word Indirect

Configure the condition upon the image will be shown.
Select the condition among [None] / [Bit Case] / [Word Case] / [Word Indirect].

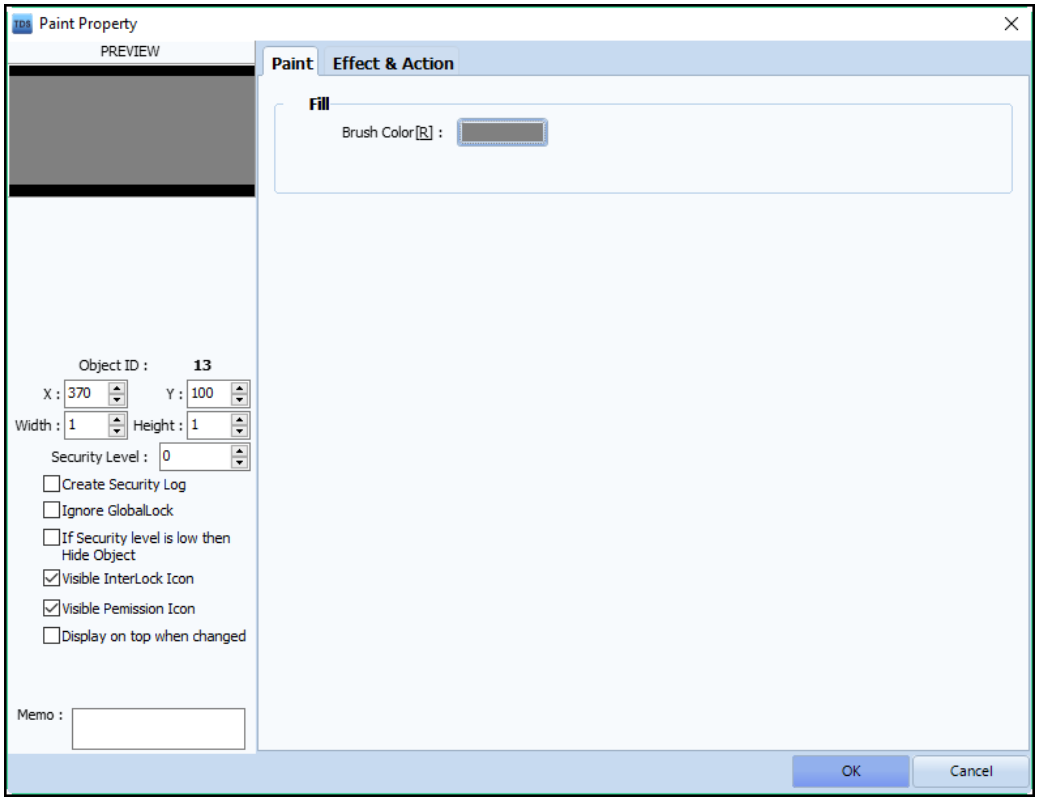
No.	Image Condition	Description
1	None	The image configured from [Image Setting] will be shown at all times.
2	Bit Case	The image configured from [Image Setting] will appear open the On/Off status of the selected Bit [Address]. Select each image for [On] and [Off].
3	Word Case	Multiple images are shown according to the range of the data read from the configured word [Address]. Select the [Min] and [Max] data, and assign images to be shown at each range. 
4	Word Indirect	Multiple images are shown according to the data of the word [Address] configured by [Word Indirect]. If [Image] is selected for [Image Object Type], add images at [Project Manager] - [Resource] - [Global Image] and show images with the [Number] of each image. The [Data] of the word address becomes the [Number] of the global image. In other words, if the word address reads [1], Global Image No.[1] is shown. (Refer to Chapter 7.3.3 [Global Image] for more details.)  If [Image Screen] is selected for [Image Object Type], images are shown according to the Image Screen [Number]. The data of the word [Address] becomes the images screen number. In other words, if the word address reads [1], Image Screen Number [1] is shown. 

8.9 Paint Object

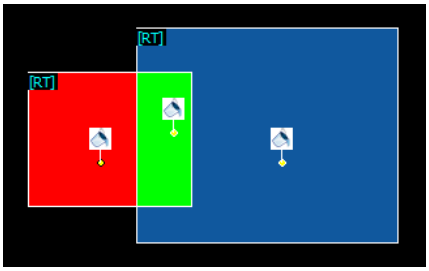
Fill a closed figure.

Fill the closed area where the Fill Object is added to.

Objects conforming a closed figure (Rectangle, Ellipse, Polygon) have their own [Fill] setting, thus, no separate paint object is required.



[Figure. Paint Object]



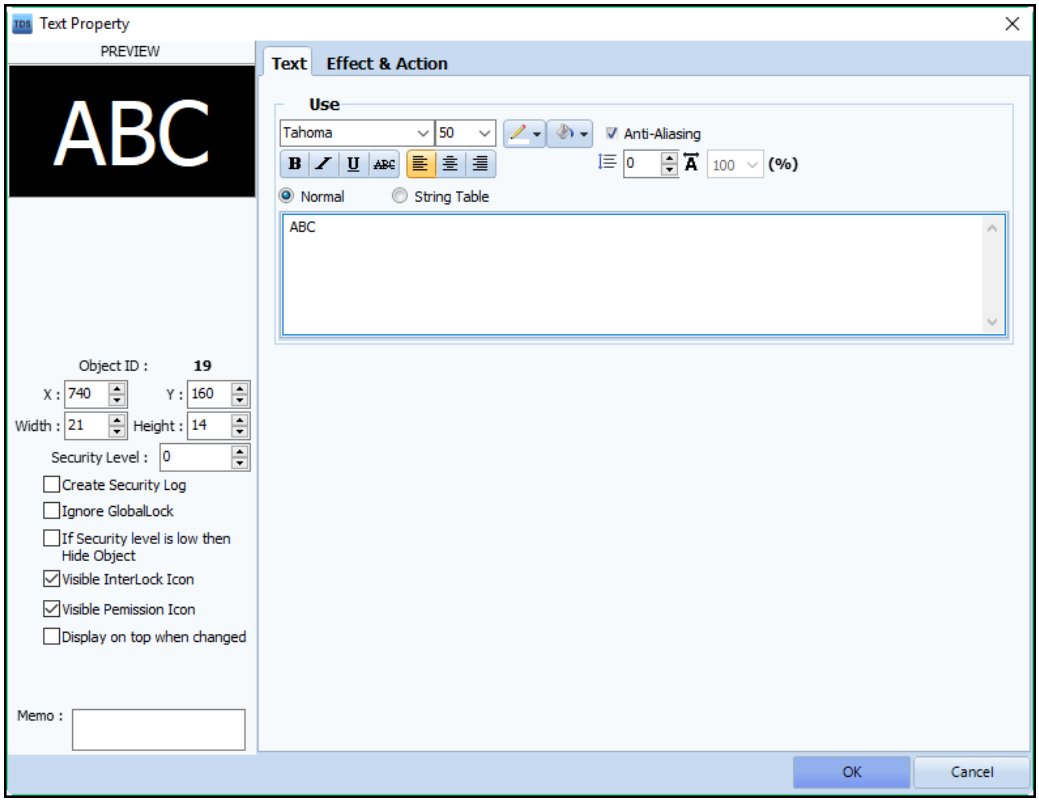
[Figure. Paint Object Added to a Screen]

8.9.1 Paint Tab

Configure the color for [Brush Color].

8.10 String Object

Add a String.



[Figure. String Object]

8.10.1 Text Tab

Enter the string and configure the font.

No.	Text	Description
1	Normal	Type in the new string of your interest.
2	String Table	Load a string added to [Project] - [String] (Refer to Chapter 4.4. [String] for more details.)

No.	Text		Description
1	Font Type		Select the font of your interest.
2	Font Size		Select the Font Size of your interest.
3	Font Color		Select the Font Color of your interest applicable to texts.
			Select the background color of your interest applicable to texts.
4	Anti-Aliasing		Render the edge of rounded texts for low-resolution. The edges of texts that are shown in step-like shapes at low resolution are rendered for a smoother display.
5	Edit Font	B	Bold - show texts in a bold fashion.
			Italic - show texts in a tilted fashion.
		U	Underline - Add an underline to texts.

			Strikethrough - Add a strikethrough line on texts.
6	Font Align		Align strings to the left.
			Align strings to the horizontal center.
			Align strings to the right.
7	Interval	0	Adjust the spacing between two or more lines, if applicable. Select the spacing in pixels.
		100	Change the scale (width to height ratio) of individual characters. Select 100% to apply the original scale. You can select between [20%] an [80%]. Several font styles may not supply font scale.

8.11 Ruler Object

Add a ruler.

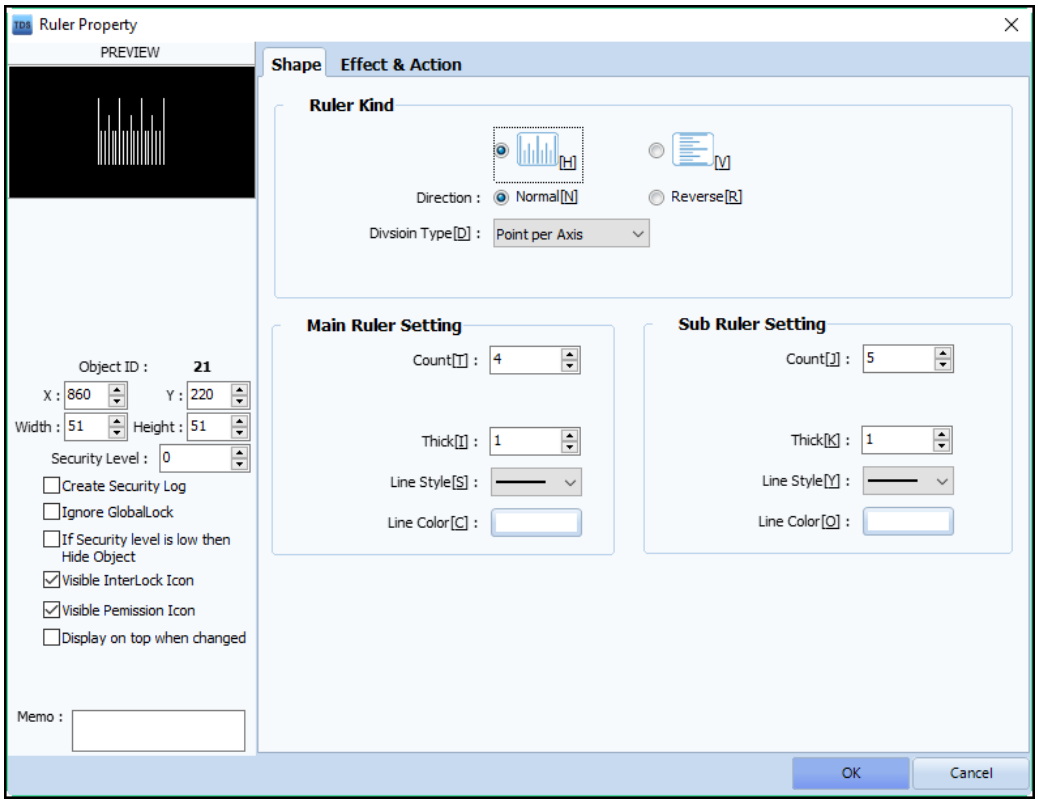
Add a [Rectangle Ruler] or [Circle Ruler]. Ruler are normally used to add details to a graph.

8.11.1 Rectangle Ruler Object

Draw a horizontal or vertical ruler.

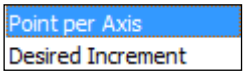
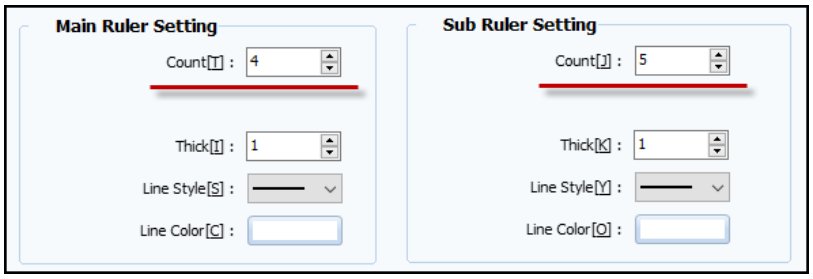
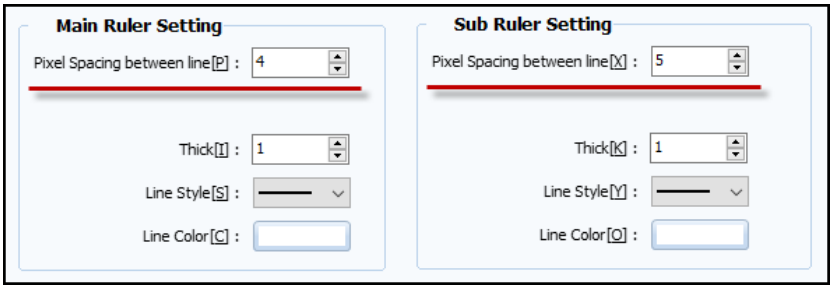
In the same way with a rectangle, drag the mouse cursor from the start point of the circle ruler to the end point of the circle ruler.

Small scales are provided between large scales.



[Figure. Rectangle Ruler Object]

(1) Ruler Kind

No.	Ruler	Description
1	Type of Ruler	Select between [Horizontal Ruler] and [Vertical Ruler].
2	Ruler Direction	Select between [In] and [Out] for the orientation of the small scale. Configure whether the small scale should be located inside or outside of the graph.
3	Division Type	Select [Division Type] between [Point per Axis] and [Desired Increment].  For [Point per Axis], configure the [Count] of large scales (Main Ruler), and small scales (Sub Ruler), to divide the entire scale with the number of large scales, and further divide each large scale with the number of small scales.  For [Desired Increment], configure the [Pixel Spacing Between Line] for both the large scales and small scales. 

(2) Main Ruler Setting / Sub Ruler Setting

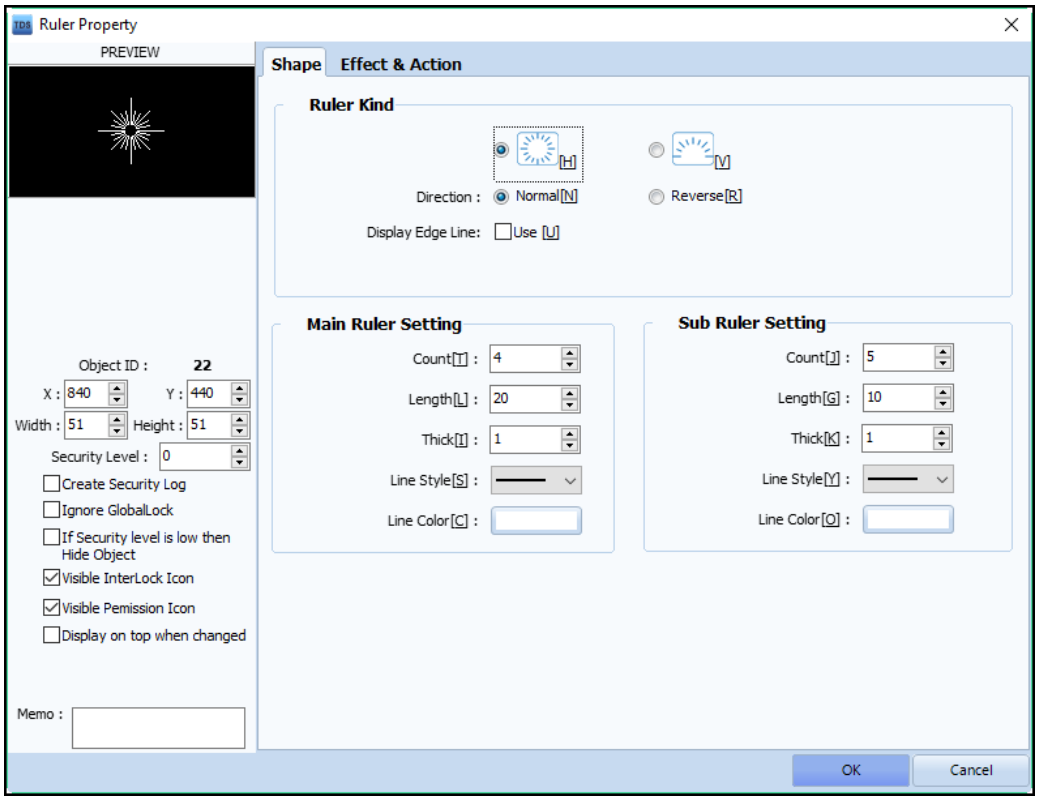
Configure [Thick] / [Line Style] / [Line Color] of scales.

No.	Scale	Description
1	Thick	Configure the scale thickness between [0] and [100] dot.
2	Line Style	Configure the scale line type.
3	Line Color	Configure the scale line color.

8.11.2 Circle Ruler Object

Draw a circle ruler.

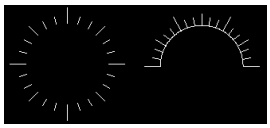
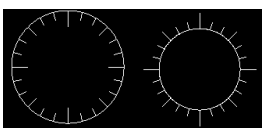
In the same way with a rectangle, drag the mouse cursor from the start point of the circle ruler to the end point of the circle ruler.

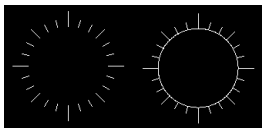


[Figure. Circle Ruler Object]

(1) Ruler Kind

Configure the shape and direction of the ruler.

No.	Scale	Description
1	Type of Ruler	Select between [Circle Ruler] and [Half Circle Ruler].  [Circle Ruler / Half Circle Ruler]
2	Ruler Direction	Select between [In] and [Out] for the orientation of the circle ruler. Select [Out] to add scales to the outside of the circle, and [In] to add scales to the inside of the circle.  [Out/In]

3	Display Edge Line	Enable [Display Edge Line] to show the [Border Line] of the circle / half-circle conforming the ruler.  Display Edge Line - Disabled / Enabled]

(2) Main Ruler Setting / Sub Ruler Setting

Configure [Scale Count] / [Length] / [Thick] / [Line Style] / [Line Color] settings.

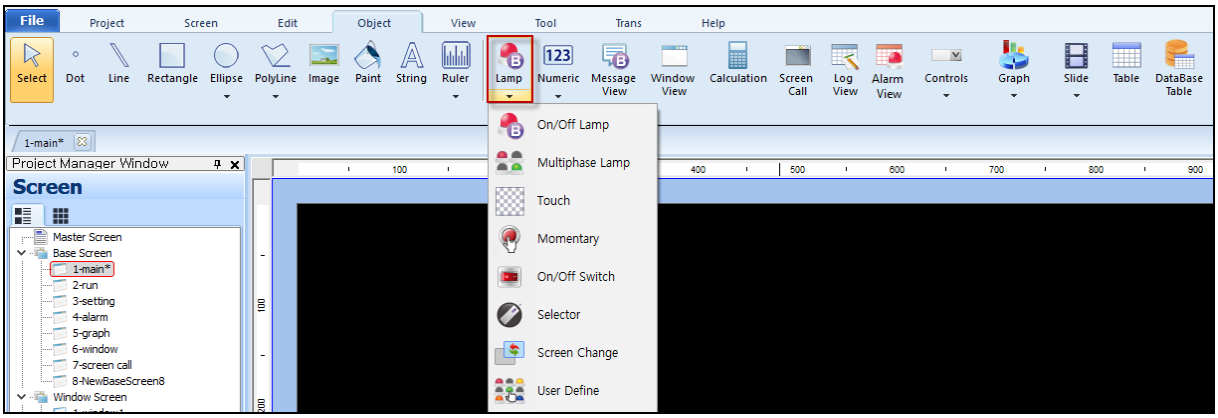
No.	Scale	Description
1	Count	Configure the number of Large Scales (Main Ruler) and Small Scales (Sub Ruler).
2	Length (Pixel)	Configure the length of each large scale and small scale.
3	Thick (Pixel)	Configure the scale thickness between [0] and [100] dot.
4	Line Style	Configure the scale line type.
5	Line Color	Configure the scale line color.

CHAPTER 9 - Lamp Object

Lamp Objects are lighted according to the [Condition].

Switch functions can be added to a Lamp Object.

Types of Lamp Object are [Bit Lamp] / [Multiphase Lamp] / [Touch] / [Momentary] / [Bit Switch] / [Selector] / [Screen Change] / [User Define].



[Figure. Lamp Object]

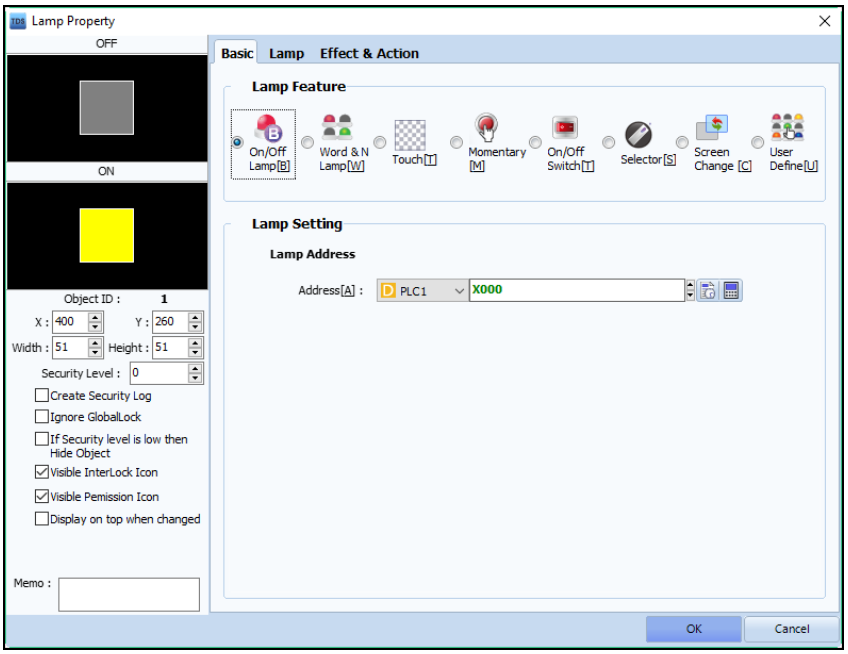
Select each type of Lamp Object from the expansion menu provided at [Object] - [Lamp].

You can also change the lamp type from [Lamp Feature] provided at the [Basic] tab of the object property window.

No.	Lamp Feature	Description
1	Bit Lamp	Display a lamp according to the On/Off status of a selected Bit Address.
2	Multiphase Lamp	Select among [Word Lamp] / [N-Bit Combination] / [N Bit Independent]. Select [Word Lamp] to indicate a lamp according to the configured [Condition]. Select [N-Bit Combination] to indicate a lamp according to the [On] / [Off] combination of multiple bit addresses. Select [N Bit Independent] to indicate a lamp according to the bit addresses with an [On] status among multiple bit addresses.
3	Touch	Create a button that performs actions upon a touch event.
4	Momentary	Create a switch that reads On while the object is touched, and Off while the object is not touched.
5	Bit Switch	Create a switch with a function of Off / On / Toggle.
6	Selector	Create a switch that turns bit addresses On in a sequential order upon each touch to the switch.
7	Screen Change	Create a switch that changes the base screen. Create a switch that pops up a configured window screen.
8	User Define	Configure detail switch functions from the [Effect & Action] tab; and configure detail lamp functions from the [Basic] tab each for [Bit Lamp] / [Multiphase Lamp] (Word Lamp / N-Bit Combination / N Bit Independent).

9.1 Bit Lamp

[Bit Lamp] provides indication of the ON/OFF status of the selected bit address.



[Figure. Bit Lamp]

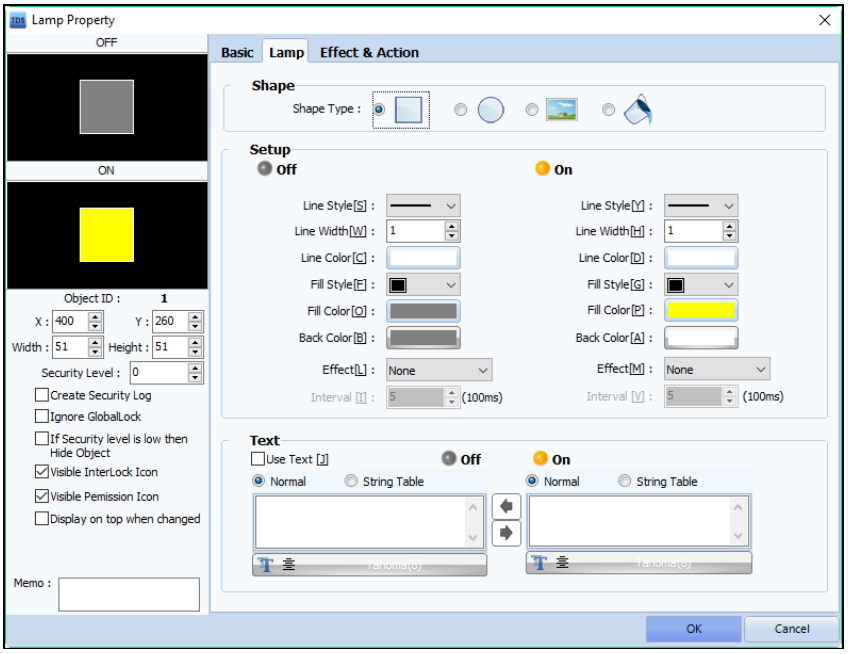
9.1.1 Basic Tab

Select [Bit Lamp] for [Lamp Feature].

Configure the bit address that shall be indicated from the [Lamp Setting].

9.1.2 Lamp Tab

Configure the shape and form of Lamp shall indicate the On/Off status of the selected bit address.



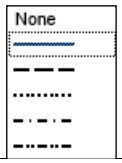
[Figure. Lamp Tab]

▶ Select [Shape Type] among [Rectangle] / [Ellipse] / [Image] / [Paint].

(1) [Rectangle] and [Ellipse]

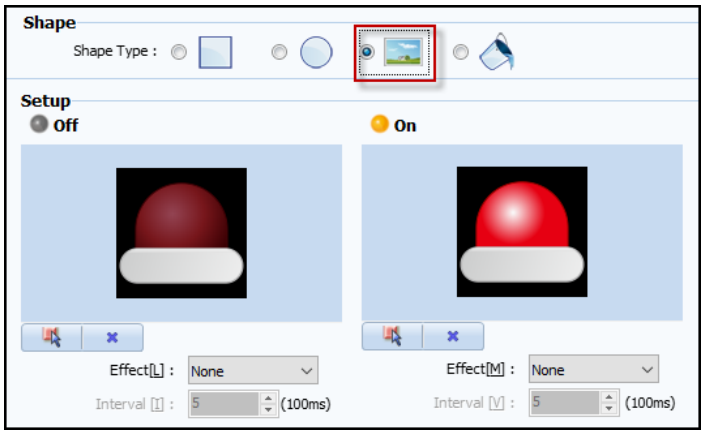
The same method is applicable for both [Rectangle] and [Ellipse] lamps.

Configure the Line Properties (Style, Color, Width) and Fill Properties (Fill Style, Fill Color, Back Color) of the lamp.

No.	Rectangle / Ellipse	Description
1	Line Style	Configure the line style for the outline of the figure. 
2	Line Width	Configure the line width. Select between [1] to [10] dots.
3	Line Color	Configure the line color.
4	Brush Style	Fill the interior of the figure with a color(s). Select among the 15 patterns.
5	Brush Color	Configure the color applicable for the black images from the [Brush Style].
6	Back Color	Configure the color applicable for the white background from the [Brush Style].

(2) [Image]

Select [Image] for the shape type.



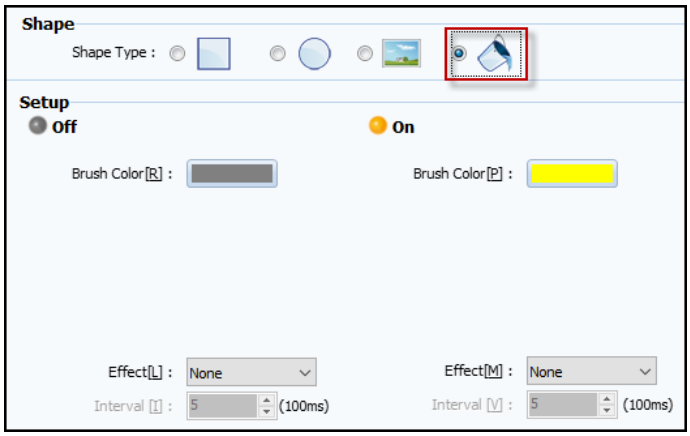
[Figure. Shape Type - Image]

No.	Image	Description
1		Open the Image Select Dialog to select the applicable image. (Refer to Chapter 7.3 [Image Select Dialog] for more details.)
2		Cancel the image selected from the [Image Select Dialog].
3		Make the background of a selected image transparent. The configured color will appear transparent.

(3) [Paint]

Select [Paint] for the shape type.

Paint is applicable to fill an existing closed figure.

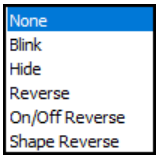


[Figure. Shape Type - Paint]

Configure the color for each [On] and [Off].

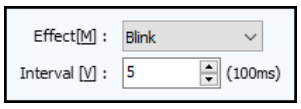
▶ Add an [Effect] to stress an [On] / [Off] status.

For an Off status, you can assign effects of [None] / [Blink] / [Hide] / [Reverse], and for On you can assign effects of [None] / [Blink] / [Hide] / [Reverse] / [ON/Off Reverse] / [Shape Reverse].



(1) [None]: No effect is applied.

(2) [Blink]: the lamp will repeatedly blink. Select the blinking [Interval] in 100msec.

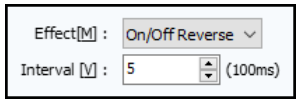


(3) [Hide]: hide the lamp.

(4) [Reverse]: reverse the lamp color.

(5) [On/Off Reverse]: Repeatedly alter the colors for On and Off. Select the altering [Interval] in 100msec.

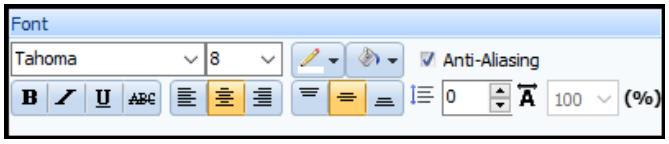
(6) [Shape Reverse]: Repeatedly alter the lamp shapes for On and Off. The caption for ON is maintained. Select the altering [Interval] in 100msec.



▶ Use strings to show texts upon the lamp.

Enable [Use Text] to configure strings for each [On] and [Off] status.

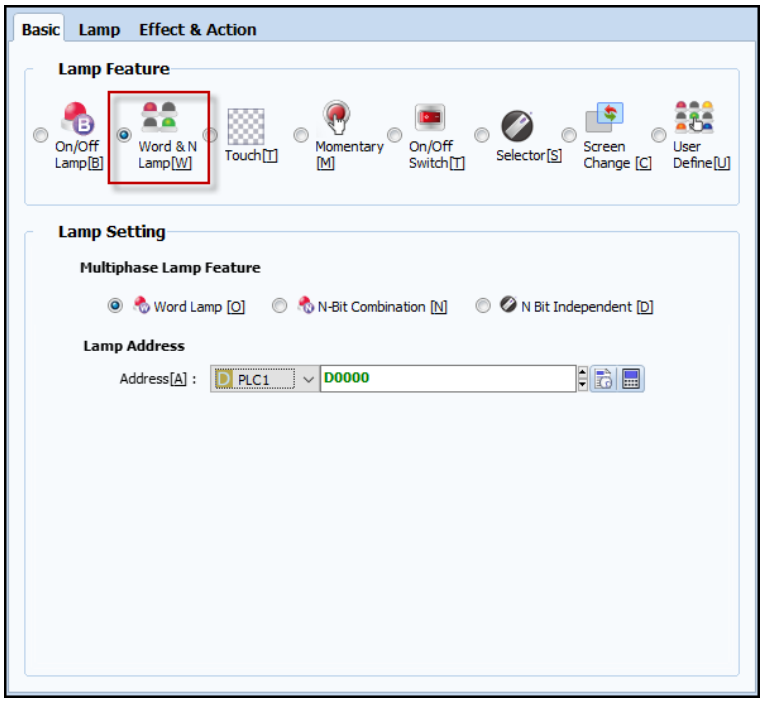
[Figure. Text]

No.	Text	Description
1	Normal	Type in the new string of your interest.
2	String Table	Load a string added to [Project] - [String].
3		Copy the On String to Off String.
4		Copy the Off String to On String.
5	Font	Configure the Font setting of texts.  (Refer to Chapter 8.10 [String Objects] for more details.)

9.2 Multiphase Lamp

[Multiphase Lamps] refers to a series of multiple lamps.

Select [Multiphase Lamp Feature] among [Word Lamp] / [N-Bit Combination] / [N Bit Independent].

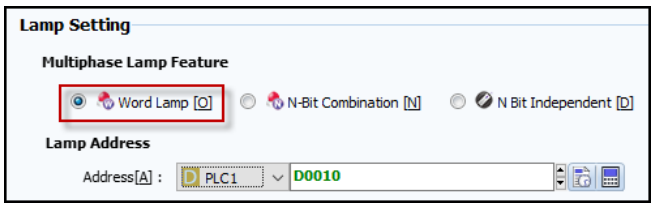


[Figure. Multiphase Lamp]

Select [Word Lamp] to indicate a lamp according to the configured [Condition].

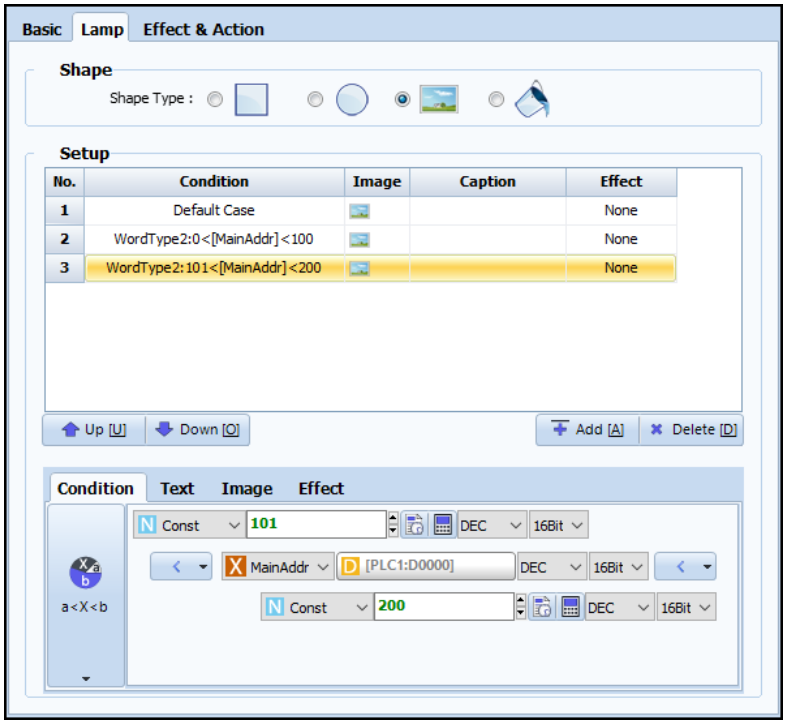
9.2.1 Word Lamp

Select [Word Lamp] to indicate a lamp according to the configured [Condition].
In general, Word Lamps are used under the condition for the [Data Range] of word addresses.



[Figure. Word Lamp]

Select [Word Lamp] for [Multiphase Lamp Feature], and configure a word address (16 bit address) for the [Lamp Address].
At the [Lamp] tab, configure the different lamps that shall be shown according to the data range of the selected address.



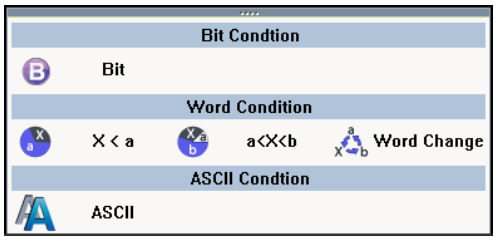
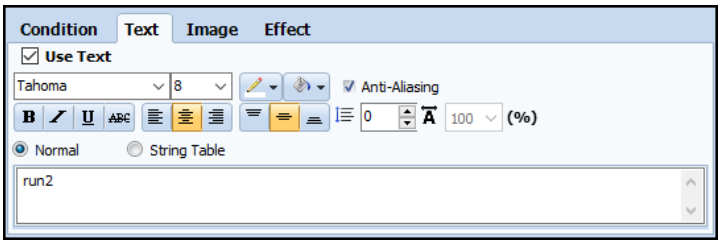
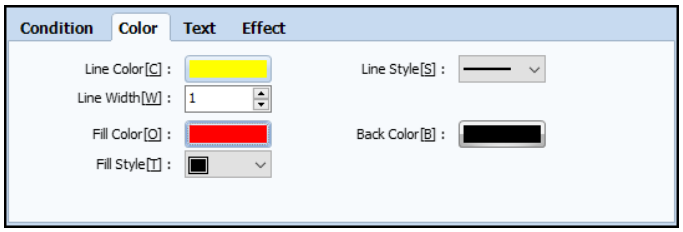
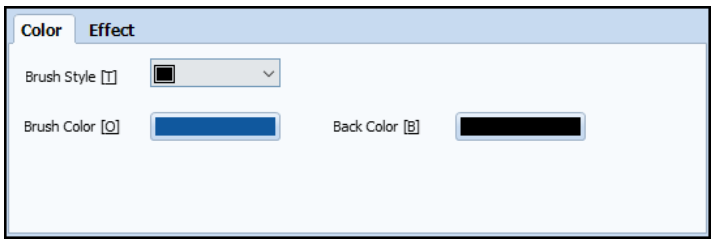
[Figure. Lamp Tab]

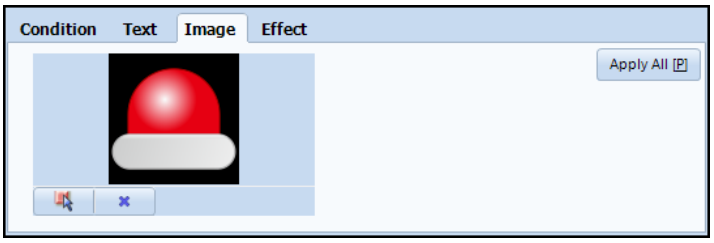
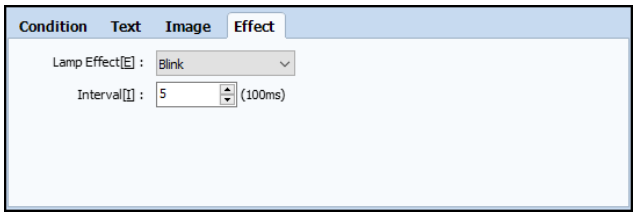
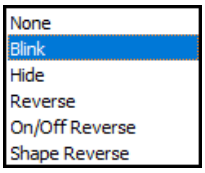
▶ Select [Shape Type] among [Rectangle] / [Ellipse] / [Image] / [Paint].
How to configure Lamp Shape is identical to the method applicable to Bit Lamps, refer to the previous [Bit Lamp] section.

▶ [Add] the number of lamps required for each [Condition] at [Setup].
Lamp 1 is the [Default Case], that shall be shown when none of the condition is true.

No.	Lamp List	Description
1	Add	Add a Lamp. Configure the [Condition] / [Color] / [Text] / [Effect] from each sub-tab provided for each additional lamp.
2	Delete	Delete a selected lamp.
3	Up	Move the selected lamp one row upward.
4	Down	Move the selected lamp one row downward.

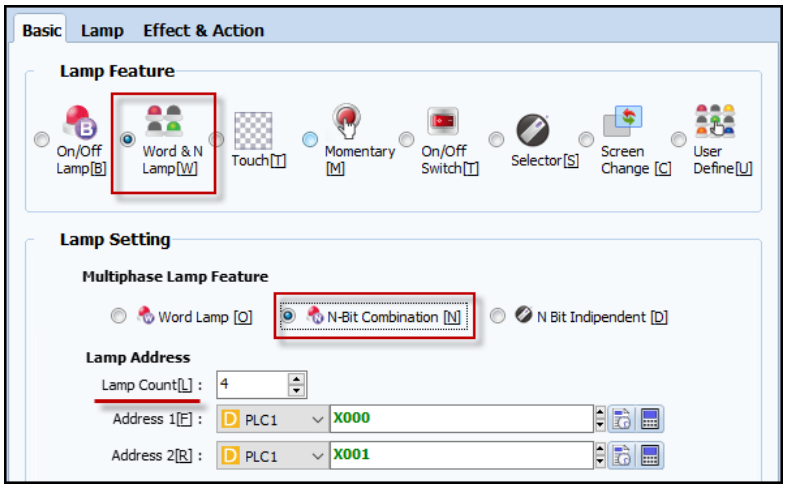
▶ Configure [Condition] / [Color] / [Text] / [Effect] for each lamp.

No.	Setting	Description
1	Condition	Configure the [Condition] upon which the lamp will be shown.  Select among [Bit Condition] / [Word Condition] (X<a, a<X<b, Word Change) / [ASCII Condition]. (Refer to Chapter 7.7 [Condition Setting Window] for more details.)
2	Text	Type in the text that will be shown on the Lamp.  (Refer to Chapter 8.10 [String Objects] for more details.)
3	Color	Configure the line color and fill color for Shape Type of [Rectangle] and [Ellipse].  Configure the color applicable for Shape Type of [Paint].  (Refer to the previous Bit Lamp section for more details.)

4	Image	Configure the image applicable for Shape Type of [Image].  (Refer to the previous Bit Lamp section for more details.)
6	Effect	Configure effects to stress each lamp.   (Refer to the previous Bit Lamp section for more details.)

9.2.2 N-Bit Combination

Select [N-Bit Combination] to indicate a lamp according to the [On] / [Off] combination of multiple bit addresses.



[Figure. Word & N Bit Lamp of Basic Tab]

▶ Select [N-Bit Combination] for [Multiphase Lamp Feature].

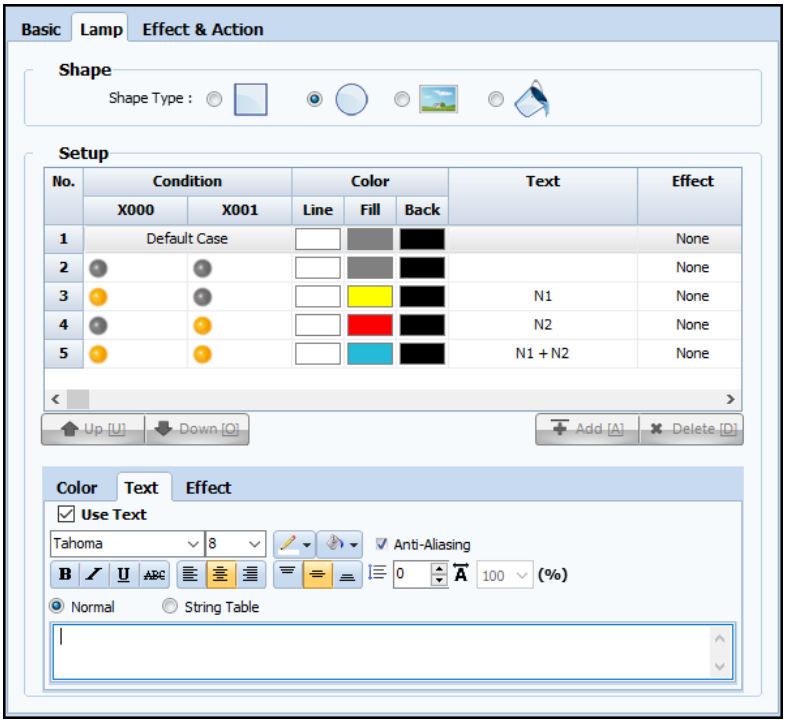
Configure the [Lamp Count] and [Address] for the [Lamp Address].

The maximum [Lamp Count] is 16.

The lamp indicates On/Off status of an address where, one bit address creates a combination of On and Off, thus, a single address can indicate up to two lamps.

Accordingly, 2 addresses provides 4 lamps, 3 addresses provides 8 lamps, and 4 addresses provides maximum 16 lamps.
Once the [Lamp Count] is configured, the applicable addresses are added as [Address 1] / [Address 2] / [Address 3] / [Address 4].

▶ From the [Lamp Tab] configure each lamp corresponding to the On/Off status of each selected address.
The list provided in [Setup] is automatically conformed according to the [Address] configured from the [Basic] tab.
You can [Delete] a lamp, if necessary.
Yellow Lamps indicate an On status of the corresponding address, and Grey Lamps indicate an Off status of the corresponding address.
Configure lamps for conditions where both [Address 1] and [Address 2] are Off, On, or where one of the two addresses is On.

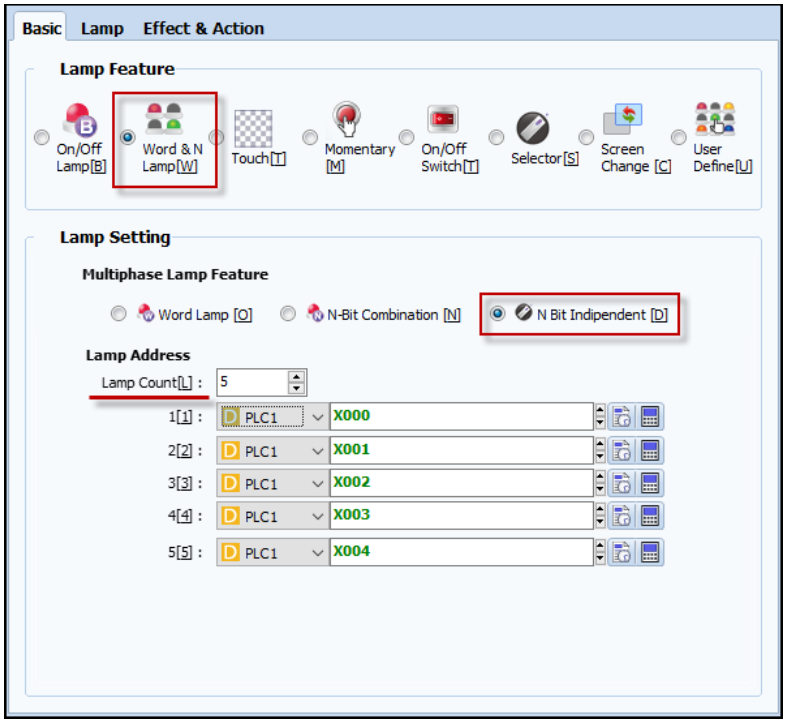


[Figure. Lamp Tab - N-Bit Combination]

Refer to the previous Bit Lamp section for more details of each [Shape Type].

9.2.3 N Bit Independent

Select [N Bit Independent] to indicate a lamp according to the bit addresses with an [On] status among multiple bit addresses.



[Figure. Basic Tab - N Bit Independent]

▶ Select [N Bit Independent] for [Multiphase Lamp Feature].

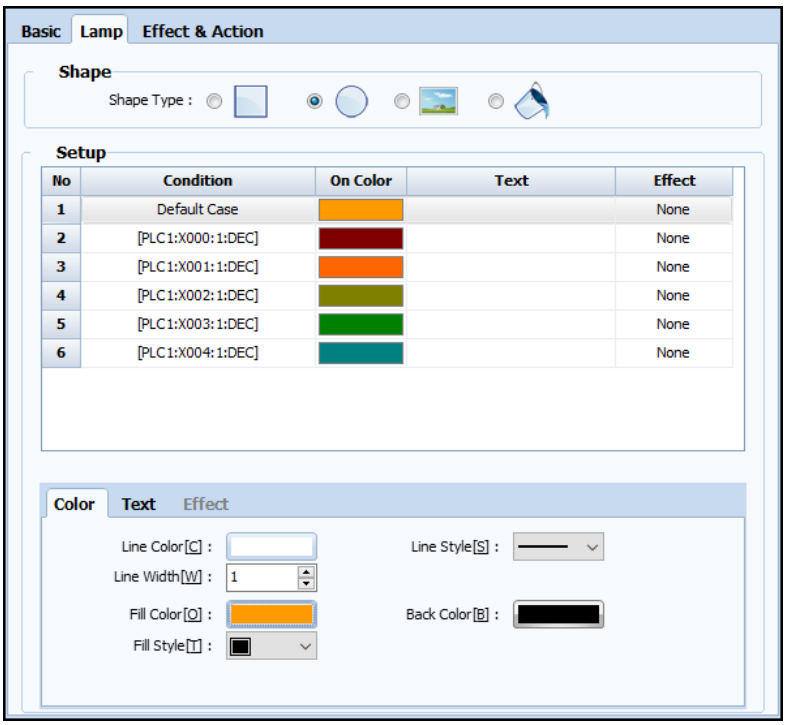
Configure the [Lamp Count] and [Address] for the [Lamp Address]

The maximum [Lamp Count] is 8.

The lamp for the Bit Address that reads On will be shown.

▶ Configure lamps for each bit address.

Refer to the previous Bit Lamp section for more details of each [Shape Type].

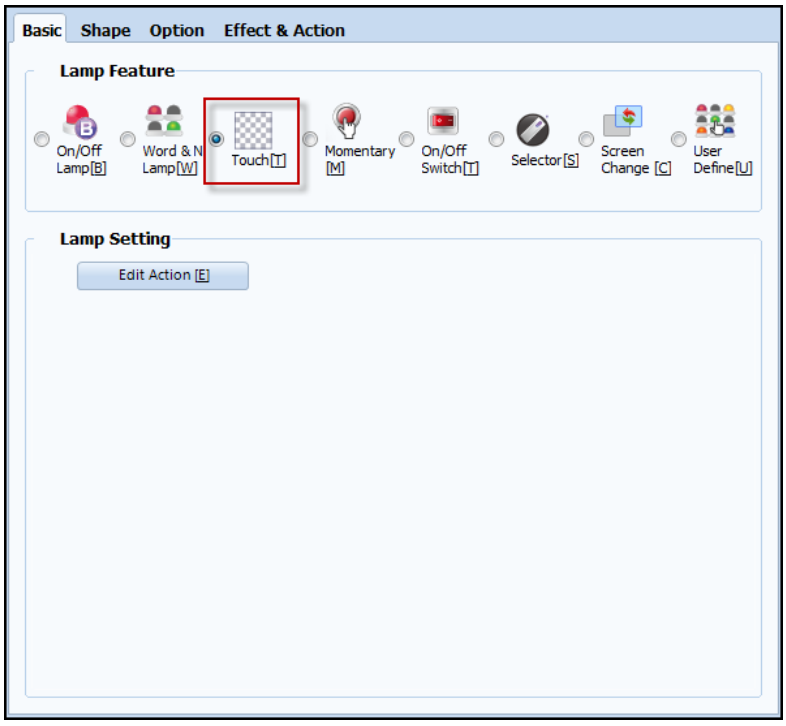


[Figure. Lamp Tab - N Bit Independent]

Each Bit Address, corresponding to the [Lamp Count] are listed with preceding order.
If there is only one bit address that reads ON, the corresponding lamp will be shown. If there are two or more bit addresses that read ON, the address with the precedence will be shown. To show a lamp with a lower order of precedence, every bit address listed in front of such lamp should read Off.

9.3 Touch

Touch Objects execute an action(s) upon a touch event.



[Figure. Touch Object]

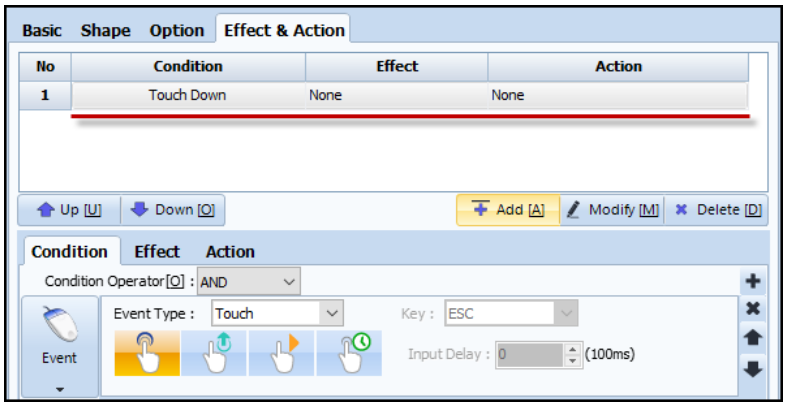
9.3.1 Basic Tab

Select [Touch] for [Lamp Feature].

You can change the Lamp Feature to another type.

Click [Edit Action] to navigate to the [Effect & Action] tab and configure the action to execute.

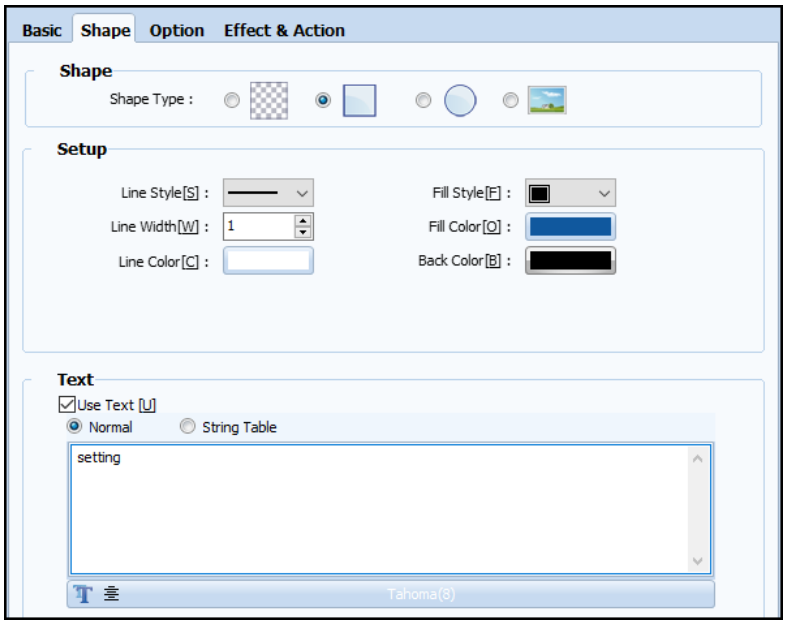
At the [Effect & Action] tab, [Touch Down] is already selected for [Condition], only configure the [Action].



[Figure. Effect & Action Tab]

9.3.2 Shape Tab

Configure the shape of the Touch Object.



[Figure. Shape Tab]

(1) Shape

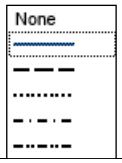
Select [Shape Type] among [None] / [Rectangle] / [Ellipse] / [Image].

Select [None] to literally assign no shape to the touch object.

▶ [Rectangle] and [Ellipse]

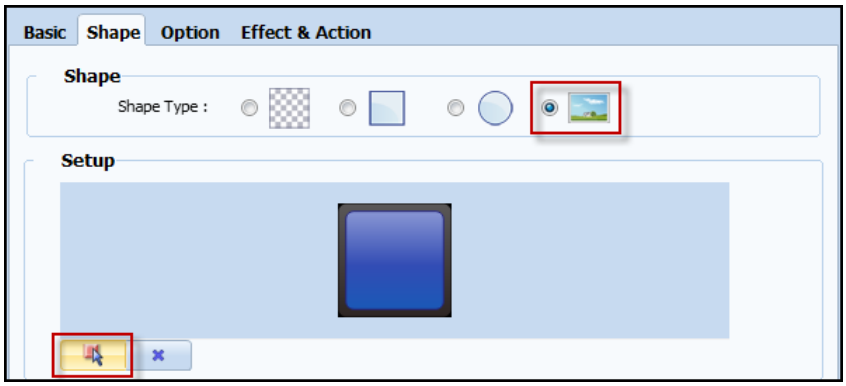
Select [Rectangle] or [Ellipse] for the shape type.

Configure the line and fill settings of the rectangle / ellipse.

No.	Rectangle / Ellipse	Description
1	Line Style	Configure the line style for the outline of the figure. 
2	Line Width	Configure the line width. Select between [1] to [10] dots.
3	Line Color	Configure the line color.
4	Brush Style	Fill the interior of the figure with a color(s). Select among the 15 patterns.
5	Brush Color	Configure the color applicable for the black images from the [Brush Style].
6	Back Color	Configure the color applicable for the white background from the [Brush Style].

▶ [Image]

Select [Image] for the shape type.



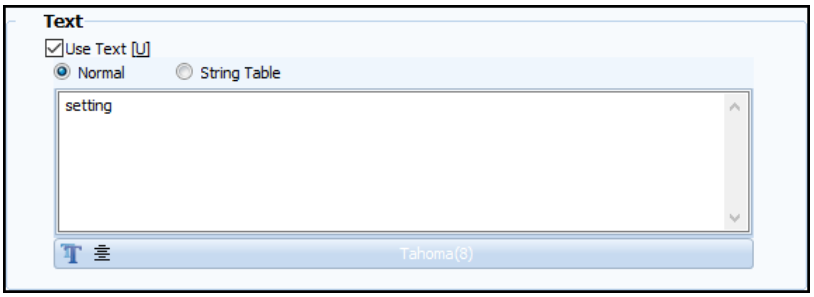
[Figure. Shape Type - Image]

No.	Image	Description
1		Open the Image Select Dialog to select the applicable image. (Refer to Chapter 7.3 [Image Select Dialog] for more details.)
2		Cancel the image selected from the [Image Select Dialog].
3		Make the background of a selected image transparent. The configured color will appear transparent.

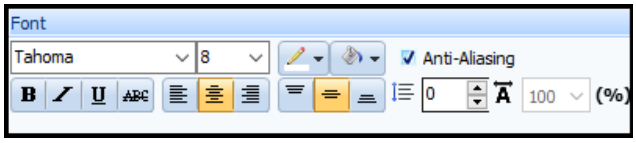
(2) Text

Add a string to the touch object.

Enable [Use Text] to configure and select between [Normal] and [String Table].

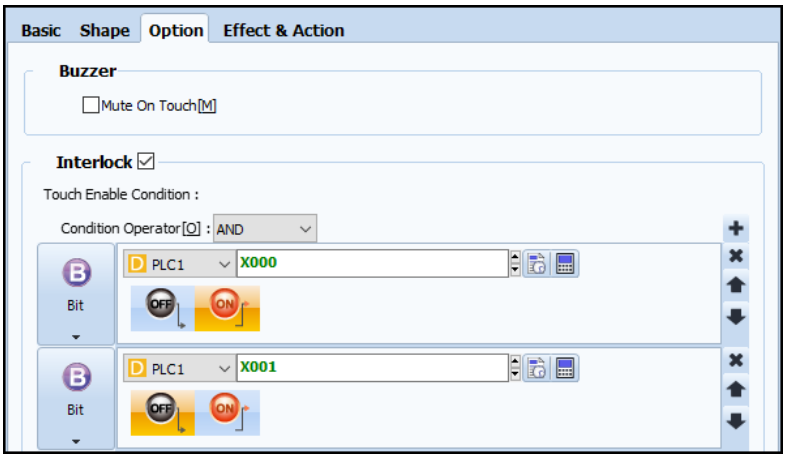


[Figure. String Table]

No.	String	Description
1	Normal	Type in the string of your interest.
2	String Table	Load a string added to [Project] - [String].
3	Font	Configure the Font setting of texts.  (Refer to Chapter 8.10 [String Objects] for more details.)

9.3.3 Touch Option Tab

Configure the sound buzzer and interlock for touch objects.



[Figure. Touch Option]

No.	Option	Description
1	Buzzer	Configure whether or not to raise an audible touch buzzer. The touch buzzer is the short 'Beep' sound made upon each touch to the touch object. Enable [Mute On Touch] to not make raise a beep sound upon a touch.
2	Interlock	Configure an interlock of the Touch Object. Enable [Interlock] and configure the [Touch Enable Condition], to activate the touch object when the [Touch Enable Condition] is true, and deactivate the touch object when the [Touch Enable Condition] is false. Add Touch Enable Conditions with the [+] button, you can up to 8 conditions. Select the applicable operator between [AND] and [OR]. Select [AND] to conform a true status when all [Touch Enable Condition] are true. Select [OR] to conform a true status when at least one [Touch Enable Condition] is true.

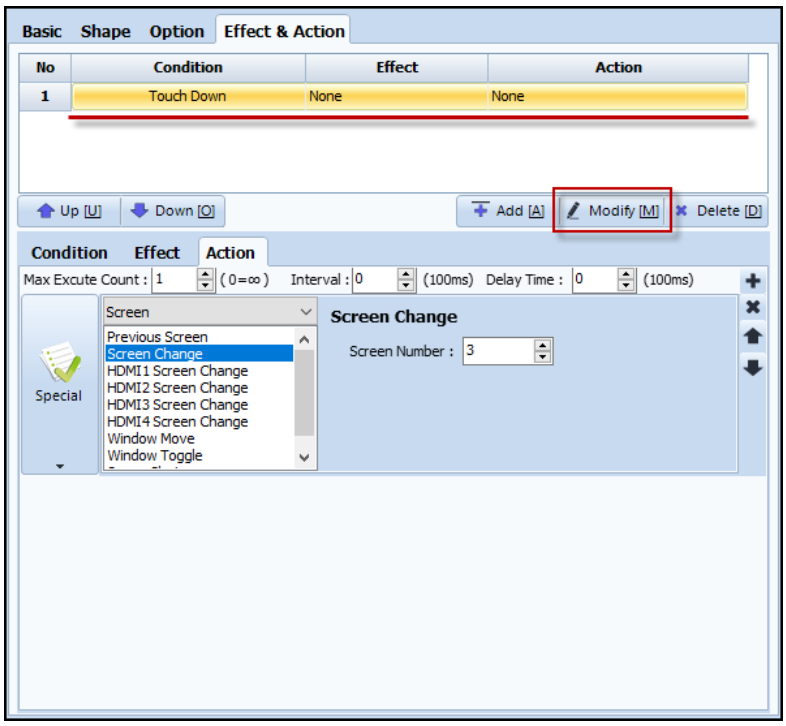
9.3.4 Effect & Action Tab

Configure Effects and Actions.

Click [Edit Action] from the [Basic] tab to navigate to the [Effect & Action] tab.

At the [Effect & Action] tab, [Touch Down] is already selected for [Condition], only configure the [Action].

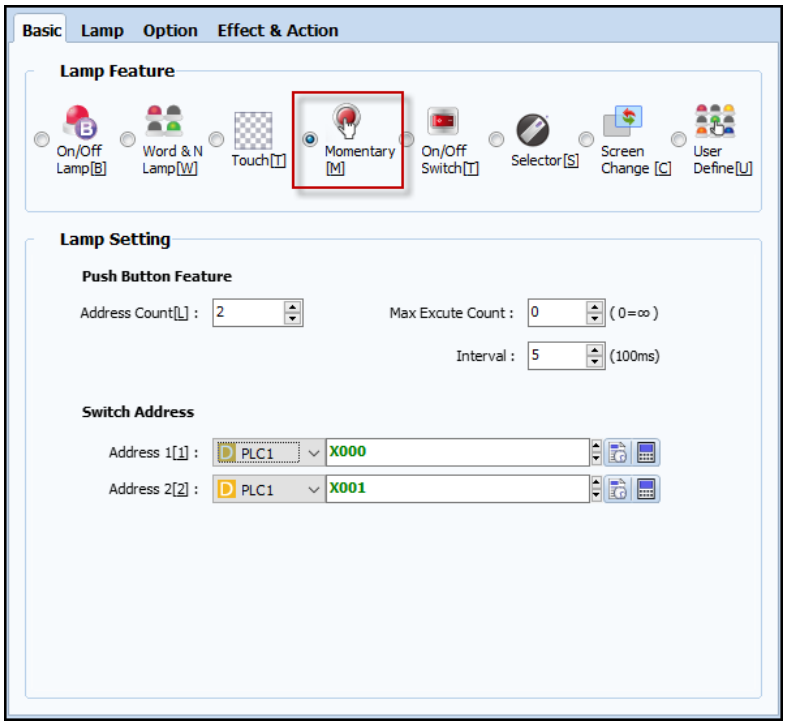
☞ Refer to Chapter 7.6 [Effect & Action] for more details.



[Figure. Effect & Action Tab]

9.4 Momentary

A Momentary switch will create an ON status to the selected Bit Address while the button is touched, and an OFF status to the selected Bit Address while the button is not touched.



[Figure. Momentary]

No.	Property	Description
1	Basic	Configure the addresses for the Momentary Switch.
2	Lamp	Configure the On/Off lamp shape for the Momentary Object.

		This function is identical to the instructions provided in Chapter 9.1.2 [Bit Lamp].
3	Touch Option	Configure the sound buzzer and interlock for momentary objects. This function is identical to the instructions provided in Chapter 9.3.3 [Touch Option Tab].
4	Effect & Action	Assign a secondary [Effect & Action] to the Momentary object. Refer to Chapter 7.6 [Effect & Action] for more details.

9.4.1 Basic Tab

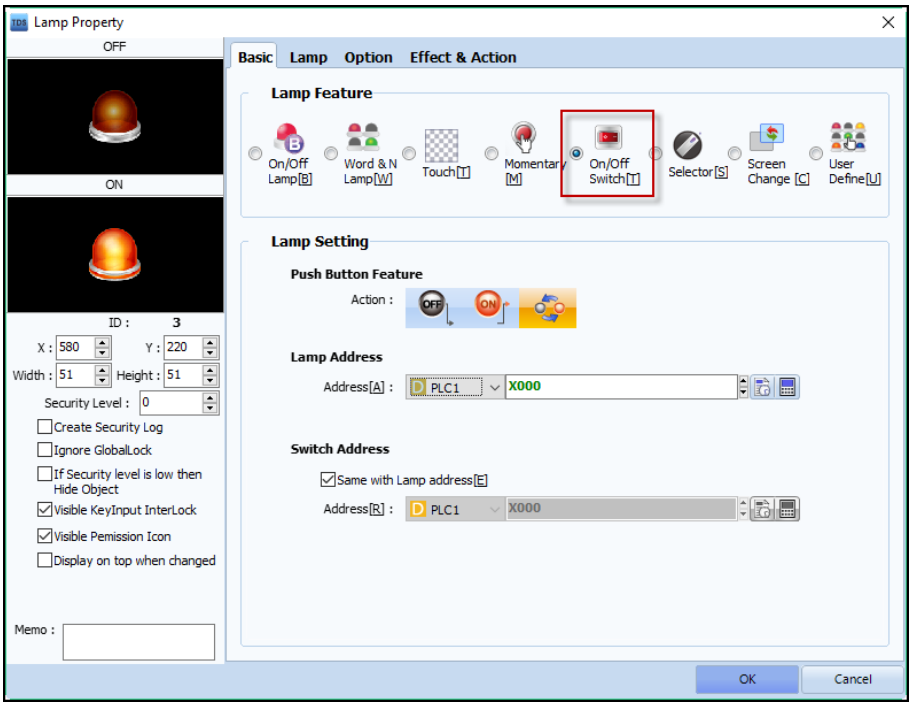
Select [Momentary] for the [Lamp Feature].
The maximum [Address Count] for [Lamp Setting] is 5.
Bit Addresses are added to the [Switch Address] list according to the number of [Address Count]. The selected Bit Addresses will read [On] when the object is touched, and [Off] when the object is not touched.

▶ If the [Max Execute Count] is [1], [ON] is entered once, upon the touch, and [OFF] is entered when the touch is removed. In other words, if the corresponding address is changed to OFF due to the PLC or other reasons, the address will not turn back to ON even if the touch is maintained.

▶ If the [Max Execute Count] is [2] or more, [ON] is entered upon a touch, and will be re-entered for the times configured for [Max Execute Count] with the prescribed [Interval] while the touch is maintained. [OFF] is entered when the touch is released.
▶ If the [Max Execute Count] is [0], [ON] is entered upon a touch, and will be repeatedly entered until the touch is released with the prescribed [Interval]. In other words, even if the corresponding address is changed to OFF due to the PLC or other reasons, the address will restore back to ON.

9.5 Bit Switch

Bit Switch, an On/OFF switch, performs an [ON] / [OFF] / [Reverse] action to the Bit Address.



[Figure. Bit Switch]

No.	Property	Description
1	Basic	Configure the properties of the Bit Switch.
2	Lamp	Configure the shape of the Bit Switch for On and Off status. This function is identical to the instructions provided in Chapter 9.1.2 [Bit Lamp].
3	Touch Option	Configure the sound buzzer and interlock for Bit Switch. This function is identical to the instructions provided in Chapter 9.3.3 [Touch Option Tab].
4	Effect & Action	Assign a secondary [Effect & Action] to the Bit Switch. Refer to Chapter 7.6 [Effect & Action] for more details.

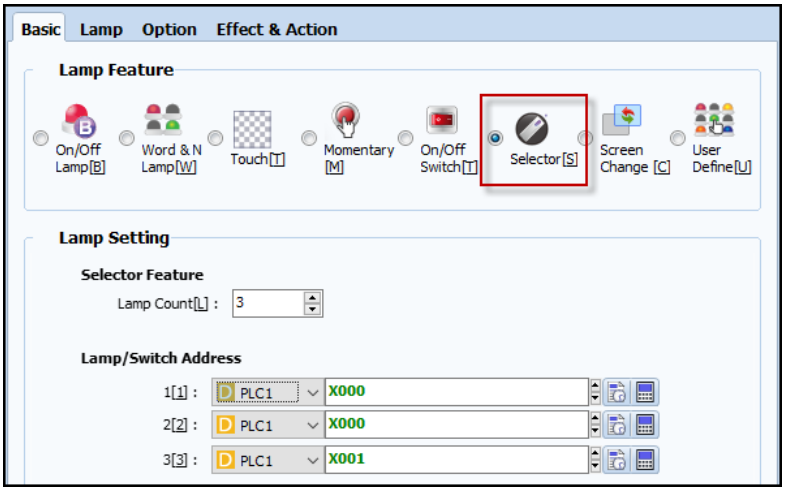
9.5.1 Basic Tab

Select [Bit Switch] for [Lamp Feature].

No.	Property	Description
1	Push Button Feature	Select among [ON] / [OFF] / [Reverse]. Enter Off to the Bit Address. Enter On to the Bit Address. Reverse the status of the Bit Address, Enter Off, if the status is On, On if the status is Off.
2	Lamp Address	Configure the lamp address that indicates the On/Off status.
3	Switch Address	Configure the bit address to be controlled upon the configured action. Enable [Same with Lamp Address] to select the same address configured for [Lamp Address].

9.6 Selector

Use the [Selector] to write an [ON] status to one bit address among multiple bit addresses.



[Figure. Selector]

No.	Property	Description
1	Basic	Configure the address of the Selector.
2	Lamp	Configure the shape of the Selector.
3	Touch Option	Configure the sound buzzer and interlock for momentary objects. This function is identical to the instructions provided in Chapter 9.3.3 [Touch Option Tab].

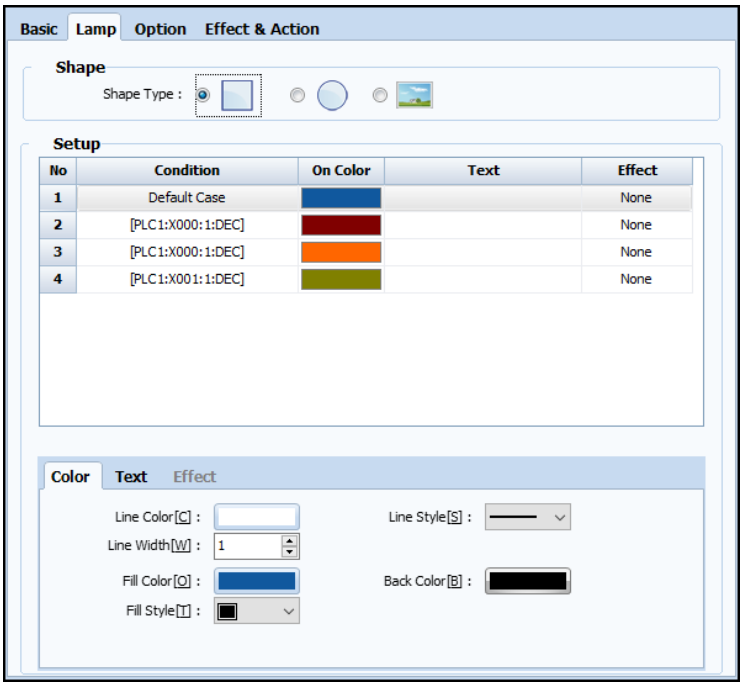
4	Effect & Action	Add a secondary [Effect & Action] to the Selector. Refer to Chapter 7.6 [Effect & Action] for more details.

9.6.1 Basic Tab

Select [Selector] for [Lamp Feature].
Configure the [Lamp Count] and [Lamp/Switch Address].
The maximum [Lamp Count] for [Lamp Setting] is 8.
Bit Addresses are added to the [Lamp/Switch Address] list according to the number of [Lamp Count].
Upon each touch to the selector, bit addresses listed to the [Lamp/Switch Address] will change to ON in the preceding order, and the addresses other than the one that turns to ON will turn OFF.
Once each address listed have changed to ON once, the first bit address changes to ON upon the next touch.

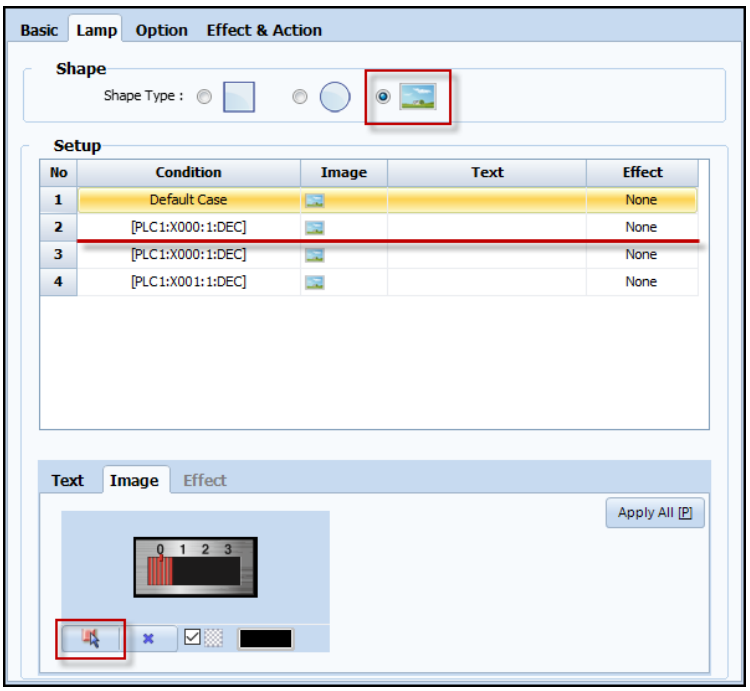
9.6.2 Lamp Tab

The list provided in [Setup] is automatically conformed according to the [Lamp Count] configured from the [Basic] tab.
Select each lamp on the list and configure the shape and text of the Lamp.



[Figure. Lamp Tab - Selector]

For [Shape Type] of [Rectangle] and [Ellipse] configure the [Line] and [Fill] setting for each lamp.
For [Shape Type] of [Image], configure the image applicable for each lamp.

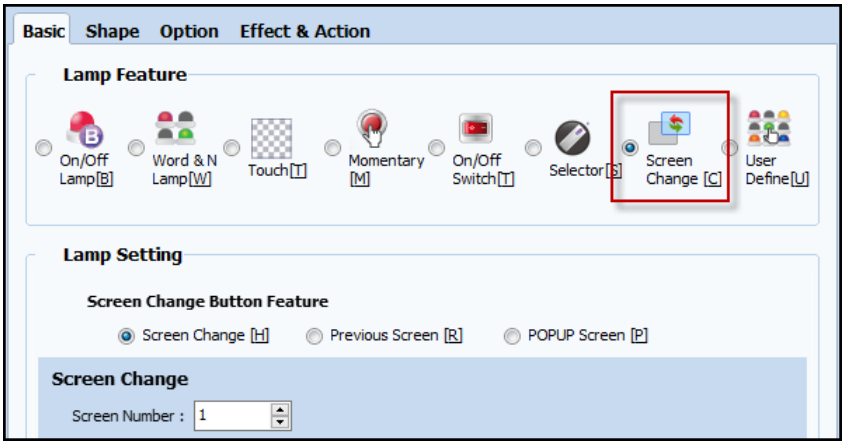


[Figure. Shape Type - Image]

Configure a [Text] to show the string on each Lamp.

9.7 Screen Change

Use a [Screen Change] object to change between base screens, or pop-up a window screen.



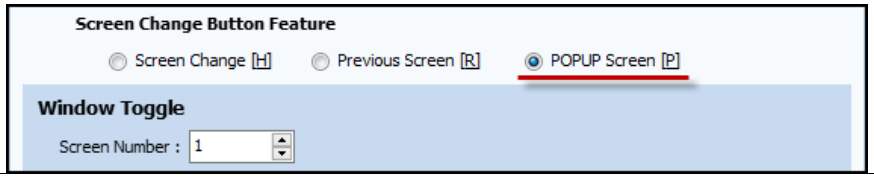
[Figure. Screen Change]

No.	Property	Description
1	Basic	Configure a screen change action.
2	Shape	Configure the shape of the Screen Change Object. This function is identical to the instructions provided in Chapter 9.3.2 [Shape Tab] (Touch Object).
3	Touch Option	Configure the sound buzzer and interlock for momentary objects. This function is identical to the instructions provided in Chapter 9.3.3 [Touch Option Tab].
4	Effect & Action	Add a secondary [Effect & Action] to the Screen Change Object. Refer to Chapter 7.6 [Effect & Action] for more details.

9.7.1 Basic Tab

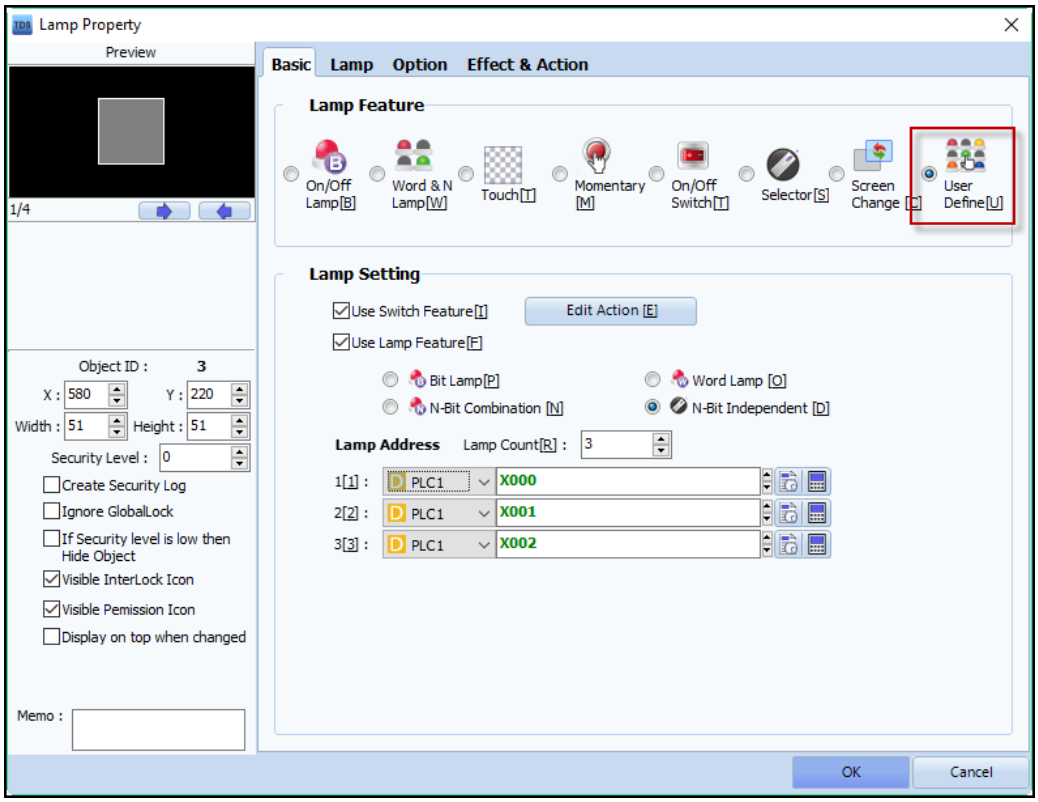
Select [Screen Change] for [Lamp Feature].

Select the [Screen Change Button Feature] among [Screen Change] / [Previous Screen] / [POPUP Screen].

No.	Property	Description
1	Screen Change [H]	The device navigates to the selected [Screen Number].
2	Previous Screen [R]	The device navigates to the immediate previous screen.
3	POPUP Screen [P]	The selected [Screen Number] will pop up. The selected Window Toggle will appear in the center of the current base screen. The pop-up window will close upon another touch. 

9.8 User Define

Select between [Switch] and/or [Lamp] for a [User Define] object.



[Figure. User Define Object]

No.	Property	Description
1	Basic	Configure the functions of [Switch] and/or [Lamp], and the lamp address.
2	Lamp	Configure the shape of the Lamp Object selected from the Basic Tab. For Bit Lamps, refer to Chapter 9.1.2.

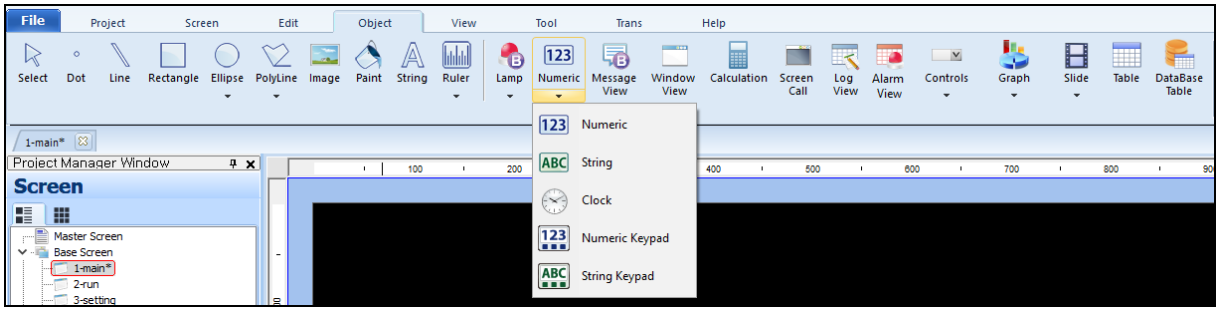
		For Word Lamps, refer to Chapter 9.2.1. For N-Bit Combinations, refer to Chapter 9.2.2. For N Bit Independent, refer to Chapter 9.2.3.
3	Touch Option	Configure the sound buzzer and interlock for momentary objects. This function is identical to the instructions provided in Chapter 9.3.3 [Touch Option Tab].
4	Effect & Action	Add a secondary [Effect & Action] to the Screen Change Object. This function is identical to the instructions provided in Chapter 9.3.4.

9.8.1 **Basic Tab**

Select [User Define] for [Lamp Feature].
Configure the [Switch] and/or [Lamp] function from the [Lamp Setting] and assign the corresponding lamp address.
Enable [Use Switch Feature] to activate the [Edit Action] button.
Click [Edit Action] to navigate to the [Effect & Action] tab and configure the action to execute upon a prescribed [Condition].
You can disable [Use Switch Feature] and only apply the lamp fuction.
Enable [Use Lamp Feature] , and select among [Bit Lamp] / [Word Lamp] / [N-Bit Combination] / [N-Bit Independent].
For a [Bit Lamp], refer to Chapter 9.1 [Bit Lamp].
For a [Word Lamp] / [N-Bit Combination] / [N-Bit Independent], refer to Chapter 9.2 [Multiphase Lamp].

CHAPTER 10 - Numeric/String Object

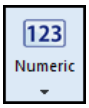
Display address data in numbers or strings with a Numeric / String Object.



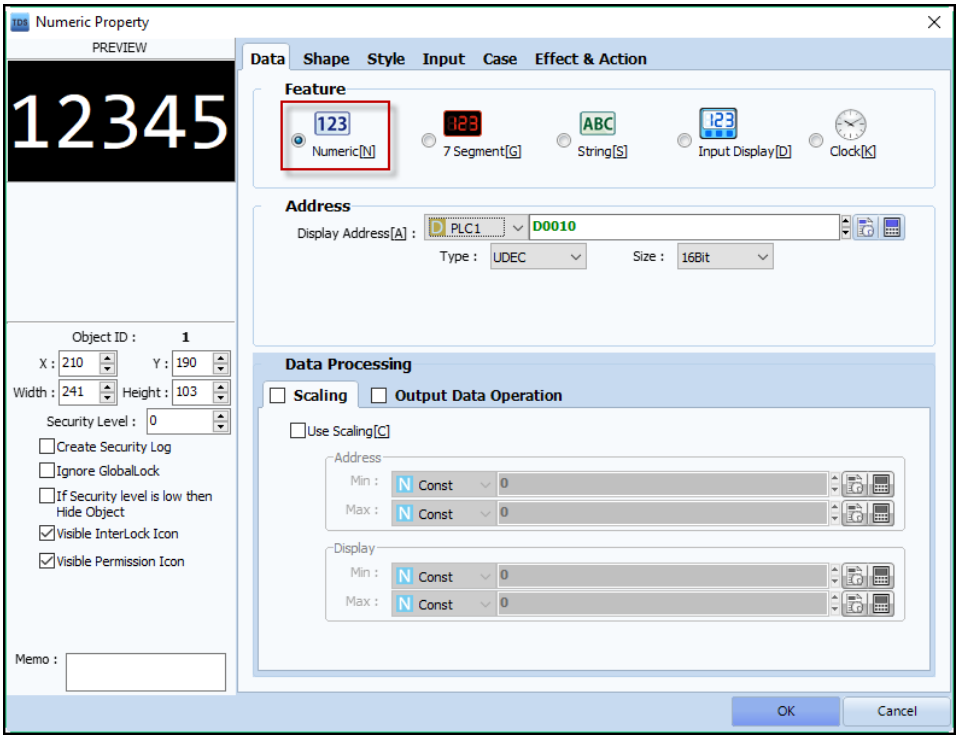
[Figure. Numeric/String Object]

No.	Object	Description
1	Numeric	The data of the selected address is expressed in numbers.
2	String	The data of the selected address is expressed in strings.
3	Clock	Show the date and time of the TOP device system clock.
4	Numeric Keypad	A Numeric Keypad object is basically identical with a Numeric object, while [Use Input] is enabled from the [Input] Tab to input numeric data.
5	String Keypad	A String Keypad object is basically identical with a String object, while [Use Input] is enabled from the [Input] tab to input string data.

10.1 Numeric Object



A Numeric object displays the data of the [Display Address] in numbers.



[Figure. Numeric Object]

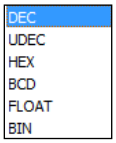
10.1.1 Data Tab

Select [Feature] between [Number] or [7 Segment].

In principle, [7 Segment] is identical with [Numeric], only the [Font] section on the [Style] tab is different.

(1) Address

Configure the [Display Address] of which data shall be shown in numbers. Configure the address [Type] and [Size].

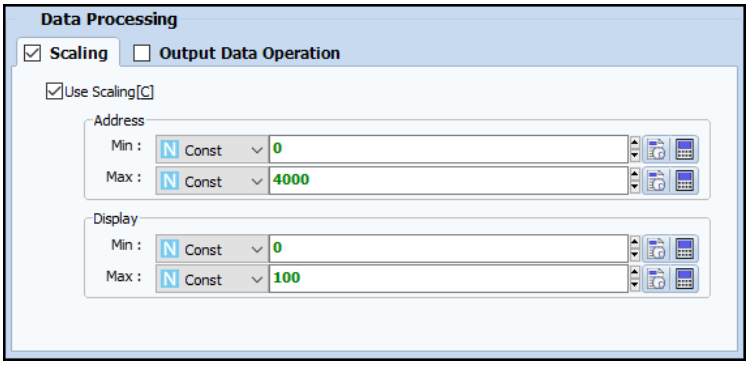
No.	Address	Description
1	Display Address	Configure the Word Address (16 bit) of which data shall be shown in numbers.
2	Type	Configure the data type. The data is shown in the selected type.  Select [DEC] to show coded decimal data. Select [UDEC] to show unsigned decimal data. Select [Hex] to show hexadecimal data. Select [BCD] to show Binary-coded decimal data. The data is actually binary-coded, yet data including values of A to F will not be shown. Select [Float] to show floating-point number data. Select [BIN] to show binary digits.
3	Size	Configure address size between [16Bit] / [32Bit]. With a configuration of Display Address of 16Bit, and address size of 32Bit, the immediately next address of the Display Address becomes the primary word, and the Display Address becomes the secondary address to show a 32Bit data.

(2) Data Processing

Use Data Processing to show processed data of the Display Address.

▶ Scaling

Enable [Use Scaling] to proportionally calculate the address data within a specific range.



[Figure. Scaling]

The [Min] / [Max] for [Address] refers to the actual data range of the [Display Address].

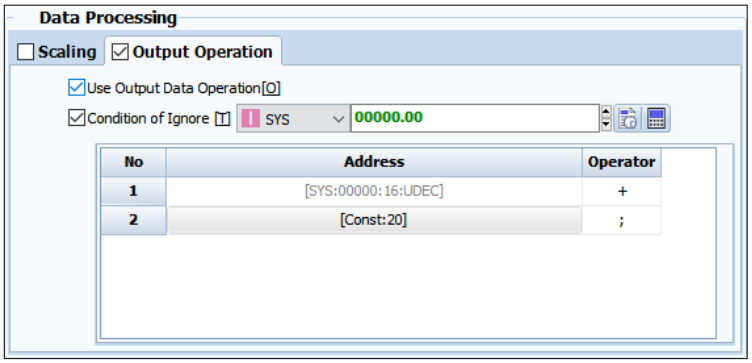
The [Min] / [Max] for [Display] refers to the range that will be shown on the screen.

The address data is proportionally calculated with the [Address] [Min] / [Max] and [Display] [Min] / [Max] with the following formula.

[Display Value] = ([Display Max] - [Display Min]) / ([Address Max] - [Address Min]) x [Actual Data].
With the above configuration, if the actual data reads [2000], the display value is 50 ([100-0]/[4000-0]x2000=50)
If the actual data is [0] or lower, the object will show [0], and if the actual data is [4000] or higher, the object will show [100].

▶ Output Data Operation

Output Data Operation shows the result of an operation conducted on the data of the [Display Address].
Select [Output Data Operation], and enable [Use Output Data Operation].



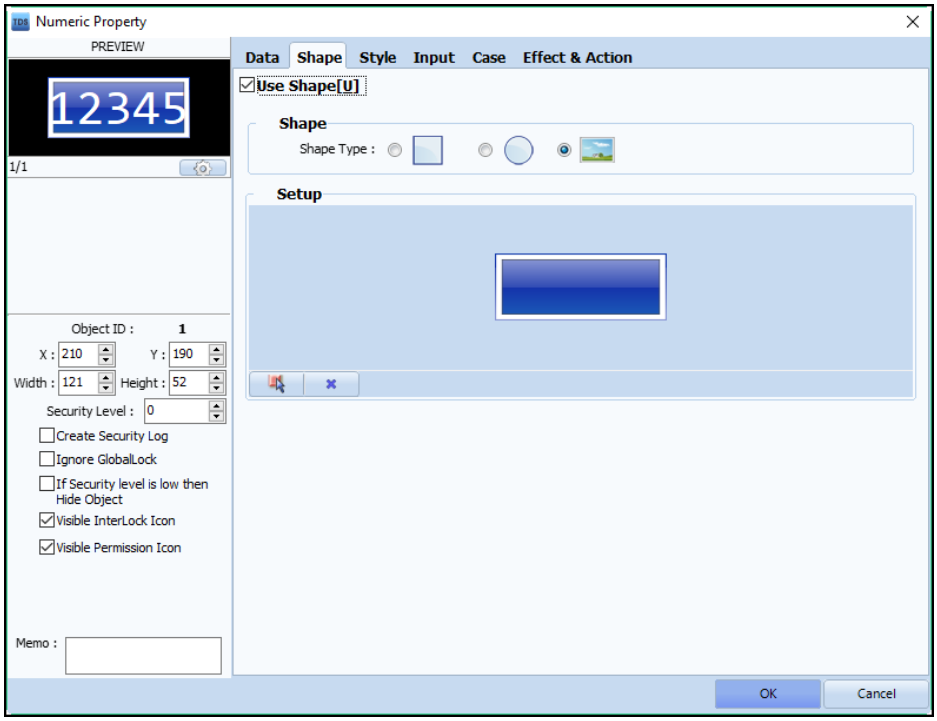
[Figure. Output Data Operation]

Enable [Condition of Ignore] to configure the bit address employed as the condition reference point.
If the bit address reads ON, the Output Data Operation is not executed.
If the bit address reads OFF, the Output Data Operation is executed.
Disable [Condition of Ignore] to execute Output Data Operation at all times.
Configure the [Address] and [Operator].
Address No.1 is fixed as [Display Address].
When you select any operator other than [;], row No.[2] will be added automatically.
With the above configuration, if the internal address of [00000.00] reads OFF, the sum of the data of the [Display Address] and 20 will be shown on the object.

No.	Operator	Description
1	+	Add the second operand to the first operand.
2	-	Subtract the second operand from the first operand.
3	*	Multiply the two operands.
4	/	Divide the first operand with the second operand.
5	^	Execute a Bit XOR operation between the two operands.
6	%	Execute an MOD operation between the two operands. The modulo operation finds the remainder after division of the first operation by the second operand.
7	&	Execute an AND operation between the two operands.
8	|	Execute a BIT OR operation between the two operands.
9	<<	Left Shift Operator. The left shift operator causes the bits of the first operand to be shifted to the left by the number of positions specified in the second operand.
10	>>	Right Shift Operator The right shift operator causes the bits of the first operand to be shifted to the right by the number of positions specified in the second operand.
11	;	Use [;] to terminate the operation.

10.1.2 Shape Tab

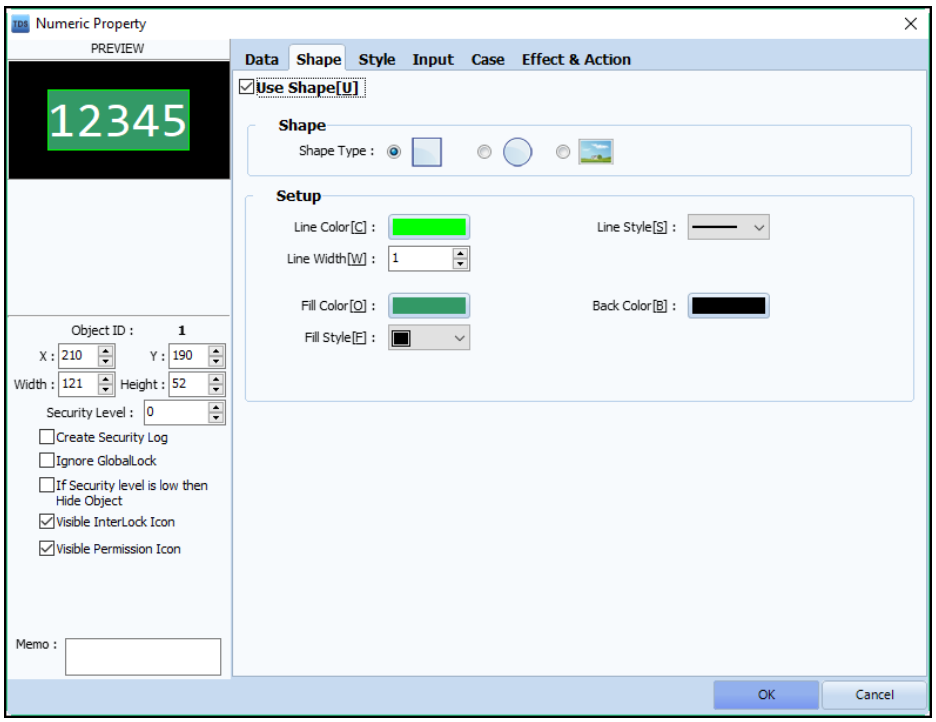
Configure a shape to be added under the number, if necessary.



[Figure. Shape Tab]

For [Shape Type] of [Image], add an image as shown above.

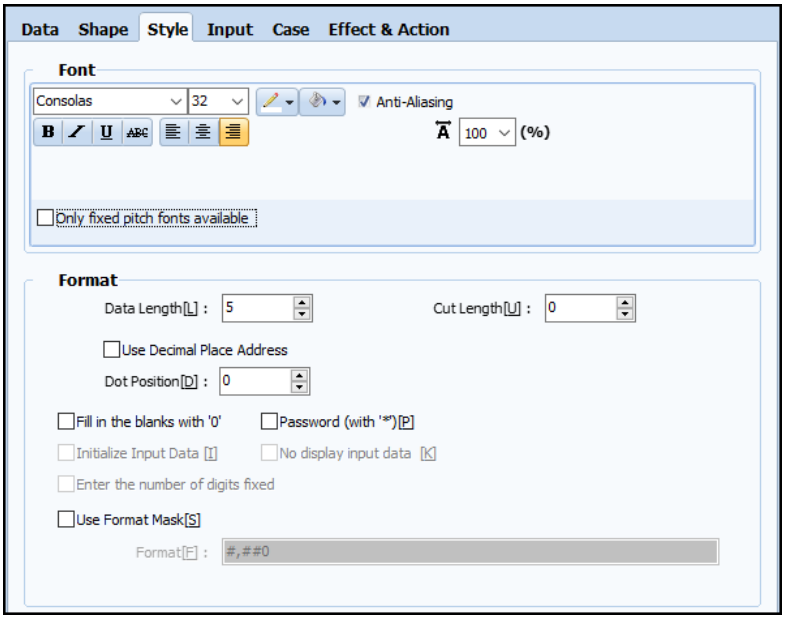
For [Shape Type] of [Rectangle] and [Ellipse], configure the [Line] and [Fill] Setting as shown below.



After you configure the settings for the Numeric object, close the Property window and select the numeric object to adjust the size of the shape.

10.1.3 **Style Tab**

Configure the font and format for numbers.



[Figure. Style Tab]

(1) Font

▶ Configure font applicable to display the numbers if [Numeric] is selected for [Feature] at the [Data] Tab.

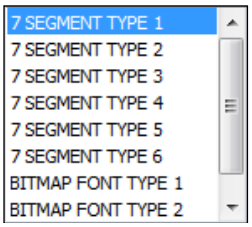
No.	Font		Description
1	Font Type		Select the font of your interest from the drop-down menu. Enable [Only fixed pitch fonts available] to suggest fonts of which width and height are identical.
2	Font Size		Select the Font Size of your interest.
3	Font Color		Configure the color for the numbers.
			Configure the background color for the numbers.
4	Anti-Aliasing		The edges of numbers that are shown in step-like shapes at low resolution are rendered for a smoother display.
5	Edit Font	**B**	Bold - show numbers in a bold fashion.
		I	Italic - show numbers in a tilted fashion.
		U	Underline - Add an underline to numbers.
		ABC	Strikethrough - Add a strikethrough line on numbers.
6	Font Align		Align numbers to the left.
			Align numbers to the horizontal center.
			Align numbers to the right.
7	Gap	100 (%)	Stretch or narrow the horizontal length of the font. Select 100% to apply the original scale. You can select between [20%] an [80%]. This function is available only for fixed pitch fonts.

▶ If [7 Segment] is selected for [Feature] at [Data] tab, [7 Segment] is basically identical with [Numeric], where only the [Font] field differs.

[7 Segment] refers to display of numbers with 7 LED lights.

[Figure. Font - 7 Segment]

Select among the 9 image fonts provided for [7 Segment].

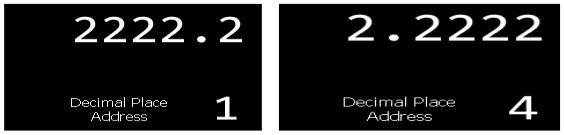


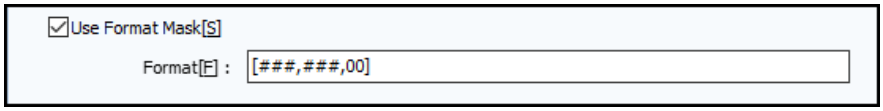
[Figure. Image Fonts]

No.	7 Segment Font	Description
1	Font Width	Configure the width of a single digit.
2	Font Height	Configure the height of a single digit.
3	Font Color	Select the color for numbers.
4	Font Back Color	Select the background color.
5	Font Align	Align the numbers to the [Left] or [Right].

(2) Format

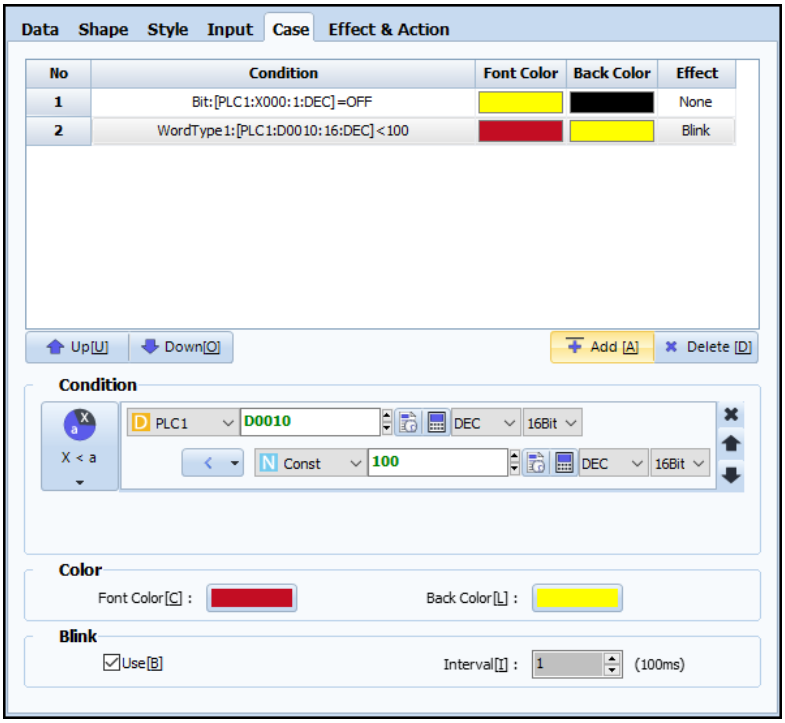
No.	Format	Description
1	Data Length	Configure the total length of the number. Decimal points and positive/negative signs are not excluded from the length. If the actual data is [1234], and the data length is [3], the object will show [234]. ▶ For Addresses with Data Size of 16bit. The data range is [0] to [65535] for UDEC data, and [-32768] to [32767] for DEC data, where you can configure a data length up to 5 digits. The data range is [0] to [FFFF] for HEX data, and [0] to [9999] for BCD data, where you can configure a data length up to 4 digits. If the data type is [BIN], you can configure a data length up to 16 digits. ▶ For Addresses with Data Size of 32Bit. The data range is [0] to [4294967295] for UDEC data, and [-2147483648] to [2147483647] for DEC data, where you can configure a data length up to 10 digits. The data range is [0] to [FFFFFFFF] for HEX data, and [0] to [99999999] for BCD data, where you can configure a data length up to 8 digits. If the data type is [BIN], you can configure a data length up to 32 digits.

		For [FLOAT] data, the [Size] is 32Bit in principle, where data size of [32 Bit] is assigned as default. The data range is from [-99999999.99] to [99999999.99], where you can configure a data length up to 10 digits.
2	Dot Position	Add a decimal point to the number. Configure a [Dot Position] of [2] to display the actual data of 123 as [1.23]. [Dot Position] is not available for data type of [HEX]. Enable [Use Decimal Place Address] to assign an address of which value is used as the Dot Position. [Figure. Use Decimal Place Address] Assign the value of an address to the Dot Position. With the above configuration, the data of [D0100] becomes the number of digits shown after the decimal point. If the data of [D0100] varies during operation, the dot position varies accordingly.  Caution! When the actual data reads [1.23] and the Dot Position is [2]: ▶ For data types of [DEC] / [UDEC]. A numeric object can only read integral numbers, where only [1] will be recognized thus the object will show [0.01]. Therefore, for data types of [DEC] / [UDEC] to display a number with a decimal point, the data should be converted to an integral number first. A number with one digit after the decimal point shall be multiplied with 10, a number with two digits after the decimal point shall be multiplied with 100, to be recognized as integral numbers. In the above case, 1.23 x 100 = 123 shall be performed prior to executing the numeric object to properly show [1.23]. ▶ For data type of [FLOAT]. The numeric object fully recognizes1.23 and shows [1.23].
3	Cut Length	The number of digits configured by the [Cut Length] will be removed from the one's place toward the left. If the actual data reads [12345] the [Data Length] is [5] and the [Cut Length] is [2], the object will show [123]. This function is not available if [Use Input] is enabled from the [Input] tab.
4	Fill in the blanks with '0'	Fill the blank spots with '0'. If the actual data reads [12], and the [Data Length] is [5], the object will show [00012]. If the actual data reads [1.2], [Data Length] is [5], and [Dot Position] is [2], the object shows [001.20].

5	Password (with '*')	Show data in '*'. This function is generally used to show passwords. If the actual data reads [1234], the object will show [****].
6	Word Swap	If the [Display Address] from [Data] tab is 16Bit (Word) with [Size] of 32Bit, the [Display Address] becomes the secondary word, and the immediately next address of the [Display Address] becomes the primary word to show a 32Bit data. Enable [Word Swap] to assign the [Display Address] as the primary word, and the next address as the secondary word.
7	Use Format Mask	Enable [Use Format Mask] to add strings between numbers. [#] refers to numbers. [0] will fill blank number slots with [0].  With the above configuration, with an actual data of [12345.6], the object will show [12,345.60] This function is not available if [Use Input] is enabled from the [Input] tab.

10.1.4 Case Tab

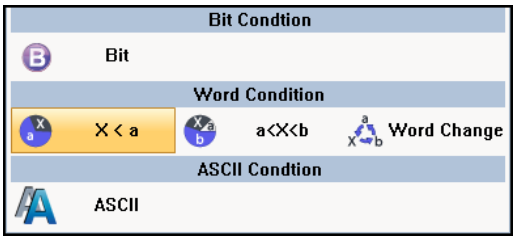
Configure change to the color of or force the object to [Blink] upon a predetermined [Condition].



[Figure. Case Tab]

Press the [Add] button to add a case.

Select each case, and configure the [Condition] / [Color] / [Blink] settings.

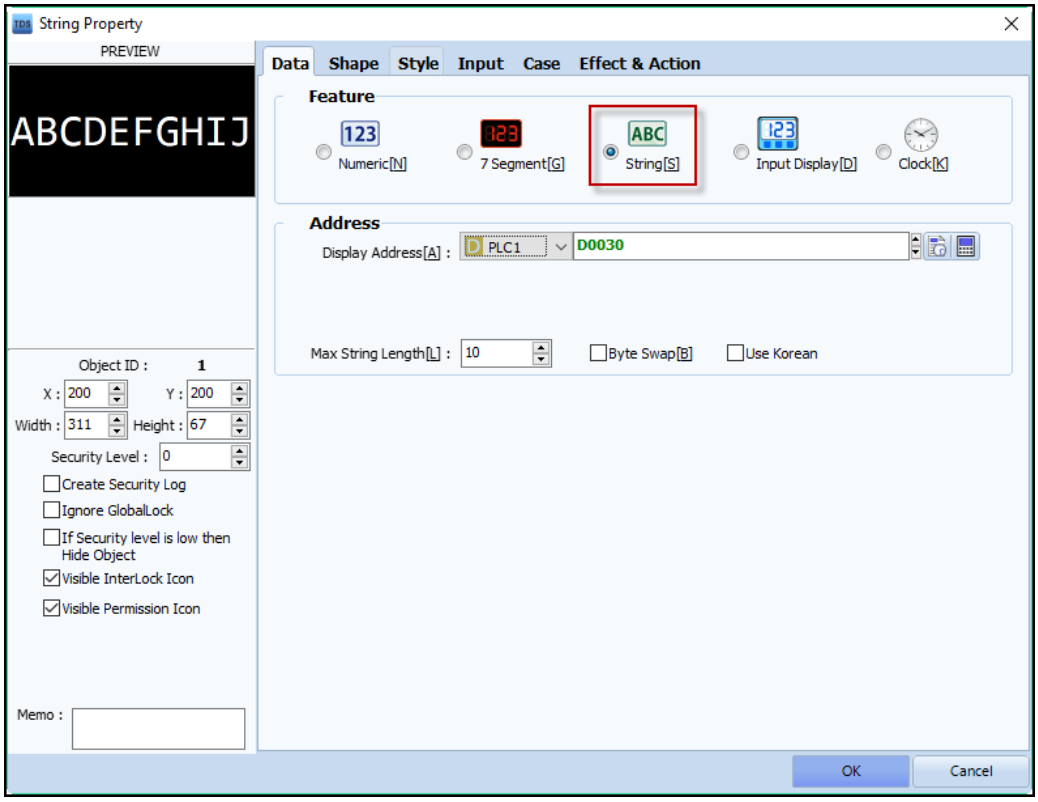
No.	Case	Description
1	Condition	Configure the condition upon which the object should [Blink] or change [Color].  Applicable conditions are [BIT] / [Word] / [ASCII]. Refer to Chapter 7.7 [Condition Tab] for more details no how to configure a condition.
2	Color	Configure the [Font Color] for numbers and [Back Color] for the background.
3	Blink	Enable [Use] and configure the [Interval] in which the object will repeatedly appear and disappear.

Delete with the [Delete] button if you don't need any more.
If the conditions of both Case 1 and Case 2 are true, the numeric object will be shown in the [Font Color] / [Back Color] of Case 1.

Therefore, adjust the list of cases with the [Up] / [Down] button to assign the cases to a specific hierarchy.
Press [Up] to move the selected Case one row upward from its current position.
Press [Down] to move the selected Case one row downward from its current position.

10.2 String Object

A String object displays the data of the [Display Address] in strings.
You can configure a [Max String Length] up to 255.



[Figure. String Object]

No.	Property	Description
1	Data	Select the [Feature] of the object and configure the [Display Address].
2	Shape	Configure a shape to be added under the string. This function is identical to the instructions provided in Chapter 10.1.2 [Shape Type] for Numeric Objects.
3	Style	Configure the font and format of strings. Functions different from those for Numeric Objects will be explained. Refer to Chapter 10.1.3 [Style Tab] for functions common with Numeric Objects.
4	Input	Refer to Chapters 10.5 [Numeric Keypad] and 10.6 [String Keypad] for more details.
5	Case	Configure change to the color of or force the object to [Blink] upon a predetermined [Condition]. This function is identical to the instructions provided in Chapter 10.1.4 [Case Tab] for Numeric Objects.
6	Effect & Action	Add a secondary [Effect & Action] to the String Object. Refer to Chapter 7.6 [Effect & Action] for more details.

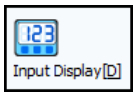
10.2.1 **Data Tab**

Configure the Feature and Display Address from the [Data] Tab.

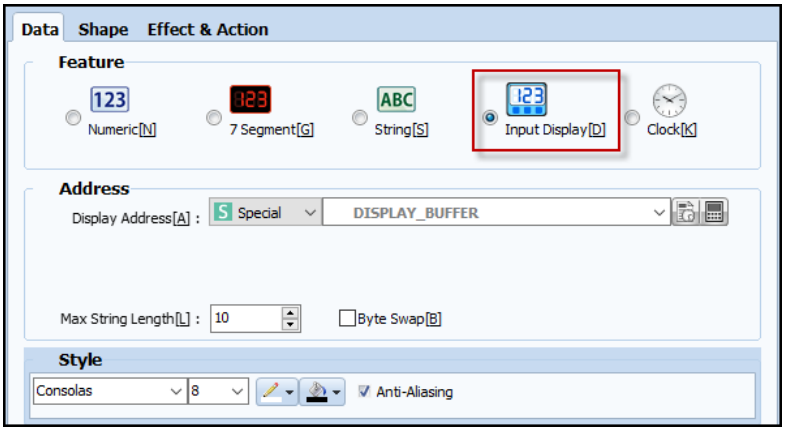
Select [String] for [Feature].

No.	Data Tab	Description
1	Display Address	Configure the address of which data shall be shown in texts.
2	Max String Length	Configure the number of strings to be shown. A 16 bit word address can read 2 characters for [English] / [Numbers] / [Special Characters] and one [Korean] character. With the above configuration, the [Max String Length] is [10] while the [Display Address] represents [2] characters, therefore, [5] word addresses, including and beginning from the [Display Address] are required. In other words, the data from [D0030] to [D0034] are shown in strings.
3	Byte Swap	A single character is 8 Bit, thus, 1 Byte. Enable [Byte Swap] to substitute the primary byte and the secondary byte with each other, according to the address type of PLC. If [Byte Swap] is applied to a data of [ABCD], [BADC] will be shown.

10.3 **Input Display Object**



An [Input Display] Object shows the value entered from the 10-key keypad.



[Figure. Input Display]

No.	Property	Description
1	Data	Select the [Feature] and configure the [Address] and [Style].
2	Shape	Configure a shape to be added under the Input Display object. This function is identical to the instructions provided in Chapter 10.1.2 [Shape Type] for Numeric Objects.
3	Effect & Action	Add a secondary [Effect & Action] to the Input Display Object. Refer to Chapter 7.6 [Effect & Action] for more details.

An Input Display object will show the entered keys on top of the keypad, as shown below.
This is a read only object, where a user cannot perform additional input.

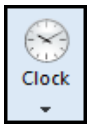
[Figure. Input Display Object]

10.3.1 **Data Tab**

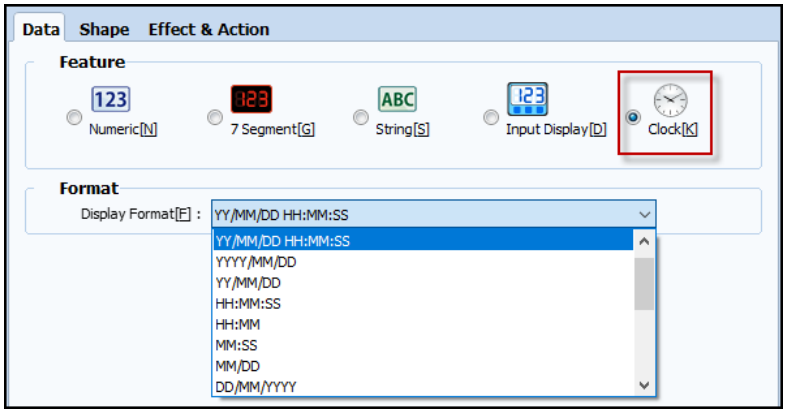
Select [Input Display] for [Feature].
The [Display Address] is assigned to the Special Address of [DSIPLAY_BUFFER] as default.
Configure the number of strings to be shown with [Max String Length]. You can configure a [Max String Length] up to 255.

Enable [Byte Swap] to substitute the primary byte and secondary byte with each other. If [Byte Swap] is applied to a data of [ABCD], [BADC] will be shown.
Configure the applicable font from the [Style] tab.

10.4 Clock Object



Display the system time clock of the TOP device with a Clock Object.



[Figure. Clock Object]

No.	Property	Description
1	Data	Select the [Display Format] for the date and time.
2	Shape	Configure a shape to be added under the Clock object. This function is identical to the instructions provided in Chapter 10.1.2 [Shape Type] for Numeric Objects.
3	Effect & Action	Add a secondary [Effect & Action] to the Clock object. Refer to Chapter 7.6 [Effect & Action] for more details.

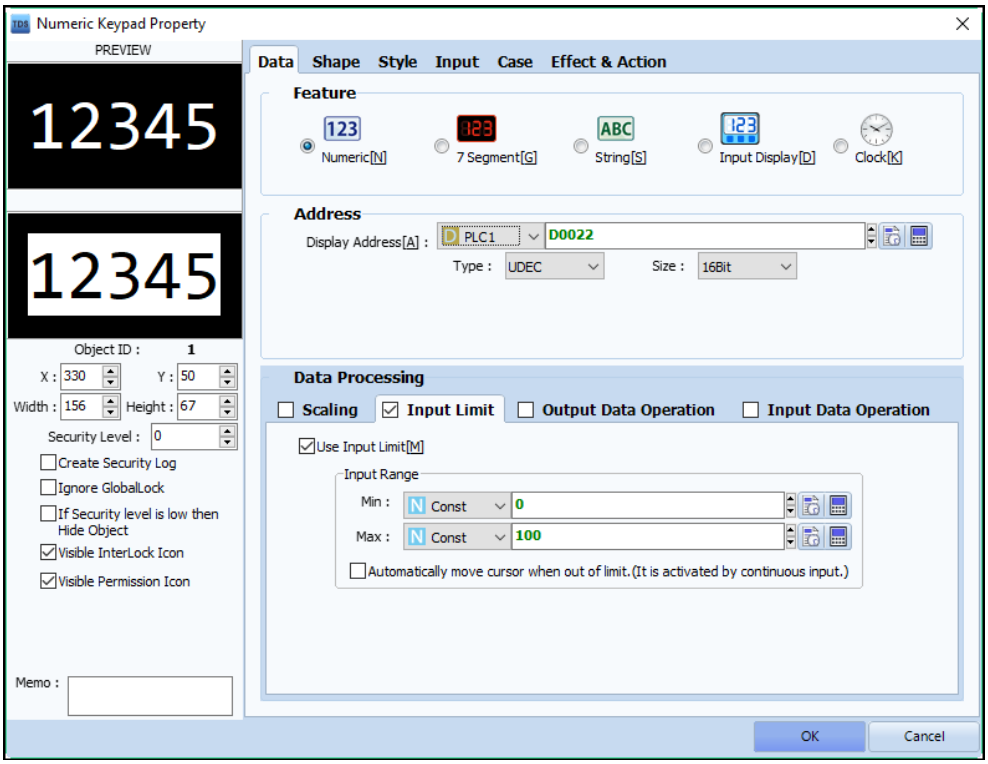
Select [Clock] for [Feature].
Select the detail [Display Format] from the drop down menu that provides numbers of options.
Each abbreviation represents: Y for Year, M for Month, D for Day, H for Hour, M for Minute, and S for Second.
For [Year], [YYYY] will show [2015] and [YY] will show [15].
The system time clock of the TOP device is saved in a Special Address.
Each special Address is: [DATE_DD] (day), [DATE_MM] (month), [DATE_WEEK] (week), [DATE_YYYY] (year), [TIME_HH] (hour), [TIME_MM] (minute), and [TIME_SS] (second).
You can change the date and time from the status bar provided in the lower part of the Menu Screen or from [Control Panel] - [Date/Time].
The changed date and time will be recorded in each Special Address for date and time.
Furthermore, If you change the Special Address assigned for Date and Time, the system time clock of the TOP device will change.

10.5 Numeric Keypad Object

Use a [Numeric Keypad] object to input data from a numeric keypad.

In principle, a [Numeric Keypad] has the same features of a [Numeric] object, the following provides instructions that are different from those of a [Numeric] object.

Go to the [Input] tab and enable [Use Input] to conform a [Numeric Keypad] Object, or disable [Use Input] to conform a [Numeric] object.



[Figure. Numeric Keypad Object]

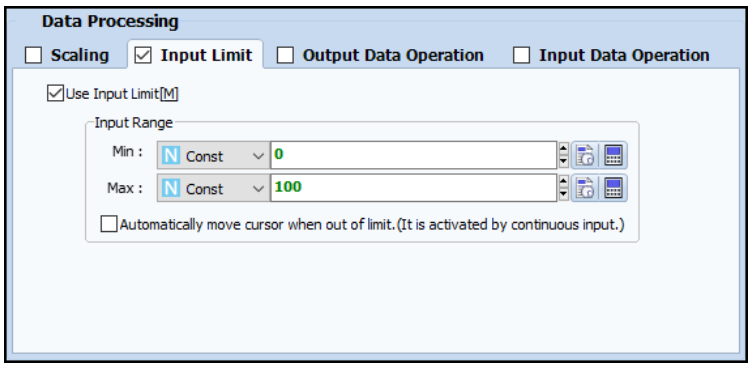
No.	Property	Description
1	Data	Select the [Feature] of the object and configure the [Display Address]. Configure settings other than those identical with a Numeric object. Refer to Chapter 10.1.1 [Data Tab] for Numeric Objects for identical settings.
2	Shape	Configure a shape to be added under the number, if necessary. This function is identical to the instructions provided in Chapter 10.1.2 [Shape Type] for Numeric Objects.
3	Style	Configure the font and format for numbers. Functions different from those for Numeric Objects will be explained. Refer to Chapter 10.1.3 [Style Tab] for functions common with Numeric Objects.
4	Input	Configure input settings.
5	Case	Configure change to the color of force the object to blink upon a predetermined [Condition]. This function is identical to the instructions provided in Chapter 10.1.4 [Case Tab] for Numeric Objects.
6	Effect & Action	Add an additional [Effect & Action] to the Numeric Keypad object. Refer to Chapter 7.6 [Effect & Action] for more details.

10.5.1 Data Tab

A Numeric Keypad object receives incoming numeric data, thus [Input Limit] and [Input Data Operation] are additionally provided.

(1) Input Limit

Configure [Input Limit] to apply a restriction to data input.



[Figure. Input Data]

Enable [Use Input Limit] and configure the [Min] and [Max] of [Input Range].

Enter the smallest allowable value in [Min], and the largest allowable value in [Max].

If the [Min] value is larger than the [Max] value, data will not be input.

The [Min] / [Max] of [Input Range] may be a [Numeric] constant, or the value of a specific address that may vary during operation.

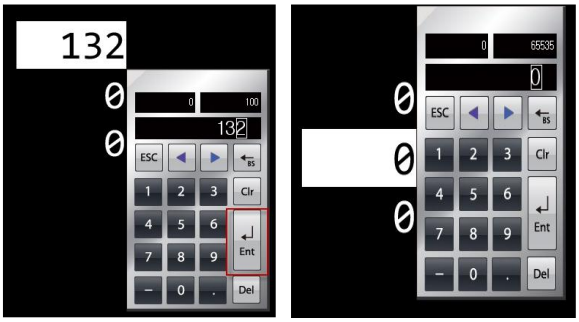
With the above configuration, the [Min] / [Max] of the [Input Range] are shown in the Numeric Keypad.

If you key in a number outside of the range of [0] to [100] and touch the [Enter] key, the number will not be admitted, and the keypad will show the below form.

[Figure. Input of data outside of Input Range]

[Automatically move cursor when out of limit] is available when [Continuous Input] is enabled from the [Input] tab.

If you key in a number outside of the [Input Range] and touch the [Enter] key, the number will not be entered, and the cursor will move to the next [Key Input Order].

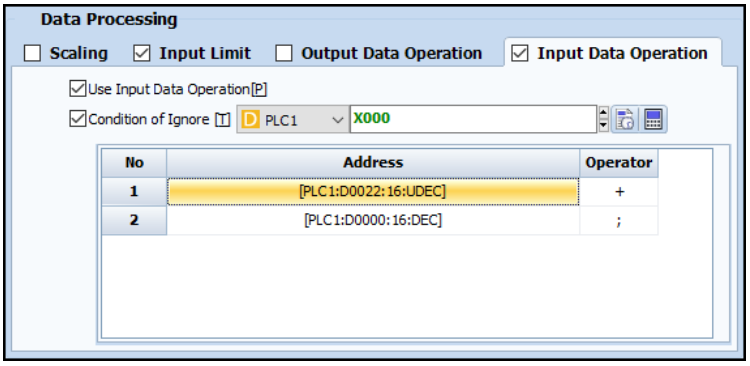


[Figure. Automatically move cursor when out of limit]

(2) Input Data Operation

[Input Data Operation] conducts an operation to the input data and saves the result of the operation to the [Display Address].

The instructions for this function is identical with those for [Output Data Operation].



[Figure. Input Data Operation]

Select [Input Data Operation] and enable [Use Input Data Operation].

Enable [Condition of Ignore] to configure the bit address employed as the condition reference point.

If the bit address reads ON, the Input Data Operation is not executed.

If the bit address reads OFF, the Input Data Operation is executed.

Disable [Condition of Ignore] to execute Input Data Operation at all times.

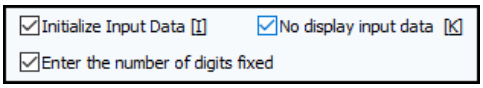
Configure the [Address] and [Operator].

Address No.1 is fixed as [Display Address].

When you select any operator other than [;], row No.[2] will be added automatically.

With the above configuration, if the internal address of [00000.00] reads OFF, the sum of the data of the input value and 20 will be entered to the [Display Address].

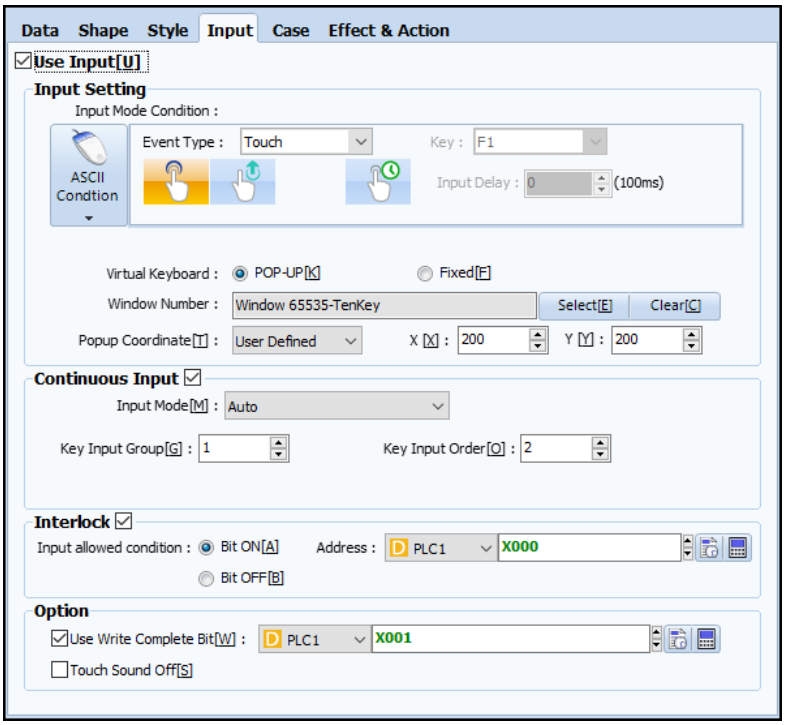
10.5.2 Style Tab



No.	Style Tab	Description
1	Initialize Input Data	Enable [Initialize Input Data] to initialize the object whenever the object is selected for a new input.
2	No display input data.	The data is not shown during input.
3	Enter the number of digits fixed.	Input is admitted only when the input data corresponds to the configured [Data Length]. Any data shorter than the [Data Length] will not be admitted.

10.5.3 Input Tab

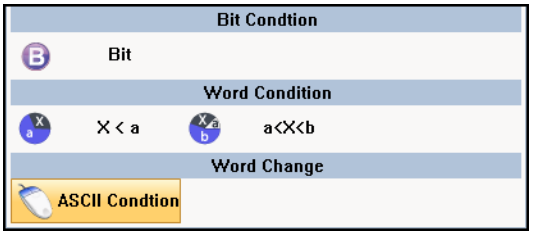
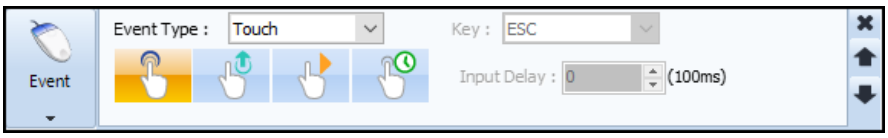
For a Numeric Keypad Object, [Use Input] is enabled as default.
Enabling [Use Input] allows you to configure various settings for data input.
Go to the [Input] tab and enable [Use Input] to conform a [Numeric Keypad] Object, or disable [Use Input] to conform a [Numeric] object.

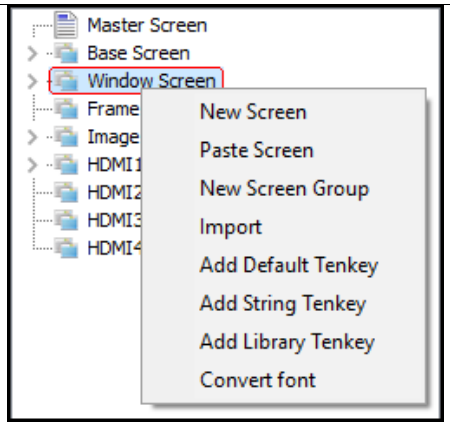


[Figure. Input Setting]

(1) Input Setting

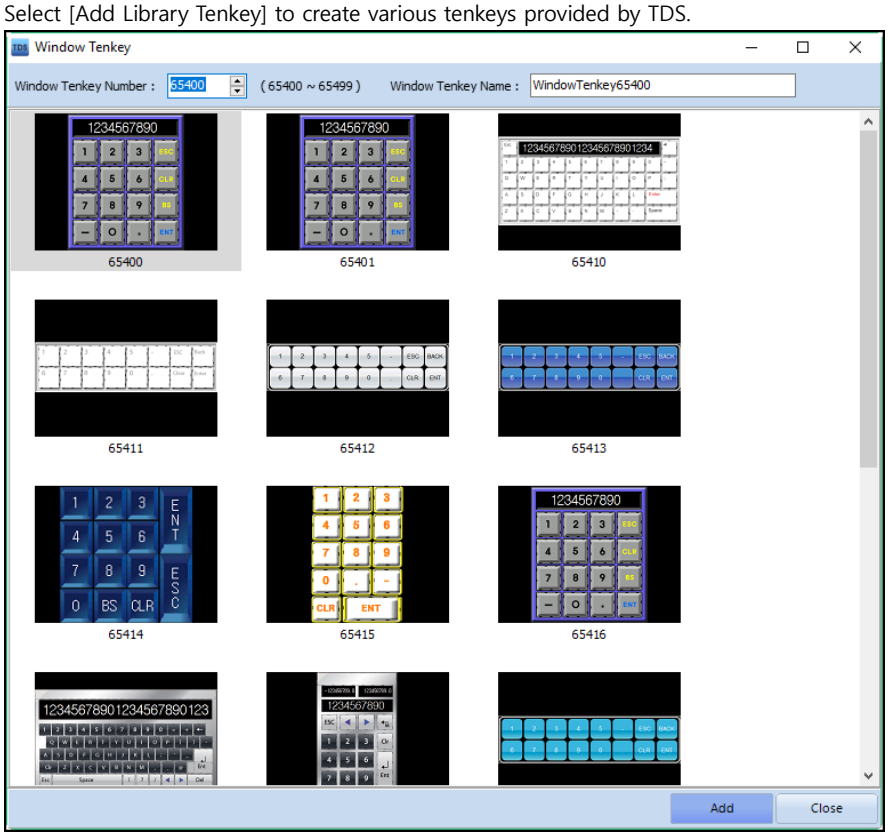
Configure the Input Mode Condition and Keyboard.

No.	Input Setting	Description
1	Input Mode Condition	Input Mode refers to the status where input is permitted (activated). The Numeric Keypad Object will be in Input Mode When the [Input Mode Condition] is true. Configure the condition among [Bit Condition] / [Word Condition] / [Event].  [Figure. Input Mode Condition] ▶ Input Mode Condition - Event - Touch The object will be in Input Mode upon a touch to the numeric keypad.  ▶ Input Mode Condition - Event - Key The object will be in Input Mode upon a strike to a specific [Key]. Refer to Chapter 7.7 [Condition Tab] for more details no how to configure a condition.
2	Virtual Keyboard	Select between [POP-UP] and [Fixed]. For [POP-UP], a virtual keyboard configured from a specific [Window Number] will pop-up upon the Input Mode. For [Fixed], a fixed keyboard will be shown on the base screen.
3	Window Number	Select the applicable keyboard. For a Numeric Keypad Object, [Window 65535-Tenkey] is selected as default; and for a String Keypad Object, [Window 65534-Keyboard] is selected as default. The two keyboards are created as default when a new project is created. If you have deleted the window screens of [65535-Tenkey] or [65534-Keyboard], you can add the keyboard from the drop down menu upon a right click to the [Project Manager] - [Screen] - [Window Screen]. Select [Add Default Tenkey] to create a [65535-Tenkey] window screen. Select [Add String Tenkey] to create a [65534-Keyboard] window screen.



[Figure. Project Manager]

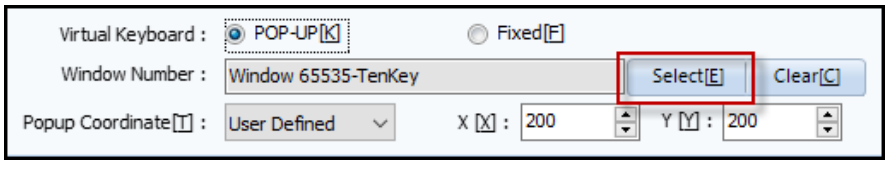
Select [Add Library Tenkey] to create various tenkeys provided by TDS.



[Figure. Adding a Library Tenkey]

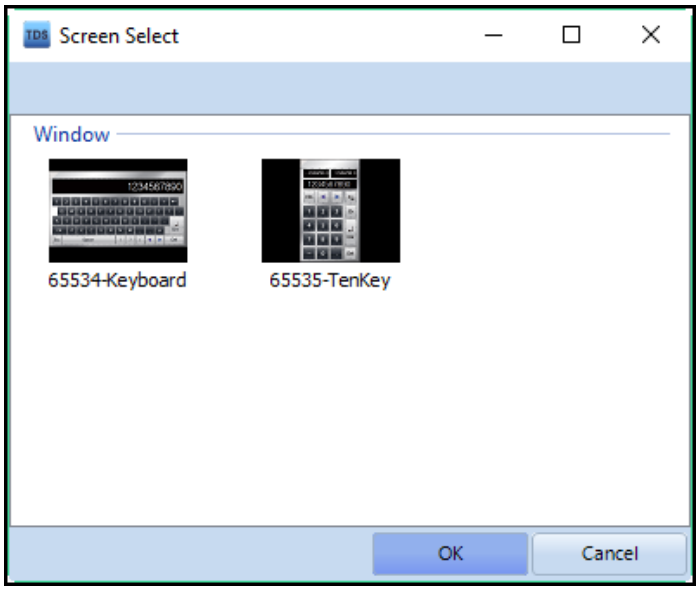
Select the Keyboard of your interest and click [Add], to add the selected Keyboard to the designated window screen number.

The 100 window screen numbers from [65400] to [65499] are reserved for library tenkeys. You can select the added tenkey (Keyboard) with the [Select] button provided for [Window Number].



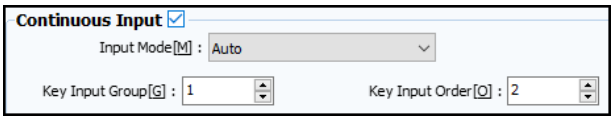
Click [Select] to open the below [Screen Select] window.

The list of all available tenkeys (keyboards) are provided in the [Screen Select] window.

		Select the keyboard of your interest and click [OK].  You can deselect a selected keyboard with the [Delete] button.
4	Popup Coordinate	This function is available when [POPUP] is selected for the [Virtual Keyboard]. Select between [Auto Position] and [User Define]. For [Auto Position], the keyboard will popup at a location deemed suitable considering the horizontal and vertical clearance with the Numeric Keypad Object. For [User Define], the keyboard will popup at the location corresponding to the configured [X] and [Y] coordinate. The designated [X] and [Y] coordinate will become the location of the upper left corner of the keyboard window.

(2) Continuous Input

Continuous Input is available when multiple Numeric Keypad Objects are added to a single screen.
Once the user inputs the numeric data for the first numeric keypad object, the system automatically navigates to the next object.

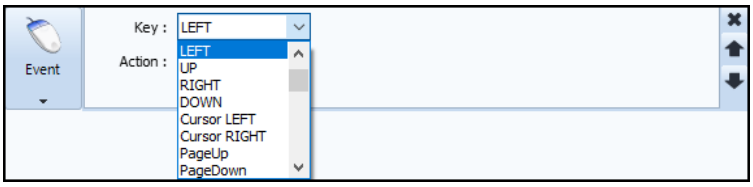


[Figure. Continuous Input]

▶ Input Mode - Auto

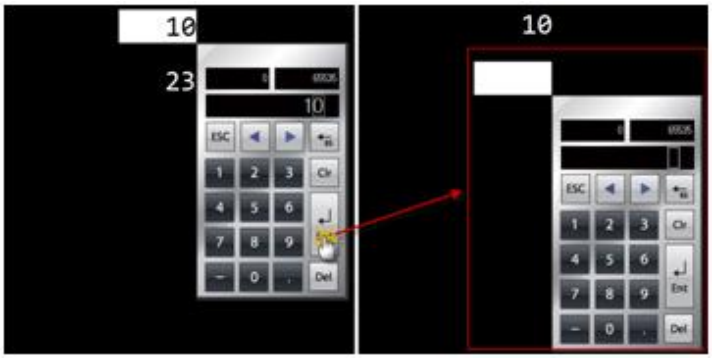
The Numeric Keypad Objects assigned to the same [Key Input Group] will be subject to data input in the ascending order of each [Key Input Order].
Assign Numeric Keypad Objects that should be entered together to the same [Key Input Group].
Assign each object to a [Key Input Order] considering the function and direction of data entry.
From the TOP device, go to a Numeric Keypad Object and enter the applicable data. Then touch [Enter], the object with the immediately ascending [Key Input Order] will be in Input Mode automatically.
Regardless to whether or not new data are typed in, an touch to the [Enter] key will enable the Input Mode of the next Numeric Keypad Object.

When Input Mode is activated, press [UP] / [DOWN] / [LEFT] / [RIGHT] key to navigate to the Numeric Keypad Object adjacent to the current object in each respective direction.
Configure the [UP] / [DOWN] / [LEFT] / [RIGHT] key from the [Effect & Action] tab as shown below.



[Figure. UP/DOWN/LEFT/RIGHT Key]

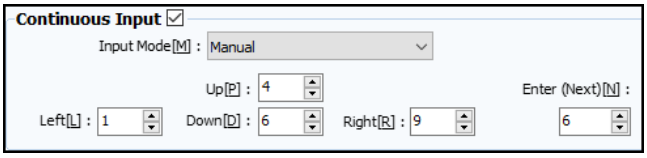
Refer to the below figure, both objects 1 and 2 are assigned to the same [Key Input Group], and object one has a [Key Input Order] of 1, and object two has a [Key Input Order] of 2. Once data are entered to Object 1, the Input Mode automatically transits to Object 2.



[Figure. Continuous Input - Auto]

▶ Input Mode - Manual

Designate each Numeric Keypad Object to be in Input Mode.

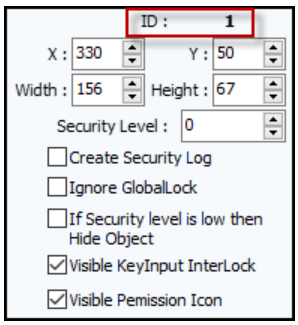


[Figure. Input Mode - Manual]

Designate each object ID of which object shall be in Input Mode upon a touch to each [UP] / [DOWN] / [LEFT] / [RIGHT] / [ENTER] key.

No.	Manual	Description
1	UP	Configure the Object [ID] of which object shall be in Input Mode upon a touch to the [UP] key.
2	Down	Configure the Object [ID] of which object shall be in Input Mode upon a touch to the [DOWN] key.
3	Left	Configure the Object [ID] of which object shall be in Input Mode upon a touch to the [LEFT] key.
4	Right	Configure the Object [ID] of which object shall be in Input Mode upon a touch to the [RIGHT] key.
5	Enter (Next)	Configure the Object [ID] of which object shall be in Input Mode upon a touch to the [Enter] key.

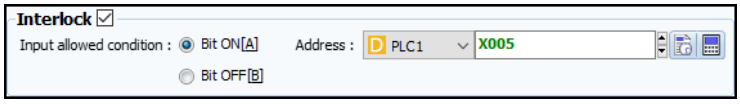
The Object ID is provided right beneath the Preview on the left side of the Property window.



[Figure. Object ID]

(3) Interlock

Configure an interlock to allow data input only when a specific [Condition] is true, and deny data input when the specific [Condition] is not true.

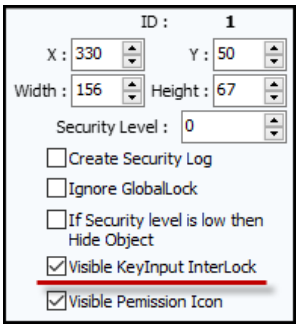


[Figure. Interlock]

With the above configuration with a [Bit ON] condition, data input is allowed when the selected Bit Address, [X005] reads ON, and denied when [X005] reads OFF.

Select [Bit OFF] to allow data input when the bit address reads [OFF] and deny data input when the bit address reads [ON].

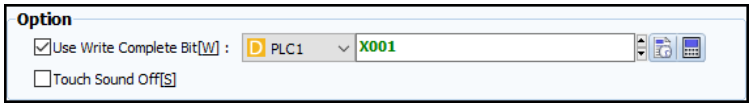
If [Input allowed Condition] blocks key entry, a [KeyInput InterLock] icon will appear momentarily on the upper left corner of the Numeric Keypad Object. This icon will be visible only when [Visible KeyInput InterLock Icon] is enabled from the Property window.



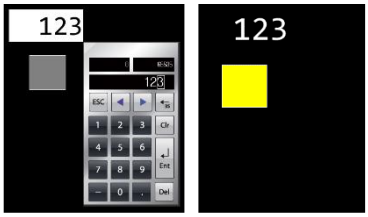
[Figure. Visible KeyInput InterLock]

(4) Option

Configure [Use Write Complete Bit] and [Touch Sound Off] settings.

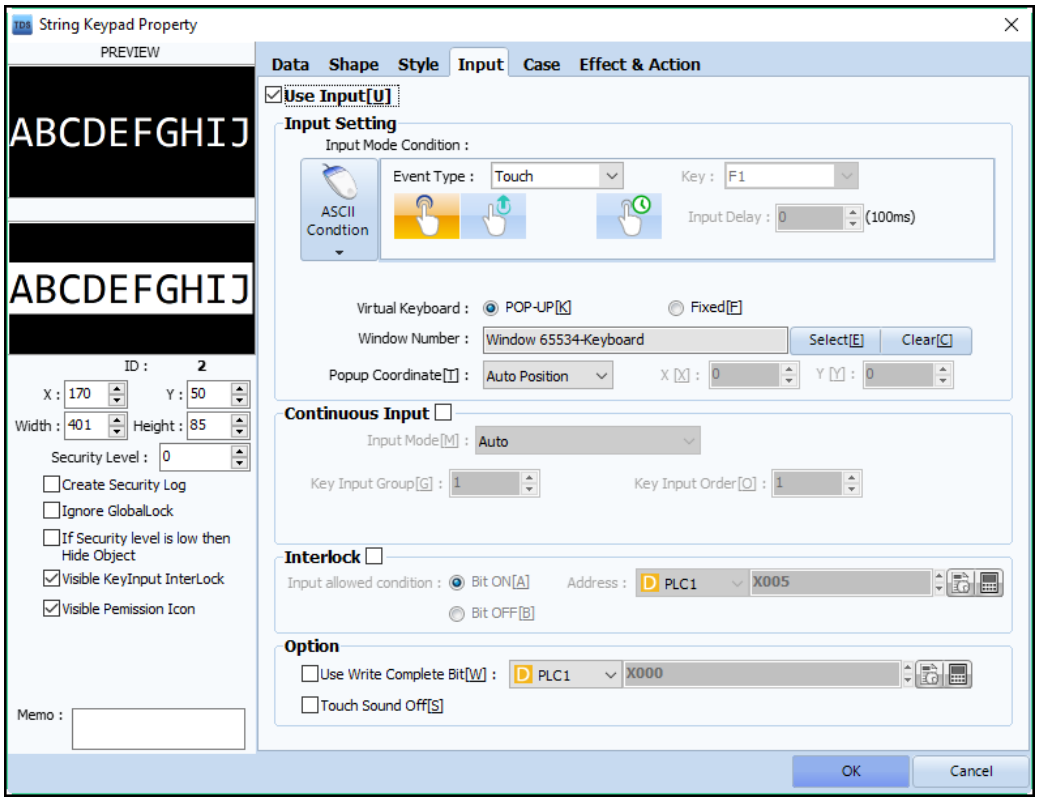


[Figure. Option]

No.	Option	Description
1	Use Write Complete Bit	Enable [Use Write Complete Bit] to turn a specific Bit Address [ON] once data is entered to a Numeric Keypad Object.  [Figure. Use Write Complete Bit] Once the Bit Address is changed to [ON], it does not automatically restore back to [OFF], thus an action to change the address back to [OFF] is required. If the Bit Address is not turned back to [OFF], the address will maintain an [ON] status.
2	Touch Sound Off	Enable [Touch Sound Off] to turn off the touch sound for the Numeric Keypad Object configured with an [Input Mode Condition] of [Event]. The touch sound for the keypad (Tenkey) is not muted.

10.6 String Keypad Object

Use a [Sting Keypad] object to input data from a string keypad.

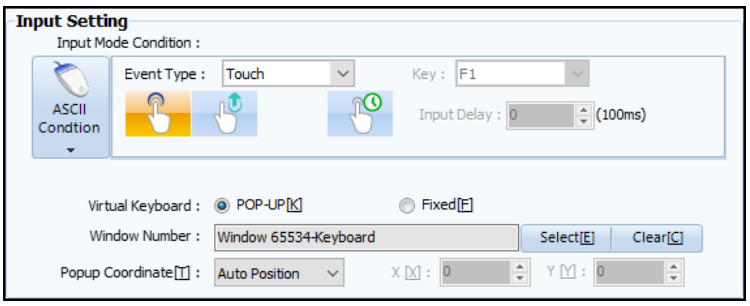


[Figure. String Keypad Object]

No.	Property	Description
1	Data	Select the [Feature] of the object and configure the [Display Address]. Configure settings other than those identical with a Numeric object. Refer to Chapter 10.1.1 [Data Tab] for Numeric Objects for identical settings.
2	Shape	Configure a shape to be added under the string. This function is identical to the instructions provided in Chapter 10.1.2 [Shape Type] for Numeric Objects.
3	Style	Configure the font and format of strings. Functions different from those for Numeric / Numeric Keypad Objects will be explained. Refer to Chapter 10.1.3 [Style Tab] for numeric objects, and Chapter 10.5.1 [Style Tab] for numeric keypad objects for identical settings.
4	Input	Configure input settings. Configure settings other than those identical with a Numeric Keypad object. Refer to Chapter 10.5.2 [Input Tab] for Numeric Keypad Objects for identical settings.
5	Case	Configure change to the color of or force the object to [Blink] upon a predetermined [Condition]. This function is identical to the instructions provided in Chapter 10.1.4 [Case Tab] for Numeric Objects.
6	Effect & Action	Add an additional [Effect & Action] to the String Keypad object. Refer to Chapter 7.6 [Effect & Action] for more details.

10.6.1 Data Tab

Select [Use Korean] from [Address] to allow input of Korean characters.
A single character for [English] / [Numbers] / [Special Characters] occupy 8 bit, while a single Korean character occupies 16 bit. Therefore, to enter a 5 letter Korean word, configure the [Max String Length] to [10].
If [Use Korean] is enabled, the system will load a Korean keyboard automatically upon a true [Input Mode Condition].
Settings for [Virtual Keyboard] / [Window Number] / [Popup Coordinate] are unavailable.



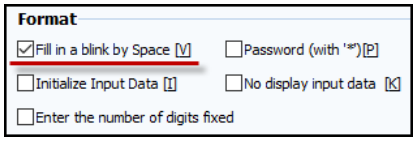
[Figure. Input Setting - Use Korean enabled]

[Figure. Korean Keypad]

Press the [ENG] button to access an English keypad.

10.6.2 Style Tab

Please find the following instructions for functions that are different from those for Numeric Objects.



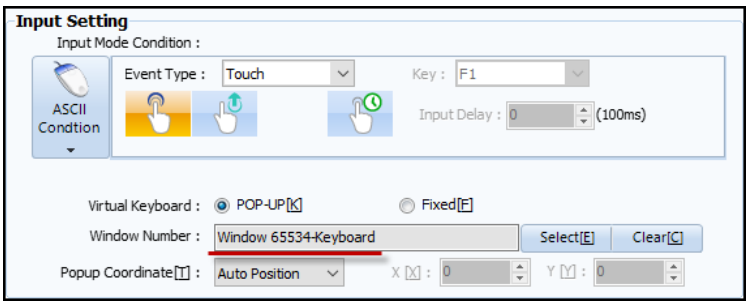
[Figure. Format]

Enable [Fill in a blank by Space] to fill void spaces compared to the [Max String Length] with spaces (Space key, 0x20). Disable [Fill in a blank by Space] to enter 0 to not filled spaces.

10.6.3 **Input Tab**

Go to the [Input] tab and enable [Use Input] to conform a [String Keypad] Object, or disable [Use Input] to conform a [String] object.

For a String Keypad Object, [Use Input] is enabled as default with the below settings.



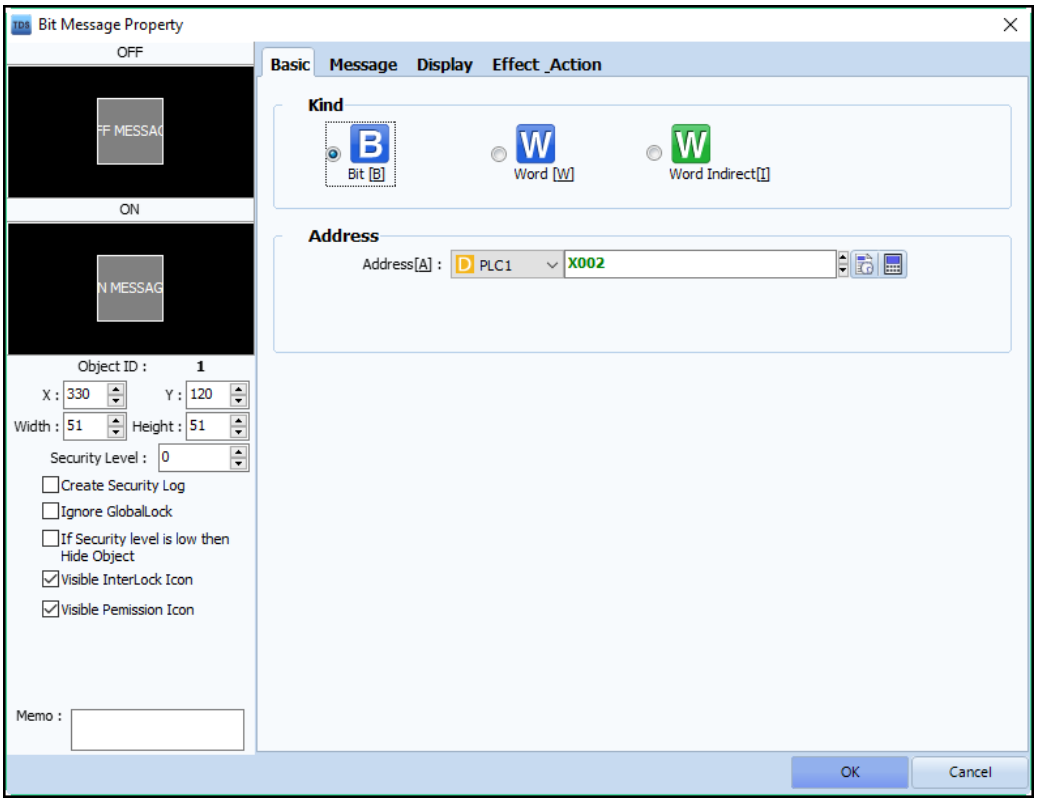
[Figure. Input Setting]

To enter a string, a string keyboard shall be selected for [Window Number].

CHAPTER 11 - Message Object

Bit Message objects shows specific strings according to the data of a selected address.

You can manually type in the applicable string, or load a string from [Project] - [String].



[Figure. Message]

No.	Property	Description
1	Basic	Configure the type of message and the corresponding address.
2	Message	Select the message to be shown from the String Table, or manually type in a message.
3	Display	Configure the [Display] / [Scroll] / [Message Display] settings.
4	Effect & Action	Configure the Effects and Actions of the Object.

11.1 Basic Tab

There are three types of messages.

No.	Type	Description
1	Bit [B]	Show a message according to the [On] / [Off] status of a Bit Address.
2	Word [W]	Show a message according to the data of a Word Address.
3	Word Indirect [I]	Show a message of which [ID] is identical to the data of a Word Address.

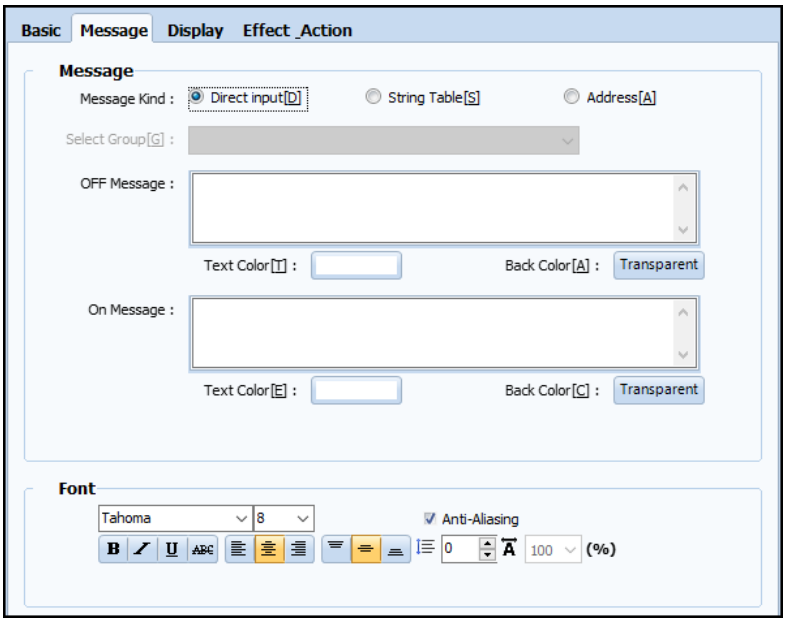
Configure the [Address] applicable to the selected message type.

11.2 Message Tab

The message tab differs by the message type.
Configure the content and font of the message that will appear according to the data of the selected address.
Manually type in the message or load a string from the String Table.

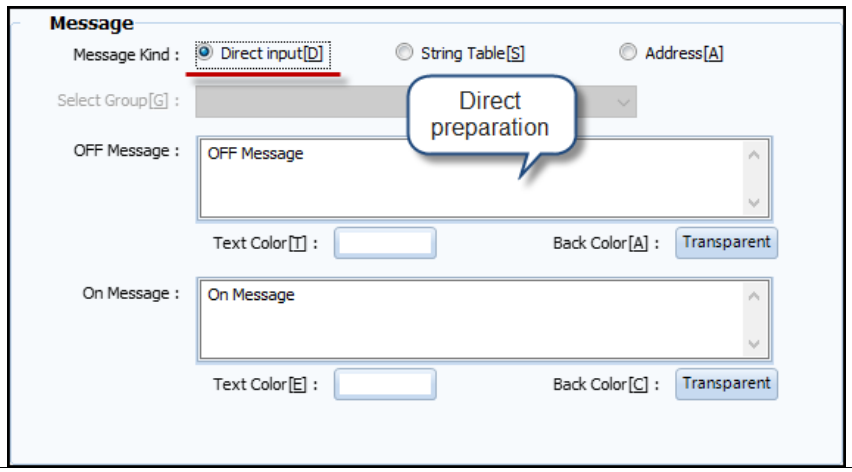
11.2.1 Bit Message

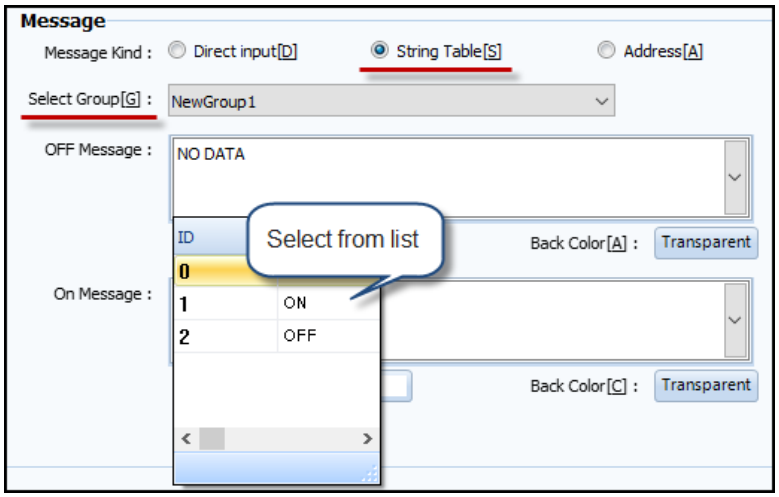
A Bit Message will show a message according to the On/Off status of a bit address.
Type in the message to be shown for each On/Off status, or select a message from the String Table.

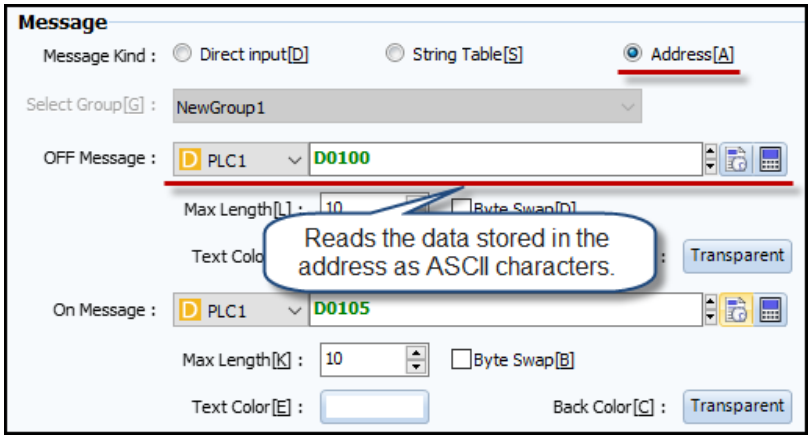


[Figure. Bit Message]

Select [Message Kind] among [Direct Input] / [String Table] / [Address].

No.	Message Kind	Description
1	Direct Input	Type in the message. 

<table>
<tr>
<td>2</td>
<td>String Table</td>
<td>Load a string added to [Project] - [String].
Select the group in which the applicable string is included from the drop down menu of [Select Group].
 

(Refer to Chapter 4.4. [String] for more details.)</td>
</tr>
<tr>
<td>3</td>
<td>Address</td>
<td>Employ the data of a selected address in the configured [Max Length] with ASCII codes.
 

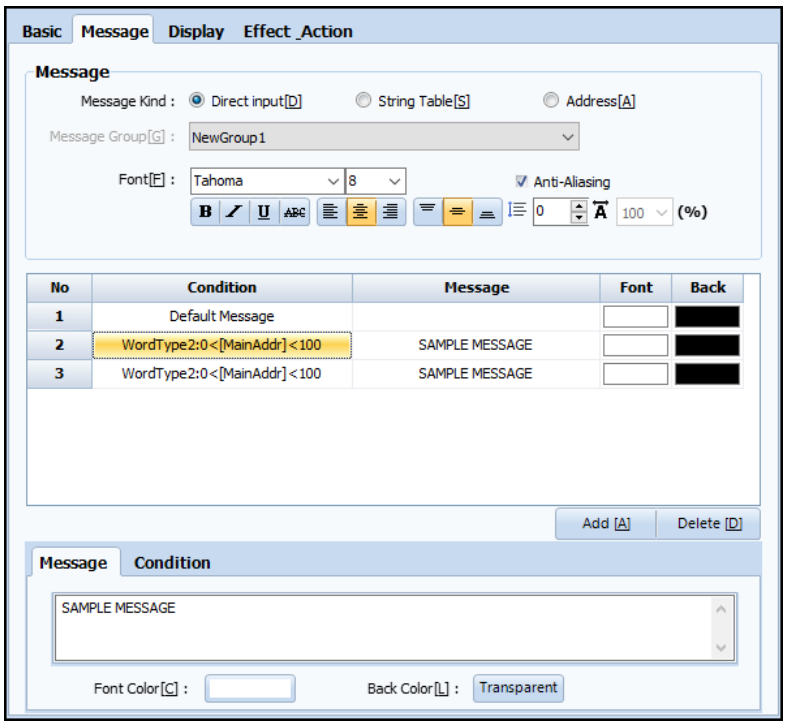
The [Max Length] refers to the maximum length of the string. One character occupies 8 bit (1 Byte), where 10 bit / 5 words are required to read 10 characters. With the above configuration the strings from [D0100] to [D0104] are shown as a message.
If [Byte Swap] is enabled, the string of [ABCDEFGHIJ] will be shown as [BADCFEHGJI].
If [Use Korean] is enabled from the Font setting, the data of the selected address is recognized as and shown in Korean.
</td>
</tr>
</table>

Configure the [Text Color] and [Back Color].

Configure the font and alignment of strings to be displayed from the [Font] setting.

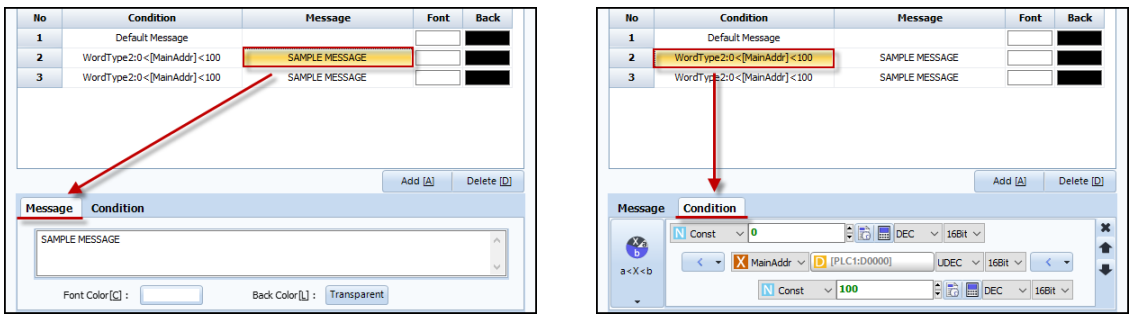
11.2.2 Word Message

A Word Message will show a message according to the data of a word address.
Configure the [Word Condition] of the word message, and type in the message to be shown for a true condition, or select a message from the String Table.



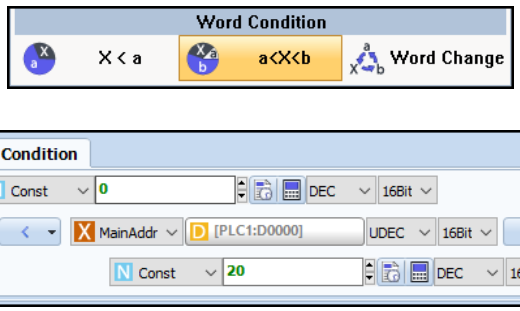
[Figure. Word Message]

Available message types are identical to those of a Bit Message, refer to the corresponding content provided in Chapter 5.2.1 [Bit Message].
No.1 Default Message is created as default.
Use the [Add] button to add more messages to the list.
If all listed conditions are not true, the [Default Message] will be shown.
If a message is not assigned to the Default Message, no message will be shown.
Remove any unnecessary message with the [Delete] button.
The Default Message can not be deleted.
Select each message, and configure the [Message] and [Condition] from each corresponding tab.



[Figure. Message / Condition Setting]

Enter the message corresponding to the selected [Message Kind].
Select [Condition] among [X<a] / [a<X<b] / [Word Change].



[Figure. Condition Setting]

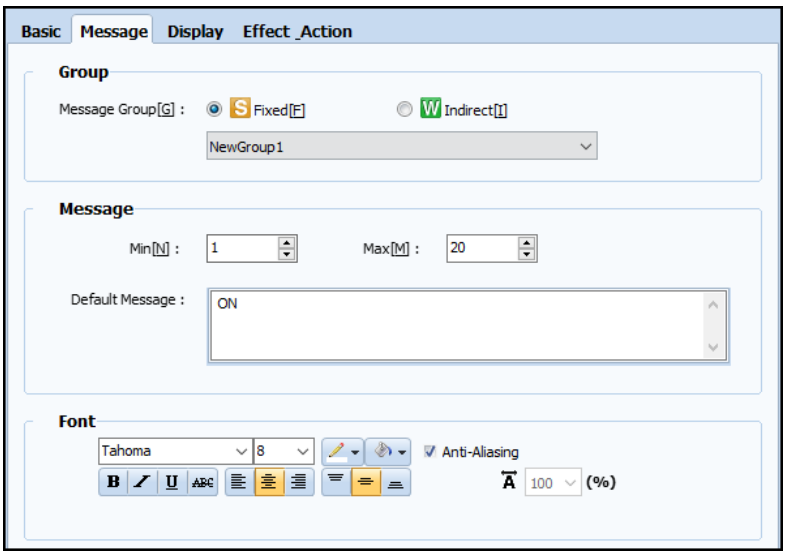
Select [X < a] to compare two data points and show the corresponding message when the condition is true.
Select [a<X<b] to compare three data points and show the corresponding message when the condition is true.
The following comparison operators are available.

No.	Comparison Operator	Description
1	<	Place this comparison operator between two operands to express a condition where the latter operand is larger than the first operand.
2	>	Place this comparison operator between two operands to express a condition where the first operand is larger than the latter operand.
3	<=	Place this comparison operator between two operands to express a condition where the latter operand is equal with or larger than the first operand.
4	>=	Place this comparison operator between two operands to express a condition where the first operand is equal with or larger than the latter operand.
5	==	Place this comparison operator between two operands to express a condition where both operands read the same value.
6	!=	The comparison operator to express a condition where the first operand is different with the latter operand.

Select [Word Change] to show a message when the data of the selected address changes.
Configure the [Text Color] and [Back Color].

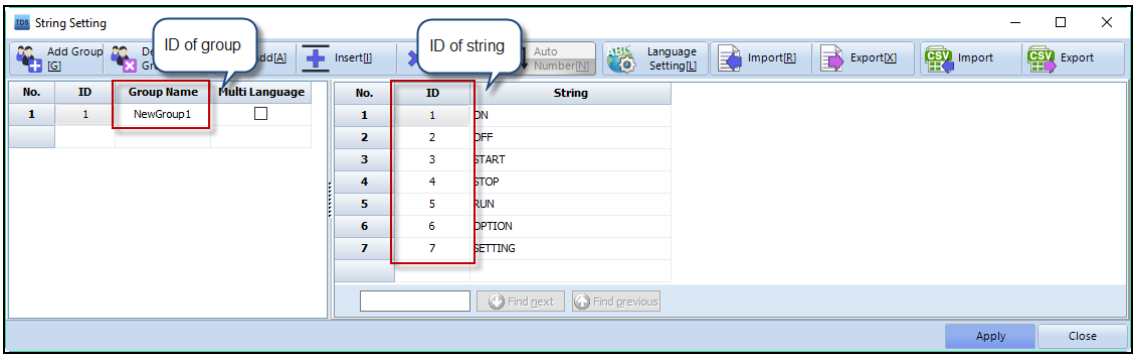
11.2.3 Word Indirect Message

A [Word Indirect Message] shows the string of which ID is same with the data of the word address configured from the [Basic tab].
Type in the message to be shown, or select a message from the String Table.



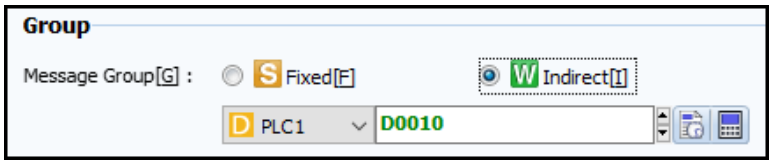
[Figure. Word Indirect Message]

[Message Group] refers to the [Group Name] shown from the [String Setting] window available from [Project] - [String].



[Figure. Project - String]

Select [Message Group] between [Fixed] and [Indirect].

No.	Message Group	Description
1	Fixed	Fix the Message Group to a specific group. Select the Group Name from the drop down menu.
2	Indirect	Select [Indirect] to designate the Group ID to the data of the selected address. The Message Group will vary according to the data of the selected address.  If [D0010] reads 1, the strings from Group ID of 1 will be shown. If [D0010] reads 2, the strings from Group ID of 2 will be shown.

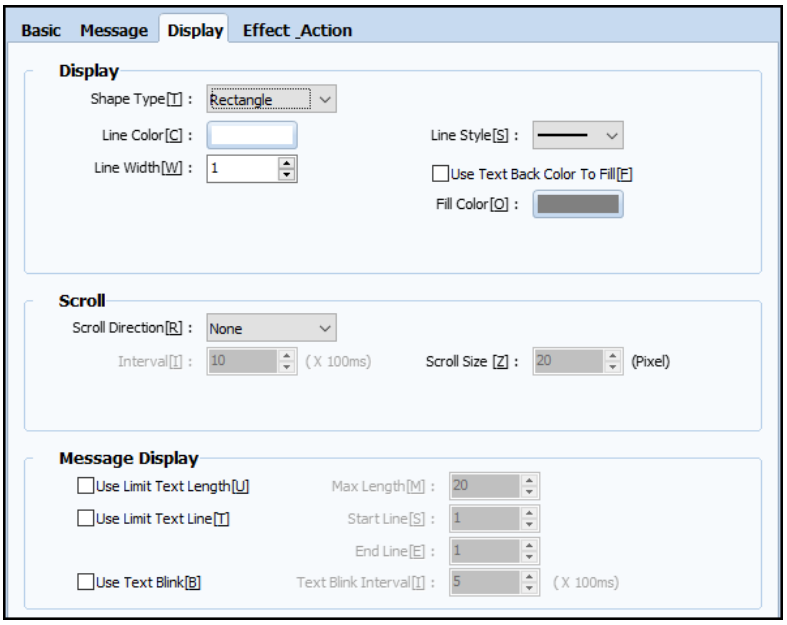
Define the range of the applicable String ID from the [Message] field.
Assign the smallest String ID to [Min], and the largest String ID to [Max].

Enter the message to be shown when the selected address reads a data outside of the configured range. Default Message may be kept empty.

Configure the font and alignment of strings to be displayed from the [Font] setting.

11.3 Display Tab

Configure [Shape] / [Scroll] / [Message Display] settings.



[Figure. Display Tab]

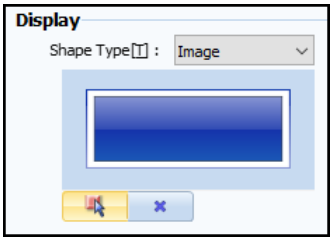
▶ Configure the shape of the object from [Display].

Select [Shape Type] between [Rectangle] and [Image].

Select [Rectangle] to conform a rectangular shape. Configure [Line Color] / [Line Style] / [Line Width] / [Fill Color] for the rectangle.

Enable [Use Text Back Color to Fill] to apply the [Back Color] selected from [Font] of the [Message] tab as the [Fill Color] for the rectangle.

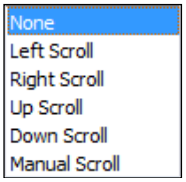
Select [Image] to load an image.



Select an image from the Image Library.

▶ [Scroll] allows you to create a moving message on the display.

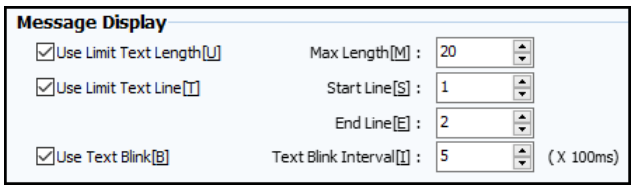
Select the [Scroll Direction] from the drop down menu.



No.	Scroll Type	Description
1	None	The string will stay still.
2	Left Scroll	The string scrolls to the left.
3	Right Scroll	The string scrolls to the right.
4	Up Scroll	The string scrolls upward.
5	Down Scroll	The string scrolls downward.
6	Manual Scroll	The string will scroll upon an input from the direction keys of [UP] / [DOWN] / [LEFT] / [RIGHT].

Configure the interval of scroll (flow) in 100ms.
Configure the [Scroll Size] in pixels to fix the distance of each scroll.

▶ Configure [Message Display] settings.

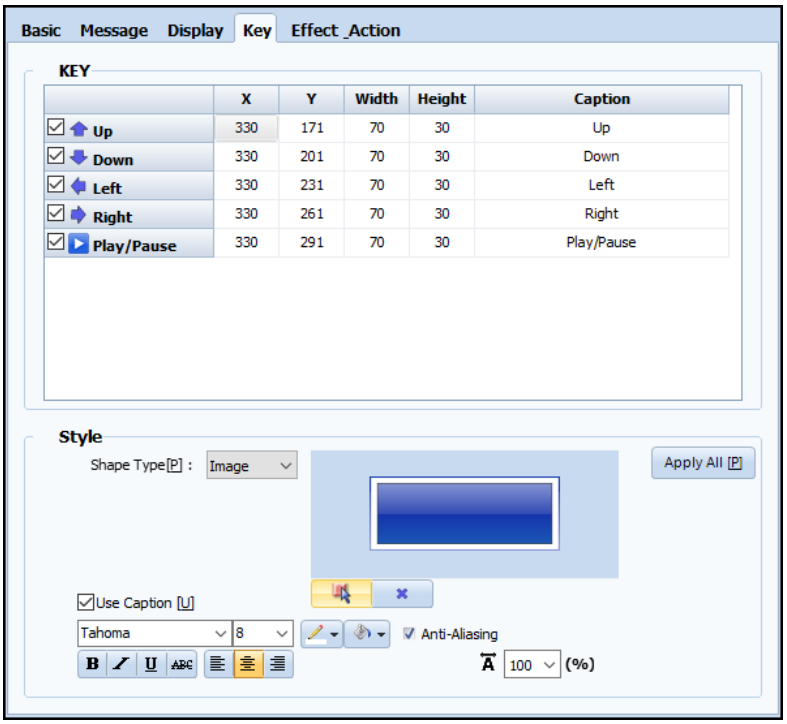


[Figure. Message Display]

No.	Message Display	Description
1	Use Limit Text Length	Limit the number of letters shown in a message. If the string exceeds the [Max Length], data up to the [Max Length] will be shown, and the exceeding data will be neglected.
2	Use Limit Text Line	Apply a restriction to the number of rows in a message. [Start Line] refers to the first row of the string, and [End Line] refers to the last row of the string. With the above configuration, for a string consists of 3 rows, only the first and second row appear in the message.
3	Use Text Blink	Apply a blink effect to the string with the selected [Interval] in 100ms.

11.4 **Key Tab**

[Key Tab] is available when [Scroll] is configured from the [Display] tab.
A [Scroll] will make the string of the message object flow to a specific direction.
Configure [KEY] to control the scroll of the message.



[Figure. Key Tab]

Select the Key of your interest.
Configure the X, Y coordinate, Width, Height and Caption of the Key.
From [Style] select the feature of the key between a rectangle or an image.

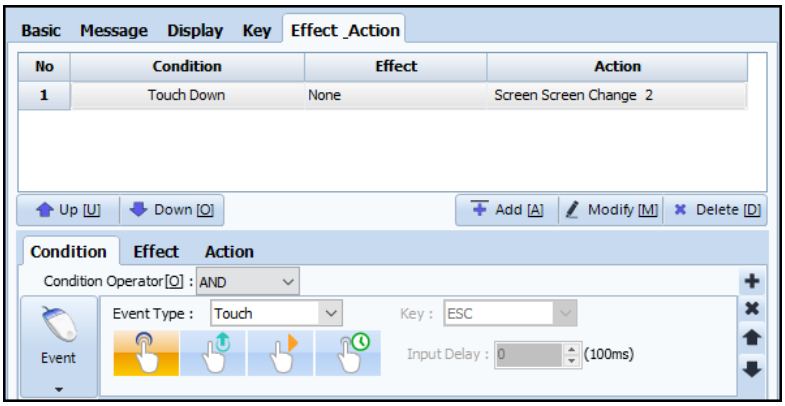
No.	Key	Description
1	Up	Scroll the string upward.
2	Down	Scroll the string downward.
3	Left	Scroll the string to the left.
4	Right	Scroll the string to the right.
5	Play/Pause	Start and pause the scroll. The scroll will start and stop upon each touch to the key.

[Figure. Using Scroll Keys]

11.5 **Effect & Action Tab**

Configure the Effects and Actions of the Object.

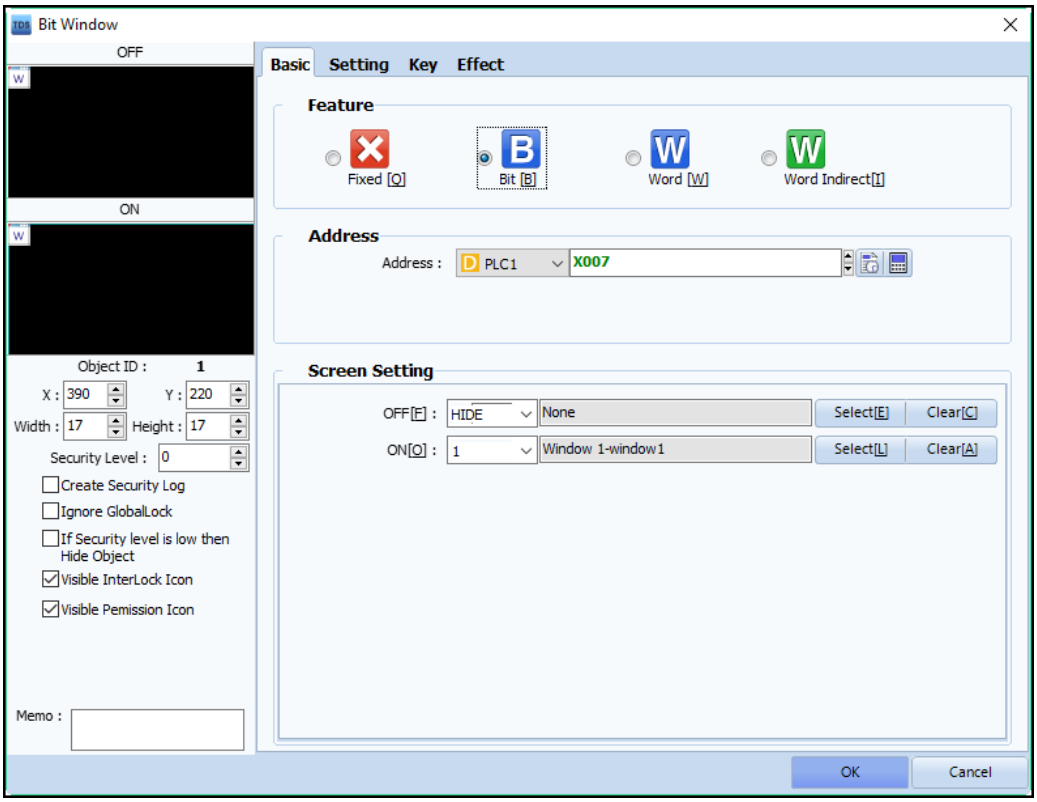
Refer to Chapter 7.6 [Effect & Action] for more details.



[Figure. Effect & Action Tab]

CHAPTER 12 - Window Object

Add a Window Object to load a window screen to a fixed position.
(Refer to Chapter 5.1.2 [New Window Screen] for more details on how to create a new window screen.)
Four types of Window Objects, [Fixed] / [Bit] / [Word] / [Word Indirect] are available.



[Figure. Window Object]

No.	Property	Description
1	Basic	Configure the [Feature] / [Address] / [Screen Setting] of the Window Object.
2	Setting	Configure the [Window Style] / [Window Position] / [Window Popup Style] of the Window Object.
3	Key	Configure toggle keys to control the window pop-up.
4	Effect & Action	Configure effects of [Hid] / [Disable] / [Reverse] / [Blink] for the Window Object.

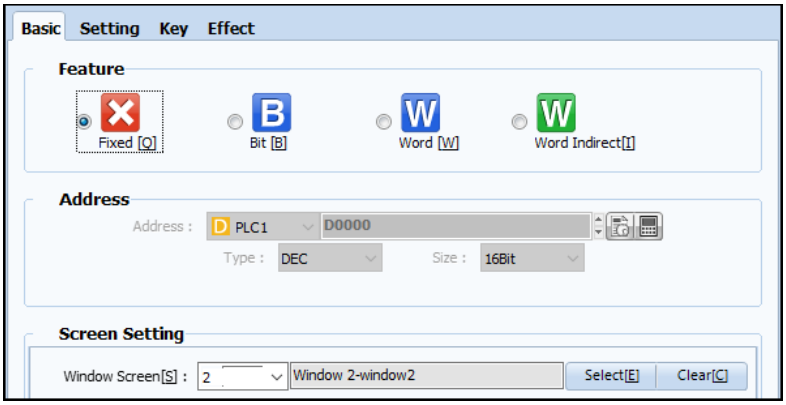
12.1 Basic Tab

Select the Window Object [Feature] among [Fixed] / [Bit] / [Word] / [Word Indirect].
Configure the [Address] / [Screen Setting] according to the selected type.

No.	Feature	Description
1	Fixed[Q]	Load and maintain the selected window screen to a fixed position of the base screen.
2	Bit [B]	Load the selected window screen according to the [On] / [Off] status of a bit address.
3	Word [W]	Load the selected window screen according to the data of a word address.
4	Word Indirect [I]	Load a window screen of which ID is identical to the data of a word address.

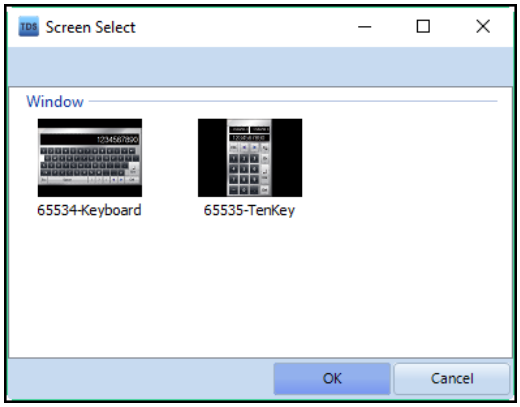
12.1.1 Fixed Window

Select [Fixed] to load and fix the selected window to a specific location on the base screen.



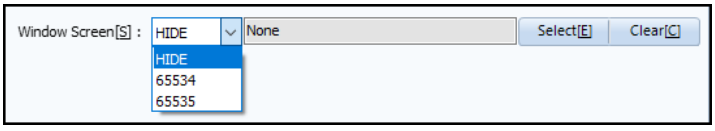
[Figure. Fixed Window]

Select one window screen that shall be fixed to the base screen at [Screen Setting].
Click [Select] to open [Screen Select] window, and select the window of your interest from the list of windows.

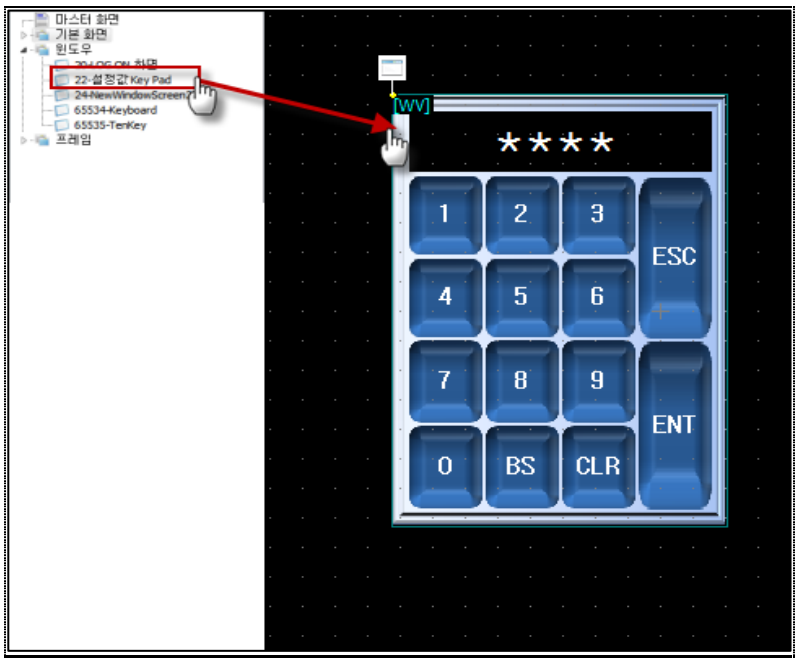


[Figure. Screen Select Window]

Without using the [Select] button, you can type in the window screen number as shown below.



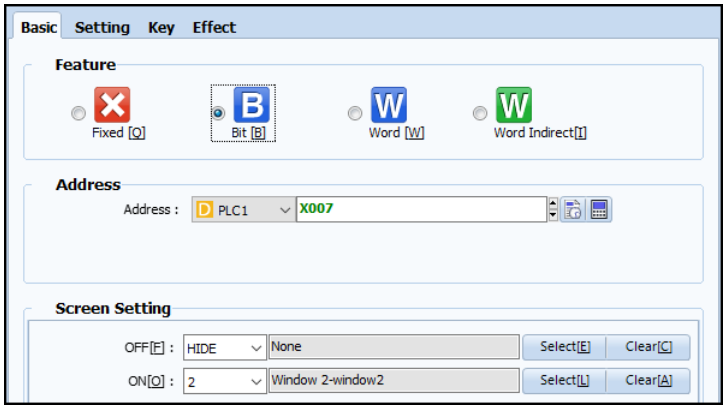
Click [Delete] to cancel a selected window screen.
For your Information! You can add a fixed window from the Window Object menu, or with a drag and drop of a [Window Screen] listed in the [Project Manager] to the current base screen.



[Figure. Window Object - Drag and Drop]

12.1.2 Bit Window

A Bit Window loads a selected window screen according to the [On] / [Off] status of a bit address.
Configure each screen for [On] status and [Off] status.

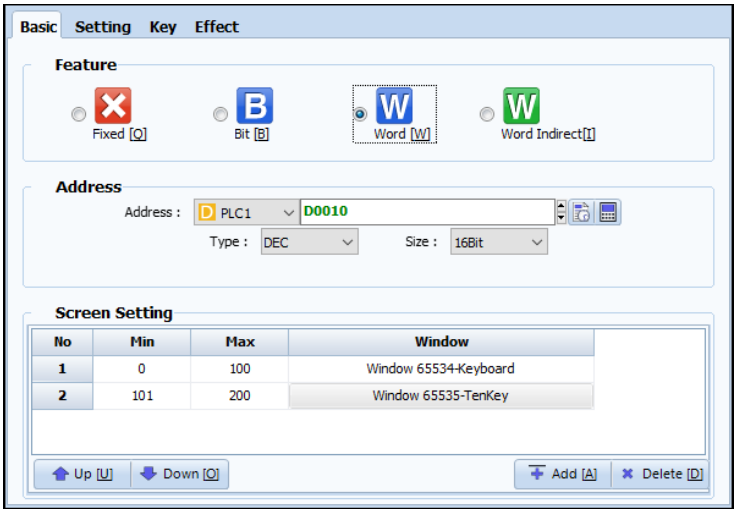


[Figure. Bit Window]

Configure the [Address] of which status determines the window object.
Configure each screen loaded upon an [On] and [Off] status at the [Screen Setting].
With the above configuration, Window Screen NO.2 will popup while [X007] reads [On].
Since [Off] is configured as [Hide], Window Screen No.2 will close when [X007] reads [Off].

12.1.3 Word Window

A Word Window will load multiple window screens according to the data of a word address.
Configure the window screen that shall popup for a specific range of [Min] and [Max].

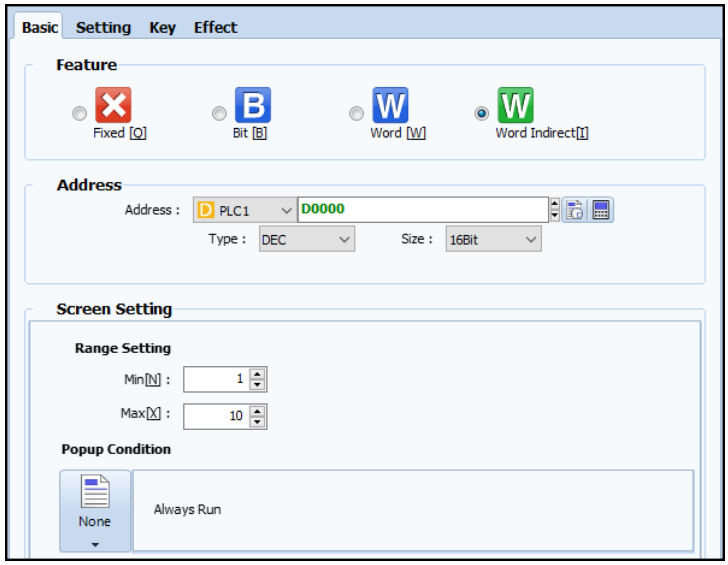


[Figure. Word Window]

Configure the [Address] of which data determines the window object.
Click the [Add] button to add the numbers of required window screens.
Configure [Min] / [Max] / [Window] for each item.
With the above configuration, if [D0010] reads a value between [0] and [100], Window Screen No.1 will be loaded.
If [D0010] reads a value between [101] and [200], Window Screen No.2 will be loaded.
If [D0010] reads a value smaller than [0] or larger than [200], the window screen will close.

12.1.4 Word Indirect Window

A [Word Indirect Window] will load a window screen of which ID number is same with the data of the word address. Configured [Address].

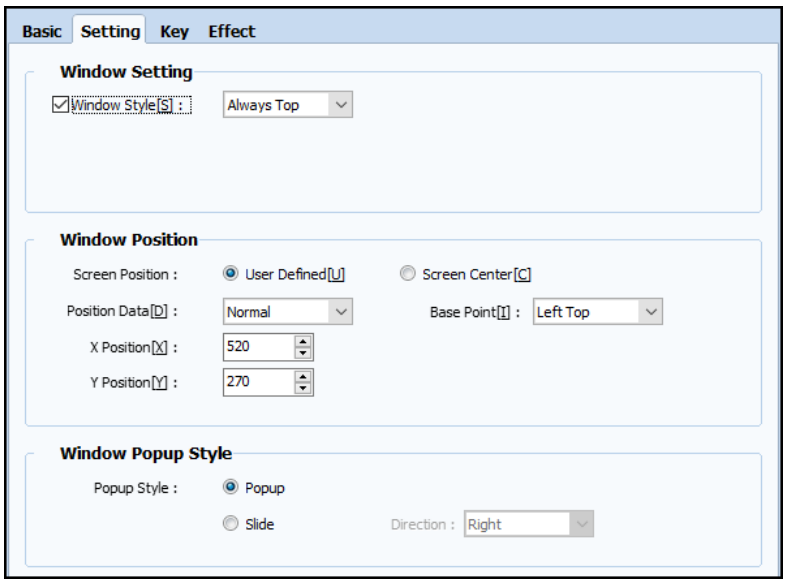


[Figure. Word Indirect Window]

Configure the [Address] of which data determines the window object.
At [Screen Setting] configure the [Min] / [Max] range of applicable window screens.
With the above configuration, if [D0000] reads [1], window screen No.1 is loaded.
If [D0000] reads [2], window screen No.2 is loaded.
If [D0000] reads [10], window screen No.10 is loaded.
Thus, the data read from [D0000] is the window screen number.
If [D0000] reads a value outside of the range between [1] and [10], no window screen will be loaded, and any loaded window screen will close. And if there are no window screen of which number corresponds to the range between [1] and [10], no window screen will be loaded.
The above [Popup Condition] of [Always Run] is equivalent to the condition of [None].
In other words, the Window Object will be running regardless to any condition.
If a specific [Popup Condition] is configured, the selected window screen will appear only during a true condition.
If the [Popup Condition] is not true, the window will not popup even if [D0000] reads a value between [1] and [10].
(Refer to Chapter 7.7 [Condition Tab] for more details.)

12.2 Setting Tab

Configure [Window Setting] / [Window Position] / [Window Popup Style].
With the [Window Style] you can elect whether or not to keep the popup window on top of all other features at all times.
Configure the [Window Position] to designate the position to which the window screen will popup.
Select [Window Popup Style] between [Popup] and [Slide].



[Figure. Setting Tab]

12.2.1 Window Setting

Select [Window Style] between [Normal] and [Always Top].

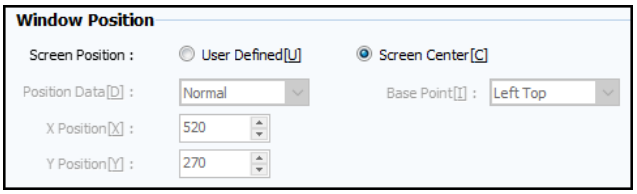
This setting is required when multiple window screens popup.

[Figure. Window Setting]

No.	Window Style	Description
1	Normal	The most recently loaded window screen will be placed on top of other features.
2	Always Top	The current window screen will be placed on top of other features. The current window screen will not be disturbed from other features.

12.2.2 Window Position

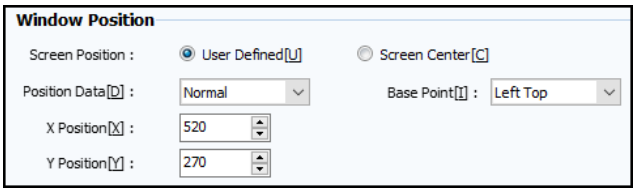
Configure the [Window Position] to designate the position to which the window screen will popup.



[Figure. Window Position]

The above configuration shows a [Screen Position] of [Screen Center] where the window screen will placed in the dead center of the display screen.

Select [User Defined] to locate the window screen to a specific [Position Data] / [Base Point] / [X Position] / [Y Position].

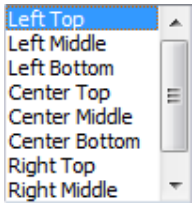


[Figure. User Defined]

For [User Defined], configure [Position Data] / [Base Point] / [X Position] / [Y Position] as shown below.

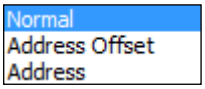
First assign the [Base Point].

The [Base Point] refers to the location of the [Window Object] placed on the in respect to the loaded [Window Sreen]. There are 9 types of Base Points.



[Figure. Base Point]

Next, select [Position Data] among [Normal] / [Address Offset] / [Address].

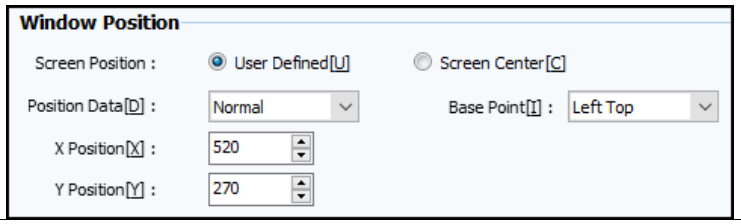


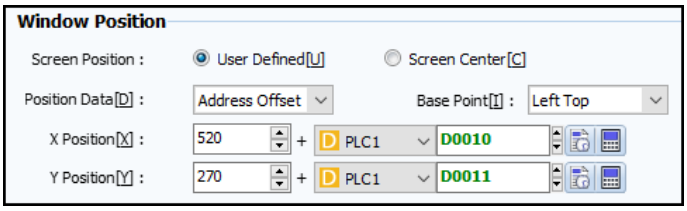
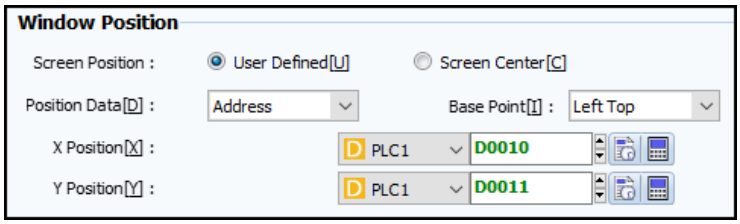
[Figure. Position Data]

The [X Position] and [Y Position] of the popup window screen varies according to the selected [Position Data].

The [X Position] refers to the horizontal pixel of the popup window.

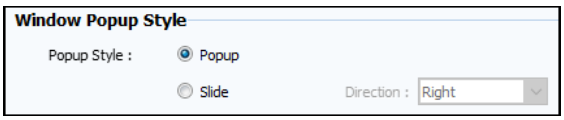
The [Y Position] refers to the vertical pixel of the popup window.

No.	Position Data	Description
1	Normal	The X and Y coordinates of the window object are employed as the X position and Y position. 
2	Address Offset	The sum of each X and Y coordinates of the window object and the data from the selected address are employed as the X position and Y position. The X position and Y position varies

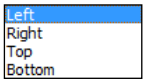
		upon a change to the data of the selected addresses.  With the above configuration, the actual [X Position] will be the sum of [520], the X coordinate of the window object and the data read from [D0010]. The actual [Y Position] will be the sum of [270], the Y coordinate of the window object and the data read from [D0011].
3	Address	The data read from the selected addresses are employed as the [X Position] and [Y Position]. The X position and Y position varies upon a change to the data of the selected addresses.  With the above configuration, the data read from [D0010] is the [X Position], and the data read from [D0011] is the [Y Position].

12.2.3 Window Popup Style

Select [Window Popup Style] between [Popup] and [Slide].

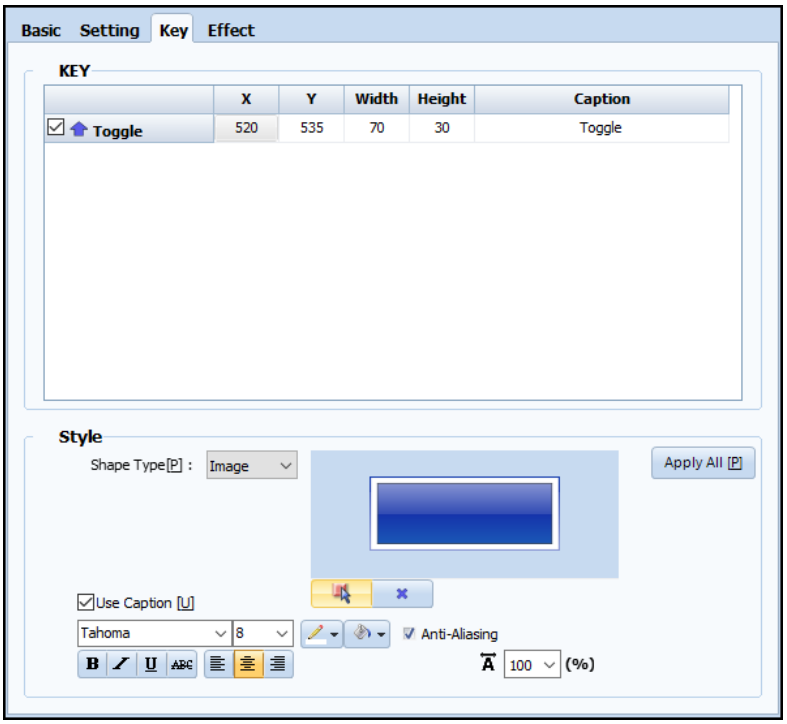


[Figure. Window Popup Style]

No.	Popup Style	Description
1	Popup	The window pops up in an instance.
2	Slide	The window slides into its position. Select [Direction] among [Left] / [Right] / [Top] / [Bottom].  [Figure. Direction] For instance, if the [Direction] is [Left], the window will start from the left end of the display screen and slides to the right side until it arrives at its configured position. When the window is closed, the window slides back to the left end to dissapear.

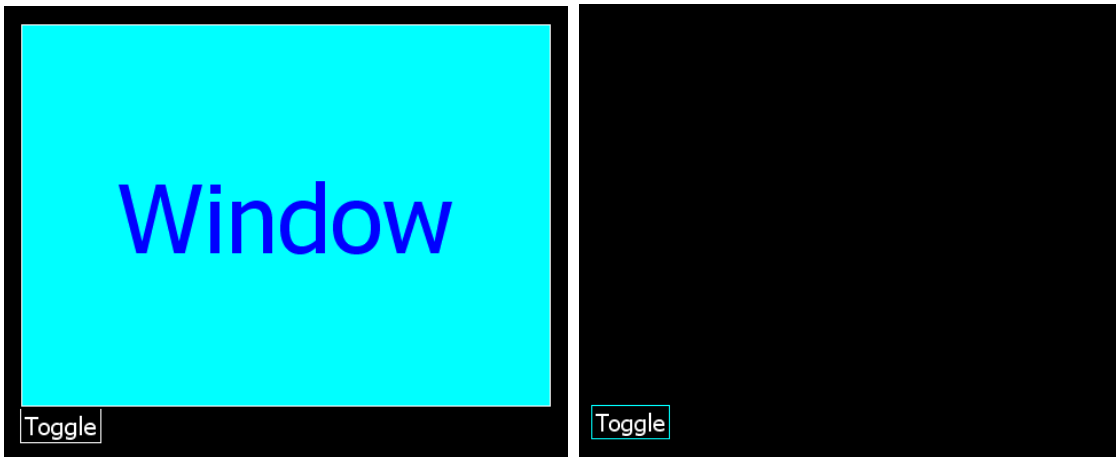
12.3 **Key Tab**

Configure a Toggle Key to [Popup] and [Close] a window screen activated by a Window Object.



[Figure. Key Tab]

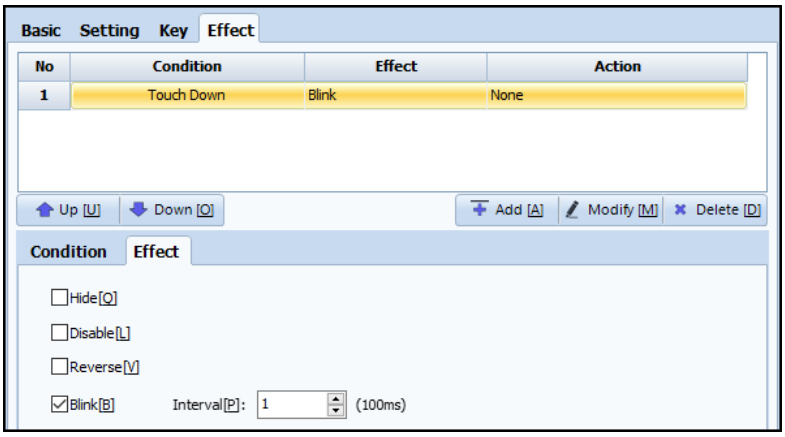
Select [Toggle] from the list provided in [KEY].
Configure the location (X, Y coordinate), Width, Height, and Caption of the Key.
Select [Shape Type] between [Color] (Rectangle) and [Image].
As shown below, a single touch to the Toggle Key will open the window screen assigned to a Window Object, and a following touch will close the popup window.



[Figure. Using a Toggle Key]

12.4 **Effect Tab**

Configure effects of [Hide] / [Disable] / [Reverse] / [Blink] for a window object.
Refer to Chapter 7.7 [Condition Tab] and Chapter 7.8 [Effect Tab] for more details.



[Figure. Effect Tab]

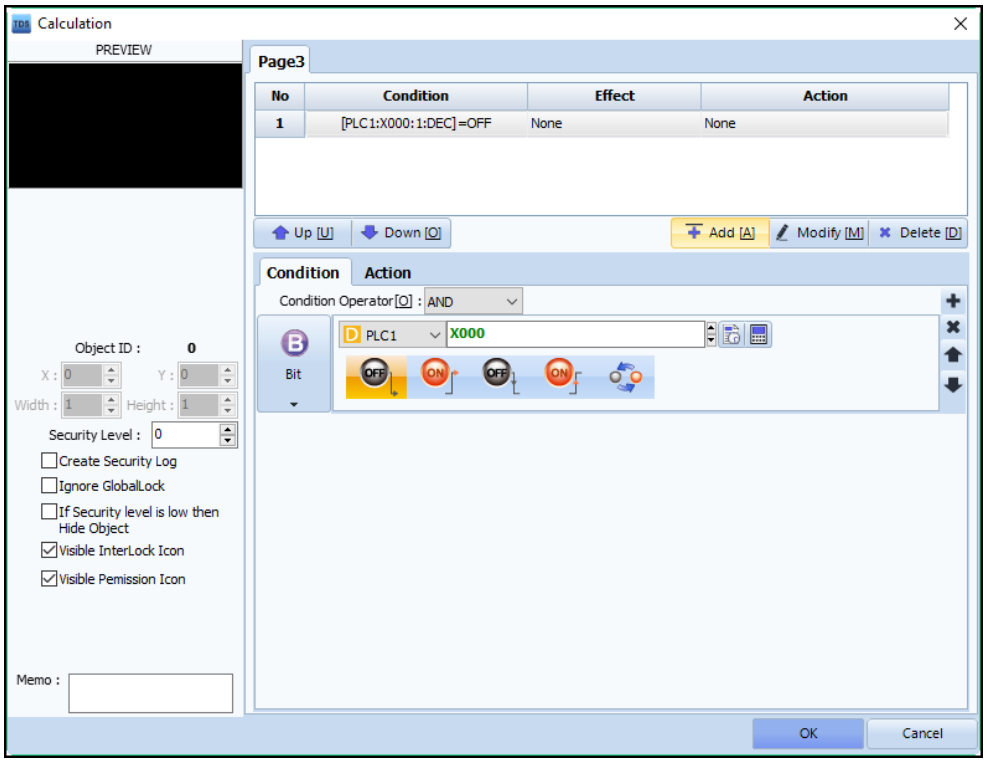
No.	Effect	Description
1	Hide	When the condition is true, the object is hidden from the display.
2	Disable	When the condition is true, the object is disabled, and no action assigned to the object will be executed.
3	Reverse	When the condition is true, the color of the object is reversed (XOR).
4	Blink/Interval	When the condition is true, the object blinks with the configured [Interval]. This effect is generally used to point out an object. The [Interval] is configured in 100ms, from the range of 1 to 60,000 (60,000 x 100ms = 6,000s),

CHAPTER 13 - Calculation Object

A Calculation Object does not appear on the screen. Thus, display configuration is not provided.
Configure a [Condition] and [Action] to be executed upon a true condition.
Add a Calculation Object to execute the calculation whenever the corresponding screen is running.

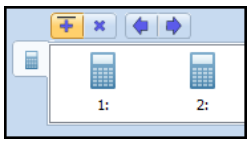
13.1 How to add a Calculation Object

Go to [Object] - [Calculation].

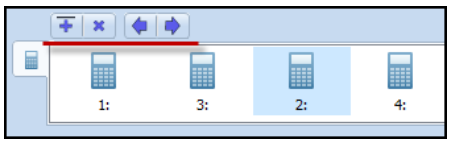


[Figure. Calculation Object]

Configure the [Condition] and [Action]. Click [OK] to add the Calculation Object that is sown in a separate field provided on the bottom of the screen as shown below.

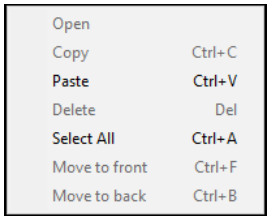


All Calculation Objects added to the screen appears on the bottom of the screen.
When multiple Calculation Objects are added, each calculation will be executed from the left to the right.
Double click each calculator icon to access the property window.



[Figure. Calculation Object List]

Configure various settings of calculation objects with the four buttons provided above the list, and the pop-up menu upon a right click to a specific calculation object.

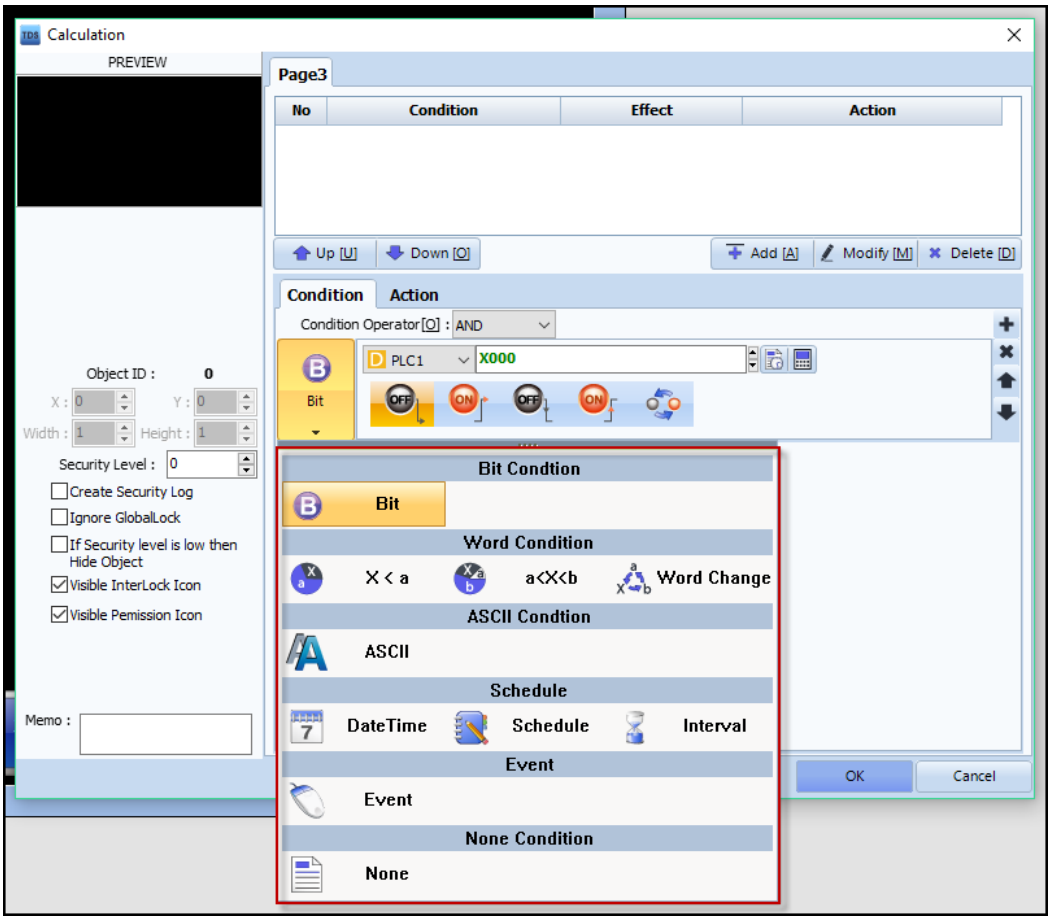


[Figure. Popup menu - Calculation Object]

No.	Property	Description
1	Open	Open the property window of the selected calculation object. A double click to a specific calculation object icon will also open the corresponding property window.
2	Copy	Copy the selected calculation object.
3	Paste	Paste a calculation object saved on the clipboard. Click the [+] button to copy and paste the most recently added calculation object.
4	Delete	Delete a selected calculation object(s) as if clicking the [X] button.
5	Select All	Select all existing calculation objects.
6	Move to Front	Move the selected calculation object one spot to the left, as if clicking the [<-] button.
7	Move to back	Move the selected calculation object one spot to the right, as if clicking the [->] button.

13.2 **Condition Tab**

Configure the [Condition] upon which the [Action] will be taken.
The configured [Action] is executed upon a true condition.
The types of [Condition] include [Bit] / [Word] / [ASCII] / [Schedule] / [Event] / [None].

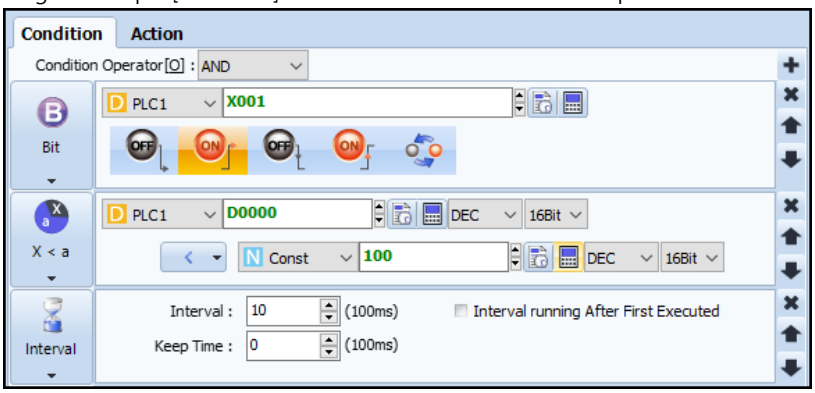


[Figure. Condition Setting]

Refer to the following brief descriptions of each condition, refer to each subsequent chapter for more details.

No.	Condition	Description
1	Bit	The ON/OFF status of a given address is used as the condition reference point.
2	Word	The word value (analogue value) of a given address is used as the condition reference point.
3	ASCII	The ASCII value (String) of a given address is used as the condition reference point.
4	Schedule	Time is used as the condition reference point.
5	Event	The touch input is used as the condition reference point.
6	None	The Effect & Action is executed at all times. The Effect & Action will be executed whenever the screen in which the object is displayed, is the running.

Refer to the following table for detail descriptions of the common buttons of the Condition tab.

Button	Description
	You can configure multiple [Condition]s with this function. You can add up to 8 conditions. 
	Delete the subejct condition.
	Move the subject condition one row upward.
	Move the subject condition one row downward.
Condition Operator [O]	If multiple [Condition]s are configured, select the operator for the conditions. [AND]: the [Condition] will be true when all conditions alloted to the [Condition] are ture. [OR]: the [Condition] will be true when at least one of the conditions alloted to the [Condition] is ture.

13.2.1 Condition - BIT

Bit conditions employ the On/Off status of a given address as the condition reference point.

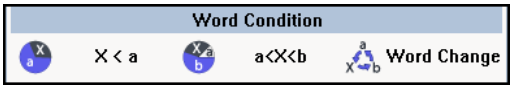
[Figure. Bit Condition]

Property	Description
Address	Configure the address that shall be used as a Bit Condition.
	Select [OFF continue] to maintain a true status while the value of the configured address is [0].
	Select [ON continue] to maintain a true status while the value of the configured address is [1].
	Select [Off edge] to create a true pulse the moment the value of the configured address changes from [1] to [0].
	Select [On Edge] to create a true pulse the moment the value of the configured address changes from [0] to [1].
	Select [REVERSE] to create a true pulse whenever the value of the configured address changes from [1] to [0], and [0] to [1].

13.2.2 Condition - Word

A [Word] address refers to a 16 bit address.

Word conditions employ the word value (analogue value) of a given address as the condition reference point.



[Figure. Word Condition]

(1) X < a Condition

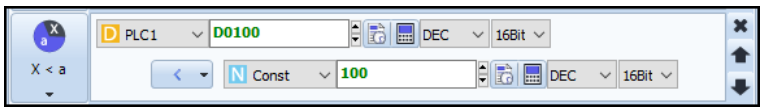
Compare two values and create a [True] status when the condition is satisfied.

The condition operator is executed once upon each change to the [X] value, rather than repeating the operator at all times.

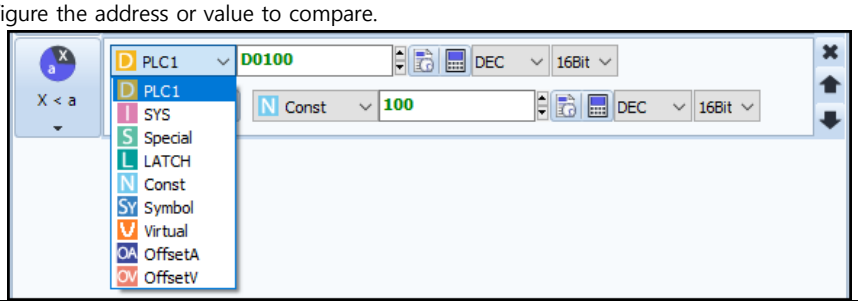
Both [X] and [a] can be assigned to an address or a constant.

There are 6 types of operators to compare [X] and [a].

With the below configuration, if [D0100] changes to a value larger than 1, a single true impulse will be created.



[Figure. Word Condition - X < a]

Property		Description
[X], [a]		Configure the address or value to compare. 
Comparison Operator	<	The comparison operator to express a condition where the first operand is smaller than the latter operand.
	>	The comparison operator to express a condition where the first operand is larger than the latter operand.
	<=	The comparison operator to express a condition where the first operand is equal with or smaller than the latter operand.
	>=	The comparison operator to express a condition where the first operand is equal iwth or larger than the latter operand.
	==	The comparison operator to express a condition where the first operand is equal with the latter operand.
	!=	The comparison operator to express a condition where the first operand is different with the latter operand.

(2) a<X<b Condition

Compare three values and create a [True] status when the condition is satisfied.

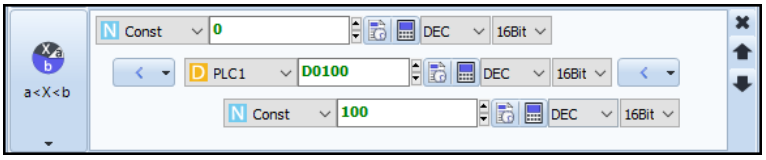
The condition operator is executed once upon each change to the [X] value, rather than repeating the

operator at all times.

All [a], [X] and [b] can be assigned to an address or a constant.

This condition is mainly used to configure a condition where [X] is between [a] and [b].

With the below configuration, if [D0100] changes to a value between [0] and [100], a single true impulse will be created.

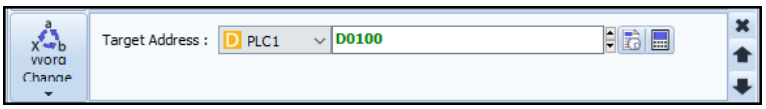


[Figure. Word Condition - a < X < b]

(3) Word Change Condition

Create a [True] status when the data of the selected address changes.

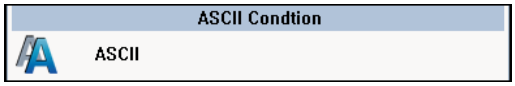
The below configuration will create a true pulse when the data of [D0100] changes.



[Figure. Word Condition - Word Change]

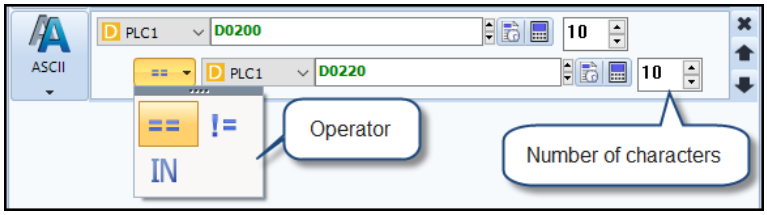
13.2.3 Condition - ASCII

The ASCII value (String) of a given address is used as the condition reference point.



[Figure. ASCII Condition]

Configure the start address for both operants, and define the number of characters subject to the operator. Configure the applicable operator. The string of both addresses are compared, and a true status is generated when the condition is satisfied.



[Figure. ASCII Condition]

Select [==] to create a true status when the string of both addresses are the same.

Select [=!] to create a true status when the string of both addresses are different.

Select [IN] to create a true status when the string of the first address is fully included in the string of the second address.

13.2.4 Condition - Schedule

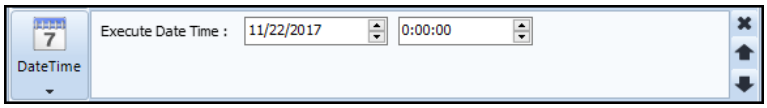
Configure a time as a condition reference point.

[Figure. Schedule Condition]

(1) Date Time

A specific date and time is used as the condition reference point.

Configure all time information including Date (Year/Month/Day) and Time (Hour/Minute/Second). A true status will be created when the configured date and time arrives.



[Figure. DateTime]

(2) Schedule

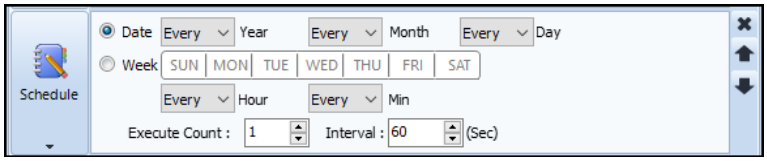
A true status is created upon a predetermined schedule.

Select between [Day] and [Week].

For [Day], if you select [Ever] for [Year] / [Month] / [Day] a true status will be repeatedly created on the configured [Hour] / [Minute] of every [Year] / [Month] / [Day] that you have selected.

For [Week], if you select a given day of the week, a true status will be repeatedly created on the configured [Hour] / [Minute] of the day you have selected.

The same logic applies to [Hour] and [Minute], where if you select [Every], a true status will be repeatedly created whenever the configured [Hour] and [Minute] arrives.



[Figure. Schedule]

If the [Execute Count] is [1], a single true pulse will be created when the predetermined [Year/Month/Day/Hour/Minute] arrives.

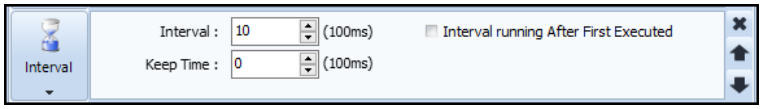
If the [Execute Count] is [2] or more and there is a configured [Interval] (seconds), a single true pulse will be created when the predetermined [Year/Month/Day/Hour/Minute] arrives, followed with a repeated amount of additional pulses according to the [Execute Count] with the predetermined [Interval].

(3) Interval

[Interval] is used to configure a condition on a regular basis.

The below configuration will create a true status the moment the object is executed, and will return to false after 0.5 seconds.

After two seconds (20 x 100ms = 2s) since the moment the condition becomes true, the status will be sustained for 0.5 seconds and go back to false.

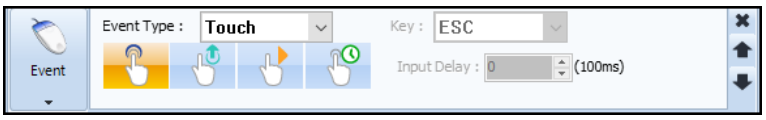


[Figure. Interval]

Property	Description
Interval	The periodic interval between true statuses.
Keep Time	The time length to sustain the true status.
Interval running After First Executed.	Enable this function to create a true status the moment the object is executed. If this function is disabled, the first true status will be created after the [Interval] has elapsed after execution.

13.2.5 **Condition - Event]**

Configure a touch input as a condition reference point.



[Figure. Event]

Property	Description
Touch Down	A true status is created when the object is touched.
Touch Up	A true status is created when the touch is released from the object.
Momentary	If a touch is maintained to the object for the amount of time configured in [Input Delay] (100ms), a true status will be created, and the true status will survive until the touch is removed. If the [Max Execute Count] at the [Action] tab is [2] or more, the action will be repeatedly executed in the specified [Interval] for the times defined by [Max Execute Count], as long as this condition is true.
Touch Delay	A single true pulse is created when the object is touched for the amount of time configured in [Input Delay] (100ms). Even if the [Max Execute Count] at the [Action] tab is [2] or more, the action will be executed only once.

13.2.6 **Condition - None**

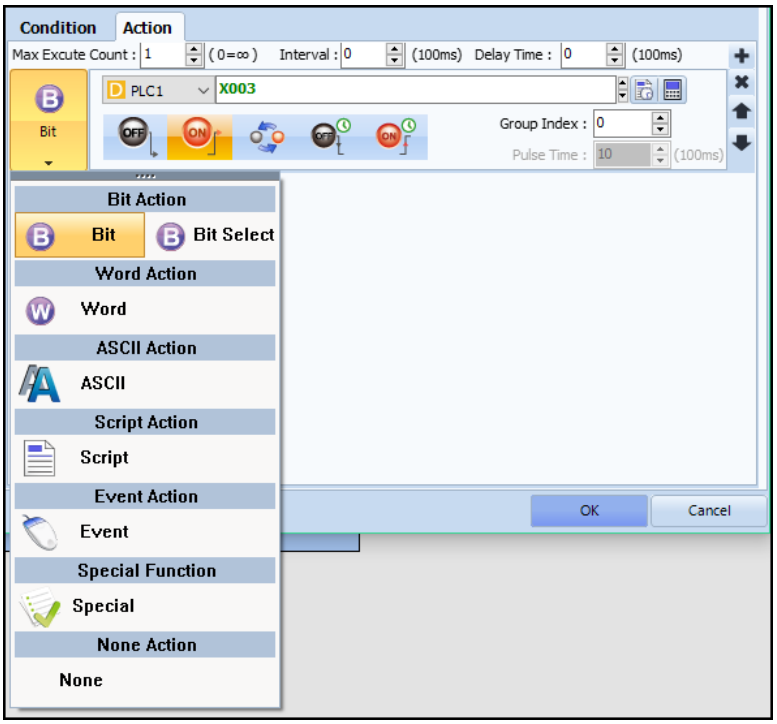
Configuring no condition refers to a condition that is always true.

Select [None] and configure an [Action], the [Action] will be repeatedly executed.

13.3 **Action Tab**

[Action] refers to the action that is executed upon a true condition.

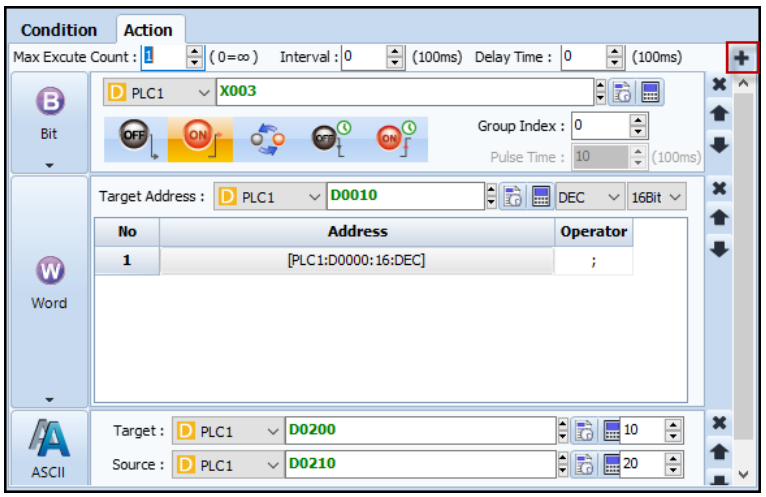
As shown below, [Action] includes [Bit Action] / [Word Action] / [ASCII Action] / [Script Action] / [Event Action] / [Special Action] / [None].



[Figure. Action Tab]

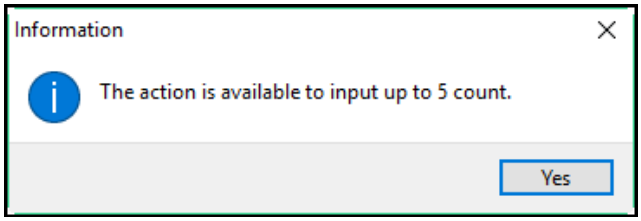
No.	Action	Description
1	Bit Action	Control the data of a Bit Address.
2	Word Action	Control the data of a Word Address.
3	ASCII Action	Enter a string to a selected address.
4	Script Action	Execute a script operation.
5	Event Action	Configure an event with the [Keyboard] / [Keypad] / [Ten Key].
6	Special Action	Execute a special action related to [Screen] / [Print] / [SD Memory] / [Memory] / [System] / [Application] / [Camera].
7	None Action	Assign no action to the condition.

You can add up to 10 actions with the [+] button on the upper right corner. If multiple actions are configured, each action will be executed in the order as presented when the condition is true.



[Figure. Adding an Action]

The following message will appear if the number of actions exceed 10.



[Figure. Error Message - Excessive number of actions]

Three function buttons are provided on the right side of each action.

Action	Description
✖	Delete the subject Action.
⬆	When multiple actions are configured, upon a true condition, the action on the top of the list is executed first, followed by each action in the order from top to bottom. Click the move upward button to move the subject action one row upward.
⬇	When multiple actions are configured, upon a true condition, the action on the top of the list is executed first, followed by each action in the order from top to bottom. Click the move downward button to move the subject action one row downward.

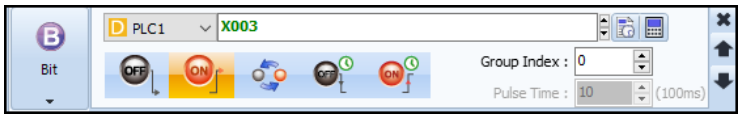
Configure the [Max Execute Count] / [Interval] / [Delay Time] that are applicable upon a true condition.

Action	Description
Max Execute Count (0=∞)	Configure the number of time the actions should be repeated. Select [0] to continuously execute the action while the condition is true. Select [1] to execute the action a single time even the true condition is sustained.
Interval (100ms)	Configure the interval between actions. Select [0] to achieve the most rapid speed.
Delay Time (100ms)	Configure the time to delay the execution of the action. Select [0] to execute an action immediately when the condition becomes true. If [5] is selected, the action will be executed 5 seconds (5 x 100ms) after the condition becomes true.

13.3.1 Action - Bit Action

(1) Bit

Control a Bit Address upon a true condition. [ON] / [OFF] / [Reverse] are the applicable actions.



[Figure. Bit Action]

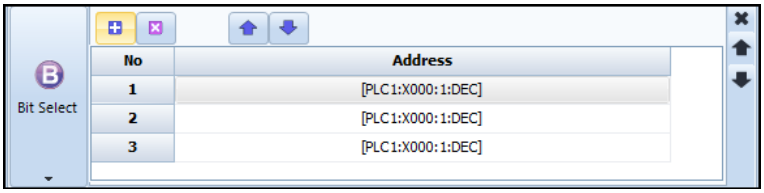
Bit	Description
Address	Configure the Bit Address that will be controlled.
[OFF Continue]	The data of the configured address turns OFF upon a true condition. In other words, the value will change to [0].
[ON Continue]	The data of the configured address turns ON upon a true condition. In other words, the value will change to [1].
[Reverse]	The data of the configured address will change from [1] to [0] or [0] to [1], whichever the previous data may have been, upon a true condition.
[OFF Pulse]	The data of the configured address is turned OFF for the time configured as [Pulse Time]. In other words, the data will read [0] for the [Pulse Time] and retrieve back to [1] afterwards.
[ON Pulse]	The data of the configured address is turned ON for the time configured as [Pulse Time]. In other words, the data will read [1] for the [Pulse Time] and retrieve back to [0] afterwards.
Group Index	Configure a group index to multiple bit addresses. To configure multiple bit addresses to a group, enter a number other than [0] in [Group Index]. Select [0] to configure no group index. The bit addresses with the same [Group Index] number will be allotted to the same group. 그룹 인덱스 : 1 If a bit address allotted to a group index turns ON, all other addresses of that group index turn OFF. For instance, if [X001] to [X005] are assigned to the same group index, and [X001] is turned [ON], the other addresses from [X002] to [X005] turns [OFF].
Keep Time (100ms)	Pulse Time is applicable for [OFF Pulse] and [ON Pulse]. The OFF or ON status will be maintained for the configured of amount of time. Configure between [1] and [600] (100ms).

(2) Bit Select

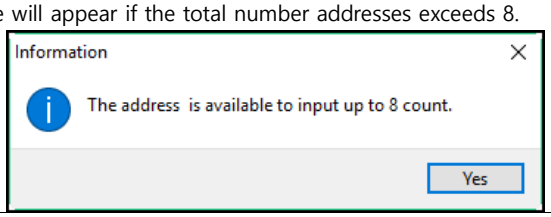
Configure multiple bit addresses. You can add up to 8 bit addresses.

When the condition is true, each bit address turns [ON] in the sequential order of [No.].

If one bit address turns ON, all other bit addresses turn OFF.



[Figure. Bit Select]

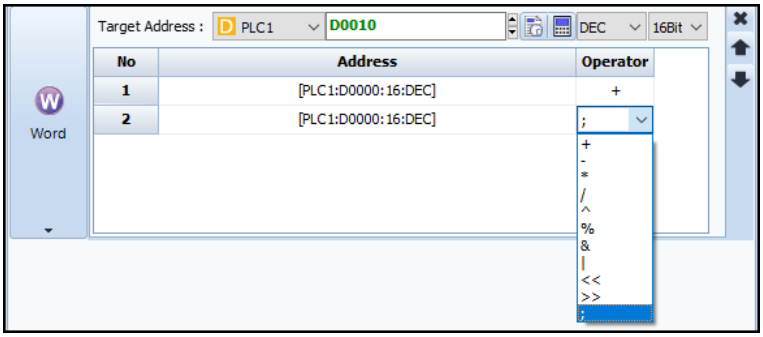
Bit Select	Description
Address	Double click the address entry field to configure the address.
	Add addresses to Bit Select. You can add up to 8 conditions. The following message will appear if the total number addresses exceeds 8. 
	Delete a selected address.
	Move a selected address to a higher precedence number.
	Move a selected address to a lower number of precedence.

13.3.2 Action - Word Action

Control the data of a word address upon a true condition.

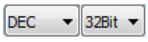
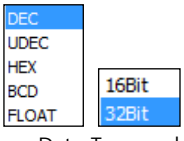
A Word address refers to a 16 bit address storing analog data.

Word Action is an action substituting data or the result of an operation to such address.



[Figure. Word Operation]

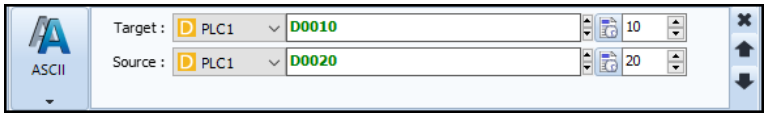
With the above configuration, when the condition is true, the sum of the values of [D0010] and [D0011] is entered to [D0010].

Word Operation	Description
Target Address	Configure the word address in which the operation result is entered.  Select the Data Type and Size from each drop down menu.  [Figure. Data Type and Size]
Address	Configure an address for row No. [1] Select [;] from the drop down menu of the [Operator] Column, as the operator to input the value the configured address as the value for the [Target Address]. When you select any operator other than [;], row No.[2] will be added automatically. Configure the address No.[2] subject to the operation. Execute the selected operation for the value of the selected addresses of Nos.[1] and [2], and enter the result to the [Target Address]. You can add operation equations by adding operators, and corresponding addresses. Operation will be executed in the ascending sequential order, regardless of the operator. In other words, the result of operation between [1] and [2] is used further operated with [3],

		and the result from that operation is then operated with [4].
Operator	+	Add the two operands and enter the result in the Target Address.
	-	Subtract the second operand from the first operand and enter the result in the [Target Address].
	*	Multiply the two operands and enter the result in the Target Address.
	/	Divide the first operand with the second operand and enter the result in the Target Address.
	^	Execute a Bit XOR operation between the two operands and enter the result in the Target Address.
	%	Execute an MOD operation between the two operands and enter the result in the Target Address. The modulo operation finds the remainder after division of the first operation by the second operand.
	&	Execute a BIT AND operation between the two operands and enter the result in the Target Operand.
	|	Execute a BIT OR operation between the two operands and enter the result in the Target Address.
	<<	Left Shift Operator. The left shift operator causes the bits of the first operand to be shifted to the left by the number of positions specified in the second operand. For instance, if the first operand [D0001] reads [1], and the second operand is a constant of [3]. For the operation of [D0001] << 3, the binary form of [1] is [0000000000000001]. Each bit of the binary form is shifted to the left 3 positions, to find [0000000000001000]. The decimal form of this result is [8].
	>>	Right Shift Operator The right shift operator causes the bits of the first operand to be shifted to the right by the number of positions specified in the second operand. For instance, if the first operand [D0001] reads [8], and the second operand is a constant of [3]. For the operation of [D0001] >> 3, the binary form of [8] is [0000000000001000]. Each bit of the binary form is shift to the right 3 positions, to find [0000000000000001]. The decimal form of the result is [1].
	;	Use [;] to terminate the operation.

13.3.3 **Action - ASCII Action**

Substitute the string of the [Target] address with the string from the [Source] Address upon a true condition.



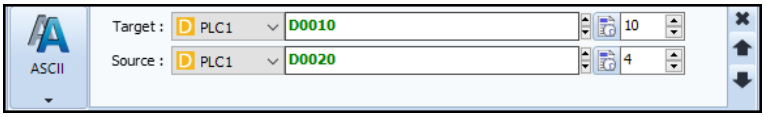
[Figure. ASCII Action]

The size of a single ASCII Code Character is 8bit. Accordingly, 2 characters are recorded in a word address(16Bit).

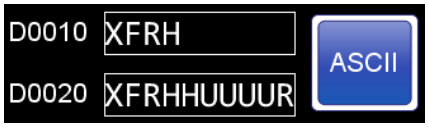
Configure the [Character Count] provided on the right side of each [Target] address and [Source] Address. With the above configuration, upon a true condition, the 10 characters from the five addresses of [D0020] to [D0024] are entered into the five addresses of [D0010] to [D0014].

You can configure different numbers of [Character Count] for the [Target] address and [Source] address. If the [Character Count] of [Source] address is 4, and the [Character Count] of [Target] address is 10, only 4

characters are copied, as shown below.



[Figure. Different Character Count]



[Figure. Different Character Count]

13.3.4 **Action - Script Action**

Execute a script upon a true condition.

You can configure scripts at [Project] - [Script].

Refer to Chapter 4.5 [Script] for more details.

[Figure. Script Action]

13.3.5 **Action - Event Action**

Configure an action from the keypad.

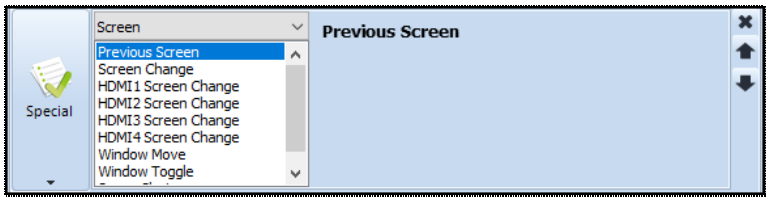
[Figure. Event Action]

Event Action		Description
Key		Select the key of your interest.
Action		Touch Down, the key is virtually pushed down.
		Touch Up, a touched down key is virtually released.

You can select among various types of keys. String input keys and numeric input keys are also available.

13.3.6 Action - Special Action

Execute a special action upon a true condition.

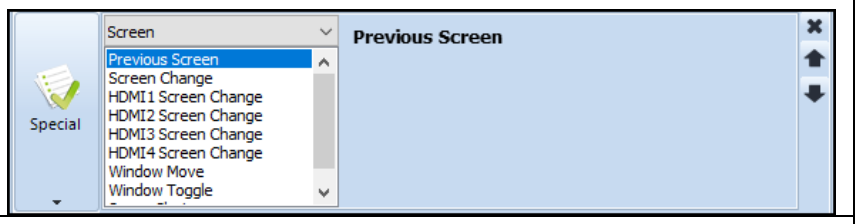
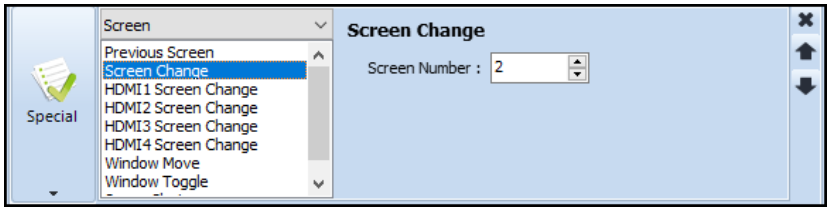


[Figure. Special Action]

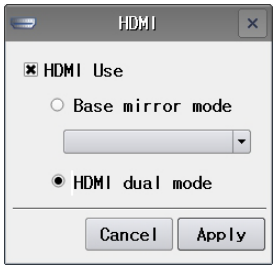
No.	Special Action	Description
1	Screen	Configure a special action related to the screen including [Previous Screen] / [Screen Change] / [HDMI Screen Change] / [Window Move] / [Window Toggle] / [ScreenShot].
2	Print	Configure actions related to Print.
3	Storage	Configure actions related to the Memory connected to the TOP device.
4	Memory	Configure actions related to [Memory Copy] / [System Buffer Copy] / [Log Clear] / [Alarm Clear].
5	System	Configure actions related to System and Security.
6	App	Configure actions that load applications from the Menu Screen.
7	Camera	Configure actions related to the TOPR Premium Model internal camera or an external camera.

(1) Action - Special Action (Screen)

Configure a special action related to the screen including [Previous Screen] / [Screen Change] / [HDMI Screen Change] / [Window Move] / [Window Toggle] / [ScreenShot].

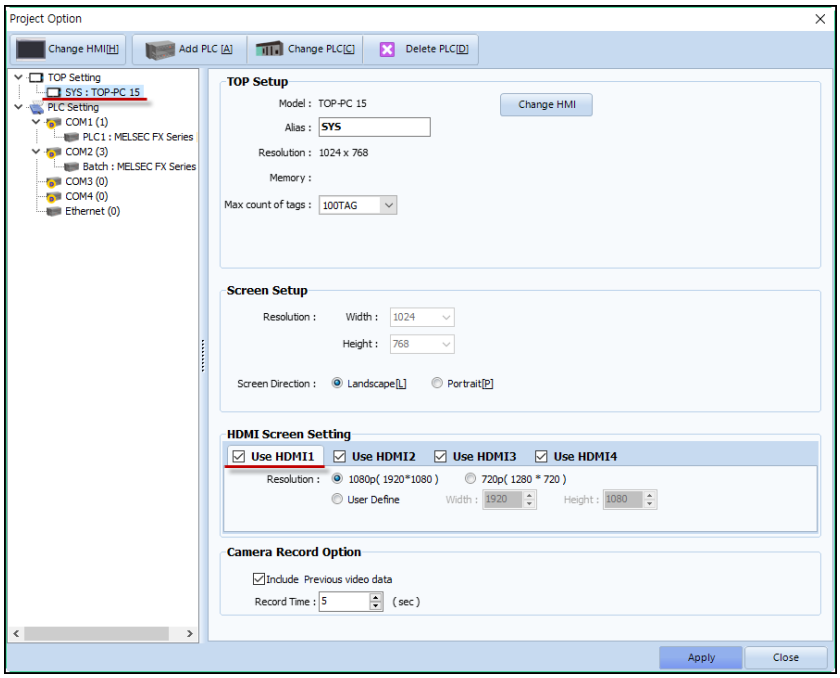
No.	Screen	Description
1	Previous Screen	The TOP device navigates back to the immediately previous screen. 
2	Screen Change	The TOP device navigates to the selected [Screen Number]. 
3	HDMI1 Screen Change HDMI2 Screen Change HDMI3 Screen Change HDMI4 Screen Change	Configure monitoring of the TOP device screen from a [Projector] / [PC] / [TV] connected with the TOP device via HDMI. A TOPR premium model has one HMDI output, and TOPView has four HDMI outputs. If [Base Mirror Mode] is selected at [Control Panel] - [HDMI] from the TOP device Menu Screen, the TOP device screen is copied to the HDMI device, where there is no

need to configure a separate HDMI screen.
If [HDMI dual mode] is selected, a separate HDMI screen can be configured for monitoring.



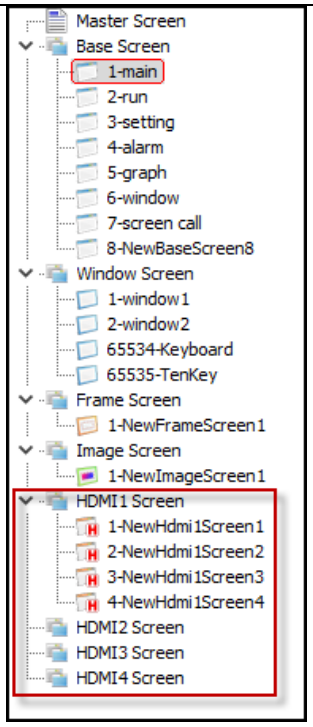
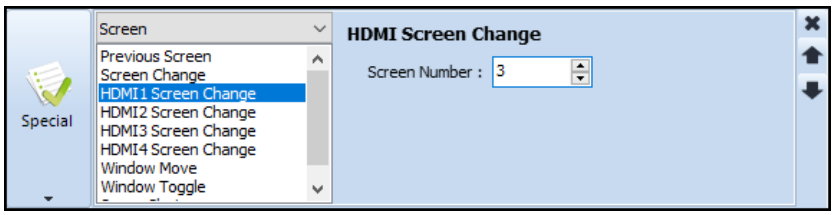
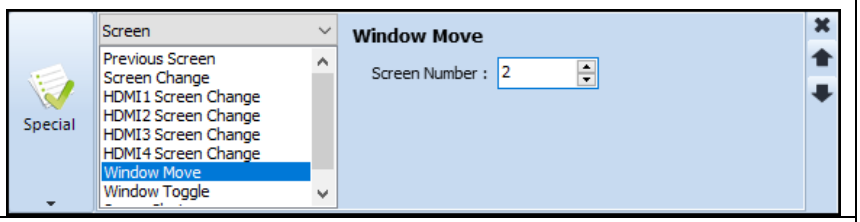
[Figure. HDMI Setting from Menu Screen]

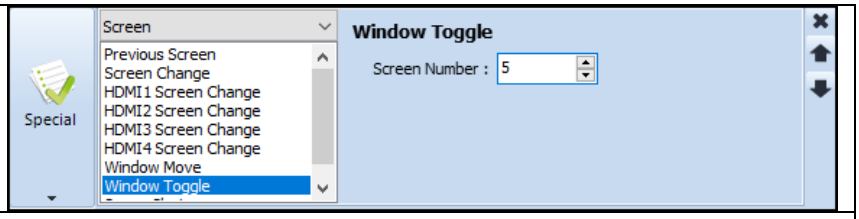
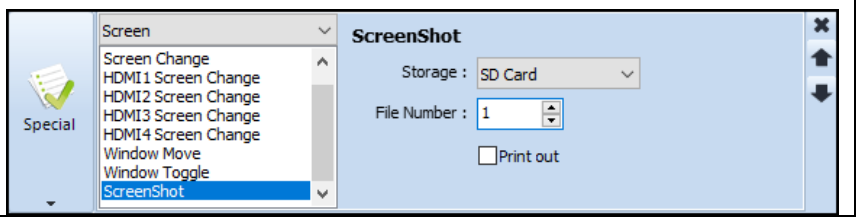
Select [Project] - [Property] from the TDS to open the [Project Option] window. Select the TOP model from [TOP Setting] provided in the list of the left side, to access [HDMI Screen Setting] on the right field. Select the HDMI that should display a screen different with the TOP device employing [HDMI dual mode]. With the below sample, TOPView is selected for the project, and you can configure up to 4 HDMI connections.



[Figure. Project Option]

With the above configuration, the lists of screens for HDMI1 to HDMI4 are shown in the [Project Manager] window. Select and configure each HDMI screen.

		 [Figure. Project Manager] With the above configuration you can change the screen with [HDMI1 Screen Change]. The display will change th the corresponding HDMI1 [Screen Number] upon a true condition.  The same method is applicable for HDMI2, HDMI3, HDMI4.
4	Window Move	Move the location of a pop-up window. With a [Touch] object, configure the [Condition] as [Event] - [Touch Down], and select [Action] - [Special] - [Window Move], and configure the number of the window screen you intend to move. This [Touch] object may be included to the window screen you intend to move, or on the base screen. While operating the TOP device, touch the [Touch] object, then touch the location to where you intend to move the pop-up window, the upper left corner of the window screen will be moved to the selected location. 
5	Window Toggle	The window screen assigned to the configured [Screen Number] will pop-up upon a true condition.

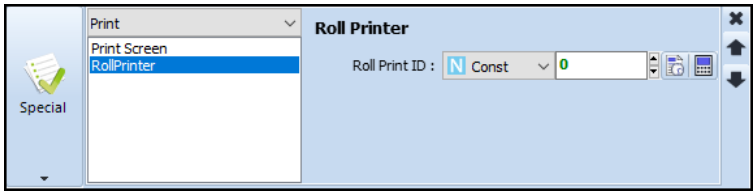
		
6	ScreenShot	The current screen is captured and saved to a [*.JPG] file upon a true condition. Select [Internal Memory] / [SD Card] / [USB] for [Storage]. Select [Internal Memory] to save the image on the TOP internal memory. Go to [Menu Screen] - [File Browser] and open the [ScreenCapture] folder to access the captured image. Select [SD Card] to save the image on the SD Card inserted to the TOP device. Select [USB] to save the image on the USB memory connected to the TOP device. Go to [UserData] - [ScreenCapture] to access the captured image saved on the [SD Card] or [USB] device. The format of the file name is [Current Date - File Number]. The [File Number] will be the number employed by the first screen shot captured on a given day. In other words, with the below configuration, the capture image is saved as a [*.JPG] file in the path of [SD Card] - [UserData] - [ScreenCapture], where the first capture is named as [20170530-1.jpg], the second capture is [20170530-2.jpg], the third capture is [20170530-3.jpg], so on and so forth. 

(2) Action - Special Action (Print)

Configure actions related to Print.
Once you run a TOPView, you can connect a roll printer to the PC and print in the configured format.

Refer to Chapter 1.2.9 [Control Panel - Communication Device - Printer] and Chapter 4.11 [Roll Printer] for more details.

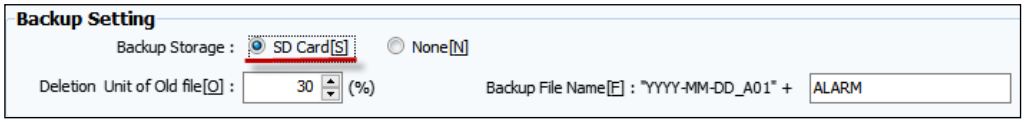
Select [RollPrinter] as below, and configure the [Roll Print ID], the [Print] will be executed upon a true condition. [Roll Print ID] refers to the page ID that will be printed, as configured at [Project] - [RollPrinter] from TDS.



[Figure. Special Action - RollPrinter]

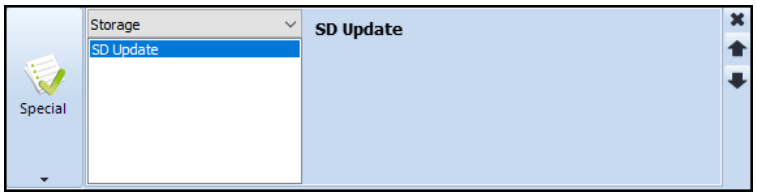
(3) Action - Special Action (Storage)

Configure actions related to storage devices connected to the TOP device.
If Alarm / Log data of the TOP device are configured to be backed up on the SD card, any created data is saved on the SD Card automatically.



[Figure. Backup to SD Card]

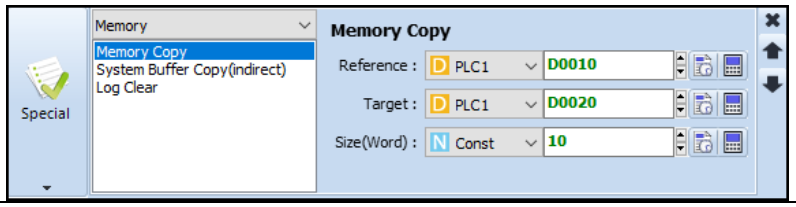
In such cases, repeatedly writing data on the SD Card will cause unnecessary system load, therefore, data are written on the SD Card whenever the accumulated data to write exceeds one frame (1K Word).
Thus, prior to removing an SD card from the TOP device, you must execute an [SD Update] to save any remaining data that is not written on the SD Card, that did not fulfill the quota of 1 frame.

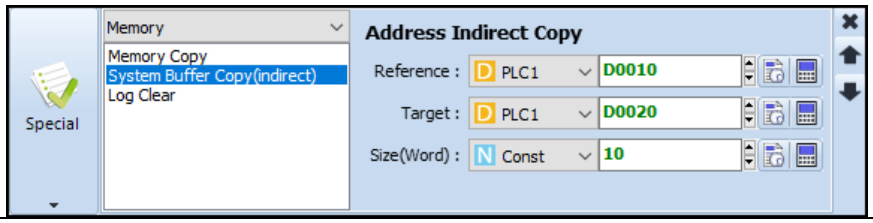
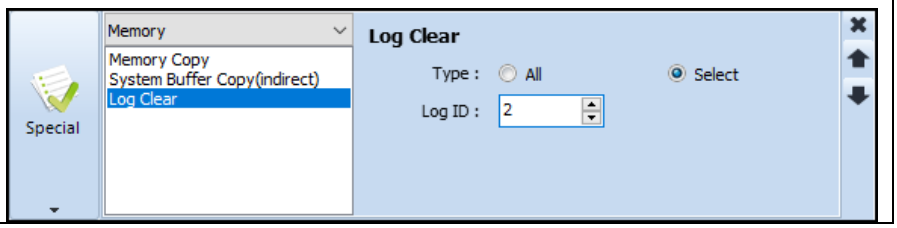


[Figure. Special Action - SD Update]

(4) Action - Special Action (Memory)

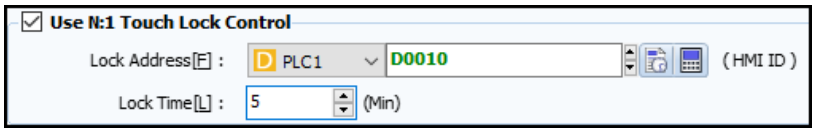
Configure actions related to [Memory Copy] / [System Buffer Copy] / [Log Clear] / [Alarm Clear].

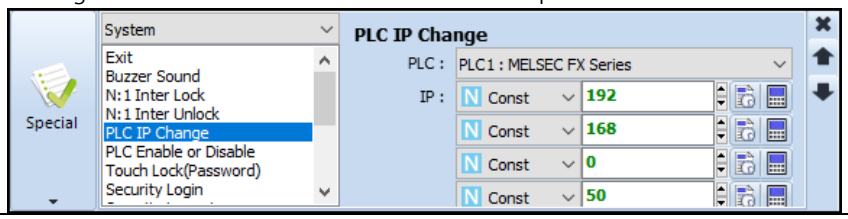
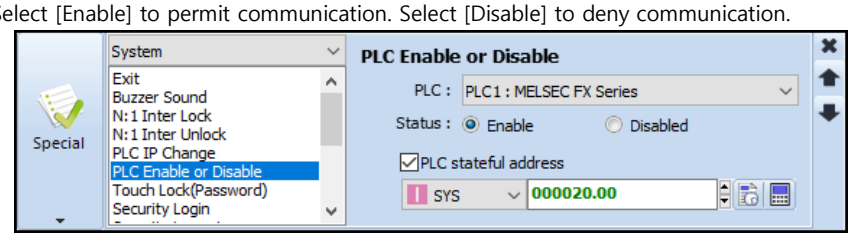
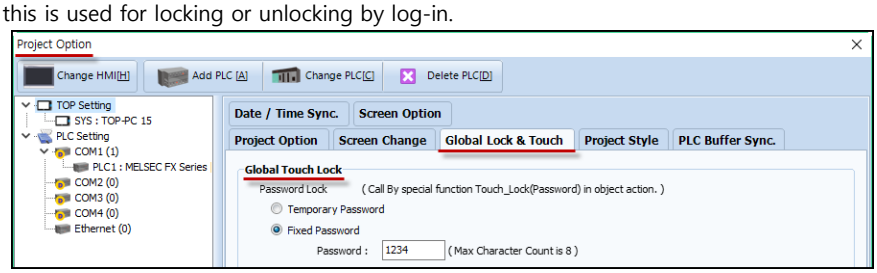
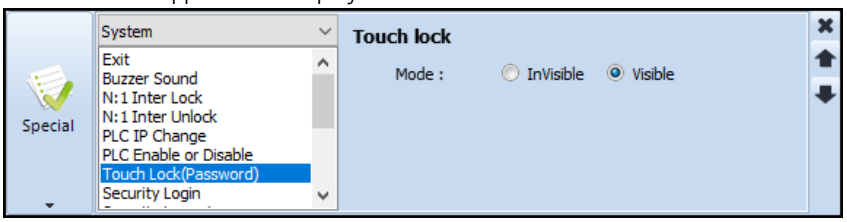
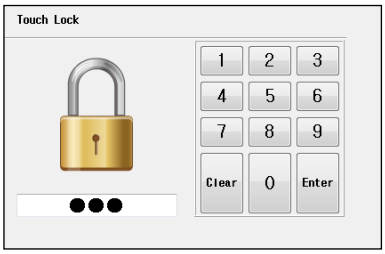
No.	Memory	Description
1	Memory Copy	Copy the data from the [Reference] address to the [Target] address. Configure the number of addresses to copy each data with [Size(Word)]. The configured [Reference] address and [Target] address are the start address. The data of addresses beginning from the [Reference] address up to the address that conforms the [Size(Word)] is copied. With the below configuration, the data between [D0010] to [D0019] are copied to [D0020] to [D0029]. In other words, D0020=D0010, D0021=D0011, D0022=D0012, ... , D0029=D0019. 
2	System buffer Copy (indirect)	Copy the data of the TOP internal address (System Buffer). The data for [Reference] address and [Target] address, are indirect addresses of the TOP internal address. Configure the number of addresses to copy each data with [Size(Word)]. With the below configuration, if [D0010] reads 20, and [D0020] reads 40, each value of the ten internal addresses from [00020] to [00029] is copied to the ten internal addresses from [00040] to [00049]. In other words, [00040]=[00020], [00041]=[00021],

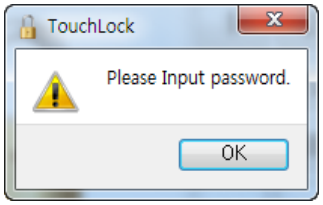
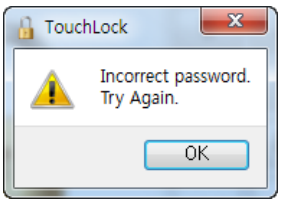
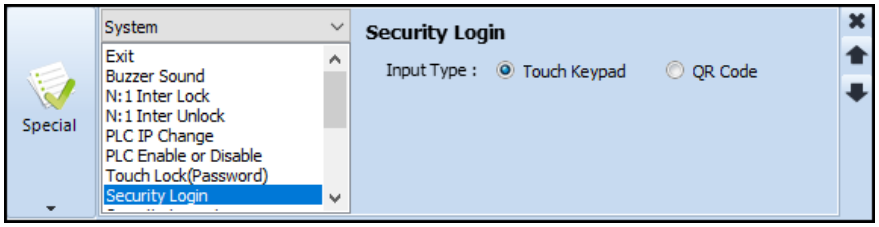
		[00042]=[00022], ... , [00049]=[00029]. 
3	Log Clear	Delete log data stored on TOP internal memory. You can configure up to 16 logs wit Log IDs from [1] to [16]. Select [All[to delete all log data. Select [Select] and configure a specific [Log ID] number to delete the corresponding log data. 

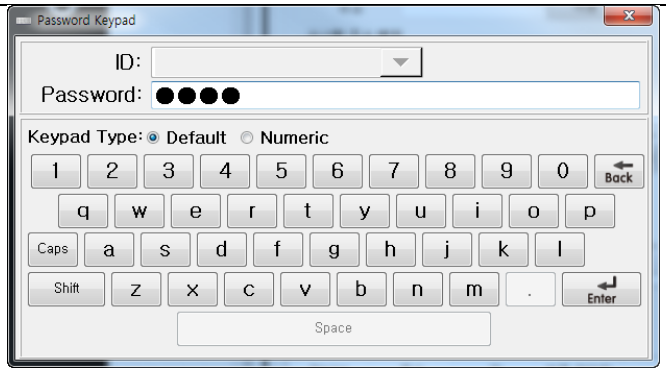
(5) Action - Special Action (System)

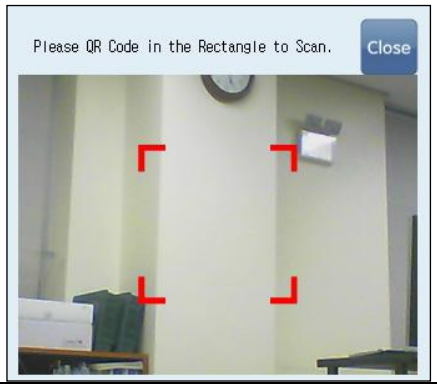
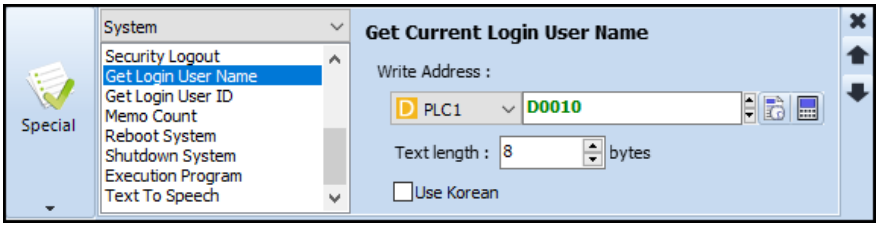
Configure actions related to System and Security.

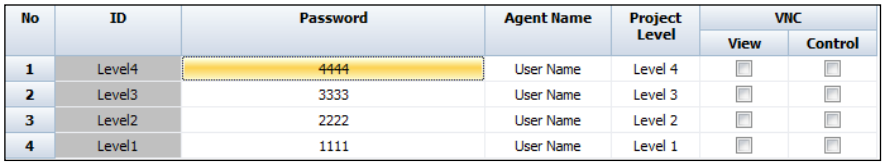
No.	Memory	Description
1	Exit	Terminate the Run Screen and go back to Menu Screen.
2	Buzzer Sound	Play the buzzer sound upon a true condition.
3	N:1 Inter Lock	Connecting multiple PLCs to a single TOP device is referred as [N:1] communication. To prevent problems that may occur by simultaneously controlling multiple TOP devices from a single PLC, you should configure [Use N:1 Touch Lock Control] settings. Go to [Project] - [Property] to open [Project Option]. Enable [Use N:1 Touch Lock Control] to create an [N:1 Interlock Action].  [Figure. Use N:1 Touch Lock Control] The above sample configuration will allow the data of Lock Address of [D0010] to become the HMI ID that can be controlled. TOP devices with other HDMI IDs will not be locked and no touch input will be allowed. (Go to [Control Panel] - [Project Settings] - [11. HDMI ID] at your TOP device to check the HMI ID.) If the value of the Lock Address of [D0010] is [0], all input is allowed from all TOP devices. For a [Lock Time] of [5] minutes, the moment one minute elapses from the last touch input, [0] will be entered to the [Lock Address] and the interlock will be dismissed. Configure [N:1 Interlock] to apply the HMI ID of itself as the [Lock Address] to prevent input from other TOP devices.
4	N:1 Inter Unlock	Configure [N:1 Inter Unlock] to substitute the Lock Address with [0] and dismiss the N:1 Interlock.
5	HMI IP Change	Change the IP Address of the TOP device. The configured IP address becomes the TOP device IP address upon a true condition.

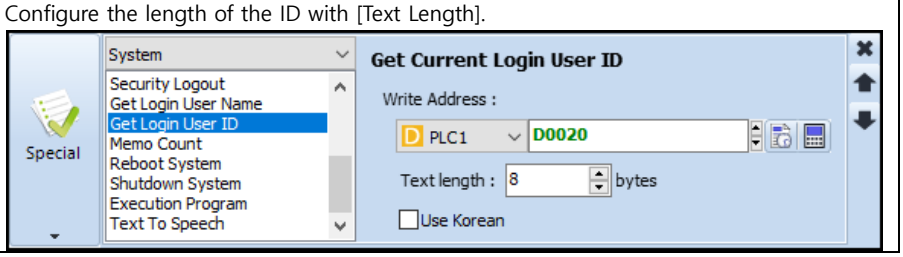
6	PLC IP Change	Change the IP address of the PLC. The configured IP address becomes the PLC IP address upon a true condition. 
7	PLC Enable or Disable	Configure whether to enable or disable a PLC upon a true condition. Select [Enable] to permit communication. Select [Disable] to deny communication.  The PLC Enable/Disable status is recorded at [PLC Stateful Address]. If the selected address reads [1] the PLC is enabled, and if the address reads [0], the PLC is disabled.
8	Touch Lock(Password)	If you set a 'Global Touch Lock' through [Project] - [Property] - [Global Lock & Touch], this is used for locking or unlocking by log-in.  [Figure. Global Touch Lock enabled] [Global Touch Lock] applies a [Touch Lock] to all objects added to the screen to prohibit any input. Touch is allowed and recognized only after password verification. Apply touch lock when a temporary on-site lock or a maintenance job is required. (Refer to Chapter 4.12.6 [Global Lock & Touch] for more details.) Touch Lock is not applied when a project is executed.  With the above configuration, executing [Touch Lock(Password)] will apply a touch lock, while the [Touch Lock Password Keypad], as shown below, will pop-up.  [Figure. Touch Lock Password Keypad] Do any work required to be done under touch lock, and enter the password in the above window to dismiss the [Touch Lock] and terminate the password keypad.

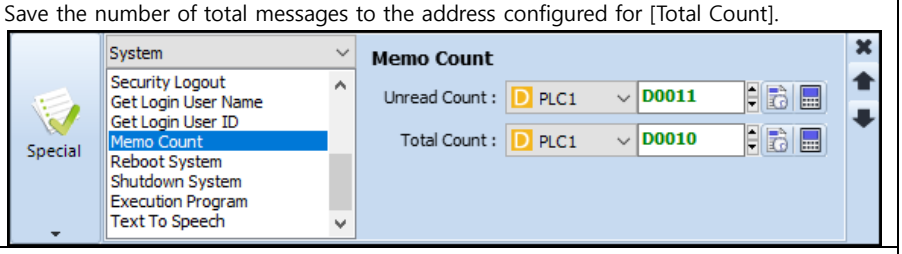
		If a situation where touch lock is required occurs, execute the [Touch Lock(Password)] action. If you click [Enter] without entering the password, the below error message will appear.  If you click [Enter] with the wrong password, the below error message will appear.  If you forgot the Temporary Password, press the key icon for five or more seconds, the password will appear right beneath the keypad. If you select [Visible], the [Touch Lock] window will be shown on the TOP device at all times until the password is verified. If you select [Invisible], the [Touch Lock] window will be not shown on the TOP device without password verification when [Touch Lock] is applied. As shown below, a [Hide] button will be shown with a countdown from 10. Click [Hide] to close the login window. Once the countdown is finished at [0], the login window will close. Press any key among [0] ~ [9], [Clear] or [Enter], the count will restore to 10.
9	Security Login	Login with this action if [Use Security Level] is enabled from [Project] - [Security]. Refer to Chapter 4.7.2 [Use Security Level] for more details.  Select [Touch Keypad] for [Input Type] to open the below keypad upon execution of the action. Type in the password configured from [Security] and press the [Enter] key to login.

<table>
<tr><td></td><td></td><td> 

Select [QR Code] for the [Input Type], and recognize the QR code to the front camera of the TOP device to login.
(A front camera is provided for TOPR Premium models.)
Once the action is executed, the below screen appears, to fit the QR code in the red square.
 
</td></tr>
<tr><td>10</td><td>Security Logout</td><td>Logout from the currently logged in User. The security level will be reset to [0].</td></tr>
<tr><td>11</td><td>Get Login User Name</td><td>Save the User Name of the currently logged in Security Level to [Write Address].
Configure the length of the User Name with [Text Length].
 

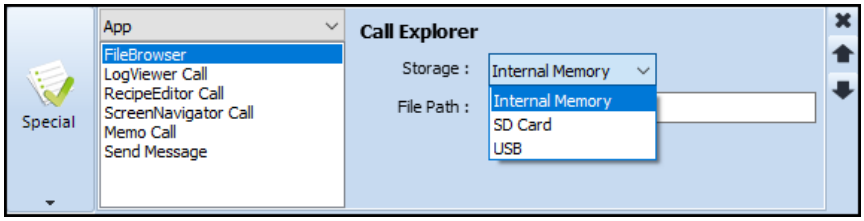
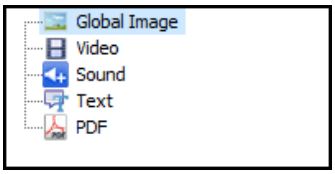


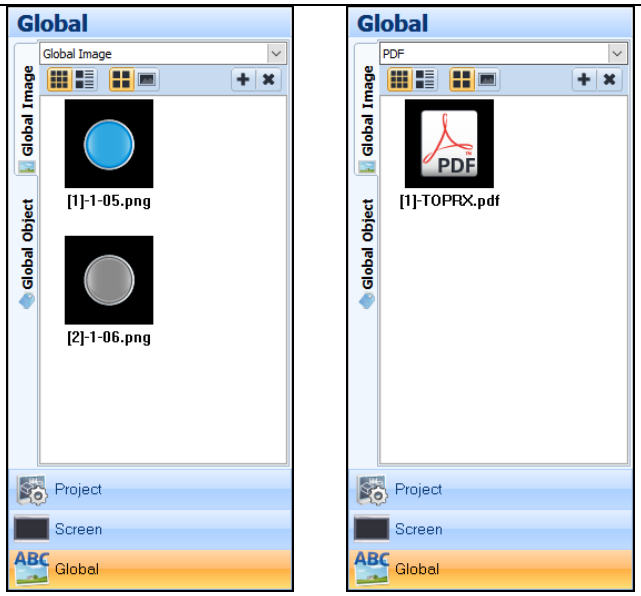
[Figure. Security]</td></tr>
<tr><td>12</td><td>Get Login User ID</td><td>Save the I of the currently logged in Security Level to [Write Address].
Configure the length of the ID with [Text Length].
 
</td></tr>
</table>

13	Memo Count	Save the number of memos to a specific address. Save the number of unread messages to the address configured for [Unread Count]. Save the number of total messages to the address configured for [Total Count]. 
14	Reboot System	Reboot the TOP device.

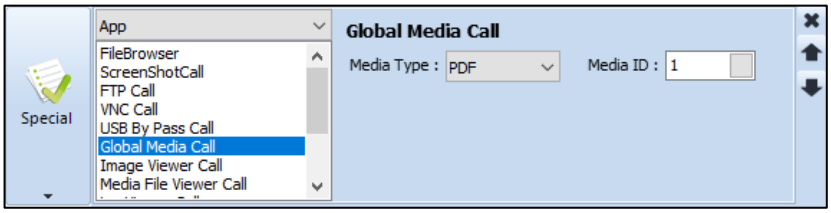
(6) Action - Special Action (App)

Call and run an application from the Menu Screen.

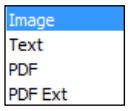
No.	Memory	Description
1	FileBrower	Load the File Browser application. Select [Internal Memory] / [SD Card] / [USB] for [Storage]. Once the File Browser is loaded, the device selected for [Storage] will be show as default. 
2	ScreenShotCall	Load the Screen Shot application.
3	FTP Call	Load FTP.
4	VNC Call	Load VNC Viewer.
5	USB By Pass Call	Load the front USB.
6	Global Media Call	Load a global media registered to resource during project running. Add and manage global media at [Project Manager] - [Resource]. Refer to the following types of global media.  [Figure. Types of global media] Click the [+] button provided on the upper right side of [Project Manager] - [Resource].



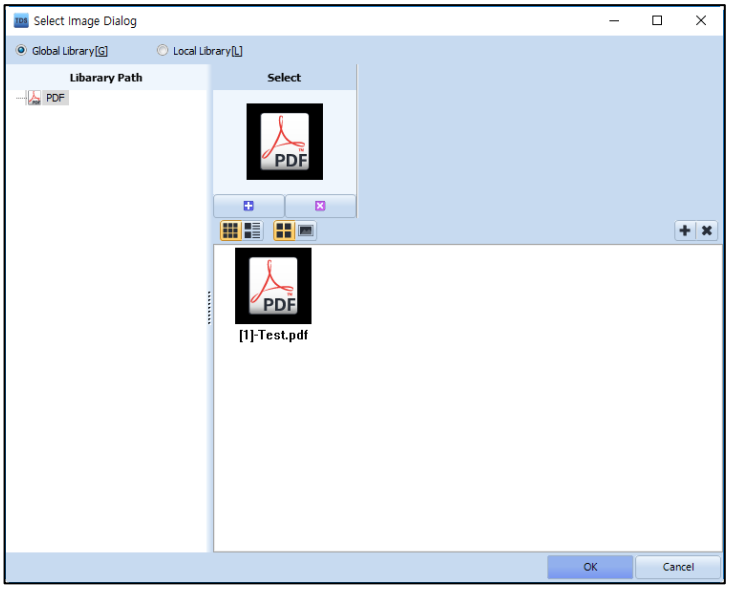
[Figure. Project Manager - Resource]



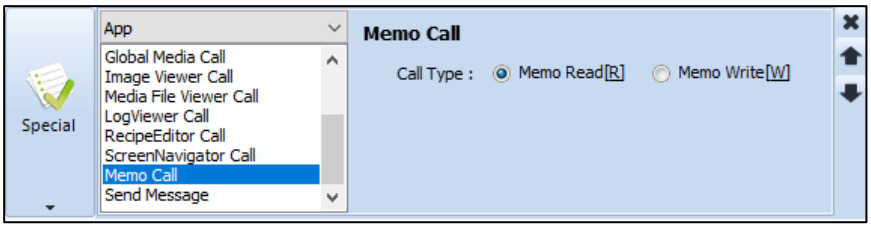
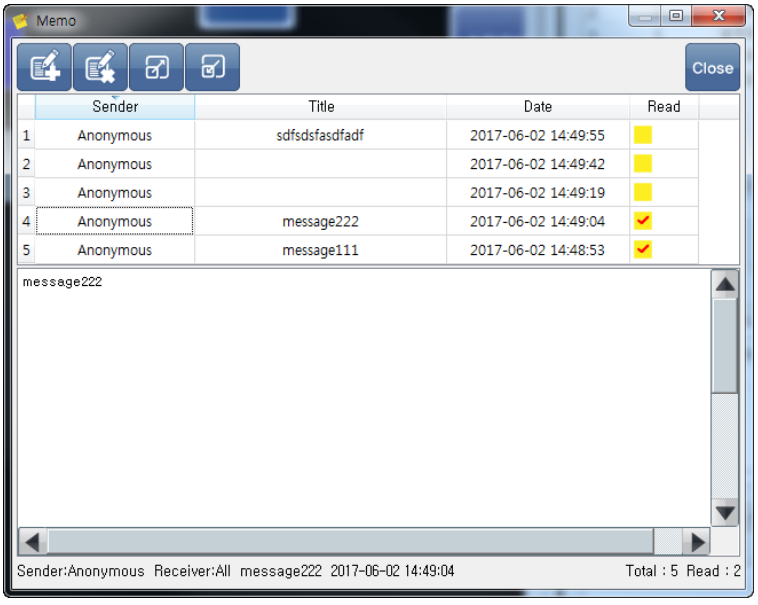
Select among [Image] / [Text] / [PDF] / [PDF Ext] for [Media Type].



Click the square box on the right side of the [Media ID] input field to open the [Select Image Dialog]. Select the media to open, and click [OK].



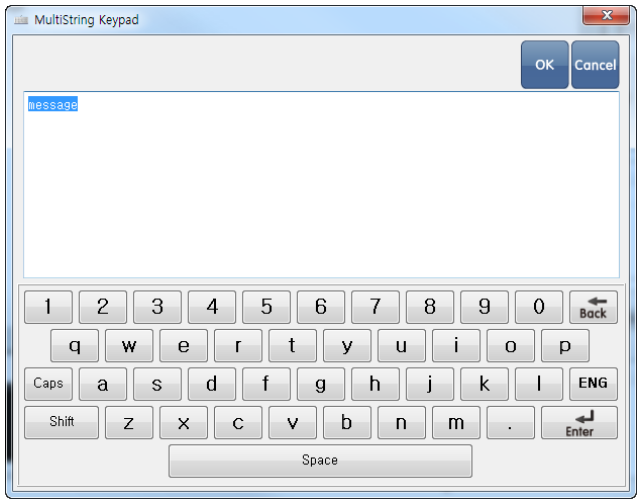
[Figure. Select Media]

		With the above configuration, the selected media is displayed upon a true condition. Refer to Chapter 22.6.3 [Resource] for more details.
7	LogViewer Call	Load LogViewer.
8	RecipeEditor Call	Load the RecipeEditor.
9	ScreenNavigator Call	Load the ScreenNavigator.
10	Memo Call	Load the [Memo Read] window or [Memo Write] window. You can leave a message on site, or read a message left on site.  Select [Memo Read] to open the below memo window and read memos.  [Figure. Memo Read] Open the Memo Write window to leave a memo. Delete a selected message.

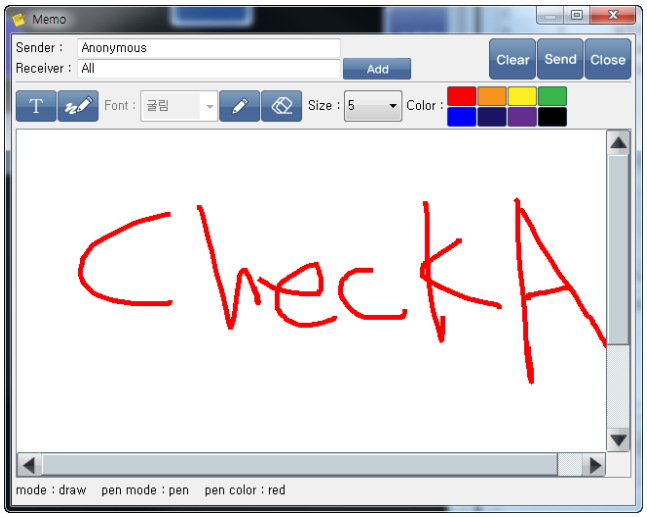
Hide the memo list and only show the contents of the memo.

Show the memo list on the top, and the contents of the memo in the bottom.

Select [Memo Write] to open the below Memo Write Window and write a memo.



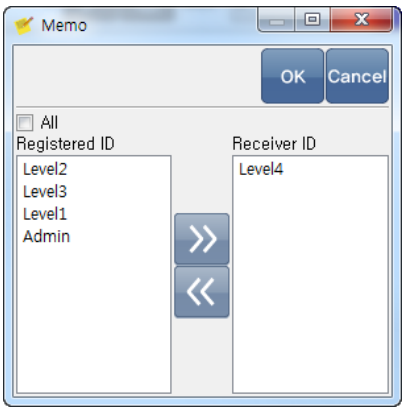
[Figure. Memo Write Window]



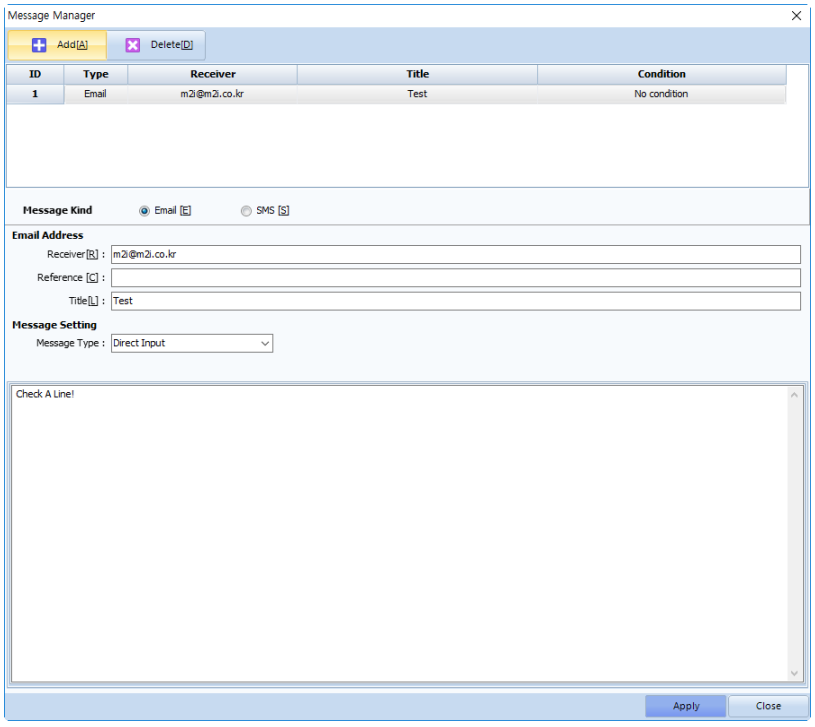
[Figure. Memo Write Window]

Sender is the name of the user who writes the memo.

Receiver is the recipient of the memo. Click [Add] to add a recipient.

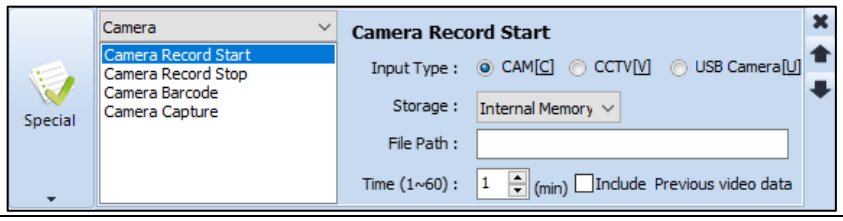
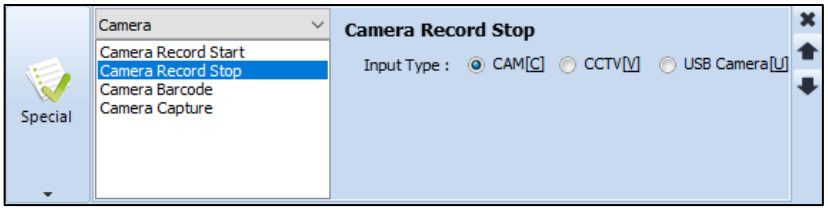
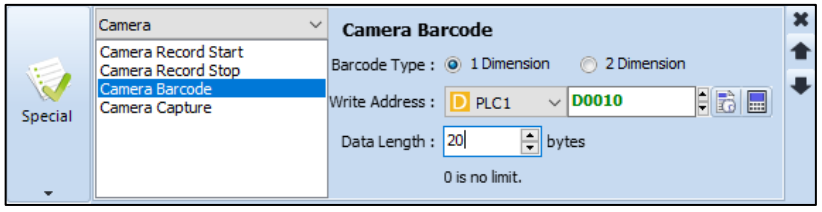
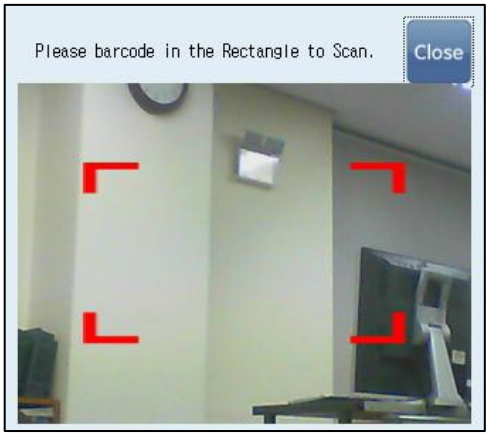


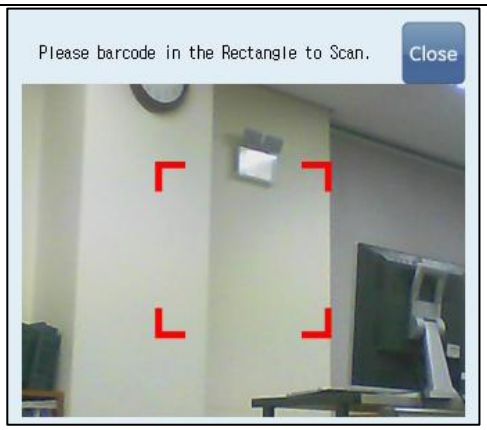
[Figure. Add button]

		Select between [Write Text] and [Draw]. Configure the Font setting of texts. Select between [Write] and [Erase]. Configure the text size. Configure the color of text/drawing. Click [Clear] to delete the memo; [Send] to send the memo; and [Close] to close the Memo Write Window.
11	Send Message	Send a message registered at [Message Manager]. Select the [Message ID] of your interest. Go to [Project] - [Message Sent] to open the [Message Manager].  [Figure. Message Manager] Refer to Chapter 4.10 [Message Manager] for more details.

(7) Action - Special Action (Camera)

Configure actions related to the TOPR Premium Model internal camera or an external camera.

No.	Camera	Description
1	Camera Record Start	Start to video record with the camera. A video file with the file name of the current date will be saved in the [CameraRecord] folder. 
2	Camera Record Stop	End video recording. 
3	Camera Barcode	Recognize a barcode with the front camera. Select between [1 Dimension] (conventional barcode, and [2 Dimension] (QR code) for the [Barcode Type]. The recognized barcode is saved in the [Write Address]. Configure the barcode length with the bit unit configured in [Data Length].   [Figure. Barcode (Conventional)]

		 [Figure. 2 Dimension (QR code)]

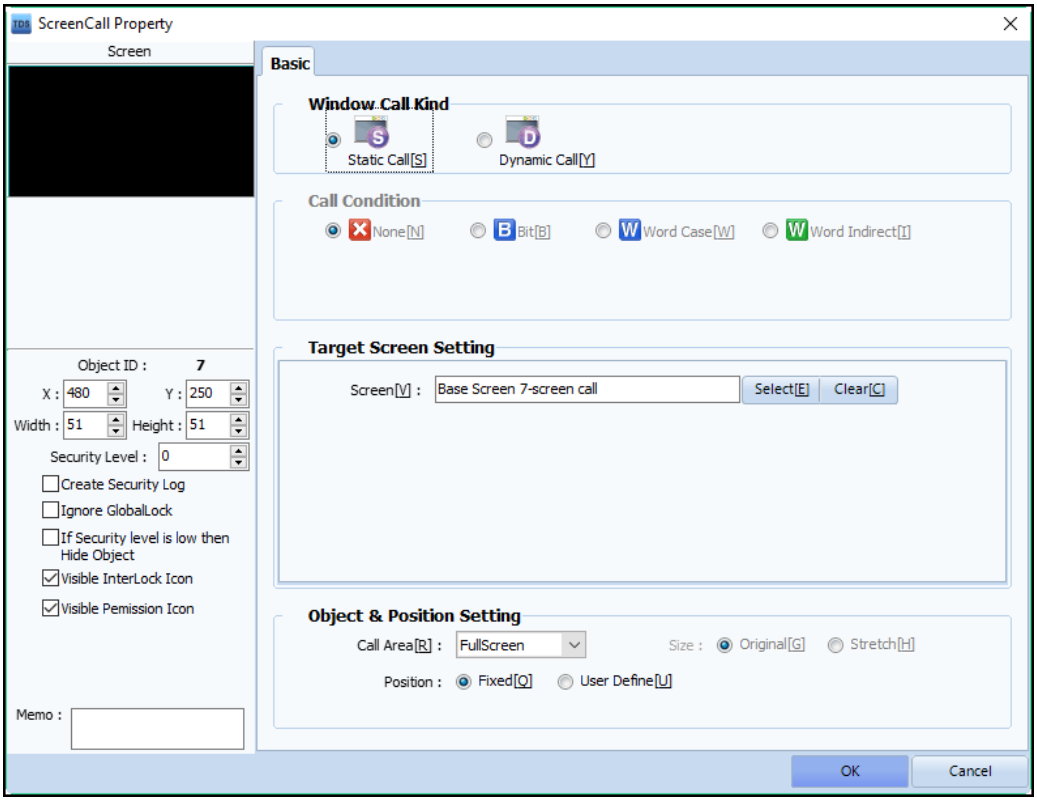
13.3.7 **Action - None**

Configure no action to be executed upon a true condition.

[Figure. Action - None]

CHAPTER 14 - ScreenCall Object

Load multiple [Base Screen] / [Frame Screen] to a single base screen for monitoring.
Touch the screen loaded by a ScreenCall Object to open the selected screen.

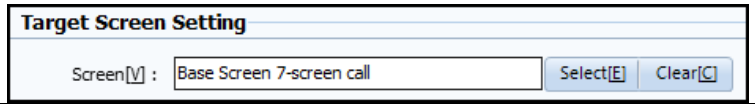


[Figure. ScreenCall Object]

14.1 Basic Tab

14.1.1 Window Call Kind

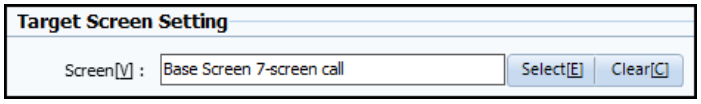
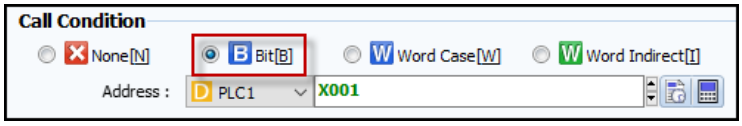
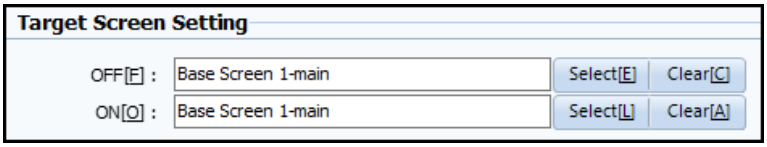
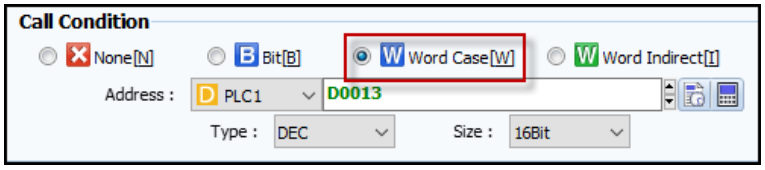
[Static Call] and [Dynamic Call] are available.

No.	Property	Description
1	Static Call	You can select a single [Base Screen] or [Frame Screen] from [Target Screen Setting]. The selected screen cannot be changed, and is loaded at its original size. Configure the [Call Condition] and [Position]. 
2	Dynamic Call	Configure a [Call Condition] to vary the screen according to the condition. A Dynamic ScreenCall object can be stretched to expand to the entire screen.

14.1.2 Call Condition / Target Screen Setting.

[Call Condition] is applicable only to a [Dynamic Call] objet.
Four types of [Call Conditions], [None] / [Bit] / [Word Case] / [Word Indirect] are available.

[Figure. Call Condition]

No.	Property	Description
1	None [N]	No call condition is configured: the functions are basically identical with a [Static Call], where the screen selected from [Target Screen Setting] cannot be changed, and the subject screen is loaded at all times.  The only difference with a [Static Call] is that [Stretch] can be selected for the screen [Size] to expand the screen to the entirety of the display.
2	Bit [B]	Load the selected screen according to the [On] / [Off] status of a bit address.  With the above configuration, select each screen that will be loaded when [Y001] reads each [OFF] and [ON].  Click [Select] to select each corresponding screen. Click [Clear] to remove the selected screen. With a [Bit] condition, you can alter between two screens.
3	Word Case[W]	Configure numbers of data ranges of a word address and load screens corresponding to each range.  With the above configuration, each corresponding screen according to the data range of [D0013] is loaded. Configure multiple ranges to alter among numbers of different screens.

<table>
<tr>
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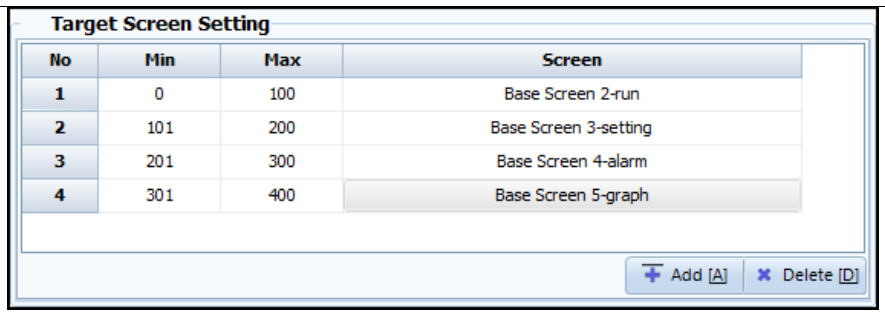
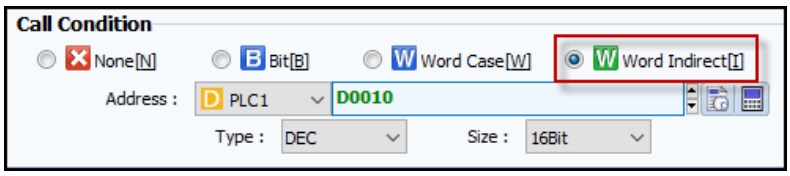
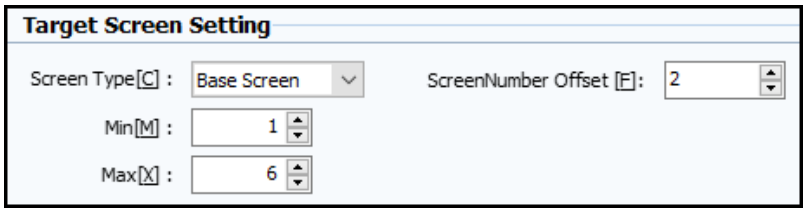
<td></td>
<td>


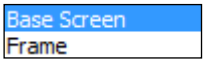
Click the [Add] button to add the numbers of required screens.
Configure [Min] / [Max] / [Screen] for each item.
Double click the [Screen] column and click the ... button on the right and select the screen of your interest from the [Screen Select] window.
</td>
</tr>
<tr>
<td>4</td>
<td>Word Indirect[I]</td>
<td>
Load a screen of which ID is identical to the data of a word address.



With the above configuration, the data read from [D0010] is the ID of the screen to load.



Select [Screen Type] between [Base Screen] and [Frame].

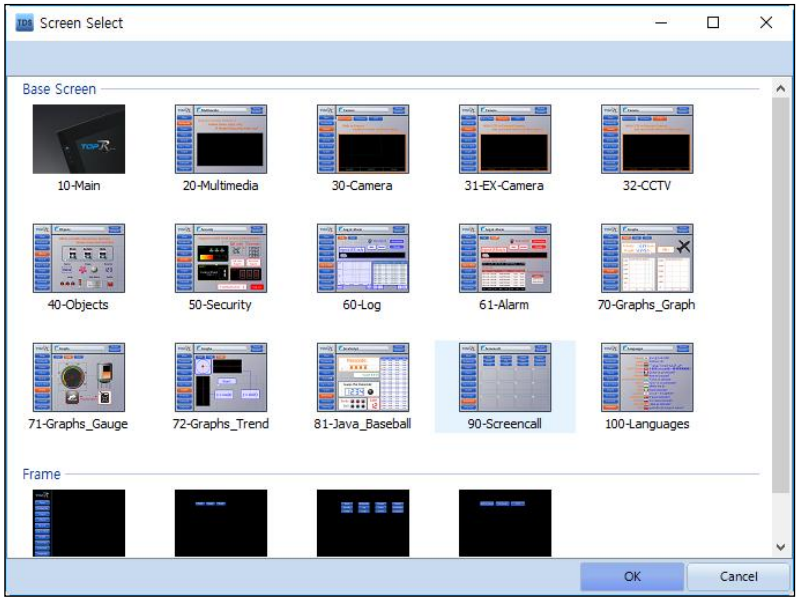


Configure the [Min] / [Max] range of applicable screens.
Any screen outside of the configured screen range will not be loaded.

If a [ScreenNumber Offset] of [1] or larger is configured, the ID of the screen to be loaded will be the sum of the data read from [D0010] and the [ScreenNumber Offset].
In other words, if [D0010] reads [3], and the [ScreenNumber Offset] is [2], base screen No.5 is loaded.

Numbers of different screens can be loaded upon the data of the selected address.
</td>
</tr>
</table>

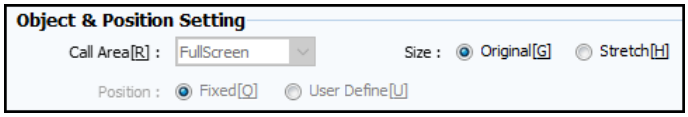
To select each screen to be loaded from [Target Screen Setting], click [Select] to open the below [Screen Select] window. Select the screen of your interest and click [OK].



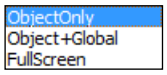
[Figure. Screen Select]

14.1.3 Object & Position Setting

Configure the [Call Area] / [Size] / [Position] of the ScreenCall object.
For a [Static Call] configure the [Call Area] and [Position]; for a [Dynamic Call], [Size] setting is additionally available.

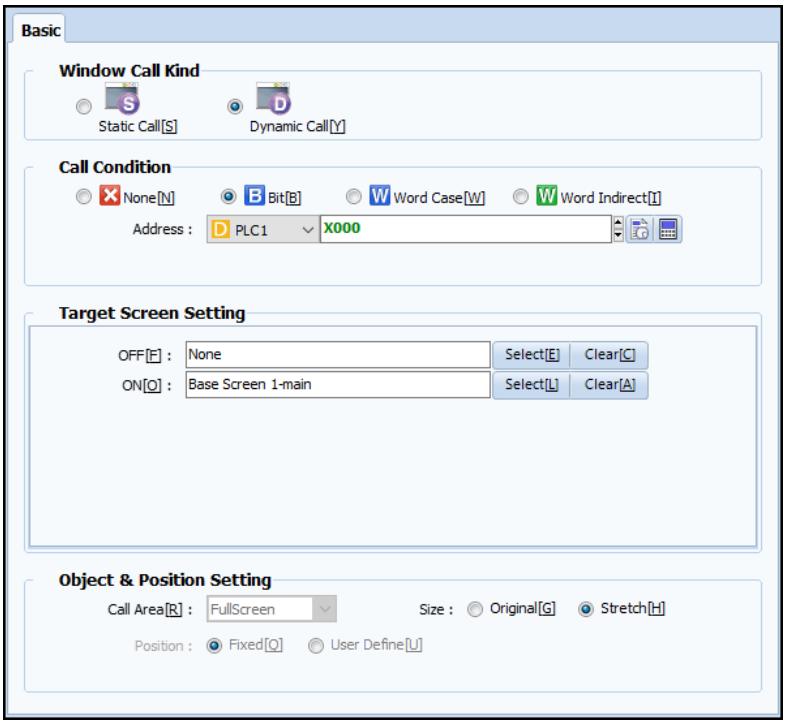


[Figure. Object & Position Setting]

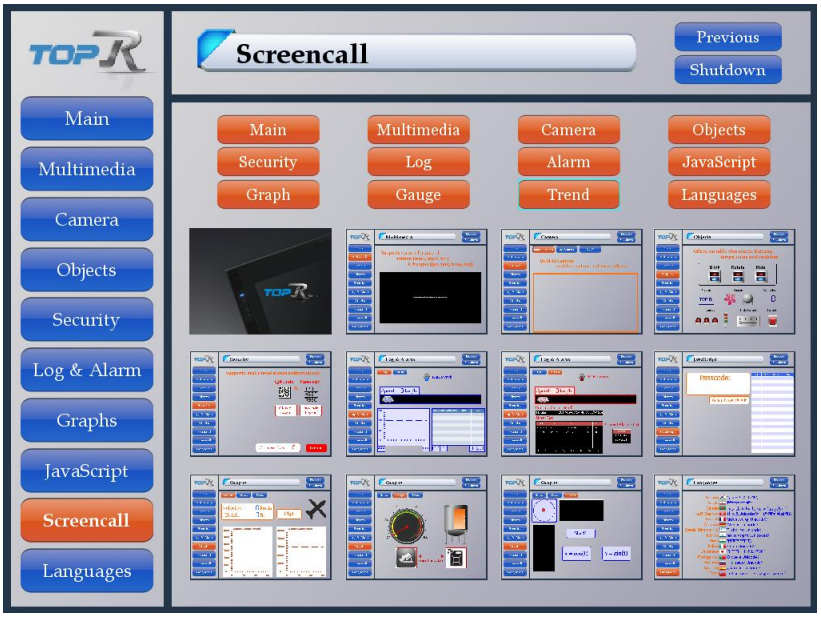
No.	Object & Position Setting	Description
1	Call Area	Select the area to which the screen will be called.  Select [ObjectOnly] to call only objects from the target screen. Select [Object+Global] to call both objects and global area (Master Screen / Frame Screen) from the target screen. Select [FullScreen] to call the entire target screen.
2	Position	Configure the position of the target screen. Select [Fixed] to call the target screen at its original position. In other words, the objects and global area of the target screen are called at each original position. Positions of each component cannot be changed. Select [User Define] to change the position of the loaded target screen by changing the location of the ScreenCall Object itself.
3	Size	Select the target screen [Size] between [Original] and [Stretch]. Select [Original] to load the target screen at its original size. Select [Stretch] to load the target screen to be expanded to an adjustable size.

14.2 How to use a ScreenCall Object

By selecting the [Size] as [Stretch] you can monitor multiple screens from a single base screen. Touch each screen to navigate to the corresponding screen.



[Figure. ScreenCall]

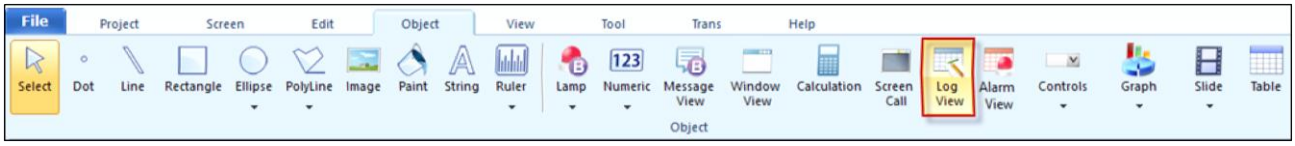


[Figure. Screen Call]

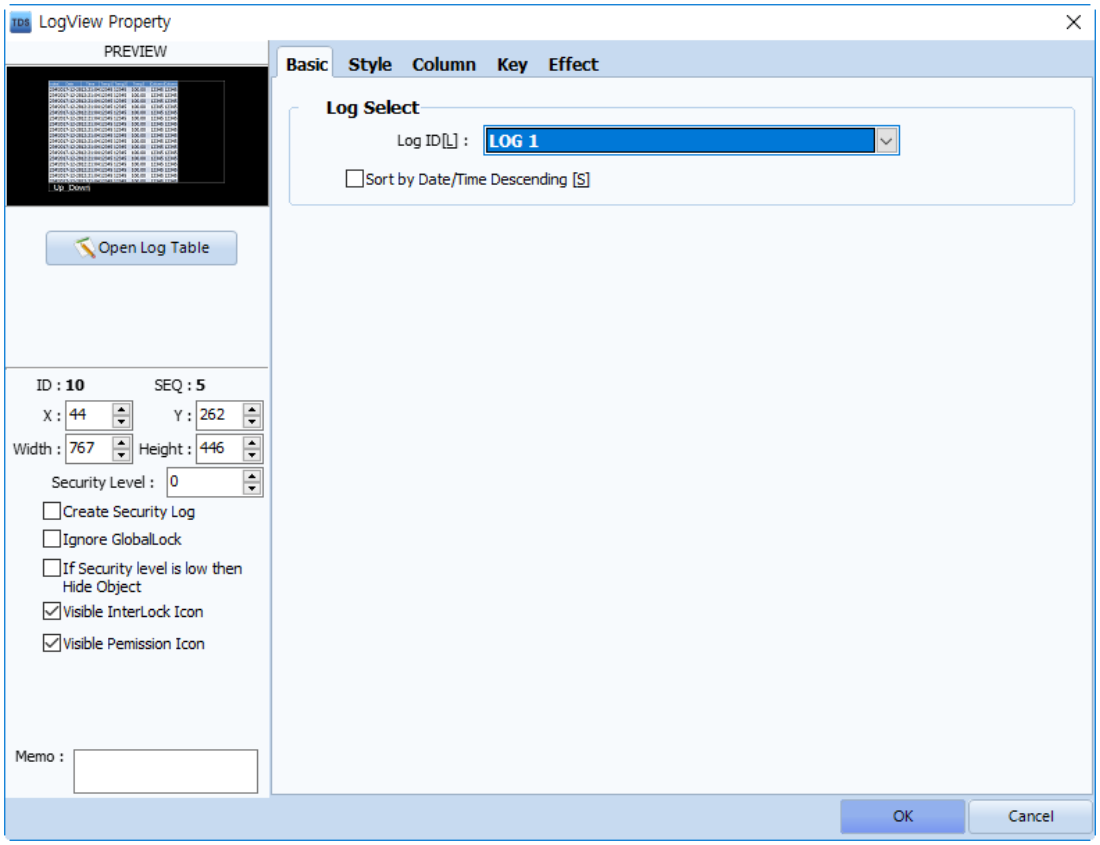
CHAPTER 15 - Log View Object

A [Log View] object displays the log data recorded according to the configurations from [Project] - [Log].
(Refer to Chapter 4.2 [Log] for more details.)

Go to [Object] - [LogView].

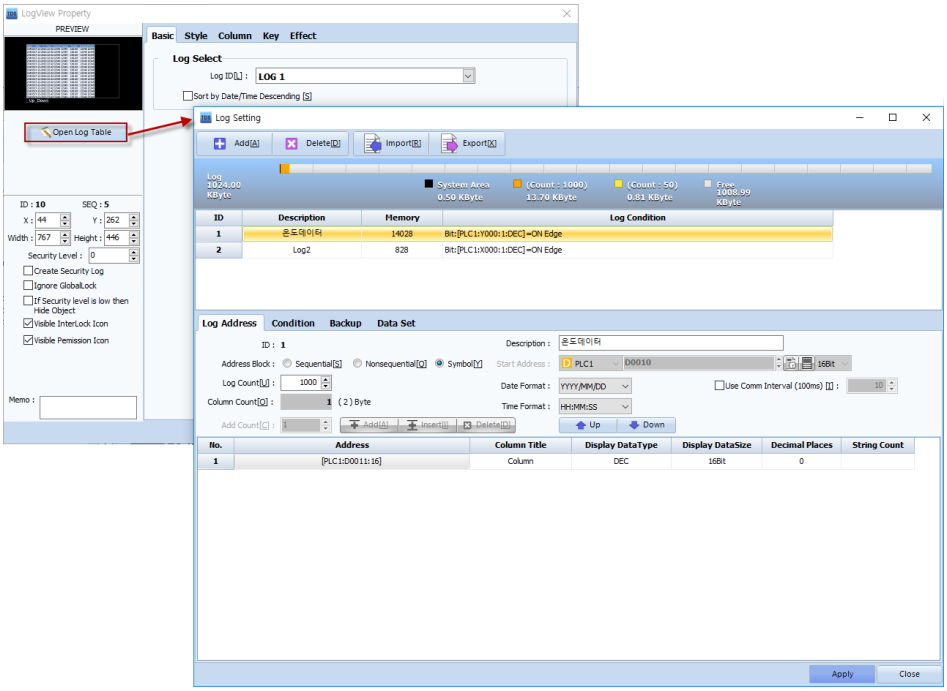


[Figure. Log View Object]



[Figure. Log View]

Go to [Project] - [Log] or [Project Manager] - [Project] - [Log] to access [Log Setting].
You can also access [Log Setting] with a click to [Open Log Table] provided on the left side of the [LogView Property] window.



[Figure. Access Log Setting from Property Window]

15.1 Basic Tab

Select the [Log ID] that is configured from [Project] - [Log].

Enable [Sort by Date/Time Descending] to show the most recent log data on the top followed with log data in a descending order. Disable [Sort by Date/Time Descending] to show the oldest log data on the top followed with log data in an ascending order.

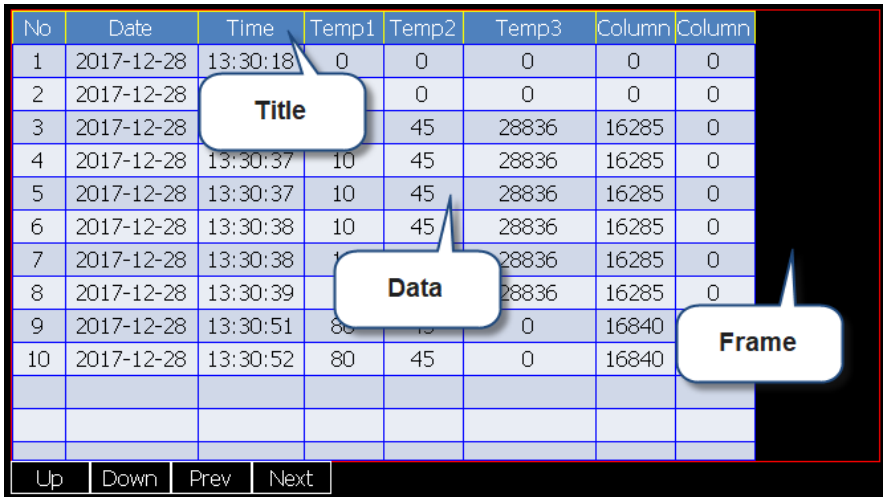
15.2 Style Tab

Configure the display setting (color, font, and other settings) of the log table.

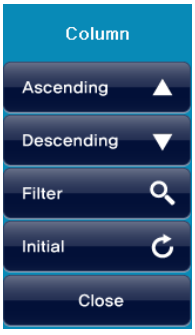
[Figure. Style Tab]

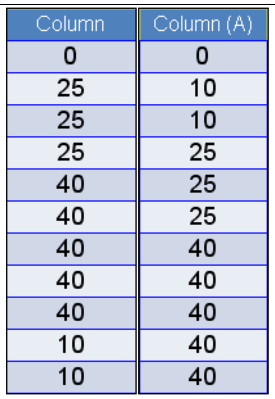
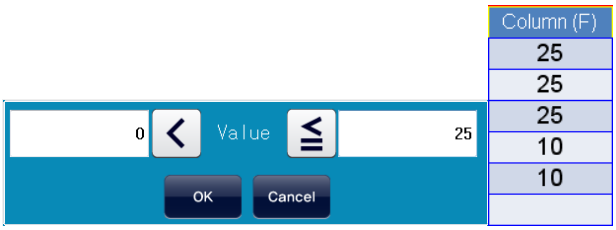
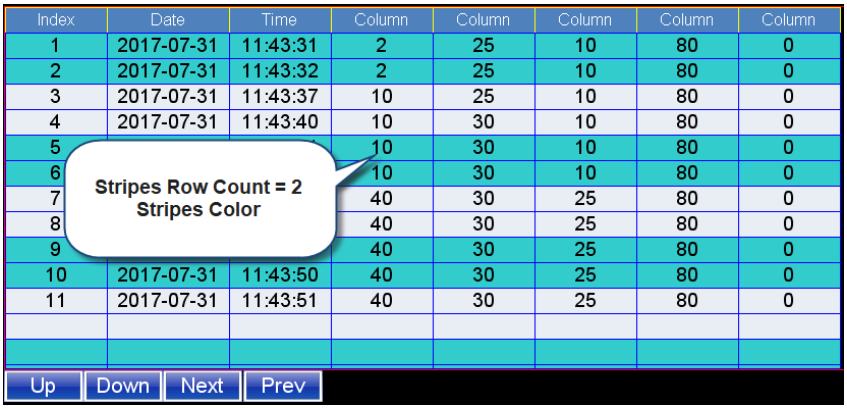
Frame refers to the outlines of the table.

A log table consists a Header (Title Bar) and Data Field.



[Figure. Log View]

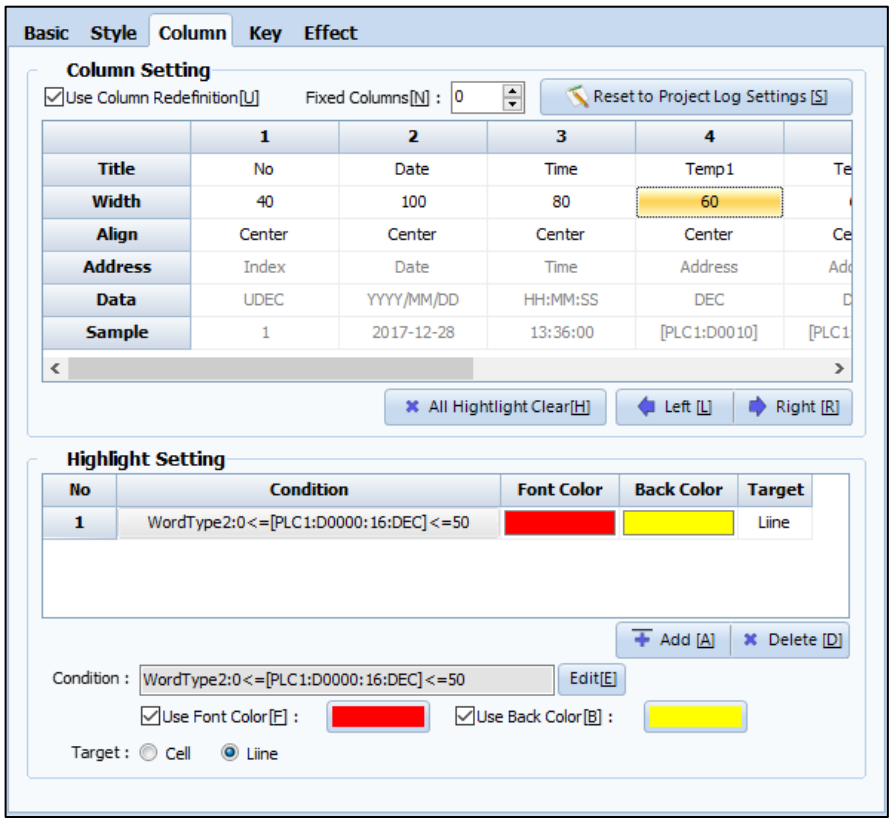
No.	Style	Description
1	Frame	Frame refers to the outline of the table. Configure the background color and line style of the frame. Configure [Line Style] / [Outer Line Color] / [Inner Line Color] / [Line Width]. If the table has the same size with the frame, the frame will not be shown, but if the frame is larger than the table, as shown above, the background will be shown on the right side of the table. [Back Color] is the background color of the frame.
2	Header	[Header] refers to the title bar. Enable [Hide Header] to hide the header. Configure [Row Height] / [Back Color] / [Line Color] / [Line Width] / [Horizontal Line Style] / [Vertical Line Style] for the table conforming the header, and [Font] for the texts of the header. Enable [Sort & Filter] to allow access to the [Column Sort & Filter] menu upon a touch to the header.  [Figure. Sort & Filter] To sort the data of the selected column, select [Ascending] for an ascending order and [Descending] for a descending order. Touch a column of your interest and touch [Ascending] from the [Sort & Filter] menu, the data table will be sorted in the ascending order of the selected column. Furthermore, the reference column of sort or filter will be highlighted with a suffix of: (A) for ascending, (D) for descending, and (F) for filter.

		 [Figure. Sort - Ascending order] Touch [Filter] to show specific data corresponding to the filter. The below range selection window will appear upon a touch to [Filter]. Configure the range and touch [OK] to filter the data of the corresponding column.  [Figure. Filter] Touch [Initial] to restore the Log View to its original state, and touch [Close] to close the [Sort & Filter] menu.
3	Data Field	Data field refers to the area in which data is shown in the table. Configure [Row Height] (in pixels) / [Back Color] / [Line Color] / [Line Width] / [Horizontal Line Style] / [Vertical Line Style] for the table conforming the data field, and [Font] for the texts of the data field. To enhance the visibility of each row, apply colored stripes to rows with [Stripes Row Count] and [Stripe Color]. With a configuration of [Stripe Row Count] of [2] and [Stripe Color] of a specific color, the data field will show stripes with two rows of [Back Color] and two rows of [Stripe Color] repeated.  [Figure. Stripe]

15.3 Column Tab

Configure the columns to be shown on the Log View Object.
The Log Data Columns consist of [Index] / [Date] / [Time] / [Data].
The number of data corresponds to the number of [Column Count] configured at [Log Setting].

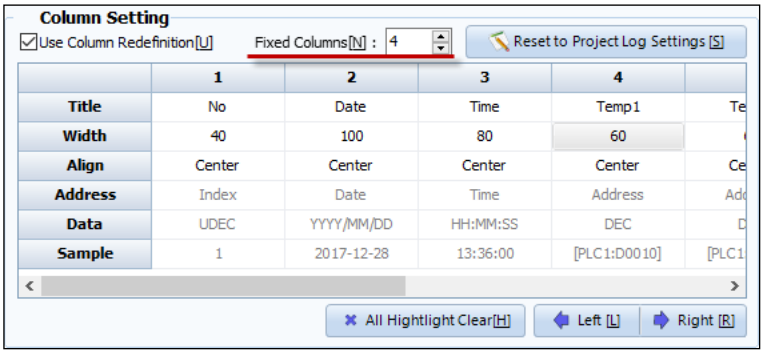
Configure the [Title] / [Width] / [Align] of each column.



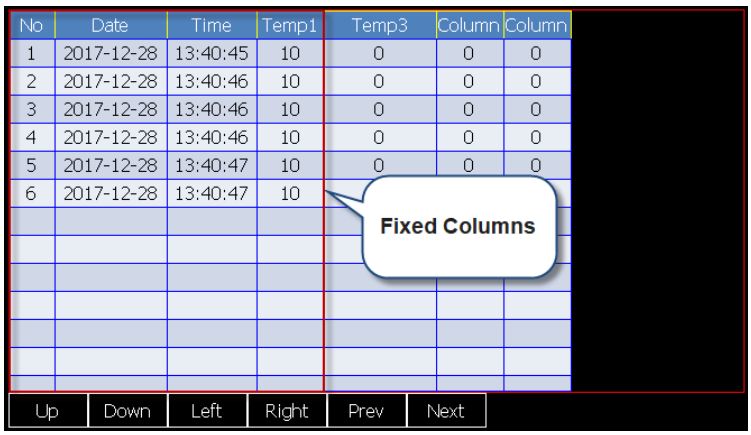
[Figure. Column Tab]

15.3.1 Column Setting

To edit the [Title] / [Width] / [Align] of each column, enable [Use Column Redefinition].
The [Fixed Columns] refer to the number of columns that stay put when the Log View object is scrolled to the left or right.



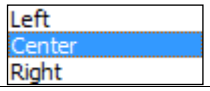
[Figure. Fixed Columns]



[Figure. 4 Fixed Columns]

Click [Reset to Project Log Settings] to restore the configuration back to [Log Setting] configured from [Project] - [Log].

Navigate through the table with the [Left] and [Right] buttons provided beneath the Column Table.

No.	Column Setting	Description
1	Title	Type in texts to apply a different title to the column.
2	Width	Configure the width of each column in pixels.
3	Align	Select how to align the data in each column among [Left] / [Center] / [Right]. 
4	Address	Determine what data should be shown in each column. [Index] refers to the sequential number assigned to each column. [Date] refers to the date, [Time] refers to the time, [Address] refers to the address data (log data) of each corresponding log.
5	Data Type	The data type of each column configured from [Project] - [Log] - [Log Address] is shown.
6	Sample	A Sample of the data or the address of the data is shown.

15.3.2 Highlight Setting

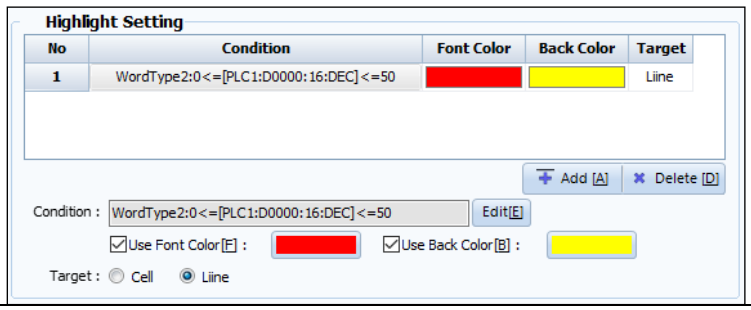
Highlight a specific column when a predetermined condition is ture.

Select the column to be highlighted from the column table and click [Add] from the [Highlight Setting] field.

Configure the [Condition] upon which the column will be highlighted.

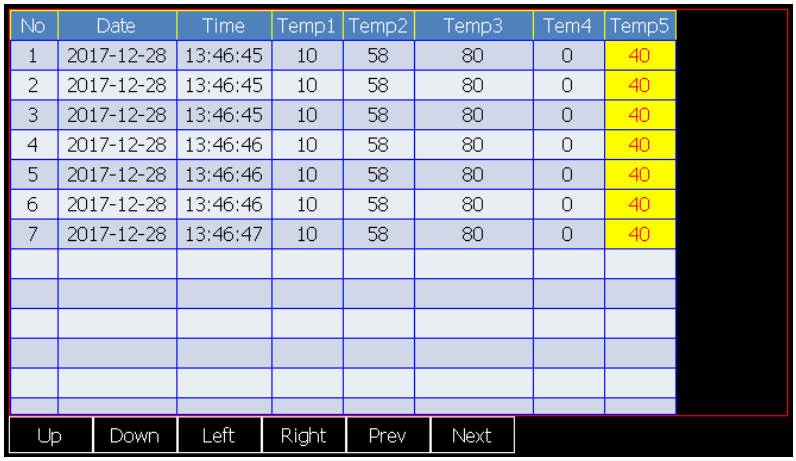
Enable [Use Font Color] to change the font color of the selected column upon a true condition.

Enable [Use Back Color] to change the background color of the selected column a true condition.



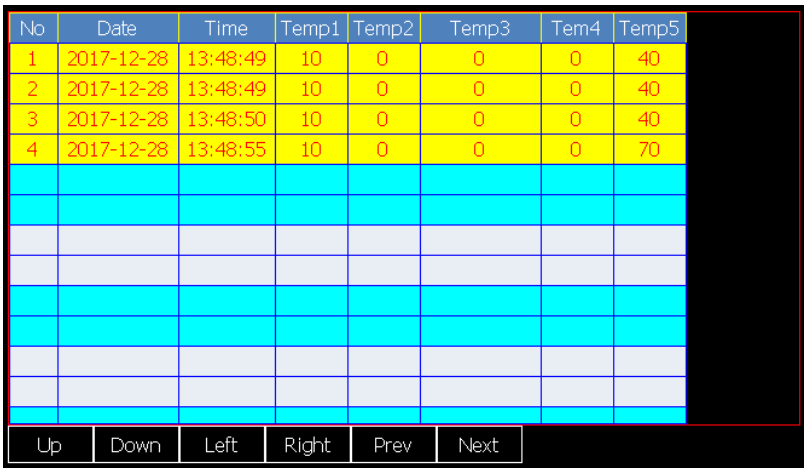
[Figure. Highlight Setting]

Select [Target] as [Cell] to only highlight the selected cell.



[Figure. Highlight Target - Cell]

Select [Target] as [Line] to highlight the entire line of the selected column.



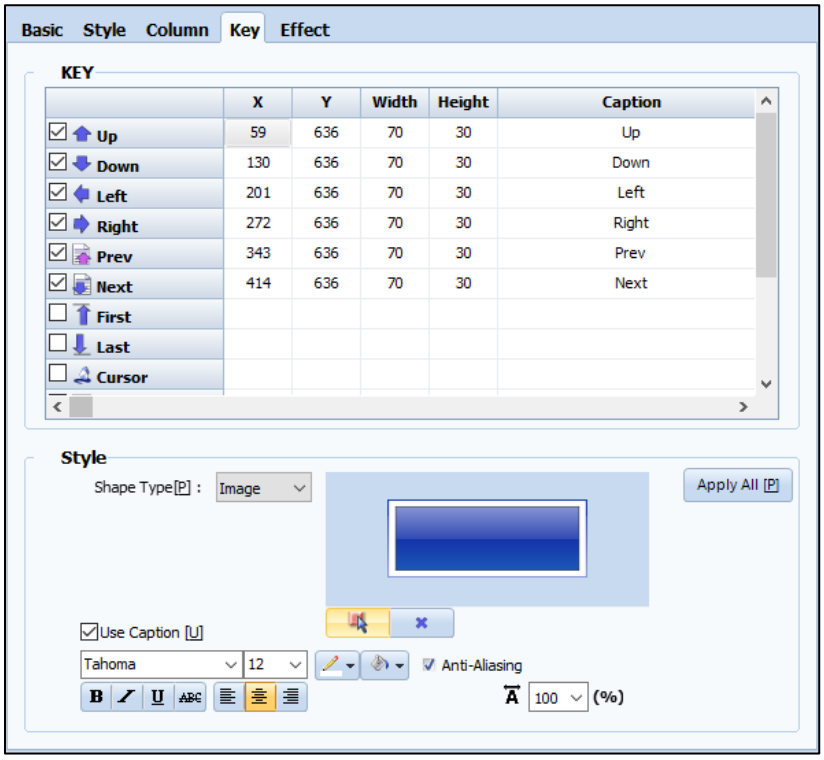
[Figure. Highlight Target - Line]

The highlight will be removed when the highlight condition is not true.

Click [All Highlight Clear] to delete all highlight settings.

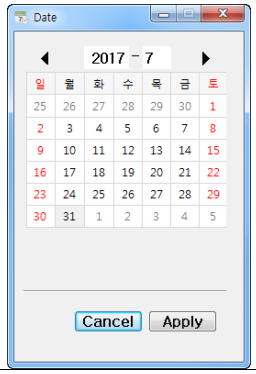
15.4 **Key Tab**

Configure details of a [Key] required for a Log View object.
Select the key of your interest from the [KEY] list.
Configure the [X coordinate] / [Y coordinate] / [Width] / [Height] / [Caption] of each key.
Configure the [Shape] of the key and the [Font] for texts from the [Style] field.
Select [Shape Type] as [Color] to apply a rectangular key.
Select [Shape Type] as [Image] to apply an image as the key.
Click [Apply All] to apply the same [Style] configuration to all selected keys.



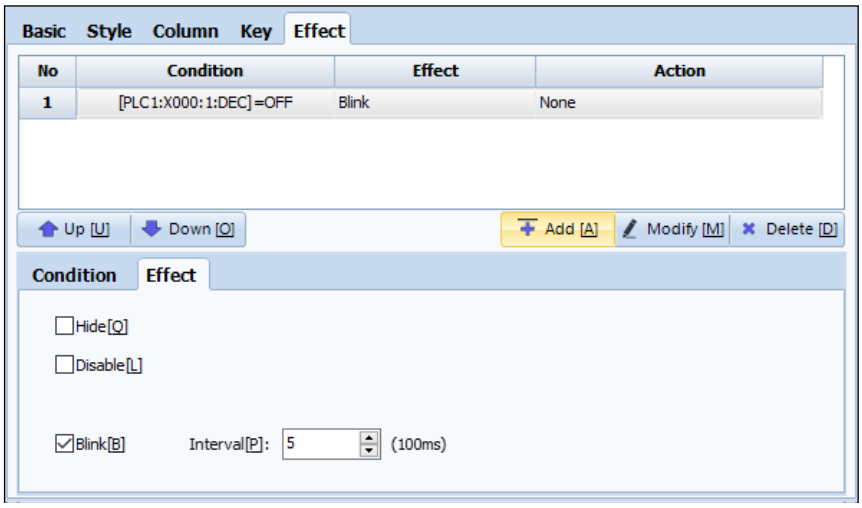
[Figure. Key Tab]

No.	Key	Description
1	Up	Scroll the current view one row downward to access the log one row above the current view. If a cursor is selected, the cursor will move one row upward.
2	Down	Scroll the current view one row upward to access the log one row below the current view. If a cursor is selected, the cursor will move one row downward.
3	Left	Scroll the current view one column to the right to access the log one column to the left of the current view.
4	Right	Scroll the current view one column to the left to access the log one column to the right of the current view.
5	Prev	Go to the previous page of the current view.
6	Next	Go to the next page of the current view.
7	First	Go to the first page.
8	Last	Go to the last page.
9	Cursor	Select a line of Log Data.
10	Date Search	Search or a specific log data. Select the date of your interest and click [Apply] to access the log

		data of the corresponding date. 
11	View Clear	Hide all log data. The log data is remained on the TOP memory.
12	Today	Show the log data from today.
13	History	Show all log data.
14	File	This unction is available only when [SD Card] is selected as the [Backup Media] from [Project] - [Log]. The log file saved on the [SD Card] is shown. Touch [File] button to open the [File Browser] and select a log file from the [SD Card].

15.5 **Effect Tab**

Configure effects of [Hide] / [Disable] / [Reverse] / [Blink] for the Log View Object.



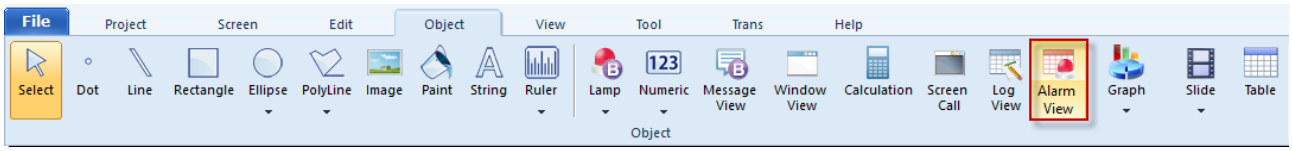
[Figure. Effect Tab]

No.	Effect	Description
1	Hide	Hide the Log View.
2	Disable	Disable the Log View Object.
3	Reverse	Reverse the color of the Log View.
4	Blink	Blink the Log View in a specific [Interval].

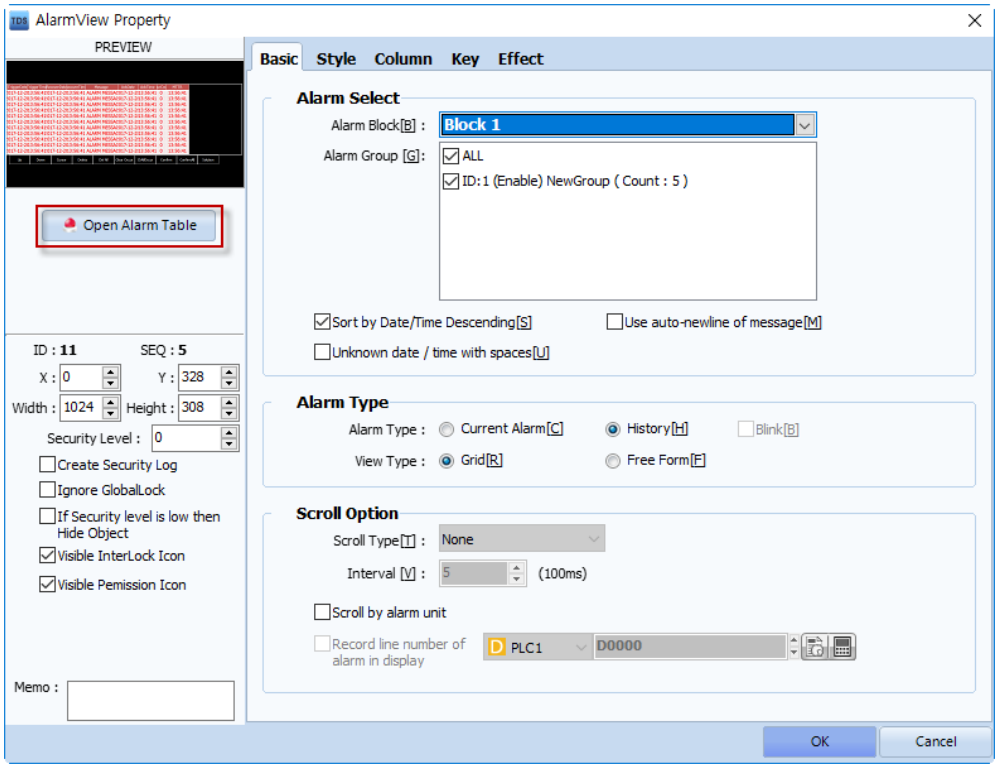
CHAPTER 16 - Alarm View Object

An [Alarm View] object displays the alarm data recorded according to the configurations from [Project] - [Alarm]. (Refer to Chapter 4.1 [Alarm] for more details.)

Go to [Object] - [Alarm View].

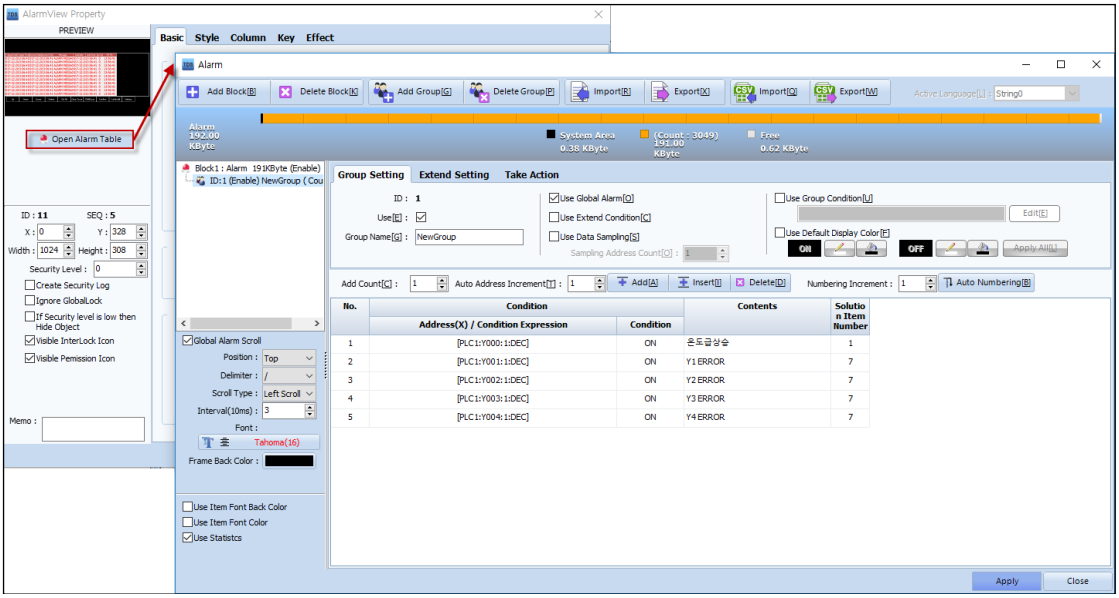


[Figure. Alarm View Object]



[Figure. Alarm View Object]

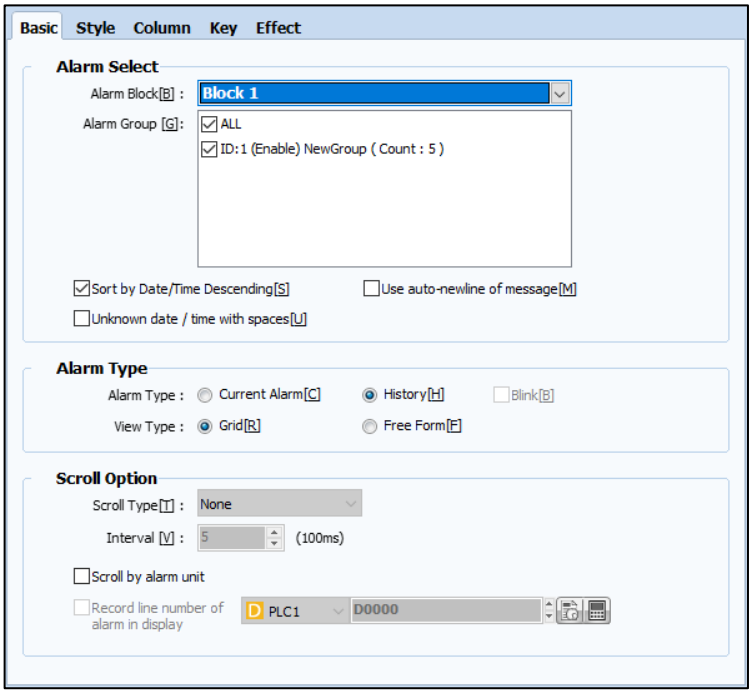
Go to [Project] - [Alarm] or [Project Manager] - [Project] - [Alarm] to access the [Alarm] window.
You can also access [Alarm] window from the [Open Alarm Table] provided on the left side of the [Alarm Property] window.



[Figure. Access Alarm List from Property Window]

16.1 **Basic Tab**

Select an [Alarm Block] and [Alarm Group] configured from [Project] - [Alarm].
Determine in which format the alarms should be shown.



[Figure. Basic Tab]

No.	Basic Tab	Description
1	Alarm Select	Select an [Alarm Block] and [Alarm Group] configured from [Project] - [Alarm]. Once an [Alarm Block] is selected, all [Alarm Groups] assigned to the [Alarm Block] are listed up. Check each alarm group to be shown. Alarm data saved upon a triggered and/or recovered alarm within the selected alarm group

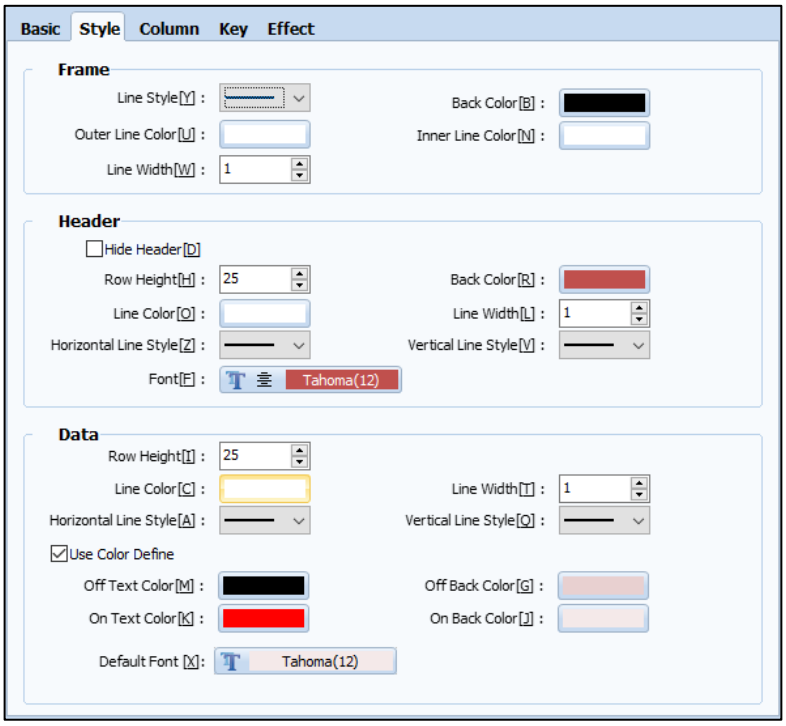
		are shown. On the alarm data table, the oldest alarm data is listed on top, and the most recent alarm data is listed on the bottom in an ascending order. Enable [Sort by Date/Time Descending] to list the most recent alarm data on the top, and the oldest alarm data on the bottom in a descending order. Enable [Use auto-newline of message] to break an [Alarm Content] that exceeds the [Width] of the column and show the [Alarm Content] in two or more lines.
2	Alarm Type	Select [Alarm Type] between [Current Alarm] and [History]. Select [Current Alarm] to show only currently triggered alarms. No recovered alarms will be shown. Enable [Blink] for [Current Alarm] to apply a blinking effect to the entire alarm data to stress the operator. Select [History] to show the trigger / recover history of all alarms. Select [View Type] between [Grid] and [Free Form]. Select [Grid] to display alarm data in a table. Select [Free Form] to display alarm data without a table, or for [Alarm Type] of [Current Alarm], configure [Scroll Option] to make the alarm data flow in a specific direction on the screen.
3	Scroll Option	[Scroll Option] is available for [Alarm Type] of [Current Alarm] and [View Type] of [Free Form]. The alarm data flows in the direction configured by [Scroll Option]. Select [Scroll Type] among [None] / [Left Scroll] / [Right Scroll] / [Up Scroll] / [Down Scroll] / [Bottom-Top Scroll]. Select [None] to apply no scroll. Select [Left Scroll] to flow alarm data from right to left. Select [Right Scroll] to flow alarm data from left to right. Select [Up Scroll] to flow alarm data from bottom to top. Select [Down Scroll] to flow alarm data top to bottom. Configure the scroll [Interval] in 100ms. [Figure. Left Scroll] [Figure. Up Scroll]

16.2 Style Tab

Configure the display style (color, font and other features) of the alarm view.
The features provided in style tab differs from [View Type] of [Grid] and [Free Form].

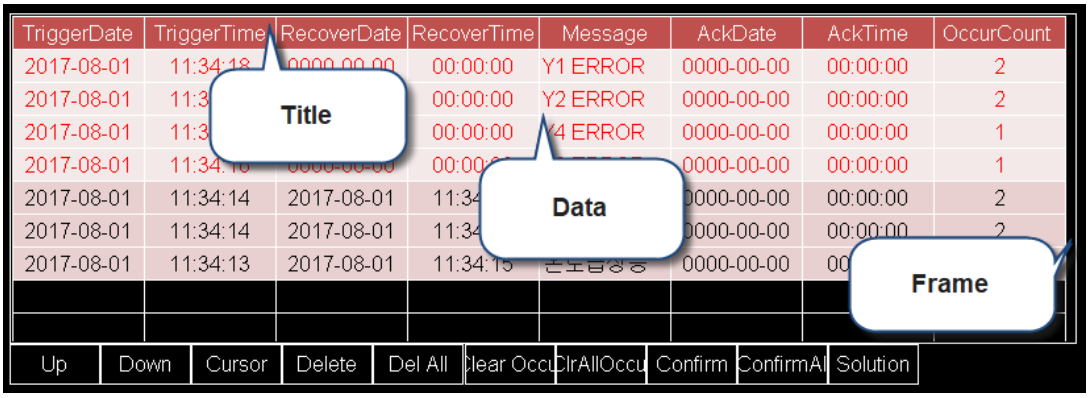
16.2.1 Style Tab - Grid

The following features are provided for a [View Type] of [Grid] configured from the [Basic] Tab.



[Figure. Style Tab - Grid]

Frame refers to the outlines of the table.
A Alarm table consists a Header (Title Bar) and Data Field.

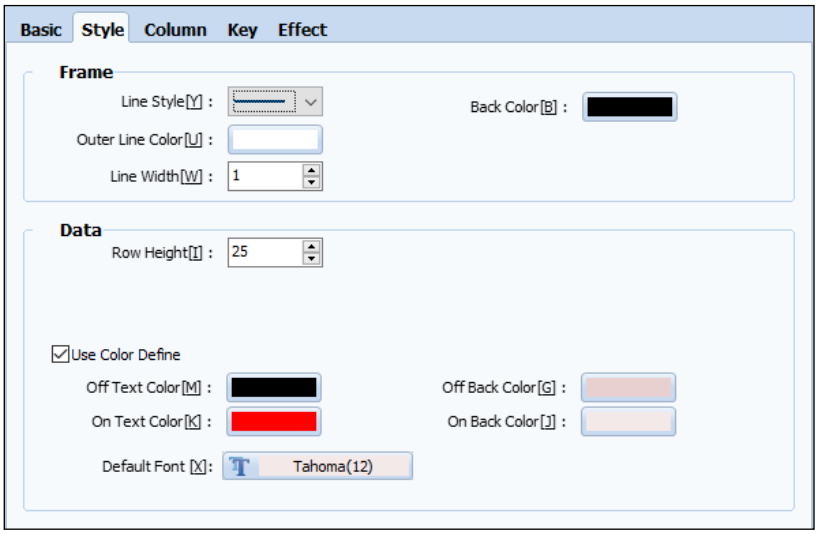


[Figure. Alarm View - Grid]

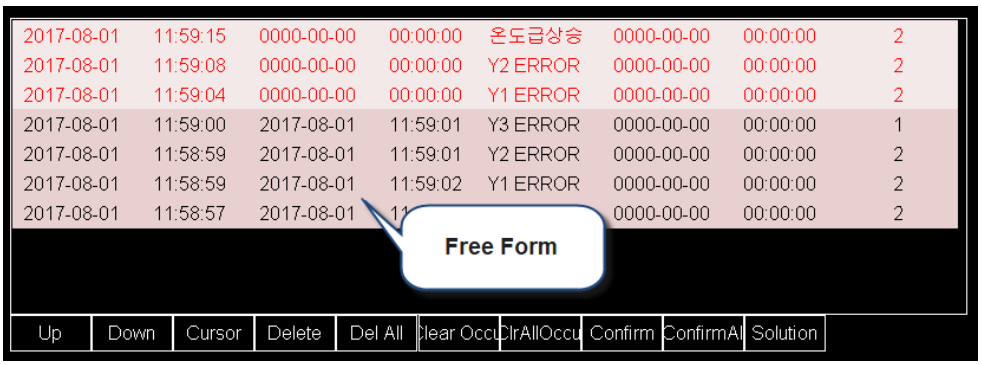
No.	Style	Description
1	Frame	Frame refers to the outline of the table. Configure the background color and line style of the frame. Configure [Line Style] / [Outer Line Color] / [Inner Line Color] / [Line Width]. If the table has the same size with the frame, the frame will not be shown, but if the frame is larger than the table, as shown above, the background will be shown on the right side of the table. [Back Color] is the background color of the frame.
2	Header	[Header] refers to the title bar. Enable [Hide Header] to hide the header. Configure [Row Height] / [Back Color] / [Line Color] / [Line Width] / [Horizontal Line Style] / [Vertical Line Style] for the table conforming the header, and [Font] for the texts of the header. [Sort] function is provided for a [Date/Time] header. Touch the title of the column to sort the data field. The data field is sorted in an ascending / descending order upon each touch.
3	Data Field	Data field refers to the area in which data is shown in the table. Configure [Row Height] (in pixels) / [Back Color] / [Line Color] / [Line Width] / [Horizontal Line Style] / [Vertical Line Style] for the table conforming the data field, and [Font] for the texts of the data field. Enable [Use Color Define] to apply different colors to a triggered and recovered alarm for better comprehension. From the above sample, the four alarms in red texts are currently triggered, while the three alarms in black texts are recovered alarms. Configure [Off Text Color] and [Off Back Color] applicable to recovered alarms. Configure [On Text Color] and [On Back Color] applicable to triggered alarms.

16.2.2 **Style Tab - Free Form**

The following features are provided for [View Type] of [Free From] configured from the [Basic] tab.



[Figure. Style Tab - Free Form]

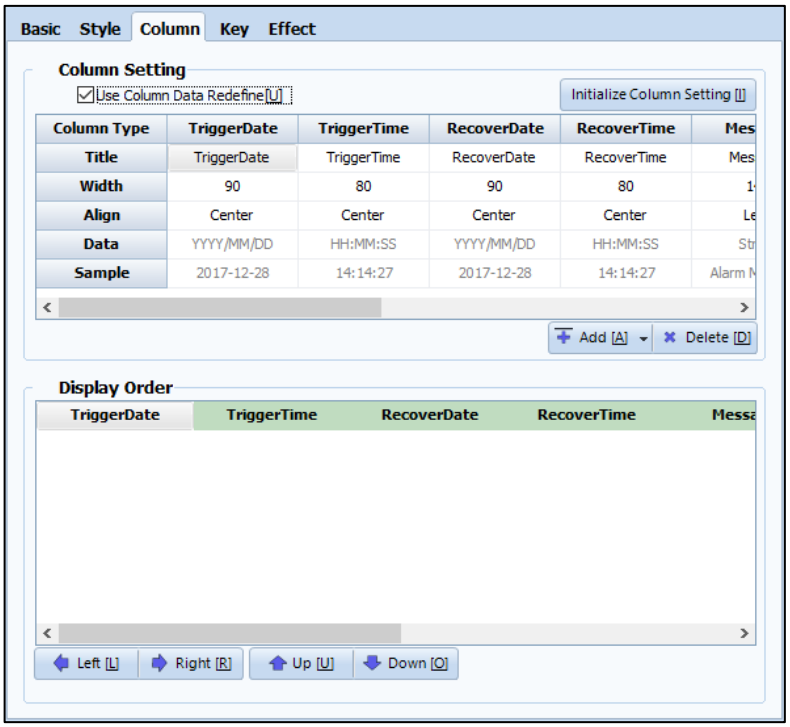


[Figure. Alarm View - Free Form]

No.	Style	Description
1	Frame	Frame refers to the outline of the table. Configure the background color and line style of the frame. Configure [Line Style] / [Outer Line Color] / [Inner Line Color] / [Line Width]. [Back Color] is the background color of the frame.
2	Data Field	Data field refers to the area in which data is shown in the table. Configure the [Row Height] (in pixels) and [Font] for the alarm data. Enable [Use Color Define] to apply different colors to a triggered and recovered alarm for better comprehension. From the above sample, the four alarms in red texts are currently triggered, while the three alarms in black texts are recovered alarms. Configure [Off Text Color] and [Off Back Color] applicable to recovered alarms. Configure [On Text Color] and [On Back Color] applicable to triggered alarms.

16.3 **Column Tab**

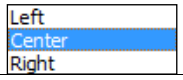
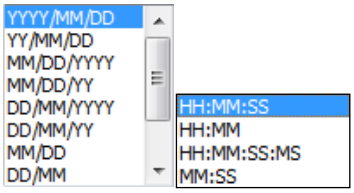
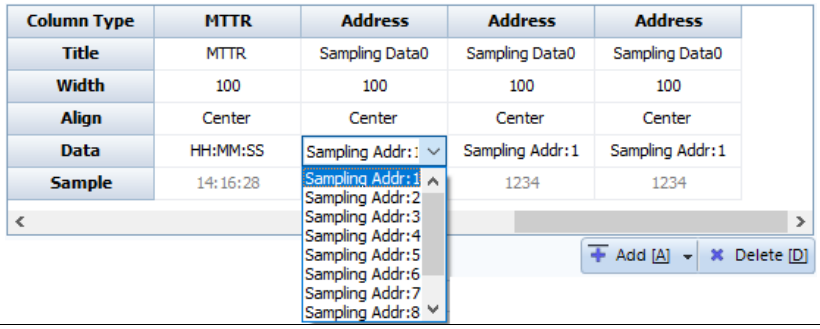
Configure the columns to be shown and the order of columns.



[Figure. Column Tab]

16.3.1 Column Setting

If [Use Define Column] is enabled for [Column Format] of the selected [Alarm Block], the configuration made at from [Project] - [Alarm] is shown in [Column Setting].
For [Alarm Type] of [Current Alarm], applicable columns are [TriggerDate] / [TriggerTime] / [Message] / [Address]; and for [Alarm Type] of [History], applicable columns are [TriggerDate] / [TriggerTime] / [Message] / [AckDate] / [AckTime] / [RecoverDate] / [RecoverTime] / [Address] / [OccurCount] / [MTTR].
Enable [Use Column Data Redefine] to edit the configuration and [Title] / [Width] / [Align] / [Data] of each column.

No.	Column Setting	Description
1	Title	Type in texts to apply a different title to the column.
2	Width	Configure the width of each column in pixels.
3	Align	Select how to align the data in each column among [Left] / [Center] / [Right]. 
4	Data	The data type of each column is shown. For columns of Date and Time select each format in which the date and time will be expressed.  For a sampling address column, double click the column and configure the sampling address. 
5	Sample	The format of each column is shown in samples.

Click [Add] to add columns.
Select a column and click [Delete] to remove the selected column.
Click [Initialize Column Setting] to restore the configuration back to [Column Format] configured from [Project] - [Alarm].

16.3.2 Display Order

Define the order in which the columns are displayed.

Navigate through the table with the [Left] and [Right] buttons provided beneath the Column Table.

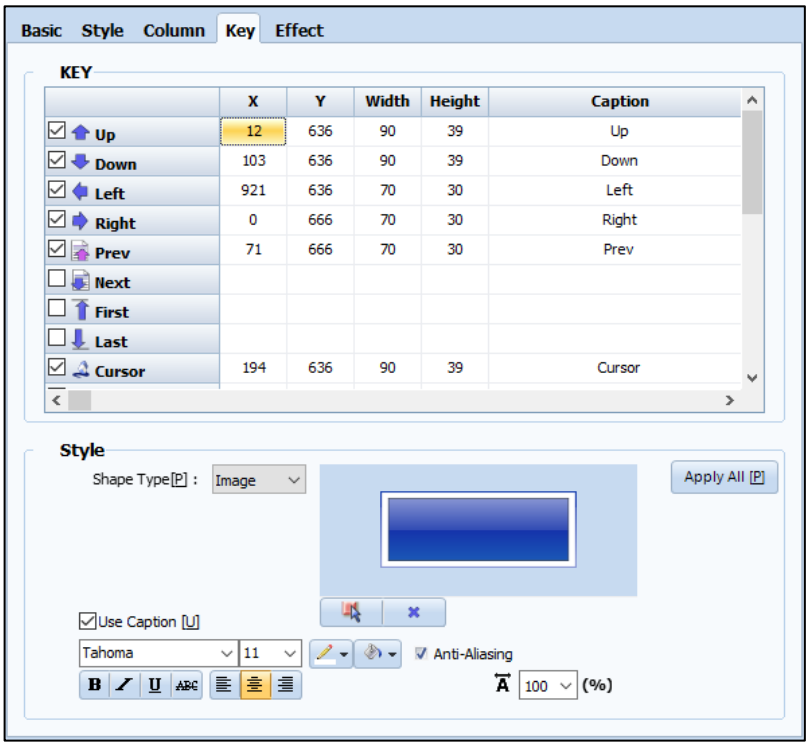
No.	Property	Description
1	Left[L]	Move the selected column one spot to the left.
2	Right[R]	Move the selected column one spot to the right.

16.4 Key Tab

Configure details of a [Key] required for a Alarm View object.

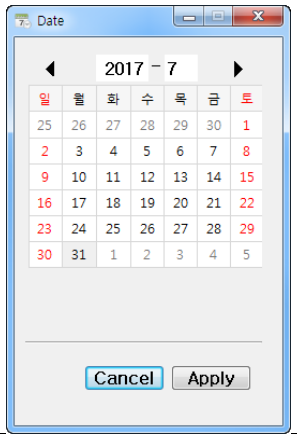
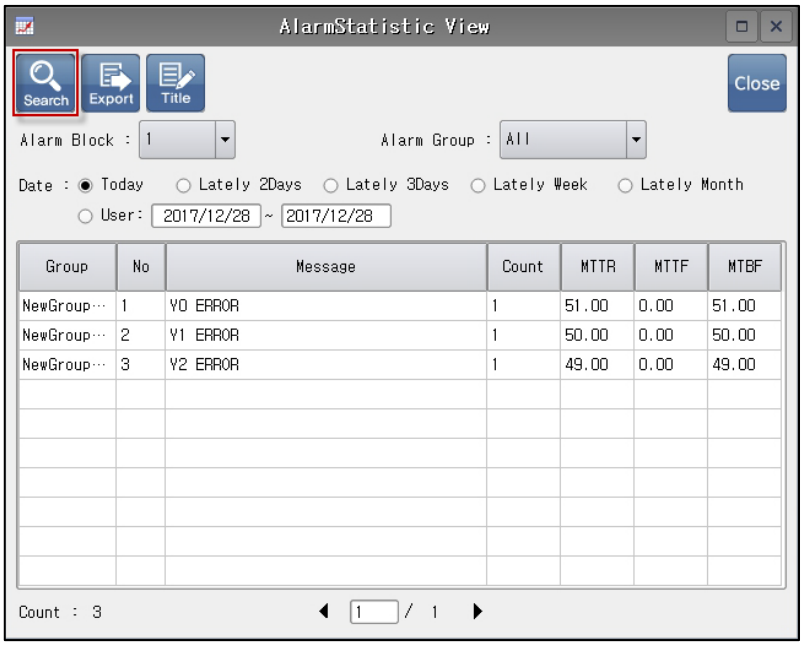
Select the key of your interest from the [KEY] list.

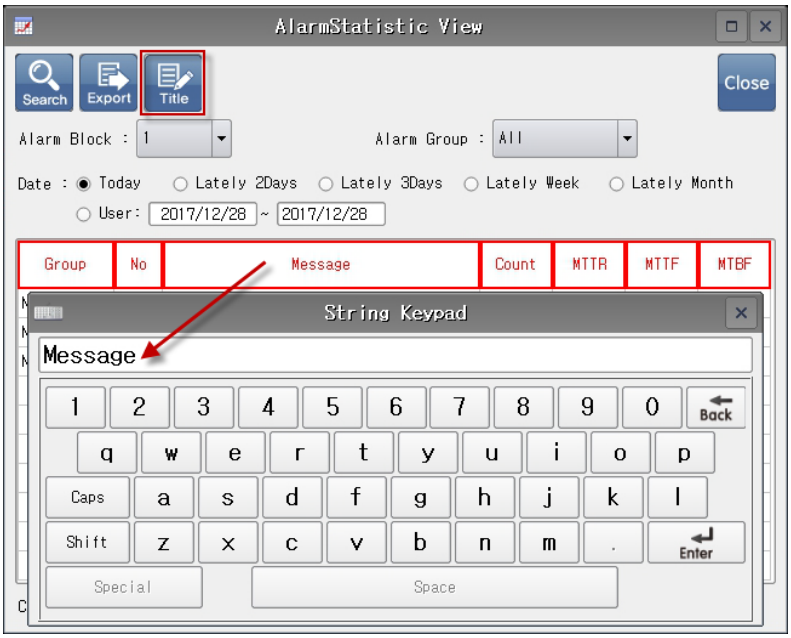
Configure the [X coordinate] / [Y coordinate] / [Width] / [Height] / [Caption] of each key.



[Figure. Key Tab]

No.	Key	Description
1	Up	Scroll the current view one row downward to access the alarm one row above the current view.If a cursor is selected, the cursor will move one row upward.
2	Down	Scroll the current view one row upward to access the alarm one row below the current view. If a cursor is selected, the cursor will move one row downward.
3	Left	Scroll the current view one column to the right to access the alarm one column to the left of the current view.
4	Right	Scroll the current view one column to the left to access the log one column to the right of the current view.
5	Prev	Go to the previous page of the current view.
6	Next	Go to the next page of the current view.

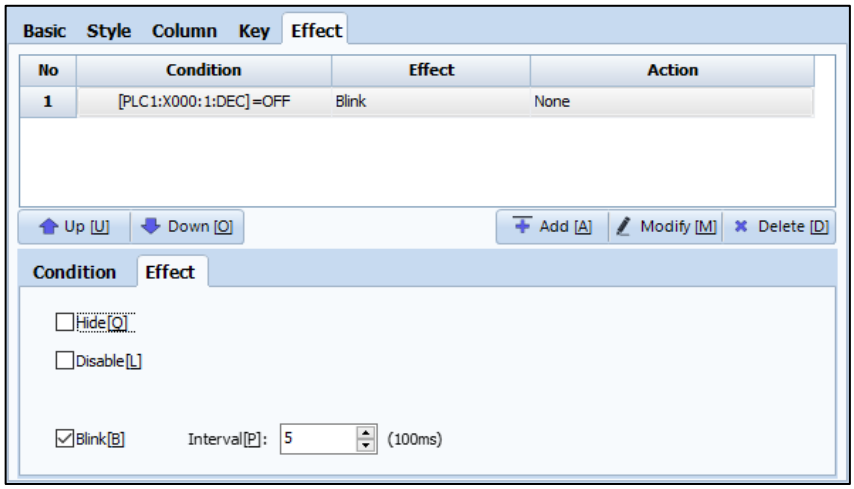
7	First	Go to the first page.
8	Last	Go to the last page.
9	Cursor	Select a line of the Alarm Data.
10	Delete	Delete a selected Alarm Data.
11	Del All	Delete all Alarm Data.
12	Clear Occur	Reset the occurrence count of the selected alarm to [0].
13	ClearAll Occur	Reset the occurrence count of all alarms to [0].
14	Confirm	Record the acknowledge date / time for the selected alarm.
15	Confirm All	Record the acknowledge date / time for all alarms.
16	Solution	Select an alarm data to which a solution is assigned with the [Cursor] and touch [Solution] to execute the assigned [Solution]. You can execute a solution with a touch to the alarm data itself.
17	Date Search	Search for a specific alarm data. Select the date of your interest and click [Apply] to access the alarm data of the corresponding date. 
18	AlarmStatistic View	Check the alarm data searched by period, or save the alarm data to a file.  Select the [Alarm Block] and [Alarm Group] of your interest. Select the period of your interest from [Date]. [AlarmStatistics View] offers periods of [Today] / [Lately 2 Days] / [Lately 3 Days] / [Lately Week] / [Lately Month] / [User]. Configure the period of your interest and click [Search] to browse alarm data

		corresponding to the period. Click [Export] to export the search result to the [TOP internal memory] / [USB Device] / [SD Card] from the File Browser. Click [Title] to change the title The header will change to red upon a click to [Title]. Select the header of your interest, and enter the new title with the pop-up [String Keyboard].  The statistics of [Count] (number of times the alarm had been triggered), [MTTR] (Mean Time To Repair), [MTTF] (Mean Time To Failure) and [MTBF] (Mean Time Between Failures). Refer to Chapter 4.1.5 [Use Statistics] for more details.
	Current Alarm	Only currently triggered alarms are shown, and recovered alarms are not shown. Touch [Current Alarm] again to show all alarm data.
19	Today	Show alarm data from today.
20	History	Show all alarm data.

Configure the [Shape] of the key and the [Font] for texts from the [Style] field.
Select [Shape Type] as [Color] to apply a rectangular key.
Select [Shape Type] as [Image] to apply an image as the key.
Click [Apply All] to apply the same [Style] configuration to all selected keys.

16.5 **Effect Tab**

Configure effects of [Hide] / [Disable] / [Reverse] / [Blink] for the Log View Object.

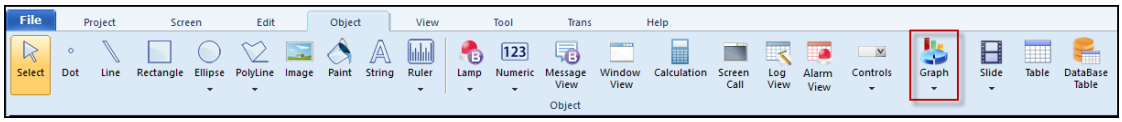


[Figure. Effect Tab]

No.	Effect	Description
1	Hide	Hide the Alarm View Object.
2	Disable	Disable the Alarm View Object.
3	Reverse	Reverse the color of the Alarm View Object.
4	Blink	Blink the Alarm View object in a specific [Interval].

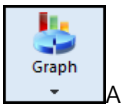
CHAPTER 17 - Graph Object

A Graph Object plots the data of a specific address in forms of an intuitive [Graph] / [Trend] / [Record] / [Gauge]. In other words, the varying data of an address is expressed in an intuitive figure.

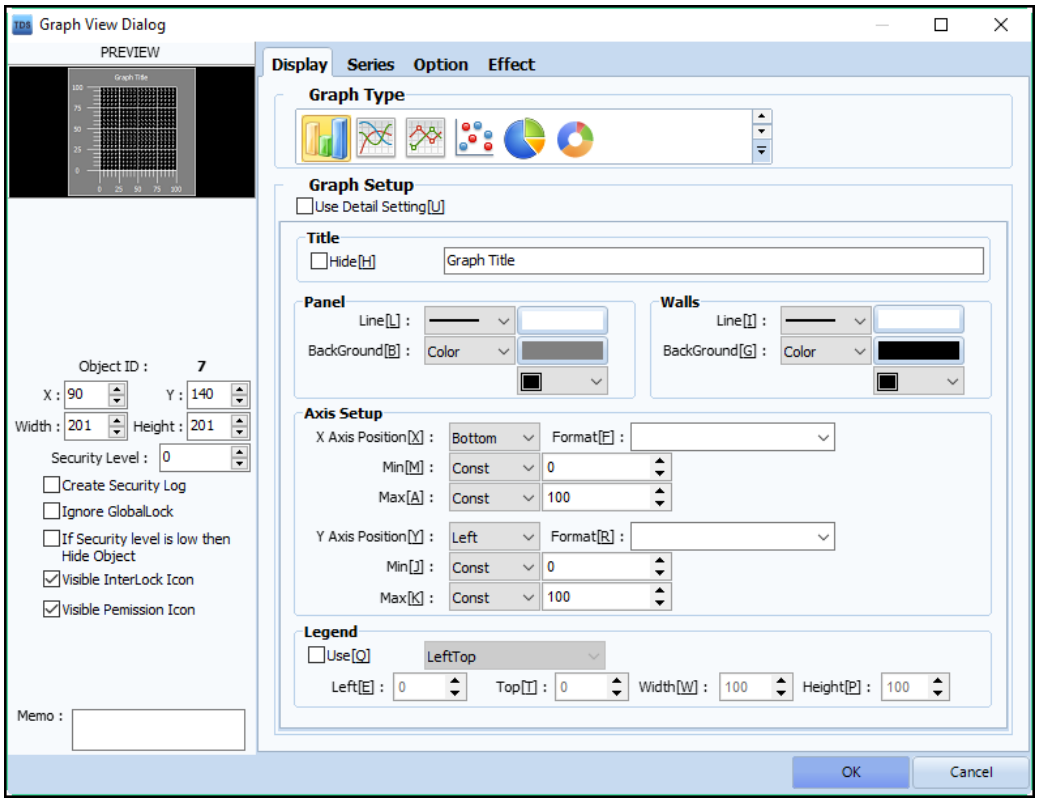


[Figure. Graph Object]

17.1 Graph Object



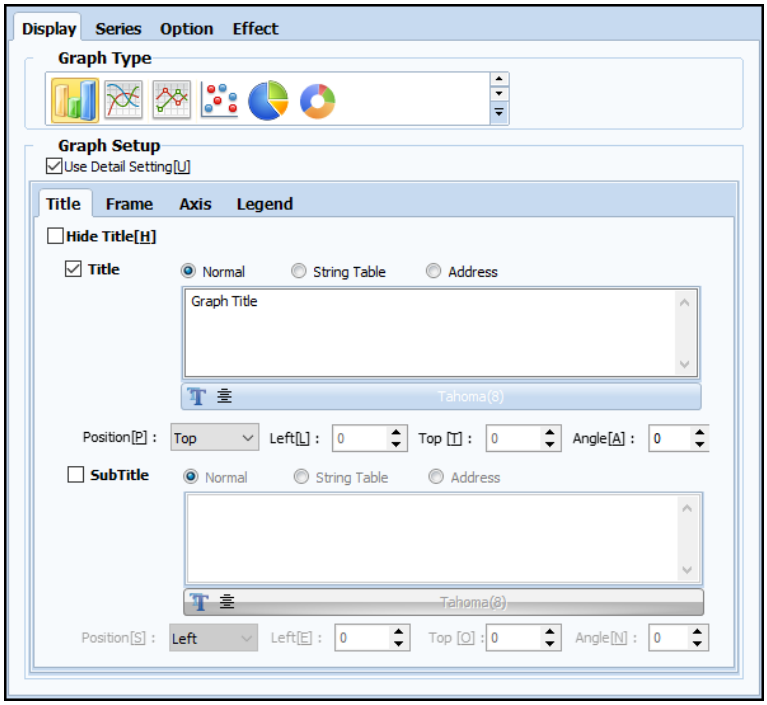
A Graph object expresses the data of an address in a form of [Bar Chart] / [Line Graph] / [Point Line Graph] / [Point Graph] / [Distributed Graph] / [Pie Chart]. Select the graph that provides the best comprehension for the type of data shown on the graph.



[Figure. Graph Object]

17.1.1 Display Tab

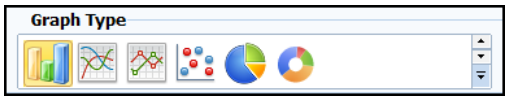
Configure the [Graph Type] / [Graph Setup] including [Title] / [Axis Setup] / [Legend].



[Figure. Display Tab]

(1) Graph Type

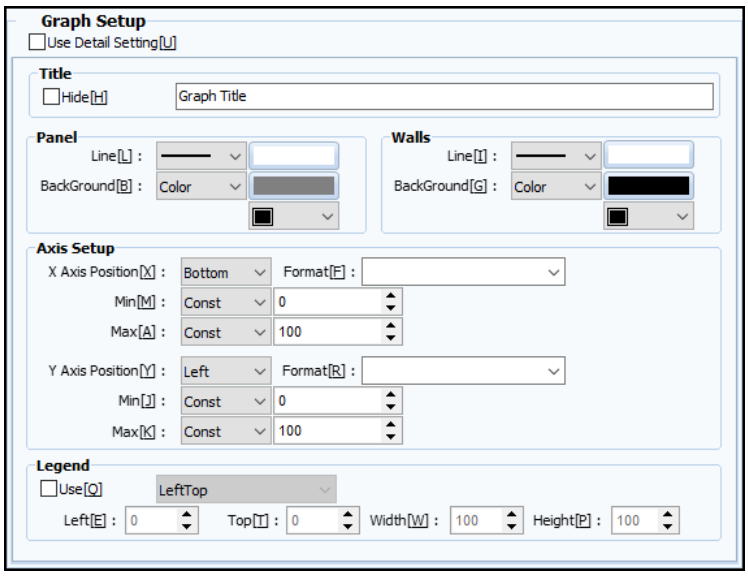
Select the Graph Type. Select [Graph Type] among [Bar Chart] / [Line Graph] / [Point Line Graph] / [Point Graph] / [Distributed Graph] / [Pie Chart]. Different types of graph offer different settings. For [Doughnut Chart] configure the hole size.



[Figure. Graph Type]

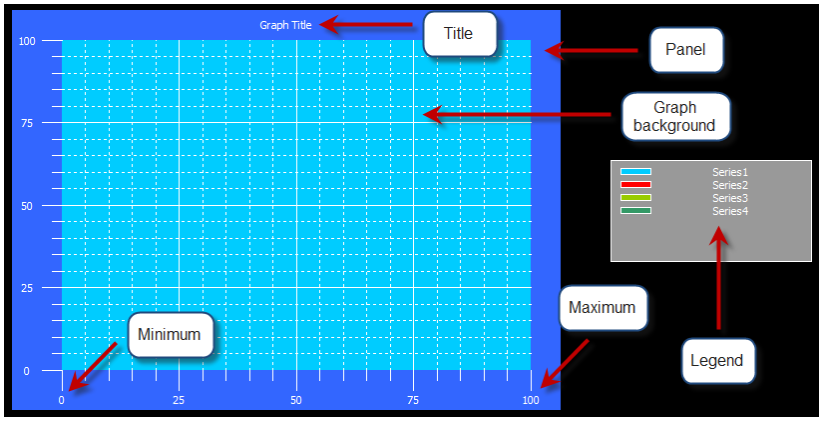
(2) General Graph Setting

If [Use Detail Setting] is disabled, only the general graph settings are available.



[Figure. Use Detail Setting - Disabled]

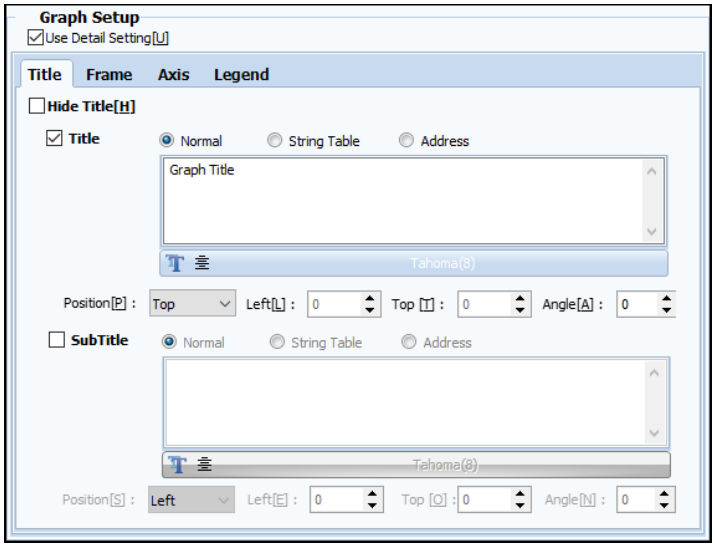
No.	General Setting		Description
1	Title		Define the graph title. Enable [Hide[H]] to hide the graph title.
2	Panel		Configure the color and background color of the panel surrounding the graph.
3	Walls		Configure the graph outline and the background color within the graph.
4	Axis Setting	Axis Position	Configure each the X coordinate and Y coordinate of the corresponding axis. The X Axis can be placed on the top or bottom, and the Y Axis can be placed on the left or the right.
		Min	Configure the [Min] / [Max] value of the X Axis and Y Axis. The [Min] value refers to the smallest value shown on the graph. Auto: The value is automatically selected. Const: The user defines a specific constant. Address: the values of selected addresses are employed as the [Min] value.
		Max	The [Max] value refers to the largest value shown on the graph. Configure the [Max] value in the same method described for [Min] value.
		Format	Configure the numeric unit of each scale of the axis. Select between one decimal place or two decimal places.
5	Legend		Configure the legend for each item shown in the graph. You can place the legend to the location of your interest.



[Figure. Names of Graph Features]

(3) Detail Graph Setting - Title

Enable [Use Detail Setting] to configure detail graph settings of [Title] / [Frame] / [Axis] / [Legend].
Configure details of title from the [Title] tab. Configure the title and applicable font, and add a sub-title.

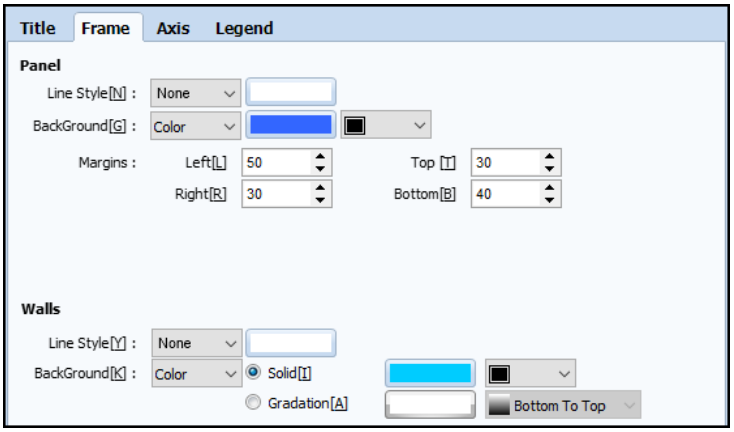


[Figure. Title]

No.	Title Setting		Description
1	Hide Title [H]		Hide the graph title.
2	Title /Sub Title	Font	Configure the font and size, and effects of the title.
		Input Setting	Select among [Normal] / [String Table] / [Address] for the content of the title. For [Address], select an address that reads the title.
3	Position[P]		Select the location of the title among [Left] / [Right] / [Top] / [Bottom] / [User Define].
4	Left[L]		For [User Define], determine the distance between the left end of the graph and title position.
5	Top[T]		For [User Define], determine the distance between the top end of the graph and the title position.
6	Angle[A]		For [User Define], select the angle in which the title should be tilted.

(4) Detail Graph Setting - Frame

Configure the lines and background of the graph from the Frame Tab.

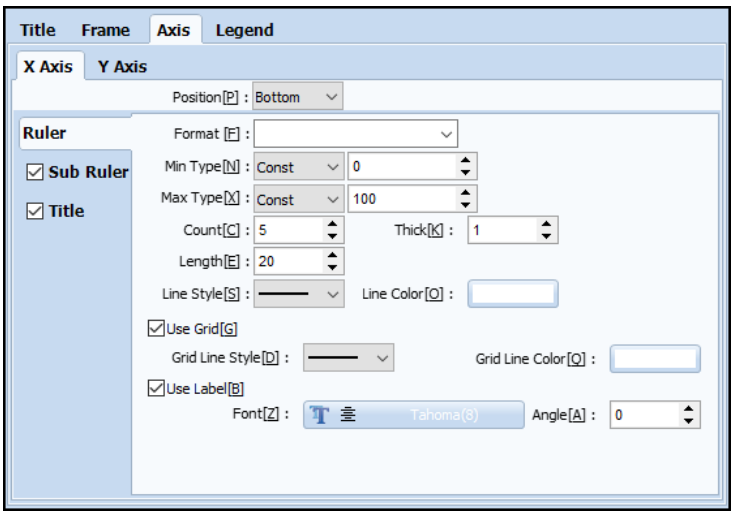


[Figure. Frame]

No.	Frame Setting		Description
1	Panel	Line Style[N]	Configure the style and color of the border line of the graph.
		BackGround[G]	Configure the background, effect and color of the background surrounding the graph.
		Margin	Configure a specific margin to define the size.
2	Walls	Line Style[Y]	Configure the style and color of the graph outline.
		BackGround[K]	Configure the background, effect and color of the background of the graph.

(5) Detail Graph Setting - Axis

Configure detail settings for the X Axis and Y Axis of the graph, and the main ruler and sub ruler of the graph.



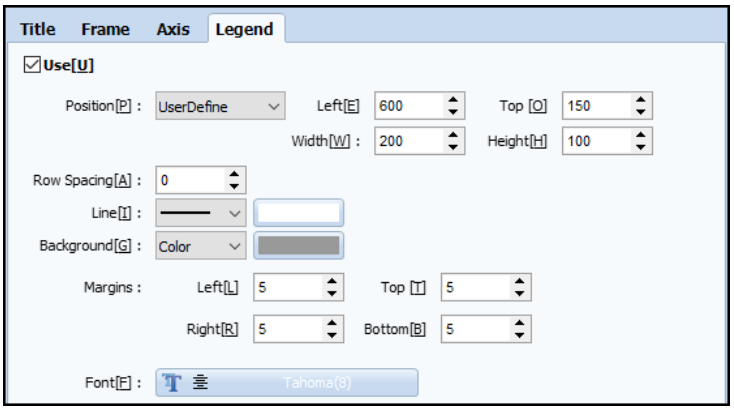
[Figure. Axis]

No.	Axis Setting		Description
1	Ruler	Format[F]	Configure the format of the scale figures shown on the Axis.
		Min Type[N]	Configure the type and minimum value of the scale. Auto: The value is automatically selected. Const: The user defines a specific constant. Address: the values of selected addresses are employed as the [Min] value. Series: the value shown on the graph varies upon the cursor position.
		Max Type[X]	Configure the type and maximum value of the scale. The same options from [Min Type] are applicable.
		Count[C]	Configure the number of scales.
		Thick[K]	Configure the thickness of each scale.
		Length[E]	Configure the length of each scale.
		Line Style[S]	Configure the line style of each scale.
		Line Color[O]	Configure the line color of each scale.
		Use Grid[G]	Enable [Use Grid] to show grid lines from each scale.
		Grid Line Style[D]	Configure the grid line style.
		Grid Line Color[Q]	Configure the grid line color for each scale.
		Use Label[B]	Enable [Use Label] to show labels.
		Font[Z]	Configure the font applicable for scale labels.
		Angle[A]	Configure the angle in which the label will be tilted.
2	Sub Ruler	Count[C]	Configure the number of sub-scales.
		Length[L]	Configure the length of each sub-scale.
		Thick[T]	Configure the thickness of each sub-scale.

		Line Style[S]	Configure the line style of each sub-scale.
		Line Color[O]	Configure the line color of each sub-scale.
		Use Grid[G]	Enable [Use Grid] to add grid lines to each sub-scale.
		Grid Line Style[Y]	Configure the grid line style.
		Grid Line Color[R]	Configure the grid line color.

(6) Detail Graph Setting - Legend

Configure the legend for each item shown in the graph.

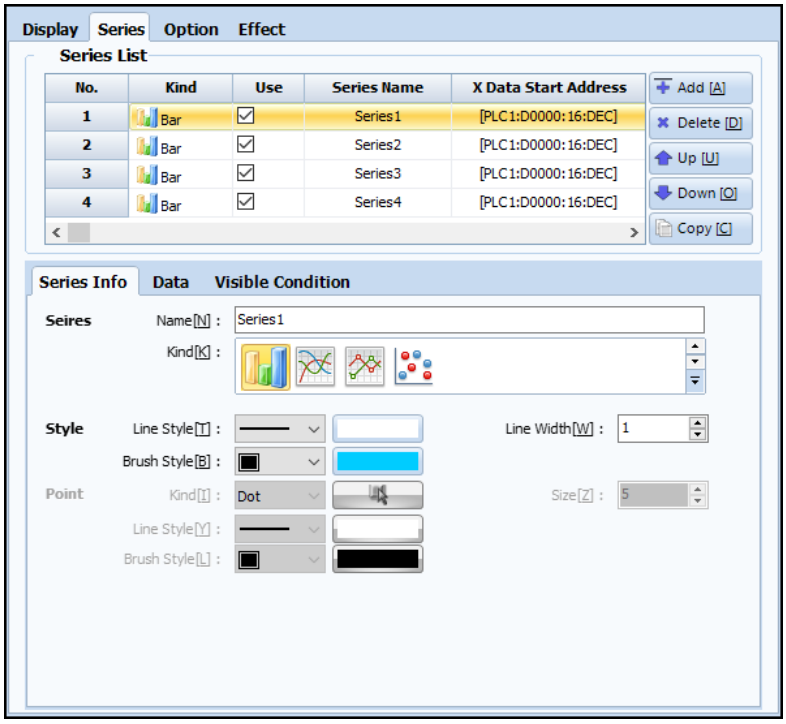


[Figure. Legend]

No.	Legend Setting		Description
1	Use[U]		Configure whether not to use a legend to display the content of each axis.
2	Position[P]		Select the [Position] of the legend among [Left], [LeftTop], [LeftMiddle], [LeftBottom], [Right], [RightTop], [RightMiddle], [RightBottom], [UserDefine].
3	Left[E]		For [Position] - [User Define], place the legend on the left side of the graph.
4	Top[O]		For [Position] - [User Define], place the legend on top of the graph.
5	Width[W]		For [Position] - [User Define], configure the width of the legend.
6	Height[H]		For [Position] - [User Define], configure the height of the legend.
7	Row Space[A]		For [Position] - [User Define], configure the clearance between two lines.
8	Line[I]		For [Position] - [User Define], configure the line style and line color.
9	BackGround[G]		For [Position] - [User Define], configure the background and background color.
10	Margin	Left[L]	Configure the margin to the left of texts in the legend.
		Right[R]	Configure the margin to the right of texts in the legend.
		Top[T]	Configure the margin to the top of texts in the legend.
		Bottom[B]	Configure the margin to the bottom of texts in the legend.
11	Font[F]		Configure the type, size and effects of fonts.

17.1.2 Series Tab

From the [Series] tab, configure settings for a set of graphs containing information of the same series. For instance, the below configuration shows two series for Bar type and Point Line type.



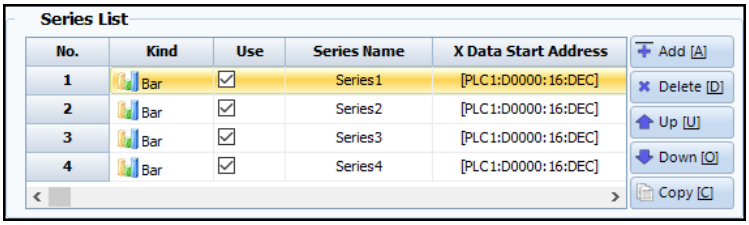
[Figure.Series Tab]

(1) Series List

Add or delete series to and from the [Series List].

Rearrange the order of Series with the [Up] and [Down] button, or copy a series.

You can assign different features to each series by selecting a series from the list and configure corresponding settings from the bottom field.



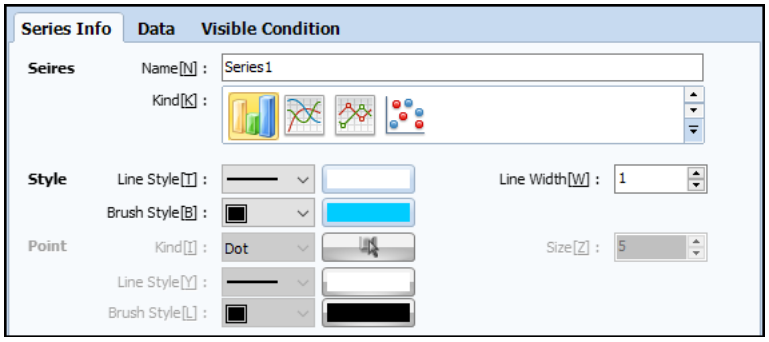
[Figure. Series List]

No.	Series List	Description
1	Add[A]	Add a series information.
2	Delete[D]	Delete a selected series information.
3	Up to[U]	Move a selected series information one row upward.
4	Down [O]	Move a selected series information one row downward.
5	Copy[C]	Copy a selected series information.

(2) Series Information

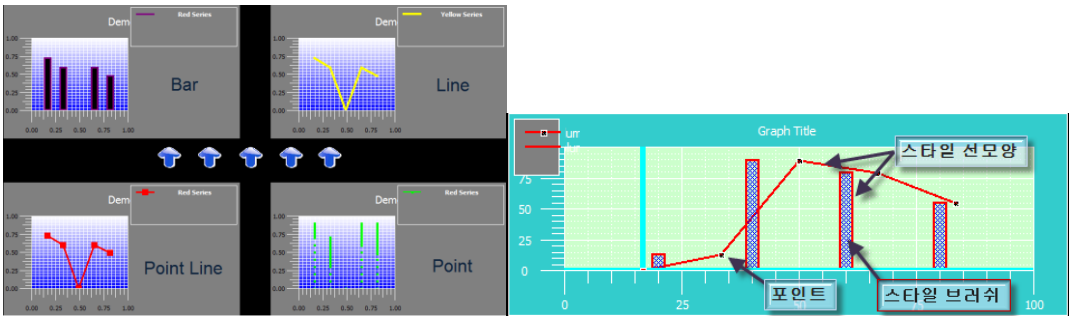
Define the outline of a selected series.

Configure the [Name] / [Kind] / [Line Style] of the series. Types of series include [Bar] / [Line] / [Point Line] / [Point], and configure the line style and color corresponding to each type.



[Figure. Series Information]

No.	Series Kind	Description
1	Bar	Create a series in the form of a bar chart.
2	Line	Create a series in the form of a line graph.
3	Point Line	Create a series in the form of a point line graph.
4	Point	Create a series in the form of a point chart.



[Figure. Series - Types, Styles and Point]

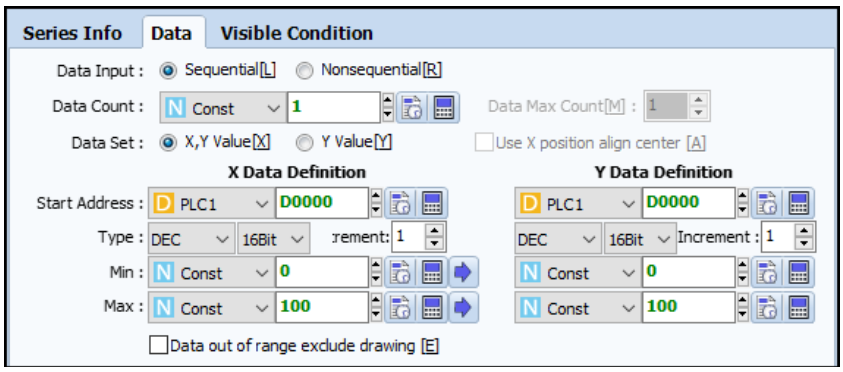
Configure the [Line Style] / [Line Width] / [Brush Style] / [Brush Style] of the series.

[Style] - [Brush Style] is available only for Bar charts.

[Point] is available for Point Line Graphs and Point Graphs.

(3) Series Data

Define each X, Y data for the series.

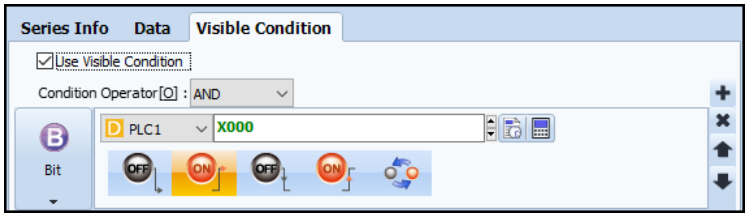


[Figure. Series Data]

No.	Data Setting		Description
1	Data Input	Sequential[L]	Configure the [Start Address] / [Data Max Count] / [Increment] to plot the data read from each address in a sequential order with the determined increment.
		Nonsequential[R]	Configure each address corresponding to the configured [Data Count].
2	Data Count		Configure the number of data to be employed.
3	Data Set	X, Y Value[X]	The data for both X Axis and Y Axis are variables, where both X, and Y data should be defined.
		Y Value[Y]	Only the data for Y Axis is a variable. For a [Data Count] of [N], [N] start points will be evenly plotted on the X axis.
		Use X position align center[A]	This function is available only for a [Data Set] of [Y Value], and the X axis line will be aligned to the center.
4	Start Address		For [Data Input] of [Sequential] configure the address that the data reference will begin.
5	Increment		Configure the data increment for each sequential order.
6	Type		Configure the address type among [DEC] / [UDEC] / [HEX] / [BCD] / [FLOAT] and address size between [16Bit] / [32Bit].
7	Min		Configure the minimum value of data variable. Select an address or assign a constant with [N Numeric].
8	Max		Configure the maximum value of a data variable. Select an Address or assign a constant with [N Number]
9	Data out of range exclude drawing[E]		Enable this function to exclude any data out of the configured range from the graph.

(4) Series Visible Condition

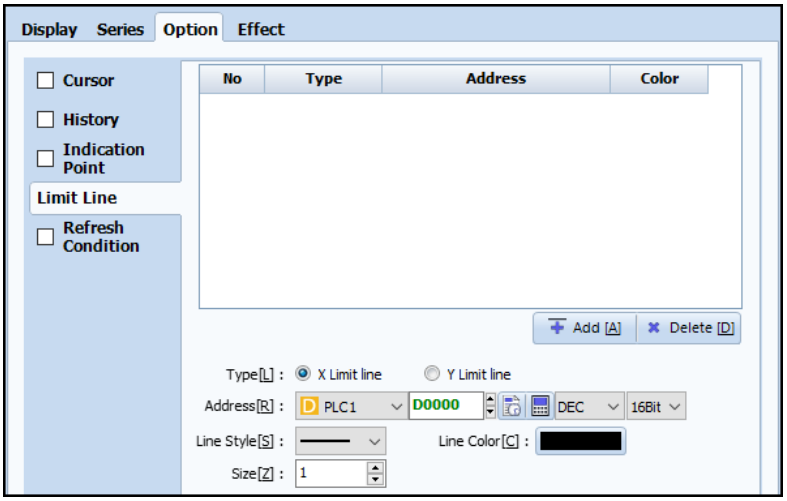
You can hide a series within a graph, and make the series appear upon a predetermined condition. With the below configuration, the subject series will be normally hidden, and will appear when [SYS:00150.00] reads [ON].



[Figure. Visible Condition]

17.1.3 Option Tab

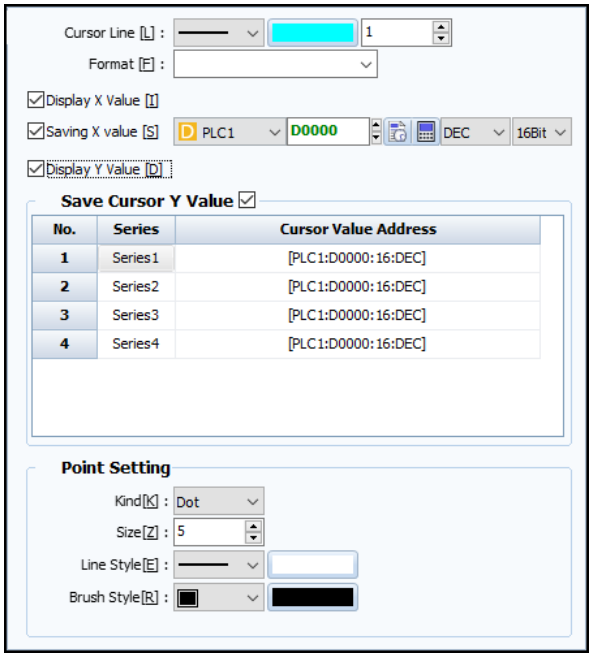
Configure available graph options including [Cursor] / [History] / [Indication Point] / [Limit Line] / [Refresh Condition] to enhance user convenience.



[Figure. Option]

(1) Cursor

Create a cursor that indicates the end point of a graph. A cursor consists of two lines each parallel to the X Axis and Y Axis, and a point indicating the end point of the graph.

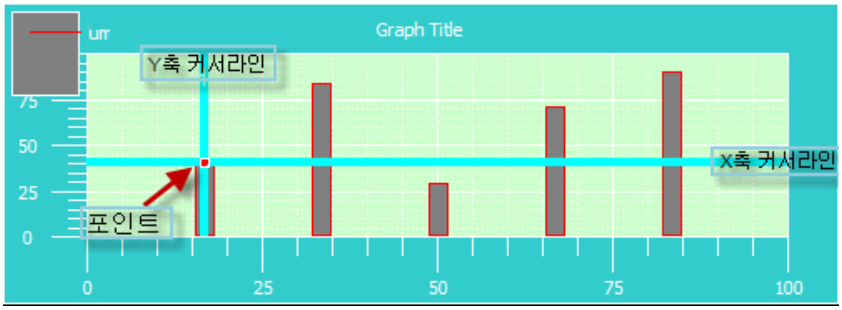


[Figure. Cursor]

No.	Cursor Setting	Description
1	Cursor Line	Configure detail settings for the cursor line including [Type] / [Color] / [Thickness] / [Format] (decimal place).
2	Display X Value	Enable this function to show the X value of the Cursor point.
3	Saving X Value	Save the X value of the cursor point to a specific address.

		Refer to Chapter 7.5 [How to enter an address] for more details.
4	Display Y Value	Enable this function to show the Y value of the Cursor point. When enabled along with [Display X Value] both values are shown on the graph.
5	Save Cursor Y Value	Save the Y value of the cursor point to a specific address. Instructions for [Saving X Value] are applicable.
6	Point Setting	Configure detail settings for the crossing point of cursor lines of X Axis and Y Axis. Configure the [Type] / [Size] / [Line Style] / [Brush Style] of the cursor point.

If a cursor and point are configured, the graph will be shown as below.

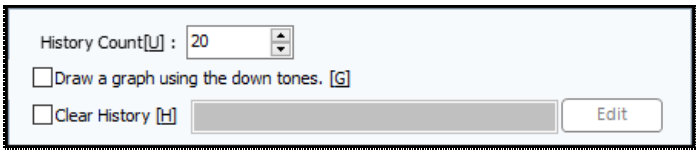


[Figure. Cursor Point]

(2) History

Plot data previous from the current data on the graph.

To distinguish previous data from current data, the previous data can be down toned.

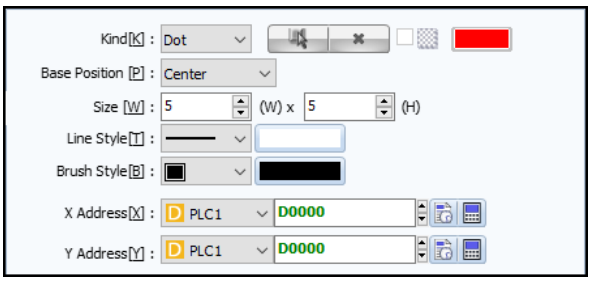


[Figure. History]

No.	History	Description
1	History Count	Configure the number of previous data to be shown.
2	Down Tone	Enable [Draw a graph using the down tones] to distinguish the previous data from current data.
3	Clear History	Configure a condition to delete previous data upon a true condition.

(3) Indication Point

Use an Indication Point to indicate a specific point of your interest on the graph.

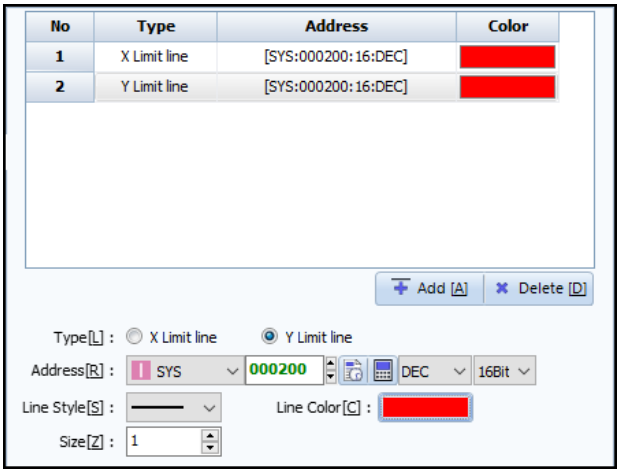


[Figure. Indication Point]

No.	Indication Point	Description
1	Type	Select [Kind] among [Dot] / [Rectangle] / [Circle] / [Image].
2	Base Position	Configure the base position with reference to the X and Y address value.
3	Size	Configure the width(W) and height(H) of the Indication point.
4	Line Style	Configure the outline of the Indication Point.
5	Brush Style	Configure the fill color of the Indication Point.
6	X, Y Address	Configure each X and Y address of the Indication Point.

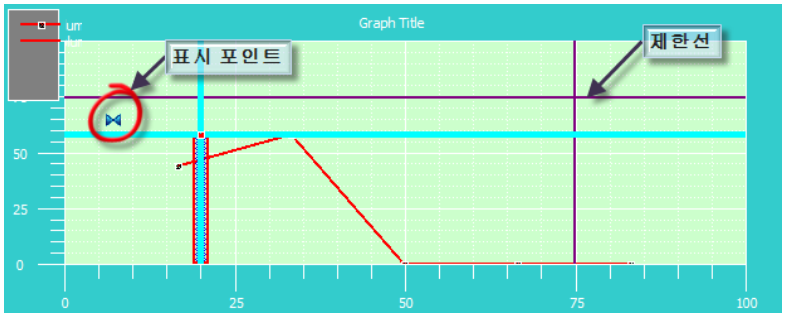
(4) Limit Line

Draw a limit line on the graph to provide a visual recognition of the reference point configured by the user.



[Figure. Limit Line]

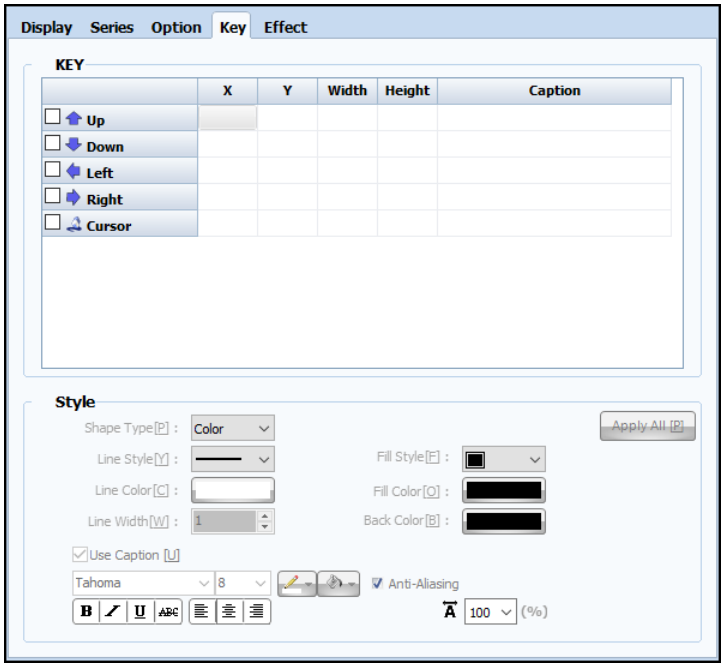
No.	Limit Line	Description
1	Type	Configure an X Limit Line or Y Limit Line.
2	Address	Configure the address at which the limit line will be placed.
3	Line Style	Configure the line style of the limit line.
4	Line Color	Configure the line color of the limit line.
5	Size	Configure the thickness of the limit line between [1] and [10].



[Figure. Indication Point & Limit Line]

17.1.4 Key Tab

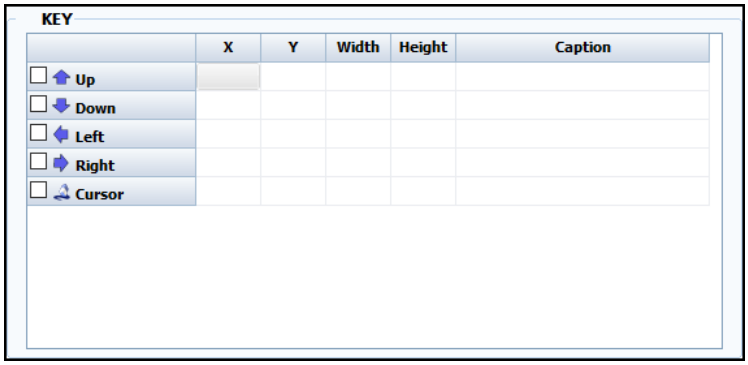
If [Option] - [Cursor] is configured, you can create a [Key].
A [Key] configured from this feature allows you to move the cursor position.



[Figure. Key Tab]

(1) KEY List

Create keys to move the cursor point of the graph. Any added key will be located under the graph construing a single object.

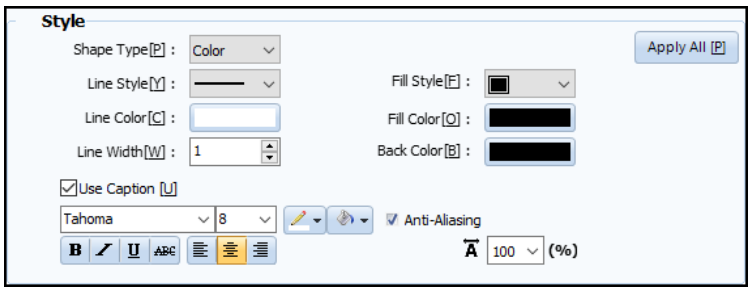


[Figure. Key List]

No.	Key Object	Description
1	Up	Move the cursor point upward.
2	Down	Move the cursor point downward.
3	Left	Move the cursor point to the left.
4	Right	Move the cursor point to the right.
5	Cursor	Show where the cursor point is currently at.

No.	Key Column	Description
1	X	Configure the X coordinate of the selected key.
2	Y	Configure the Y coordinate of the selected key.
3	Width	Configure the width of the selected key.
4	Height	Configure the height of the selected key.
5	Caption	Configure a user defined caption for the selected key.

(2) Style



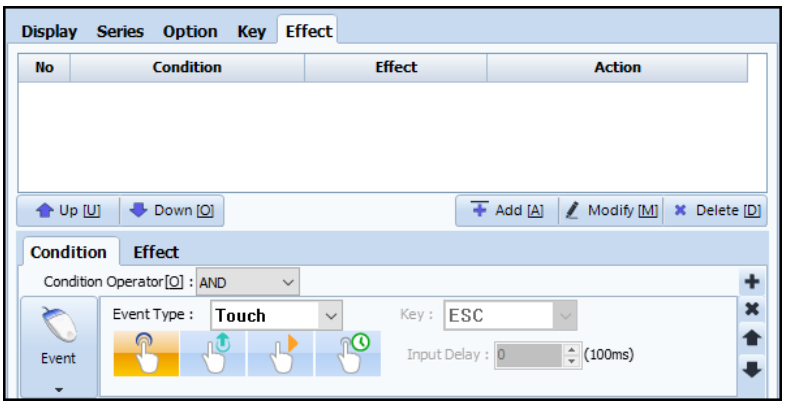
[Figure. Style]

No.	Style	Description
1	Shape Type[T]	Select the [Shape Type] between [Color] (Rectangle) and [Image].
2	Line Style[Y]	For a [Shape Type] of [Color], configure the line style of the rectangle.
3	Line Color[C]	For a [Shape Type] of [Color], configure the line color of the rectangle.
4	Line Width[W]	For a [Shape Type] of [Color] configure the line thickness of the rectangle.
5	Fill Style[F]	For a [Shape Type] of [Color] configure the fill style of the rectangle.
6	Fill Color[O]	For a [Shape Type] of [Color], configure the fill color of the rectangle.
7	Back Color[B]	For a [Shape Type] of [Color], configure the background color of the key.
8	Use Caption[U]	Elect to show the caption of the Key.
9	Font	Configure the font type, size and effect of the caption.
10	Apply All[P]	Apply the current configuration to all keys.

17.1.5 Effect Tab

Add an additional [Effect & Action] to the Object.

Refer to Chapter 7.6 [Effect & Action] for more details.

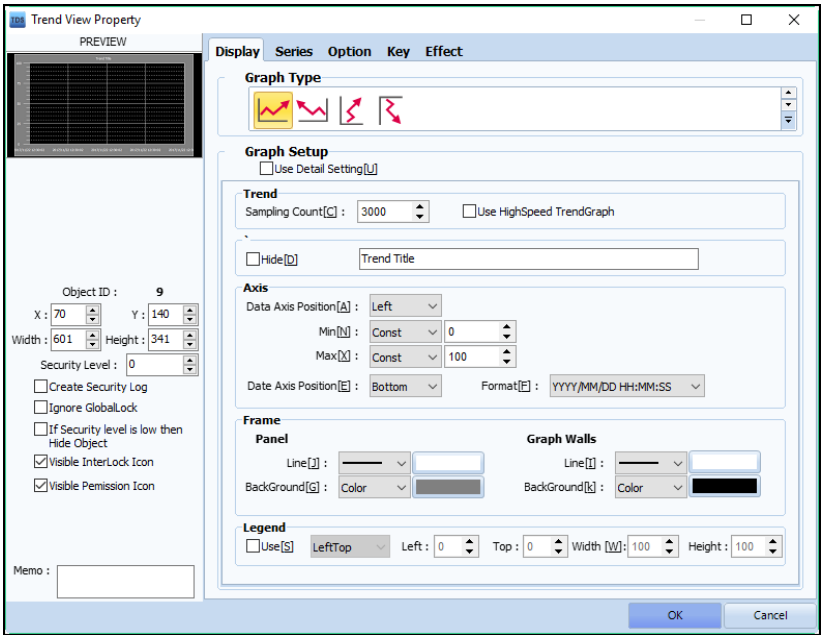


[Figure. Effect - Graph]

17.2 Trend Object

A Trend Object displays a time-dependent varying data.

Unlike Chapter 17.1 [Graph Object], only one of X or Y Axis can be selected to the variable, and the other axis will refer to the date.

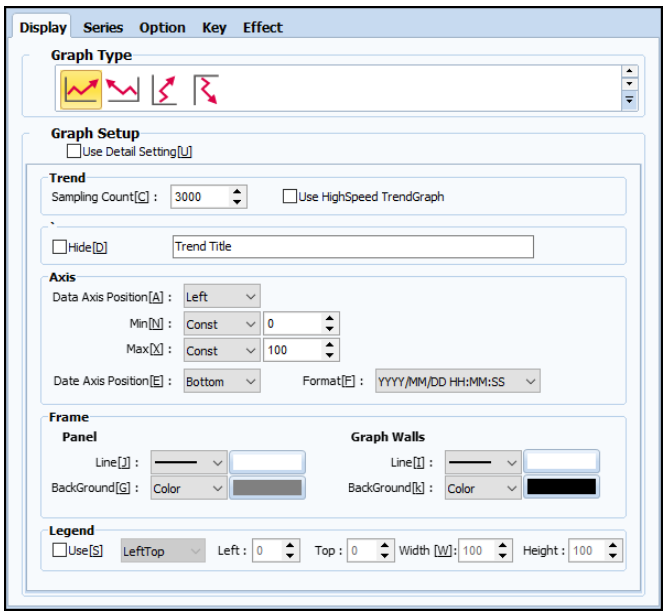


[Figure. Trend Object]

17.2.1 Display Tab

Configure the type and external features of the Trend Object.

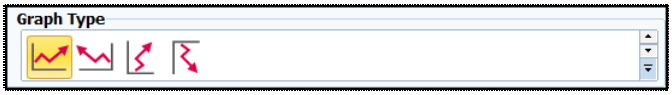
As provided in Chapter 17.1 [Graph Object], the tab provides general settings and detail settings. Refer to Chapter 17.1.1 [Display Tab] of Graph Objects for more details.



[Figure. Display Tab]

(1) Graph Type

Select the Graph Type. The trend differs upon the selected graph type.

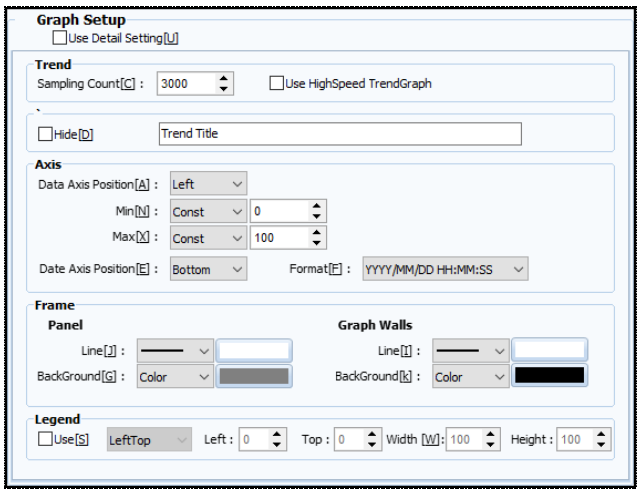


[Figure. Graph Type]

	Graph Type	Data Variable	Description
		The X Axis represents time, while the Y Axis represents the data variable.	With the Y Axis as data variable, the trend is shown from the left to right.
			With the Y Axis as data variable, the trend is shown from the right to the left.
		The X Axis represents the data variable, while the Y Axis represents time.	With the X Axis as data variable, the trend is shown from bottom to top.
			With the X Axis as data variable, the trend is shown from top to bottom.

(2) General Graph Setting

If [Use Detail Setting] is disabled, only the basic graph settings for [Sample Count] / [Title] / [Axis] / [Frame] / [Legend] are available.

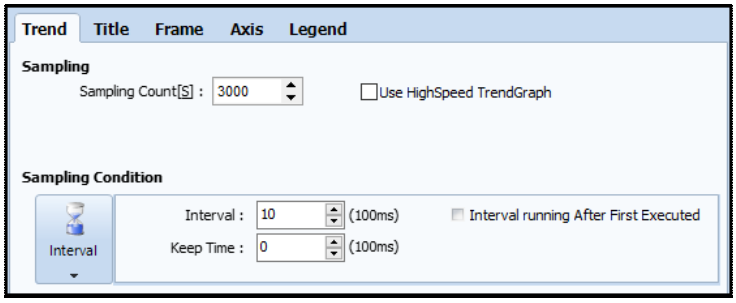


[Figure. General Graph Setting]

No.	General Setting	Description	
1	Trend	Configure the [Sampling Count]. Samples refer to the number of graph information stored, where [Sample Count] refers to how much of data should be saved.	
2	Title	Type in the title. 숨김[H] Enable [Hide] to hide the title.	
3	Axis	Axis refers to the reference scale provided on the graph. Adjust the location of the Data Axis and Date Axis, and configure the [Min] / [Max] value. The Axis position differs according to the Graph Type.	
			The X axis represents date, while the Y axis represents data. Thus, select [Data Axis Position] between [Left] and [Right]; and select [Date Axis Position] between [Bottom] and [Top].
			The X axis represents data, while the Y axis represents date. Thus, select [Data Axis Position] between [Bottom] and [Top]; and select [Date Axis Position] between [Left] and [Right].
		Format	Select the date format among various combinations provided from the drop-down menu.
4	Frame	Configure [Panel] and [Graph Walls] settings. Refer to Chapter 17.1 [Graph Object] for more details.	
5	Legend	Configure the legend for each item shown in the graph. Refer to Chapter 17.1 [Graph Object] for more details.	

(3) Detail Graph Setting - Trend

Configure detail settings from [Trend] / [Title] / [Frame] / [Axis] / [Legend].

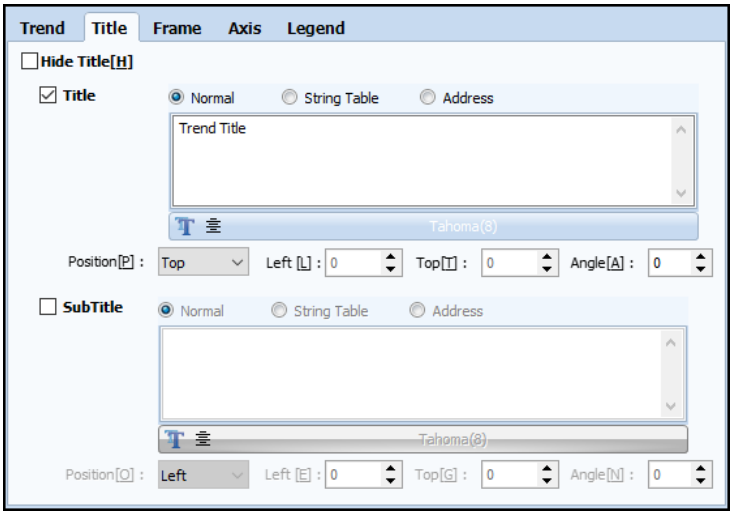


[Figure. Use Detail Setting]

No.	Detail Setting	Description
1	Sampling	Sampling Count refers to the number of data plotted to show the trend. With a minimum count of [100] you can configure up to [20,000] counts.
2	Sampling Condition	Configure the condition upon which a sample should be collected. This function is identical to configuring a condition for an [Effect & Action]. Refer to Chapter 7.6 [Effect & Action] for more details.

(4) Detail Graph Setting - Title

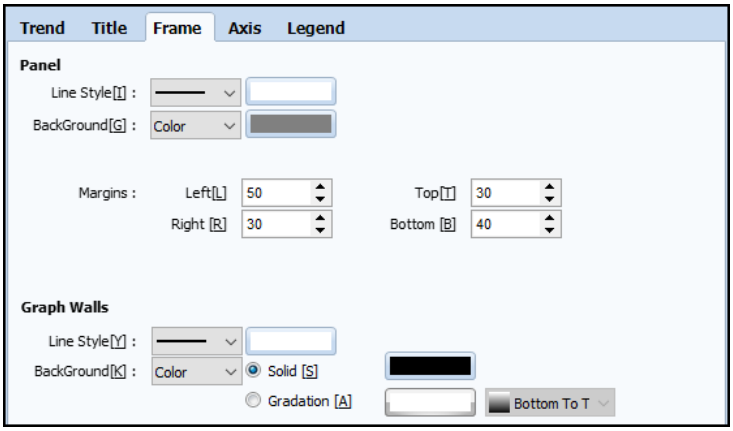
[Title] refers to the title of the trend, and configure the title and applicable font, and add a sub-title. Refer to Chapter 17.1 [Graph Object] for more details.



[Figure. Title]

(5) Detail Graph Setting - Frame

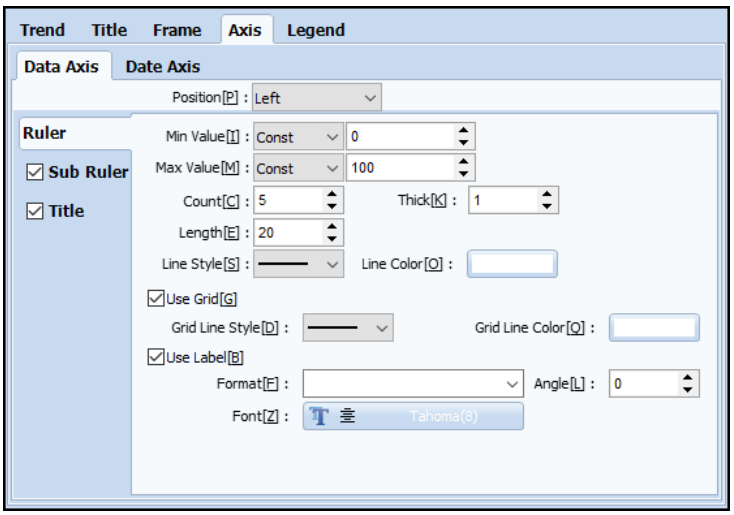
Configure the [Line Style] and [Background] and [Margin] for the [Panel] and [Line Style] and [Background] for the [Graph Walls]. Refer to Chapter 17.1 [Graph Object] for more details.



[Figure. Frame]

(6) Detail Graph Setting - Axis

A Trend Object has a Data Axis and Date Axis. In general, you can add and configure detail settings for rulers and titles. Refer to Chapter 17.1 [Graph Object] for more details.

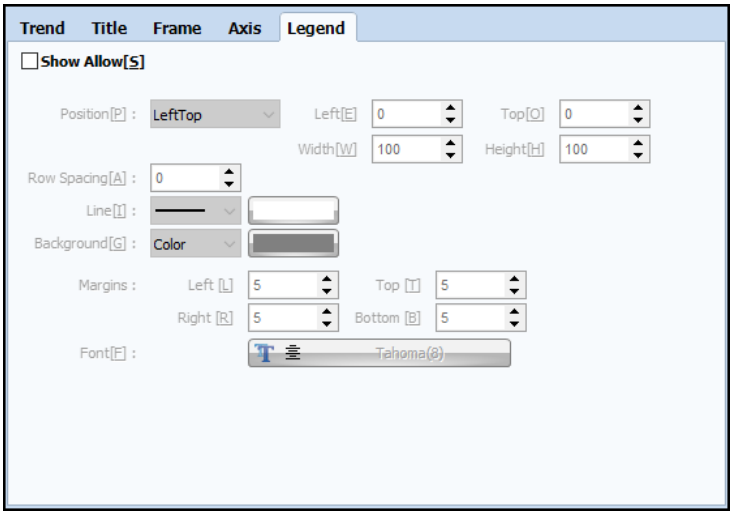


[Figure. Axis]

(7) Detail Graph Setting - Legend

Show the legend for trend series.

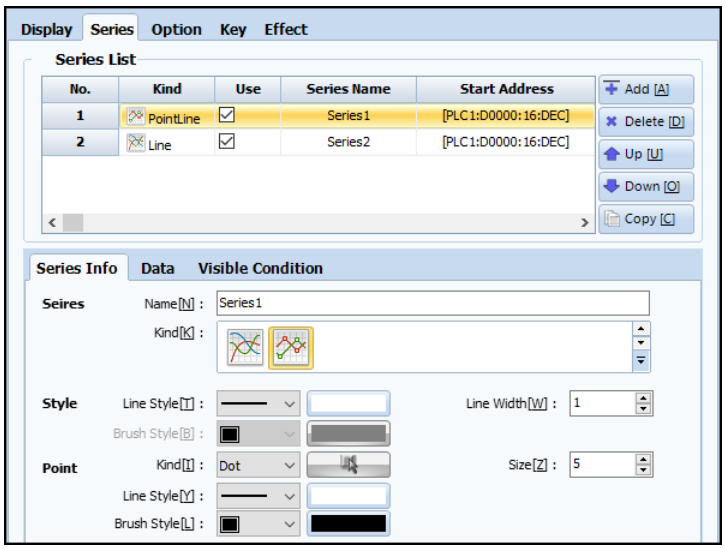
As explained for Graph Objects, information of trend series are distinguished and titles can be assigned to series for better recognition.



[Figure. Legend]

17.2.2 Series Tab

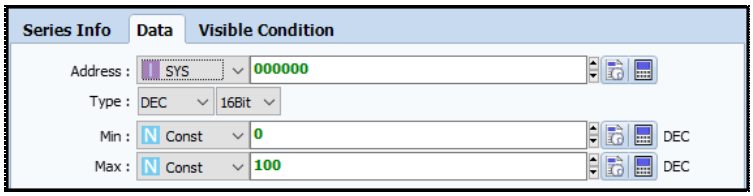
In general, features for [Series] are identical to that of Chapter 17.1 [Graph Object]. Unlike [Graph] series, only [Line] and [Point] are available, and [Bar] and [Point] are not available. Refer to Chapter 17.1 [Graph Object] for more details of style and point.



[Figure. Series Tab]

(1) Sample

Configure the series data. Since a Trend Object employs one axis for date, only one data can be configured. As shown below, configure the type and address of the data. Further configure the [Min] / [Max] value of data.

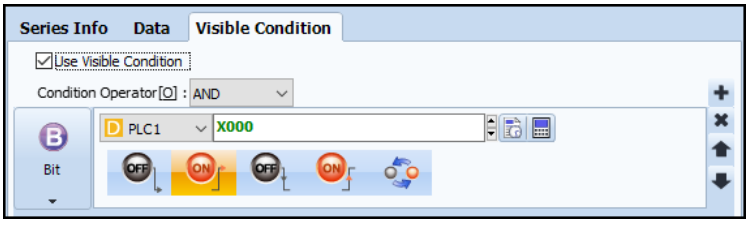


[Figure. Series Data]

(2) Visible Condition

You can hide a series and show the series upon a true condition.

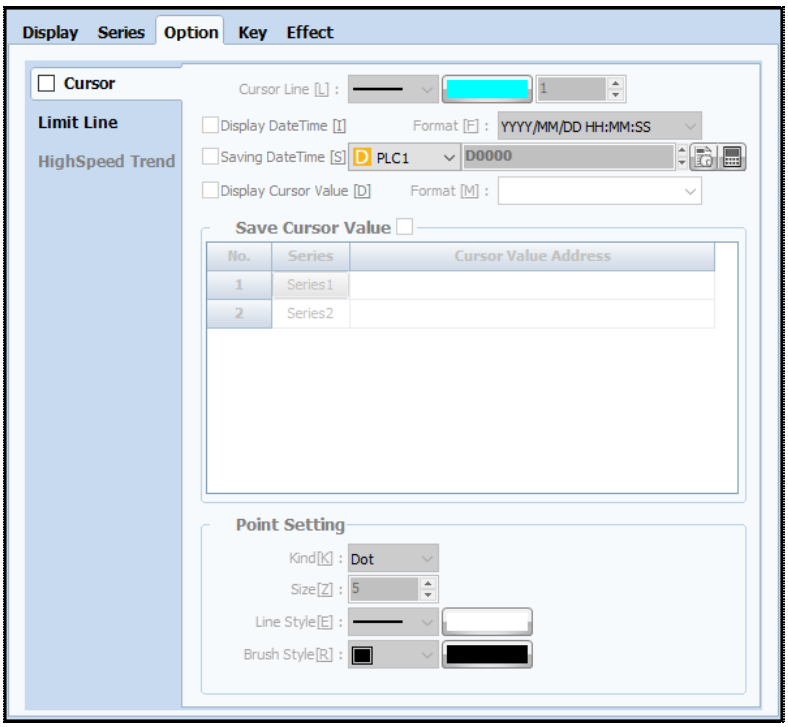
With the below configuration, the selected series is normally hidden, and will appear when [SYS:00150.00] reads [ON].



[Figure. Visible Condition]

17.2.3 Option Tab

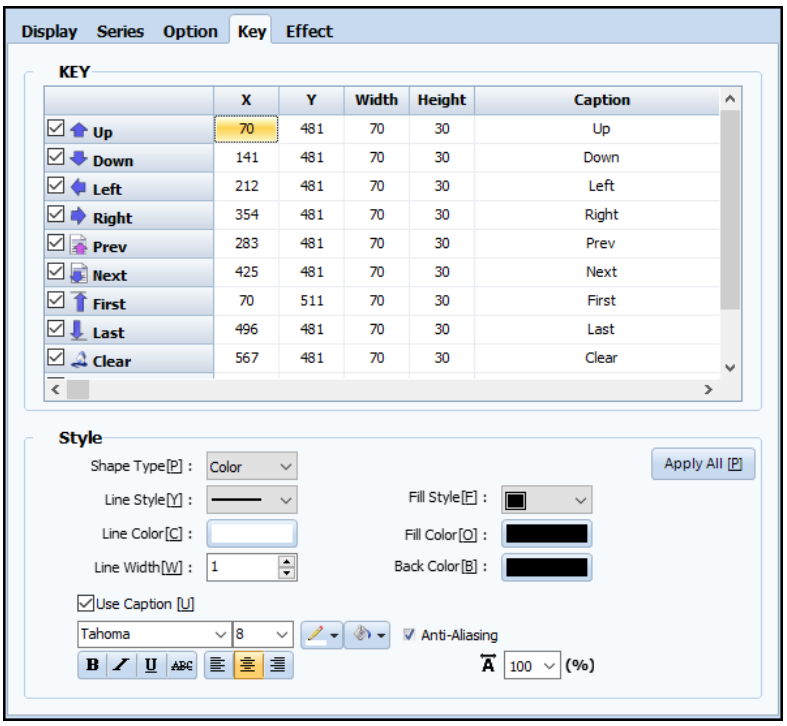
Configure available trend options including [Cursor] / [Indication Point] / [Limit Line] to enhance user convenience. These options are identical with the options provided in Chapter 17.1 [Graph Object] except [History]. With a [Cursor] option, configure [Key]s to control the cursor position of the trend object.



[Figure. Option]

17.2.4 **Key Tab**

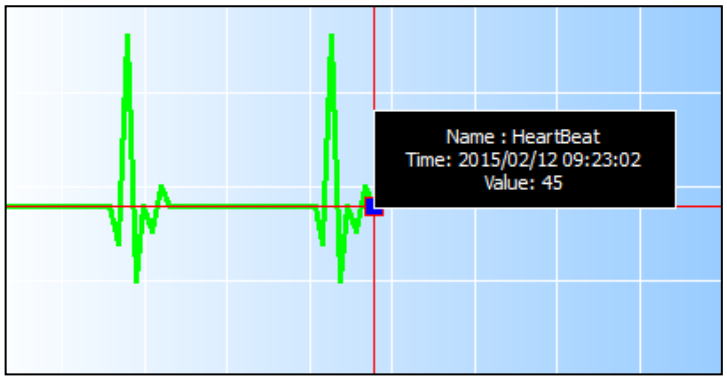
If [Option] - [Cursor] is configured, you can create a [Key]. You can create two types of Keys: one to navigate through the graph, and one to move the cursor position. Select each Key of your interest to create the key. A cursor shows the name, size, value of the current point. Refer to Chapter 17.1 [Graph Object] for more details.



[Figure. Key Tab]

No.	Key Object	Description
1	Up	Move the cursor point upward. This key is applicable for [Bottom to Top] and [Top to Bottom] trend objects.
2	Down	Move the cursor point downward. This key is applicable for [Bottom to Top] and [Top to Bottom] trend objects.
3	Left	Move the cursor point to the left. This key is applicable for [Left to Right] and [Right to Left] trend objects.
4	Right	Move the cursor point to the right. This key is applicable for [Left to Right] and [Right to Left] trend objects.
5	Prev	Show the previous page of the graph. For a [Bottom to Top] / [Top to Bottom] trend, the page beneath the current page is shown; for a [Left to Right] / [Right to Left] trend, the page on the left of the current page is shown.
6	Next	Show the next page of the graph. For a [Bottom to Top] / [Top to Bottom] trend, the page above the current page is shown; for a [Left to Right] / [Right to Left] trend, the page on the right of the current page is shown.
7	First	Move the cursor point to the first data sample.
8	Last	Move the cursor point to the last data sample.
9	Clear	Clear the current graph.
10	Action	Run/Stop the Graph.
11	Cursor	Disable the graph cursor.

With a [Cursor], the information of a cursor point of the user's interest is shown. This [Cursor] is controlled with a [Key].

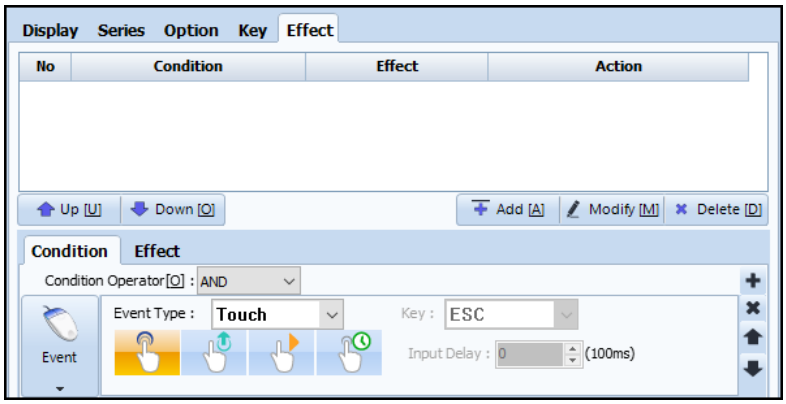


[Figure. Cursor]

17.2.5 **Effect Tab**

Add an additional [Effect & Action] to the Object.

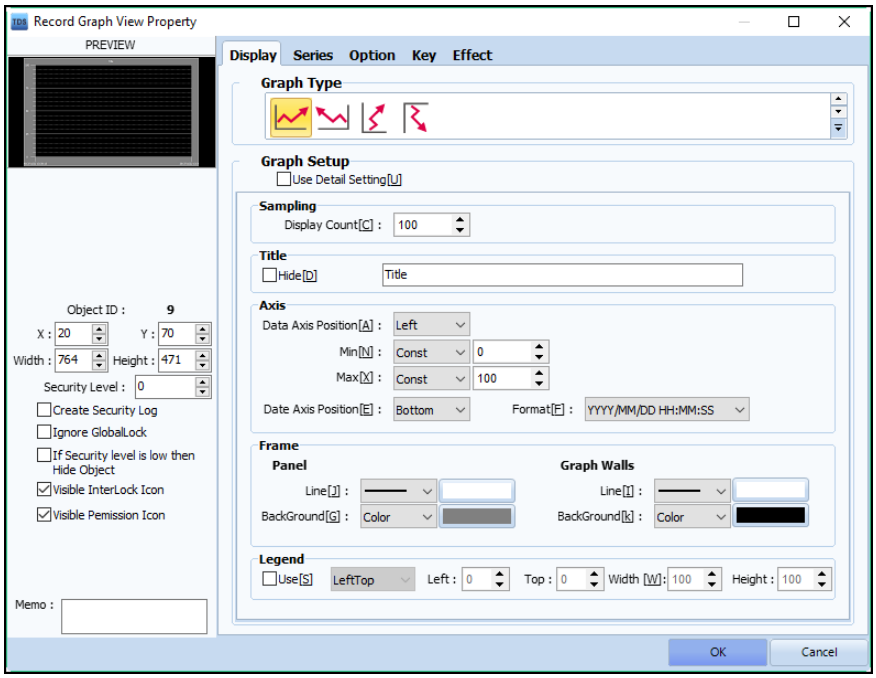
Refer to Chapter 7.6 [Effect & Action] for more details.



[Figure. Effect & Action Tab]

17.3 **Record Object**

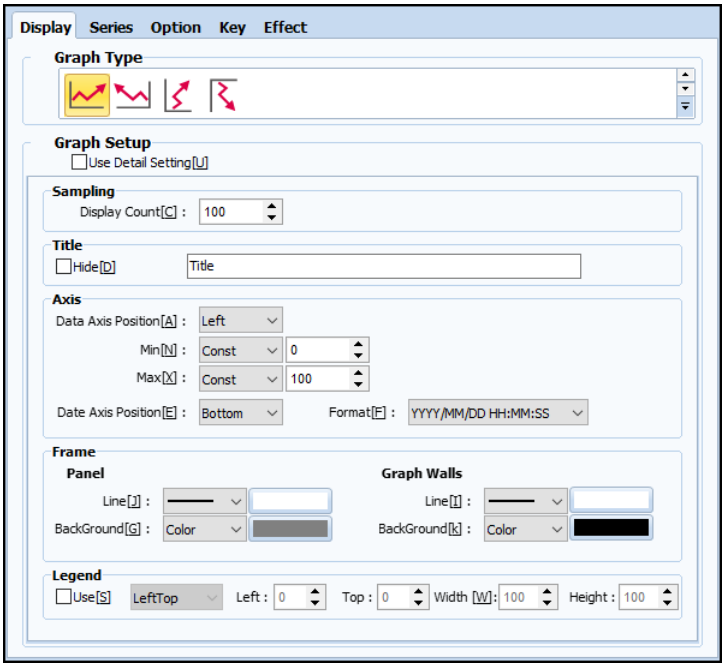
Unlike a [LogView Object], a Record Object shows the log data in a form of [Trend].
The same method explained for Trend Object is applicable to drawing the graph. To create a Record object, log data should exist.



[Figure. Record Object.

17.3.1 Display Tab

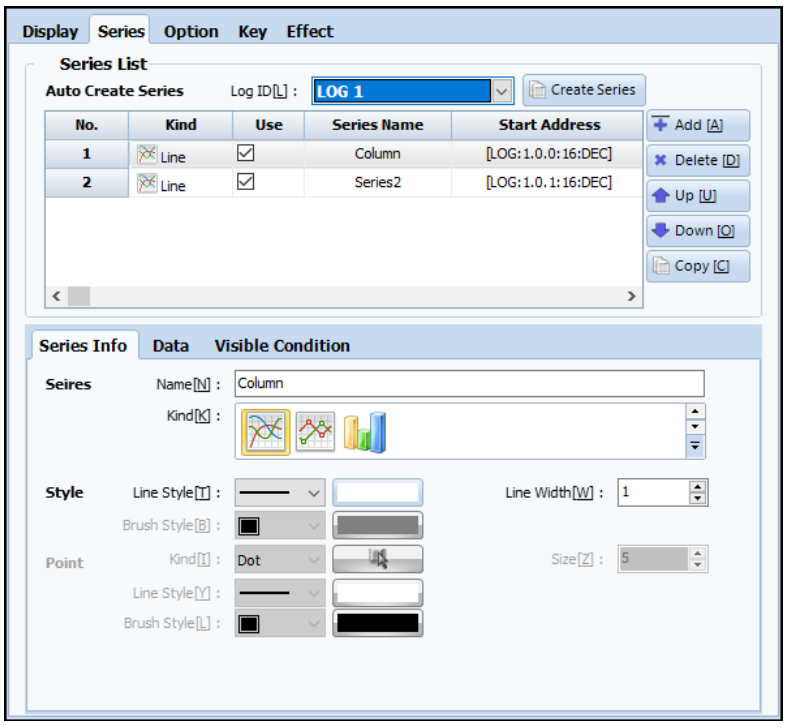
Configure the type and external features of the Record Object.
The same instructions provided in Chapter 17.2 [Trend Object] are applicable.



[Figure. Display Tab]

17.3.2 Series Tab

Configure record series.

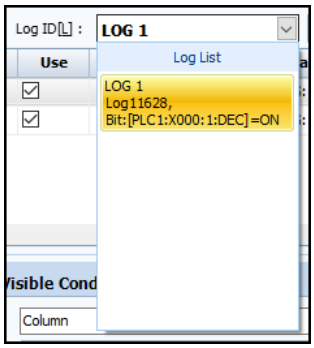


[Figure. Series Tab]

(1) Series List

The list of series are provided, with an Auto Create function. Record series mainly employs log data, therefore create series with [Log ID] as shown below.

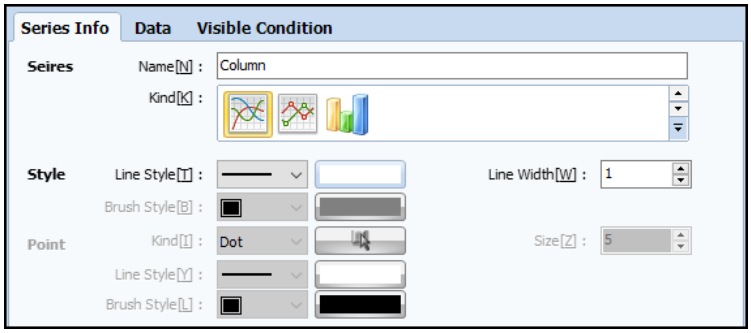
Only Log IDs that exist in the Log Setting are shown. Then, click [Create Series] to create a series. Edit the Series Information and Data for a created series.



[Figure. Auto Create Series]

(2) Series Information

For record series information, refer to Chapter 17.2 [Trend Object].

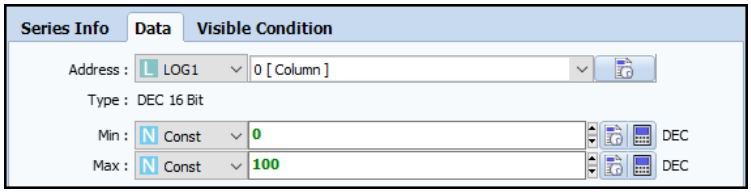


[Figure. Series Information]

(3) Series Data

Configure the Series Data Setting. Records are plotted with log data, therefore select the Log Address. First select the Log number and then define the address.

Further configure the [Min] / [Max] value of data.

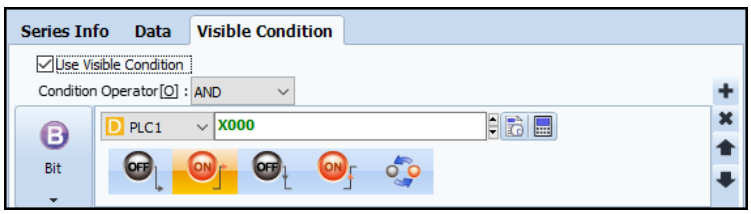


[Figure. Series Data]

(4) Visible Condition

You can hide a series in a graph and show the series upon a true condition.

With the below configuration, the selected series is normally hidden and will appear when [SYS:00150.00] reads [ON].

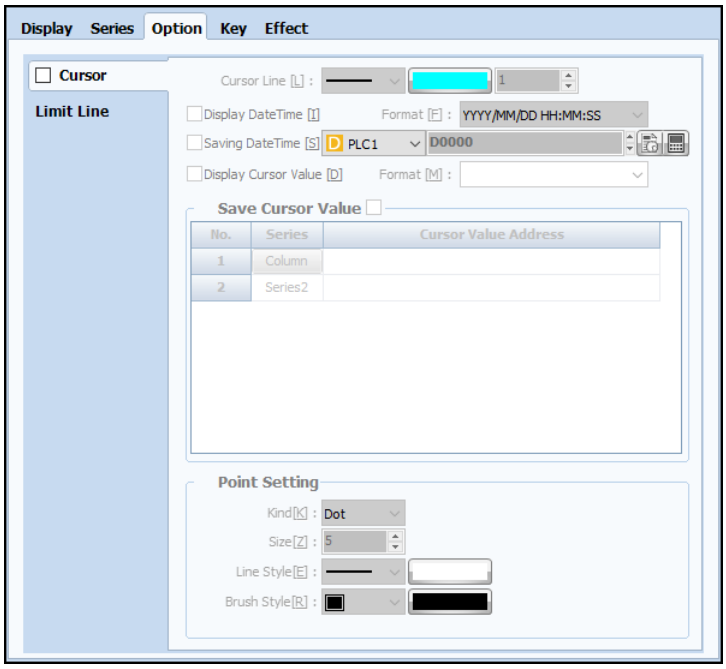


[Figure. Visible Condition]

17.3.3 Option Tab

Configure available record options including [Cursor] / [Indication Point] / [Limit Line] to enhance user convenience. These options are identical with the options provided in Chapter 17.1 [Graph Object] except

[History].

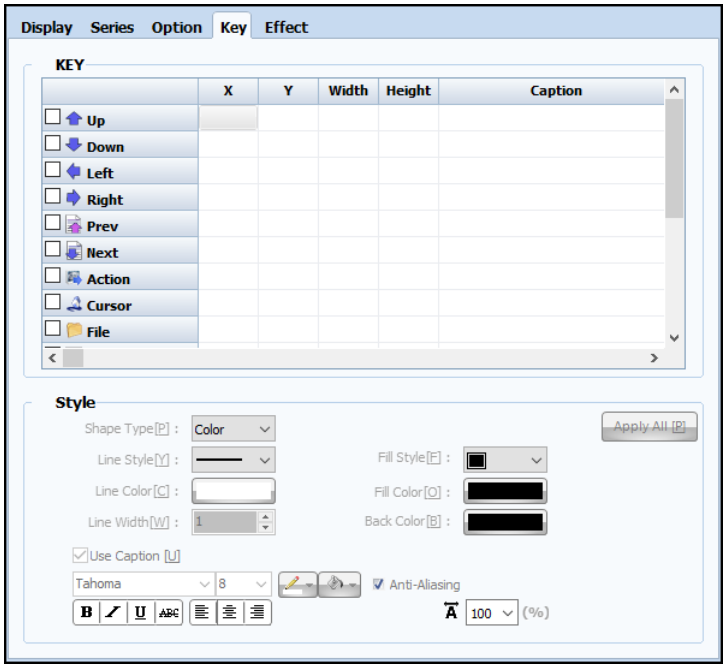


[Figure. Option]

17.3.4 Key Tab

Create a Record key.

If [Option] - [Cursor] is configured, you can create a key to handle the cursor point. Refer to Chapter 17.1 [Graph Object] for more details.

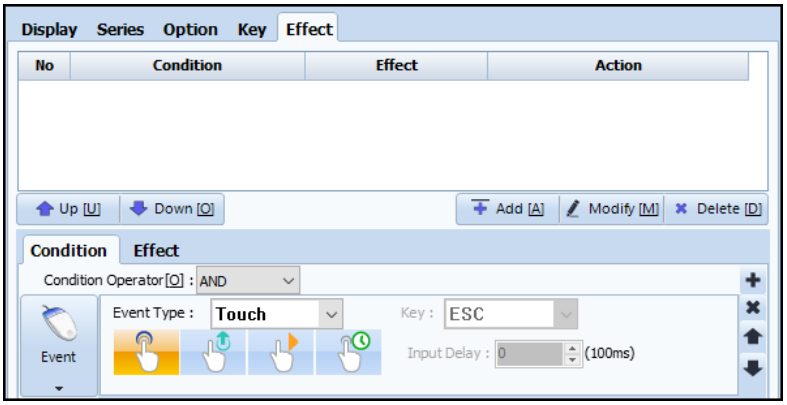


[Figure. Key Tab]

17.3.5 Effect Tab

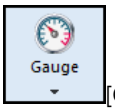
Add an additional [Effect & Action] to the Object.

Refer to Chapter 7.6 [Effect & Action] for more details.



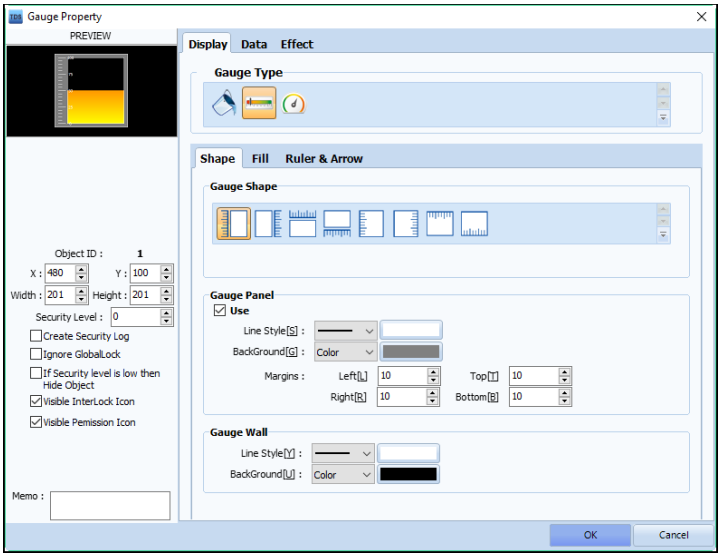
[Figure. Effect - Record]

17.4 Gauge Object



[Gauge] refers to all visual expressions of a quantitative figures in shapes and forms of length, angle or shape.

Top Design Studio offers a familiar, and intuitive Gauge Object for the user's convenience in checking various data. [Fill] / [Bar] / [Circular] gauges are available.

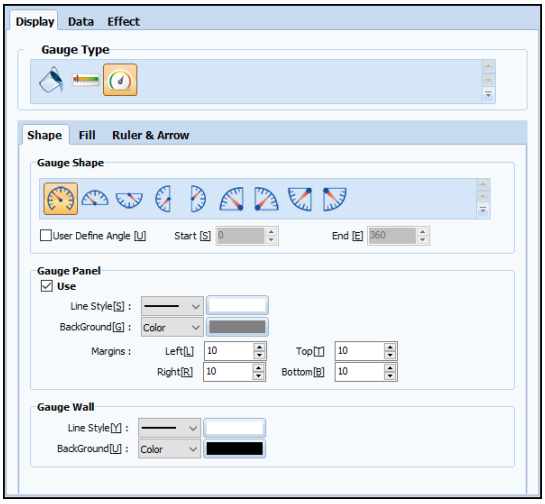


[Figure. Gauge Object]

17.4.1 Display Tab - Shape

Configure the display of the gauge, and various shapes and fill settings depending on the Gauge Type.

Configure the gauge shape form the [Shape] tab.



[Figure. Display Tab]

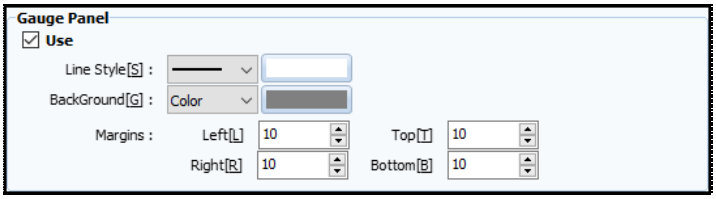
(1) Gauge Shape

[Gauge Shape] is available for [Gauge Type]s of [Bar] and [Circular], while [Fill] does not require a specific [Gauge Shape]. For a [Circular] gauge, you can configure a central angle of the circular sector.

[Figure. Gauge Shape]

(2) Gauge Panel

Configure detail settings of [Line] / [Background] / [Margin] for [Gauge Panel] which refers to the entire gauge object.

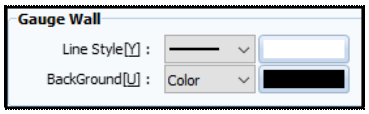


[Figure. Gauge Panel]

No.	Gauge Panel		Description
1	Line Style[S]		Configure the line style and line color of the outline of the object.
2	Background[G]		Configure the background and background color of the object.
3	Margin	Left[L]	Configure the margin to the left of the gauge in the object.
		Right[R]	Configure the margin to the right of the gauge in the object.
		Top[T]	Configure the margin to the top of the gauge in the object.
		Bottom[B]	Configure the margin to the bottom of the gauge in the object.

(3) Gauge Wall

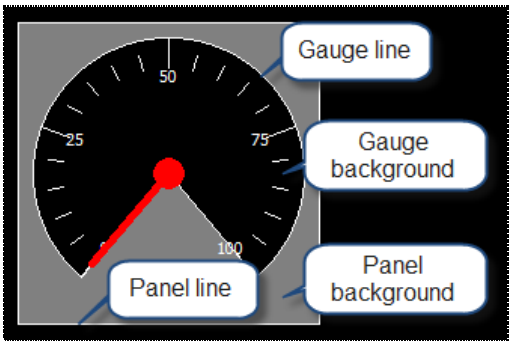
Configure the background inside of the gauge, not the object.



[Figure. Gauge Wall]

No.	Gauge Wall	Description
1	Line Style[Y]	Configure the line style and line color of the outline of the gauge .
2	Background[U]	Configure the background and background color of the gauge.

A preview is provided for the currently configured settings.

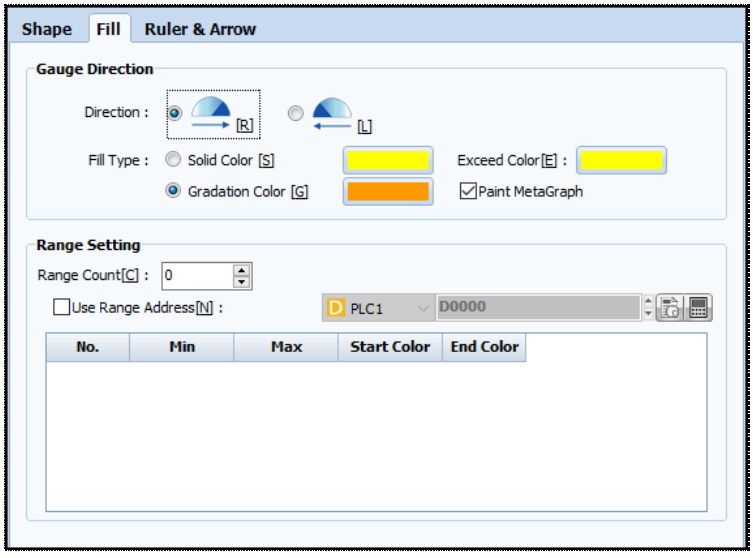


[Figure. Gauge Panel, Gauge Wall]

17.4.2 Display Tab - Fill

Configure direction and type of fill.

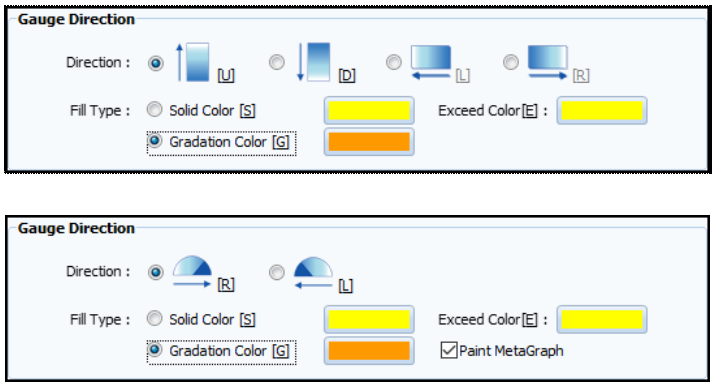
Furthermore, you can change the fill color in parcels.



[Figure. Fill Setting]

(1) Gauge Direction

Configure the direction in which the gauge will show the data. Also configure the fill direction for gauge display. For a [Fill] gauge, configure the direction and color as configured for a [Bar] gauge.

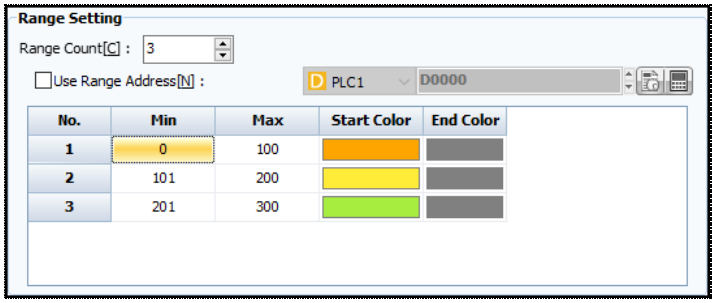


[Figure. Gauge Direction]

No.	Gauge Direction		Description
1	Direction	[U]	Fill the gauge from bottom to top.
		[D]	Fill the gauge from top to bottom.
		[L]	Fill the gauge from right to left.
		[R]	Fill the gauge from left to right.
		[L]	Move the gauge from right to left.
		[R]	Move the gauge from left to right.
2	Fill Type	Solid Color	Fill the gauge with a single color.
		Exceed Color	Configure the color in which the gauge will be filled, when the value exceeds the gauge range.
		Gradation Color	Configure the color to which gradation should be applied.
		Paint MetaGraph	For a [Circular] Gauge, select whether or not to fill the gauge upon moving the gauge.

(2) Range Setting

Configure ranges to apply different colors upon the gauge reading. Add the number of required ranges, and configure the [Min] / [Max] value of each range.

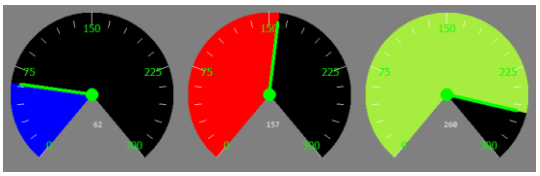


[Figure. Range Setting]

No.	Range Setting	Description
1	Range Count[C]	Configure the number of ranges.
2	Use Range Address[N]	Configure the address applicable for the Range display. If used along with the data address, you can vary the fill color upon change of the data.
3	No.	The sequential number of each range.
4	Min	The Minimum value of the range.
5	Max	The Maximum value of the range.

6	Fill Color	Configure the fill color for the corresponding range.

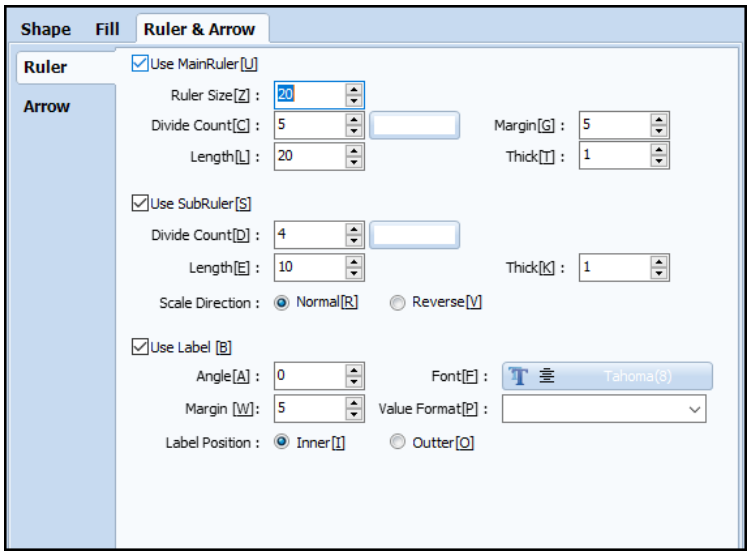
By configuring [Range Setting] the same gauge may show different colors upon the reading as shown below.



[Figure. Gauge with Range Setting]

17.4.3 Display Tab - Ruler & Arrow

Configure the ruler and arrow applied on the gauge.



[Figure. Ruler]

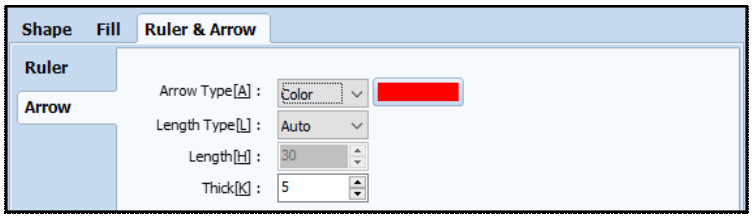
(1) Ruler

No.	Ruler		Description
1	Use MainRuler	Ruler Size	Configure the size of MainRuler.
		Divide Count	Configure the number of MainRulers to conform the entire gauge.
		Margin	Configure the margin for MainRuler.
		Length	Configure the length of the MainRuler between [1] and [100].
		Thick	Configure the thickness of a MainRuler between [1] and [10].
2	Use SubRuler	Divide Count	Configure the number of SubRulers to conform a single MainRuler.
		Length	Configure the length of a SubRuler between [1] and [24].
		Thick	Configure the thickness of a SubRuler between [1] and [10].
		Scale Direction	Configure the direction of SubRulers. For [Scale Direction] of [Normal], the SubRuler will start from the inner line of the MainRuler and extend toward the outside of the Gauge Object, while for [Reverse], the SubRuler will start from the end of the Gauge and extend toward the center of the Gauge Object.
3	Use Label	Angle	Configure the angle in which the label should be tilted.
		Font	Configure the font of the Label.

		Margin	Configure the margin of the label from the base point in the direction selected for [Label Position].
		Value Format	Select between one decimal place or two decimal places for the Label Value.
		Label Position	Select the [Label Position] between [Inner] and [Outer] with reference from the gauge outline.

(2) Arrow

[Arrow] is available only for [Circular] gauges. Configure the arrow with the shape and form of your interest.

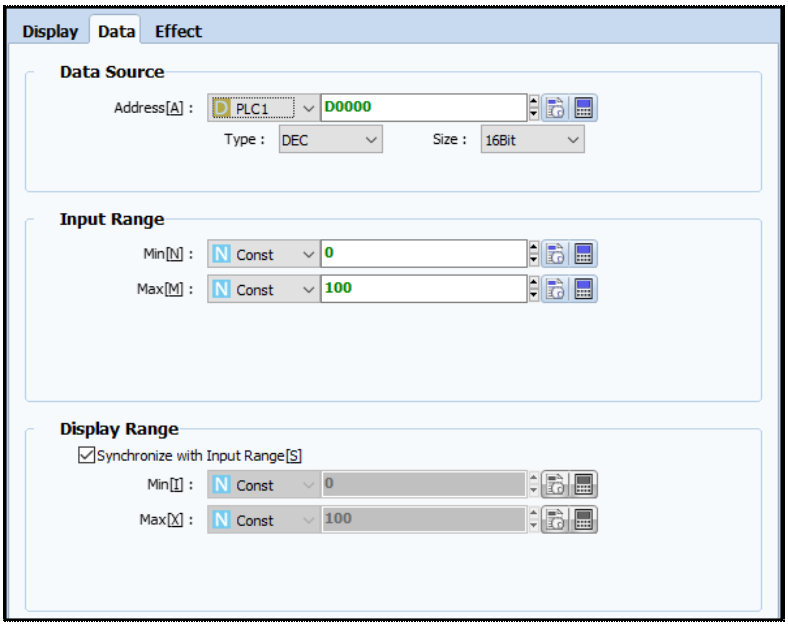


[Figure. Arrow]

No.	Range Setting	Description
1	Arrow Type	Configure the shape and color for the arrow.
2	Length Type	Select the [Length Type] between [Auto] and [Value]. Select [Auto] to allow the system to fit the Arrow to the size of the gauge. Select [Value] to define a fixed arrow length. If [Value] is selected, the arrow length will not change even if the size of the gauge object itself is changed.
3	Length	For [Length Type] of [Value], configure the arrow length.
4	Thick	Configure the thickness of the arrow between [1] to [10].

17.4.4 **Data Tab**

Configure the [Data Source] / [Input Range] / [Display Range] for the Gauge Object.

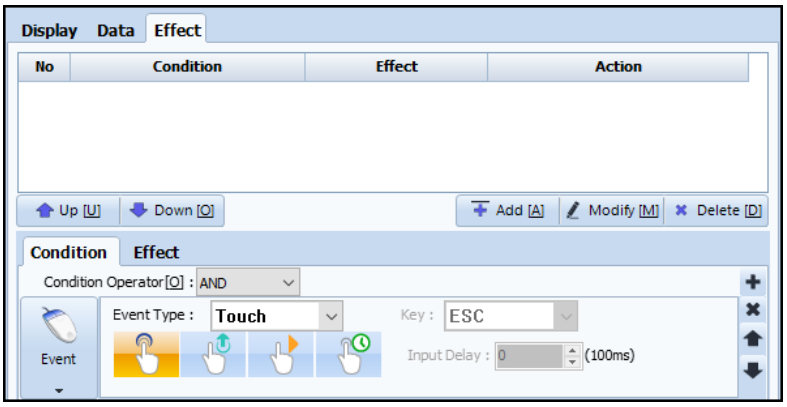


[Figure. Data]

No.	Data	Description
1	Data Source	Configure the address of the data source that is employed as the gauge value.
2	Input Range	Configure the data input range. Once the data reaches the Max value the gauge also reaches its entire length.
3	Display Range	Configure the data display range, which is the ruler label of the gauge.

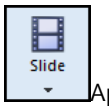
17.4.5 Effect Tab

Add an additional [Effect & Action] to the Object. Refer to Chapter 7.6 [Effect & Action] for more details.

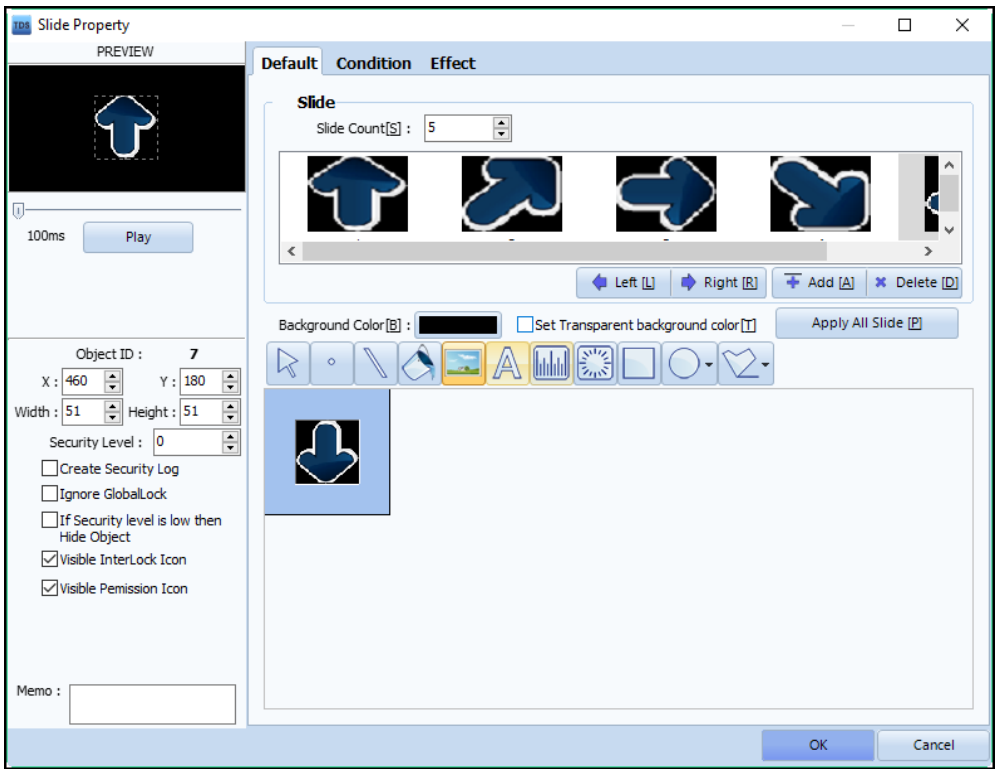


[Figure. Effect Tab]

CHAPTER 18 - Slide Object



Apply an animated effect by showing numbers of screens in a specific order with a specific interval with a [Slide] Object. You can employ up to 64 slides to a single slide object, and only shapes can be used a slide.



[Figure. Slide Object]

The [PREVIEW] shows the first slide, click [Play] to view a demonstration of the configured slide object.
The size of the slide object conforms the size of the slide screen.
Adjust the [Width] and [Height] provided on the left side of the property window to adjust the size of the slide screen.

18.1 Basic Tab

▶ Create a slide screen.

Configure the [Slide Count] to create slide screens corresponding to the configured number.
You can create new slides with the [Add] button.
The maximum [Slide Count] is 64.

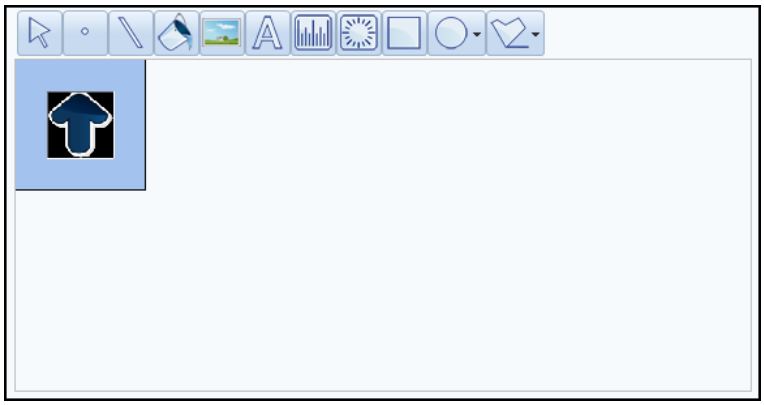
No.	Slide	Description
1	Left	Move the selected slide one spot to the left.
2	Right	Move the selected slide one spot to the right.
3	Add	Add a new slide to the right of the last slide.
4	Delete	Delete a selected slide.

▶Configure the [Background Color] of the slide.

No.	Slide Edit	Description
1	Background Color	Configure the [Background Color] of the slide.
2	Set Transparent background color	Apply a transparent background to the slide to only show the objects employed in each slide.
3	Apply All Slide	Click [Apply All Slide] to apply the background settings to all slides.

▶ Configure each slide.

Select the slide of your interest from the slide list to access the edit screen of the selected slide.



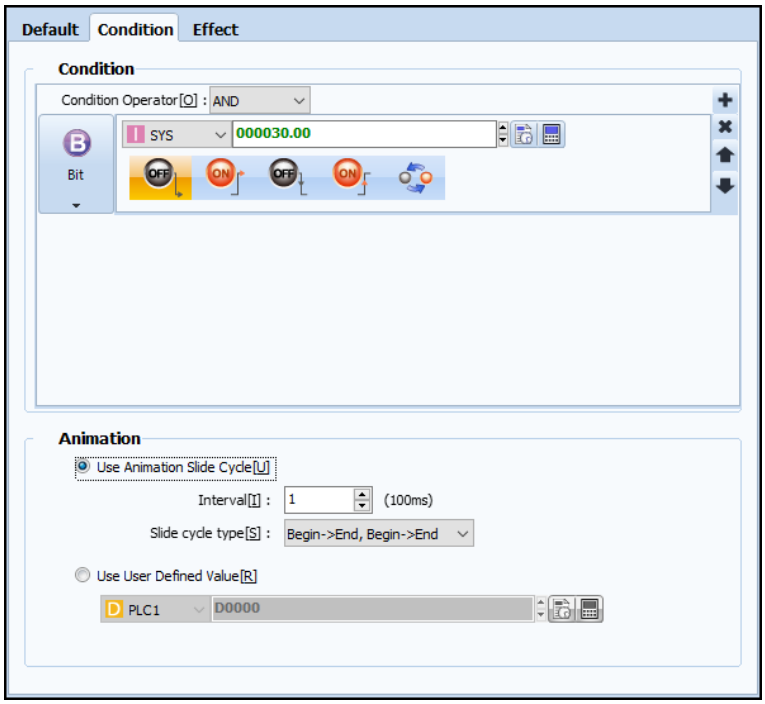
[Figure. Slide Edit]

Select an object to be included in the slide among [Select] / [Dot] / [Line] / [Paint] / [Image] / [String] / [Rectangle Ruler] / [Circle Ruler] / [Rectangle] / [Ellipse] / [Polygon]. An [Action] cannot be employed in a slide.
Refer to Chapter 8.1 [Objects(1)] for more details on how to add each object.
The screen size is same to the size of the slide object.
Configure the [Width] and [Height] of the slide object to change the resolution of the slide.

Zoom In and out of the slide with by scrolling the mouse wheel while the Ctrl key is pressed. This does not change the physical size of the slide.

18.2 Condition Tab

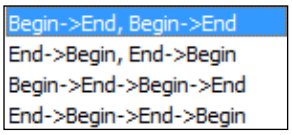
Configure the condition upon which the slide will be executed, and the [Animation] settings.



[Figure. Condition Tab]

From [Condition] field, configure the condition upon which the slide will be executed.
The slide object will be executed while the configured condition is true.
(Refer to Chapter 7.7 [Condition Tab] for more details.)

From [Animation] field, configure the [Interval] and [Direction] of the slide show.
Select between [Use Animation Slide Cycle] and [Use User Defined Value].
Enable [Use Animation Slide Cycle] to apply a fixed [Interval] and [Slide Cycle Type].
Configure the [Interval] in 100ms.
Select [Slide Cycle Type] among four options.

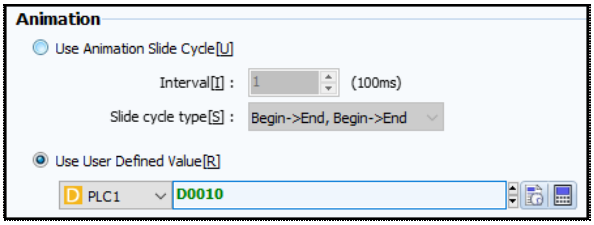


No.	Slide Cycle Type	Description
1	Begin->End, Begin->End	Each slide from the first to last slide will be shown in an ascending order. After the last slide, the slide show will restart from the first slide.
2	End->Begin, End->Begin	Each slide from the last to first slide will be shown in a descending order. After the first slide, the slide show will restart from the last slide.
3	Begin->End->Begin->End	Each slide from the first to last slide will be shown in an ascending order. After the last slide, each slide from the last to first slide will be shown in a descending order.
4	End->Begin->End->Begin	Each slide from the last to first slide will be shown in a descending order. After the

		first slide, each slide from the first to last will be shown in an ascending order.

With the above configuration, the slide show will be executed by displaying screens in the order of 1 > 2 > 3 > 4 > 1 > 2 > 3 > 4 > 1 > 2 >> 3 > 4 so on and so forth with an interval of 200ms.

Enable [Use User Defined Value] to employ a word address of which data becomes the slide number to be shown.



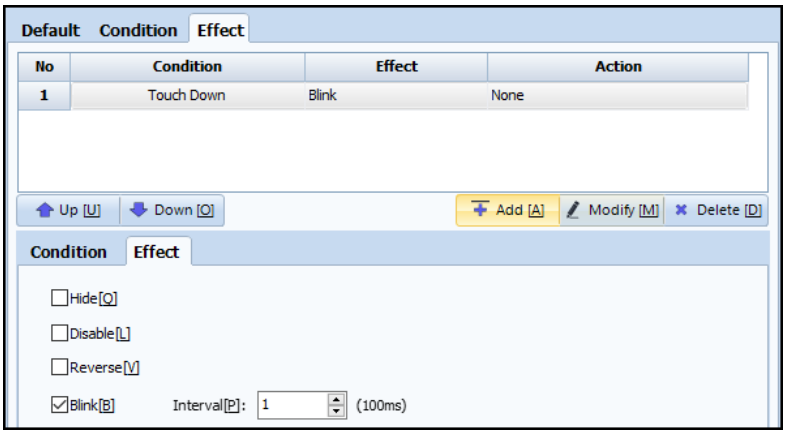
[Figure. Use User Defined Value]

Change the data of the [User Define Value Address] to navigate through multiple slides.

With the above configuration, when [MW000010] reads [1], slide No.1 will be shown.

18.3 Effect Tab

Configure effects of [Hide] / [Disable] / [Reverse] / [Blink] for the Log View Object.



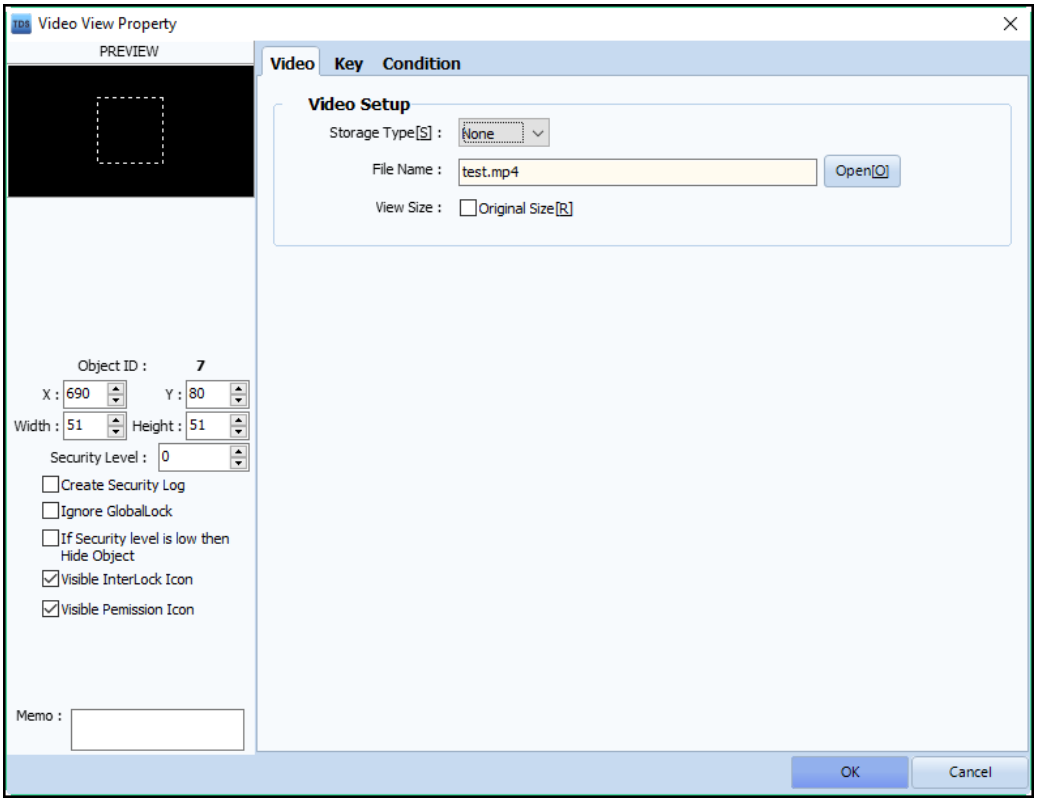
[Figure. Effect Tab]

No.	Effect	Description
1	Hide	Hide the Slide object upon a true condition.
2	Disable	Disable the Slide object upon a true condition.
3	Reverse	Reverse the color of the Slide object upon a true condition.
4	Blink	Blink the Slide object in a specific [Interval] upon a true condition.

CHAPTER 19 - Video Object

Play a video file on the screen with a [Video] Object.

Applicable video formats are [WMV] and [MP4]. The maximum file size is 300MByte.



[Figure. Video View Property]

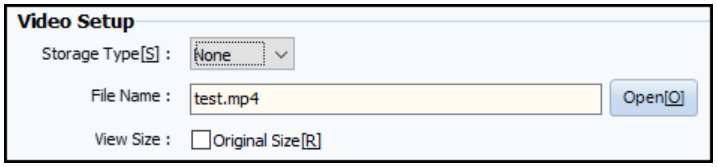
Caution! The TOP device may not support several video files according to its Codec.

Caution! Playing a large resolution video on a relevantly small object may cause buffering in the video.

Selecting [Original Size] for [View Size] will result in the best video quality. Resolution of 640 x 480 is recommended.

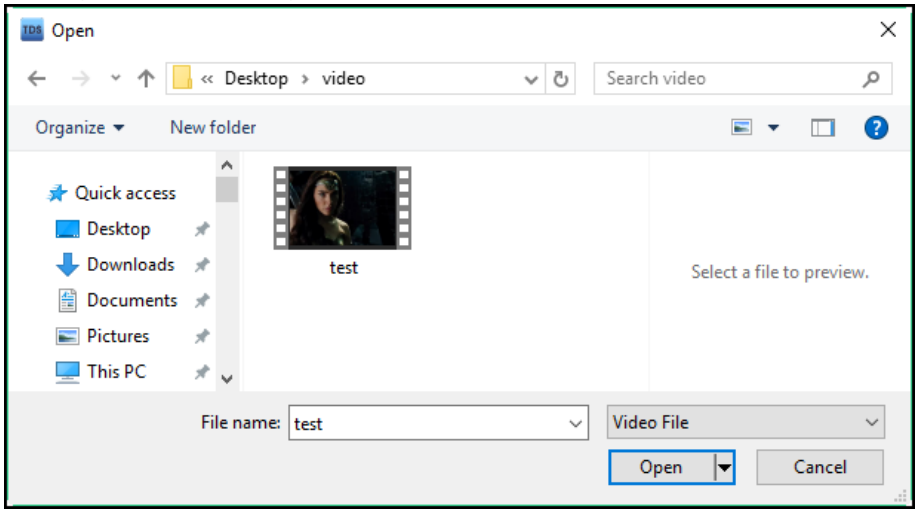
19.1 Video Tab

Load the applicable video file, and configure the [View Size] and [Storage Type].



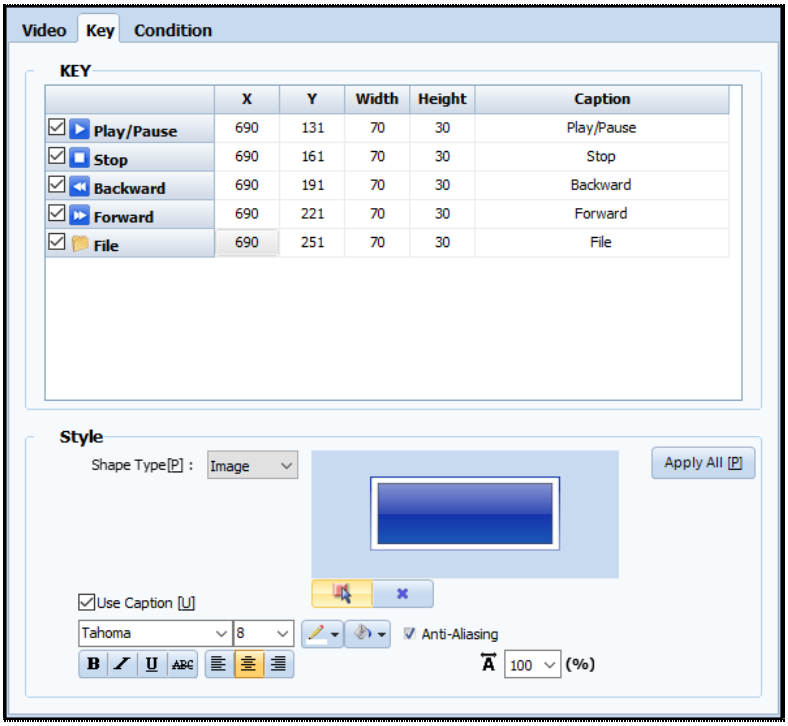
[Figure. Video Tab]

No.	Video Setting	Description

1	Storage Type	Select [None] to save the subject video file on the TOP device internal memory. Select [SD Card] to save the subject file on the SD Card inserted to the TOP device.
2	File Name	Upload the video file. Click [Open] to access the [Open] window (Browser) as shown below.  [Figure. Open Window] Select the Video file of your interest and click [Open] to upload the video file.
3	View Size	Enable [Original Size] to play the uploaded video at its original size. Enabling [Original Size] provides the best quality. Disable [Original Size] to play the uploaded video fit to the size of the Video Object.

19.2 Key Tab

Configure keys to be shown on the screen that controls the playing of the video.



[Figure. Key Tab]

Add or remove each of the five types of keys for a video object, with the checkboxes provided for each

key.Configure the X, Y coordinate, Width, Height and Caption of the Key.

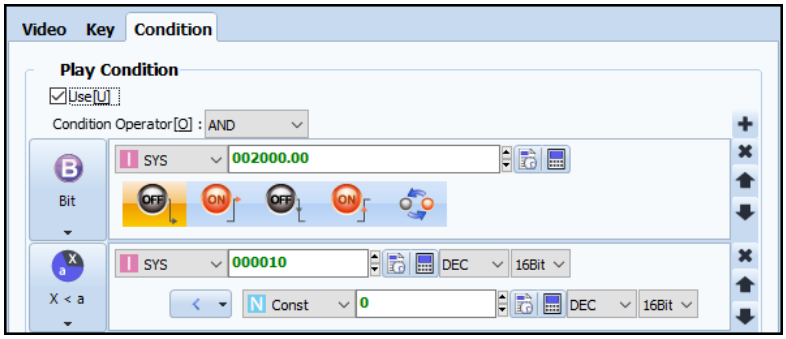
No.	Video Key List	Description
1	Play/Pause	Play or pause the video. If you [Pause] a video, a subsequent touch will resume the video from the previous spot.
2	Stop	Stop the video. A subsequent touch to the [Play/Pause] key will start the video from the beginning.
3	Backward	Move video backward.
4	Forward	Move the video forward.
5	File	Load the video file saved on the TOP internal memory.

19.3 Condition Tab

Configure the condition upon which the video object will be executed.

Disable [Use] to apply no condition, and play the video object at all times.

(Refer to Chapter 7.7 [Condition Tab] for more details.)

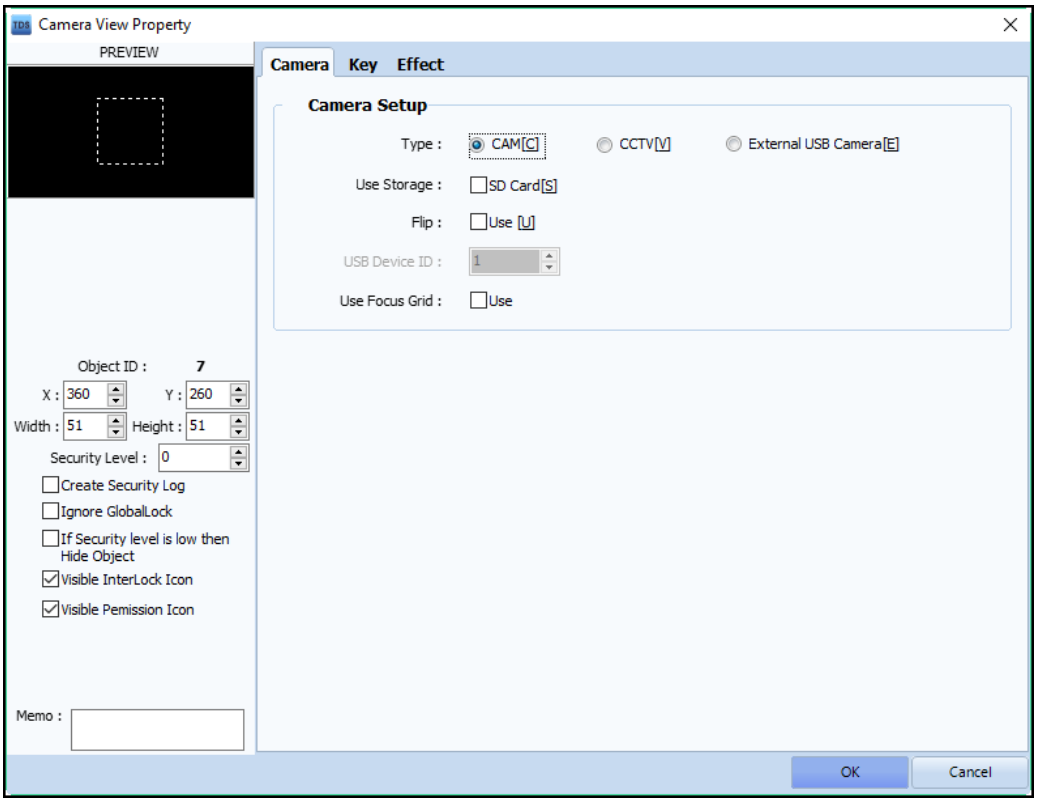


[Figure. Condition Tab]

CHAPTER 20 - Camera Object

Display or record a video shot from the [Internal Camera] / [External Camera] / [CCTV] with a [Camera] Object.

Camera function is provided in TOPR Premium models.



[Figure. Camera Object]

20.1 Camera Tab

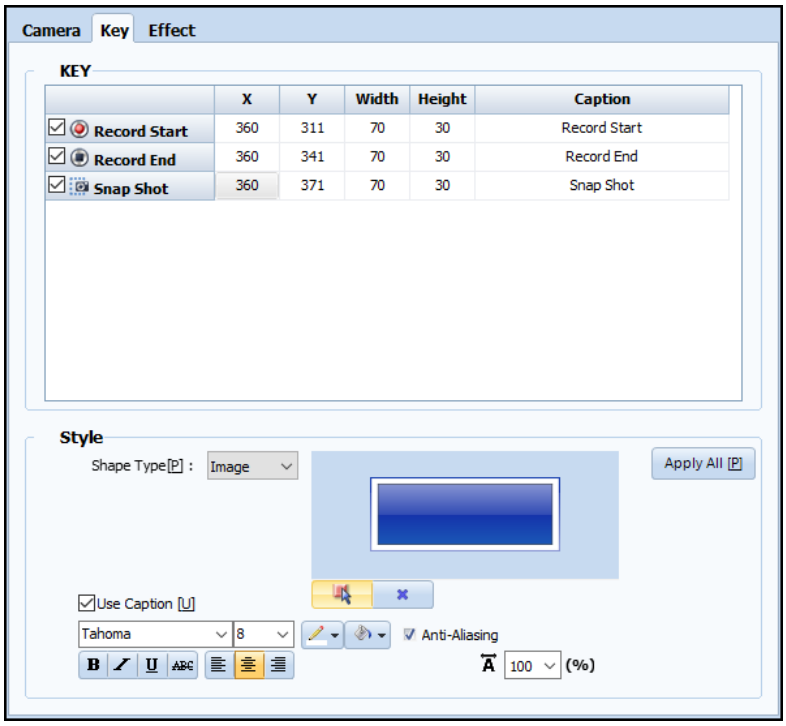
Configure various settings according to the [Type] of camera.

No.	Camera Setup	Description
1	Type	Select [CAM] to show footage from the front camera of a TOPR device. Select [CCTV] to show footage from a CCTV camera connected to the Video Port of a TOPR device. Select [External USB Camera] to show footage from an external USB camera connected to the USB port of a TOPR device.
2	Use Storage	Select [SD Card] to save the footage from the camera on the SD card inserted to a TOPR device. Do not select [SD Card] to save the footage on the TOPR internal memory.
3	Flip	Enable [Use] to flip the footage upside down.
4	USB Device ID	For [Type] of [External USB Camera], select the ID of the USB device. Go to [Control Panel] - [Option Device] - [USB Manager] to check the applicable USB ID.
5	Use Focus Grid	Enable [Use] to show the objects overlapping with the video object, rather than hiding

		such objects behind the Camera object.

20.2 **Key Tab**

Configure Keys required for a Camera Object.
Available Keys are [Record Start] / [Record End] / [Snap Shot].



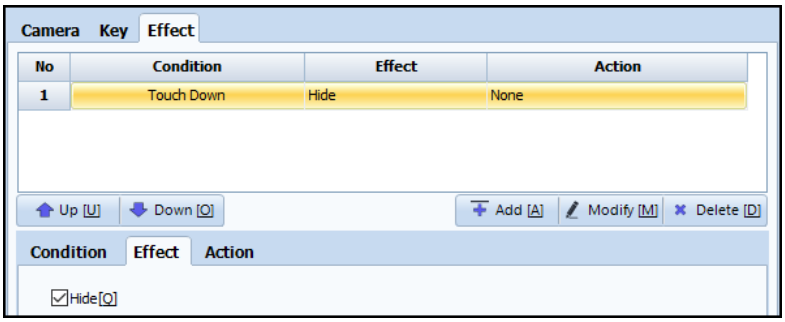
[Figure. Key Tab - Camera]

No.	Key	Description
1	Record Start	Start recording the footage. While recording the video, a red dot will blink on the upper left corner of the camera object. The video will be saved on the [SD Card] or [TOP internal Memory] depending on the configuration of [Use Storage] from the Camera tab. If saved on the TOP device, the video will be located in the [CameraRecord] folder.
2	Record End	Conclude recording the footage. The blinking red dot disappears.
3	Snap Shot	Capture the current footage to a still image. The snap shot is saved in the [CameraScreenShot] folder, if [SD Card] is not selected as [Use Storage].

Configure detail settings of each key from [Style].
Select among [Color] (Rectangle) and [Image].
Click [Apply All] to apply the current configuration to all applicable keys.

20.3 **Effect Tab**

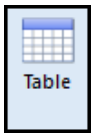
Add a [Hide] effect or [Action] according to a specific condition.



[Figure. Effect Tab]

Configure a [Hide] effect to hide the camera object upon a true condition.
Refer to Chapters 7.6 through 7.9 for more details.

CHAPTER 21 - Table Object

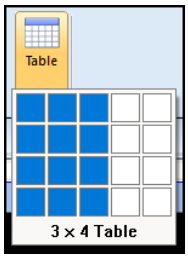


Express data in a table with a [Table] Object.

Click the [Table] menu from [Object], a 5 x 4 table will appear as shown below.

Move the mouse so that the blue colored table conforms the columns and rows of your interest. Left click and span the table object on the edit screen to the size of your interest.

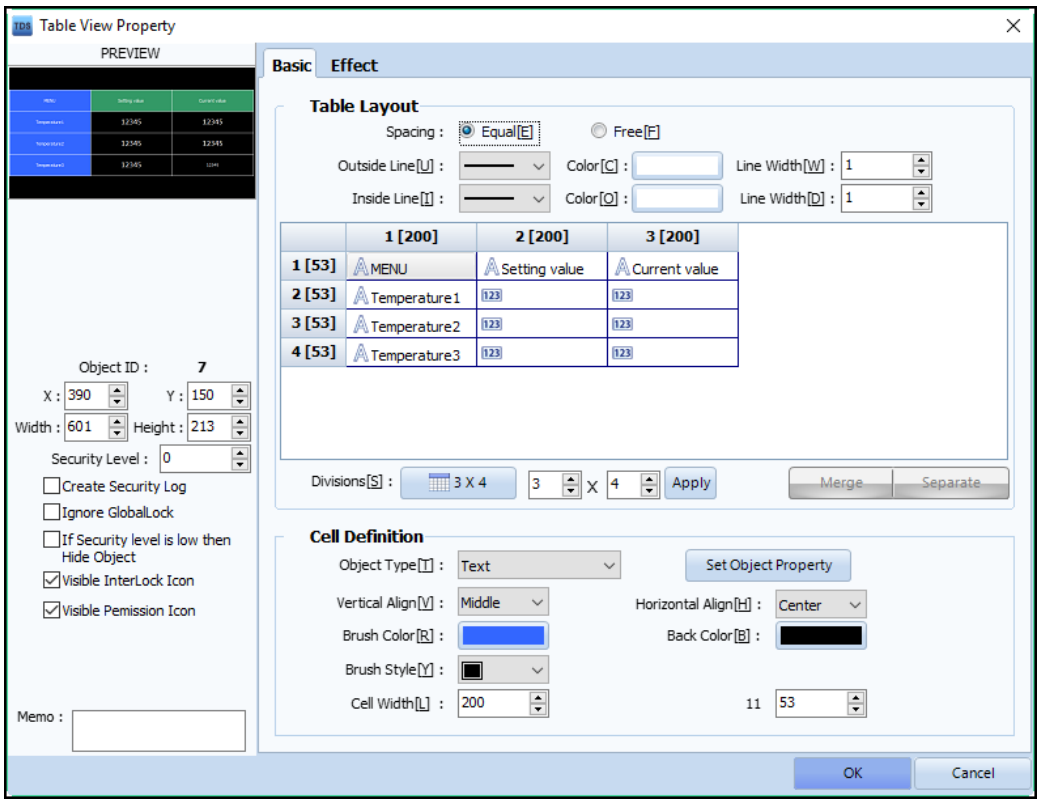
As shown below, drag the trackers provided on the table object to adjust the size of the Table Object. Access the [Table View Property] window with a double click to the object or by selecting [Property] from the drop down menu upon a right click to the Table object.



[Figure. New Table]

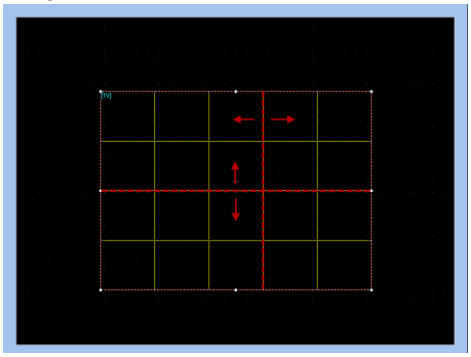
21.1 **Basic Tab**

Configure the [Table Layout] and [Cell Definition].



[Figure. Table View Property Window]

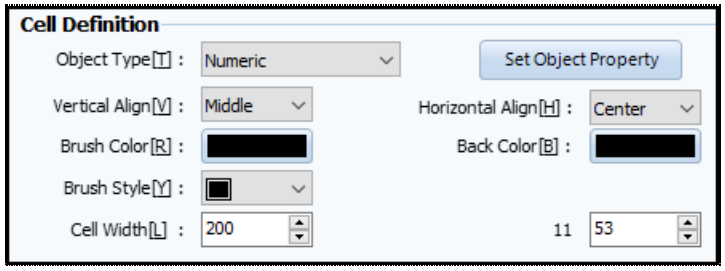
21.1.1 Table Layout

No.	Table Layout	Description
1	Spacing	Select [Spacing] between [Equal] and [Free]. Select [Equal] to apply an equal distance between each cell. You can subsequently adjust the size of each cell, yet each row and column will have the same size. Select [Free] to change the size of each row or column. To change the size of a cell, place the cursor on a yellow line to change the cursor to a hand icon. Drag the hand to change the size.  After changing cell size with [Free], select [Equal] once again, to adjust the size of each cell so that all cells have the same width and height.
2	Outside Line	Configure the [Line Style] / [Line Color] / [Line Width] of the line conforming the external border of the Table Object.
3	Inside Line	Configure the [Line Style] / [Line Color] / [Line Width] of the lines conforming the interior of the Table Object.
4	Divisions	Configure the number of columns and rows. Configure each number of columns and rows and click [Apply].

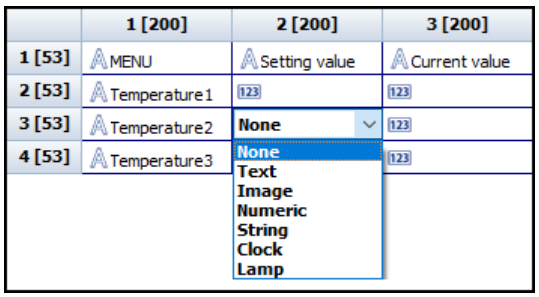
The [Merge] button is available when two or more adjacent cells are selected.
Select two or more adjacent cells and click [Merge] to merge the selected cells to a single cell.
The [Separate] button is available when a merged cell is selected. Select a merged cell and click [Separate] to separate the merge cells to the original number of cells.

21.1.2 Cell Definition

Assign objects to each cell.



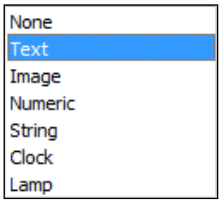
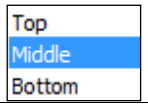
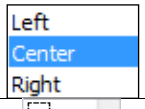
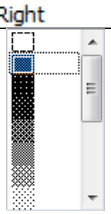
[Figure. Cell Definition]



From the above table, double click an empty cell to access the list of applicable objects from a drop down menu.

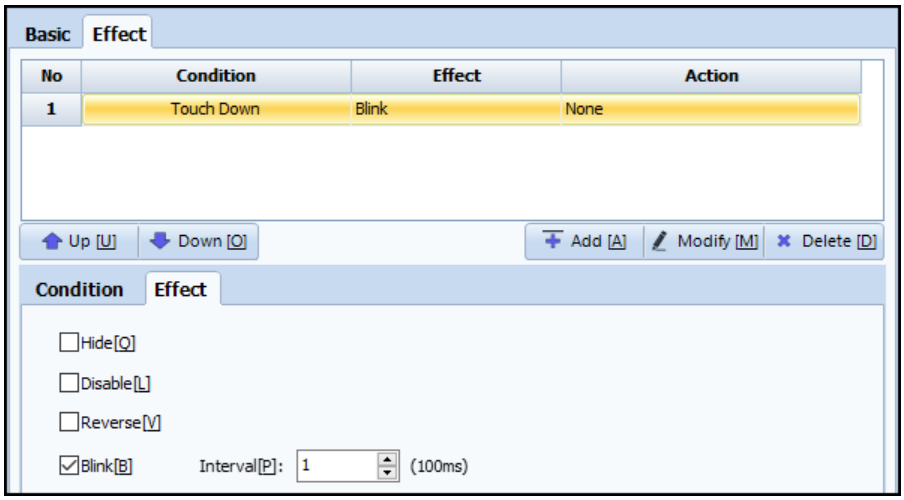
Select an object among [Text] / [Image] / [Numeric] / [String] / [Clock] / [Lamp].

You can also configure the applicable object for each cell from the [Cell Definition] field.

No.	Cell Definition	Description
1	Object Type	Select the object type applicable to a selected cell.  Select an object among [Text] / [Image] / [Numeric] / [String] / [Clock] / [Lamp]. Click [Set Object Property] to open the corresponding property window of each object type.
2	Vertical Align	Select the vertical alignment of objects within cells among [Top] / [Middle] / [Bottom]. 
3	Horizontal Align	Select the horizontal alignment of objects within cells among [Left] / [Center] / [Right]/ 
4	Brush Style Brush Color Back Color	 Configure the pattern to occupy each cell with [Brush Style]. Select among the 17 patterns. The black part will be colored with the [Brush Color] and the white part will be colored with the [Back Color].
5	Cell Width Cell Height	For [Spacing] of [Equal], changing the [Cell Width] and [Cell Height] will be applied to all cells, and the overall size of the table object will change accordingly. For [Spacing] of [Free], the [Cell Width] and [Cell Height] of the row and column of the selected cell will change.

21.2 **Effect Tab**

Apply effects to the Table objects according to a Bit Condition or Word Condition.

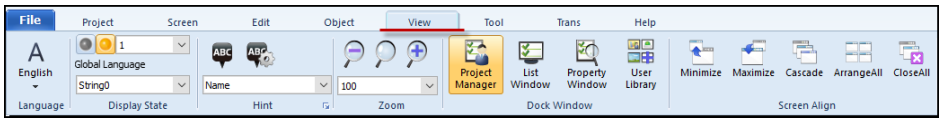


[Figure. Effect Tab]

No.	Effect	Description
1	Hide	Hide the table object upon a true condition.
2	Disable	Disable the table object upon a true condition.
3	Reverse	Reverse the color of the table object upon a true condition.
4	Blink	Blink the table object in a specific [Interval] upon a true condition.

CHAPTER 22 - View

Please find the instructions for [View] Menu.
The View menu allows you to configure various settings for the display of the TOP Design Studio software. Configure [Language] / [Hint] / [Zoom] and other settings. Manage [Docking Windows] and [Screen Align].



[Figure. View Menu]

22.1 Language

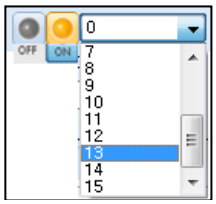
Select the system language for the TOP Design Studio software.
English is selected as default, and you can select Korean from [View] - [Language].

[Figure. Language]

22.2 Display State

22.2.1 Status Number

Use [Status Number] to show objects as they are running on a TOP device according to the data status of each configured address.

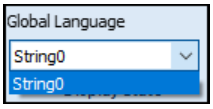


[Figure. Status Number]

For Bit Addresses, the corresponding objects are shown for each [On] and [Off] status. Select [On] to show the objects when the corresponding bit address reads [On]. This state refers to Status No. 1. Select [Off] to show the objects when the corresponding bit address reads [Off]. This state refers to Status No. 0. For word addresses, objects are shown for states for each status from the first [0] bit to the last [15] bit.

22.2.2 Global Language

Select a [Global Language] from the drop down menu showing the list of global languages configured from [Project] - [String] - [Language Setting]. You can add strings from [0] to [15].

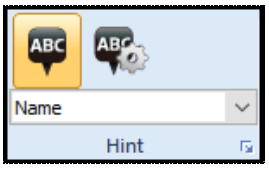


[Figure. Global Language]

22.3 Hint

Hint refers to the brief description provided on the upper left corner of each object. Types of hint include [Name] / [All Address] / [Read Address] / [Write Address] / [ID] / [Memo], and detail settings for font and colors are available from [Hint Option].

22.3.1 Show Hint

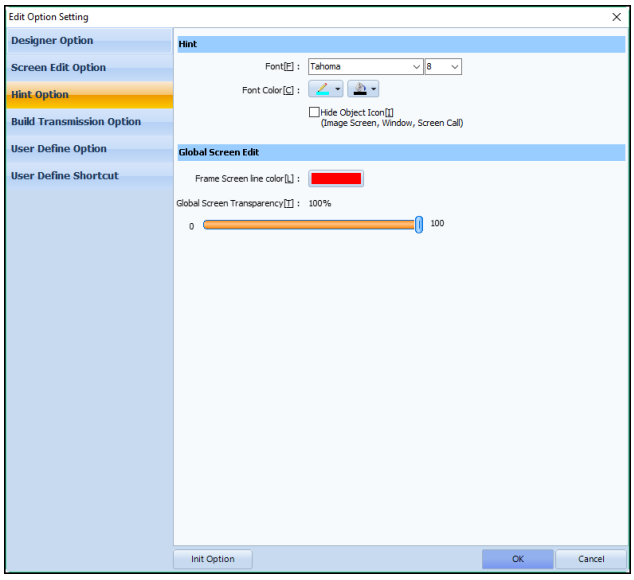


[Figure. Hint]

Configure whether or not to show hint balloons with [Show Hint]. Click the icon to turn the background orange to show hints. Click the icon again to turn the background blue to hide hints.

22.3.2 Hint Option Setting

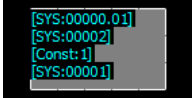
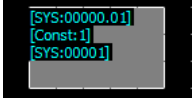
Configure the [Font] / [Background] / [Size] of hints. Refer to Chapter 6.9.4 [Option Setting] (3) [Hint Option] for more details.



[Figure. Hint Option]

22.3.3 **Hint Type**

Select the type of hint to be shown among [Name] / [All Address] / [Read Address] / [Write Address] / [ID] / [SEQUENCE] / [Memo].

No.	Type	Description	
1	Name	Show the abbreviation of the object name. Detail information for each abbreviation is provided in the following table.	
2	All address	Show both Read Address and Write Address. No hint will be provided if no object address is assigned.	
3	Read Address	Show the address from which the object reads data.	
4	Write Address	Show the target address to which the object sends data.	
5	ID	Show the object ID, numbered in a sequential order. The first object added to the current screen has an ID of [00001], the second object has an ID of [00002].	
6	Memo	Show the message configured from [Memo] of the Object Property.	

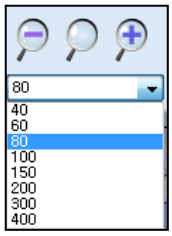
Refer to the following Object Name Abbreviation Table.

No.	Object	English	Abbreviation
1	Dot	Dot	[DT]
2	Line	Line	[LN]
3	Ellipse	Ellipse	[EL]
4	Arc	Arc	[AC]
5	Pie	Pi	[PI]
6	Chord	Chord	[CD]
7	Rectangle	Rectangle	[RT]
8	Polyline	Polyline	[PL]
9	Polygon	Polygon	[PG]
10	Image	Image	[IG]
11	Text	Text	[TX]
12	Rectangle Scale	Rectangle Scale	[RL]
13	Circle Scale	Circle Scale	[CL]
14	Bit Lamp	Bit Lamp	[BL]
15	Multiphase Lamp	Multiple Lamp	[ML]
16	Momentary Switch	Momentary Switch	[PS]
17	Bit Switch	Bit Switch	[BS]

18	Selector	Select Switch	[SS]
19	Screen Change Lamp	Screen Change	[SC]
20	User Defined Lamp	User defined Lamp	[UL]
21	Numeric	Numeric	[NU]
22	String	String	[ST]
23	Clock	Clock	[CK]
24	Message	Message	[MV]
25	Window	Window	[WV]
26	Screen Call	Screen Call	[SC]
27	Log View	Log View	[LV]
28	Alarm View	Alarm View	[AV]
29	Graph	Graph	[GV]
30	Trend	Trend	[TV]
31	Log Graph	Log Graph	[LG]
32	Gauge Graph	Gauge Graph	[GG]
33	Slide	Slide	[SL]
34	Video	Video	[VV]
35	Camera	Camera	[CV]
36	Table	Table	[TV]

22.4 Zoom

Zoom in and out of the edit screen. 100% is selected as default, where you can zoom in and out within a range from [40%] to [400%].



[Figure. Zoom]

You can scroll the mouse wheel while holding the [Ctrl] key to zoom in and out of the view.

No.	Zoom		Function
1	Zoom In		Zoom in to the current view. The maximum zoom ratio is 400%.
2	Zoom Default		Restore to 100%.
3	Zoom Out		Zoom out of the current view. The minimum zoom ration is 40%.
4	User Defined		The current zoom ratio is shown, and configure a specific ratio to zoom in or out of the current view.

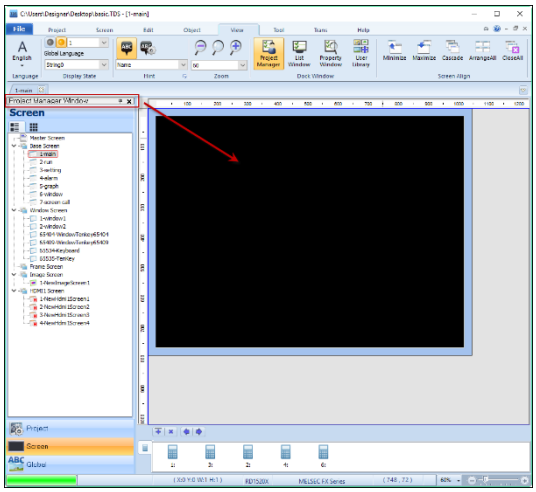
22.5 Docking Window

Docking windows are literally windows that are docked to the screen as magnets are attached to a metal plate.
Add necessary docking windows with frequently used functions as docking windows for easy access.
TOP Design Studio offers docking windows of [Project Manager] / [List] / [Property] / [User Library].

22.5.1 How to handle a Docking Window.

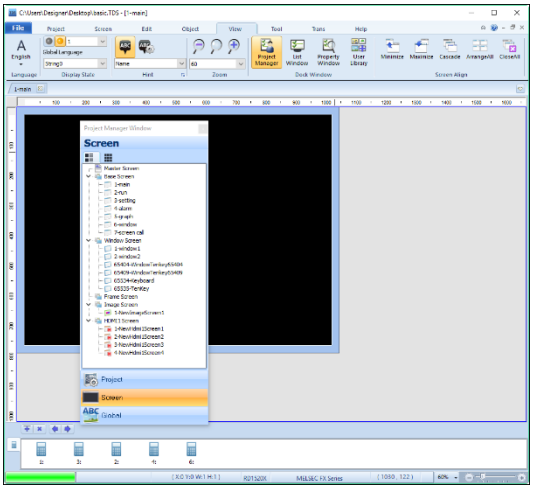
You can dock or float a docking window to the work screen, and hide or show the docking window.

(1) Docking Window - Float
A simple drag of the title of a docking window will detach the window from its docked position.



[Figure. Detaching a Docking Window]

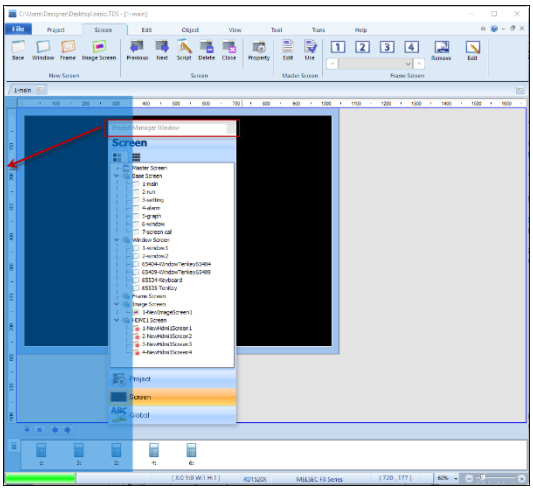
Click the [Title] of a fixed docking window and drag the mouse cursor to a point outside of its fixed location to remove the docking window from its fixed position.



[Figure. Detaching a Docking Window]

(2) Docking to the Left / Right

A floating docking window can be docked to the left, or right, whichever applicable, with a simple drag of its title to a fixed position. Every Docking Window can be docked to the left or right, whichever preferable.

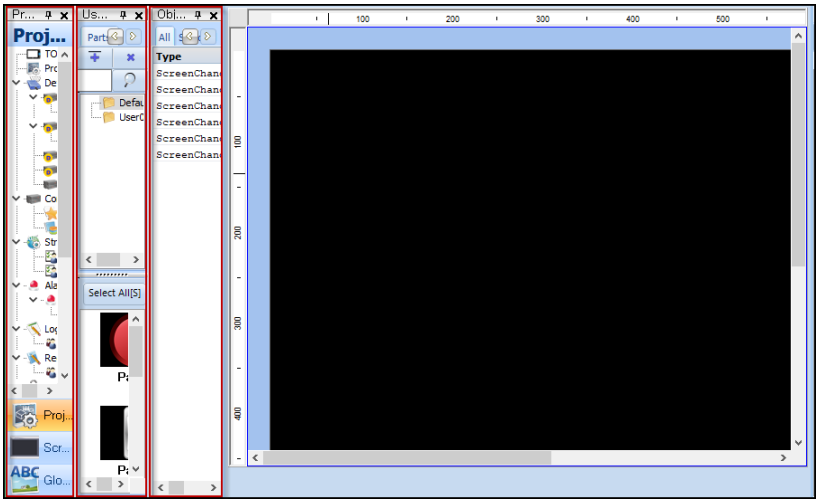


[Figure. Docking Window - Dock]

(3) Auto Hide

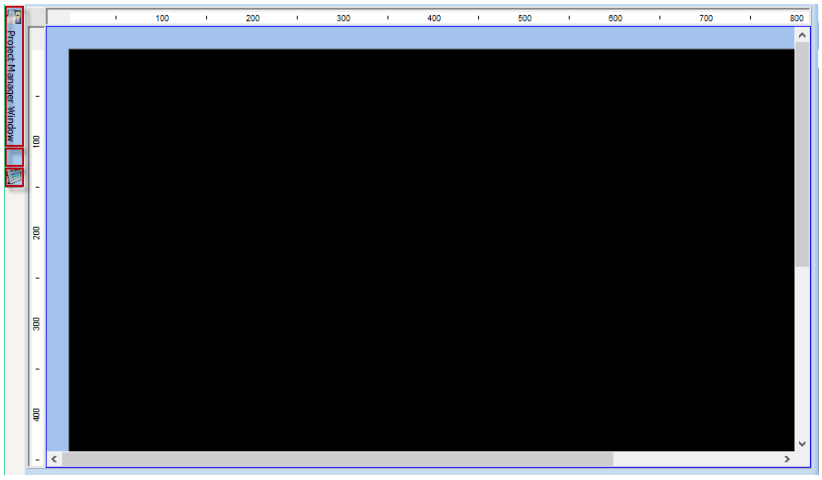
When multiple docking windows are fixed to the screen, you can hide a specific docking window and open the docking window only when necessary.

① Docking Window - Auto Hide

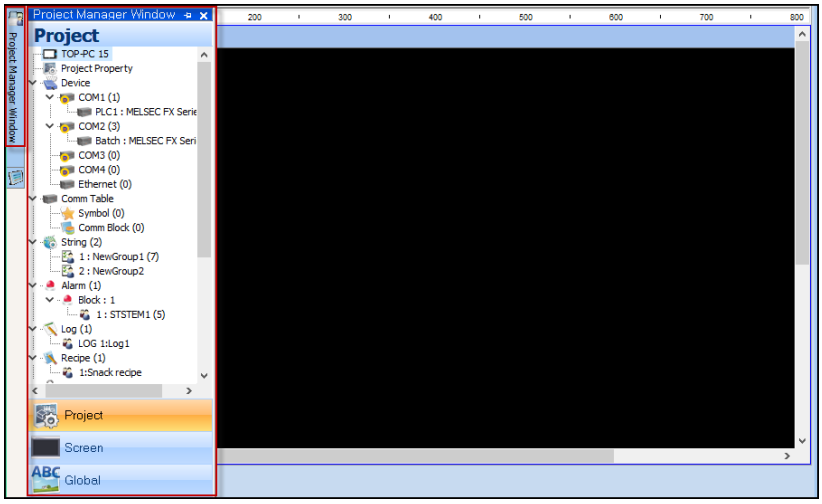


[Figure. Auto Hide Disabled]

If multiple docking windows are open without enabling [Auto Hide], the screen will be unorganized, and will provide little space to draw the project as shown below. Using [Auto Hide] in these circumstances hides the docking windows behind a small tab provided on both ends of the window, providing larger drawing space. Normally, only the headers of each docking window are shown as the below [Figure. Auto Hide Enabled], and the docking window of your interest will slide out of the tab as the below [Figure. Select Window Header]. To dock the expanded window, turn the thumbtack icon to a vertical position with a click. Turn the thumbtack icon back to a horizontal position with a subsequent click and hide the docking window again.



[Figure. Auto Hide Enabled]



[Figure. Select Window Header]

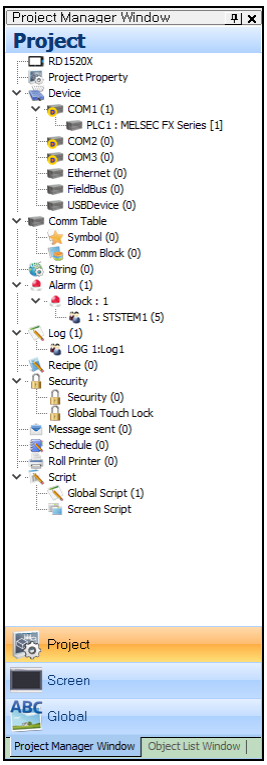
You can move the position of a docking window by dragging the header of a docking window.

22.6 Project Manager

Project Manager provides a comprehensive overview and management of the project settings, screens, global settings, and resource.
[Project Manager] consists of [Project] / [Screen] / [Resource] / [Global].

22.6.1 Project

[Project Manager] - [Project] is a global setting that provides a general overview of all configurations for [Project Property] / [Symbol] / [Communication Block] / [Multi-language] / [Alarm] / [Log] / [Recipe] / [Security] / [Script] and others. A double click to each item will open the corresponding setting window.



[Figure. Project]

No.	Project	Description
1	Select HMI	Access and change the current Touch Model.
2	Project Property	Access and configure the current Project Property. (Refer to Chapter 4.12.1 [TOP Setting] for more details.)
3	Device	Configure the current Device. (Refer to Chapter 4.12.2 [PLC Setting] for more details.)
4	Symbol	Access the current symbols. Open [Symbol Manager] with a double click. (Refer to Chapter 4.6 [Symbol] for more details.)
5	Communication Block	Access the communication blocks. Open the [Communication Block Setting] Window with a double click. (Refer to Chapter 4.4. [Communication Block] for more details.)
6	String Table	Access the String Tables. (Refer to Chapter 4.4. [String] for more details.)
7	Alarm	Access the alarm data. (Refer to Chapter 4.1 [Alarm] for more details.)
8	Log	Access the Log Data. (Refer to Chapter 4.2 [Log] for more details.)
9	Recipe	Access the recipe data. (Refer to Chapter 4.3 [Recipe] for more details.)
10	Security	Access the security settings. (Refer to Chapter 4.7 [Security] for more details.)
11	Script	Access script settings. (Refer to Chapter 4.5 [Script] for more details.)
12	Message Sent	Open the Message Manager. (Refer to Chapter 4.10 [Message Sent] for more details.)
13	Schedule	Access the Schedule Table Dialog. (Refer to Chapter 4.9 [Schedule] for more details.)

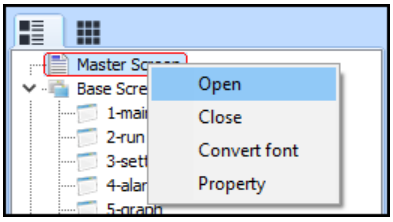
14	Roll Printer	Access the Roll Printer Edit window. (Refer to Chapter 4.11 [Roll Printer] for more details.)

22.6.2 **Screen**

View the overall configuration of project screens.

The screen tree consists of [Master Screen] / [Base Screen] / [Window Screen] / [Frame Screen] / [Image Screen].

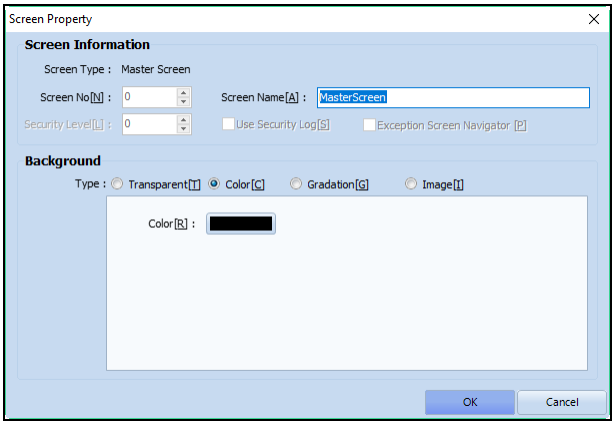
(1) Master Screen



[Figure. Master Screen]

No.	Pop-up Menu	Description
1	Open	Open the selected Master Screen.
2	Close	Close the selected Master Screen.

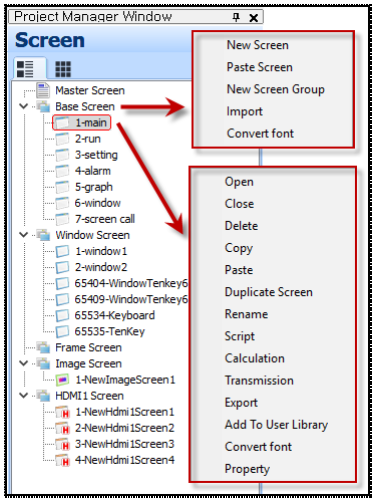
① Screen Property - Master Screen



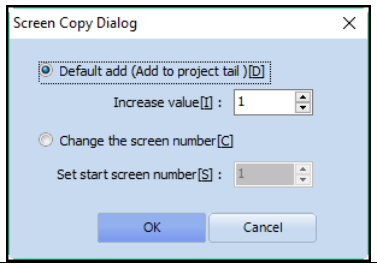
[Figure. Screen Property - Master Screen]

No.	Property	Description
1	Screen Number	The Master Screen Number is shown. There is only one Master Screen, and the number cannot be changed.
2	Screen Name	The Master Screen Name is shown.
3	Security Level	This function is not available for the Master Screen.
4	Use Security Log	This function is not available for the Master Screen.
5	Exception Screen Navigator	This function is not available for the Master Screen.
6	Background Type	Select the Background Type among [Transparent] / [Color] / [Gradation] / [Image].

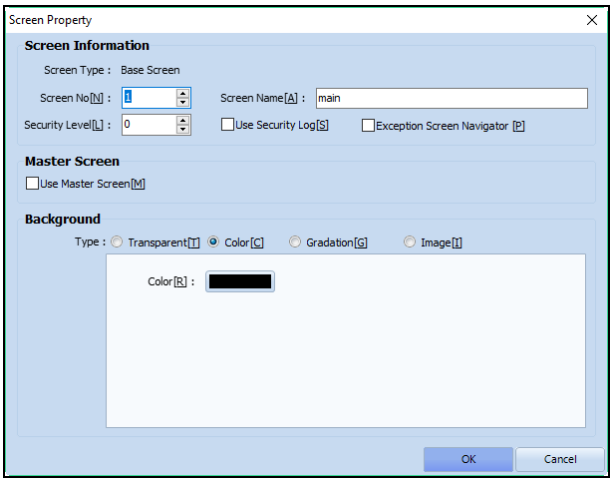
(2) Base Screen



[Figure. Base Screen]

No.	Pop-up Menu	Description
1	New Screen	Create a new Base Screen.
2	New Screen Group	Create a new Screen Group to group Base Screens.
3	Import	Import an existing Base Screen.
4	Open	Open the selected Base Screen.
5	Close	Close the selected Base Screen.
6	Delete	Delete the selected Base Screen.
7	Copy	Copy the selected Base Screen.
8	Paste	[Copy] is the prerequisite for [Paste]. Paste a Base Screen copied to the clipboard as a Base Screen of the current project, or as a Base Screen of another project.
9	Duplicate Screen	Add a Base Screen identical to the selected Base Screen according to the configuration of [Screen Copy Dialog]. Select [Duplicate Screen] to open [Screen Copy Dialog]. Select [Default add (Add to project tail)] to add an identical Base Screen to the end of the current Base Screen List with the next number of the largest existing number of Base Screen. You can configure a specific [Increment Value] for the screen number. Select [Change the Screen Number] to create an identical Base Screen with the screen number configured for [Set Start screen number]. 
10	Rename	Rename the selected Base Screen.
11	Script	Configure the script applicable to the selected Base Screen.
12	Calculation	Configure the calculation applicable to the selected Base Screen.
13	Transmission	Compare the project drawing and the TOP drawing and separately transfer only the selected Base Screen.
14	Export	Save the selected Base Screen as another file. You can [Import] an exported screen.
15	Add to User Library	Save the selected screen to the User Library.

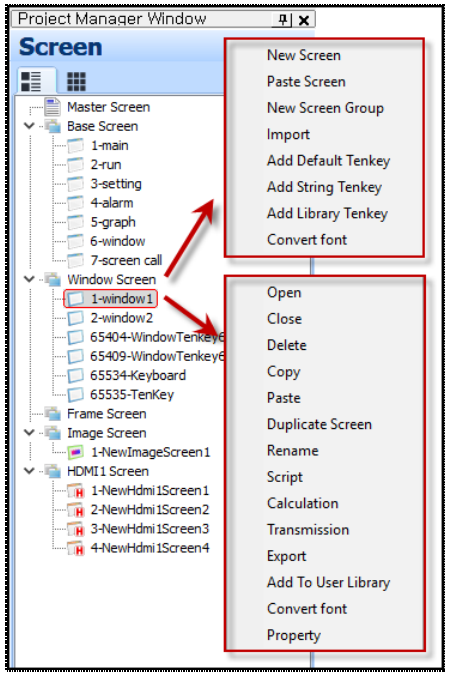
① Screen Property - Base Screen



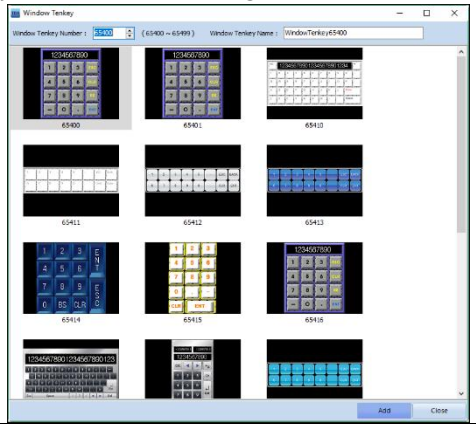
[Figure. Screen Property - Base Screen]

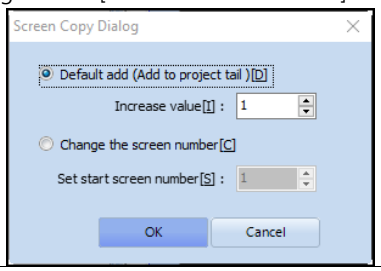
No.	Property	Description
1	Screen Number	The Base Screen Number is shown.
2	Screen Name	The Base Screen Name is shown.
3	Security Level	Assign a security level to the Base Screen. Select security level among [0] to [15], with a password configured from [Project] - [Security]. (Security Level [0] refers to no security features.)
4	Use Security Log	For a [Security Level] of [1] or above, Enable [Use Security Log] to record the [Login] / [Logout] information on the TOP internal Memory. Refer to Chapter 4.7 [Security] for more details.
5	Exception Screen Navigator	Enable this function to exclude the screen from Screen Navigator. Screen Navigator is available from the TOP Menu. Refer to Chapter 1.2.8 [Control Panel - System] (15) [TOP Menu] for more details.
6	Use Master Screen	Apply the Master Screen to the selected Base Screen. Refer to Chapter 5.4 [Master Screen] for more details.
7	Background Type	Select the Background Type among [Transparent] / [Color] / [Gradation] / [Image].

(3) Window Screen

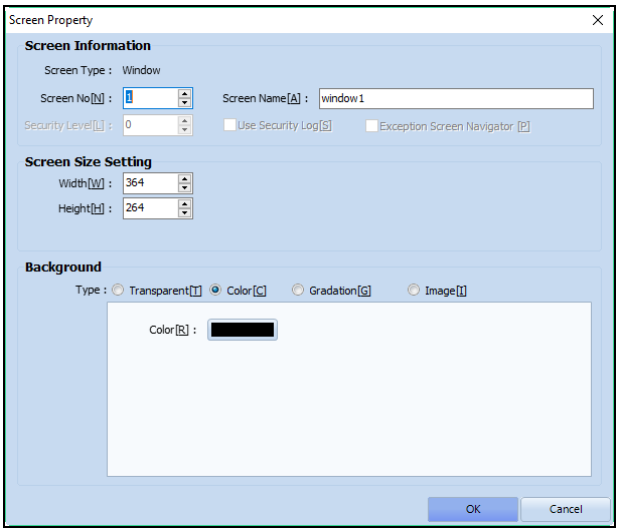


[Figure. Window Screen]

No.	Pop-up Menu	Description
1	New Screen	Create a new Window.
2	Paste Screen	Paste a Window Screen copied to the clipboard.
3	New Screen Group	Create a new Screen Group to group Window Screens.
4	Import	Import an existing Window Screen.
5	Add Default Ten-key	Add a default ten-key. If a default ten-key already exists, no action will be made.
6	Add String Ten-key	Add a Keyboard to enter characters. If a string ten-key already exists, no action will be made.
7	Add Library Ten-key	Add a Window Screen for a ten-key (keypad) save din the User Library. Select the Window Ten-key of your interest, configure the [Window Ten-key Number] and [Window Ten-key Name] and click [Add]. The Window Screen Numbers available for a Library Ten-key are fixed within the range of [65400] to [65499]. 
8	Open	Open the selected Window Screen.
9	Close	Close the selected Window Screen.
10	Delete	Delete the selected Window Screen.
11	Copy	Copy the selected Window Screen.
12	Paste	[Copy] is the prerequisite for [Paste]. Paste a Window Screen copied to the clipboard as a Window Screen of the current project, or as a Window Screen of another project.

13	Duplicate Screen	Add a Window Screen identical to the selected Window Screen according to the configuration of [Screen Copy Dialog]. Select [Duplicate Screen] to open [Screen Copy Dialog]. Select [Default add (Add to project tail)] to add an identical Base Screen to the end of the current Base Screen List with the next number of the largest existing number of Base Screen. You can configure a specific [Increment Value] for the screen number. Select [Change the Screen Number] to create an identical Window Screen with the screen number configured for [Set Start screen number]. 
14	Rename	Rename the selected Window Screen.
15	Script	Configure the script applicable to the selected Window Screen.
16	Calculation	Configure the calculation applicable to the selected Window Screen.
17	Transmission	Compare the project drawing and the TOP drawing and separately transfer only the selected Window Screen.
18	Export	Save the selected Window Screen as another file. You can [Import] an exported screen.
19	Add to User Library	Save the selected screen to the User Library.

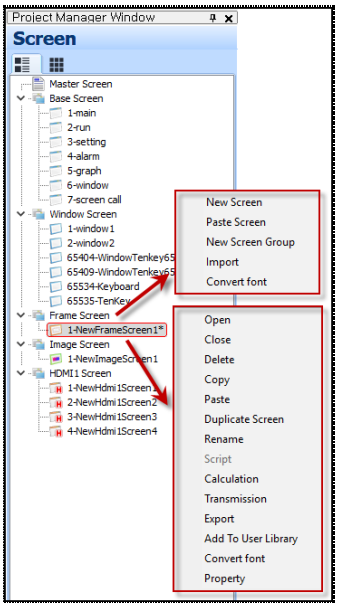
① Screen Property - Window Screen



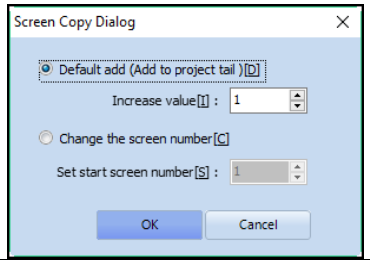
[Figure. Screen Property - Window Screen]

No.	Property	Description
1	Screen Number	The Window Screen Number is shown.
2	Screen Name	The Window Screen Name is shown.
3	Security Level	This function is not available for a Window Screen.
4	Use Security Log	This function is not available for a Window Screen.
5	Exception Screen Navigator	This function is not available for a Window Screen.
6	Screen Size Setting	Configure the width, height, style of the Window Screen.
7	Background Type	Select the Background Type among [Transparent] / [Color] / [Gradation] / [Image].

(4) Frame Screen

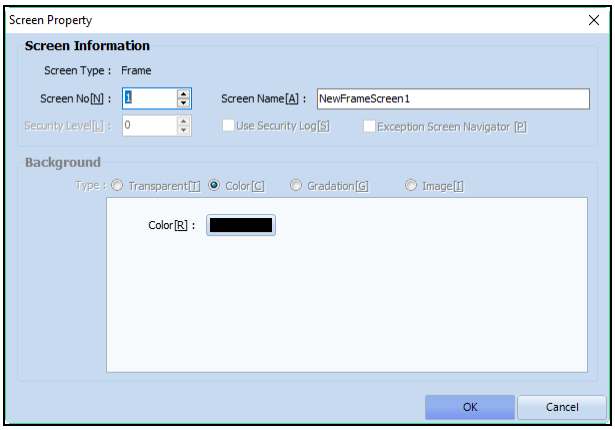


[Figure. Frame Screen]

No.	Pop-up Menu	Description
1	New Screen	Create a new Frame Screen.
2	Paste Screen	Paste a Frame Screen copied to the clipboard.
3	New Screen Group	Create a new Screen Group to group Frame Screens.
4	Import	Import an existing Frame Screen.
5	Open	Open the selected Frame Screen.
6	Close	Close the selected Frame Screen.
7	Delete	Delete the selected Frame Screen.
8	Copy	Copy the selected Frame Screen.
9	Paste	[Copy] is the prerequisite for [Paste]. Paste a Frame Screen copied to the clipboard as a Frame Screen of the current project, or as a Frame Screen of another project.
10	Duplicate Screen	Add a Frame Screen identical to the selected Frame Screen according to the configuration of [Screen Copy Dialog]. Select [Duplicate Screen] to open [Screen Copy Dialog]. Select [Default add (Add to project tail)] to add an identical Frame Screen to the end of the current Frame Screen List with the next number of the largest existing number of Frame Screen. You can configure a specific [Increment Value] for the screen number. Select [Change the Screen Number] to create an identical Frame Screen with the screen number configured for [Set Start screen number]. 
11	Rename	Rename the selected Frame Screen.
12	Script	This function is not available for a Frame Screen.
13	Calculation	Configure the calculation applicable only to the selected Frame Screen.
14	Transmission	Compare the project drawing and the TOP drawing and separately transfer only the

		selected Frame Screen.
15	Export	Save the selected Frame Screen as another file. You can [Import] an exported screen.
16	Add to User Library	Save the selected screen to the User Library.

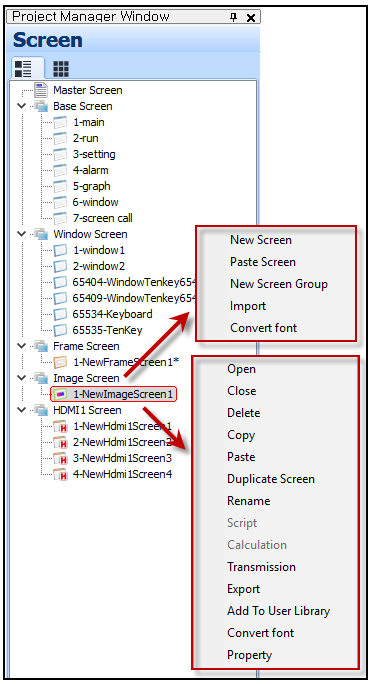
① Screen Property - Frame Screen]



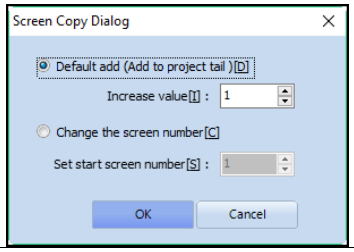
[Figure. Screen Property - Frame Screen]

No.	Property	Description
1	Screen Number	The Frame Screen Number is shown.
2	Screen Name	The Frame Screen Name is shown.
3	Security Level	This function is not available for a Frame Screen.
4	Use Security Log	This function is not available for a Frame Screen.
5	Exception Screen Navigator	This function is not available for a Frame Screen.
6	Background	Background cannot be configured for a Frame Screen.

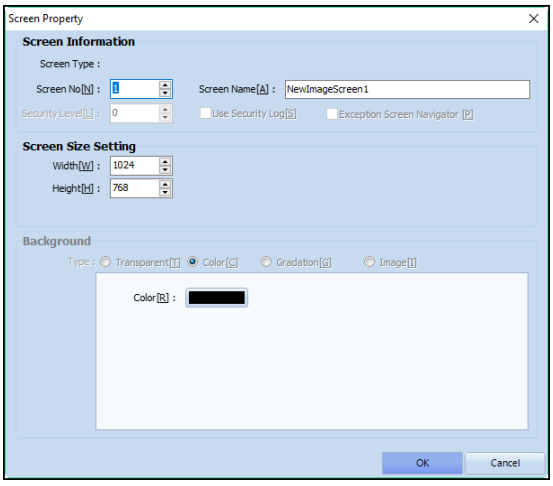
(4) Image Screen



[Figure. Image Screen]

No.	Pop-up Menu	Description
1	New Screen	Create a new Image Screen.
2	Paste Screen	Paste an Image Screen copied to the clipboard.
3	New Screen Group	Create a new Screen Group to group Image Screens.
4	Import	Import an existing Image Screen.
5	Open	Open the selected Image Screen.
6	Close	Close the selected Image Screen.
7	Delete	Delete the selected Image Screen.
8	Copy	Copy the selected Image Screen.
9	Paste	[Copy] is the prerequisite for [Paste]. Paste an Image Screen copied to the clipboard as an Image Screen of the current project, or as an Image Screen of another project.
10	Duplicate Screen	Add an Image Screen identical to the selected Image Screen according to the configuration of [Screen Copy Dialog]. Select [Duplicate Screen] to open [Screen Copy Dialog]. Select [Default add (Add to project tail)] to add an identical Image Screen to the end of the current Image Screen List with the next number of the largest existing number of Image Screen. You can configure a specific [Increment Value] for the screen number. Select [Change the Screen Number] to create an identical Image Screen with the screen number configured for [Set Start screen number]. 
11	Rename	Rename the selected Image Screen.
12	Script	This function is not available for an Image Screen.
13	Calculation	This function is not available for an Image Screen.
14	Transmission	Compare the project drawing and the TOP drawing and separately transfer only the selected Image Screen.
15	Export	Save the selected Image Screen as another file. You can [Import] an exported screen.
16	Add to User Library	Save the selected screen to the User Library.

① Screen Property - Image Screen



[Figure. Property Screen - Image Screen]

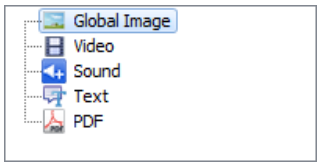
No.	Property	Description
1	Screen Number	The Image Screen Number is shown.
2	Screen Name	The Image Screen Name is shown.
3	Security Level	This function is not available for an Image Screen.
4	Use Security Log	This function is not available for an Image Screen.
5	Exception Screen Navigator	This function is not available for an Image Screen.
6	Screen Size Setting	Configure the width, height, style of the Image Screen.
7	Background	Background cannot be configured for a Frame Screen.

22.6.3 Resource

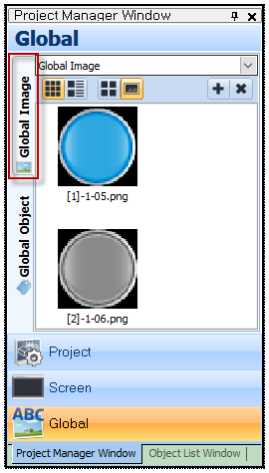
View the overall configuration of project resources of [Global Image] and [Global Object].

(1) Global Image

Register [Global Image] / [Video] / [Sound] / [Text] / [PDF].
Images available from [Global Image] can be used upon a [Word Indirect] condition for an image object, or can be added to the edit screen with a drag and drop input.
Files added to [Global Image] / [Text] / [PDF] can be used for [Project] - [Alarm] - [Solution].



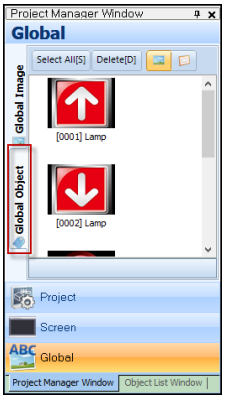
Numeric prefix are added to global images in an ascending order of creation.
Add [+] or delete [X] a selected image with each respective button.



[Figure. Global Image]

(2) Global Object

Add frequently used shapes, tags or groups to the Global Object for easy access. The concept of inheritance is applied for convenient editing.



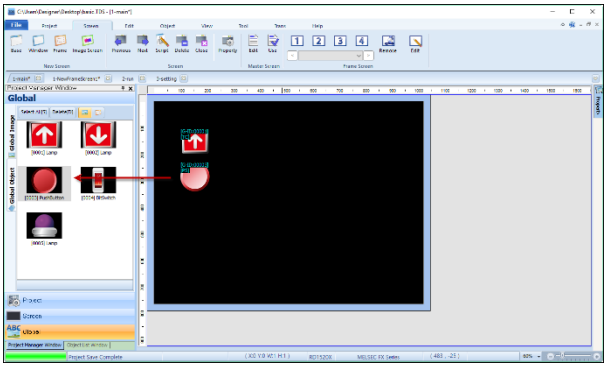
[Figure. Global Object]

When a global object is added to a screen, the properties of the global object is maintained in the subject screen. Inheritance refers to the state where the properties of an object is maintained. If you change the property of a global object from [Project Manager] - [Global Object], the new configuration is applied to all objects created from such Global Object.

Therefore, in cases where an object or group repeatedly appears on multiple screens, adding the object or group to Global Object, and conforming the repeated object or group from Global Object provides convenience if the property of such object or group has to be changed.

① How to add a Global Object

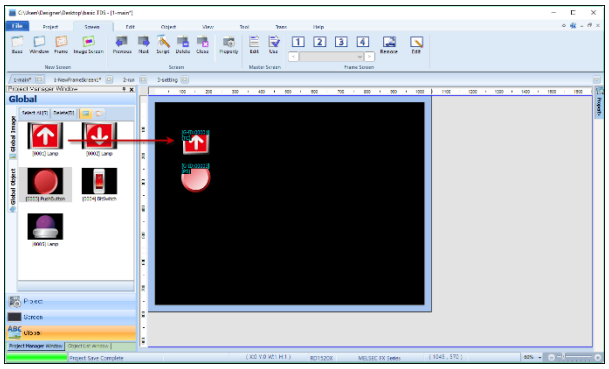
Drag and drop an object or group from the current screen to the Global Object window to add a Global Object.



[Figure. Adding a Global Object]

② How to use a Global Object

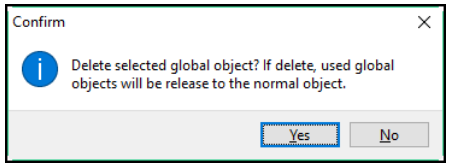
Drag and drop an object or group from the Global Object window to the current screen to use a Global Object.



[Figure. Using a Global Object]

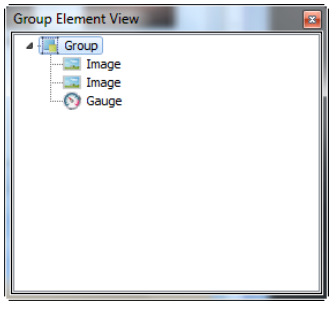
③ How to delete or change the property of a Global Object

Delete a Global Object from the Global Object Window by selecting [Delete] from the pop-up menu upon a right click to the Global Object of your interest. To delete two or more Global Objects at once, select the subject Global Objects from the Global Object window and click [Delete] provided above the list. If you delete a Global Object, the below message window will appear asking for your confirmation.



[Figure. Delete confirm message]

Select [Yes] to delete the global object, and [No] to abort the session. Change the property of a Global Object from its respective Property Window by selecting [Property] from the pop-up menu upon a right click. If the Global Object is a group, select [Property] as mentioned above, and select the object of your interest from the [Group Element View] window to open each respective Property window.

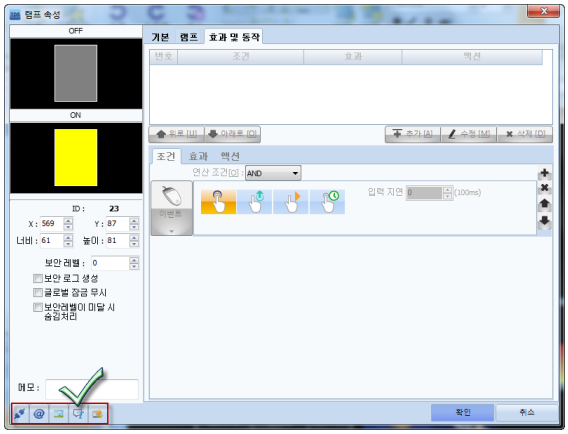


[Figure. Group Element View]

④ Cancel Inheritance

You can cancel a part of or the entire inheritance to configure different properties.

Once the inheritance is canceled, the object property will not change even if the property of the original Global Object is changed.



[Figure. Cancel Inheritance]

Double click an object added from [Global Object] to open its Property window as shown below. [Cancel Inheritance] and [Redefine Effect] is available for all types of objects. Partial cancellation differs from each object type, with the following functions.

No.	Partial Cancellation	Icon	Description
1	Cancel Inheritance		Cancel all inheritance and configure all properties of your interest.
2	Redefine Address		Cancel the inheritance of addresses and configure different addresses.
3	Redefine Image		Cancel the inheritance of images, and configure different images.
4	Redefine Caption		Cancel the inheritance of texts, and configure different texts.
5	Redefine Effect		Cancel the inheritance of [Effect & Action] and configure different [Effect & Action].

By canceling inheritance (as whole or in parts) will activate the settings no longer subject to inheritance. However, such object will not be subject to global application of the property of a Global Object.

22.7 List Window

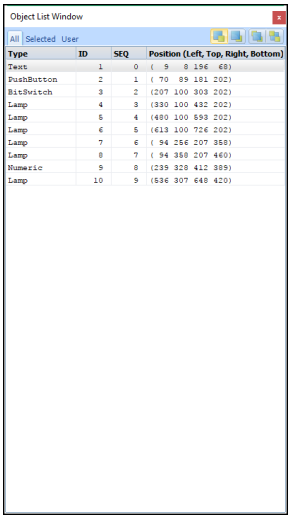
All objects and groups in the current edit screen are compiled in the List Window for overall control. [List] window consists of tabs for [All] / [Select] / [User].

22.7.1 Type of Tabs

[Lists] window consists of tabs for [All] / [Select] / [User].

(1) All

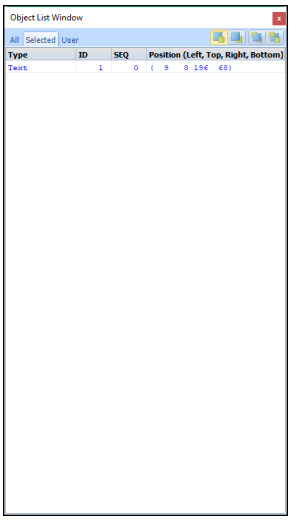
All objects and all object groups are compiled in the All tab. The List Window shows the ID, sequential order and position of each item.



[Figure. List Window - All]

(2) Selected

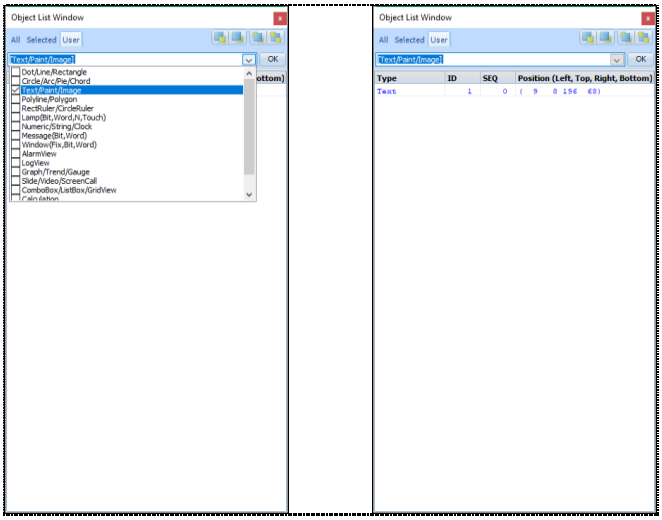
Currently selected objects are compiled in the Selected tab.



[Figure. List Window - Selected]

(3) User

Objects of which type is selected by the user are compiled in the User tab. Select the objects of your interest, as shown below, to compile objects corresponding to the configuration on the list.



[Figure. List Window - User]

22.7.2 List Order

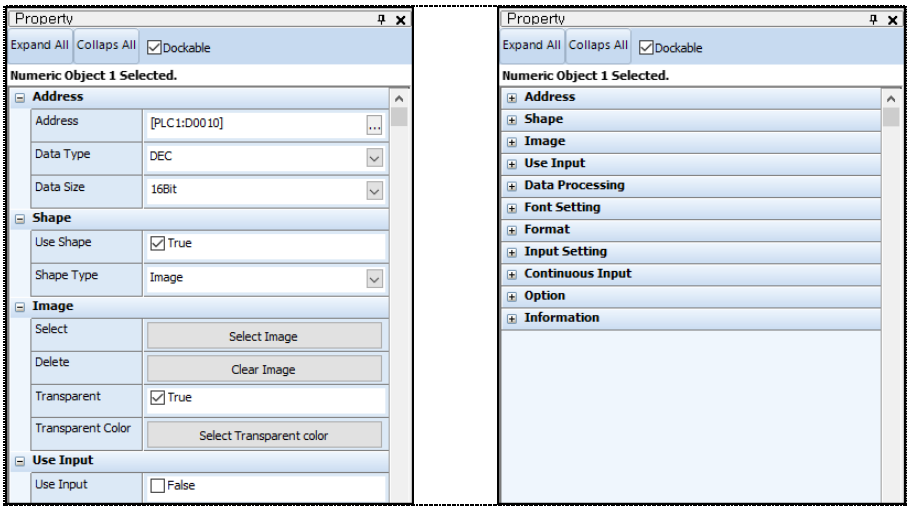
Configure the order of objects listed in the Object List window with the four buttons on the upper right side of the Object List Window.

Each button has the following function.

No.	Align Order	Image	Description
1	Send Back		Send the selected object one step backward.
2	Send Front		Send the selected object one step forward.
3	Send Front End		Send the selected object furthest to the front.
4	Send Back End		Send the selected object furthest to the back.

22.8 Property Window

The Property Window displays and provides access to the properties of the current screen and tags or objects included in the current screen.



[Figure. Property - Expand All] [Figure. Property - Collapse All]

22.8.1 Components of Property Window

Refer to the following detail description for the Property Window.

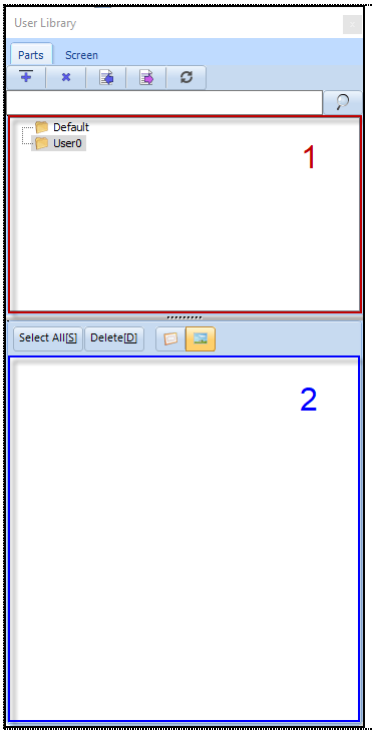
No.	Item	Description
1	Expand All	Show all applicable properties.
2	Collapse All	Hide all properties and show category titles only.
3	Dockable	Enable [Dockable] to allow docking the window to left or right side of the window, and disable [Dockable] to not allow docking of the window.

22.9 User Library Window

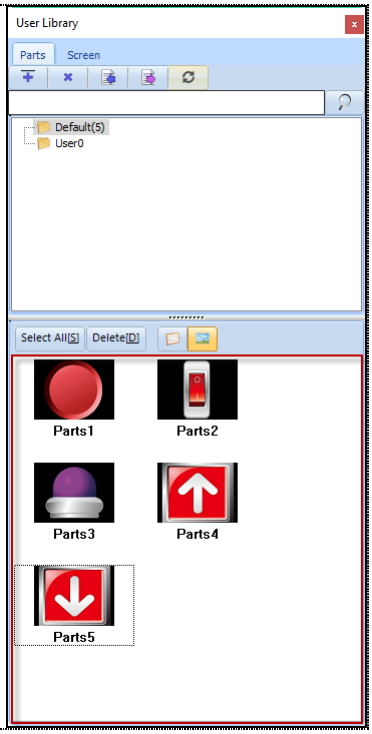
Add frequently used objects or screens to a user library window for easy access.

22.9.1 How to create a User Library Window

Configure the folders conforming the user library from the area framed [1] in the below [Figure. User Library] After setup of the folders, select a folder of your interest and drag and drop a specific object to the area framed [2] in the below figure.



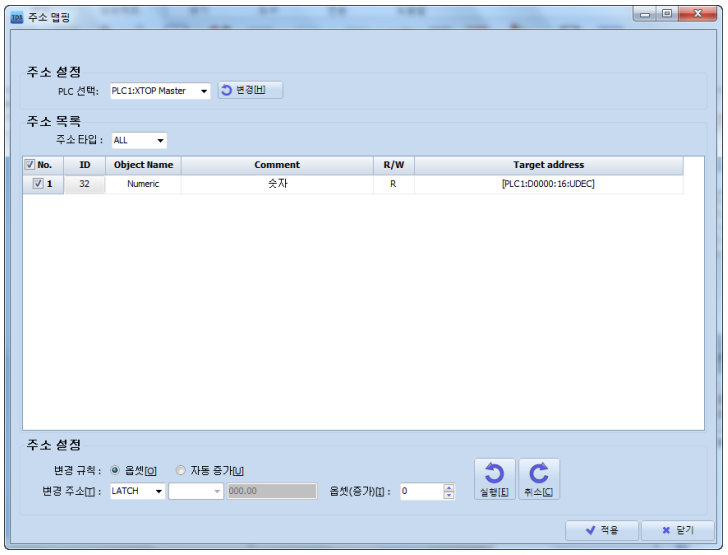
[Figure. User Library]



[Figure. Adding an Object]

22.9.2 How to use User Library Window

Drag and drop an object from the User Library to the current screen to add the object to the current screen. When an object from the User Library is added to the edit screen, a [Address Mapping] window appears as below to configure the current address settings and new address settings.



[Figure. Address Mapping]

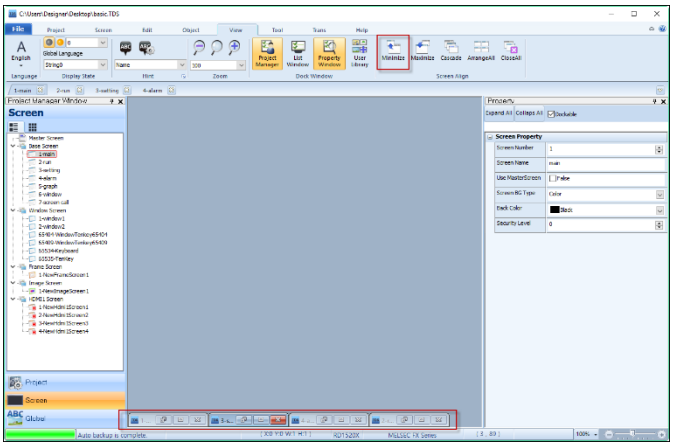
22.9.3 User Library Window Property

No.	Property	Description
1	Parts	Open a folder containing objects added to the User Library.
2	Screen	Open a folder containing screens added to the User Library.
3		Create a new folder. Select a folder and click [Add] upon a right click to create a sub folder.
4		Delete the selected folder.
5		Import an existing User Library.
6		Export the current User Library to a separate file.
7	Select All[S]	Select All files included in the folder.
8	Delete[D]	Delete the selected files.
9		View files by name.
10		View files by thumbnails.

22.10 Screen Align

22.10.1 Screen Align - Minimize

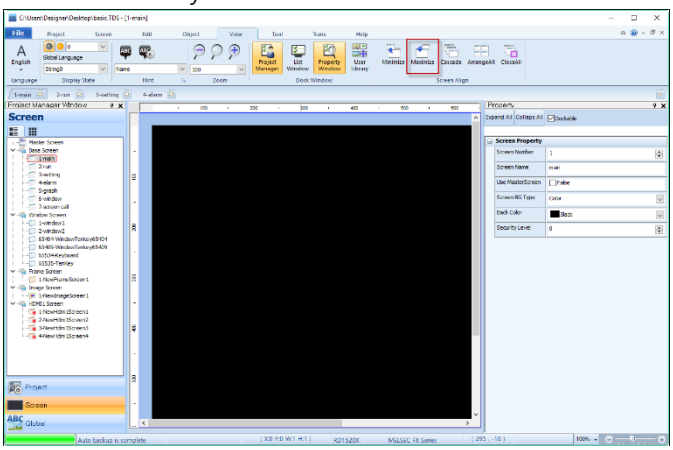
Minimize all open screens to be aligned on the bottom of the screen.



[Figure. Screen Align - Minimize]

22.10.2 Screen Align - Maximize

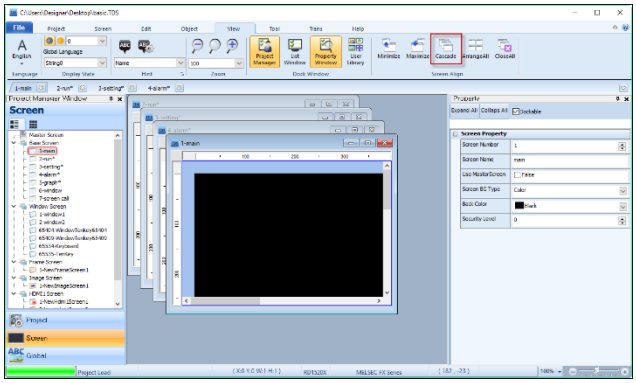
Maximize all open screens to the entirety of the edit screen.



[Figure. Screen Align - Maximize]

22.10.3 **Screen Align - Cascade**

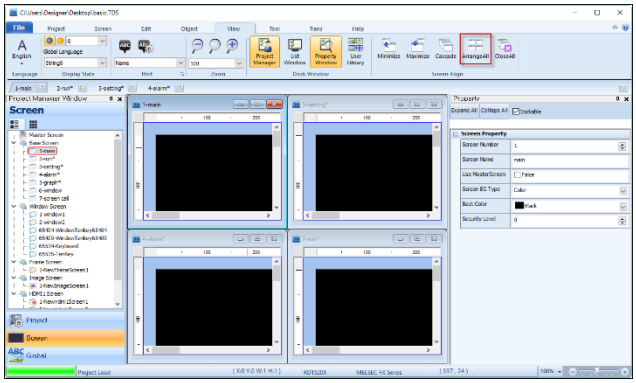
Align all open screens in a progressive order so that all title bars appear on screen at the same time.



[Figure. Screen Align - Cascade]

22.10.4 **Screen Align - Tile**

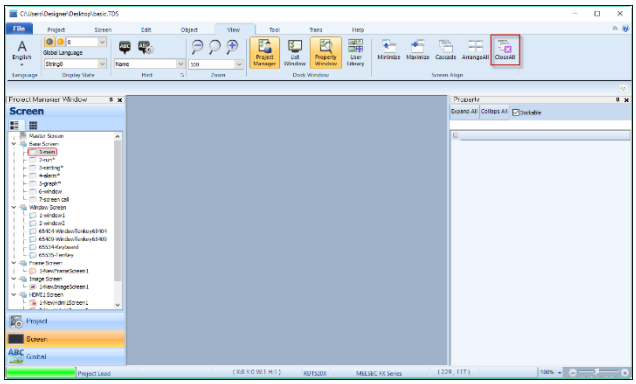
Align all open screens to be placed side by side like tiles.



[Figure. Screen Align - Tile]

22.10.5 **Screen Align - Close All**

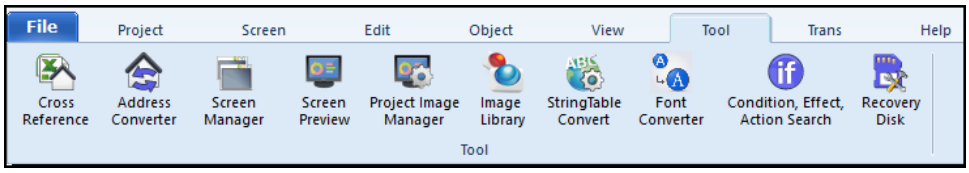
Close all open screens.



[Figure. Screen Align - Close All]

CHAPTER 23 - Tool

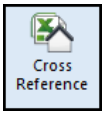
[Tool] menu provides functions for project editing and management. [Tool] menu features functions to search and convert addresses employed by the project, allowing easy appliance to other projects or batch modification.



[Figure. Tool Menu]

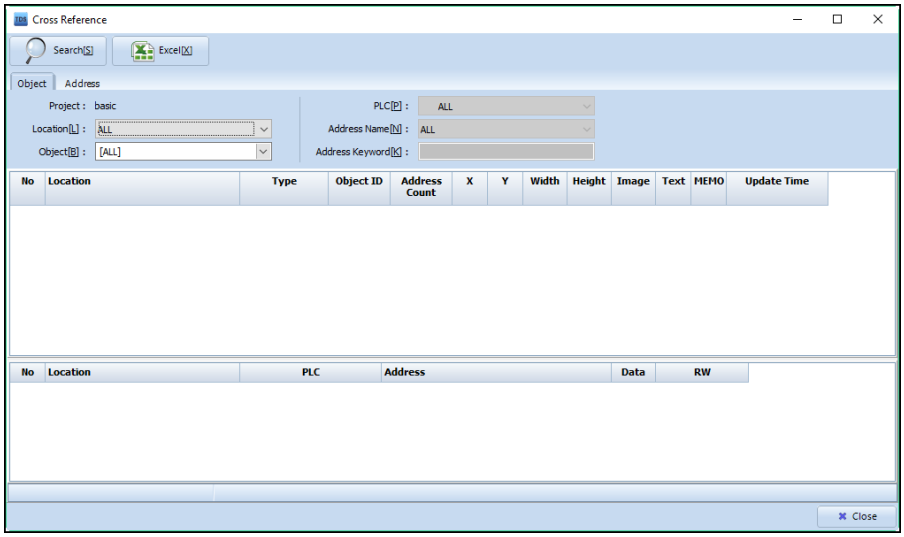
No.	Tool	Description
1	Cross Reference	Search address and objects employed in the project and manage such information in an Excel format.
2	Address Converter	Configure or change addresses employed by the project in one batch.
3	Screen Manager	Manage Base Screens, Window Screens and Frame Screens.
4	Screen Preview	Save the preview of a drawing screen to an image file.
5	Project Image Manager	Manage images employed in the Project.
6	Image Library	Manage the library of the project.
7	String Table Converter	Convert texts employed in the project to string tables, or convert a string table to general texts.
8	Recovery Disk	Create a recovery disk allowing you to initialize all programs and data of the TOP device.
9	Condition, Effect, Action Search	Search and manage conditions, effects and actions employed in the project.

23.1 Cross Reference



[Search] addresses and objects employed in the project.

The search result can be saved on an [Excel] file, so that you can manage the objects and addressed throughout the entire drawing process.

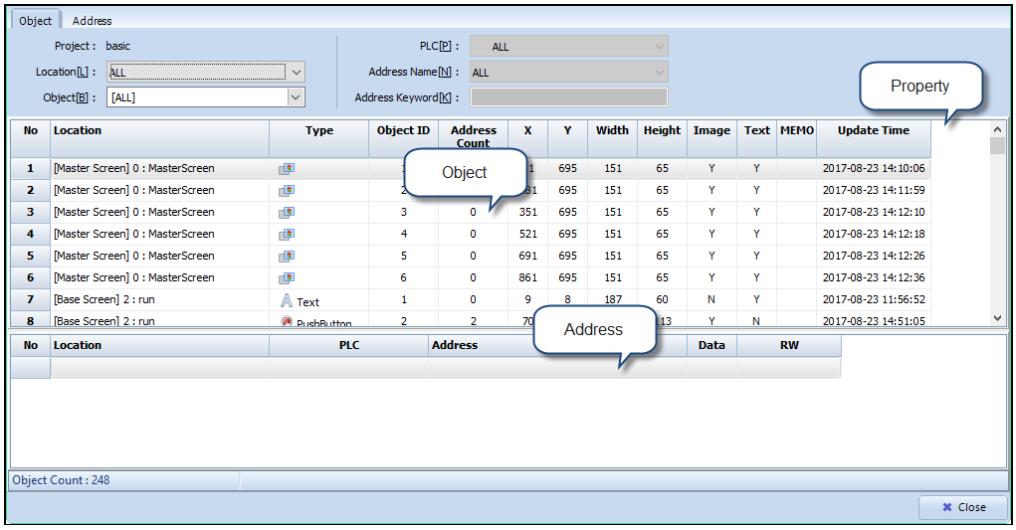


[Figure. Cross Reference]

No.	Cross Reference	Description
1	Search[S]	Search an object or addressed employed in the project corresponding to a specific condition.
2	Excel[X]	Export the search result to an Excel File.

23.1.1 Object Search

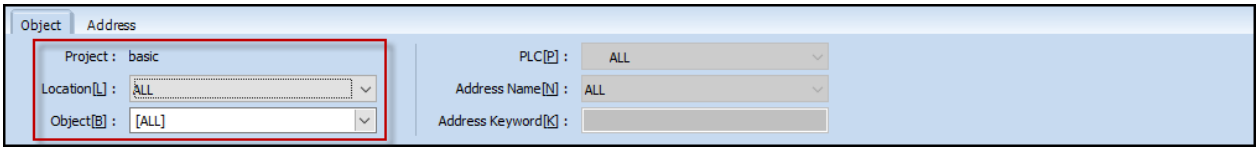
Search all objects employed in the project to find objects corresponding to the search condition.
Double click an address or object compiled in the search result to open its Property window. Any change made in the property window accessed from the [Cross Reference] menu is immediately applied.



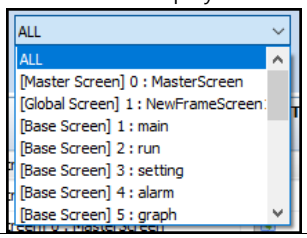
[Figure. Object Search]

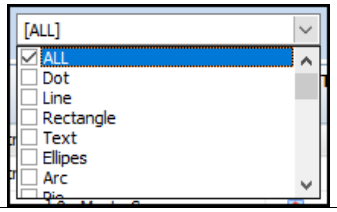
(1) Object Search Condition

Objects are searched according to the configuration of filters. Select the Object Location and Object Type.



[Figure. Object Search Condition]

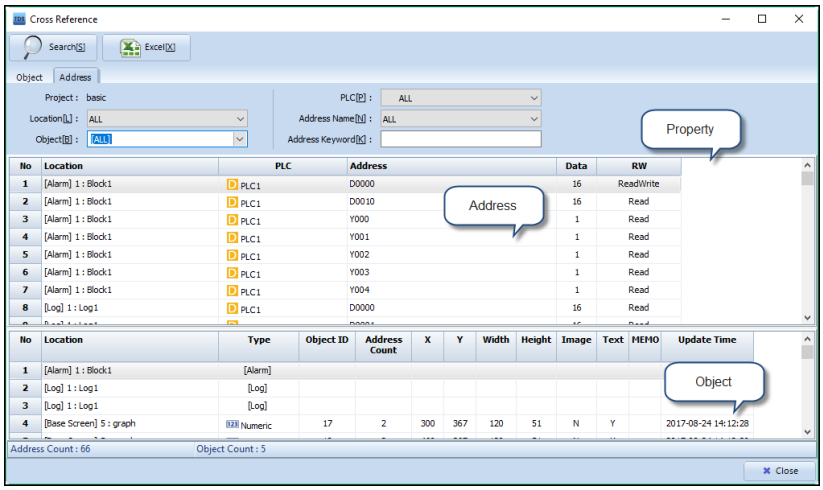
No.	Object Search	Description
1	Project	The name of the current drawing project is shown.
2	Location[L]	Limit the search to a specific screen of your interest. Select among each [Master Screen] / [Base Screen] / [Frame Screen] / [Window Screen], and select [All] to search all objects and addresses employed in the project. 

3	Object[B]	Select which type of object should be searched for. Select [All] to search all objects included in the screens corresponding to the configured [Location]. 

23.1.2 Address Search

Search all addresses employed in the project to find addresses corresponding to the search condition.

Double click an address or object compiled in the search result to open its Property window.

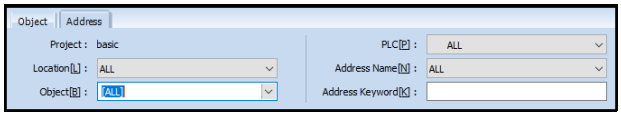


[Figure. Address Search]

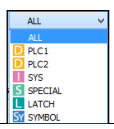
(1) Address Search Condition

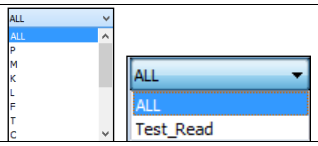
Addresses are searched according to the configuration of filters.

Select the PLC Address, Address Name, physical address to conform a search condition.



[Figure. Address Search Condition]

No.	Address Search	Description
1	Project	The name of the current drawing project is shown.
2	Location[L]	Limit the search to a specific screen of your interest.
3	Object[B]	Select the type of object of which address you intend to find.
4	PLC[P]	Select the type of address you intend to find. 
5	Address Name[N]	For address types of [PLC] or [Symbol] select the address name of your interest.

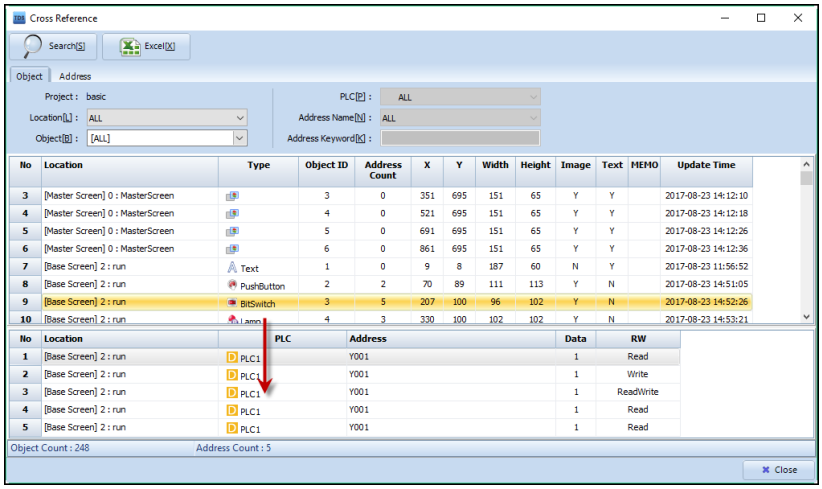
		
6	Address Keyword[K]	Enter the keyword of your interest. Ex) Search for a PLC address of [00010] with the name of M.

23.1.3 Search Result

Compile the search results on a list providing functions of [Sort], and access to the [Property] window each [Object] or [Address].

(1) Object Search Result

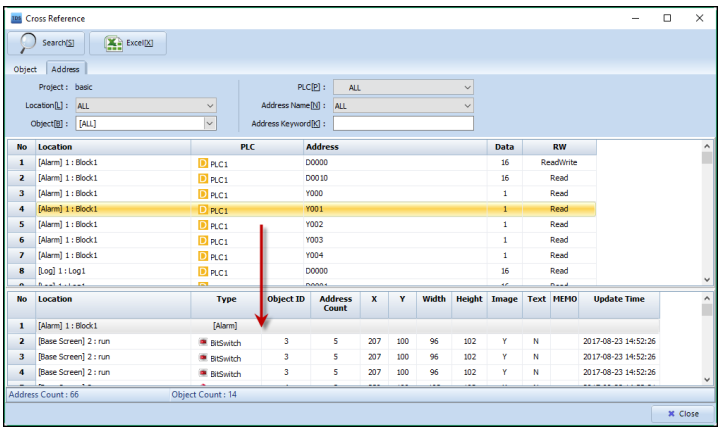
When you search for an [Object], the search result of corresponding objects is compiled in the middle section of the [Cross Reference] window, and addresses correlated with each object are listed in the lower section of the [Cross Reference] window by selecting each object from the search result list. The total number of matching results is shown in the [Status Bar].



[Figure. Object Search Result]

(2) Address Search Result

When you search for an [Address], the search result of corresponding addresses is compiled in the middle section of the [Cross Reference] window, and objects correlated with each address are listed in the lower section of the [Cross Reference] window by selecting each address from the search result list. The total number of matching results is shown in the [Status Bar].

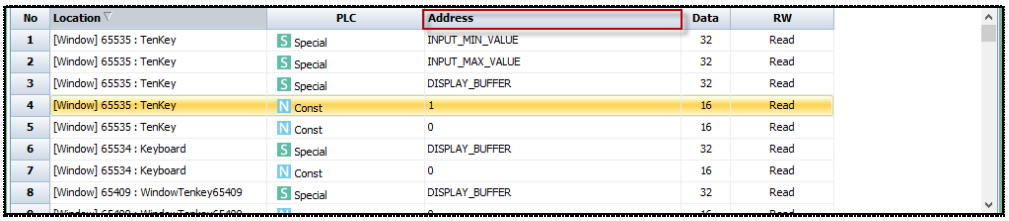


[Figure. Address Search Result]

Search Result		Description
Object	No.	Sequential number assigned to each searched object.
	Location	The screen in which the object is located.
	Type	The object type.
	Object ID	The Object ID.
	Address Count	The number of matching objects.
	X	The X coordinate of the object.
	Y	The Y coordinate of the object.
	Width	The horizontal width of the object.
	Height	The vertical height of the object.
	Image	Whether or not an image is employed in the object.
	Text	Whether or not texts are used in the object.
	MEMO	Any MEMO recorded from the object edit window.
	Update Time	The date and time of the most recent update.
Address	No.	Sequential number assigned to searched addresses.
	Location	The screen in which the address is located.
	PLC	The address type.
	Address	The physical address.
	Data	The length of the data occupied by the address.
	RW	The status of the address between R (Read) and W (Write).

(3) How to sort search results

Sort each column in an [Ascending Order] or [Descending Order] with a click to the column header, which will change the status of a small triangle appearing on the column header.



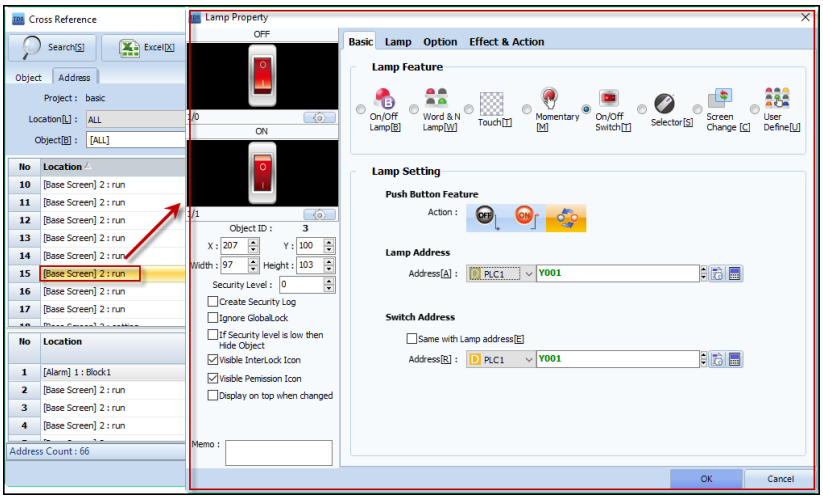
No	Location	PLC	Address	Data	RW
1	[Window] 65535 : TenKey	Special	INPUT_MIN_VALUE	32	Read
2	[Window] 65535 : TenKey	Special	INPUT_MAX_VALUE	32	Read
3	[Window] 65535 : TenKey	Special	DISPLAY_BUFFER	32	Read
4	[Window] 65535 : TenKey	Const	1	16	Read
5	[Window] 65535 : TenKey	Const	0	16	Read
6	[Window] 65534 : Keyboard	Special	DISPLAY_BUFFER	32	Read
7	[Window] 65534 : Keyboard	Const	0	16	Read
8	[Window] 65409 : WindowTenkey65409	Special	DISPLAY_BUFFER	32	Read

[Figure. Search Result -Sort]

No.	Sort Option	Description
1		List the column in an [Ascending Order].
2		List the column in a [Descending Order].

(4) How to edit an Object or Address

It is easy to edit an [Object] or [Address] from the [Cross Reference] window. Double click an [Object] or [Address] of your interest to open the corresponding property window.

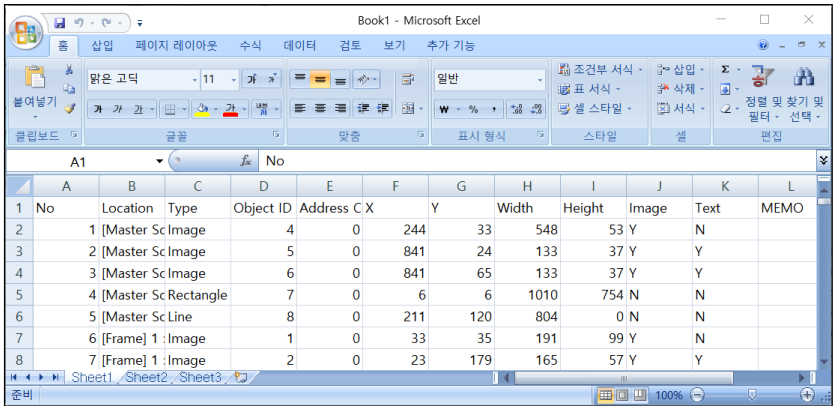


[Figure. Open a property window from Cross Reference]

23.1.4 Excel

Save the search result to an Excel file.

Click [Excel], the search result is exported to an excel file as shown below.

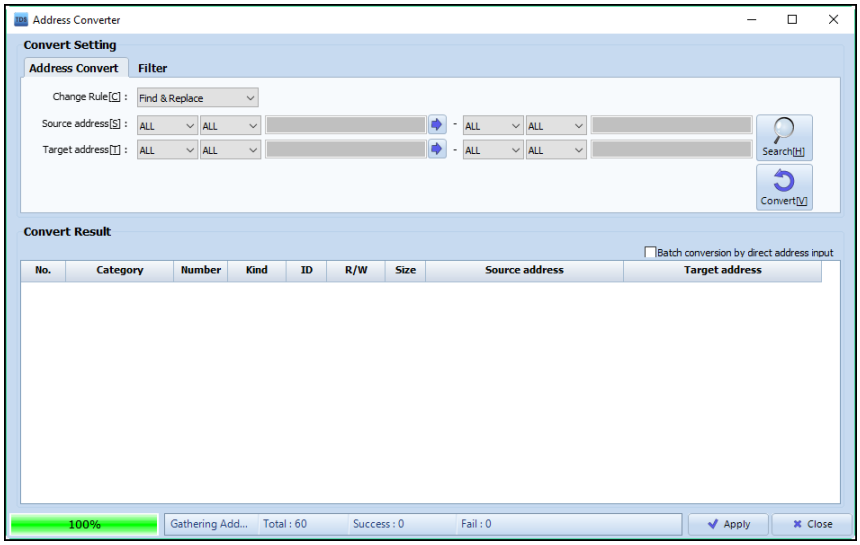


	A	B	C	D	E	F	G	H	I	J	K	L
1	No	Location	Type	Object ID	Address C	X	Y	Width	Height	Image	Text	MEMO
2	1	[Master Sc	Image	4	0	244	33	548	53	Y	N	
3	2	[Master Sc	Image	5	0	841	24	133	37	Y	Y	
4	3	[Master Sc	Image	6	0	841	65	133	37	Y	Y	
5	4	[Master Sc	Rectangle	7	0	6	6	1010	754	N	N	
6	5	[Master Sc	Line	8	0	211	120	804	0	N	N	
7	6	[Frame] 1	Image	1	0	33	35	191	99	Y	N	
8	7	[Frame] 1	Image	2	0	23	179	165	57	Y	Y	

[Figure. Excel]

23.2 Address Converter

You can [Find] and [Convert] an address included in the project. Configure search conditions with the available filters. Change the data of addresses in a specific range in a batch, or change the data of a specific address one by one.



[Figure. Address Converter]

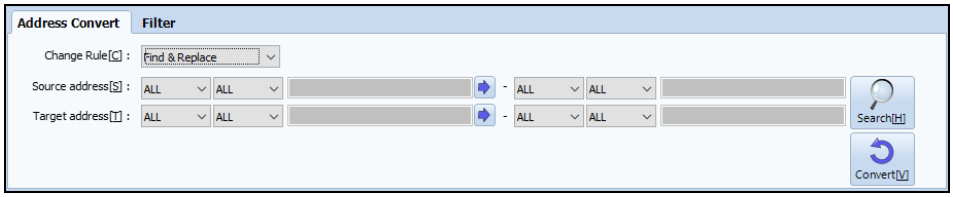
No.	Address Converter	Description
1	Search[S]	Search for the address which should be converted.
2	Convert[V]	Convert the Source Address to the Target Address.
3	Apply[A]	Apply the conversion result.
4	Close	Close the [Address Converter].

23.2.1 Convert Setting

Search a [Source Address] you intend to convert. By configuring search conditions, you can search for specific types of addresses.

(1) Address Convert

Select the type and range of [Source Address] and click [Search].

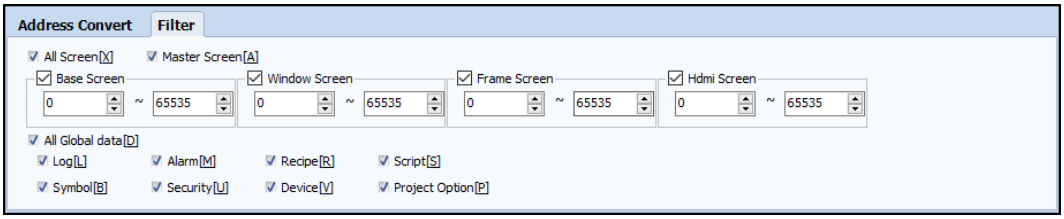


[Figure. Address Convert]

No.	Address Convert		Description
1	Change Rule	Find & Replace	Replace the [Source Address] with the [Target Address]. If the range of the [Source Address] is identical with the range of the [Target Address], the entire range is successfully converted. However, if the two ranges differ, conversion may not be successfully completed. Thus you are recommended to take caution in configuring the range.
		Increase/Decrease	The [Source Address] will be converted to an increased/decreased address according to the [Inc/Decrease Value] of your selection. With the below configuration where the [Inc/Decrease Value] is [1], a [Source Address] which is originally [D0000] will be converted to [D0001]. Inc/Decrease value[I] : 1
		Calculation	Convert the [Source Address] beginning from the [Start Address] by applying the [Increase Value] to each [Source Address]. In other words, if the [Start Address] is [0000], and the [Increase Value] is [3], Address [0000] will be converted to [0000], the next [Source Address] on the list will be converted to [0003], the next to [0006], so on and so forth. Start Address[A] : 000 Increase Value[N] : 3
		User Define(1:1)	Apply a 1:1 conversion of each address per object by importing a CSV file in a specific template. In other words, rather than converting all addresses with the identical internal address of [100], internal addresses of [100] assigned to each Object are individually converted.
		User Define(1:N)	Apply an 1:N conversion of addresses by importing a CSV file in a specific template. Unlike [User Define(1:1)], all internal addresses of [100] are changed in a batch.
2	Source Address		Configure the type and range of addresses that are currently assigned to. Source address[S] : PLC1 X 000 ALL PLC1 SYS Special LATCH Virtual
3	Target Address		Configure the type and range of addresses to which the [Source Address] should be converted. Target address[T] : PLC1 X 000 ALL PLC1 SYS Special LATCH Virtual
4	Search		Search addresses corresponding with the selected [Type] and [Range].
5	Convert		Convert the [Source Address] to the [Type] and [Range] of the corresponding [Target Address].

(2) Filter

Configure detailed search conditions applicable for [Search] from the [Address Convert] tab.

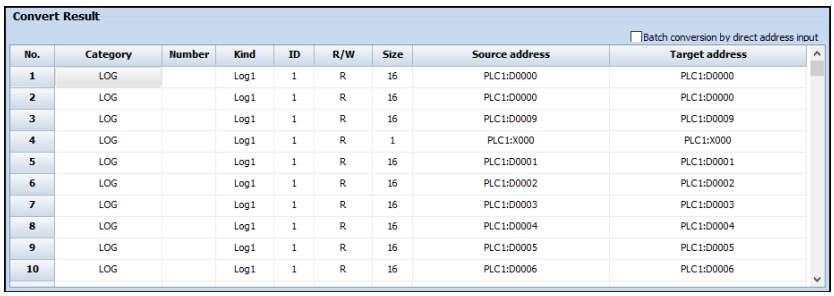


[Figure. Filter]

No.	Filter	Description
1	All Screen[X]	Select whether to search all screens or a specific type / range of screens.
2	Master Screen[A]	Add Master Screens to the search condition.
3	Base Screen	Add Base Screens to the search condition.
4	Window Screen	Add Window Screens to the search condition.
5	Frame Screen	Add Global Screens to the search condition.
6	HDMI Screen	Add HDMI Screens to the search condition.
7	All Global Data[D]	Add Global Data to the search condition.
8	Log[L]	Add Logs to the search condition.
9	Alarm[M]	Add Alarms to the search condition.
10	Recipe[R]	Add Recipes to the search condition.
11	Script[P]	Add Scripts to the search condition.
12	Security[U]	Add Security Pages to the search condition.
13	Device[V]	Add devices to which a PLC address is assigned (PLC) to the search condition.
14	Project Option[P]	Add Project Properties to the search condition.

23.2.2 **Convert Result**

Configure the search condition, [Source Address] and [Target Address]. Click [Search], and click [Convert], the [Source Address] corresponding to the search condition is listed, with each corresponding [Target Address].



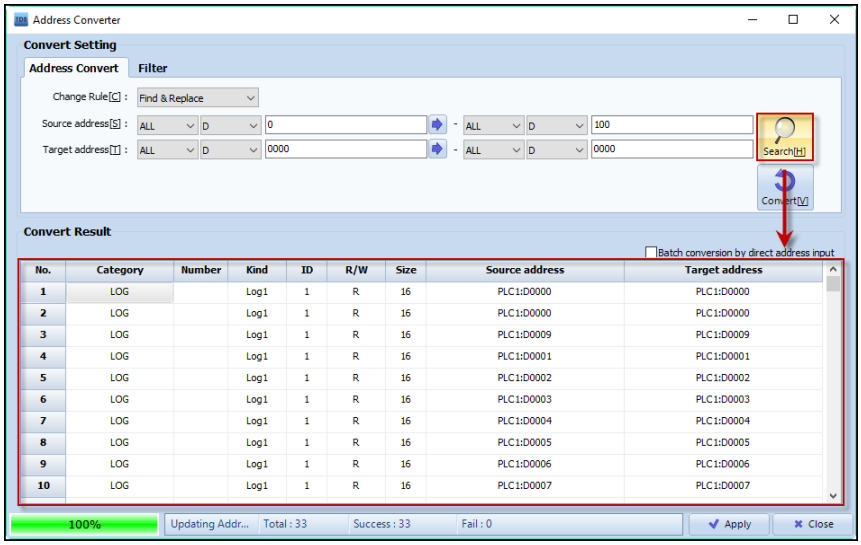
[Figure. Search & Convert Result]

No.	Convert Result	Description
1	Batch conversion by direct address input	Enable this function to enter addresses to be covered without using the [Convert] button. Configure the Target Address and click [Apply] to confirm the Target Address. Source Address will be converted according to the rules applied for the Target Address In other words, if the target address is in a sequential order such as [0000], [0001], [0002], ... the Source Address will convert to form a sequential order.
2	No.	The sequential number of matching addresses.
3	Category	The location at which the object employing the addresses is placed.
4	Screen Number	The screen number in which the object employing the address is located.
5	Kind	The type of the object employing the address.
6	ID	The ID of the object employing the address.
7	R/W	The nature of the address (Read / Write).
8	Size	The address size of the object employing the address.
9	Source Address	The address subject to be changed. The result of [Source Address] - [Search] is compiled in the list.
10	Target Address	The intended new address of the [Source Address], as a result of [Convert] according to the configuration of [Target Address]. Each [Target Address] can be individually changed.

23.2.3 How to convert addresses (Find&Replace, Increase/Decrease, Calculation)

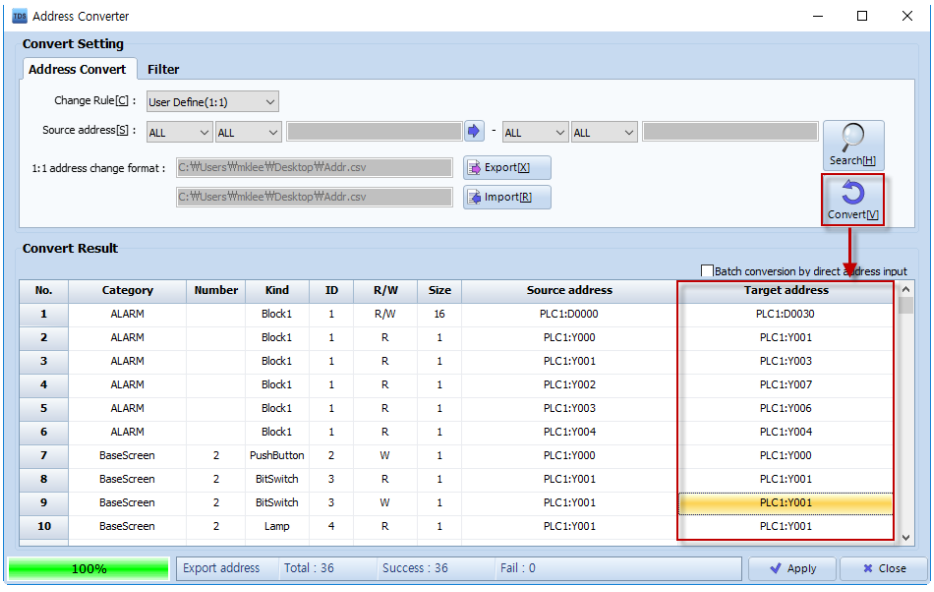
(1) The steps to convert addresses are: [Search] > [Convert] > [Apply]. In other words, find the [Source Address], the configure the change rule and [Target Address], and apply the conversion.

First, configure the [Address], [Filter] for [Source Address] and click [Search]. Then, the [Convert Result] will show a list of [Source Address]. Since no [Change Rule] nor [Target Address] has been configured, the [Source Address] will be copied to the [Target Address].



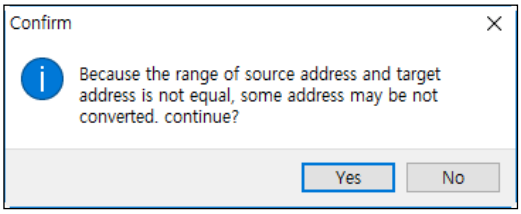
[Figure. Address Conversion - Step 1]

(2) Configure the [Change Rule], and the [Target Address], [Convert Conditions] (including [Start Address], [Increase Value] or whatever applicable for the selected [Change Rule]), and click [Convert] to view the [Target Address] compliant with the configured [Change Rule] and [Convert Condition].



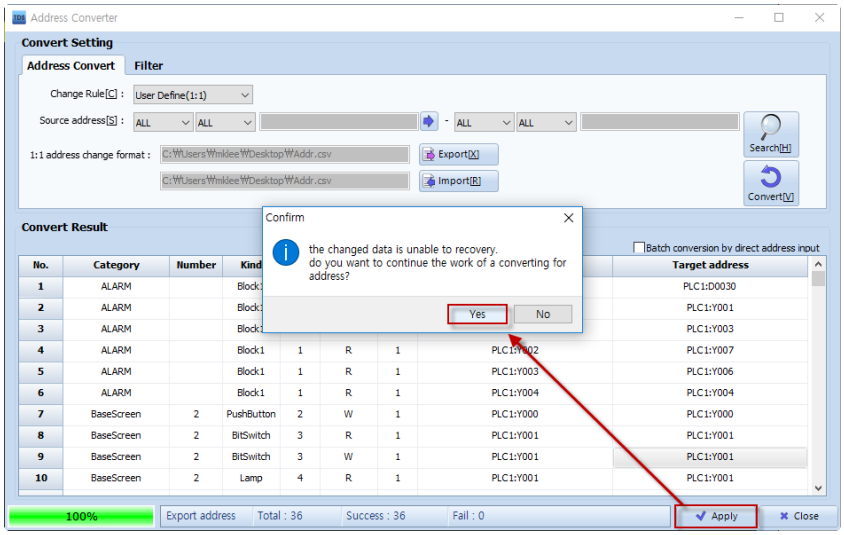
[Figure. Address Conversion - Step 2]

(3) If any problem with the [Target Address] is identified, the following message will appear, notifying you to check the addresses with a problem.



[Figure. Address Conversion - Error Message]

(4) Click [Apply] and select [Yes] from the selection message to confirm the conversion.



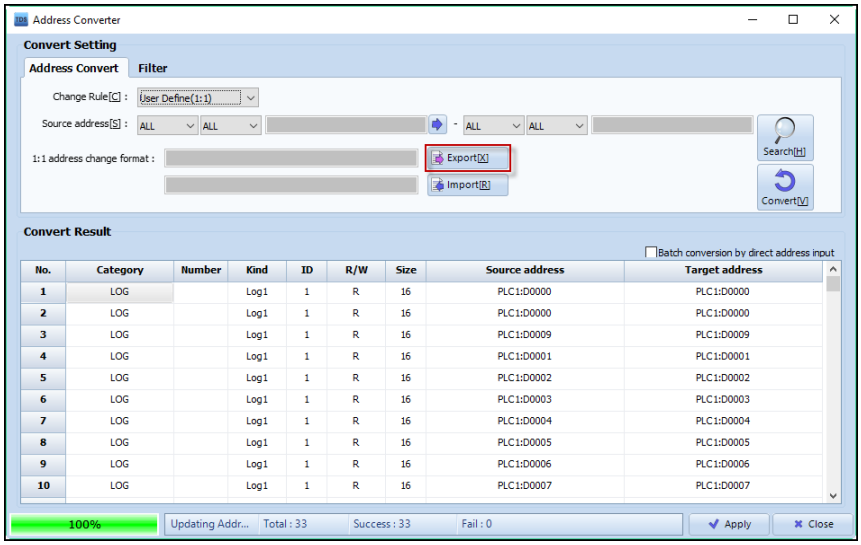
[Figure. Address Conversion - Step 3]

23.2.4 **User Define**

For [Change Rule] of [User Define(1:1)] and [User Define(1:N)], follow the same sequence of [Search] - [Convert] - [Apply]

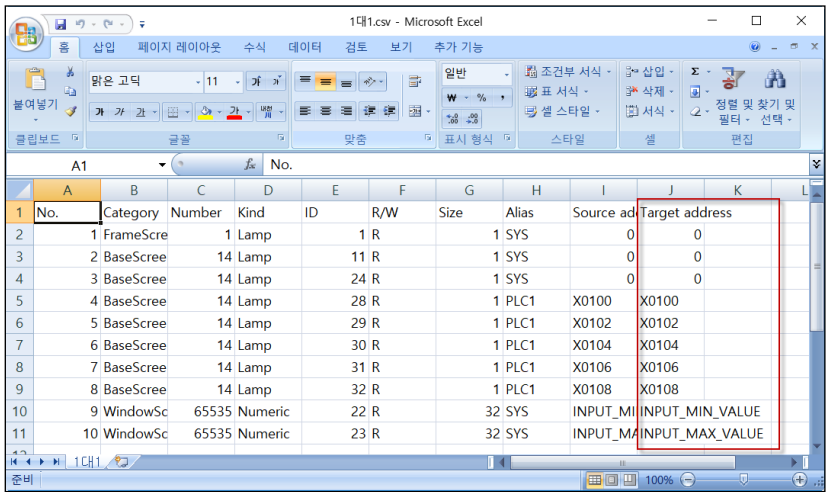
Search for the [Source Address], and configure the [Target Address] from an Excel File and further convert the selected [Source Address].

(1) First, configure the [Address], [Filter] for [Source Address] and click [Search]. Then, the [Convert Result] will show a list of [Source Address]. Click [Export] to save the search result to an Excel File (*.CSV).

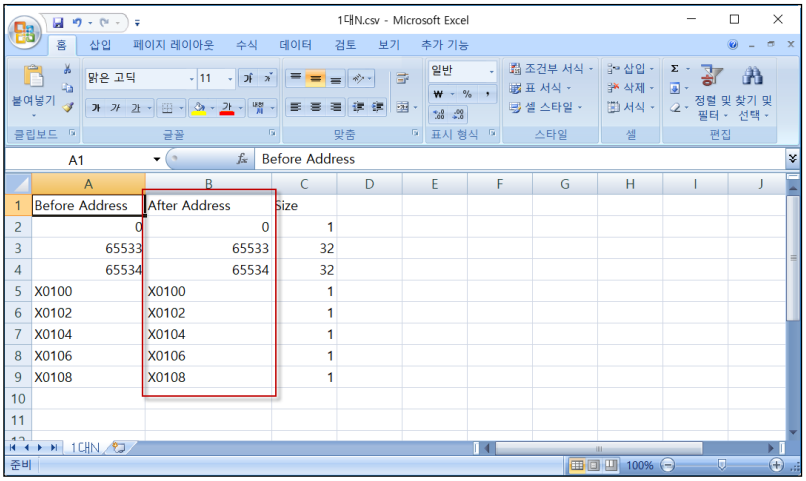


[Figure. User Define - Export]

(2) Open the excel file and configure the [Target Address]. For [Change Rule] of [User Define(1:1)], each [Target Address] should be individually configured; however for [User Define(1:N)], [Target Address] should be configured for each address. In other words, for an internal address of [100], a [User Define(1:1)] conversion requires you to configure a [Target Address] for every object employing [100], however a [User Define(1:N)] conversions requires you to configure a single [Target Address] for all objects employing [100]. Configure the [Target Address] for [User Define(1:1)], and configure the [After Address] for [User Define(1:N)].



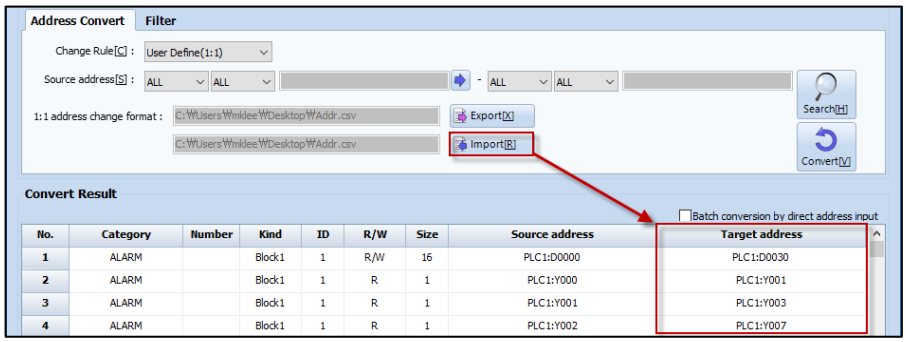
[Figure. User Define (1:1)]



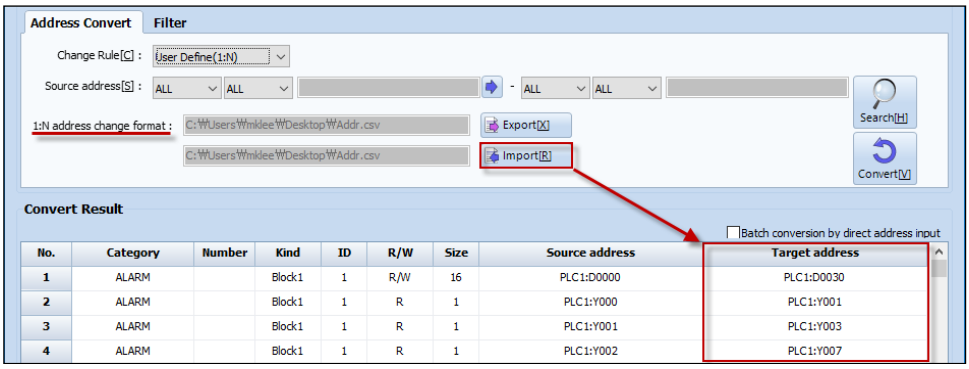
[Figure. User Define (1:N)]

(3) After configuring the [Target Address] / [After Address], whichever applicable, save the file and load the file with [Import].

Import the [*.CSV] file and click [Convert] to execute the conversion.



[Figure. User Define (1:1) Conversion]

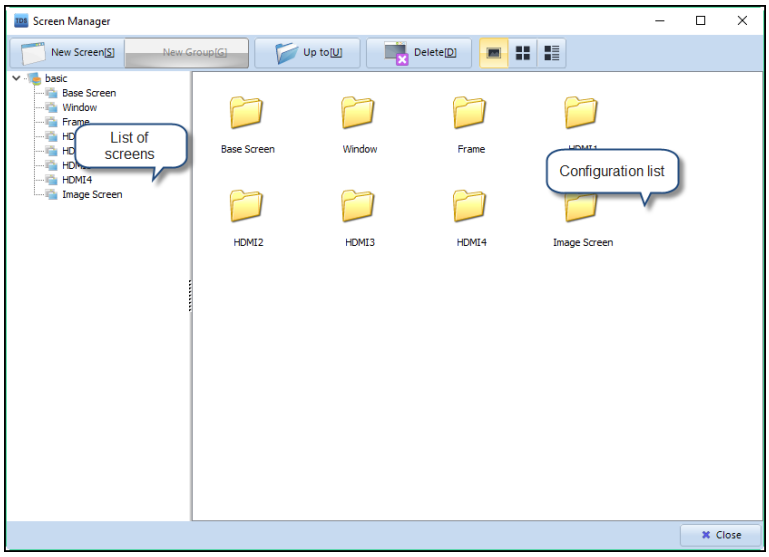


[Figure. User Define (1:N) Conversion]

(4) Click [Apply] and select [Yes] from the selection message to confirm the conversion.

23.3 Screen Manager

[Screen Manager] a comprehensive and simple management to all screens employed by the project. The many screens employed by the project can be managed by each category or group. You can configure the property of each screen and add, copy or delete screens from the Screen Manager. This function provides convenience in comprehensive management of the multiple screens in a complicated project.

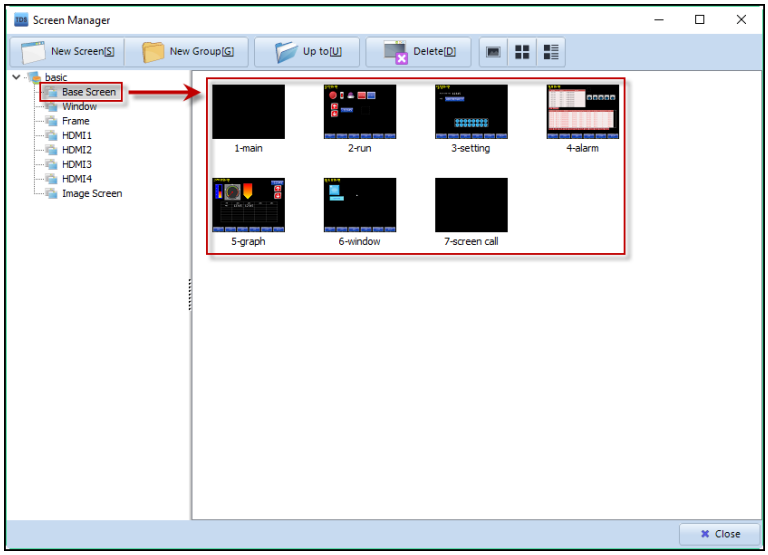


[Figure. Screen Manager]

No.	Screen Manager	Description
1	New Screen[S]	Add a new screen to the selected category.
2	New Group[G]	Add a New Group to the selected category.
3	Up to[U]	Move to the parent directory.
4	Delete[D]	Delete the selected item.
5		Show the items in large icons.
6		Show the items in small icons.
7		Show details of each item.

23.3.1 Screen / Screen List

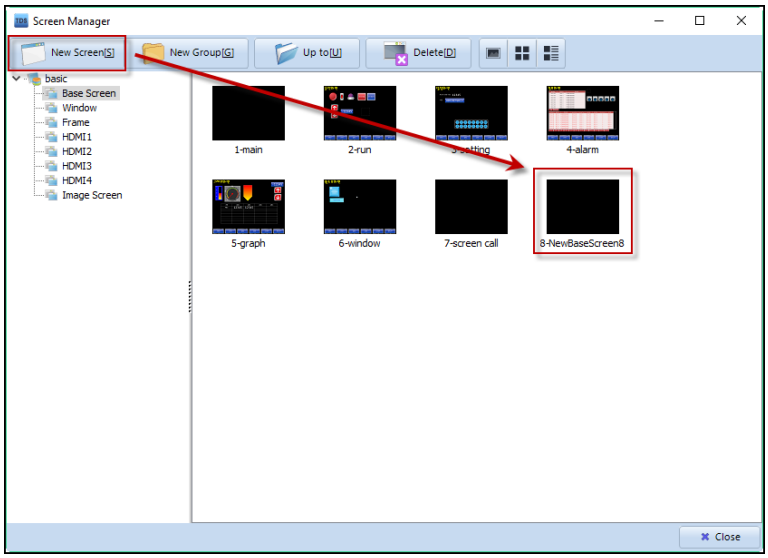
Select a [Screen Category] to browse the [Screen List] You can copy multiple screens in a single category by selecting multiple items from the [Screen List] with a drag of the mouse cursor, followed with a [Ctrl+C] and [Ctrl+V] input.



[Figure. Screen Manager]

(1) New Screen

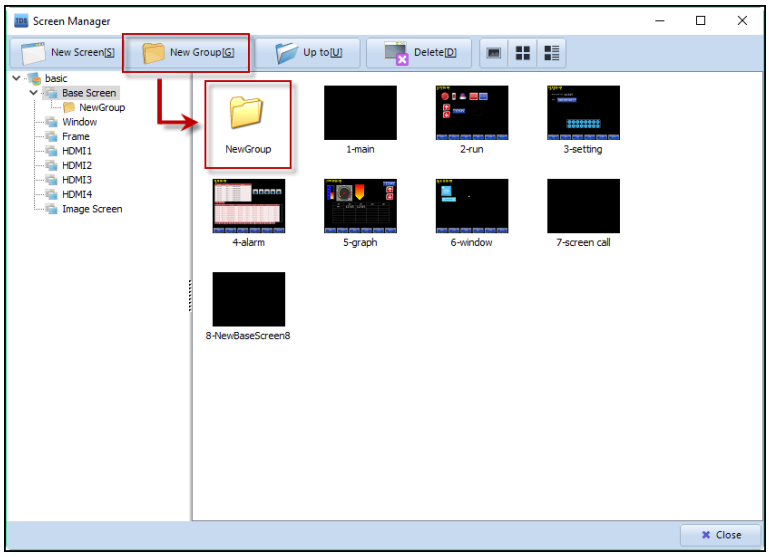
Select a Screen Category and click [New Screen] to add a new screen to the selected category as shown below. You can also add a screen with a [Ctrl+C] / [Ctrl+V] input of a selected screen.



[Figure. New Screen]

(2) New Group

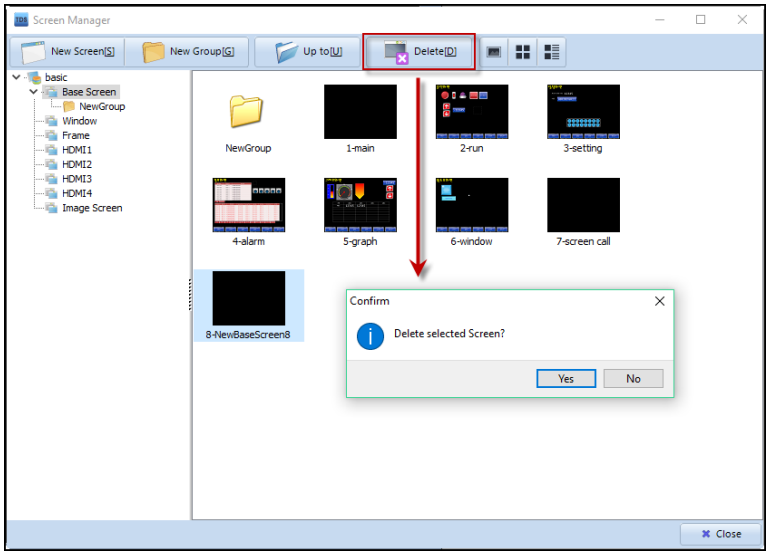
Select a Screen Category and click [New Group] to add a new folder to the selected category as shown below. You can manage screens by grouping multiple screens to a folder.



[Figure. New Group]

(3) Delete

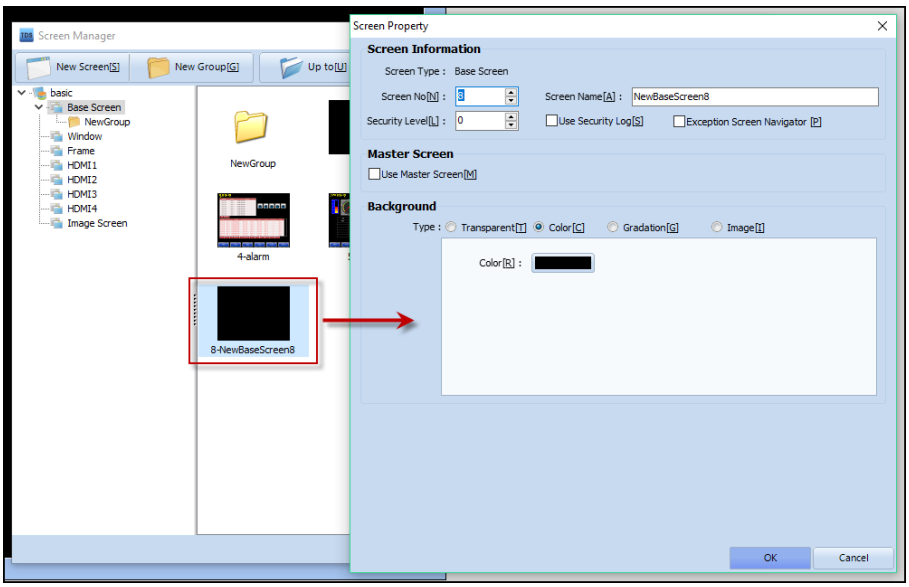
Select a screen(s) and click [Delete]. The below confirm message will appear. Select [Yes] to delete the selected screen(s) in a controlled manner.



[Figure. Delete]

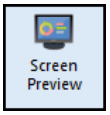
(4) Screen Property

Access and configure the [Screen Property] from the [Screen Manager]. Double click a screen from the screen list to open the [Screen Property] window. Properties changed from the [Screen Property] window is immediately reflected in the [Screen Manager].

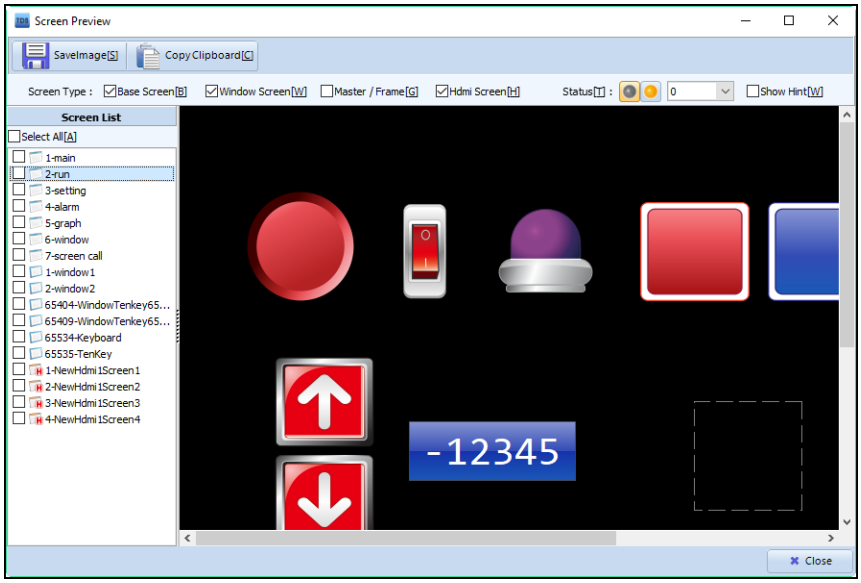


[Figure. Screen Property]

23.4 Screen Preview



Save the screen of a drawing project to an image file with [Screen Preview]. This function is useful when the content of a project is documented.



[Figure. Screen Preview]

No.	Screen Preview	Description
1	Save Image[S]	Save the selected screen to an image file.
2	Copy Clipboard[C]	Copy the selected screen to the Clipboard.

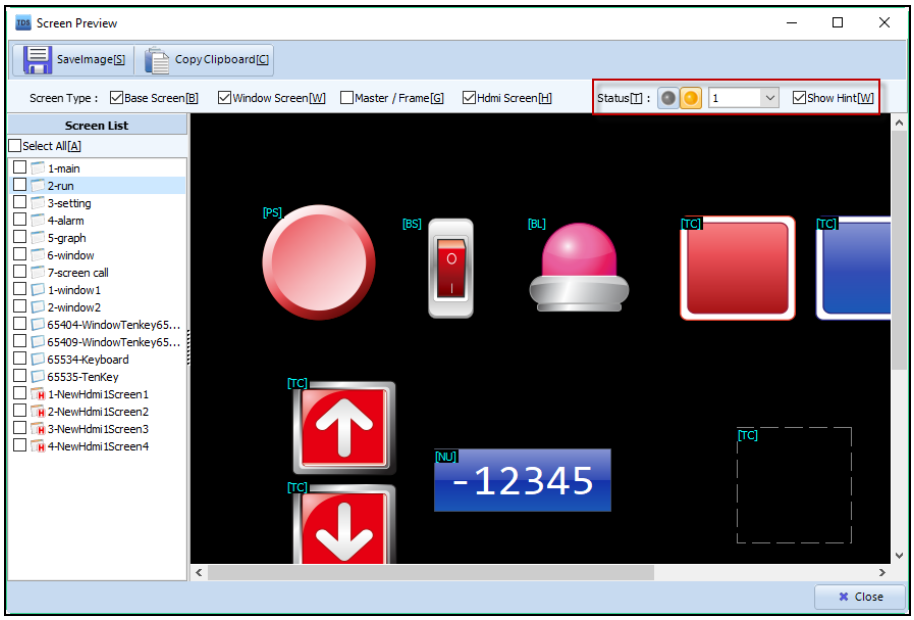
No.	Screen Preview		Description
1	Screen Type	Base Screen	Add Base Screens to the Screen List.
		Window Screen	Add Window Screens to the Screen List.

		Master / Frame	Add Master Screens and Frame Screens to the Screen List.
		HDMI Screen	Add HDMI Screens to the Screen List.
2	Status[T]		Show the objects in the screen at an [Off] condition.
			Show the objects in the screen at an [On] condition.
			For objects employing a word address, the feature of the object according to the [On] / [Off] status of the [00] Bit to the last [15] Bit. For Word Lamp Objects and Word Message Objects, the feature for each configured order is shown.
3	Show Hint[W]		Show the names of, effects and actions applied to objects employed in the screen.
4	Screen List	Select All	Select all images of the screens in the Screen List.

23.4.1 Save Image

Follow these steps to save a screen to an image file. First, configure the settings for [Status] and [Show Hint].

The below configuration shows [Status] of [On] and [Show Hint] enabled, where the abbreviation of each object is shown on the screen.



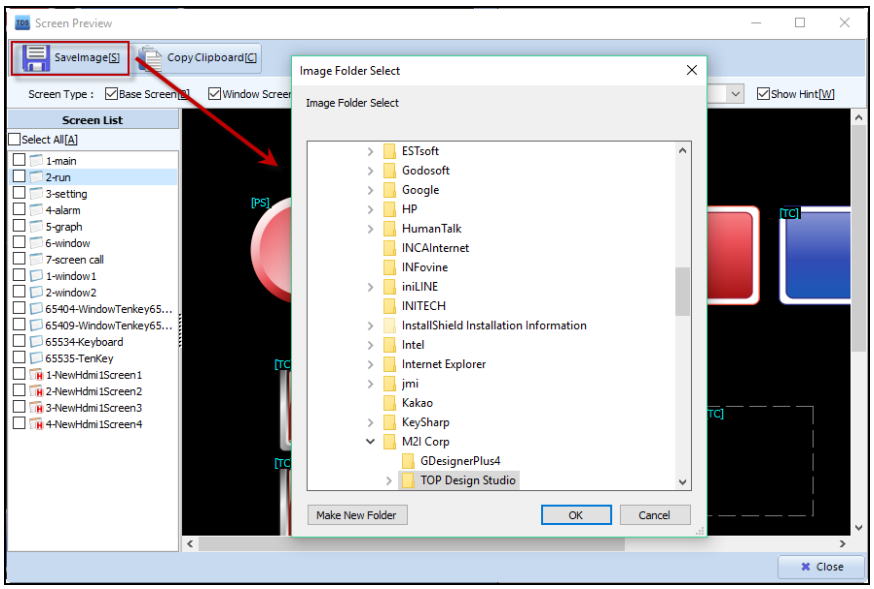
[Figure. Save Image - Step 1]

After configuring the settings, click [Save Image].

The [Image Folder Select] window will appear.

Select the path to save the screen image as a [*.BMP] file.

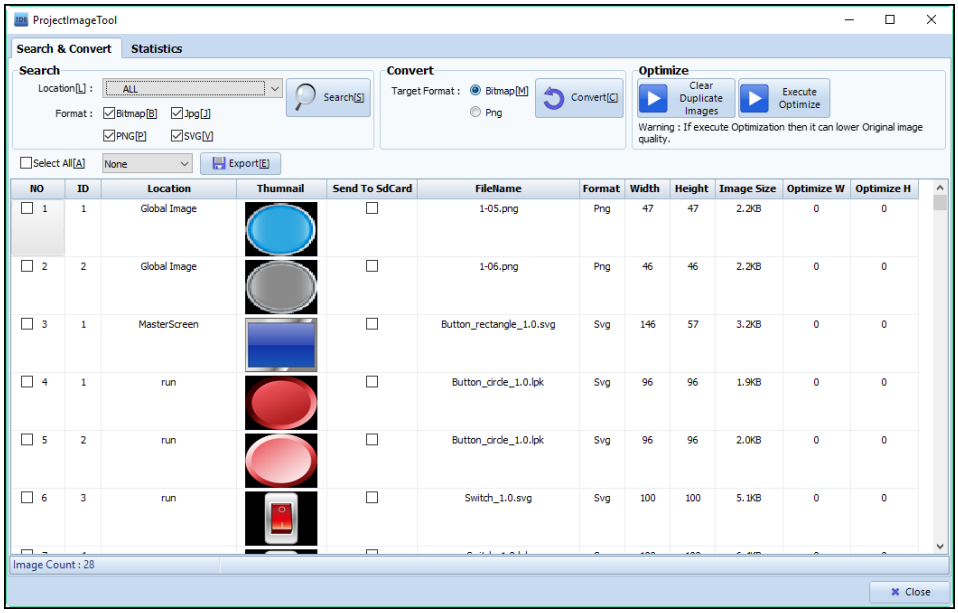
Click [Copy Clipboard] to copy the screen to the clipboard for subsequent use.



[Figure. Image Folder Select]

23.5 Project Image Manager

Search an image employed in the project, to access the size and management of or export to a specific file type. Select file format between [*.BMP] and [*.PNG].



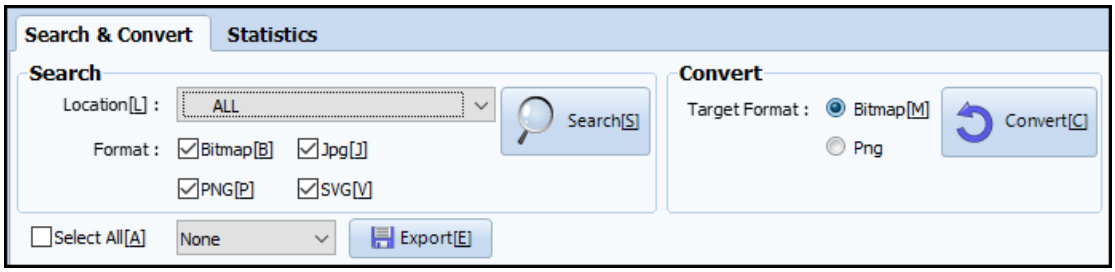
[Figure. Project Image Tool]

No.	Button	Description
1	Search[S]	Search images employed in the Project.
2	Convert[C]	Convert a selected image to a [*.BMP] file or a [*.PNG] file.
3	Clear Duplicate Images	Organize same images employed in the project. If two identical images with different sizes are employed, both files are included in the build. Therefore, organizing duplicated images reduces the overall size of the project.

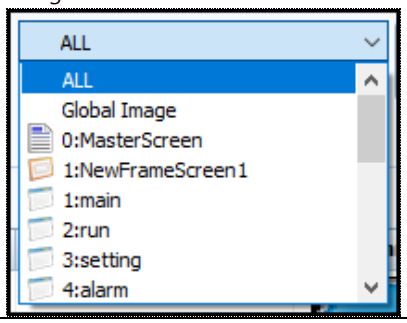
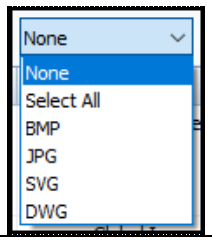
4	Execute Optimize	Optimize images employed in the project. Executing optimize may cause the image quality deteriorate.
5	Export [E]	Export a selected image.

23.5.1 Search & Convert

Search images according to their screen position and format.
You can covert and save searched images as a different format.

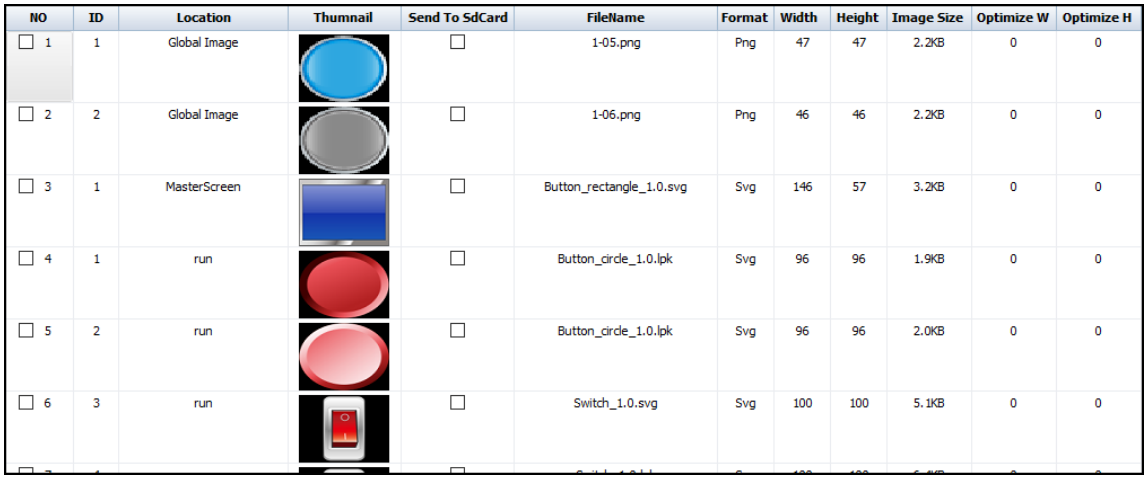


[Figure. Search & Convert]

No.	Search & Convert		Description
1	Search	Location[L]	Select the screen in which the image of your interest is employed. Select [All] to search all images in all screens. 
		Format	Select the image format of your interest. Applicable formats are Bitmap[B], Jpg[J], PNG[P], and SVG[V].
2	Convert	Target Format	Select the format to which the image should be converted. Applicable formats are BMP[M] and PNG[P].
3	Select All[A]		From the search result, select all found images, or select all images of a specific format configured from the drop down menu. 

23.5.2 **Search Result**

The search results and conversion results are listed. The size and name of each image file is shown, and each file can be saved or converted.



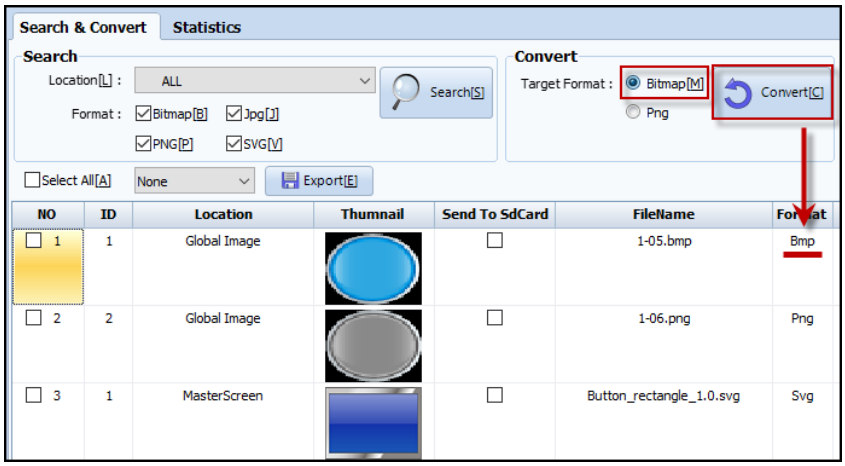
NO	ID	Location	Thumnail	Send To SdCard	FileName	Format	Width	Height	Image Size	Optimize W	Optimize H
1	1	Global Image			1-05.png	Png	47	47	2.2KB	0	0
2	2	Global Image			1-06.png	Png	46	46	2.2KB	0	0
3	1	MasterScreen			Button_rectangle_1.0.svg	Svg	146	57	3.2KB	0	0
4	1	run			Button_circle_1.0.lpk	Svg	96	96	1.9KB	0	0
5	2	run			Button_circle_1.0.lpk	Svg	96	96	2.0KB	0	0
6	3	run			Switch_1.0.svg	Svg	100	100	5.1KB	0	0

[Figure. Search Result]

No.	Search Result	Description
1	NO	The sequential number for each matching image. Click the check box to select images.
2	ID	The ID number of the image employed in the project.
3	Location	The location of the image employed in the project.
4	Thumbnail	A Thumbnail of the image.
5	Send To SD Card	Save a selected image(s) on the SD Card. (Caution! If no SD Card is inserted, this function may not be properly executed).
6	FileName	The name of the image file.
7	Format	The format of the image file.
8	Width	The horizontal width of the image.
9	Height	The vertical height of the image.
10	Image Size	The size of the image file.
11	Optimize W	The horizontal width of the object after [Execute Optimize].
12	Optimize H	The vertical height of the object after [Execute Optimize].
13		Click the column header to sort the list.

(1) Convert Format

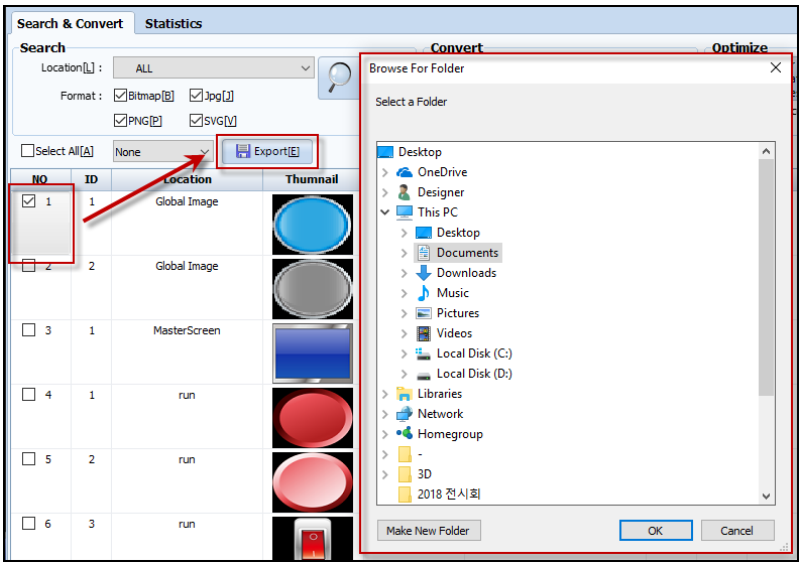
To change the format of an image, select the [Target Format] and [Target Image] and click [Convert] to change the file format as shown below.



[Figure. Convert Image Format]

(2) Export

Click [Export] to save a selected image(s) to a file.

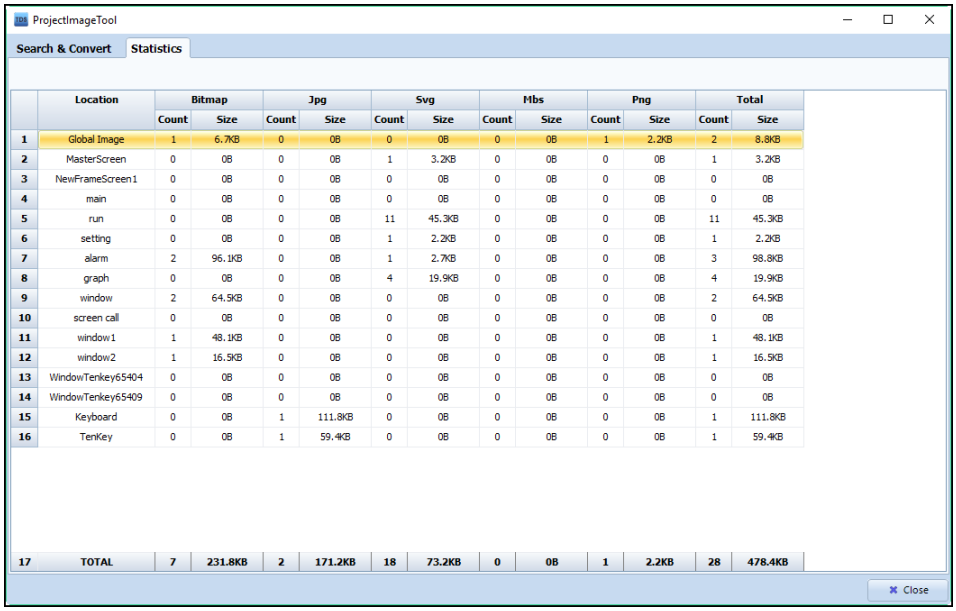


[Figure. Export]

23.5.3 **Statistics**

The statistics of all images employed in the project is provided.

The format and size of image files employed in each screen of the project is provided, along with the total number and size of all images.



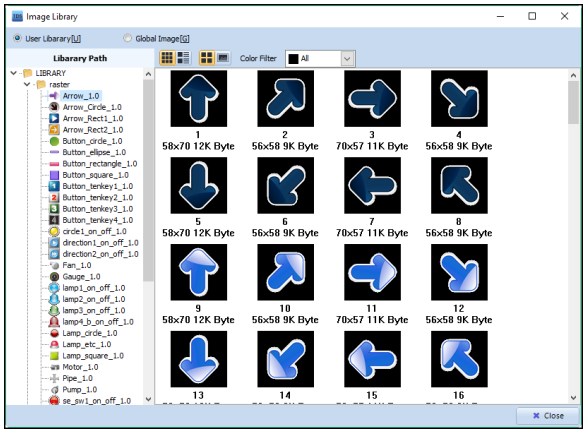
	Location	Bitmap		Jpg		Svg		Mbs		Png		Total	
		Count	Size	Count	Size	Count	Size	Count	Size	Count	Size	Count	Size
1	Global Image	1	6.7KB	0	0B	0	0B	0	0B	1	2.2KB	2	8.8KB
2	MasterScreen	0	0B	0	0B	1	3.2KB	0	0B	0	0B	1	3.2KB
3	NewFrameScreen1	0	0B	0	0B	0	0B	0	0B	0	0B	0	0B
4	main	0	0B	0	0B	0	0B	0	0B	0	0B	0	0B
5	run	0	0B	0	0B	11	45.3KB	0	0B	0	0B	11	45.3KB
6	setting	0	0B	0	0B	1	2.2KB	0	0B	0	0B	1	2.2KB
7	alarm	2	96.1KB	0	0B	1	2.7KB	0	0B	0	0B	3	98.8KB
8	graph	0	0B	0	0B	4	19.9KB	0	0B	0	0B	4	19.9KB
9	window	2	64.5KB	0	0B	0	0B	0	0B	0	0B	2	64.5KB
10	screen call	0	0B	0	0B	0	0B	0	0B	0	0B	0	0B
11	window1	1	48.1KB	0	0B	0	0B	0	0B	0	0B	1	48.1KB
12	window2	1	16.5KB	0	0B	0	0B	0	0B	0	0B	1	16.5KB
13	WindowTenkey65404	0	0B	0	0B	0	0B	0	0B	0	0B	0	0B
14	WindowTenkey65409	0	0B	0	0B	0	0B	0	0B	0	0B	0	0B
15	Keyboard	0	0B	1	111.8KB	0	0B	0	0B	0	0B	1	111.8KB
16	TenKey	0	0B	1	59.4KB	0	0B	0	0B	0	0B	1	59.4KB
17	TOTAL	7	231.8KB	2	171.2KB	18	73.2KB	0	0B	1	2.2KB	28	478.4KB

[Figure. Statistics]

No.	Statistics		Description
1	Location		The location of the Base Screen, Window Screen, Global Screen.
2	File Format / Total	Count	The total number of images existing in the screen.
		Size	The total size o all images existing in the screen.
3			Click each column header to sort the list. [Ascending Order], [Descending Order]

23.6 Image Library

Add images to and manage images in the default [User Library] or [Global Image] with [Image Library]. In particular, media (pdf, text, image) assigned to [Alarm] - [Solution] must be registered to [Global Image], and images in [Global Image] provide easy access.



[Figure. Image Library]

No.	Image Library	Description
1		Show images in large icons.
2		Show images in detail.
3		Show images in small thumbnails.
4		Show images in large thumbnails.
5		Select the color to be shown in the image list.
6		Add an image to the selected directory.
7		Delete a selected image(s).

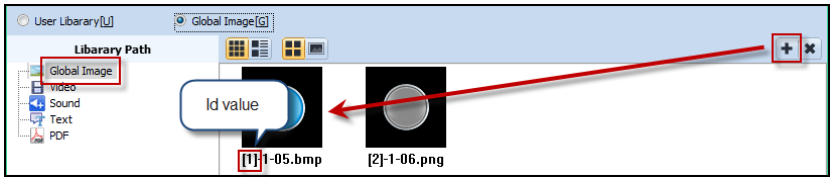
No.	Image Library	Description
1	User Library[U]	The sequential number for each matching image. Click the check box to select images.
2	Global Image[G]	The ID employed in the Project.

23.6.1 Global Image

Data entered by the User.

Applicable data formats are Images, Videos, Sounds, Texts and PDF. Applicable video format is [*.mp4], and applicable sound format is [*.wav].

Select the applicable data type from [Library Path], and click [+] to add a file. Once added as a Global Image, the file will be assigned with a prefix of its [ID], and this [ID] is applicable as the [Solution Item Number] for [Alarm] - [Solution] or be used from [Word Indirect].

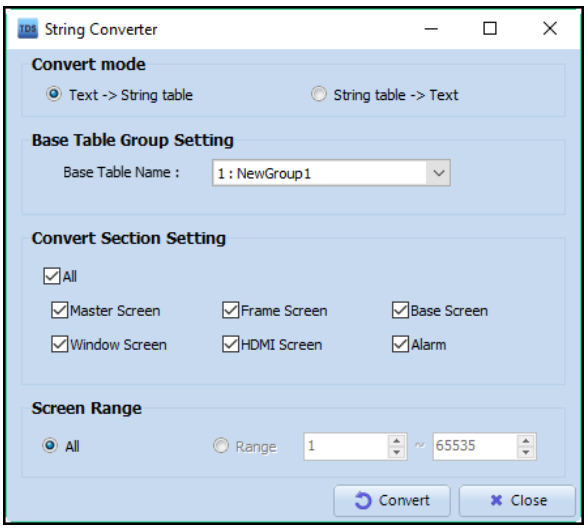


[Figure. Global Image]

23.7 String Table Converter

Convert texts to string tables or string tables to texts with the [String Converter]. You can change all strings of the project, or change strings of a specific screen / range.

To execute [String Converter], a String Table (Multi-language) must be configured for the project.

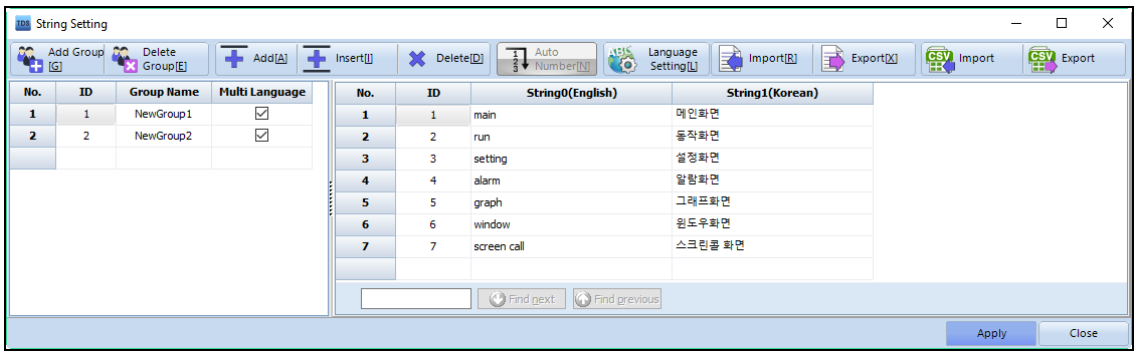


[Figure. String Converter]

No.	String Converter		Description
1	Convert Mode	Text -> String Table	Convert general texts employed by objects to a string table.
		String Table -> Text	Convert string table employed by objects to general texts.
2	Convert Section Setting	All	Execute [String Converter] for all screens.
		Master Screen	Execute [String Converter] only for Master Screen.
		Frame Screen	Execute [String Converter] only for Frame Screen.
		Base Screen	Execute [String Converter] only for Base Screen.
		Window Screen	Execute [String Converter] only for Window Screen.
		HDMI Screen	Execute [String Converter] only for HDMI Screen.
		Alarm	Execute [String Converter] only for strings employed by an [Alarm].
3	Screen Range	All	Convert strings for all ranges of the selected screen type.
		Range	Convert strings for a specific range of the selected screen type.
4	Convert		Convert strings according to the configuration.
5	Close		Close the [String Converter] window.

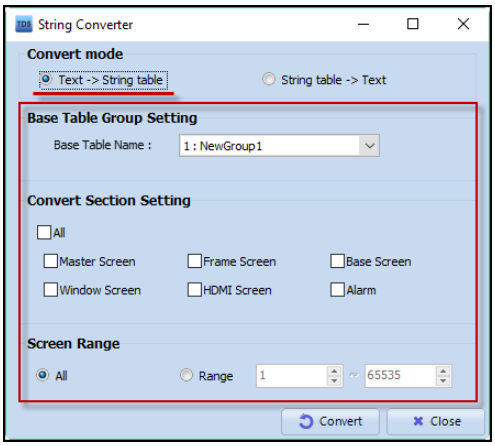
23.7.1 Convert Mode - Text -> String Table

To convert a text to a (Multi-Language) String Table, a (Multi-Language) String Table must be configured as a prerequisite. If a String Table is not configured, the string conversion will not be executed. Refer to Chapter 4.4 [String] for more details on how to configure a String Table.



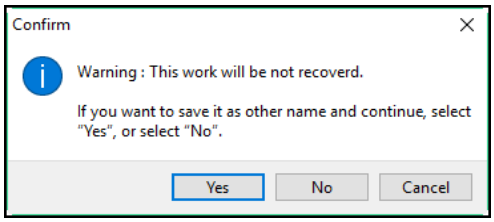
[Figure. String Setting]

After configuring a String Table, you can execute a string conversion. Select [Text -> String Table] for the [Convert Mode], and configure the [Base Table Group Setting] and [Screen Range].



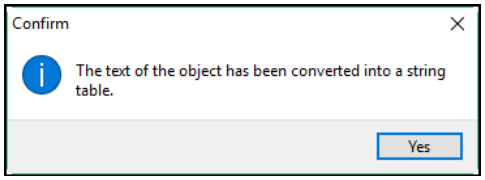
[Figure. Convert Mode - Text -> String Table]

Click [Convert] to execute the conversion. The conversion is irreversible, and a message window informing you to save the current project as another name appears. Click [Yes] to save the current project, prior to conversion, as another file, or [No] to execute the conversion without saving the current project file.



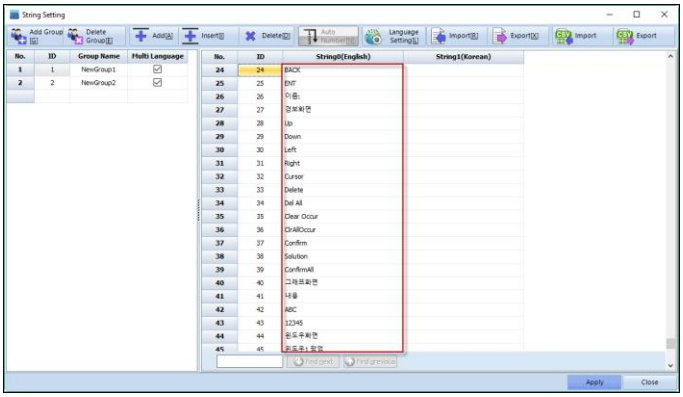
[Figure. Confirm Message]

Select whether or not to save the file, and the conversion is executed. Once conversion is completed, the below message will appear.



[Figure. Message - Conversion Complete]

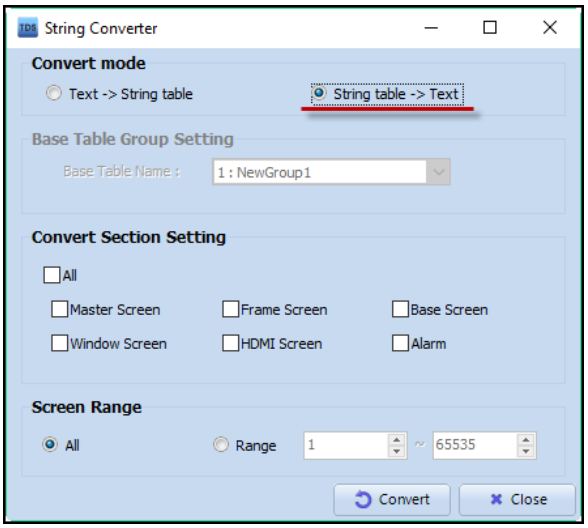
After conversion, the texts within the configured range are now string tables, which can be accessed from the [String] tab of each object. If a text within the conversion range was not originally listed in the String Table, the text will be automatically added to the String Table.



[Figure. New Texts added to the String Table upon Conversion]

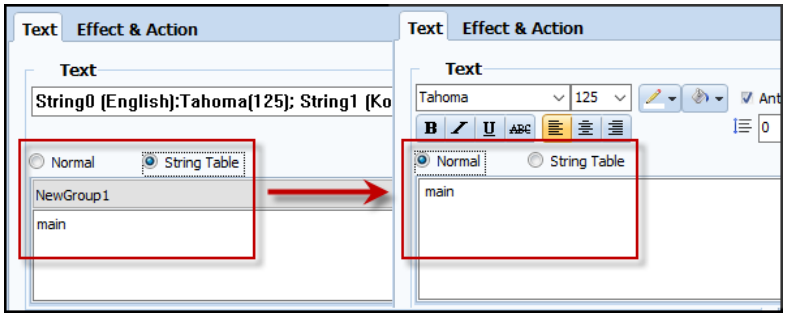
23.7.2 Convert Mode - String Table -> Text

Convert texts allotted to the [String Table] to general texts, with the same method applied for [Text -> String Table], by configuring the [Convert Section Setting] and [Screen Range].



[Figure. Convert Mode - String Table -> Text]

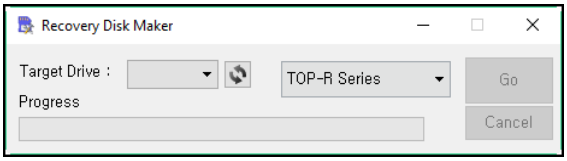
After conversion, the texts connected to the String Table are now individual texts.



[Figure. Convert Mode - String Table -> Text]

23.8 Recovery Disk

A Recovery Disk is useful to initialize the TOP Device when it shows no response, or does not properly operate. You need an SD Card to make a Recovery Disk, and with the recovery disk, the Operating System, Hydra, Daemon, Utility and all data of the TOP device is initialized. (Caution! Once the TOP device is recovered, no previous data is recovered.)



[Figure. Recovery Disk]

23.8.1 Recovery Disk

An SD Card is required to make a recovery disk. Prepare an SD card and follow the below steps.

(1) Connect the SD Card to your PC.

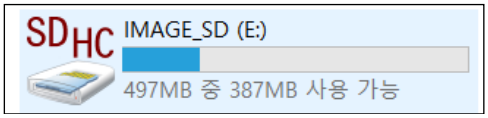
(2) Click [Tool] - [Recovery Disk].

(3) Select the driver of the SD Card.

(4) Select the TOP Series for which the recover disk is made.

(5) Click [Go] to create the Recovery Disk.

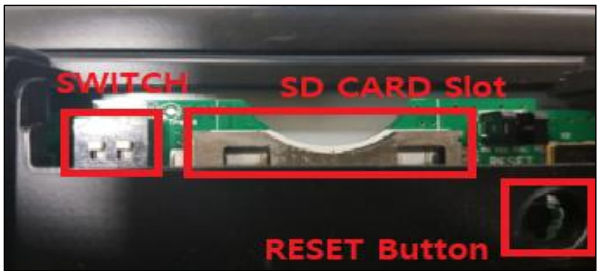
Once [Go] is selected in the above steps, a recovery disk is made as shown below.



[Figure. Recovery Disk]

23.8.2 How to use a Recovery Disk

If you open the SD card cover on the back side of your TOP device, you can find an SD Card Slot, a White-colored switch and a Reset Button. Initialize your TOP device with these three features. The shape and form of the switch and reset button may differ by each TOP model.



[Figure. SD Card Slot on TOP Device]

(1) Open the SD Card cover on the back of your TOP device.

(2) Insert the SD card containing the Recovery Disk to the slot.

(3) Turn down all white-colored switches located next to the SD Card Slot, and push the Reset Button to reset the TOP device.

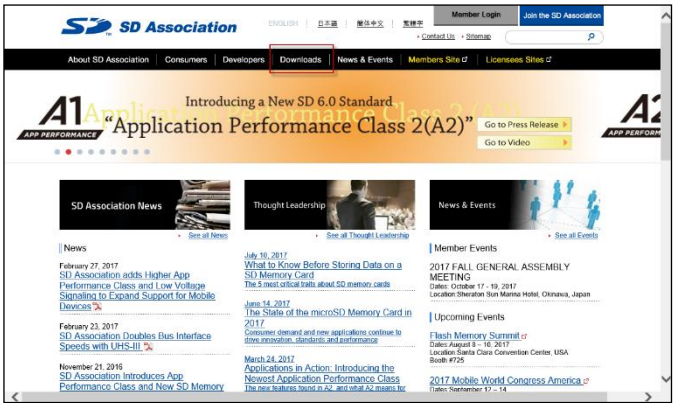
(4) The TOP will reboot by itself and the recovery system will be loaded.

(5) Once the TOP device is completely recovered, the TOP device will raise a repeated buzzer.
Then, remove the SD Card, and restore the white-colored switches to an upward position, and press Reset button once again. The TOP device will reboot again, and the recovery process in finished.

23.8.3 How to Format a Recovery Disk

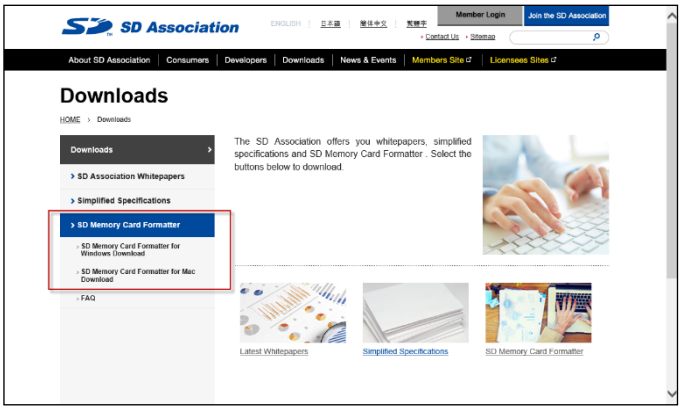
An SD Card used as a Recovery Disk shows a reduced capacity. To restore the original capacity of the SD Card, the SD Card should be formatted. Use the format program provided by [SD Association] rather than conventional Format function provided by Windows OS, which is not compatible.

(1) Go to www.sdcard.org.



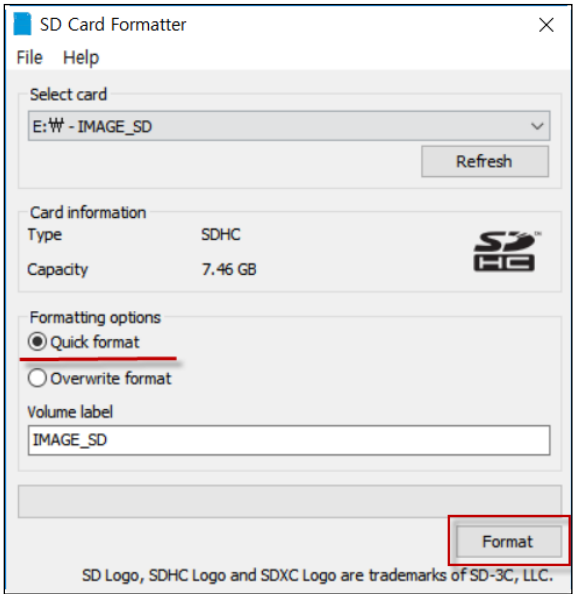
[Figure. SD Association Website]

(2) Select [Download] Download [SD Memory Card Formatter]. Select the applicable OS between Windows and Mac.



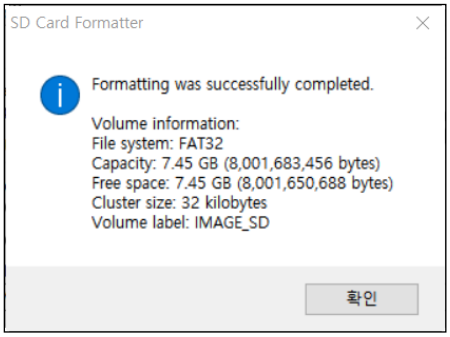
[Figure. SD Memory Card Formatter - Download Page]

(3) Click [Accept] to proceed the download. Install the program according to the instructions provided by the Install-Shield Wizard. Run the program after installation.



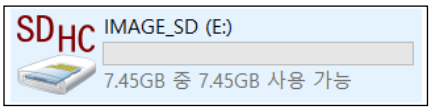
[Figure. SD Card Formatter]

(4) Select the SD Card of your interest, configure the [Formatting Options] as [Quick Format] and click [Format]. A message will appear informing you that all data on the SD card will be permanently deleted. Click Yes(Y) to proceed. Once format is completed the following message will appear, informing you that the format was successfully completed.



[Figure. Formatting Completed]

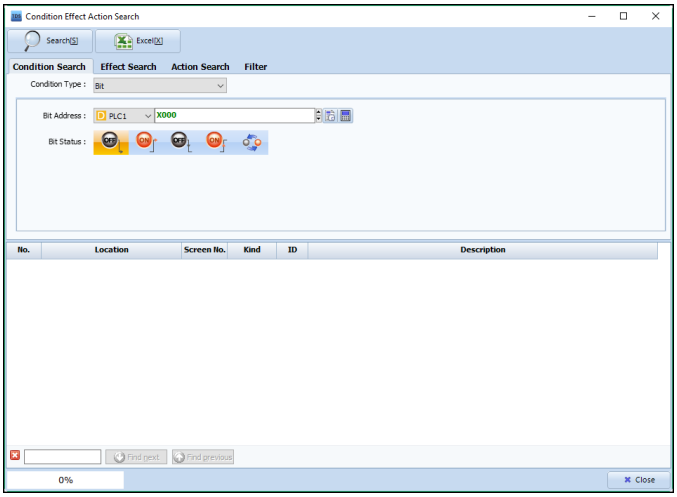
(5) Once formatting is completed, the SD card is restored to its original capacity as shown below.



[Figure. Completed Formatting]

23.9 Condition, Effect, Action Search

Search or and manage [Condition] / [Effect] / [Action] employed in objects of the current project. Configure search range with available filters and export the search result to an Excel file for easy management.



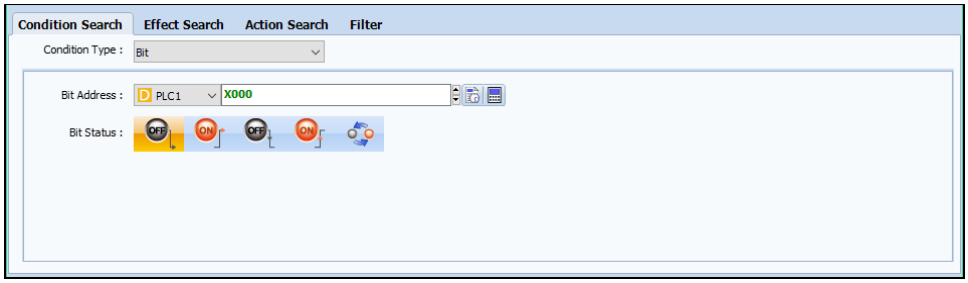
[Figure. Condition Effect Action Search]

No.	Condition, Effect, Action Search	Description
1	Search	Search for Conditions, Effects and Actions
2	Excel	Export the search result to an Excel File.
3	Condition Search	Search for conditions employed in objects of the current project.
4	Effect Search	Search for effects employed in objects of the current project.
5	Action Search	Search for actions employed in objects of the current project.
6	Filter	Configure the range in which conditions, effects and actions should be searched for.
7	Close	Close the [Condition Effect Action Search]

23.9.1 Condition Search Tab

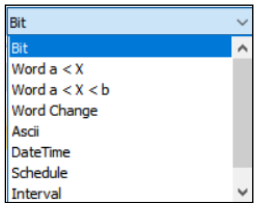
Search for a condition employed in the project.

Configure search conditions according to the Condition Type of your interest, and view which object in which screen employs such conditions.



[Figure. Condition Search]

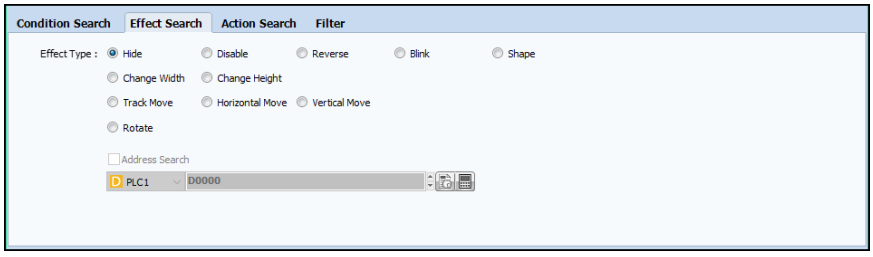
Select among the [Condition Type] provided in the drop down menu.
The conditions available at [Effect & Action] are provided.



[Figure. Condition Type]

23.9.2 Effect Search Tab

Search for effects employed in the project. Select the effect type of your interest from the drop down menu and see which object from which screen employs such effect.

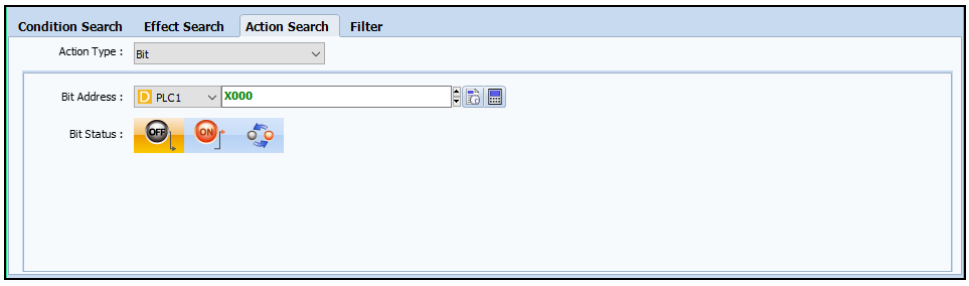


[Figure. Effect Search]

The effects available at [Effect & Action] are provided.

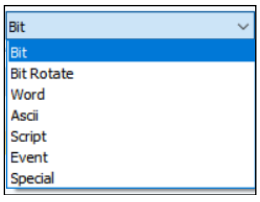
23.9.3 Action Search Tab

Search for actions employed in the project. Select the action type of your interest from the drop down menu and see which object from which screen employs such action.



[Figure. Action Search]

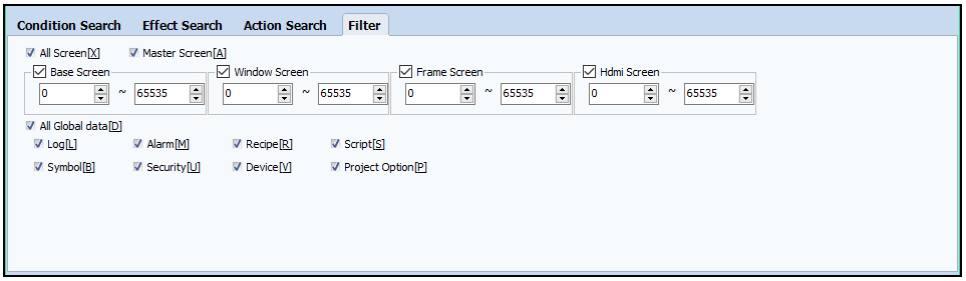
Select among the [Action Type] provided in the drop down menu. The actions available at [Effect & Action] are provided.



[Figure. Action Type]

23.9.4 Filter

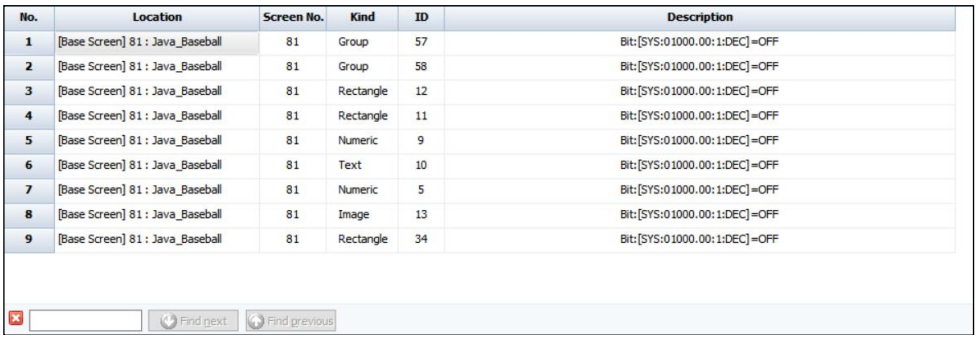
Select the screen type and range to search for a condition, effect, action. You can apply additional filters to the current search result and re-run a search.



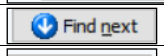
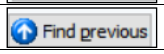
[Figure. Filter]

23.9.5 Search Result

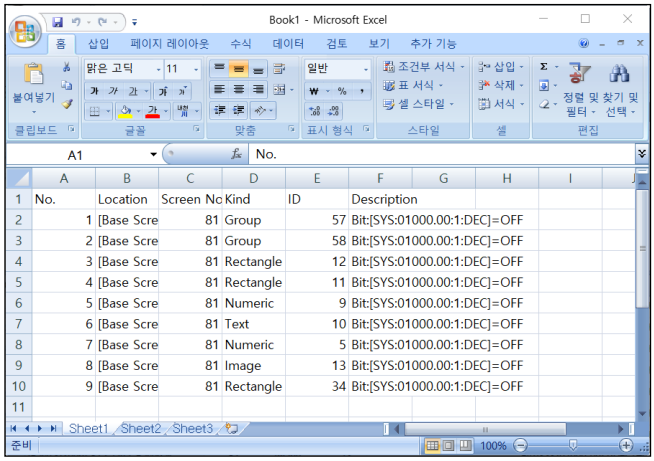
After configuring the search condition for either [Condition Search] / [Effect Search] / [Action Search], and applying [Filter], click [Search] to attain the corresponding results. The search result can be exported to an Excel file with a click to [Excel].



[Figure. Search Result]

No.	Search Result	Description
1	No.	Sequential number assigned to each search result.
2	Location	The location of the object employing the search result.
3	Screen No.	The screen number of the object employing the search result.
4	Kind	The type of the object employing the search result.
5	ID	The ID number of the object employing the search result.
6	Description	The condition, effect, action corresponding to the search option.
7		Search through the search result for a specific keyword.
8		Find the next search result containing the keyword.
9		Find the previous search result containing the keyword.

Click [Excel] to export the search result to an excel file as shown below.



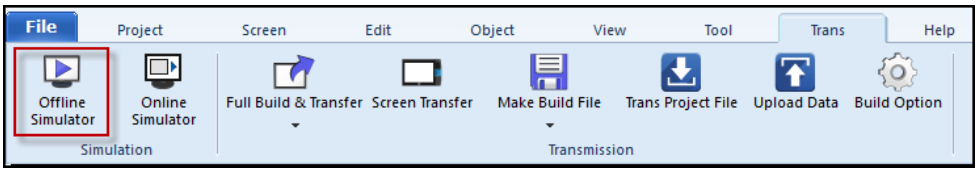
No.	Location	Screen No	Kind	ID	Description
1	[Base Scre	81	Group	57	Bit:[SYS:01000.00:1:DEC]=OFF
2	[Base Scre	81	Group	58	Bit:[SYS:01000.00:1:DEC]=OFF
3	[Base Scre	81	Rectangle	12	Bit:[SYS:01000.00:1:DEC]=OFF
4	[Base Scre	81	Rectangle	11	Bit:[SYS:01000.00:1:DEC]=OFF
5	[Base Scre	81	Numeric	9	Bit:[SYS:01000.00:1:DEC]=OFF
6	[Base Scre	81	Text	10	Bit:[SYS:01000.00:1:DEC]=OFF
7	[Base Scre	81	Numeric	5	Bit:[SYS:01000.00:1:DEC]=OFF
8	[Base Scre	81	Image	13	Bit:[SYS:01000.00:1:DEC]=OFF
9	[Base Scre	81	Rectangle	34	Bit:[SYS:01000.00:1:DEC]=OFF

[Figure. Excel]

CHAPTER 24 - Trans

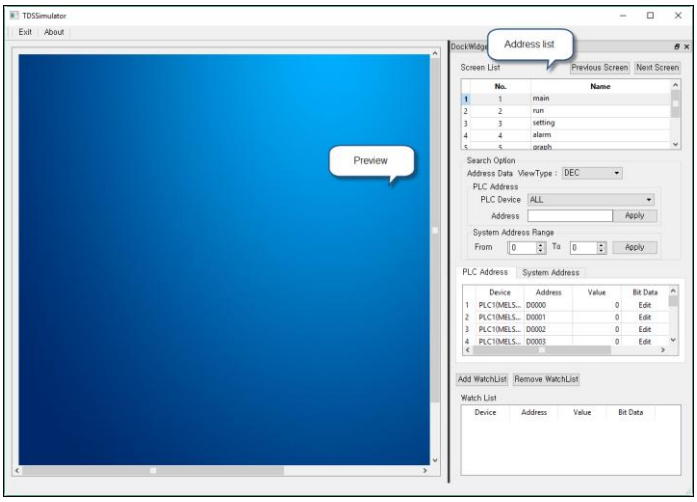
24.1 Offline Simulator

Run a virtual simulation with [Offline Simulator] local from your PC without loading the project to a TOP device. A virtual simulation of the project is provided on your PC just as if it is run on a TOP device, providing you an overview to detail address information. Go to [Trans] - [Offline Simulator] or press the [F12] key to run the Offline Simulator.



[Figure. Offline Simulator]

From the Offline Simulator, a left click to the mouse cursor is deemed as a touch to the TOP device screen. The preview on the left shows what will appear on the TOP device display, and the inspector on the right shows a screen list, search option, address data and other control functions.



[Figure. TDS Simulator]

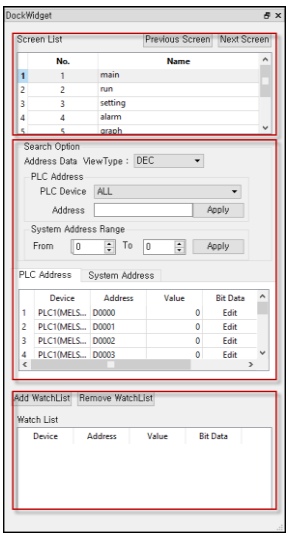
24.1.1 Preivew

The image shown in Preview is identical to the display output of the TOP device.
Use a left click to the mouse cursor to simulate a touch action on the screen.

[Figure. Preview]

24.1.2 **Inspector**

The Inspector provides information of the screen, objects, PLC address shown in the Preview and allows you to change data of addresses. Enter data to a PLC address of your interest to check the On/Off action or change in analogue value from Preview.
The Inspector consists of three major fields. [Screen List] showing the list of screens; [Search Option] allowing you to search for addresses; and [Watch List] to monitor the data of selected addresses.

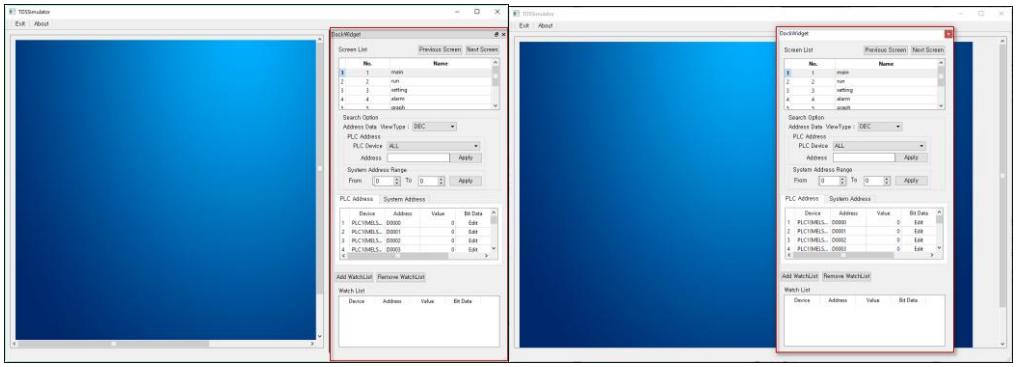


[Figure. Inspector]

No.	Inspector	Description
1	Screen List	The list of all applicable screens. Click a specific screen to show the preview of the selected screen.
2	Search Option	Search for an address employed in the drawing project.
3	Watch List	Add specific addresses of your interest for monitoring the change of its data.

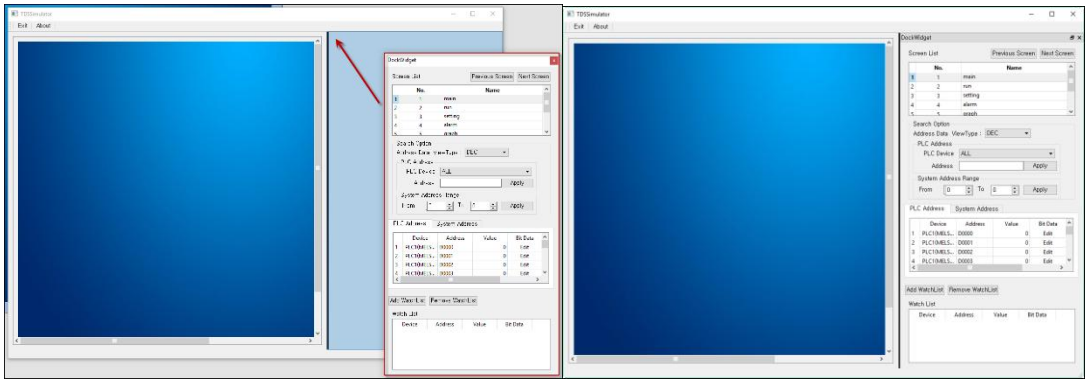
(1) DockWidget

The [Inspector] can be docked to the TDS Simulator or float around your computer screen.
Drag the title bar of the [Inspector] to undock the Inspector from the TDS Simulator window.



[Figure. Inspector - Undocked]

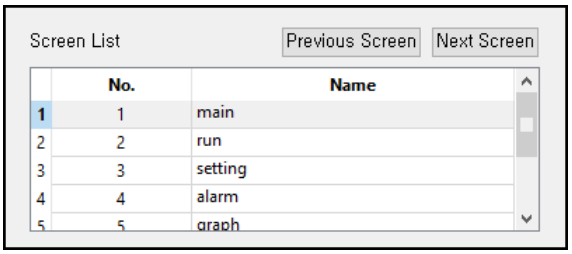
Drag the title bar of the Inspector to its original position to dock it to the window. While dragging the title bar, the background will turn blue when the cursor is within the docking range.



[Figure. Inspector - Docked]

24.1.3 Screen List

The list of operating screens is compiled. Click any part of the row of the screen of your interest to open the screen in Preview.



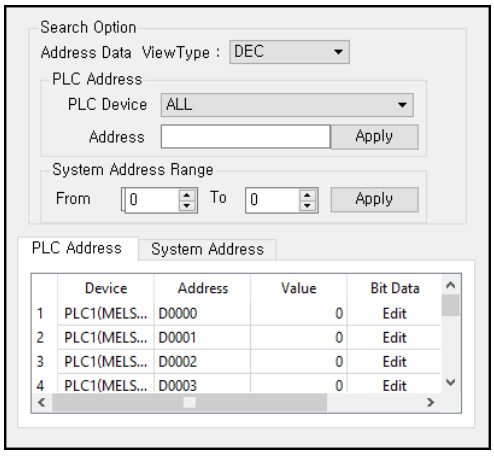
[Figure. Screen List]

No.	Screen List	Description
1	Previous Screen	Go back to the previous screen.
2	Next Screen	Go to the next screen.
3	No.	The prefix assigned to each screen.
4	Name	The name of each screen.

24.1.4 Search Option

Search for and change the data of an active address of the Preview.

Access [PLC Address] or [System Address] where System Address refers to an internal address of the TOP device.

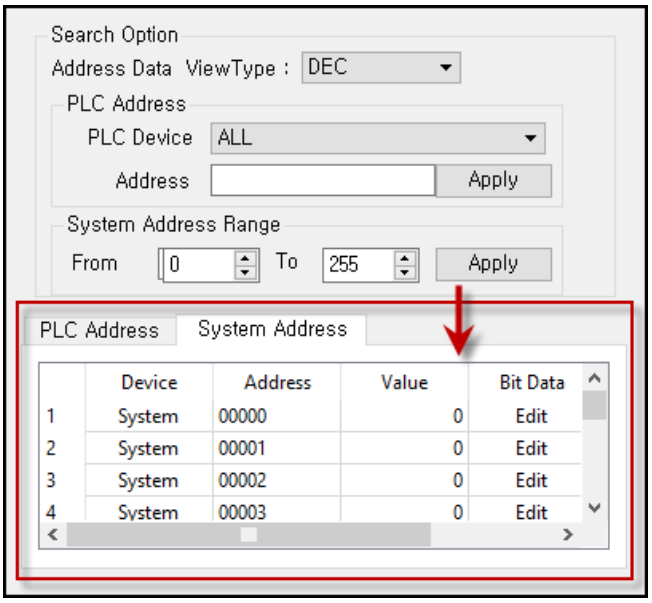


[Figure. Search Option]

No.	Search Option		Description
1	Address Data View Type		Select address type among [DEC] / [UDEC] / [HEX] / [BIN].
2	PLC Address	Device	Select the PLC Address Group ('D', 'M', etc)
		Address	Configure the PLC Address of your interest.
		Apply	Click [Apply] to compile a list of PLC addresses corresponding to the search option.
3	System Address Range	From	Configure the first address of the search range with a number between [0] and [10,239].
		End	Configure the last address of the search range with a number between [0] and [10,239].
		Apply	Click [Apply] to compile a list of System addresses corresponding to the search option.
4	PLC Address List		The list of corresponding PLC addresses.
5	System Address List		The list of corresponding System addresses.

(1) Address Search - PLC / System

Configure the [Search Option] and click [Apply] to attain the search result.

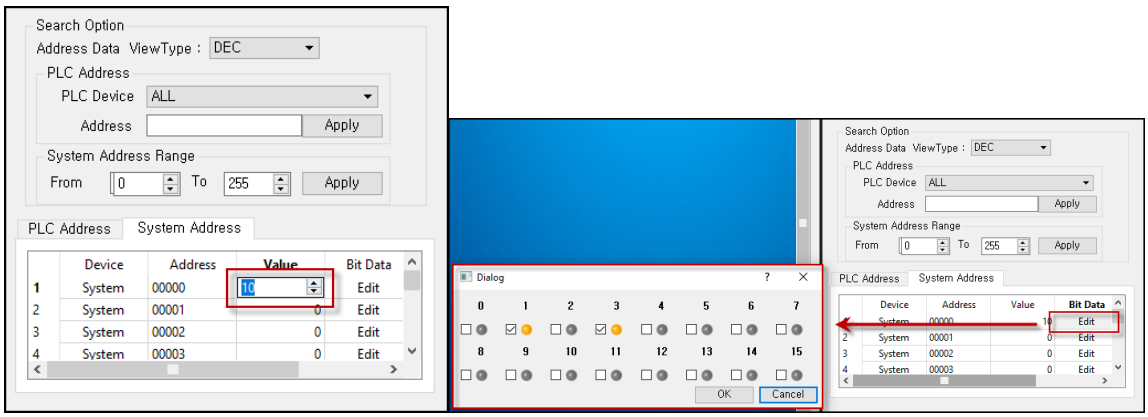


[Figure. Address Search]

No.	Address List	Description
1	Device	The name of the device hosting the address ('D", 'M', 'System', etc)
2	Address	The address of the device.
3	Value.	The decimal number representing the address status. You can change the value of each address.
4	Bit Data	The binary value of the address. You can change the status of the bit data.

(2) Changing the value of a PLC Address / System Address

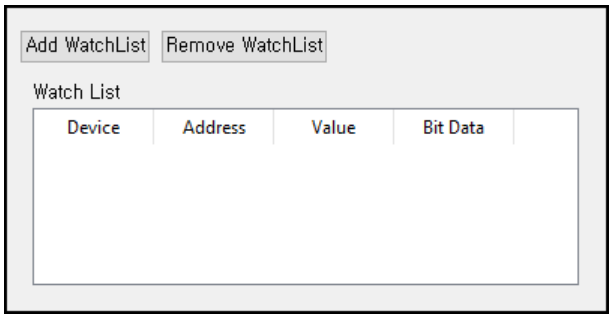
Change the data read from the address with [Value] and [Bit Data]. [Value] is shown in decimal numbers, and [Bit Data] is shown in binary numbers. Double click a data of your interest.



[Figure. Changing an Address Value]

24.1.5 **Watch List**

Add an address to the Watch List to monitor the change of the value. This function provides easy access to frequently used addresses or addresses with specific interests.

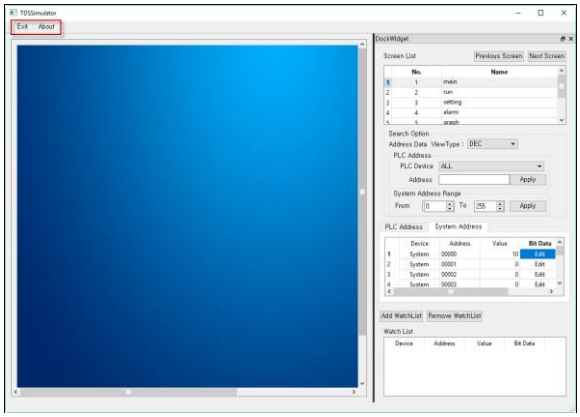


[Figure. Watch List]

No.	Watch List	Description
1	Add Watch List	Add a selected address from the search result to the Watch List.
2	Remove Watch List	Remove a selected address from the Watch List.

24.1.6 **Offline Simulator - Exit & Information**

The TDS Simulator is a program embedded in TDS, and has its own version information. Click [About] to check the version information.

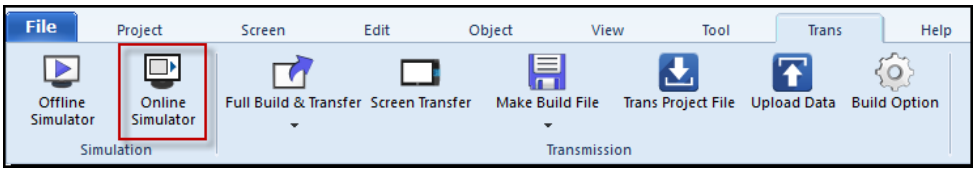


[Figure. TDS Simulator - Exit / About]

No.	Simulator	Description
1	About	Open the version information of the Simulator
2	Exit	Close the TDS Simulator.

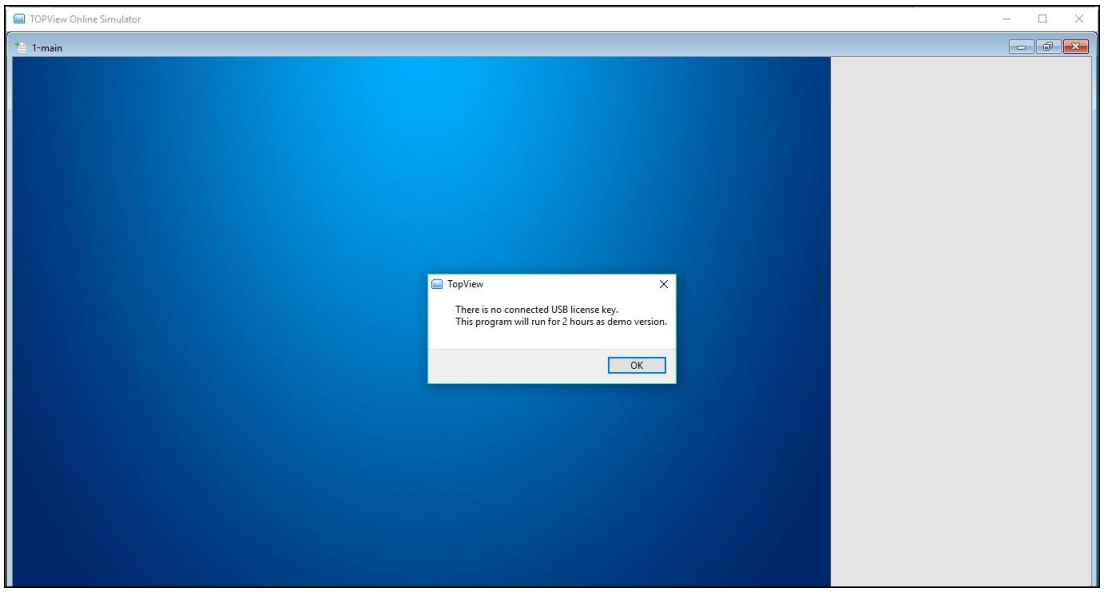
24.2 Online Simulator

Unlike [Offline Simulator], [Online Simulator] provides a simulation of the project with live communication with a PLC, as if the project will be operated on a TOP device with live communication with a PLC. Connect the Ethernet Port or Serial Port of your PLC with an actual PLC to confirm communication activities.



[Figure. Online Simulator]

Go to [Trans] - [Online Simulator] or press the [F10] key to run the Online Simulator.

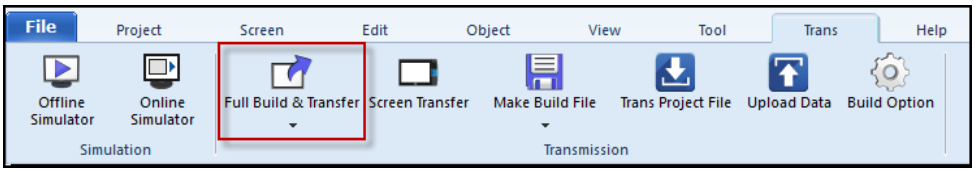


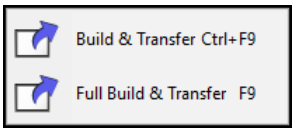
[Figure. Online Simulator]

Upon executing [Online Simulator], [TOPView Online Simulator] will appear on your screen. A warning message is provided informing you that the simulator will be terminated after every 2 hours if you do not have a license key. If a [TOPView] license issued by SCADA software, a PC HMI, is installed, you can monitor and control the PLC from your PC with no time limit.
Refer to Chapter 26 [TOP View] for more details on TOP View.

24.3 Build & Transfer

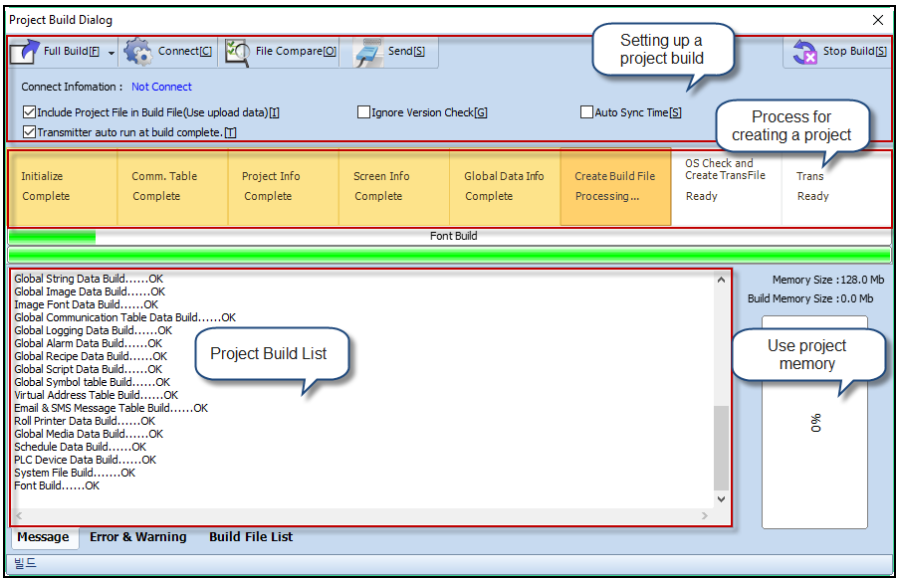
Build and Transfer functions are used to upload a drawing project to your TOP device. Use [Full Build & Transfer] or [Build & Transfer].





[Figure. Build & Transfer]

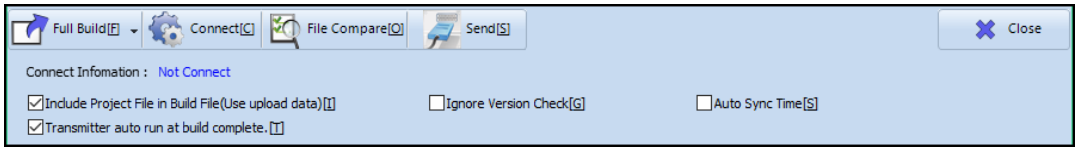
No.	Build & Transfer	Description
1	Full Build & Transfer	Upload the entire drawing project to a TOP device. All elements of the current project are built and transferred to the TOP device.
2	Build & Transfer	Only updates made during the current session are built and transferred to the TOP device. In other words, items with an update mark(*) are built and transfered.



[Figure. Project Build]

24.3.1 Project Build Dialog

Project Build Dialog provides functions of build to TOP device, connect, file compare, and send, with other options of backup information (backup project file), and Auto time synchronization.

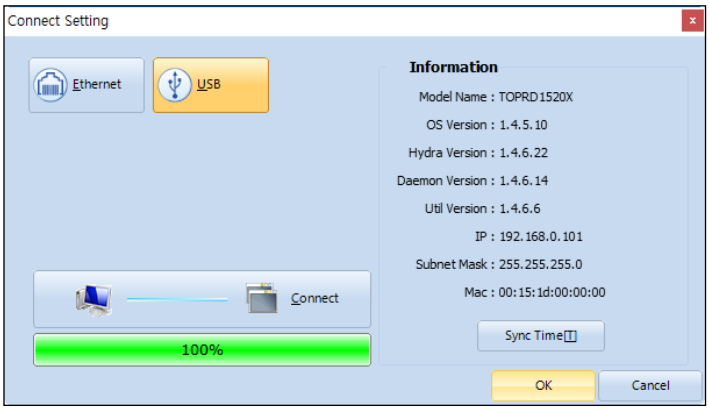


[Figure. Project Build Setting]

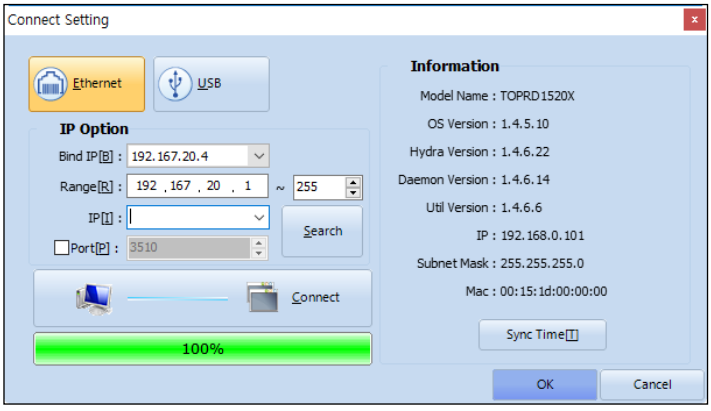
No.	Project Build	Description
1	Full Build / Build	Rerun the TDS Project Build. If Build was executed with a [Build & Transfer] session, no necessity to rerun a build. You can rather select Full Build or Build (Build only updates made during the current session).
2	Connect	Open the [Connect Setting] window to configure connection with the TOP device. (Select between [Ethernet] and [USB]).
3	File Compare	Compare the file uploaded on the TOP device and the current file open on the TDS. All discrepancies identified from the execution are compiled in a list.
4	Send	Upload the built project to a TOP device.
5	Connect Information	The status of the communication between the TOP device and TDS.
6	Include Project File in Build File	Enable this function to include the TDS file along with the project build to the TOP device. If selected, a backup file of the original project is transferred to the TOP device. If not selected, you cannot download the project file from the TOP device.
7	Ignore Version Check	No firmware (OS, Daemon, Hydra, Util) version check is conducted prior to upload, and the drawing project is unconditionally uploaded to the TOP device.
8	Auto Sync Time	Enable this function to perform a time synchronization with the PC and TOP device during uploading the project to the TOP device.
9	Transmitter auto run at build complete.	If your PC is connected with a TOP device, the drawing project is automatically uploaded to the TOP device once the build is completed.
10	Close	Close the Project Build Dialog.

(1) Connect

Configure connection between TDS (PC) and a TOP device. Click [Connect] to open the below [Connect Setting] window. Features differ according to the connected device. Information of the connected TOP device is shown.



[Figure. Project Build Connect - USB]

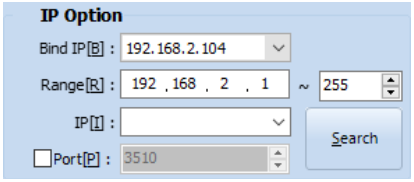


[Figure. Project Build Connect - Ethernet]

No.	Connect Setting	Description
1	Ethernet	Elect to connect the TOP device through an Ethernet port. To use this function, your PC and TOP device must be communicating via Ethernet, and you should configure the IP address.
2	USB	Elect to connect the TOP device through a USB port. This function is available from the USB port in front of the TOP device with no other specific setting.
3	Connect	Connect the TOP device via Ethernet or USB.
4	Information	Once the TOP device is connected, various information of the TOP device are shown.
5	Sync Time	Reset the TOP device system time clock to the current system time of your PC.
6	OK	Save the current status and close [Connect Setting].
7	Cancel	Abort [Connect Setting] without saving any modification.

1) TOP Connect - Ethernet

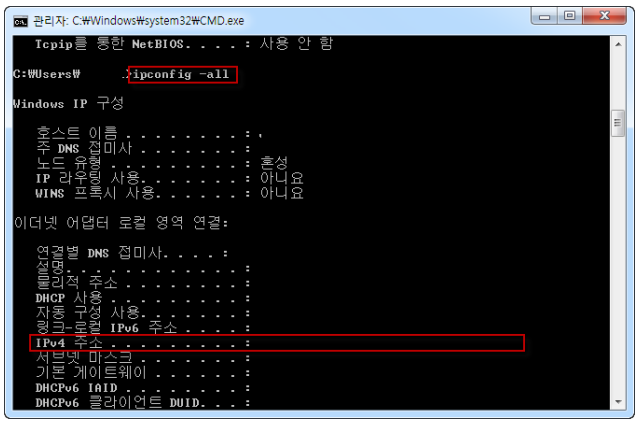
IP address must be configured to communicate via Ethernet. Check the status of IPs of the PC connected with the TOP device, and the IPs configured from the TOP device. No further configuration is required for a public IP. However, if private IPs are employed, both devices must be included in the same network location (Subnet Mask Setup).



[Figure. Ethernet Connection]

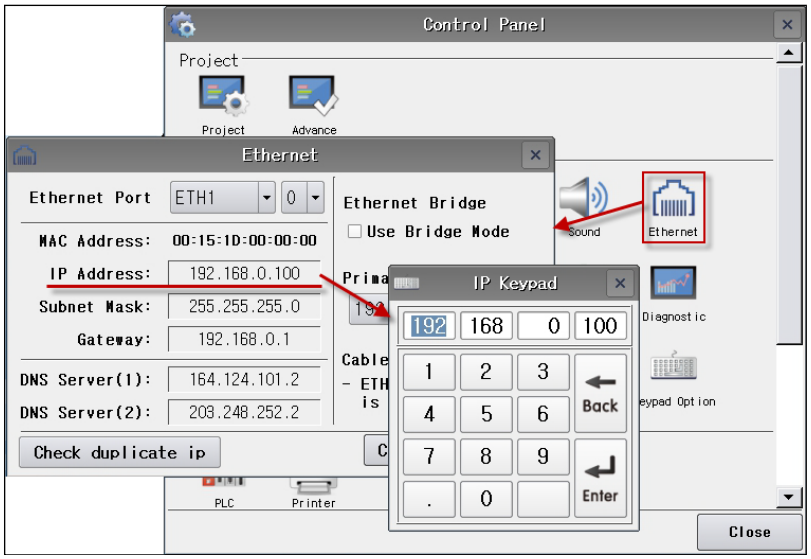
No.	IP Option	Description
1	Bind IP[B]	Select the IP of the current PC, this is a selection, not configuration. If the PC has two or more IP addresses, select the IP of the network card that is actually connected with the TOP device via Ethernet.
2	Range[R]	If you do not know the exact IP of the TOP device, you can search for the TOP device IP.
3	IP[I]	Correctly enter the TOP Device IP and click [Connect] to admit connection.
4	Port[P]	Port No. 3510 is selected as default. This setting is used for special purposes.
5	Search[S]	For private IPs, and the PC and TOP device is located in the same network (Range), click [Search] to find the corresponding IP of the TOP device.

You can find the IP of your computer from a Window Command. Press [Window+R] on your keyboard to open the below Command window. Type [ipconfig-all] and press enter to find the IP allotted your PC.



[Figure. IPConfig]

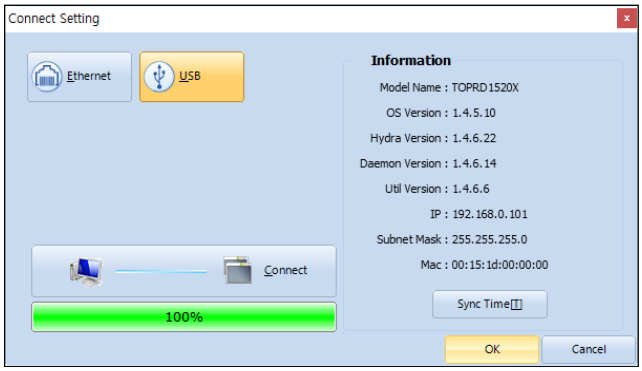
Find the IP of your TOP device from the [Menu Screen] - [Control Panel] on your TOP device. Access and configure Ethernet information of your TOP device as shown below.



[Figure. TOP IP Address]

2) TOP Connect - USB

Unlike connection via ethernet, USB connection does not require any separate setting. You only have to connect the TOP device via USB, select [USB] and click [Connect] to access the TOP device information.

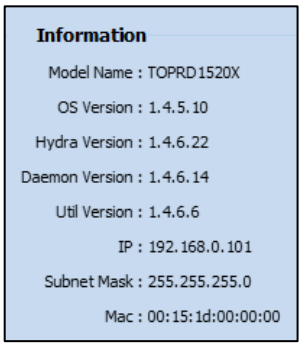


[Figure. USB Connection]

3) Connect Information

The information of the TOP device connected with TDS is shown.

Check the OS information, version of various systems, and IP address from the Information provided.



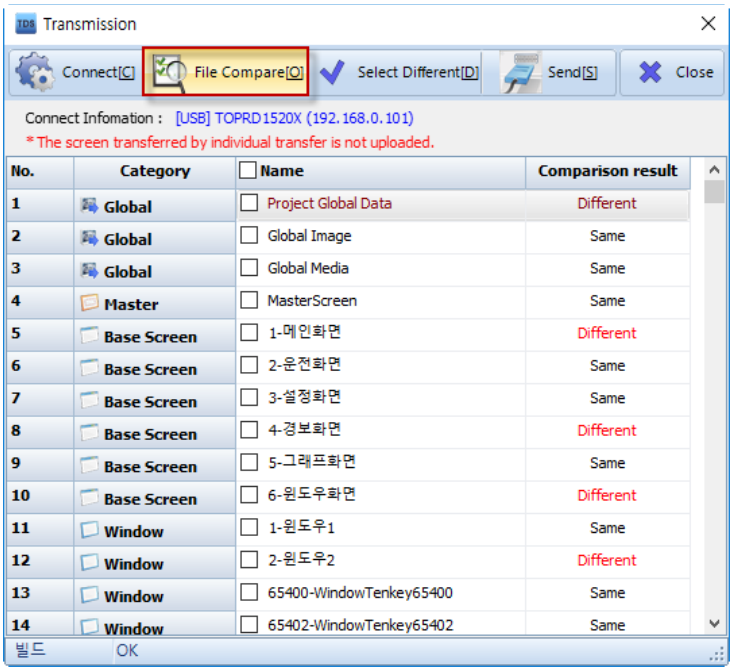
[Figure. Connect Information]

No.	Connect Information	Description
1	Model Name	The model name of the connected TOP device.
2	OS Version	The OS version of the connected TOP device.
3	Hydra Version	The Hydra version of the connected TOP device.
4	Daemon Version	The Daemon version of the connected TOP device.
5	Util Version	The Util version of the connected TOP device.
6	IP	The IP address of the connected TOP device.
7	Subnet Mask	The Subnet Mask of the connected TOP device.
8	Mac	The Mac address of the connected TOP device.

(2) File Compare

Compare files while the TOP device is connected to your PC (via Ethernet or USB). The Project file uploaded on the TOP device and the currently opened project file of the TDS is compared and all discrepancies are compiled to a list.

All items including global data (alarm, log, recipe, etc.), global image, master screen, base screen, window screen, frame screen, image screen are compared and the result, whether or not these items are the same on both project files, are compiled in a list.

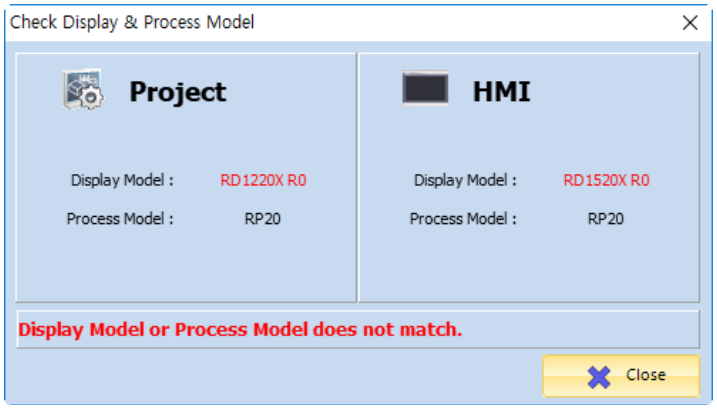


[Figure. File Comparison Result]

No.	File Compare	Description
1	Connect	Click [Connect] to compare files after replacing the connected TOP device, or if the TOP device was disconnected.
2	File Compare	After reconnecting a TOP device, or connecting another TOP device, click [File Compare] to execute a comparison.
3	Select Different	Select all items that show a discrepancy in a batch. You can select each item individually. Selected in batch or individually, you can transfer the selected items.
4	Send	Send the selected screen or global data to the TOP device.
5	Close	Close the File Compare window.

(3) Send

Upload the current Project File to the connected TOP device. The project file is transferred to the TOP device via Ethernet or USB, whichever applicable. If the TOP model configured for the project differs from the actual TOP device receiving the project file, the below error message will appear. You can reconfigure the TOP model from [Project] - [Property] menu of TDS.

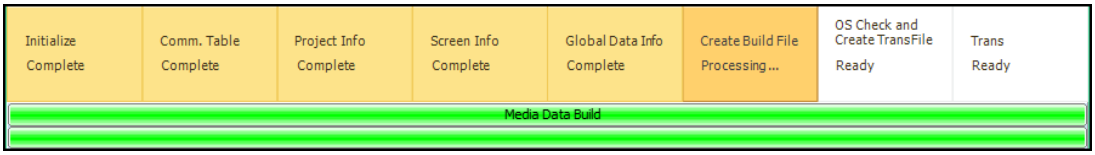


[Figure. Error Message - Wrong Model]

With a healthy cable connection and proper model, the transfer is completed in several seconds.

24.3.2 Project Build Progress

The progress of project build is shown. This function provides information in which portion of the build encountered an error.



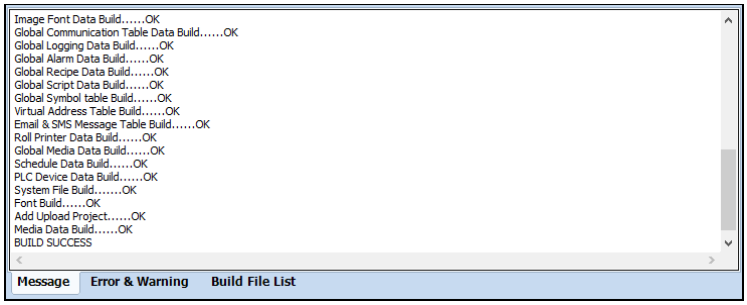
[Figure. Project Build Progress]

No.	Build Progress	Description
1	Initialize	The build file is initialized.
2	Communication Table	Communication Table for communicating with PLC is created.
3	Project Information	The HMI setup of the project is created.
4	Screen Information	Information for each project screen is created.
5	Global Data Information	Global Data including log, alarm, security and others are created.
6	Create Build File	The aforementioned data are compiled to a build file. Once Create Build File is completed, the build process is completed.
7	OS Check and Create Transfer File	The OS of the TOP device and the TDS project is compared, and the transfer file is created.
8	Transfer	The drawing project is uploaded to the TOP device.

24.3.3 Project Build List

The list of project build progress and all errors are compiled on a list.

You can also check the build file memory.

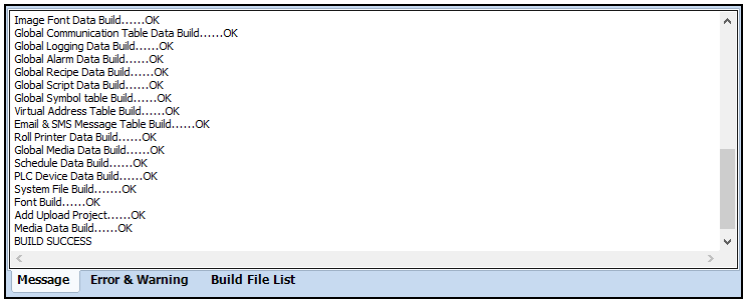


[Figure. Project Build List]

No.	Build List	Description
1	Message	Messages from the Build Progress is shown.
2	Error & Warning	The list of errors and warnings from the Build Progress is shown.
3	Build File List	Information of the build files are provided including description and size.

(1) Message

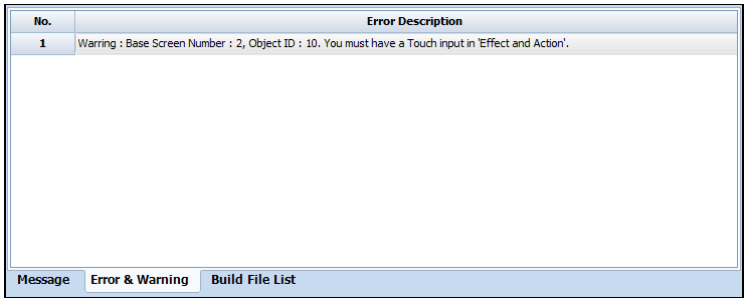
Completed items of the build progress are listed in a form of message.



[Figure. Message]

(2) Error & Warning

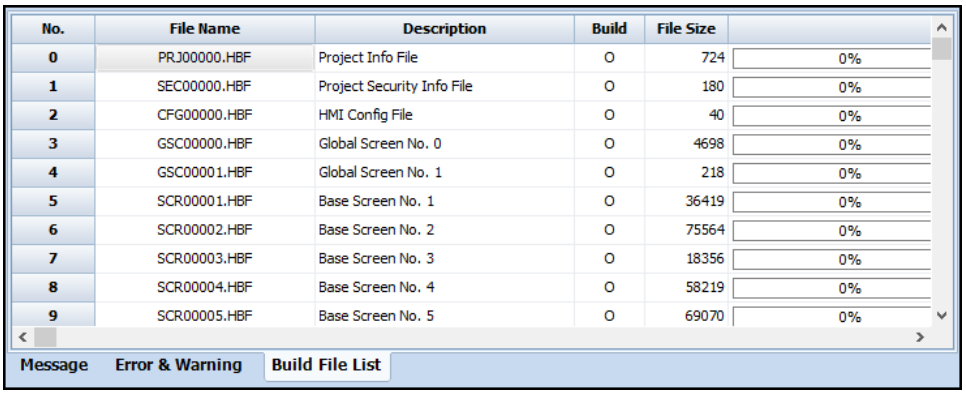
Errors and warnings occurred during the build progress are listed. Detail information of each error is provided. Build will not be completed upon a single error, and the project cannot be uploaded to the TOP device. Warnings do affect the build and transfer, yet allows you to check for any mistakes in the project.



[Figure. Error & Warning]

(3) Build File List, Memory Information

All files created upon a completed build are shown with their name, description and file size.



No.	File Name	Description	Build	File Size	
0	PRJ00000.HBF	Project Info File	O	724	0%
1	SEC00000.HBF	Project Security Info File	O	180	0%
2	CFG00000.HBF	HMI Config File	O	40	0%
3	GSC00000.HBF	Global Screen No. 0	O	4698	0%
4	GSC00001.HBF	Global Screen No. 1	O	218	0%
5	SCR00001.HBF	Base Screen No. 1	O	36419	0%
6	SCR00002.HBF	Base Screen No. 2	O	75564	0%
7	SCR00003.HBF	Base Screen No. 3	O	18356	0%
8	SCR00004.HBF	Base Screen No. 4	O	58219	0%
9	SCR00005.HBF	Base Screen No. 5	O	69070	0%

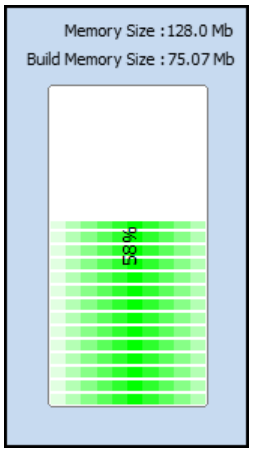
Message | Error & Warning | Build File List

[Figure. Build File List]

24.3.4 Project Memory

Once the Project Build is completed, the amount of memory occupied by the current project is shown against the total memory of the TOP device.

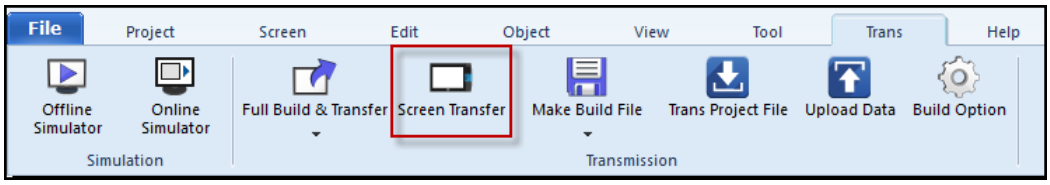
The [Memory Size] represents the total memory of the TOP device, while the [Build Memory Size] represents the memory occupied by the Project Build File.



[Figure. Project Memory]

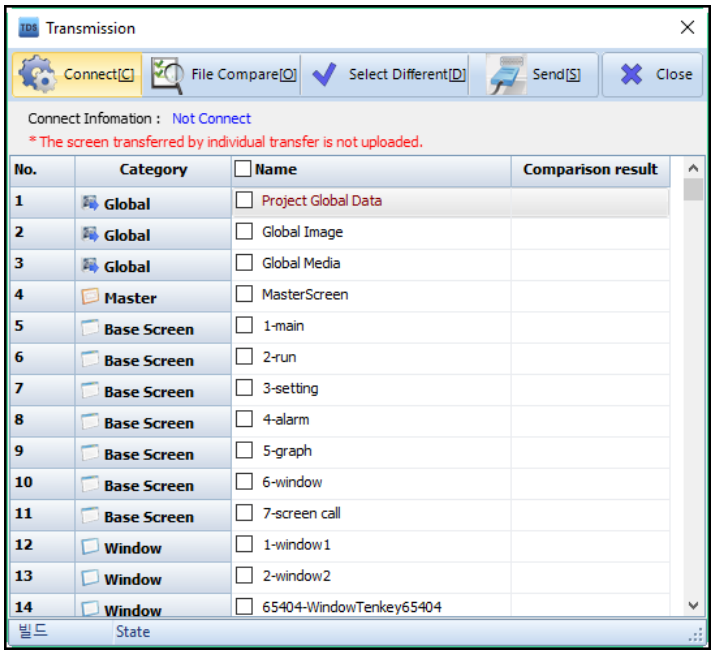
24.4 Screen Transfer

Transfer selected screens with [Screen Transfer]. In general [Full Build & Transfer] is used to build the entire project file and upload the build file to the TOP device.
Under certain circumstances, you can send a several number of selected screens to the TOP device with [Screen Transfer].



[Figure. Screen Transfer]

Click [Screen Transfer] to open the below window.

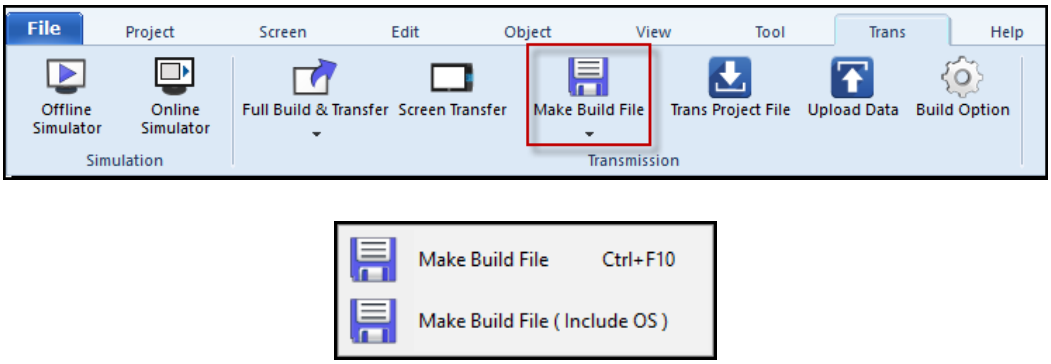


[Figure. Screen Transfer]

All screens, global data, image screens configured for the project are listed. Select the checkbox of the item of your interest, and send only the selected items.
You can also execute a [File Compare] as explained previously, to transfer selected screens.
However, screens individually selected and transferred will not be subsequently transferred.

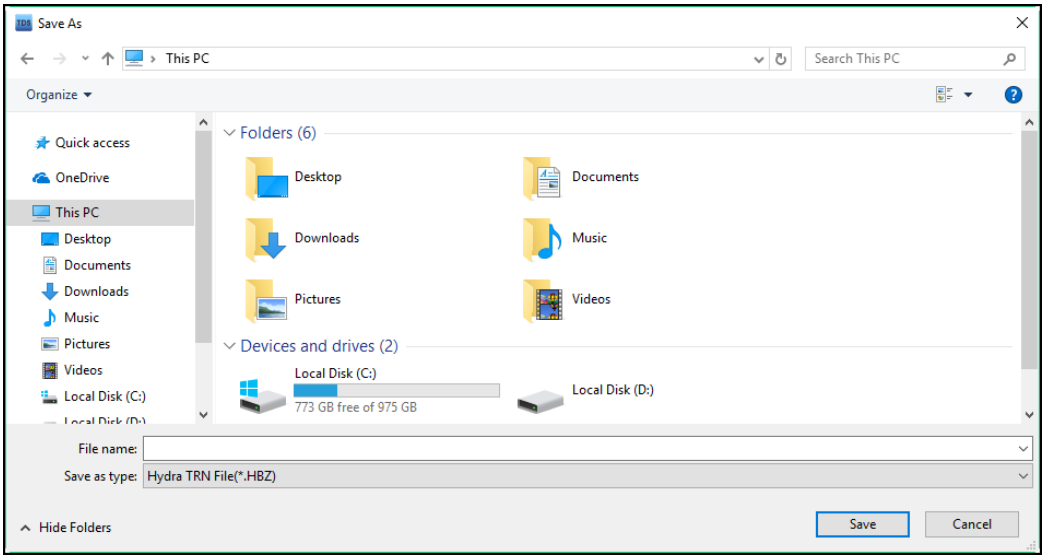
24.5 Make Build File (Include OS)

Use [Make Build File] to create a [*.HBZ] file from TDS to upload the file to the TOP device. With a [*.HBZ] file, you can upload a project to the TOP device even if you do not have the corresponding drawing project file. This function is mainly used to upload only the build file to the TOP device without disclosing the original drawing project. To make transfer only a [*.HBZ] file, first, you have to [Make Build File].



[Figure. Make Build File]

Click [Make Build File] to open a browser as shown below.



[Figure. Director for HBZ file]

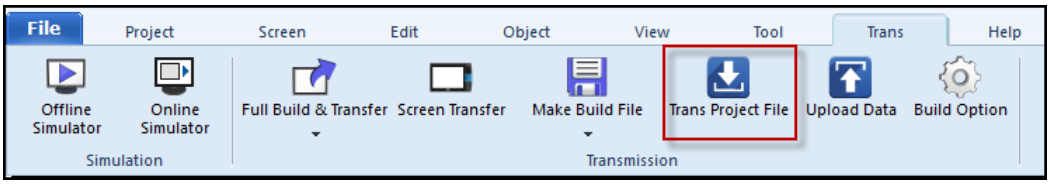
Configure the [File Name] in the path of your interest and click [Save] to create an [*.HBZ] file with the configured name in the selected path.

Use [Make Build File (include OS)] to include the OS (Firmware) included in the current TDS version to the [*.HBZ] file.

You can further upload the [*HBZ] file to a TOP device with [Trans Project File].

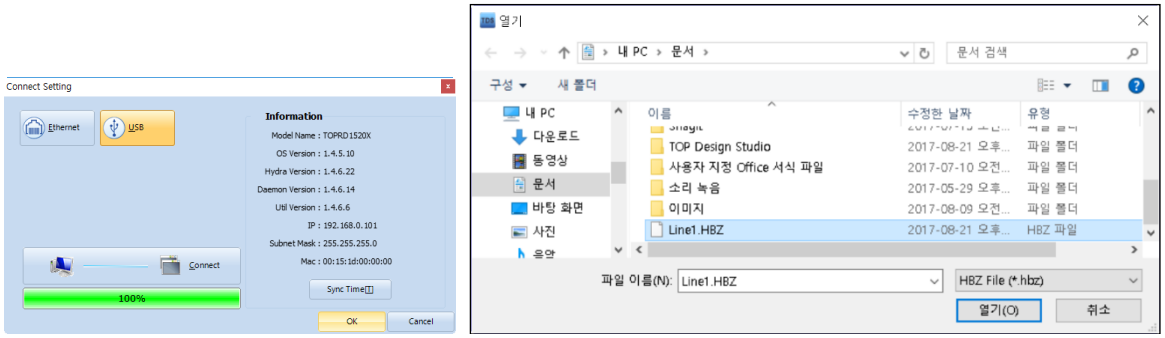
24.6 Trans Project File

Upload the aforementioned [*.HBZ] file to a TOP device.



[Figure. Trans Project File]

Click [Trans Project File] to open the [Connection Setting] window. Connect a TOP device to your PC, and find the [*.HBZ] file of your interest file and click [Open] to start transfer.

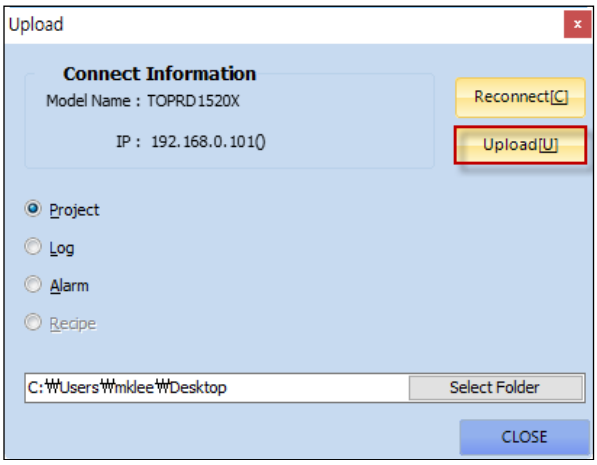


[Figure. Connect Setting & Select HBZ file]

Refer to Chapter 9.3.1 [Connect] for Build & Transfer for more details.

24.7 Upload Data

Upload the drawing project or global data from the TOP device to your PC. In other words, use this function if you want to check log, alarm, recipe or the project file saved on the TOP device from your PC. Configure the [Connect Setting] (either Ethernet or USB) to transfer data.

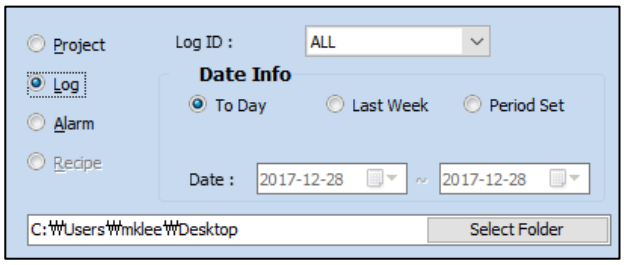


[Figure. Upload]

No.	Upload	Description
1	Reconnect[C]	If the connection was disturbed or if another TOP device is connected, reinstall the connection.
2	Upload[U]	Start to transfer the selected files.
3	Project	Transfer the Drawing Project saved on the TOP device.
4	Log	Transfer the Log Data recorded on the TOP device.
5	Alarm	Transfer the Alarm Data recorded on the TOP device.
6	Recipe	Transfer the Recipe Data recorded on the TOP device.
7	Select Folder	Select the director path in which the transferred files should be saved.

(1) Log / Alarm Setting

You can transfer Log Data or Alarm Data from a specific period of dates.

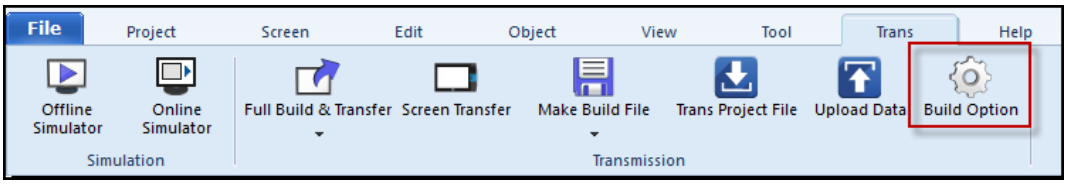


[Figure. Log / Alarm Data]

No.	Upload		Description
1	Log Alarm ID		Select the Log ID or Alarm Group to be transferred.
2	Date Info	Today	Transfer log / alarm data recorded on the current day.
		Last Week	Transfer log / alarm data recorded in the previous 7 days.
		Period Set	Transfer log / alarm data recorded during a specific period.

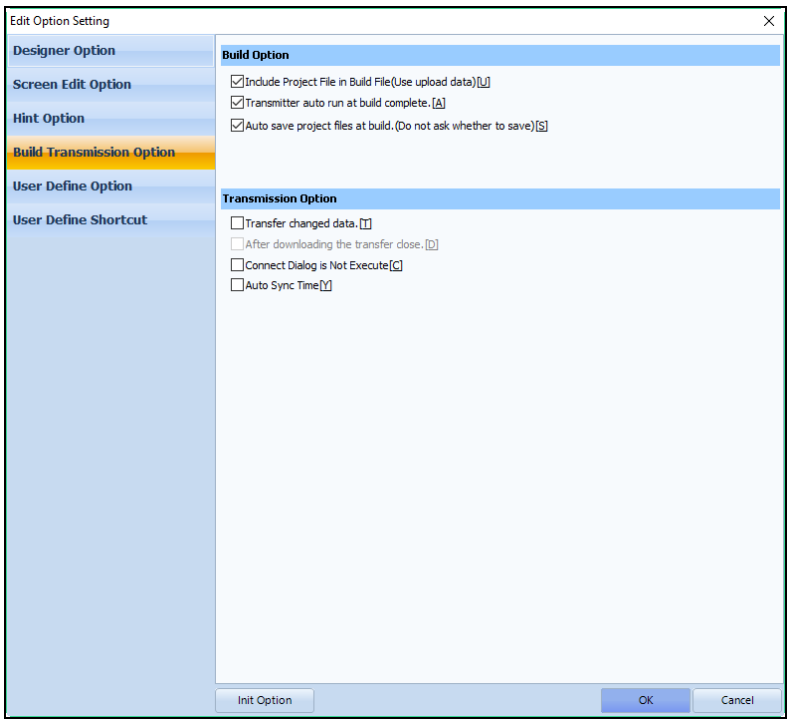
24.8 **Build Option**

Click [Build Option] to open the [Edit Option Setting] providing access to [Build Option] and [Transmission Option] allowing user specific configuration of build and transfer.



[Figure. Build Option]

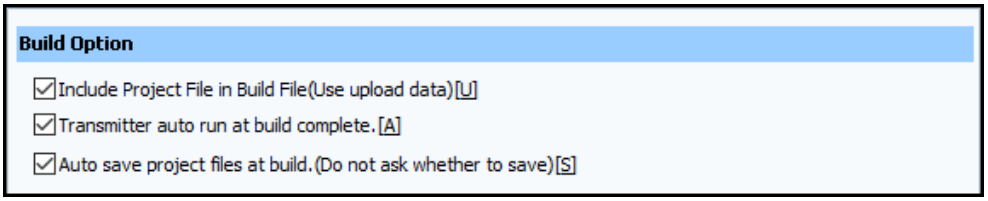
Find the [Build Option] and [Transmission Option] as shown below.



[Figure. Build / Transmission Option]

(1) Build Option

Configure whether or not to include specific data in the build file, or whether or not to automatically transfer after completing build.

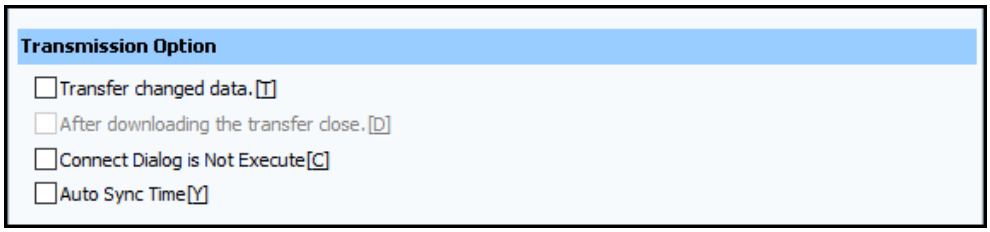


[Figure. Build Option]

No.	Build Option	Description
1	Include Project File in Build[U]	Include upload data in build. If this function is disabled, you cannot upload Project File from TOP device.
2	Transmitter auto run at build complete[A]	If the TOP device is connected to your PC, project transfer is automatically executed once the build is completed. If this function is disabled, click [Send] to transfer the project to the TOP device after completing Build.
3	Auto save project files at build[S]	The current project file is saved prior to proceeding with Build. If this function is disabled, the current project file is not automatically saved upon Build.

(2) Transmission Option

Configure a more convenient transfer with the Transmission Options. Functions for connection, file transfer and data transfer are provided.

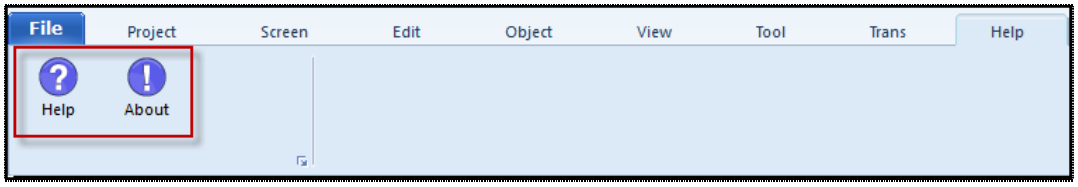


[Figure. Transmission Option]

No.	Transmission Option	Description
1	Transfer Data Changed	When uploading the same project with minor updates, only the changed data are transferred. Enabling this function enhances the transfer speed.
2	After downloading the transfer close	The Transmitter is closed once the transfer is completed. If this function is disabled, the transmitter remains on your screen after completing the transfer.
3	Connect Dialog is Not Execute	The [Connect Setting] window will not open again prior to transfer. If this function is disabled, the [Connect Setting] window will appear once again when you transfer the project.
4	Resend	When you elect to transfer a project file to the TDS device, the most recently transferred file is automatically selected. This function relieves the burden of selecting the same file you have recently selected.
5	Auto Sync Time	Upon Transfer, the system time clock of the TOP device is adjusted to the system time clock of your PC.

CHAPTER 25 - Help

This chapter describes the function of [Help] menu.

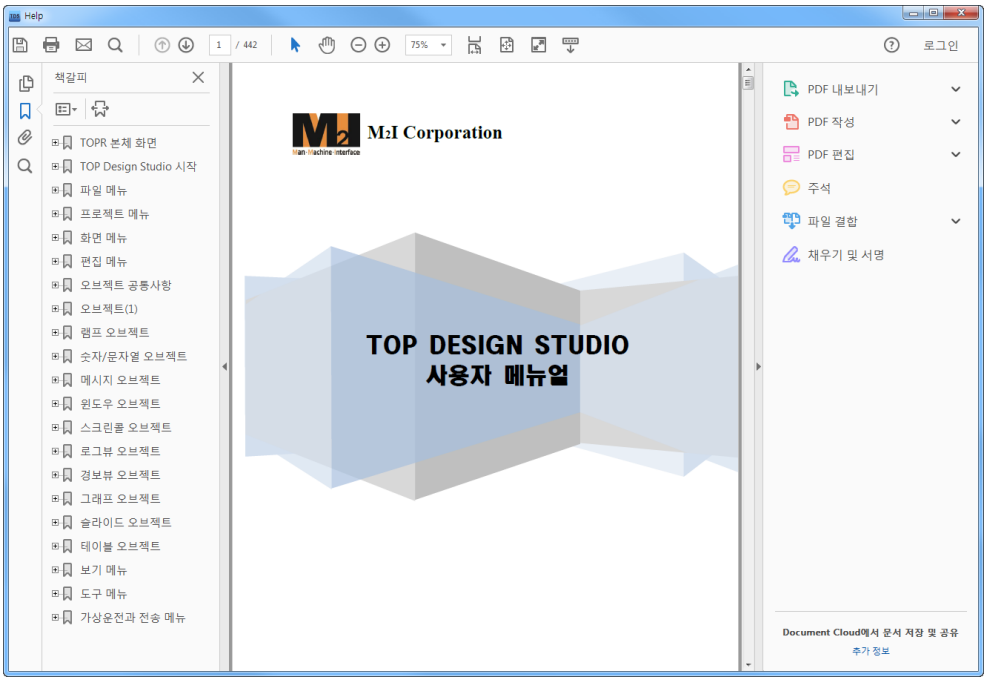


[Figure. Help Menu]

Click [Help] to access the TDS software User's Manual.
Click [About] to access the version information of the TDS software.

25.1 Help

Click [Help] to open the TOP Design Studio User's Manual as shown below.
Navigate through chapters with the bookmarks provided on the left.



[Figure. TDS Software User's Manual]

25.2 **About**

Click [About] to open the version information of the installed TDS software.

[Figure. Product Information]

CHAPTER 26 - TOPView

TOPView(SCADA) is a window based automation monitoring and control software.

26.1 TOP View (SCADA) type

There are 5 types of TOP View products for different range of tags.

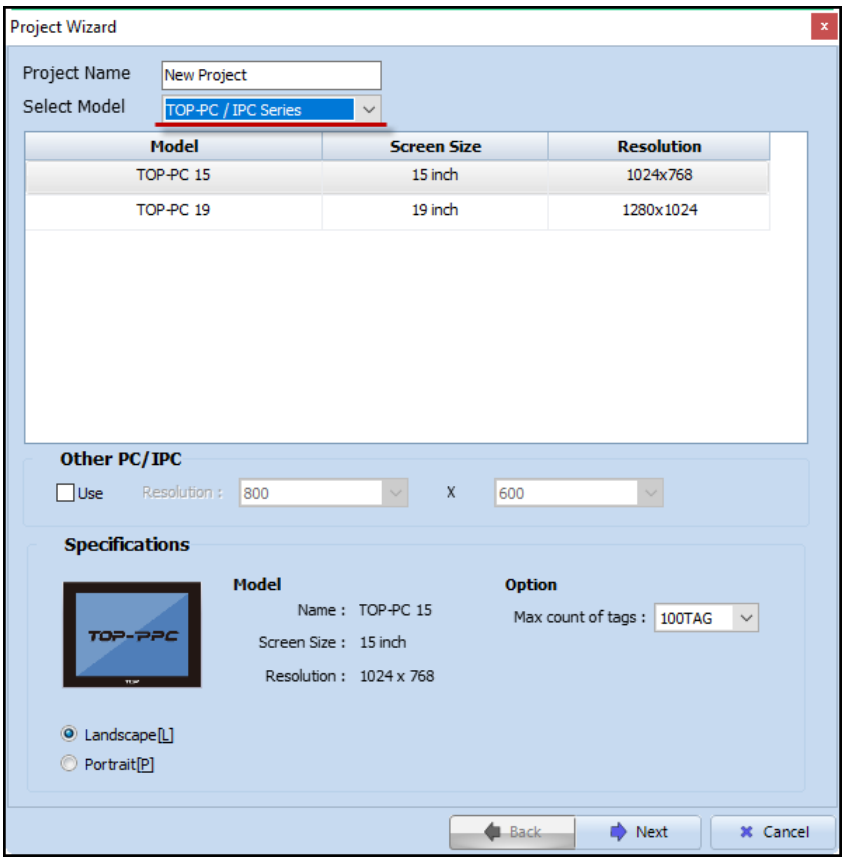
No.	TOP View Model	Tag Count
1	TOP-VIEW100P	100 tags
2	TOP-VIEW300P	300 tags
3	TOP-VIEW600P	600 tags
4	TOP-VIEW1300P	1300 tags
5	TOP-VIEW2000P	2000 tags
6	TOP-VIEWFULLP	Unlimited Tags

The TOPPPC product is a Panel PC integrated with TOP View.
TOPPPC offers an aluminum casing, 15" 1024x768 screen all-in-one Panel PC.

No.	TOPPPC Model	Windows 7 Embedded
1	TOPPPC1500XA-WN-R8H64	TOPView(X), RAM 8GB, eMMc 64GB
2	TOPPPC1500XA-WF-R8H64	TOPView(O), RAM 8GB, eMMc 64GB
3	TOPPPC1500XA-WN-R8HE256	TOPView(X), RAM 8GB, SSD 256GB
4	TOPPPC1500XA-WF- R8HE256	TOPView(O), RAM 8GB, SSD 256GB

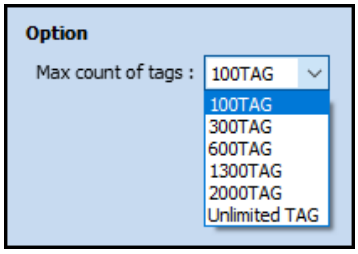
26.2 New TOP View Project

A TOP View Project is capable to create and operate a project created with TOP Design Studio as if it is ran on a TOP device.
You can configure programs [by Tags] or [by Device], and convert a TOPView project to a TOP product project or vice versa.
Select [New Project] from TDS, to open the below [Project Window].
Select [TOP-PC/IPC Series] for [Select Model] and select the applicable resolution from the model list.



[Figure. New TOPView Project]

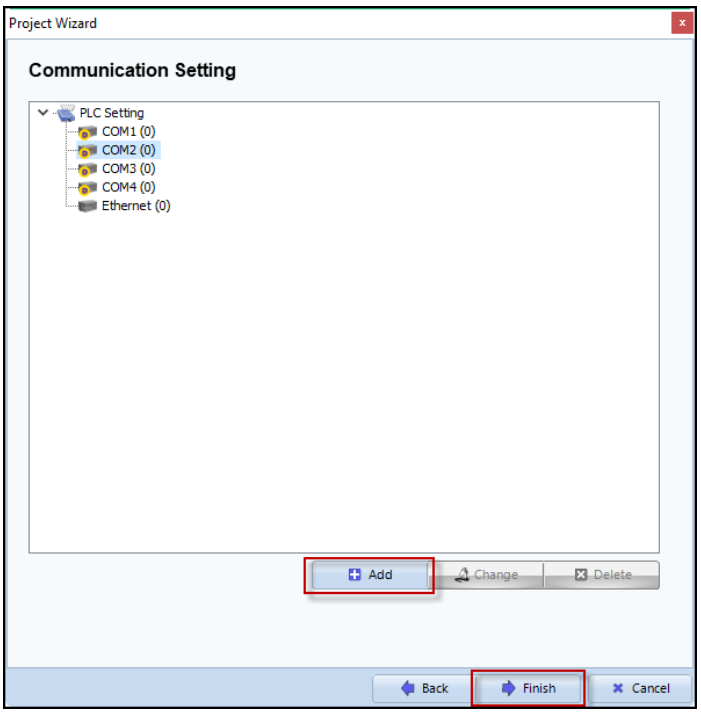
Configure the [Option] of [Max Count of Tags] according to your TOPView program.



Click [Next] to move on the [Communication Setting] stage.

Configure the PLC of your interest.

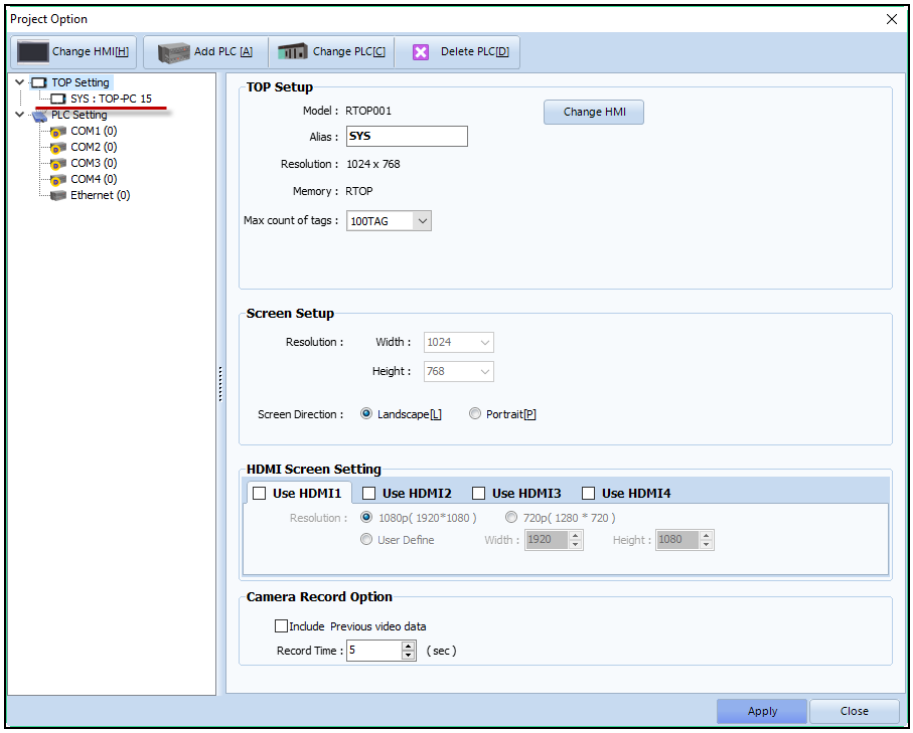
As default, serial ports of [COM1] / [COM2] / [COM3] / [COM4] and the Ethernet port are available.



[Figure. Communication Setting - TOPView Project]

You can configure the communication either from this page or from [Project] - [Property]. Click [Finish] to create the Project.

The configuration made at the [Project Wizard] can be changed at [Project Option] available from [Project] - [Property]. Select the TOPView model of your interest from [TOP Setting] on top of the list provided on the left side, and change settings provided on the right.



[Figure. Project Option]

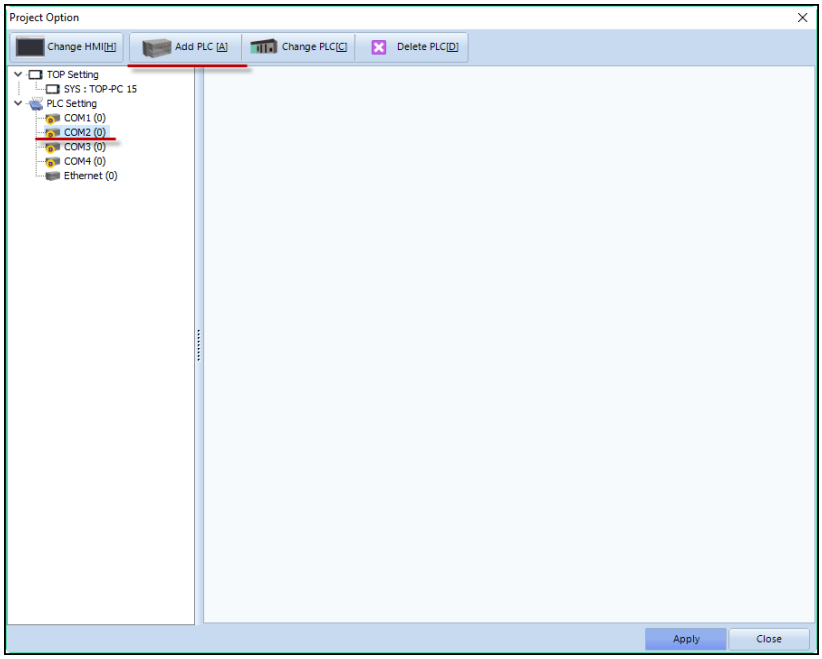
After creating a [New Project], go to [File] - [Save] and save the project to a file.

26.3 PLC Driver Setup

26.3.1 PLC Driver Setup

Configure the PLC connected to the port of the PC running TOPView.

Configure PLC Driver Setup from [Project Option] window available at [Project] - [Property] of TDS.



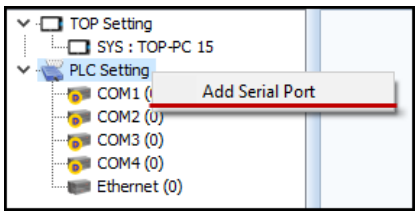
[Figure. Project Option]

Select a port and click [Add PLC] and configure the PLC of your interest.

There are more serial ports on the PC than the default serial ports of [COM1] to [COM4], therefore, go to [Project] - [Property] and modify or add serial ports.

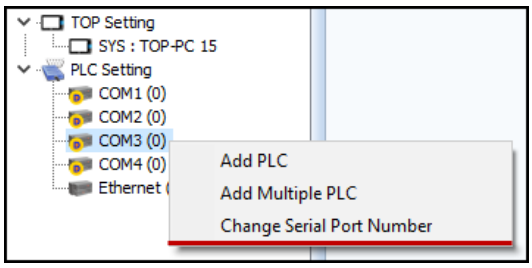
[Add Serial Port] menu is available upon a right click to the [PLC Setting] provided in the list on the left.

A new serial port is added to the list with the number following the last serial port.



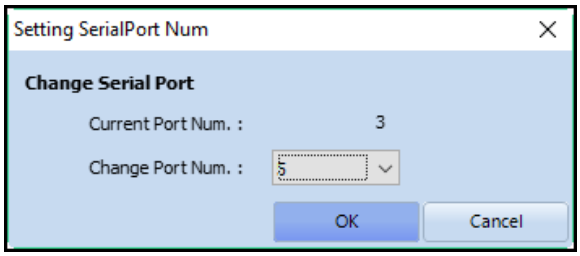
[Figure. Add Serial Port from Project Option]

Select the serial port you intend to change, and select [Change Serial Port Number] from the drop down menu upon a right click to the subject serial port.



[Figure. Change Serial Port Number from Project Option]

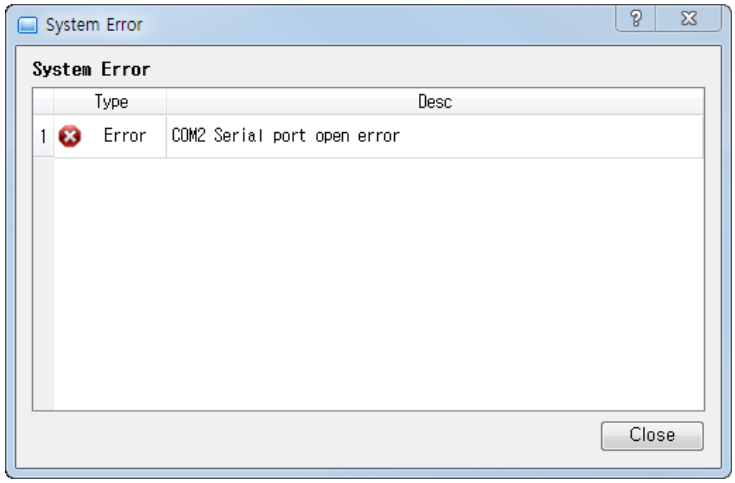
With the below configuration with a [Change Port Num] of [7], [COM3] is changed to [COM7].



[Figure. Change Serial Port Number from Project Option]

26.3.2 System Communication Error

The following error message will appear upon a communication between TOP View and the configured PLC.



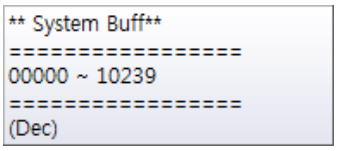
[Figure. Communication Error]

When you encounter a communication error, go to the corresponding communication manual and check the terminal wiring diagram for the PC and PLC, and check other communication settings.

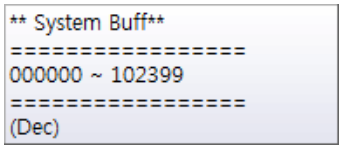
26.4 How to enter an address / Tag Count

26.4.1 System Address

The internal address of TOPView (System Buffer) is 10 times more than that of a TOP device, where you can employ addresses from [0] to [102,339]. The unit of each system address is 16bit (word).



[Figure. System Address - TOP Device]



[Figure. System Address - TOP View]

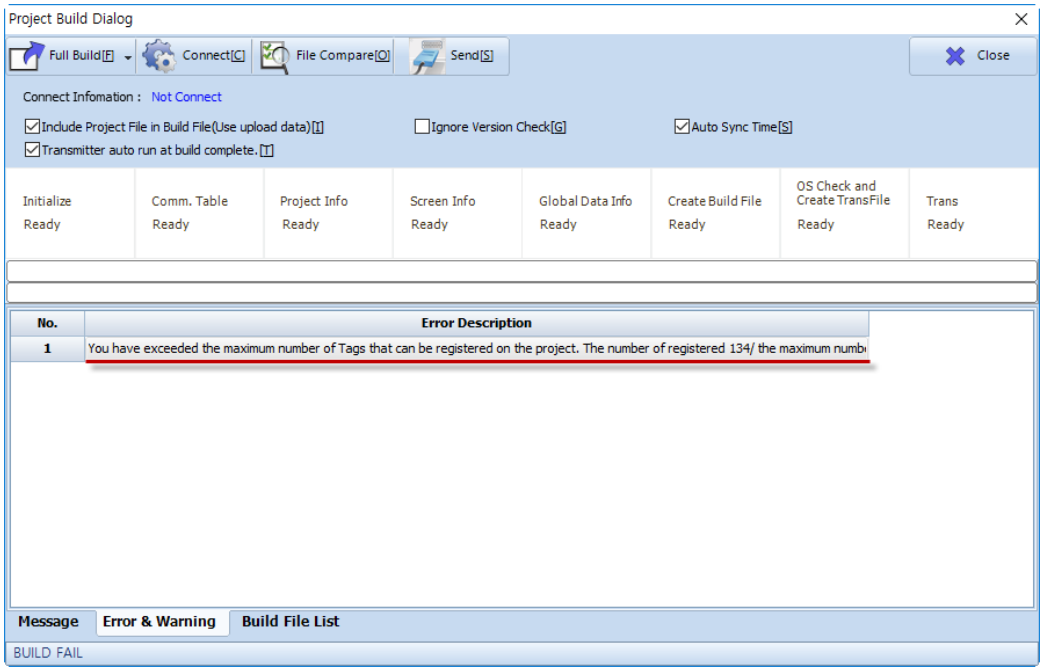
26.4.2 PLC Address

The license of TOP View differs according to the number of available addresses (tag count).
Therefore, to manage addresses, use [Symbol Manager] and [Communication Block].

(1) Symbol Manager
Go to [Project] - [Symbol], and add addresses to the [Symbol Manager], and further employ a [Symbol] address.
Refer to Chapter 4.6 [Symbol] for more details.

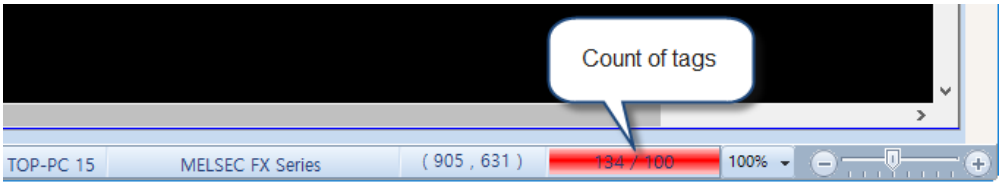
(2) Communication Block
Go to [Project] - [Communication Block] and configure the communication table between PLC and TOPView.
Refer to Chapter 4.8 [Communication Block] for more details.

(3) Excessive number of tags
Each TOPView has a specific maximum tag count according to the purchases license.
Once the total tag count exceeds its maximum count, the error shown below will occur when [Trans] - [Build & Transfer] is executed.



[Figure. Error Message - Excessive number of tags]

The maximum allowable tag count and the current tag count are shown on the status bar.



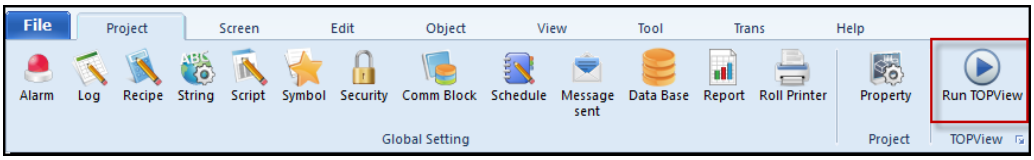
[Figure. Tag Count on Status Bar]

26.5 Run TOPView

You can run a project while you are creating the project from TDS.

26.5.1 How to Run TOPView

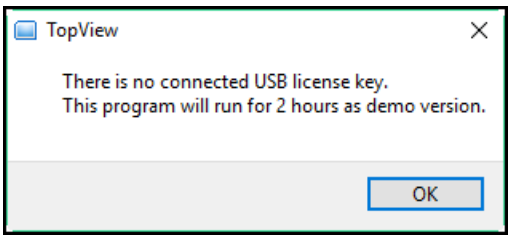
Go to [Project] and click [Run TOPView]



[Figure. Run TOPView]

Or click the TOPView icon on your desktop.

If you did not install a purchased TOPView license, the below message will appear.



[Figure. License Key Message]

Without a License key, you can run TOPView up to 2 hours.
TOPView will terminate after two hours.

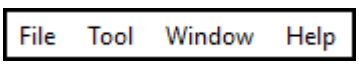
26.5.2 **TOPView Screen**

The below is the TOPView Screen where menus and a toolbar are provided on the upper part of the screen.

[Figure. TOPView]

26.6 **TOPView screen menu**

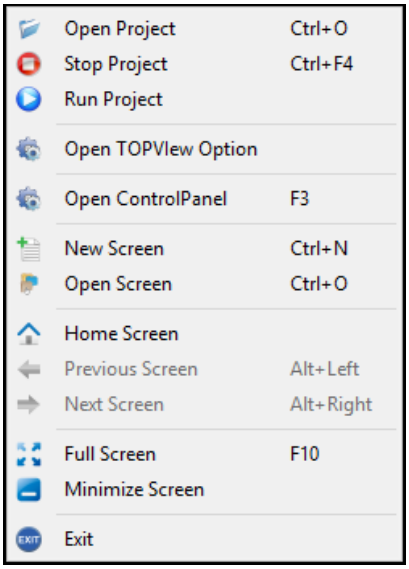
Please find the instructions for TOPView screen menu.



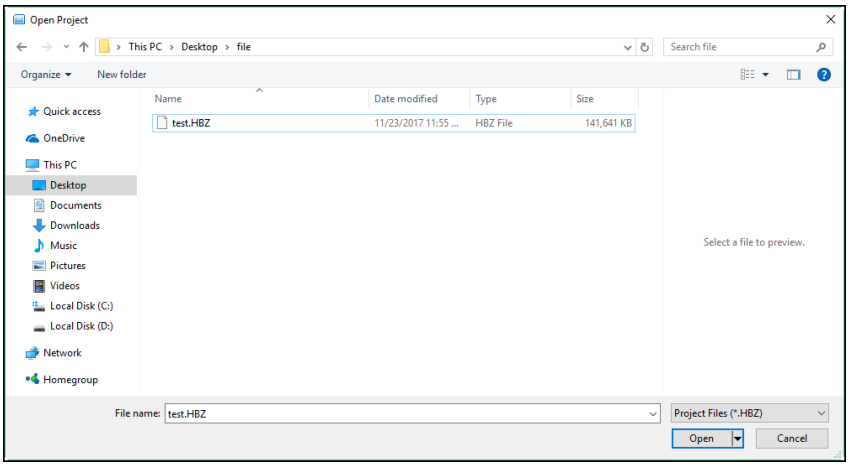
[Figure. TOPView Menu]

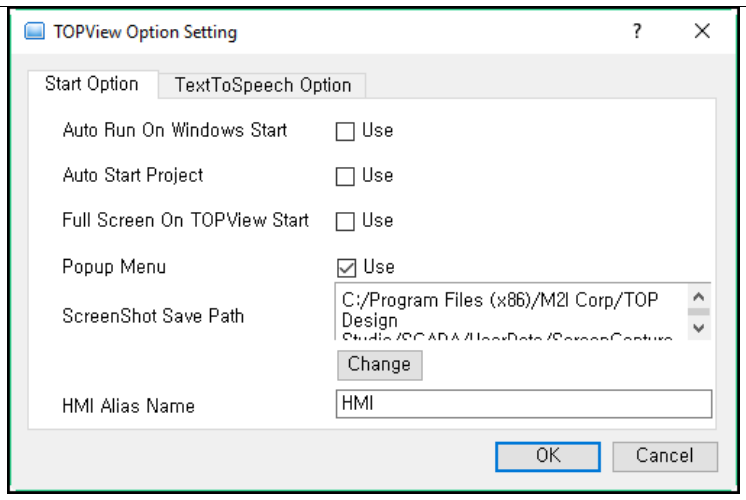
26.6.1 File

Functions related to the file are provided.



[Figure. File Menu

No.	File	Description
1	Open Project	Open an [*.HBZ] file from TOPView. An [*.HBZ] file is a transfer build file made by TDS, from the menu path of [Trans] - [Make Build File].  [Figure. Open Project]
2	Stop Project	Stop the currently running project and close the run screen.
3	Run Project	Run the most recently run project.
4	Open TOPView Option	Configure options upon starting TOPView from [Start Option].

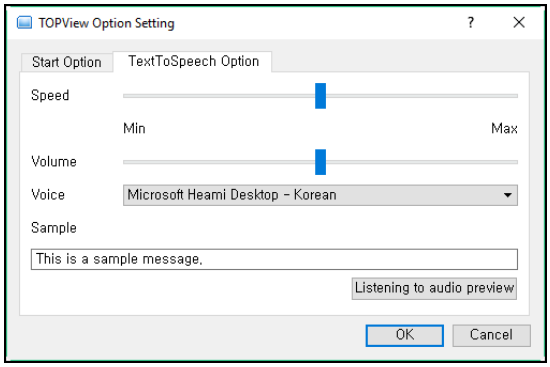


[Figure. Start Option]

Select [Use] for [Auto Run On Window Start] to start TOPView whenever the Window of your PC is started.
Select [Use] for [Auto Start Project] to run the recent project whenever TOPView Program is started.
Select [Use] for [Full Screen On TOPVeiw Start] to span the TOPView screen to the entirety of the screen whenever TOPView program is started.
Select [Use] for [Popup Menu] to show the screen toolbar as a popup menu upon a right click to the run screen.

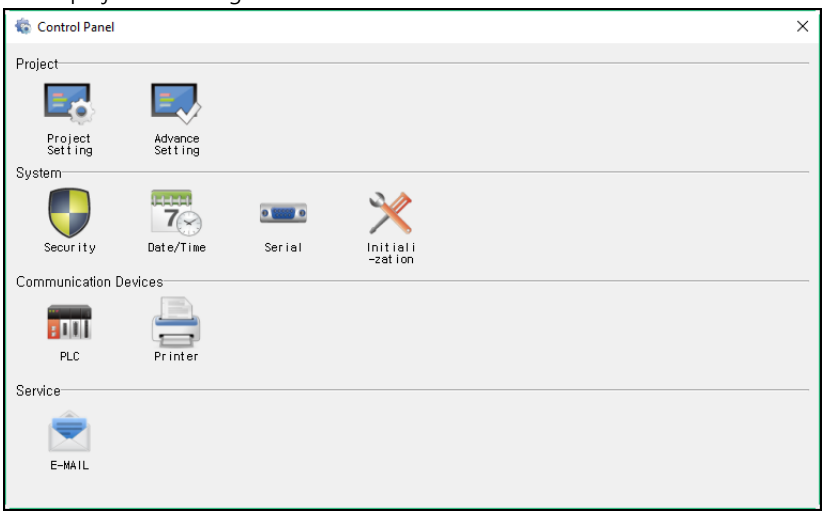
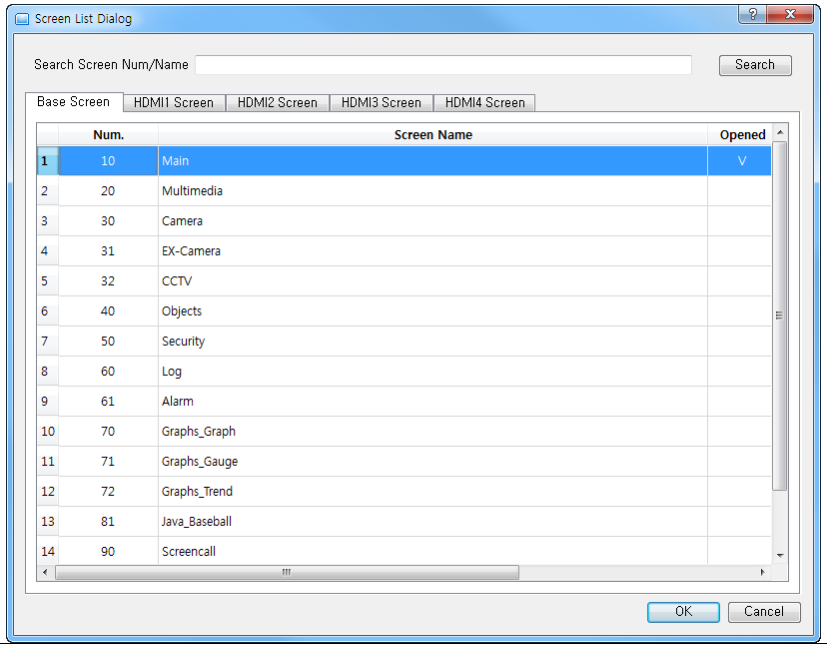
[Figure. Popup Menu upon right click]

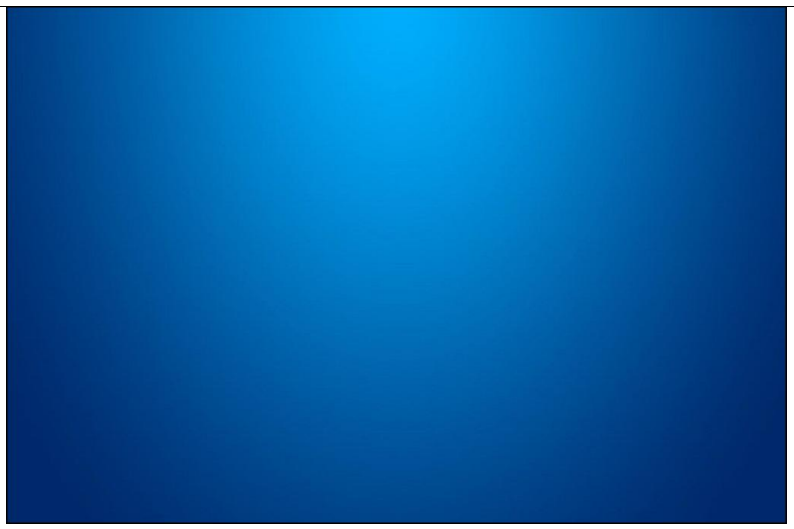
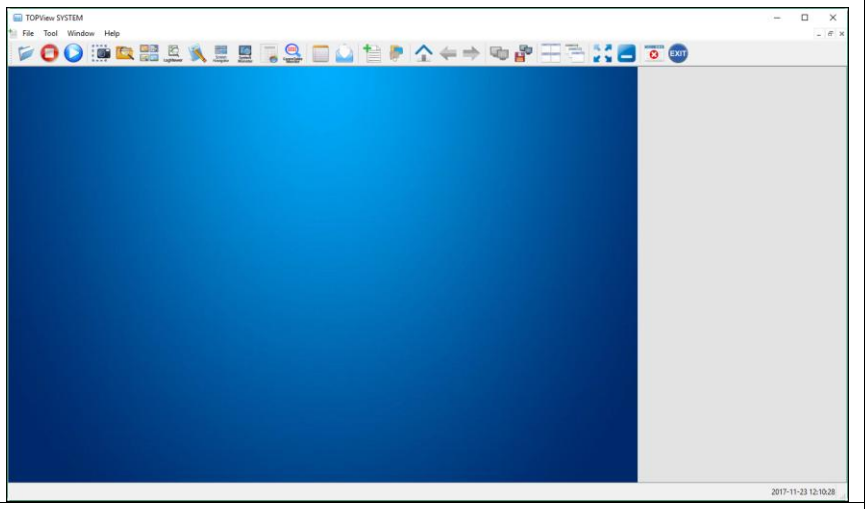
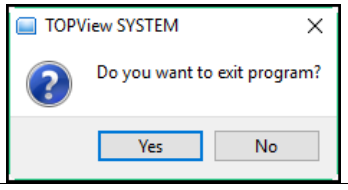
Configure the [Screen Shot Save Path] in which a screenshot file should be made. Click [Change] to change the path.
[HMI Alias Name] is the alias for the TOPView.



[Figure. Text To Speech Option]

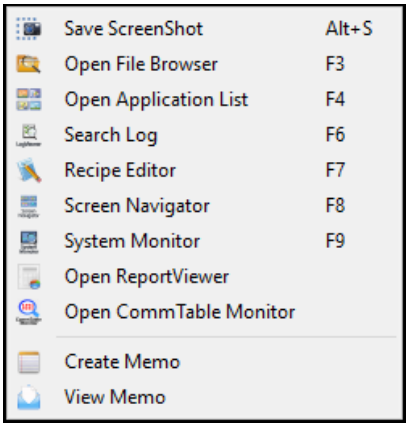
Configure options to reads texts with an audio voice from [Text To Speech Option].
Configure [Speed] of the voice.
Configure the [Volume] of the voice.
Select a [Voice] from the drop down menu.
Enter a [Sample] sentence and click [Listening to audio preview] to hear the system reading the sample with the current settings.

5	Open Control Panel	Open the Control Panel provided from the Menu Screen. Control Panel is available only when [Stop Project] was executed. While a project is running all menus from Control Panel are disabled.  Refer to Chapters 1.2.7 to 1.2.11 [Control Panel] for more details.
6	New Screen	Create a new run screen. A new screen opens with the screen configured from [Control Panel] - [Project Setting] - [3. Start Screen No.] running.
7	Open Screen	Select a screen of your interest from the [Screen List Dialog] and click [OK] to run the selected screen on a new run screen. 
8	Home Screen	The program will navigate to the screen number selected at [Control Panel] - [Project Setting] - [3. Start Screen No.]
9	Previous Screen	Go back to the previous screen. The run screen navigates to the immediate previous screen. If no screen change was performed after starting the project, [Previous Screen] will be disabled.
10	Next Screen	Go to the next screen. Once, the screen has changed upon a [Previous Screen] action, click [Next Screen] to abort to the screen to which the [Previous Screen] action was taken. If [Previous Screen] was not performed, [Next Screen] is disabled.
11	Full Screen	Expand the run screen to the entirety of the display, except the Menus.

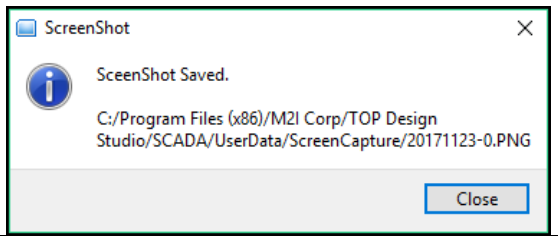
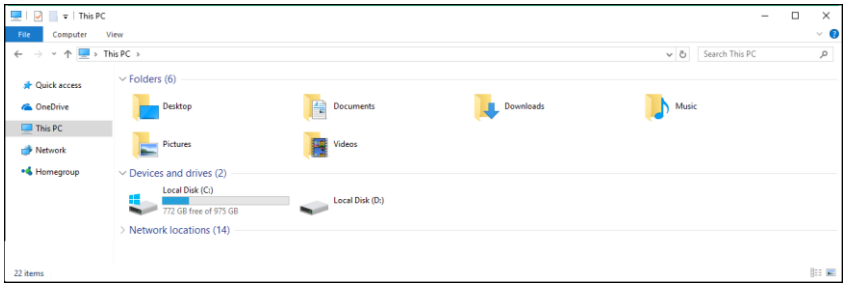
		 The below menu bar will appear upon a right click to the run screen. Click the [ ] button to restore the size of the run screen with the screen toolbar. 
12	Minimize Screen	Minimize the TOPView Program Window.
13	Exit	Terminate the TOPView Program. Click [Yes] to close the program. 

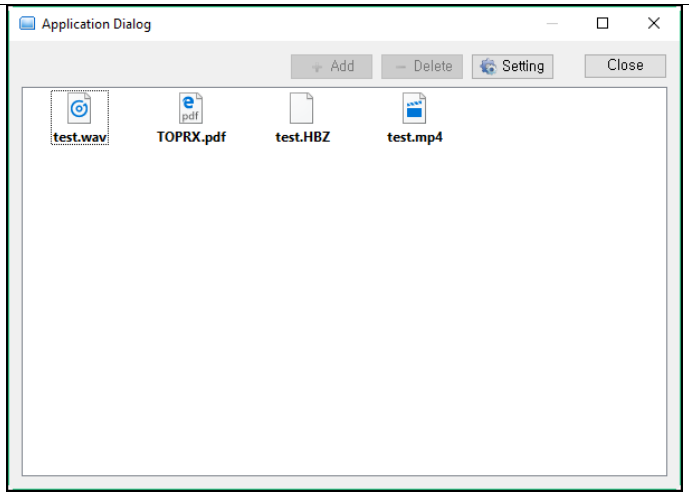
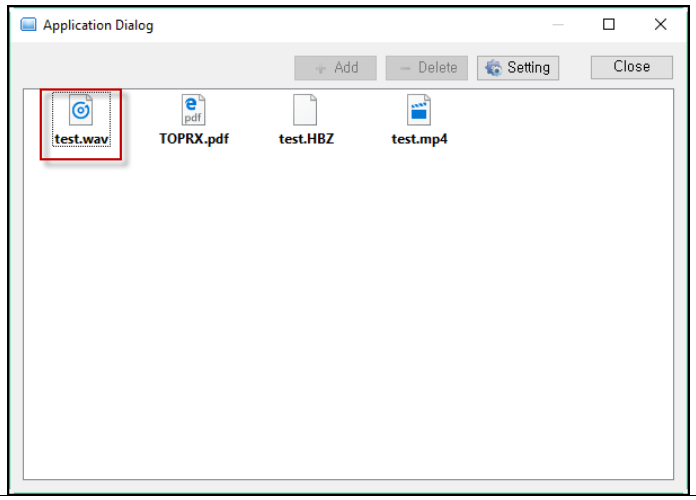
26.6.2 **Tool**

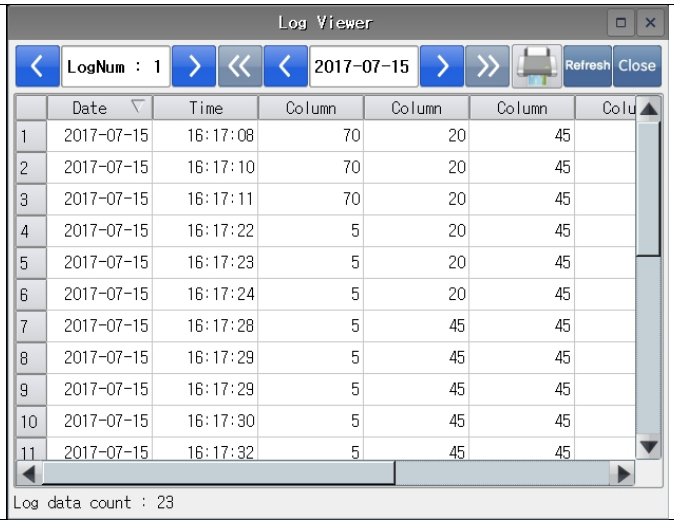
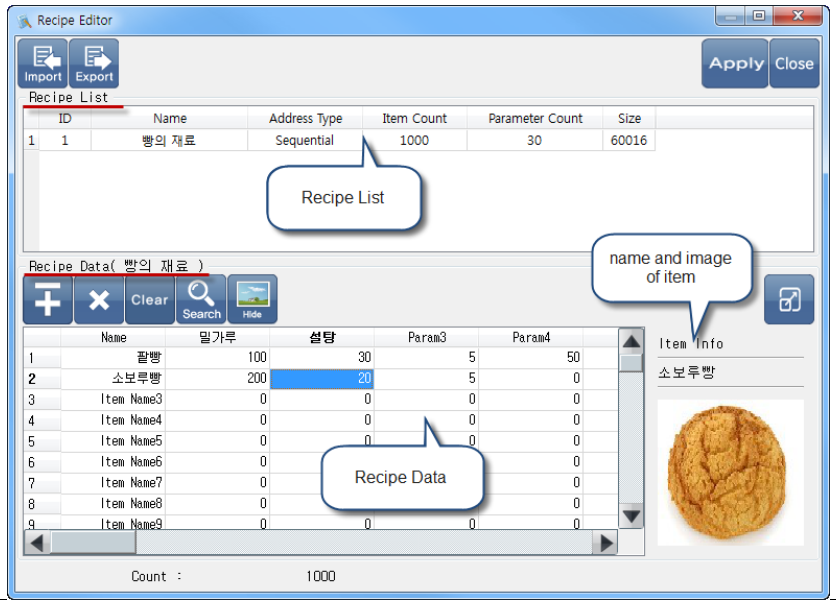
Useful tools are provided

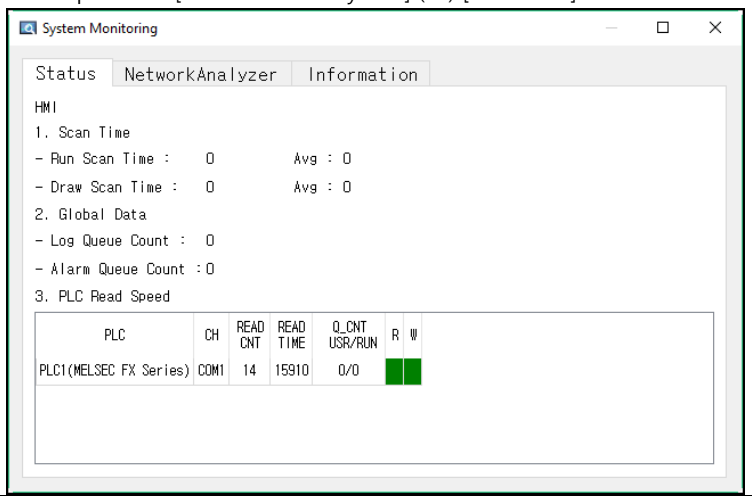
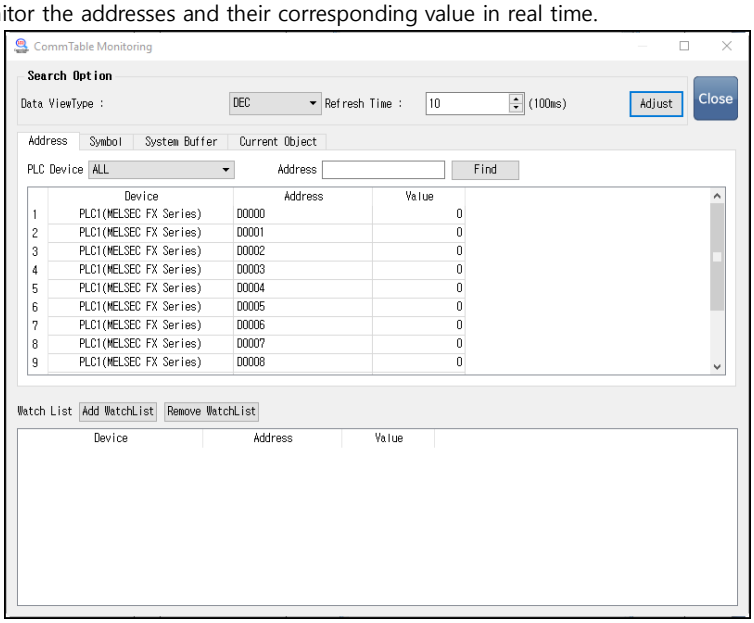


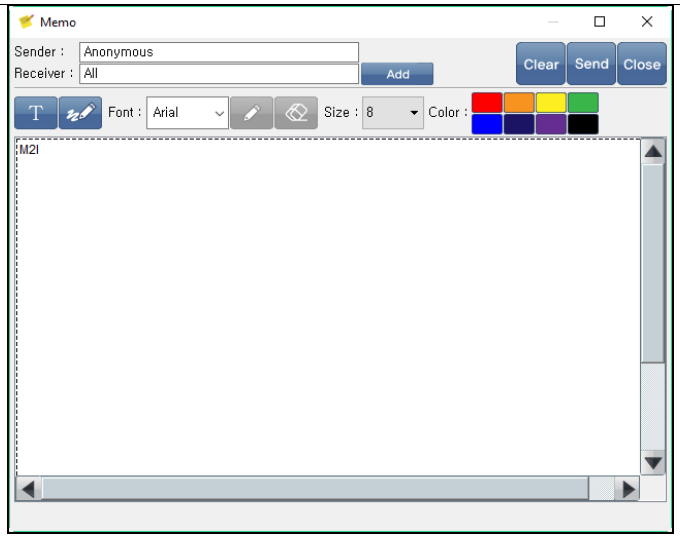
[Figure. Tool Menu]

No.	Tool	Description
1	Save Screen Shot	Capture and save the entire TOPView Program screen to a file. Configure the path of the capture file at [TOPView Option]. The file will be named [Date-Sequential No.PNG] The below message will appear when the file is successfully saved. 
2	Open File Browser	Open the File Browser.  [Figure. File Browser]
3	Open Application List	The Application List allows you to add frequently used applications, and easily employ an application listed on the Application list from [Tool] - [Open Application List]. To open another application when TOPView is running in Full Screen, you have to minimize TOPView, or close the Project to find the application of your interest. However, Open Application List eliminates such burden, such like a [Shortcut] available from your PC.

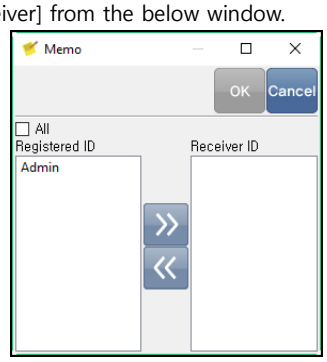
		 ▶ Click [Setting] to activate the [Add] / [Delete] button. add or delete applications with these buttons. Click [Add] to open the [Open] dialog. Select a run file from the [Open] dialog. All types of executable files are available (image/document/program, etc.) Select an application and click [Delete] to remove the application. ▶ Click [Setting] once again to deactivate the [Add] / [Delete] button, and each application can be executed. Click an application of your interest to run the application as shown below. 
4	Search Log	Open [Log Viewer] which allows you to search for logs according to the [Log ID] / [Date]. This function is identical with the functions for [LogViewer] of the TOP menu from a TOP device. Refer to Chapter 4.2.5 [Display Log Data] for more details.

		
5	Recipe Editor	Open [Recipe Editor] where you can access and edit recipes. You can edit the item name and recipe data. This function is identical with the functions for [Recipe] of the TOP menu from a TOP device. Refer to Chapter 4.3.8 [Recipe Editor on TOP Menu of Run Screen] for more details. 
6	Screen Navigator	Access to an overview of all project screens and select a screen to run from the [Screen Navigator]. This function is identical with the functions for [Screen Navigator] of the TOP menu from a TOP device.
7	System Monitor	Monitory the [System Status] / [Network Analyzer] / [Information] from the [System Monitoring] window.

		This function is identical with the functions for [System Monitor] of the TOP menu from a TOP device. Refer to Chapter 1.2.8 [Control Panel - System] (15) [TOP menu] for more details. 
8	Open Report Viewer	Open the Report Viewer. Refer to Chapter 28 [Report] for more details.
9	Open Communication Table Monitor	Open the Communication Table of the current run screen. This function is identical with the functions for [CommTable Monitor] of the TOP menu from a TOP device. All addresses employed in the current run screen are provided. Monitor the addresses and their corresponding value in real time.  Select [Data ViewType] that should be shown in the [Value] column, from the drop-down menu. Addresses and values shall be updated in real-time upon the interval selected in the [Refresh Time]. Select an [Address] and press [ADD WatchList] to register a specific address to the Watch List. Addresses added to the Watch List can be monitored regardless if you change the screen.
10	Create Memo	Create a Memo on the TOPView Program. All memos are provided in [Tool] - [View Memo]. Enter the [Sender].



Click [Add] to add a [Receiver] from the below window.



Select [All] to allow all users to see the memo.

Disable [All] and select an ID which is assigned to a specific security level from [Control Panel] - [Security] to allow the user with the specific security level to access the memo.

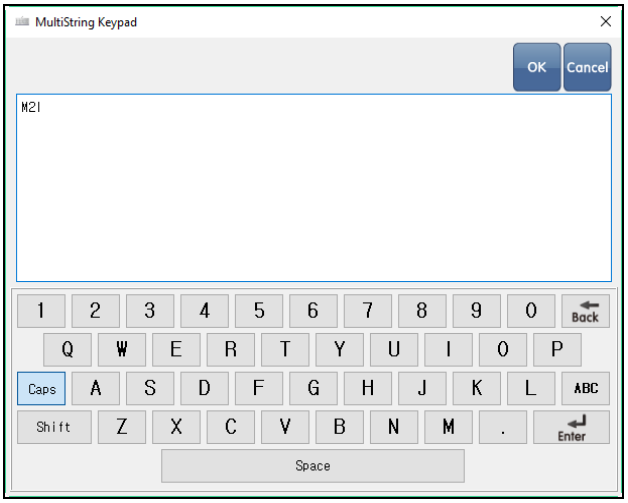
Select a user ID from [Registered ID] and click [>>] to add the selected user to the [Receiver ID] list. After selecting all recipients, click [OK] to confirm your selection.

Create a memo with the [Text Mode] or [Paint Mode].

Select [Text Mode] and click the memo field to open the below [MultiString Keypad].

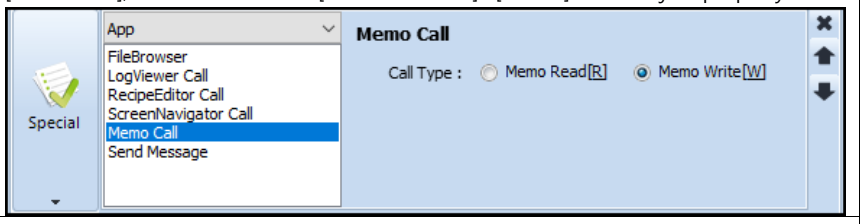
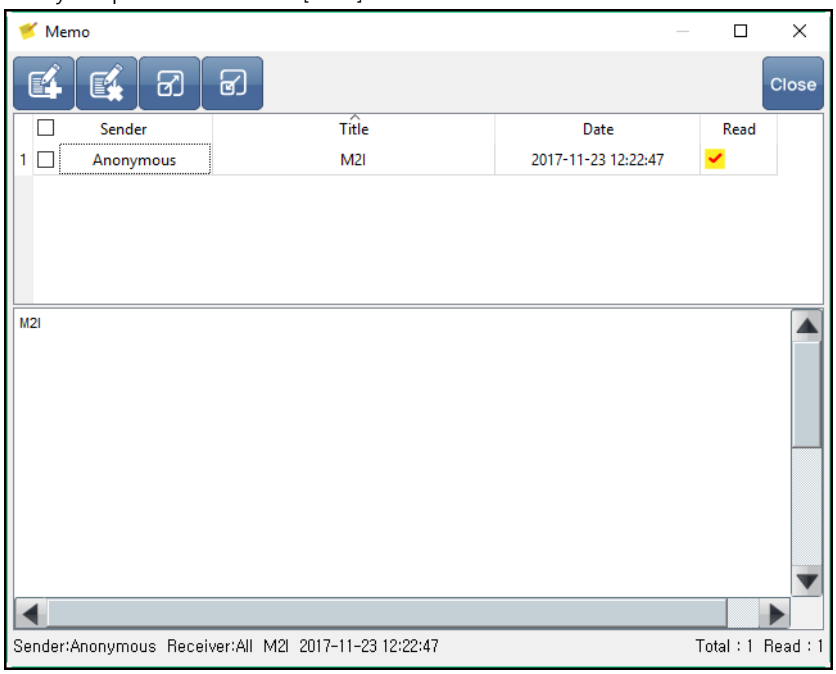
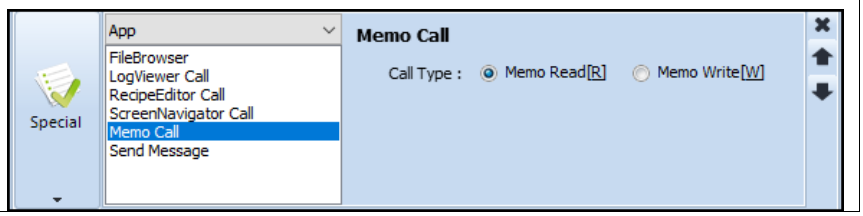
Enter the memo with the string keypad or from your keyboard.

Configure the [Font/Size/Color] of texts.



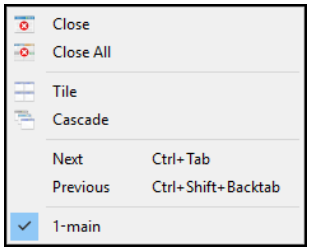
Select [Paint Mode] to write or draw a memo like if you are using a pen.

Draft the memo with [Pen] / [Eraser], and configure the size and color of the [Pen] / [Eraser].

		This function is identical with the functions for [Memo Write] of [Special] - [App] - [Memo Call], available from the [Effect & Action] -[Action] of an object property. 
11	View Memo	Read a memo created from [Tool] - [Create Memo]. The Memo list provides information of [Sender] / [Title] / [Date] / [Read Status]. Select a memo of your interest from the list to display the content in the field below. Once you open the memo the [Read] status will be checked.  This function is identical with the functions for [Memo Read] of [Special] - [App] - [Memo Call], available from the [Effect & Action] -[Action] of an object property. 

26.6.3 Window Menu

Functions related to the run screen and windows are provided.



[Figure. Window Menu]

No.	Window Menu	Description
1	Close	Close the selected (active) run screen.
2	Close All	Close all run screens.
3	Tile	Align run screens in a tile fashion.
4	Cascade	Align run screens in a cascade fashion.
5	Next	Go to the next screen.
6	Previous	Go to the previous screen.
7	Previous Run Screen	A list of currently running screens are provided. The screen with a check mark is the currently active screen.

26.6.4 Help

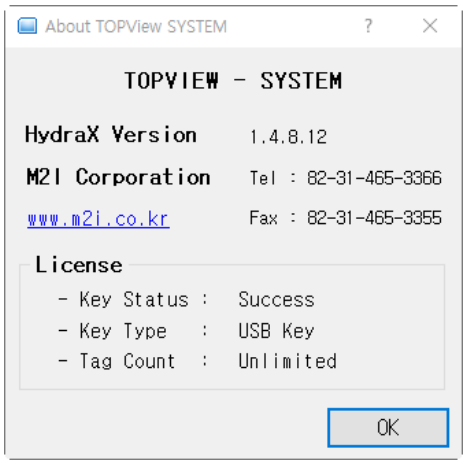
Access the version and license information of the TOPView.

[Figure. About]

Select the About menu to open the below dialog.

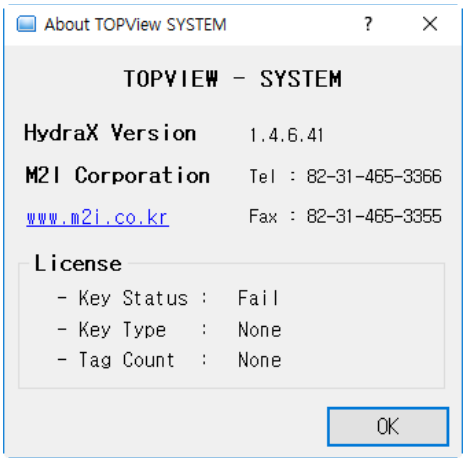
[HydraX Version] refers to the TOPView program version.

[License] shows information on whether or not a license key has been registered and other relevant information.



[Figure. About Menu]

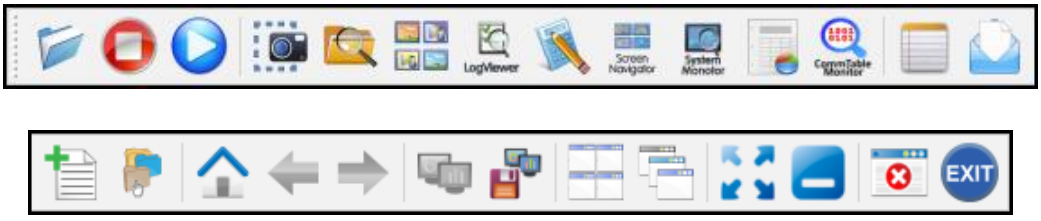
[Key Status] shows whether or not the license key is registered.
[Success] means that the license key is properly registered, and [Fail[means that it is not properly registered.
[Key Type] refers to the type of license key.
[Tag Count] refers to the maximum tag count applicable to the TOPView Product.
The system information will be shown as below If a license key is not registered.
Without a license key, the TOPView Program can be accessed up to two hours. TOPView will terminate after two hours.



[Figure. About Menu]

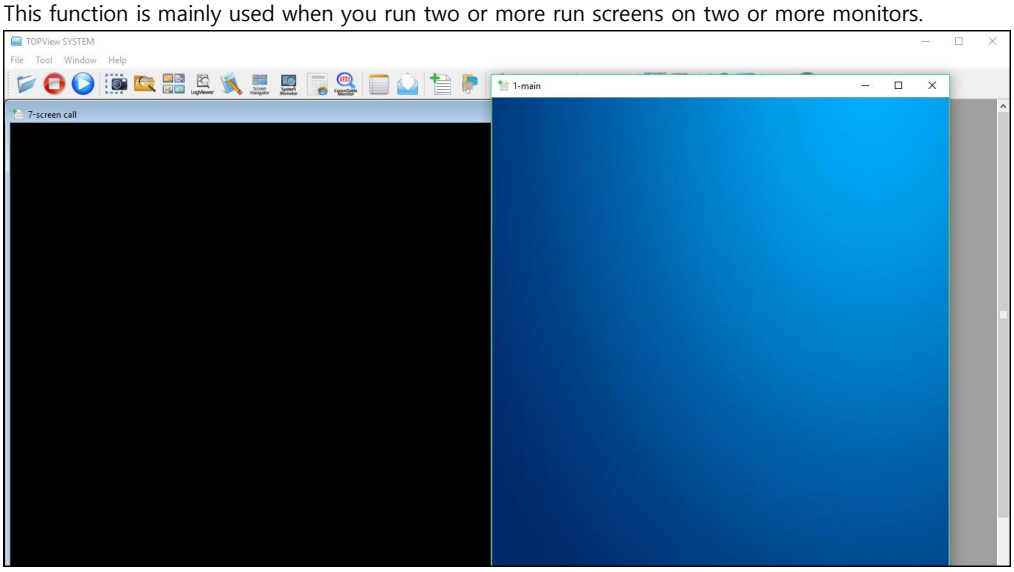
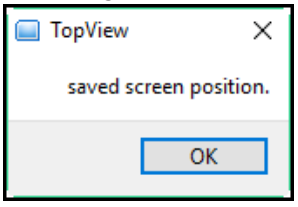
26.6.5 **Toolbar**

The screen has a toolbar as shown below.
The majority of these functions are available from the aforementioned menus.



[Figure. Screen Toolbar]

No.	Toolbar	Description
1		Open Project
2		Stop Project
3		Run Project
4		Save Screen Shot
5		Open File Browser
6		Open Application List
7		Search Log
8		Recipe Editor
9		Screen Navigator

10		System Monitor
11		Open Report Viewer
12		Open Communication Table Monitor
13		Create Memo
14		View Memo
15		New Screen
16		Open Screen
17		Home Screen
18		Previous Screen
19		Next Screen
20		Multi-Screen Mode This function is active when two or more run screen are currently running. The function allows you to extract the run screen out of the boundary of the program. This function is mainly used when you run two or more run screens on two or more monitors.  The [Screen Toolbar] will pop-up in a run screen extracted from the TOPView program upon a right click. [Figure. Screen Toolbar for Multi-screen]
21		Save Screen Position. Save the current configuration when you run two or more run screens with the [Multi Screen Mode]. The below message will appear once the setting is saved.  If you save the multi-screen setting, the saved setting will be applied when the TOPView program is started.
22		Align - Tile

23		Align - Cascade
24		Full Screen
25		Minimize Screen
26		Close
27		Exit

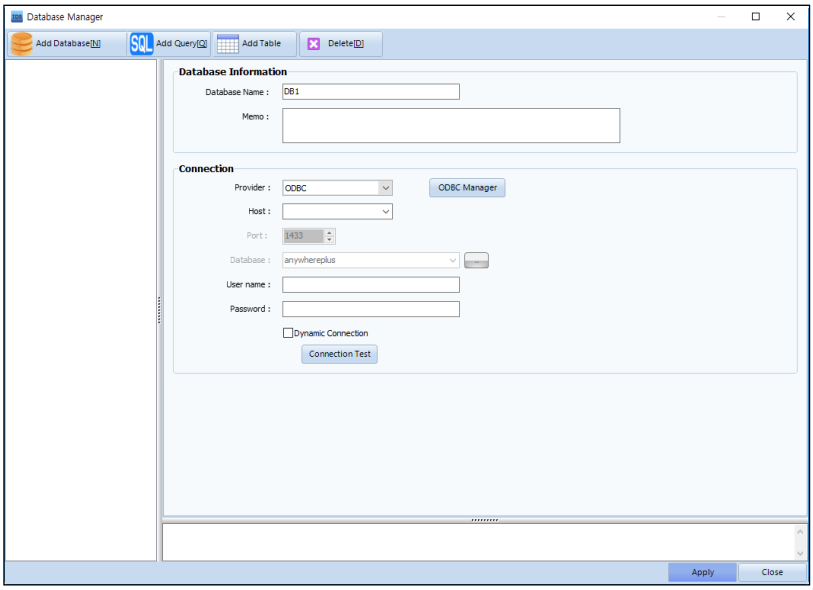
CHAPTER 27 - DataBase

27.1 Connecting with DataBase

TOPView provides two types of database connection schemes: OLEDB and ODBC, compatible with databases such as Oracle, MySQL, SQLLite, MSSQL and others.

To connect with a database, you have to configure the connection with a DB Server within the network with the [Database Manager].

Go to [Project] > [Database] to open the [Database Manager].

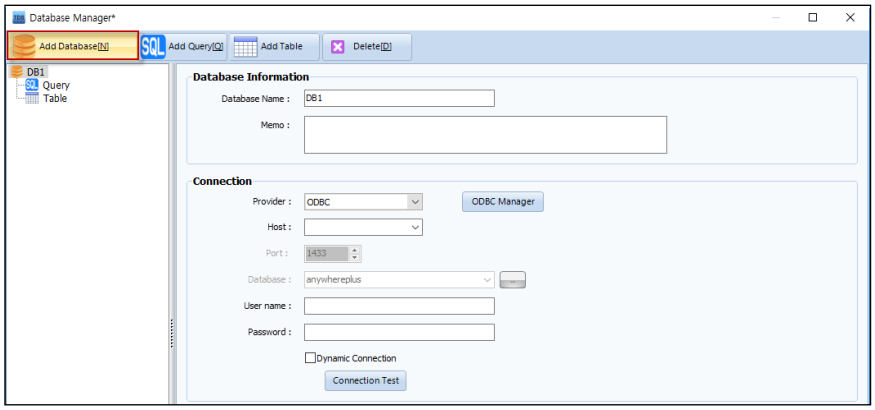


[Figure. Database Manager]

27.1.1 Add DataBase & Connection Setting

Click [Add DataBase] from [DataBase Manager], an new database item named 'DB1' is created on the left side of the window.

Select a database item and configure its connection settings to connect with a database.

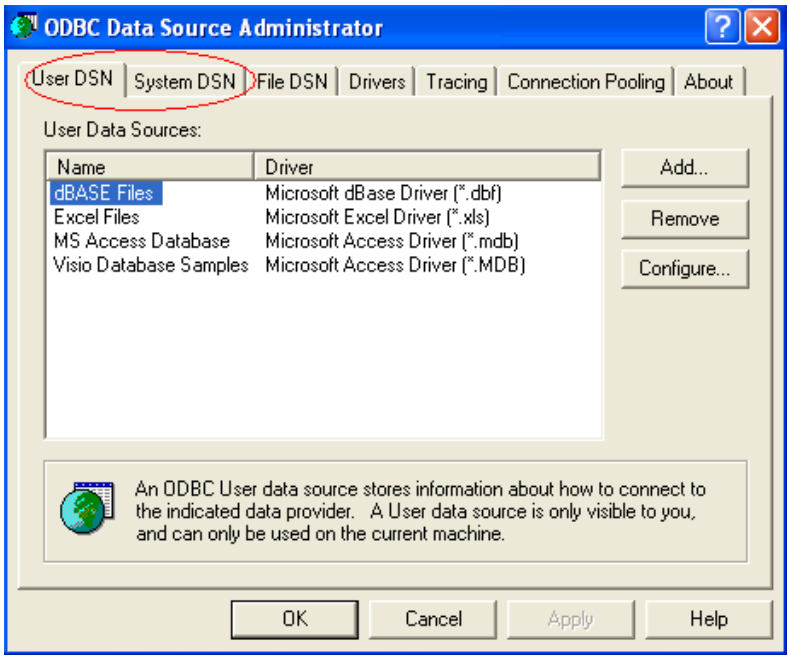


[Figure. Database Connection Setting]

- Database Type: Select Database Type among Oracle, MySQL, SQLLite, ODBC, or other database types.
  Note. Refer to Chapter 27.1.2 [Connection with ODBC] for more details on connecting with ODBC.
- ODBC Manager Open the [ODBC Data Source Administrator]. For database connections via ODBC, you must add the database of your interest from [ODBC Data Source Administrator].
- Host: Enter the IP of the server on which the database is installed and operating. For ODBC, select the database registered to ODBC.
- Database: Enter the name of the database service. Multiple databases may be operated on a single database, therefore for clarity, each database should be assigned to a specific name.
- User: Enter the database login ID.
- Password: Enter the login password.
- Dynamic Connection: Select whether or not to maintain the database connection at all times, or at limited times elected by the user. Disable this function if frequent data inquiry occurs, and enable this function if intermittent data inquiry occurs.
- Connection Test: Test whether or not the database can be connected or not.
-

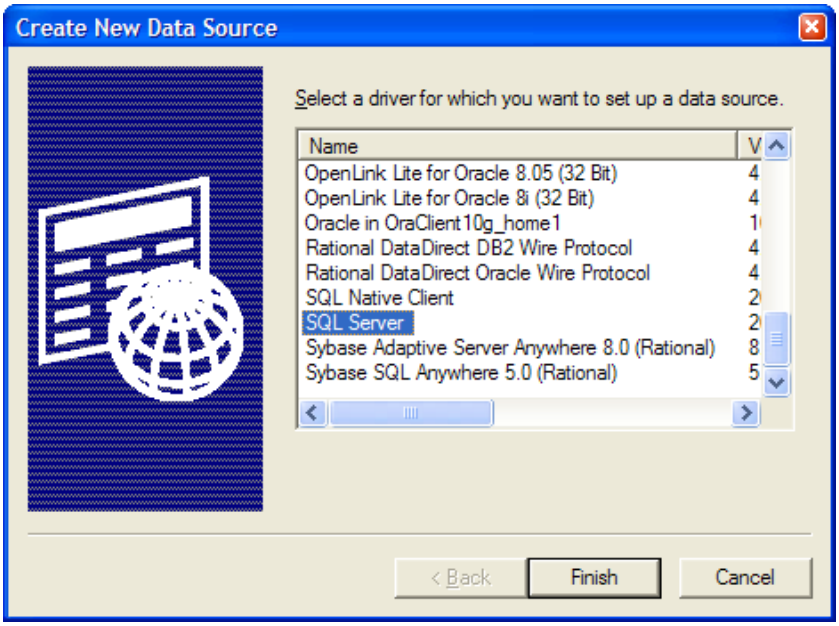
27.1.2 **ODBC Connection**

ODBC (Open Database Connectivity) is a open database connection developed by Microsoft, admitting connection through ODBC drives provided by Oracle, MSSQL, MySQL, and other database providers. To connect through ODBC, the database connection settings must be configured from ODBC Data Source Administrator.



[Figure. ODBC Data Source Administrator]

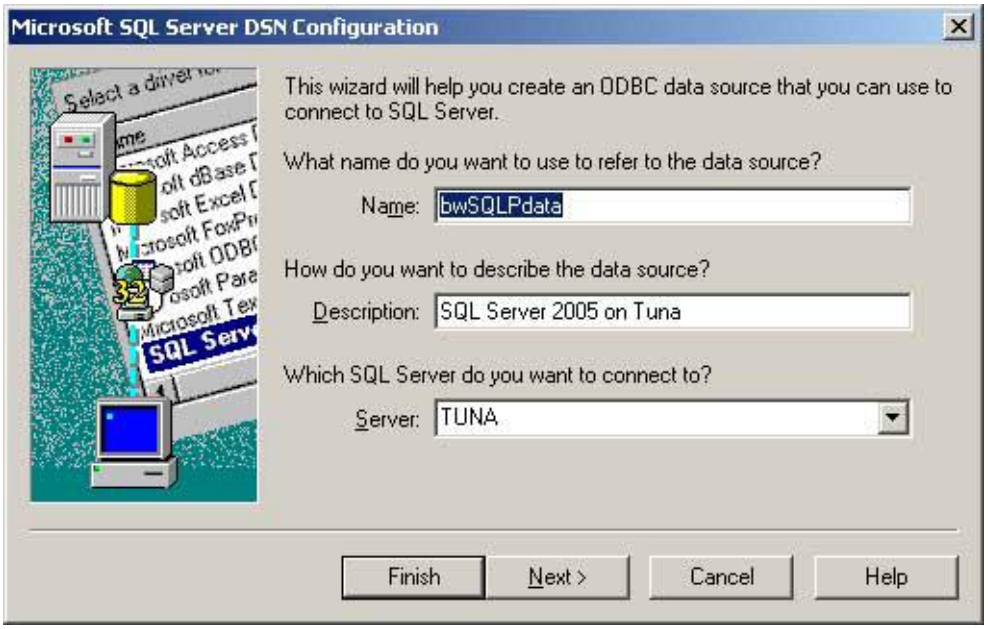
Click [ODBC Manager] from the [Database Manager] to open the [ODBC Data Source Manager], and click [Add] on the right side of [User DSN] tab.



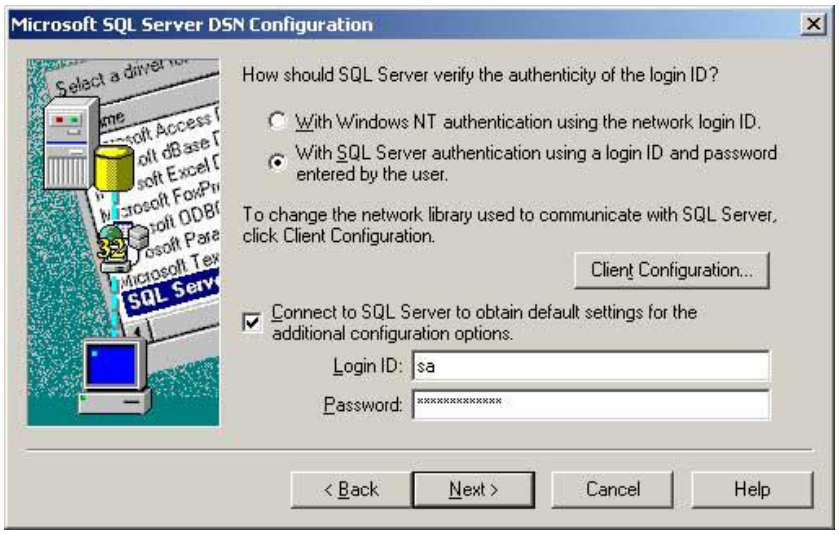
[Figure. Create New Data Source]

First select the type of database from [Create New Data Source]
For instance, if you intend to add MSSQL database, select 'SQL Server', enter the required information in the following order, and click [Next].

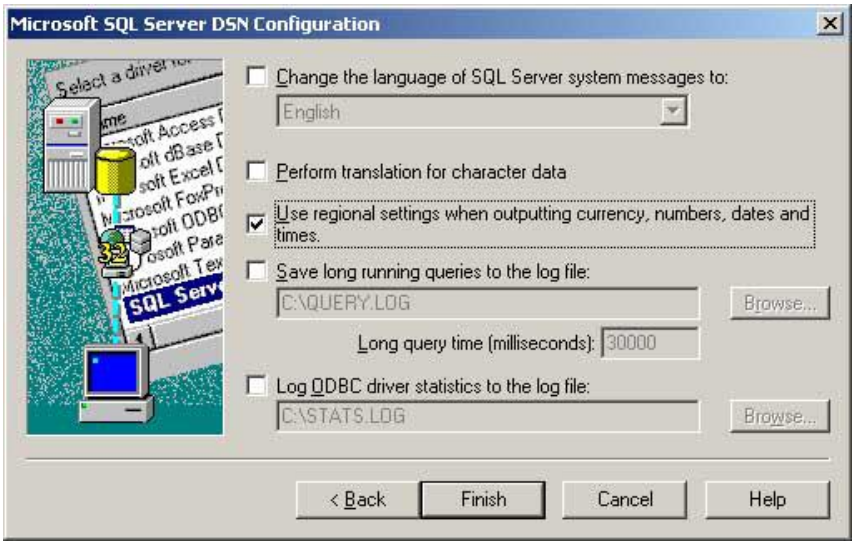
1) Database Name and Server



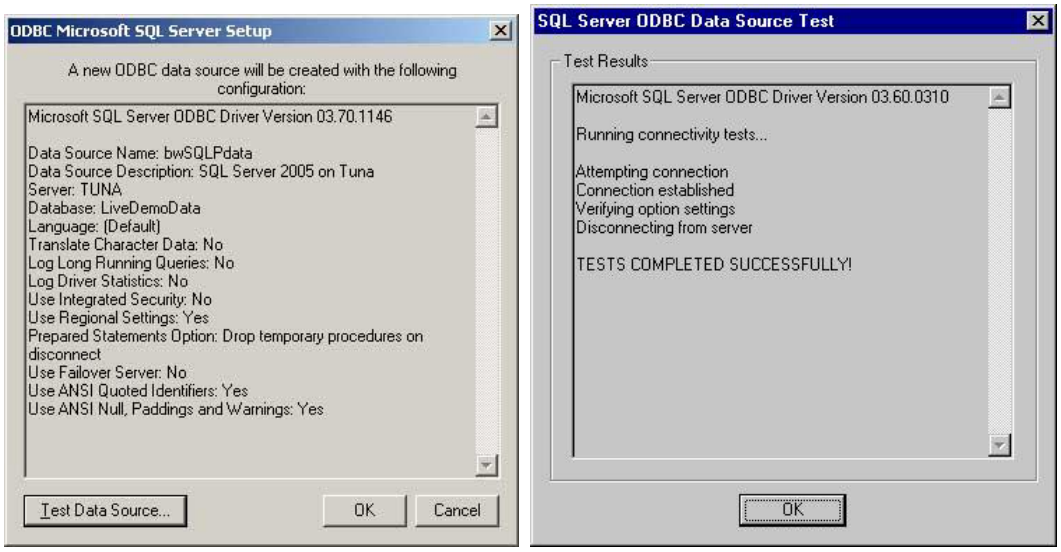
2) ID / PW Setup


Microsoft SQL Server DSN Configuration
How should SQL Server verify the authenticity of the login ID?
With Windows NT authentication using the network login ID.
With SQL Server authentication using a login ID and password entered by the user.
To change the network library used to communicate with SQL Server, click Client Configuration.
Client Configuration...
Connect to SQL Server to obtain default settings for the additional configuration options.
Login ID: sa
Password: ********
< Back
Next >
Cancel
Help

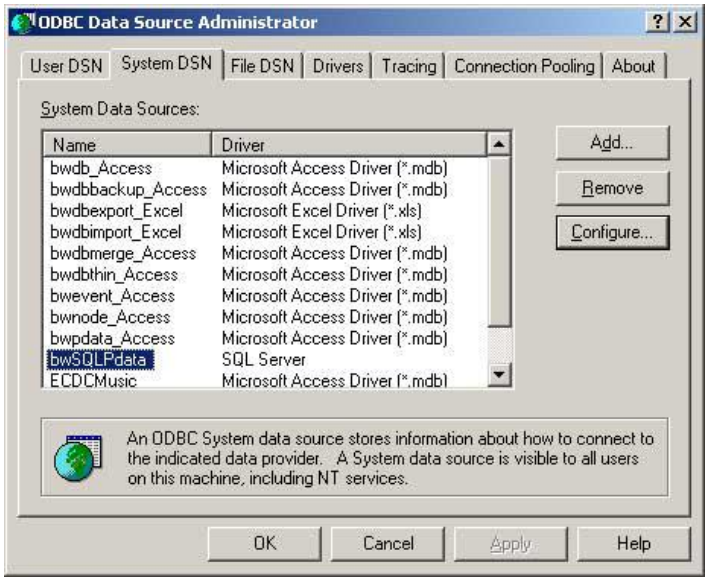
Microsoft SQL Server DSN Configuration
Change the default database to:
WebAccessPData
Attach database filename:
Create temporary stored procedures for prepared SQL statements and drop the stored procedures:
Only when you disconnect.
When you disconnect and as appropriate while you are connected.
Use ANSI quoted identifiers.
Use ANSI nulls, paddings and warnings.
Use the failover SQL Server if the primary SQL Server is not available.
< Back
Next >
Cancel
Help


Microsoft SQL Server DSN Configuration
Change the language of SQL Server system messages to:
English
Perform translation for character data
Use regional settings when outputting currency, numbers, dates and times.
Save long running queries to the log file:
C:\QUERY.LOG
Browse...
Long query time (milliseconds): 30000
Log ODBC driver statistics to the log file:
C:\STATS.LOG
Browse...
< Back
Finish
Cancel
Help

3) Database Connection Test & Complete



Follow the steps and click [OK] to create the new database connection named [bwSQLPdata].

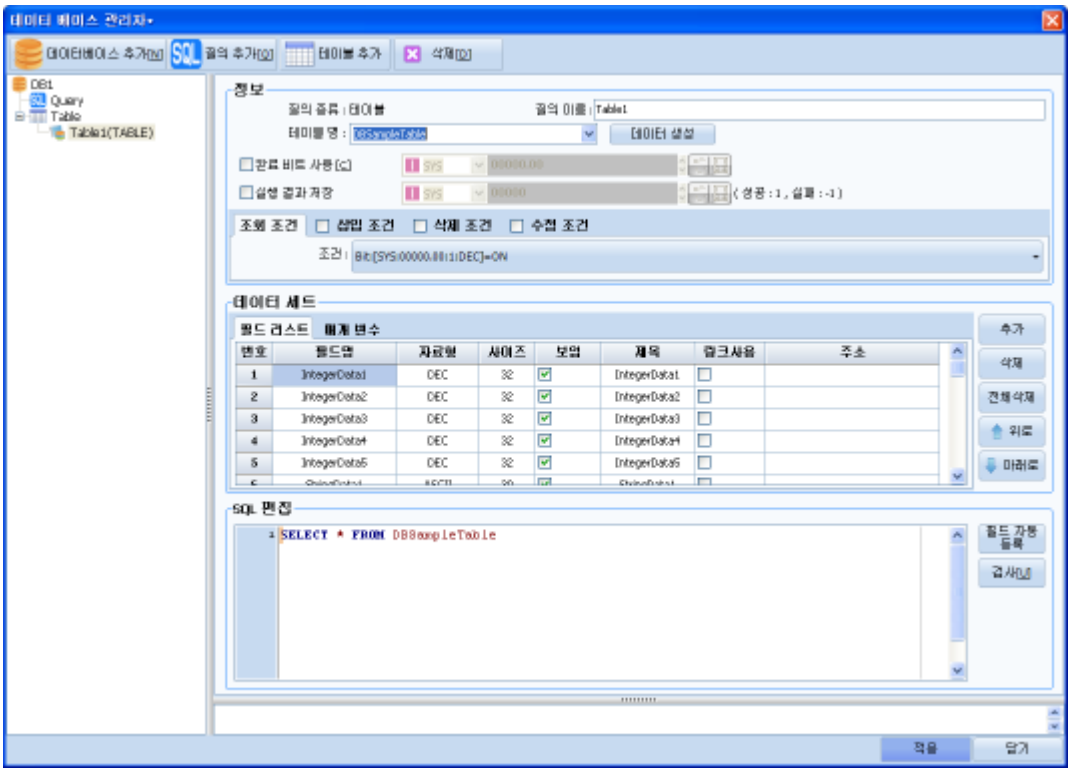


27.2 View Data

In general, a database consists one or more tables, and a standard language referred as 'Query' is employed to view, INSERT / UPDATE data from these tables.
Refer to the following instructions on how to input and output data from and to a database with Query.
The Database Manager provides two major methods to view, SELELCT / INSERT / DELETE data.
If you are not familiar with Query, or only simple view/handling of data is required, use [Table]. If complicated view/handling of data is required, use Query.

27.2.1 Data Input/Output with Table

Even without Query, you can easily materialize complicated functions such as data SELECT / UPDATE / INSERT / DELETE with the [Table] provided by [Database Manager] and a [Database Table Object].
Click [Add Table] on the Toolbar of [Database Manager], to open the New Table window as shown below.



[Figure. New Table]

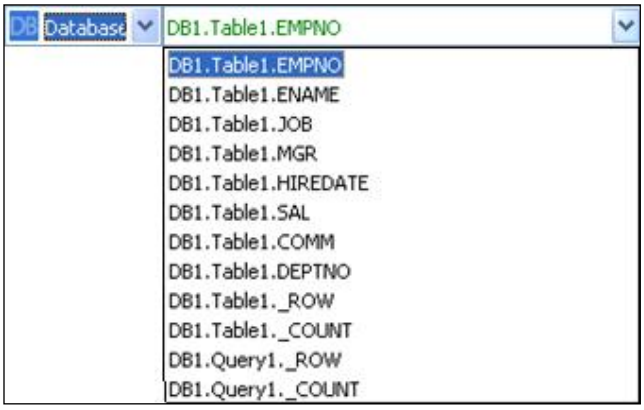
1) Information

Configure the table that shall be displayed in the database table object, and configure conditions to conduct SELECT / UPDATE / INSERT / DELETE.
A list of available databases is compiled in the drop down menu of the [Table] combination box, select the table of your interest and click [New Data] to access the data field list employed in the table from the [Data Set].
If data is not connected, enter the table name by yourself.

- Use complete bit: Turn the bit address ON for query execution complete of SELECT / UPDATE / INSERT / DELETE, regardless to the success or failure of the execution.
  (※ A complete Bit that has been turned ON does not turn OFF by itself)
- Save execution result: The result of whether or not the query for SELECT / UDPATE / INSERT / DELETE for the designated address was properly executed is saved as 1 or -1. [1] refers to a successful execution, and [1] refers to a failed execution.

2) SELECT / UPDATE / INSERT / DELETE

You can perform SELECT / UPDATE / INSERT / DELETE with a [String/Numeric Display Key] object without using a [Database Table] object.
Add a String or numeric key display object to a screen, select [Database] category for an address at the edit dialog to show the field information of the table as below.



[Figure. Database field information]

For instance, if a database named [DB1] is allotted to [Table1], and a view condition is assigned and executed, the object receives the query result from the database server, and even though it is not shown on the screen, a virtual data table is created on the memory as shown below.

No.	EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
1	1100	HONG Gildong	Emp	Y	2011.02.03	120000		10
2	1200	CHOI Cheolsoo	Emp	N	2012.03.02	134500		10
3	1300	GO Youngsoo	Emp	N	2013.05.11	145000		20
4	1400	CHO Hyeonbae	Emp	N	2014.01.01	154000		10
5	1500	NOH Taeyoung	Emp	Y	2009.12.23	290000		30
6	1600	KIM Pansoo	Emp	N	2014.05.20	300000		20
7	1700	KIM Youngho	Emp	N	2008.08.05	451000		20
8	1800	LEE Youngae	Emp	N	2009.09.09	521000		10
9	1900	KANG Ilho	Emp	N	2011.11.12	854000		30
10	2000	KIM Insik	Emp	Y	2011.06.30	452000		10

[Figure. Virtual Data Table]

The number of database tables created on the memory with data received from the database server is recorded in [DB1.Table1._COUNT]. For instance, if 10 records had been made as result of Query, [DB1.Table.1_COUNT] reads [10].

No.	Address	Description
1	DBName.TableName._COUNT (DB1.Table1._COUNT)	The number of data received from Database (Row Count) is recorded in this address.
2	DBName.TableName._ROW (DB1.Table1._ROW)	The address in which the Row number of the data to be View / Edit / Delete is assigned.

If you want to display the data for No.6 KIM Pansoo from the above sample Virtual Data Table, enter fields such as [DB1.Table1.EMPNO], [DB1.Table1.ENAME], [DB1.Table1.JOB] for addresses of a String/Numeric object, and enter the number of your interest in [DB1.Table1.ROW].

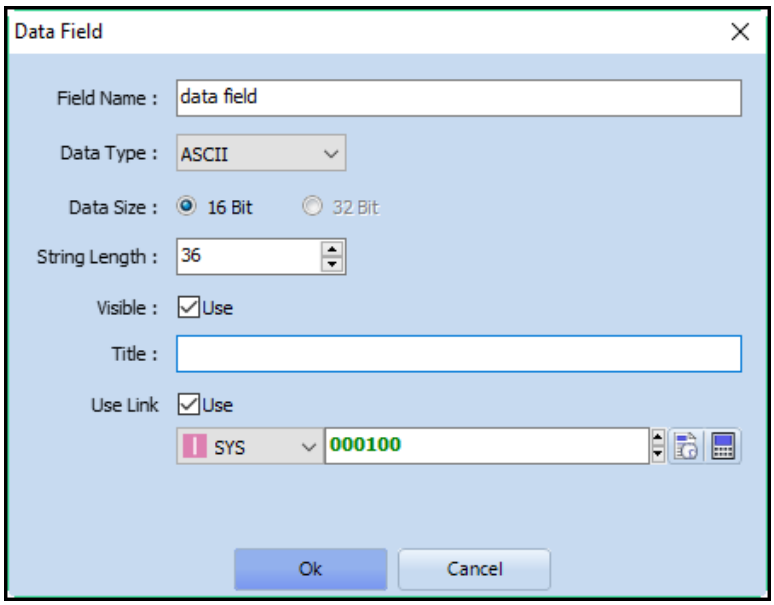
- Search Condition: Configure the table data search condition for table defined by Database Manager.
- Add Condition: Configure conditions to add data recorded in [DB1.Table.EMPNO], [DB1.Table1.ENAME] to the database.
- Delete Condition: Configure conditions to delete the data of a specific row defined by [DBName.TableName._ROW] (for instance, DB1.Table1._ROW), from the table.
  (The first row of a table starts from [0])
- Edit Condition: Configure conditions to update the data (row) corresponding to [DBName.TableName._ROW] (for instance, DB1.Table1._ROW) with the data defined by [DB1.Table1.ENAME], [DB1.Table1.JOB].

3) Data Set

Define the fields to be employed in an [Database Table] object, and parameters, if necessary.

▶ **Field List**

If the database connection is available, you can add [Data Field] automatically with the [Add Field Automatically] button. If the database connection is not available, click the [Add] button provided on the left side to manually add fields from the [Data Field] window shown below.



- Field Name: Enter the name of the field defined in the database table.
- Data Type: Select the data type.
- Data Size: Select the data size between [16Bit] and [32Bit] for numeric data (DEC, Float, and others).
- String Length: For [Data Type] of [ASCII], select the length of a string.
- Visible: Enable [Use] to show data in the DataBase Table object.
- Title: Enter the column header employed in the DataBase Table object.
- Use Link: Select whether or not to assign an address to be synchronized with the TOP system memory.

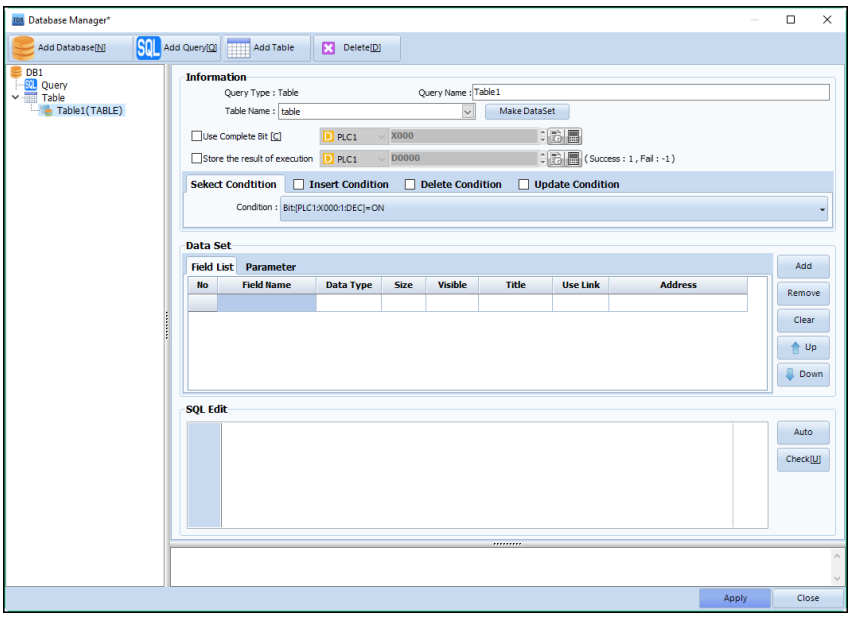
Note! To write data to a linked address when one or more data of the table complies with the condition, the Row number of your interest must be assigned to [DB1.Table1._ROW].

▶ **Parameter**

If a new table named [EMP] was added from the aforementioned process, a query stated [SELECT*FROM EMP] will be automatically added to the SQL edit field.
The purpose of this query is to view all data located in the table named [EMP]. However, it is not normal to view all data included in a table. In general, a query has a form as shown below.

```
SELECT * FROM EMP
  WHERE SAL > 1000;
```

The above query means to find data of which SAL field value is larger than 1000 from the EMP table. In the query, [SAL>1000] functions as a filter, and under certain circumstance, you might have to configure a query requesting to find data that is larger than 500 or 2000. In such cases, assigning [1000] as a parameter mapped to system buffer or a PLC address, will provide a more detailed data search.



[Figure. Using a Parameter - Sample]

As shown above, add a parameter named [MyValue], and map the parameter to [SYS:00100]. Then add [MyValue] in the query to change the value of [MyValue] easily with the data from [SYS:00100].

4) SQL Edit

You can use the Query automatically generated upon creating a new table, however, you can type in Query sentences in the SQL edit field for a more complex and specific data management.
For instance if you want to configure an additional filter other than the aforementioned [SAL>1000] query, or sort the data result in an ascending order, type in a query as below.

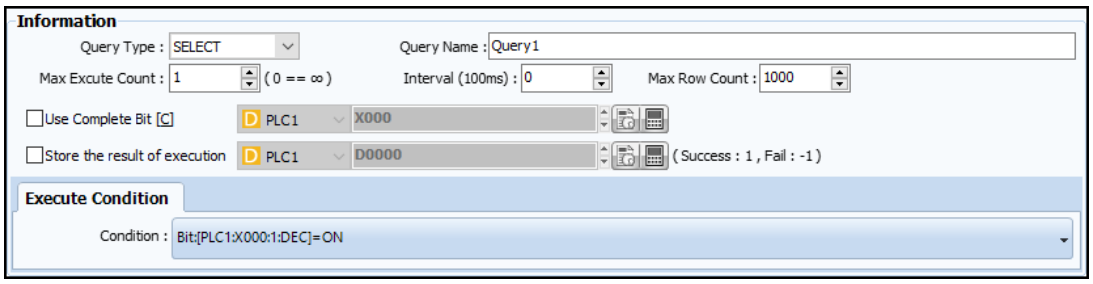
```
SELECT * FROM EMP
 WHERE SAL > 1000
    AND HIREDATE > '2016-01-01'
 ORDER BY ENAME;
```

- Auto: The field list of the selected table is added to the [Field List] of [Data Set]. This function is available only if the currently working PC is connected with the database.
- Check: The validity of the current query is checked. This function is available only if the currently working PC is connected with the database.
-

※ It is difficult to introduce all commands and application of Query in this manual. Therefore, for more details on how to use Query, refer to other books related to Standard SQL, or search online.

27.2.2 Data input/output with Query.

If the aforementioned data input with a Table is recommended for those not familiar with Query, this section provides instructions on how to input/output data with Query for those familiar with Query, who can use various functions for a more complex and variety data input / output.

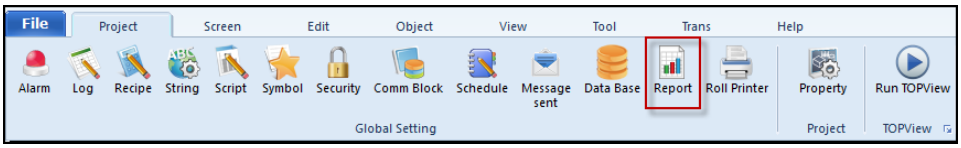


- Query Type: Select among [SELECT] / [UPDATE] / [INSERT] / [DELETE].
- Query Name: Define the name of the Query. No two queries should have the same name.
- Max Execute Count: Configure the number of times the query should be executed when the [Execute Condition] is true.
- Interval: Configure the interval of each execution in 100ms, if the Max Execute Count is [0] (infinite) or [2] or larger.
- Max Row Count: For a [SELECT] query, configure the maximum number of data set to be returned. Use Complete Bit: Turn the configured Bit Address ON upon a completed query regardless to its success or failure. (※ A complete Bit that has been turned ON does not turn OFF by itself)
- Save execution result: The result of whether or not the query for SELECT / UDPATE / INSERT / DELETE for the designated address was properly executed is saved as 1 or -1. [1] refers to a successful execution, and [1] refers to a failed execution.

※ Refer to Chapter 27.2.1 [Data Input/Output With Table] for more details of Data Set and SQL Edit.

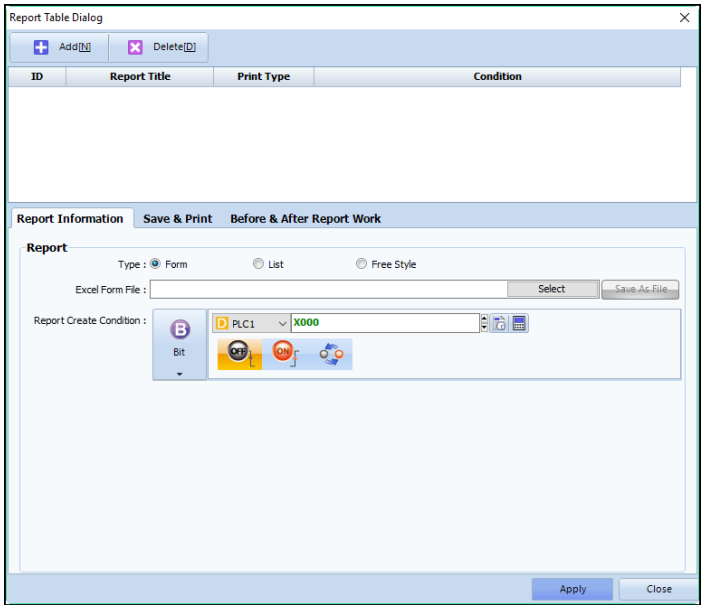
CHAPTER 28 - Report

TOPView(SCADA) features a function to easily export a report in Excel format. You can configure the template by editing an excel file, and enter a reserved word or current value at a certain location to easily save and print a report.



[Figure. Project - Report]

Click [Report] to open the [Report Table Dialog].



[Figure. Report Table Dialog]

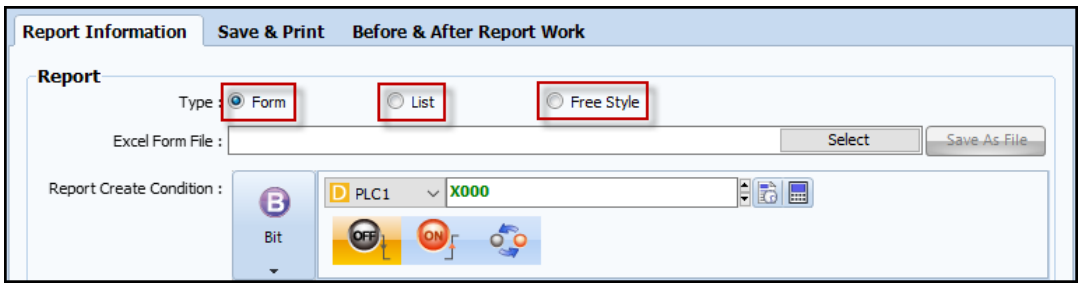
You can add multiple Form / List reports, which both will be explained later.
In other words, you can save/print two or more reports, and save multiple accumulative lists to an excel file.

28.1 Report Information

Select the report type, and reporting condition from [Report Information] tab.

28.1.1 Report Type

Three types of reports are available.



[Figure. Report Type]

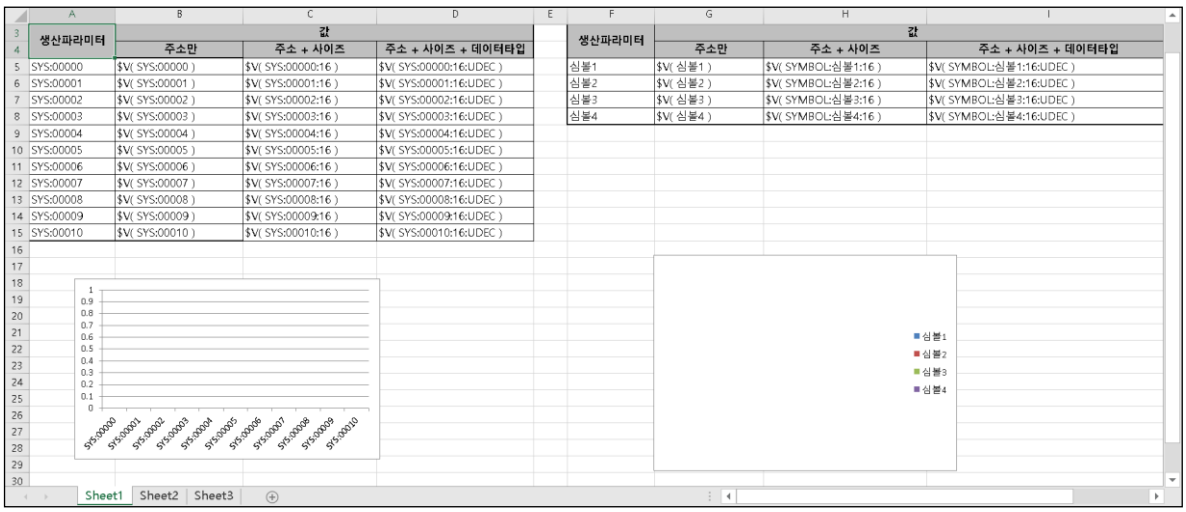
No.	Report Type	Description
1	Form	Create an intuitive report template from MS Excel and record data such as production unit count, number of defects, and production parameters at a specific point of time (bit, trigger, etc.) on the report.
2	List	Create a template from excel by only configuring columns and headers and accumulatively record data upon time in a horizontal or vertical direction. This function is similar with log records.
3	Free Style	Freely record data or texts in each cell. You can dynamically record data to a specific cell at a specific point of time with a script function.

28.1.2 **Excel Form File**

Select an Excel file that shall be employed as the report template.
In other words, designate an existing MS Excel file.
This excel file can be created in an extremely simple and intuitive manner.

(1) Report Type - Form

Draft the format in an Excel file with the form, and string of your selection.
Every word other than the reserved word of "$V(ADDRESS)" are shown in the report as they are configured in the Excel file.
All advanced applications of Excel including Macro, Graphs, are available.



[Figure. Excel Form File]

1) System Buffer

The reserved word for a System Buffer is [$V(SYS:SYSTEMBUFFERADDRESS)]. For instance, if [$V(SYS:00000)] is entered in the [B5] cell, the value read from System Buffer [0] is recorded in [B5] cell.

For data other than a conventional decimal number, expanded reserved words are available.

-"$V(SYS:00000:32:FLOAT)" : The data read from System Buffer [0] and [1] are processed and saved as a 32bit real number.

-"$V(SYS:00000:7:ASCII)" : The data read from System Buffer [0] through [3] is processed and saved as a 7 character ASCII code.

-"$V(SYS:00000:16:HEX)" : The data read from System Buffer [0] is processed and saved as a 16bit hexadecimal number.

-"$V(SYS:00000:16:DEC)" : The data read from System Buffer [0] is saved as a 16 bit coded decimal.

-"$V(SYS:00000:16:UDEC)" : The data read from System Buffer [0] is saved as a 16bit unsigned decimal.

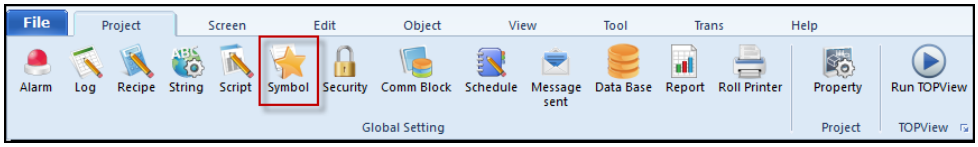
-"$V(SYS:00000)" : The data read from System Buffer [0] is saved as a 16bit unsigned decimal.

Hence, reserved words with no specific data size and type are deemed as a 16 bit / unsigned decimal.

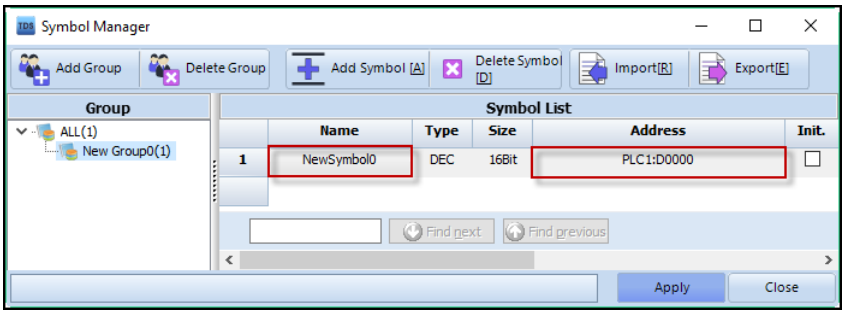
2) PLC Address

The reserved word to record a data from a PLC address to the report is [$V(SYMBOL)].

For instance, if [$V(SYMBOL:SYMBOL1)] is entered in the [H5] cell, the value read from [SYMBOL1] is recorded in [H5] cell. From the below sample, [SYMBOL1] refers to [D0008] assigned from the Symbol Manager.



[Figure. Project - Symbol Manager]



[Figure. Symbol Manager]

For data other than a conventional decimal number, expanded reserved words are available.

-"$V(SYSMBOL:SYMBOL1:32:FLOAT)" : If the data read from the address assigned to SYMBOL1 is a real number, the data is processed ad saved as a real number.

-"$V(SYSMBOL:SYMBOL1:7:ASCII)" : If the data read from the address assigned to SYMBOL1 is a ASCII 7 word, the data is saved as a string.

-"$V(SYSMBOL:SYMBOL1:16:HEX)" : The data read from the address assigned to SYMBOL1 is saved as a 16bit hexadecimal number.

-"$V(SYSMBOL:SYMBOL1:16:DEC)" : The data read from the address assigned to SYMBOL1 is saved as a 16bit coded decimal number.

-"$V(SYSMBOL:SYMBOL1:16:UDEC)" : The data read from the address assigned to SYMBOL1 is saved as a 16bit unsigned decimal number.

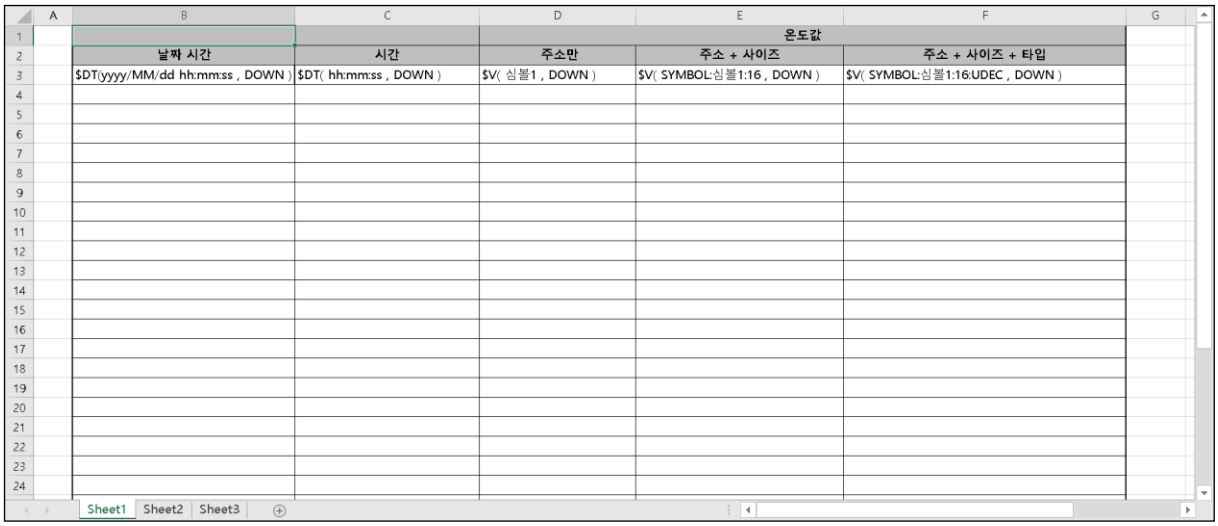
-"$V(SYSMBOL:SYMBOL1)" : The data read from the address assigned to SYMBOL1 is saved as a 16bit unsigned decimal number.

Hence, reserved words with no specific data size and type are deemed as a 16 bit / unsigned decimal.

-"$V(SYMBOL1)" : If [SYMBOL], data size and type are omitted, the data is deemed as a 16bit unsigned decimal number.

(2) Report Type - List

The principal of a List Report is same with that of a Form Report.
Draft the format in an Excel file with the form, and string of your selection.
Every word other than the reserved words of [$V(ADDRESS, DOWN/RIGHT)] and [$DT(DATE/TIME, DOWN/RIGHT)] are shown in the report as they are configured in the Excel file.
All advanced applications of Excel including Macro, Graphs, are available.



	B	C	D	E	F
1			온도값		
2	날짜 시간	시간	주소만	주소 + 사이즈	주소 + 사이즈 + 타입
3	$DT(yyyy/MM/dd hh:mm:ss , DOWN)	$DT(hh:mm:ss , DOWN)	$V(심볼1 , DOWN)	$V(SYMBOL:심볼1:16 , DOWN)	$V(SYMBOL:심볼1:16:UDEC , DOWN)

Sheet1 Sheet2 Sheet3

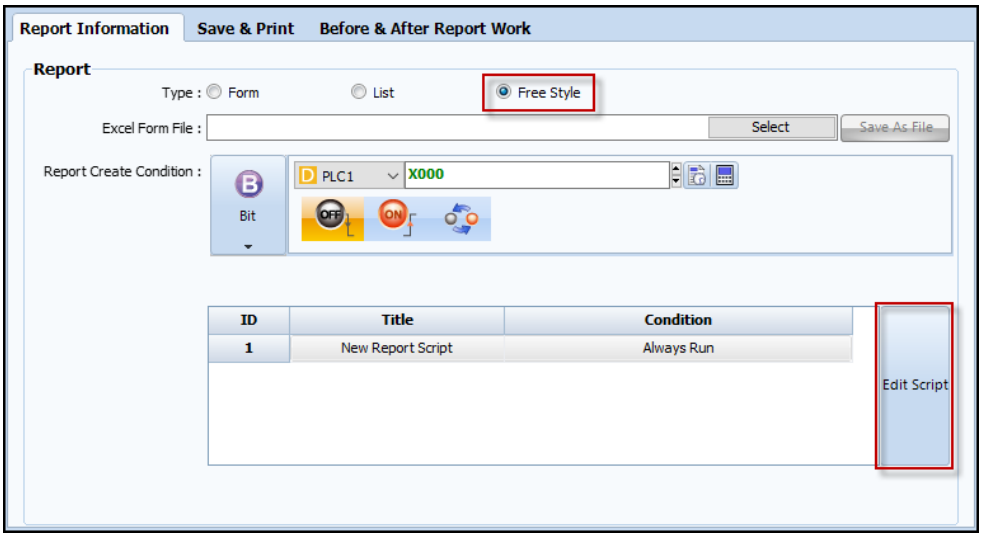
[Figure. Excel List File]

The data for date and time can be cumulatively reported with the following reserved words.
The reserved words are configured with a principle of [$DT(DATE/TIME format, Direction)].
-"$DT(yyyy/MM/dd hh:mm:ss, DOWN)" : The [Year/Month/Date Hour:Minute:Second] is recorded downward whenever [Data Create Condition] is true.
-"$DT(hh:mm:ss, DOWN)" : The [Hour:Minute:Second] is recorded downward whenever [Data Create Condition] is true.
-"$DT(yyyy/MM/dd, RIGHT)" : The [Year/Month/Date] is recorded to the right whenever [Data Create Condition] is true.
The data value follows the same rules described for Form Reports. Only the Direction (DOWN / RIGHT) is added for a List Report.
-"$V(SYS:00000:16:HEX, DOWN)" : The data read from System Buffer [0] is processed and saved as a 16bit

hexadecimal number. The data is recorded downward whenever [Data Create Condition] is true.
-"$V(SYSMBOL:SYMBOL1, RIGHT)" : The data read from the address assigned to SYMBOL1 is saved as a 16bit unsigned decimal number. The data is recorded to the right whenever [Data Create Condition] is true.
When [Report Create Condition] is true, the cumulative data recorded upon a true [Data Create Condition] are compiled in and saved as a list.

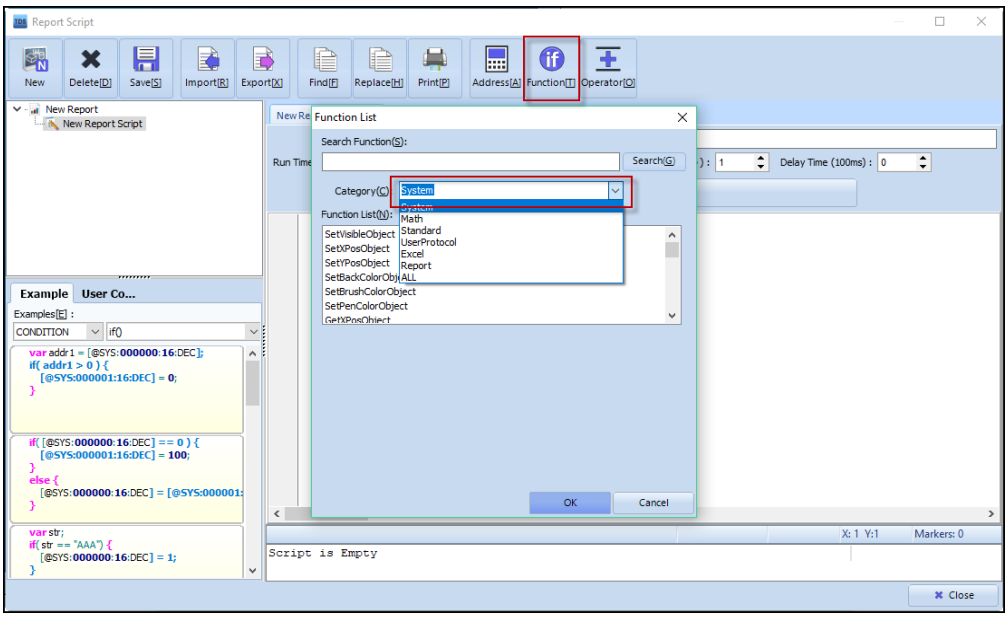
(3) Report Type - Free Style

Configure the template and words of your interest in an Excel file.
Unlike Form Reports and List Reports, Free Style does not support reserved words.
Only scripts are applicable to write specific data to a specific location.
All advanced applications of Excel including Macro, Graphs, are available.

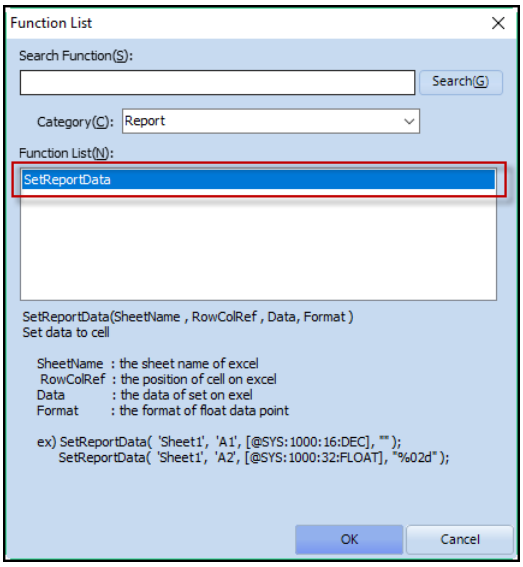


[Figure. Report Type - Free Style]

Click [Edit Script] to open the [Report Script] window and configure applicable scripts.
Click [Function] from the [Report Script] window to open [Function List], select [Report] from the drop down menu for [Category] and add the [SetReportData] function.



[Figure. Report Type - Free Style]

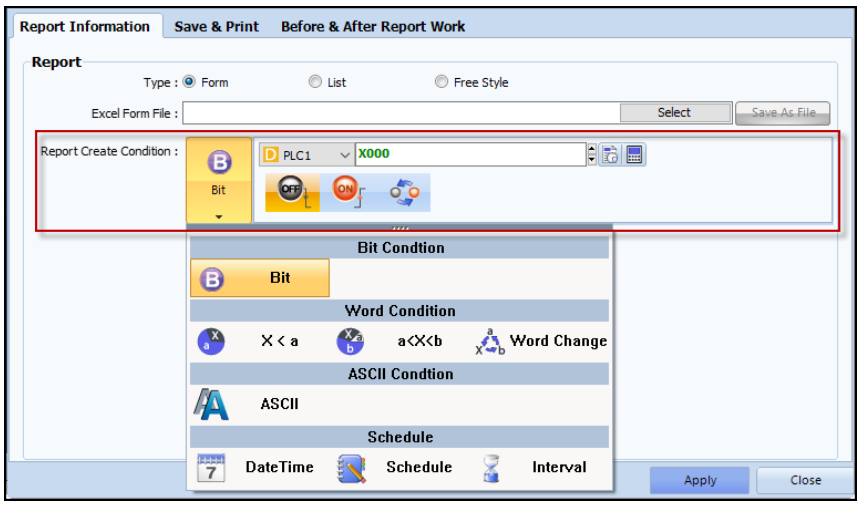


[Figure. SetReportData Function]

For instance if [SetReportData('Sheet1','A1',[@SYS:00000:16:DEC]."")] is entered as a script, the data read from System Buffer [0] is recorded in [Sheet1] [A1] cell as a coded 16bit data. Data is recorded according to the script execution condition, and the data is actually written on the excel form upon a true [Report Create Condition], as same as Form / List reports.

28.1.3 Report Create Condition

[Report Create Condition] refers to the condition upon which the actual report, thus, the excel file is saved to a specific path (or printed). [Report Create Condition] is configured as other conditions are configured.

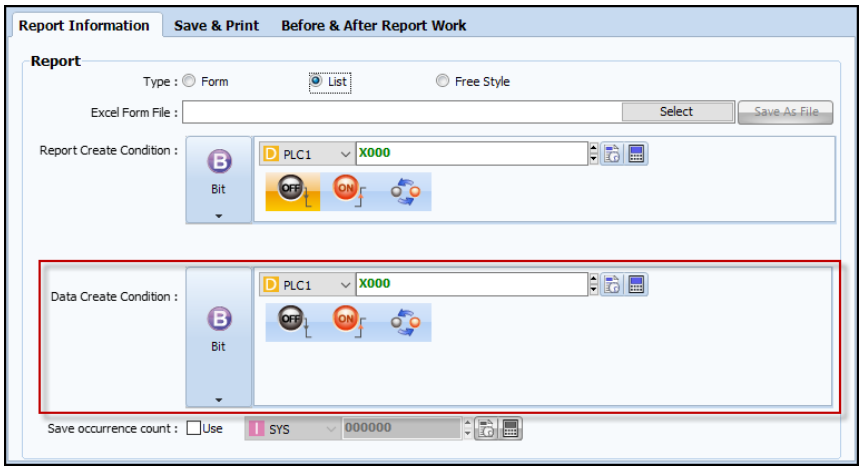


[Figure. Report Create Condition]

28.1.4 Data Create Condition

Data Create Condition is applicable only when the Report Type is [List]. A Report List is cumulatively compiles data on a time-series basis to the right or downward, which requires a time point to record data, similar to log conditions.

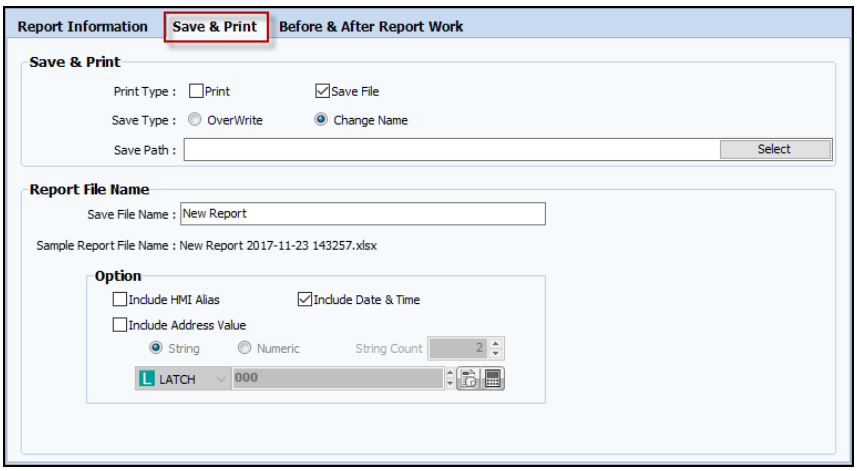
[Data Create Condition] refers to the condition upon which the actual data is recorded.



[Figure. Data Create Condition]

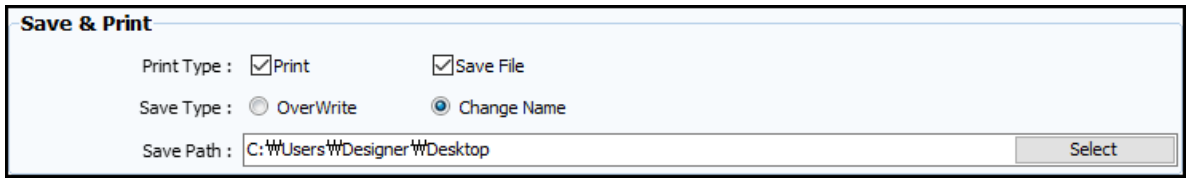
28.2 Save & Print

Configure the path in which the report is saved, and naming rules from [Save & Print] tab.



[Figure. Save & Print]

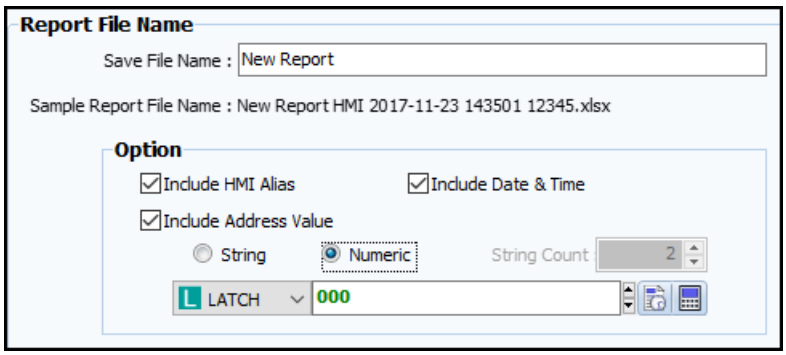
28.2.1 Save & Print



[Figure. Save & Print]

No.	Category	Description
1	Print Type	In general [Save File] is selected. Enable both [Print] and [Save File] to print the report while saving the report to a file at the same time.
2	Save Type	Select [OverWrite] to overwrite an existing file, if any, upon a true Report Create Condition. Select [Change Name] to create a new file with a suffix of [_1], [_2], as many as required, if a file with the same name exists.
3	Select Path	Configure the path in which the report is saved.

28.2.2 Report File Name



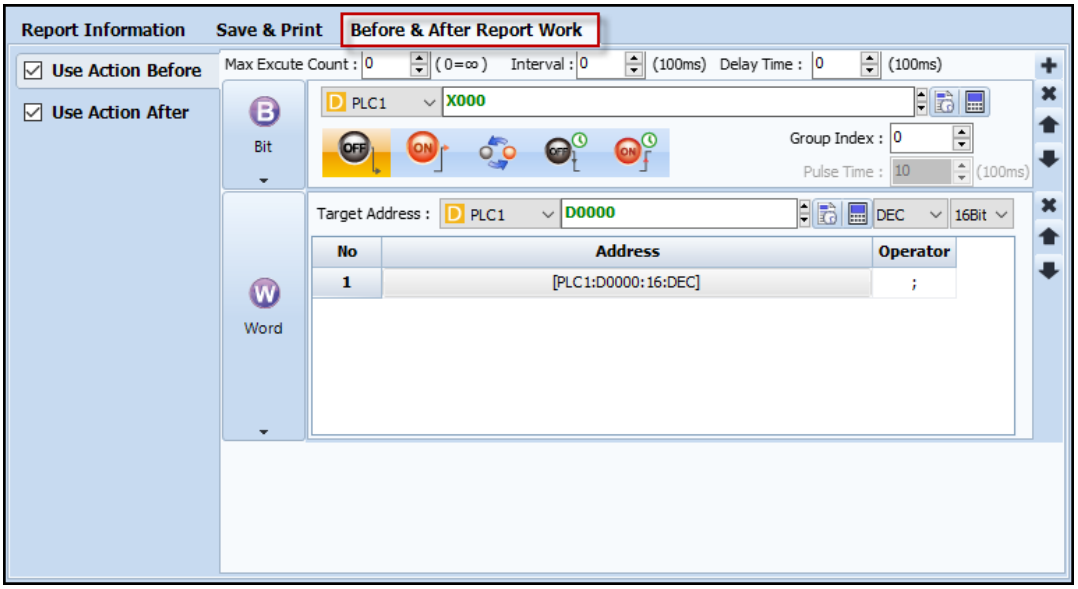
[Figure. Report File Name]

No.	Category	Description
1	Save File Name	Enter the File Name. Configure other options to assign suffixes to the file name.
2	Sample Report File Name	A sample file name with the current configuration is shown. For a file name of [New Report HMI 2017-09-04 004838 12345.xlsx]: "New Report" : Save File Name "HMI" : HMI Alias (Option)

		"2017-09-04" : Date (Option) "000438" : Time (HHMMSS) (Option) "12345" : Value of the address (PLC / System Buffer, whichever applicable) at the time of record (Option)
3	Include HMI Alias	Enable [Include HMI Alias] to add the alias configured for the TOP device, as a suffix.
4	Include Date & Time	Enable [Include Date & Time] to add the date and time of the moment the file is saved, as a suffix.
5	Include Address Value	Enable [Include Address Value] to add additional data in numeric or string forms as a suffix. This function is normally used to express the line name, equipment name or production category.

28.3 Before & After Report Work

Configure actions to be taken before and after creating a report.
You can turn On a certain bit, or enter a specific word value prior to creating a report file.
You can also reset data, or use the status as a complete information after creating a report file.



[Figure. Before & After Report Work]

Refer to Chapter 7.6 [Effect & Action] for more details.