T-solution | Leader in Electrics & Automation

User Manual

GMWIN

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 Industrial Systems

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Chapter 1. The Start

1.1 Characteristic of GMWIN

GMWIN is a software tool to write a program and debug for all type of GLOFA PLC.
GMWIN has the following characteristic and merits.

1.1.1 International Standard Language

GLOFA PLC uses the language announced as an international standard by IEC (International Electro technical Commission) basically.

1) Standardization of Program Language

Provides international standard languages such as LD, SFC, IL and available to select the language easy to apply to the system.

(1) Illustrated Language
LD (Ladder Diagram): Relay logic form language
(2) Character Language
IL (Instruction List): Assembly language type language
(3) SFC (Sequential Function Chart): Flowchart form language

2) Standardization of variable use

Uses the expression of direct variable by standardizing as I, Q, M and available to make a program easily and conveniently using the symbol. The allocation of program variable memory is carried out automatically or by the user designation.
Available to select various data type and kinds and set the initial value, and easy to understand the program with the comments for the variables.

1.1.2 Convenient User Interface

1) PLC system composition as project unit

Easy to make and test a program as one PLC system contains several programs.

2) PLC connection through network

Available to download and monitor the program to the directly connected PLC as well as other station PLC connected by network.

3) Plentiful PLC information reading

Available to read various PLC information and monitor PLC status and in the program, available to monitor variables and link parameter.

4) User Definition Command

Available to reuse the program as the user makes a program as a library in order to use it in other environment.
Available to define the programs that the user uses often or does not want to open except standard function or function block as one function/function block to use it easily.

5) Program Simulation

Has a function as if it operates PLC in the PC without connecting directly to PLC and available to verify the program made by GMWIN.

6) Adoption of multiple document interface mode of program

GMWIN adopts MDI (Multiple Document Interface) mode and available to edit several programs simultaneously.

7) Introduction of convenient wizard

When making a new project, new program and the user-defined library etc., the function of “wizard” enables the user to follow easily.

1.2 Specially changed points in GMWIN V4.0

1) Multiple working of project

Available to display more than 2 GMWIN and runs multiple working.

2) Split window type variable window supporting

Variable window shall be output as a split window form with editing window and the user can find the variable list easily to input.

3) Introduction of message window available for docking

Error message, find results, cross-reference, I/0 use status etc. shall be output in the result window available for docking to use them conveniently.

4) Tool bar editing function supporting

User can select and define for tool bar and dock it on the desired position.

5) Documentation function enforcement

Enforces the direct variable statement function and print function to make the document more easily.

6) SFC language reinforcement

SFC action is available to make with SFC and use the action up to 8.

7) Editing function reinforcement

Editing function such as undo, block unit copy, automatic variable input dialogue box in case of contact coil input etc., is reinforced.

8) Project structure reading improvement

Scan program and task program is divided as a tree type in the project window to read the project structure easily.

9) Project bundle function

Provides the function to bundle the program in the project and the user defined function/function block as one file only with the project name.

10) Display of the line number when scrolling

Displays the line number on the top of program when scrolling in the program window to find the desired parts easily.

11) Enlarged variable window

Provides the enlarged variable window to see 22 variables at once.

12) Replace direct variables

Replaces direct variables of the selected area.

13) Convenient folder management

Provides useful project folder management as being made a project name folder for each project.

14) Used I/O status

Provides a function to see used I/O in the programs.

1.3 Requirements for GMWIN execution

To use GMWIN, the following H/W and S/W are required:

1) Personal Computer and Memory

Personal computer with more than Pentium CPU and at least more than 160MB memory including extension memory.

2) Serial port

More than 2 serial port to make the utmost use of the GMWIN function and communicate with PLC body.

3) Hard Disk

Hard disk with more than 20MB available capacity to install all GMWIN related files and use GMWIN smoothly.

4) Mouse

A mouse available to connect to computer body and suitable for Korean/English windows to make the utmost use of GMWIN function.

5) Printer

A printer available to use for Korean/English windows to print GMWIN.

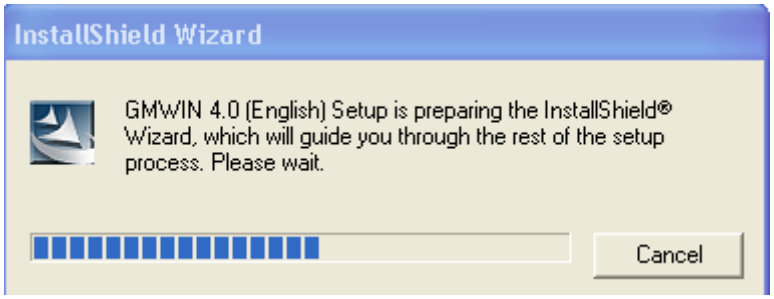
6) Korean/English windows

Korean/English windows 95/98/NT/2000/XP is required.

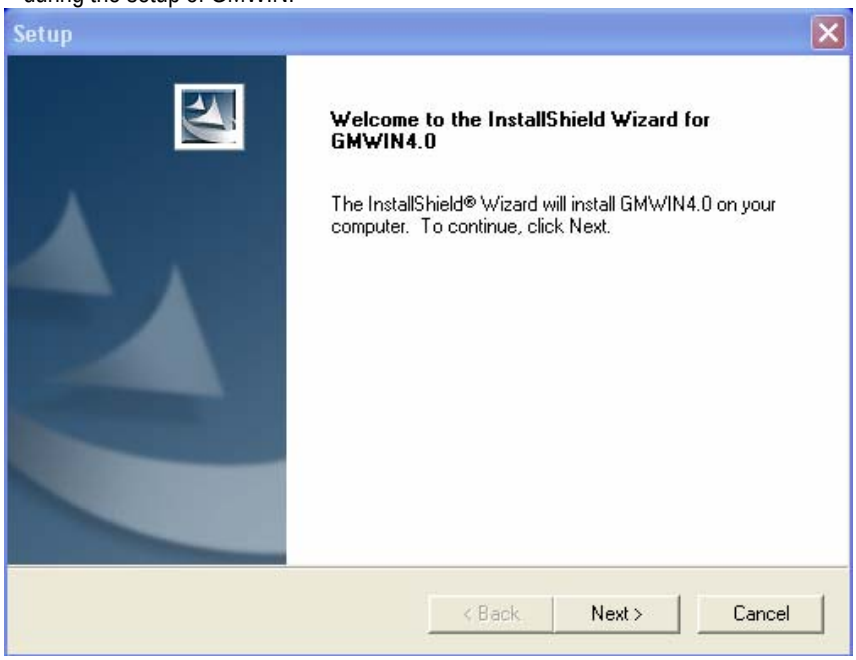
1.4 GMWIN Installation

To install GMWIN, double click “GMWIN 4” on the WINDOWS.

◆ The setup logo screen is displayed and setup wizard is ready to install.

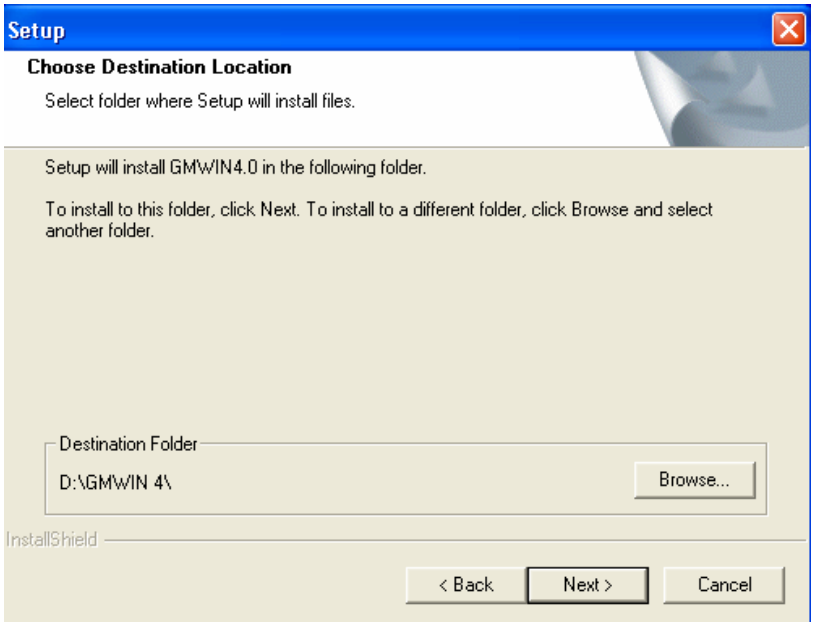


- A dialogue box showing the welcome message appears. It is required to exit other windows application programs during the setup of GMWIN.

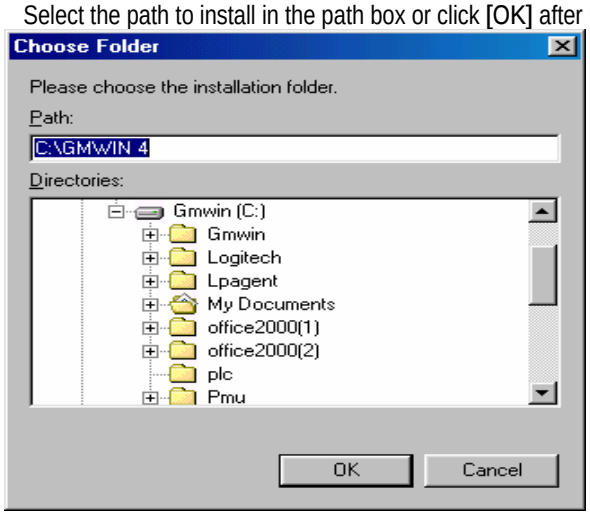


- Click [Next] to move the next screen.
- A dialogue box showing the path to install appears. The path to install is shown on the bottom of the screen. To change the path to install, click [Browse].

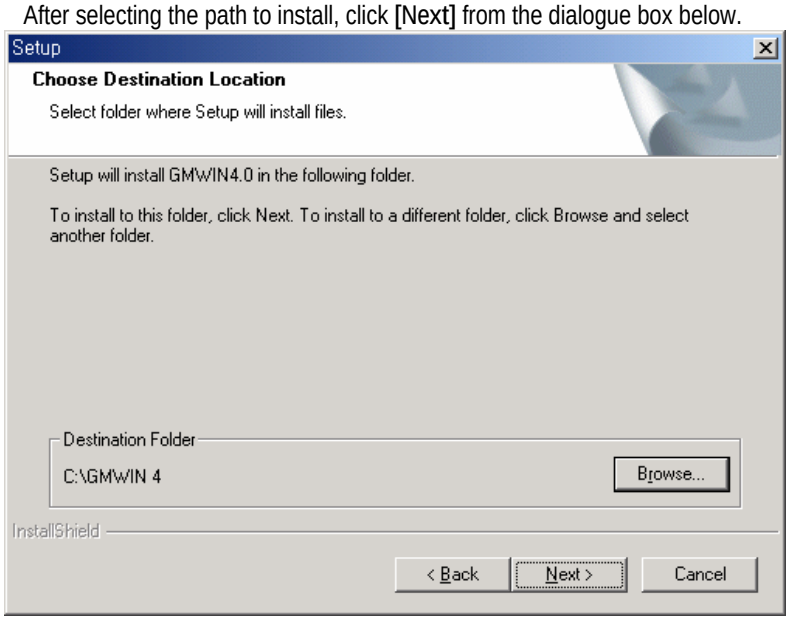
To stop the setup, you can click [Cancel] anywhere during setup. As it is in the state not installed completely, it is not available to execute GMWIN.



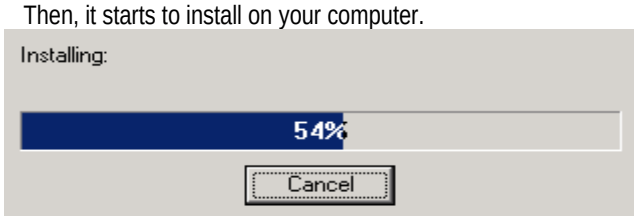
- If click [Browse] in the foregoing dialogue box, the dialogue box to input the path appears.
- Select the path to install in the path box or click [OK] after inputting it in the path name column.



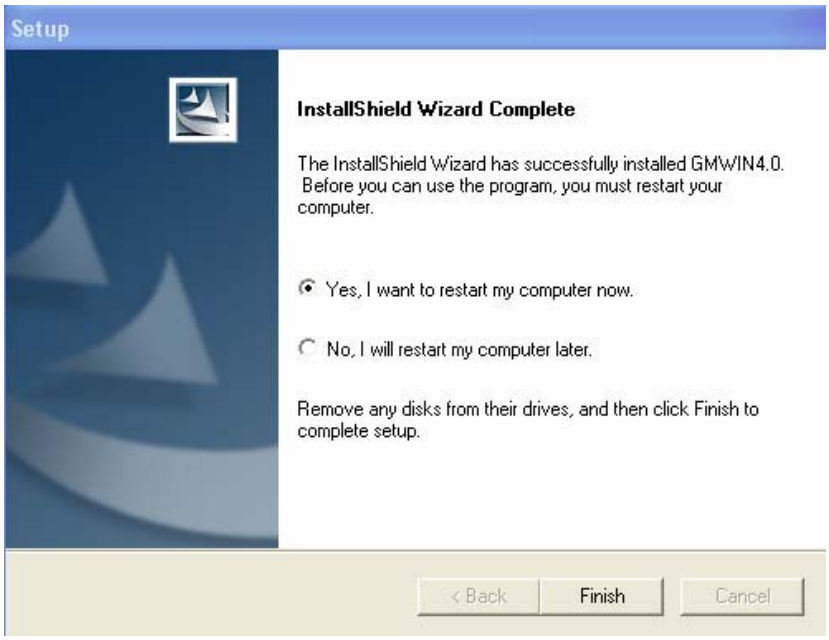
- After selecting the path to install, click [Next] from the dialogue box below.



- Then, it starts to install on your computer.



- If the install is completed, it is required to restart your computer. You have to decide whether to restart your computer now or later from the following screen.



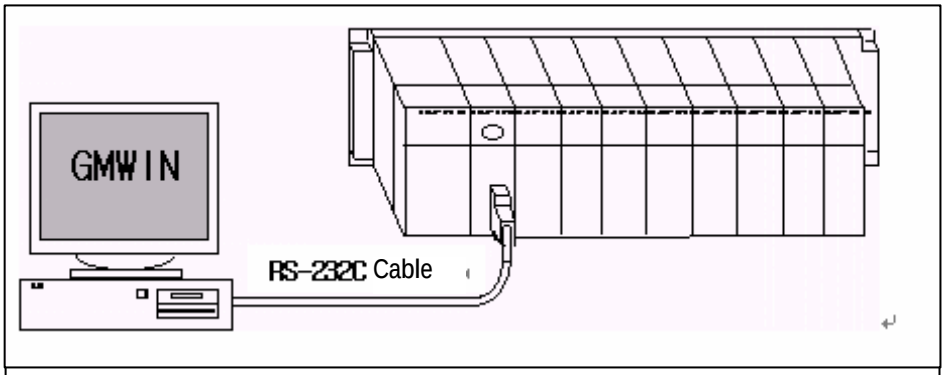
Shortcut icon is made on the desktop and GMWIN is registered below windows program menu.
Execute GMWIN items in the windows start menu or double click the shortcut icon.

1.5 How to connect with PLC

To connect GMWIN to PLC, it is required to determine 2 options – Method of Connection and Depth of Connection – in advance. For Method of Connection, there are 5 modes; connection by RS-232C, connection by modem, connection by communication module (GLOFA Fnet/Mnet for PC), connection by network (Ethernet), connection by USB and for Depth of Connection, there are 3 steps; local connection, remote 1 and remote 2. Connection option is available to set by selecting menu [Project]-[Option].

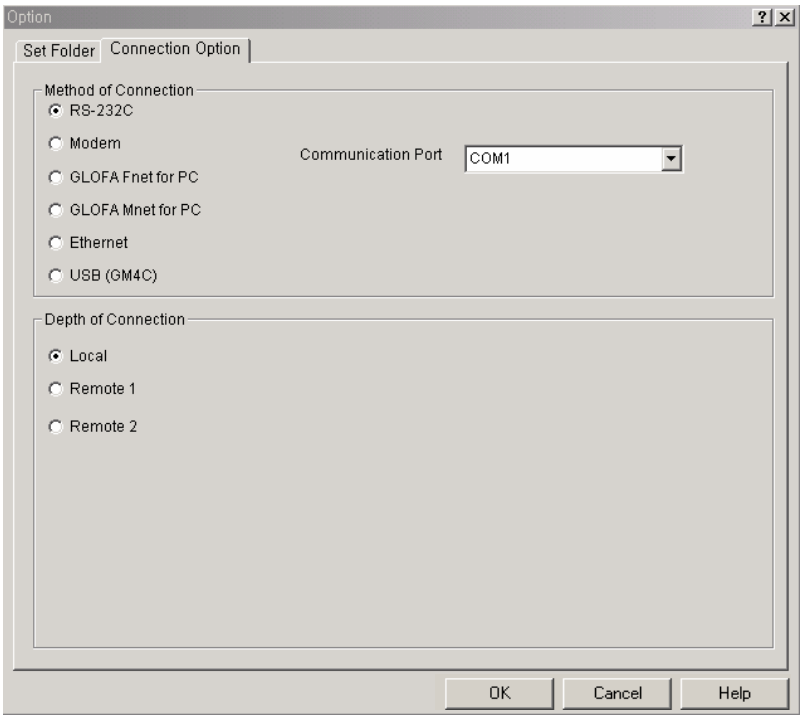
1.5.1 Local connection

Connect RS-232C connector between PLC and RS-232C COM Port as shown below.



Pin No.	GMWIN(IBM PC)	GLOFA PLC	Pin No.
1	DCD/CD	DCD/CD	1
2	RxD	RxD	2
3	TxD	TxD	3
4	DTR	DTR	4
5	COM/SG	COM/SG	5
6	DSR	DSR	6
7	RTS	RTS	7
8	CTS	CTS	8
9	RI	RI	9
9 Pin			9 Pin

- Select menu [Project]-[Option].
- Select tab [Connection Option].



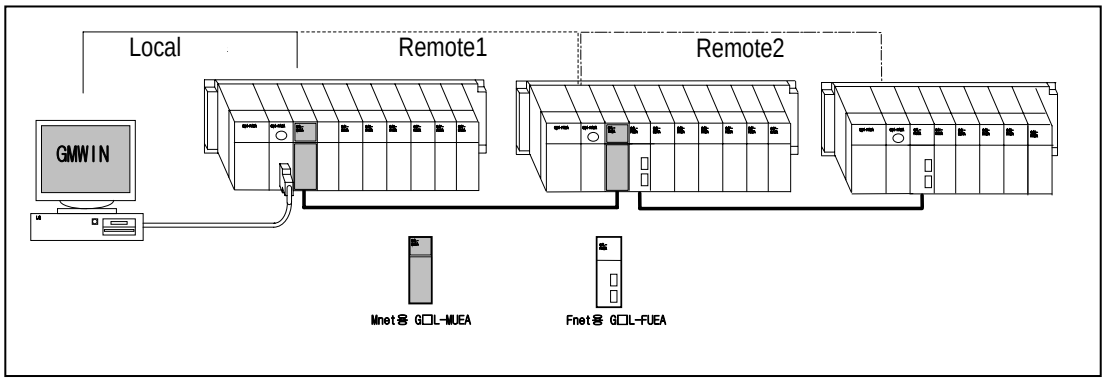
- Set 'RS-232C' in Method of Connection.
- Set 'COM1~COM4' communication port.
- Select 'Local' in Depth of Connection and press [OK].
- If selecting menu [Online]-[Connect], the RS-232C connection shall be done between PC and PLC.

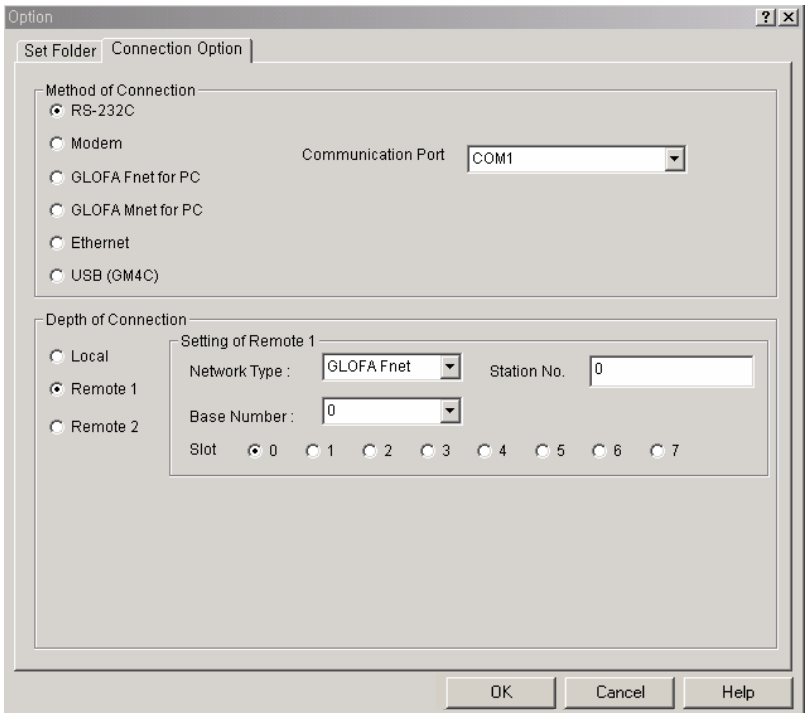
Point

1. As option maintains the value once changed, it is not necessary to set new option whenever you open the project again.
2. As default communication port is set as COM1 at the first setup of GMWIN V4.0, if the communication port connected is not COM1, it is required to connect after changing the communication port in the option.
3. For connection mode except RS-232C, it means the case to purchase communication module separately and connect. For further information, refer to '2.2.2 connection option' or each 'communication module instructions'.

1.5.2 Remote connection

Connect RS-232C connector between RS-232C COM Port of PC and PLC as shown below and compose the net by using a communication module between PLC and PLC.





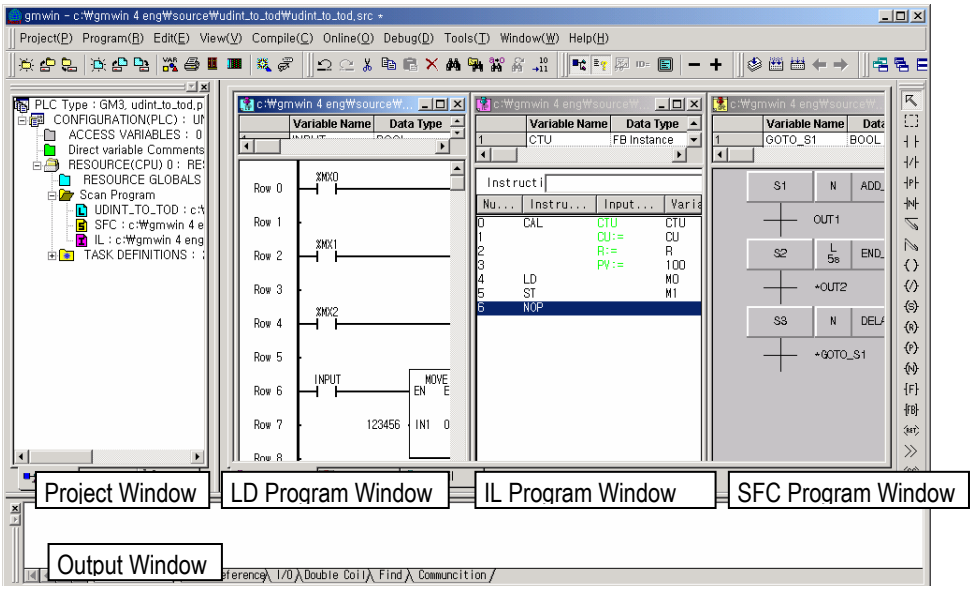
- Select RS-232C in the connection mode.
- Select COM1~COM4 communication port.
- Select Remote 1 and Remote 2 in Depth of Connection.
- Designate the used network type, the station number and the slot number which the communication module is mounted and press [OK].
- If selecting menu [Online-Connection], the remote connection is done between PC & PLC.

Point

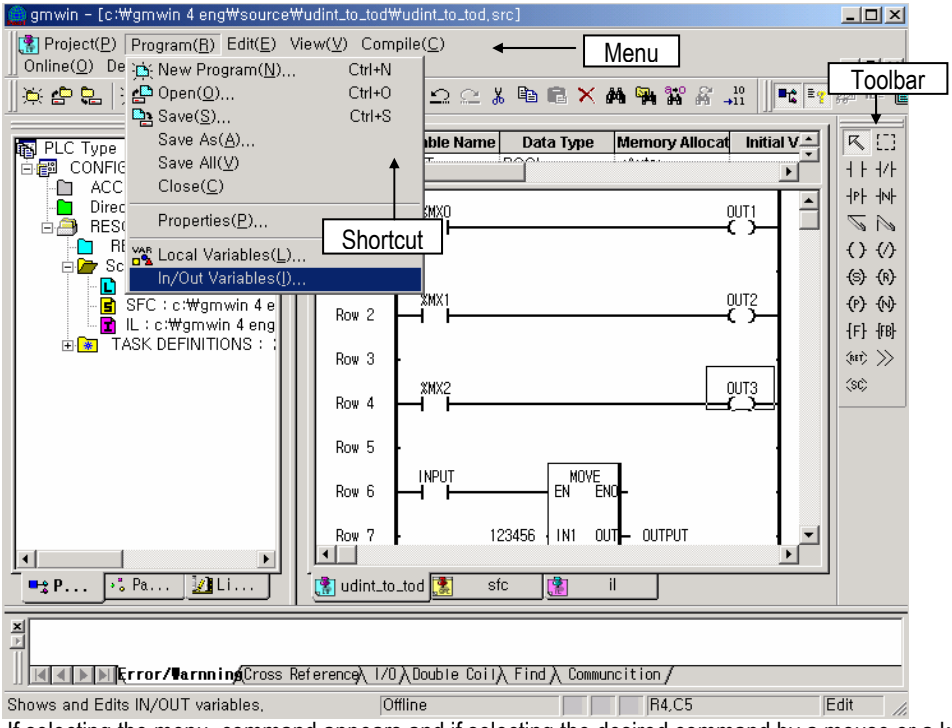
1. Remote connection shall be used to write, read and remote control a program by connecting to all PLC linked by network.
2. For further information, refer to Chapter 2.2 and each communication module instruction.

Chapter 2. Basic Usage

2.1 Screen Configuration



2.1.1 Menu configuration



If selecting the menu, command appears and if selecting the desired command by a mouse or a key, it runs.
If selecting the ellipsis (...) added command, the dialogue box of low order appears.
In case of menu with short-cut key (Ctrl+X, Ctrl+C...), press the short-cut key to select the command directly.

1) Project

Command	Description
New project	Creates a project for the first time.
Open	Opens the exiting projects.
Open Project from PLC	Uploads the project and program from PLC.
Save	Saves the project. Program is not available to save.
Save as	Saves the project as another name.
Close	Closes the project.
Open project bundle	Opens project bundle file.
Make project bundle	Bundles all file connected to the project as one file.
Add to project	Add new items (program definition, resource. task, library etc. resource is only for GM1) to the project.
M Area Edit	Edits M area or saves it.
Preview	Shows the screen to be printed in advance.
Print Project	Prints the items of the project
Print Program	Sets contents of the actuated program.
Printer Setup	Sets printer option.
Option	Sets GMWIN related option.
Previous project list	Opens the project worked in the previous time.
Exit	Finishes GMWIN.

2) Program

Command	Description
New program Ctrl+N	Creates a program for the first time.
Open Ctrl+O	Opens the existing program.
Save Ctrl+S	Saves the program.
Save as	Saves the program as another name.
Close	Closes the program.
Close all	Closes all program.
Properties	Replace the program properties.
Local variables	Edits the variable.
In/Out variables	In case of function/function block, it edits I/O variable.
Previous program list	Opens the program worked in the previous time.

Addition in case of SFC

Command	Description
Action list	In case of SFC, it shows action list.
Transition list	In case of SFC, it shows transition list.
Properties	In case of SFC, it designates the properties.

3) Edit

Command	Description
Undo Ctrl+Z	Cancels to edit on the program edit window and return to the forgoing status.
Redo Ctrl+Y	Restores the edit-canceled action again.
Cut Ctrl+X	Delete the drawn block and copy it to the clipboard.
Copy Ctrl+C	Draw the block and copy it to the clipboard.
Paste Ctrl+V	Copy the drawn block from clipboard to the edit window.
Delete Del	Delete the drawn block.
Find Ctrl+F	Finds the desired character.
Replace Ctrl+H	Finds the desired character and replace it with new one.
Replace Direct Variables	Replaces the desired direct variables.
Find next Ctrl+F3	Run repeatedly the previously executed 'Find'.
Go	Moves the cursor to the desired row.
Find in files	Finds the character from all file of the project or the desired path.
Toolbox	Uses the edit tool for each program.

Addition in case of LD

Command	Description
Delete line Ctrl+D	Deletes one line.
Insert line Ctrl+L	Inserts one line.
Insert cell Ctrl+I	Inserts one cell.

Edit tool for each program

In case of IL edit

Command	Description
Function F2	Function insert
Function block F3	Function block insert
Label F4	Label insert
Operator F5	Operator insert

In case of LD edit

Inserts the contact, coil, function, function block, jump, and return etc. which is corresponding to the menu.

In case of SFC edit

Command	Description
Step F2	Inserts step/transition.
Branch F3	Inserts the parallel or selection branch.
Action/transition F4	Inserts the action or transition.
Label F5	Inserts the label.
Jump F6	Inserts the jump.
Zoom F7	Enters into the action/transition and edits the program.

4) View

Command	Description
Toolbar	The user defines the toolbox.
Status bar	Shows or hides the status line.
Full screen	Enlarges the scope to indicate the program window to the overall screen.
Project	Shows or hides the project window.
Output	Shows or hides the result window.
Variable monitor	Shows or hides the variable monitor window.
I/O monitor	Shows or hides I/O monitor window.
Link parameter	Shows or hides link parameter window.
Zoom	Enlarges or reduces the screen.
Show Memory/ Comments	Shows or hides the variable comments.
Properties	Shows the registration information of the currently selected items.
Monitor Array.	Selects array no. of the variable declared as array.

In case of LD edit

Command	Description
Zoom	Enlarges or reduces the LD screen.
Show Memory/ Comments	Shows or hides the memory of variable and comments..

In case of SFC edit

Command	Description
Zoom	Enlarge or reduce the SFC screen.
Comments	Shows or hides the variable comments.
Action	Shows or hides the action.

5) Compile

Command	Description
Compile	Compiles the program.
Make	Compiles the program that is not compiled from the programs belonging to the project and then makes the PLC execution file.
Build All	Compiles all programs belonging to the project and then makes the PLC execution file.
Memory Reference	Shows the used global variable or direct variable.
Show Used I/O	Shows I/O use status table of direct variable.
Check Double Coil	Shows the used double coil.
Previous Message	Moves to the previous message position.
Next Message	Moves to the next message position.

6) Online

Command		Description
Connect+Write+Run+Monitor On (run) Ctrl+R		Connects the PLC designated in the option and writes the program prepared by the user to the PLC and then converts the mode and starts to monitor.
Connect		Connects GMWIN and PLC designated in the option.
Disconnect		Disconnect the connection of GMWIN and PLC.
Read		Reads PLC data.
Write		Writes GMWIN program to PLC.
Monitor On/ Off		Starts/finishes program monitoring.
PLC Mode	Run	Converts PLC mode.
	Stop	
	Sleep	
	Debug	
	Master convert	Converts CPU to communicate in GM1.
Reset	Data Clear	Clears PLC data as “0”.
	Reset	Resets PLC.
	Overall Reset	
Flash memory	Read	Reads flash memory type information installed in CPU or writes data to flash memory.
	Write	
	Mode	
PLC Info	System	Shows PLC information.
	Error/ Warning	
	History	
	I/O Module Fault	
	Base Units	
I/O Modules	I/O info	Shows/writes PLC I/O configuration status.
	I/O synchronization	Matches PLC I/O configuration with project & PLC.
I/O Forcing	Input	Sets forced I/O value/execution allowance.
	Output	
Network	Link Enable	Shows link module type, installed slot, station no.
	Info	Shows network information.
	Mnet parameter	Inputs Mnet parameter.
Comm Info		Shows sending/receiving information.
Online Edit	Start	Starts to edit in the run.
	Write	Writes the edit contents in the run.
	Cancel	Cancels to edit in the run.
FSM		Sets the data for fault of F-net slave module.
I/O Skip		Sets I/O to skip.
Fault Mask		Sets failure mask.
Initialize Special Module		Initializes special module.

7) Debug

Command	Description
Begin Debug	Converts to the debug mode and starts/finishes the debug.
Go Ctrl+F9	Runs to the break point
Step over Ctrl+F8	Runs by one step.
Step in	Debugs function/function block.
Step out	Step out the current block when debugging function/function block.
Pause	Stops running.
Run to Cursor Ctrl+F2	Runs to the cursor position.
Insert/Remove Breakpoint Ctrl+F5	Sets or removes break point.
Breakpoint List/Condition	Shows the set break point list and sets break condition.
Task Enable	Allows the task conversion in the debug.

8) Tools

Command	Description
Library manager	Edits library.
Start simulation	Starts simulator.
Data share	Shares monitor values with excel.

9) Window

Command	Description
New window	Opens new window against current window.
Cascade	Configures several windows belonging to GMWIN in tiers.
Title Horizontally	Configures several windows belonging to GMWIN horizontally
Title Vertically	Configures several windows belonging to GMWIN vertically.
Arrange Icons	Arranges icons belonging to GMWIN.
Close all	Closes all windows belonging to GMWIN.

10) Help

Command	Description
Contents	Opens GMWIN helpdesk.
Using Help	Opens how to use helpdesk.
LGIS Homepage	Connects to LG Industrial Systems homepage by internet.
About GMWIN	Displays GMWIN information.

2.1.2 Toolbar

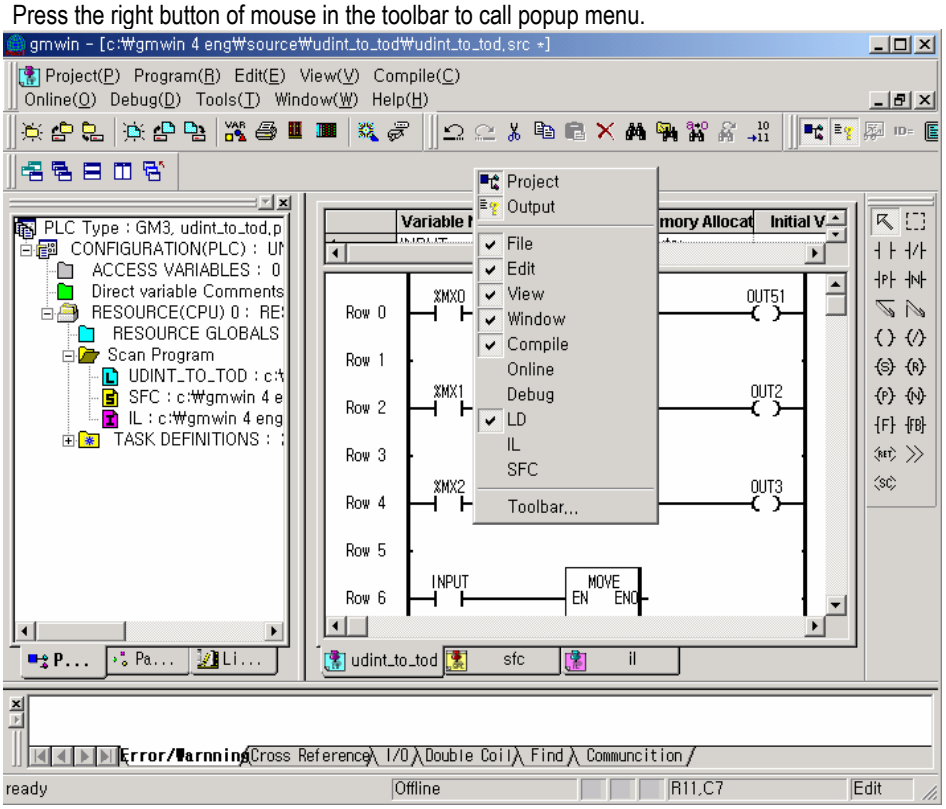
GMWIN provides the currently often-used menus as icons.
You may press the desired icon to run. The shape of each tool and explanation are shown below.

Tool	Command	Tool	Command	Tool	Command
	New project		Connect+Write+Run Monitor On		Make
	Open		Connect		Library manager
	Save		Disconnect		Start Simulation
	New program		Write		Redo
	Open		Monitor On/Off		Find from files
	Save		Run		Go To
	Local variables		Stop		Title Vertically
	Undo		Pause		Close all
	Cut		Begin Debug		Project Window
	Copy		Go		Output Window
	Paste		Step over		Variable Monitor
	Delete		Step in		I/O Monitor
	Find		Step out		Zoom Out
	Replace		Pause		Zoom In
	Find Next		Run to Cursor		Print
	Compile		Insert/Remove Breakpoint		New Window
	Full screen		Write in Online Edit		Tiered configuration
	Previous Message		System		Title Horizontally
	Next Message		I/O information		PLC history
	Online Edit Start		Data share		

Point

Add/remove toolbar

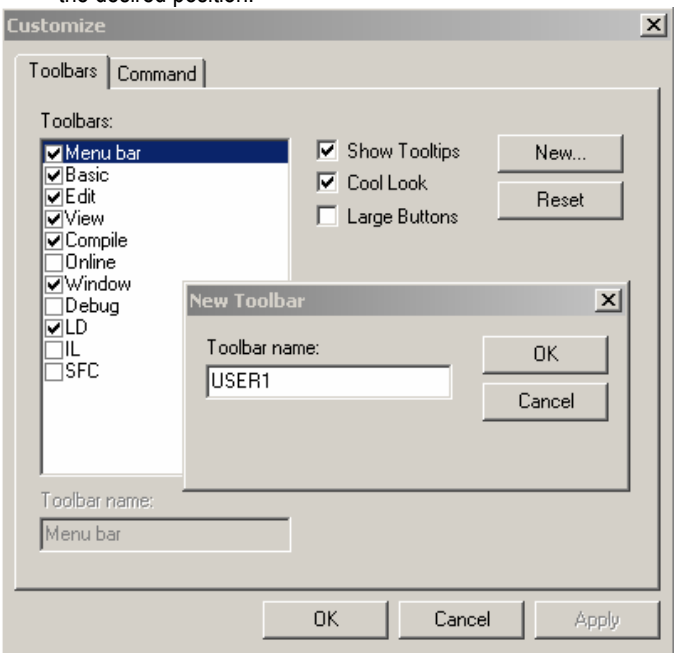
◆ Press the right button of mouse in the toolbar to call popup menu.



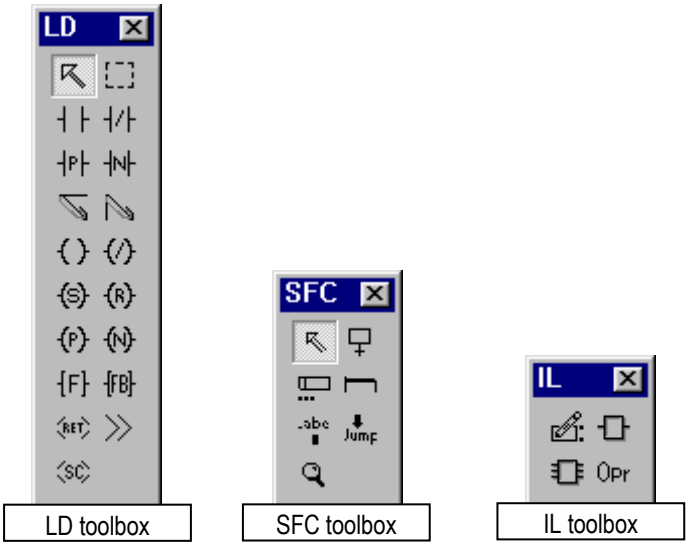
User defined toolbar

◆ Menu [view]-[Toolbar]-[New Toolbar] selection

After inputting the name of new toolbar, put the desired icon on the newly made toolbar and dock it on the desired position.



2.1.3 Toolbox

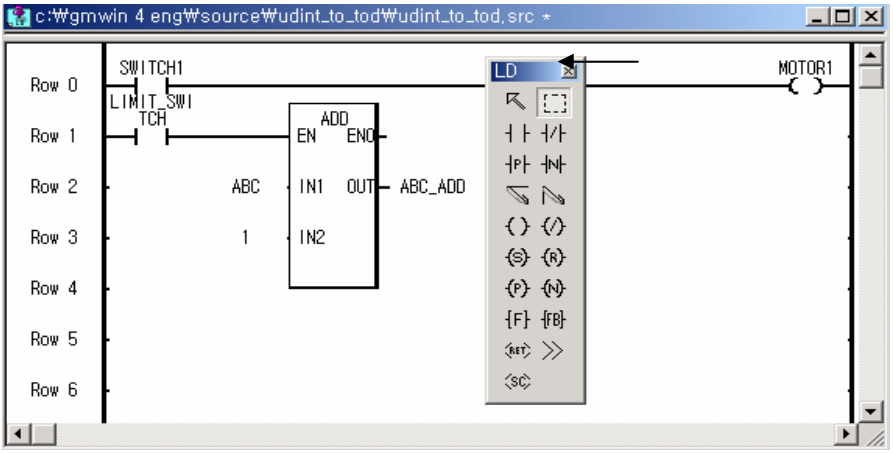


You can execute the command using often when program editing through toolbox. Press the desired tool by a mouse to execute. The previously set tool is available to run through menu [Edit]-[Toolbox].
You can adjust the position of toolbox and the appearance on the screen by selecting menu [View]-[Toolbar] or using a popup menu.

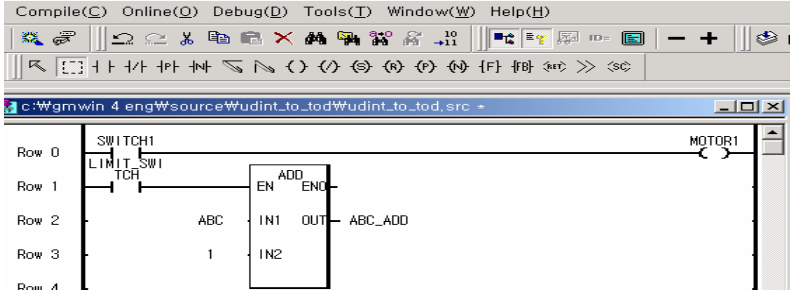
Point

How to change the toolbox position

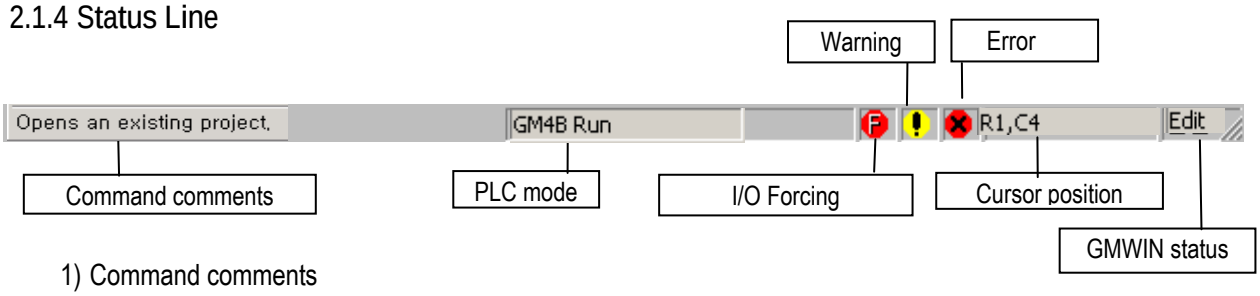
◆ Drag the ↙ indicated part to the desired position by a left button of a mouse.



◆ For example, if dragging to the upward, the toolbox moves as below.



2.1.4 Status Line



1) Command comments

Indicates the explanation for the reversed menu or command, and the mouse positioned toolbar.

2) PLC mode

Indicates PLC mode.
If not connected to PLC, it is indicated as off-line.
Offline-run-stop-pause-debug

3) Forced I/O setting

In case of setting I/O Forcing, it is indicated a

4) Warning

In case of abnormal status (warning) occurrence to PLC, it is indicated a

5) Error

In case of abnormal status (error) occurrence to PLC, it is indicated a

6) Cursor position

Indicates the cursor position when program editing.

7) GMWIN status

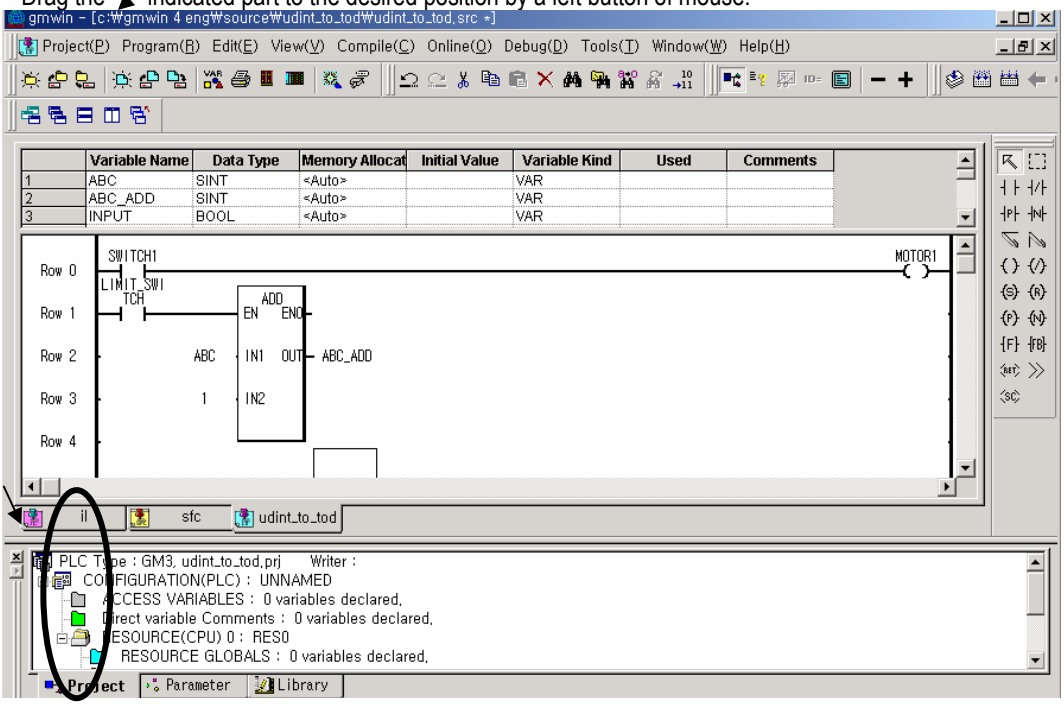
Indicates GMWIN status.
Edit: Indicates 'in the way of program edit in GMWIN'.
Monitor: Indicates 'in the way of monitoring the PLC data'.
Debug: Indicates 'in the way of debugging the PLC program'.

2.1.5 Docking of windows

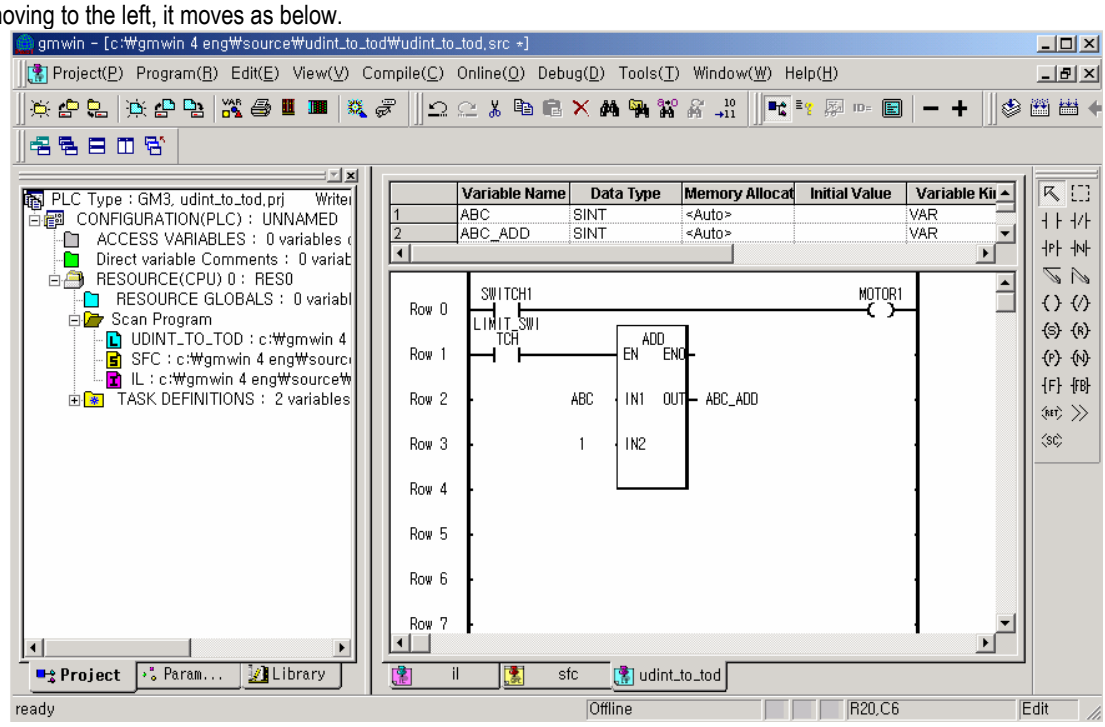
The window (project window, output window etc.) to see from view menu is composed of the window available to dock. You can adjust the desired position and size by using a mouse. And you can hide the window if you don't want to show.

1) Position move

◆ Drag the ↙ indicated part to the desired position by a left button of mouse.

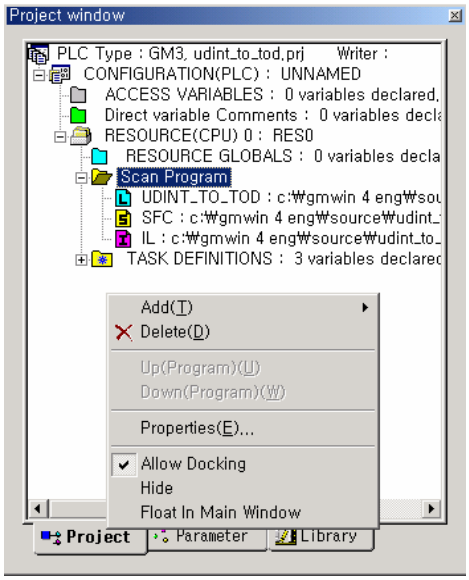


If moving to the left, it moves as below.

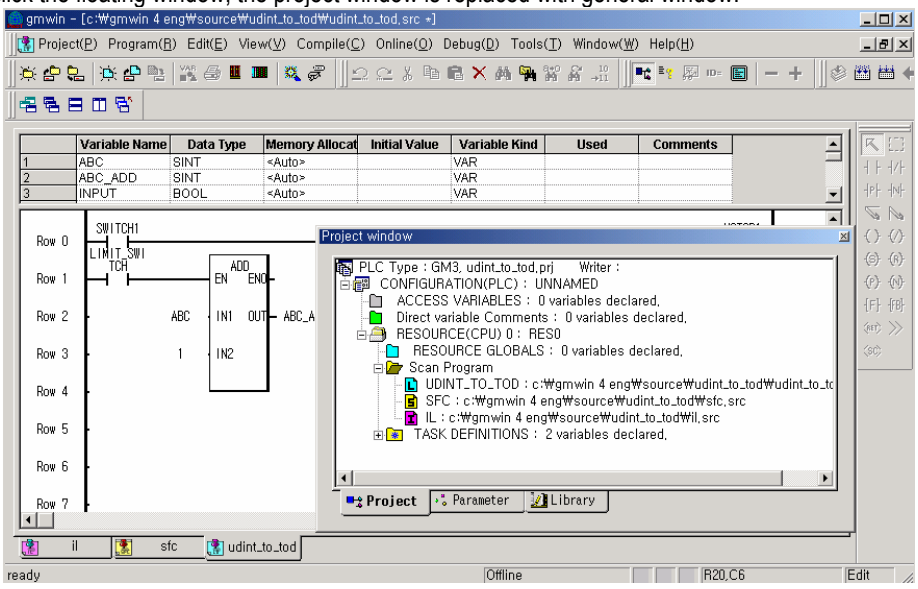


2) Float In Main Window

◆ Press the right button of mouse from the current window to select popup menu.



◆ If click the floating window, the project window is replaced with general window.

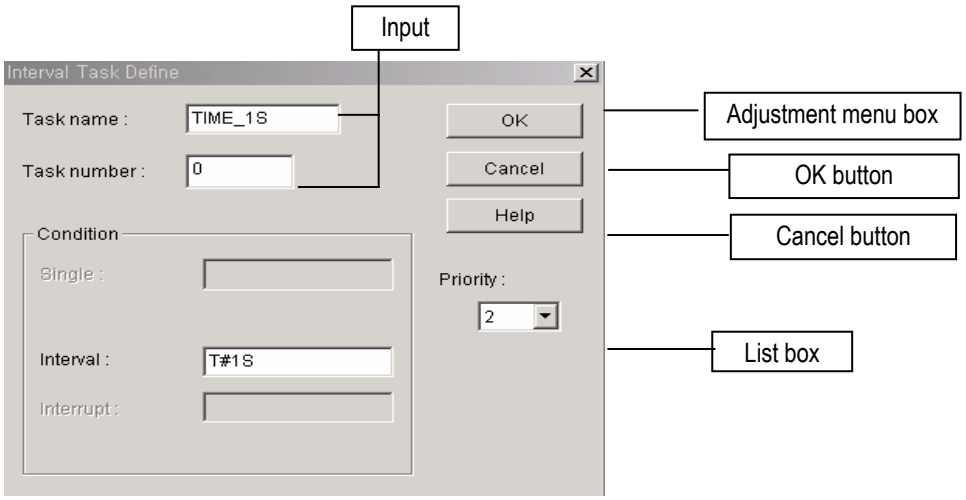


3) Hide

◆ Press the right button of mouse from current window to select [Hide] from popup menu.
If Project window disappears, you have to select menu [View]-[Project] to see again.

2.1.6 How to use dialogue box

In dialogue box, there are input column, OK button, option selection, list box etc. The user can input or set the desired value.



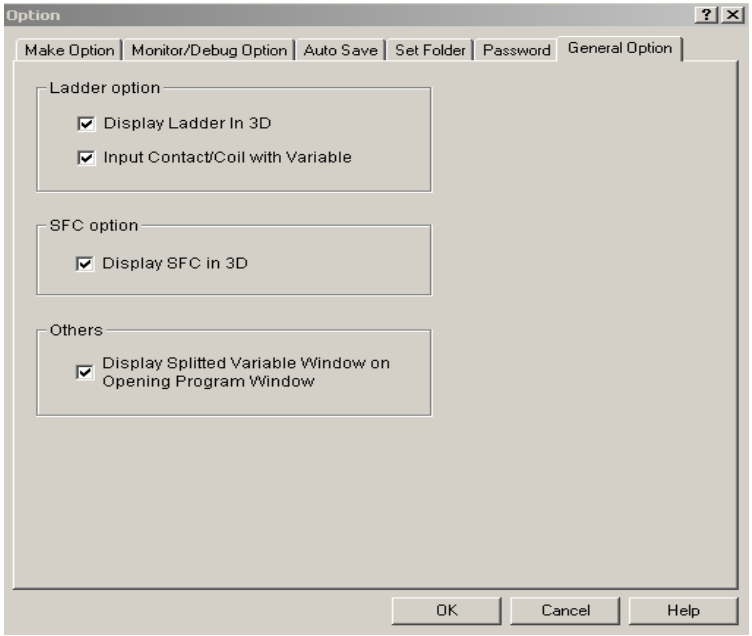
Input: Input the desired character by using a key.
Option: Use this option when selecting only one from the same group.
Press the desired items by a mouse.
List box: Select one from several lists.
Press the arrow of list box to display the list and then click the desired items to select.
OK button: Click [OK] to close the dialogue box after input the set value.
Cancel button: Click [Cancel] or double click the adjustment menu box to cancel the set value and close the dialogue box.

2.2 Option

2.2.1 General option

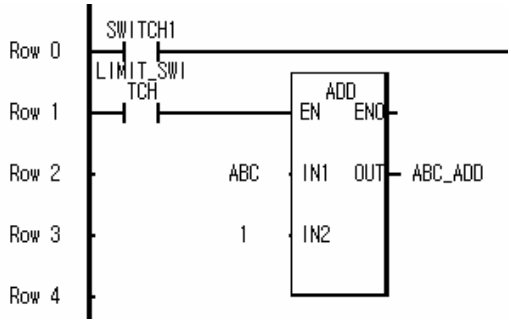
In general option, it is available to set ladder option, SFC option, general option.

◆ Select menu [Project]-[Option]-[General Option].

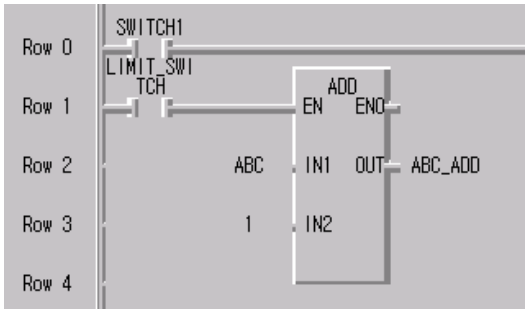


1) Ladder option

- Available to set ladder screen and input mode.
- If selecting [Display Ladder In 3D], you can see the 3D type ladder screen.



General ladder

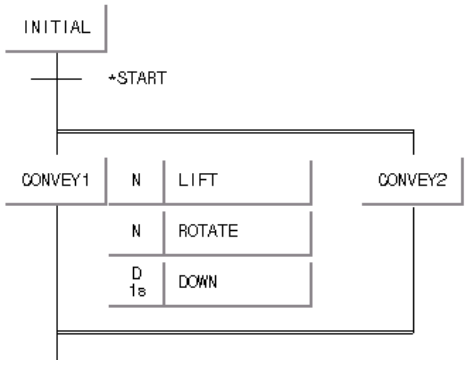


3D ladder

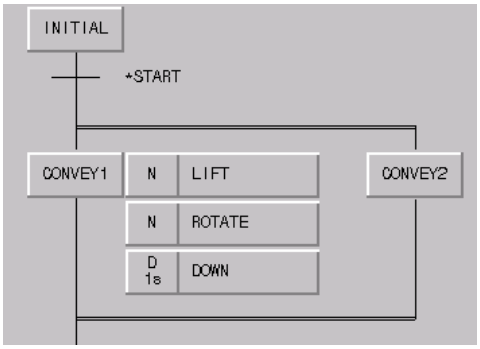
- If selecting [Input Contact/Coil Variable] a dialogue box that selects the variable if inserting contact/coil when LD program input, appears. This is useful if input the name of variable together whenever input the contact/coil.

2) SFC option

- Available to set the SFC screen display mode.
- If selecting [Display SFC In 3D], you can see the 3D type SFC screen.



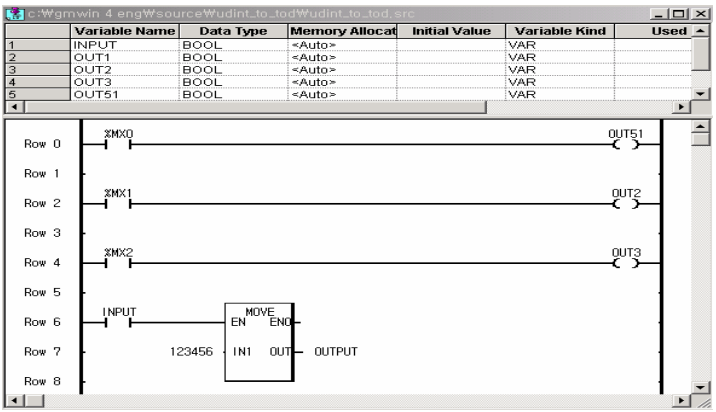
[General SFC]



[3D SFC]

3) General option

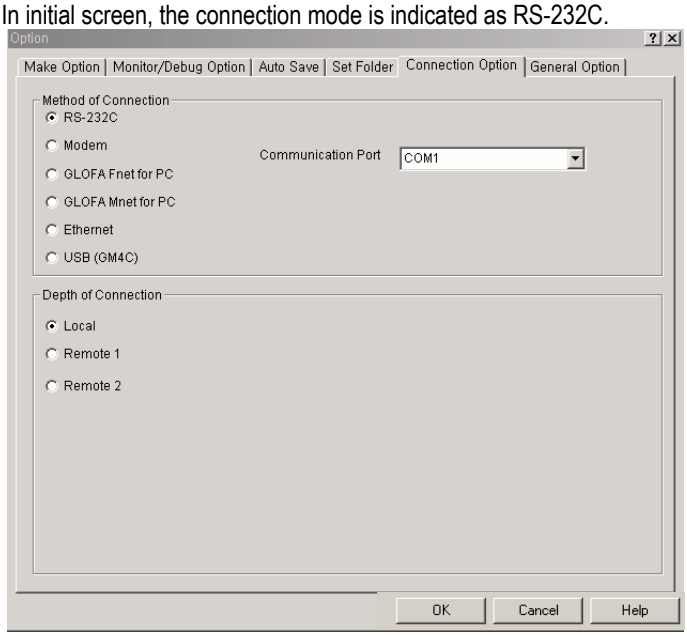
- If selecting [Display Variable Split windows], the variable window is shown on the top together when open the program window.



2.2.2 Connection option

It is required to set communication port (COM1~4) to communicate with PLC.

- Select menu [Project]-[Option]-[Connection option].
- In initial screen, the connection mode is indicated as RS-232C.

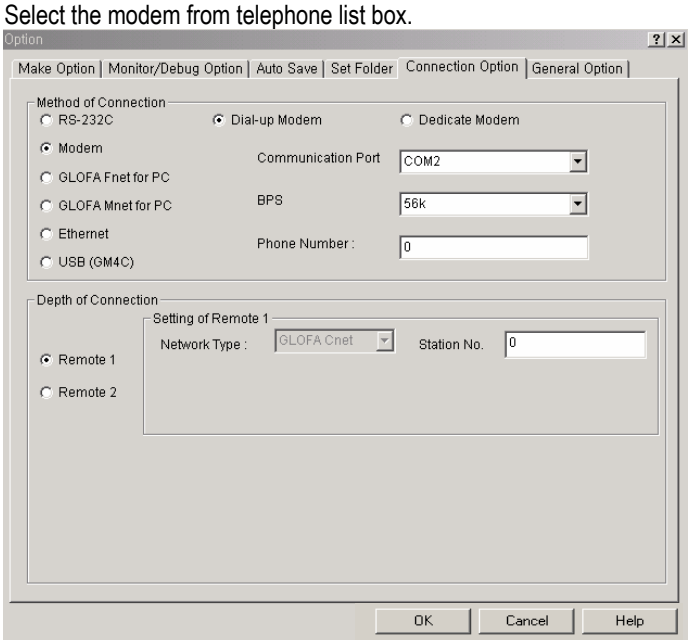


1) Connection by serial communication

- Select [RS-232C] from serial communication list box.
- Select [Communication Port] according to the environment and then, press [OK].

2) Connection by Modem

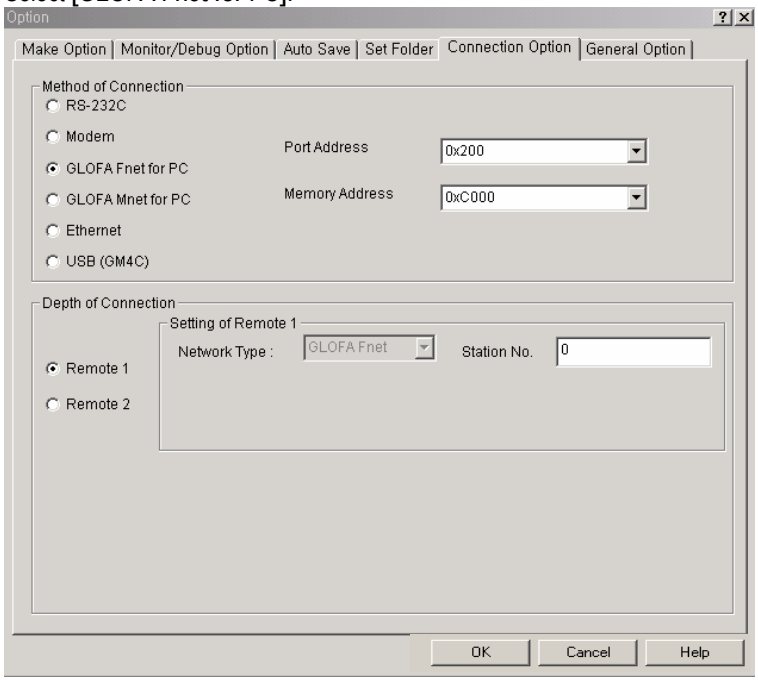
- Select the modem from telephone list box.



- Select the modem installed communication port from [Communication Port] list.
- Select the transfer speed that the user's modem supports from [BPS] list.
- After input the telephone no. of partner station to connect in the telephone no. input window, click [OK].

3) Connection by GLOFA Fnet for PC

- Select [GLOFA Fnet for PC].



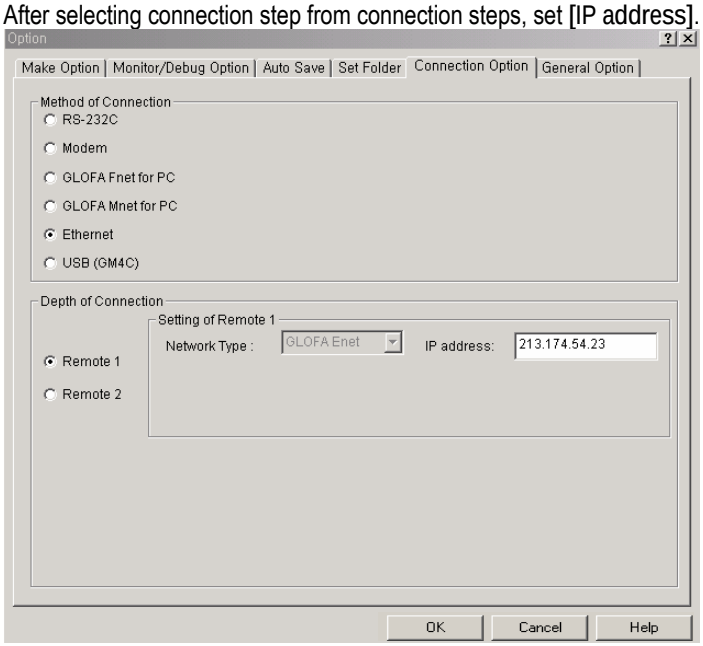
- Select the suitable port address from [Port Address] list.
- After selecting the suitable memory address from [Memory Address] list, click [OK].

4) Connection by GLOFA Mnet for PC

- Select [GLOFA Mnet for PC].
- Select the suitable port address [Port Address] list.
- After selecting the suitable memory address from [Memory Address] list. Click [OK].

5) Connection by Ethernet

- Select [Ethernet].
- After selecting connection step from connection steps, set [IP address].



Point

Major items when linking computers

Items	Standard	
Serial communication Channel	RS-232C 1 channel	Based on RS-232C standard spec.
	RS-422/485 1 channel	Based on RS-422/485 standard spec
Protocol action by user definition	After the user write communication frame by Frame Editor and download it to the link module, controls the communication protocol by F/B of the user program.	
PLC interface	Queue Access mode through 32K common RAM	
Communication protocol	Dedicated protocol	Multi drop/1:1 mode communication support by LGIS dedicated protocol
	PADT protocol	PLC remote control thru PADT using PADT protocol of GLOFA PLC.
	User defined protocol	Download using frame editor (sets RS232C and RS422 independently)
Data type	7 or 8	Sets in editor and download. (Sets RS232C and RS422 independently)
	1 or 2	
	1	
	Even/Odd	
Channel selection	Select Independent Channel/Dependent Channel in Editor	
Synchronization mode	Supplement Synchronization Type	
Transfer rate (BPS)	300/600/1200/2400/4800/9600/19200/38400 selection	
Modem communication	Available to connect to RS-232C channel	
System configuration	1:1, 1:N, N: M (N + M ≤ 32)	
Transfer distance	RS-232C: max. 15M (available to extend by Modem)	
	RS-422: max. 500M	
Diagnosis function	Loop-Back Test Mode	Test1/Test2 Mode
	Action status indication thru 16 LED display in the Run.	

2.2.3 GMWIN related directory setting

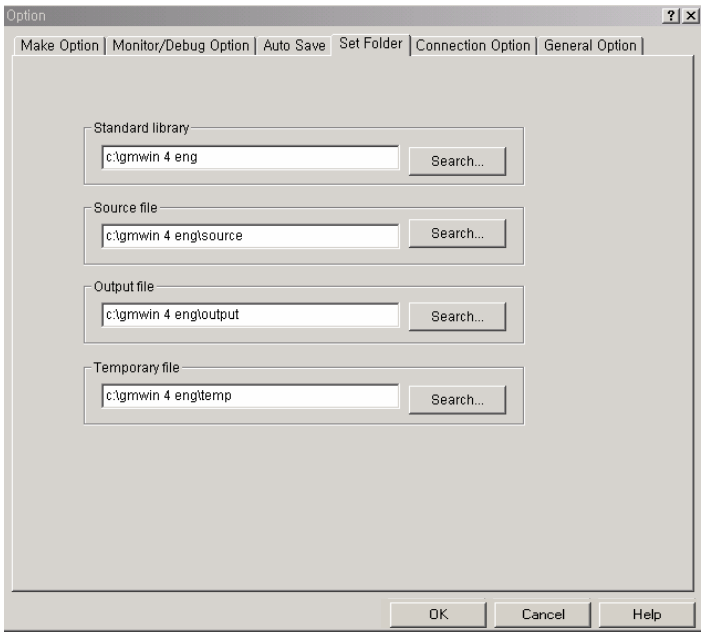
If setup the GMWIN, folders will be set automatically in the setup directory.
Available to use by changing 4 default directories.

- Standard library directory: a directory where library for GMWIN is located and user defined library is stored.
- Source file directory: a directory to store source program files such as various program, user-defined function/ function block etc.
- Output file directory: a directory to store the object file that is created when source file is compiled.
  In GMWIN V4.0, when creating a project output folder of the project name is created in the project folder.
- Temporary file directory: a directory to store various temporary file that is created in the run of GMWIN.
- Select menu [Project]-[Option]-[Set Folder].

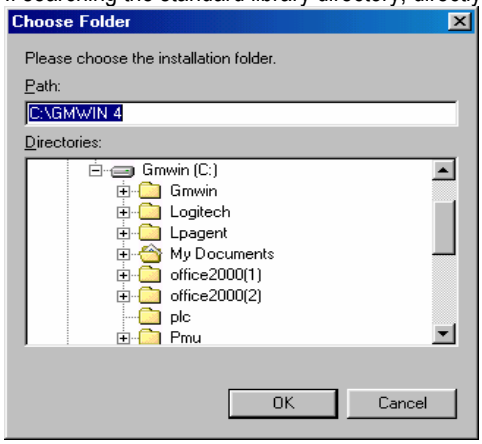
Point

Directory creation in GMWIN V4.0

- In GMWIN V4.0, Project folder is created as the name of each project under source folder and output folder is created under each project folder.
- In GMWIN V4.0, output folder is not necessary separately but it is required to set a directory to be compatible with GMWIN V3.x.

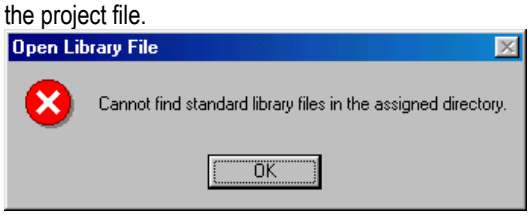


◆ If searching the standard library directory, directly input the directory or click [Search].



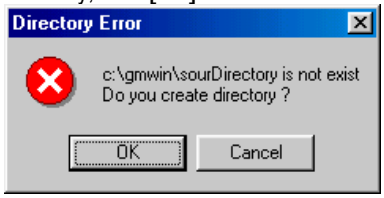
◆ After selecting the directory, click [OK].

◆ If standard library does not exist in the designated directory, the error message appears as below when opening the project file.



◆ After selecting the directory of source file, click [OK].

◆ If the selected directory does not exist, the message appears as below. If the user wants to create the selected directory, click [OK] and if the user does not want to create the directory, click [Cancel].

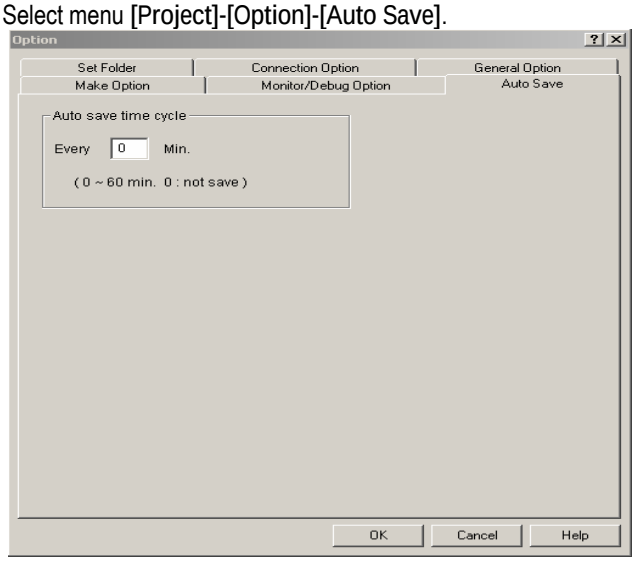


◆ The selection of Output file/temporary file directory is the same as source file directory selection.

2.2.4 Auto Save

Sets the time interval to save project and program automatically.
The file saved automatically shall be saved as the extender of ". ASV" in the directory where that program file exists and if close the program window, it is deleted automatically. Therefore, if program error occurs before saving the program, it is available to restore by calling the automatic save file.

- Select menu [Project]-[Option]-[Auto Save].

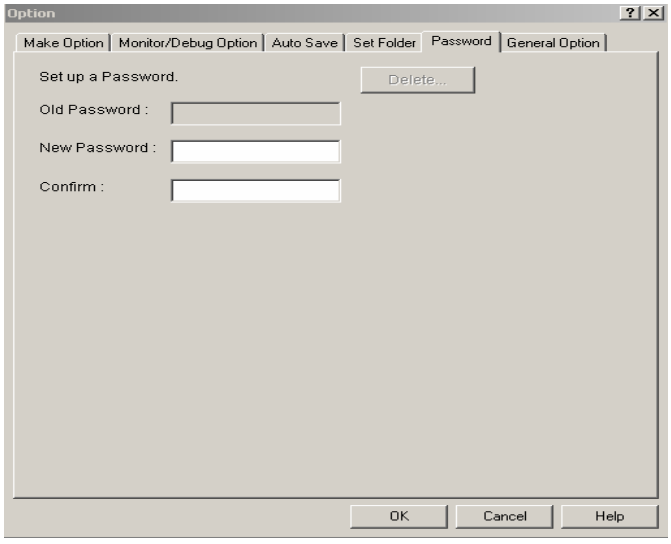


- Sets the auto save time interval. (Available from 1 to 60minutes, and if input "0", it does not save automatically.)
- Click [OK].

2.2.5 Password

Sets the password to PLC.

- Select menu [Project]-[Option]-[Password]. (Available only in the condition of online connection with PLC.)



- After selecting [Password] tab, input the previous password, new password, password confirm.
- Click [OK].

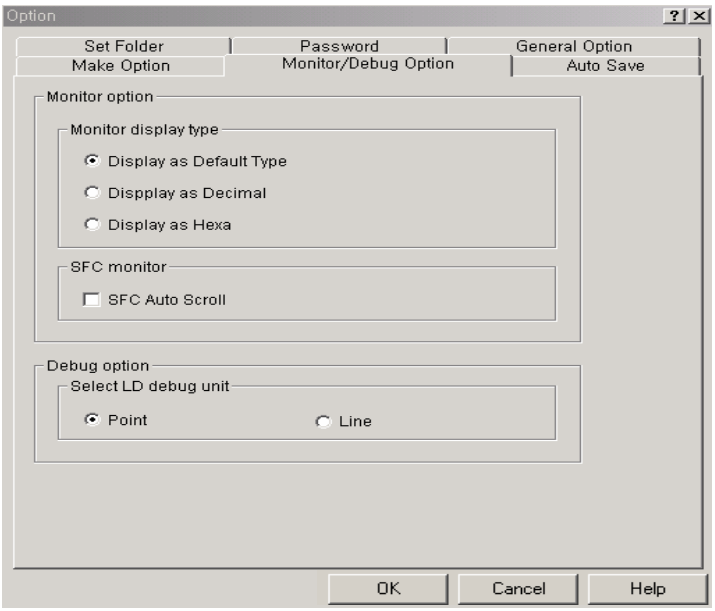
To cancel password set,

- Click [Cancel].

2.2.6 Monitor/Debugger option

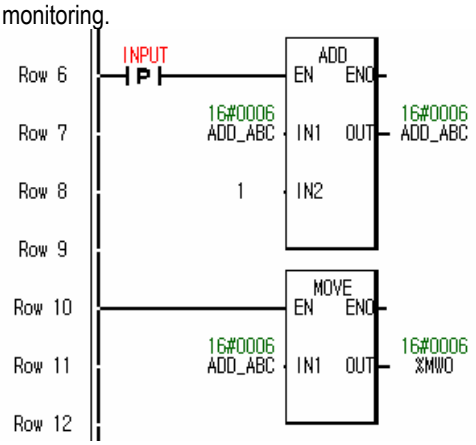
Available to set various options related to monitor.

◆ Select menu [Project]-[Option]-[Monitor/Debug Option].



◆ After selecting the desired display type from monitor display type, click [OK].

Ex) if selecting monitor display type as [Display as Hexa], the monitor value of variable is displayed as hexa like “16#*” when monitoring.



(1) SFC monitor

◆ If selecting [SFC Auto Scroll], scrolls automatically according to monitoring position when SFC monitoring.

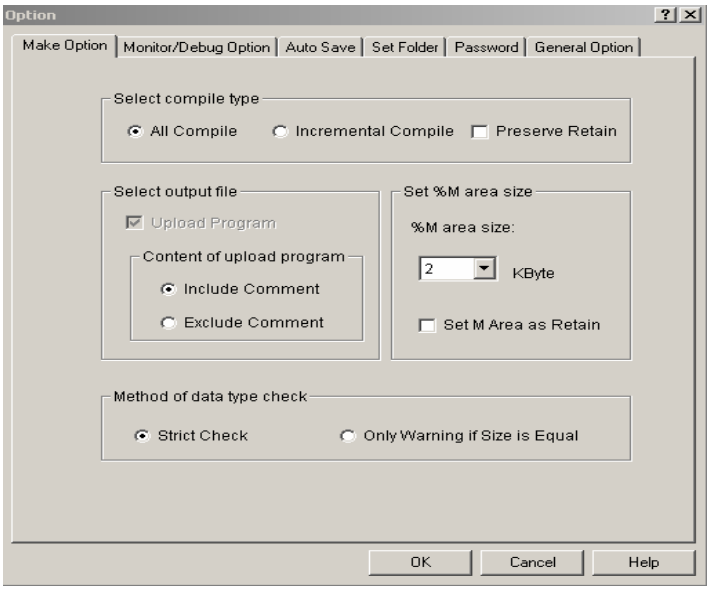
(2) Debug option

◆ The user can select the debugging by point and line according to the desired type when LD debugging.

2.2.7 Make option

Available to set compile type selection, output file selection, %M area size etc.

- Select menu [Project]-[Option]-[Make Option].



Compile type selection option

- Available to set the method to compile the user prepared source program.
- If selecting [All Compile] from Select compile type, it compiles again from the beginning regardless of editing of source program.
- If selecting [Incremental compile] from compile type selection, it compiles only the changed part of source program based on the previously compiled information.

Output file selection option

- Available to select whether or not to create upload program from output file selection, when making.

%M area size option

- Available to select %M area size and set the retain for %M area.

Method of Data Type Check

- When compiling, if the variable data size is same and different in the variable data type, the warning occur without the error.

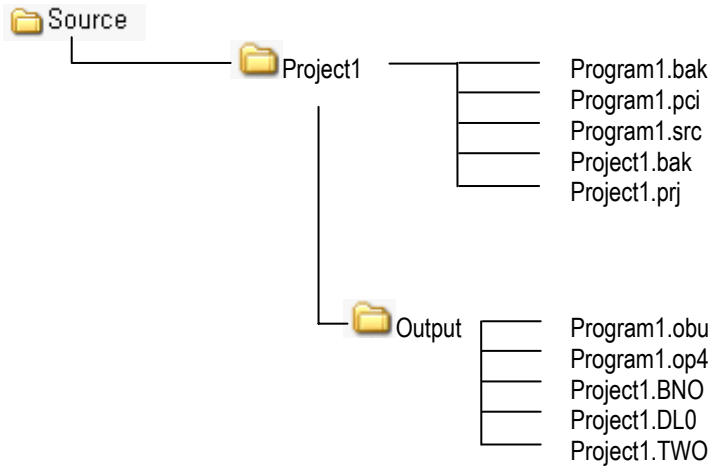
2.3 File created in GMWIN

If the user creates the project and edits the program and makes the PLC execution file, the file is made as follows:

File name	Description
<Project name>.PRJ	The user prepared project file
<Bundle file> .MUK	Bundle file for the project
<Project name>.BN0	PLC execution file In case of GM1, it creates as much as the number of resource. <Project name>.BN0 ~ <project name>.BNi, (i : number of resource)
<Project name>.MON	Information file for monitoring
<Project name>.CR0	Creates when making memory reference execution file. Text file that indicates the global variables and direct variables used for each program (Cross Reference)
<Project name>.DL0	Upload file
<Project name>.EW0	File for online edit
<Project name>.INF	File for monitor and debug
<Project name>.TW0	File to online edit.
<Project name>.VAR	File to preserve the user designated variables from variable monitor
<Program name>.SRC	The user prepared program file
<Program name>.ASV	The user prepared program is saved periodically as this name. This file is created only in case of setting the time value in the menu [Option-Auto save] and deleted automatically if close the program window normally.
<Program name>.PCI	Partial compile information file
<Program name>.PCB	PCI Backup file
<Program name>.MPS	Data ram file of simulator
<Program name>.OP?	Created when compiling the program. (In case of program block)
<Program name>.OB?	Created when compiling the program. (In case of function block)
<Program name>.OF?	Created when compiling the program (in case of function) (OP3: in case of GM3, OP4: in case of GM4)
<Program name>.SP?	Created when simulation compiling the program. (In case of program block)
<Program name>.SB?	Created when simulation compiling the program. (In case of function block)
<Program name>.SF?	Created when simulation compiling the program. (In case of function)

Point

Directory construction in GMWIN V4.0 is as follows.
(Ex) Project name: Project1.prj, Program name: Program1.src



Chapter 3. Program example

3.1 How to make Project and open Program

It is available to learn how to use GMWIN generally through program example. The overall flow chart is as follows:

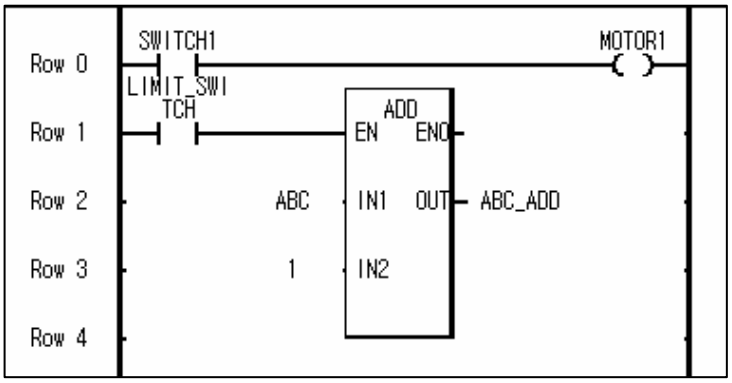
How to make Project

Project file name	Car engine line
PLC type	GM3
Writer	Hong Gil-dong
Project comments	Welding processing of car engine line

How to make Program

Instance name	Welding
Program file name	Robot
Program type	Ladder Diagram
Conducting condition	Scan program
Program comments	Welding robot & line control

How to do Programming



How to Compile/Make — Makes execution file through compile/make

How to write Program — Writes the program to PLC.

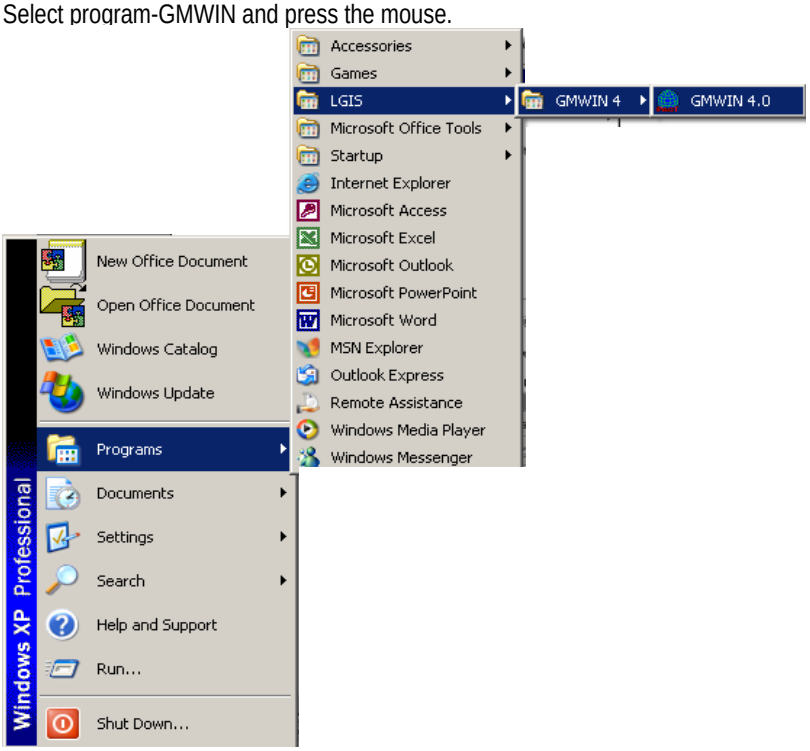
How to operate Program — Changes the PLC mode with “run”.

How to monitor Program — Checks the action status by program monitoring.

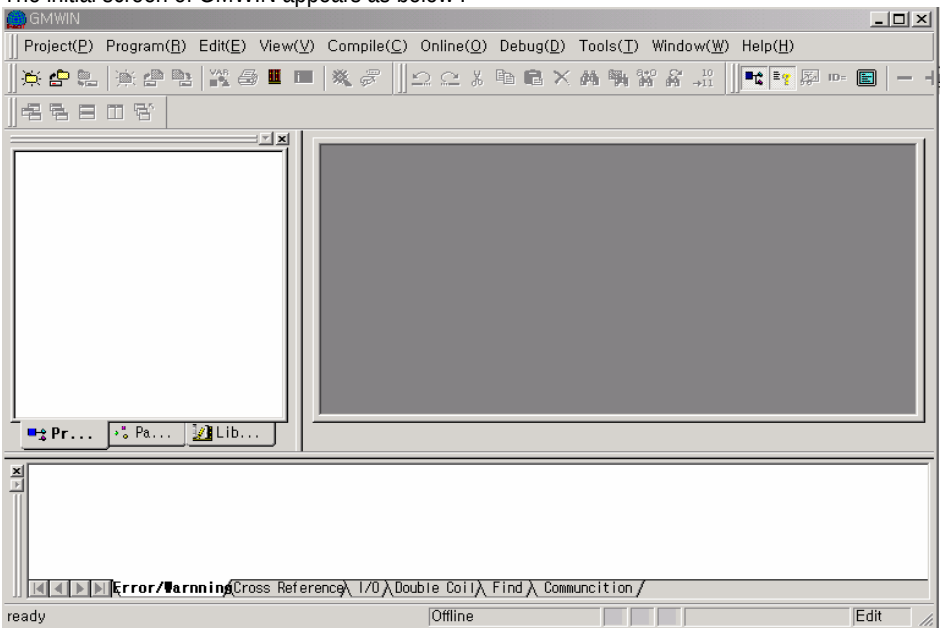
<Working flow chart of program>

3.1.1 How to execute GMWIN

- Press the start menu  of windows.
- Select program-GMWIN and press the mouse.



- The initial screen of GMWIN appears as below :

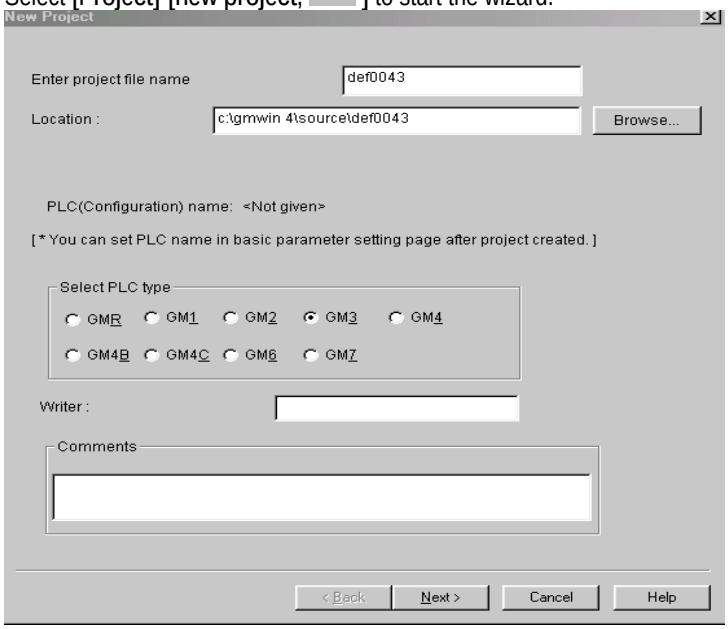


Point

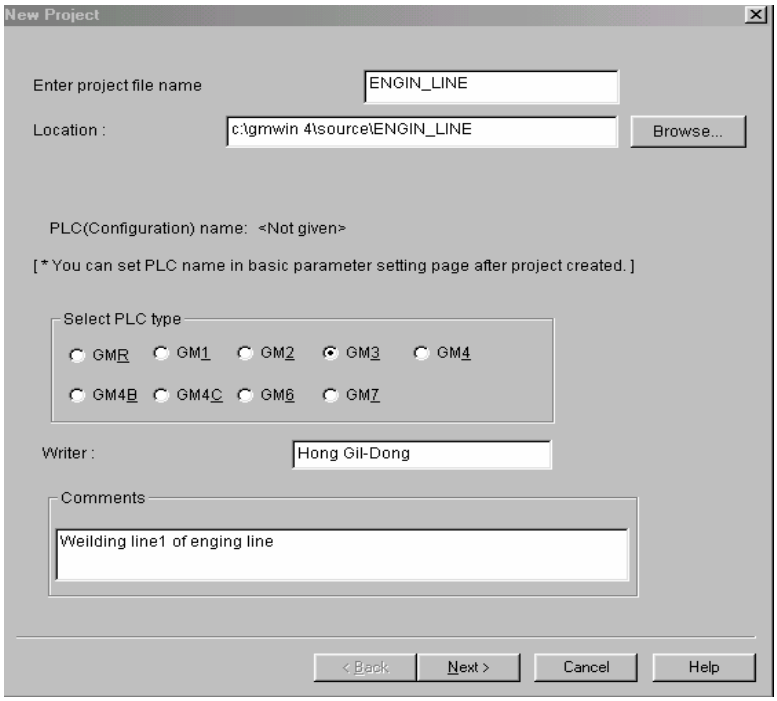
If used GMWIN previously, the final working project and program will be open.

3.1.2 How to make Project

◆ Select [Project]-[new project,] to start the wizard.

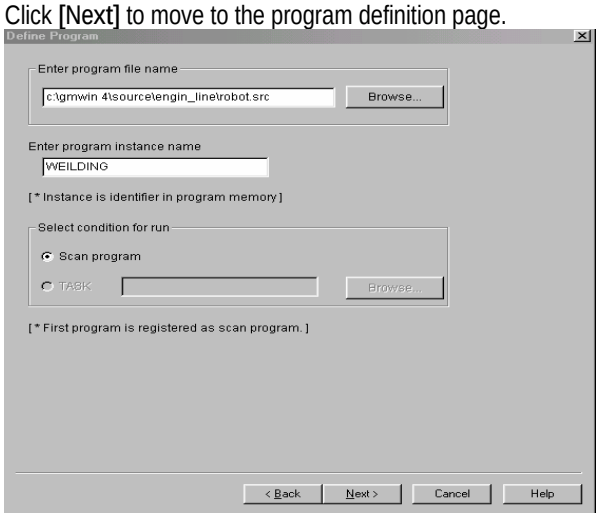


◆ Input as the followings in the input column of the generated new project.

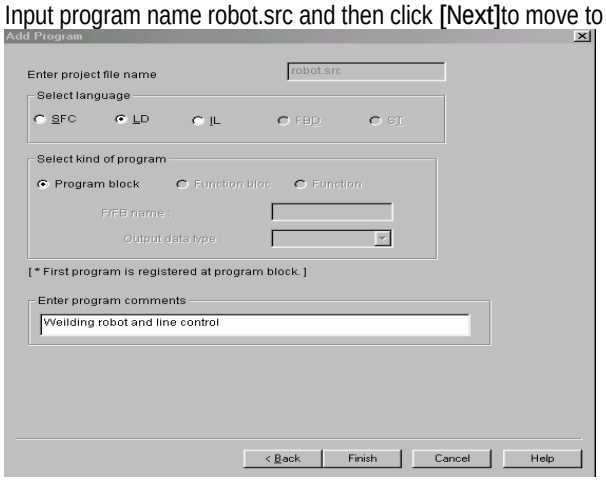


3.1.3 How to make Program

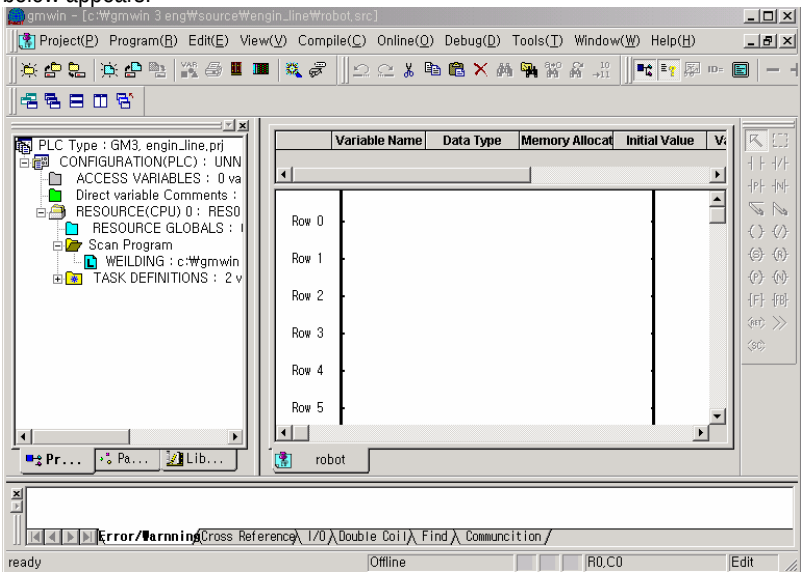
- Click [Next] to move to the program definition page.



- Input instance name
- Input program name robot.src and then click [Next]to move to new program page.



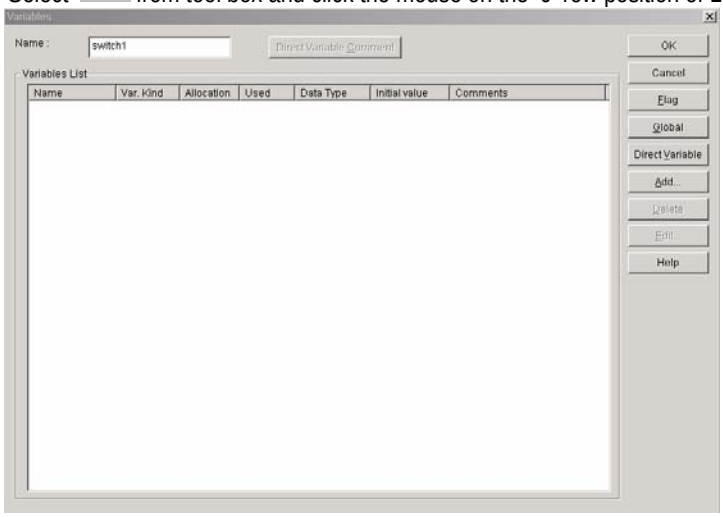
- Select the type of language for program(LD) from new program dialogue box.
- After input the comments for program to the comments column, press [Enter] key or click [Finish] and the screen below appears.



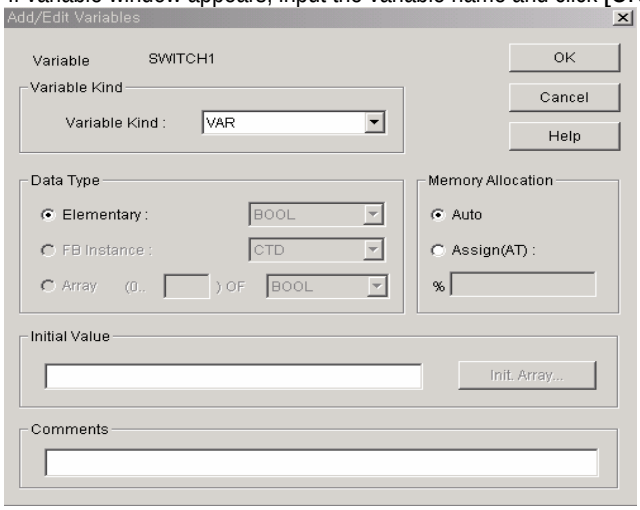
3.2 How to do Programming

3.2.1 How to insert contact / output coil

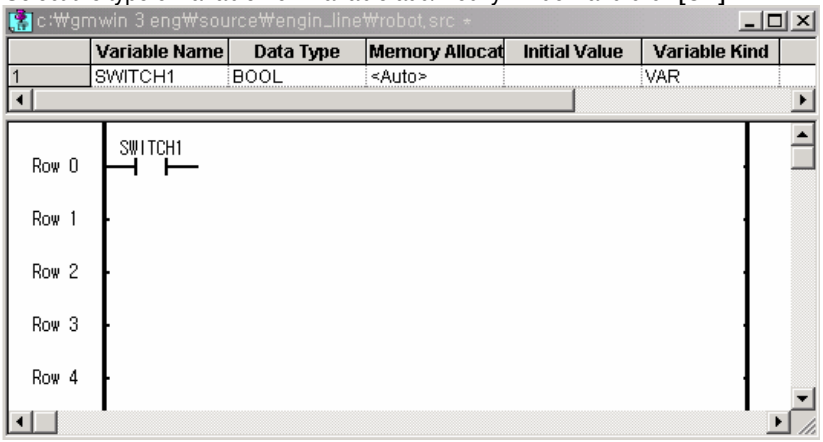
◆ Select  from tool box and click the mouse on the '0' row position of LD window.



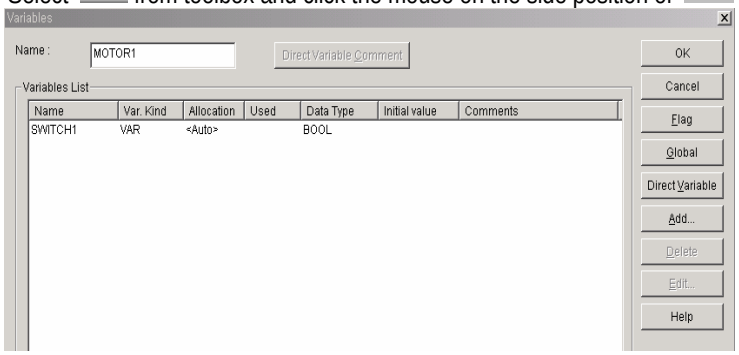
◆ If variable window appears, input the variable name and click [OK].



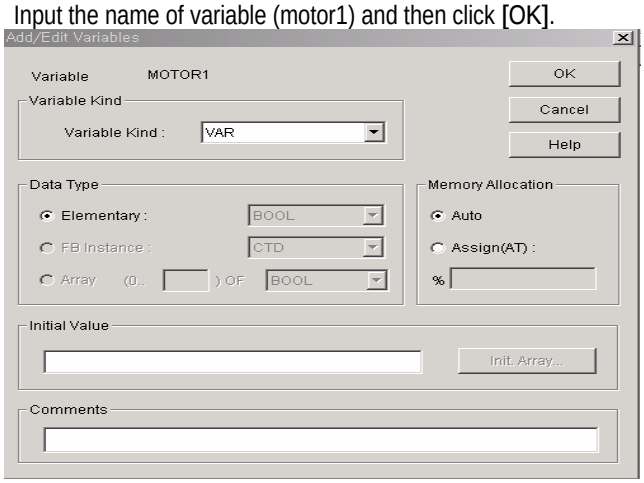
◆ Select the type of variable from variable add/modify window and click [OK].



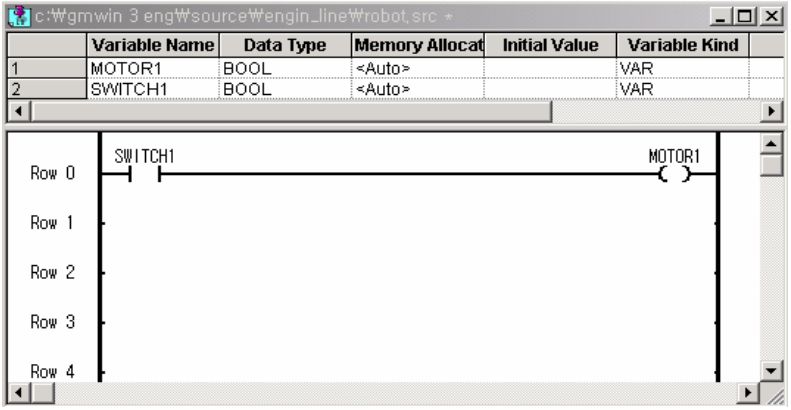
◆ Select { } from toolbox and click the mouse on the side position of ⊣⊢ contact.



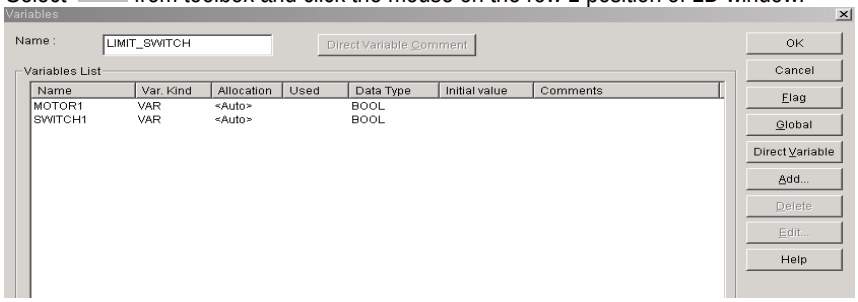
◆ Input the name of variable (motor1) and then click [OK].



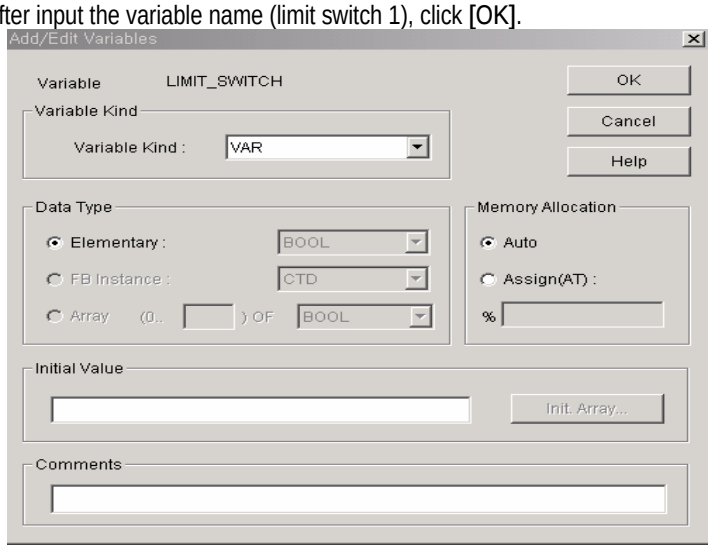
◆ After selecting the variable type of, click [OK] and the coil will be inputted.



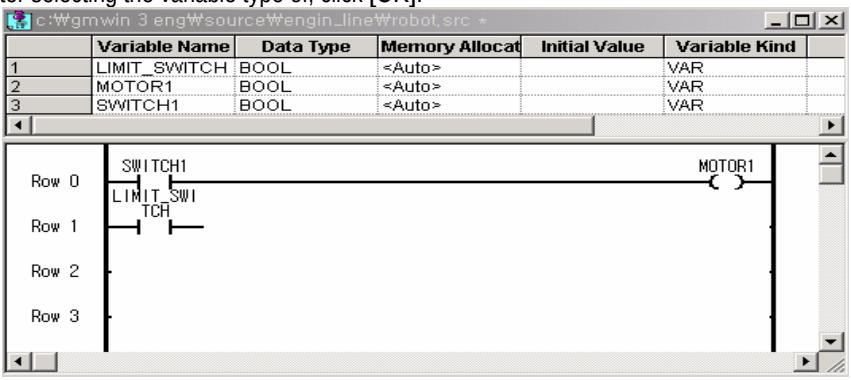
◆ Select ⊣⊢ from toolbox and click the mouse on the row 1 position of LD window.



◆ After input the variable name (limit switch 1), click [OK].

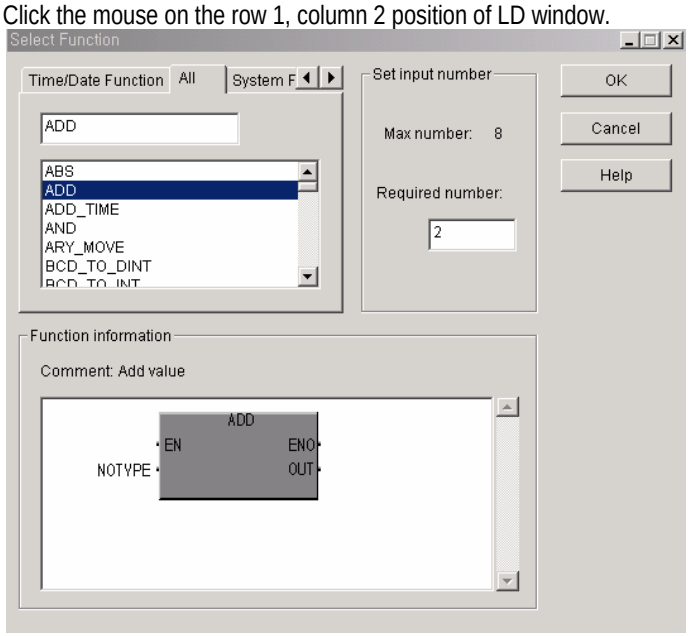


◆ After selecting the variable type of, click [OK].

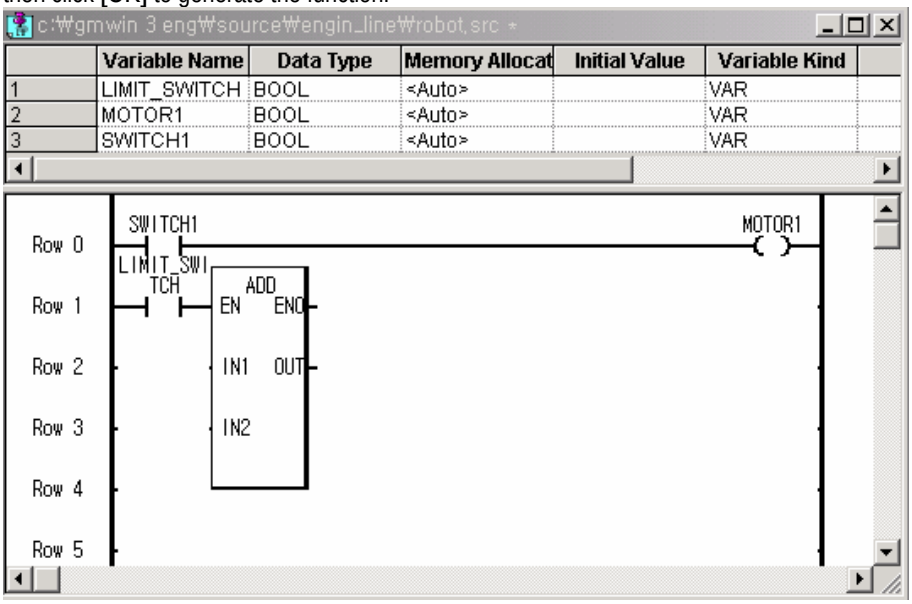


3.2.2 How to make Function

- Select {F} from tool window by using a mouse.
- Click the mouse on the row 1, column 2 position of LD window.

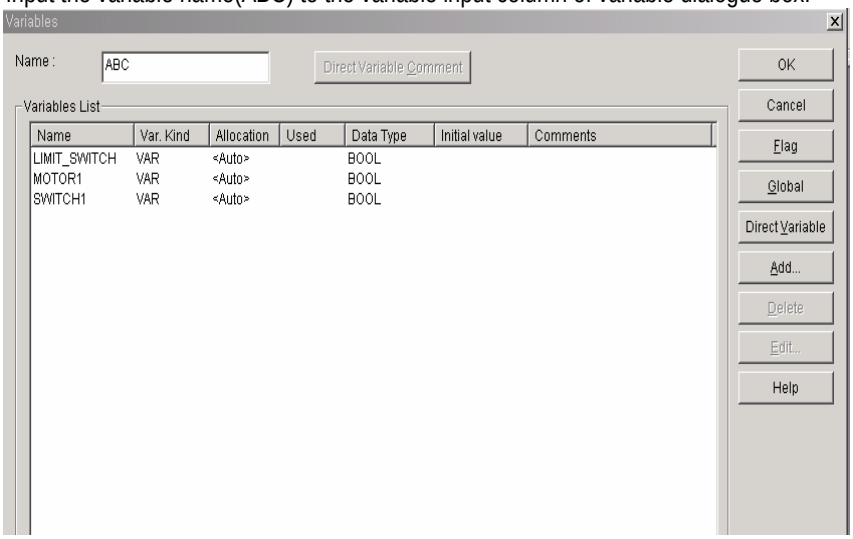


- Select the numeric operation function ADD from function list dialogue box and input the number of input '2' and then click [OK] to generate the function.

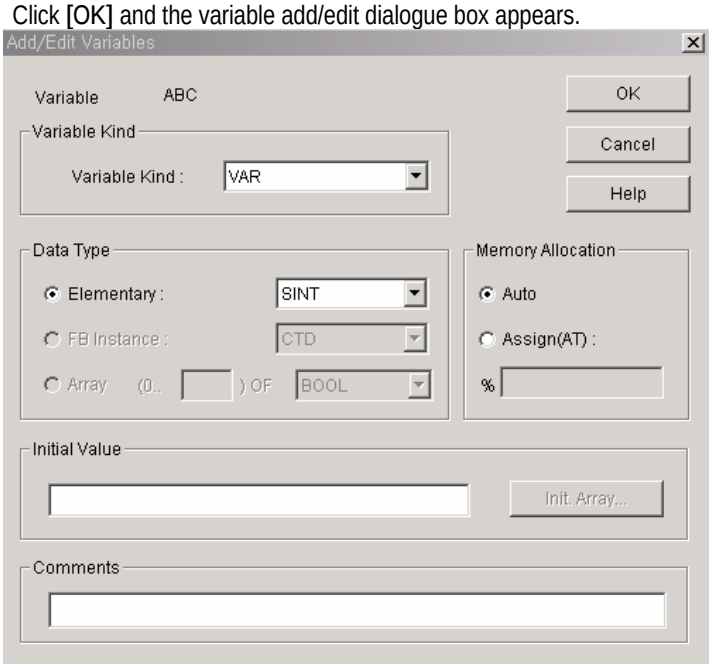


3.2.3 How to input Variable

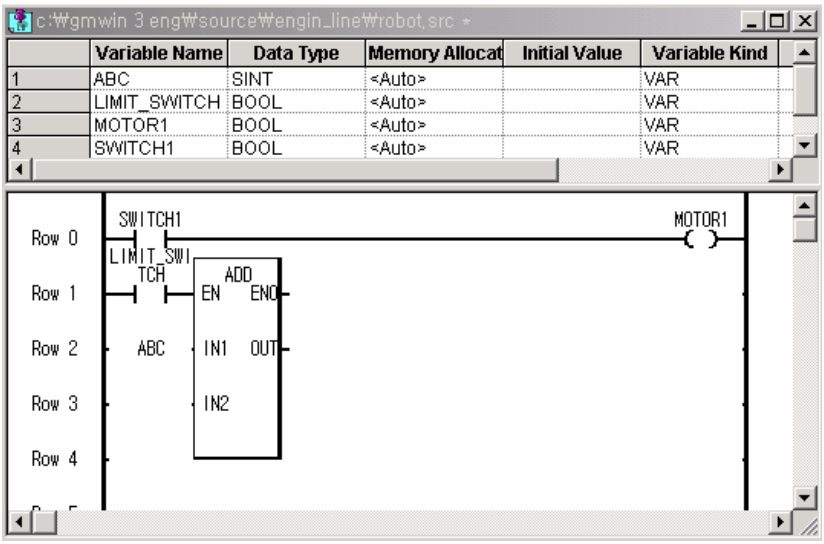
- Select  from toolbox.
- Double click the mouse on the IN1 position (row 2, column 1) of function ADD.
- Input the variable name(ABC) to the variable input column of variable dialogue box.



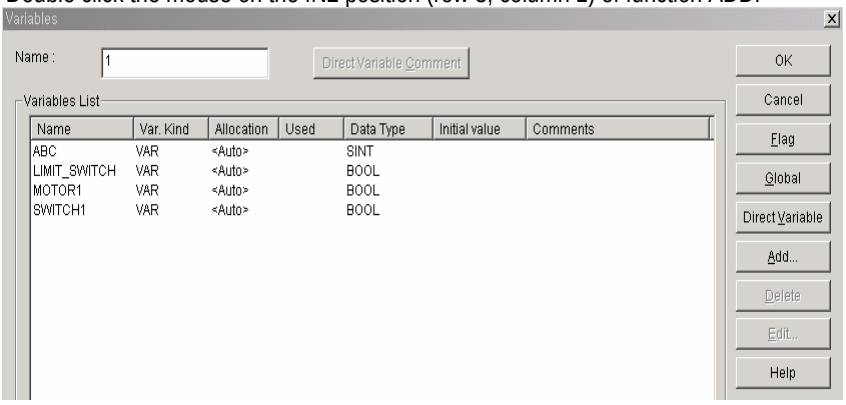
- Click [OK] and the variable add/edit dialogue box appears.



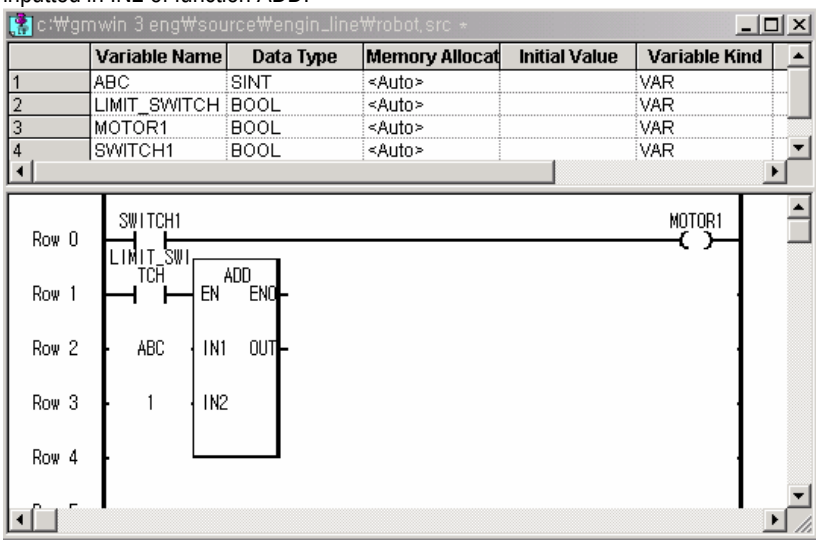
- Click [OK]. It shows that variable “ABC” is inputted in the IN1 of function ADD.



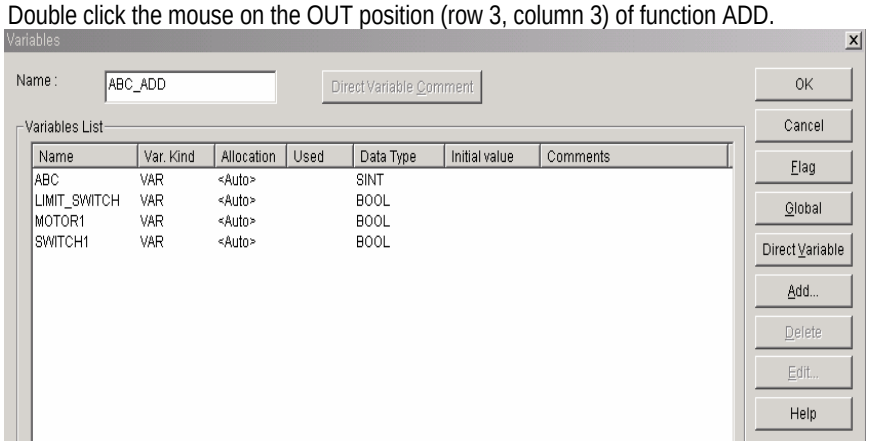
◆ Double click the mouse on the IN2 position (row 3, column 1) of function ADD.



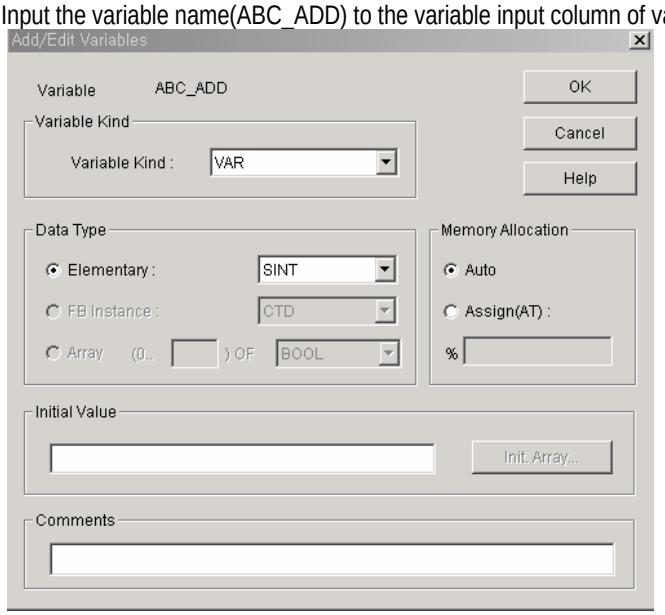
◆ If input the constant “1” to the variable input column of variable dialogue box and click **[OK]**, the constant 1 is inputted in IN2 of function ADD.



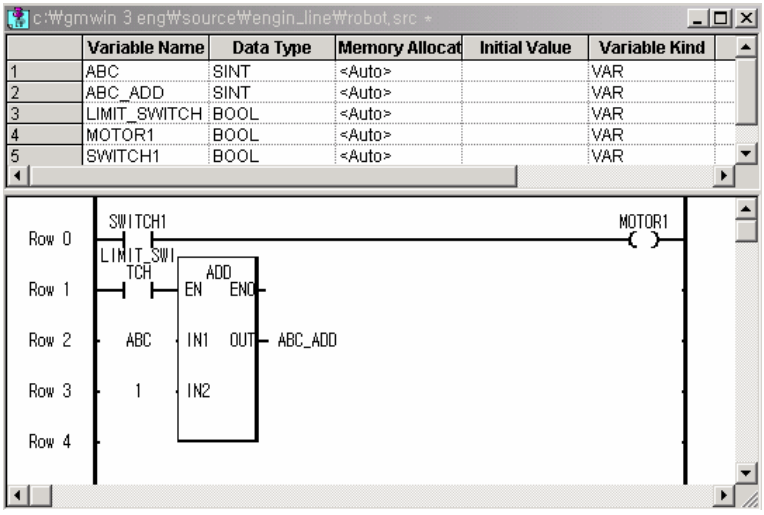
◆ Double click the mouse on the OUT position (row 3, column 3) of function ADD.



◆ Input the variable name(ABC_ADD) to the variable input column of variable dialogue box and click [OK].



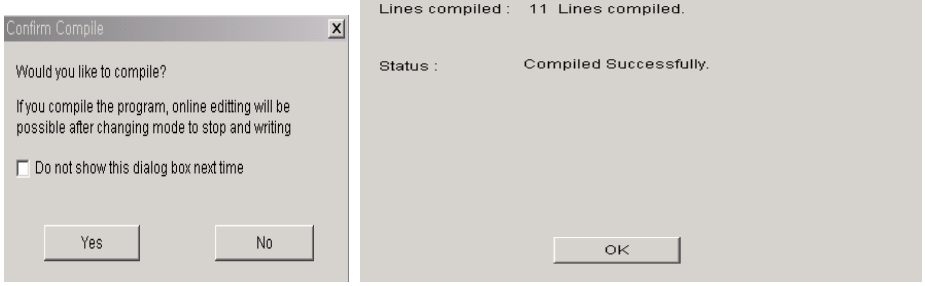
◆ If select the variable type from variable add/edit window and click [OK], the variable ABC_ADD is inputted in OUT of function ADD.



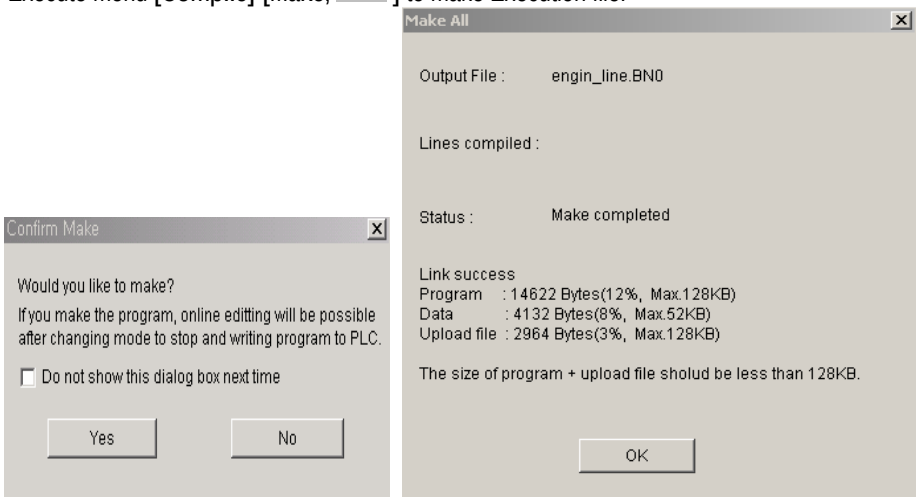
3.3 How to compile/write Program

3.3.1 How to Compile/Make

◆ Select menu [Compile]-[Compile,].



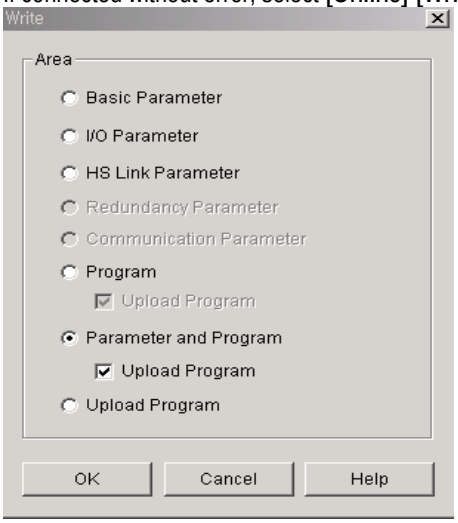
◆ Execute menu [Compile]-[Make,] to make Execution file.



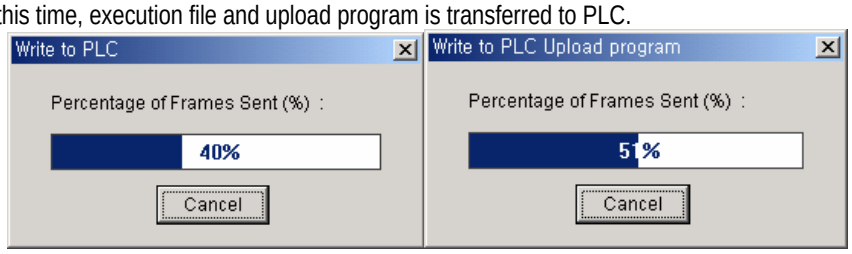
◆ If you fail to make execution file due to the occurrence of error, modify the program according to the error message and then run MAKE again.

3.3.2 How to write Program

- Check the connection status of GMWIN and PLC before program transfer.
- Check whether or not the key mode of PLC is Remote Stop. Not available to write Program on the other key position
- Select menu [Online]-[Connect].
- If there is something wrong on PLC, the error/warning information window appears. In this case, delete the cause of error occurrence first. (refer to CPU manual.)
- If connected without error, select [Online]-[Write] to designate the item to write and then click [OK].



- At this time, execution file and upload program is transferred to PLC.



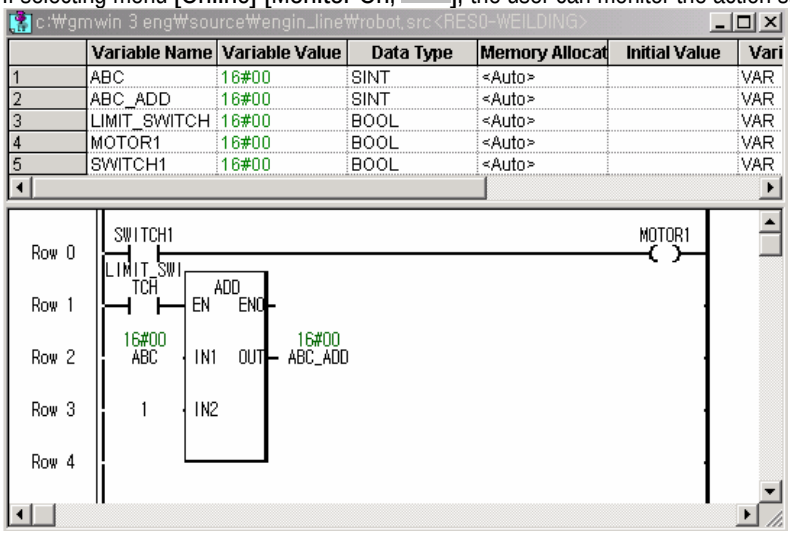
3.4 How to run and monitor Program

3.4.1 How to operate Program

- After completing the transfer, select menu [Online]-[PLC Mode]-[Run]. At this time, PLC becomes Remote run mode and starts to operate Program.(if selecting the PLC mode key as “run”, it becomes Local run and also starts to operate Program.)

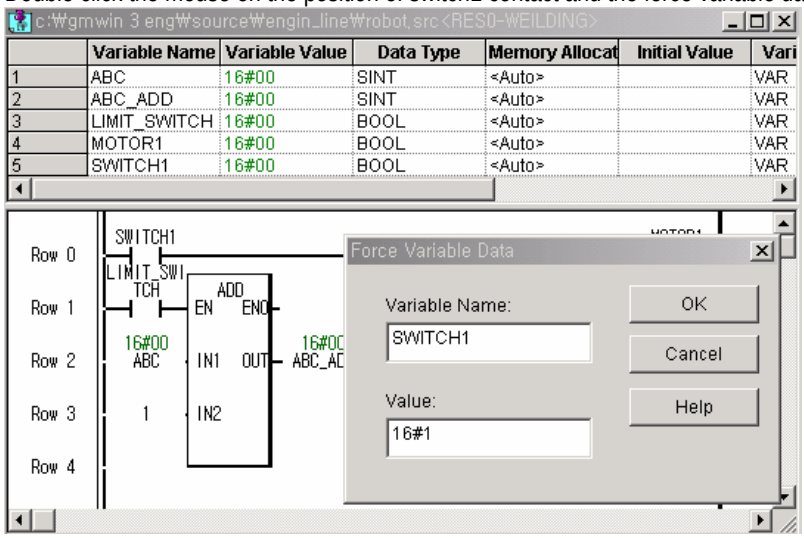
3.4.2 How to monitor Program

- If selecting menu [Online]-[Monitor On, ], the user can monitor the action status of program through GMWIN.

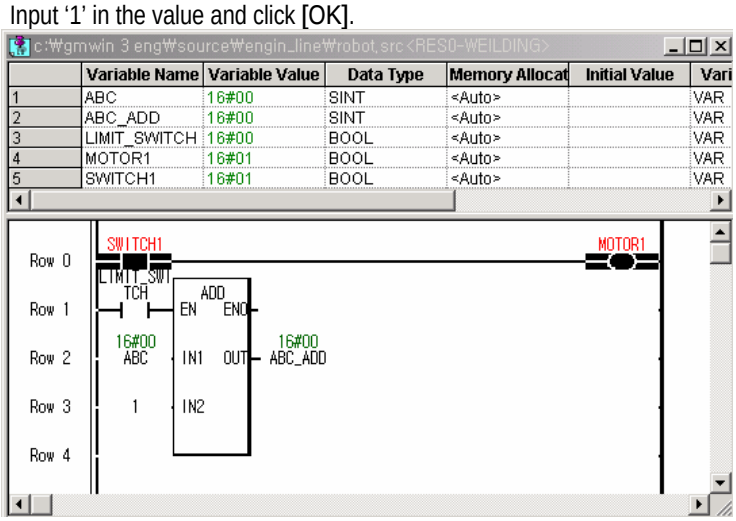


3.4.3 How to do force variable data

- Double click the mouse on the position of switch1 contact and the force variable data dialogue box appears.



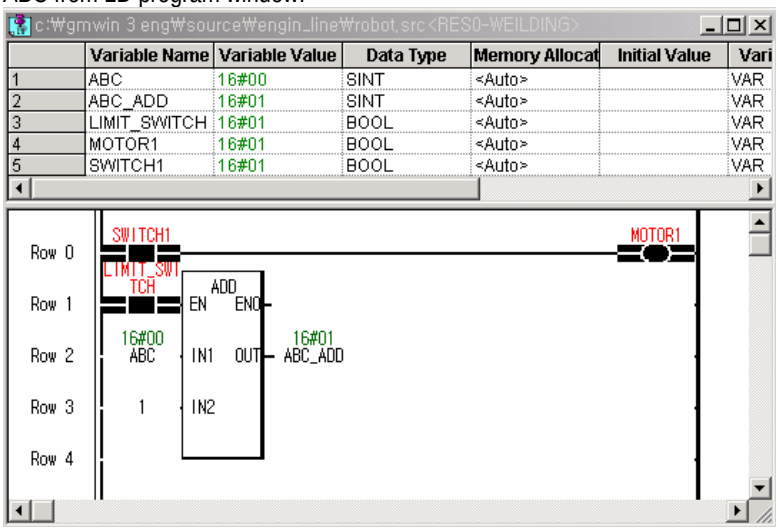
◆ Input '1' in the value and click [OK].



◆ If switch 1 is "ON", it is available to monitor that motor 1 becomes "ON".

◆ Execute the force input variable for limit switch 1 as the same method to the above.

◆ It is available to monitor that the value of variable ABC_ADD increases 1 by 1 according to the input of variable ABC from LD program window.



3.5 How to make the User Defined Function/Function Block

It is available to make the user defined function/function block through “how to follow”. The overall flowchart is as follows :

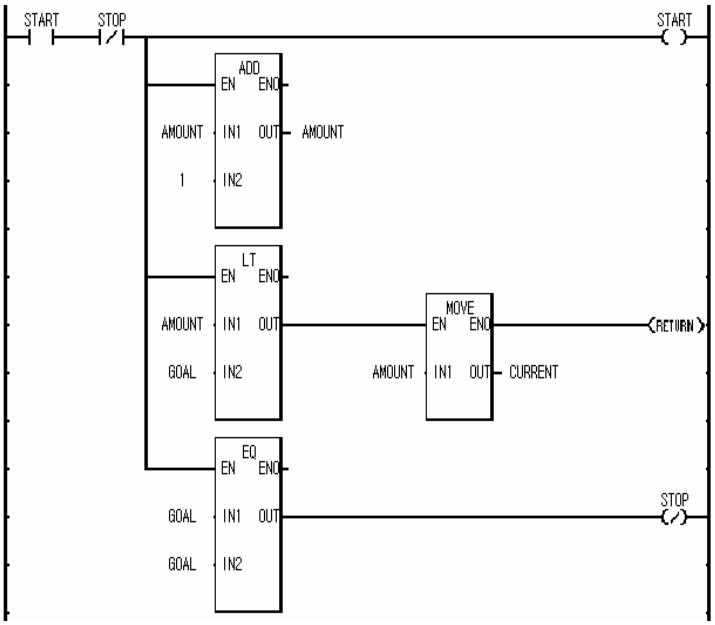
How to make Program

Program file name	Spinning machine control
Language	LD
Program type	Function block
Function block name	Spinning machine
Program comments	Function block for spinning machine control.

How to make I/O Variable

Input variable	Start to work (BOOL)
Input variable	Emergency stop (BOOL)
Input variable	Goal value (INT)
Output variable	Motor run (BOOL)
Output variable	Current value (INT)

How to do Programming



How to register F/B

Registers the user F/B to the Project through compile.

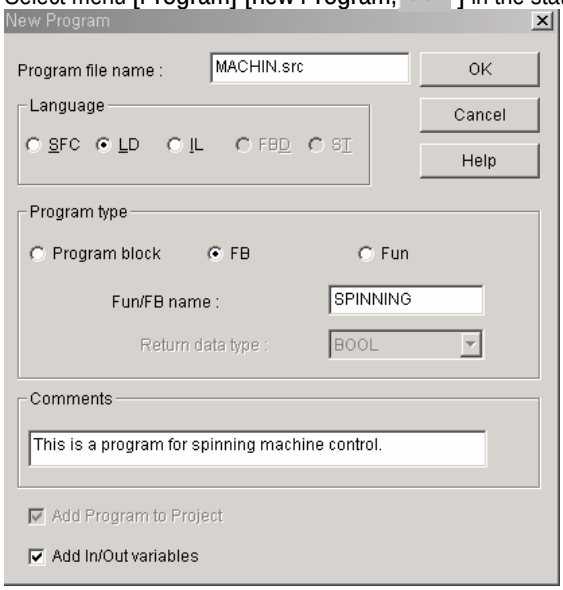
How to call F/B

Calls the user F/B from the Program.

[Working flowchart of “how to follow]

3.5.1 How to make the User defined function/function block

◆ Select menu [Program]-[new Program,] in the status of open program.



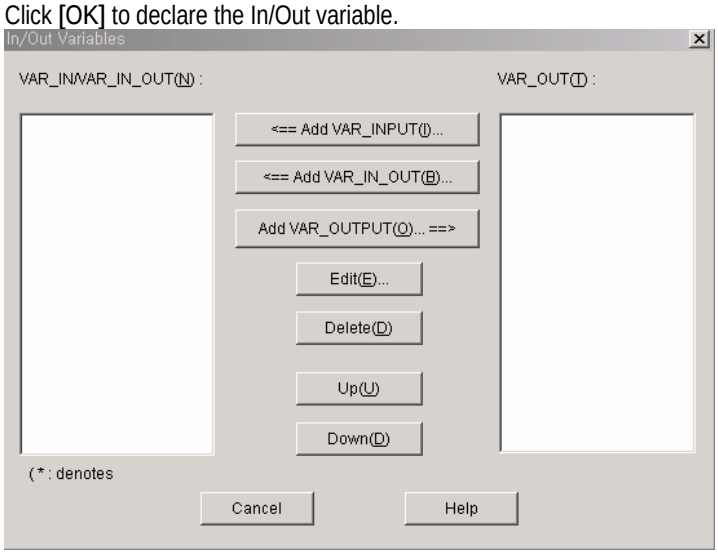
◆ Input the program file name as above and select the language and program type.

- To make the user defined function, it is required to select the program type Fun and input the language and function block name.
  As the output variable is fixed as 'OUT' in the function, it is required to select output data type.
- To make the user defined function block, it is required to select the program type FB and input the language and function name.

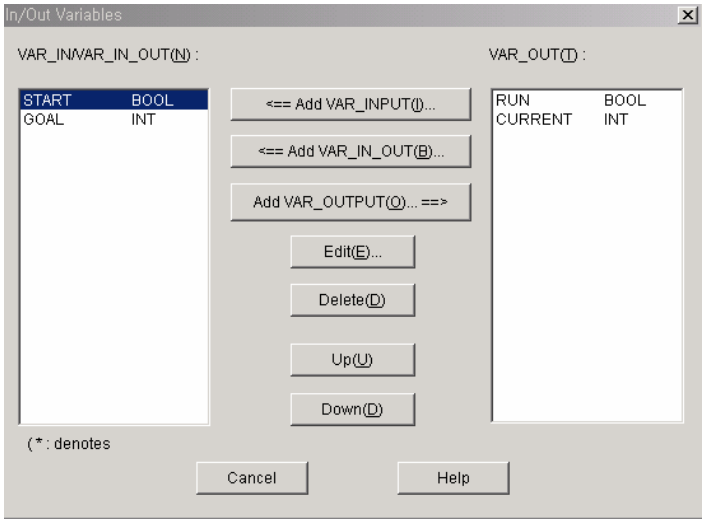
Point

In the user defined function, it is NOT available to select the language SFC.

◆ Click [OK] to declare the In/Out variable.

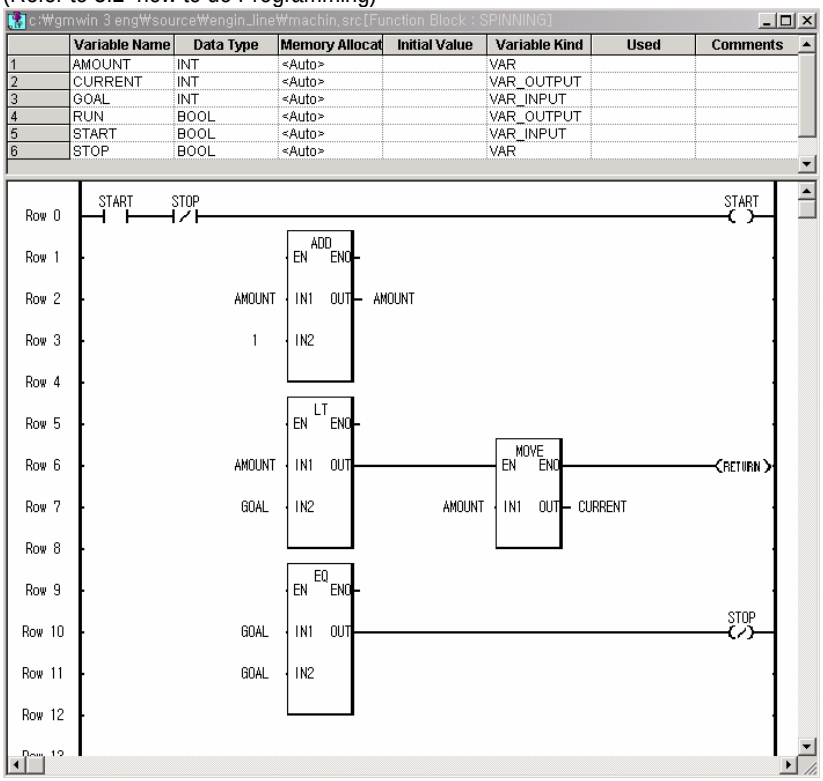


◆ Add input variable, In/Out variable, output variable. At this time, it is not available to add output variable in the function.



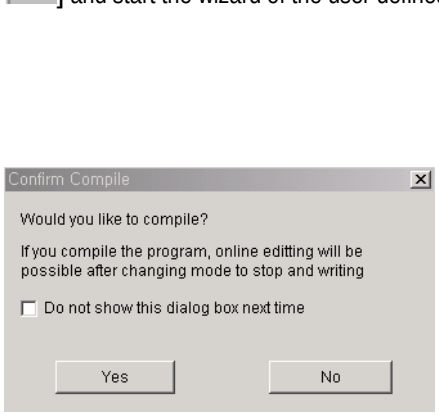
◆ After completing to add In/Out variable, click **[Close]** and start to write Program.

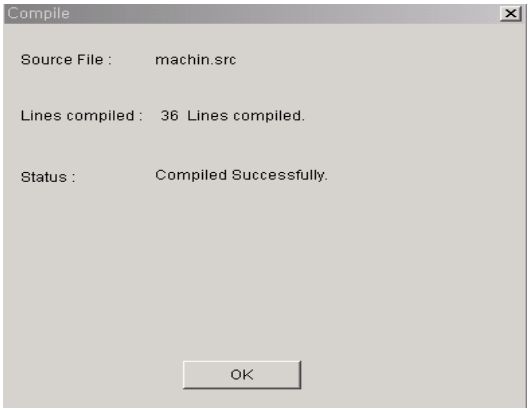
◆ Write a program of the user defined function/function block as below.
(Refer to 3.2 how to do Programming)



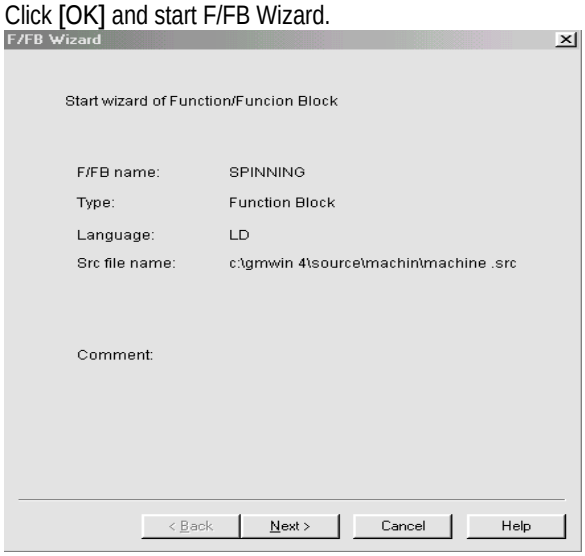
3.5.2 How to register the user defined function/function block

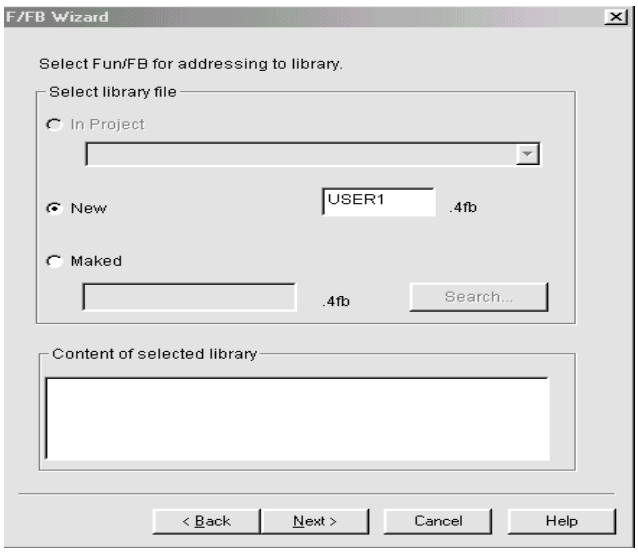
◆ If the program preparation of the user defined function/function block is completed, select [Compile]-[Compile, ] and start the wizard of the user defined function/function block.



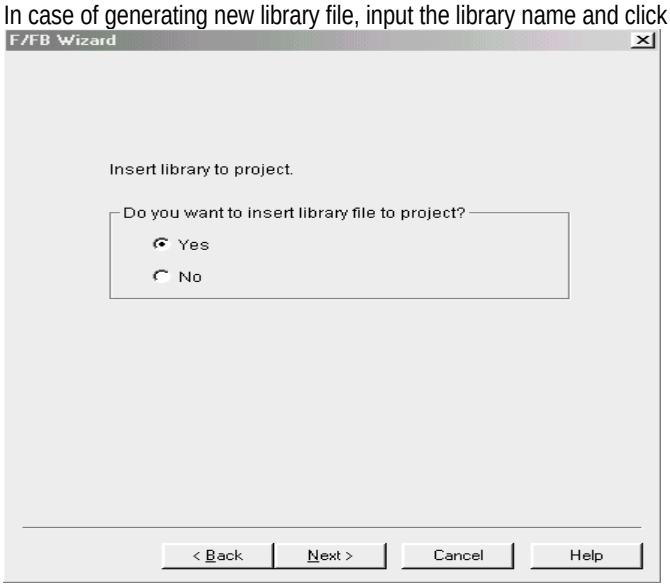


◆ Click [OK] and start F/FB Wizard.

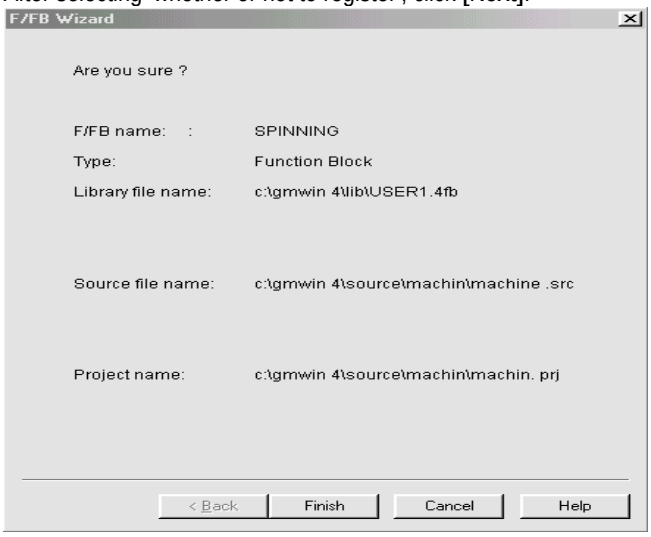




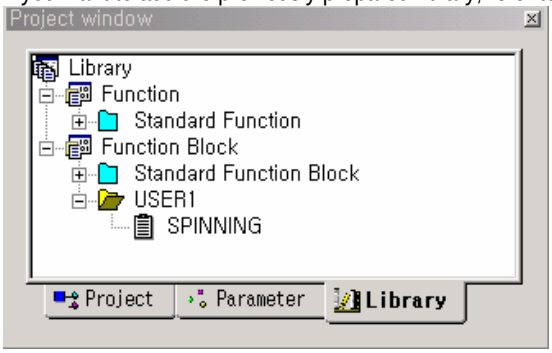
◆ In case of generating new library file, input the library name and click [Next] and start F/FB Wazard.



◆ After selecting 'whether or not to register', click [Next].



◆ Click [Finish] and the function block 'USER1' is added to the library of project window.
If you want to add the previously prepared library, refer to 4.5.3 Library road.



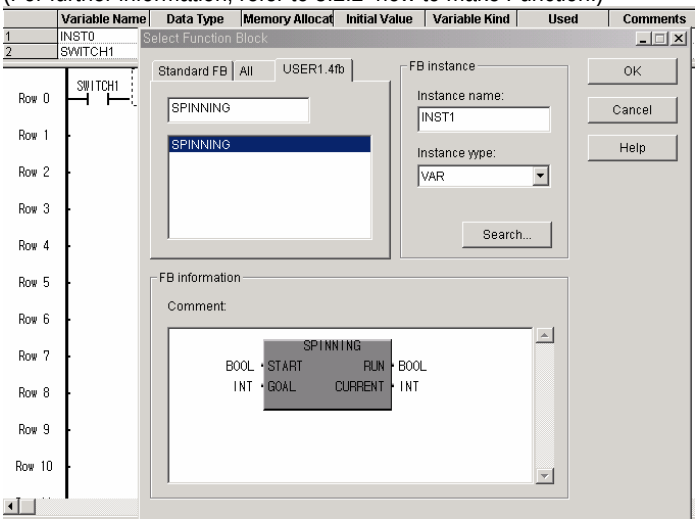
Point

How to call the source file of the user defined function/function block

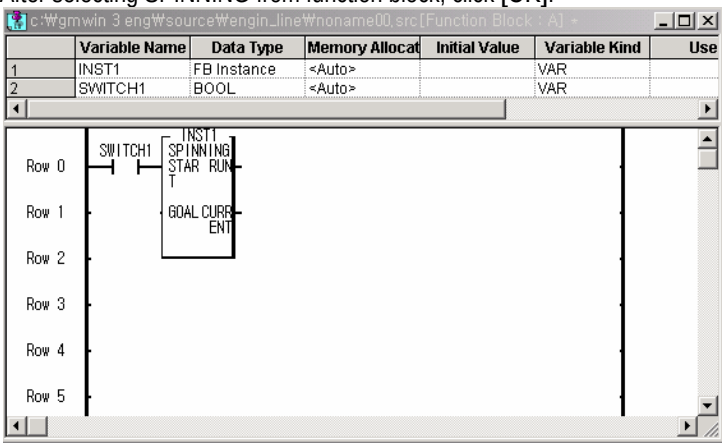
◆ To call the source file of the user defined function/function block, double click the relevant name ("SPINNING" from the above project window).

3.5.3 How to call the user defined function / function block from the Program

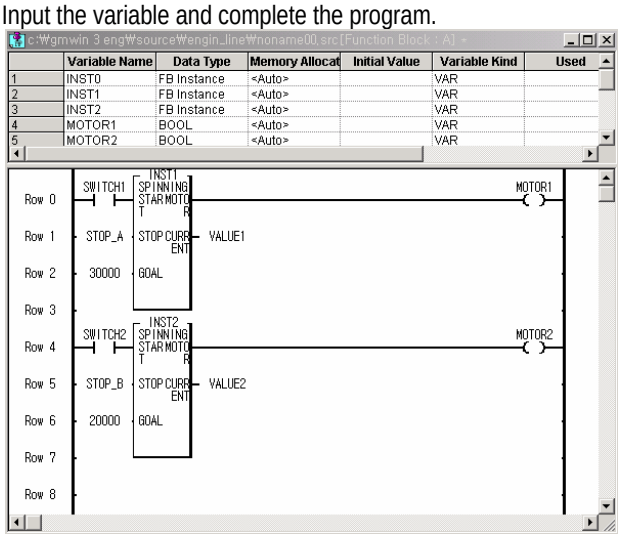
- Select the function block() from tool window by using a mouse.
- Click the left button of mouse on the position to insert.
  (For further information, refer to 3.2.2 how to make Function.)



- After selecting SPINNING from function block, click [OK].



- Input the variable and complete the program.



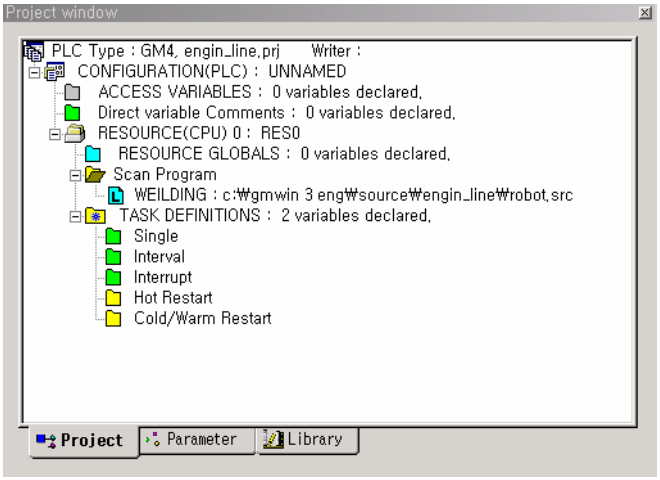
- If program is completed, start to compile and write.
  (For the subsequent processing, refer to 3.3 how to compile/write Program, 3.4 how to run and monitor Program.)

Chapter 4. How to make Project/Program

4.1 Overview

4.1.1 Configuration of Project

Project is composed of Configuration, Parameter and Library.

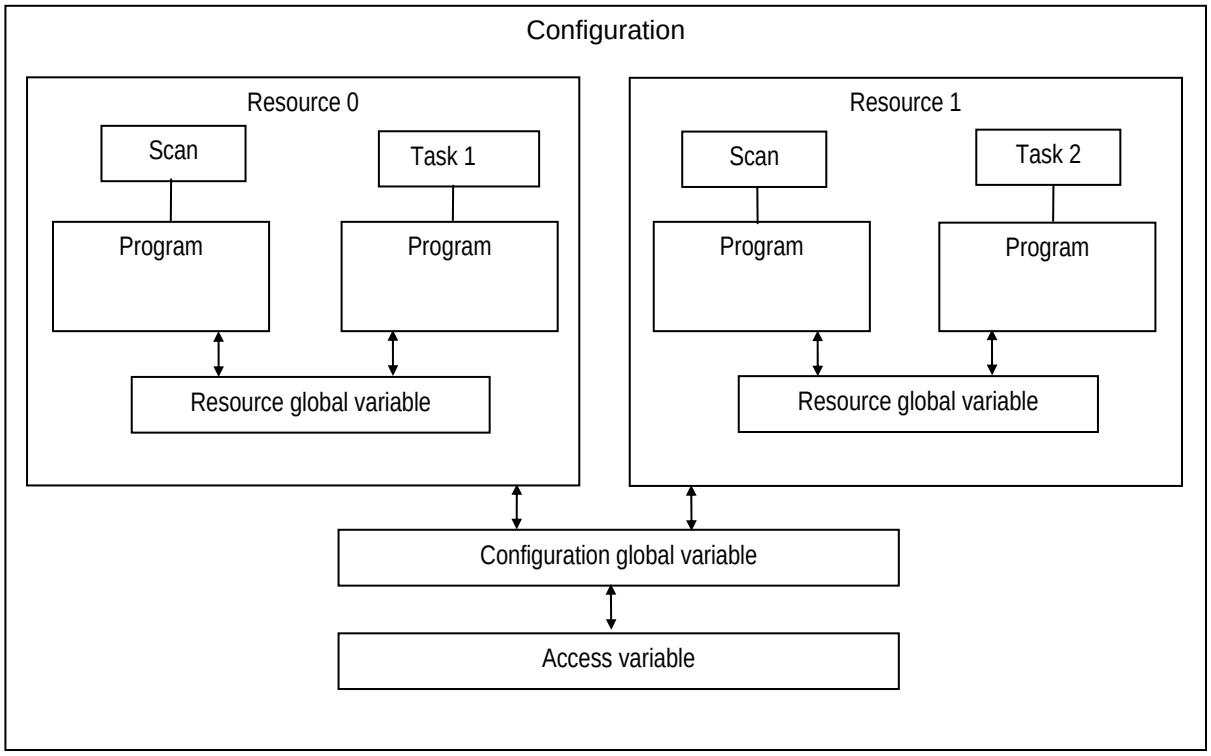


Project has the layer structure as follows :

Layer items	Description
Project	Defines overall PLC system.
Configuration	Sets several definition items of PLC program.
Configuration global variable	Variable list using for overall configuration
Access variable	Accessible variable list by other configuration
Resource	Related to CPU module
Resource global variable	Variable list using for overall resource
Task definition	Defines program execution condition
Program definition	Describes each program and its execution condition
Parameter	Defines the H/W contents of PLC system.
Basic parameter	Defines basic H/W parameter.
I/O parameter	Defines the contents of I/O module.
High speed link parameter	Describes the contents of high speed link parameter.
Double parameter	Sets input/output circuit, failure mask (for GMR)
Communication parameter	Describes communication parameter (for GM7)
Library	Defines library file.
Function	Function library file list currently inserted.
Function block	Function block library file list currently inserted

4.1.2 Configuration diagram

Configuration is composed as follows:



It is available to compose maximum 180 programs for one project. Configuration is what defines the starting condition of each program, variable sharing between programs etc.

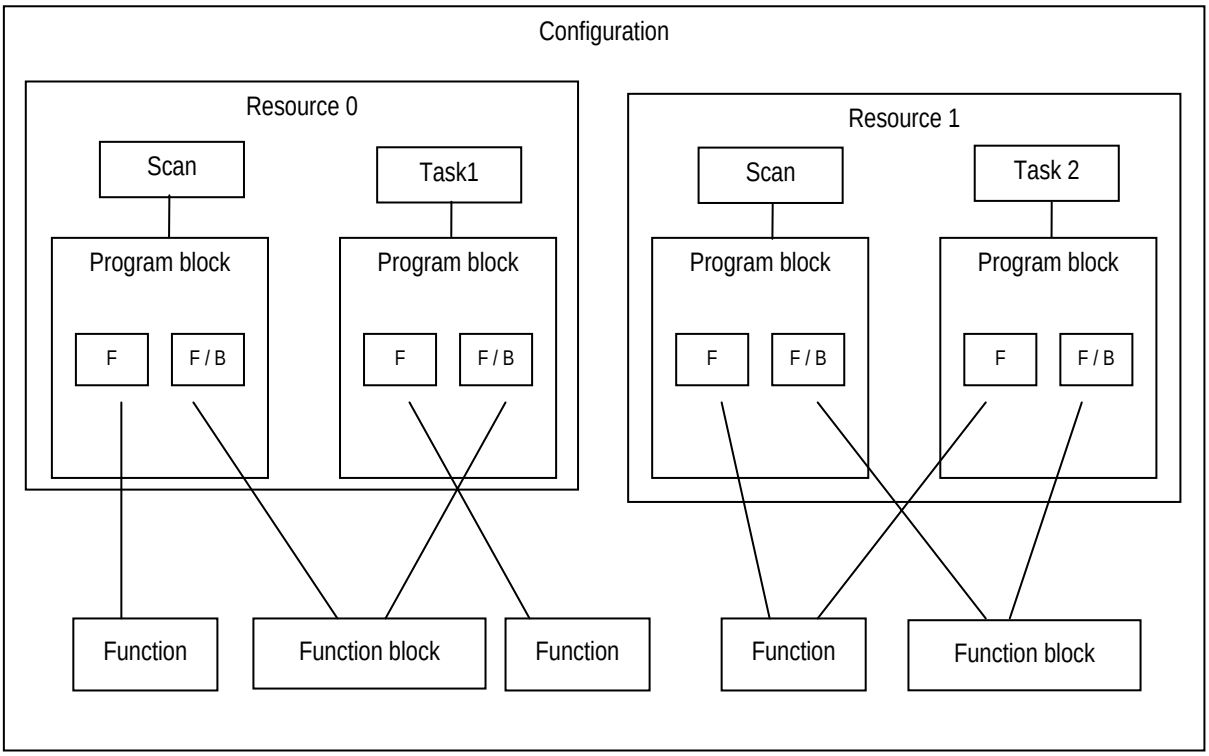
Point

The number of program available to compose for one project is as follows:

◆ GMR ~ GM4 : 180 , GM6 ~ GM7 : 100

4.1.3 Program Diagram

Program is a unit to write the command language for the actual action of the PLC system.
Program type is divided into program block, function and function block, and it is available to do programming for each program with ladder, IL, SFC etc.



1) Program block: a code to be preserved in PLC program area and execute the PLC.
2) Function : a program composition factor that does not memorize the operation result such as 4 fundamental operation, comparison operation etc. within the command language and outputs promptly the operation result for input.
3) Function block : a program composition factor that memorizes the operation result within the command language like timer, counter etc. and uses the memorized operation result through several scans.

Point

On the above diagram, it is available to write Program block, function and function block with LD,IL, SFC respectively, but for function, it is required to make it with LD or IL.

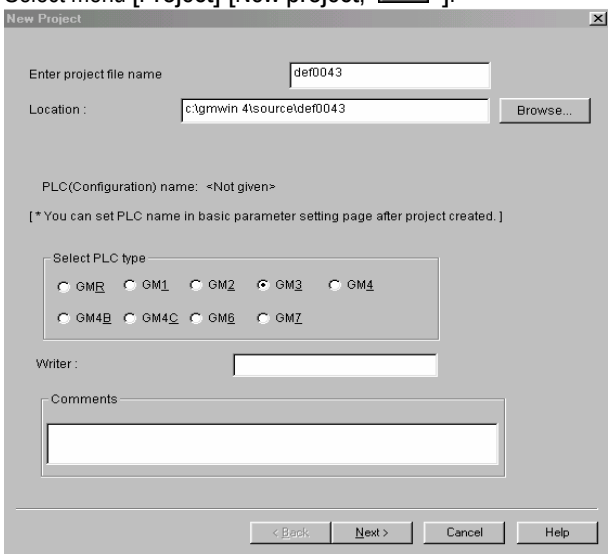
4.2 How to make Project

4.2.1 How to make New project

The user can make new project and new program according to the wizard function.

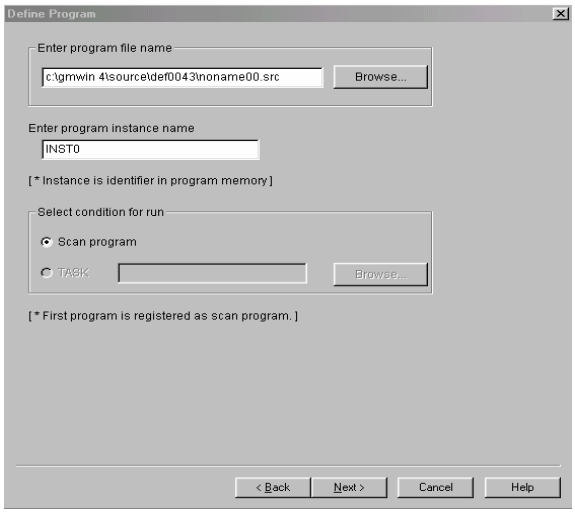
1) How to create Project

- Select menu [Project]-[New project, ].



- Input the project file name.
- Select the PLC type to apply from the option button of PLC type.
- Input the writer name to the writer name column.
- Input the comments to the comments column.
- Click [Next] and the program “Define Program” box appears.

2) How to define Program

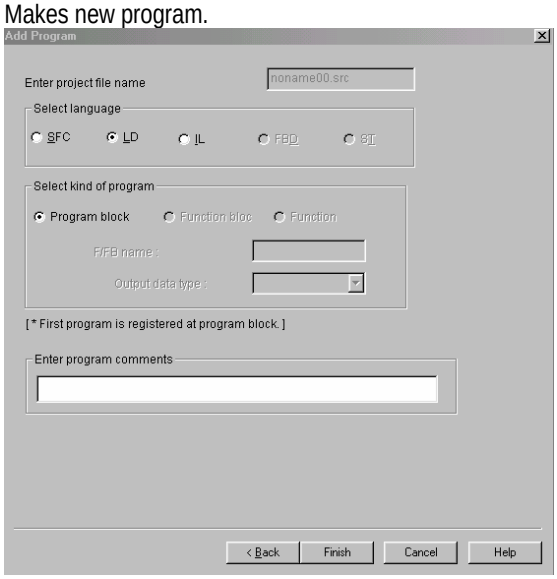


In the Define Program box, the user can register the program to the Project.

- Input the instance name.
- Designates the program file name.
- Click [Next] and the dialogue box to make the program appears.

3) How to create Program

- Makes new program.



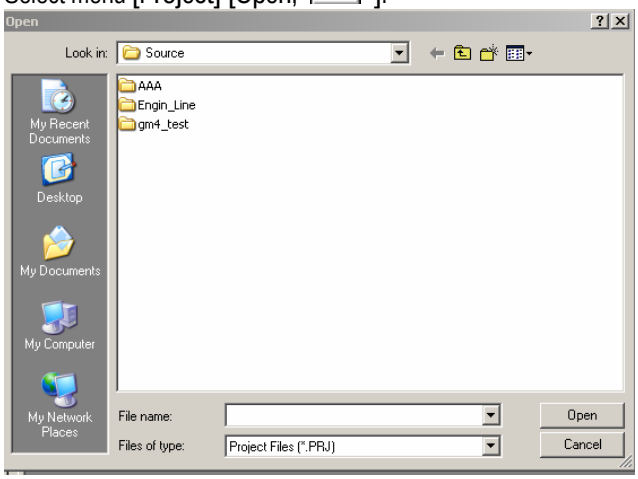
- Select Program language.
- Select Program type. The program to be inserted to the project should be 'program block'.
- Input Program comments.
- Click [Finish] and the program window appears.

4.2.2 How to open/save Project

1) How to open Project

Opens the already prepared project.

- Select menu [Project]-[Open, ].

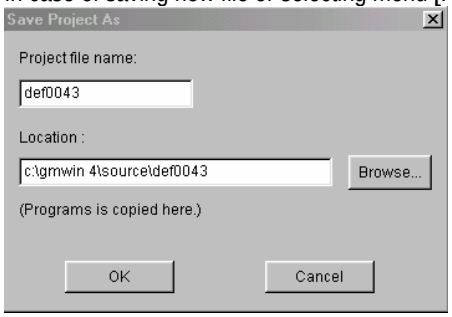


- After opening the desired project folder by double click, select project file and click [Open].

2) How to save Project

Saves the prepared project or program.

- Select menu [Project]-[Save, ]. In case of saving the already existing project file, save it without any message.
- In case of saving new file or selecting menu [Project]-[Save As], the following dialogue box appears.



- After input the desired project file name, click [Save].
- New project folder is made under the source folder which is selected in [Project]-[Option] and program also is saved under the new project folder.

Point

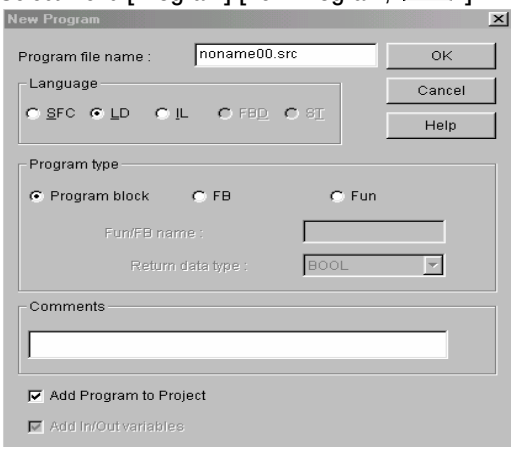
How to open the currently worked project/program

- The currently worked project is listed under [Menu]-[Project] and the program is listed under [Menu]-[Program] and
- if selected, it opens.

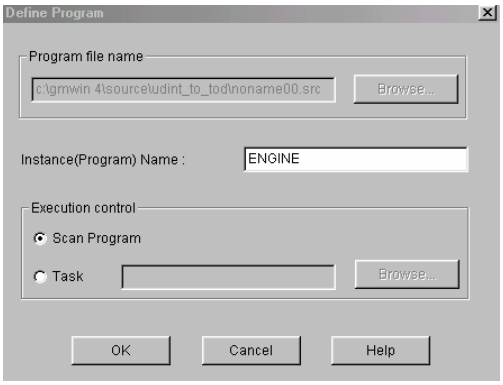
4.2.3 How to make new Program

Makes a new program. The new program is available to execute only in case of inserting it to the project.

- Select menu [Program]-[new Program, ].



- Input the program name.
- Select a language(The languages currently provided by GLOFA PLC are SFC, LD, IL. FBD and ST to be provided later.)
- Select the program type from program type option button. In case of writing the user defined function/function block by selecting function/function block, refer to Chapter 3 how to follow, 3.5 how to make the user defined function/ function block.
- Input the comments to the program comments input column.
- Determine whether or not to add Program to the Project.
- Click [OK].
- In case of selecting “Add Program to Project”, “Define Program” dialogue box appears.



◆ After selecting instance name and conducting condition from program definition dialogue, click [OK] and new program is generated.

Point

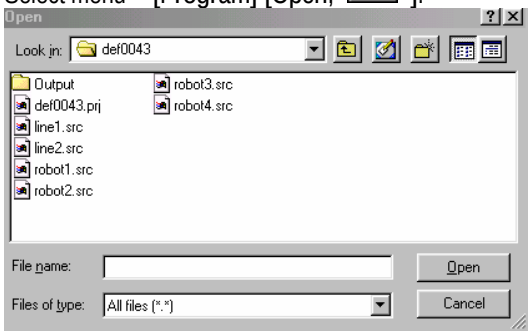
Fun/FB name, Add In/Out variables now shall be activated only in case of selecting function/function block option button and output data type is activated only in case of selecting function option button.
(For further information, refer to 3.5 how to make the user defined function/function block.)

4.2.4 How to open/save Program

1) How to open program

Opens the already prepared program.

◆ Select menu [Program]-[Open, ].



◆ After selecting the desired program file, click [OK].
◆ The selected program is generated in the program window.

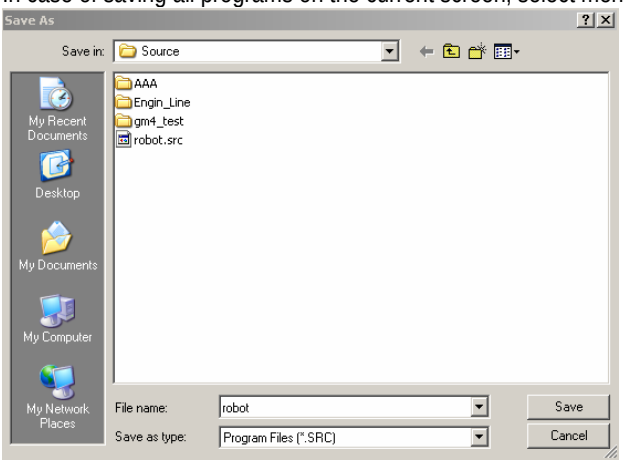
Point

1.When you want to open the program file designated in the project, move the mouse to the relevant program item from the project window list and double click to open the program.
2.When opening several programs simultaneously, select the desired number of program from the above by using a Shift key and click [Open].
3. It is not available to open more than 2 same programs in Modify mode or Debug mode.
In case of monitor mode, it is available to open more than 2 same programs and monitor different part respectively against
the situation not available to see the long program on one screen.
4. The program opened by [Program]-[Open] is not inserted to the Project. To insert it to the Project, it is required to select add program from project menu or select popup menu [Add project...].

2) How to save program

Saves the prepared program.

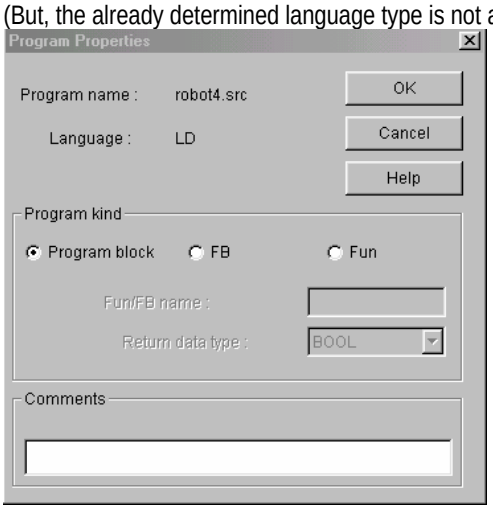
- Select menu [Program]-[Save, ]. In case of saving the already existing program file, save it without any message.
- In case of saving new file or selecting menu [Program]-[Save As], the following dialogue box appears.
- After input the desired program file name, click [Verify].
- In case of saving all programs on the current screen, select menu [Program]-[Save all].



4.2.5 How to change Program Properties

Changes the program type or comments of the program in editing.

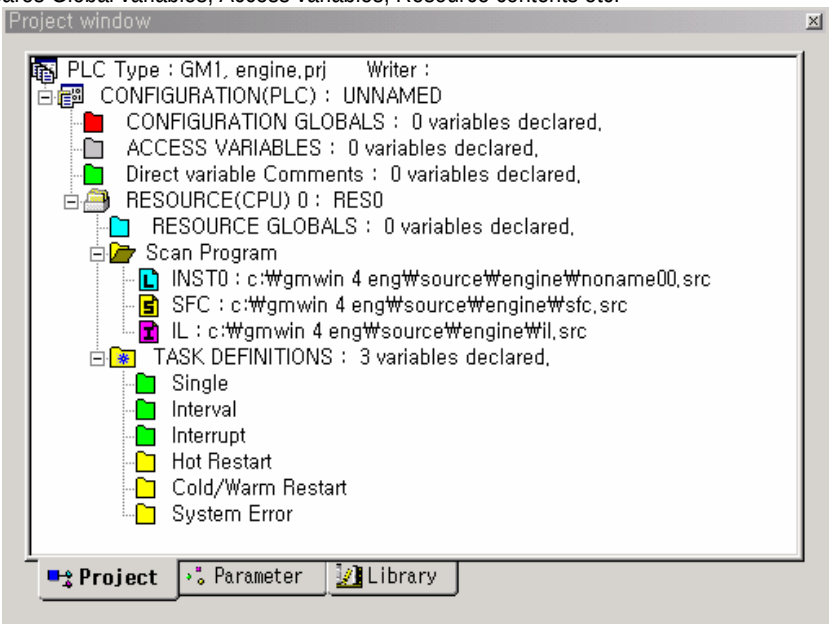
- Select menu [Program]-[Program properties] and the dialogue box similar to the case of program generation. (But, the already determined language type is not available to change.)



- After modifying the desired item, click [OK].

4.3 How to prepare Configuration

Prepares Global variables, Access variables, Resource contents etc.



Point

1. How to use Folder

We call the picture shown before each item on the above hierarchy chart as 'folder' and it is available to see the above chart in detail or briefly by pressing each picture of folder by a mouse and pressing the left/right arrow key. The types of folder are as follows :


The folder already unfolded. If pressing this folder, it becomes the folder available to unfold and the contents of lower part shall be deleted.


The folder available to unfold. If pressing this folder, it becomes the unfolded folder and the contents of lower part shall be displayed.


The folder that does not unfold any more (indicates the items)


The folder that indicates each item

2. Indication of program type of project window


: LD program


: SFC program


: IL program

4.3.1 How to edit Configuration

There are three (3) methods to edit the list of hierarchy structure displayed in the project window as follows.

1) Double click the mouse on the desired item to edit.

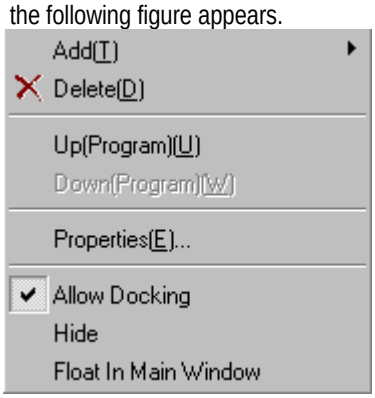
2) Move the cursor to the item to edit and then press Enter key.

3) After pressing the right button of mouse on the desired item to edit, select popup menu [Properties] to edit.

Point

Popup menu (Project)

- Click the mouse on the temporary position or the desired position from the project window and the following figure appears.

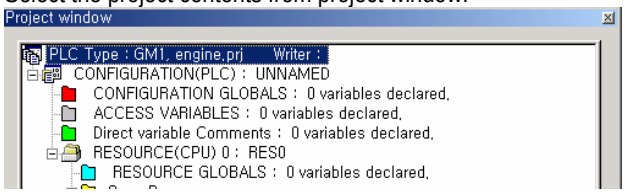


By using this function, the user can edit Project easily.

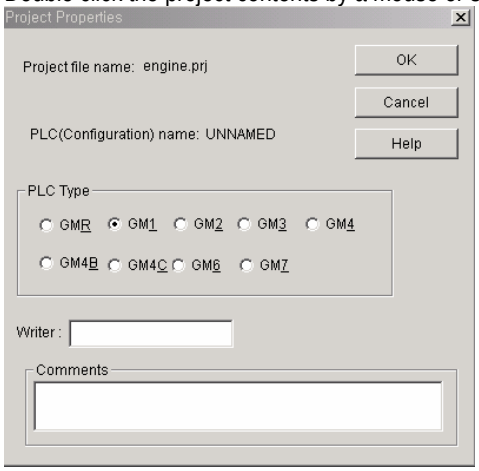
4.3.2 How to modify the Project contents

It is available to modify the project contents generated in Clause 4.2.

- Select the project contents from project window.



- Double click the project contents by a mouse or select popup menu [Properties].



- Modify the project contents.
- Click [OK].

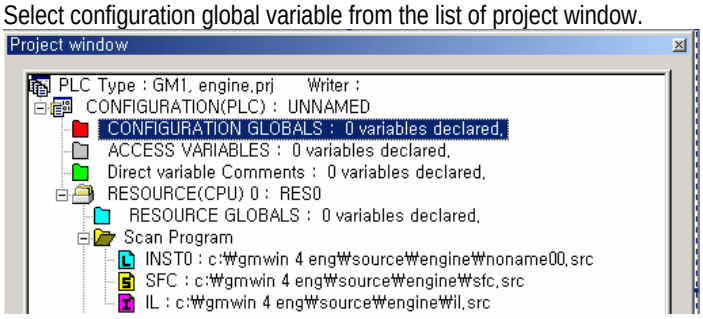
Point

If PLC type is changed, it is required to select again library file except standard library and load it.
(For details, refer to Chapter 4.5 how to edit Library.)

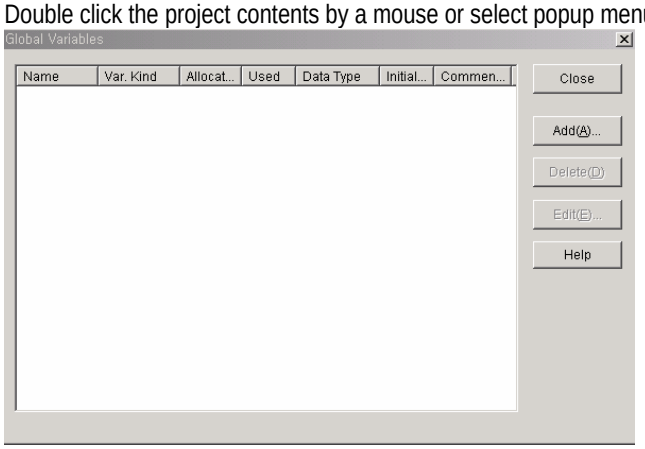
4.3.3 How to make Configuration global variable

Configuration global variable is the variable available to use in common for all program in various resource and is used only for GM1 where several resources exist.

- Select configuration global variable from the list of project window.

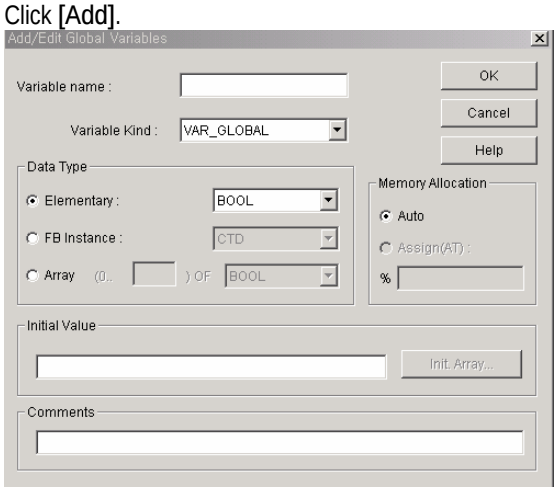


- Double click the project contents by a mouse or select popup menu [Properties].



1) How to add configuration global variable

- Click [Add].



- Input the variable name to the variable name input column.
- Select the variable type from the list box of variable type.
- Select data type.
- Select memory allocation option button for direct memory allocation.
- To give the initial value, input the value to the initial value input column.
- Input the comments to the comments input column.
- Click [Ok].

2) How to delete Configuration global variable

- Select the item to delete from the list box of global variable.
- Click [Delete].

3) How to edit Configuration global variable

- Select the item to modify from the list box of global variable list.
- Click [Edit].
- Input by using the same method as that of adding.

Point

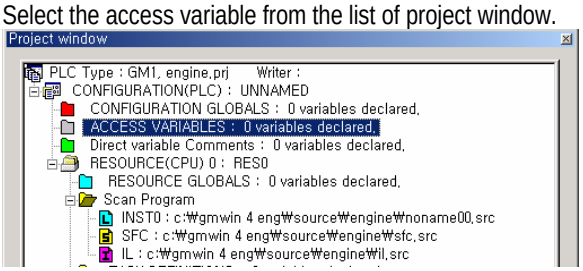
The number of global variable to use is limited.

◆There is no limit for the number of global variables.

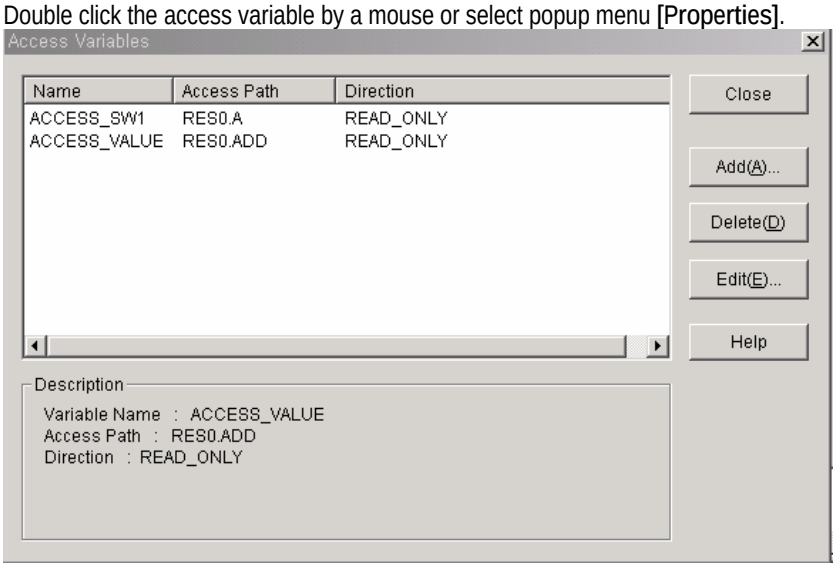
4.3.4 How to make Access Variable

Access variable is used to protect other data except those declared as access variable by limiting the right only to the one declared as access variable when other PLC (other configuration) tries to read and write its PLC information. It means that other PLC is available to access to the variable declared here and the right to access is limited only by read or read and write.

- Select the access variable from the list of project window.

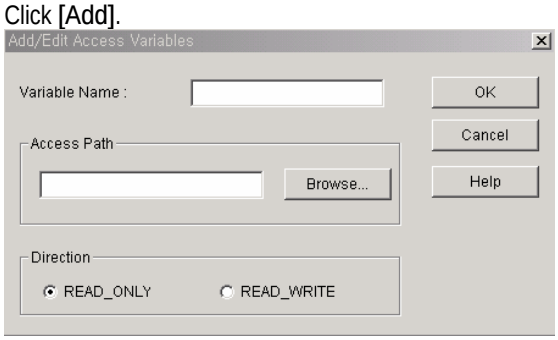


- Double click the access variable by a mouse or select popup menu [Properties].



1) How to add Access Variable

- Click [Add].



- Input the variable name to the access variable name input column. Only Capital letter is available for the name of access variable.
- Input access path to the access path column. The examples of access path input is as follows :

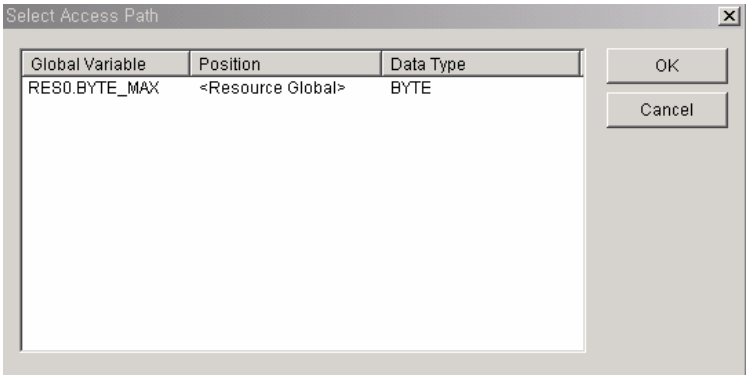
In case of GM1

Available input access path	Examples
Configuration global variable	A, VALVE1
Resource global variable	Resource name/global variable name ==> RES1.A
Direct variable	Resource name/direct variable ==> RES1. %I0.0.0

In case of GM2~7

Available input access path	Examples
Resource global variable	Global variable name only used ==>A
Direct variable (except GM1)	Direct variable only used ==> %I0.0.0

- Press [Browse] to select access path.



- Select option button [DIRECTION]. (one between READ_ONLY and READ_WRITE)
- Click [OK].

2) How to delete Access Variable

- Select the item to delete from list box of access variable list.
- Click [Delete].

3) How to modify Access Variable

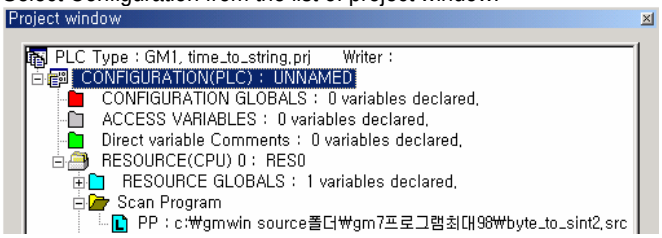
- Select the item to modify from list box of access variable list.
- Click [Edit].
- Input as the same method as that of adding and click [OK].

4.3.5 How to add Resource (only for GM1)

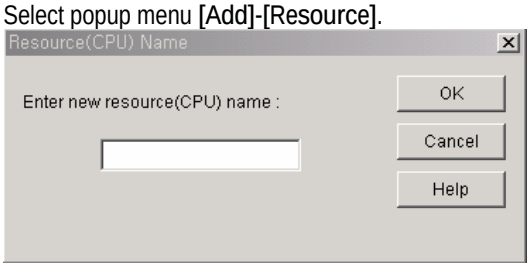
Resource corresponds with CPU of PLC. Therefore, in case of composing the multiple CPU, it is available to use 4 resources for GM1. (Other model except GM1 has 1 resource.)

1) How to add Resource

- Select Configuration from the list of project window.



- Select popup menu [Add]-[Resource].



- Input Resource name in the resource name dialogue box.
- Click [OK].
- New resource is inserted in the project window and Define Program dialogue box appears as like project generation.

2) How to delete Resource

- Select resource to delete.
- Select popup menu [Delete] or press [DEL] key.

4.3.6 How to make Resource global variable

Resource global variable is the variable available to use for all program in the resource. The contents of editing is the same as that of the Configuration global variable.

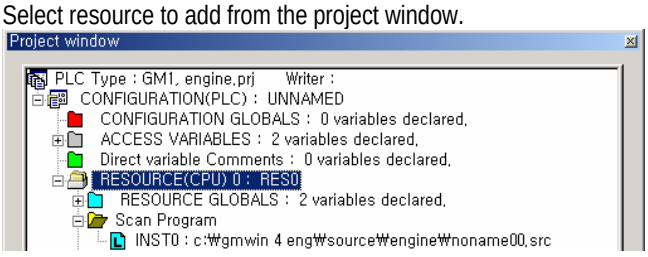
4.3.7 How to add Program

The program defined in this article is the program to be executed actually in PLC.
There are two types of program; Scan program and Task program. In case that several scan programs exist, it is executed according to the defined order and the task program is executed according to the task condition.

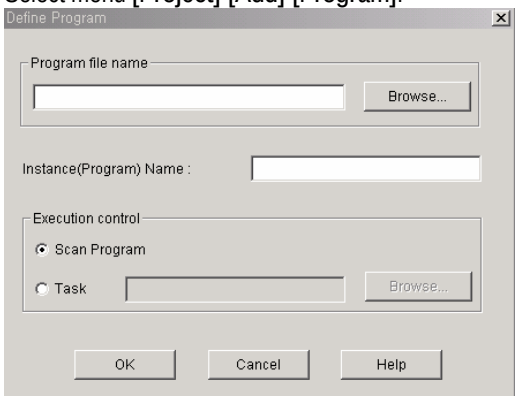
1) How to add Program

Program is divided into Scan program and Task program.
For task program, refer to “4.3.8 how to add Task”.

- Select resource to add from the project window.



- Select menu [Project]-[Add]-[Program].



- Input instance name (program name) to the instance name input column.
- Select execution control option button whether to select scan program or task program.
- In case of task program, input task name directly to the task input column or in case of the already defined task, click [Browse] to select the task to use in the task list dialogue box and then click [OK].
- Input the program file name (~.SRC) to be prepared by the user or in case of the already saved file, click [Browse] to select the file from program file selection dialogue box and then click [OK].
- Click [OK].
- New program is inserted in the project window.

2) How to delete Program

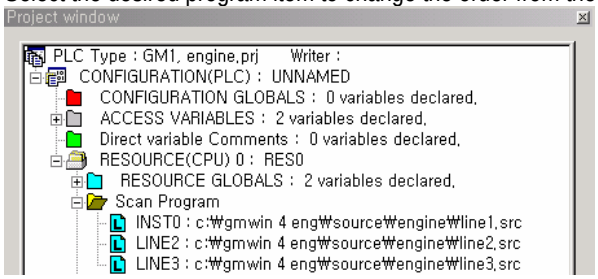
- Select the program to delete.
- Press popup menu [Delete] or press [Del] key.

3) How to modify Program

- Select program from the list of project window.
- Double click the program to modify or select popup menu [Properties].
- Input as the same method as that of adding program and then click [OK].

4) How to move Program order

- Program is conducted according to the order shown on the project hierarchy chart (from up to down). If want to change the order, follow as below.
- Select the desired program item to change the order from the list of project window.

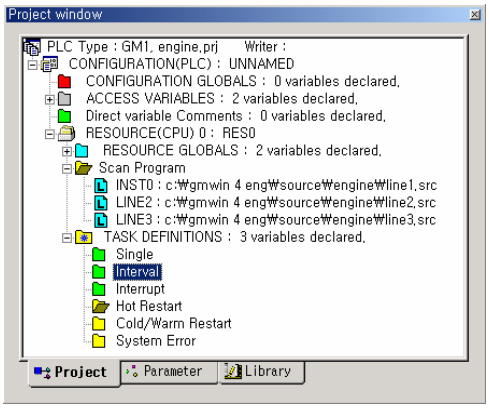


Select popup menu [Project]-[Up(Program)] or [Project]-[Down(Program)].

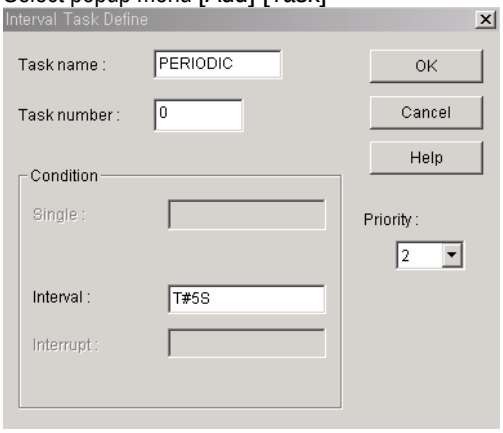
4.3.8 How to add Task

Task is to define the execution condition of program. There are 3 types of task ; Single, Interval, Interrupt.

1) How to add task



- Select the task to edit from the list of project window.
- Select popup menu [Add]-[Task]



- Input task name to the task name input column.
- Input task number as follows.

Executing condition	Task no.
Interval	0 ~31
Interrupt	32 ~47 (GM4:32 ~39)
Single	48 ~63

But, for interrupt, it is automatically set as the interrupt no. and relevant task no. is designated.
The Task no. of GM6,7 is automatically set according to the priority.
The task of GM6,7 are 8 including Interval/ Interrupt/ Single.

In case of Single, the variable name is described as the number, in case of Interval, the proceeding and in case of External, input position of interrupt card. The followings are the input examples available for each case:

(1) In case of Single

Having 'BOOL' Resource global variable	A, VALVE1 etc.
Having 'BOOL' direct variable	%IX0.0.0, %QX0.1.1, %MX10 etc.

(2) In case of Interval

The constant value showing the proceeding time	T#10S, T#1H10M10S10MS etc.

(3) In case of Interrupt

Interrupt no. (available up to GM1~3:0~15, GM4~7: 0~7)	0, 1, 2 .. 15
(GM6/7 : Direct variable %I)	%IX0.0.0

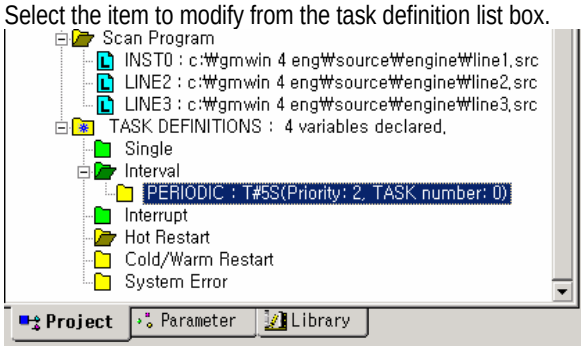
- Select the priority from priority list box. The priority is available from 0 to 7 and the small number has the high priority.
- Click [OK].

2) How to delete task

- Select the item to delete from the task definition list box.
- Press popup menu [Delete] or [Del] key.

3) How to modify task

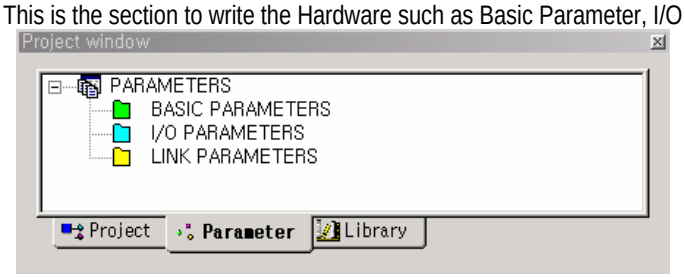
- Select the item to modify from the task definition list box.



- Double click the task to modify by a mouse or select popup menu [Properties].
- Input as the same method as that of adding task and click [OK].
- Move one by one.

4.4 How to set Parameter

This is the section to write the Hardware such as Basic Parameter, I/O Parameter, Link Parameter etc.

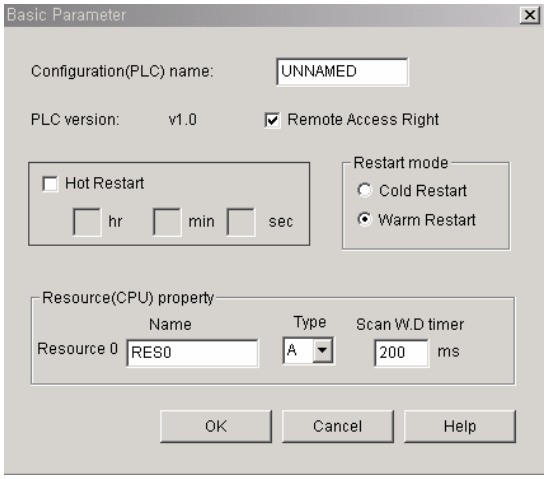


4.4.1 How to edit Basic parameter

It sets the basic parameter.

◆ Double click the basic parameter by a mouse from parameter window of project window.

1) In case that the using PLC is GMR,GM2,GM3,GM4,



◆ Input the PLC name to configuration (PLC) name input column.
PLC name is available to write 8 alphabet letters (4 Korean letters) and the name written here becomes the configuration name.

◆ Application PLC version indicates the PLC version available in current GMWIN version.
That is, the available PLC version should be more than V1.0.

◆ Set whether or not to allow remote access right(Default value : allowed)

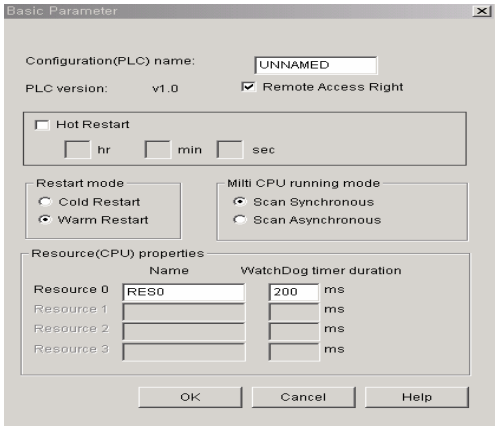
◆ Press Hot restart item to set hot restart.
If selecting the hot restart , it is required to set hot restart time as second unit from one second to 23h59m59s.

◆ Press option button of restart mode to select a cold restart or warm restart.

◆ Write the resource name. The resource name is available to write 8 Alphabet letter (4 Korean letter).

◆ Set the watch dog time. It is available to set the time as 1[ms] unit up to max. 655359[ms].
But, for GM7, it is available to set up to max. 5000ms.

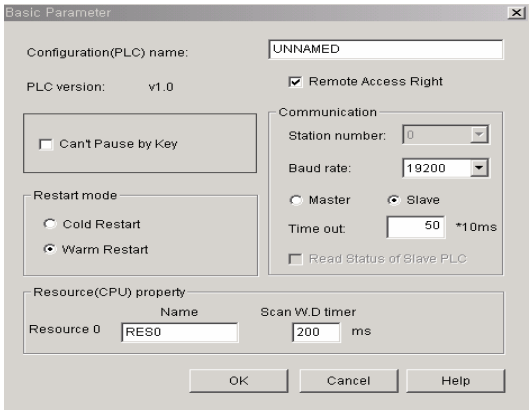
1) In case that the using PLC is GM1,



◆ Press the option button of multi CPU operation mode scope to select whether or not to scan synchronous or asynchronous in the GM1 multi CPU system. (Applied only for GM1. Refer to GM1 instructions)

◆ For GM1, it is available to set Resource 0 ~ 3.
(In case of having the 3 installed CPUs, it is required to set up to Resource 2.)

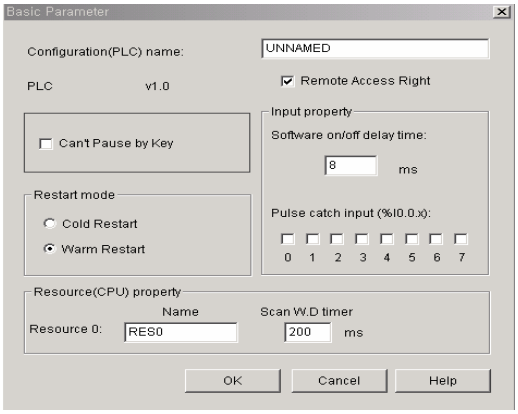
2) In case that the using PLC is GM6,



◆ For GM6, 7, it is available to select “Can’t pause by key”. If selected, it maintains the run mode despite of placing the key switch on PAUSE mode of CPU.

◆ For GM6, there is communication setting mode. In case of using the built-in communication of CPU, it is required to set station number, communication speed, master/slave, time out etc. in this mode.
(For further information, refer to GM6 instructions.)

3) In case that the using PLC is GM7,



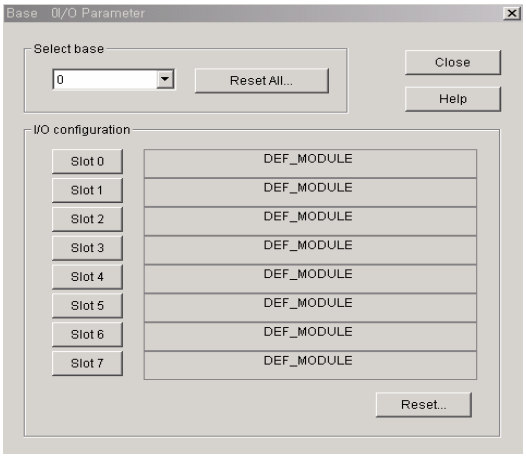
For GM7, it is available to set “Software on/off delay time” and “Pulse catch input” function in the input column.(For further information, refer to GM7 instructions.)

4.4.2 How to set I/O Parameter

It sets I/O parameter.

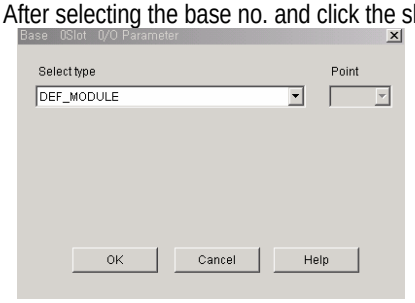
◆ Double click I/O parameter from parameter window of Project window.

1) In case that the using PLC is GM3, GM4, GM6,



◆ The initial value shall not be detected as an error even if any module is installed in the I/O as default.

◆ After selecting the base no. and click the slot to select by a mouse.



◆ After selecting I/O type and point, click **[OK]** and it shall be set as the selected module.

◆ If click **[Reset All]** from base selection, I/O parameter set in all base shall be changed with DEF_EMPTY.

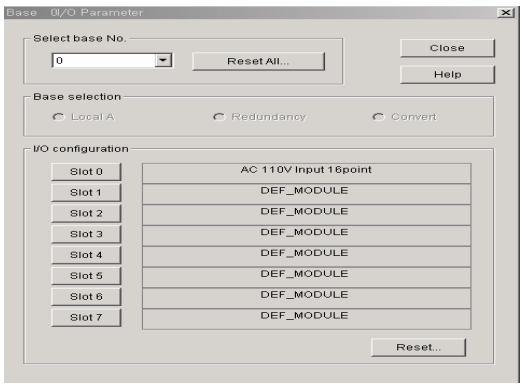
◆ If click **[Reset]** from I/O type setting, I/O parameter set in the slot within the selected base shall be changed with DEF_EMPTY.

Point

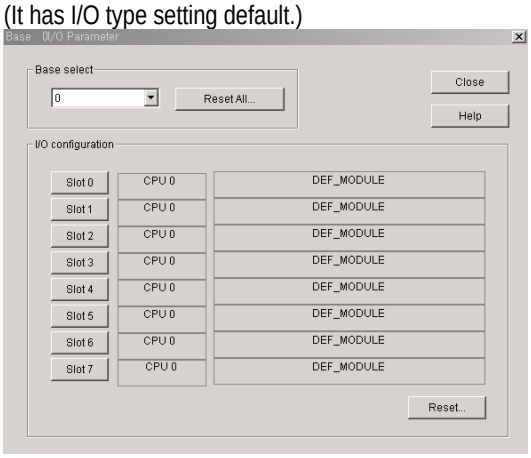
To read the currently installed I/O and write it to the I/O parameter, refer to Chapter 8 How to monitor, I/O synchronization.

2) In case that the using PLC is GMR, GM1, GM2,

1. For GMR, there is base setting column as follows.(For further setting method, refer to GMR instructions.)



2. For GM1 CPU, the CPU composition item is added and displayed as follows.
(It has I/O type setting default.)



3. For GM7, it is not needed to set I/O parameter.

◆ If selecting Base no. to set from base selection, the setting contents of the selected base shall be output in the I/O type setting list.

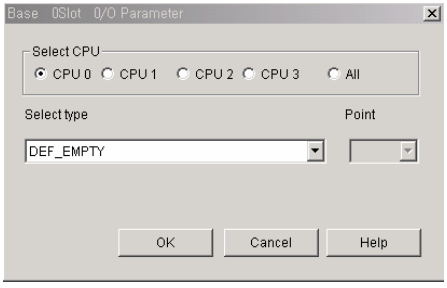
◆ If click **[Overall Delete]** from base selection, the I/O parameter set in all base shall be changed with DEF_EMPTY.

◆ If click **[Delete]** from I/O type setting, the I/O parameter set in the slot within the selected base shall be changed with DEF_EMPTY.

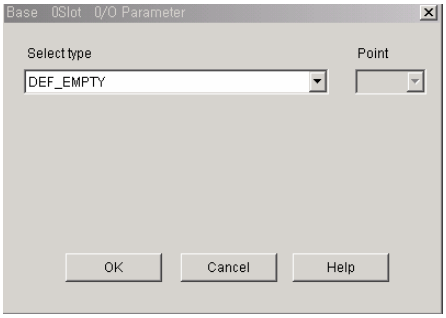
◆ Base setting range of each PLC Series.

PLC type	Setting range
GMR	Base 0 ~ 15
GM1	Base 0 ~ 31
GM2	Base 0 ~ 7
GM3,4	Base 0 ~ 3
GM6	Base 0 ~ 1

◆ To set the I/O parameter for each slot in the I/O type setting, if selecting the relevant button of the desired slot no. to set, the base slot I/O parameter dialogue box appears as below. After selecting the desired item from the I/O type selection of the dialogue box and the point suitable for I/O from the point item, click **[OK]**.



GM1



GM2 ~ GM6

Point

GM1 CPU have a item to select the CPU.

Reference

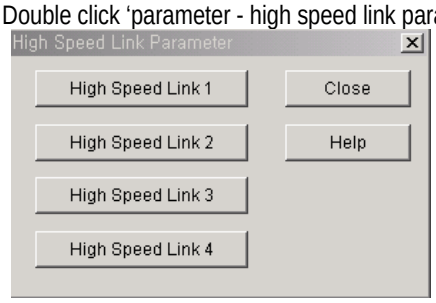
The I/O type name used as basic value is as follows:

I/O type name	Description
Input	If input module is not installed in the selected slot in power input, “module type inconsistent error” occurs.
Output	If output module is not installed in the selected slot in power input, “module type inconsistent error” occurs.
I/O	If I/O module is not installed in the selected slot in power input, “module type inconsistent error” occurs.
Special	If special module is not installed in the selected slot in power input, “module type inconsistent error” occurs.
Default	If any module is installed in the selected slot in power input, error does not occur.
Empty slot	If a module is installed in the selected module in power input, “module type inconsistent error” occurs.

4.4.3 How to set High Speed Link Parameter

It sets high speed link parameter.

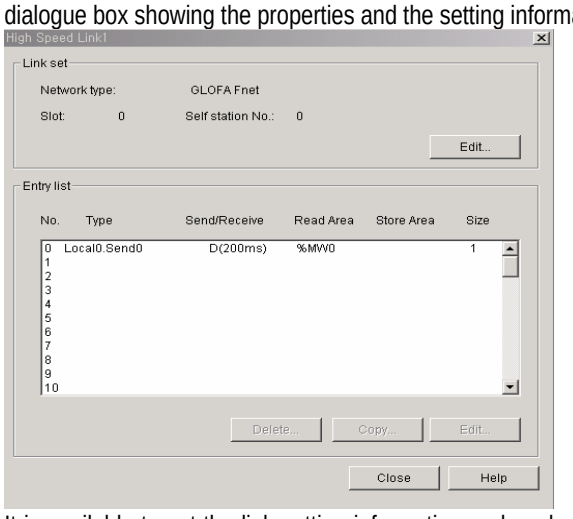
◆ Double click ‘parameter - high speed link parameter’ from project window.



Point

1. The composition to set high speed link parameter according to PLC type is as below.
   GM1/2/3: high speed link 1~ 4, GM4/6: high speed link 1 ~ 2,
2. For GM7, it is available to set high speed link parameter from communication parameter.

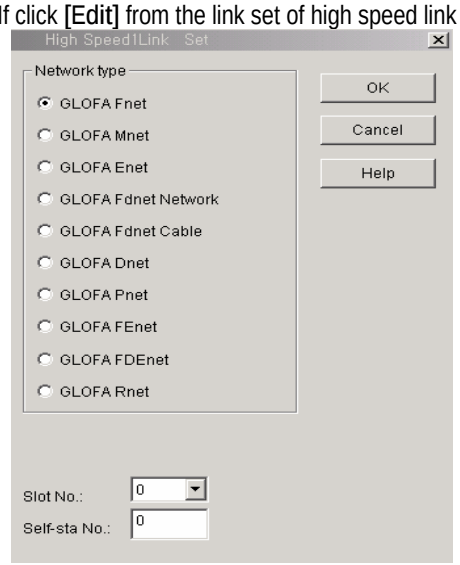
◆ If pressing the button of high speed link no. to set from high speed link parameter dialogue box, the high speed link dialogue box showing the properties and the setting information of the selected link appears.



◆ It is available to set the link setting information and each properties in the high speed link dialogue box. For entry list, the multiple selection is available : Available to use the relevant button for delete, edit, copy or use the Del key for delete or use Ctrl+C/Ctrl+V key for copy/put.

1) How to set Link

◆ If click [Edit] from the link set of high speed link dialogue box, the high speed link setting dialogue box appears.



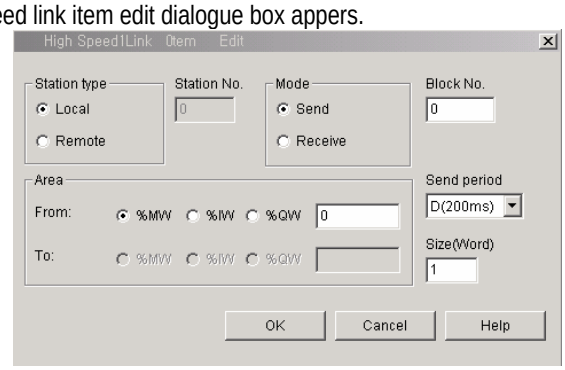
◆ Select the link module in the network type.

◆ Designate the link module installed slot no.

◆ Designate the station number.

2) How to add Entry list

◆ After selecting the entry list no. to set from the high speed link dialogue box, click [Edit] or double click and the high speed link item edit dialogue box appers.



◆ Select the station type (Remote or Local) from the station type.

◆ Set the station no.

◆ Select whether to send or receive a data from mode.

◆ Designate the block no.(available to split the area to send a data.)

◆ Select the send period. (A: 20ms, B: 50ms, C: 100ms,D: 200ms, E: 500ms, F: 1S, G: 5S, H: 10S)

◆ Set the send/receive area from the area. Select each area by option button and input the address in each input column.

◆ Set the data size to communicate in the size input column.(by WORD unit)

3) How to delete Entry List

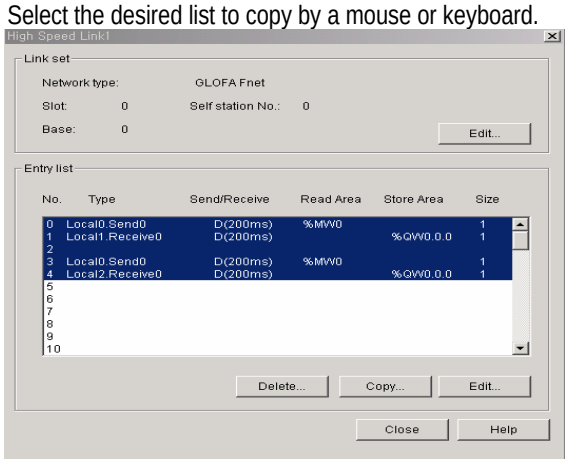
◆ After selecting the entry list no. to delete from the high speed link dialogue box, click [Delete] or press [Del] key.

◆ To delete the selected entry list, click [OK] and if not, click [Cancel].

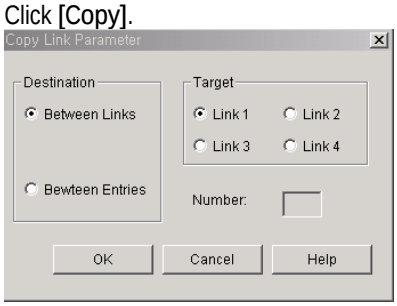
4) How to copy Entry list

(1) Copy between links

◆ Select the desired list to copy by a mouse or keyboard.



◆ Click [Copy].



◆ After selecting [Between Links] from Destination, select the link to copy.

◆ If click [OK], the copy is completed.

Point

The method to select the entry list is as below :

(1) How to select several list arranged in order

◆ Press the first desired entry list.

◆ Press the left button of mouse and drag it to the desired entry list.

◆ After moving the selection cursor to the entry list by using a Tab key, move to the first desired entry list by using an arrow key.

◆ Press Shift key and at the same time select the final desired entry list by using an arrow key.

(2) The method of multi selection of the several split list

◆ Press Ctrl key and at the same time click each entry list no.

◆ After moving the selection cursor to the entry list by using a Tab key, move to the first desired entry list by using an arrow key.

◆ If press Shift + F8 and detach, the selection cursor starts to flicker

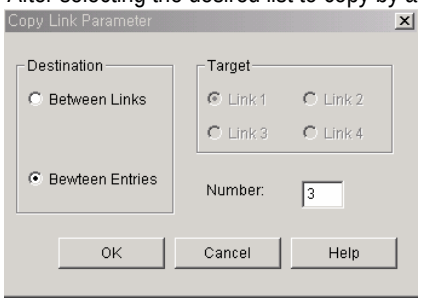
◆ Select the desired entry list by using an arrow key.

◆ Press the space key to select each entry list.

◆ After completing the selection, press again Shift + F8.

(2) Copy between entries.

◆ After selecting the desired list to copy by a mouse or keyboard, click **[Copy]**.



◆ After selecting **[Between Entries]** from copy method, input the entry no. to copy.

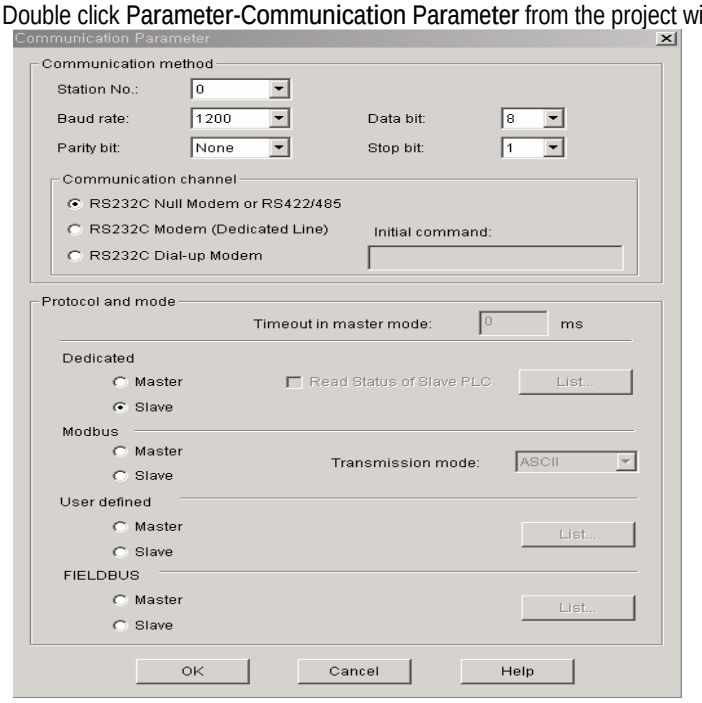
◆ Click **[OK]** and the copy is completed.

(3) Except the above methods, after selecting the desired item to copy by a mouse or keyboard, press Ctrl+C to copy and after placing the cursor on the desired position, put the copied contents by pressing Ctrl+V.

4.4.4 How to set Communication Parameter

For GM7, it sets communication mode, protocol and transfer mode.

◆ Double click **Parameter-Communication Parameter** from the project window.



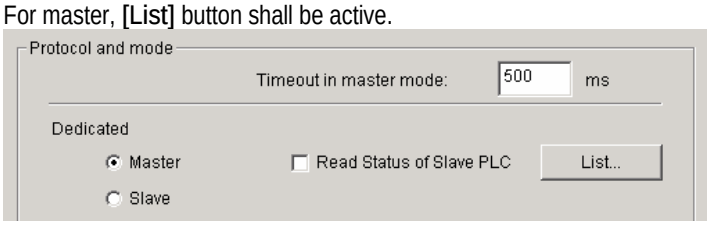
◆ Set Communication mode as below.

Items	Description
Self Station No.	Available to set from station 0 to station 31. (*Note1)
Baud Rate	Available to set as 1200, 2400, 4800, 9600, 19200, 38400, 57600 bps.
Data bit	Available to set as 7 or 8 Bits. (*Note2)
Parity bit	Available to set as No, Even, Odd.
Stop bit	Available to set as 1 or 2 Bit(s). (*Note3)
Communication channel	• RS232C channel modem or RS422/485 : Communication channel to select for communication by using the built-in function of GM7 basic unit and Cnet I/F module (G7L-CUEC). • RS232C dedicated modem : Communication channel to select in case that the modem used for modem communication by the use of Cnet I/F module (G7L-CUEB) is the dedicated modem. • RS232C dial up modem : communication channel to select in case that the modem used for modem communication by the use of Cnet I/F module (G7L-CUEB) is general dial up modem. Note) RS232C dedicated modem and RS232C dialup modem communication shall be done only in Cnet I/F module (G7L-CUEB) that supports RS232C and not in Cnet I/F module (G7L-CUEC) that supports RS422/485.
Timeout in master mode	• Time to wait the reply frame after sending the demand frame from GM7 basic unit set as master. • Default value is 500ms. • Set this considering maximum sending/receiving period time of master PLC. • If setting the value smaller than maximum sending/receiving period time, the communication error occurs.
Master / Slave	If setting as master, it shall be the subject of communication system and it is available to write and read a data in the device (PLC) designated as Slave.
Slave State read	Set this in case of reading the GM7 basic unit state designated as Slave. Do not select this except for monitoring the state of slave. This may be the cause to slow down the communication speed. (available to set only for dedicated protocol.)
Transmission mode	Available to select either ASCII mode or RTU mode. (available to set only for Modbus protocol)

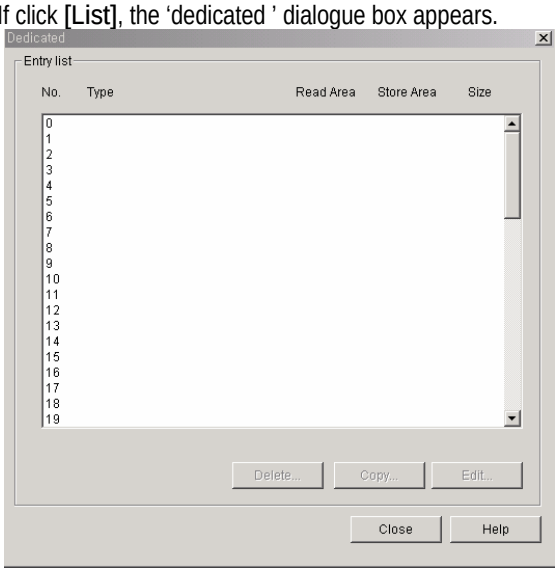
*Note1) For Modbus, do not designate station '0' as broadcast station number.
It may be the cause of malfunction.
But, for GM7, the broadcast is not supported.
*Note2) For Modbus, set ASCII mode as 7 Bits and RTU mode as 8 Bits.
*Note3) For Modbus, in case that the parity bit is set the stop bit shall be 1 and in case that the parity bit is not set, the stop bit shall be set as 2Bits.

1) Dedicated communication

◆ Set the protocol as dedicated and select [Master] or [Salve].
For master, [List] button shall be active.

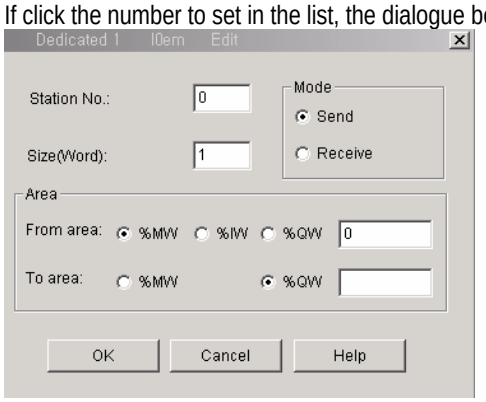


◆ If click [List], the 'dedicated ' dialogue box appears.



◆ It is available to set the information of each list from the above dialogue box. By selecting the multi selection for registration list, it is available to use the relevant button for Delete, Edit, Copy etc. or use Del key for Delete and Ctrl+V/Ctrl+C for Copy/Edit.

◆ If click the number to set in the list, the dialogue box to set the list properties appears.



◆ In case of writing a data to Slave station from mode, select 'send' and in case of reading a data from Slave station, select 'receive'.

◆Set the slave number (partner station) to the partner station number input column.

◆Set the data size to communicate in the size input column by WORD unit. It is available to define maximum 60 words.

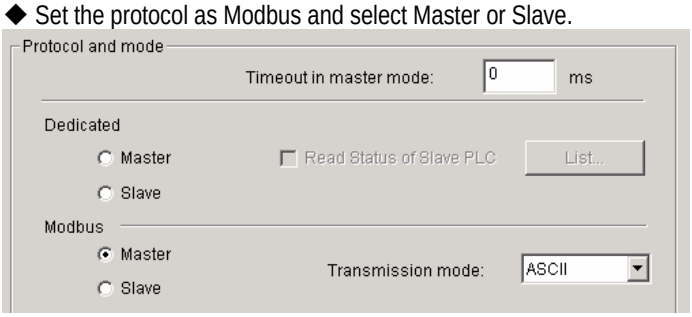
◆Set the sending and receiving area and address in the area.

Point

1. If selecting %MW0, select %MW and input '0' in the side blank.
2. If selecting %QW0.1.0, select %QW and input '0.1.0' in the side blank.

2) Modbus communication

◆ Set the protocol as Modbus and select Master or Slave.



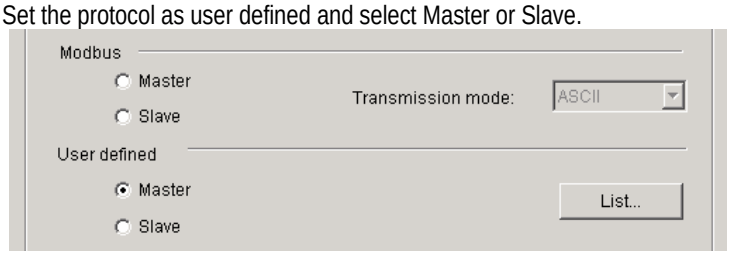
◆ Select the transmission mode of Modbus.

Point

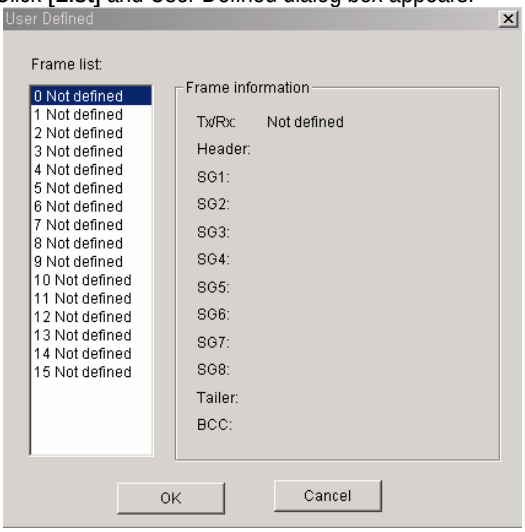
1. Modbus communication uses function block (MOD0102,MOD0203,MOD0506,MOD1516). For details, refer to GM7 instructions '8.3 Modbus Protocol Communication'.

3) User defined communication

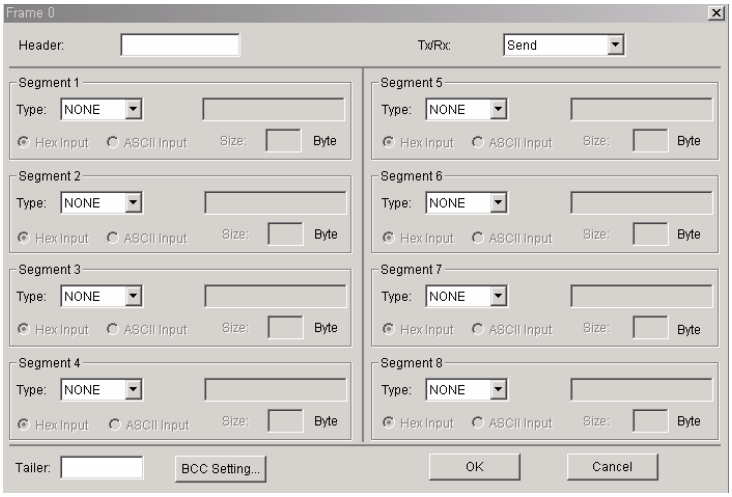
◆ Set the protocol as user defined and select Master or Slave.



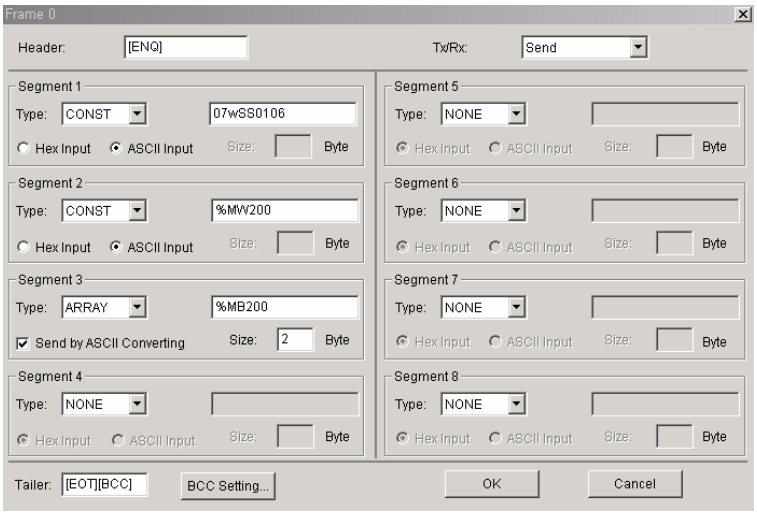
◆ Click [List] and User Defined dialog box appears.



◆ Click the frame no. to set from the registration list and the dialogue box to set the frame information appears.



◆ Select send or receive in Tx/Rx.
◆ Input header, segment, tail for each frame.



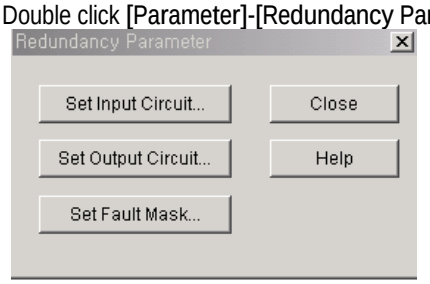
Point

For further information, refer to GM7 instructions '8.2 the User Defined Protocol Communication.

4.4.5 How to set Redundancy Parameter

It sets Redundancy Parameter.

◆ Double click **[Parameter]-[Redundancy Parameter]** of project window.

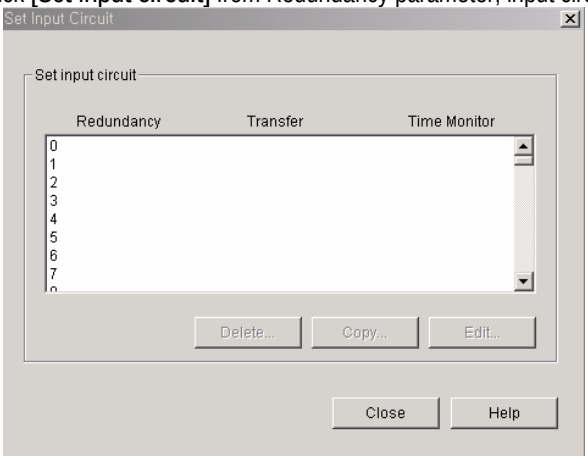


Press Redundancy button to set from Redundancy Parameter dialogue box and the related dialogue box appears.

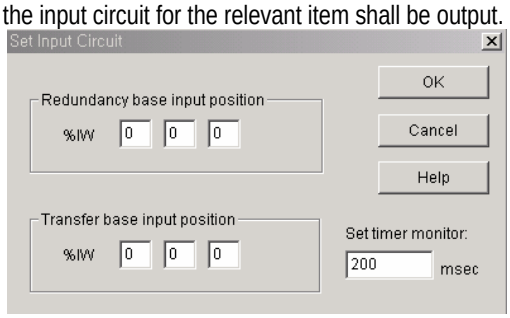
1) How to set input circuit

This is a dialogue for input triple setting.

If click **[Set Input circuit]** from Redundancy parameter, input circuit setting dialogue box appears.



If double click the item to set from input circuit setting dialogue box or click **[Edit]**, the input circuit setting dialogue box to set the input circuit for the relevant item shall be output.



Triple input means that after designating 3 input modules, the input data that more than 2 input values from 3 modules match each other is used as the input value of program. At this time, input module should have the same duplicate base, 2 input module installed in the slot and 1 input module installed in the conversion base. The input circuit setting item is as below.

◆ Redundancy base input position

It designates the position and channel of input module installed in redundancy base for triple input. As input module should be installed in the same base and same slot of CPU A/B side, there is only one position designation item. The base designated at this time should be the base set as redundancy I/O from base setting dialogue box.

◆ Conversion base input position

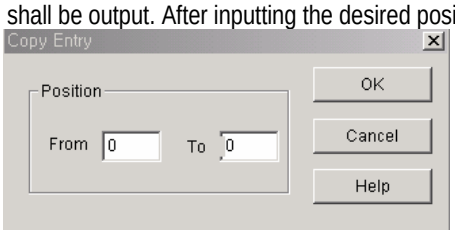
It designates the position and channel of input module installed in the conversion base for triple input. The base designated at this time should be the bas set as conversion I/O from base setting dialogue box.

◆Set time monitor

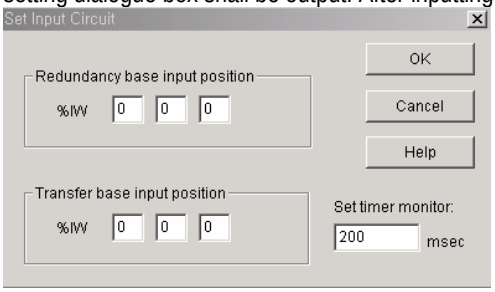
This is the time value that allows the temporary input value inconsistency caused by the delay of input module.

◆ To delete the selected list, select the desired item to delete first and then click [Delete].

◆ To copy the selected list, select the desired item to copy first and then click [Copy]. A copy dialogue box per item shall be output. After inputting the desired position in the desired position to copy, click [OK].

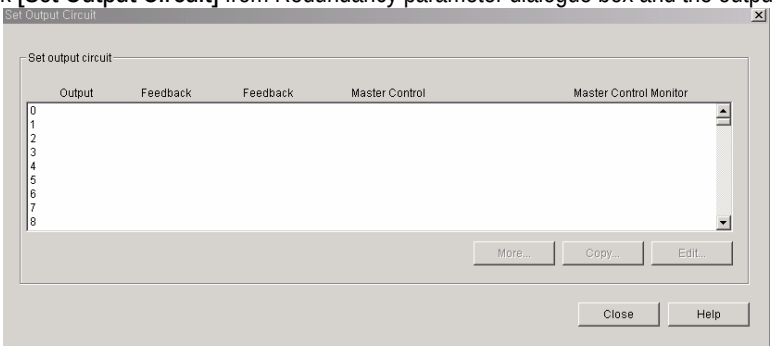


◆ To modify the selected registration list, select the desired item to modify first and then click [Edit]. The input circuit setting dialogue box shall be output. After inputting the desired value, click [OK].

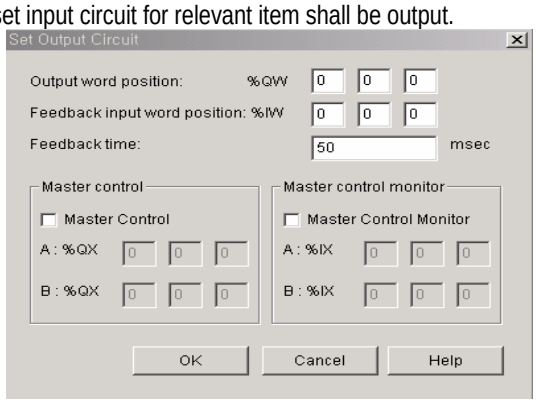


2) How to set output circuit

Click [Set Output Circuit] from Redundancy parameter dialogue box and the output circuit setting dialogue box appears.



Double click the item to set from output circuit setting dialogue box or click [Edit], the output circuit setting dialogue box to set input circuit for relevant item shall be output.



◆ Output word position

It designates the position and channel of output module to compose by redundancy. The base designated at this time should the base set as Redundancy I.O from the base setting dialogue box.

◆ Feedback input word position
This designates the position and channel of feedback input module when composing the redundancy by the type O-F mode. The base designated at this time should be the base set as redundancy/conversion I/O in the base setting dialogue box.

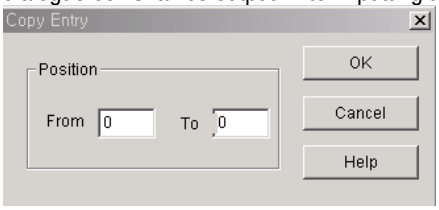
◆ Feedback time
This sets the time that allows the temporary inconsistency between output value and feedback input when composing the redundancy of output as type O-F mode.

◆ Master control
This designates output position for power cutoff and contact no. when composing the redundancy of output as type O-FP mode. The base designated at this time should be the base set as redundancy/conversion I/O in the base setting dialogue box.

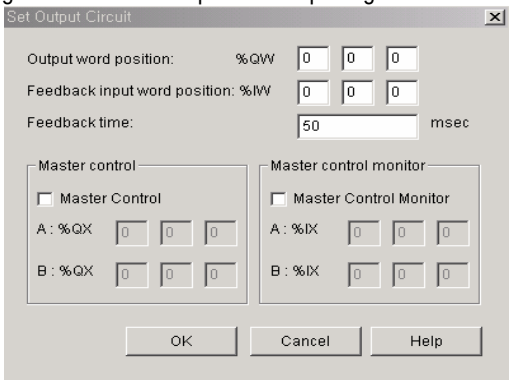
◆ Master control monitoring
This designates input position and contact no. to monitor the output for power cutoff. The base designated at this time should be the base set as redundancy/conversion I/O in the base setting dialogue box.

◆ To delete the selected registration list, select the desired item to delete first and click [Delete].

◆ To copy the selected registration list, select the desired item to copy first and click [Copy]. The copy per item dialogue box shall be output. After inputting the desired position to copy, click [OK].

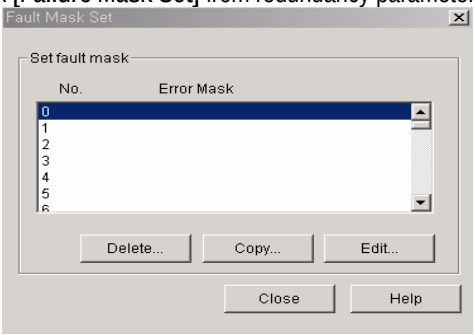


◆ To modify the selected registration list, select the desired item to modify and click [Edit]. The output circuit setting dialogue box shall be output. After inputting the desired value, click [OK].

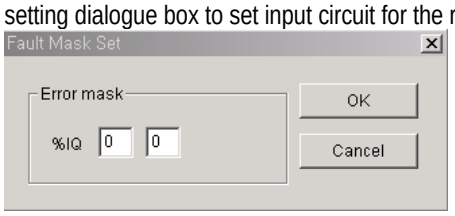


3) How to set failure mask

If click [Failure Mask Set] from redundancy parameter dialogue box, the failure mask setting dialogue box appears.



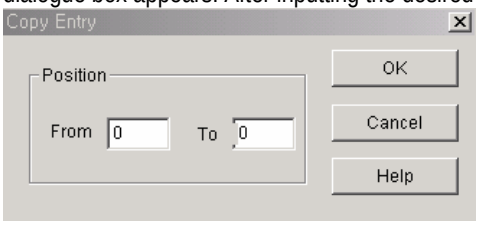
◆ Double click the desired item to set in the failure mask setting dialogue box or click [Edit] and the failure mask setting dialogue box to set input circuit for the relevant item shall be output.



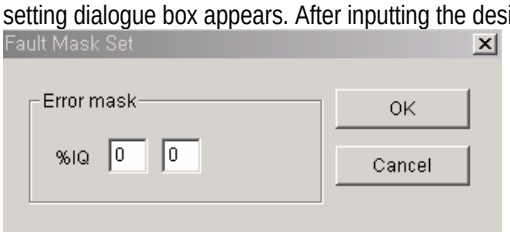
◆ Prompt action module position in case of failure
It is available to designate the prompt action module position in case of failure regardless of the base setting state.

◆ To delete the selected registration list, select the desired item to delete first and click [Delete].

◆ To copy the selected registration list, if you select the desired item to copy first and click [Copy], the copy per item dialogue box appears. After inputting the desired position to copy, click [OK].



◆ To modify the selected registration list, if you select the desired item to modify first and click [Edit], the failure mask setting dialogue box appears. After inputting the desired value, click [OK].

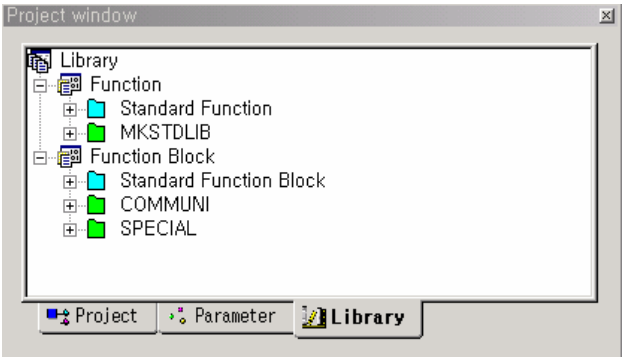


4.5 How to edit Library

4.5.1 Composition of Library

It is available to add and delete library file.
Library has the following hierarchy structure.

Items	Description
Function	Function library file list inserted currently
Function block	Function block library file list inserted currently



As library saves function/function block that the user can use in the program by dividing into file, it is available to call and write it if necessary or make new library file (the command prepared by the user) according to the user's convenience.

4.5.2 The type of library file

Library file is an aggregate of function or function block.

Library file	Extend	Examples
Function library	. * FU	stdlib.3fu: Standard function library for GM3
Function block library	. * FB	special.3fb: Standard function block library for GM3

Point

. from *FU and .*FB, * indicates the relevant PLC type.
(For GM3, it shall be .3FU.)

The library file classified according to the usage is as follows:

Type of library file	Description	Example
Standard library	The gathering file of basic function/ function block (Available to use promptly by calling from the program)	stdlib.*fu, stdlib.*fb
Dedicated library	The gathering file of function block used for special/ communication module (A/D, D/A, Link etc.)	special.*fb, communi.*fb
Extension library	Library file provided by the manufacturer for the convenience of the user using the existing product.	APP.*fu APP.*fb (MASTER-K related library)
User definition library	Library file made directly by the user.	(user defined name).*fb

4.5.3 How to load Library

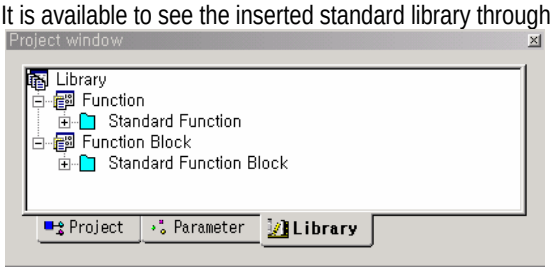
1) How to load standard library

Standard library is automatically loaded when executing GMWIN program from the directory designated in the dialogue box which appears when selecting menu [Project]-[Option]-[Directory].

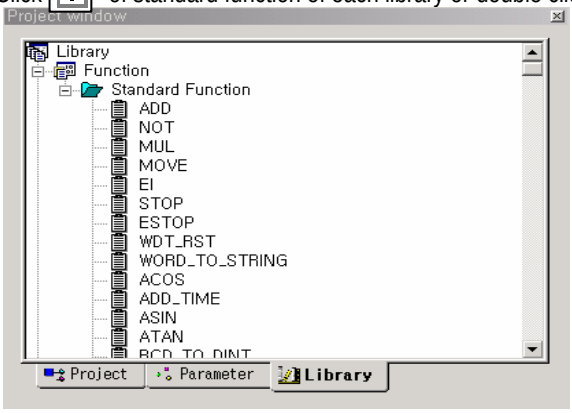
Point

To change the directory, refer to “2.2.3 GMWIN related directory setting”.

◆ It is available to see the inserted standard library through library window.



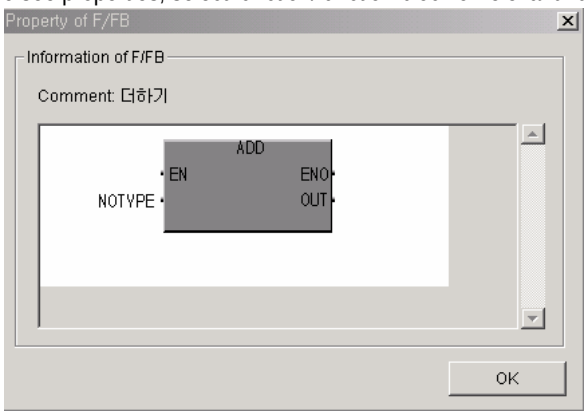
◆ Click [+] of standard function of each library or double click to see function/ function block list.



Point

View library properties.

◆ To see properties, select function/function block of relevant library and then select popup menu [Properties].



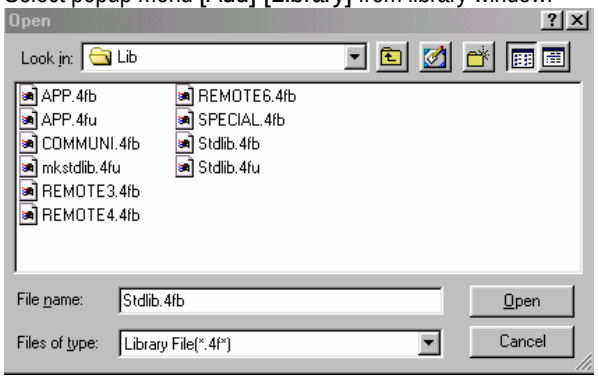
Point

If “stdlib.*fu” and “stdlib.*fb” (* is the relevant PLC type. For GM1, it shall be stdlib.1fu) does not exist in the designated directory, the error message “not available to open” appears when you open project. In this case, it is required to input the directory that standard library exists correctly in the menu [Project]-[Option]-[Directory] dialogue box or copy the standard library file to the selected directory.

2) How to load dedicated/extension library and the user defined library

It is available to select and load the dedicated/extension library and the user defined library according to the user’s convenience.

◆ Select popup menu [Add]-[Library] from library window.

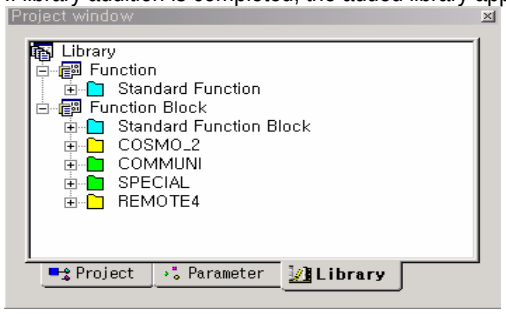


◆ Select the desired library from Open dialogue box and click [Open].

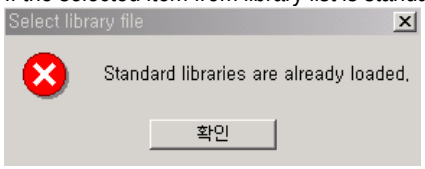
The library provided by the manufacturer and the user definition library appears in the library list as the above dialogue box.

(1) communi.3fb : communication related function block (Cnet, Fnet, Mnet)
(2) APP.3fu : MASTER-K PLC related function
(3) special.3fb : special module function block for GM3
(4) remote3.3fb : special module function for GM3 in REMOTE communication

◆ If library addition is completed, the added library appears in the project screen.

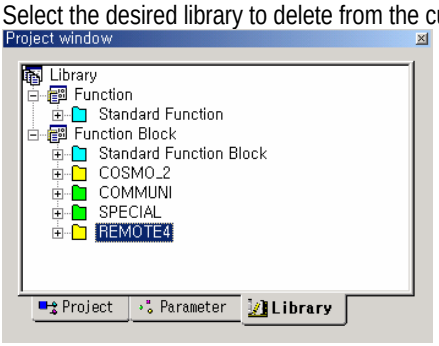


◆ If the selected item from library list is standard library when adding library, the error message appears as below.

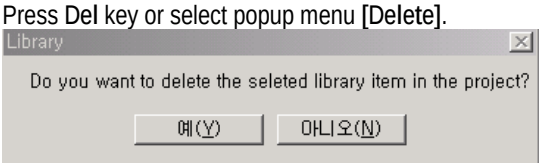


The method to delete the inserted library is as below.

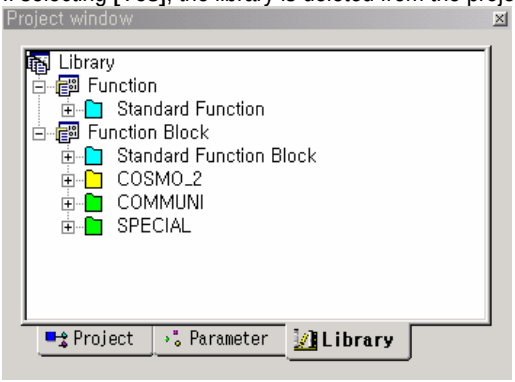
◆ Select the desired library to delete from the currently inserted library list box.



◆ Press **Del** key or select popup menu **[Delete]**.



◆ If selecting **[Yes]**, the library is deleted from the project window.



Chapter 6. How to write Program

6.1 How to make Execution File

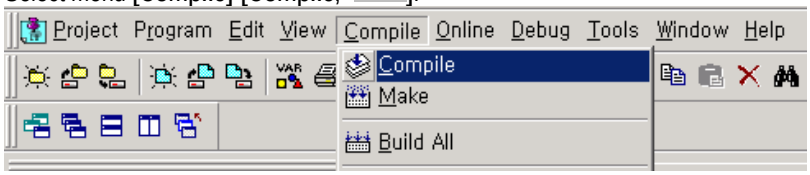
Execution file is the file to be saved in PLC memory and the generating processing is as follows.

1) Program Compile
This is the function to compile the program defined as program instance in the project.
In this case, it analyzes the program and searches error and if there is no error, it generates the object file for one file.
Object file name: program file name. OP3 (in case that PLC type is GM3)
2) Project Make (execution file generation)
This is the function to bind the object file generated from program compile each other.
In this case, it searches global variable, function/function block error and generates one execution file.
Execution file name: project file name. BN0
But, in GM1, the execution file is generated as much as the number of the defined resource.
(Project file name. BN1, project file name. BN2,...)

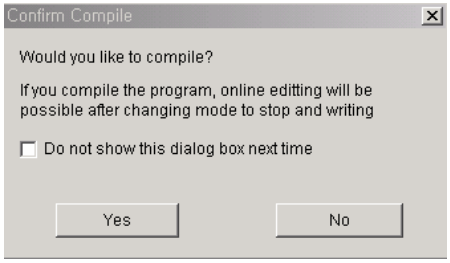
6.1.1 Compile

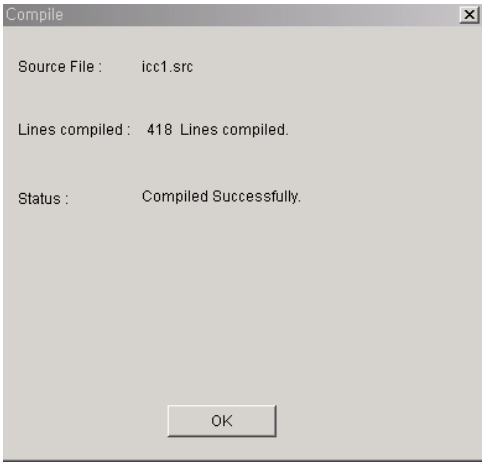
Execute 'compile' for the currently active program window and generate the object file.

- Select menu [Compile]-[Compile,].

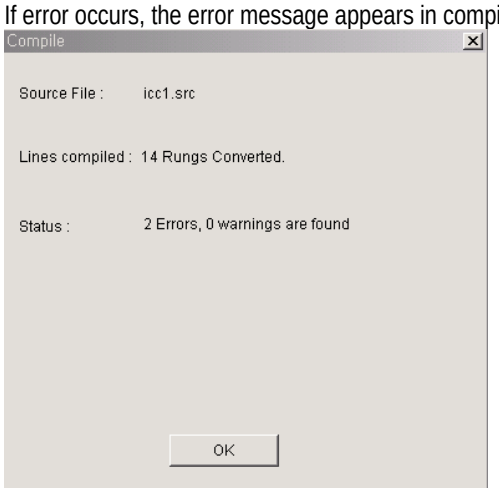


- If compile is completed without error, it appears as below.

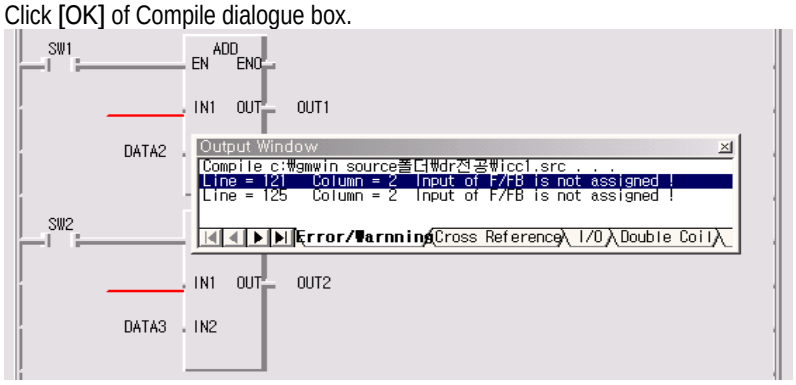




◆ If error occurs, the error message appears in compile dialogue box and the object file is not generated.



◆ Click [OK] of Compile dialogue box.



◆ The error part of program is indicated on the program as RED. If you double click the error content in the output window, you can reach the error part.

◆ If there are several error parts, select menu [Compile]-[Previous message] or [Compile]-[Next message] and the cursor moves to the relevant position of error message.

◆ After modifying the error part, execute [Compile] again.

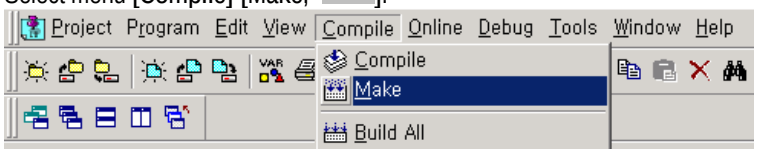
Point

1. In case that it is not the user-defined program, if you select [Make] without compile or [Compile all], the execution file shall be generated after compile.
2. The user-defined program should be required to execute [Compile] to be registered as a library. For details, refer to 'How to make the user defined library'.
3. To open the output window, select menu [View]-[Output].

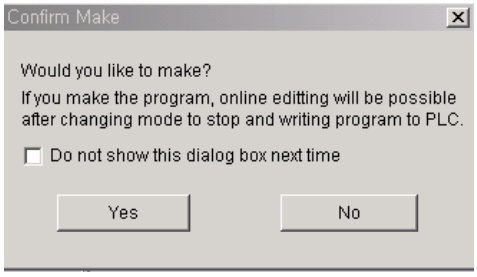
6.1.2 Make

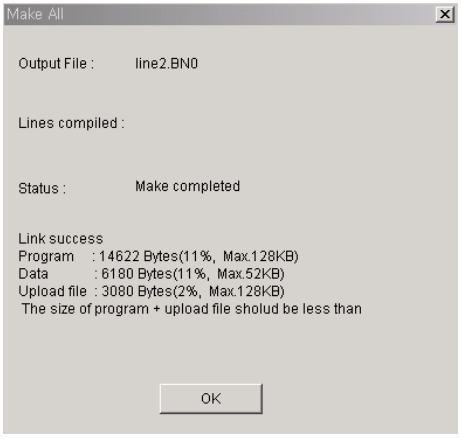
After compiling the program that needs to compile among the programs belonging to the project, execution file is generated.

◆ Select menu [Compile]-[Make,].



◆ Click [OK] from execution file make dialogue box.





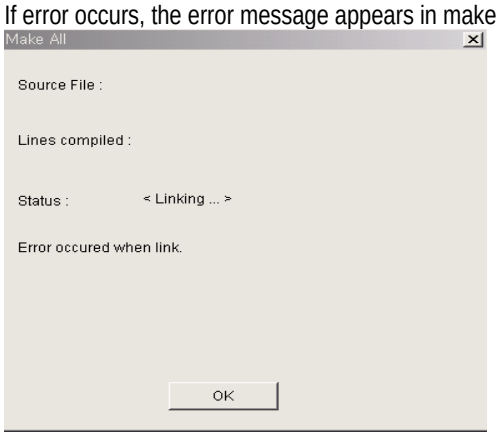
◆ Execution file is made and it shows program size, data size, upload file size.

Point

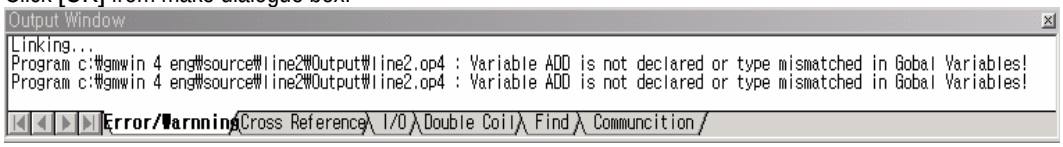
1. The size of program+upload file should be less than 256KB
   256KB is PLC CPU program memory and its capacity depends on PLC CPU.
   If program+upload file is more than PLC CPU program memory, upload file can be written to PLC CPU and shall be written to flash memory / memory pack.
2. In case of writing the upload file to flash memory/memory pack
   After [Online Edit], program of the program memory is renewed but the program of the flash memory/memory Pack is not renewed, in this case user want to write the program to the flash memory/memory pack
   After changing PLC mode switch with STOP, the modified upload file shall be written by menu [Online]-[Flash Memory]-[Write Program].
3. Program size, Data size should be smaller than the allowed size with reference of PLC instructions.
4. Upload program can be saved in flash memory according to the program size.

Program size	Position to save the Upload program
(Execution program + upload program) size < Program RAM size	Saved in CPU RAM.
Program RAM size < (Execution program + upload program) size	In case of flash memory installed, saved in flash memory after verified by user.

◆ If error occurs, the error message appears in make dialogue box and execution file is not generated.



◆ Click [OK] from make dialogue box.

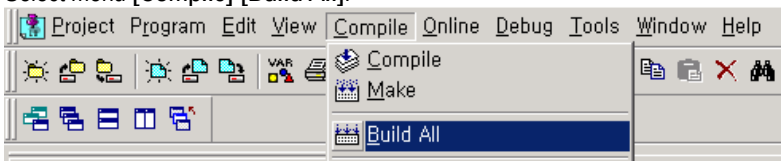


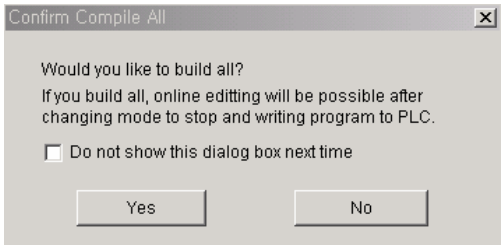
◆ The error content appears in the output window. After modifying the error part, execute [Compile] again.

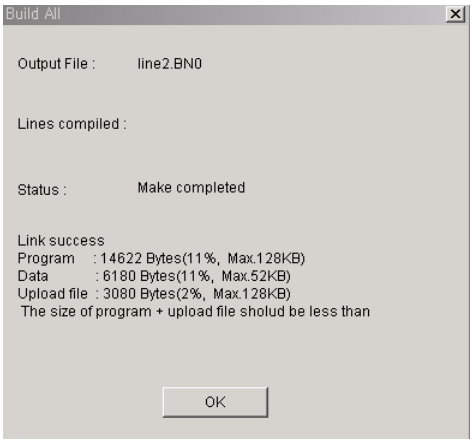
6.1.3 Build All

After compiling all programs belonging to the project, PLC execution file is generated.

◆ Select menu [Compile]-[Build All].







◆ Click [OK] from build all dialogue boxes.

◆ If error occurs, the error message appears in build all dialogue box and execution file is not generated. In this case,

Point

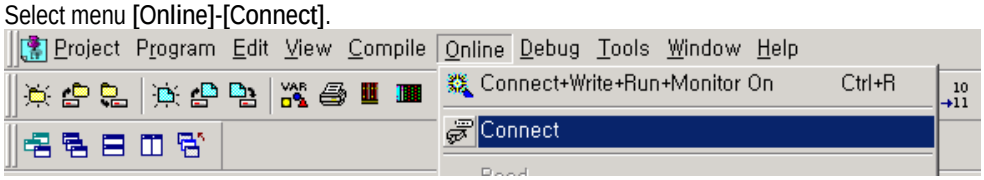
1. If executing only program compile, execution file is not generated.
   That is, it is not available to write program in PLC.
2. When program [Compile], program is saved and when [Make], project is saved. If you don't want to save, you should save as another name and then [Compile] or [Make].

6.2 How to write Program

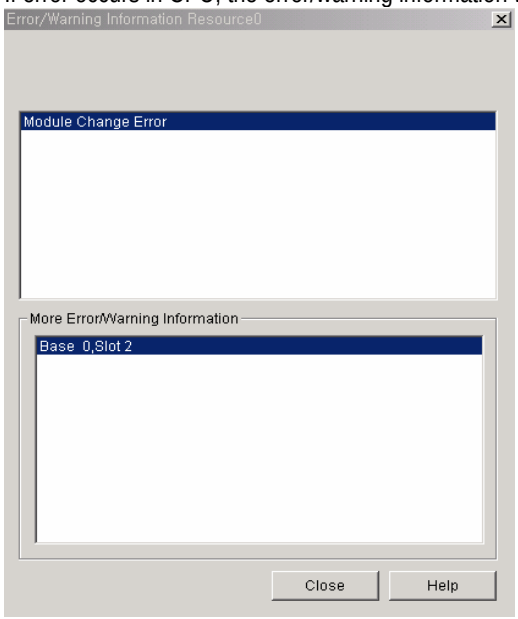
This is the function to write the generated execution file to PLC after compiling the program.

6.2.1 Connect

◆ Select menu [Online]-[Connect].



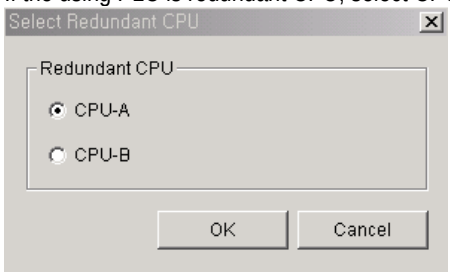
◆ If error occurs in CPU, the error/warning information window appears.



Point

1. As it is not available to write program if error occurs, take an action for the error and then start to write program. But, in case of abnormal battery or abnormal RTC, that shows the abnormal status of PLC, it is available to write program.

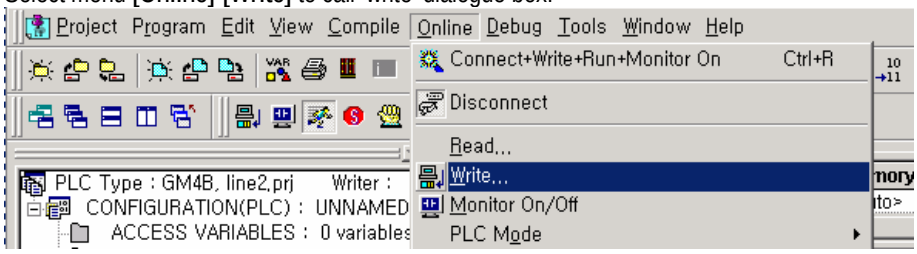
◆ If the using PLC is redundant CPU, select CPU in redundant CPU selection dialog box.



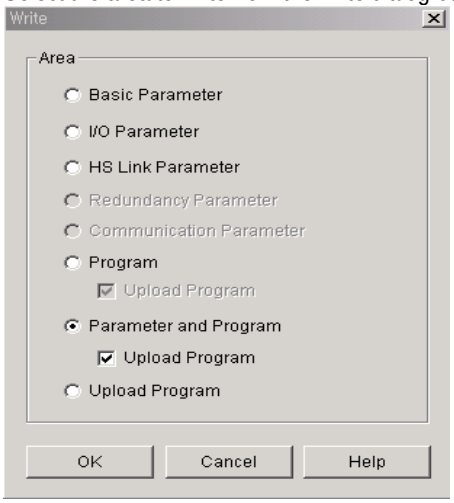
6.3 How to write with PLC

This is the function to write GMWIN parameter and program with PLC.

◆ Select menu [Online]-[Write] to call 'write' dialogue box.



◆ Select the area to write from the write dialog box.

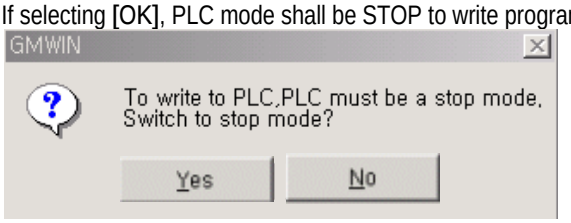


◆ Designate the memory areas to be written in PLC from write dialogue and click [OK].

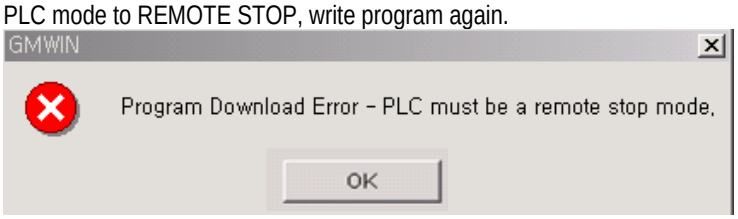
(1) Basic parameter: writes only basic parameter in PLC.
(2) I/O parameter: writes only I/O parameter in PLC.
(3) High speed link parameter: writes only high-speed link parameter in PLC.
(4) Redundancy parameter: writes only redundancy parameter in PLC. (Active only in case of selecting redundancy)
(5) Communication parameter: writes only communication parameter in PLC. (Active only in case of selecting GM7)
(6) Program: writes only program in PLC.
(7) Parameter and program: writes parameters and programs together in PLC.
(8) Upload program: writes upload program in PLC. Only in case of selecting upload program, upload program is written in PLC and it is available to upload later.

Point

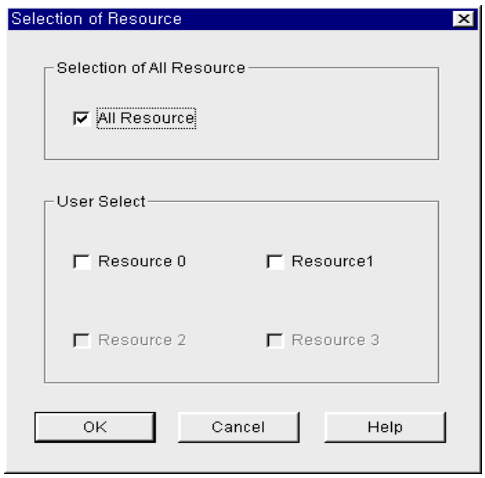
1. In case the current PLC status is REMOTE RUN, the following screen appears.
   If selecting [OK], PLC mode shall be STOP to write program.



2. In case the current PLC status is LOCAL RUN or LOCAL STOP, the following screen appears. After changing the PLC mode to REMOTE STOP, write program again.



◆ In case that PLC type is GM1 and Resource is more than 2, select Resource from resource selection screen to write parameter and program with PLC and then click [OK].



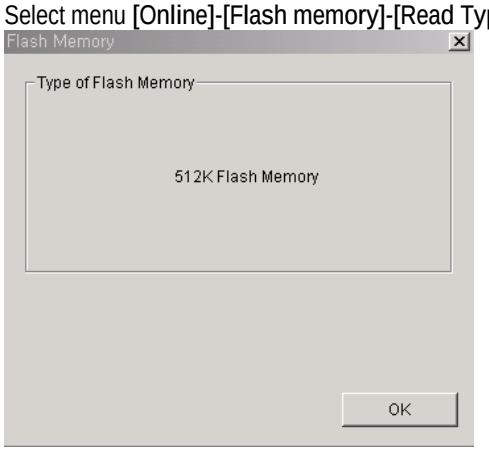
6.4 How to write in Flash Memory

For the ROM operation of program, install the memory module in CPU and then write program in flash memory.
For ROM operation, it operates with the program saved in flash memory when the power is ON. For details, refer to CPU instructions of the relevant model.

6.4.1 Read Type

First check flash memory type installed in CPU module.

◆ Select menu [Online]-[Flash memory]-[Read Type].



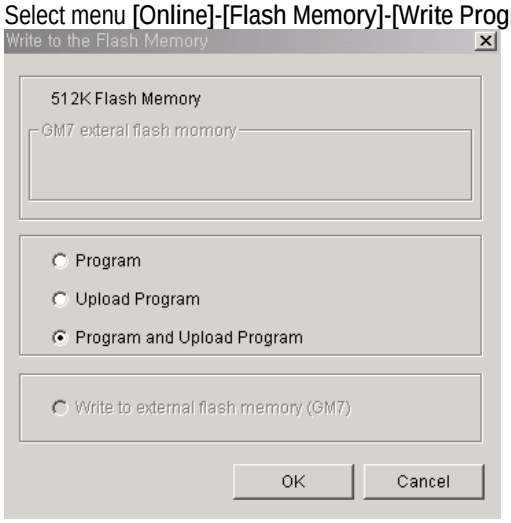
Point

1.Check if memory module is installed in CPU module before using flash memory.
  1) GM1/2: G2M-M128
  2) GM3: G3M-M064
  3) GM4: G4M-M128
  4) GM6: built-in CPU module
  5) GM7: built-in G7M-M256 & CPU module
2.In case of GM6, GM7, as the flash memory is installed, it is available to set as flash memory mode by the operation of deep switch. For details, refer to GM6, GM7 instructions.
3.In case of GM7, it is available to install the external type flash to use except built-in flash.
  In this case, the information of GM7 external type flash memory appears.

6.4.2 Write Program

It moves the program stored in PLC data RAM to the flash memory to write.

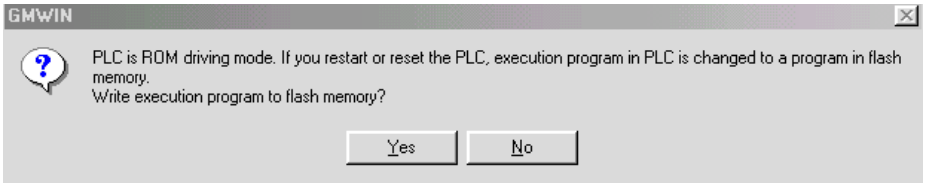
- Select menu [Online]-[Flash Memory]-[Write Program].



- After selecting the content to write in flash memory, click [OK].

Point

If selecting menu [Online]-[Write] in case of that flash memory is installed in CPU module, program write shall be finished and the following screen appears.



- Click [Yes] to write the current program in memory module directly.
- After writing the program to flash memory, if executing [Online Edit] the upload file of the flash memory is not renewed.
- To renew the upload file of the flash memory, Change the PLC mode to STOP and use the menu [Online]-[Write].

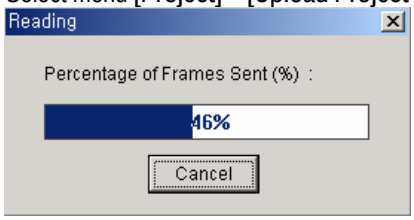
6.5 Upload Project From PLC

It reads the PLC parameter and program from GMWIN.

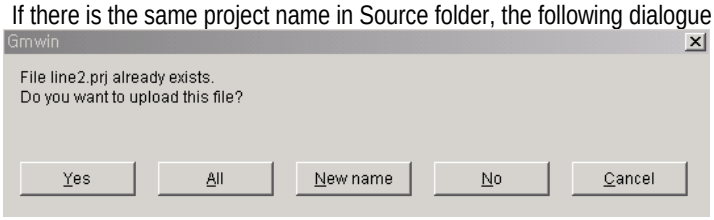
6.5.1 Upload Project From PLC

Read the source program from PLC.
Upload the compressed project file and source file from PLC RAM (program memory) or flash memory to GMWIN.

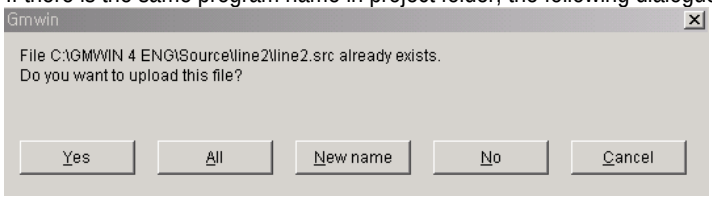
- Select menu [Project] – [Upload Project From PLC].



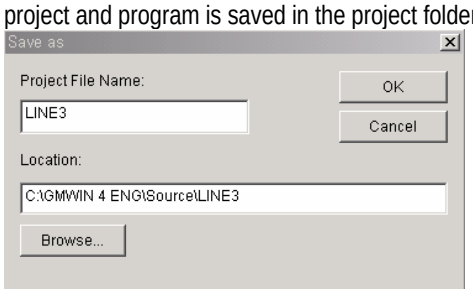
- If there is the same project name in Source folder, the following dialogue box appears.



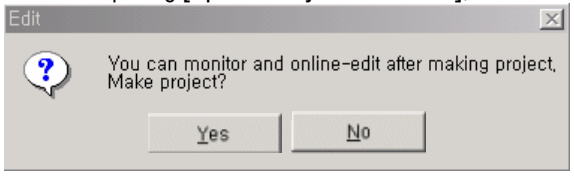
- If there is the same program name in project folder, the following dialogue box appears.



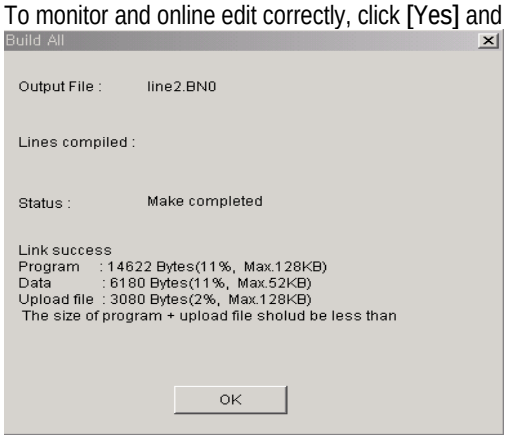
- In this case, click [ALL] to monitor and modify correct in the run.
- [Yes]: Override the same name's project or program.
- [All]: Override the same name's project and program.
- [New name]: the following dialog box appears and if input the project name, the project folder is created and the project and program is saved in the project folder.



- [No]: doesn't override the same name's project or program.
- [Cancel]: cancels the upload.
- When completing [Upload Project From PLC], the following dialog box appears.



To monitor and online edit correctly, click [Yes] and the following dialog box appears.

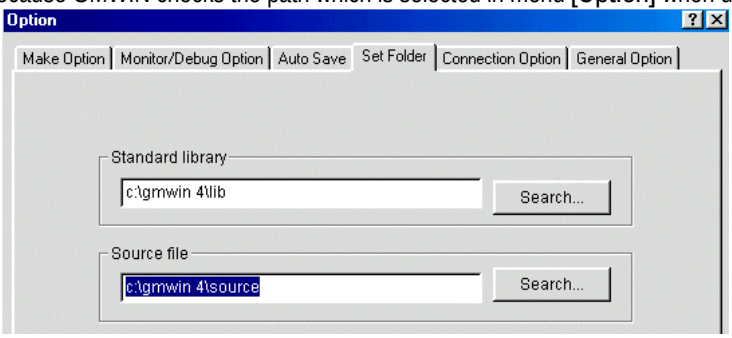


Point

- [Upload Project From PLC] is available in case of that upload file is written previously to PLC. Be sure to execute [Upload Project From PLC] after writing the upload file to PLC.
- The path of the project/program when [Upload Project From PLC] (default)

```
Source folder
└── Project name folder
    ├── Output folder
    ├── Project name.prj
    └── Program name.src
```

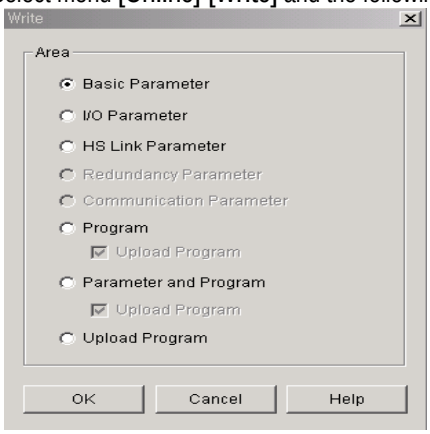
- The above path is an example when source folder path is selected as default in menu [Option].
- Because GMWIN checks the path which is selected in menu [Option] when uploading.



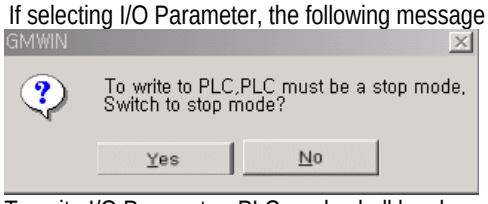
6.5.2 How to write parameter

Writes parameters to PLC on run.

♦ Select menu [Online]-[Write] and the following dialog box appears.



◆ Select parameter to write from the dialog box and click [OK].
◆ If selecting I/O Parameter, the following message appears.



To write I/O Parameter, PLC mode shall be changed STOP.

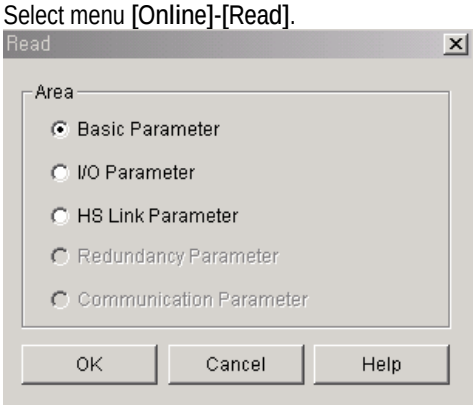
Point

◆ As writing parameter in [Online Edit], PLC's parameter is not changed.
In this case, be sure to write parameter using menu [Online]-[Write]
◆ Parameter can be edited regardless to using menu [Online Edit] and use menu [Online]-[Write].

6.5.3 How to read parameter

Uploads the parameter information saved in PLC RAM.

◆ Select menu [Online]-[Read].



◆ After designating memory area of parameter to read from dialogue box, click [OK].

(1) Basic parameter: reads only basic parameter from PLC.
(2) I/O parameter: reads only I/O parameter from PLC.
(3) High speed link parameter: reads only high-speed link parameter from PLC.
(4) Redundancy Parameter: reads only redundancy parameter from PLC.
(Active only in case of selecting redundancy)
(5) Communication Parameter: reads only communication parameter from PLC.
(Active only in case of selecting GM7)

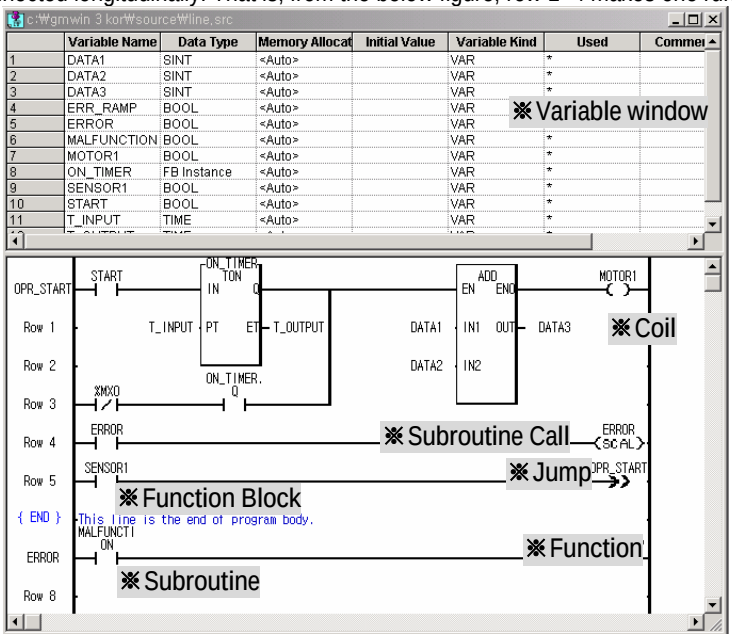
◆ The parameter read from PLC shall be updated to the project parameter.

Chapter 5. Programming

5.1 LD Programming

5.1.1 Structure of LD Program

LD program describes PLC program through Graphic code such as coil or contact which is used in Relay logic diagram. Comments from the below figure describes the comments for the relevant rung. Rung means the gathering of continued line connected longitudinally. That is, from the below figure, row 1~4 makes one rung and row 5 makes one rung.

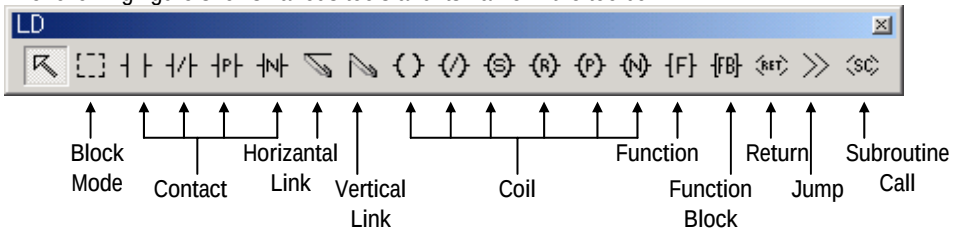


From the above figure, { END } of row 6 indicates the end of main program. The error action processing connected to next row is a type of subprogram and row 4 is calling this subroutine.

5.1.2 How to use Menu

1) Toolbox and Short-cut key

It is available to use Toolbox by attaching it on the desired position by a mouse.
The following figure shows various tools and its name in the toolbox.



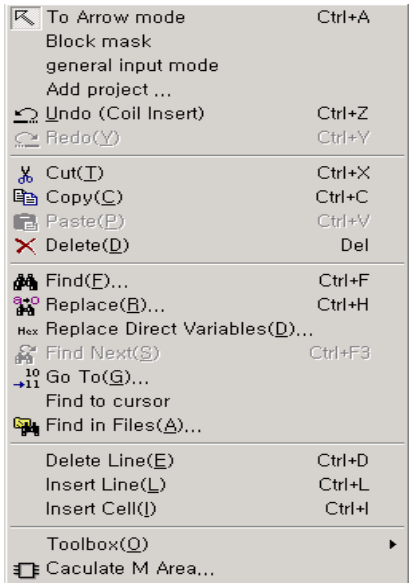
The shape and function of each factor is as follows.

Symbol	Short-cut key	Description
	F2	Normally open contact
	F3	Normally closed contact
	F4	Horizantal link
	F5	Vertical link
	F6	Coil
	F7	Negated coil
	F8	Function
	F9	Function Block
	Shift+F1	Positive transition-sensing contact
	Shift+F2	Negative transition-sensing contact
	Shift+F3	Set (latch) coil
	Shift+F4	Reset (unlatch) coil
	Shift+F5	Positive transition-sensing coil
	Shift+F6	Negative transition-sensing coil
	Shift+F7	LD program exit and subroutine exit command
	Shift+F8	Jump command indicating LD program branch (to lable position)
	Shift+F9	Command to call subroutine

After selecting ay factor of toolbox, the mouse is changed with the same shape as the factor.

2) Popup menu

If pressing the right button of a mouse in any position or the desired position from LD program window, the figure appears as below:

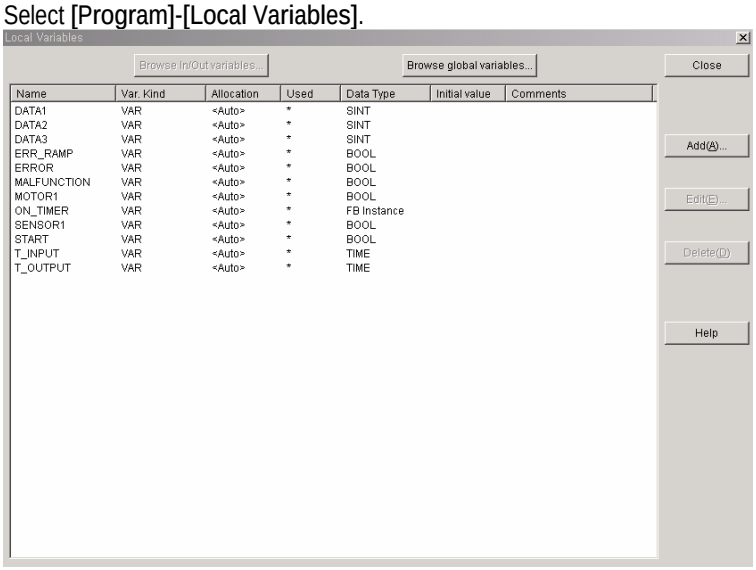


It is available to edit Program easily by using this function.

5.1.3 Variable List

It is available to edit Local Variable that corresponds with the currently actuated program window.

◆ Select [Program]-[Local Variables].



◆ After add, delete, edit each variables, click [Close].

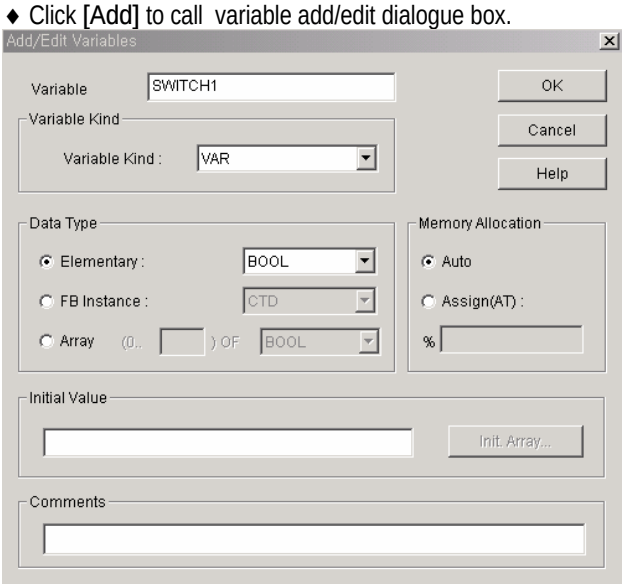
Point

For function/function block, output variable name to return, I/O variable except local variable inputted by the user appears in the list box of local variable list, and for SFC, the variable TRANS that indicates the transition condition and not available to edit/delete appears. Each indication example is as follows:

RETVAL	<Return variable>	INT	- Output variable name of function to return
IN1	VAR_INPUT	BOOL	- Input variable in function/function block
IN2	VAR_INPUT	INT	- Input variable in function/function block
OUT1	VAR_OUTPUT	BOOL	- Output variable in function block
TRANS	<SFC transition>	BOOL	- SFC transition condition variable

1) Add/Edit Variables

♦ Click [Add] to call variable add/edit dialogue box.

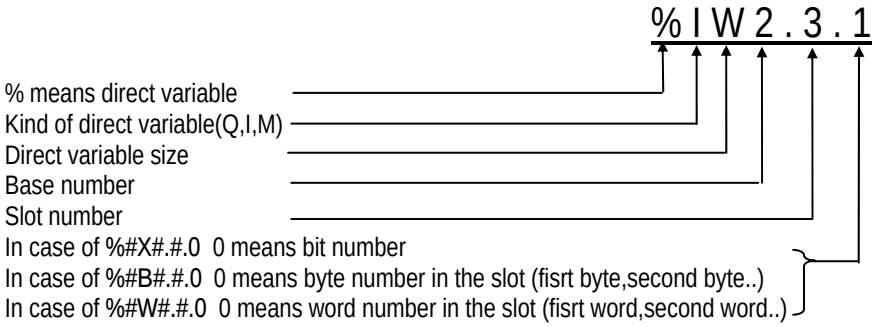


♦ Input the variable name in the variable name input column.

Point

It is available to have Alphabet 16 letters (Korean 8 letters) for variable name and Alphabet 8 letters (Korean 4 letters) for function block instance name.

- ♦ Select the variable type from variable type list box.
- ♦ Select data type option button (either elementary or function block instance) and select the type from list box.
- ♦ Select memory allocation option button (either auto or assign (AT)) and if selecting Assign(AT), input the correct address in the input column.
- ♦ Auto : When program compiling, data area is automatically allocated according to the declared variable type.
- ♦ Assign : The user allocates the declard variable in I, Q, M area.
- ♦ For assign, the designation of I, Q, M area to input is as follows:



Prefix	Meaning
I	Input
Q	Output
M	Internal memory
X, none	1 bit
B	1 byte (8 bits)
W	1 word(16 bits)
D	2 words(32 bits)
L	4 words(64 bits)

Ex.) %QX3.1.4 or %Q3.1.4 : 4th bit of Slot 1 of Base 3
%IW2.4.2 : 2nd Word of Slot 4 of Base 2
%MD48 : Double word 48 of Internal Memory (It starts from 0.)
%MW10.3 : 3rd bit of Word 10 of Internal Memory
(no concept of base or slot in the internal memory)

- ◆ If there is initial value, input the intial value in the initial value input column
- ◆ Input the comments in the comment input column.
- ◆ Click [OK].

2) Variable delete

- ◆ Select the variable to delete from local variable list box.
- ◆ Press [Delete] or press Del key.

3) Variable edit

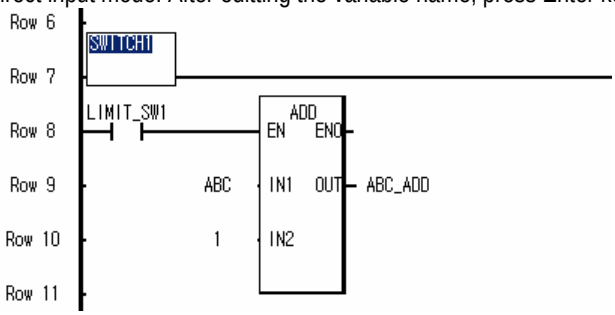
♦ Select the variable to edit from the local variable list box.

♦ After modifying the variable with the same method as that of adding the variable in Variable add/edit list box, click [OK].

Point

Variable edit from program window

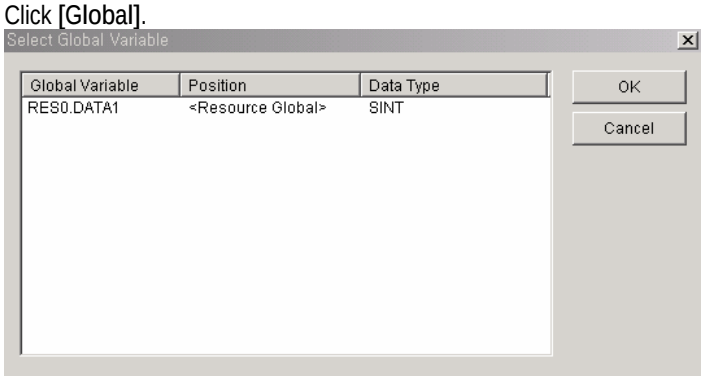
♦After moving the mouse cursor to the variable to edit, press the left button of a mouse and it becomes the state of variable direct input mode. After editting the variable name, press Enter key and the variable add/edit list box appears.



4) Global variable

◆ This is used when using the already declared global variable in the program.

◆ Click [Global].



◆ After selecting Global variable to use in the Program, click [OK].

◆ The selected global variable is declared as VAR_EXTERNAL and added to the local variable list.

Point

When declaring the variable, if the program belongs to the project, that variable is registered automatically in the global variable when declaring the variable as VAR_EXTERNAL.

5) I/O variables

◆ It is available to refer the current delared I/O variable without closing the local variable list box.

◆ Click [Direct Variable] and the dialogue box in the same way of selecting menu [Program]-[In/Out Variables] appears and it is available to add, edit, delete the I/O variable with the same way.

Point

For I/O variable editing, refer to 3.5.1 how to make the user defined function/function block.

Point

How to add/delete and edit the variable from the variable window.

♦ How to add the variable from varible window.
After selecting popup menu [Add New Varible], add it.

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind
1	DATA1	SINT	<Auto>		VAR_EXTERNA
2	DATA2	SINT	<Auto>		
3	DATA3	SINT	<Auto>		
4	ERR_RAMP	BOOL	<Auto>		
5	ERROR	BOOL	<Auto>		
6	MALFUNCTION	BOOL	<Auto>		
7	MOTOR1	BOOL	<Auto>		VAR

Add New Variable...
Cut
Del

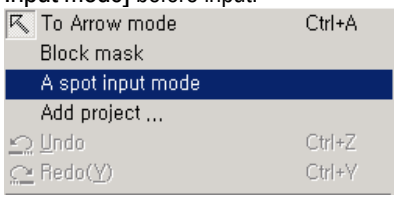
♦ How to delete the variable from the variable window.
After selecting the variable, press Del key or select popup menu [Del].

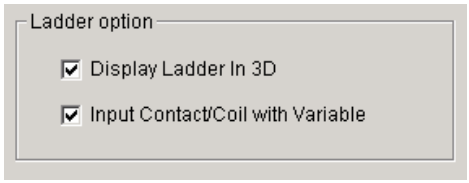
♦ How to edit the variable from the variable window.
Double click the relevant variable and edit it and then click [OK].

5.1.4 LD command

1) Contact/coil

◆ Select contact/coil input mode from menu [Project]-[Option]-[General Option] or select popup menu [A spot input mode] before input.



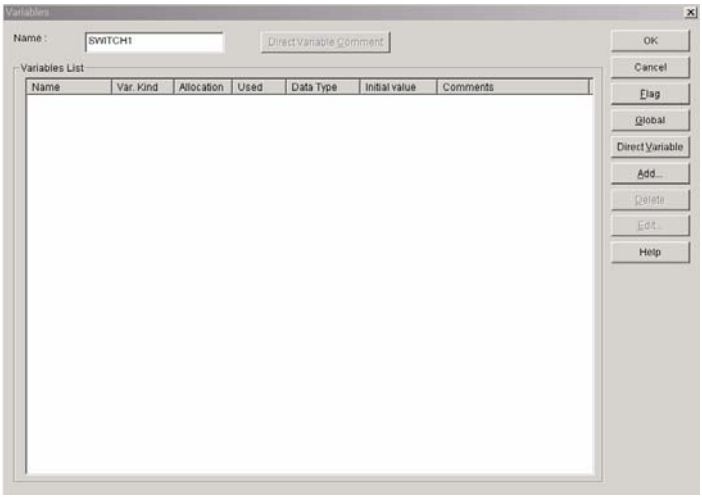


Point

1. If selecting [Input Contact/Coil with Variable] or [A spot input mode] as above, and if you input contact/coil, the variable window appears and you can input the variable promptly. (The following example shows the case of selecting [Input Contact/Coil with Variable])
2. If not selected contact/coil input mode, input contact/coil first and then input the variable through varible input processing by calling the variable window.

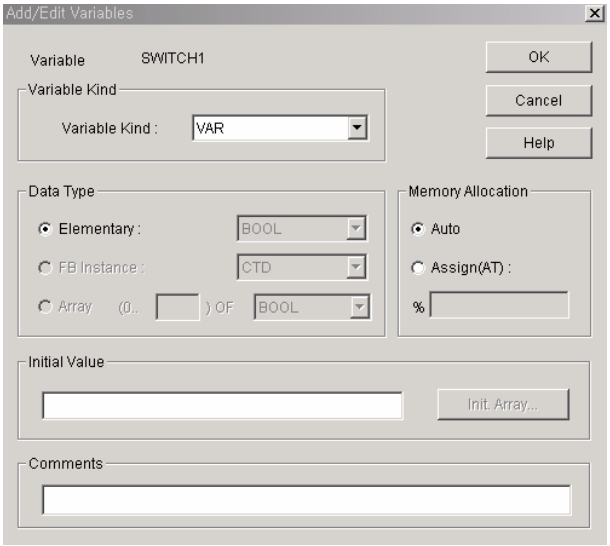
◆ Select the desire contact from toolbox.
◆ Click the mouse on the desire position from LD program window.

◆ Move the cursor to the position to input the contact.
◆ Select the desired contact from the command of menu toolbox with short-cut key (F2).

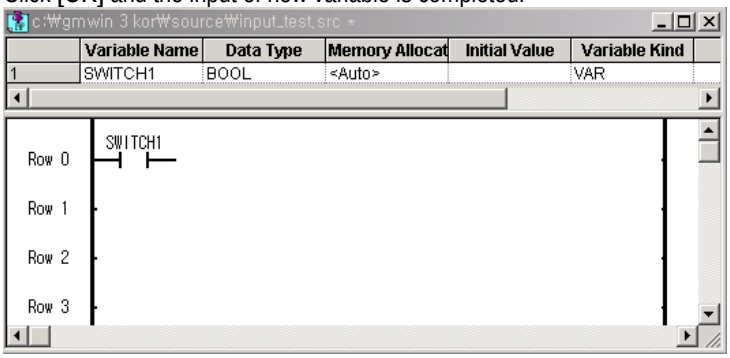


◆ After inputting the variable name in the variable window, click [OK].

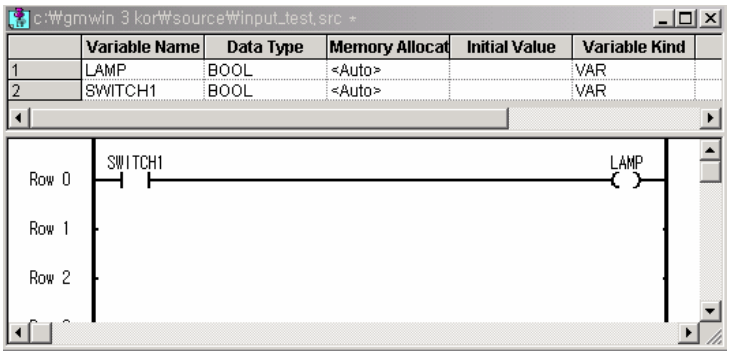
The variable add/edit dialogue box that defines the variable properties appears.



◆ Click [OK] and the input of new variable is completed.



◆ After selecting a coil and if repeting the above processing, the coil is inputted as follows..

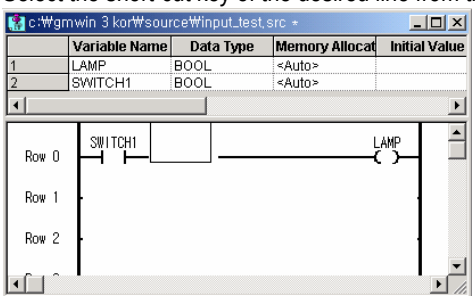


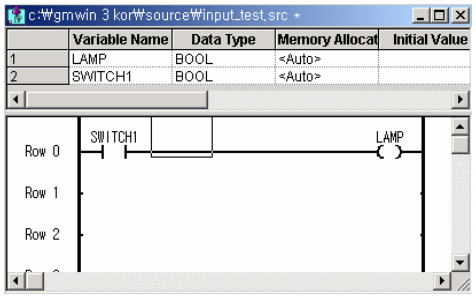
2) Line

It is required to input the line to connect contact, coil, function, functio block etc.

- Select the desired line from toolbox.
- Click the mouse on the desired position of LD program window.

- Move the cursor to the position to input the line.
- Select the short-cut key of the desired line from the command of menu toolbox.





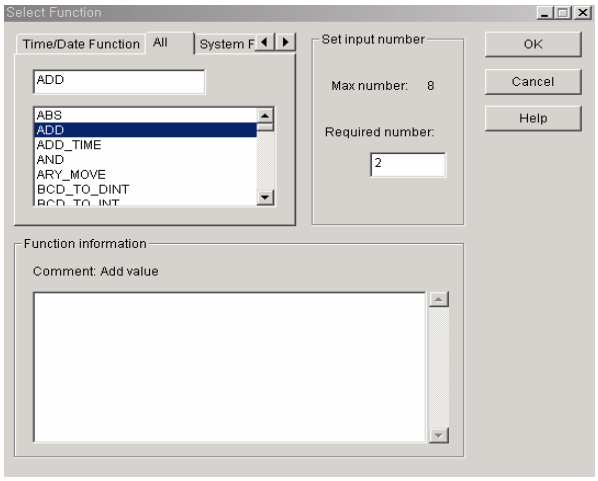
Point

1. In case of inputting long line, it is available to input the long line by pressing the mouse left button on the desired position and dragging the mouse.
2. In case of contact, it is available to input from column 1 to column 40 of LD program. But, in case of longitudinal line, available to input column 2 to column 29.

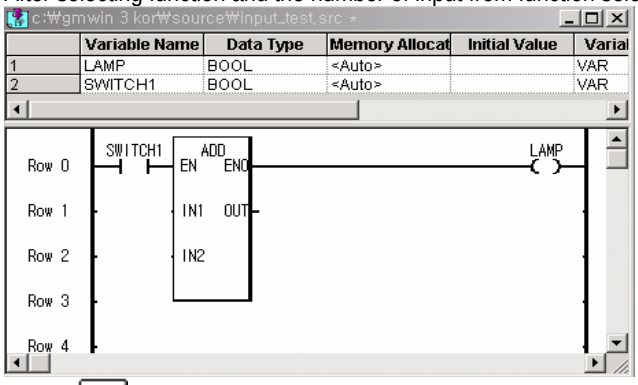
3) Function

- Select {F} from toolbox.
- Click the mouse on the desired position of LD program window.

- Move the cursor to the position to input the function in the LD program window.
- Select Function(F8) from the command of menu toolbox.

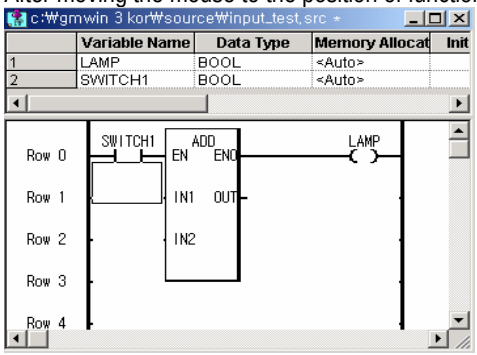


◆ After selecting function and the number of input from function selection window, click [OK].

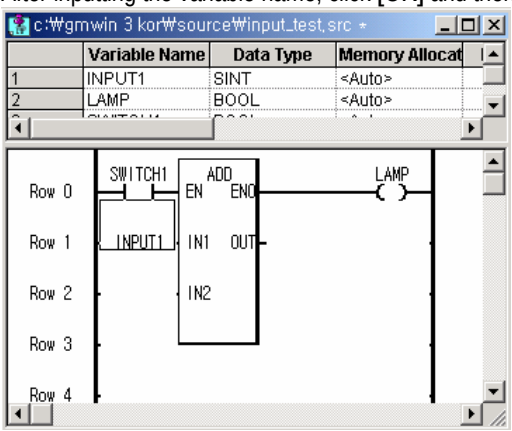


◆ Select  from toolbox or popup menu [To Arrow mode].

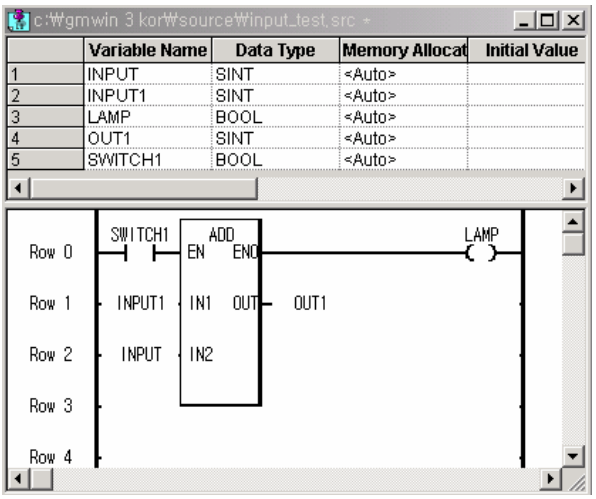
◆ After moving the mouse to the position of function variable IN1 input column, double click.



◆ After inputting the variable name, click [OK] and then input the variable type in the variable add/edit dialogue box.



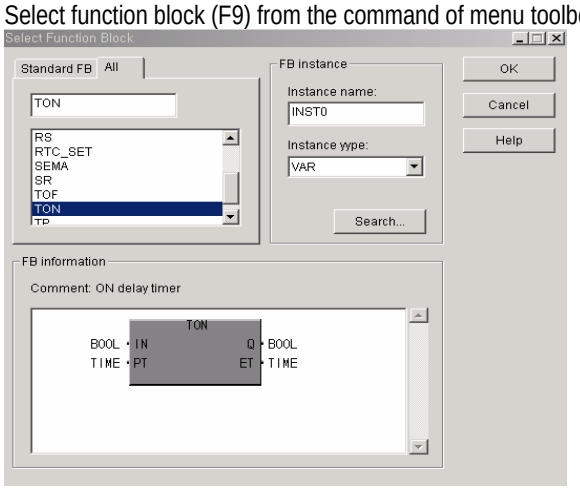
◆ For IN2,OUT, repeat the above processing to input the variable.



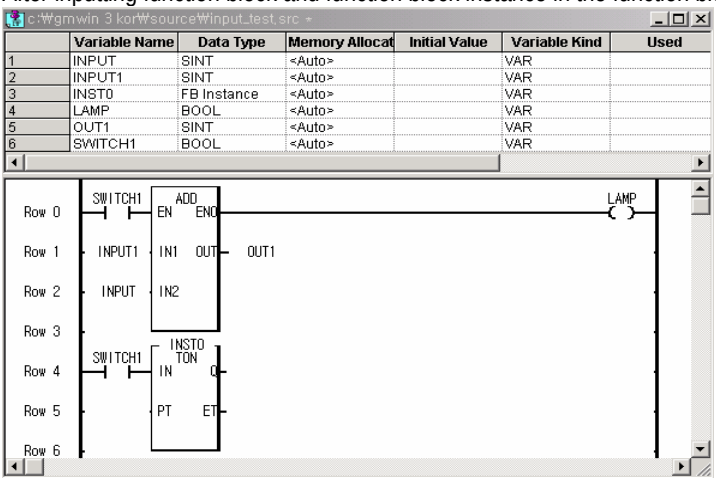
4) Function block

- Select  from toolbox.
- Click the mouse on the desired position of LD program window.

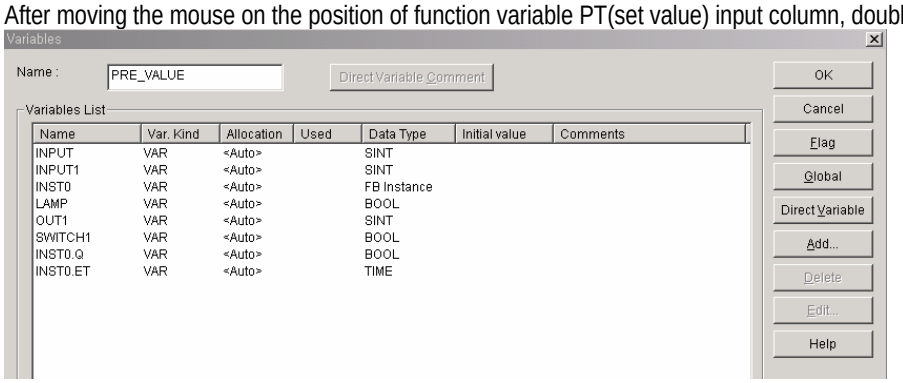
- Move the cursor to the position to input function block in the LD program window.
  Select function block (F9) from the command of menu toolbox.



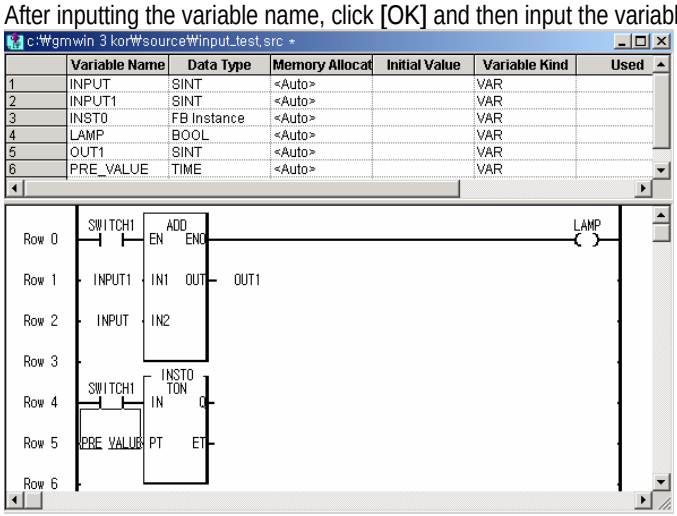
- After inputting function block and function block instance in the function block selection window, click [OK].



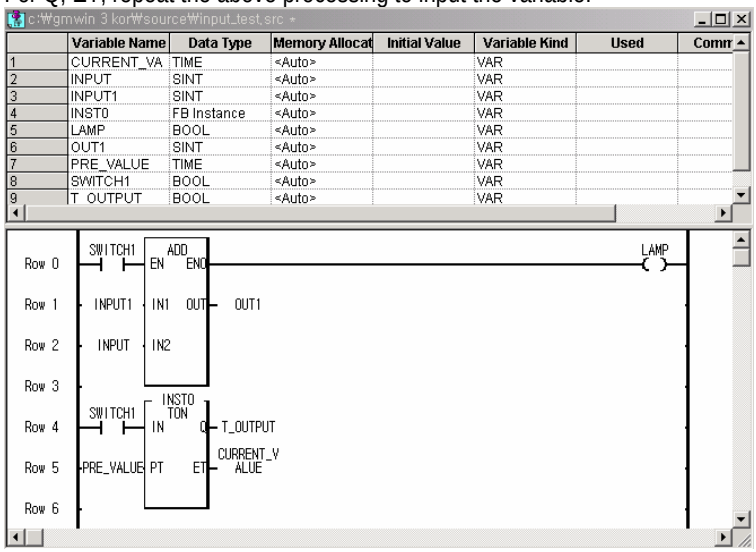
- Select  from toolbox or popup menu [To Arrow mode].
- After moving the mouse on the position of function variable PT(set value) input column, double click.



- After inputting the variable name, click [OK] and then input the variable type in the variable add/edit dialogue box.

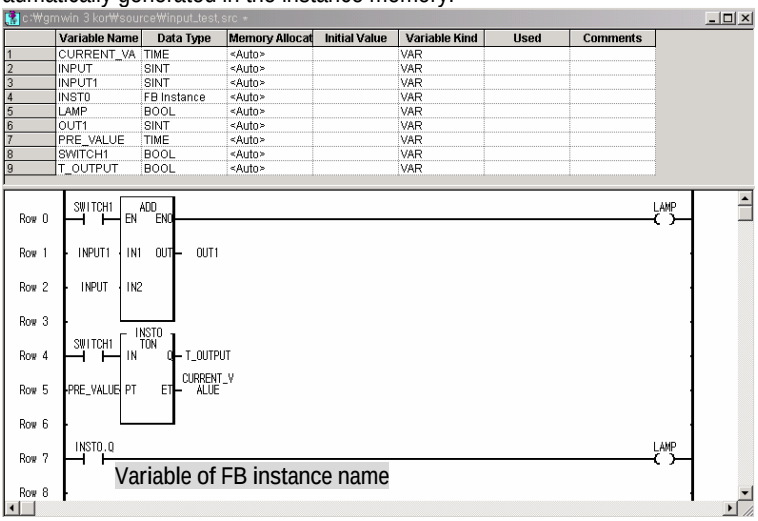


- For Q, ET, repeat the above processing to input the variable.



Point

1. It is available to use the output variable of function block without inputting. That is, from the above example, timer ouput as the variable INSTO.Q (instance name.Q) and the current value as the variable INSTO.ET (instance name.ET) is aumatically generated in the instance memory.



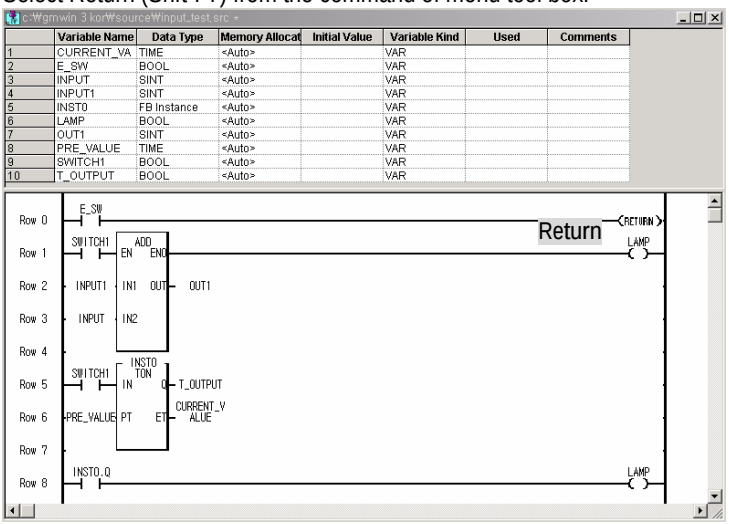
2. For function block, it is available to inut from column 2 to column 30 of LD program.

5) Return

This is the command that indicates LD program exit and subroutine exit.

- Select  from tool box.
- Click the mouse on the desired position of LD program window.

- Move the cursor to the position to input Return in the LD program window.
- Select Return (Shft-F7) from the command of menu tool box.



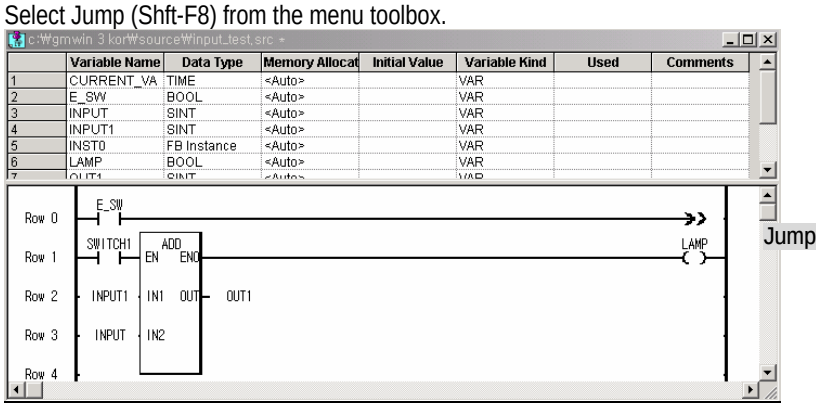
- In case that Switch 1 is 'ON' on the above program, do not execute ADD function and exit the program.

6) Jump

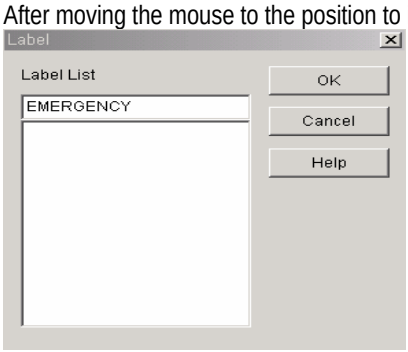
Jump is the method to go directly to the row for branch among LD program. The destination is shown as label. The position of label should be inputted in row 0 as below. Jump included in the main program of LD program that includes the subroutine is required to input the label included in the main program and Jump in the subroutine scope is required to branch only with the label in the subroutine.

- Select from toolbox.
- Click the mouse on the desired position of LD program window.

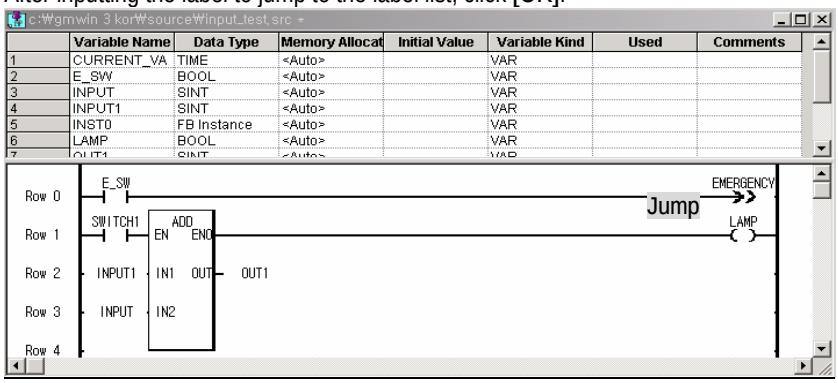
- Move the cursor to the position to input Jump in the LD program window.
- Select Jump (Shft-F8) from the menu toolbox.



- Select from toolbox or popup menu [To Arrow mode].
- After moving the mouse to the position to input function variable PT(set value) input column, double click.



- After inputting the label to jump to the label list, click [OK].



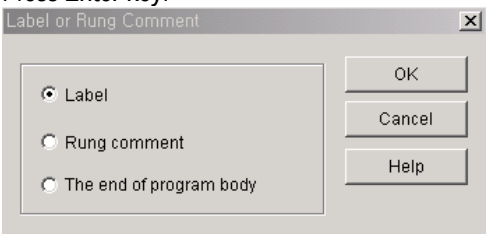
Point

Jump should be used with Label.

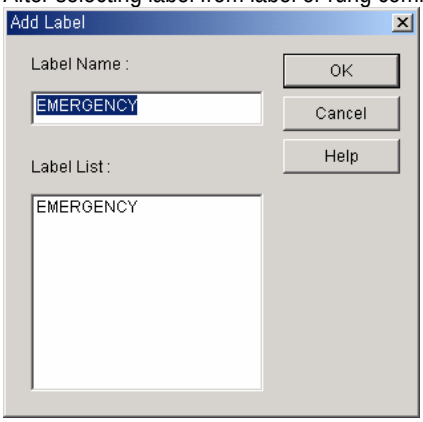
7) Label

- Select  from toolbox or popup menu [To Arrow mode].
- After moving the mouse to column 0 from LD program window, double click.

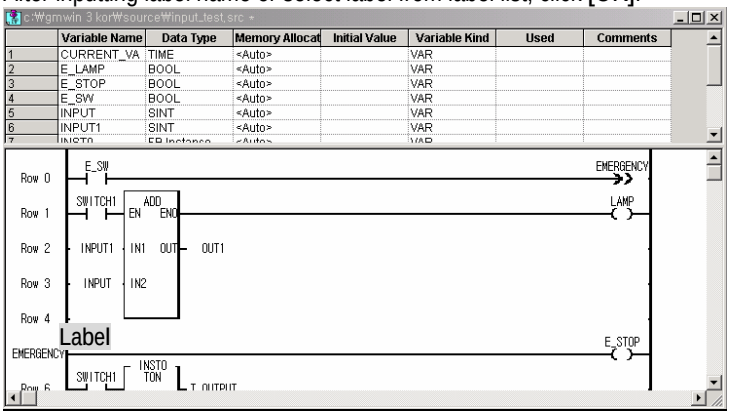
- Move the cursor to the position of column 0 from LD program window.
- Press Enter key.



- After selecting label from label or rung comment dialogue box, click [OK].



- After inputting label name or select label from label list, click [OK].

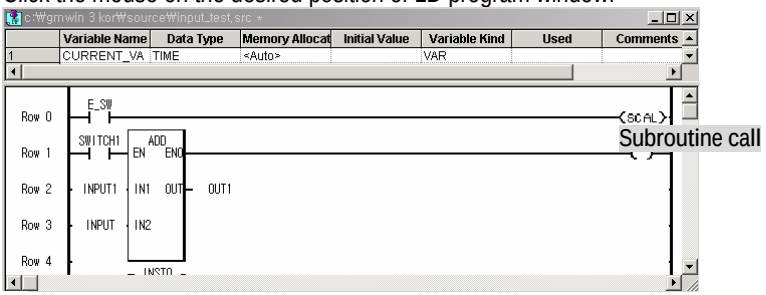


8) Subroutine

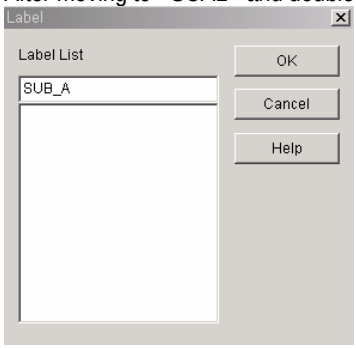
Register the frequently used action as a subroutine behind main program and use it by calling repeatedly through 'call subroutine'.
In this 'how to input subroutine', it describes how to call subroutine, how to indicate main program end and how to write subroutine.

(1) Subroutine call

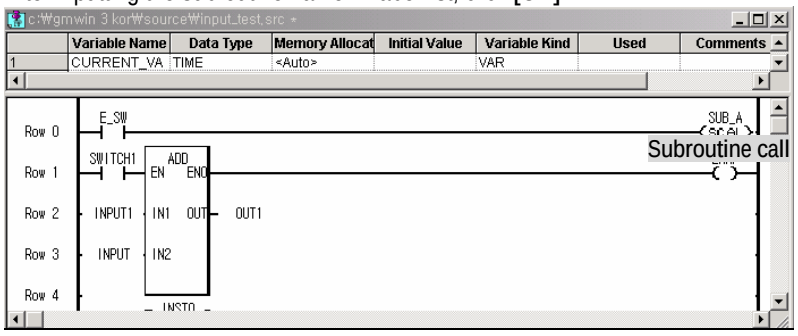
- Select <SC> toolbox.
- Click the mouse on the desired position of LD program window.



- Move the cursor to the position to input the subroutine name from LD program window
- Select menu [Toolbox]-[Subroutine call<SCAL>,(Shft-F9)].
- Select from toolbox or popup menu [To Arrow mode].
- After moving to <SCAL> and double click.



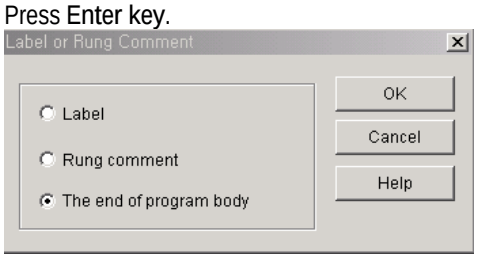
- After inputting the subroutine name in label list, click [OK].



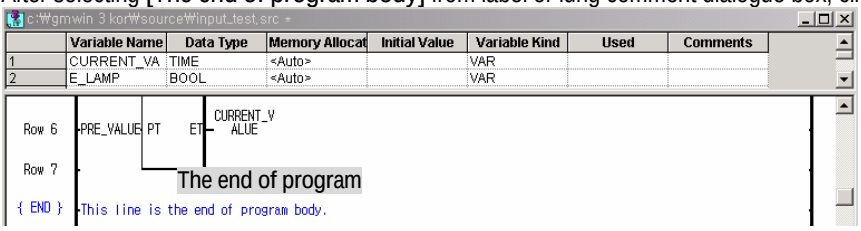
(2) The end of program body

- Select  from tool box or popup menu [To Arrow mode].
- Double click on column 0 of the row that you want to designate as main program end.

- Move the cursor to column 0 of the row that you want to designate as main program end.
- Press Enter key.

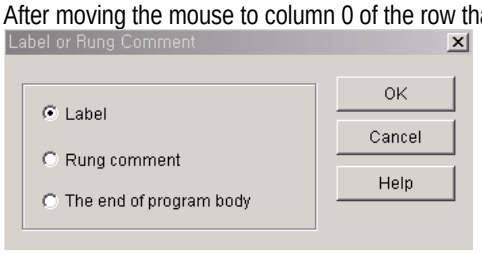


- After selecting [The end of program body] from label or lung comment dialogue box, click [OK].

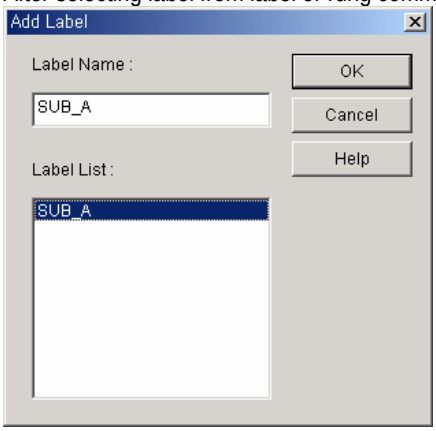


(3) how to write Subroutine

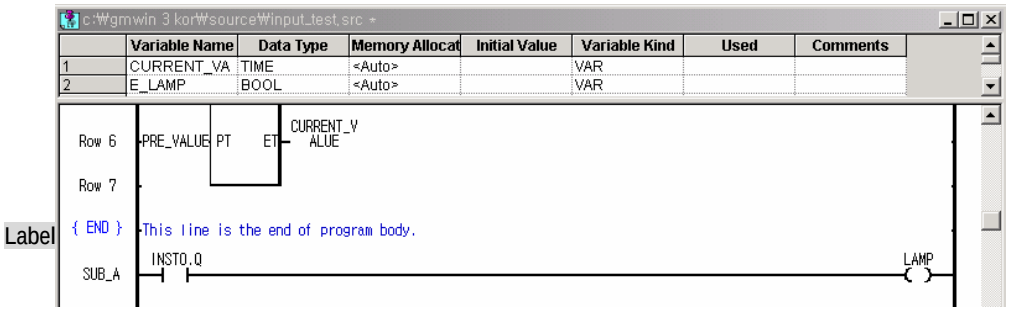
- Select  from tool box or popup menu [To Arrow mode].
- After moving the mouse to column 0 of the row that subroutine program shall be located, double click.



- After selecting label from label or rung comment [Label], click [OK].



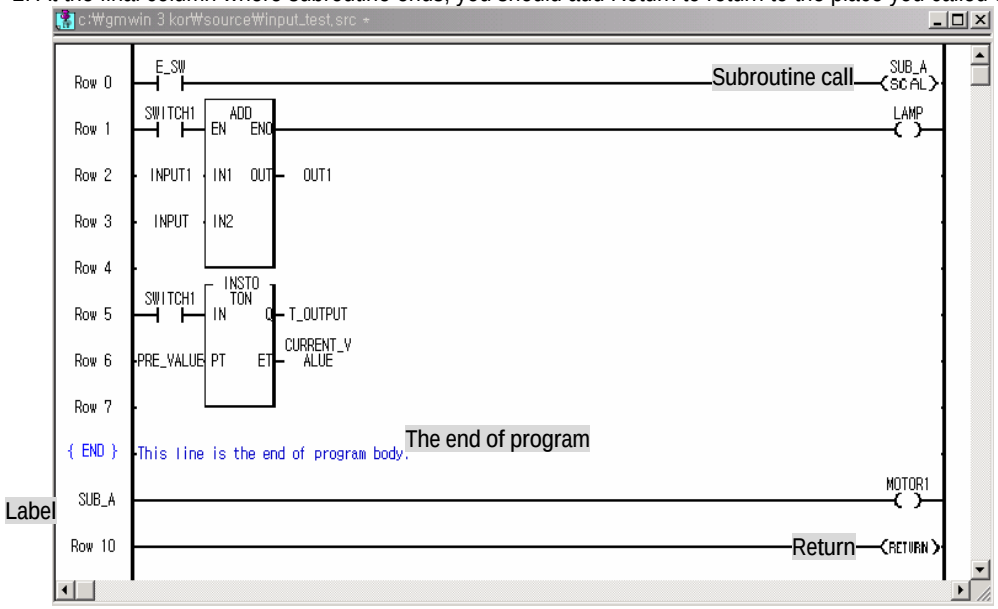
- After inputting label name in “Add Label” dialogue box, click [OK].



◆ From row 9(SUB_A), write subroutine program.

Point

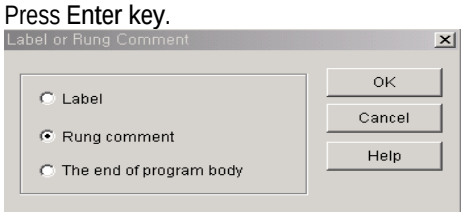
1. It is available to write subroutine program from the next row of {END} marked row.
2. At the final column where subroutine ends, you should add Return to return to the place you called Subroutine.



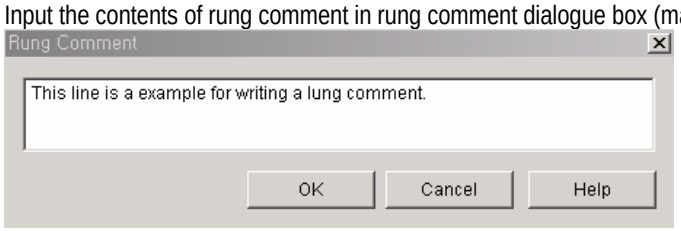
9) Rung comment

- Select  from toolbox or popup menu [To Arrow mode].
- After moving the mouse to the column 0 of the first row of the desired rung from LD program window, double click. But in case of modifying the already written statement, double click on the rung statement.
- Select rung statement from a dialogue box.

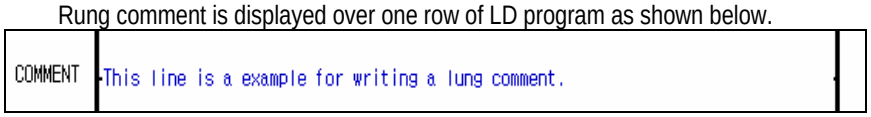
- Move the cursor to the column 0 of the first row of the desired run from LD program window. But in case of modifying rung statement, move the cursor to rung statement.
- Press Enter key.



- Select rung statement from label or rung comment dialogue box.
- Input the contents of rung comment in rung comment dialogue box (max.170 letters).



Rung comment is displayed over one row of LD program as shown below.



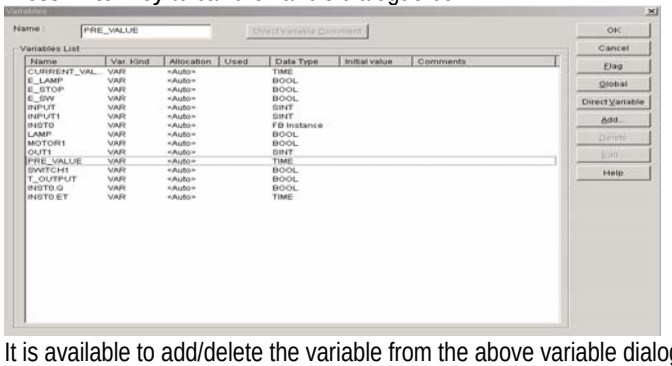
Program logic under 'the end of program body' is regarded as subroutine program.

10) Variable input

It is used when inputting the variable to contacts, coil, function/function block etc.

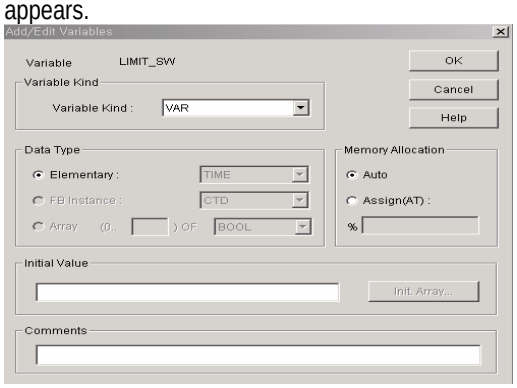
- Select  from toolbox or popup menu [To Arrow mode].
- After moving the mouse to the I/O position of the desired contact, coil, or function/function block from LD program window, double click.

- Move the cursor the I/O postion of the desired contact, coil or function/function block from LD program window.
- Press Enter key to call the varible dialogue box.



- It is available to add/delete the variable from the above variable dialogue box.

- After inputting the variable name to use in the variable dialogue box, click [OK]. If selecting the already declared variable name, the input of varible shall be completed right here.
- In case of inputting the new variable name, the variable add/edit dialogue box that defines the variable properties appears.

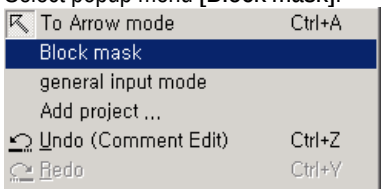


- Click [OK] and the input of new variabe shall be completed.

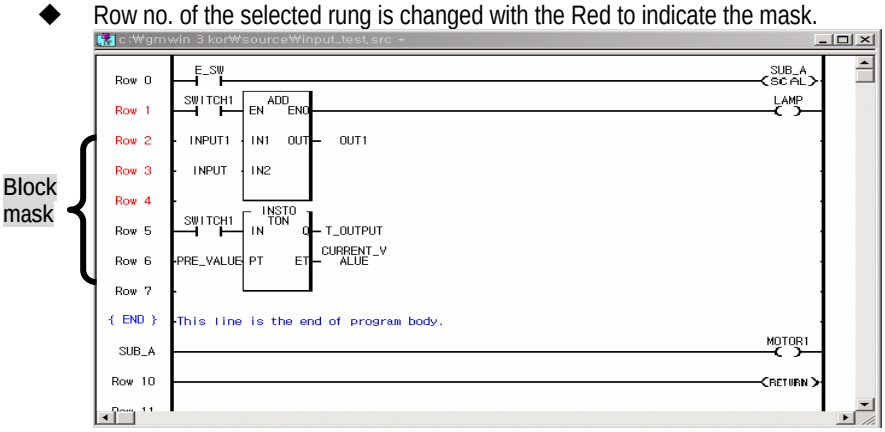
11) Block mask

Block mask is the function to mask the part not desired to execute from the program.
Block masked part is not available to Compile/Make.

- Move the cursor to the rung to do block mask.
- Select popup menu [Block mask].



- Row no. of the selected rung is changed with the Red to indicate the mask.



12) Block designation

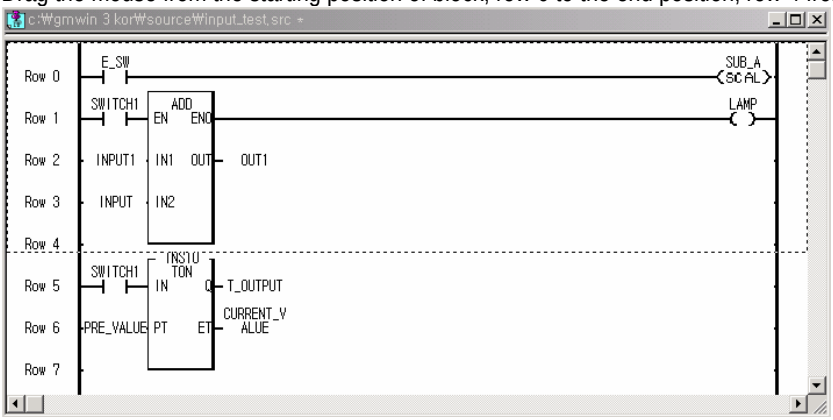
To edit block, it is required to designate the scope to apply first. To copy or delete the continued program, select first the desired scope by block and then select the function of block edit. (refer to 5.1.5 how to edit LD)
The method to designate the block is as follows.

- Select  from toolbox.
- After moving the mouse to the starting position of block from LD program window, click the left button and drag the mouse to the final row of the area to select.

- Move the cursor to the starting position of the block from LD program window.
- In the state of pressing Shift key, move the cursor to the final row of the area to select by using the arrow key.

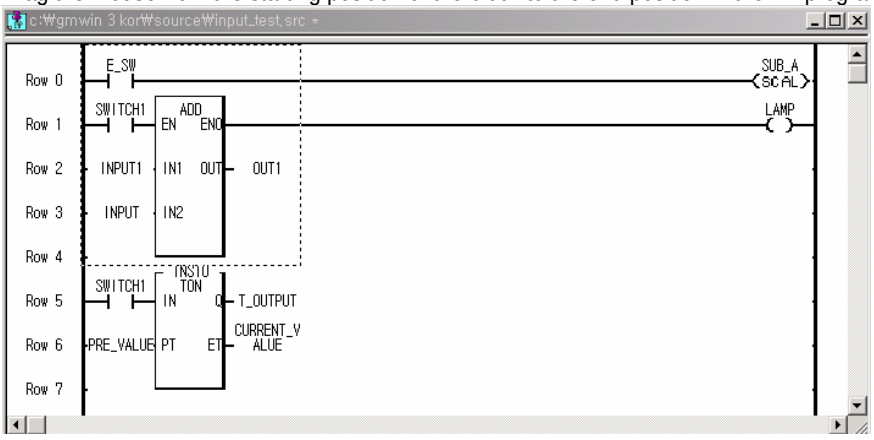
(1) In case of setting the block by row unit

- Drag the mouse from the starting position of block, row 0 to the end position, row 4 from in the LD program window.



(2) In case of setting the block of random size

- Drag the mouse from the starting position of the block to the end position in the LD program window.



Point

In case of block setting, if the end of the range is over the function or function block, the function/function block is automatically included.

5.1.5 LD edit

1) Undo/Redo

This is the function to undo or redo the previously edited action in the way of program writing.

(1) Cancel the edit

◆ Select menu [Edit]-[Undo (Ctrl+Z , )]

◆ Select menu [Edit]-[Undo (Ctrl+Z)].

(2) Rerun

◆ Select menu [Edit]-[Redo (Ctrl+Y , )].

◆ Select menu [Edit]-[Redo (Ctrl+Y)].

Point
Only one time redo is available after undo the edit.

2) Cut, Copy, Paste, Delete

To execute 'cut, copy, put, delete', it is required to designate the cell or block first. To select the cell, select the arrow by a mouse and then select the desired position.

(1) Cut

In the condition of designating the cell or block,

◆ Select menu [Edit]-[Cut (Ctrl+X, )] or popup menu [Cut].

(2) Copy

In the condition of designating the cell or block,

◆ Select menu [Edit]-[Copy (Ctrl+C, )] or popup menu [Copy].

(3) Paste

After [cut] or [copy],

◆ Move the cursor to the position to execute [paste] in the LD program window.

◆ Select menu [Edit]-[Paste (Ctrl+V, )] or popup menu [Put].

(4) Delete

In the condition of designating the cell or block,

◆ Select menu [Edit]-[Delete (Delete, )] or popup menu [Delete] or press Del key.

Point

It is available to move/copy easily by a mouse as below when move/copy by cell unit.

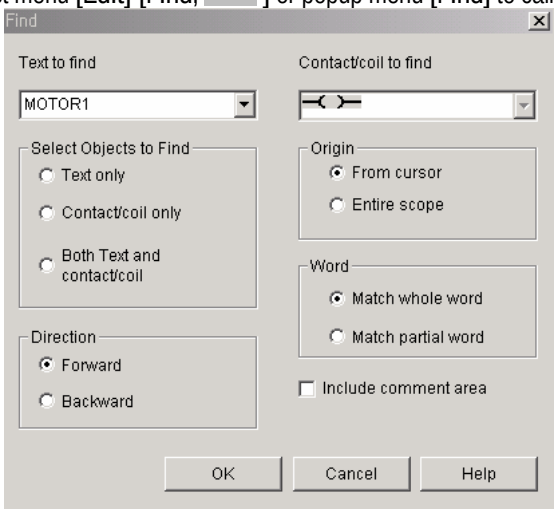
- Select  from toolbox or popup menu [To Arrow mode].
- Move the mouse to the position of cell to move/copy in the LD program window.
- Click the left button of a mouse and drag to the desired position.
- For 'move', detach the left button of a mouse.
- For 'copy, detach the left button of a mouse in the state of pressing Ctrl key.

3) Find, Find next, Find in files

This is the function to find the use position of the variable name or contact used in the program.

(1) Find

Select menu [Edit]-[Find, ] or popup menu [Find] to call a find dialogue box.



- Input the character string to find in the name input column of find dialogue box.
- Select the option below and then click [OK].

A) Contact/Coil
Select the contact or coil to find.

B) Range
Select the range to execute 'Find'.
From cursor : execute 'find' from the current cursor position.
Entire scope : executes 'find' in overall program.

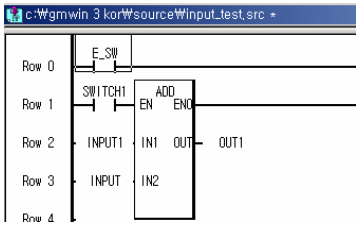
C) Direction
Select the direction to execute 'Find'.
Forward : executes 'find' from current cursor to downward direction.
Backward : executes 'find' from current cursor to upward direction.

D) Word
Select how much it matches when searching the content of character.
Mach whole word : searches the same word.
Mach partial word : searches even the word that matches partially.

F) Include comment area
Execute 'find' including the comment

Point

If the mouse cursor is placed on the variable to find and you execute 'find' menu,it is not necessary to input the variable name one by one in the input column as the name to find shall be displayed.



(2) Find next

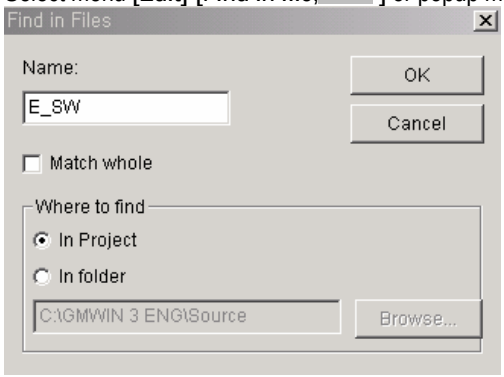
In case that **[Find]** has been executed before, execute **[Fina next]** in the condition already set before.

◆ Select menu **[Edit]**-**[Find next (Ctrl+F3,**  **)]** or popup menu **[Find next]**.

(3) Find in files

This is the function to designate project or directory to find variable from several files.

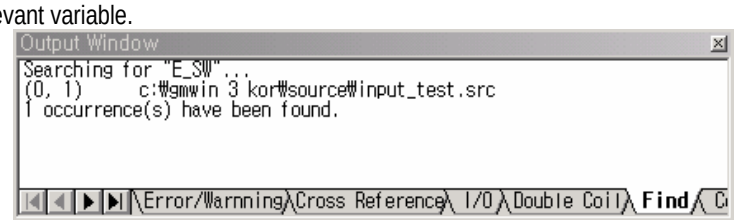
◆ Select menu **[Edit]**-**[Find in file,**  **]** or popup menu **[Find in files]**.



◆ Input the name to find from **[Find in files]** dialogue box.
◆ Designate the file to find from **[Find in files]** dialogue box.
◆ Click **[OK]**.

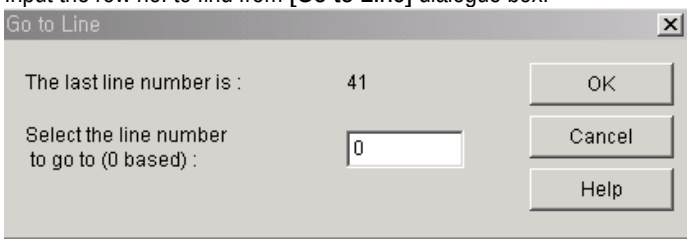
Point

If selecting **[In folder]**, it's nessarary to designate the project folder path.
If executing **[Find in files]**, the result is displayed in the output window and if you double click the result, it moves to the relevant variable.



4) Goto

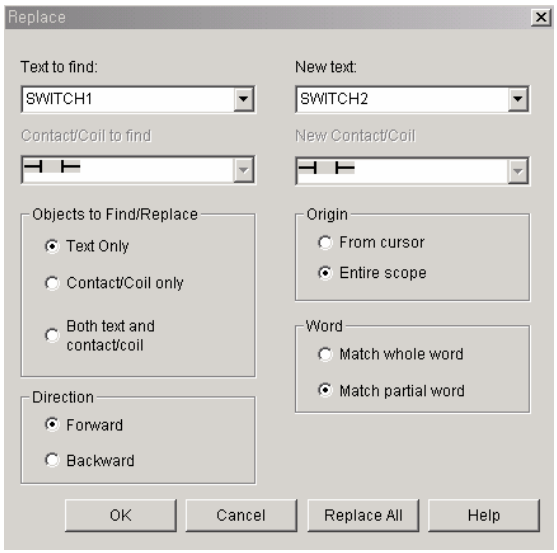
- Select menu [Edit]-[Goto, ] or popup me [Goto].
- Input the row no. to find from [Go to Line] dialogue box.



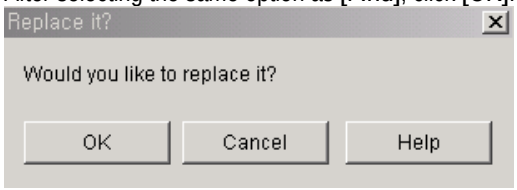
- Click [OK].

5) Replace

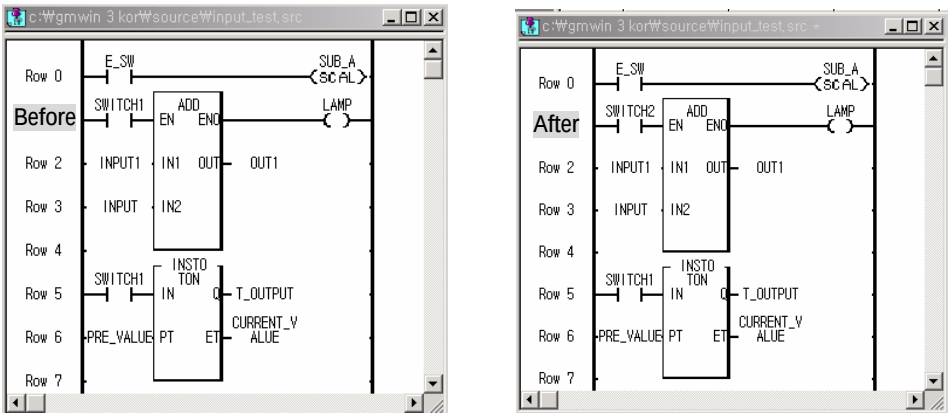
Select menu [Edit]-[Replace, ] or popup menu [Replace] to call [Replace] dialogue box.



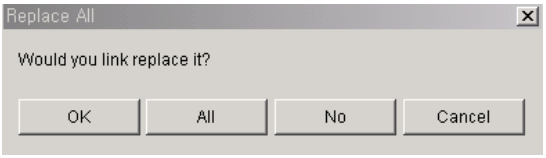
- Input the character to replace in the name input column.
- Select the LD program factor to replace in contact/coil list box.
- Input the character to replace newly in the new name input column.
- Select the LD program factor to replace newly from new contact/coil list box.
- After selecting the same option as [Find], click [OK].



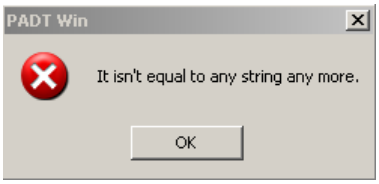
- Click [OK].



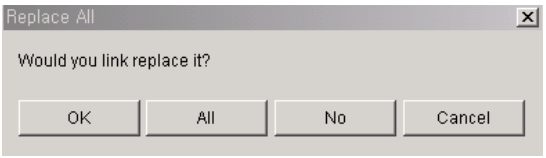
♦In case of replcing several same name's variables one by one.
Select **[Replace all]** from **[Replace]** dialog box the following dialog box appears.



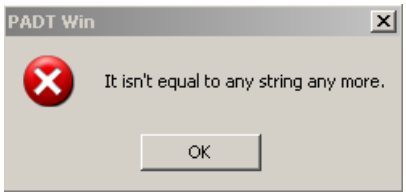
If selecting [OK] it finds a same name and replaces with new name, after that, finds again.
If there is no same name, the following message appears.



♦In case of replcing several same name's variables simultaneously
Select **[Replace all]** from **[Replace]** dialog box the following dialog box appears.



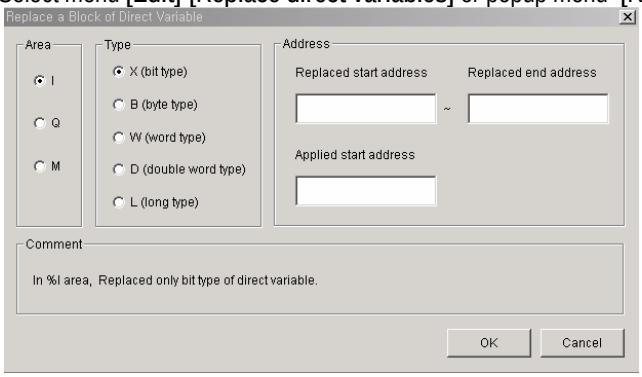
If selecting **[All]**, it finds all same name variables and replace with new name at the same time.
After replacing, the following message appears.



6) Replace direct variables

This is the function to replace direct variables of user defined address area.

Select menu **[Edit]-[Replace direct variables]** or popup menu **[Replace direct variables]**

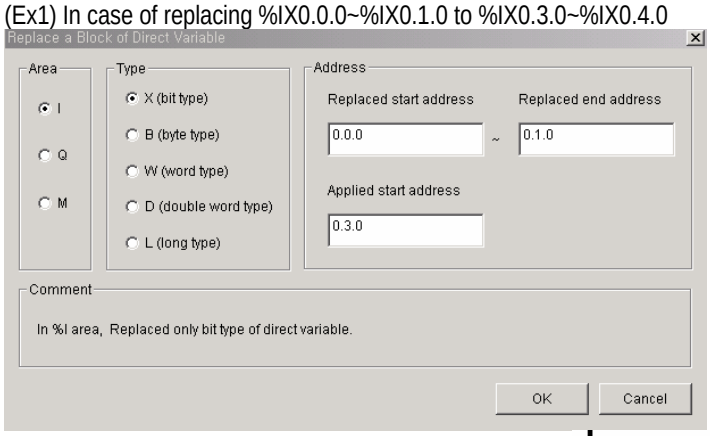


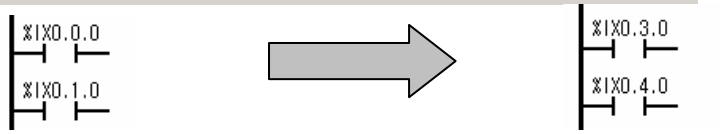
A) Area : Direct variable area to replace

B) Type : Direct variable data type to raplace

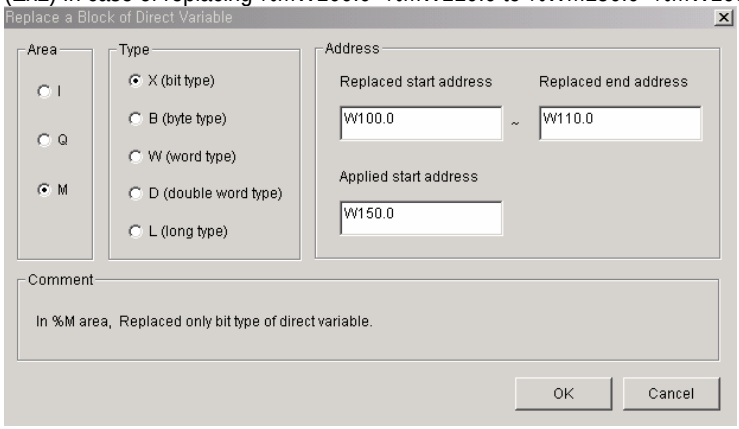
C) Address : Start address/end address to replace and start address to apply.

(Ex1) In case of replacing %IX0.0.0~%IX0.1.0 to %IX0.3.0~%IX0.4.0





(Ex2) In case of replacing %MW100.0~%MW110.0 to %WM150.0~%MW160.0



As above it is nessarary to input address with W(W means word unit)

If replacing %MD100.0 input D100.0 in the address.

7) Delete or Insert cell/line

This is the function to delete or insert the cell/line where the current cursor is placed.

(1) How to delete line

- Select  from toolbox or popup menu [To Arrow mode].
- Click the mouse on the position to delete the line in the LD program window.
- Select menu [Edit]-[Delete line] or popup menu [Delete line].

- Move the cursor to the position to delete line in the LD program window.
- Select menu [Edit]-[Delete line (Ctrl+D)].

(2) How to delete cell

It deletes the cell of the current cursor position.

If the position of current cursor is empty space, move up the content of the back of current column by 1 column size.

- Select  from tool box or popup menu [To Arrow mode].
- Click the mouse on the position to delete the cell in the LD program window.
- Select menu [Edit]-[Delete cell] or popup menu [Delete] or press Del key.

- Move the cursor to the position to delete the cell in the LD program window.
- Select [Edit]-[Delete cell].

(3) how to insert the line

- Select  from toolbox or popup menu [To Arrow mode].
- Click the mouse on the position to insert the line in the LD program window.
- Select menu [Edit]-[Insert line (Ctrl+N)] or popup menu [Insert line].

- Move the cursor to the position to insert the line in the LD program window.
  Select menu [Edit]-[Insert line (Ctrl+N)].

(4) how to insert the cell

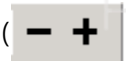
Inserts the empty cell on the cursor position.

- Select  from tool box or popup menu [To Arrow mode].
- Click the mouse on the position to insert the cell in the LD program window.
- Select menu [Edit]-[Insert cell (Ctrl+I)] or popup menu [Insert cell].

- Move the cursor to the position to insert the cell in the LD program window.
- Select menu [Edit]-[Insert cell (Ctrl+I)].

8) Zoom in/out

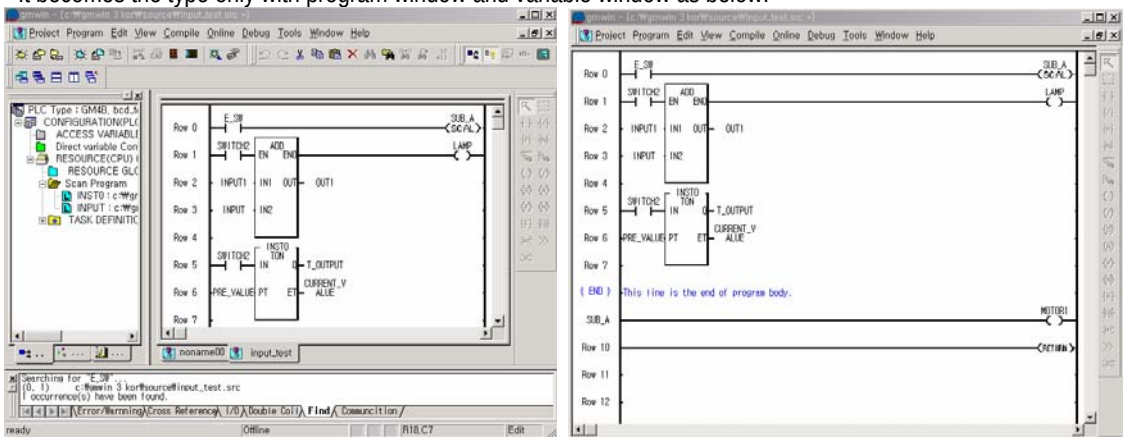
It provides the function to adjust the size of scrren in writing the LD program.

- Select menu [View]-[Zoom(Ctrl+E)] to call a dialogue box.
- Adjust the size of screen by using 'enlarge/reduce screen' dialogue box or icon ().

9) Full screen

It is the function to maximize the size of program window in writing the LD program.

- Select menu [View]-[Full screen,].
- It becomes the type only with program window and variable window as below.

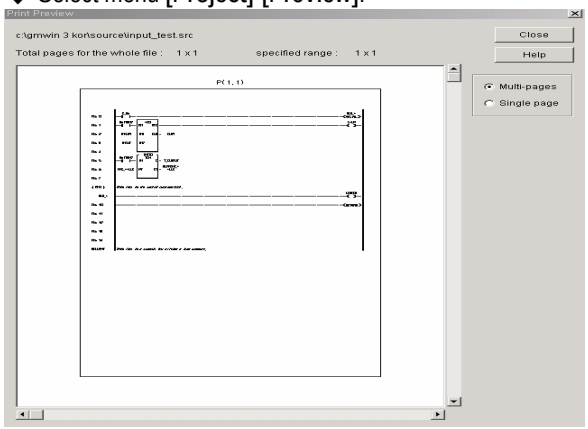


◆- To return to the original screen, select menu [View]-[Full screen].

10) Preview

◆ It provides the function to preview LD, SFC , IL program screen.

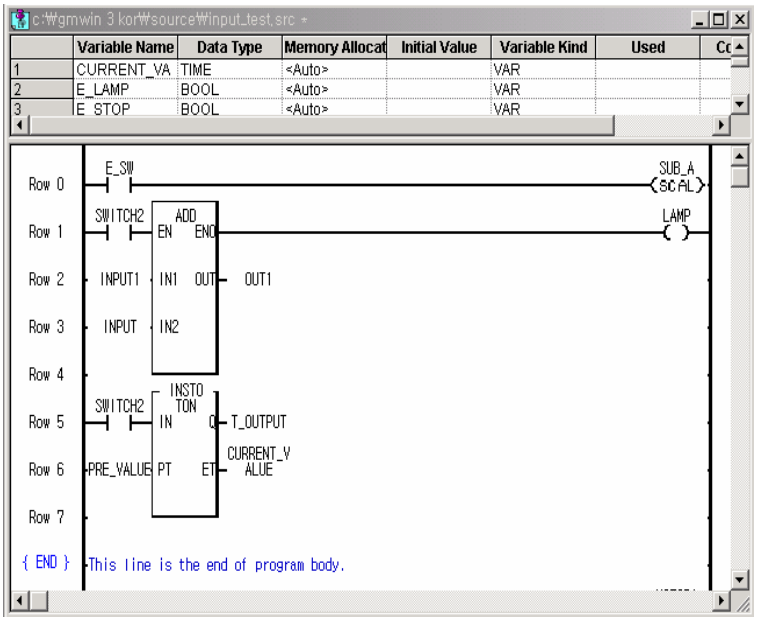
◆ Select menu [Project]-[Preview].



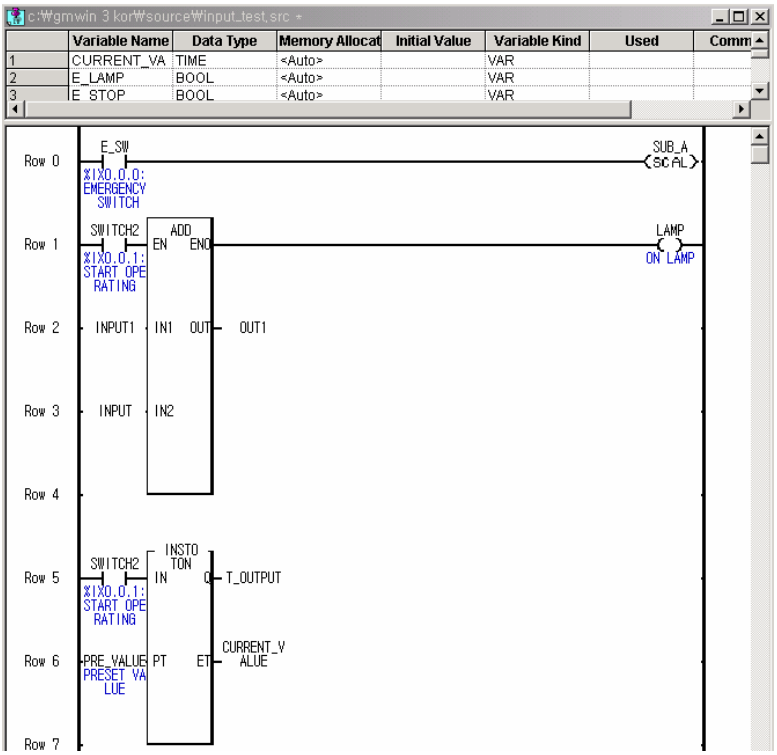
11) Show Memory/Comment

LD program provides the function to indicate the memory position of each variable and variable statement.

◆ Select menu [View]-[Show Memory/Comment].



(In case that [show Memory/Comment] is not indicated.)

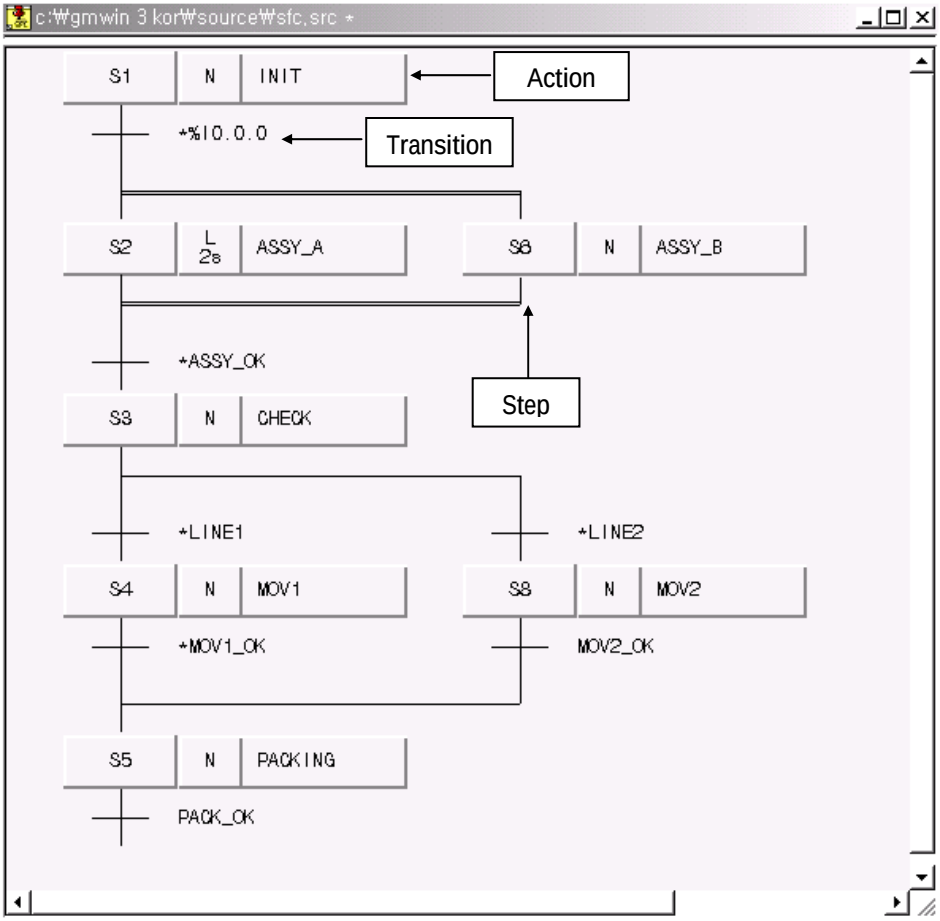


(In case that [Show Memory/Comment] is indicated.)

5.2 SFC Programming

5.2.1 Structure of SFC Program

SFC provides how to divide the PLC language (IL, LD) into Step and Transition according to execution order, and the composition of structure is as follows :



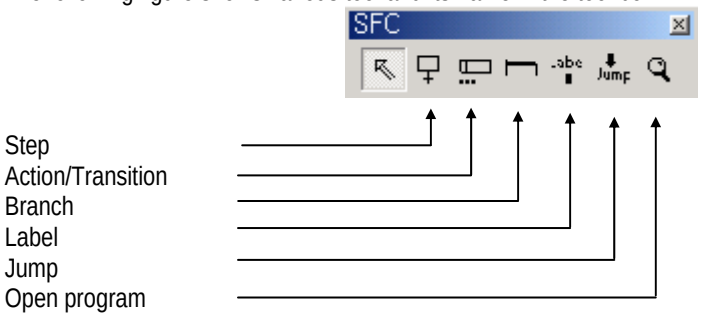
Point

SFC (Sequential Function Chart): the most optimal structured programming mode when the user wants to use the PLC for automatic control of machine.

5.2.2 How to use the menu

1) How to use Tool Box

The following figure shows various tool and its name in the tool box.



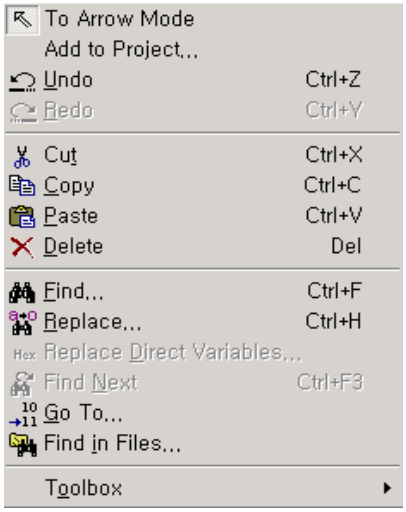
2) How to use Short-cut key

Symbol	Name	Short cut key	Description
	Step	F2	Step describes sequence control unit by connecting the action.
	Transition		The conditon to move from the active step to next step.
	Selection branch	F3	Defines Execution flow according to transition condition.
	Parallel branch		Used when control several sequence simultaneously.
	Action/Transition	F4	Indicates the processing content within the step.
	Label	F5	The place where execution fow starts by Jump.
	Jump	F6	Used to change the execution flow.
	Zoom-in	F7	Used to open step and action program.
	Arrow	Ctrl+A	Used to select cell or block.

After selecting the factor to insert in Too box, click the left button of a mouse on the desired position.

3) How to use Popup menu

If pressing the right button of a mouse on any position or the desired position from SFC program window, the figure appears as below:



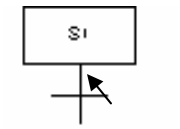
It is available to edit the program easily by using this function.

5.2.3 How to input SFC command

1) Step/Transition

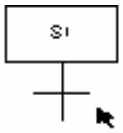
According to the current position, one pair of step/transition or transition/step shall be generated.

- The initial screen of SFC program is as below.

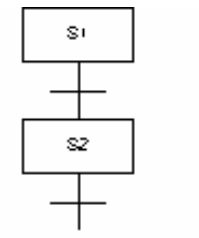


- Select  from toolbox.

If move the mouse to the indicated section, appears on the screen.



- Click the mouse on the indicated position.
- New step/transition shall be generated on the indicated position of the screen.

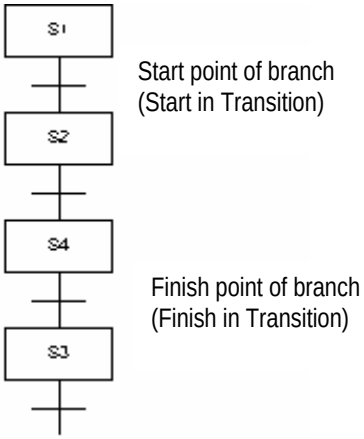


- Move the cursor to one place among the followings by using a key.
- Select menu [Toolbox]-[Step (F2)].

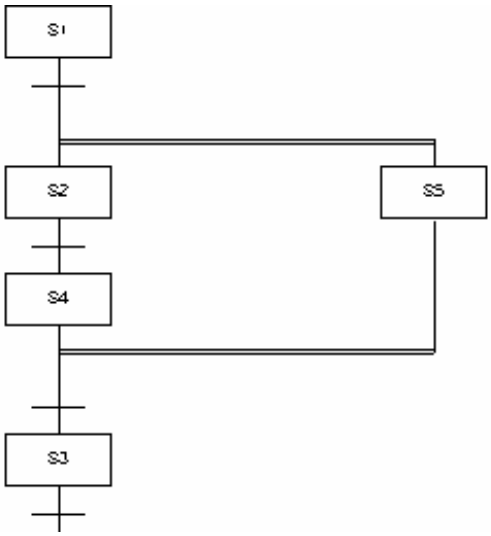
2) Parallel Branch

(1) in case of generating parallel branch for the first time,

- After selecting  from tool box, click the mouse on the transition position to start branch.



- Transition shall be active in RED.
- Click the mouse in Transition to finish Branch.

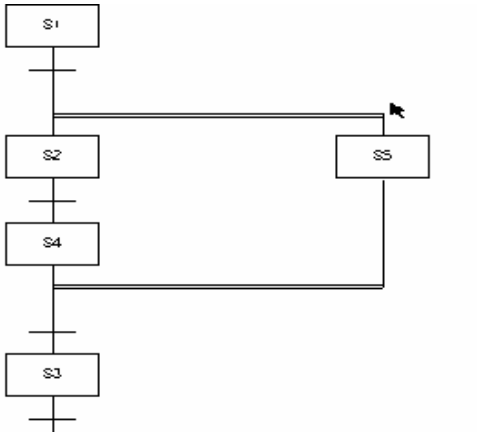


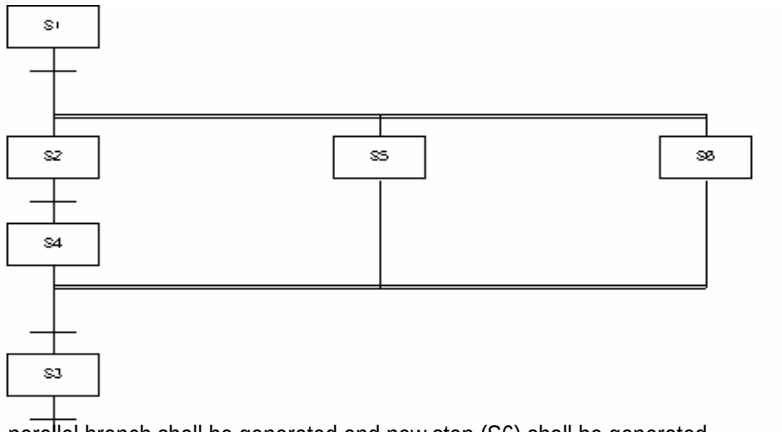
Parallel branch shall be generated and new step (S5) shall be generated.

- Move the cursor to the transition to start Branch by a key.
- Select menu [Toolbox]-[Branch (F3)].
- Move the cursor to the transition to finish the branch by a key.
- Select menu [Toolbox]-[Branch (F3)].

(2) In case of extending and generating the parallel branch

- Select from toolbox.
- Click the mouse on the starting position of parallel branch (indication of the figure)





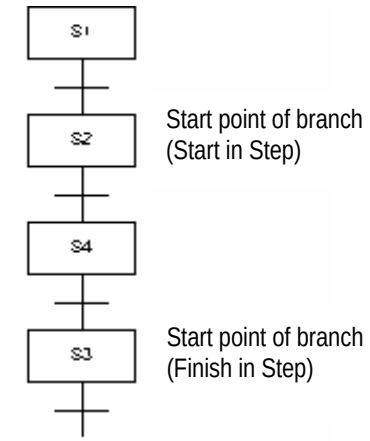
- The parallel branch shall be generated and new step (S6) shall be generated.

- Move the cursor to the starting position of parallel branch to insert by a key.
- Select menu [ToolBox]-[Branch (F3)].

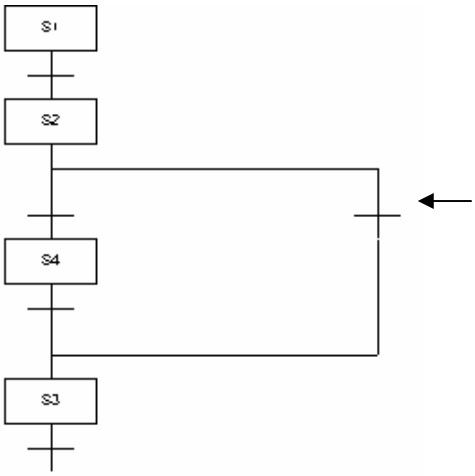
3) Selection Branch

(1) In case of generating Selection Branch for the first time

- After selecting from toolbox, click the mouse on step position (S2) to start the Branch.



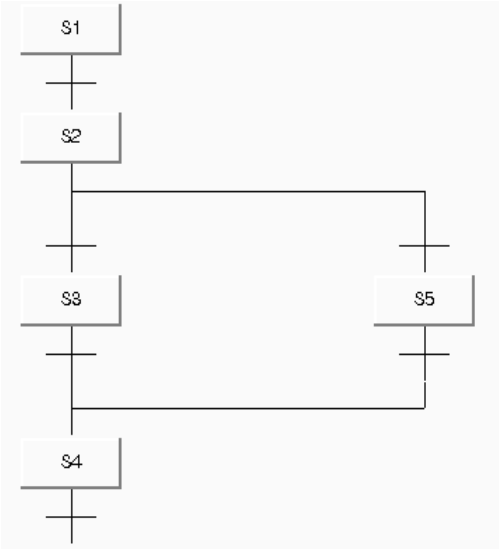
- Step (S3,S4) shall be active in RED.
- Click the mouse on the Step (S3) to finish the Branch.



After generating Selection Branch and making new Transition, add Step to new Trasition.

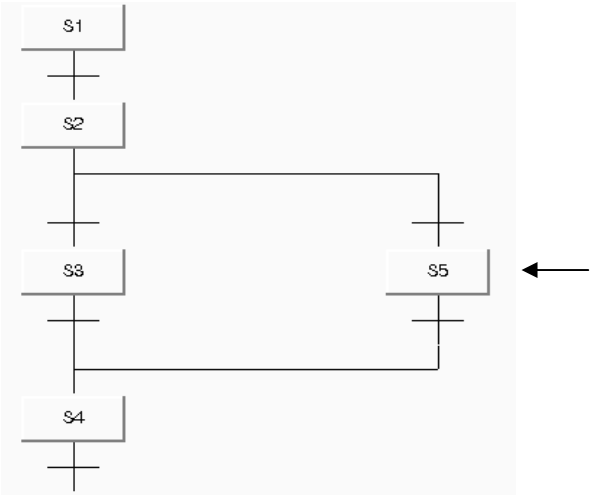
- Select from toolbox.
- If move the mouse the indicated position, appears on the screen.
- Click the mouse on the indicated position.
- New step sall be generated in the indicated position of the screen.

- Move the cursor to the step to start point of branch by using a key.
- Select menu [Toolbox]-[Branch (F3)].
- Move the cursor to the step to finish point of branch by using a key.
- Select menu [Toolbox]-[Branch (F3)].



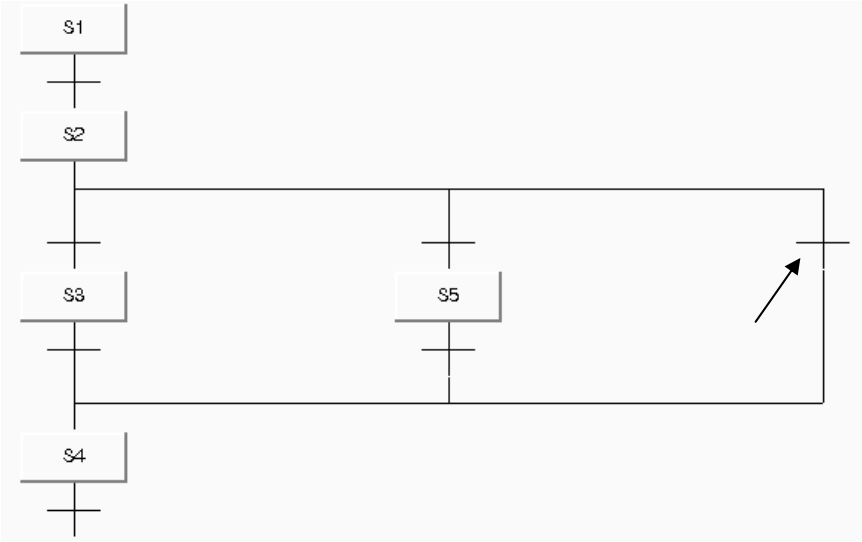
(2) In case of extending and generating Selection Branch

- Select  from toolbox.
- Click the mouse on the starting position of selection branch (Indication of the figure).

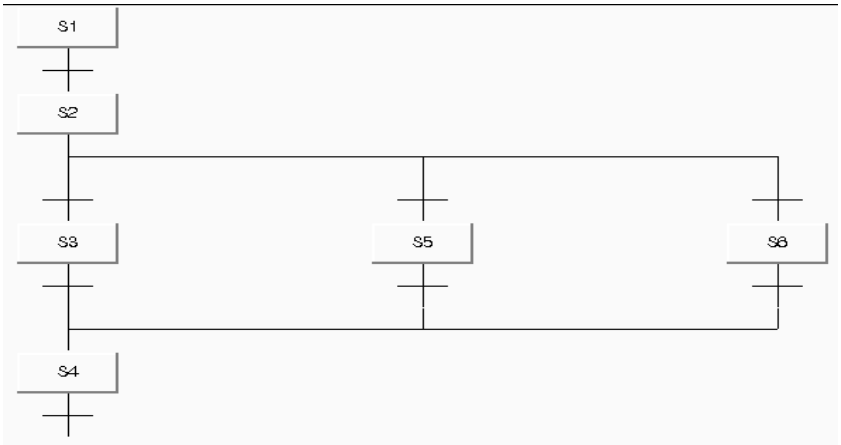


- If generating selection branch and making new transition, add the Step to new transition.
- Select  from toolbox.
- If move the mouse to the indicated position, appears on the screen.
- Click the mouse on the indicated position.
- New step shall be generated on the indicated position of the screen.

- Move the curso to the starting position of selection branch to insert by a key.
- Select menu [Toolbox]-[Branch (F3)].



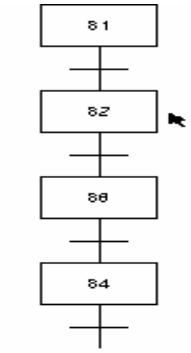
[Before inserting the step to the transition of selection branch]



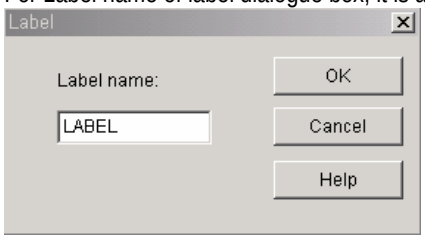
[After inserting the step to the transition of selection branch]

4) Label

- Select Label: from toolbox.
- Move the mouse to the step (Indication of the figure) and click.



- Input the label name in Label dialogue box and click [Verify].
- For Label name of label dialogue box, it is available to input Alphabet 16 letters (Korean 8 letters).



- Label shall be generated.

Point

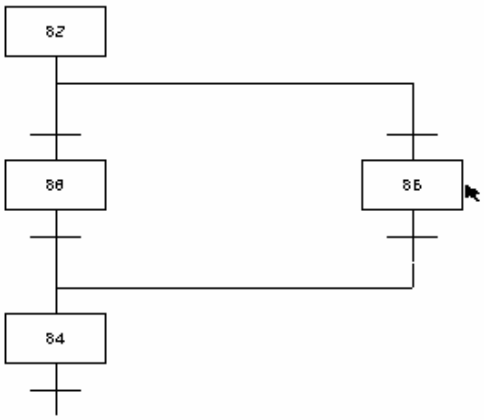
Label shall be inserted before Step, and used with Jump.

- Move the cursor to the step by using a key.
- Select menu [Toolbox]-[Label (F5)].
- Inut the label name in label dialogue box and then click [OK].

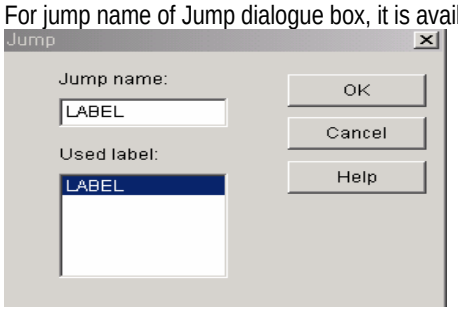
5) Jump

- Select 

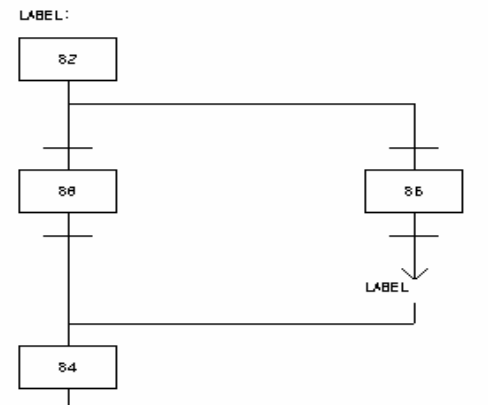
from toolbox.



- After moving the mouse to the step (Indication of the figure) above the desired transition to generate Jump, click [OK].
- Input Jump name in Jump dialogue box and then click [OK].
- Select the label to jump among the using labels in Jump dialogue box and double click, and the name of label will appear in Jump name column.
- For jump name of Jump dialogue box, it is available to input Alphabet 16 letters (Korean 8 letters).



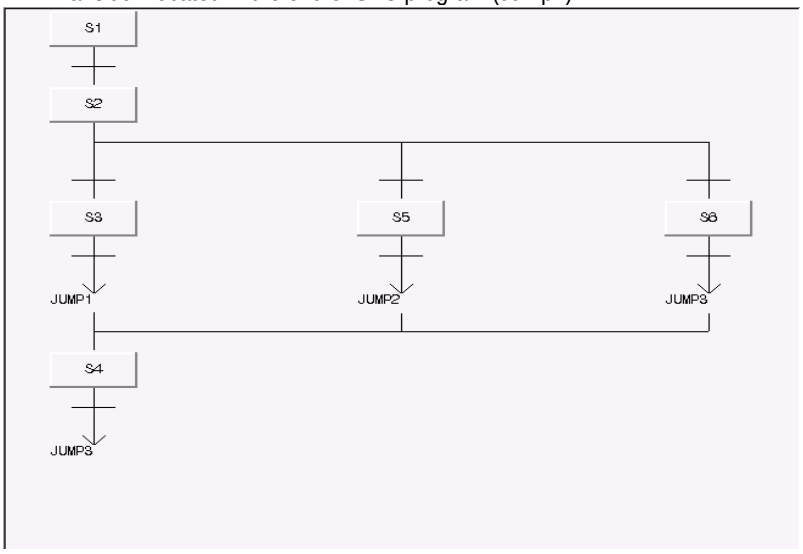
- Jump shall e generated.



The place available to generate Jump :

Point

- Transition under the step except first transition (Jump1,Jump2,Jump3)
- Transition located in the end of SFC program (Jump4)

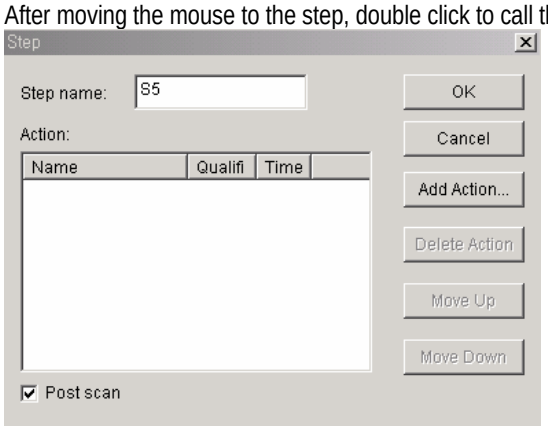


- Move the cursor to the desired position (Indication of the figure) to generate Jump by using a key. Select menu [Toolbox]-[Jump (F6)].
- Input Jump name in [Jump] dialogue box and then click [OK].

6) How to edit Step

This is the function to change the step name or add/delete the action to the step.

- After moving the mouse to the step, double click to call the step dialogue box.



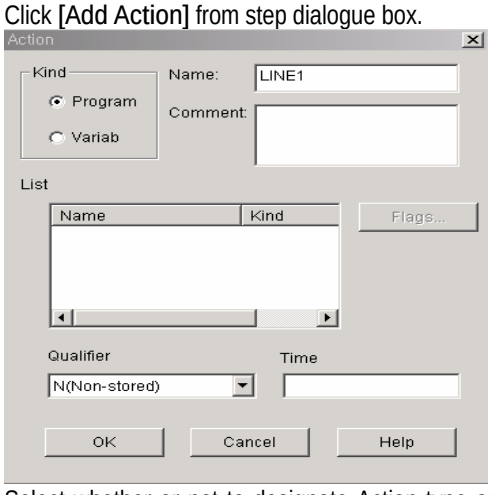
- Change the step name.
- Click [Add Action] to add the action.
- Click [Delete Action] to delete the action.
- Determine whether or not select Post Scan.
- Click [Move Up] or [Move Down] to change the position of action.

7) Action

This is the method to connect Action by using the icon of toolbox except the methods on the above.

- Select  from toolbox.
- After moving the mouse to the step, click to call step dialogue box.

- Move the cursor to the step by using a key.
- Select menu [Toolbox]-[Name (F4)].
- Click [Add Action] from step dialogue box.



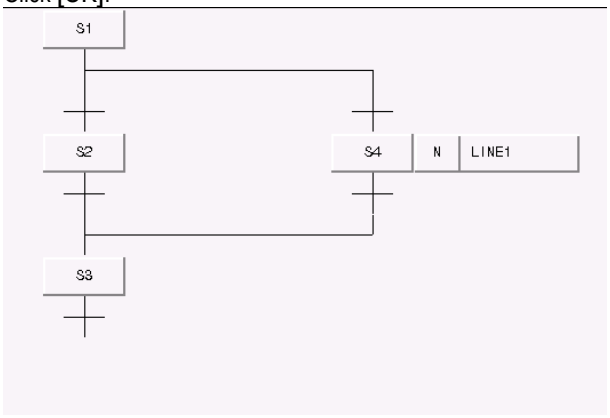
Select whether or not to designate Action type as program or BOOL variable output in the type option button of action dialogue box. If designating it as variable, the output of designated variable shall be '1' when action is actuated.

1) In case of designating Action as Program

- Input Action name (Alphabet : 16 letters, Korean : 4 letters) in name input column.
  When connecting the already using action, select it in the list box.
- Input the statement (Alphabet: 40 letters, Korean : 20 letters) in the statement inut column.

2) In case of designating Action as Variable

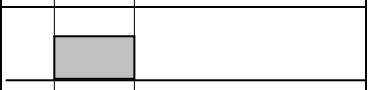
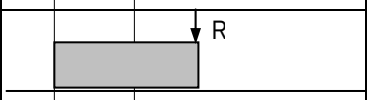
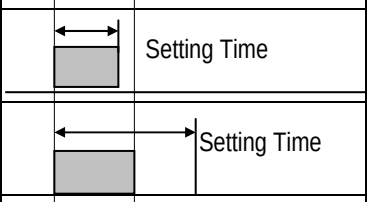
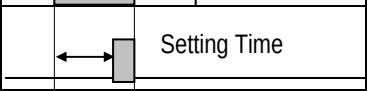
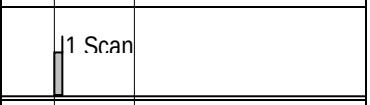
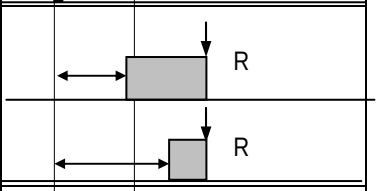
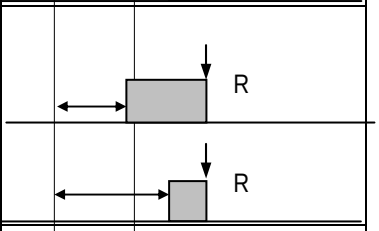
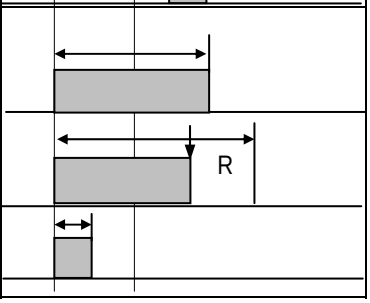
- Input Variable name (Alphabet 16 letters/Korean 8 letters) in name input column.
  When connecting the already declared variable, select it in the list box.
  Select the desired Qualifier from qualifier list box.
- If the selected qualifier has the time value (D,L,SD,SL,DS), input the time value in 'time' input column.
  Ex) T#10S
- Click [OK].



Point

It is available to connect maximum 8 actions for one step.

< The type and function of Qualifier >

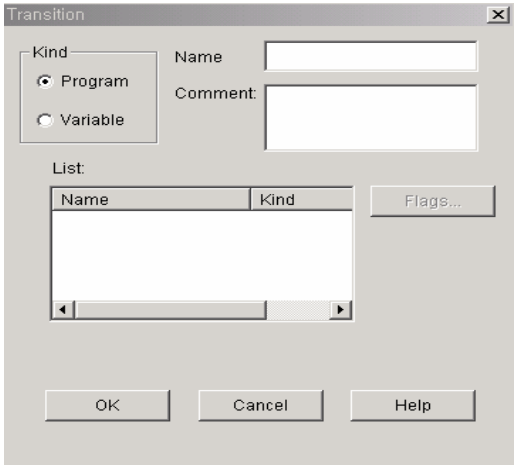
Symbol	Function	
N(Non-stored)	Action is executed while Step is in active.	
R(overriding Reset)	R(overriding Reset) makes stopping the execution of action executed by qualifier(S,SD,DS,SL) before.	
S(Set)	After Step is in active, an action is executed until R qualifier acts.	
L(time Limited)	After Step is in active, an action is executed as long as setting time.	
D(time Delayed)	After Step is in active, the execution of action is delayed as long as setting time.	
P(Pulse)	Action is executed at the only moment when Step is in active.	
SD(stored & time Delay)	After Step is in active, an action is executed after the lapse of setting time until R qualifier acts. If the R qualifier, However, acts before the lapse of setting time, the action is not executed.	
DS(Delayed & stored)	After Step is in active, an action is executed after the lapse of setting time until R qualifier acts. But, if the step is in passive or the R qualifier acts before the lapse of setting time, the action is not executed.	
SL(stored & time Limited)	After Step is in active, an action is executed as long as setting time, and when the setting time elapses or R qualifier acts, the action is stopped.	

8) Transition

It defines Transition by the variable or program.

- Select from toolbox or double click Transition.
- After moving the mouse to the Transition, click to call transition dialogue box.

- Move the cursor to the Transition by using a key.
- Enter the transtion.



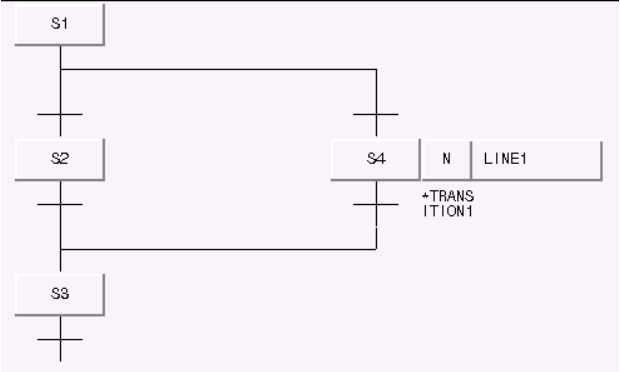
- Select whether or not to designate the transition condition as program or BOOL variable in 'kind' option of Transition dialogue box. If designating BOOL variable, the condition shall be 1 when the variable is 1 and move to next step.

(1) In case of designating Transition as Program

- Input Transition name (Alphabet 16 letters/Korean 8 letters) in name input column.
  When connecting the already using transition, select it in the list box.
- Inut statement for transition (Alphabet: 40 letters/Korean 20 letters) in the statement input column.

(2) In case of designating Transition as Variable

- Input Transition name (Alphabet 16 letters/Korean 8 letters) in name input column.
  When connecting the already declared variable, select it in the list box.
- Input statement for transition (Alphabet : 40 letters/Korean 20 letters) in the statement input column.
- Click [OK].
- The figure below shows that Transition is inputted as 'Transition 1'.



Point

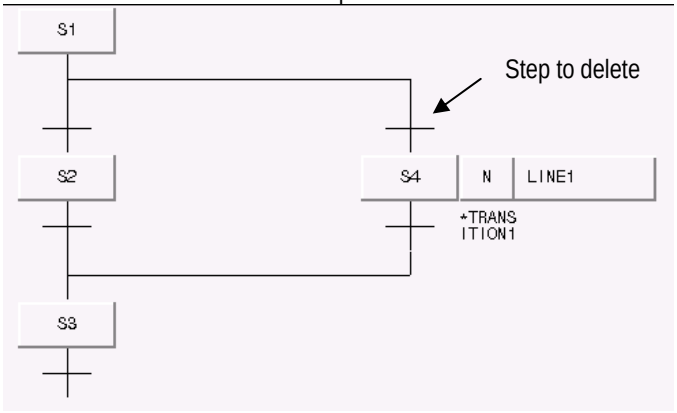
When designating Transition as program, output shall be always TRANS.

5.2.4 How to edit SFC

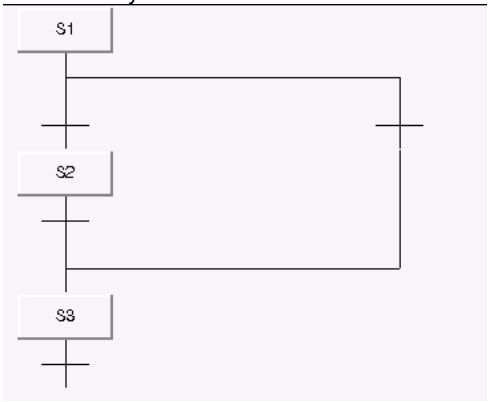
1) Delete

(1) How to delete Step/Transition

◆ Move the mouse to the desired step or transition to delete.



◆ Press Del key.



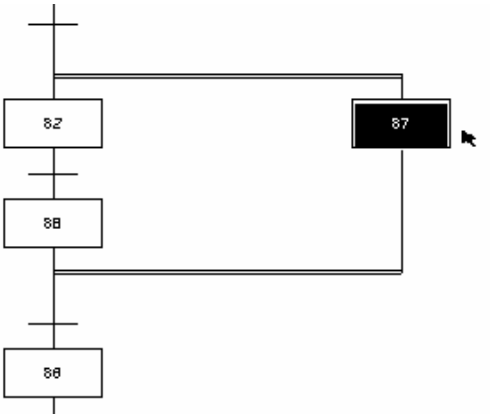
◆ Move the cursor to the step to delete by using a key.
◆ Select menu [Edit]-[Delete].

Point

Even if Transition is deleted in SFC program, Transition program is not deleted.
To delete the program, it is required to delete it in Transition list (menu [Program]-[Transition List]).

(2) How to delete Branch

◆ After moving the mouse to the step (Indication of the figure, in case of parallel branch) that exists in the branch, or transition (in case of selection branch), press Del key.



◆ Move the cursor to the step (or transition) of the branch to delete by using a key.
◆ Select menu [Edit]-[Delete].

(3) How to delete Label

◆ After moving the mouse to the label to delete, press Del key.

◆ Move the cursor to the label to delete by using a key.
◆ Select menu [Edit]-[Delete].

(4) How to delete Jump

◆ After moving the mouse to the jump to delete, press Del key.

◆ Move the cursor to the jump to delete by using a key.
◆ Select menu [Edit]-[Delete].

(5) How t delete Action

◆ After moving the mouse to the action to delete, press Del key.

◆ Move the cursor to the action to delete by using a key.
◆ Select menu [Edit]-[Delete].

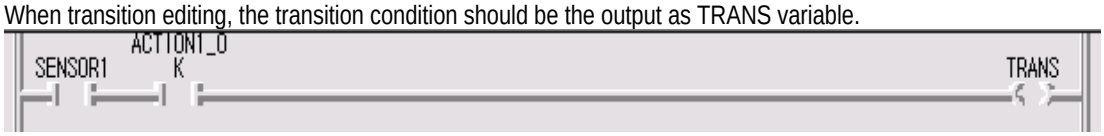
Point
Even if the action is deleted in SFC program, Action program is not deleted. To delete the program, it is required to delete it in action list (menu [Program]-[Action List]).

2) Action, Transition Zoom-in

This is the function to edit the program of action or transition.

- Select  from toolbox.
- After moving the mouse to the action or transition, click to call 'language selection' dialogue box. In this case, if it is designated as variable, zoom-in is not available.
- For the action or transition that selected the program type previously, language type selection shall be omitted.

- Select the desired language type from language selection dialogue box.
- Click [OK] to call the screen to write program.
- When transition editing, the transition condition should be the output as TRANS variable.



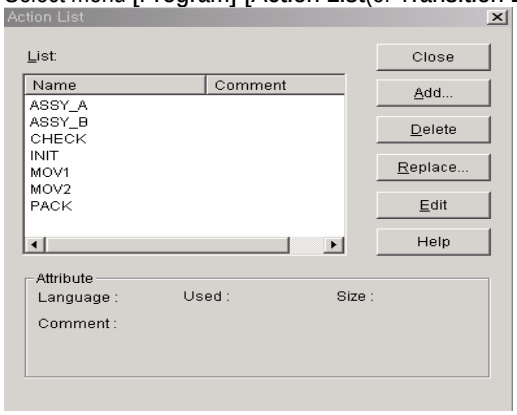
Point

1. The variable used in Action/Transition shall be used in common within all other action transition.
2. Action/Transition program is not saved separately but saved together when saving SFC program. Therefore, if saving in the SFC program window, Action/Transition shall be saved together.

3) Action/Transition list

It is available to see the currently using Action/Transition list.

- Select menu [Program]-[Action List(or Transition List)].



- In Action List dialogue box, Action (or Transition) list and the properties for the selected action appears.
  Language : language type that Action is written
  Size : program size of Action
  Statement : statement for Action
  Number used : Action number used in SFC program

(1) How to insert Action
- Click [Add] in Action list dialogue box.
- After inputting Action name and statements, click [OK].

(2) How to modify Action name
- Click [Edit] in Action list dialogue box.
- After inputting Action name and statement to modify, click [OK].
- In this case, the action using in SFC program shall be modified in SFC program.

(3) How to delete Action
- Click [Delete] in Action list dialogue box.
  In this case, the action using in SFC program shall not be deleted.

(4) How to edit Action
It is available to edit Action program.
- Click [Edit] in Action list dialogue box.

4) How to edit Block

To execute block function, it is required to designate the range to apply first. That is, to copy or delete a series of content, select the desired contents as a block and then select Block Edit function.
When setting Block in SFC, only correct program is available. For example, it is required to set the block starting from the Step and finishing from Transition. The designation of block is as follows :

- Select  from toolbox or popup menu [Arrow Mode].
- After moving the mouse to the startng position of block from SFC program window, press the left button of a mouse and drag to the end row of the range to select.

- Move the cursor to the startng positionof block from SFC program window.
- Press Shift key and move the cursor the end row of the range to select by using an arrow key.

(1) Cut
In the condition of designating a block,
- Select menu [Edit]-[Cut (Ctrl+X, )] or popup menu [Cut].

(2) Copy
In the condition of designating a block,
- Select menu [Edit]-[Copy (Ctrl+C, )] or popup menu [Copy].

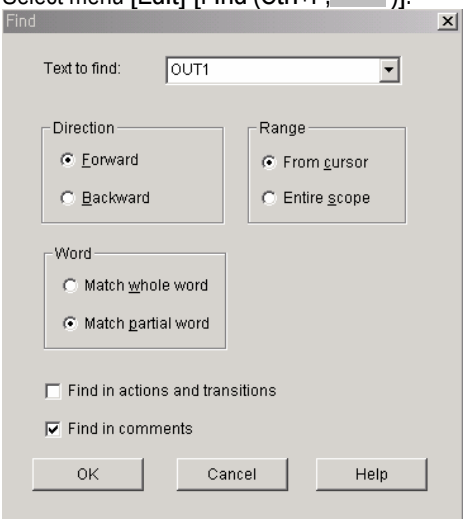
(3) Paste
After [cut] or [copy],
- Move the cursor to the position to execute [Paste] in LD program window.
- Select menu [Edit]-[Put (Ctrl+V, )] or popup menu [Paste].

(4) Delete
In the condition of designating a block,
- Select menu [Edit]-[Delete, ]] or select Del key or popup menu [Delete].

5) Find, Find again, Find from several flles

(1) Find

- Select menu [Edit]-[Find (Ctrl+F, )].



- Input the character to find in the name input column of find dialogue box.
  Select the option as below and then click [OK].

A) Range
Select the range to execute [Find].
From the cursor: executes from the current cursor position.
Overall : executes in the overall program.

B) Direction
Select the direction to execute [Find].
Forward: executes from the cursor positon to downward.
Backward : executes from the cursor position to upward.

C) Find in comments.
Executes [Find] including the comments.

D) Find in actions/transitions
Executes [Find] in Action/Transition program to find the used variables.

(2) Find Next
In case that [Find] has been executed before, execute [Find]/[Replace] in the condition already set before.

- Select menu [Edit]-[Find Next (Ctrl+F3, )] or popup menu [Find Next].

(3) Go

- Select menu [Edit]-[Go To, ] or popup menu [Go To].
- Input X (landscape), Y (longitudinal) coordinates to find in [Go To] dialogue box.

(4) Find in files
It finds the input characters in all program (*.SRC) belonging to the project or all program (*.SRC) of defined path.

- Select menu [Edit]–[Find in files, ] or popup menu [Find in files].
- Input the character to find.
- Select whether to find the character in the program belonging to the project or in the path.
- The result of [Find in files] is displayed in the output window.

6) Replace

- Select menu [Edit]-[Replace (Ctrl+H, )] or popup menu [Replace].
- Input the character to find in the name input column of replace dialogue box.
- Input new character in new name input column of replace dialogue box.
- After selecting option, click [OK].

7) Zoom

It is available to adjust the size of screen.

- Select menu [View]-[Zoom].
- After fixing the size of screen in zoomdialogue box, click [OK].

8) How to Show/Hide Action

It is available to see the overall flow at once by hiding the Action and viewing the step only.

- Select menu [View]-[Action].

9) SFC Properties

(1) Include debug information

To debug SFC program, it is required to include the debug information in PLC execution file.

- Select menu [Program]-[SFC Properties].
- Select [Include debug information] in [SFC Properties] dialogue box.

If selecting [Include debug information], the size of PLC execution file becomes large.

(2) Set step area to retain

When PLC is converted from STOP mode to RUN mode, the previously actuated step shall be active. That is, the step actuated information shall be retained.

- Select menu [Program]-[SFC properties].
- Select [Set step area to retain] in SFC properties dialogue box.

5.3 IL Programming

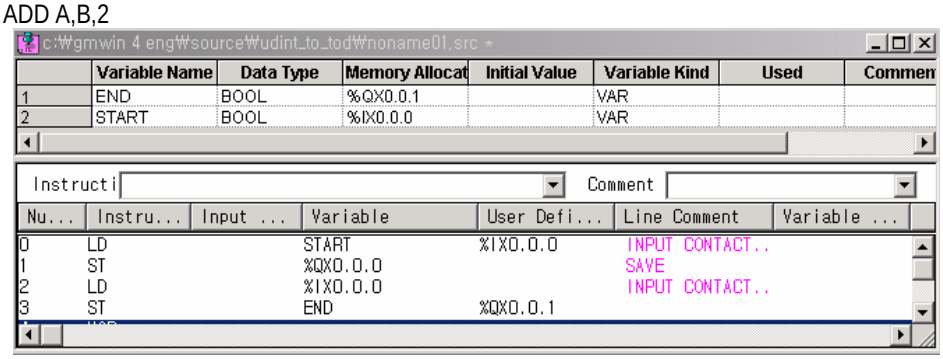
5.3.1 Structure of IL Program

IL is composed of command, statement input window, toolbox and indication section and header window that classifies the indication section.

IL is the language composed of command (Instruction) and as the elements of command(instruction), there are operator, function/function block, label etc.

The input of command and operand shall be done in command input window and the input of statement, in the statement input window. The classification of command and operand shall be done by the empty character and in case of several operands, the classification between operands shall be done by ‘,’ .

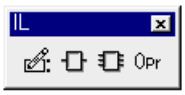
Ex) ADD A,B,2



5.3.2 How to use the menu

1) How to use ToolBox

The following figure shows various tools and its name in the tool box.



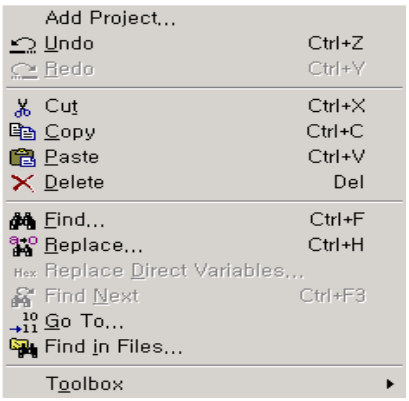
2) How to use Short-cut key

	Function	Select the function to input.
	Function block	Select the function block to input.
	Label	Input the label.
	Operator	Select the operator to input.

The above figures are the menu that is displayed when pressing the right buttong in IL and it is available to execute each function easily and simply..

3) How to use Popup Menu

If pressing the right button of a mouse in any position or the desired position in IL program window, the figure appears as below.



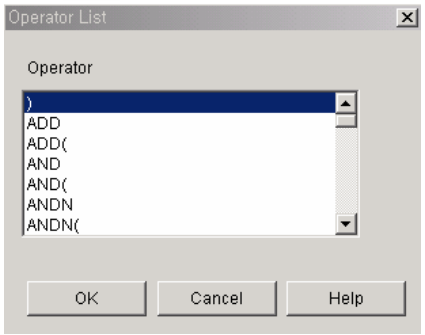
5.3.3 How to input IL command

1) Operator

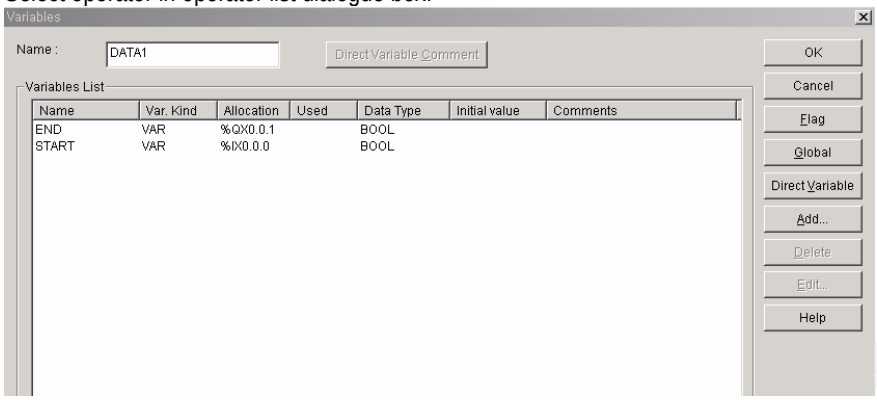
END indicates the end of main program and the program after END is subroutine program. Without END, the overall shall be main program. To call subroutine,SCAL,SCALC,SCALN shall be used and to return from subroutine, RET,RETC,RETN shall be used. It is not allowed to place the name written in SCAL(C,N) in front of END. If JMP(C,N) is in front of END, the relevant label should be in front of END and if behind END, the relevant label should be behnd END. Even if RET (C.N) does not exist behind END, the last end is regarded as the return from subroutine.

- Move the cursor of program indication area to the position to input.
- Click 

from toolbox.



- Select operator in operator list dialogue box.

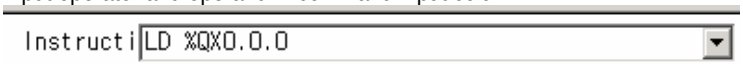


- Input operand in the variable name input column of variable dialogue box.
- Click [OK].

> **Point**
>
> In case of operand input, if you want to input the already declared variable, select it in the list box of Variable dialogue box.

Method 1

- Move the cursor of program indication scope to the position to input.
- Input operator and operand in command input column.



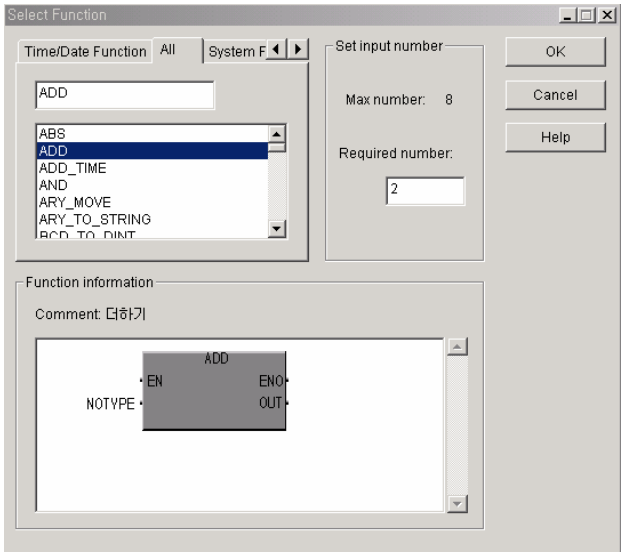
- Press Enter key.

Method 2

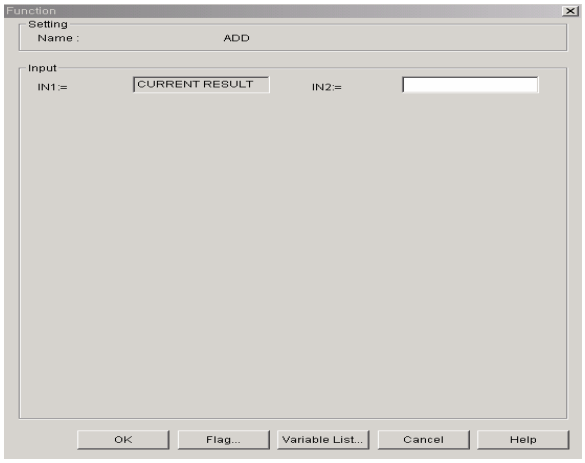
- Move the cursor of program indication scope to the position to input.
- Select menu [Edit]-[Toolbox]-[Operator] to call operator list dialogue box.
- Select operator in Operator list dialogue box.
- Input operand in the variable name input column of variable dialogue box.
- Click [OK].

2) Function

- Move the cursor of program indication scope to the position to input.
- Click  from toolbox.



- Select the function from function list dialogue box.



- Input operand in the input column of function dialogue box.
- Click [OK].

Point
In case of operand input, if you want to input the already declared variable, click the button of variable list of function dialogue box and select it in the list of variable dialogue box.

Method 1

- Move the cursor of program indication area to the position to input.
- Input the function and operand in command input column.

- Press Enter key.

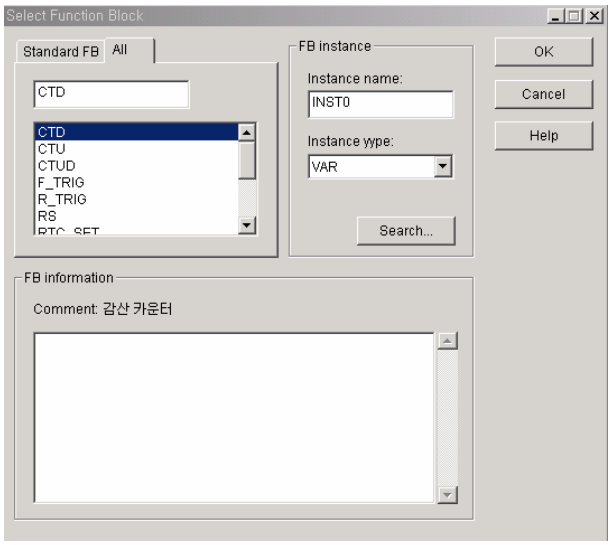
Method 2

- Move the cursor of program indication area to the position to input.
- Select menu [Edit]-[Toolbar]-[Function] to call the function list dialogue box.
- Select the function in function list dialogue box.
- Input operand in function dialogue box.
- Click [OK].

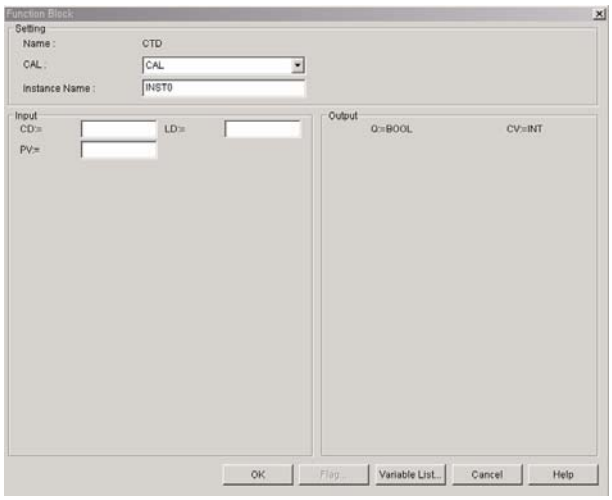
Point
In case of Extensible function(the function that the number of input variable is extensible), the number of operand input is not fixed.

3) Function Block

- Move the cursor of program indication scope to the position to input.
- Click  from toolbox.



- After selecting the function block to use in function block list dialogue box, click [OK] and the function block dialogue box appears.



- Input the instance name in instance input column.
- Input the relevant operand in input column.
- Click [OK].

Point
In case of operand input, if you want to input the already declared varible, click [Variable List] of function block dialogue box and select it in the list box of variable dialogue box.

Method 1

- Move the cursor of program indication scope to the position to input.
- Input CAL/CALC/CALN in command input column.

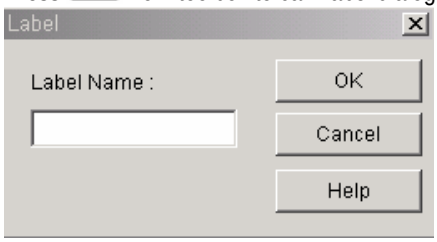
- Press Enter key.
- Select Function block in function block list dialogue box.
- Input the instance name and operand in function block dialogue box.
- Click [OK].

Method 2

- Move the cursor of program indication area to the row to input.
- Select menu [Edit]-[Toolbar]-[Function block].
- Select Function block in function block list dialogue box.
- Input the instance name and operand in function block dialogue box.

4) Label

- Move the cursor of program indication area to the position to input.
- Press  from toolbox to call Label dialogue box.



- Input the label name (Alphabet: 16 letters/Korean 8 letters) in Label dialogue box.
- Click [OK].

Method 1

- Move the cursor of program indication area to the row to input.
- Input the label name and ':' in command input column.

- Press Enter key.

Method 2

- Move the cursor of program indication scope to the row to input.
- Select menu [Edit]-[Toolbar]-[Label].
- Input the labelname in label dialogue box.
- Click [OK].

5) Comment

Writes the statement in the statement input column. It is available to input the statement by classifying it into the row statement and variable statement according to the statement indication of tool box. It is available to change the statement directly in the statement input column.

- Move the cursor of program indication area to the row to input.
- Write the statement (Alphabet: 24 letters/Korean: 12 letters) in the comment input column.

- Move the cursor of program indication area to the comment input column.
- Write the comment.

5.3.4 How to edit IL

1) How to insert Program/how to convert modification mode

For the conversion of the insert mode,

- Press Insert key on the keyboard.

For the conversion of modification mode,

- Press Insert key on the keyboard.

2) How to delete program

- Move the cursor of program indication area to the row to delete.
- Press Delete key on the keyboard.

3) How to edit Block

To execute block function, it is required to designate the range to apply first. That is, to copy or delete a series of content, select the desired contents as a block and then select block edit function.
The designation of block is as follows:

- Move the cursor to the row of the range to select.
- Press the left button of a mouse and drag to the end row of the range to select.

- Move the cursor to the row of the range to select.
- Press Shift key and move the cursor to the end row of the range to select by using an arrow key.

(1) Cut

In the condition of designating the block

- Select menu [Edit]-[Cut (Ctrl+X, )] or popup menu [Cut].

(2) Copy

In the condition of designating the block

- Select menu [Edit]-[Copy (Ctrl+C, )] or popup menu [Copy].

(3) Paste

After [Cut] or [Copy],

- Move the cursor to the position to execute [Paste] in program indication area.
- Select menu [Edit]-[Put (Ctrl+V, )] or popup menu [Put].

(4) Delete

In the condition of designating the block

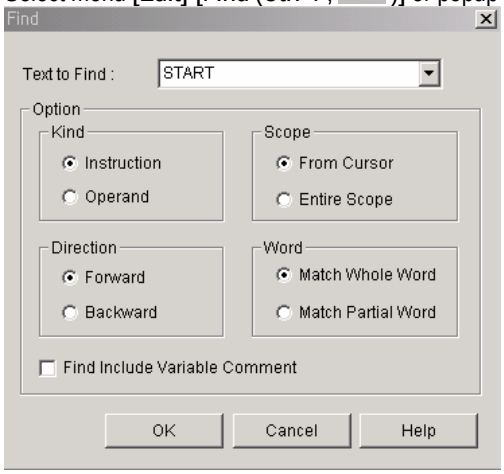
- Select menu [Edit]-[Delete, ] or popup menu [Delete], or press Del key.

4) Find, Find Next, Find in files

(1) Find

It finds the instruction or operand in the currently editing program.

- Select menu [Edit]-[Find (Ctrl+F, )] or popup menu [Find].



- Input the character string to find in [Text to Find] input column of find dialogue box.
- Select the following option and then click [OK].

A) Kind

Select the kind of character string to find.

B) Scope

Select the range to execute [Find].

From the cursor: executes [Find] from the current cursor position.

Overall : executes [Find] in the overall program.

C) Direction

Select the direction to execute 'find'.

Forward: executes [Find] from the cursor to downward direction.

Backward : executes [Find] from the cursor to upward direction.

D) Word

Select the coincidence of the word to search.

Mach Whole Word : searches the word that matches overall.

Mach Partial Word : searches even the word that matches partially

(2) Find Next

In case that [Find] has been executed before, execute [Find Next] in the condition already set before.

- Select menu [Edit]-[Find Next (Ctrl+F3, )] or popup menu [Find Next].

(3) Find in files

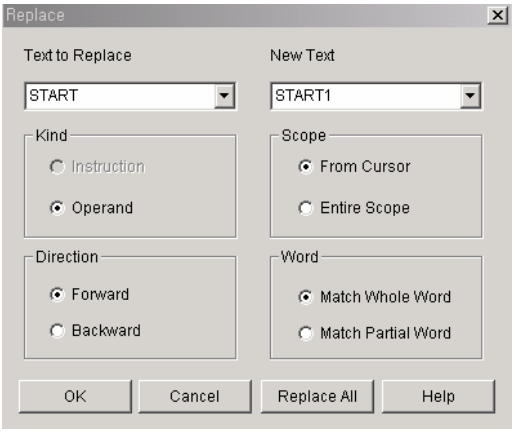
It finds the input character in all program (*.SRC) belonging to the project or all program of specipic path (*.SRC).

- Select menu [Edit]–[Find in files,] or popup menu [Find in files].
- Input the character to find.
- Select whether to find in the program belonging to the project or in the path.
- The result of finding is displayed in the output window.

5) Replace

This is the function to replace the operand in the currently editing program with the user desired operand.

- Select menu [Edit]-[Replace (Ctrl+H,)] or popup menu [Replace].



- Input the character string to find in [Text to Replace] in replace dialogue box.
- Input new character string in new character string input column.
- Select the option same as [find] and click [OK].
- If you want to replace the character string all at once, click [Replace all].

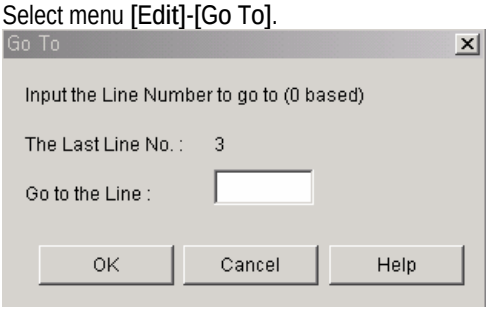
Point

Only the operand is available to replace the character string.

6) Go To

It finds the desired row in the program.

- Select menu [Edit]-[Go To].



- Input the row to find in the input column of [Go To] dialogue box.
- Click [OK].

Chapter 7. Online Command

In Online mode, it is available to do remote control and monitor for PLC through GMWIN.

7.1 How to convert PLC mode

This is the function to convert the PLC run mode through GMWIN.

Run mode

- Select menu [Online]-[PLC Mode]-[Run].

Stop mode

- Select menu [Online]-[PLC Mode]-[Stop].

Pause mode

- Select menu [Online]-[PLC Mode]-[Pause].

Debug mode

- Select menu [Online]-[PLC Mode]-[Debug].

Master conversion

- Select menu [Online]-[PLC Mode]-[Change master CPU].

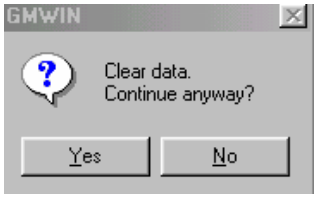
(This is the function to convert Master CPU when using GM1 dual PLC.)

7.2 Reset

7.2.1 Data Clear

This is the function to delete data memory area of PLC. Please pay your attention as all retained data values are deleted in this case.

- Select menu [Online]-[Reset]-[Data Clear].

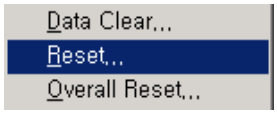


- Click [Yes].

7.2.2 Reset

This is the function to reset PLC. Restart mode is the mode set as Cold and Warm.

- Select menu [Online]-[Reset].



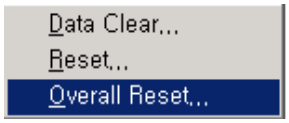
- Select [Reset].

- Click [Yes].

7.2.3 How to reset Over All

This is the function to reset PLC overall. As restart mode is Cold restart, the previously retained data are deleted.

◆ Select menu [Online]-[OVERALL Reset].

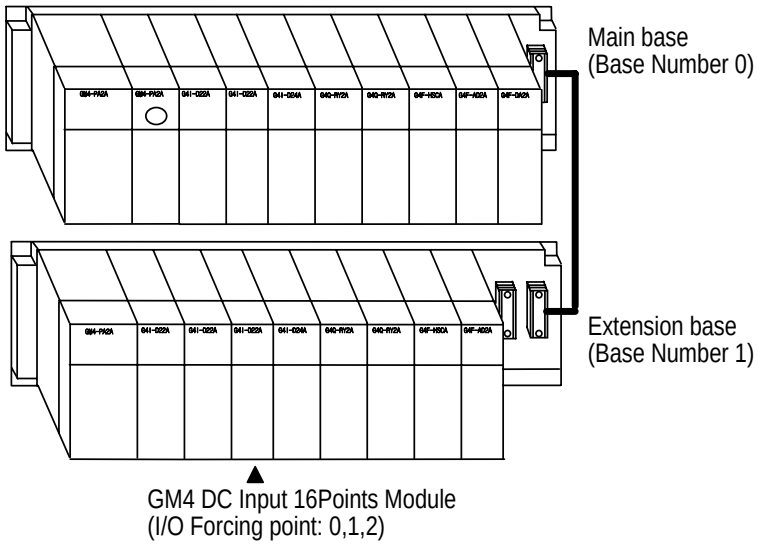


◆ Select [OVERALL Reset].

◆ Click [Yes].

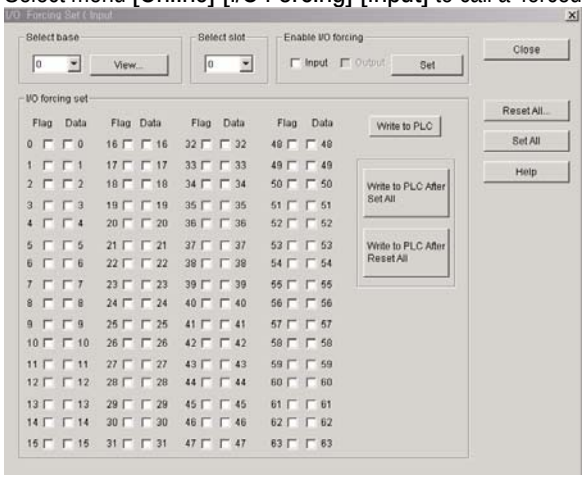
7.3 How to set I/O Forcing

This is the function to set [I/O forcing] of I/O refresh area in PLC and it is different from forced writing of program variable.
The method to set [I/O forcing] in the input module of the marked (▲) part of PLC system composed as the below figure is as follows:

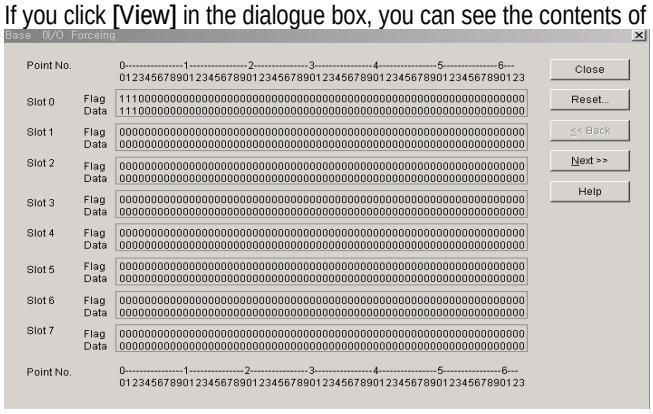


7.3.1 I/O Forcing set (Input)

- Select menu [Online]-[I/O Forcing]-[Input] to call a 'forced I/O setting (input)' dialogue box.



- To execute [I/O Forcing], set [Input] of Enable I/O Forcing in the dialogue box and then click [Set].
- Select Base 1, slot 2 in the dialogue box.
- Set Data and Flag (0~2) in [I/O forcing set] of dialogue box.
- If you click [Write to PLC] in the dialogue box, the forced I/O setting (input) is completed.
- If you click [Write to PLC After Set All], all contact of the selected slot shall be ON and if you click [Write to PLC After Reset All], all contact of the selected slot shall be released.
- If you click [Set All] in the dialogue box, all contact of PLC shall be forced setting ON and if you click [Reset All], the forced I/O setting of all contact shall be released. In this case, click [Write to PLC] to write the forced value in PLC.
- If you click [View] in the dialogue box, you can see the contents of I/O Forcing set (input).



7.3.2 I/O Forcing set (Output)

The method to set Forced Output is the same as that of Forced Input setting.

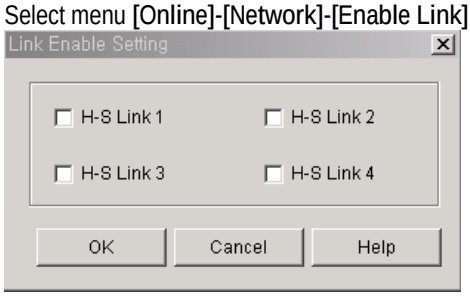
- Select menu [Online]-[set Forced I/O]-[Output] to call the 'forced I/O setting (output)' dialogue box.
- Set 'output' of 'forced I/O setting allowed' and then click [Set].
- Input Base selection :1, slot selection :4 in the dialogue box.
- Set the forced data and flag (0~2) in the forced I/O setting of the dialogue box.
- If you click [Write to PLC] in the dialogue box, the forced I/O setting (output) shall be completed.
- If you click [Write to PLC After Set All], all contact of the selected slot shall be forced ON, if you click [Write to PLC After Reset All], all contact of the selected slot shall be released.
- If you click [Set All], all contact of PLC shall be ON and if you click [Reset All], all contact shall be released. In this case, click [Write to PLC] to write the forced value in PLC.
- If you click [View] in the dialogue box, you can see the content of forced I/O setting (output).

7.4 Network

7.4.1 Link Enable Setting

This sets the use block of high speed link parameter.
The communication by high speed link parameter should be required to set [Link Enable Setting] to communicate.

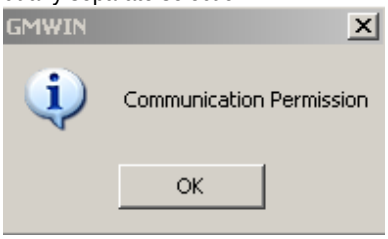
◆ Select menu [Online]-[Network]-[Enable Link].



◆ After selecting 'high speed link', click [OK].

Point

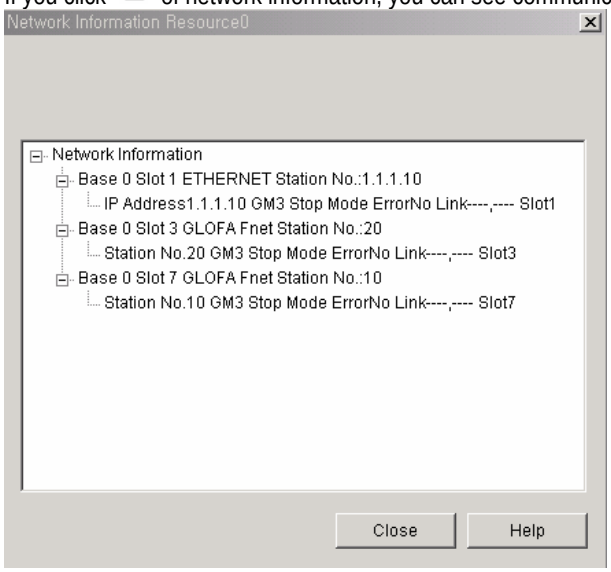
As for GM7, it is available to install only one communication module, the communication is allowed with the message below without any separate selection.



7.4.2 Link Status

This shows the station number, type, action mode, error and slot position of communication module installed in PLC.

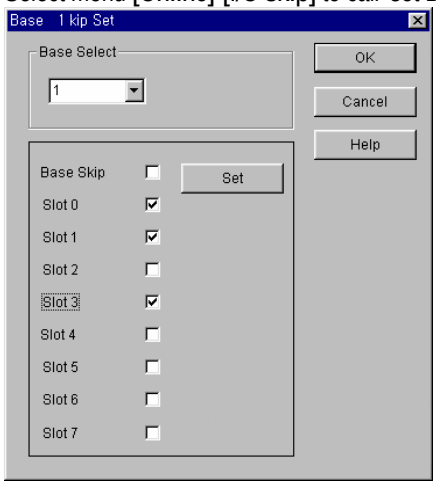
- Select menu [Online]-[Network]-[Link Status].
- If you click ⊞ of network information, you can see communication information installed in PLC.



7.5 I/O skip

It sets I/O skip in PLC.
The method to set I/O skip is as follows:

- Select menu [Online]-[I/O skip] to call 'set Base skip' dialogue box.

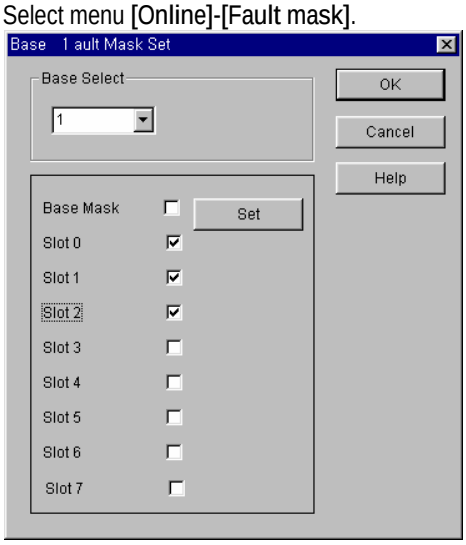


- Designate Base no. to skip I/O in [Base skip Set] dialogue box.
- After designating the slot no. in 'set base skip' dialogue box, click [OK].
- For details, refer to GM1,2 instructions.

7.6 Fault Mask

It sets fault mask in PLC.
The method to set Fault mask is as follows :

- Select menu [Online]-[Fault mask].

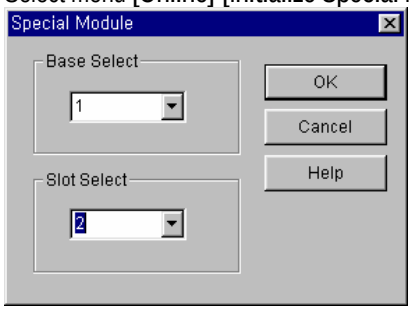


- Designate Base no. to mask in the dialogue box.
- After designating slot no. in the dialogue box, click [OK].
- For details, refer to GM1, 2 instructions.

7.7 Initialize Special Module

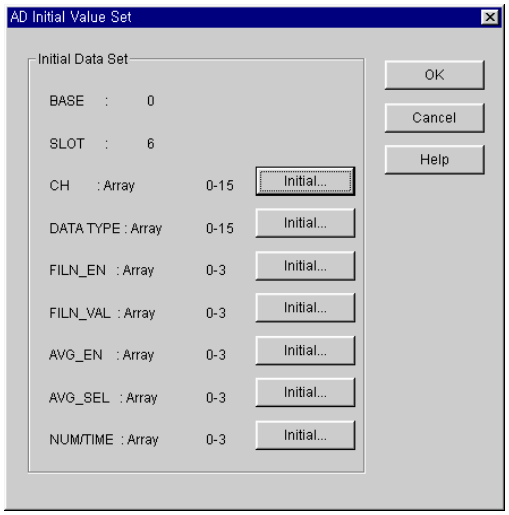
It executes the initialization of special module installed in PLC.
The method to initialize the special module is as follows:

- Select menu [Online]-[Initialize Special Module].



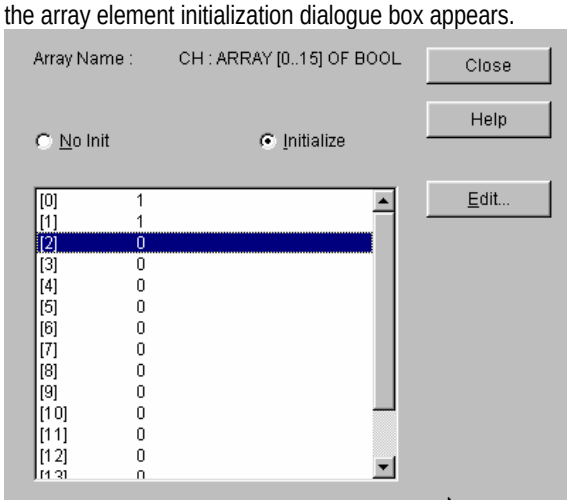
- After designating base no. and slot no. of Special module available to initialize in the dialogue box, click [OK].
- If fail to designate the base no. and slot no. of special module to initialize in the dialogue box, the error message box as below appears on the screen.

- After designating the base no. and slot no. of special module to initialize in the dialogue box correctly, click [OK] and the dialogue box to initialize the selected special module appears.
- Select the parameter to initialize in 'Initial Value setting' dialogue box.



- If you select the parameter to initialize in the dialogue box, array initialization dialogue box appears and outputs the value set in the selected parameter.

- After selecting the desired item to modify from the array initialization dialogue box, if you double click or click **[Edit]**, the array element initialization dialogue box appears.

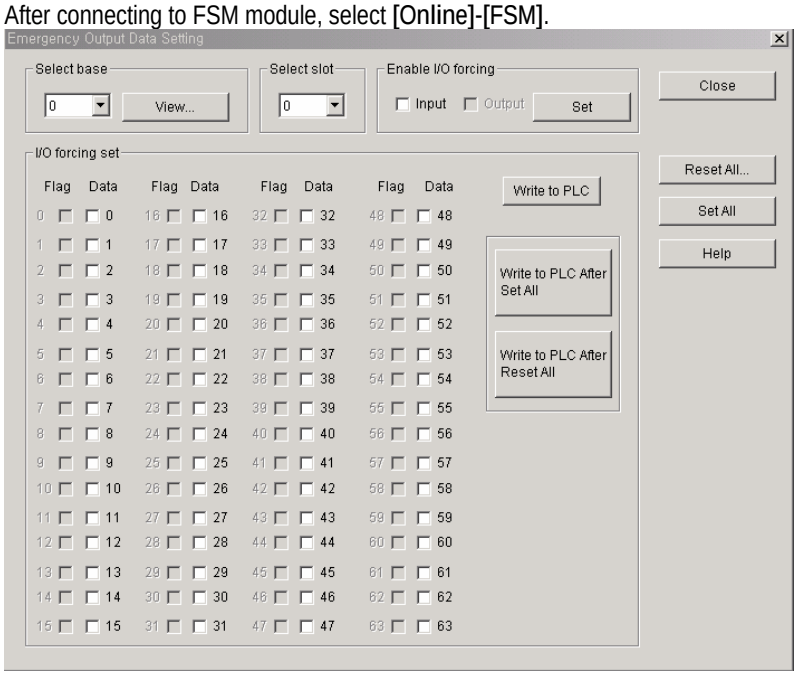


- After modifying the value to initialize in array element initialization dialogue box, click **[OK]**.

7.8 FSM

It sets the remote I/O output value in case that the malfunction (system down, communication down) occurs in FSM (Fieldbus Slave Module).
The method to set I/O is the same as the forced I/O setting.

◆ After connecting to FSM module, select [Online]-[FSM].

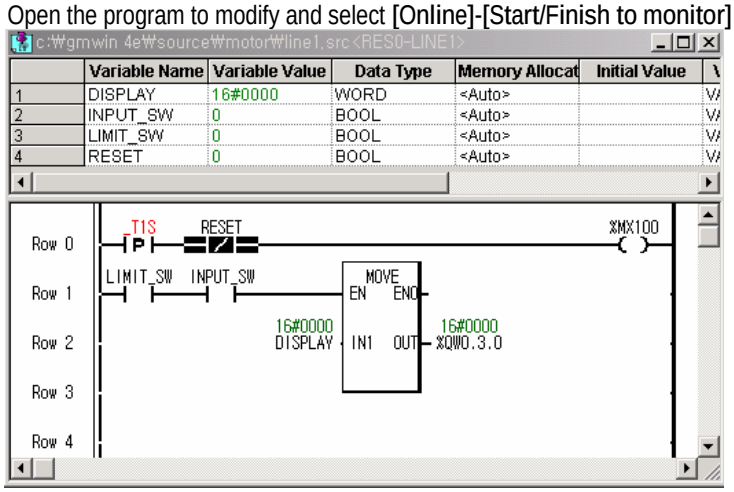


7.9 Online Edit

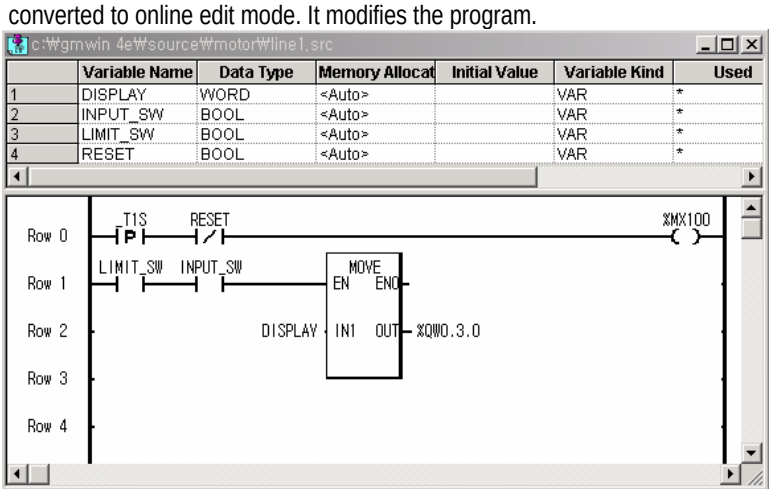
7.9.1 Online Edit Start

It is available to modify the program without converting PLC to STOP mode when PLC is in RUN mode.
When PLC is in RUN mode, it is available to open the program to modify. In this case, the program in the PLC should be the same as the program to modify.

◆ Open the program to modify and select [Online]-[Start/Finish to monitor] to run PLC.



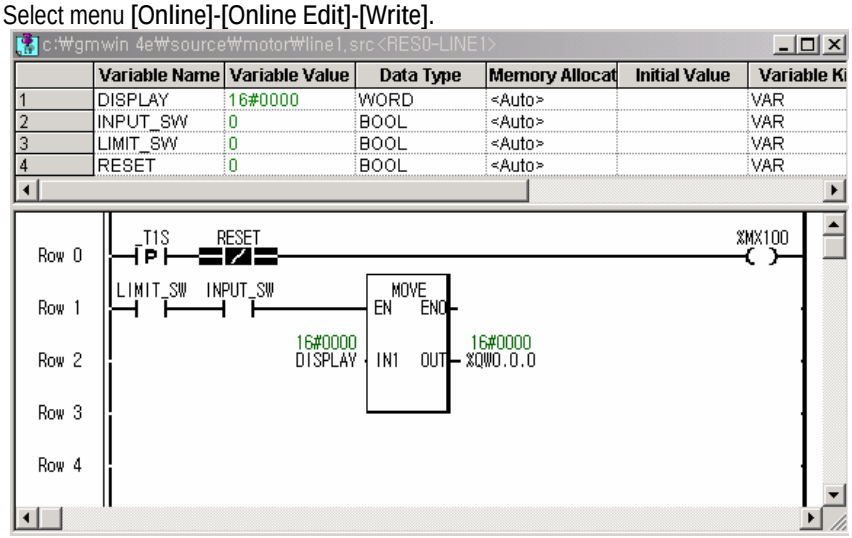
◆ Select menu [Online]–[Online Edit]-[Start]. In this case, if it is monitor on, the relevant program shall be converted to online edit mode. It modifies the program.



7.9.2 Online Edit Write

It writes the modified program in PLC.

- Select menu [Online]-[Online Edit]-[Write].



- If error occurs, it is not available to write the program in PLC. Select menu [Online]-[Online Edit]-[Start] to modify the error.

7.9.3 Online Edit Cancel

If you cancel while editing the program, the program returns to the previous state (the state before selecting menu [Online]-[Online Edit]-[Start]).

- Select menu [Online]-[Online Edit]-[Cancel]

7.9.4 Available items to execute online edit

It is available to edit the following items in the online.

- Modification, addition, deletion of contact and variable
- Modification of numerical value used directly in the program
- Retain, addition of initial value variable
  Initial value, retain variable shall be applied when converting from STOP mode to RUN mode.
- Rung addition or deletion
- Replacement of parameter
  Available to replace only basic parameter, high-speed link parameter. (Including Link Enable)
  Replacement of I/O parameter is not available.
- Addition of Jump and label
- Variable deletion in the variable list.
- Replacement of variable memory allocation
  Ex) AT %I0.2.0 ==> %I0.2.1

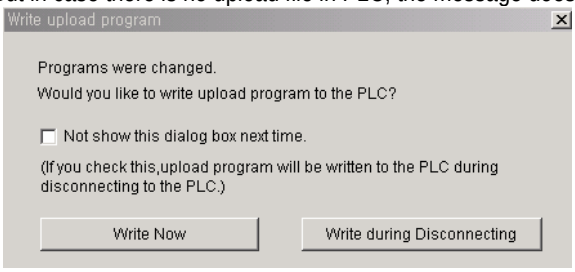
7.9.5 Restraints to execute online edit

The following items are not available to modify in the run.

- Replacement of variable properties
  Ex) Local variable (VAR) ==> Global variable (VAR_EXTERNAL)
  But, it is available to replace the initial value of the variable declared as initial value.
- Modification, addition, deletion of global variable
- Addition, deletion of program block
- Addition of the user defined function/function block (available to reuse the already using function/function block)
- Modification of the user definition function/function block
- Simultaneous Modification of lots of rungs
  <number of modified rung + number of label included in the modified rung> should be less than 256 (PLC body related matter)
- Library insertion.

7.9.6 Upload file after online edit

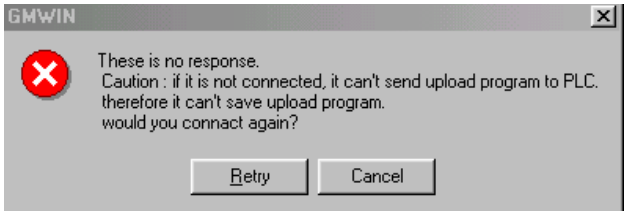
♦ After completing the online edit, if selecting [Online Edit]-[Write] the following message appears.
But in case there is no upload file in PLC, the message doesn't appears.



♦ Write Now: the upload is written immediately to PLC.
♦ Write during Disconnecting: when selecting **[Online]-[Disconnect]**, the upload file is written to PLC.
♦ Not show this dialog box next time: If selecting it operates like **[Write during Disconnecting]** and the dialog box doesn't appear any more. (if executing GMWIN again this dialog box appears).

Point

♦. If disconnecting the cable after selecting **[Not show this dialog box next time]** or **[Write during Disconnecting]** the following message appears.



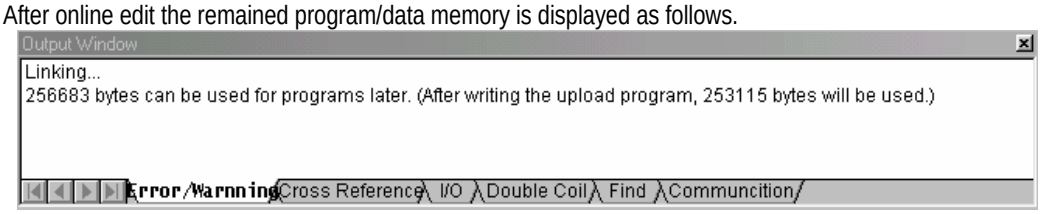
In this case, reconnect the cable and select **[Retry]** to write the upload file when disconnecting.

♦ If selecting [Cancel], the upload file of PLC is invalid anymore and in case of selecting **[Upload Project From PLC]**, the following message appears.

In this case, select menu **[Make]** and write to PLC to do **[Upload Project From PLC]**.

7.9.7 Program/Data capacity check after online edit

- ♦ It's available to check the remained program/data memory of PLC after online edit.
- ♦ After online edit the remained program/data memory is displayed as follows.

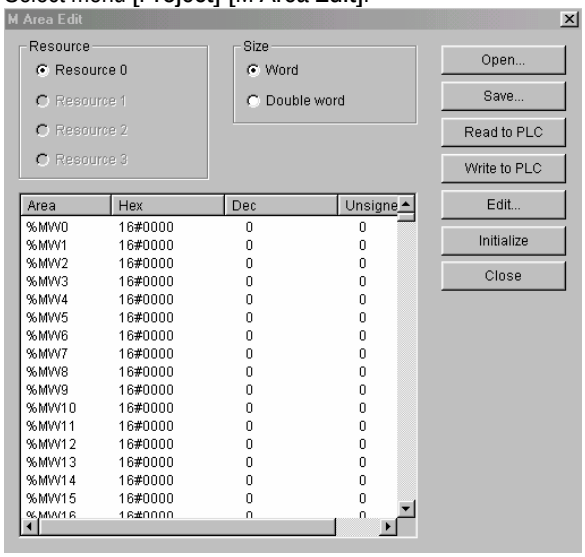


- ♦ Program: the remained program memory capacity.

7.10 M Area Edit

It is available to edit the %M area of direct variable.

- ◆ Select menu [Project]-[M Area Edit].

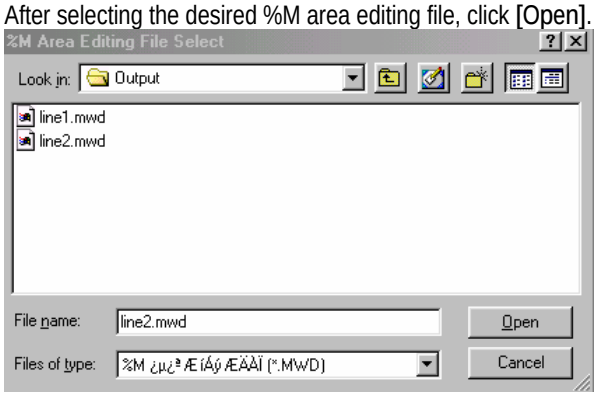


- ◆ For GM1 multi CPU, select Resource.
- ◆ Select the size to indicate by word or double word.

1) Open

It opens the already written %M area-editing file.

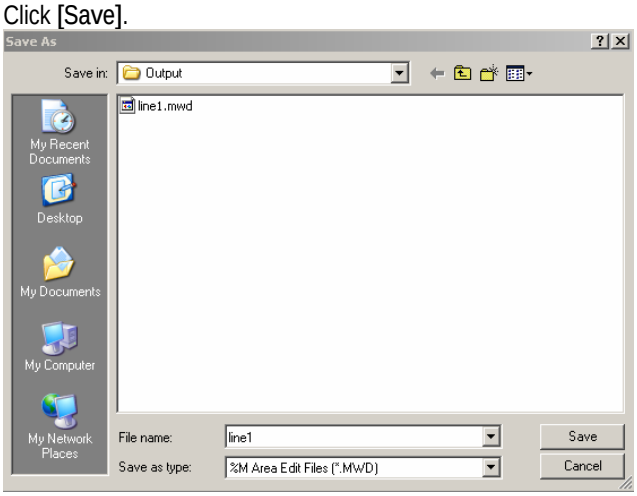
- ◆ Click [Open].
- ◆ After selecting the desired %M area editing file, click [Open].



2) Save

It saves the written %M area file.

◆ Click [Save].



◆ After inputting the desired %M scope file name, click [Save].

3) Read from PLC

It reads the %M area from PLC data memory.

◆ Click [Read from PLC].

4) Write to PLC

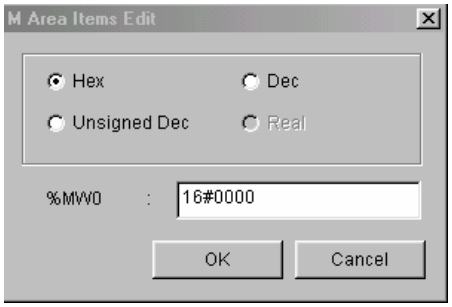
It writes the written %M area to PLC data memory.

◆ Click [Write to PLC].

5) Edit

It designates the value to each memory address of %M area.

◆ Double click the desired %M area to edit or click [Click].



◆ After inputting the desired value, click [OK].

6) Initialize

◆ Click [Initialize] to initialize all %M area as the initial value(16#0).

7) Close

◆ Click [Close] to close the edit window of M area.

Chapter 8. Monitoring

In GMWIN, it is available to monitor the PLC operation status in the run. The available monitoring is as follows:
1) Program monitoring
2) I/O monitoring
3) Variable monitoring
4) Link parameter monitoring

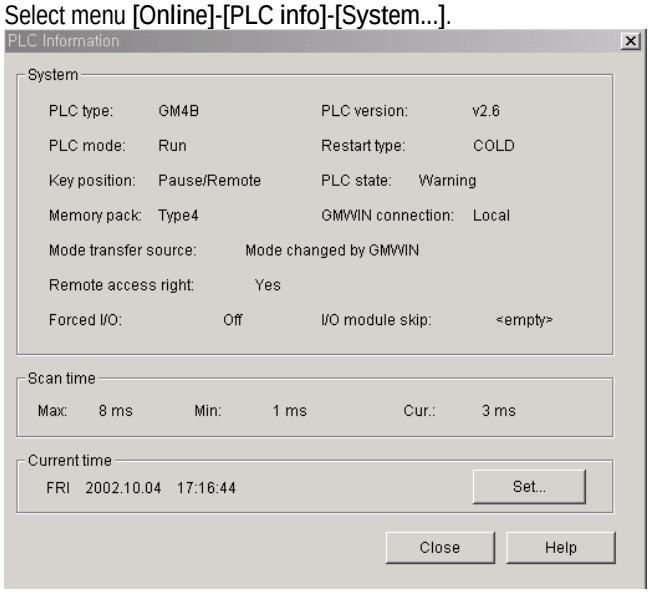
8.1 PLC information

This is the function to show various information of PLC system.
It is available to verify system information, error/warning information, PLC history (AC Fail history, Error history, Mode change history etc).

8.1.1 System Information

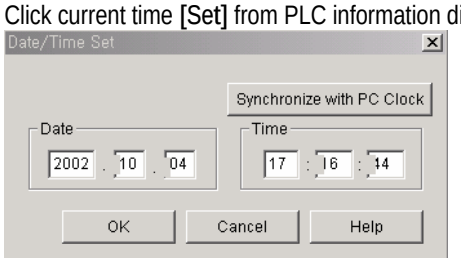
System information is the function to show the composition of PLC system. It is available to verify system information, scan time, current time, error status etc. and set the current time.

- Select menu [Online]-[PLC info]-[System...].



To set or modify the current time,

- Click current time [Set] from PLC information dialogue box to call [Date/Time Set] dialogue.



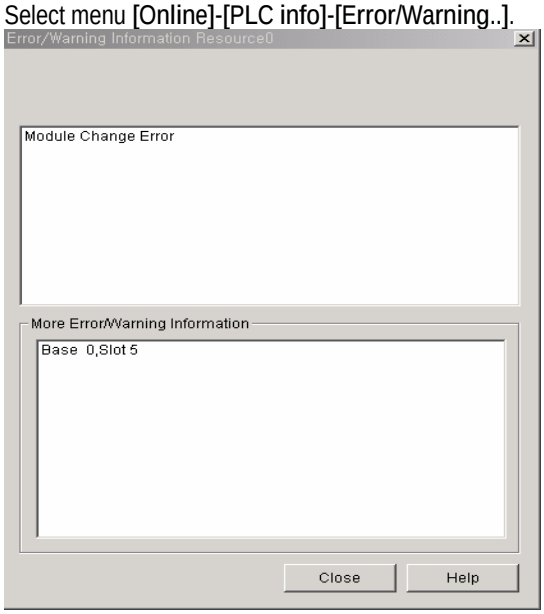
- Set the date/time in the above dialog box.
- If selecting [Synchronize with PC Clock] and the data/time of PLC is set with the data/time of PC.

8.1.2 Error/Warning information

In error/warning information, it is available to verify if the error occurs as below.

- In case that actually mounted module is different from I/O parameter.
- In case that module composition is changed in the run.
- In case that fuse of the fuse installed module is cut off,
- In case that it is not available to read/write normally in I/O module.
- In case that the normal interface is not available in special or communication module.
- Whether or not the error detect slot position and the fail occurrence of external unit
- Whether or not the task collision

◆ Select menu [Online]-[PLC info]-[Error/Warning..].



8.1.3 AC Fail History

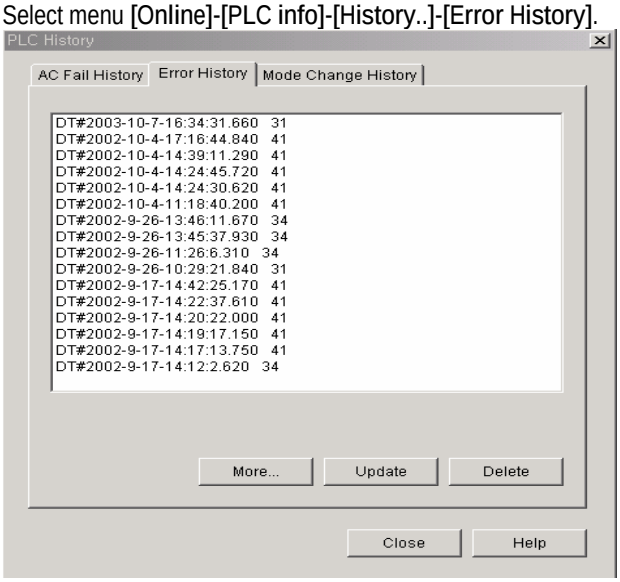
This shows the history that PLC power is cut off.

◆ Select menu [Online]-[PLC info..]-[History]-[AC Fail History].

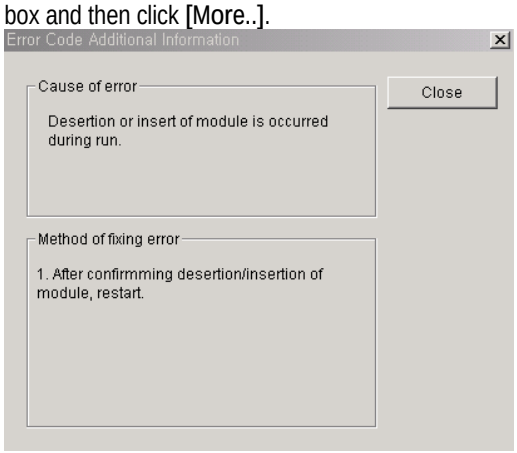
8.1.4 Error History

This shows the history that the error occurred in PLC.

◆ Select menu [Online]-[PLC info]-[History..]-[Error History].



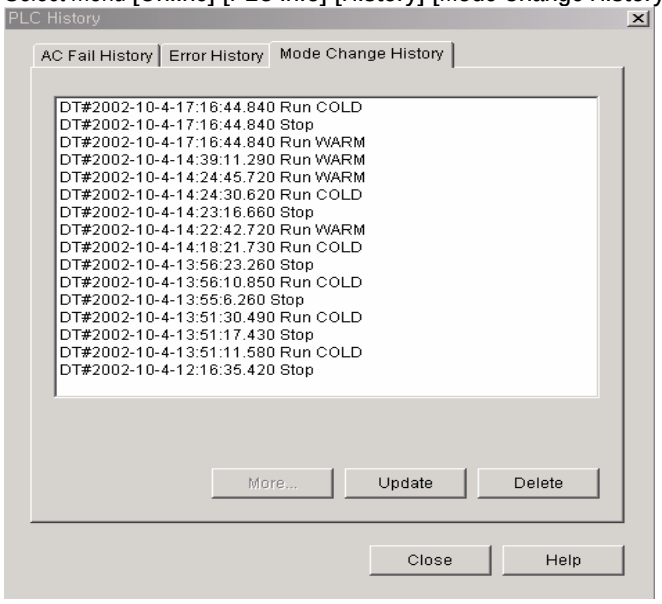
◆ To view the detailed information for the occurred error history, select the item you need more information in the list box and then click [More..].



8.1.5 Mode Change History

This shows the history that PLC mode is changed.

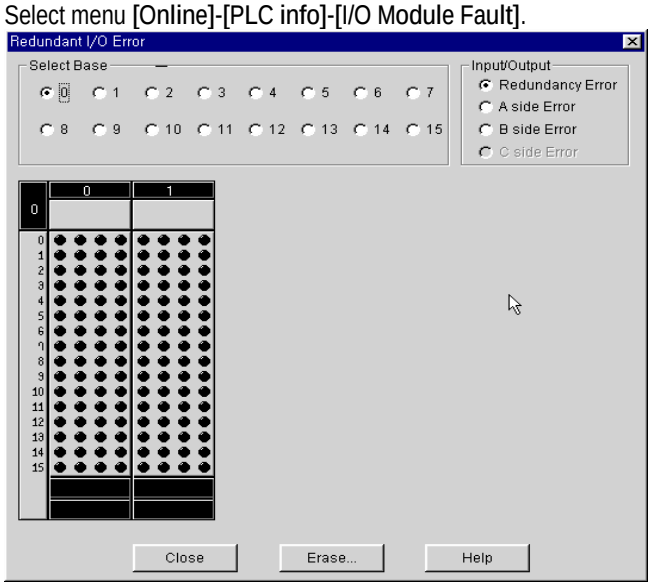
◆ Select menu [Online]-[PLC info]-[History]-[Mode Change History].



8.1.6 How to view I/O failure detail information

This shows the failure information of I/O contact for redundant system.

◆ Select menu [Online]-[PLC info]-[I/O Module Fault].



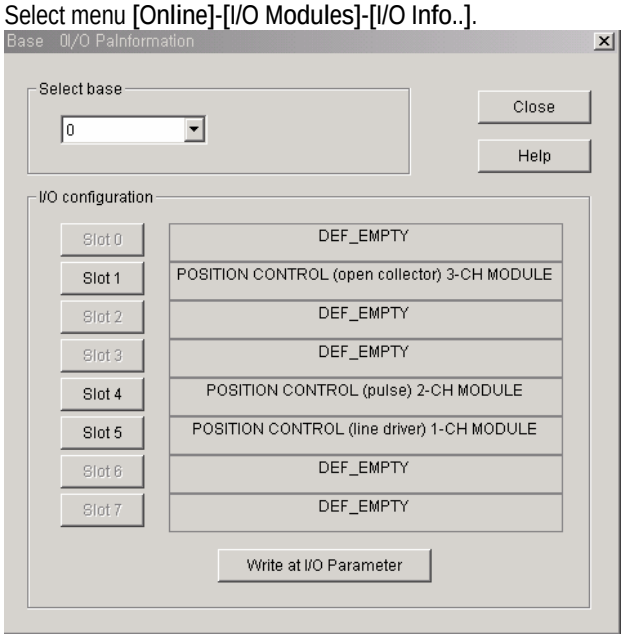
◆ Click [Delete] to delete the I/O module fault information.
It is available to delete the redundancy failure and C side failure when connected to Master, and A side and B side failure when connected to CPU respectively.

8.2 I/O Module Information

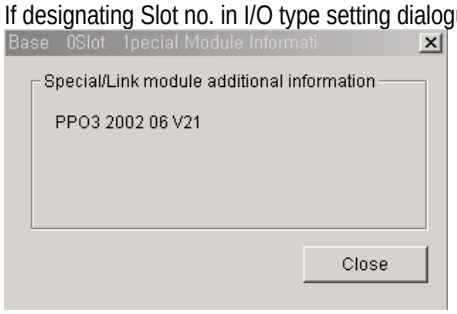
8.2.1 I/O Modules

It shows I/O unit composition of system.

- Select menu [Online]-[I/O Modules]-[I/O Info..].



- Designate Base number.
- If designating Slot no. in I/O type setting dialogue box, it is available to read the information of special module.



8.2.2 I/O Synchronization

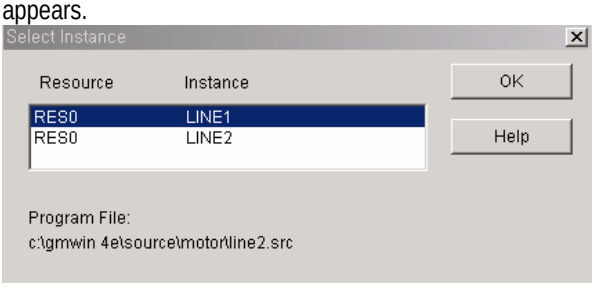
This function is to synchronize I/O information of PLC to I/O parameter.

- Select menu [Online]-[I/O Modules]-[I/O Synchronization].

8.3 Program Monitoring

It is available to monitor the PLC operation processing in the run.

- Select menu [Online]-[Connect].
- Select menu [Online]-[Monitor On/Off].
  In this case, if more than two instances are defined for the same program, 'instance selection' dialogue box appears.



- Select the instance in the instance selection list box and click [OK].

Point

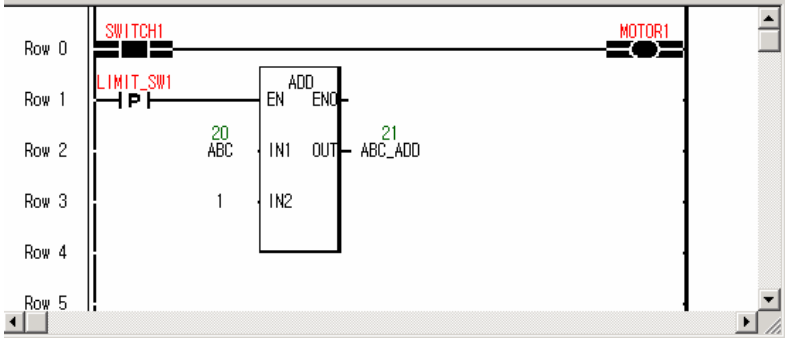
To monitor in GMWIN, the current program on the GMWIN screen and the transferred program to PLC should be same. After making the program and transferring it to PLC, if you modify and monitor the program, the value of monitoring may be different as the transferred program to PLC and the open program in GMWIN is different. Therefore, if the program is modified after transferring the program to PLC, select menu [Compile]-[Make] to make execution file and write it again to PLC and then execute to monitor.
It is not available to edit the program belonging to the project in the way of monitoring while available to edit the program not belonging to the project.

8.3.1 LD Monitoring

This function shall be divided into the function to indicate the variable status basically and the function to set the variable value as ON/OFF.

1) Program monitoring

	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Variab
1	ABC	20	SINT	<Auto>		VAR
2	ABC_ADD	21	SINT	<Auto>		VAR
3	ADD	0	SINT	<Auto>		VAR
4	LIMIT_SW1	1	BOOL	<Auto>		VAR
5	MOTOR1	1	BOOL	<Auto>		VAR
6	SWITCH1	1	BOOL	<Auto>		VAR



(1) Variable monitoring

The used variable value is monitored in LD variable window.

(2) Program monitoring

- As contact or coil variable is BOOL type, it is available to identify the variable status (ON/OFF) by the color change of the relevant variable name (RED↔BLACK).
  That is, if the variable name is indicated as RED, it indicates that the relevant variable is ON while if BLACK, it indicates that the relevant variable is OFF.
- As I/O variable of function/function block are various such as BOOL, BYTE, WORD, SINT, STRING etc., the current variable value is indicated on the blank of high order of variable name as number or string.

2) How to write forced variable value

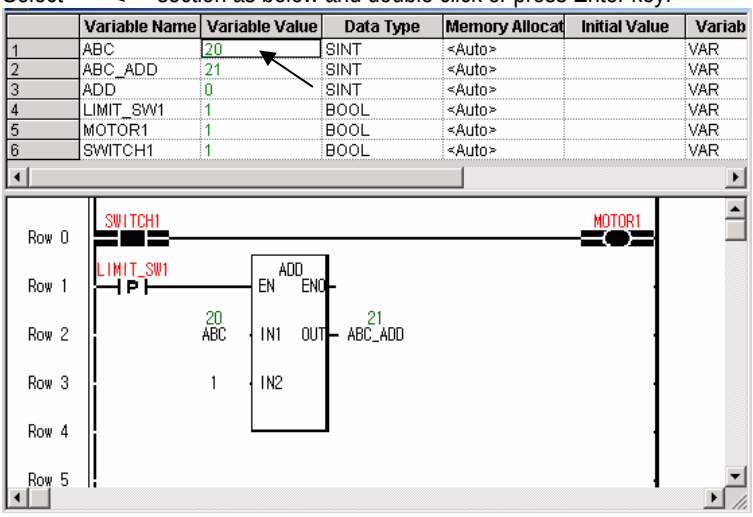
As contact or coil variable is Boolean, set the variable value as 1 or 0 to indicate ON/OFF, while in case of I/O of function/function block, it is available to set the variable value as the desired value.

◆ After moving the mouse to the variable position for forced setting in LD program or the variable window, double click to call [Force Variable Input] dialogue box.

◆ Move the cursor to the variable position for forced setting in LD program or variable window.
◆ Press Enter key.

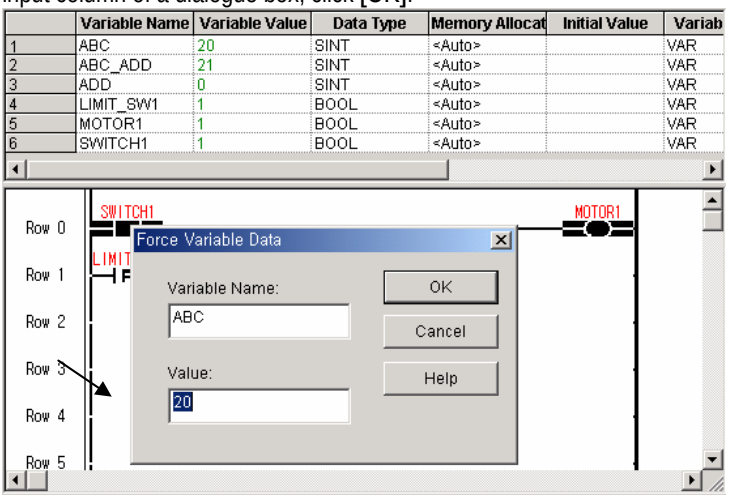
(1) Example of forced variable input in variable window

◆ Select ↘ section as below and double click or press Enter key.



(2) Examples of forced variable input in program window

◆ Double click ↘ section directly as below program or press Enter key. After inputting '0 (off)' in variable value input column of a dialogue box, click [OK].

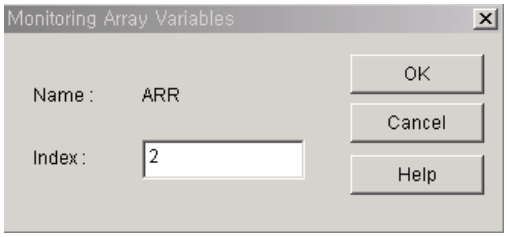


3) Array variable monitoring

If program monitoring starts, the array variable monitors the first elements of array variable basically. If array variable name is ARR, this variable shall be indicated as ARR (0) in monitoring and monitors the first element. (Ex: in case of using as ARR, ARR [1] type is not related.)

◆ Move the cursor to the array variable to monitor.

◆ Click [View]-[Monitor Array].



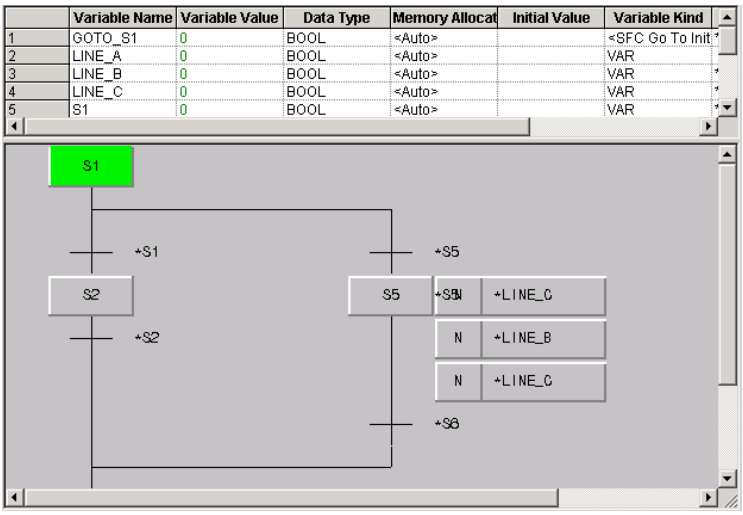
◆ After inputting the desired element no. to monitor in the 'Monitoring Array Variables' dialogue box, and click [OK]. It is available to monitor array variable by using a short-cut key instead of 'Monitoring Array Variables' dialogue box.

◆ Move the cursor to the array variable to monitor.

◆ To increase the element no., input Ctrl+↑ and to decrease it, input Ctrl+↓.

8.3.2 SFC Monitoring

It is available to see the flow of SFC program by indicating the active (in the run) step and action.
If you select [SFC Auto Scroll] from menu [Option], SFC window is automatically scrolled according to the active step.



To monitor Action, Transition program,

◆ Move the mouse to Action or Transition and then double click.

◆ After moving the cursor to Action or Transition, Press Enter key.

8.3.3 IL Monitoring

This monitors only the program belonging to the project. It is not available to edit in the way of monitoring.
Monitoring data is shown on the position of program value. It is available to see monitoring data on the desired position by adjusting the column of header window.
When monitoring, press menu [View]-[Comment] to hide the comment.

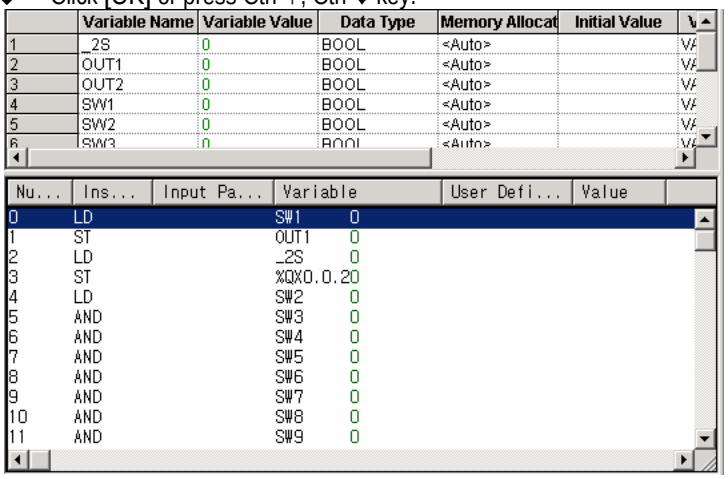
1) Program monitoring

(1) Variable monitoring
In IL variable window, the value of the used variable shall be monitored as GREEN.

(2) Program monitoring
In IL program, the value shall be monitored as GREEN on the right side of variable.

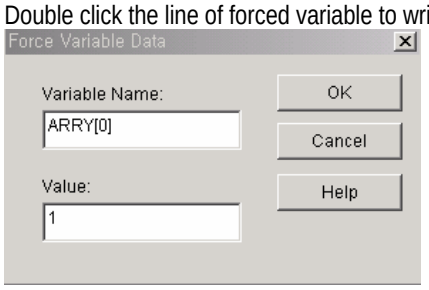
(3) Array variable monitoring
The variable declared as array shall be monitored after designating the initial index as '0'. To change the index, move the cursor to the desired line and then

- Double-click
- Designate the index of array element.
- Click [OK] or press Ctrl-↑, Ctrl-↓ key.



2) How to write forced variable

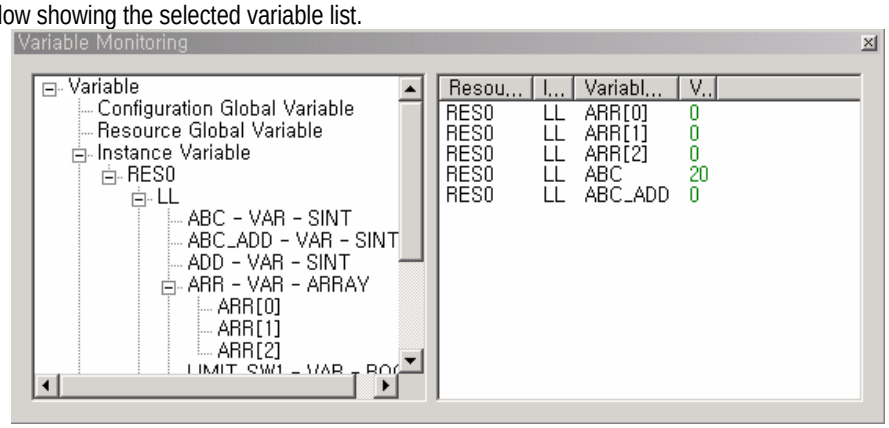
- Double click the line of forced variable to write.



- Input the variable value in value input column from 'Force Variable Data' dialogue box.
- Click [OK].

8.4 Variable Monitoring

In the variable monitoring, it is available to monitor the variable declared in the program, global variable, I, Q, M scope, system flag etc. Variable monitoring window is composed of variable selection window that has a tree structure and the window showing the selected variable list.



To select monitoring variable, double click the desired item or drag & drop.

In case of first monitoring,

- Select menu [Online]-[Monitor On/Off], menu [View]-[Variable Monitor].

In case of in the way of program monitoring

- Select menu [View]-[Variable Monitor].

Point

If not connected to PLC, select menu [Connect] before selecting the above menu.

- Select the variable to monitor in the variable selection window.
  For variable selection, refer to 'how to select the variable' as below.

8.4.1 Variable selection

This function enables to monitor the variable declared in the program, global variable, I, Q, M scope, system flag etc. simultaneously. The user selects the variable to monitor.

- To select the variable in the variable monitor window, double click the variable to monitor or drag & drop.

1) Registration of configuration global variable (only for GM1)

It registers Configuration global variable.

- Click ⊞ of configuration global variable item.
- Select the variable to monitor.

2) Selection of resource global variable

It registers Resource global variable.

- Click ⊞ of Resource global variable item.
- Select the variable to monitor.

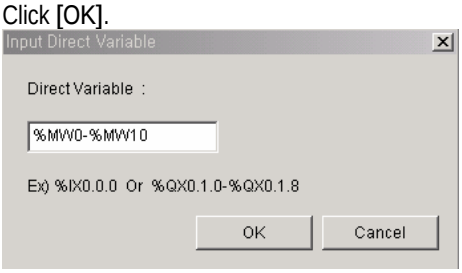
3) Selection of program instance variable

It registers the variable declared in the designated program.

- Click ⊞ of instance variable item.
- Unfold the instance in the instance item.
- Select the variable to monitor.

4) Registration of direct variable

- Double click the item of direct variable.
- Input the lot no. of direct variable in the input column.
  Ex) if input %QW0.0.1 or %QW0.0.1 －%QW0.0.3,
  %QW0.0.1, %QW0.0.2. , %QW0.0.3 shall be registered.
- Click [OK].



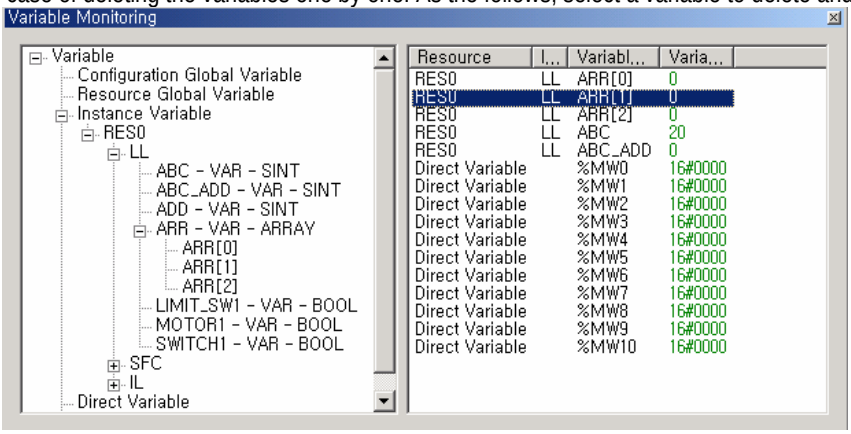
5) Registration of system flag

- Unfold ⊞ of flag item.
- Select the flag to monitor.

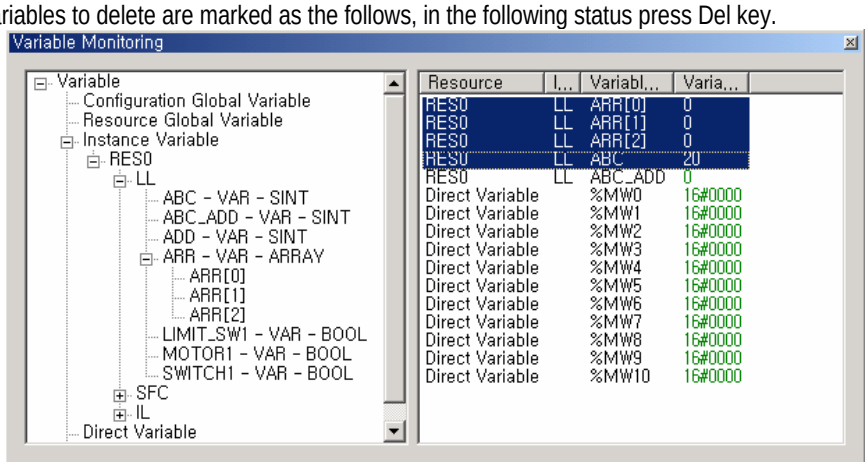
The registered variables shall be displayed in variable list.

8.4.2 How to delete the registered variables

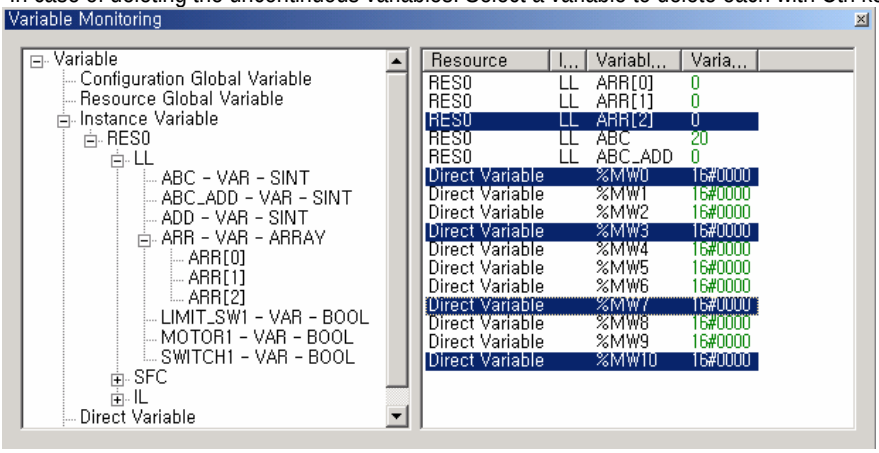
♦In case of deleting the variables one by one: As the follows, select a variable to delete and press Del key.



♦In case of deleting the continuous variables: Select a first variable to delete and a last variable with Shift key and the variables to delete are marked as the follows, in the following status press Del key.



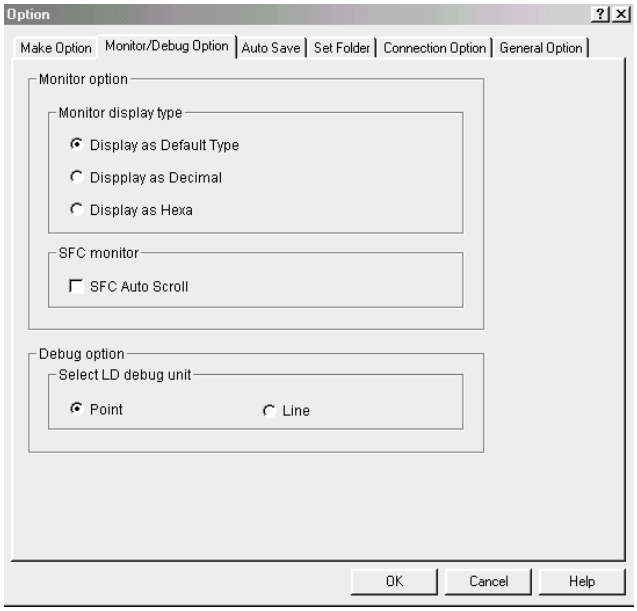
♦ In case of deleting the uncontinuous variables: Select a variable to delete each with Ctrl key and press Del key.



8.4.3 How to change the monitor display type

This option is to change the indication form of the variable to monitor.

◆ Select menu [Project]-[Option]-[Monitor/Debug Option].



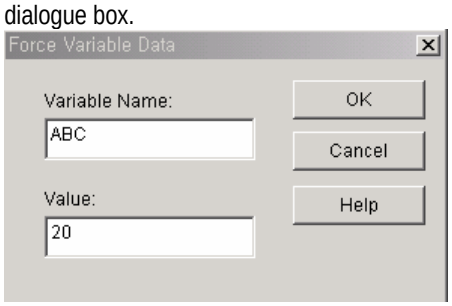
◆ After selecting the desired indication form from monitor indication form, click [OK].

Ex) If selecting [Display as Hexa] in monitor display type, the monitoring value of variable shall be indicated as Hexa such as “16#*” when monitoring.

8.4.4 Force Variable Data

This forces to output the variable value as the desired value.

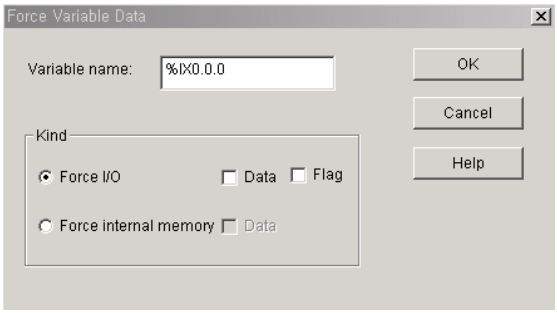
- After moving the mouse to the variable position to replace the value, double click to call force variable data dialogue box.



- Input the variable value in the value input column.
- Click [OK].

Point

Despite of forced output of variable value, the value may be changed by program.
In case of direct variable I/O, the dialogue box appears as below.



- If you want to replace the I/O value, select [Force I/O] option and if you want to set it as 1, select data and flag column.
  (Refer to 7.3 how to set forced I/O)
- If you want to replace the internal value, select [Force internal memory] option, and if you want to set it as 1, select Data column.

Point

For the forced I/O of direct variable, select [Set] from menu [Online]-[I/O Forcing]-[Input/output].

8.5 I/O Monitoring

This monitors the I/O unit composing of PLC system. If you select menu [View]-[I/O Monitor] or press ID= m toolbox, it starts to monitor.
On the left top, the selected base no. appears and on the bottom of each slot, the monitoring data value is indicated as decimal or hexa according to the monitor display type of [Option]. And if you press each contact of I/O card by a mouse, ON/OFF toggles. As this is different from [I/O Forcing], the value may be changed by the program.

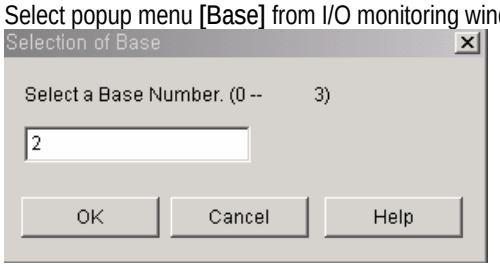
In case of first monitoring,
- Select menu [Online]-[Start/finish to Monitor], menu [View]-[I/O Monitor].

In the way of monitoring,
- Select menu [View]-[I/O Monitor].

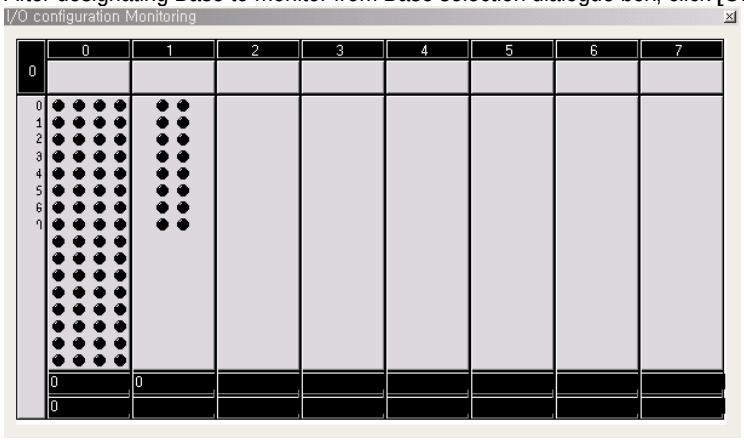
If you start to monitor I/O, it monitors the I/O of 0 Base. If you want to monitor the I/O of other base, select the desired base.

1) Base selection

- Select popup menu [Base] from I/O monitoring window to call the base selection dialogue box.



- After designating Base to monitor from Base selection dialogue box, click [OK].



2) View I/O information

Select popup menu [Properties] from I/O monitoring window to call I/O information of base dialogue box.

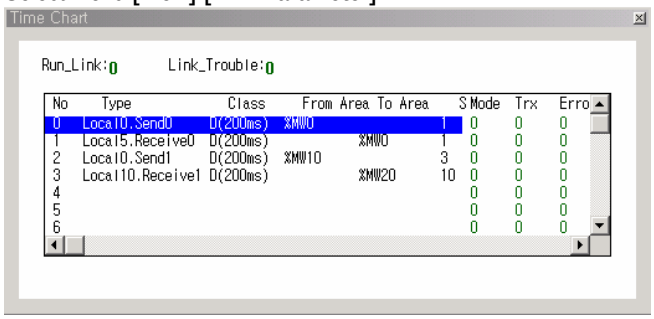
To stop I/O monitoring, do as follows:
Select menu [View]-[I/O Monitor] or click ID=

8.6 Link Parameter monitoring

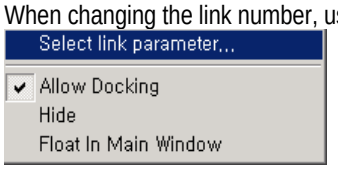
It monitors the link proceeding status for the parameter set in Link parameter item of project window. If you select menu [View]-[Link Parameter], it starts to monitor.

In case of first monitoring,

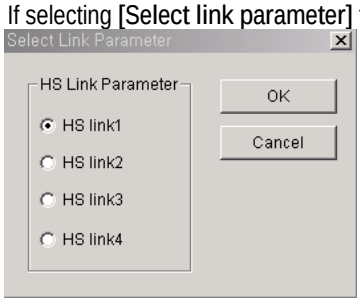
- Select menu [View]-[Link Parameter].



- When changing the link number, use popup menu as follows.



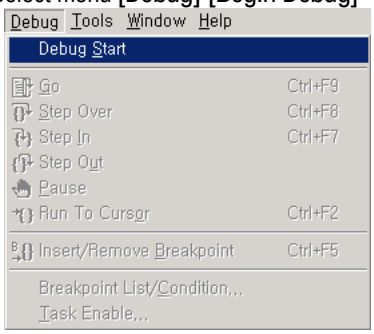
- If selecting [Select link parameter] the following dialog box appears.



Chapter 9. Debugging

Debugging is the function to find and delete the program error to run the PLC program written by the user normally.

♦ Select menu [Debug]-[Begin Debug]



♦ [Step Over]: The method to find program error by proceeding the program step by step.

♦ [Step In]: The method to find the user defined FB.

♦ [Step Out]: The method to out from debugging the user defined FB.

♦ [Run To Cursor]: starts debugging to the current cursor position.

♦ [Insert/Remove Breakpoint]: Sets the point to stop debugging and the maximum point is 32.

Each point is indicated as RED and when the status of break is indicated as BLUE.

Data Break Run

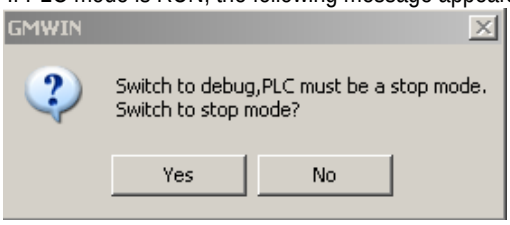
The method to find program error by breaking the variable value for a certain variable or the condition to access the variable.

If the program to debug is open, the start of Step Run is the first line of that program and if not open, it starts from the first line of the first scan program designated in the project

Point

♦ The conversion to debugging mode is available only in case that PLC mode is STOP.

♦ If PLC mode is RUN, the following message appears.



♦ After online edit, debugging is unavailable and in this case make and write the program to PLC.

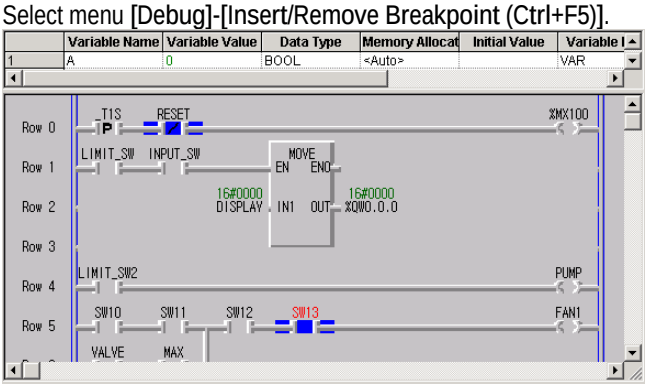
9.1 LD Debugging

9.1.1 Breakpoint

1) Breakpoint insertion

This is the method to find program error after breaking to the specific position of program to stop the program.

- Select menu [Online]-[Connect].
- Select menu [Debug]-[Begin Debug].
- Move the cursor to the desired position to break.
- Select menu [Debug]-[Insert/Remove Breakpoint (Ctrl+F5)].

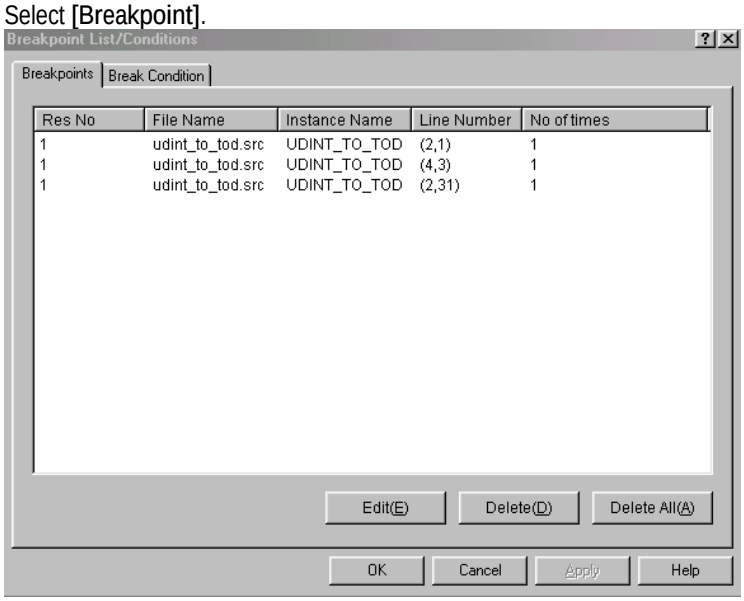


- Select menu [Debug]-[Insert/Remove Breakpoint (Ctrl+F5).

2) Break point list

It is available to view and delete the currently set break points in Break Point List dialogue box. Break point is saved per project unit. That is, the previously set break point shall be the set status when calling the project again.
If break point is deleted here, the break point set in the program shall be deleted.

- Select menu [Debug]-[Breakpoint List/Condition].
- Select [Breakpoint].



- It is available to view and delete the currently set break points all and available to reduce the break number.
- Click [OK].

(1) How to delete break point

- Select the break point to delete in the list box.
- Click [Delete].

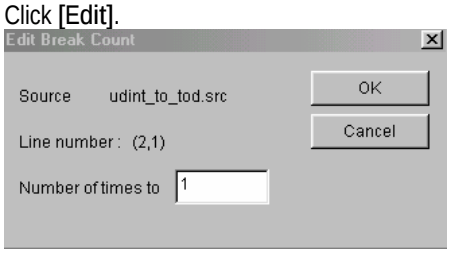
(2) How to delete break point all

- Click [Delete All].

(3) How to modify break point number

After conducting to break the break point as much as the designated number, PLC stops.

- Select the break point to modify the number in the list box.
- Click [Edit].

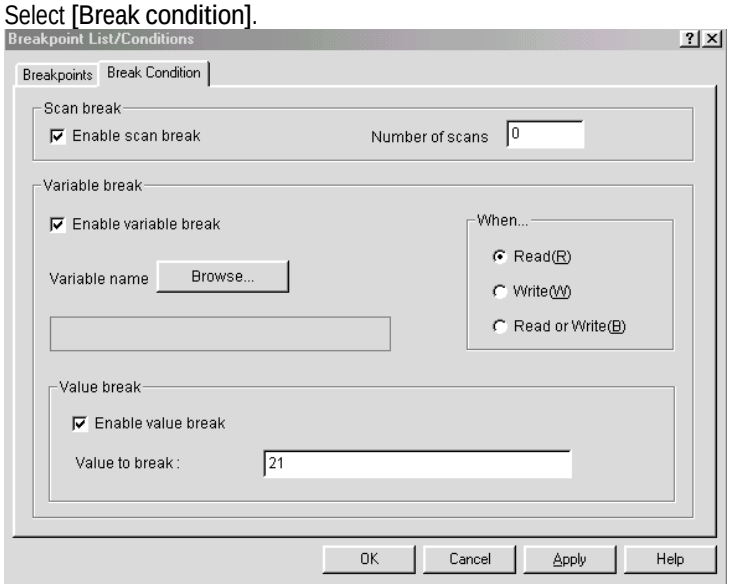


- Input the desired break number and then click [OK].

9.1.2 Break Condition

It is available to set the break condition to stop according to the scan number or the variable status after designating the variable, in the break condition set dialogue box.

- Select menu [Debut]-[Breakpoint List/Condition].
- Select [Break condition].



1) Scan Break

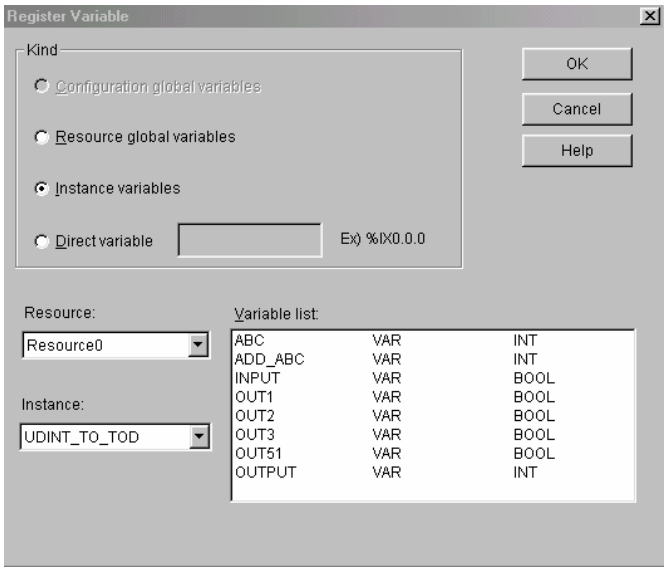
After PLC is run as much as the designated scan number, it stops.

- Select [Enable scan break] check column.
- Input the scan number in scan number input column.

2) Variable Break

If you write or read the random value to the designated variable, the PLC stops.

- Select [Enable variable break].
- Click [Browse].



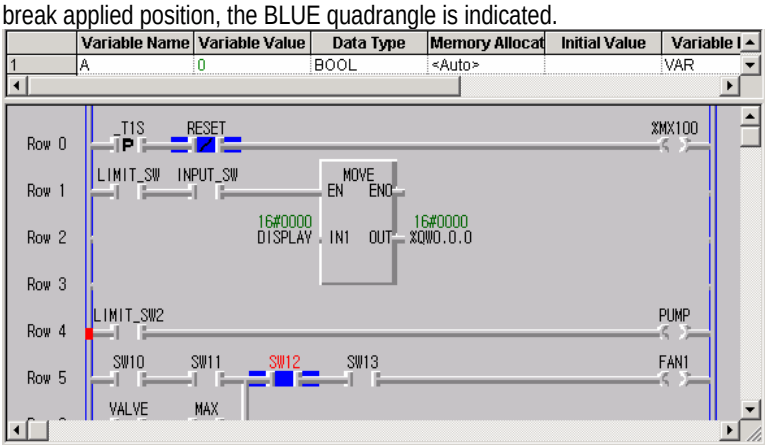
- After selecting the variable in variable registration dialogue box, click [OK].
- Select one from option button starting [When.]
  [Read]: stops when reading the variable
  [Write]: stops when writing the random value to the variable.
  [Reading/Write]: stops when reading or writing random value to the variable
- If you want to stop when the variable reaches a certain value, select [Value break] check column and input the value in the input column.

9.1.3 Debugging run

1) GO

After setting the break point or break condition, it is available to execute program to the set break through break RUN.

- Select menu [Debug]-[GO (Ctrl+F9)].
- On the left bottom of the position of break point, the RED quadrangle is indicated and on the left top of the current break applied position, the BLUE quadrangle is indicated.



- If you select menu [Debug]-[GO (Ctrl+F9)] again, the break is applied to the next break point or the place satisfied with the condition.
- In the row 4 of the above, program stops and the break is applied. If you select menu [Debug]-[GO (Ctrl+F9)] again, the program stops in the next breakpoint and the break is applied.

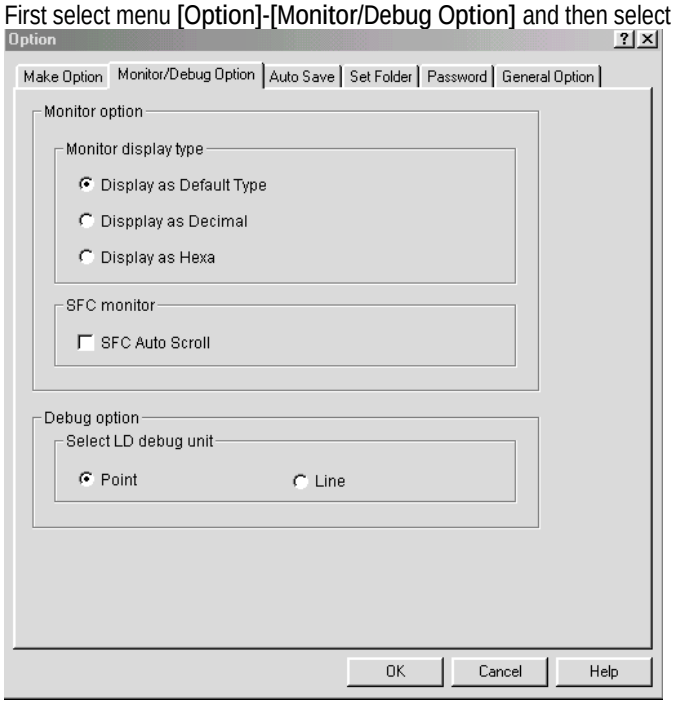
2) Run To Cursor

- Move the cursor to the desired position to designate the break.
- Select menu [Debug]-[Run To Cursor (Ctrl+F2)].
- In this case, the program stops on the current cursor position and the break is applied.

3) Step Over

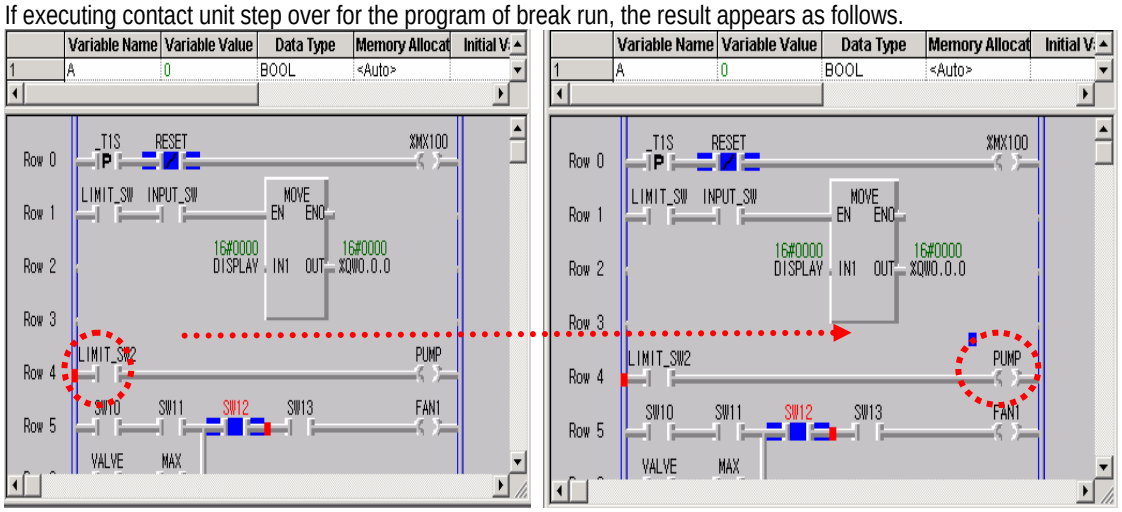
The Step Over in LD debugging supports the contact unit step over and the rung unit step over.
In case of setting by contact unit, it is available to execute the program and debug by one contact or function/function block. In case of setting by rung unit, execute the program and debug by rung unit.

- First select menu [Option]-[Monitor/Debug Option] and then select Debug option by contact unit or rung unit.



- Select menu [Debug]-[Step Over (Ctrl+F8)].

If executing contact unit step over for the program of break run, the result appears as follows.

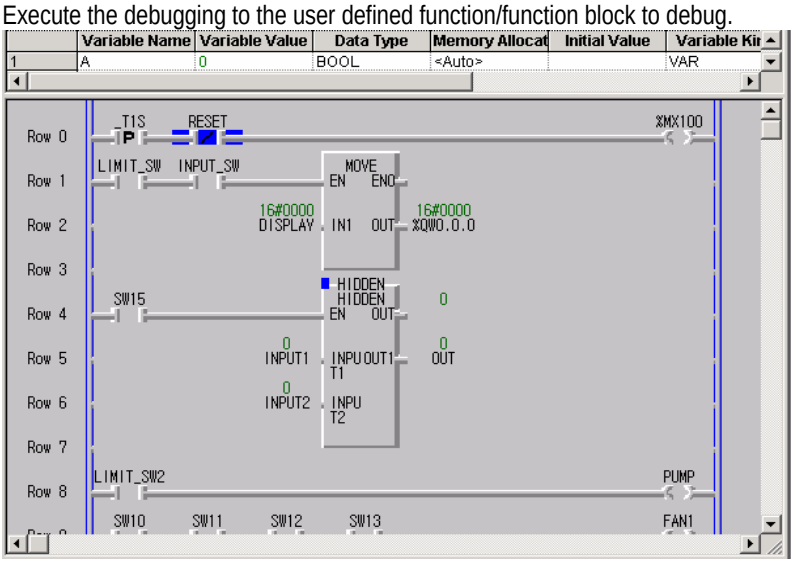


[Before] [After]

4) Step In

In case that the break is applied on the user defined function/function block, it is available to debug the user defined function/function block by using this step in function.

◆ Execute the debugging to the user defined function/function block to debug.



From the above figure, HIDDEN is the user defined function block.

◆ Select menu [Debug]-[Step In (Ctrl+F7)].

If the source program of the user defined function/function block that tried the step in exists, it is available to monitor/debug this program.

5) Step-out

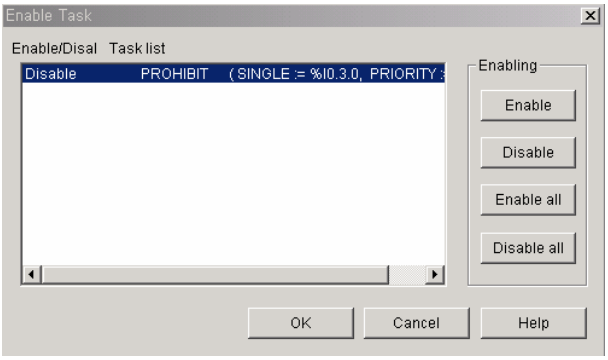
To return from the user defined function/function block in the debugging to program, select menu [Debug]-[Step out].

◆ Select menu [Debug]-[Step out].

9.1.4 Task Enable

When debugging in case there is the task designated program instance, if you execute step by step and then run, it may be available or not available to convert it to other task.

◆ Select menu [Debug]-[Set Task Conducting].



◆ Select the task to enable/disable in the task list box.
◆ Click [Enable]/[Disable].
◆ To allow/prohibit all, click [Enable All]/[Disable All].
◆ Click [Verify].

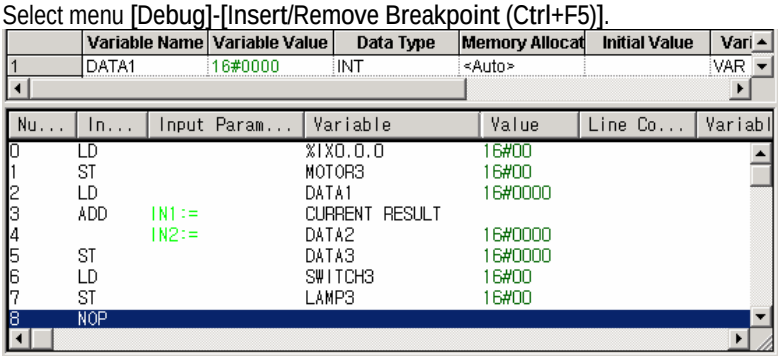
9.2 IL Debugging

9.2.1 How to set Break Point

1) How to set Break Point

This is the method to find program error after applying the break to the specific position of program and stopping the program.

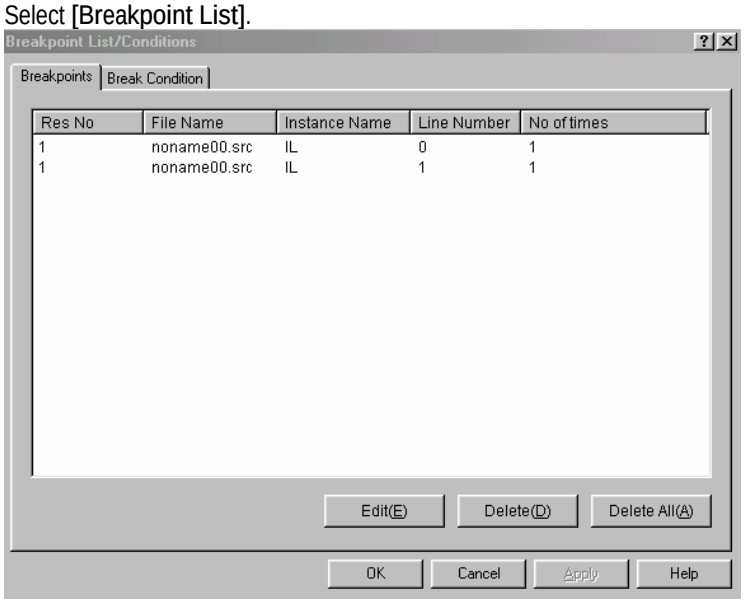
- Select menu [Online]-[Connect].
- Select menu [Debug]-[Debug Start].
- Move the cursor to the desired position to designate the break.
- Select menu [Debug]-[Insert/Remove Breakpoint (Ctrl+F5)].



2) Break Point List

It is available to view and delete the currently set break point at once in the break point list dialogue box. Break point is saved per project unit. That is, the previously set break point shall be the set status if you call that project again.
If the break point is deleted here, the break point set in the program shall be deleted.

- Select menu [Debug]-[Breakpoint List/Condition].
- Select [Breakpoint List].



- It is available to view and delete the currently set break point all and available to reduce the break number.
- Click [OK].

(1) Delete

- Select the break point to delete in the list box.
- Click [Delete].

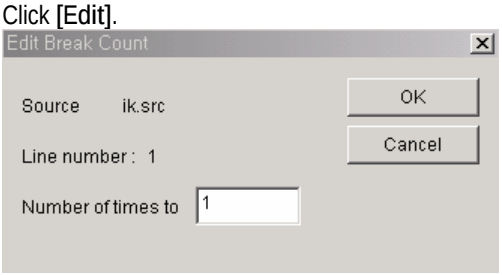
(2) Delete All

- Click [Delete all].

(3) Edit

After executing the break point as much as the designated number, the PLC stops.

- Select the break point to modify the number in the list box.
- Click [Edit].



- Input the desired break number and click [OK].

9.2.2 Break Condition

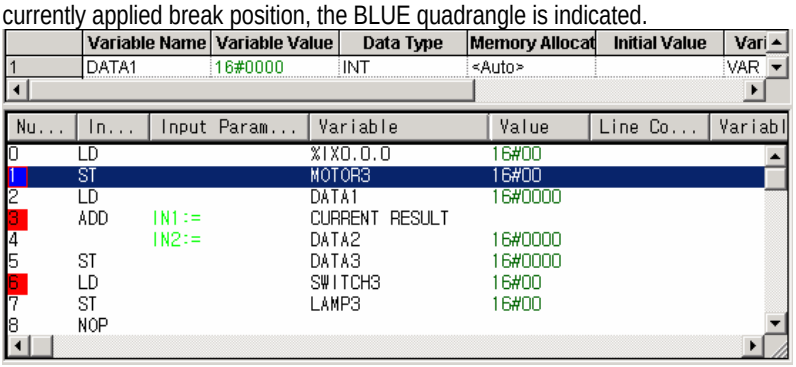
It is available to set the break condition to stop according to the scan number of the variable status after designating one variable in the break condition set dialogue box. For details, refer to 'how to set break condition' in '9.1 LD Debugging'.

9.2.3 How to execute Debugging

1) Go

After finishing to set the break point or break condition, it is available to execute the program to the break set through [Go].

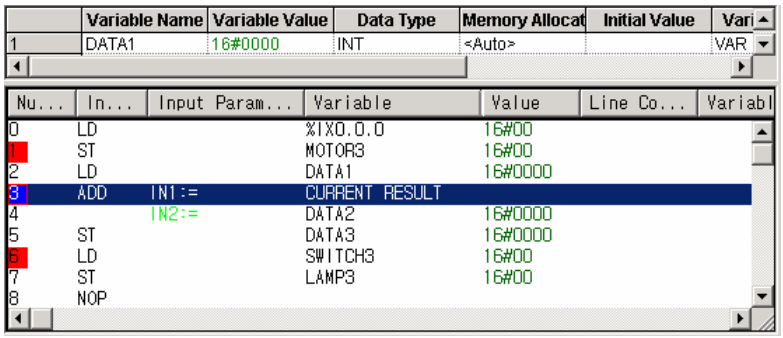
- Select menu [Debug]-[Go (Ctrl+F9)].
- On the left bottom of the position of break point, the RED quadrangle is indicated while on the left top of the currently applied break position, the BLUE quadrangle is indicated.



	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Vari
1	DATA1	16#0000	INT	<Auto>		VAR

Nu...	In...	Input Param...	Variable	Value	Line Co...	Variabl
0	LD		%IX0.0.0	16#00		
1	ST		MOTOR3	16#00		
2	LD		DATA1	16#0000		
3	ADD	IN1:=	CURRENT RESULT			
4		IN2:=	DATA2	16#0000		
5	ST		DATA3	16#0000		
6	LD		SWITCH3	16#00		
7	ST		LAMP3	16#00		
8	NOP					

- If you select menu [Debug]-[Go (Ctrl+F9)] again, the break is applied on the place satisfied with the next break point or break condition.
- On the line 0 of the above figure, the program stops and the break are applied. If you select menu [Debug]-[Run (Ctrl+F9)] again, the program stops on the line 2 of the above program and the break is applied.



2) Run To Cursor

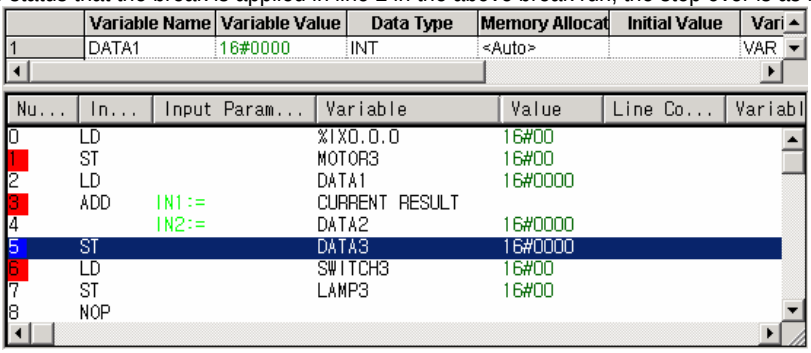
- Move the cursor to the desired position to designate the break.
- Select menu [Debug]-[Run To Cursor (Ctrl+F2)].
- In this case, the program stops on the current cursor position and the break is applied.

3) Step Over

The step over in IL debugging is executed per line unit.

- Select menu [Debug]-[Step Over (Ctrl+F8)].

In the status that the break is applied in line 2 in the above break run, the step over is as follows:



4) Step in

In case that the break is applied on the user defined function/function block, it is available to debug the user defined function/function block by using the step in function.

- Execute the debugging to the user defined function/function block to debug.
- Select menu [Debug]-[Step In (Ctrl+F7)].

If there is source program of the user defined function/function block that tried the step in, it is available to monitor/debug this program.

5) Step Out

To return from the user defined function/function block in the debugging to general program, select menu [Debug]-[Step Out].

- Select menu [Debug]-[Step Out].

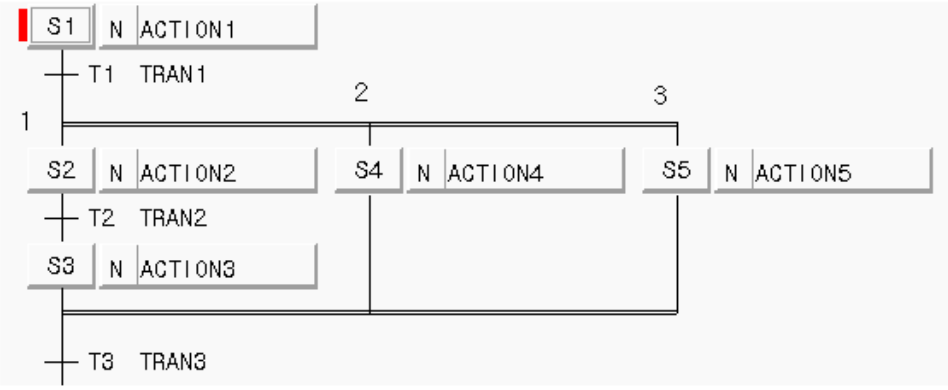
9.3 SFC Debugging

9.3.1 How to set Break Point

SFC is available to set break only in the Step.

1) How to set Break Point

- Move the cursor to the step to set break.
- Select menu [Debug]-[Insert/Remove Break Point (Ctrl+F5)].



- Select menu [Debug]-[Run (Ctrl+F9)].
  In this case, ACTION1 is executed and if TRAN1 condition is satisfied, PLC stops at the moment that Step S2 that the break is set becomes active.

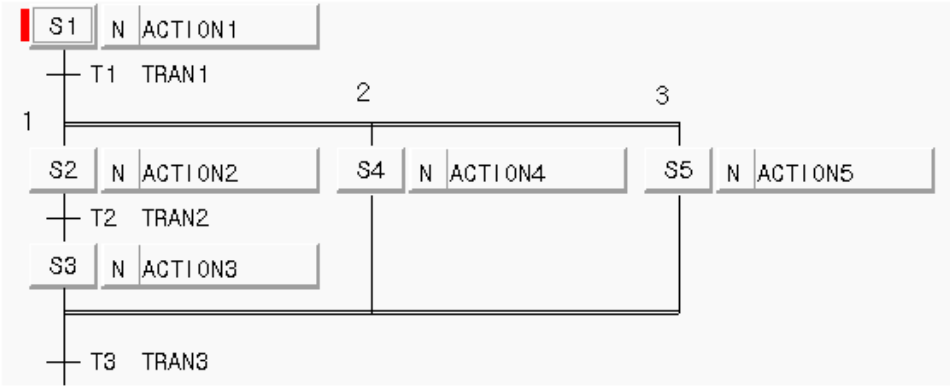
2) How to run to the cursor position

- Move the cursor to the Step to set the break.
- Select menu [Debug]-[Run To Cursor (Ctrl+F2)].
  In this case, the PLC stops at the moment that the step with the cursor is active.

9.3.2 Step Over

The program is executed step by step (S1, S2, S3).

◆ Select menu [Debug]-[Step Over (Ctrl+F8)].



In this case, if the break is applied to Step S2, the connected ACTION2 runs till TRAN2 condition is satisfied, and the PLC stops at the moment that the next connected step S3 becomes active. If you execute [Step Run] again, ACTION3 connected to the step S3 runs till TRAN3 condition is satisfied, and the PLC stops if the next connected step becomes active.

When selecting Step Run, if the next is parallel branch, select on which branch you execute the Step Run.

◆ Select Branch no. in branch selection dialogue box (select from 1,2,3 figures) and then click [OK].

9.3.3 Step In

If you execute Step In after the break is applied in the step, the break is applied in the first line of the connected action.

9.3.4 Action Debugging

It is available to do Debugging Work by zooming the action program.
According to the use language, it has the same function as IL, LD debugging.

Chapter 10. Simulator

This is the function to operate PLC as if the user operates the PLC in PC without connecting directly and enables to verify the program written by GMWIN.

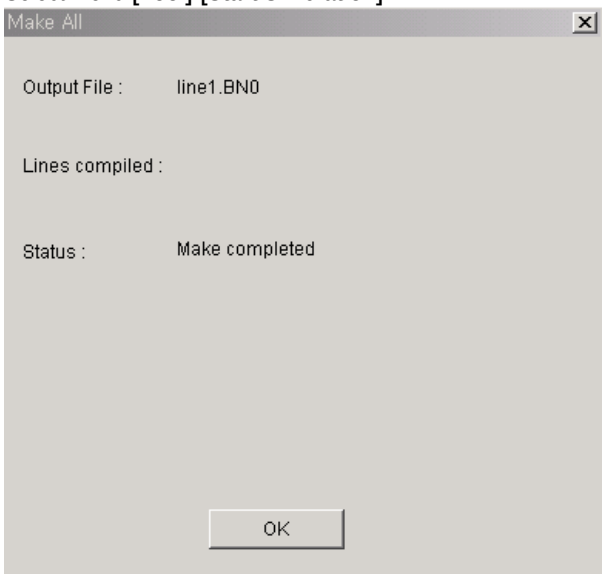
10.1 How to write Program

Uses the same method when writing program by using the existing GMWIN.

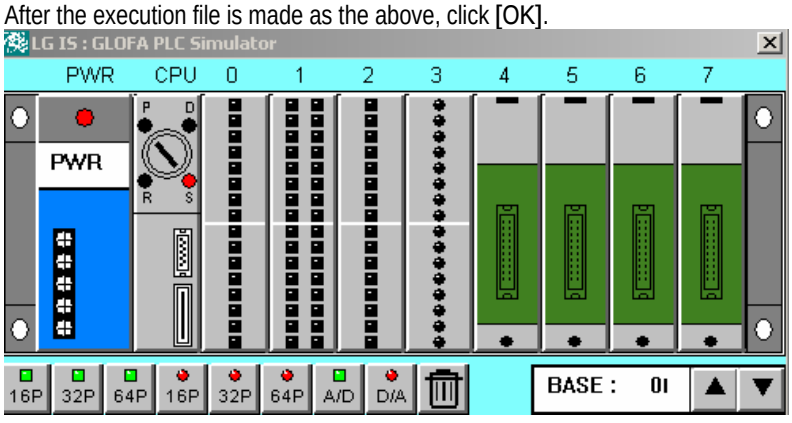
10.2 How to start Simulation

Writes the program to execute with GMWIN.

◆ Select menu [Tool]-[Start Simulation].

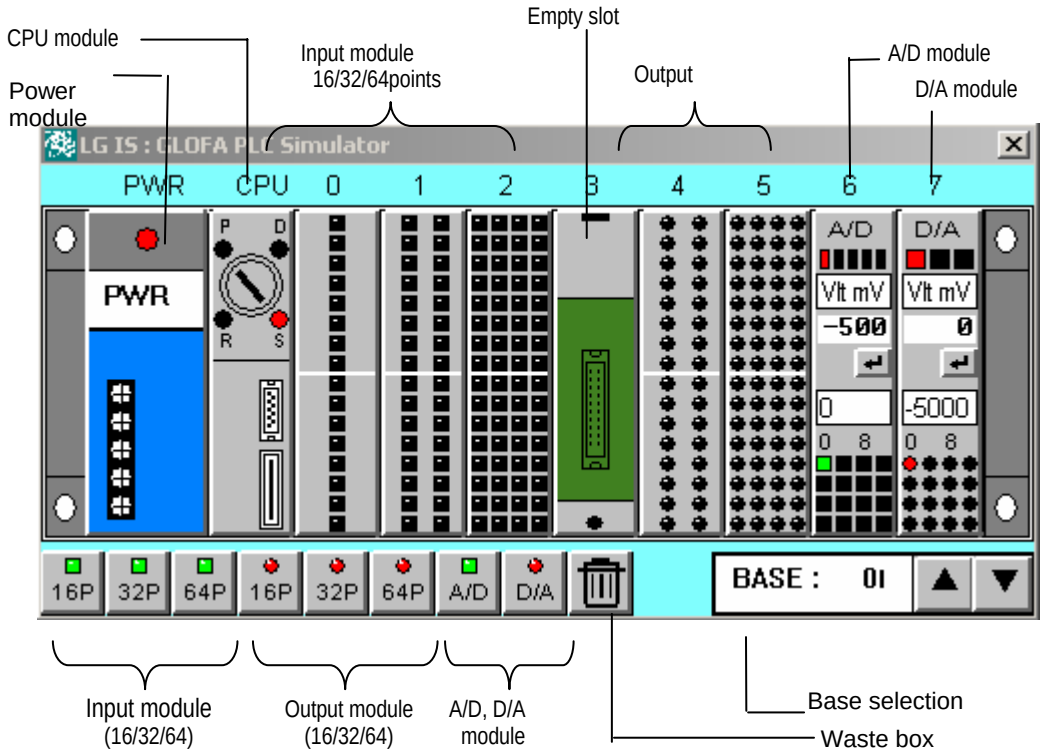


◆ After the execution file is made as the above, click [OK].



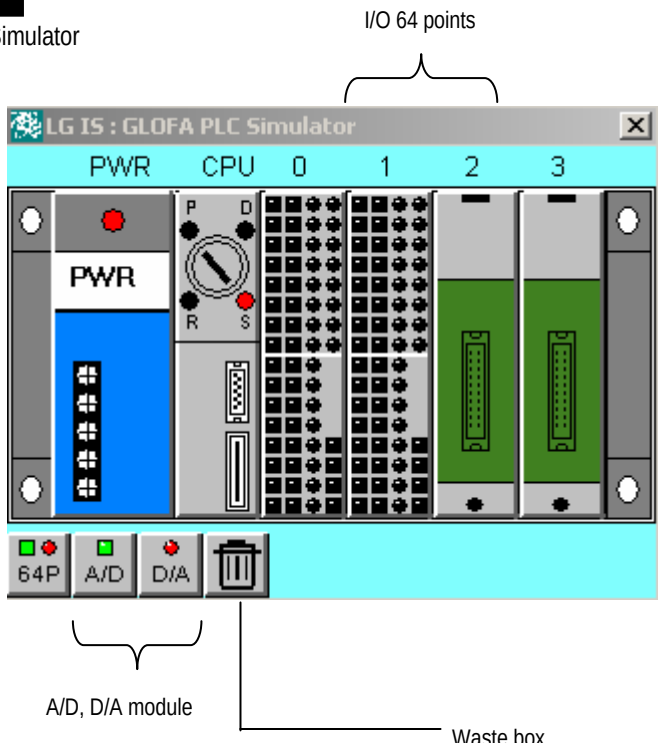
◆ The screen that enables to conduct the simulator function as above appears.

◆ The explanation for GLOFA PLC Simulator is shown as below:



Point

♦ GM7 Simulator



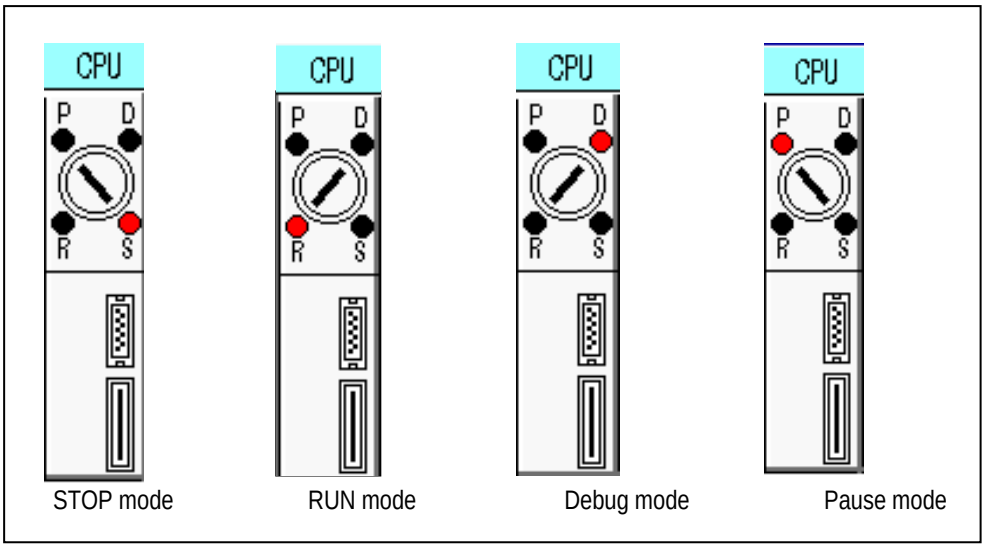
♦ As GM7 is a block type not module type and has one I/O, the type of simulator is different. Input module and output module of module type simulator figure from the foregoing page composes one I/O in GM7 simulator. I/O is indicated with max. 64 points regardless of points.

10.3 How to install/delete Module

If there is I/O variable ad direct variable used in writing program, it shall be automatically installed in the relevant base/slot when simulation starts.

Data type	16 points	32 points	64 points
X	0 ~15	16 ~31	32 ~63
B	0 ~1	2 ~3	4 ~7
W	0	1	2 ~3
D	×	0	1
L	×	×	0

It is available to install/delete module only when CPU module is STOP mode.



1) How to install Module

- After setting Base, if you select the desired I/O (A/D, D/A) icon by using a mouse and place it on the relevant slot position, the module shall be installed.
- Input, A/D module: indicated as quadrangle (On: GREEN, Off: BLACK)
  Output, D/A module: indicated as circle (On: RED, Off: BLACK).

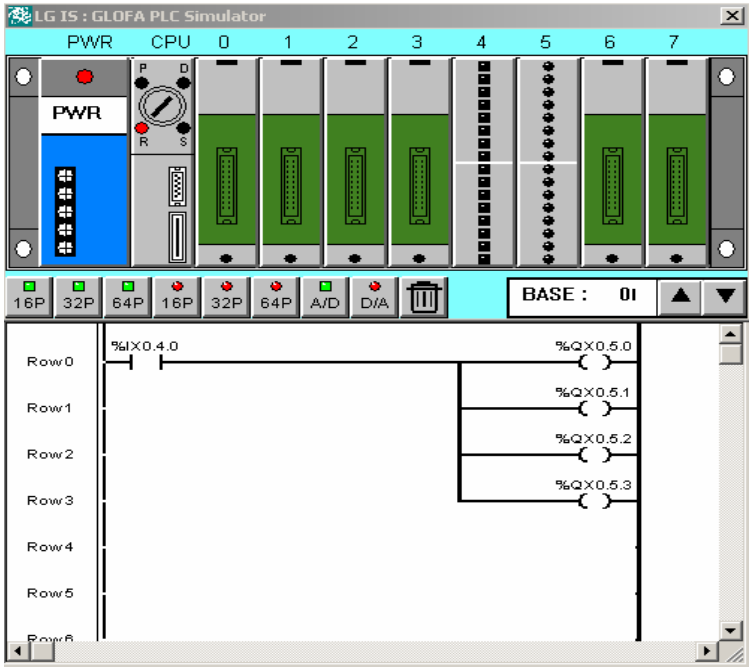
2) How to delete Module

- Drag the desired slot module to delete by using a mouse to the waste box.

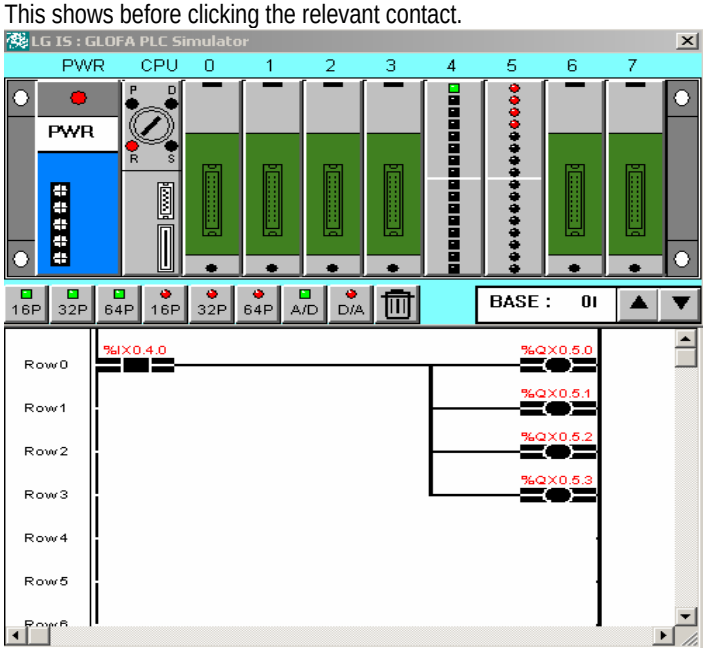
10.4 Simulation

10.4.1 I/O Module simulation

It is available to execute On/Off of I/O contact by clicking the relevant contact directly.



◆ This shows before clicking the relevant contact.



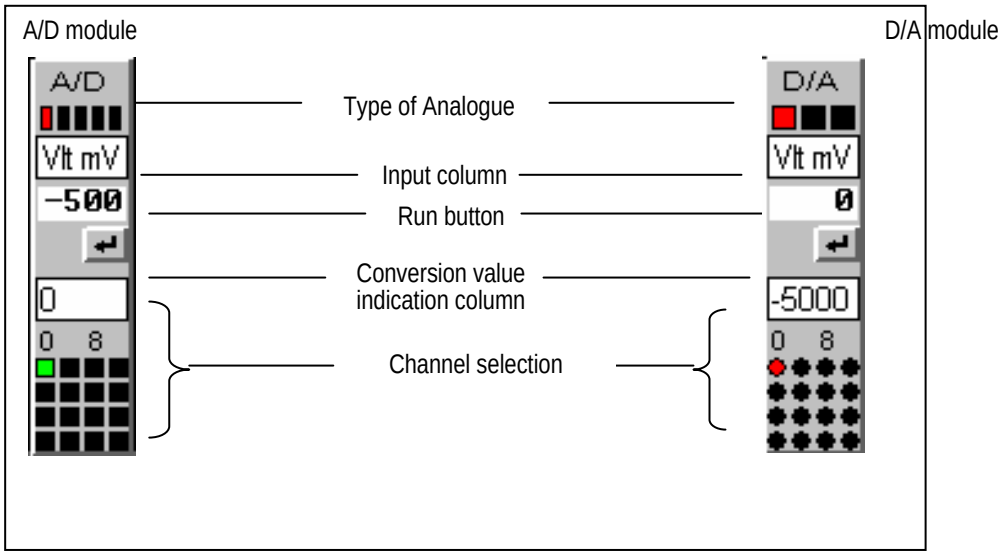
◆ This is the executed GMWIN screen when clicking the first contact of 4th slot of GLOFA PLC simulator.

10.4.2 Power simulation

- If simulator starts, the power shall be ON.
- If click the power lamp, the power becomes OFF and then returns to ON. This is regarded as that the PLC power actually became OFF and then returned to ON. In this case, if there is a program defined as Hot Restart, run that program.
- Power simulation is available only in RUN mode.

10.4.3 A/D, D/A simulation

The special modules that PLC simulator enables to support are A/D and D/A.



A. Type of analogue: indicates the type of A/D input power (±5V, ±10V, ±20,4～20 ㎃) and D/A output power (±5V, ±10V, 4,20 ㎃).
B. Input column: where inputs A/D analogue value and D/A digital value.
C. Run button: run command button to convert the inputted value.
D. Conversion value indication column: where the converted analog and digital value is indicated.
E. Channel selection: indicates the selected channel.

- A/D, D/A simulation has some effective values such as Base, Slot, Channel, Data type set in the A/D, D/A initialization function block (AD□INI / DA□INI) edited basically in the program and other items are disregarded.
- In case that A/D, D/A module is installed in the base and slot not used in the program, that base and slot is effective in the relevant scope but simulation shall be done out in the condition that data type is all '0' (that means DT=0, 0～16000 output type) and all channel is used.
- It is available to change the type of analog only in STOP mode and the properties of the currently selected channel shall be changed with that of the changed type of analog channel.
- The change of channel is available in all modes and the conversion value of the changed channel is indicated.
- In case of A/D, it is available to set analog type according to each channel and if the channel changes, the type of analog for that channel shall be changed and indicated.
- In case of D/A, only one analog type is available for all channels. Not available to set analog type per channel.
- Input unit of analog value of A/D module shall be voltage:㎷, current:㎂ and the input value of input column is analog value that is limited within the range of the current analog type. If exceeding the low/high limit value, take the low/high value.
  (Example)
  If analog value –6000 is inputted in the state that analog type is ±5V (DT=0), it is regarded as –5000 and the converted digital value is indicated as '0'.
- Input range of D/A module digital value shall be determined by data type (DT).
  {DT=0: 0～16000 , DT=1: -8000～-8000 }
- Input value of input column is digital value that is limited within the range according to DT and if exceeding the

low/high limit, take the low/high value.
(Example)
If digital value 17000 is inputted in the state that analog type is ±5V (DT=0), it is regarded as 16000 and the converted analog value is indicated as 5000.

- The order of A/D (D/A) module simulation is as follows:

(1) Install A/D (D/A) module. (STOP mode)
(2) Select analog type. (STOP mode)
(3) Change the CPU mode to RUN mode.
(4) Select the channel to convert.
(5) Input analog (digital) value within the input range.
(6) Press the run button to give a conversion command.
(7) Check if digital (analog) value is indicated per data type and check if the program is normally run in GMWIN screen.

10.5 The function through GMWIN online menu

For details, refer to Chapter 7 Online Function.

10.5.1 Monitor

The items available to monitor in the run of simulator, are program and variable.

10.5.2 I/O Forcing

Conducts the forced ON/OFF function.

10.5.3 Data Clear

This function is available only if CPU mode of simulator is STOP mode and this makes all current data value clear '0'.

10.5.4 Reset

Reset and Overall Reset is available in the simulator.

10.5.5 Mode Change

It is available to change CPU mode of simulator on the GMWIN online mode conversion.
Mode conversion is available by clicking each mode of CPU module.
It is not available to convert from Stop => Pause mode.

10.6 Debug

For details, refer to Chapter 9. Debugging function.

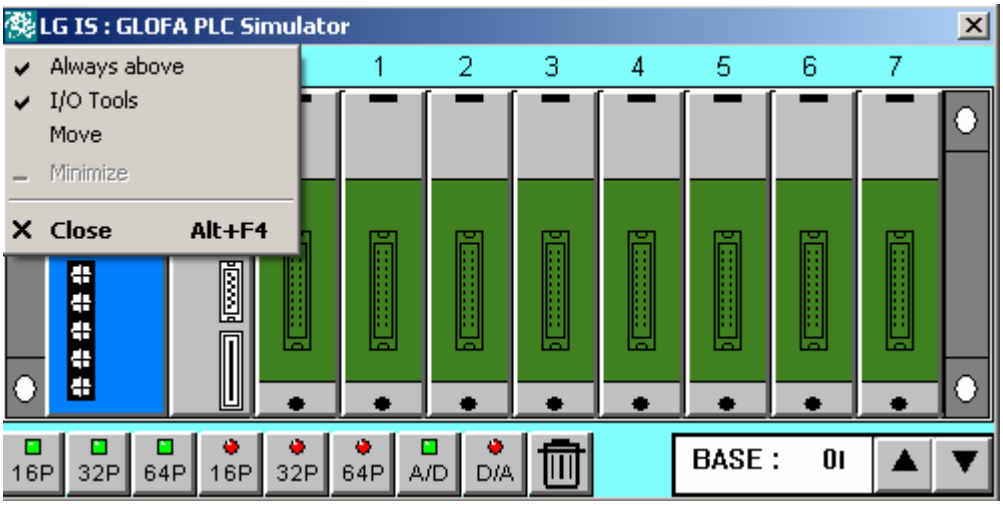
- Click Debug(D) of CPU module of simulator to debug.
- Debug function provided by simulator is the same as that of GMWIN but variable value break is not available.
- When converting from each mode to Debug mode, the current value shall be maintained.

10.7 Close Simulation

◆ To finish the execution of simulator, click menu of GMWIN [Tool]-[Stop Simulation].

Point

◆ When executing the simulation, the position of simulator is as [Always above], if unchecking [Always above] select the popup menu as the follows.



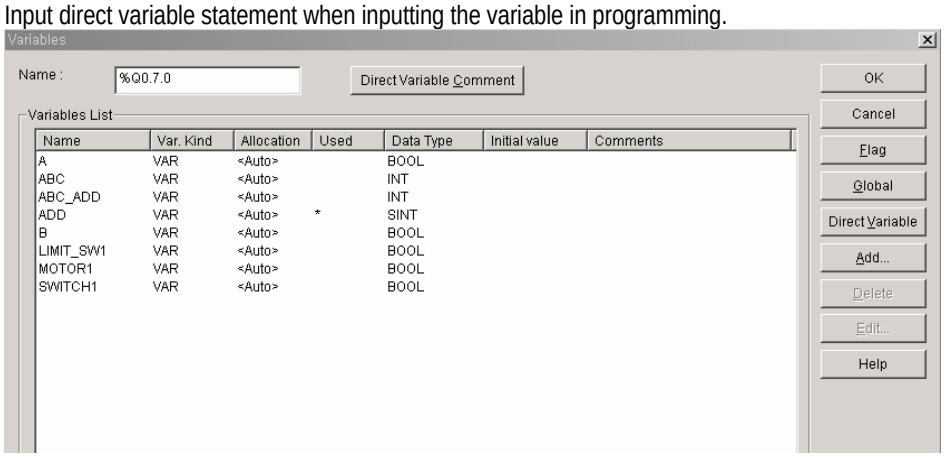
Chapter 11. How to write Document

11.1 How to make reference data

11.1.1 Direct variable comment

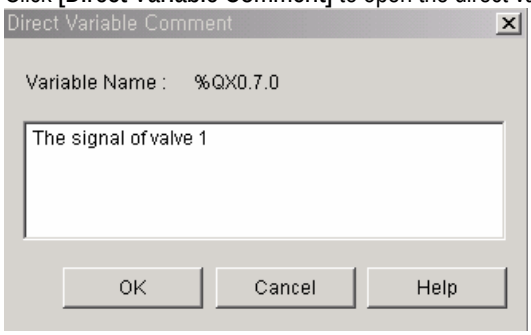
1) How to input direct variable statement

- Input direct variable statement when inputting the variable in programming.

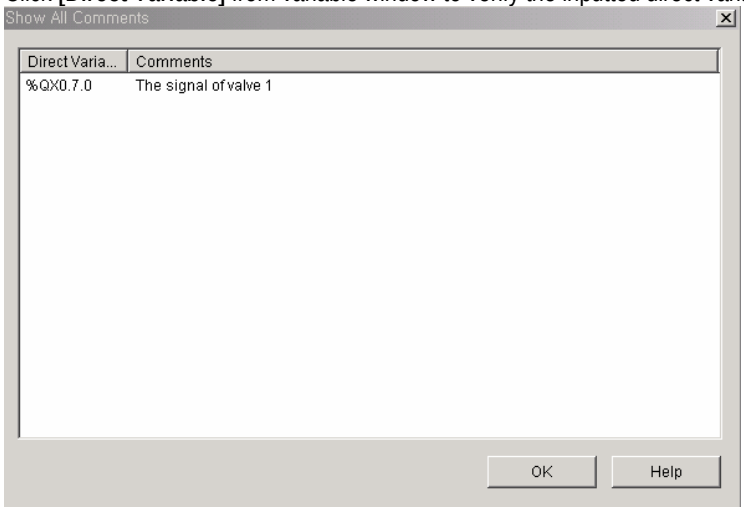


- If you input direct variable in the variable name input column, the direct variable comment button shall be active.

- Click [Direct Variable Comment] to open the direct variable input window.



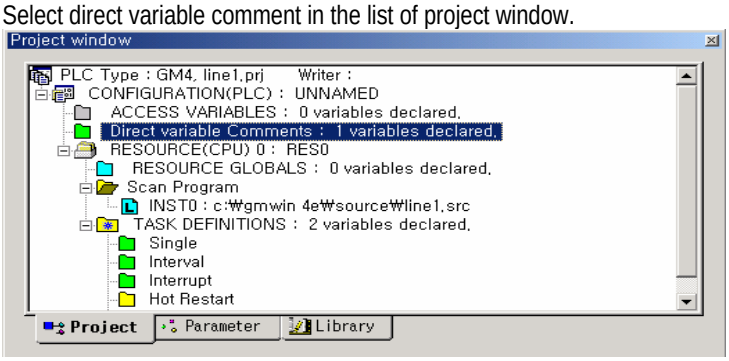
- After inputting direct variable comment, if you click [OK], direct variable comment shall be inputted.
- Click [Direct Variable] from variable window to verify the inputted direct variable comment.



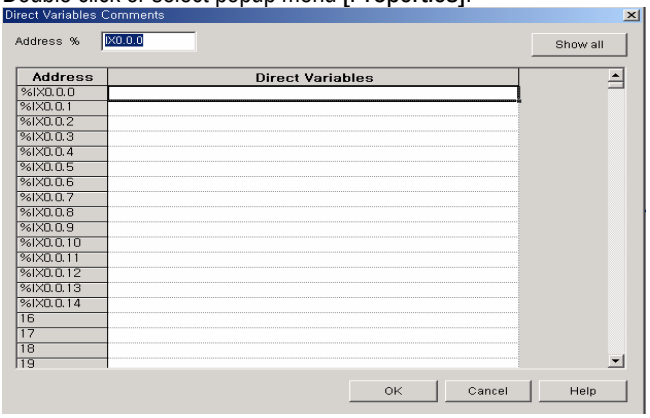
2) How to edit direct variable comment

It is available to edit the comment of direct variable used in the project in the direct variable comment dialogue box in the project. This content matches with that of direct variable comment inputted in the programming.

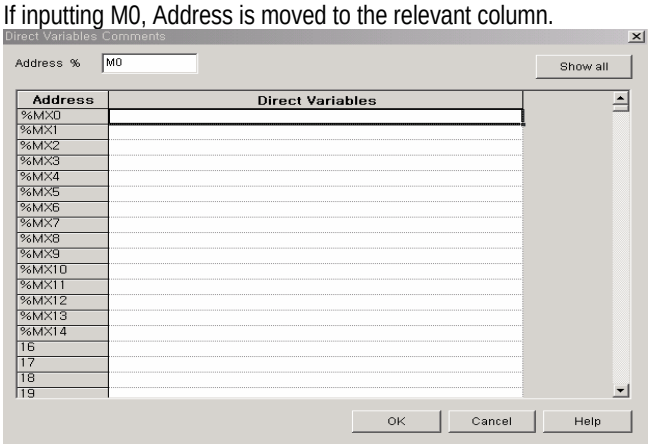
◆ Select direct variable comment in the list of project window.



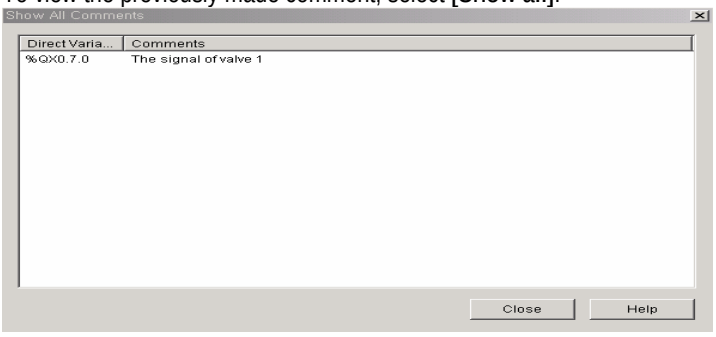
◆ Double click or select popup menu [Properties].



◆ Input the address to write the comment in [Address %].
If inputting M0, Address is moved to the relevant column.

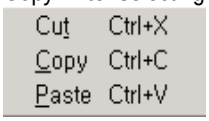


◆ To view the previously made comment, select [Show all].



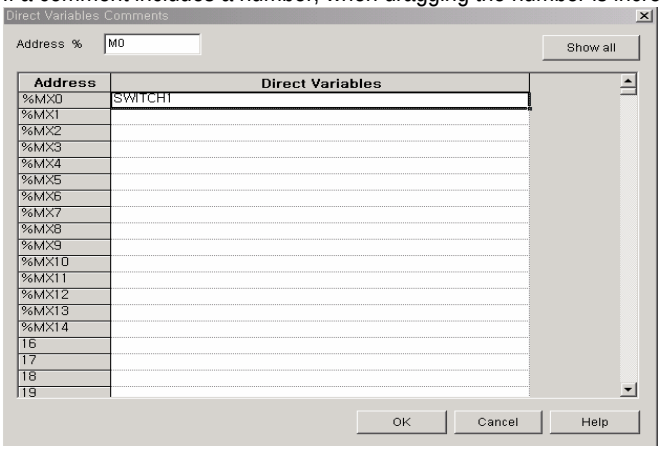
3) Direct variable edit

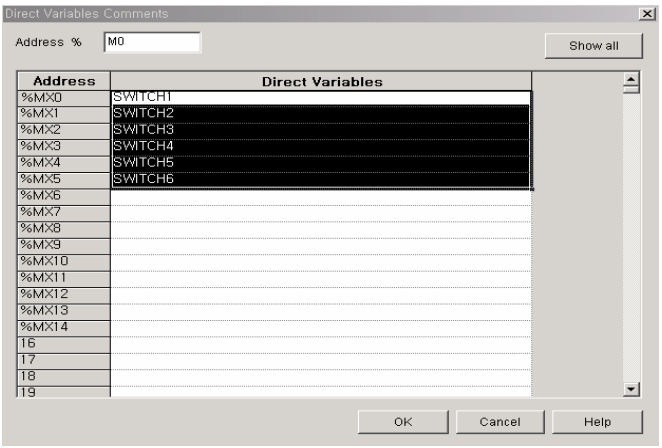
- Copy: After selecting the comment to edit and if calling the popup menu the following dialog box appears.



Select [Copy] and [Paste] in the comment line to copy.

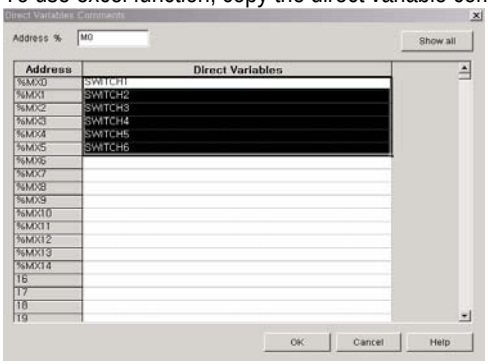
- It's available to copy and paste like MS Excel.
- If a comment includes a number, when dragging the number is increased as follows.

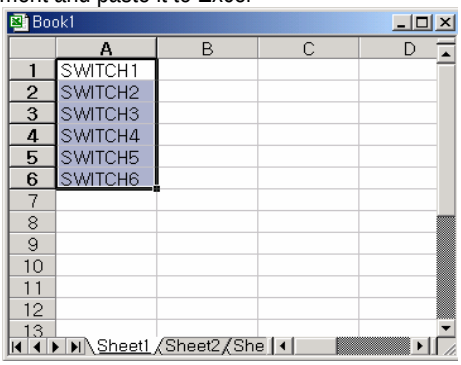




4) Compatibility with MS Excel

- To use excel function, copy the direct variable comment and paste it to Excel



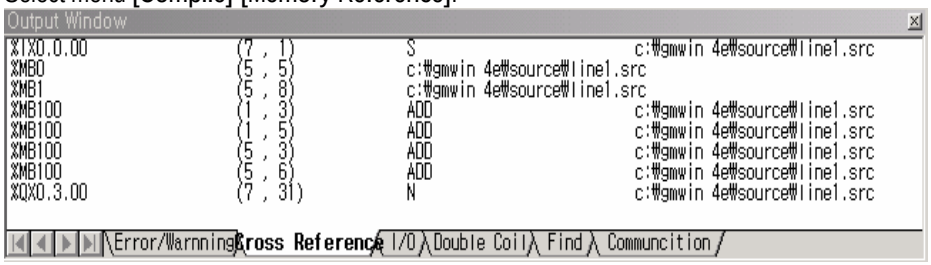


11.1.2 Memory Reference

This is the function to view the position or whether or not the use of direct variable/global variable used in the program belonging to the project through the variable window.

1) How to view direct/indirect variable, global variable position

- Select menu [Compile]-[Memory Reference].



- This shows the position of the memory allocated direct/indirect variable.
- It is available to see the used program name and [row, column] in the result window.
- Double click to move to the relevant variable.

2) How to print direct variable/global variable position

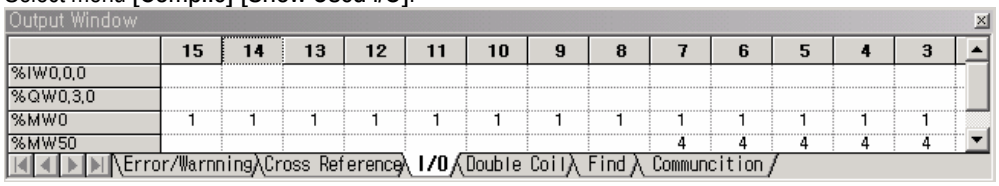
- Select [memory reference] in project print to print.

11.1.3 Used I/O status

1) How to make the used I/O status table of direct variable

It is available to see the direct variable used in the program belonging to the project through the table directly.

- Select menu [Compile]-[Show Used I/O].



- The used I/O status shall be showed in the output window.

2) How to print the use status of direct variable

- Select [Used I/O] in project print to print.

11.2 How to keep Project File

In case that user want to keep or transfer the project, it is requred to save all three files as below.

1) Project file

2) All program file included in the project

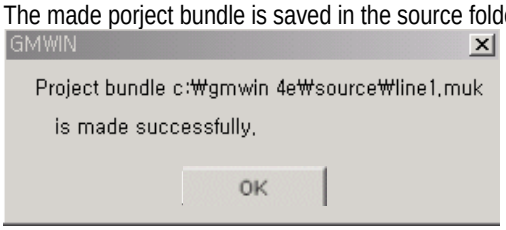
3) All user program file used in the project

In this case, if you want to keep each file, it is recommended to keep each file as one project bundle file as some part of program or user program may be missed. As this project bundle file bundles the above three files all, it is easy to keep them.

11.2.1 Export Project Bundle

This is the function to bundle all three files on the above as one file.

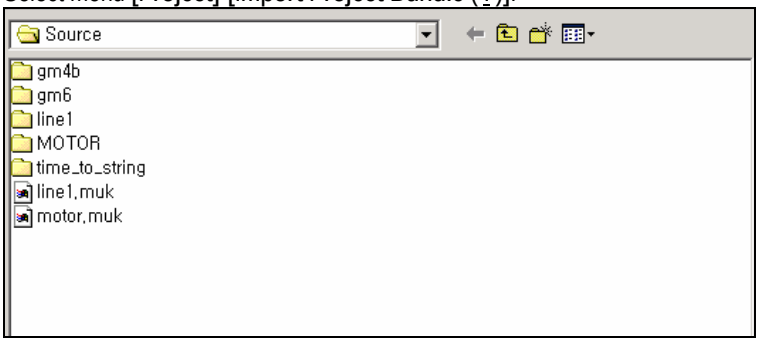
- Select menu [Project]-[Make Project Bundle(E)].
- The made porject bundle is saved in the source folder which is designated in [Option].



11.2.2 Import Project Bundle

This is the function to release the generated bundle file (project name.MUK) through 'make project bundle' into the original project and program.

- Select menu [Project]-[Import Project Bundle (I)].



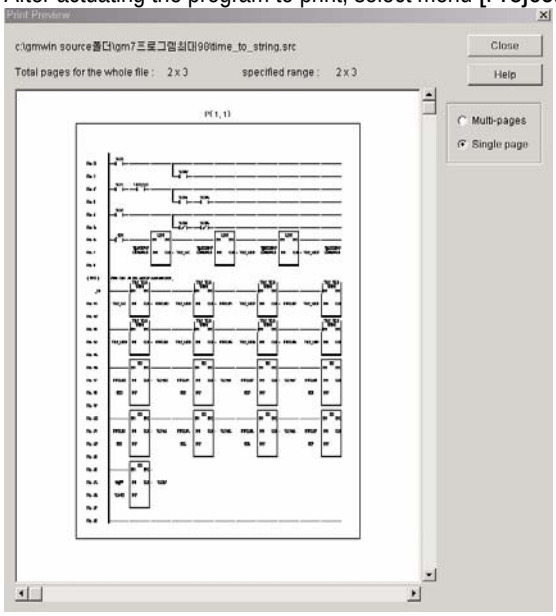
- After selecting the desired bundle file (project name. MUK), click [Open].

11.3 Printing

11.3.1 Preview (V)

This is the function to view the content to be printed in advance.

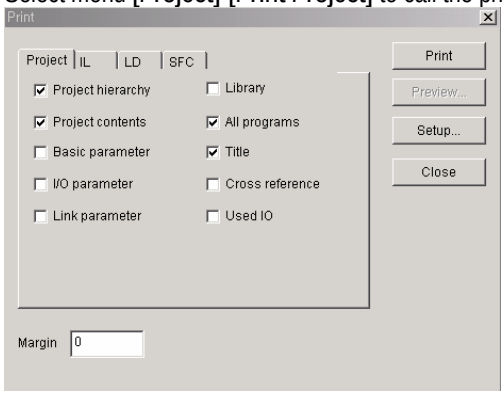
- After actuating the program to print, select menu [Project]-[Preview].



- Determine whether to show several pages (max. 3 pages) simultaneously on one screen or show each page one by one from the several pages/one page of preview dialogue box.

11.3.2 How to print Project

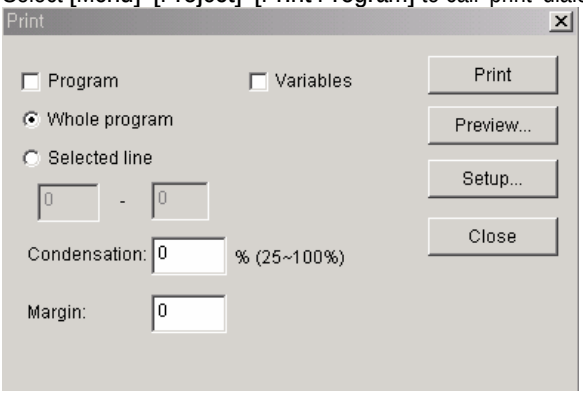
- Select menu [Project]-[Print Project] to call the print option dialogue box.



- Select the item to print from the project print option dialogue box.
  (1) Project hierarchy: prints the layer diagram in Project window.
  (2) Project contents: prints the detail content of project layer diagram. (Access variable, task definition, direct variable comment etc.)
  (3) Basic parameter: prints the content of basic parameter.
  (4) I/O parameter: prints the content of I/O parameter.
  (5) Link parameter: prints the content of link parameter.
  (6) Library: prints the content of the used library.
  (7) All program: prints all program in project.
  (8) Title: prints the necessary coverage in case of documentation of the printed content.
  (9) Cross-reference: prints the position information of direct variable/global information.
  (10) Used I/O: prints the I/O table used in project.
- Input the left margin of the content to print by mm unit in the margin group box in the project print option dialogue box.

11.3.3 How to print IL program

- Select [Menu]–[Project]–[Print Program] to call 'print' dialogue box.



- Select the content to print in the range group box of the print option dialogue box.
  (In case of program, select the range to print.)
- Input the condensation rate of the content to print in the print option dialogue box.
- Input the left margin of the content to print by mm unit in the margin group box in the print option dialogue box.
- [Preview] in the print option dialogue box is the function to see the content to print in advance.
  After verifying through [Preview], adjust the condensation rate of the content to print.

11.3.4 How to print LD program

- Select [Menu]–[Project]–[Print Program] to call the print dialogue box.
- Select the content to print in range group box of the print option dialogue box.
  (In case of program, select the range to print.)
- Input the condensation rate of the content to print in the condensation rate input column of the print dialogue box.
- Input the left margin of the content to print by mm unit in the margin input column of the print dialogue box.
- [Preview] of the print option dialogue box is the function to show the content to print in advance.
  After verifying through [Preview], adjust the enlarge/reduce rate of the content to print.

11.3.5 How to print SFC Program

- Select [Menu]–[Project]–[Print Program] to call the print dialogue box.
- Select the content to print in range group box of the print option dialogue box.
- Input the condensation rate of the content to print in condensation input column of the print option dialogue box.
- Input the left margin of the content to print by mm unit in margin input column of SFC print option dialogue box.
- [Preview] of SFC print option dialogue box is the function to show the content to print in advance.
  After verifying through [Preview], adjust the condensation rate of the content to print.