XG5000 USER MANUAL

The right choice for the ultimate yield!

LS ELECTRIC strives to maximize your profits in gratitude for choosing us as your partner.

Programmable Logic Control

XG5000

XGT Series

User Manual

XGK/XGB

⚠ Safety Instructions

- Read this manual carefully before installing, wiring, operating, servicing or inspecting this equipment.

- Keep this manual within easy reach for quick reference.

LS ELECTRIC

Before using the product …

For your safety and effective operation, please read the safety instructions thoroughly before using the product.

▶ Safety Instructions should always be observed in order to prevent accident or risk with the safe and proper use the product.

▶ Instructions are separated into "Warning" and "Caution", and the meaning of the terms is as follows;

⚠ **Warning**	This symbol indicates the possibility of serious injury or death if some applicable instruction is violated
⚠ **Caution**	This symbol indicates the possibility of slight injury or damage to products if some applicable instruction is violated

▶ The marks displayed on the product and in the user's manual have the following meanings.

⚠ Be careful! Danger may be expected.

⚡ Be careful! Electric shock may occur.

▶ The user's manual even after read shall be kept available and accessible to any user of the product.

Safety Instructions when designing

⚠Warning

▸ **Please, install protection circuit on the exterior of PLC to protect the whole control system from any error in external power or PLC module.** Any abnormal output or operation may cause serious problem in safety of the whole system.

- Install applicable protection unit on the exterior of PLC to protect the system from physical damage such as emergent stop switch, protection circuit, the upper/lowest limit switch, forward/reverse operation interlock circuit, etc.

- If any system error (watch-dog timer error, module installation error, etc.) is detected during CPU operation in PLC, the whole output is designed to be turned off and stopped for system safety. However, in case CPU error if caused on output device itself such as relay or TR can not be detected, the output may be kept on, which may cause serious problems. Thus, you are recommended to install an addition circuit to monitor the output status.

▸ **Never connect the overload than rated to the output module nor allow the output circuit to have a short circuit**, which may cause a fire.

▸ **Never let the external power of the output circuit be designed to be On earlier than PLC power**, which may cause abnormal output or operation.

▸ **In case of data exchange between computer or other external equipment and PLC through communication or any operation of PLC (e.g. operation mode change), please install interlock in the sequence program to protect the system from any error**. If not, it may cause abnormal output or operation.

Safety Instructions when designing

```
⚠ Caution
```

‣ **I/O signal or communication line shall be wired at least 100mm away from a high-voltage cable or power line.** If not, it may cause abnormal output or operation.

Safety Instructions when designing

```
⚠ Caution
```

‣ **Use PLC only in the environment specified in PLC manual or general standard of data sheet.** If not, electric shock, fire, abnormal operation of the product or flames may be caused.

‣ **Before installing the module, be sure PLC power is off.** If not, electric shock or damage on the product may be caused.

‣ **Be sure that each module of PLC is correctly secured.** If the product is installed loosely or incorrectly, abnormal operation, error or dropping may be caused.

‣ **Be sure that I/O or extension connecter is correctly secured.** If not, electric shock, fire or abnormal operation may be caused.

‣ **If lots of vibration is expected in the installation environment, don't let PLC directly vibrated.** Electric shock, fire or abnormal operation may be caused.

‣ **Don't let any metallic foreign materials inside the product**, which may cause electric shock, fire or abnormal operation.

Safety Instructions when wiring

⚠ Warning

‣ **Prior to wiring, be sure that power of PLC and external power is turned off.** If not, electric shock or damage on the product may be caused.

‣ **Before PLC system is powered on, be sure that all the covers of the terminal are securely closed.** If not, electric shock may be caused

⚠ Caution

‣ **Let the wiring installed correctly after checking the voltage rated of each product and the arrangement of terminals.** If not, fire, electric shock or abnormal operation may be caused.

‣ **Secure the screws of terminals tightly with specified torque when wiring.** If the screws of terminals get loose, short circuit, fire or abnormal operation may be caused.

‣ **Surely use the ground wire of Class 3 for FG terminals, which is exclusively used for PLC**. If the terminals not grounded correctly, abnormal operation may be caused.

‣ **Don't let any foreign materials such as wiring waste inside the module while wiring,** which may cause fire, damage on the product or abnormal operation.

Safety Instructions for test-operation or repair

⚠ Warning

▸ **Don't touch the terminal when powered**. Electric shock or abnormal operation may occur.

▸ **Prior to cleaning or tightening the terminal screws, let all the external power off including PLC power.** If not, electric shock or abnormal operation may occur.

▸ **Don't let the battery recharged, disassembled, heated, short or soldered**. Heat, explosion or ignition may cause injuries or fire.

⚠ Caution

▸ **Don't remove PCB from the module case nor remodel the module.** Fire, electric shock or abnormal operation may occur.

▸ **Prior to installing or disassembling the module, let all the external power off including PLC power.** If not, electric shock or abnormal operation may occur.

▸ **Keep any wireless installations or cell phone at least 30cm away from PLC**. If not, abnormal operation may be caused.

Safety Instructions for waste disposal

⚠ Caution

▸ **Product or battery waste shall be processed as industrial waste.** The waste may discharge toxic materials or explode itself.

Revision History

Version	Date	Remark	Revised Page
V 1.0	'05.03	First Edition	-
V 1.1	'06.05	Word revised and detailed description added	-
V 1.2	'08.06	PID monitor added	CH.11
V1.3	'09.09	1. XG5000 installation modified	1-4~1-6
		2. Option modified	2-24~2-36
		3. Making new project modified	3-3~3-4
		4. Sharing variable, automatic variable added	4-23~4-38
		5. Editing tools modified	5-2
		6. OR contact modified	5-4~5-5
		7. LD screen properties modified	5-29
		8. View variable/comment modified	5-33
		9. Program optimization modified	5-34
		10. I/O parameter modified	9-6
		11. Device auto-allocation parameter added	9-25~9-26
		12. I/O Skip modified	10-43~10-49
		13. Fault mask modified	10-50~10-51
		14. module changing wizard modified	10-52
		15. Print setting modified	14-8~14-9
		16. SFC editing added	CH16
		17. ST editing added	CH17
		18. Event input module added	CH18
		19. coil modified	5-10

LS ELECTRIC

Version	Date	Remark	Revised Page
V1.6	'10.03	1. User Function/Function Block added	CH19
		2. System requirements and installation procedure Modified	CH1
		3. Contents on basic parameter added	CH9.1
		4. PLC information/Password function modified	CH10.9.1, CH10.9.3
V1.7	'10.07	1. Contents on installation of XG5000 (C++ patch) added	CH1.3
		2. SOE U device added	CH18.8
V1.8	'14.02	1. Advice for Help open error	CH2.1.1
		2. Product Table classified by PLC Series added	CH3.2.1
		3. Custom events information modified	CH10.17.2
		4. SOE module's function added	CH18.4.1, CH18.6
V1.9	'14.08	1. Integrated Tool UI Updated	
V2.0	'15.02	1. Product Table classified by PLC Series updated	CH3.2.1
V2.1	'17.01	1. Installation of LS Studio and Basic Usage	CH20.1, CH20.2
		2. XG5000 variables / comments share	CH20.3
		3. Communication parameter setting	CH20.4
V2.2	'17.07	1. Add race monitor XBMS maximum value	CH11
V2.3	'18.02	1. Data memory function added	CH3.4.6
		2. Find and replace function improved	CH8
V2.4	'19.05	1. Program block password function added	CH3.7
V 2.5	'20.05	LSIS to change its corporate name to LS ELECTRIC	Entire
V 2.6	'23.06	1. Updated list of related user manuals - Added XGI-CPUZ contents	
		2. Domain modification (www.lselectric.co.kr -> www.ls-electric.com)	
		3. Addition of program read prohibition settings	CH10.3
		4. Added setting with link enable	CH10.3

Version	Date	Remark	Revised Page
V 2.7	'24.06	Warranty period change	-

Thank you for purchasing PLC of LS ELECTRIC Co., Ltd.

Before use, make sure to carefully read and understand the User's Manual about the functions, performances, installation and programming of the product you purchased in order for correct use and importantly, let the end user and maintenance administrator to be provided with the User's Manual.

The User's Manual describes the product. If necessary, you may refer to the following description and order accordingly. In addition, you may connect our website (http://www.ls-electric.com/) and download the information as a PDF file.

Relevant User's Manuals

Title	Description
XG5000 User's Manual (for XGK, XGB)	XG5000 software user manual describing online function such as programming, print, monitoring, debugging by using XGK, XGB CPU.
XG5000 User's Manual (for XGI, XGR)	XG5000 software user manual describing online function such as programming, print, monitoring, debugging by using XGI, XGR CPU.
XGK/XGB Instructions & Programming User's Manual	User's manual for programming to explain how to use instructions that are used PLC system with XGK, XGB CPU.
XGI/XGR/XEC Instructions & Programming User's Manual	User's manual for programming to explain how to use instructions that are used PLC system with XGI, XGR, XEC CPU.
XGK CPU User's Manual (XGK-CPUA/E/H/S/U)	XGK-CPUA/CPUE/CPUH/CPUS/CPUU user manual describing about XGK CPU module, power module, base, IO module, specification of extension cable and system configuration, EMC standard.
XGI CPU User's Manual (XGI-CPUU/CPUH/CPUS)	XGI-CPUU/CPUH/CPUS user manual describing about XGI CPU module, power module, base, IO module, specification of extension cable and system configuration, EMC standard.
XGI CPUZ User's Manual (XGI-CPUZ3/ CPUZ5/ CPUZ7)	XGI-CPUZ3/ CPUZ5/ CPUZ7 user manual describing about XGI CPU module, power module, base, IO module, specification of extension cable and system configuration, EMC standard.
XGR Redundant Series User's Manual	XGR- CPUH/F, CPUH/T user manual describing about XGR CPU module, power module, extension drive, base, IO module, specification of extension cable and system configuration, EMC standard.
XG-PM User's Manual	XG-PM software user manual describing online function such as motion programing, monitoring, debugging by using Motion Control Module.

About User's Manual

LS*ELECTRIC* 2

◎ Table of Contents ◎

Chapter 3 Variable/Comment ....

Chapter 4 Variable/Comment .... 4-1~4-38

Chapter 8 Find/Replace .... 8-0~8-36

Chapter 9 Parameters .... 9-1~9-26

Chapter 10 Online .... 10-1~10-74

Chapter 11 Monitoring

Chapter 12 Debugging.. **12-1~12-18**

Chapter 13 Online Editing..……13-1~13-3

Chapter 14 Print...14-1~14-9

16.2.2 Entering Step/Transition 16-2

16.2.3 Entering Action 16-3

16.2.4 Entering Block/Transition 16-4

16.2.5 Entering Label 16-5

16.2.6 Entering Jump 16-6

16.2.7 Entering Left Branch..16-7

16.2.8 Entering Right Branch 16-9

16.2.9 Step Register Information Edit 16-12

16.2.10 Transition Register Information Edit..16-13

16.2.11 Action Register Information Edit..16-14

16.2.12 Block Register Information Edit...16-17

16.2.13 Label Register Information Edit...16-18

16.2.14 Jump Register Information 16-19

16.2.15 Priority to Selective Branch Setting...16-20

16.2.16 Selective Branch Priority Rest..16-21

16.2.17 Delete Element...16-22

16.2.18 Copy/Cut/Paste 16-22

16.2.19 Edit Cancel and Redo 16-26

16.2.20 Program Edit Mode 16-27

16.3 View Program 16-28

16.3.1 Program Zoom In/Out Ratio Change 16-28

16.3.2 SFC Screen Attributes..16-28

16.3.3 View Block/Action/Transition List 16-33

16.3.4 Open Program...16-34

16.4 Additional Edit Functions 16-35

16.4.1 Book Mark 16-35

16.4.2 Go To...16-39

Chapter 17 ST Edit...**17-1~17-23**

Chapter 18 Exclusive Functions for Event Input Module................18-1~18-31

Chapter 19 User Function / Function Block....................................19-1~19-17

Chapter 20 LS Studio......................................20-1~20-18

Chapter 1 Introduction

1.1 Features of XG5000

XG5000 is a software tool designed to program and debug XGT PLC series with the following features and merits.

1) Multi-PLC, Multi-Program

Allows the user to edit, monitor or manage PLC system interlocked with several PLC included in a project at the same time.
And the program can be made as divided into Scan programs and various Task programs.

2) Various Drag and Drop

Makes editing easy and convenient with Drag and Drop function on most of editors such as Project, Variable/ Comment, LD Edit, Variable Monitor, etc.

3) Setting User's Shortcut Keys

Shortcut Keys provided as default can be changed or added as specified as familiar to user.

4) Various Message Windows

Provides various message windows to edit and inspect program easily.

5) Convenient Edit of Variable/Comment

- Edit with MS Excel is available.
- Various types of Edit is available through View Variable, View Device, View Flag, etc.
- Similar kind of Variables can be added easily with Auto-fill.
- Convenient Copy is available on the different Variable/Comment Windows with Drag and Drop.
- Direct Edit is available without displaying dialog box just like Excel.

6) Convenient Program Edit

- Unlimited Undo/Redo function provided.
- Block Edit available in cell unit.
- Screen-divided Edit available.
- Find/Replace function enhanced.
- Execution in rung unit can be prohibited with Block Mask function.
- Convenient access allowed to specific position with Bookmark function.
- Memory of selected device can be referred when editing LD.

7) Various Monitoring Functions

- Various monitoring functions are provided such as variable monitoring, device monitoring, system monitoring, trend monitoring, special module monitoring, etc.

8) Custom Events

- If user defined conditions are met for specific device, logging and reading data is available.

9) Module Changing Wizard

- Module can be safely and easily changed during Run without stopping PLC.

1.2 System Requirements necessary for XG5000

Item	Requirement
Personal computer and memory	Computer with PENTIUM /256MB memory or more
Communication port	RS-232 serial port or USB port
Hard disk	at least 500MB area
Mouse	connectable to PC
Monitor	1024 X 768 or more resolution
Window	Window XP/VISTA/7/8 supported

1.3 Installation of XG5000

[Steps]

    1. Execute the installation file.

    2. To run the XG5000 normally, special package need to be installed. If the installation screen appears, press [Install] button.

    3. Select [Yes] in the following window. Time to install the special package varies according to PC and may be 1~2 minutes or more. Once it is installed, though you install XG5000 again, installing the special package is not needed.
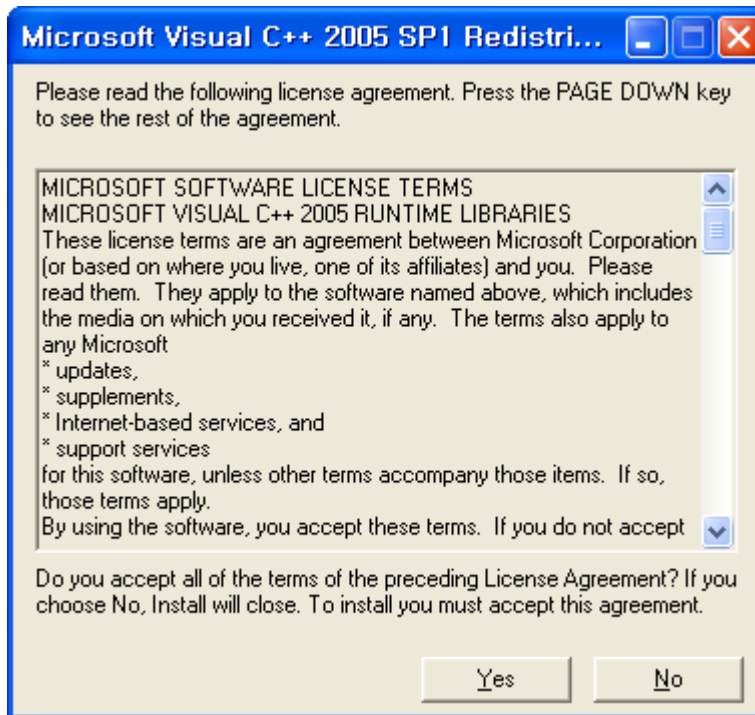
Note

Special package can't be executed normally

Phenomenon 1) Though you press "Installation" button , installation is not executed and same window appears

Phenomenon 2) When you press "Installation" button, the following window appears

Microsoft Visual C++ 2005 Redistributable

Command line option syntax error. Type Command /? for Help.

OK
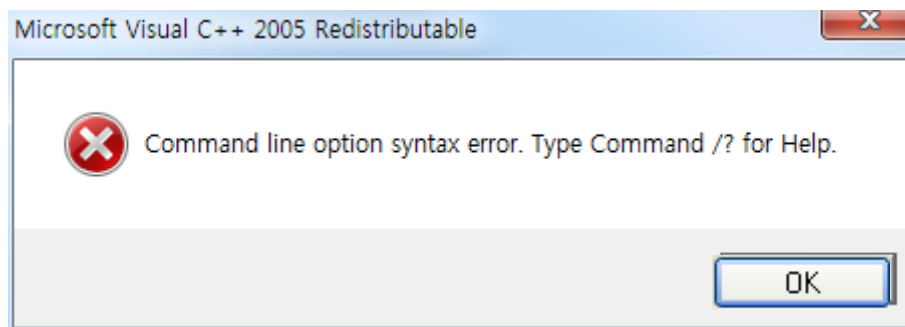
Estimated reason)

First, In order to install the special package, administrator right is needed. Si if you try with account that is not having administrator right, it may not be installed.

Second, if installation path has special character (Special character may include Korean character). If user account has Korean character, it may cause a trouble)

Solution)

When installing a XG5000, try with account that has administrator right. (Since special package is installed once, if you have never installed a XG5000 you need a administrator right)

And check whether a path for XG5000 installation is having special character and if there is Korean character in user account, try with Administrator account.

4.Installation Wizard will prepare for installation as below.
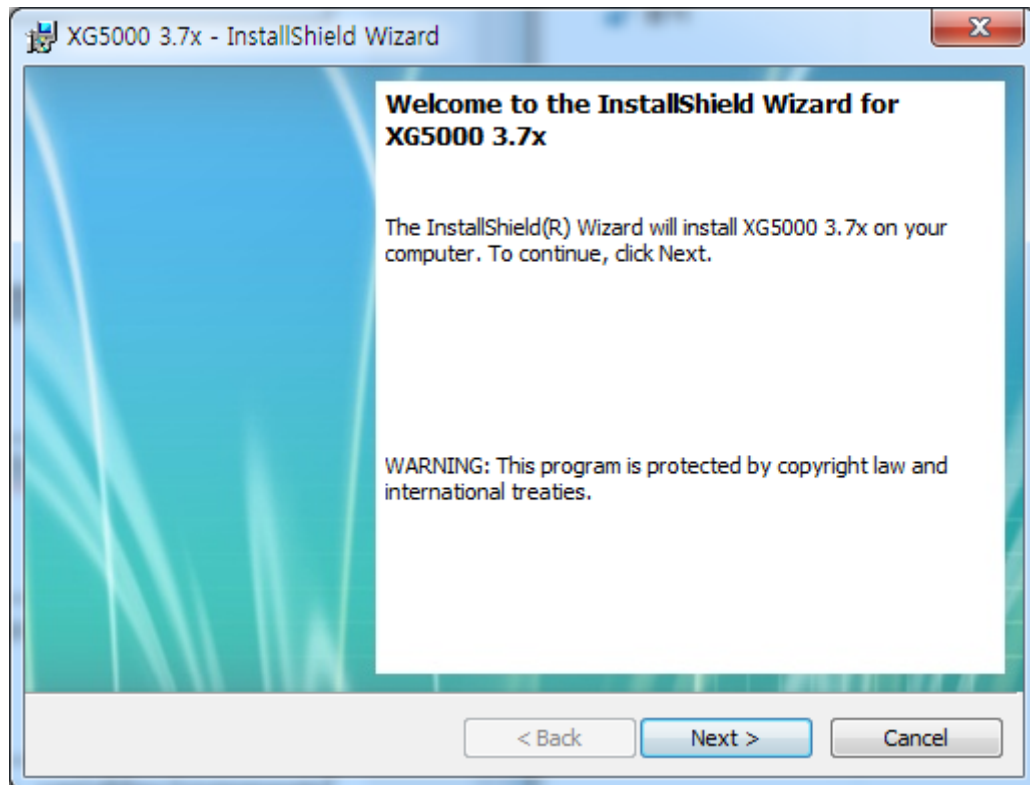
5.Enter your name and company name and then click [Next] button.
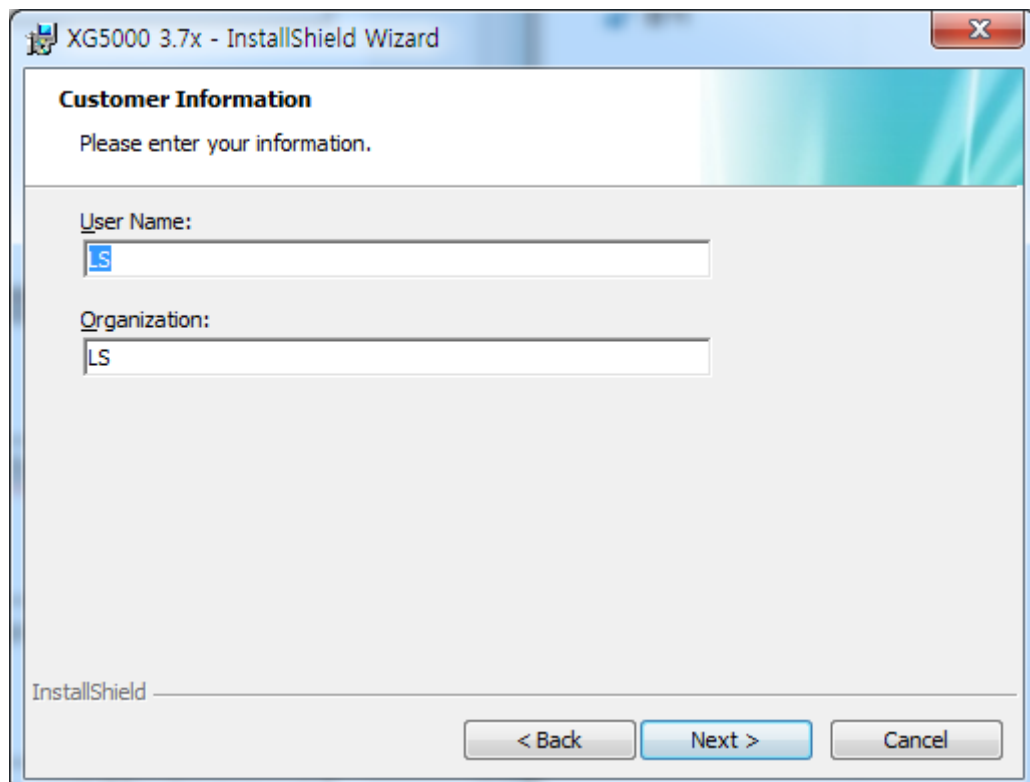
6. Select a folder to install XG5000 into. If you want to change the folder, click Browse… button and make or select a new folder. XG5000 needs about 30M Bytes of installation space in hard disk, which will ask you to select a disk with enough capacity. If the installation space is not enough, a warning message will be displayed to make the following progress unavailable.

7. After a folder is selected, click [Next] button.
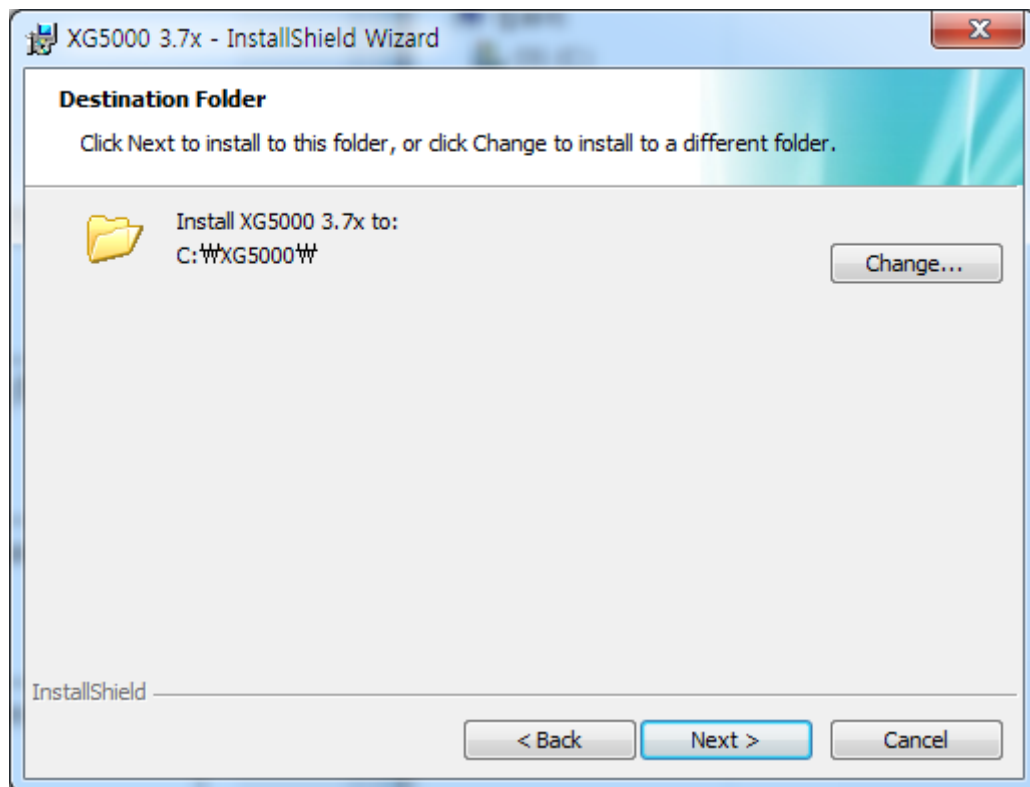
8. Check installation folder and click [Next] button.

9. Installation will be started as shown below.
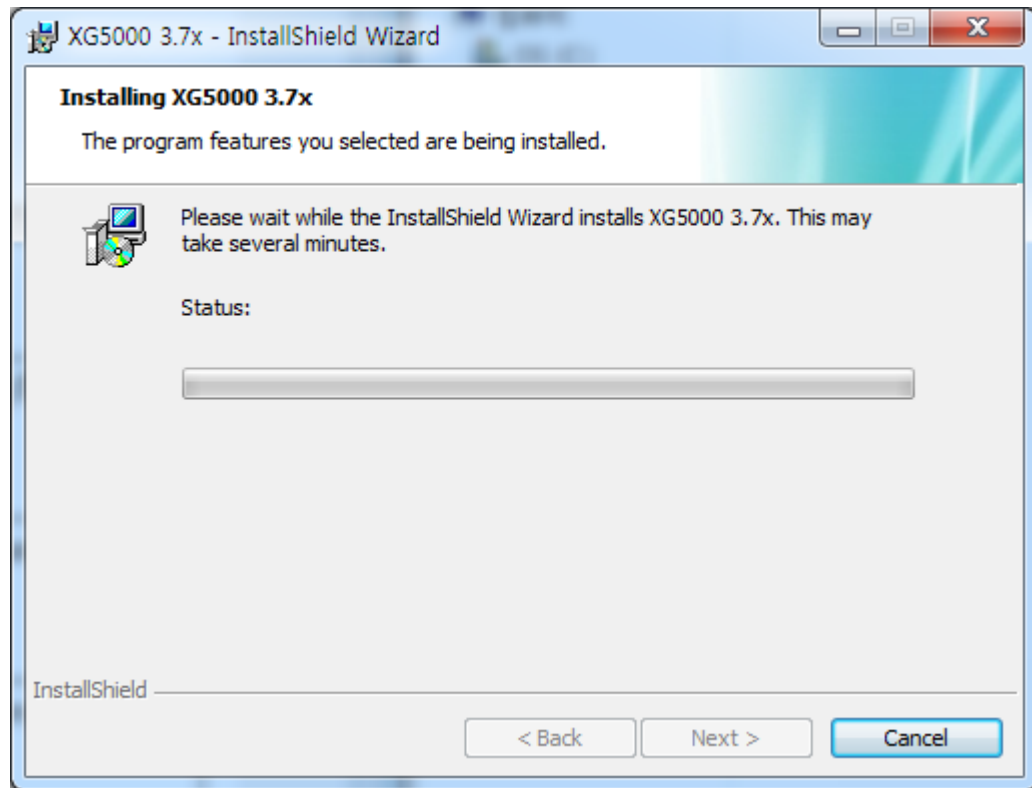
10. In case PC is being connected with PLC through USB, at the final stage of installation, USB device driver installation window appears. Press "Continue" to install the USB device driver.
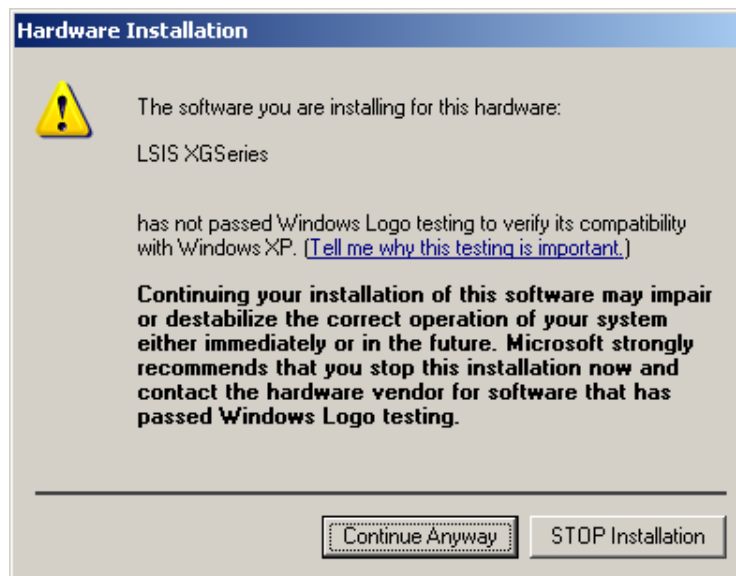
11. Wait a second for the installation to be complete.
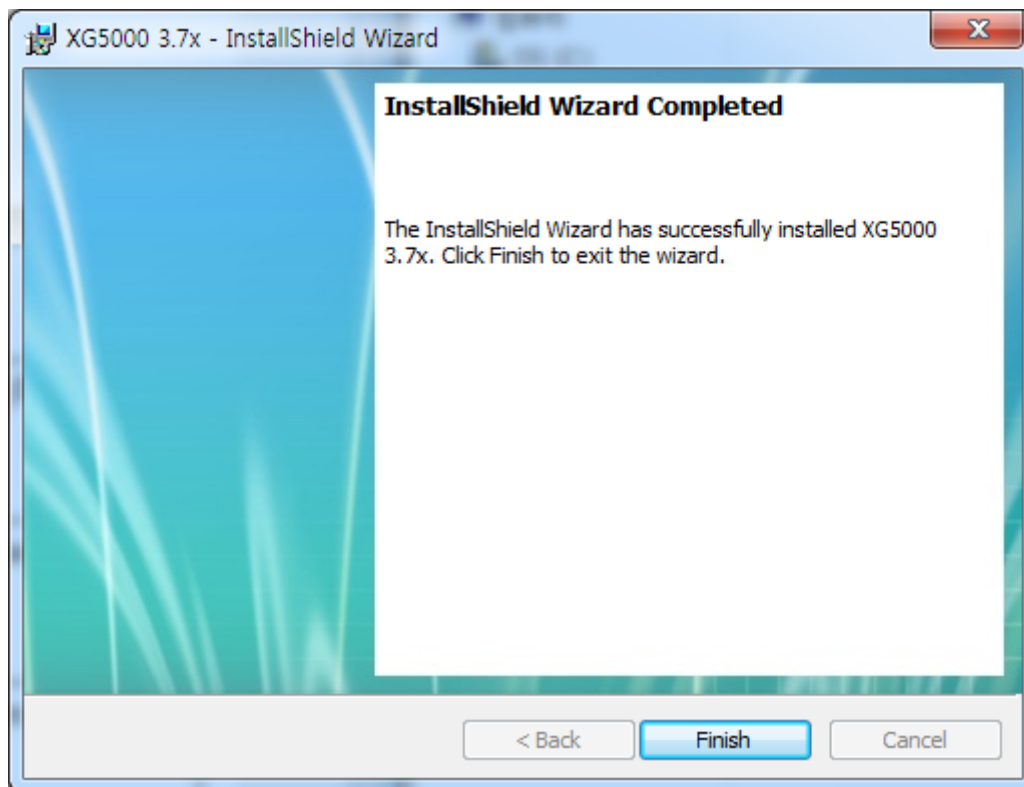
1.4 Installation of USB Device Driver

If XG5000 has been installed on Windows XP for the first time, USB device driver shall be additionally installed. Although USB connection is not available, USB device driver shall be also installed as described below.

Notes

In case of installing the XG5000 while PC is being connected with PLC through USB, USB device driver installation window appears automatically. (refer to CH1.3, 10)

[Steps]

1. Ensure that Drivers folder is created in the folder where XG5000 is installed, and there are 2 driver files of **GmUSBD.sys** and **GmUSBD.inf** in the Drivers folder. If there is no folder or driver file, reinstall XG5000.
2. Turn PLC Power on and connect USB connector with PC. If connection is established, Found New Hardware Wizard Dialog Box will be displayed to ask you to install the device driver.

3. Among the selection options in Found New Hardware Wizard Dialog Box, select "Installation from a list or specific location (Advanced)" and click [Next] to continue.

4. Among driver searching options, select "Search for the best driver in these locations" and check "Include this location in the search".
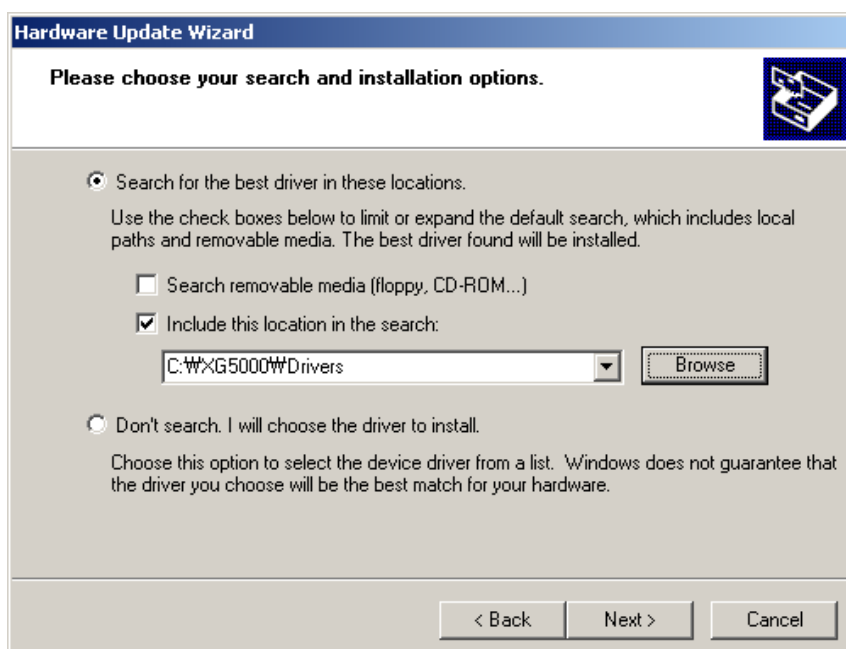
5. Click [Browse] button. On Browse Folder Dialog Box, select Drivers' folder where XG5000 is installed.

6. Click [OK] button. Now computer will search for the driver files in the selected folder.
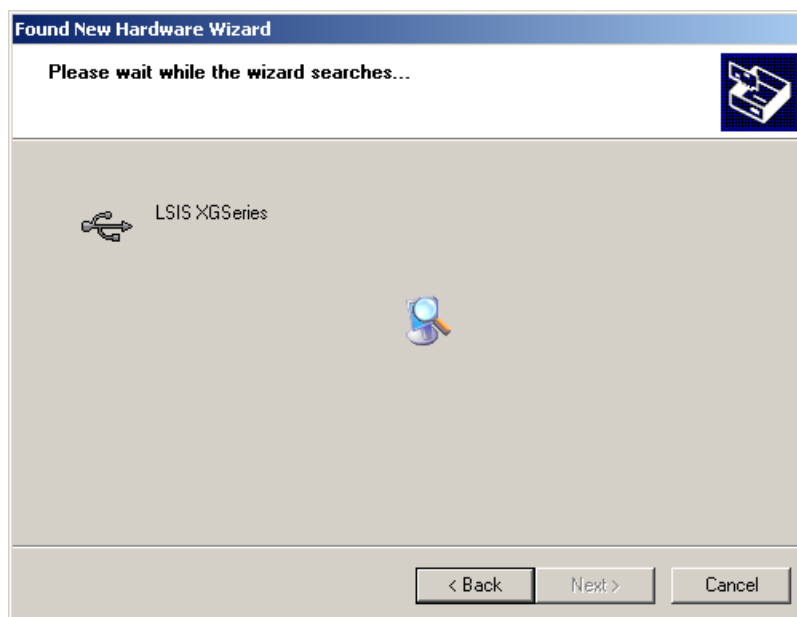
7. If the computer found the most suitable device driver, you will be asked to decide to install the selected device driver. Since USB device driver operated stably based on Windows OS, you may click [Continue Anyway] button.

8. If the device driver has been installed completely, the Installation Complete Dialog Box will be displayed as follows. Click [Finish] button to end the installation of the driver.
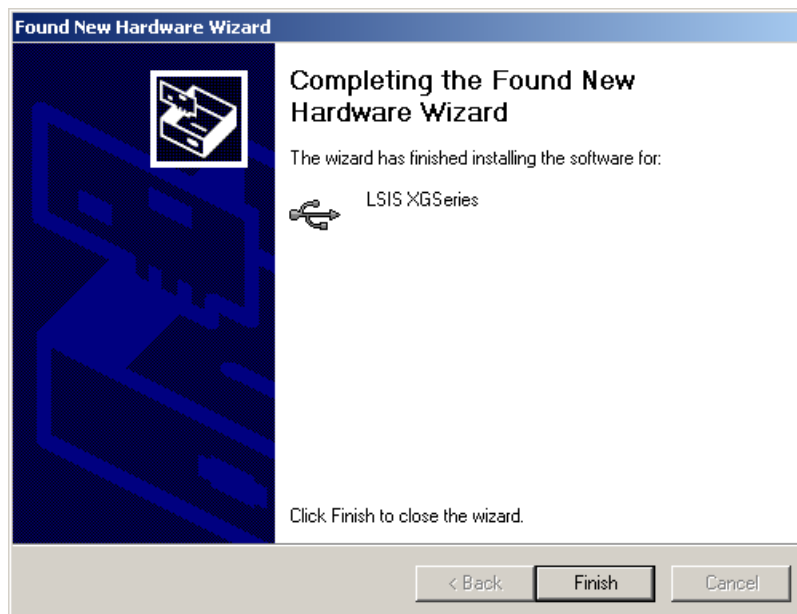
Notes

Generally, you can install the USB device driver through "Install the software automatically (Recommended)".

1.5 Confirmation of Installed USB Device Driver

If USB connection is not available, check the installation status of the device driver as follows.

[Steps]
 1. Click the right button of the mouse with the cursor on [My Computer] icon on the background screen, and select [Manage] on the menu.
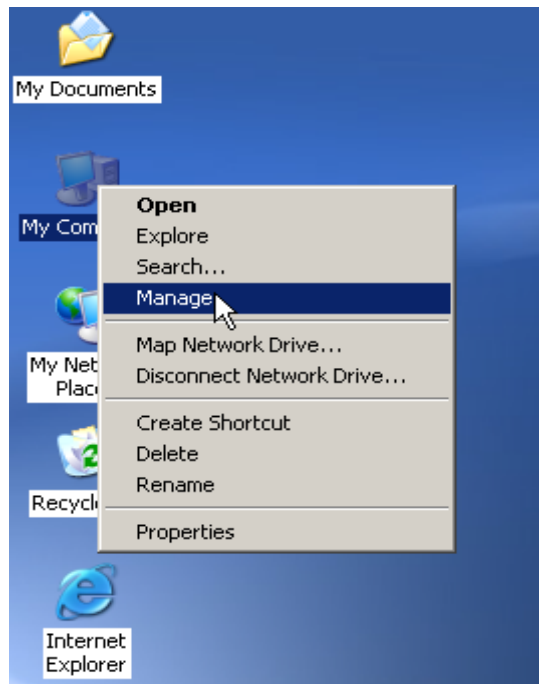
 2. Computer Management Dialog Box will be displayed as shown in the figure below. On the left tree list of Dialog Box, click [Computer Management (Local)]-[System Tools]-[Device Manager] in regular order. The items displayed on the list may be different according to devices installed on the computer.

1) Normal Case
   The USB device driver for XGT PLC has been installed successfully, if the list [LSIS XG Series] appears with the figure under [Universal Serial Bus Controller].
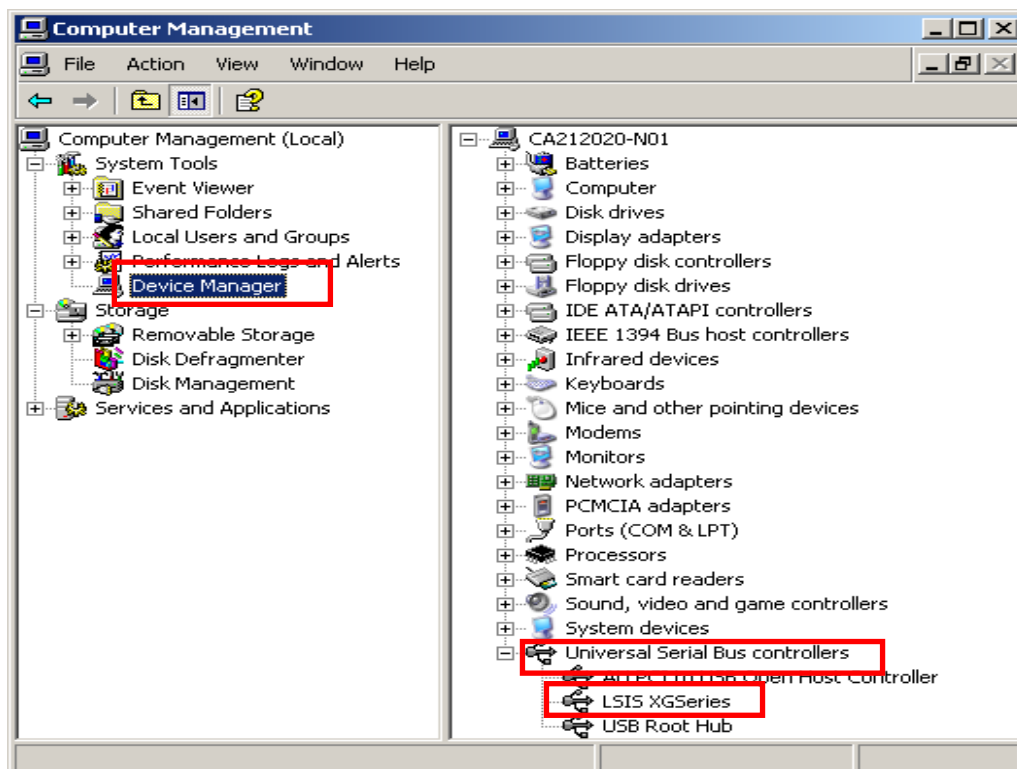
2) Abnormal Case

The device driver has not been installed successfully, if the following figure is displayed.
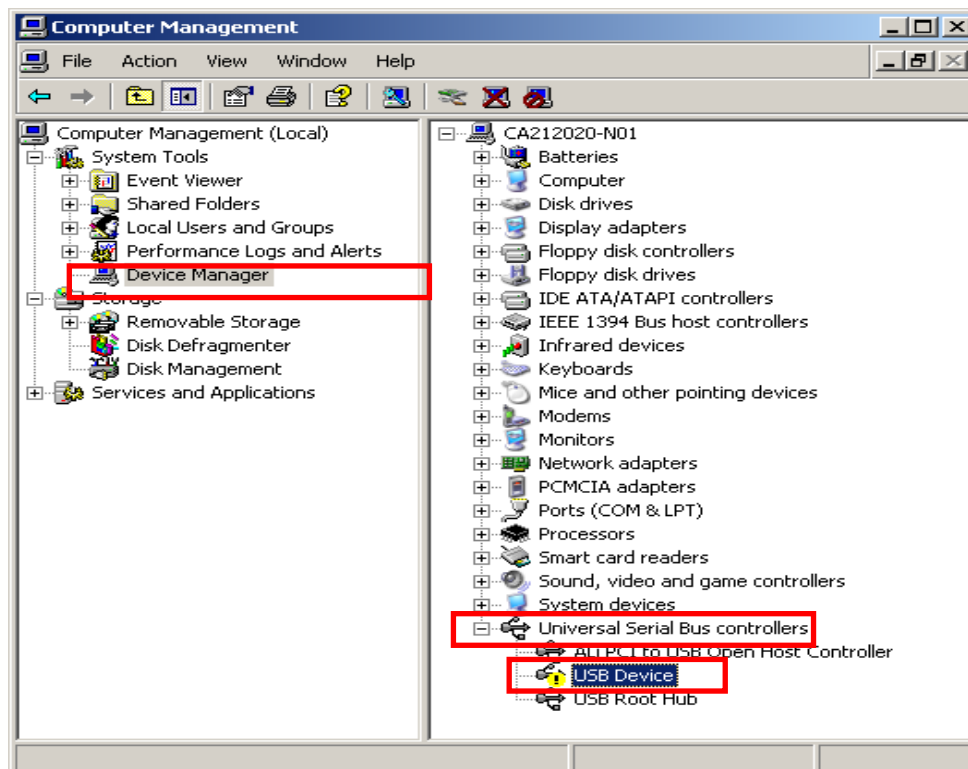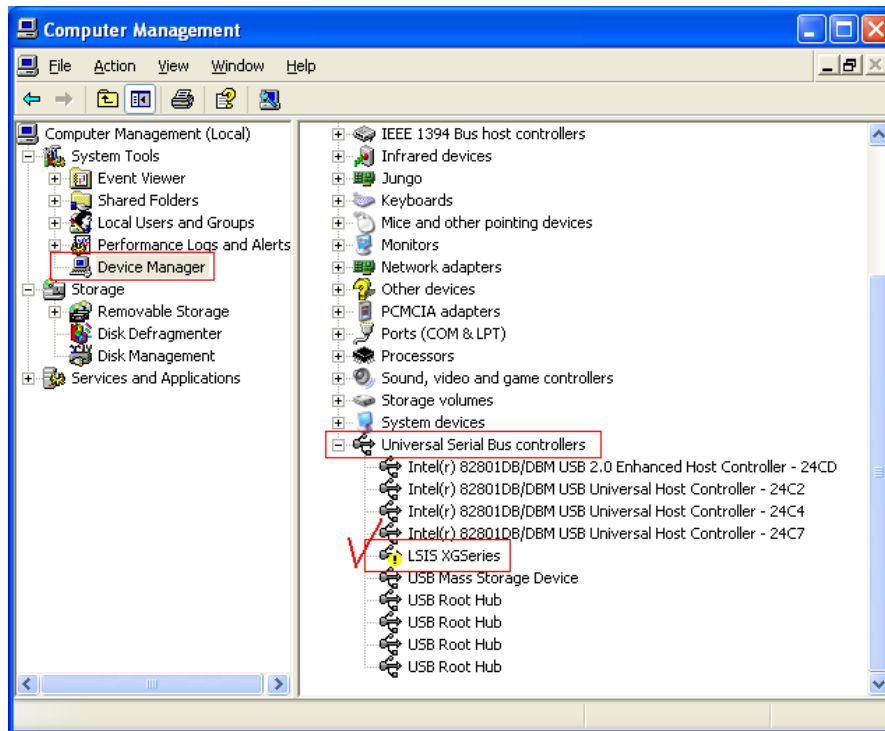
If the USB driver for XGT PLC is not installed successfully, reinstall the USB driver for XGT PLC in the following steps

[Steps]

1. On the device driver with the icon with an exclamation mark, click the right button of the mouse. Select [Update Driver] on the menu.
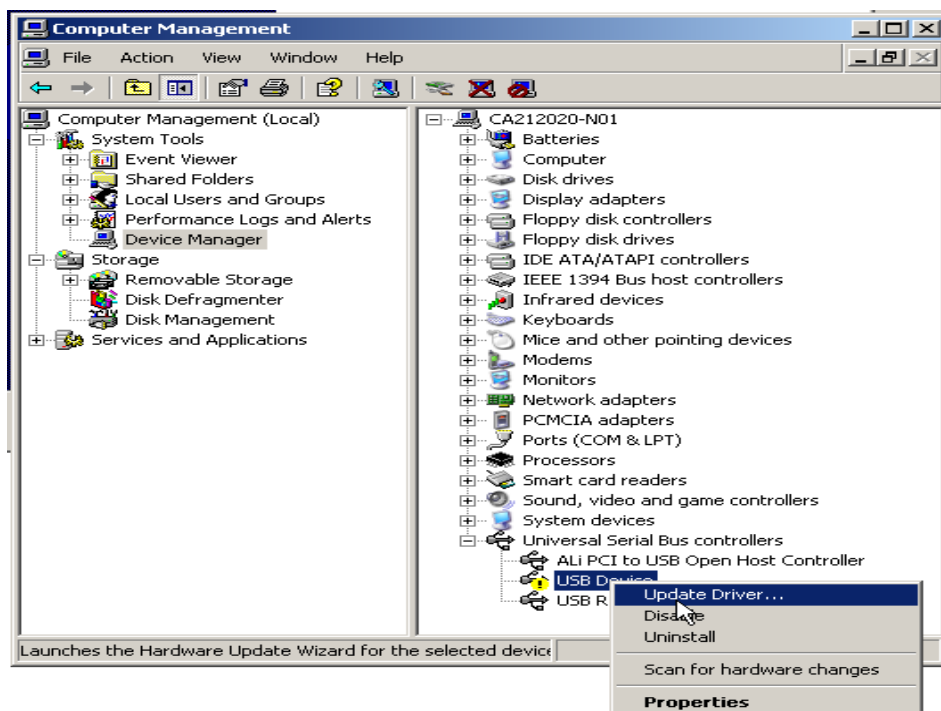
2. Found New Hardware Wizard Dialog Box will appear. Select the option "Installation from a list or specific location (Advanced)" and click [Next]. The next sequence is manually the same as in Installation of Device Driver.

If the USB driver for XGT PLC is not installed successfully, reinstall the USB driver for XGT PLC in the following steps.

[Steps]

1. If the device driver has been installed incorrectly or in error, execute H/W Update Wizard. Select the option "Installation from a list or specific location (Advanced)" and click [Next].

2. On search and installation options, select [Don't Search. I will choose the driver to install.] and click
   [Next].
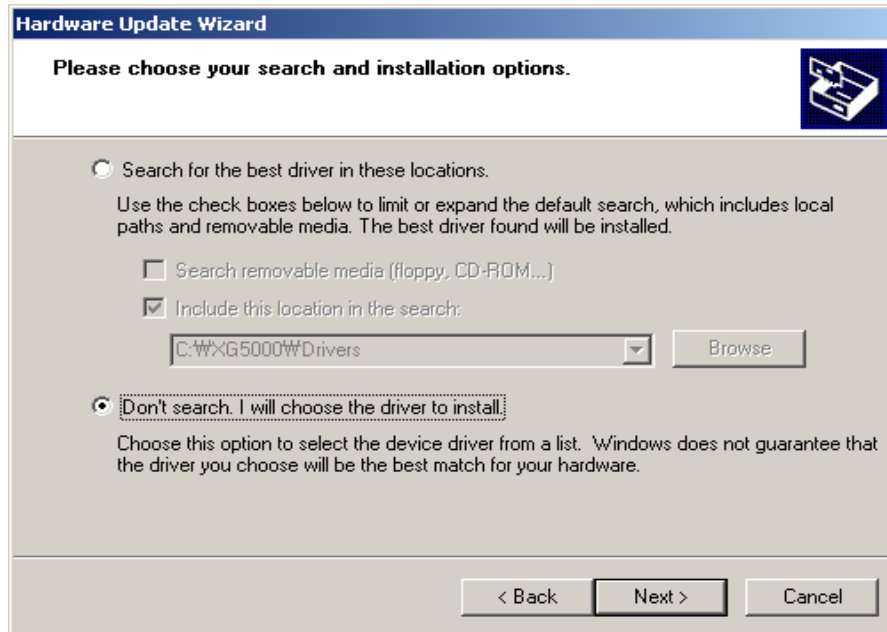
3. Click [Have Disk…] on the Dialog Box below.
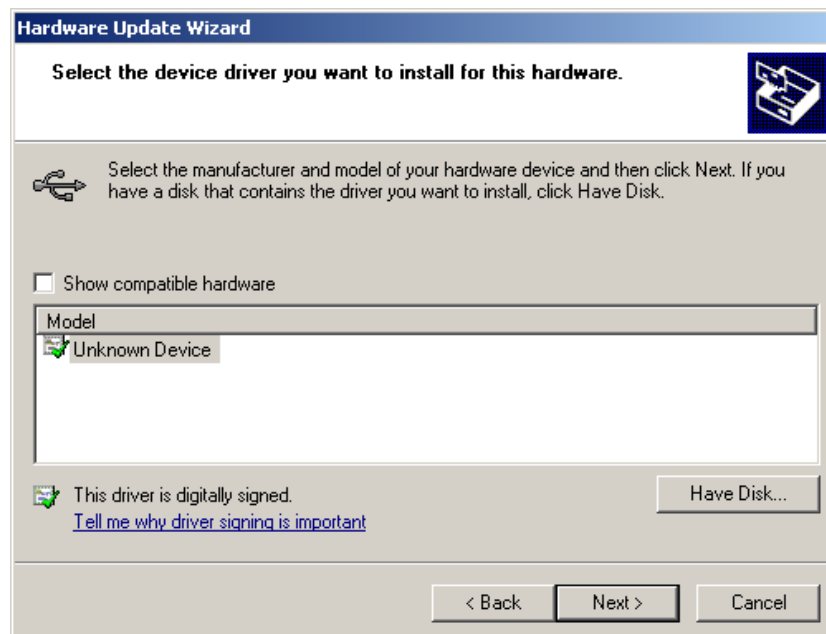
4. If Installation Dialog Box is displayed on the disk, click [Browse] button.
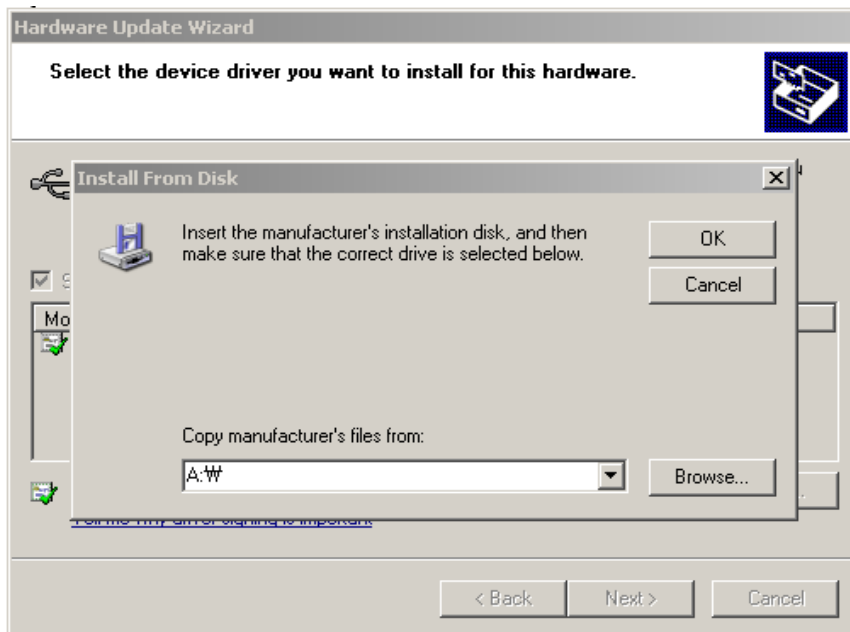
5. From the Browse File Dialog Box, move to the folder XG5000 is installed in. Select drivers folder to display **GmUSBD.inf** file. With this file selected, click [Open] button.
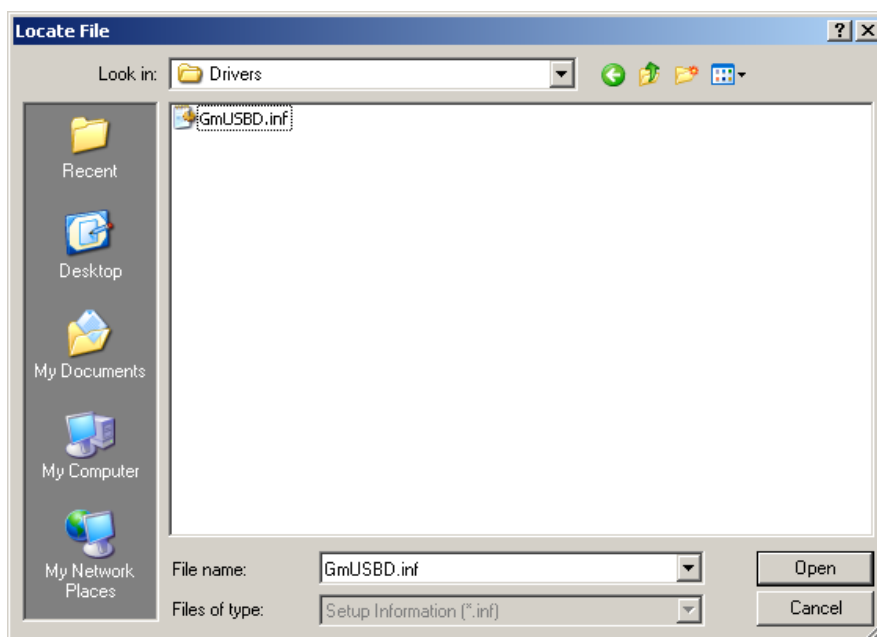
6. On the location item of manufacturer's file to copy, a directory with the file of the device driver will be displayed. Click [OK] button.
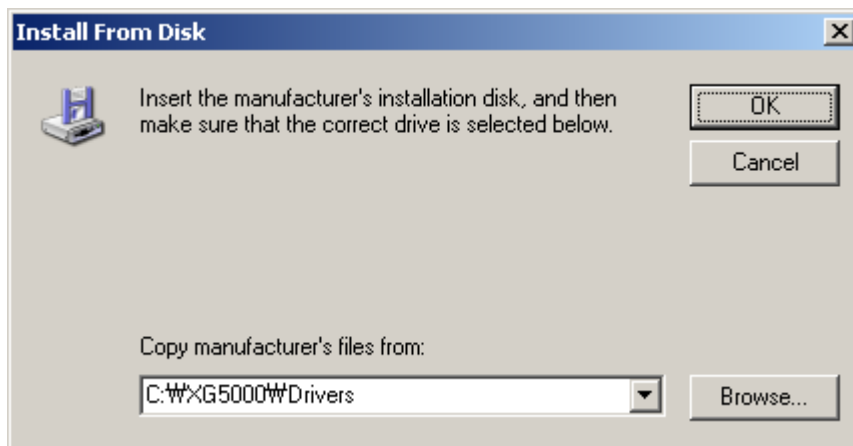
7. On the compatible H/W display list of the device driver Select Dialog Box, select "LSIS XGSeries" driver and then click [Next] button.
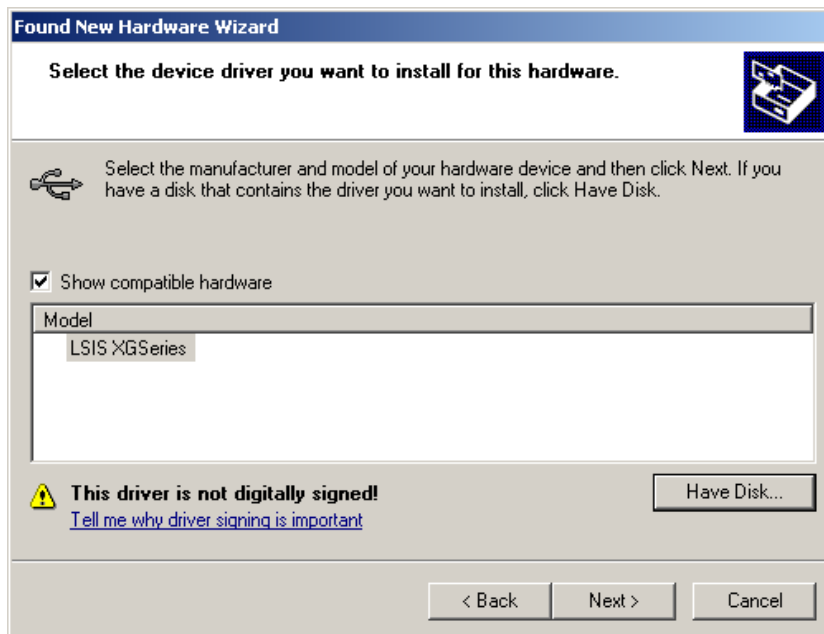
8. Hardware Installation Dialog Box will appear. Click [Continue Anyway] to go on with the installation.
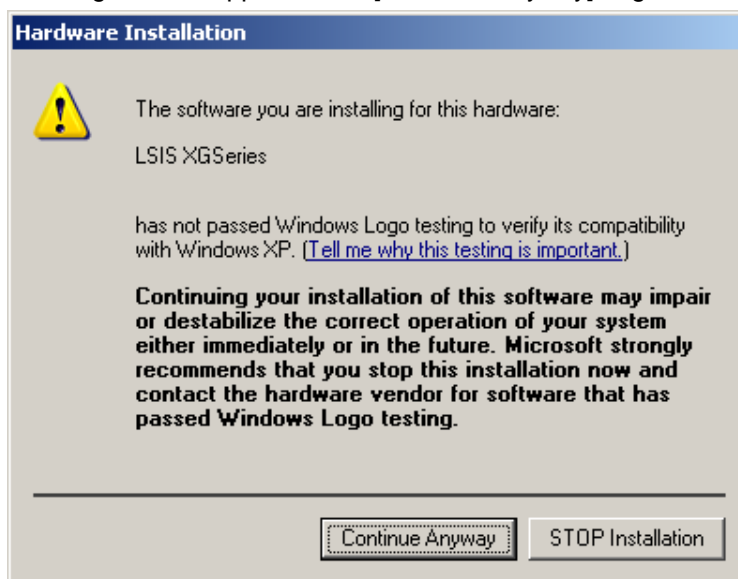
9. Found New Hardware Wizard Complete Dialog Box will appear. Click [Finish] button to end the installation
   of the driver.

Chapter 2 Basic Application

2.1 Screen Configuration

XG5000 screen is composed as shown below.

[Screen of XG5000]
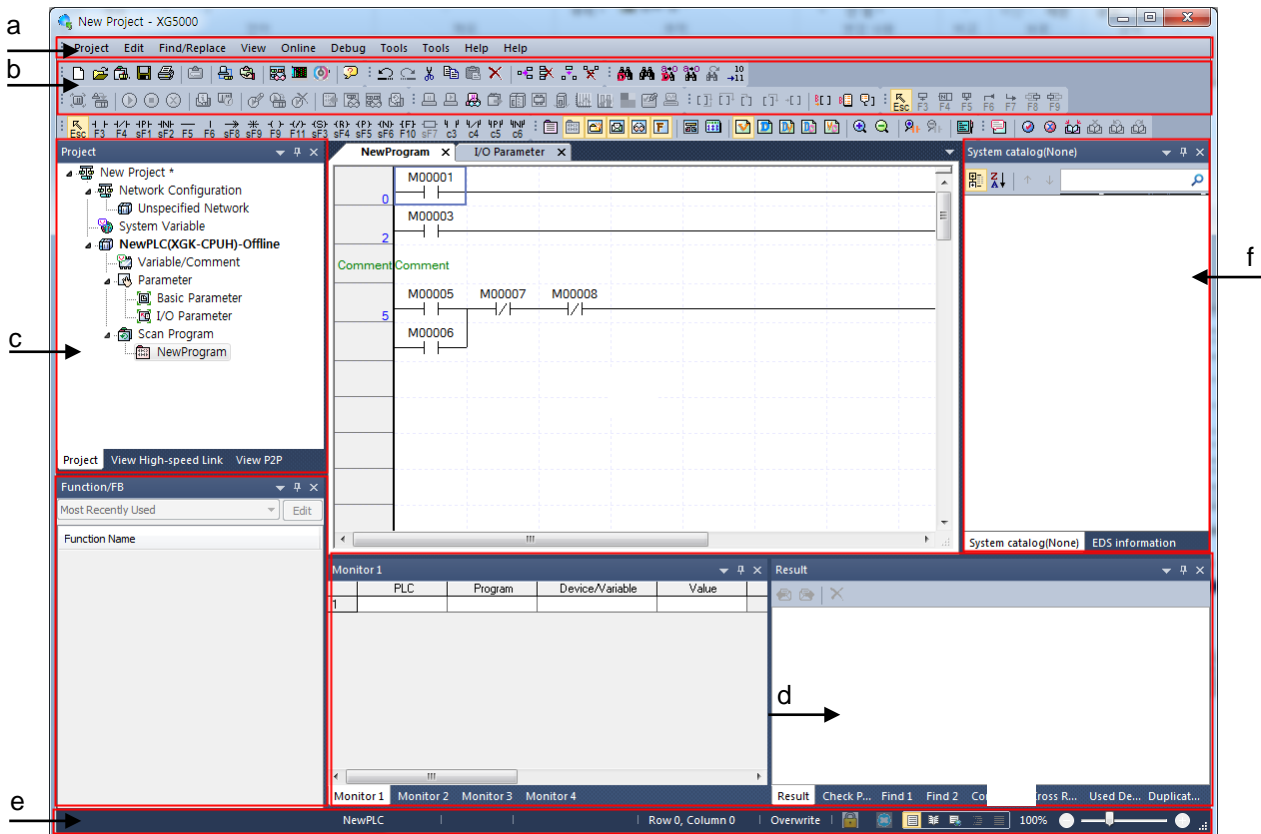
[Description of screen component]

a. Menu bar: It is the basic menu bar for the XG5000 software.

b. Tool bar: used to execute the instruction which contained in the menu conveniently.

c. Project window: used to display the configuration items of the presently opened project.

d. Message window: used to display various messages generated while XG5000 is running.

e. Status bar: used to display the status of XG5000, the information of connected PLC, etc.

f. System catalog window: used to display system catalog and EDS information

2.1.1 Menu Configuration

If the menu is selected, application instructions will be appeared and an instruction will be executed when an instruction is selected by clicking mouse button or pressing shortcut key. If the shortcut key for the menu (Ctrl + X, Ctrl + C) is available, press the shortcut key directly to select the instruction.

1) Project

Instruction		Description
New Project		Creates a new project.
Open Project		Opens the existing project.
Open from PLC		Uploads the project and program stored in PLC.
Open KGLWIN File		Opens the project file for KGLWIN.
Open GMWIN File		Opens the project file for GMWIN.
Save Project		Saves the project.
Save As		Saves the project as a different name.
Close Project		Closes the project.
Save as Binary		Saved as the binary file that cannot show the details of the project.
Write Binary to PLC		Writes the binary file with the PLC. You cannot see the details of the project.
Open from Memory		Opens the project from the memory module.
Write to Memory		Writes the project in the memory module.
Add Item	PLC	Adds a new PLC to the project.
	Task	Adds a new task program to the project.
	Program	Adds a new scan program to the project.
	Function	Adds new user functions to the PLC.
	Function block	Adds new user function blocks to the PLC.
	Data type	Adds new user data types to the PLC.
	Network	Adds new networks to the project.
	Communication module	Adds new communication modules to the network.
	P2P Communication	Adds new P2P items to the communication module.
	High-speed link communication	Adds new high-speed link items to the communication module.
	User frame	Adds new user frames to the P2P items.
	Add groups	Adds new groups to the P2P items.
Import	PLC	Reads the PLC program from the file.

Item from File	Variable/Comment	Imports the variable/comment from the separated comment file.
	Program	Imports the program from a separated program file.
	I/O parameter	Imports the I/O parameter from a separated I/O parameter file.
	Basic parameter	Imports the basic parameter from a separated basic parameter file.
Export to File		Saves the selected items included opened project as separated file.
Save Variable Names to File		Saves variable names to file for using other programs.
Save EtherNet/IP Tags to File		Registers EtherNet/IP tag and saves the established EtherNet/IP tag list to the file.
Compare Projects		Compares two projects stored in PC and displays its result.
Print		Prints the active window's details.
Preview		Previously displays the screen to be printed.
Print Project		Selects the project item to print
Print Setup		Sets the printer options.
Exit		Ends XG5000.

2) Edit

Instruction	Description
Undo	Cancels the edit on Program Edit Window to recovers its previous status.
Redo	Recovers the edit cancelled above.
Cut	Copies the selects block to clipboard and deletes the block.
Copy	Copies the selects block to the clipboard.
Paste	Copies from the clipboard onto Edit Window.
Delete	Deletes the selected block or items.
Select All	Displays all the details of presently active window in block.
Insert Line	Adds a new line to the cursor position.
Delete Line	Deletes the line from the cursor position
Insert Cell	Adds a cell available to the cursor position.
Delete Cell	Deletes a cell from the cursor position
Register Module Variable Comments	Adds the variables related to the modules set for I/O parameters to variables/comments automatically.
Network variable automatic registration	Adds the variables allocated to XG-CANOpen to variables/comments automatically.
Optimize Program	Optimizes the program automatically.
Comment/Label Input	Inputs a comment or label in the cursor position.
Set Block Mask	Sets cursor-positioned rung or specified block area Block Mask in rung unit.
Remove Block Mask	Cancels cursor-positioned rung or specified block area set Block Mask.
Bookmark Set/Remove	Sets or cancels a bookmark.

Instruction		Description
	Remove All	Cancels all the bookmarks specified.
	Previous Bookmark	Moves to the previous bookmark.
	Next Bookmark	Moves to the next bookmark.
Edit Tools		Edit Tools for each program are available.

3) Variable edit

Instruction	Description
Add EXTERNAL variable	Registers the variables declared as global variables to the local variables.
Move item up	Moves up the position of the selected item in a line.
Move item down	Moves down the position of the selected item in a line.
Delete all unused variables/comments	Deletes all unused global variables, direct variable comments, local variables from the program.
Reallocate All Auto-allocation variables	Changes the addresses of all automatically-allocated global/local variables.

4) Find/Replace

Instruction		Description
Find Device		Finds the desired device based on the type.
Find String		Finds the desired String.
Replace Device		Finds the desired device to replace with a new device.
Replace String		Finds the desired String to replace with a new String.
Find Again		Repeats Find or Replace previously executed.
Go To	Step	Moves the cursor to the position of a desired step.
	Rung Comment	Moves the cursor to the position of a desired rung comment.
	Label	Moves the cursor to the position of a desired label.
	End Instruction	Moves the cursor to the position of END Instruction.
Previous Message		Moves from the message window to the place the previous message indicates.
Next Message		Moves from the message window to the place the next message indicates.

5) View

Instruction	Description
IL	Converts to IL View during LD Edit.
LD	Converts to LD View during IL Edit.
Project Window	Shows or hides the project window.
P2P window	Shows or hides the P2P view window.
high-speed link window	Shows or hides the high-speed link view window.
Message Window	Shows or hides the message window.
Variable Monitoring Window	Shows or hides the variable monitor window.
EDS information window	Shows or hides the EDS information window.
Catalog window	Shows or hides the catalog window.
Cross Reference	Displays the used-memory information on the message window's memory reference tap.
Used Device	Displays the used-device information on the message window's used-device tap.
Check Program	Inspects the program and displays its result on the message window's program inspect tap.
Variables	Displays the variable name in the program.
Devices	Displays the device name in the program.
Devices/Variables View	Displays the device and the variable in the program.
Devices/Comments View	Displays the device and the comment in the program.
Zoom-In	Displays the screen magnified.
Zoom-Out	Displays the screen reduced.
Resize Width	Automatically adjusts the cell width applicably to the string width in the Variable/Comment window.
Resize Height	Automatically adjusts the cell height applicably to the string height in the LD or Variable/Comment window.
Full Screen	Enlarge the program window or Variable/Comment window applicably to the whole screen.
Properties	Displays the registered information of the selected item on the project window.
LD Properties	Shows the properties of the LD screen.
Increase Columns	Increases the number of contact points
Decrease Columns	Decreases the number of contact points

6) Online

Instruction	Description

Instruction		Description
Connect/Disconnect		Connects or disconnects with PLC.
Connect Settings		Specifies the connection method.
Change Mode	Run	Changes PLC mode.
	Stop	
	Debug	
Read		Reads parameter/program/comment from PLC.
Write		Writes parameter/program/comment on PLC.
Compare with PLC		Compares the project to the project saved in PLC
Set Flash Memory		Shows the window for setting up the flash memory.
Communication Module Setting	Enable Link	Sets up Link-Enable of the high-speed link and P2P.
	Upload/download(File)	Downloads or uploads the OS or BBM file of modules.
	EIP tag Download	Downloads the EIP tag list to the EIP module.
	EIP tag Upload	Uploads the EIP tag list to the EIP module.
	Config. Upload(Dnet,Pnet)	Uploads the configuration information of Dnet and Pnet.
	system diagnosis	Displays the system diagnosis window.
Reset/Clear	Reset PLC	Resets the PLC.
	Reset individual module	Resets the communication module individually.
	Clear PLC	Deletes the parameters/programs/comments from the PLC.
	Clear all PLC	Deletes all programs, passwords, data from the PLC.
	SD memory	Formats the SD memory card.
	Delete parameter	Deletes parameters of the communication module.
Diagnosis	PLC information	Shows up the PLC information window.
	PLC history	Shows up the PLC history window.
	PLC errors/warnings	Shows up the PLC error history/warning window.
	I/O Information	Shows up the I/O information window.
	Save PLC history	Saves the PLC's history.
Force I/O		Displays the window for compulsory I/O setting.
I/O Skip		Displays the window for I/O skip setting.
Fault Mask		Displays the window for fault mask setting.
Module Changing Wizard		Displays the dialog window to change modules.
Start Online Editing		Starts modification during run.
Write Modified Program		Writes the program and information modified during run on PLC
End Online Editing		Ends modification during run.

7) Monitor

Instruction	Description
Start/Stop Monitoring	Starts or stops the monitor.
Pause	Temporarily stops the monitor.
Resume	Restarts the monitor temporarily stopped.
Pausing Conditions	Specifies conditions for the monitor temporary stop.
Change Current Value	Specifies the device value being monitored.
System Monitoring	Execute the system monitor.
Device Monitoring	Execute the device monitor.
Special Module Monitoring	Execute the special module monitor.
Trend Monitoring	Execute the trend monitor.
PID monitoring	Executes PID monitor.
SOE monitoring	Executes SOE monitor.
Custom Events	Specifies the custom events.
Data Traces	Specifies the device to monitor the change of the data.

8) Debug

Instruction	Description
Start/Stop Debugging	Converts to Debug mode to Start/Stop Debugging.
Go	Runs to the break point.
Step Over	Runs step by step.
Step Into	Debugs the subroutine.
Step Out	Escapes from the subroutine.
Temporary Stop	Stops Run.
Go to Cursor	Runs to the cursor position.
Set/Remove Breakpoints	Sets or cancels the break point.
Breakpoints List	Displays the list of the break points specified.
Breakpoint Conditions	Specifies the break conditions

9) Tools

Instruction	Description
Network Manager	Shows the PLC network and specifies the parameter.
Temperature control	Executes the XG-TCON tool.
Position control	Executes the XG-PM tool.
Address calculator	Executes the address calculator.
Start simulator	Starts the simulator.
ASCII code table	Displays the ASCII code table.

User definition		Users define tools, commands.
Option		Can change the XG5000's environment for a user.
EDS	Register EDS file	Registers the EDS file used for the EtherNet/IP module.
	Delete EDS file	Deletes the EDS file used for the EtherNet/IP module.
	View EDS file	Displays the EDS file used for the EtherNet/IP module.

10) Window

Instruction	Description
New Window	Opens a new window on the active window.
Split	Divides the active window.
New horizontal tab group	Arrays the several windows belonging to XG5000 with the horizontal tab
New vertical tab group	Arrays the several windows belonging to XG5000 with the vertical tab.
Move to next tab group	Moves to the next tab group.
Move to previous tab group	Moves to the previous tab group.
Close All	Closes all windows belonging to XG5000.
Reset window layout	Resets the default layout of the project.

11) Help

Instruction	Description
XG5000 Help	Opens Help for XG5000 application.
XGK/XGB Instruction Help	Opens Help for XGK/XGB PLC instructions.
XGI Instruction Help	Opens Help for XGI instructions.
LS ELECTRIS Web Site	Connects to LS ELECTRIC Home Page via the Internet.
About XG5000	Displays XG5000 information.

Notes
- If you have a problem for opening Help, change the value of resister like below.
Acrobat Reader xx.0 --> acroviewRxx   ex) Acrobat Reader 10.0 --> acroviewR10
Acrobat xx.0 --> acroviewAxx   ex) Acrobat 10.0 --> acroviewA10
Path : HKEY_CLASSES_ROOT\acrobat\shell\open\ddeexec\application

2.1.2 Tool Box

XG5000 provides the shortcut icons for frequently used menus. Click a tool desired to execute.

[Tool Box]
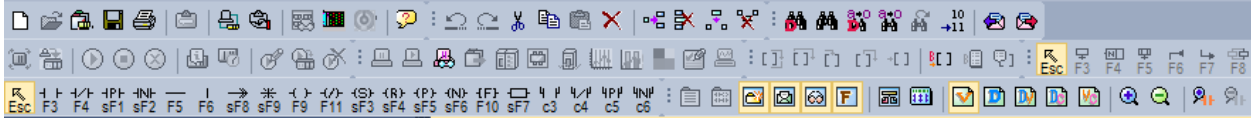
1) New Tool Box

It is used to create a new tool box containing frequently used tools.

[Dialog Box]
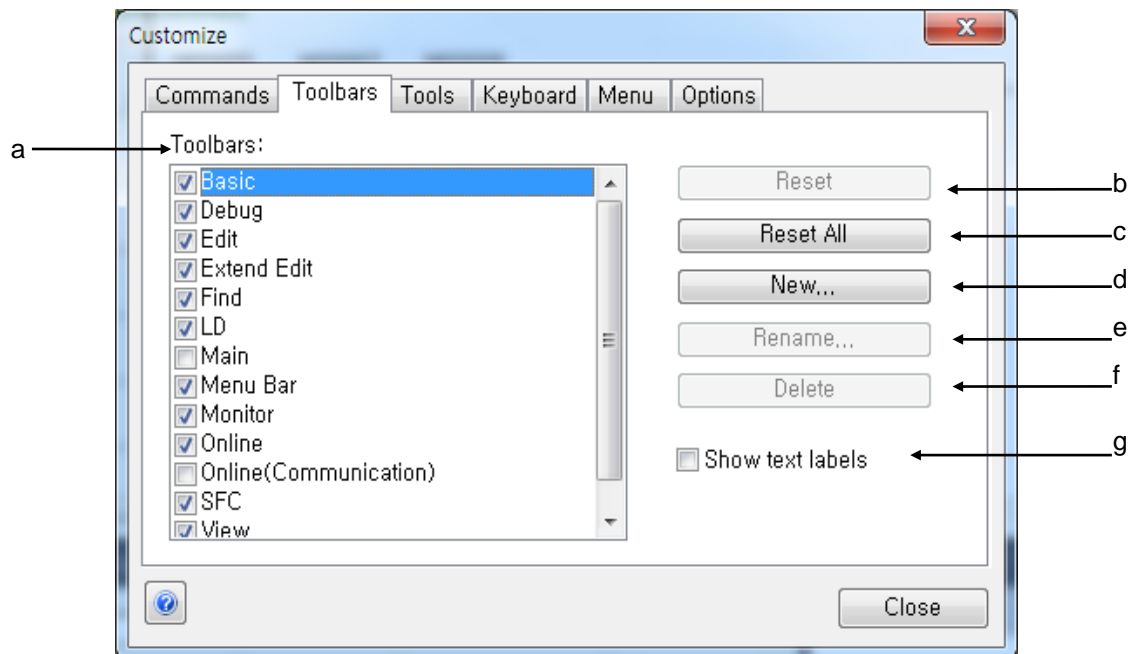
Items	Descriptions
Toolbars (a)	Can make the toolbar appear or disappear by ticking the checkbox in front of each toolbar name.
Reset(b)	Initializes the selected toolbar.
Reset All(c)	Initializes all toolbars.
New(d)	Creates a new toolbar.
Rename (e)	Changes the name of the toolbar made by a user.
Delete(f)	Deletes the toolbar made by a user.
Show text labels (g)	Displays the name of the toolbar.

[Steps]

1. Select the menu [Tool]-[User Definition]

2. Click [New] button.

3. If the dialog box for entering toolbar name shows up, enter the toolbar name.
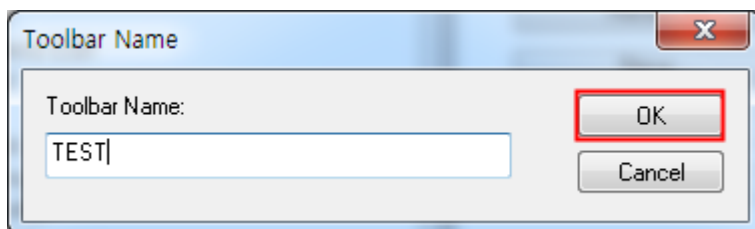
4. Press 'OK' button. At this time, the empty toolbox is created and the new toolbar 'TEST' will be added to the toolbar list.
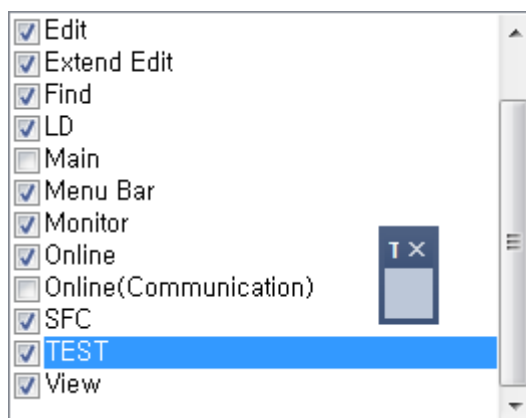
2) Tool Box Fill

It is the command tab of the customized dialog box. It can compose new commands to create new toolbars.

 [Dialog Box]
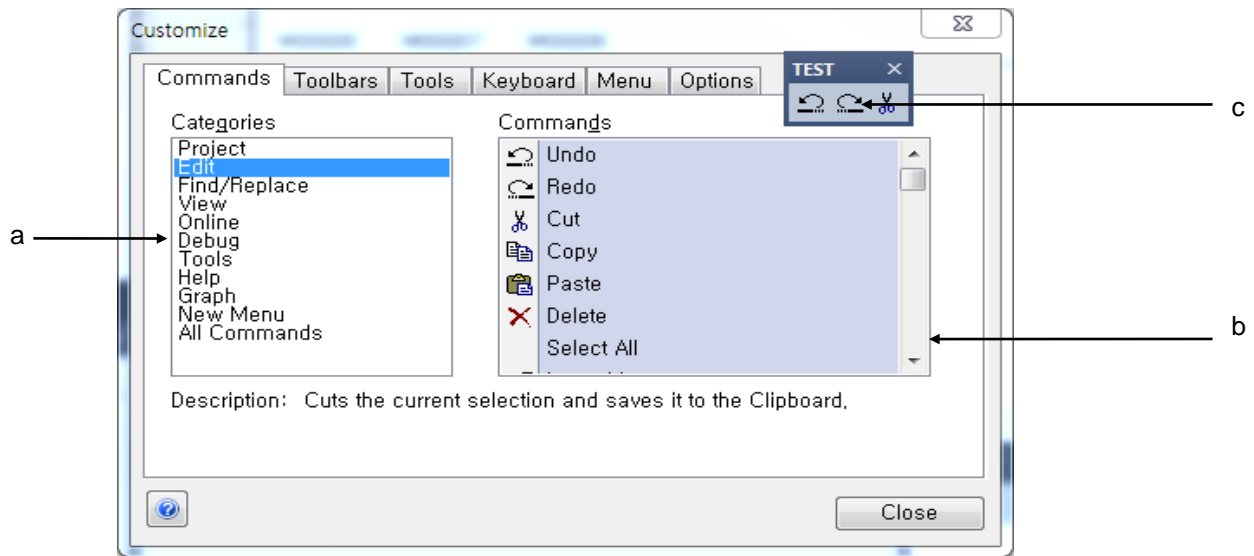
Items	Descriptions
Categories(a)	Provides the menu list.
Command(b)	Provides the command list belonging to one menu.
User Toolbar(c)	If you the desired command on a user toolbar, the toll will be added.

The following procedure is to explain how to fill the toolbar created from 1) with commands

[Steps]

1. Select the command tab of [Tool]-[Customize].

2. Drag the desired command and put it on the above toolbar.

3. Repeat (b) until the desired commands are all added.

4. After adding commands are completed, press 'Close' button

2.2 Shortcut Setting

[Dialog Box]

a
b
d
e
f
c
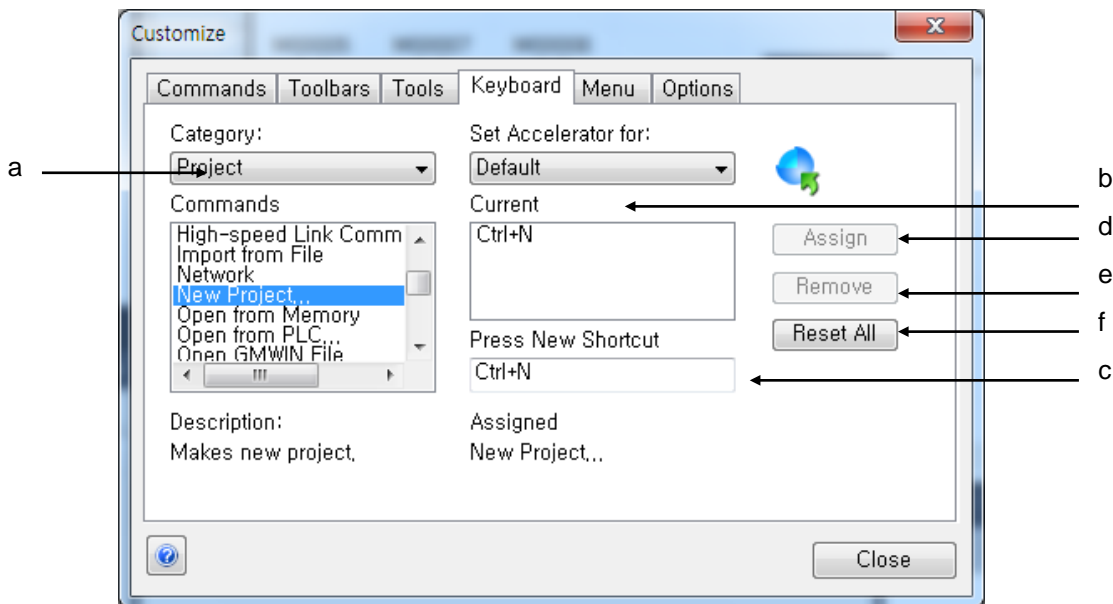
Items	Descriptions
Category(a)	Selects the menu to set up shortcut key in the category list.
Current(b)	Displays the currently allocated key.
Press New Shortcut(c)	Inputs new shortcut keys.
Assign(d)	Allocates newly shortcut keys entered for the selected menu.
Remove(e)	Deletes the current shortcut key.
Reset all(f)	Deletes all user shortcut keys and set all shortcut keys as default.

[Steps]

1. Select the menu keyboard tab of [Tool]-[user definition].

2. Select the category to set up shortcut key from the menu selection list.
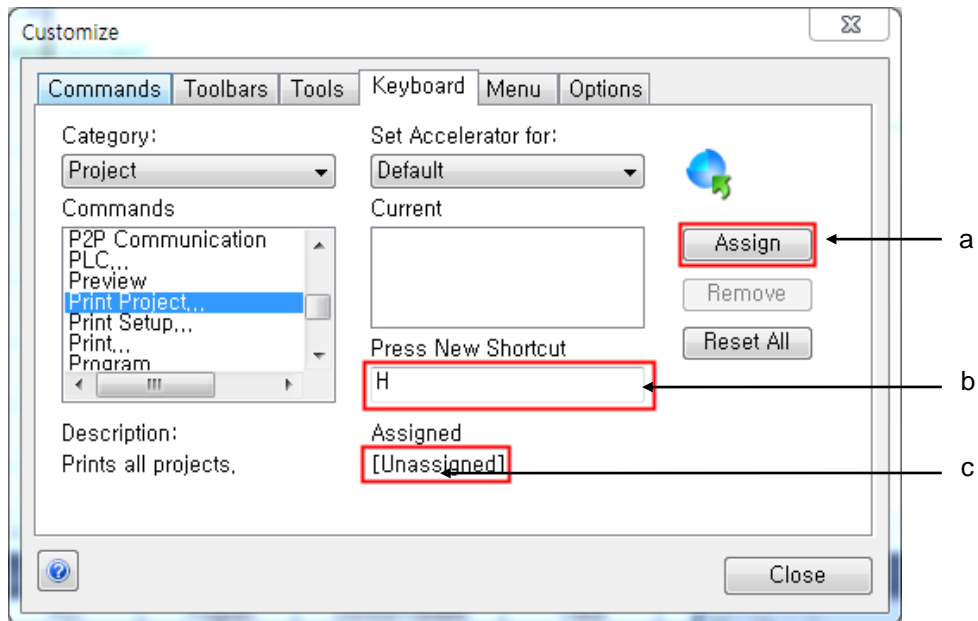
a. Enter the shortcut keys to be set. For example, if you want to use Ctrl + H, hold down Ctrl on your keyboard and press H. Then, the shortcut keys will be displayed in the editing window. If the key combination is already applied, the message 'Already Allocated' will be displayed and the 'Shortcut Key Allocation' button will not be activated

b. Press the shortcut key A or [Allocation] button.

c. Press the [Exit] button.

2.3 Setup of Toolbox Options

You can select options for the menu or toolbox.

[Dialog Box]

a
b
c
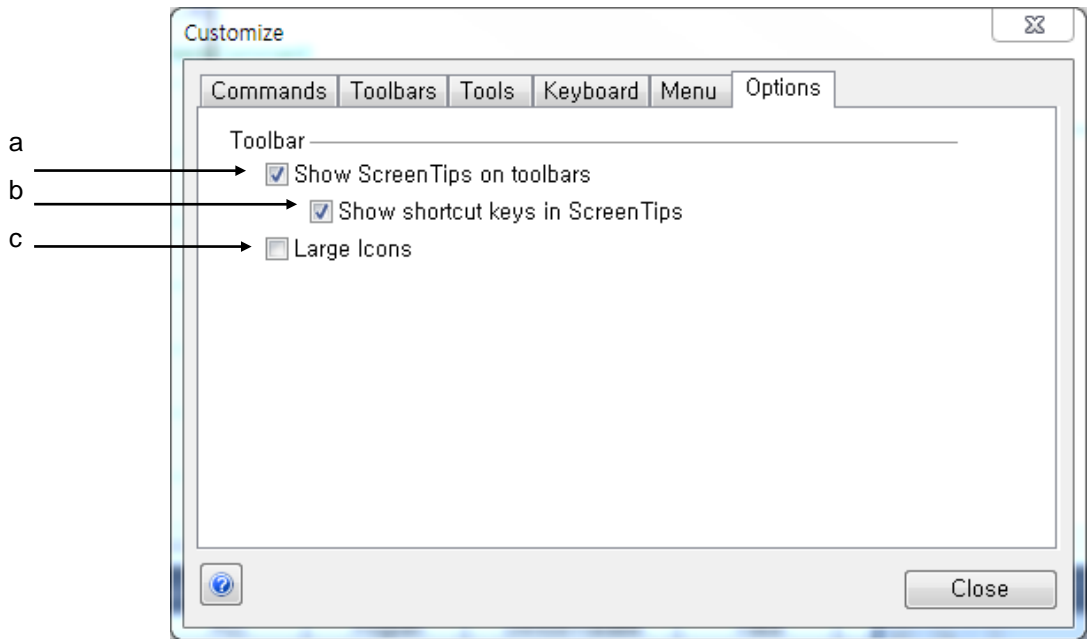
Items	Descriptions
Show ScreenTips on toolbars(a)	Displays tool-tips when the mouse pointer stays on the toolbar.
Show shortcut keys in ScreenTips (b)	Displays the shortcut key when the mouse pointer stays on the toolbar.
Large icons(c)	Displays the toolbar icons in a large size.

[Example of showing ScreenTips in the tool bar]

If you put the mouse on the tool executing 'Simulation', you can see the tool tip, 'Simulation' will pop up.
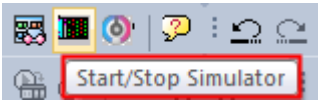
[Example of showing shortcut key on tool-tip]
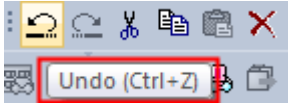
If you put the mouse on the tool executing 'Undo', you can see the tool tip, 'Undo(Ctrl+Z)' will pop up.

[Example of Large icon]

2.3.1 Status Display Line

[Dialog Box]

NewPLC | | | Row 7, Column 2 | Overwrite | 100%

a   b   c   d   e   f   g
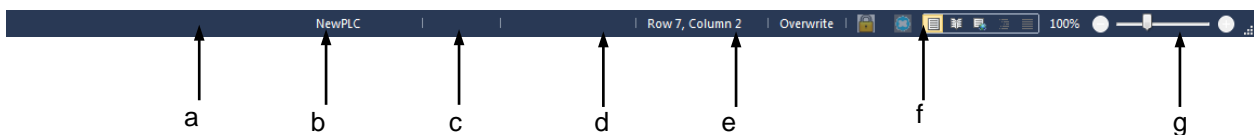
[Description of Dialog Box]

 a. Configuration: Displays the names of active configurations.
 b. State of the PLC: Indicates the current operating conditions of the PLC.
 c. Access state: Indicates the access state with the activated PLC.
 d. Display cursor position: Displays the cursor position when editing the program.
 e. Mode: Displays the current editing mode.
 f. State of safe signature: Displays the state of safe signature.
 g. Zoom In/Zoom Out: Zooms in and out the program's screen.

2.3.2 Change View Window

The windows that you can see in the 'View' menu are all docking ones. You can adjust the position and size of the windows with a mouse and they can be docked to any position.

In addition, there is the function to maintain docking windows in a floating state or hide them automatically.

1) Moving the position of the docking window

The below Fig. indicates the guide line of the docking position that is shown when moving the tool window. If you move the tool window once as below, the docking guide will be shown up in the screen. You can easily dock it by putting the window to inside of the docking guide.

2) Changing into floating window

Click the targeted docking window title with the right mouse button or press the lower arrow-shaped button to select the [Floating Window] menu.
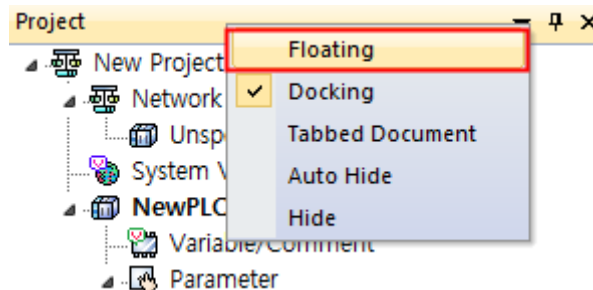
3) Auto-Hide Mode

Click the targeted docking window title with the right mouse button to select the menu [Auto-Hide] or if you press the tack-shaped button in the docking window as below for 'Hide' mode, the window will automatically disappear.
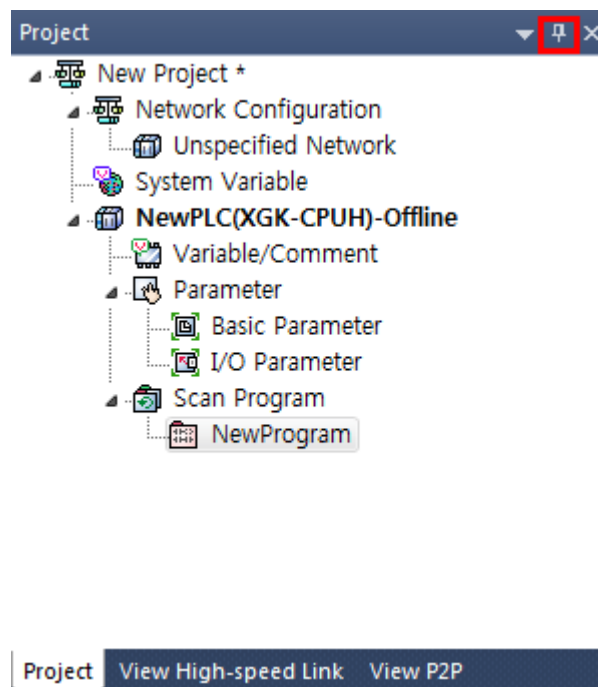
2.3.3 Application of Dialog Box

Dialog Box provides blanks for Input, OK, Options and List Box where the user can input or specify the value as desired.

[Dialog Box]
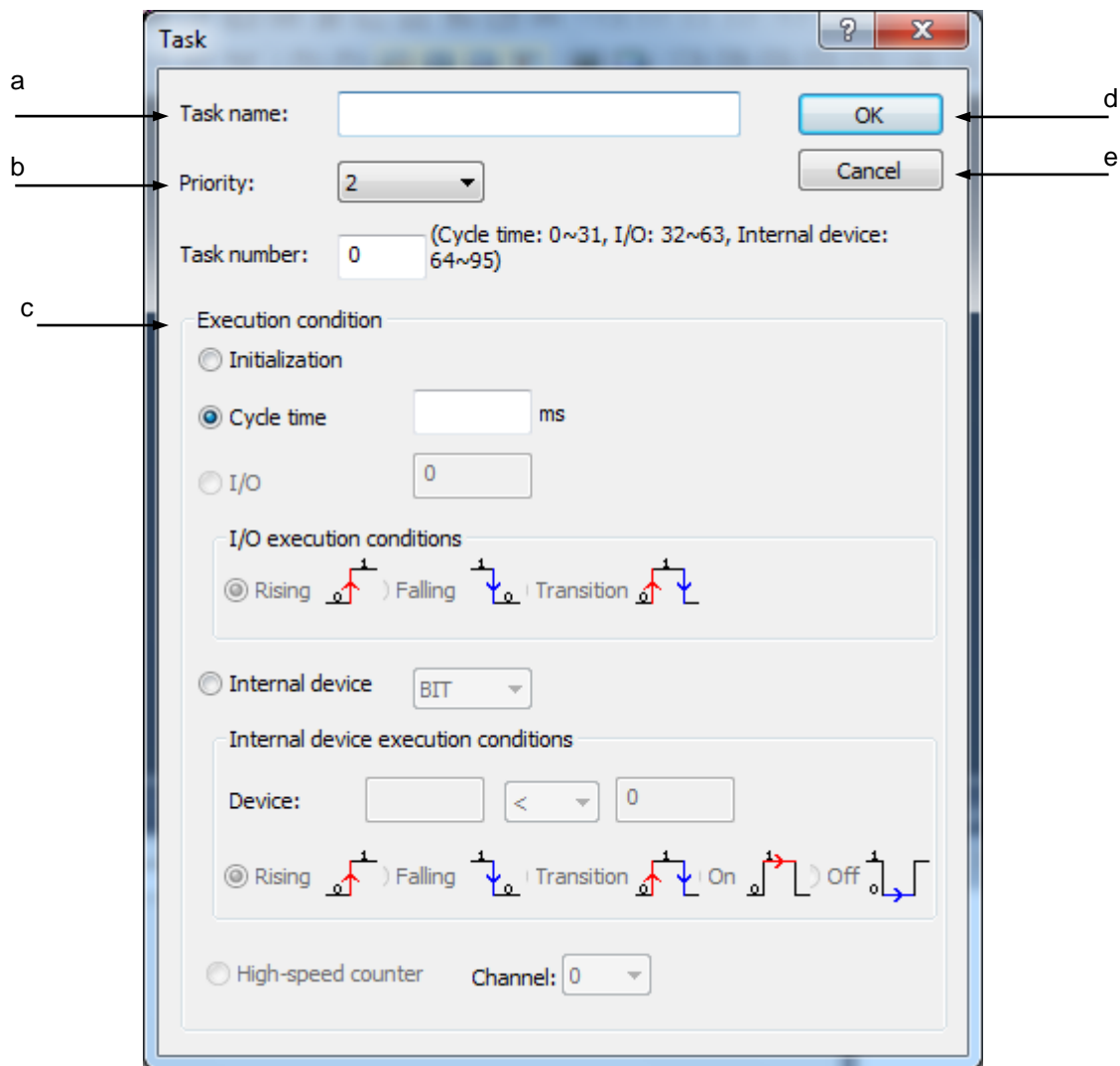
[Description of Dialog Box]

a. Input: used to input desired string by means of keys.

b. List Box: used to select an item on the list. Press the list box arrow to display the list with the item to click and select as desired.

c. Options: used to select just one item in the same group. Use the mouse to select the item desired.

d. OK: If [OK] is clicked, the specified value will be input.

e. Cancel: If [Cancel] is clicked, the specified value will not be input but the previous status will be kept.

2.4 Open/Close Project

2.4.1 Open Project

[Steps]

1.Select [Project]-[Open Project] on the menu.

2.Select [Project File] and then click [Open].

<table>
<tr><td>Notes</td></tr>
<tr><td>
  – The integrated project file's extension is".xgwx".
  – The PLC programming project file's extension is".xgpx".
  – The network setup project file's extension is".xfgx".
  – If you select the project file in the opening dialog box, you can see the project comment in the
     comment area.
</td></tr>
</table>

2.4.2 Close Project

[Steps]

1.Select [Project]-[Close Project] on the menu. Default of the Shortcut Key is not specified.

2.If the project is not saved after edited, the following message will appear.
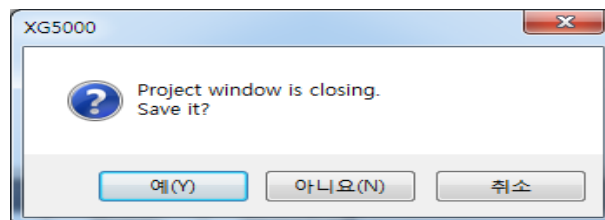
3.Click [Yes] to save.

2.4.3 Save Project

[Steps]

1. Select [Project]-[Save Project] on the menu.

<table>
<tr><td>Notes</td></tr>
<tr><td>
– The mark "*" displayed to the right of the project name on the project window means that the present
  project has been edited.
</td></tr>
</table>

2.5 Convenient Edit Functions

These functions are available in LD, IL, Variable/Comment, Variable Monitor and Project Window. Variable/Comment and Excel can share the edited details with each other.

2.5.1 Cut-Paste

It is used to select blocks to move to other places.

[Steps]

1. [Cut]-[Paste] menu is used to move the data of the selected area to a new position to paste the data on. The example of [Cut]-[Paste] on the Variable/Comment Window is as follows;
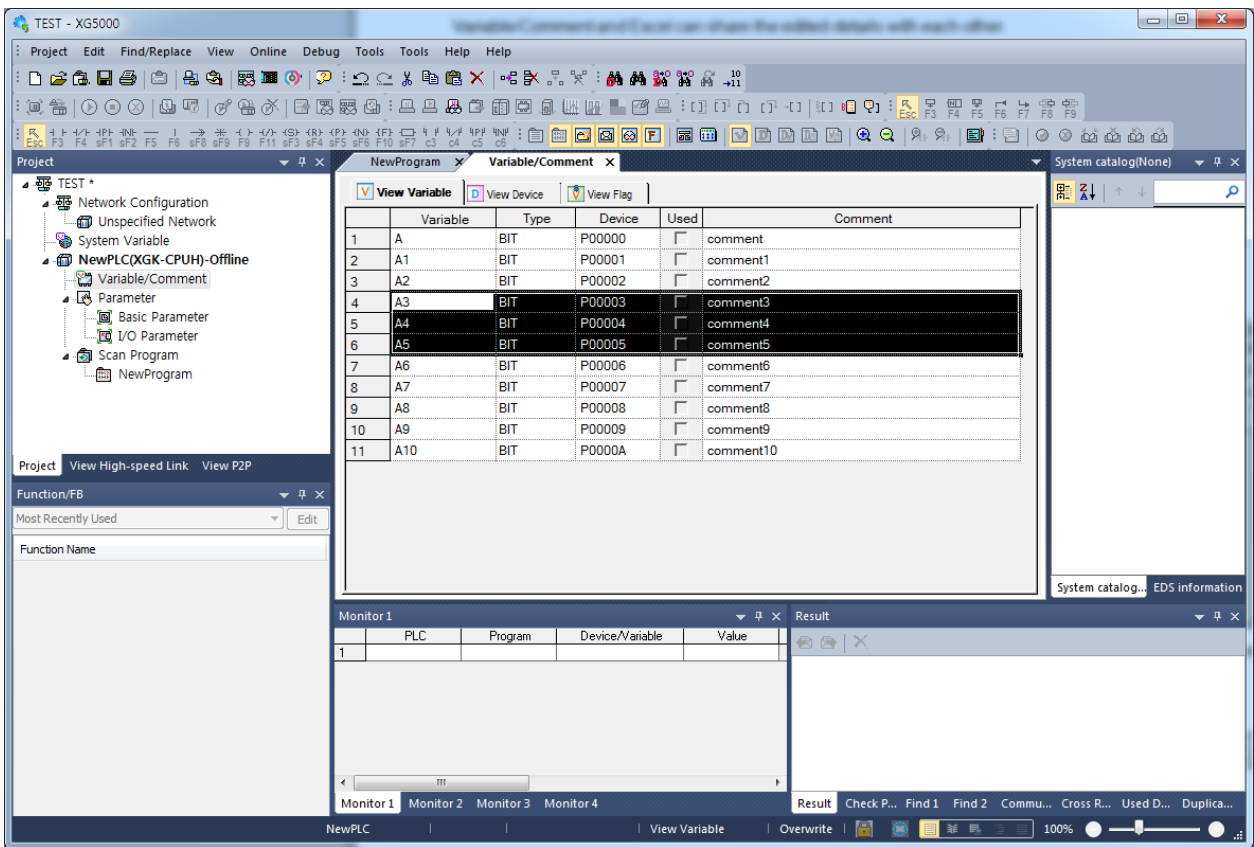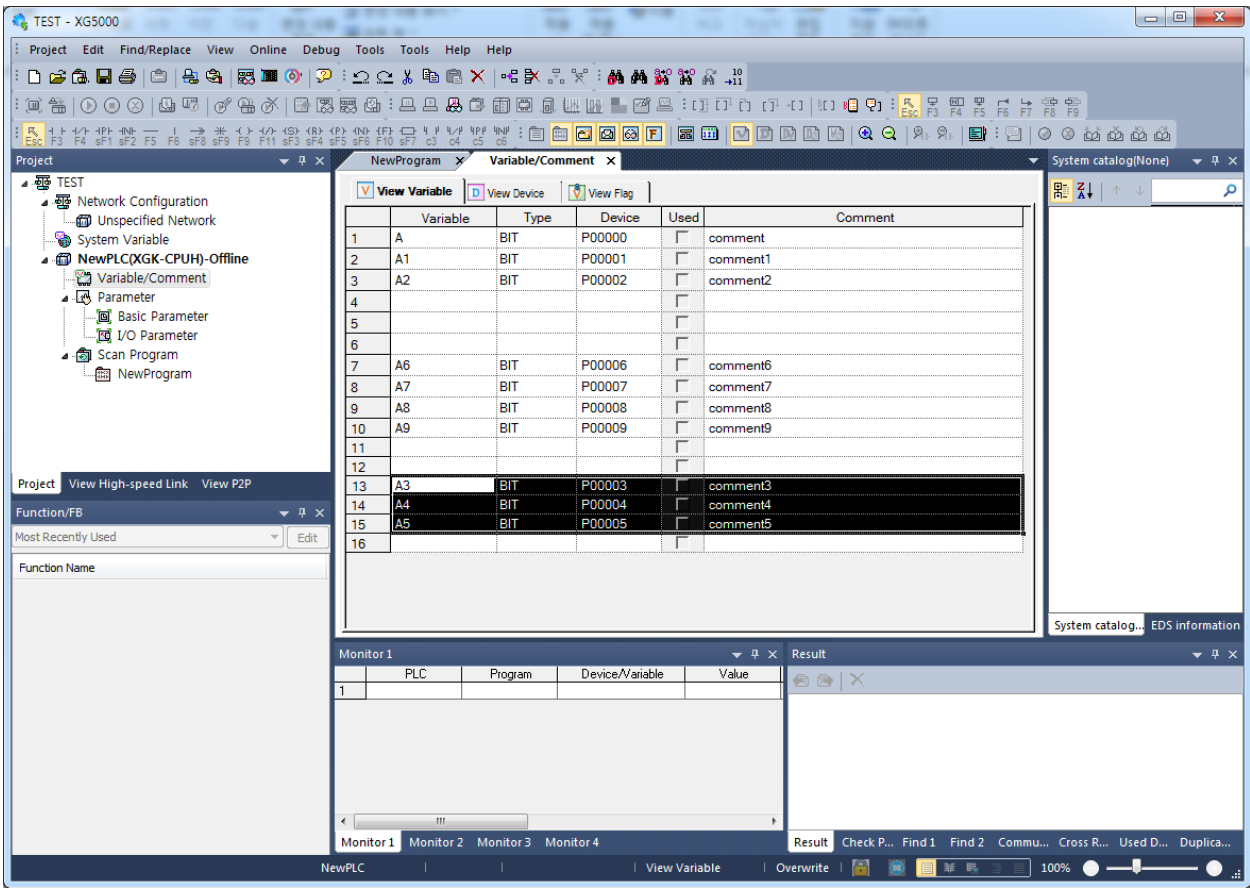
2.5.2 Copy – Paste

[Copy] - [Paste] menu is used to create one more data identical to the data of the selected area. At this time, if the variable name should not be duplicated as described in Variable/Comment, an applicable warning message will appear. Refer to the comment of each edit window for more details. The example of [Copy] - [Paste] in LD figure is as follows;
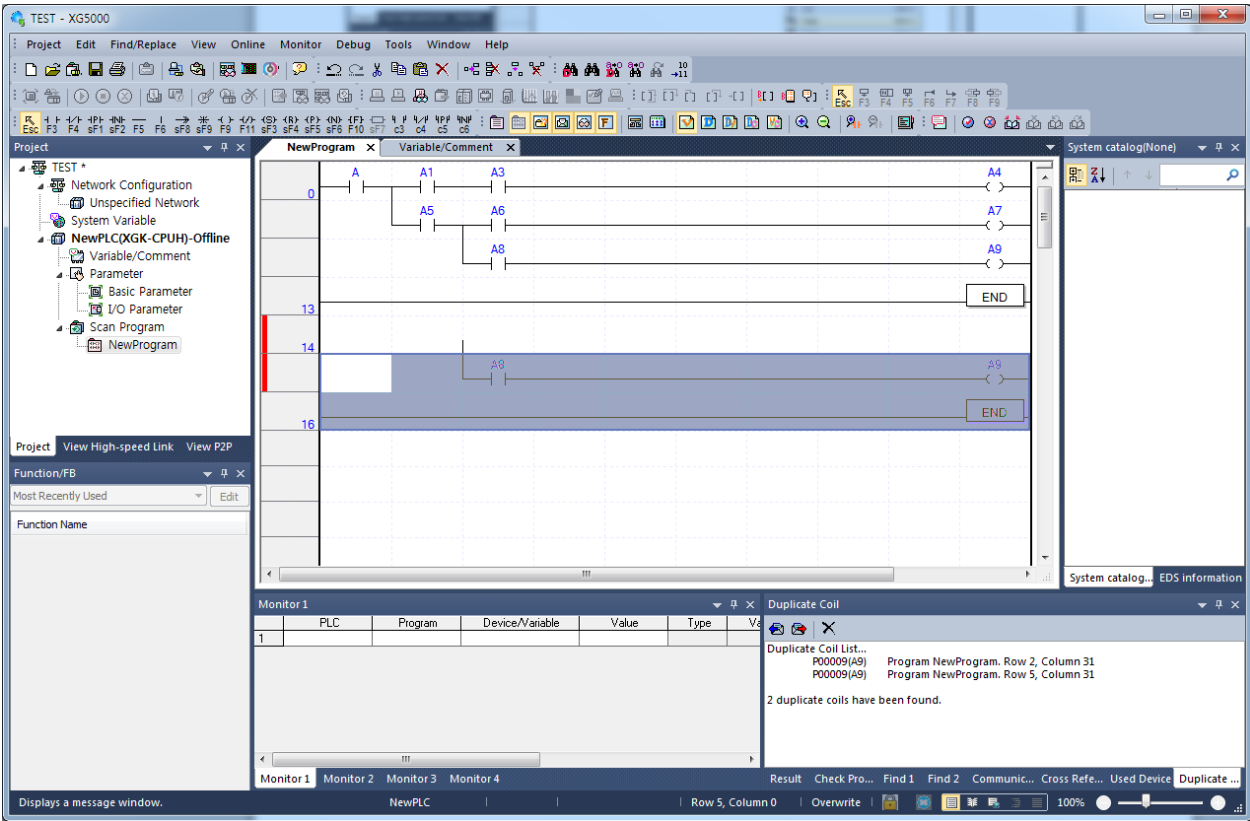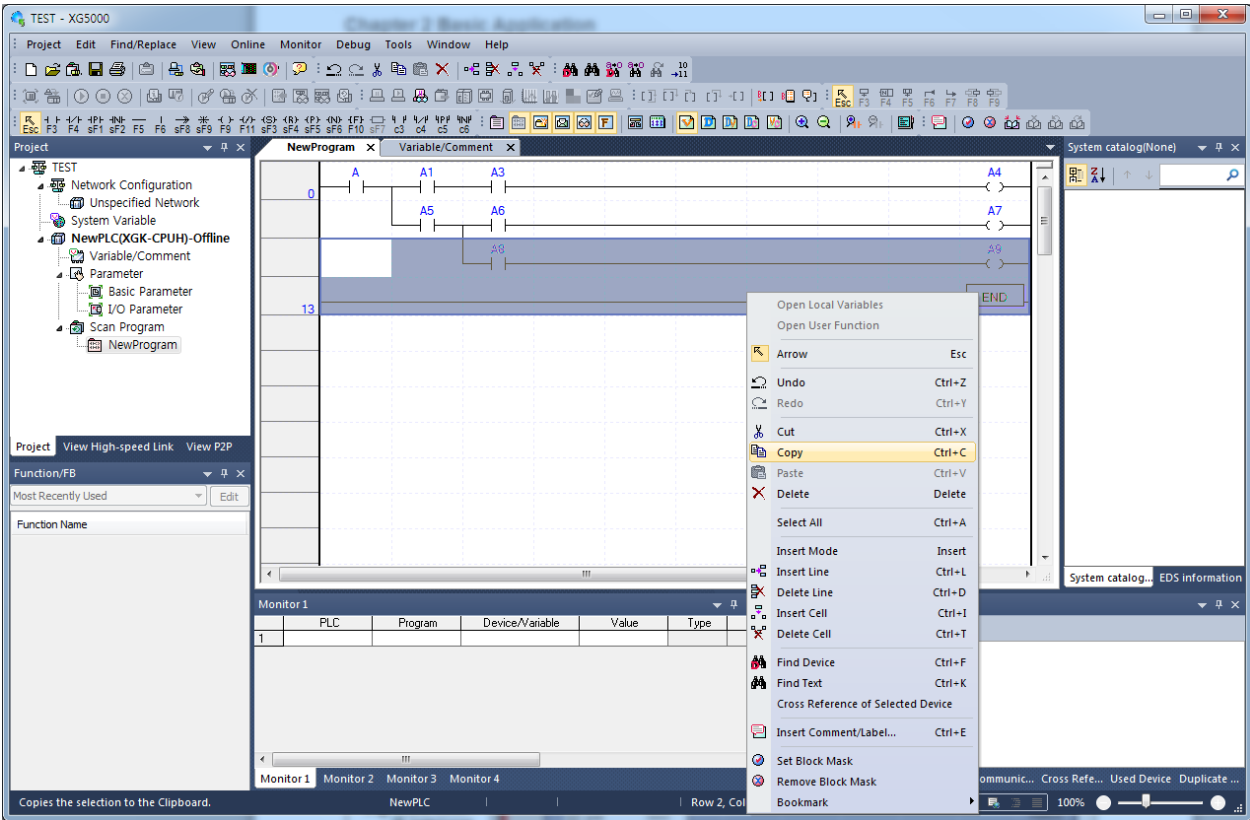
2.5.3 Drag and Drop

[Drag and Drop] is applied as based on [Cut]-[Paste] and [Copy]-[Paste] under the given conditions. In other words, if [Drag and Drop] is used on the identical area of LD or IL edit window, it will work as [Cut]-[Paste]. And if [Drag and Drop] is used with 2 or more XG5000 program instances being open, it will work as [Copy]-[Paste].
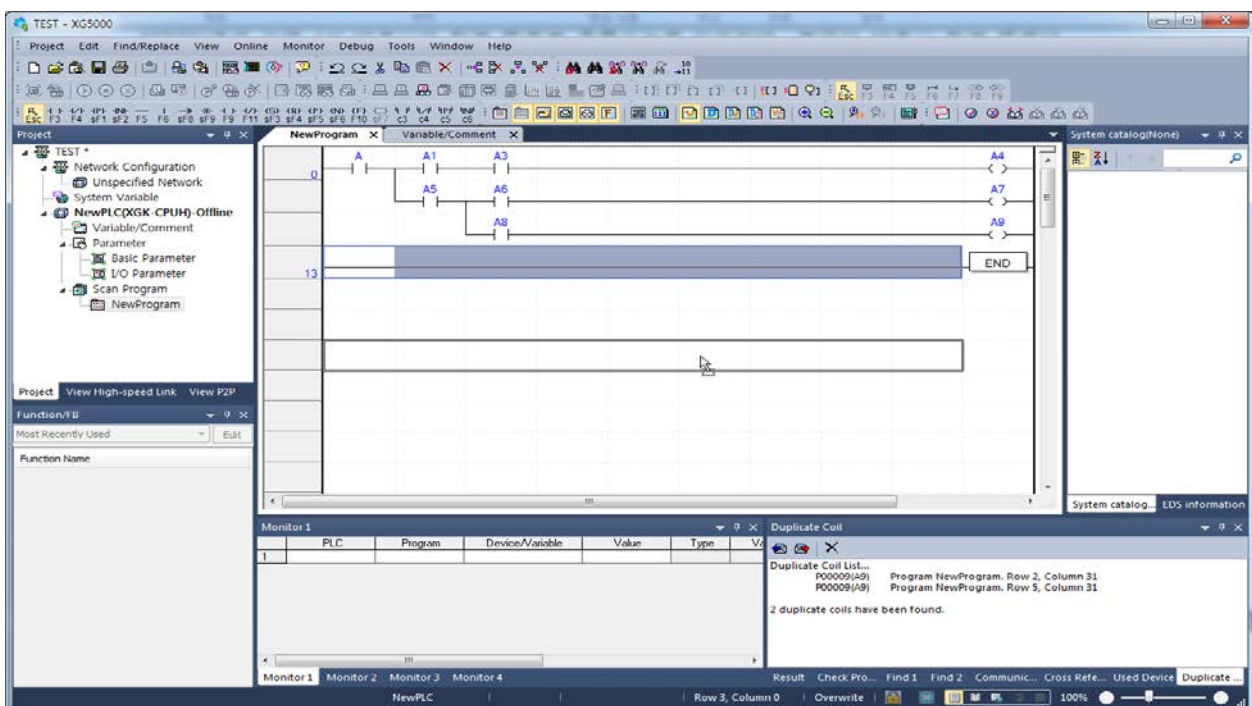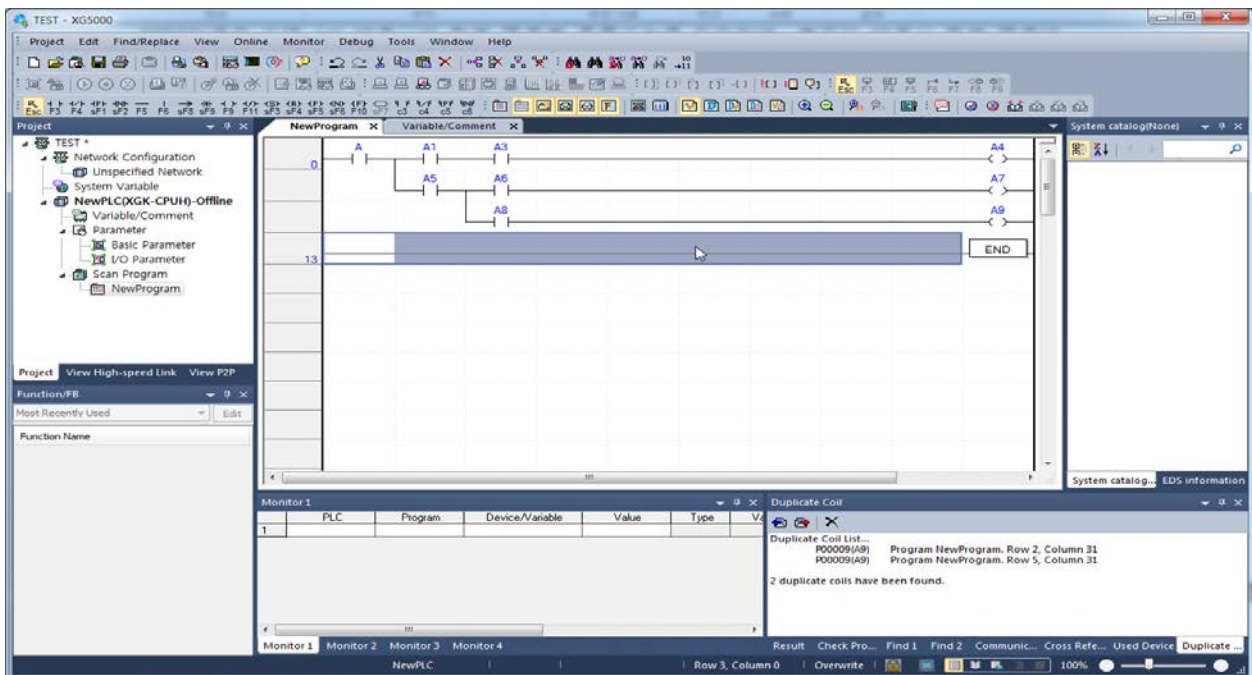
The figure above shows the [Drag and Drop] result of the line selected in an instance.
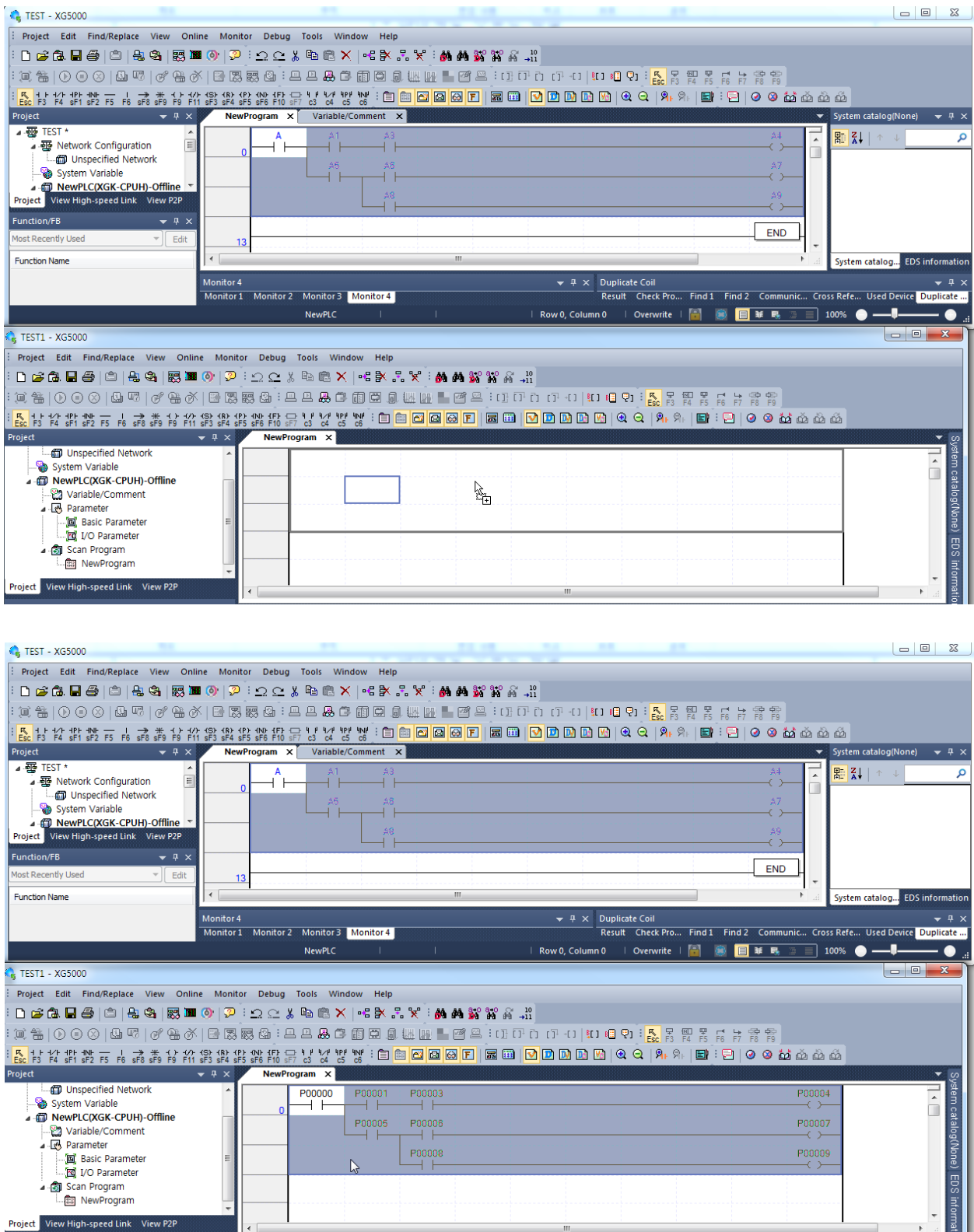
The figure above shows the [Drag and Drop] result of the area selected between two instances.

Notes

－- Cut, Copy and Paste are also available through the mouse context menu of the edit window.

- Copy and Paste in Variable/Comment or LD/IL Edit needs to be surely confirmed by the user even if the program inspects its duplication.

- If Cut, Copy or Paste is executed where it is unavailable, the program will not reply thereto.

- Cut, Copy or Paste between different areas may cause a serious program error.

- No automatic conversion function is provided for Cut, Copy or Paste executed onto the place with different data type. Accordingly the user needs to check the area pasted.

2.6 Edit Window Zoom In, Zoom Out

This function is used to magnify or reduce the Edit Window in a specific rate.

The applicable magnification rate changes by minimum 5% within the range of 50% ~ 200%.

[Steps]

1. Select [View]-[Zoom In] or [View]-[Zoom Out] on the menu as necessary. Or use the combo box to select or input a desired magnification rate. Or together with Ctrl being pressed, use the mouse wheel to adjust the rate. The two figures below show the examples of 50% and 200% magnified screens.
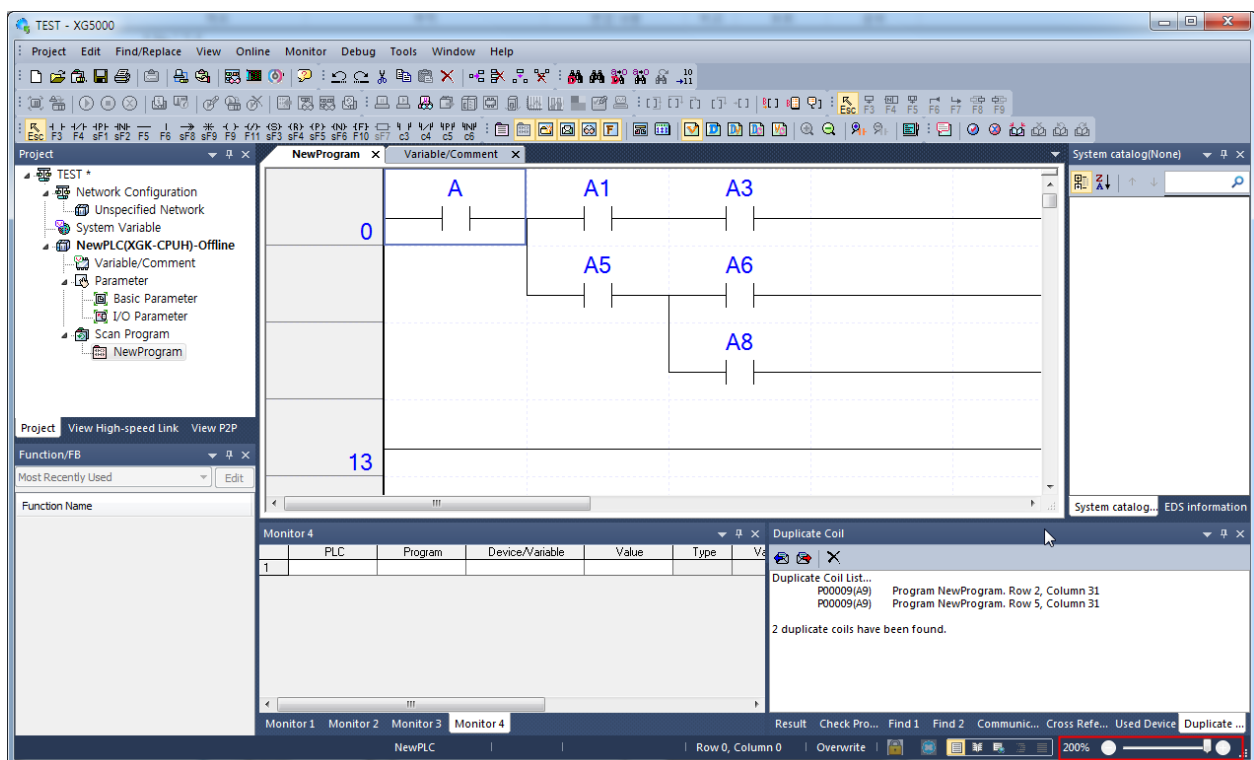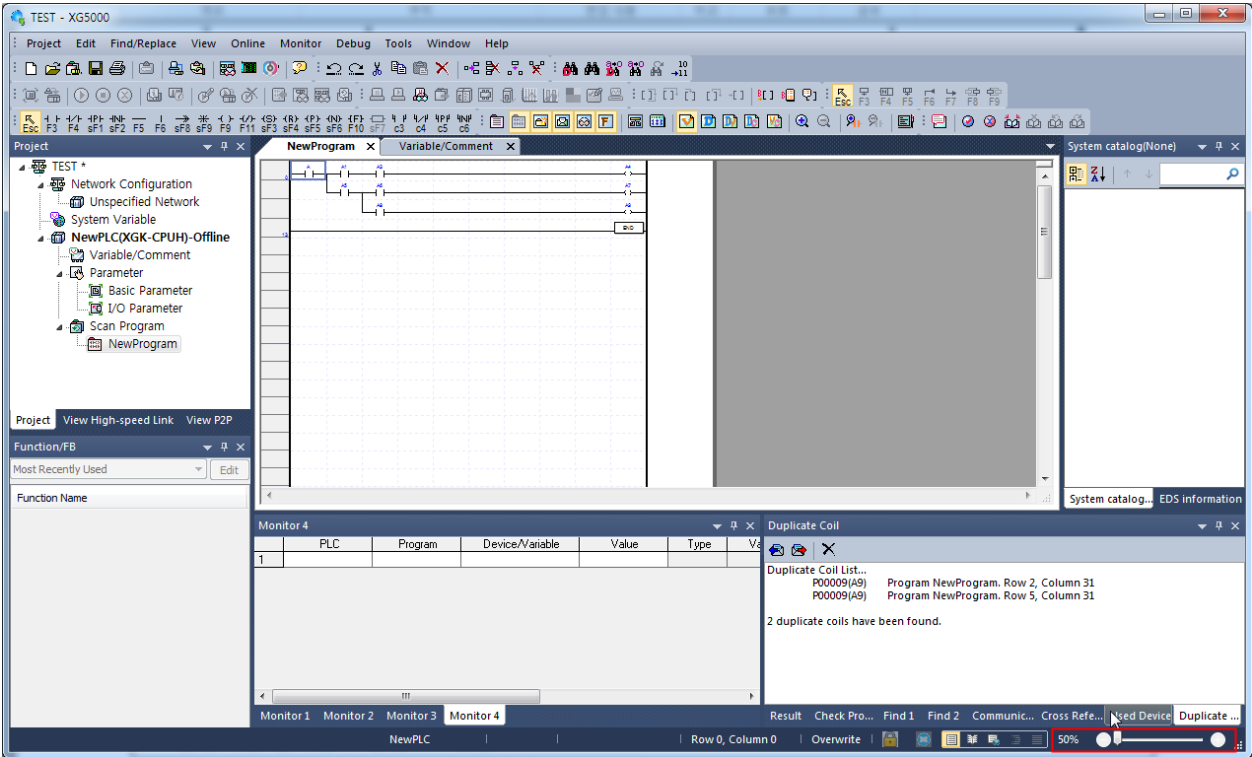
2.7 Options

2.7.1 Option configuration

Option of XG5000 is as follows..

[Dialog Box]
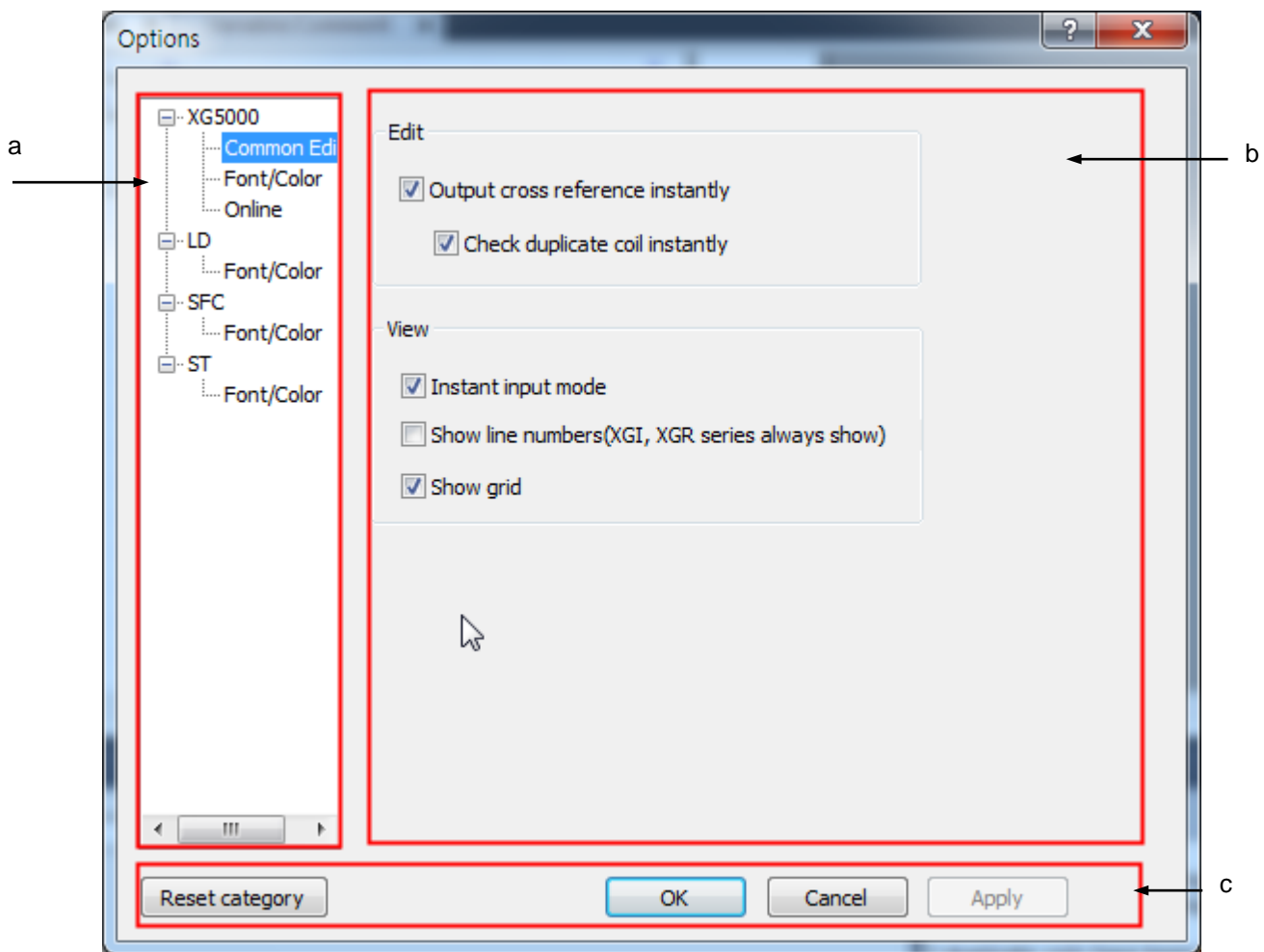
[Description of Dialog Box]

a. Category: XG5000 options applied to entire program and operations applied according to language are
        classified as tree type

b. Setting contents: If you select category, applicable contents are displayed

c. Common button: Common button applied to all categories no matter which category is selected Reset
        category button is used to reset all options

2.7.2 XG5000 option

Specify items related with project.

[Steps]

1. Select [Tools]-[Options]

2. Select XG5000 in option dialog box
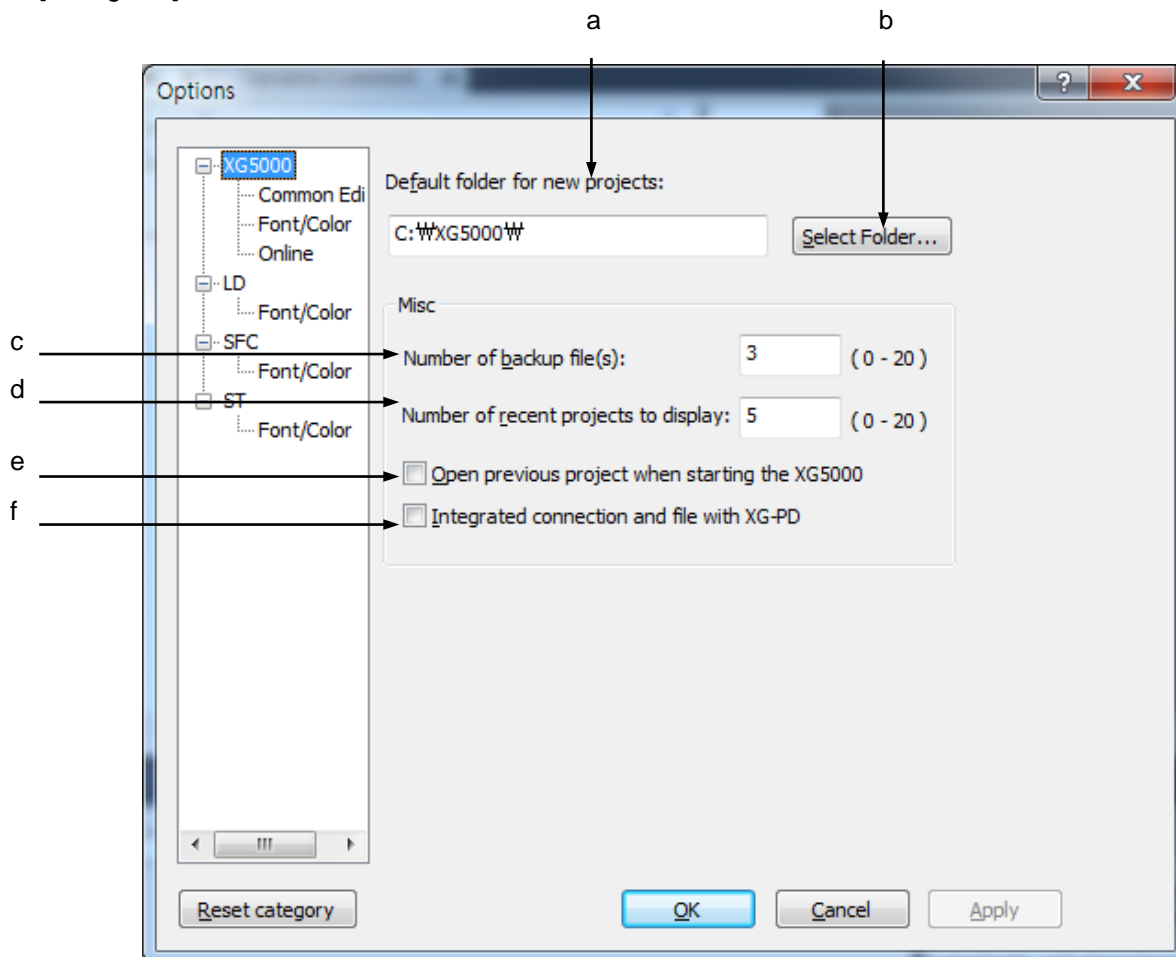
[Dialog box]

[Description of dialog box]

a. Default folder for new projects: default folder location when making new project

b. Select Folder: Search folder

c. Specifies the number of backup file to restore project file. Up to 20 is available

d. Specifies the number of recently opened project displayed at menu [Project] – Recent Project]. Up to 20 is available

e. When starting XG5000, opens the recent project automatically

f. When executing XG-PD through XG5000 menu, make connection option of XG5000 and PLC name displayed at XG-PD identically.

2.7.3 XG5000 Common Editor

[Steps]

1. Select menu [Tools]-[Options]

2. Select option after select [Common Editor] in XG5000 category

[Description of dialog box]
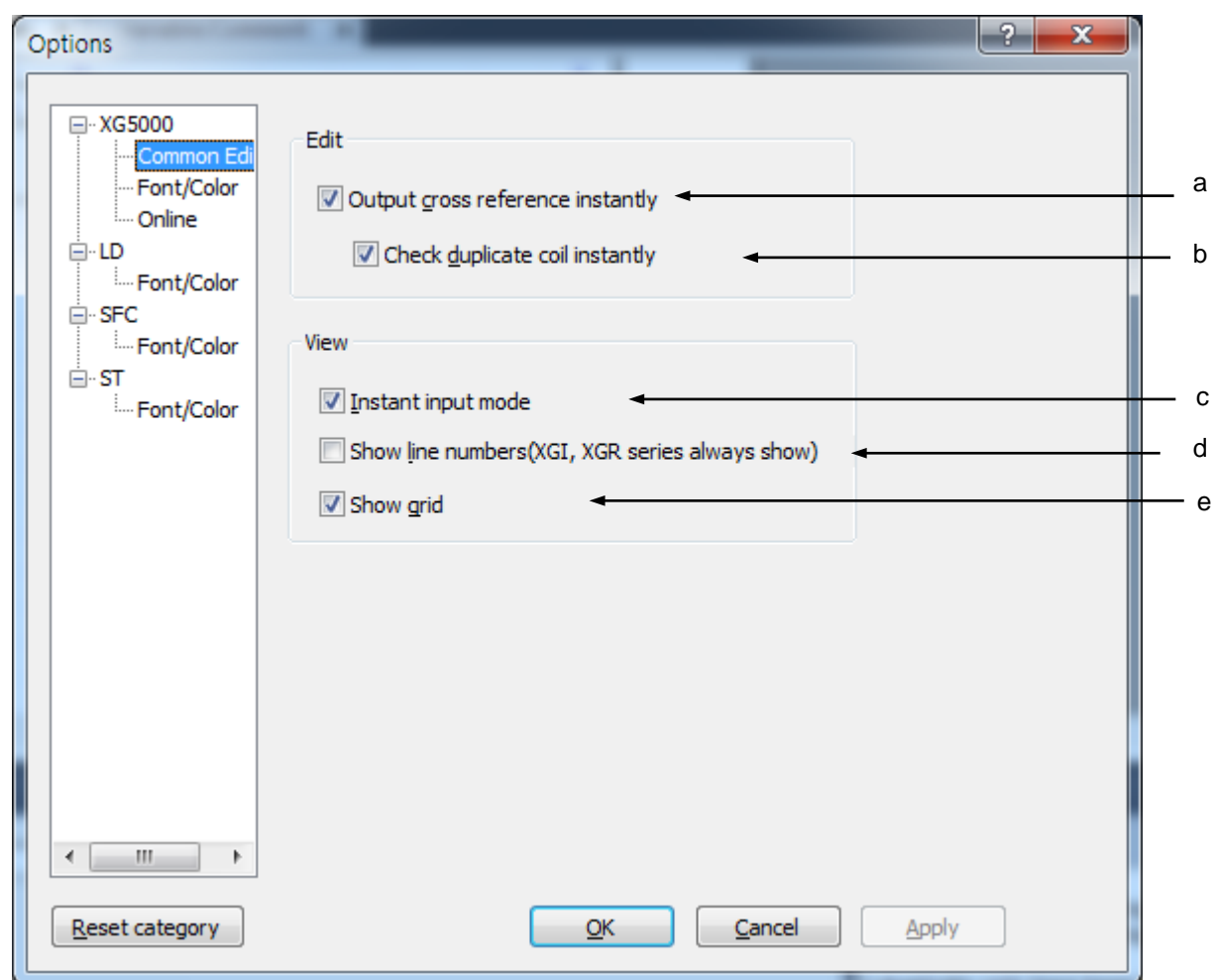
[Description of dialog box]

a. Output cross reference instantly: for device used in LD, displays memory reference contents automatically. When this option is not selected, you can check the result of memory use by selection [View]-[Cross Reference]

b. Check duplicate coil instantly: check duplicate coil and display at duplicate coil window during editing

c. Instant input mode: When inputting contact point, shows device input window for user to input device instantly. When Instant input mode is not selected, move cursor and double-click or press Enter to input device

d. Show line number: shows line number in editing window.

e. Show grid: shows grid in editing window

2.7.4 XG5000 Color Options

Color to be displayed on the LD/IL Edit Window can be specified by the user.

[Steps]
1.Select [Tools]-[Option] on the menu.
2.Select the Color tap on the Option Dialog Box.
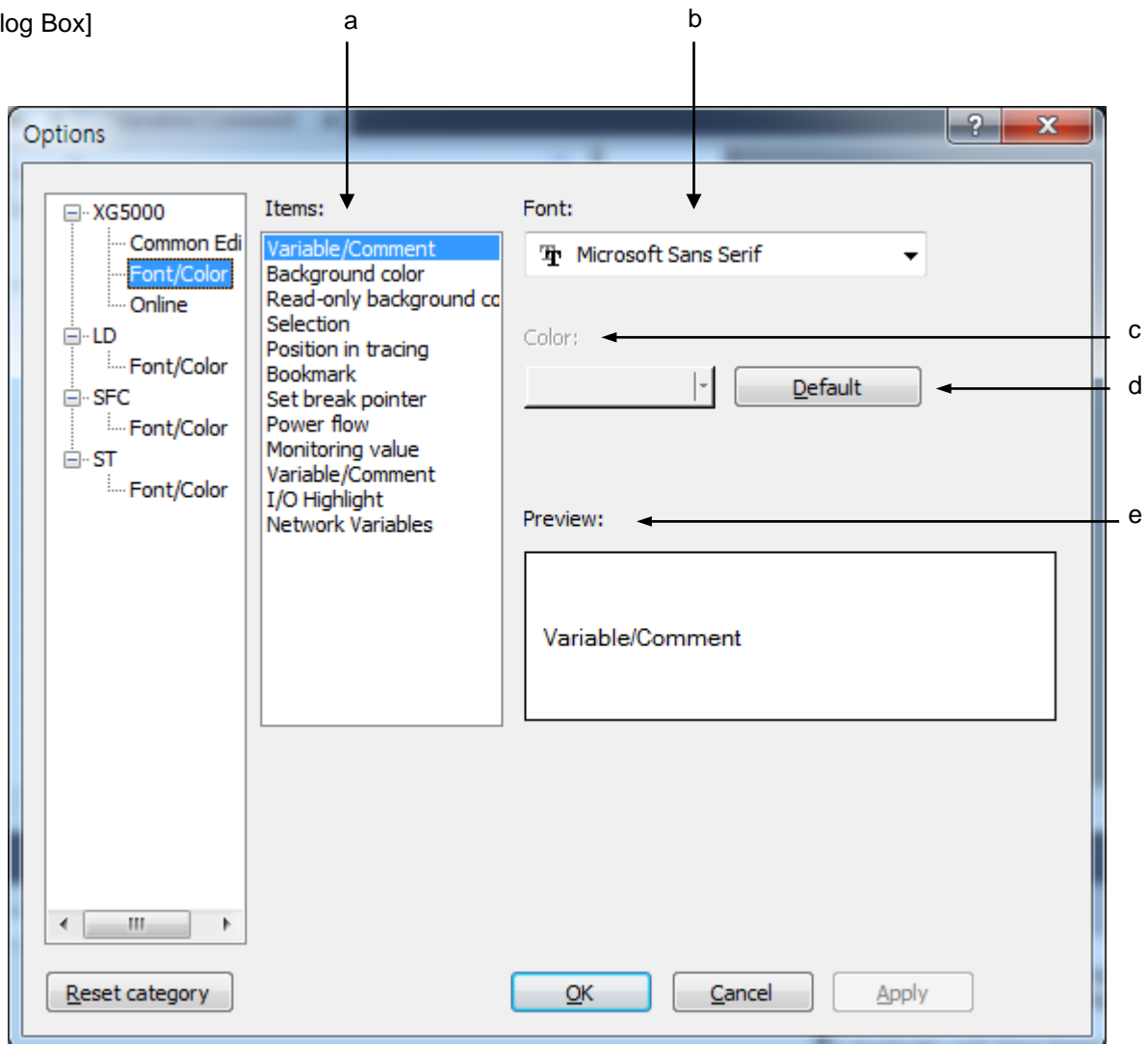
[Dialog Box]

[Description of Dialog Box]

a. Items: Used to select the area to specify its font or color.

b. Font: activated when item is Variable/Comment, specifies font of Variable/Comment

c. Color: activated when item is not Variable/Comment, specifies color

d. Default: for selected item, restore default value

e. Preview: displays the setting value of the selected item

2.7.5 Online Options

Online related options can be specified.

[Steps]

1.Select [Tools]-[Option] on the menu.

2.Select the Online tap on the Option Dialog Box.
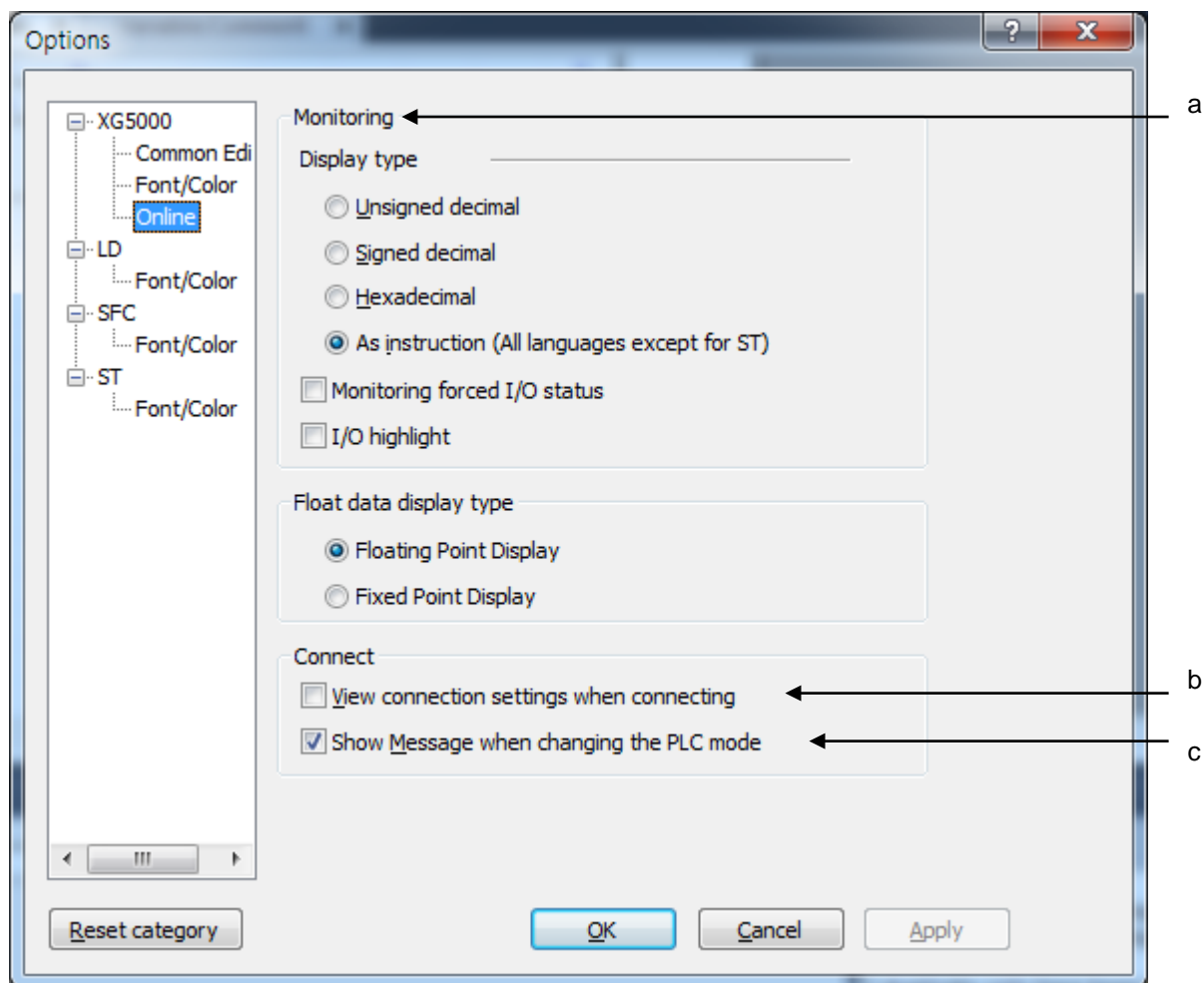
[Dialog Box]

[Description of Dialog Box]

a. Monitoring: used to specify the display format of the data value.

   Example) If Hexadecimal is selected on the Monitor Display Format, the variable values when

   monitored will be displayed in hexadecimal

Monitor Display Format	*Example)* Application Instruction ADD
Unsigned Decimal	
Signed Decimal	
Hexadecimal	
As instruction	

b. View connection setting when connecting: used to display the specified details of the connection with PLC automatically when connected. If the option [View connection settings when connecting] is selected, the following Dialog Box will appear whenever PLC is connected with.
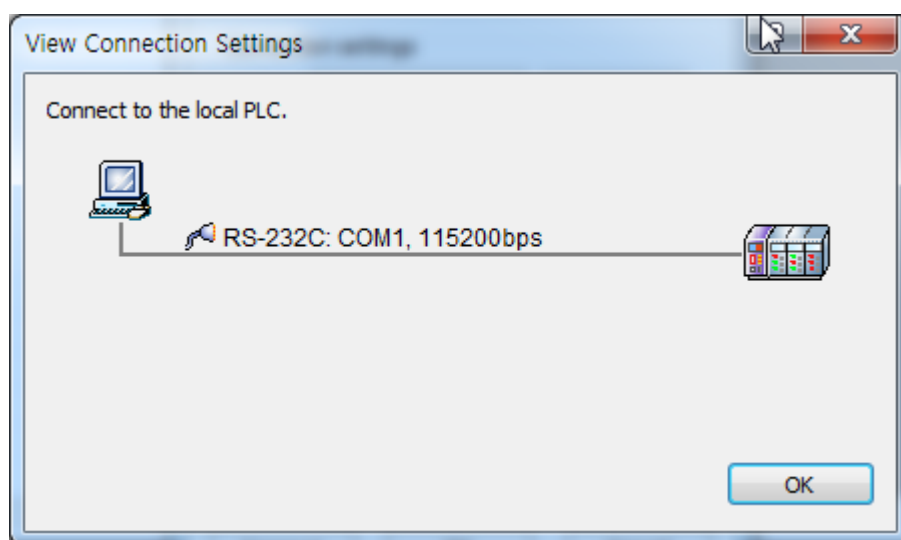
c. Show Message when changing the PLC mode: When changing the PLC mode, displays conversion message automatically.

When changing from Stop mode to Run mode, the following message shows.
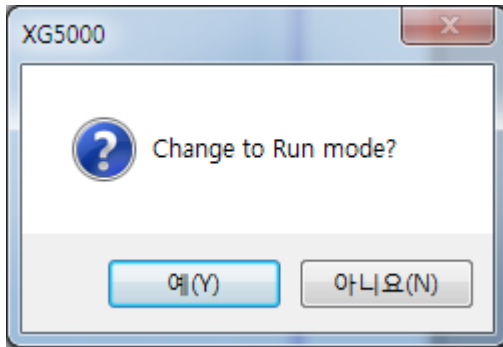
When changing from Run mode to Stop mode, the following message shows
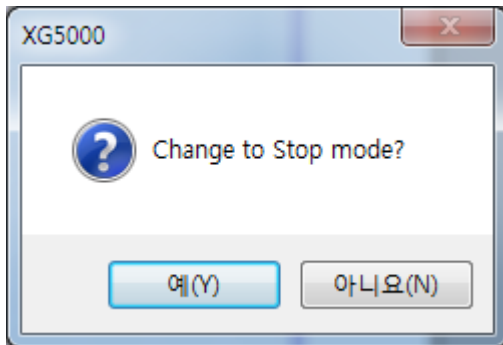
2.7.6 LD option

You can change text and column width of LD editor

[Steps]

1. Select [Tools]-[Option] on the menu.
2. After selecting LD category, specify the item for changing

[Dialog box]
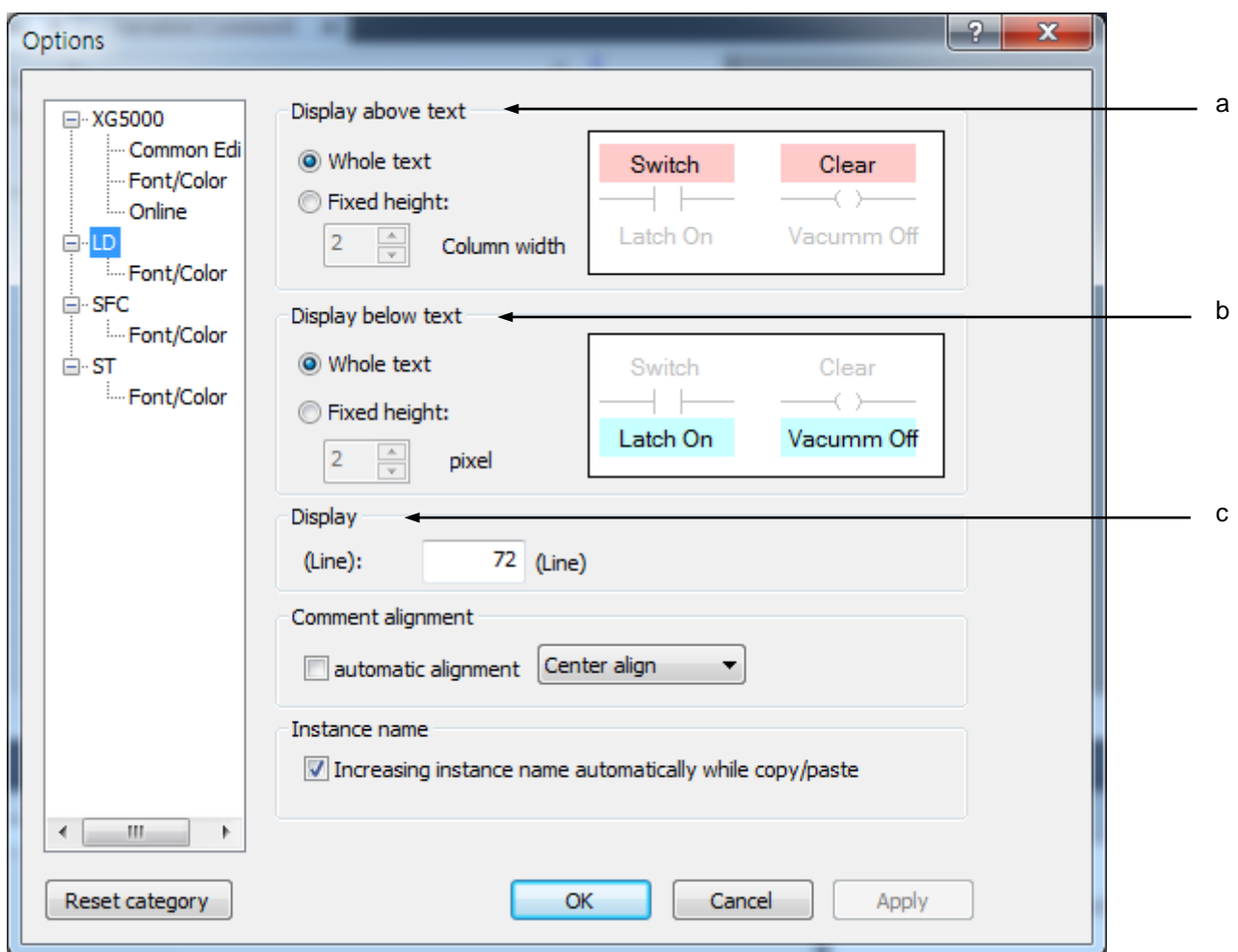
[Description of dialog box]

a. Display above text: When displaying text above diagram, decides whether to display height of text as variable type according to the number of character or as fixed type according to setting
b. Display below text: .When displaying text below diagram, decides whether to display height of text as variable type according to the number of character or as fixed type according to setting
c. Display: specified column width of LD diagram

2.7.7 LD Font/Color option

You can change Font/Color used in LD editor

[Steps]

1. Select [Tools]-[Option]
2. After selecting [Font/Color] in LD category, specifies font/color
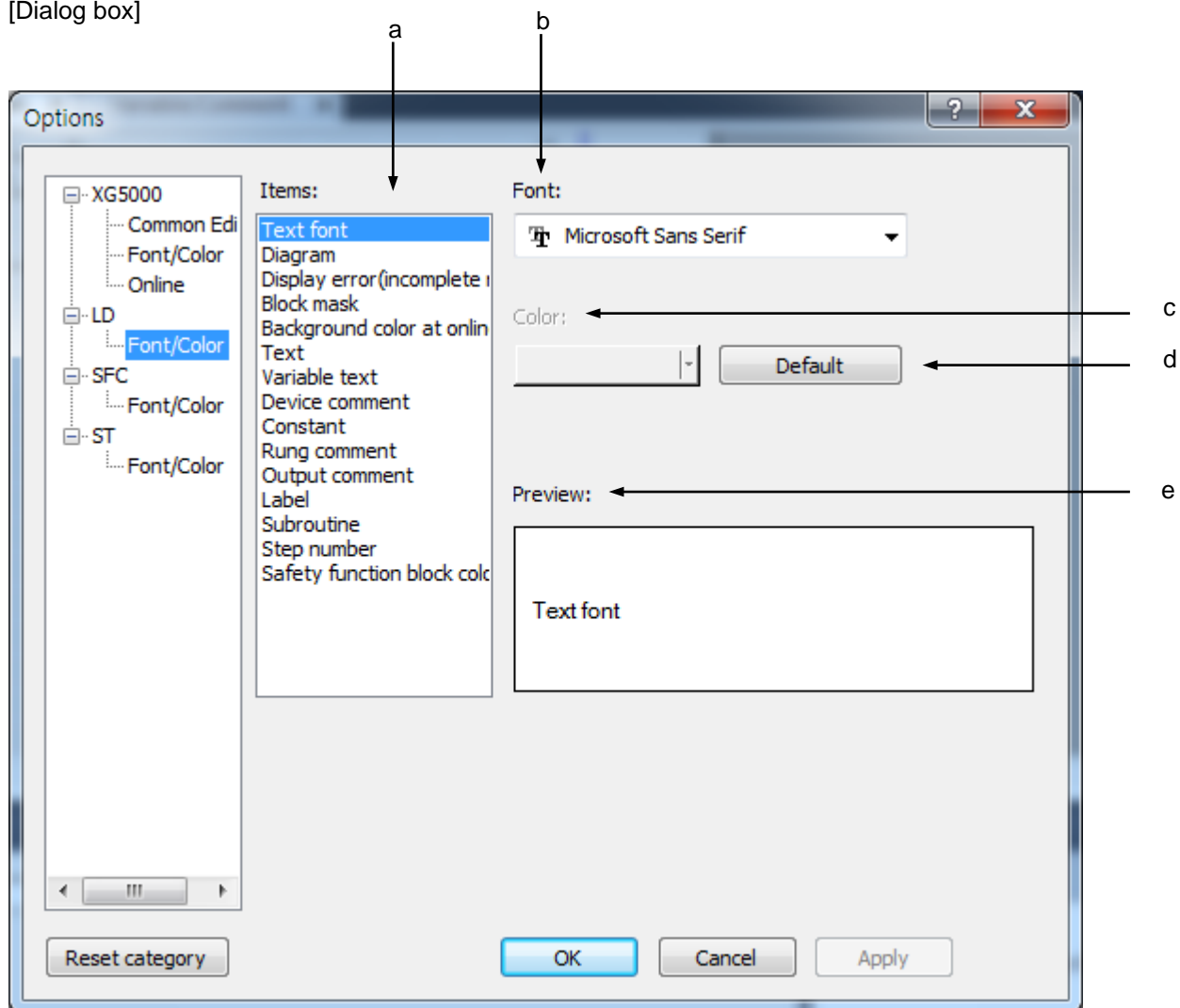
[Dialog box]

[Description of dialog box]

a. Items: Used to select the area to specify its font or color.

b. Font: activated when item is Variable/Comment, specifies font of Variable/Comment

c. Color: activated when item is not Variable/Comment, specifies color

d. Default: for selected item, restore default value

e. Preview: displays the setting value of the selected item

2.7.8 SFC option

Options used when editing SFC program

[Steps]

3.1. Select [Tools]-[Option]

4.2. Select SFC category

[Dialog box]

[Description of dialog box]

a. Show comment: shows comment of step, transition, action and block

b. Show print area: shows print-able area with the thick dotted line

c. Show page number: shows page number in print-able area

d. Step column width: specifies column width of step, transition

e. Action column width: specifies column width of action.

f. Utilize SFC split window: you can use SFC split window.

g. Split window position: decides split widow position

h. Split window contents: decides which content to display

Note
- Range of step column width is 20~200.
- Range of action column width is 70~400.

2.7.9 SFC Font/Color

You can change font/color used in SFC editor

[Steps]

1. Select [Tools]-[Option]

2. After changing [Font/Color] in SFC category, specified font/color

[Dialog box]
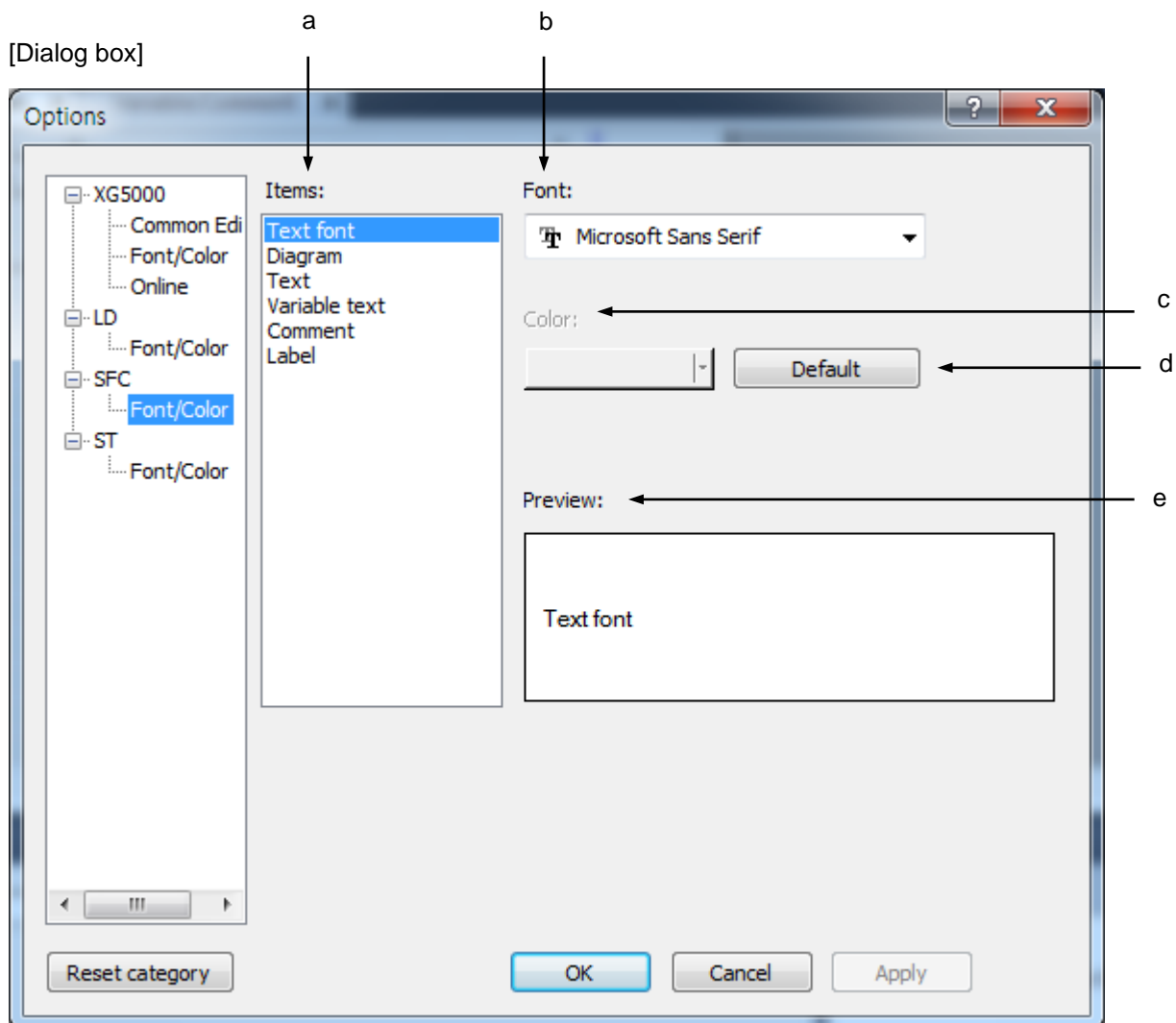
[Description of dialog box]

a. Items: Used to select the area to specify its font or color.

b. Font: activated when item is Variable/Comment, specifies font of Variable/Comment

c. Color: activated when item is not Variable/Comment, specifies color

d. Default: for selected item, restore default value

e. Preview: displays the setting value of the selected item

2.7.10 ST option

Options used in editing ST program.

[Steps]

1. Select [Tools]-[Option].
2. Select ST category

[Dialog box]
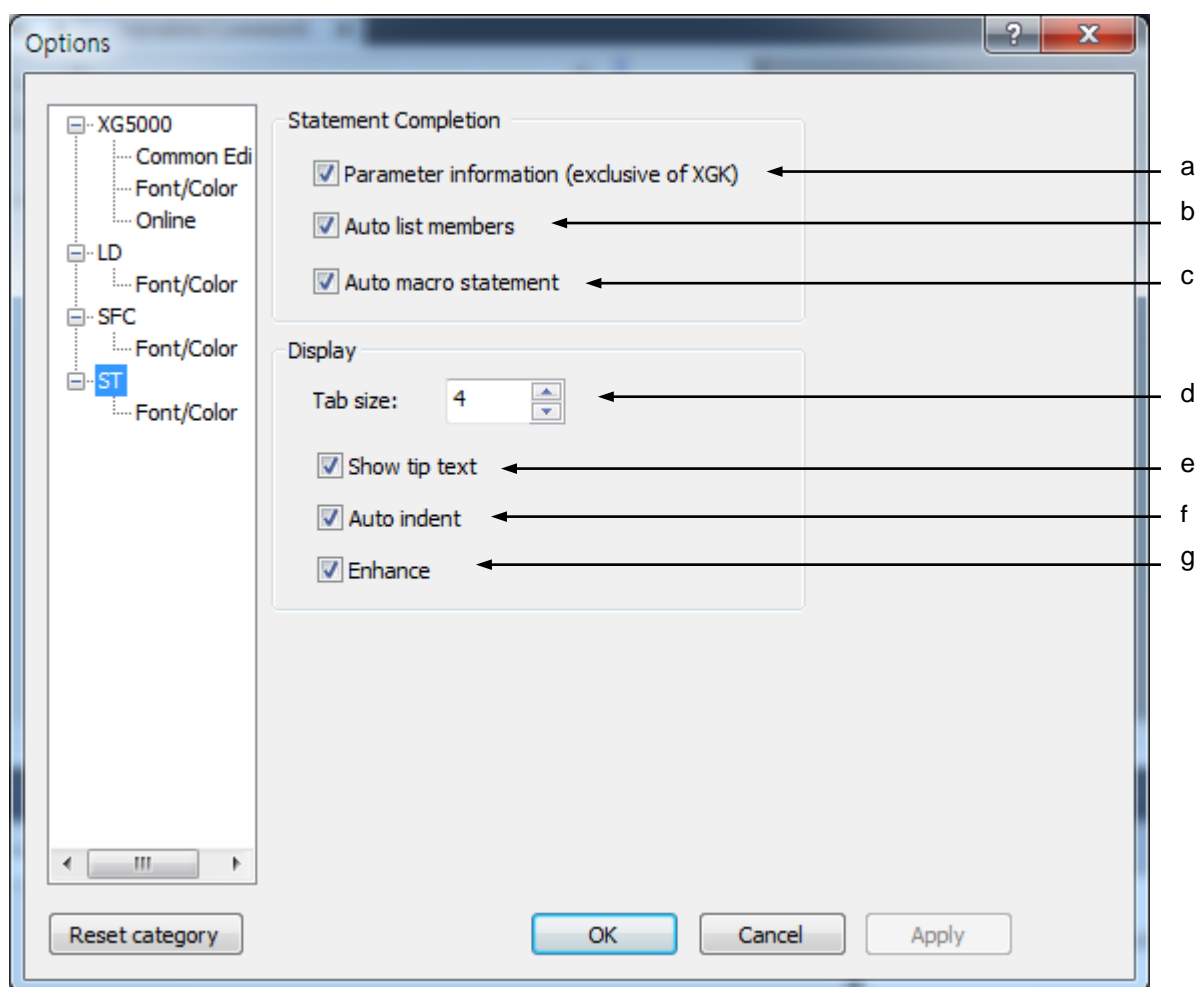
[Description of dialog box]

a. Parameter information: exclusive of XGK CPU

b. Auto list members: When inputting character with keyboard, shows instruction and variable starting with inputted character

c. Auto macro statement: When inputting control statement such as IF, WHILE, SWITCH and pressing Enter key, complete the statement according to ST grammar

d. Tap size: specifies space size when pressing Tap key

e. Show tip text: When move cursor on the character string, shows comment on character string

f. Auto indent: When changing line with Enter key, indented automatically as many as previous tap size.

g. Enhance: Shows character string with diverse color according to variable, reserved word, comment and instruction

2.7.11 ST Font/Color

You can change Font/Color used in ST Editor.

[Steps]

1. Select [Tools]-[Option]

2. after selecting [Font/Color] in ST category, specifies font/color.
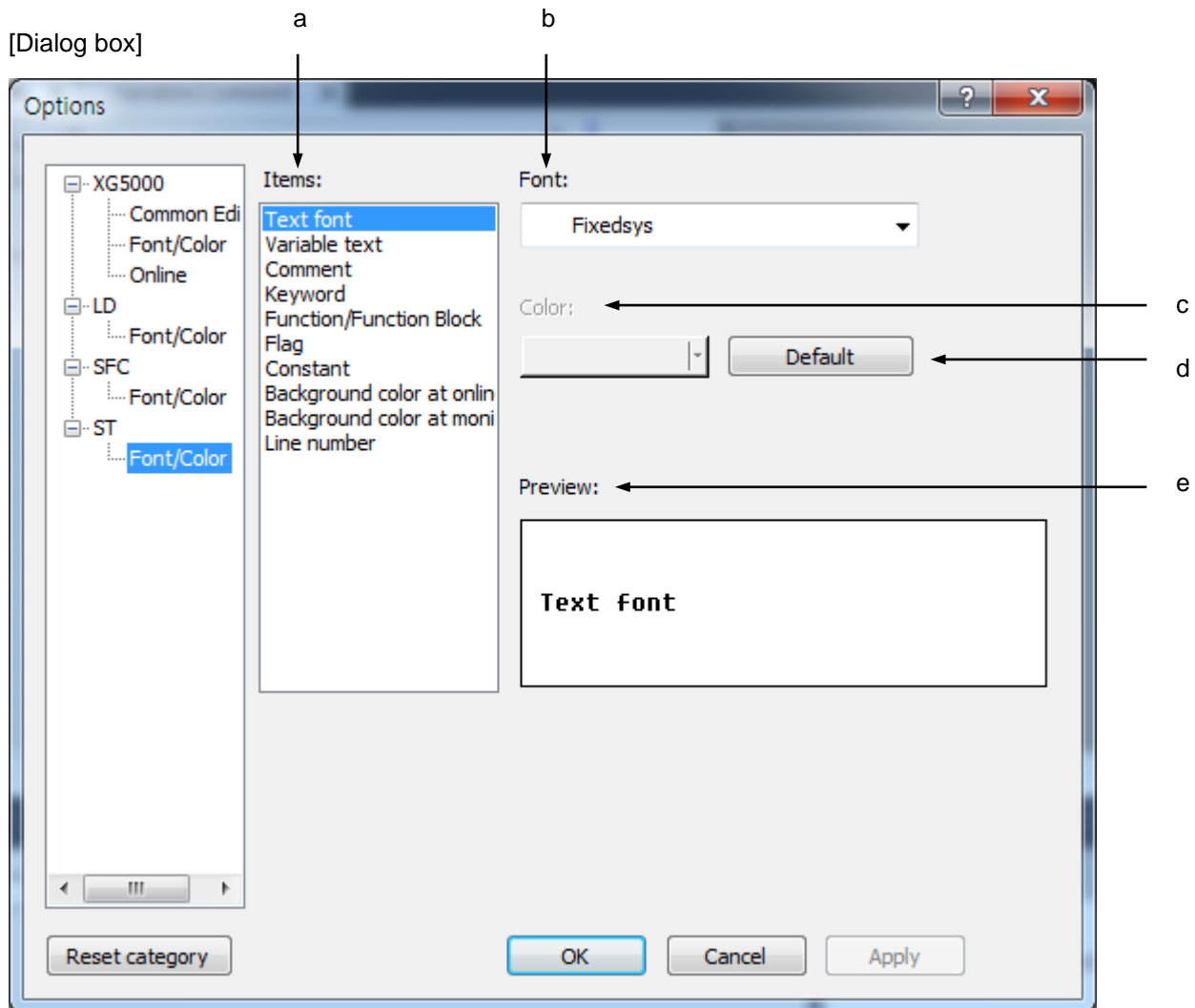
[Dialog box]

[Description of dialog box]

a. Items: Used to select the area to specify its font or color.

b. Font: activated when item is Variable/Comment, specifies font of Variable/Comment

c. Color: activated when item is not Variable/Comment, specifies color

d. Default: for selected item, restore default value

e. Preview: displays the setting value of the selected item

Chapter 3. Project

3.1 Project Configuration

The items of the project configuration are follows.

[Dialog Box]
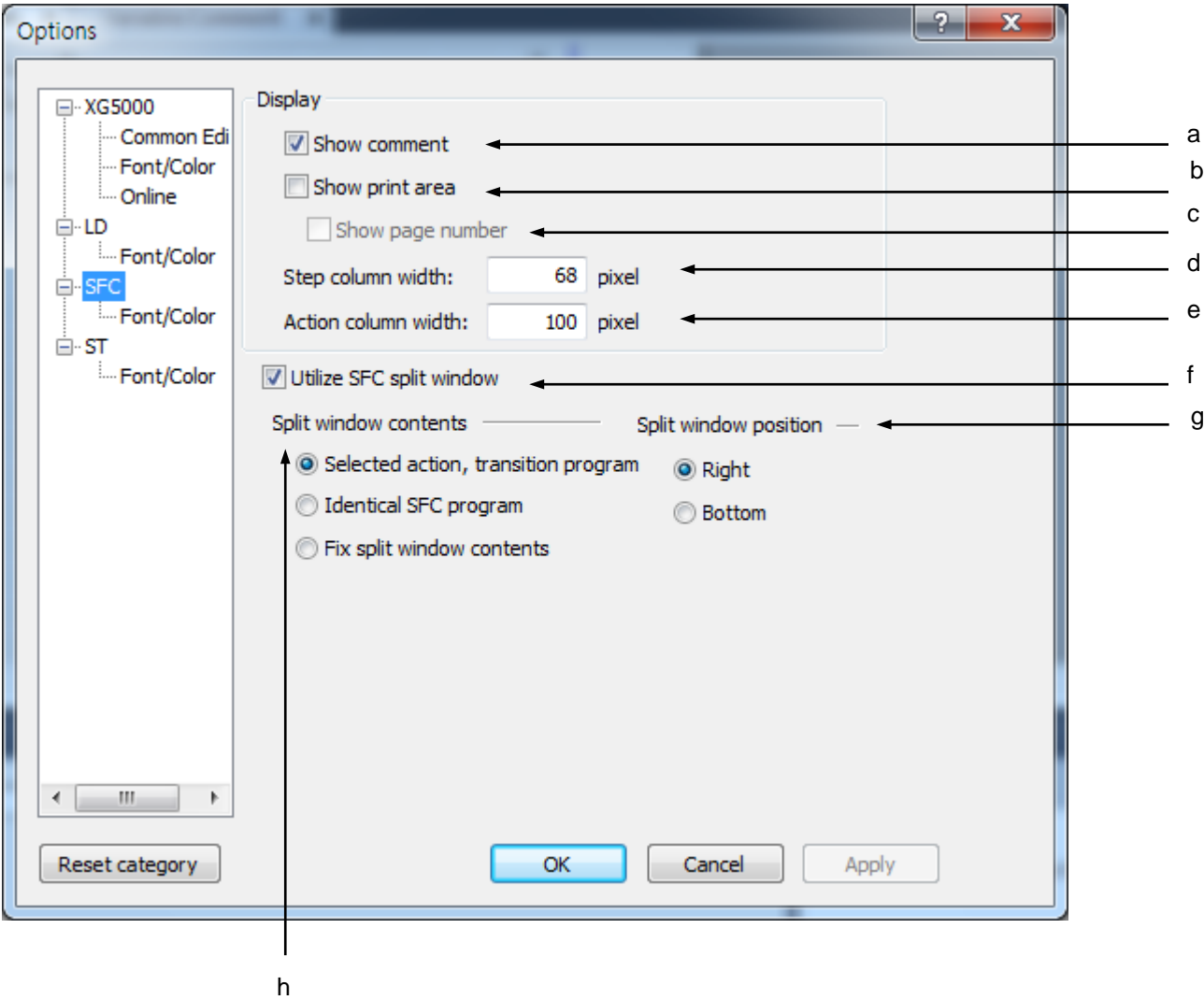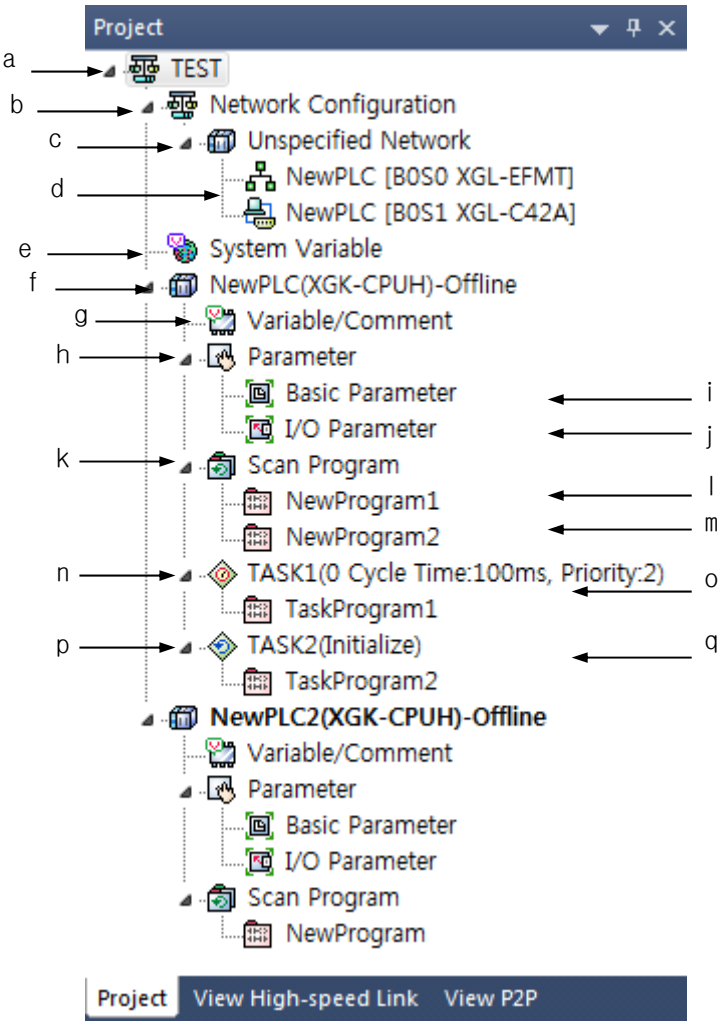
[Description of Dialog Box]

a. Project: Defines the whole system. One project can include several related PLCs.

b.Network configuration: Defines the networks belonging to the project.

c.Added network: Can add the networks of various types.

d.Communication module: Indicates the communication module belonging to the networks.

e.System variable: Indicates the variables shared among PLCs through the network.

f.PLC: Indicates the system corresponding to one CPU module.

g.Variable/Comment: Can edit and view the variables and comments saved to the device.

h.Parameter: Defines the operation and configuration of the PLC system

i.Basic parameter: Defines the basic operations

j.I/O parameter: Defines the configuration of I/P modules.

k.Scan program: Defines the standing executive program in the subcategory.

l.Program1: It is the standing executive program defined by a user.

m.Program2: It is the standing executive program defined by a user..

n.Task1: Indicates fixed-cycle tasks defined by a user.

o.Program1: It is the program that is executed depending on the task 1's conditions.

p.Task2: It is the initialization task defined by a user.

q. Program2: It is the program executed only when being converted into Run mode.

Notes
- Several PLCs can be included in one project. In this way, with several PLC included in one project its management will be convenient, and monitoring several PLCs will be also available through simultaneous connection to several PLCs with one running XG5000.

3.2 Project File Management

3.2.1 New Project

It is used to create a new project. At this moment, a folder whose name is identical to the project name will be also created, where the project file will be created.

[Steps]

1. Select [Project]-[New Project] on the menu.
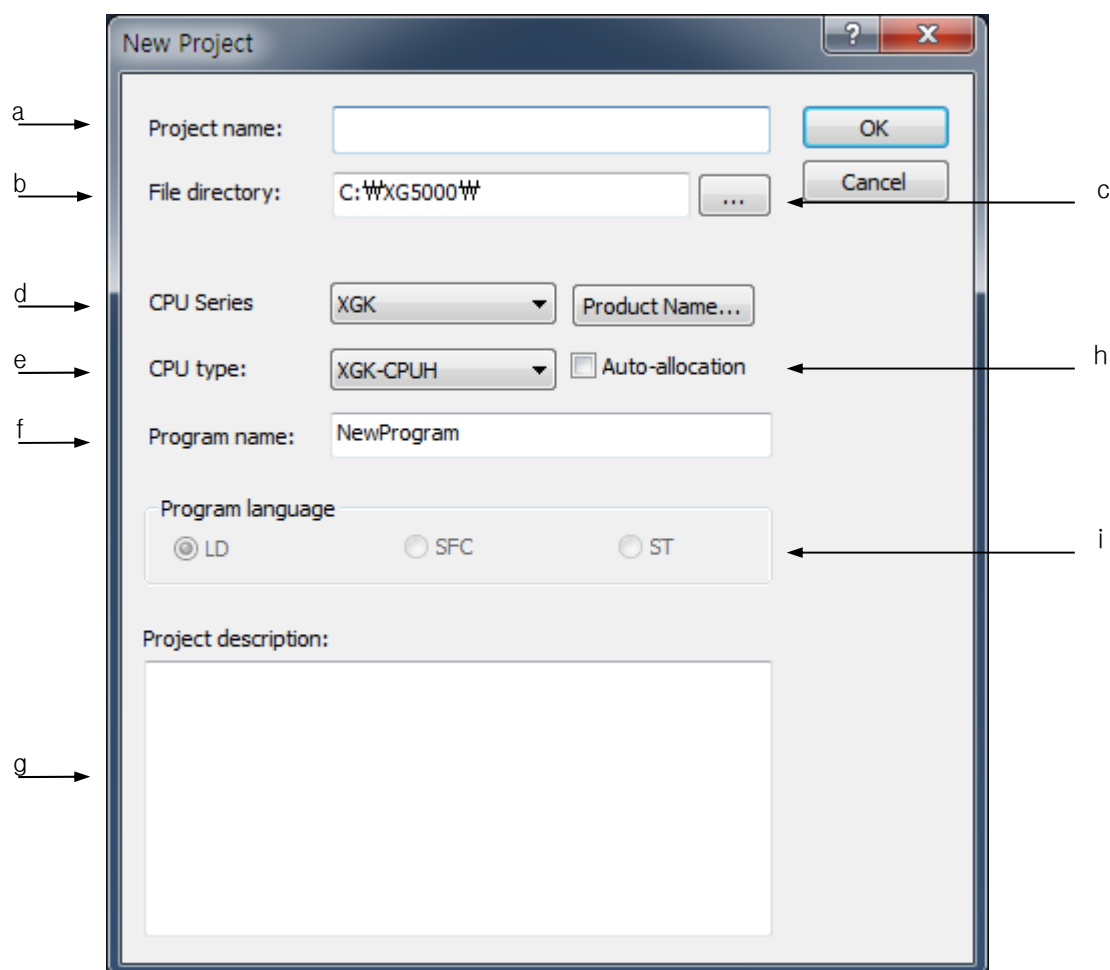
[Dialog Box]

[Description of Dialog Box]

  a. Project name: used to input the desired project name, which will be the name of the project file. The extension of the project file will be ".xgwx".

  b. File directory: a folder whose name is identical to the project name as specified by the user will be created and there the project file will be created.

  c. […]: used to specify the project file location after searching for the existing folders.

  d. PLC type: used to select the PLC unit.

  e. CPU type: used to select the CPU type

  f. Program name: specifies program name basically included in project

  g. Project description: inputs project description

  h. Auto-allocation: if you check this option, you can use the following options

      - Local variable: accessible within one program

      - Global variable: accessible within all programs

      - ST language

      - SFC language

Note
- If you select auto-allocation, when declaring variable, you can't allocate device. XG5000 allocates device automatically   - Auto-allocation can be applied to only XGK series.

  i. Program language: activated when selecting IEC type PLC or auto-allocation function.

Notes
- Project File: If a new project is created, a folder whose name is identical to the project file name will be created, where the project file will be created inside. The extension of ".xgwx" will be automatically attached to the project file if not specified.

- **Product Table classified by PLC Series**

PLC Series	CPU	Name	PLC Series	CPU	Name
XGK	XGK-CPUE	XGK-CPUE		XGB-XBCU	XBC-DN32UA
	XGK-CPUS	XGK-CPUS			XBC-DR28U
	XGK-CPUA	XGK-CPUA			XBC-DR28UP
	XGK-CPUH	XGK-CPUH			XBC-DR28UA
	XGK-CPUU	XGK-CPUU		XGB-XBCS	XBC-DR30SU
	XGK-CPUSN	XGK-CPUSN			XBC-DN30S(U)
	XGK-CPUHN	XGK-CPUHN			XBC-DP30SU
	XGK-CPUUN	XGK-CPUUN			XBC-DR20SU
XGI	XGI-CPUE	XGI-CPUE			XBC-DN20S(U)
	XGI-CPUS	XGI-CPUS			XBC-DP20SU
	XGI-CPUH	XGI-CPUH			XBC-DR40SU
	XGI-CPUU	XGI-CPUU			XBC-DN40SU
	XGI-CPUU/D	XGI-CPUU/D			XBC-DP40SU
	XGI-CPUUN	XGI-CPUUN			XBC-DR60SU
XGR	XGR-CPUH	XGR-CPUH/F	XGB		XBC-DN60SU
		XGR-CPUH/T			XBC-DP60SU
		XGR-CPUH/S		XGB-XBCE	XBC-DR10E
	XGR-INC	XGR-INCT			XBC-DN10E
		XGR-INCF			XBC-DP10E
XGS	XGS-CPU	XGS-CPU01A			XBC-DR14E
XGB	XGB-DR16C3	XGB-DR16C3			XBC-DN14E
	XGB-DR32HL	XGB-DR32HL			XBC-DP14E
	XGB-XBMS	XBM-DR16S			XBC-DR20E
		XBM-DN16S			XBC-DN20E
		XBM-DN32S			XBC-DP20E
	XGB-XBCH	XBC-DR32H			XBC-DR30E
		XBC-DN32H			XBC-DN30E
		XBC-DR64H			XBC-DP30E
		XBC-DN64H		XGB-XBMH	XBM-DN32H
		XBC-DN32H/DC		XGB-XBMH2	XBM-DN32H2
		XBC-DN64H/DC		XGB-XBMHP	XBM-DN32HP
		XBC-DR32H/DC	XGB(IEC)	XGB-XECH	XEC-DN32H
		XBC-DR64H/DC			XEC-DN64H
	XGB-XBCU	XBC-DN32U			XEC-DP32H
		XBC-DN32UP			XEC-DP64H

PLC Series	CPU	Name
XGB(IEC)	XGB-XECH	XEC-DR32H
		XEC-DR64H
		XEC-DR32H/D1
		XEC-DR64H/D1
	XGB-XECS	XEC-DN20SU
		XEC-DN30SU
		XEC-DN40SU
		XEC-DN60SU
		XEC-DR20SU
		XEC-DR30SU
		XEC-DR40SU
		XEC-DR60SU
	XGB-XECE	XEC-DN10E
		XEC-DN14E
		XEC-DN20E
		XEC-DN30E
		XEC-DP10E
		XEC-DP14E
		XEC-DP20E
		XEC-DP30E
		XEC-DR10E
		XEC-DR14E
		XEC-DR20E
		XEC-DR30E
	XGB-XECU	XEC-DN32U
		XEC-DN32UP
		XEC-DN32UA
		XEC-DR28A
		XEC-DR28UP
		XEC-DR28UA
	XGB-XEMH2	XEM-DN32H2
	XGB-XEMHP	XEM-DN32HP
XMC	XMC-E32A	XMC-E32A
	XMC-E32C	XMC-E32C

3.2.2 Open Project

[Steps]

1. Select [Project]-[Open Project] on the menu.

[Dialog Box]
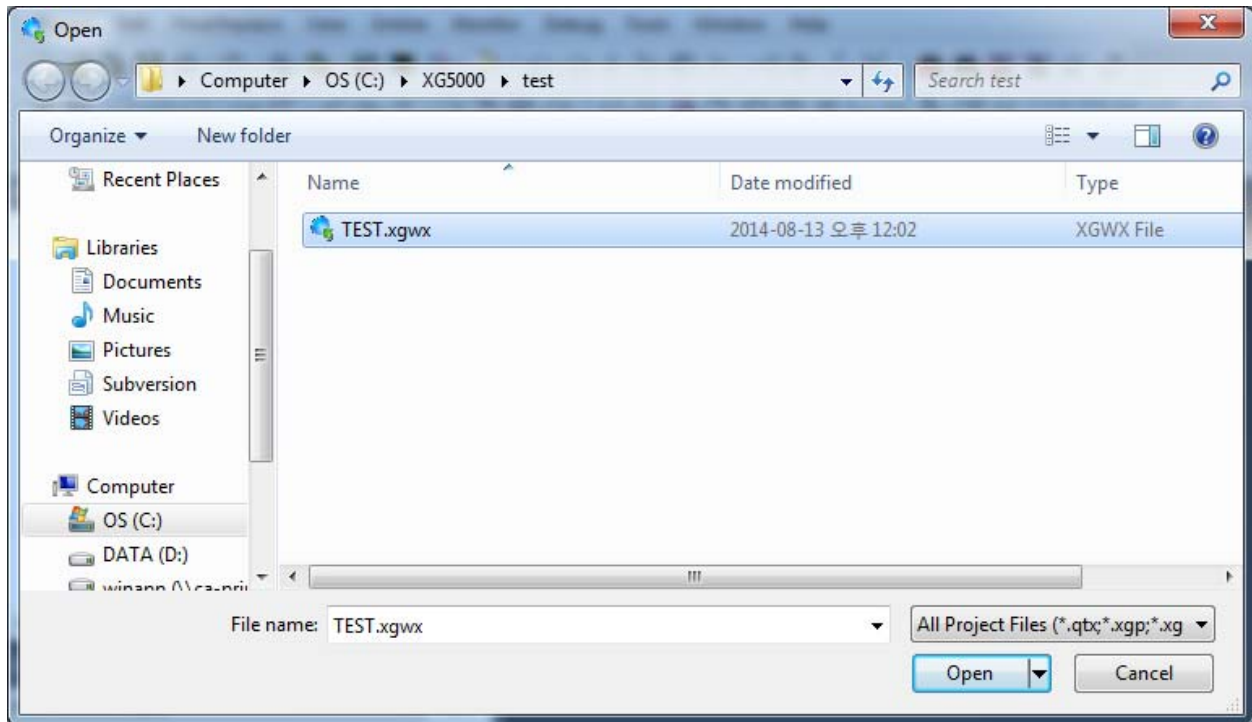
2. If Project File is selected, user defined comment will appear on the comment which will help the user to select the project. If project file selected Click [Open].

3.2.3 Open from PLC

It is used to read the project stored in PLC to make a new project. If the project is already open in XG5000, this project will be closed to create a new project.

[Steps]

1. Select [Project]-[Open from PLC] on the menu.

[Dialog Box]
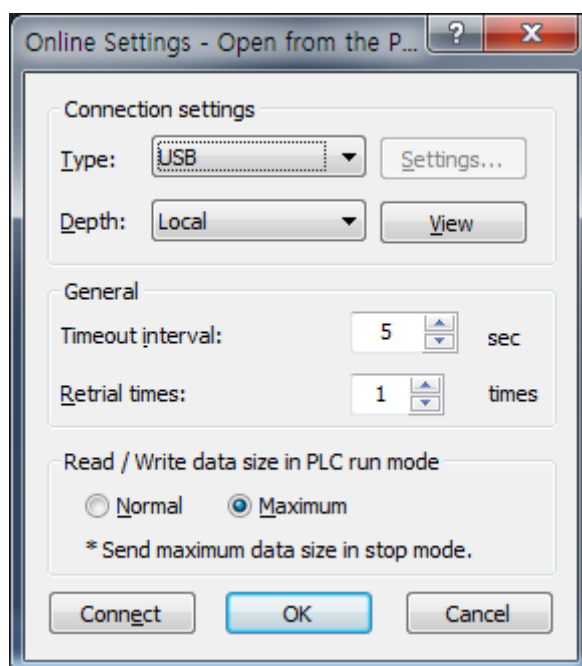
2. Select the object to connect to on the [Online Settings] and click [OK]. Refer to Connect Options in On
   -line for details on connection settings.

3. A new project will be created.

Notes

- The project read from PLC will be saved in PC through the menu [Project]-[Save Project].

Notes

- Select [Online]-[Read] to read the items of PLC and import to the presently Open Project.

3.2.4 Save Project

It is used to save the changed project.

[Steps]

1. Select [Project] - [Save Project] on the menu.

Notes

‒ If items of project is changed and needed to be saved, "*" will be displayed at the side of the project
 name of the project window.
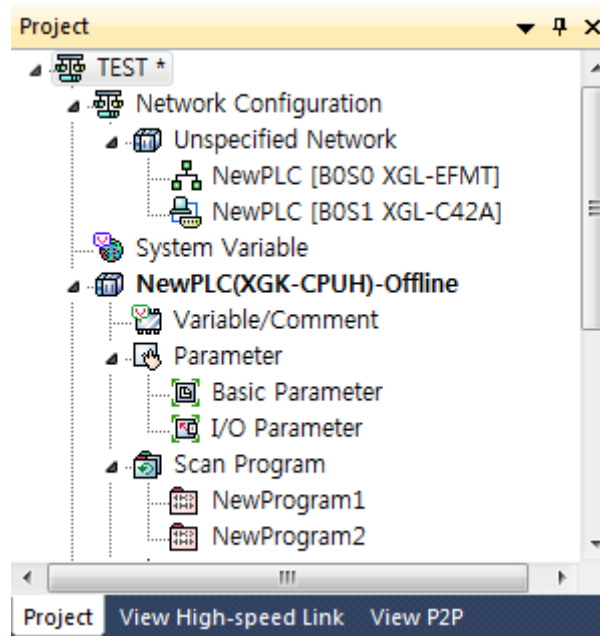
3.2.5 Save as

It is used to save the project as a different file name.

[Steps]

1. Select [Project]-[Save As] on the menu.
2. Input a new project file name and select a folder where project file will be saved and click [OK] button.

[Dialog Box]
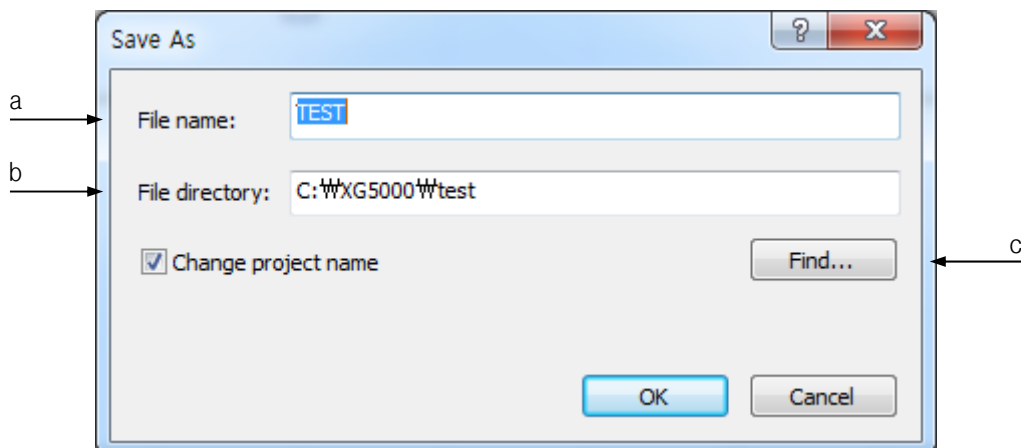
[Description of Dialog Box]

   a. File name: used to input the desired project name, which will be the name of the project file. The extension of the project file will be ".xgp".

   b. File directory: a folder whose name is identical to the project name as specified by the user will be automatically created, where the project file will be created.

   c. Find: used to specify the project file location after searching for the existing folders.

3.2.6 Opening unread project

[Procedures]

1. Open the integrated project from the PLC.
2. Select the PLC items of offline state to be read.
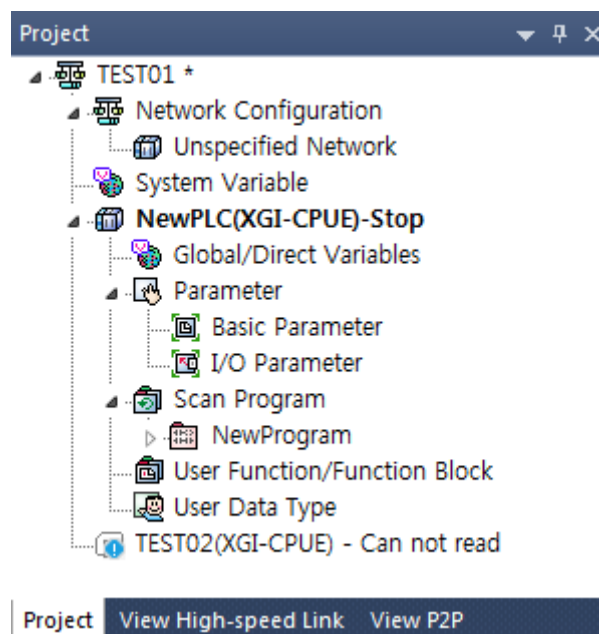
3. Select the menu [Online]-[Read].

Note

- To read the selected items from the PLC normally, the following conditions should be met.

    1) The PLC items in the project should be all Write-Enable.

    2) It must be matched with the connected PLC model.
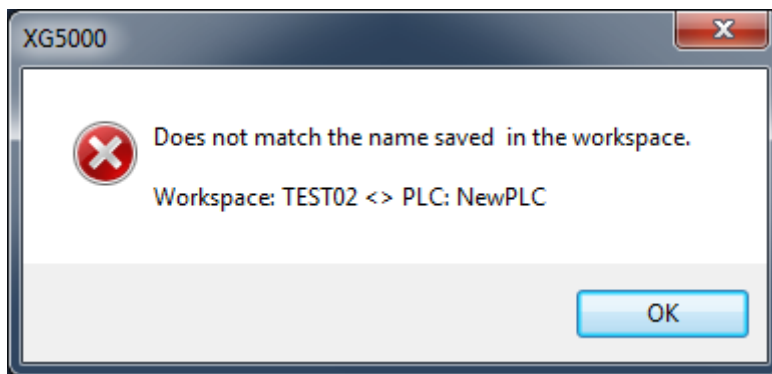
- In the event the information of the selected PLC items is not matched, you can reconfigure the PLC in the following manner.

    1) Delete the unread PLC items.

    2) Add the same type of projects.

    3) Connect to the PLC and read by using the menu [Online]-[Connection Setting] function.

    4) Press [Apply] button in IO parameter to configure the basic network.

3.3 Open KGLWIN File

3.3.1 Open KGLWIN file

It is used to read KGLWIN project file in XG5000 to convert to XG5000 project. The list of the project convertible items are as follows.

- Program (LD, IL)
- Variable/Comment
- Rung/Output comment
- Basic Parameters
- Monitor Variable

The list excluded items from conversion of the KGLWIN project file into XG5000 project is as follows.

- I/O Parameter
- High-speed link parameter.
- Inside the program (NOP instruction)

I/O Parameter is excluded from conversion since it has different PLC unit and different I/O type.

HS link parameter is excluded from conversion since the process of the HS link in XGT is different from that of Master-K series PLC. And HS link-related instruction is also excluded from conversion of project.

[Steps]

1. Select [Project] - [Open KGLWIN File] on the menu.
2. Select the folder where KGLWIN project to open is stored in and select KGLWIN project file to convert to XG5000 project.
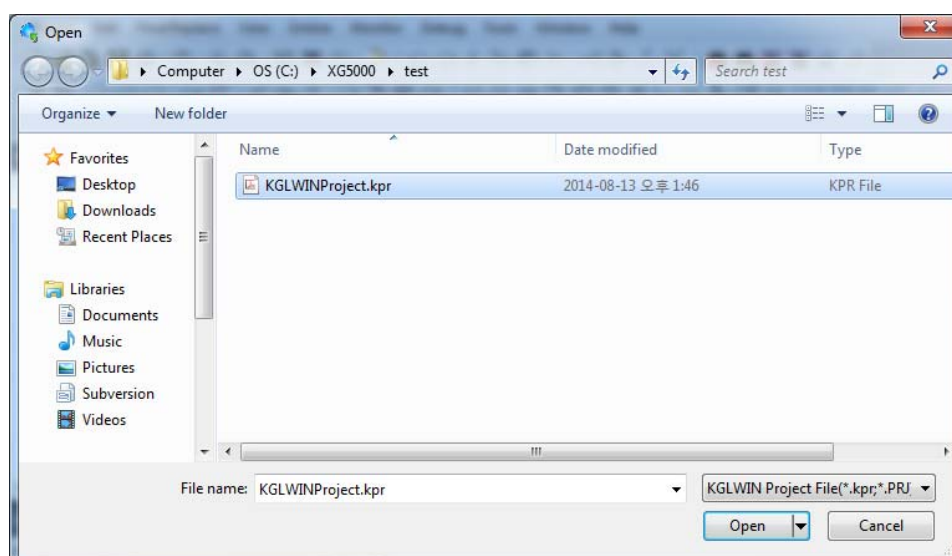
3. Click Open to display the New Project Dialog Box.
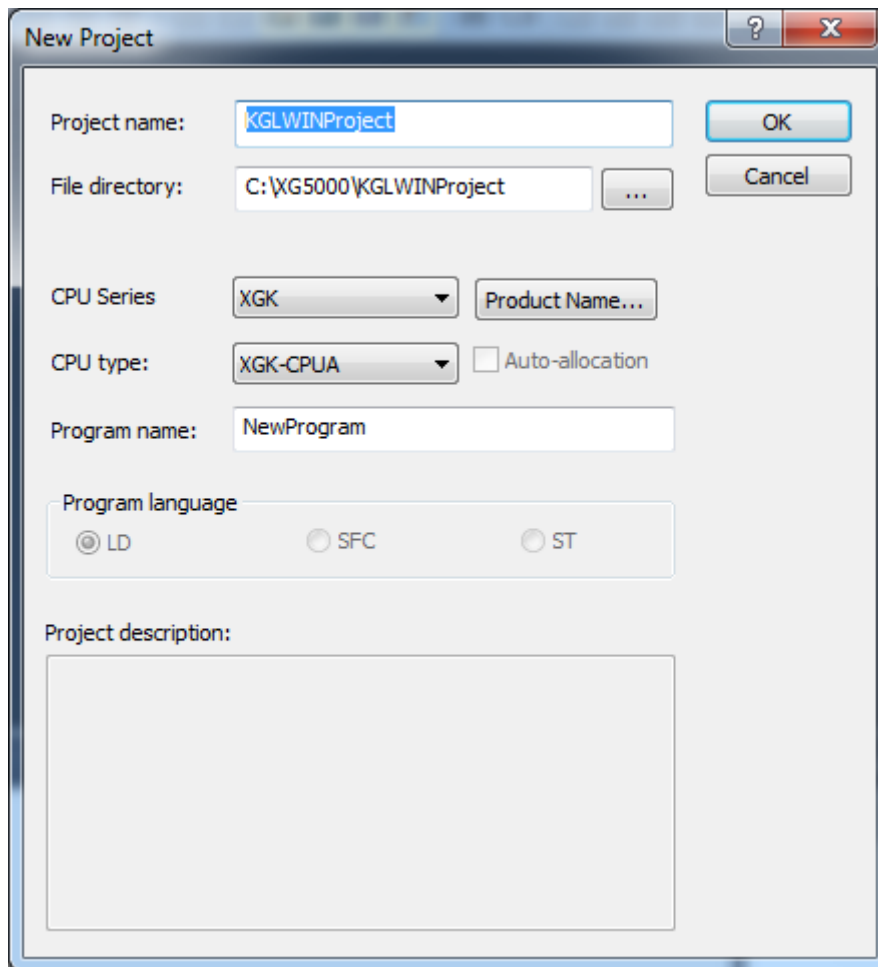
4. Input Project name, PLC type, etc. and then click [OK]. Then XG5000 will convert KGLWIN file into XG5000 project. If any error occurs while the file is converted, it will be displayed on the result window. Refer to the next chapter for details on errors.
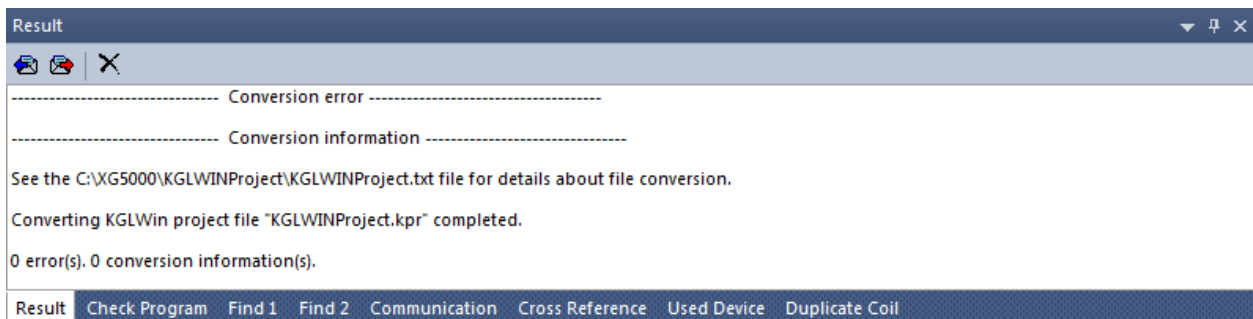
3.3.2   KGLWIN Project conversion rules

1) Device/Memory Area

  KGLWIN Project and XG5000 Project are different from each other in device type and memory area. Since XG5000 can use all the devices KGLWIN uses, and its memory area larger than that of KGLWIN, it brings the exact details of KGLWIN when converted. However, the user may need to modify the details for effective application of the memory area, refer to XG5000 memory or using the device function used.

2) Change Variable Name

  In XG5000, a blank or a special character can not be used in the variable name, and figure can not be used at the start of variable name. Thus, when the project is converted, the area applicable to the special character or the blank will be converted to '_' automatically. In addition, if the start of the variable name is with a figure, '_' will be automatically attached in front of figure. If a variable name which was seen in KGLWIN is not seen when the project converted, carefully check if '_' is included.

  KGLWIN or XG5000 uses the Flag Variable respectively. Flags (F device area) are somewhat different between KGLWIN and XG5000. Accordingly the variable name applicable to the flag will not convert but follow the XG5000 variable name.

  XG5000 regards BIT, WORD type of T, C device area as a variable. If the variables of both BIT and WORD type are registered in KGLWIN, it shall be selected which variable to use during the conversion.

3) Rung/Line comment

  Rung comment and Line comment will be converted 1 to 1. However, since the step number can be changed while KGLWIN project is converted to XG5000 project, the location of Rung or Line comment in KGLWIN may be different from the location in XG5000.

4) Basic Parameters

  Basic Parameters of KGLWIN Project will be converted to XG5000 Project only in common area based on the PLC unit.

  Example: If K1000S is converted to XGK-CPUH, latch area, timer limit, watch-dog timer, PLC operation mode, etc. will be converted.

5) Program Converted
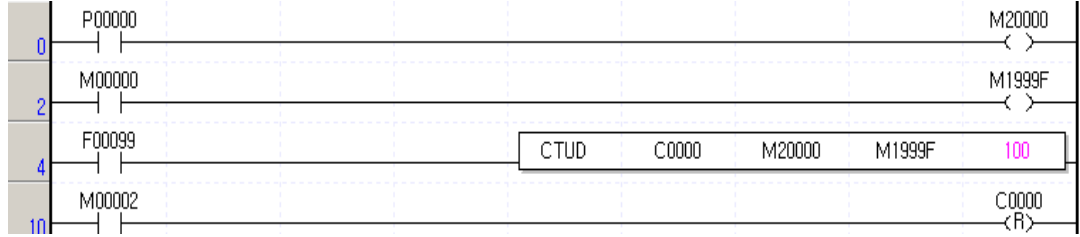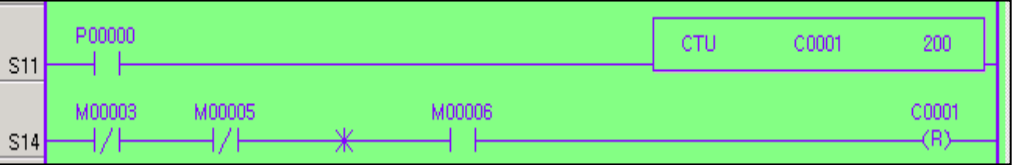
  If any error occurs on KGLWIN project file, a warning message will appear.

<table>
<tr><td>Notes</td></tr>
</table>
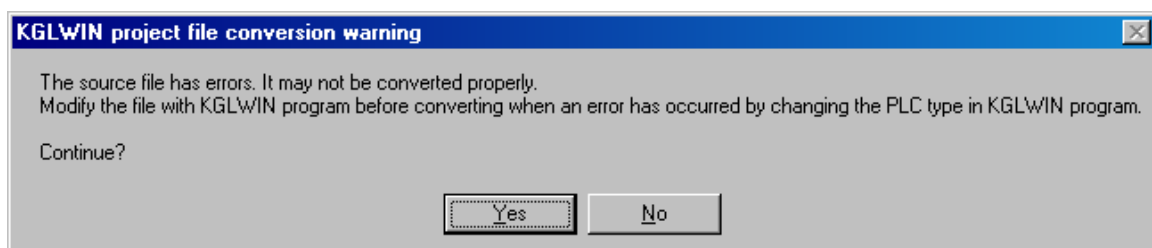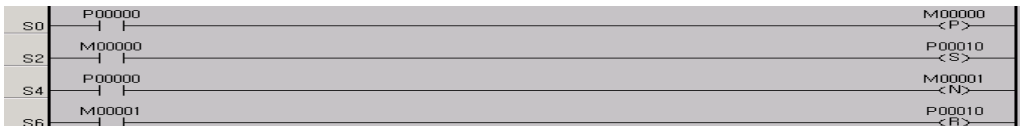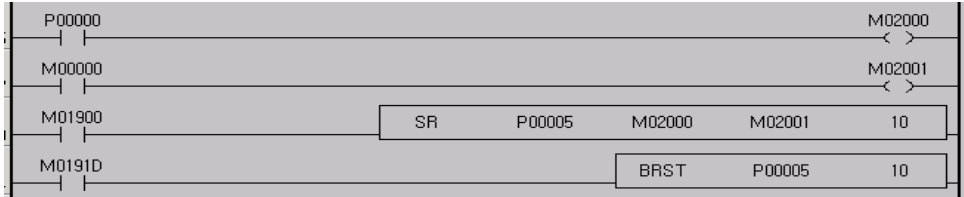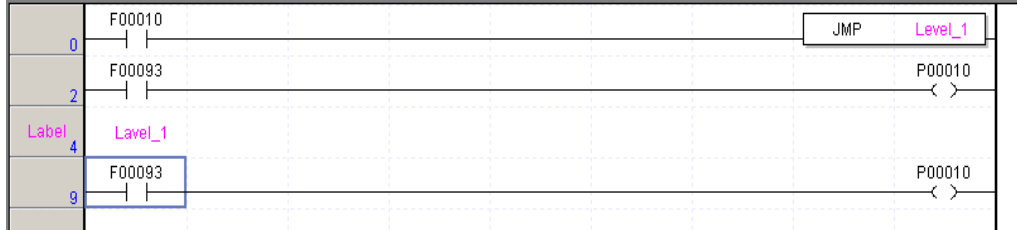
- If any error occurs on LD logic, LD logic may not be converted exactly. Let the error all cleared if possible and then start to convert.

Application instructions used in Master-K series PLC are somewhat different from those used in XG5000. Some exceptions generated when converting Application instructions of other programs are as follows.

Instructions with changed LD display	
Instruction CTUD	MK series
	XGK series
	The display format of CTUD has been changed among counter instructions. In front of UP/DOWN counter instruction, CTUD, always ON flag, F99, must be located. Three output coils must be created with M area's remnant addresses which will be used Up/Down, trigger and counter reset signals, respectively. Information on M area memory used will be displayed on the result window of XG5000. The user should be careful not to use the area used by XG5000.
Instructions CTU, CTD, CTR	MK series
	XGK series

Instructions with changed LD display	
	The display format of CTU, CTD and CTR has been changed among counter instructions. The instruction displayed in 2-line block in KGLWIN will be displayed as divided in 1 line. Reset signal must be created with M area's remnant addresses. Information on M area memory used will be displayed on the result window of XG5000.. The user should be careful not to use the area used by XG5000.
Output instructions SET/RST D, D NOT	MK series
	XGK series
	The display format of the instructions above has been changed. D/D NOT instructions are displayed in –(P)- / -(N)- respectively, and SET/RESET instructions in -(S)- / -(R)- respectively with the identical operation. The changed details of the instructions above are displayed on the XG5000's output window as "Changed Information: Instruction Name Changed".
Instructions (D)ROR(P) (D)ROL(P) (D)RCL(P) (D)RCR(P)	MK series
	XGK series
	The number of operands of the instructions above has been changed to 2 due to the extended function in XG5000. Since these instructions are used to rotate by 1 bit in a word or double word in KGLWIN, the instructions will fill the default with 1 of the second operand when converted to XG5000 project. The operation is identical with operation in KGLWIN. There will not any result message for conversion.
Move instruction SR	MK series

Instructions with changed LD display	
	XGK series The SR instructions will be displayed with 4 separate lines. At this moment also, Two output coils must be created with M area's remnant addresses which will be used for input and direction signals. And BRST instruction must be added to reset the data.
Diverge instructions JMP,JME	MK series
	XGK series While a figure is used for the label for JMP, JME instruction in KGLWIN, XG5000 uses the String for label. To specify this, XG5000 converts KGLWIN factor of figure to String with "LABEL_" attached in front for the figure. The result window messages of the instructions converted are as follows. JME – Displayed as "Label" in XG5000. Since the instruction name is LABEL internally, "Changed Information: Instruction Name Changed" will be displayed JMP – No Changed Information will be displayed on the result window of XG5000.
Diverge instructions CALL,SBRT	MK series

Instructions with changed LD display	
	XGK series CALL and SBRT also use the String factor like JMP and LABEL, and the conversion results are also identical.
Instructions unavailable in XGK **FILR** **FILW**	**MK series**
	XGK series The instructions are not available in XG5000. So, These instructions will be displayed in ERR block as shown above with the Changed Information "Error" displayed on the result window of SG5000. The Changed Information of the instructions above displays on the result window "Error: Error Information is included in KGLWIN File."
Bit Instructions **BSET, BLD, BRST, BLDN, BAND, BANDN, BOR, BORN, BOUT**	**MK series**
	XGK series The instructions above are classified into application instruction with two operands in KGLWIN, but bit instruction in XG5000. The display will be changed to bit instructions. Changed Information of the instructions above displays on the result window "Changed Information: Instruction Name Changed."

The instructions listed in the table below will be changed to other instructions. Because the basic data type of operands are changed from unsigned integer to signed integer. U which located the last of instructions means unsigned integer and S means signed integer. The message "Changed Information: Instruction Name Changed" will be displayed on the result window.

| Instructions with the name changed ||
MK series	XGK series
DD	ADDU
ADDP	ADDUP
DADD	DADDU
DADDP	DADDUP
DDEC	DDECU
DDECP	DDECUP
DDIVS	DDIV
DDIVSP	DDIVP
DDIV	DDIVU
DDIVP	DDIVUP
DEC	DECU
DECP	DECUP
DI(n)	DIN
DINC	DINCU
DINCP	DINCUP
DIVS	DIV
DIVSP	DIVP
DIV	DIVU
DIVP	DIVUP
DMULS	DMUL
DMULSP	DMULP
DMUL	DMULU
DMULP	DMULUP
DSUB	DSUBU
DSUBP	DSUBUP
EI(n)	EIN
INC	INCU
INCP	INCUP
JME	LABEL
MULS	MUL

Instructions with the name changed	
MK series	XGK series
MULSP	MULP
MUL	MULU
MULP	MULUP
D NOT	OUTN
D	OUTP
SUB	SUBU
SUBP	SUBUP

The instructions listed in the table below will be deleted when KGLWIN project is converted to XG5000 project. The message "Error: Instruction Deleted" will be displayed on the result window of XG5000.

Instructions unavailable in XGK series
ECON
CONN
DFILR
DFILRP
DFILW
DFILWP
DRCV
DSND
FILR
FILRP
FILW
FILWP
HSCNT
HSCST
MEND
MODBUS
MODCOM
PID8
PID8AT
PLSOUT
POSCTR
POSDST
POSIST
POSJOG

Instructions unavailable in XGK series
POSORG
POSSOR
POSVEL
PWM
RCV
READ
READP
RGET
RPUT
SEND
SND
SND8
SNDCOM
STATUS
TRCV
TSND
URCV
USND
WRITE
WRITEP

6) Change Flag Information

The flags used in MK series and XGT series have been changed partially. Accordingly the changed flags will be automatically converted to the flags identically operated.

Refer to CPU manual for details on the changed flags.

Notes

‒ It is necessary to confirm the flag used in the program.

The message "Changed Information: Flag Purpose Changed" will be displayed on the result window if there is more than one changed flag in the converted project.

3.3.3 Confirm converted file

The conversion result is displayed on the result window as shown below along with the step number in the original project file and the step number in the converted XG5000 file for the user to double-click the mouse on the list of the result window to go to the applicable location.

```
Message Window                                                                    ⊠
------------------------------ Conversion error ------------------------------    ▲

------------------------------ Conversion information ------------------------------
     Conversion information: [XG5000 step:0004, KGLWIN step:0004] Change instruction name: ADD => ADDU
     Conversion information: [XG5000 step:0020, KGLWIN step:0028] Change instruction name: DINC => DINCU
     Conversion information: [XG5000 step:0022, KGLWIN step:0031] Change instruction name: DMULS => DMUL
     Conversion information: [XG5000 step:0026, KGLWIN step:0038] Change instruction name: DDIVS => DDIV

See the C:\XG5000\KGL_Transform\KGL_Transform.txt file for details about file conversion.

Converting KGLWin project file "KGL_Transform.PRJ" completed.
                                                                                  ▼
◄                                                                               ►
|◄ ◄ ► ►|\Result /\ Check Program /\ Find 1 /\ Find 2 /\ Communication /\ Cross Reference /\ Used Device /\ Duplicate Coil /
```

1) Classification Based on the Output Messages

Changed Information	Change instruction name	The instruction name is changed even with the identical function.
	Flag address changed	The flag name is changed even with the identical function.
Error	Error Information included in KGLWIN file. {ERR.}	Error information is included in the original file.
	Instruction unavailable in XG5000	Once used in KGLWIN but deleted from XG5000. Displayed as ERR instruction in LD.

2) Log File Messages of Changed Information

Information on Project Change leaves its log of the String file (extension: txt) name identical to the newly created project. At this moment, the following messages will be displayed.

Messages	Description
Instruction Name Changed	The instruction name is changed even with the identical function.
Flag address changed	The flag name is changed even with the identical function.
Instruction Properties Changed: Operand to String	The operand of the diverge instructions JME, JMP, CALL, etc. changed from positive integer to string
Instruction Properties Changed: Display format	The display of the instructions CTD, CTUD, SR, etc. by 2~4 lines block changed to 1 line block association.
Instruction Properties Changed: Number of operands, default applied	Due to extended function such as ROR and ROL, the number of operands increased or deceases.
Instruction Properties Changed: Operand to Single Bit	Applicable to BLD, BSET, etc. among application instructions, basic instructions changed due to basic instructions extended.
Error Information in KGLWIN File	Error information is included in the KGLWIN project file.

Instruction Deleted	Once used in KGLWIN but deleted from XG5000. Displayed as ERR instruction in LD.

Step number for KGLWIN and XG5000 is displayed to make easy to find the location applicable to each message. Select [Find/Replace]-[Go To]-[Step] on the menu to confirm the details.

> Notes
>
> After the Project conversion, surely confirm or change the following items.
> - If application instruction is on ERR in XG5000.
> - If any error occurs on KGLWIN LD program
> - If the flag is used
> - Converted details of the basic parameter
> If any error occurs on KGLWIN project file or the file is incomplete, surely correct it so to download onto PLC for its application.

3.4 Project Item (PLC, Task, Program)

3.4.1 Add item (PLC, Task, Program)

PLC, task and program can be inserted into the project additionally.

1) Add PLC

[Steps]

1. On the project window, select the Project Item.
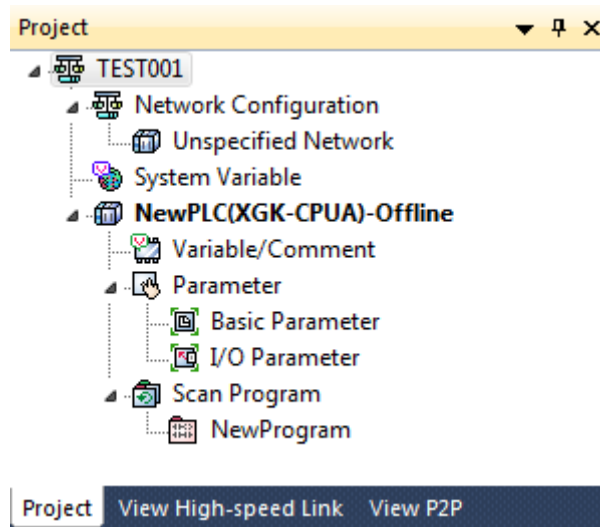
2. Select [Project]-[Add Item]-[PLC] on the menu.
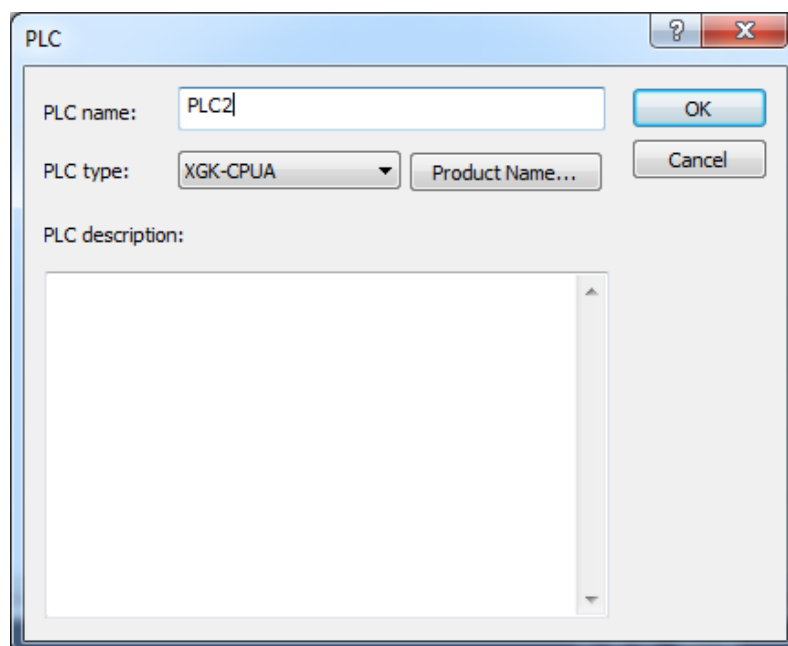
3. Input PLC name, PLC type and PLC Description, and then click [OK] to create a new PLC a shown below.
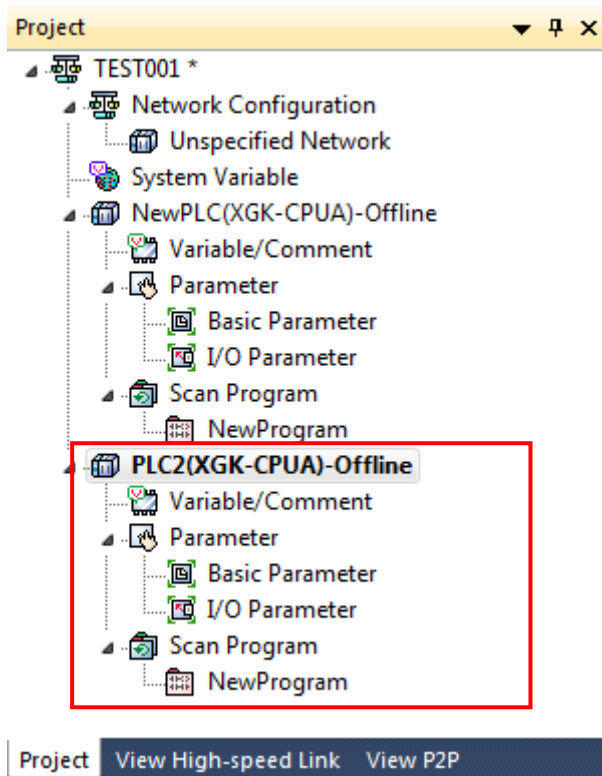
Notes
- PLC is kind of a project as in previous KGLWIN. XG5000 allows the user to specify the project as a unit of PLC and include several projects (PLC) in one project to manage conveniently.

2) Add Task

Notes
- Refer to XGK CPU manual for more information on the operation and the details of the task.

[Steps]

1. On the project window, select the PLC Item.
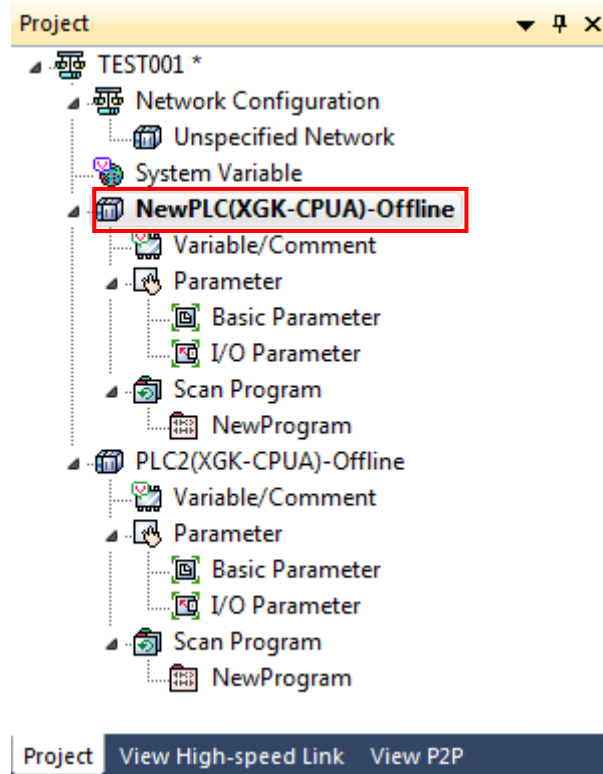
2. Select [Project]-[Add Item]-[Task] on the menu.

[Dialog Box]

[Description of Dialog Box]

    a. Task name: used to input a desired task name. Korean, English and figures can be used except for special characters.

    b. Priority: used to specify the priority of the tasks. The less the figure is, the higher the priority is.

    c. Task number: used to manage the tasks in PLC. According to the execution condition, the number specified in the right shall be used. Ex.) Fixed Cycle: 0 ~ 31

    d. Execution condition: used to specify the execution condition under which the task will be executed.

Notes

 – Execution condition may be different according to the PLC type.

 – Initialization: It is the task to be executed when PLC mode is converted from Stop to Run. It will be executed till the _INIT_DONE (F10250) Flag is ON. And while the initialization task is executed, the programs (including the Scan Program) which belong to other task will not be executed.

 – Fixed Cycle: The task will be executed at an interval of specified time. The time shall be input in ms unit.

 – External contact point: The task will be executed if specified external contact point is ON. Applicable external device shall be input.

    Example) P00016

 - Internal device: The task will be executed based on the status of internal device. The setup item will be different according to the type of internal device.

---

    e. Internal device execution condition: setting items are different according to the type of internal device.

    f. Device: used to input the device name which will be used as the start condition of task program. Input BIT or WORD device according to the condition to execute task program.

    g. Word device start condition: The start condition shall be specified if WORD type of the internal device start condition is selected.

    h. Bit device start condition: The start condition shall be specified if BIT type of the internal device start condition is selected.

3. Input Task name, Priority, Task Number and Execution Condition, and then click [OK] to create a new Task
    as shown below.
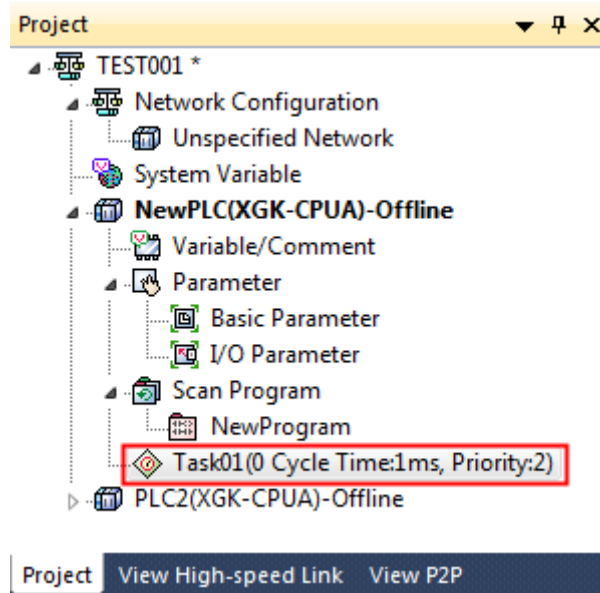
3) Add Program

[Steps]

1. On the project window, select the Program Location to add.
    The program can be added to Scan Program or Task Item.
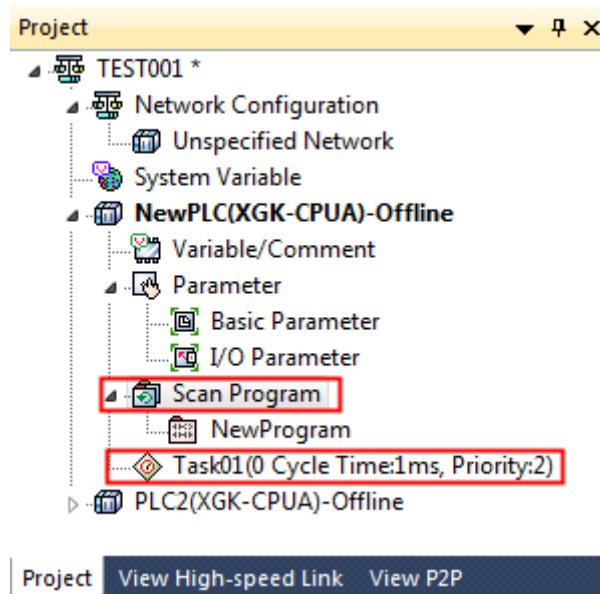
2. Select [Project]-[Add Item]-[Program] on the menu.
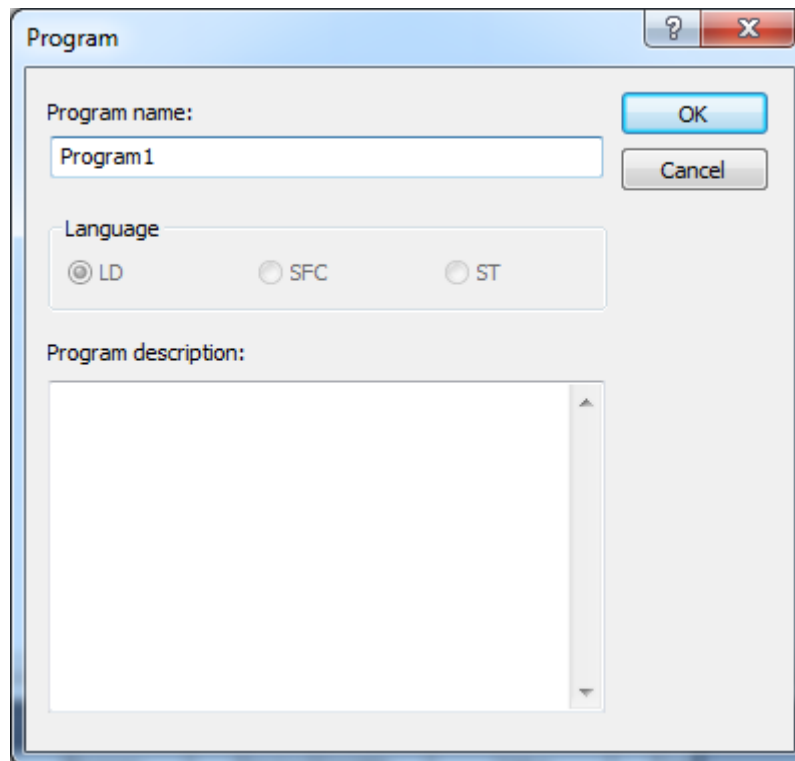
3. Input Program name and Program Description, and then click [OK].
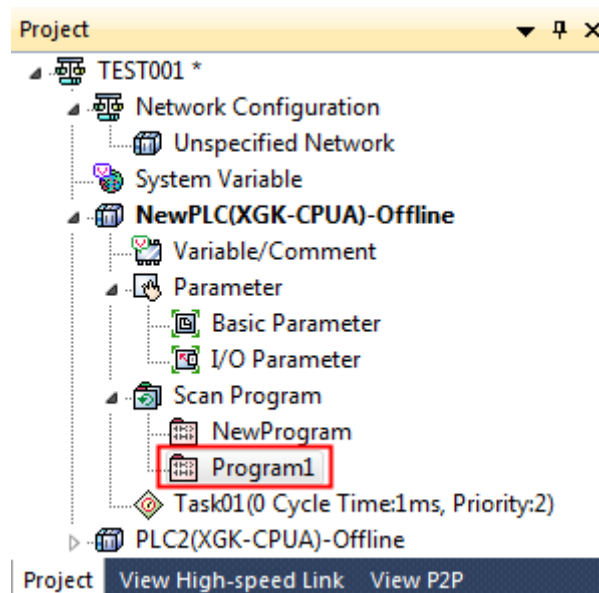
4) Add Function

Function can be added only if XGK series support auto-allocation.

[Steps]

1. Select the position of the function blocks to be added in the project window.
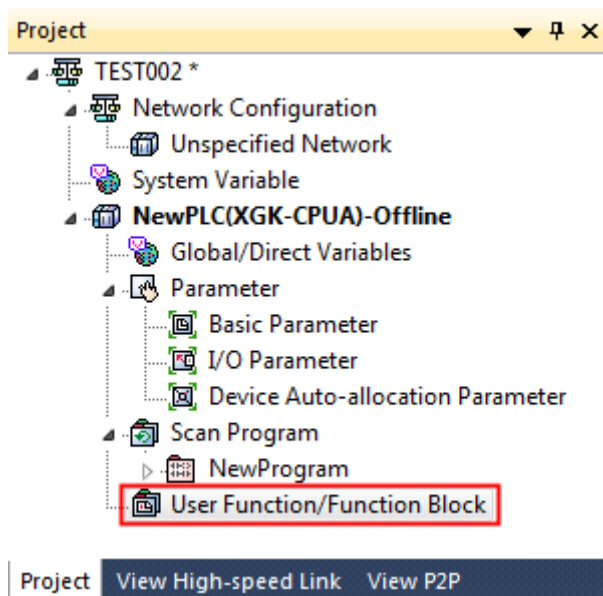
2. Select the menu [Project]-[Add Items]-[Function].
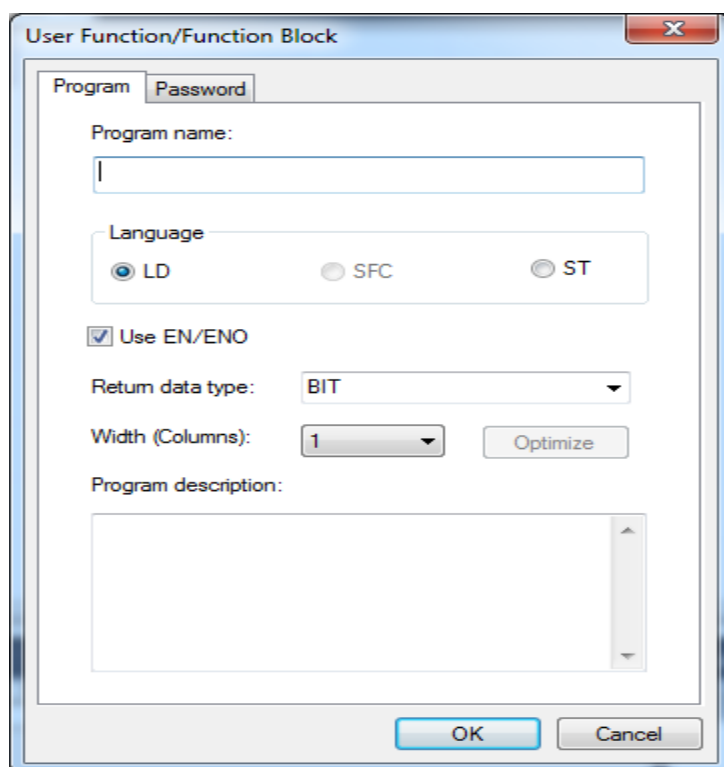
3. After inputting name, language, use of EN/ENO, return data type, the number of width columns, comment, then, press OK button.
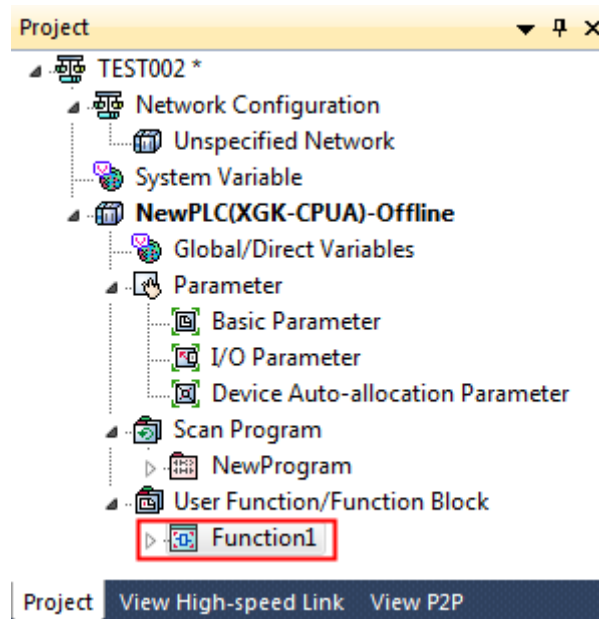
5) Add Function Block

Function block can be added only if XGK series support auto-allocation.

[Steps]

1. Select the position of the function blocks to be added in the project window.
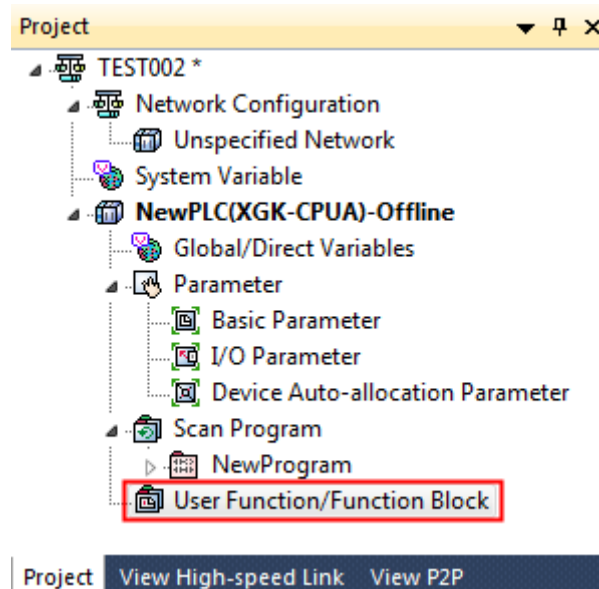
2. Select the menu [Project]-[Add Items]-[Function Block].
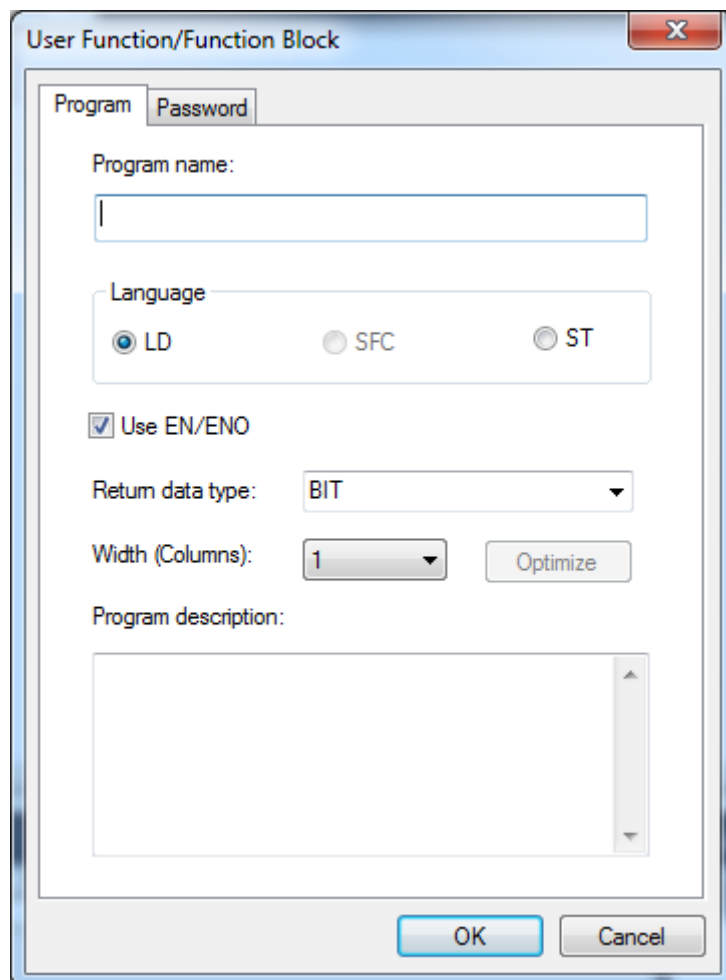
3. After inputting name, language, use of EN/ENO, return data type, the number of width columns, comment, then, press OK button.
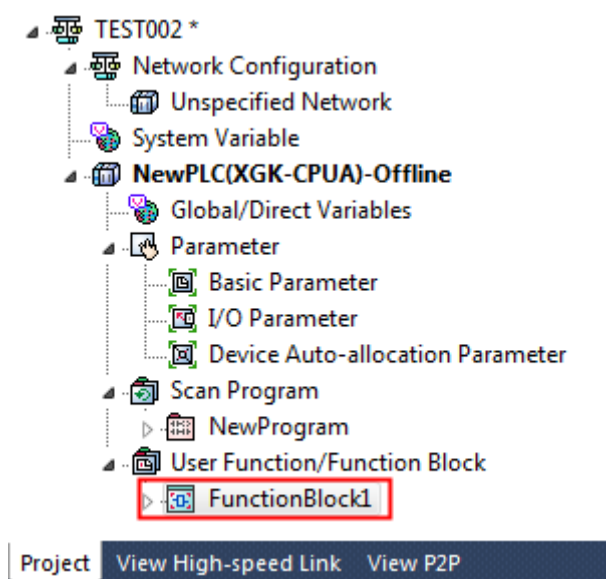
3.4.2 Import item from file

The following items can be saved as separate item files and replaced by saved item file.

Item	File Extension
PLC	cfg
Variable/Comment	cmt
I/O Parameter	iop
Basic Parameter	bsp
Program	prg

Import function is inserting project items such as PLC, program and parameters from saved item files. When import function for an item is executed, the item of currently opened project will be replaced by imported item file.

Notes

- Since Variable/Comment, Basic Parameters and I/O Parameters are overwritten on the existing items, the content of the existing item will be erased.

---

1) PLC

[Steps]

1. On the project window, select the Project Item.
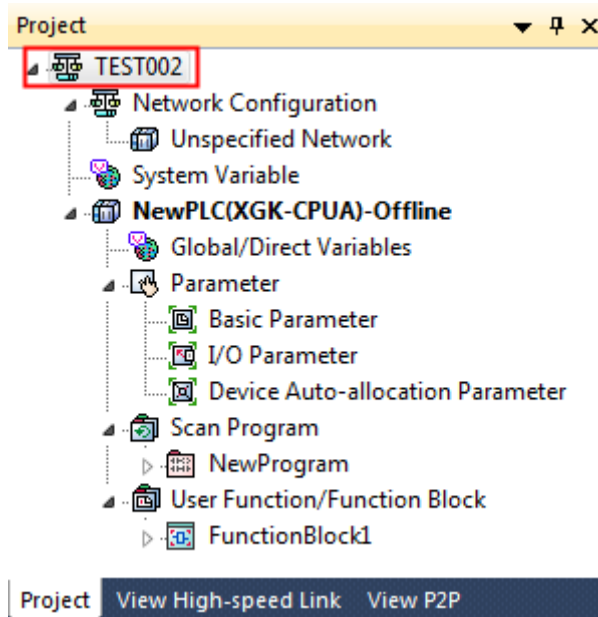
2. Select [Project]-[Import Item from File]-[PLC] on the menu.

3. Select the file, and then click [OK].

2) Variable/Comment

[Steps]

1. On the project window, select the PLC Item.
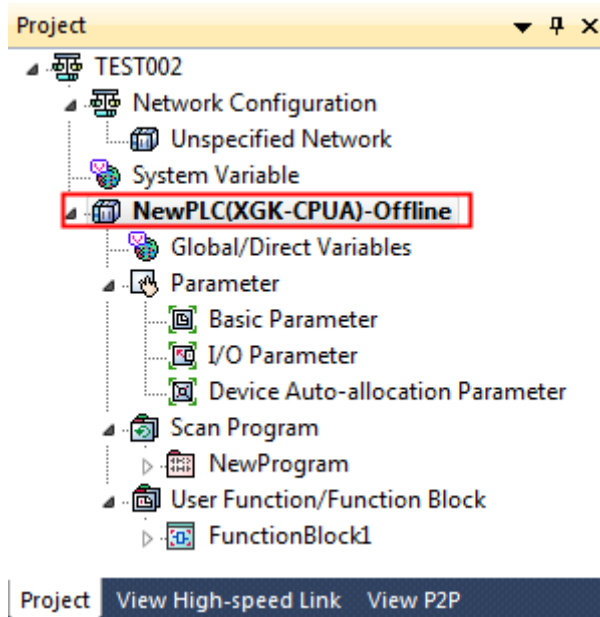
2. Select [Project] – [Import Item from File]-[Variable/Comment] on the menu.

3. Select the file, and then click [OK].

3) I/O Parameter

[Steps]

1. On the project window, select the PLC Item.
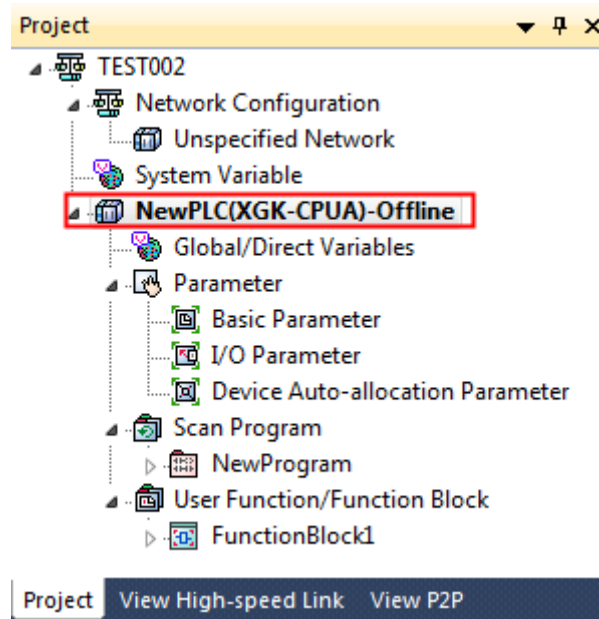
2. Select [Project]-[Import Item from File]-[I/O Parameter] on the menu.

3. Select the file, and then click [OK].

4) Basic Parameter

[Steps]

1. On the project window, select the PLC Item.
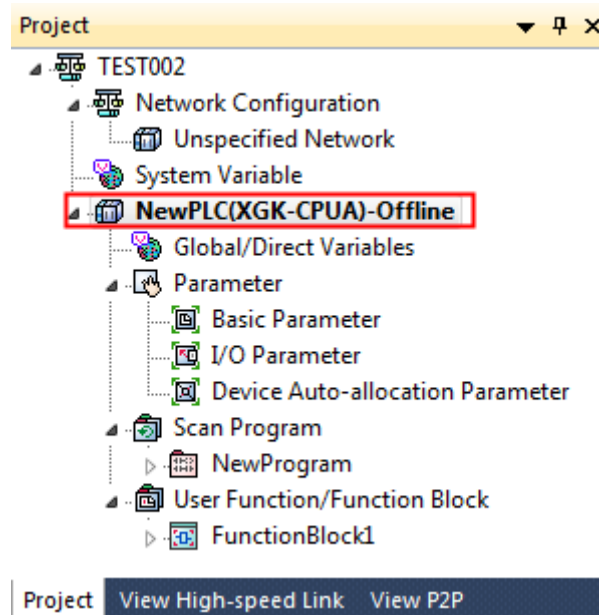
2. Select [Project]-[Import Item from File]-[Basic Parameter] on the menu.

3. Select the file, and then click [OK].

5) Program

[Steps]

1. On the project window, select the Program Location to add.

   The program can be added to Scan Program or Task Item.
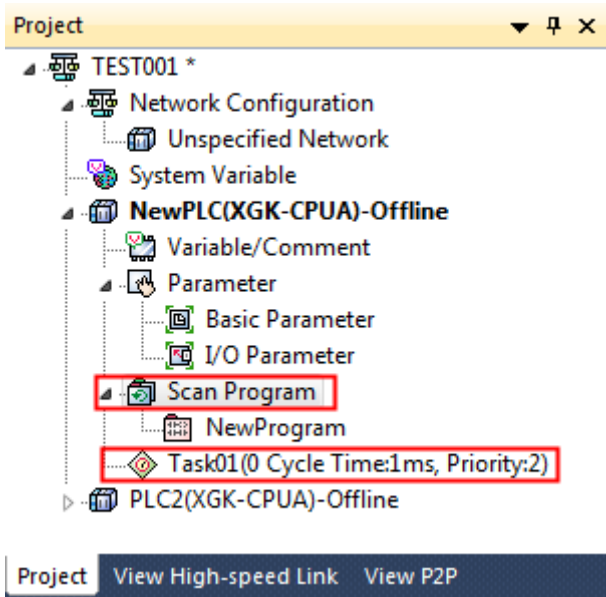
2. Select [Project]-[Import Item from File]-[Program] on the menu.

3. Select the file, and then click [OK].

3.4.3 Export to file

The following items can be saved as separate item files.

Item	File Extension
PLC	.cfg
Variable/Comment	.cmt
I/O Parameter	.iop
Basic Parameter	.bsp
Program	.prg

1) PLC

[Steps]

1. On the project window, select the PLC Item.
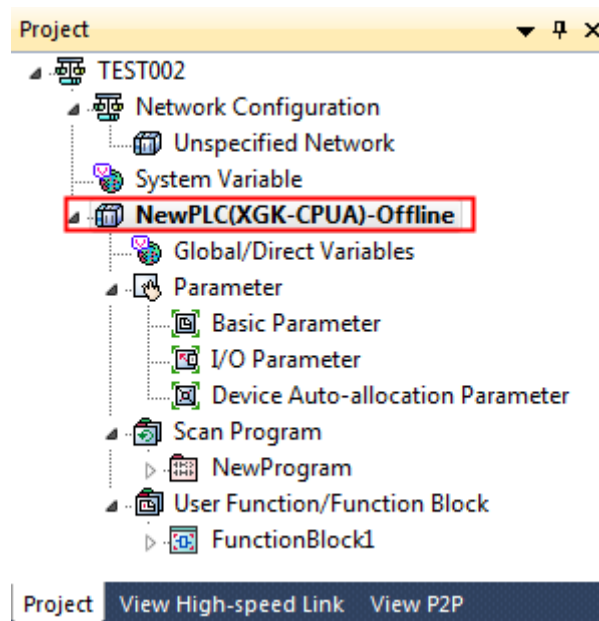
2. Select [Project] – [Export to File]-[PLC] on the menu.
3. Input the file name, and then click [OK].

2) Variable/Comment

[Steps]

1. On the project window, select the Variable/Comment Item.
2. Select [Project] - [Export to File]-[Variable/Comment] on the menu.
3. Input the file name, and then click [OK].

3) I/O Parameters

[Steps]

1. On the project window, select the I/O Parameter Item.
2. Select [Project] - [Export to File] - [I/O Parameter] on the menu.
3. Input the file name, and then click [OK].

4) Basic Parameters

[Steps]

1. On the project window, select the Basic Parameter Item.
2. Select [Project] - [Export to File] - [Basic Parameter] on the menu.
3. Input the file name, and then click [OK].

5) Program

[Steps]

1. On the project window, select the Program Item.

2. Select [Project] - [Export to File] - [Program] on the menu.

3. Input the file name, and then click [OK].

Notes
− Items can be easily copied or moved between the projects with Drag and Drop function.
− Especially, drag and drop function is available between projects, when two XG5000 are executed.

3.4.4 Item register information

The name and comment of respective item can be viewed to change.

1) Project properties

[Steps]

1. On the project window, select the Project Item.
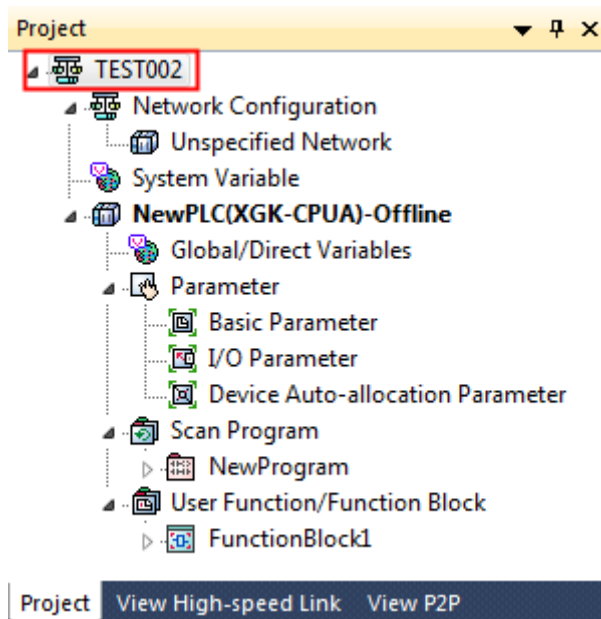
2. Select [View] - [Properties] on the menu.

[Dialog Box]
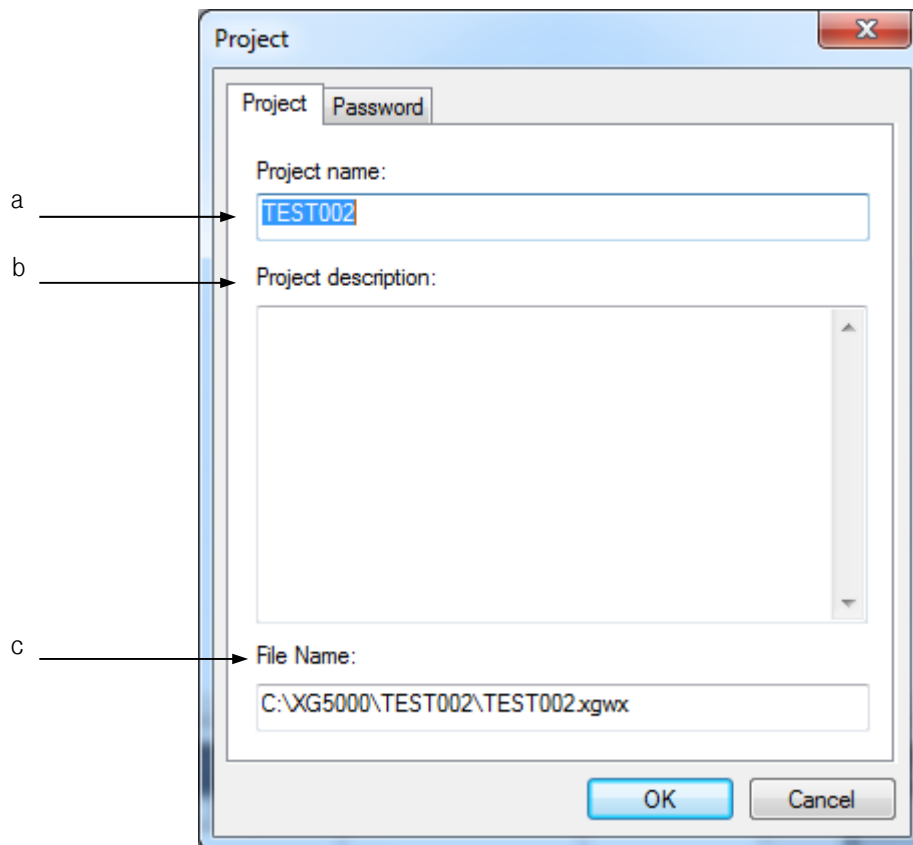
[Description of Dialog Box]

   a. Project name: displays the project name, which can be changed as necessary.

   b. Project description: displays the project description, which can be changed as necessary.

   c. File Name: displays the file name where the project is saved. Select [Project] - [Save As] to save as a different file.

3. After the change, click [OK].

2) PLC Properties

[Steps]

1. On the project window, select the PLC Item.

2. Select [View] - [Properties] on the menu.

3. After the change, click [OK].

3) Task Properties

[Steps]

1. On the project window, select the Task Item.

2. Select [View] - [Properties] on the menu.

3. After the change, click [OK].

4) Program Register Information

[Steps]

1. On the project window, select the Program Item.

2. Select [View] - [Properties] on the menu.

3. After the change, click [OK].

3.4.5 Change program sequence

Scan and Task program will be executed from the upper in regular sequence.

Thus, the program location shall be changed to change the execution sequence.

1) Order Change with the menu

[Steps]

1. Move the cursor onto the program to change the order of execution.

2. Click the right mouse button to select [Upward (Program)] or [Downward (Program)] on the menu.

2) Order Change with Drag and Drop

[Steps]

1. Move the cursor onto the program to change the order of execution.

2. Click the left mouse button to drag to the location desired.

3. Drop on the desired location.

3.4.6 Data memory

The data memory added to the project can be used for the following purposes. First, apply data values set offline with project. Second, read the memory values stored in the PLC and monitor them offline to identify problems with the program.

1) Readable area - All memory areas supported by the PLC (including the same flag area as the F area)

2) Writable area - M, W (IEC), P, M, L, K, D, ZR, Z (XGK). However, it will be cleared to 0 in the area where

the retain (XGK latch) is not set. (Except W and ZR)

Note
Depending on the type of PLC, the type of memory supported may be different. Refer to the help of the selected PLC for the type and characteristics of the PLC memory.

1) Adding memory

The ability to add items to memory while offline. There is no data area limitation for adding memory. However, some areas can not be written.

[Steps]

1) Select the PLC item in the XG5000 project tree.

2) Press the right mouse button to select the menu [Add item] - [Data memory].
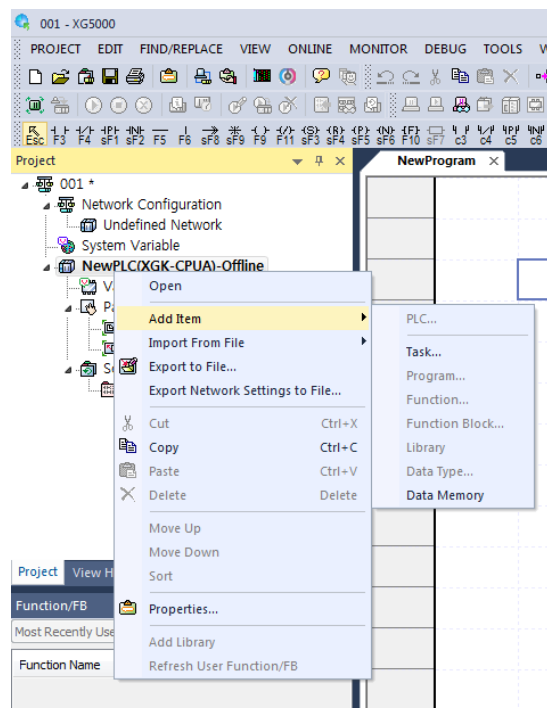
[Dialog Box]
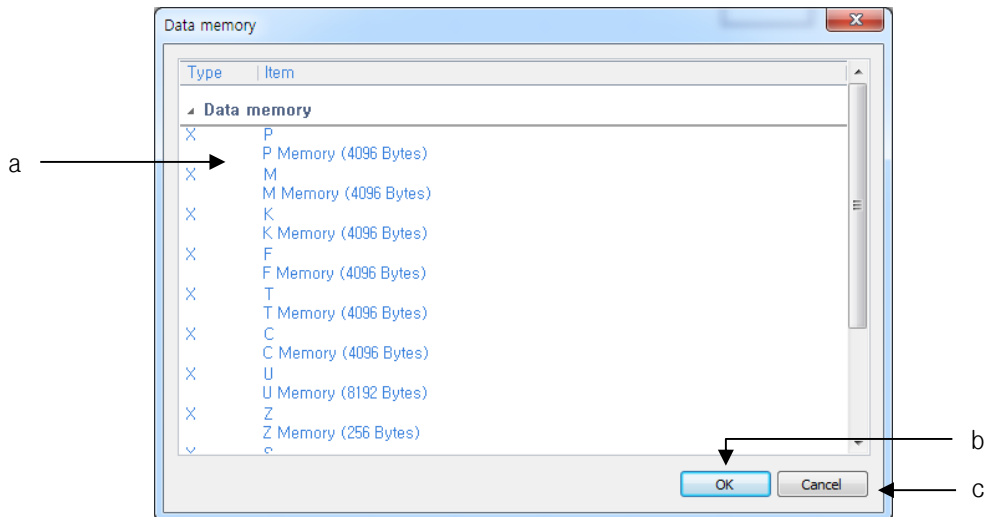
a. Memory - Displays the memory area that can be added to the current PLC item. Memory areas already added to the project are not displayed.

b. OK - Adds the selected memory area and closes the dialog box.

c. Cancel - closes the dialog box.
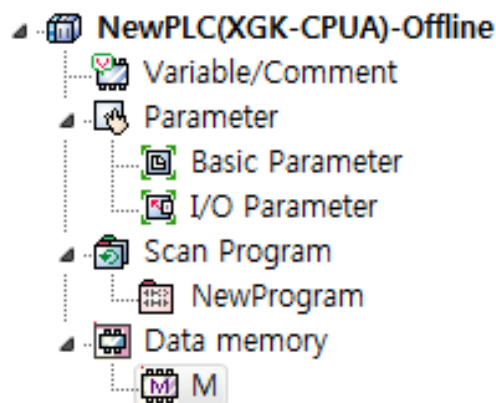
2)   Deletion of memory

Deletes the memory area added to the project.

[Steps]

1. Select the memory item to delete.

2. Select menu [Delete] item.
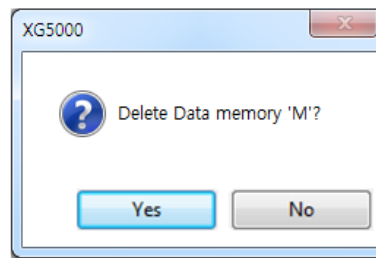
3. In the confirmation message box, click the [Yes] button.

3) Edit memory

Edit the memory entries added to the project.

[Steps]

1. Double-click the memory area you want to edit in the project tree.

2. Move to the memory location to change and change the value. The memory editing function is the same as the device monitoring function of the XG5000. For the edit function, refer to 11.5 Device monitor item.
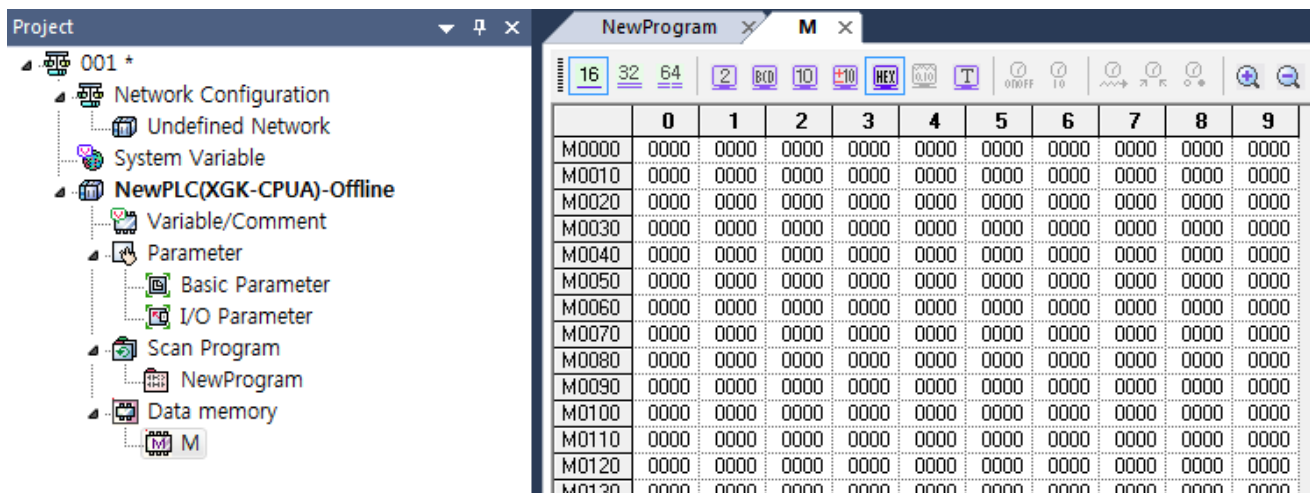
4) Offline Monitoring

Offline monitoring is a function to monitor program or variable value using data memory without being connected with PLC. Off-line monitoring uses the registered data memory to display the value. If the data memory is not added to the project, 0 is monitored as the value. Also, the current value change function does not work.
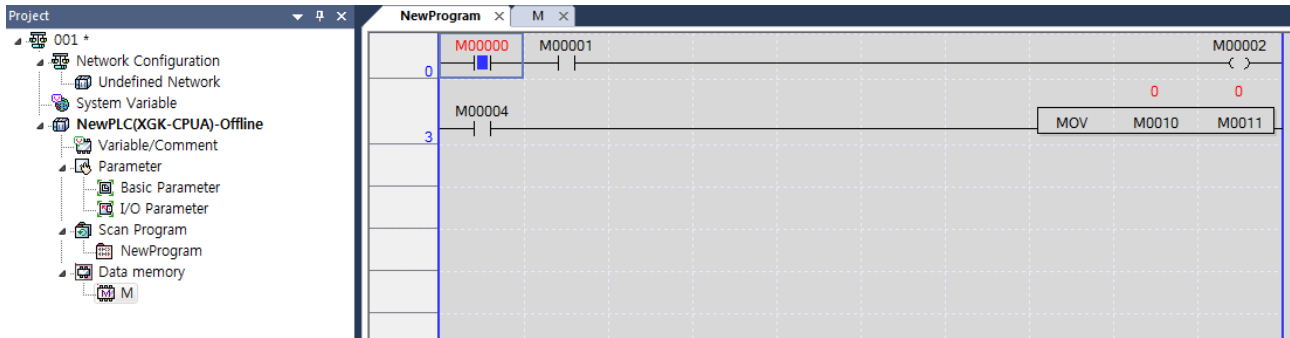
The current value can be changed in the same way as online.
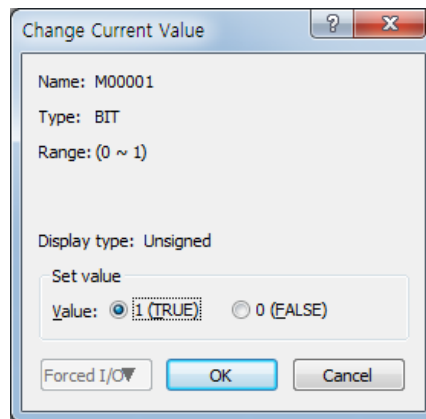
The changed value is monitored. However, unlike actual PLC, logic is not executed.
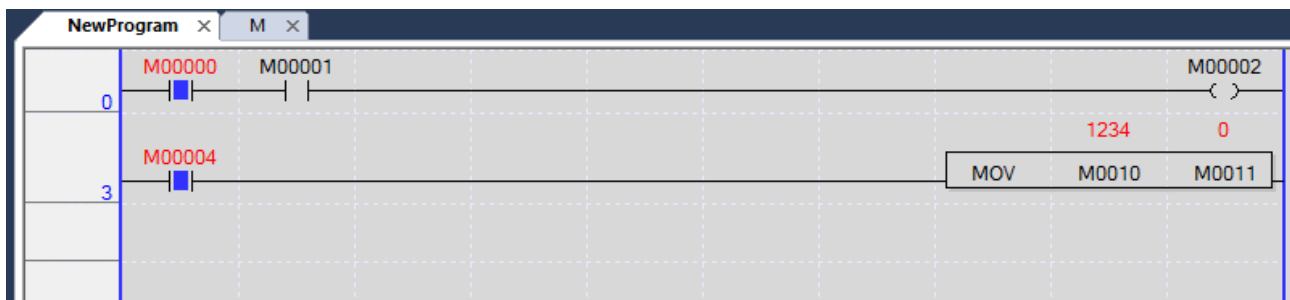
5) Reading memory

This function reads the PLC data memory. When reading, all data memory areas of the PLC can be read.

[Steps]

1. Select menu [Online] - [Read] item.

2. In the Read dialog box, select the [Data memory] item, and then click the [Settting] button.
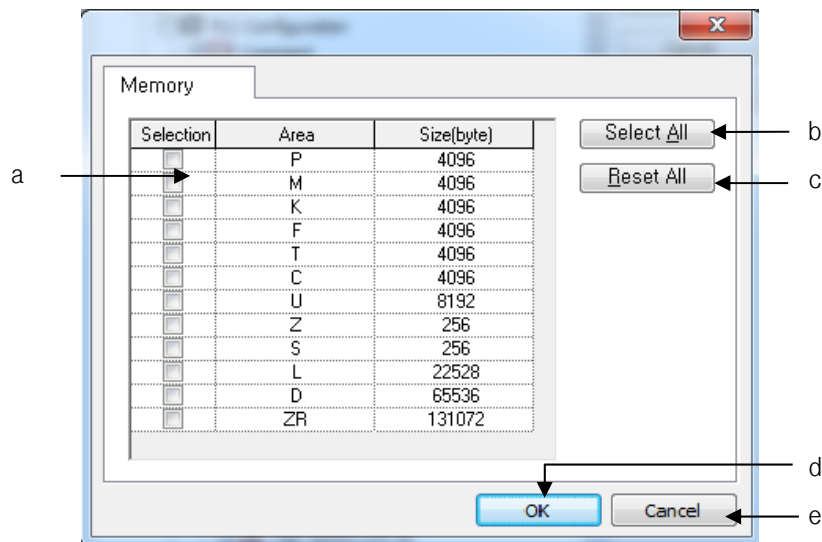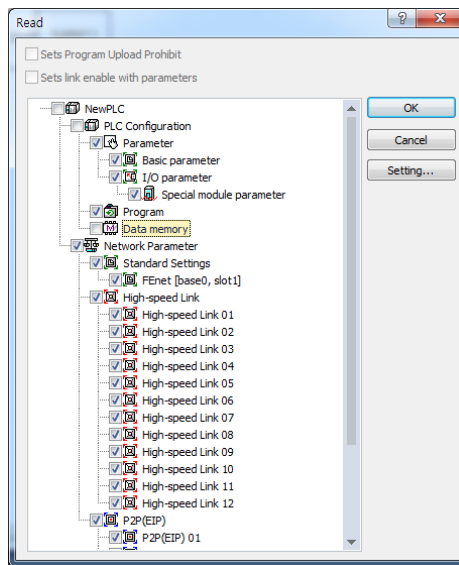
[Dialog Box]

a. Memory area - Displays the memory area selectable in the current PLC.

b. Select All - Selects all memory items.

c. Reset All - cancels the selection.

d. OK - Save your changes and close the dialog box.

e. Cancel - closes the dialog box.

3. Select the memory area to read and press the [OK] button.

4. Select the [Data memory] area and click the [OK] button.

Note

When the memory is read, the data is read across multiple scans. Therefore, in the case of data that changes quickly, the data may be inconsistent.

Information about the selected data memory is not stored in the PLC. Therefore, when opening from the PLC, the data memory area that was previously written is not read. When opening from PLC, select item to read from XG5000 menu [Tools] - [Option] Read from PLC.

[Steps]

a. Select [Tools] - [Options] on the menu.

b. Select the [Online] item in the dialog box.

c. Select the [Show selection dialog when executing Open from PLC] item and click the [OK] button.
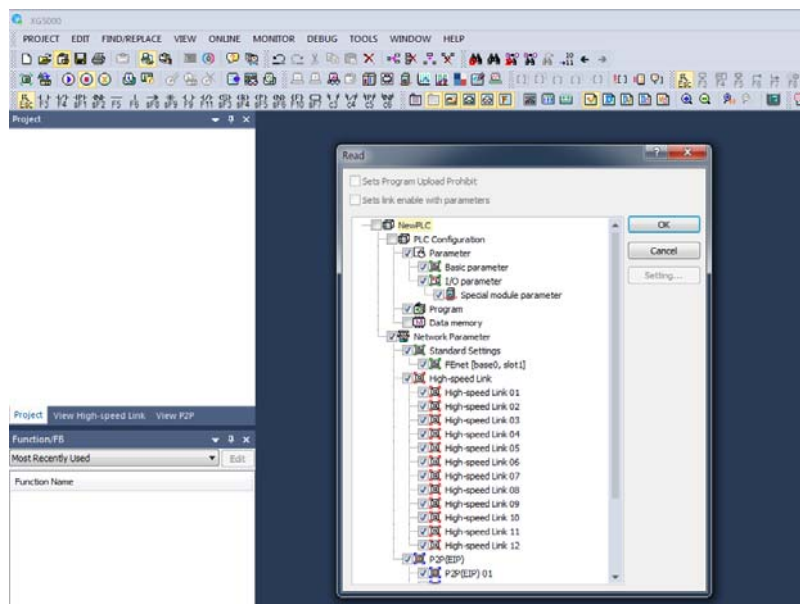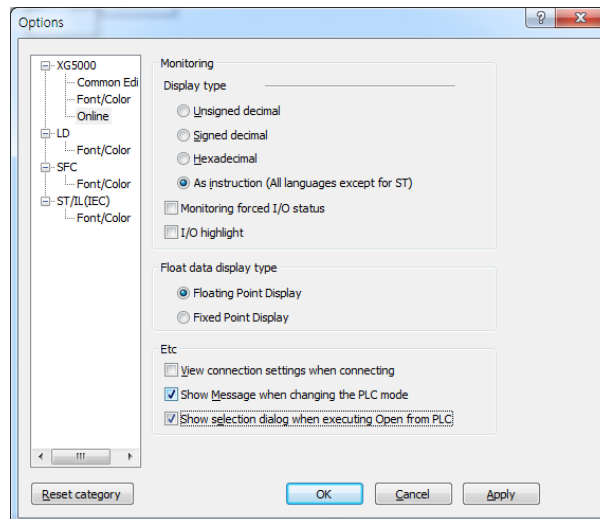
6) Memory write

The data memory set in the project is written to the PLC. The data memory is writable regardless of the run or stop mode.

[Steps]

a. Select the menu [Online] - [Write].

b. In the Write dialog box, select [Data memory], and then click the [Setting] button.
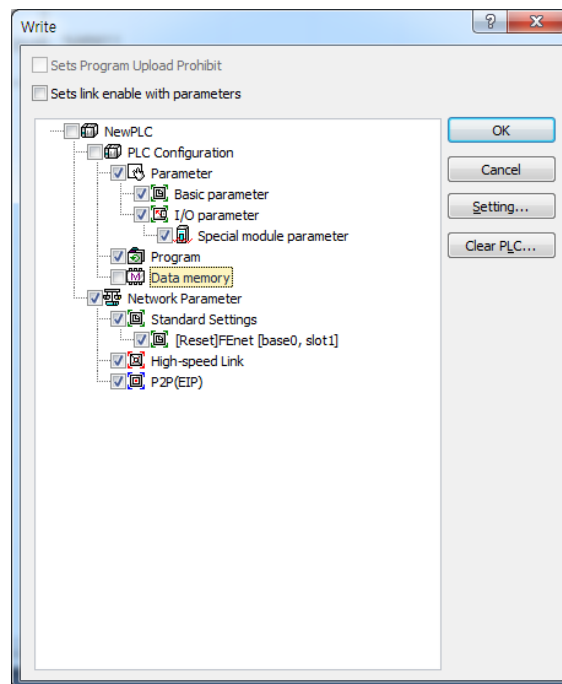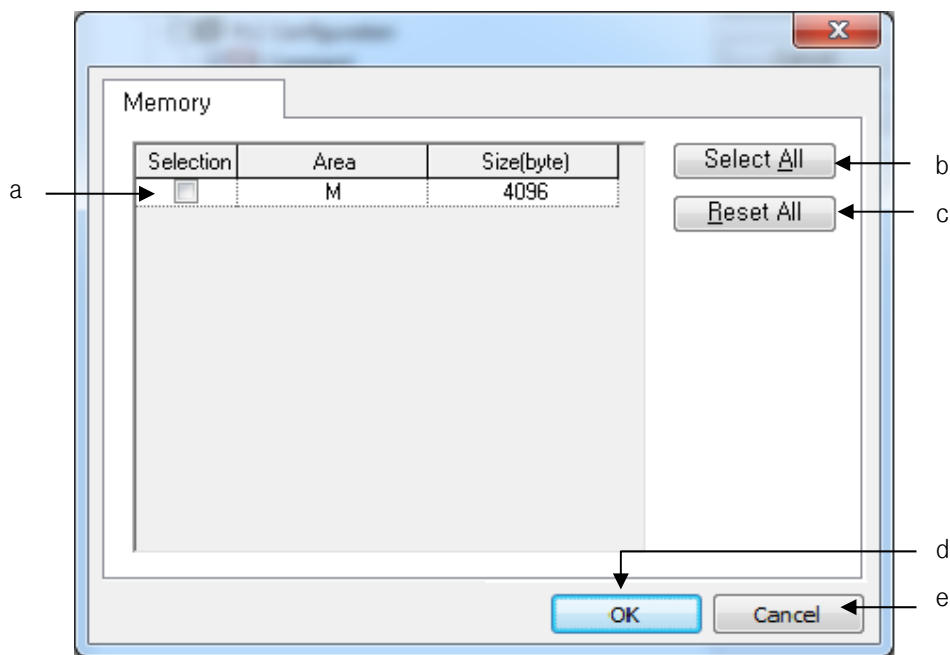
[Dialog Box]

a. Memory area - The memory area that can be written in the current PLC is displayed.

b. Select All - Selects all memory items.

c. Reset All - cancels the selection.

d. OK - Save your changes and close the dialog box.

e. Cancel - closes the dialog box.

Note
Memory area write is applicable only memory that can set retain (XGK latch). If the selected memory is not set to retain (XGK latch), it is reset to 0 when entering PLC RUN.

3.5　Compare Project

Two projects can be compared with each other based on respective item. Compare result will be displayed on the Result window.

[Steps]

1. Select [Project]-[Compare Projects] on the menu.

2. On the [Compare Projects], Click [Open Project].

3. Select the project files to compare with.
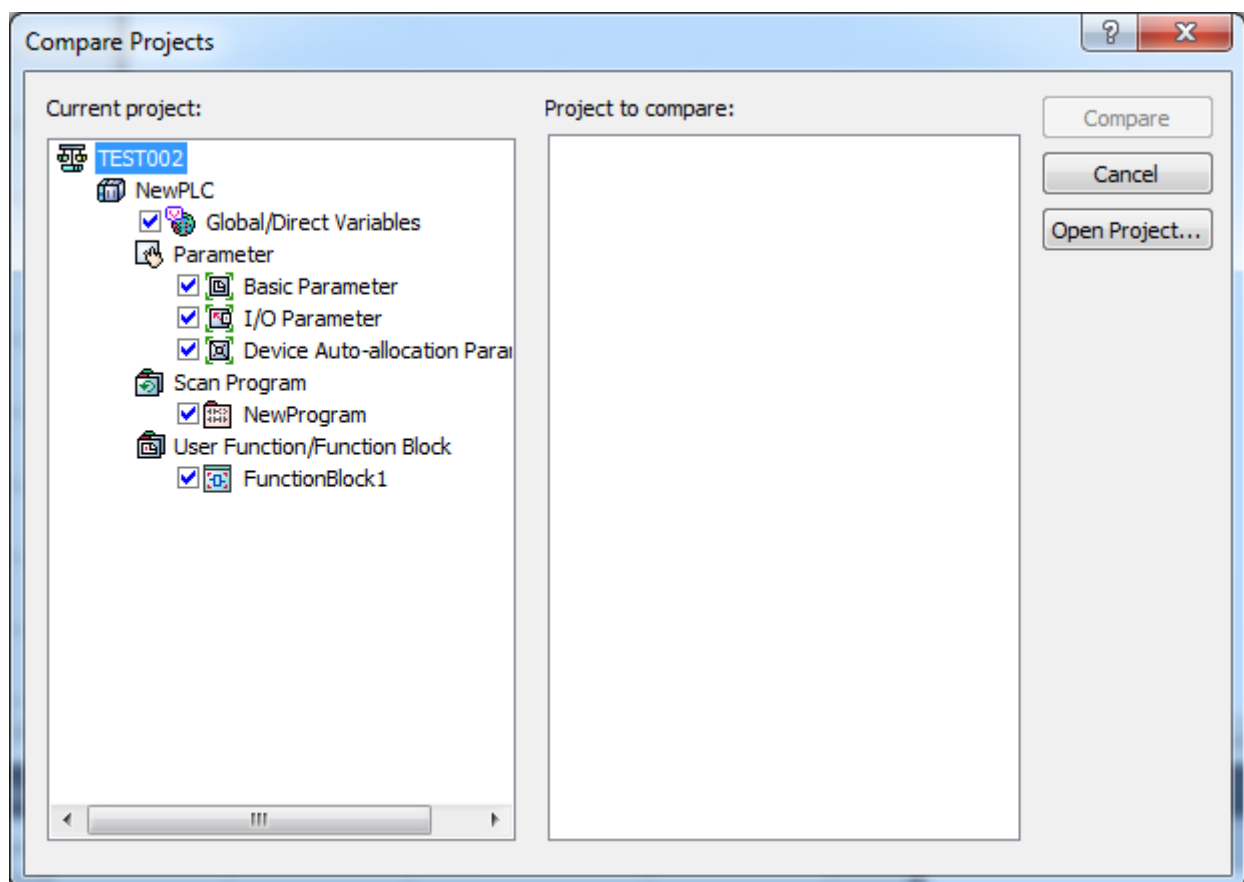
4. Select the items to compare with. At this moment, the selected items of both projects must be identical.
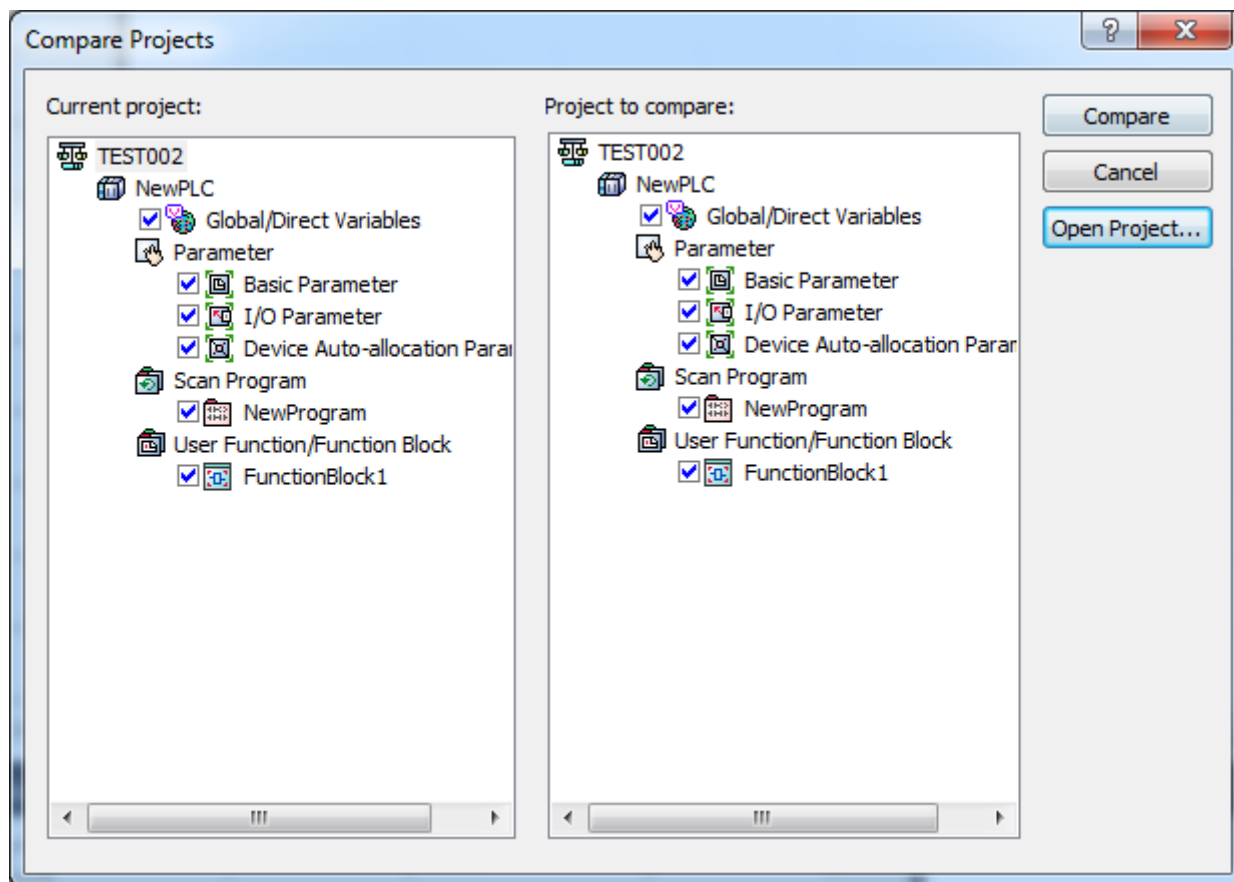
5. Click [Compare].

6. Compare result will be displayed on the Result window.

```
Result                                                                    ✕

📥 📤  ✕

==== Compare NewPLC with NewPLC Global/Direct Variables ====
Global variables match.

Comments of the Device match.

Basic parameters match.

==== Compare NewPLC with NewPLC I/O Parameter ====
The I/O parameters match

==== Compare NewPLC with NewPLC Device Auto-allocation Parameter ====
Information of device auto allocation is identical.

==== Compare NewPLC: NewProgram with NewPLC: NewProgram Program ====
Local variables match.

programs match.

==== Compare  FunctionBlock1 User Function/Function Block with  FunctionBlock1 User Function/Function Block ====
Local variables of the function block match.

programs match.

Result   Check Program   Find 1   Find 2   Communication   Cross Reference   Used Device   Duplicate Coil
```

3.6 Project Password

Password for project file can be setup. This function prevents other users from opening the project file . This project file password has nothing to do with the password of PLC.

> **Notes**
>
> - Password is available in Korean and English, however with the capital/small letters sorted out in English. Up to 8 characters of password is available.
> - Be careful! If the password is forgotten, the Project File can not be opened.

3.6.1 Set password

[Steps]

1. On the project window, select the Project Items.
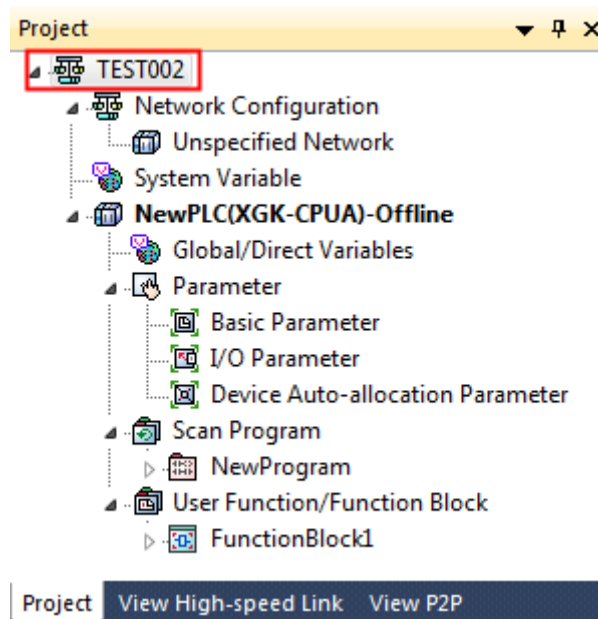
2. Select [View] - [Properties] on the menu.

3. On the project dialog box, select the [Password] tap.
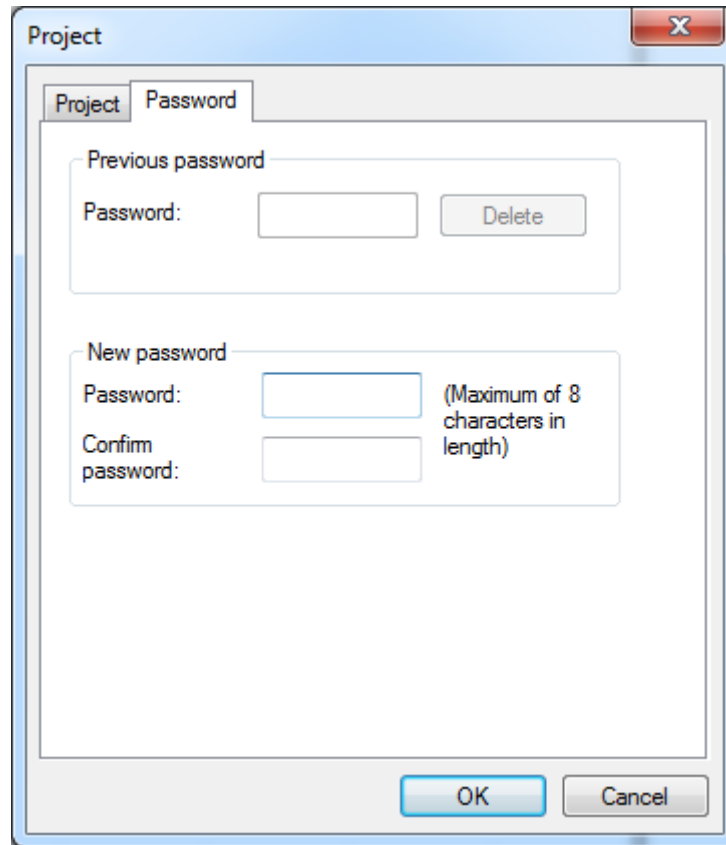
4. Input the password in New password.

5. Input the password once again in Confirm password as identical as input in the 4 above.

6. Click [OK].

3.6.2 Change password
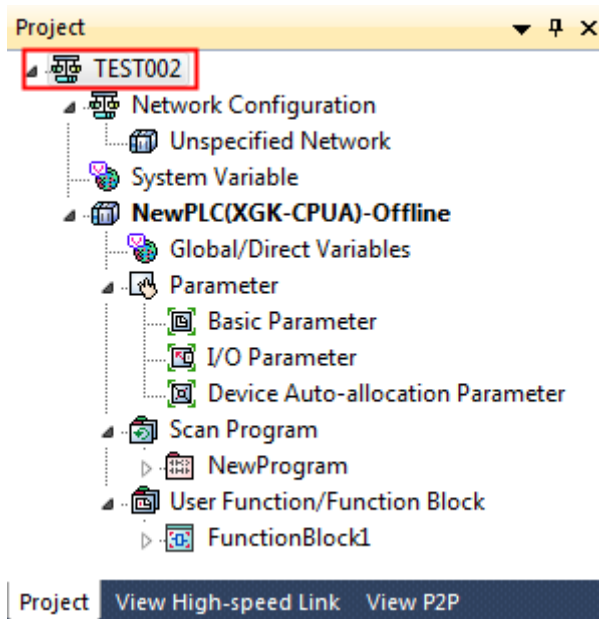
[Steps]

1. On the project window, select the Project Item.

2. Select [View]-[Properties] on the menu.

3. On the project [Dialog Box], select the [Password] tap.
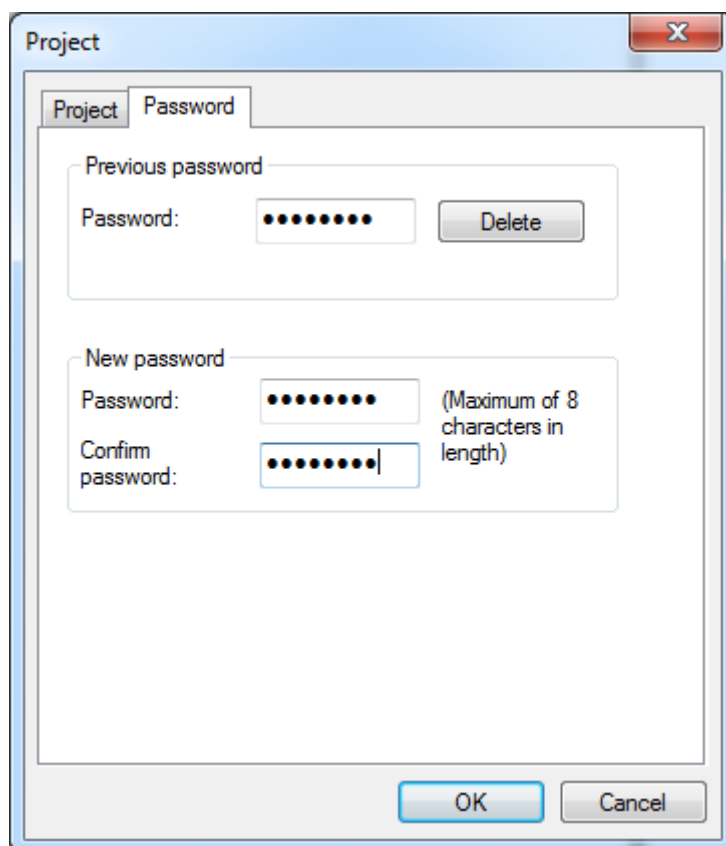
4. Input the previous password in Old Password.

5. Input a new password in New password.

6. Input the new password once again in Confirm Password as identical as input in the 5 above.

7. Click [OK].

3.6.3 Delete password
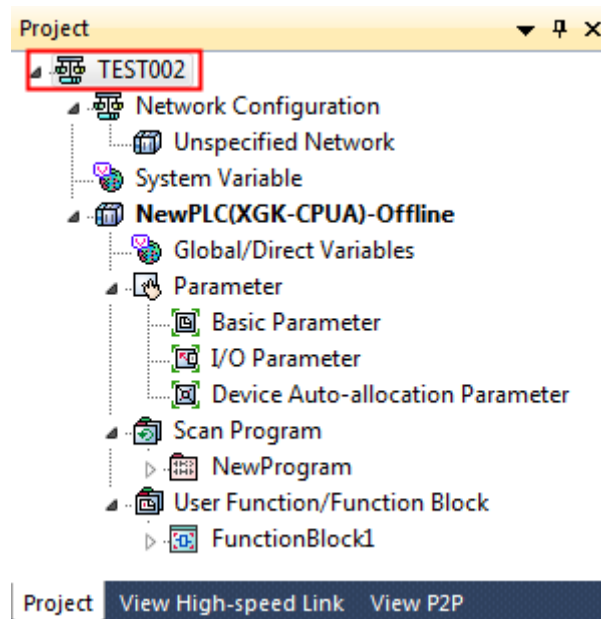
[Steps]

1. On the project window, select the Project Item.

2. Select [View] - [Properties] on the menu.

3. On the project dialog box, select the [Password] tap.
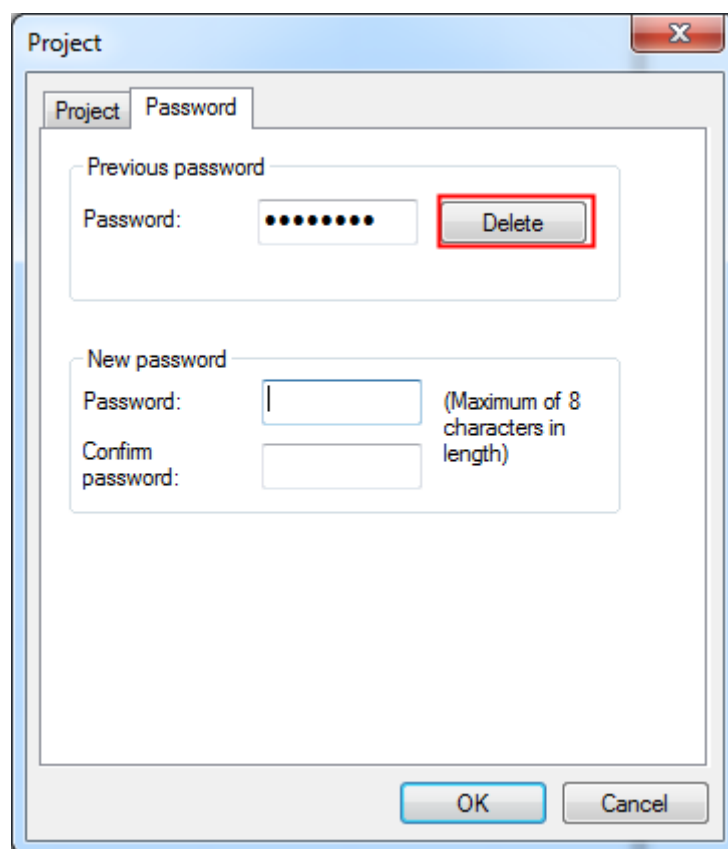
4. Input the previous password in Old Password.

5. Click [Cancel].

3.7 Program block password

To set the password for each program block, set the password for each program block and enter the password to open the program.

Note
-The program block password can be set in the PLC disconnect status.   -Password characters are Korean / English and case sensitive. Up to 8 characters can be used. Special characters, blank spaces are available.   -After setting password, connect to PLC and write program to PLC.   -If you forget your password, you will not be able to open the project file.

3.7.1 Set password

[Steps]

1.Select the program item in the project window.

2.Select [View] - [Properties] on the menu.

3.In the program dialog, select the Password tab.

4.Enter your password in the new password.

5.Re-enter the password you entered in step 4. to confirm your password.

6.Press the OK button.

3.7.2 Change password
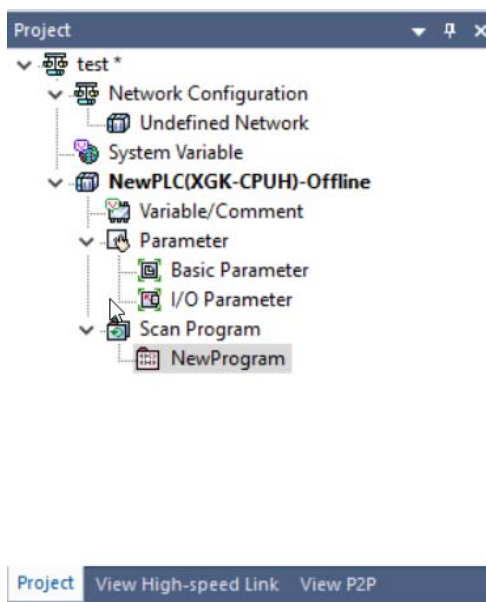
[Steps]

1.Select the program item in the project window.

2.Select [View] - [Properties] on the menu.

3.In the program dialog, select the Password tab.
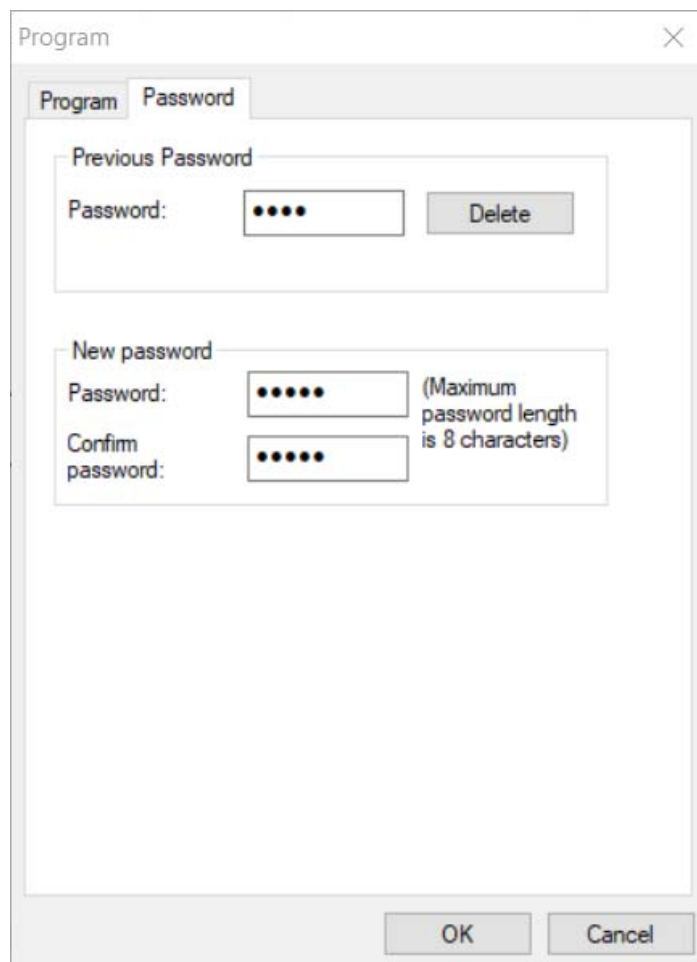
4.Enter the old password in the Previous Password.

5.Enter the new password in the New Password.

6.Re-enter the password you entered in step 5 to confirm your password.

7.Press the OK button.

3.7.3 Delete password

[Steps]

1.Select the program item in the project window.

2.Select [View] - [Properties] on the menu.

3.In the program dialog, select the Password tab.

4.Enter the old password in the Previous Password.

5.Click the Delete button.

Program

Program | Password

Previous Password

Password: •••••   Delete

New pass...

Password

Confirm
password:

th
)

XG5000

⚠ Password is deleted.

OK

OK   Cancel
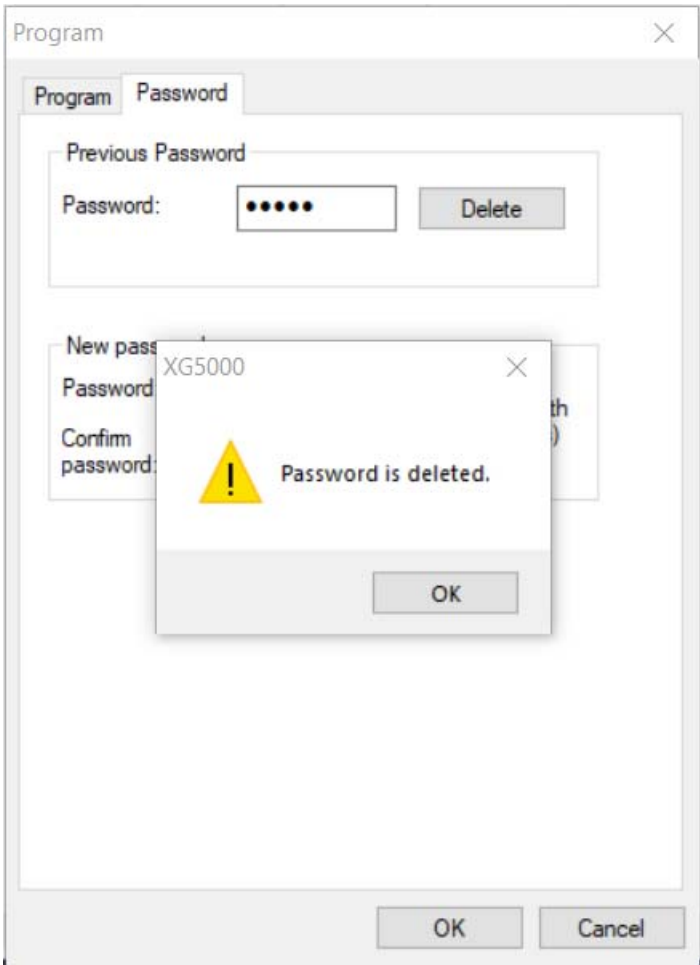
3.8 Setup of integrated project network

It is available for the integrated project only.

3.8.1 Network configuration

[Steps]

1.In the project window, select [Network Configuration] and then, select [Add Item]-[Network].
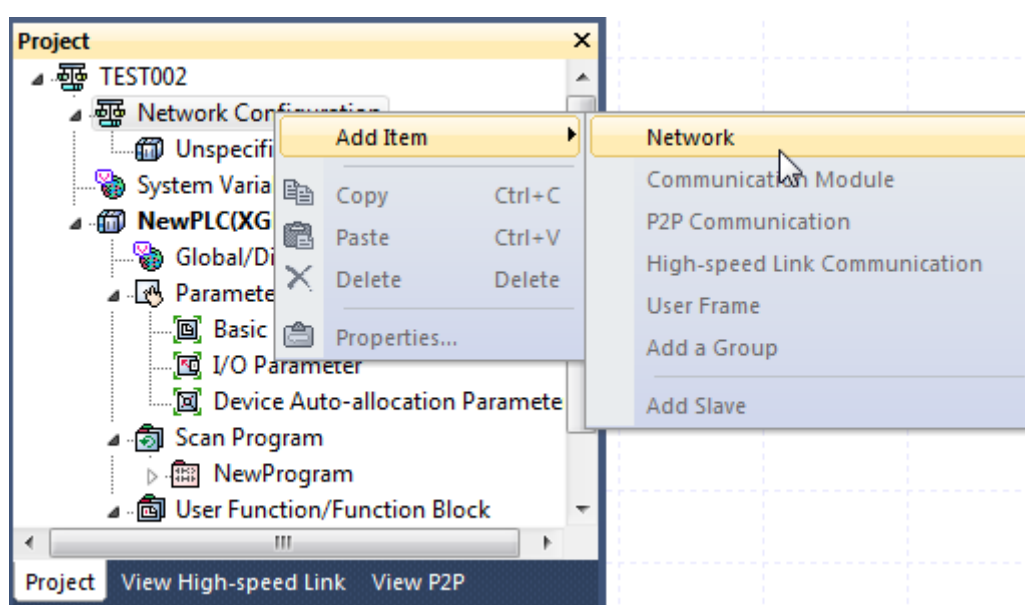
2.In the screen to add networks, enter the [Name] and select [Network Type].
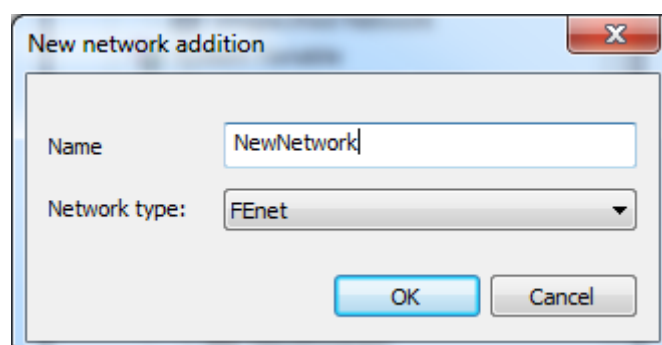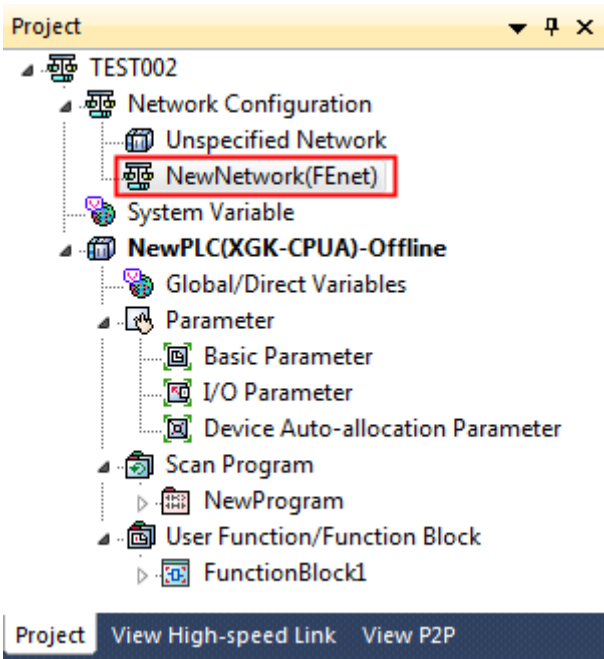
3. Specify the communication module in the I/O parameters.
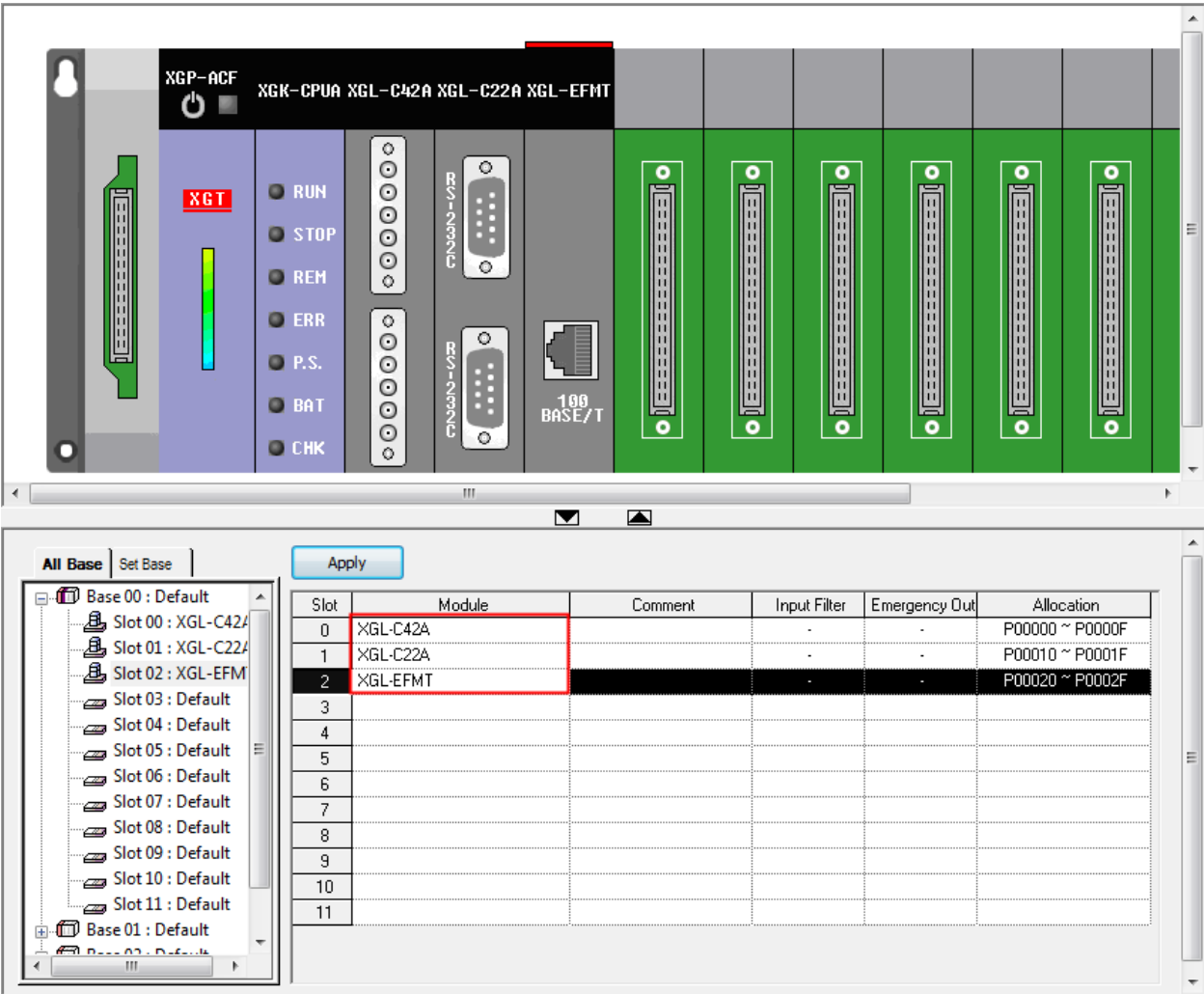
4. If you click [Apply] button, the set communication module will be added under [Network configuration]-[Basic Network] of the project.
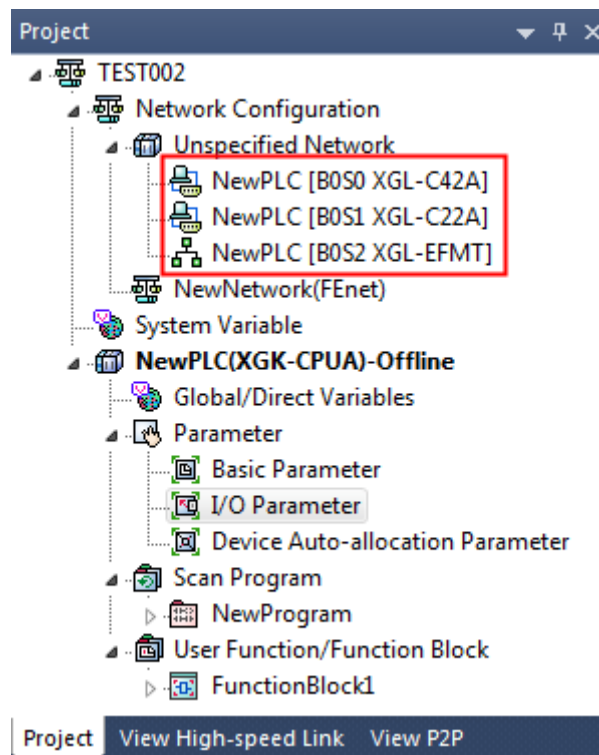
5. Select [Network Configuration]-[Network Name] in the project window and then, select [Add Item]-[Communication Module].
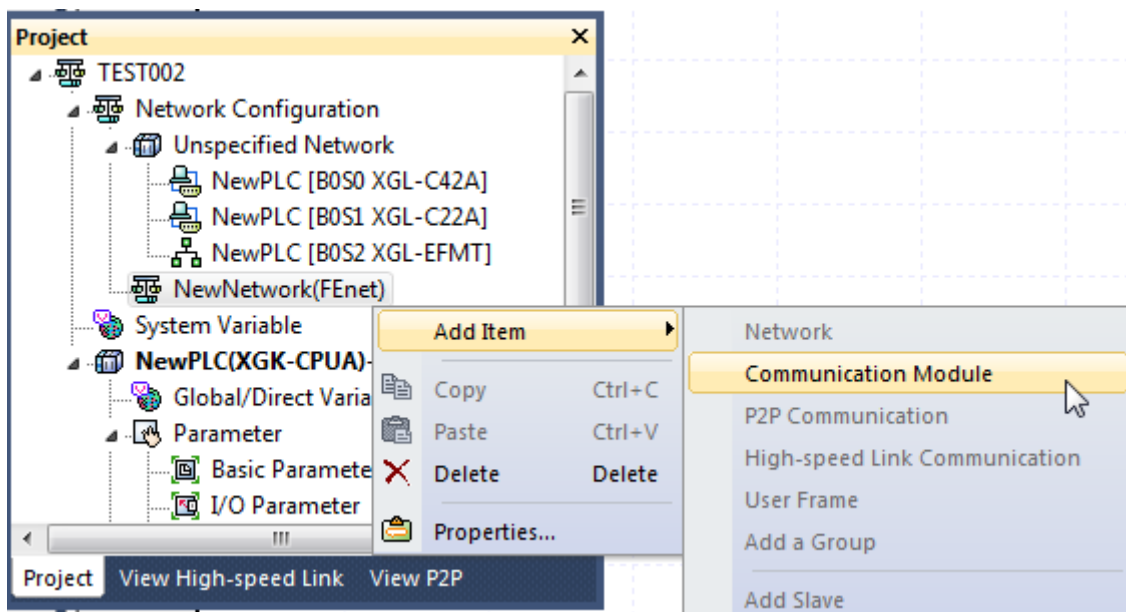
[Dialog Box]
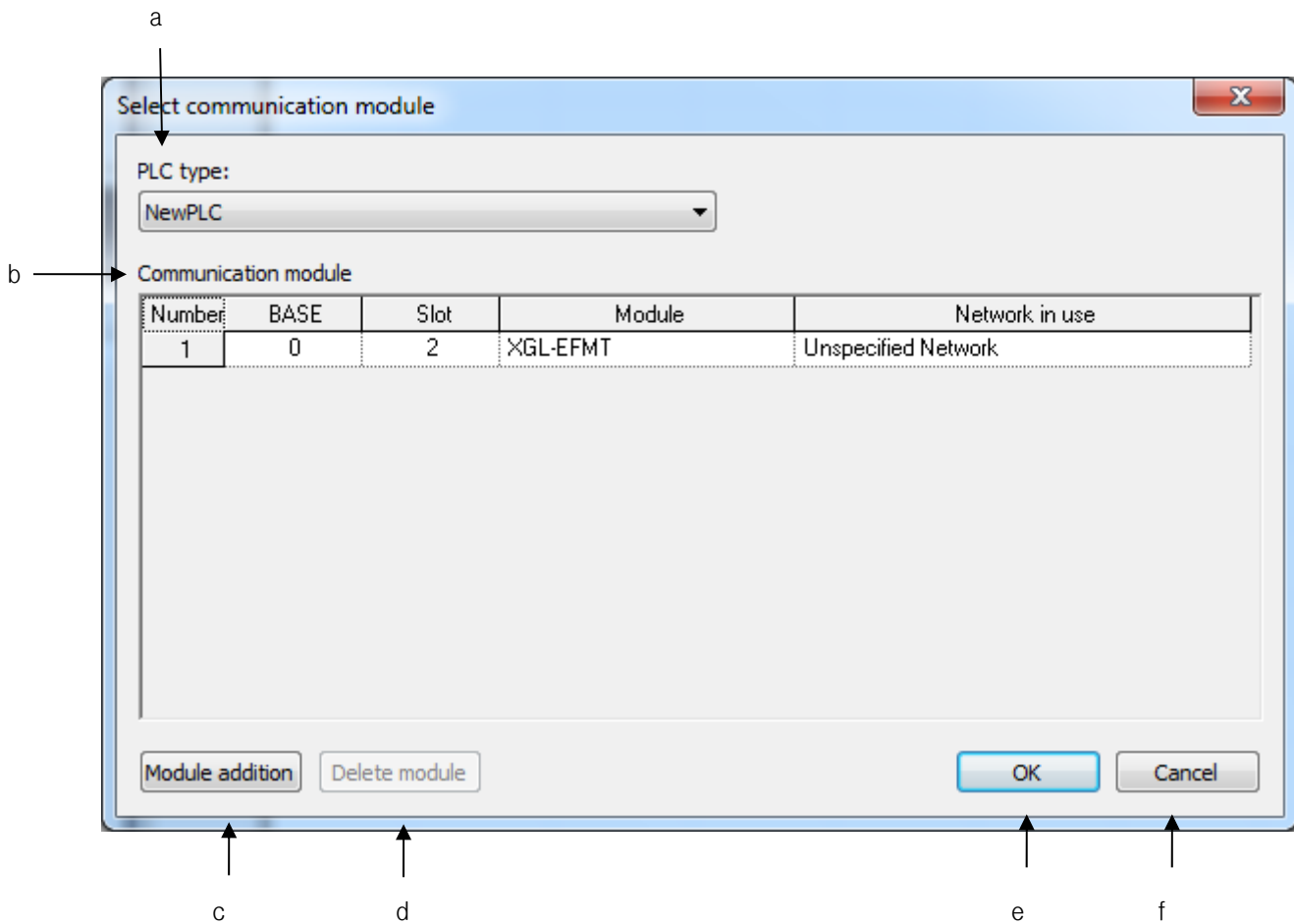
a.PLC type: Displays the PLC items added to the project.

b.Communication module: Displays the communication module list of the selected PLC.

c.Module addition: Adds the communication module to the selected PLC.

d.Delete module: Deletes the communication module selected from the communication module list.

e.OK: Adds the communication module selected from the communication module list to the current network and closes the dialog box.

f.Cancel: Closes the dialog box without adding the communication module to the current network.

6. If you select the communication module and press [OK] button, you can see the following project window.
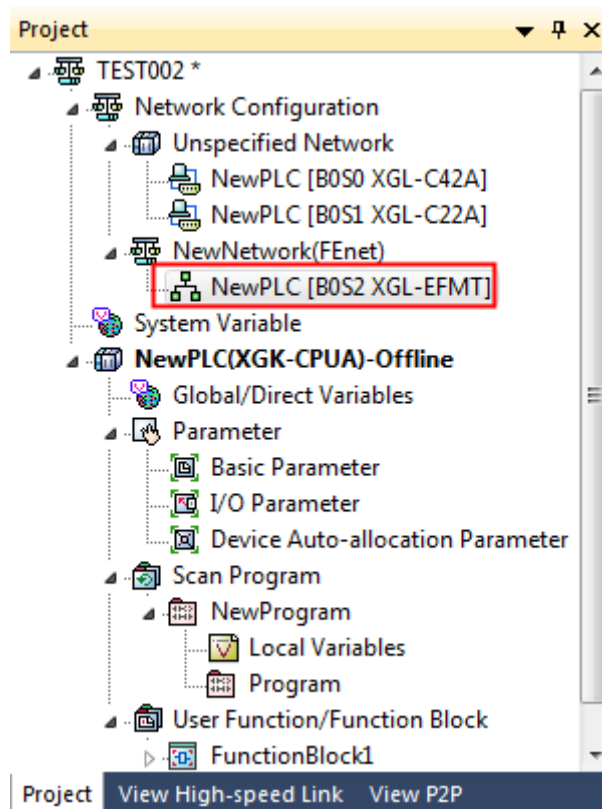
7. Double-click the communication module in the project window and enter the basic setup items.
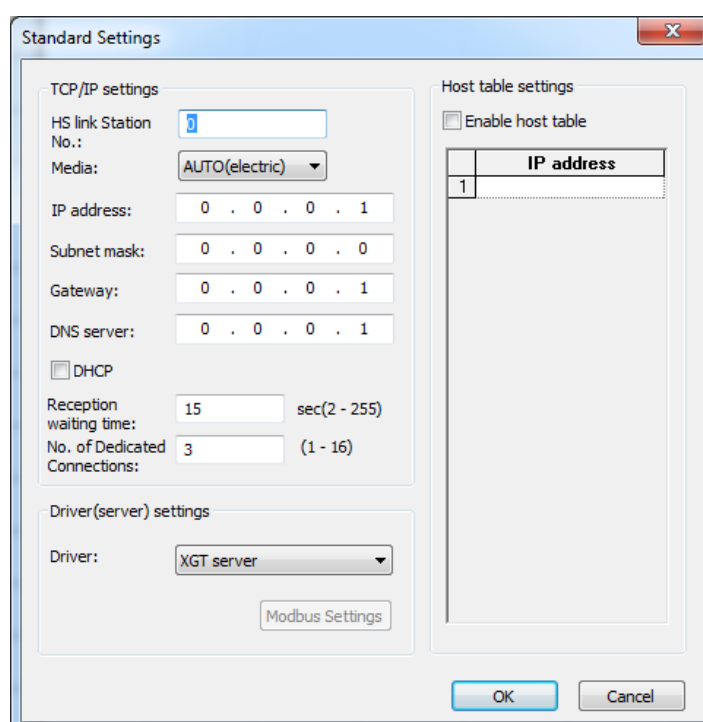
3.8.2 Deletion of Network

[Steps]

1. Select the network to be deleted.
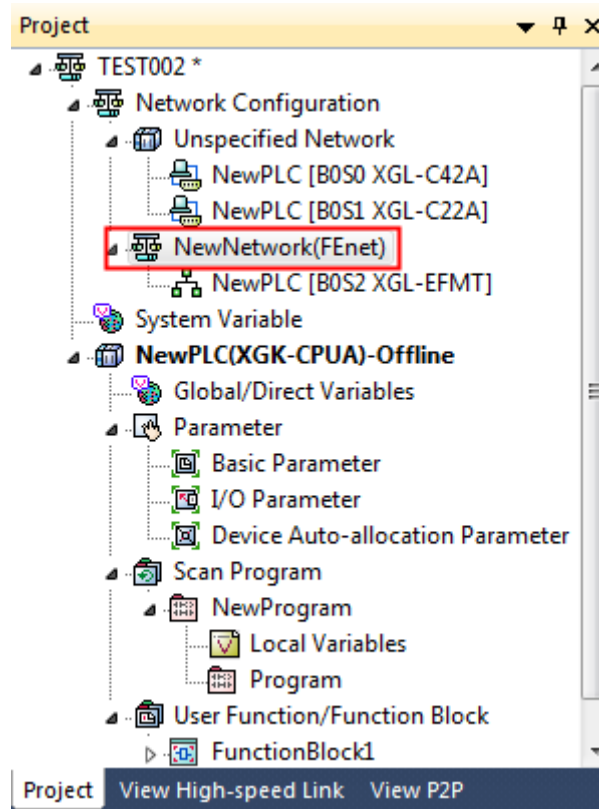
2. Click on the right mouse button and select the items to be deleted.
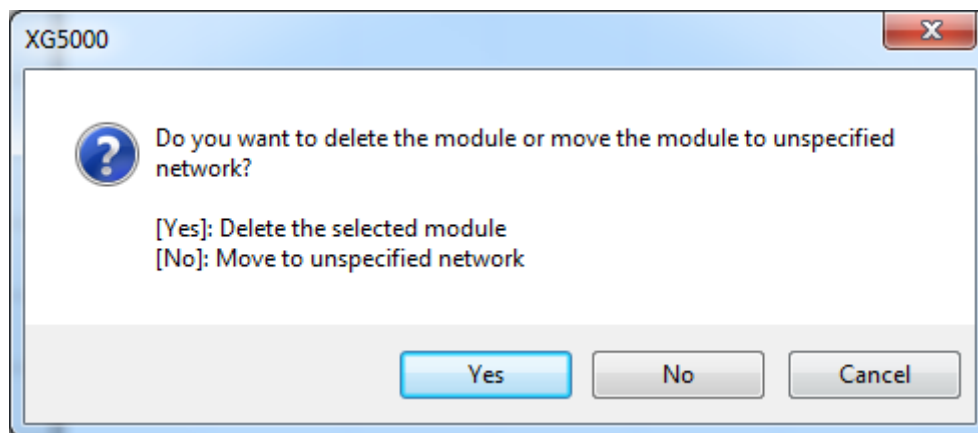
3. If you want to delete the subcategory of the selected network, press [Yes] button

3.8.3 Deletion of Communication Module

[Steps]

1.Select the communication module to be deleted.
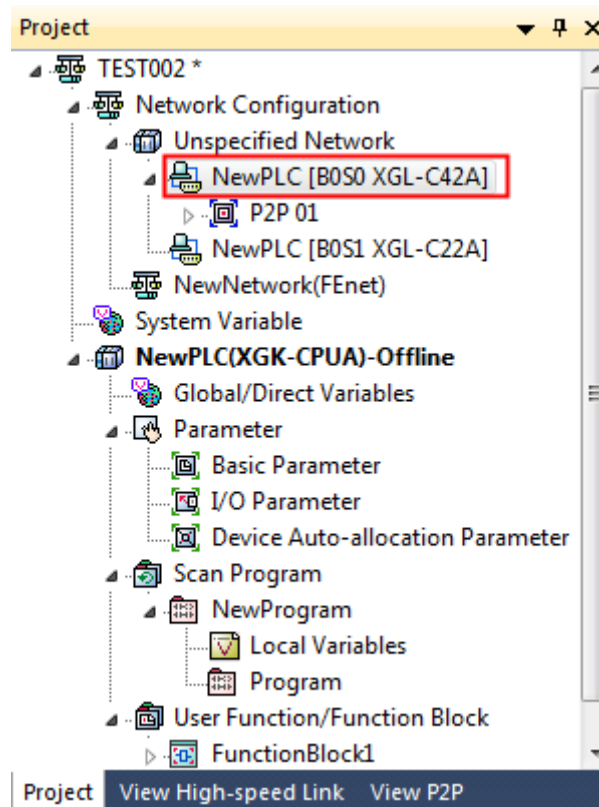
2.Click on the right mouse button and select the items to be deleted.
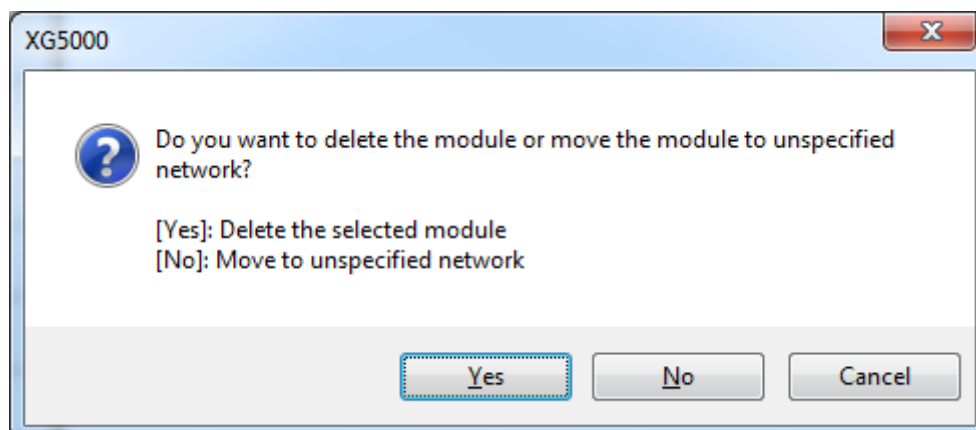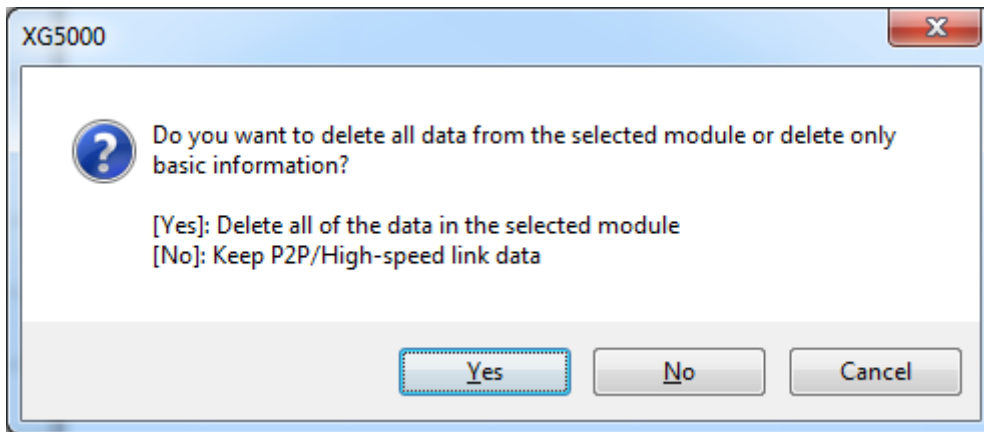
3. If you want to delete the module, press [Yes] button; if you want to move to the basic network, press [No] button.

4. If you want to delete the communication module, you can choose whether including high-speed link, (if there are P2P items), the relevant data.

Notes

- In the event you choose to maintain P2P and high-speed link data, you can see the details in high-speed link, P2P view.

- In the event the communication module is deleted in the project tree, the module names will be displayed as network names in high-speed link, P2P view.
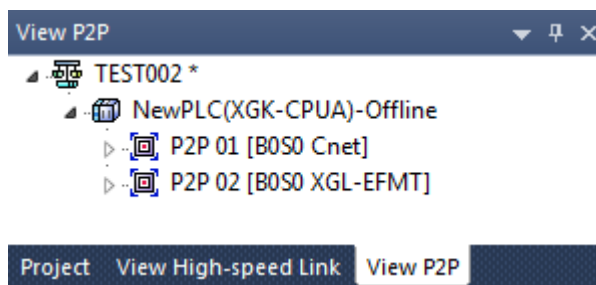
In the event the communication module is added again in the network configuration and the relevant module type is matched, the model name will be displayed instead of network name

---

3.8.4 Setup of P2P

1) Add P2P

1. Select the communication module item, [XGL-EFMT] in the project window and then, select [Add Items]-[P2P Communication].
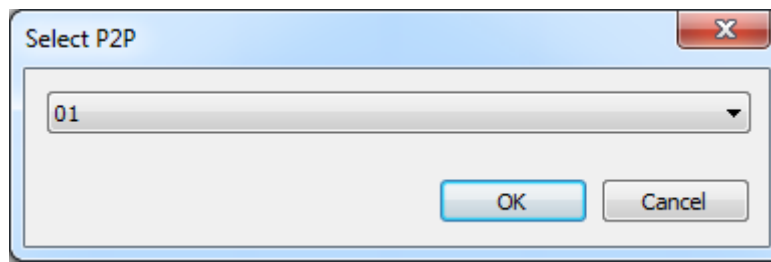
2. After numbering, click [OK] button and the P2P items will be added as below.
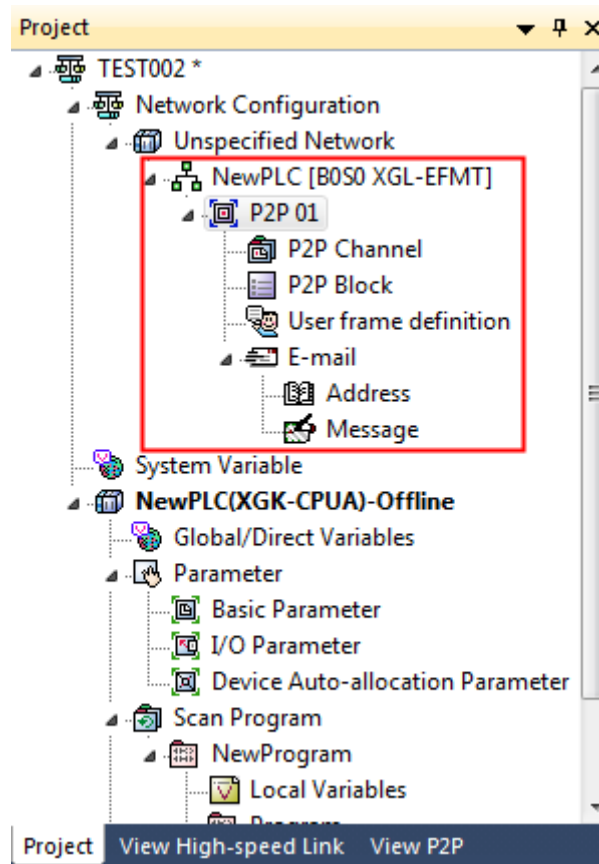
3. Refer to the communication module to set up P2P.

Notes
- In the event you doubly add other communication module P2Ps to the P2P number allocated to the existing communication module, the existing communication module information will be deleted and the P2P items of the newly declared communication module will be allocated.

2) Deletion of P2P

1. Select the P2P item in the project window and press [Delete] button.
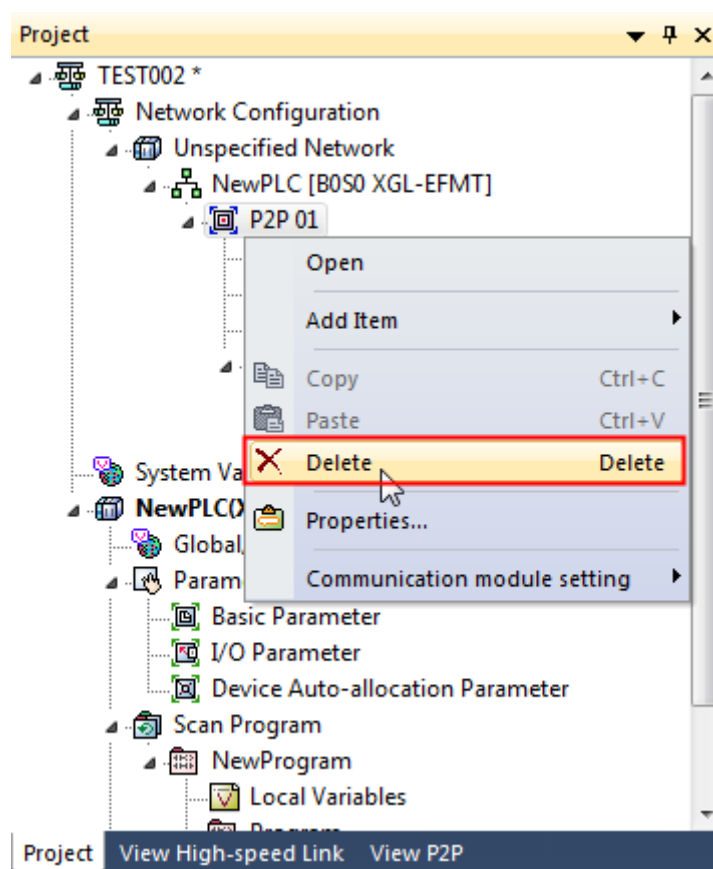
2. In the dialog box to confirm deletion of P2P, press [OK] button.
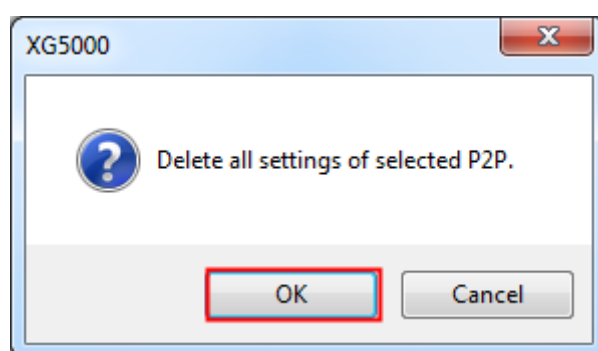
3) Edition of P2P

1. Select the P2P items in the project window and then, select [Properties].
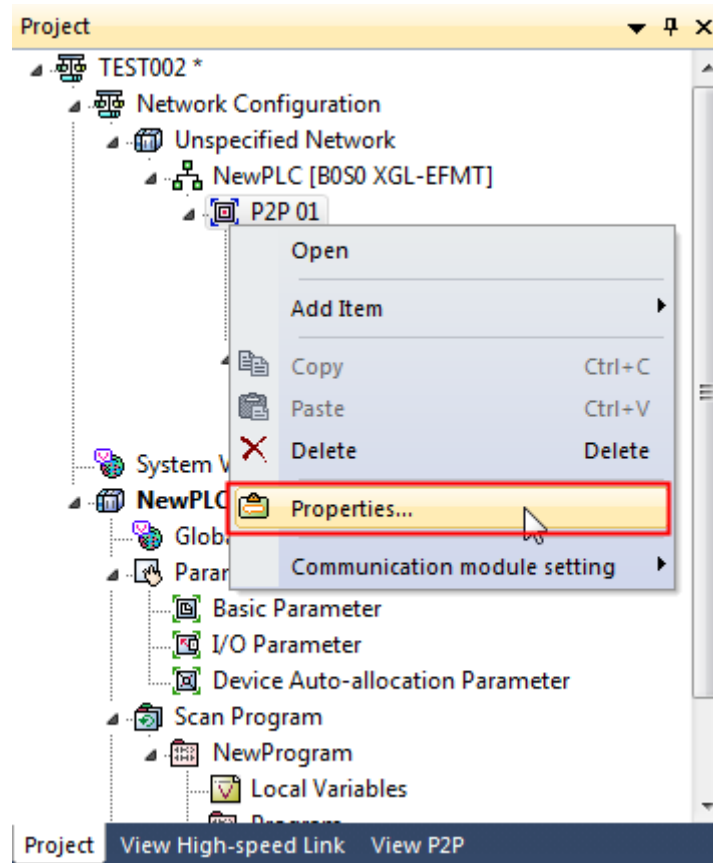
2. Select the index to be changed in the P2P selection dialog box.
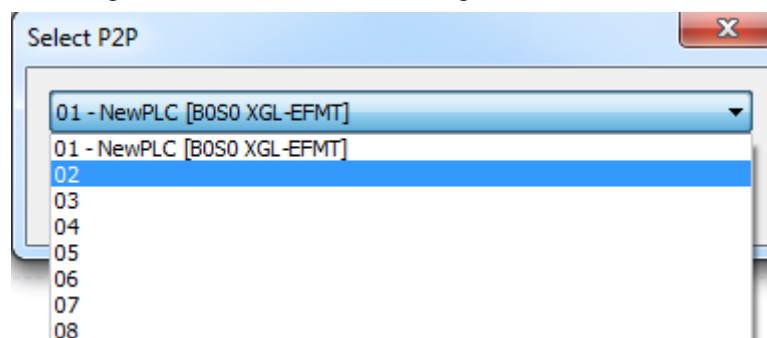
3. In the P2P selection dialog box, press [OK] button.
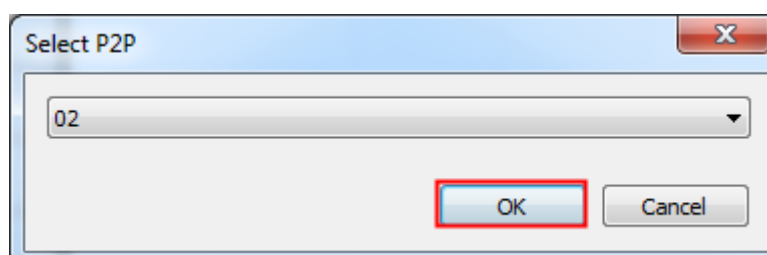
3.8.5 Setup of high-speed link

1) Adding high-speed link

1.Select the communication module [XGL-EFMT] in the project window and then, select [Add items]-[High-speed Link Communication].
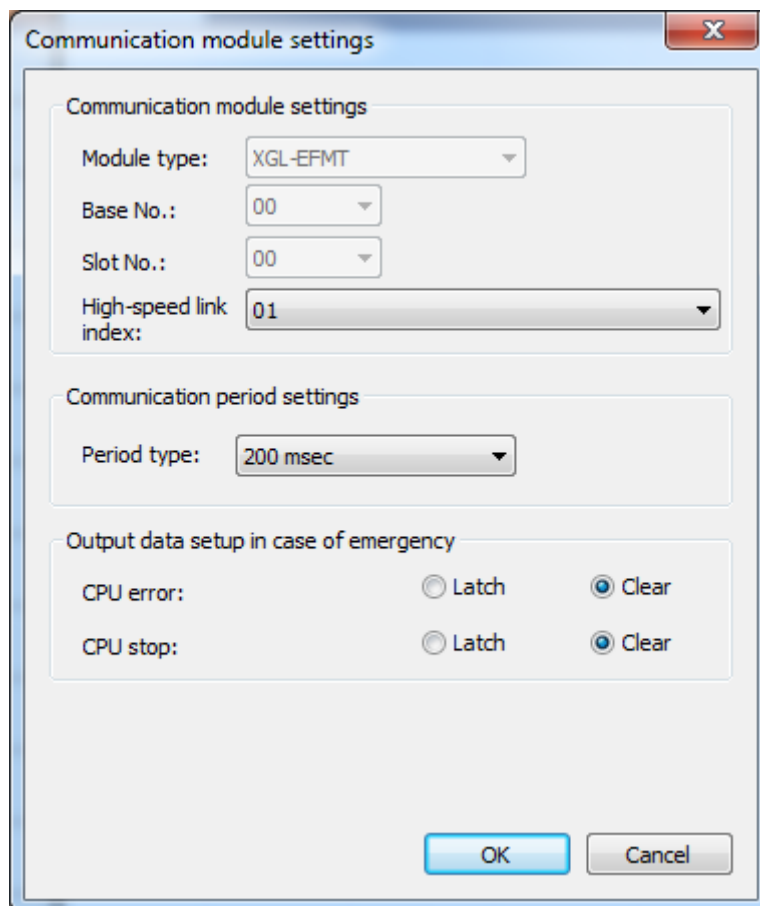
2.After numbering, click [OK] button and the high-speed link(HSLink 01) items will be added as below.
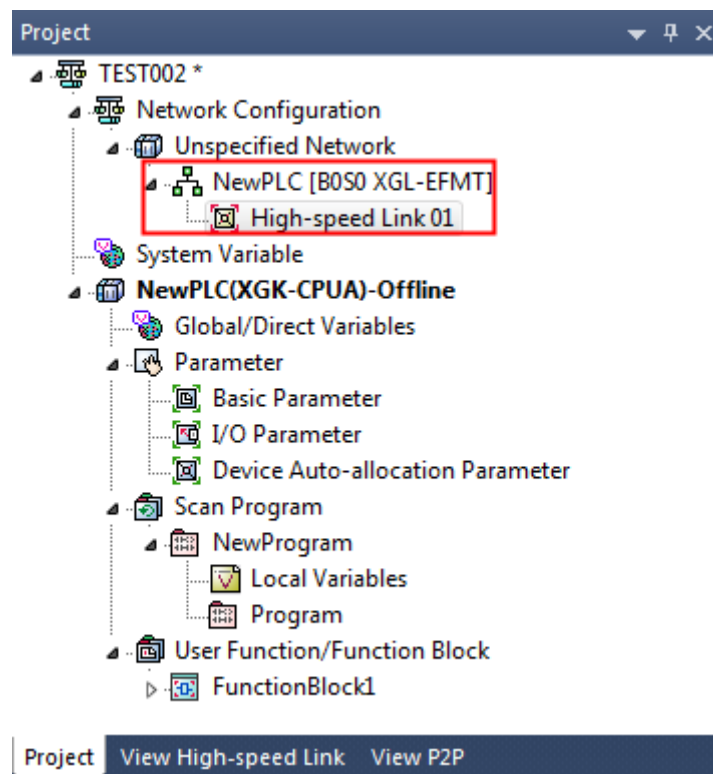
3.Refer to the communication module to set up high-speed link.

Notes
- In the event you doubly add other communication modules' high-speed links to the high-speed link number allocated to the existing communication module, the existing communication module information will be deleted and the high-speed link items of the newly declared communication module will be allocated.

2) Deletion of high-speed link

1. Select the high-speed link items in the project window and then, select [Delete].
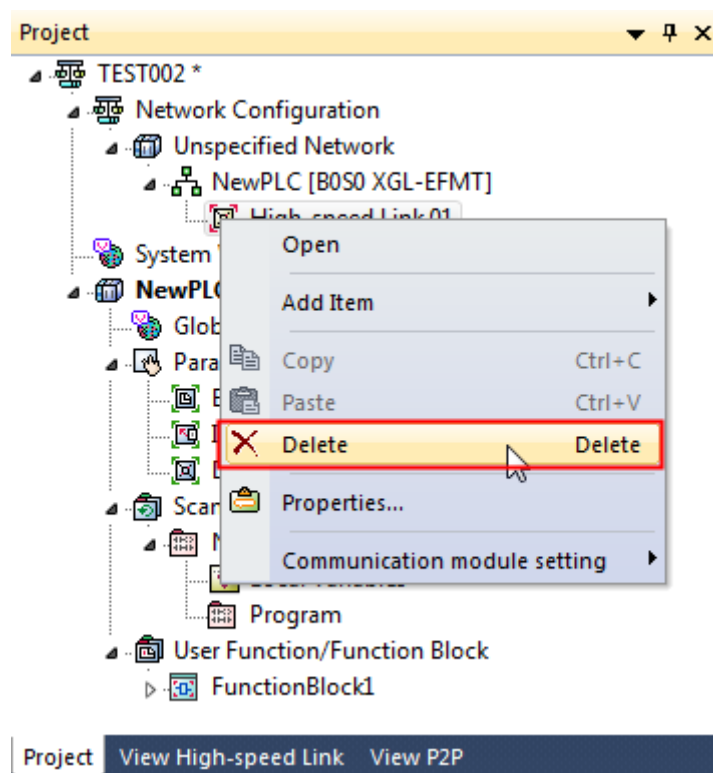
2. Press [OK] button in the dialog box to confirm deletion of the high-speed link.
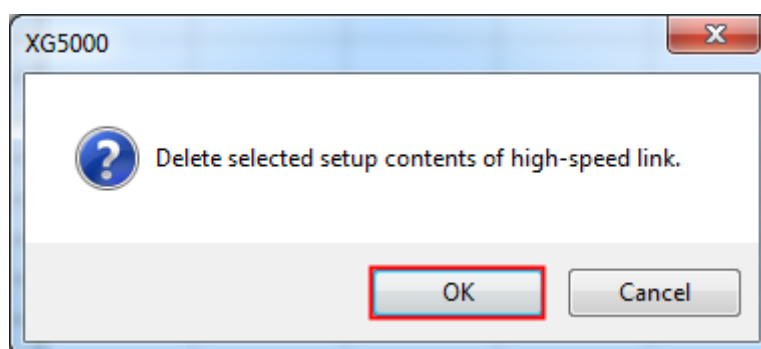
3) Edition of High-speed link

1. Select the high-speed link in the project window and then, select [Properties].
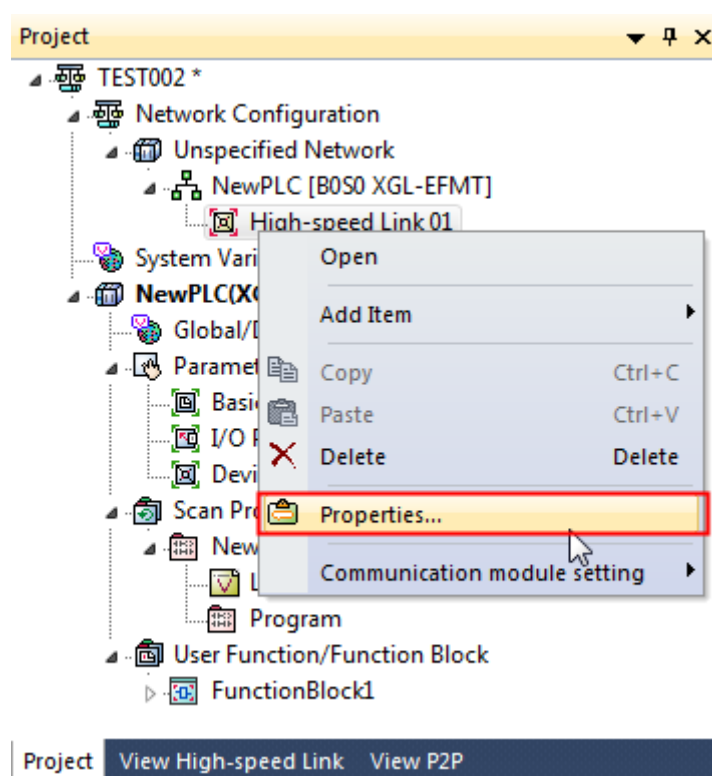
2. Select the index to be changed in the dialog box to set up the high-speed link communication module.

Chapter 3. Project
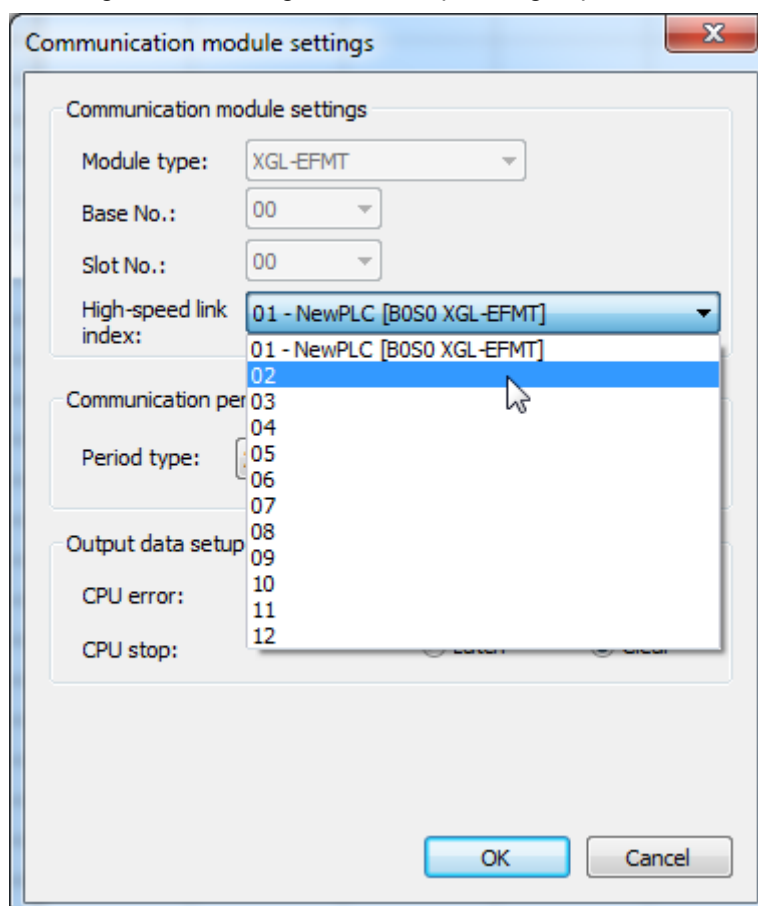
3. Press [OK] button in the dialog box to set up the high-speed link communication module.
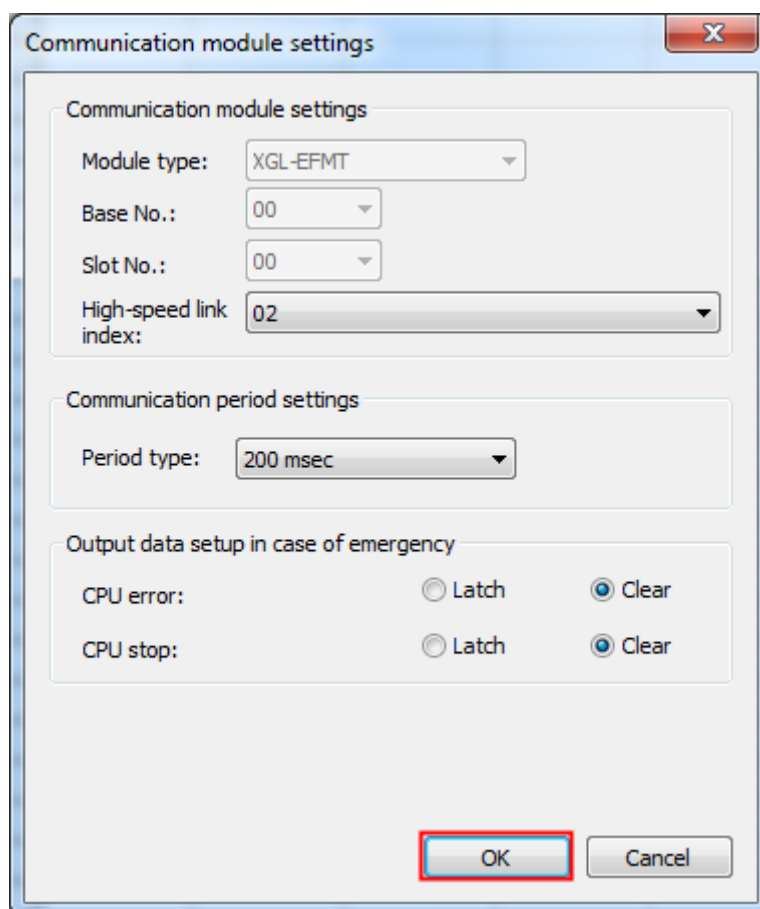
Chapter 4 Variable/Comment

The user normally uses the devices directly in the program. As a rule, the user needs to know what the devices are used for in the program. A simple method is to input the Comment in the device. The better method is to specify a variable in the device and use the variable in the place the device is used. In XG5000, just one of the comment and the variable, or both of them can be specified in the device. In addition, the declared variable/comment can be used in all the programs.

4.1 Variable/Comment

Variable/Comment is composed of View Variable, View Device and View Flag.
View Variable is used to declare the variable to be used in the program, or to display the whole list of the declared variables based on the variables. View Device is used to declare the variable to be used in the program, or to display the whole list of the declared variables based on the devices. View Flag is used to display the list of the flags provided as declared. Flags are classified into the system flag, HighSpeed link flag, P2P flag and PID flag.

4.1.1 View variable

It is used to display the whole list of the declared Variables/Comments.

	Variable	Type	Device	Used	Comment
1	VAR0	BIT	M00000	☐	Variable0
2	VAR1	BIT	M00001	☐	Variable1
3	VAR2	BIT	M00002	☐	Variable2
4	VAR3	BIT	M00003	☐	Variable3
5	VAR4	BIT	M00004	☐	Variable4
6	VAR5	BIT	M00005	☐	Variable5
7	VAR6	BIT	M00006	☐	Variable6
8	VAR7	BIT	M00007	☐	Variable7
9	VAR8	BIT	M00008	☐	Variable8
10	VAR9	BIT	M00009	☐	Variable9
11	VAR10	BIT	M0000A	☐	Variable10

4.1.2 View device

It is used to display the list of the Variables/Comments declared from the device input with its type changed.

[Dialog Box]
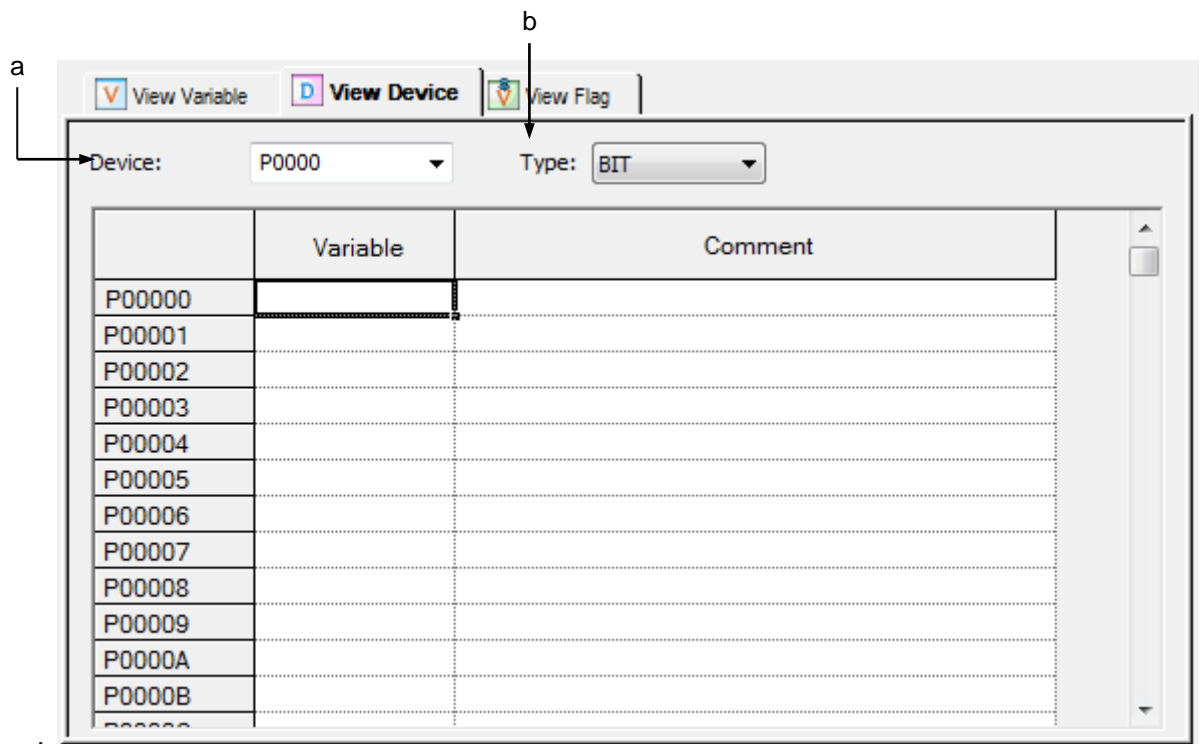
[Description of Dialog Box]

a. Device: used to display the list of the variables/comments from the device input.

b. Type: used to display the list of the variables/comments with the device type selected.

Note
A portion of F, L and K device is Read Only device. The color of the background will be displayed in gray, and the cell can not be edited.

4.1.3   View flag

[Dialog Box]

a   b   c   d
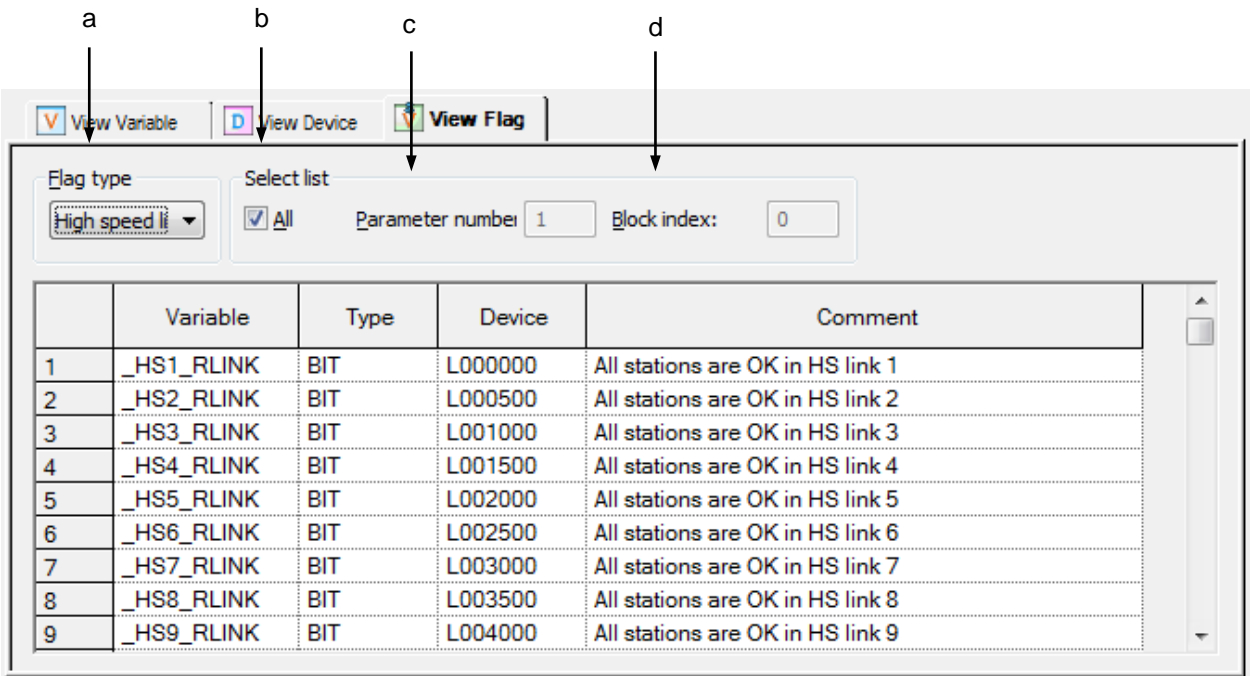
[Description of Dialog Box]

a. Flag kind: used to select kind of flag among System, HS link, P2P and PID.

b. All: used to display the whole list of the flags selected from [Flag kind]. As for the system flag, all the details only will be displayed on the screen. If [All] is not checked, only the flag applicable to [Parameter number] and [Block index] will be displayed.

c. Parameter number: This will be active only for High-speed link, P2P and PID flag. Only the flag item of the input parameter number will be displayed.

(*Example.* If Parameter Number 1 is input, it will be as shown below.)

	Variable	Type	Device	Comment
1	_HS1_RLINK	BIT	L000000	All stations are OK in HS link 1
2	_HS1_LTRBL	BIT	L000001	Trouble after _HS 1 RLINK on
3	_HS1_STATE00	BIT	L000020	Total states of HS link 1-block 000
4	_HS1_MOD000	BIT	L000100	Operation mode of HS link 1-block 000
5	_HS1_TRX000	BIT	L000180	Normal communication with HS link 1-block 000
6	_HS1_ERR000	BIT	L000260	Error mode of HS link 1-block 000
7	_HS1_SETBLOC	BIT	L000340	Setting of HS link 1-block 000

d. Block index: This will be active only for HighSpeed link and P2P flag. Only the flag item of the input block
    index will be displayed. (*Example.* If Block index 120 is input, it will be as shown below.)

	Variable	Type	Device	Comment
1	_HS1_RLINK	BIT	L000000	All stations are OK in HS link 1
2	_HS1_LTRBL	BIT	L000001	Trouble after _HS 1 RLINK on
3	_HS1_STATE12	BIT	L000098	Total states of HS link 1-block 120
4	_HS1_MOD120	BIT	L000178	Operation mode of HS link 1-block 120
5	_HS1_TRX120	BIT	L000258	Normal communication with HS link 1-block 120
6	_HS1_ERR120	BIT	L000338	Error mode of HS link 1-block 120
7	_HS1_SETBLOC	BIT	L000418	Setting of HS link 1-block 120

Notes
- View Flag can not declared since the flags are Read Only variables.

4.2   Variable/Comment Edit

On the list of the presently declared variables/Comments, Variable, Type, Device and Comment item can be edited. In addition, a new variable can be added to the list of the variables/comments to use in the program.

4.2.1   Variable/Comment register

This is used to register the variable/comment to use in the program. In order to register on the list of variables/ comments, go through View Variable or View Device as well.

1) View Variable Register

A variable can be added on, changed or deleted from the list of variables/comments.

[Dialog Box]

[Description of Dialog Box]

a. Variable: The declared variable can not be duplicated with the identical name.

   - A figure is unavailable for the first character.
   - A special character is unavailable. (However,'_' is available.)
   - Empty character is unavailable.
   - A name identical to the device is unavailable. (*Example.* P0, PF,…)
   - Hexadecimal format is unavailable. (*Example.* h23, hf,…)
   - When all the lines are empty, the type of the variable if input will be BIT as the default.

b. Type: Available types to input are BIT, WORD and BIT/WORD only.

   - For S device, BIT type only available.
   - For Z, ZR, N device, WORD type only available.
   - For T, C device, BIT/WORD type only available.
   - And for other devices, BIT, WORD type only available.
   - If the type is changed on the list of variables/comments declared, the device format will be changed as applicable to the type.

c. Device: The declared device can not be duplicated with the identical name.

   - When all the lines are empty and a device is input, type of the device will be displayed with BIT, WORD or BIT/WORD according to the device format.
   - If the device is changed on the list of variables/comments declared, the type will be changed to BIT, WORD or BIT/WORD as applicable to the device format.
   - The device of the flag area can not be registered on the list of variables/comments.

d. Comment: All the characters are available to input.

   - Use Ctrl + Enter key to apply the multi-line input.

e. Line Efficiency: [Variable] or [Comment] is required to register on the list of variables/comments.

   - If nothing is registered on the list of variables/comments, it will be displayed in pink.

Notes
- If any error occurs during the cell edit, it will be impossible to move to the next cell.
- Press ESC key to recover the previous value during the cell edit.

2) View Device Register

A variable can be added on, changed or deleted from the list of variables/comments.

[Dialog Box]

[Comment of Dialog Box]

a. Variable: The declared variable can not be duplicated with the identical name.

  − A figure is unavailable for the first character.

  − A special character is unavailable. (However,'_' is available.)

  − Empty character is unavailable.

  − A name identical to the device is unavailable. (*Example.* P0, PF,…)

  − Hexadecimal format is unavailable. (*Example.* h23, hf,…).

b. Comment: All the characters are available to input.

  − Use Ctrl + Enter key to apply the multi-line input.

4.2.2 Copy, Cut, Delete, Paste

Copy, Cut, Delete and Paste can be executed to edit the list of variables/Comments used in the program.

1) Copy

It is used to save the data of the area selected to copy in the clipboard. The copied details can be added to the present project or other projects. Paste on other applications is also available.

[Steps]

1. Select the area to copy.
2. Select [Edit] - [Copy] on the menu.

Notes

- How to select the area is as follows;
- Use the mouse to select the cell of (0,0) in order to select the whole table
- Select [Edit] - [Select All] in order to select the whole table.
- Use the mouse to select the column header of the cell in order to select the whole columns.
- Use the mouse to select the row header of the cell in order to select the whole rows.
- Use the mouse to drag the part of the cell in order to select the area.
- Use Shift + Arrow keys on the keyboard in order to select the area.

2) Delete

It is used to delete the data of the selected area from the list of variables/comments.

[Steps]

1. Select the area to delete.
2. Select [Edit] - [Delete] on the menu.

Notes

- View Flag can not be edited exclusively for Read.

3) Cut

It is used to save the selected data in the clipboard in order to add to the present project or other projects. Besides, it will delete the selected data.

[Steps]

1. Select the area to cut.
2. Select [Edit]-[Cut] on the menu.

4) Paste

It displays the data saved in the clipboard on the selected position. If the data is already displayed, the Dialog Box will be called to select and change the data.

* If the data saved in the clipboard is a part of columns,

[Steps]

1. Select the position to paste on.

2. Select [Edit]-[Paste] on the menu.

3. If the variable and the device are identical on the list of variables/comments, the dialog box will be called.
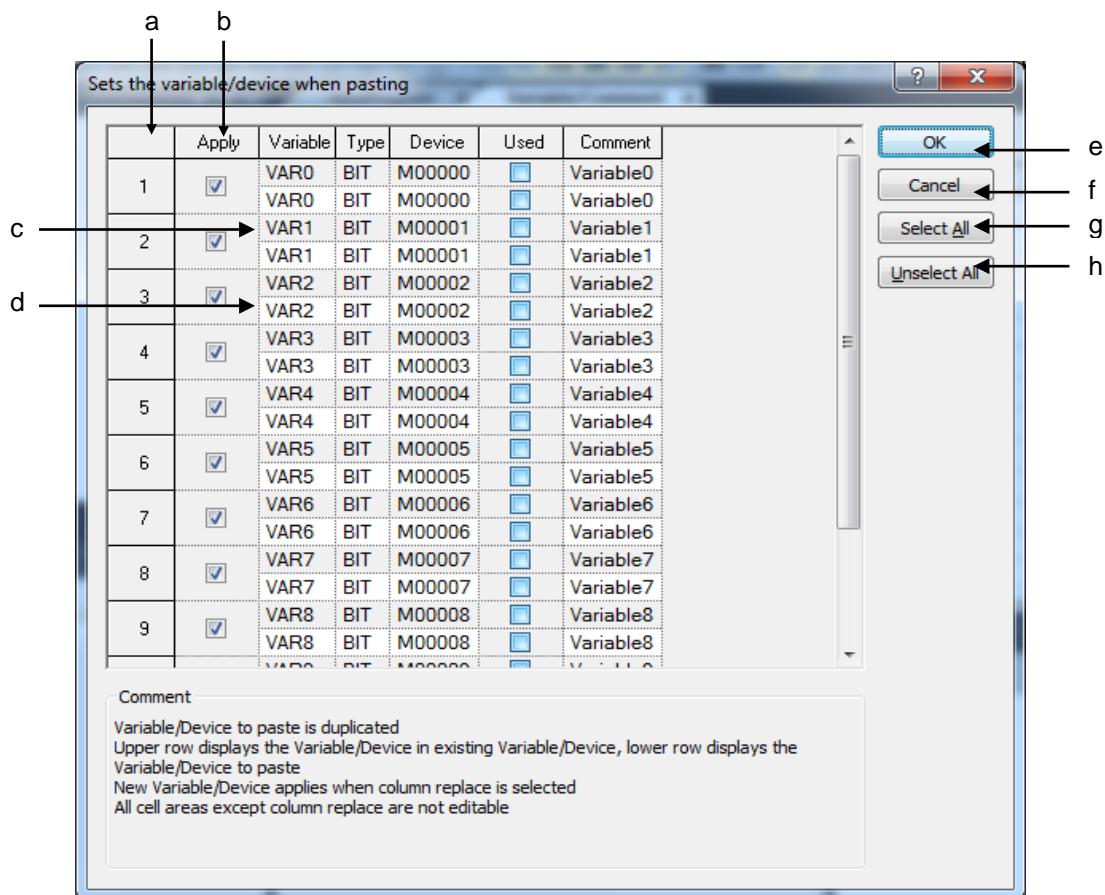
[Dialog Box]

[Comment of Dialog Box]

a. Number: used to display the duplicated number of the variables and devices to paste.

b. Replace: used to apply Paste.

c. Gray Line: used to display the existing list of variables/comments, which will not be edited.

d. White Line: used to display the list of variables/comments obtained from the clipboard, which will not be

edited.

e. OK: applies the lines of the selected check box. The existing list of variables/comments will be deleted to add a new list of variables/comments.

f. Cancel: The existing list of variables/comments will not be deleted, and a new the list of variables/comments will not be applied accordingly.

g. Select All: used to check all the check boxes in the [Replace] column.

h. Reset: used to cancel all the selected check boxes in the [Replace] column.

* **If the data saved in the clipboard is of the partial columns,**

[Steps]

1. Select the position to paste on.

2. Select [Edit]-[Paste] on the menu.

3. If the variable and the device are identical on the list of variables/comments, the dialog box will be called.
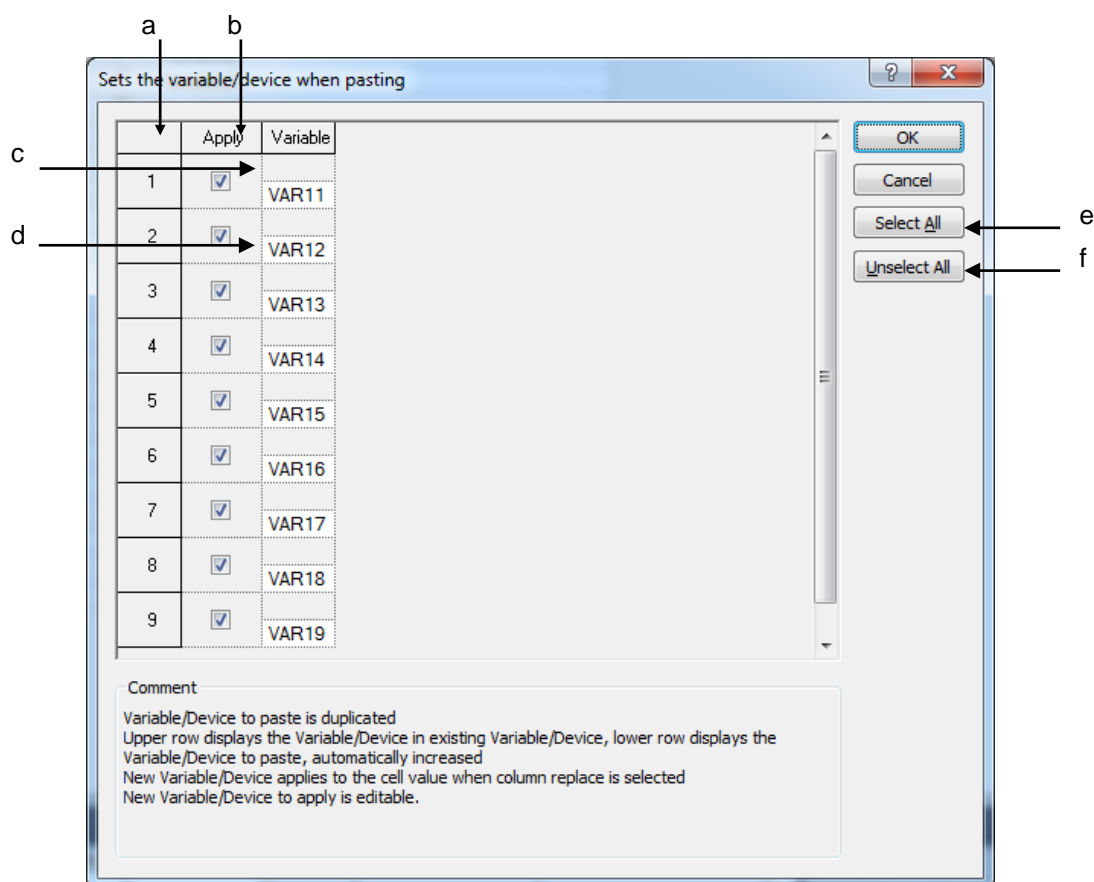
[Dialog Box]

[Comment of Dialog Box]

a. Number: used to display the duplicated number of the variables and devices to paste.

b. Replace: used to apply Paste.

c. Gray Line: used to display the data in the existing cell, which will not be edited.

d. White Line: If the variable or device of the data to paste is duplicated, it will be automatically increased and then displayed on the screen. In addition, the cell can be edited.

e. Select All: used to check all the check boxes in the [Replace] column.

f. Reset: used to cancel all the selected check boxes in the [Replace] column.

Notes

‑ If all items are identical, the cell can not be edited, while if partially identical, the cell can be edited.

‑ If the number of the columns saved in the clipboard is greater than the number of the columns to paste,

　it is not possible to paste.

‑ If the data saved in the clipboard is greater than the number of the lines to paste, it is not possible to paste.

‑ Paste in View Device will regard the data saved in the clipboard as the partial columns.

‑ Paste is not available in View Flag but in other Excel program.

4.2.3 Insert line

It is used to insert new lines as many as the lines of the selected area, which will make the existing lines move downward.

[Steps]

1. Select the area to insert the lines into.

2. Select [Edit] - [Insert Line] on the menu.

.

Notes
− If no cell is selected, one cell will be added to the last line.
− If Enter key or Tab key is selected at the last of the lines, a new line will be created.
− It is available only in View Variable.

4.2.4 Delete line

It is used to delete the lines as many as the lines of the selected area.

[Steps]

1. Select the area to delete the lines from.

2. Select [Edit] - [Delete Line] on the menu.
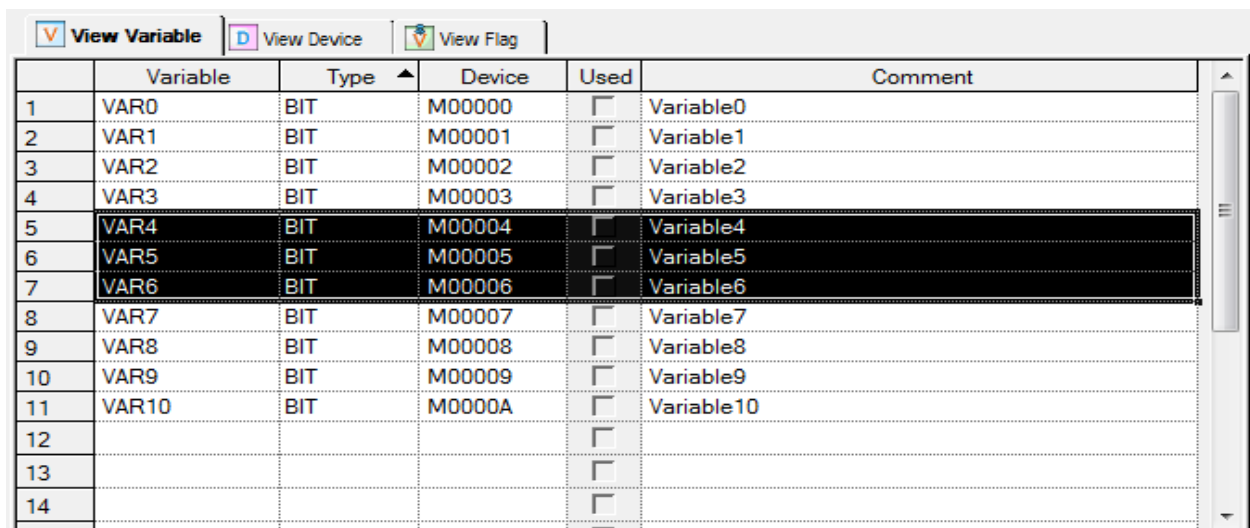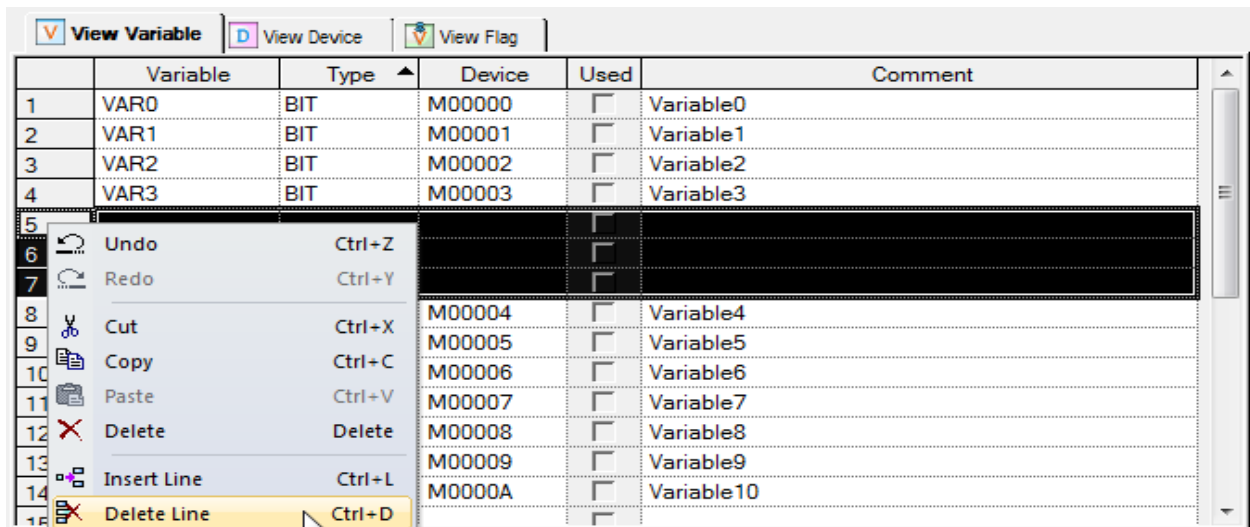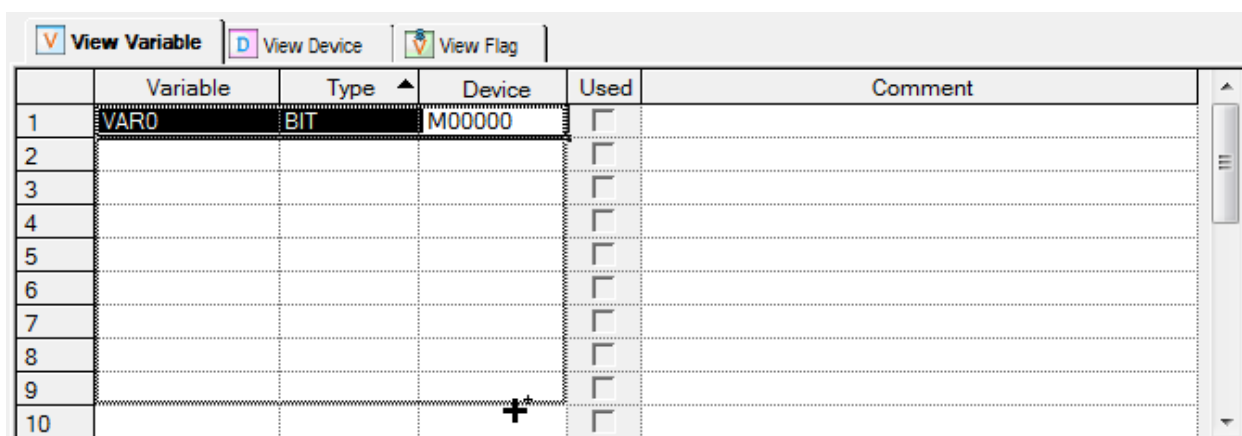
Notes
- If no cell is selected, [Delete Line] will not be executed.
- It is available only in View Variable.

4.2.5 Automatic fill
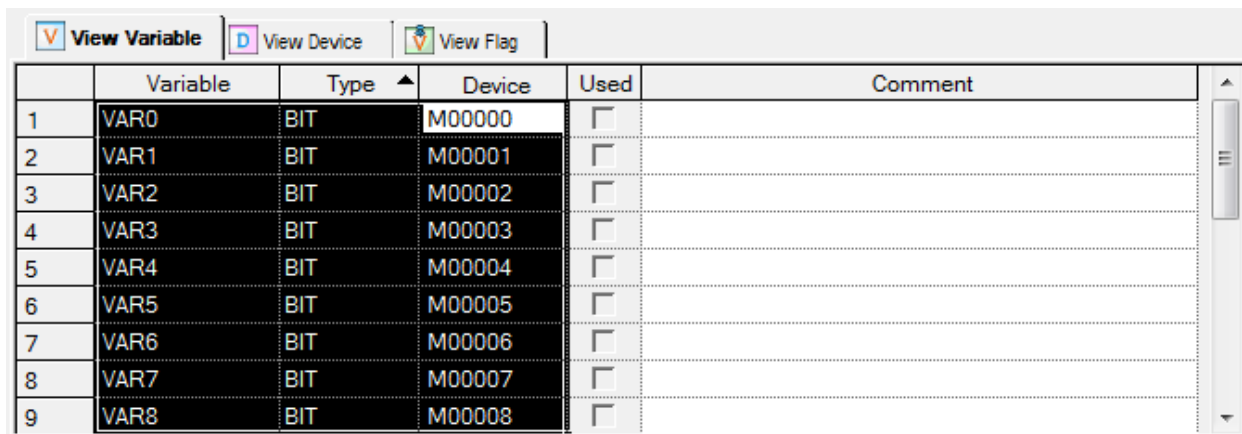
It is used to increase or decrease variables and devices to add on the list of variables/comments.

[Steps]

1. Move the mouse to the end of the cell and the mouse cursor will change to + shape.
2. Move the mouse upward and downward with its left button being pressed.

[Details]

a. Variable: Since the variable can not be declared as duplicated, the Automatic Fill shall be always executed. The case with figures will be found to increase the figures automatically. If there is no figures in the variable, 1 is added at the end of firstly copied variable, and the number will be increased automatically.

b. Type: The cell will be filled with the value in copied type. If the device and the type are not identical, the device will change to conform to the type. If identical, the device will not change.

c. Device: Since the device can not be declared as duplicated, the Automatic Fill shall be always executed.

The case with figures will be found to increase the figures automatically. If the device and the type are not identical, the type will change to conform to the device.

d. Comment: If Automatic Fill is executed with Ctrl key being pressed, the figures area will automatically increase, and if with Ctrl key not pressed, it will be copied.

Notes
－ If Automatic Fill is executed with an empty cell, it will be deleted.
－ Automatic Fill is available for many cells.
－ It is available only in View Variable and View Device.

4.2.6 Drag and drop

It is used to copy the selected items to paste on different positions.

[Steps]

1. Select the area to drag and drop.
2. The mouse cursor will change to the state available for drag and drop.
3. With the left mouse button being pressed, drag and drop the selected items onto a position to paste on.

[Details]

a. Drag and drop is available onto Variable Monitoring Window.

b. Drag and drop is available onto LD Window.

c. Copy is available when drag and drop is executed onto Excel program.

d. Drag and drop is available onto Data Traces window.

e. Drag and drop is available onto View Variable of other XG5000 programs.

f. Drag and drop is available onto View Device of other XG5000 programs.

Notes

－ Data is not moved but just copied always when dragged and dropped.

－ Paste is not available in View Flag.

4.2.7   Undo/Redo

Undo is used to cancel the edited detail in order to return to its previous state. Redo cancels again the operation of Edit Cancel.

[Details]

1. Undo/Redo is available for Cell Edit.

2. Undo/Redo is available for Change.

3. Undo/Redo is available for All Change.

4. Undo/Redo is available for Delete.

5. Undo/Redo is available for Cut.

6. Undo/Redo is available for Paste.

7. Undo/Redo is available for Automatic Fill.

8. Undo/Redo is available for Insert Line. (Only in View Variable)

9. Undo/Redo is available for Delete Line. (Only in View Variable)

10. Undo/Redo is available for drag and drop.

11. Undo/Redo is available for Align. (Only in View Variable)

Notes

－ In View Variable, if the data is moved to other windows or a variable is added in LD and IL, all the information for Undo/Redo will disappear.

－ In View Device, if the device item changes, all the information for Undo/Redo will disappear.

－ It is not used in View Flag.

4.2.8 Export to file

It is used to save the previously declared list of variables/Comments on the file and to open and read in the external programs.

[Steps]

1. Select [Edit] - [Export to File] on the menu.

<div style="border:1px solid black; padding:10px;">

Notes

- It is available only in View Variable.

</div>

4.2.9 U Device automatic register

It is used to register variables of the respective module by referring to the special module information specified in I/O parameter. The user can modify the variable and the comment.

[Steps]

1. Set the special module on the slot in I/O parameter.
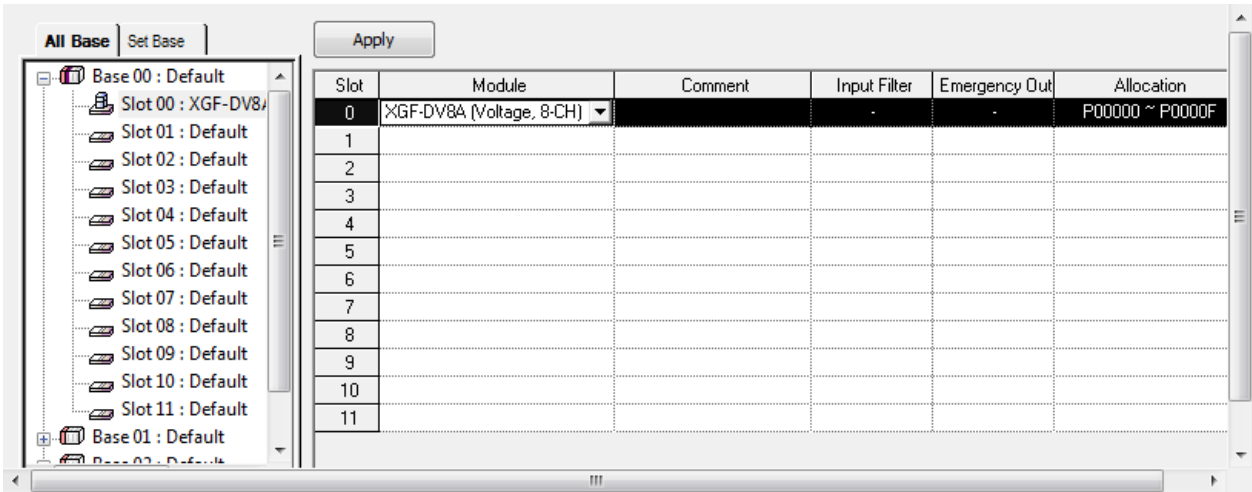
2. Select [Edit] - [Register Module Variable Comments] on the menu.
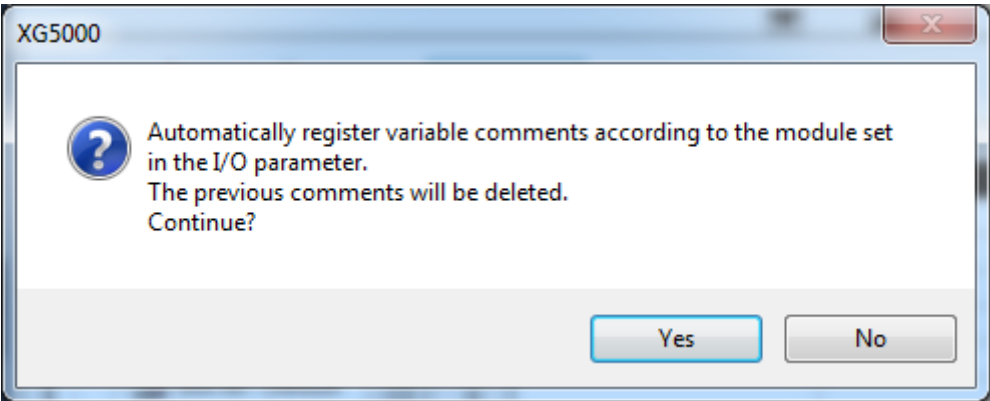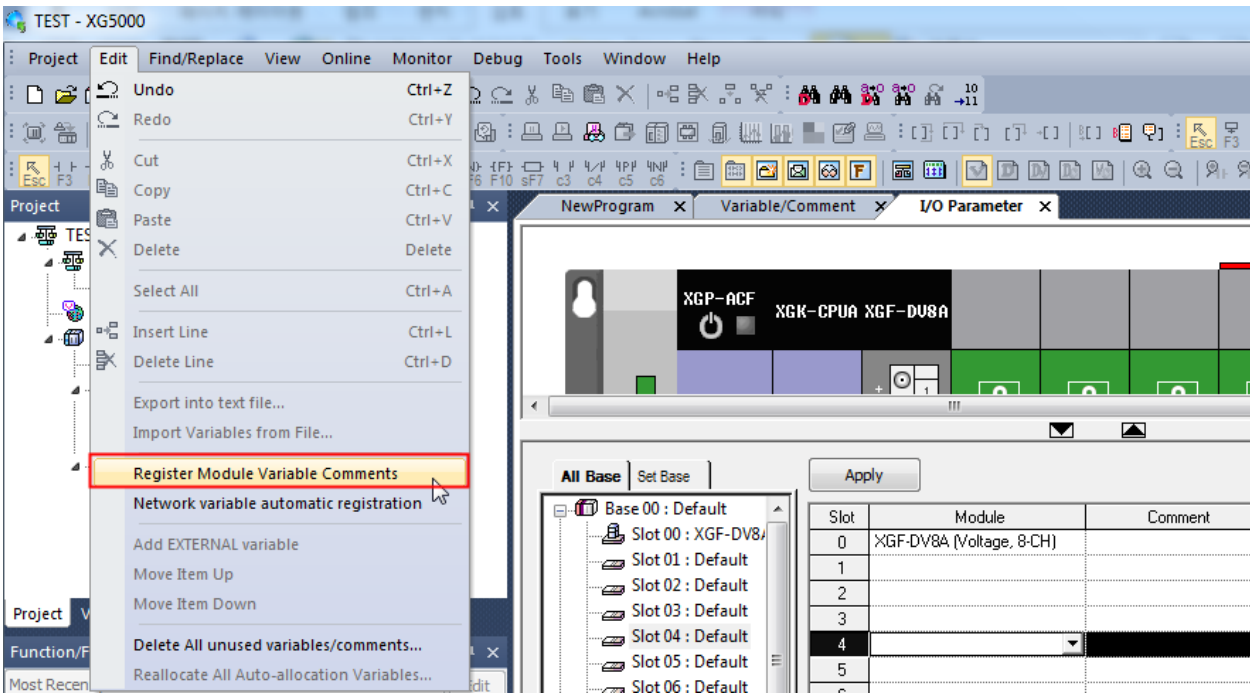
	Variable	Type ▲	Device	Used	Comment
10	_00_CH0_ERR	BIT	U00.00.0	☐	Analog Output Module: CH0 Error
11	_00_CH1_ERR	BIT	U00.00.1	☐	Analog Output Module: CH1 Error
12	_00_CH2_ERR	BIT	U00.00.2	☐	Analog Output Module: CH2 Error
13	_00_CH3_ERR	BIT	U00.00.3	☐	Analog Output Module: CH3 Error
14	_00_CH4_ERR	BIT	U00.00.4	☐	Analog Output Module: CH4 Error
15	_00_CH5_ERR	BIT	U00.00.5	☐	Analog Output Module: CH5 Error
16	_00_CH6_ERR	BIT	U00.00.6	☐	Analog Output Module: CH6 Error
17	_00_CH7_ERR	BIT	U00.00.7	☐	Analog Output Module: CH7 Error
18	_00_RDY	BIT	U00.00.F	☐	Analog Output Module: Module Ready
19	_00_CH0_ACT	BIT	U00.01.0	☐	Analog Output Module: CH0 Active
20	_00_CH1_ACT	BIT	U00.01.1	☐	Analog Output Module: CH1 Active
21	_00_CH2_ACT	BIT	U00.01.2	☐	Analog Output Module: CH2 Active
22	_00_CH3_ACT	BIT	U00.01.3	☐	Analog Output Module: CH3 Active
23	_00_CH4_ACT	BIT	U00.01.4	☐	Analog Output Module: CH4 Active
24	_00_CH5_ACT	BIT	U00.01.5	☐	Analog Output Module: CH5 Active
25	_00_CH6_ACT	BIT	U00.01.6	☐	Analog Output Module: CH6 Active
26	_00_CH7_ACT	BIT	U00.01.7	☐	Analog Output Module: CH7 Active
27	_00_CH0_OUTE	BIT	U00.02.0	☐	Analog Output Module: CH0 Output Status Setting
28	_00_CH1_OUTE	BIT	U00.02.1	☐	Analog Output Module: CH1 Output Status Setting
29	_00_CH2_OUTE	BIT	U00.02.2	☐	Analog Output Module: CH2 Output Status Setting
30	_00_CH3_OUTE	BIT	U00.02.3	☐	Analog Output Module: CH3 Output Status Setting
31	_00_CH4_OUTE	BIT	U00.02.4	☐	Analog Output Module: CH4 Output Status Setting

Notes

– Delete all the existing information of the U devices to add on the list of variables/comments referring to the presently specified I/O parameter.

4.2.10 Automatic registration of network variables

It is the function to add the variables allocated from the XG-CANOpen tool to XG5000.

1) How to create network variables

1. Register the CANOpen module in the project window and press 'Apply' button.

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0(main)	XBC-DN/DP32H (DC		3 Standard[ms]	Default	P0000 ~ P003F
1	XBL-CMEA		-	-	P0040 ~ P007F
2					
3					
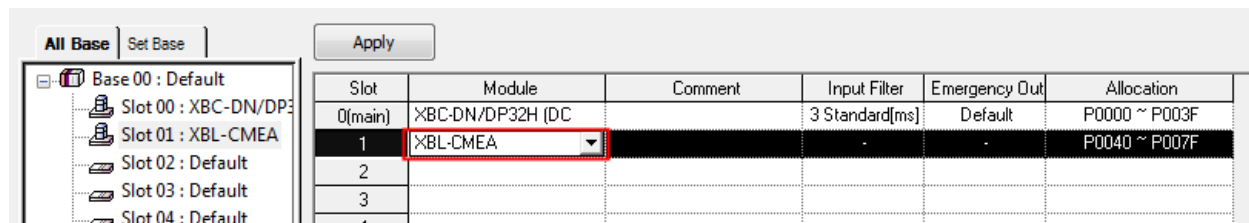
2. Then, the CANOpen module items will be created in the project window.
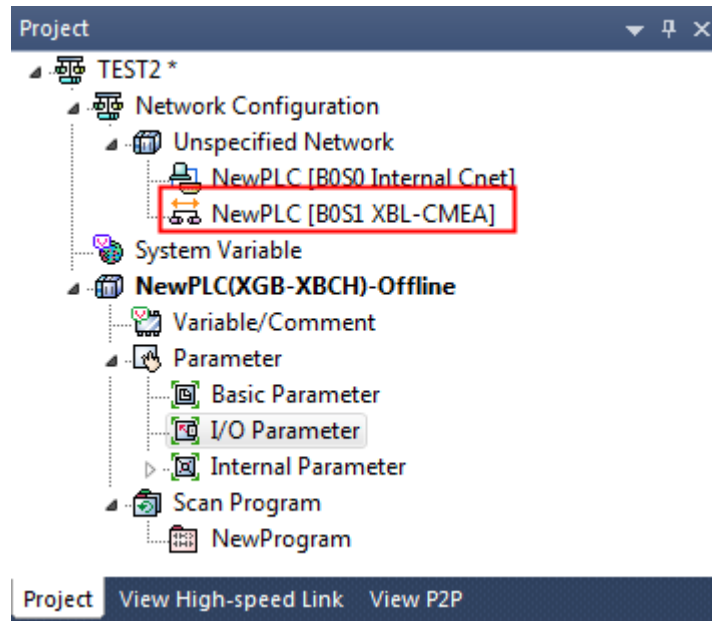
3. Click the CANOpen module items to execute the XG-CANopen tool.
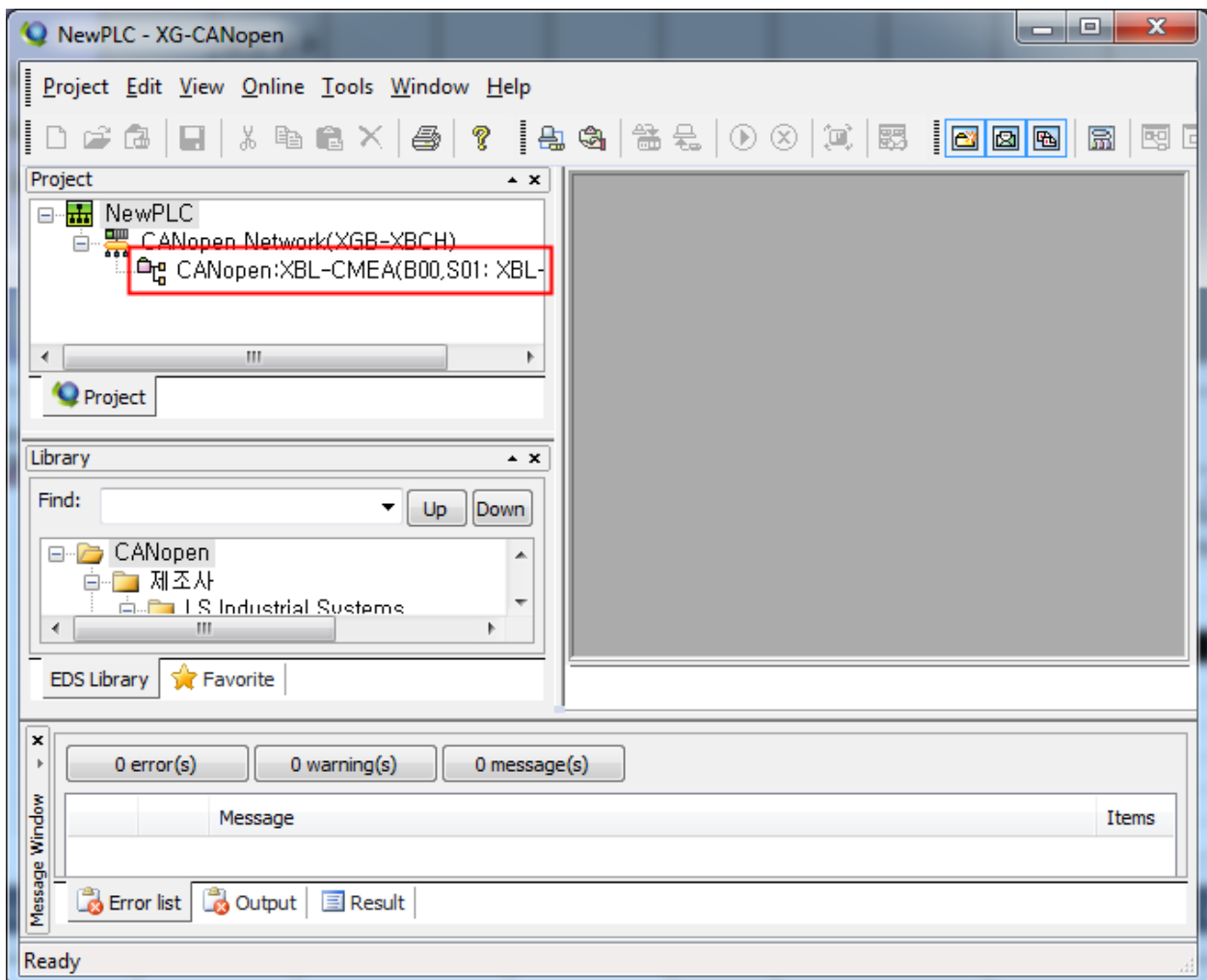
4. Click the master items to select the registration information.
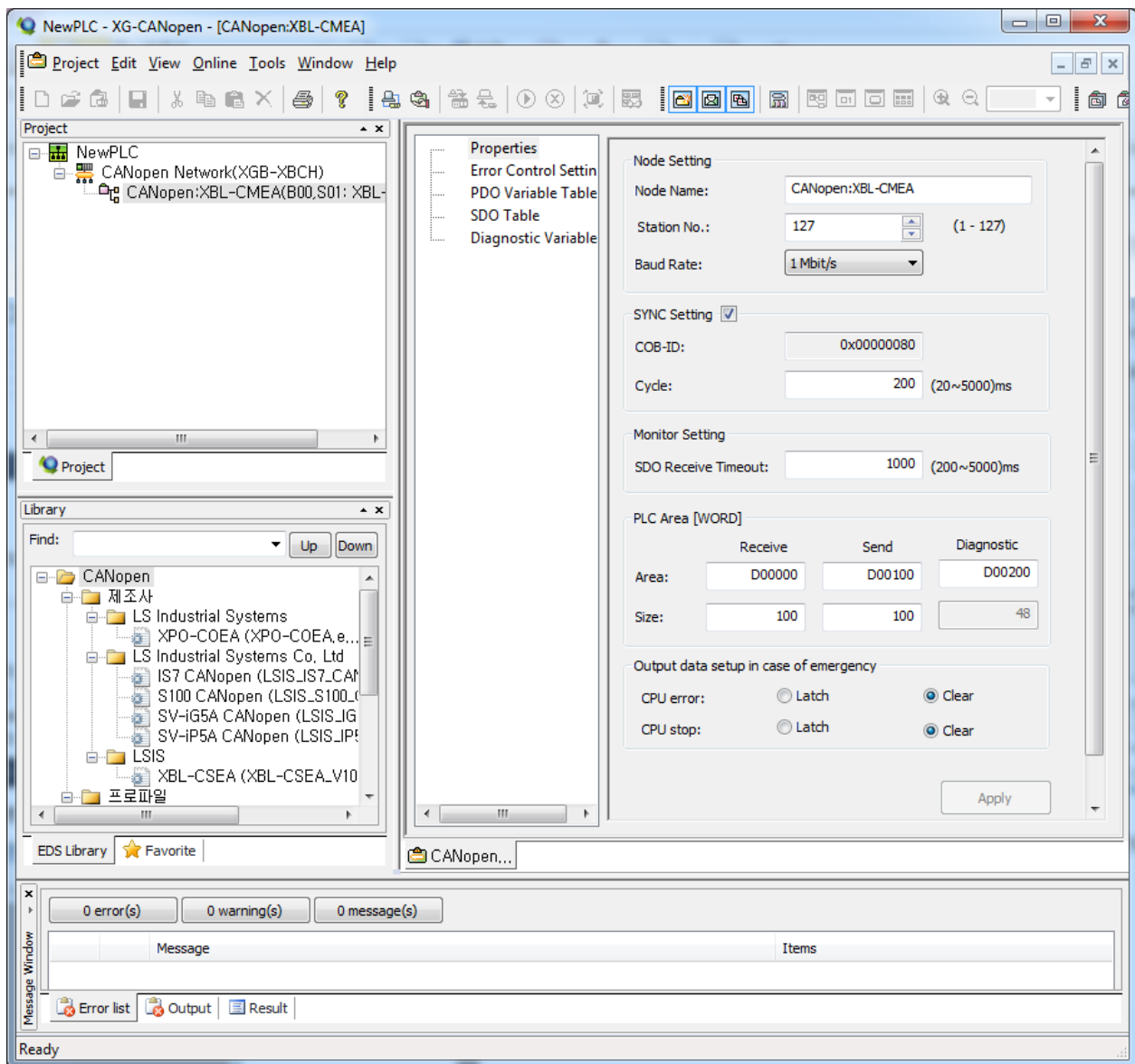
5. After setting up the device for diagnosis variable items in the PLC area, press 'Apply' button.
6. The allocated variable list will be displayed in the diagnosis variable table.

2) Automatic registration of Network variables

1. Click the menu [Edit]-[Automatic Registration of Network Variables].

2. Then, the message "Do you want to add the variable allocated from XG-CANopen to XG5000?" will be displayed.
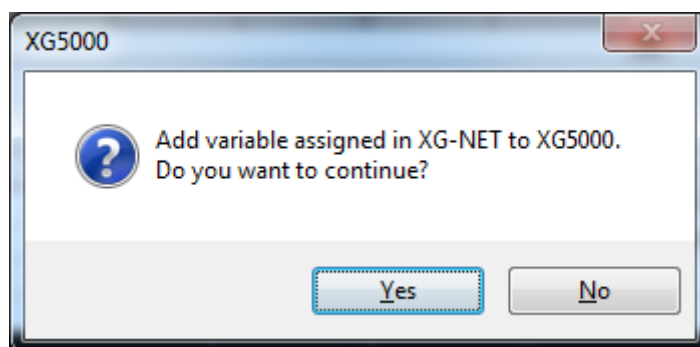
3. Select [Yes] button].

4. Select 'Variable/Comment' in the project window.

Then, the network variables will be automatically registered and displayed.

	Variable	Type ▲	Device	Used	Comment
1	_0001_001_CHA	BIT	D00200.0	☐	1: Master does not operate
2	_0001_001_CHA	BIT	D00200.1	☐	1: Slave does not operate
3	_0001_001_CHA	BIT	D00200.2	☐	1: Configuration error
4	_0001_001_CO	BIT	D00201.0	☐	1: CANopen Controller is at BUS Off state
5	_0001_001_CO	BIT	D00201.1	☐	1: Controller FIFO Overflow
6	_0001_001_CO	BIT	D00201.2	☐	1: Error Passive state
7	_0001_001_CO	BIT	D00201.3	☐	1: Transmit Queue Overflow
8	_0001_001_CO	BIT	D00201.4	☐	1: Error Warning state
9	_0001_001_CO	BIT	D00201.5	☐	1: Receive Error CANID Overflow
10	_0001_001_CO	BIT	D00201.6	☐	1: Receive Queue Overflow
11	_0001_001_EVE	BIT	D00203.0	☐	1: Errors that can occur in the transfer of SDOs
12	_0001_001_EVE	BIT	D00203.1	☐	1: Errors that were found in the communications proce
13	_0001_001_EVE	BIT	D00203.2	☐	1: Errors occurring during Network Settings
14	_0001_001_EVE	BIT	D00203.3	☐	1: Error information related to any error control mecha
15	0001_001_SLA	BIT	D00216.8	☐	1: Slave configuration completed

4.2.11 Preview

This function is used to previously show the screen which will be printed.

[Steps]

1. The window to previously show shall be displayed on the screen.

2. Select [Project]-[Preview] on the menu.

	Variable	Type	Device	Used	Comment
1	_0001_001_CHA	ST	D002 00.0		1: Master does not operate
2	_0001_001_CHA	ST	D002 00.1		1: Slave does not operate
3	_0001_001_CHA	ST	D002 00.2		1: Configuration error
4	_0001_001_CO	ST	D002 01.0		1: CANopen Controller is at BUS Off state
5	_0001_001_CO	ST	D002 01.1		1: Controller FIFO Overflow
6	_0001_001_CO	ST	D002 01.2		1: Error Passive state
7	_0001_001_CO	ST	D002 01.3		1: Transmit Queue Overflow
8	_0001_001_CO	ST	D002 01.4		1: Error Warning state
9	_0001_001_CO	ST	D002 01.5		1: Receive Error CAN ID Overflow
10	_0001_001_CO	ST	D002 01.6		1: Receive Queue Overflow
11	_0001_001_EVE	ST	D002 03.0		1: Errors that can occur in the transfer of SDOs
12	_0001_001_EVE	ST	D002 03.1		1: Errors that were found in the communications proce
13	_0001_001_EVE	ST	D002 03.2		1: Errors occurring during Network Settings
14	_0001_001_EVE	ST	D002 03.3		1: Error information related to any error control mechan
15	_0001_001_SLA	ST	D002 16.8		1: Slave configuration completed
16	_0001_001_SLA	ST	D002 16.9		1: Slave configuration error
17	_0001_001_SLA	ST	D002 16.A		1: Slave EMCY error
18	_0001_001_SLA	ST	D002 16.B		1: Slave is on init status
19	_0001_001_SLA	ST	D002 16.C		1: Slave on Stop mode
20	_0001_001_SLA	ST	D002 16.D		1: Slave on pre-operational mode
21	_0001_001_SLA	ST	D002 16.E		1: Slave is on operational mode
22	_0001_001_SLA	ST	D002 17.8		1: Slave configuration completed
23	_0001_001_SLA	ST	D002 17.9		1: Slave configuration error
24	_0001_001_SLA	ST	D002 17.A		1: Slave EMCY error
25	_0001_001_SLA	ST	D002 17.B		1: Slave is on init status
26	_0001_001_SLA	ST	D002 17.C		1: Slave on Stop mode
27	_0001_001_SLA	ST	D002 17.D		1: Slave on pre-operational mode
28	_0001_001_SLA	ST	D002 17.E		1: Slave is on operational mode
29	_0001_001_SLA	ST	D002 18.8		1: Slave configuration completed
30	_0001_001_SLA	ST	D002 18.9		1: Slave configuration error
31	_0001_001_SLA	ST	D002 18.A		1: Slave EMCY error
32	_0001_001_SLA	ST	D002 18.B		1: Slave is on init status
33	_0001_001_SLA	ST	D002 18.C		1: Slave on Stop mode
34	_0001_001_SLA	ST	D002 18.D		1: Slave on pre-operational mode
35	_0001_001_SLA	ST	D002 18.E		1: Slave is on operational mode
36	_0001_001_SLA	ST	D002 19.8		1: Slave configuration completed
37	_0001_001_SLA	ST	D002 19.9		1: Slave configuration error
38	_0001_001_SLA	ST	D002 19.A		1: Slave EMCY error
39	_0001_001_SLA	ST	D002 19.B		1: Slave is on init status
40	_0001_001_SLA	ST	D002 19.C		1: Slave on Stop mode
41	_0001_001_SLA	ST	D002 19.D		1: Slave on pre-operational mode
42	_0001_001_SLA	ST	D002 19.E		1: Slave is on operational mode
43	_0001_001_SLA	ST	D002 20.8		1: Slave configuration completed
44	_0001_001_SLA	ST	D002 20.9		1: Slave configuration error
45	_0001_001_SLA	ST	D002 20.A		1: Slave EMCY error
46	_0001_001_SLA	ST	D002 20.B		1: Slave is on init status
47	_0001_001_SLA	ST	D002 20.C		1: Slave on Stop mode
48	_0001_001_SLA	ST	D002 20.D		1: Slave on pre-operational mode
49	_0001_001_SLA	ST	D002 20.E		1: Slave is on operational mode
50	_0001_001_SLA	ST	D002 21.8		1: Slave configuration completed
51	_0001_001_SLA	ST	D002 21.9		1: Slave configuration error
52	_0001_001_SLA	ST	D002 21.A		1: Slave EMCY error
53	_0001_001_SLA	ST	D002 21.B		1: Slave is on init status
54	_0001_001_SLA	ST	D002 21.C		1: Slave on Stop mode
55	_0001_001_SLA	ST	D002 21.D		1: Slave on pre-operational mode
56	_0001_001_SLA	ST	D002 21.E		1: Slave is on operational mode
57	_0001_001_SLA	ST	D002 22.8		1: Slave configuration completed
58	_0001_001_SLA	ST	D002 22.9		1: Slave configuration error
59	_0001_001_SLA	ST	D002 22.A		1: Slave EMCY error
60	_0001_001_SLA	ST	D002 22.B		1: Slave is on init status
61	_0001_001_SLA	ST	D002 22.C		1: Slave on Stop mode
62	_0001_001_SLA	ST	D002 22.D		1: Slave on pre-operational mode
63	_0001_001_SLA	ST	D002 22.E		1: Slave is on operational mode
64	_0001_001_SLA	ST	D002 23.8		1: Slave configuration completed
65	_0001_001_SLA	ST	D002 23.9		1: Slave configuration error

Notes

- By changing the size of the column, the window previously displayed on the screen can be adjusted.
- In View Device, all the areas of the specified type will be displayed on the Previous View screen.
- In View Variable, incomplete variables displayed on the present screen will be also displayed on the Preview screen.

4.2.12 Print

It is used to print the window displayed on the screen in View Variable, View Device and View Flag.

[Steps]

1. The window to print shall be displayed on the screen.

2. Select [Project]-[Print] on the menu.

Notes

- By changing the size of the column, the details to be printed on paper can be adjusted.

- In View Device, all the areas of the specified type will be printed.

- In View Variable, incomplete variables displayed on the present screen will be also printed.

4.2.13 Convenient functions
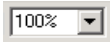
1) Align

- Double-click the column header to align in the descending sequence and in the ascending sequence.

- Presently aligned positions are displayed with the arrow direction.

Notes

- It is available only in View Variable and View Flag.

- If the View mode changes to View Variable, types and devices will be aligned to display.

---

2) View

- Screen Zoom-In: shows the screen magnified.

- Select [View]-[Zoom-In] on the menu.

- Screen Zoom-Out: shows the screen reduced.

- Select [View]-[Zoom-Out] on the menu.

- Use of Combo Box for screen Zoom-In/Zoom-Out.

- Select the magnification rate of 100% in the combo box of the toolbar.

- Width Automatic Adjust: adjusts the column size applicably to the String length of the cell.

- Select [View]-[Resize Width] on the menu.

- Height Automatic Adjust: adjusts the line height applicably to the String height of the cell.

- Select [View]-[Resize Height] on the menu.

3) Shortcut Keys

Shortcut Keys	Comment
Home	Used to move to the first in the cell.
End	Used to move to the end in the cell.
Ctrl + Home	Used to move to the first cell position.
Ctrl + End	Used to move to the last cell position.
Shift + Ctrl + Home	From the present to the highest cells selected.
Shift + Ctrl + End	From the present to the lowest cells selected.
Shift + Page Up	From the cell to the page up position selected.
Shift + Page Down	From the cell to the page down position selected.
Shift + Tab, Shift + Enter	Used to move to the next cell (right->left, bottom->top), and to move to the last cell in the first cell.
Tab, Enter	Used to move to the next cell (left->right, top->bottom). A new line will be created in the last call.
Ctrl + Enter	Multi-line will be input in the comment column.

4.2.14 EtherNet/IP tag Export

1. Select the menu [Project]-[Save EtherNet/IP tags to file].
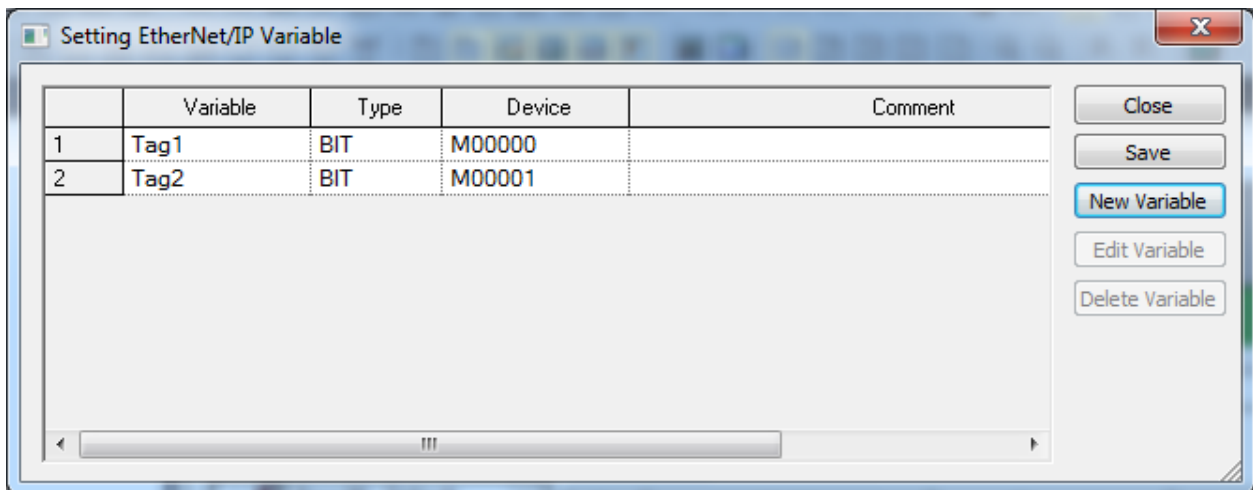
2. In the window to set up EtherNet/IP variable, click [Add Variable] button.

- Enter the variable in the window to add variables.
- Select the data type.
- Input the device.
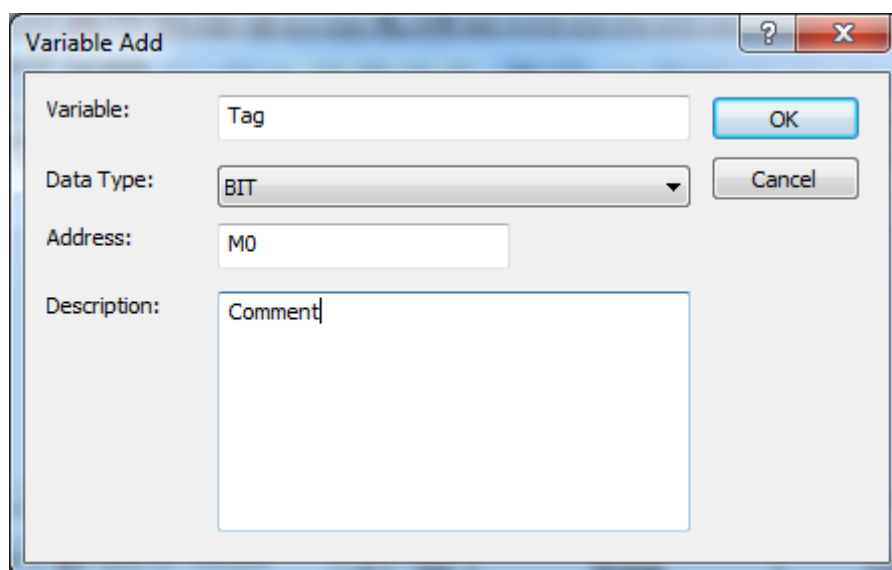
3. You can see the variable is added to the window to set up EtherNet/IP variable.
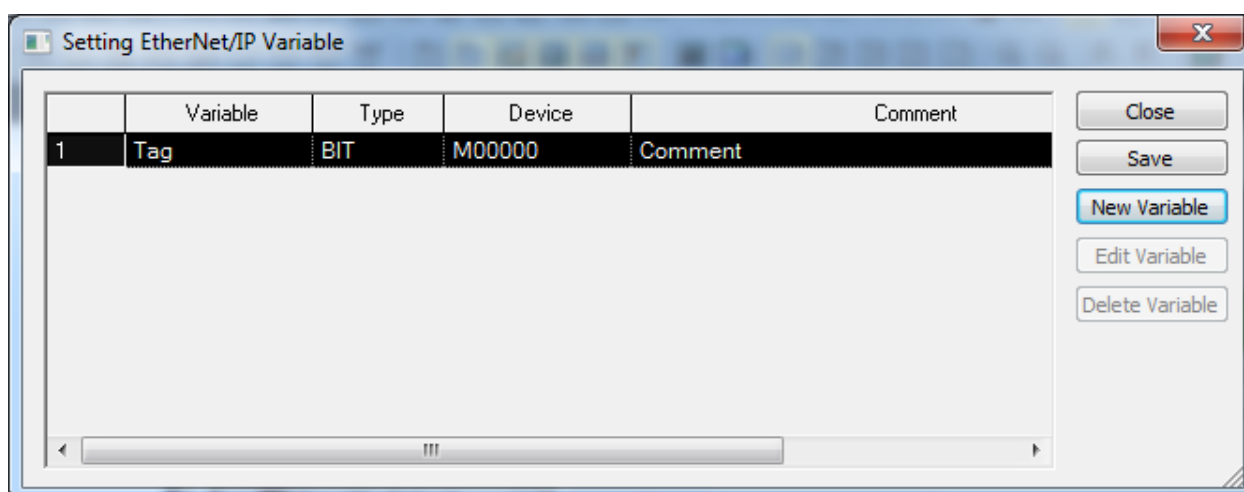
4. Click [Save] button in the window to set up EtherNet/IP variable.
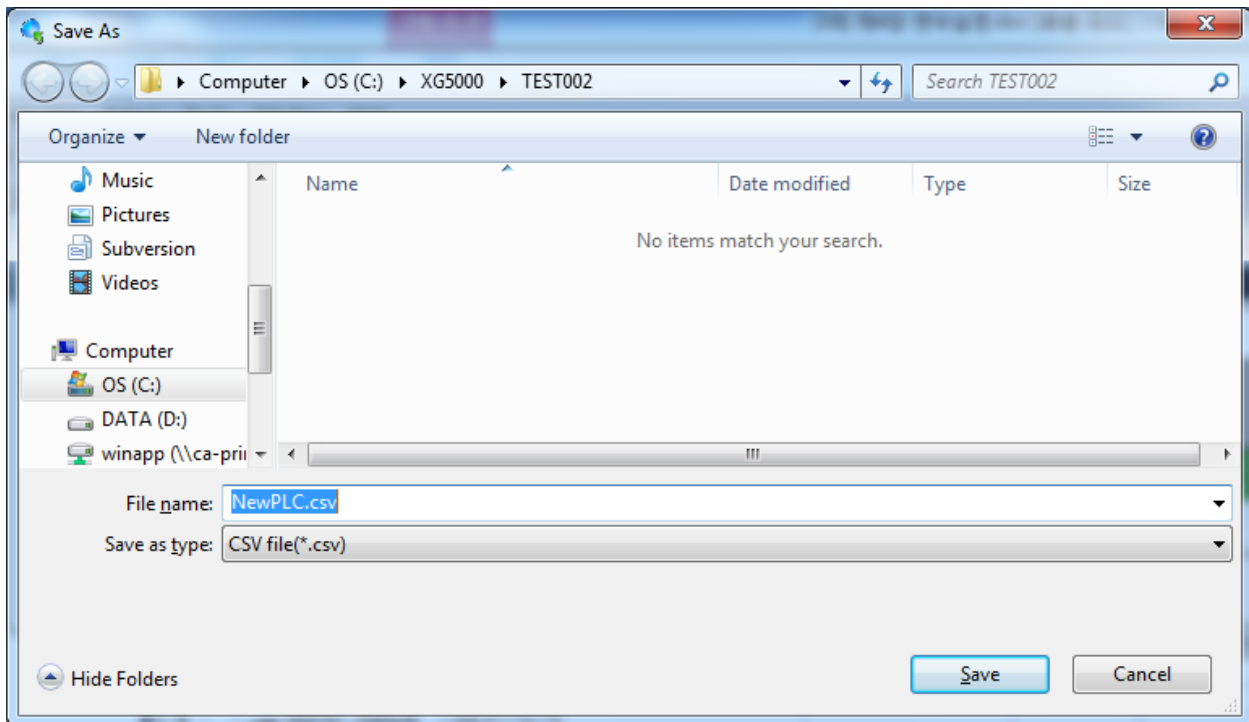
5. Save the EtherNet/IP variable as CSV file.

4.3 Sharing Variable

XG5000 is programming tool for PLC. In PLC program, factor and step consist of variable and device.

Variable and device need to be observed by external device. To be observed by external program, saves

variable and device as CSV file.

Flag and Variable/Comments can be saved

4.3.1 Saving variable/comment

[Steps]

1. Select item to be saved in project window.
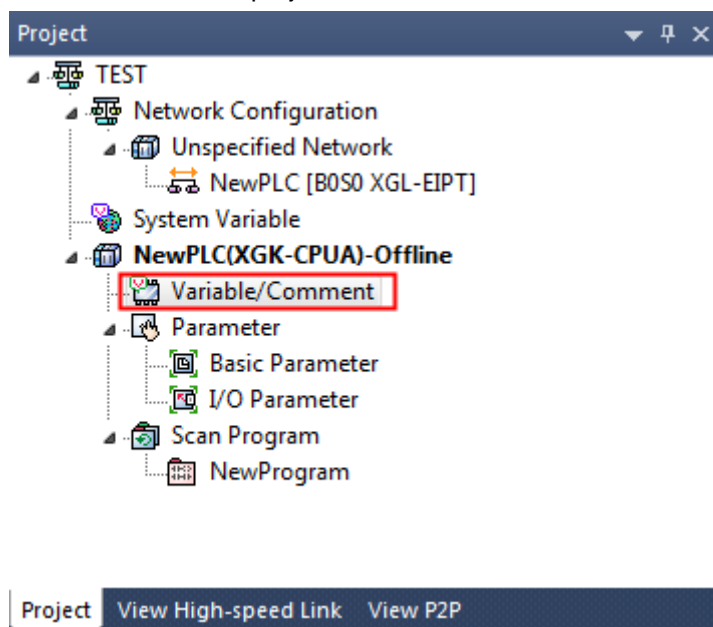
2. Select [Project]-[Save Variable Names to File]

🗋	New Project...	Ctrl+N
📂	Open Project...	Ctrl+O
📇.	Open from PLC...	
	Open KGLWIN File...	
	Open GMWIN File...	
💾	Save Project	Ctrl+S
	Save As...	
	Close Project	
	Save As Binary...	
	Write Binary to PLC...	
	Open from Memory	
	Write to Memory...	
	Add Item	▶
	Import from File	▶
🗐	Export to File...	
	Save Variable Names to File...	
	Save EtherNet/IP Tags to File...	
📇	Compare Projects...	
🖨	Print...	Ctrl+P
	Preview	
	Print Project...	
	Print Setup...	
	1 C:\XG5000\test\TEST.xgwx	
	2 C:\XG5000\TEST002\TEST002.xgwx	
	3 C:\XG5000\TEST001\TEST001.xgwx	
	4 C:\XG5000\TEST01\TEST01.xgwx	
	5 AUTO BUFFING MC (2014.08.09).xgwx	
	Exit	

[Dialog box]

CSV File Export Settings

Save Item to CSV File

- ☑ NewPLC
  - ☑ Variable/Comment
  - ☑ Flag
    - ☑ System
    - ☑ High speed link
    - ☑ P2P
    - ☑ PID

	Apply	Variable	Type	Device	EIP	
1	☑	_RUN	BIT	F00000	☐	RUN
2	☑	_STOP	BIT	F00001	☐	STOP
3	☑	_ERROR	BIT	F00002	☐	ERROR
4	☑	_DEBUG	BIT	F00003	☐	DEBUG
5	☑	_LOCAL_CON	BIT	F00004	☐	Local con
6	☑	_MODBUS_CON	BIT	F00005	☐	Modbus
7	☑	_REMOTE_CON	BIT	F00006	☐	Remote
8	☑	_RUN_EDIT_ST	BIT	F00008	☐	Download
9	☑	_RUN_EDIT_CH	BIT	F00009	☐	Processin
10	☑	_RUN_EDIT_DO	BIT	F0000A	☐	Online ec
11	☑	_RUN_EDIT_NG	BIT	F0000B	☐	Online ec
12	☑	_CMOD_KEY	BIT	F0000C	☐	Change c
13	☑	_CMOD_LPADT	BIT	F0000D	☐	Change c
14	☑	_CMOD_RPADT	BIT	F0000E	☐	Change c
15	☑	_CMOD_RLINK	BIT	F0000F	☐	Change c
16	☑	_FORCE_IN	BIT	F00010	☐	Force inp
17	☐	_FORCE_OUT	BIT	F00011	☐	F

Save
Close

File Path:

[Description of dialog box]

  a. Item for saving: select item to be saved.

    -. If you check upper box, all lower boxes are checked.

    -. If you click on **+**, **-** button, tree is enlarged or reduced.

    - If you click one item, variables of selected item shows art right grid.

  b. Application: only selected variable is saved.

  c. File Path: specifies file path where CSV file is saved

  d. Save: if you click on this button, the following dialog box shows. Set the file path and file name.
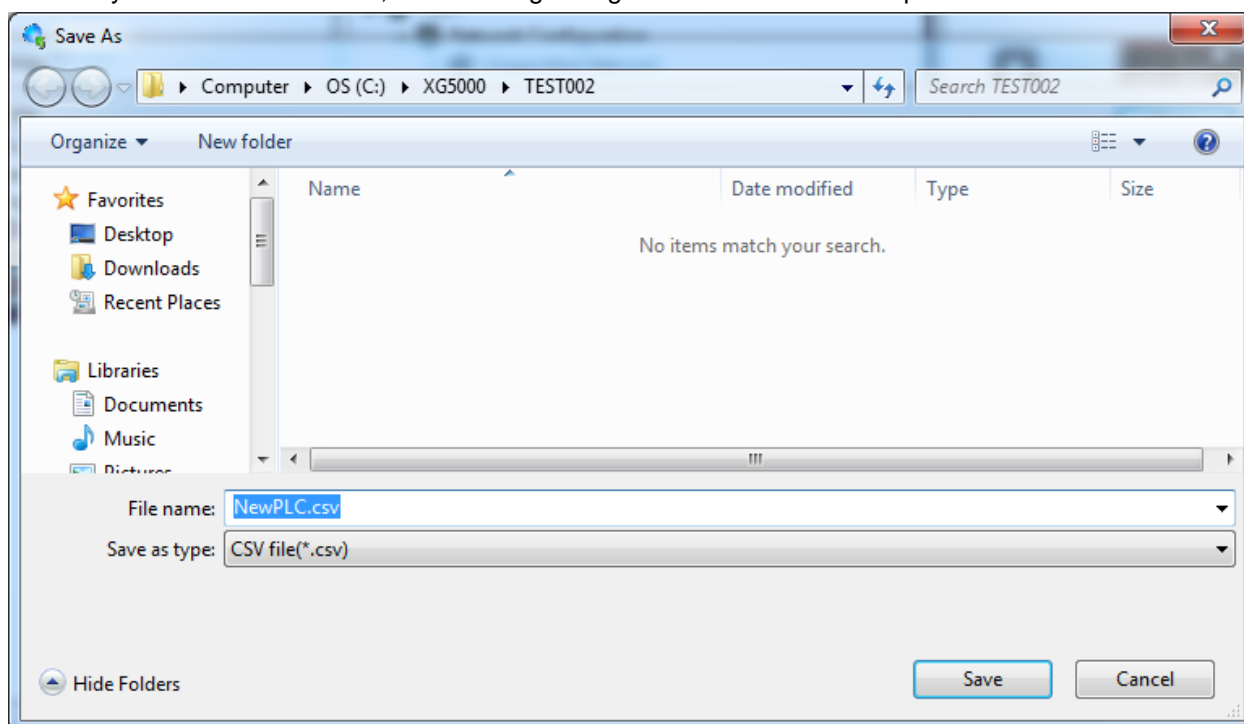
    - Default file name is PLC name and you can change it.

    - If you press 'SAVE', CSV file is created and saved.

    - If you press 'Cancel', CSV file is not created and the window is closed

  e. Cancel: CSV file is not created and the window is closed.

4.3.2 CSV file structure

Remark	Title=CSV File					
Remark	Date=2009-1-14					
Remark	Version=Ver3.0					
Remark	PLC Name=NewPLC					
Remark	CPU Type=XGK-CPUH					
Type	Scope	Variable	Address	Data Type	Property	Comment

Tag	VariableComment	Data1	M0000	WORD		Memory 1
Tag	VariableComment	Data2	M0001	WORD		Memory 1
Tag	VariableComment	Data3	M0002	WORD		Memory 1
Tag	VariableComment	Data4	M0003	WORD		Memory 1
Tag	VariableComment	Data5	M0004	WORD		Meemory 1
Tag	VariableComment	Data6	M0005	WORD		Memory 1
Tag	VariableComment	Button1	P00000	BIT		Lamp 1
Tag	VariableComment	Button 2	P00001	BIT		Lamp 2
Tag	VariableComment	Button 3	P00002	BIT		Lamp 3
Tag	VariableComment	Button 4	P00003	BIT		Lamp 4
Tag	VariableComment	Button 5	P00004	BIT		Lamp 5
Tag	VariableComment	Button 6	P00005	BIT		Lamp 6

[Description of file structure]

1． Remark: shows information (shows data for reference)

　　Title: displays file format

　　Date: displays file-created date

　　Version: displays file version

　　PLC Name: displays Configuration name

　　CPU Type: displays CPU type

2． Type: displays data type

　　Scope: displays scope which tag is belonged to

　　Variable: displays variable name

　　Address: displays device of variable (displayed in XGK, XGI format)

　　Data Type: displays data type (displayed in XGK, XGI format)

　　Property: displays whether this variable is Auto-variable(A) read-only variable(R)

　　Comment: displays comment of variable

3． Tag: displays content of variable

Note

－ In case ' " ' is used in comment, it changes into ' $Q ' in CSV file

－ In case ' $ ' is used in comment, it changes into " $$ " in CSV file

4.3.3 Import external variable in XG-PD

In order to refer to the variable and device of PLC program in XG-PD, specifies as shown below

[Steps]

1. Saves CSV file at XG5000 to be used in XG-PD. CPU type of XG5000 and XG-PD should be same.

2. Select area to use external variable in High-speed Link Block and click on right button of mouse. Select [Import variable name] in the created context menu
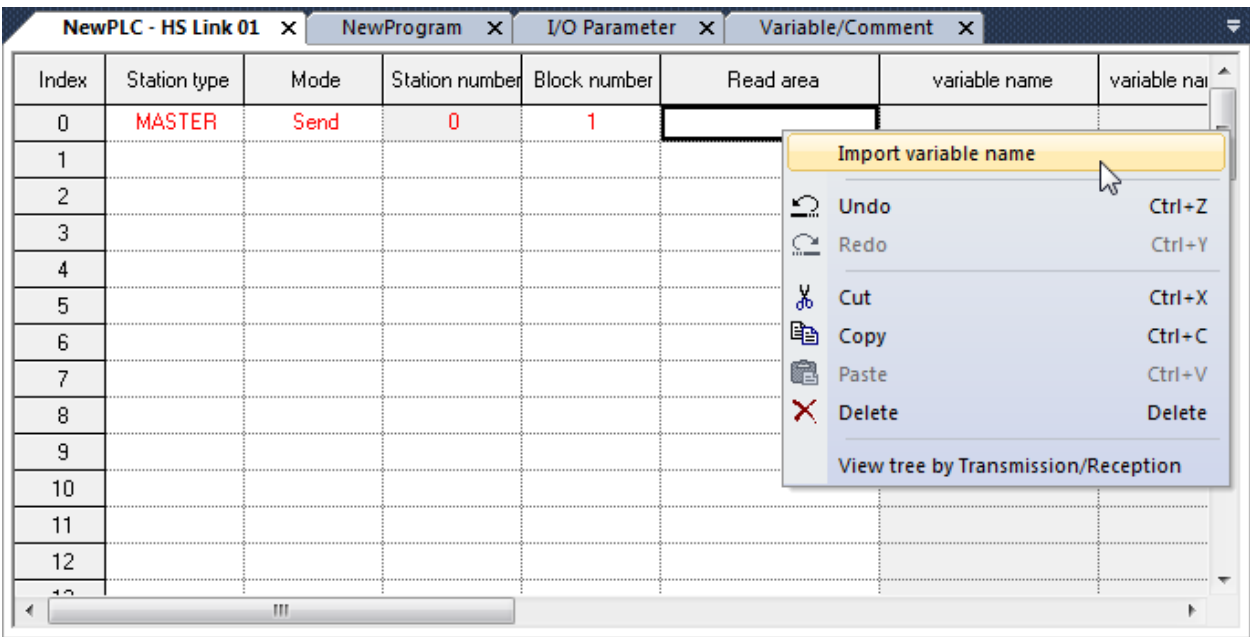
3. Click "File Open" and select file created by step 1. Then click on 'Open'.
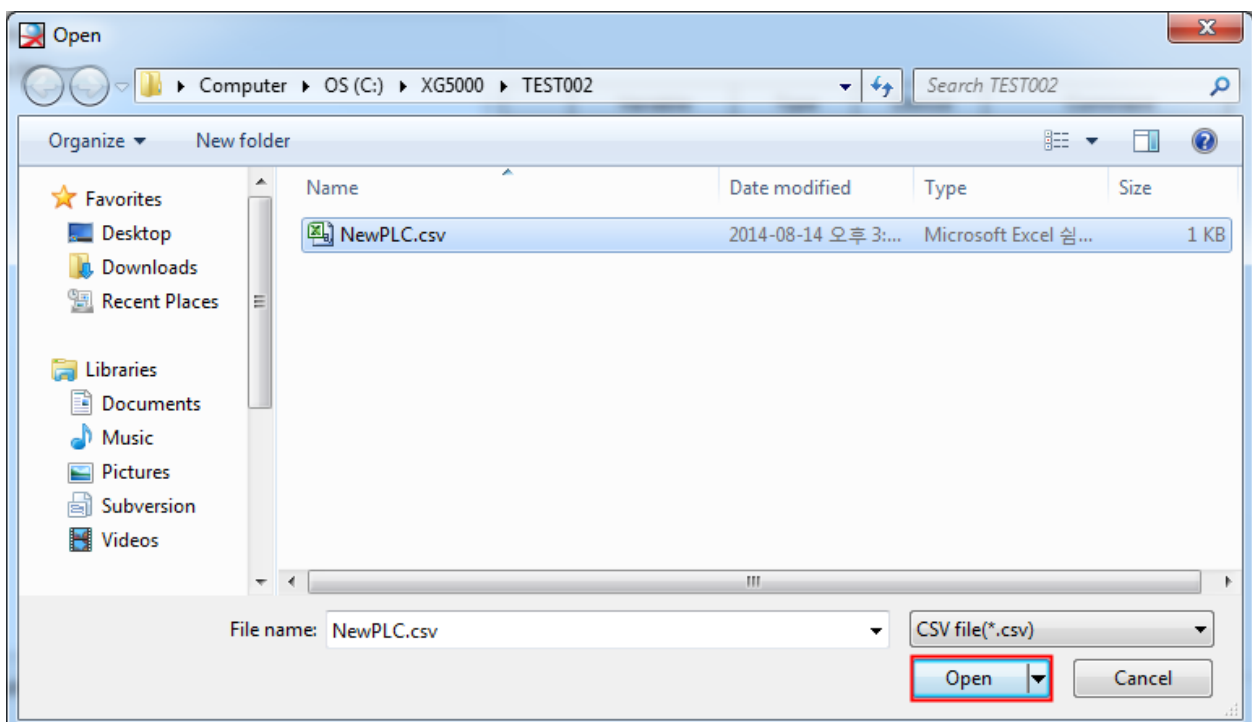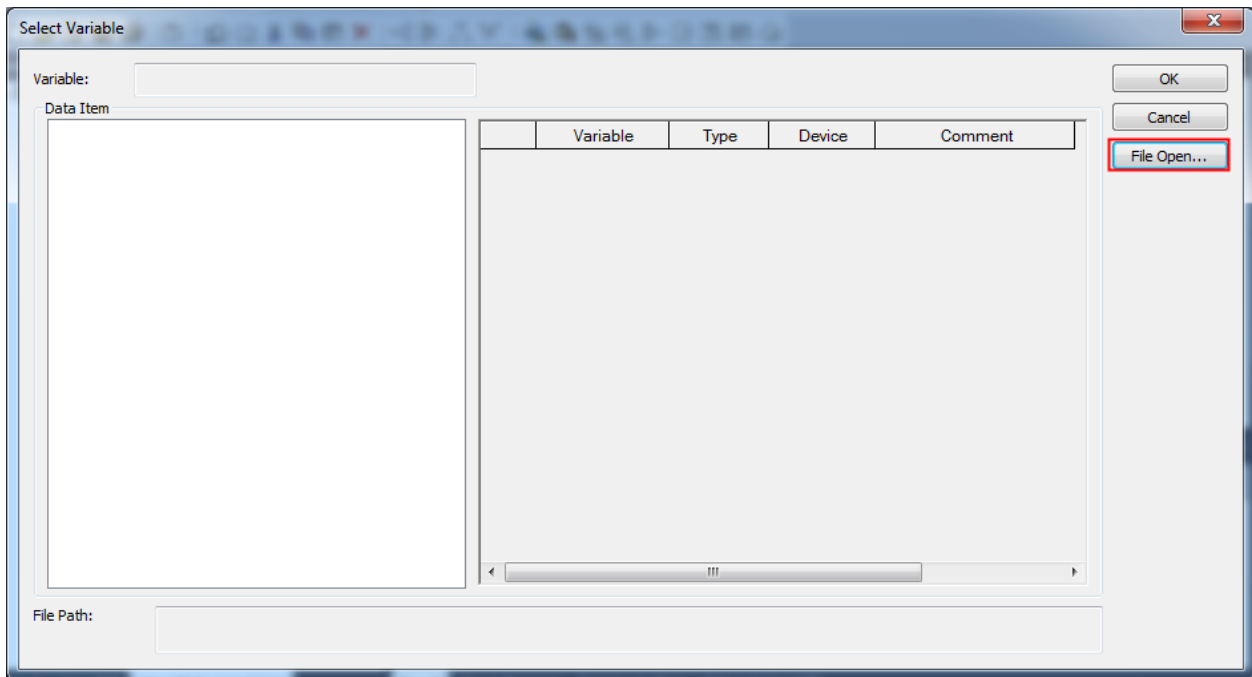
4. If you select item in data item, the variable list shows. Select variable in variable list and click 'OK'
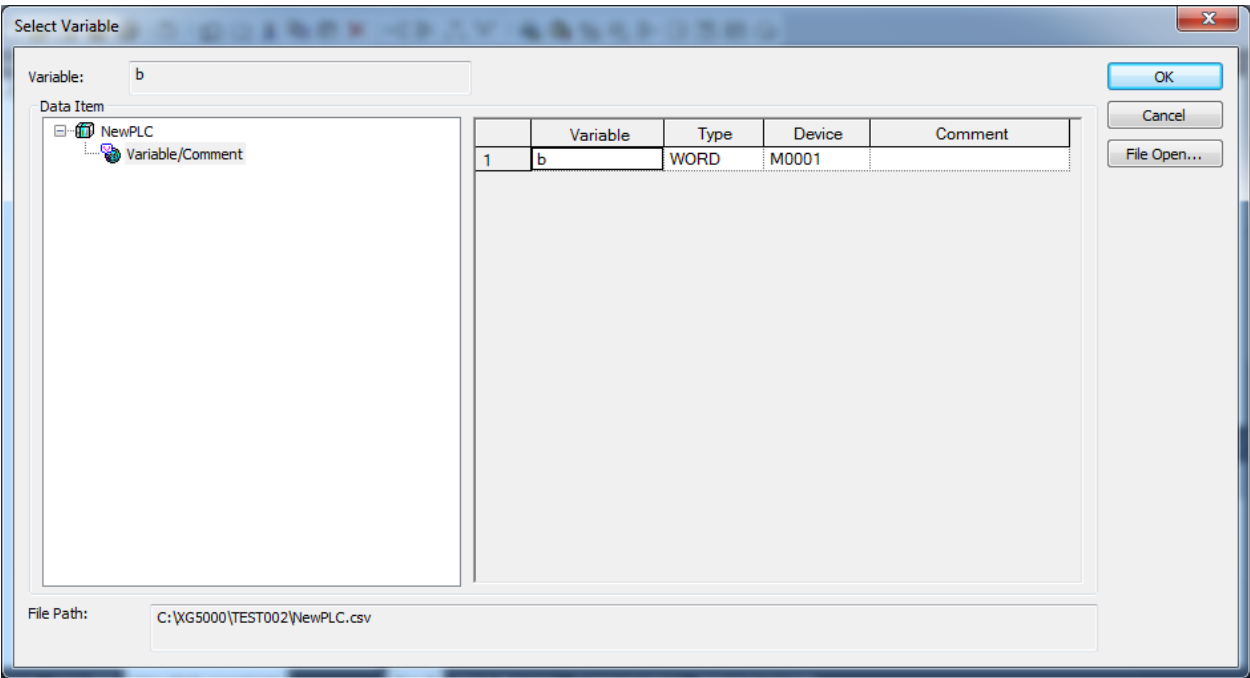
5. In High-Speed Link window, Read area, variable, variable comment is shown as below

4.4 XGK Automatic Variable

Describes on information when using automatic variable in XGK series

In Global Variable, you can declare commonly used variable and see already declared variable list. In Device Comment, you can declare comment of device and, edit comment and see already declared comment.

In Local Variable, you can declare variable used in one program and see already declared local variable. You can register global variable as External variable to be used in relevant program

4.4.1 Global variable

Declares variable and shows entire list of global variable

	Variable Kind	Variable	Type	Device	Latch	Used	EIP	Comment
16	VAR_GLOBAL	_00_CH3_ACT	BIT	U00.01.3				Analog Input Module: CH3 Active
17	VAR_GLOBAL	_00_CH3_DATA	WORD	U00.05				Analog Input Module: CH3 Output
18	VAR_GLOBAL	_00_CH3_HOO	BIT	U00.20.3				Analog Input Module: CH3 High Out Of F
19	VAR_GLOBAL	_00_CH3_IDD	BIT	U00.10.3				Analog Input Module: CH3 Input Disconr
20	VAR_GLOBAL	_00_CH3_LOOR	BIT	U00.21.3				Analog Input Module: CH3 Low Out Of R
21	VAR_GLOBAL	_00_CH4_ACT	BIT	U00.01.4				Analog Input Module: CH4 Active
22	VAR_GLOBAL	_00_CH4_DATA	WORD	U00.06				Analog Input Module: CH4 Output
23	VAR_GLOBAL	_00_CH4_HOO	BIT	U00.20.4				Analog Input Module: CH4 High Out Of F
24	VAR_GLOBAL	_00_CH4_IDD	BIT	U00.10.4				Analog Input Module: CH4 Input Disconr
25	VAR_GLOBAL	_00_CH4_LOOR	BIT	U00.21.4				Analog Input Module: CH4 Low Out Of R
26	VAR_GLOBAL	_00_CH5_ACT	BIT	U00.01.5				Analog Input Module: CH5 Active
27	VAR_GLOBAL	_00_CH5_DATA	WORD	U00.07				Analog Input Module: CH5 Output
28	VAR_GLOBAL	_00_CH5_HOO	BIT	U00.20.5				Analog Input Module: CH5 High Out Of F
29	VAR_GLOBAL	_00_CH5_IDD	BIT	U00.10.5				Analog Input Module: CH5 Input Disconr

4.4.2 Device Comment

Inputs device or show comment of device

[Dialog box]

[Description of dialog box]

a. Device: shows device comment list according to type

b. Type: show device comment list according to type

- WORD, only BIT/WORD are available

- For S device, only BIT type is available

- For Z, ZR, N device, only WORD type is available

- For T, C device, only BIT/WORD type is available

- For other devices, BIT/WORD type is available

c. Show defined comments: displays defined comments.

Note
- Device is different according to CPU type.
- Background of read-only device is gray and shell can't be edited

4.4.3 Registering Global Variable

Registers global variable to be used in program. You can register global variable in Global Variable tap.

1) Registering in Global Variable

You can add, modify and delete global variable in Global Variable tap.

[Dialog box]

	Variable Kind	Variable	Type	Device	Latch	Used	EIP	Comment
45	VAR_GLOBAL	A1	BIT	D00000.1[AUTO]		□	□	
46	VAR_GLOBAL	A2	BIT	D00000.2[AUTO]		□	□	
47	VAR_GLOBAL	A3	BIT	D00000.3[AUTO]		□	□	
48	VAR_GLOBAL	A4	BIT	D00000.4[AUTO]		□	□	
49	VAR_GLOBAL	A5	BIT	D00000.5[AUTO]		□	□	
50	VAR_GLOBAL	A6	BIT	D00000.6[AUTO]		□	□	
51	VAR_GLOBAL	A7	BIT	D00000.7[AUTO]		□	□	
52	VAR_GLOBAL	A8	BIT	D00000.8[AUTO]		□	□	

[Description of dialog box]

a. Variable kind: only VAR_GLOBAL can be here

b. Variable: duplicated variable name is not allowed.

   - Number can't used as the first character.

   - Special character can't be used. (But,'_' can be used.)

   - Empty space can't be used.

   - Same name with device is not allowed (example: M0, F0....)

   - In case all item in line are empty, if you input variable, type will be the BIT, default value

c. Type: total 23 types are available.

   - Basic type (17): (BIT, NIBBLE, BYTE, WORD, DWORD, LWORD, SINT, INT, DINT, LINT, USINT, UINT, UDINT, ULINT, REAL, LREAL, STRING, TIMER0_1, TIMER1, TIMER10, TIMER100, COUNTER)

   - Additional type by Module (6): (TIMER0_1, TIMER1, TIMER10, TIMER100, COUNTER, FB_INST)

d. Device: inputs device. If you don't input device, automatically allocated area is displayed.

   - N/A[AUTO]: When device is not allocated automatically

   - Device[AUTO]: When device is allocated automatically (Example, D0000.0[AUTO])

e. Latch: For automatic variable, sets non-latch, latch1, latch2

   - When allocating device, latch column is not activated

   - You can edit latch area at device area setting window of basic parameter

f. Used: displays whether it is used or not in program.

g. Comment: all kind of characters are allowed.

   - Use Ctrl + Enter for multi-line input

h. Effectiveness of line: Variable kind, variable, type are necessary for registering at global variable window

   - When line is not complete, that line is displayed as pink color

---

Note

- When editing shell, if error occurs, it is displayed as pink color

- When editing shell, if you press ESC, previous value will be restored

- When Device Auto-allocation Parameter is not set, device is not allocated for automatic variable.

- If device auto-allocation parameter changes, device for automatic variable may change.

- Index device, #device, #index device can't be used as automatic variable

---

Note

- In case of inputting device in ladder program, memory allocation for automatic variable is done except already used device area

    Ex) In case device auto-allocation area is D0~D100, if D0 is already been using in program, when allocating automatic variable AA, D0 is not allocated for variable AA and D1 is allocated

- After allocating memory for automatic variable, if that device is used in program, that device changes into variable. In case deleting automatic variable, variable in programs keeps its name and is displayed as error format

    Ex) In case device auto-allocation area is D0~D100, automatic variable AA is allocated to D0, if you use D0 in program, it changed variable AA automatically.

- In case of changing area in device auto-allocation area and latch area of basic parameter, part duplicated with previous area is kept and not duplicated part is changed into new area. In case area is not included, sets N/A[Auto]. Program and variable window execute update.

    EX) 1) When device auto-allocation area is changed from D0~D100 into M0~M100, memory allocation of variable AA which already is allocated D0, changes into M0.

    2) When device auto-allocation area is changed from D0~D100 into D10~M100, memory allocation of variable AA which already is allocated D10, doesn't change.

    3) When device auto-allocation area D0~D100 is deleted, memory allocation of variable AA which already is allocated D0, changes into N/A[Auto].

4.4.4 Registering Local Variable

Registers local variable to be used in program. You can register local variable in Local Variable tap.

1) Registering at local variable

You can add, modify or delete variable at local variable list

[Dialog box]

	Variable Kind	Variable	Type	Device	Latch	Used	Comment
1	VAR	Local_Var	BIT	D00000.B[AUTO]		☐	
2	VAR	Local_Var1	BIT	D00000.C[AUTO]		☐	
3	VAR	Local_Var2	BIT	D00000.D[AUTO]		☐	
4	VAR	Local_Var3	BIT	D00000.E[AUTO]		☐	
5	VAR	Local_Var4	BIT	D00000.F[AUTO]		☐	
6	VAR	Local_Var5	BIT	D00001.0[AUTO]		☐	
7						☐	

Tabs: NewProgram[Program] × | Global/Direct Variables × | I/O Parameter × | **NewProgram[Local Variables]** ×

[Description of dialog box]

a. Variable Kind: VAR, VAR_EXTERNAL can be here

　　－ If you set this item as VAR_EXTERNAL, type, device, latch, used, comment column is not activated

b. Variable: duplicated variable name is not allowed.

　　－ Number can't used as the first character.

　　－ Special character can't be used. (But,'_' can be used.)

　　－ Empty space can't be used.

　　- Same name with device is not allowed (example: M4, P4, R9....)

　　－ In case all item in line are empty, if you input variable, type will be the BIT, default value

c. Type: total 22 types are available.

　　- Basic type (22): (BIT, NIBBLE, BYTE, WORD, DWORD, LWORD, SINT, INT, DINT, LINT, USINT, UINT, UDINT, ULINT, REAL, LREAL, STRING, TIMER0_1, TIMER1, TIMER10, TIMER100, COUNTER)

d. Device: inputs device. If you don't input device, automatically allocated area is displayed.

　　－ N/A[AUTO]: When device is not allocated automatically

　　- Device[AUTO]: When device is allocated automatically (Example, D0000.0[AUTO])

e. Latch: For automatic variable, sets non-latch, latch1, latch2

　　－ When allocating device, latch column is not activated

　　－ You can edit latch area at device area setting window of basic parameter

f. Used: displays whether it is used or not in program.

g. Comment: all kind of characters are allowed.

　　－ Use Ctrl + Enter for multi-line input

h. Effectiveness of line: Variable kind, variable, type are necessary for registering at global variable window

　　－ When line is not complete, that line is displayed as pink color

4.4.5 Adding EXTERNAL variable

You can brings list made in Global Variable by adding EXTERNAL variable

[Steps]

1. Select [Edit]-[Add EXTERNAL variable]

2. Dialog box for selecting global variable shows.

3. If you input variable you want to find in Find Variable, then searches automatically.

4. If you select Global Variable Item, you can sort the global variable according to All, general variable, special module related value.

5. Check the Application column for adding and click OK

[Dialog box]

Add External Variable

Find Variable:

Global Variable Item

Item: All ▼

		All		
		General Variable		
		Base00, Slot00: XGF-AV8A (Voltage, 8-CH)		

	Apply	Variable Kind	Variable	Type	
1	☐	VAR_GLOBAL	A	BIT	D0
2	☐	VAR_GLOBAL	A1	BIT	D0
3	☐	VAR_GLOBAL	A10	BIT	D0
4	☐	VAR_GLOBAL	A2	BIT	D0
5	☐	VAR_GLOBAL	A3	BIT	D0
6	☐	VAR_GLOBAL	A4	BIT	D0
7	☐	VAR_GLOBAL	A5	BIT	D0
8	☐	VAR_GLOBAL	A6	BIT	D0
9	☐	VAR_GLOBAL	A7	BIT	D0
10	☐	VAR_GLOBAL	A8	BIT	D0
11	☐	VAR_GLOBAL	A9	BIT	D0

OK | Cancel | Select All | Unselect All

Add External Variable

Find Variable:

Global Variable Item

Item: Base00, Slot00: XGF-AV8A (Voltage, 8-CH) ▼

	Apply	Variable Kind	Variable	Type	
1	☐	VAR_GLOBAL	_00_CH0_ACT	BIT	U0
2	☐	VAR_GLOBAL	_00_CH0_DATA	WORD	U0
3	☐	VAR_GLOBAL	_00_CH0_HOO	BIT	U0
4	☐	VAR_GLOBAL	_00_CH0_IDD	BIT	U0
5	☐	VAR_GLOBAL	_00_CH0_LOOR	BIT	U0
6	☐	VAR_GLOBAL	_00_CH1_ACT	BIT	U0
7	☐	VAR_GLOBAL	_00_CH1_DATA	WORD	U0
8	☐	VAR_GLOBAL	_00_CH1_HOO	BIT	U0
9	☐	VAR_GLOBAL	_00_CH1_IDD	BIT	U0
10	☐	VAR_GLOBAL	_00_CH1_LOOR	BIT	U0
11	☐	VAR_GLOBAL	_00_CH2_ACT	BIT	U0

OK | Cancel | Select All | Unselect All

4.5 System variable

It is displayed only when selecting the tool integration project. It shows the list of high-speed link of communication modules and variables or devices used for setting up P2P.

4.5.1 System Variables

It displays the list of variables or devices set in the high-speed link and P2P windows.

	Variable	Address	Type	The number of types	PLC Name/PLC Type	Range	High-speed Link	P2P	EIP	Annotation	Comment
1	A	M0000	WORD	1	NewPLC/XGK-CPUA	GLOBAL	☑	☐	☐	High-speed Link:1:0:Read are	
2	A1	M0001	WORD	1	NewPLC/XGK-CPUA	GLOBAL	☑	☐	☐	High-speed Link:1:1:Read are	
3	A2	M0002	WORD	1	NewPLC/XGK-CPUA	GLOBAL	☑	☐	☐	High-speed Link:1:2:Read are	
4	A3	M0003	WORD	1	NewPLC/XGK-CPUA	GLOBAL	☑	☐	☐	High-speed Link:1:3:Read are	
5	A4	M0004	WORD	1	NewPLC/XGK-CPUA	GLOBAL	☑	☐	☐	High-speed Link:1:4:Read are	
6	A5	M0005	WORD	1	NewPLC/XGK-CPUA	GLOBAL	☑	☐	☐	High-speed Link:1:5:Read are	
7	A6	M0006	WORD	1	NewPLC/XGK-CPUA	GLOBAL	☑	☐	☐	High-speed Link:1:6:Read are	
8	A7	M0007	WORD	1	NewPLC/XGK-CPUA	GLOBAL	☑	☐	☐	High-speed Link:1:7:Read are	

a. Variable: Displayed when the variables are declared in the memory allocation.

b. Address: Displays the devices used in high-speed link and P2P windows.

c. Type: Displays the device types used in high-speed link and P2P windows.

d. The Number of types: Displays the number of types declared in high-speed link and P2P windows.

e. PLC Name/PLC Type: Displays the configuration name and CPU to which the high-speed link and P2P windows belong.

f. Range: Displays the range of the declared variable.

- GLOBAL Variables declared by the device or variables registered to 'Variable View' tab of Variable/Comment.

-FLAG: Declared by the flag variable or device; sub-items will be displayed depending on the flag type.

g. High-speed link: Ticked here when the variables or devices are used in the high-speed link window.

h. P2P: Ticked here when the variables or devices are used in the P2P window.

i. EIP: In case of applying Ethernet/IP module, ticked here when the variables or devices are used in the P2P window.

j. Annotation: Displays the position information of used variables.

k. Comment: Displays the comment on the variables.

Chapter 5. LD Edit

LD program displays the PLC program through graphic signals of coils or contact points used in the relay logic diagram.

5.1   Limits

There are functional limits in LD Program Edit as described below.

Item	Description	Limit
Maximum contact points	Maximum contact points available to input in a line	Up to 31
Maximum lines	Maximum lines available to edit	Up to 65535
Maximum Copy lines	Maximum Copy lines available to copy at a time	Up to 300
Maximum Paste lines	Maximum Paste lines to paste at a time	Up to 300

5.2   Program Edit

5.2.1   Edit Tools

The input of LD Edit items shall be started after the input symbols are selected from the LD tool box and the mouse clicked on the specified position or with applicable Shortcut Key pressed.
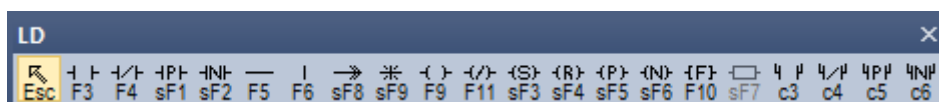
Symbol	Shortcut Key	Description
Esc	Esc	Changes to selection mode
F3	F3	Normally open contact point
F4	F4	Normally closed contact point
sF1	Shift + F1	Positive-conversion detection contact point
sF2	Shift + F2	Negative-conversion detection contact point
F5	F5	Horizontal line
F6	F6	Vertical line
sF8	Shift + F8	Connection line

Symbol	Shortcut Key	Description
sF9	Shift + F9	Reverse input
F9	F9	Coil
F11	F11	Reverse coil
sF3	Shift + F3	Set(latch) coil
sF4	Shift + F4	Reset(unlatch) coil
sF5	Shift + F5	Positive-conversion detection coil
sF6	Shift + F6	Negative-conversion detection coil
F10	F10	Application instruction
c3	Ctrl+3	Normally opened OR contact point
c4	Ctrl+4	Normally closed OR contact point
c5	Ctrl+5	Positive-conversion detection OR contact point
c6	Ctrl+6	Negative-conversion detection OR contact point

The following Shortcut Keys are related with the movement of the cursor. Applicable Shortcut Keys can not be specified by users XG5000.

Shortcut Key	Description
Home	Moves to the start of the column.
Ctrl + Home	Moves to the start of the program
Back space	Deletes the present data and moves to the left.
→	Moves the present cursor to the right by a blank.
←	Moves the present cursor to the left by a blank.
↑	Moves the present cursor upward by a blank.
↓	Moves the present cursor downward by a blank.
End	Moves to the end of the column.
Ctrl + End	Moves to the last line edited.

Notes

- Among Shortcut Keys in Edit Toolbox, 's' stands for Shift key, 'c' for Ctrl key.

    Example) Positive-conversion detection contact point: Shift + F1 → s + F1 → sF1

- The Shortcut Keys described in Edit Tool are based on the Shortcut Keys basically provided in XG5000.

- For setting details on the user defined Shortcut Keys, Refer to 2.4 Shortcut Setting in Chapter 2 Basic Application.

5.2.2 Input Contact point

This is used to input the contact points (normally open contact, normally closed contact, positive-conversion detection contact and negative-conversion detection contact).

[Steps]

1. Move the cursor to the location to input the contact point on.
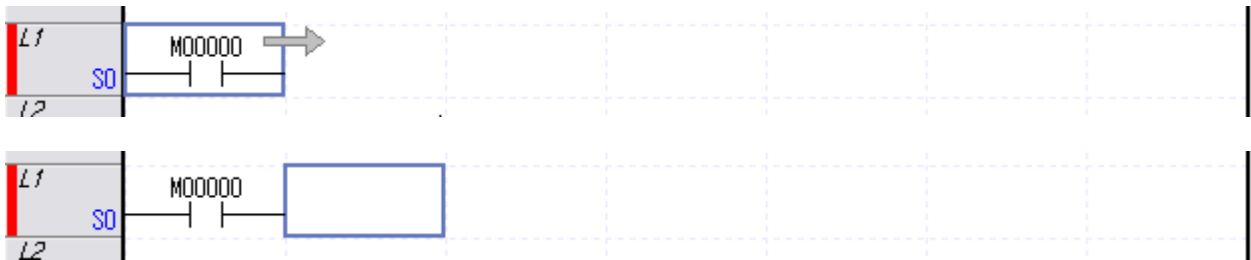
2. On the tool box, select the type of the contact to input and then click the edit area. Or click the Shortcut Key applicable to the contact to input.

3. After the device name is input on the Variable Input Dialog Box, click [OK]. Refer to 5.2.3 Variable/Device Input for details on the Variable Input Dialog Box.

Notes

– Select [Tool]-[Option]-[Option Dialog Box] on the menu. If the Input mode is promptly released from the LD/IL Edit page, the Variable Input Dialog Box will not be displayed.
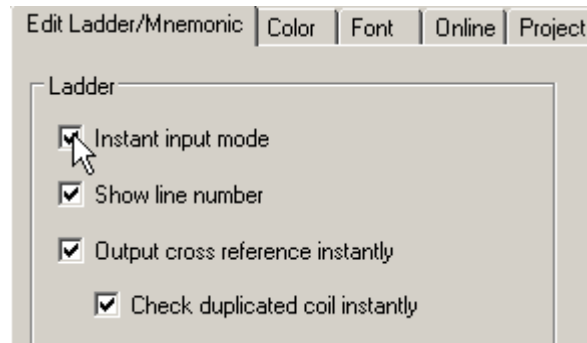
– The basic operation of Enter key is to input identical kind of instruction used previous edit.

Example) If a normally open contact is input and entered in the previous edit, the normally open contact input dialog box will be displayed when enter key is pressed.

5.2.3 Input OR contact point

Inputs OR contact point (Normally opened OR contact point, Normally closed OR contact point, Positive-conversion detection OR contact point, Negative-conversion detection OR contact point)

[Steps]

1. Move the cursor where you want connect OR
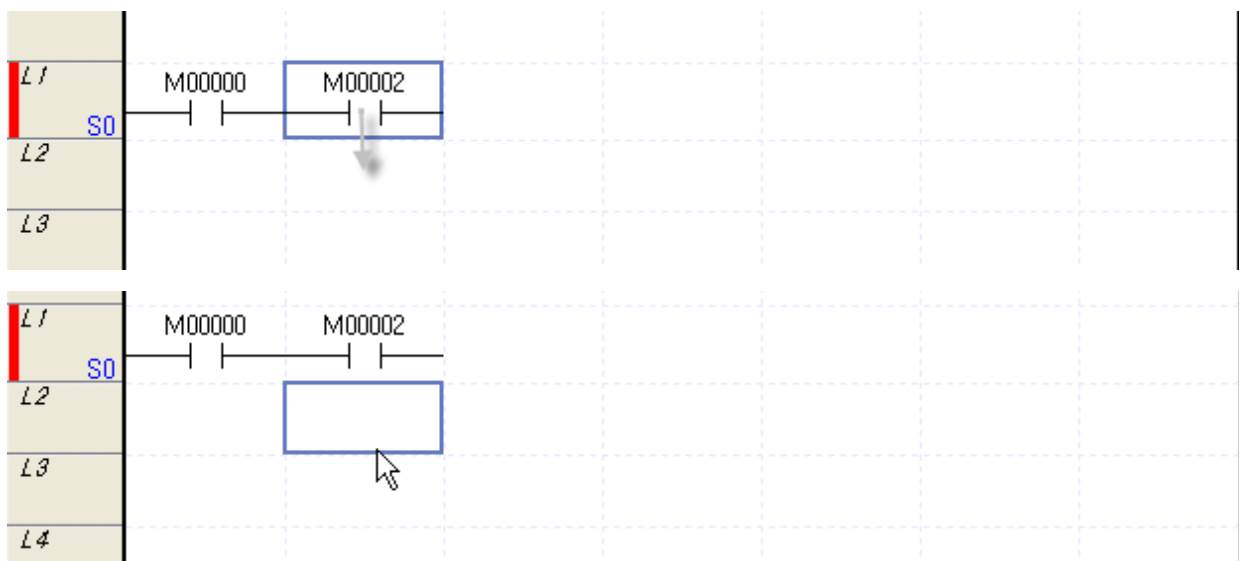
2. Select contact point kind at Toolbar and click editing area. Or press shortcut key corresponding to OR contact point

3. Input device name at dialog box for variable input. For detail on dialog box for variable input, refer to 5.2.4

Note

- In duplicated mode, in case contact point is in cursor, OR connection does not operate
- In there is application instruction etc, vertical line is not inserted
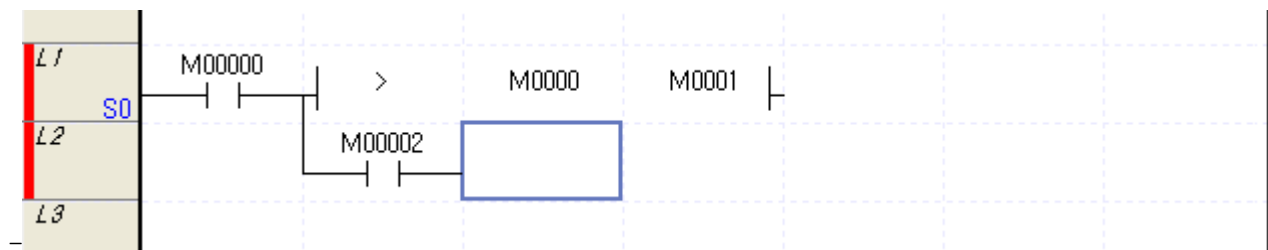
5.2.4 Input Variable/Device

It is used to input the Device or Variable/Comment.
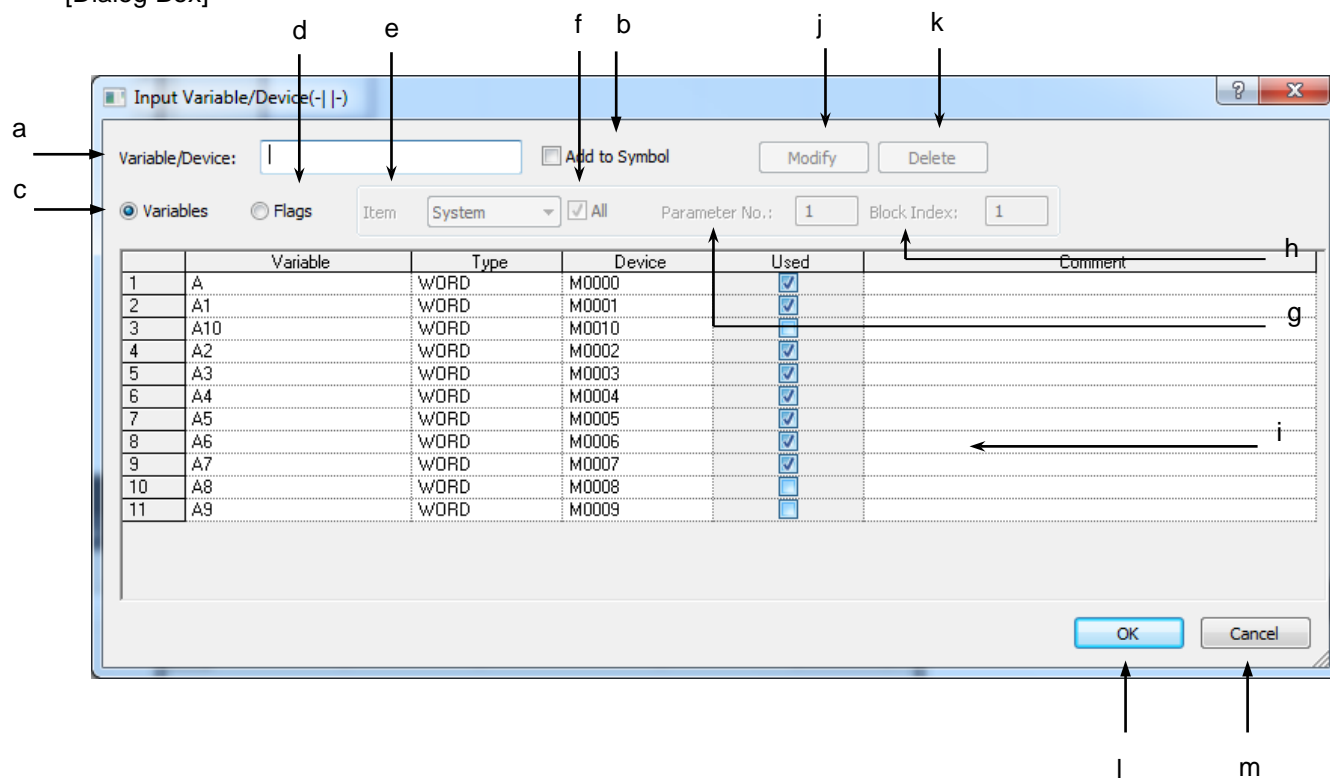
[Dialog Box]

[Description of Dialog Box]

a. Variable/Device: used to input the Device or Declared Variable name. If the input String is of variable format and the applicable String is not registered as a variable in the Variable/Comment, the Variable/Comment Add Dialog Box will be displayed.

b. Add to Symbol: used to decide to add the input device to the Variable/Comment automatically or not. With Variable/Comment Automatic Add selected if any other device than registered on the Variable/Comment list is input, the Variable/Comment Add Dialog Box will be displayed.

c. Variable/Comment: used to display the Declared Variable/Comment on the list.

d. Flag: displays flags on the list. Detailed flag type can be selected on the flag item.

e. Item: as the selection box, it displays the types of the flags. System/High-speed Link/P2P/PID Flags are available to select.

f. All: used to decide to display all the flags selected on the item or the flags only applicable to the input parameter number/block index.

g. Parameter number: used to input the setting number for each selected flag item. 0~12 is available for HS link, 0~8 for P2P and 0~63 for PID.

h. Block Index: used to input the block number for each selected flag item. 0~127 is available for High-speed link and 0~63 for P2P.

i. Variable/Comment List: displays the details of Variable/Comment and flags.

j. Modify: used to modify the selected Variable/Comment.

k. Delete: used to delete the selected Variable/Comment.

l. OK: applies the input or selected items and closes the Dialog Box.

m. Cancel: closes the Dialog Box.

[Dialog Box]
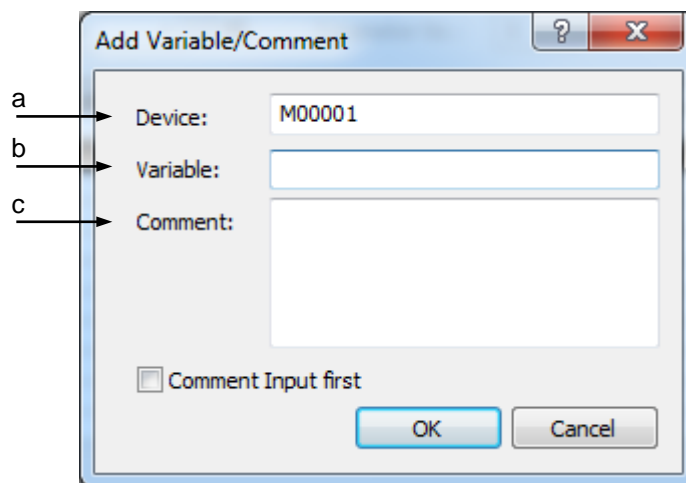
[Description of Dialog Box]

a. Device: used to input the device to add.

b. Variable: used to input the variable name to add.

c. Comment: used to input the description to add.

5.2.5 Input Line

The horizontal line shall be input for horizontal connection between LD Edit factors, and the vertical line shall be for vertical connection.

1) Horizontal Line Input

[Steps]

1.Move the cursor onto the location to connect to.
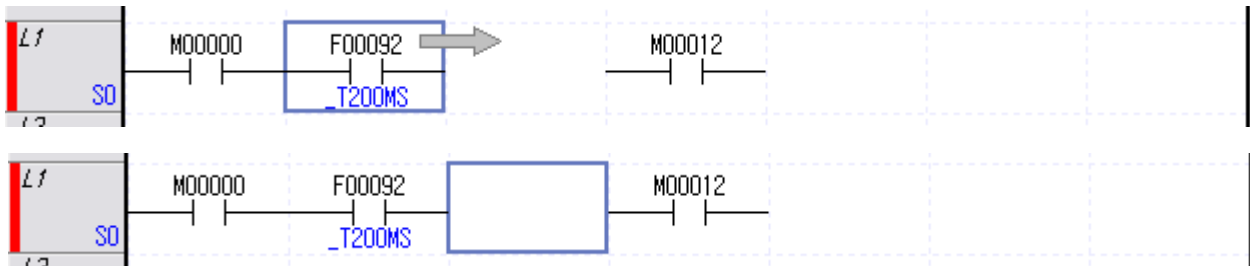
2. Select the Shortcut Key of Horizontal Line Input. Or select Horizontal Line on the tool box to select the Edit area to input the Horizontal Line in.
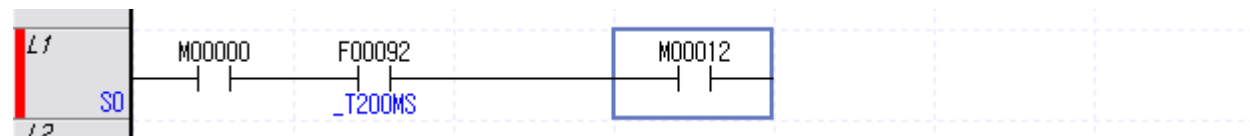
2) Vertical Line Input

[Steps]

1. Move the cursor onto the location to connect to.
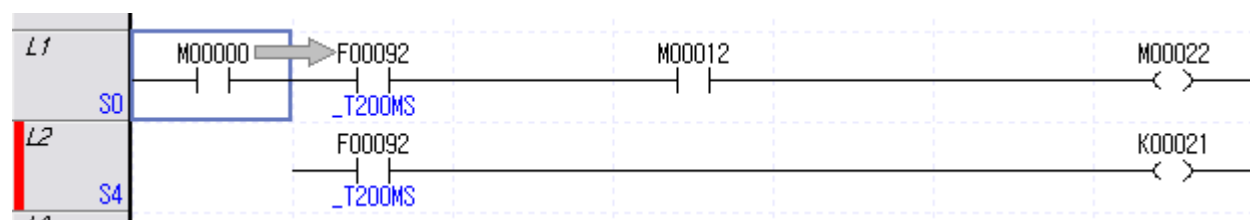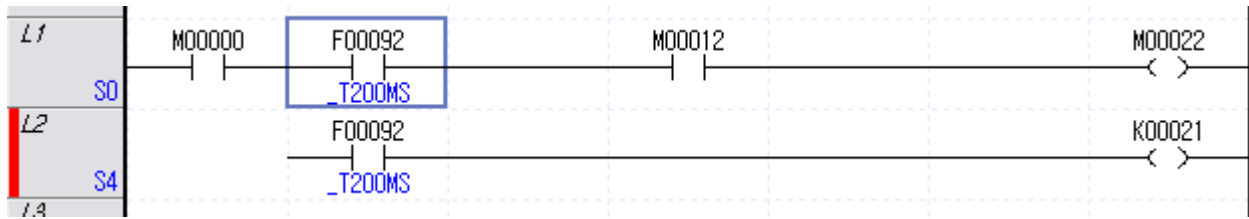
2. Select the Shortcut Key of Vertical Line Input. Or select Vertical Line on the tool box to select the Edit area to input the Vertical Line in.
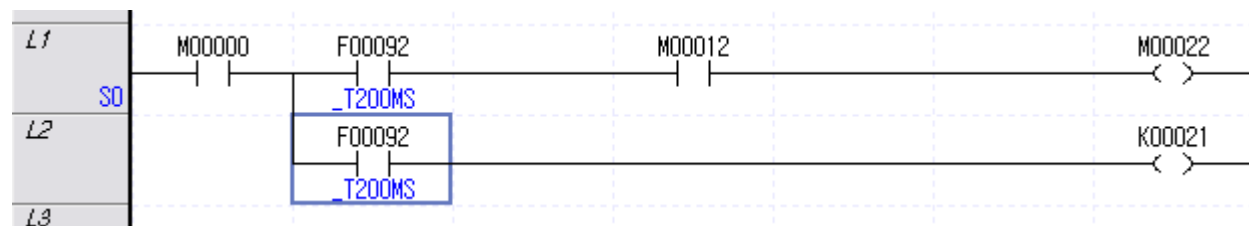
Notes

－ The vertical line will be input downward to the left from the location of the present cursor.

5.2.6 Input Coil

It is used to input the coils (coil, reverse coil, positive-conversion detection coil and negative-conversion detection coil).

[Steps]

1. Move the cursor to the location to input the coil on.
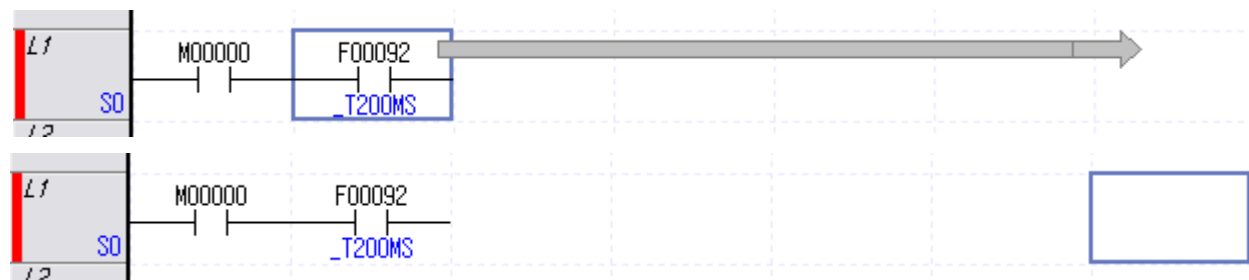
2. On the tool box, select the type of the coil to input and then click the edit area. Or click the Shortcut Key applicable to the coil to input.

3. After the device name is input on the Variable Input Dialog Box, click [OK].
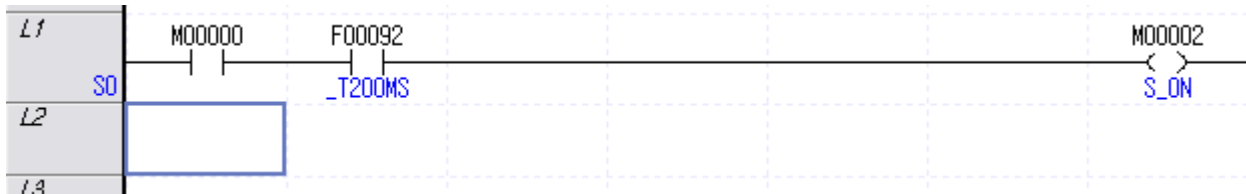
Notes
− If a coil and output related application instruction is input, a horizontal line will be automatically input to connect with the left factor.
- In case there is duplicate coil, output to output module according to status of last coil.

5.2.7 Input Application Instruction

It is used to input the application instruction for calculation.

[Steps]

1. Move the cursor to the location to input the application instruction on.
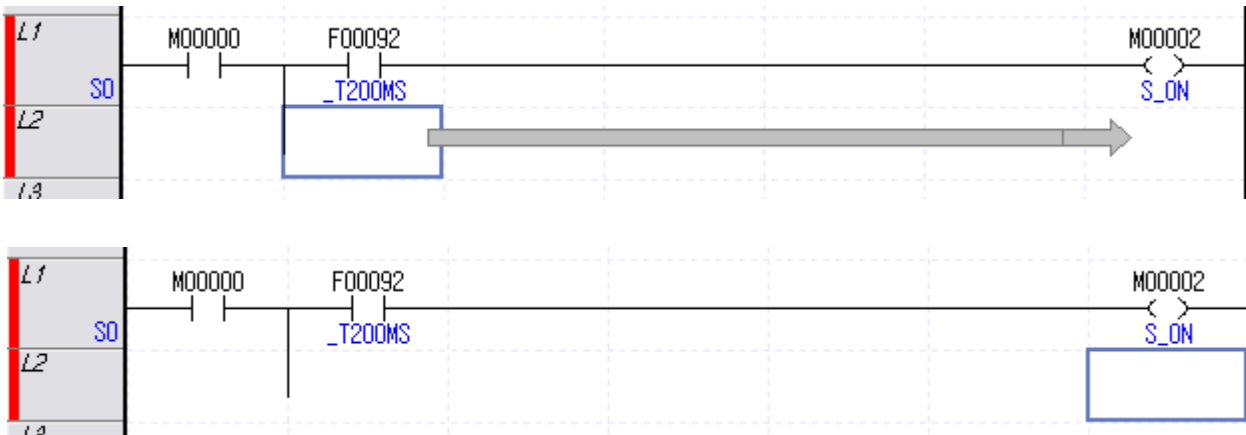
2. On the tool box, select the application instruction to input and then click the edit area. Or click the Shortcut Key applicable to the application instruction input.

Input the application instruction, or edit the input application instruction.

[Dialog Box]
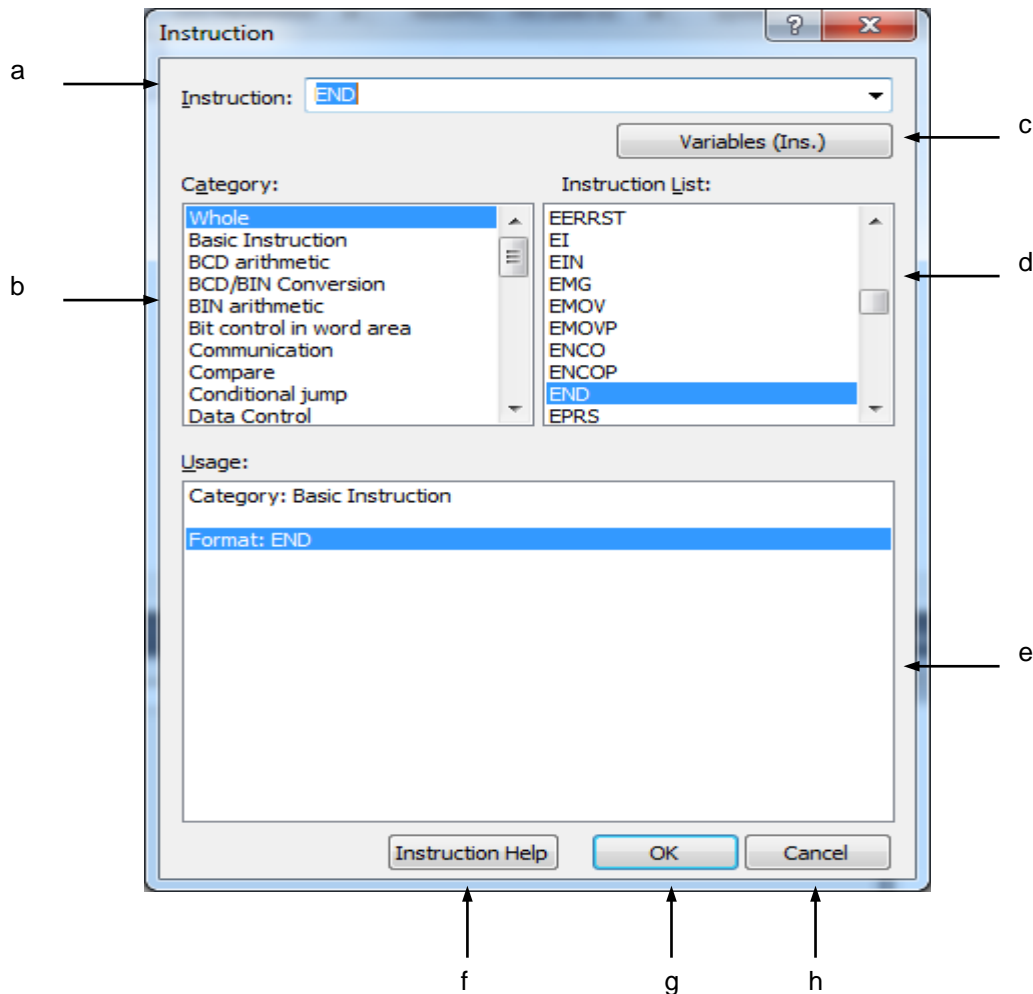
[Description of Dialog Box]

a. Instruction: used to input the application instruction. If the input application instruction is edited, the previous application instruction will be displayed in default.

b. Category: used to display the application instructions classified. If specific classification is selected, the instructions applicable to the classification will be displayed on the instructions list.

c. Variable (Ins.): used to display the classification of the input application instructions, the application method and the available area for each operand.

d. Instruction: the list of the instructions which belong to the specified classification will be displayed. If 'All' is selected, all the instructions will be displayed.

e. Usage: used to display the Variable/Device Input Dialog Box.

f. Command Help: used to display the help for the selected of input command.

g. OK: Applies the input details and closes the Dialog Box.

h. Cancel: closes the Dialog Box.

3. On the Application Instruction Input Dialog Box, input the application instruction, and then click [OK].

```
L1      M00000     F00092                                              M00002
  SO     ─┤ ├──      ┬                                                 ─( )─
                   _T200MS                                              S_ON
L2                            │                          MOV    hF0F0   L00023
L3      ┌──────────┐
        │          │
L4
```
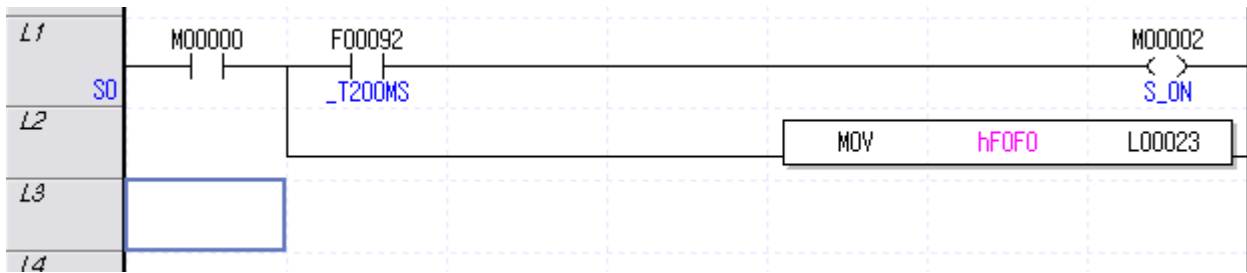
Notes

- Refer to XGK CPU manual for details on the application instructions.
- The following steps lead you to edit application instructions easily.
  ① Input application instruction.
  ② Variable/Device input dialog box will be displayed when Enter key is pressed.
  ③ Input the device on the Variable/Device input dialog box.
  ④ The Variable/Device name will be displayed when input is finished.
  ⑤ If the input operand is not the last operand for the instruction, the cursor will move to
     the position to input next operand.

5.2.8 Inputting the applied command of functions/function blocks

The command is available only if it is created through 'Device Auto-allocation project'.

[Steps]

1.Move your cursor to the position to input the command applying extended functions.
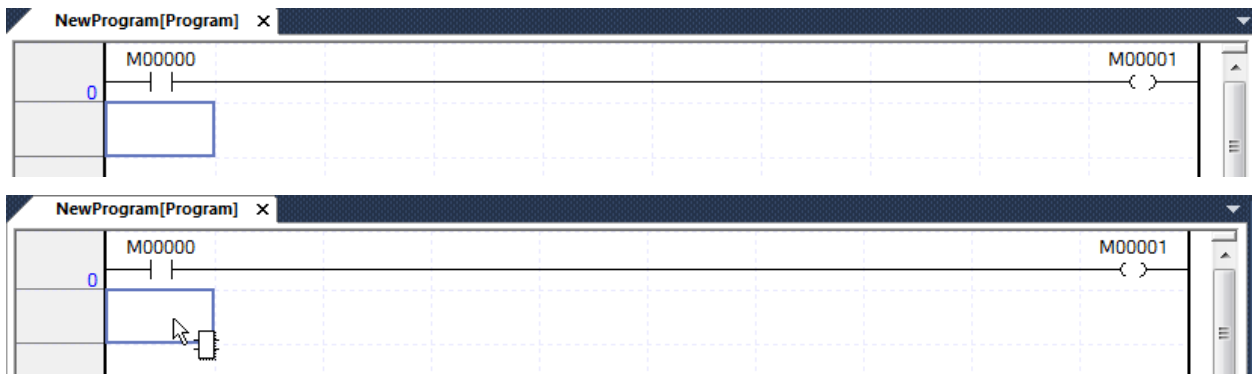
2.Select the command applying extended functions and click the edition area. Otherwise, press the short key
   to input the command applying extended functions.
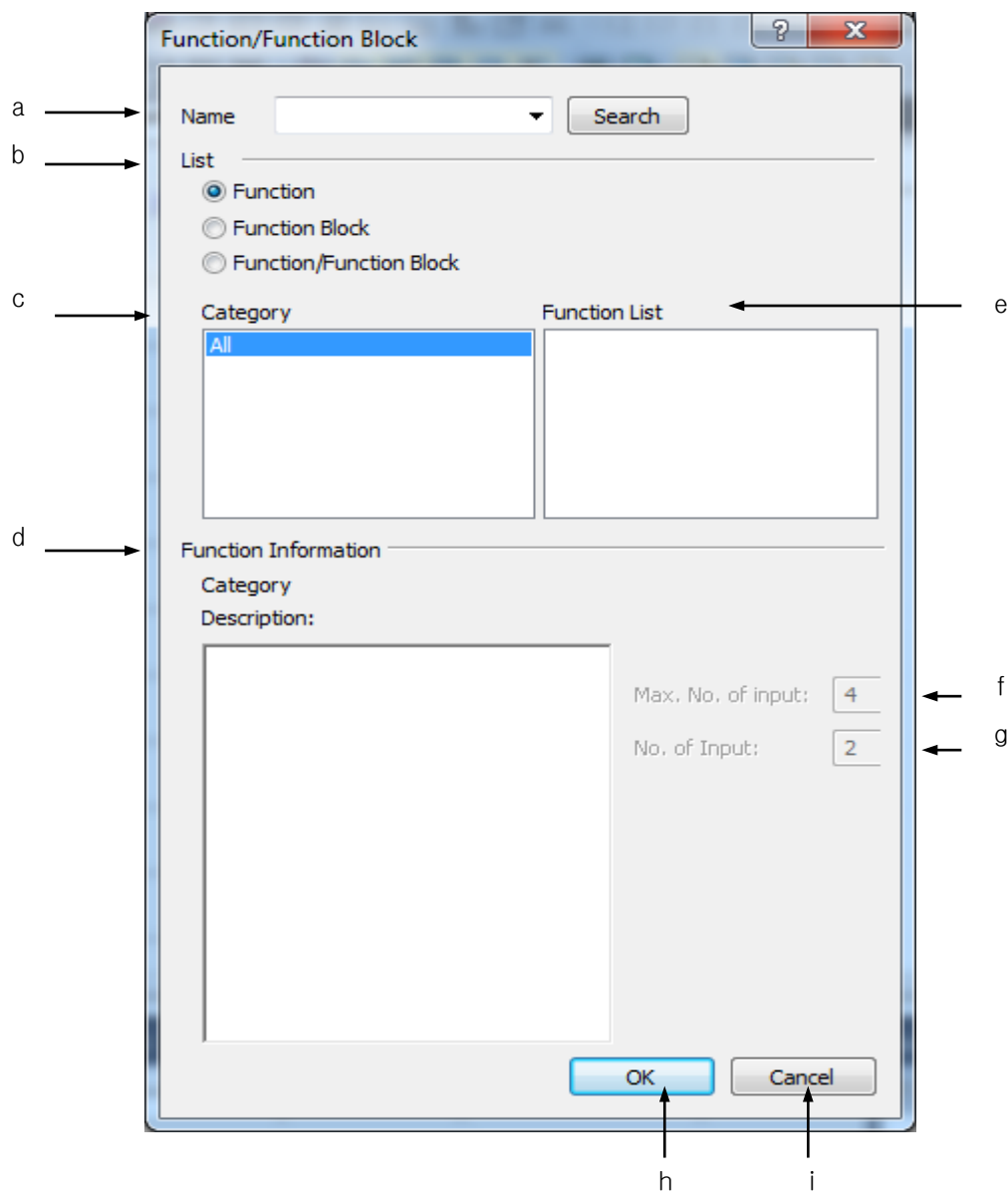
a. Name: Searches the names for the functions.

b. List: Displays the list for the functions.

c. Category: Displays the classification of the extended functions.

d. Function information: Displays the designated function's information.

e. Function list: Displays the list of the extended functions.

f. Max. No. of input: Fixes the maximum input of the functions.

g. No. of input: Determines the number of inputs for the functions.

h. OK: Applies the input details and close the dialog box.

i. Cancel: Closes the dialog box.

After inputting the applied command in the dialog box to input the applied command, press OK button.

5.2.9 Input Comment

It is used to input the Rung and Output Comment. The comment displayed on the start position of Rung is called [Rung Comment], and the comment for the output factor is called [Output Comment].
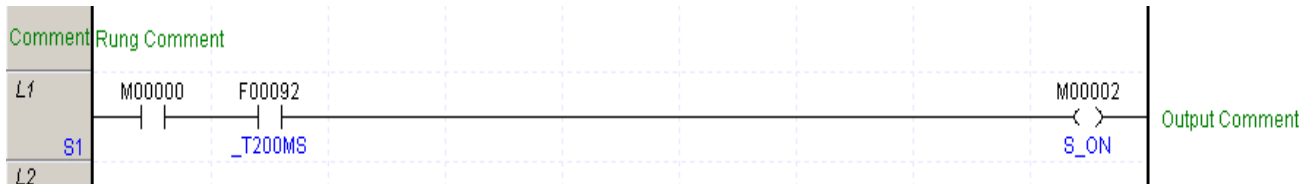
1)Rung Comment

[Steps]

1. Move the cursor to the location to input the rung comment on.
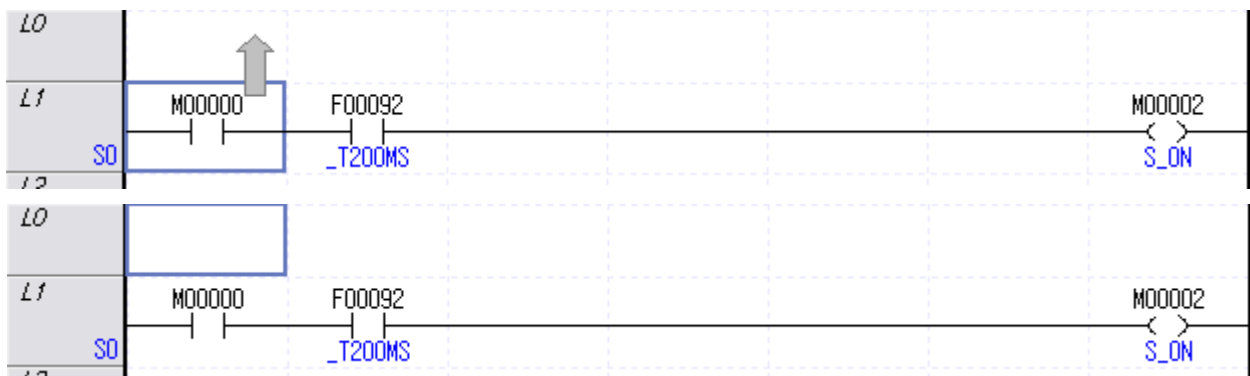
2. Select [Edit]-[Comment/Label Input].

[Dialog Box]

Input the Comment and Label.
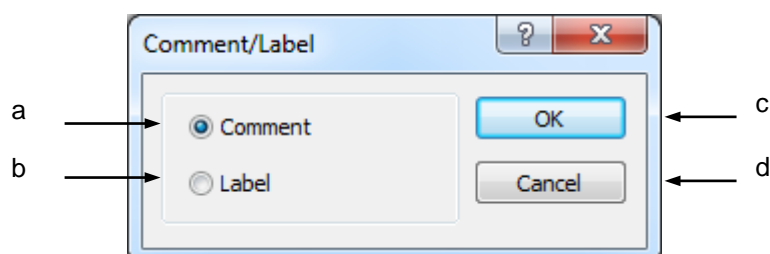
[Comment of Dialog Box]

a. Comment: used to select the Rung Comment to input.

b. Label: used to select the Label to input.

c. OK: applies the selected details and closes the Dialog Box.

d. Cancel: closes the Dialog Box.

3. If the Rung Comment Dialog Box is displayed, input the comment and click [OK].

[Dialog Box]

Input or edit the Rung Comment or the Output Comment.
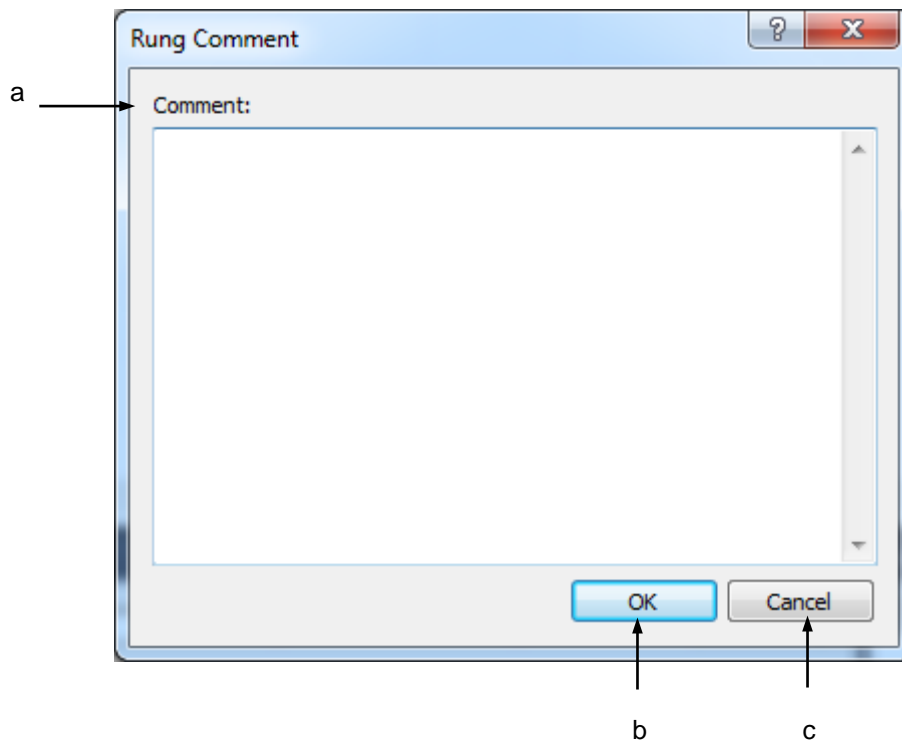
[Description of Dialog Box]

a. Comment: used to input the details of the rung comment or the output comment.

b. OK: applies the input details and closes the Dialog Box.

c. Cancel: closes the Dialog Box.
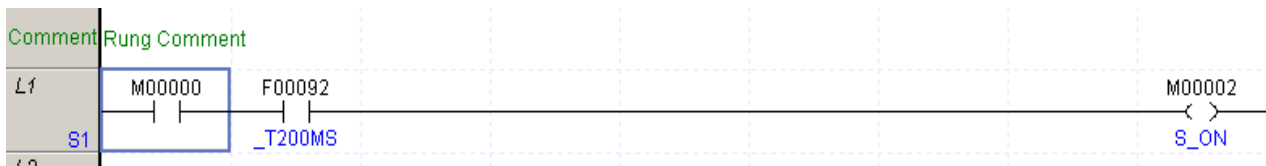
2) Output Comment

[Steps]

1. Move the cursor to the location to input the output comment on.
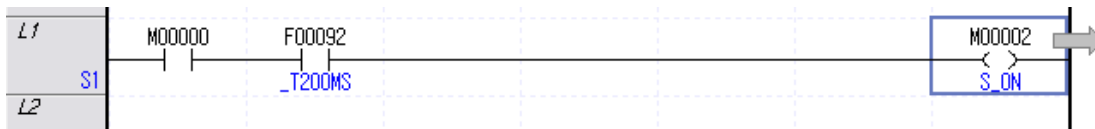
2. Double-click the left mouse button or press Enter key.

3. Input the output comment on the Output Comment Dialog Box and then click [OK].
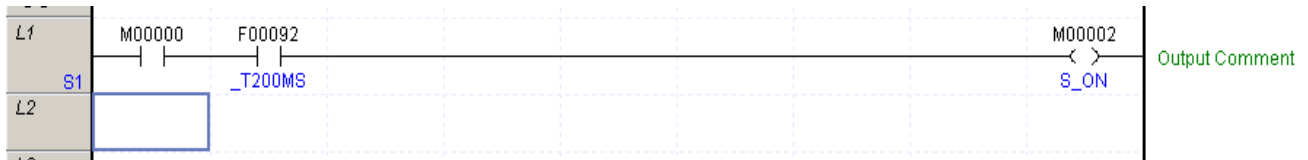
Notes

- The output comment will be available to input only when the output factor exists.

5.2.10   Input Label

This is used to input the label to refer to from the application instruction of JMP.

[Steps]

1. Move the cursor to the location to input the label on.
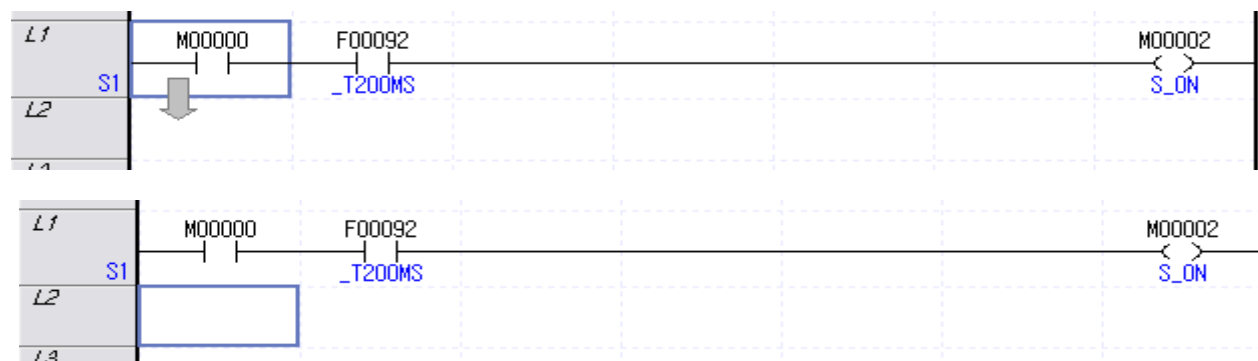
2. Select [Edit] – [Comment/Label Input].

3. On the Dialog Box, select Label and then press Enter or click [OK].
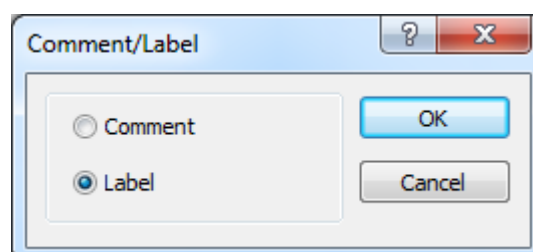
3. On the Label Dialog Box, input the label to add, and then click [OK].

[Dialog Box]
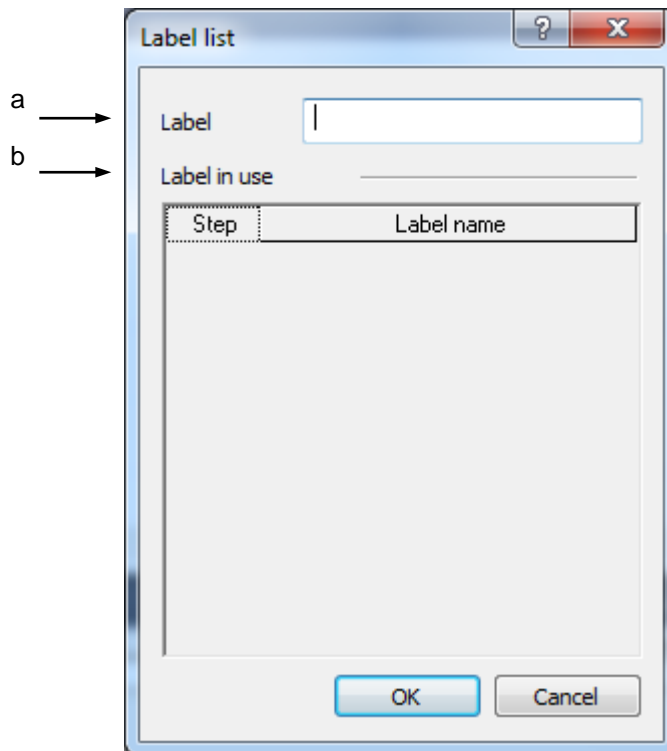
[Comment of Dialog Box]

a. Label: used to input the label to use.

b. Label being used: used to display the label presently used in the same scan program.

Notes
‒ Up to 16 characters in English is available for the label.
‒ Capital/Small letters are sorted out for the label. The first letter of the label can not be a figure or a special character.
‒ Label Input rules shall conform to the Variable/Comment Input rules. Refer to 4.2.1 in Chapter 4 Variable/Comment for details on the Variable/Comment Input rules.

5.2.11 Insert Cell

It is used to insert a new cell in the present cursor position.

[Steps]

1. Move the cursor to the location to insert the cell in.
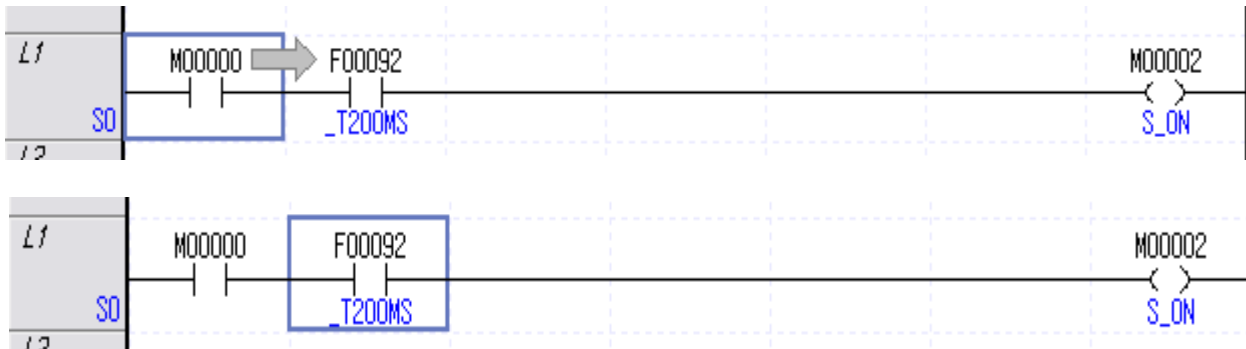
2. Select [Edit] - [Cell Insert].
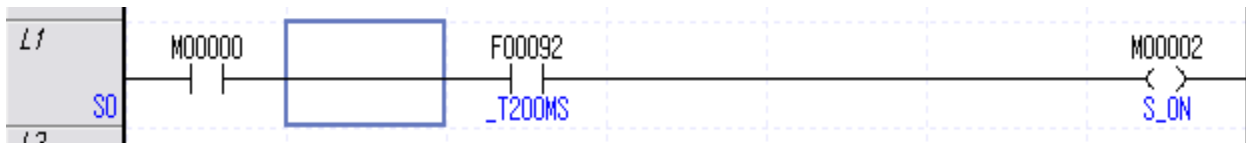
> **Notes**
>
> - Cell Insert operates in rung unit.
>
>
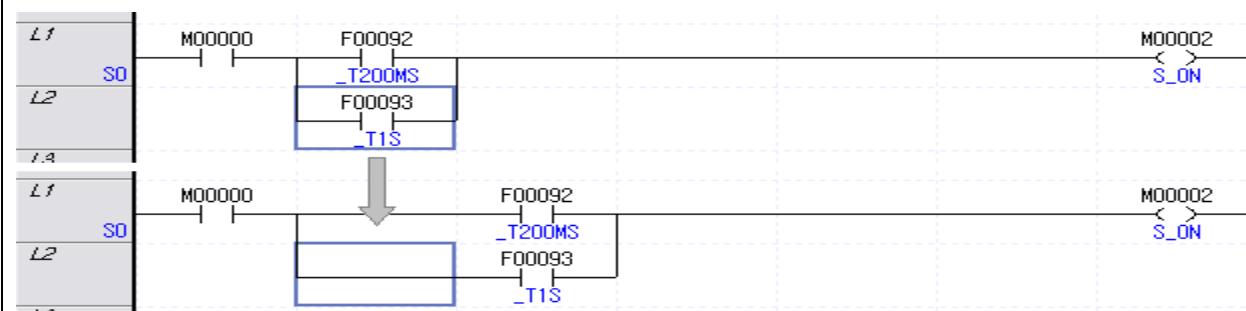
5.2.12 Insert Line

It is used to insert a new line in the present cursor position.

[Steps]

1. Move the cursor to the location to insert the line in.
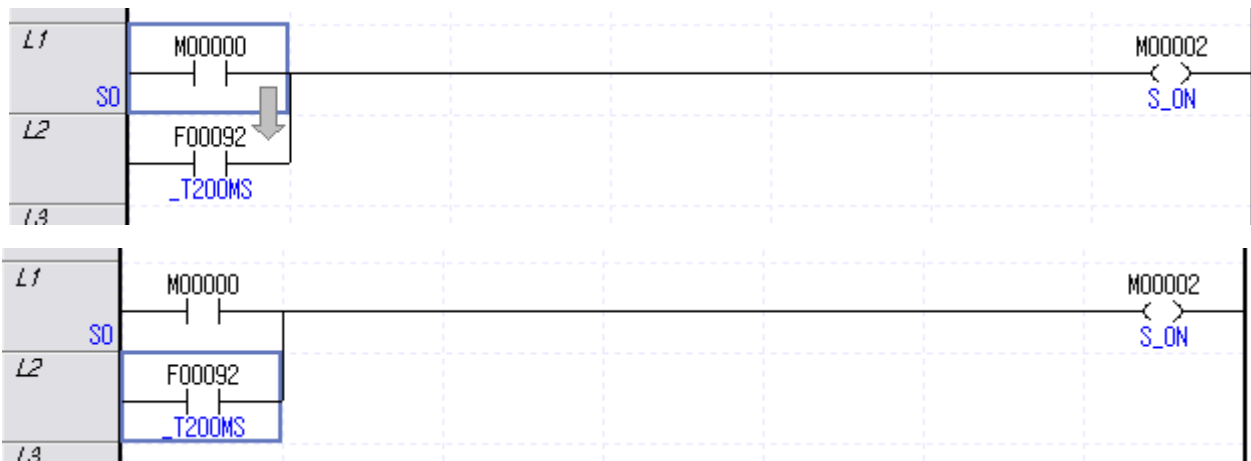
2. Select [Edit] - [Line Insert].
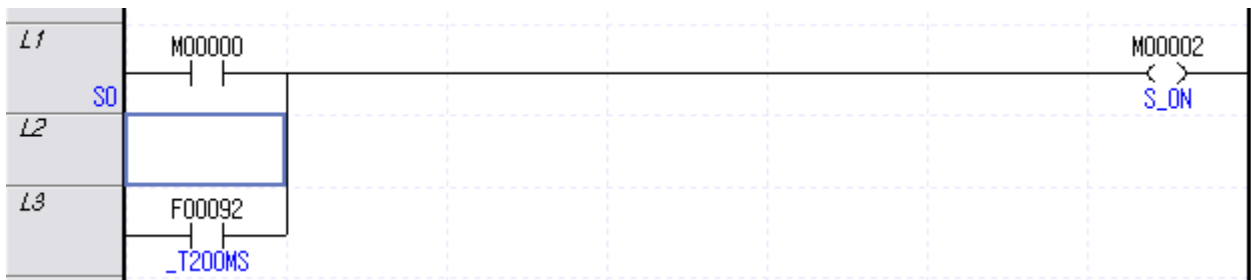
Notes
– If Line Insert is executed, a new line will be inserted in the present cursor position.
– If an area is selected for Line Insert, new lines as many as the lines in the selected area will be inserted.

5.2.13 Delete Factor

It is used to delete the input contact point, coil, application instruction, line, rung/output comment and label.

[Steps]

1. Move the cursor to the location to delete the factor from.
2. Select [Edit] - [Delete].

5.2.14 Delete Cell

It is used to delete the factors such as the input contact point and horizontal line to draw in the next cell.

[Steps]

1. Move the cursor to the location to delete the cell from.
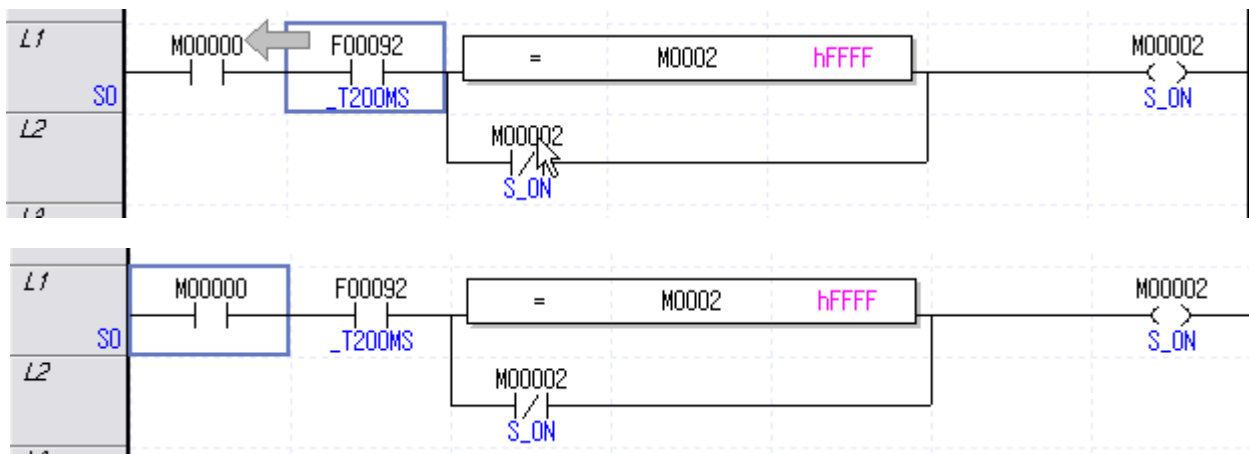
2. Select [Edit] – [Delete Cell].
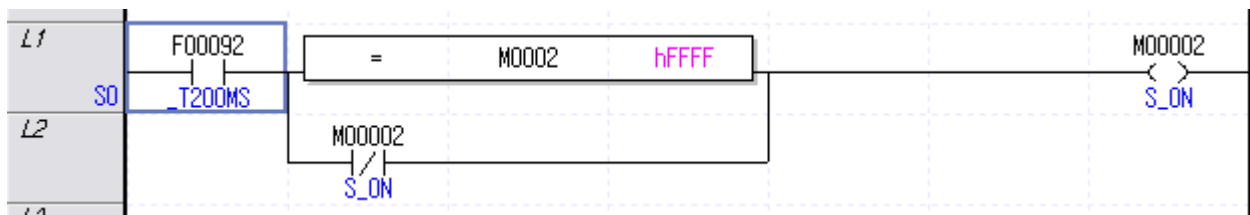
Notes

- Delete Cell operates in rung unit.
- If among the factors connected with OR, any other factor than the horizontal line is included in the present cursor position, Delete Cell is unavailable.
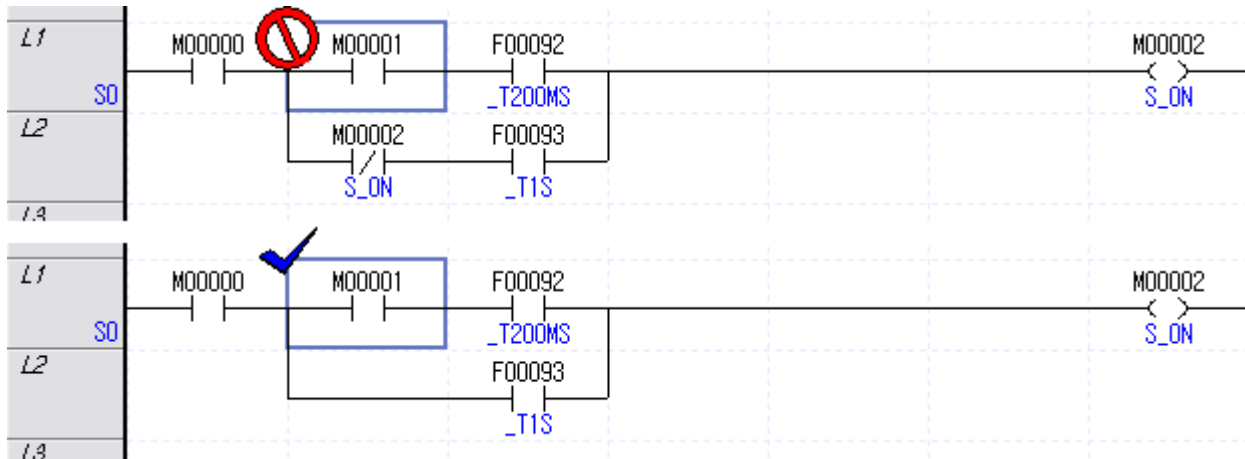
5.2.15 Delete Line

It is used to delete all the lines in the selected area.

[Steps]

1. Move the cursor onto the line to delete.
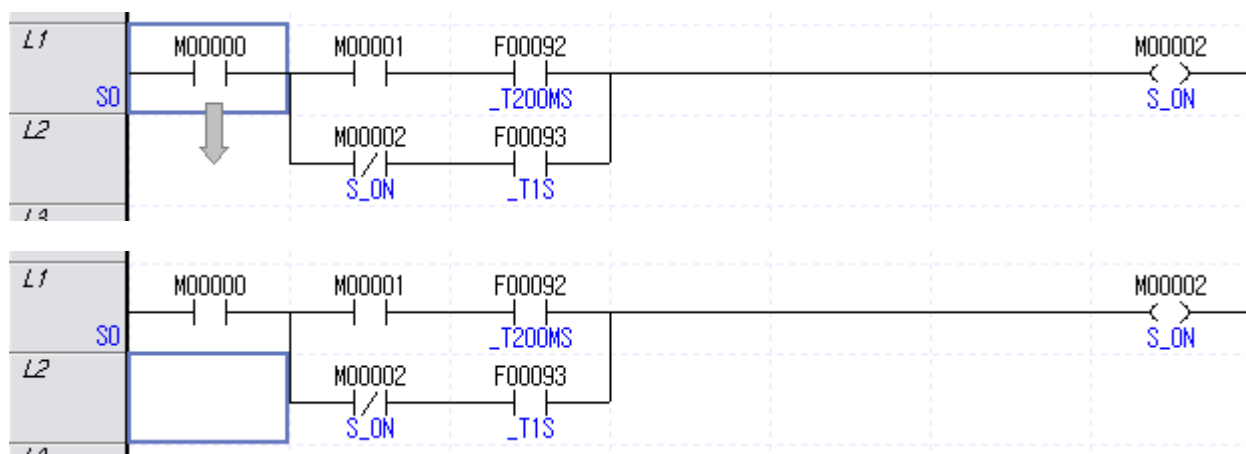
2. Select [Edit] - [Line Delete].
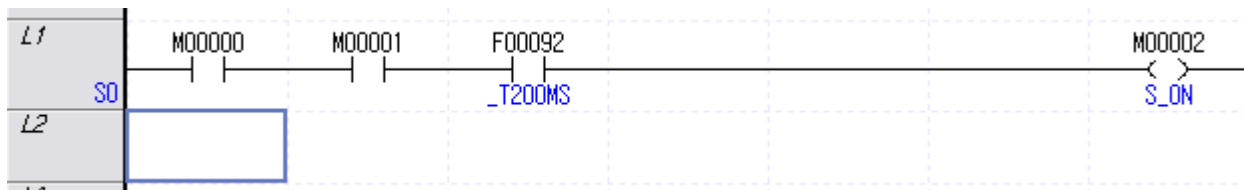
5.2.16   Copy/Cut/Paste

It is used to copy the data in the selected area, or cut the data to copy on the specified position. Differently from [Copy], [Cut] is used to delete the data in the presently selected area.

1) Copy

[Steps]

1. Select the area to copy.
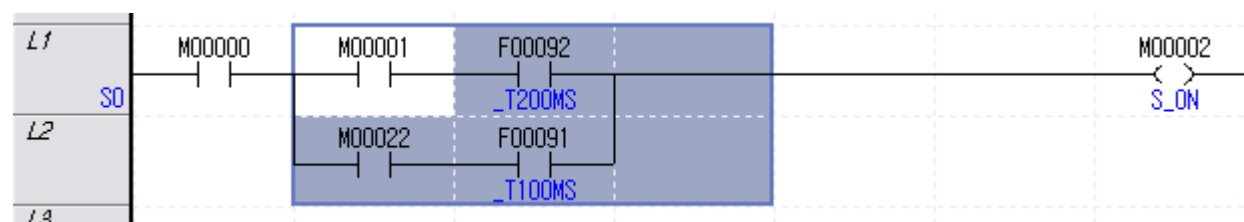
2. Select [Edit] - [Copy] on the menu.
3. Move the cursor to the area to paste on.
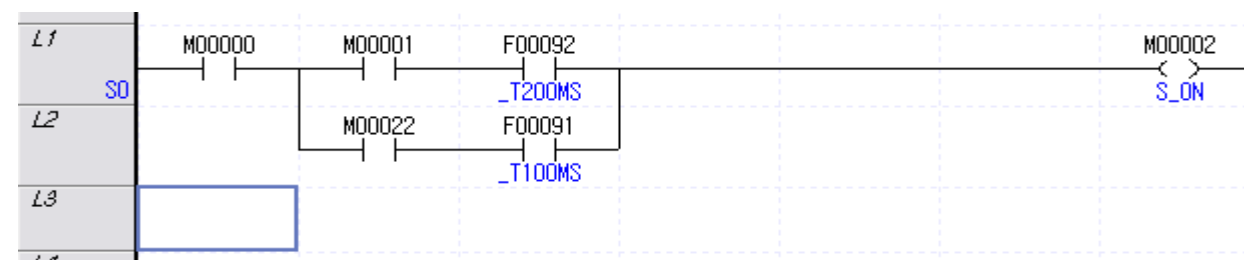
4. Select [Edit] - [Paste] on the menu.
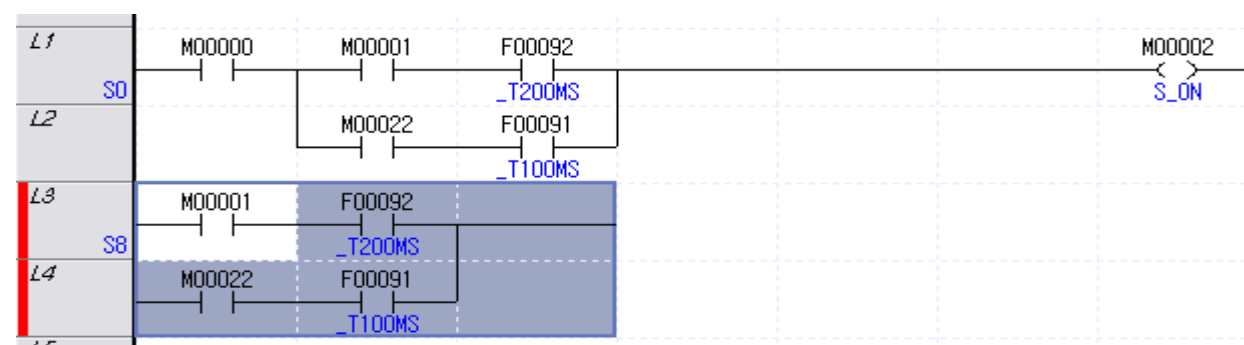
2) Cut

[Steps]

1. Select the area to cut.
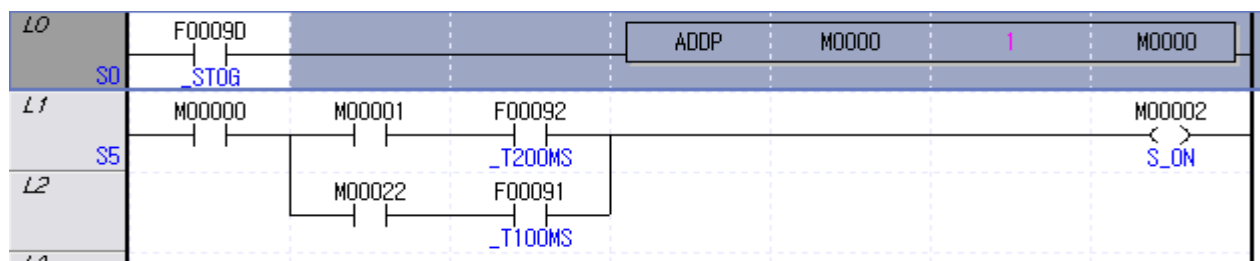
2. Select [Edit] - [Cut] on the menu.
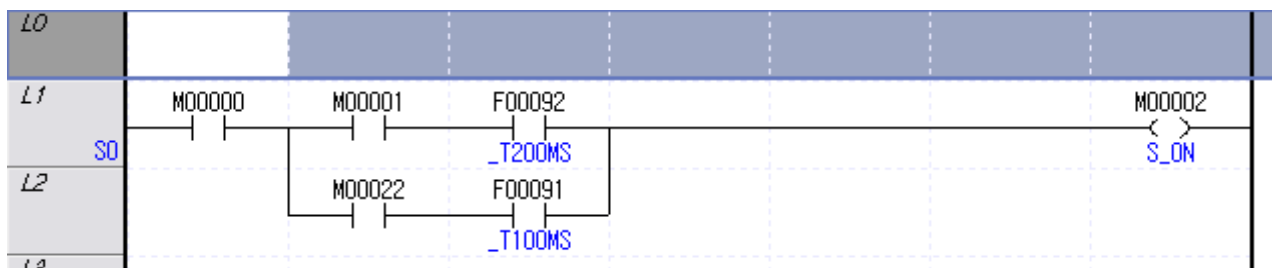
3. Move the cursor to the area to paste on.
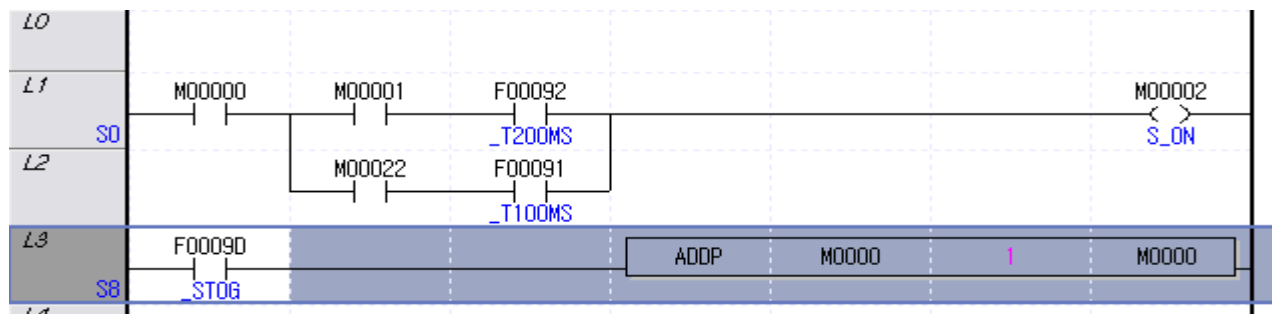
5.2.17 Drag & Drop

Drag & Drop function leads the edit more easy and convenient with mouse. Moving and copying the LD data with drag & drop function is available in the LD program. And the dragging the information of Variable/Comment in the Variable/Comment window and dropping to the operands of contacts, coils, and application instruction is possible.

1) Start of Drag & Drop.

Select items or area to drag and move the cursor to the selected area. The shape of cursor will be changed when the mouse cursor is moved to selected item or area. The change of mouse cursor shape means that drag & drop is ready.

 When Move Data.

 When Copy Data

 When Move or Copy Data is impossible
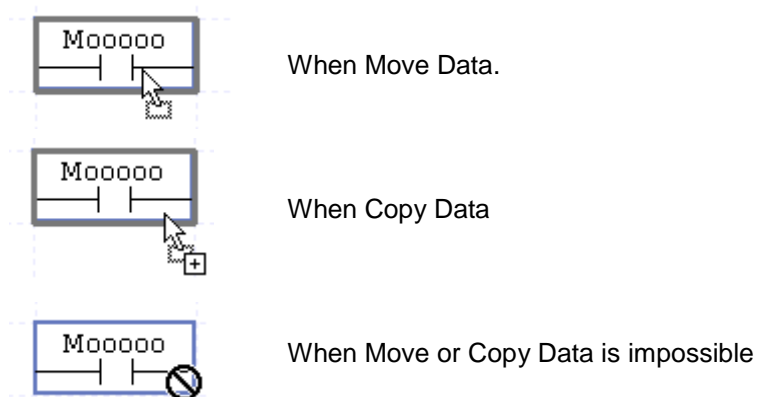
2) Move Data.

It is used to move data included in selected area. The original data will be deleted after movement of data is finished. The steps to move data with drag & drop function are as follows.

[Steps]

1. Select the items or area where the data to be moved is located.
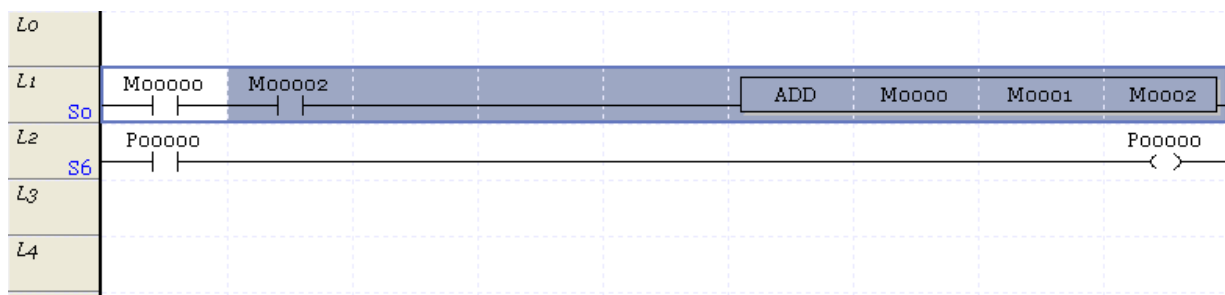
2. Move the mouse cursor to the selected area and press the left side button of mouse. Wait until the shape of mouse cursor is changed.
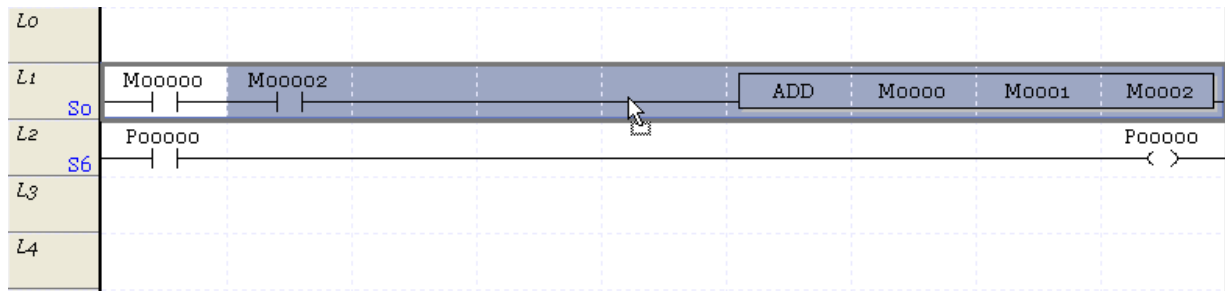
3. Release the mouse button after moving the cursor to the area where the data is moved to.
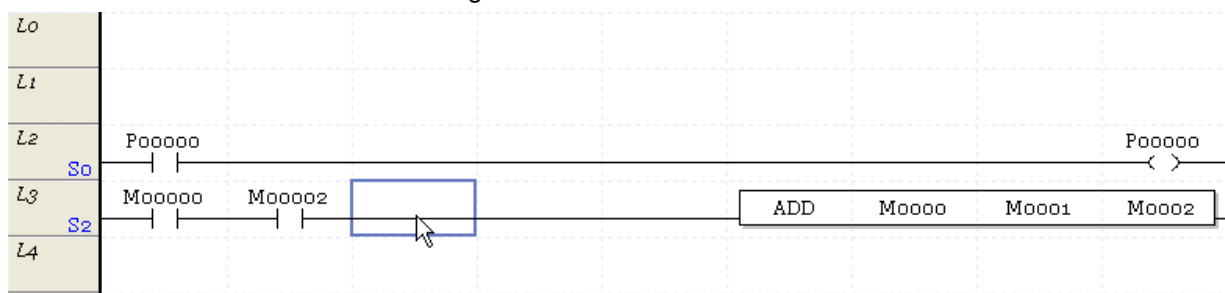
3) Copy Data.

It is used to copy data included in the selected area. Different from moving data,the original data will be remained. To copy data, Ctrl key must be pressed while drag & drop function is executed. The steps to copy data are as follows.

[Steps]

1. Select the items or area where the data to be copied is located.
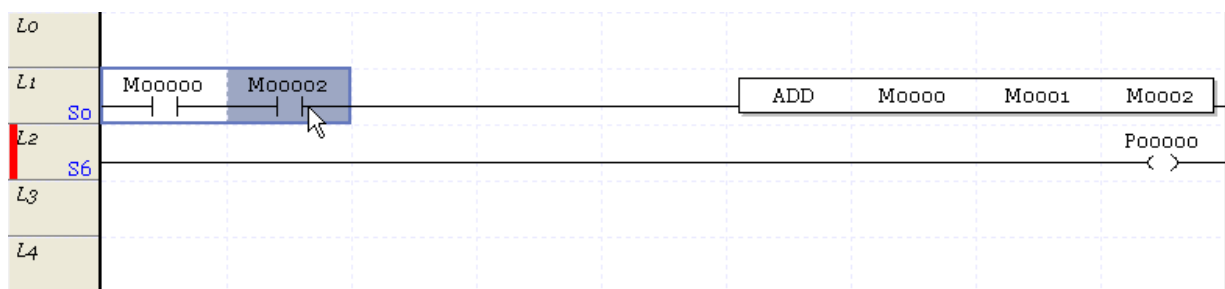
2. Move the mouse cursor to the selected area and press the left side button of mouse and Ctrl key of keyboard. Wait until the shape of mouse cursor is changed.
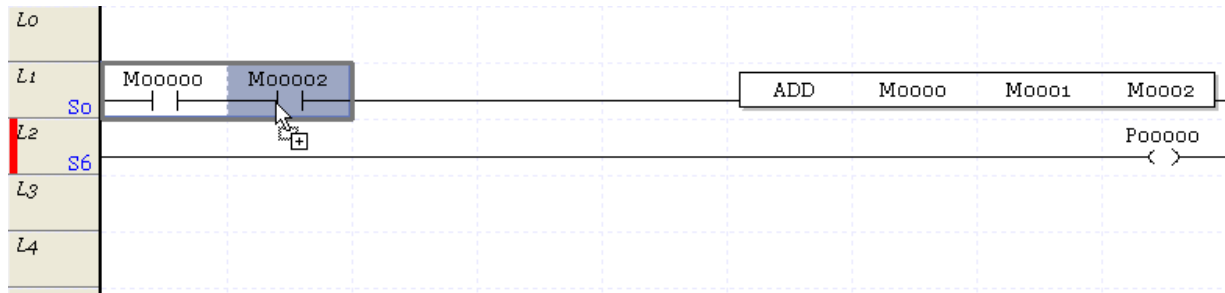
3. Release the mouse button and Ctrl key after moving the cursor to the area where the data is moved to.
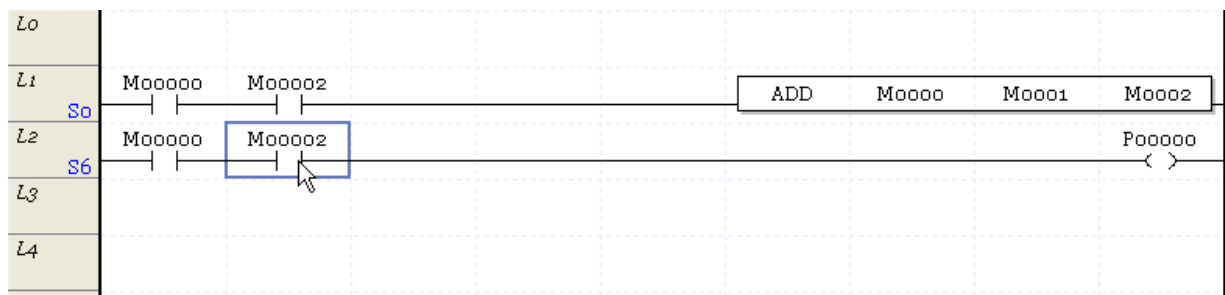
4) Paste Variable/Comment.

It is used to paste device (including Variable/Comment) from Variable/Comment window to instructions. This function is available for contacts, coils and application instructions, but it is not available if data types of operand and copied data are mismatch. The steps to paste variable/comment with drag & drop function are as follows.

[Steps]

1. Select an item to be copied in the Variable/Comment window and move the mouse cursor to the boundary of the cell and start drag & drop.

	Variable	Type	Device	Comment
1	LOW_Limit	BIT	M00000	Lower boundary Limit Switch
2	HIGH_Limit	BIT	M00001	Higher boundary Limit Switch

2. Drag the mouse to the position where the selected device is copied to. At this moment, the shape of cursor will be changed if drop is possible.
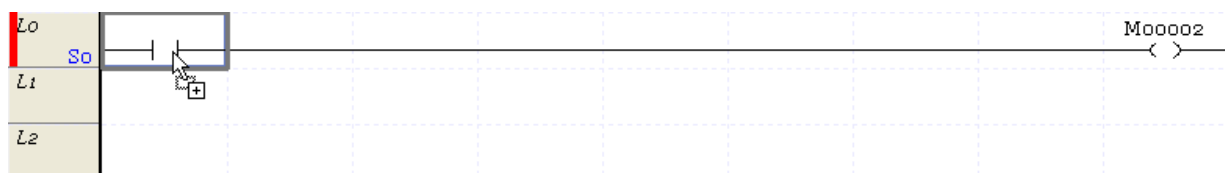
3. Release the mouse button.
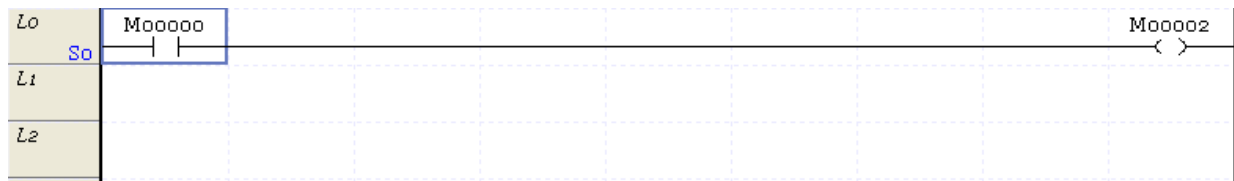
Notes.

- It is possible to copy the device information from variable monitor window.

- It is possible to copy the device information from trend monitor window.

5.2.18 Undo and Redo

It is used to Undo the details edited by Program Edit back to its previous state, or execute again the details cancelled.

1) Undo (example of Delete)

[Sequence]

1. Move the cursor onto the position to delete.
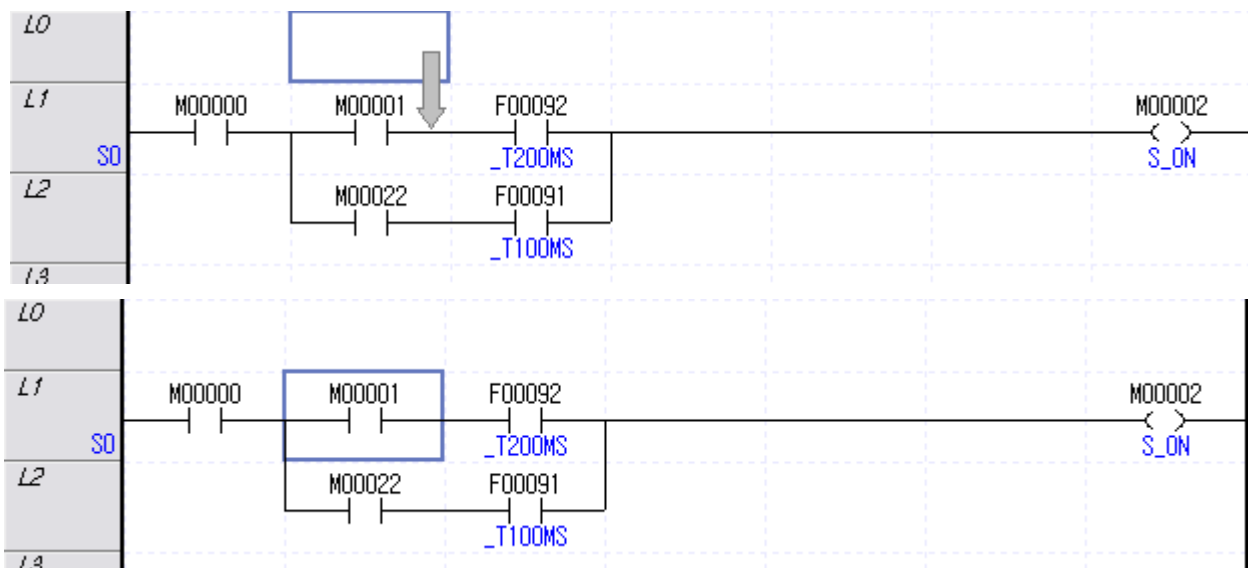
2. Select [Edit] - [Delete] on the menu.
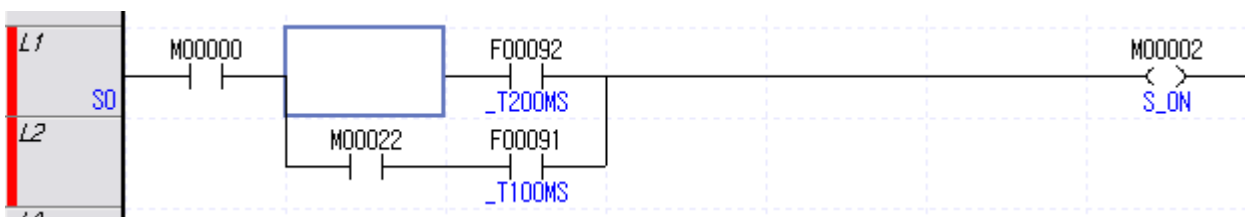
3. Select [Edit] - [Undo] on the menu.
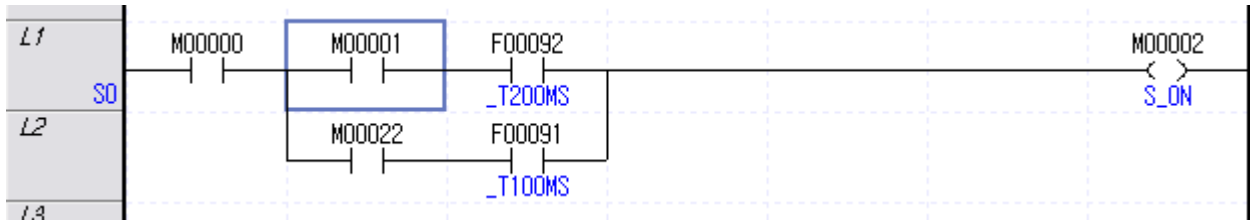
2) Redo (example of Delete)

1. Select [Edit] - [Redo].
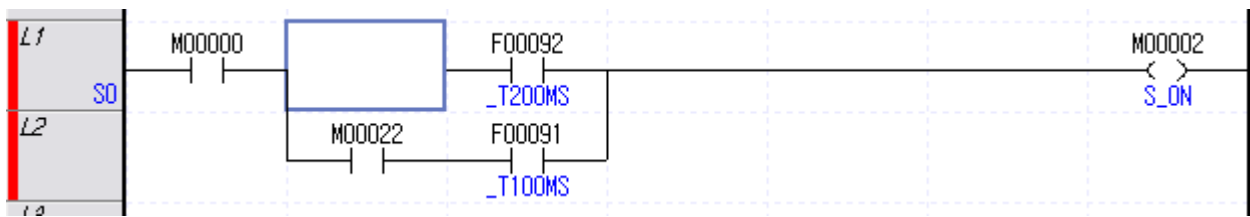
Notes

- All the edited details can be cancelled or executed again.
- The number of times to cancel the execution is unlimited.

The shortcut key for Undo is "Ctrl + Z", Redo is "Ctrl + Y".

5.2.19 Change Columns

It regulates the number of contacts can be inserted in a line.

1) Change Columns.

[Steps]

1. Select [View]-[Change Columns] on the menu.
2. Select the number of contacts can be inserted in a line. The choices are 9, 12, 16, 20, 24, 28, 32.

2) Increase Contact Number.

[Steps]

1. Select Increase Contact number on the View tool bar.

3) Decrease Contact Number

[Steps]

1. Select Decrease Contact number on the View tool bar.

Notes

- The range of the number of contacts is 9 ~ 32.

- If the contact number inserted in a line is greater than assigned number, '▶' mark will be displayed as below. The connection to the next line will be displayed with'▶ connection number' mark and connected line will be displayed with 'connection number ▶'mark.
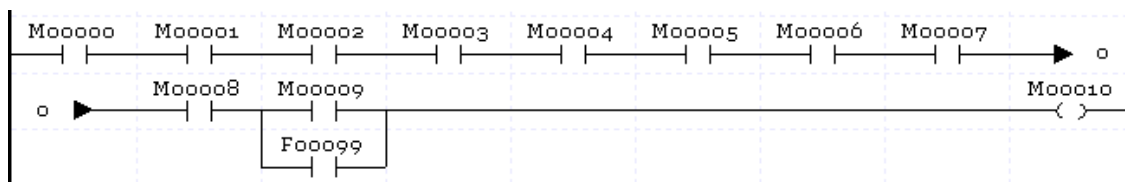
- Line number may be converted or duplicated when Change Columns function is used.
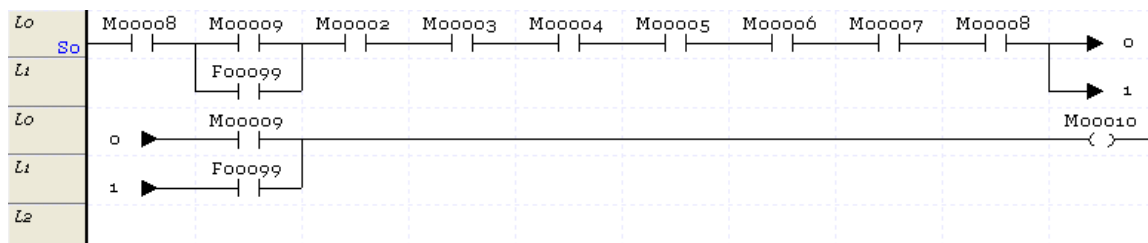
5.2.20 LD View Properties

Specifies LD View Properties. In properties, you can specify setting about device view, variable view, comment view, Magnification and number of contacts. For entire LD screen, you can specify same properties

[Steps]

1. Select [View]-[LD View Properties]
2. Change LD View Properties and press OK

[Dialog box]
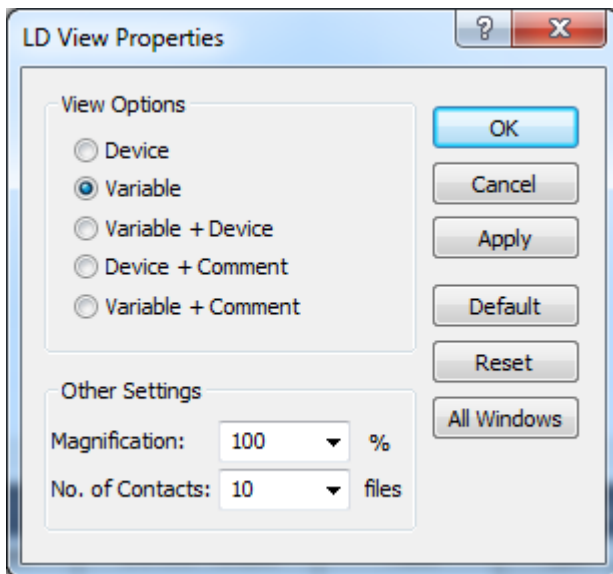
5.3   Program View

It is used to specify the Program View options.

5.3.1   IL Program View

It is used to convert the LD program to the IL program in IL format so to display or edit the IL program as converted.

[Sequence]

1. Select the program.
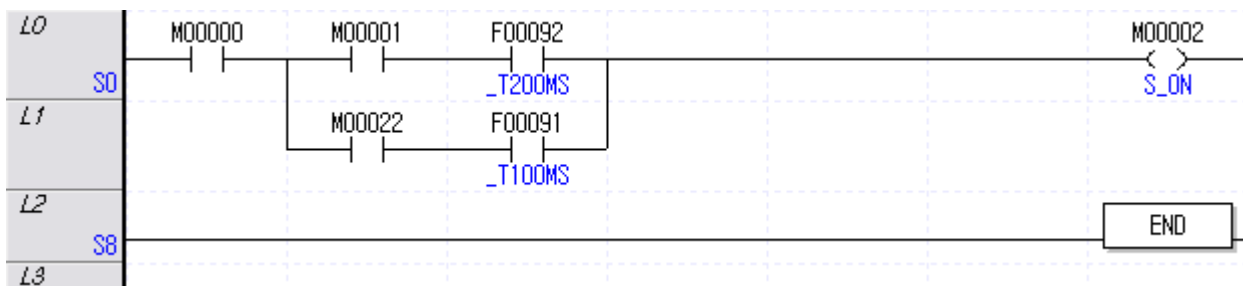
2. Select [View] - [IL].

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	
0	0	LOAD	D00002.2				
	1	MPUSH					
	2	AND	F00090				
	3	MOV	hFFEE	P0000			
	5	MLOAD					
	6	MOV4	hF	P00004			
	9	MLOAD					
	10	OUT	P00000				
	11	MPOP					
	12	OUT	P00010				
1	13	END					

Notes

- If any incomplete rung exists, the LD program can not be converted to IL program.

5.3.2 Program Magnification Change

This is used to change the magnification of the LD program displayed on the screen.

1) Zoom-In

[Sequence]

1. Select [View]-[Zoom-In] on the menu.

2) Zoom-Out

[Sequence]

1. Select [View]-[Zoom-Out] on the menu.

Notes

- Ctrl + Upward Wheel if available perform Zoom-Out step by step.
- Ctrl + Downward Wheel if available perform Zoom-In step by step.
- On the View Tool selection box, the user can select or directly input the magnification. Refer to 2.2 Tool Box in Chapter 2 Basic Application for more details.

| NewPLC | | | Row 1, Column 0 | Overwrite | 🔒 | 📷 | 📋 | 100% ⬤ ━━┃━━ ⬤ |
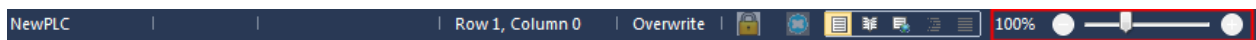
5.3.3 View Device

It is used to display only the name of the applicable device for the device used as the operand of the contact point, coil and application instruction.

[Sequence]

1. Select [View]-[Devices].
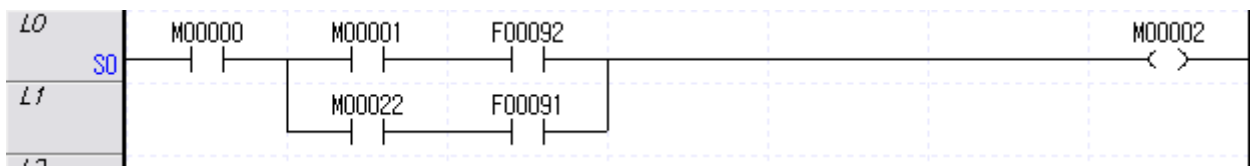
5.3.4 View Variable

It is used to display the name of the variable for the device used as the operand of the contact point, coil and application instruction

If no variable is declared for the applicable device, it will be displayed as the device name.

[Sequence]

1. Select [View]-[Variable].
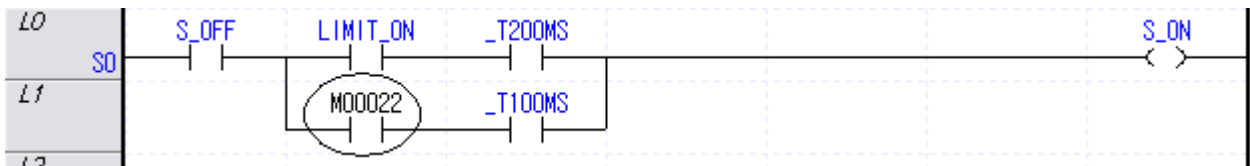
5.3.5 View Device/Variable

It is used to display the name of the device/variable for the device used as the operand of the contact point, coil and application instruction.

If no variable is declared for the applicable device, the device name only will be displayed.

[Sequence]

1. Select [View]-[Devices/Variables] Item.
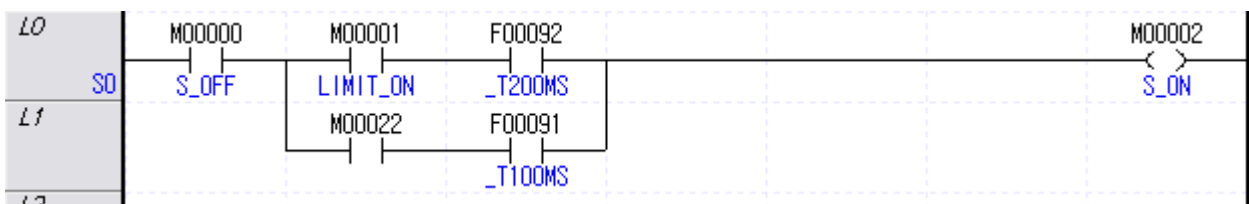
5.3.6 View Device/Comment

It is used to display the device/comment for the device used as the operand of the contact point, coil and application instruction.

If no comment is available for the applicable device, the device name only will be displayed

[Steps]

1. Select [View]-[Devices/Comments] Item.
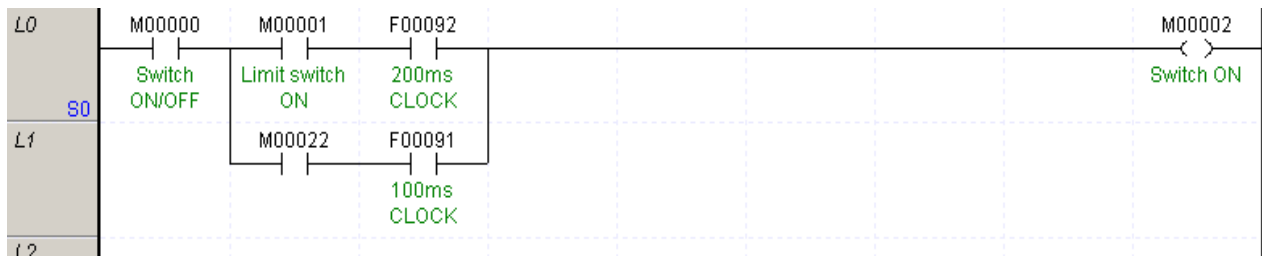
5.3.7 View Variable/Comment

It is used to display the variable/comment for the device used as the operand of the contact point, coil and application instruction.

[Steps]

1. Select [View]-[Variable/Comment]
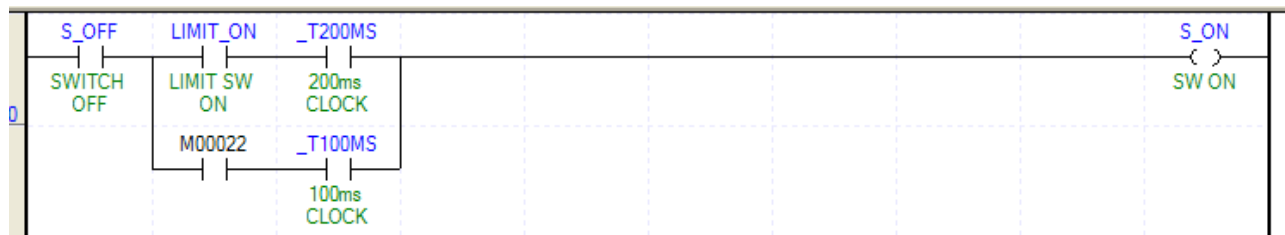
Notes
− If View Options are changed, it may take some time according to the number of the edited program steps.
− Print function of the Device/Variable/Comment is available.

5.4   Edit Function Additional

Additional functions will be described below for convenient edit.

5.4.1 Optimize Program

It is used to delete the horizontal and empty lines between the contact points so to optimize the position where LD diagram will be drawn.

[Sequence]

1. Select [Edit] - [Optimize Program] on the menu.
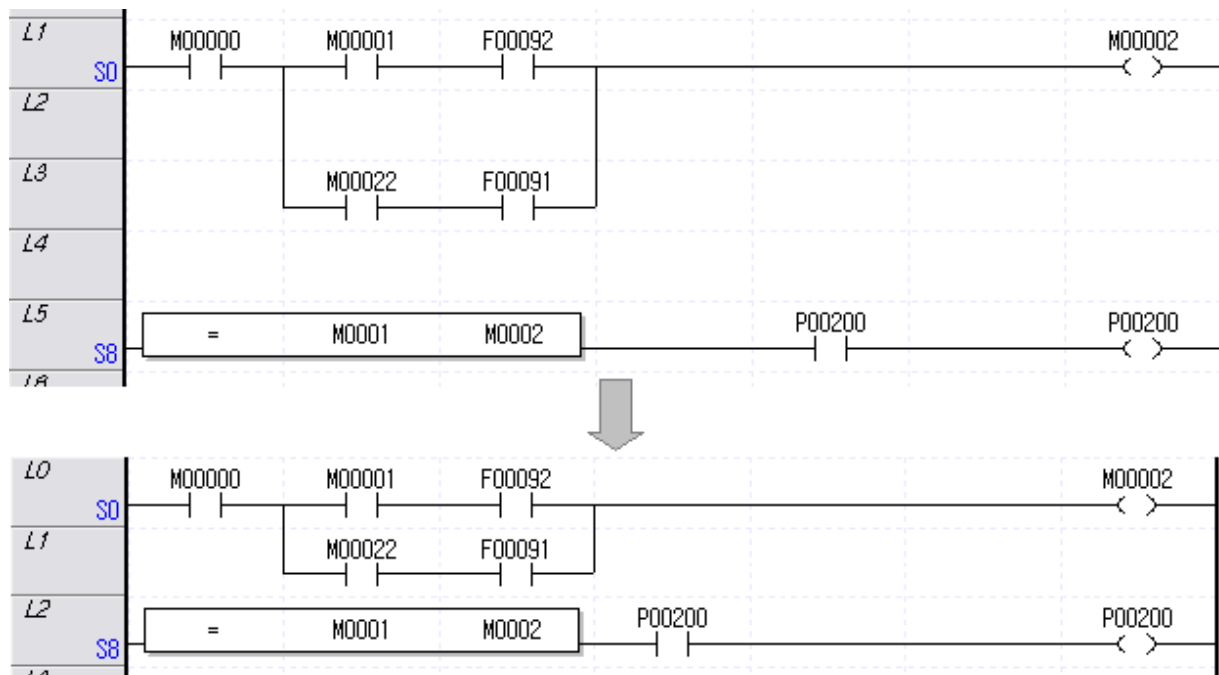
Notes

‒ Optimize Program if once executed can not be back to its previous state through execution cancel.

‒ It may take some time according to the size of the program.

‒In case LD logic is not complete, optimization function doesn't operate

XG5000

❌ Due to incomplete rung, could not proceed program optimization.

OK
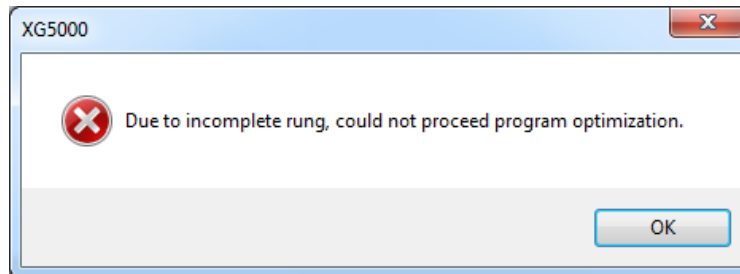
5.4.2 Block Mask Instruction

This is used to specify or cancel the area Block Mask in PLC among the LD programs.

1) Block Mask Instruction Setting

[Sequence]

1. Move the cursor to the rung to specify the Block Mask instruction.
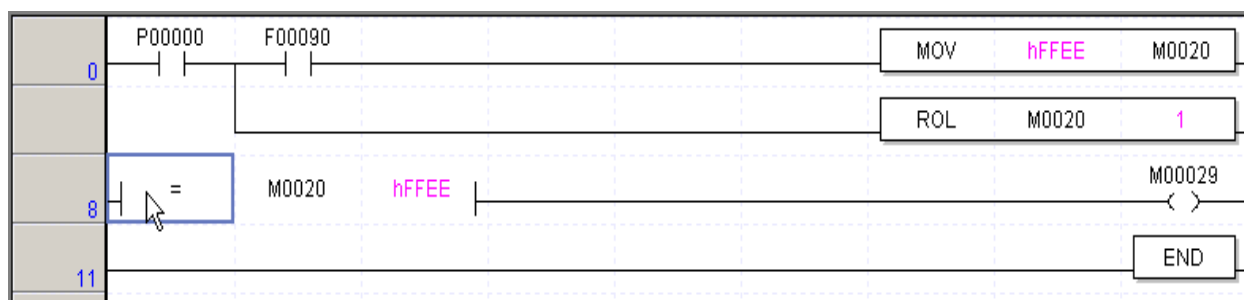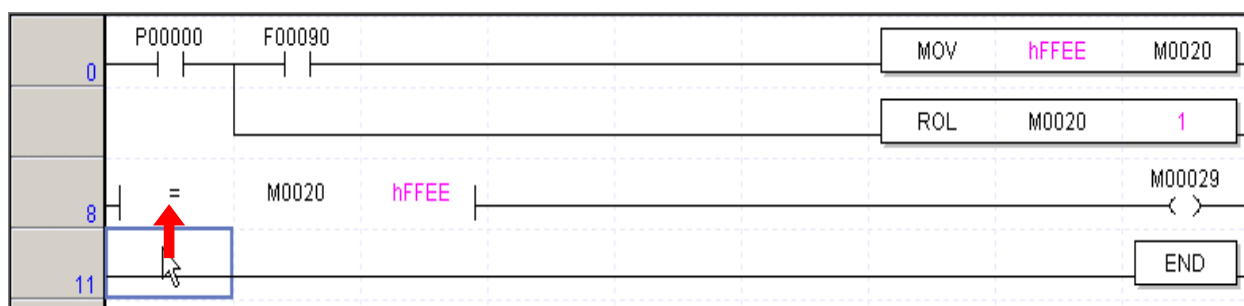
2. Select [Edit] - [Set Block Mask Instruction].
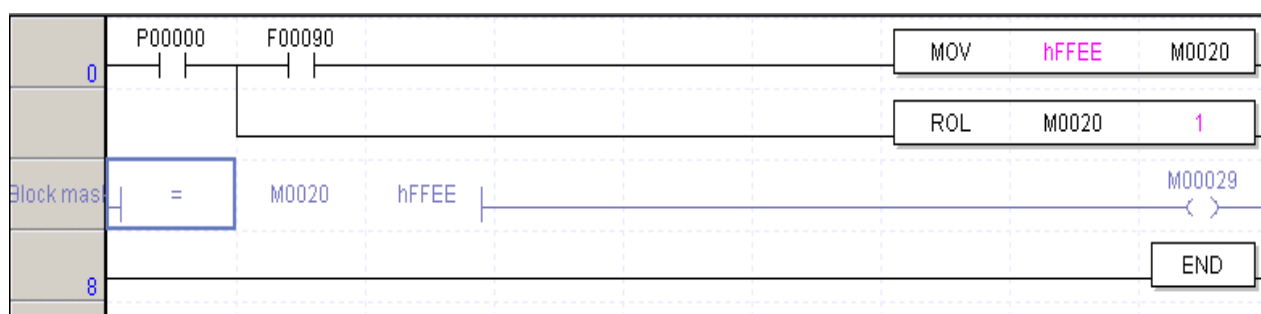
2) Block Mask Instruction Cancel

[Sequence]

1. Move the cursor to the rung to cancel the Block Mask instruction.
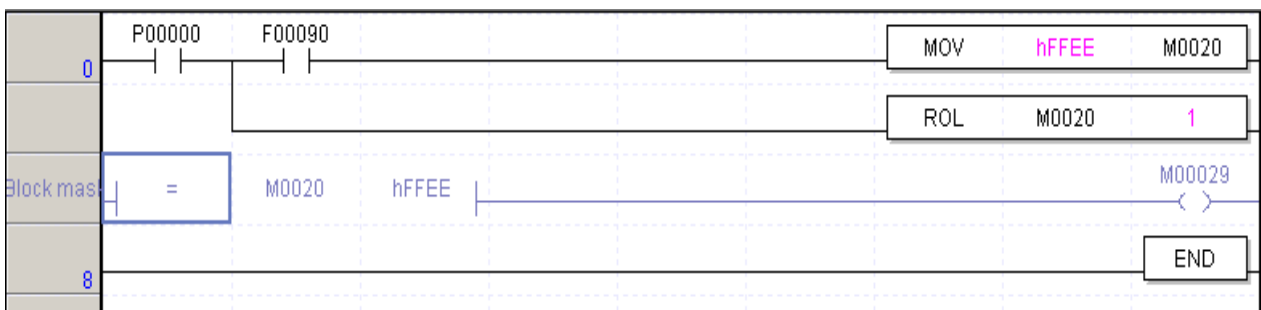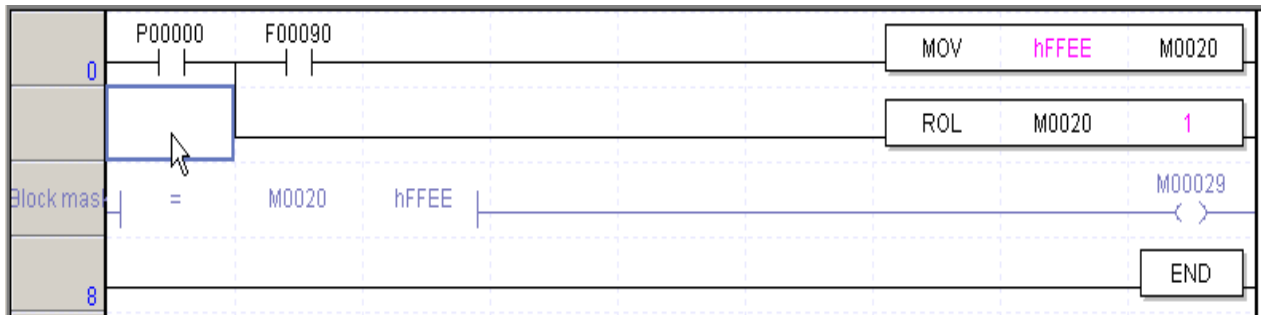
2. Select [Edit] - [Remove Block Mask] on the menu.
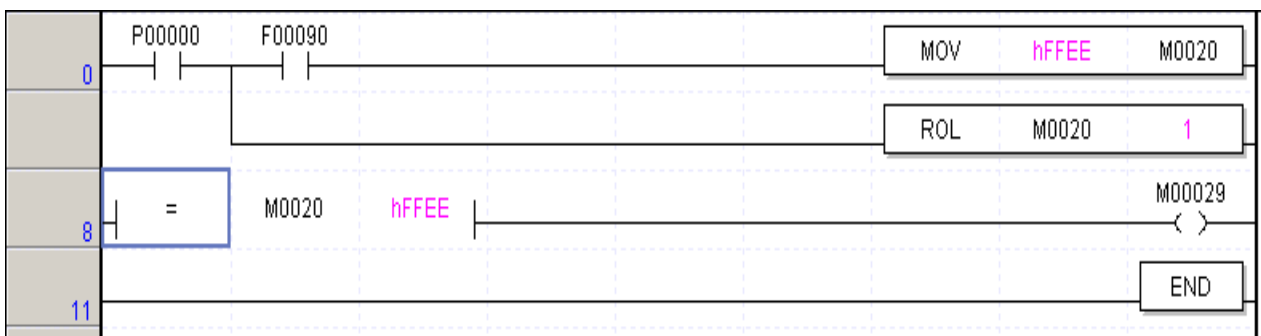
Notes.
- The program capacity of block masked area is included not in the program capacity but comment capacity.
- The program in the block masked area can be written to PLC and read from PLC just like comment.
- Online edit is impossible for the block masked program. To modify the block masked program when PLC is running, write comment function is available.

5.4.3 Bookmark

It allows the user easily to move to an interesting area with the bookmark specified on the line.

1) Set Bookmark

[Sequence]

1. Move the cursor to the line to specify the bookmark on.
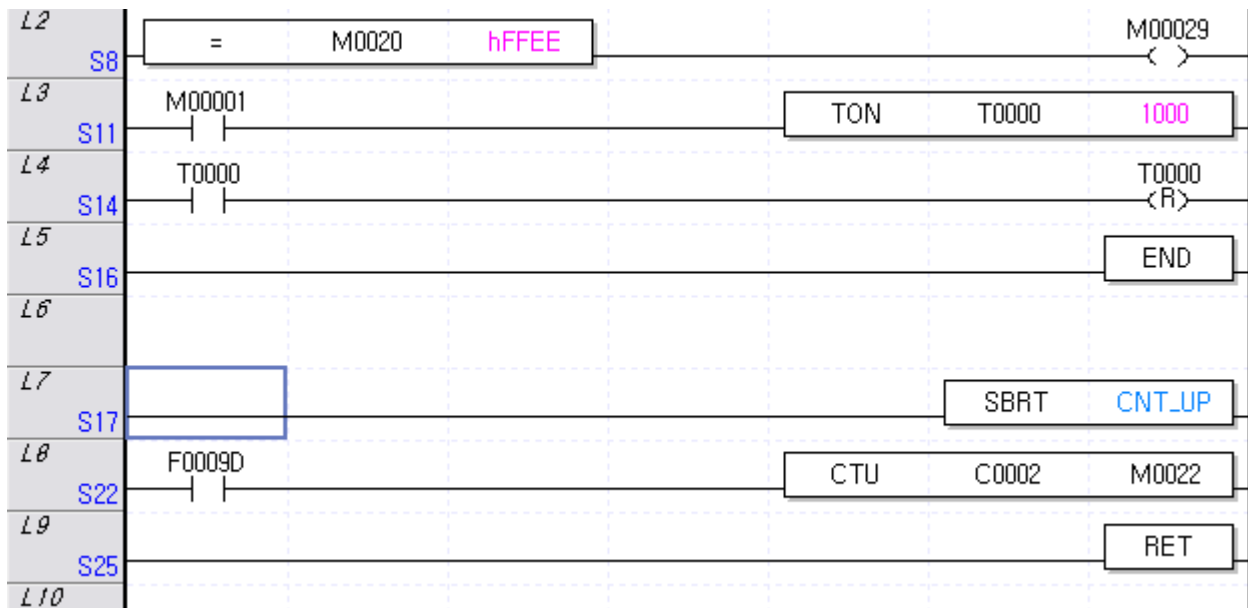
2. Select [Edit] - [Bookmark] - [Set/Remove] on the menu.
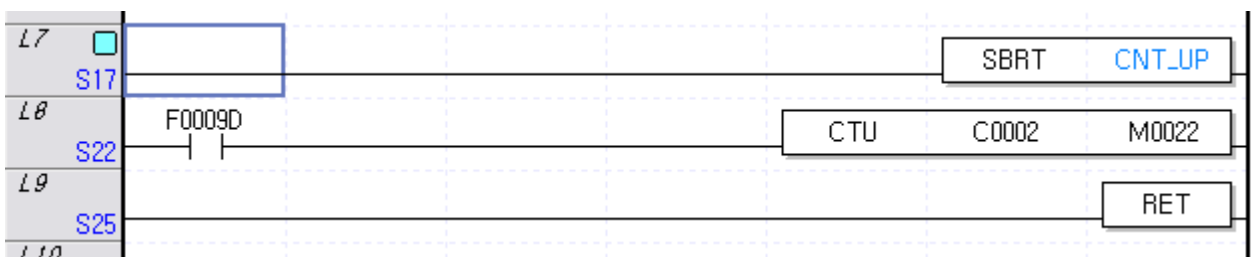
2) Bookmark Reset

[Sequence]

1. Move the cursor to the line to cancel the bookmark from.

2. Select [Edit] - [Bookmark] - [Set/Reset] on the menu.
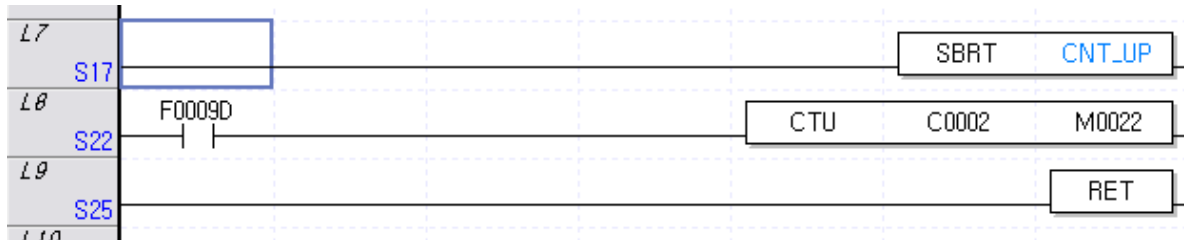
3) Reset All Bookmark

[Sequence]

1. Select [Edit] - [Bookmark] - [Remove All] on the menu.
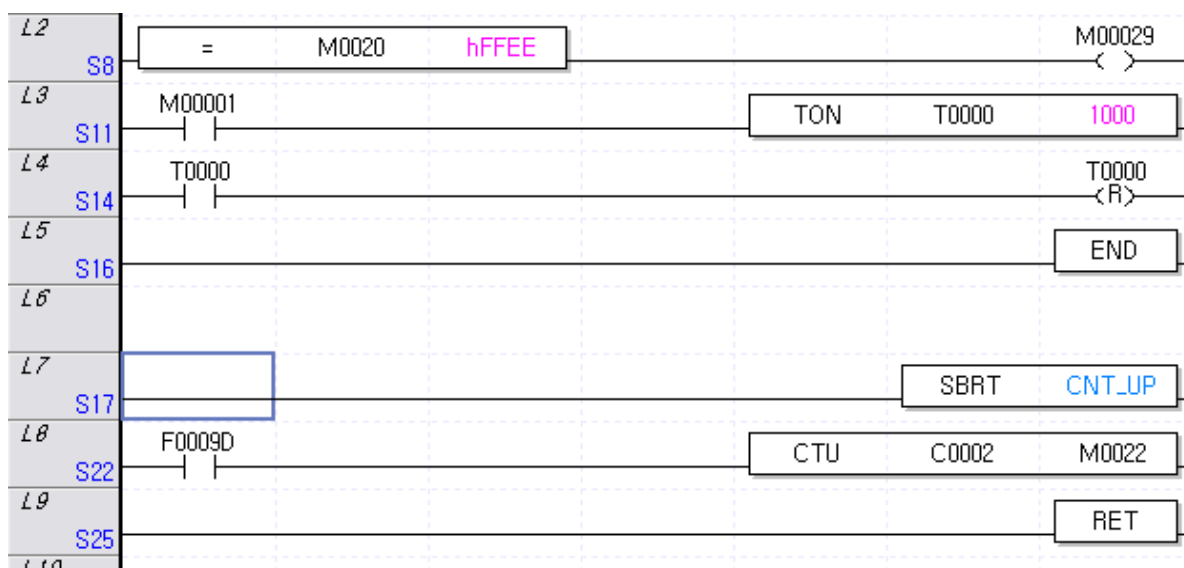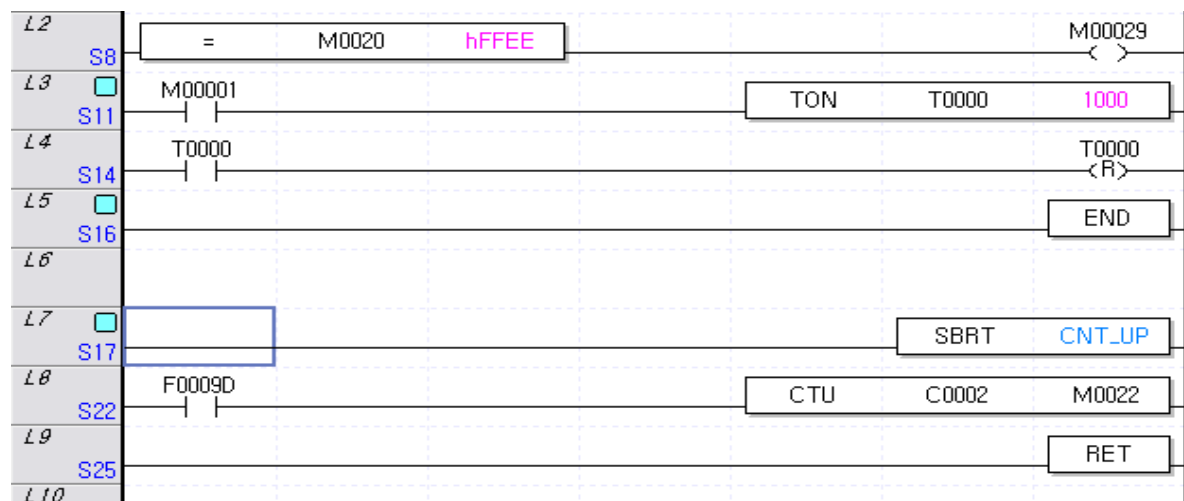
4) Previous Bookmark

[Sequence]

1. Select [Edit] - [Bookmark] - [Previous Bookmark] on the menu.
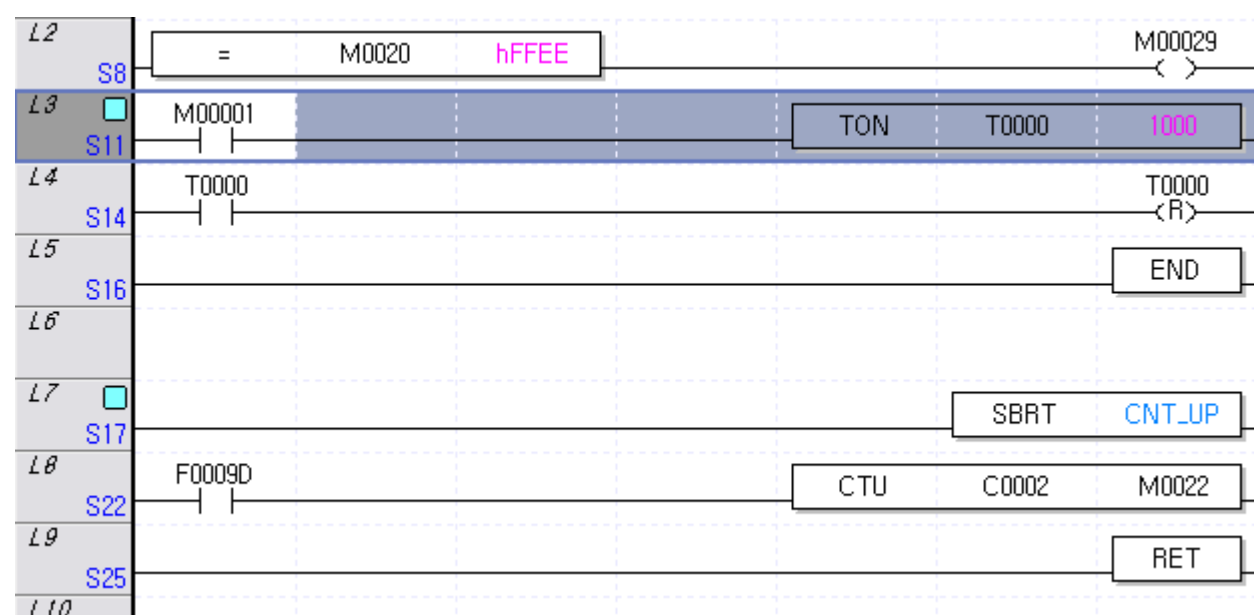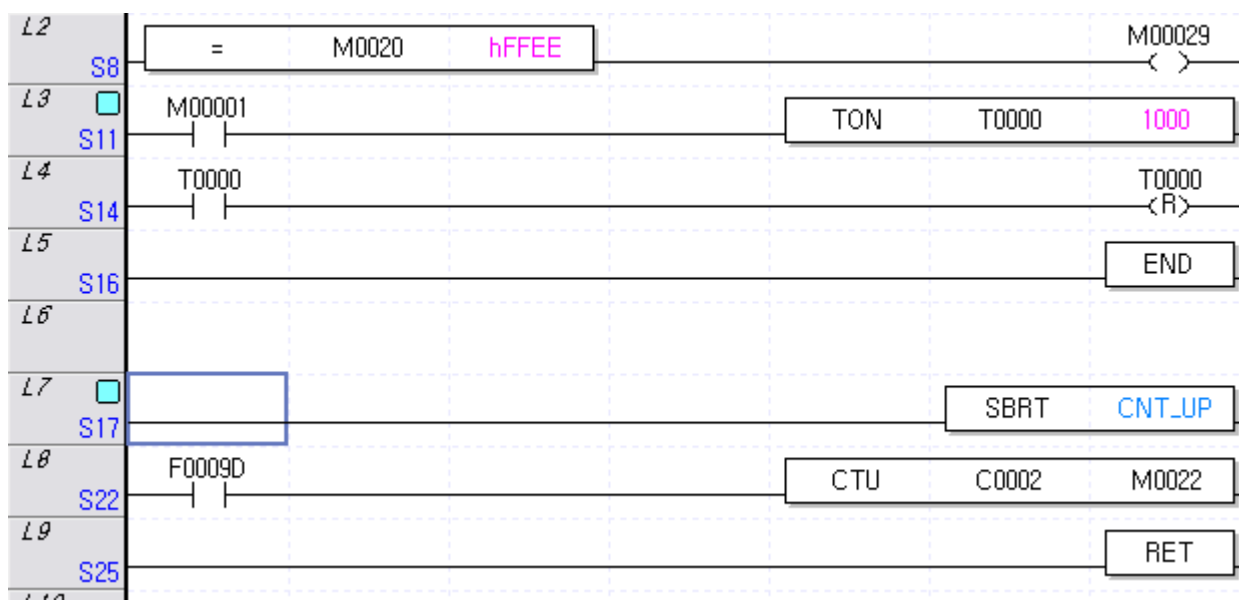
5) Next Bookmark

[Sequence]

1. Select [Edit] - [Bookmark] - [Next Bookmark] on the menu.
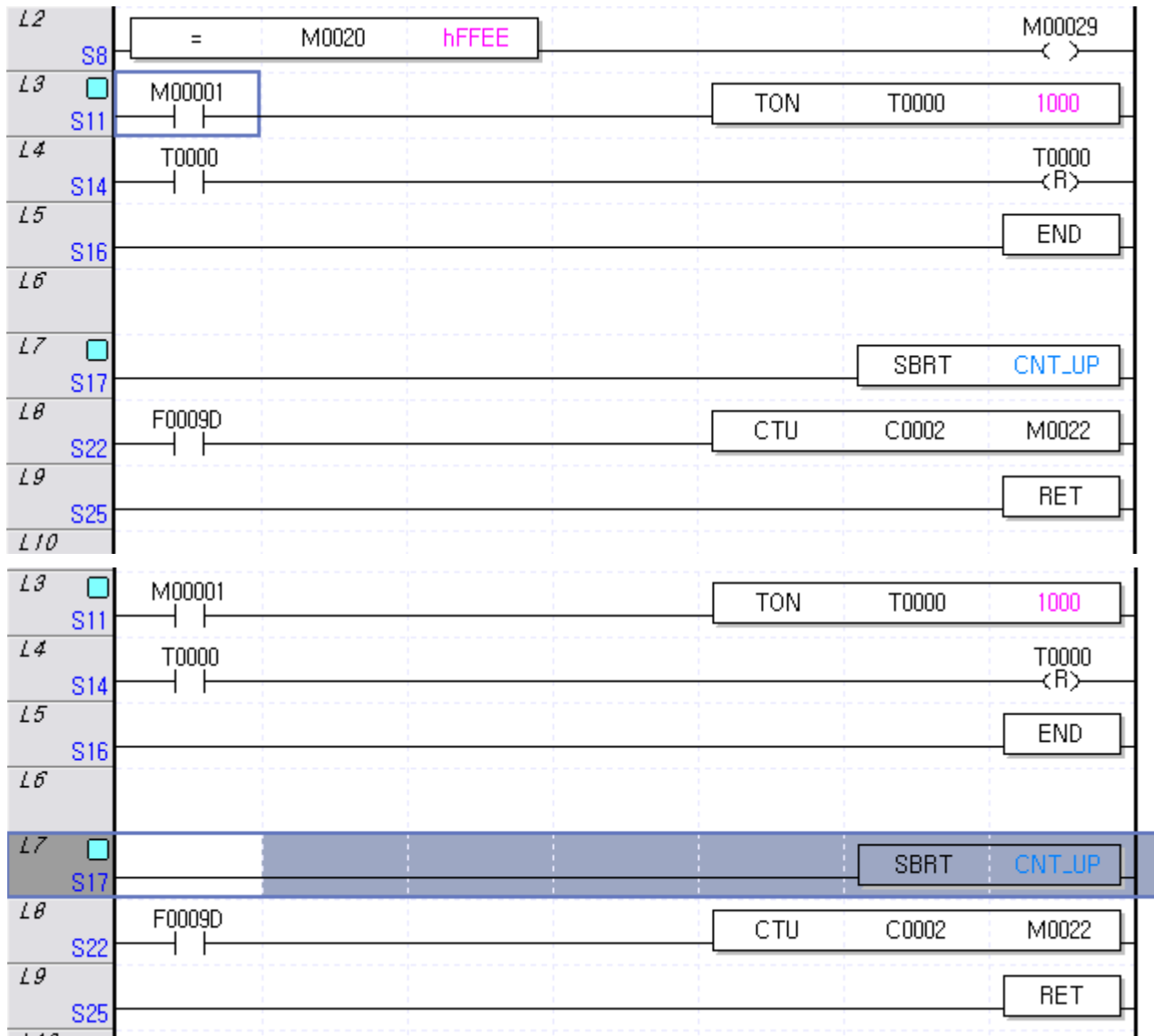
Notes
− Bookmark will be specified in line unit.
- [Move to Previous Bookmark] and [Move to Next Bookmark] function is effective in the same program.
− Bookmark is not an item to edit, thus the Set/Reset options will not be included in Undo and Redo.

5.4.4 Go To

It is used to move to the step position the program has specified, or go to the position of the edited label and rung comment.

1) Go To Step

[Sequence]

1. Select [Find/Replace]-[Go To]-[Step/Line].

[Dialog Box]
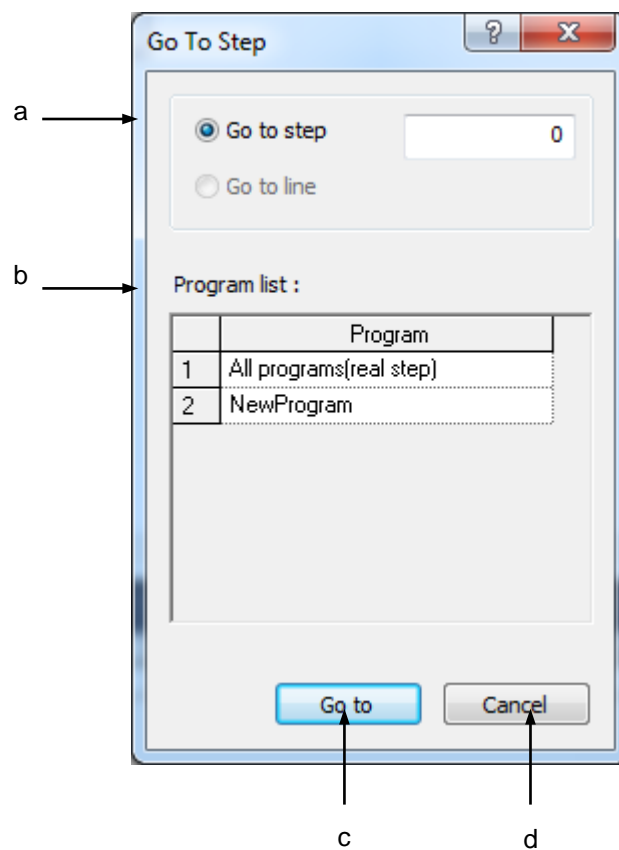
[Description of Dialog Box]

a. Go to what: used to input the step to go to.

b. Program list: used to display the list of the present PLC programs.

c. Go to: closes the Dialog Box to go to the selected program's step to find.

d. Cancel: closes the Dialog Box.

2. Input the step to move to on the Dialog Box.

2) Go To Label

[Sequence]

1. Select [Find/Replace]-[Go To]-[Label].

[Dialog Box]
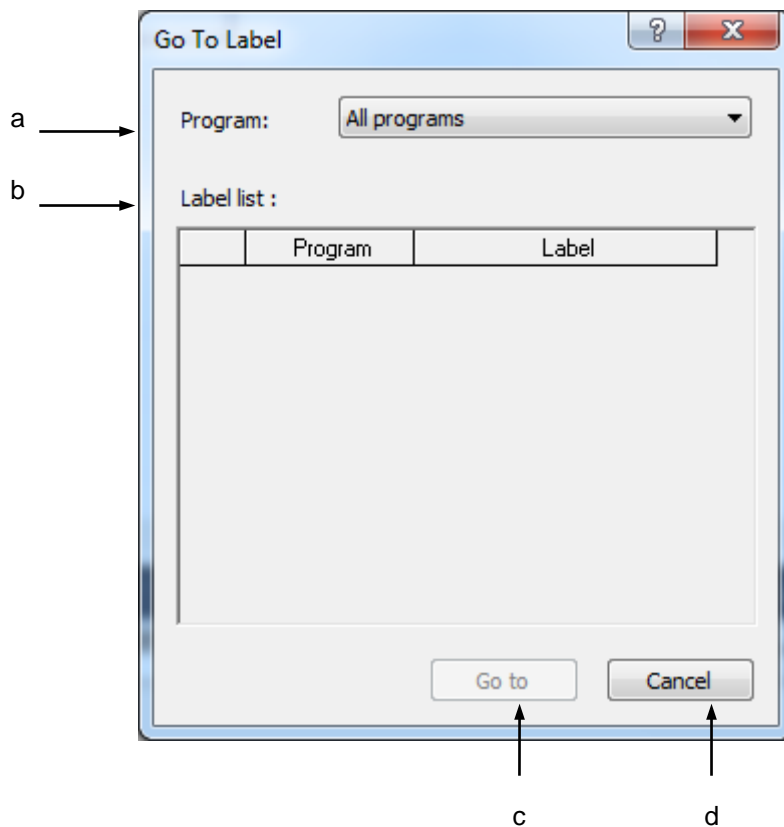
[Description of Dialog Box]

a. Program: used to display the list of the present PLC programs. If 'All Programs' is selected, the list of all the labels will be displayed.

b. Labels list inside the program: used to display the list of the labels used in the selected program.

c. Go To: closes the Dialog Box to go to the selected label.

d. Close: closes the Dialog Box.

2. Select the label to go to on the Dialog Box.

3) Go To Rung Comment

[Sequence]
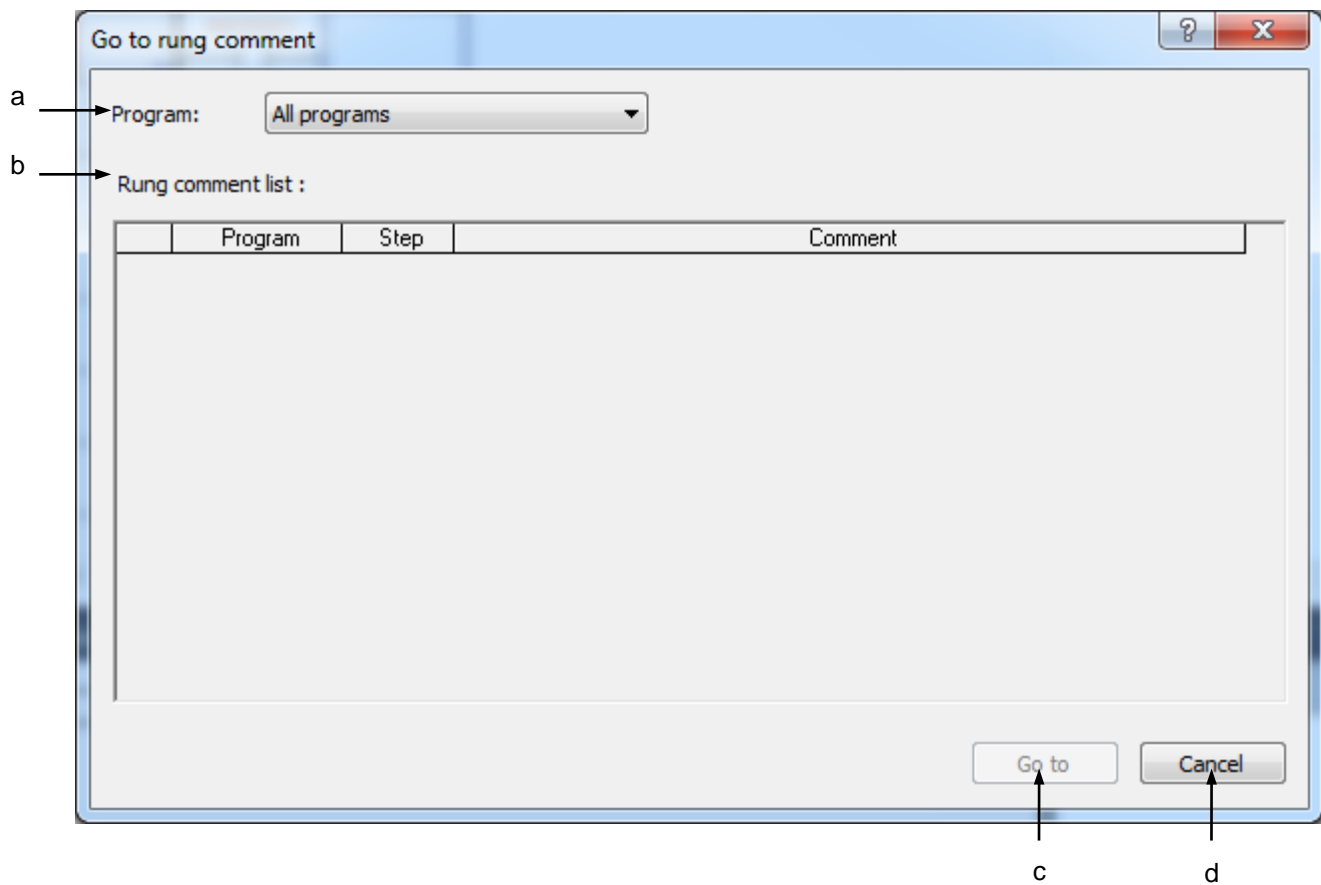
1. Select [Find/Replace]-[Go To]-[Rung Comment].

[Dialog Box]

[Description of Dialog Box]

a. Program: used to display the list of the present PLC programs. If 'All Programs' is selected, the list of all the rung comments will be displayed.

b. Rung comment list: used to display the list of the rung comments used in the selected program.

c. Go to: closes the Dialog Box to go to the selected rung comment.

d. Close: closes the Dialog Box.

2. Select the rung comment to go to on the Dialog Box.

4) Go To END Instruction

[Sequence]

1. Select [Find/Replace]-[Go To]-[END Instruction] on the menu.

[Dialog Box]
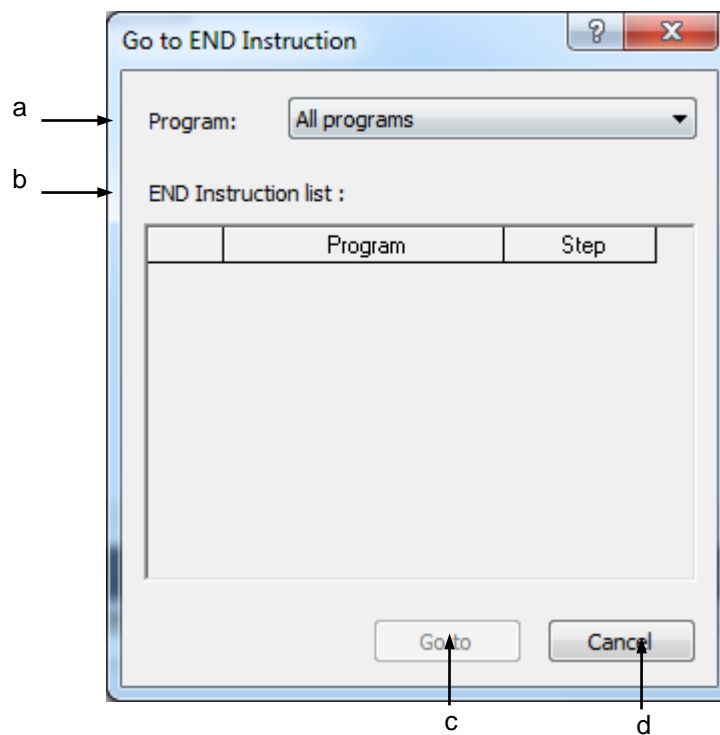
[Description of Dialog Box]

a. Program: used to display the list of the present PLC programs. If 'All Programs' is selected, the list of all the END instructions will be displayed.

b. END instruction list inside the program: used to display the list of the END instructions used in the selected program.

c. Go to: closes the Dialog Box to go to the selected END instruction.

d. Close: closes the Dialog Box.

2. Select the END instruction to go to on the Dialog Box.

Chapter 6 IL Edit

The programming method of IL language which is based on String will be described in this chapter.

6.1   Screen Configuration

6.1.1   IL Window

1)   Description of IL Window

[Dialog Box]

Rung	Step		instruction	OP 1	OP 1 variable	OP 2	OP 2 variable	OP 3	OP 3 variable	OP 4	OP 4 variable
0	0		Comment	comment							
1	1		LOAD	F0009B	_1ON						
	2		PUT	4		0		2		1	
	6	●	PUT	4		1		0		1	
	10		PUT	4		3		2		2	
	14		SET	P00006							
2	15		Comment	rung comment							
3	16		Comment	rung comment							
4	Block ma		LOAD	M00013							
	Block ma		OUT	P00064							
5	17		LOAD	F00000	_RUN						
	18		AND	F0009B	_1ON						
	19		OR	M00012							
	20		OR	M00066							
	21		AND NOT	P0001D							
	22		AND NOT	P00009							
	23		AND NOT	T0019							
6	24		LOAD	M00012							
	25	●	TON	T0019		450					
7	27		LOAD	M00066							
	28	●	OR	M00067							
	29		AND NOT	P00034							
	30		OUT	M00067							
8	31		END								

(labels a, b, c, d pointing to columns; labels e, f, g, h, i, j pointing to rows)

[Description of Dialog Box]

  a. Rung: used to display the sequence number of the rung of each line. The rung can be changed whenever the line is edited.

  b. Step: used to display the step of each line.

  c. Instruction: used to display the instruction.

  d. Operand: used to display the operand. Based on the View mode, applicable device, variable and flag may be displayed.

  e. Brake Pointer: used to display the brake pointer specified. Refer to Debug Function for more details.

  f. Rung comment: used to display the rung comment.

  g. Block Mask Instruction: used to display the Block Mask instruction specified.

  h. Error Rung Display: used to display the rung incomplete. If the rung complete, this will be displayed.

  i. Bookmark: used to display the bookmark specified.

  j. Selected line: used to display the presently selected line.

Notes

- Color of the selected line, background, Block Mask instruction or error rung can be changed through [Tools]-[Options].

6.1.2 Instruction Input Window

On the Instruction Input Window as shown below, the instruction and the operand can be input and changed.

Instruction Input Window

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	Comment	comment						
1	1	LOAD D00002.2							
	2	MPUSH							
	3	AND	F00090						
	4	MOV	hFFEE	P0000					
	6	MLOAD							
	7	MOV4	hF	P00004					
	10	MLOAD							
	11	OUT	P00000						
	12	MPOP							
	13	OUT	P00010						
2	14	END							

6.1.3 Limits

The output comment will not be displayed. In addition, the edit of the output comment is unavailable.

6.2 Program Edit

6.2.1 Overwrite/Insert mode

The Overwrite Mode is used to change the existing details of the selected line. Insert Mode is used to add newly input details to the selected line. In this case, the existing details move to the next line.

1) Overlap mode

[Sequence]

1. Select [Edit] - [Overwrite Mode] on the menu.
2. Select the line to change.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	Comment	comment						
1	1	LOAD	D00002.2						
	2	MPUSH							
	3	AND	F00090						
	4	MOV	hFFEE	P0000					
	6	MLOAD							
	7	MOV4	hF	P00004					
	10	MLOAD							
	11	OUT	P00000						
	12	MPOP							
	13	OUT	P00010						
2	14	END							

3. Press Enter key to create the Instruction Input Window on the selected line. Input the details to change on the Instruction Input Window.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	Comment	comment						
1	1	LOAD M100							
	2	MPUSH							
	3	AND	F00090						
	4	MOV	hFFEE	P0000					
	6	MLOAD							
	7	MOV4	hF	P00004					
	10	MLOAD							
	11	OUT	P00000						
	12	MPOP							
	13	OUT	P00010						
2	14	END							

4. After the input, press Enter key to change the instruction and operand of the selected line and to create the Instruction Input Window right on the next line.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	Comment	comment						
1	1	LOAD	M00100						
	2	MPUSH							
	3	AND	F00090						
	4	MOV	hFFEE	P0000					
	6	MLOAD							
	7	MOV4	hF	P00004					
	10	MLOAD							
	11	OUT	P00000						
	12	MPOP							
	13	OUT	P00010						
2	14	END							

2) Insert mode

[Sequence]

1. Select [Edit] - [Insert Mode] on the menu.

2. Select the line to change.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	Comment	comment						
1	1	LOAD	M00100						
	2	MPUSH							
	3	AND	F00090						
	4	MOV	hFFEE	P0000					
	6	MLOAD							
	7	MOV4	hF	P00004					
	10	MLOAD							
	11	OUT	P00000						
	12	MPOP							
	13	OUT	P00010						
2	14	END							

3. Press Enter key to create the Instruction Input Window on the selected line. Input the details to insert on the Instruction Input Window.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	Comment	comment						
1	1	LOAD	M00100						
	2	MPUSH							
	3	AND	F00090						
	4	MOV hFFEE P0000							
	6	MLOAD							
	7	MOV4	hF	P00004					
	10	MLOAD							
	11	OUT	P00000						
	12	MPOP							
	13	OUT	P00010						
2	14	END							

4. After the input, press Enter key to insert the instruction and operand in the selected line and move the details of the existing line to the next line then to create the Instruction Input Window.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	Comment	comment						
1	1	LOAD	M00100						
	2	MPUSH							
	3	AND	F00090						
	4	MOV	hFFEE	P0010					
	6	MLOAD							
	7	MOV4	hF	P00004					
	10	MLOAD							
	11	OUT	P00000						
	12	MPOP							
	13	OUT	P00010						
2	14	END							

Notes

- On the left bottom of the XG5000 program, the present mode is displayed.

NewPLC	Offline				Inser
NewPLC	Offline				Over
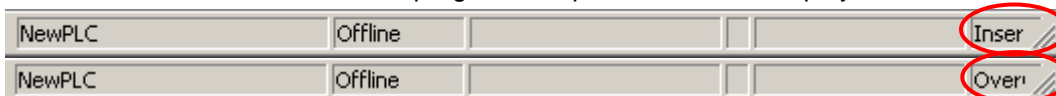
- When the last line of the program is edited, the operation is always in Insert mode.

- Overwrite/Insert mode is available only for Instruction Input (6.2.2) and Application Instruction Input (6.2.3). Rung Comment Input (6.2.4) and Paste (6.2.8) operate always in Insert mode only.

6.2.2 Input Instruction

This is used to input the instruction or application instruction in the IL editor.

[Sequence]

1. Select the line to input in.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	M00001						
	1	OUT	P00002						
1	2	LOAD	M00003						

2. Press Enter key to create the Instruction Input Window on the selected line.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	M00001						
	1	OUT	P00002						
1	2	LOAD	M00003						

3. Input the instruction and operand on the Instruction Input Window.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	M00001						
	1	OUT	P00002						
1	2	LOAD	M00003						
			mov m2 p2						

4. Press Enter key to input the instruction and operand in the applicable line and to create the Instruction Input Window right on the next line.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	M00001						
	1	OUT	P00002						
1	2	LOAD	M00003						
	3	MOV	M0002	P0002					

Notes

- The space between instruction and operand and between operand and operand should be classified with the characters of SPACE.
- Inputting the instruction on the Instruction Input Window will automatically create the instructions list starting with the character input. Select a desired instruction from the instructions list and then press Enter key for the selected instruction automatically to enter the Instruction Input Window.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	D00002.2						
	1	MPUSH							
	2	lo							
	3	**LOAD**		P0000					
	5	LOAD NOT							
	6	LOAD$<		P00004					
	9	LOAD$<=							
	10	LOAD$<>							
	11	LOAD$=							

- Whenever the selected line is edited, the rung in which the selected line is included will be checked if or not.
- Only the complete rung will be saved in IL. In other words, any rung in error will not be saved when the program is saved or XG5000 is ended.
- If any rung in error is included, conversion to LD will not be allowed.

6.2.3 Input Application Instruction

This is used to input the application instruction and operand in the IL editor.

The application instruction can be input through 2 routes; One is as specified in 6.2.1, the other is through [Edit]-[Application Instruction].

[Sequence]

1. Select the line to input in.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	M00001						
	1	OUT	P00002						
1	2	LOAD	M00003						

2. Select [Edit] - [Application Instruction] on the menu.

3. Input the application instruction and operand.

Rung	Step	instruction	OP 1					OP 6	
0	0	LOAD	D00002.2						
	1	MPUSH							
	2	AND	F00090						
	3	MOV	hFFEE						
	5	MLOAD							
	6	MOV4	hF						
	9	MLOAD							
	10	OUT	P00000						
	11	MPOP							
	12	OUT	P00010						
1	13	END							

Instruction [?][x]

Instruction: [MLOAD] [▼]

[Variables (Ins.)]

Category: Instruction

Whole	MAX
Basic Command	MAXP
BCD arithmetic	MCS
BCD/BIN Conversion	MCSCLR
BIN arithmetic	MID
Communication	MIDP
Compare	MIN
Conditional jump	MINP
Data Control	MLOAD
Data Processing	MOF

Usage:

Category: Basic Command

Format: MLOAD

[Command Help] [OK] [Cancel]

4. Click [OK] to input the instruction and operand in the applicable line and to create the Instruction Input Window right on the next line.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	D00002.2						
	1	MPUSH							
	2	AND	F00090						
	3	MOV	hFFEE	P0000					
	5	MLOAD							
	6								

Notes

- In order to input the String constant like $MOV as an operand, attach small quotation marks to the String as shown below;

    Ex.) $MOV 'Kanada' m1

6.2.4 Input Rung Comment

It is used to input the rung comment.

[Sequence]

1. Select the line to input in.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	M00001						
	1	OUT	P00002						
1	2	LOAD	M00003						
	3	MOV	M0002	P0002					

2. Select [Edit]-[Insert Comment] and then input the details of the rung comment.
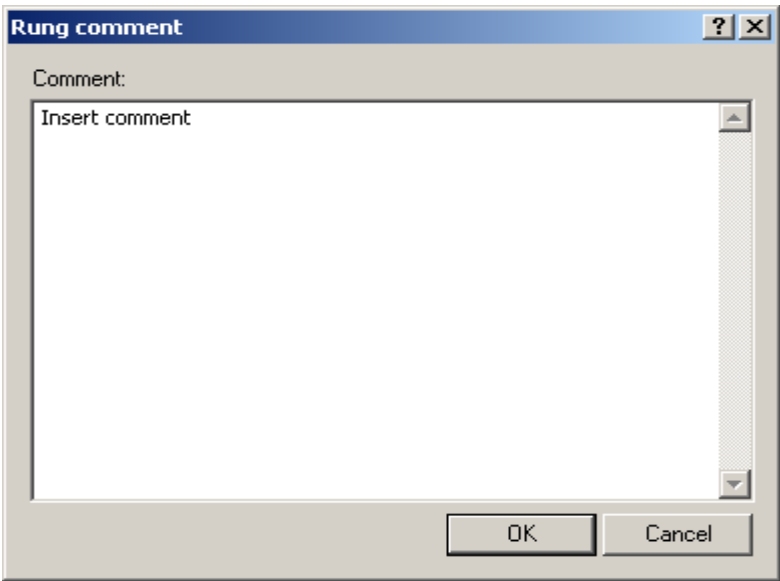
3. Click [OK] to input the rung comment in the applicable line.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	M00001						
	1	OUT	P00002						
1	2	LOAD	M00003						
	3	MOV	M0002	P0002					
2	5	Comment	Insert commnet						

Notes

- The rung comment will be positioned always at the first of the rung. Even if the rung comment is input in the middle of the lines of the rung, it will be automatically positioned at the first line of the rung.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	M00001						
	1	AND	M00002						
	2	OUT	P00002						
1	3	LOAD	M00003						
	4	MOV	M0002	P0002					

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	Comment	Rung Comment						
1	1	LOAD	M00001						
	2	AND	M00002						
	3	OUT	P00002						
2	4	LOAD	M00003						
	5	MOV	M0002	P0002					

6.2.5 Change Instruction

This is used to change the instruction and operand prepared previously.

[Sequence]

1. Select the line to change.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	9	LOAD	M00013						
	10	OUT	P00064						
2	11	LOAD NOT	F00000						
	12	AND	F0009B						
	13	OR	M00012						
	14	OR	M00066						
	15	AND NOT	P0001D						
	16	AND NOT	P00009						
	17	AND NOT	T0019						
	18	OUT	M00012						

2. Press Enter key to create the Instruction Input Window on the selected line. The existing instruction and operand will be displayed on the Instruction Input Window.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	9	LOAD	M00013						
	10	OUT	P00064						
2	11	LOAD NOT F00000							
	12	AND	F0009B						
	13	OR	M00012						
	14	OR	M00066						
	15	AND NOT	P0001D						
	16	AND NOT	P00009						
	17	AND NOT	T0019						
	18	OUT	M00012						

3. Change the instruction and operand on the Instruction Input Window.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	9	LOAD	M00013						
	10	OUT	P00064						
2	11	LOAD F00011							
	12	AND	F0009B						
	13	OR	M00012						
	14	OR	M00066						
	15	AND NOT	P0001D						
	16	AND NOT	P00009						
	17	AND NOT	T0019						
	18	OUT	M00012						

4. Press Enter key to input the instruction and operand in the applicable line and to create the Instruction Input Window right on the next line.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	9	LOAD	M00013						
	10	OUT	P00064						
2	11	LOAD	F00011						
	12	AND F0009B							
	13	OR	M00012						
	14	OR	M00066						
	15	AND NOT	P0001D						
	16	AND NOT	P00009						
	17	AND NOT	T0019						
	18	OUT	M00012						

6.2.6 Insert Line

It is used to insert an empty line in the selected line.

[Sequence]

1. Select the line to insert in.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
1	9	LOAD	M00013						
	10	AND	M00022						
	11	OUT	P00064						
2	12	LOAD	M00012						
	13	TON	T0019	450					
3	15	LOAD	M00066						
	16	OR	M00067						
	17	AND NOT	P00034						
	18	OUT	M00067						
4	19	END							

2. Select [Edit]-[Insert Line].

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
1	9	LOAD	M00013						
	10	AND	M00022						
	11	OUT	P00064						
2	12	LOAD	M00012						
	13	TON	T0019	450					
3	15	LOAD	M00066						
	16	OR	M00067						
	17	AND NOT	P00034						
	18	OUT	M00067						
4	19	END							

6.2.7 Delete Line

This function is used to delete the instruction and operand previously input.

[Sequence]

1. Select the line to delete.
2. Select [Edit]-[Delete Line] on the menu.

Notes

- Insert Line and Delete Line will insert and delete as many a line as specified.
- The last line will not be available for Insert Line or Delete Line function.
- Delete Line will delete the selected line, regardless of instruction, rung comment or Block Mask instruction.
- The remaining line of the Block Mask instruction after its partial line is deleted, will be decided to exist or not, based on the start line (Block Mask or executable) of the rung it belong to..

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6
0	0	LOAD	F0009B					
	1	PUT	4	0	2	1		
	5	PUT	4	3	2	2		
1	Block ma	LOAD	M00013					
	Block ma	AND	M00022					
	Block ma	OUT	P00064					
2	9	LOAD	M00012					
	10	TON	T0019	450				
3	12	LOAD	M00066					
	13	OR	M00067					
	14	AND NOT	P00034					
	15	OUT	M00067					
4	16	END						

After the line is deleted.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
	9	OUT	P00064						
1	10	LOAD	M00012						
	11	TON	T0019	450					
2	13	LOAD	M00066						
	14	OR	M00067						
	15	AND NOT	P00034						
	16	OUT	M00067						
3	17	END							

6.2.8   Paste, Copy, Cut

These functions are used to select one or more lines to copy, cut and paste on a desired position.

Cut is used to delete the presently selected lines. However, Copy does not delete any selected line.

1) Cut

[Sequence]

1. Select the lines to cut.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
1	9	LOAD	M00013						
	10	AND	M00022						
	11	OUT	P00064						
2	12	LOAD	M00012						
	13	TON	T0019	450					
3	15	LOAD	M00066						
	16	OR	M00067						
	17	AND NOT	P00034						
	18	OUT	M00067						
4	19	END							

2. Select [Edit]-[Cut] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
1	9	LOAD	M00012						
	10	TON	T0019	450					
2	12	LOAD	M00066						
	13	OR	M00067						
	14	AND NOT	P00034						
	15	OUT	M00067						
3	16	END							

2) Copy

[Sequence]

1. Select the lines to copy.

2. Select [Edit]-[Copy] on the menu.

3) Paste

[Sequence]

1. Select the line to paste on.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
1	9	LOAD	M00012						
	10	TON	T0019	450					
2	12	LOAD	M00066						
	13	OR	M00067						
	14	AND NOT	P00034						
	15	OUT	M00067						
3	16	END							

2. Select [Edit]-[Paste] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
1	9	LOAD	M00012						
	10	TON	T0019	450					
2	12	LOAD	M00066						
	13	OR	M00067						
	14	AND NOT	P00034						
	15	OUT	M00067						
3	16	LOAD	F00011						
	17	AND	F0009B						
	18	OR	M00012						
	19	OR	M00066						
	20	AND NOT	P0001D						
	21	AND NOT	P00009						
	22	AND NOT	T0019						
	23	OUT	M00012						
4	24	END							

6.2.9　Undo/ Redo

This is used to cancel the details edited previously or execute again the details cancelled.

1) Undo

1.Select [Edit]-[Undo] on the menu.

2) Redo

1.Select [Edit]-[Redo] on the menu.

Notes
－ Undo/Redo is available for Instruction Input, Comment Input, Delete, Change, Cut/Paste, Device Change, String Change and Block Mask Instruction Set/Reset.

6.3 Program View

It is used to change the magnification of IL program, or to see the user defined operand in various ways.

6.3.1 Change Program Magnification

It is used to change the magnification so to adjust the size of the IL program displayed on the screen.

1) Zoom-In

[Sequence]

1. Select [View]-[Zoom-in] on the menu.

2) Zoom-Out

[Sequence]

1. Select [View]-[Zoom-Out] on the menu.

Notes
– Ctrl + Downward wheel scroll if available performs Zoom-In step by step, and Ctrl + Upward wheel scroll performs Zoom-Out step by step.   – On the View Tool selection box, the user can select or directly input the magnification. Refer to 2.2 Tool Box in Chapter 2 Basic Application for more details.

6.3.2 View Device

This function is used to display only the device of the operand.

[Sequence]

Select [View]-[Devices] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	(
0	0	LOAD	F0009B						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
1	9	LOAD	M00012						
	10	TON	T0019	450					
2	12	LOAD	M00066						
	13	OR	M00067						
	14	AND NOT	P00034						
	15	OUT	M00067						
3	16	END							

6.3.3 View Variable

This function is used to display the variable if the operand is declared as the variable and the device if not declared as the variable in the IL editor.

[Sequence]

Select [View]-[Variables] on the menu.

Rung	Step	instruction	OP 1 variable	OP 2 variable	OP 3 variable	OP 4 variable	OP 5 variable	OP 6 variable	OP 7
0	0	LOAD	_1ON						
	1	PUT	4	0	1	2			
	5	PUT	4	5	2	2			
1	9	LOAD	M00012						
	10	TON	T0019	450					
2	12	LOAD	M00066						
	13	OR	M00067						
	14	AND NOT	P00034						
	15	OUT	M00067						
3	16	END							

6.3.4 View Device, Variable

This function is used to display both the device and the declared variable of the operand in the IL editor.

[Sequence]

Select [View]-[Devices/Variables] on the menu.

Rung	Step	instruction	OP 1	OP 1	OP 2	OP 2	OP 3	OP 3	OP 4
0	0	LOAD	F0009B	_1ON					
	1	PUT	4		0		1		2
	5	PUT	4		5		2		2
1	9	LOAD	M00012	AutoDrive					
	10	TON	T0019		450				
2	12	LOAD	M00066	ForCmd					
	13	OR	M00067						
	14	AND NOT	P00034						
	15	OUT	M00067						
3	16	END							

6.3.5 View Device, Comment

This function is used to display both the device and the device comment of the operand in the IL editor.

[Sequence]

Select [View]-[Devices/Comments] on the menu.

Rung	Step	instruction	OP 1	OP 1 comm	OP 2	OP 2	OP 3	OP 3	OP 4
0	0	LOAD	F0009B	1 scan ON					
	1	PUT	4		0		1		2
	5	PUT	4		5		2		2
1	9	LOAD	M00014	Auto Driving					
	10	TON	T0019		450				
2	12	LOAD	M00064	Accept Comparing					
	13	OR	M00067	Start					
	14	AND NOT	P00034	HEAD UP					
	15	OUT	M00067	Start					
3	16	END							

6.4 Additional Edit Function

6.4.1 Block Mask Instruction

This is used to specify or cancel the line which dose not need to be executed in PLC. If it may be necessary later even though not right now, let it specified as the Block Mask instruction for the sake of convenience.

1) Block Mask Instruction Setting

[Sequence]

1. Select the line (rung) to specify the Block Mask instruction.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	9	LOAD	M00013						
	10	OUT	P00064						
2	11	LOAD	M00012						
	12	TON	T0019	450					
3	14	LOAD	M00066						
	15	OR	M00067						
	16	AND NOT	P00034						
	17	OUT	M00067						
4	18	LOAD	F00011						
	19	AND	F0009B						
	20	OR	M00012						
	21	OR	M00066						
	22	AND NOT	P0001D						
	23	AND NOT	T0019						
	24	OUT	M00012						
5	25	END							

2. Select [Edit]-[Set Block Mask Instruction] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP
0	0	LOAD	F0009B						
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	Block ma	LOAD	M00013						
	Block ma	OUT	P00064						
2	9	LOAD	M00012						
	10	TON	T0019	450					
3	12	LOAD	M00066						
	13	OR	M00067						
	14	AND NOT	P00034						
	15	OUT	M00067						
4	16	LOAD	F00011						
	17	AND	F0009B						
	18	OR	M00012						
	19	OR	M00066						
	20	AND NOT	P0001D						
	21	AND NOT	P00009						
	22	AND NOT	T0019						
	23	OUT	M00012						
5	24	END							

2) Remove Block Mask Instruction

[Sequence]

1. Select the line to cancel the Block Mask instruction.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP
0	0	LOAD	F0009B						
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	Block ma	LOAD	M00013						
	Block ma	OUT	P00064						
2	9	LOAD	M00012						
	10	TON	T0019	450					
3	12	LOAD	M00066						
	13	OR	M00067						
	14	AND NOT	P00034						
	15	OUT	M00067						
4	16	LOAD	F00011						
	17	AND	F0009B						
	18	OR	M00012						
	19	OR	M00066						
	20	AND NOT	P0001D						
	21	AND NOT	P00009						
	22	AND NOT	T0019						
	23	OUT	M00012						
5	24	END							

2. Select [Edit] - [Remove Block Mask] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	9	LOAD	M00013						
	10	OUT	P00064						
2	11	LOAD	M00012						
	12	TON	T0019	450					
3	14	LOAD	M00066						
	15	OR	M00067						
	16	AND NOT	P00034						
	17	OUT	M00067						
4	18	LOAD	F00011						
	19	AND	F0009B						
	20	OR	M00012						
	21	OR	M00066						
	22	AND NOT	P0001D						
	23	AND NOT	T0019						
	24	OUT	M00012						
5	25	END							

Notes

– Block Mask Instruction Set/Reset operates in rung unit. Namely, the whole rung including the selected line will be set or cancelled.

6.4.2 Bookmark

This function is identical to the Book Leaf function. If a bookmark is specified in a specific line, fast and easy movement will be available from other line to the location with the bookmark specified.

1) Bookmark Set/Reset

[Sequence]

1. Select the line to specify (Reset) the bookmark.

2. Select [Edit]-[Bookmark]-[Set/Reset] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	9	LOAD	M00013						
	10	OUT	P00064						
2	11	LOAD	M00012						
	12	TON	T0019	450					
3	14	LOAD	M00066						
	15	OR	M00067						
	16	AND NOT	P00034						
	17	OUT	M00067						
4	18	LOAD	F00011						
	19	AND	F0009B						
	20	OR	M00012						
	21	OR	M00066						
	22	AND NOT	P0001D						
	23	AND NOT	T0019						
	24	OUT	M00012						
5	25	END							

Notes
- Bookmark Set/Remove will be repeatedly set and cancelled whenever selected.

2) Bookmark Reset All

[Sequence]

1. Select [Edit]-[Bookmark]-[Reset All] on the menu.

[Previous Bookmark Sequence]

This function is used to go to the bookmark line specified in front of the present line, based on the presently selected line.

1. Select [Edit]-[Bookmark]-[Previous Bookmark] on the menu.

[Next Bookmark Sequence]

This function is used to go to the bookmark line specified at the back of the present line, based on the presently selected line.

1. Select [Edit]-[Bookmark]-[Next Bookmark] on the menu.

6.5　Go To

This function is used to go to the applicable location of step, label or rung comment designated.

6.5.1　Go To Step

This function is used to go to the specific step designated.

[Sequence]

1. Select　　[Find/Replace]-[Go To]-[Step] on the menu.
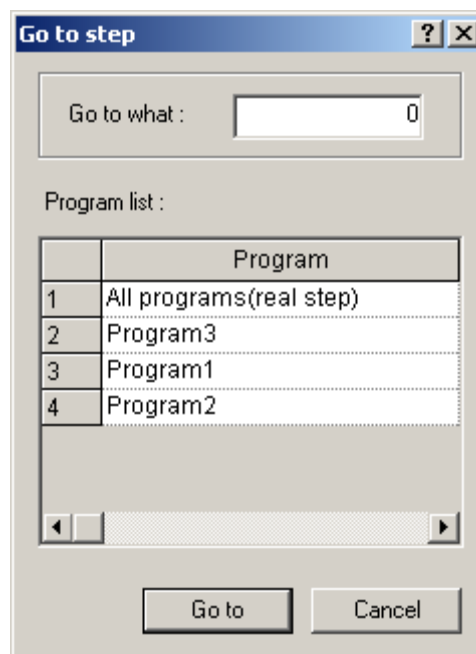
2. Select the program where the step to find is included, and then input the step to go to in [Go to what].

3. Click [Go To].

6.5.2 Go To Label

This function is used to go to the label prepared previously.

[Sequence]

1. Select [Find/Replace]-[Go To]-[Label].
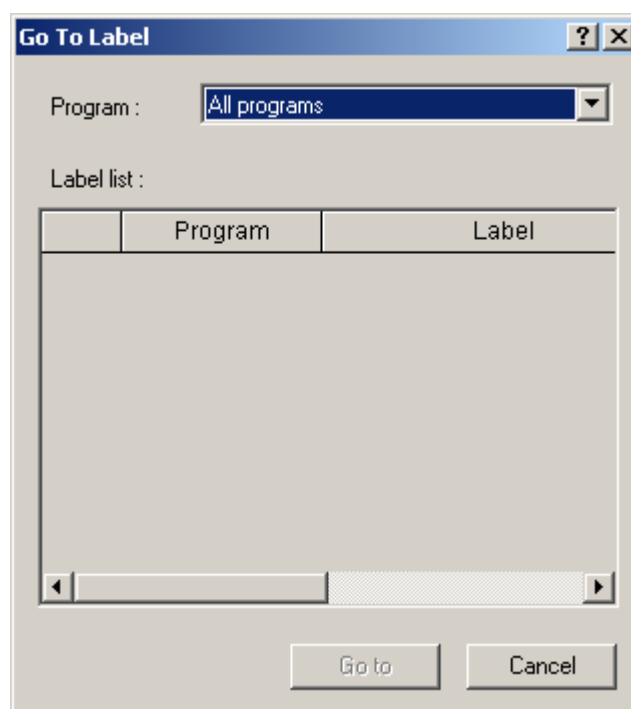
2. Select the program, and then select the label to go to on the labels list.

3. Click [Go To].

Rung	Step	instruction	OP 1	OP 1	OP 2	OP 2	OP 3	OP 3	OP 4
0	0	LOAD	F0009B	1 scan ON					
	1	PUT	4		0		1		2
	5	PUT	4		5		2		2
1	9	LOAD	M00014	Auto Driving					
	10	TON	T0019		450				
2	12	LABEL	ABCD						
3	17	LOAD	M00064	Accept Comparing					
	18	OR	M00067	Start					
	19	AND NOT	P00034	HEAD UP					
	20	OUT	M00067	Start					
4	21	END							

6.5.3 Go To Rung Comment

This function is used to go to the rung comment.

[Sequence]

1. Select [Find/Replace]-[Go To]-[Rung Comment] on the menu.

Go to rung comment

Program : All programs

Rung comment list :

	Program	Step	Comment
1	Program3	12	Rung Comment 1
2	Program1	14	Rung comment 2

Go to   Cancel
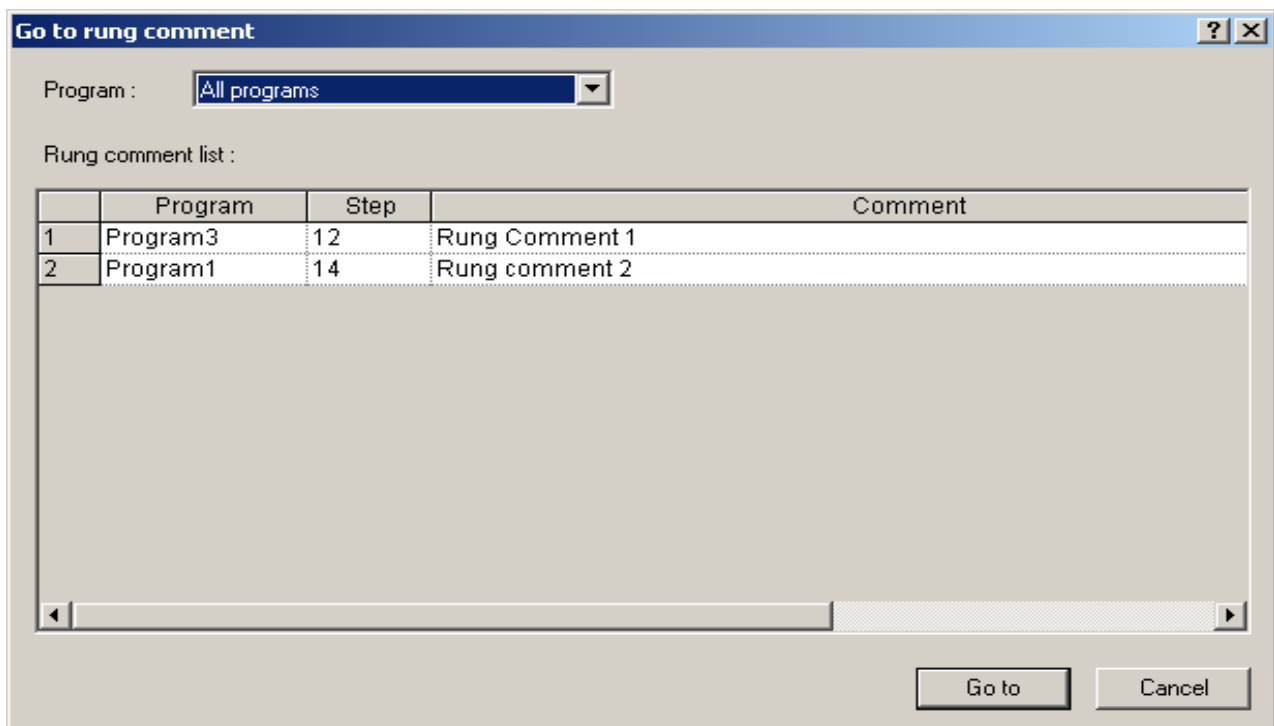
2. Select the program, and then select the rung comment to go to on the comments list.

3. Click [Go To].

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	
0	0	LOAD	F0009B						
	1	PUT	4	0	2	1			
	5	PUT	4	3	2	2			
1	9	LOAD	M00013						
	10	OUT	P00064						
2	11	LOAD	M00012						
	12	TON	T0019	450					
3	14	Comment	Rung comment 2						
4	15	LOAD	M00066						
	16	OR	M00067						
	17	AND NOT	P00034						
	18	OUT	M00067						
5	19	LOAD	F00011						

6.5.4 Go To END Instruction

This function is used to go to the END instruction.

[Sequence]

1. Select [Find/Replace]-[Go To]-[END Instruction] on the menu.
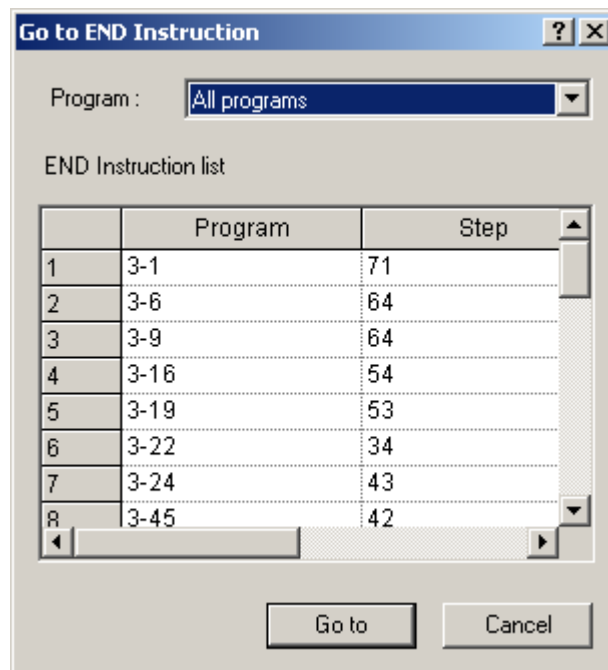
2. Select the program, and then select the END instruction to go to on the END instructions list.
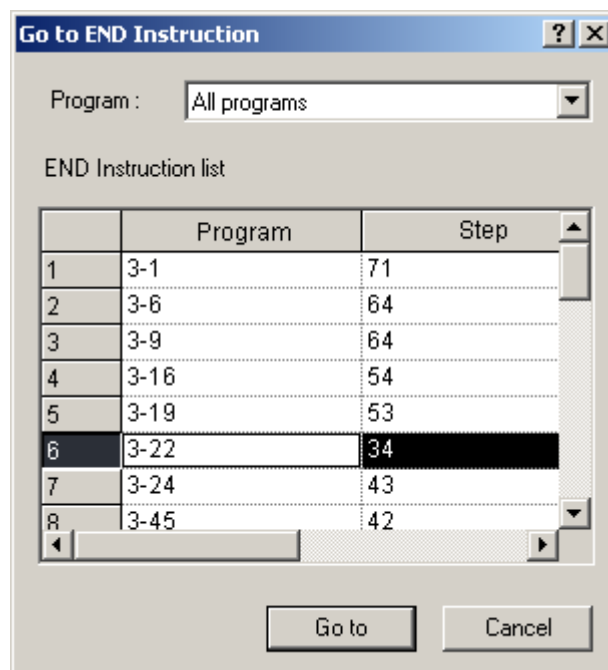
3. Click [Go To].

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6
0	0	LOAD	F00099					
	1	GET	4	h014A	M0100	23		
1	6	LOADP	M00000					
	8	AND	U04.00.0					
	9	AND	U04.00.2					
	10	CLR	4	0	1			
2	16	LOADP	M00008					
	18	AND	U04.00.0					
	19	AND NOT	U04.00.1					
	20	AND NOT	U04.00.2					
	21	ORG	4	0				
3	24	LOADP	M00005					
	26	AND	U04.00.0					
	27	AND NOT	U04.00.1					
	28	AND NOT	U04.00.2					
	29	IST	4	0	D00000			
4	34	END						

Chapter 7 Programming Convenience

7.1   Cross Reference

It is used to display the application details of all the devices used in the program. The devices include contact points (normally open contact point, normally closed contact point, positive-conversion detection contact point and negative-conversion detection contact point), coils (coil, reverse coil, positive-conversion detection coil and negative-conversion detection coil) and all the devices used as the operand of application instructions.
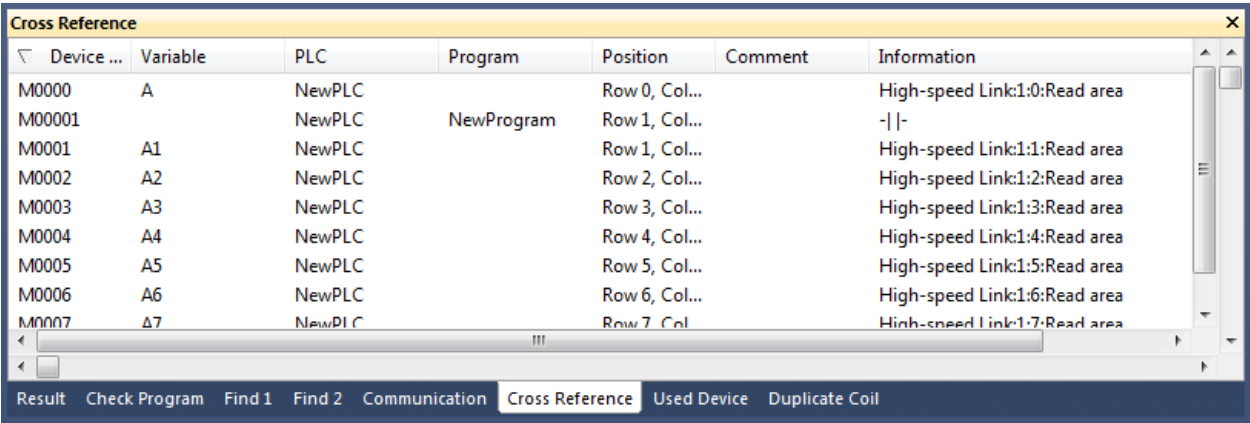
7.1.1   View All Device

It is used to display all the devices used in the present PLC.

[Steps]

1. Select [View] - [Cross Reference] on the menu.

[Cross Reference Window]

[Description of Cross Reference Window]

Column	Details
Device	Displays names of all the devices used in the present PLC.
PLC	Displays names of PLC belonging to the present program.
Program	Displays name of the program using the applicable device.
Position	Displays the coordinates inside the program.

Step	Displays the steps inside the program.
Type	The following signs are displayed for the type of instructions; -( )-: Coil -(/)-: Reverse coil -(S)-: Set coil -(R)-: Reset coil -(P)-: Positive-conversion detection coil -(N)-: Negative-conversion detection coil -| |-: Normally open contact point -|/|-: Normally closed contact point -|P|-: Positive-conversion detection contact point -|N|-: Negative-conversion detection contact point -[F]-: Application instruction
Instruction	Displays the application instruction used and the sequence of the operand if used as the operand of an application instruction.
Variable	Displays the variable name if a variable is declared for the device.
Comment	Displays the description if the description is input for the device.

1) Data Alignment

Click the column header to align the applicable column. Whenever the column is clicked, it will be aligned in the ascending and then descending sequence repeatedly. A triangle will be displayed on the basic column of the present alignment. The normal triangle means that the alignment is in the ascending sequence, and the reverse triangle means that the alignment is in the descending sequence.

Example.1) Alignment in the ascending sequence based on the device names

Example.2) Alignment in the descending sequence based on the device names

2) Find

It is used to go to the position of the program using the selected device. Double-click the applicable line, or click the right mouse button to select [Find] on the menu.
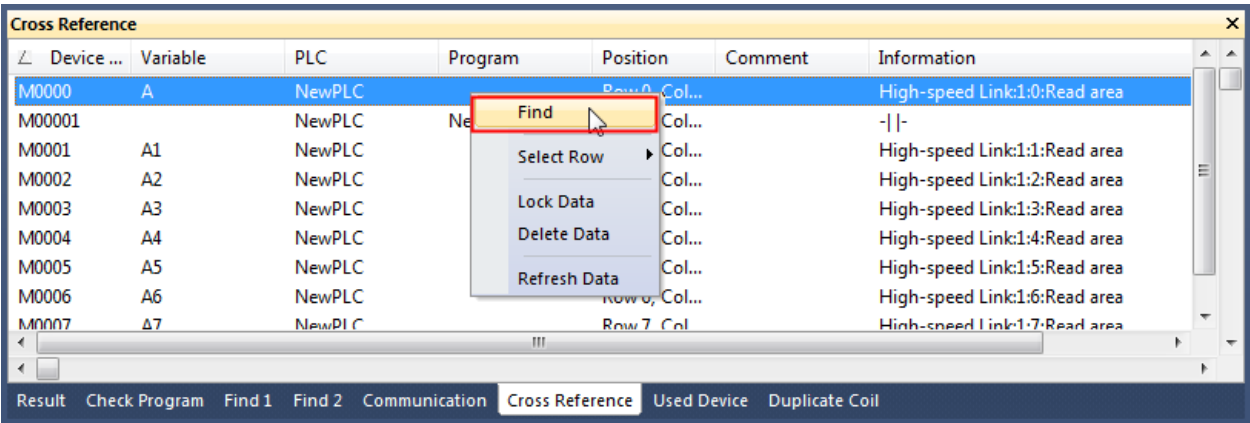
3) Select Row

It is used to display the desired data only on the screen. Click the right mouse button to select each item on the menu [Select Row].
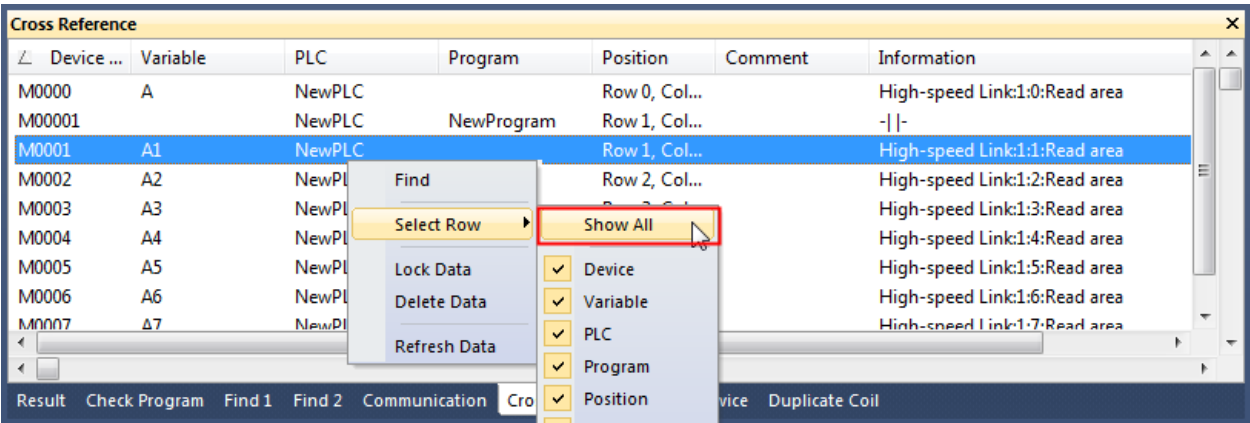
4) Lock Data

Details of the Cross Reference Window are updated when the cursor moves in the program. If you don't want to update them, specify the Fix function. Click the right mouse button to select [Lock Data].

5) Delete Data

It deletes all the details of the Cross Reference Window.

Notes
- It may take some time accordingly based on the number of devices used for aligning the data.

7.1.2 Output Cross Reference Instantly

If the device is selected in the program, the used step and the purpose will be displayed.

[Steps]

1. Select the Cross Reference tap to display the Cross Reference Result on.

2. Move the cursor to the position of the device to display the purpose of.

Notes

− If 'Output cross reference instantly' is used, the edit speed may get slow.
− Select [Tools]-[Options]-[Edit Ladder/Mnemonic], on the LD/IL Edit page to apply 'Output cross reference instantly' function.

Edit

☑ Output cross reference instantly

    ☑ Check duplicate coil instantly
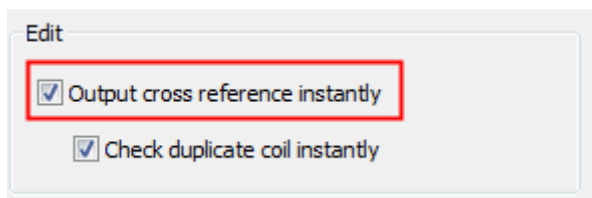
- Refer to 7.1.4 for details on the Cross Reference Window.

7.1.3　Check Duplicated Coil Instantly

It is used to inspect the applicable device if used as duplicated whenever the coil is edited. If the device is used as a coil in a different location inside PLC, the list for the program name, location and step will be displayed.

[Steps]

1. Add a coil.
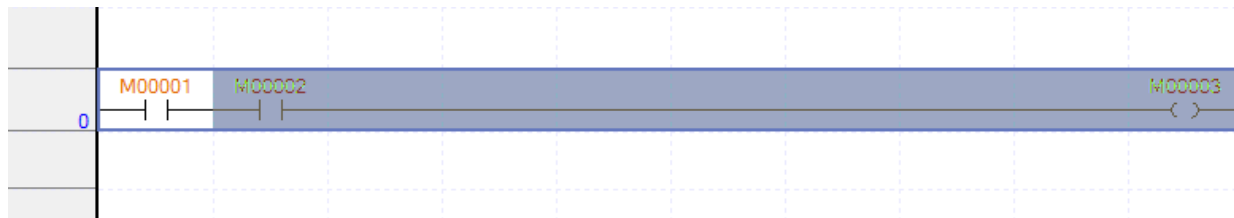
2. Select and copy the line the applicable coil is included in to move to the next line to paste on.
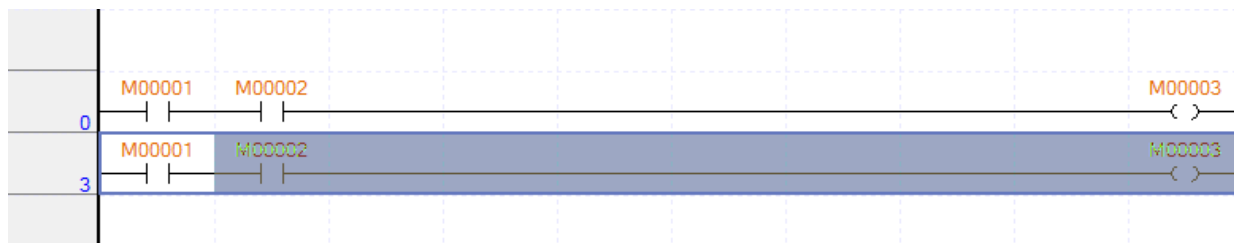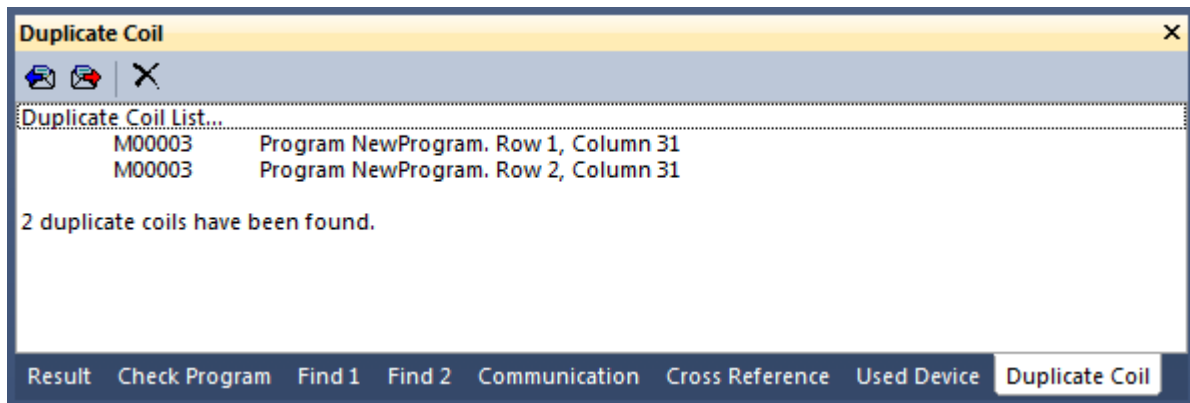
Notes

– 'If 'Check duplicated coil instantly' is used, the edit speed may get slow.

– Select [Tools]-[Options]-[Edit Ladder/Mnemonic], on the LD/IL Edit page to apply 'Check duplicated coil instantly' function.

– 'Check duplicated coil instantly' inspects the coil and the reverse coil only.

7.2 Cross Reference of Selected Device

It displays the details of use of the devices selected from the program. Devices include contacts (normally open contacts, normally closed contacts, positive transition-sensing contacts, negative transition-sensing contacts) and coils(coils, reverse coils, positive transition-sensing coils, negative transition-sensing coils) and devices that are used as operand of the applied command.

7.2.1 Viewing the selected devices

For the devices selected in the program, it displays the device information that is currently used for the PLC.

1. Select the menu [View]-[Cross Reference of Selected Device].

7.3 Used Device

It shows all the devices used in the program (LD, IL). The devices used in each device area will be displayed as classified into input and output.

[Description of Window]

Device	WORD		BIT		F		E		D		C		B		A		9		8		7		6		5		4		3		2		1		0	
	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O	I	O
P0001									1																											
P0003																											2									
P0006																							1													
M0001																							1				1		3		1					
M0006																					2		2		2		1									
F0001																																	1			
F0009											3																									
T0019	3	1																																		

a. Device Display: displays each device used in the program in Word unit. # device, index device, and # index device are not displayed.

b. Word Column: used to display the number of the applicable words used in the program.

c. Bit Column: used to display the number of the applicable bit devices used in the program. The devices of S area, T area and C area are displayed.

d. Bit Area: used to display the bit area of the devices displayed in Word unit as divided into hexadecimal bit unit.

e. I/O classification: used to display the number of the applicable bit devices as classified into input(I) and output(O).

7.2.1 Execute Used Device

[Sequence]

1. Select [View]-[Used Device] on the menu.

[Dialog Box]
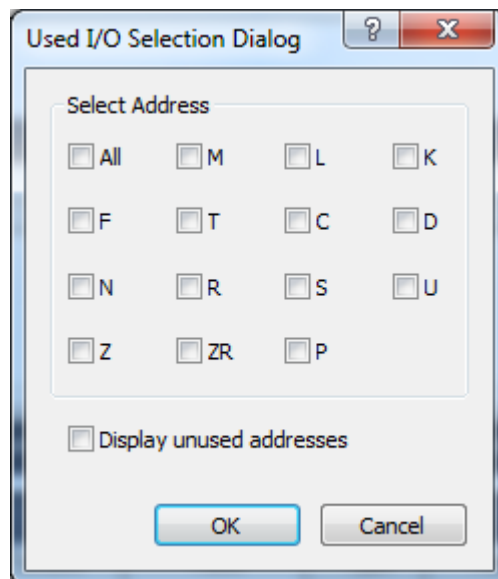
a.Select Area: you can select the device types to be displayed on the screen.

b.Display unused devices: Displays the whole address of the devices selected by [Select Device] or used device list only.

Notes
- Select [Update Used Device] on the context menu to display the used devices.
- After Used Device is executed, the details of the program if edited will not be automatically updated.

7.3.2 View Device Uses

Double-click the mouse on the cell where the used I/O figures are displayed, or click 'View Device Uses' on the context menu.

[Dialog Box]
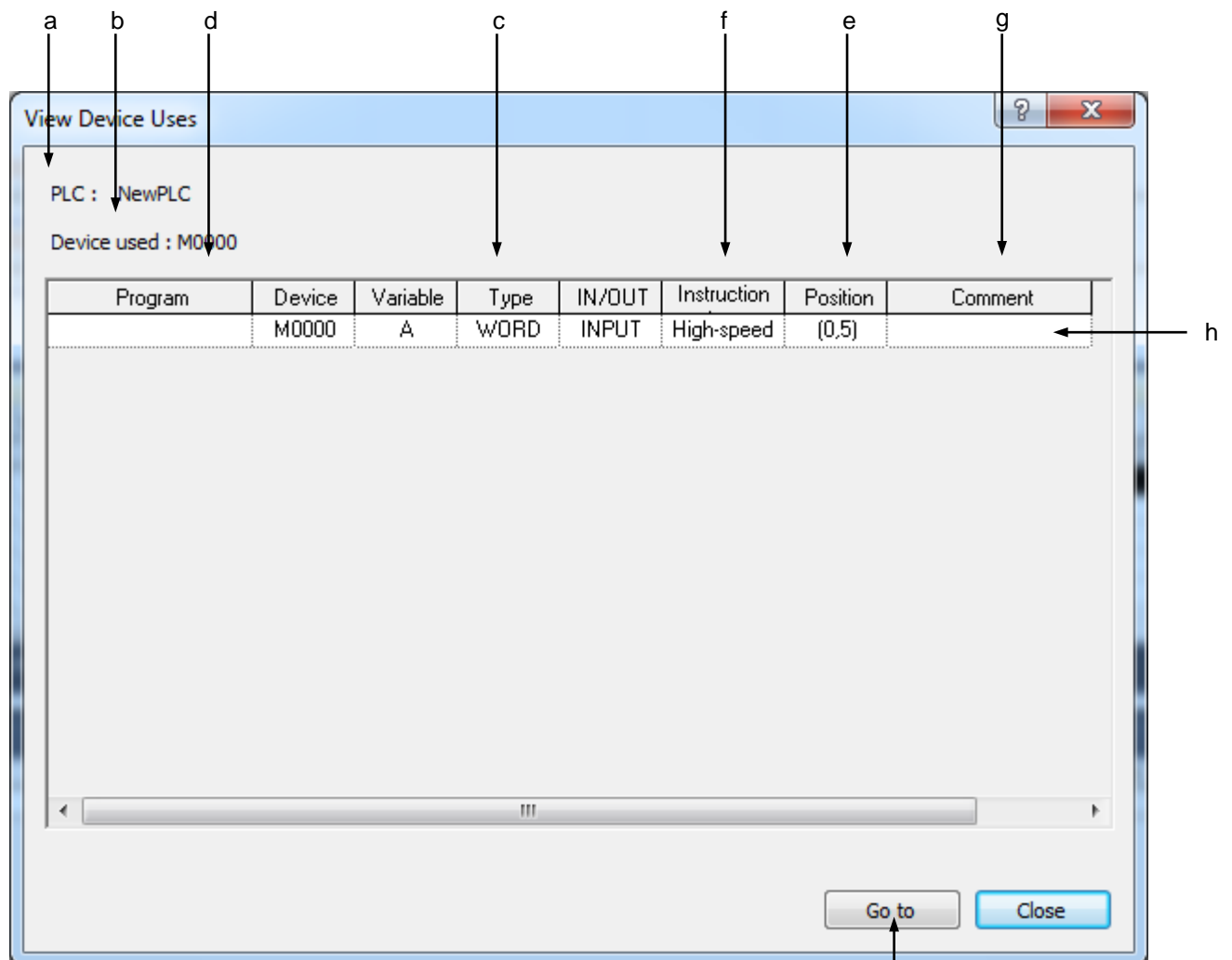
[Description of Dialog Box]

a. PLC: used to display the PLC name with the applicable device used.

b. Device used: It is the device that the Device Uses View dialog box shows.

c. Type: displays the device type.

d. Program: displays the program name with the applicable device used.

e. Step: displays the step position where the applicable device is used.

f. Instruction Type: shows for which instruction type of operand the applicable device is used. (displayed as identical as the instruction tool bar of LD editor)

g. Application Instruction: shows the sequence of the operand and its application instruction if the applicable device is used as the operand of the application instruction.

h. Select the line

i. Go To: used to go to the program with the selected line (device) used.

7.4   Check Program

This function is used to check the prepared LD program for errors. Inspection items are as follows;

- Logic Error: checks for LD connection errors.
- Grammar Error: checks for errors related with grammar used in SBRT/CALL, FOR/NEXT, etc.
- Duplicated Coil Error: checks for errors if output factors are used as duplicated.

7.4.1   Check Program Setting

[Sequence]

1. Select [View]-[Check Program] on the menu.

[Dialog Box]
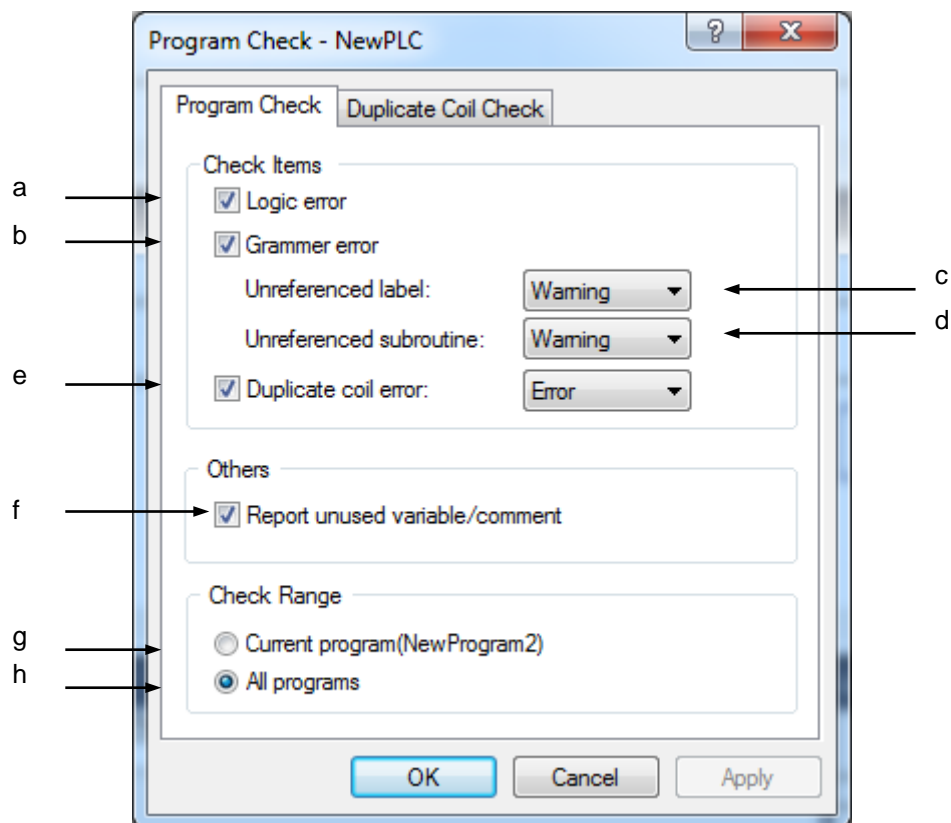
[Description of Dialog Box]

a. Logic Error: used to check for program's logic errors such as LD connection errors and short circuit.

b. Grammar Error: used to check for errors in application instructions such as CALL/SBRT, MCS/MCSCLR, etc.

c. Unreferenced label: used to specify the processing range of the declared label which was not used. [Ignore], [Warning] or [Error] can be selected.

> **Notes**
> - Ignore: used not to check for any error.
> - Warning: If any error occurs, [Warning] will be displayed on the Result Window and writing a program on PLC is available.
> - Error: If any error occurs, [Error] will be displayed on the Result Window and writing a program on PLC is unavailable.

d. Unreferenced subroutine: used to specify the processing range of the declared subroutine which was not used. [Ignore], [Warning] or [Error] can be selected.

e. Duplicated coil error: used to check for the Duplicated Coil error.

f. Duplicated coil Processing: used to select [Error] or [Warning] for the Duplicated Coil.

g. Current program (New Program): used to inspect the present program only.

h. All programs: used to inspect all the programs listed on the present PLC item.

> **Notes**
> - Refer to 7.3.3 and 7.3.4 for details on Logic Error and Grammar Error.
> - If the present program only is selected while one or more programs are listed on the present PLC item, inspection of CALL/SBRT will not be executed.
> - When writing a program on PLC, all the items other than the Duplicated Coil will be always inspected if specified or not by the user.

> **Notes**
> - In XGT series PLC, many a program can be added to the PLC item and the SBRT call is available between programs.
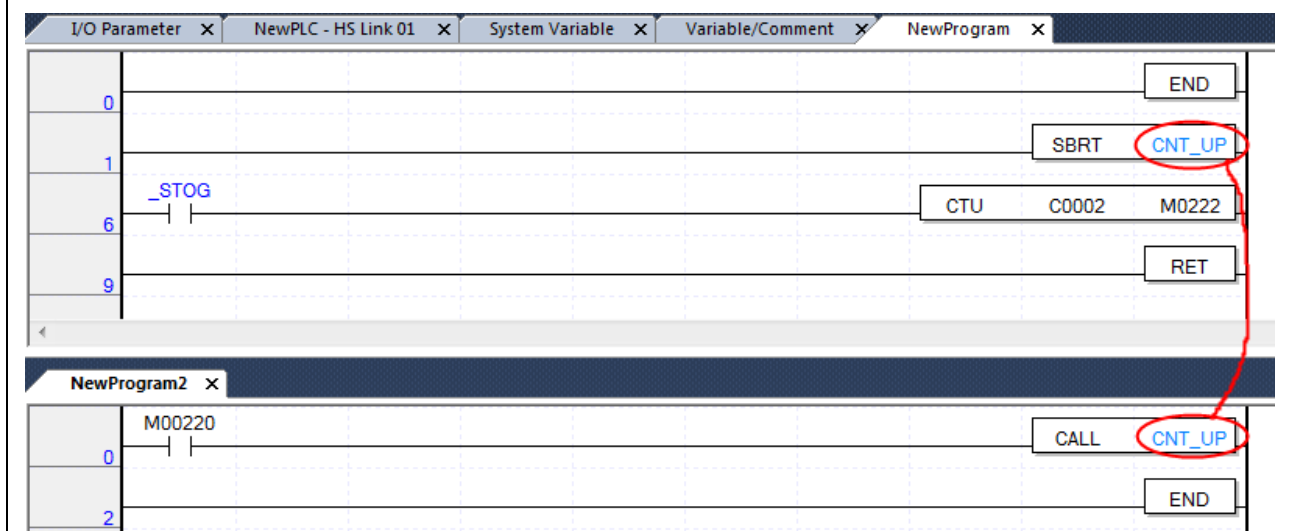
[Dialog Box]
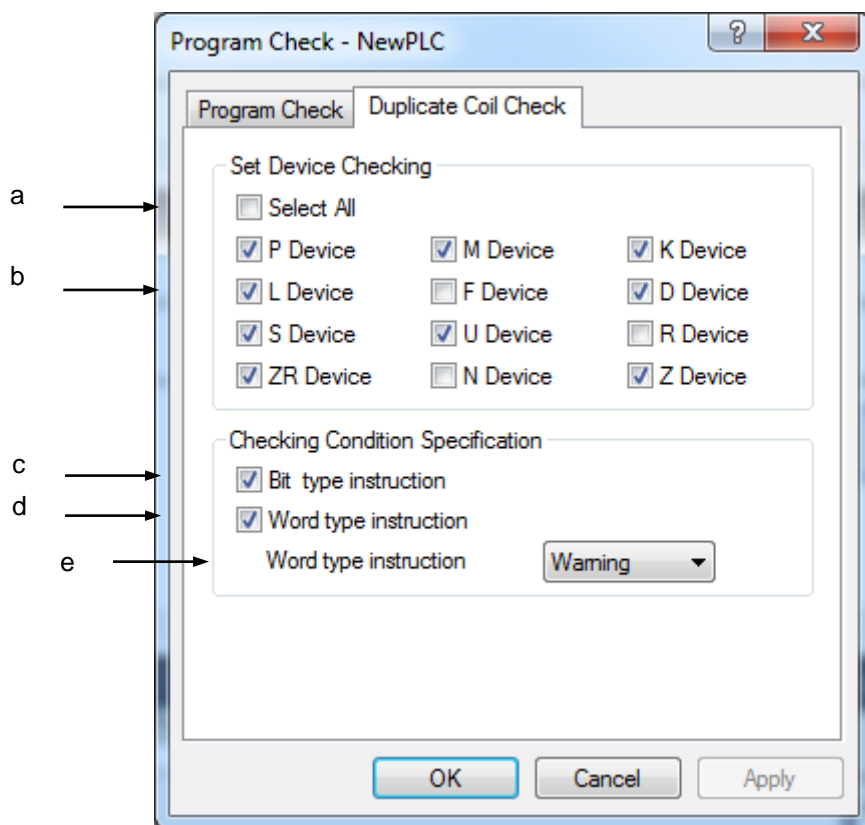
[Description of Dialog Box]

a. Select All: used to inspect all the devices areas.

b. Device Select: used to specify the device area to check for the Duplicated Coil.

c. Bit type instruction: used to inspect the operand of the bit type of application instructions.

d. Word type instruction: used to inspect the operand of the word type of application instructions.

e. Word type of application instructions to process: [Warning] or [Error] can be selected if the Duplicated Coil is checked in d above.
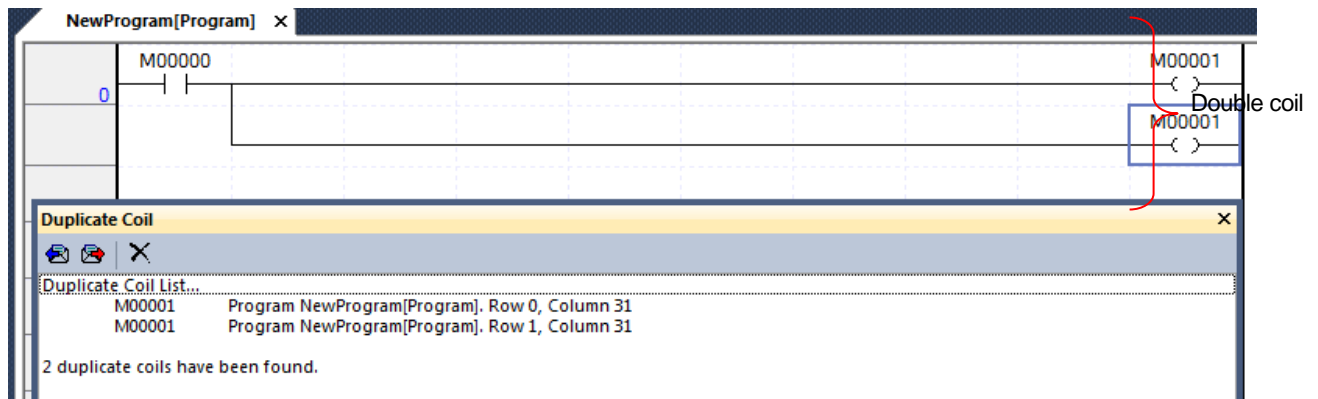
Notes

- Set coil (-(S)-) and Reset coil (-(R)-) are not the object to check for the Duplicated Coil.
- The range of "Check the word type of application instructions" depends on the data type of the output operand of application instructions. For example, since LMOV M0100 P0000 is an instruction to move the 4 words of M0100~M0103 to P0000~P0003 as shown below, the words of P0000~P0003 will be the range to check for the Duplicated Coil.
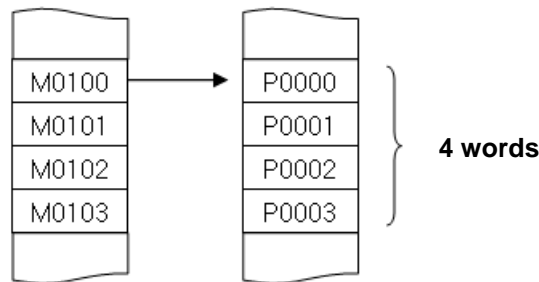
7.4.2 Check Result Trace

If any error occurs on the program, its details will be displayed on the Program Inspect tap of the message window. Double-click the error details to move to the location where the error occurs.
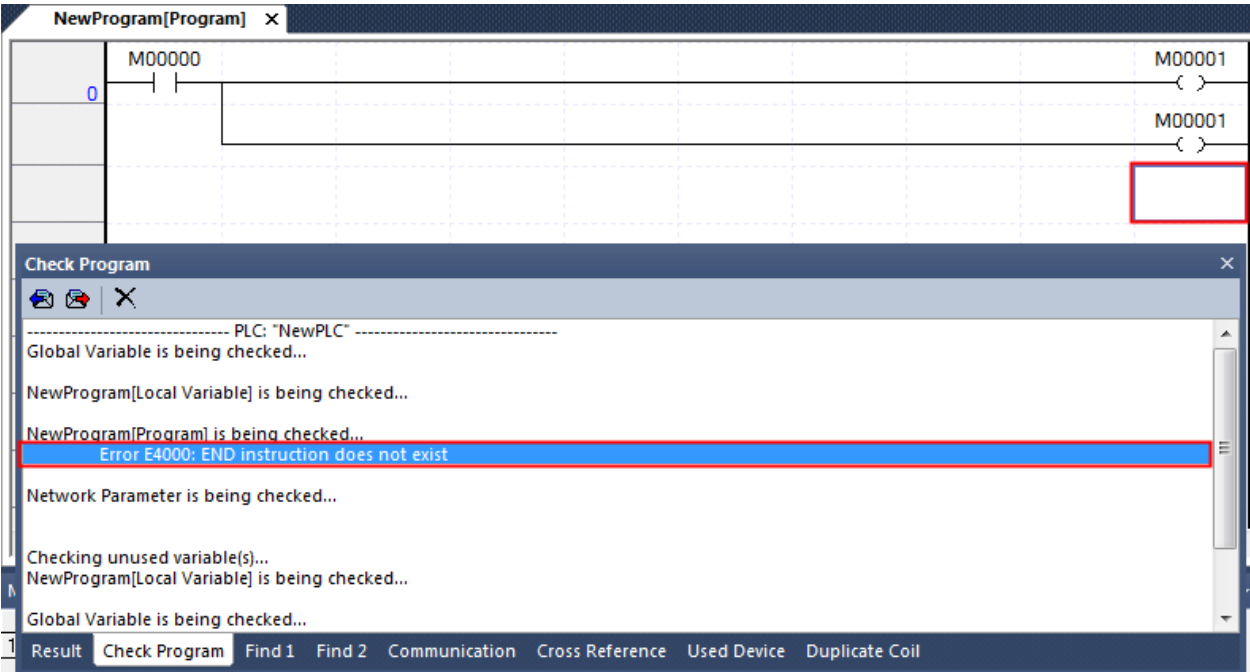
7.4.3 Logic Error

It is used to check for any logic error, and display its details and location if any occurs.

1) L0000: Input or output is not connected. This error will occur if the contact point is not connected with the power line.
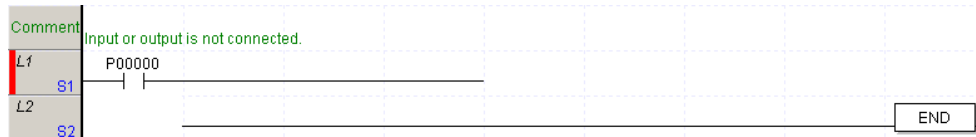
Action: Correct the LD program in order not to let input and output disconnected.
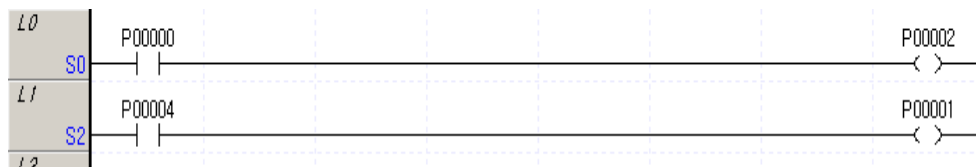
2) L0100: It is a short circuit. This error will occur if the area connected with OR is connected with the horizontal line without the contact point.
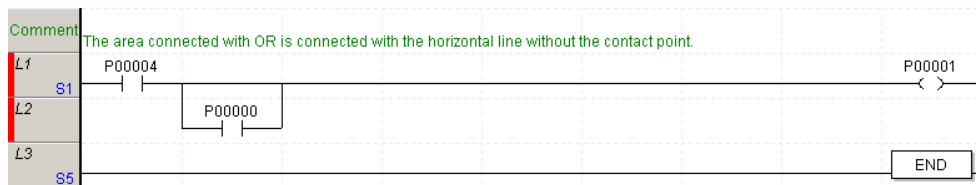
Action: Delete OR if the OR connection is not necessary any more, or input the contact point in the applicable location.

3) L0200: Device or variable is not input. This error will occur if the device or variable is not input in the contact point or coil.
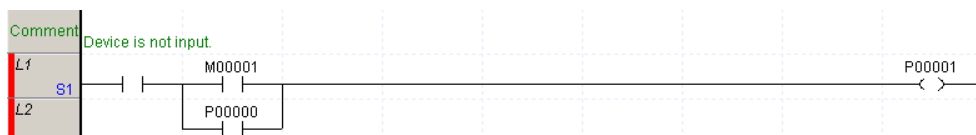
Action: Input a proper device in the contact point or coil where the error occurs.
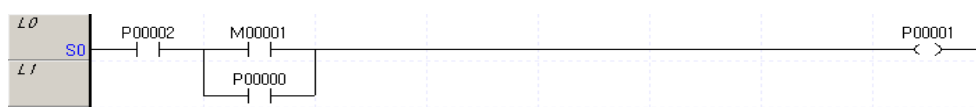
4) L0300: OR-LOAD incorrectly connected. This error will occur if OR-LOAD connected incorrectly.
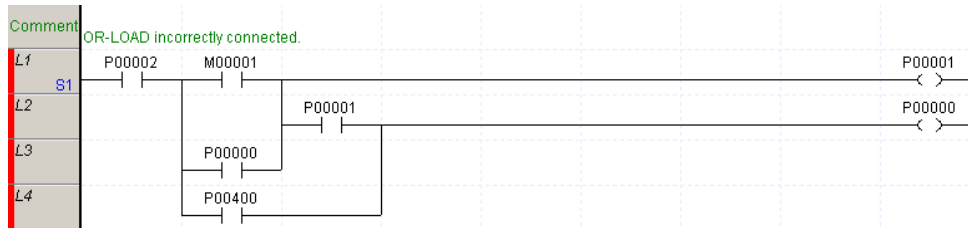
Action: Search for OR-LOAD incorrectly connected and then correct the LD program.
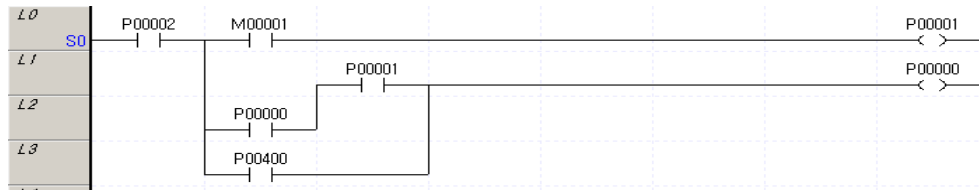
5) L0400: Specified number of contact points exceeded. This error will occur if the number of continuous LOAD instructions exceeds 32.
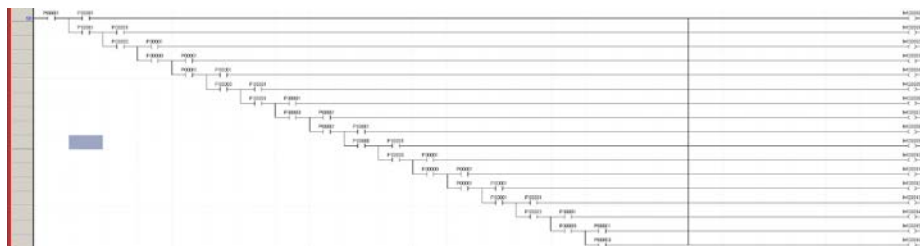
Action: Correct the LD program in order not to let the LOAD instructions exceed 32.

6) L0401: Incorrect input. This error will occur if the input necessary is nonexistent.
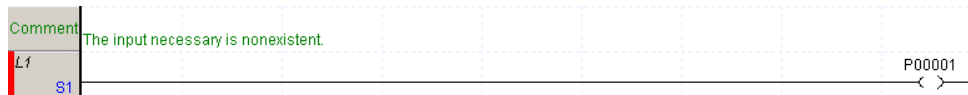
Action: Add the necessary input to the input terminal.
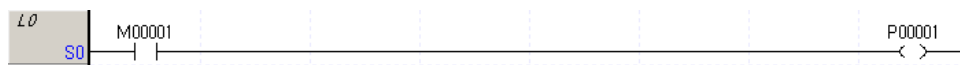
7) L0402: Incorrect input. This error will occur if the input unnecessary is existent.

Action: Delete the input unnecessary from the input terminal.

8) L0404: The maximum number of MPUSHs exceeded. This error will occur if the number of continuous MPUSH/MPOPs exceeds 16.
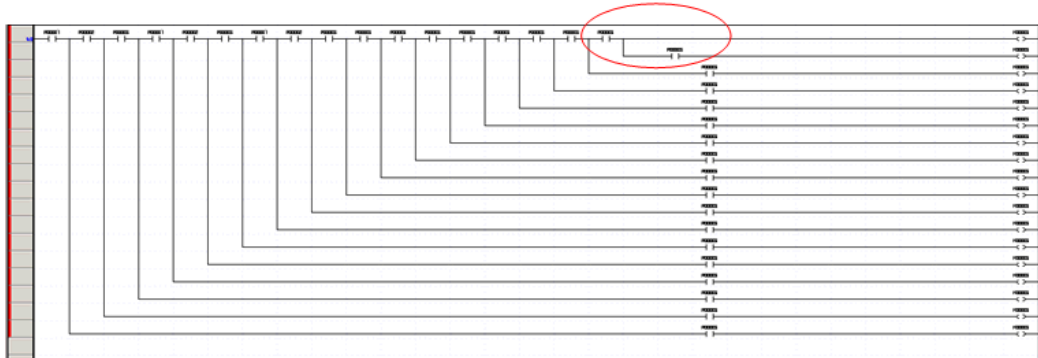
Action: Correct the LD program in order not to let the continuous MPUSH/MPOPs exceed 16.

9) L0406: Application instruction in error. This error will occur if the application instruction nonexistent in XGT series PLC is used.
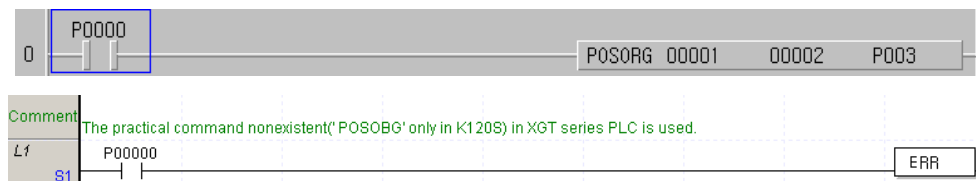
Action: Replace the instruction with the one provided by XGT series PLC.

Notes

- This error will occur if MK series PLC project file is converted to XGT project.

7.4.4 Grammar Error

This function is used to check for grammar-related errors generated when a application instruction is used.

1) E0001: MCS instruction duplicated. This error will occur if MCS number is duplicated.
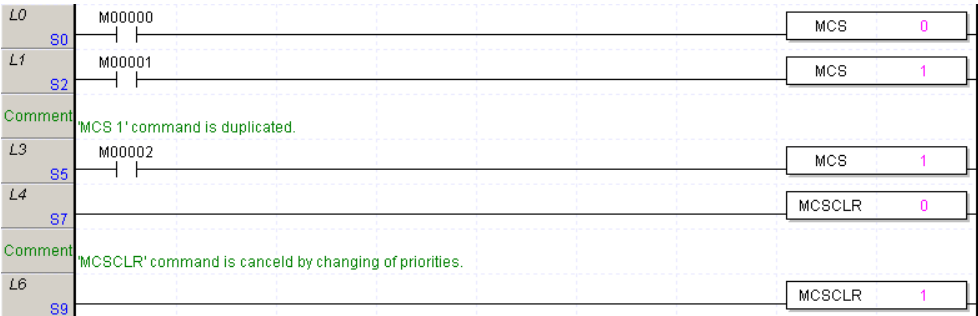
Action: Correct the duplicated MCS instruction, or add the correspondent MCSCLR instruction.

2) E0002: MCSCLR nonexistent or cancelled already. MCS instruction is singly used.
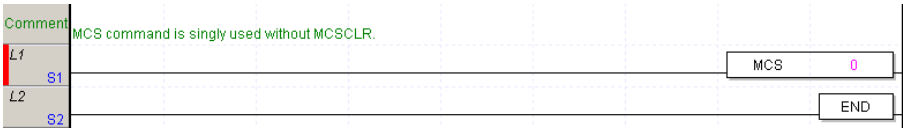
Action: Input the correspondent MCSCLR instruction.

3) E0003: MCS instruction nonexistent. MCSCLR instruction is singly used.
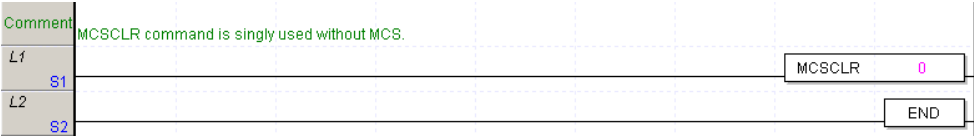
Action: Input the correspondent MCS instruction, or delete the MCSCLR instruction.

4) E1001: Label declared as duplicated. This error will occur if duplicated LABEL used.
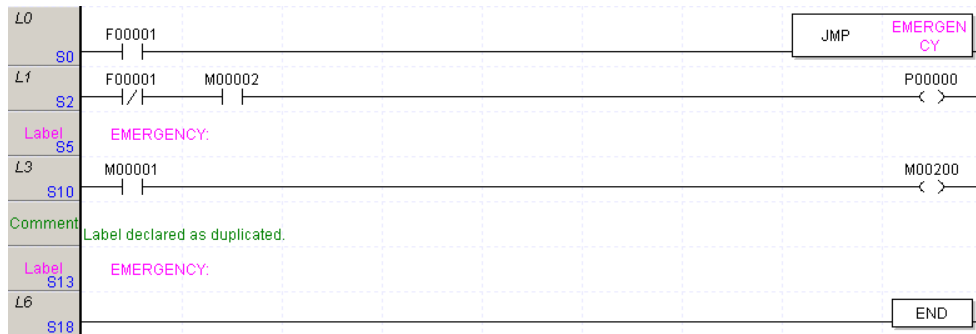
Action: Delete the duplicated label, or change the name of the label.

5) E1002: Label '*Label Name*' nonexistent. This error will occur if JMP is used to refer to the nonexistent label.
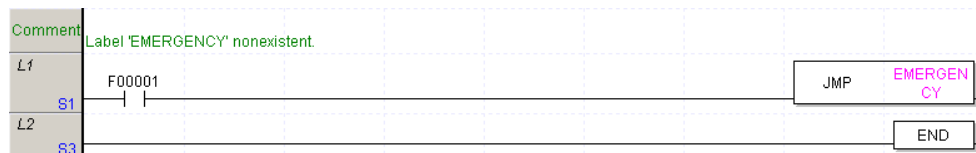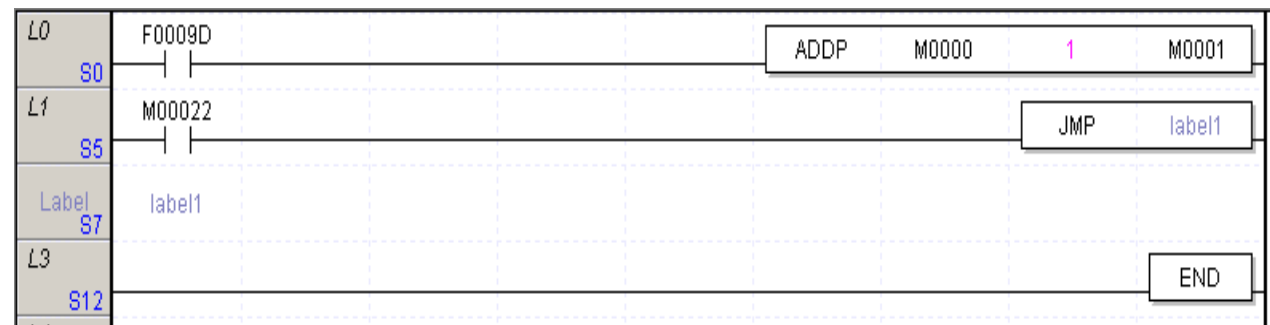

Action: Add the label where the error occurs, or correct the JMP instruction which uses the label.
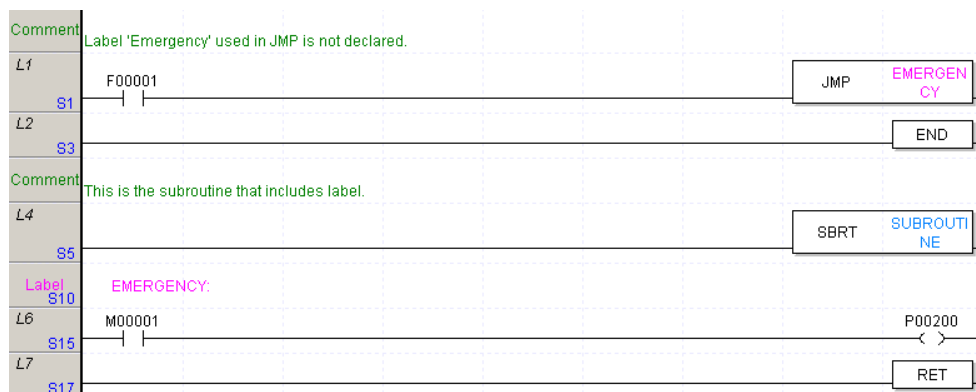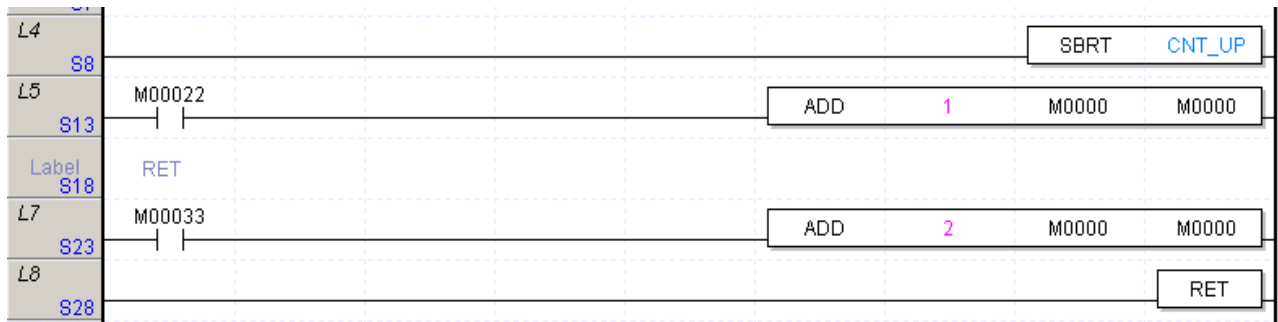
6) E1003: Label '*Label Name*' not used. This error will occur if the JMP instruction is nonexistent to use the label existent.
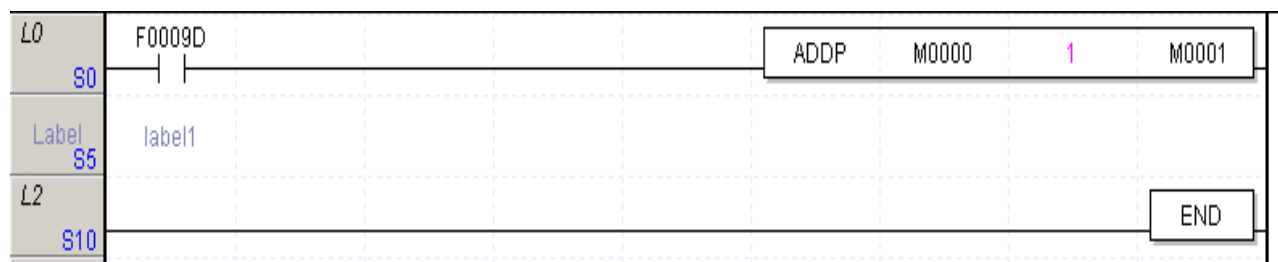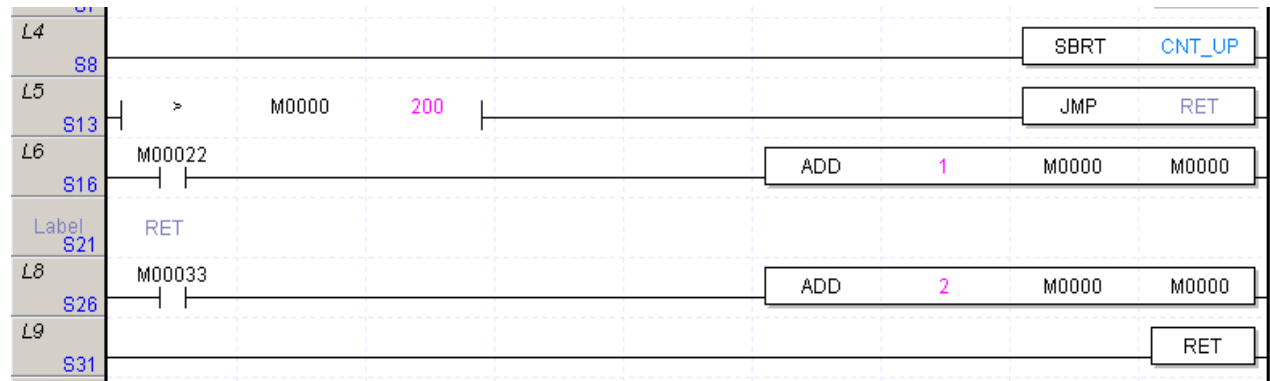

Action: Delete the label, or add the application JMP instruction.

7) E1004: Label '*Label Name*' not used in the subroutine. This error will occur if the JMP instruction is nonexistent to use the label existent in the subroutine.
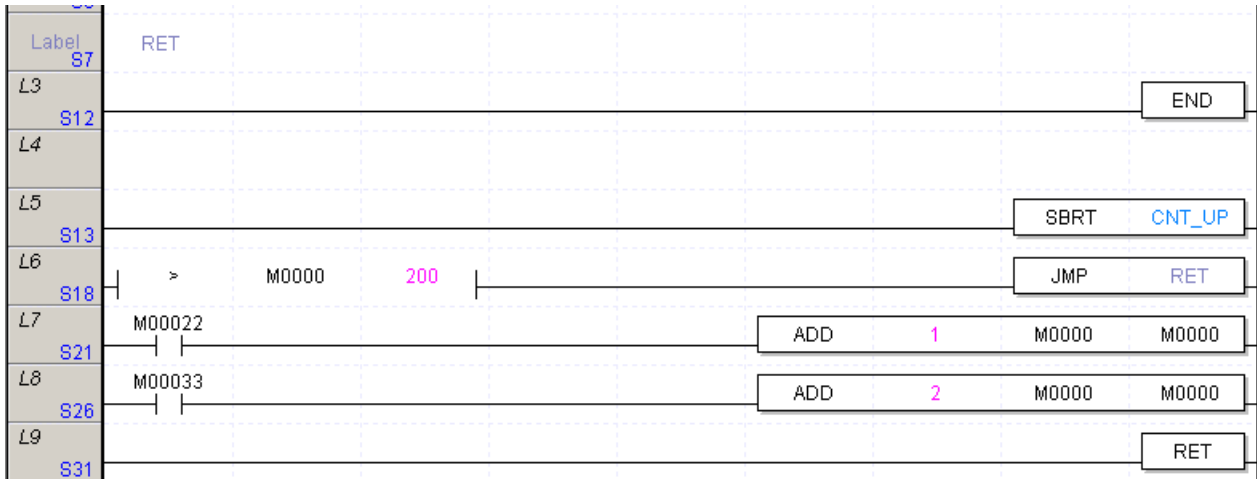

Action: Delete the label in the subroutine, or add the application JMP instruction.

- The error number E1003/E1004 will occur only when [Warning] or [Error] is selected for the label not referred to in the Grammar Error Inspect item. Refer to 7.3.1 Program Inspect Setting for details.

8) E1005: Label '*Label Name*' nonexistent in the subroutine. This error will occur if the JMP instruction uses the label nonexistent in the subroutine.

Action: Add the label in the subroutine, or correct the JMP instruction.
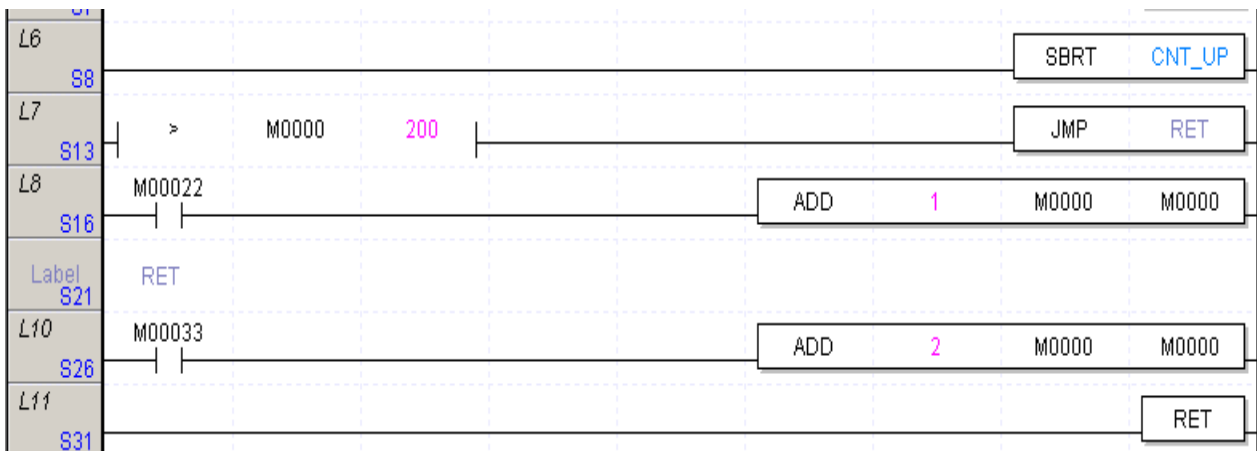
9) E2015: The maximum number of labels exceeded. Based on the PLC type, the maximum number of labels is exceeded.

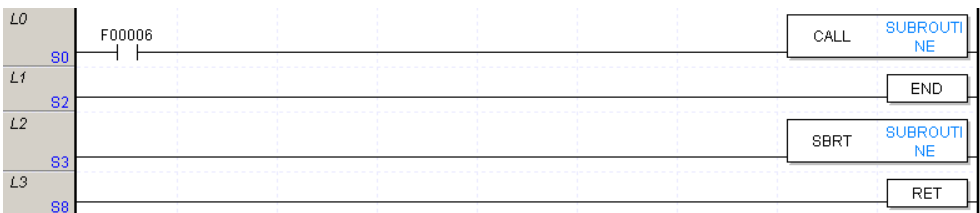Action: Check the number of the labels used.

Notes
- The maximum number of labels usable depends on the PLC type. Refer to XGK CPU manual for details.
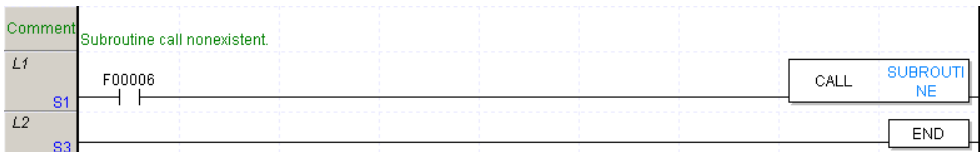
10) E2001: Return instruction nonexistent in the subroutine 'Subroutine Name. The subroutine shall be finished with the RET instruction.
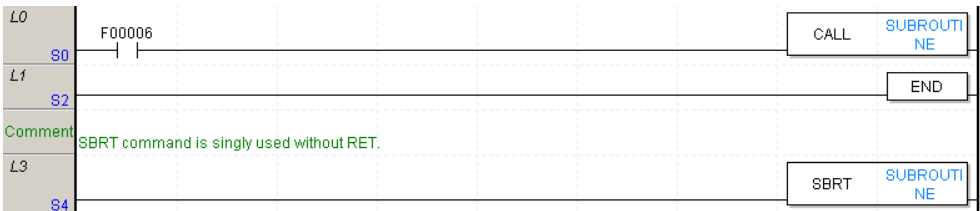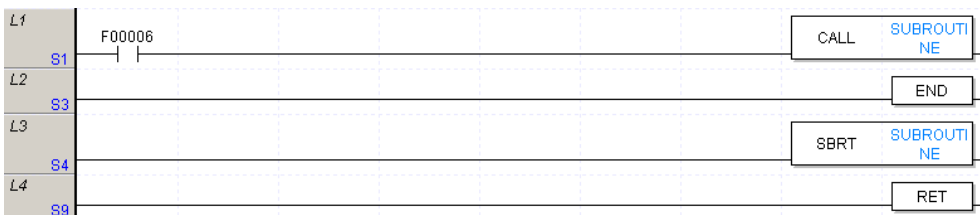

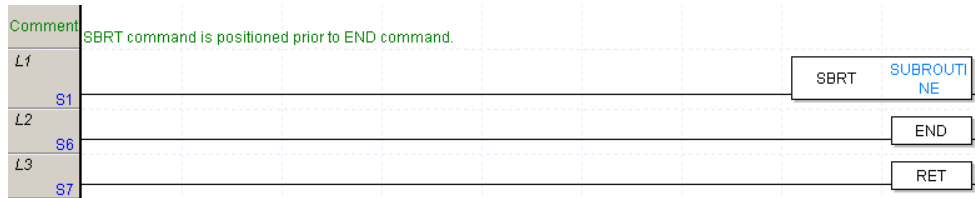Action: Add the RET instruction in the subroutine block.

11) E2010: Subroutine call nonexistent. The call of nonexistent SBRT causes an error.
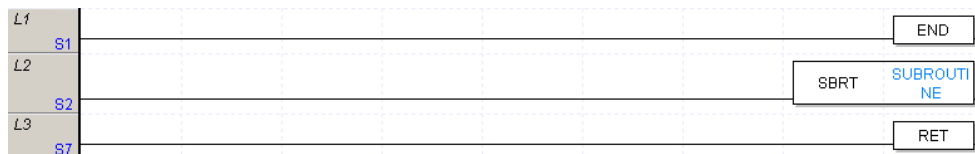

Action: Add the SBRT~RET blocks of the subroutine name to call.

12) E2003: Subroutine '*Subroutine Name*' is positioned prior to END instruction. SBRT and RET positioned prior to END instruction cause an error.

Action: Move the application instructions SBRT and RET to the position after the End instruction.

13) E2011: Subroutine not used. Although SBRT~RET blocks exist, no CALL instruction is available to use the applicable subroutine.
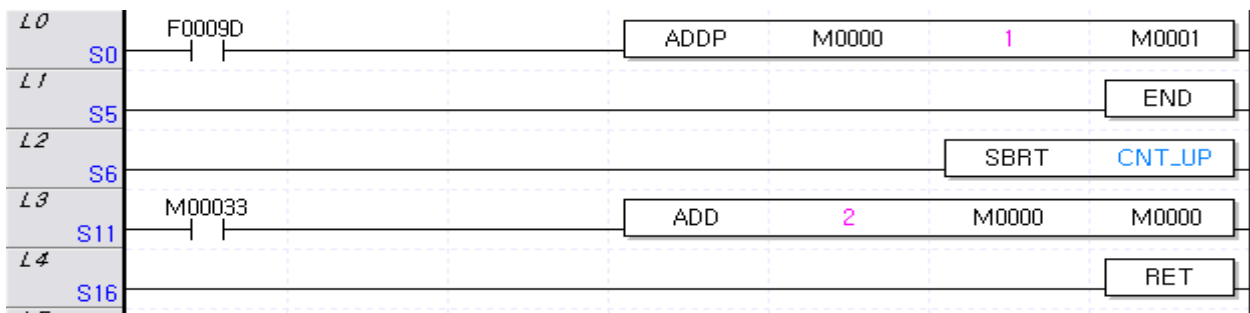
Action: Delete the subroutine not to be used, or add the CALL instruction.
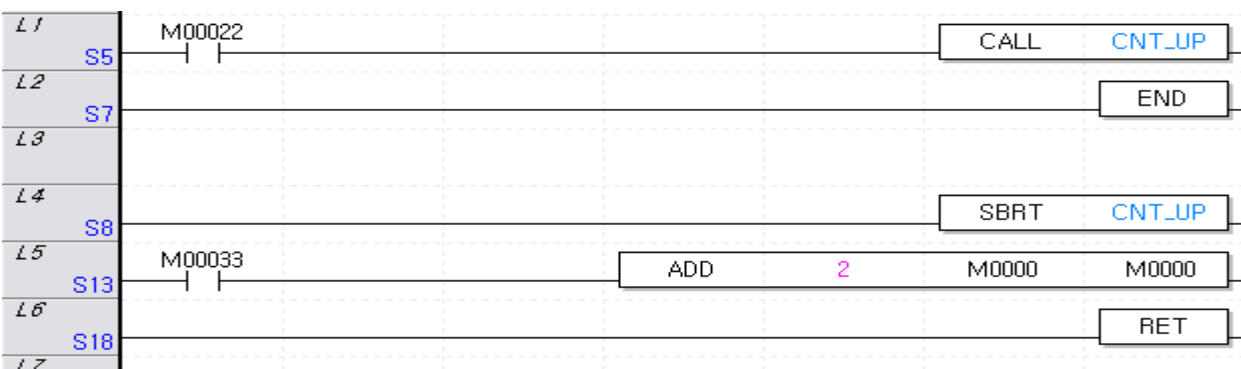
Notes
– The error number E2011 will occur only when [Warning] or [Error] is selected for the subroutine not referred to in the Grammar Error Inspect item. Refer to 7.3.1 Program Inspect Setting for details.

14) E2012: Subroutine declared as duplicated. '*Subroutine Name*'- An identical name of the subroutine can not be used.

Action: Change the duplicated name of the subroutine.
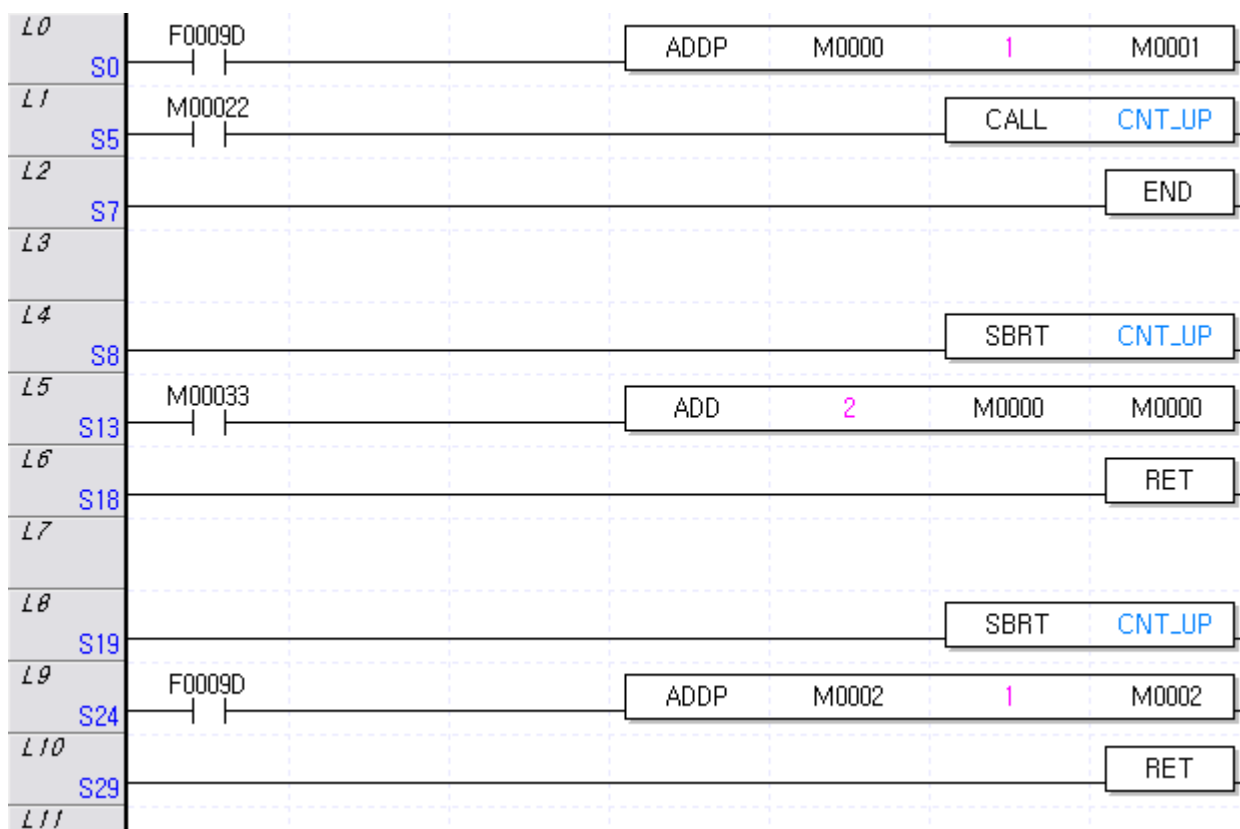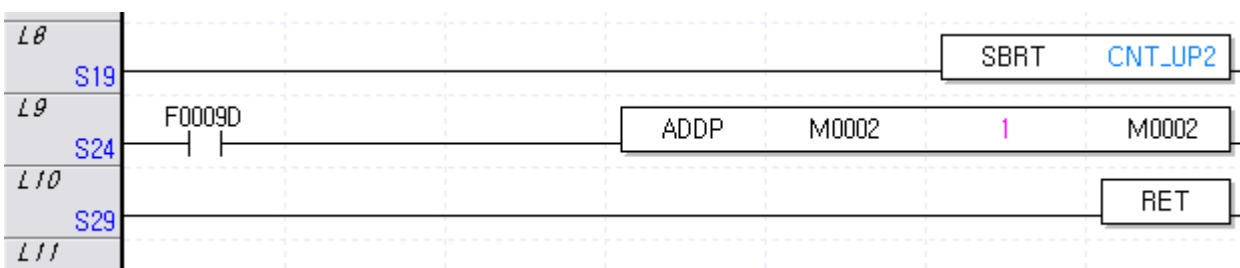

15) E2014: The maximum number of subroutines exceeded. Based on the PLC type, the maximum number of subroutines is exceeded.

Action: Check the number of the subroutines used.

Notes
- The maximum number of subroutines usable depends on the PLC type. Refer to XGK CPU manual for details.

16) E3001: Identical NEXT unavailable. If the application times of FOR/NEXT instructions are not identical, it will cause an error.
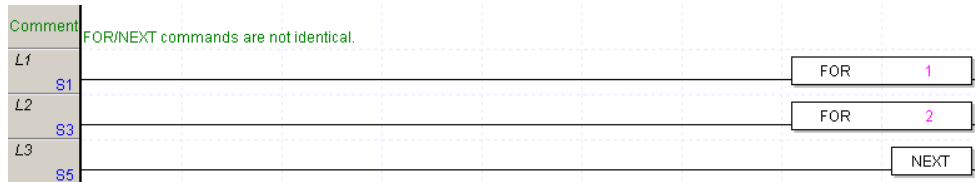
Action: Let the number of FOR instructions and NEXT instructions identical.
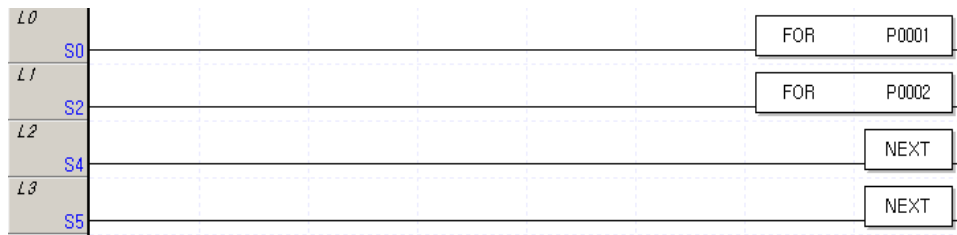
17) E3002: Identical FOR unavailable. If the application times of FOR/NEXT instructions are not identical, it will cause an error.
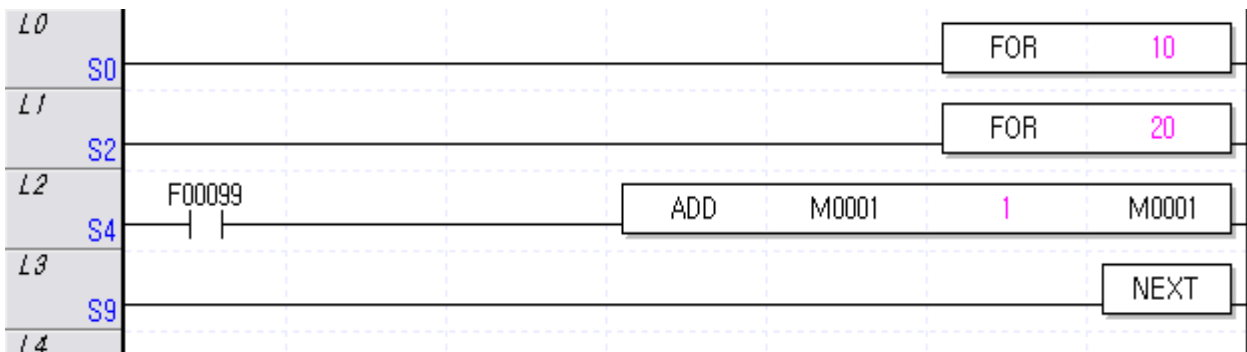
Action: Let the number of FOR instructions and NEXT instructions identical.
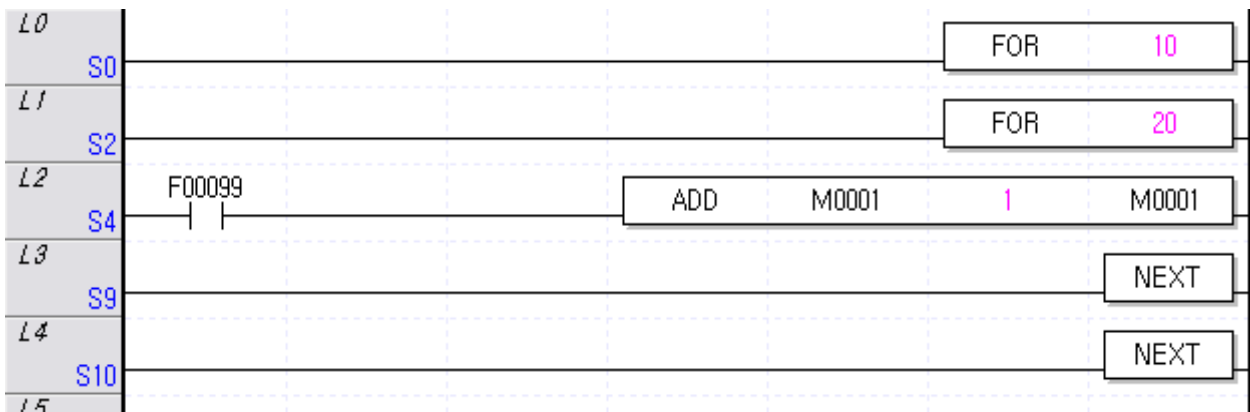
18) E3003: FOR-NEXT can not be duplicated more than 16 times. FOR/NEXT can be duplicated up to 16 blocks. If the number of the duplicated FOR/NEXT blocks exceeds 16, it will cause an error.
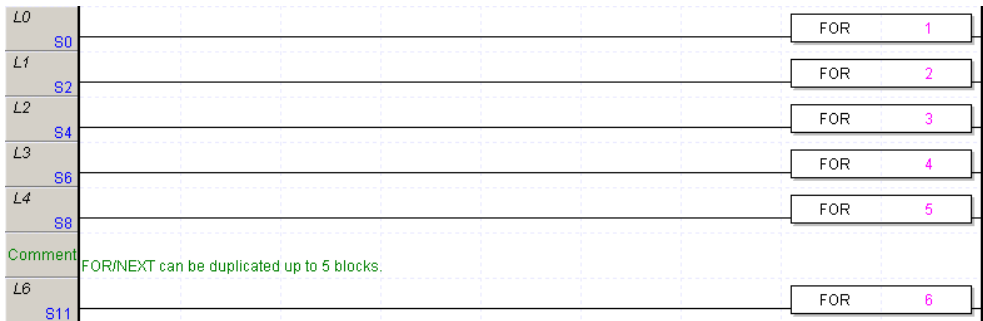
Action: Correct the number of the FOR / NEXT blocks not to exceed 16.

19) E3004: Between FOR-NEXT, RET or END is not available. If RET or END is included between FOR and NEXT, it will cause an error.
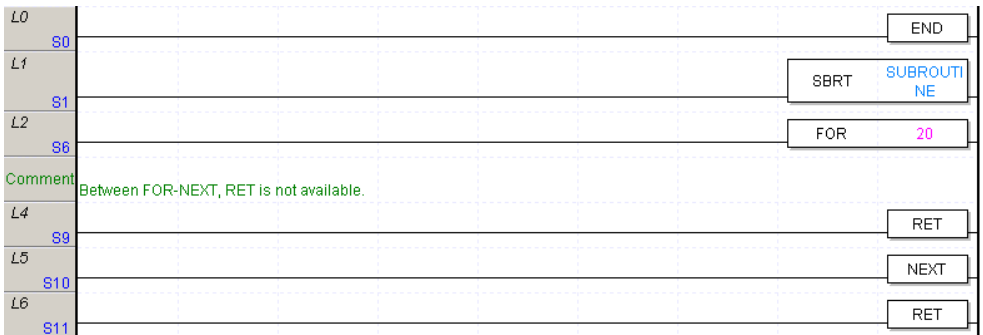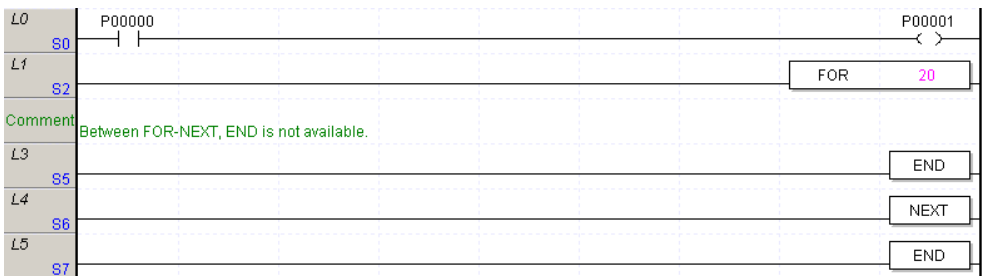
Action: Change the location of END and RET instruction positioned between FOR/NEXT blocks.

20) E3005: BREAK singly used. BREAK instruction can be used only between FOR/NEXT blocks.

L0	F0009D		ADDP	M0000	1	M0001
S0	┤ ├					
L1	M00022				CALL	CNT_UP
S5	┤ ├					
L2	M00100					BREAK
S7	┤ ├					
L3						END
S9						
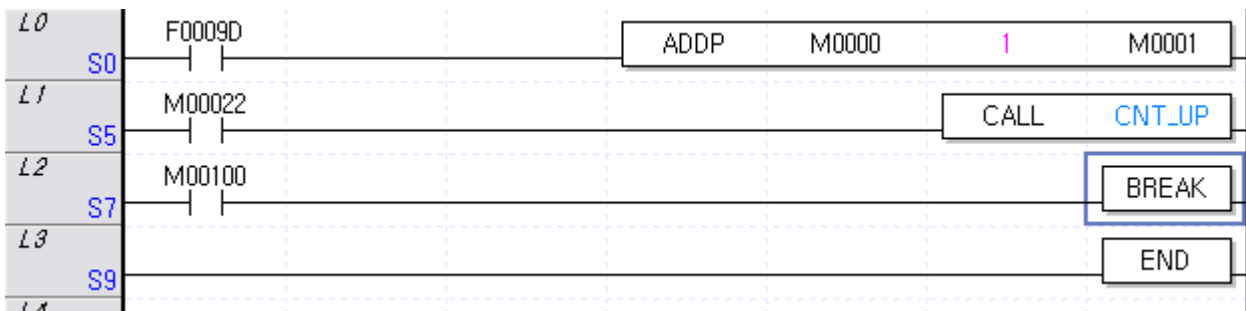
Action: Change the location of BREAK instruction.

21) O0001: The maximum program capacity exceeded. The maximum programmable step is exceeded.

Action: Correct the program not to exceed the specified program capacity.

> **Notes**
>
> – The program capacity depends on the PLC type. Refer to XGK CPU manual for details.

22) O0002: One or more scan programs necessary. There is no scan program in the present PLC item, which will cause an error.

Action: Add an applicable program to the Project [Scan Program].

Chapter 8 Find / Replace

It is a function to search and replace device and Text in LD, variable / description of XG5000.

8.1 Find a device

This function is used to find the device previously made in LD Editor, SFC Editor, IL Editor, or Variable/Comment Editor.

[Steps]

  Select [Find / Replace] - [Find Device] on the menu
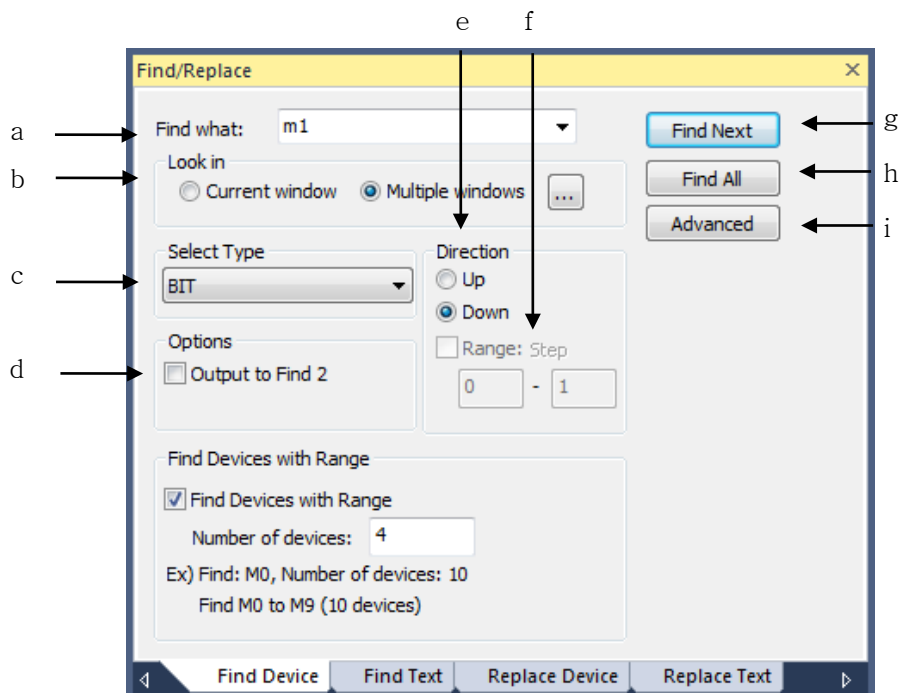
[Dialog Box]

[Description of dialog box]

a.　　Find what: Specifies the device you are looking for.

b.　　Look in: Specify the area you are looking for. The current window can be found only in the active window. Multiple windows are available for device discovery in the project. If you select multiple windows, [Advanced] Button is activated, select the item to find the device in the project window.

c. Select type: Select the type of device you are looking for. There are [Bit], [Bit (Word + Bit)], [Word], [Word (Bit + Word)] and [All] items for type selection.

① When [Bit] is selected, only the bit device can be entered in the search contents, and only the bit device is searched in the selected search area.

② When [Bit (Word + Bit)] is selected, only bit devices can be entered in the search contents, and word devices including bit devices and bits in the selected search area are searched. (For example, if you enter bit device M0000A in the search result, the device to be searched also

searches for word device M0000 including bit device M0000A and bit device M0000A.)

③ When [Word] is selected, only the word device can be entered in the search contents, and only the word device is searched in the selected search area.

④ When [Word (Bit + Word)] is selected, only the word device can be input to the search contents, and the search is performed for all the bit devices belonging to the word device and word in the selected search area. (For example, if a word device M0000 is input in the search result, the device to be searched searches from the bit device M00000 belonging to the word device M0000 and the word device M0000 to the device M0000F.)

⑤ If [All] is selected, device search is performed in the bit (type of word) type when the bit device is input in the search contents, and word device is input in the search content. Perform device discovery. In the case of word and bit device, the device is searched in the form of bit (word including bit) and word (Bit + Word). (For example, if an M1 device is input in the form of a word and a bit device in the search result, the device to be searched also searches for the word device M0000 including the bit device M00001 and the bit device M00001 as in the bit (word including bit) Performs search from bit device M00010 to M0001F device belonging to word device M0001 and word device M0001 as word (Bit + Word).)

d. Output to Find 2: The XG5000 has two search result windows. By default, the Find 1 Results pane will be displayed in the Results pane, but if you select this check box, the results will be displayed in the Find 2 Results pane.

e. direction: In each editor, specify whether to search above or below the currently selected line.

f. Range: After specifying each direction, select to search only by specifying specific lines. If you select Specify range, you must enter the start line and the last line.

g. Find next: Look for the above setting just after the currently selected line (position). When the corresponding device is found, the place where the device is located is selected.

h. Find all: It searches all of the above settings and displays the result in the search result window.

i. Advanced: Use this function when you want to search only for specific contacts, specific coils, extended functions, and function / function blocks used in the ladder editor.

Note
- The results are displayed in the Find window only when you have searched all.
- Find All is found in the document, so choosing a direction is meaningless.

Note

- 'Advanced' Button is pressed.
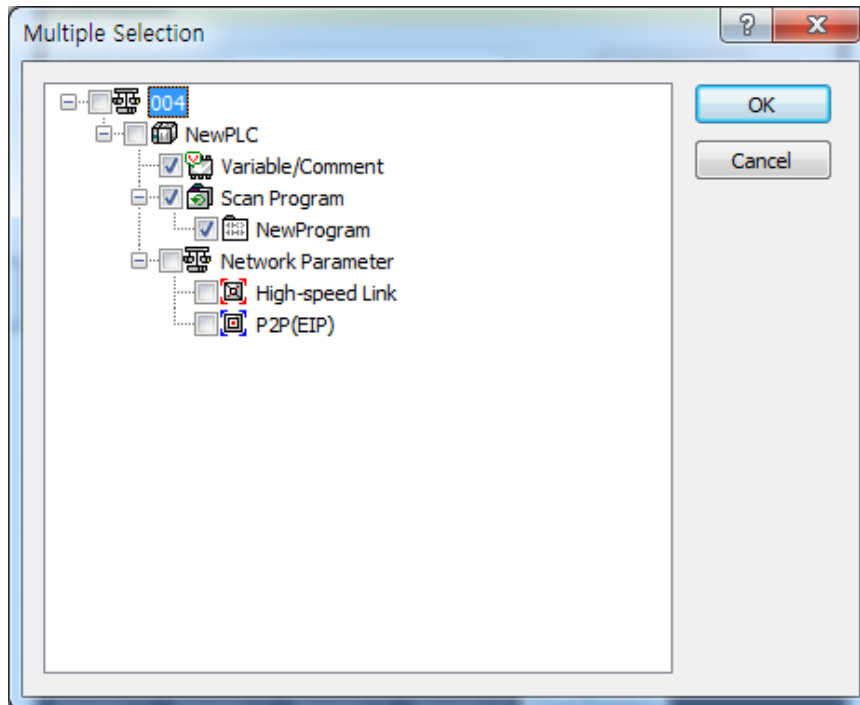
Note
- The 'Advanced' button is enabled only when the current window is a ladder editor, and the following items are displayed when this button is pressed.
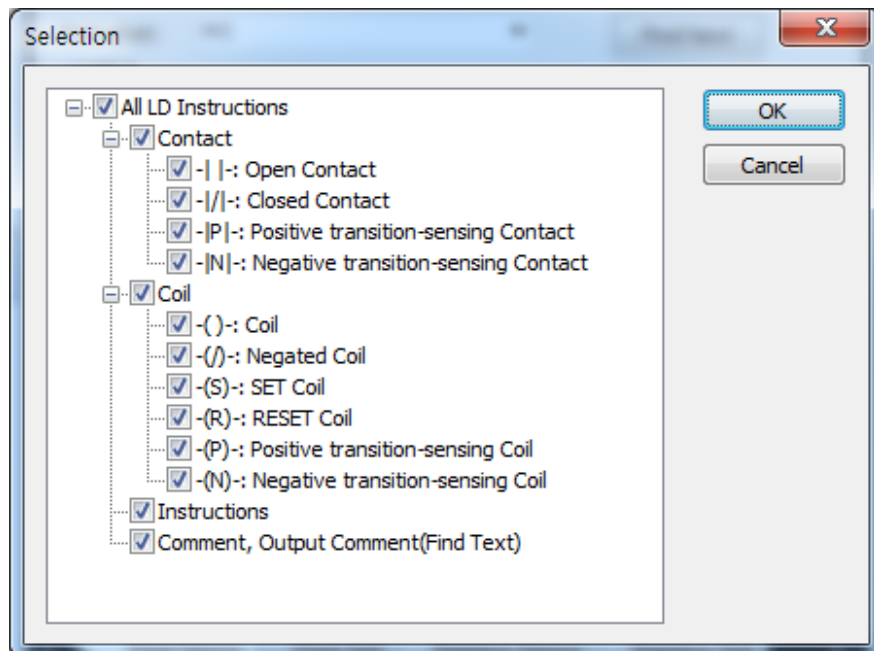
8.1.2 Find Next Device

It is commonly used in LD, IL, global / direct variables, local variables and so on.

The following is based on LD.

[Steps]

1. Select the cell that is the base of the direction.
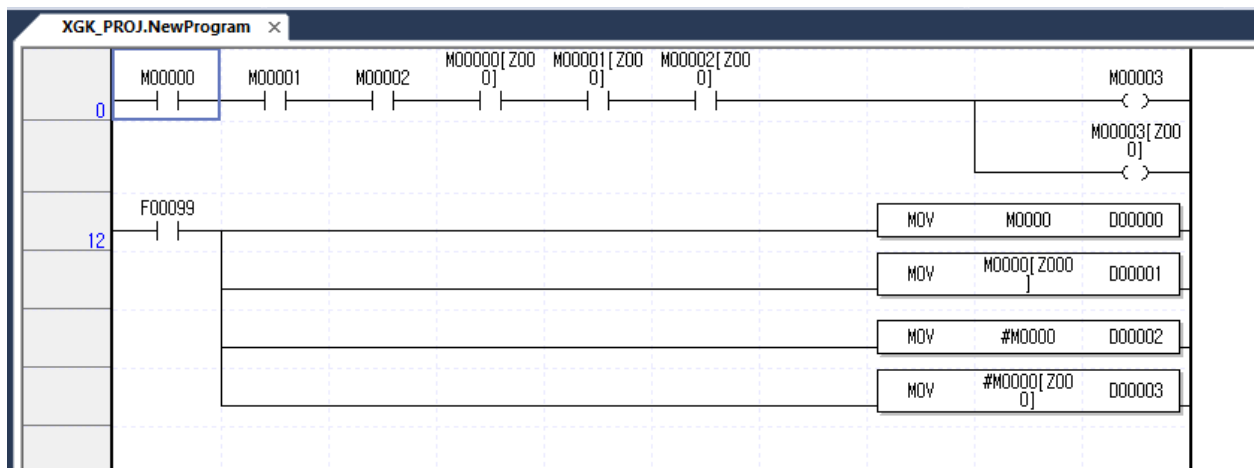
2. Select [Find / Replace] - [Find Device] on the menu and enter the search contents and search conditions.
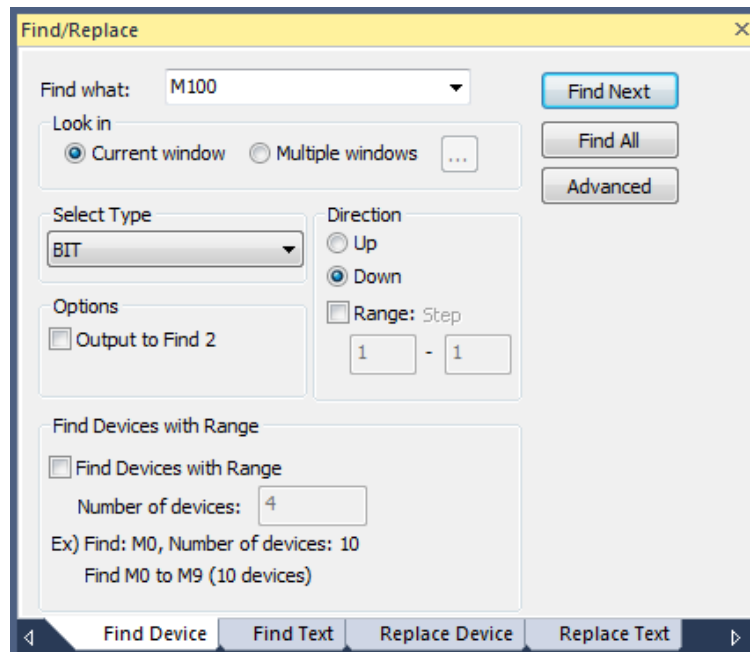
3. Click the Find Next button. If there is a device that matches what you set in the dialog box, the cell moves to the matching device.
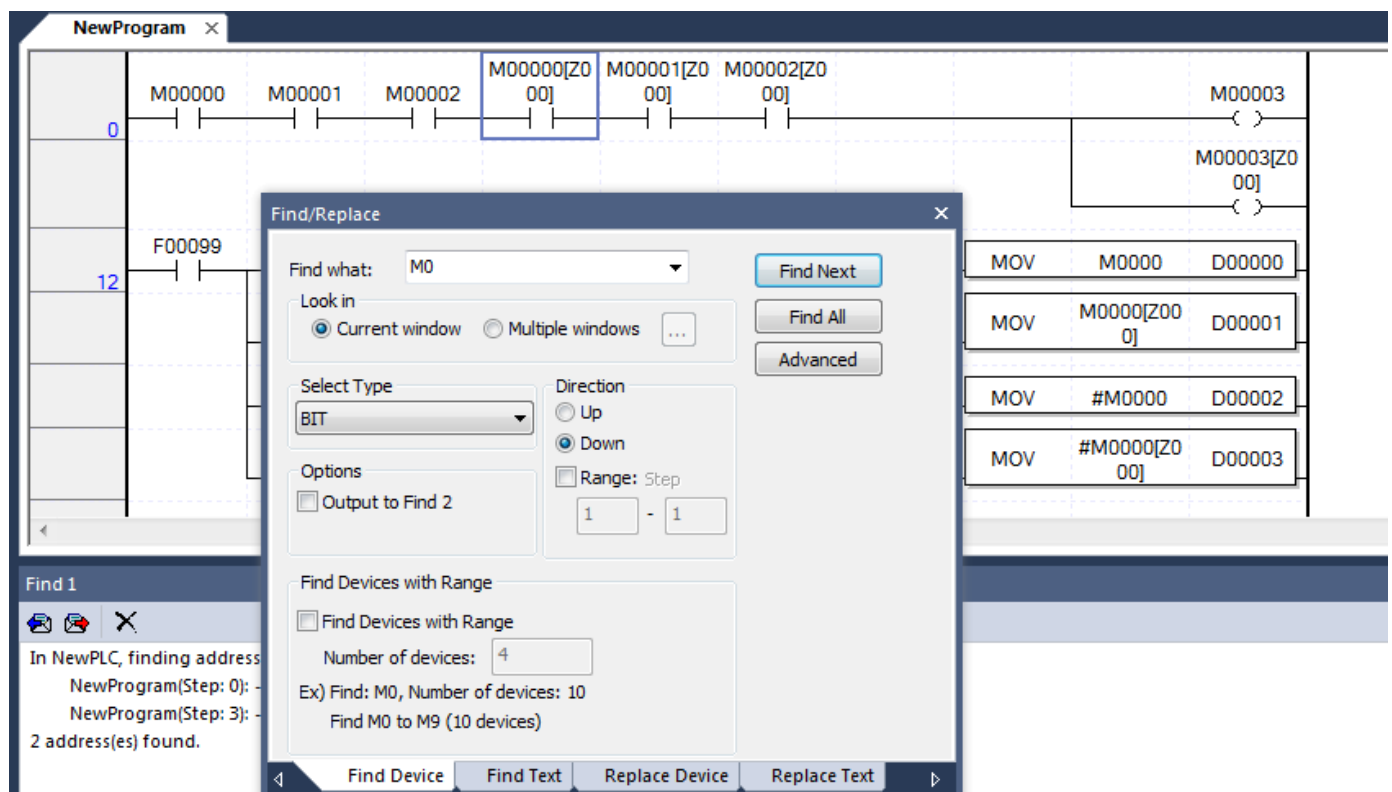
8.1.3 Find all devices

It is commonly used in LD, IL, global / direct variables, local variables and so on.

The following is based on LD.

[Steps]

1. Select [Find / Replace] - [Find Device] on the menu.

2. Set the device you want to find, directions, and selections.

3. Click the Find All button. Find All displays the results in the Find message window as shown below.
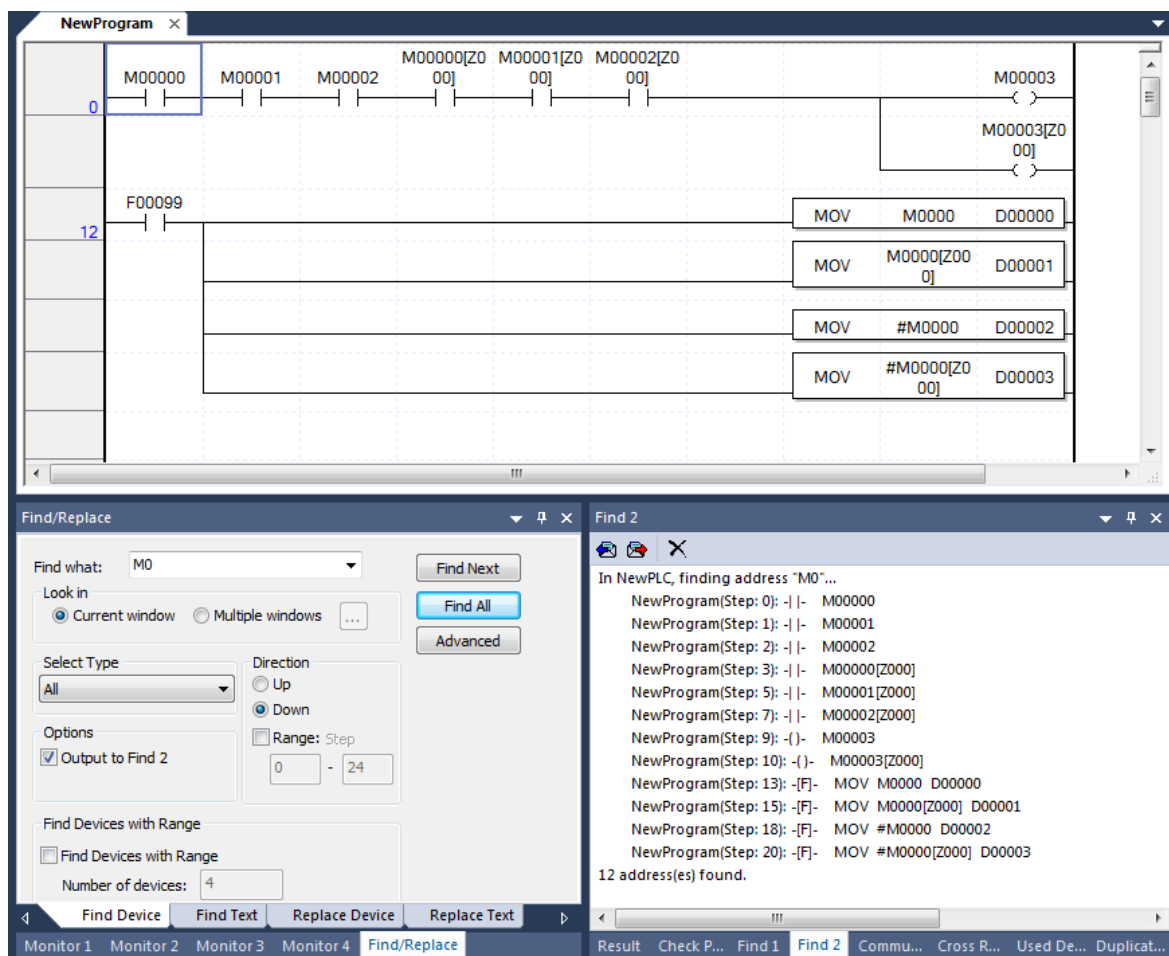
4.Select the line you want to find in the Find window and press the Enter key to move the cell to the line of the LD program.
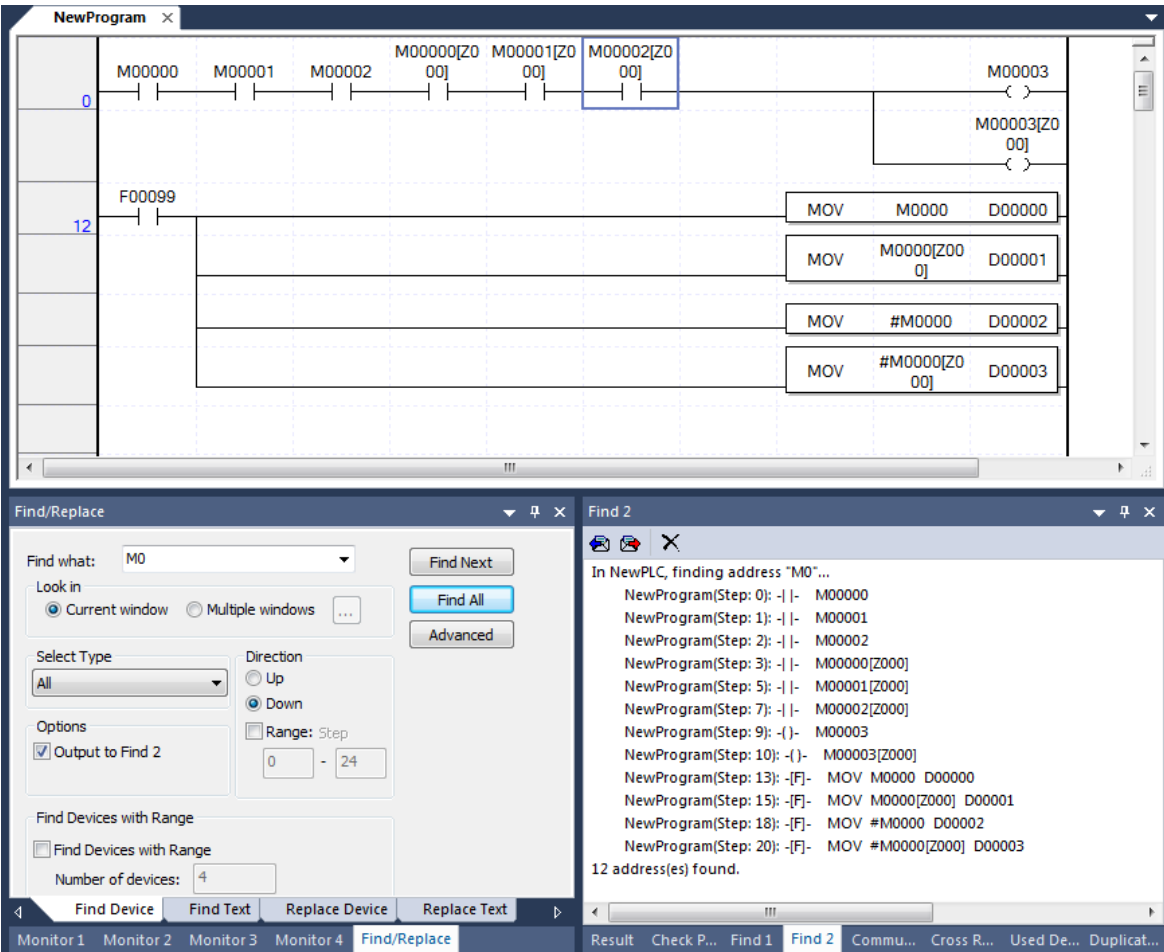
Note
－ Find All finds the device in the selected area in the Find area.

8.2 Find Text

It is a function to search for Text such as rung comment, variable, variable comment, application command, label except device.

[Dialog Box]
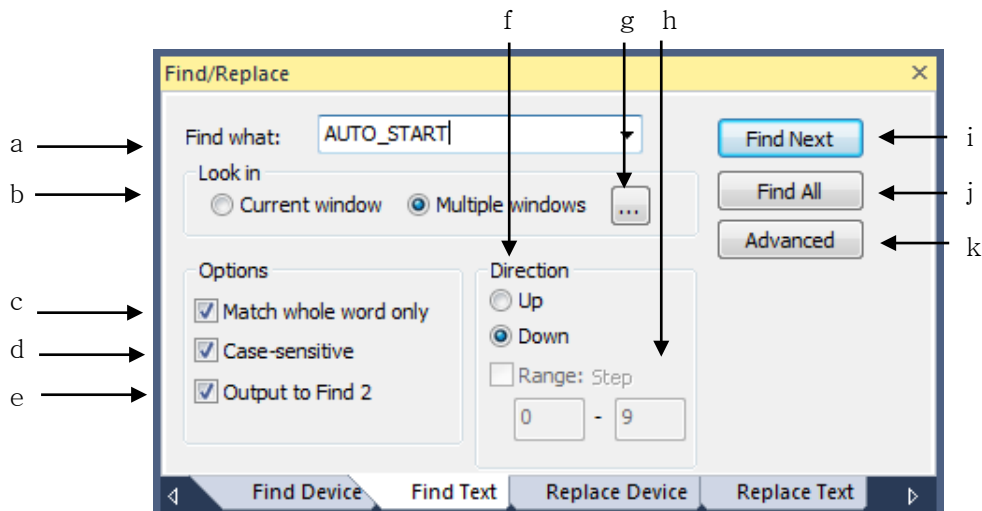
[Description of dialog box]

a. Find what: Specify the Text you are looking for.

b. Look in: Specify the area you are looking for. The current window is only able to find the Text in the active window. Multiple windows can be used to find Text in a project. If you select multiple windows, [Advanced] Button is activated, select an item to search for a Text in the project window.

c. Match whole word only: If you check Exactly matches, only the Text that exactly match the Text specified in the Find what will be found. If you do not check it, you will also find the Text that contains the find.

d. Case sensitive: If you check case-sensitivity, only the case-sensitive Text is searched. If unchecked, it searches without case sensitivity.

e. Output to Find 2: The XG5000 has two search result windows. By default, the Find 1 Results pane will be displayed in the Results pane, but if you select this check box, the results will be displayed in the Find 2 Results pane.

f. direction: In each editor, specify whether to search before or after the currently selected line.

g. Advanced: If you have specified 'Multiple windows' in the selection area, a window is displayed where you can select multiple areas at the same time.
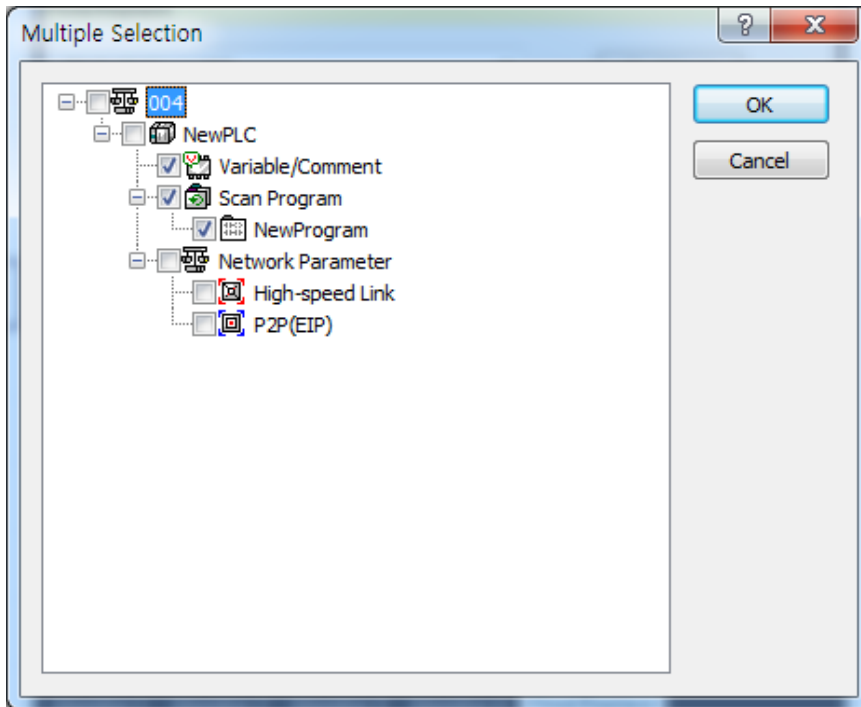
h.   Range: After specifying each direction, select to search only by specifying specific lines. If you select Specify range, you must enter the start line and the last line.

i.   Find next: Look for the above setting just after the currently selected line (position). If a matching Text is found, the selection moves to where the Text is located.

j.   Find all: It searches all of the above settings and displays the result in the search result window.

k.   Advanced: This button is used only in the ladder editor. It is used to search only the specific contact, specific coil, extended function, function / function block used in ladder editor.

Note
- Only when you have searched all, the results are displayed in Find 1 and 2.
- Find All is found in the document, so choosing a direction is meaningless.
- The item selection button is only visible in the LD editor.
The following dialog box appears when this button is selected.
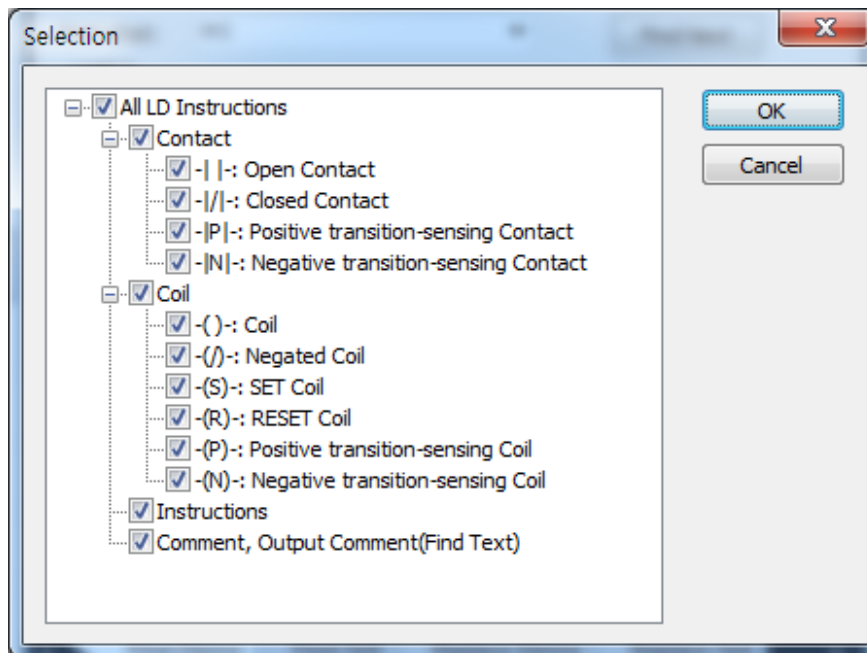
8.2.1 Find Next Text

It is commonly used in LD editor, SFC editor, ST editor, and variable / description editor.

The following is based on LD.

[Steps]

1. Select the cell that is the base of the direction.
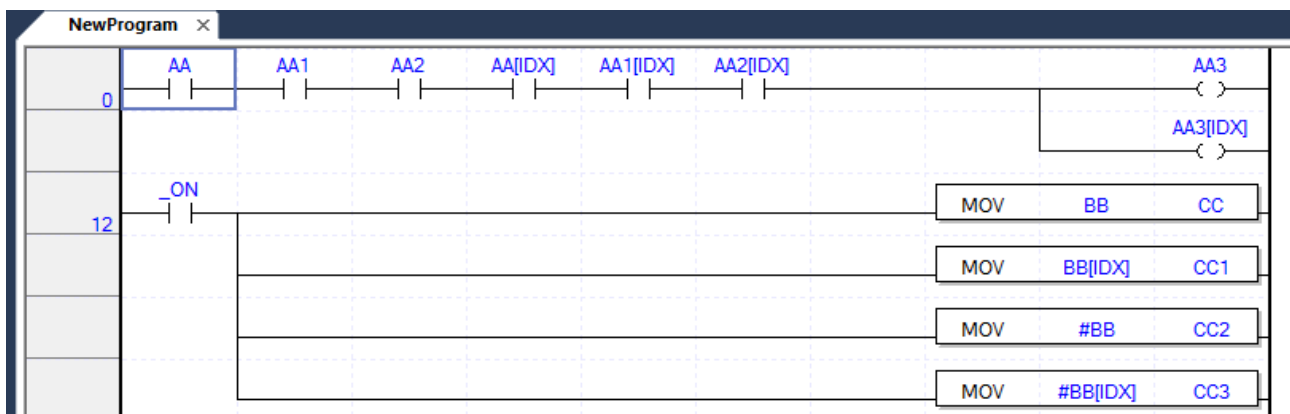
2. Select [Find / Replace] - [Find Text] on the menu.
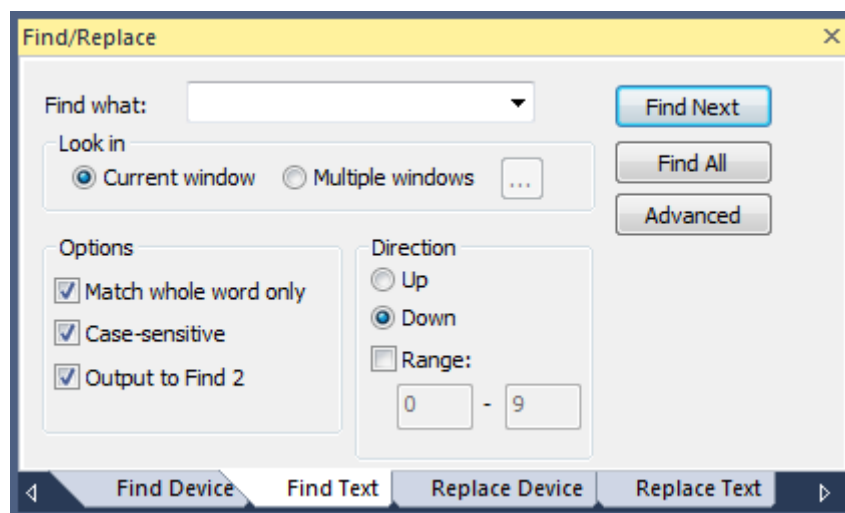
3. Set the Text, selection, and direction you want to find.
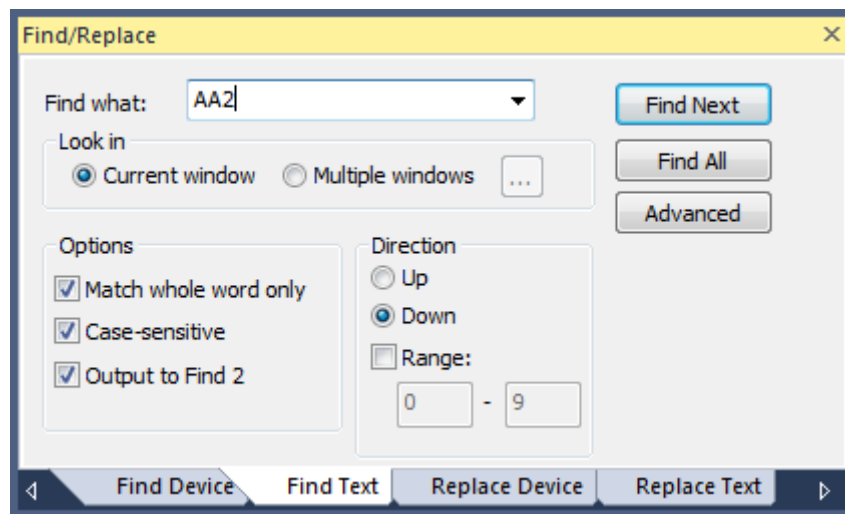
4. Click the Find Next button. If there is a Text that matches what you set in the dialog box, the cell moves to the matching Text.
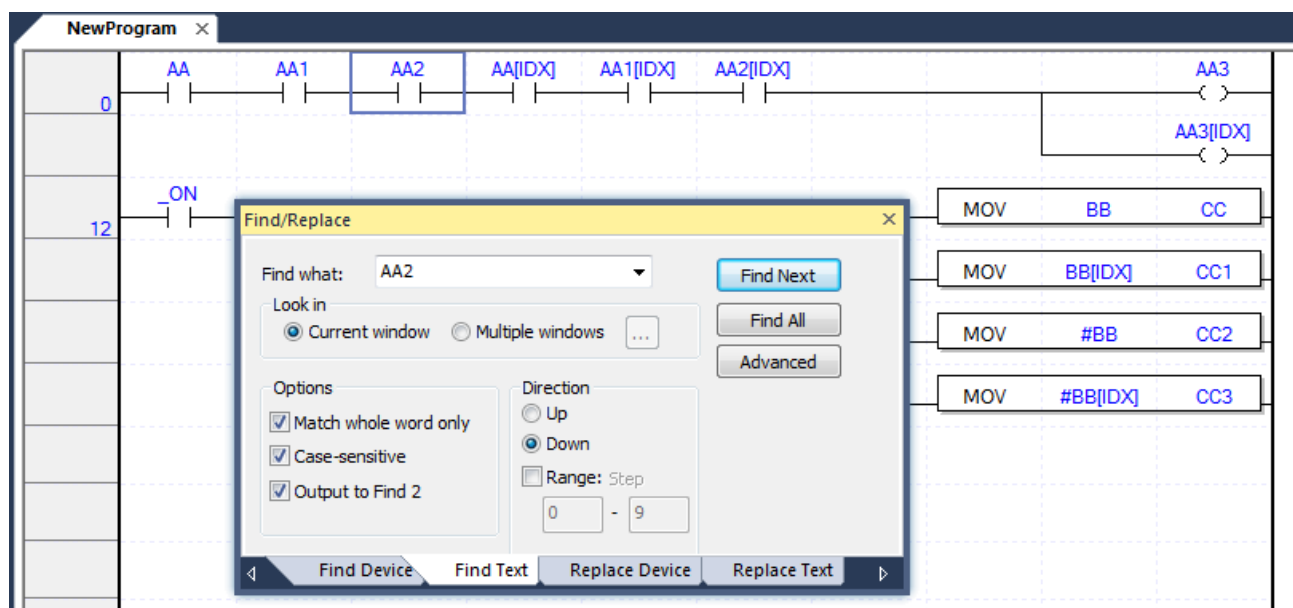
8.2.2 Find all Text

It is commonly used in LD editor, SFC editor, ST editor, and variable / description editor.

The following is based on LD.

[Steps]

1. Select [Find / Replace] - [Find Text] on the menu.

2. Set the Text you want to find, selection, direction, and so on.
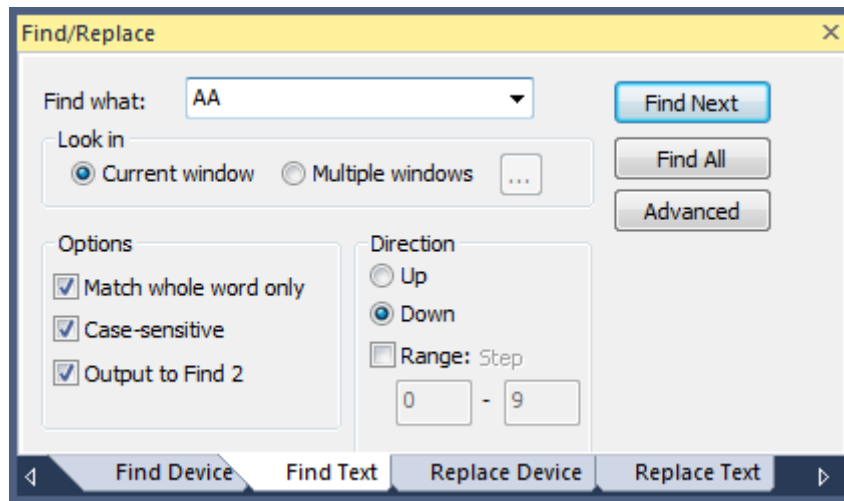
3. Click the Find All button. Find All displays the results in the Find Messages window.
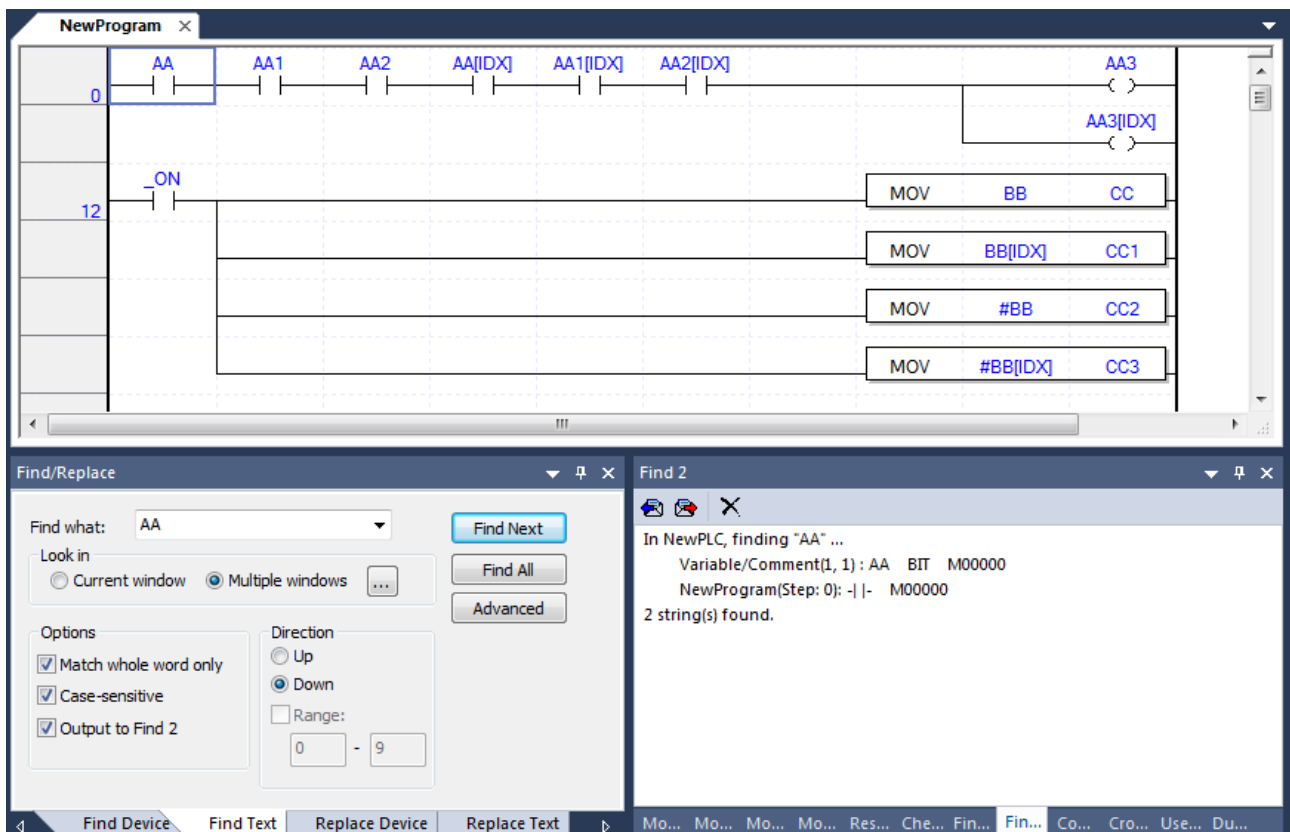
4. Select the line you want to find in the Find window and press the Enter key to move the cell to the line of the LD program.
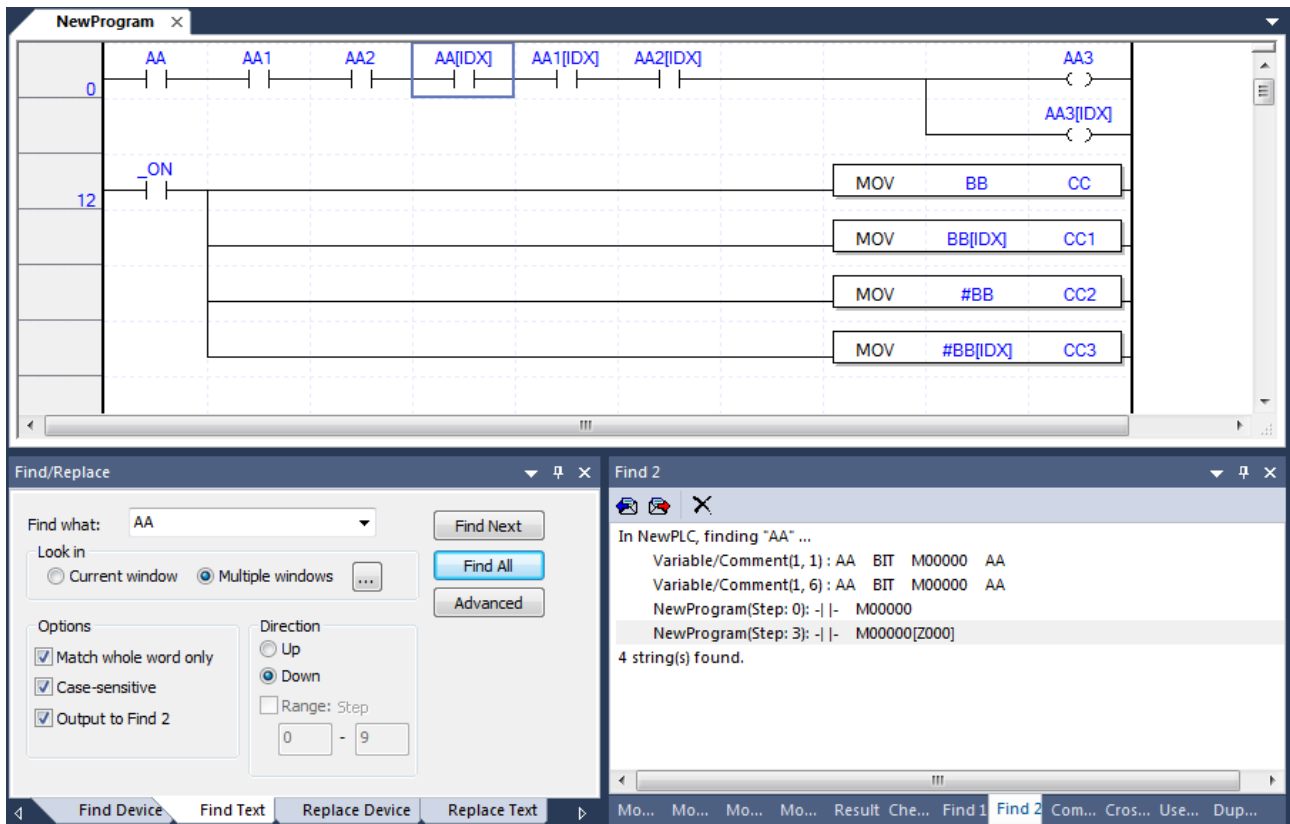
Note
– Find in the 'Current Window' in the search area will find the currently active program.
– In the "Find in Multiple Window" area, click Find Window to run Find in all selected windows.

8.3 Replace device

LD editor, IL editor, SFC editor, ST editor, variable / description editor and so on.

[Dialog Box]
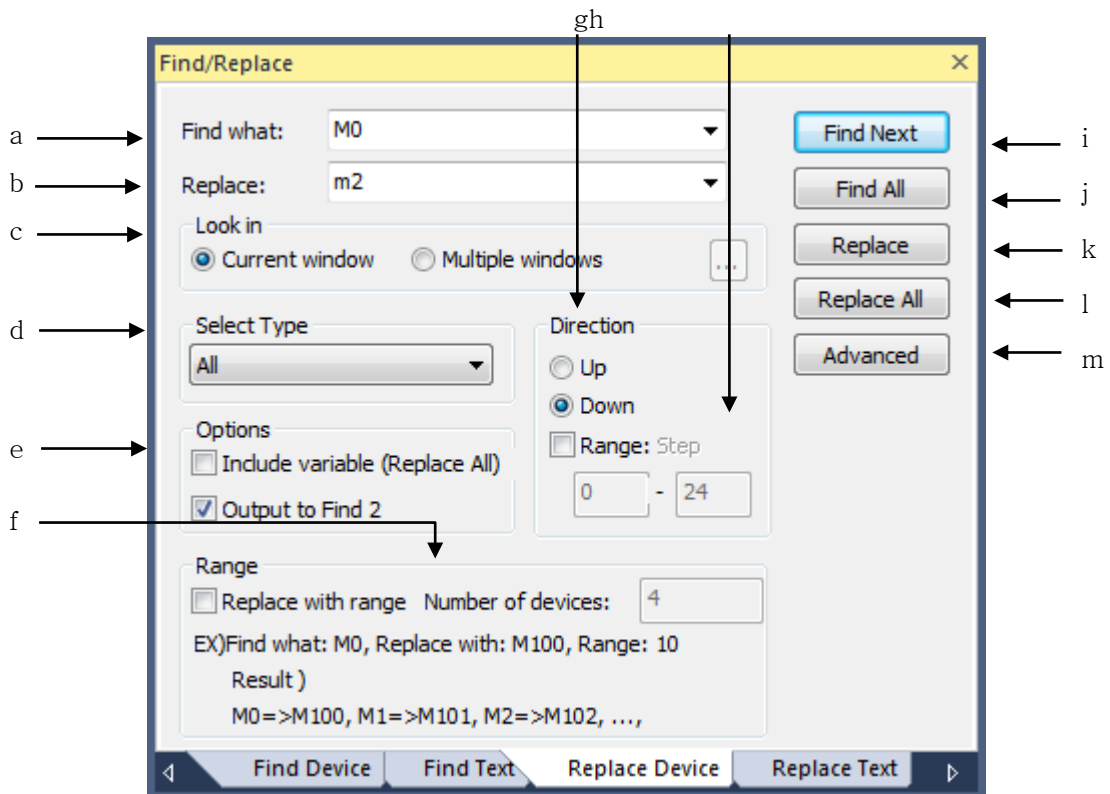
gh

```
Find/Replace                                        ×

a →   Find what:    M0                    ▼    │ Find Next │  ← i

b →   Replace:      m2                    ▼    │ Find All  │  ← j

c →   ┌ Look in ──────────────────────┐        │ Replace   │  ← k
      │ ◉ Current window  ○ Multiple windows │ [...]
      └──────────────────────────────┘        │ Replace All │ ← l

d →   ┌ Select Type ────────┐  ┌ Direction ─┐  │ Advanced  │  ← m
      │ All              ▼ │  │ ○ Up       │
      └──────────────────┘  │ ◉ Down     │
                            │
e →   ┌ Options ─────────────┐ │ ☐ Range: Step
      │ ☐ Include variable (Replace All) │
      │ ☑ Output to Find 2   │ │ 0    - 24
f →   └──────────────────────┘

      ┌ Range ──────────────────────────┐
      │ ☐ Replace with range  Number of devices: │ 4 │
      │ EX)Find what: M0, Replace with: M100, Range: 10
      │     Result )
      │     M0=>M100, M1=>M101, M2=>M102, …,
      └──────────────────────────────┘

  ◁  │ Find Device │ Find Text │ Replace Device │ Replace Text │ ▷
```

[Description of dialog box]

a.   Find what: Specifies the device you are looking for.

b.   Replace: Specify the device to be replaced.

c.   Look in: Specify the area you are looking for. The current window can be found only in the active window. Multiple windows are available for device discovery in the project. If you select multiple windows, [Advanced] Button is activated, select the item to find the device in the project window.

Find/Replace   ✕

Find what: M0   ▼   Find Next

Replace: m2   ▼   Find All

Look in
◉ Current window   ○ Multiple windows   [...]   Replace

Replace All

Select Type   Direction

Selection   ✕

☑ All LD Instructions
   ☑ Contact
      ☑ -| |-: Open Contact
      ☑ -|/|-: Closed Contact
      ☑ -|P|-: Positive transition-sensing Contact
      ☑ -|N|-: Negative transition-sensing Contact
   ☑ Coil
      ☑ -( )-: Coil
      ☑ -(/)-: Negated Coil
      ☑ -(S)-: SET Coil
      ☑ -(R)-: RESET Coil
      ☑ -(P)-: Positive transition-sensing Coil
      ☑ -(N)-: Negative transition-sensing Coil
   ☑ Instructions
   ☑ Comment, Output Comment(Find Text)

OK

Cancel
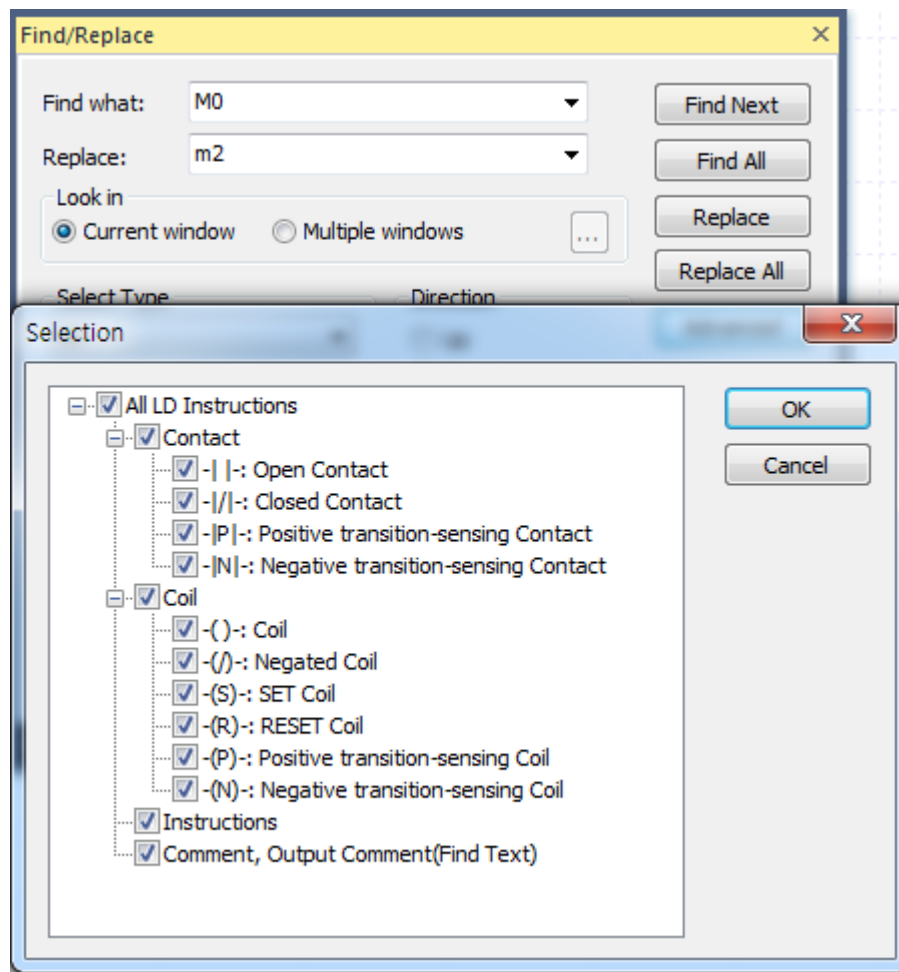
d. Select type: Select type: Select the type of device you are looking for. There are [Bit], [Bit (Word + Bit)], [Word], [Word (Bit + Word)] and [All] items for type selection.

① When [Bit] is selected, only the bit device can be entered in the search contents, and only the bit device is searched in the selected search area.

② When [Bit (Word + Bit)] is selected, only bit devices can be entered in the search contents, and word devices including bit devices and bits in the selected search area are searched. (For example, if you enter bit device M0000A in the search result, the device to be searched also searches for word device M0000 including bit device M0000A and bit device M0000A.)

③ When [Word] is selected, only the word device can be entered in the search contents, and only the word device is searched in the selected search area.

④ When [Word (Bit + Word)] is selected, only the word device can be input to the search contents, and the search is performed for all the bit devices belonging to the word device and word in the selected search area. (For example, if a word device M0000 is input in the search result, the device to be searched searches from the bit device M00000 belonging to the word device M0000 and the word device M0000 to the device M0000F.)

⑤ If [All] is selected, device search is performed in the bit (type of word) type when the bit device is input in the search contents, and word device is input in the search content. Perform device discovery. In the case of word and bit device, the device is searched in the form of bit (word including bit) and word (Bit + Word). (For example, if an M1 device is input in the form of a word and a bit device in the search result, the device to be searched also searches for the word device M0000 including the bit device M00001 and the bit device M00001 as in the bit (word including bit) Performs search from bit device M00010 to M0001F device belonging to word device M0001 and

word device M0001 as word (Bit + Word).)

e. Include variable (Replace all): Select whether to replace the variable / description of the device entered in the search contents to the variable / description of the device entered in the replacement contents. In other words, choose whether to replace the device variable / description as well.

f. Number of devices: Specify the Number of devices. Only active when batch replace is checked

g. direction: In each editor, specify whether to search before or after the currently selected line.

h. Range: If you select Range, you can only perform device replacement within a specific line. If you select Specify range, you must enter the start line and the last line.

i. Find next: Look for the above setting just after the currently selected line (position). When the corresponding device is found, the place where the device is located is selected.

j. Find all: It searches all the devices corresponding to the set contents and displays the result in the search result window.

k. Replace: Replaces the device with the previously set position based on the currently selected position (line).

l. Replace all: Find the previous setting and replace it.

m. Advanced: This button is used only in the ladder editor. It is used to search only the specific contact, specific coil, extended function, function / function block used in ladder editor.

Note

- For all replace, direction selection is not meaningful.

- If you check batch replace, you can replace all.

- The item selection button is only visible in the LD editor.

  The appearance of the Advanced dialog box that is displayed when this button is selected is the same as in Chapter 8.1 Find Device.
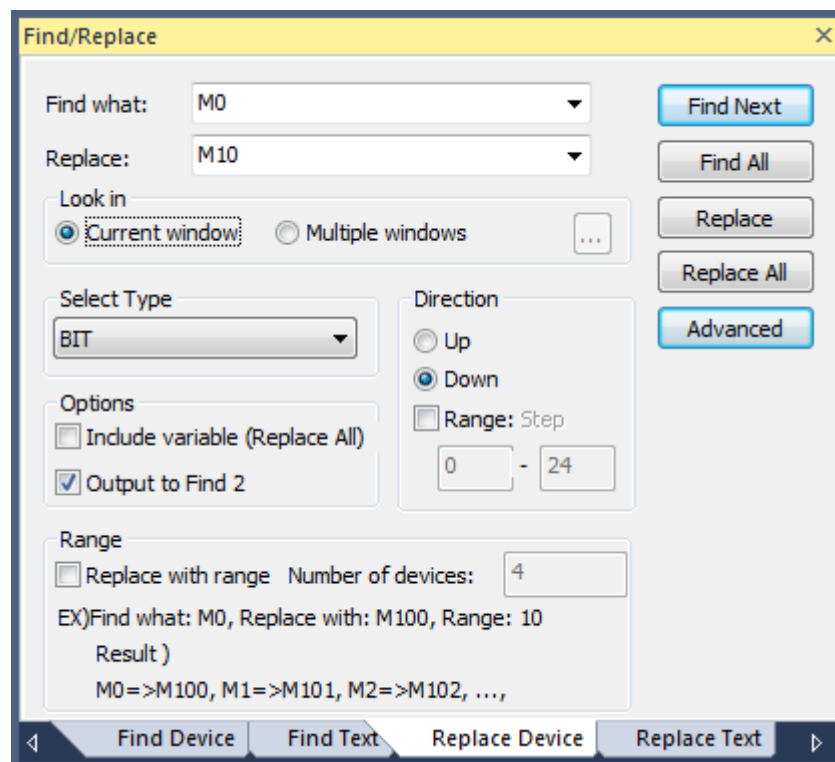

8.3.1 Replace device

LD editor, variable / description editor, etc. It is a function to find the device that you have already created. The following is based on LD.

[Steps]

1. Select the cell that is the base of the direction.

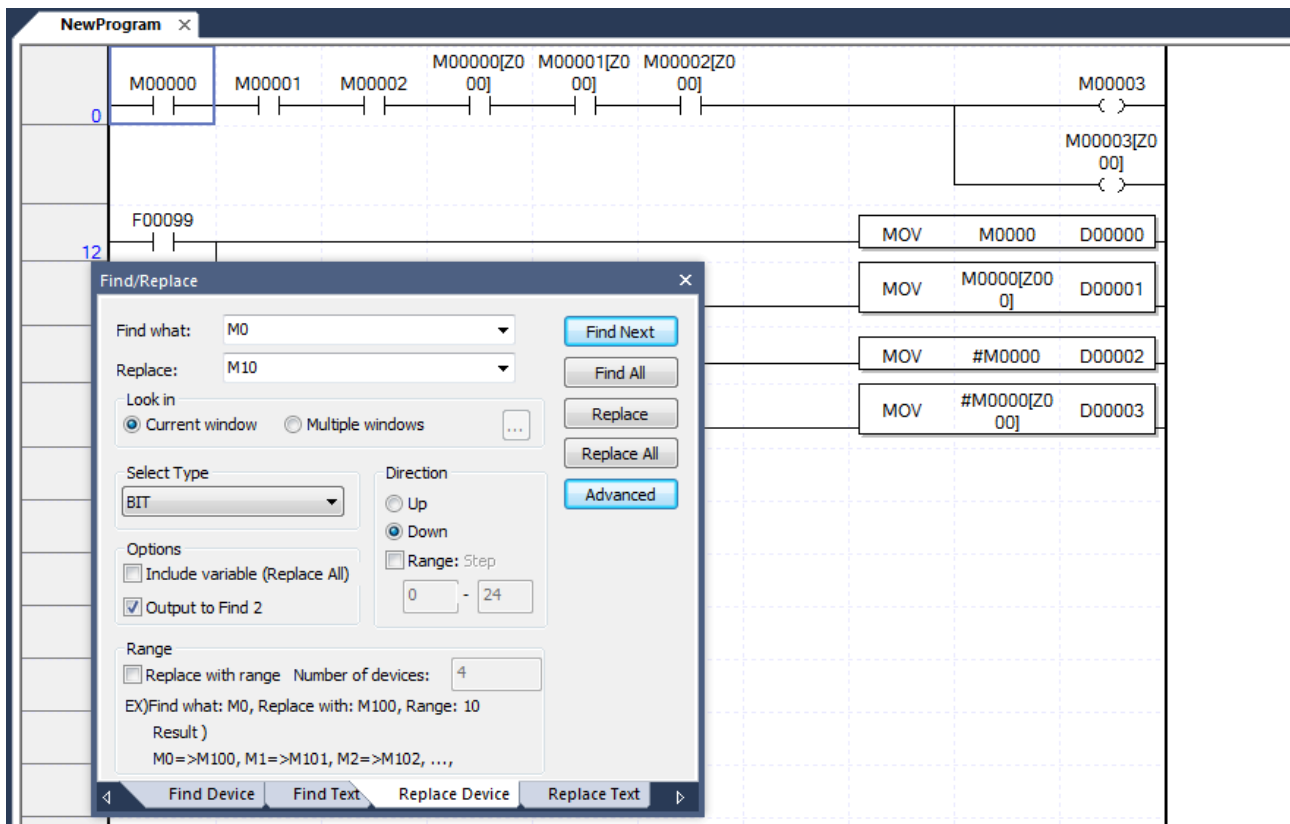2. Select [Find / Replace] - [Replace Device] on the menu.
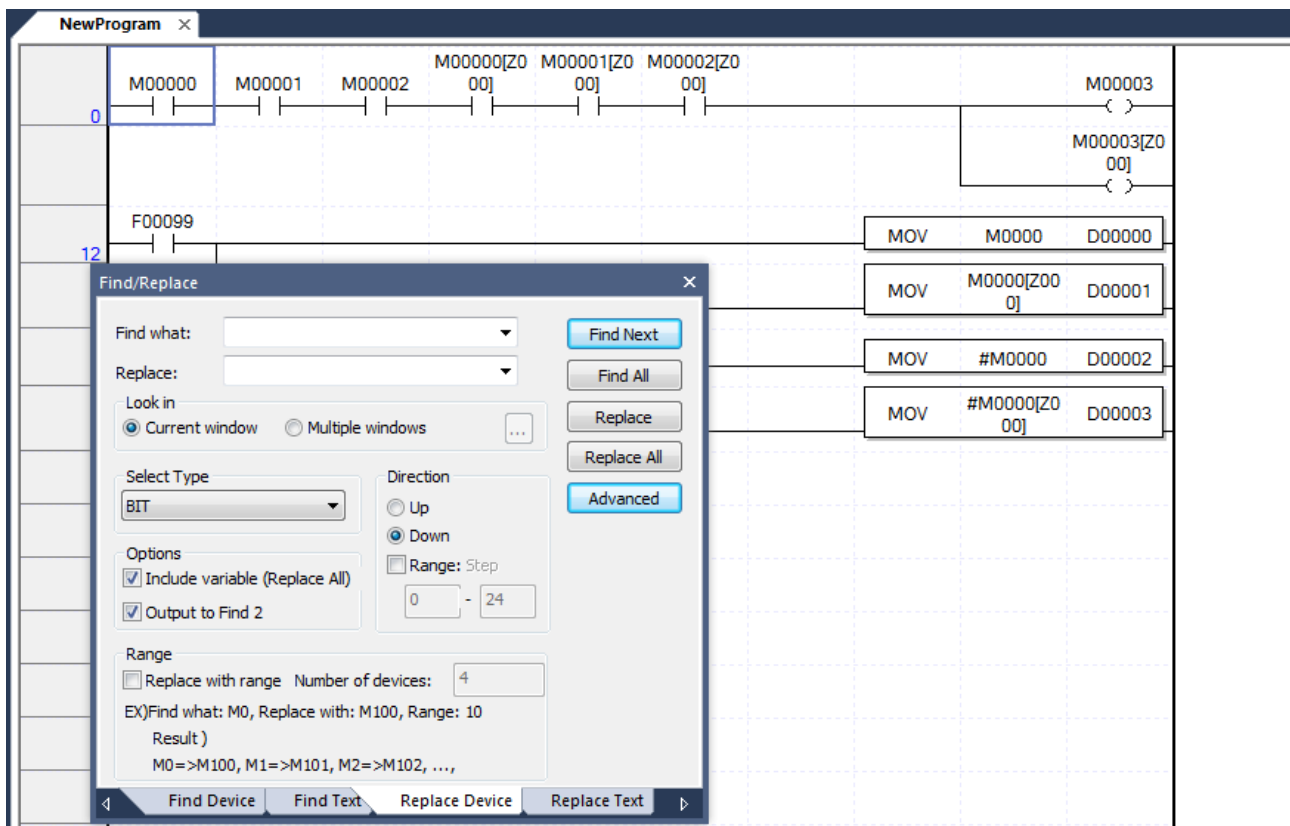
3. Set what to search, content to replace, type selection, direction, and so on.
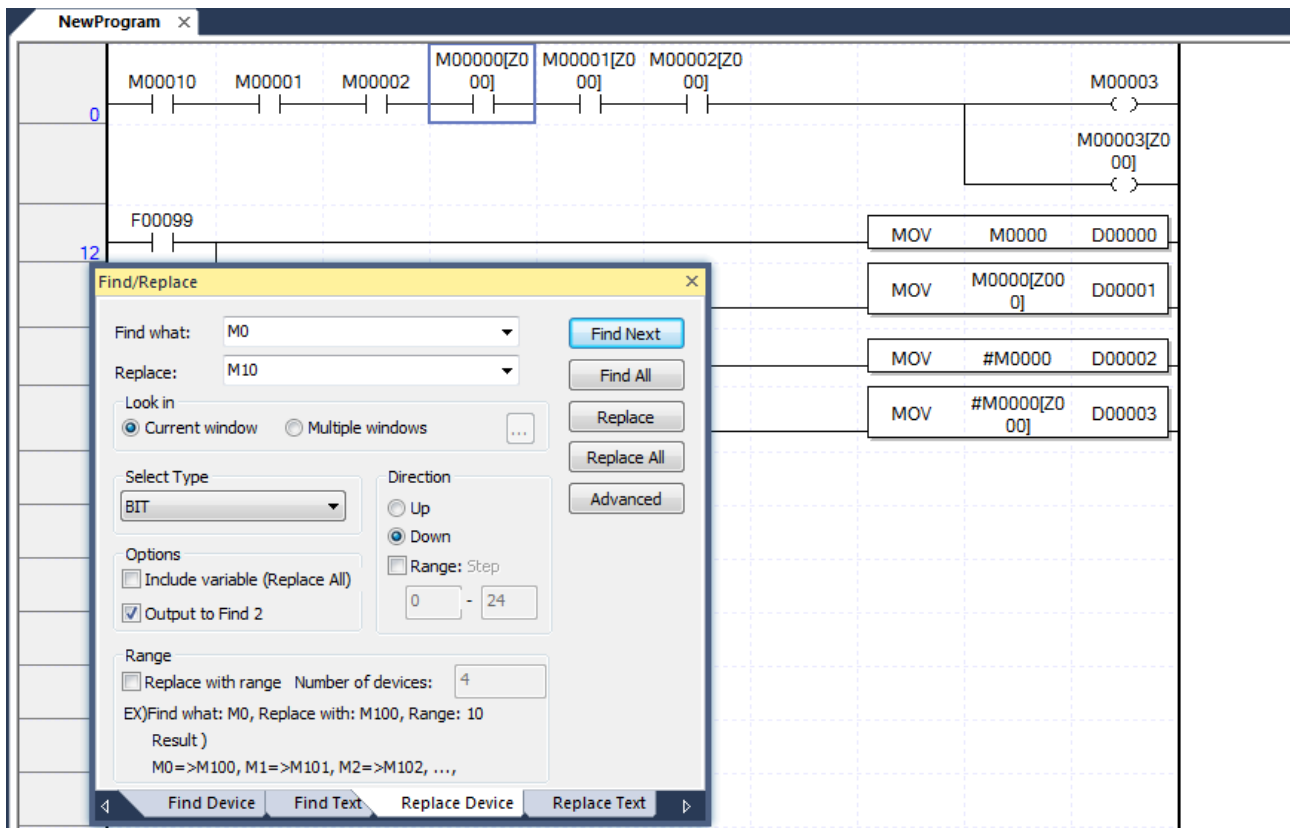
4. Press the Replace button. If the device of the currently selected cell is the same as the one found, replace the current cell with the one set in the dialog box and move to the next cell

This is where the previous replace was made.

Note

- Replace only if the Find and Replace dialog box matches the device and type of the currently selected cell.
- When you click the Replace button, you will be taken to the next cell that matches the find in the Replace dialog box, regardless of whether the Replace is running.
- In the case of Replace, when the Replace Device dialog box is created, it finds and replaces all the current programs based on the selected cell. That is, if the direction is set down, the device that matches the end of the program from the selected cell is found, and then the device that matches from the beginning of the program to the reference cell is found again.
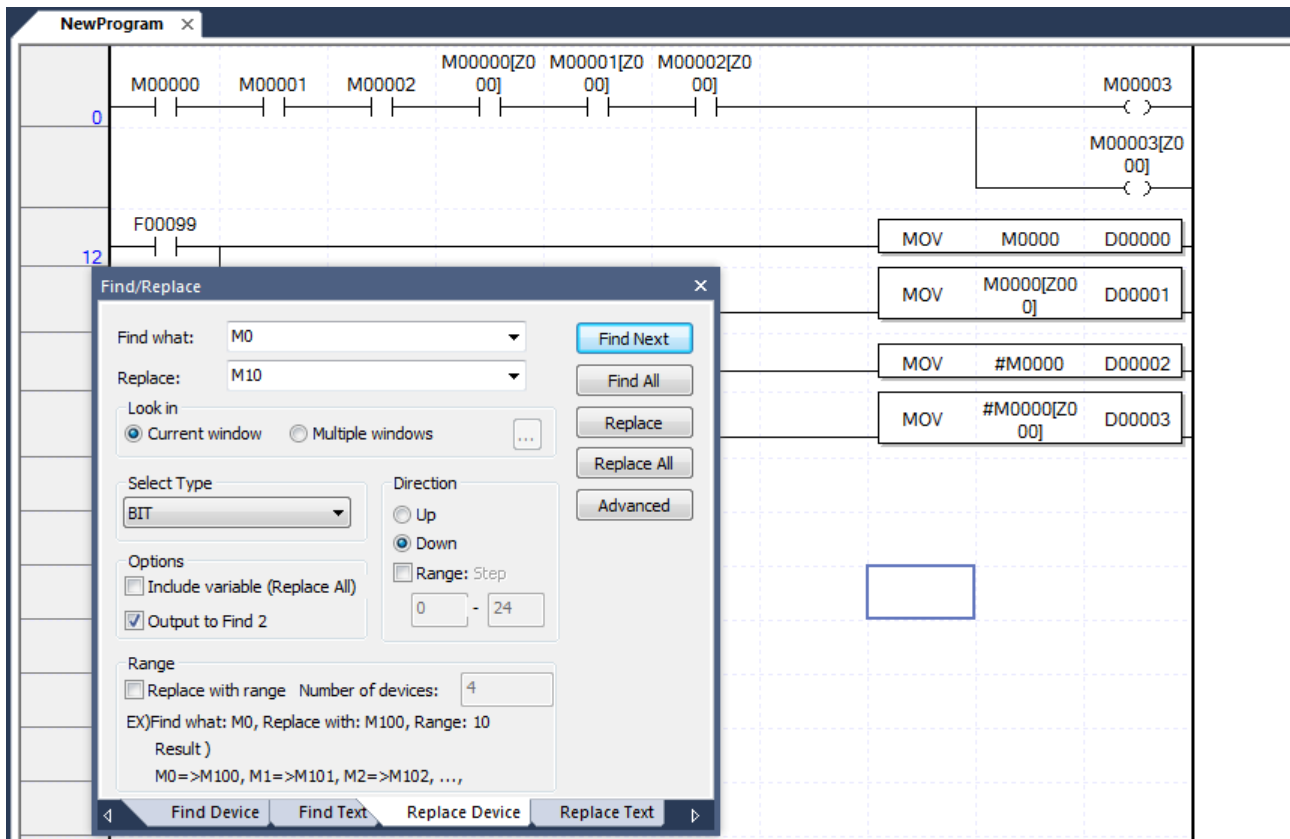
8.3.2 Replace all devices

LD editor, variable / description editor, etc. It is a function to find the device that you have already created. The following is based on LD.

1) Replace All
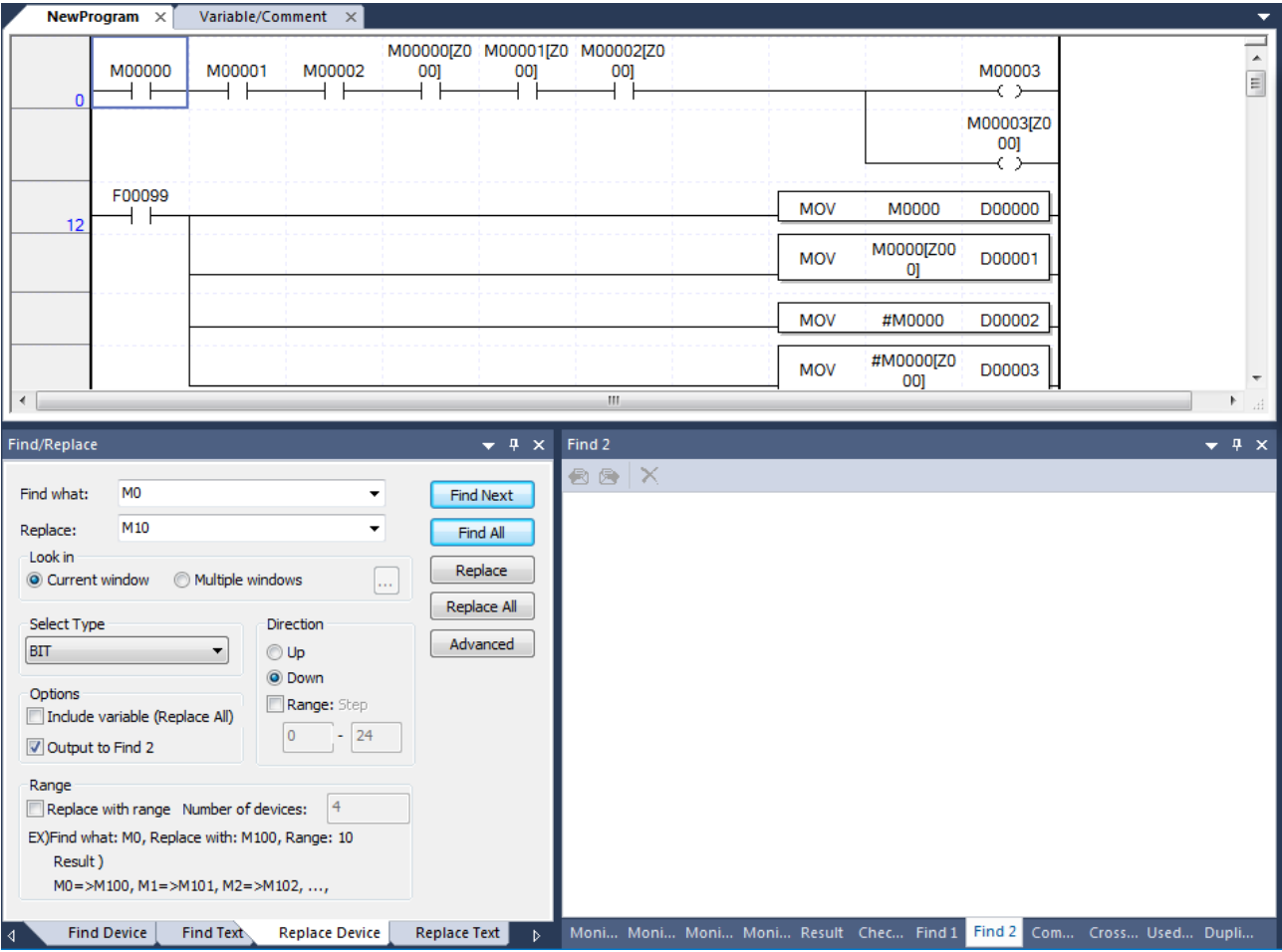
[Steps]

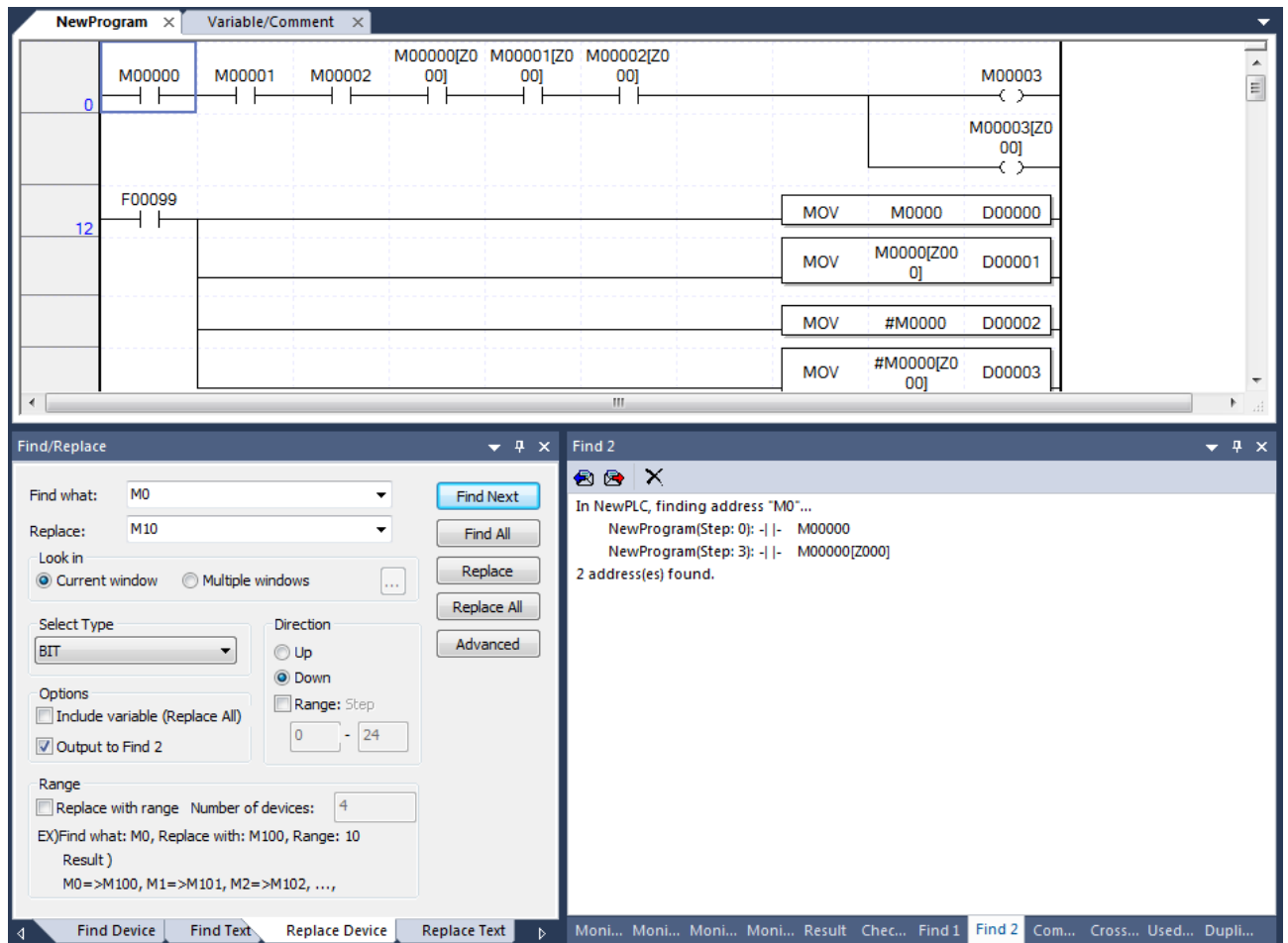Select [Find / Replace] - [Replace Device] on the menu.

1. Set what to search, content to replace, type selection, direction, and so on.

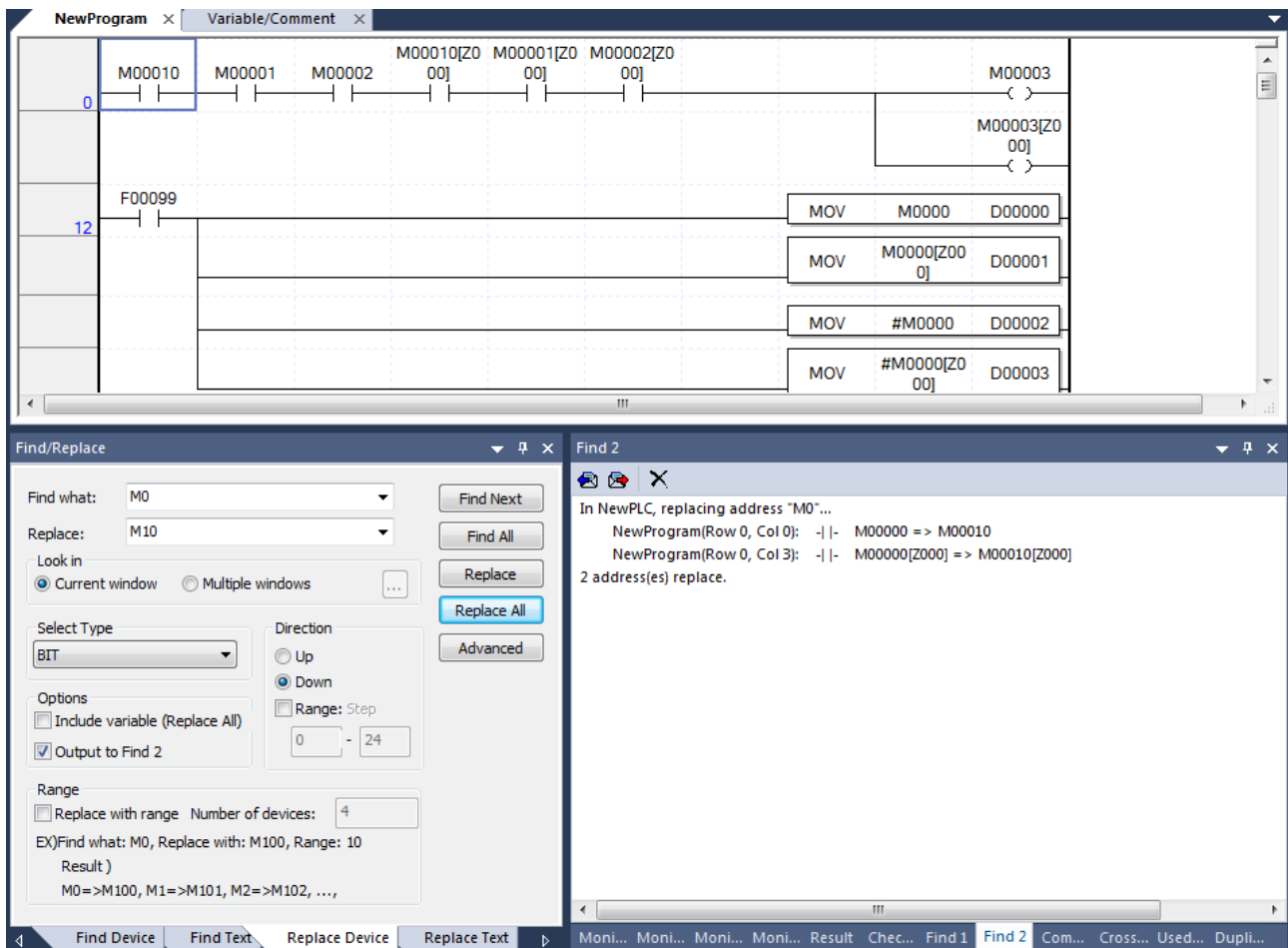2. Click the Find All button. Find all the M0 bit devices in the Find 2 Results window.

3. Press the Replace All button.

4. When all the replaces are completed in the current program, the following message box is created.

2) Replace with range

Batch replace is used to batch replace the sequential devices. In other words, devices from M0000 to M0009 can be replaced from P000 to P0009.

[Steps]

1. Select [Find / Replace] - [Replace Device] on the menu.
2. Set what you want to find, what you want to replace, type selection, direction, etc., and check the Replace with range check box. Set the number of devices to batch replace and the area to be included.
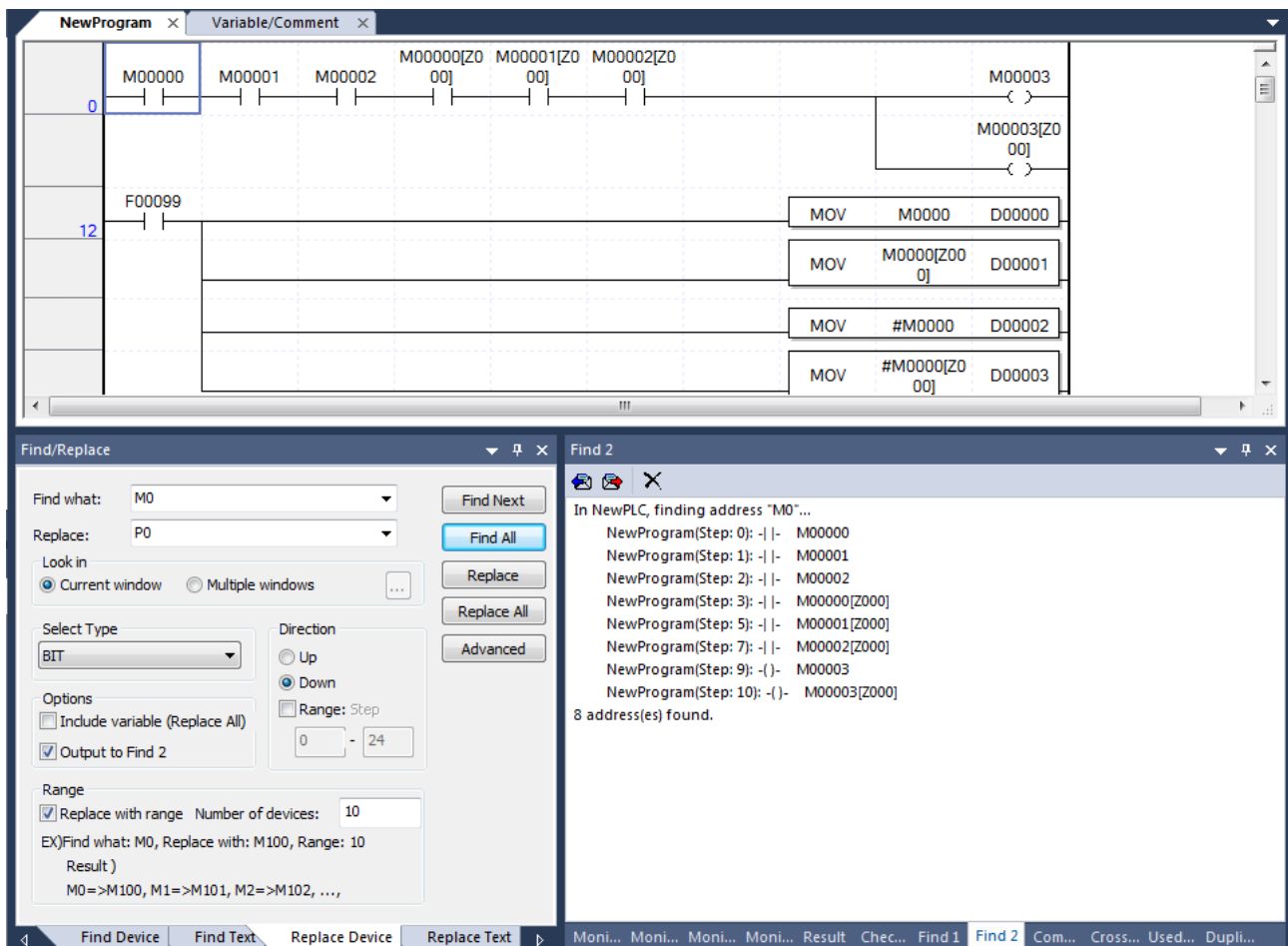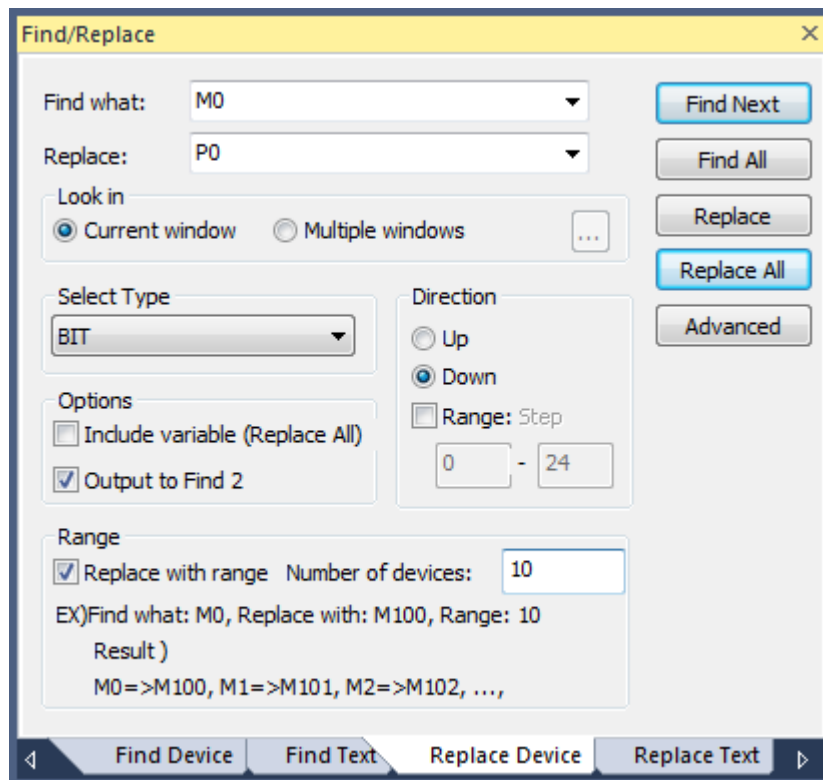
3. Press the Replace All button.
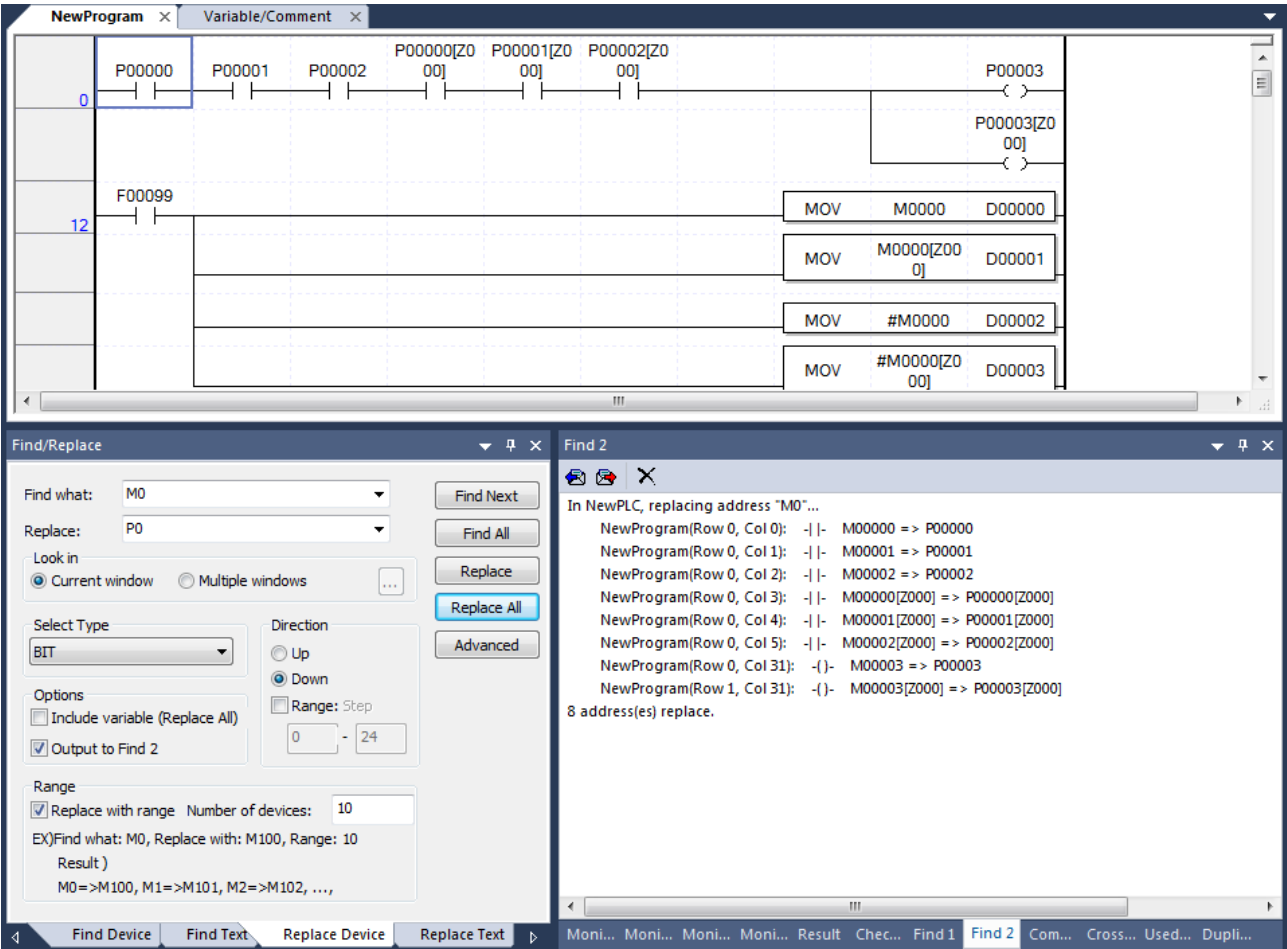
Note
− Batch replaces are available only for devices. Constants can not be replaced in bulk.

8.4 Replace Text

It is a function to search for explanation statements, variables except for devices.

[Dialog Box]

[Description of dialog box]

a.   Find what: Specify the Text you are looking for.

b.   Replace: Specifies the Text to replace.

c.   Look in: Specify the area you are looking for. The current window is only able to find the Text in the active window. Multiple windows can be used to find Text in a project. If you select multiple windows, [Advanced] Button is activated, select an item to search for a Text in the project window.
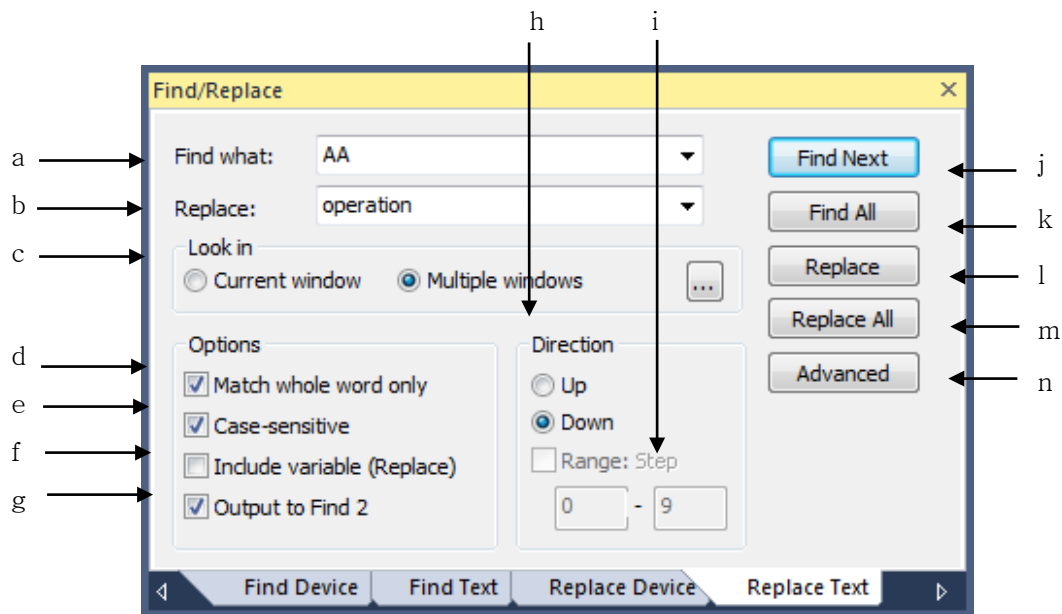
d.   Match whole word only: If you check Exactly matches, only matches Text that exactly match the Text specified in Find. If you do not check it, you will also find the Text that contains the find.

e.   Case sensitive: If you check case-sensitivity, only the case-sensitive Text is searched. If unchecked, it searches without case sensitivity.

f.   Include variable (Replace all): If you check this part, when replacing, the Text including the variable is replaced. If it is not checked, replace it without including variable.

g.   Output to Find 2: The XG5000 has two search result windows. By default, the Find 1 Results pane displays the Find All and Replace All results, but if you select this check box, the results are displayed in the Find 2 Results pane.

h.   direction: In each editor, specify whether to search before or after the currently selected line.

i.   Range: If you select Range, you can perform Text replacement only within a specific line. If you select Specify range, you must enter the start line and the last line.

j.   Find next: Look for the above setting just after the currently selected line (position). If a matching Text is found, the cell moves to where the Text is located.

k.   Find all: It searches all the contents to be set and displays the result in the search result window.

l.   Replace: Find and replace the above settings.

m.   Replace all: Find the contents set above and replace all.

n.   Advanced: This button is used only in the ladder editor. It is used to search only the specific contact, specific coil, extended function, function / function block used in ladder editor.

Note

− The item selection buttons are only visible in the ladder editor.

  The appearance of the dialog box displayed when this button is selected is the same as in Section 8.1, Device Search.

8.4.1 Replace Text

LD editor, variable / description editor, etc. It is a function to find the device that you have already created. The following is based on LD.

[Steps]

1. Select the cell that is the base of the direction.

2. Select [Find / Replace] - [Replace Text] on the menu.

3. Set the Text, selection, and direction you want to replace with the Text you are looking for.
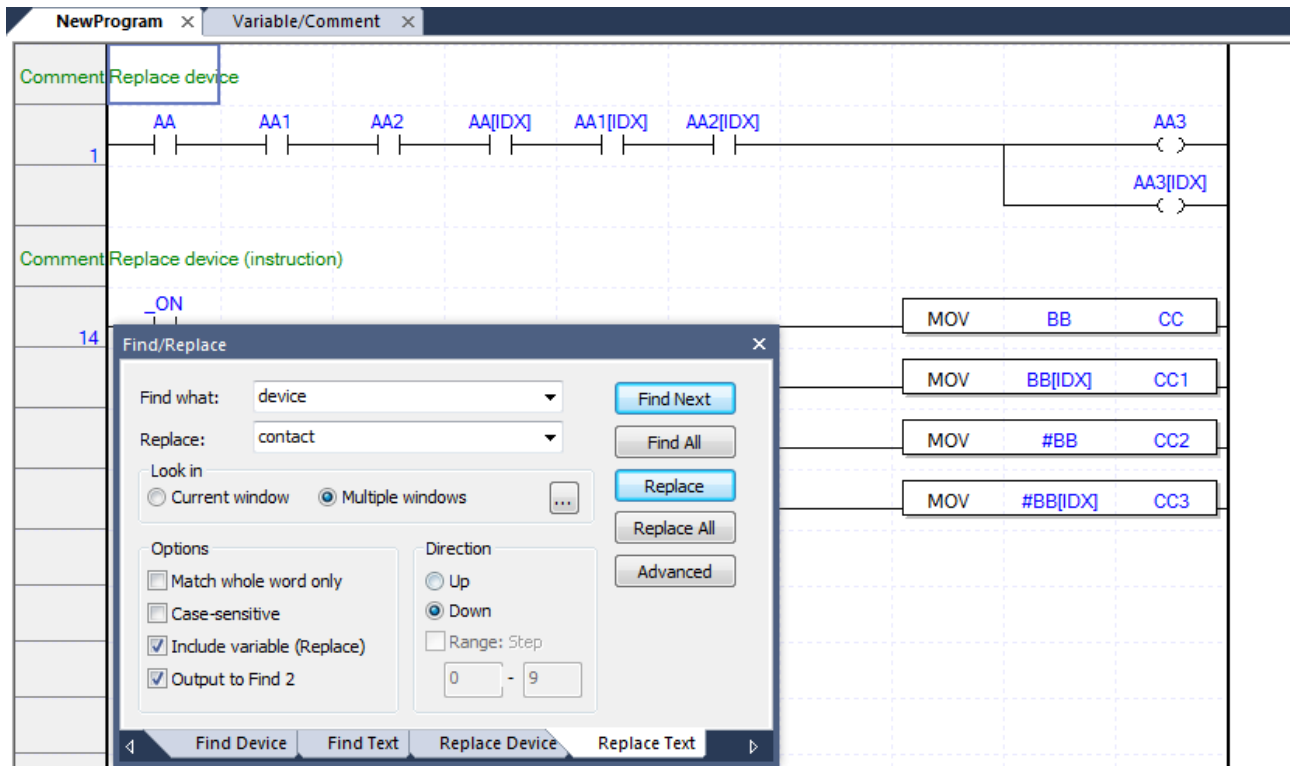
4. Press the Replace button. If the Text of the currently selected cell matches the found one, it replaces the current cell with the one you set in the dialog box and moves to the cell that matches the found one.
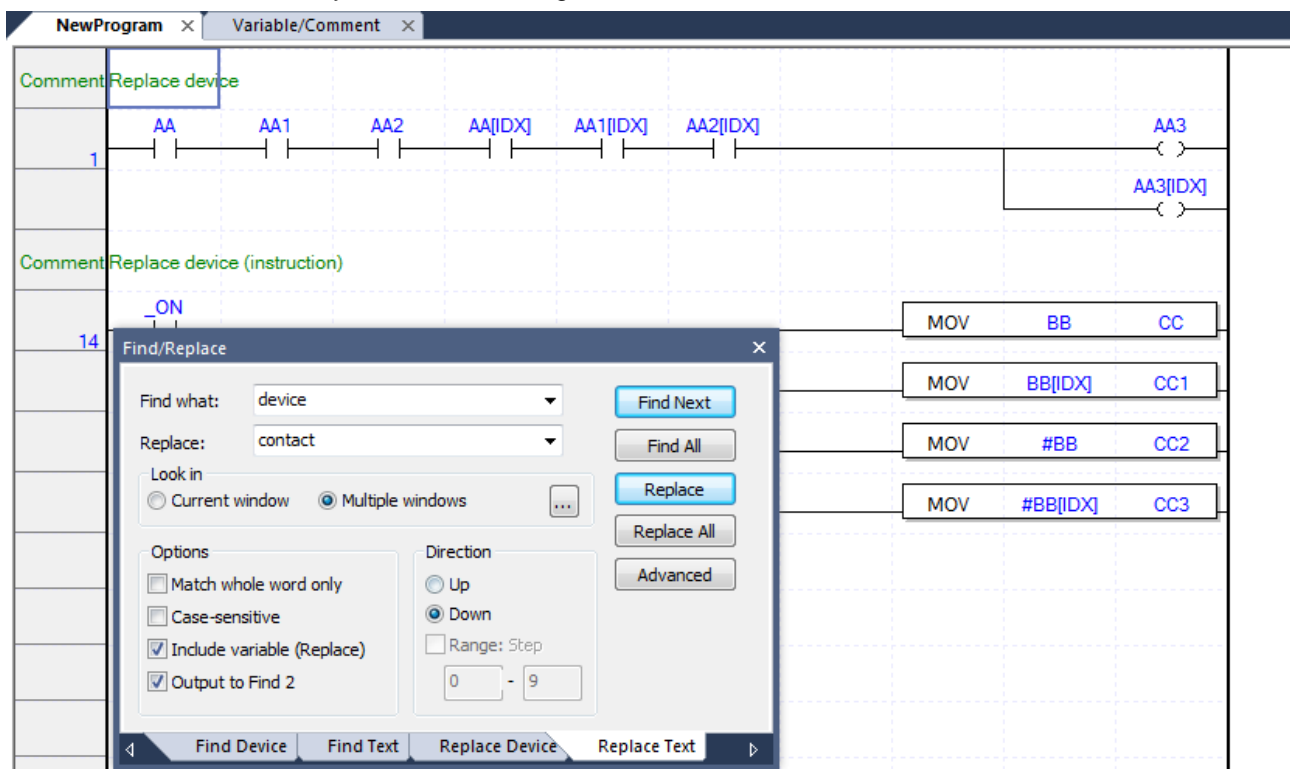
5. If you want to replace the AA variable with the DD variable in the ladder program, you must select the

variable inclusion option when changing and the DD variable must be declared in the variable / explanation window.

6. Press the Replace button. If the Text of the currently selected cell matches the found one, it replaces the current cell with the one you set in the dialog box and moves to the cell that matches the found one.

Note
- Replace is executed only when the Text of the currently selected cell matches the search contents of the dialog box. - When you click the Replace button, you will be taken to the next cell that matches the find in the Replace dialog box, regardless of whether the Replace is running. - In the case of Replace, when the Replace Device dialog box is created, it finds and replaces all the current programs based on the selected cell.

8.4.2 Replace all Text

LD editor, variable / description editor, etc. It is a function to find the device that you have already created. The following is based on LD.

[Steps]

1. Select [Find / Replace] - [Replace Text] on the menu.

2. Set what to search, what to replace, and what to choose.
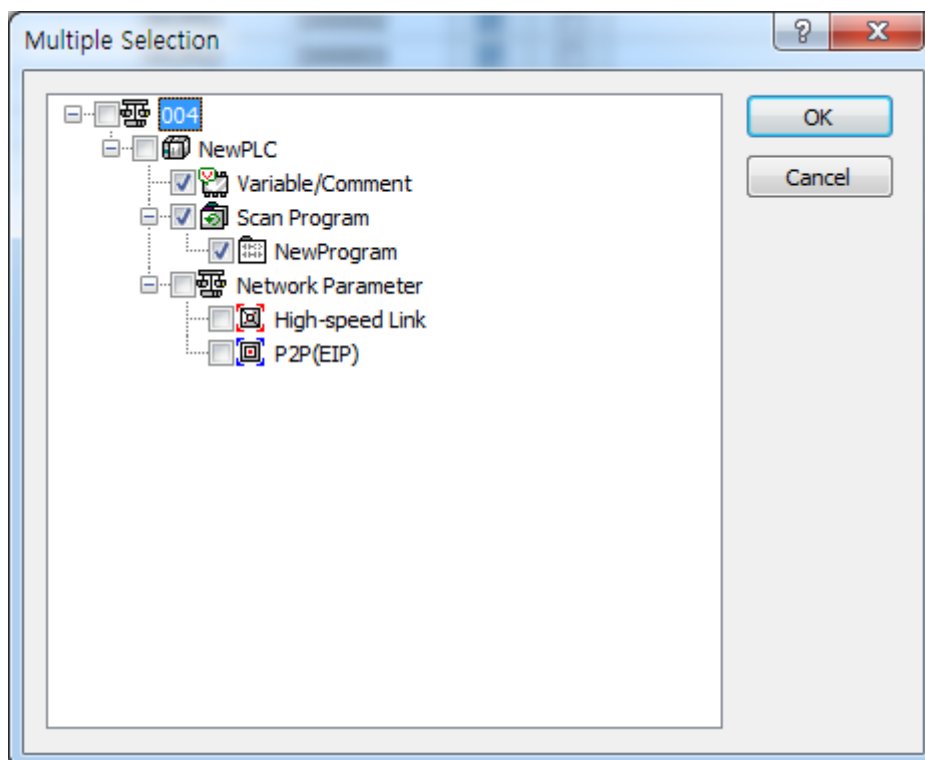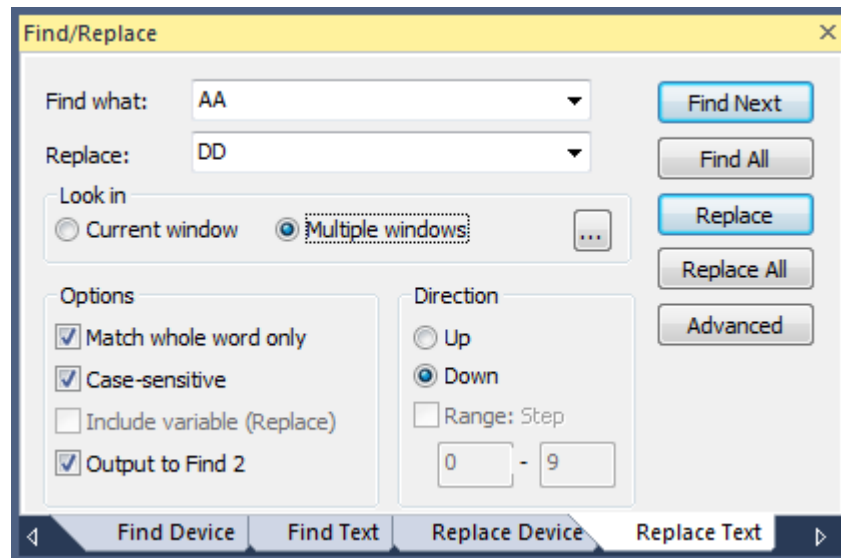
3. Click the Find All button. Find all found results 2 Display in the results window.

4. Press the Replace All button. . All variables used in the variable / description window and the LD program are replaced and displayed in the Find 2 Results window.

8.5 Find Again

Find Again is a feature th at you can use to find a device or find a text search previously. If you have not done this before, it is disabled.

[Steps]
Select [Find / Replace] - [Find Again] on the menu.

Chapter 9 Parameters

9.1   Basic parameter

It is used to specify the basic parameters related with PLC operation.

Notes.
– Please refer to the CPU or Instruction manual for details of basic parameter.

[Steps]

1. On the project tree, double-click [Parameter]-[Basic Parameters].

[Dialog Box]
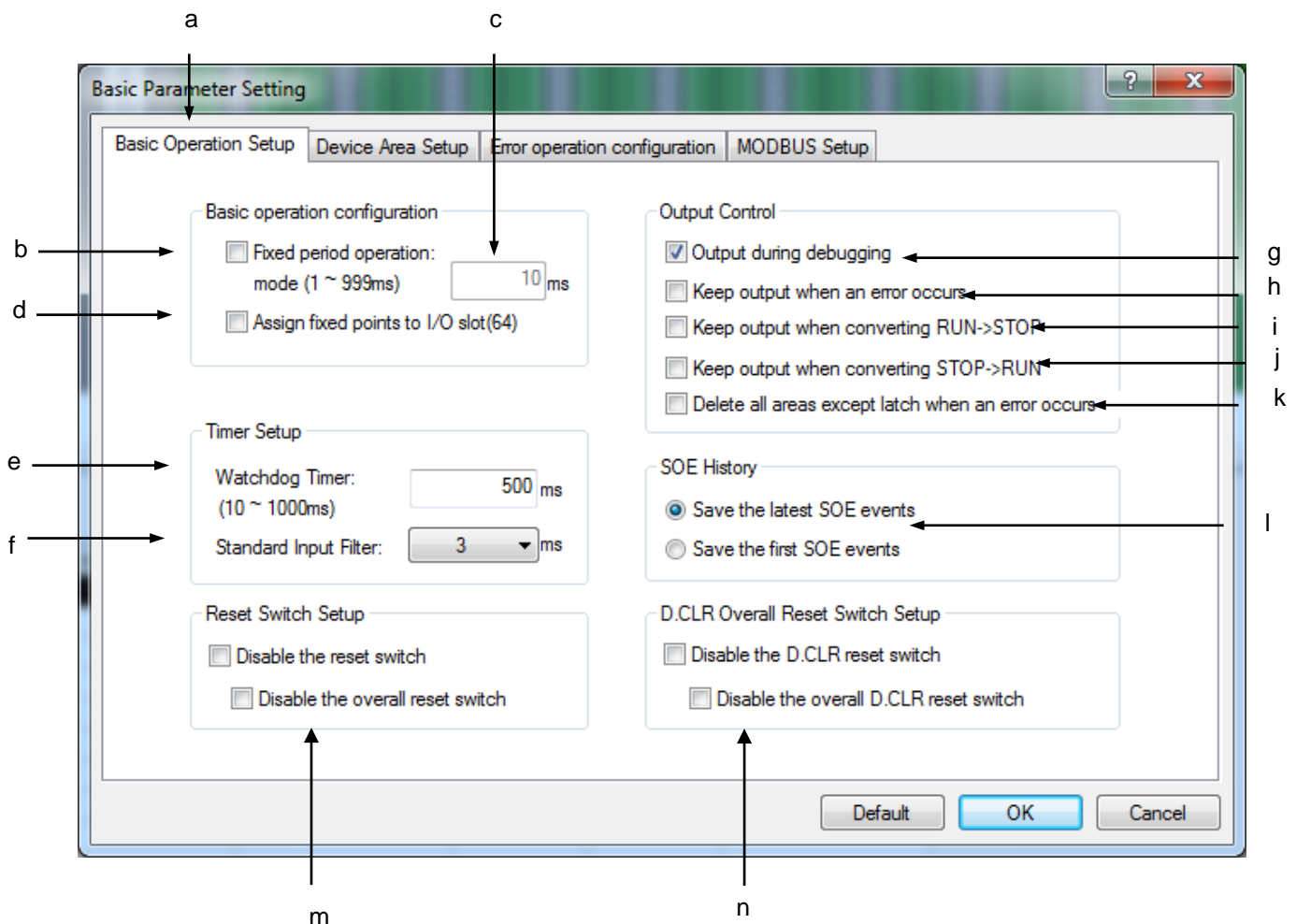
[Description of Dialog Box]

a. Basic Parameters Settings: used to specify setting of basic operation, time and output control of [Basic Parameters] information.

b. Fixed period operation: used to decide to run the PLC program based on the fixed period operation or based on the scan time.

c. If (b) Fixed period operation above is checked, input the operation time in ms unit.

d. Assign Fixed Points to I/O slot (64): used to decide to assign fixed 64 points of memory to I/O slot or to let it assigned freely by the program.

e. Watch Dog timer: used to specify the time value of the scan watch-dog timer to keep PLC from stopping due to program error.

f. Standard input filter: used to specify the standard input value.

g. Output during debugging: used to decide to output the data to the output module as usual or not even while being debugged.

h. Keep Output when an error occurs: used to decide to output the data to the module as usual or not even when an error or a specific input occurs.

i. Keep Output when converting RUN->STOP converted: used to decide to output the data to the module as usual or not even when PLC operation mode is converted from RUN to STOP.

j. Keep Output when STOP->RUN converted: used to decide to output the data to the module as usual or not even when PLC operation mode is converted from STOP to RUN.

k. This is used to decide to delete the memory area with no latch specified in case an error occurs during RUN.

l. Exclusive function for event input module: refer to CH 19 event input module

m. Disable Reset switch: determines whether to disable the Reset switch of CPU module.
   In case of disabling Overall Reset, only Overall Reset is disabled.

n. Disable Reset switch: determines whether to disable the D.CLR switch of CPU module.
   In case of disabling Overall D.CLR, only Overall D.CLR is disabled.

2. Device Area Setup

[Dialog Box]

a   c

b

d

| Basic Parameter Setting | | | | | | |
| Basic Operation Setup | Device Area Setup | Error operation configuration | MODBUS Setup | | | |

Select latch area

Selects the area to save data. If not selected, the set values in right table will be ignored.

☐ Enable area 1   ☐ Enable area 2

Timer Boundary

Kind	Start	End
100ms	0	999
10ms	1000	1499
1ms	1500	1999
0.1ms	2000	2047

Latch Area

Kind	Latch area 1			Latch area 2		
	Use	Start	End	Use	Start	End
D	☐	0	32767	☐	0	0
M	☐	0	2047	☐	0	0
S	☐	0	127	☐	0	0
C	☐	0	2047	☐	0	0
T(100ms)	☐	0	999	☐	0	0
T(10ms)	☐	1000	1499	☐	0	0
T(1ms)	☐	1500	1999	☐	0	0
T(0.1ms)	☐	2000	2047	☐	0	0

Default   OK   Cancel

[Description of Dialog Box]

a. Device Area Setup: used to specify the area to preserve (latch area) of [Basic Parameters] information even when PLC power is off.

b. Select latch area: used to specify data area to preserve. It is the representative flag to control area 1 and area 2 of the right latch area table. If the check box is not selected, value specified in the right latch area table will be ignored.

c. It is used to specify desired latch area for each device, to decide to use the respective device and to select the area. Area 1 and area 2 can not be used as overlapped, and the maximum size of each latch area is the maximum size of the device area.

d. Timer areas are divided into 100ms, 10ms, 1ms and 0.1ms. This area can be selected as the latch area within the specified value of the left timer limit area. Like other devices the areas can not be set as overwritten. The number of timers to use can be adjusted, and the value specified here will have a great influence on the timer of LD diagram or IL program. Default for setting value of each timer is as follows;

T100ms	Start: 0	End: 999
T10ms	Start: 1000	End: 1499
T1ms	Start: 1500	End: 1999
T0.1ms	Start: 2000	End: 2047

When the timer limit specified is the default, the timer will be automatically in 100ms unit with T100 if used in LD diagram. It is because T100 is in the area of T100ms. In order to use the timer with a cycle of 10ms in basic setting, optional address among T1000 ~ T1499 needs to be used. The user can specify the timer area of each cycle to assign more memory areas to the cycle desired to apply more.

In timer limit setting, different cycles can be set as overlapped. In addition, since Start and End of the area are always 0 and 2047 fixed, their modification is unavailable. Each cycle needs to be used with its size divided in this area.

3. Error Operation Setup

[Dialog Box]
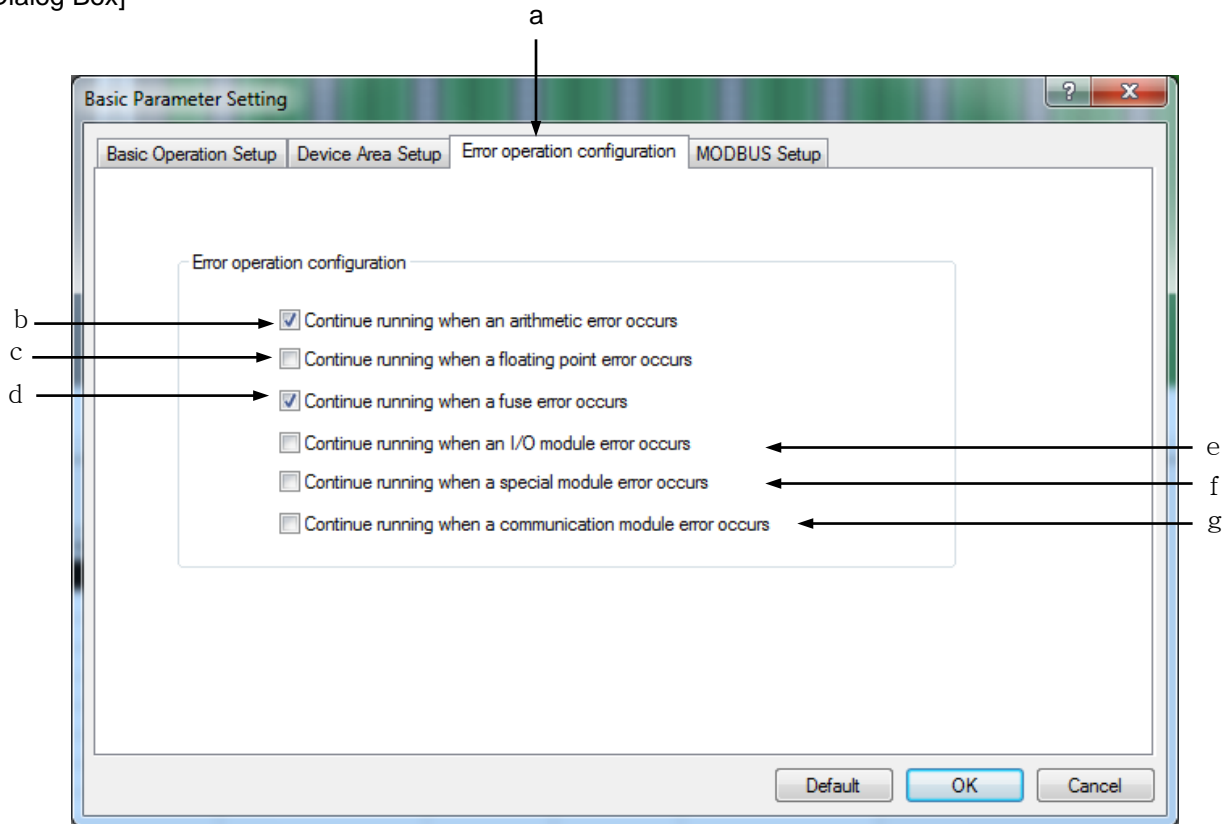
[Description of Dialog Box]

a. This tap is used to specify the operation method when an error occurs on PLC among [Basic Parameters] information.

b. If this option is selected, PLC will continuously run although a arithmetic error occurs during PLC RUN.

c. If this option is selected, PLC will continuously run although a floating decimal point error occurs during PLC RUN.

d. If this option is selected, PLC will continuously run although an error occurs on the fuse connection status of the module during PLC RUN.

e. If this option is selected, PLC will continuously run although an error occurs on I/O module during PLC RUN.

f. If this option is selected, PLC will continuously run although an error occurs on the special module during PLC RUN.

g. If this option is selected, the user can decide to continue the PLC operation or not although an error occurs on the communication module.

4. MODBUS Setup

   The RS-232C port of CPU module can be operated as slave module of MODBUS communication.

[Dialog Box]

a

Basic Parameter Setting

| Basic Operation Setup | Device Area Setup | Error operation configuration | MODBUS Setup |

Connection Setup

b → Station number: 63
c → Data BIT: 8
d → Stop BIT: 1
e → Baud rate: 115200
f → Parity BIT: EVEN
g → Serial mode: ASCII

Memory Area

Digital Input start address: P0000 ← h
Digital Output start address: P1000 ← i
Analog Input start address: D00000 ← j
Analog Output start address: D01000 ← k

*Only WORD variable type is allowed.

Default   OK   Cancel

[Description of Dialog Box]

a. It is used to specify MODBUS basic information among [Basic Parameters] information.

b. It is used to specify the station Number used for MODBUS communication. 0~63 is available for the range.

c. It is used to change the number of data bits used for each String received. It shall be set identical to the value specified in PLC communicating with the user. Most String is transferred in 7 or 8 data bits.

d. It is used to change the time (if time is measured by bit) required to transfer each String.

e. The maximum speed of the data to transfer through this port will be specified in bps (bit/sec). The maximum speed will be normally specified as much as supported by the communicating computer or device.

f. It is used to specify the parity bit.

g. It is used to specify the transference mode. ASCII communication and RTU communication are available.

h. Used to specify the start address of DI (Digital Input) memory area to read through MODBUS, where the value should be specified in Word unit.

i. Used to specify the start address of DO (Digital Output) memory area to read through MODBUS, where the value should be specified in Word unit.

j. Used to specify the start address of AI (Analog Input) memory area to read through MODBUS, where the value should be specified in Word unit.

k. Used to specify the start address of AO (Analog Output) memory area to read through MODBUS, where the value should be specified in Word unit.

9.2 I/O Parameters

It is used to specify the I/O type to be applied to PLC slot and the applicable parameters for each slot.

[Steps]

1. On the project tree, select [Parameter]-[I/O Parameters].

[Dialog Box]

a   b   c   d
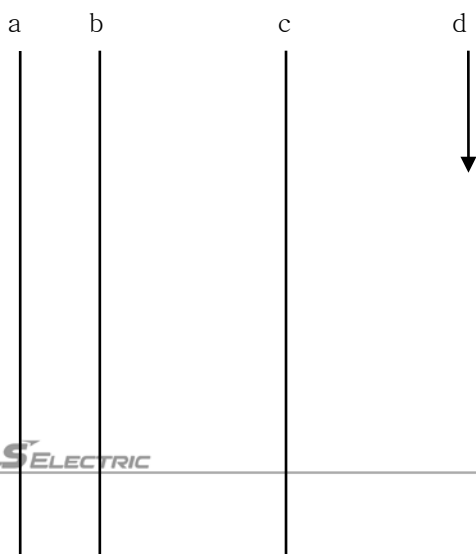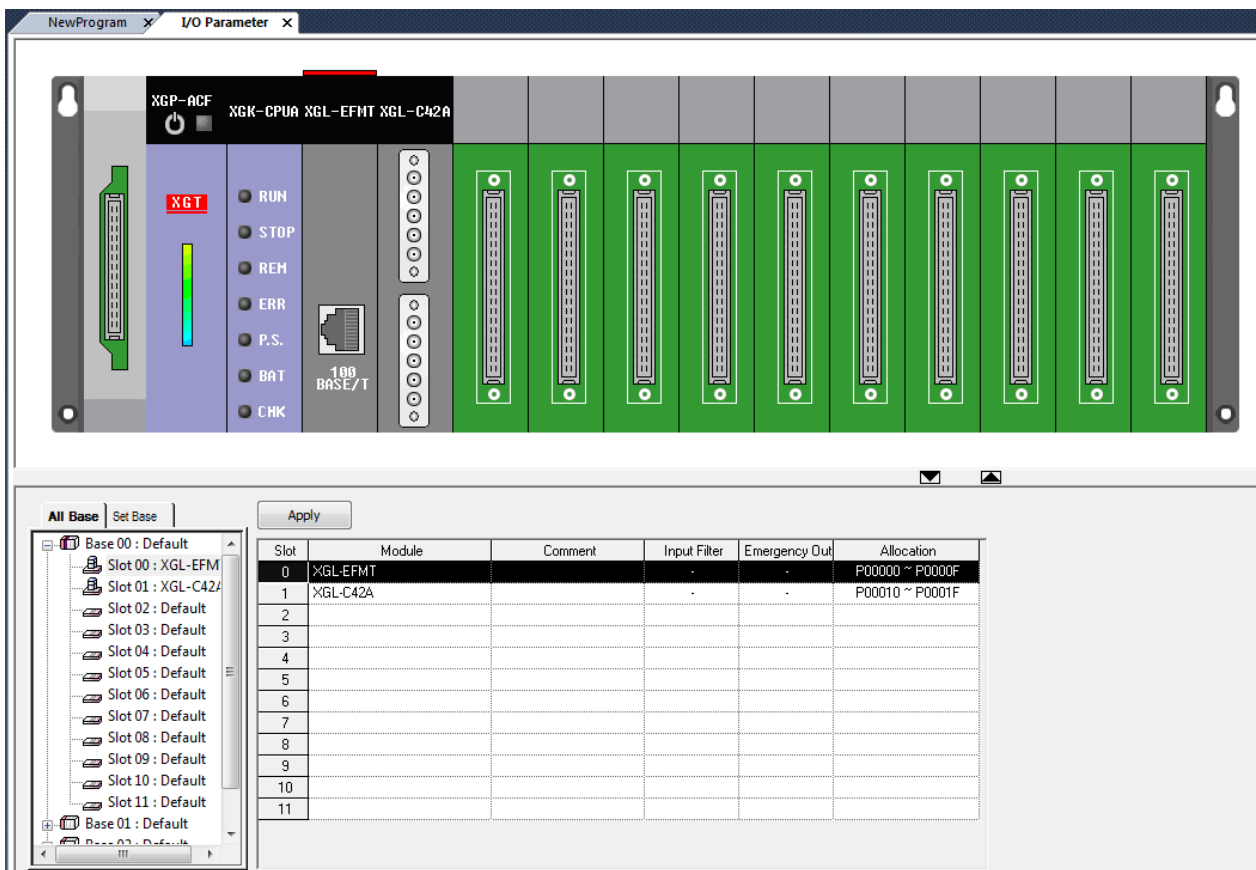
[Description of Dialog Box]

a. All bases: Displays the base module information and the module information by slot. If the module for the slot is not specified, it is displayed as 'default'.

b. Set base: Displays the base selecting module only.

c. Apply: Applies the changed details and closes the dialog box.

d. Module information window: Displays the set module as images.

Notes	

– Fixed point assignment and variable point assignment are available for the module assignment method. The fixed point assignment assigns 64 points collectively to a slot while the variable point assignment depends on the module type. Exceptionally 16 points is assigned to the special/communication module and the empty slot.

The table below shows the differences between variable assignment and fixed assignment, based on the basic base.

Slot	Module Name	Variable Assignment	Fixed Assignment
0	32-point Input	P00000 ~ P0001F	P00000 ~ P0003F
1	64-point Output	P00020 ~ P0005F	P00040 ~ P0007F
2	A/D Module	P00060 ~ P0006F	P00080 ~ P0011F
3	Communication Module	P00070 ~ P0007F	P00120 ~ P0015F
4	16-point Output	P00080 ~ P0008F	P00160 ~ P0019F
Omitted below			

– Refer to 9.1 Basic Parameter for details on the module assignment types.

Notes
– Refer to XG-PD manual for details on the communication module information setting.
– Refer to APM manual for details on the positioning module information setting.

9.2.1 Base Module Information Setting

1) Base Module Information Setting

It is used to specify the base module related information.

[Steps]
1. Select the base module to specify from the device list.
2. Click the right mouse button to select [Base Setting].

[Dialog Box]
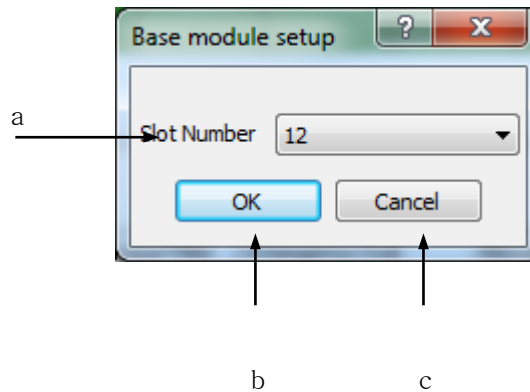
[Description of Dialog Box]

a. Number of Slots: used to input the maximum number of slots.

b. OK: applies the changed items and closes the dialog box.

c. Cancel: closes the dialog box.

Notes
− If the specified number of slots is less than the maximum number of slots, the rest area is unavailable to edit.

2) Base Module Delete

[Steps]

1. Select the base module to delete from the device list.

2. Click the right mouse button to select [Delete Base].

3. [Delete] or [OK] message box will be displayed. Click [OK] button to delete the information of the applicable base module.

9.2.2 Module Information Setting Based on Slots

Module type and detailed module information will be described based on slots

[Steps]

1. Select the slot to specify the module in the slot information.
2. Select the module column to display the module selection box. Or click the right mouse button to select [Edit].

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0	▼				
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

3. Press the selection box to select the module.

⊞ ▤ Digital Module List
⊞ ▥ Special Module List
⊞ ▤ Communication Module List
⊞ ▤ Reserved Module
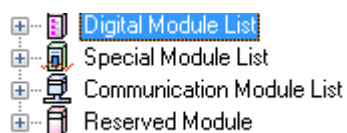
Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0	XGF-AV8A (Voltage, 8-CH) ▼		-	-	P00000 ~ P0000F
1					
2					

4. Select the description column and then click the right mouse button to select [Edit]. And input the description String for the applicable slot.

Notes
- Up to 128 characters in English (up to 64 characters in Korean) is available to input for the module description.

9.2.3 Current consumption for base modules

It displays the total current consumption for the modules attached to the base module.

[Procedures]

1. Click on the right mouse button and select [Current Consumption].
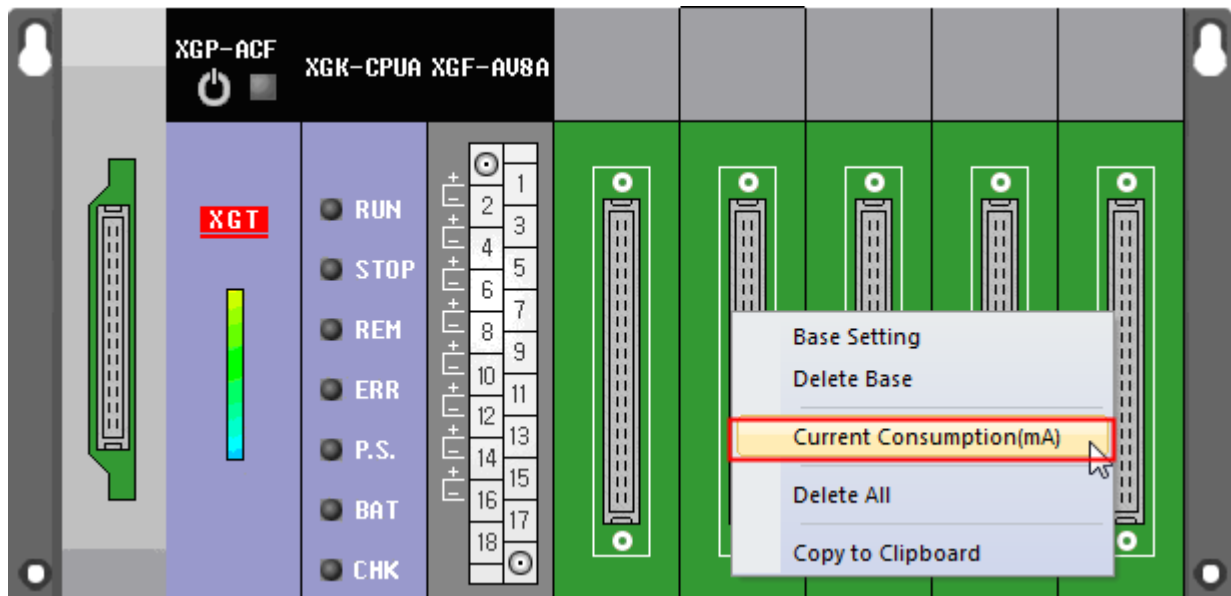
2. Then, the estimated current consumption will be displayed.
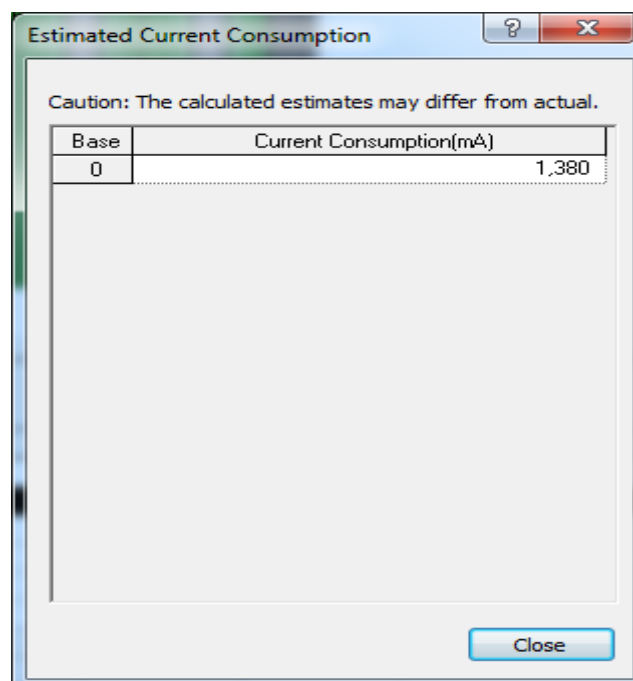
9.2.4 I/O Parameter Edit Function

Data editing details of Copy, Cut and Paste will be described below, based on slots.

1) Copy/Paste

[Steps]

1. Select the slot to copy.

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0	XGI-D22A/B (DC 24V INPU		3 Standard[ms]	-	P00000 ~ P0000F
1	XGQ-RY2A/B (RELAY OU		-	Default	P00010 ~ P0001F
2	XGF-AV8A (Voltage, 8-CH) ▼		-	-	P00020 ~ P0002F
3					
4					
5					
6					
7					
8					
9					
10					
11					

2. Click the right mouse button to select [Copy].

3. Select the slot to paste.

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0	XGI-D22A/B (DC 24V INPU		3 Standard[ms]	-	P00000 ~ P0000F
1	XGQ-RY2A/B (RELAY OU		-	Default	P00010 ~ P0001F
2	XGF-AV8A (Voltage, 8-CH)		-	-	P00020 ~ P0002F
3					
4					
5	▼				
6					
7					
8					
9					
10					
11					

4. Click the right mouse button to select [Paste].

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0	XGI-D22A/B (DC 24V INPU		3 Standard[ms]	-	P00000 ~ P0000F
1	XGQ-RY2A/B (RELAY OU		-	Default	P00010 ~ P0001F
2	XGF-AV8A (Voltage, 8-CH)		-	-	P00020 ~ P0002F
3					
4					
5	XGF-AV8A (Voltage, 8-CH) ▼		-	-	P00050 ~ P0005F
6					
7					
8					
9					
10					
11					

2) Cut/Paste

1. Select the slot to cut.

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0	XGI-D22A/B (DC 24V INPU ▼		3 Standard[ms]	-	P00000 ~ P0000F
1	XGQ-RY2A/B (RELAY OU		-	Default	P00010 ~ P0001F
2	XGF-AV8A (Voltage, 8-CH)		-	-	P00020 ~ P0002F
3					
4					
5	XGF-AV8A (Voltage, 8-CH)		-	-	P00050 ~ P0005F
6					
7					
8					
9					
10					
11					

2. Click the right mouse button to select [Cut].

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0	XGI-D22A/B (DC 24V INPU		3 Standard[ms]	-	P00000 ~ P0000F
1	XGQ-RY2A/B (RELA		-	Default	P00010 ~ P0001F
2	XGF-AV8A (Voltage,		-	-	P00020 ~ P0002F
3					
4					
5	XGF-AV8A (Voltage,		-	-	P00050 ~ P0005F
6					
7					
8					
9					
10					
11					

Edit

Undo   Ctrl+Z
Redo   Ctrl+Y
Cut   Ctrl+X
Copy   Ctrl+C
Paste   Ctrl+V
Delete   Delete

Copy to Clipboard

3. Select the slot to paste.

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0					
1	XGQ-RY2A/B (RELAY OU		-	Default	P00010 ~ P0001F
2	XGF-AV8A (Voltage, 8-CH)		-	-	P00020 ~ P0002F
3					
4					
5	XGF-AV8A (Voltage, 8-CH)		-	-	P00050 ~ P0005F
6					
7					
8					
9					
10					
11					

4. Click the right mouse button to select [Paste].

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0					
1	XGQ-RY2A/B (RELAY OU		-	Default	P00010 ~ P0001F
2	XGF-AV8A (Voltage, 8-CH)		-	-	P00020 ~ P0002F
3					
4	XGI-D22A/B (DC 24V INPU		3 Standard[ms]	-	P00040 ~ P0004F
5	XGF-AV8A (Voltage, 8-CH)		-	-	P00050 ~ P0005F
6					
7					
8					
9					
10					
11					

3) Undo

[Steps]

1. Select the slot to delete.

Slot	Module	Comment	Input Filter	Emergency Out	Allocation
0	XGL-EFMT		-	-	P00000 ~ P0000F
1	XGQ-RY2A/B (RELAY OU		-	Default	P00010 ~ P0001F
2	XGF-AV8A (Voltage, 8-CH)		-	-	P00020 ~ P0002F
3					
4	XGI-D22A/B (DC 24V INPU		3 Standard[ms]	-	P00040 ~ P0004F
5	XGF-AV8A (Voltage, 8-CH)		-	-	P00050 ~ P0005F
6					
7					
8					
9					
10					
11					

2. Click the right mouse button to select [Delete].

3. Click the right mouse button to select [Undo].

4) Redo

[Steps]

1. Click the right mouse button to select [Redo].

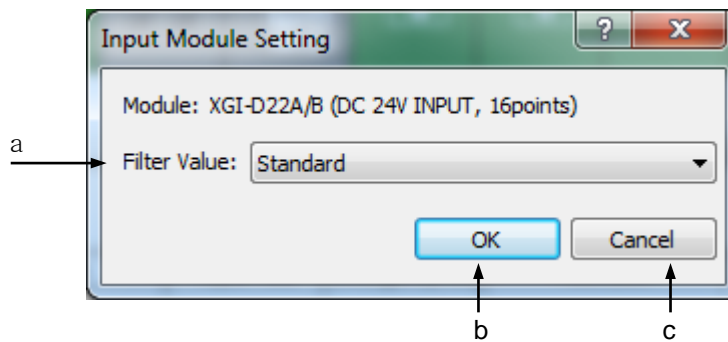| Notes |
| --- |
| – 20 steps are available for Undo and Redo functions. |
| – The shortcut keys used in I/O Parameters Edit can not be used as the user defined shortcut key specified in XG5000. |
| – One click of the mouse will select a single slot. In order to select lots of slots, drag the slot columns where the slot number is displayed as many as desired. |

9.2.5 Detailed Module Information Setting

How to set the detailed module information will be described. Double-click the mouse or click [details] button for the detailed module information setting.
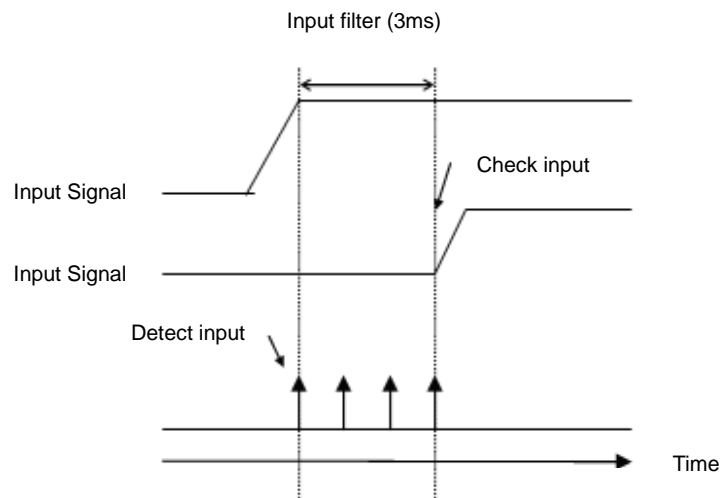
1) Input module
[Dialog Box]

[Description of Dialog Box]
a. Filter: used to specify the filter constant value for the input.
b. OK: applies the specified details and closes the Dialog Box.
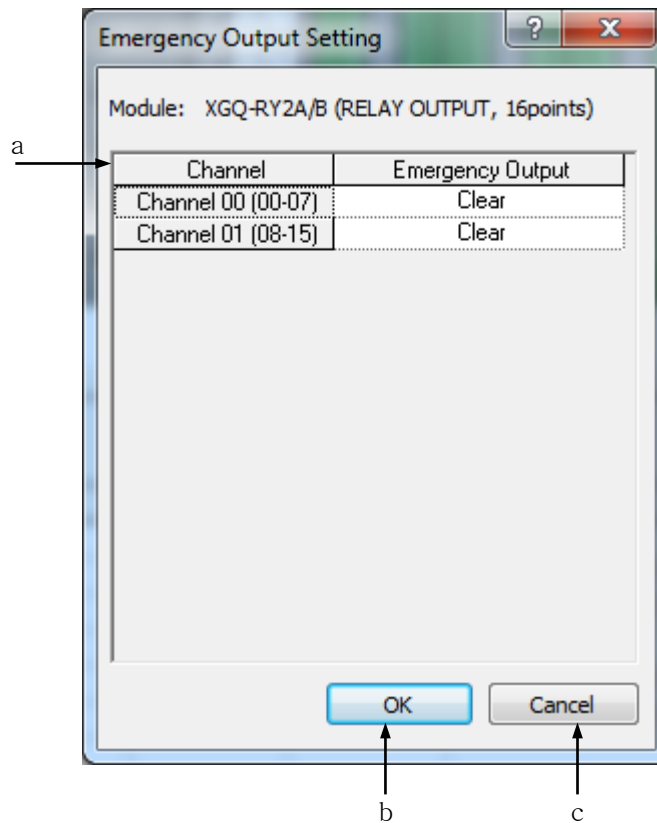c. Cancel: closes the Dialog Box.

> **Notes**
>
> - Input module with the input of AC can not specify the filter value.
> - Standard value of the input filter shall be specified in basic parameters. Refer to 9.1 Basic Parameters for details on the Basic Parameters.
> - The input filter used to inspect the input signal will process the applicable signal as normal input if kept identical for the filtering time. The figure below is with the input filter value of 3ms. As the input signal is kept identical for 3ms from the moment detected by specific level, it will be processed as normal input in 3ms.
>
> Input filter (3ms)
>
> Input Signal
>
> Check input
>
> Input Signal
>
> Detect input
>
> Time

2) Output module

[Dialog Box]

[Description of Dialog Box]
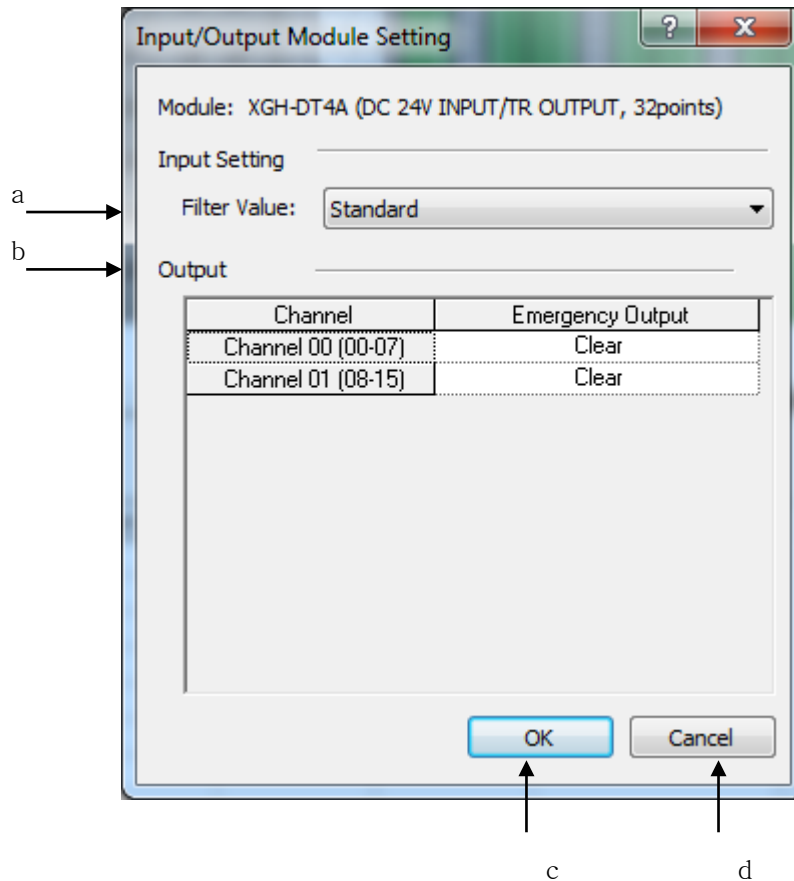
a. Channel: one channel is assigned for 8 points, and the emergent output mode can be specified per channel.

b. OK: applies the specified items and closes the Dialog Box.

c. Cancel: closes the Dialog Box.

Notes
– Emergent output value will be specified in emergency like the stopped CPU during RUN
– Default for the emergent output is Hold.

3) I/O module

[Dialog Box]

[Description of Dialog Box]

a. Filter Value: used to specify filter constant value for the input.

b. Output setting: used to specify detailed information for the output.

c. OK: applies the changed items and closes Dialog Box.

d. Cancel: closes Dialog Box.

Notes
– I/O module is of mixed type of input module and output module. The input part has the characteristics identical to the input module, and the output part identical to the output module.

4) Interrupt Module

Interrupt or Pulse-Catch mode is available for each channel. Rising/Falling condition is also available to specify for the bit of each channel.

[Dialog Box]

[Description of Dialog Box]

a. Filter Value: used to specify filter constant value for the input.

b. SOE History management: In case the module has no space to save events any more.

c. Use External Time: You can select the base time; internal or external time

d. Event setting details: set up the input condition of the event

e. OK: applies the changed items and closes the Dialog box.

f. Cancel: closes the Dialog box.

Notes

- If you want get more information about parameter setting, see the SOE module user manual.

---

5) Module Reservation

It assigns the points of module only without any specific module specified. 16, 32 and 64 points are available for the assignment.

6) A/D Module

On the I/O Parameter Setting Dialog box select A/D module and then click [Details] to display the Parameter Setting Dialog box as shown below.

[Dialog Box]

XGF-AV8A (Voltage, 8-CH)

XGF-AV8A (Voltage, 8-CH)

Parameter	CH 0	CH 1	CH 2	CH 3	CH 4	CH 5	CH 6	CH 7
☐ Channel status	Disable ▼	Disable	Disable	Disable	Disable	Disable	Disable	Disable
☐ Input range	1~5V	1~5V	1~5V	1~5V	1~5V	1~5V	1~5V	1~5V
Output type	0~16000	0~16000	0~16000	0~16000	0~16000	0~16000	0~16000	0~16000
☐ Filter process	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable
Filter constant	1	1	1	1	1	1	1	1
☐ Average setting	Disable	Disable	Disable	Disable	Disable	Disable	Disable	Disable
☐ Average processing	Count-Avr	Count-Avr	Count-Avr	Count-Avr	Count-Avr	Count-Avr	Count-Avr	Count-Avr
Average value	2	2	2	2	2	2	2	2

OK   Cancel

[Description of Dialog Box]

a. All Parameters Settings: after the white check box selected on the left of the parameter names, change the parameter item value to change all channels' applicable parameter value.

b. Maximum/Minimum Value Display: as for the parameter item to input figures, if the user inputs data, an applicable range will be displayed on the bottom of the dialog box automatically. If the user changes the parameter value to any other value than the default, the String color will change [Black]→[Blue].

c. OK: applies the changed items and closes the dialog box.

d. Cancel: closes the dialog box.

e. Parameter Setup: The parameter data can be setup by select in combo box or input data, and refer to the table below for choices or range of each parameter.

[Description of Parameter item]

Parameter	Setting Items	Default
Channels	Disable/Enable	Disable
Input Range	1~5V/0~5V/0~10V/-10~10V (Voltage Type)	1~5V
	4~20mA/0~20mA (Current Type)	4~20mA
Output Type	0~16000/-8000~8000/1000-5000/0~10000%	0~16000
	(Input range changes based on items)	
Filter Process	Disable/Enable	Disable
Filter Constants	1-99	1
Average Process	Disable/Enable	Disable
Average Method	Count Average/Time Average	Count Average
Average Value	Count Average 2-64000, Time Average 4-16000	2

Table 1. A/D Module Parameter Item

7) D/A Module

On the I/O Parameters Setting Dialog box, select D/A module and then click [Details] to display the Parameters Setting dialog box as shown below.

[Dialog Box]

[Description of Dialog Box]

a. All Parameters Settings: after the white check box selected on the left of the parameter names, change the parameter item value to change all channels' applicable parameter value. If the user changes the parameter value to any other value than the default, the String color will change [Black]→[Blue]

b. OK: applies the changed items and closes the Dialog box.

c. Cancel: closes the Dialog box.

d. Parameter Setup: The parameter data can be setup by select in combo box or input data, and refer to the table below for choices or range of each parameter.

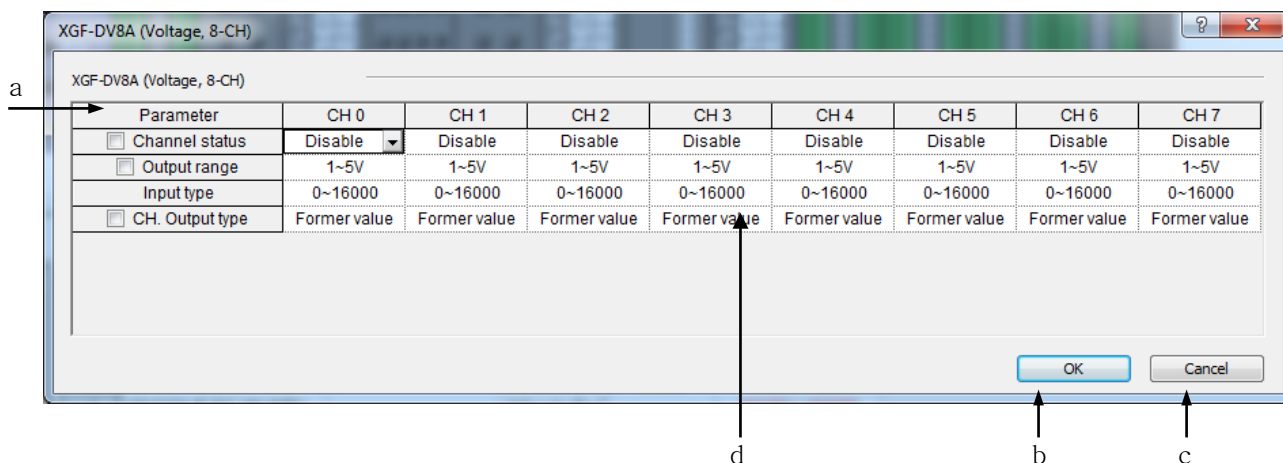[Description of Parameter item]

Parameter	Setting Items	Default
Channels	STOP/RUN	STOP
Output Range	1~5V/0~5V/0~10V/-10~10V (Voltage Type) 4~20mA/0~20mA (Current Type)	1~5V 4~20mA
Input Type	0~16000/-8000~8000/1000-5000/0~10000% (changed based on output range)	0~16000
Channel Output Type	Previous/minimum/middle/maximum Value	Previous Value

Table 1. D/A Module Parameter Item

8) High-speed Counter Module

On the I/O Parameters Setting Dialog box, select HighSpeed counter module and then click [Details] to display the Parameters Setting Dialog Box as shown below.

[Dialog Box]

[Description of Dialog Box]

a. Parameter Area: displays the parameter item. And if the user changes the parameter value to any other value than the default, the String color will change [Black]→[Blue].

b. Maximum/Minimum value Display: as for the parameter item to input figures, if the user inputs data, an applicable range will be displayed on the bottom of the dialog box automatically.

c. OK: applies the changed items and closes the Dialog Box.

d. Cancel: closes the Dialog Box.

e. Parameter Setup: The parameter data can be setup by select in combo box or input data, and refer to the table below for choices or range of each parameter.

[Description of Parameter items]

Parameter	Setting Items	Default
Counter Mode	Linear Counter/Ring Counter	Linear Counter
Pulse Input Mode	2-phase 1-multiplier/2-phase 2-multiplier/ 2-phase 4-multiplier/CW-CCW/ 1-phase 1-input 1-multiplier/ 1-phase 1-input 2-multiplier/ 1-phase 2-input 1-multiplier/1-phase 2-input 2-multiplier	2-phase 1-multiplier

Additional Function Mode	N/A/Count clear/Count latch/ Sampling count/Measure input frequency / Measure rotations per unit time/Count Disable	N/A
Range Value [msec]	0-60000	0
Compared Output 0 Mode	(Single Compare) less/(Single Compare) less or equal/ (Single Compare) equal/(Single Compare) equal or greater/ (Single Compare) greater/(Section Compare) included/ (Section Compare)excluded	(Single Compare) less
Compared Output 1 Mode	As identical as specified above	(Single Compare) less
Preset Input Value	-2147483648-2147483647	0
Ring Counter, Minimum Value	-2147483648-2147483647	0
Ring Counter, Maximum Value	-2147483648-2147483647	0
Compared Output 0 Minimum Setting Value	-2147483648-2147483647	0
Compared Output 0 Maximum Setting Value	-2147483648-2147483647	0
Compared Output 1 Minimum Setting Value	-2147483648-2147483647	0
Compared Output 1 Maximum Setting Value	-2147483648-2147483647	0
Number of Pulses per Rotation	0-60000	0
Frequency Display mode	1Hz/10Hz/100Hz/1000Hz	1Hz

Table 1. HS Counter Parameter Items

> **Notes**
> - "Number of Pulses per Rotation" item among High-speed counter parameter items will be active when the Additional Function Mode is set to "Measure rotations per unit time".
> - Refer to APM manual for details on the positioning module.
> - Refer to XGPD manual for details on the communication module.
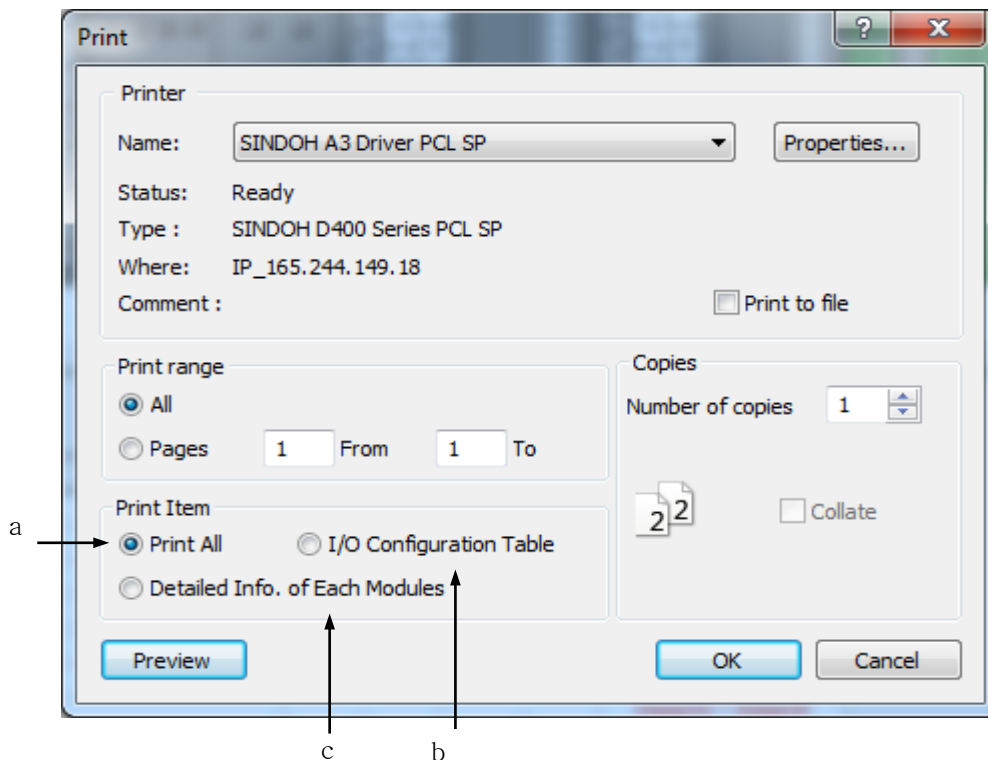
9.2.6 I/O Parameter Print Function

This function is used to print the specified I/O parameter and detailed module information specified.

1) Print Option Setting

[Sequence]

1. On I/O Parameter Dialog Box, select [Print Button]-[Print].

[Dialog Box]

[Description of Dialog Box]

a. Print All: prints all I/O configuration table and detailed module information.

b. I/O Configuration Table: prints I/O parameter's module setting details based on slots, description and I/O information assigned.

c. Detailed Information of Each Modules: prints the detailed module information for specified slot module.

2) Print Preview

[Sequence]

1. Select [Print Button]-[Print] on the I/O Parameter Dialog Box.

2. Click [Preview] on the [Print Dialog Box].

3) Copy to Clipboard

It is used to print the I/O parameter table to the clipboard, thus to add onto the String editor, word processor or spread sheet.

[Sequence]

1. Select [Print Button]-[Copy to Clipboard] on the I/O parameter Dialog Box.

Notes

- While printing clipboard, the print options are not available but always I/O configuration table only available to print.

9.3 Device Auto-allocation Parameter

To allocate device to automatic variable automatically, sets device area
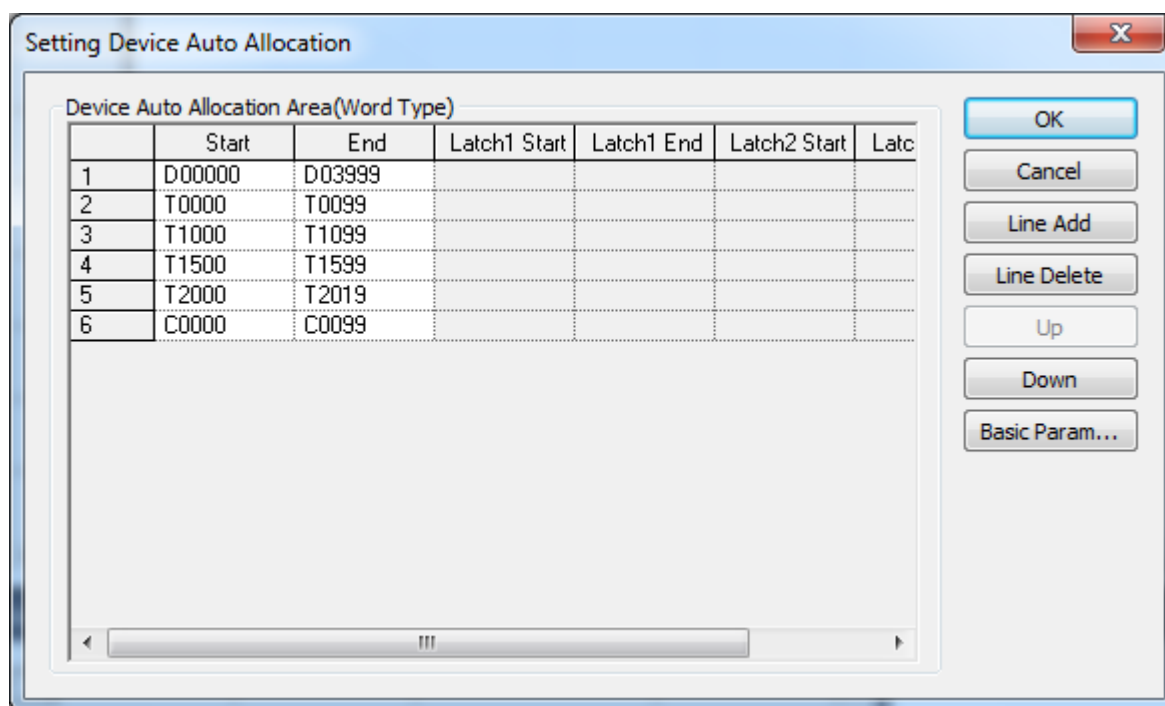
You can change position of device

[Steps]

1. Double-click [Parameter]-[Device Auto-allocation Parameter]

1) Basic operation setting

[Dialog box]

	Start	End	Latch1 Start	Latch1 End	Latch2 Start	Latc
1	D00000	D03999				
2	T0000	T0099				
3	T1000	T1099				
4	T1500	T1599				
5	T2000	T2019				
6	C0000	C0099				

Setting Device Auto Allocation — Device Auto Allocation Area(Word Type)

OK / Cancel / Line Add / Line Delete / Up / Down / Basic Param...

[Description of dialog box]

a. Order: according to order, memory allocation is done in order from upper line to lower line.

b. Start: inputs start position of word device

c. End: inputs end position of word device.

d. OK: in case declared device changes, memory is allocated again and close dialog box

e. Cancel: doesn't apply the changed device and close dialog box

f. Line add: adds device applied to memory allocation

g. Line Delete: delete device applied to memory allocation

h. Up: Changes the memory allocation order up.

i. Down: changes the memory allocation order down.

j. Basic parameter: shows basic parameter dialog box to change device area and latch status

---

Note

− If one line is not effective, it is shown as pink color

− D, M, T, C area are available for device auto-allocation area

− One device can be set with diverse parts

− Start device should be smaller than End device or equal

− In case of timer, sets 4 types (0.1, 1, 10, 100ms) of timer auto-allocation area (TIMER0_1, TIMER1, TIMER10, TIMER100 timer type)

− For Latch 1 start, Latch 1 End, Latch 2 Start, Latch 2 End, refer to basic parameter information and displays

---

Chapter 10 Online

Available functions only with PLC connected will be described below.
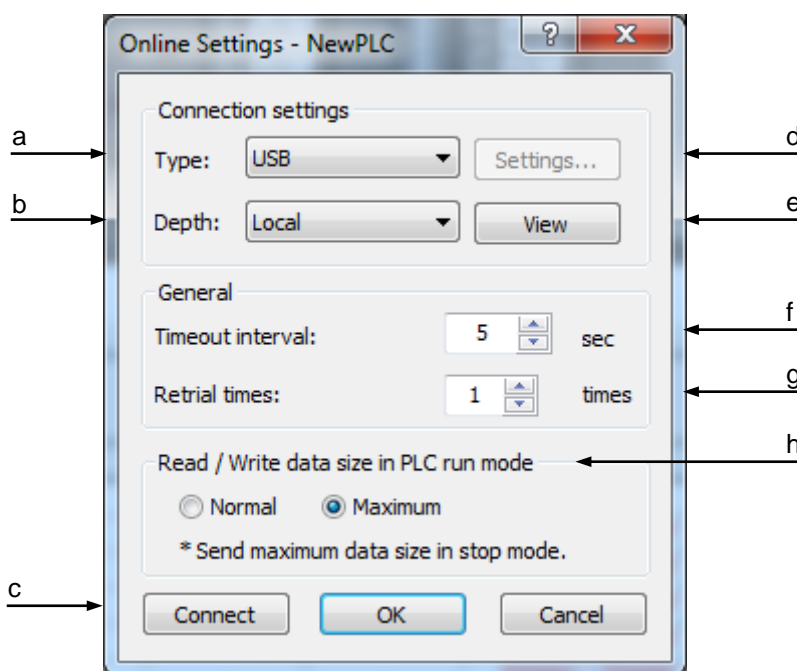
10.1 Connect Options

It is used to specify the connection network with PLC.

10.1.1 Local Connect Setting

RS-232C or USB connection is available for Local Connect Setting.

1.Select [Online]-[Connect Settings] on the menu.

[Dialog Box]

[Description of Dialog Box]

a.   Type: used to specify communication media when PLC is connected. RS-232C,
      USB, Ethernet and Modem are available to set.

b.   Depth: used to specify the connection configuration with PLC. Local, Remote 1
      and Remote 2 are available to set.

c.   Connect: tries to connect to PLC as specified in Connect options.

d.   Settings: allows detailed setting based on a. Connection Type selected.

e.   Preview: used to see all Connect Options at a glance.

f.   Timeout interval: Time-out occurs to retry to connect if the communication connection to PLC
      is not resumed within the specified time.

g. Retrial times: used to specify the times to retry to connect with PLC if the communication connection fails.

h. Read/Write data size in PLC run mode: used to specify the frame size of data to transfer. This option is available only when the PLC operation is in Run mode. In other operation modes, data will be transferred in the maximum frame size.
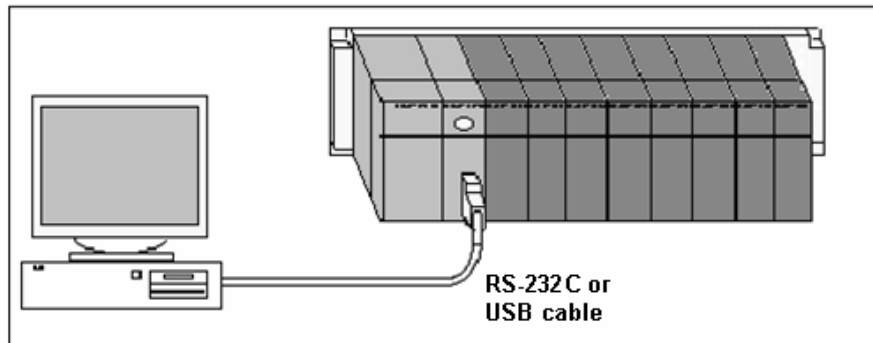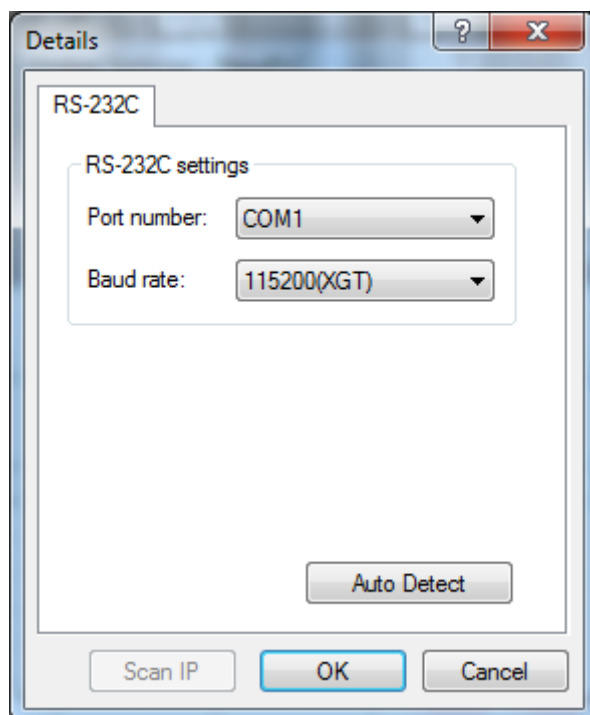

Notes

– Default Timeout interval is 5 seconds.

– In the following cases, warning message may occur. If warning message occurs set timeout interval more than 5 seconds.

  1) Set timeout interval less than 5 seconds.

  2) Timeout interval is less than 5 seconds when opening an existing project.

  3) Timeout interval is less than 5 seconds when reading from PLC.

1) Connection of Local RS-232C

[Steps]

1. Select the Connection Type of RS-232C.

2. Click the setting button to specify communication speed and communication COM port.

3. Click [OK] to save the Connect Options.

[Dialog Box]

Notes
– Default is RS-232C COM1 with the communication speed of 115200bps.
– 38400bps and 115200bps available for communication speed.
– Communication speed is 115200bps for XGK Series, and 38400bps for remote connection via Rnet.
– Communication ports of COM1 ~ COM8 are available.
– If USB serial device is used, a virtual COM port will be applied to the communication port. Check the device administrator to ensure the specified port number.
– Connection in XG5000 and Connection in XG-PD, device monitor and system monitor are available with one PLC at the same time. However, it shall be of identical Connect Options.

2) Connection of Local USB

1.   Select the Connection Type of USB.

2.   USB has no detailed setting options. Thus the setting button is inactive.

3.   Click [OK] to save the Connect Options.

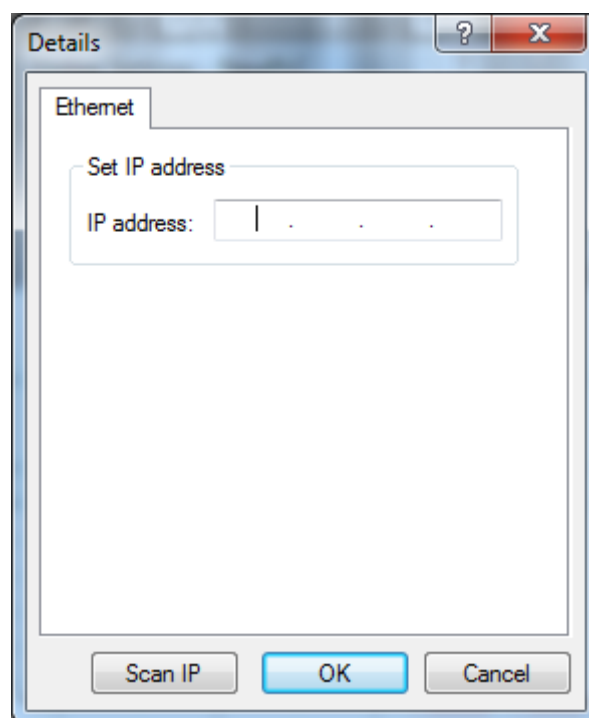| Notes |
| --- |
| – USB device driver has to be installed for USB to connect to PLC. If not, let it installed prior to the connection. |
| – When XG5000 is installed, USB driver will be installed automatically. If USB driver is not normally installed, download the applicable driver from LS ELECTRIC Home Page to install. |

10.1.2 Remote 1 Connect Setting

1) Ethernet Connect Setting

[Steps]

1.   Select the Connection Type of Ethernet.

2.   Click the setting button to specify Ethernet IP.

3.   Click [OK] to save the Connect Options.

[Dialog Box]

Notes
– Ethernet shall be connected with PC to connect to Ethernet.
– IP is as specified in Ethernet communication module.
– Use Ping in [Execute] on Windows start menu previously to ensure normal connection is allowed with the specified IP.

2) Modem Connect

1. Select the Connection Type of Modem.

2. Click the setting button to specify modem details.

[Dialog Box]
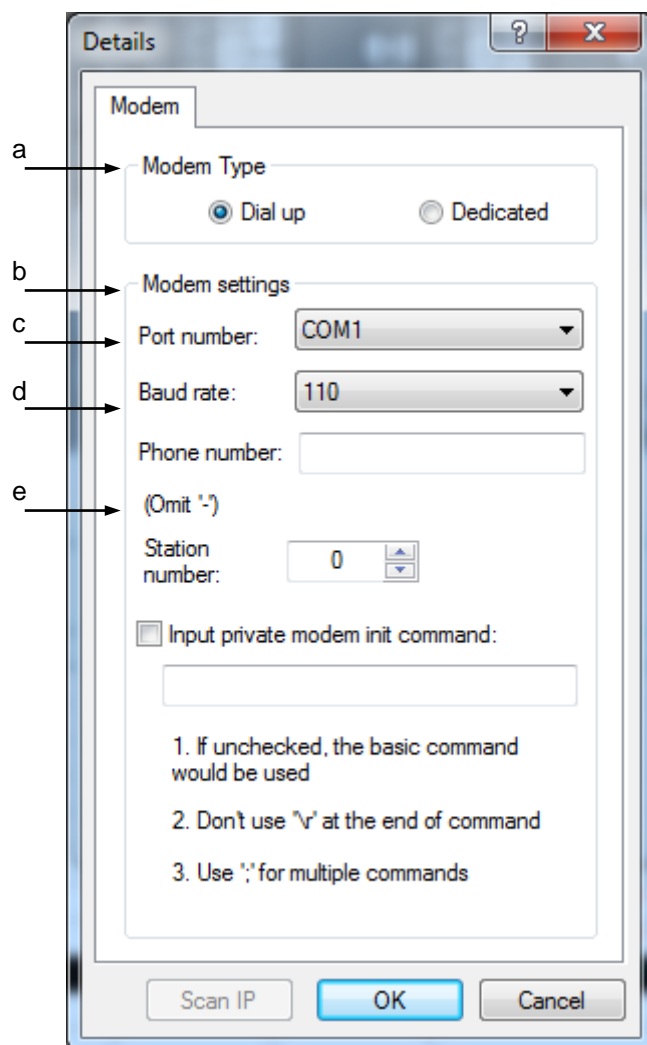
[Description of Dialog Box]

a. Modem Type: specifies the modem type available to connect. Cnet communication module has the exclusive modem functions.

b. Port number: specifies modem's communication port.

c. Baud rate: specifies modem's communication speed.

d. Phone number: used to input modem's number of phone if it's dial-up modem.

e. Station number: used to input the station Number specified in the communication module of Remote Step 1.

3) RS-232C or USB Remote Connect

[Steps]

1. Select the Connection Type of RS-232C.

2. Select the Connection Step of Remote 1.

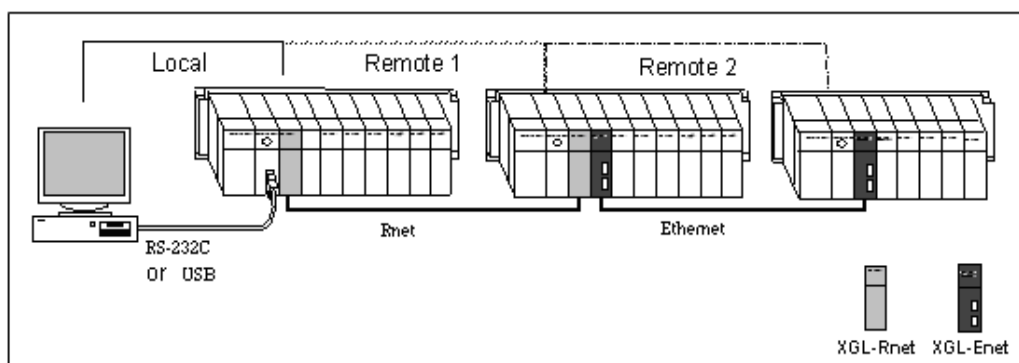3. Click the setting button to specify Remote 1.

[Dialog Box]
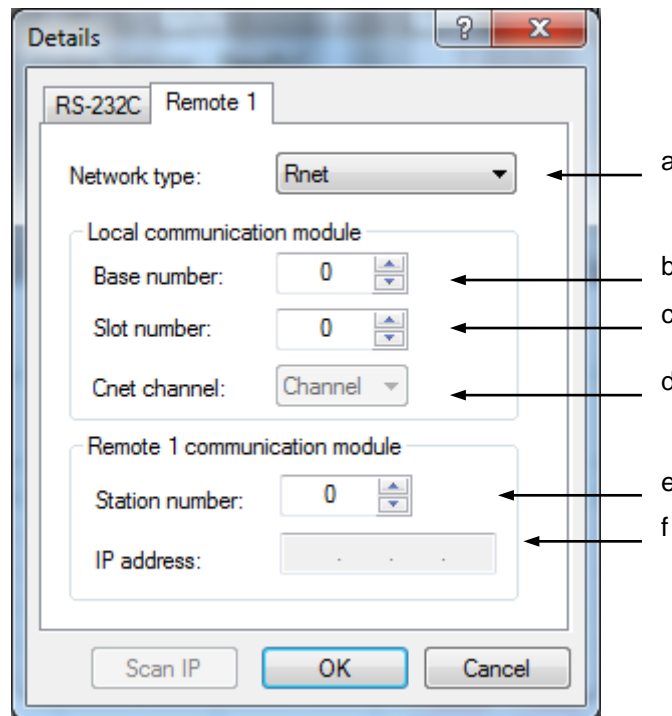
[Description of Dialog Box]

a. Network type: used to specify PLC communication module type for remote connection. Rnet, Cnet, FEnet and FDEnet are available for the communication modules.

b. Base number: used to specify communication module's base number of local PLC base.

c. Slot number: used to specify communication module's slot number of local PLC base.

d. Station number: used to input communication module's specified station Number of Remote 1.

e. Cnet channel: Select the connection channel port if the communication module of Remote 1 connection is Cnet module.

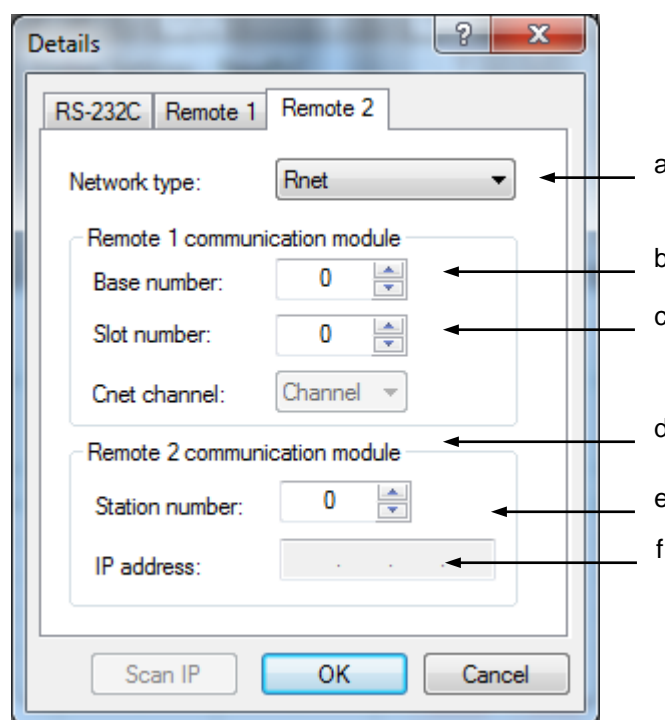f. IP address: used to input communication module's specified IP address of Remote 1

Notes
– Only if the network type is Enet or FEnet, IP address will be active. If not, IP address will be   inactive with the Station number active.
– Base number of 0~7 and slot number of 0~15 is available.

10.1.3 Remote 2 Connect Setting

[Dialog Box]

[Description of Dialog Box]

a. Network type: used to specify PLC communication module type for remote connection. Rnet,

　　Cnet, FEnet and FDEnet are available for the communication modules.

b. Base number: used to specify communication module's base number of local PLC base.

c. Slot number: used to specify communication module's slot number of local PLC base.

d. Station number: used to input communication module's specified station Number of Remote 1.

e. Cnet channel: Select the connection channel port if the communication module of Remote 2 connection is Cnet module.

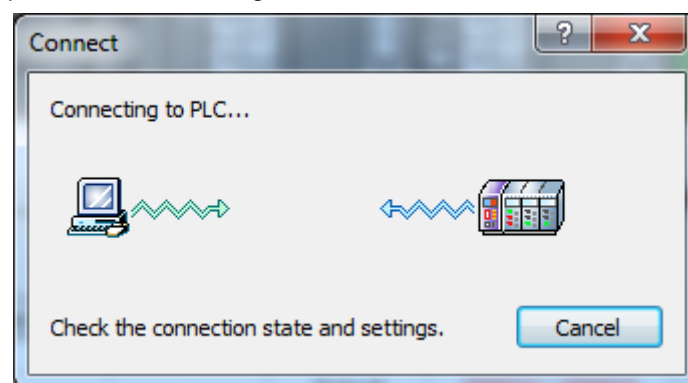f. IP address: used to input communication module's specified IP address of Remote 1.

10.2 Connect/Disconnect
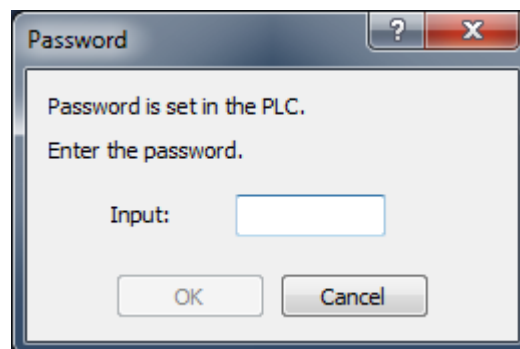
10.2.1 Connect

It tries to connect to PLC based on the specified Connect Options.

[Steps]

1. Select [Online]-[Connect] on the menu.
2. The Dialog Box will appear while connecting.

3. If connected to PLC, the Online menu and Online status will be displayed.
4. If password is setup in the PLC, Password input dialog will be displayed.

5.Connection will be established if the input password is match with the PLC password.

Notes

- If connected to PLC fast, the Dialog Box may appear and disappear quickly while connecting.

- After connected, PLC's status will be displayed at the side of project name on the project window and on the status display line.
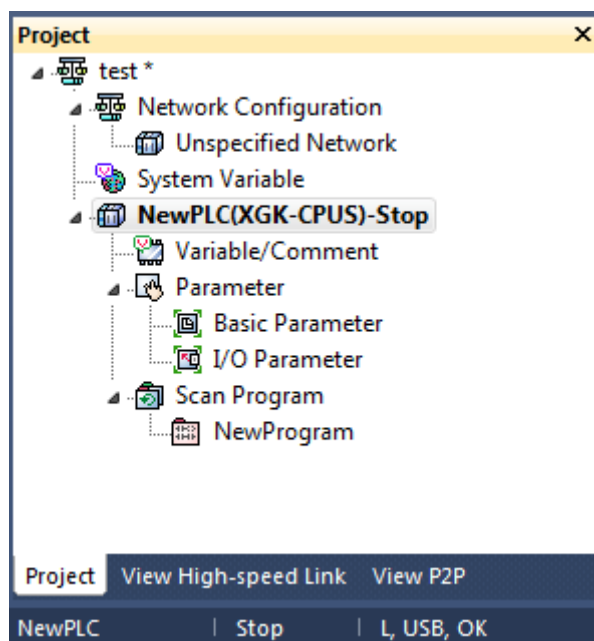
- If any other application program is already connected while PLC connected, its main Online functions are unavailable.
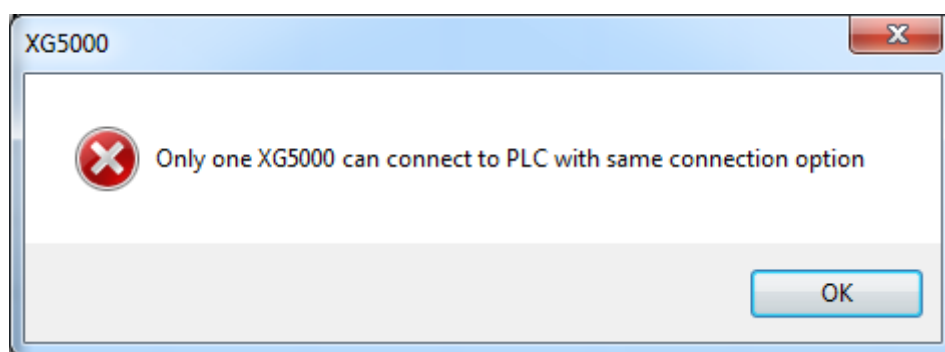
- After PLC connected, connecting its cable to other PLC with different type will make the former PLC disconnected automatically.

- When Disconnect is executed, Monitor and Debug functions will be also ended.

Notes

- Check Points when connection is failed.

　1)　RS-232C

- Check if RS-232C cable connection between Computer and PLC is correct.
- Check if the number of COM port of computer is match with the number of COM port where the cable is connected.
- Check if the link of RS-232C cable is correct.
- Check if the status of PLC is normal.

　2)　USB

- Check if USB cable connection between Computer and PLC is correct.
- Check if the computer found the PLC as an USB device correctly.
  - a) Connect the computer and PLC with USB cable.
  - b) Click [Control Panel]-[System]-[Hardware Tab]-[Device Manager].
  - c) Check if the computer found the PLC as an USB device correctly in the [Device Manager] dialog box.
  - d) If there is "yellow exclamation mark" or "Unknown Device", it means that the computer have not found the driver file for connected device.
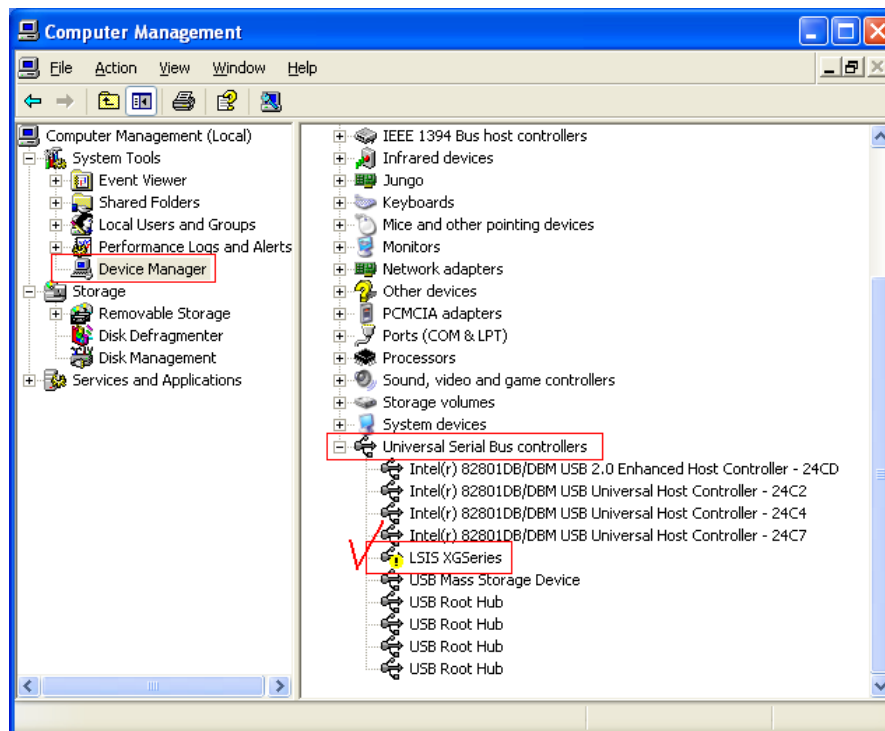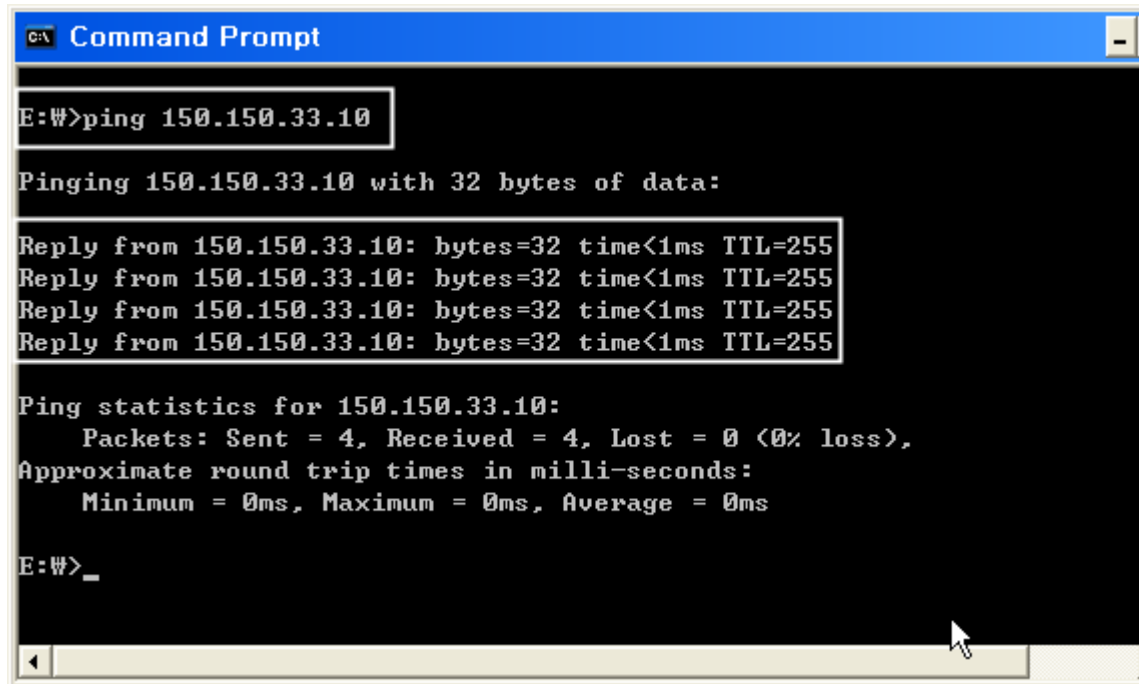

Abnormal connection
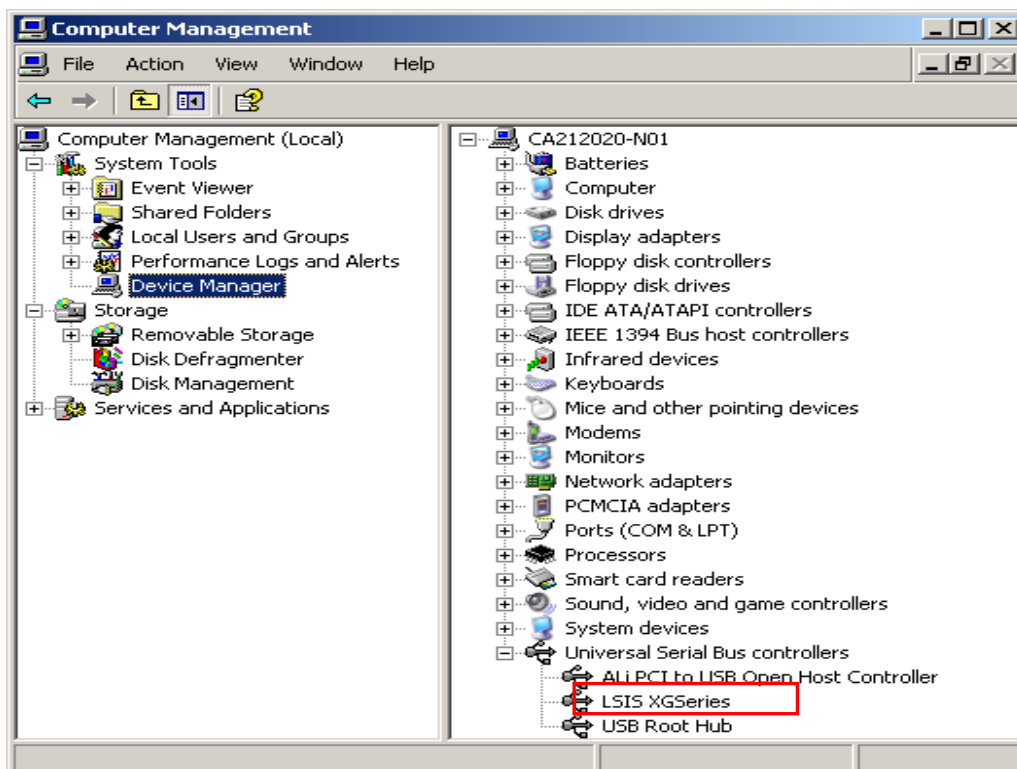
- Normal connection

3) Ethernet

- Check if Ethernet cable (LAN cable) connection between Computer and PLC is correct.
- Check if the IP and Gateway of Ethernet module is correct. The IP and Gateway of Ethernet module can be read or written with XG-PD software, which can be executed when [Tools]-[Network Manager] on the XG5000 menu bar is clicked.
- Check if the Ethernet module responds correctly, if the IP and Gateway of Ethernet module is correct.

    a) Click "Execute" which can be seen when Start button of Windows is clicked.

    b) Input "command" in the Execute dialog box.
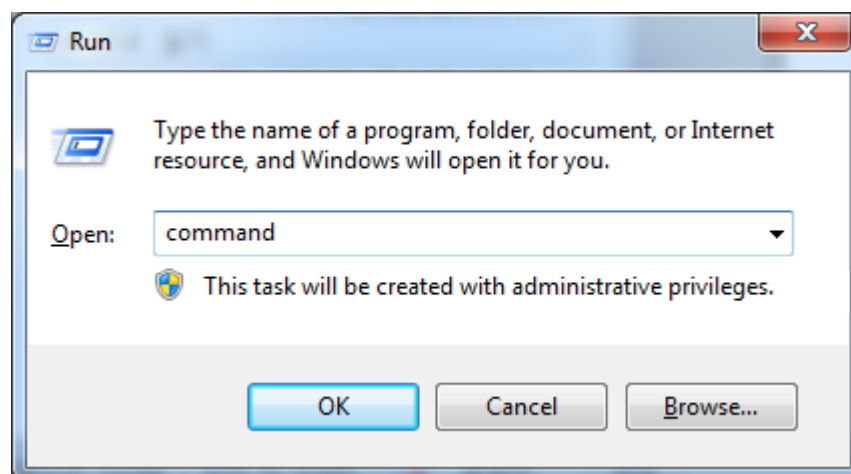
    c) Execute ping test for Ethernet module in the Command Prompt. Type "ping IP address" and press 'Enter' key. If the Ethernet module responds normally, the screen will show the

communication status as below. And if the Ethernet module does not respond, the screen will show "Time out" message.

```
■ Command Prompt                                                    -

E:₩>ping 150.150.33.10

Pinging 150.150.33.10 with 32 bytes of data:

Reply from 150.150.33.10: bytes=32 time<1ms TTL=255
Reply from 150.150.33.10: bytes=32 time<1ms TTL=255
Reply from 150.150.33.10: bytes=32 time<1ms TTL=255
Reply from 150.150.33.10: bytes=32 time<1ms TTL=255

Ping statistics for 150.150.33.10:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

E:₩>_
```

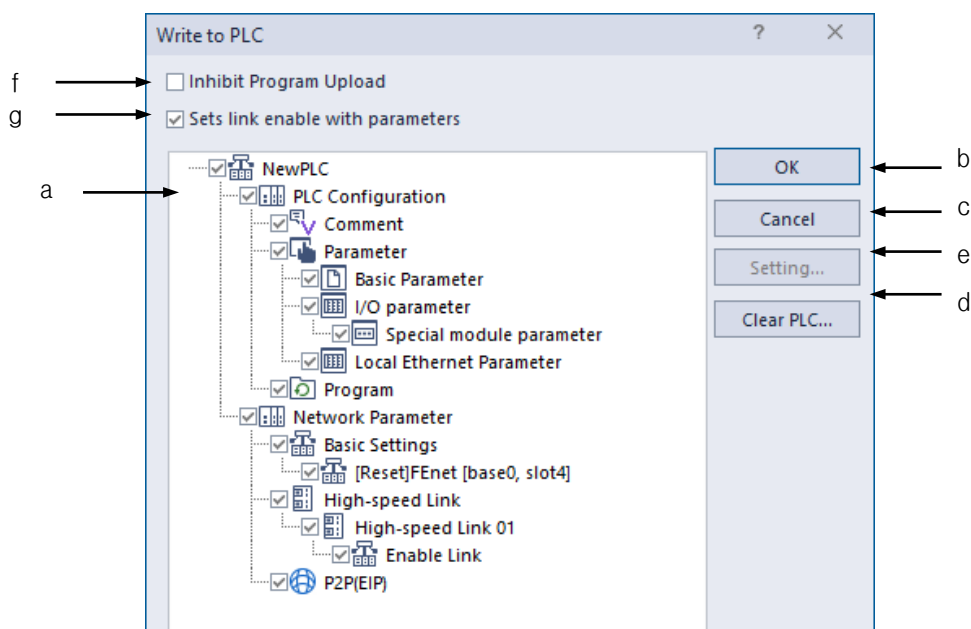● Check if the status of PLC is normal.

10.3 Write

It is used to transfer user programs, respective parameter and comment to PLC.

[Steps]

1. Select [Online]-[Connect] to connect to PLC via Online.

2. Select [Online]-[Write].

3. Select the data to transfer to PLC and then click [OK] to start to transfer the selected data to PLC.
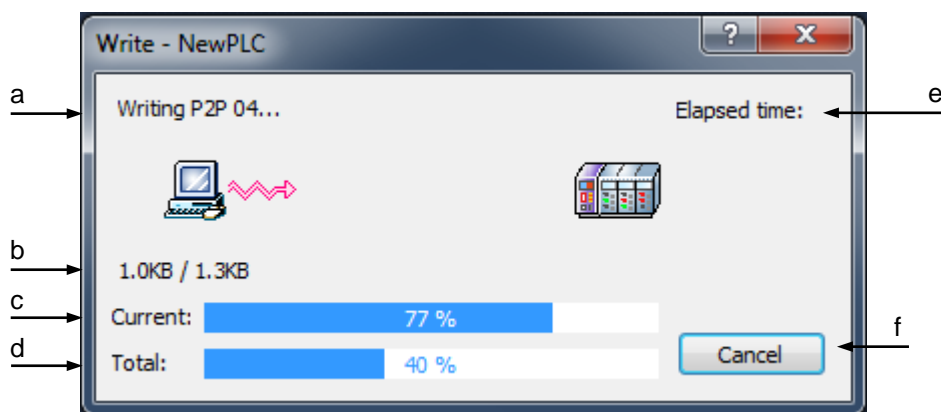
[Dialog Box]

[Description of Dialog Box]

a. Selection Tree: selects the data to transfer to PLC.

b. OK: starts to transfer the data to PLC if clicked.

c. Cancel: Cancels data writing.

d. Clear PLC: Pops up the window to delete the memory areas or parameters, programs inside of the PLC before writing the program(For more details on the function, refer to '10.8 Deletion of PLC').

e. Setting: Added settings for writing are allowed.

f. Program read prohibition setting: When program read prohibition is set, reading of all programs, parameters, and comments from PLC is prohibited. (XGK/XGB only supported)

g. Setting link enable together: Link enable for P2P and high-speed link services registered in the project can be set together when writing.
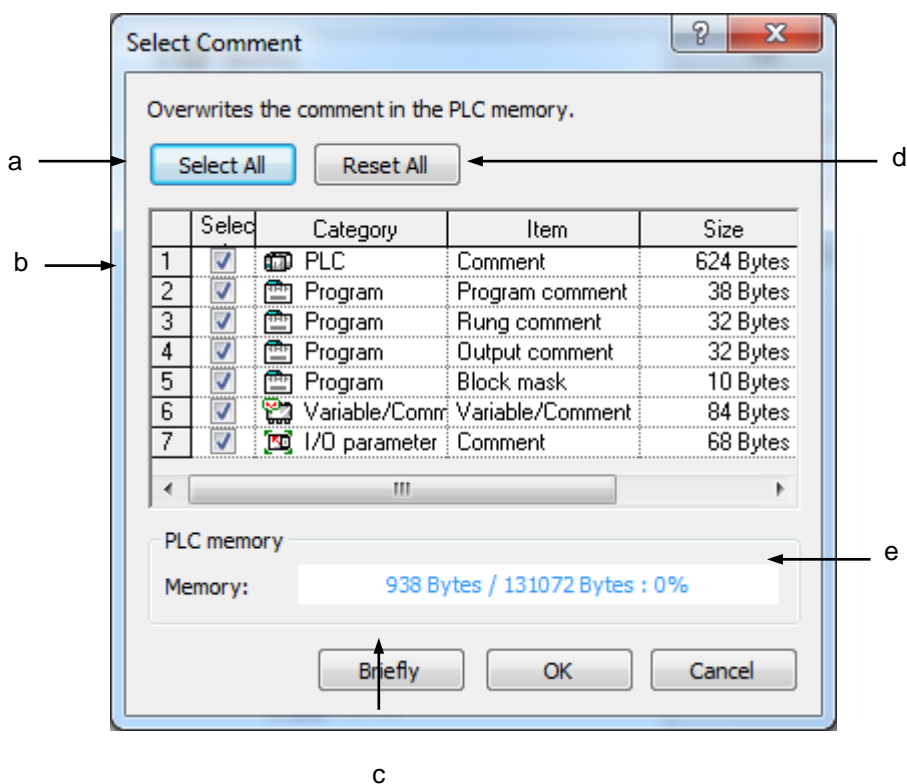
[Dialog Box]

[Description of Dialog Box]

a. displays the present Write/Read item in progress.

b. displays the data size of the item (present item's size/ all items' size)

c. displays progressing rate of the present item.

d. displays progressing rate of all items.

e. displays progressing time elapsed till present.

f. Cancel: Stops transferring the data.

[Dialog Box]

[Description of Dialog Box]

a. Select All: selects all the items in b Select.

b. List of Select Items: displays the comment items available to write inside the PLC comment memory.

c. Displays the size in byte or KB unit.

d. Release: cancels all items selected on b List of Select Items.

e. Displays the rate of memory used in the comment memory inside PLC for the selected item.

   (*Example*: selected comment 37.7KB/PLC's comment memory 128KB)

Notes

- The special module parameter Write is available only when I/O parameter Write is selected.
- Modification Write time during Run will take much longer than during Stop.
- If PLC is in Run mode, Comment only is available to write.

10.4　Read

It is used to upload programs, respective parameter and comment saved in PLC to apply to the present project.

[Steps]

1.　Select [Online]-[Connect] to connect to PLC.
2.　Select [Online]-[Read].
3.　Click [OK] after items to upload from PLC are selected. The uploaded items will be applied to the present project.

Notes
‐ Refer to 10.3 Write for comment of each Dialog.
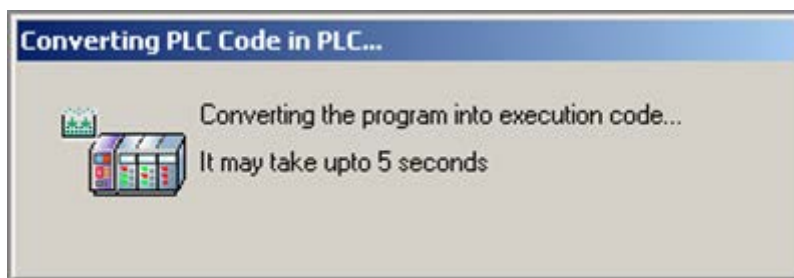
10.5 Change Mode

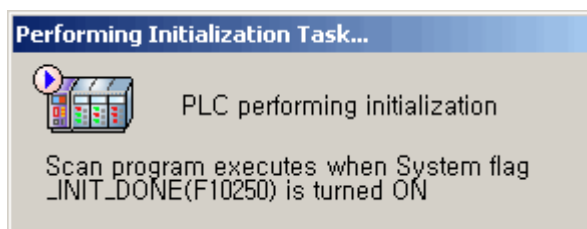It is used to convert PLC operation mode.

[Steps]

1. Select [Online]-[Connect] to connect to PLC.
2. Select [Online]-[Change Mode]-[Run/Stop/Debug].
3. PLC operation mode will change as selected by the user.

Notes

- PLC's remote dip switch shall be ON with the operation mode dip switch in Stop.
- The program in PLC shall be identical to that in the project to convert to Debug mode.
- If converted from Stop to Run mode, a Dialog Box will appear to inform that the program is being converted to an executable code inside PLC. This Dialog Box may not be closed for up to 30 seconds according to the program size.

Converting PLC Code in PLC...

Converting the program into execution code...
It may take upto 5 seconds

- If converted to Run mode, the following Dialog Box will appear while initialization task is executed. After the initialization task is over or disconnected, the Dialog Box will disappear.

Performing Initialization Task...

PLC performing initialization

Scan program executes when System flag
_INIT_DONE(F10250) is turned ON

- If converted to Run or Debug mode, Run or Debug function will not be normal if any error occurs on PLC. Delete the PLC error first and then convert the operation mode.

- If ☑ Show Message when changing the PLC mode   in the [Option]-[Online] is unchecked, the confirm message will not displayed when Mode Change instruction is executed.
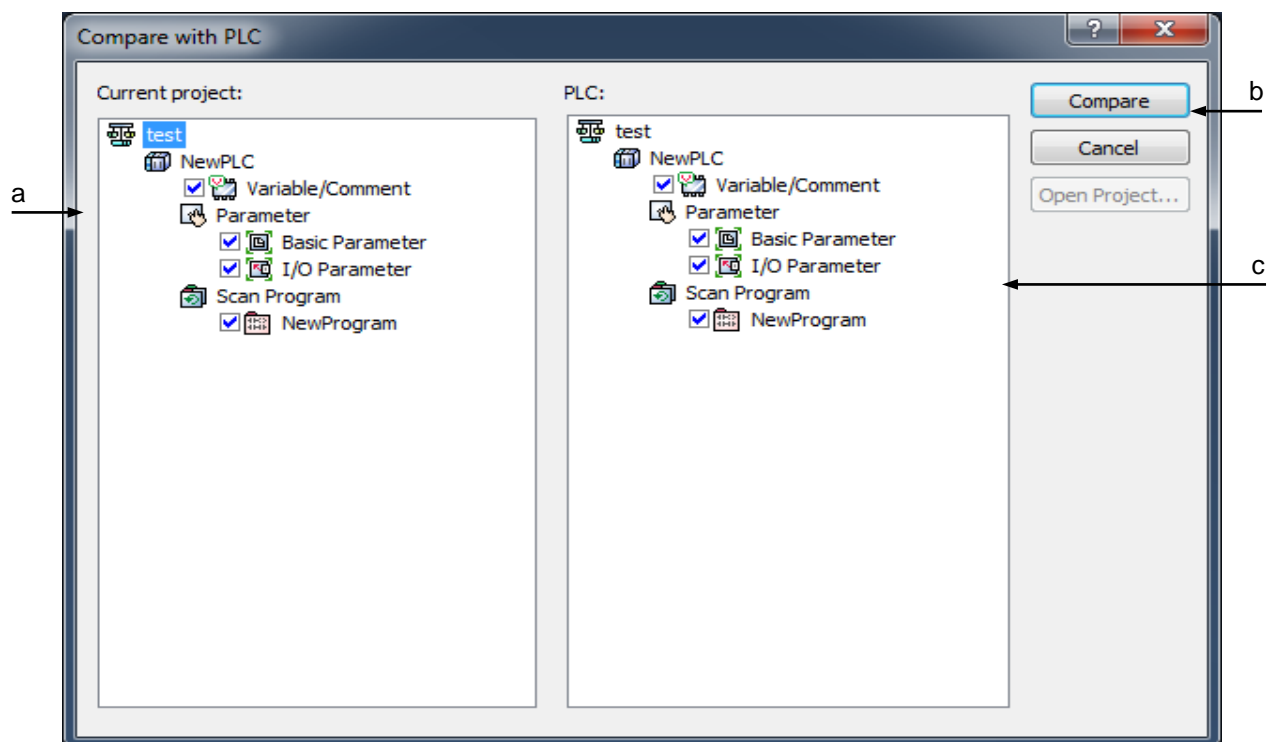
10.6   Compare to PLC

It compares the project in PLC to the project open in XG5000.

[Steps]

1. Select [Online]-[Connect] To connect to PLC.

2. Select [Online]-[Compare with PLC].

3. Select an object to compare and then click [Compare].

[Dialog Box]

[Description of Dialog Box]

a. Current project: means the project open in XG5000.

b. Compare: compares between the selected items.

c. Project to compare: means the project inside PLC.

Notes
－ The result of Compare is identical to the menu [Project]-[Compare Project].
－ Refer to 'Compare Project' for detailed result of Compare.

10.7 Setup of Communication Module

It is the function to set up the communication module embedded to the PLC.
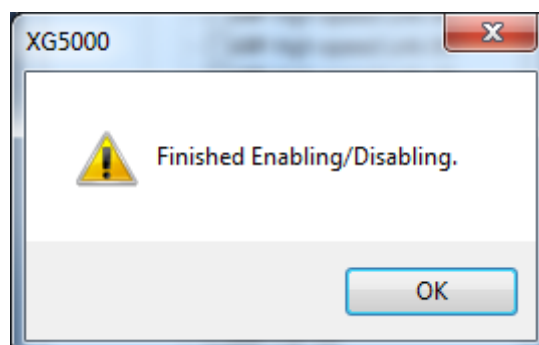
10.7.1 Link Enable

It sets up the operations of high-speed link and P2P service.
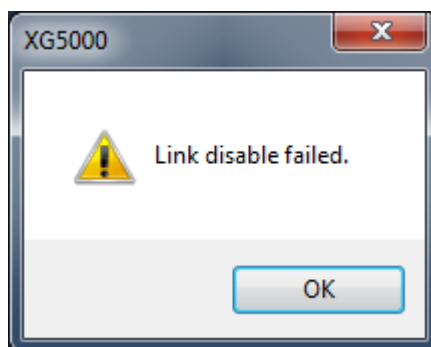
[Procedures]

1. Select the menu [Online]-[Connect] for connecting to the PLC.
2. Select the menu [Online]-[Communication module setting]-[Link Enable].
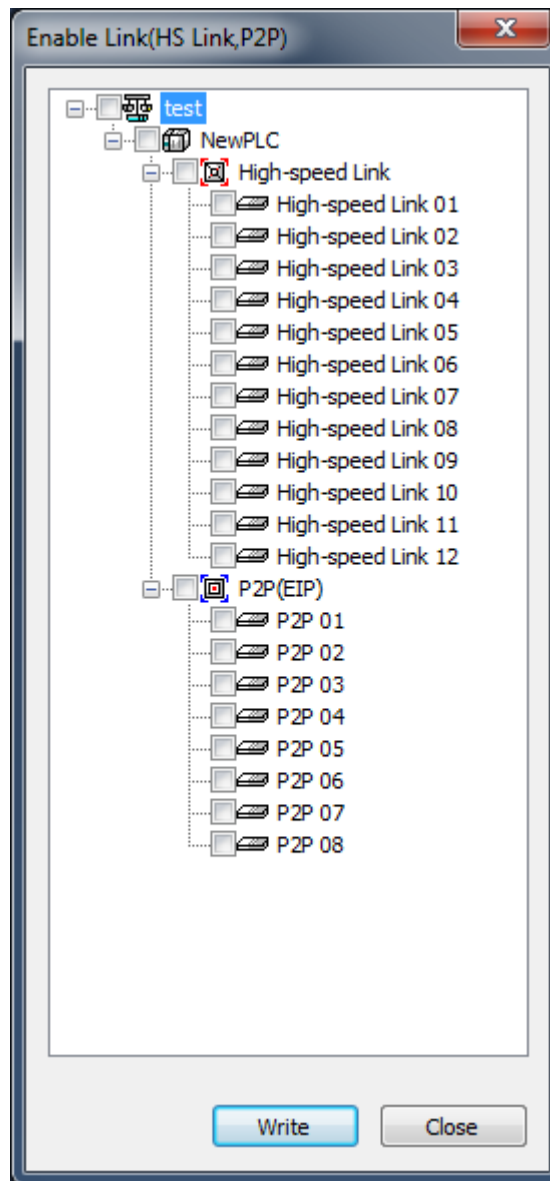
3. Check the items to be set and click 'Write'.
4. If you 'Write', the below completion message will be displayed.

5. In case of failure, failure message will be displayed.

10.7.2 Download/Upload

It is used to download or upload files such as OS, BBM, etc. for the communication module.

[Procedures]

1. Select the menu [Online]-[Connect] for connecting to the PLC.

2. Select the menu [Online]-[Communication module setting]-[Download/Upload].

3. Select the communication modules to be downloaded/uploaded.

4. Select the File Type.

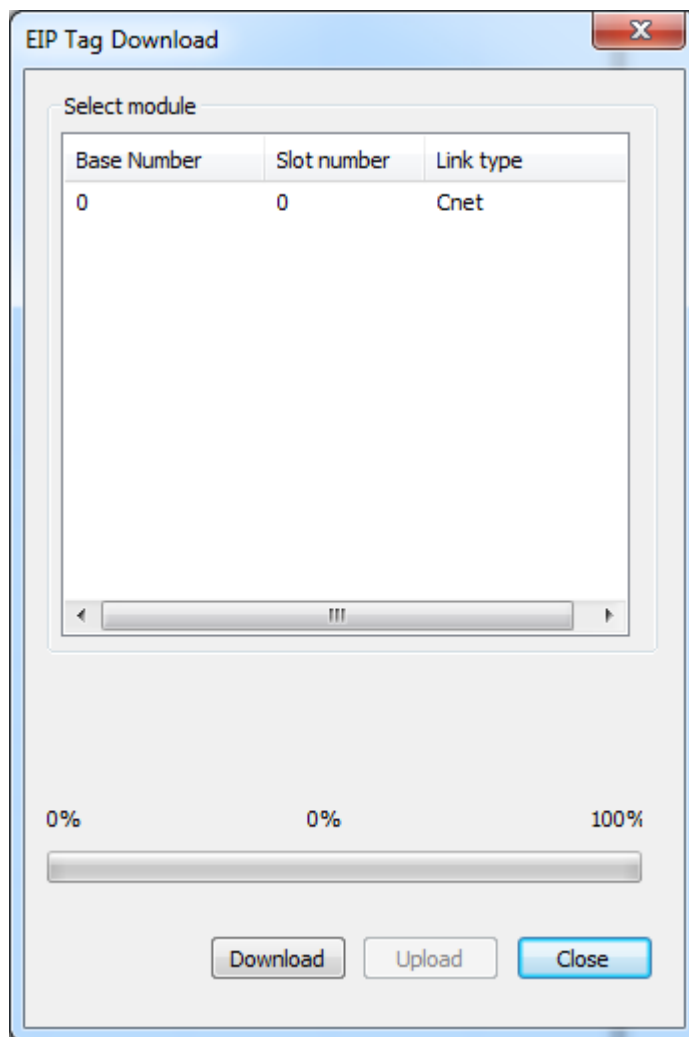5. Select the BBMBoot, download, upload button depending on the file types.
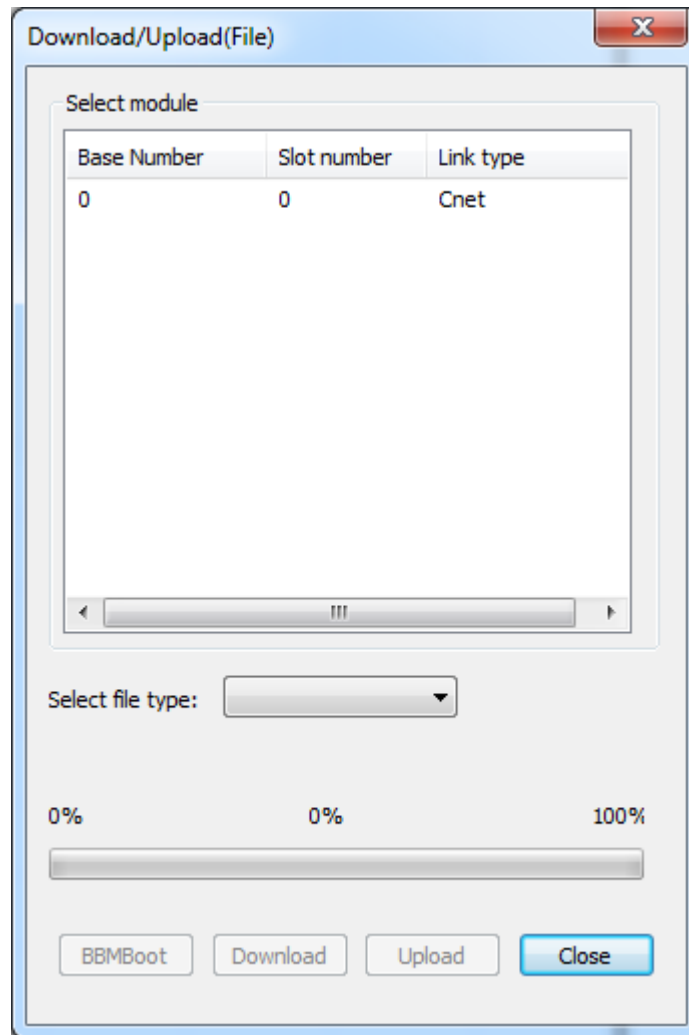
10.7.3 EIP Tag Download

It downloads the EIP tag for EtherNet/IP module's tag communication.

[Procedures]

1. Select the menu [Online]-[Connect] for connecting to the PLC.
2. Select the menu [Online]-[Communication module setting]-[EIP tag download].

3. Select the EtherNet/IP module to be downloaded.
4. Select the download button.
5. The tags set in the menu [project]-[EtherNet/IP tag Export] window will be downloaded.
6. After download is finished, the completion message will be displayed.

10.7.4 Config. Upload

In case the communication module is Pnet or Dnet module, it is used to upload the configuration information set for the module.
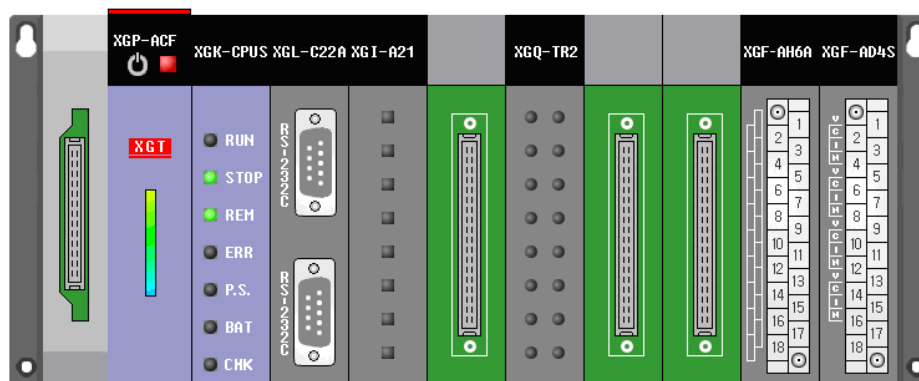
[Procedures]

1. Select the menu [Online]-[Connect] for connecting to the PLC.

2. Select the high-speed link window to be Config. Uploaded.

3. Select the menu [Online]-[Communication module setting]-[Config. upload].

4. The information to be Config. uploaded to the high-speed link window will be displayed.

10.7.5 System Diagnosis

[Procedures]

1. Select the menu [Online]-[Connect] for connecting to the PLC.

2. Select the menu [Online]-[Communication module setting]-[System Diagnosis].

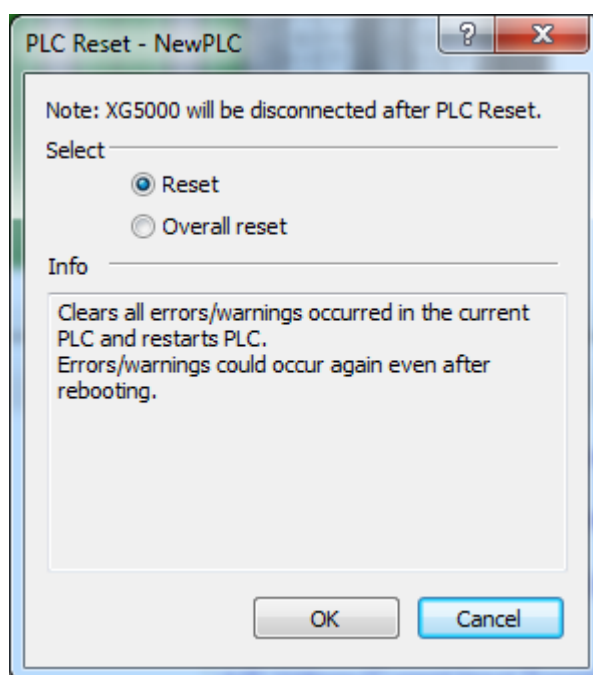| Note |
|------|
| −For more details on system diagnosis, refer to the communication module manual. |

10.8   Reset PLC

It is used to reset PLC. Reset PLC is also available with 'Reset PLC' dip switch.

[Steps]

1. Select [Online]-[Connect] to connect to PLC.

2. Select [Online]-[Reset PLC].

3. After reset type selected, click [OK] button to reset PLC.

[Dialog Box]

Notes
－ Reset and Overall reset are available for its type.
－ Reset: when PLC powered back, it will delete error/warning information to allow power on. error/warning may occur continuously based on the situation.
－ Overall reset: when PLC powered back, it will delete error/warning information, latch 1 area data, I/O skip, error mask and forced I/O setting area to allow power on.
－ Be careful! PLC after reset will be off and then on again.

10.9 Reset individual module

[Procedures]

1. Select the menu [Online]-[connect] for connecting to the PLC.

2. Select the menu [Online]-[Reset/Clear]-[Reset individual module].

3. Tick the communication module to be reset and press OK button.
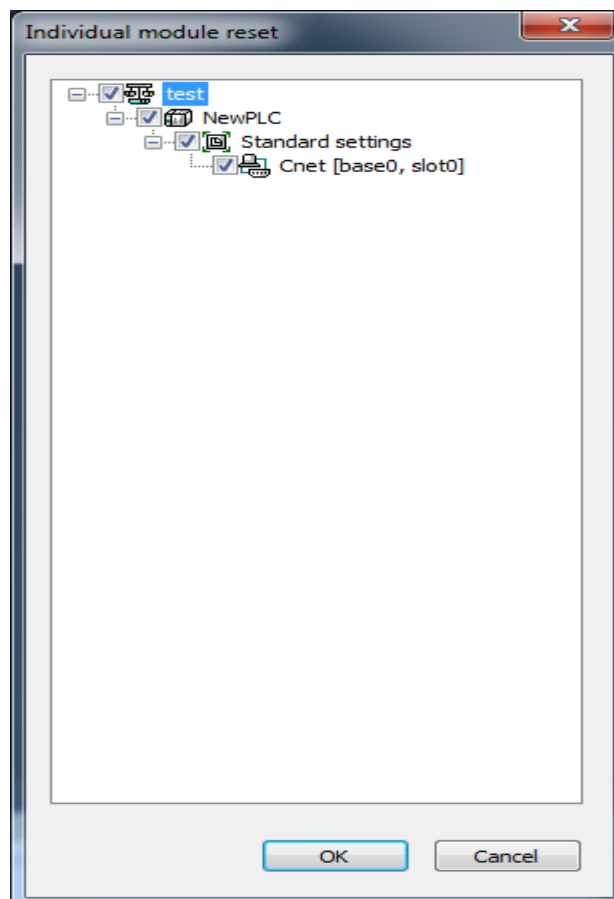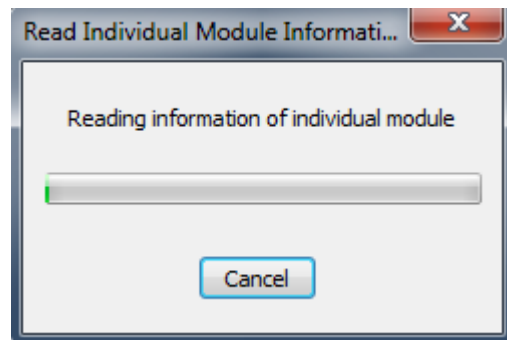
Note

-For more details on reset of individual communication module, refer to the communication module manual.

10.10 Clear PLC

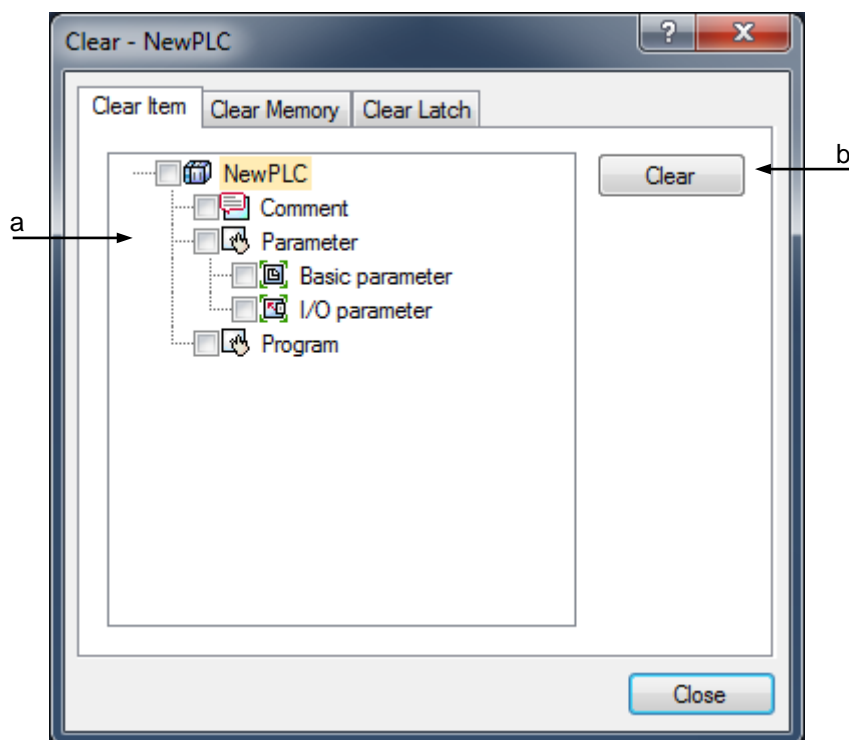It deletes programs, respective parameter, comment, and memory and latch area in PLC.

[Steps]

1. Select [Online]-[Connect] to connect to PLC.
2. Select [Online]-[Clear PLC].
3. Select items to delete and then click Clear to start Clear PLC.

10.10.1 Clear Item

It deletes the contents of the project saved in PLC.

[Dialog Box]

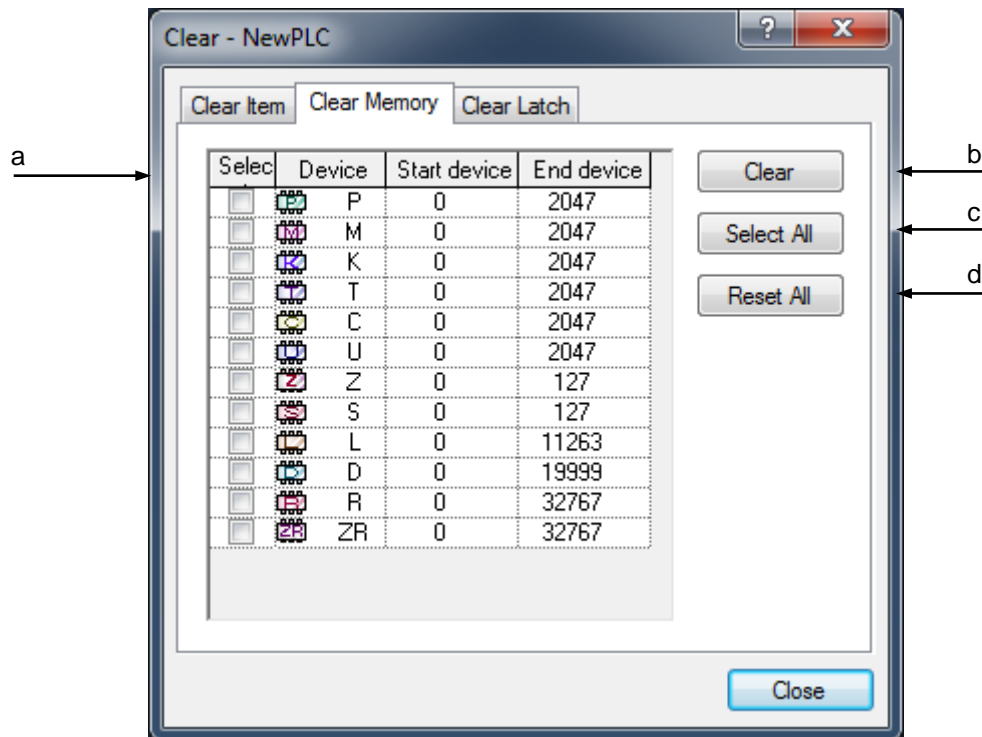

[Description of Dialog Box]

a. List of items to select: shows the items saved in PLC.

b. Clear: deleted the selected items.

10.10.2 Clear Memory

It deletes the memory value in PLC.

[Dialog Box]

[Description of Dialog Box]

a. List of memory areas to select: shows the memory areas in PLC. Start/End address to delete can be specified by the user.

b. Clear: deleted the selected items.

c. Select All: selects all the memory areas.

d. Reset All: cancels all the memory areas selected.

10.10.3 Clear Latch

It deletes the device value specified as a latch area.

[Dialog Box]
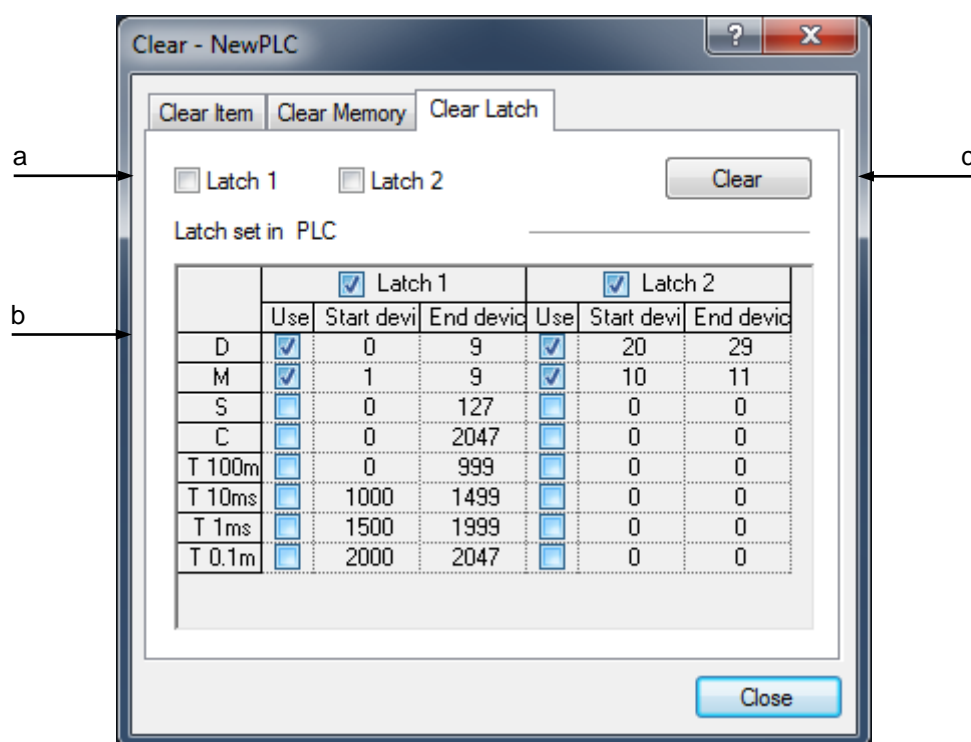
[Description of Dialog Box]

a. Latch Area Check Box: device area's value of the latch area checked and selected in PLC will be deleted if execute button is pressed.

b. Latch set in PLC: shows the latch setting area and setting details specified in basic parameters of PLC. Edit is not allowed.

c. Clear: deletes the selected items.

Notes
– Delete is available only when PLC's remote dip switch is ON with operation mode dip switch in Stop mode and PLC operation in Stop mode.
– If Start address is larger than End address, Clear Memory is not available.
– Be careful! The data once deleted will not be recovered.
– Clear Latch is used to delete the device value specified as a latch area. Latch Set in PLC will not be deleted. In order to delete the Latch Set in PLC, modify the basic parameters and then download the basic parameters onto PLC.

10.11   Clear all PLC

[Procedures]

1.   Select the menu [Online]-[Reset/Clear]-[Clear all PLC].

2.   The message will be displayed; "All programs, parameters, passwords, data of the PLC are deleted".

3.   If you press [Yes] button, the connect setup window will be displayed.

4.   If you press [OK] button in the connect setup window, the process [Delete all PLCs] will be executed.
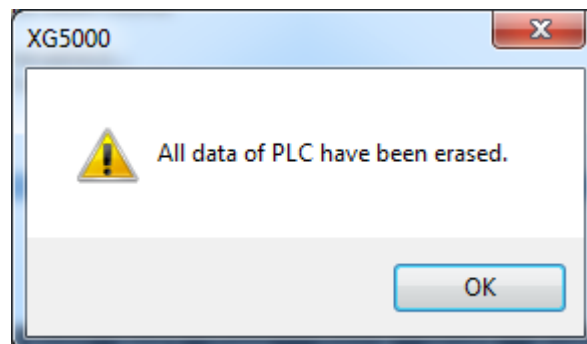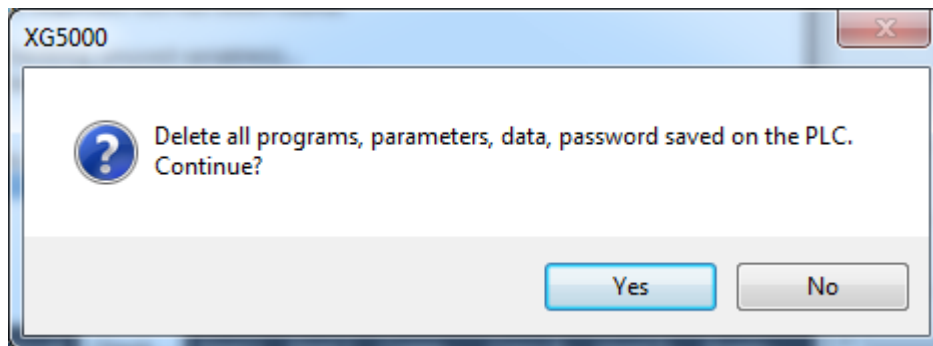
Note
−The function [Clear all PLC] is available in some XGB models only.

10.12   SD format

It has the function to format the SD memory card.

[Procedures]

1.   Select the menu [Online]-[Connect] for connecting to the PLC.
2.   Select the menu [Online]-[Reset/Clear]-[SD Format].

      The message on matters that require attention is displayed.
3.   If you click [Yes] button, the format window will be displayed and if you select 'Start' button, formatting

      will be executed.

Note

-The function [SD Format] is available in some XGB models only

10.13 Deletion of parameters

It is the function to delete the high-speed link and P2P parameters set in the communication module.

[Procedures]

1. Select the menu [Online]-[Connect] for connecting to the PLC.
2. Select the menu [Online]-[Reset/Clear]-[Delete parameters].
3. Select the parameters to be deleted and press the OK button.
4. Execute the process 'Delete selected parameters'.
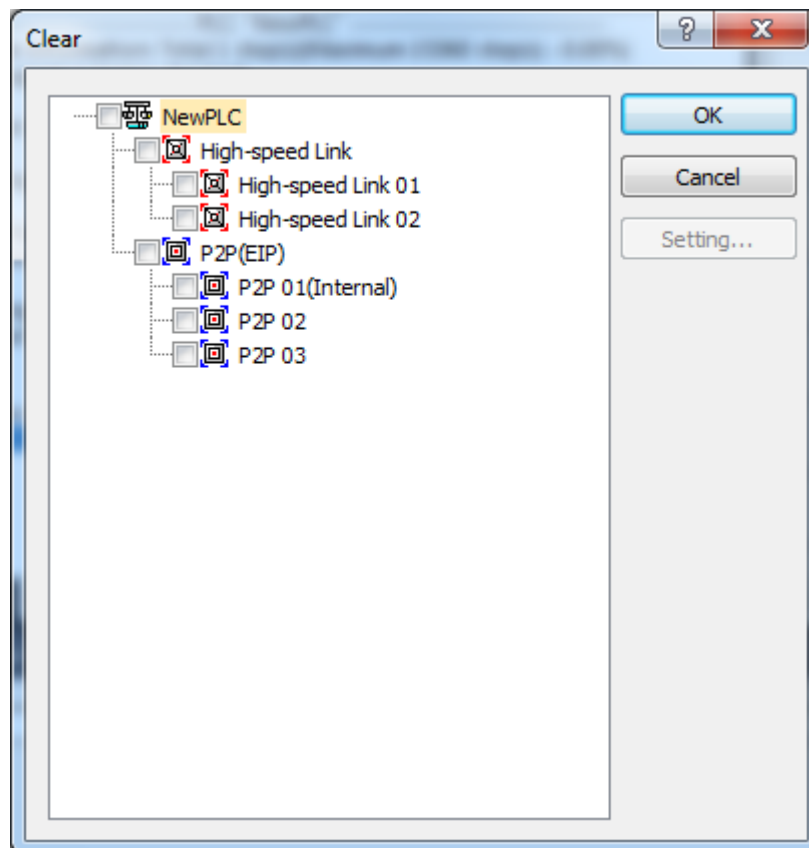
Note
−For more details on deleting parameters, refer to the communication module manual.

10.14   PLC Information

It shows the information of PLC connected, where password and PLC timer can be set.
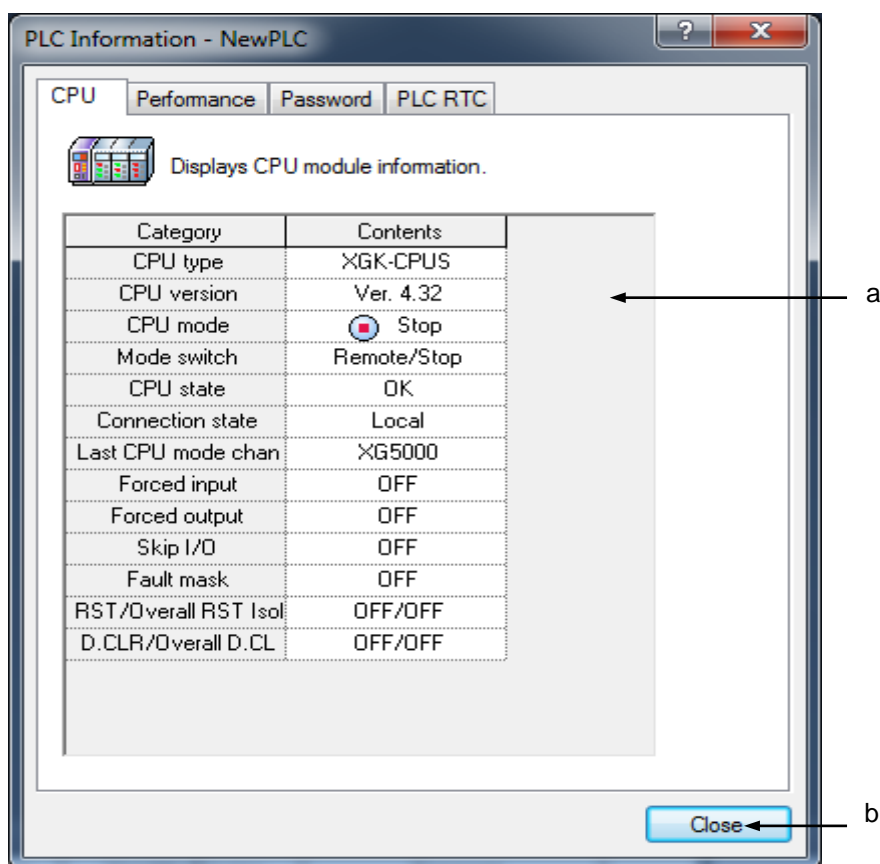
10.14.1   CPU Information

Detailed information of PLC CPU can be checked.

[Sequence]

1. Select [Online]-[Connect] to connect to PLC.

2. Select [Online]-[PLC Information].

3. Select the CPU tap.

[Dialog Box]

[Description of Dialog Box]

a. Shows the specified details and status of the connected PLC CPU.
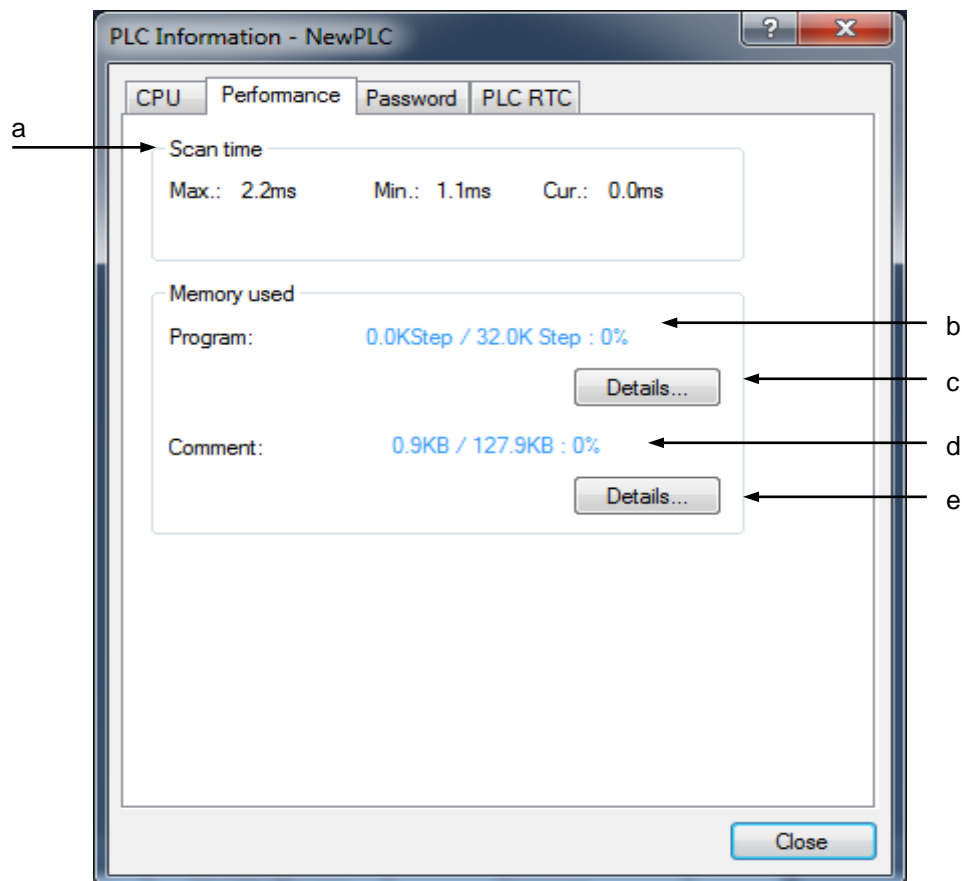
b. Close: Close the dialog box.

10.14.2 CPU Performance

Scan time of PLC and memory application status can be checked.

[Steps]

1. Select [Online]-[Connect] to connect to PLC.

2. Select [Online]-[PLC Information].

3. Select the Performance tap.

[Dialog Box]

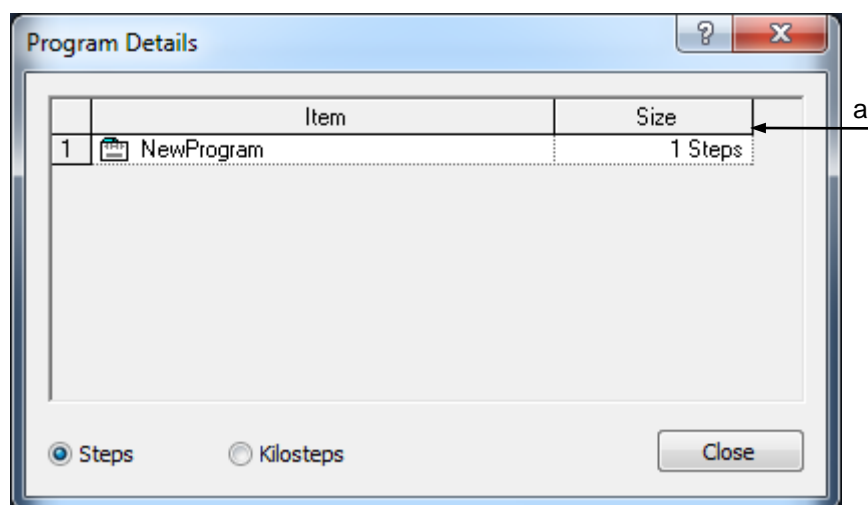[Description of Dialog Box]

a. Scan Time: shows the Maximum/Minimum/Current scan time of PLC connected.

b. Program Memory used: shows the downloaded programs' size/ all PLC program areas' size.

c. Details: shows the list of programs downloaded on PLC.

d. Comment Memory used: shows the downloaded comment's size/ all PLC comment areas' size.

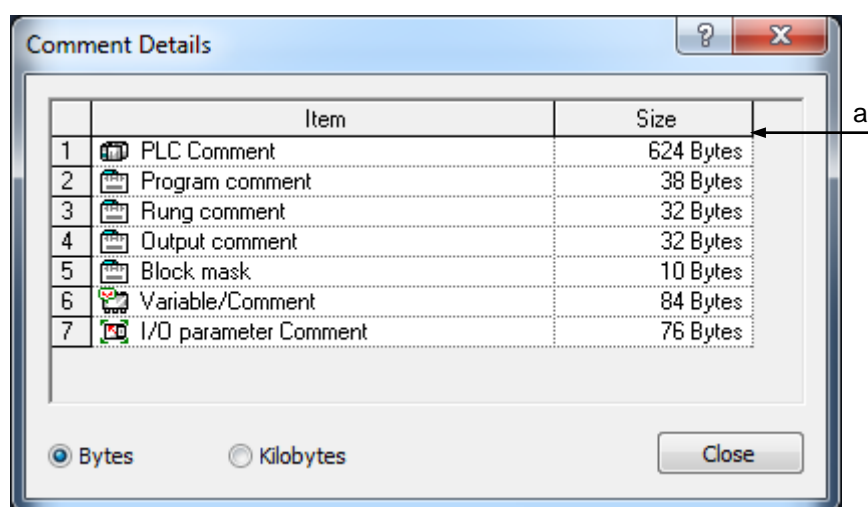e. Details: shows the list of comments saved in PLC.

[Dialog Box]

[Description of Dialog Box]

a. List: shows the list of the programs saved and the number of steps of each program.

[Dialog Box]

[Description of Dialog Box]

a. List: shows the list of the comments saved and the size of each comment.
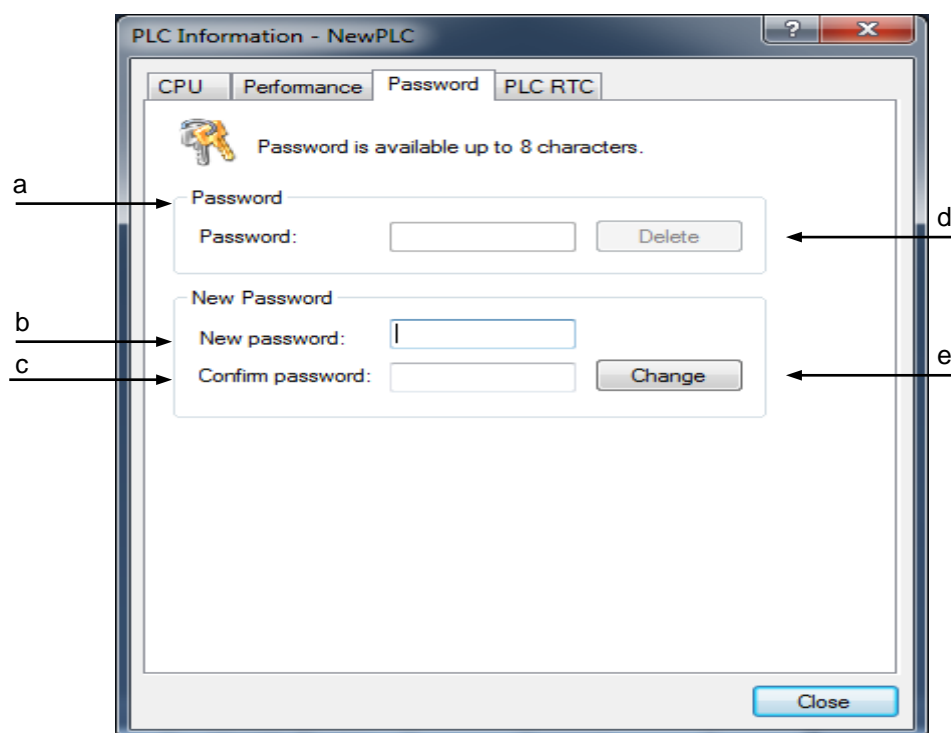
10.14.3 Password

User password can be specified, changed or deleted to protect PLC information.

[Sequence]

1. Select [Online]-[Connect] to connect to PLC.

2. Select [Online]-[PLC Information].

3. Select the Password tap.

[Dialog Box]

[Description of Dialog Box]

a. Current Password: used to input the password saved in PLC.

b. New password: used to input a new password.

c. New password Confirmed: used to input the New Password again.

d. Delete: deletes the password of PLC.

e. Change: changes the password of PLC.

[Password Setting]

1. Input a new password in Edit Box 'b' for New Password Input

2. Input the new password again in Edit Box 'c' for New Password Confirm as identical as in 1 above.

3. Click Change button 'e' to set the new password in PLC.

[Password Changes]

1. Input the password saved in PLC in Edit Box for current Password Input.

2. Input a new password in Edit Box 'b' for New Password Input.

3. Input the new password again in Edit Box c for New Password Confirm as identical as in 2 above.

4. Click Change button 'e' to change the password of PLC.

[Password Delete]

1. Input the password saved in PLC in Edit Box for current Password Input.

2. Click Clear d to delete the password of PLC.

Notes

‑ Up to 8 letters is available for the password.

‑ Letters used as password will be classified into capital or small.

‑ Special letters can be used for password.

- If password is setup in the PLC, the PLC asks the password when connection is tried and the PLC permit to connection when password is correct.

Notes

In order to protect the program in the PLC and user intellectual property, enhanced password function with new password process is supported at XG5000 V3.4 or above

Enhanced password function is applied to the following CPU OS or above

In case of using the following CPU version or above, you should use the latest XG5000.

CPU	XGK	XGI	XGR	XBM	XEC	XBC "H" type	XBC "S" type	XBC "E" type
OS version	V3.51	V3.2	V1.8	V2.6	V1.3	V1.9	V1.0	V1.0

In case of using the latest XG5000 (V3.4 or above) and CPU OS lower than above table, previous password process is applied and enhanced password function is not applied
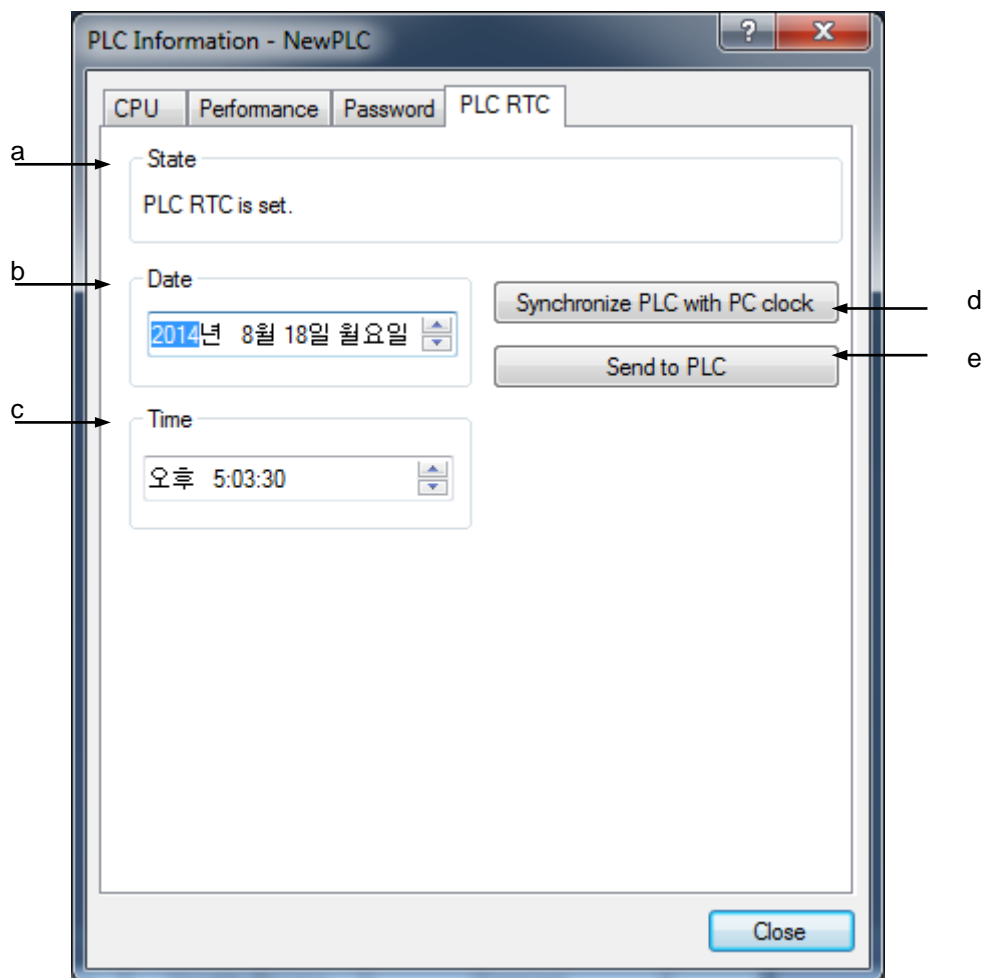
10.14.4 PLC RTC Setting

The RTC (Real Time Clock) of PLC can be setup as follow steps.

[Steps]

1. Select [Online]-[Connect] to connect to PLC.

2. Select [Online]-[PLC Information].

3. Select the PLC RTC tap.

[Dialog Box]

[Description of Dialog Box]

a. State: shows PLC timer setting status. If the timer is not specified, PLC time will not be read.

b. Date: displays date.

c. Time: displays time.

d. Synchronize with PC clock: synchronizes date and time between PC and PLC.

e. Send to PLC: transfers user specified time to PLC.
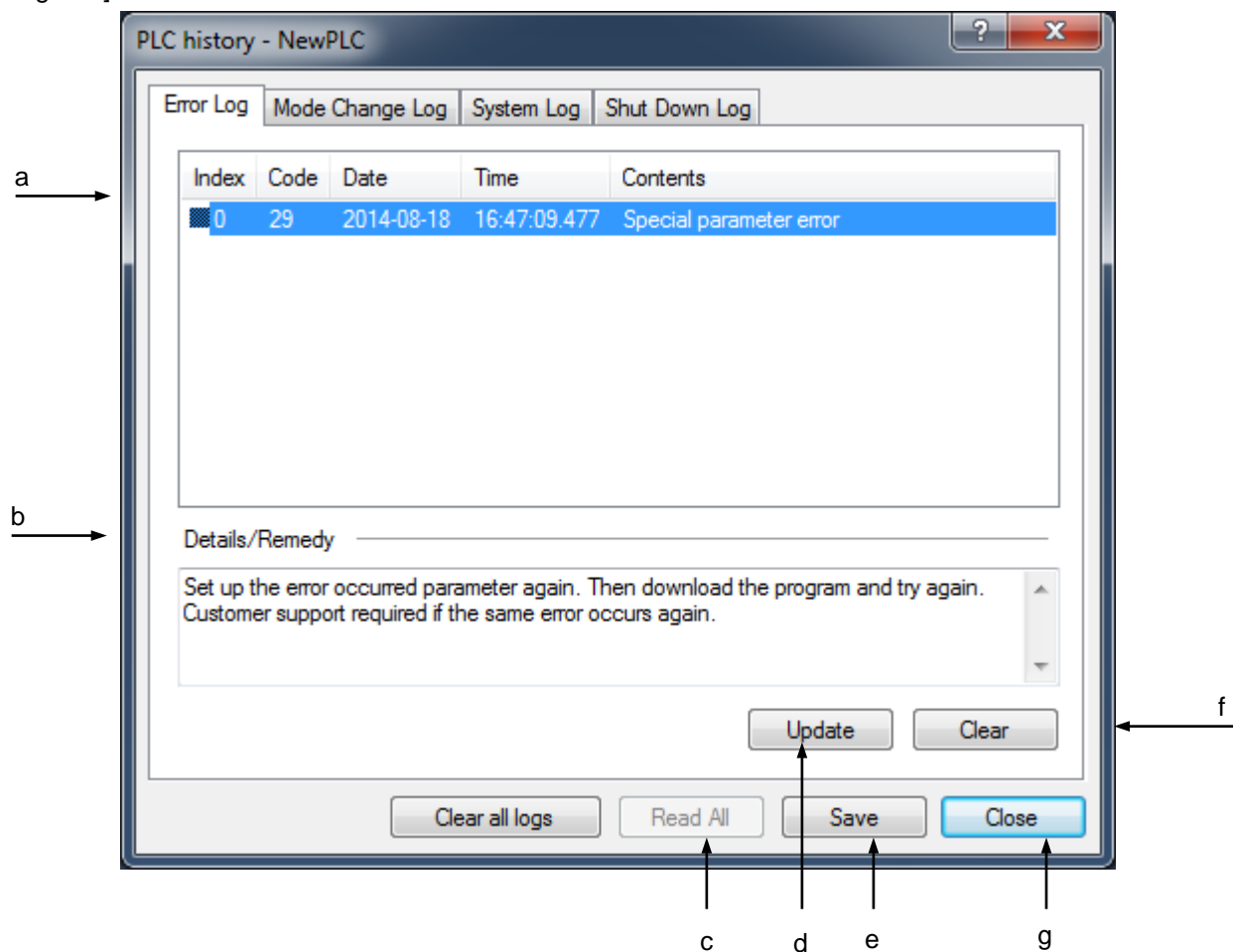
10.15   PLC History

It displays the history data of error/warning, Change Mode and Shut down Log saved in PLC.

10.15.1   Error Log

[Sequence]

1. Select [Online]-[Connect] to connect to PLC.

2. Select [Online]-[PLC History].

3. Select the Error Log tap on PLC History Dialog Box.
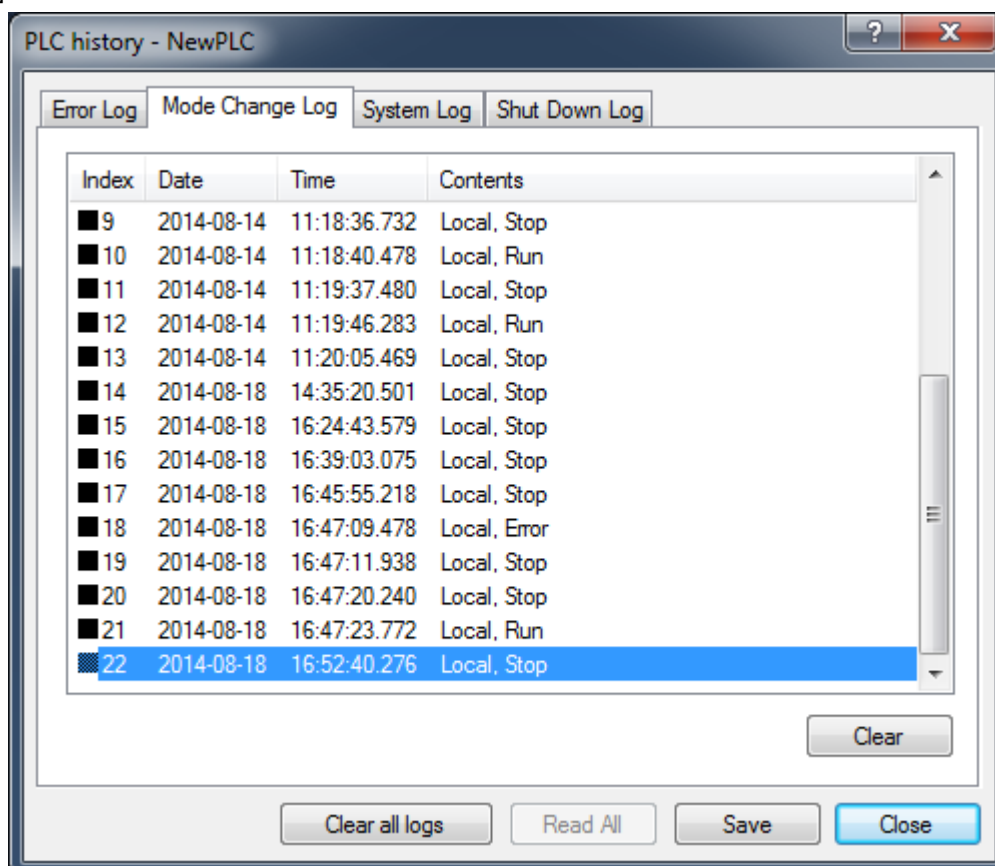
[Dialog Box]

[Description of Dialog Box]

a. List: displays Error Log.

b. Details/Remedy: displays details of the error selected from the history along with action to take against the error.

c. Read All: reads and displays all PLC histories.

d. Update: reads PLC history again.

e. Save: saves PLC history on file.

f. Delete: deletes PLC history.

g. Close: closes the Dialog Box.

10.15.2 Change Mode History
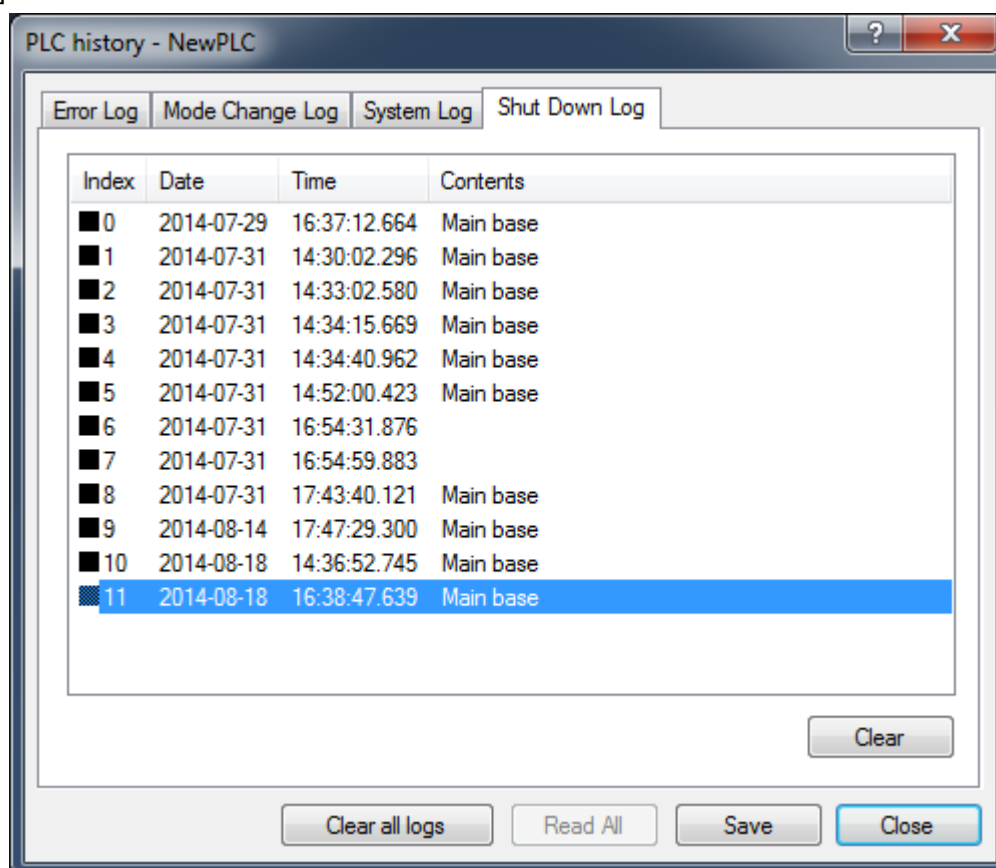
It shows the Mode Change Log of PLC operation modes.

[Dialog Box]

10.15.3 Shut down Log History

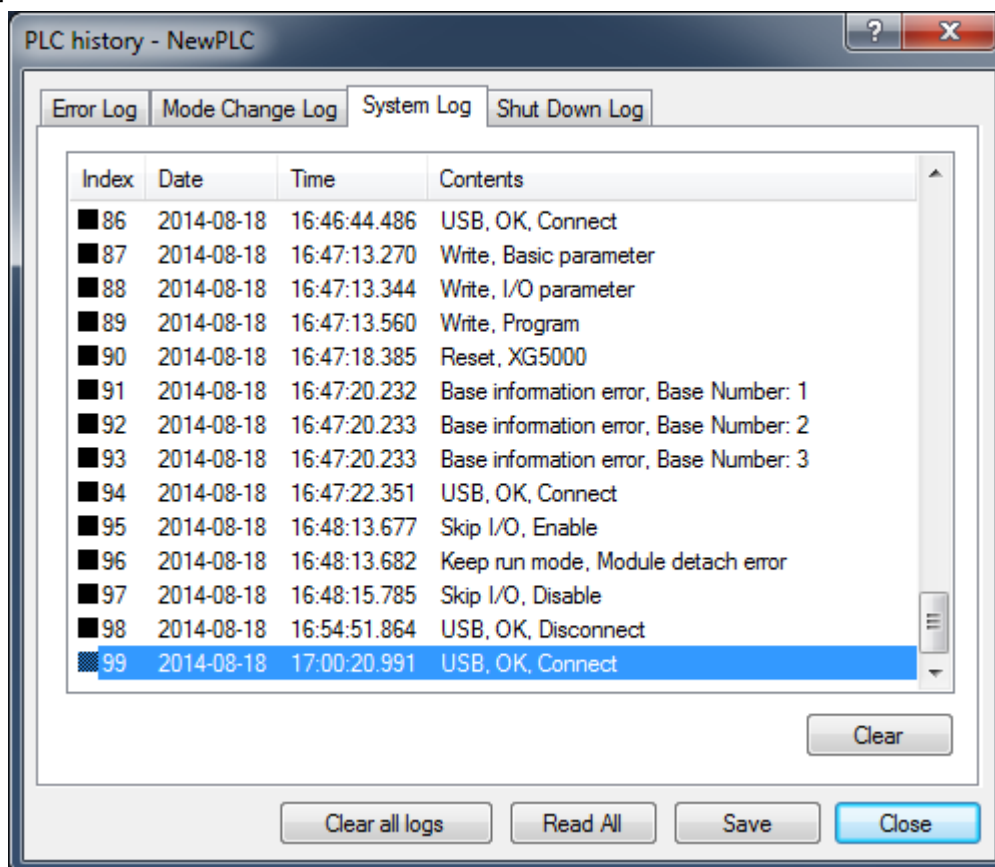It shows the Shut down Log history of PLC.

[Dialog Box]

Notes
– Base number where the power is cut also will be displayed.

10.15.4 System Log

It shows the history of works executed by XG5000 when PLC runs.

[Dialog Box]

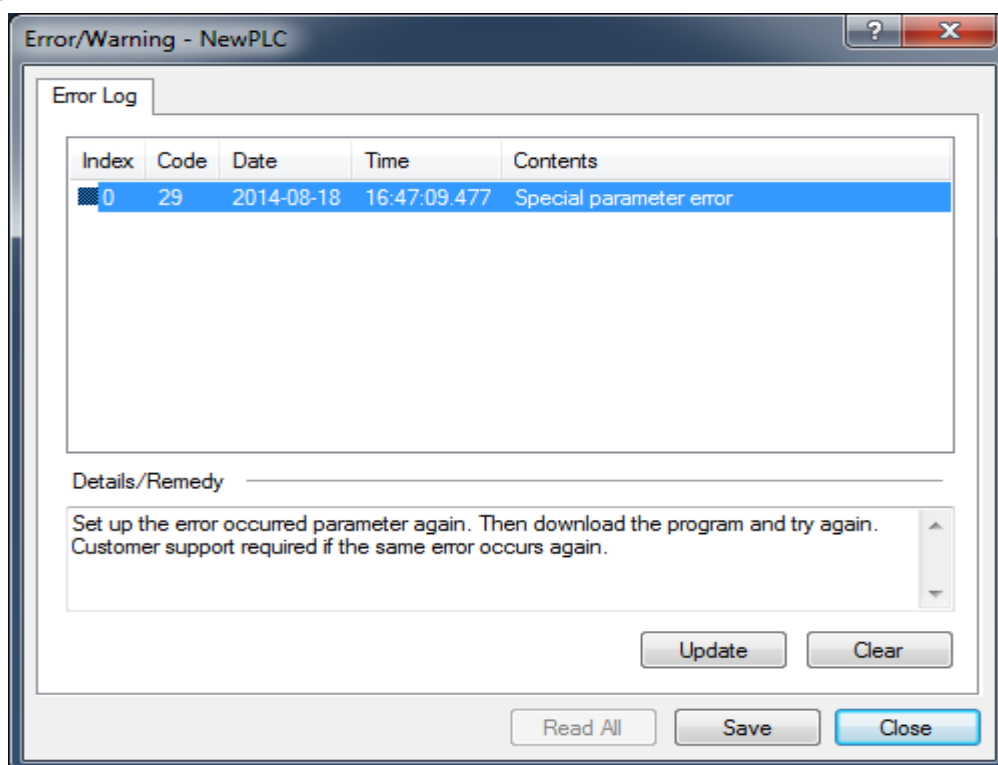| Notes |
|---|
| – Each history is arranged in time sequence. |
| – Each history will be saved on ".csv" file. This file can be open through Excel or other String editing programs. |
| – Double-click the first column of the list to change the arrangement method. |
| – On each Dialog Box displayed, 100 histories will be read respectively. Press Read All button to read more PLC histories. |
| – If the histories of PLC are less than 100, Read All button will be inactive. |

10.16   PLC Error/Warning

Error/warning and previous Error Log presently saved in PLC can be checked.

[Steps]

1. Select [Online]-[Connect] to connect to PLC.

2. Select [Online]-[Error/Warning].

[Dialog Box]

Notes

- If any error or warning occurs during connection or Online, the Error/Warning dialog box will appear.

- If the error is "I/O parameter discordant, I/O installation error, fuse error, I/O Read/Write error, special communication module error", the applicable error's slot information will be displayed as well.

- If a program error (produced when PLC is converted from Stop to Run) or execution program error (produced when PLC is in Run), double-click the area of program name to move to the applicable step if the program is identical to PLC program.

10.17   I/O information

[Procedures]

1.   Select the menu [Online]-[Connect] for connecting to the PLC.

2.   Select the menu [Online]-[diagnosis]-[I/Q information].
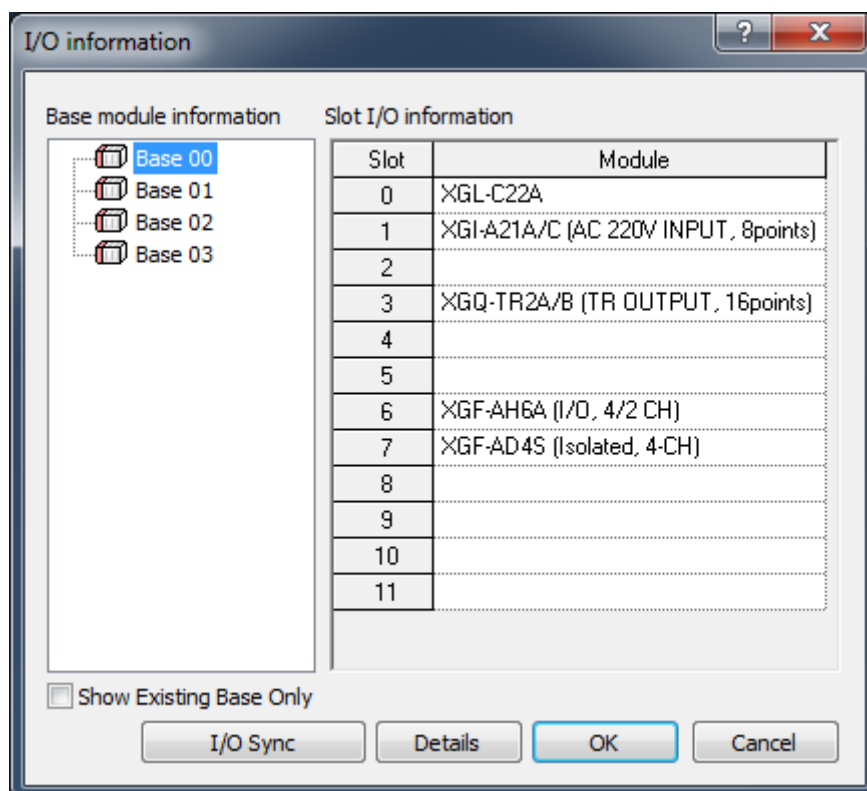
[Description on the dialog box]

a. Base module information: Displays the base.

b. Show Existing base only: If you tick this, the base where modules are embedded currently only will be displayed.

c. Slot I/O information: Shows the modules that are embedded to the base currently.

d. I/O Sync: Writes the parameters set up in the base.

e. Details: Displays the detailed information on the currently-embedded module.

f. OK: Saves the changed I/O information.

g. Cancel: Closes the I/O information window.

10.18 Saving PLC history

[Procedures]

1. Select the menu [Online]-[Connect] for connecting to the PLC.

2. Select the menu [Online]-[diagnosis]-[Save PLC history].
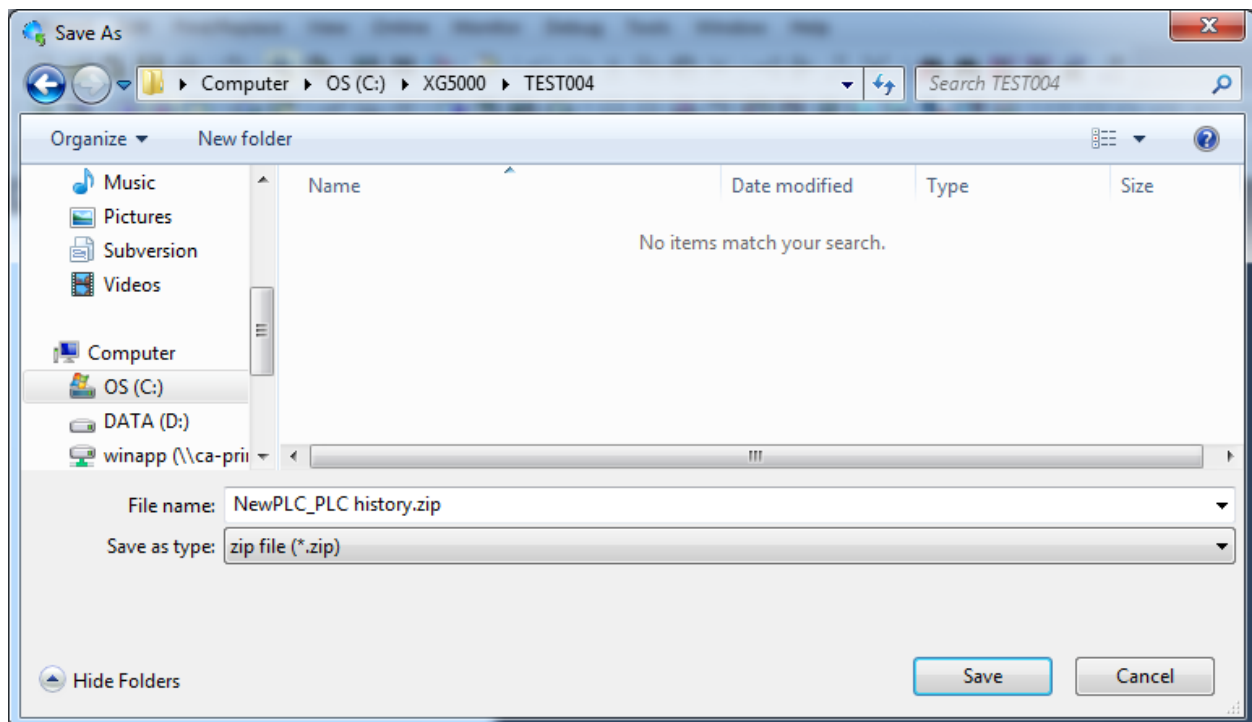
3. If you click [diagnosis]- [Save PLC history], the window for saving will show up.

4. Save the PLC's history so far.

10.19 Flash Memory Setting

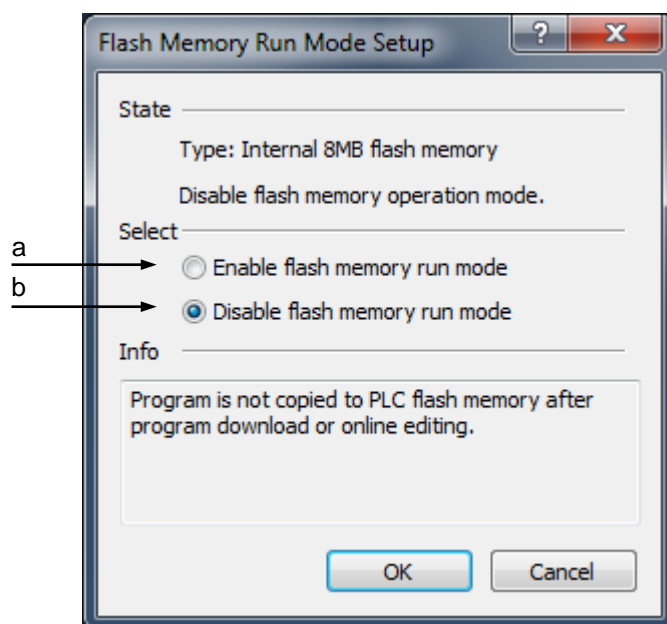Flash memory operation of PLC can be specified.

Flash memory operation: When PLC operation mode Changes to Run, it executes Run operation after copying the program in the flash memory to the program memory. In other words, it runs PLC through the program in the flash memory.

(PLC operation in Run mode: it means that the operation mode changes from Stop to Run, and that the operation mode is Run when PLC is powered back on)

[Steps]

1. Select [Online]-[Connect] to connect to PLC.
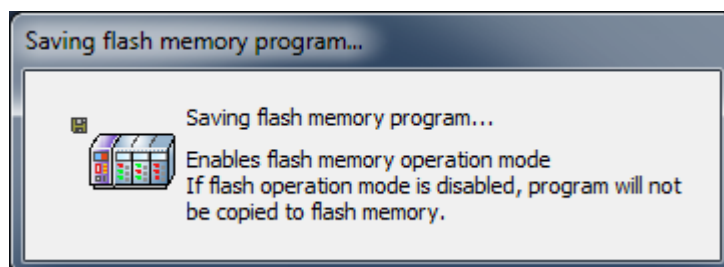
2. Select [Online]-[Set Flash Memory].

[Dialog Box]

[Description of Dialog Box]

a. Enable flash memory run mode: specifies the flash memory's operation mode.

b. Disable flash memory run mode: cancels the flash memory's operation mode.

Notes

- If a flash memory operation mode is specified, the program can be copied to the flash memory after Program Write or Modification Write during Run.

Saving flash memory program...

Saving flash memory program...

Enables flash memory operation mode
If flash operation mode is disabled, program will not be copied to flash memory.

- The flash memory operation mode setting is prepared to recover the program when PLC status is not normal.
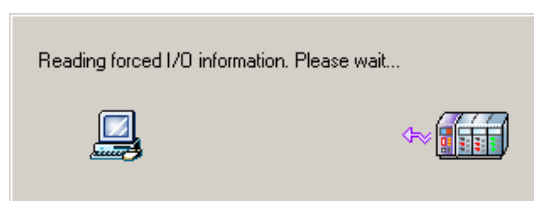
10.20   Forced I/O Setting

Forced I/O of the I/O refresh area can be specified in PLC.
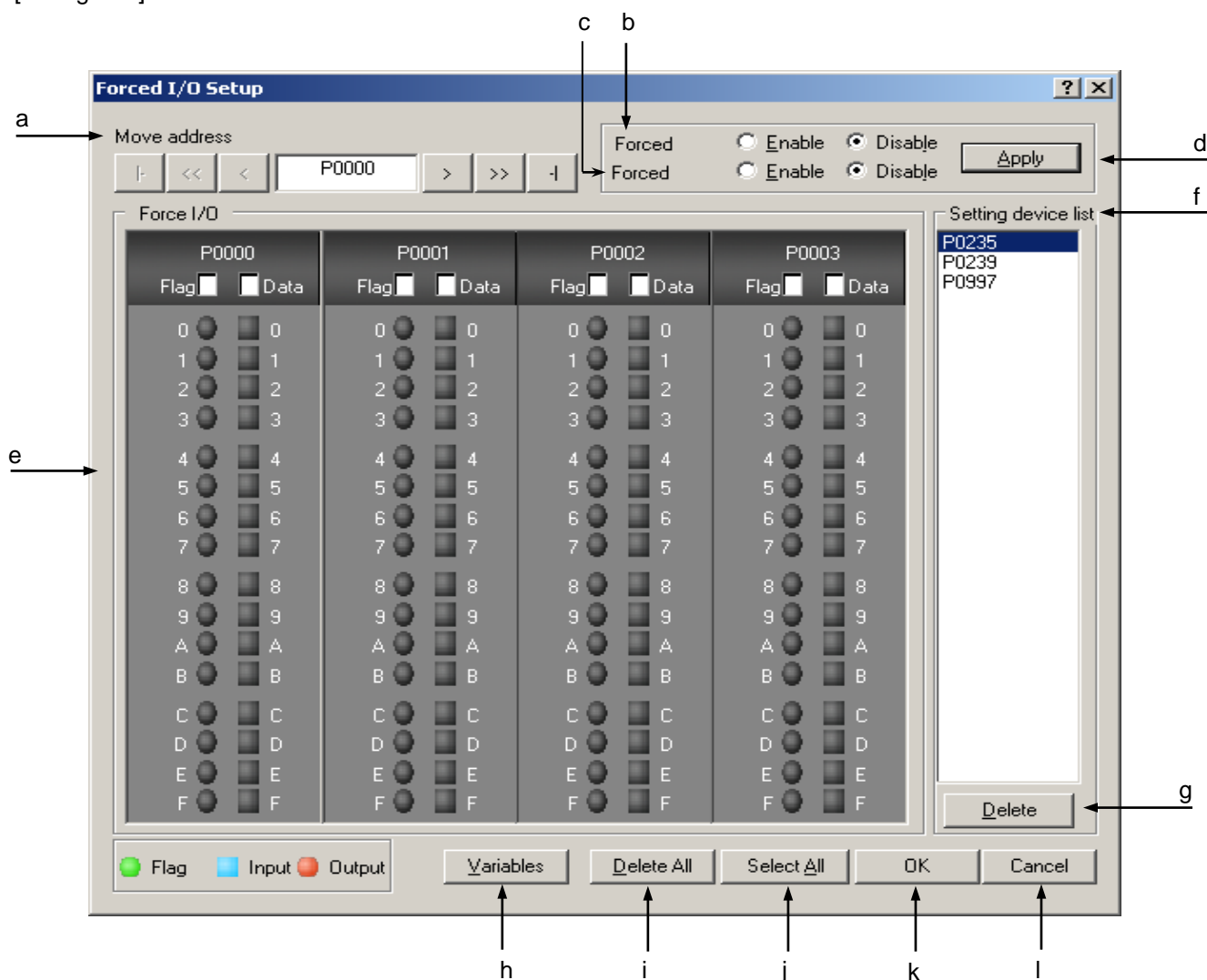
1.Select [Online]-[Forced I/O Setting].

Notes

‒ To obtain Forced I/O information, it will take about 5 sec. at a speed of 115200bps with RS-232C connected, or about 1 sec. with USB.

Reading forced I/O information. Please wait...

[Dialog Box]

[Description of Dialog Box]

a. Move address: changes the address value of area. Use the button or directly input the address value in the edit box desired to move to.

Button	Description
<<	Used to move to 8 words previous address.
<	Used to move to 1 word previous address.
>	Used to move to 1 word previous address.
>>	Used to move to 8 words previous address.
|-	Used to move to start address.
-|	Used to move to last address.

b. Forced Input: used to decide to allow Forced Input or not. Forced input value per bit will be applicable only when the Forced Input is allowed.

c. Forced Output: used to decide to allow Forced Output or not. Forced output value per bit will be applicable only when the Forced Output is allowed.

d. Apply: saves the changed items in PLC without closing the dialog box.

e. Forced I/O: used to specify the flag and data for each bit.

Notes

– The flag displays the Forced I/O application status for each bit. If the flag is selected, it means Enable, and if not, it means Disable.

– The data displays the forced value. If selected, 1 will be the forced value, and if not, 0 will be the forced value. However, it is effective only when the flag is in Enable status.

| Flag	Data	Forced Value
0 (not selected)	0 (not selected)	X
0 (not selected)	1 (selected)	X
1 (selected)	0 (not selected)	0
1 (selected)	1 (selected)	1

---

f. Setting device list: displays the device with the Forced I/O flag or data specified.

g. Delete: deletes the flag and data specified in the selected device from the specified devices list.

h. Variables: displays the Variable list.

i. Delete All: used to cancel the specified flag and data for all areas.

j. Select All: used to specify the flag and data for all areas.

k. OK: applies the changed items and closes the dialog box.

l. Cancel: closes the dialog box.

Notes

If Variables Dialog button is pressed, the only Variable declared on P device will be displayed.

Notes

- In case the assignment method of fixed points of 64-bit is used for each module, the flag and data can be specified for the other bits than the output module points if not identical to the points of the output module actually installed on PLC. Ex) If 16-poit output module is installed on the basic base, the flag and data can be specified for the 48 points.
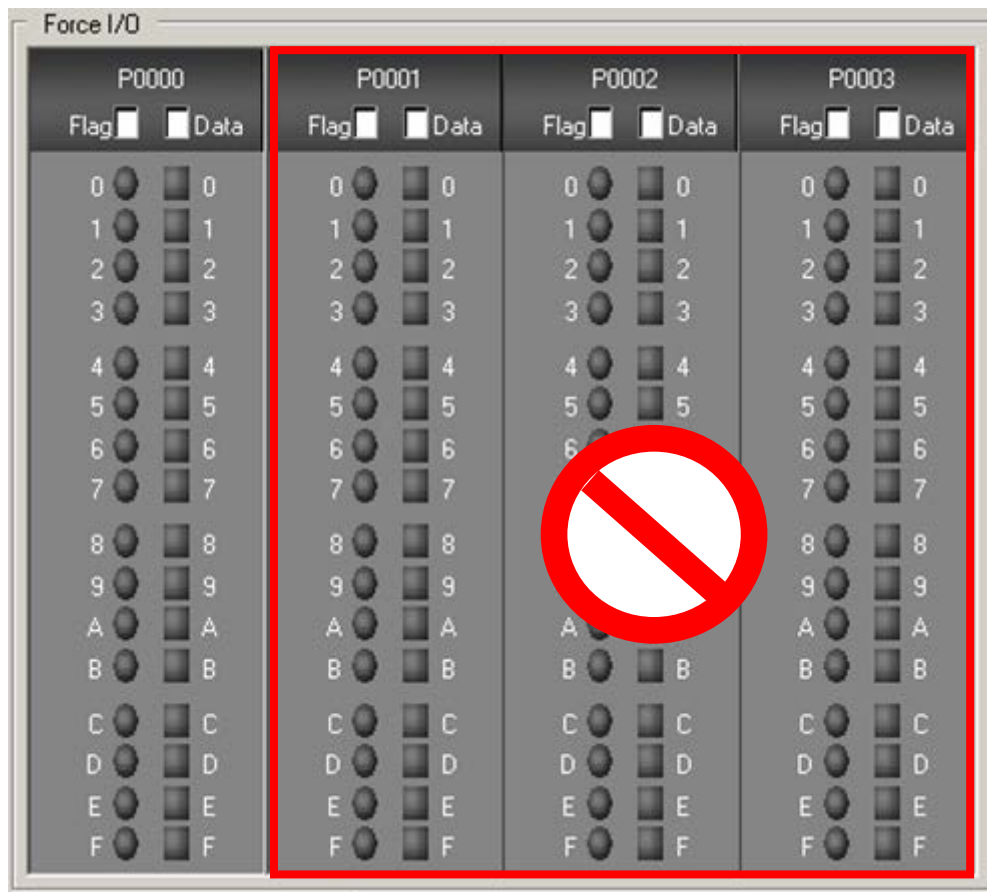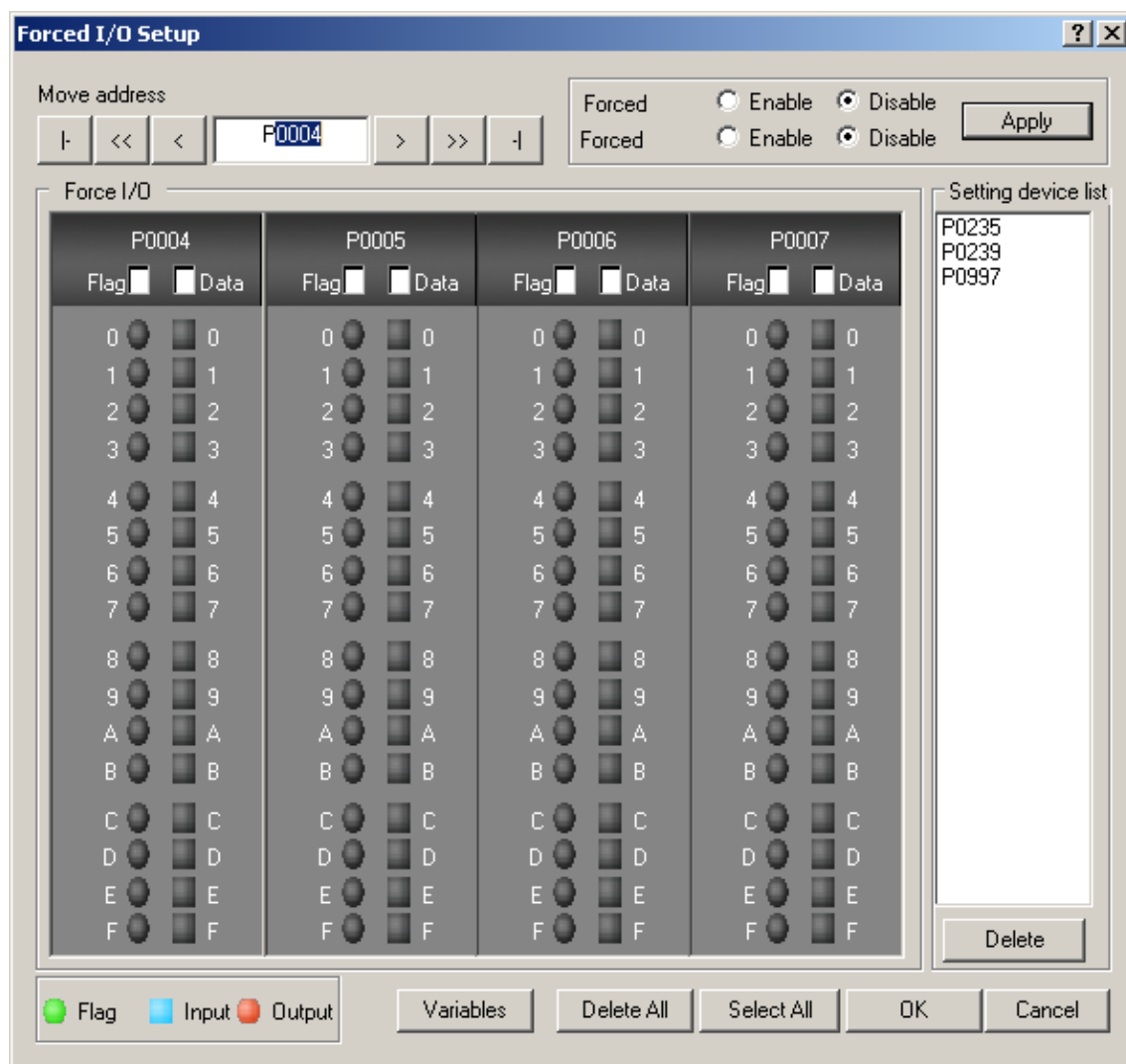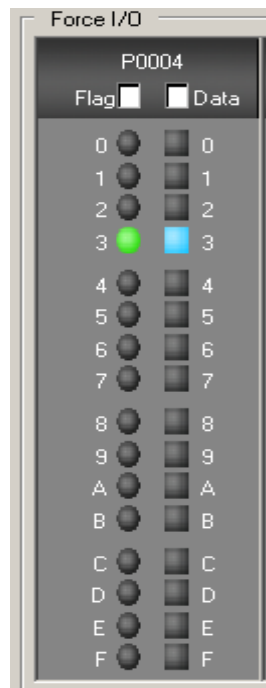
1) Forced I/O Setting

[Steps]

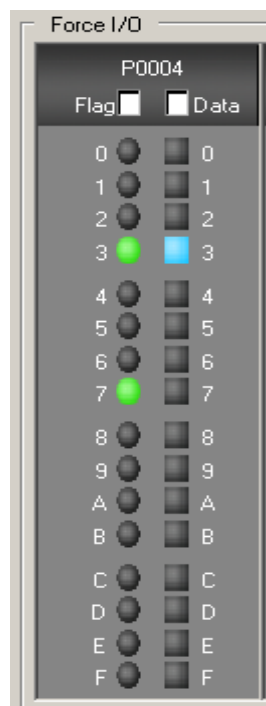(*Example.*: P0004 word 4th bit's forced output 1, 7th bit's forced output 0)

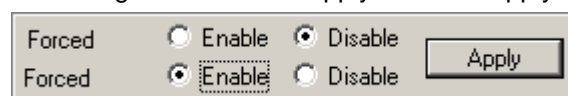1. Move to P0004. Use the button or directly input the area desired to move to.

2. Select the flag and data of the bit 3.

3. Select the flag of the bit 7. As the forced output value of the bit 7 is 0, no data needs to be selected.

4. Select the Forced Output Enable Flag and then click Apply button to apply the forced value.
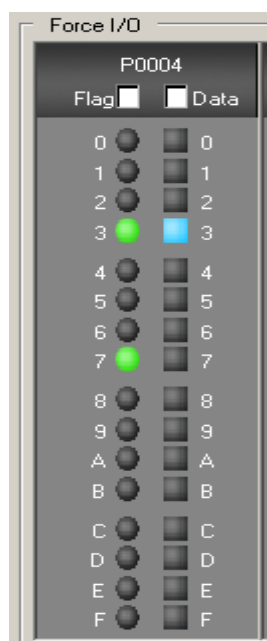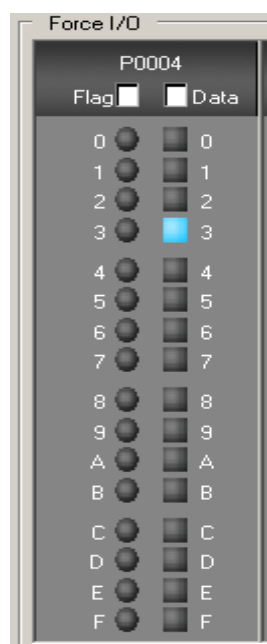
2) Forced I/O Cancel

[Steps]

(*Example*: P0004 word 4th, 7th bit's forced value to cancel)

1. Move to P0004. Use the button or directly input the area desired to move to.

2. Cancel the bit 3 and 7's flag selected to cancel the forced output value

3. Click Apply button.

Notes

Monitoring is to display the value of the calculation result of the program.

- In the case of the forced input, monitoring will be with the forced value since the forced

  input value is updated in the monitor area.

- In the case of the forced output, monitoring will not be available since the forced value will be

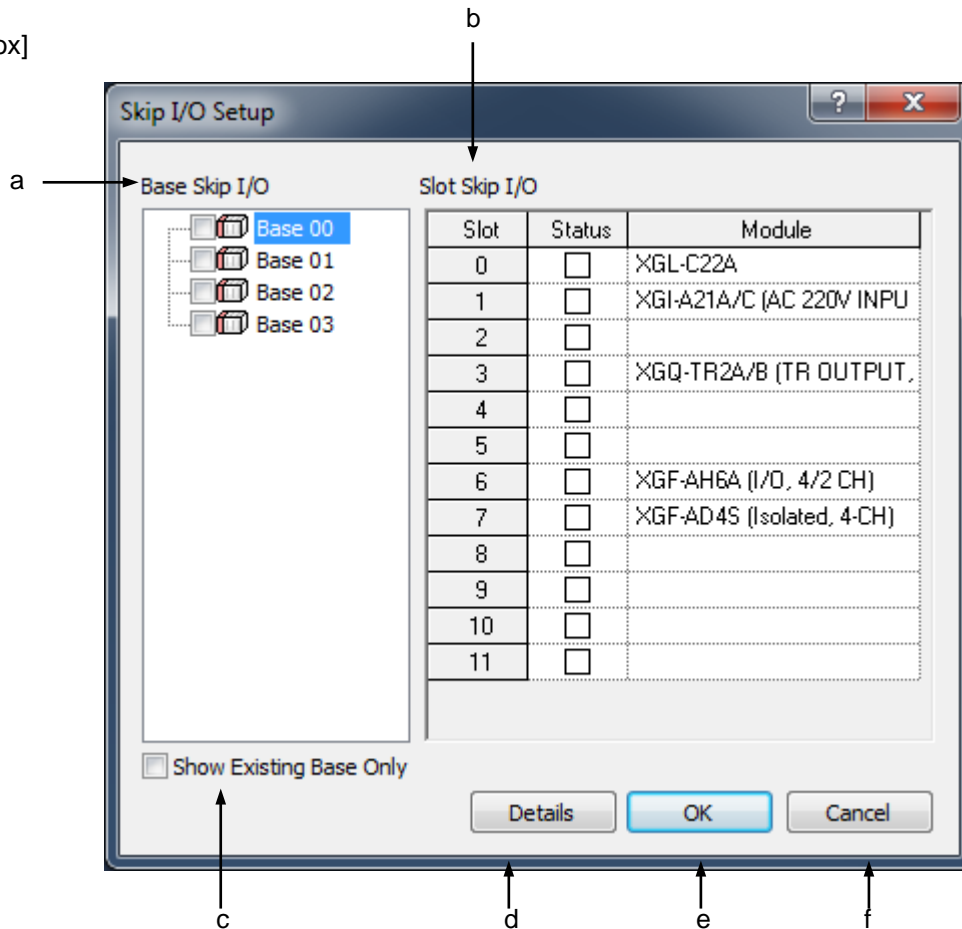 actually output regardless of the calculation result.

10.21   Skip I/O

It is used to decide to inspect I/O and update I/O for the specific module during PLC operation.

[Sequence]

1. Select [Online] - [Skip I/O].

[Dialog Box]

[Description of Dialog Box]

a. Base I/O Skip: used to decide to skip the base I/O or not. If the base module is skipped, all slots in the base will be I/O skipped.

b. Slot I/O Skip: used to decide to skip the slot I/O or not.

c. Show Existing Base Only: shows existing base only

d Details: displays detailed information of the special module or the communication module only.

e OK: applies the changed items and closes the dialog box.

f Cancel: closes the dialog box.

1) Skip I/O Setting for each slot

[Sequence]

1. Select the base with the slot to specify Skip I/O.
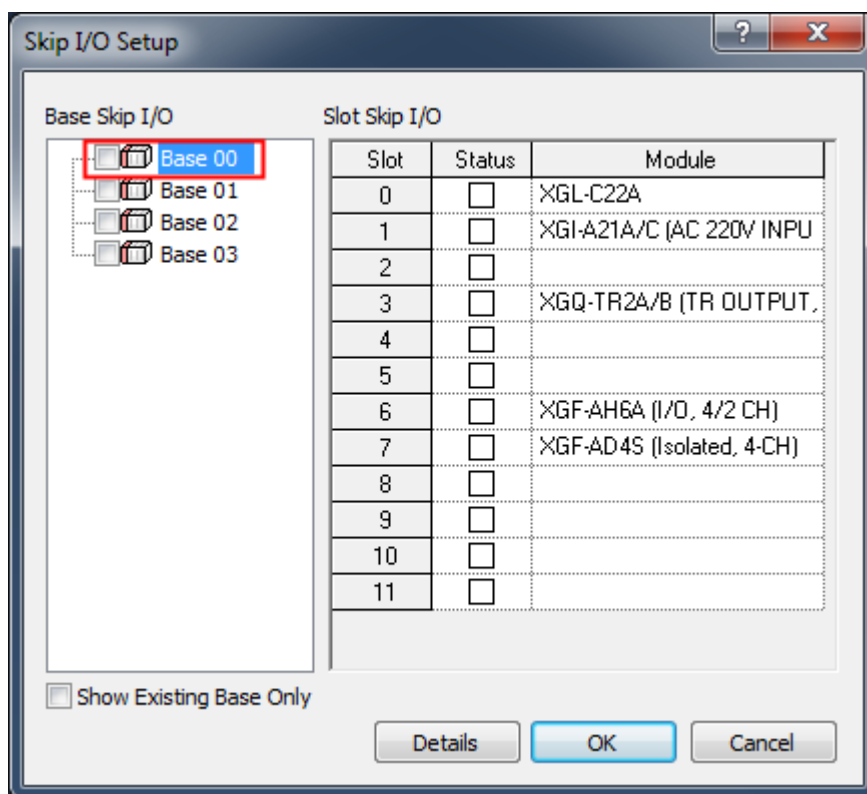
2. Select the slot to specify the Skip I/O.
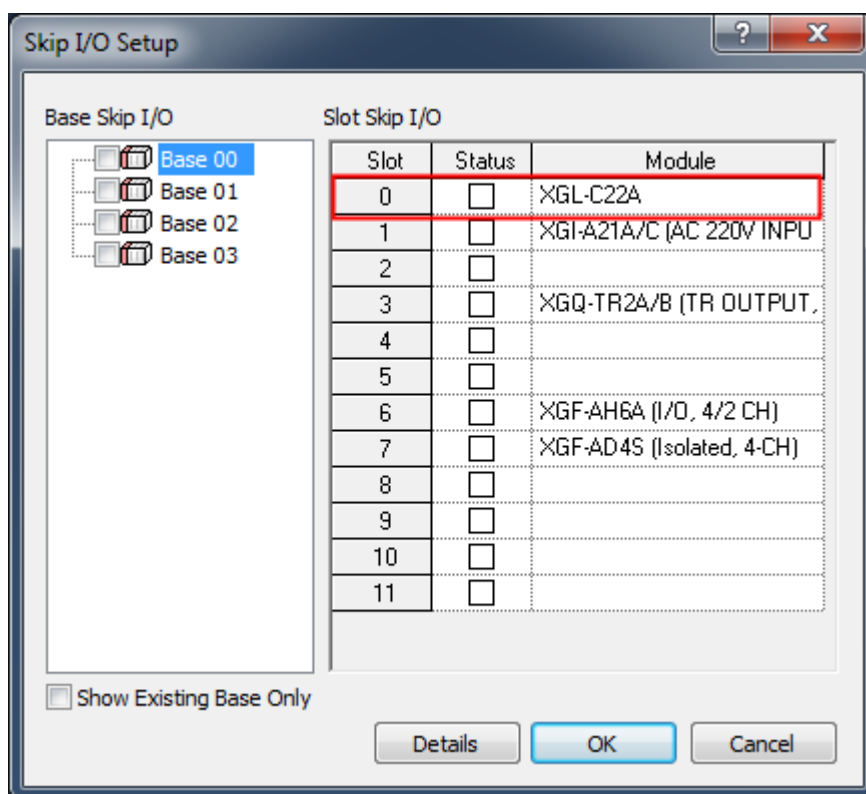
3. Select the check box of the status column. At this moment '*'mark will be added to the base.
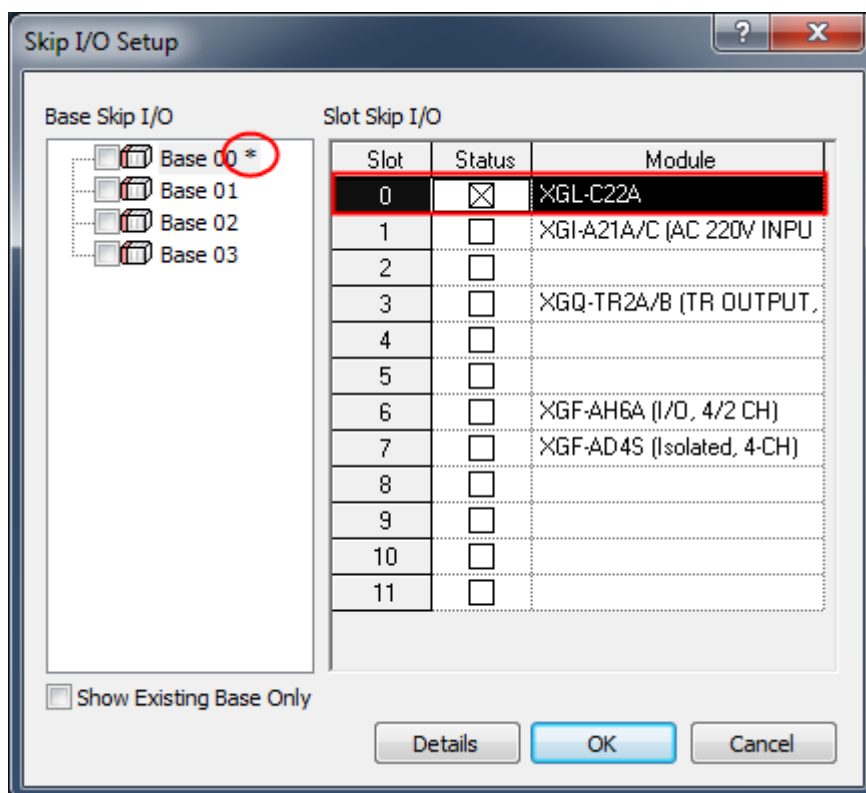
4.If you press OK, the changed items are displayed.
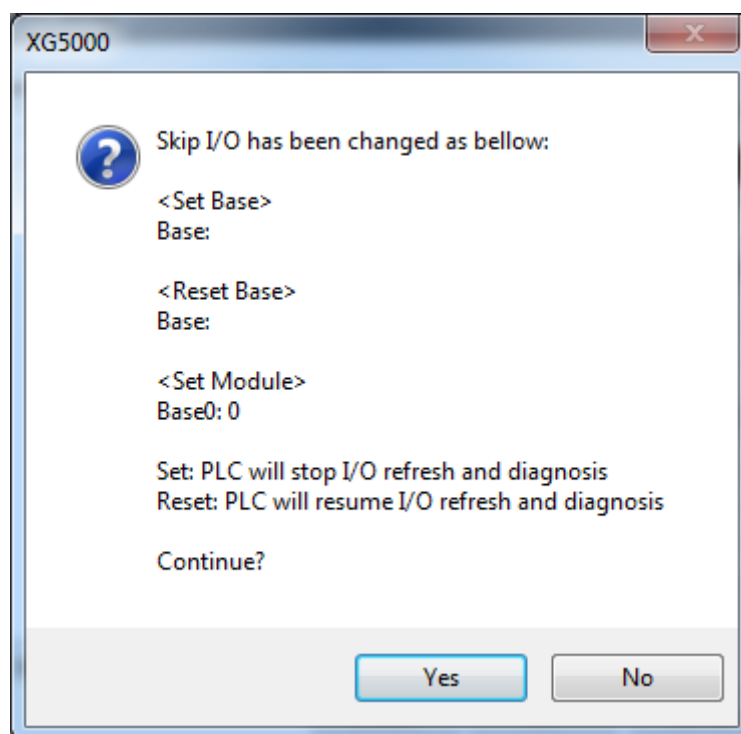
2) Skip I/O Cancel for each slot
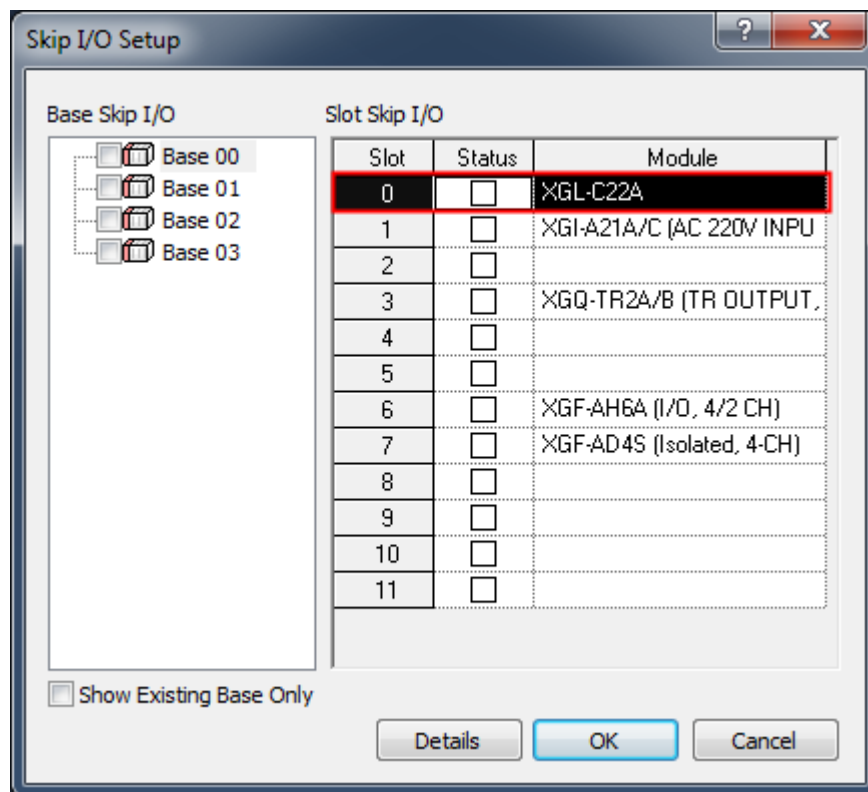
[Sequence]

1. Select the base to cancel the Skip I/O.

2. Select the slot to cancel the Skip I/O.

3. Cancel the selected check box of the status column. '*'mark will be deleted if there is no slot any more where Skip I/O is specified in the applicable base.

Skip I/O Setup

Base Skip I/O

- Base 00
- Base 01
- Base 02
- Base 03

Slot Skip I/O

Slot	Status	Module
0	☐	XGL-C22A
1	☐	XGI-A21A/C (AC 220V INPU
2	☐	
3	☐	XGQ-TR2A/B (TR OUTPUT,
4	☐	
5	☐	
6	☐	XGF-AH6A (I/O, 4/2 CH)
7	☐	XGF-AD4S (Isolated, 4-CH)
8	☐	
9	☐	
10	☐	
11	☐	

☐ Show Existing Base Only

[Details] [OK] [Cancel]

4.If you press OK, the changed items are displayed.

XG5000

Skip I/O has been changed as bellow:

<Set Base>
Base:

<Reset Base>
Base:

<Reset Module>
Base0: 0

Set: PLC will stop I/O refresh and diagnosis
Reset: PLC will resume I/O refresh and diagnosis

Continue?

[Yes] [No]
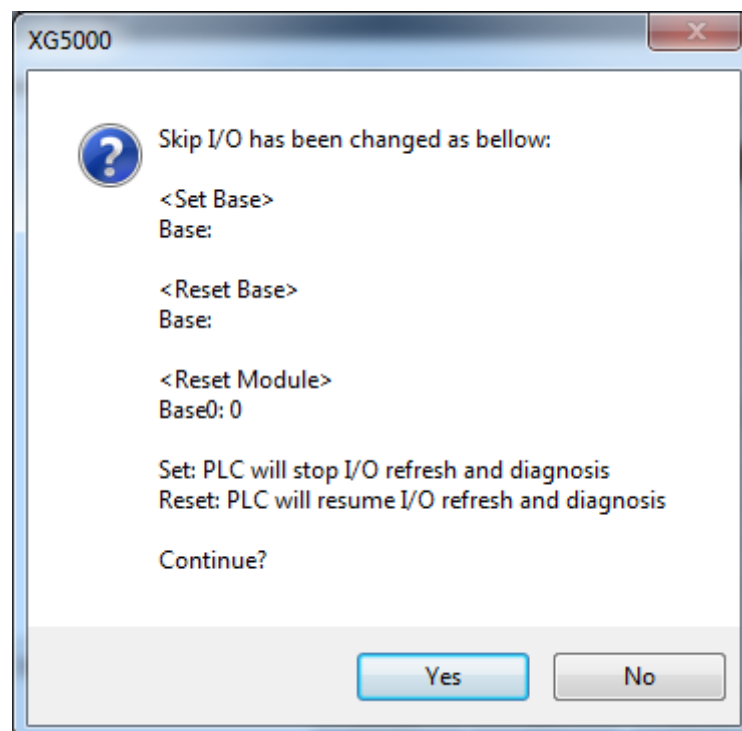
3) Base Skip I/O Setting

[Sequence]

1. Select the base to specify the base Skip I/O.

2. Select the check box.

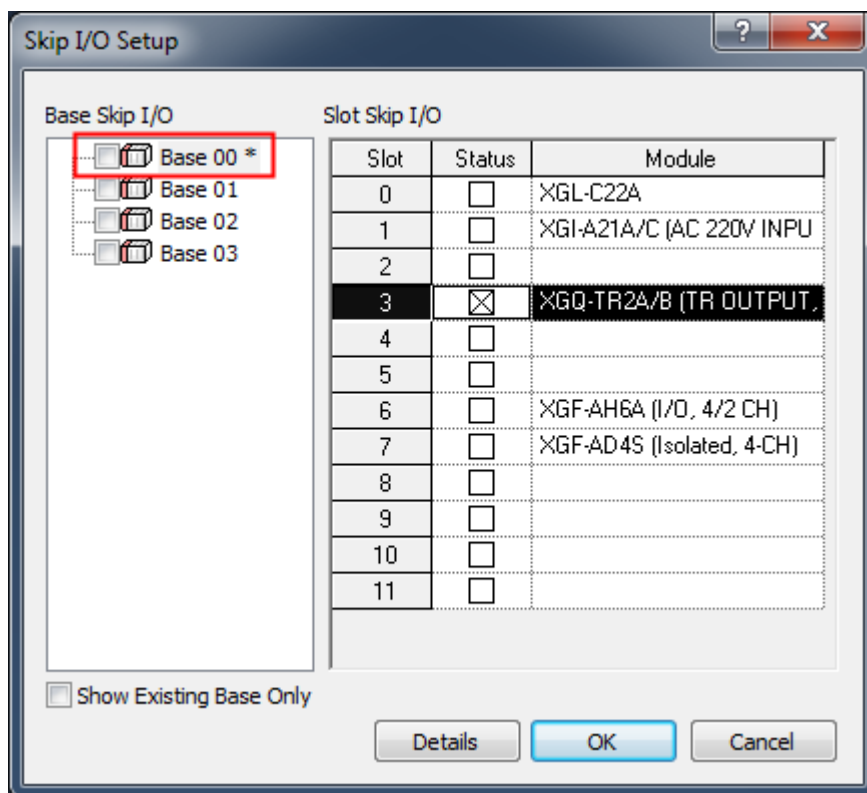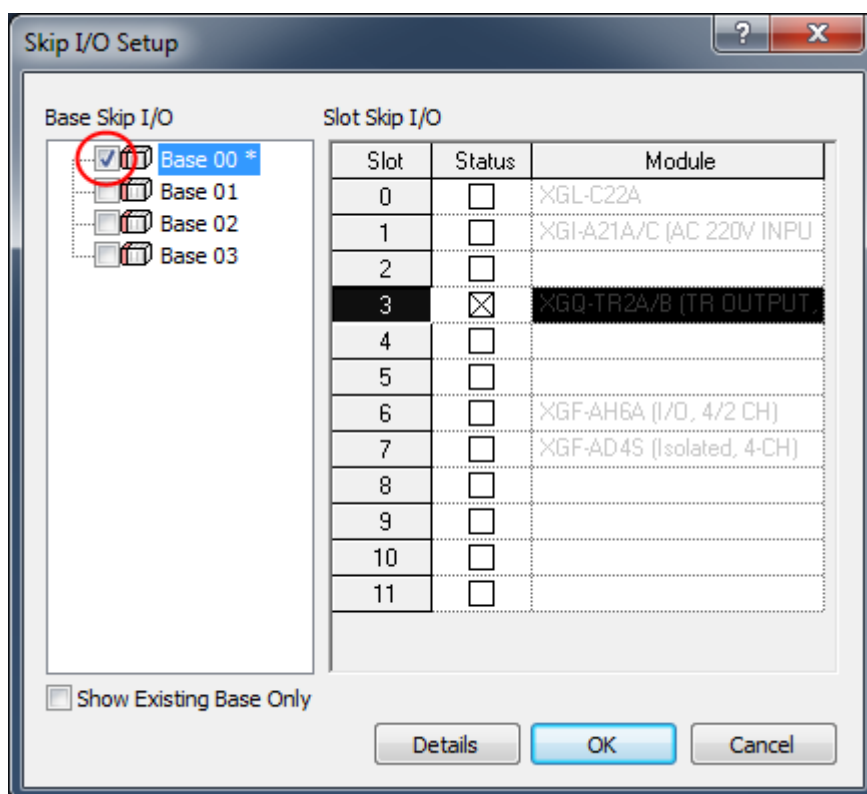3.If you press OK, the changed items are displayed.
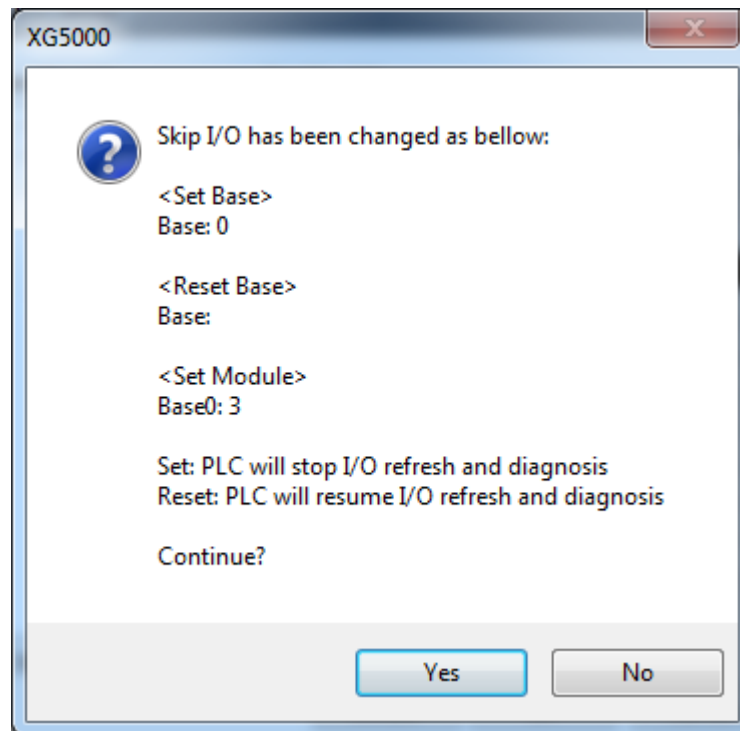
4) Base Skip I/O cancel

[Sequence]
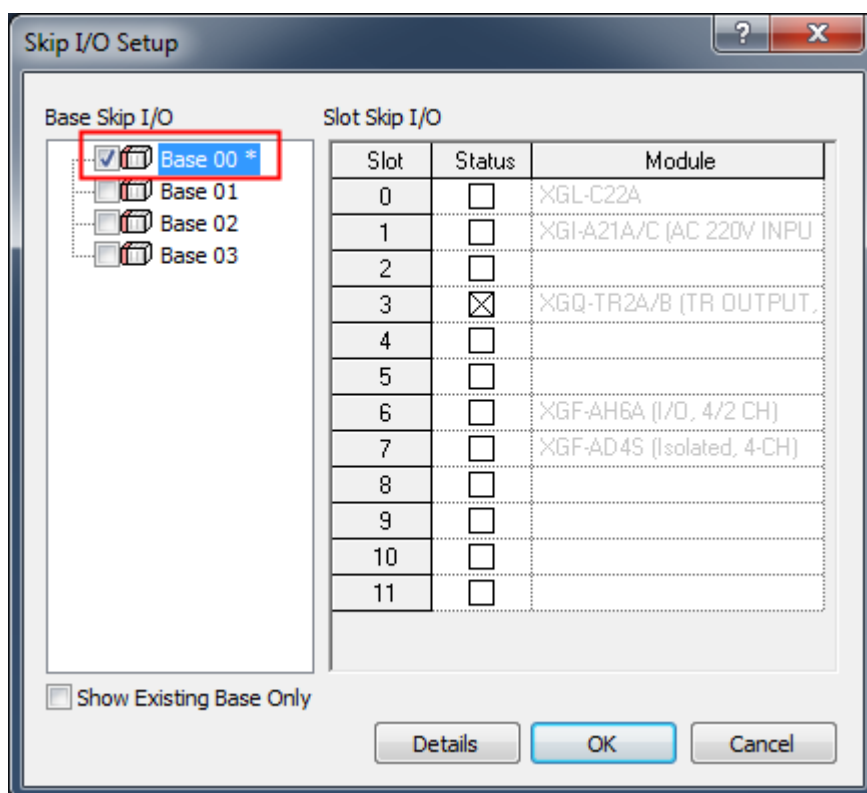
1. Select the base to cancel the base Skip I/O

2. Cancel the check box selected. As the base Skip I/O is canceled, the Skip I/O for each slot can be specified or canceled.
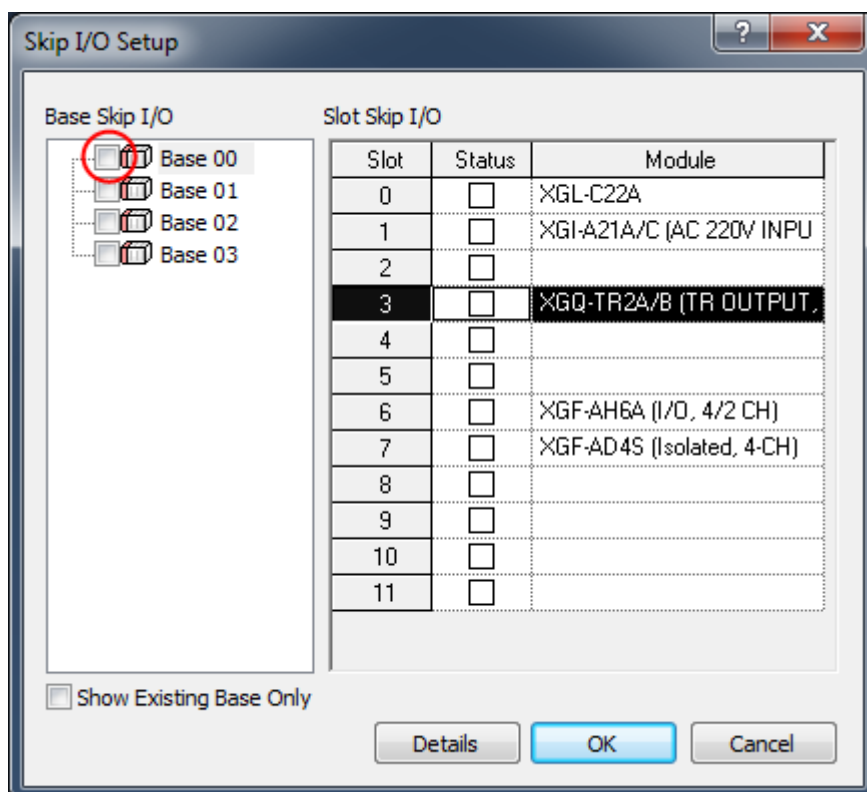
3.If you press OK, the changed items are displayed.
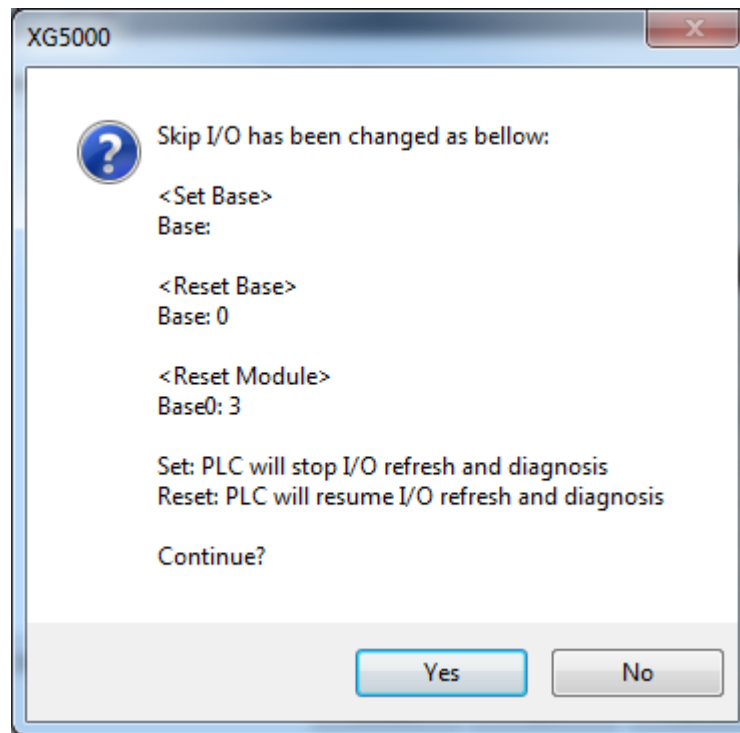
Notes
- Click [OK] button to apply the specified Skip I/O.

10.22 Fault Mask

It is used to decide to keep running the module in Fault or not during PLC operation.

[Sequence]

1. Select [Online]-[Fault Mask Setting].

[Dialog Box]

b

a

Fault Mask Setup

Base Fault Mask	Slot Fault Mask

Base 00
Base 01
Base 02
Base 03

Slot	Status	Module
0	☐	XGL-C22A
1	☐	XGI-A21A/C (AC 220V INPU
2	☐	
3	☐	XGQ-TR2A/B (TR OUTPUT,
4	☐	
5	☐	
6	☐	XGF-AH6A (I/O, 4/2 CH)
7	☐	XGF-AD4S (Isolated, 4-CH)
8	☐	
9	☐	
10	☐	
11	☐	

☐ Show Existing Base Only

Details   OK   Cancel

c   d   e   f
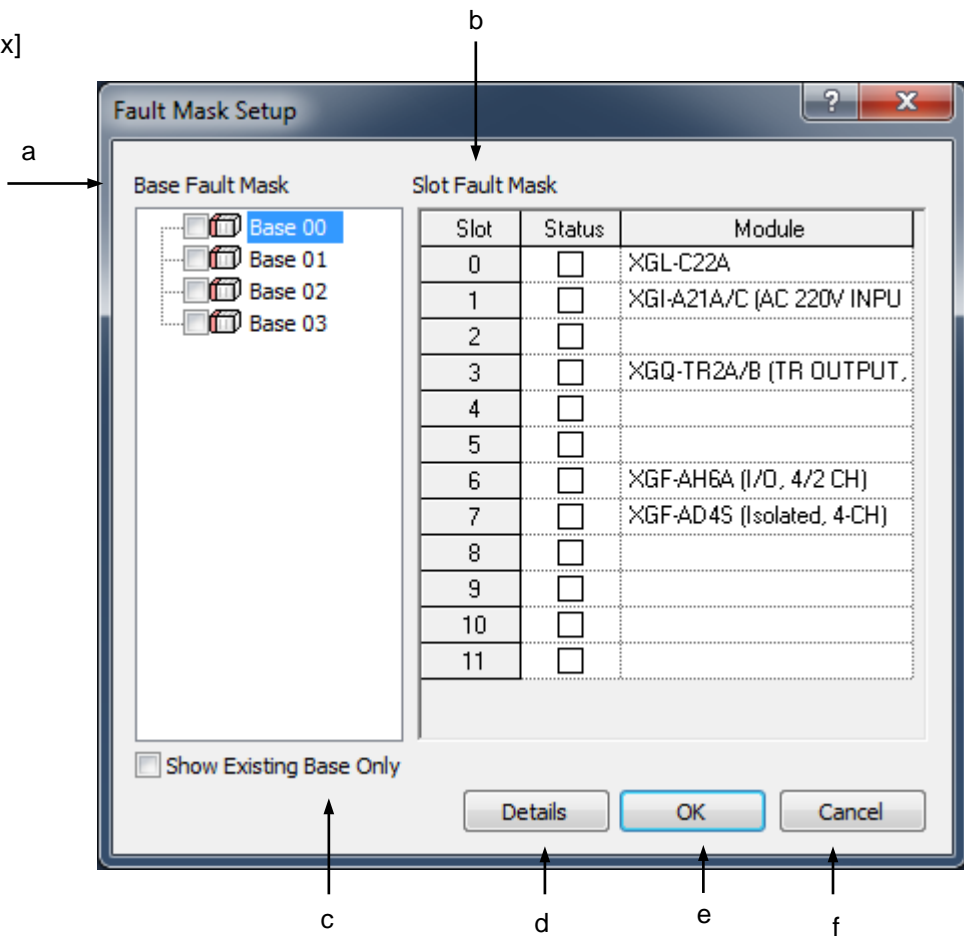
[Description of Dialog Box]

a. Base Fault Mask: used to decide to apply base module's fault mask or not. If the base module's mask is specified, all slots in the base will be of the fault mask.

b. Slot Fault Mask: used to decide to apply the fault mask for each slot or not.

c. Show Existing Base Only: shows existing base only

d. Details: displays detailed information of the special module or the communication module only.

e. OK: applies the changed items and closes the dialog box.

f. Cancel: closes the dialog box.

Notes
- Canceling the 'Fault Mask' specified is identical as described in Skip I/O setting. Refer to Skip I/O Setting for its details.

Notes

- The I/O Information dialog box which is similar to Fault Mask or I/O skip dialog box when [Online]-[I/O Information] is selected. I/O Sync. Button will be activated when PLC is STOP Mode.
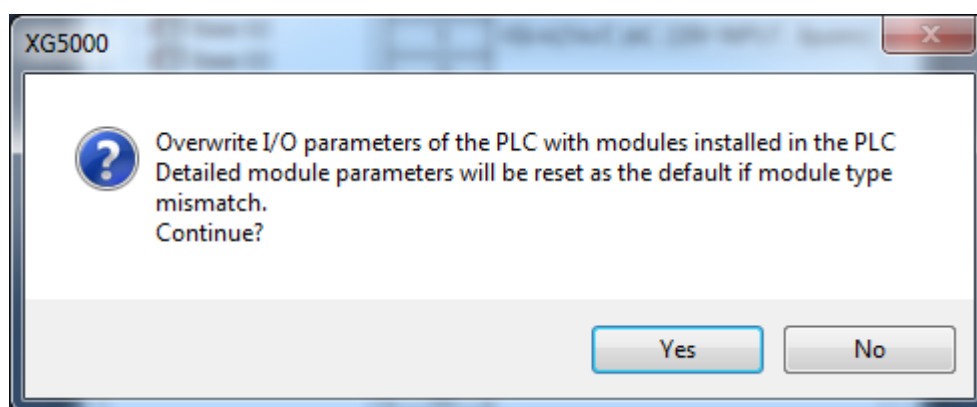
Slot	Module
0	XGL-C22A
1	XGI-A21A/C (AC 220V INPUT, 8points)
2	
3	XGQ-TR2A/B (TR OUTPUT, 16points)
4	
5	
6	XGF-AH6A (I/O, 4/2 CH)
7	XGF-AD4S (Isolated, 4-CH)
8	
9	
10	
11	

Base module information: Base 00, Base 01, Base 02, Base 03

Show Existing Base Only

[I/O Sync] [Details] [OK] [Cancel]
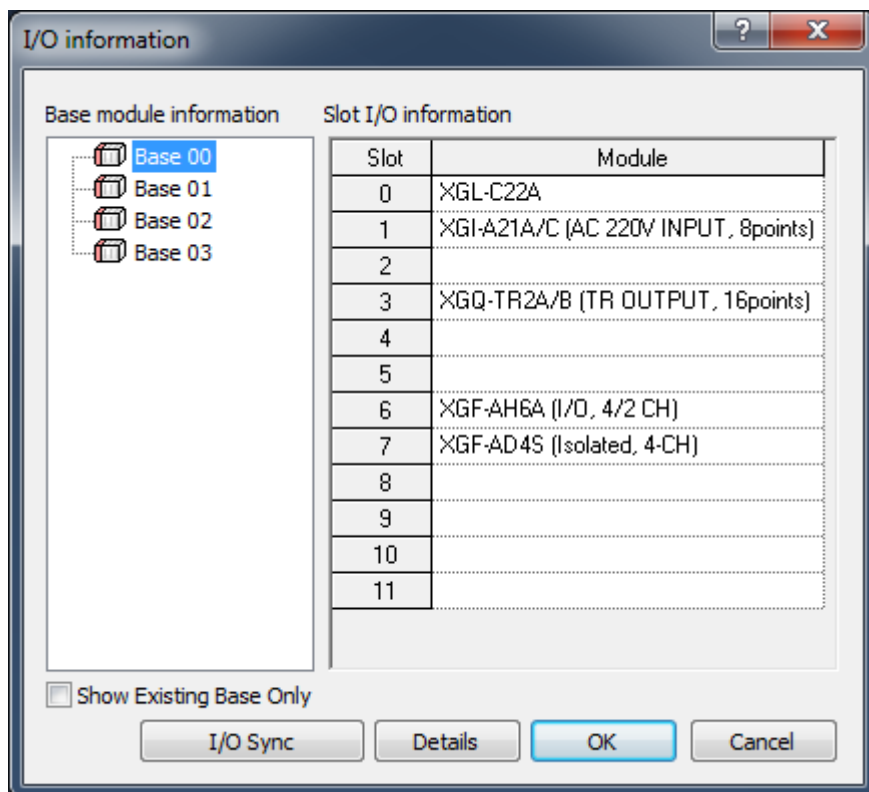
- The I/O Parameter of XG5000 project will be synchronized with the real module installation information when I/O Sync. button is clicked. Please be careful since the previous I/O parameter will be erased.

XG5000

Overwrite I/O parameters of the PLC with modules installed in the PLC Detailed module parameters will be reset as the default if module type mismatch.
Continue?

[Yes] [No]

10.23   Module Changing Wizard

This Wizard is used to change the module during PLC operation.

Note
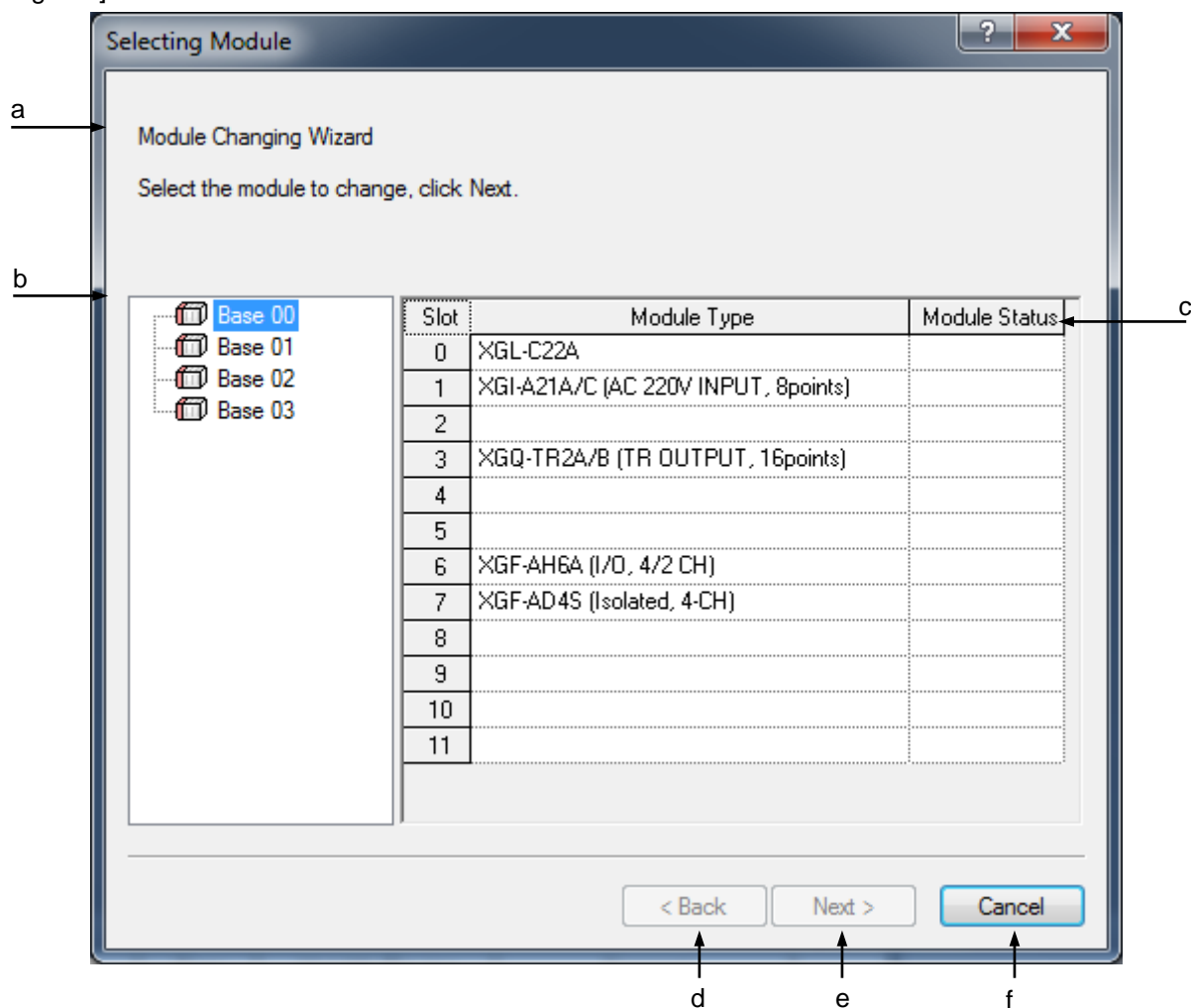
     – Module Changing Wizard can be executed only in Run mode

     – In case there is PLC error, you can't start Module Changing Wizard.

XG5000

⚠ Cannot proceed, the PLC is not in run mode.

OK
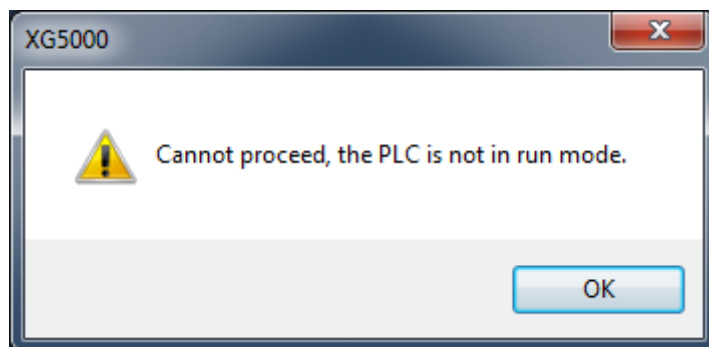
[Steps]

1. Select [Online]-[Module Changing Wizard].

2. Select the module to change at the module selection stage and then click Next button.
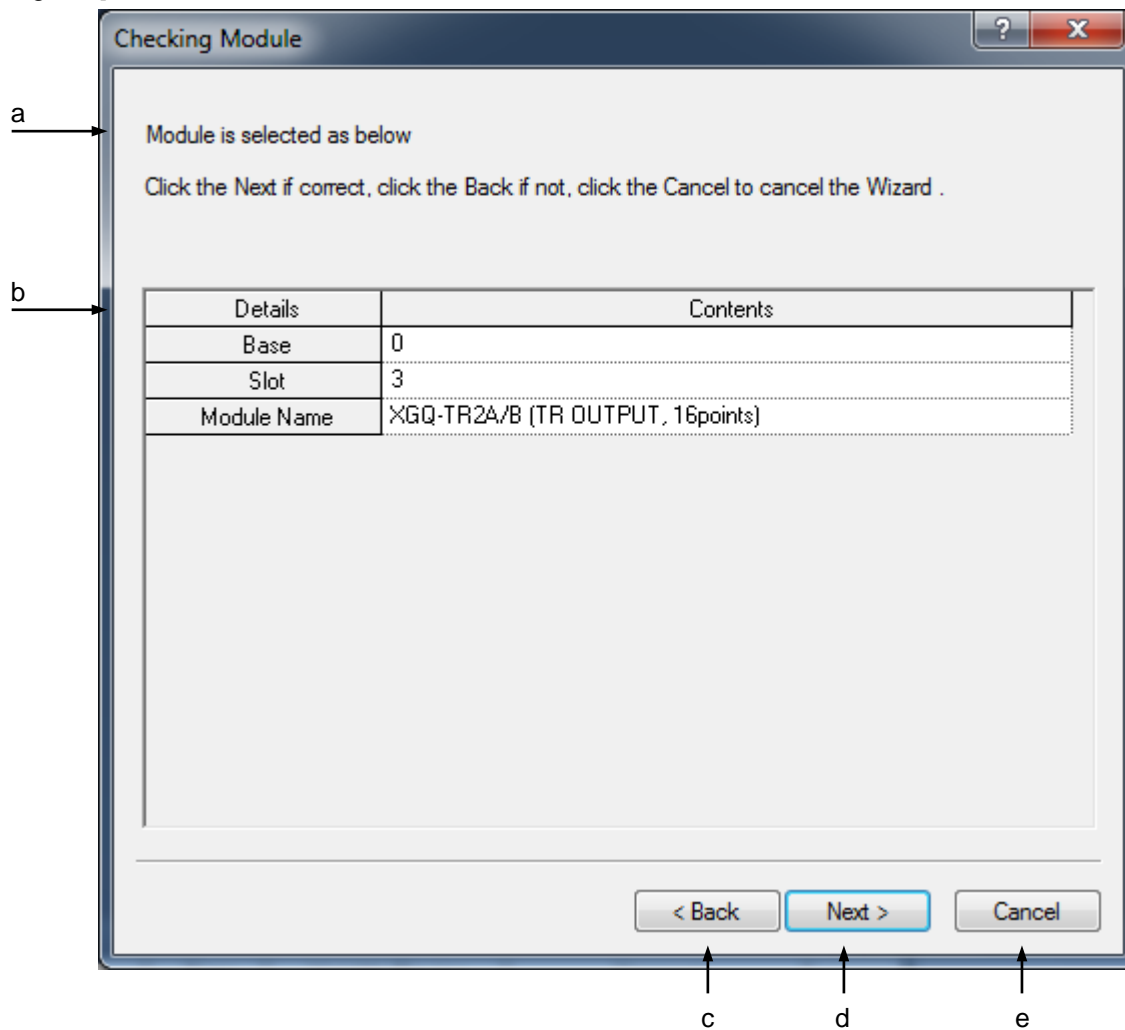
[Dialog Box]

[Description of Dialog Box]

a. Comment: displays the comment of the module selection stage.

b. Base Module Tree: displays the base module.

c. Slot Modules List: displays the information of the slot installed on the base module.

d. Back: It will be inactive at the module selection stage.

e. Next: used to move to the module confirming stage. It will be active only if the module to change is selected.

f. Cancel: Finishes the Module Changing Wizard.

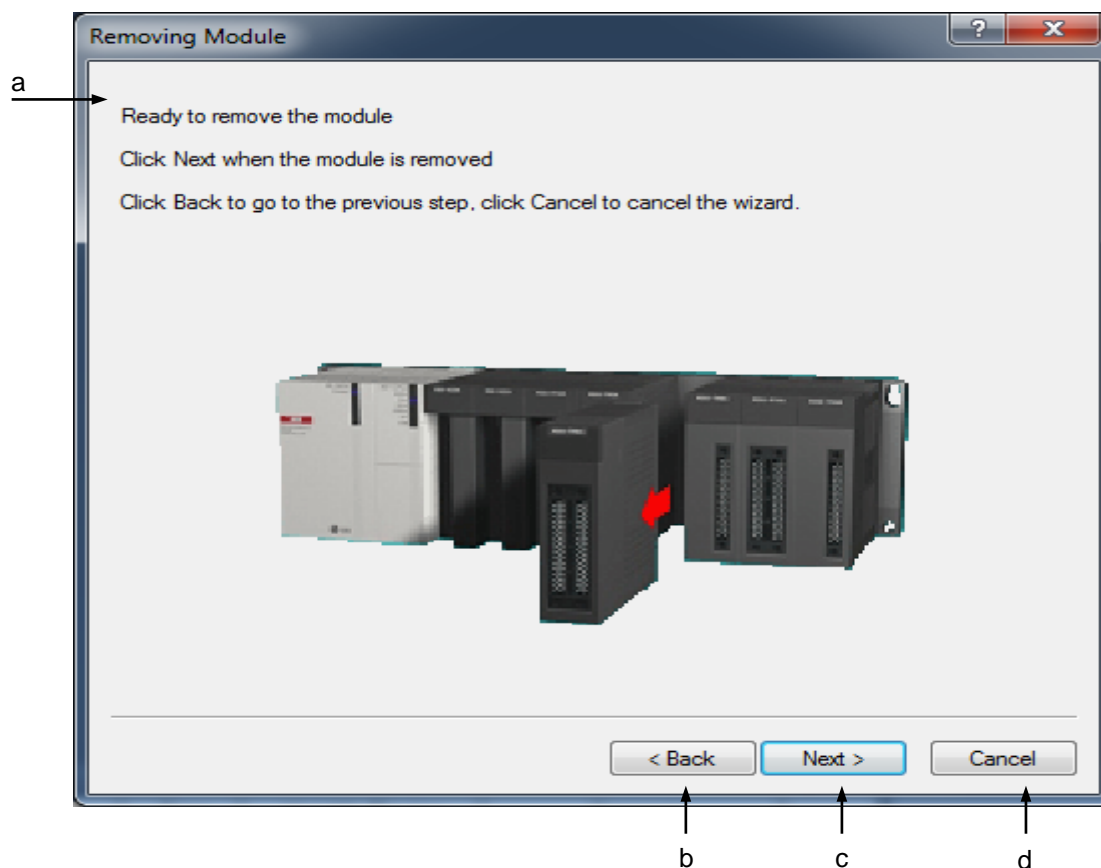3. Check the module to change at the module confirming stage.

[Dialog Box]

[Description of Dialog Box]

a. Comment: displays the comment of the module confirming stage.

b. Module Information: displays detailed information on the selected module.

c. Back: used to move to the module selection stage.

d. Next: used to move to the Removing Module.

e. Cancel: closes the 'Module Changing Wizard'.

4. Click Next button if the information displayed is identical to the module to change, or click Back button to
   go back to the previous stage. In order to cancel the Module Changing Wizard, click Cancel button.

5. Remove the module at the Removing Module.

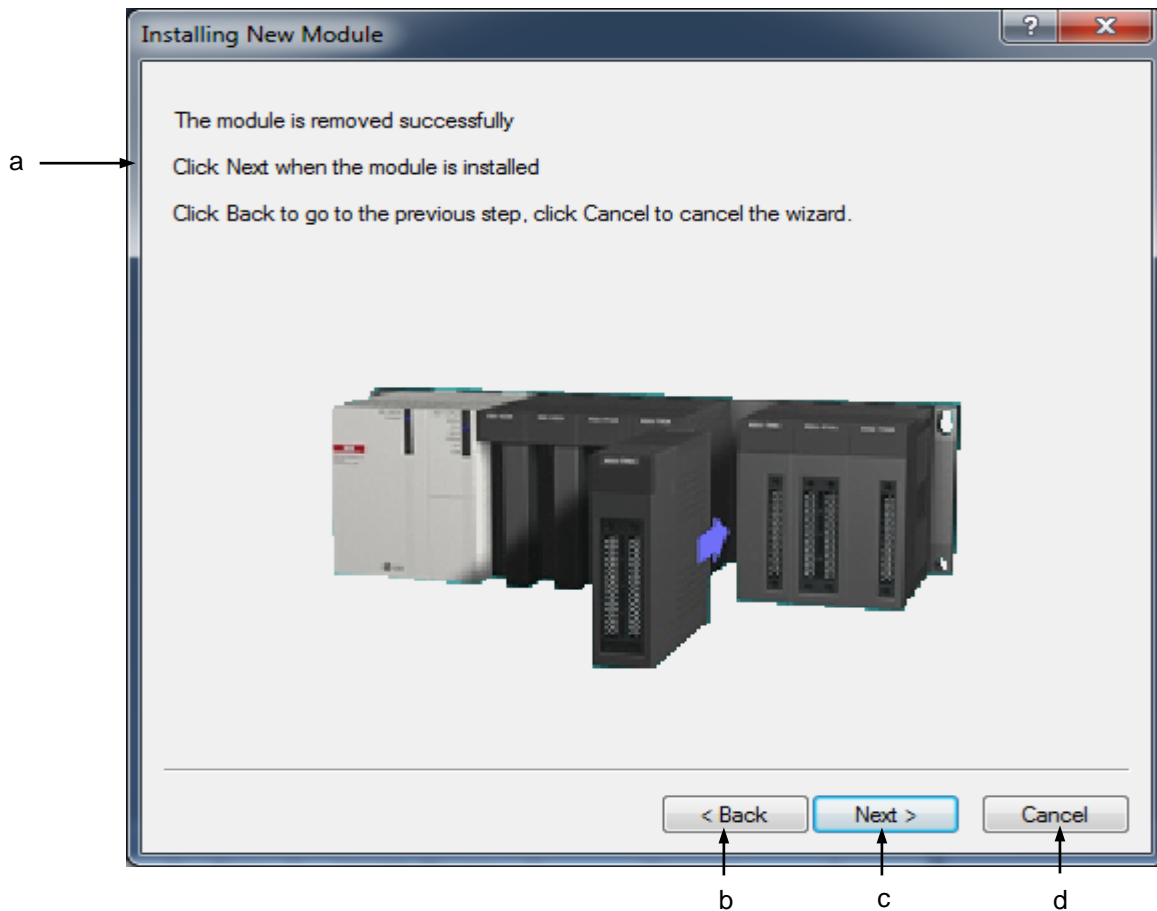[Dialog Box]

[Description of Dialog Box]

a. Description: displays the comment of the Removing Module.

b. Back: used to move to the confirming stage of the module removal.

c. Next: used to move to the module installation stage.

d. Cancel: closes the Module Changing Wizard.

6. If the module removed, click Next button. Or click Back button to move back to the previous stage. Or click
   Cancel to cancel the Module Changing Wizard.

Notes

‒ If the module is not removed normally, an error message will appear on the comment

---

7. Install the module at the module installation stage.

[Dialog Box]

[Description of Dialog Box]

a. Description: displays the comment of the module installation stage.

b. Back: used to move to the Removing Module.

c. Next: used to move to the confirming stage of the module installation.

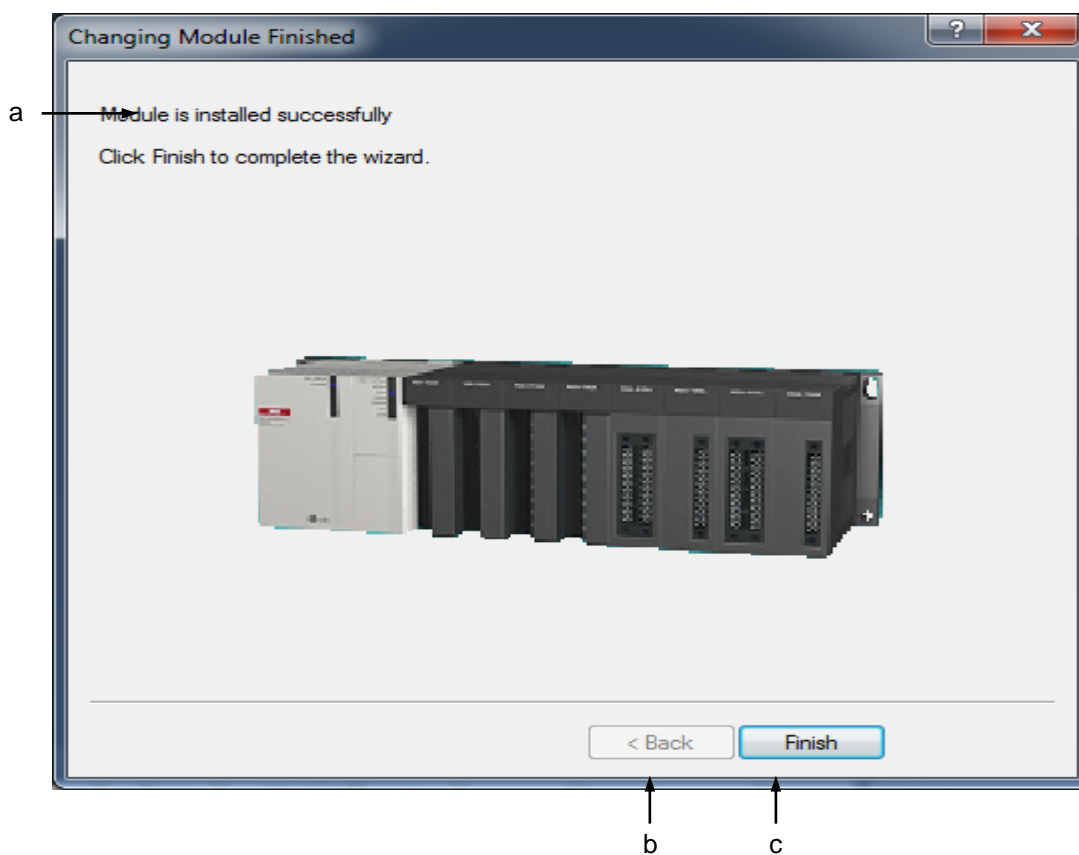d. Cancel: closes the Module Changing Wizard.

8. If the module installed, click Next button. Or click Back button to move back to the previous stage. Or click Cancel to cancel the Module Changing Wizard.

Notes

－ If the module is not installed normally, an error message will appear on the comment.

9.Close the Module Changing Wizard.

[Dialog Box]

[Description of Dialog Box]

a. Description: displays the comment of the module change complete stage.

b. Back: It will be inactive since going back to previous stage is unavailable after the module changed.

c. Finish: finishes the Module Changing Wizard.

| Notes |
| --- |
| If the Module Changing Wizard is cancelled, Fault Mask and Skip I/O may be set to protect the applicable module. |

Notes

- If you want to change the module without the Wizard, follow the sequence described below.

[Sequence]

1. Set the Skip I/O for the module to change.

2. Set the Fault Mask for the module to change.

3. Remove the module from PLC.

4. Install a new module.

5. Release the Skip I/O for the applicable module.

6. Select [Online]-[PLC Error/Warning] to check for any error on the applicable module.

7. If no error found on the applicable module, release the Fault Mask for the module.

- Refer to Skip I/O and Fault Mask for more details on Skip I/O and Fault Mask specified for the module.

<div style="border:1px solid; padding:8px;">

10.24 Custom Events

</div>

The Custom Events mean a series of events whose conditions are the devices specified by the user. User defined events are registered in PLC, which will monitor the registered events and record the event history if generated. The event history can be used to operate and debug the system.
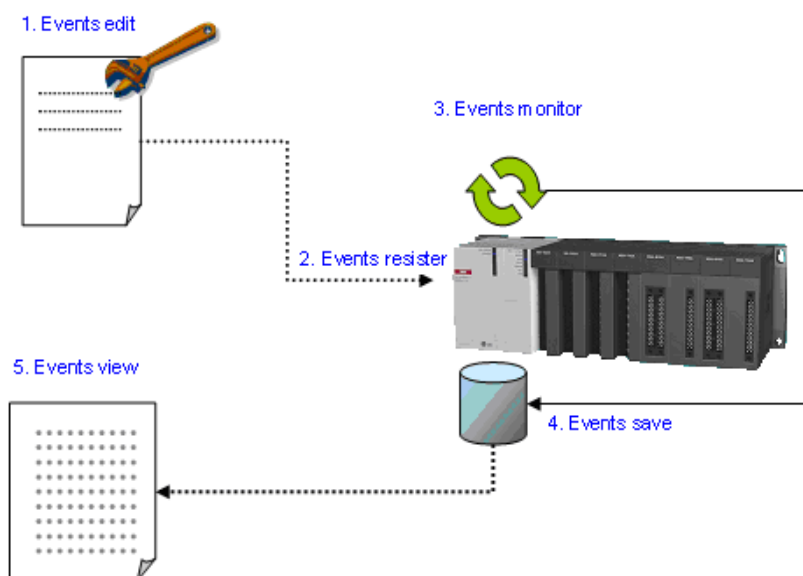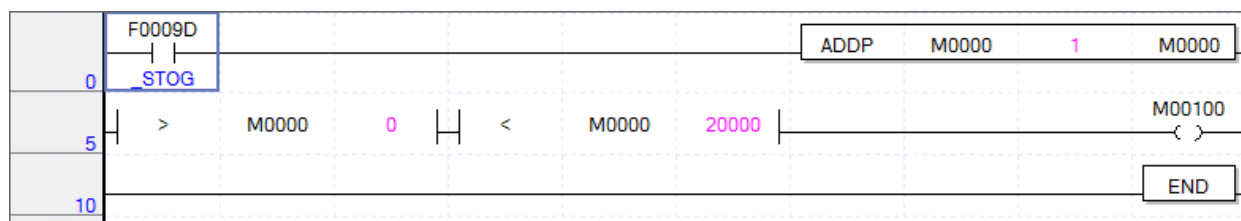

10.24.1 Example

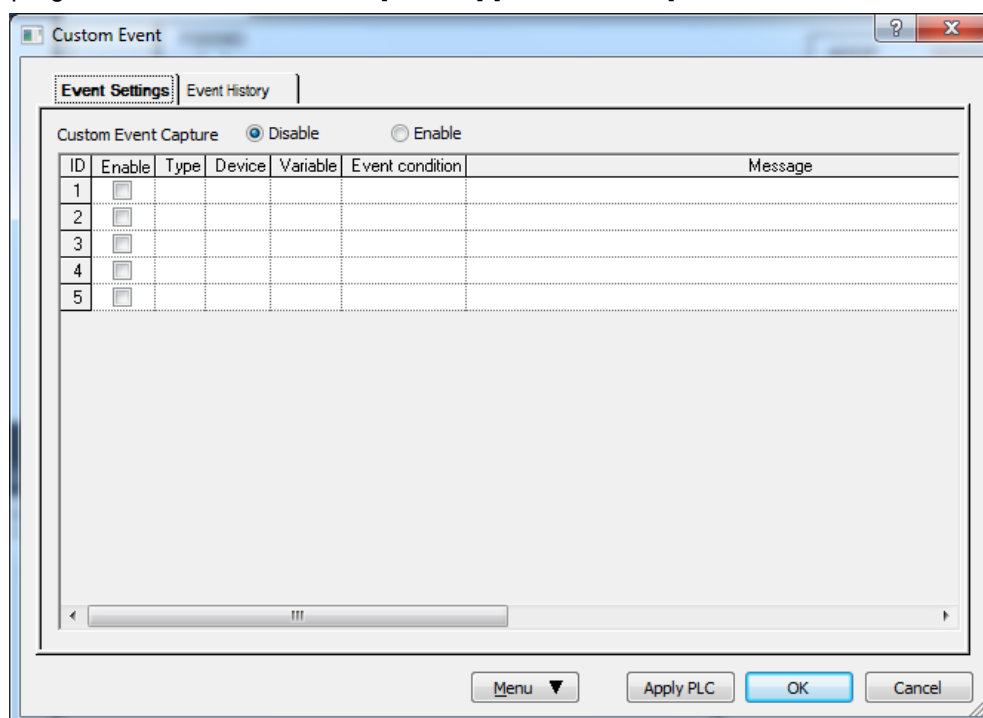The event is defined as the data of M0000 whose data is increase by 1 every scan is greater than 100 and less than 110, and if the event is met, PLC stores the data of M0000.
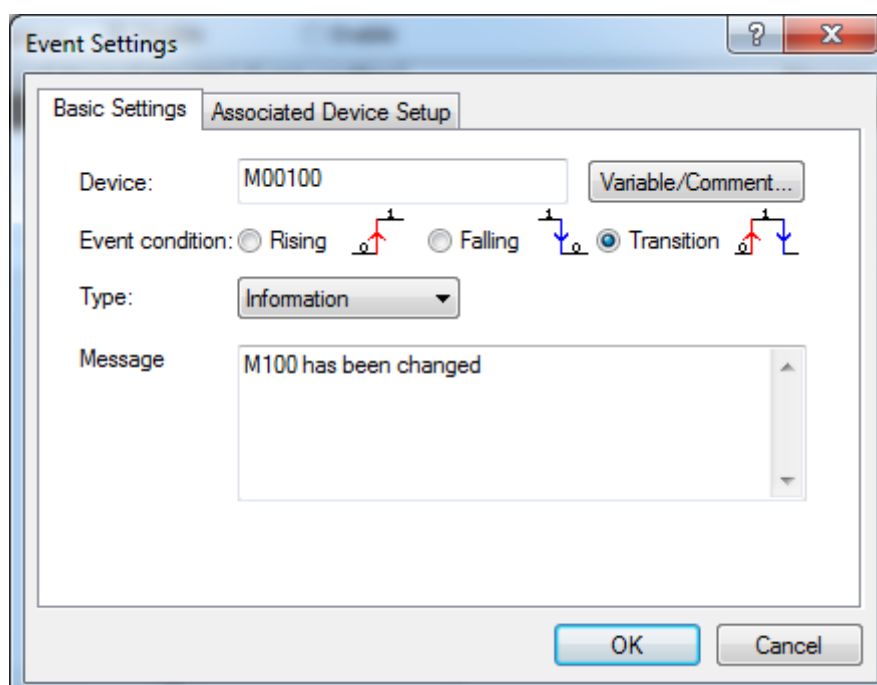
[Steps]

   1. Make a program as follow.

2. Write the program to the PLC and select [Monitor]-[Custom Event] on the Online menu.

3. Open Event Setup dialog box by clicking [Add event] and setup each items as figure below.

4. Open 'Associated Device Setup' dialog box and setup the bit device M00100 and word device M0000 as figure below to store the data when event is met.
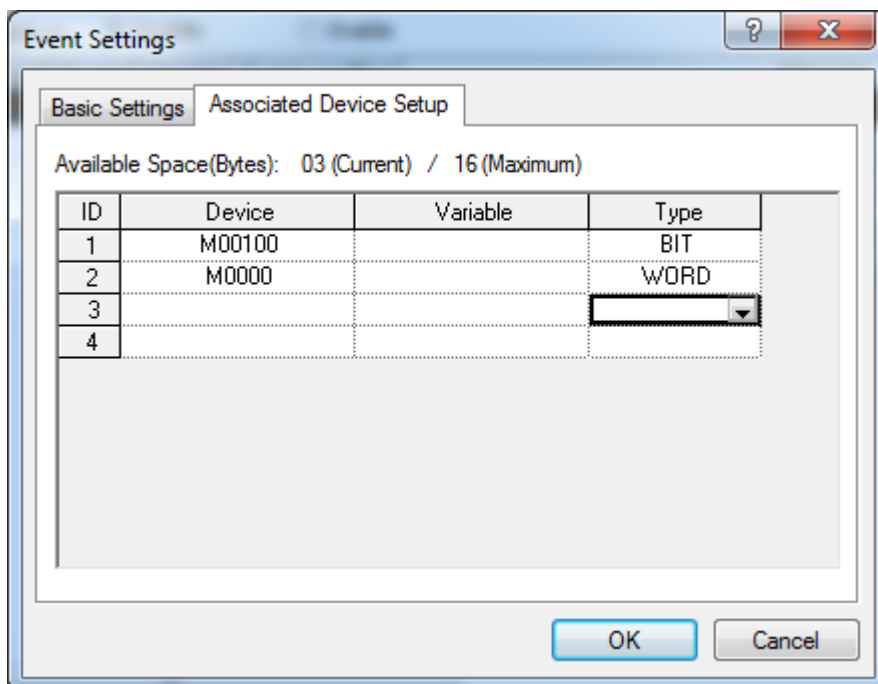
5. Close the dialog box, select 'Enable' for 'Event allowance' on the upper side of dialog box and click 'OK' button. A message box will be displayed as figured below since the event setup has been changed. Click 'Yes' button on the message box.
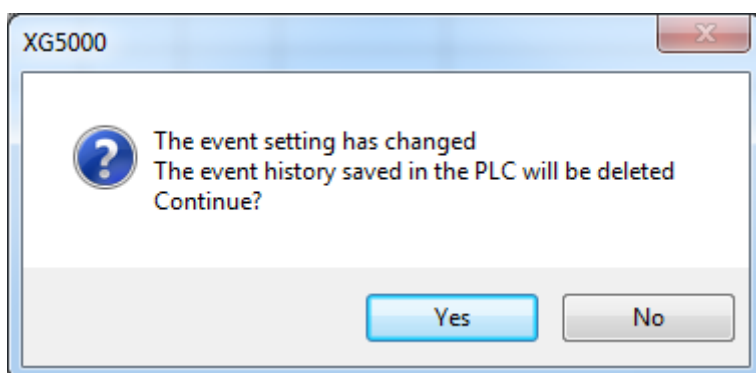
6. Change the PLC mode RUN.

7. Select [Monitor]-[Custom Event] on the Online menu to check event history and select event history tab on the 'Custom Event' dialog box.
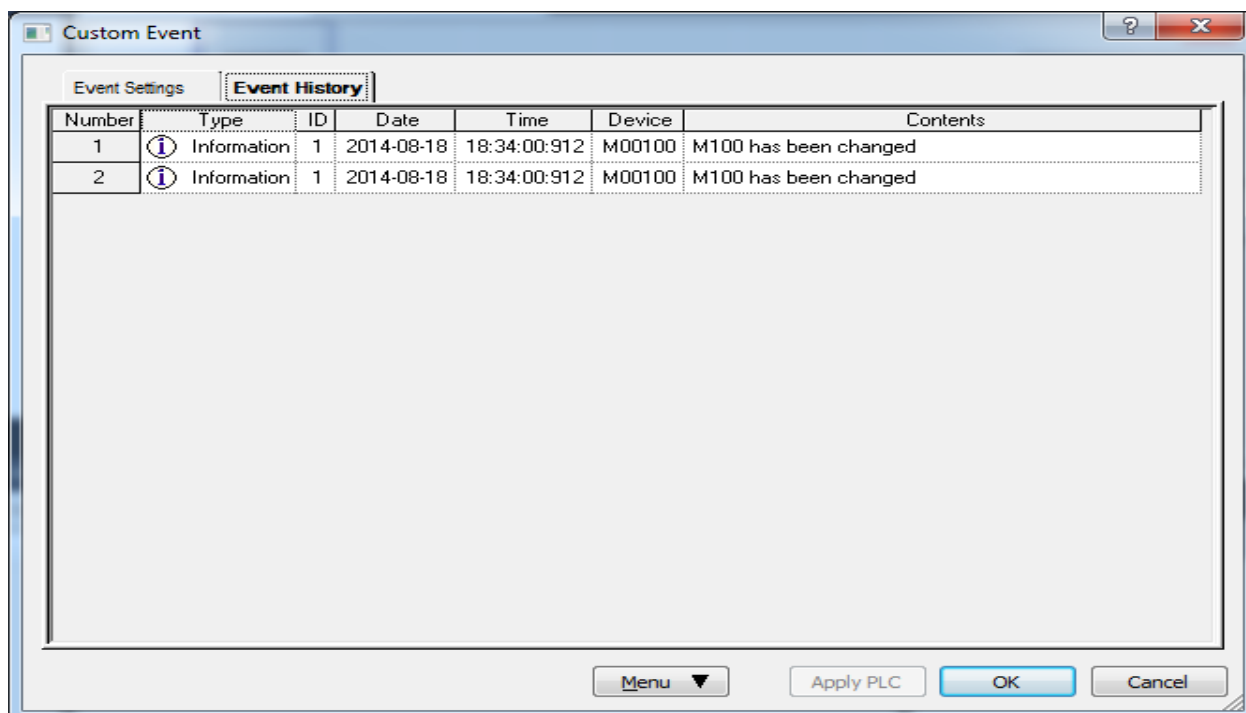
8. An 'Event History' dialog box will be displayed when an event item is selected, and [Properties] button on the menu is clicked, where the list of associated device and the details of event can be seen.

10.24.2 Event Setting

[Steps]

1. Select [Monitor] - [Custom Events].

2. Click the event setting tap on the user event dialog box.
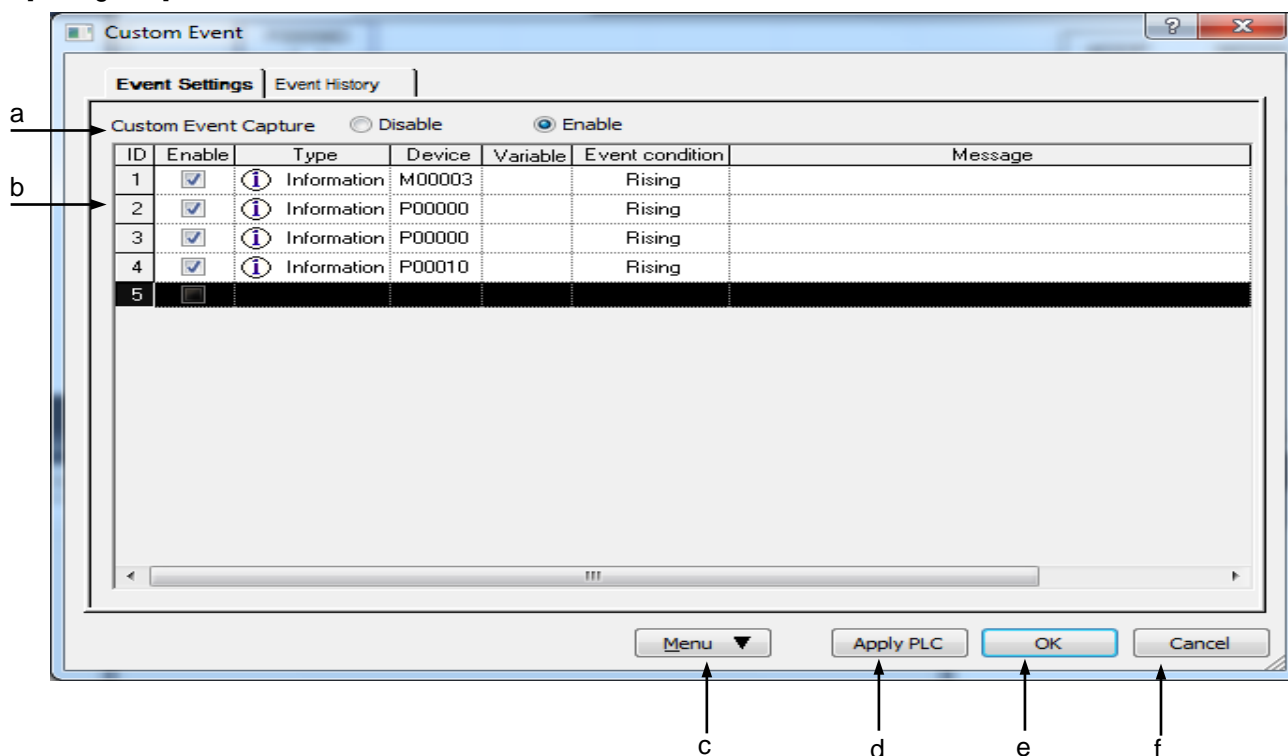
[Dialog Box]

[Description of Dialog Box]

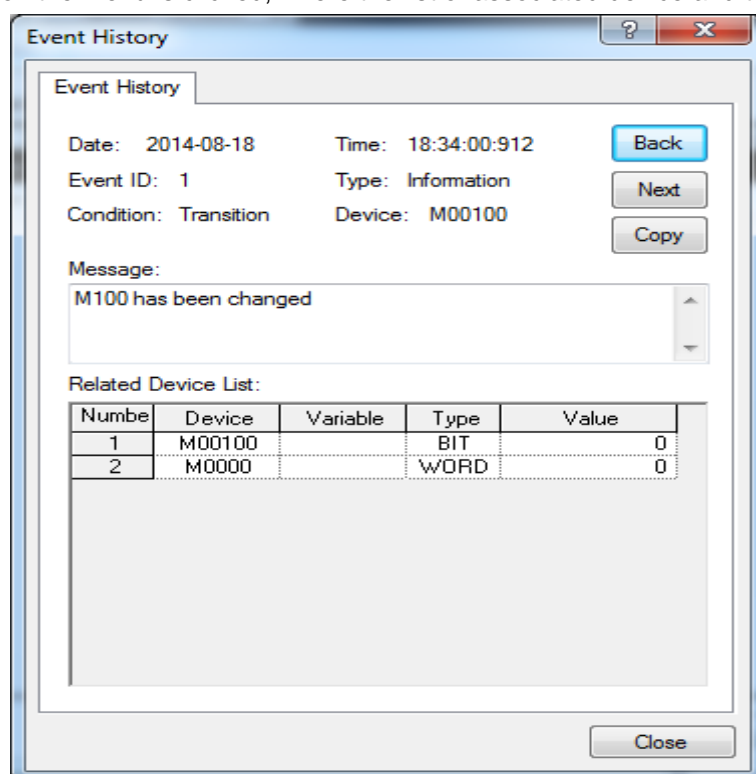a. Event Allowance: used to decide to allow the user event or not. If the event disenabled, PLC does not collect the Custom Events.

b. Events History: displays the list of the Custom Events presently specified.

Notes
- Refer to 1) User Event Item Add for details on each item of the events list.

c. Menu button: displays the event setting menu.

d. Apply PLC: applies the changed items to PLC without closing the Dialog Box.

e. OK: applies the changed items and closes the Dialog Box.

f. Cancel: closes the Dialog Box.

1) Custom Event Item Add

[Steps]

1. Select [Add Event].

2. Select the basic setting tap.

[Dialog Box]

[Description of Dialog Box]

a. Device: used to input the device to monitor the events. The event device shall be of the value 0 or 1 in bit format only.
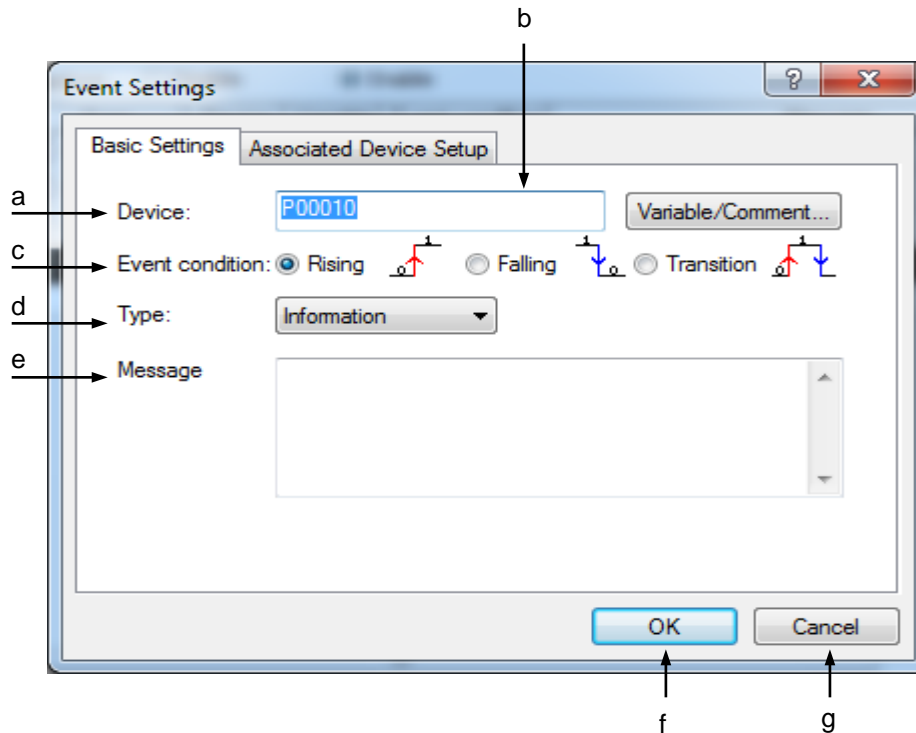
> **Notes**
> – Refer to Chapter 4 Variable/Comment for details on device type and display format.

b. Variables: displays Variable/Comment Dialog Box. The device can be selected from Variable/Comment declared in the Variable/Comment Dialog Box.

c. Event condition: used to specify the condition to make the user event occur. If rising condition selected, the user event will occur when the event device value changes from 0 to 1. And if falling condition selected, the user event will occur when the event device value changes from 1 to 0. If transition condition selected, the user event will occur whenever the event device value changes.

d. Type: used to specify the user event type. An applicable type can be selected among Information, Alarm and Warning.

> **Notes**

> – Event type is specified by user based on the importance of the event and is used as a classifying method of events for Event View.
>
> – Refer to 10.17.2 Event History for more details.

e. Message: used to input an event message. The maximum length of the message is 80 characters in English) (40 in Korean). The event message input is displayed with Event History menu.

f. OK: applies the changed items and closes the Dialog Box.

g. Cancel: closes the Dialog Box.

3. Used to input event device. Or click the Variable/Comment button to select the device from the declared Variable/Comment.

4. Specifies event conditions.

5. Specifies event type.

6. Used to input an event message.

7. Select the Associated devices setting tap to specify the Associated devices.

[Dialog Box]
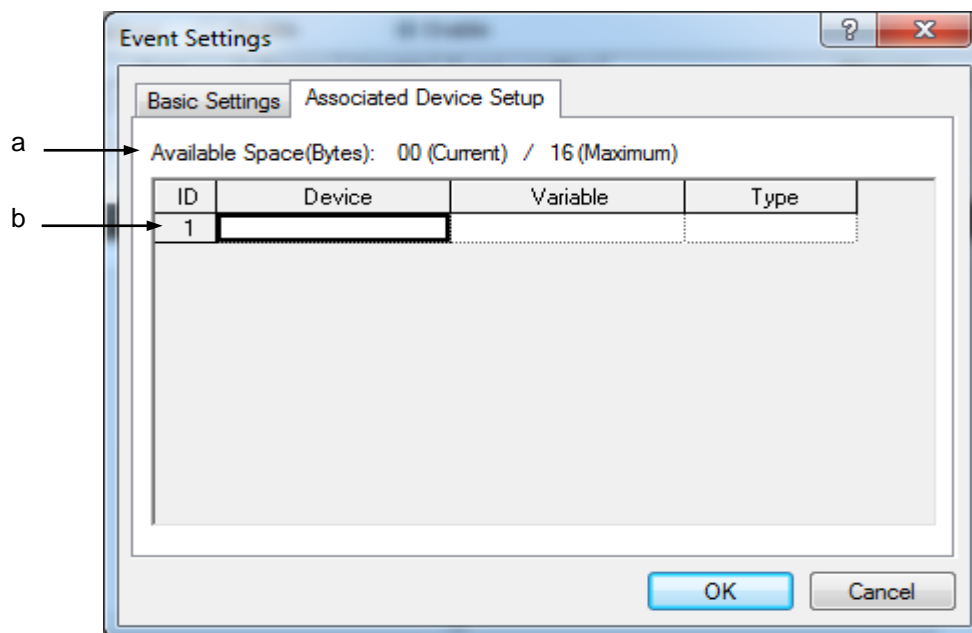
[Description of Dialog Box]

a. Available: displays the sum of the size of the each Associated device type input, which is available up to 16 bytes.

b. Associated devices list: used to input the Associated devices. Up to 8 Associated devices can be input.

- If related devices are specified, the value of the related devices will be also recorded when applicable events happen.
- Up to 8 related devices can be specified in up to 16 bytes based on the data type of the device input. Supported data type and its respective byte size are as shown below.(XGB : Up to 4 related devices)

Type	Size	Type	Size
BIT	1 Byte	REAL	4 Bytes
BYTE	1 Byte	LREAL	8 Bytes
WORD	2 Bytes	INT	2 Bytes
DWORD	4 Bytes	DINT	4 Bytes
LWORD	8 Bytes	LINT	8 Bytes

8. Click [OK] to save the input items, or click Cancel to cancel it.

Notes

- Up to 10 custom events is available to register. (XGB : Up to 5 custom events)

2) Edit Event

It is used to edit the user event items input.

[Steps]

1. Select the event to edit.

ID	Enable	Type	Device	Variable	Event condition	Message
1	✓	ⓘ Information	M00003		Rising	
2	✓	ⓘ Information	P00000		Rising	
3	✓	ⓘ Information	P00000		Rising	
4	✓	ⓘ Information	P00010		Rising	
5	☐					

2. Select [Edit Event].
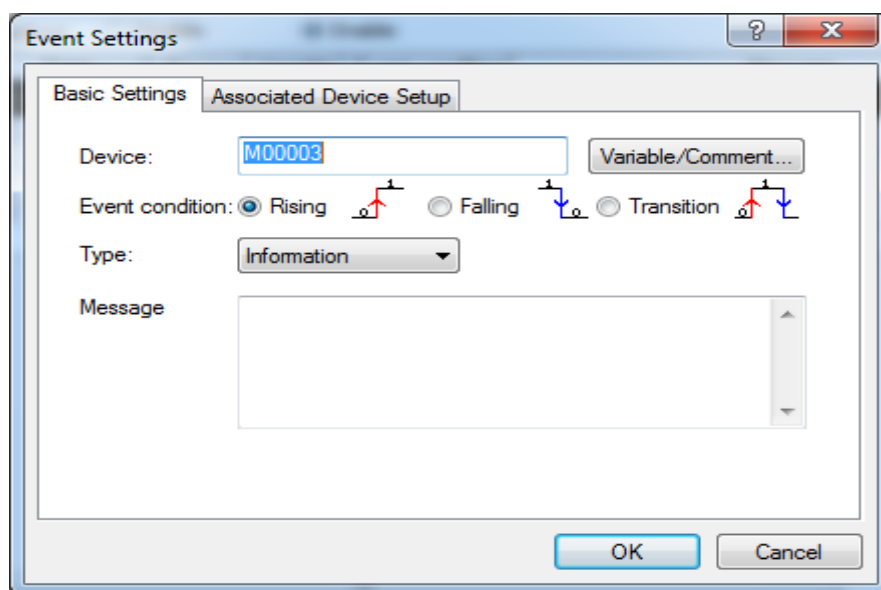
3. Click [OK] to apply the changed items, or click Cancel to cancel it

3) Delete Event

It deletes the user event input.

[Steps]

1. Select the event to delete.

2. Select [delete].

4) Event Allowance

It is used to decide to allow all custom events or not.

[Steps]

1. Click Enable to allow the event, or click Disable not to allow.

Event allowance ○ Disable   ◉ Enable
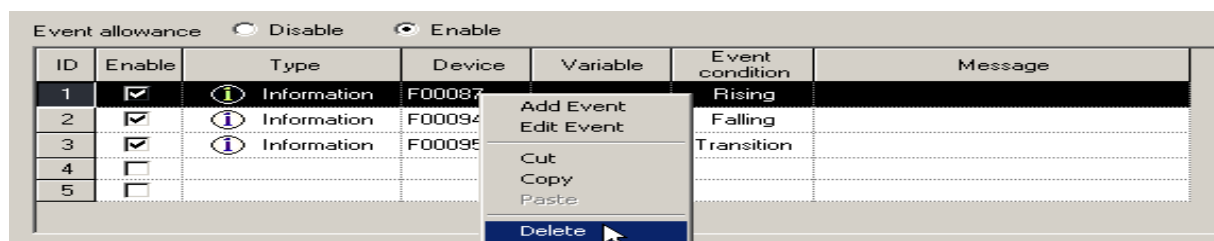
5) Event Allowance Setting

Each event will be decided to be enabled or not.

[Steps]

1. Select the event to make enabled.

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☑	ⓘ Information	F00094	_T2S	Falling	
3	☑	ⓘ Information	F00095	_T10S	Transition	
4	☐					
5	☐					

2. Select the Event Allowance column. If the event is enabled, ☑ will be displayed, and if disenabled, ☐ will be displayed.

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☐	ⓘ Information	F00094	_T2S	Falling	
3	☑	ⓘ Information	F00095	_T10S	Transition	
4	☐					
5	☐					

6) Custom Event Copy/Paste

[Steps]

1. Select the event to copy.

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☑	ⓘ Information	F00094	_T2S	Falling	
3	☑	ⓘ Information	F00095	_T10S	Transition	
4	☐					
5	☐					

2. Move to the position to paste on.

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☑	ⓘ Information	F00094	_T2S	Falling	
3	☑	ⓘ Information	F00095	_T10S	Transition	
4	☐					
5	☐					

3. Select [Paste].

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☑	ⓘ Information	F00094	_T2S	Falling	
3	☑	ⓘ Information	F00095	_T10S	Transition	
4	☑	ⓘ Information	F00095	_T10S	Transition	
5	☐					

7) Custom Event Cut/Paste

[Steps]

1. Select the event to cut.

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F000§		Transition	
2	☑	ⓘ Information	F000§		Falling	
3	☑	ⓘ Information	F000§		Transition	
4	☑	ⓘ Information	F000§		Transition	
5	☐					

Add Event
Edit Event
Cut
Copy
Paste
Delete

2. Select [Cut].

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☑	ⓘ Information	F00095	_T10S	Transition	
3	☑	ⓘ Information	F00095	_T10S	Transition	
4	☐					

3. Move to the position to paste on.

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☑	ⓘ Information	F00095	_T10S	Transition	
3	☑	ⓘ Information	F00095	_T10S	Transition	
4	☐					
5	☐					

4. Select [Paste].

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☑	ⓘ Information	F00095	_T10S	Transition	
3	☑	ⓘ Information	F00095	_T10S	Transition	
4	☑	ⓘ Information	F00095	_T10S	Transition	
5	☐					

8) Delete All

[Steps]

1. Select [Delete All].

ID	Enable	Type	Device	Variable	Event condition	Message
1	☑	ⓘ Information	F00095	_T10S	Transition	
2	☑	ⓘ Information	F00095		Transition	
3	☑	ⓘ Information	F00095		Transition	
4	☑	ⓘ Information	F00095		Transition	
5	☐					

Add Event
Edit Event
Cut
Copy
Paste
Delete
Delete All

Apply PLC   OK   Cancel

ID	Enable	Type	Device	Variable	Event condition	Message
1	☐					
2	☐					
3	☐					
4	☐					
5	☐					

9) Save Event

Since the user defined event is saved in PLC, it shall be additionally saved to manage as files.

[Steps]

1. Select [Save Event].

2. Input a file name to save with on File Save Dialog Box and click [OK].

10) Open Event

It read user defined event setting from the file.

[Steps]

1. Select [Open Event].

2. Select a file to read and then click [OK] button.

Notes
- The event if opened will be added to the list of the present events.
- Up to 10 events is available. More than 10 will not be added to the list.

10.24.3 Event History

It reads the user event history saved in PLC to display its applicable details.

[Steps]

1. Select [Monitor] [Custom Event].

2. Select the Event History tap on the user event dialog box.
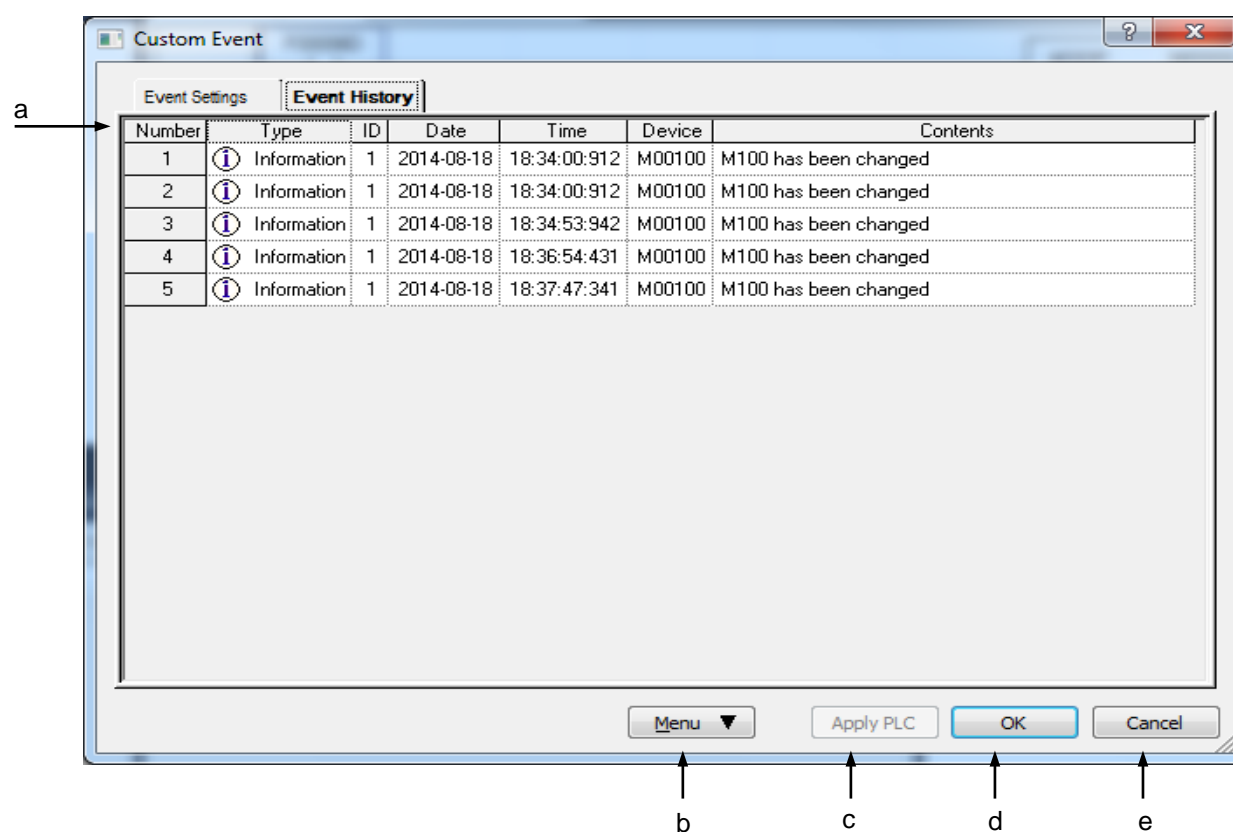
[Dialog Box]

[Description of Dialog Box]

a. Event History List: displays the event history found on PLC.

b. Menu: displays the event history-related menu.

c. Apply PLC: inactive on the event history page.

d. OK: applies the changed items and closes the Dialog Box.

e. Cancel: closes the Dialog Box.

Notes

‑ Refer to 1) Detailed Event History for the respective event history item.

---

1) Detailed Event History View

It displays the details of the event.

[Steps]

1.Select the item to display its Event History.
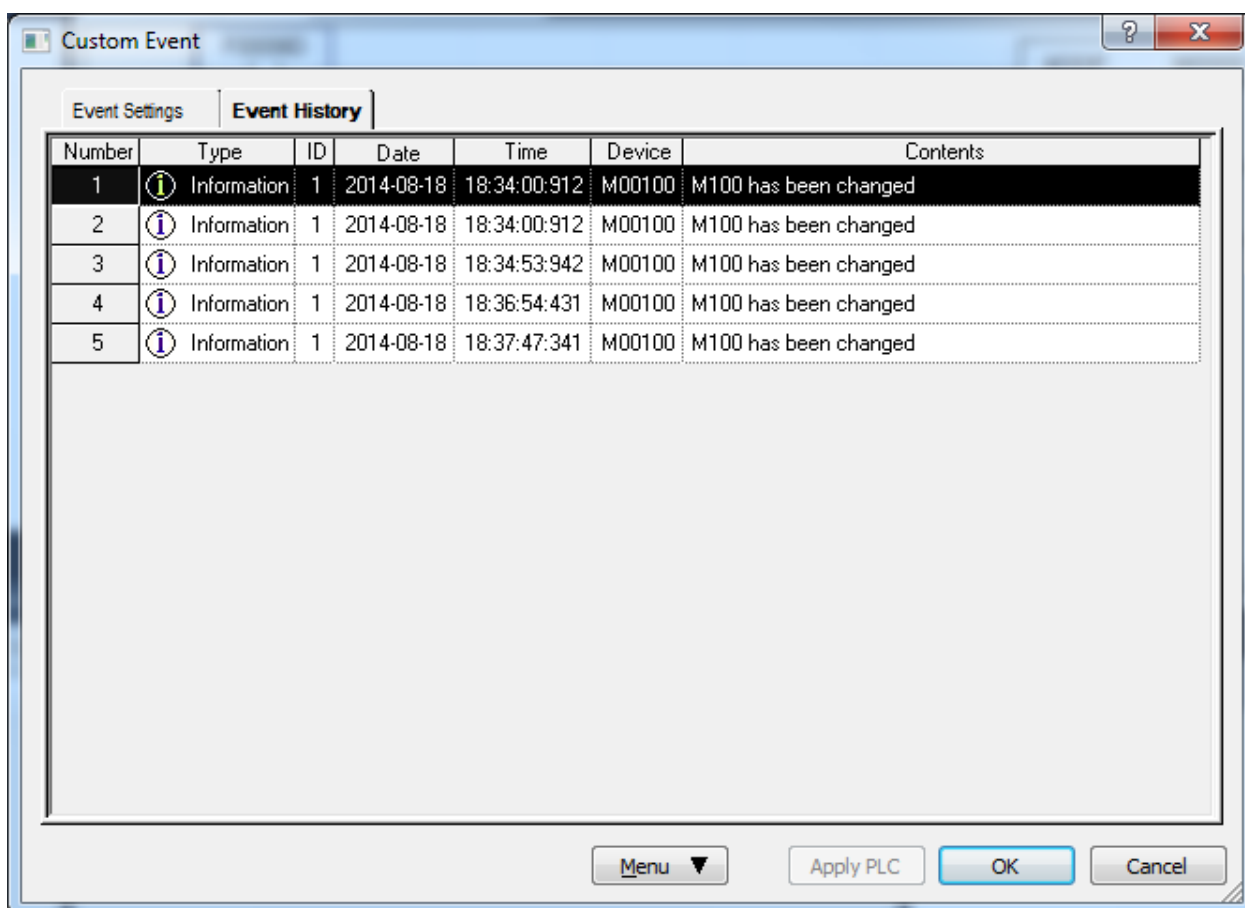
2. Select [Information].

[Dialog Box]

a

b

c

e

f

g

d

h
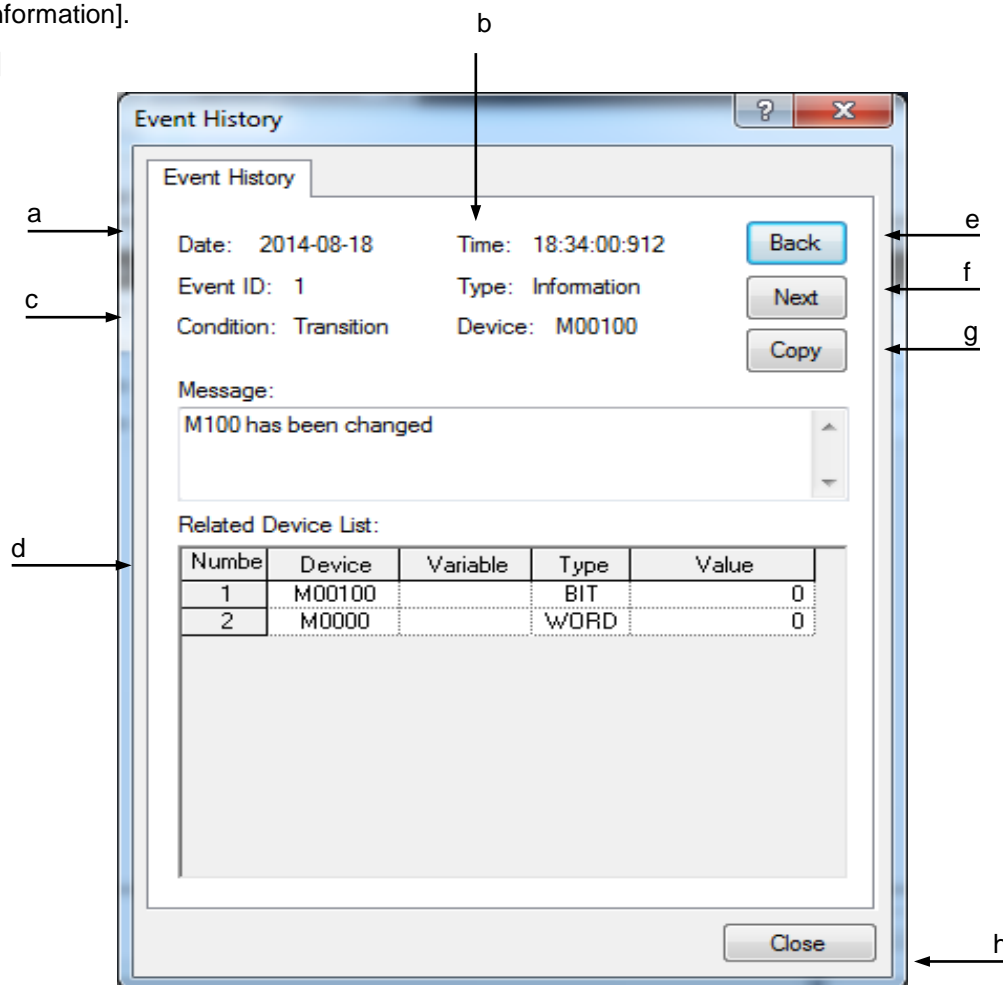
[Description of Dialog Box]

a. Date: displays the date an event occurs in Year-Month-Date.

b. Time: displays the time an event occurs in Hour: Minute: Second: MS.

c. Condition: displays event details specified in event setting items.

Notes
- Refer to 1) Custom Event Items Additional of 10.17.1 for details on the respective event setting item.

---

d. Associated devices list: displays the Associated devices list and the value when the event happened. The display format of the device value can be changed with the right mouse button clicked on [View in hexadecimal] or [View as specified].

e. Back: displays the previous event history.

f. Next: displays the next event history.

g. Copy: copies the present event history.

h. Close: closes the Dialog Box.

2) Refresh

It updates the event history as recent details in PLC.

1.Select [Refresh].

3) Event Filtering

The history can be displayed on the event type.

1.Select [View All].

2.Select [View Informtion].

3.Select [View Warning].

4.Select [View Alarm].

Chapter 11 Monitoring

11.1 Monitoring

XG5000's monitoring functions used in common (Start/Stop Monitoring, Pause, Resume, Pausing Conditions, Change Current Value) will be described below.

11.1.1 Start/Stop Monitoring

[Start Monitoring]

1. Select [Online]-[Connect] on the menu for on-line connection to PLC.
2. Select [Monitor]-[Start/Stop Monitoring] on the menu to start monitoring.
3. If LD or IL program is active, it will be now in monitoring mode changed.

Notes

- When monitoring starts, correct value may not be monitored if PLC program and XG5000 program are discordant.

[Stop Monitoring]

1. Select [Monitor]-[Start/Stop Monitoring] on the menu to stop monitoring.

Notes

- If already started, monitoring will end. If not started yet, monitoring will start.

11.1.2 Change Current Value

Selected device's current value or Forced I/O setting can be changed during monitoring.

[Sequence]

1. Select [Online]-[Connect] on the menu for on-line connection to PLC.
2. Select [Monitor]-[Start Monitoring] on the menu to start monitoring.
3. Select device or variable on the program or variable monitoring window.
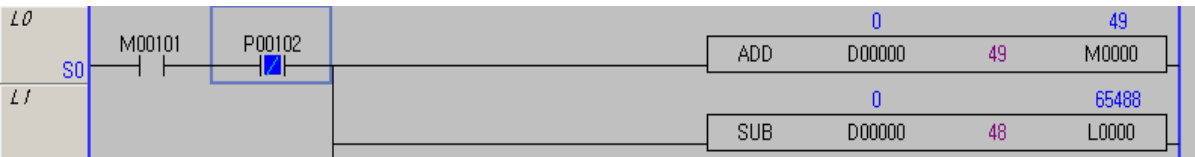
4. Select [Monitor]-[Change Current Value] on the menu.

5. Input Current Value in dialog box and select OK to change the current value.

[Dialog Box]
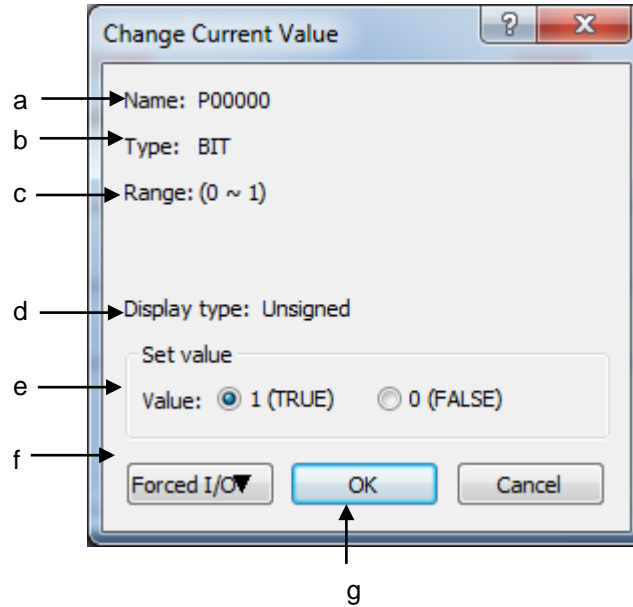
[Description of Dialog Box]

a. Device: Name of the device where current value is changed.

b. Type: Type of the device where current value is changed.

c. Range: Available range of current value to input based on type.

d. Current value On/Off: Device On/Off specified if its type is bit.

e. Value: Device value specified if its type is not bit.

f. Forced I/O▼: Forced I/O setting available if device is "P" area and bit type.

    - Flag: It is used for Forced I/O setting.

    - Data: Forced I/O data value is specified.

g. OK: It is used to transfer setting value to PLC.

Notes
− Default of the value is displayed based on the device's display type. In other words, if it is displayed in hexadecimal when monitored, current value changed will be too in hexadecimal.
− The value may not be input according to its display type. In other words, if displayed in hexadecimal, it can be input in unsigned decimal.
− When OK button pressed, error may occur due to ineffective input value or exceeded range inspected.
− Hexadecimal input shall be started with h" attached as shown in "h1234".
− As for String type, current value (String) shall be input between single quotation marks such as ('abcde').
− Only if device is "P"device and bit type, compulsory I/O button will be active.
− If compulsory I/O button is active, edit box of current value input and On/Off setting button will be inactive.
− Change Current Value and Compulsory I/O Setting will not be executed at a time.
− Refer to 10.13 Compulsory I/O Setting for more details on Compulsory I/O Setting.

11.1.3 Pause Monitoring

Monitoring can be momentarily stopped or restarted directly by user during monitoring.

1) Pause Monitoring

The user can directly stop monitoring momentarily.

[Sequence]

1. Select [Online]-[Connect] on the menu for on-line connection to PLC.
2. Select [Monitor]-[Start Monitoring] on the menu to start monitoring.
3. Select [Monitor]-[Pause] on the menu to stop monitoring momentarily.

2) Restart Monitoring

The user can directly restart monitoring when it is momentarily stopped.

[Sequence]

1. Select [Monitor]-[Resume] on the menu to restart monitoring.

Notes

- PLC is in Run mode, even if monitoring is momentarily stopped.
- Momentarily stopped monitoring only can be restarted.
- Monitoring value will not be renewed if program screen is moved with Pause Monitoring.
- If current value is changed with Pause Monitoring, PLC value will be changed but monitoring value of program screen will not be renewed.

3) Pausing Conditions

If specified device meets the pausing conditions, monitoring will stop momentarily.

[Sequence]

1. Select [Monitor]-[Pausing Conditions] on the menu.
2. Specify device on dialog box of Pausing Conditions.
3. Click OK to save details.

[Dialog Box]
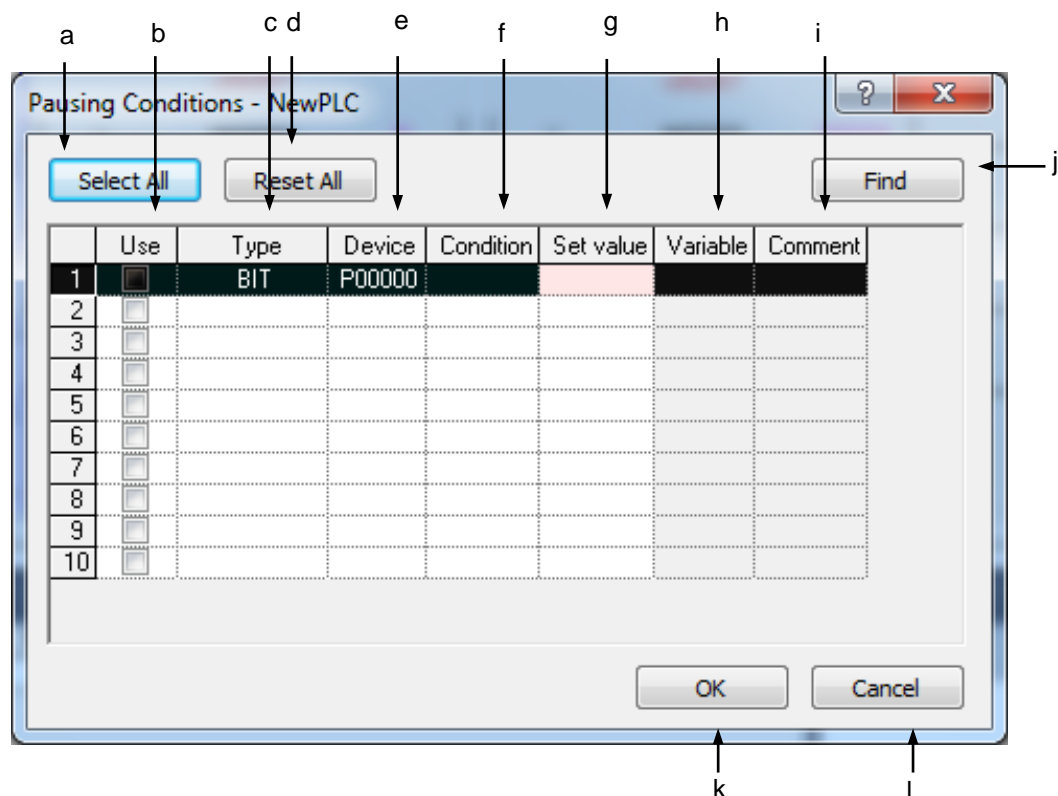
[Description of Dialog Box]

a. Select All: used to check all items with no error to allow on the list.

b. Use: used to check setting status of Pause Monitoring.

c. Type: used to select device type.

d. Reset All: used to cancel all the selected items allowed.

e. Device: used to input device name to stop monitoring momentarily.

f. Condition: used to select conditions to stop monitoring momentarily.

g. Set value: used to input condition value to stop monitoring momentarily.

h. Variable: used to display variables declared in device.

i. Comment: used to display description declared in device.

j. Find: used to find the device to stop monitoring momentarily on Variable/Comment list.

k. OK: used to save changed details and close dialog box.

l. Cancel: used to close dialog box without saving changed details.

Notes

– Conditions for Pause Monitoring can be set up to 10.

– Items in error will not be saved even if OK button pressed.

– Error is displayed in pink.

– String type does not support the function of Pause Monitoring.

– # Device (#D00001), Index Device (P0000[Z0100]) and Double Device (#P0000[Z0100]) do not support Pause Monitoring.

– Among 5 conditions [==, >, <, >=, <=] available for Pause Monitoring, one can be selected.

11.2 LD Program Monitoring

With XG5000 in monitoring status, it displays contact points prepared in LD diagram (ordinarily open contact point, ordinarily closed contact point, positive-converted detection contact point, negative-converted detection contact point), coils (coil, reverse-coil, set coil, reset coil, positive-converted detection coil, negative-converted detection coil) and application instruction's current value.

[Monitor Start Sequence]

1. Select [Monitor]-[Start/Stop Monitoring] on the menu.

2. LD program will be changed to monitoring mode.
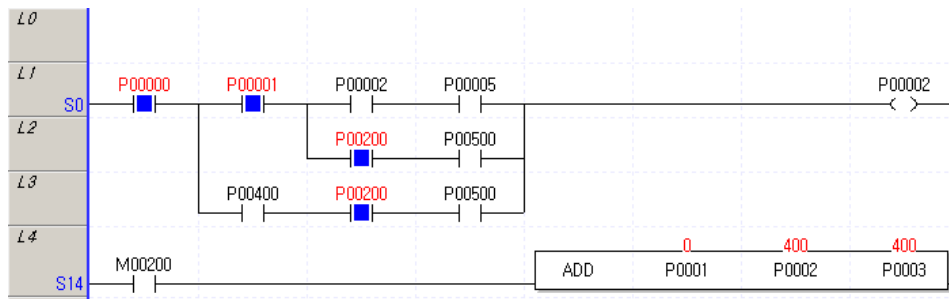
3. Change Current Value: Select [Monitor]-[Change Current Value] on the menu.

[Monitor display of contact point]
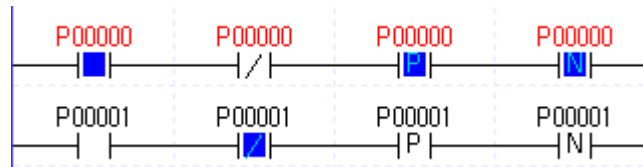
[Monitor Stop Sequence]

1. Ordinarily open contact point: If applicable contact point's value is On status, device (or variable) value will be displayed in red, and the power flow inside the contact point in blue.

> **Notes**
>
> − Monitor-related color described in this manual is provided basically by XG5000. Applicable color may be changed on the menu [Tools]-[Options]. Refer to the option item in Chapter 2. Basic Application for more details.

2. Ordinarily closed contact point: If applicable contact point's value is On status, device value will be displayed in red, and the power flow inside the contact point will not be displayed.

3. Positive-converted detection contact point: displayed as identically as ordinarily open contact point.

4. Negative-converted detection contact point: displayed as identically as ordinarily closed contact point.

[Coil Monitor Display]
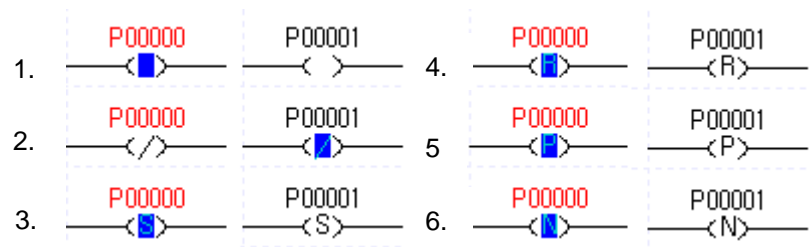
1. Coil: If applicable coil's value is On status, device (or variable) value will be displayed in red, and the power flow inside the coil in blue.

2. Reverse-coil: If applicable coil's value is On status, device (or variable) value will be displayed in red, and the power flow inside the coil will not be displayed.

3. Set coil: displayed as identically as coil.

4. Reset coil: displayed as identically as c oil.

5. Positive-converted detection coil: displayed as identically as coil.

6. Negative-converted detection coil: displayed as identically as coil.

[Monitor Display of Application Instruction]
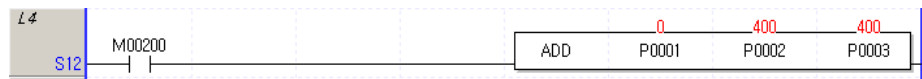
Applicable value is directly displayed on application instruction's operand. Data of application instruction is displayed based on monitoring display format.

Notes

− Displayed data of application instruction can be specified on Monitor/Debugger page on the menu [Tools]-[Options]-[Online]. Refer to the option item in Chapter 2 Basic Application for more details.
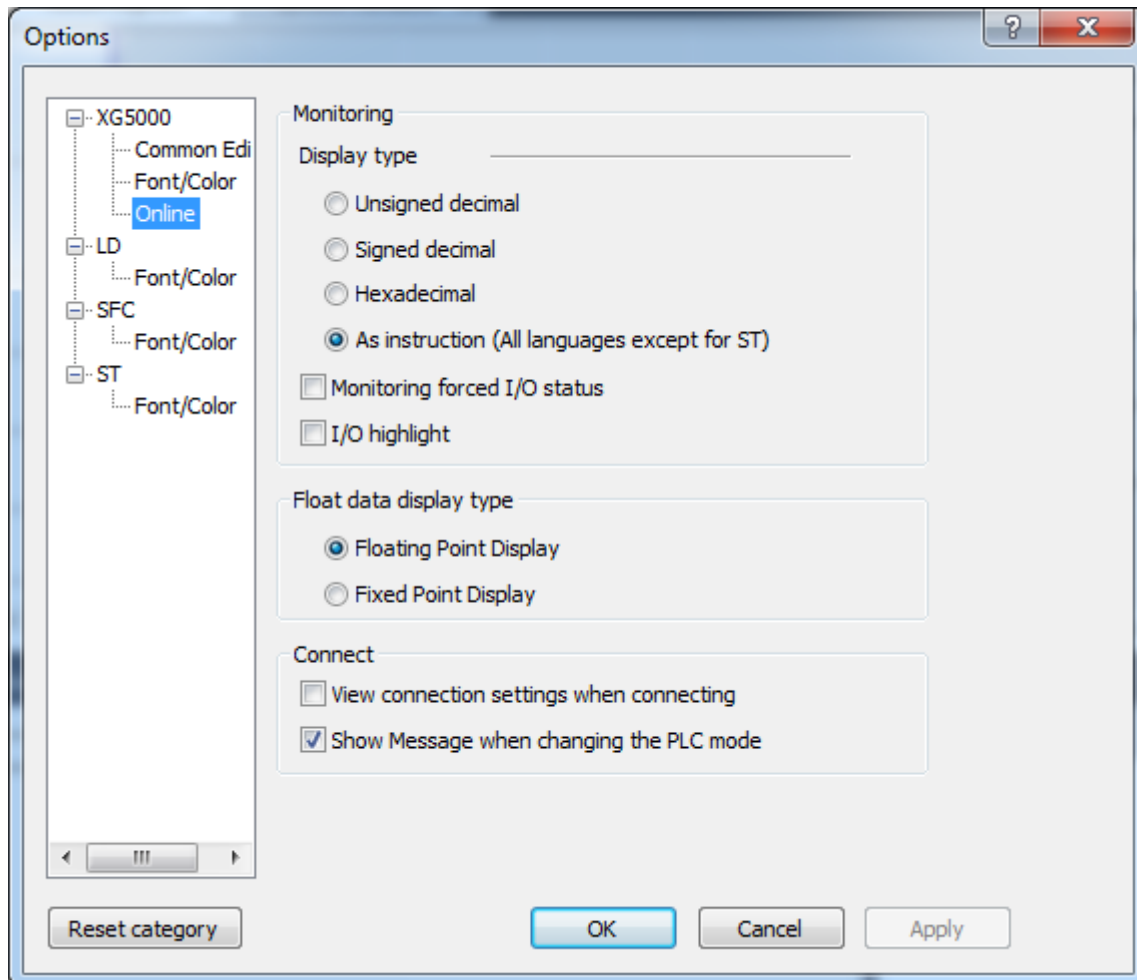
[Monitor Stop]

1. Select [Monitor]-[Start/Stop Monitoring] on the menu.

Notes

‑ All kinds of Edit are unavailable except Modification during Run Mode when monitored.

‑ Refer to the 1st clause of this chapter, Monitor in Common for details on Pause Monitoring and Change Current Value.

‑ When monitoring starts and stops, LD diagram height will change to display application instruction's current value, which will take some time according to the quantity of prepared program.

11.3   Variable Monitoring

Monitoring is available through specific variable or device registered.

[Variable Monitoring Window]
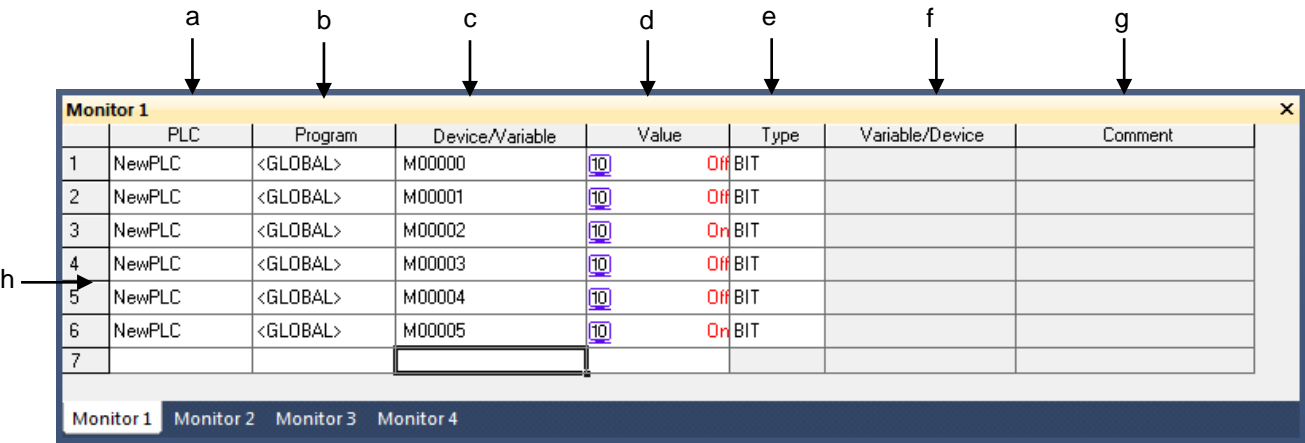
[Description of Variable Monitoring Window]

a. PLC: Shows the names of PLCs that can be registered. XG5000 can realize multi-configuration of PLC so it should be distinguished variable monitor window.

b. Device/variable: Inputs the device name. # device or double device also can be set up.

c. Type: Sets up the types of registered devices. BIT, WORD, DWORD, LWORD, INT, DINT, LINT, REAL, LREAL, STRING can be registered.

d. Value: Displays the value of the relevant device during monitoring. You can change the value through 'Change Current Value of Monitoring'.

e. Variable/device: Displays the variable name when the device name is registered to the variable/comment list and variable name exists. If it is not registered to the variable/comment list, it will be displayed as a blank. Press 'Enter' or double-click the mouse on the position of the variable column, you can select the variables from the variable list.

f. Comment: Displays the device comment.

g. Error Display: Displayed as pink color.

   Error

   - In case even one of PLC name, device, type is not input
   - In case the device address is wrong.
   - In case the device is out of the area depending on the type.
   - In case the device type is not supported or the PLC name does not exist.
   - Variable monitor tab: The variable monitor window is composed of 4 windows.

Notes
- The areas of value, variable and comment column can not be edited by user.
- 4 variable monitoring taps can not be monitored at the same time.
- The number of devices available to register in variable monitoring is unlimited.
- Only the part displayed on the screen will be monitored.
- The larger the number of devices is, the slower the monitoring may be renewed.
- Even if not in monitoring mode, register is available on variable monitoring.

11.3.1 Register Monitoring

1) Register on Variable/Comment

Monitoring items can be registered on Variable/Comment list on the variable monitoring windows.

[Sequence]

1. On the monitoring window, click the right button of the mouse to select [Register in Variable/Comment].

Change Current Value...		
Briefly		
View Options	▶	
✓ Unsigned Decimal		
Signed Decimal		
Hexadecimal		
String		
Select All	Ctrl+A	
Cut	Ctrl+X	
Copy	Ctrl+C	
Paste	Ctrl+V	
Delete	Delete	
Register in Variable/Comment...		
Register All...		
Set Monitor Pause...		
Find Text...	Ctrl+K	
Find Again	Ctrl+F3	
Print...	Ctrl+P	
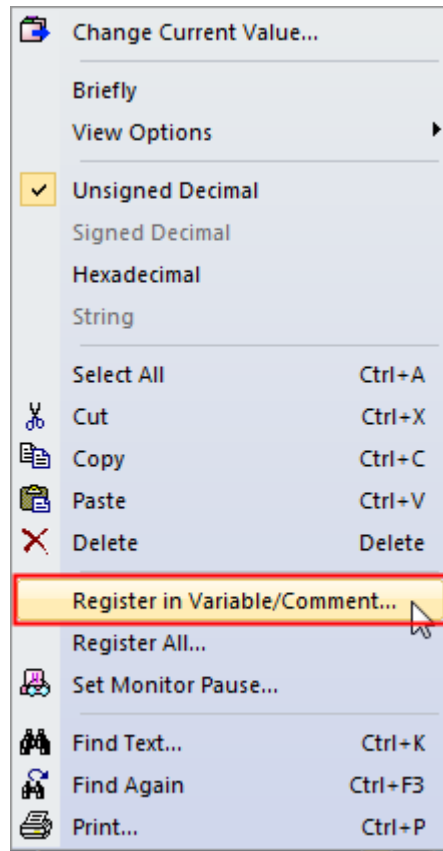
2. [Select] dialog box will appear if PLCs are 2 or more included in the project. Select PLC to register.

3. If [Select] dialog box appears, select variables to register on the variable monitoring windows.

[Dialog Box]

Select Variable/Device

Variable/Device: [   ]   List: [System ▼]   ☑ All

	Variable	Type	Device	Comment
1	_RUN	BIT	F00000	RUN
2	_STOP	BIT	F00001	STOP
3	_ERROR	BIT	F00002	ERROR
4	_DEBUG	BIT	F00003	DEBUG
5	_LOCAL_CON	BIT	F00004	Local control
6	_MODBUS_CON	BIT	F00005	Modbus mode ON
7	_REMOTE_CON	BIT	F00006	Remote mode ON
8	_RUN_EDIT_ST	BIT	F00008	Downloading a program at online editing mode
9	_RUN_EDIT_CH	BIT	F00009	Processing online editing internally
10	_RUN_EDIT_DO	BIT	F0000A	Online editing done
11	_RUN_EDIT_NG	BIT	F0000B	Online editing abnormal termination
12	_CMOD_KEY	BIT	F0000C	Change operation mode by the switch
13	_CMOD_LPADT	BIT	F0000D	Change operation mode by the local PADT
14	_CMOD_RPADT	BIT	F0000E	Change operation mode by the remote PADT
15	_CMOD_RLINK	BIT	F0000F	Change operation mode by the remote communicatio
16	_FORCE_IN	BIT	F00010	Force input
17	_FORCE_OUT	BIT	F00011	Force output
18	_SKIP_ON	BIT	F00012	Executing I/O skips
19	_EMASK_ON	BIT	F00013	Executing fault mask
20	_MON_ON	BIT	F00014	Monitoring mode
21	_USTOP_ON	BIT	F00015	STOP by STOP Function

[OK]   [Cancel]

[Description of Dialog Box]

a. Variable/Device: used to input device names to find.

b. List: used to show items registered on Variable/Comment or Flags list

c. List(L): used to select Variable/Comment or Flags list to show items registered thereon.

d. OK: used to register selected items on the variable monitoring windows.

Notes

- Several items can be selected at a time on Select Variable/Device dialog box.
- The selected item is added at the last line of the variable monitoring windows.
- An item identical to previously registered item can be also registered.

---

2) Register All

Many devices with an identical variable type (BIT, WORD……) can be registered.

[Sequence]

1. On the variable monitoring window, click the right button of the mouse to select [Register All].
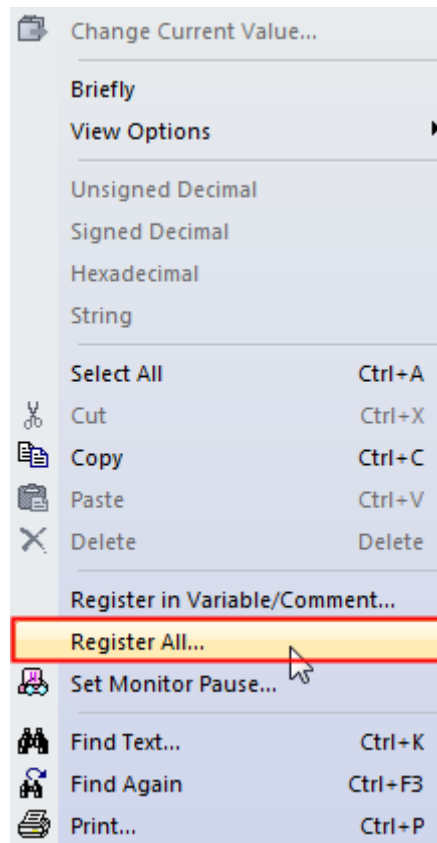
2. [Select] dialog box will appear if PLCs are 2 or more included in the project. Select PLC.

3. [Register All] dialog box will appear.

[Dialog Box]
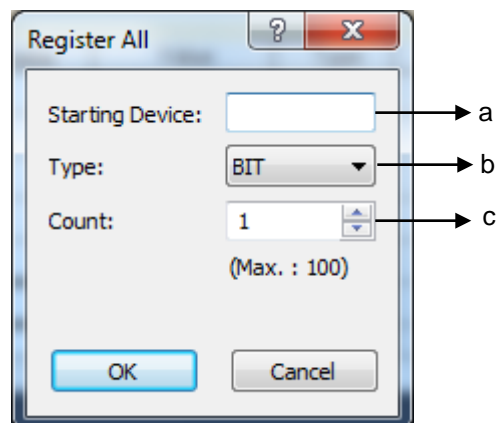
[Description of dialog box]

a. Start Device: used to input start address of the device to register.

   (Device Ex.: P0, D0, D0.0, U00.0.0, R0)

b. Type: used to specify registered device type. Bit or Word available only.

c. Count: used to input the number of registers as many as the registers made from the start device.

d. *Example*: used to show an example of the start device input. The example shows that input device is D
    with type of Bit, and input device is U.

   Input Example) Start Device: D0.0

   Type: Bit

   Number of registers: 10

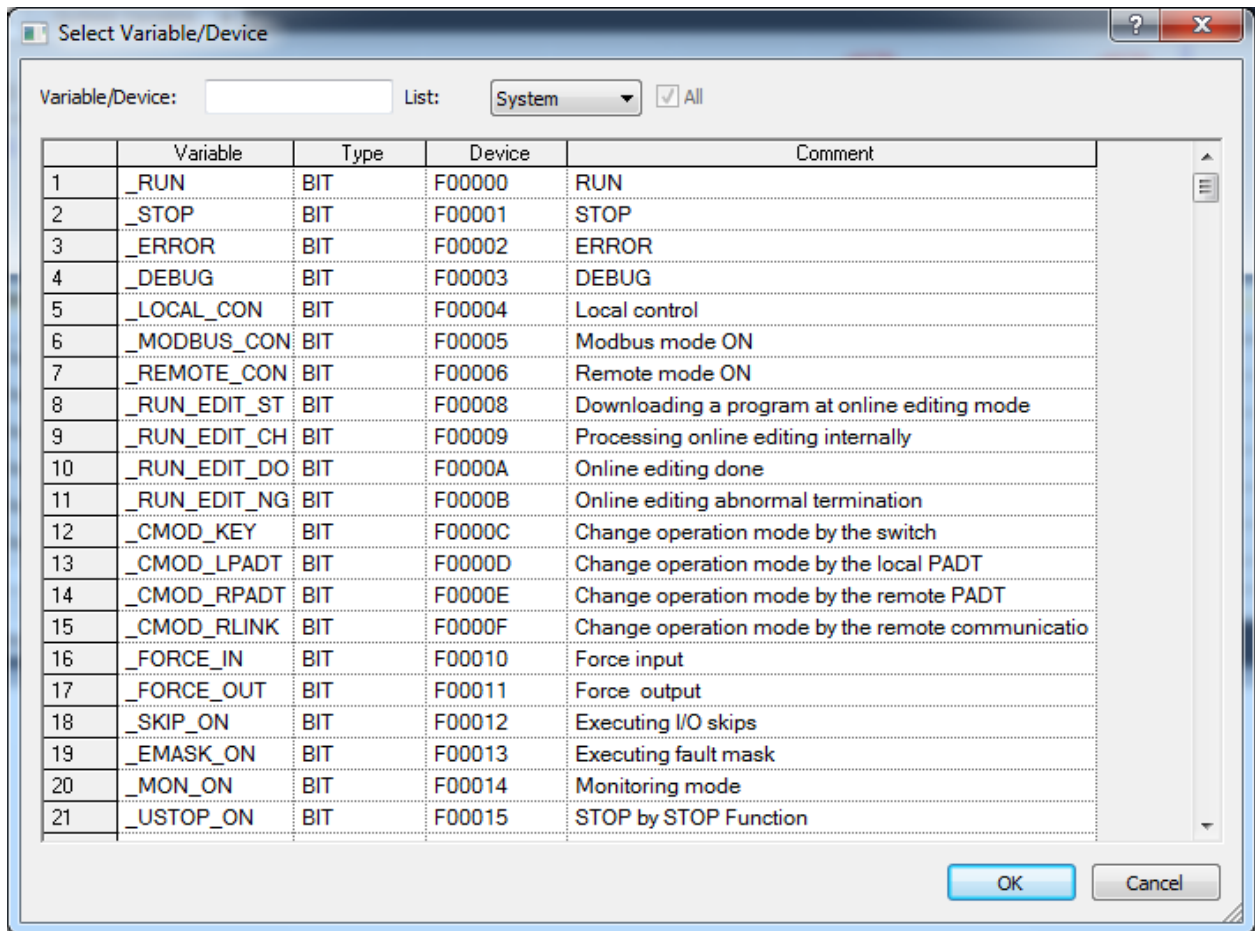| Monitor 1							✕
	PLC	Program	Device/Variable	Value	Type	Variable/Device	Comment
17	NewPLC	<GLOBAL>	P0001A	10 Off	BIT		
18	NewPLC	<GLOBAL>	P0001B	10 Off	BIT		
19	NewPLC	<GLOBAL>	P0001C	10 Off	BIT		
20	NewPLC	<GLOBAL>	P0001D	10 Off	BIT		
21	NewPLC	<GLOBAL>	P0001E	10 Off	BIT		
22	NewPLC	<GLOBAL>	P0001F	10 Off	BIT		
23	NewPLC	<GLOBAL>	P00020	10 Off	BIT		
24	NewPLC	<GLOBAL>	P00021	10 Off	BIT		
25	NewPLC	<GLOBAL>	P00022	10 Off	BIT		
26	NewPLC	<GLOBAL>	P00023	10 Off	BIT		
27							

Monitor 1   Monitor 2   Monitor 3   Monitor 4

Notes
- Up to 100 can be registered all at a time.
- The item to register is added at the last line of the variable monitoring windows.
- An item identical to previously registered item can be also registered.

3) Register by user

The user can directly input items to register on the variable monitoring windows.

PLC, Type and Device Column can be edited directly by user.

> **Notes**
>
> - Copy, Paste and Delete functions supported.
> 1. Copy: available in String format on the variable monitoring windows. Paste is available onto Excel or other String editor.
> 2. Paste: Paste is available onto variable monitoring after Copy from Excel or other String editor.
> 3. Delete: used to delete not the selected cell but the selected row.
> 4. Delete is available with several rows selected.
> - Undo or Redo functions are not supported.

4) Drag and Drop Register from other windows

The user can select contact point, coil, variable, etc. from other windows (LD, IL, Variable/Comment windows) to drag and drop down on the variable monitoring windows for register.

[Sequence]

1. Select the area from other windows (LD, IL, Variable/Comment windows) to register on the variable monitoring.

Area to register onto the variable monitoring from LD window – Red Edge
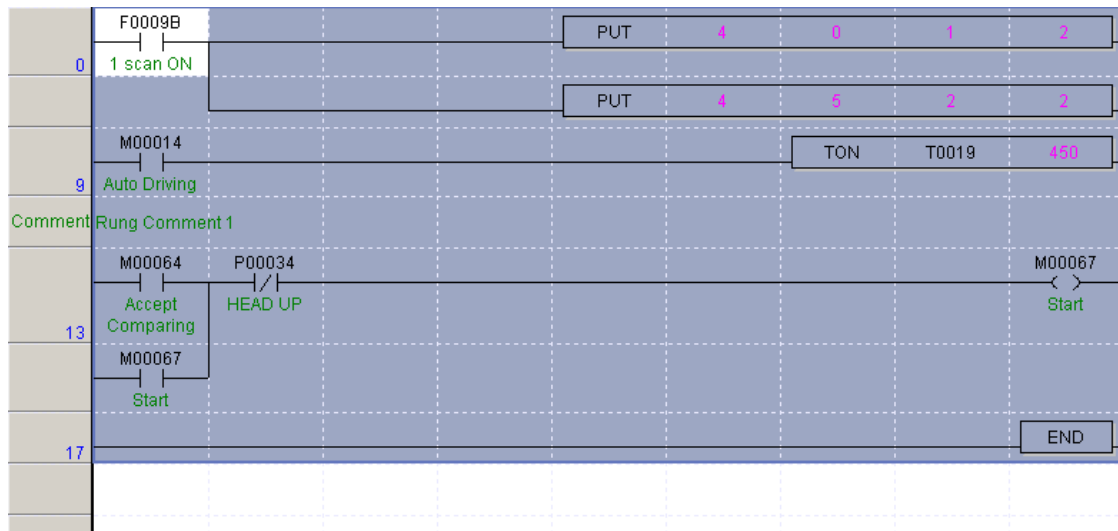
Area to register onto the variable monitoring from Variable/Comment window

	Variable	Type ▼	Device	Comment	
1	Variable1	BIT	D00002.2		
2	Variable2	BIT	D00002.3		
3		BIT	M00070	I/V UNCLP	
4		BIT	M00071	Return I/V UNCLP	
5		BIT	M00100	I/V UNCLP	
6	Variable6	BIT/WORD	T0002		
7	Variable7	BIT/WORD	T0003		
8	Variable8	BIT/WORD	T0004	I/V UNCLP Operation	
9	Variable9	BIT/WORD	T0005		
10		BIT/WORD	T0015	I/V UNCLP DLY	
11	Variable3	WORD	D00005		
12	Variable4	WORD	D00006		
13	Variable5	WORD	P0004		

2. Move onto the variable monitoring window along with the mouse's left button being pressed on the selected area.

- Cursor shape and input image will be created if the mouse is moved onto the variable monitoring window as shown below.

	PLC	Type	Device	Value	Variable ▼	Comment
1						

3. Release the mouse's left button after positioned on the row of the variable monitoring window to insert the selected items into.

4. The selected items will be registered on the variable monitoring window.

	PLC	Type	Device	Value	Variable ▼	Comment
1	PLC1	BIT	D00002.2	10	Variable1	
2	PLC1	BIT	D00002.3	10	Variable2	
3	PLC1	BIT	M00070	10		I/V UNCLP
4	PLC1	BIT	M00071	10		Return I/V UNCLP
5	PLC1	BIT	M00100	10		I/V UNCLP
6	PLC1	BIT	T0002	10	Variable6	
7						

Notes

- The larger the number of variables to register is, the longer the registration time may be.

- The number of registers is unlimited.

- If the items are inserted in the middle of rows, they will be registered between rows.

- With the mouse's left button still pressed, move onto variable monitoring number taps (Monitoring 1, Monitoring 2, Monitoring 3 and Monitoring 4) to register on the applicable variable monitoring taps.

11.3.2 View

1) Detailed/Briefly

It is a helpful function to view as many a variable as possible on the screen of the variable monitoring window.

[Sequence]

1. On the variable monitoring window, select [Briefly] on the menu displayed by the right button of the mouse.

2. It will be shown as below;

	Device	Value	Device	Value	Device	Value	Device	Value
1	D00002.2	10	D00002.3	10	M00070	10	M00071	10
2	M00100	10	T0002	10	T0003	10	T0004	10
3	T0005	10	T0015	10	D00005	10	D00006	10
4	P0004	10	D00002.2	10	D00002.3	10	M00070	10
5	M00071	10	M00100	10	T0002	10		

Only the columns for Device and Value are displayed.

3. Select [Detailed] again to display the following figure containing many a row.

	PLC	Type	Device	Value	Variable	Comment
1	PLC1 ▼	BIT	D00002.2	10	Variable1	
2	PLC1	BIT	D00002.3	10	Variable2	
3	PLC1	BIT	M00070	10		I/U UNCLP
4	PLC1	BIT	M00071	10		Return I/U UNCLP
5	PLC1	BIT	M00100	10		I/U UNCLP
6	PLC1	BIT	T0002	10	Variable6	
7	PLC1	BIT	T0003	10	Variable7	
8	PLC1	BIT	T0004	10	Variable8	I/U UNCLP Operation
9	PLC1	BIT	T0005	10	Variable9	
10	PLC1	BIT	T0015	10		I/U UNCLP DLY
11	PLC1	WORD	D00005	10	Variable3	
12	PLC1	WORD	D00006	10	Variable4	
13	PLC1	WORD	P0004	10	Variable5	
14	PLC1	BIT	D00002.2	10	Variable1	
15	PLC1	BIT	D00002.3	10	Variable2	
16	PLC1	BIT	M00070	10		I/U UNCLP
17	PLC1	BIT	M00071	10		Return I/U UNCLP
18	PLC1	BIT	M00100	10		I/U UNCLP
19	PLC1	BIT	T0002	10	Variable6	
20						

> **Notes**
>
> − 'Briefly' will hide the columns for PLC, Type, Variable and Comment.
> − Even if in Brief View mode, the hidden columns can be viewed through View function.
> − The number of rows is decided by the size of the variable monitoring window.
> − In Brief View mode, the number of rows will be changed if the size of the Variable Monitoring Window changed.
> − Even if in Brief View mode, Register, Delete and Edit functions are all available. (However, Undo & Redo functions are not supported.)
> − In Brief View mode, mouse tool tips are available.
> − Mouse tool tips can display PLC, Type, Device and Variable only. However, the variable if declared will be displayed.
>
> | | Device | Value | Device | Value | Device | Value |
> |---|--------|-------|--------|-------|--------|-------|
> | 1 | D00002.2 | 10 | D00002.3 | 10 | M00070 | 10 |
> | 2 | M00071 | 10 | M00100 | 10 | T0002 | 10 |
> | 3 | T0003 | 10 | T0004 | PLC: PLC1 | T0005 | 10 |
> | 4 | T0015 | 10 | D00005 | Type: BIT | D00006 | 10 |
> | 5 | P0004 | 10 | D0000 | Device: M00100 | D00002.3 | 10 |
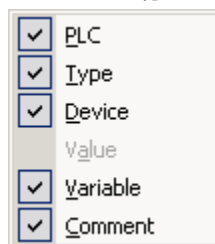> | 6 | M00070 | 10 | M00071 | 10 | M00100 | 10 |
> | 7 | T0002 | 10 | | | | |

2) Show function

The user can select the column as desired.

[Sequence]

1. On the variable monitoring window, click the right button of the mouse to select [View Option]-[Column Name (PLC, Type, Device, Value, Variable, Comment)] on the menu displayed.

✓	PLC
✓	Type
✓	Device
	Value
✓	Variable
✓	Comment

2. Hide the column selected.
3. Select again the same menu to show the column selected.


> **Notes**
>
> - Default is Show All.
> - This function is also available in Detailed View mode.
> - The value column does not support Hide function.
> - If converted to Detailed or Brief View mode, hidden columns will be displayed as default.
> - String in the hidden columns can not be copied. Thus, the String in the hidden columns can not be pasted onto other editors.

3) Display

Display of the monitoring value of the device registered on the variable monitoring can be changed.

[Sequence]

1. On the variable monitoring window, click the right button of the mouse to select [Unsigned Decimal, Signed Decimal, Hexadecimal and String] on the menu displayed.
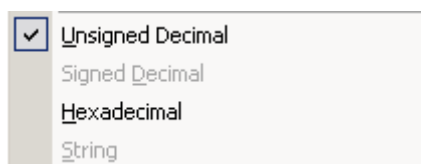
2. Display type of the device of the selected row will be changed.

Displays available based on type

Display Type	BIT	NIBBLE	BYTE	WORD	DWORD	LWORD	REAL	LREAL	STRING
Unsigned Decimal	O	0	0	O	O	O	X	X	X
Signed Decimal	X	X	X	O	O	O	O	O	X
Hexadecimal	O	0	0	O	O	O	O	O	O
String	X	X	X	X	X	X	X	X	O

> **Notes**
>
> - Bit type if viewed in unsigned decimal will be displayed "On/Off".
> - Hexadecimal is displayed with small letter 'h' as shown in "h10AC".
> - String is displayed in ""as shown in "adcd".
> - Separately applicable from the monitoring option.
> - Display menus will be active or inactive based on available display type.
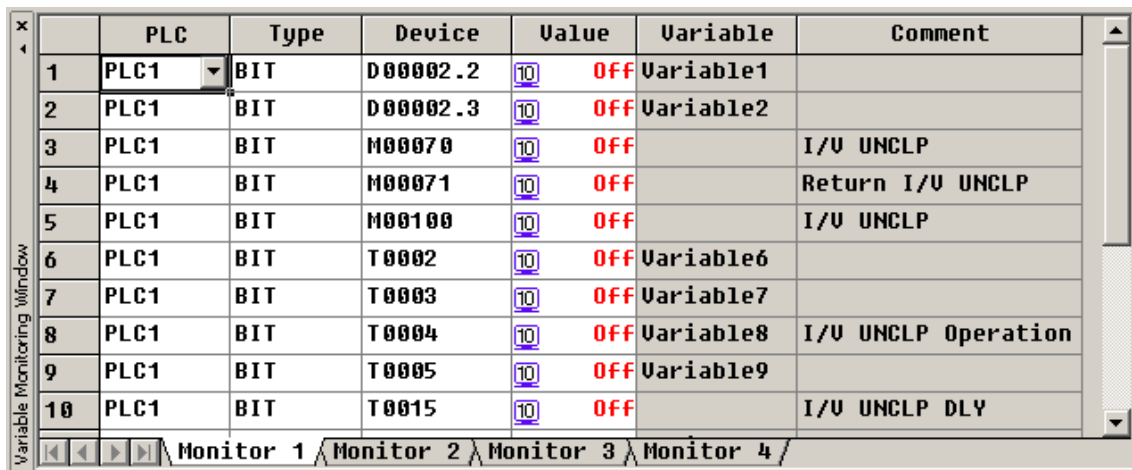
11.3.3 Operation of Monitoring

1) Start Monitoring

It is used to start the monitoring of the device registered on the variable monitoring.

[Sequence]

1. Select [Monitor]-[Start/Stop Monitoring] on the menu.

2. The item with identical Start Monitoring PLC name and the item with no error will execute Monitoring.

	PLC	Type	Device	Value	Variable	Comment
1	PLC1 ▼	BIT	D00002.2	🔟 Off	Variable1	
2	PLC1	BIT	D00002.3	🔟 Off	Variable2	
3	PLC1	BIT	M00070	🔟 Off		I/U UNCLP
4	PLC1	BIT	M00071	🔟 Off		Return I/U UNCLP
5	PLC1	BIT	M00100	🔟 Off		I/U UNCLP
6	PLC1	BIT	T0002	🔟 Off	Variable6	
7	PLC1	BIT	T0003	🔟 Off	Variable7	
8	PLC1	BIT	T0004	🔟 Off	Variable8	I/U UNCLP Operation
9	PLC1	BIT	T0005	🔟 Off	Variable9	
10	PLC1	BIT	T0015	🔟 Off		I/U UNCLP DLY

\Monitor 1 /Monitor 2 \Monitor 3 \Monitor 4 /

Variable Monitoring Window being monitored

Notes

− PLC's device value will not be displayed if not monitored.

− Any item with error will not be monitored.

− Edit, Add and Delete are available even during monitoring.

---

2) Change Current Value

Current value of the device can be changed in monitoring mode.

[Sequence]

1. Select [Monitor]-[Start/Stop Monitoring] on the menu.

2. Select [Device].

3. Select [Monitor]-[Change Current Value] on the menu. Or double-click the value cell of the device selected on the variable monitoring window, or press Enter.

4. Dialog box of Change Current Value will appear, where user can directly input the current value.

5. Click OK button to transfer the setting value to PLC.

11.3.4 Find

1) Find

It helps find string based on the classification by capital/small letter, partial accord and direction.

> **Notes**
> - On the variable monitoring, Find function is not available.
> - On the variable monitoring, Change function is not available.
> - Value is regarded as string not as figure when Find function is executed in the value column.

2) Find Again

It is used to find again the string found before. Execute Find on the program or Variable/Comment, and then execute Find Again on the variable monitoring to start to find.

11.3.5 Print

It prints the variable monitoring tap presently active.

> **Notes**
> - The variable monitoring tap if not active will not be printed.
> - Value even if being monitored can be printed.
> - The screen will be printed as is. In other words, hidden columns can not be printed.
> - Print Preview function is not available.

11.3.6 Shortcut Keys

All the operations are available with shortcut keys on the menu.

Notes
－ Some shortcut keys can not be changed as specified by user.

Shortcut Keys	Details
Home/End	On the variable monitoring window, select a cell to make the cursor into the cell in the column where edit is available (PLC, Device, Type Column) to be in Edit mode.
Ctrl+Home/End	Moves to the first or the last cell.
Ctrl+Arrow	Moves from the presently selected cell to the first or the last cell to the left or right, above or below.
Tab	Moves the present cell from the left to the right.
Shift+Tab	Moves the present cell from the right to the left.
Enter	Moves the present cell from above to below. If the present cell is value column during monitoring, it will change the current value as well. If the present cell is variable column, it will register on Variable/Comment.
Shift+Enter	Moves the present cell from below to above.

11.3.7 Alignment

Alignment can be changed to ascending or descending sequence.

[Sequence]

1. Double-click the left mouse button positioned on the header of the column to align.

	PLC	Type	Device ▼	Value	Variable	Comment
1	NewPLC	BIT	U04.00.C	10		Z-axis Error Found
2	NewPLC	BIT	U04.00.A	10		Z-axis Command Received
3	NewPLC	BIT	U04.00.7	10		Y-axis Error Found
4	NewPLC	BIT	U04.00.6	10		Y-axis During Operation
5	NewPLC	BIT	U04.00.5	10		Y-axis Command Received
6	NewPLC	BIT	U04.00.2	10		X-axis Error Found
7	NewPLC	BIT	U04.00.1	10		X-axis During Operation
8	NewPLC	BIT	U04.00.0	10		X-axis Command Received

2. Alignment will be in ascending or descending sequence

	PLC	Type	Device ▲	Value	Variable	Comment
1	NewPLC	BIT	U04.00.0	10		X-axis Command Received
2	NewPLC	BIT	U04.00.1	10		X-axis During Operation
3	NewPLC	BIT	U04.00.2	10		X-axis Error Found
4	NewPLC	BIT	U04.00.5	10		Y-axis Command Received
5	NewPLC	BIT	U04.00.6	10		Y-axis During Operation
6	NewPLC	BIT	U04.00.7	10		Y-axis Error Found
7	NewPLC	BIT	U04.00.A	10		Z-axis Command Received
8	NewPLC	BIT	U04.00.C	10		Z-axis Error Found
9						

3. After aligned, an arrow figure will be displayed according to ascending or descending sequence.

Notes

- If aligned in descending sequence, a downward arrow image will be displayed. And if aligned in ascending, an upward arrow image will be displayed.
- It is not aligned yet when the project is opened.
- If aligned once more in descending sequence, it will be aligned in ascending sequence.
- Align function in row unit (horizontally) is not available.

11.4 System Monitoring

System Monitoring is used to display PLC's slot information, I/O information assigned, module status and data value.

11.4.1 Basic Application

There are two methods available to execute System Monitoring.

－ Select [Monitor]-[System Monitoring] on the XG5000 menu.

－ Select [Start]-[Program]-[XG5000]-[System Monitoring] on the Start menu.
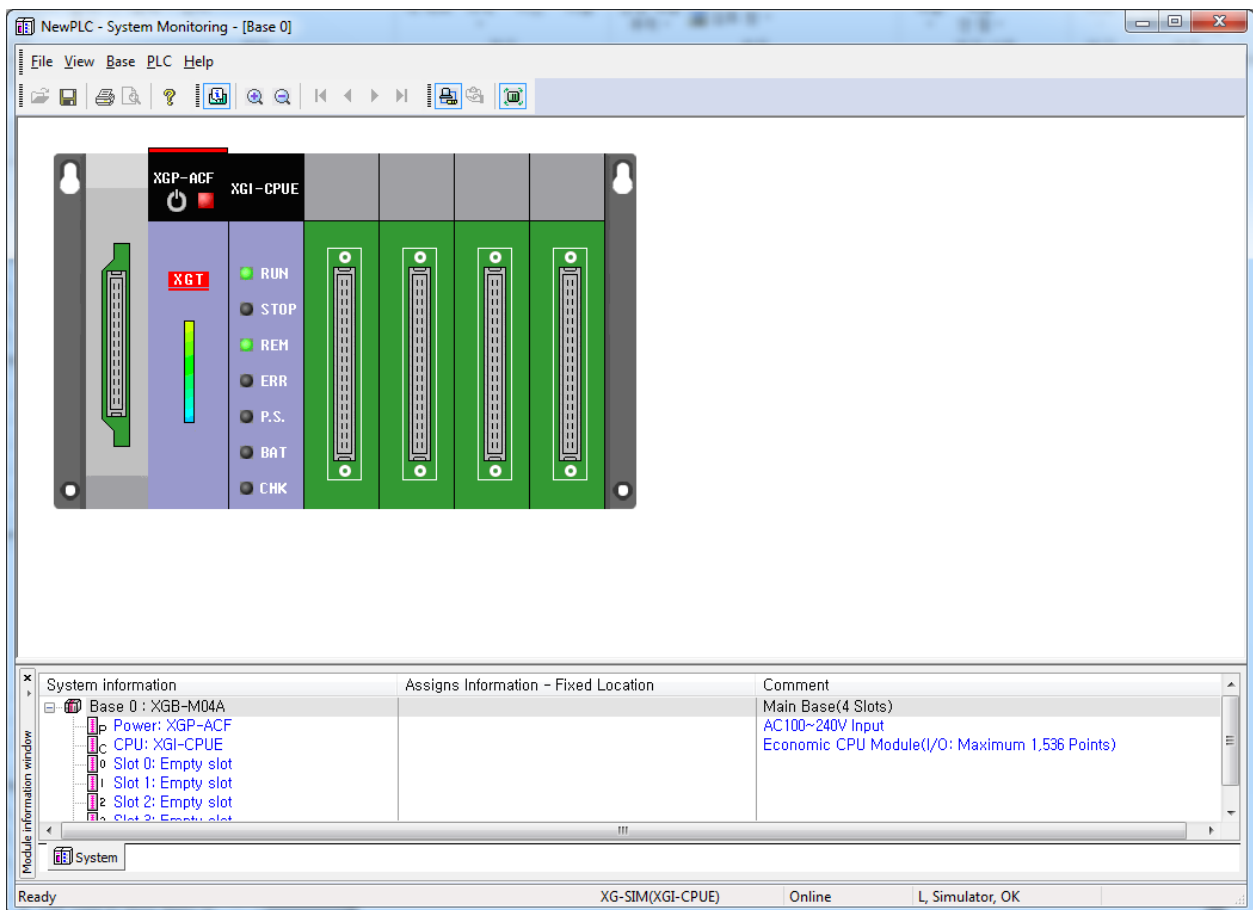
Module Information Window displays the information of the slot installed on PLC. After reading the module information saved in PLC, it displays it on the data display screen of the module information window.

Select one of those specified below to view Base.

－ Select items on the module information window. (Ex. Base 0, Base 1, …)

－ Select [Base] items on the menu. (Select First, Previous, Next, Last base)

－ Use the direction key on the keyboard to position the module's cursor on the base to select.

Notes

‒ If System Monitoring is executed on the XG5000 menu, it will be in Connect and Monitoring status.

11.4.2 Connect/Disconnect

System Monitoring can be created by a call from XG5000, or can be also executed solely.

Thus, the connection is available to PLC with Connect options. If connected with PLC, base information is read from PLC to display on the module information window.

[Sequence]

1. Specify Connect options.

2. Confirm that cable is installed applicably to connection method.

3. Select [PLC]-[Connect] on the menu to connect.

4. Select [PLC]-[Disconnect] on the menu to disconnect.

Notes

‒ System Monitoring when executed will start to connect with the saved Connect options.

‒ If executed in XG5000, it will start to connect with XG5000's Connect options.

‒ Default of Base 0 will be displayed on the screen.

11.4.3 System Synchronization

It reads base information, I/O assignment method and slot information specified in PLC to display on the screen. When monitored, it will read I/O skip information and forced I/O input/output information to change the current value.

[Sequence]

1. Confirm the connection status with PLC.

2. Select [PLC]-[System Synchronization] on the menu.

Notes

‒ If the system synchronization executed, the module information only will be updated.

‒ Refer to Basic Parameter Information for details on I/0 assignment method.

11.4.4 All I/O modules ON/OFF

It is used to check output value of all the I/O modules installed on PLC.

1) All I/O modules ON

It makes the data value of all the I/O modules installed on PLC be ON.

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[All I/O modules ON] on the menu.

2) All I/O modules OFF

It makes the data value of all the I/O modules installed on PLC be OFF.

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[All I/O modules OFF] on the menu.

11.4.5 Selected I/O modules ON/OFF

It is used to check output value of the selected I/O modules installed on PLC.

1) Selected I/O module ON

It makes the data value be ON as many as the contact points of the selected I/O modules on the base displayed on PLC screen.

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[Selected I/O modules ON] on the menu.

2) Selected I/O module OFF

It makes the data value be OFF as many as the contact points of the selected I/O modules on the base displayed on PLC screen.

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[Selected I/O modules OFF] on the menu.

11.4.6 Change Current Value

In order to change the current value, it shall be in the connection status with PLC and in monitoring mode.
Click the contact point to change the data value of the selected contact point to ON or OFF.

[Sequence]
1. Confirm the connection status with PLC and the monitoring mode.
2. Position the mouse cursor on the I/O module's contact point to change the cursor to hand shape.
3. Click the I/O module's contact point.

<table>
<tr><td>Notes</td></tr>
<tr><td>
－ Move the mouse onto I/O contact point to display the assigned device on the status bar.
－ If I/O skip is specified, it will be displayed always OFF.
－ If I/O compulsory input and output is specified, the specified value will be always displayed.
</td></tr>
</table>

11.4.7 Information Display of Power Module

Information of Power Module displays base power-cut history including date, time and details in which power-cut bases are displayed.

[Sequence]
1.Confirm the connection status with PLC.
2. Select one method among those below to display the module information.
－ With Power Module selected, select [PLC]-[Module Info.] on the menu.
－ With Power Module selected, click the right button of the mouse to select [Module Information] on the menu.
－ With Power Module selected on the Module Information window, click the right button of the mouse to select [Module Info.] on the menu.
－ If Power Module is selected on the screen, press Enter.
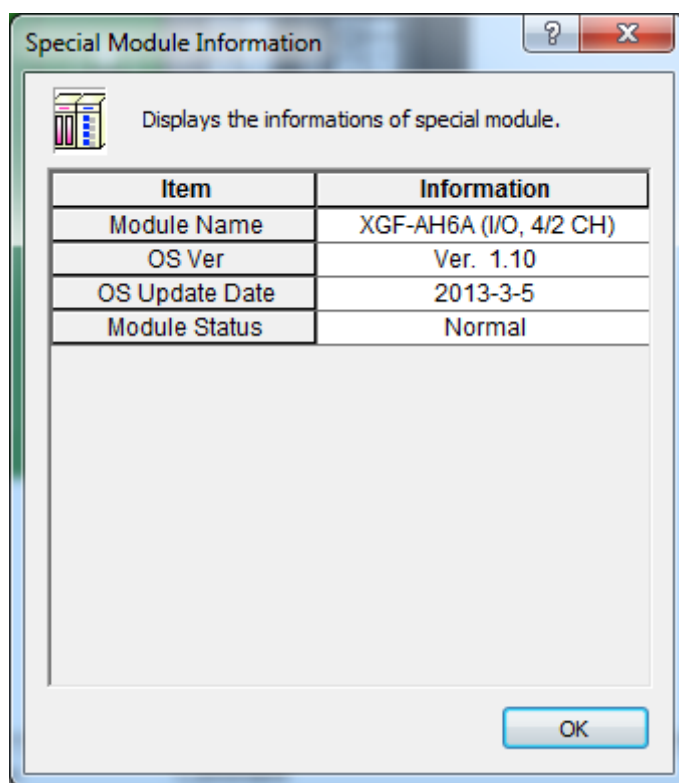－ Double-click the mouse positioned on Power Module displayed on the screen.

<table>
<tr><td>Notes</td></tr>
<tr><td>
－ If the number of power-cuts exceeds 100, only up to 100 can be displayed on the screen.
－ No module information is available for empty slot and I/O module.
</td></tr>
</table>

11.4.8 Information Display of CPU module

Information of CPU Module displays CPU version, type, operation mode, key status, CPU status, connection status, forced I/O setting status, I/O skip and error mask status.

[Sequence]

1. Confirm the connection status with PLC.
2. Select one method among those below to display the module information.
- With CPU Module selected, select [PLC]-[Module Info.] on the menu.
- With CPU Module selected, click the right button of the mouse to select [Module Info.] on the menu.
- With CPU Module selected on the Module Information window, click the right button of the mouse to select [Module Info.] on the menu.
- If CPU Module is selected on the screen, press Enter.
- Double-click the mouse positioned on CPU Module displayed on the screen.

PLC Information - NewPLC

| CPU | Performance | Password | PLC RTC |

Displays CPU module information.

Category	Contents
CPU type	XGK-CPUS
CPU version	Ver. 4.32
CPU mode	▶ Run
Mode switch	Remote/Stop
CPU state	OK
Connection state	Local
Last CPU mode chan	XG5000
Forced input	OFF
Forced output	OFF
Skip I/O	OFF
Fault mask	OFF
RST/Overall RST Isol	OFF/OFF
D.CLR/Overall D.CL	OFF/OFF

Close
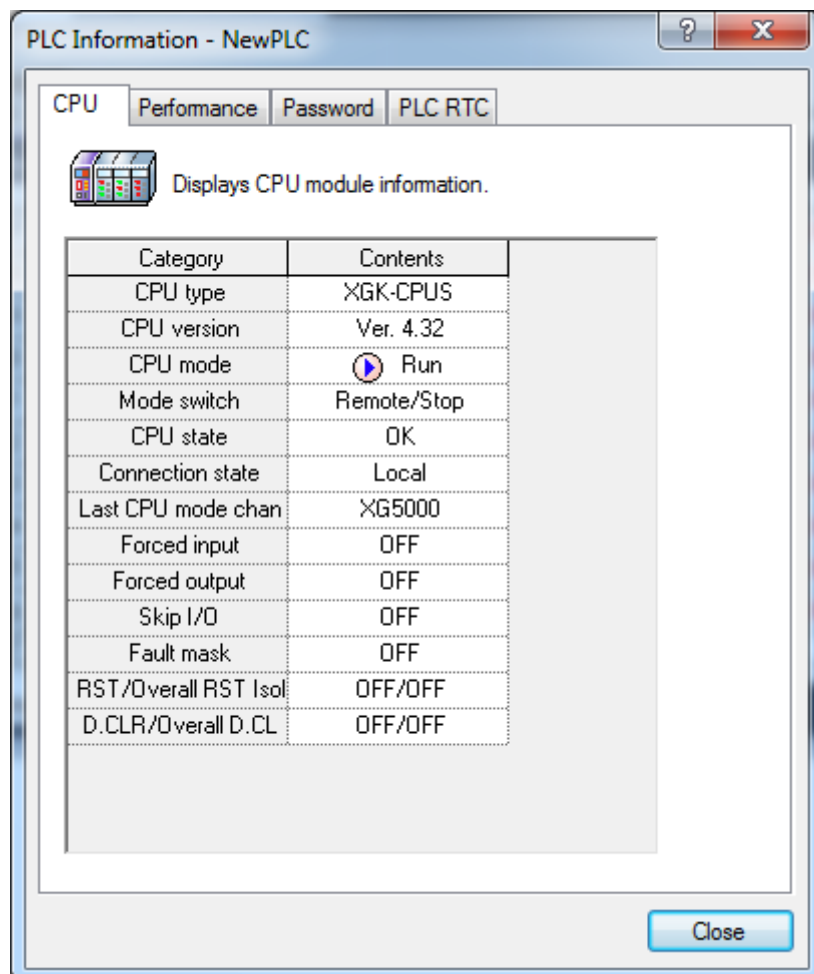
11.4.9 Information Display of Communication Module

Information of Communication Module displays module type, operation status, H/W version & error status, O/S version and its installed date.

[Sequence]

1.Confirm the connection status with PLC.

2. Select one method among those below to display the module information.

- With Communication Module selected, select [PLC]-[Module Info.] on the menu.

- With Communication Module selected, click the right button of the mouse to select [Module Info.] on the menu.

- With Communication Module selected on the Module Information window, click the right button of the mouse to select [Module Info.] on the menu.

- If Communication Module is selected on the screen, press Enter.

- Double-click the mouse positioned on Communication Module displayed on the screen.

List	Context
Module kind	XGL-C22A
Base Number	0
Slot Number	0
Channel 1 Number	0
Channel 1 Connect	RS232
Channel 2 Number	0
Channel 2 Connect	RS232
Hardware Error	Error code(0x4)
Hardware Version	Ver. 255.255
O/S Version	Ver. 2.50
P2P	Disable
Parameter information	Communication port type error
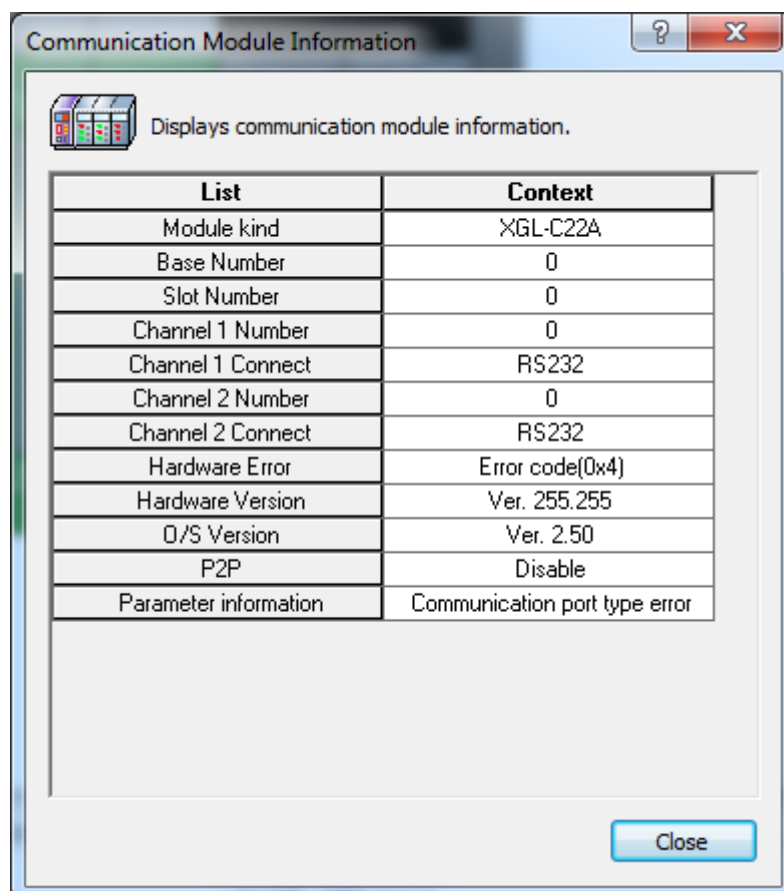
11.4.10 Information of Special Module

Information of Special Module displays module type, module-related information, O/S version, and module status.

[Sequence]

1. Confirm the connection status with PLC.

2. Select one method among those below to display the module information.

− With Special Module selected, select [PLC]-[Module Info.] on the menu.

− With Special Module selected, click the right button of the mouse to select [Module Info.] on the menu.

− With Special Module selected on the Module Information window, click the right button of the mouse to select [Module Info.] on the menu.

− If Special Module is selected on the screen, press Enter.

− Double-click the mouse positioned on Special Module displayed on the screen.

Special Module Information	
Displays the informations of special module.	
Item	**Information**
Module Name	XGF-AH6A (I/O, 4/2 CH)
OS Ver	Ver. 1.10
OS Update Date	2013-3-5
Module Status	Normal

OK

[Detailed Description]

Classification	Description
Module type	Provides special module's type and its detailed information.
O/S version	Provides special module's installed O/S version information, which will be helpfully used for upgrading module O/S later.
O/S updated date	Provides special module's latest O/S updated date information.
Module status	Provides special module's present status (error code) information.

11.4.11 Start/Stop Monitoring

It reads PLC's I/O data to display on the screen.

1) Start Monitoring

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[Start Monitoring] on the menu.

2) Stop Monitoring

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[Stop Monitoring] on the menu.

11.4.12 Special Module Monitoring

It executes monitoring the special module (A/D module, D/A module, HS counter module).

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[Special Module Monitoring] on the menu.

Special Module Monitor

XGF-AH6A (I/O, 4/2 CH)

Input Item	Max/Min value	Current value
CH0 A/D value	0 / 0	0
CH1 A/D value	0 / 0	0
CH2 A/D value	0 / 0	0
CH3 A/D value	0 / 0	0
Output item	Setting value	Current value
CH0 Digital value		0
CH1 Digital value		0

Input Item	Setting Value	Current Value
Channel	CH 0	
Channel status	Disable	Disable
Input range	4~20mA	4~20mA
Output type	0~8000	0~8000
Average processing	Sampling	Sampling
Average value	0	0
Output Item	Setting Value	Current Value
Channels	CH 0	
Channel status	Disable	Disable
Output range	4~20mA	4~20mA
Input type	0~8000	0~8000
CH. Output type	Former value	Former value
D/A Digital value	0	0
Output enable	Disable	Disable
Output enable	Disable	

[Reset max/min value] [Stop Monitoring] [Test]

[Close]

Notes

‒ Please refer to the special module manual or chapter 11. 6 Special Module monitoring for the details of special module monitoring.

‒ Not [Special Module Monitoring] but [Module Info.] function is only available for the positioning module.

- Positioning module's monitoring function shall be applied along with its exclusive software package.

11.4.13 Save

It is used to save the system information and data presently displayed on the screen.

[Sequence]

1. Select [File]-[Save] on the menu.

2. Select [File]-[Save As] on the menu to save the data as a different name.

Notes

‒ File extension will be set as (.smi).

11.4.14 Open

It is used to read the system information file previously saved.

[Sequence]

1. Select [File]-[Open] on the menu.

‒ Double-click an applicable file name.

‒ Drag & drop the file onto the System Monitoring to open it.

11.4.15 Move Base

It selects a base to show its module information.

[Sequence]

1. Move to the first base.

‒ Select [Base]-[First Base] on the menu.

2. Move to the previous base.

‒ Select [Base]-[Previous Base] on the menu.

3. Move to the next base.

‒ Select [Base]-[Next Base] on the menu.

4. Move to the last base.

‒ Select [Base]-[Last Base] on the menu.

11.4.16 Preview

This function is used to previously view the image to be printed.

On the Previous View window, the user can modify the area to be printed.

[Sequence]

1. Click [Preview].

– Select [File]-[Preview] on the menu.

2. Modify the area of the image displayed.

3. Move the mouse to the edge.

4. Mouse cursor will be changed.

5. Move the mouse while being clicked to modify the size.
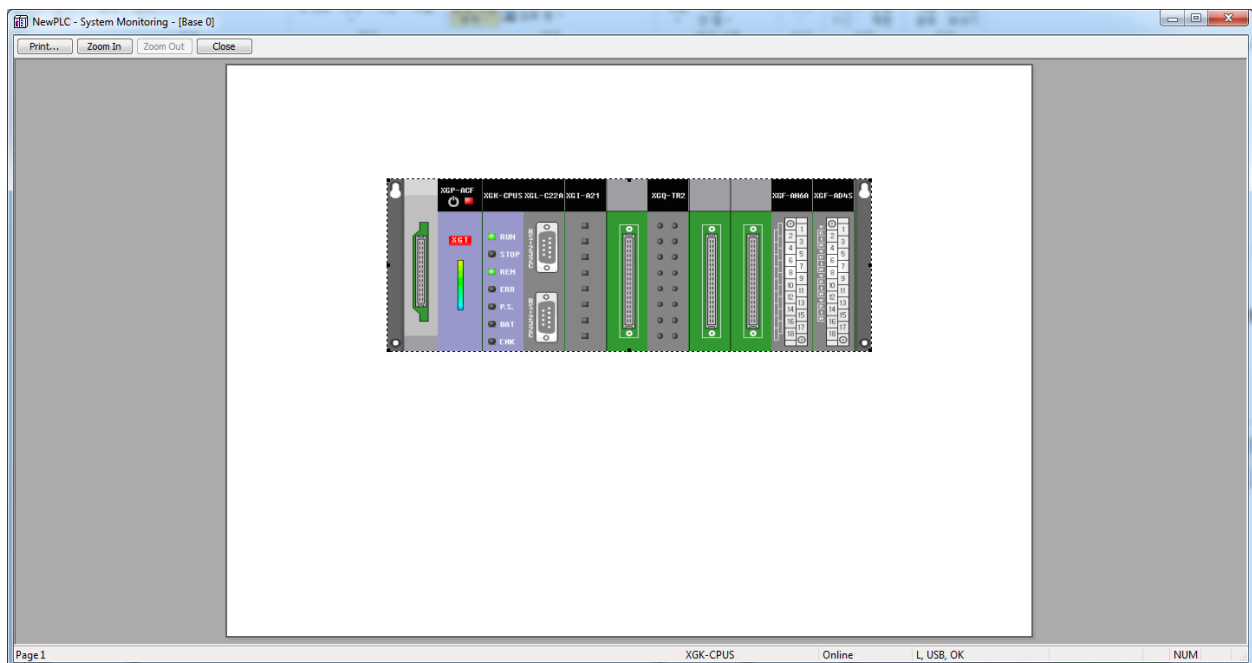
Notes
– The specified area of Preview will be saved.
– In monitoring mode, Preview is not available.

11.5 Device Monitoring

Device Monitoring can monitor all the device areas' data in PLC.

It can write or read data value on the PLC's specific device. In addition, Device Monitoring can display the data value variously when displayed or input on the screen according to bit format and display method.

11.5.1 Basic Application

[Sequence]

There are 2 methods available to execute Device Monitoring function.

- Select [Monitor]-[Device Monitoring] on the XG5000 menu.
- Select [Program]-[XG5000]-[Device Monitoring] on the Start menu.
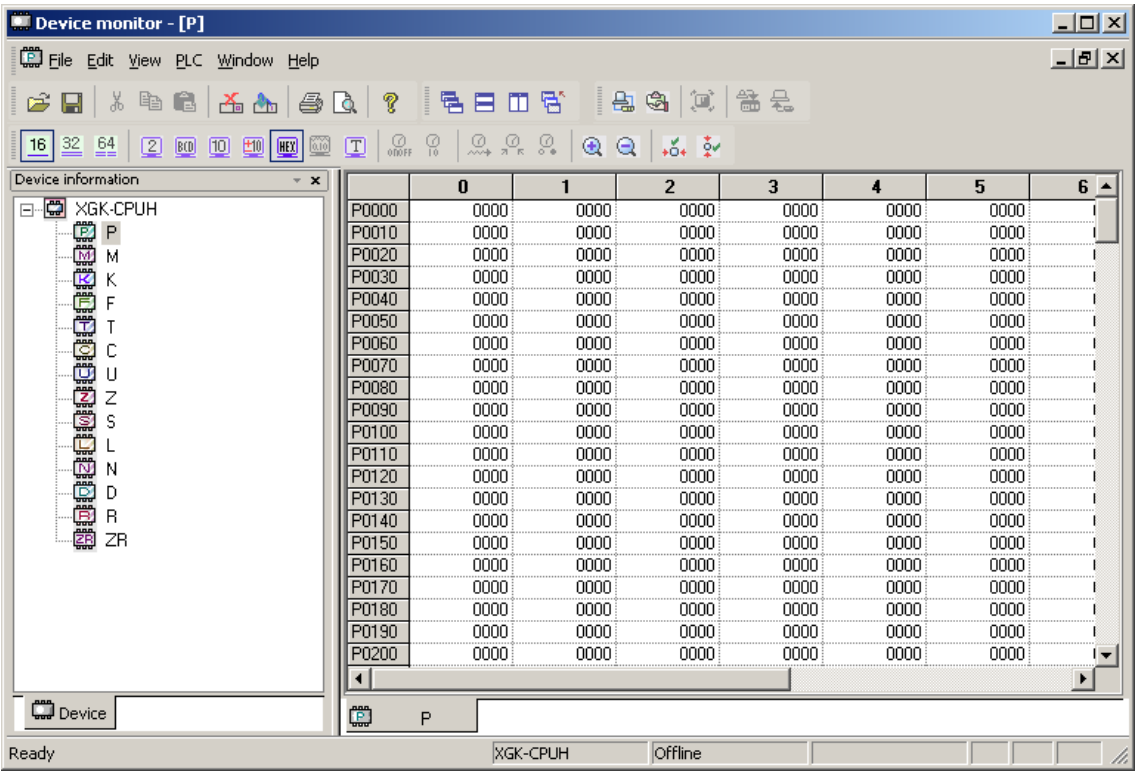
The device information window displays all the device areas in PLC, based on CPU type.
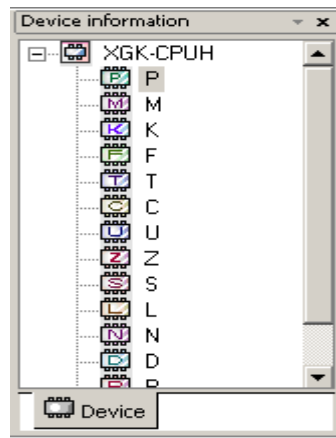
How to open the device is as follows. Double-click the device icon (Ex. P, T, …) or click the right button of the mouse to select [Open Device] on the menu.

Notes

‑ Device monitoring if executed on the XG5000 menu will be in Connect, Monitor status.

‑ If not in Monitoring mode, the device if open will display the previous data value.

‑ Basically the data value will be initialized to 0.

11.5.2 Device Areas

Device Areas are necessary for effective and correct control of various types of data. PLC provides various device areas of data to manage such data effectively. The user is requested to classify the data areas for applicable reference in the program.

Refer to PLC manual for respective detailed device area.

11.5.3 Data Format and Display Items

There are mainly 4 methods to display data on the screen.

Display Setting	Description
Data Size	16 bits, 32 bits, 64 bits
Display Format	Binary, BCD, Unsigned decimal, Signed decimal, Hexadecimal, Real, String
View/Hide T & C device data	View Current value, View setting value, View bit value
Display Format of T & C device bit value	Character bits, Figure bits

1) 16 bits

Data size of the device is displayed in 16 bits.

[Sequence]

1. Select [View]-[View Option]-[16 bit] on the menu.
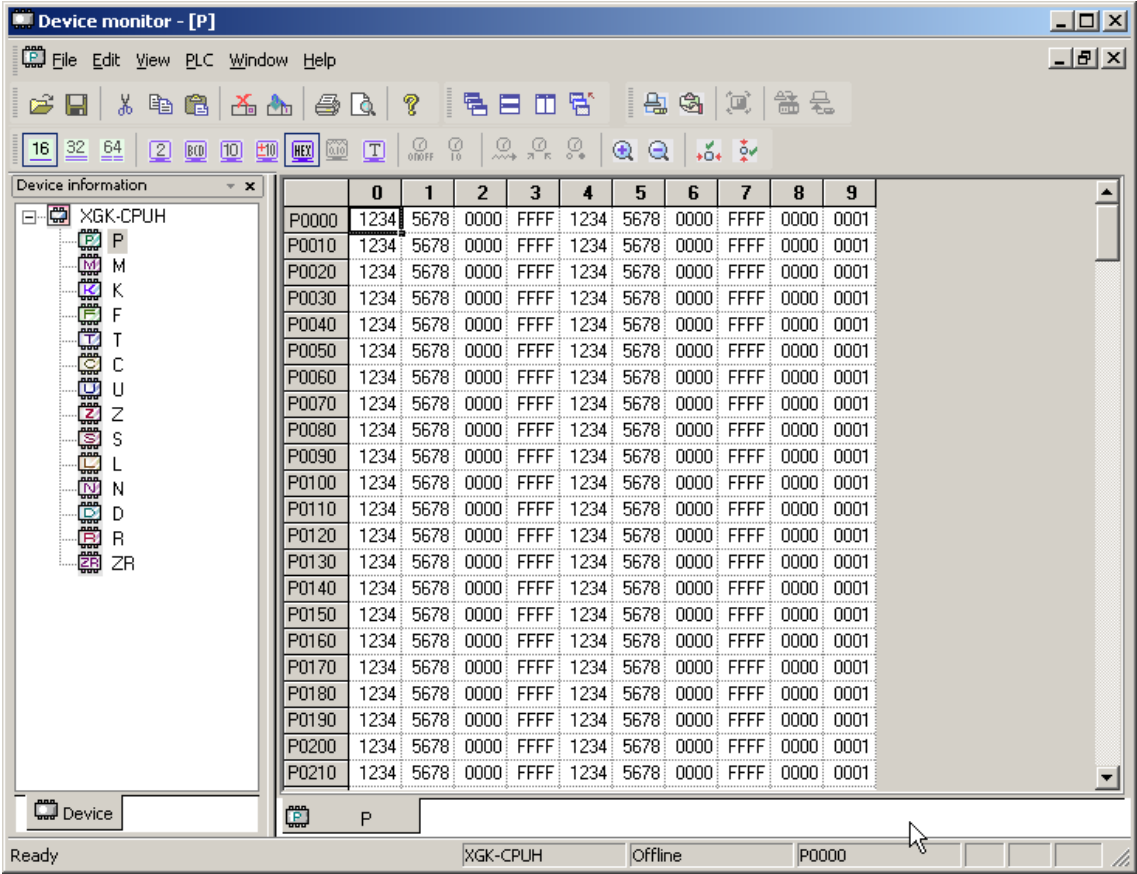
Notes

 - Assigned device of the selected cell is displayed in the status bar.

2) 32 bits

Data size of the device is displayed in 32 bits.

[Sequence]

1. Select [View]-[View Option]-[32 bit] on the menu.
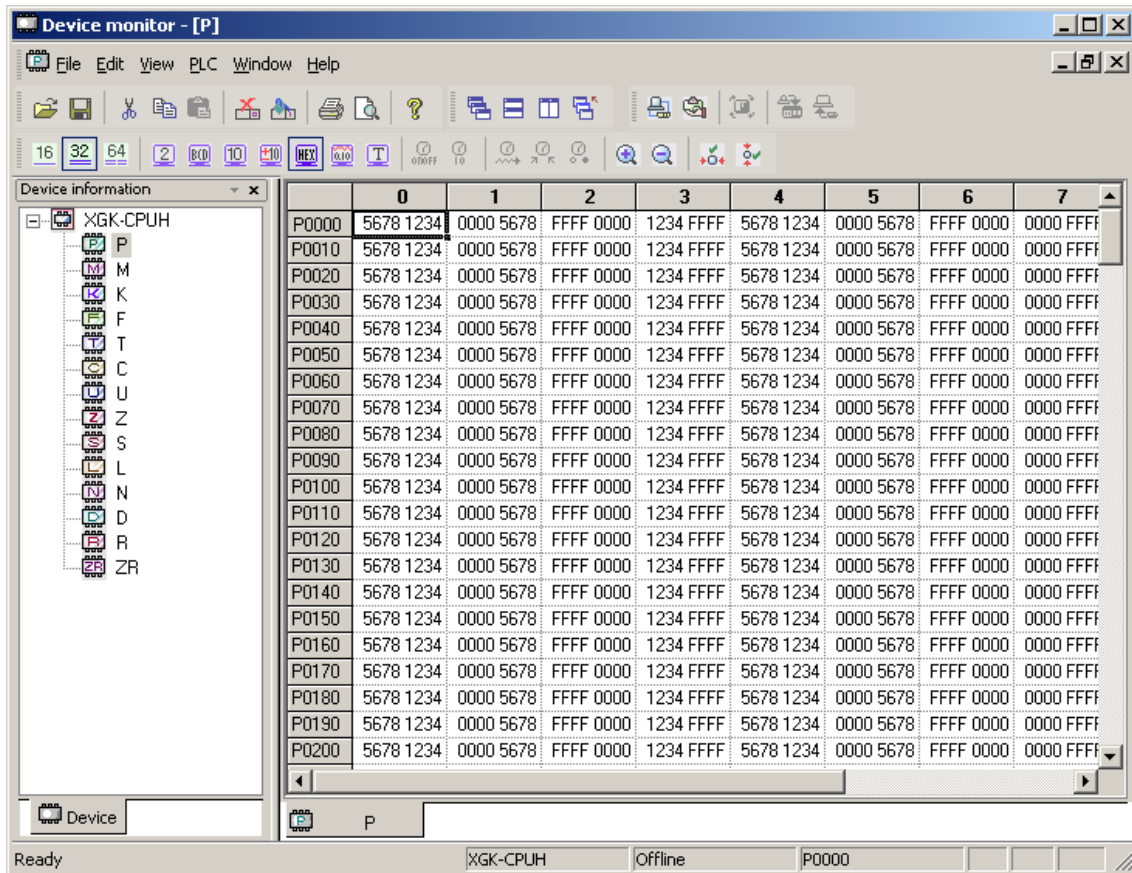
[Detailed Description]

- 32-bit P0000 device is of memory format united with 16-bit device P0000 and P0001.

16 bits

P0000	P0001	P0002	P0003
1234	5678	0000	FFFF

32 bits

P0000		P0001	
5678	1234	0000	5678

3) 64 bits

Data size of the device is displayed in 64 bits.

[Sequence]

1. Select [View]-[View Option]-[64 bit] on the menu.
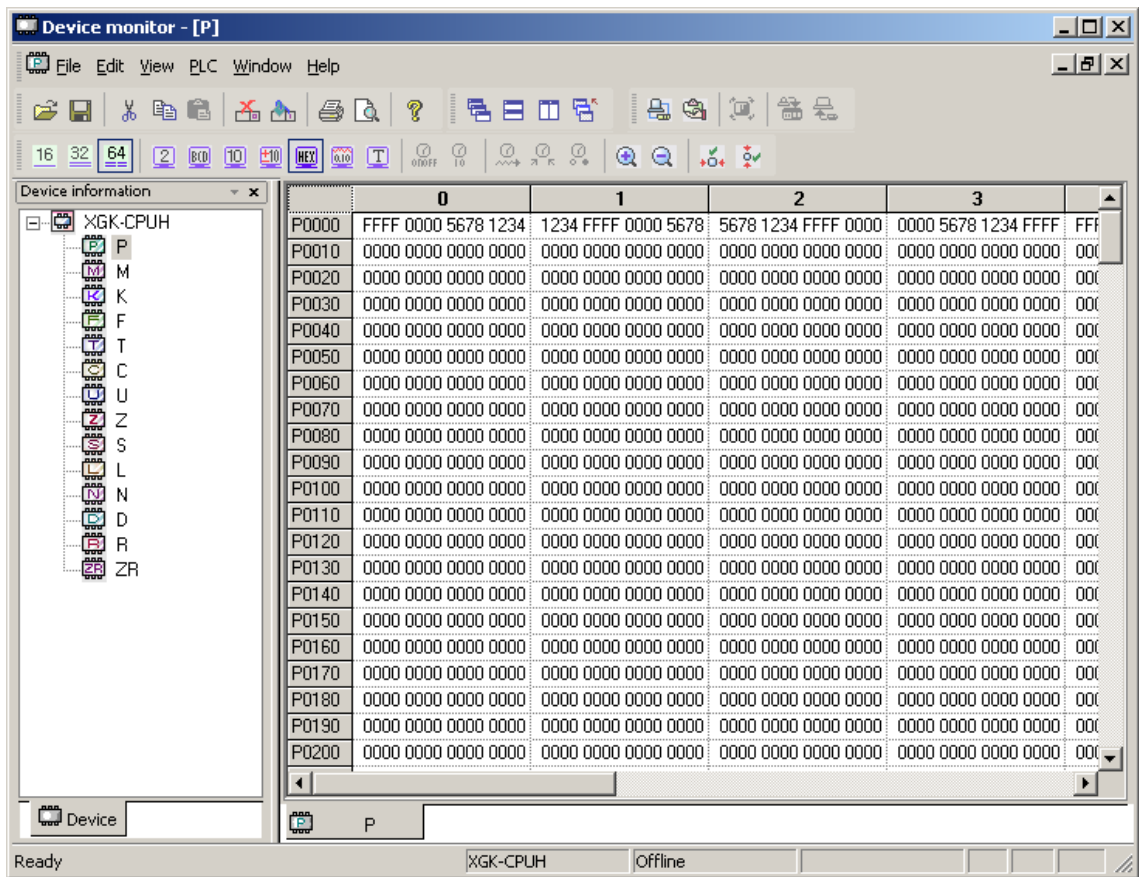
[Detailed Description]

- 64-bit P0000 device is of memory format united with 16-bit P0000, P0001, P0002 and P0003.

16 bits

P0000	P0001	P0002	P0003	P0004	P0005	P0006	P0007
1234	5678	0000	FFFF	1234	5678	0000	FFFF

64 bits

P0000				P0001			
FFFF	0000	5678	1234	1234	FFFF	0000	5678
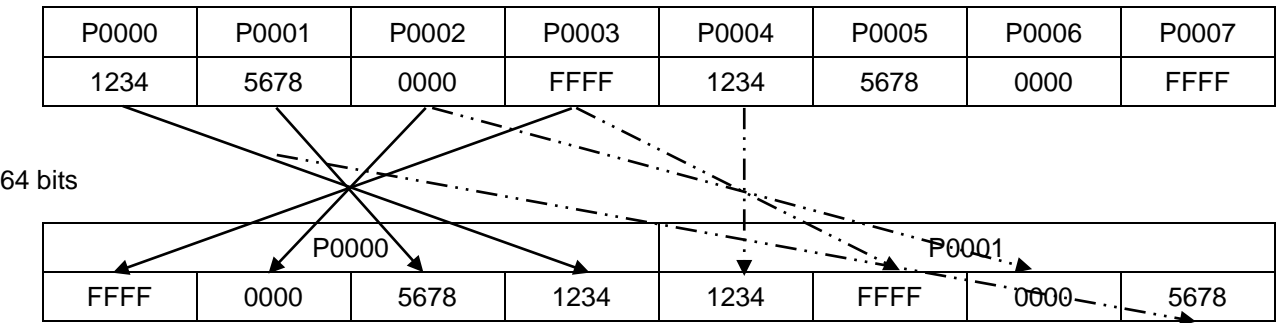
4) Binary

Data is displayed in binary.

[Sequence]

1. Select [View]-[View Option]-[Binary] on the menu.
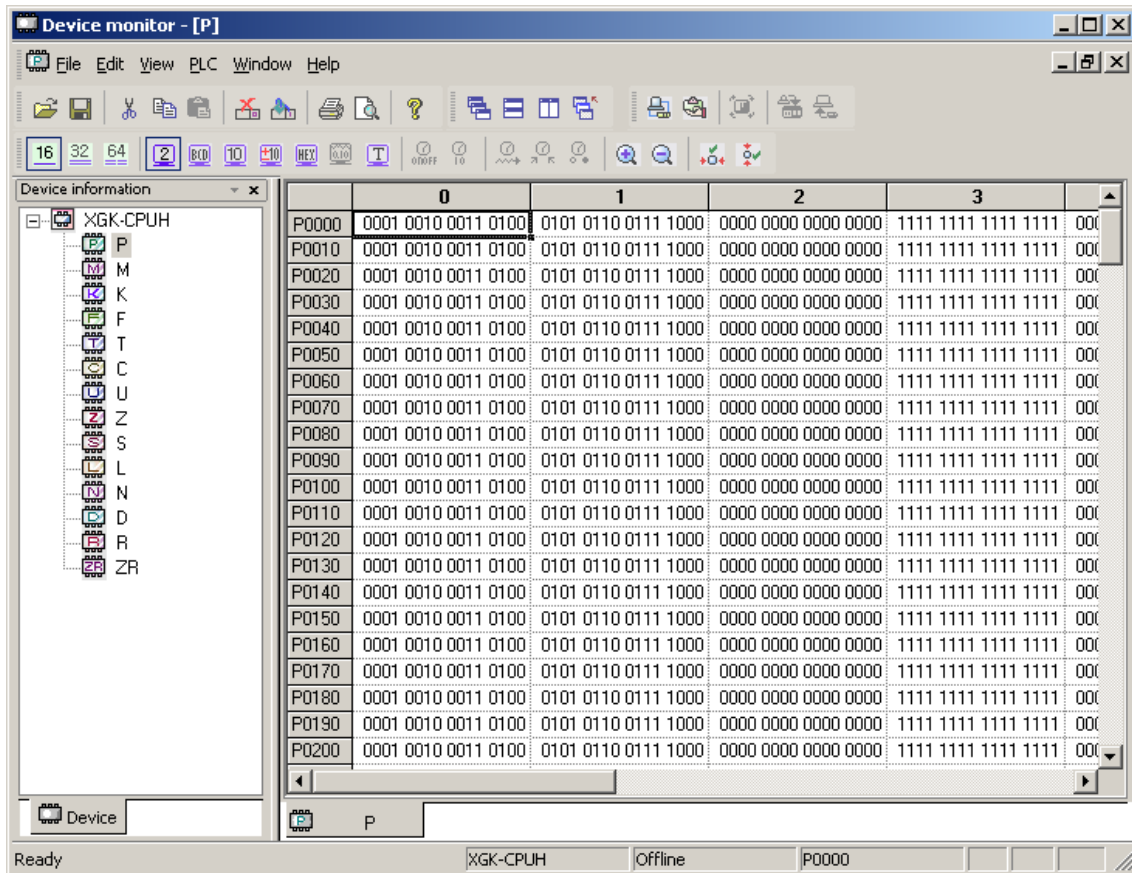
[Detailed Description]

- Data value is displayed by 1, 0, ' ' (blank).

Application Example)

Hexadecimal	1234
Binary	0001 0010 0011 0100

5) BCD

Data is displayed in BCD.

[Sequence]

1. Select [View]-[View Option]-[BCD] on the menu.
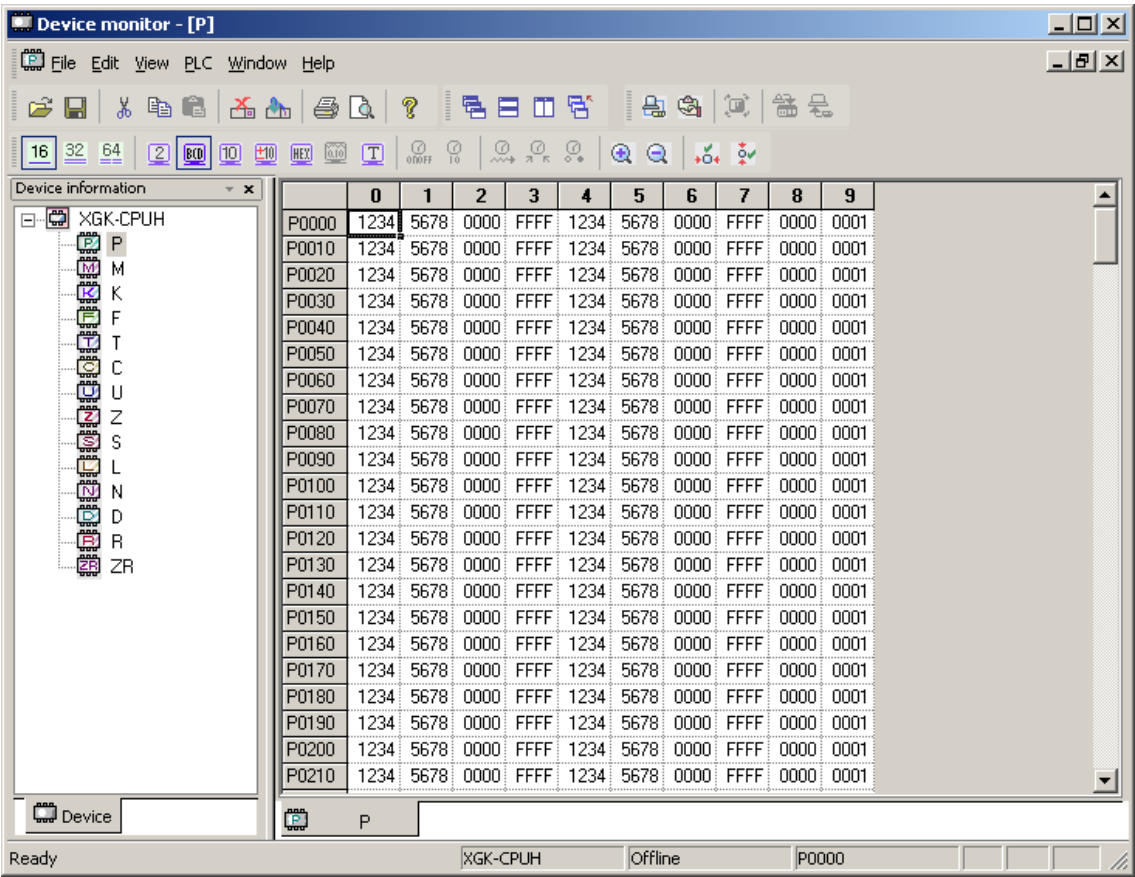
[Detailed Description]

－ Data value is displayed by the figures of 0 ~ 9.

Application Example)

Hexadecimal	1234
BCD	1234

6) Unsigned decimal

Data is displayed in unsigned decimal.

[Sequence]

1. Select [View]-[View Option]-[Unsigned Decimal] on the menu.
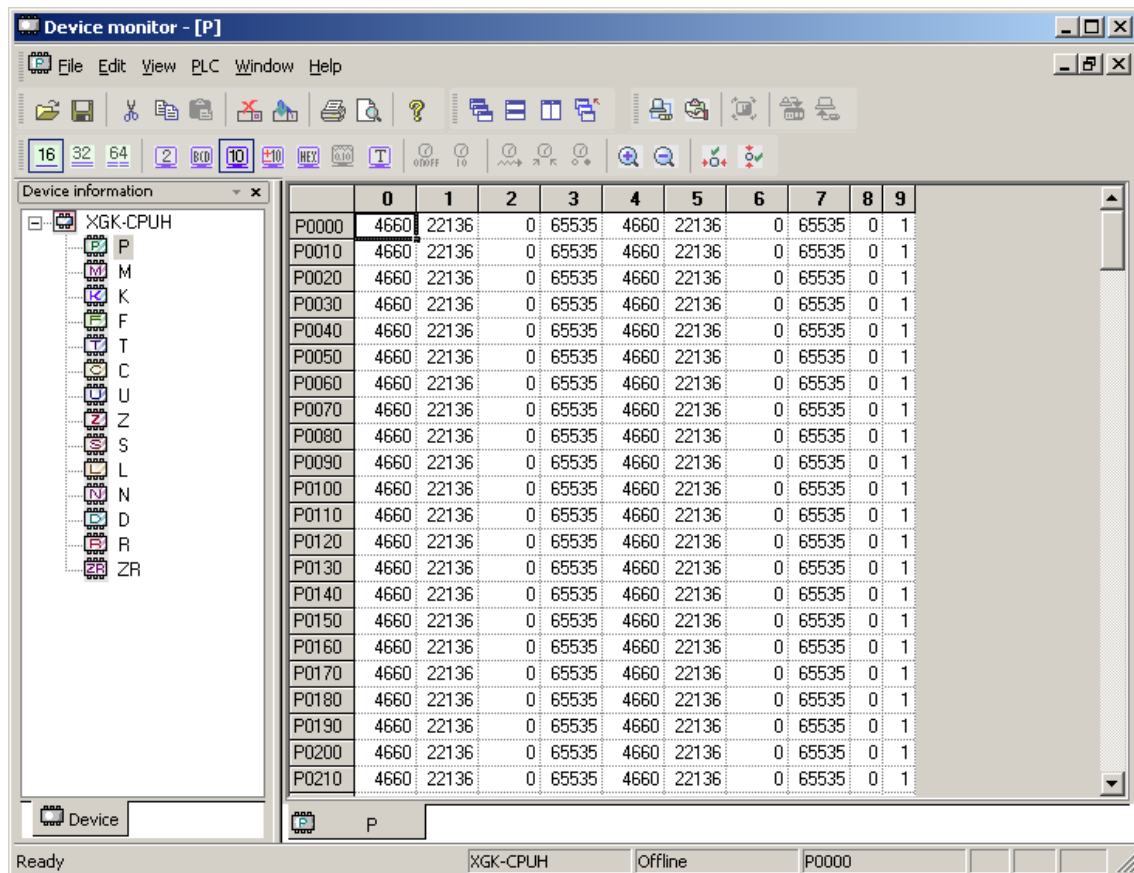
[Detailed Description]

- Data value is displayed by the figures of 0 ~ 9.

Application Example)

Hexadecimal	1234
Unsigned decimal	4660

7) Signed Decimal

Data is displayed in signed decimal.

[Sequence]

1. Select [View]-[View Option]-[Signed Decimal] on the menu.
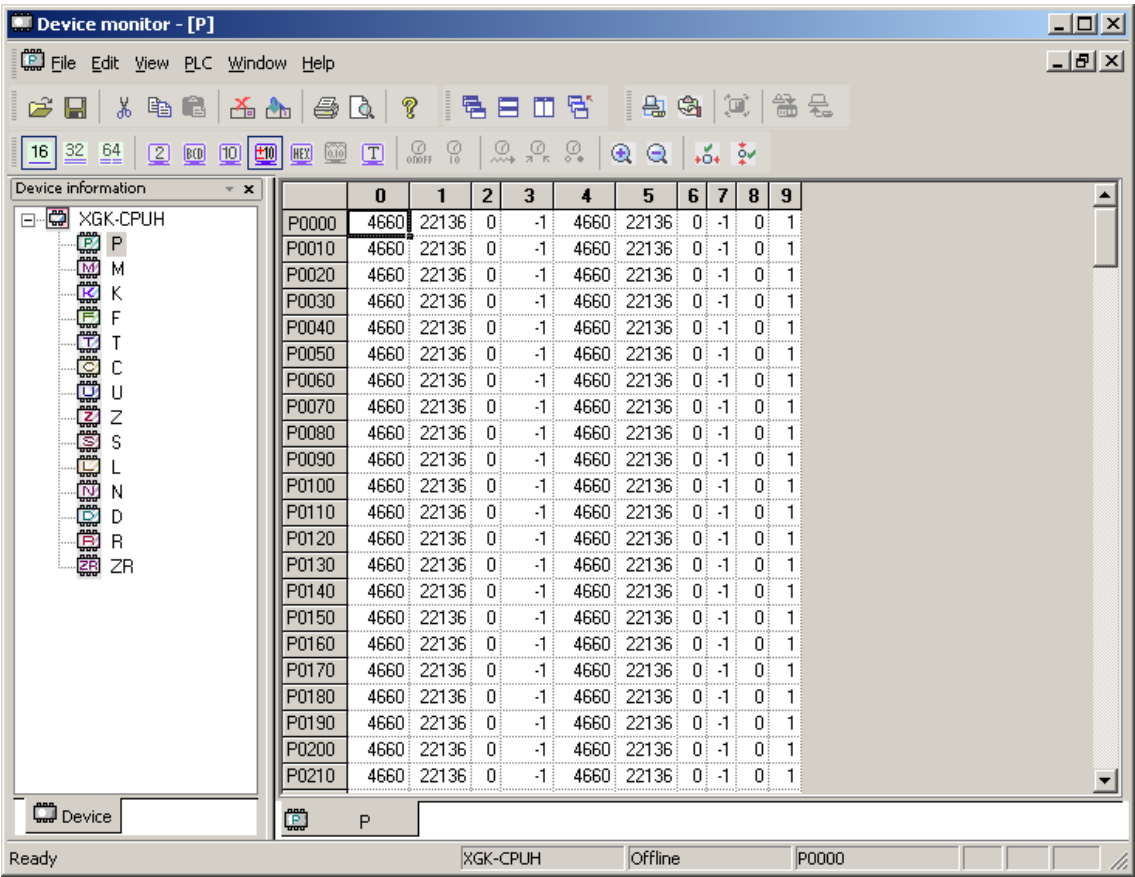
[Detailed Description]

- Data value is displayed by the figures of 0 ~ 9.

Application Example)

Hexadecimal	1234
Signed decimal	4660

8) Hexadecimal

Data is displayed in hexadecimal.

[Sequence]

1. Select [View]-[View Option]-[Hexadecimal] on the menu.
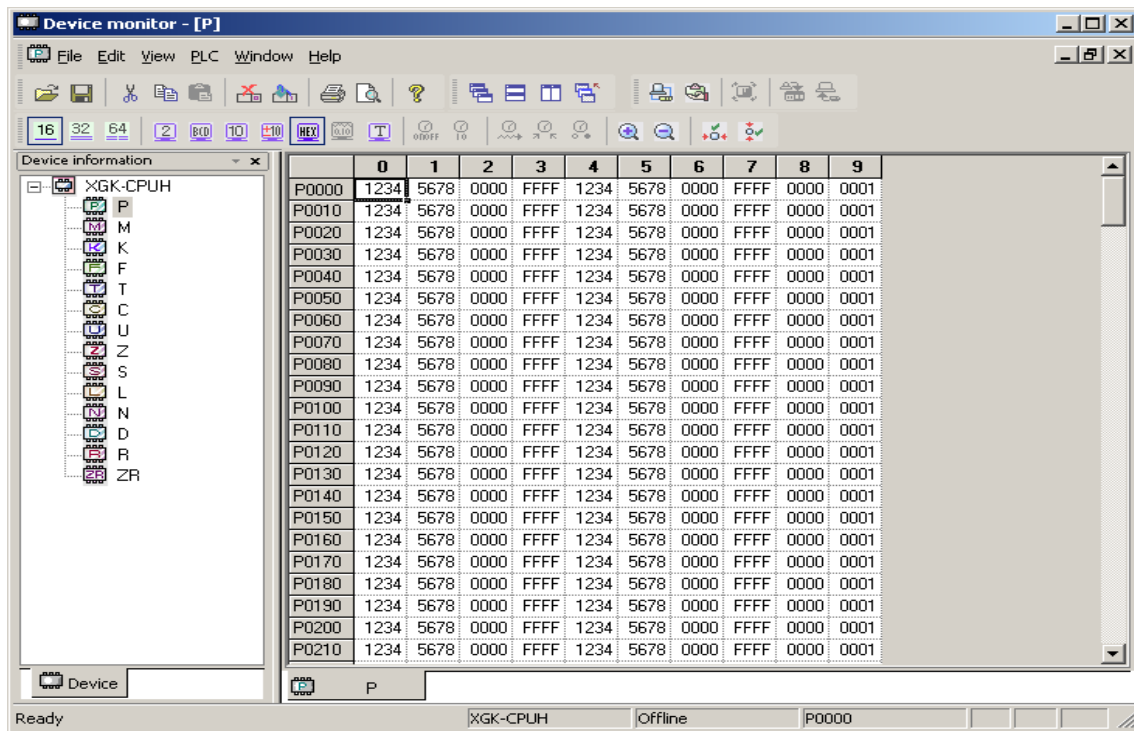
9) Real

Data is displayed in real.

[Sequence]

1. Select [View]-[View Option]-[Real] on the menu.
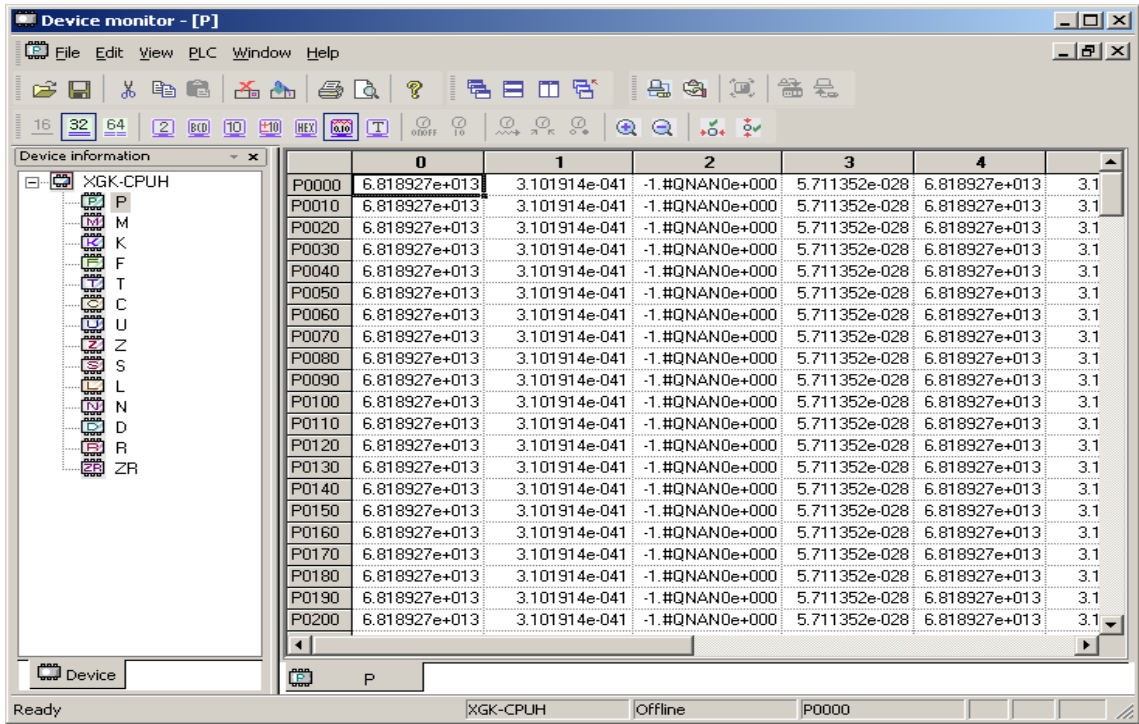
[Detailed Description]

- Data value is displayed in real.

- Real format is available in 32 bits and 64 bits.

Application Example)

Hexadecimal	5678 1234
Real	6.818927e+013

10) Text

Data is displayed in ASCII string.

[Sequence]

1. Select [View]-[View Option]-[Text] on the menu.
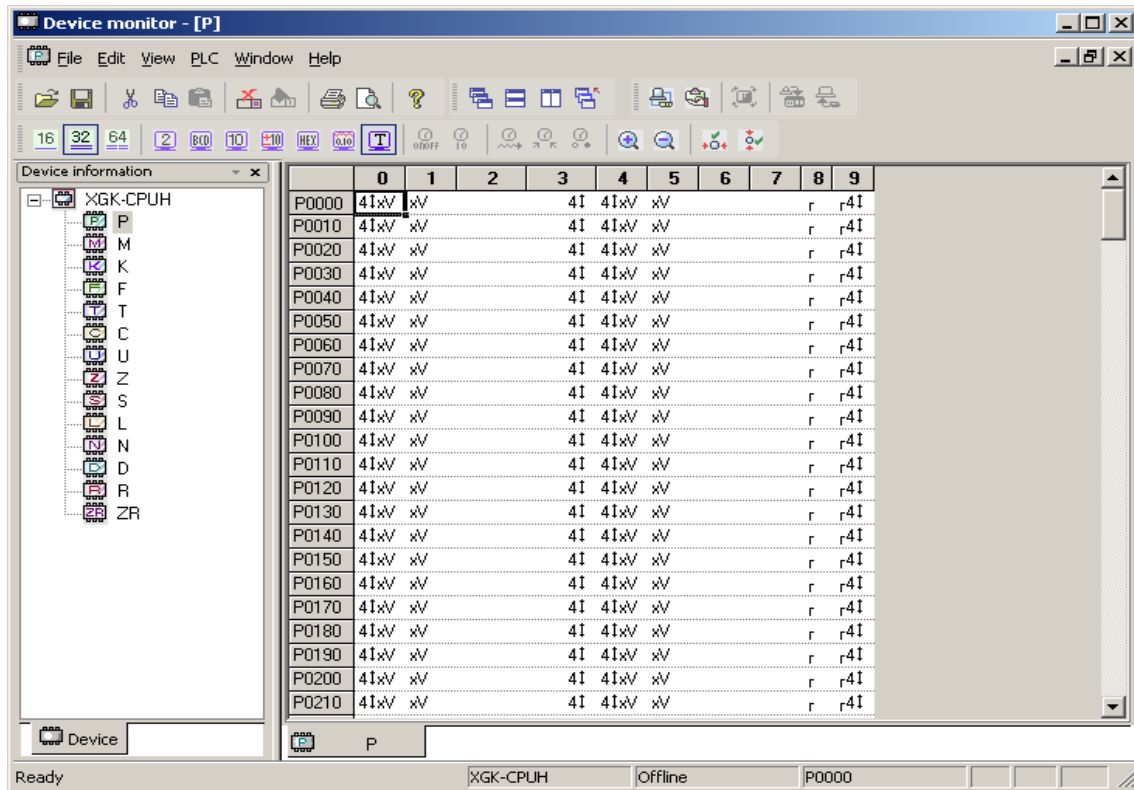
[Detailed Description]

- Data value is displayed in ASCII string.

Application Example)

Hexadecimal	1234
Text	4□

11) Current Value

This function is used to show or hide the row of the current value in the T and C devices.

[Sequence]

1. Select [View]-[View Option]-[Current Value] on the menu.
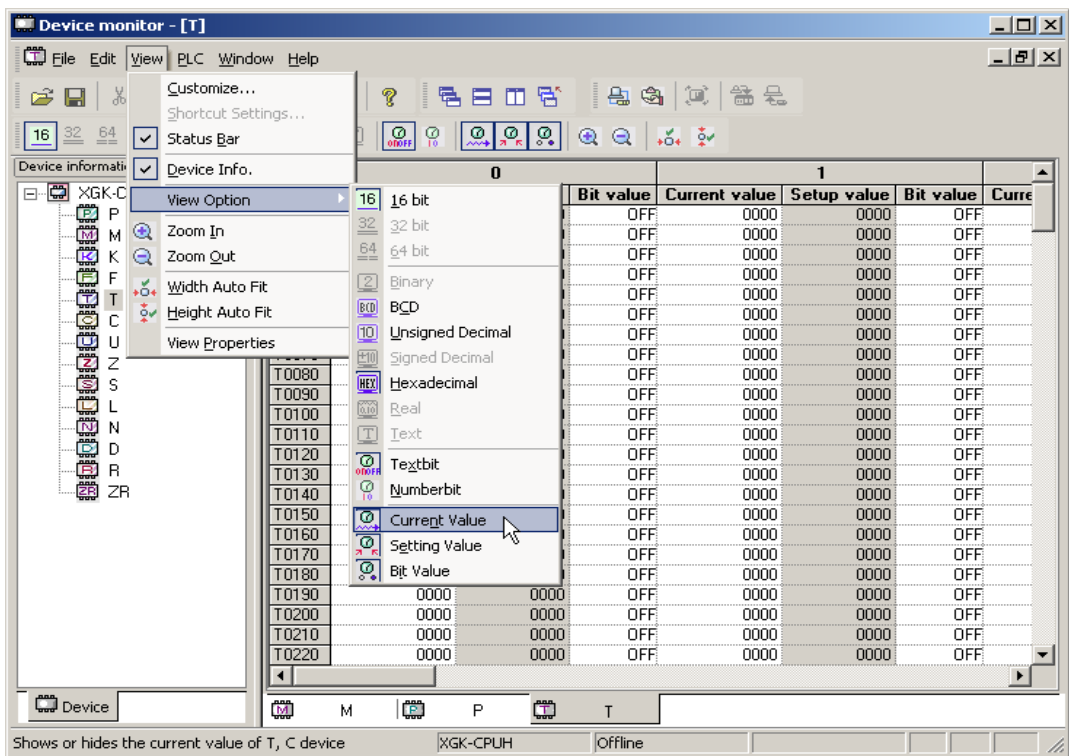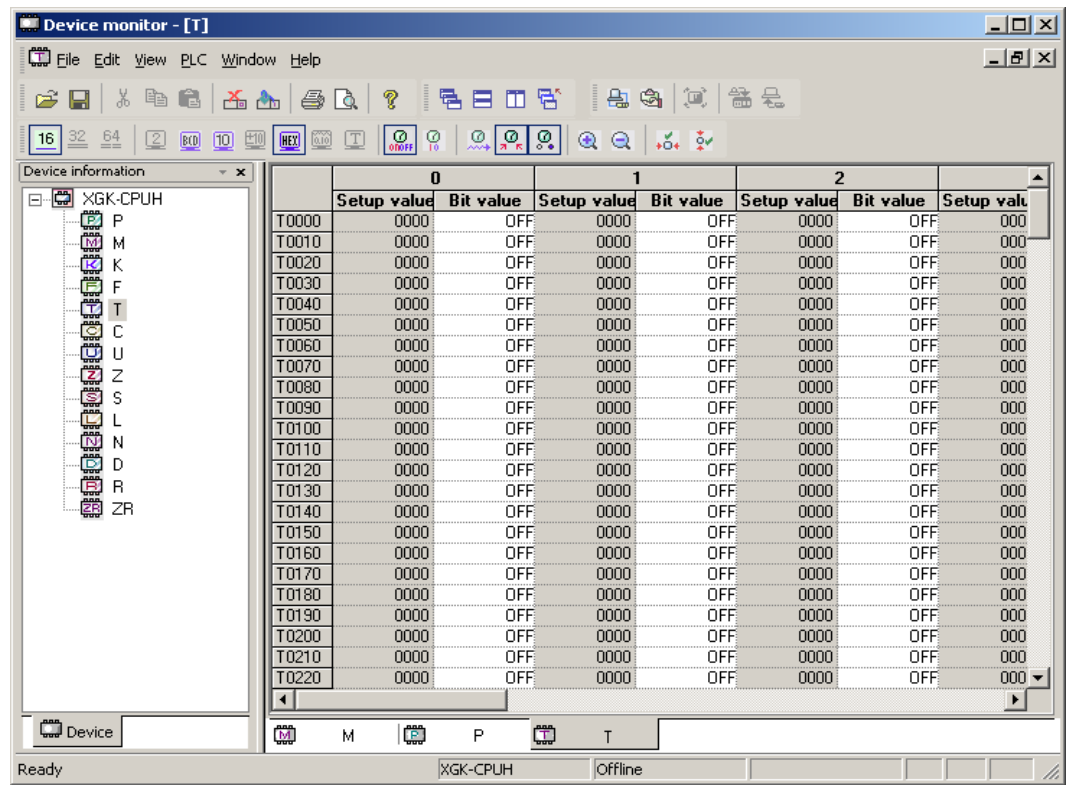
12) Setting Value

This function is used to show or hide the row of the setting value in the T and C devices.

[Sequence]

1. Select [View]-[View Option]-[Setting Value] on the menu.
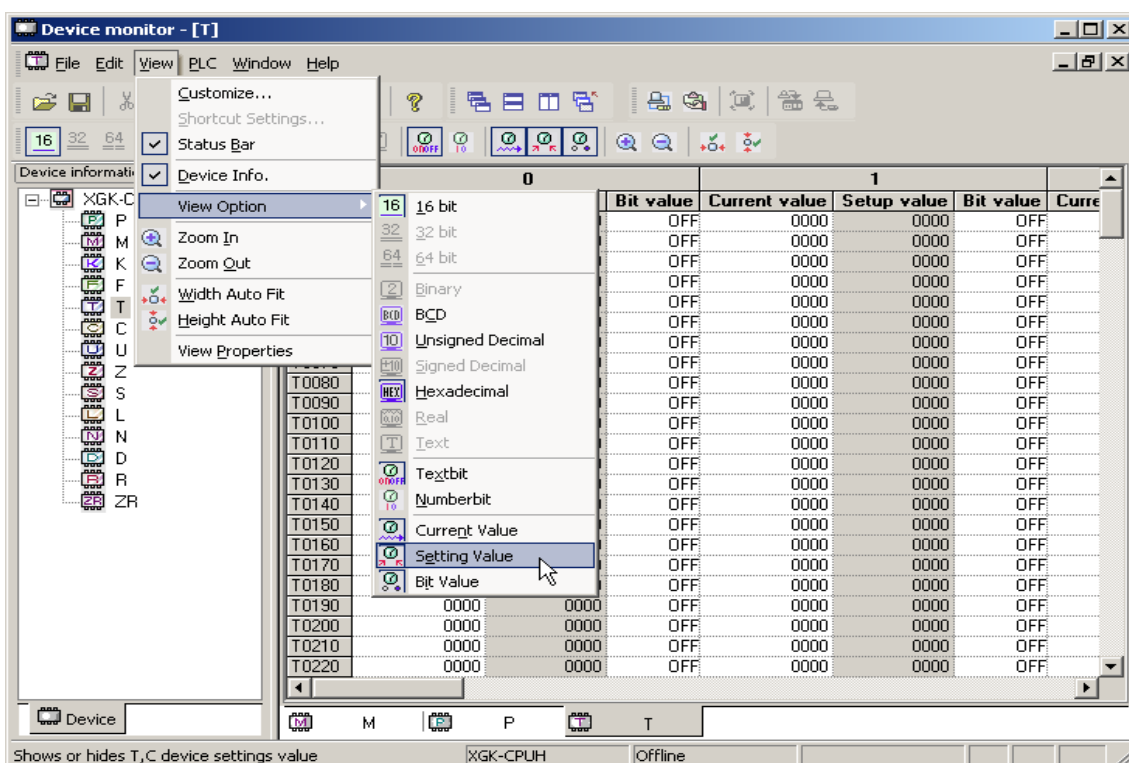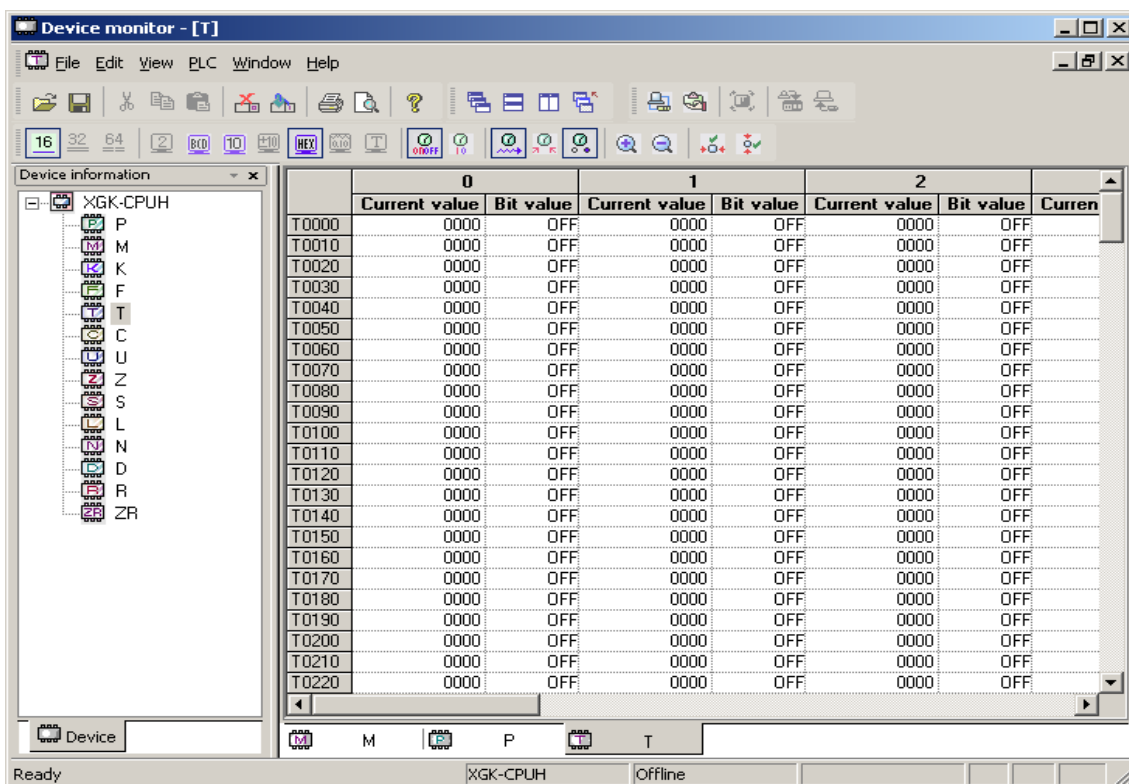
13) Bit Value

This function is used to show or hide the row of the bit value in the T and C devices

1.[Sequence]-[Bit Value] on the menu.
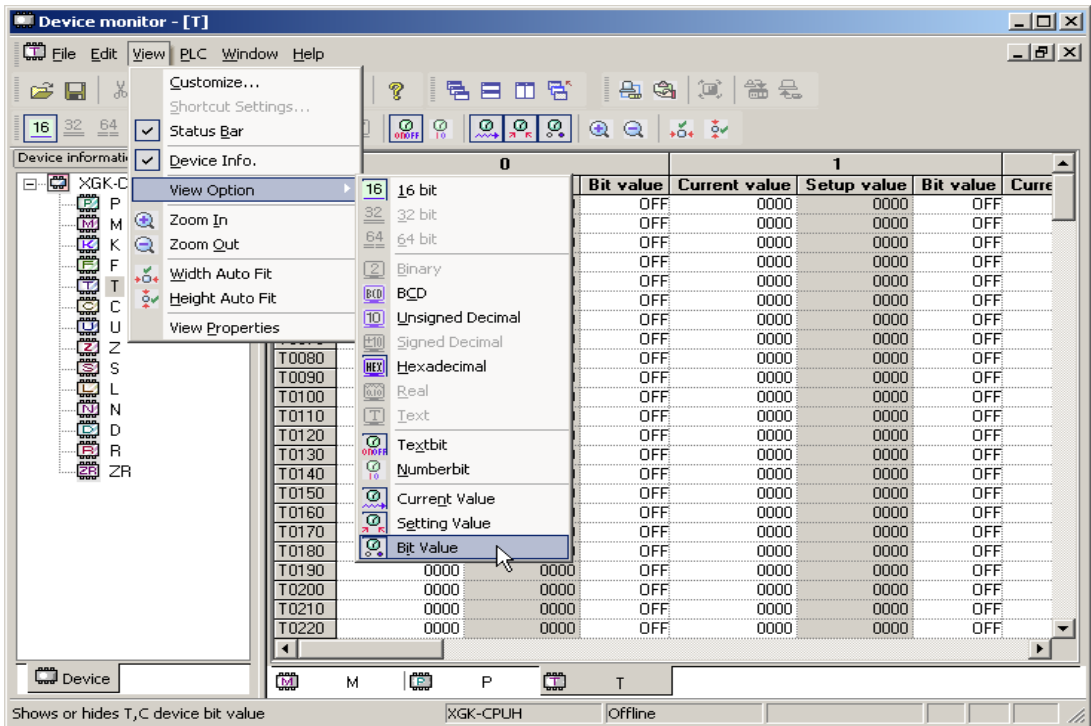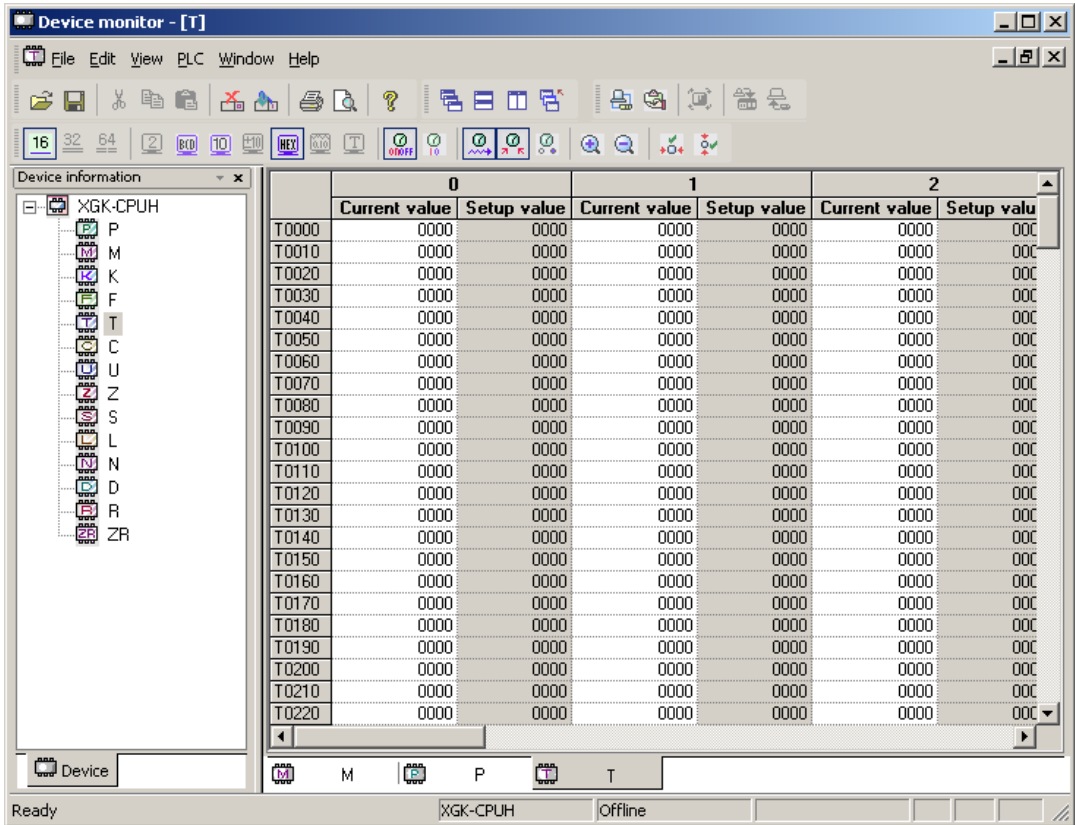
14) Text Bits

This function is used to display the bit value data by ON/OFF in T and C devices.

[Sequence]

1. Select [View]-[View Option]-[Textbit] on the menu.
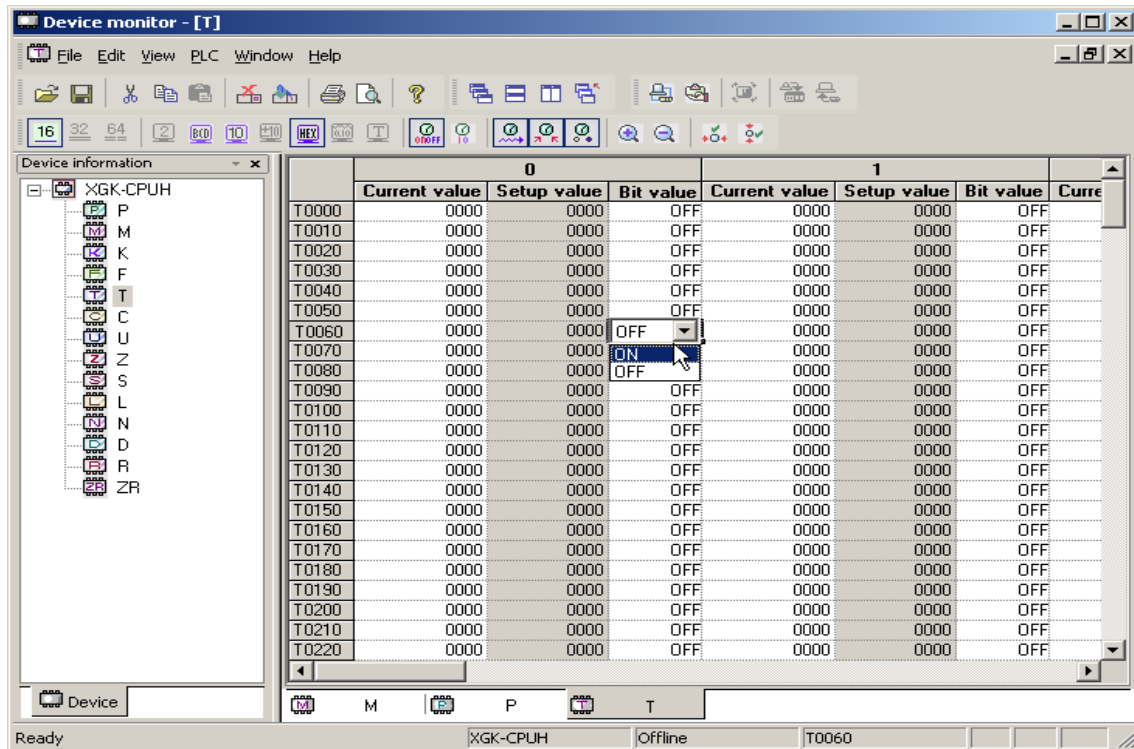
15) Numberbit

This function is used to display the bit value data by the figures of 1/0 in T and C devices.

[Sequence]

1. Select [View]-[View Option]-[Numberbit] on the menu.
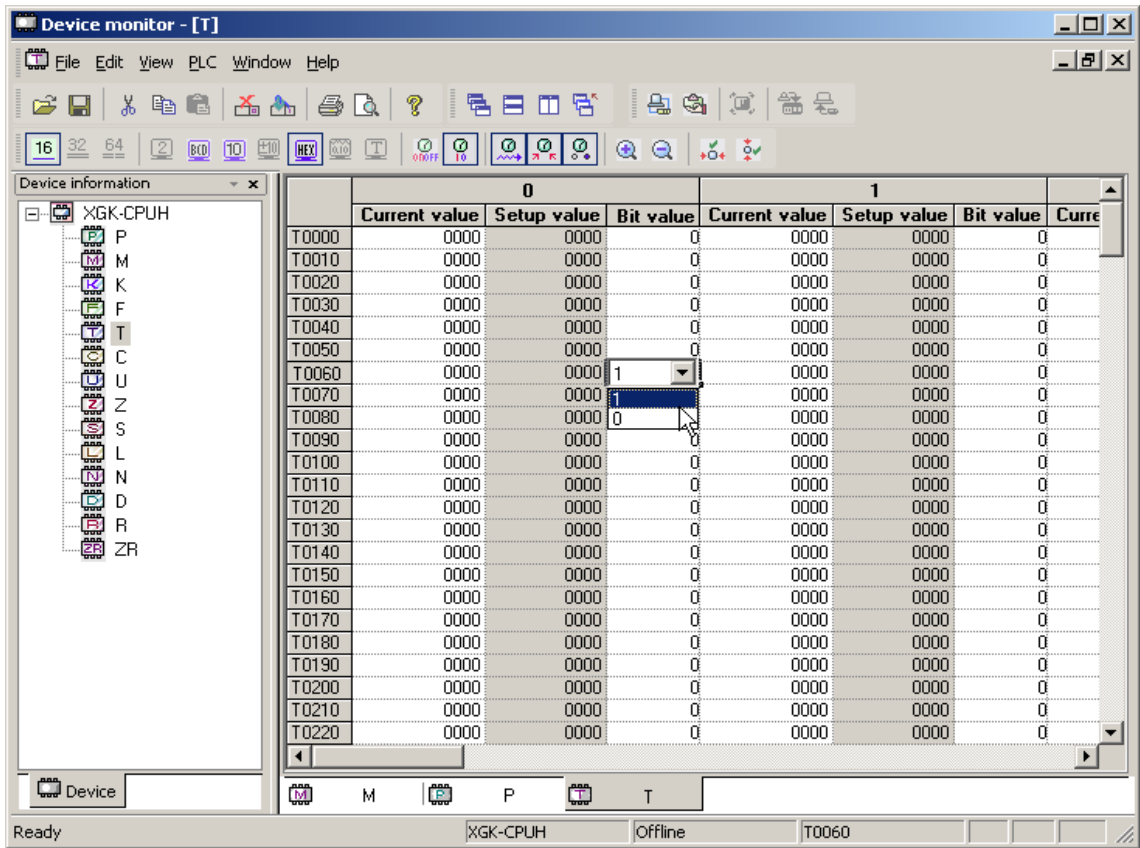
11.5.4 Edit Data

Data value shall be specified to write device data on PLC, or to write the selected area only on PLC.

1) Edit Cell

It is used to edit data on the cell.

[Sequence]

1. Use the mouse or keyboard to select an optional cell.
2. Input data into the selected cell.

2) Cut

It is used to delete the data of the selected area to save it in the clipboard.

[Sequence]

1. Select the area to cut.

2. Select [Edit]-[Cut] on the menu.

3) Copy

It is used to copy the data of the selected area to save it in the clipboard.

[Sequence]

1. Select the area to copy.

2. Select [Edit]-[Copy] on the menu.

4) Delete

It is used to delete the data of the selected area.

[Sequence]

1. Select the area to delete.

2. Select [Edit]-[Delete] on the menu.

5) Paste

It is used to paste the data saved in the clipboard on a selected location.

[Sequence]

1. Select the area to paste.

2. Select [Edit]-[Paste] on the menu.

6) Fill

It is used to fill the selected data.

[Sequence]

1. Use the mouse to select the cell area to fill automatically.

2. Position the mouse at the end of the cell to make the mouse cursor shaped "+" .

3. Move the mouse with its left button pressed upward and downward.

4. Release the left button of the mouse.

11.5.5 Save Device

There are 3 methods available to save the device.

1) Save All Device Areas

[Sequence]

1. Select [File]-[Save] on the menu.

2. Select [File]-[Save As] on the menu to save the data as a different name.

－ File extension will be set as (.mem).
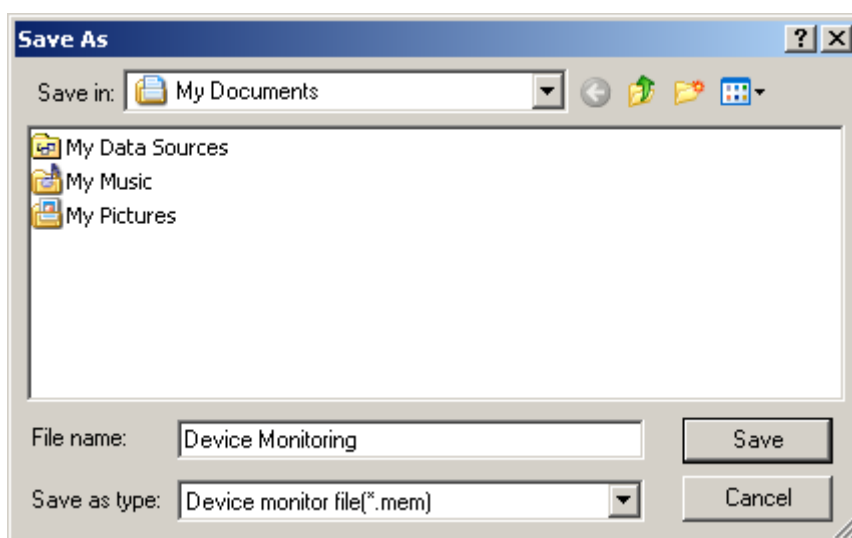
2) Save Respective Device Area

[Sequence]

1. Select [File]-[Device to File] on the menu.

－ File extension will be set as (device+m). (Ex. pm, mm, lm,…)
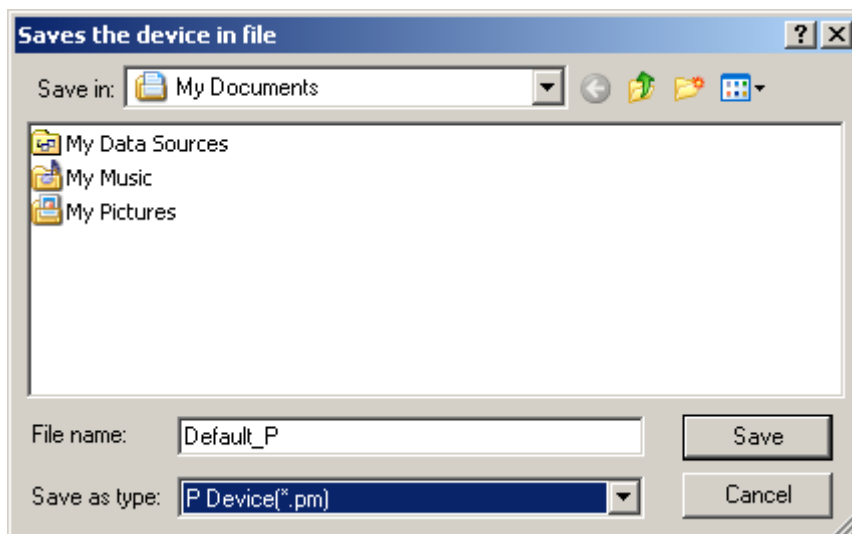
3) Save Respective Device Area if all windows closed

[Sequence]

1. Select [File]-[Save Device to File] on the menu.

2. Select the device to save from the combo box.

– File extension will be set as (device+m). (Ex. pm, mm, lm,…)
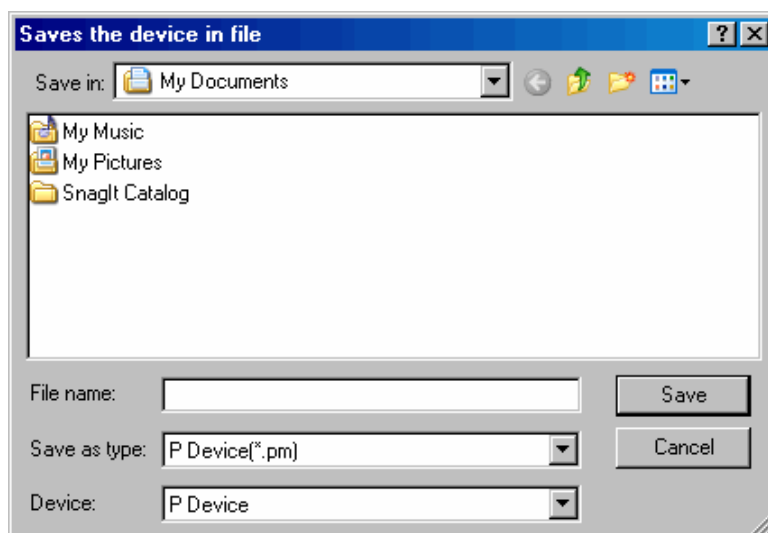
11.5.6 Open Device

There are 3 methods available to open the device.

1) Open All Device Areas

[Sequence]

1. Select [File]-[Open] on the menu.
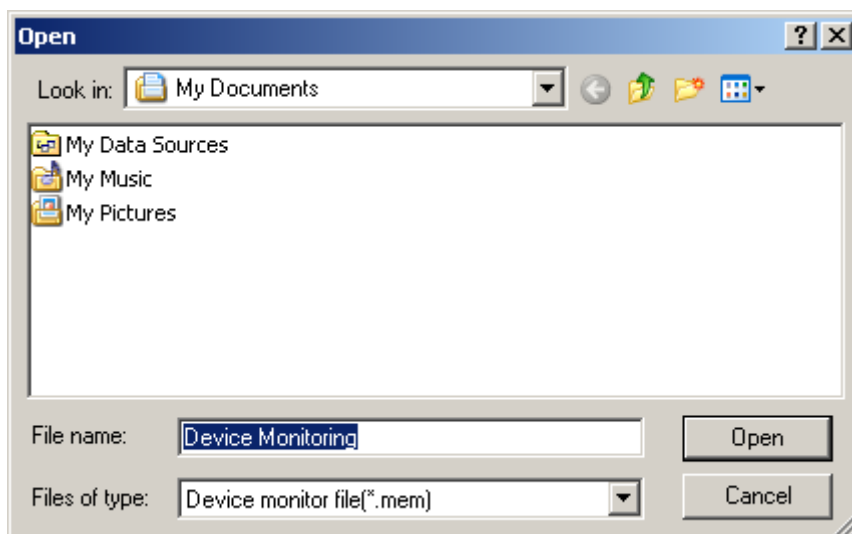
2) Import Device from File

[Sequence]

1. Select [File]-[Import Device from File] on the menu.
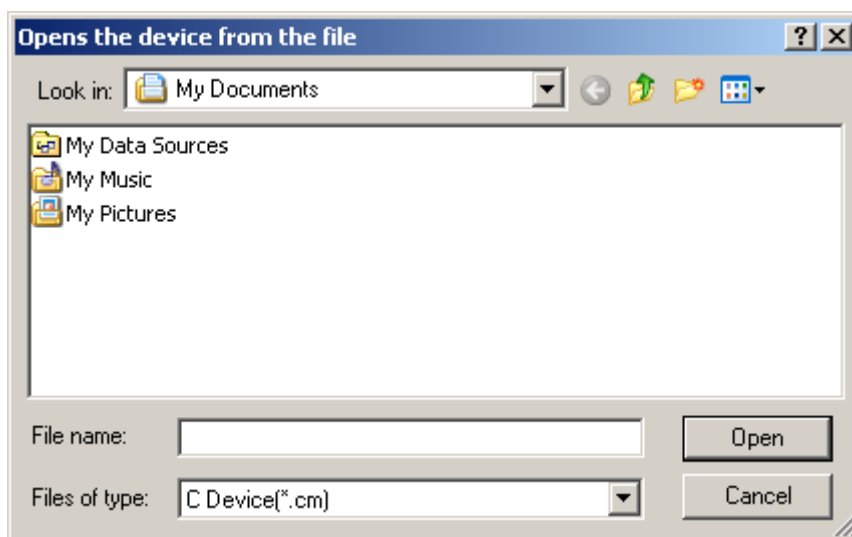
3) Open Respective Device Area if all windows closed

[Sequence]

1. Select [File]-[Import Device from File] on the menu.

2. Select the device to open from the combo box.
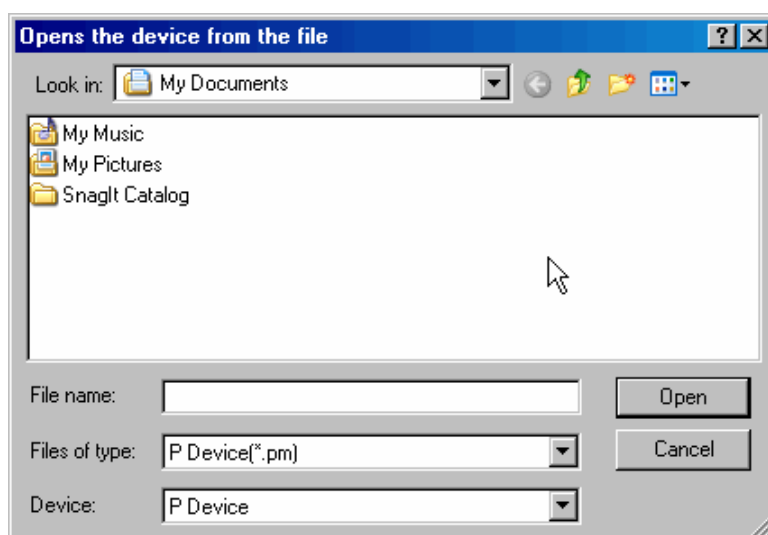
Notes

- If in monitoring mode, Open and Open Device from File are inactive.

11.5.7 Data Value Setting

Data value of the device can be specified according to its display type and the number of bits. In addition, setting area of the data value can be selected.

[Sequence]

1. Select [Edit]-[Fill Data Area] on the menu.
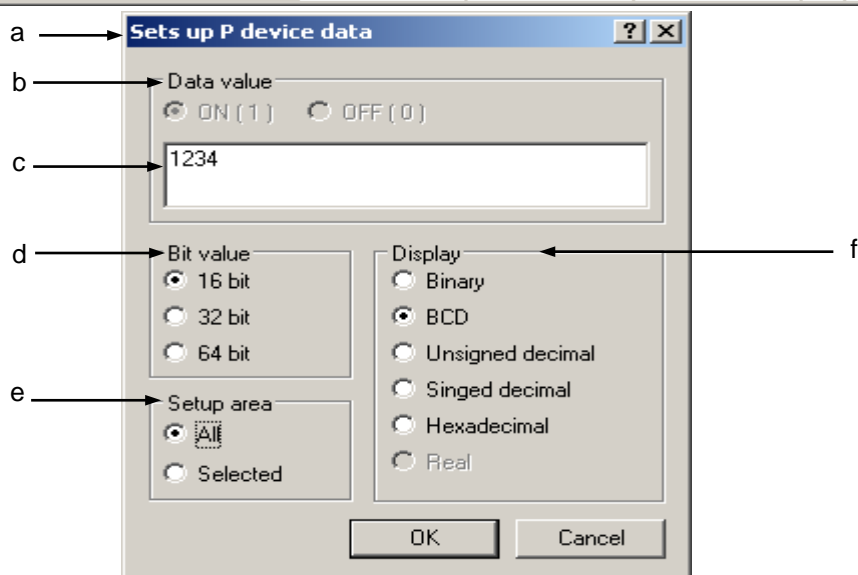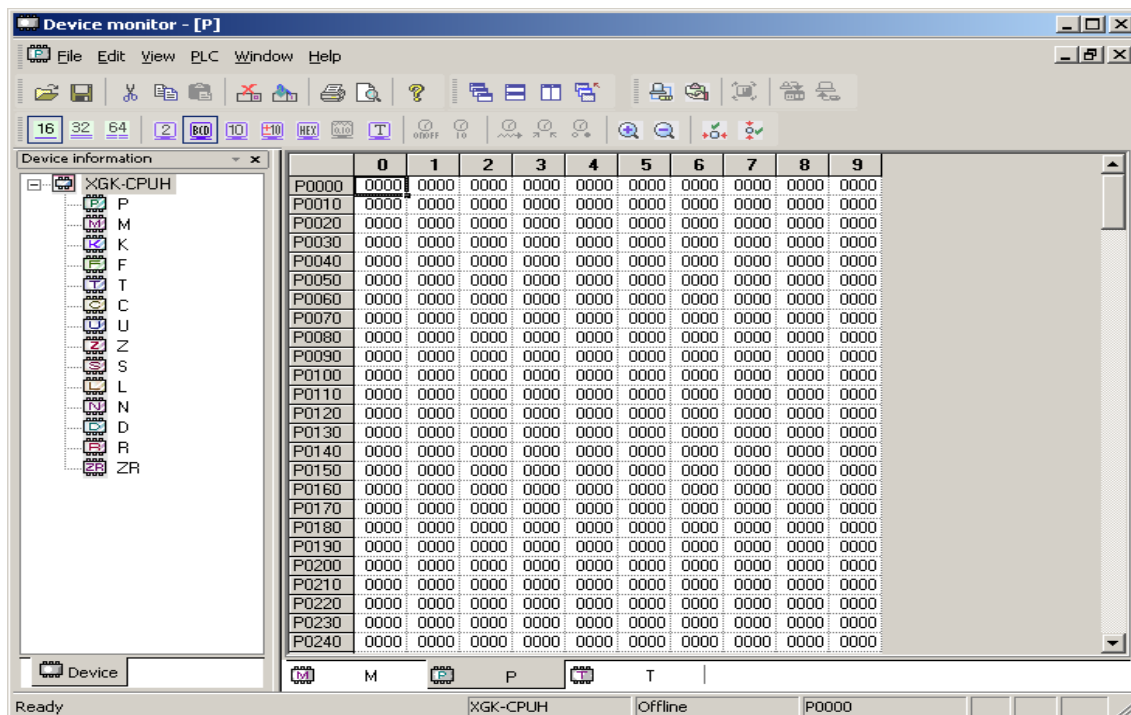
[Description of Dialog Box]

a. Title bar: used to display the device to set its data value.

b. Data value: used to input and display the data compatible with the number of bits and the display format.

c. Bit value: used to set the bit value in T and C devices.

d. Number value: used to decide the size of data.

e. Setup area: used to decide the range the data value is applied to in the device.

f. Display: used to decide the input format of data and change the format of the data value according to changed value display if any data value is available.

Notes

- Device name is displayed on the title to call dialog box of Setting Data Value.

11.5.8 Clear Data

It is used to delete all data value of the device.

[Sequence]

1. Select [Edit]-[Clear Data] on the menu.

2. A message will be called to ask if you want to delete the whole device areas.
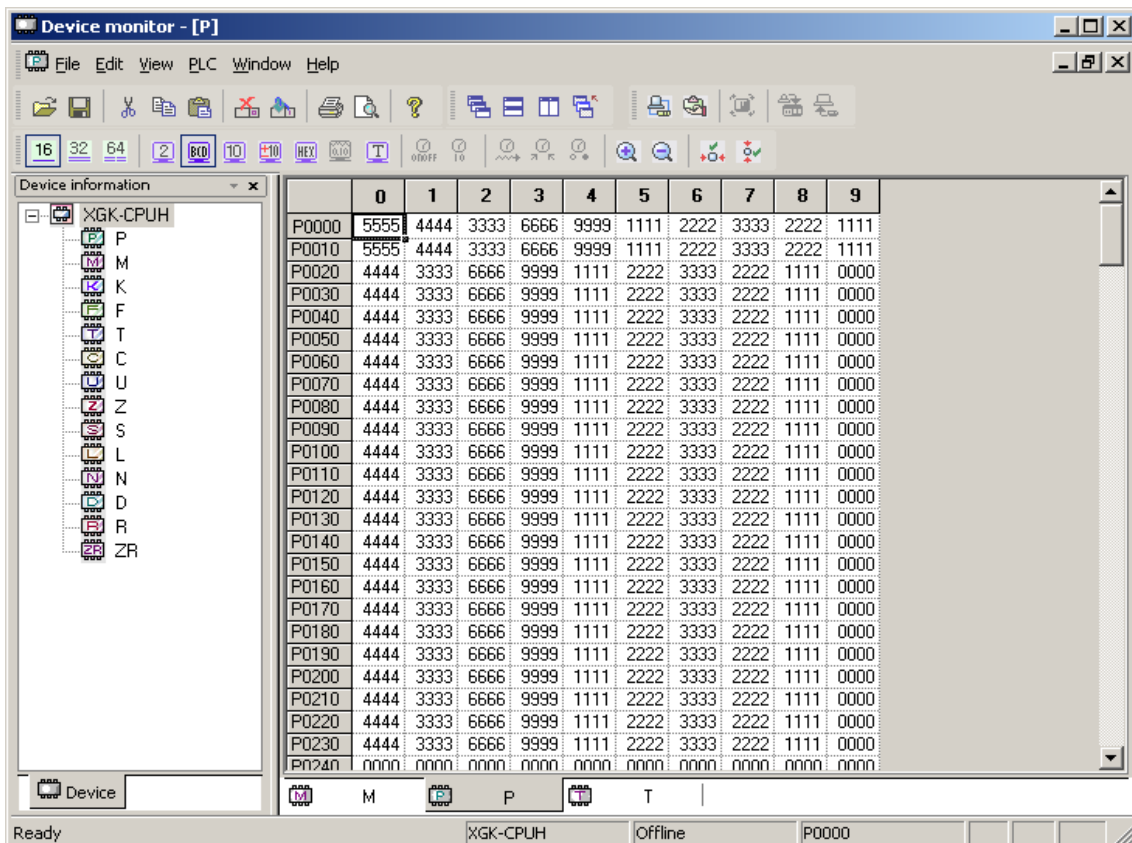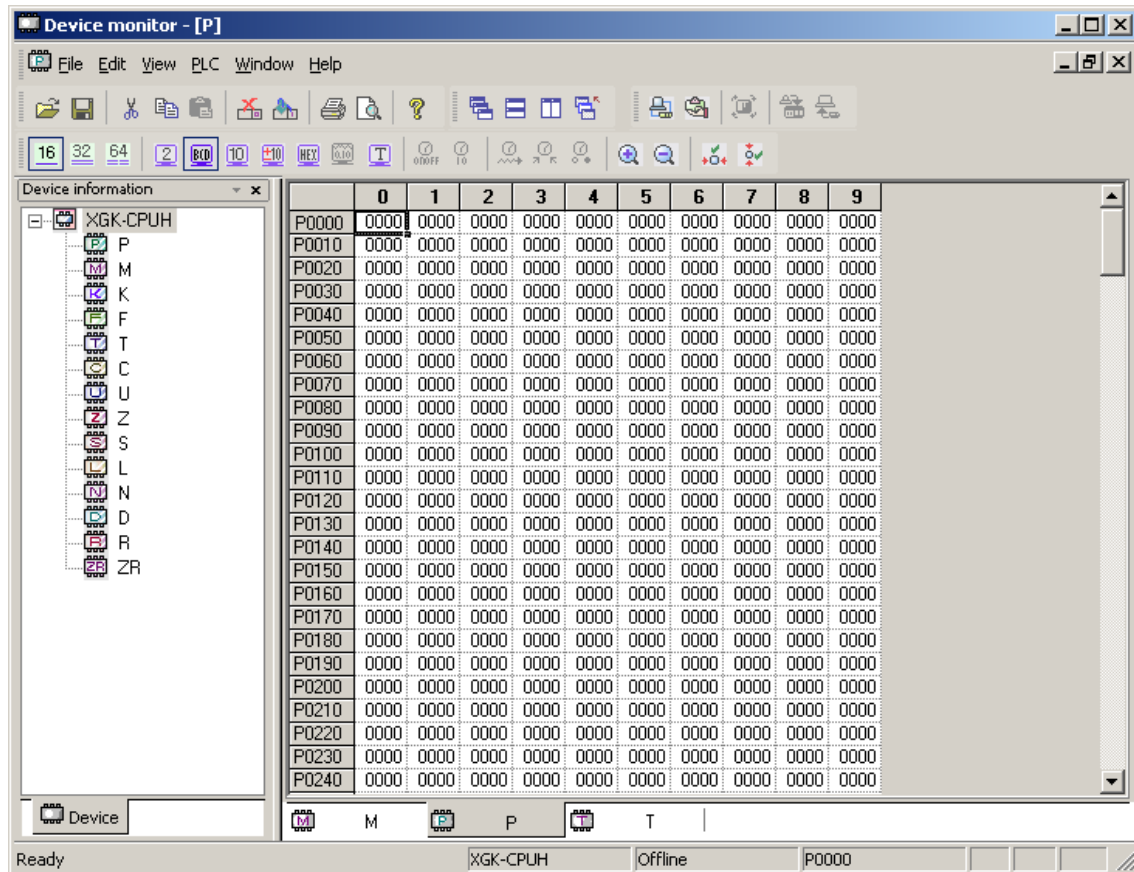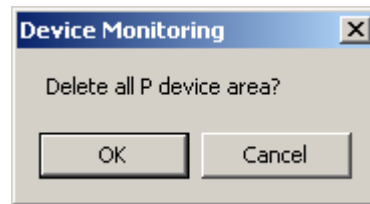
11.5.9 Write to PLC

It is used to transfer the device data saved in on-line computer to PLC.

[Sequence]

1. Ensure PLC is connected and the monitoring mode is inactive.
2. Select [PLC]-[Write to PLC] on the menu.
3. Select the device to write on Write dialog box of PLC.
4. Click OK to write the selected device on PLC.

[Dialog Box]
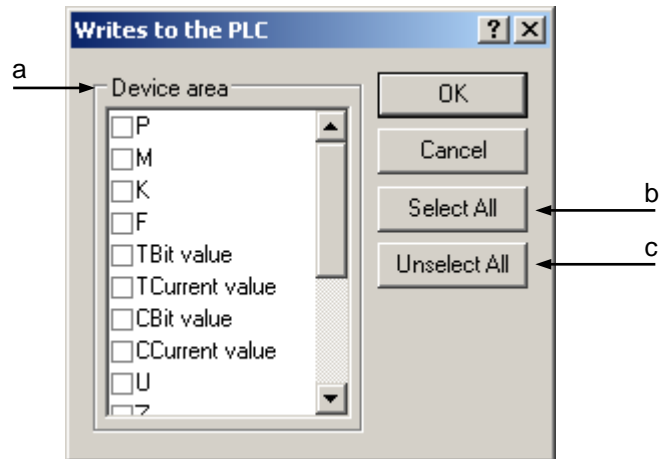
[Description of Dialog Box]

a. Device Area: used to display the list of the devices to write on PLC.

b. Select All: used to select all the devices to write on PLC.

c. Unselect All: used to cancel all the devices selected to write on PLC.

Notes

－ Since the setting value of T & C devices is available only for Read, it can not be written on PLC.

－ F device's exclusive Read areas can not be written on PLC. Exclusive Read areas are based on the type of CPU.

11.5.10 Read from PLC

It is used to read the device data saved in PLC to on-line computer.

[Sequence]

1. Ensure PLC is connected and the monitoring mode is inactive.

2. Select [PLC]-[Read from PLC] on the menu.

3. Select the device to read from Read dialog box of PLC.

4. Click OK to read the selected device from PLC.

[Dialog Box]
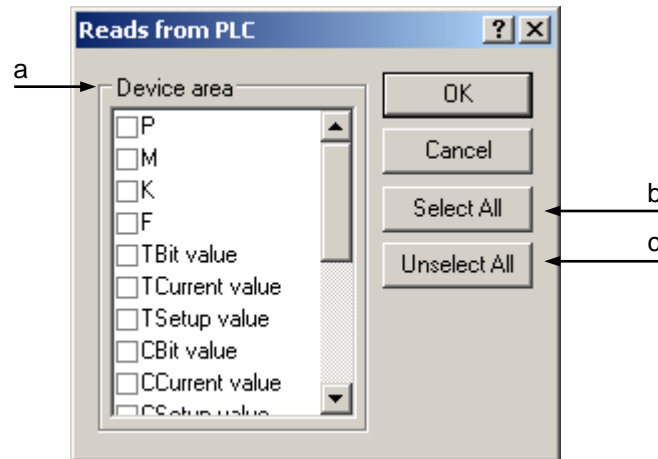
[Description of Dialog Box]

a. Device Area: used to display the list of the devices to read from PLC.

b. Select All: used to select all the devices to read from PLC.

c. Unselect All: used to cancel all the devices selected to read from PLC.

11.5.11 Write Selected Area on PLC

It is used to write the device data in the selected area on PLC connected.

[Sequence]

1. Select the area to write on PLC.

2. Select [PLC]-[Write Selected Area to PLC] on the menu.

3. A message will be called to ask if you want to write the selected area on PLC.
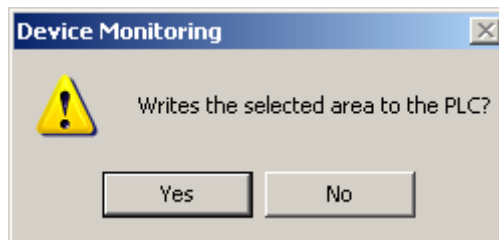
4. Write the selected area on PLC.

11.5.12 Start/Stop Monitoring

It reads the device data from PLC to display on the screen in the on-line status, or it stops reading the data.

1) Start Monitoring

It reads the device data from PLC to display on the screen in the on-line status.

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[Start Monitoring] on the menu.

2) Stop Monitoring

It stops reading the device data from PLC in the on-line status.

[Sequence]

1. Confirm the connection status with PLC.
2. Select [PLC]-[Stop Monitoring] on the menu.

Notes

‒ If in monitoring mode, the data can not be edited.

‒ If in monitoring mode, [Write to PLC], [Read from PLC], [Write Selected Area to PLC] are not available.

11.5.13 Change Current Value

It is used to change the data value of the cell in monitoring mode.

[Sequence]

1. Ensure PLC is connected and the monitoring mode is active.

2. Select [PLC]-[Change Current Value] on the menu.

3. Dialog box of Change Current Value will be called.

[Dialog Box]
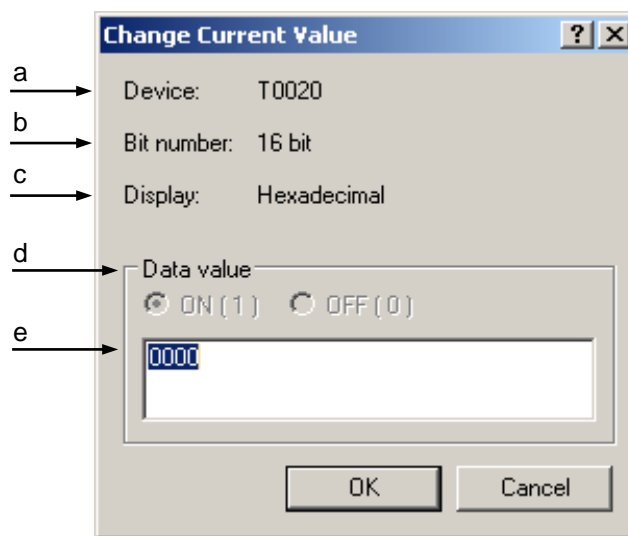
[Description of Dialog Box]

a. Device: used to display the start device to change the current value.

b. Bit number: used to display the number of bits to change the current value.

　– Usually it is identical to 16, 32 or 64 bits as displayed on the screen.

　– Bit value of T and C devices is 1 bit.

　– String format is displayed in 32*8 bits.

c. Display: used to display the data display format to change the current value.

d. Data value: used to display the data value to change the current value.

e. ⬜: used to specify the bit value of T and C devices.

Notes
– If the current value is changed in string display format, the data value of 32-byte area is changed always from the start device.

11.5.14 PLC Type Settings

It is used to display the PLC type presently set or to set device data based on the PLC type.

[Sequence]

1. Select [File]-[PLC Type Settings] on the menu.
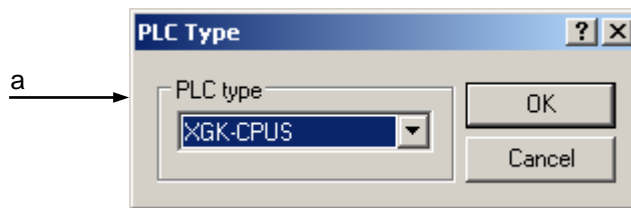
[Dialog Box]

[Description of Dialog Box]

a. PLC Type: used to display or change the PLC type presently set.

<div style="border:1px solid">

Notes

- While connected with PLC, the present PLC type can be displayed only, not changeable.

</div>

11.5.15 Screen Zoom-In/Zoom-Out

It is used to zoom in or out the size of the screen displayed.

1) Screen Zoom-In

It zooms in the screen.

[Sequence]

1. Select [View]-[Zoom-In] on the menu.

2) Screen Zoom-Out

It zooms out the screen.

[Sequence]

1. Select [View]-[Zoom-Out] on the menu.

11.5.16 Automatic Width/Height Adjustment

This function is used to adjust the size of the data values so to display on the screen.

1) Width AutoFit

It adjusts the size to the string length of the cell.

[Sequence]

1. Select [View]-[Width AutoFit] on the menu.

2) Automatic Height Adjustment

It adjusts the row height to the string height of the cell.

[Sequence]

1. Select [View]-[Height AutoFit] on the menu.

11.5.17 Properties

It is used to change the font and font size of the data value displayed on the screen. In addition, the color of the data value can be changed if in monitoring mode.

[Sequence]

1. Select [View]-[View Properties] on the menu.
2. Select [Font…] to change font
3. Select [Color…] to change color.
4. Click OK to apply the newly specified value.

[Dialog Box]
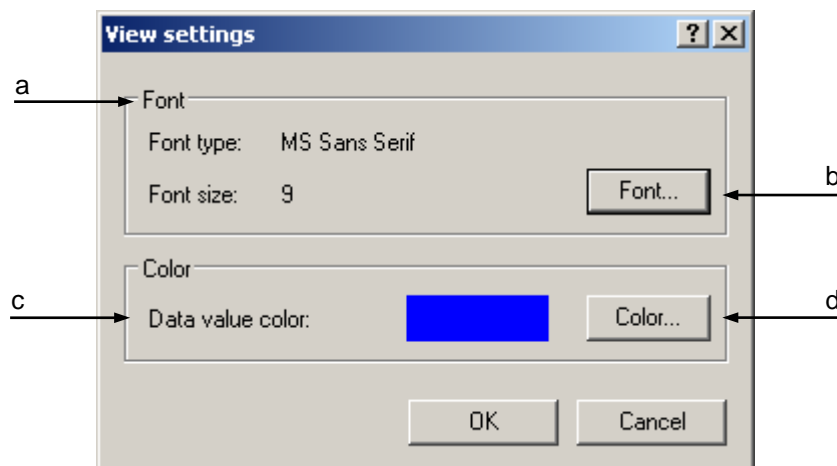
[Description of Dialog Box]

a. Font Type, Font size: shows presently displayed font name and font size.

b. Font: calls a dialog box to change font name and font size displayed on the screen.

c. Data value color: displays color of data value presently specified in monitoring mode.

d. Color: calls a dialog box to change color of data value in monitoring mode.

11.5.18 Page Setting

It is used to specify the device page printed.

Page margins, title and grid lines can be showed or hidden as necessary.

In addition, the sequence of pages to print can be specified with priority of row or column.

[Sequence]

1. Select [File]-[Page Setup] on the menu.

2. Specify margins.

3. Show or hide title and grid lines as necessary.

4. Specify the sequence of pages to print with priority of row or column.

5. Specify the print type of the center of page, horizontal or vertical.

11.6 Special Module Monitoring

LS ELECTRIC
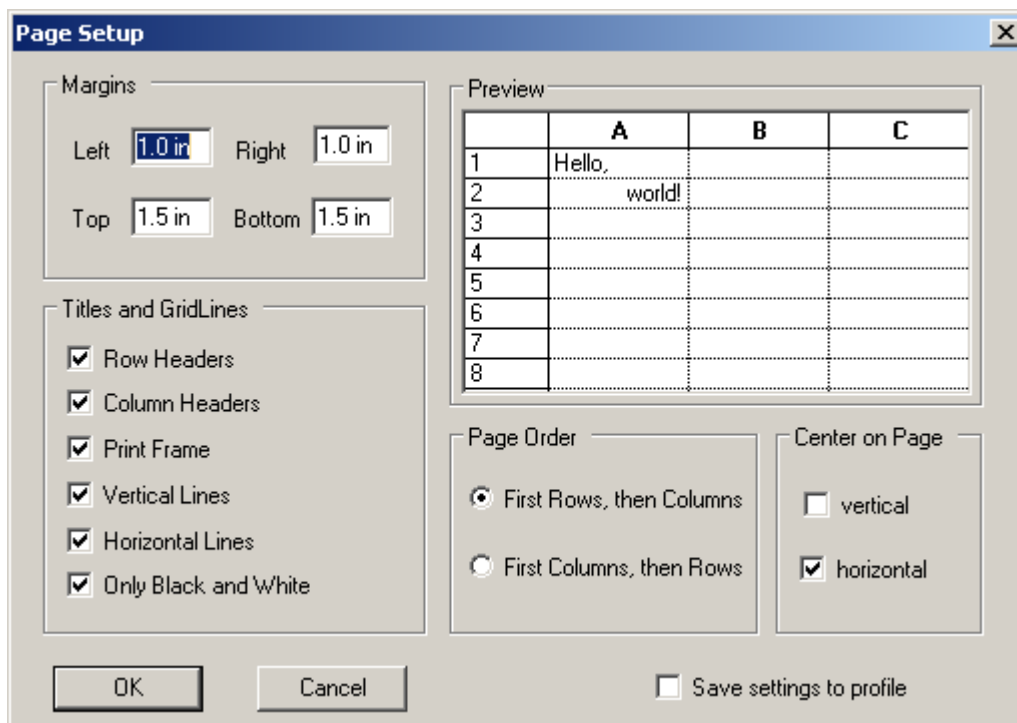
Select [Monitor]-[Special Module Monitoring] on the menu of XG5000 program to display "Special Module" list dialog box (as shown in Fig. 1). "Special Module List" dialog box displays the information list of the special module presently installed on the PLC system for the user to select a module on the list and then to click [Monitor] in order to show "Special Module Monitoring" dialog box (as shown in Fig. 2). Through the "Monitoring/Test" screen, the user can directly change the parameter value saved in the special module while checking the test operation and its status of the applicable module.

[Dialog Box]
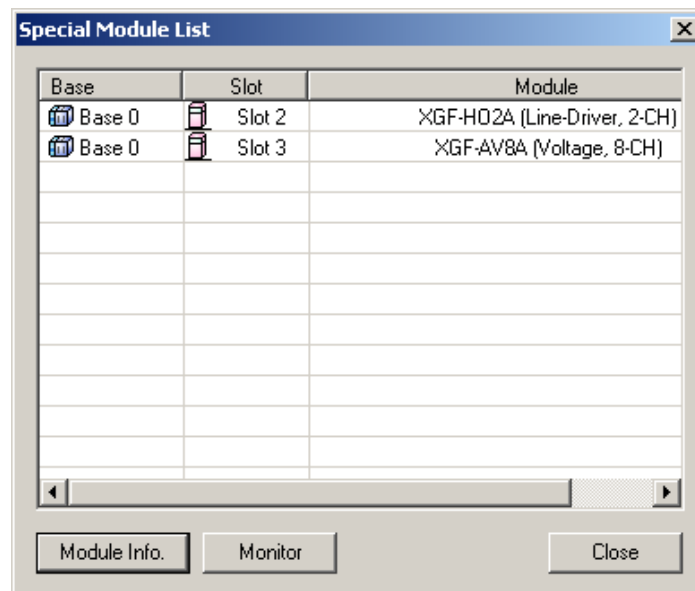
Fig. 1 Special Module Screen
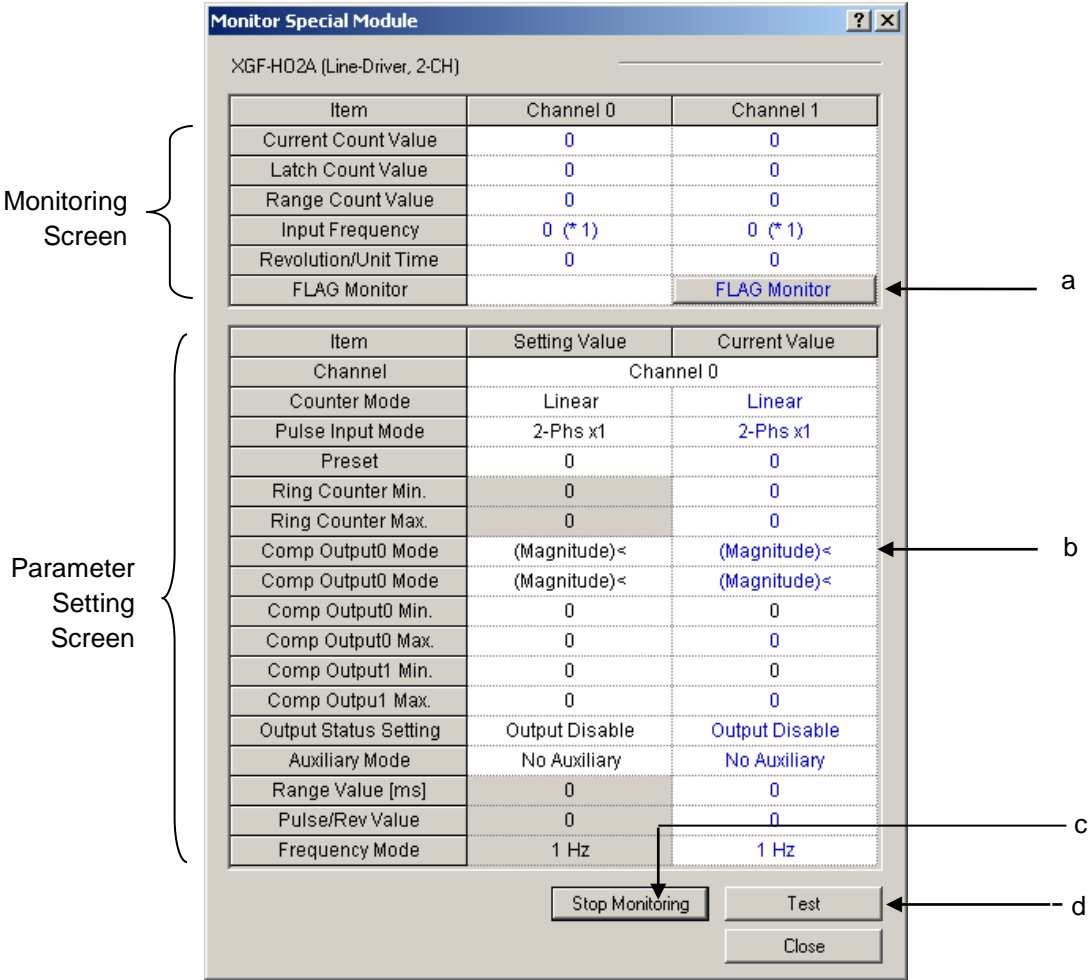
Fig. 2 Monitoring/Test Screen (High-speed Count Module)

HSC Module Flag & Command   ? ✕

XGF-HO2A (Line-Driver, 2-CH)

Item	Channel 0	Channel 1
Counter Status	Decrement	Decrement
External Preset Command Flag	OFF	OFF
CARRY Flag	OFF	OFF
BORROW Flag	OFF	OFF
Auxliary Function Flag	OFF	OFF
Comparator Output0 Output	OFF	OFF
Comparator Output1 Output	OFF	OFF

Screen for Contact Point Input Signal Status

e

Command	Channel 0	Channel 1
Counter Enable	OFF	OFF
Count Preset	OFF	OFF
Decremental Counter	OFF	OFF
Auxiliary Function Enable	OFF	OFF
Comparison Function Enable	OFF	OFF
Ext. Comparator Output Enable	OFF	OFF
Comp-Output0 EQUAL Reset	OFF	OFF
Comp-Output1 EQUAL Reset	OFF	OFF
CARRY/BORROW Reset	OFF	OFF
External Preset Input Selection	OFF	OFF
Aux-Func Ext. Input Selection	OFF	OFF
Ext. Preset Detect Flag Reset	OFF	OFF

Instruction Screen

f

Cancel

Fig. 2 Monitoring & Instruction Screen of HS Counter Module FLAG

[Description of Dialog Box]

a. FLAG Monitor(applicable only to HS counter module): Flag monitoring function is used to execute instructions for HS counter module. The user can check the instruction and input signal status along with HS counter monitoring/test screen as well as Flag monitoring screen (refer to Fig. 2) displayed at the same time.

b. Parameter Setting Screen: Parameter setting screen is divided into parameter changing area (setting value) and confirming area (current value) that the changed parameter is successfully transferred to the module during monitoring.

c. Start Monitoring: Click [Start Monitoring] button to start monitoring being displayed on the screen. Click the button once more to stop monitoring.

d. Test: After changing the parameter at the bottom of the Monitoring/Test screen, click [Test Start] button to start to test the operation of applicable special module, which will directly transfer the parameter information to the module so to display its result on the monitoring screen for the user to confirm.

e. Confirm Contact Point Input Signal Status: The user can confirm HS counter status of input contact point signal (ON/OFF) through the upper of the Flag monitoring screen.

f. Instruction Screen: The user can execute the instruction for HS counter operation and additional functions at the bottom of the Flag monitoring screen. If the instruction is correctly executed, the status of the applicable instruction will be displayed in ON/OFF on the button.

Notes

－ HS counter Flag monitoring and instruction functions are available with HS counter module selected by the user on the special module screen.

11.7 Trend Monitoring

Trend monitoring is used to read the data periodically from PLC connected so to display in a graph. The trend monitoring window is composed of bit graph and trend graph. In the bit graph, bit device's On/Off status is displayed in stair-shaped graph. And in the trend graph, the variation trend of the data is displayed with the device value converted from word to data format specified.

11.7.1 Example.

The current value of a counter, C0000, whose data increase by 1 every seconds and limited to 10, will be displayed with trend graph.

[Steps]

1. Make a program as follows.
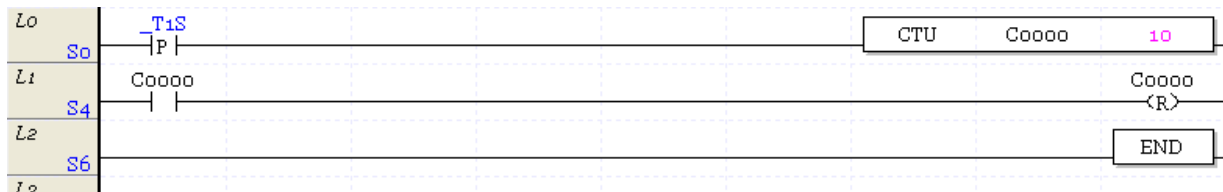
2. Write the program to the PLC ans change the mode RUN.
3. Select [Monitor]-[Trend Monitoring] on the menu to display the trend monitor window.

4.Select [Graph]-[Graph Settings].

5. Select 'Graph Setup' tab on the monitor setup dialog box and input C0000 for Device.
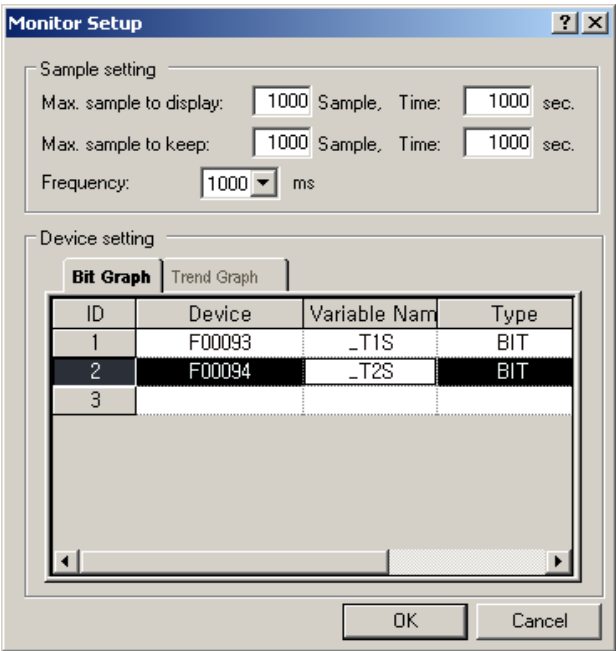
6.Click 'OK' button and close the dialog box. The device C0000 is registered in the trend graph.
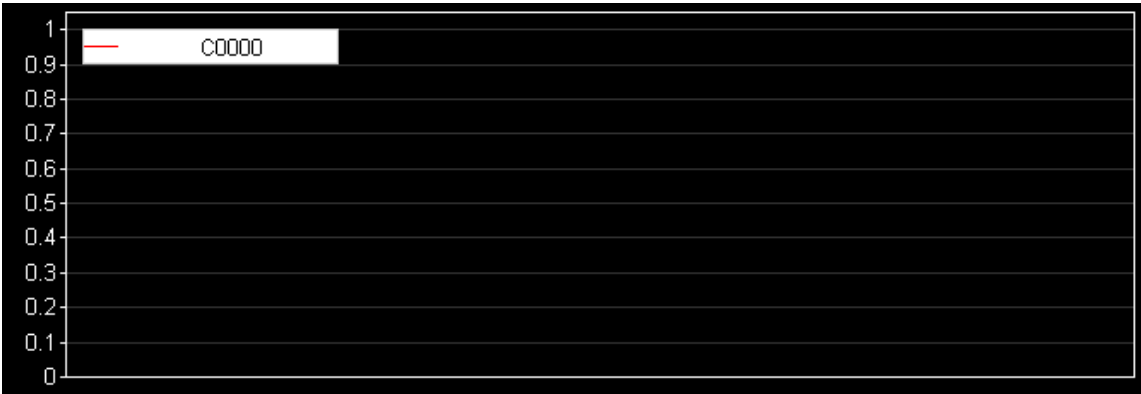
7. Uncheck 'View Bit Graph' on the [View]-[Bit Graph] menu. Since the trend graph only will be displayed.
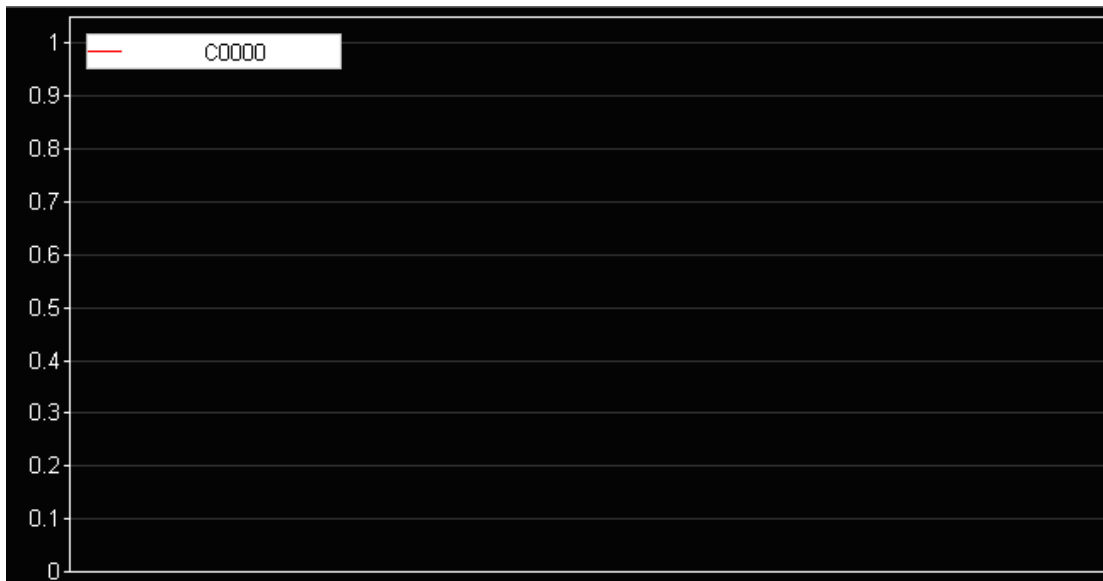
8. Click [Monitor]-[Start/Stop Monitoring] and the monitoring will be started. The current value of counter, C0000, will be displayed with trend graph.
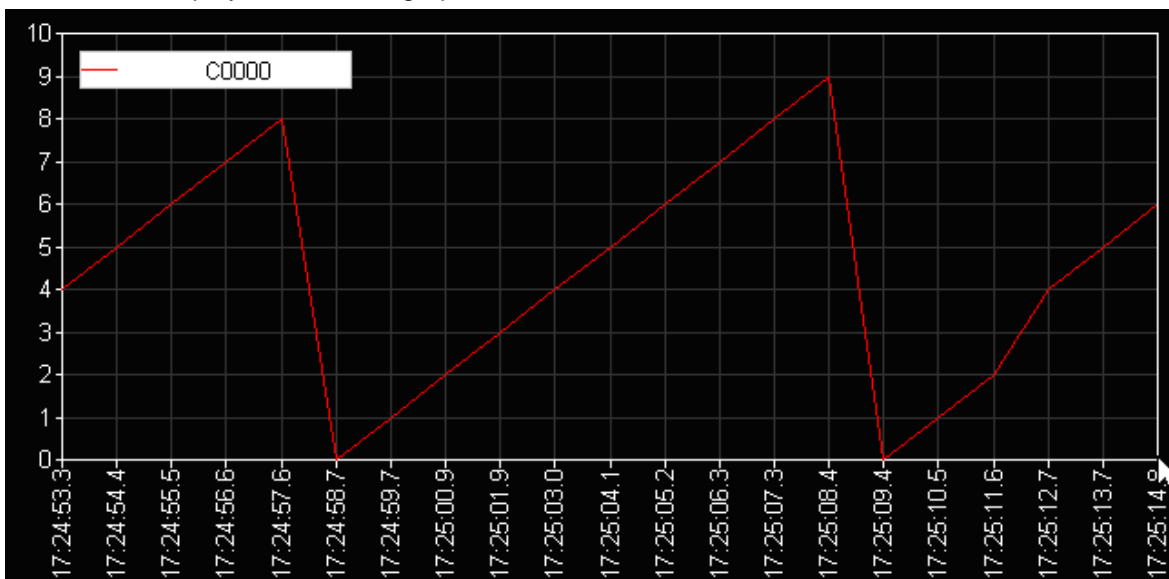
Notes

‑ The data to display on the trend monitoring may be different from the actual data. In order to monitor correct timing, use the data trace function.

‑ Refer to 11.8 for details on the data trace function.

11.7.2 Setting Trend Monitoring

[Sequence]

1. Select [Graph]-[Graph Settings] on the menu.
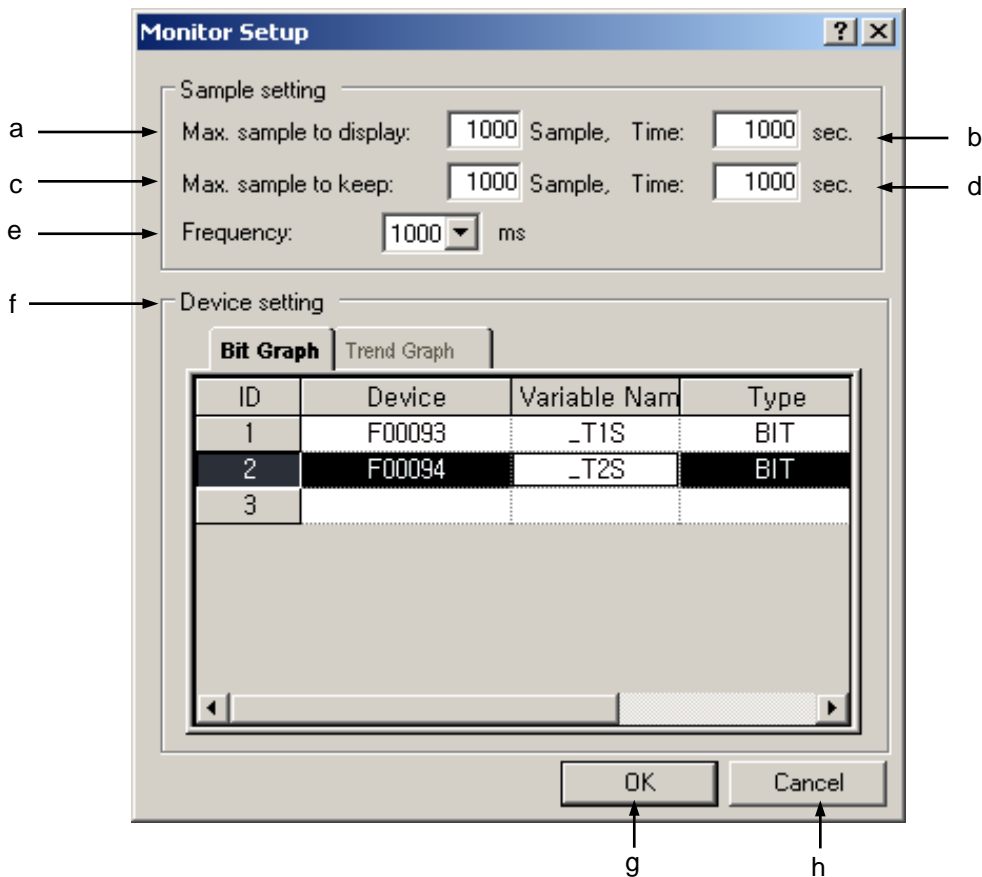
[Dialog Box]

[Description of Dialog Box]

a. Max. sample to display: displays the maximum number of samples available to scroll in the graph.

b. Time: displays the maximum number of samples available for a second.

c. Max. sample to keep: displays the maximum number of samples available to save on the file.

d. Time: displays the maximum number of samples available to keep for a second.

Notes

‑ The 'Max. samples to display' can not be greater than the 'Max. sample to keep'.

‑ The 'Max. time to display' can not be greater than the 'Max. time to keep'.

‑ The relationship between the Max. samples to keep and the Max. sample to displayed is as shown below. In the figure below, 'Graph' is of a graph area presently displayed on the screen, which is available to scroll horizontally as many as the max. samples displayed.
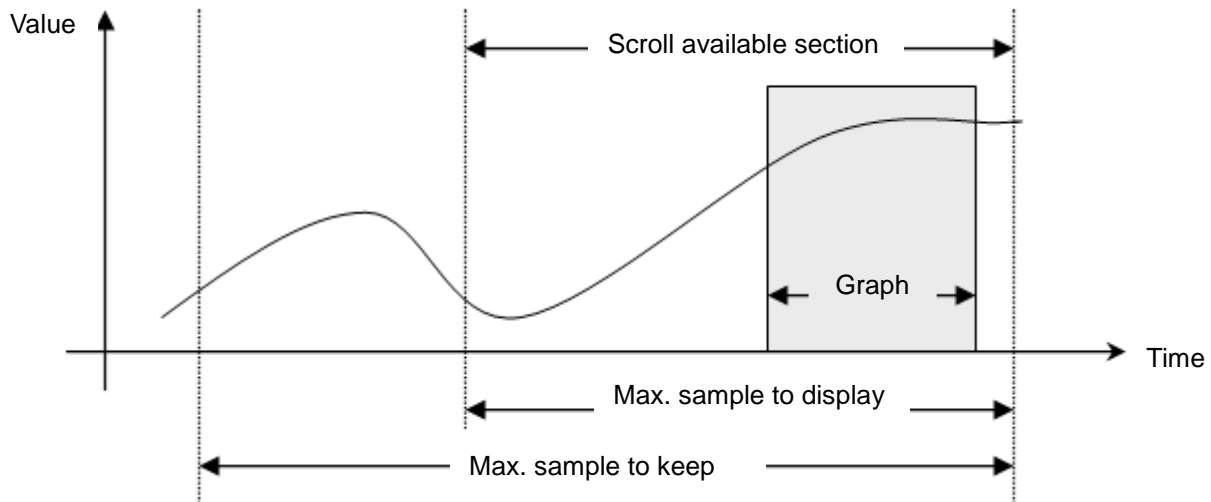
‑ The Max. samples to keep means the max. number of samples available to save on the file. Refer to the section of 11.7.5 '8) Text'.

e. Frequency: used to specify the cycle to read data from PLC. The shorter the cycle is, the more correct the data is, which may have an influence on PLC scan and PC performance, though.

f. Device Setting: used to designate the device to monitor. The device can be displayed in bit or in real as specified.

g. OK: applies the changed items and closes the dialog box.

h. Cancel: closes the dialog box.

1) Setting Bit Device

It is used to input the bit device to monitor.

[Sequence]

1. Select the bit graph tap on the Setting Monitoring dialog box.

2. Input the device of bit type. Or double-click the variable column to select the declared device on the Variable/Comment dialog box.

Notes

- Up to 8 bit devices are available to register.

2) Setting Trend Device

It is used to input the trend device to monitor.

[Sequence]

1. Select the trend graph tap on the Setting Monitoring dialog box.
2. Input the device of word type. Or double-click the variable column to select the declared device on the Variable/Comment dialog box.
3. Click the type column to select the data type.

Notes

- Up to 12 trend devices are available to register.
- Supported data types are as follows;

Type	Size	Type	Size
BIT	1 bit	REAL	4 bytes
NIBBLE	4 bits	LREAL	8 bytes
BYTE	1 byte	INT	2 bytes
WORD	2 bytes	DINT	4 bytes
DWORD	4 bytes	LINT	8 bytes
LWORD	8 bytes		

11.7.3 Setting graph

[Sequence]

1. Select [Graph]-[Graph Settings] on the menu.
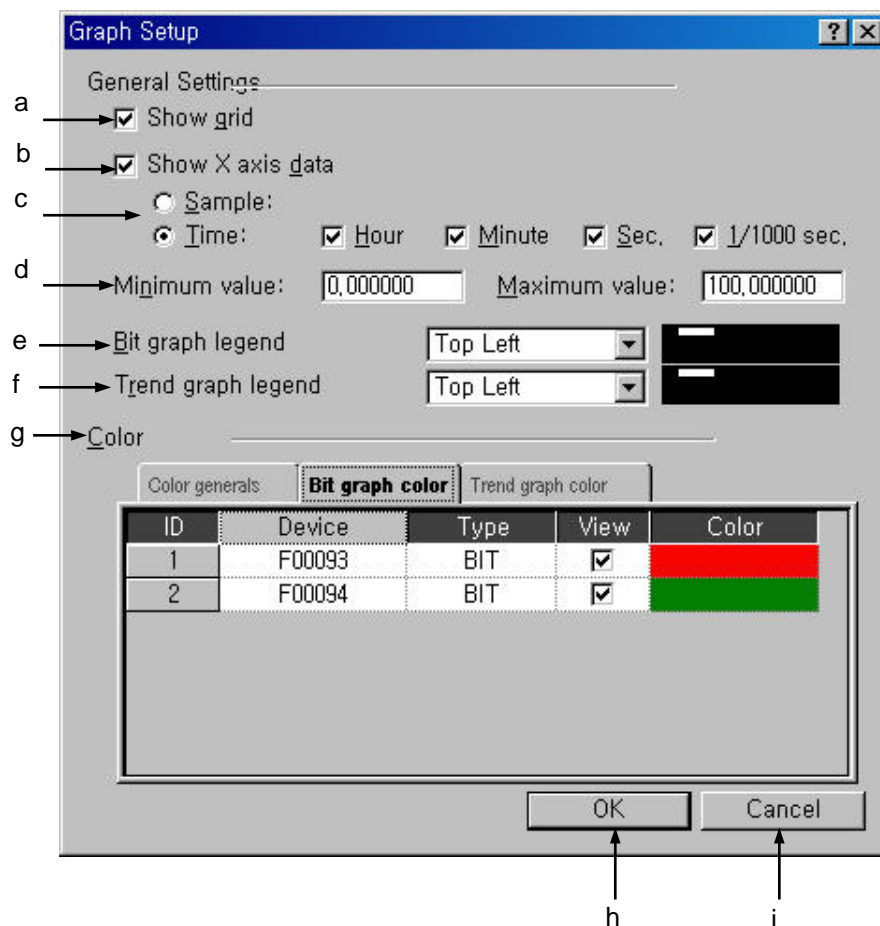
[Dialog Box]

[Description of Dialog Box]

a. Show grid: used to decide to show XY grid or not on the screen.

b. Show X-axis data: used to decide to show X-axis data or not.

c. Show X-axis data: used to specify the display method of X-axis data.

d. Minimum value/Maximum value: used to set the max./min. range of the graph.

Notes

- The max./min. value is applied only to Y-axis of the trend graph, and not applied if View Present Y-axis is automatically adjusted.
- The min. value input can not be greater than the max. value.
- The actual data's max./min. value range and specified graph's max./min. value range are as shown below. Only the range in gray will be displayed in the graph.

Value :

Maximum data value

Maximum value (set)

Minimum value (set)

Minimum data value

Graph display range

Time
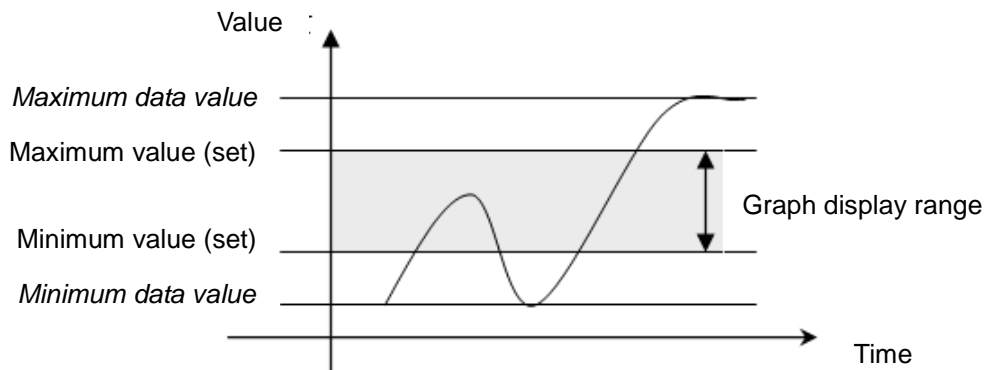
e. Bit graph legend: used to specify the position of bit graph index. No Index, Left Upper, Right Upper, Left Bottom and Right Bottom are available for the Bit Index Position.

f. Trend graph legend: used to specify the position of trend graph index. No Index, Left Upper, Right Upper, Left Bottom and Right Bottom are available for the Trend Index Position.

g. Color: used to specify device color of each graph.

Notes
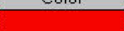
- If View Check Box is cancelled in Setting Color, its applicable device will not be displayed in the graph.

h. OK: applies the changed items and closes the dialog box.

i. Cancel: closes the dialog box.

1) Graph Color Settings

[Sequence]

1. Select the device to change its graph color.
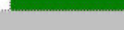
2. Click the color column to display applicable dialog box. On the dialog box, select desired color and then click [OK] button.
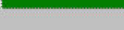
2) View Graph Option Settings

[Sequence]

1. Select the device to change its Graph Option.

1. Select or cancel the Check Box of View Column.

11.7.4 Setting Graph Window

It is used to decide to change View Graph Option and display the data value as necessary.

[Sequence]
1. Select [Graph]-[Graph Settings] on the menu.
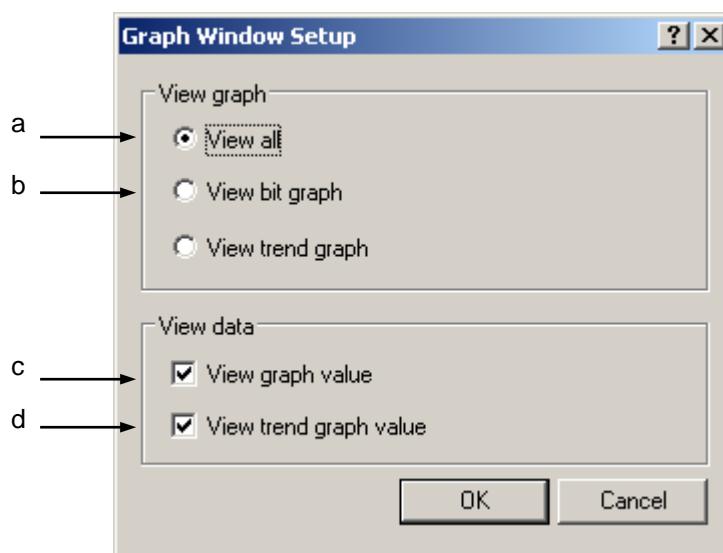
[Dialog Box]

[Description of Dialog Box]
a. View all: displays all the bit and trend graphs.
b. View bit graph: displays only the bit graph.
c. View bit graph value: displays only the bit graph value.
d. View trend graph value: displays the trend graph value.

11.7.5 Graph function

1) View Cursor

It is used to display the data value the mouse is positioned on.

[Sequence]

1. Select [Graph]-[View Cursor] on the menu.

2. Click the left mouse button to select the graph. Whenever the mouse moves, the data value the cursor is positioned on will be displayed.
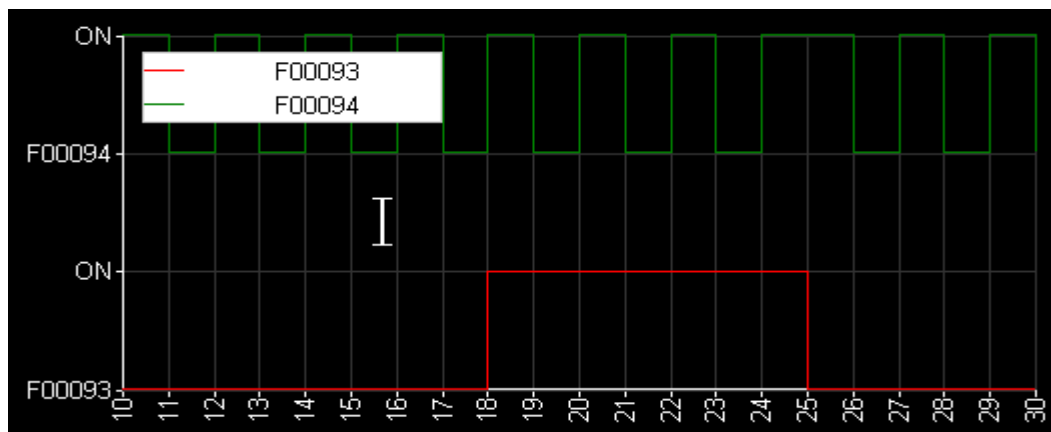
Notes
- View cursor function is only active in the state of Stop Monitoring/Pause Monitoring.

2) Scroll Synchronization

It is used to decide to synchronize the bit graph with the trend graph in time axis. It is useful in monitoring the bit graph and the trend graph data with the identical time.

[Sequence]

Select [Graph]-[Scroll Sync.] on the menu.

1. Move the horizontal scroll bar to scroll the bit graph and the trend graph at the same time based on Scroll Synchronization specified.
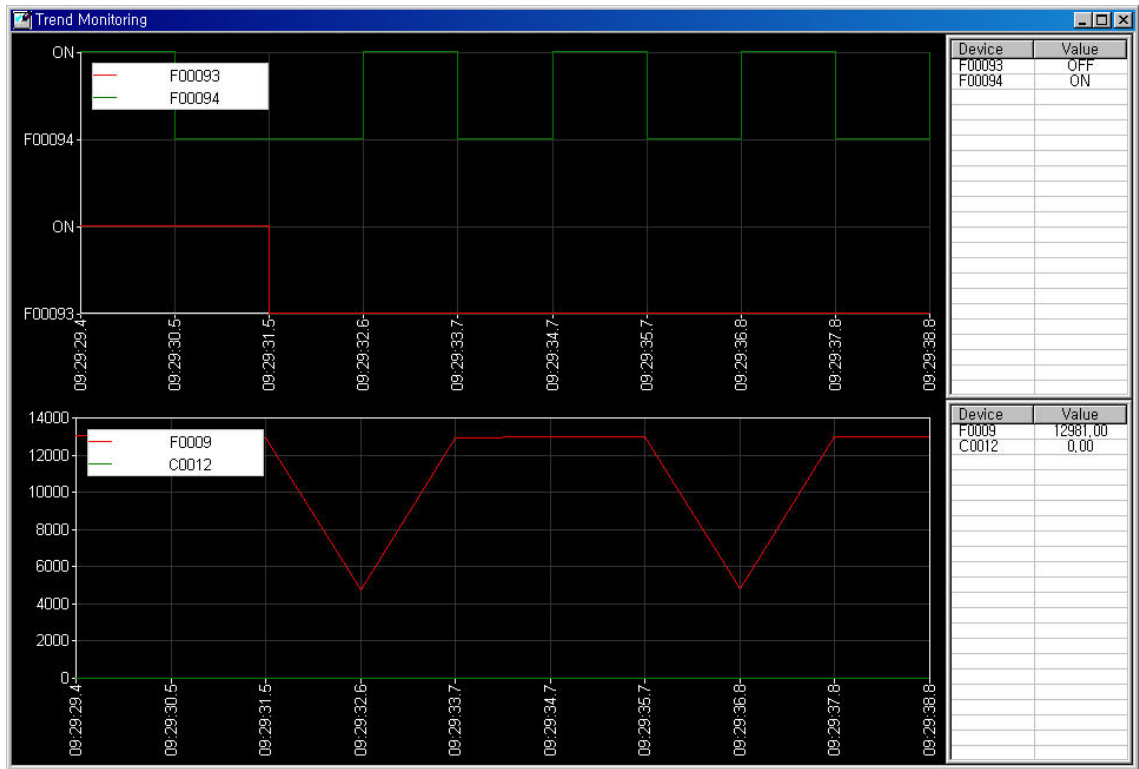
3) Adjust X-axis magnification

It is used to adjust X-axis magnification.

[Sequence]

1. Select [Graph]-[Zoom In X axis], [Zoom Out X axis], [Reset X-axis] on the menu. Based on the selected item, X-axis's time interval will be increased, decreased or back to basic value.
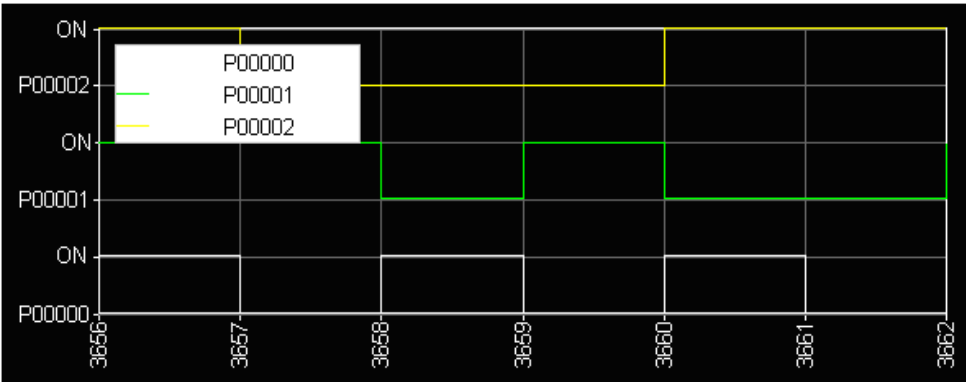
4) Adjust Y-axis magnification

It is used to adjust Y-axis magnification.

[Sequence]

1. Select [Graph]-[Zoom In Y axis], [Zoom Out Y axis], [Reset Y axis] on the menu. Based on the selected item, Y-axis's height will be increased, decreased or back to basic value.
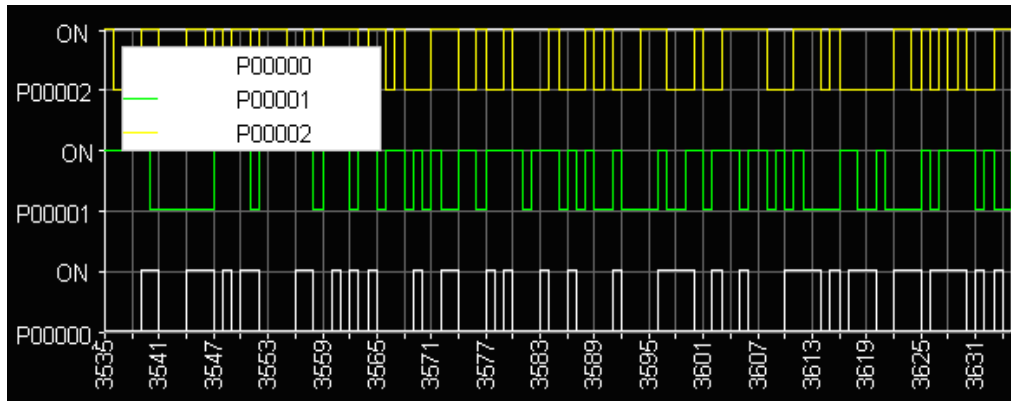
5) Adjust X-axis Automatically

It is used to decide to adjust X-axis automatically. If the automatic adjustment is set, the horizontal scroll bar will disappear and all the data can be seen at a glance.

[Sequence]

1. Select [Graph]-[X axis Autofit] on the menu.
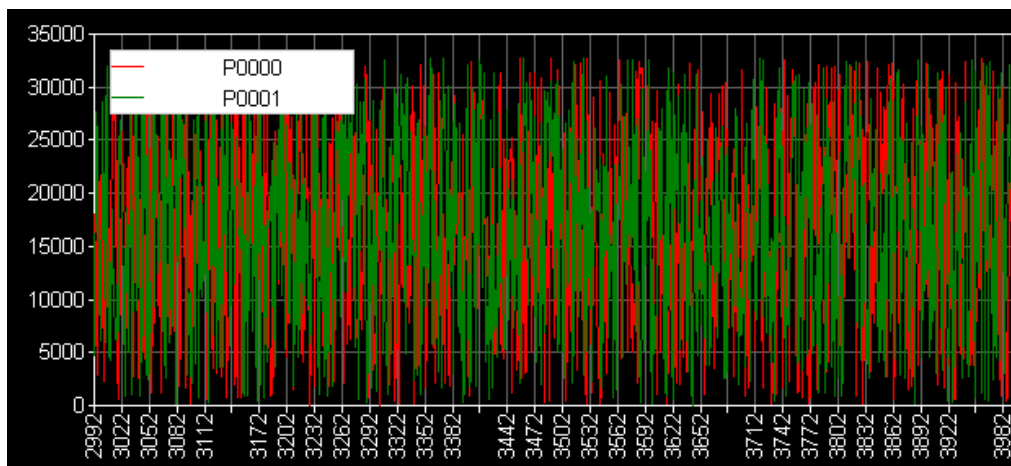
6) Adjust Y-axis Automatically

It is used to decide to adjust Y-axis automatically. The automatic adjustment of Y-axis is applicable only to the trend graph.

[Sequence]

1. Select [Graph]-[Adjust Y-axis Automatically] on the menu.

Notes

 - If the function of Y axis Autofit is not selected, the display will be based on the max./min. value specified in Graph Settings.

---

7) Save as Bitmap

It is used to save the graph presently displayed on the screen on the file in window bit map.

[Sequence]

1. Select [Graph]-[Save as Bitmap] on the menu.
2. Input a file name to save with and then click [OK].

8) Save as Text

It is used to save the graph data on the file in text. Samples as many as the max. samples kept specified in setting the max. graph will be saved.

[Sequence]

1. Select [Graph]-[Save as Text] on the menu.
2. Input a file name to save with and then click [OK].

Notes

 - The String file will be saved in CSV format of Excel.

---

9) Copy to Clipboard

It is used to copy the graph presently displayed on the screen onto the window clipboard.

[Sequence]

1. Select [Graph]-[Copy to Clipboard] on the menu.

Notes
- The data will not be displayed if 'Y axis auto scale' is setup and the variant of data is less than 2.2e-016. The graph will be displayed as figure below.
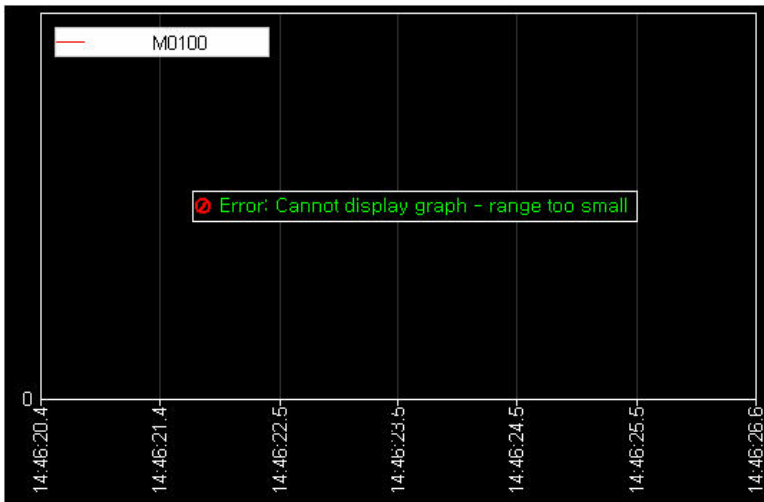
11.8 Data Traces

Trace Data is used to specify trace condition and device to trace in PLC so to collect the data complying with the specified condition from PLC. In XG5000, applicable data read from PLC will be displayed in a graph. While being similar to the trend monitoring described in 11.7, it can collect more correct data as read from PLC.

Trace Data operates as follows;

Sequence	Details
Ready	Confirm the connection with PLC and the Run status of PLC.
Setting Trace	Decide to allow trace or not, And specify trigger condition, sample properties and trace device. Refer to 11.8.3 for more details.
Write to PLC	Write trace setting items on PLC. Refer to 1) Write Trace Setting Items in 11.8. 5 for more details.
Start Trace	Start trace with specified trigger conditions automatically or with manual trace selected. Refer to 11.8.3 Setting Trace for detailed trigger setting, and 4) Start Manual Trace in 11.8.5 for detailed manual trace.
Read Data	Read trace data from PLC. Refer to 3) Read Trace in 11.8.5 for more details
Process Graph	Refer to 11.8.4 for more details.

[Sequence]
1. Select [Monitor]-[Data Traces] on the menu.

[Trace Data Window]
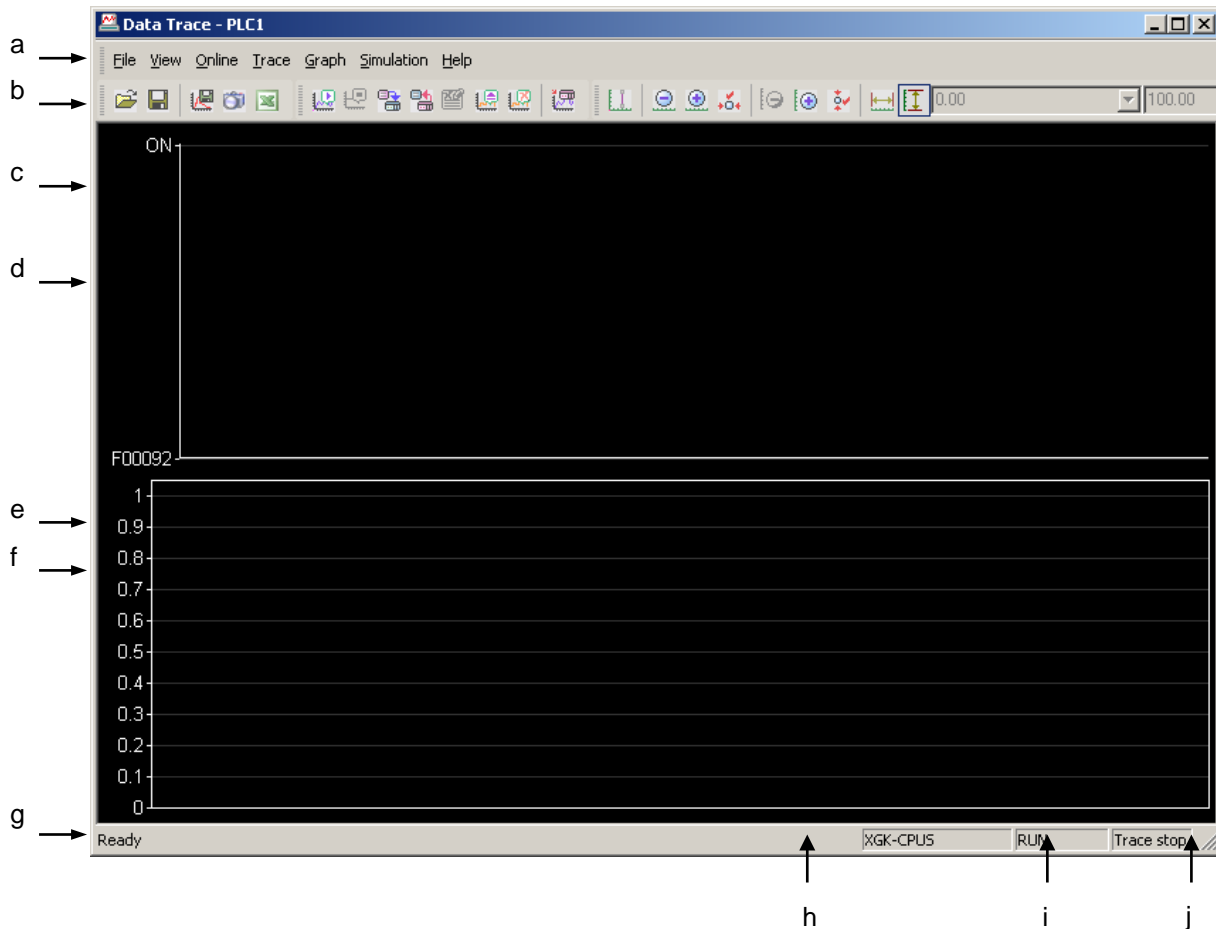
[Description of Window]

a. Menu: displays the data trace menu.

b. Tool Box: displays the tool box of the data trace.

c. Bit graph Index: displays bit device and graph color.

d. Bit graph: displays the data of bit device.

e. Word graph Index: displays word device and graph color.

f. Word graph: displays the data of word device.

g. Status bar: displays the status of data trace.

h. Progress bar: displays the progress status if data is read from PLC.

i. PLC status: displays off-line status and the operation status of PLC.

j. Trace status: displays the trace status of PLC.

11.8.1   Connect

[Sequence]

1. Select [Online]-[Connect] on the menu.

Notes
- Refer to 10.1 Connect Options in XG5000 manual for details on Connect Options.

11.8.2   Setting Trace

It is used to specify trace conditions and trace device.

[Sequence]
1. Select on the menu [Trace]-[Setting Trace].

[Dialog Box]
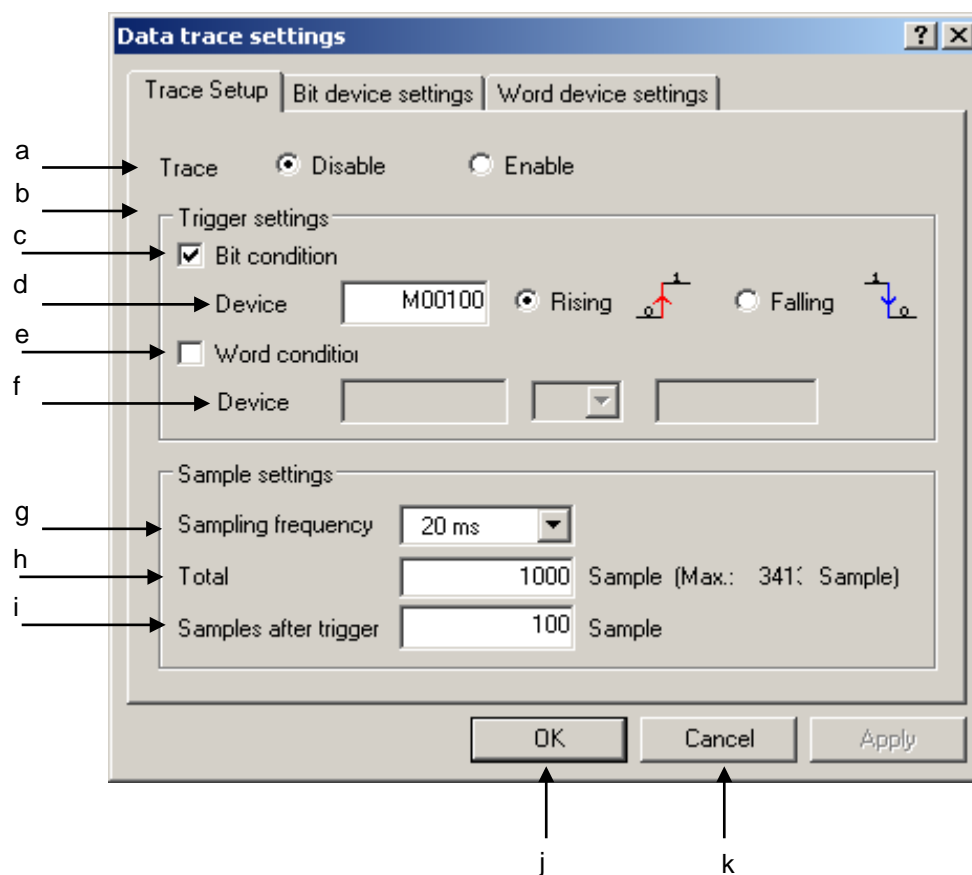
[Description of Dialog Box]

a. Trace: decides to allow the trace or not.

b. Trigger settings: specifies the condition for trace start. As a trigger condition bit condition or word condition can be selected.

c. Bit condition: decides to use bit trigger condition or not. As for bit trigger setting, refer to 1) Setting Bit Trigger item.

d. Device: specifies the device to monitor the bit trigger condition.

e. Word condition: decides to use word trigger condition or not. As for word trigger setting, refer to 2) Setting Word Trigger item.

f. Device: specifies the device to monitor the word trigger condition.

g. Sampling frequency: specifies the cycle to collect data.

h. Total sample: specifies the number of samples in total to collect. The number of samples in total will be decided based on the input sample device.

i. Samples after trigger: specifies the number of samples to collect after triggered.

j. OK: saves the changed items and closes the dialog box.

k. Cancel: closes the dialog box.

Notes

‒ Use the number of samples in total and the number of samples after triggered to apply various collection methods.

a. Number of Samples in Total = Number of Samples after triggered: a method to collect data after triggered, which will be used when the data before triggered is not necessary.

b. Number of Samples in Total > Number of Samples after triggered (≠0): a method to collect data even before triggered, which will be used when the data before and after triggered is necessary.

c. Number of Samples after triggered = 0: a method not to collect data after triggered, which will be used when the data after triggered is not necessary.

---

1) Setting Bit Trigger

It uses the variation of the bit device value as a trigger condition.

[Sequence]

1. Select the check box of bit condition.

2. Input the device to use as a bit condition. Bit device format only is available.

3. Specify trigger condition, where rising or falling is available. Rising means that the device value changes from 0 to 1, and falling means that the device value changes from 1 to 0.

2) Setting Word Trigger

It uses the variation of the word device value as a trigger condition.

[Sequence]

1. Select the check box of word condition.

2. Input the device to use as a word condition. Word device format only is available.

3. Input constant value to compare with word device value.

4. Select a condition to use to compare with the constant value input. Available conditions are as follows.

   < (less than), <= (less than or equal to), == (equal to), >= (greater than or equal to), > (greater than),

3) Bit device settings

It is used to select the bit device to collect data. The selected device will be displayed in a bit graph.

[Sequence]

1. Select the Bit device settings tap on dialog box of Data Trace Settings.
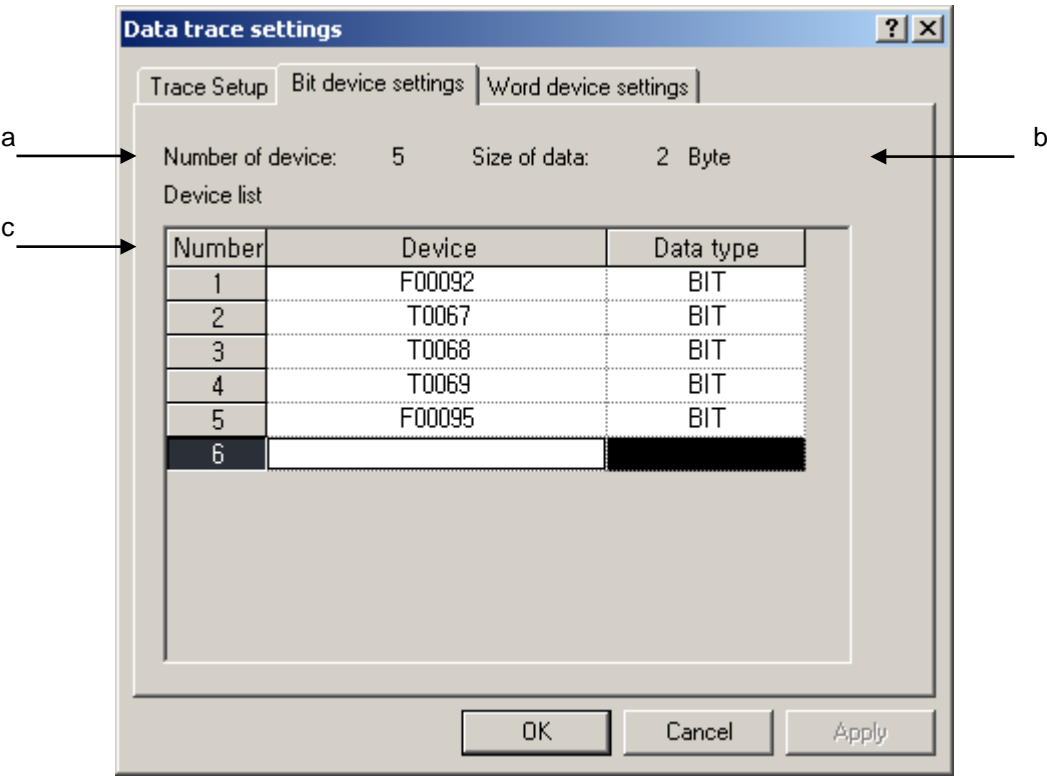
[Dialog Box]

[Description of Dialog Box]

a. Number of devices: displays the number of bit devices specified.

b. Size of data: displays the size of the data specified. More than 1 bit device will be displayed in 2 bytes.

c. Device list: displays the list of the bit devices specified.

2. Input the device of bit type. Click the right mouse button and select [Add Line] to add a line. Click the right mouse button and select [Delete Line] to delete the device input.

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

- Devices of bit type can be input up to 16.

4) Word Device Settings

It is used to select the word device to collect data. The selected device will be displayed in a word graph

[Sequence]

1. Select the word device setting tap on dialog box of Data Trace Settings.
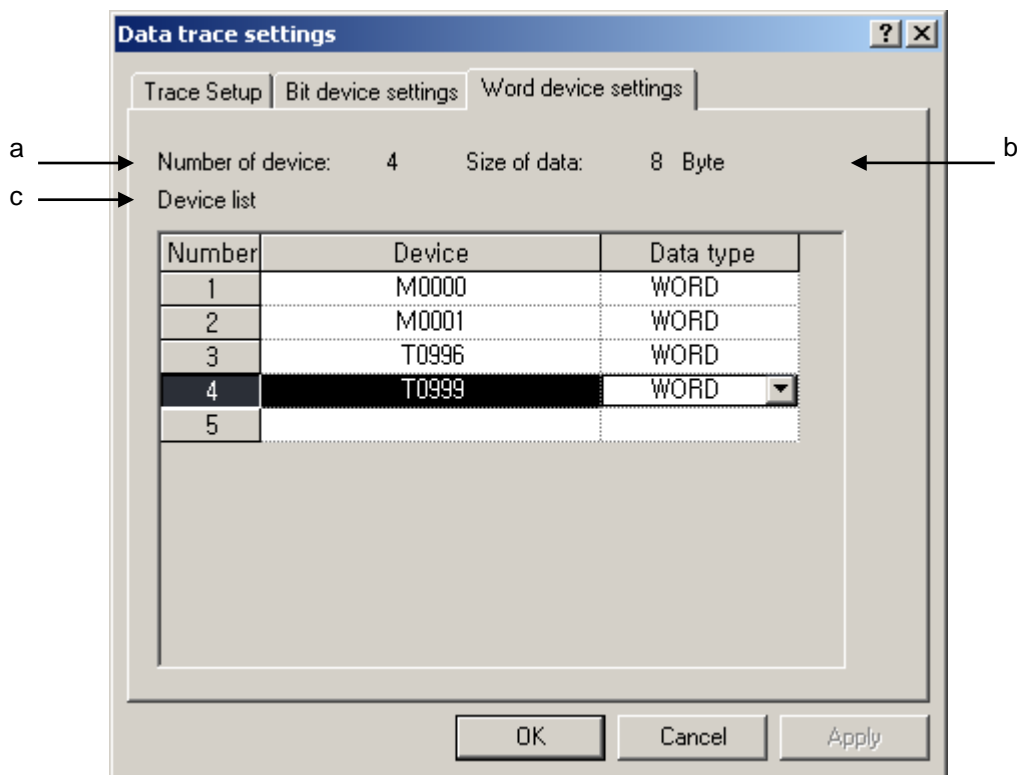
[Dialog Box]

[Description of Dialog Box]

a. Number of device: displays the number of word devices specified.

b. Size of data: displays the size of the data specified. The size will be decided based on the specified data type.

c. Device list: displays the list of the word devices specified.

2. Input the device of word type.

3. Select the data type of device.

Notes

– Devices of word type can be input up to 8(XBMS: Max. 4)

– Supported data types are as follows.

Type	Size	Type	Size
BYTE	1 byte	REAL	4 bytes
WORD	2 bytes	LREAL	8 bytes
DWORD	4 bytes	INT	2 bytes
LWORD	8 bytes	DINT	4 bytes
		LINT	8 bytes

11.8.3 Setting Graph

[Sequence]

Select [Graph]-[Graph Settings] on the menu.
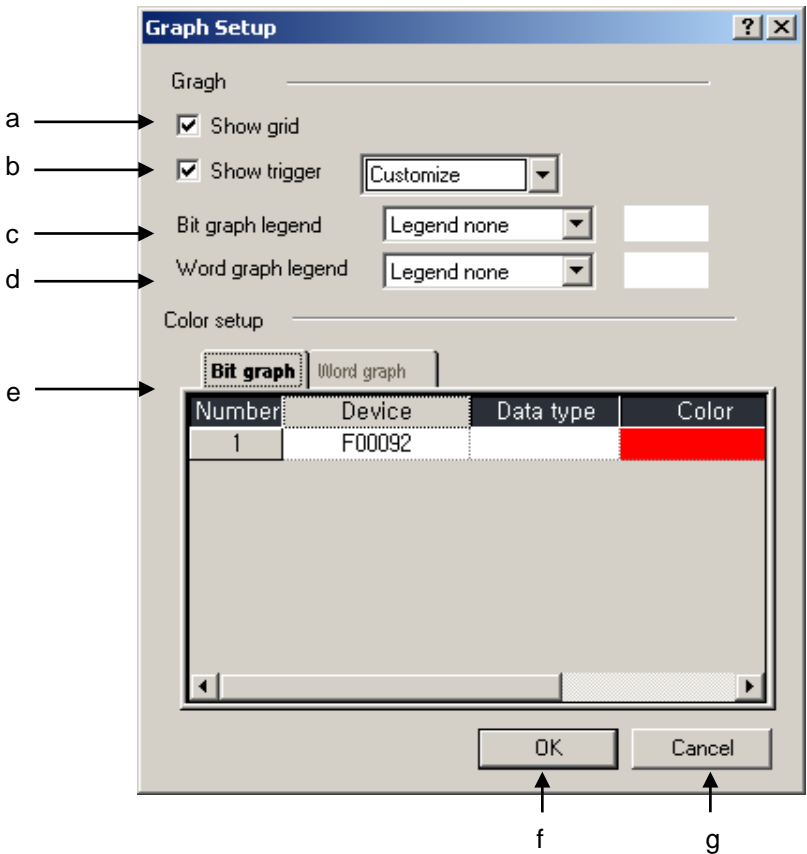
[Dialog Box]

[Description of Dialog Box]

a. Show grid: used to decide to show XY grid or not on the screen.

b. Display trigger: used to decide to display the trigger position on the graph, and to specify color.

c. Bit graph legend: used to specify the position of bit graph index. No Index, Left Upper, Right Upper, Left Bottom and Right Bottom are available for the Bit Index Position.

d. Word graph legend: used to specify the position of word graph index. No Index, Left Upper, Right Upper, Left Bottom and Right Bottom are available for the Word Index Position.

e. Color setup: used to specify device color of each graph.

f. OK: applies the changed items and closes the dialog box.

g. Cancel: closes the dialog box.

1) Setting Graph Color

[Sequence]

1. Select the device to change its graph color.
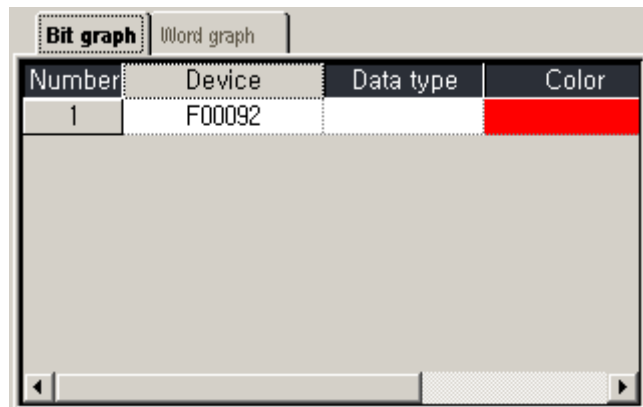
2. Click the color column to display applicable dialog box. On the dialog box, select desired color and then click [OK] button.

11.8.4 Trace

It is used to read the data traced from PLC or the data specified.

1) Write Trace Setting
It applies the trace setting to PLC.

[Sequence]
1. Select [Trace]-[Write Trace Settings] on the menu.

2) Read Trace Settings
It is used to read trace setting from PLC.

[Sequence]
1. Select [Trace]-[Read Trace Settings] on the menu.

3) Read Data Traces
It reads trace data from PLC.

[Sequence]
1. Select [Trace]-[Read Trace] on the menu.

4) Start Manual Trace
It is used to start to trace data under the trace condition presently specified.

[Sequence]
1. Select [Trace]-[Start Manual Trace] on the menu. If data is presently traced, the applicable menu will be inactive.

11.8.5 Simulation

Using the trace data read from PLC, it displays the data in the sequence of time.

1) Simulation Settings
[Sequence]
1. Select [Simulation]-[Simulation Setting] on the menu.

[Dialog Box]
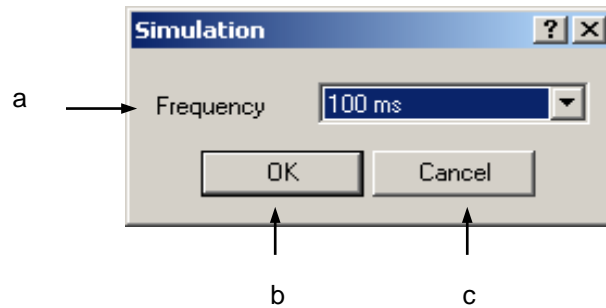
[Description of Dialog Box]

a. Frequency: used to specify the cycle to update the data sample on the screen. Available data update cycles are 20, 50, 100, 200, 500, 1000 and 2000ms value.

b. OK: applies the changed items and closes the dialog box.

c. Cancel: closes the dialog box.

2) Simulation

It is used to start Simulation. Simulation will be active only with trace data available.

[Sequence]

1. Select [Simulation]-[Start Simulation] on the menu.

3) Simulation Pause

It is used to stop Simulation in progress momentarily.

[Sequence]

1. Select [Simulation]-[Simulation Pause/Resume] on the menu.

4) Simulation Resume

It is used to continue Simulation which was momentarily stopped.

[Sequence]

1. Select [Simulation]-[Simulation Pause/Resume] on the menu.

5) Stop

It is used to stop Simulation.

[Sequence]

1. Select [Simulation]-[Stop Simulation] on the menu.

11.8.6 Graph Function

Refer to 11.7.5 Graph Function in this manual for its basic functions.

1) Move Trigger

It moves the trigger to its generated point of time.

[Sequence]

1. Select [Graph]-[Go to Trigger Position] on the menu.

11.8.7 File function

It is used to save or read trace setting from the file.

1) Open

[Sequence]

1. Select [File]-[Open] on the menu.
2. Select a file name to open on File dialog box and then click [OK].

2) Save

[Sequence]

1. Select [File]-[Save] on the menu.
2. Input a file name to save with on File Save Box and then click [OK].

3) Save as

[Sequence]

1. Select [File]-[Save As] on the menu.
2. Input a different file name to save with on File Save Box and then click [OK].

4) Save as Bit Map

It is used to save the graph presently displayed on the screen on the file in window bit map.

[Sequence]

1. Select [File]-[Send]-[Save as Bitmap] on the menu.
2. Input a file name to save with and then click [OK].

5) Save Text

It is used to save the graph data on the file in text. Samples as many as the max. samples kept specified in setting the max. graph will be saved.

[Sequence]

1. Select [File]-[Send]-[Save Text] on the menu.
2. Input a file name to save with and then click [OK].

6) Copy Clipboard

It is used to copy the graph presently displayed on the screen onto the window clipboard.

[Sequence]

1. Select [File]-[Send Out]-[Copy Clipboard] on the menu.

11.8.8 View Function

This function is used to display or hide the tool bar and the status display line on the screen.

1) View Tool Bar

[Sequence]

1. Select/Cancel [View]-['Tool Name'] on the menu.

2) View Status Display Line

[Sequence]

1. Select/Cancel [View]-[Status bar] on the menu.

3) Data

It displays trace data in value. View Data will be active only with trace data available.

[Sequence]

1. Select [View]-[Data] on the menu.

[Dialog Box]
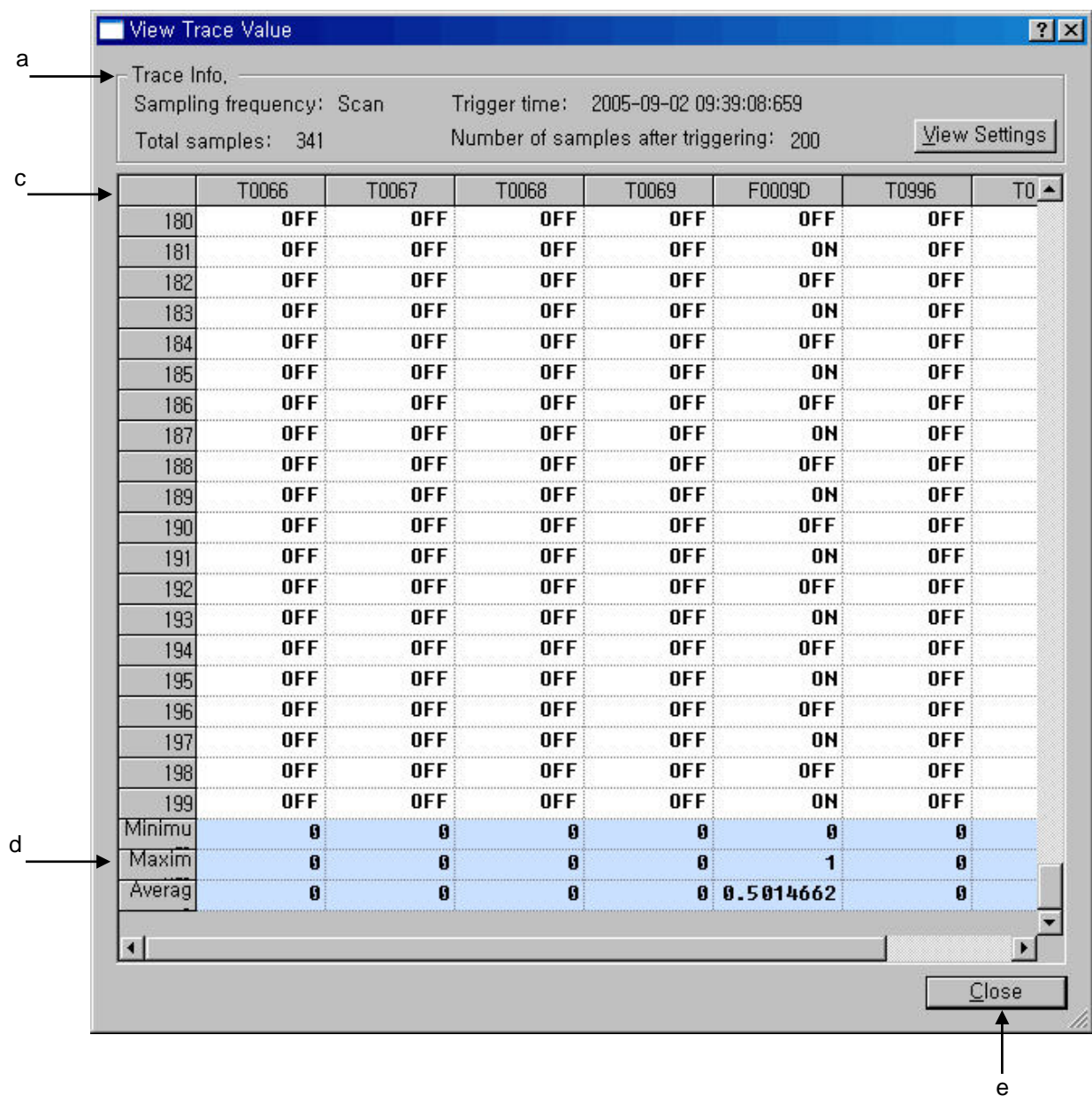
[Description of Dialog Box]

a. Trace info: displays the trace sampling cycle.

b. View Settings: displays the trace details.

c. Data Grid: displays the current value specified in the sequence of the samples. The sample data will be displayed in negative before triggered, and in positive after triggered.

d. Minimum, Maximum, Average: displays the Min., Max., and Average value per device.

e. Close: closes the dialog box.

11.9 PID Monitor

At PID monitor, you can set data value by loop unit and monitor it for PID control. XGI/XGR supports 8 blocks (256 loops). Representative function of PID monitor is as follows.

1) Read/Write PID data from PLC

2) Read/Save PID data from file

3) PID monitor/setting

4) PID trend view

11.9.1 Basic instructions

[Sequence]

Select [Monitor]-[PID monitor].
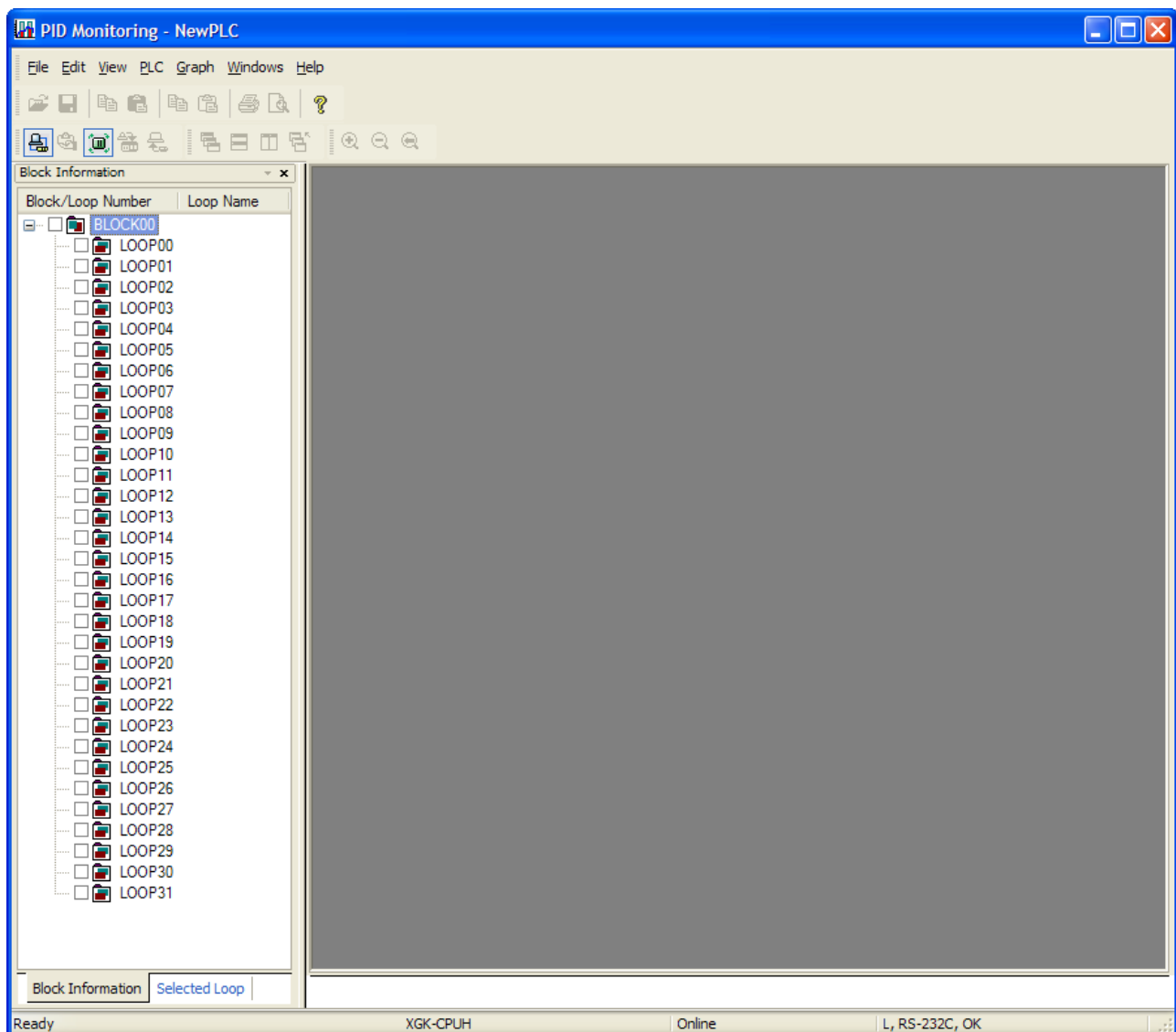
At block information window, select block, loop you want.

If you double-click loop or press enter, loop monitor window shows up.
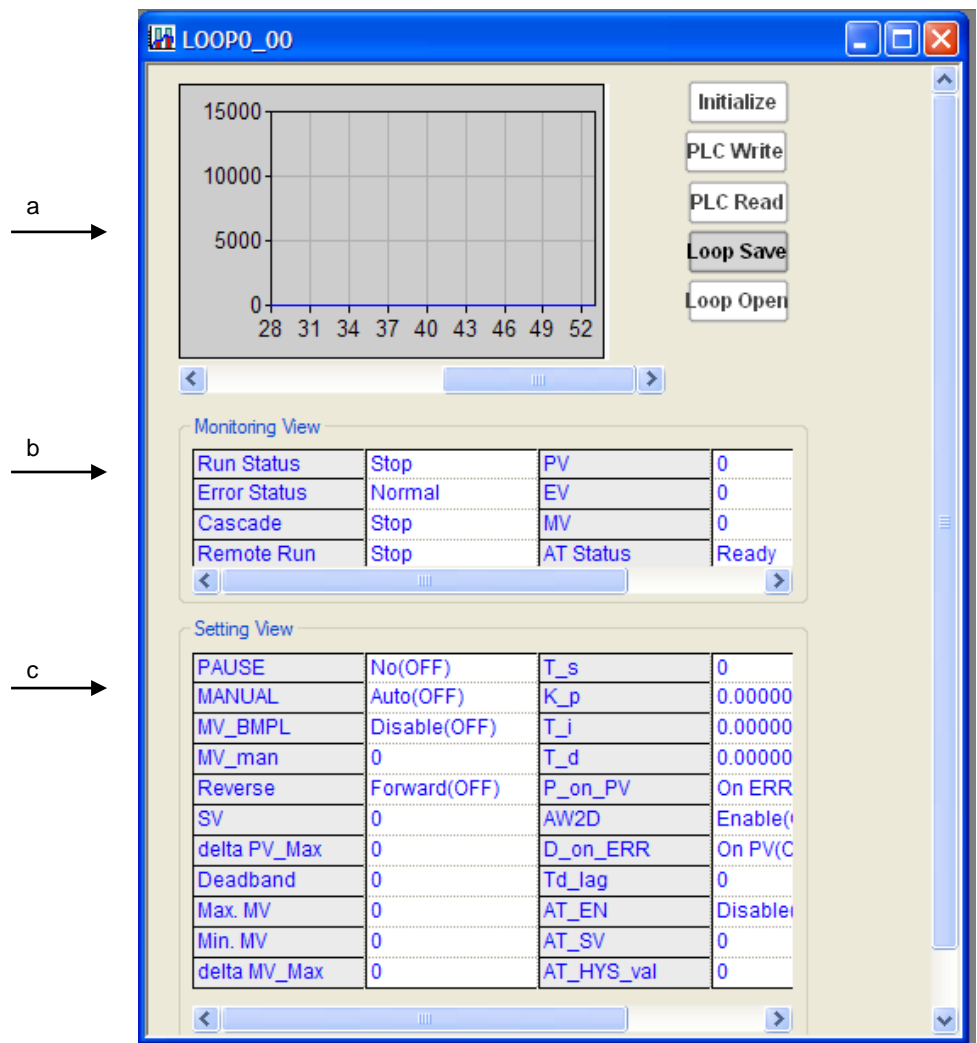
[Detail description]

a. Graph: indicates PV (Present Value), MV (Manipulated Value), SV (Setting value) among PID monitor value as trend graph

b. Monitor window: monitors real data value of PID variable, you can't edit value in the monitor window

c. Detail setting window: indicates value of setting item adjusting monitor value. The user can edit at online/off line.

11.9.2 Save file

It saves PID data value into file.

1) Save All Loops

[Sequence]

　　Select menu [File]-[Save All Loops]

　　After inputting file name, press 'Save' button

2) Save Block

How to save at menu

[Sequence]

　　Select [File]-[Save Block]
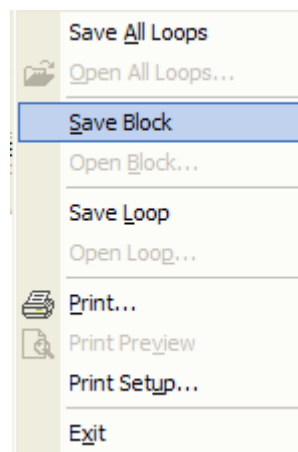
　　After inputting file name, press 'Save' button

How to save at block information window

[Sequence]

Select block to save at block information window

Push the right button of mouse and select [Save Block]
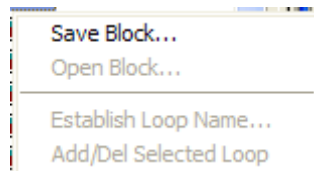
After inputting file name, press 'Save' button

3) Save Loop

How to save at block information window

[Sequence]

Select loop to save at block information window

Push the right button of mouse and select [Save Loop]

After inputting file name, press 'Save' button

How to save at loop monitor window

[Sequence]

Push 'Loop Save' button at loop monitor window

After inputting file name, press 'Save' button
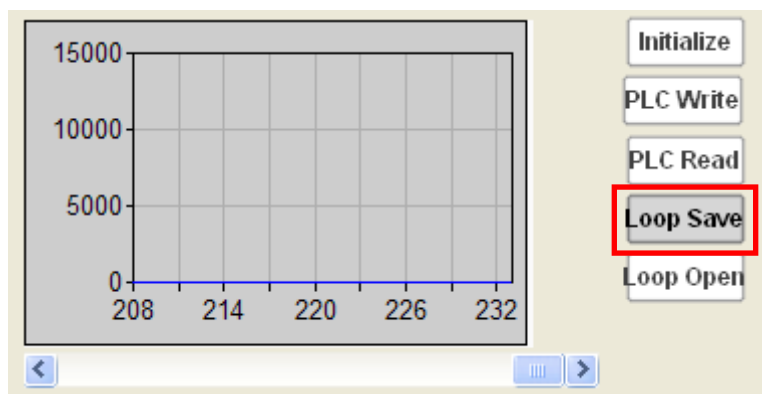
Note
Extension per file type is as follows - Save All Loops: ppc - Save Block: ppb - Save Loop: ppl

11.9.3   Open file

 Reads PID data setting value from file

1) Open All Loops

[Sequence]

    Select [File]-[Open All Loops]

    After inputting file name, push 'Open' button

2) Open Block

How to open at menu

[Sequence]

    Select [File]-[Open Block] at menu
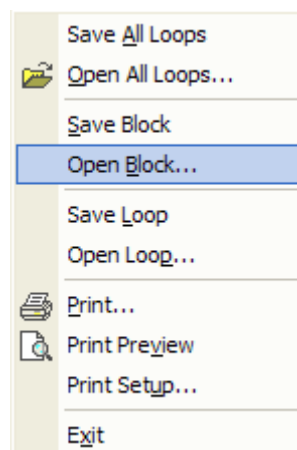
    After inputting file name, push 'Open' button

How to open at block information window

[Sequence]

    Select block to open at block information window

    Press the right button of mouse and select [Open Block]

Save Block…
Open Block…
Establish Loop Name…
Add/Del Selected Loop
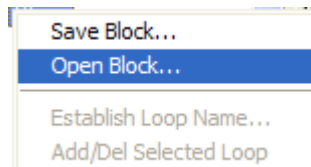
    After inputting file name, push 'Open' button

3) Open Loop

How to open at block information window

[Sequence]

    Select loop to open at block information window

    Press the right button of mouse and select [Open Loop]

    After inputting file name, push 'Open' button

How to open at loop monitor window

[Sequence]

    Press Open Loop button at loop monitor window

    After inputting file name, push 'Open' button

11.9.4 Setting/adjustment of loop name

It is used to name PID loop

[Sequence]

Press the right button at block information window and select [Establish Loop Name]

Input name you want and press OK
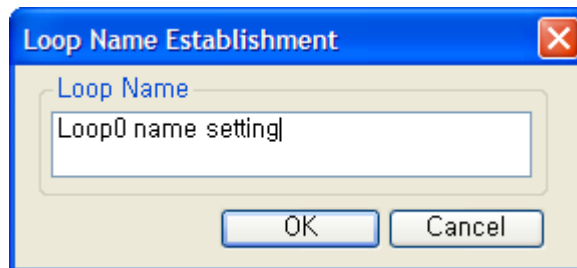
Check name of loop
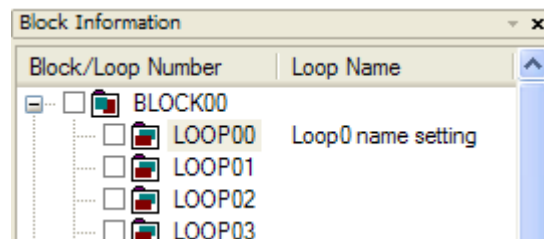
Note
You can set/adjust loop name at Selected Loop tap of block information window

11.9.5   Add/Delete selected loop

It is function to monitor easily selected loop the user uses frequently among maximum 32 loops.

Add selected loop

[Sequence]

Push the right button at block information window and select [Add/Del Selected Loop]

Check if check box in front of loop number is set or not at block information window
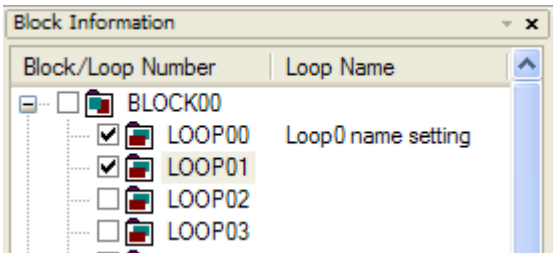
Check if selected loop is added or not at Select Loop tap of block information window
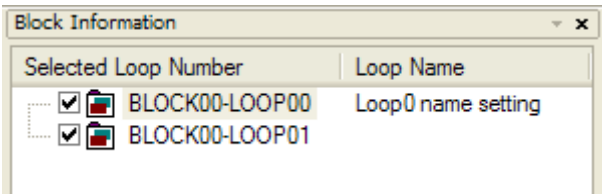
Delete selected loop

[Sequence]

Push the right button and select [Add/Del Selected Loop] at block information window

Check if check box in front of loop number is canceled or not at block information window.

You can cancel at Selected Loop tap.

Check if selected loop is not deleted or not at selected loop tap of block information window.

Note
You can add/delete loop or block by clicking check box of block information window.

11.9.6 Print/Print Preview

It is function to print/print preview the activated loop monitor window and detail setting window

Print Preview

[Sequence]

    Select [File]-[Print Preview]

Print function

[Sequence]

    Select [File]-[Print] or [Print] at preview window

<div style="border:1px solid">

Note

Print/Print Preview supports only one loop at one time

</div>

11.9.7 Connection to PLC

Connects PID monitor to PLC

After connecting PLC at XG5000, if you execute PID monitor at XG5000, PID monitor connect to PLC and it converts monitor mode

[Sequence]

    Sets connection method through [PLC]-[Connection Settings]

    Select [PLC]-[Connection]

11.9.8 Write loop data to PLC

It writes data value to PLC by loop unit. You can check progress through progress bar at bottom of PID monitor
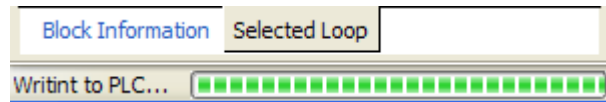
[Sequence]

Select loop at block information window

Open loop monitor window by double-clicking

Input the value at detail setting window of loop monitor window

Push the PLC Write button or select [PLC]-[Write Loop]

11.9.9 Write all data to PLC

It writes all loop data to PLC. You can check progress through progress bar at bottom of PID monitor
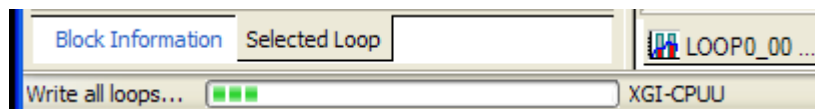
[Sequence]

Select [PLC]-[Write All]

11.9.10 Read loop data from PLC

It reads data value from PLC by loop unit. You can check progress through progress bar at bottom of PID monitor

[Sequence]

Select loop at block information window

Open loop monitor window by double-clicking

Push the PLC Read button at loop monitor window or select [PLC]-[Read Loop]

11.9.11 Read all data from PLC

It reads all loop data from PLC. You can check progress through progress bar at bottom of PID monitor

[Sequence]

Select [PLC]-[Read All]

11.9.12 Monitor start/end

1) Start Monitoring

It reads PID data value in PLC connected and indicates at screen

[Sequence]

Check if PLC is connected

Select [PLC]-[Start Monitoring]

2) End Monitoring

It stops monitoring PID data value of PLC

[Sequence]

Select [PLC]-[End Monitoring]

Note
In case of monitor mode, you can't edit detail setting. You can change setting value only by [Edit]-[Change Current Value] －In case of monitor mode, you can't execute [PLC Write], [PLC Read], [Loop Open] and [Loop Save] is only available.

11.9.13　Change current value during monitoring

It sets data necessary to PID control

If you want to use all data relevant to loop to PLC, refer to 11.9.8.

[Sequence]

　　　If it is not monitor mode, select [PLC]-[Start Monitoring]

　　　Select block and loop you want at block information window

　　　Open relevant loop by double-clicking relevant loop or using ENTER key

　　　Move the mouse to cell you want to set at loop monitor window

　　　Push the right button and select [Change Current Value] or push the ENTER key

　　　Change value and press OK

[Dialog box]
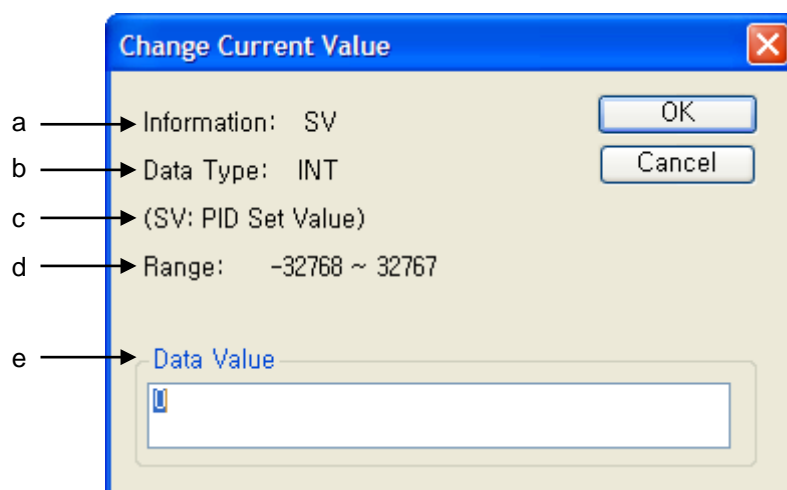
[Dialog box description]

a. Information: indicates PID information to set

b. Data Type: indicates data type of PID information to set

c. Parenthesis information: indicates detail meaning of setting information

d. Tolerance range: indicates data value range of PID information to set

e. Data Value: indicates data value to set

Note
[Current Value Change] function is activated in case of monitor status Data relevant to detail setting at loop monitor is available to write, and monitor window part can't be changed.

11.9.14 Graph

It indicates PV (Present Value), MV (Manipulated Value), (Setting Value) among PID monitoring value as graph
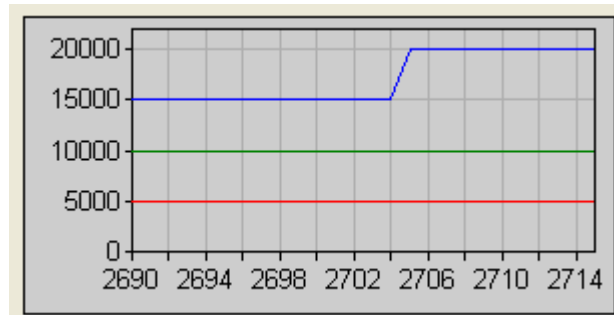
In case of changing PID flag value of XG5000 or changing detail setting value at PID monitor during monitoring, it is reflected in real time. In case of stopping monitoring, graph also stops. And in case of restarting monitoring, it draws again from last run time. The horizontal axis is renewed every 1 second

11.9.15 Graph related function

1) Horizontal scroll bar

If 25 second passes after starting monitoring, horizontal scroll is created automatically
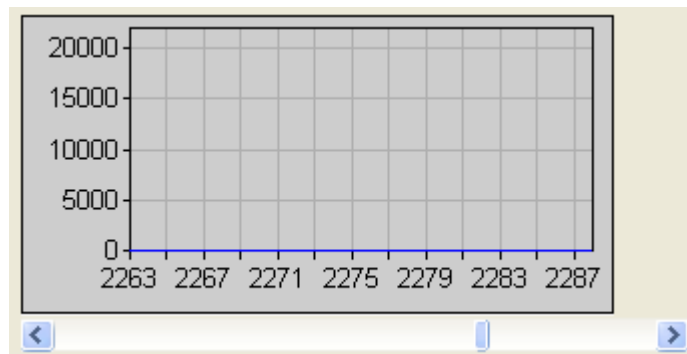
If you press both end arrow of scroll, time line increases/decreases by 1. And if you press both blank. Time line increases/decreases by 10.

2) Vertical scroll bar

It is used to adjust vertical interval and see value more detail or inclusively

[Sequence]

Push [Graph]-[Zoom In Y-axis] or [Graph]-[Zoom Out Y-axis]

Note
-Enlargement of Y axis is supported up to 4 steps
- In order to restore previous status, select [Graph]-[Return Zoom]

3) Graph color setting

It is used to change color of PV (Present Value), MV (Manipulated Value), SV (Setting Value) graph

[Sequence]

Select [Graph]-[Graph Color Setting]

Select graph color part you want to change
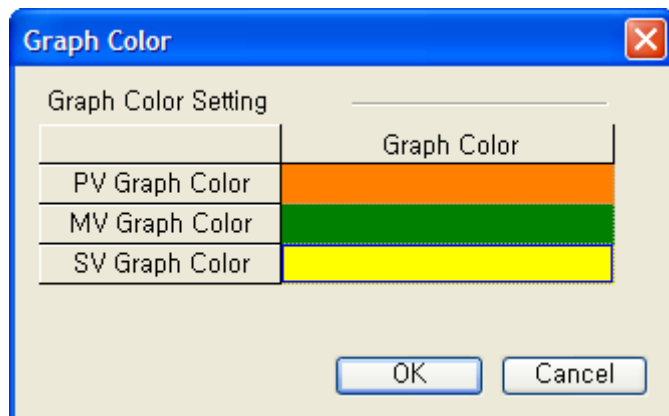
Select color at color table and press OK
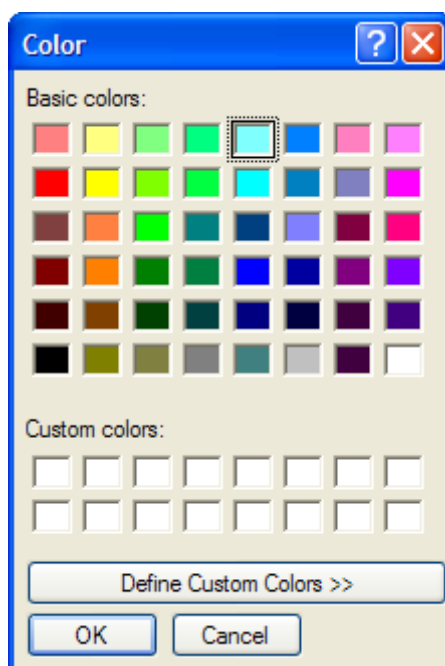
Check the change of graph color
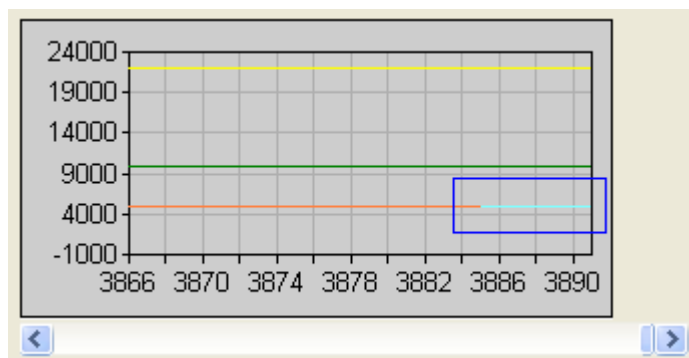
4) Graph initialization

  Delete accumulated graph and draw again

[Sequence]

      Select [Graph]-[Graph Initialization]

      Check graph is renewed from time line 0

11.9.16　Edit function

1) Cell copy

      It is used to execute copy of cell unit among detail setting value of PID monitor

[Sequence]

      Select cell to copy and after pressing the right button of mouse, select [Cell Copy]

Note
Since copy of bit data is not possible, [Cell Copy] menu is not activated.

2) Cell Paste

  It is used to paste value with cell unit among detail setting value of PID monitor

[Sequence]

      Select cell to copy and after pressing the right button of mouse, select [Cell Copy]

      Select [Cell Paste] after pressing the right button of mouse at cell you want to paste

> **Note**
>
> When Cell Copy is not executed, [Cell Paste] is not activated
>
> Cell Paste function is supported at same data type
>
> When pasting different data type, warning window occurs
>
> When selecting more than one cell, Cell Copy/Paste is not possible

3) Setting Copy

It is used to copy entire detail setting of PID monitor

[Sequence]

Select detail setting window grid to copy and select [Setting Copy] by right button of mouse.

If you execute Setting Copy, all setting area is selected.

4) Setting Paste

It is used to paste all detail setting of PID monitor

[Sequence]

Select detail setting window grid to copy and select [Setting Copy] by pushing right button of mouse.

Select detail setting window grid to copy and select [Setting Paste] by pushing right button of mouse.

> **Note**
>
> When you select cell more than one, you can't execute Setting Copy/Paste

5) Initialize setting

It is used to initialize entire detail setting value of activated PID monitor. You can't use this during monitoring

[Sequence]

Push [Initialize] at activated loop or select [Initialize setting] on detail setting grid by pushing right button of mouse

> **Note**
>
> You can't execute [Cell Paste], [Setting Paste], [Initialize Setting] during monitoring

Chapter 12 Debugging

12.1   Start/Stop Debugging

12.1.1   Start Debugging

[Sequence]

1. Select [Online]-[Connect] on the menu to connect with PLC.

2. Select [Online]-[Write] on the menu to download the program onto PLC.

3. Select [Online]-[Change Mode]-[Debug] or [Debug]-[Start/Stop Debugging] on the menu.

Notes

- ― This function is available only with PLC connected in online

- ― Debug is unavailable if PLC operation is in Run mode.

- ― Debug function is available with XG5000 program and PLC program identical to each other. If they are not identical, download the applicable program.

- ― Monitoring function is also available in Debug mode.

- ― If any error occurs on PLC, Debug instruction will not work normally. Clear the error to execute the Debug instruction.

12.1.2   Stop Debugging

[Sequence]

1. Select [Online]-[Change Mode]-[Stop] or [Debug]-[Start/Stop Debugging] on the menu.

2. PLC will end Debug and come to the Stop mode.

Notes

- ― Even if Debug stops, Monitor does not end.

12.2   LD Program Debugging

It is used to specify functions to debug the prepared LD program.

12.2.1   Set/Remove Breakpoints

It is used to set or remove the Breakpoint per step.

1) Set Breakpoint

[Sequence]

1. Move the Breakpoint to the step to specify.
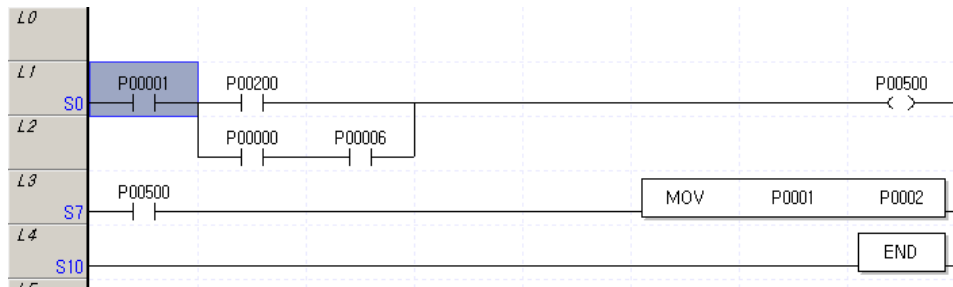
2. Select [Debug]-[Set/Remove Breakpoints] on the menu.
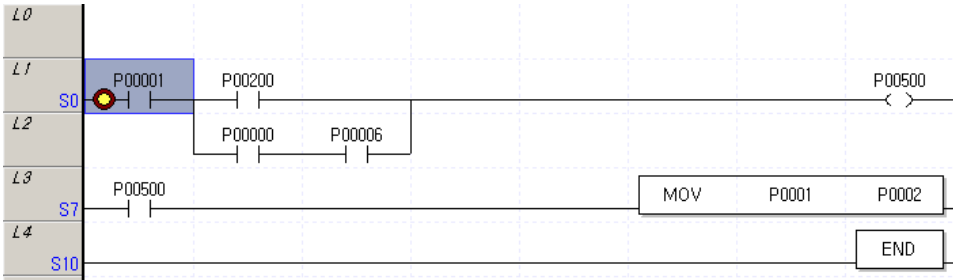
Notes
− The break can not be set on the area specified by a Block Mask instruction.
− Application instruction will set the breakpoint on the instruction String area.
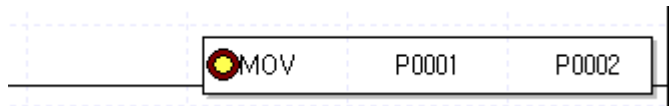
2) Remove Breakpoint

[Sequence]

1. Move the Breakpoint to the step to remove.
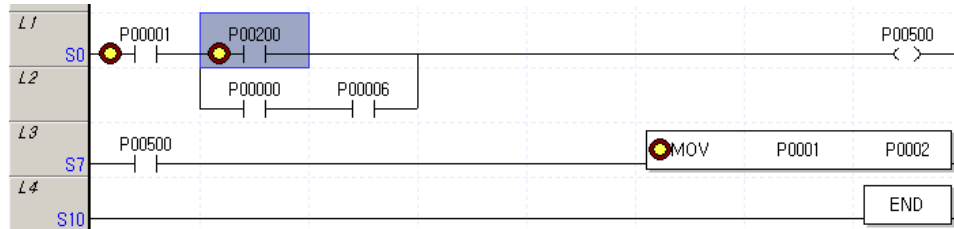
2. Select [Debug]-[Set/Remove Breakpoints] on the menu.
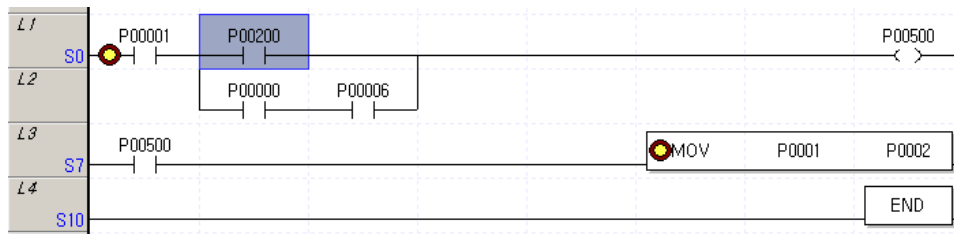
12.2.2   Go

It starts program debugging using the specified Breakpoint. With the Go function, the program can be run up to the Breakpoint specified.

[Sequence]

1. Select [Debug]-[Go] on the menu. The program will be run till the breakpoint complying with the condition is reached.

LS ELECTRIC
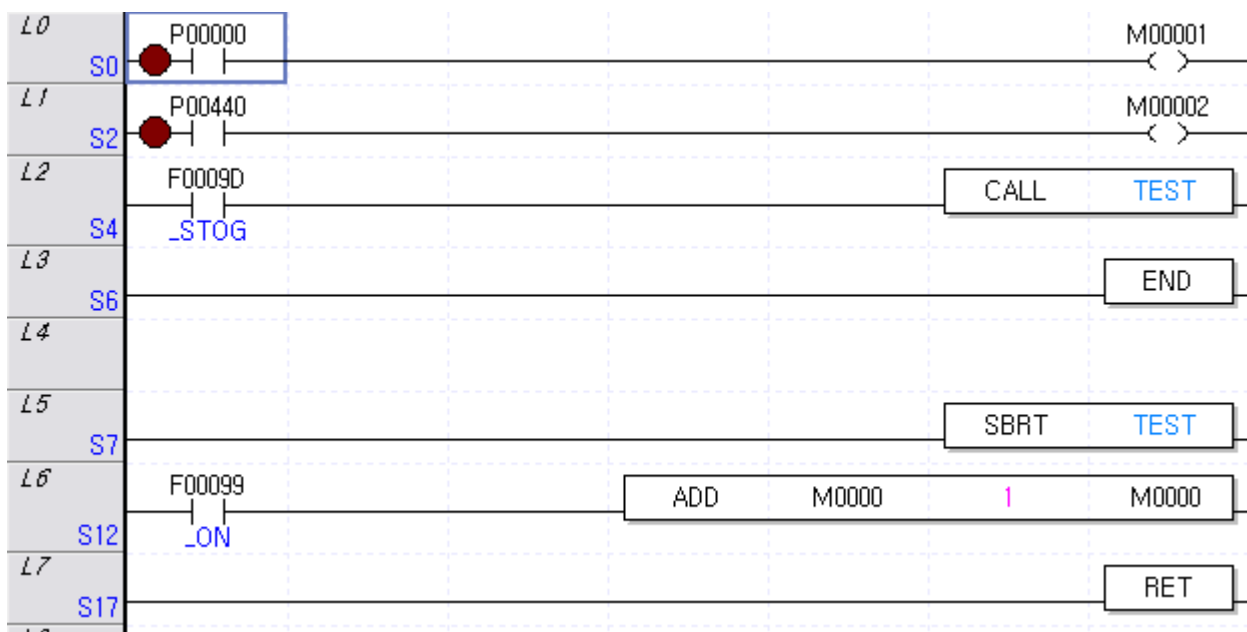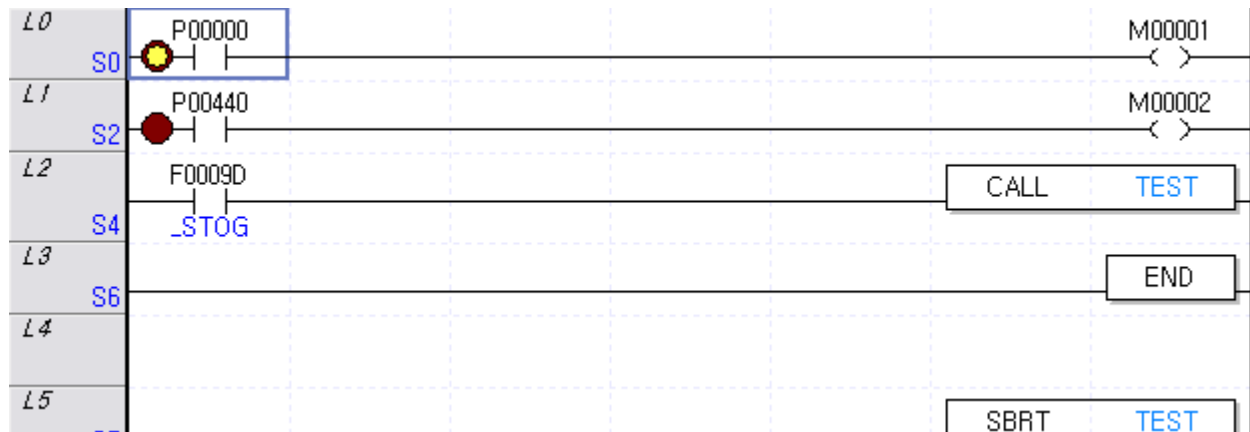
2. Select [Debug]-[Go] on the menu again to go to the next Breakpoint.

12.2.3 Go to Cursor

It is used to make the program run up to the cursor position.

[Sequence]

1. Move the cursor to the position desired to run.
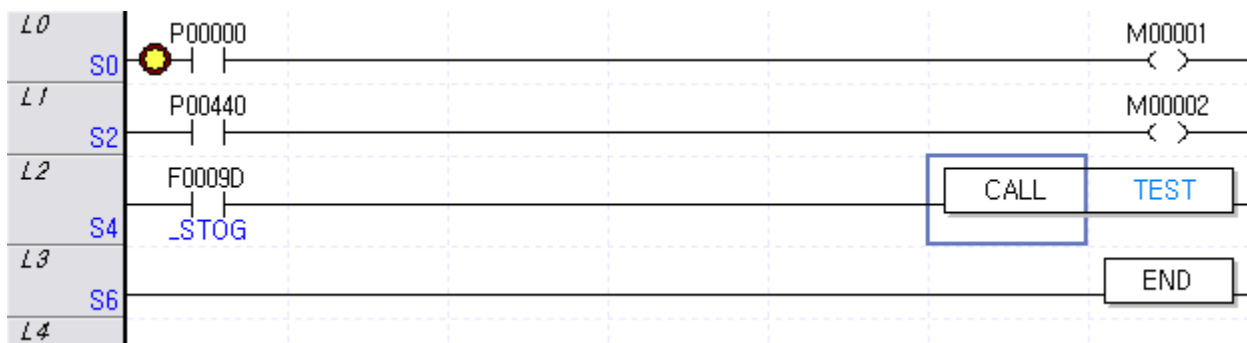
2. Select [Debug]-[Go to the Cursor] on the menu.
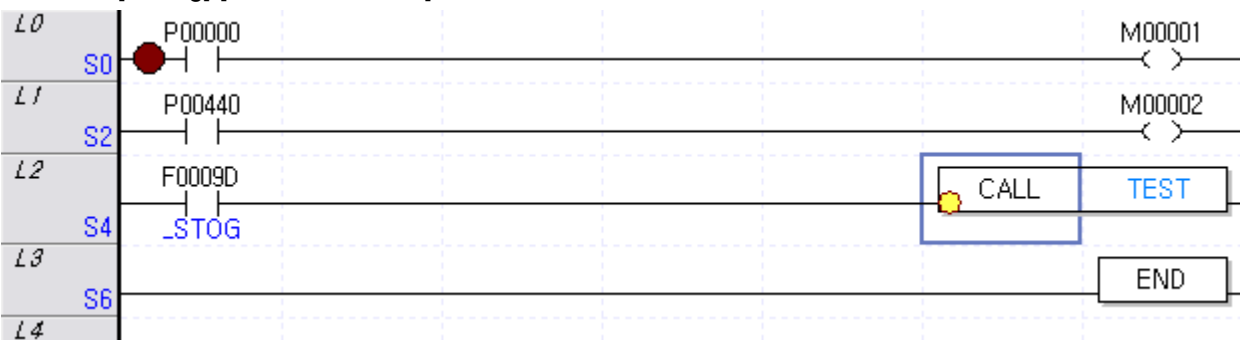
12.2.4 Step Into

If the Breakpoint is engaged during debugging, its progress will be made step by step. When debugging program, Step Into, Step Out and Step Out functions will be provided.

1) Step Into

It runs the program to the next step. If the present step is a application instruction CALL with the running condition satisfied, it will enter the subroutine block.

[Sequence]

1. Select [Debug]-[Step Into] on the menu.
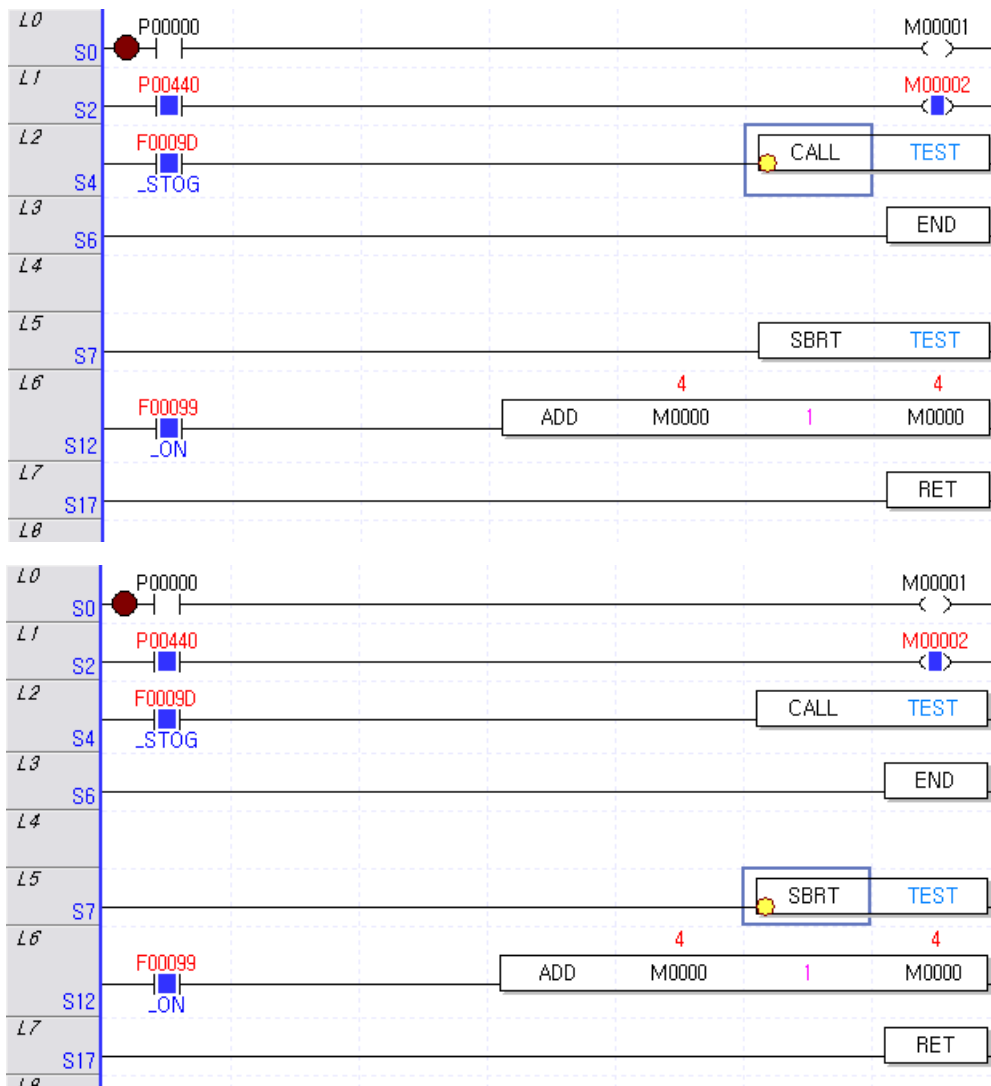
- If not with CALL instruction or if the CALL running condition unsatisfied, the program will be run to the next step.
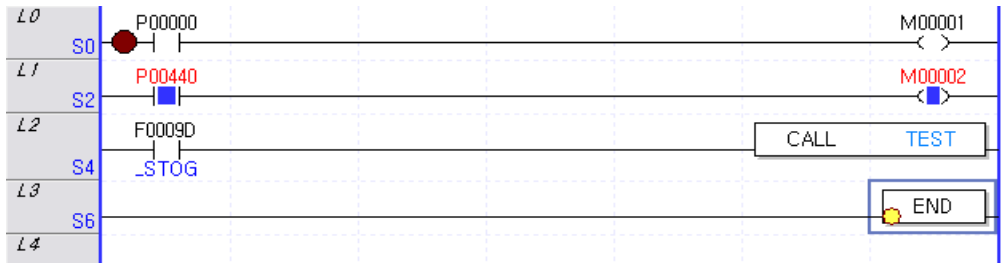
2) Step Out

It is used to step out of the subroutine block once entered with Step Into function executed.

[Sequence]
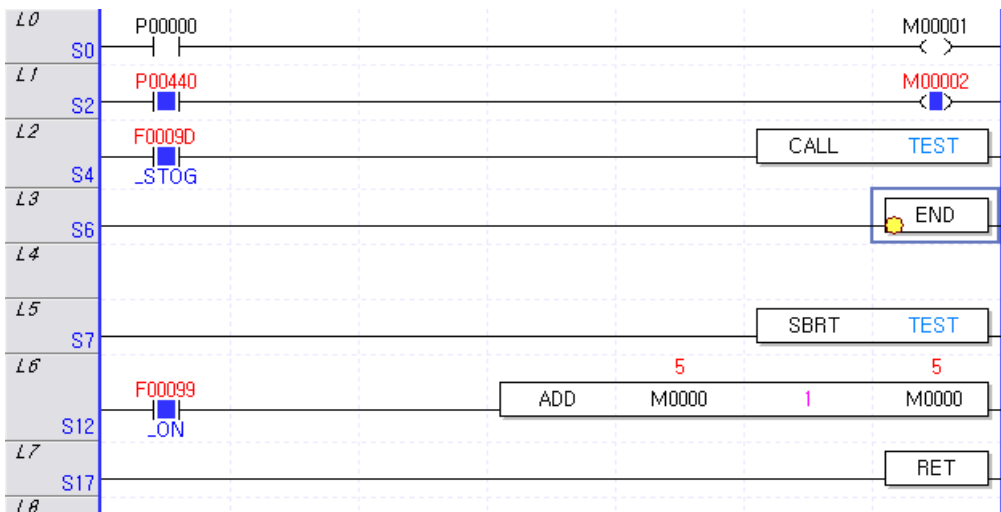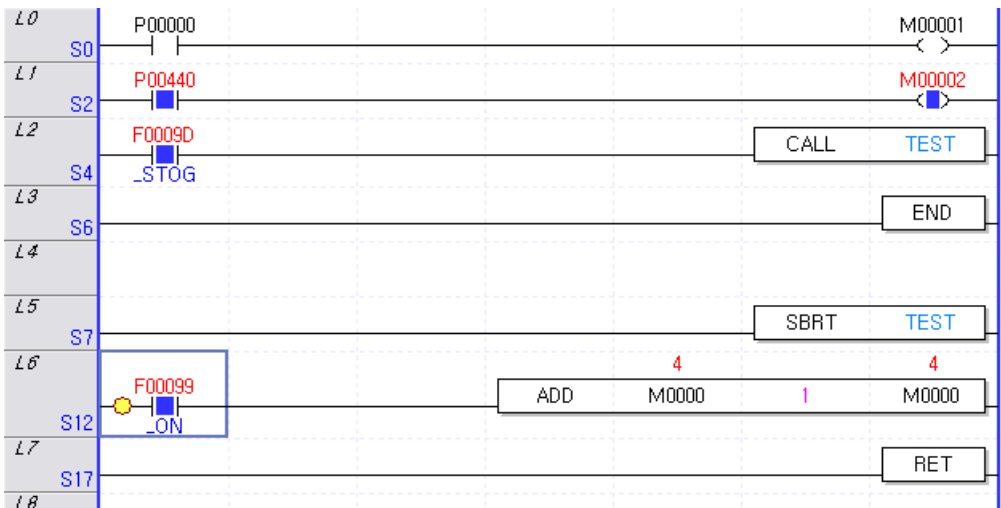
1. Select [Debug]-[Step Out] on the menu.

Notes

- If the presently debugged step is not inside the subroutine block, the program will be run to the next step.

3) Step Over

It is used to run the program to the next step. Differently from Step Into, even if the present step is a application instruction CALL, it will not enter the subroutine block but run the program to the next step.

[Sequence]

1. Select [Debug]-[Step Over] on the menu.
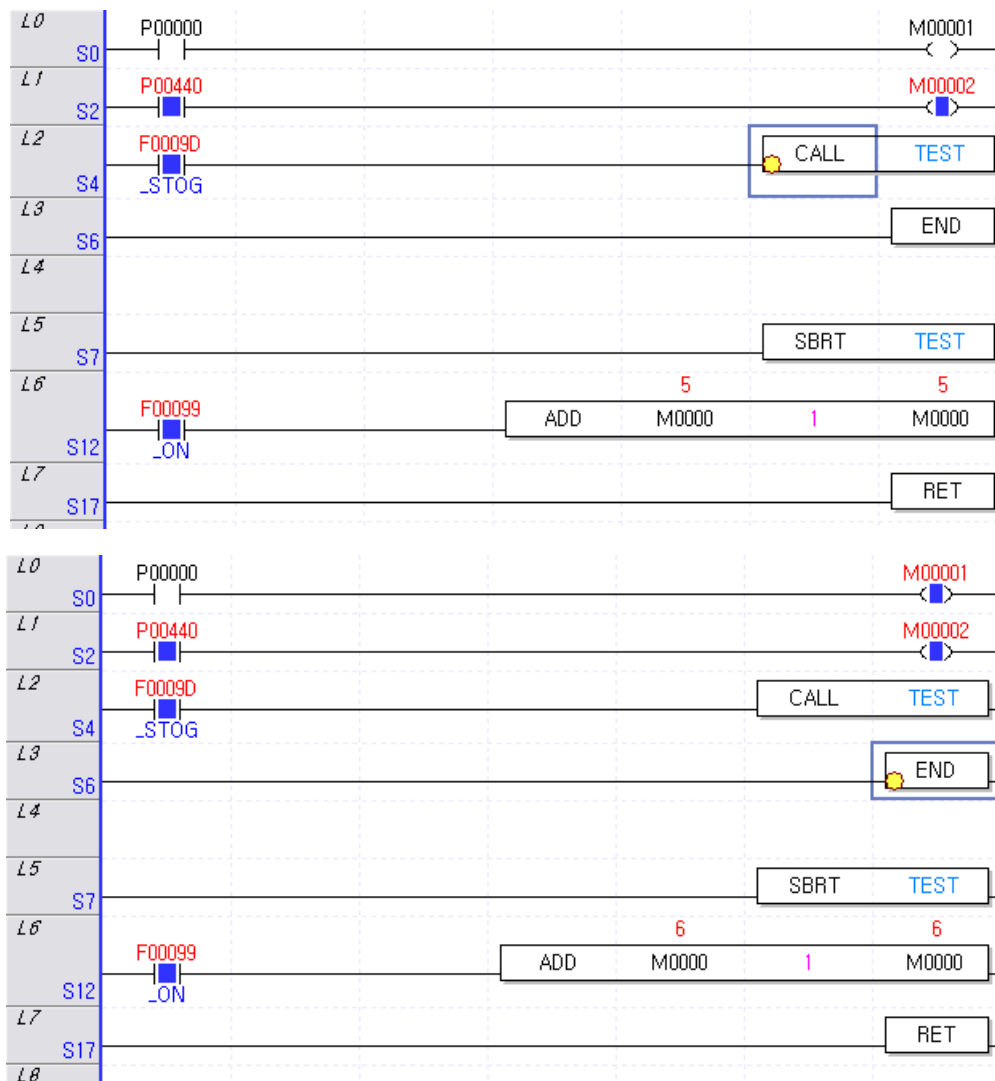
12.3 IL program Debugging

It is used to specify functions to debug the prepared IL program.

12.3.1 Set/Remove Breakpoints

It is used to set or remove the Breakpoint per step.

1) Set Breakpoint

[Sequence]

1.Move the Breakpoint to the step to specify.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP
0	0	LOAD	P00102					
	1	MPUSH						
	2	AND	F00090					
	3	MOV	hFFEE	P0000				
	5	MLOAD						
	6	MOV4	hF	P00004				
	9	MLOAD						
	10	OUT	P00000					
	11	MPOP						
	12	OUT	P00010					
1	13	END						

2. Select [Debug]-[Set/Remove Breakpoints] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP
0	0	LOAD	P00102					
	1	MPUSH						
	2	AND	F00090					
	3	● MOV	hFFEE	P0000				
	5	MLOAD						
	6	MOV4	hF	P00004				
	9	MLOAD						
	10	OUT	P00000					
	11	MPOP						
	12	OUT	P00010					
1	13	END						

Notes
－ The break can not be set on the area specified by a Block Mask instruction.
－ IL will set the Breakpoint in line unit.

2) Remove Breakpoint

[Sequence]

1.Move the Breakpoint to the step to cancel.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP
0	0	LOAD	P00102					
	1	MPUSH						
	2	AND	F00090					
	3	● MOV	hFFEE	P0000				
	5	MLOAD						
	6	MOV4	hF	P00004				
	9	MLOAD						
	10	● OUT	P00000					
	11	MPOP						
	12	● OUT	P00010					
1	13	END						

2.Select [Debug]-[Set/Remove Breakpoints] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP
0	0	LOAD	D00002.2					
	1	MPUSH						
	2	AND	F00090					
	3	MOV	hFFEE	P0000				
	5	MLOAD						
	6	MOV4	hF	P00004				
	9	MLOAD						
	10	● OUT	P00000					
	11	MPOP						
	12	● OUT	P00010					
1	13	END						

12.3.2 Go

It starts program debugging using the specified Breakpoint. With the Run function, the program can be run up to the Breakpoint specified.

[Sequence]

1. Select [Debug]-[Go] on the menu. The program will be run till the Breakpoint complying with the condition is reached.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	● LOAD NOT	F00000						
	3	AND	F0009B						
	4	● OR	M00066						
	5	AND NOT	T0019						
	6	OUT	M00012						
2	7	LOAD	M00012						
	8	TON	T0019	450						
3	10	● LOAD	M00066						
	11	OR	M00067						
	12	AND NOT	P00034						
	13	OUT	M00067						
4	14	END							

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	◉ LOAD NOT	F00000						
	3	AND	F0009B						
	4	● OR	M00066						
	5	AND NOT	T0019						
	6	OUT	M00012						
2	7	LOAD	M00012						
	8	TON	T0019	450						
3	10	● LOAD	M00066						
	11	OR	M00067						
	12	AND NOT	P00034						
	13	OUT	M00067						
4	14	END							

2. Select [Debug]-[Go] on the menu again to go to the next Breakpoint.

12.3.3 Go to Cursor

It is used to make the program run up to the cursor position.

[Sequence]

1. Move the cursor to the position desired to run.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	LOAD NOT	F00000						
	3	AND	F0009B						
	4	OR	M00012						
	5	OR	M00066						
	6	◉ AND NOT	P0001D						
	7	AND NOT	P00009						
	8	AND NOT	T0019						
	9	OUT	M00012						
2	10	LOAD	M00012						
	11	TON	T0019	450						
3	13	LOAD	M00066						
	14	OR	M00067						
	15	AND NOT	P00034						
	16	OUT	M00067						
4	17	END							

2. Select [Debug]-[Go to Cursor] on the menu.

Rung	Step		instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0		LOAD	M00013						
	1		OUT	P00064						
1	2		LOAD NOT	F00000						
	3		AND	F0009B						
	4		OR	M00012						
	5		OR	M00066						
	6	●	AND NOT	P0001D						
	7		AND NOT	P00009						
	8		AND NOT	T0019						
	9		OUT	M00012						
2	10		LOAD	M00012						
	11		TON	T0019	450					
3	13		LOAD	M00066						
	14	○	OR	M00067						
	15		AND NOT	P00034						
	16		OUT	M00067						
4	17		END							

12.3.4 Step Progressing

If the Breakpoint is engaged during debugging, its progress will be made step by step. When debugging program, Step Into, Step Out and Step Over Instructions will be provided.

1) Step Into

It runs the program to the next step. If the present step is an application instruction CALL with the running condition satisfied, it will enter the subroutine block.

[Sequence]

1. Select [Debug]-[Step Into] on the menu.

Rung	Step		instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0		LOAD	M00013						
	1		OUT	P00064						
1	2		LOAD NOT	F00000						
	3		AND	F0009B						
	4		OUT	M00012						
2	5	●	LOAD	M00012						
	6	○	CALL	TEST						
3	7		END							
4	8		SBRT	TEST						
5	13		LOAD	F00099						
	14		ADD	M0000	1	M0000				
6	18		RET							

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	LOAD NOT	F00000						
	3	AND	F0009B						
	4	OUT	M00012						
2	5	● LOAD	M00012						
	6	CALL	TEST						
3	7	END							
4	8	○ SBRT	TEST						
5	13	LOAD	F00099						
	14	ADD	M0000	1	M0000				
6	18	RET							

Notes

- If not with CALL instruction or if the CALL running condition unsatisfied, the program will be run to the next step.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	LOAD NOT	F00000						
	3	AND	F0009B						
	4	OUT	M00012						
2	5	● LOAD	M00012						
	6	CALL	TEST						
3	7	○ END							
4	8	SBRT	TEST						
5	13	LOAD	F00099						
	14	ADD	M0000	1	M0000				
6	18	RET							

---

2) Step Out

It is used to step out of the subroutine block once entered with Step Into Instruction executed.

[Sequence]

1. Select [Debug]-[Step Out] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	LOAD NOT	F00000						
	3	AND	F0009B						
	4	OUT	M00012						
2	5	● LOAD	M00012						
	6	CALL	TEST						
3	7	END							
4	8	SBRT	TEST						
5	13	○ LOAD	F00099						
	14	ADD	M0000	1	M0000				
6	18	RET							

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	LOAD NOT	F00000						
	3	AND	F0009B						
	4	OUT	M00012						
2	5 ●	LOAD	M00012						
	6	CALL	TEST						
3	7 ●	END							
4	8	SBRT	TEST						
5	13	LOAD	F00099						
	14	ADD	M0000	1	M0000				
6	18	RET							

> **Notes**
>
> - If the presently debugged step is not inside the subroutine block, the program will be run to the next step.

3) Step Over

It is used to run the program to the next step. Differently from Step Into, even if the present step is a application instruction CALL, it will not enter the subroutine block but run the program to the next step.

[Sequence]

1. Select [Debug] - [Step Over] on the menu.

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	LOAD NOT	F00000						
	3	AND	F0009B						
	4	OUT	M00012						
2	5 ●	LOAD	M00012						
	6 ●	CALL	TEST						
3	7	END							
4	8	SBRT	TEST						
5	13	LOAD	F00099						
	14	ADD	M0000	1	M0000				
6	18	RET							

Rung	Step	instruction	OP 1	OP 2	OP 3	OP 4	OP 5	OP 6	OP 7
0	0	LOAD	M00013						
	1	OUT	P00064						
1	2	LOAD NOT	F00000						
	3	AND	F0009B						
	4	OUT	M00012						
2	5 ●	LOAD	M00012						
	6	CALL	TEST						
3	7 ●	END							
4	8	SBRT	TEST						
5	13	LOAD	F00099						
	14	ADD	M0000	1	M0000				
6	18	RET							

12.4   List of Break Points

The list shows all the Break Points being used in the program, where the user can decide to use or delete the Break Point.

[Sequence]

1. Select [Debug] - [Breakpoints List] on the menu.

[Dialog Box]
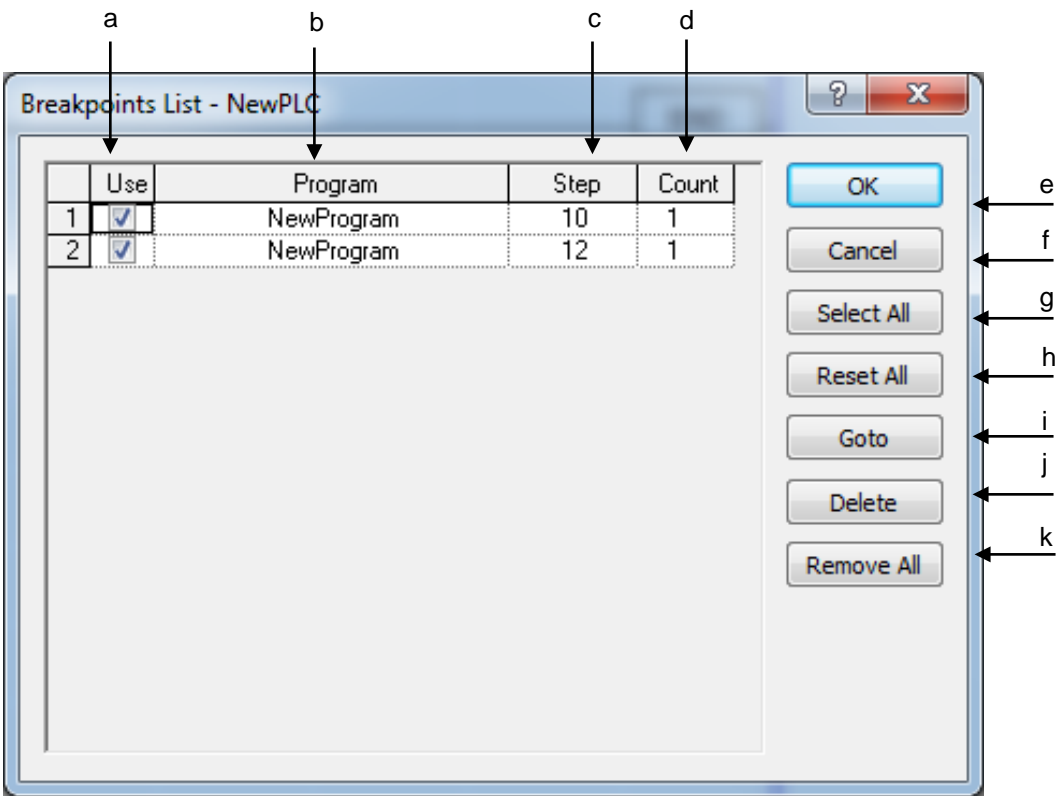
[Description of Dialog Box]

a. Use: If the checked item once allowed is cancelled in the check box, the break only will not be engaged although the breakpoint being used is not deleted.

b. Program: displays the name of the program where the breakpoint is used.

c. Step: displays the Step number where the breakpoint is caught.

d. Count: After executed the number of times as many as the specified steps where the breakpoint is caught, PLC will be then breaked. (*Example*; If the breakpoint is set inside FOR 20 ~ NEXT with the number of times 10, FOR 20 ~NEXT will be executed 10 times and then will be breaked.)

e. OK: saves the changed details and closes the dialog box.

f. Cancel: just closes the dialog box without saving the changed details.

g. Select All: checks all the listed items to allow.

h. Reset: cancels all the checked items previously allowed.

i. Go to: used to move to the position where the selected breakpoint is used.

j. Remove: deletes the selected breakpoints from the list.

k. Remove All: deletes all the breakpoints from the list.

Notes
- Up to 62 Breakpoints are available to be registered in PLC.

12.5   Device Break

Applicable debugging is available based on the data value and the application of the device.

1) Setting Device Break

[Sequence]

1. Select [Debug] - [Breakpoint Conditions] - [Device Break] on the menu.

[Dialog Box]
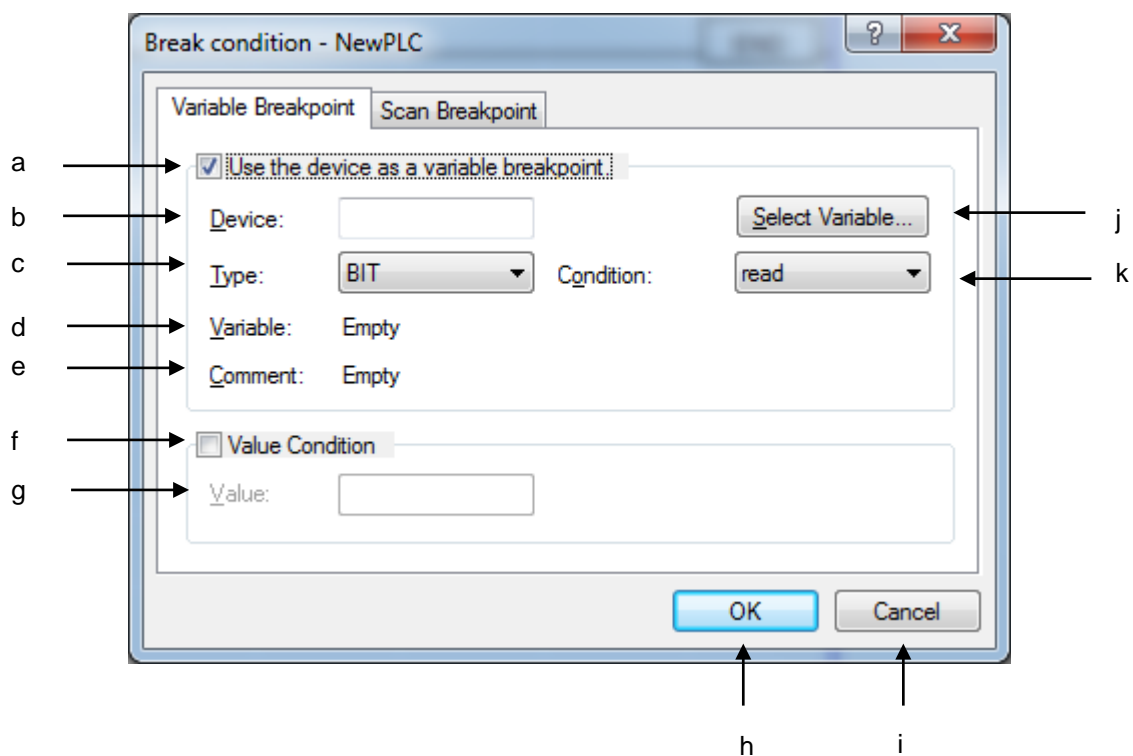
[Description of Dialog Box]

a. Use the device as a device break: If the check in the box is cancelled, the break even if saved, will not be used.

b. Device: shows the device name used for device break.

c. Type: shows the type of the device used for device break.

d. Variable: displays the variable name if device is with the variable name declared in Variable/Comment.

e. Comment: displays the comment if the device is with the comment declared in Variable/Comment.

f. Use Value Break: If the check in the box is cancelled, the value even if saved, will not make the device break engaged.

g. Value: if the specified device value is reached, the break will be engaged. The maximum/minimum value is based on the device type.

h. OK: saves the changed details and closes the dialog box.

i. Cancel: just closes the dialog box without saving the changed details.

j. Find: finds a desired device on the Variable/Comment list.

k. Condition: makes the break engaged when writing the value on or reading the value from device.

2) Device Break Run

[Sequence]

1. Specify the device break.

2. Select [Debug]-[Go] on the menu. PLC runs debugging.

3. If specified device break conditions are met, a message will be displayed to inform that the device break is engaged, when PLC stops running.
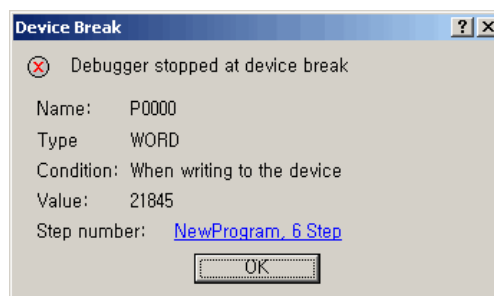
Notes
‐ Among device types, BYTE, NIBBLE and STRING do not support the device break instruction.
‐ While PLC runs debugging, just one condition if only satisfied among breakpoint, device break, scan break, etc., will apply the break.
‐ Click the left mouse button on the program name to move to the program position where the device break is applied.
‐ If the value is changed in other application programs (such as device monitor) than the specified device program, movement to the program position where the device break is applied may not be possible.

12.6 Scan Break

This function is used to run PLC as many as the scan times specified, and apply the bake.

[Sequence]

1. Select [Debug] - [Break Conditions] on the menu.

2. Select [Scan Break] tap.

[Dialog Box]
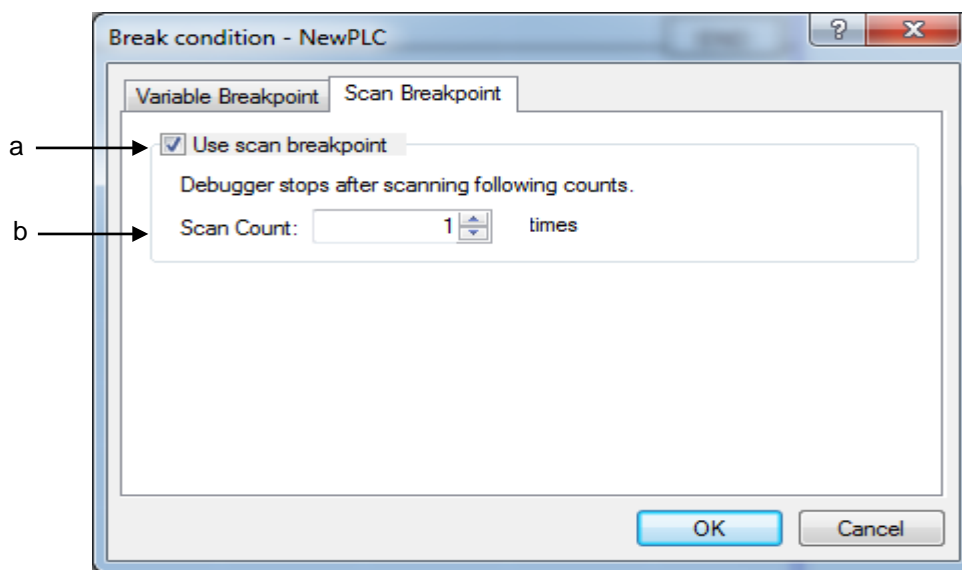
[Description of Dialog Box]

a. Use Scan Break: If the check in the box is cancelled, the specified scan break times even if saved, will not be executed while PLC runs debugging.

b. Count: used to input scan times to apply the break. 1 ~ 2147483647 is available for the setting value.

[Scan Break Run]

1. Check Use Scan Break and specify the scan times to apply the break.

2. If [Debug]-[Go] is selected on the menu, PLC runs debugging.

3. PLC will inform that the scan break is engaged after executed as many as specified scan times.
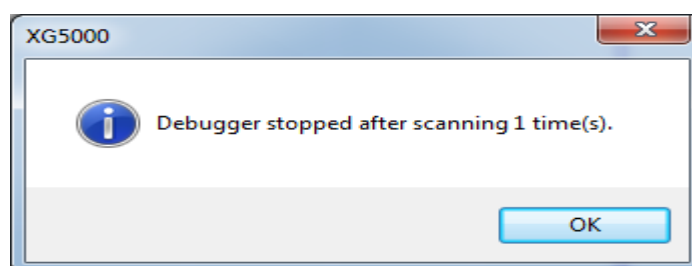
Chapter 13 Online Editing

This function is used to edit the PLC program with PLC operation status in Run mode.

13.1 Sequence of Online Editing

```
┌─────────────────────┐
│  a. Open Project    │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│    b. Connect       │
└─────────────────────┘
          │         ╲
          │          ┌─────────────────────┐
          │          │  c. Start Monitoring │
          │          └─────────────────────┘
          ▼         ╱
┌─────────────────────┐
│ d. Start Online     │          * Start Online Editing will start after active.
│    Editing          │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│     e. Edit         │◀─────┐
└─────────────────────┘      │     * Start Online Editing and Write Modified Program can be repeated.
          │                  │
          ▼                  │
┌─────────────────────┐      │
│ f. Write Modified   │──────┘
│    Program          │
└─────────────────────┘
          │
          ▼
┌─────────────────────┐
│ g. End Online       │
│    Editing          │
└─────────────────────┘
```
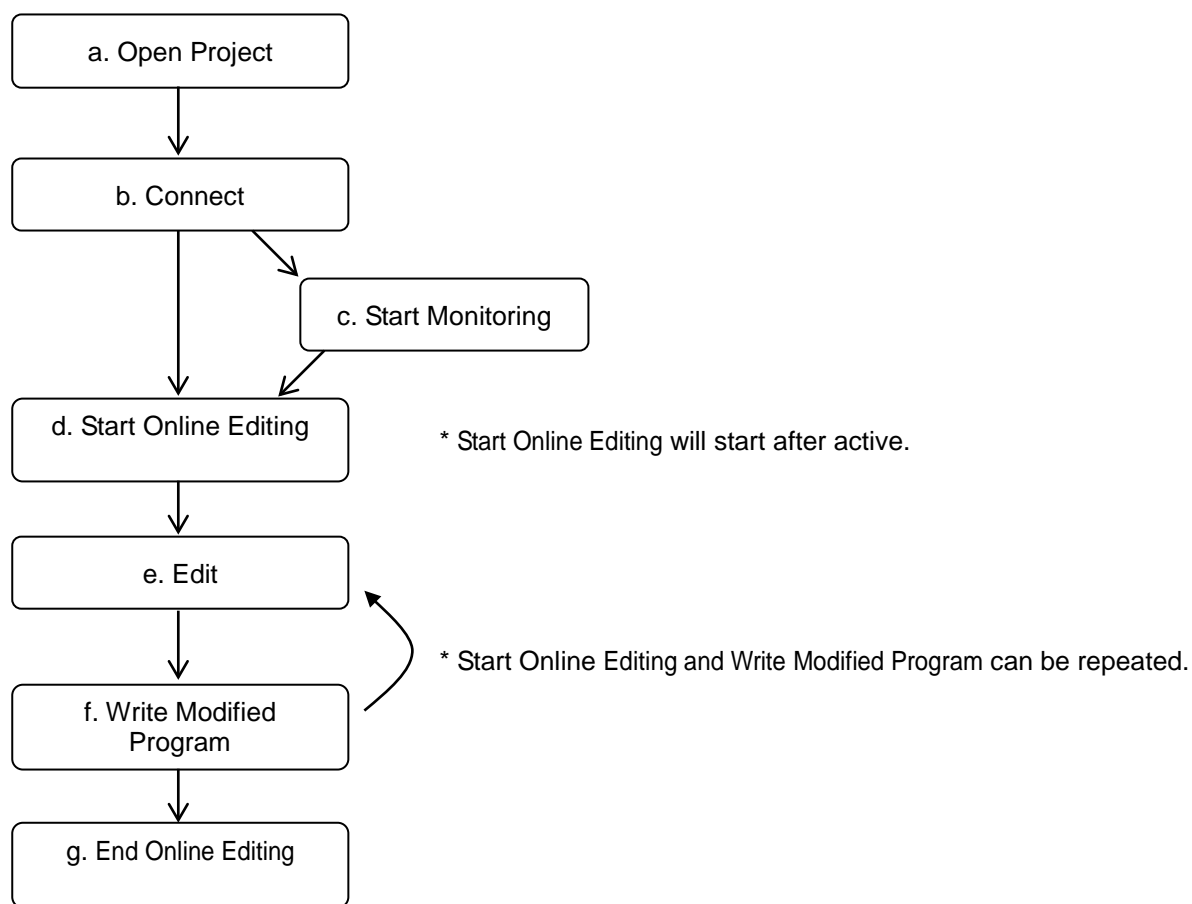
[Description of Sequence]

a. Open Project

- Select [Project]-[Open Project] on the menu. Open the project identical to the PLC project to perform

  Online Editing. Select [Project]-[Open from PLC] on the menu.

b. Connect

- Select [Online]-[Connect] on the menu to connect with PLC.

c. Start Monitoring

- Select [Monitor]-[Start Monitoring] on the menu.

- Online Editing is available while monitoring.

- Start/Stop Monitoring is available during Online Editing.

d. Start Online Editing

- Select [Online]-[Start Online Editing] on the menu.

   A message box figured below will be displayed if opened project is different from the project saved in the PLC.
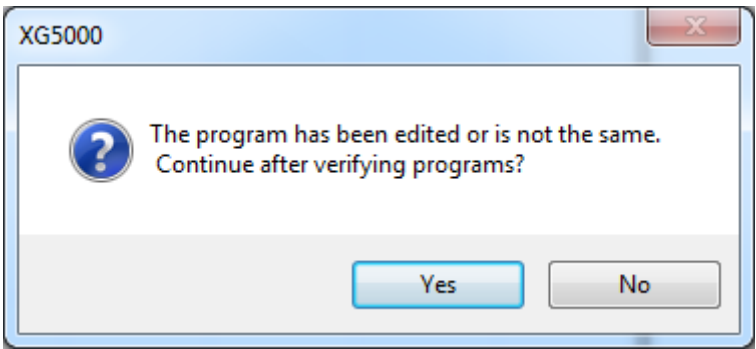
   If 'Yes' button is clicked, Online editing will be continue after comparing the projects.

   If 'NO' button is clicked, Online editing will be stopped. In this case, Online editing is possible after reading project from PLC.

- Online Editing will be available after its program window is active and the program is selected.

- After Online Editing starts, the program window will be changed to edit mode during Run.
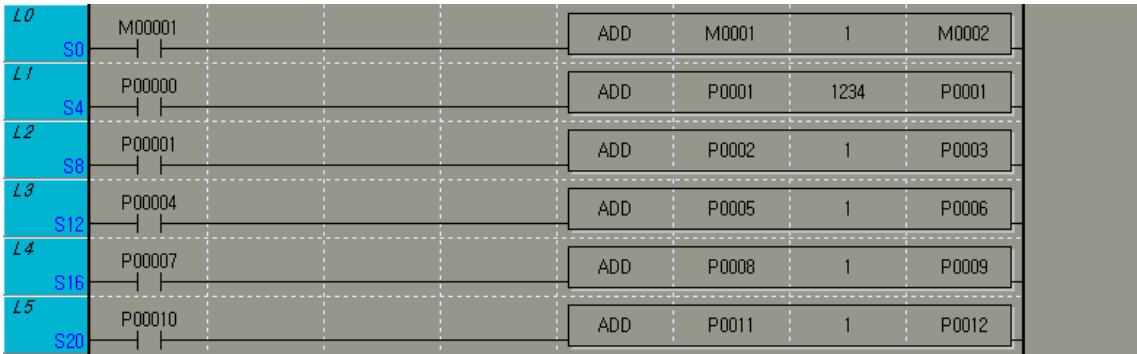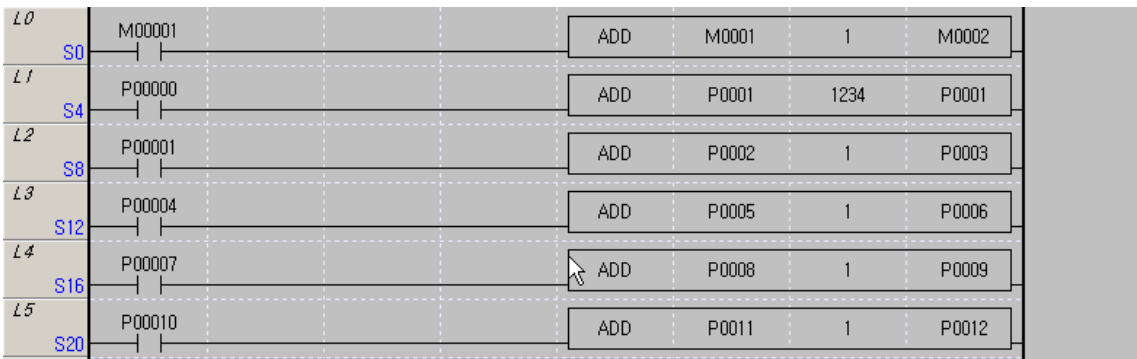
- 2 or more programs can not be modified at the same time during run.

- If Online Editing starts, the background color of the program can be changed through its

  applicable option.

e. Edit

- Edit Online Editing is the same as specified in the off-line Edit.

f. Write Modified Program

- Select [Online]-[Write Online Editing] on the menu.

- The applicable program only will be transferred to PLC.

g. End Online Editing

－ Select [Online]-[End Online Editing] on the menu.

Notes

－ During Write Online Editing, the Comment (Rung Comment, Output Comment, Non-Comment …) will
   not be written on PLC. Write the Comment Directly through [Online]-[Write] on the menu.

－ During Edit Online Editing, the monitor value may not be correct. In order to monitor the correct
   value, Write Online Editing should be executed.

－ Simultaneous online editing more than 1 program block is prohibited.

－ Adding or deleting of program block on online editing is prohibited.

－ The '*' mark will be displayed in the head of online-edited rung, and the mark will be disappeared when
    online writing is executed or online editing is finished.
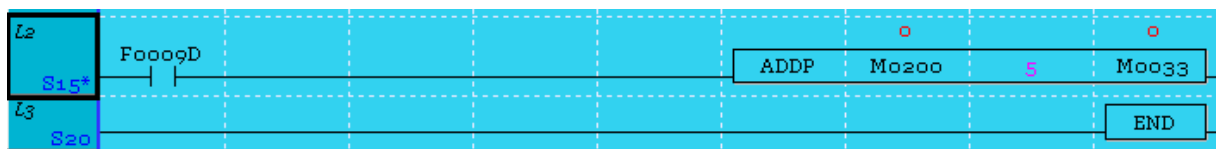
Chapter 14 Print

14.1 Print Project

This instruction is used to print all the contents in the project in regular sequence.

It is also used to select items to be printed, specify necessary setting options for printing per item, and execute Preview and Print instruction.

[Steps]

1. Select [Project]-[Print Project] on the menu.
2. Print Project dialog box will appear.
3. Specify each item.

[Dialog Box]
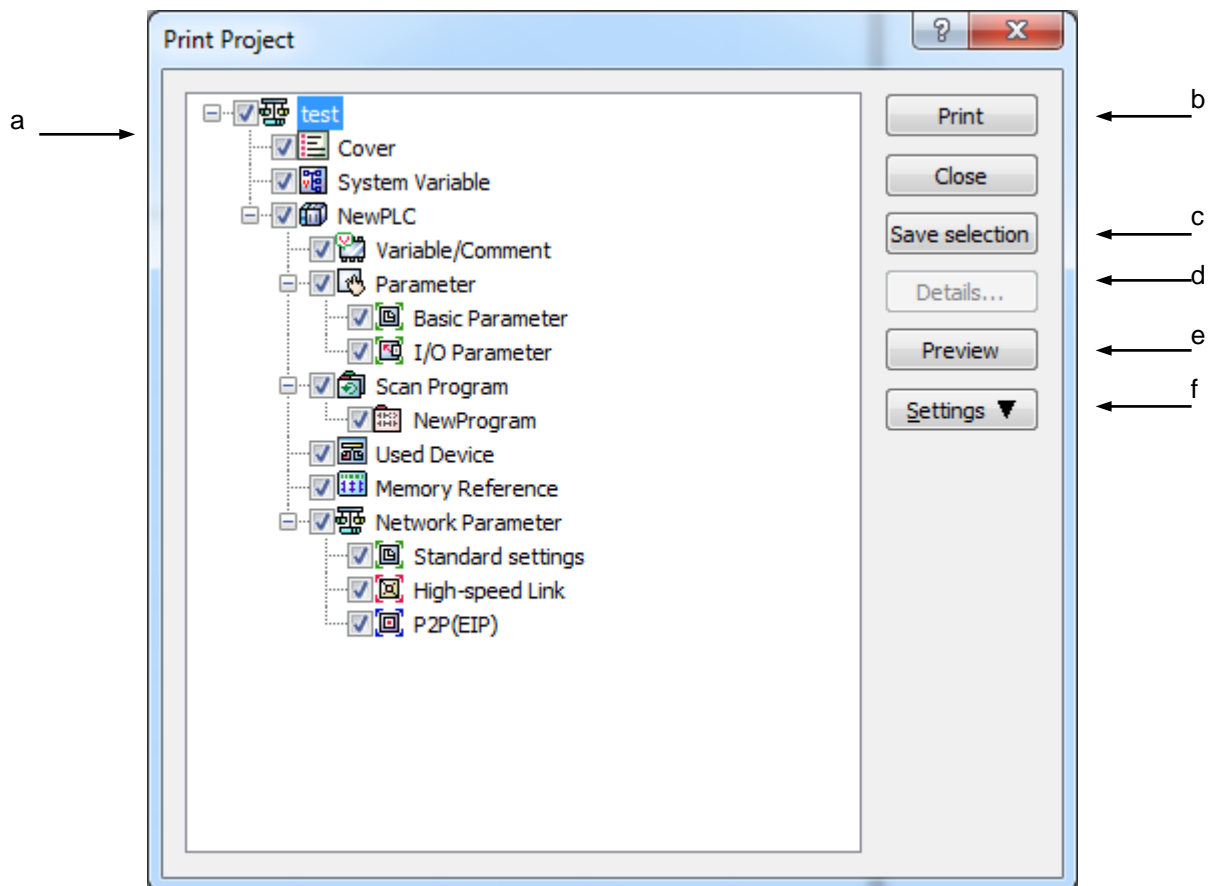
[Description of Dialog Box]

a. Project Level Diagram: displays level structure of the item printable in the Project. Detailed setting functions are available in the tree structure of the Level Diagram. Print and Previous View functions are available for the selected item.

b. Print: prints the selected item in the Project Level Diagram.

c. Save Selection Item: saves the selected item in the Project Level Diagram.

d. Details: used to specify details of the selected item in the Project Level Diagram.

e.Preview: used to view the selected item previously to print in the Project Level Diagram.

f. Settings: sets the general print options such as Printer Setting, Print Page Setting, Margin Setting, etc.

Notes

– Details button in the Project Level Diagram will be active only with the right mouse button positioned on [Cover], [Program], [I/O parameter] as selected presently.

– Refer to each print option for setting each detailed item. (Program Print Setting ➔ Refer to Program Print)

– Device and Memory Reference used in the Project Level Diagram are identical to those on the window displayed when [View]-[Used Device] and [View]-[Cros Reference] are executed on the menu.

14.1.1 Print Setting

It is used to specify paper to print on and the printer.

[Steps]

Click 'f. Setting' on the main Print Dialog Box or click the right mouse button in the 'a. Project Level Diagram'.

[Dialog Box]

Details...	← a
Page Setup...	← b
Header/Footer...	← c
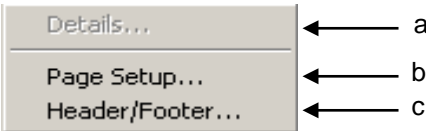
[Description of Dialog Box]

a. Details: Refer to Print Setting for each item.

b. Page Setting: used to specify paper to print on.

c. Header/Footer: used to input String displayed on the Header and Footer.

14.1.2 Page Setup

It is used to specify margins of paper to print on.

[Steps]

1. Click 'f. Setting' on the main Print Dialog Box or click the right mouse button in the 'a. Project Level Diagram'.
2. Select [Page Setup] on the menu.

[Dialog Box]
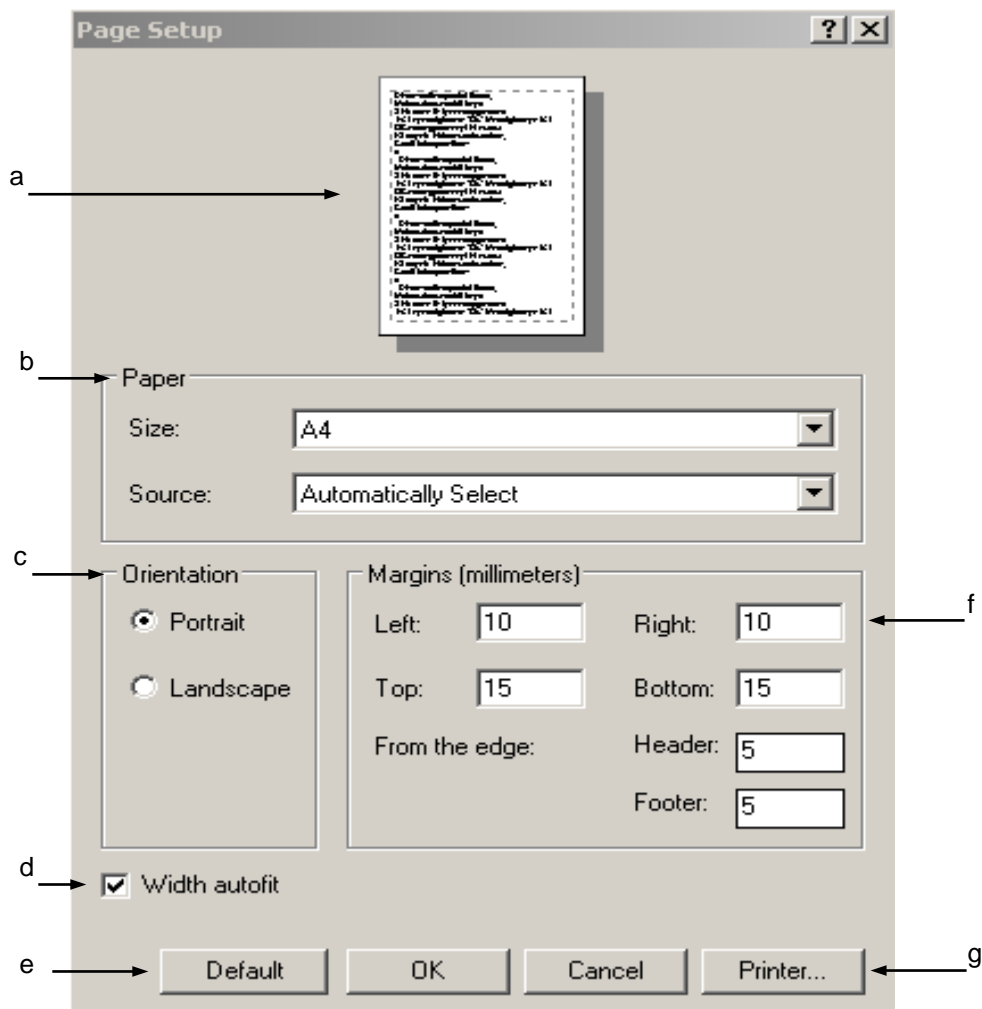
[Description of Dialog Box]

a. Where the selected paper and layout of margins can be viewed previously.

b. Used to select paper to print on.

c. Used to select a printing direction.

d. Zooms out the screen to adjust to the paper width printed.

e. Back to Default: details of Margins, Header and Footer are changed back to default, the basic value specified when the program installed

f. Margin Setting: specifies margins of paper printed.

g. Printer: used to change the setting options of the printer.

Notes

‒ Be careful not to let the print contents overwritten with header or footer when printed, with due regard to margins.

‒ If there are no content in header/footer, no header/footer will be printed.

14.1.3 Header/Footer Setting

It is used to specify the content of Header/Footer.

[Dialog Box]
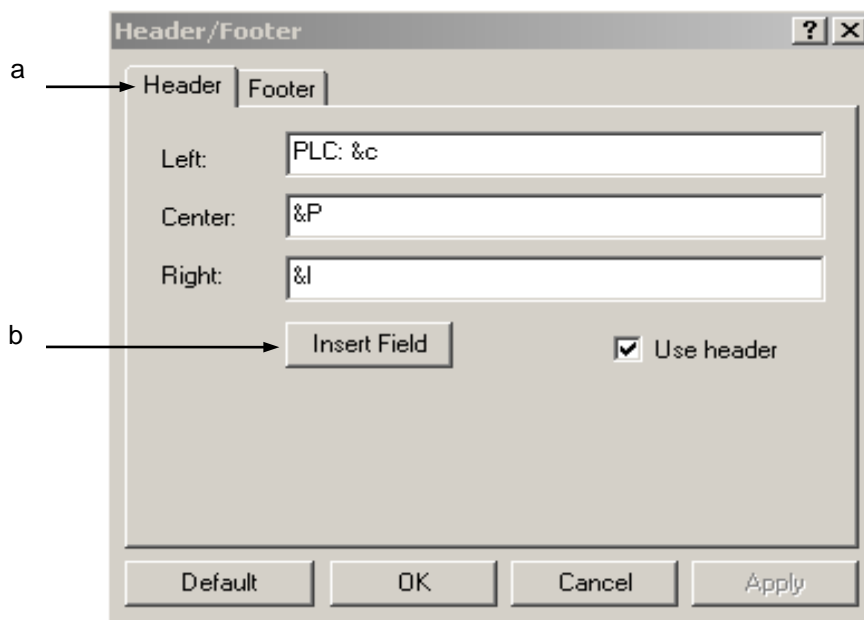
[Description of Dialog Box]

a. Content Setting: used to input the content in the left/center/right of the Header/Footer.

b. Insert Field: used to insert the field into the position of the cursor presently placed on the Edit Box (left, center, right).
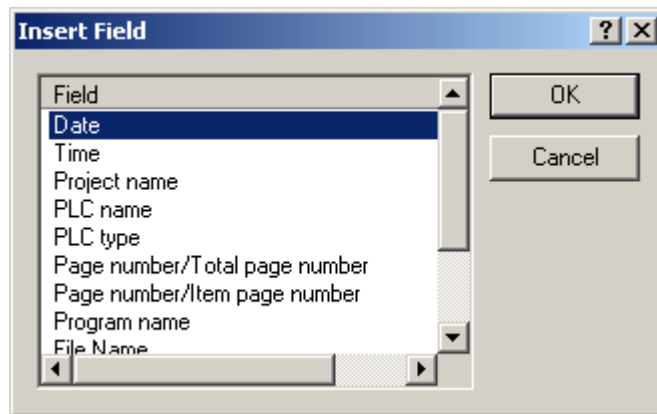
Notes

- If the content of the header/footer is long, the header/footer in the left, center or right may be printed as overwritten with each other.
- The user can specify the content of the header/footer using Input and Field at the same time.
  Example) If the content of "The date today is &d" is input on the header/footer
  ➔ "The date today is 2004-06-01"will be printed.
- Field Content
- Date: &d ➔ yyyy-mm-dd
- Time: &t ➔ hh:mm:ss
- Project name: &p
- PLC name: &c
- PLC type: &T
- Page number/Total Page number: &n ➔ Page number/Total Page number of the selected items
- Page number/Item page number: &N ➔ Page number/Item page number of one item
- Program name: &P ➔ displayed only in program print mode.
- File Name: &f ➔ file name of the present project
- Path and file name: &F ➔ file name displayed with its directory route.
- Project comment: &C ➔ Project comment will be printed if any. The comment if too long may not be correctly printed.

14.1.4 Cover Setup

It is used to specify the print cover.

[Steps]

1. Select [Cover] in the Project Level Diagram on Print Dialog Box.
2. Click Details button, or press Enter key.

[Dialog Box]
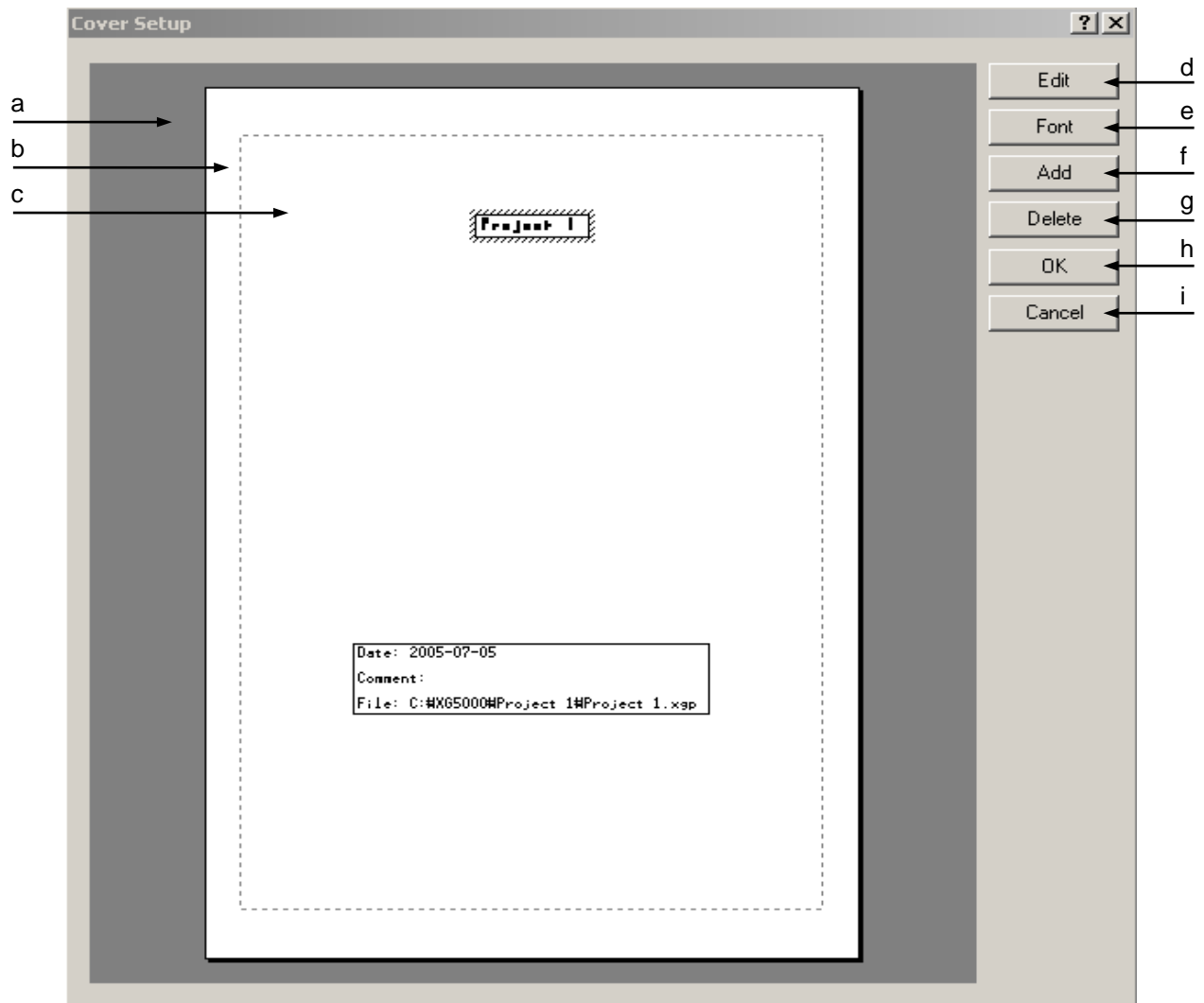
[Description of Dialog Box]

a. Cover Paper: Default is A4 vertical. Printed differently based on the paper setup. If the Edit Box exceeds the paper, the exceeded area will not be printed.

b. Margin Display: displays the specified margins with a dotted line.

c. Edit Box: displays the content printed on the cover, where the content, font and position can be changed.

d. Edit: used to edit the content of the presently selected Edit Box. Double-click the mouse on "c. Edit Box" or press Enter key when the Edit Box is selected to execute Edit. If the Field is inserted, Edit is also available.

e. Font: changes font of the presently selected Edit Box.

f. Add: adds a new Edit Box to the print cover.

g. Delete: deletes the presently selected Edit Box.

h. OK: applies the changed items and closes the dialog box.

i. Cancel: closes the dialog box.

[Content Add Steps]

1. Press [Add] button.

2. Move the mouse on the paper.

3. The mouse cursor will change as shown.

4. Click the left mouse button on the paper.

5. Edit Dialog Box will appear
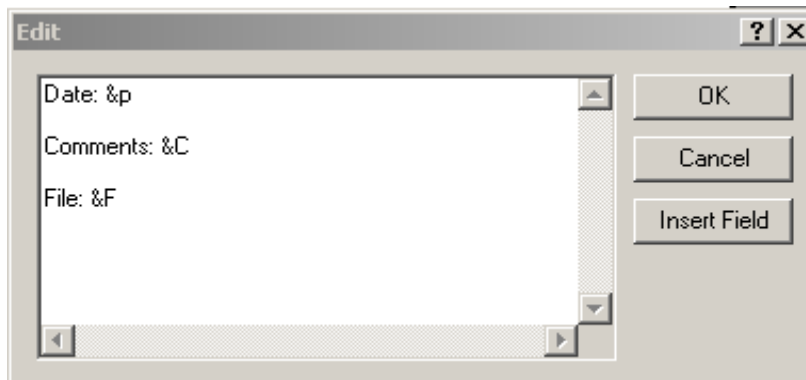
6. Pressing ESC will change the mouse cursor to the arrow shape again.

Notes

- Edit Box can be aligned in the paper and the Edit Box.

  ➔ It will be available through the menu displayed by the right mouse button pressed on the paper.
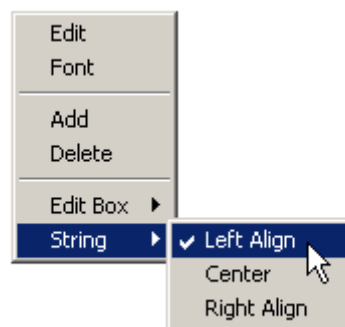
- [Edit Box]-[Center]: aligns the selected Edit Box on the center of paper.

- [String]-[Left Align]: aligns the content of the selected Edit Box on the left in the Edit Box.

- The edge of the Edit Box will not be printed.

- Edit Box can be moved by Drag and Drop instruction of the mouse or with the arrow keys.

- Undo and Redo are not available.

- If string including field is previously viewed, the field will be displayed as analyzed. If edited, the field will be displayed back.

14.2   LD Program Print

It is used to print the selected LD program.

14.2.1   Print Setting

[Steps]

1. Select the program item to print.

2. Select [Project]-[Print] on the menu .

[Dialog Box]
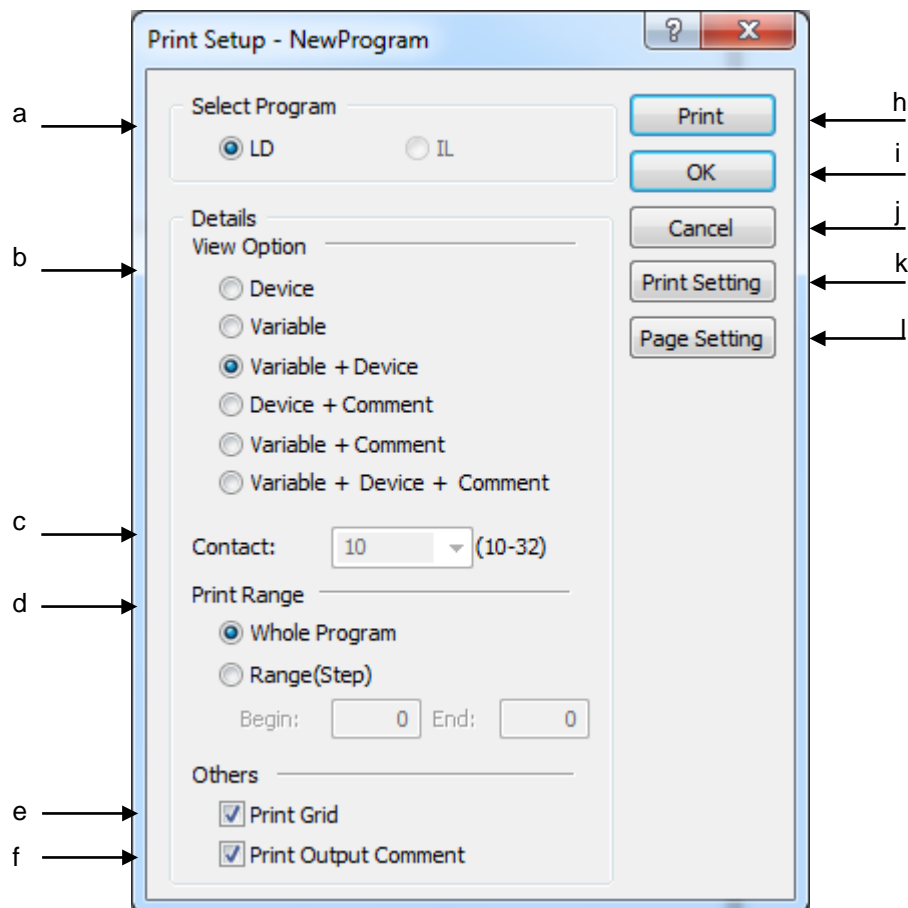
[Description of Dialog Box]

a. Select Program: selects a program to print. In LD program, IL program print can not be selected.

─ Click Details button to select a print program for Print Project.

b. View Options: used to specify View Options for printing. Refer to 5.3 Program View Options in this manual for each View Option.

c. Contact: used to specify the number of contacts in a line. The number of contact is fixed to the number currently displayed if printing is executed in the LD program.

d. Print Range: specify print range

e. Print Color: used to decide to apply Color print or not. If the check box is selected, the print will be in color, and if not, it will be in black-and-white.

f. Print Grid: used to decide to apply Grid Print or not.

h. Print: starts to print with the presently specified options applied.

i. OK: applies the presently specified options and closes the Dialog Box.

j. Cancel: closes the Dialog Box.

k. Printer Setting : used to specify the printer setup options.

l. Page Setting: used to call 'Page setup' dialog box. The size of paper and space of print page can be setup in the 'Page Setup' dialog box.

14.2.2 Preview

It is used to previously view the content of the print specified.

[Steps]
1. Select [Project]-[Preview] on the menu.

Chapter 15 XG-SIM

15.1   Getting Started

15.1.1 Features of XG-SIM

XG-SIM is a Windows-based virtual PLC for XGT PLC series. If using XG-SIM, an operator may execute a created program without PLC and debug a PLC program by using the functions of input setup and module simulation.

XG-SIM supports the following functions.

1) **Program simulation**

An operator can simulate a program created by LD/SFC/ST languages. In addition, it supports modification function during run, with which an operator may apply modification during run of a program that is operated in XG-SIM, and it supports debugging function that trace a user-created program by unit of step.

2) **PLC Online function**

Besides program monitoring function provided by XG5000, an operator may user online diagnosis functions such as system monitor, device monitor, trend monitor, data trace and user event.

3) **Module simulation**

It also supports simple simulation function for modules mountable on XGK rack type PLC, such as digital I/O module, A/D conversion module, D/A conversion module, high speed counter, temperature control module and positioning module. If using the module simulation function, a program may be simulated by using input values from module.

4) **I/O input condition setup**

The value of device may be set with value of specific device or channel value in a module set as input conditions. Using I/O input condition setup function may realize the program simulation as created with no PLC program separately created to test a created PLC program.

15.1.2 System Requirements for the Execution of XG-SIM

Minimum requirements: Pentium3 900MHz, 256MB RAM

Recommended requirements: Pentium4 1.5GHz, 512MB and higher RAM

XG-SIM requires higher system specifications than XG5000. If the minimum requirements are adopted, scan cycle may be extended longer than the set fixed cycle and constant scan may not work properly, probably resulting interruption of access. In addition, even the recommended requirements may suffer from the same symptoms. Then, irrespective of system requirements, access may be interrupted according to user's setting such as SLEEP mode.

Notes
– If using fixed cycle, fixed cycle error/warning dialog box is not displayed.

15.1.3 XG-SIM Execution

1. By executing XG5000, create a program to run on XG-SIM.
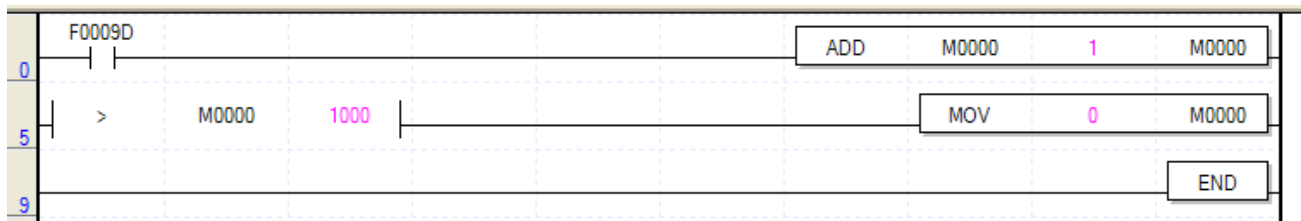
2. Select [Tools] – [Start Simulator] in XG5000 Menu. If XG-SIM is started, a created program is automatically downloaded onto XG-SIM. After XG-SIM is executed, it goes to Online, Access and Stop.

3. By selecting [Online] – [Change Mode] – [Run] in XG5000 Menu, execute the downloaded program. For available online menus of XG5000 when XG-SIM is executed, refer to the following table.

Menu	Support	Menu	Support
Open from PLC	○	Fault mask setup	X
Convert mode (run)	○	Module change wizard	X
Convert mode (stop)	○	Start modification during run	○
Convert mode (debug)	○	Write modification during run	○
Disconnect	X	End modification during run	○
Read	X	Start/end monitor	○

Menu	Support	Menu	Support
Write	○	Pause monitor	○
Compare to PLC	X	Resume monitor	○
Flash memory setup (set)	X	Monitor pause setup	○
Flash memory setup (cancel)	X	Change current value	○
PLC Reset	X	System monitor	○
PLC Removal	○	Device monitor	○
PLC info (CPU)	○	Special module monitor	○
PLC info (Performance)	○	User event	○
PLC info (password)	○	Data trace	○
PLC info (PLC clock)	○	Start/end debug	○
PLC history (error log)	○	Debug (run)	○
PLC history (mode conversion log)	○	Debug (step over)	○
PLC history (power off log)	○	Debug (step in)	○
PLC history (system log)	○	Debug (step out)	○
PLC error warning	○	Debug (move to cursor)	○
I/O info	○	Set/cancel break point	○
Forced I/O setup	○	Break point list	○
I/O skip setup	○	Break condition	○

15.2 XG-SIM

15.2.1 Program Window Configuration

XG-SIM program is configured as follows.
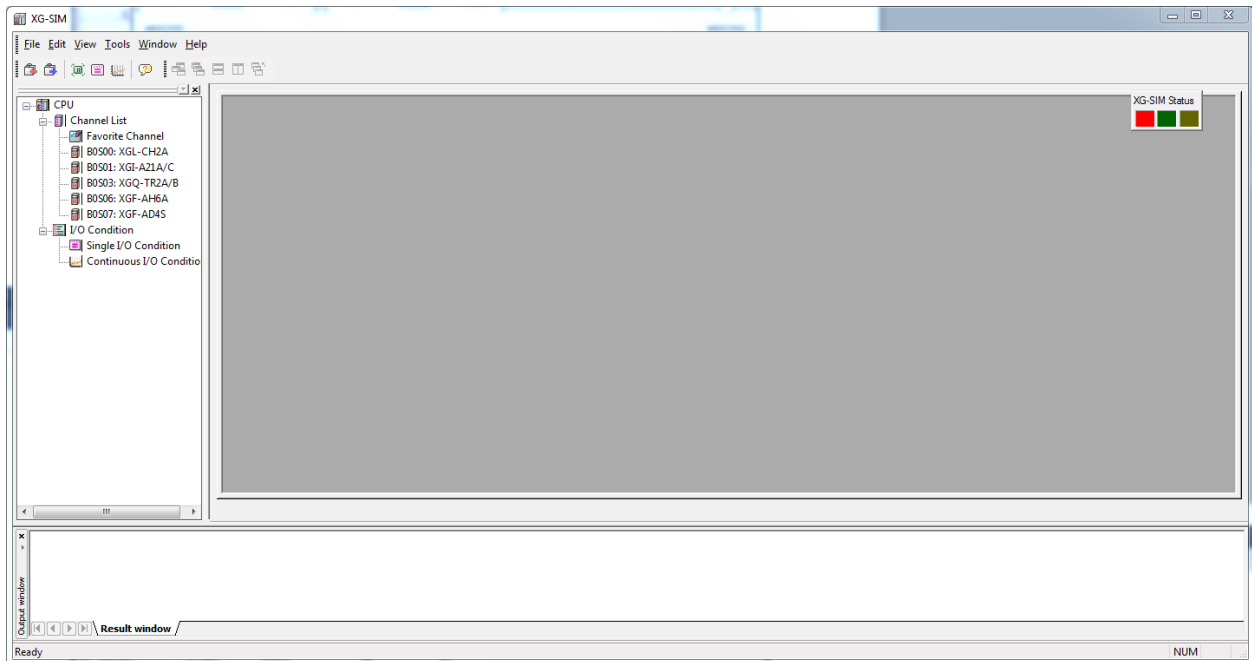
5) Channel list

It displays channels by modules and user's favorable channels. In case of module, it displays the only modules set in I/O parameter. Module is displayed in a format of 'B0 (base number) S00 (slot number): module name.'

6) I/O condition

It displays single/continuous I/O conditions.

7) Status display

It displays the status of simulator.

Status	Description	Display
Initial	Shows initial status. Not accessible by simulator	
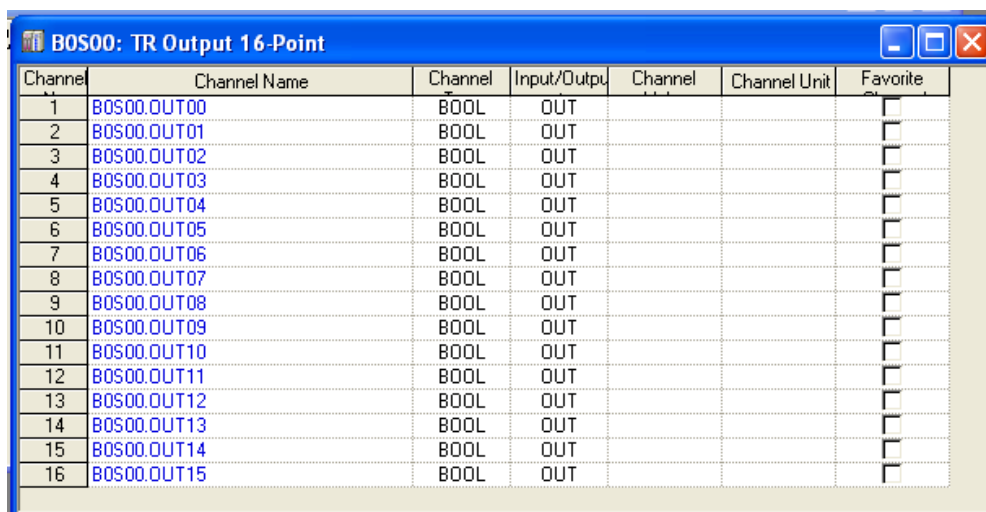
Status	Description	Display
Accessible	Shows the status of access ready. Red LED lights up.	
Single I/O condition executed	Shows single I/O condition is executed, during which green LED blinks.	
Continuous I/O condition executed	Shows continuous I/O condition is executed, during which yellow LED blinks	

15.2.2 Channel List

1) Module Channel

Double-click an item to view its channel in the tree view.

To register a channel as a favorable channel, check the 'checkbox' of favorable channel.

.

2) Channel monitor

1.Start monitor

[Steps]

a.Select [Tools] – [Start channel monitoring] in Menu.

2.Change current value of channel

[Steps]

a.Select a channel of which current value is to be changed.

b.Move from a selected channel to a column of current value.

c.By double-clicking or pressing Enter key, display the dialog box of change channel value.
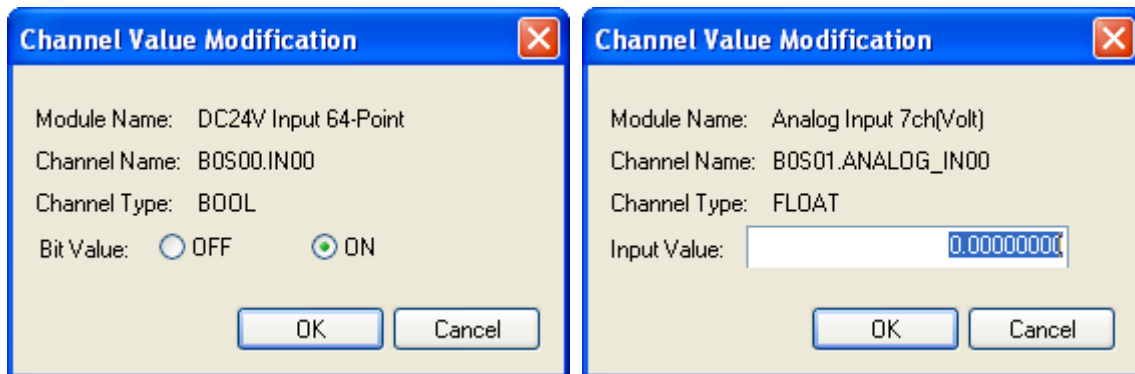
[Description of Dialogue Box]

a. Module name: displays a selected module's name.

b. Channel name: displays a selected channel's name.

c. Channel type: displays the data type of a selected channel

d. Bit value: selects ON/OFF in case of bit type

e. Input value: directly enters a value in case of other types

---

Notes

- If I/O direction is OUT, the current value of a channel may not be changed.

3.End monitor

[Steps]

Select [Tools] – [End channel monitor] in Menu.

15.2.3 I/O Condition

I/O condition means the function to forcibly record a user-present value into a specific device when meeting conditions that are entered by a user. For instance, in a statement, 'if Device%IX0.0.0 is 1, set all the values of device %MX0 ~ %MX100 as 1', 'if Device%IX0.0.0 is 1' constitutes the condition and 'set all the values of device %MX0 ~ %MX100 as 1'is 'recording the user-preset value forcibly.'

XG-SIM provides I/O condition function to eliminate discomfort that to test a user-created PLC program, a user should periodically change device value by changing the monitor current value of XG5000 or should create another PLC program to test PLC program. In addition, with I/O condition, it may advantageously reflect the data sending to a module or receiving from a module to a program.

1) Conditional statement

It describes conditional statement used in single input condition or continuous input condition. A conditional statement consists of one or more conditions while a conditional statement may be used as one or more statements through the combination of conditions

Type	Operator	Priority	Description
Single comparison	==	4	Equal to
	!=	5	Not equal to
	>	6	Larger than
	>=	7	Equal to or larger than
	<=	8	Equal to or smaller than
	<	9	Smaller than
Four operations	+	2	Add
	-	3	Subtract
	*	0	Multiply
	/	1	Divide
Bit operation	&	12	Bit multiply
	|	13	Bit sum
	^	14	Beta bit sum
Logic operation	&&	10	Logical multiply
	||	11	Logical sum
Others	(	-	
	)	-	

Where, device or channel is to be compared. For instance, if expressing 'M0000 is larger than 100 and device M000010 is On' as a conditional statement, it may be expressed as follows.

(M0000 > 100) && (M000010 == TRUE)

In case of device, indicates memory size with the following expression

Type	Data size	Reference
X	1 bit	Default type of device supporting bit
B	1 byte	Designate lower byte of word device
W	2 byte	Default type of device not supporting bit
D	4 byte	-
L	8 byte	-

2) Basic functions

Both single I/O condition and continuous I/O condition keep the following interface.

1. Input I/O condition

[Steps]

a.Move to a position to enter new I/O condition.

b.Select [Edit] – [Properties] in Menu.

c.Edit I/O condition dialog box and click OK.

2. Edit I/O condition

[Steps]

a. Select I/O condition to edit.

b. Select [Edit] – [Properties] in Menu.

c. Change an item in the I/O condition dialog box and click OK.

3. Cut/Paste I/O Condition

[Steps]

a. Select the I/O condition to cut.

b. Select [Edit] – [Cut] in Menu.

c. Move to a position to paste and select [Edit] – [Paste] in Menu.

4. Copy/Past I/O Condition

[Steps]

a. Select I/O condition to copy.

b. Select [Edit] – [Copy] in Menu.

c. Move to a position to paste and select [Edit] – [Paste] in Menu.

5. Delete I/O Condition

[Steps]

a. Select I/O condition to delete.

b. Select [Edit] – [Delete].

Conditio	Condition	Condition Name	Condition Status	Condition Comment
1	☐			
2	☑	Cut		
3	☑	Cut		
4	☐			
5	☐			
6	☐			
7	☐			

Context menu:
- Cut   Ctrl+X
- Copy   Ctrl+C
- Paste   Ctrl+P
- Delete   Delete
- Insert Line   Ctrl+L

Conditio	Condition	Condition Name	Condition Status	Condition Comment
1	☐			
2	☐			
3	☑	Cut		
4	☐			
5	☐			

6. Insert line

[Steps]

a. Select a position to insert a line

b. Select [Edit] – [Insert Line] in Menu.

Conditio	Condition	Condition Name	Condition Status	Condition Comment
1	☐			
2	☐			
3	☑	Cut		
4	☐			
5	☐			
6	☐			
7	☐			
8	☐			

Context menu:
- Cut   Ctrl+X
- Copy   Ctrl+C
- Paste   Ctrl+P
- Delete   Delete
- Insert Line   Ctrl+L

Conditio	Condition	Condition Name	Condition Status	Condition Comment
1	☐			
2	☐			
3	☐			
4	☑	Cut		
5	☐			

7. Delete line

[Steps]

a. Select a position to delete a line.

b. Select [Edit] – [Delete Line] in Menu.

Conditio	Condition	Condition Name	Condition Status	Condition Comment
1	☐			
2	☐		Cut	Ctrl+X
3	☐		Copy	Ctrl+C
4	☑	Cut	Paste	Ctrl+P
5	☐		Delete	Delete
6	☐			
7	☐		Insert Line	Ctrl+L
8	☐		Delete Line	Ctrl+D
9	☐		Condition Up	Ctrl+U

Conditio	Condition	Condition Name	Condition Status	Condition Comment
1	☐			
2	☐			
3	☑	Cut		
4	☐			
5	☐			

3) Single I/O Condition

Single I/O condition copies the value entered into a selected device/channel if meeting the operation option.

[Description of Dialog Box – Basic Setting]

a. Use condition: sets whether to apply single I/O condition. If not allowing the use, XG-SIM does not use the condition set by a user.

b. Name: enter the name of I/O condition.

c. Description: enter a simple comment for I/O condition.

d. Always execute: sets it to start operation as soon as it is executed, irrespective of user-designated condition.

e. Execution by Button: sets it to execute a preset condition only when a user presses buttons.

f. Execution by condition expression: sets it to execute a condition only when meeting a user-present conditional statement.

g. View Channel Browser: displays a channel finder. The related buttons are activated only when selecting the operation by its conditional statement.
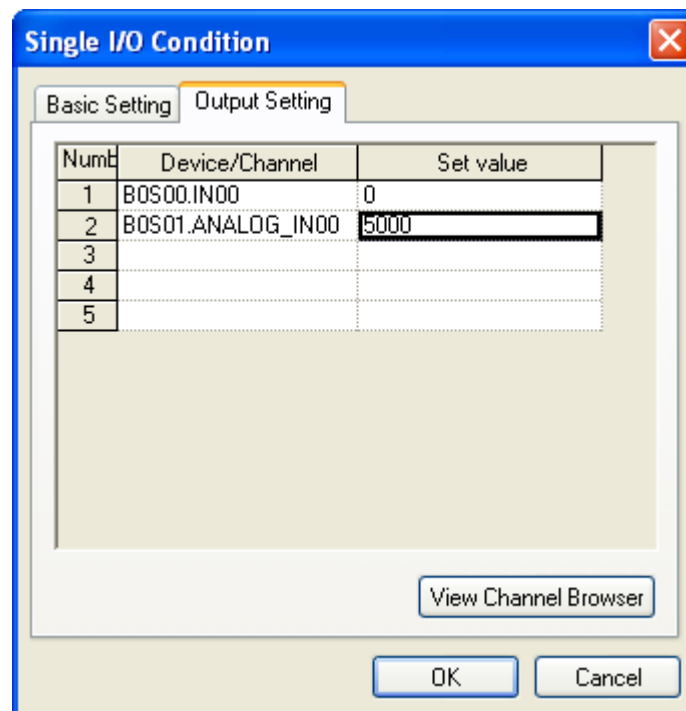
[Description of Dialog Box – Output Setting]

a. Device/Channel: enter the name of channel/device to record output value.
b. Set value: enter a value to set. Device, channel or constant may be entered.

4) Continuous I/O condition

Continuous I/O condition enters a value entered into the selected device/channel when meeting the operation option.
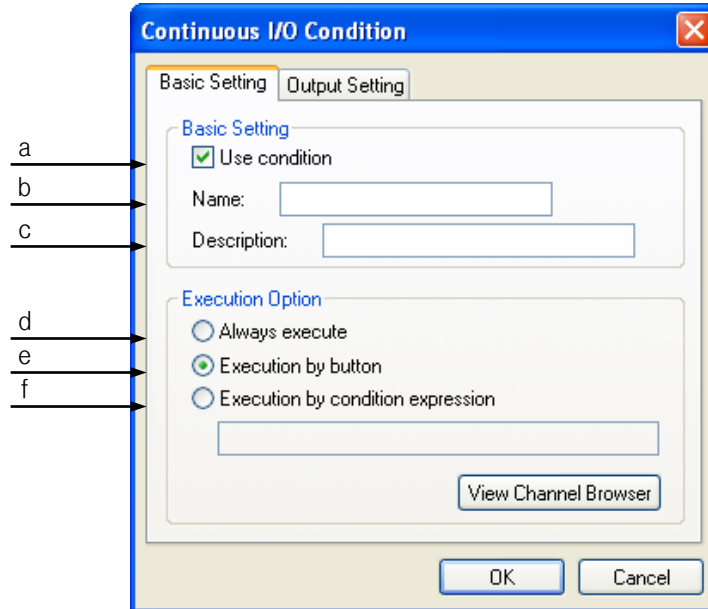
[Description of Dialog Box – Basic Setting]

a. Use condition: sets whether to apply continuous I/O condition. If not allowing the use, XG-SIM does not use the condition set by a user.

b. Name: enter the name of I/O condition.

c. Description: enter a simple comment for I/O condition.

d. Always execute: sets it to start operation as soon as it is executed, irrespective of user-designated condition.

e. Execution by Button: sets it to execute a preset condition only when a user presses buttons.

f. Execution by conditional expression: sets it to execute a condition only when meeting a user-present conditional statement.

g. View Channel Broswer: display a channel finder. The related buttons are activated only when selecting the operation by its conditional statement.
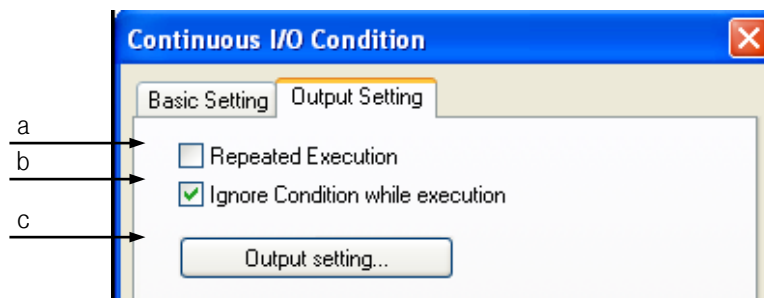
[Description of Dialog Box – Output Setting]

a. Repeated Execution: selects whether to enter output repetitively.

b. Ignore Condition while execution: selects whether to inspect operation condition while entering continuous value.

c. Output setting: displays the dialog box to set continuous value

---

Notes

Considering performance of XG-SIM, Single I/O and continuous I/O have the following restriction

Relevant I/O	Restriction	Restriction number
Single/continuous	Number of I/O condition can be activated	Each 20
Single/Continuous	Number of CH/device can be inputted to condition expression	Each 8
Single/Continuous	Number of CH/device can be inputted at output setting	Each 10

Notes
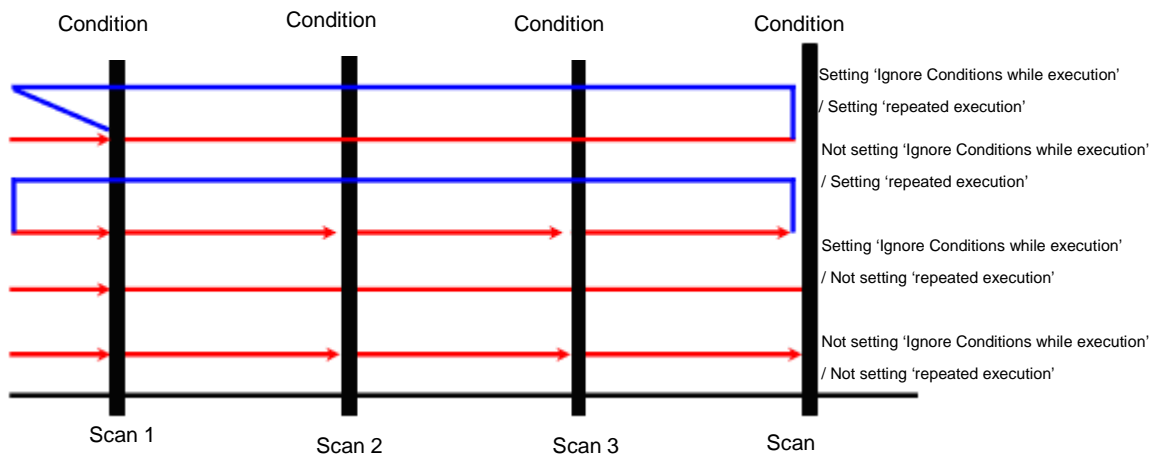
In the continuous I/O setup, XG-SIM writes every value inserted in continuous value setup into the related device/channel **every time scan is executed**. At the moment, it does not designate 'Always execute' or it continues to write the only first value set in the continuous value of a scan **unless selecting** 'Ignore conditions while execution' or using a true conditional statement. In addition, if **setting** Repeat Operation, it repetitively operates from the first scan after completing all scans.

Continuous value no.	1	2	3	4	5	6	7
Value to designate	7	6	5	4	3	2	1

For instance, in the above continuous value,

① Not setting 'Ignore Condition while Execution' / not setting 'Repeated Execution' (if button operation/conditional statement is false)

7 → 7 → 7 → 7 → 7 → 7 → 7 → 7

② Not setting 'Ignore Condition while Execution' / not setting 'Repeated Execution' (if Always execute/conditional statement is true)

7 → 6 → 5 → 4 → 3 → 2 → 1

③ Setting 'Ignore Condition while Execution' / not setting 'Repeated Execution'

7 → 6 → 5 → 4 → 3 → 2 → 1

④ Not setting 'Ignore Condition while Execution' / setting 'Repeated Execution' (if button operation/conditional statement is false)

7 → 7 → 7 → 7 → 7 → 7 → 7 → **7** → 7 → 7 → 7 → 7 → 7 → 7 → …

⑤ Not setting 'Ignore Condition while Execution' / setting 'Repeat Execution' (if Always execute/Conditional statement is true)

7 → 6 → 5 → 4 → 3 → 2 → 1 → **7** → 6 → 5 → 4 → 3 → 2 → 1 → …

⑥ Setting 'Ignore Condition while Execution' / setting 'Repeated Execution'

7 → 6 → 5 → 4 → 3 → 2 → 1 → **7** → 6 → 5 → 4 → 3 → 2 → 1 → …

5) Dialog Box to input continuous value

1. Input value

Input a value to set as output in Continuous I/O condition

Continuous Value Setting

Number	B0S01.ANALOG_IN Channel/Device
1	4
2	5
3	6
4	7
5	4
6	2
7	4
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
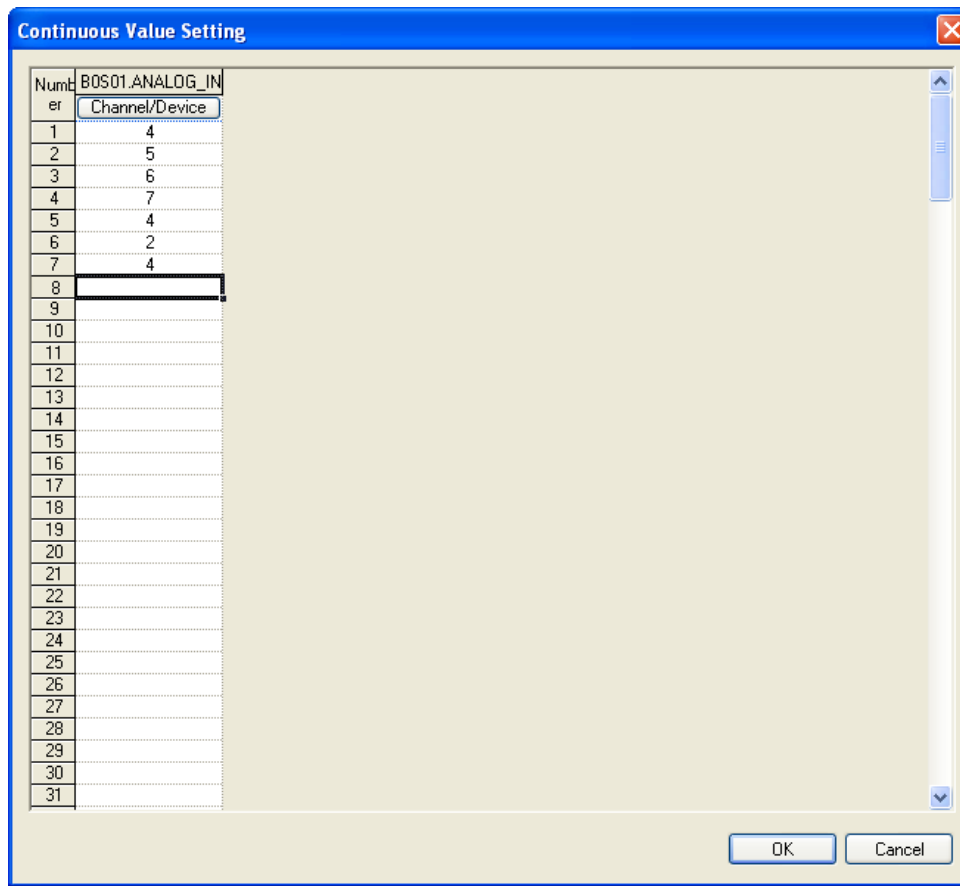
OK   Cancel

[Description of Dialog Box]

a.Device/Channel: enter a device/channel to set its value.

b.Value: the only constant such as integer, real number, hexadecimal or True/False may be entered.

c.OK: saves edited items and exits the dialog box.

d.Cancel: cancels values entered.

2. Select Device/Channel

Select a device/channel to enter its continuous value.

[Steps]

a. Double-click a column to enter device/channel
b.Then, dialog box to enter device/channel is displayed.

c. Enter a device/channel and click OK.

Channel/Device Name

Channel/Device Name: B0S01.ANALOG_IN00   View Channel Browser
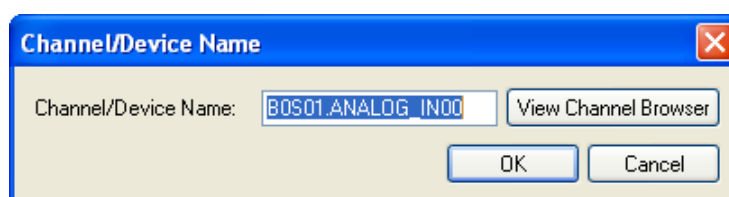
OK   Cancel

[Description of Dialog Box]

a. Channel/Device Name: enter the name of a channel/device.

b. View Channel Browser: displays a channel finder.

c. OK: saves edited items and exits the dialog box.

d. Cancel: cancels edited items and exists the dialog box**.**

3. Input value

[Steps]

a. Move a cursor to enter a value

b. Enter a value.

4. Auto Filling

[Steps]

a. Select an area.
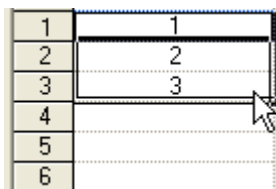
b. Cursor is changed if placing it on the right corner of a selected area.
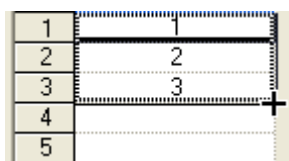
c. With the left button pressed, drag it up or down.
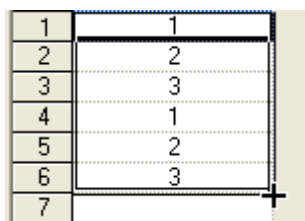
Notes

- If using Ctrl key for Auto Filling, it is possible to enter continuous value of monotonic increase/monotonic decrease, depending on dragging direction.

---

6) Monitor I/O Condition

1.Start Monitor

[Steps]

a.Select [Tools] – [Use Single I/O Condition] or [Tools] – [Use Continuous I/O Condition] in Menu.

Conditio N	Condition	Condition Name	Condition Status	Condition Comment
1	☑	kaka	Action	
2	☑	keke	Action	
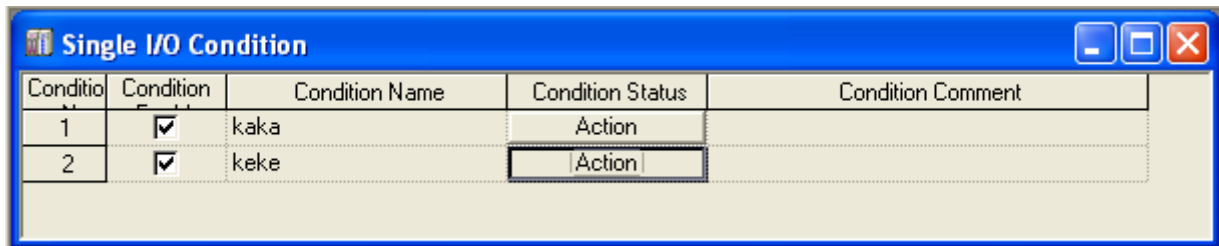
2.End Monitor

[Steps]

a.Deselect [Tools] – [Use Single I/O Condition] or [Tools] – [Use Continuous I/O Condition] in Menu.

Notes

- Program scan is the procedure that operations are repetitively executed from the first to the last step of a program created by the basic program execution scheme of PLC. XG-SIM also executes operations through scan and keeps the following procedure.
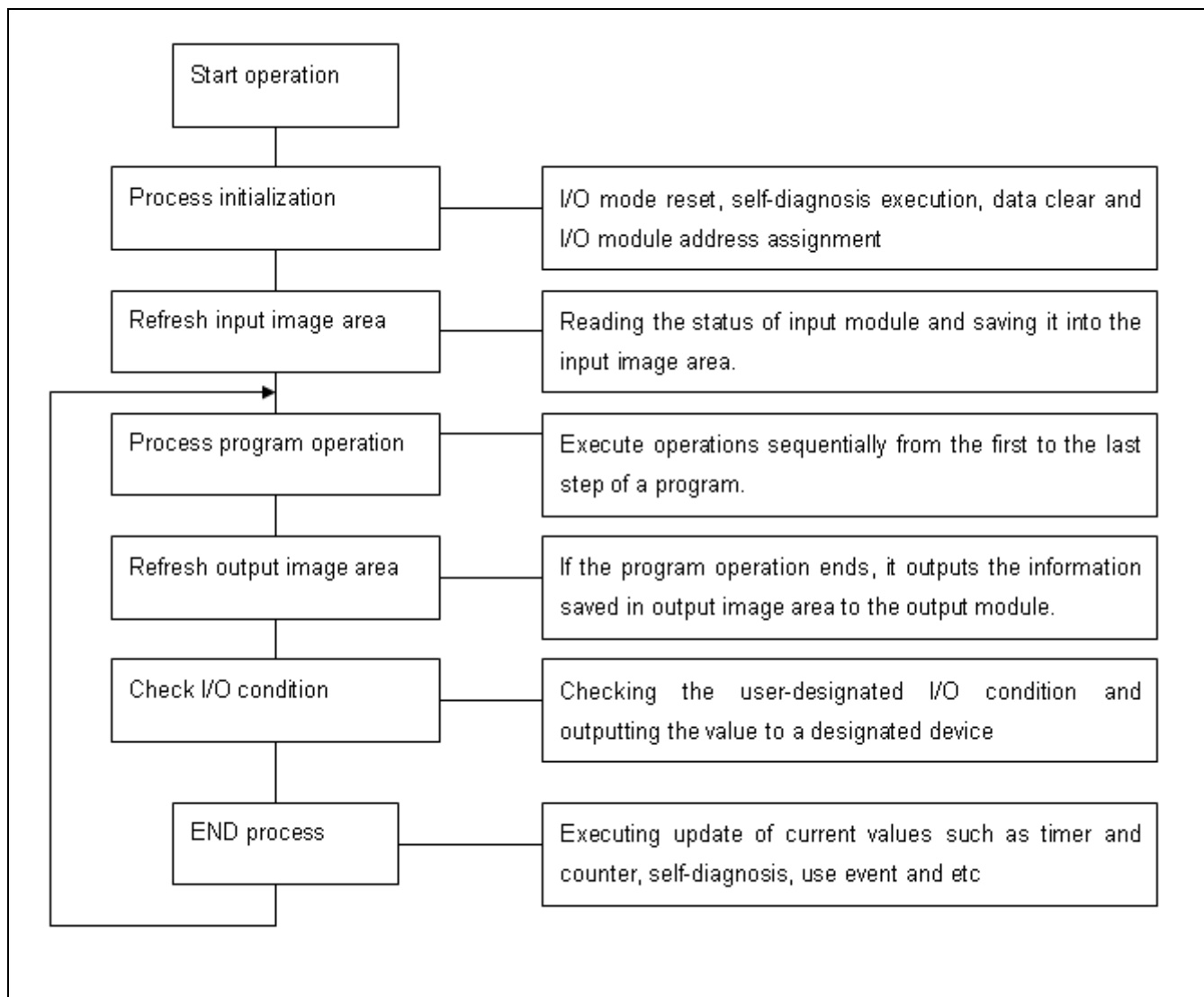
15.2.4 Module Simulation

XG-SIM provides a simple simulation function for I/O module and special module. In case of digital I/O module, it supports I/O function for I or Q area; in case of special module, it supports the monitoring function for analogue value receiving from or sending to outside.

1) Module setting
The module simulation function provided by XG-SIM uses the information set in the I/O parameter of XG5000. Therefore, it is necessary to set a module in the I/O parameter to simulate the module and reflect to a program.

For instance, to simulate the PLC system with the following configuration, it is necessary to set I/O parameter as presented in the figure.

Base	Slot	Module	Module type
Basic base	0	XGI-D21A	DC 24V 8 point input module
Basic base	1	XGF-AV8A	Voltage type A/D conversion module(8 ch)
Basic base	2	XGF-HO2A	Open collector type high speed counter module(2 ch)

Slot	Module	Comment	Input Filter
0	DC 24V INPUT, 8points		3 Standard [ms]
1	XGF-AV8A (Voltage, 8-CH)		-
2	XGF-HO2A (Open-Collector		-
3			

After XG-SIM is executed, system monitor shows the module set in I/O parameter as presented in the figure.
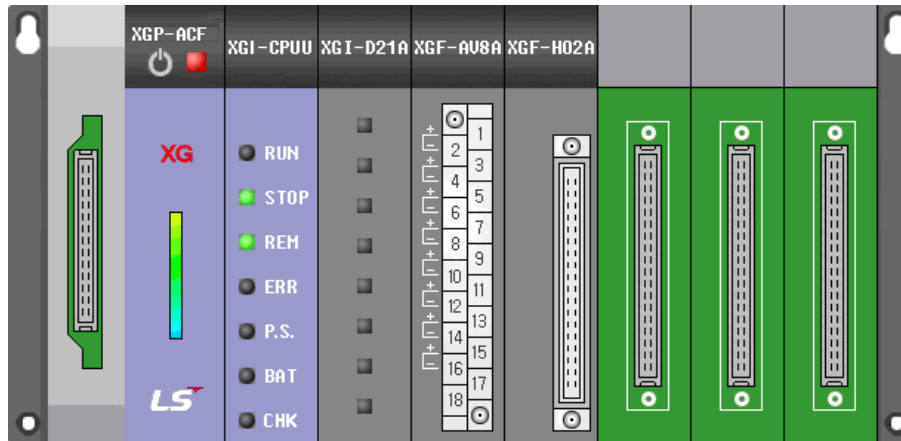
Notes

– For details of I/O parameter editing and the parameter setting by modules, refer to XG5000 Manual.

– To apply the details of I/O parameter set in XG5000, it is necessary to download I/O parameter to XG-SIM again. If the type of a selected module is changed, XG-SIM should be executed again.

2) Digital I/O Module

Digital I/O module simulation may change the current value of contact or simulate whether the output used as the output in the program is normally outputted. It may be different as follows, depending on the I/O module setting in I/O parameter.

	Not setting I/O module	Setting I/O module
Change Input	Use the monitor's current value change	Use the XG-SIM channel value change
Change output	Unable to change	Unable to change
Forcible I/O input	Not applicable	Input forcibly set input
Forcible I/O output	Not applicable	Output forcibly set output

3) Analog Input Module (A/D conversion module)

For the analog input module supported by XG-SIM, refer to the following table.

Module name	Support
XGF-AV8A (Voltage type 8ch)	○
XGF-AC8A (Current type 8ch)	○
XGF-AD4S (Insulation type 4ch)	X

XG-SIM supports 4 types of input voltage ranges and digital data formats and 2 kinds of input current ranges as follows.

Input voltage range	Input current range	Digital output format
1 ~ 5V	4 ~ 20mA	0 ~ 16000
0 ~ 5V	0 ~ 20mA	-8000 ~ 8000
0 ~ 10V	-	1000 ~ 5000
-10 ~ 10V	-	0 ~ 10000 (%)

XG-SIM supports the following analog input parameters.

Parameter	Support	Parameter	Support
Operation channel	○	Filter constant	○
Input voltage(current) range	○	Averaging	○
Output data type	○	Averaging method	○
Filter process	X	Average	○

Analog input may be directly set in XG-SIM window and the input range is valid only within the input voltage (current) range set in the parameter.

Analog input may be set in 'Channel' item of XG-SIM window.

Channel	Channel Name	Channel Type	Input/Output	Channel	Channel Unit	Favorite
1	B0S01.ANALOG_IN00	FLOAT	IN		volt	☐
2	B0S01.ANALOG_IN01	FLOAT	IN		volt	☐
3	B0S01.ANALOG_IN02	FLOAT	IN		volt	☐
4	B0S01.ANALOG_IN03	FLOAT	IN		volt	☐
5	B0S01.ANALOG_IN04	FLOAT	IN		volt	☐
6	B0S01.ANALOG_IN05	FLOAT	IN		volt	☐
7	B0S01.ANALOG_IN06	FLOAT	IN		volt	☐
8	B0S01.ANALOG_IN07	FLOAT	IN		volt	☐

4) Analog output module (D/A conversion module)

For the analog output module supported by XG-SIM, refer to the following table.

Module name	Support
XGF-DV4A (voltage type 4ch)	○
XGF-DV8A (current type 8ch)	○
XGF-DC4A (current type 4ch)	○
XGF-DC8A (current type 8ch)	○
XGF-DV4S(insulated voltage output 4ch)	X
XGF-DC4S(insulated current output 4ch)	X

XG-SIM supports the following voltage(current) range and input data type.

Input data type	Output voltage range	Output current range
0 ~ 16000	1 ~ 5V	4 ~ 20mA
-8000 ~ 8000	0 ~ 5V	0 ~ 20mA
1000 ~ 5000	0 ~ 10V	-
0 ~ 10000 (%)	-10 ~ 10V	-

XG-SIM supports the following analog output parameter.

Parameter	Support
Operation channel	○
Output voltage(current) range	○
Input data type	○
Channel output status	X

Digital input may be entered through special module parameter in a program and it is valid only within the range set in the parameter.

> **Notes**
>
> – For the details on the parameters of analog output module and the programming, refer to the manual of a module.

An operator may check the analog output that is converted in 'Channel' item of XG-SIM.

Channel	Channel Name	Channel	Input/Output	Channel	Channel Unit	Favorite
1	B0S03.ANALOG_OUT00	FLOAT	OUT		Volt	☐
2	B0S03.ANALOG_OUT01	FLOAT	OUT		Volt	☐
3	B0S03.ANALOG_OUT02	FLOAT	OUT		Volt	☐
4	B0S03.ANALOG_OUT03	FLOAT	OUT		Volt	☐
5	B0S03.ANALOG_OUT04	FLOAT	OUT		Volt	☐
6	B0S03.ANALOG_OUT05	FLOAT	OUT		Volt	☐
7	B0S03.ANALOG_OUT06	FLOAT	OUT		Volt	☐
8	B0S03.ANALOG_OUT07	FLOAT	OUT		Volt	☐

5) High speed counter module (HSC module)

For the high speed module supported by XG-SIM, refer to the following table.

Module name	Support
XGF-HO2A (open collector 2ch)	○
XGF-HD2A (open driver 2ch)	○

XG-SIM supports the following counter parameter as follows.

Parameter	Support	Parameter	Support
Counter mode	X	Comparison output 0 max. value	○
Pulse input mode	X	Comparison output 1 min. value	○
Preset	○	Comparison output 1 max. value	○
Ring counter min. value	X	Output status setting	○
Ring counter max. value	X	Additional function mode	X
Comparison output 0 mode	○	Section value (ms)	X
Comparison output 1 mode	○	No. of pulse per rotation	X
Comparison output 0 min. value	○	Frequency display mode	X

> **Notes**
>
> – For the details on the parameters of high speed counter module and the programming, refer to the manual of a module.

The current count value may be changed in 'Channel' of XG-SIM window. High speed counter simulator compares the input count value to a value set in parameter and uses it as the comparison output signal.

Channel	Channel Name	Channel T...	Input/Outpu	Channel ...	Channel Unit	Favorite Ch...
1	B0S02.CH0_COMPARE_OUPUT0	BOOL	OUT			☐
2	B0S02.CH0_COMPARE_OUPUT1	BOOL	OUT			☐
3	B0S02.CH0_CURRENT_COUNT	DINT	IN		count	☐
4	B0S02.CH1_COMPARE_OUPUT0	BOOL	OUT			☐
5	B0S02.CH1_COMPARE_OUPUT1	BOOL	OUT			☐
6	B0S02.CH1_CURRENT_COUNT	DINT	IN		count	☐

6) Temperature input module (RTD module)

For the temperature input module supported by XG-SIM, refer to the following table.

Module name	Support
XGF-RD4A (4ch)	○
XGF-RD4S (Insulation type 4ch)	X
XGF-TC4S (Insulation type 4ch)	X

XG-SIM supports the following temperature input parameter.

Parameter	Support	Parameter	Support
Operation channel	○	Process warning very upper limit	X
Sensor type	○	Process warning upper limit	X
Temperature unit	○	Process warning lower limit	X
Filter constant	X	Process warning very lower limit	X
Averaging process	X	Process warning hysterisis	X
Average	X	Variance warning setup type	X
Scaling data type	X	Variance warning upper limit	X
Scaling min. value	X	Variance warning lower limit	X
Scaling max. value	X	Variance warning detection cycle	X

Notes

- For the details on the parameters of temperature input module and the programming, refer to the manual of a module.

Temperature input may be changed in 'Channel' of XG-SIM window.

Channel	Channel Name	Channel T...	Input/Outpu	Channel ...	Channel Unit	Favorite Ch...
1	B0S03.TEMPERATURE_IN0	FLOAT	IN		°C	☐
2	B0S03.TEMPERATURE_IN1	FLOAT	IN		°C	☐
3	B0S03.TEMPERATURE_IN2	FLOAT	IN		°C	☐
4	B0S03.TEMPERATURE_IN3	FLOAT	IN		°C	☐

7) Positioning module (APM module)

> **Notes**
>
> XG-SIM supports limited functions among the APM functions that PLC actually supports. APM module in XG-SIM is the module created to help users understand the operation of APM-related functions, so error and program operations may be different with XG-SIM when actually operating PLC. Furthermore, it supports a part of APM related errors, so actual PLC operation may generate different errors, which do not appear in XG-SIM. For the APM function block list supported by XG-SIM, refer to the followings.

For the positioning module supported by XG-SIM, refer to the following table.

Module name	Support
XGF-PO1A (open collector axis 1)	○
XGF-PO2A (open collector axis 2)	○
XGF-PO3A (open collector axis 3)	○
XGF-PD1A (line driver axis 1)	○
XGF-PD2A (line driver axis 2)	○
XGF-PD3A (line driver axis 3)	○

XG-SIM supports the following step data parameter(X/Y/Z axes).

Parameter	Support	Parameter	Support
Coordinate	X	Circular interpolation aux.point [pulse]	X
Control method	○	M code	X
Operation pattern	○	Acc./dec. number	X
Operation method	X	Operation speed	○
Target position [pulse]	○	Dwell time	X
Circular interpolation direction	X	-	-

XG-SIM supports the following operation parameters(X/Y/Z axes).

Parameter type	Item	Support
Basic parameter	Bias speed	○
Extended parameter	External command selection	○
	External command	○
	External stop	○
	External simultaneous start	○
	External speed/position conversion	○
Origin/manual parameter	Origin address	X
	High speed origin return	X
	Low speed origin return	X
Origin/manual parameter	High speed JOG	○
	Low speed JOG	○
	Inching speed	○

The list of exclusive APM function blocks supported by XG-SIM is as follows.

Function block	Command	Support
ORG	Origin return start	X
FLT	Floating origin setting	○
DST	Direct start	○
IST	Indirect start	○
LIN	Linear interpolation start	X
CIN	Circular interpolation start	X
SST	Synchronous start	○
VTP	Speed/position conversion	X
PTV	Position/speed conversion	X
STP	Stop	○
SKP	Skip operation	○
SSP	Position synchronization	X
SSS	Speed synchronization	○
POR	Position override	○
SOR	Speed override	○
PSO	Positioning speed override	X

Function block	Command	Support
NMV	Continuous operation	○
INCH	Inching start	○
RTP	Manual operation returning to previous position	○
SNS	Start step no. change	○
SRS	Repeat step no. change	○
MOF	Cancel M code	○
PRS	Current position preset	○
ZOE	ZONE output allowed	○
ZOD	Encoder preset	○
Teaching-related instruction	-	X
EMG	Emergency stop	○
CLR	Error reset	○
ECLR	Point operation	X
PST	Point operation step data setting	X
PWR	Read current status	○

The APM command error codes generated in XG-SIM are as follows.

Error code	Meaning
151	Operation speed of operation data may not be 0.
221	Direct start command may not be executed during operation.
224	Direct start command may not be executed in an absolute coordinate of which origin is not determined.
231	Indirect start command may not be executed during operation
234	Indirect start command may not be executed in an absolute coordinate of which origin is not determined.
291	Synchronous start command may not be executed during operation.
294	Synchronous start command may not be executed in an absolute coordinate of which origin is not determined.
321	Dec. stop command may not be executed if not operating.
331	Skip command may not be executed if not operating.
355	Main/Aux axis setting of speed synchronous command had an error
356	Main/Aux axis ratio setting of speed synchronous command had an error
361	Position override command may not be executed if not operating

Error code	Meaning
371	Speed override command may not be executed if not operating
391	Continuous operation command may not be executed if not operating
401	Inching command may not be executed during operation
431	Auto operation point return command may not be executed during operation
441	Start step no. change command may not be executed during operation
461	Position teaching command may not be executed during operation
481	Internal emergency stop

Notes

– Detail parameter of positioning module is set in a separate APM package, not in XG5000. To set the parameters used in the positioning module, it is necessary to set APM package operation data and save the project file as follows. In addition, APM project file should be located in a same folder in which XG5000 project file is saved.

BxSyz.apm (x base number, yz slot number, not case-sensitive)

Base	Slot	Project name saved
0	0	B0S0.apm
0	10	B0S10.apm
1	0	B1S0.apm
1	11	B1S11.apm
2	0	B2S0.apm
2	12	B2S12.apm

– For detail settings of APM module parameter, refer to APM package user's manual.

It is possible to check the status of APM module such as the current position in 'Channel' of XG-SIM window.

Channel	Channel Name	Channel Type	Input/Output	Channel	Channel Unit	Favorite
1	B0S00.XCurrentPosH	UINT	OUT			☐
2	B0S00.XCurrentPosL	UINT	OUT			☐
3	B0S00.XCurrentVelH	UINT	OUT			☐
4	B0S00.XCurrentVelL	UINT	OUT			☐
5	B0S00.YCurrentPosH	UINT	OUT			☐
6	B0S00.YCurrentPosL	UINT	OUT			☐
7	B0S00.YCurrentVelH	UINT	OUT			☐
8	B0S00.YCurrentVelL	UINT	OUT			☐
9	B0S00.ZCurrentPosH	UINT	OUT			☐
10	B0S00.ZCurrentPosL	UINT	OUT			☐
11	B0S00.ZCurrentVelH	UINT	OUT			☐
12	B0S00.ZCurrentVelL	UINT	OUT			☐

Notes

- The channels of positioning module have the following meaning. (i.e.: based on X-axis)

Channel name	Meaning
XCurrentPosH	High 16 bits in the current position value of X-axis
XCurrentPosL	Low 16 bits in the current position value of X-axis
XCurrentVelH	High 16 bits of the current speed value of X-axis
XCurrentVelL	Low 16 bits of the current speed value of X-axis

15.3.1 Restrictions

Comparing to actual PLC, XG-SIM have the following restrictions.

15.3.1 Watchdog Timer

Watchdog timer is installed in XGI PLC to prevent a created PLC program from working abnormally. On the other hand, XG-SIM executes scan at lower speed than actual XGI series PLC, so the watchdog timer set in the basic parameter does not work properly.

15.3.2 Communication module

XG-SIM does not provide any COM functions. Therefore, the following function blocks created by a program are saved as the internal data of XG-SIM and they are not actually used for communication.

Class	Name	Function
Station No. setting	P2PSN	Designate the station no. of communication counterpart
Reading area designation (WORD)	P2PWRD	Designate the word data reading area
Writing area designation (WORD)	P2PWWR	Designate the word data writing area
Reading area designation(BIT)	P2PBRD	Designate the bit data reading area
Writing area designation (BIT)	P2PBWR	Designate the bit data writing area

15.3.3 Non-rack type PLC

1) **Instruction**

The following instructions are not operate normally

Instruction	Content
PIDAT	PID auto-tuning start instruction
PIDHBD	PID forward/backward mixed operation instruction

2) **Module simulation**

XG-SIM operates based on rack type PLC of XGK. In case of small PLC such as XGB-XBMS, dedicated instruction such as PITAT and some items such as basic parameter/built-in parameter doesn't operation normally.

Chapter 16 SFC Edit

The SFC program can control the execution sequence of other program languages (LD, ST), using graphic symbols (step, transition, branch, etc.).

16.1   Limitation

Following limitations are applied to SFC program edit.

Item	Description	Limit
Max. No. of Steps	This is the maximum number of the steps usable in a program, excluding the steps using step variables.	512 steps
Max. No. of Rows	Maximum No. of the rows which can be edited.	65,535 rows
Max. No. of Columns	Maximum No. of the columns which can be edited.	65,535 columns

16.2   Program Edit

16.2.1   Edit Tool

SFC edit elements can be entered by selecting the element from the SFC tool bar and mouse-click or using shortcut key at the desired position.
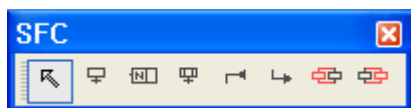
Symbol	Shortcut Key	Description
	Esc	Change to selection mode
	-	Step+Transition or Transition+Step
	-	Action
	-	Block+Transition or Transition+Block
	-	Label
	-	Jump
	-	Left Branch
	-	Right Branch

Following shortcut keys are used to move mouse cursor, These keys cannot be redefined in the XG5000.

Shortcut Key	Description
Home	Go to the first character of the line.
Ctrl+Home	Go to the beginning of the program.
→	Move cursor to the right by one character.
←	Move cursor to the left by one character.
↑	Move the cursor up by one row.
↓	Move the cursor down by one row.
End	Go to the end of the line.
Ctrl+End	Go to the last edit line.

Note

- In the shortcut key definition, 's' stands for the Shift key, 'c' stands for the Ctrl key, and 'a' stands for the Alt key.
- The shortcut keys used in the Edit Tool are in accordance with the default keys provided in the XG5000.
- For user defined shortcut key, refer Chapter 2, Basic Operation, 2.4 Shortcut Key Setting.

    For each SFC program added to the project program list, at least 64 words of automatic variables must have been declared.

16.2.2 Entering Step/Transition

Enter Step/Transition.

[Procedure]

1. Move cursor to the desired position.
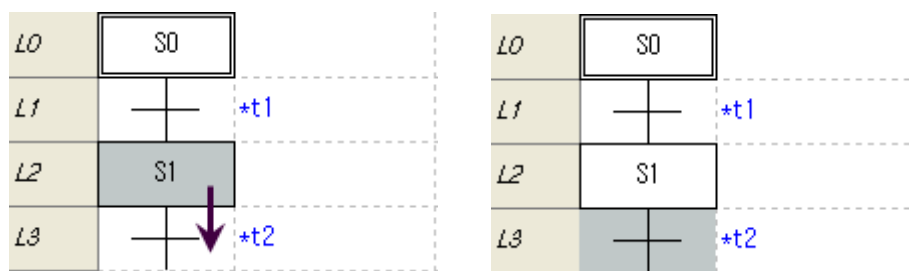
2. Select Step from the Toolbar and click edit area, or press the shortcut key corresponding to the contact point to enter the Step.

3. New Step/Transition will be entered.
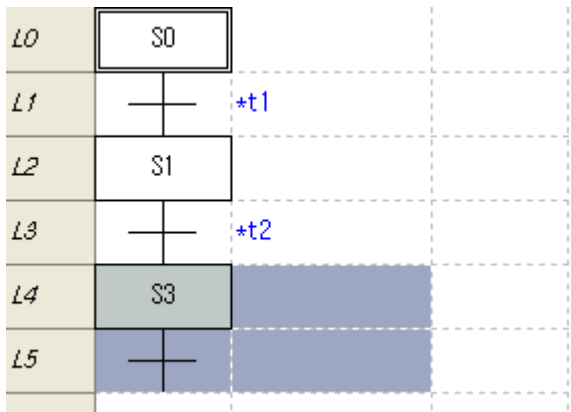
<table>
<tr><td colspan="2">Note</td></tr>
</table>

- Step name is automatically determined, or user can name it as necessary.
- According to the entry position, it is entered as Step + Transition or Transition + Step.

	Item at the selected position
Step + Transition	Transition, parallel branching start line, label, end line of selective branching
Transition + Step	Step, Block, starting line of selective branching, end line of selective branching

- "Read Only" variables cannot be used for Step/Transition variable.

16.2.3 Entering Action

An Action executes linked program when the connected Step is activated.

[Procedure]

1. Move cursor to the desired position.
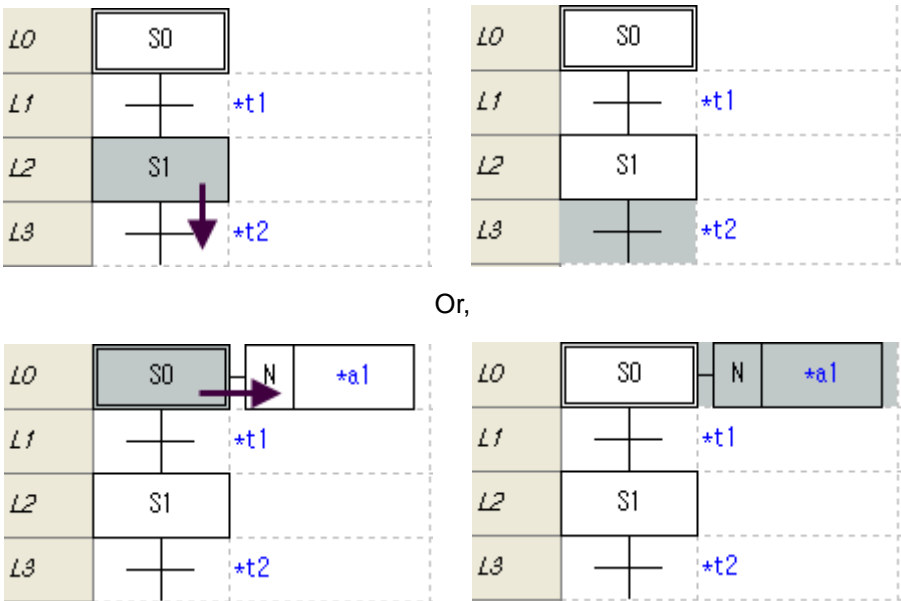
Or,

2. Select the shortcut key for entering. Or, select Action from the toolbar and select the edit area to enter it.

or
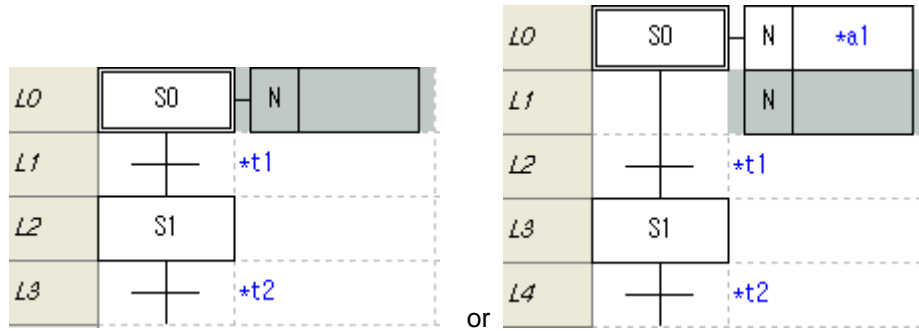
Note

– The position where Action is entered differs by the selected item.

Position	Item at the selected position
Right	Right side of Step if a Step is selected
Below	Beneath the Action if an Action is selected

– Unlimited number of Actions can be linked to a Step.

– Actions cannot be linked to a Block.

-"Read Only" variables cannot be used for Action variable.

16.2.4   Entering Block/Transition

Enters a Block/Transition.

[Procedure]

1. Move cursor to the desired position.
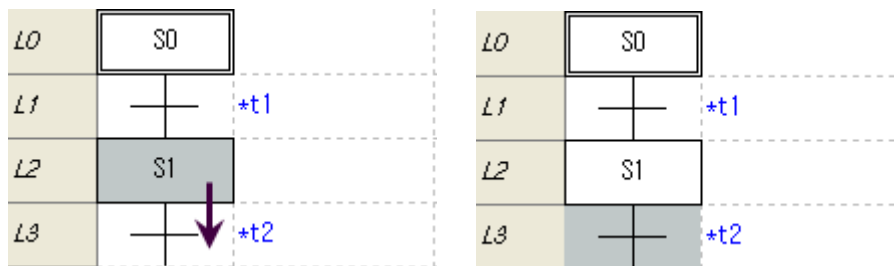
2. Select Block from the toolbar and click edit area, or press corresponding shortcut key.

3. A new Blok/Transition is entered.
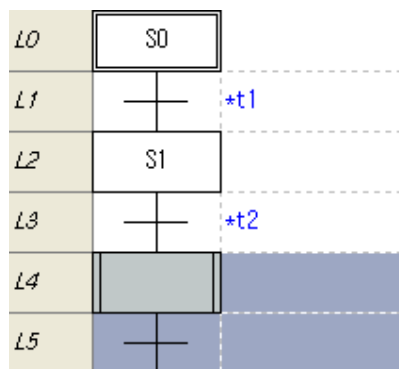
16.2.5 Entering Label

Enters a Label.

[Procedure]

1. Move cursor to the desired position.
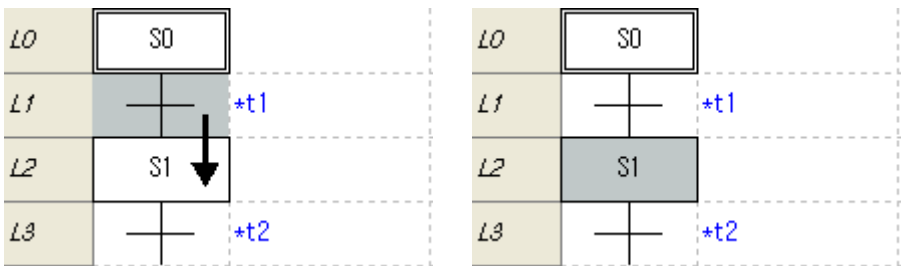
2. Select Label from the toolbar and click edit area, or press corresponding shortcut key.

3. A new Label is entered.
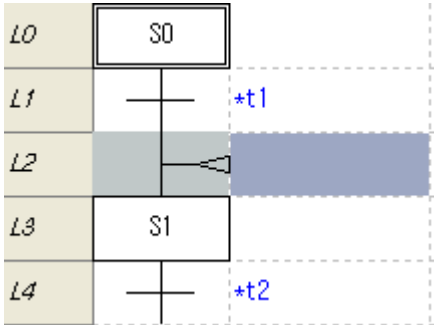
16.2.6   Entering Jump

Enters a Jump.

[Procedure]

1. Move cursor to the desired position.
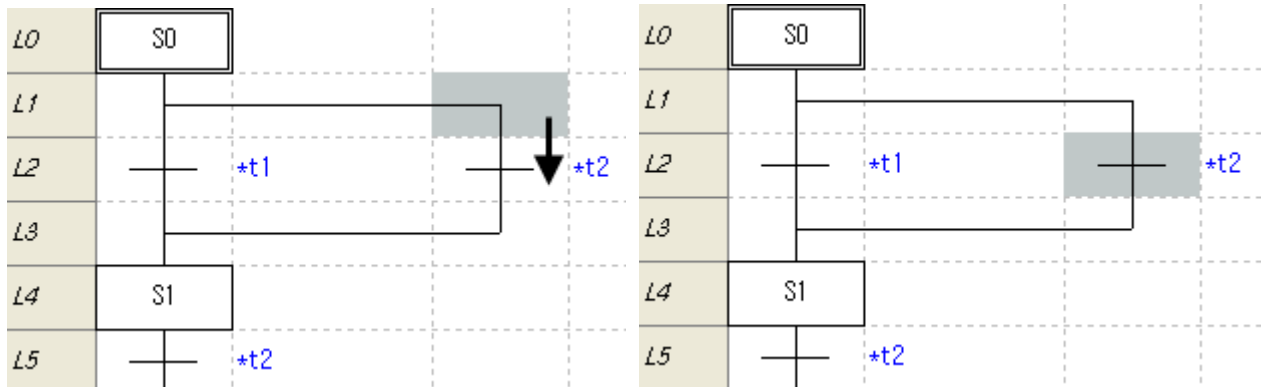
2. Select Jump from the toolbar and click edit area, or press corresponding shortcut key.

3. A new Jump is entered.
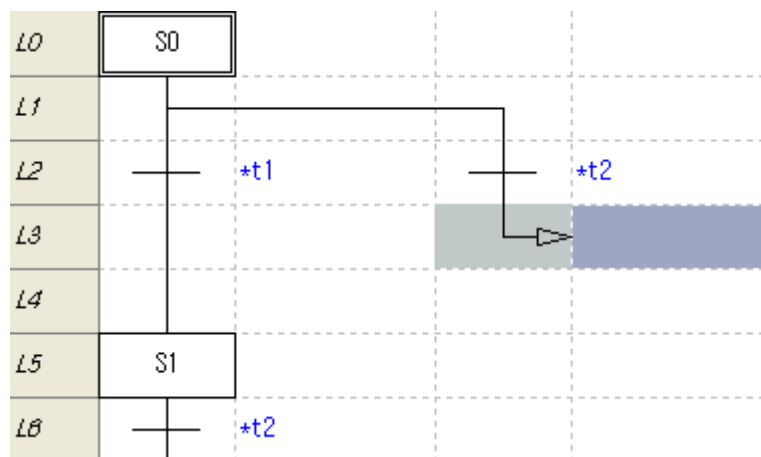
Note
− A Jump can be entered only when the last Transition in the selected branch or the last Transition in the last line of the program has been selected.
− The Jump will be entered after the selected Transition.
- Jumping is allowed within the same program only.

16.2.7 Entering Left Branch

Enters a Left Branch. An example of creating Select Branch is provided below.

1) Creating a Branch
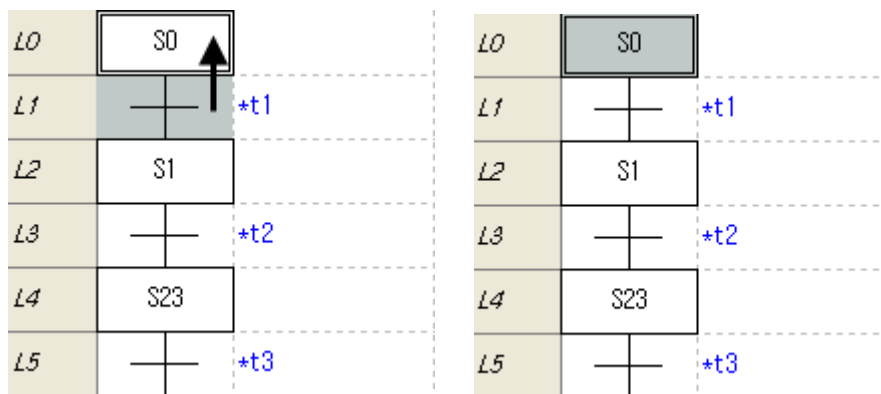
[Procedure]

1. Move cursor to the desired position.

2. Select Left Branch from the toolbar and click edit area, or press corresponding shortcut key.

3. Mark the starting point and linkable point of the Branch.
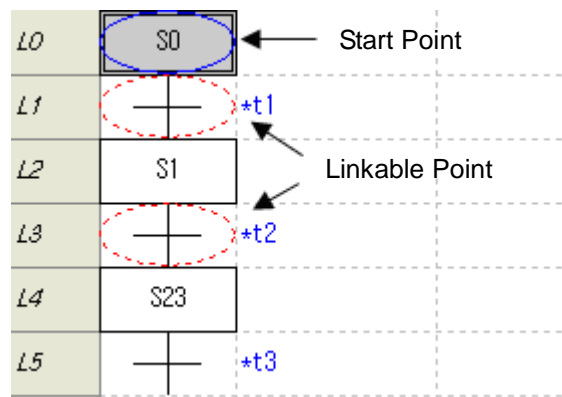
4. Move cursor to the Branch end point.
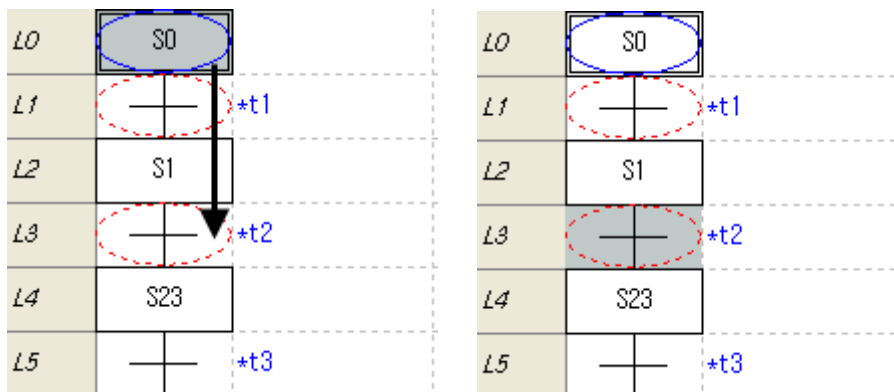
5. Select the branch end point.

6. A branch is created.

	Item at the branch starting point	Line Shape
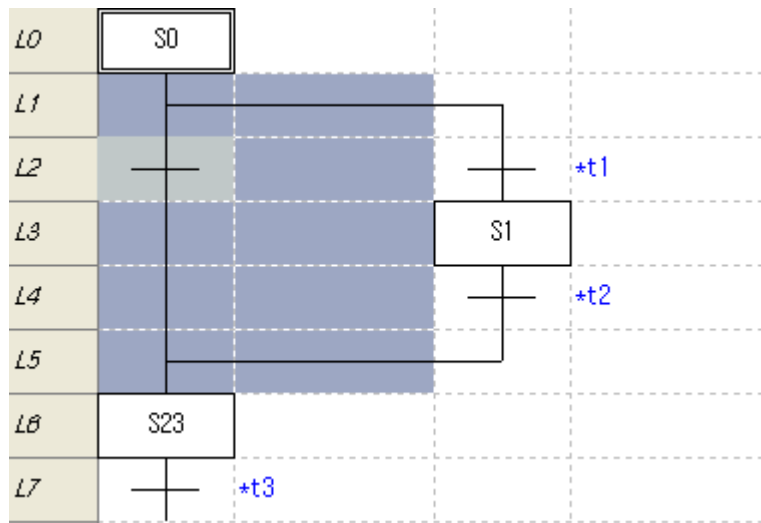
Note

- Selective Branch or Parallel Branch will be created according to the position of the selected starting point.

	Item at the branch starting point	Line Shape
Selective Branch	Step, Block	Single horizontal line
Parallel Branch	Transition	Two horizontal lines

2) Adding a Branch

[Procedure]
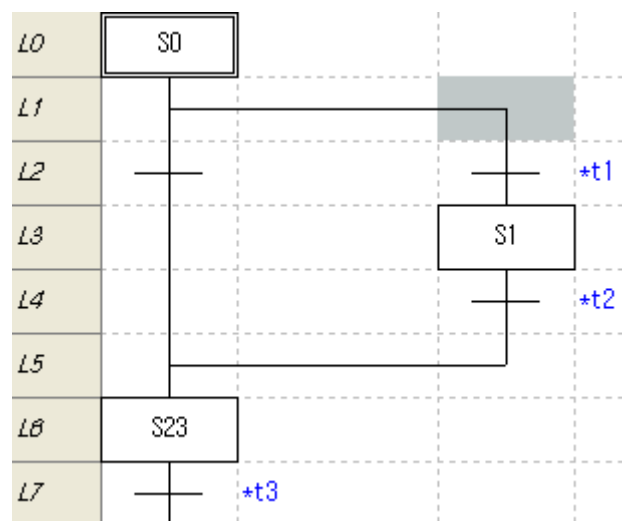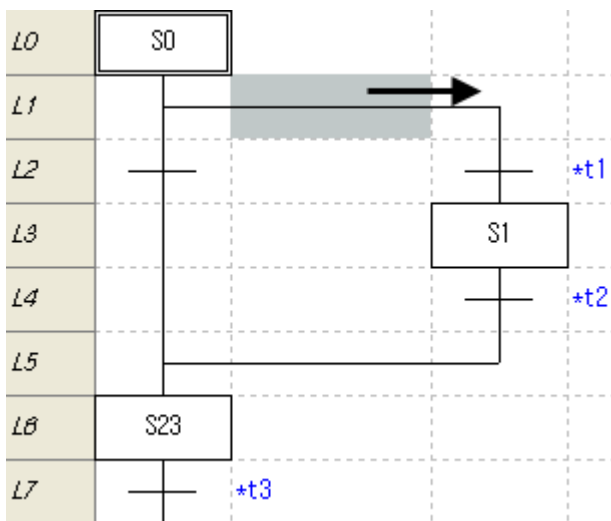
1. Move cursor to the desired position.

2. Select Left Branch from the toolbar and click edit area, or press corresponding shortcut key.

3. A new Branch is added.
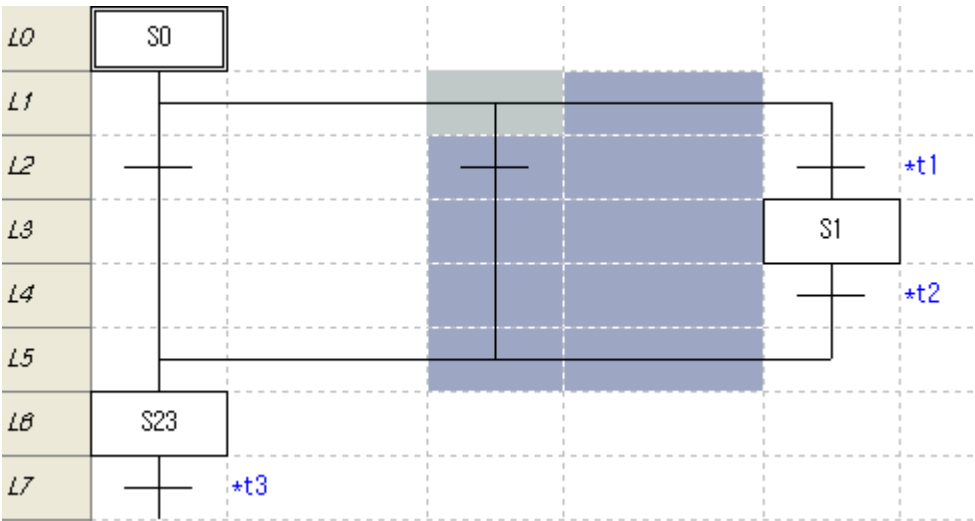
Note

    Although number of Branch is not limited, it may be limited by the number of the horizontal rows.

- Selective and Parallel Branches cannot be added to the other type.

16.2.8   Entering Right Branch

Enters a Right Branch with an example of a Parallel Branch.

1) Creating a Branch
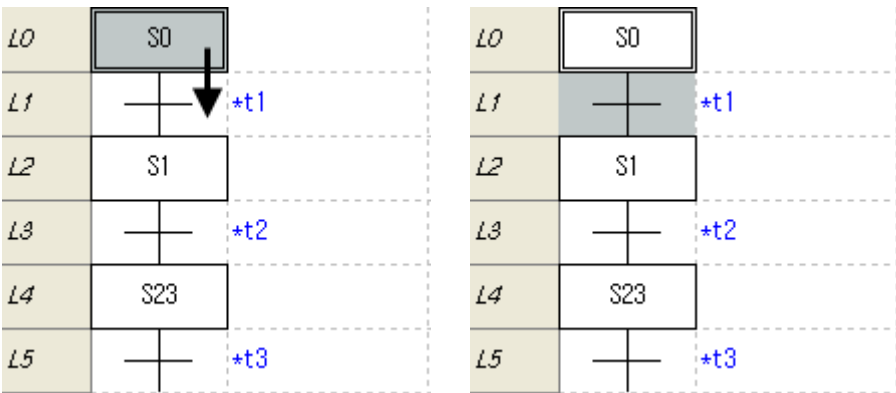
[Procedure]

1. Move cursor to the desired position.

2. Select Right Branch from the toolbar and click edit area, or press corresponding shortcut key.

3. Mark the starting and linkable positions of Branch.
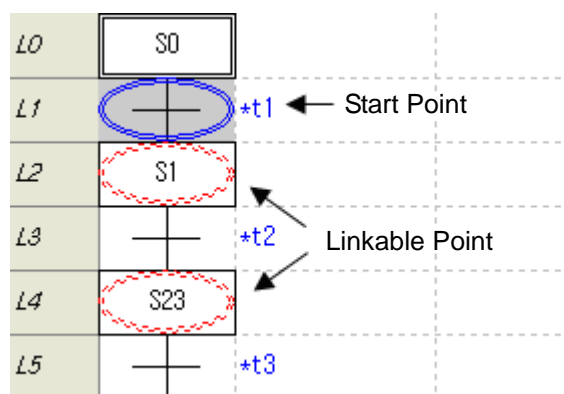
4. Move the cursor to the end position of the Branch.
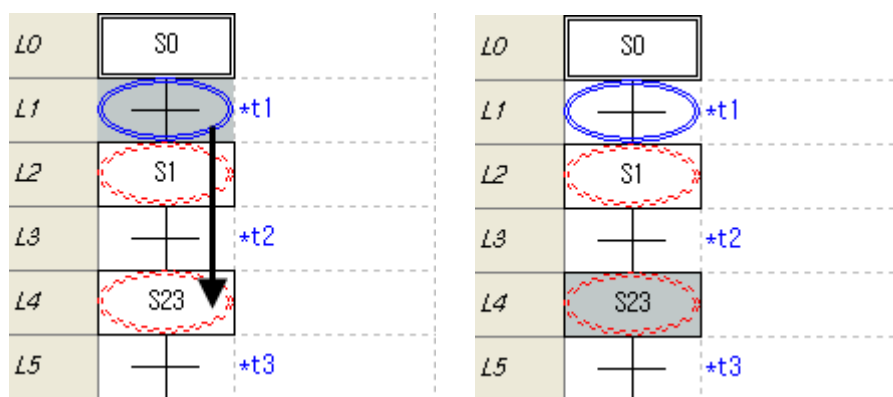
5. Select the end point of the Branch.

6. A Branch is created.

2) Adding a Branch

[Procedure]

1. Move cursor to the desired position.
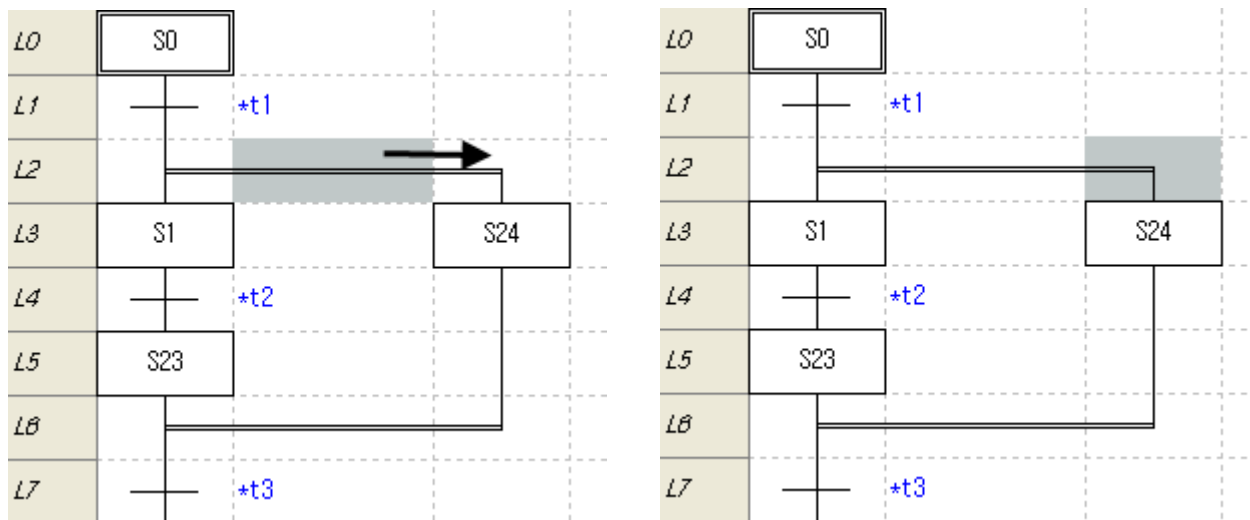
2. Select Right Branch from the toolbar and click edit area, or press corresponding shortcut key.

3. A new Branch is entered.
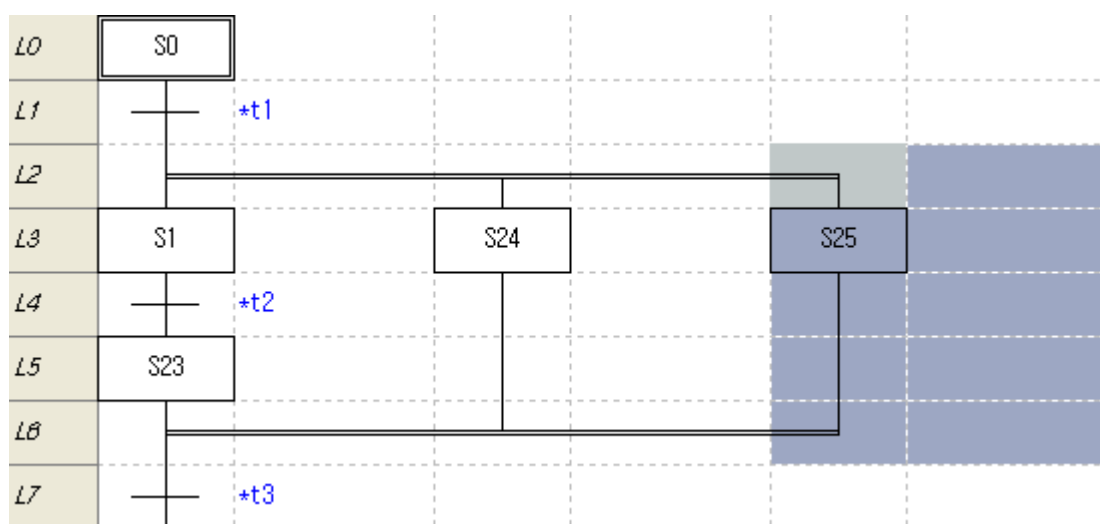
16.2.9 Step Register Information Edit

Edit name or comment of Step.

[Procedure]

1. Move cursor to the desired position.
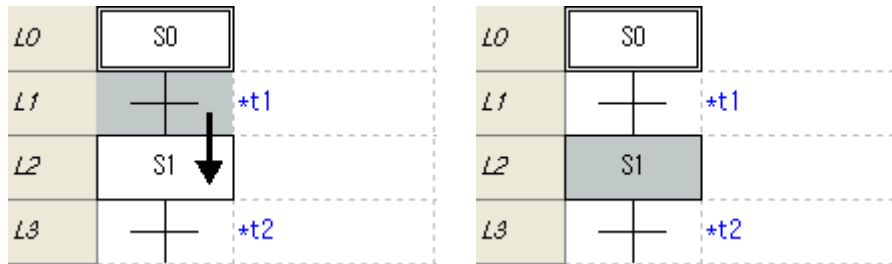
2. Press Enter or double click mouse left button.

[Dialog]

[Dialog] box description

a. Name: enter Step name.

b. Comment: enter comment for the Step.

c. Initial Step: designate as the initial Step.

d. Step Variable: refer Step name from the local variable list.

e. Local Variable: designate a variable in the local variable list.

f. Confirm: save the changes and exit the dialog.

g. Cancel: exit the dialog without saving the changes.

Note
- The initial step is the starting step of the program, thus can be designated only one in a program. Error is inspected when inspecting the program.
- When using a step variable, the variable of the step name can be referred to by other programs.

16.2.10   Transition Register Information Edit

Edit the name or comment of Transition.

[Procedure]
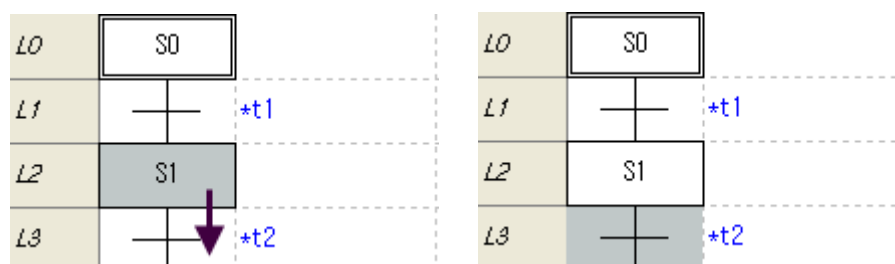
1. Move cursor to the desired position.

2. Press Enter or double click mouse left button.

[Dialog]

[Dialog] box description

a. Name: enter name of the Transition.

b. Comment: enter comment of the Transition.

c. Classification: the Transition can be defined as a variable or a program.

d. List: show other Transitions being used in the current program window.

e. Local Variable: designate a variable in the local variable list.

f. Simple: hide the list.

g. Confirm: save the changes and exit the dialog.

h. Cancel: exit the dialog without saving the changes.

Note
- Transition programming is available with LD or ST only.

16.2.11   Action Register Information Edit

Edit name, comment or limiter of Action.

[Procedure]
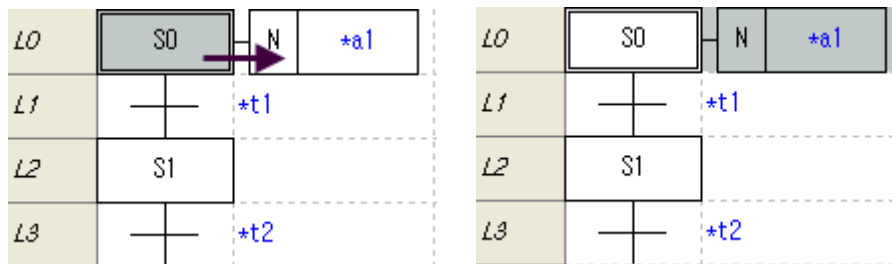
1. Move cursor to the desired position.

2. Press Enter or double click mouse left button.
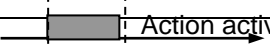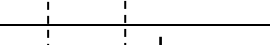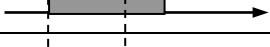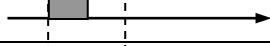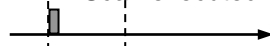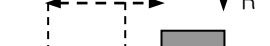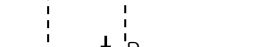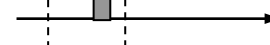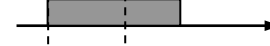
[Dialog]

[Dialog] box description

a. Name: enter name of the Action.

b. Comment: enter comment of the Action.

c. Classification: the Action can be defined as a variable or a program.

d. Post Scan: after executing the Action, disable the coil in the Action.

e. List: show other transition being used in the current program window.

f. Limiter: other actions are available according to the action limiter.

g. Time: enter time according to the action limiter.

   - Time: Constant * (Time Interval), E.g.) 120 * 10ms = 1200ms

h. Local Variable: designate a variable in the local variable list.

i. Simple: hide the list.

j. Confirm: save the changes and exit the dialog.

k. Cancel: exit the dialog without saving the changes.

Note

- The behavior of Action varies by limiter.

Limiter	Function	Behavior
		▨ Step active
N (Non-stored)	Action is executed only when Step is active.	Action active
R(overriding Reset)	If Step is active, the same actions executed with the S, SD, DS, or SL Limiter are stopped.	
S (Set)	If Step is active, Action is executed until the R Limiter is executed.	R Limiter executed
L (time Limited)	The Action will be executed for the set up time from the time when the Step was activated.	Setup time
D (time Delayed)	The Action will be executed after the set up time from the time when the Step was activated.	
P (Pulse)	The Action will be executed only for the moment the Step was activated.	1 Scan executed
SD (Stored & time Delay)	The Action will be executed from the set up time after the Step activation until R Limiter is executed. If the R Limiter is executed before the set up time, the Action will not be executed.	R
DS (time Delayed & Stored)	The Action will be executed from the set up time after the Step activation until R Limiter is executed. If the Step is disabled or R Limiter is executed before the set up time, the Action will not be executed.	R
SL (Stored & time Limited)	The Action will be executed for the set up time from the Step activation, and terminated at the expiration of the set up time or R Limiter execution.	R

- Time shall be entered in the form; Time * (Time interval).

- Action program can be composed using LD, ST, or SFC.

16.2.12   Block Register Information Edit

Edit name or comment of Block.

[Procedure]

1. Move cursor to the desired position.
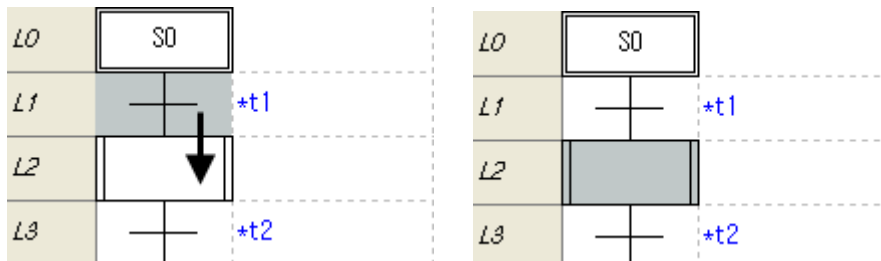
2. Press Enter or double click mouse left button.

[Dialog]

[Dialog] box description

a. Name: enter Block name.

b. Comment: enter comment of the Block.

c. List: show other Blocks being used in the current program window.

d. Simple: hide the list.

e. Confirm: save the changes and exit the dialog.

f. Cancel: exit the dialog without saving changes.

Note
- Block contents can be composed using SFC program only.
- A Block is not linked with an Action.

16.2.13   Label Register Information Edit

Edit name of Label.

[Procedure]

1. Move cursor to the desired position.
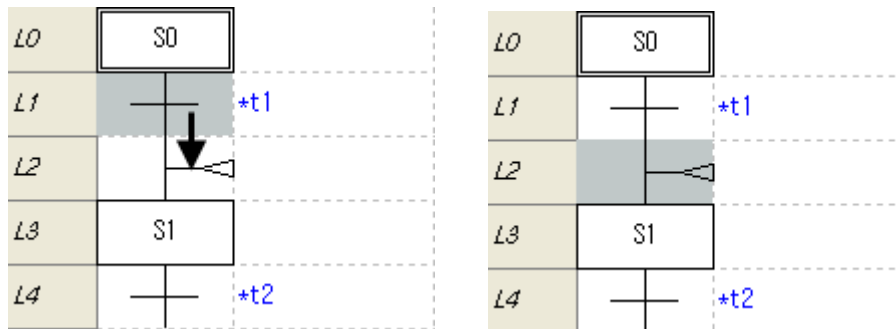
2. Press Enter or double click mouse left button.
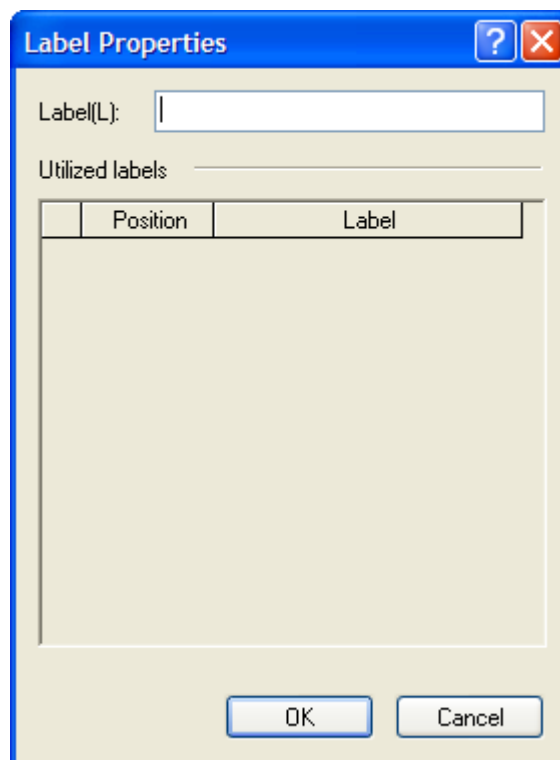
[Dialog]

[Dialog] box description

a. Label: enter name of the label.

b. List: show other labels being used in the current program window.

c. Confirm: save the changes and exit the dialog.

d. Cancel: exit the dialog without saving changes.

16.2.14   Jump Register Information

Edit name of a Jump.

[Procedure]

1. Move cursor to the desired position.
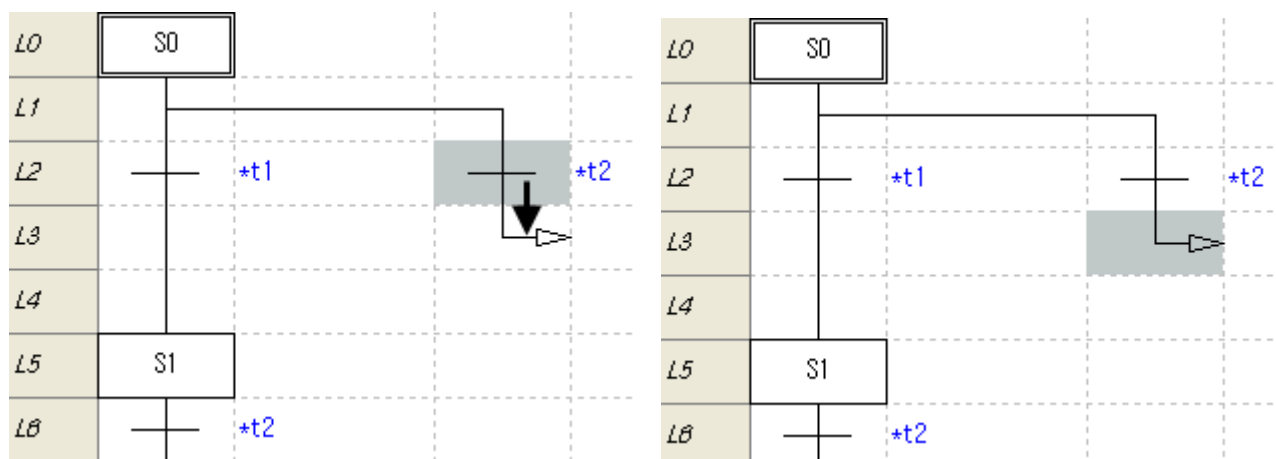
2. Press Enter or double click mouse left button.

[Dialog]

[Dialog] box description

a. Jump: enter name of the Jump.

b. List: show other labels being used in the current program window.

c. Confirm: save the changes and exit the dialog.

d. Cancel: exit the dialog without saving changes.

Note

‑ Jump name must be the same as the label name.

- Cannot jump to another SFC program.

16.2.15 Priority to Selective Branch Setting

The priority of the program execution of the entered Selective Branches can be set up.

[Procedure]

1. Move cursor to the beginning point of the Selective Branch.
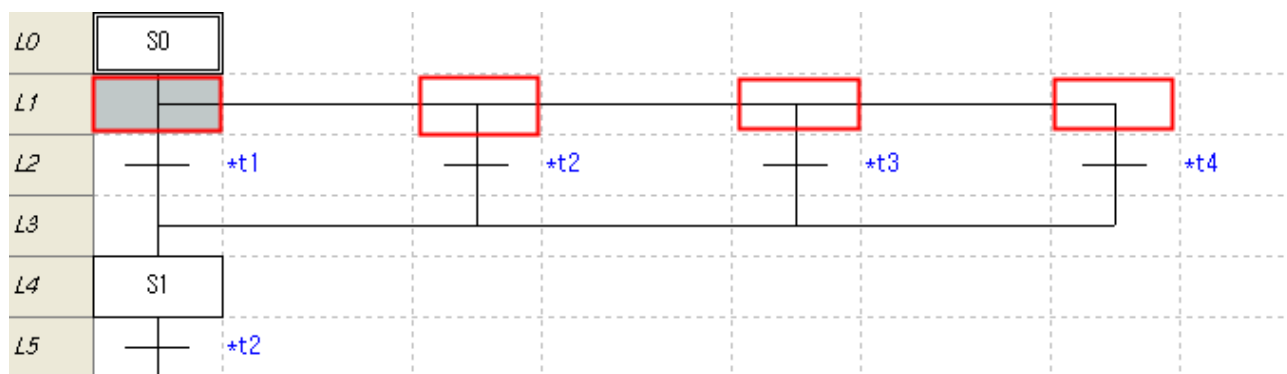
2. Select menu [Edit] – [Set-up Priority of Selective Branch].

3. Click the beginning points of the Selective Branches to set up priority order.
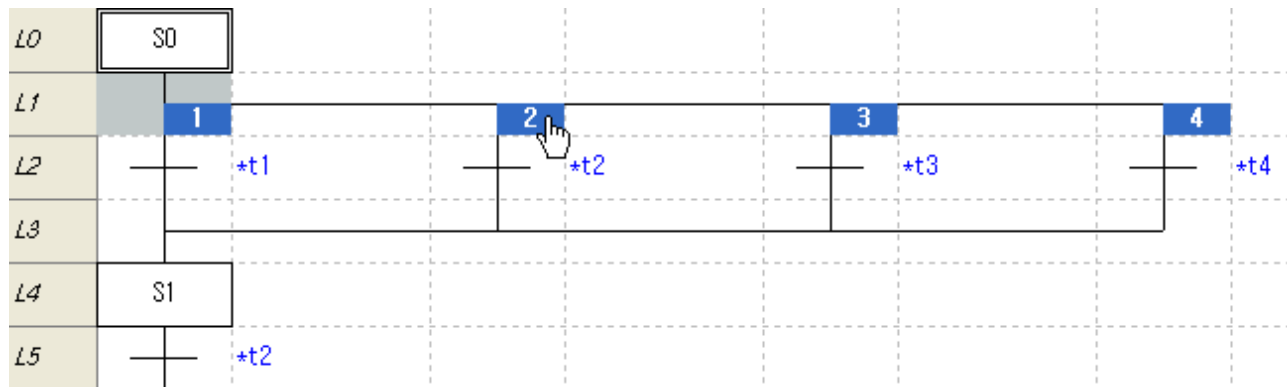
4. Click any position other than the beginning point of Branch to finish setting.

LO	S0			
L1	1	2	3	4
L2	⊢⊣ *t1	⊢⊣ *t2	⊢⊣ *t3	⊢⊣ *t4
L3				
L4	S1			
L5	⊢⊣ *t2			
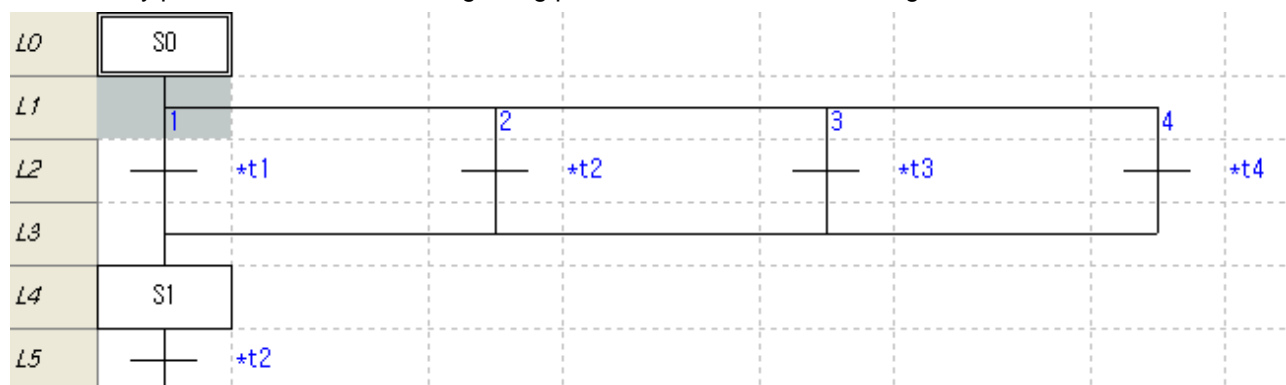
Note

- Number of priorities can be set up as much as the number of the branches.

  - If priority order has not been defined, the program compiling proceeds from left to right. That is, the program is executed from left to right.

- Double clicking a selective branch initializes the branch to the top priority branch.

16.2.16   Selective Branch Priority Rest

Rest the priority setting of the selective branches.

[Procedure]

1. Select the beginning point of the Selective Branch whose priority order has been set up.

LO	S0			
L1	1	2	3	4
L2	⊢⊣ *t1	⊢⊣ *t2	⊢⊣ *t3	⊢⊣ *t4
L3				
L4	S1			
L5	⊢⊣ *t2			
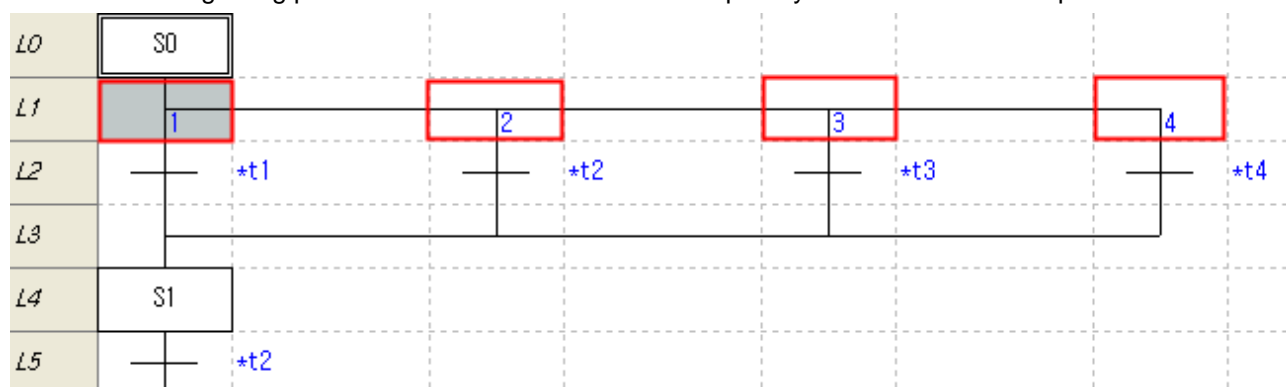
2. Select menu [Edit] – [Selective Branch Priority Rest].

3. The priority setting of the branch is reset.
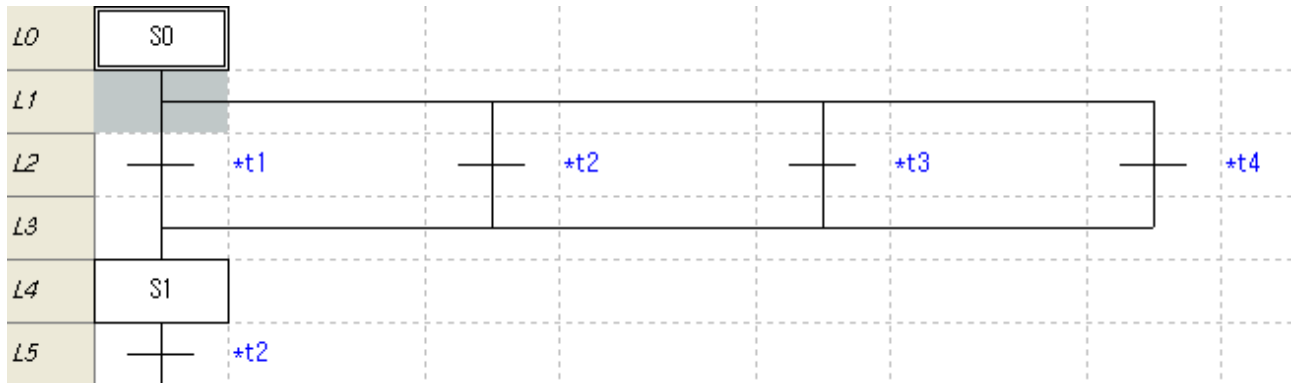
16.2.17   Delete Element

Deletes Step, Transition, Action, Block, Label, Jump, or Branch can be deleted.

[Procedure]

1. Move cursor to the element to be deleted.

2. Select menu [Edit]-[Delete].

Note
– According to the selected position, Step, Transition, or Block is deleted together with the element beneath it.
– Deletion may be inapplicable. In such case, alarm message appears, and edit is cancelled.
- Deleting after selecting the beginning point of a Branch will delete all the contents beneath the Branch.

16.2.18   Copy/Cut/Paste

The data in a selected area can be copied or cut and pasted to another position. Different from copying, cutting will delete the existing data.

1) Copy/Paste

[Procedure]

1. Select the area to be copied.
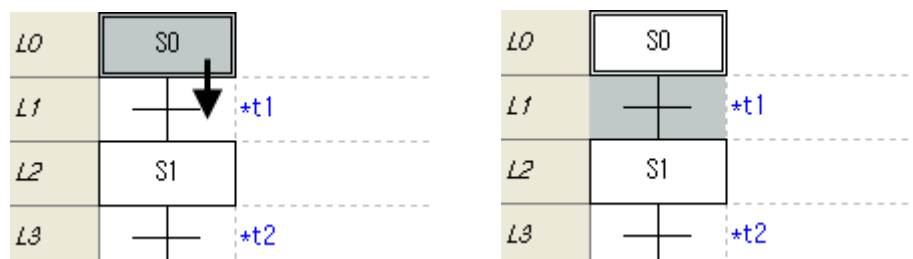
2. Select menu [Edit]-[Copy].

3. the area to be copied is indicated.
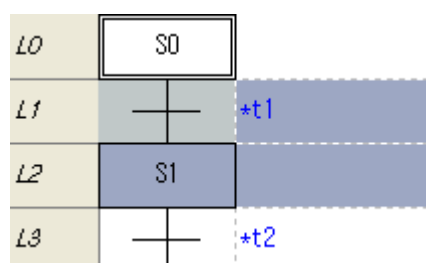
4. Move cursor to the desired position for pasting.
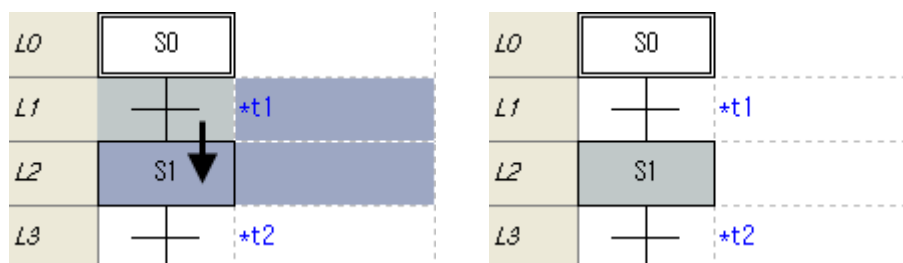
5. Select menu [Edit]-[Paste].
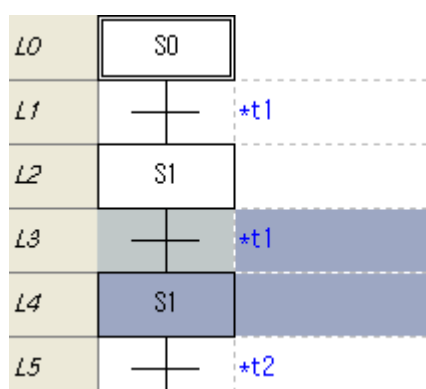
> **Note**
>
> - According to the selected position, Step, Transition, or Block is copied together with the element beneath it.
>
> -- Copy may be inapplicable according to the position. In such case, the edit is cancelled.
>
> - Copying after selecting the beginning point of a Branch will copy all the contents beneath the Branch.
>
> - To paste a branch, select the beginning point of the branch.
>
> - Pasting is applicable only for the same type of branches.
>
> - Action can be pasted to a Step by selecting the Step.
>
> - The principle of paste is to make the same operation as element input.
>
>   - Copying will copy the programs of the Action, Transition and Block. Afterwards, pasting to another program will also paste the copied programs too.

2) Cut/Paste

[Procedure]

1. Select the area to cut off.
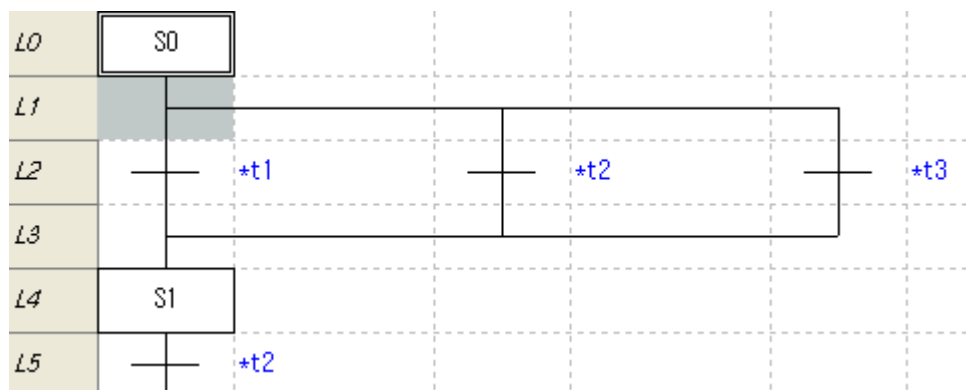
2. Select menu [Edit]-[Cut].
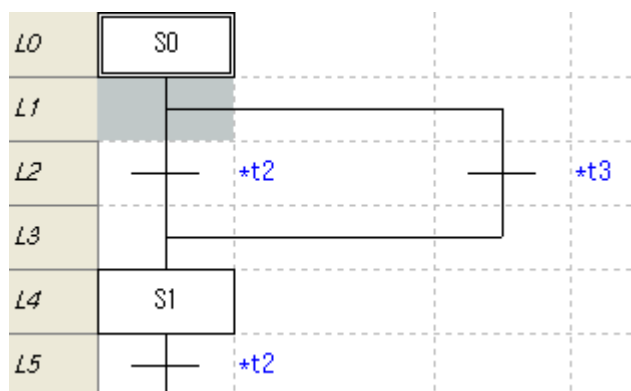
3. Move cursor to the area to paste to.
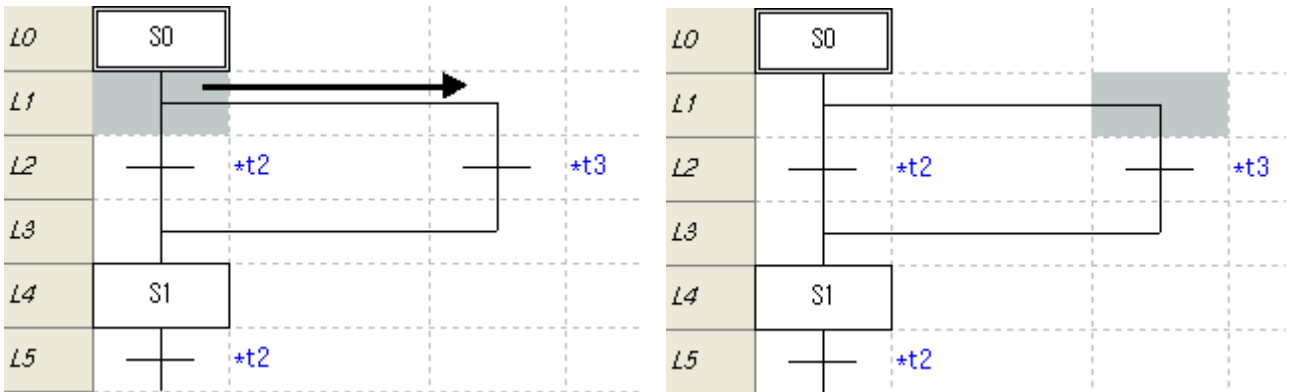
4. Select menu [Edit]-[Paste].
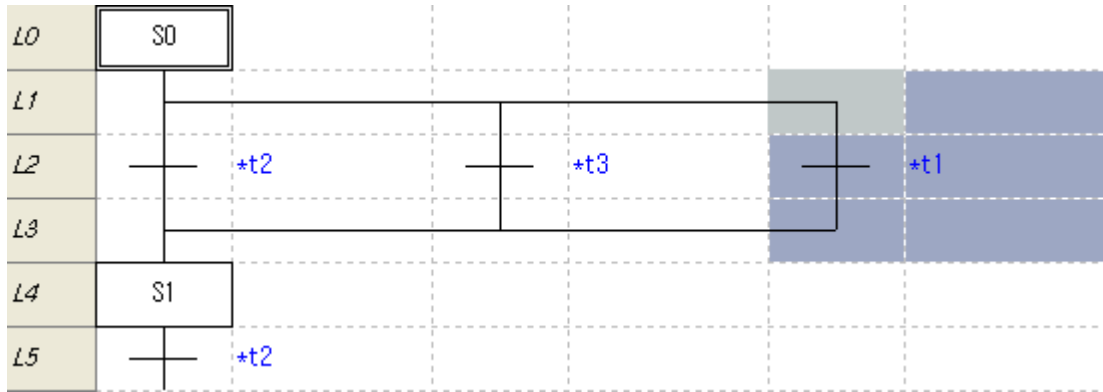
16.2.19　Edit Cancel and Redo

Cancel the changes made in program edit, or redo the cancelled change.

1)　Edit Cancel (with an example of deletion)

[Procedure]

1.　Move cursor to the position to delete.
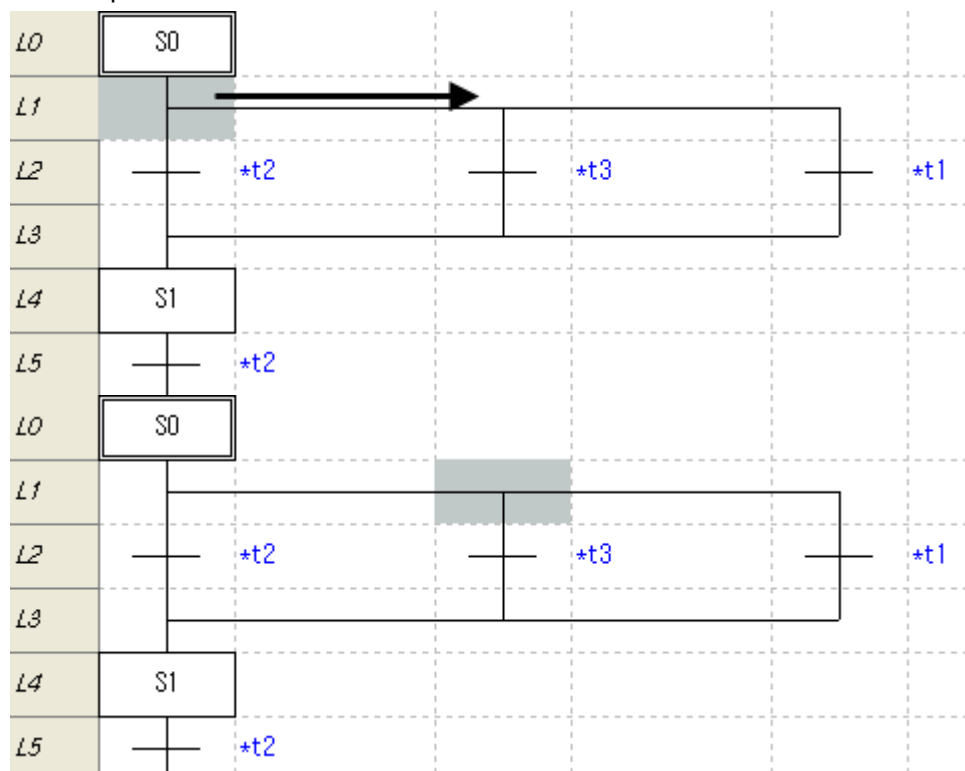
2.　Select menu [Edit]-[Delete].
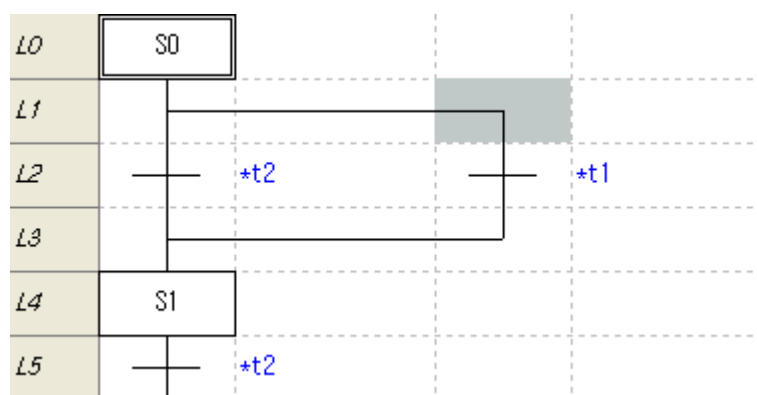
3. Select menu [Edit]-[Edit Cancel].
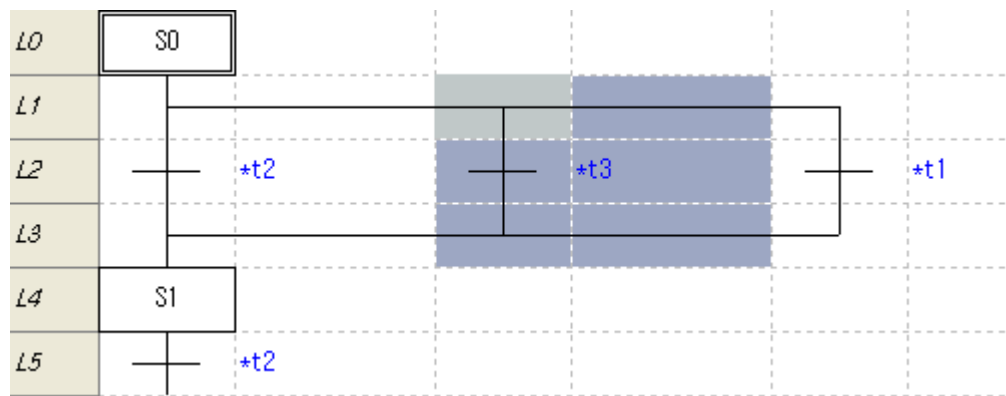
4. The edited area is indicated and the change is cancelled.

2) Redo (with an example of deletion)

1. Select menu [Edit]-[Redo].
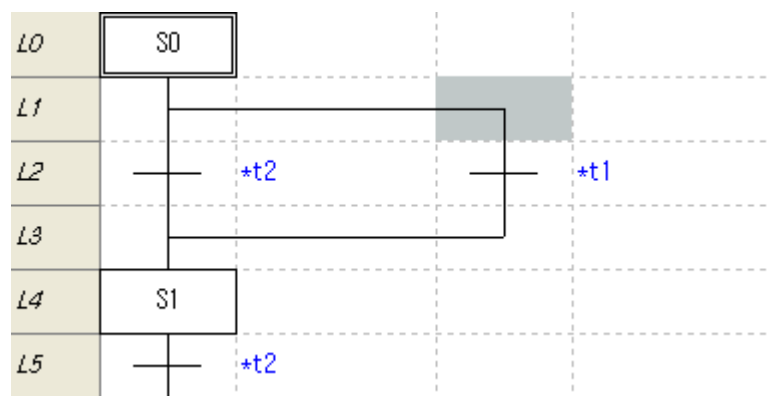
Note
– For all the changes made in edit, cancel or redo is applicable.
– Number of cancel is not limited.

16.2.20   Program Edit Mode

The SFC program works in insertion mode only.

Insertion Mode: Row 5, Column 0   Insert

16.3   View Program

This section described view option, zoom in and zoom out of the SFC program.

16.3.1 Program Zoom In/Out Ratio Change

Changes the magnification of the screen view of the SFC program.

1) Zoom In

[Procedure]

1. Select menu [View]-[Zoom In].

2) Zoom Out

[Procedure]

1. Select menu [View]-[Zoom Out].

Note

－ With a wheeled mouse, Ctrl+Upward roll reduces magnification by one step.

－ With a wheeled mouse, Ctrl+Downward roll enlarges magnification by one step.

－ Magnification can be selected from the Magni View tool bar, or entered directly.

   For details, see Chapter 2, Basic Operation, 2.2 Toolbar.

16.3.2   SFC Screen Attributes

The contents, position or other information displayed on the SFC program screen can be edited.

[Procedure]

1. Select menu [Tool]-[Option]-[SFC].

[Dialog]
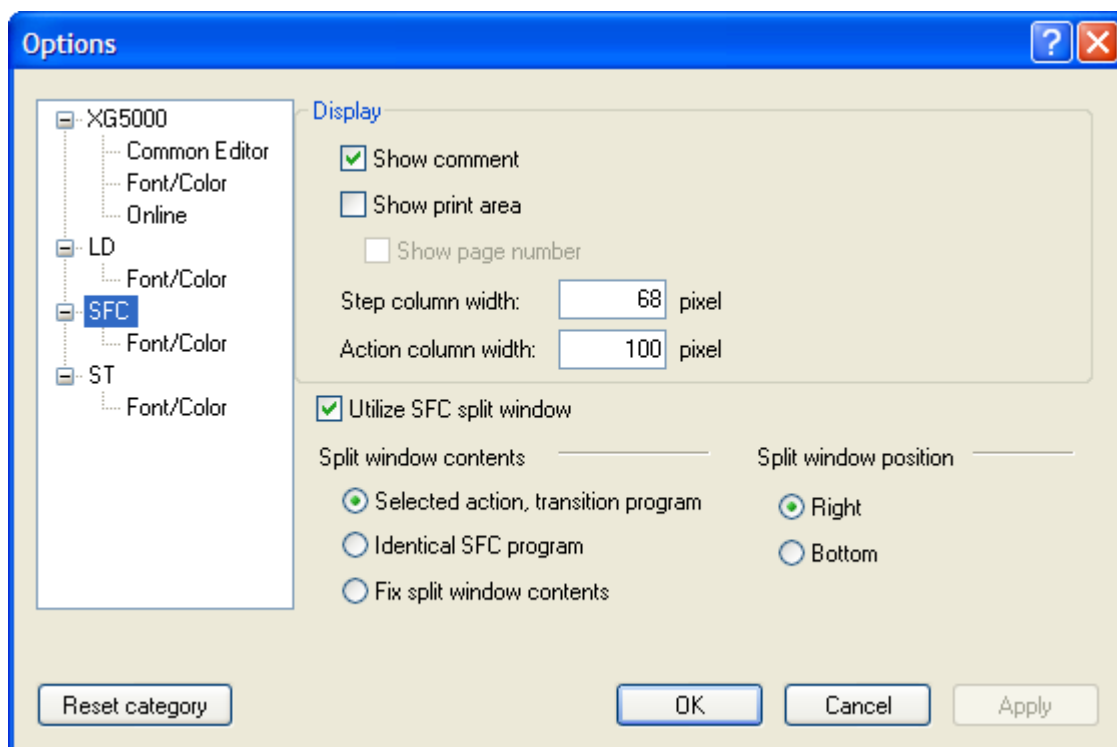
[Dialog] box description

a. View Comment: show comments of Step, Transition, Action, or Block.

b. View Print Area: mark print area with thick dotted line.

c. View Page No.: show page No. in the print area.

d. Step Column Width: column width of Step or Transition can be set up.

e. Action Column Width: column width of Action can be set up.

f. SFC Partitioned Window: SFC window can be partitioned.

g. Partitioned Window Content: arrange the view contents in the partitioned windows.

h. Partitioned Window Position: SFC partition direction can be arranged.

i. Confirm: save the changes and exit the dialog.

j. Cancel: exit the dialog without saving changes.

k. Apply: apply the setting to the present SFC window.

l. Rest Initial Value: rest all the settings to the default values of the XG5000 installation.

Note
⁻ Step column width range is 20~200.
- Action column width range is 70~400.

1) View Comments

<Comments not displayed>   <Comments displayed>
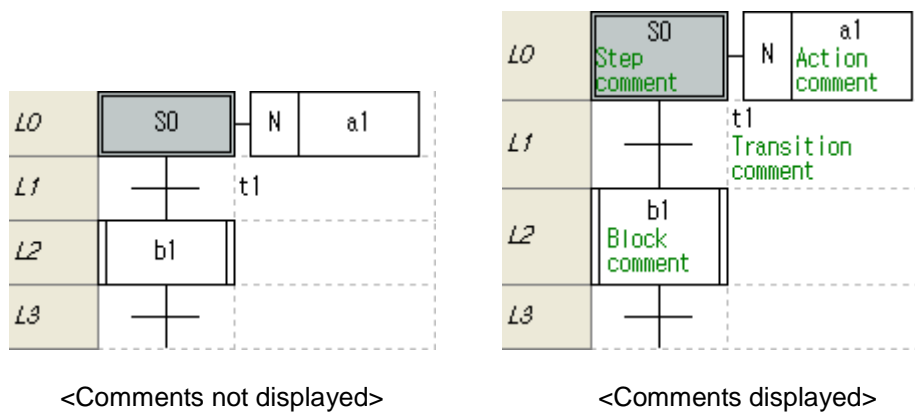
2) View Print Area
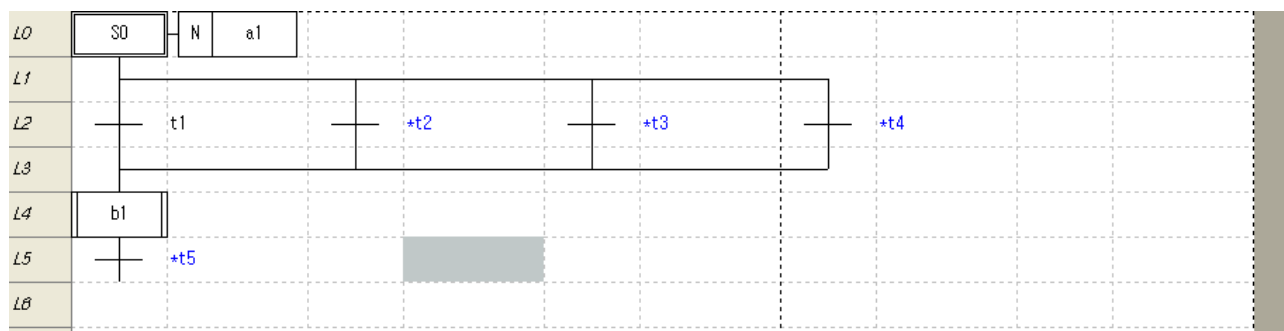
3) View Page No.
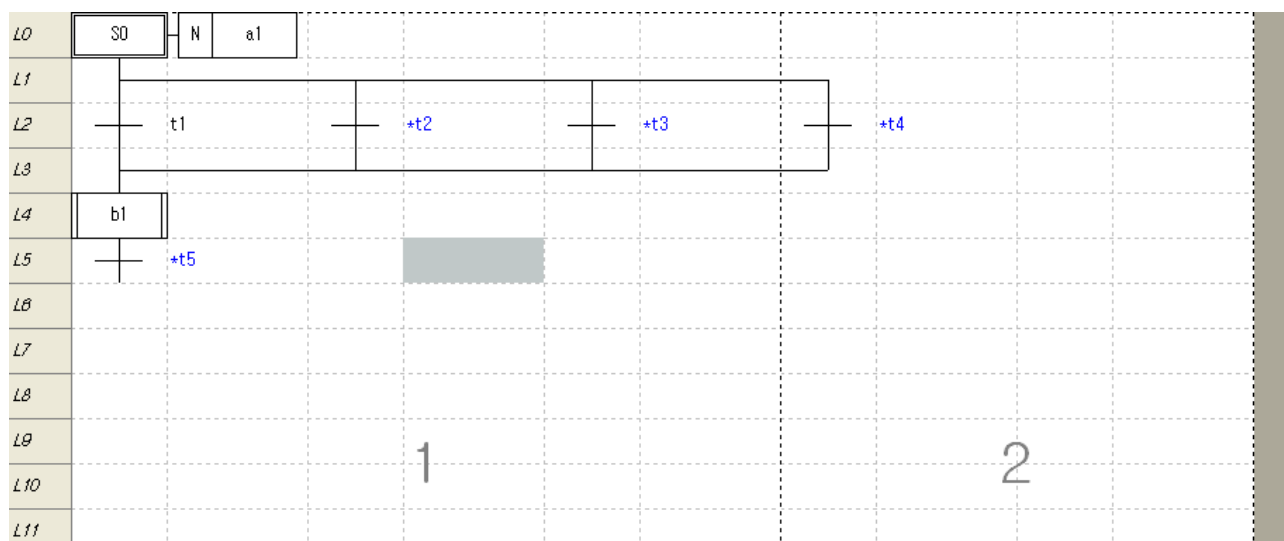
4) Step Column Width

<Step column 68 pixel (default) screen>   <Step column 100 pixel screen>
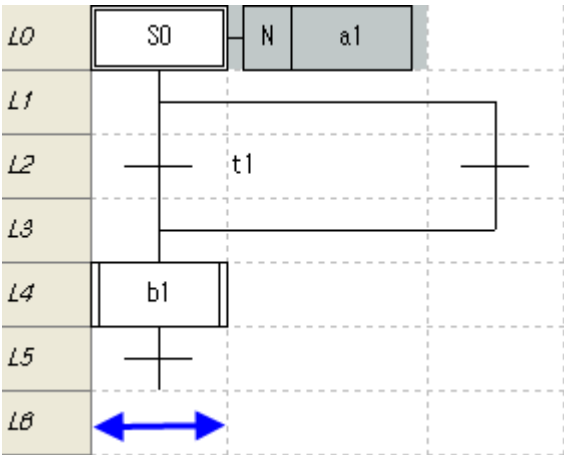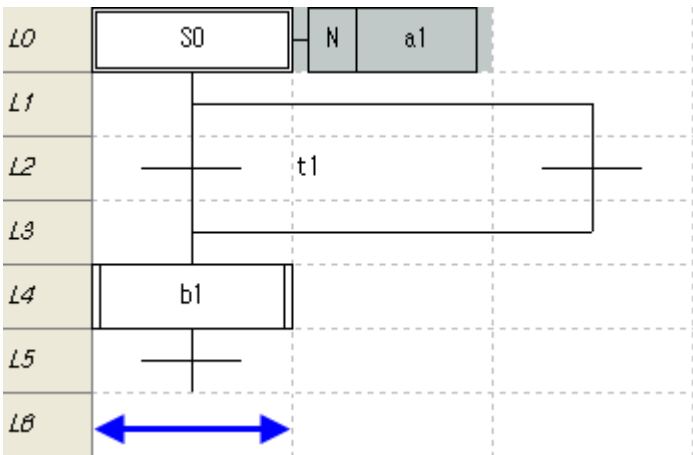
5) Action Column Width

<Action column 100 pixel (default) screen>   <Action column 150 pixel screen>
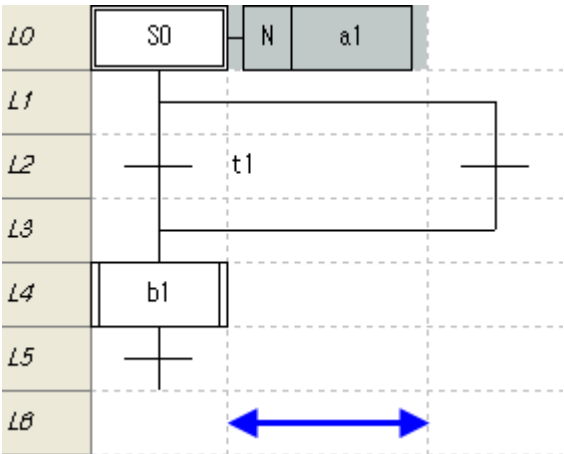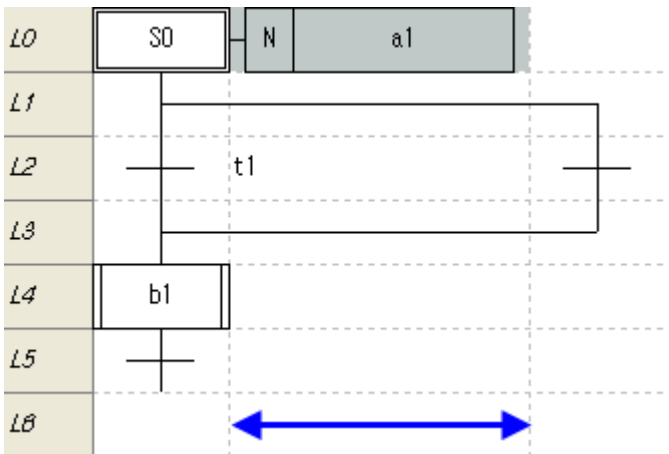
6) Partitioned Window

<Screen with partitioned windows>

<Screen not partitioned>
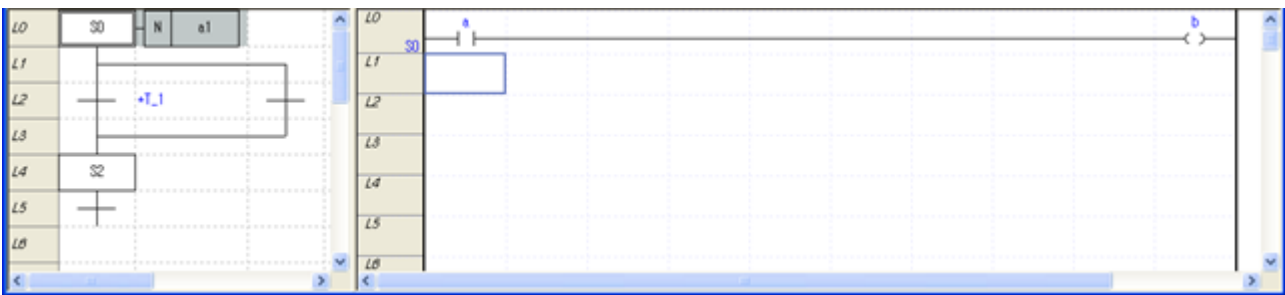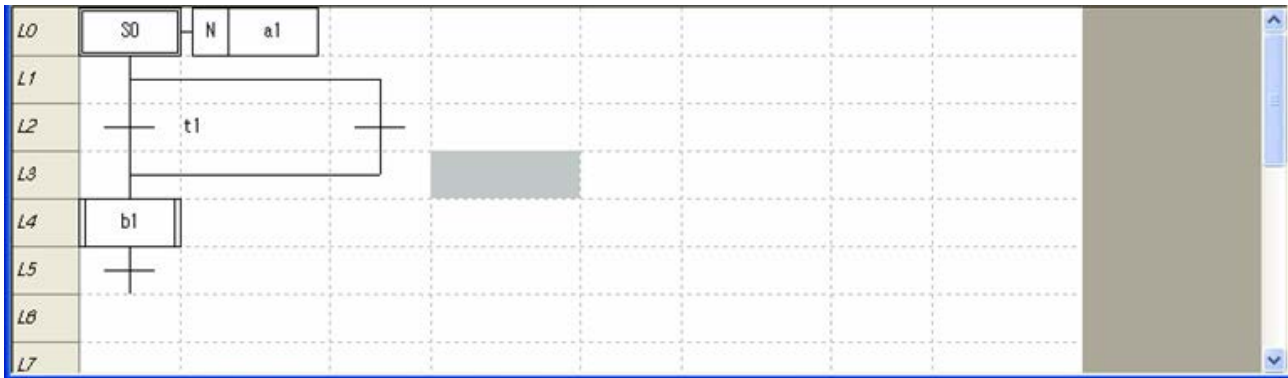
7) Partitioned Window Contents

<View selected Action, Transition: Action selected>

<View the same SFC program>

<View partitioned window with fixed contents: view the contents previously fixed, different from selected position>
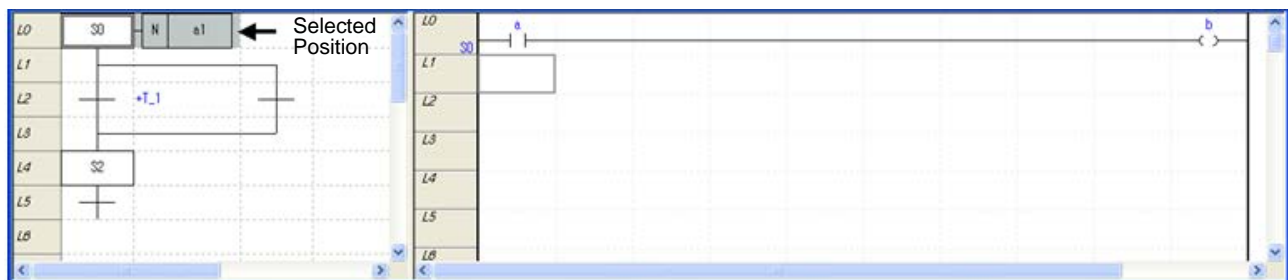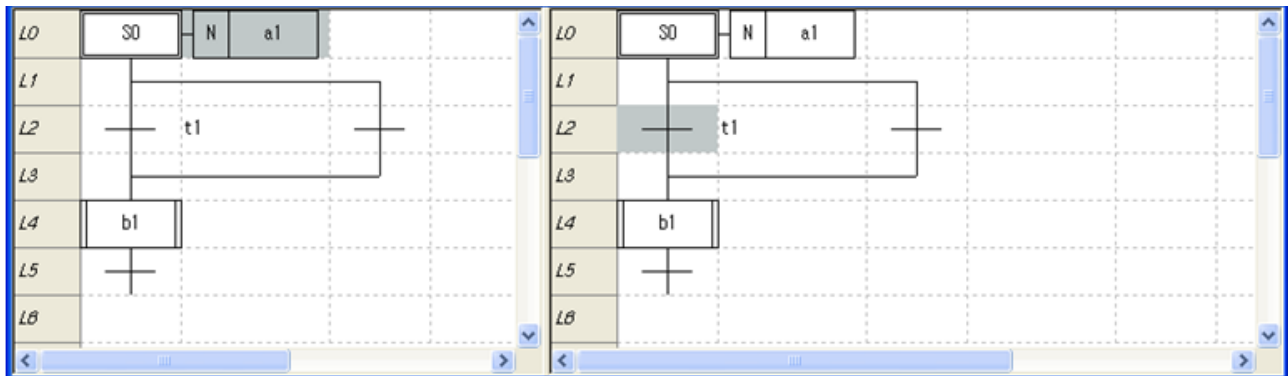
8) Partitioned Window Position

<Partitioned window on the right side>

<Partitioned window at the bottom>
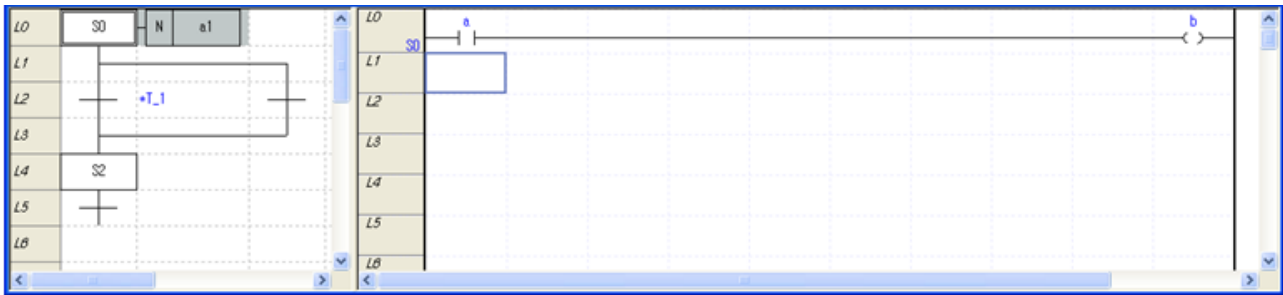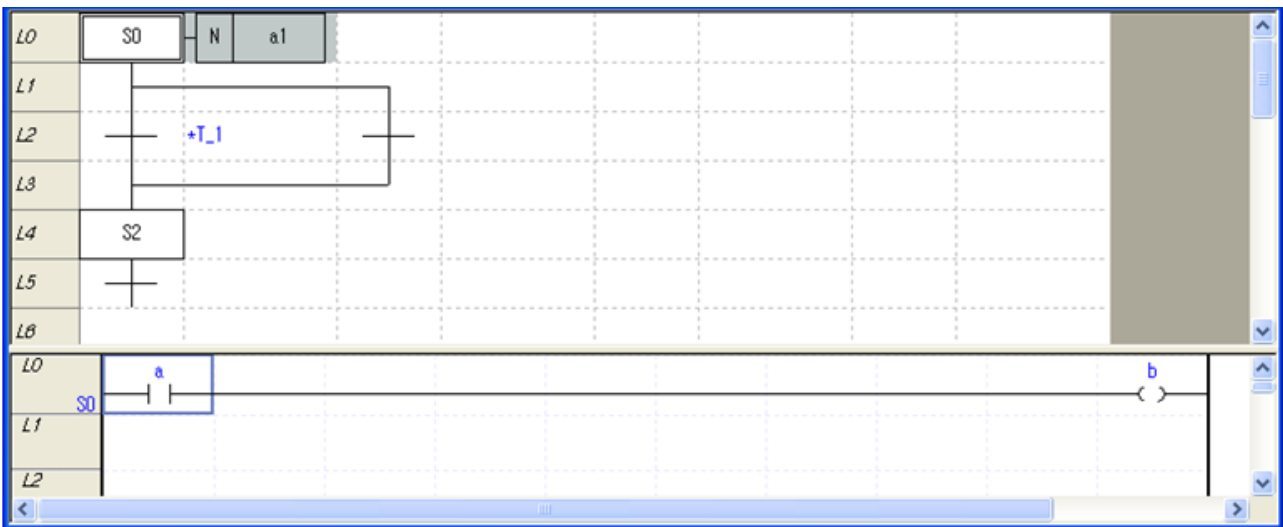
16.3.3 View Block/Action/Transition List

Check other program list being used in the SFC program, and can edit name, comment, etc.

[Procedure]

1. Select menu [View]-[Block/Action/Transition List].
2. List window will appear.

16.3.4   Open Program

The Block, Action, or Transition program at the position selected by SFC program can be opened in new window.

[Procedure]

1. Select the position to open the program.
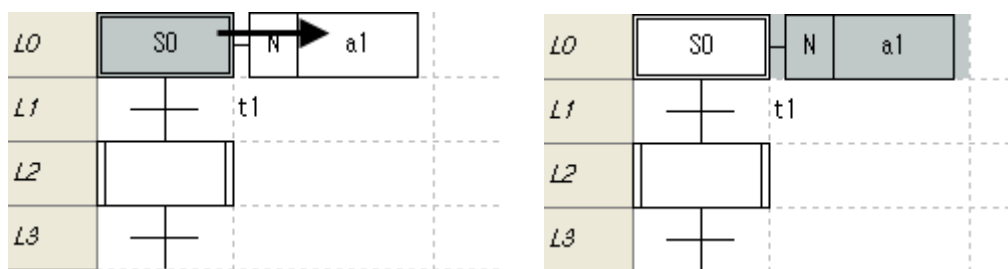
2. Select menu [View]-[Open Program].
3. Open the selected program in a new window.
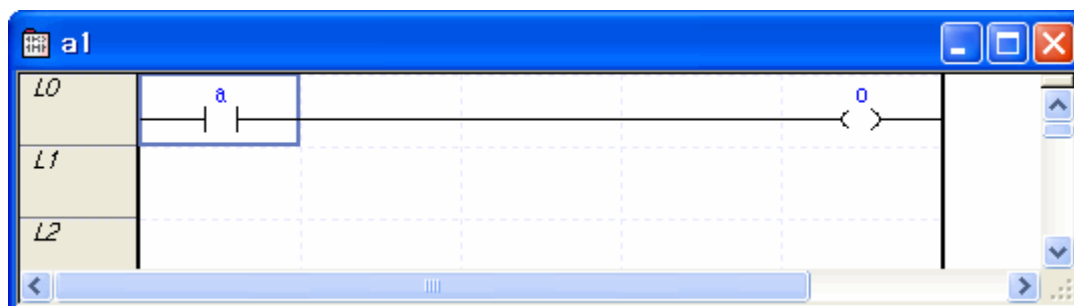
16.4　Additional Edit Functions

This section described additional convenience functions for edit.

16.4.1　Book Mark

Book marks can be set up to go to desired position promptly.

1) Book Mark Setting

[Procedure]

1. Move cursor to the position to set a book mark.
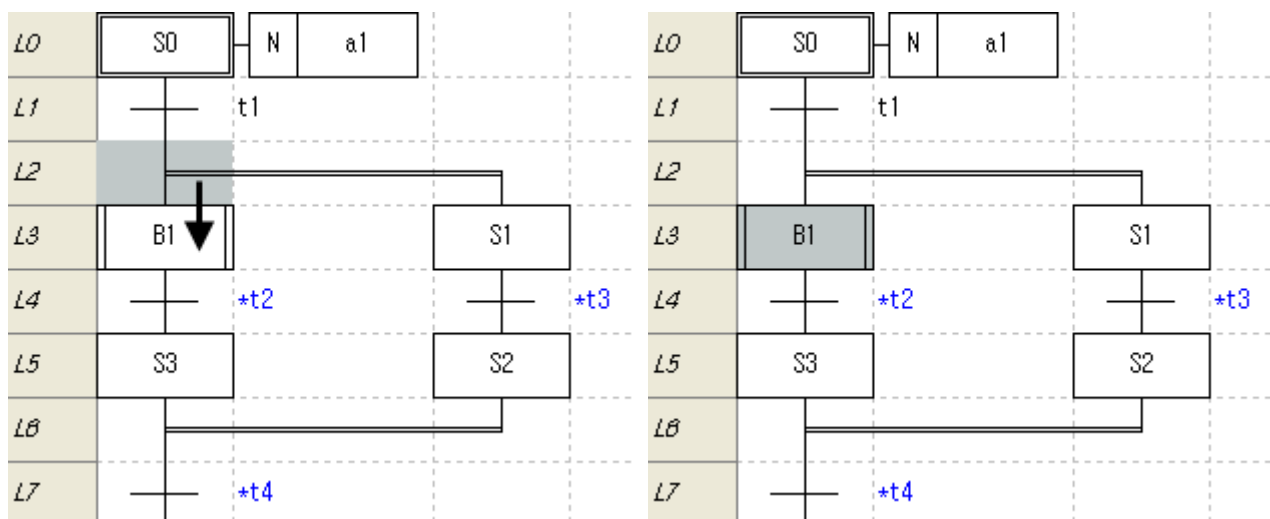
2. Select menu [Edit]-[Book Mark]-[Set/Rest].
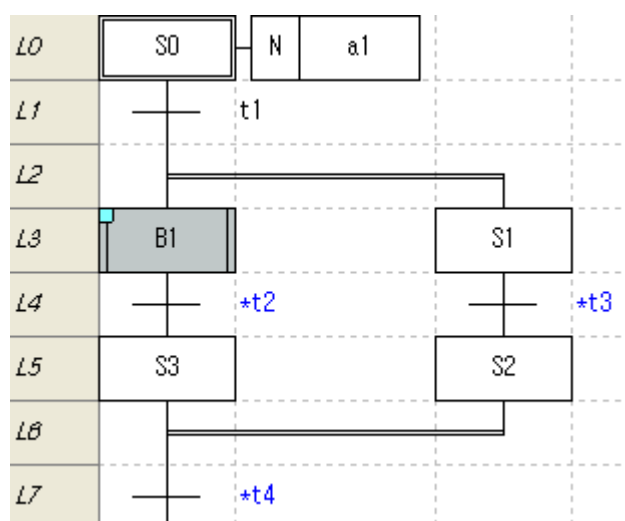
2) Reset Book Mark

[Procedure]

1. Move cursor to the position to reset a book mark.
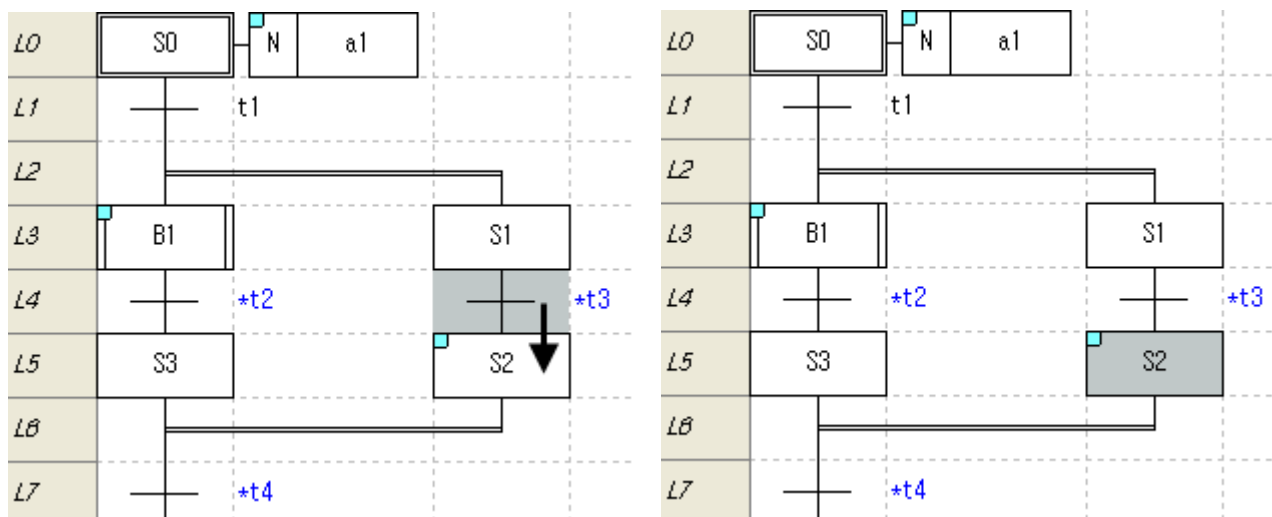
2. Select menu [Edit]-[Book Mark]-[Set/Rest].
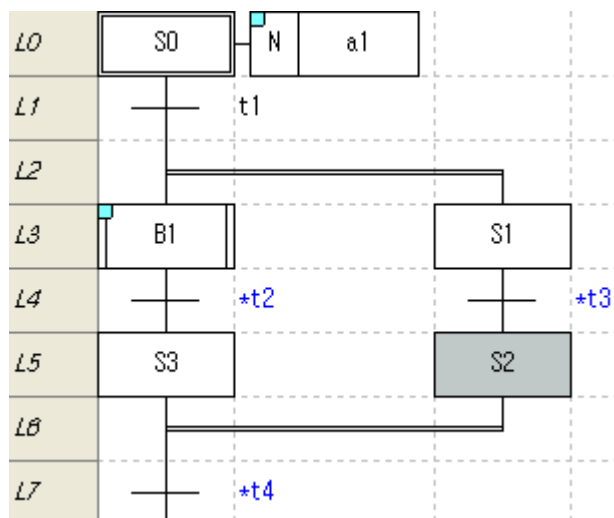
Reset All Book Marks

[Procedure]

3. Select menu [Edit]-[Bok Mark]-[Rest All].
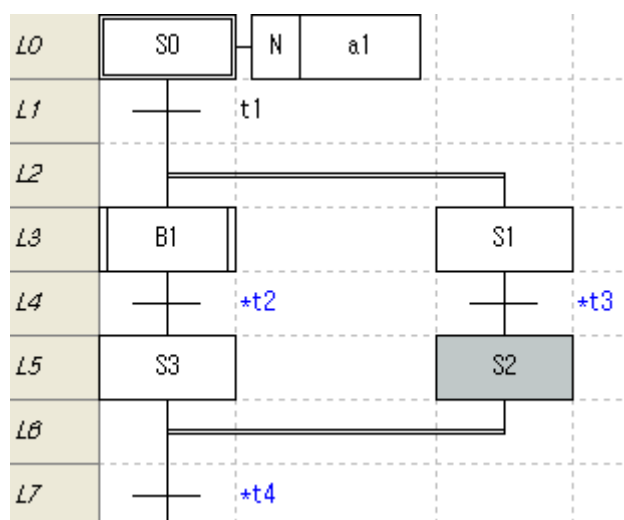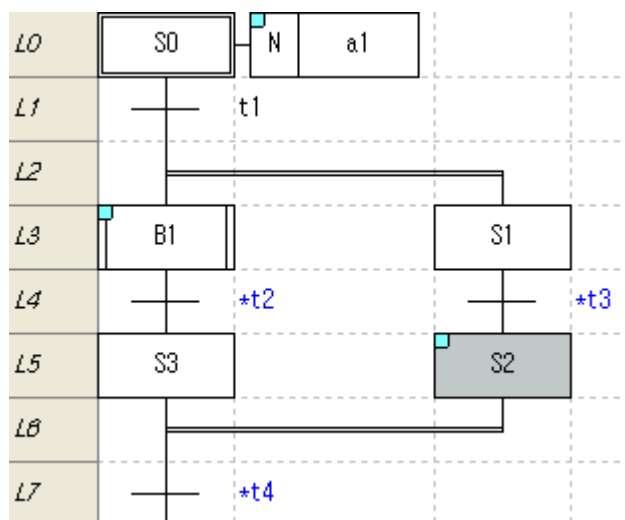
3) Go to the Previous Book Mark

[Procedure]

1. Select menu [Edit]-[Book Mark]-[Previous Book Mark].
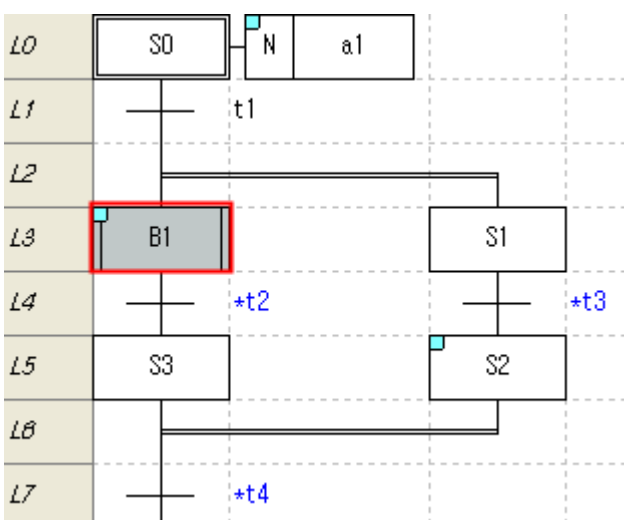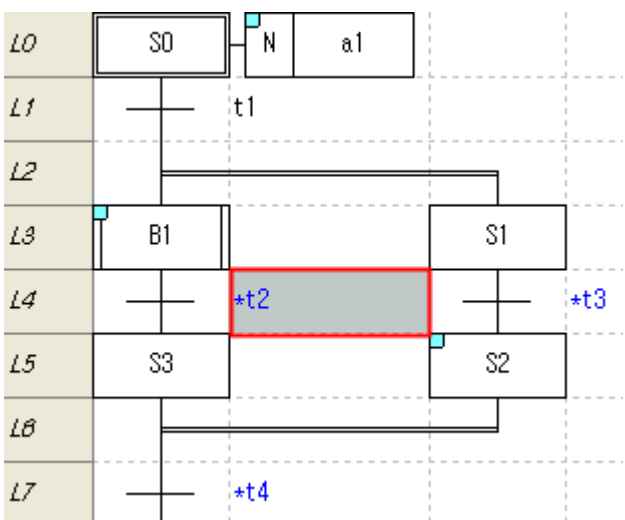
4) Go to the Next Book Mark

[Procedure]

1. Select menu [Edit]-[Book Mark]-[Next Book Mark].
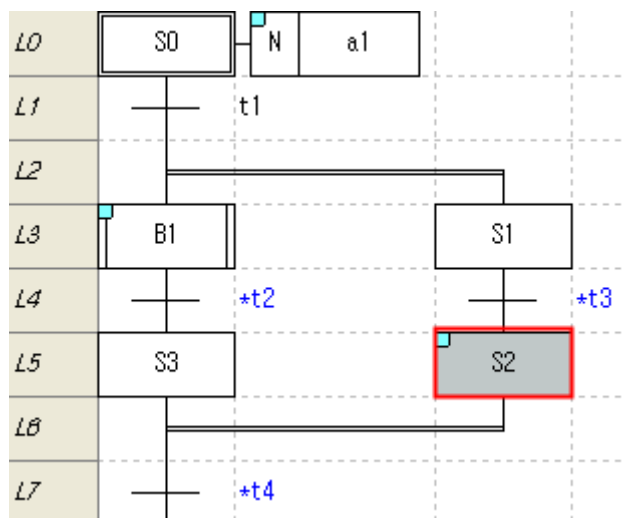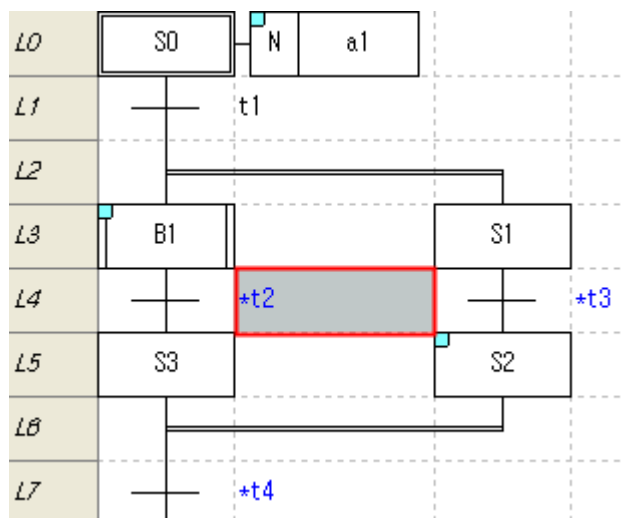
Note
‒ Book marks are set up by cell unit.
‒ Since a book mark is not an edit item, cancel or redo is not applied to book mark set/reset.

16.4.2　Go To

Go to the designated line, edited label, or Rung comment.

1)　Go To Line

[Procedure]

1.　Select menu [Search/Replace]-[Go To]-[Step/Line].

[Dialog]

a

b

c　　　d
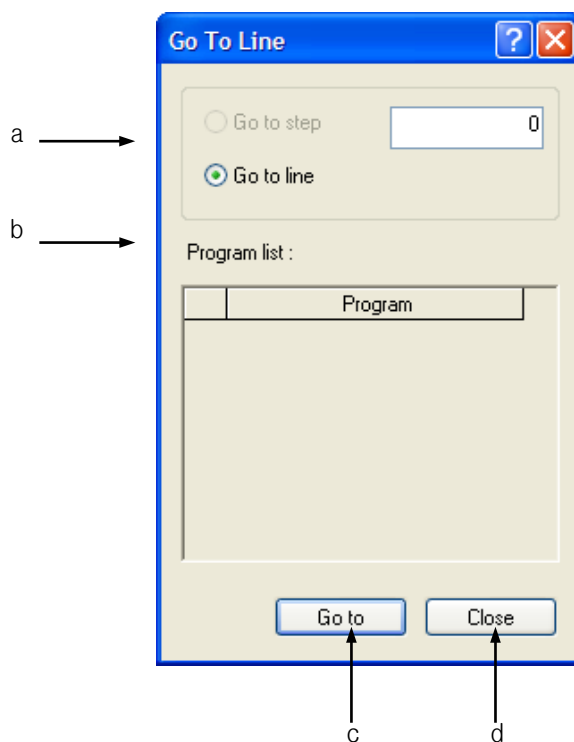
[Dialog] box description

a.　Go To Line: enter the line to go to.

b.　Program List: show the program list of the present PLC.

c.　Go To: exit the dialog and go to the destination Step of the selected program.

d.　Cancel: exit the dialog.

2.　Enter the Step to go to in the dialog box.

Note
- Go To Line is available in LD or ST program only.
- The LD used as the Action/Transition of SFC is not available for Go To function.

2) Go To Label

[Procedure]

1. Select menu [Search/Replace]-[Go To]-[Label].
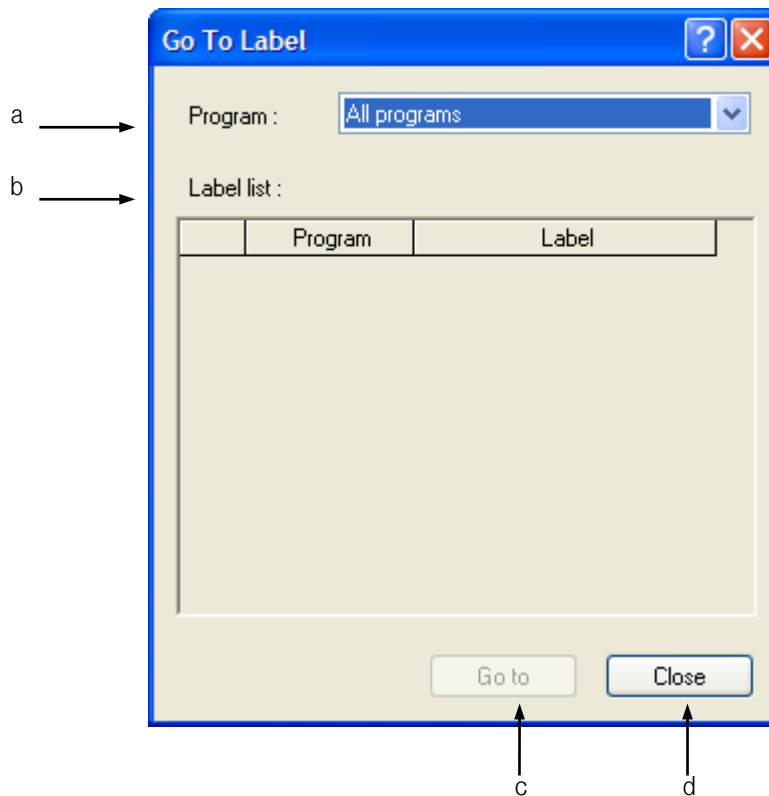
[Dialog]

a

b

c

d

[Dialog] box description

a. Program: show the program list of the present PLC. If 'Whole Program' is selected, the list for all the labels appears.

b. Label list in the program: show the list of the label being used in the selected program.

c. Go To: exit the dialog, go to the selected label.

d. Cancel: exit the dialog.

2. Select the label to go to in the dialog.

Note
- Go To Label function is available in the LD program only.
- The LD used as the Action/Transition of SFC is not available for Go To function.

3) Go To Rung Comment

[Procedure]

1. Select menu [Search/Replace]-[Go To]-[Rung Comment].
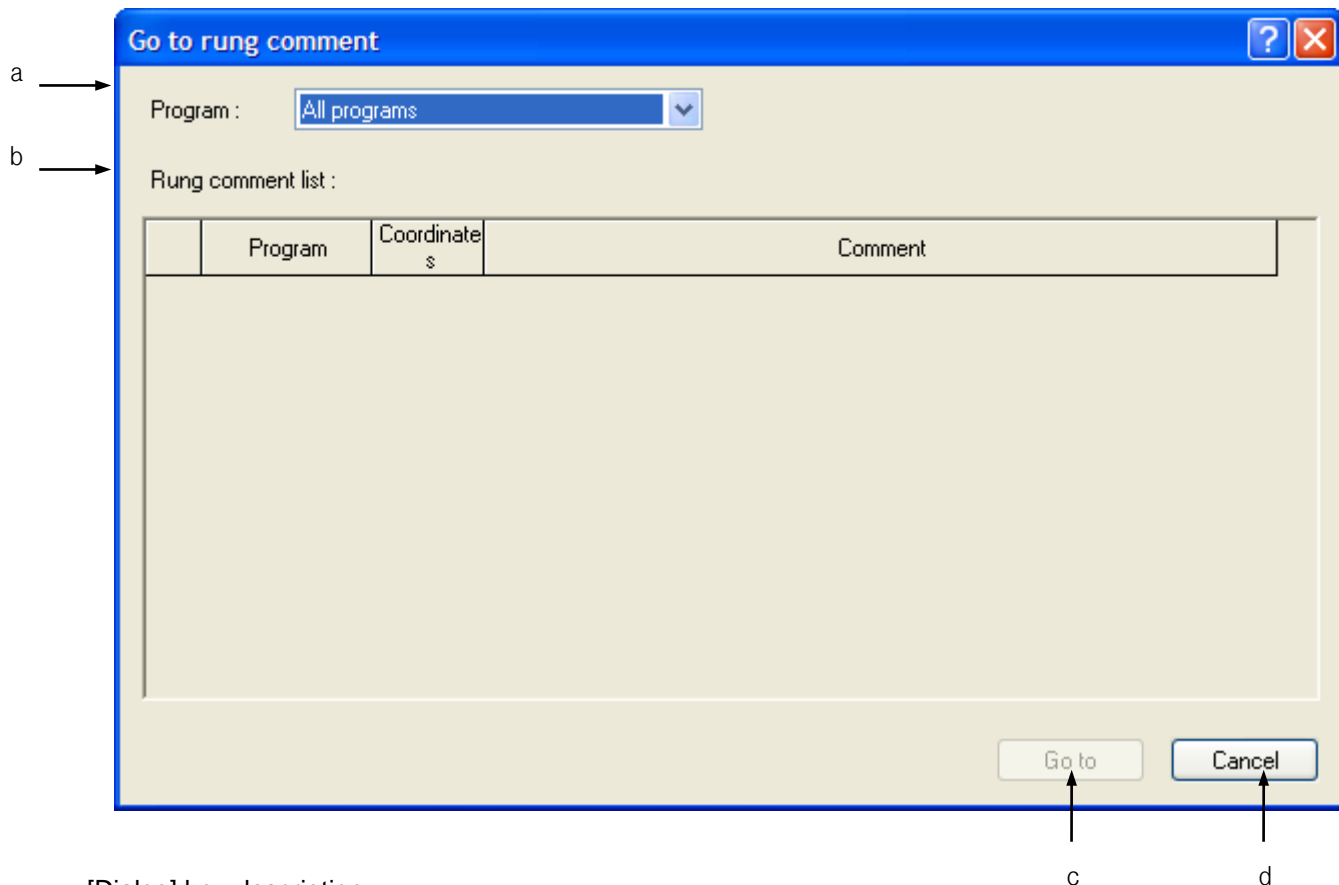
[Dialog]

a

b

c   d

[Dialog] box description

a. Program: show the program list of the present PLC. If 'Whole Program' is selected, the list for all the Rung Comments appears.

b. Rung Comment list in the program: show the list of the Rung Comments in the selected program.

c. Go To: exit the dialog, go to the selected Rung Comment.

d. Cancel: exit the dialog.

2. Select the Rung Comment to go to from the dialog.

Note

- Go To Rung Comment function is available in the LD program only.

- The LD used as the Action/Transition of SFC is not available for Go To function.

4) Go To END Command

[Procedure]

1. Select menu [Search/Replace]-[Go To]-[END Command].

[Dialog]
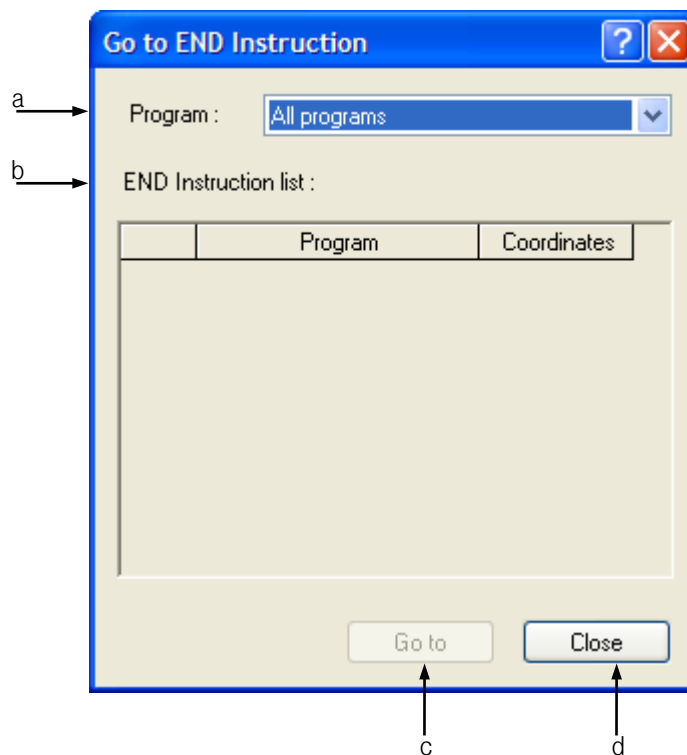
[Dialog] box description

a. Program: show the program list of the present PLC. If 'Whole Program' is selected, all the END commands will appear.

b. END list in the program: show the list of the END commands in the selected program.

c. Go To: exit the dialog, go to the selected END command.

d. Cancel: exit the dialog.

2. Select the END command to go to from the dialog.

Note
- Go To END command function is available in the LD program only.
- The LD used as the Action/Transition of SFC is not available for Go To function.

Chapter 17 ST Edit

The ST is a character based programming language in accordance with the IEC 61131-3.

17.1   ST Programming

For PLC, scan program pr SFC can be programmed with ST.

17.1.1 Adding Scan Program

[Sequence]

1.   Select Scan Program in the Project window.
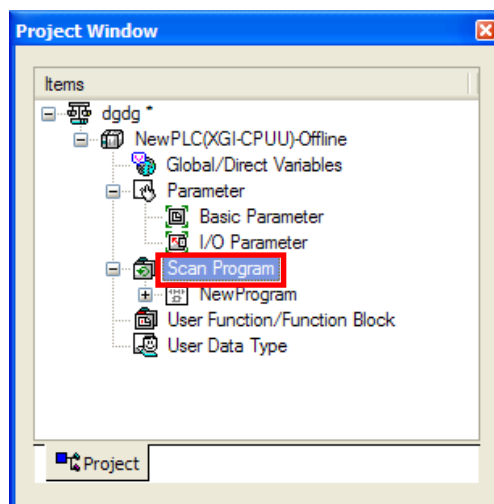
2.   In the menu, select [Project]-[Add Item]-[Program].
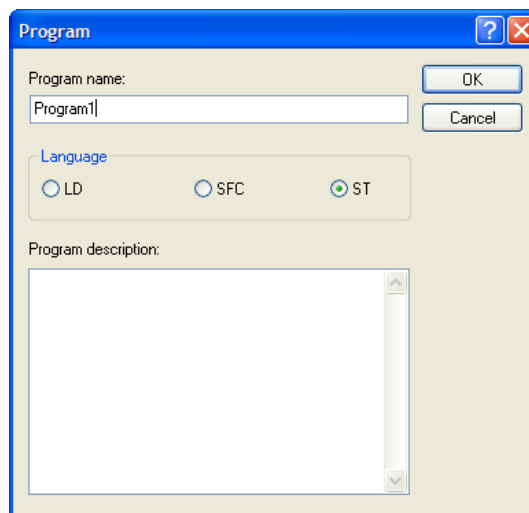
3. Enter the name and description of the program, select ST as the language, and press Confirm.
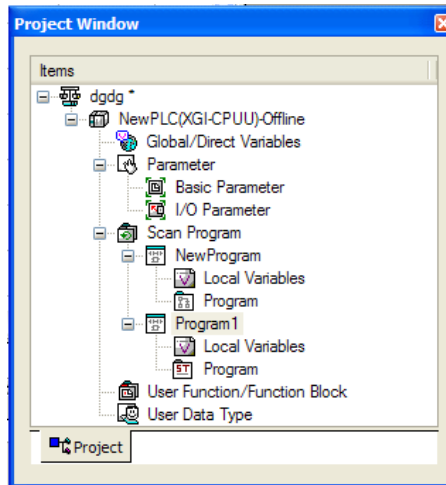
17.1.2 Add SFC transition and action

[Adding Transition]

1. In the SFC program, move the cursor to the location to enter Transition.
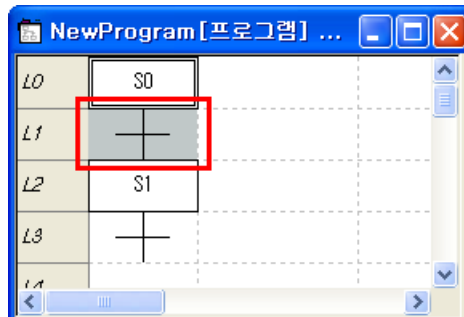
2. Select a transition and double click it or press Enter.
3. Enter the name and description of the transition; check the Program (P) radio button in the classification (K), as necessary press Confirm.
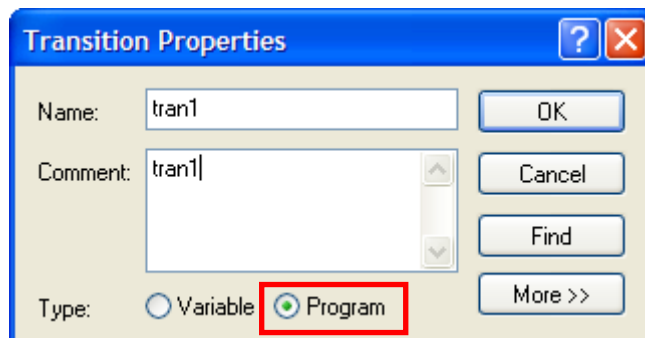
4.   In the Add Program dialog, select ST as the language.
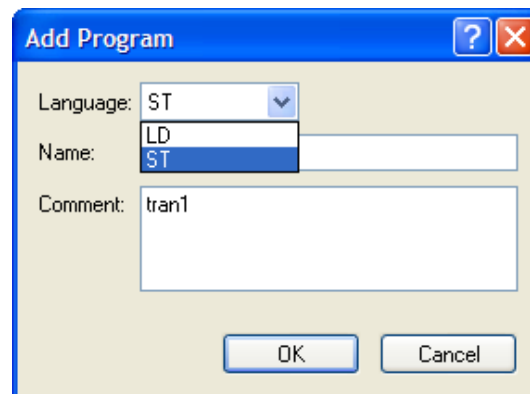
[Adding Action]

1.   In the Action Register dialog, enter the name and description of the Action, select Program (P) in the classification (K), and press Confirm.
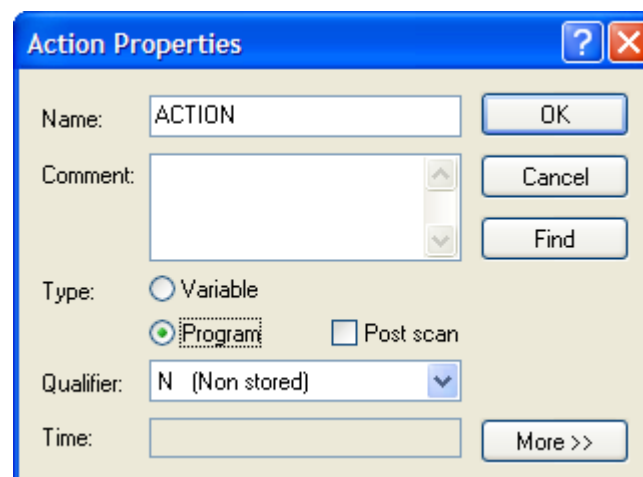
2.   In the Add Program dialog, select ST as the language.
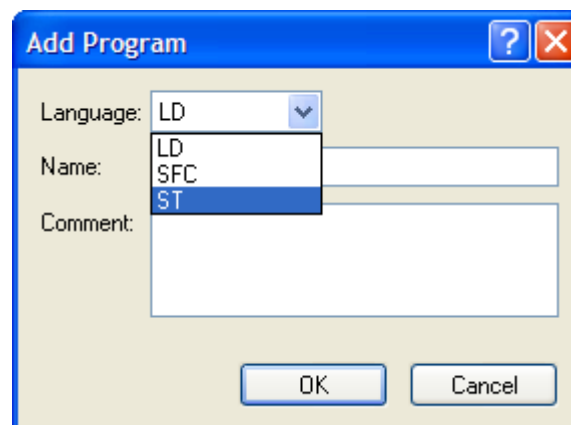
17.2   Limitation

Following limitations are applied to ST program edit.

Item	Description	Limit
Max. number of characters in a line	Max. number of characters in a line is 2,048 English alphabets or 1,024 Korean alphabets.	2,048

1. Only one kind of language can be used in a scan program.

2. Scan program language and transition and action of SFC language may differ from each other.

3. A program made with a language cannot be converted to another language.

17.3   Program Edit

17.3.1   Shortcut Key

For ST programming and edit, input, copy, cut or paste can be performed using keyboard.

Following shortcut keys can be changed with the menu [Tools]-[Shortcut Key Setting].

Function	Shortcut Key	Description
Copy	Ctrl + C	Copy the selected character string.
Paste	Ctrl + V	Paste the selected character string.
Delete	Del	Delete the selected character string.
Cut	Ctrl + X	Copy and delete the selected character string.
Cancel	Ctrl + Z	Return to the previous status.
Redo	Ctrl + Y	Return from the state of before change to the previous edit state.
Select All	Ctrl + A	Select the entire character string.

Following shortcut keys are used for cursor movement, and cannot change in the XG5000.

Shortcut Key	Description
Home	Go to the first character of the line.
Ctrl + Home	Go to the beginning of the program.
→	Move cursor to the right by one character.
←	Move cursor to the left by one character.
↑	Move the cursor up by one row.
↓	Move the cursor down by one row.
End	Go to the end of the line.
Page up	Go upward by one page.
Page down	Go downward by one page
Ctrl + End	Go to the last edit line.
Ctrl + →	Go to the first character of the next word.
Ctrl + ←	Go to the first character of the previous word.
Ctrl + Del	Delete to the beginning position of the next word.
Ctrl + BS	Delete to the first character of the present word.
Shift + Move	Select the section from the present cursor position to the position to go to.

Note

1. In the shortcut key definition, 's' stands for the Shift key, 'c' stands for the Ctrl key, and 'a' stands for the
   Alt key.
2. The shortcut keys used in the Edit Tool are in accordance with the default keys provided in the XG5000.
3. For user defined shortcut key, refer Chapter 2, Basic Operation, 2.4 Shortcut Key Setting.

17.3.2   Copy/Paste

You can copy selected character string to the clipboard and paste it with Paste function.

[Procedure]

   1. Select the character string to be copied.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2. Select menu [Edit]-[Copy].

3. Go to the position to Paste the character string.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         |
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

4. Select menu [Edit]-[Paste].

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         any_INT_2|
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

Note
1. Clip board: a memory area of computer system provided for temporary storage space.
2. When performing the Paste function, if a section has been selected, the section will be overwritten with the character string stored in the clip board, otherwise, the character string in the clip board will be inserted.
3. Paste function is available for text only.

17.3.3 Undo/Redo

Cancel function restores the state before edit. Redo function returns to the state before cancel after a Cancel command has been executed.

[Procedure]
1. After executing Paste function, select menu [Edit]-[Undo].

   => The 'pasted' character string is deleted.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         |
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2. Select menu [Edit]-[Redo].

   => The Paste function will be executed again.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         any_INT_2|
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

17.3.4 Select/Add Variable

Enter a variable in the selected section or cursor position.

[Procedure]
1. Move the cursor to desired position, and select menu [Edit]-[Select/Add Variable].

[Dialog]

[Dialog] Box Description

Variable: enter name of the direct variable or declared variable. The entered character string is variable type and if the character string has not been registered as a variable in the Variable/Description, Add Variable/Description dialog will appear.

a. Local variables: show the list of declared local variables.

b. Direct variable description: show direct variable description.

c. Flag: Show flag on the list. Detail flag type can be selected in the flag item.

d. Item: a selection box which shows flag types. System/High Speed Link/P2P/PID flags can be selected.

e. Whole: select whether the whole flags for the selected item will be displayed or only the flags pertinent to the entered parameter No./block index will be displayed.

f. Parameter No.: enter the setting number of the selected flag item. 0~12 for high speed link, 0~8 for P2P, and 0~63 for PID.

g. Block Index: enter the block number of the selected flag item. 0~127 for high speed link and 0~63 for P2.

h. Global Variables: show the list of the global variables. They can be registered as EXTERNAL variables.

i. Add Variable: a dialog where variables can be added into the local variable list appears.

j. Edit Variable: a dialog for edit a selected variable appears.

k. Delete Variable: deleted the selected variable from the local variable list.

l. Confirm: enter the input or selection and exit the dialog.

m. Cancel: exit the dialog without entering the change.

[Dialog]

[Dialog] Box Description

a. Variable: enter name of the variable to be added.

b. Data Type: select the type of the variable to be added.

c. Variable Kind: select the data type of the variable to be added.

d. Address: allocate the direct address of the variable to be added.

e. Initial Value: enter the initial value of the variable to be added.

f. Latch: enter the latch status of the variable to be added.

g. Comment: enter the description of the variable to be added.

2. Enter the variable at the cursor position.

Note
1. Placing the cursor in a character string which is not in the variable list and execute [Add/Select Variable] command to add a new variable. 2. Selecting a character string as a group and execute [Add/Select Variable] command to replace the selected character string with the variable

17.3.5   Insert Application Command

Insert a character string of application command at the cursor position.

[Procedure]

1. Move the cursor to the desired position.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         |
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2. Select menu [Edit]-[Function/Function Block].
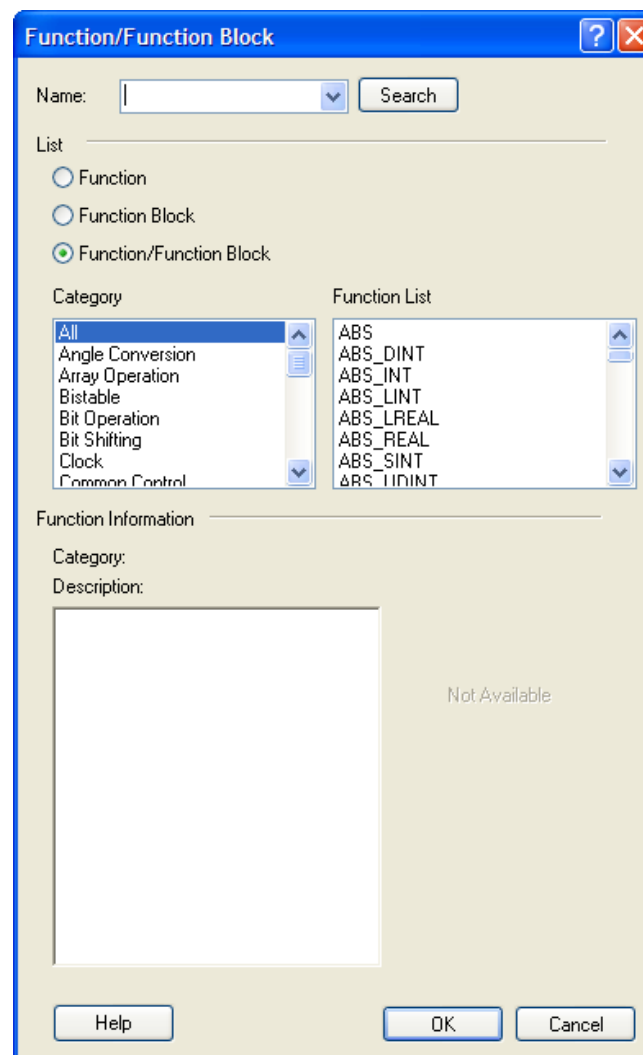
[Dialog]

[Dialog] Box Description

a. Application Command: enter name of the application command to be used.

b. Classification: show the classification of the application command.

c. Command: show the list of the application commands which fall under the selected class.

d. Confirm: enter the input and exit the dialog.

e. Cancel: exit the dialog.

3. Function/Function Block is inserted.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```
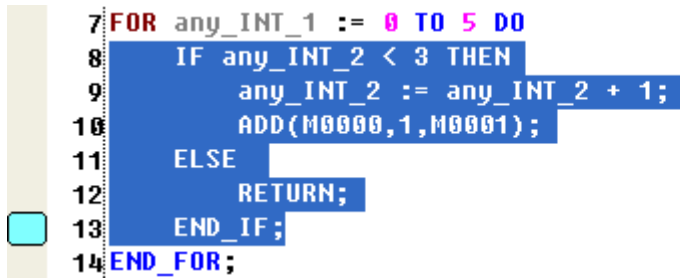
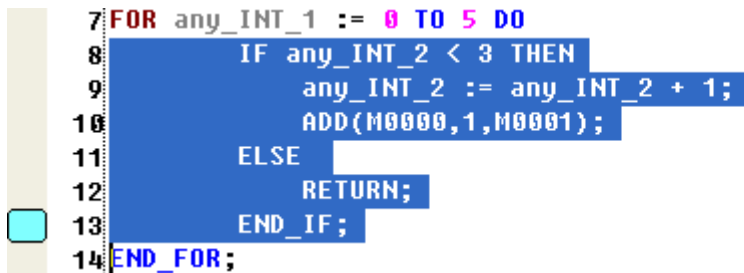| Note |
| --- |
| - The input/output parameters for application commands are not entered automatically, but need to be edited according to the user's intention.
 - Automatic variable and application command may have the same names. |

17.4 View Program

This section describes the screen display setting of the ST software program.

17.4.1 ST Option

Description on the option dialog box of the ST software.

[Procedure]

1. Select menu [Tool]-[Option].

2. Select ST.

[Dialog]
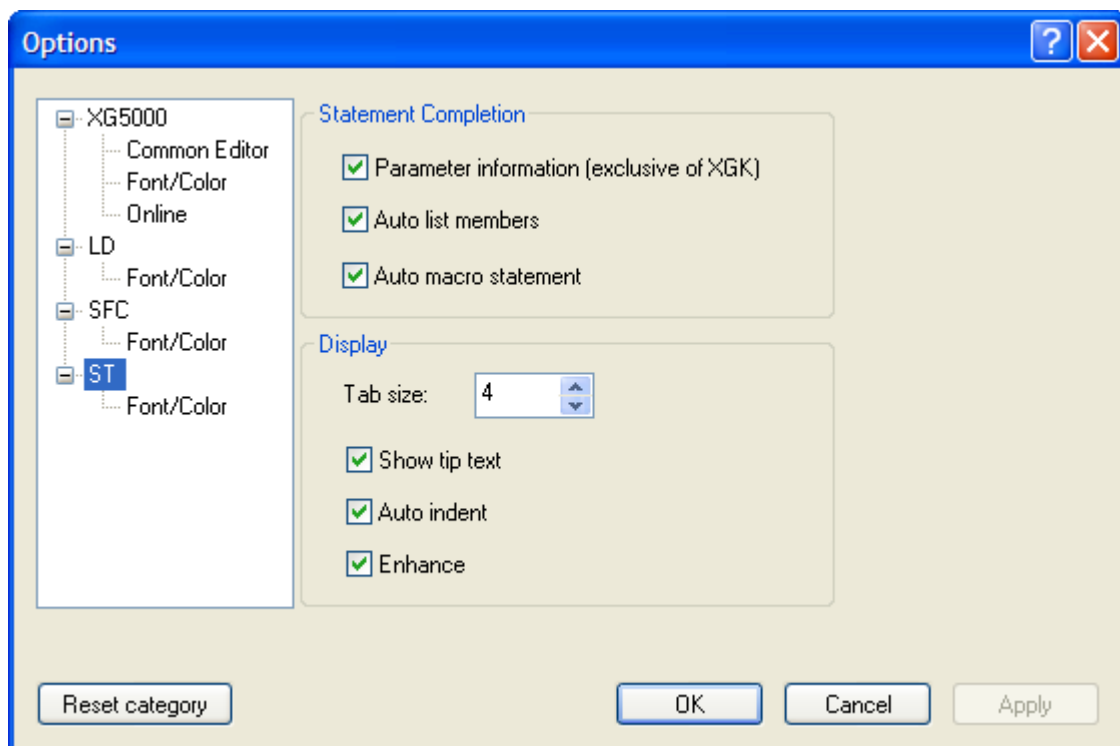
[Dialog] Box Description

a. Enter parameters automatically: not applicable when using the XGK CPU.

b. Select list at key input: when entering a character with the keyboard, the names of the application command and variables which begin with the character are listed.

Select/Repeated text automatic completion: enter the F, WHILE, SWITCH, etc., which are the control statement of the ST software and press enter, the statement will be automatically completed in compliance with the ST grammar.

c. Tap Spacing: enter the spacing of tap key.

d. Show Tool Tip: moving cursor on the character string of the ST program will show the comment of the

character string.

e. Auto Indent: at line change by Enter key, the new line will be indented by the number of the tap spacing of the previous line.

f. Apply Word Color: in the ST program, apply coloring to variable, reserved words, comments, and application commands.

17.4.2 Font/Color

Coloring or font scheme can be applied by word unit.

1) Font

[Procedure]

1. Select menu [Tool]-[Option].
2. Select ST Font/Color.
3. Change font.

Note

1. Character size cannot be changed.

2. Default font is "Fixedsys."

3. For details of option setting, see 2.6 [Option].

---

2) Color

[Procedure]

1. Select menu [Tool]-[Option].
2. Select ST Font/Color.
3. Change color.
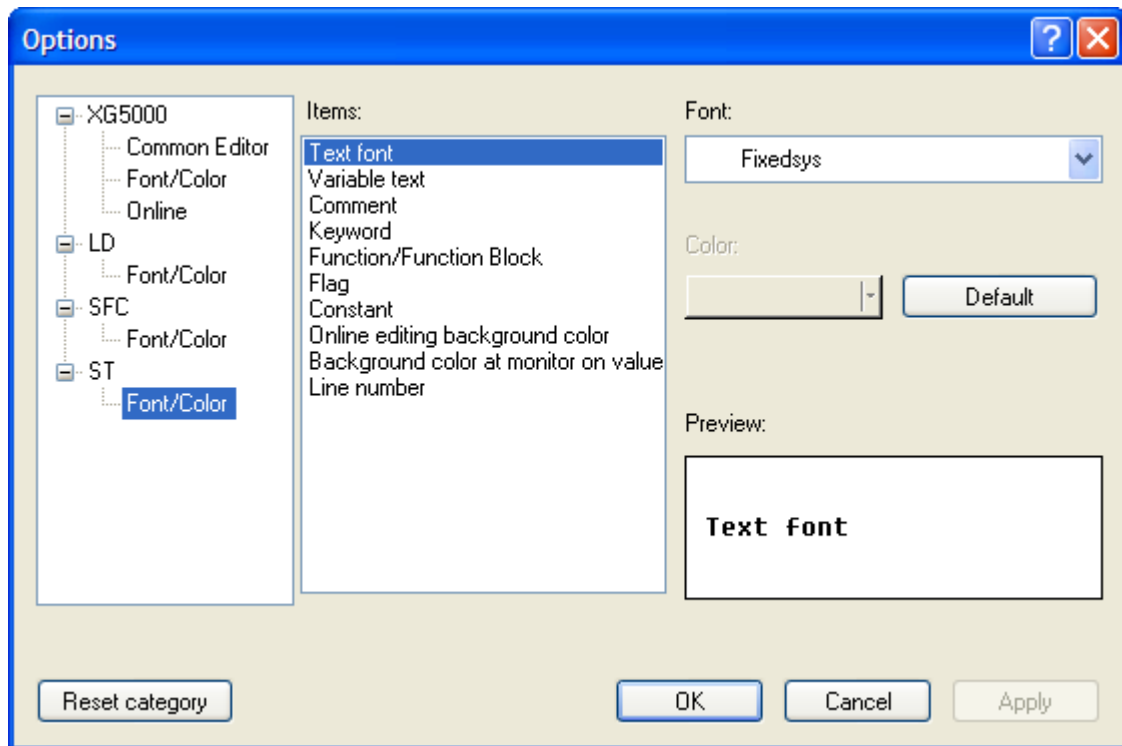
> **Note**
> 1. The items whose color can be changes are "Variable," "Comment," "reserved Word." "Function/Function Block," "Flag," "Constant," and "Background Color for Edit during Running."
> 2. For details of option setting, see 2.6 [Option].

17.4.3 Zoom

ST programming does not support Zoom In/Out function.

17.4.4 Tap

Set up the tap spacing for indent.

[Procedure]
1. Select menu [Tool]-[Option].
2. Select ST Edit Setting.
3. Change tab spacing.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

[Screen with tap spacing 4]

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8         IF any_INT_2 < 3 THEN
 9             any_INT_2 := any_INT_2 + 1;
10             ADD(M0000,1,M0001);
11         ELSE
12             RETURN;
13         END_IF;
14 END_FOR;
```

[Screen with tap spacing 8]

Note
1. The default tap spacing is 4.
2. Tap size ranges from 1 to 100.

17.4.5 View Line Number

Show or hide line number in ST program.

[Procedure]

1. Select menu [Tool]-[Option].

2. Select XG5000 Edit Common.

3. Select View Line No.

17.5   Additional Edit Functions

This section describes the additional edit functions provided for convenience.

17.5.1 Book Mark

Insert book marks to go to interested pages promptly.

1) Book Mark Setting

[Procedure]

1. Move the cursor to the desired position.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2. Select menu [Edit]-[Book Mark]-[Set/Reset].

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2) Reset Book Mark

[Procedure]

1. Move the cursor to the desired position.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2. Select menu [Edit]-[Book Mark]-[Set/Reset].

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

3) Reset All Book Marks

[Procedure]

1. Select menu [Edit]-[Book Mark]-[Reset All].

```
 2
 3 any_INT_1 := 0;
 4 any_INT_2 := 0;
 5 any_INT_3 := 0;
 6
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
15
```

4) Go to the previous book mark

[Procedure]

1. Select menu [Edit]-[Book Mark]-[Previous Book Mark].

5) Go to the next book mark

[Procedure]

1. Select menu [Edit]-[Book Mark]-[Nest Book Mark].

Note

1. Book marks are set up by line.

2. Since a book mark is not an edit function, its set or reset are not influenced by the cancel or redo function of the edit.

17.5.2 Select from Character String List

When entering characters with keyboard, the characters and character strings which begin with the character are listed for convenient selection.

[Procedure]
1. Enter character with keyboard.
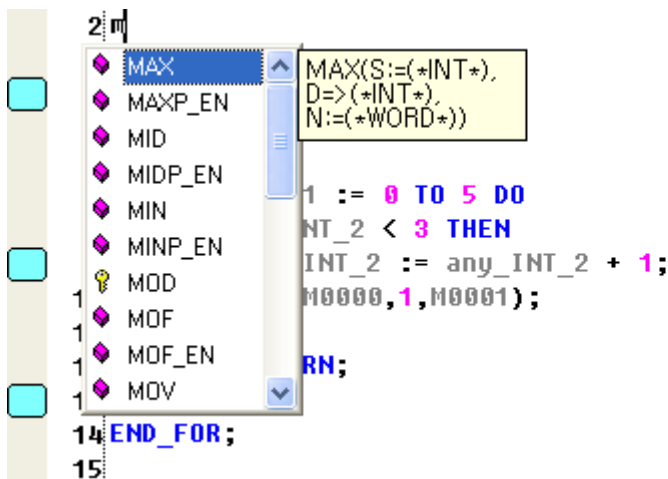
2. From the list of the words, select desired character string.
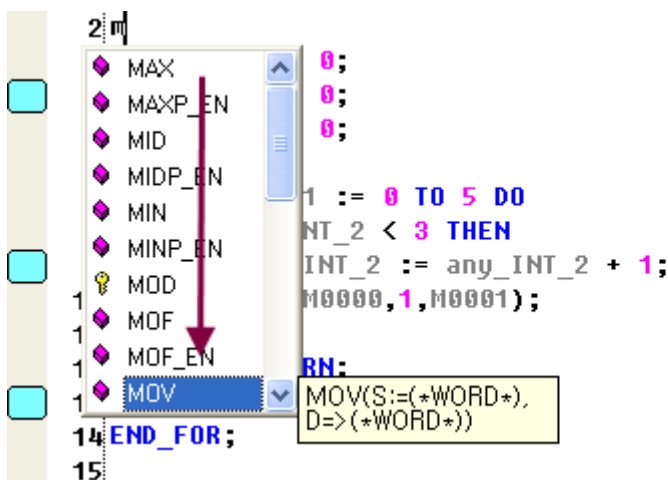
3. Press Enter of double click the desired character string.

```
 2 MOV
 3 any_INT_1 := 0;
 4 any_INT_2 := 0;
 5 any_INT_3 := 0;
 6
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
15
```

Note
Character string list bit map description   1. 🔑 : ST language key words such as IF, CASE, WHILE, etc.   2. ◆ : variable name   3. ◆ : flag variable name   4. ◆ : function name

17.5.3 Set/Remove block mask

Set or reset the area of the ST program which will not be executable by the PLC.

Set up block mask using the symbols "(*" and "*)"

1) Set up Block Mask Statement

1. Select the area to be set up to be the non-executable statement

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2. Select menu [Edit]-[Set Block Mask].

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9 (*        any_INT_2 := any_INT_2 + 1;
10           ADD(M0000,1,M0001);
11 *)    ELSE
12           RETURN;
13       END_IF;
14 END_FOR;
```

2) Remove Block mask

1. Select the non-executable statement which has been set up.

2. Select menu [Edit]-[Remove Block Mask].

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9 (*        any_INT_2 := any_INT_2 + 1;
10           ADD(M0000,1,M0001);
11 *)    ELSE
12           RETURN;
13       END_IF;
14 END_FOR;
```

17.5.4 Set/Remove Line Block mask

Different from [Set/Reset Non-executable Statement] which is applicable for a selected area, this command set/reset non-executable statement by line basis from the cursor position.
Line Non-executable Statement can be set up using the symbol "//."

1) Set-up Line Non-executable Statement

1. Select the line(s) to be set up as non-executable statement.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9           any_INT_2 := any_INT_2 + 1;
10           ADD(M0000,1,M0001);
11       ELSE
12           RETURN;
13       END_IF;
14 END_FOR;
```

2. Select menu [Edit]-[Set/Remove Line Block Mask].

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9 //        any_INT_2 := any_INT_2 + 1;
10 //        ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2) Remove Line Block Mask

1. Select the lines to be reset from the line non-executable statement.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9 //        any_INT_2 := any_INT_2 + 1;
10 //        ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2. Select menu [Edit]-[Set/Remove Line Block Mask].

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

17.5.5 Indent/Outdent

Indent or outdent the selected area.
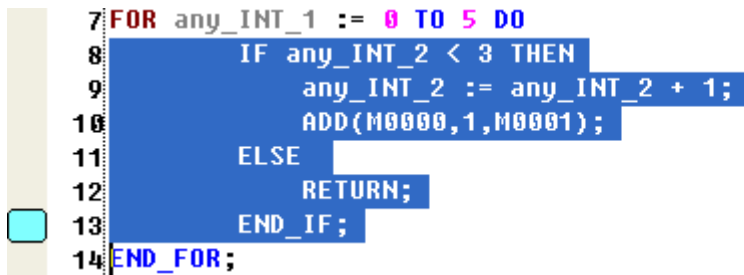
1) Indent

1. Select the area to be indented.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

2. Press Tab key.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8         IF any_INT_2 < 3 THEN
 9             any_INT_2 := any_INT_2 + 1;
10             ADD(M0000,1,M0001);
11         ELSE
12             RETURN;
13         END_IF;
14 END_FOR;
```
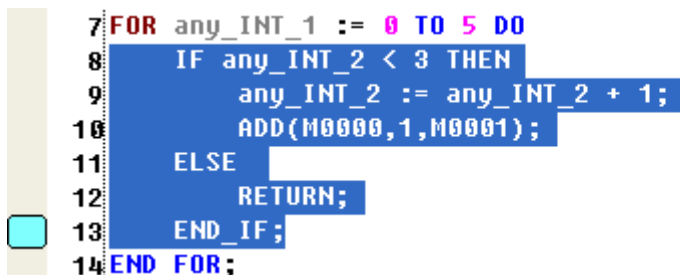
2) Outdent

1. Select the area to be outdented.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8         IF any_INT_2 < 3 THEN
 9             any_INT_2 := any_INT_2 + 1;
10             ADD(M0000,1,M0001);
11         ELSE
12             RETURN;
13         END_IF;
14 END_FOR;
```

2. Press Shift + Tab key.

```
 7 FOR any_INT_1 := 0 TO 5 DO
 8     IF any_INT_2 < 3 THEN
 9         any_INT_2 := any_INT_2 + 1;
10         ADD(M0000,1,M0001);
11     ELSE
12         RETURN;
13     END_IF;
14 END_FOR;
```

Chapter 18 Exclusive Functions for Event Input Module

18.1 Overview

The XGF-SOEA Module (hereinafter, the "event input module") is for the recording of the events entered from outside. The event input module is a data recording device which can record event information (time and state) in 1ms resolution. The event input module has not program device or external device used in the CPU. The event input is available only for monitoring and file saving using the SOE monitor.

1. XGK/I/R CPU: save 3,000 event at maximum

  (Up to 3,000 events can be saved in the order of occurrence.)

2. XGF-SOEA module: save 300 event at maximum

18.1.1 Characteristics of SOE Monitor

1. This is a software package for the operation and monitoring of the XGF-SOEA module of XGT series.

2. This package provides a function that enables independent operation of the SOE monitor, regardless of the XG5000.

3. This enables data monitoring and saving.

18.1.2 Functions of the SOE Monitor

The SOE monitor is an exclusive software package which runs on a PC platform and communicates with the CPU of XGK. XGI or XGR series for easy and fast operation of XGF-SOEA.

The major functions of the SOE monitor are as follows.

1. Read/save event history

2. Delete event history

3. View module parameter setting

4. Save event history in and Excel file

18.1.3 Files Created in the SOE Monitor

When the user creates and edits a project, the files having the extensions below are created.

1. <Name>.set: the logging file for the event the user has created. This file is created at saving the event.

2. <Name>.xls: the module event file created by the user. Event record is saved in an Excel file.

18.2 Screen Configuration

This section describes the basic screen elements, windows and pop-up menus when "Monitor," "SOE Monitor" is selected in the XG5000 monitor state. The figure below is the beginning shot of the SOE monitor.

[Dialog]

1) Select [Monitor]-[SOE Monitor] in the menu.
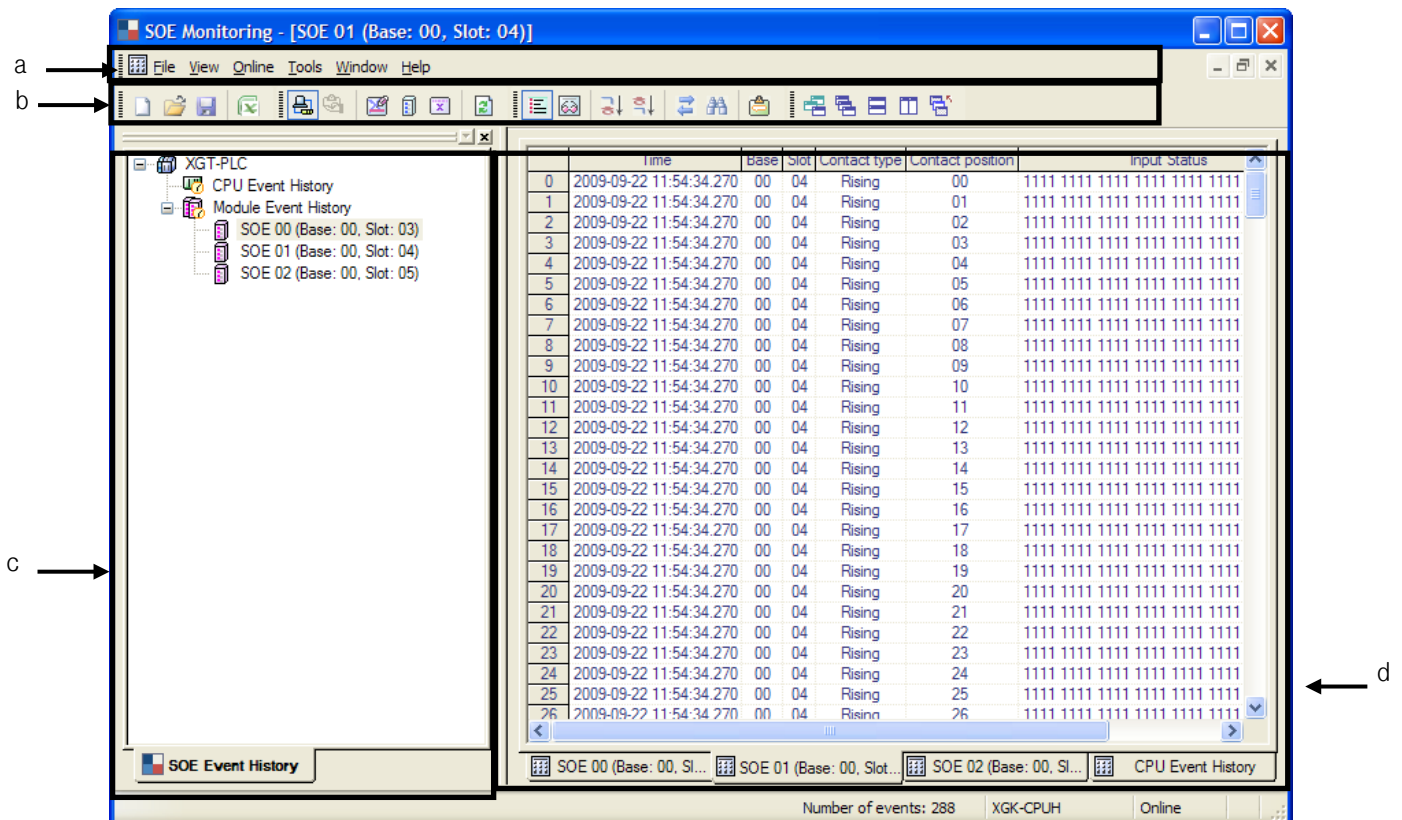
[Dialog] description;

a. Menu: basic menu is provided for using the software program.

b. Tools: menu can be easily selected and executed with toolbar.

c. SOE event history window: shows the elements of the current project.

d. Event monitor window: shows the event information of the module selected in the project.

e. Status bar: shows the information of the event and connected PLC.

18.2.1 Menu Structure

If you select a menu item, commands appear. The commands can be executed with mouse or keyboard. Some menus provide shortcut keys.
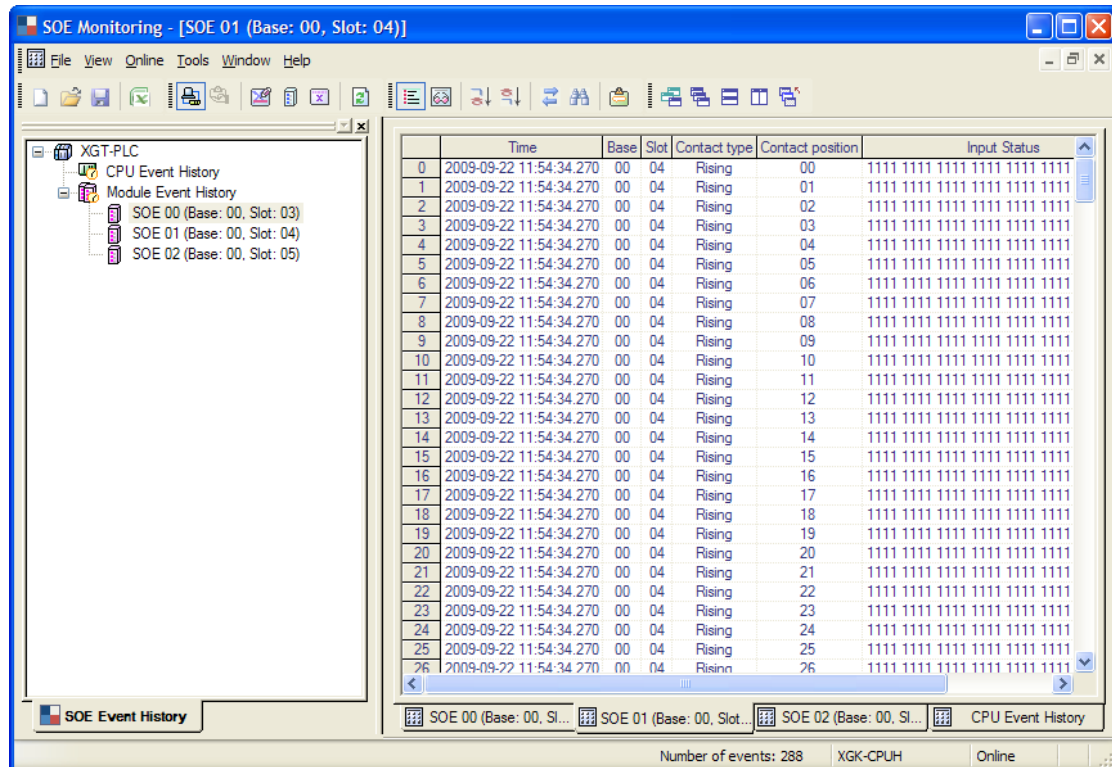
1) Project

Command	Description
New logging session	Create the project.
Open logging	Open an existing logging file.
Save logging as	Save the logging file with a different file name.
Export to file	Save the current logging data in an Excel file.
Exit	End the SOE monitor

2)View

Command	Description
All events	Show all hidden events in an activated window.
Filtering	Show only the events meeting the filtering criteria.
Newest first	Show the data in the order of recent to old in the monitor window.
Oldest first	Show the data in the order of old to recent in the monitor window.
Find event	Search desired event.
Module Property	Show parameter setting (in online operation)

3)Online

Command	Description
Connect/Disconnect	Connect with or disconnect from the PLC.
Connection setting	Set up access method.
Clear PLC event history	Delete the event data saved in the PLC CPU memory.
Clear SOE module event history	Delete the event data saved in the SOE module memory.
Clear all SOE event history	Delete all the event data saved in the memory of the SOE module in the PLC system.
Refresh event	Load the event data of the SOE module.

4)Tool

Command	Description
Option	User can configure SOE monitor environment for user convenience.
Customize	User defines tools and commands.

5)Window

Command	Description
New window	Open a new window in the activated window.
Cascade	Arrange the windows in the XG5000 in cascade layout.
Tile Horizontally	Arrange the windows in the XG5000 in horizontal layout.
Tile Vertically	Arrange the windows in the XG5000 in vertical layout.
Close all	Close all the windows of the XG5000.

6)Help

Command	Description
About SOE monitoring	Provides the information on the SOE monitor.

18.2.2 Tools

Frequently used menu items are provided with respective shortcut keys (icons).

You can execute the menu by mouse-clicking on the icon.

[Toolbar]

1) Create a new toolbar

You can edit the toolbar with frequently used tools.

[Sequence]

1. Select [Tool]-[Customize] in the menu.

2. Click on the New Tool icon.

3. Enter tool name in the new toolbar dialog.

4. Click on Confirm button. A toolbar without tool will be created.

[Dialog]
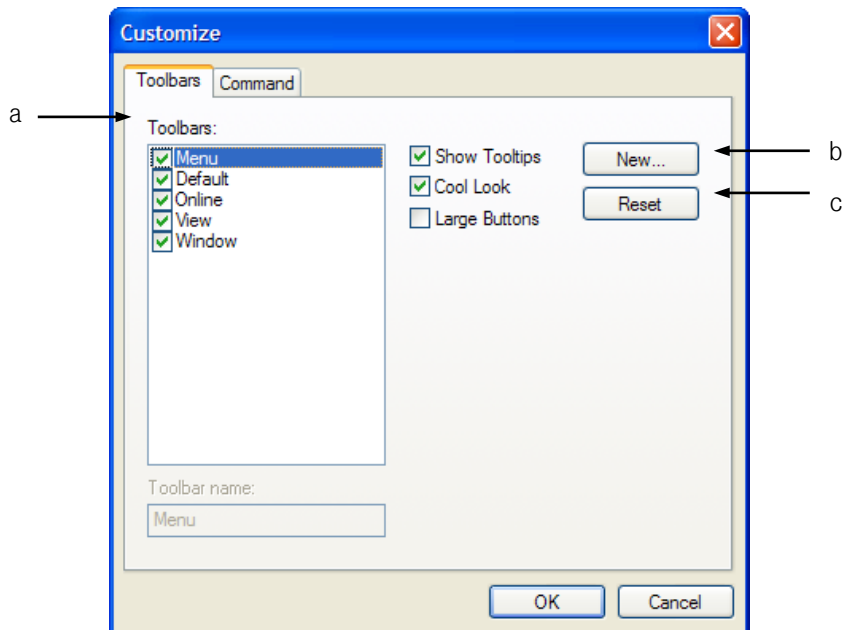
[Dialog] description;

a. Toolbar: check/remove-check in the check box in front of the items to make the toolbar appear/disappear.

b. New tool: create a new toolbar.

c. Reset: initialize the toolbar.

2) Add tools to toolbar

Add tools in the toolbar created above.

[Sequence]

1. Select the Command tab in the user definition dialog.

2. Create a toolbar and click on the Confirm button.

[Dialog]

a

c

d

b
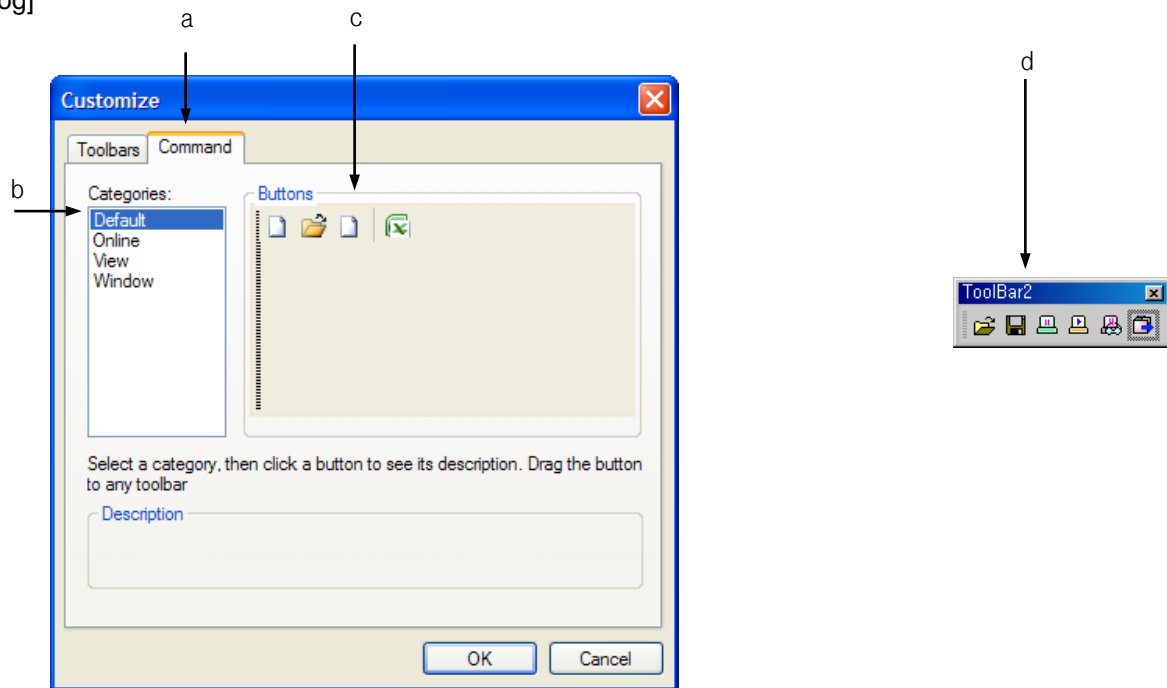
[Dialog] description;

a. Command: the Command tab in the user definition dialog.

b. Type: select the existing toolbar.

c. Button: select the desired tool.

   User toolbar: drag-drop the desired tool with the button onto the user toolbar to add it.

18.2.3 SOE Event History Window

The SOE monitor displays the XGF-SOEA module SOE event history window automatically when connected with PLC CPU.

Double-click on the desired module to run the event monitor window.

[Dialog]
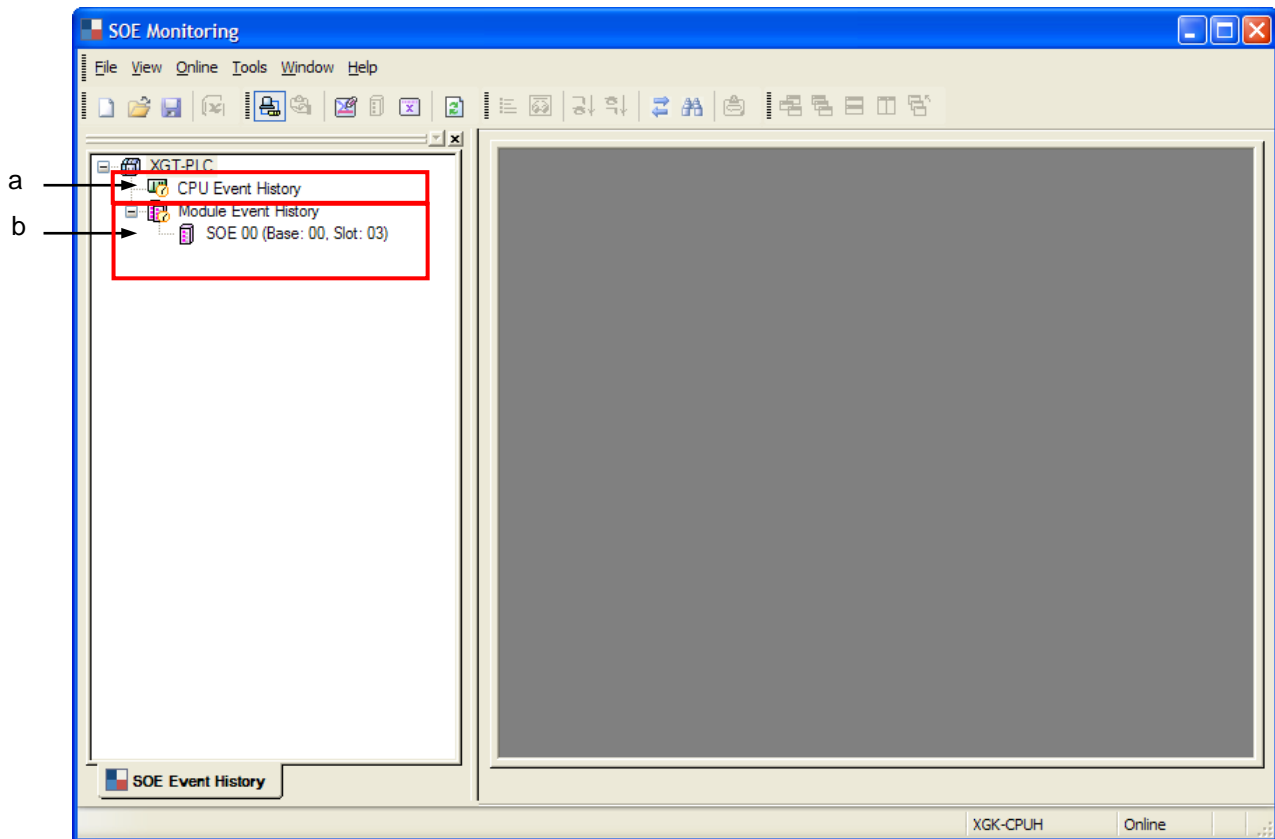
[Dialog] description;

a. CPU event history: select the event saved in the CPU module.

b. Module event history: select the event saved in the SOE module.

c. Double-click on the CPU event history or module event history to activate the event monitor window.

18.2.4 Status Bar

[Dialog]

| | Number of events: 288 | XGK-CPUH | Online | |

               a   b

                                 c
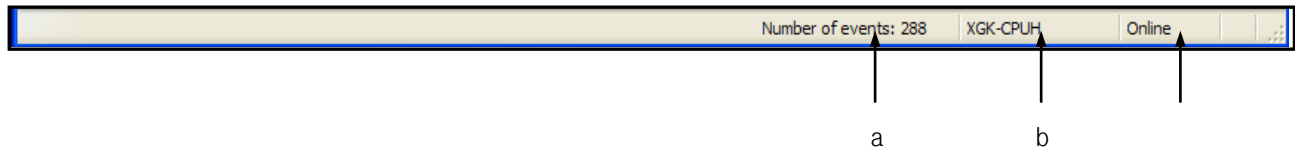
[Dialog] description;

a. Event No.: show the number of the events in the event monitor window.

b. PLC name: show the name of the PLC connected with the SOE monitor.

c. Online: show the PLC connection status of the SOE monitor.

18.3 Basic Parameter Setting

Basic parameters of the XGF-SOEA can be set up using the menu or toolbar of the XG5000.

18.3.1 Setting Items

Sets up the method of saving the history occurred in the XGF-SOEA module in the CPU module.

[Sequence]

1) Click on the [Parameter]-[Basic Parameter] in the project tree.

2) Basic operation setting
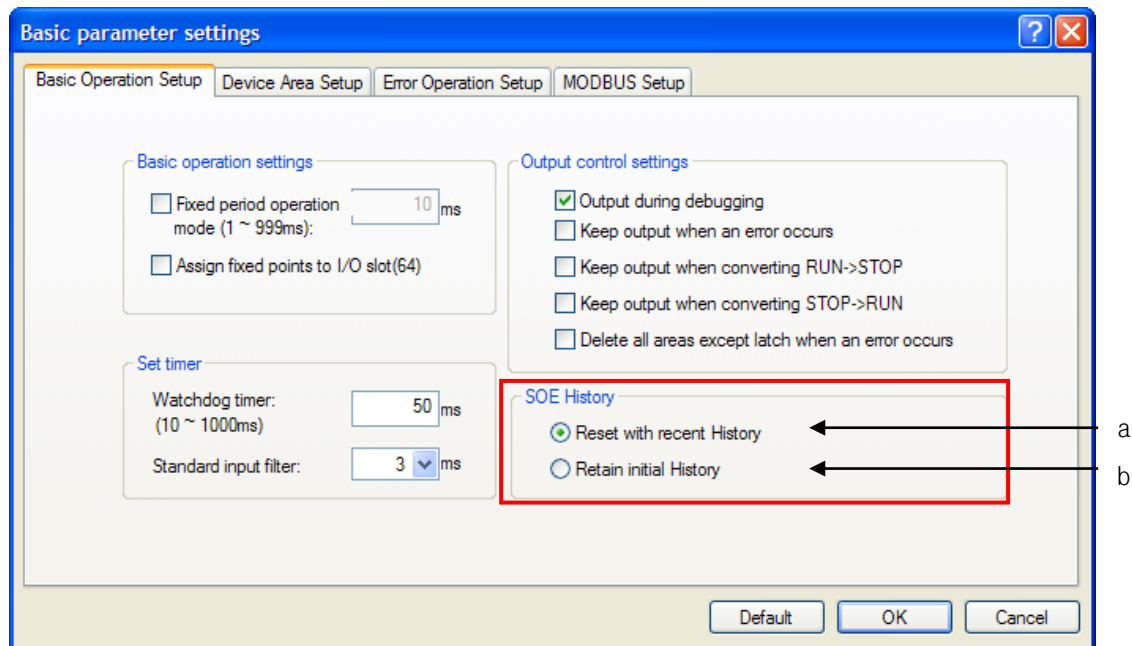
[Dialog]

[Dialog] description;

a. Overwrite with recent history: used to save the most recent event. If there are more than 3,000 events, the oldest event is deleted and the new event is saved

b. Maintain the initial history: used to maintain the first event. If there are more than 3,000 events, no new events will be saved.

18.4 I/O Parameter Setting

I/O parameters of the XGF-SOEA can be set up using the menu or toolbar of the XG5000.

18.4.1 Setting Item

Sets up the method of saving the external event history in the XGF-SOEA module.

[Sequence]

1) Click on the [Parameter]-[I/O Parameter] in the project tree.
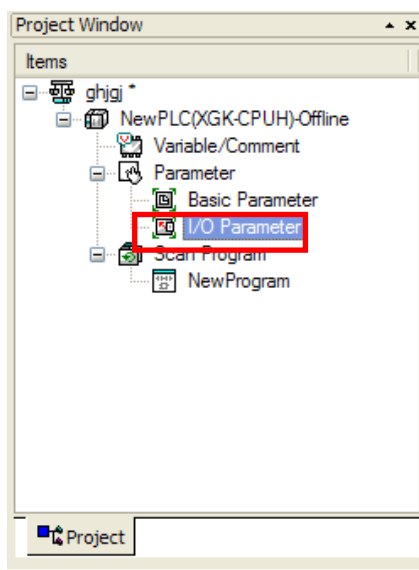
2) In the 'I/O Parameter Setting' window, click on the slot of the base where the module is mounted..

In the example below, the XGF-SOEA module is at #4 slot, #0 base.
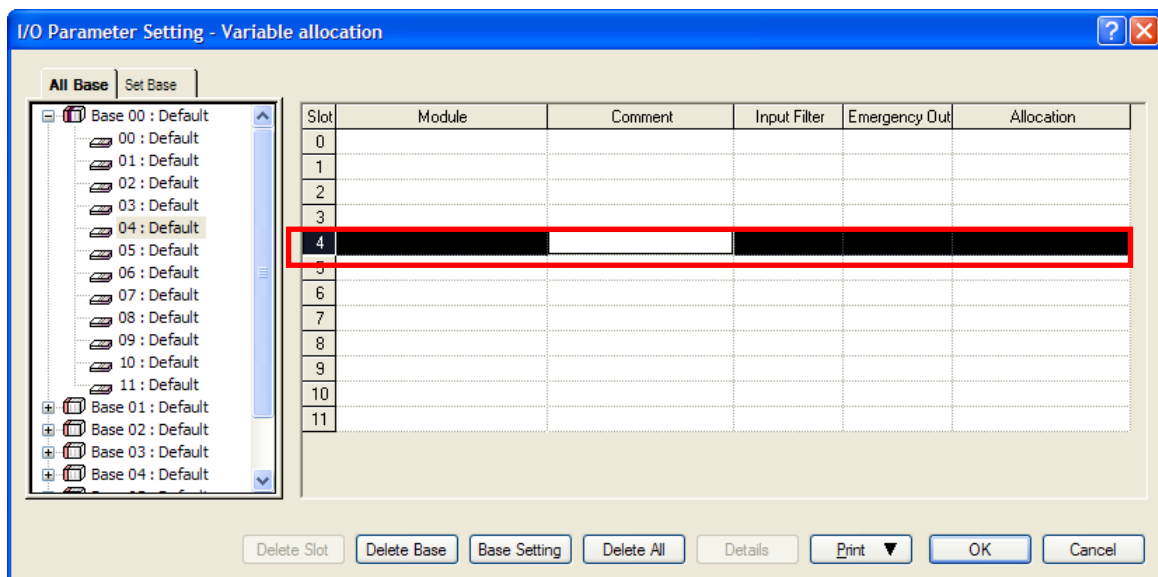
3) In the above window, click on the arrow button. A window where respective module can be selected will appear.

Select the desired module.
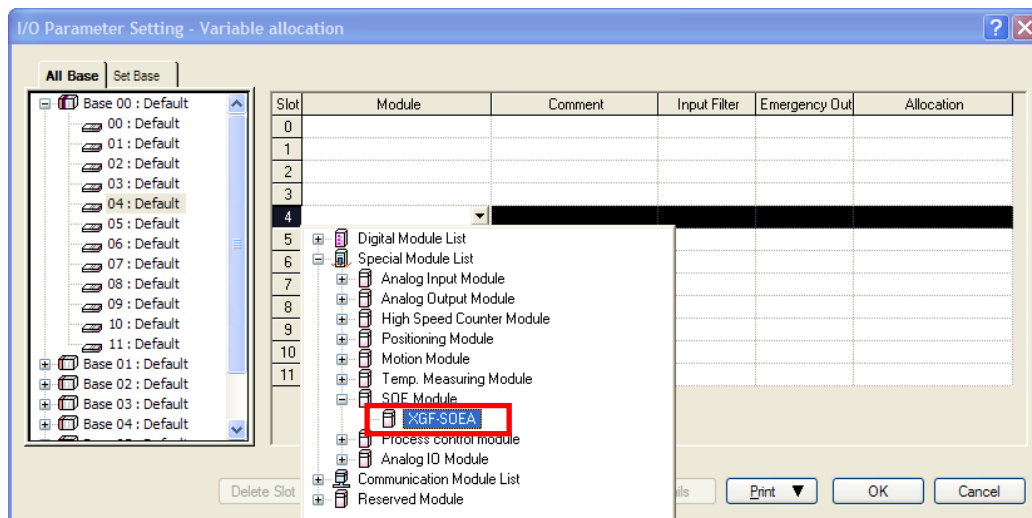
4) After selecting the module, click on the [Detail] button.
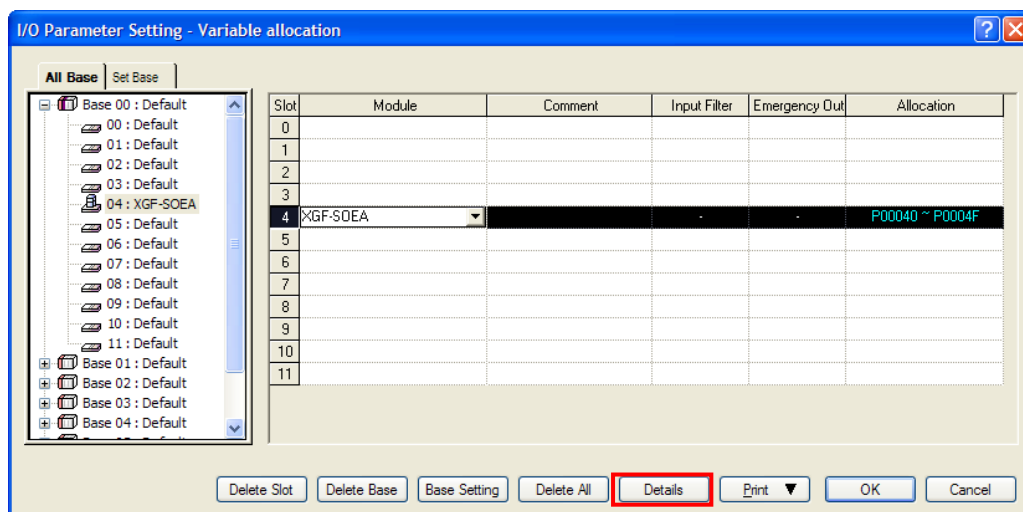
[Dialog]
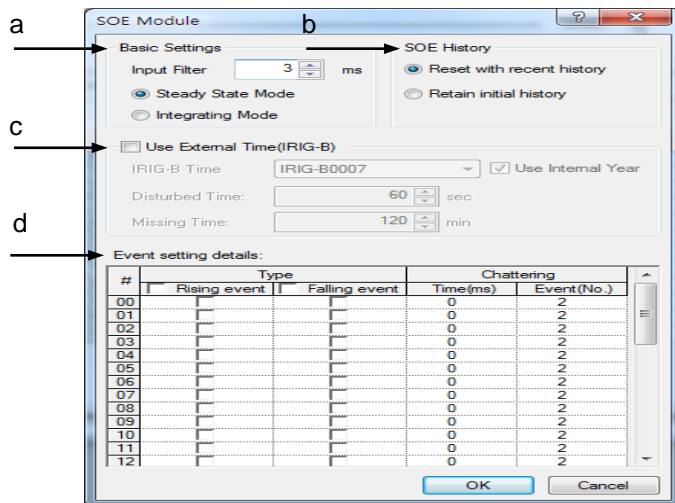
[Dialog] description

a. Input filter setting: set up the time which enables an event to be identified as an effective input data.

                (Setting range: 1ms ~ 100ms)

b. Event history setting

- Overwrite with recent history: use this to save the most recent event.

                    If the events exceed 300, the oldest event is deleted and the last one is saved.

- Maintain the initial history: use this to retain the first event.

                    If the events exceed 300, the last one will not be saved.

c. External Time(IRIG-B) use setup : set up the standard time with external time.

  When you select internal time, IRIG-B format setting / Disturbed time / Missing time are disabled.

 – IRIG-B time format setup : It is activated only when the external time is selected. Set external time format.

 – Disturbed time : It is activated only when the external time is selected. Set the time value that changed

                from Disturbed state to Missing state due to unstable external time signal.

 – Missing time : It is activated only when the external time is selected. Set the time value that changed

                from Missing state to Invalid state.

d. Detail event setting: set up the input condition of the event.

- Type: 'Rise,' 'Fall' or simultaneously, 'Rise/Fall' of event can be set up.

        Event conditions can be set up for each input contact point.

- Chatter: abnormal signals not related with event can be processed as chattering.

Notes
– If you want get more information about parameter setting, see the SOE module user manual.

18.5 View Module Information

XG5000 supports viewing event input module information.

[Sequence]

1) [Online] -> [Connect]; select [I/O Information].
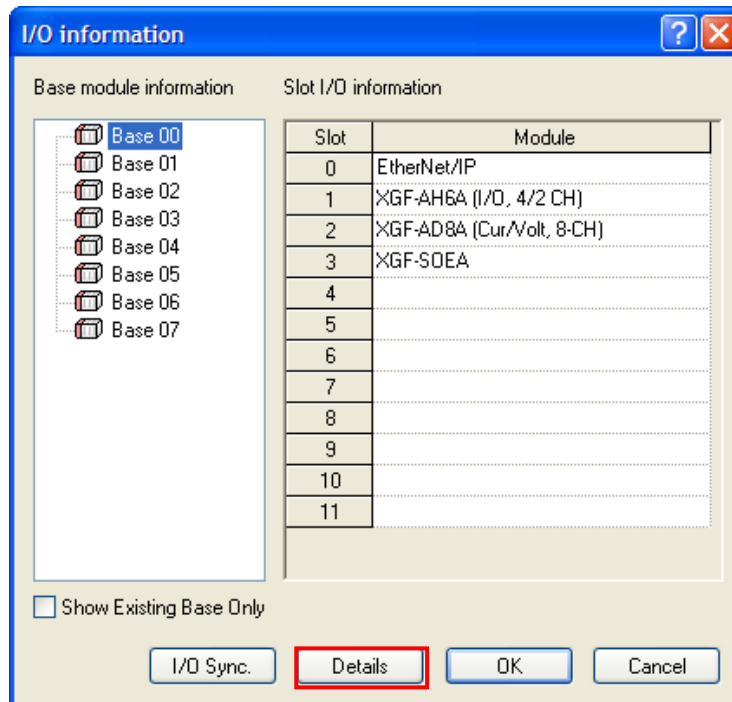
2) Clicking on the [Detail Info] will show XGF-SOEA information as shown below;
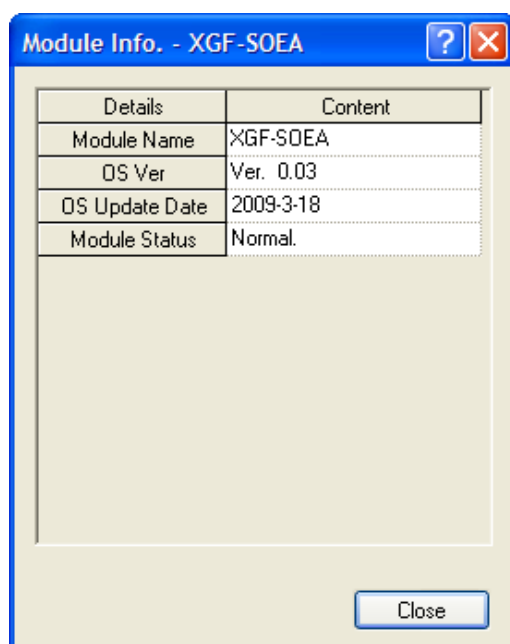
18.6 Event History Monitor

The events entered into the CPU and event input modules can be monitored with the SOE monitor.

[Sequence]

1) [Online] -> [Connect]; select [Monitor] -> [SOE Monitoring].

Unless in [Online] state, the [SOE Monitor] menu is not activated.
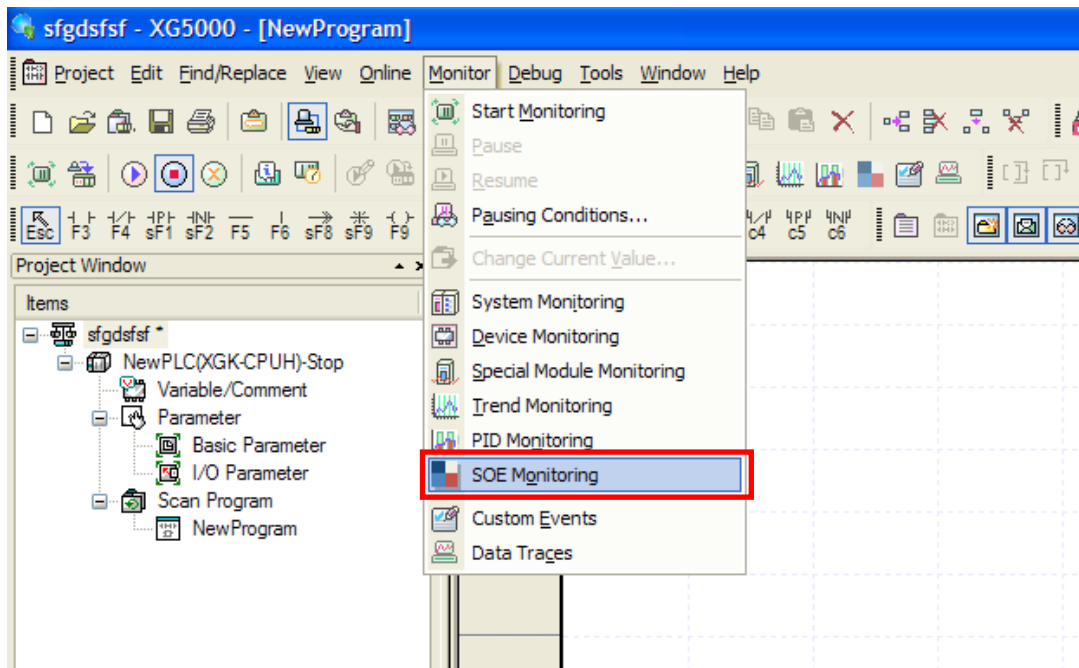
a. [SOE Monitor] will be executed.
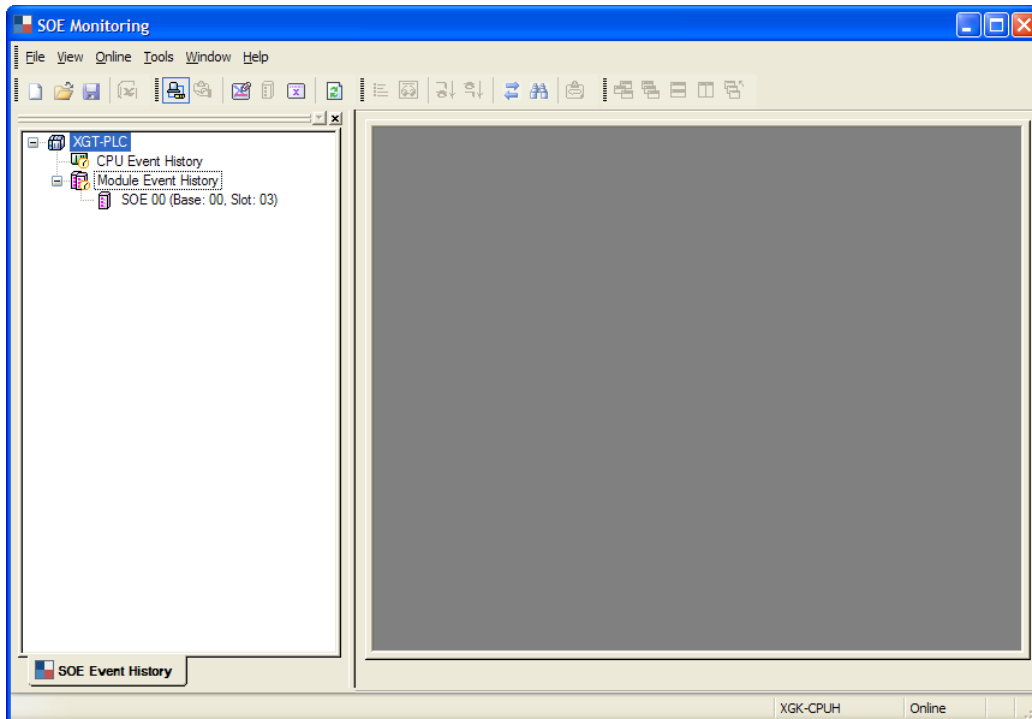
b. Select [Online] -> [Connect].

The information of the event input module in the connected system will appear.
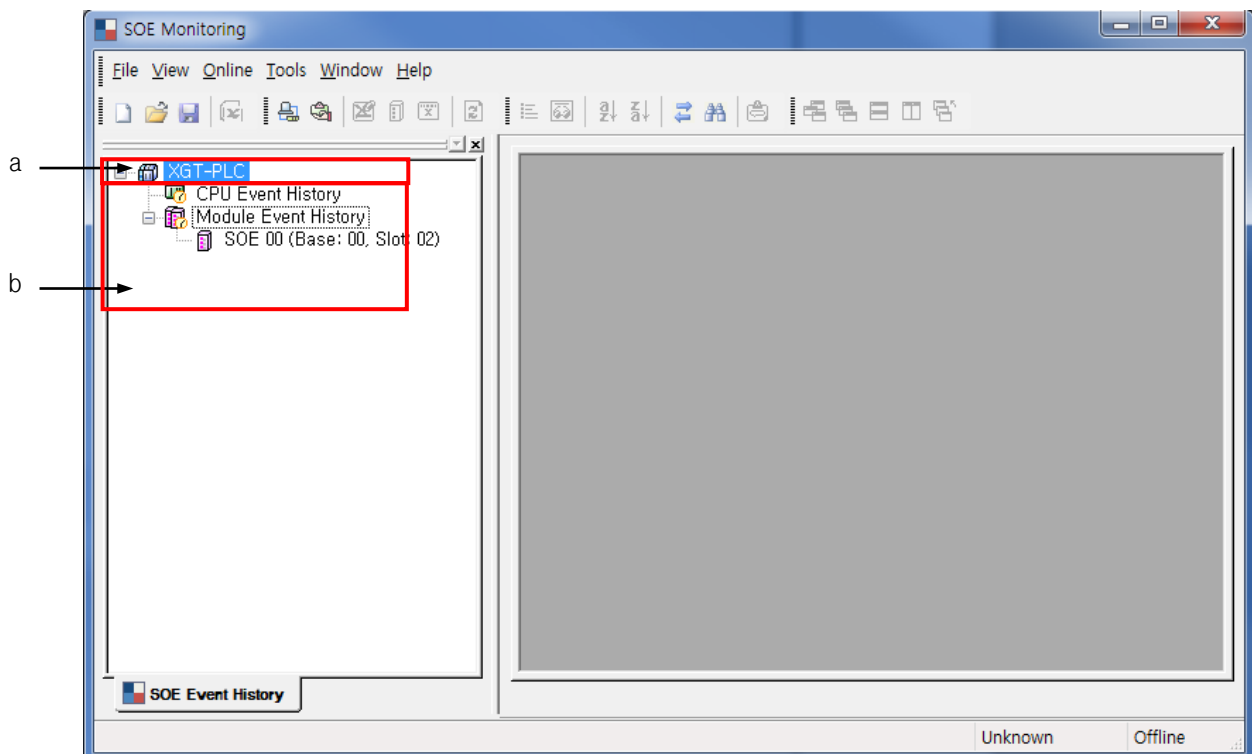
a. CPU event history: the event history stored in the CPU module.

b. Module event history: the event history stored in the SOEA module.

c. Double clicking on the CPU event history or module event history will activate the event monitor window.

c. Click on the CPU event history.

[CPU Event History] -> double click -> [Online] -> [Refresh Event]
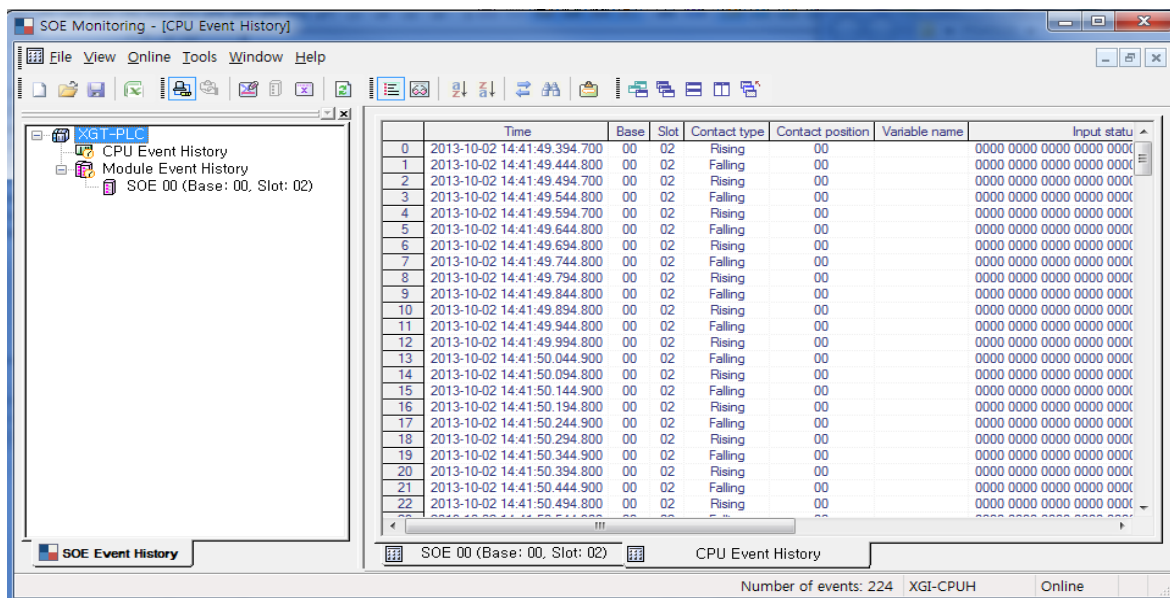
d. Click on the module event history.

[SOE 02 (Base: 00, Slot: 04] -> double click -> [Online] -> [Refresh Event]
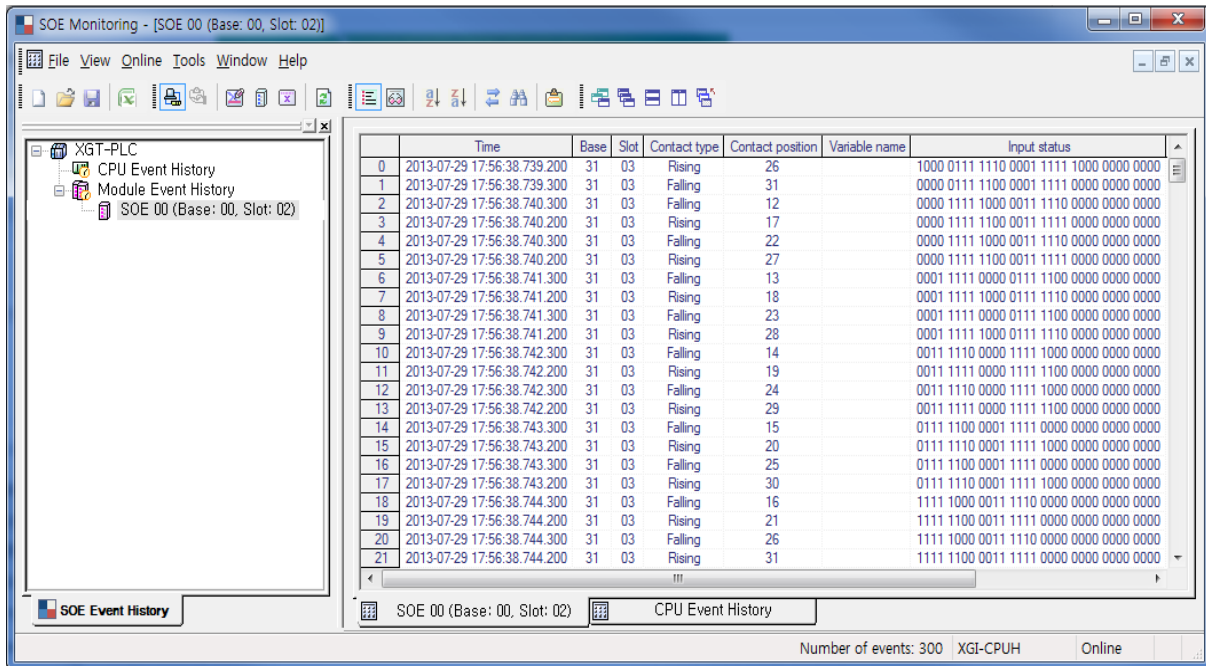
2. Event history information

Base No.

Slot No.

Input conditions

Variable name,input state

Event occurrence contact

The occurrence time is displayed as Year-Month-Day hour : minute : second. millisecond. microsecond.

occurrence time :   2009 – 04 – 26   17 : 43 : 32 . 105 . 300

Description :   Year – Month – Day   hour : minute : second . ms . µs

<Details of the event information>

Event No.	Year/Month/Day	Time	Base	Slot	Trigger type	Contacts	Variable name	Input state (All of 32 contacts)	Base time (Inside/Outside)	Time state (valid / disturbed / missing / invalid / No sync)

2) View

This function provides user convenience including searching and comparing of events.
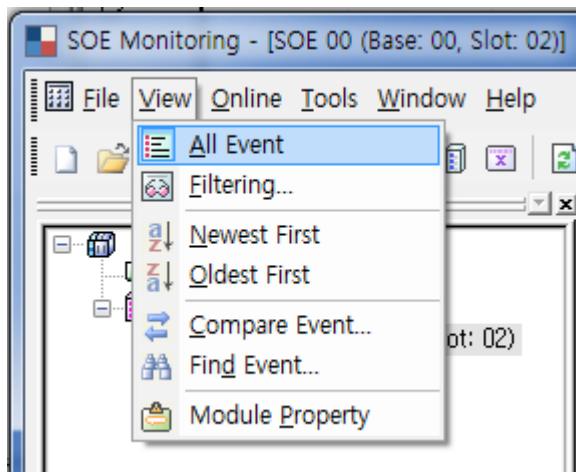
1. Module event display: select [View] -> [Filtering] to look up all the events regardless of the filter setting.

[Sequence]

a. Select [View] -> [All Event].
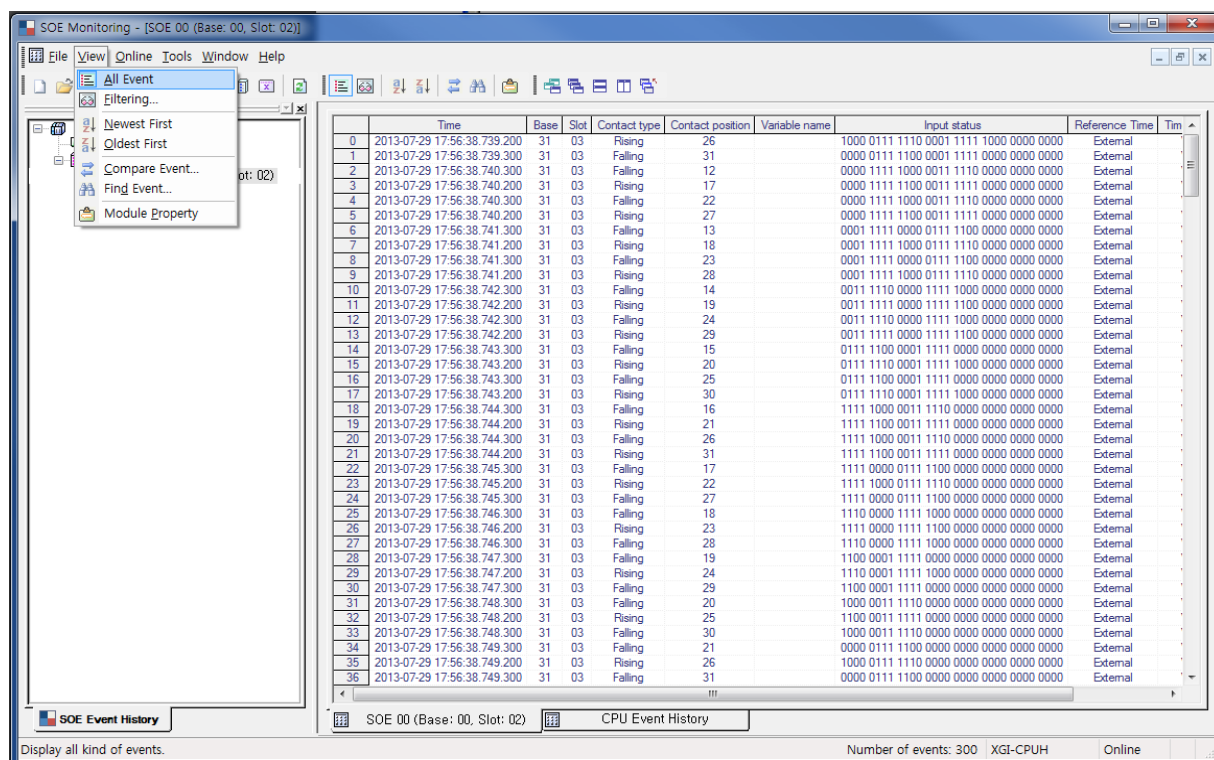
2. Event filter: use this function to search the behavior of a specific event.

[Sequence]

a. Select [View] -> [Filtering].

[Dialog]
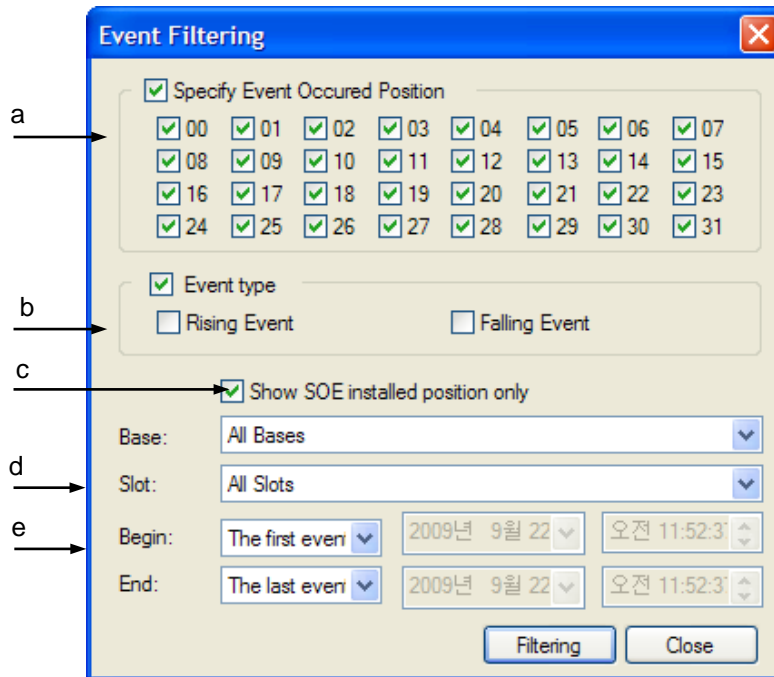
[Dialog] description;

a. Designate event occurrence point: designate the bit at which the event has occurred.

b. Designate event type: designate the input condition at which the event has occurred.

c. Show SOE installed position only: used only for CPU event history filtering.

Only the base and slot of event input module will appear.

d. Base/Slot: used only for CPU event history filtering. Designates base and slot.

e. Begin/End: designate the event filter with the time and the first event, and the last event.

3. An example of event filter

Select [View] -> [Filtering].

- Event occurrence point filter setting

Filtering result

#0 bit

Rise event

a. Event occurrence point setting: No. "0" bit

b. Event type setting: "Rise" event.

Select [View] -> [Filtering].

- Base and time designation filter setting

Filtering result

Base/slot

Event time

(2009.9.22 12:23)

a. Base/Slot: designate all the bases and slots

b. Begin/End setting: 2009.4.26.3.42.12~:2009.4.26.5.44.12

4. Priority to the last/first

- Priority to the recent events: the recent events have priority over the old events in the display list.

- Priority to old events: the old events have priority over the recent events in the display list.

[Sequence]

a. Select [View] -> [Newest first].

[Dialog]

[Sequence]

b. Select [View] -> [Oldest first].

5. Event Comparison

 Compare the events stored in the CPU and event input modules and show the result.

[Sequence]

a. Select [View] -> [Compare Event].
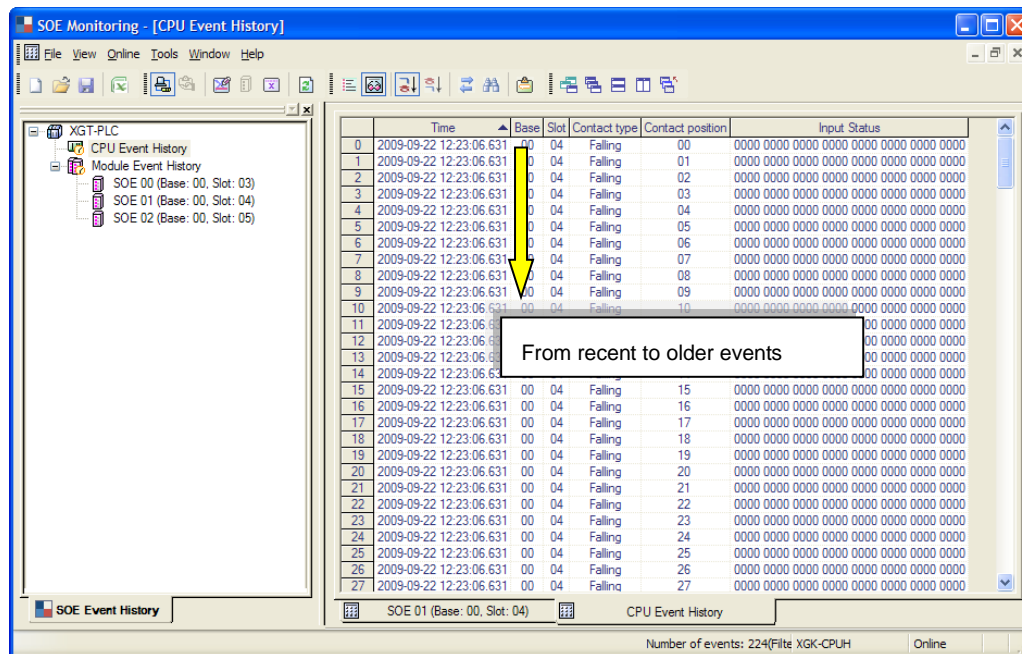
6. Delete Event History

Delete CPU history: the history stored in the CPU module is deleted.

[Sequence]

a. Select [Online] -> [Clear PLC Event History].
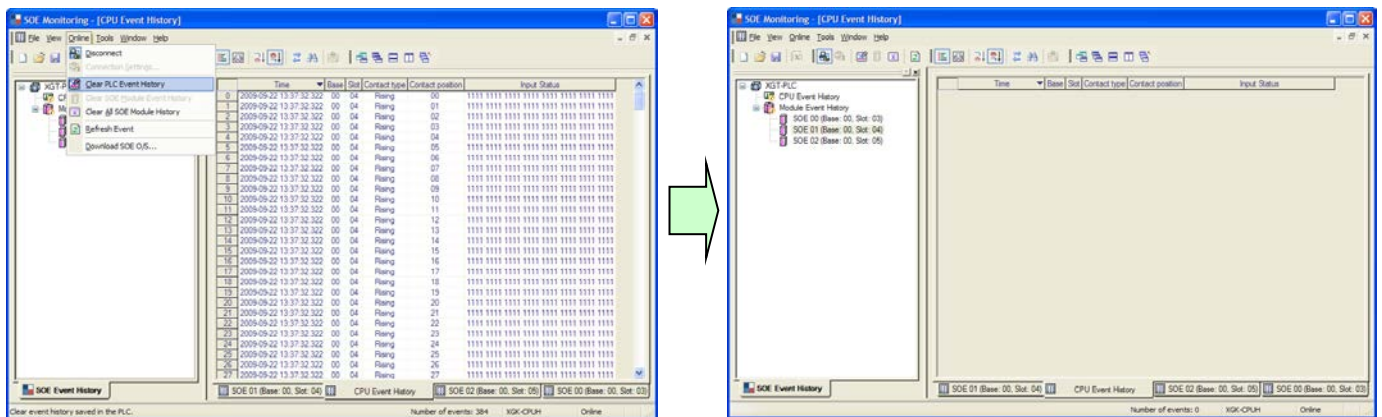
Clear SOE module event history: delete the history stored in the module.

[Sequence]

b. Select [Online] -> [Clear SOE Module Event History].
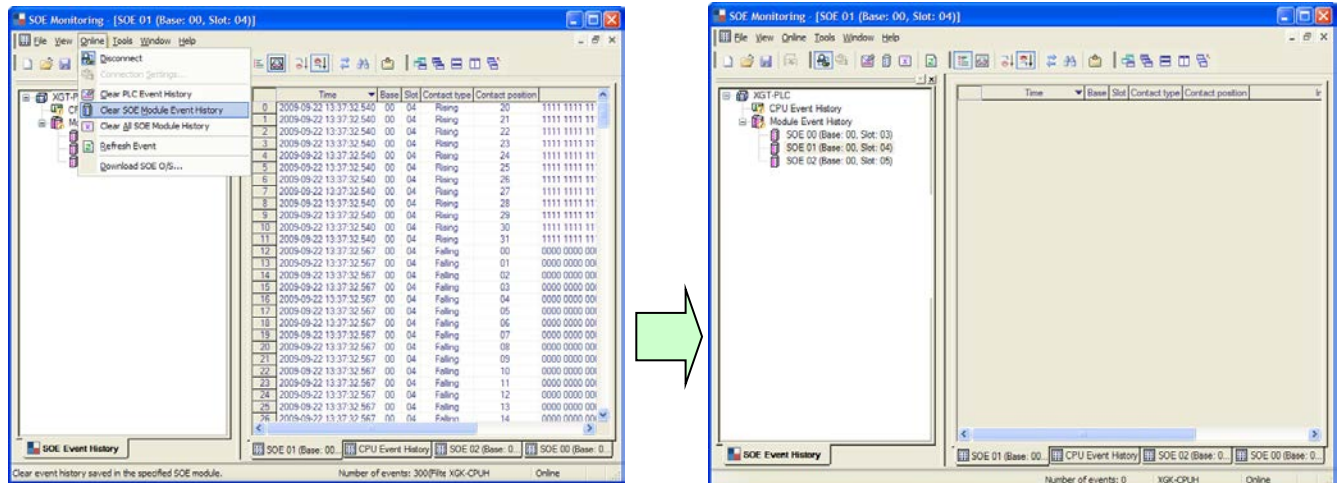
Clear All SOE module History: delete the history stored in all the SOEA modules.

[Sequence]

c. Select [Online] -> [Clear All SOE module History].
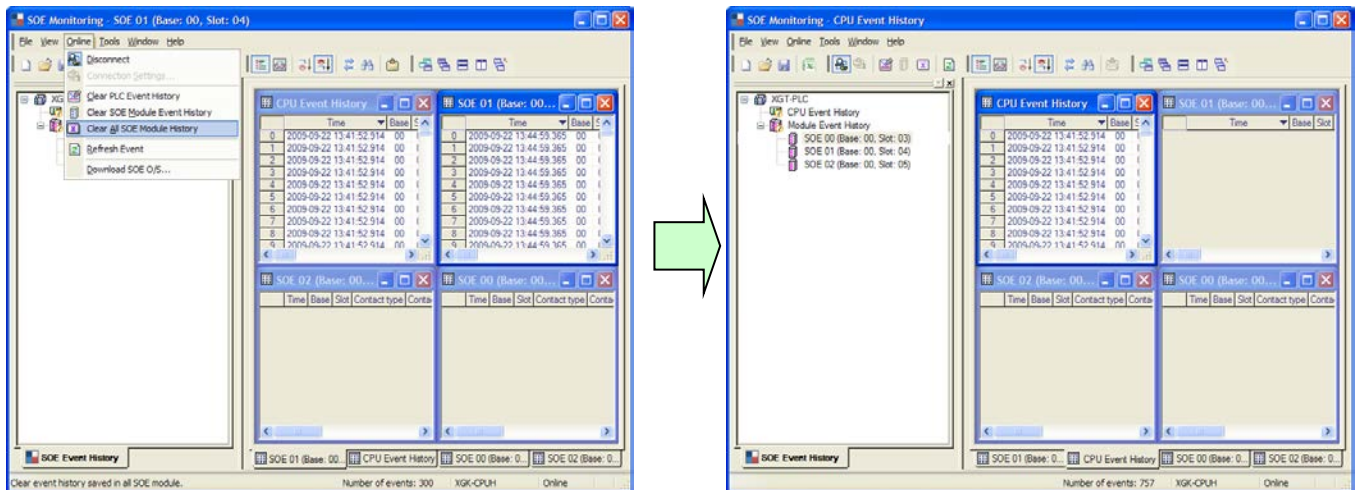
18.7 Save as an Excel File

This section describes how to save an event file as an Excel file.

1) Save as an Excel file

The event file is saved as an Excel file.

[Sequence]

1. Select the event history to be converted into an Excel file in the event monitor window.

2. Select [File]-[Export to file] from the menu.

3. Enter a new file name in the Save As dialog.

4. Click on the Save button to create a new Excel file.

[Dialog]
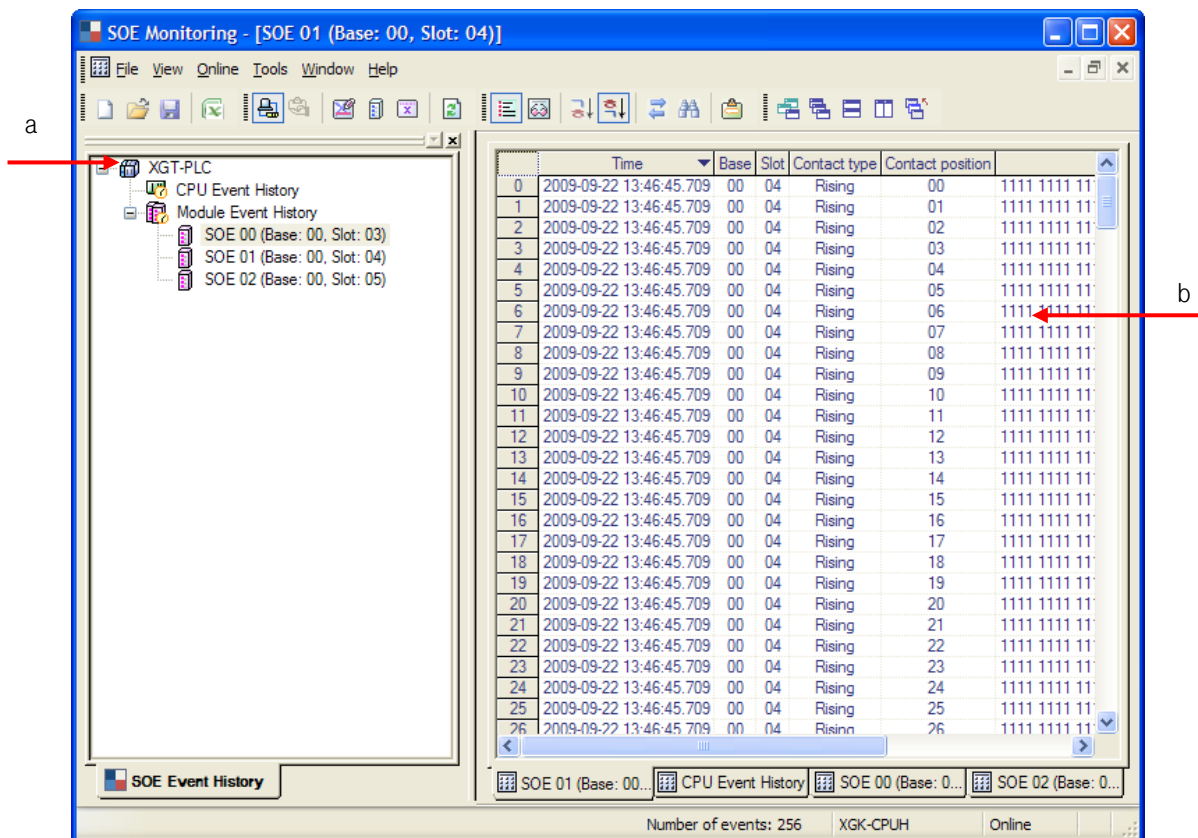
[Dialog] description;

a. SOEA event history window: show the elements of the current project.

b. Event monitor window: show the event data of the selected module of the project.

c. This conversion to an Excel file is effective only for the currently active main screen (one window).

2) [File]-[Export to fille]
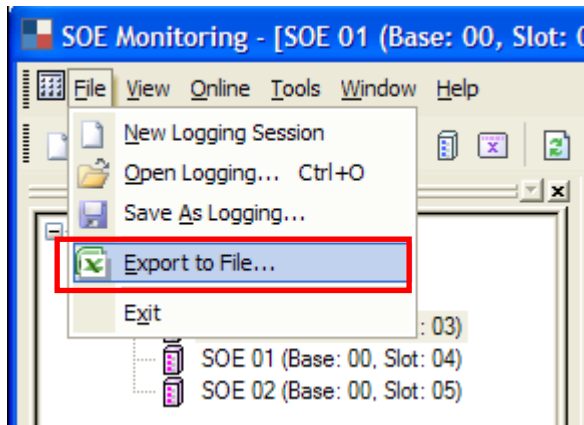
3) Enter a new file name in the Save As dialog.
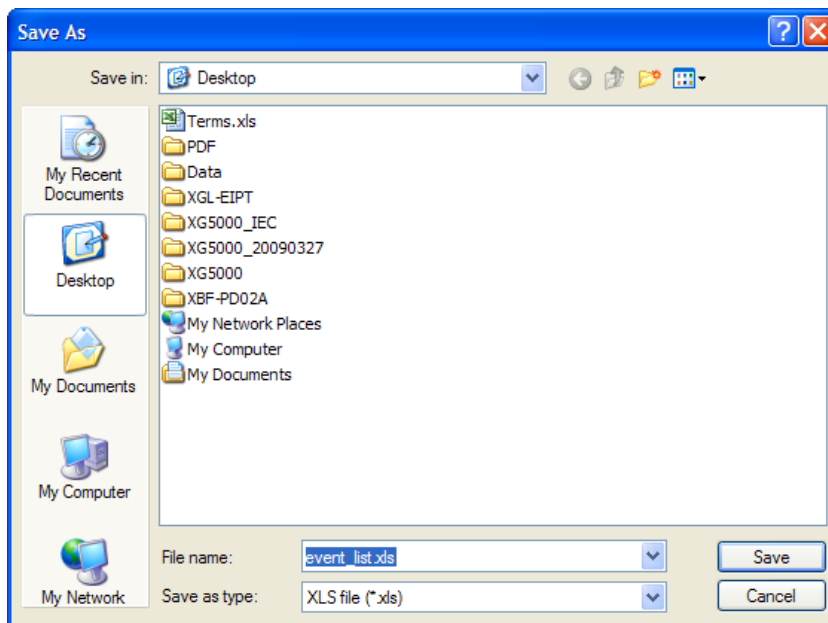
4) Click on the Save button to create a new Excel file.

5) Open file in the Excel application (to read the saved event file in Excel)

		Time	Base	Slot	Contact type	Contact position	Input Status
1		Time	Base	Slot	Contact type	Contact position	Input Status
2	0	'2009-09-22 13:46:45.709	0	4	Rising	0	1111 1111 1111 1111 1111 1111 1111 1111
3	1	'2009-09-22 13:46:45.709	0	4	Rising	1	1111 1111 1111 1111 1111 1111 1111 1111
4	2	'2009-09-22 13:46:45.709	0	4	Rising	2	1111 1111 1111 1111 1111 1111 1111 1111
5	3	'2009-09-22 13:46:45.709	0	4	Rising	3	1111 1111 1111 1111 1111 1111 1111 1111
6	4	'2009-09-22 13:46:45.709	0	4	Rising	4	1111 1111 1111 1111 1111 1111 1111 1111
7	5	'2009-09-22 13:46:45.709	0	4	Rising	5	1111 1111 1111 1111 1111 1111 1111 1111
8	6	'2009-09-22 13:46:45.709	0	4	Rising	6	1111 1111 1111 1111 1111 1111 1111 1111
9	7	'2009-09-22 13:46:45.709	0	4	Rising	7	1111 1111 1111 1111 1111 1111 1111 1111
10	8	'2009-09-22 13:46:45.709	0	4	Rising	8	1111 1111 1111 1111 1111 1111 1111 1111
11	9	'2009-09-22 13:46:45.709	0	4	Rising	9	1111 1111 1111 1111 1111 1111 1111 1111
12	10	'2009-09-22 13:46:45.709	0	4	Rising	10	1111 1111 1111 1111 1111 1111 1111 1111
13	11	'2009-09-22 13:46:45.709	0	4	Rising	11	1111 1111 1111 1111 1111 1111 1111 1111
14	12	'2009-09-22 13:46:45.709	0	4	Rising	12	1111 1111 1111 1111 1111 1111 1111 1111
15	13	'2009-09-22 13:46:45.709	0	4	Rising	13	1111 1111 1111 1111 1111 1111 1111 1111
16	14	'2009-09-22 13:46:45.709	0	4	Rising	14	1111 1111 1111 1111 1111 1111 1111 1111
17	15	'2009-09-22 13:46:45.709	0	4	Rising	15	1111 1111 1111 1111 1111 1111 1111 1111

18.8 U Device Auto Registration

Describes XG5000's U device auto registration

18.8.1 U device auto registration

Refers to the SOE module information set in I/O parameter and registers the variable on each module. User can modify the variable and comment.

[Sequence]

1) Set the SOE module at a slot of I/O parameter in a project window.
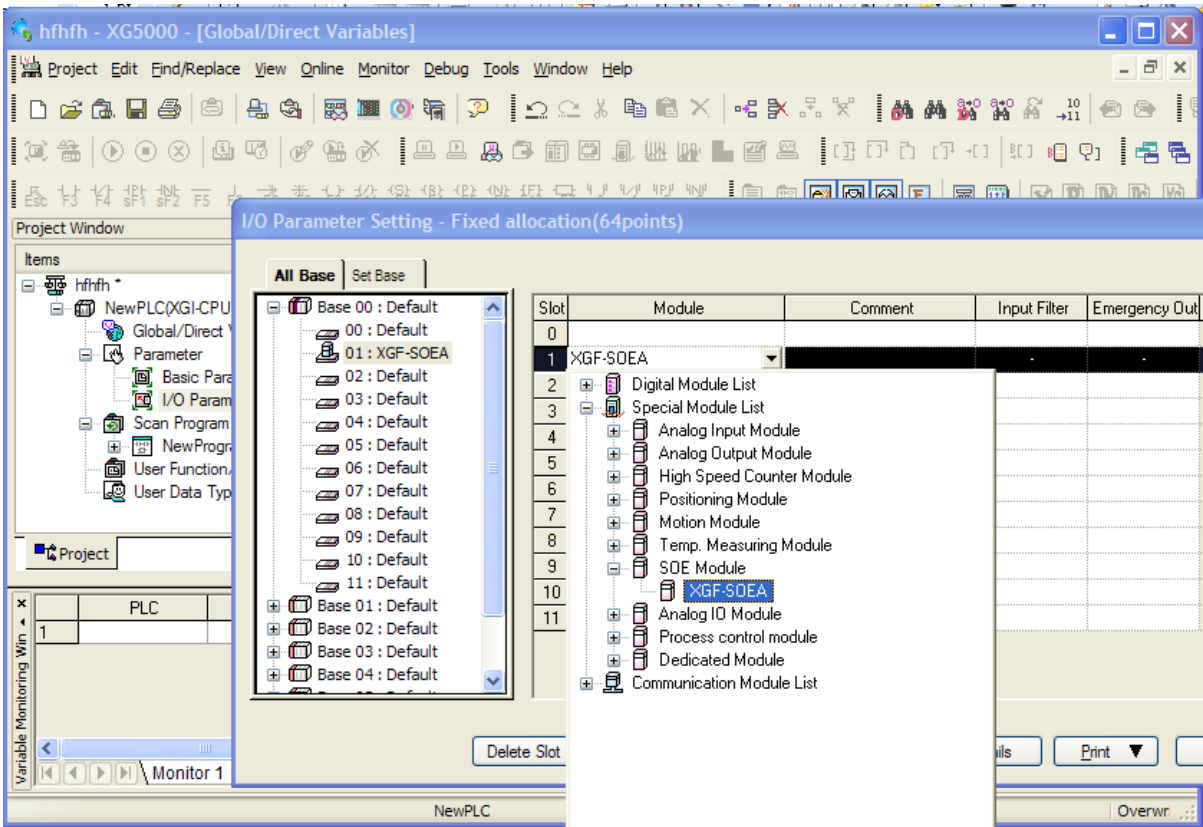
2) Select [Register Special/Communication Module Variables] at [Edit].
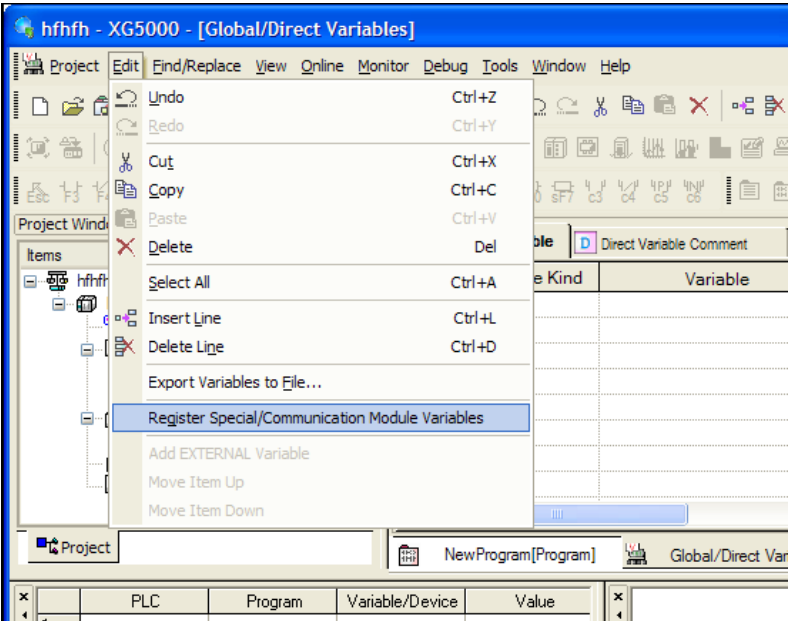
3) Click 'Yes'.
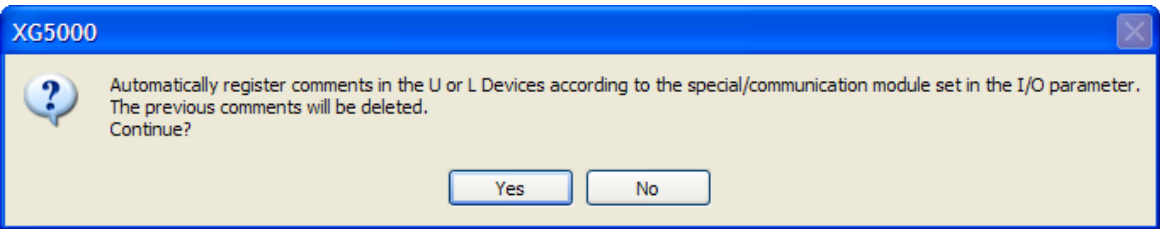
4) Variables are registered as follows.
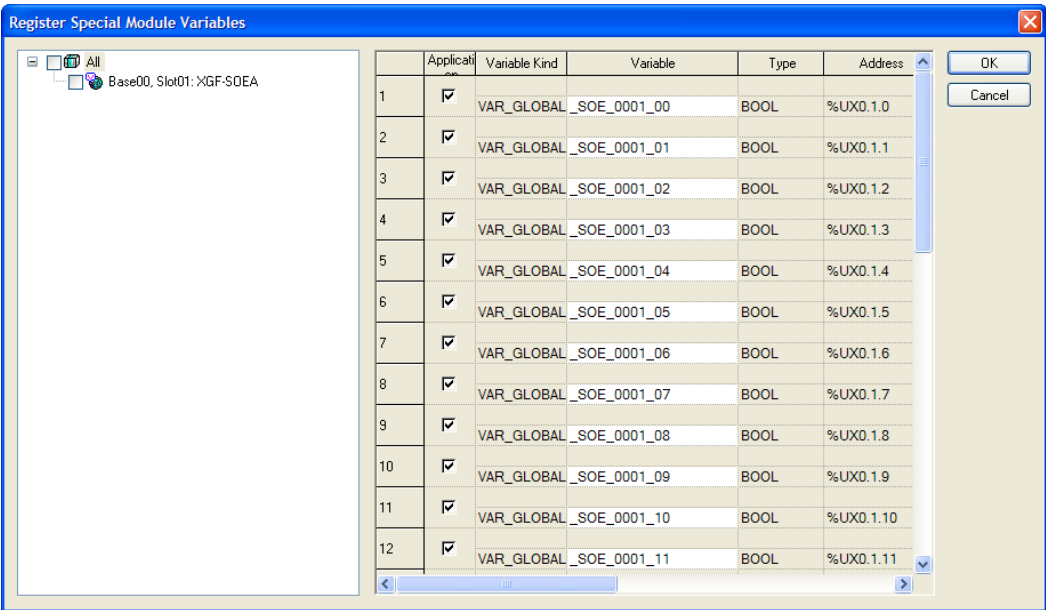
[SOE module U device]

- Indicates On/Off status of input contact point of SOE module. (32 contact points)
- You can edit Variable/Device name and those can be expressed in connection with U device at SOE monitor.

	PLC	Program	Variable/Device	Value	Type	Device/Variable
1	NewPLC	<GLOBAL>	_SOE_0001_00	10	BOOL	%UX0.1.0
2	NewPLC	<GLOBAL>	_SOE_0001_01	10	BOOL	%UX0.1.1
3	NewPLC	<GLOBAL>	_SOE_0001_02	10	BOOL	%UX0.1.2
4	NewPLC	<GLOBAL>	_SOE_0001_03	10	BOOL	%UX0.1.3
5	NewPLC	<GLOBAL>	_SOE_0001_04	10	BOOL	%UX0.1.4
6	NewPLC	<GLOBAL>	_SOE_0001_05	10	BOOL	%UX0.1.5
7	NewPLC	<GLOBAL>	_SOE_0001_06	10	BOOL	%UX0.1.6
8	NewPLC	<GLOBAL>	_SOE_0001_07	10	BOOL	%UX0.1.7
9	NewPLC	<GLOBAL>	_SOE_0001_08	10	BOOL	%UX0.1.8
10	NewPLC	<GLOBAL>	_SOE_0001_09	10	BOOL	%UX0.1.9
11	NewPLC	<GLOBAL>	_SOE_0001_10	10	BOOL	%UX0.1.10
12	NewPLC	<GLOBAL>	_SOE_0001_11	10	BOOL	%UX0.1.11
13	NewPLC	<GLOBAL>	_SOE_0001_12	10	BOOL	%UX0.1.12
14	NewPLC	<GLOBAL>	_SOE_0001_13	10	BOOL	%UX0.1.13
15	NewPLC	<GLOBAL>	_SOE_0001_14	10	BOOL	%UX0.1.14
16	NewPLC	<GLOBAL>	_SOE_0001_15	10	BOOL	%UX0.1.15
17	NewPLC	<GLOBAL>	_SOE_0001_16	10	BOOL	%UX0.1.16
18	NewPLC	<GLOBAL>	_SOE_0001_17	10	BOOL	%UX0.1.17
19	NewPLC	<GLOBAL>	_SOE_0001_18	10	BOOL	%UX0.1.18
20	NewPLC	<GLOBAL>	_SOE_0001_19	10	BOOL	%UX0.1.19
21	NewPLC	<GLOBAL>	_SOE_0001_20	10	BOOL	%UX0.1.20
22	NewPLC	<GLOBAL>	_SOE_0001_21	10	BOOL	%UX0.1.21
23	NewPLC	<GLOBAL>	_SOE_0001_22	10	BOOL	%UX0.1.22
24	NewPLC	<GLOBAL>	_SOE_0001_23	10	BOOL	%UX0.1.23
25	NewPLC	<GLOBAL>	_SOE_0001_24	10	BOOL	%UX0.1.24

18.8.2 Saving Variable

1) You can save contents in 'Global Variables' into the text file.

2) Click [Export Variables to File] in [Edit]

3) Then, contents in 'Global Variables' are saved into the text file.

Chapter 19 User Function / Function Block

A user can personally create and use a function/function block, which is not provided by XG5000. The User Function/Function Block can be created as follows.

Create new project selecting auto-allocation

↓

Create the user function/function block program

↓

Create the user function/function block I/O variable

↓

User function/function block programming

↓

Use it in a scan program
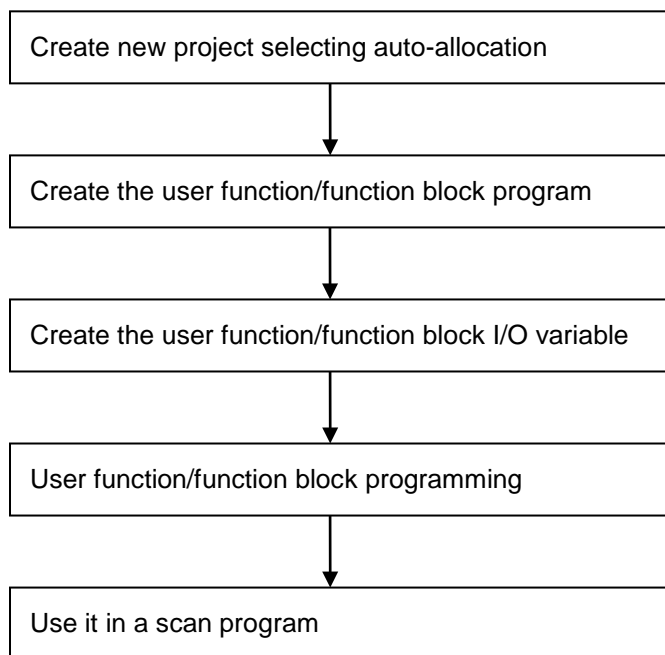
알아두기

- Available in XG5000 V3.3 or above, XGK CPU OS V3.4 or above

19.1 Create User Function/Function Block

19.1.1 Create auto-allocation project

For XGK series, to use user function/function block, when creating the project, you should check auto-allocation. If not, you can't use user function/function block.
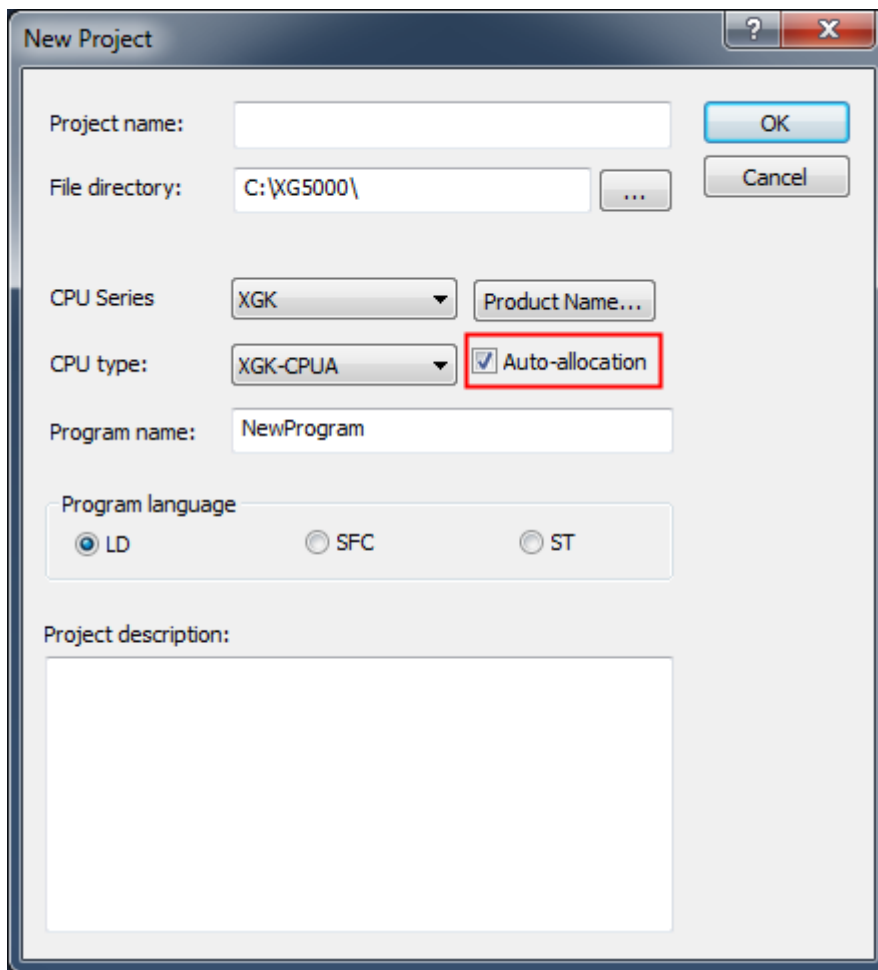
19.1.2 Create User Function/Function Block Program

In order to create user function/function block, after selecting User Function/Function Block, select [Project] → [Add item] → [Function] or [Project] → [Add item] → [Function Block] on the menu or select [Add item] → [Function] / [Function Block] on the context menu that appears if you click right button of mouse.

[Dialog box]
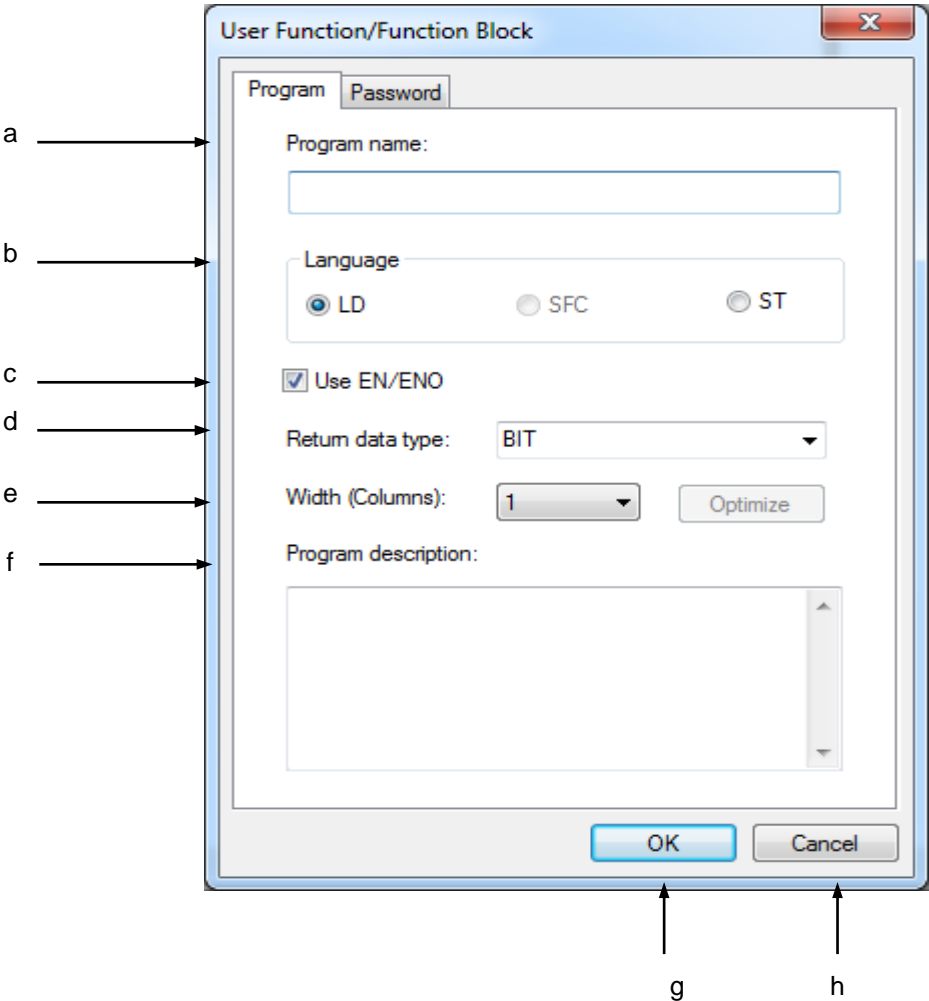
[Description of Dialog box]

a.Program Name: used to input a User Function/Function Block. When the user-defined function/function is registered, the input name is registered.

b. Language: used to select a programming language for the User Function/Function Block. A user-defined function is created only by the LD language while a user-defined function block can be created by either the LD or SFC language.

c. Use EN/ENO: used to select whether to use or not EN/ENO, which is used under the operation condition of function/function block. If not selecting EN/ENO, a user should declare BOOL type variable in the first input and first output parameters of the function/function block.

d. Return Data Type: designates a type of the results after a user-defined function is executed. It is activated only when a user-defined function is created.

e. Width (Columns): adjusts the width columns number of user function/function block

f. Program description: used to input the comment of a User Function/Function Block. If unnecessary, the comment does not have to be input.

g. OK: saves the input in the dialog box and closes the dialog box.

h. Cancel: cancels the input in the dialog box and closes the dialog box.

Note

- For Width (Columns) item, you can specify the width of function/function block and it can be useful to make long I/O variable name not overlapped.

Width =1   Width =2
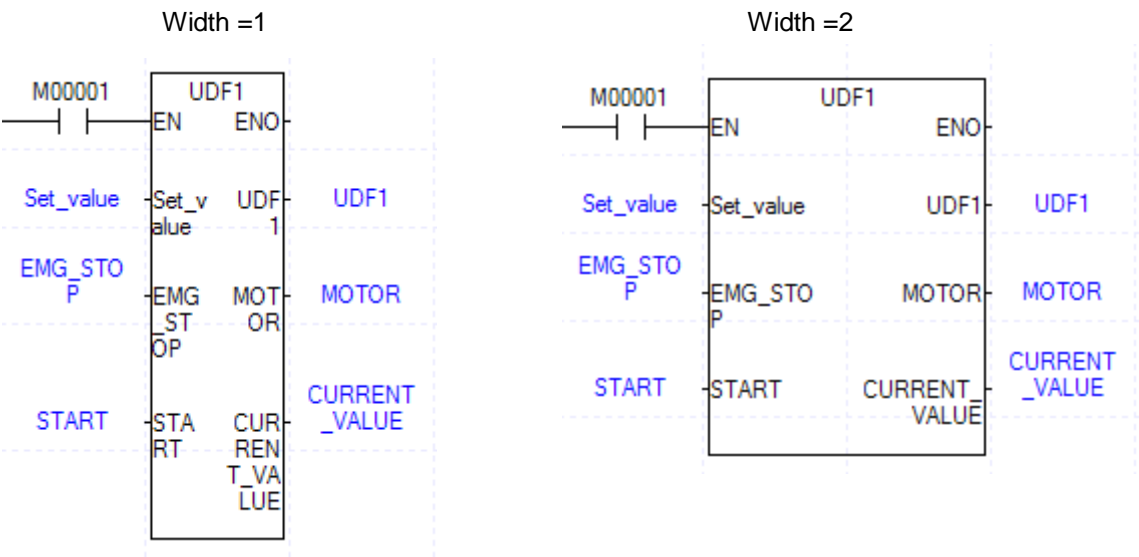
- If clicking OK button, a new item is created under the item of User Function/Function Block.
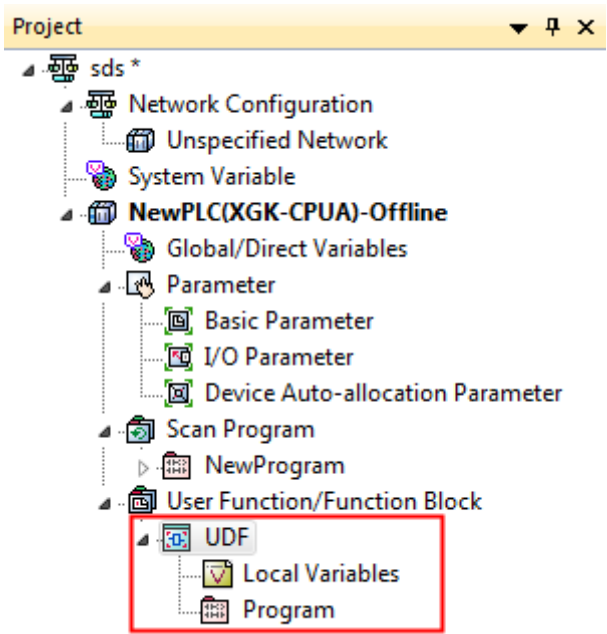
19.1.3 Create User Function/Function Block I/O Variable

[Steps]

1. If double-clicking [Local Variables] among the items under User Function/Function Block, the following local variable screen is created.

[Local Variables window]

[Description of Local Variable Window]

a. VAR_RETURN: variable only made in the user function represents result of user function. Its data type is the return data type designated when creating user function block and name is same as that of user function

b. Function shape: displays function/function block shape according to input variable, I/O variable, output variable inputted in the local variable window. The shape is displayed when using the User Function/Function Block in the scan program.

2. Add input variable, I/O variable and output value in the local variable screen. Depending on the added I/O variables, the function/function block shape is automatically changed on the bottom of the local variable screen.

	Variable Kind	Variable	Type	Used	Comment
1	VAR_RETURN	UDF	BIT	☐	
2	VAR_INPUT	START	BIT	☐	
3	VAR_INPUT	STOP	BIT	☐	
4	VAR_OUTPUT	MOTOR	BIT	☐	

NewProgram[Program] ✕   UDF[Local Variables] ✕

```
          ┌──────────┐
BIT ─┤EN      ENO├─ BIT
     │          │
BIT ─┤STA    UDF├─ BIT
     │ RT       │
     │          │
BIT ─┤STO    MOT├─ BIT
     │ P      OR │
     └──────────┘
```
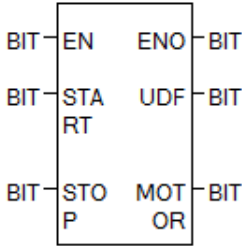
Notes
- Input variable and output variable should be, at least, one or more, respectively but the number is limited to 64.

19.1.4 User Function/Function Block Programming

[Steps]

1. If double-clicking a program among the items under the User Function/Function Block, a program screen with the previously designated language appears. The following screen shows the screen created when selecting the LD.
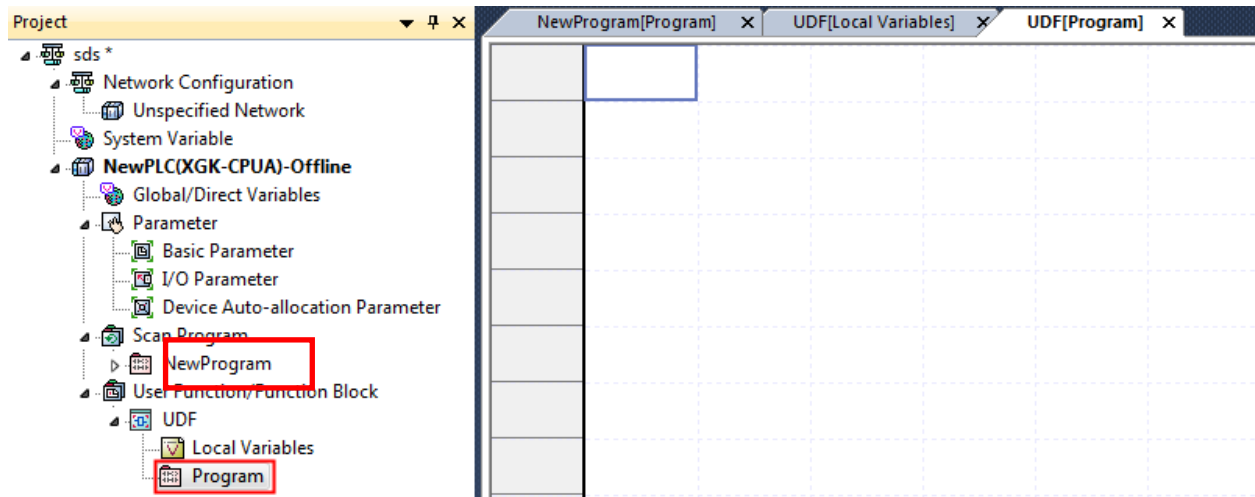
2. Create a program, based on the variable inputted in the local variable window.
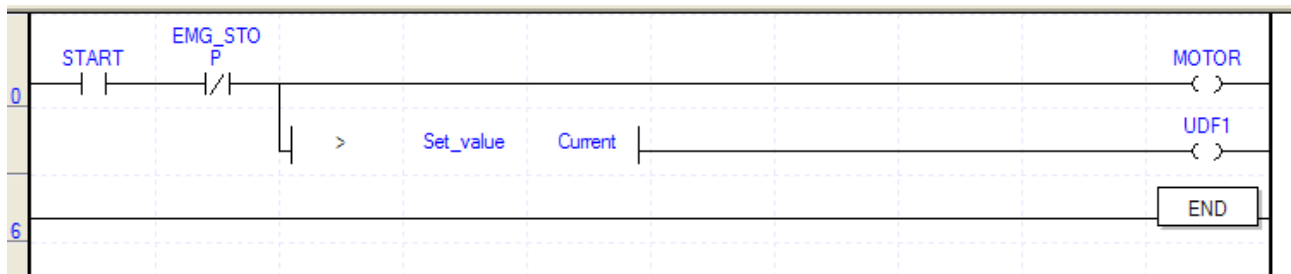
Notes

- You can't user another user function/function block in the user function/function block programming

- The variable whose name is same as that of user function should be used

- Direct variable (device) can be used only in the user function block programming

- In the user function block, you can set trigger on bit type input parameter (variable)

Type of trigger is as follows.

1) R_EDGE(Rising Edge): When variable changes from 0 to 1, derivers 1 into function block.

2) F_EDGE(Falling Edge): When variable changes from 1 to 0, derivers 1 into function block.

- If local variable edit and program edit are finished, select extension function in the toolbar to check whether the edited User Function/Function Block is registered.
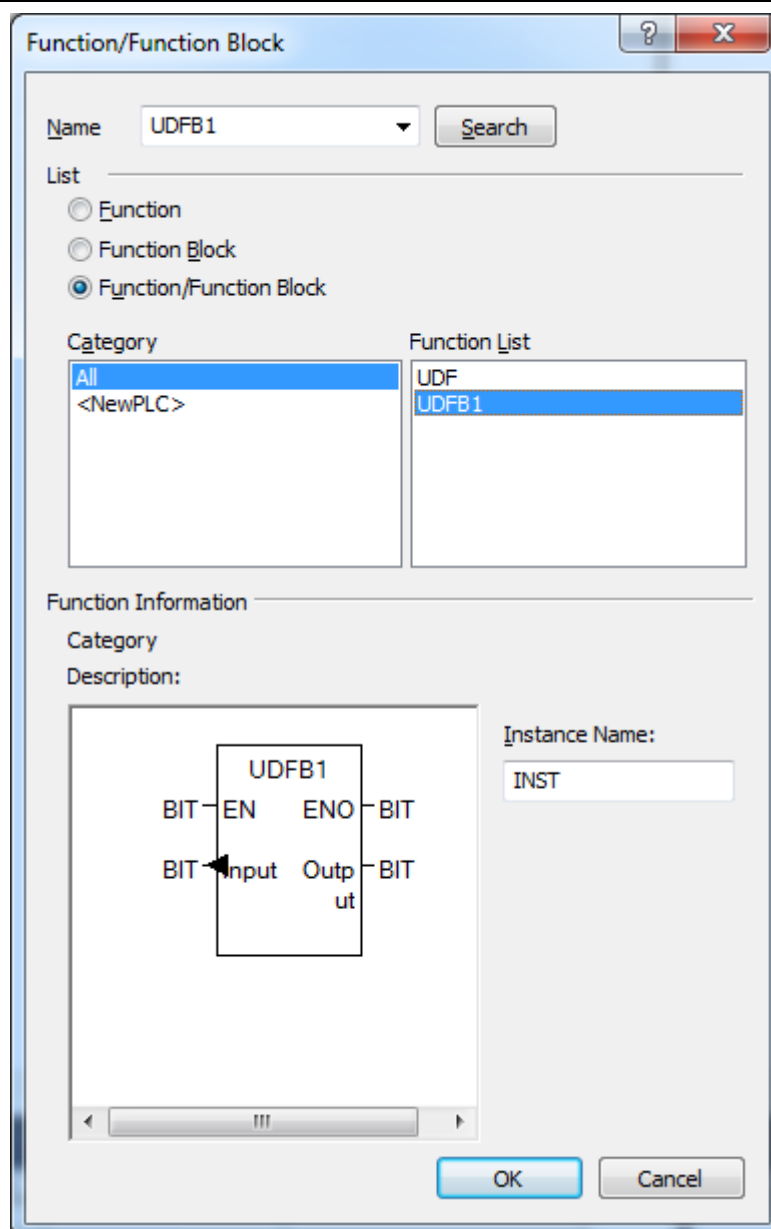
19.2   Use User Function/Function Block

[Steps]

1.Open the program to use a User Function/Function Block and move the cursor to the position to input.
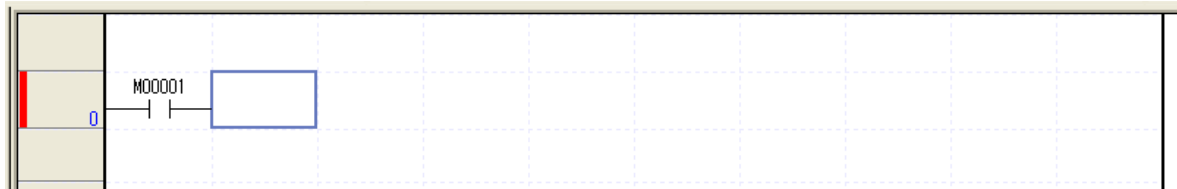
2. Click Extension Function Toolbar. .
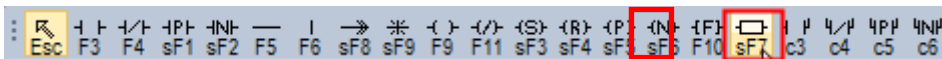
3. Select a User Function/Function Block in the function/function block dialog box.

Function/Function Block

Name   UDFB1   ▼   Search

List
○ Function
○ Function Block
◉ Function/Function Block

Category   Function List
All   UDF
<NewPLC>   UDFB1

Function Information
Category
Description:

UDFB1
BIT — EN   ENO — BIT
BIT — Input   Output — BIT

Instance Name:
INST

OK   Cancel
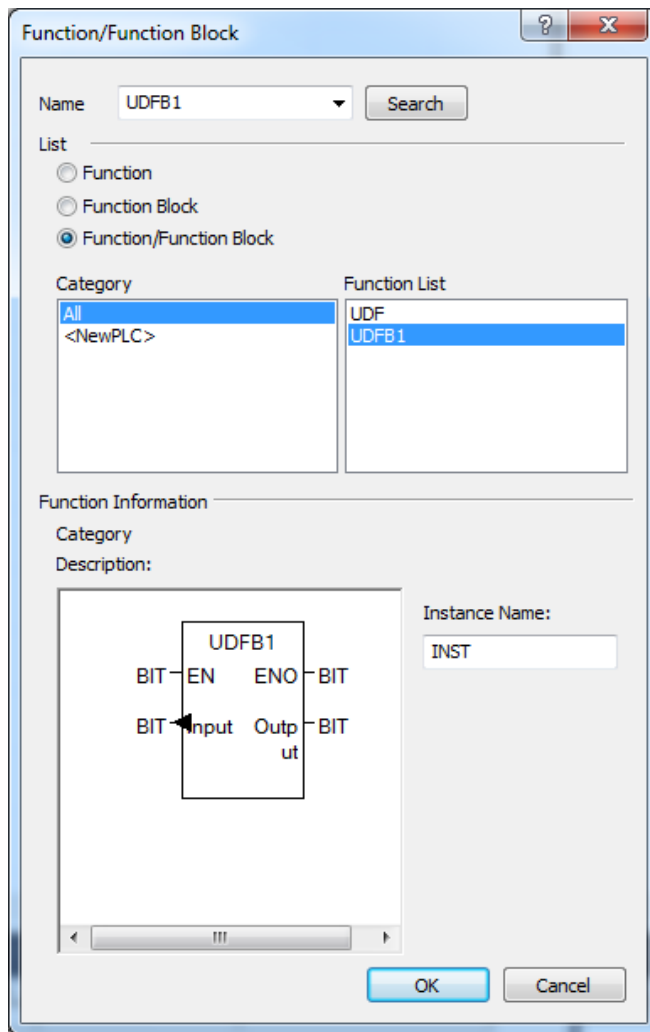
4. Input the variable to be used in the input/output of function/function block.

INST1
UDFB1
a
0 ——| |—— EN   ENO
b
——◀ Input Output
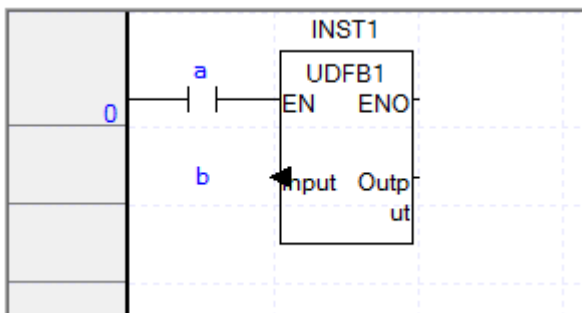
Notes

> – Only one input line is available ahead of user function/function block and connects with EN.
>
> In case there is no EN, it can connect with first BIT type input variable.
>
> - Output line can come out from BIT type output variable and only one is available.
>
> – Online editing for user function/function block is not available.
>
> But, deleting user function/ function block in the scan program is available.

19.3   Protect user Function/Function Block Source

19.3.1 Password

1) Setting individual password for user function/function block

[Steps]

1. After user function/function block on the project window, select [Properties].
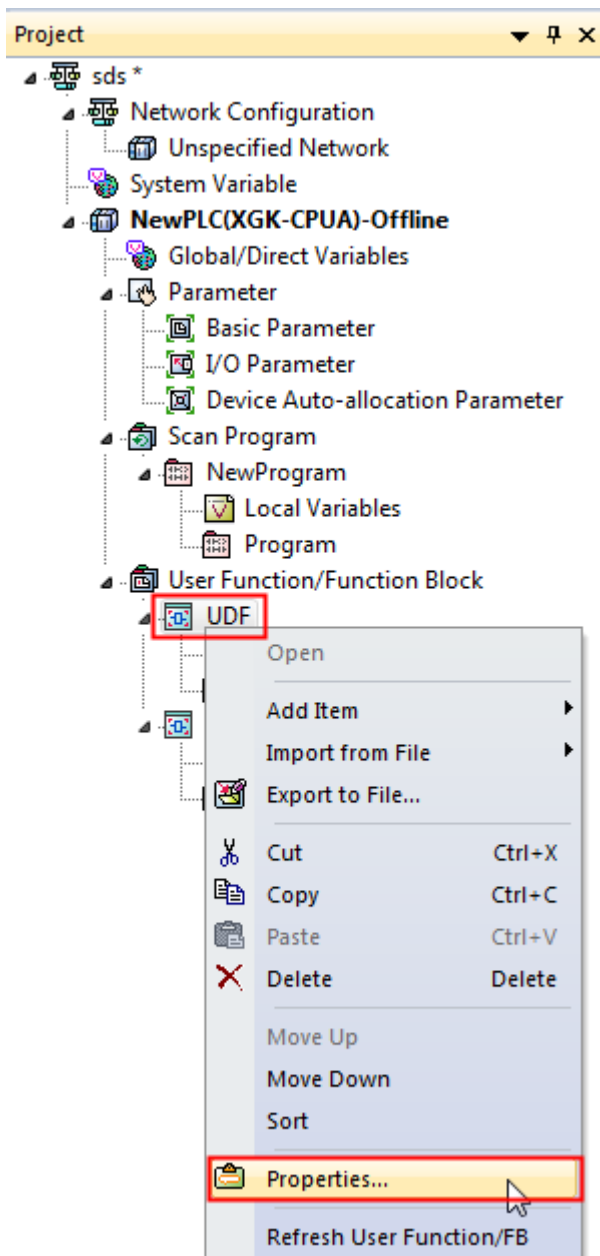
2. Select password tap in the dialog box.
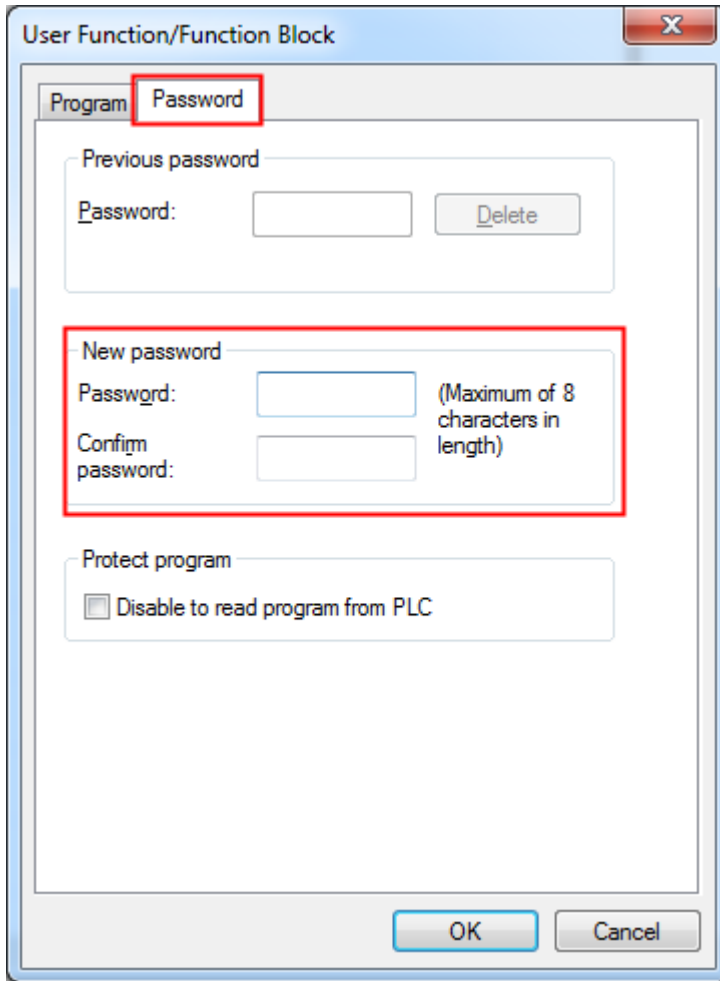
3. Input password.

4. Input password again at [Confirm password].

5. Press OK

6. Since then, password is needed whenever you open the user function/function block.
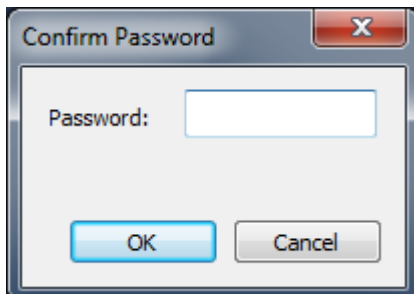
2) Setting password for entire user function/function block

[Steps]

1. After selecting [User Function/Function Block] on the project window, select [Properties].
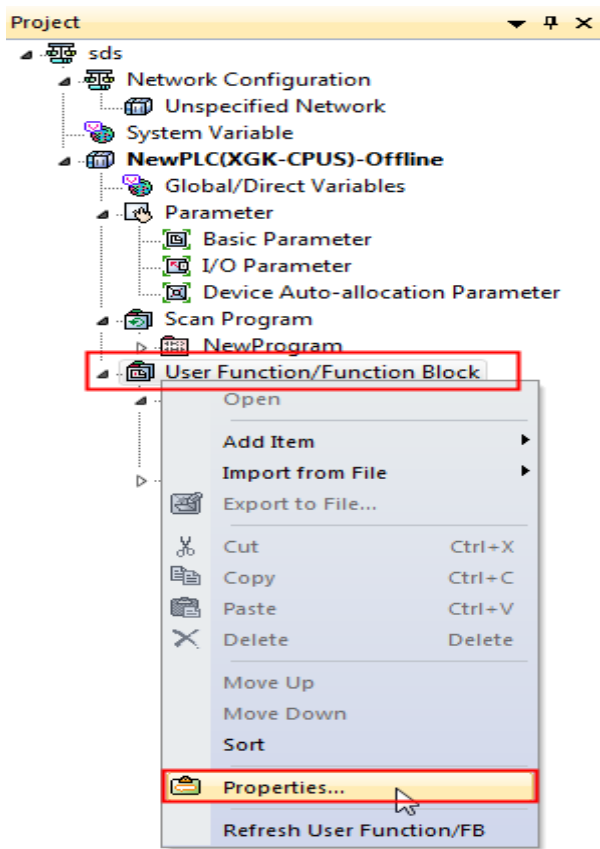
2. Input password in the dialog box.
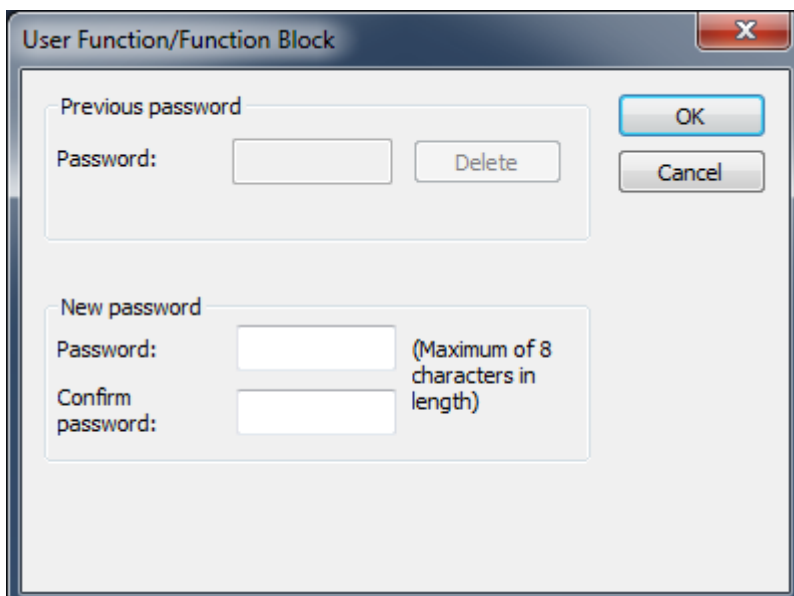
3. Input password again at [Confirm password]

4. Press OK

5. Password is needed when you open any user function/function block.
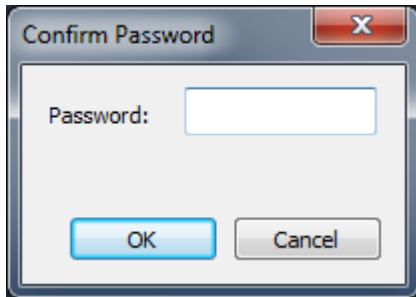
Notes

− If you lost a password, you can't open a user function/function block. But though you don't know the password, you can use it in the program.

19.3.2 Disable to Read Program from PLC

This function makes not to see program source of user function/function block after reading a program from PLC.

[Steps]

1. After selecting [User Function/Function Block] at the project window, select [Properties].
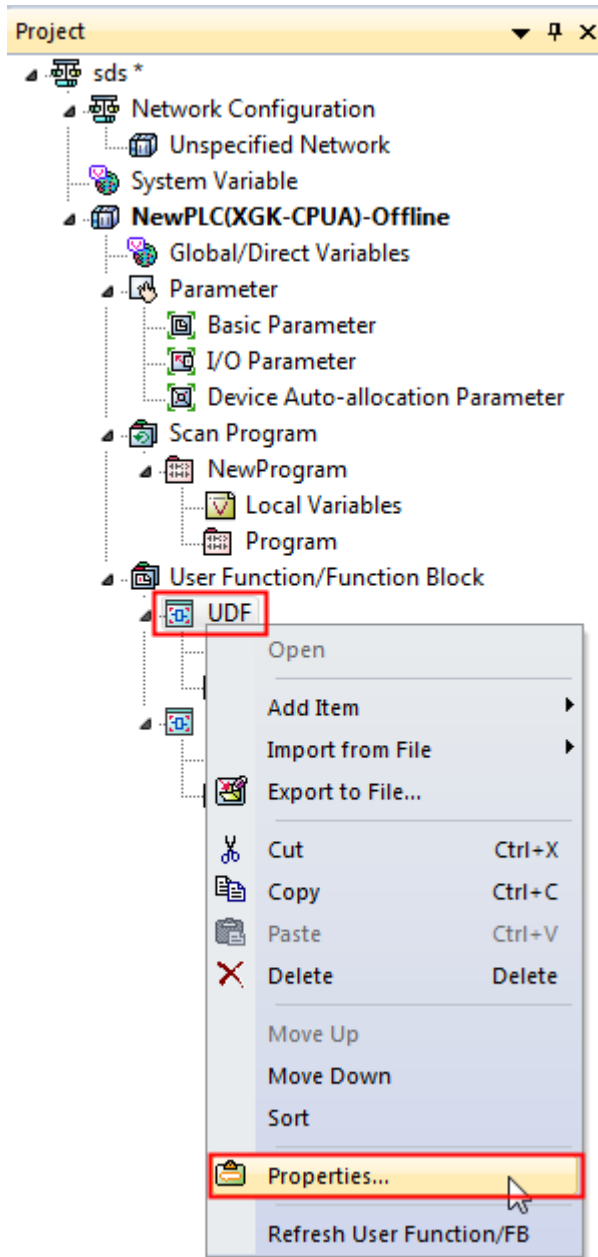
2. Select password tap at the dialog box.
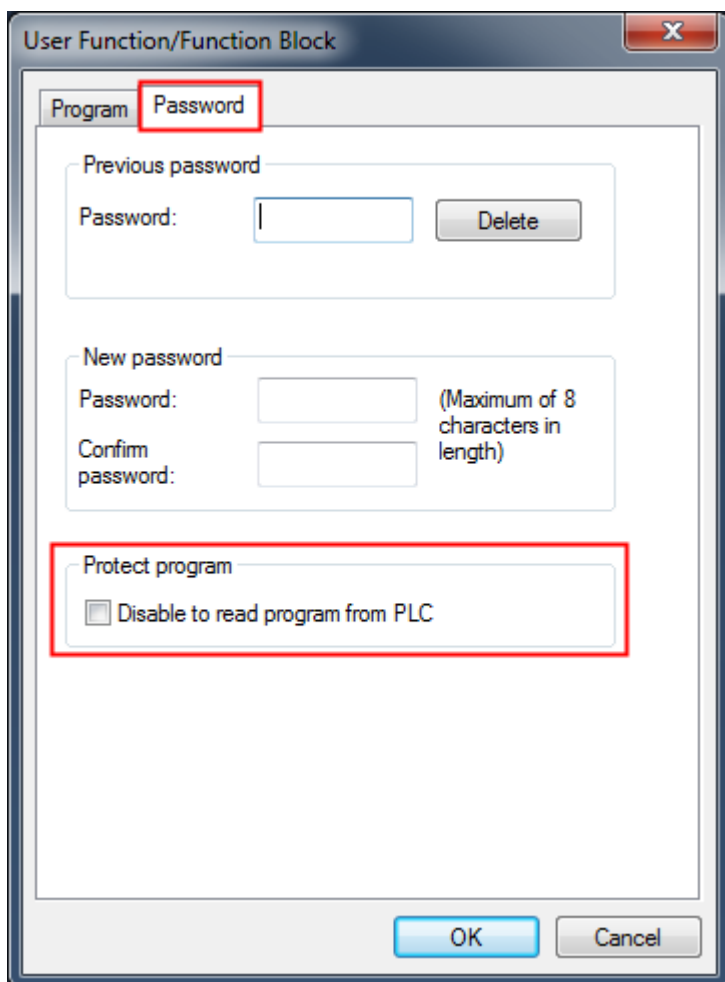
3. Check the box next to [Disable to read program from PLC].

4. Press OK

5. Since then, if you read program from PLC, you can't open user function/function block program.

Chapter 20 LS Studio

20.1 Start

20.1.1 Features

XG5000 provides an integrated development environment with software such as XP-Builder, DriveView7. In the integrated development environment, all project files are integrated and managed by the XG5000.
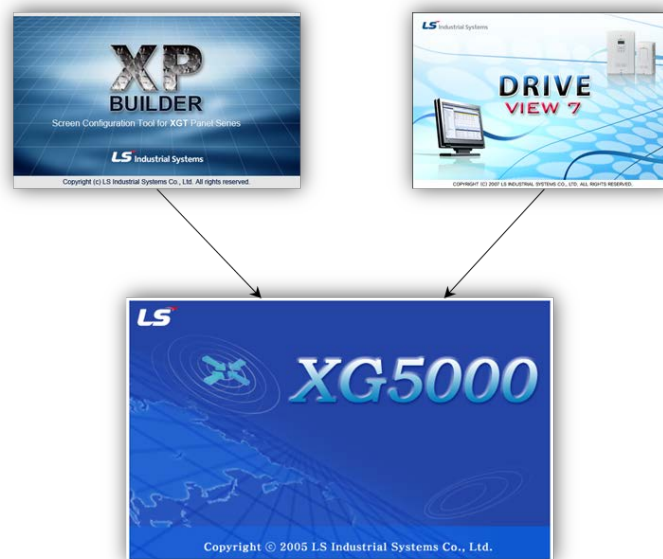
By using the XP-Builder integration project, the list of variables used in the PLC can be used immediately without the inconvenience of exporting or importing as a CSV file. In addition, Driveview7 makes it easier to configure communication settings by using the inverter list in the project.

1) Previous using method

To use XG5000's variables and comments in XP-Builder, use CSV format file.
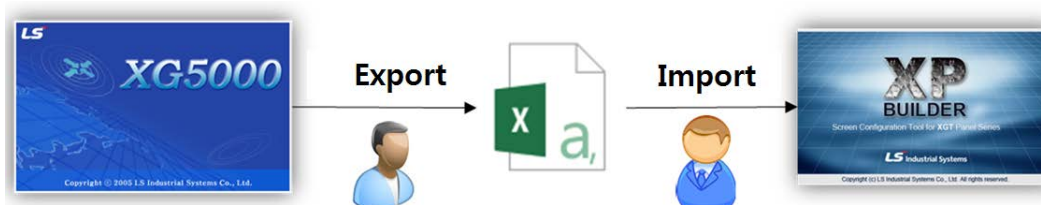
Variables and comments export function is used in XG5000 to save variable / comment as CSV file. In XP-Builder, the file saved in XG5000 is used by 'importing into tag group'. If the variable / comment created in the XG5000 changes frequently, this process is repeated.

2) Using method in the tool integration environment

To use XG5000's variables and comments in XP-Builder, double-click HMI item in XG5000 project tree.

In the tool integration environment, it is not necessary to save the variable / comment items used in the xg5000 as a separate file, and even if the variable / comment changes, exporting to the file is not necessary. This can reduce overall engineering time.

20.1.2 Install file

To use the integrated project environment, you can use the LS Studio integrated installation package, or you can install the XG5000, XP-Builder, and DriveView7 separately.

Note

1) The following software versions are integrated with the XG5000.
 	
   ① XG5000: Version 4.11 or later
   ② XP-Builder: Version 2.00[B27] or later
   ③ DriveView7: Version 1.4.2 or later

20.1.3 Install

(1) Run the installation file.

(2) The installation wizard prepares for installation. Press next button.

(3) Select the type of installation.

Complete installation installs XG5000, XP-Builder, and DriveView 7.
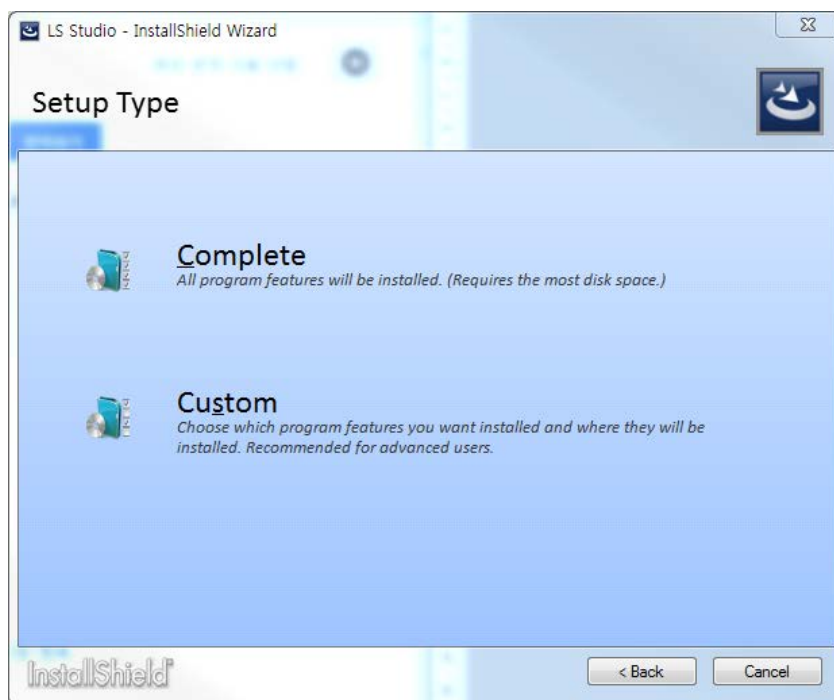
In a custom configuration, you can select and install the programs you want.
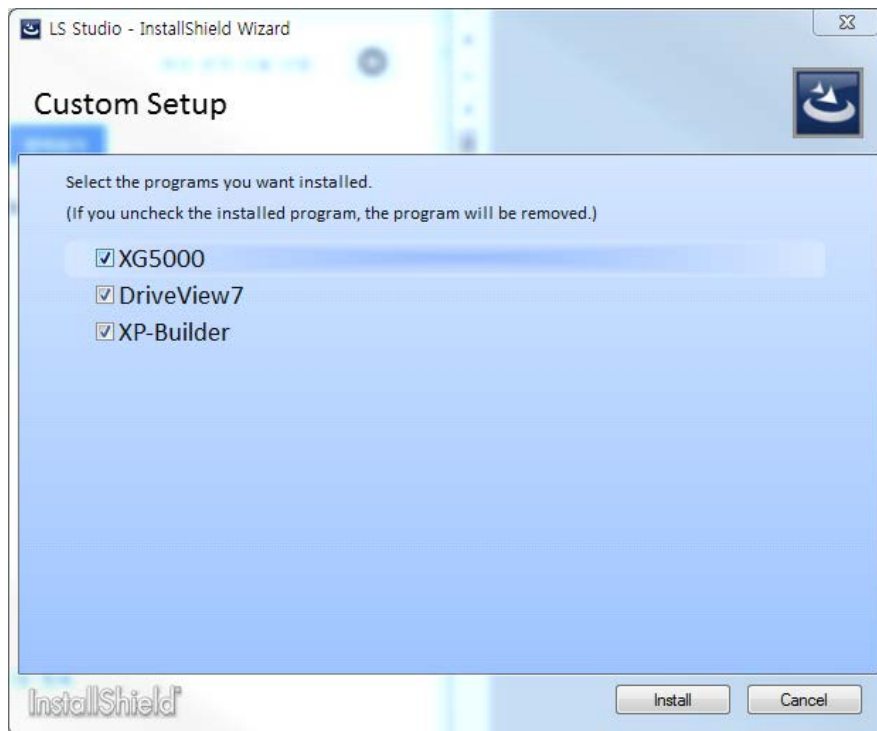
(4) If you select the type of installation, start the installation as shown below.
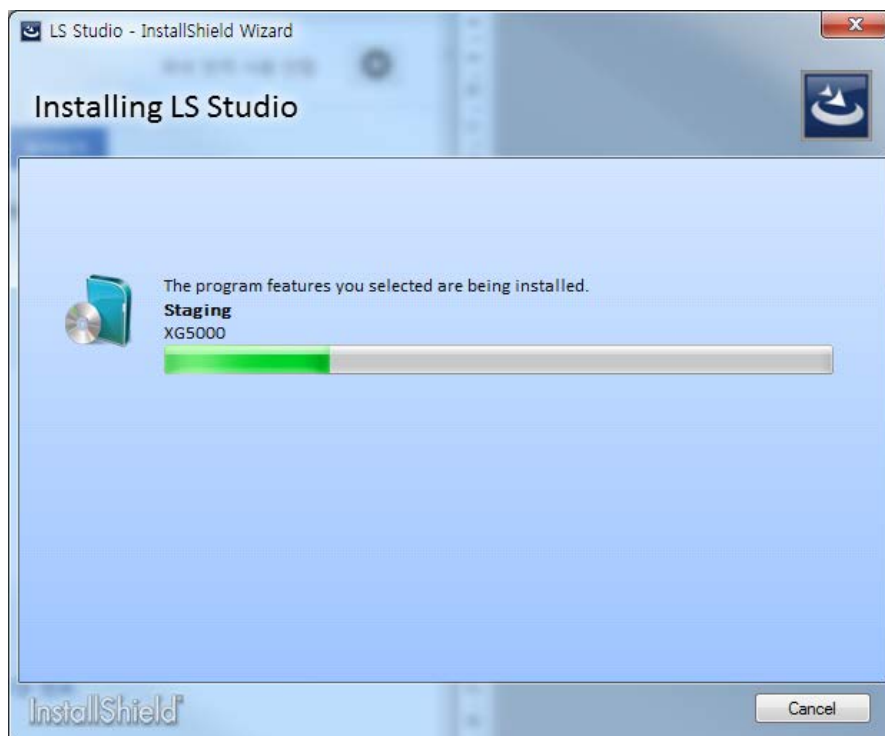
(5) The installation files of the selected program will be executed sequentially. For detailed installation procedure of each program, refer to the instruction manual of each program.

20.1.4 Delete

You can uninstall it all at once using the LS Studio installation package or you can uninstall them individually using the respective installation files.

(1) In Control Panel - [Programs and Features], right-click LS Studio and click "Uninstall" or double-click.
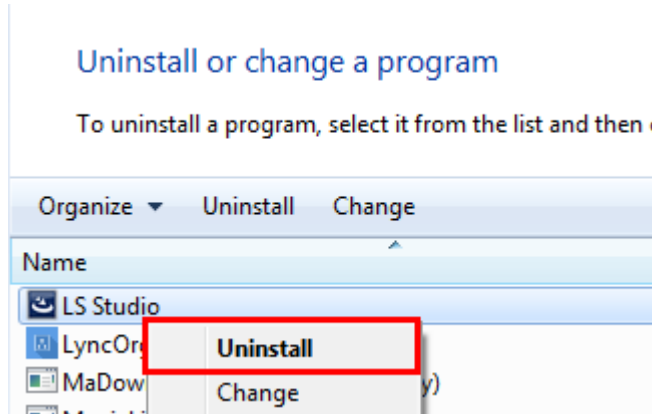
(2) The uninstall wizard will run as shown below.
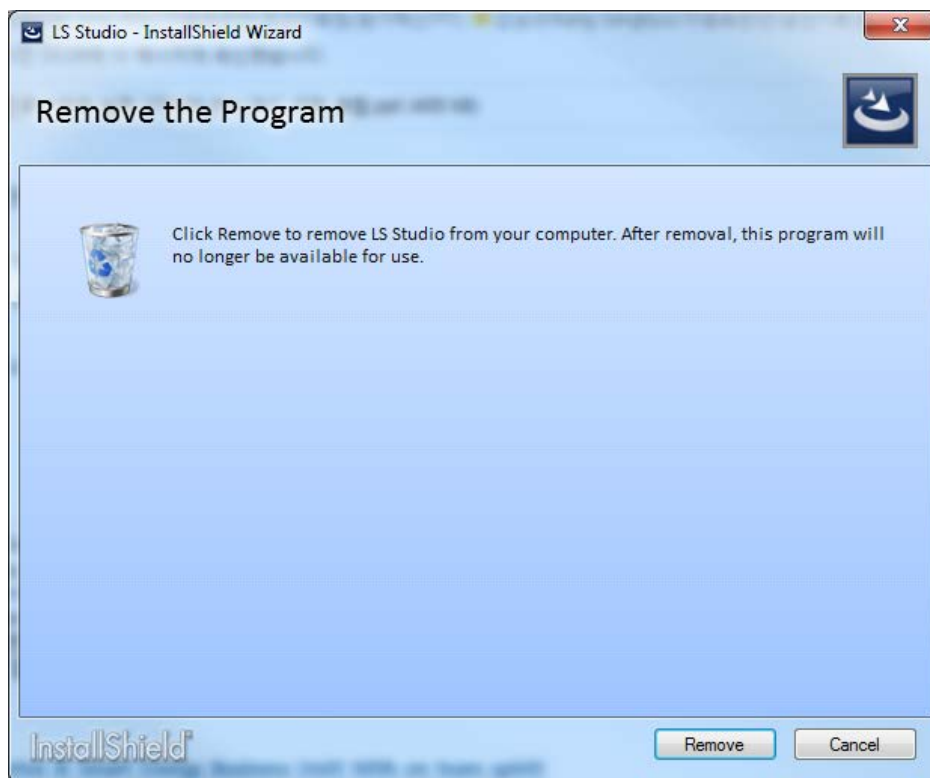
(3) The deletion proceeds as shown below.
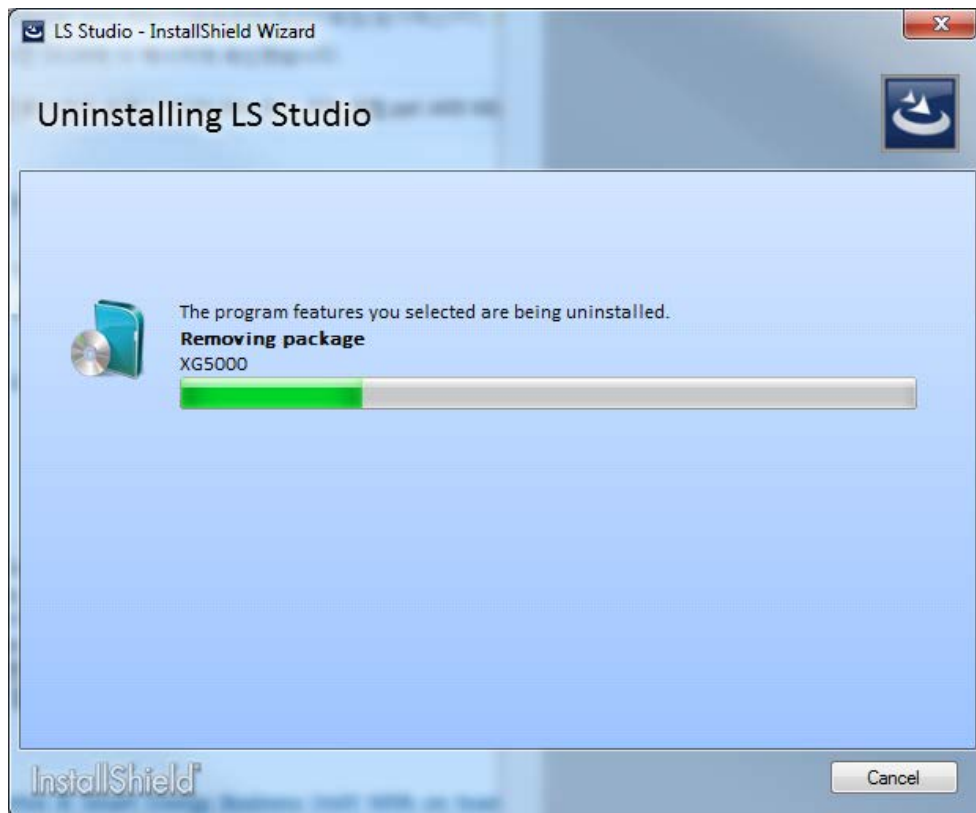
Note
1) The method of deleting individual software installation through LS Studio is the same as the deletion method of each software. For details, refer to the instruction manual of each software.

20.2 Basic usage

This chapter describes basic usage for using the project integration function. Integrated XG5000 has added functions to run XP-Builder and Driveview7, and its basic usage is same as existing XG5000.

20.2.1 Add item

To use added integration function, add an item to the XG5000 project. Items are added at the same level as PLC.

[Steps]

1. Select [Project] - [Add Item] - [PLC / Add-on] on the menu.
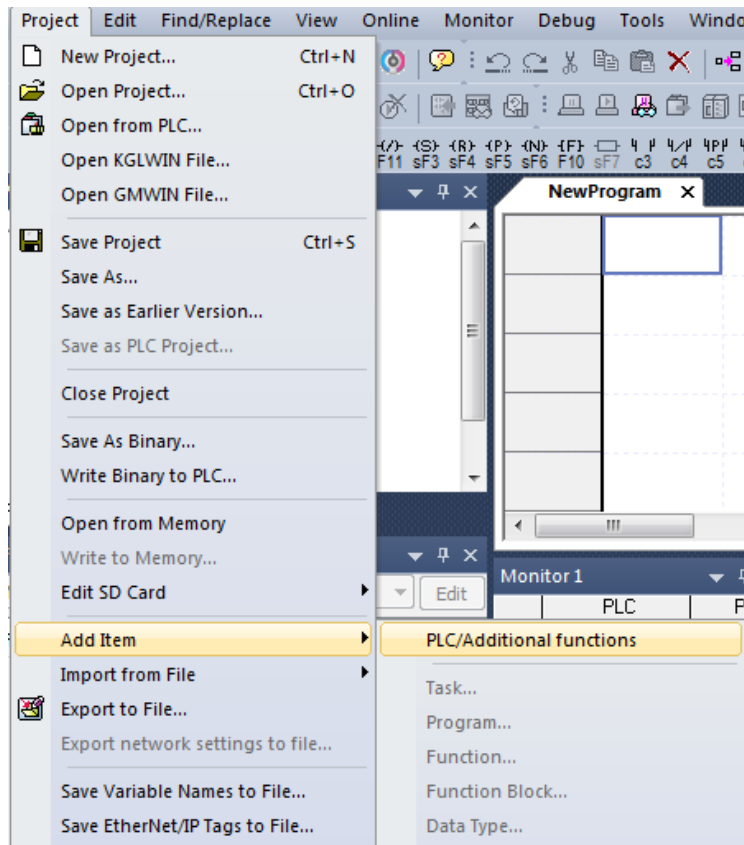
2. In the "Add Configuration" dialog box, select the item you want to add.

[Dialog box]
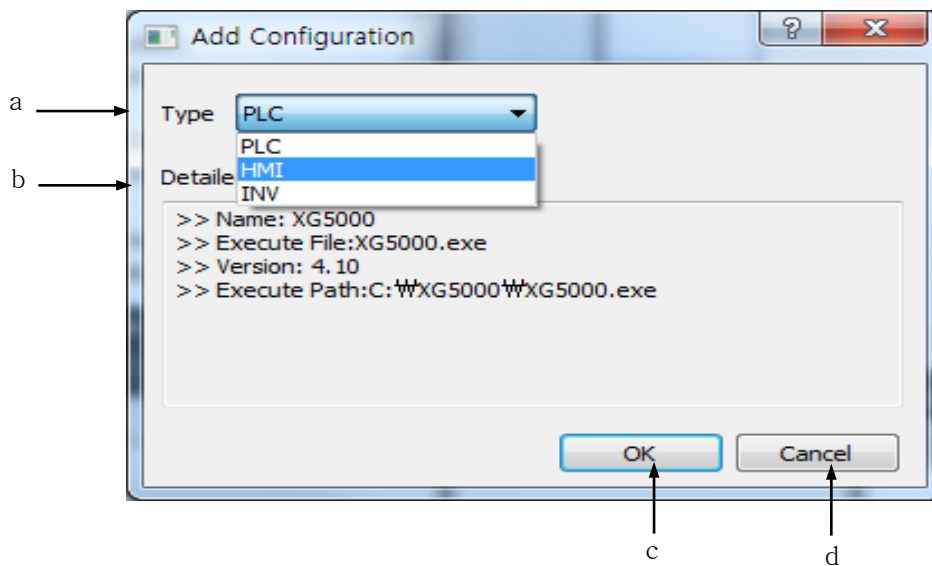
[Dialog Box Description]

a. Type: Select the type of item you want to add. When PLC is selected, the Add PLC dialog box is displayed. Items to be added are displayed as integrable items installed on your PC

b. Detail: Displays the details of the item to be added.

c. OK: Closes the Add Configuration dialog box and displays the detail dialog box.

d. Cancel: Cancel adding configuration and close the dialog box.

3. Select the name and product (model) to create.

[Dialog box]
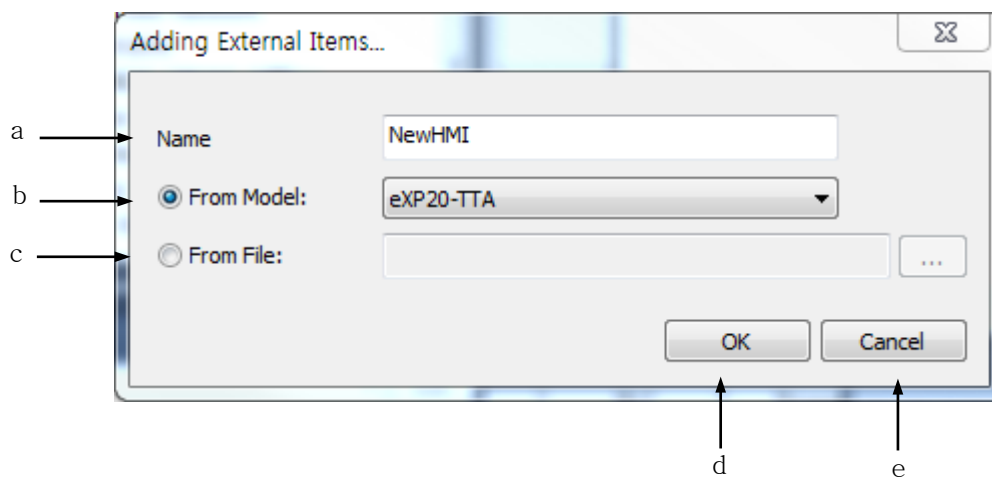
[Dialog Box Description]

a. Name: Enter the name to be added in the XG5000 project. You cannot duplicate items in the current project.

b. From Model: Select the detail model. Different items are displayed depending on the items added.

c. From File: Adds an item from the selected file. The model information and name in the file are displayed.

   If the name you add is duplicated in the project, a number is appended to avoid duplication.

e. OK: Close the dialog box and add the entry as input..

f. Cancel: Cancels the input and closes the dialog box.
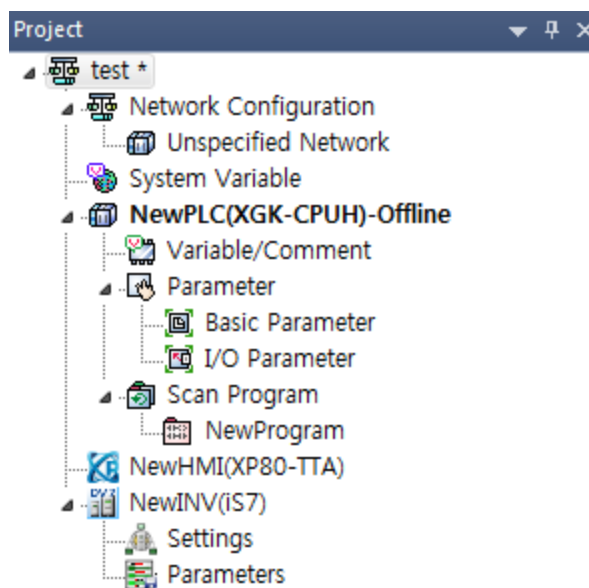
Note

1) Items and sub-items added to the project tree are displayed differently depending on the selected item.

2) When you add an item from a file, the selected file is copied and saved with the XG5000. The selected file remains without being deleted.

3) Items that are added can be activated or deactivated on an item-by-item basis. The available additional functions can be set in the common functions related to the XG5000 in the menu [Tools] – [Options] dialog box.
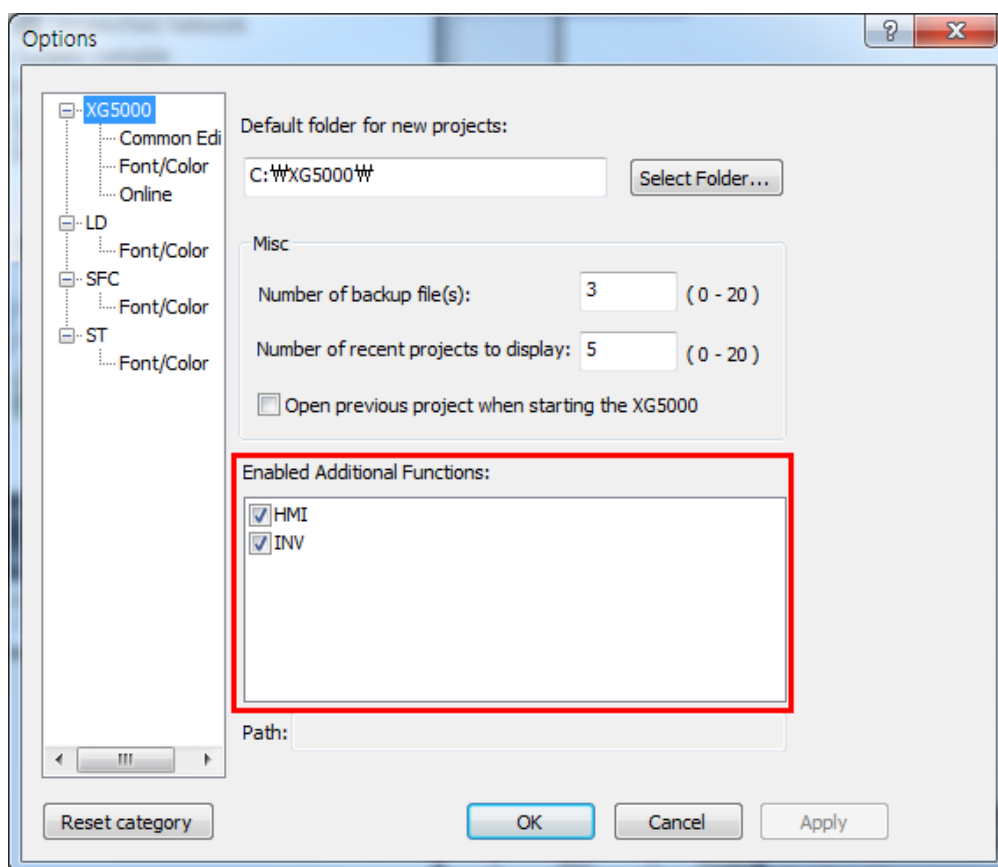
20.2.2 Run item

To run the program associated with the added item, double-click each item in the project tree. If the connected program is already running, it will be activated.
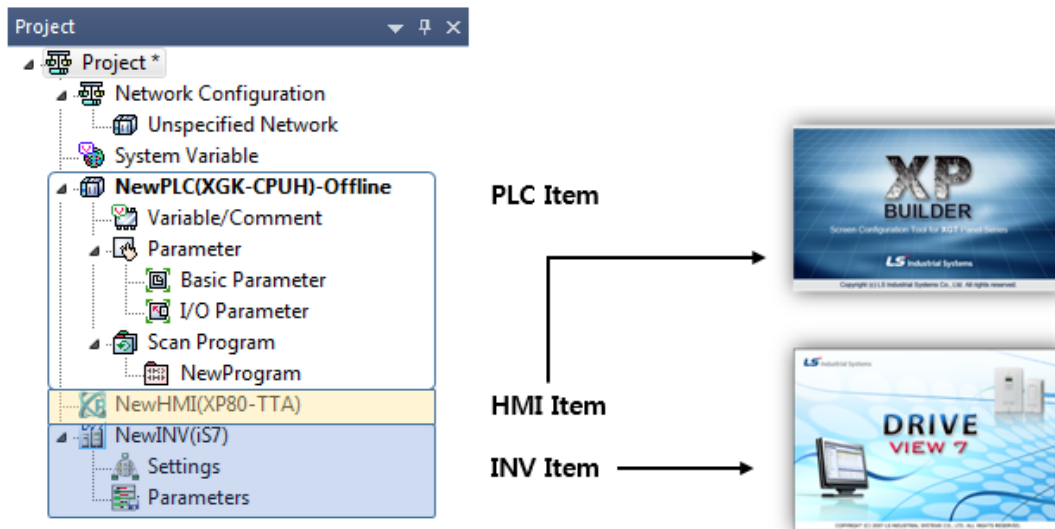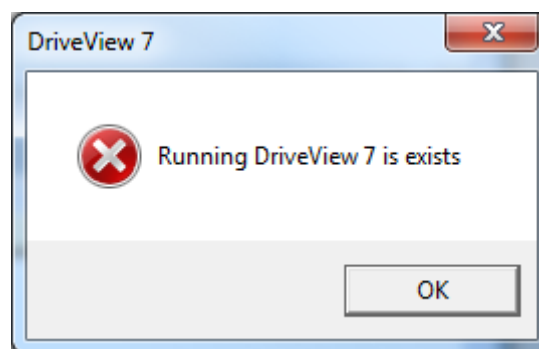
20.2.3 Save as PLC Project

Project files saved in the integrated project environment can only be used with the XG5000 individually installed version V4.10 or later. If you want to use with XG5000 V4.11 or earlier, you can save it as PLC project file by using [Save as PLC Project] function.

(1) Execute [Project] - [Save as PLC Project] in the integrated environment project PLC, HMI, and inverter are added.
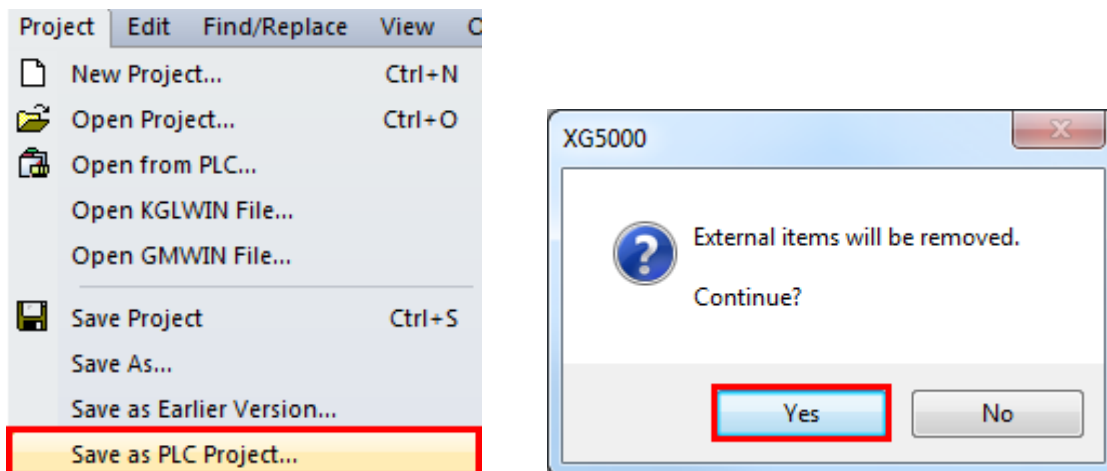
(2) In the dialog box below, enter a file name and click Save.
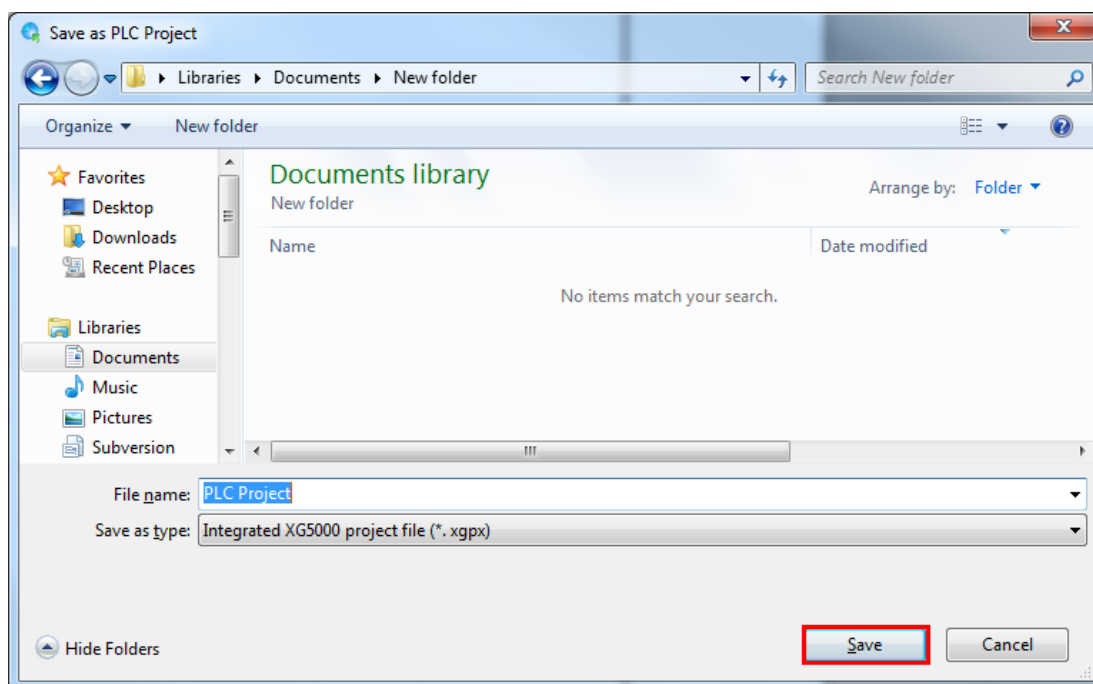
(3) Open the saved file in an individually installed version of XG5000 V4.10 or earlier.

20.3 XG5000 variables / comments share

This chapter explains how to use variables / comments set in XG5000 with XP-Builder.

[Steps]

1. On the XG5000, select the variable / comment you want to share with the HMI.

The XG5000 allows you to select global variables, flags, and local variable entries.

알아두기

1) In the XG5000 project, variables sent and received by HMI or communication can be checked in the system variable list.

---

2. Select the HMI item in the project tree and double-click it.

3. Double-click the tag item in the project tree of XP-Builder to display the tag window.

4.Select the [NewPLC] item in the tag group to see the list of variables selected on the XG5000.
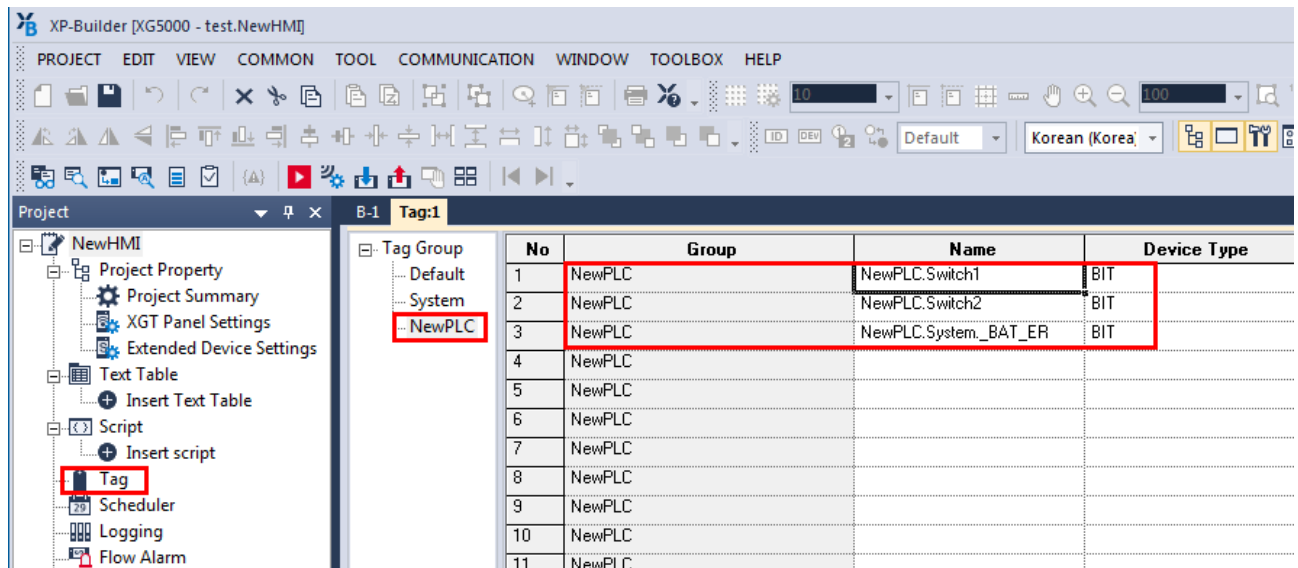
5.It is used in drawing by using registered tag list in XP-Builder.
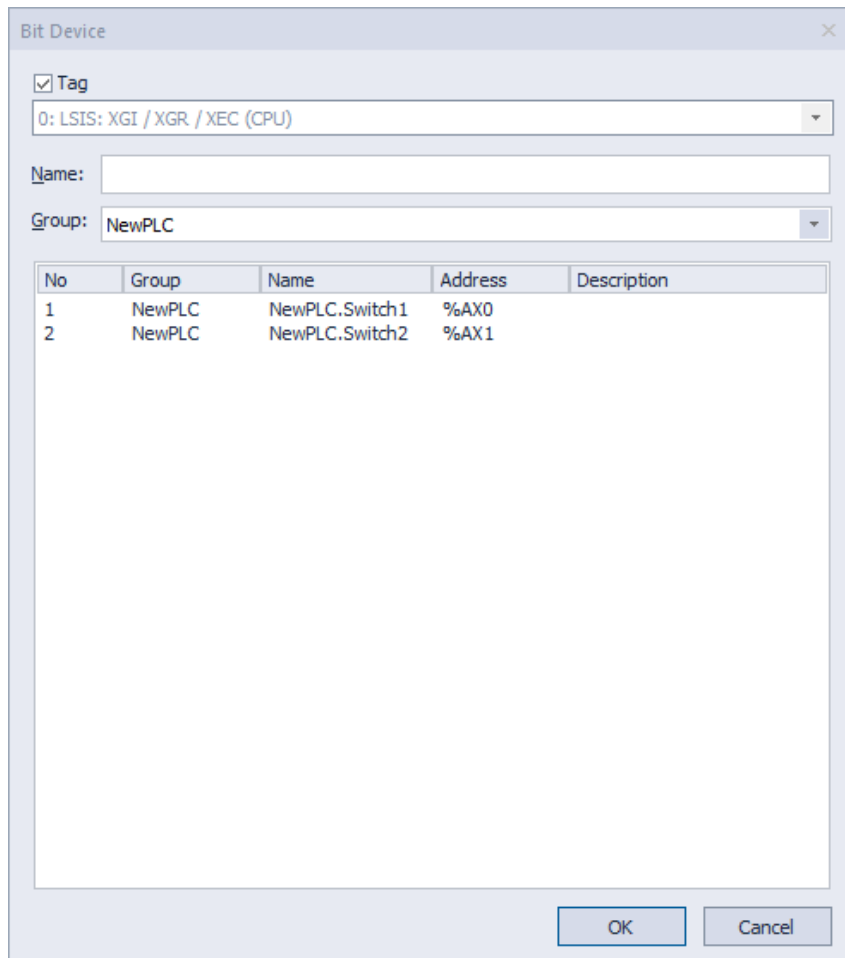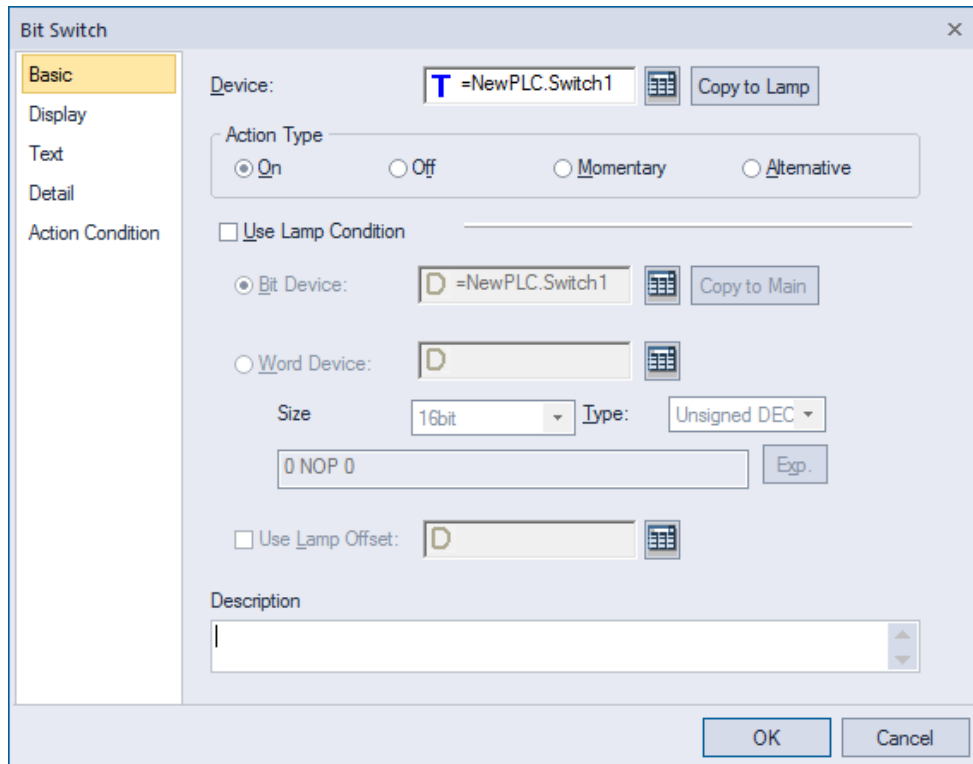
20.4 Communication parameter setting

This section explains how to set the communication parameters using the INV items registered in the project. For the procedure to add an INV item, see section 2.1 Add item.

[Steps]

1. Add communication module supporting LS bus to current project (Cnet only)
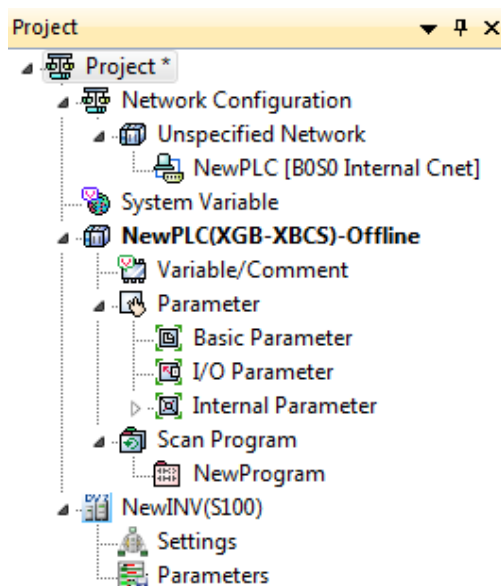
2. Select Use P2P in the communication module's default setting.
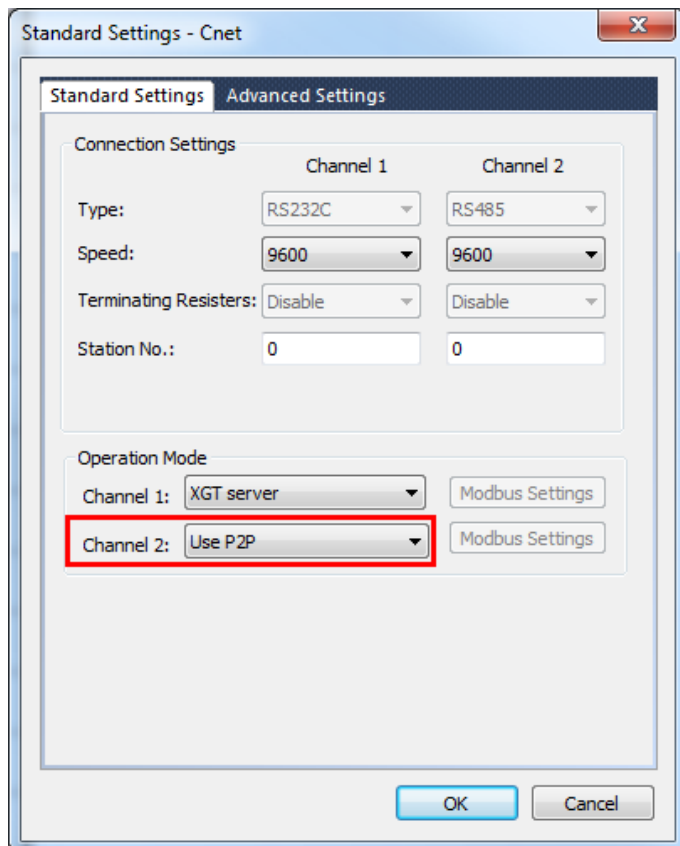
3. Add P2P parameter for communication module and select LS BUS item in P2P channel.
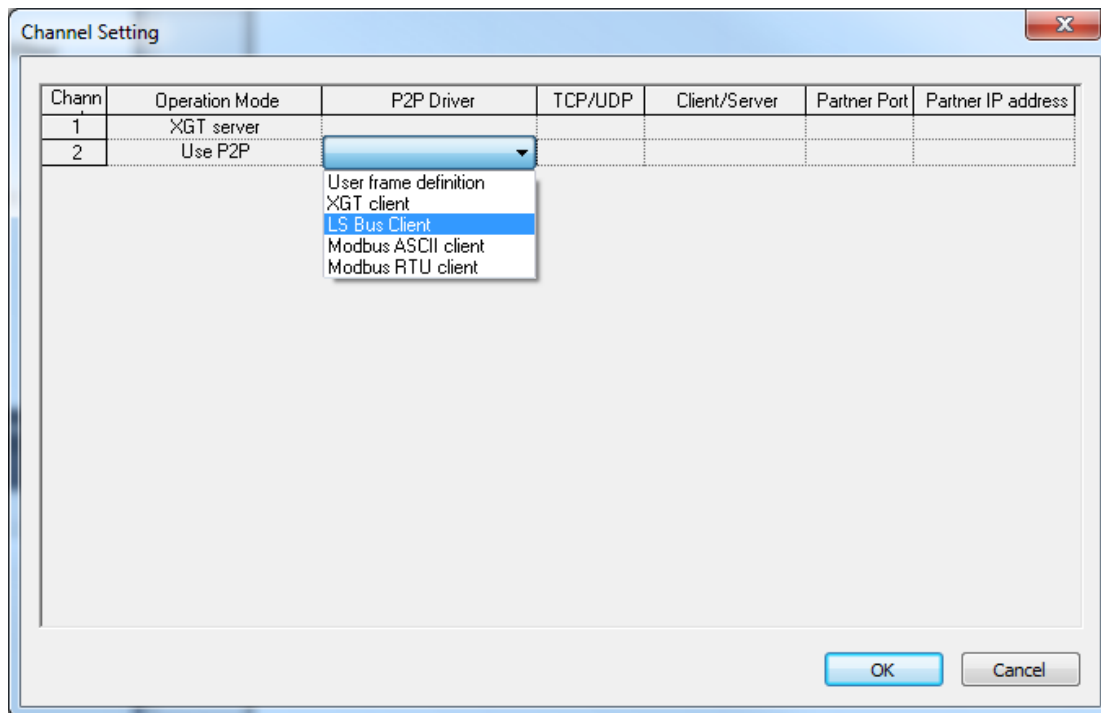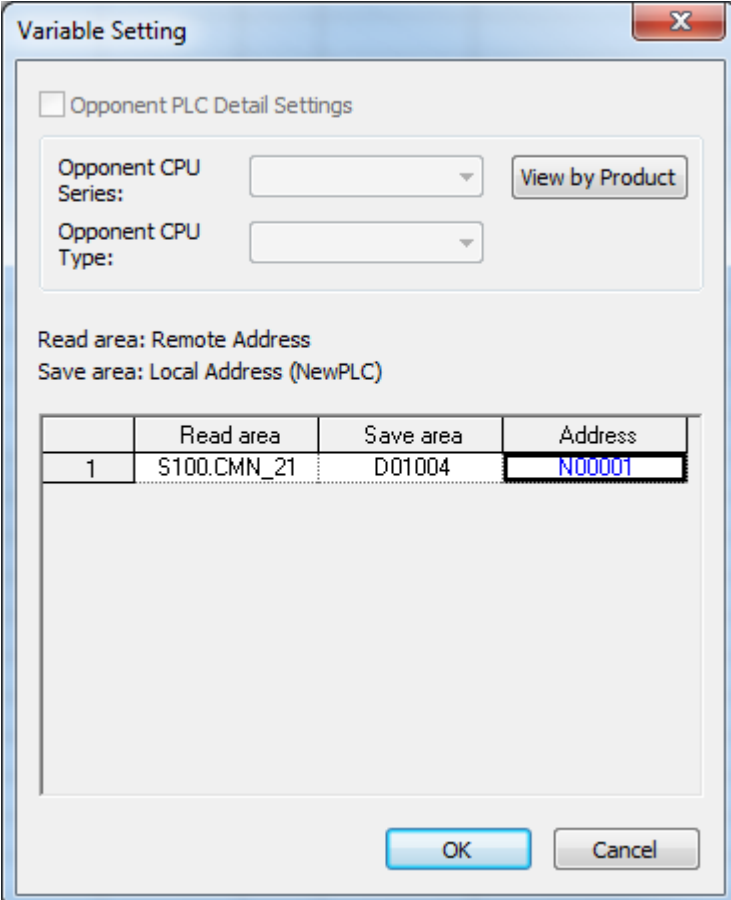
4. Enter the default settings for P2P and click the [Set] button.

5. In the Variable Setting dialog box, right-click "Read Area" and select "Inverter Setting".
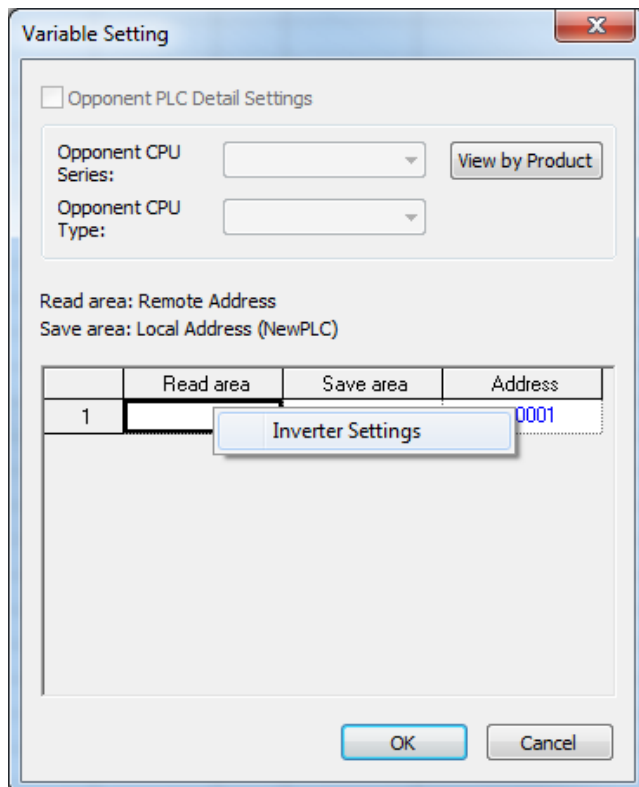
6. Select inverter, group and variable in the inverter variable selection dialog box and select the OK button.
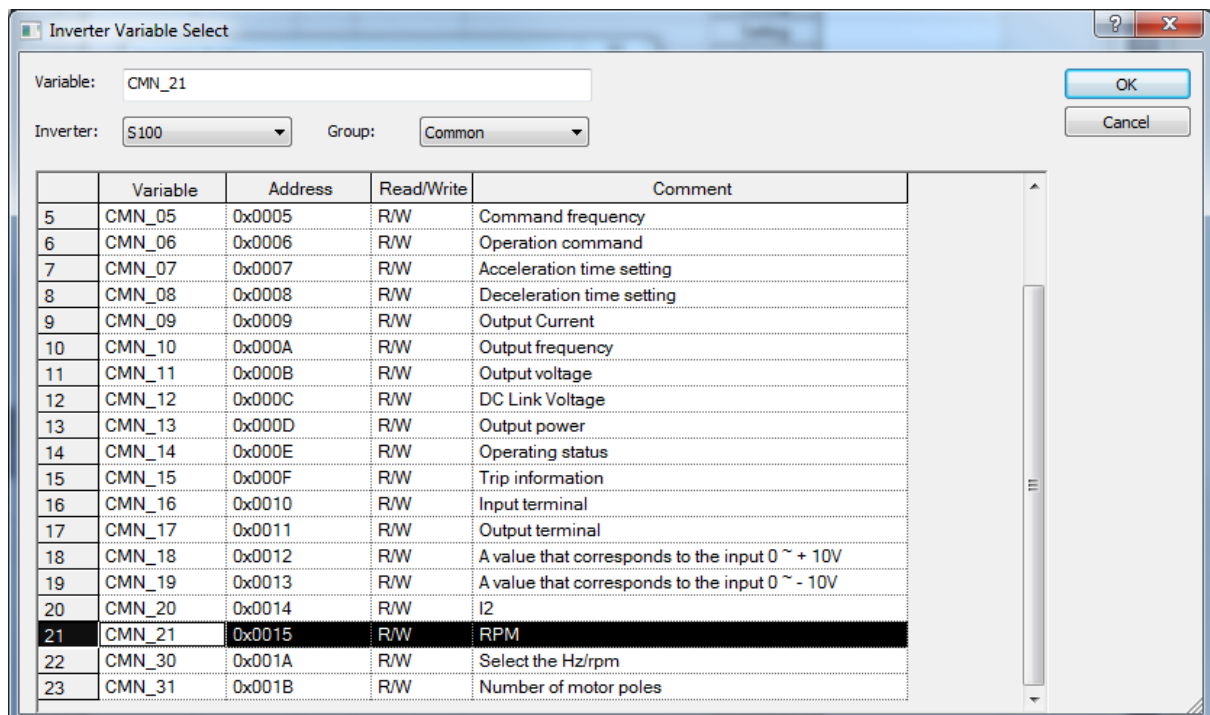
7. After setting the save area, select the OK button.

Variable Setting

☐ Opponent PLC Detail Settings

Opponent CPU
Series: ▼   View by Product

Opponent CPU
Type: ▼

Read area: Remote Address
Save area: Local Address (NewPLC)

	Read area	Save area	Address
1	S100.CMN_21	D01004	N00001

OK   Cancel

Warranty

1. Warranty Period

The product you purchased is guaranteed for 36 months from the date of manufacture.

2. Scope of Warranty

(1) The initial diagnosis of faults is basically conducted by your company. However, upon your request, our company or our service network can undertake this task for a fee. If the cause of the fault lies with our company, this service will be provided free of charge.

(2) This warranty only applies if the product is used under normal conditions according to the specifications and precautions described in the handling instructions, user manuals, catalogs, and caution labels.

(3) Even within the free warranty period, the following cases will be subject to paid repairs:

1) Replacement of consumable and life-limited parts (e.g., relays, fuses, electrolytic capacitors, fans, LCDs, batteries, etc.)

2) Failures or damages caused by improper storage, handling, negligence, or accidents by the customer

3) Failures resulting from the customer's hardware or software design

4) Failures due to modifications without our consent

   (Repairs will be refused, even for a fee, if recognized as modified or repaired outside our company)

5) Failures that could have been avoided if the customer's equipment, in which our product is incorporated, had safety devices required by legal regulations or common industry standards

6) Failures that could have been prevented if maintenance and replacement of consumable parts were performed normally according to the handling instructions or user manuals

7) Failures and damages to the product caused by using connected equipment or inappropriate consumables

8) Failures caused by external factors such as fire, abnormal voltage, force majeure, and natural disasters such as earthquakes, lightning,salt damage, wind, and flood damage

9) Failures due to reasons that could not be predicted with the scientific and technical standards at the time of our shipment

10) Other failures, damages, or defects recognized as the responsibility of your company

Environmental Policy

LS ELECTRIC Co., Ltd supports and observes the environmental policy as below.

Environmental Management

LS ELECTRIC considers the environmental preservation as the preferential management subject and every staff of LS ELECTRIC use the reasonable endeavors for the pleasurably environmental preservation of the earth.

About disposal of the Product.

LS ELECTRIC' PLC unit is designed to protect the environment. For the disposal, separate aluminum, iron and synthetic resin (cover) from the product as they are reusable.

www.ls-electric.com

LS ELECTRIC Co., Ltd.