7-solution Leader in Electrics & Automation



GMWIN



A Safety Instructions

- Read this manual carefully before installing, wiring, operating, servicing or inspecting this equipment.
- Keep this manual within easy reach for quick reference.



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

- 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.
- 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.
- 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.
- 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.
- 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.

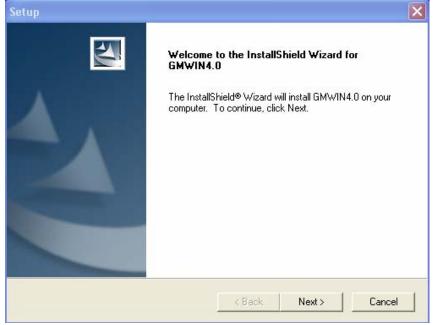
The setup logo screen is displayed and setup wizard is ready to install.





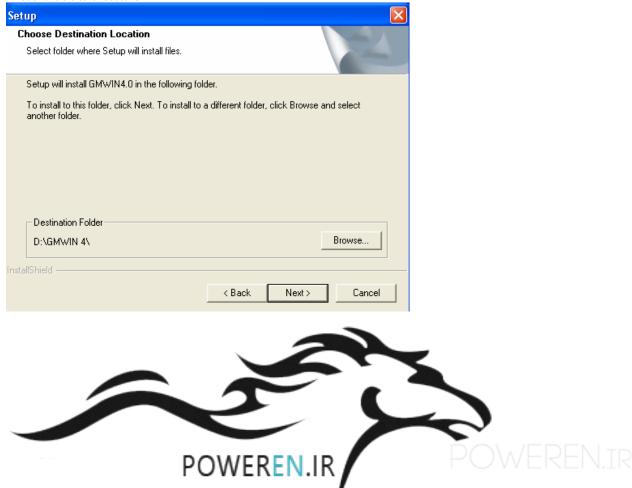


• A dialogue box showing the welcome message appears. It is required to exit other windows application programs during the setup of GMWIN.



- 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.

Choose Folder
Please choose the installation folder.
<u>P</u> ath:
C:\GMWIN 4
Directories:
Gmwin (C:) Gmwin Gmwin Gmwin Logitech Lpagent Gmice2000(1) Gfice2000(2) Gfice200(2) Gfice200(2)
OK Cancel

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

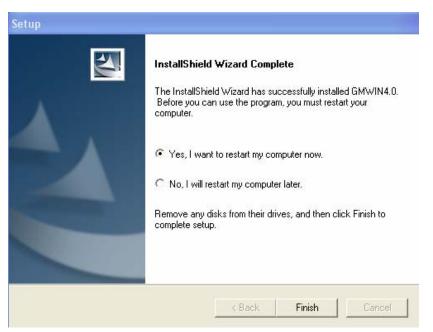
Setup	×
Choose Destination Location	and the second se
Select folder where Setup will install files.	
Setup will install GMWIN4.0 in the following folder.	
To install to this folder, click Next. To install to a different another folder.	folder, click Browse and select
Destination Folder	
C:\GMWIN 4	Browse
InstallShield	
<u>< B</u> a	ck Next> Cancel

Then, it starts to install on your computer.

Installing:
54%
Cancel

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.



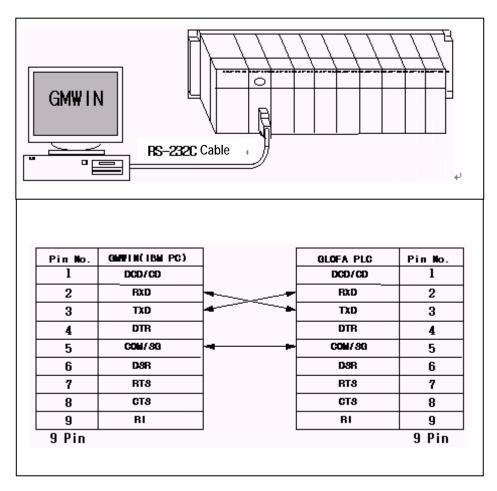


1.5 How to connect with PLC

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.





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

Option				? ×
Set Folder Connection Option				
Method of Connection				
O Modem	Communication Port	COM1	-	n II
C GLOFA Fnet for PC		ICOMI	·	
C GLOFA Mnet for PC				
C Ethernet				
O USB (GM4C)				
Depth of Connection				
● Local				
C Remote 1				
C Remote 2				
		OK	Cancel	Help

- 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.

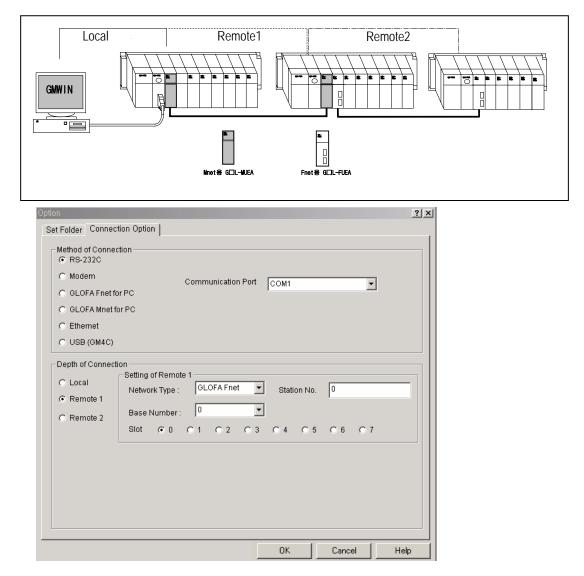
Point

- 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

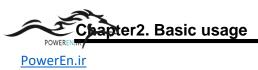
Connect RS-232C connector between RS-232C COM Port of PC and PLC as shown below and compose the net by using a communication module between PLC and PLC.



- 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.

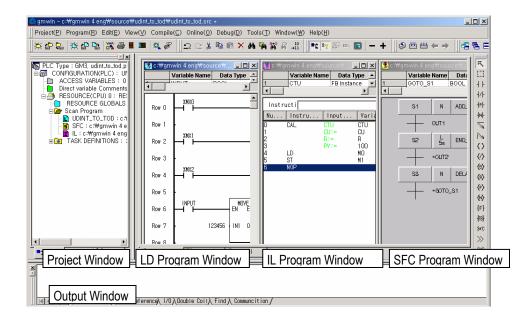
Point

- 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

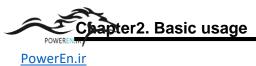


2.1.1 Menu configuration

💼 gmwin – [c:\#gmwin 4 eng\#source\#udint_to_tod\#udint_to_tod,src]	
Image: Project(P) Program(P) Edit(E) View(V) Compile(C) Menu Online(Q) De ☆ New Program(N) Ctrl+N Menu Menu ☆ 合 Q > A Max 34 A A ☆ 合 Q > A Max 34 A A A	Toolbar
PLC Type Save As(A) B CONFIC Save All(V) ACC Close(C)	
	 N N
Bill : c:₩gmwin 4 eng IL : c:₩gmwin 4 eng TASK DEFINITIONS : Row 3 · XMX2 0UT3	(P) (N) {F} {FB} (mr) ≫ (sc)
Row 7 123456 IN1 OUT OUTPUT ■ P * Pa 2 I	
X P K ()) [ξrror/VarnningCross Reference] 1/0 λ Double Coilλ Find λ Communcition /	
Shows and Edits IN/OUT variables. Offline R4,C5	Edit //

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

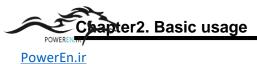
Command	Description	
New project	Creates a project for the first time.	
Open	Opens the exiting projects.	
Open Project from PLC	Uploads the project and program from PLC.	
Save	Saves the project. Program is not available to save.	
Save as	Saves the project as another name.	
Close	Closes the project.	
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.
Сору	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 Dir	ect 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

Comma	nd	Description
Delete line	Ctrl+D	Deletes one line.
Insert line	Ctrl+L	Inserts one line.
Insert cell	Ctrl+l	Inserts one cell.

Edit tool for each program

In case of IL edit

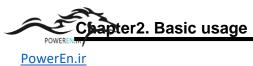
Command		Description
Function	F2	Function insert
Function block	F3	Function block insert
Label	F4	Label insert
Operator	F5	Operator insert

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

Con	nmand	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

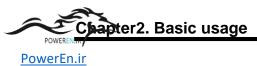
Command	Description
Compile	Compiles the program.
Make	Compiles the program that is not compiled from the programs belonging to the project and then makes the PLC execution file.
Build All	Compiles all programs belonging to the project and then makes the PLC execution file.
Memory Reference	Shows the 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.



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6) Online

Ctrl+R prepared by the user to the PLC and then converts the mode at starts to monitor. Connect Connects GMWIN and PLC designated in the option. Disconnect Disconnect GMWIN and PLC. Read Reads PLC data. Write Writes GMWIN program to PLC. Monitor On/ Off Starts/finishes program monitoring. PLC Mode Run Step Converts PLC mode. Step Debug Master convert Converts PLC data as "0". Reset Reset Overall Reset Resets PLC. Overall Reset Reads flash memory type information installed in CPU or writes date to flash memory. Mode Write PLC Info System Shows PLC information. Error/Warning History I/O module Fault Base Units Shows/writes PLC I/O configuration status. I/O synchronization Matches PLC I/O configuration status. I/O synchronization Matches PLC I/O configuration with project & PLC. Output Sets forced I/O value/execution allowance. Output Shows link module type, installed slot, station n		Command	Description		
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Write to flash memory. Mode Mode PLC Info System System Shows PLC information. Error/ Warning History History I/O Module Fault Base Units Base Units /O Modules I/O info Shows/writes PLC I/O configuration status. I/O synchronization Matches PLC I/O configuration status. I/O synchronization Matches PLC I/O configuration with project & PLC. /O Forcing Input Sets forced I/O value/execution allowance. Output Output Info Network Link Enable Shows link module type, installed slot, station no. Info Shows network information. Input Shows sending/receiving information. Online Edit Start Start Starts to edit in the run. Write Writes the edit contents in the run. Cancel Cancels to edit in the run. CSM Sets the data for fault of F-net slave module. I/O skip. Fault Mask Sets failure mask.		Overall Reset			
Mode Mode DLC Info System Shows PLC information. Error/ Warning History History I/O Module Fault Base Units Base Units /O Modules I/O synchronization Matches PLC I/O configuration status. I/O synchronization Vo Forcing Input Sets forced I/O value/execution allowance. Output Shows link module type, installed slot, station no. Info Shows network information. Info Shows sending/receiving information. Mnet parameter Inputs Mnet parameter. Comm Info Shows sending/receiving information. Dnline Edit Start Starts to edit in the run. Write Cancel Cancels to edit in the run. Cost of Cancel Sets the data for fault of F-net slave module. /O Skip Sets failure mask. Sets failure mask.	Flash memory	Read	Reads flash memory type information installed in CPU or writes data		
PLC Info System Shows PLC information. Error/Warning History History I/O Module Fault Base Units Base Units /O Modules I/O info Shows/writes PLC I/O configuration status. I/O Synchronization Matches PLC I/O configuration with project & PLC. /O Forcing Input Sets forced I/O value/execution allowance. Output Shows link module type, installed slot, station no. Info Shows network information. Info Shows sending/receiving information. Online Edit Start Starts to edit in the run. Write Writes the edit contents in the run. Cancel Sets the data for fault of F-net slave module. /O Skip Sets failure mask.		Write	to flash memory.		
Error/Warning History I/O Module Fault Base Units /O Modules I/O info Shows/writes PLC I/O configuration status. I/O Synchronization Matches PLC I/O configuration with project & PLC. /O Forcing Input Sets forced I/O value/execution allowance. Output Output Output Vetwork Link Enable Shows link module type, installed slot, station no. Info Shows network information. Info Shows sending/receiving information. Online Edit Start Starts to edit in the run. Write Writes the edit contents in the run. Cancel Sets the data for fault of F-net slave module. /O Skip Sets failure mask.		Mode			
History I/O Module Fault Base Units I/O info /O Modules I/O info Shows/writes PLC I/O configuration status. I/O synchronization Matches PLC I/O configuration with project & PLC. /O Forcing Input Sets forced I/O value/execution allowance. Output Output Network Link Enable Shows link module type, installed slot, station no. Info Shows network information. 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. 'SM Sets I/O to skip. 'Gault Mask Sets failure mask.	PLC Info	System	Shows PLC information.		
I/O Module Fault Base Units /O Modules I/O info Shows/writes PLC I/O configuration status. I/O synchronization Matches PLC I/O configuration with project & PLC. /O Forcing Input Sets forced I/O value/execution allowance. Output Output Network Link Enable Shows link module type, installed slot, station no. Info Shows network information. 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. 'SM Sets I/O to skip. 'ault Mask Sets failure mask.		Error/ Warning			
Base Units Base Units /O Modules I/O info Shows/writes PLC I/O configuration status. I/O synchronization Matches PLC I/O configuration with project & PLC. /O Forcing Input Sets forced I/O value/execution allowance. Output Output Shows link module type, installed slot, station no. Network Link Enable Shows network information. 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. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.		History			
I/O Modules I/O info Shows/writes PLC I/O configuration status. I/O synchronization Matches PLC I/O configuration with project & PLC. /O Forcing Input Sets forced I/O value/execution allowance. Output Output Sets forced I/O value/execution allowance. Network Link Enable Shows link module type, installed slot, station no. Info Shows network information. 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 I/O to skip. Fault Mask Sets failure mask.		I/O Module Fault			
I/O synchronization Matches PLC I/O configuration with project & PLC. /O Forcing Input Sets forced I/O value/execution allowance. Output Output Output Network Link Enable Shows link module type, installed slot, station no. Info Shows network information. Info Shows sending/receiving information. Online Edit Start Vrite 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. /O Skip Sets failure mask.		Base Units			
/O Forcing Input Sets forced I/O value/execution allowance. Output Output Network Link Enable Shows link module type, installed slot, station no. Info Shows network information. Mnet parameter Inputs Mnet parameter. Comm Info Starts Online Edit Start 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. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.	I/O Modules	I/O info	Shows/writes PLC I/O configuration status.		
Output 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. Dnline 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. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.		I/O synchronization	Matches PLC I/O configuration with project & PLC.		
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. Dnline Edit Start Vrite 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. /O Skip Sets l/O to skip. Fault Mask Sets failure mask.	I/O Forcing	Input	Sets forced I/O value/execution allowance.		
Info Shows network information. Mnet parameter Inputs Mnet parameter. Comm Info Shows sending/receiving information. Dnline Edit Start 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. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.		Output			
Mnet parameter Inputs Mnet parameter. Comm Info Shows sending/receiving information. Dnline Edit Start 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. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.	Network	Link Enable	Shows link module type, installed slot, station no.		
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. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.		Info	Shows network information.		
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. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.		Mnet parameter	Inputs Mnet parameter.		
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. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.	Comm Info	·	Shows sending/receiving information.		
Cancel Cancels to edit in the run. FSM Sets the data for fault of F-net slave module. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.	Online Edit	Start	Starts to edit in the run.		
FSM Sets the data for fault of F-net slave module. /O Skip Sets I/O to skip. Fault Mask Sets failure mask.		Write	Writes the edit contents in the run.		
/O Skip Sets I/O to skip. Fault Mask Sets failure mask.		Cancel	Cancels to edit in the run.		
ault Mask Sets failure mask.	FSM		Sets the data for fault of F-net slave module.		
	I/O Skip		Sets I/O to skip.		
nitialize Special Module Initializes special module.	Fault Mask		Sets failure mask.		
	Initialize Special I	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	Runs to the cursor position.
Ctrl+F2	
Insert/Remove Breakpoint	Sets or removes break point.
Ctrl+F5	
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.

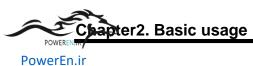


2.1.2 Toolbar

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.

🛛 🌣 👉 😓 🖄 👉 🕒 🔀 🎒 💷 🔲	¾ <i>;;;</i> ⊇ ⊇ X № ® X A % % & - + = = 0 5
	📲 🖳 🐼 🛞 🏩 😩 🖉 🧤 🗇 🅈 🔢 🕑 🕀 🗄 😗 🎝

Tool	Command	Tool	Command	Tool	Command
<u>í</u>	New project	×	Connect+Write+Run Monitor On		Make
P 1	Open	9.	Connect		Library manager
f ⁰	Save	90	Disconnect		Start Simulation
	New program	₽	Write	0	Redo
	Open		Monitor On/Off		Find from files
• •	Save	*	Run	10 →11	Go To
	Local variables	6	Stop		Title Vertically
ΩÌ	Undo	1	Pause	ហែ	Close all
Ж	Cut	۲	Begin Debug		Project Window
Ē	Сору	Ð	Go	12 g	Output Window
	Paste	₽ 1	Step over	K	Variable Monitor
×	Delete	{ ⁺}}	Step in	ID=	I/O Monitor
# \$	Find	{} -	Step out	-	Zoom Out
a+o H	Replace	۹	Pause	+	Zoom In
ů,	Find Next	→{}	Run to Cursor	5	Print
۲	Compile	<mark>₿</mark> _{}}	Insert/Remove Breakpoint		New Window
	Full screen	•	Write in Online Edit		Tiered configuration
Ŷ	Previous Message	9	System		Title Horizontally
Ŷ	Next Message		I/O information		PLC history
R	Online Edit Start	*	Data share		



Point Add/remove toolbar Press the right button of mouse in the toolbar to call popup menu. gmwin - [c:₩gmwin 4 eng₩source₩udint_to_tod₩udint_to_tod,src <u>- 0 ×</u> \mathbb{R} Project(P) Program(R) Edit(E) View(V) Compile(C) Online(O) Debug(D) Tools(T) Window(W) Help(H) _ 8 × 英告兄 英告告 💥 🖉 🔳 🗰 💐 🖉 🛛 그 그 🖇 🖻 🖥 🗙 🖓 📑 🖬 🖷 🗮 🖬 👘 🔩 Project I N ≣¶ Output K []] Variable I mory Allocat 🛛 Initial V 🔺 ✓ File • 1 + 1/+ Ī Þ ACCESS VARIABLES : 0 🖌 Edit ┥┍┝╴┥╲┝ ٠ 📋 Direct variable Comments ✓ View✓ Window OUT51 XMXO 50 RESOURCE(CPU) 0 : RE:
 RESOURCE GLOBALS
 Scan Program Row O () () ✓ Compile Row 1 (S) (R) UDINT_TO_TOD : c:t SFC : c:\#gmwin 4 e Online 0UT2 XMX1 Debug (P) (N) Row 2 📘 IL∶c:₩gmwin 4 eng LD ~ {F} {FB} TASK DEFINITIONS : Row 3 (887) >>> SFC оитз - ССС-(SC) XMX2 Row 4 Toolbar... Row 5 MOVE EN ENO INPUT Row 6 Þ € Í I 📑 P... 💀 Pa... 💹 Li.. 📳 udint_to_tod 💽 sfc 1 il × [] 【 【 ▶ ▶ **Error/#arnning**Cross Referenceλ 1/0λDouble Coilλ Findλ Communcition / Offline R11,C7 Edit ready

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.

Toolbars: Menu bar Basic Edit View Compile Online Window Debug LD IL SFC Toolbar name: Menu bar	Show Tooltips Cool Look Carge Buttons New Toolbar Toolbar USER1 OK Carge	New Reset X OK Cancel	USER1	
--	--	-----------------------------------	-------	--



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2.1.3 Toolbox

LD 💌		
K []		
- + + +/F		
HPF HNF		
$\langle \rangle \langle \rangle$		
(S) (R)	SFC 💌	
(P) (N)		
{F} { FB}		IL 🗵
(887) >>>	-abe Jump	<u> 2</u> : -D
(s¢)	٩	DPr
LD toolbox	SFC toolbox	IL 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.

Switchi Motori Row 0 LIMIT_SWI TCH EN Bow 1 H H H/H ABC IN1 OUT ABC_ADD Sow 3 1
30w 4 (5) (8) (F) (1) (F) (F) (FB) (m ²) ≫



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2.1.4 Status Line Warning Error Edit Opens an existing project, GM4B Run 🔁 ! 🗶 R1,C4 PLC mode Cursor position Command comments I/O Forcing **GMWIN status** 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 ϵ 4) Warning In case of abnormal status (warning) occurrence to PLC, it is indicated 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'.

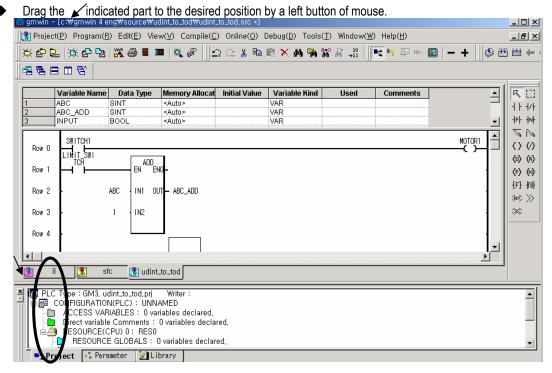
Debug: Indicates 'in the way of debugging the PLC program'.



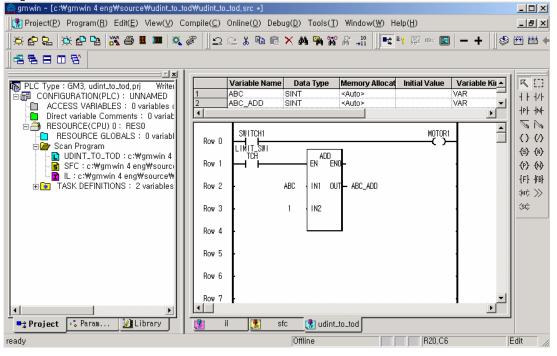
2.1.5 Docking of windows

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



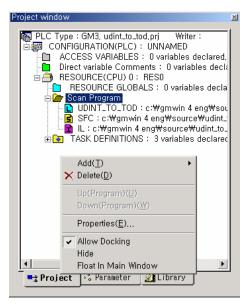
If moving to the left, it moves as below.



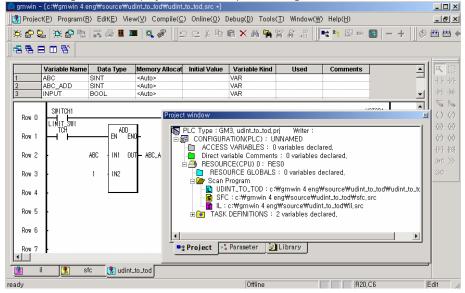


2) Float In Main Window

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.



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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.

	IIIP	ul	
Interval Task Defin	e	×	
Task name :	TIME_1S	ОК	Adjustment menu box
Task number :	0	Cancel	 OK button
Condition ——		Help	 Cancel button
Single :		Priority :	
		2 💌	
Interval :	T#18		 List box
Interrupt :			

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

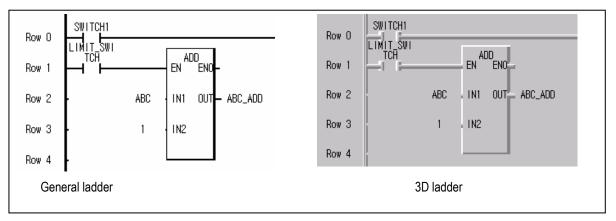
2.2.1 General option

- In general option, it is available to set ladder option, SFC option, general option.
- Select menu [Project]-[Option]-[General Option].

Option ?	×
Make Option Monitor/Debug Option Auto Save Set Folder Password General Option Ladder option Image: Display Ladder In 3D Image: Input Contact/Coil with Variable SFC option	
Display SFC in 3D	
Others Display Splitted Variable Window on Opening Program Window	
OK Cancel Help	



- 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.



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.

	INITIAL *START
CONVEY1 N LIFT CONVEY2	CONVEY1 N LIFT CONVEY2
N BOTATE	N ROTATE
D 18 DOWN	
[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.

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used 🔺
	INPUT	BOOL	<auto></auto>		VAR	
	OUT1	BOOL	<auto></auto>		VAR	
	OUT2	BOOL	<auto></auto>		VAR	
	OUT3	BOOL	<auto></auto>		VAR	
	OUT51	BOOL	<auto></auto>		VAR	
						•
Row 0	*MX0				001 	¹⁵¹
Row 1					-	
Row 2	2MX1				0U	T2
Row 3	•					
Row 4	×MX2				C	5
Row 5	•					
Row 6		EN E	NO-			
Row 7	• 1	23456 IN1 0	ОТ— ООТРОТ			
Row 8	-					



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.

tion					?
/lake Option Monitor/	/Debug Option	Auto Save Set Folder	Connection Option	General Option	
Method of Connectio	n				
C Modem		Communication Port	COM1	•	
C GLOFA Mnet for F					
C Ethernet					
C USB (GM4C)					
- Depth of Connection					
C Local					
C Remote 1					
C Remote 2					
			ок	Cancel H	elp

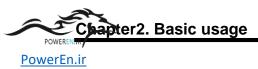
1) Connection by serial communication

- 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.

Option			?
Make Option Monitor/De	bug Option Auto Save Set Folder	Connection Option General Opt	tion
Method of Connection –	Dial-up Modem	C Dedicate Modem	
 Modem GLOFA Fnet for PC 	Communication Port	COM2	
C GLOFA Mnet for PC	BPS	56k 💌	
C Ethernet C USB (GM4C)	Phone Number :	0	
	ing of Remote 1 twork Type : GLOFA Cnet 💌	Station No. 0	
		OK Cancel	Help
	the stall set a survey of set	and the set for any second	

- 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].

ption				? :
Make Option Monitor/Debug Option	Auto Save Set Folder	Connection C	ption General	Option
Method of Connection				
O Modem	Port Address	0x200	•]
GLOFA Fnet for PC GLOFA Mnet for PC	Memory Address	0xC000	•]
C Ethernet				
C USB (GM4C)				
Depth of Connection Setting of Remo Remote 1 Remote 2		Station No.	0	
		ок (Cancel	Help

- 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].

Jption	<u> </u>
Make Option Monitor/Debug Option Auto Save Set Folder Connection Option General Option	
Method of Connection	
C Modem	
C GLOFA Fnet for PC	
C GLOFA Mnet for PC	
Ethernet	
C USB (GM4C)	
C Remote 1 C Remote 2 C Remote 2	
OK Cancel Hel	





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Point

Major items when linking computers

Items	Standard					
Serial communication	RS-232C 1 channel	Based on RS-232C standard spec.				
Channel	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				
	Dedicated protocol	Multi drop/1:1 mode communication support by LGIS dedicated protocol				
Communication protocol	PADT protocol	PLC remote control thru PADT using PADT protocol of GLOFA PLC.				
	User defined protocol	Download using frame editor (sets RS2320 and RS422 independently)				
	7 or 8	Sets in editor and download.				
Data type	1 or 2	(Sets RS232C and RS422 independently)				
	1					
	Even/Odd					
Channel selection	Select Independent Channel/Dependent Channel in Editor					
Synchronization mode	Supplement Synchronization Type					
Transfer rate (BPS)	300/600/1200/2400/4800/9600/192	200/38400 selection				
Modem communication	Available to connect to RS-232C c	hannel				
System configuration	1:1, 1:N, N: M (N + M ≤ 32)					
Transfer distance	RS-232C: max. 15M (available to e	extend by Modem)				
	RS-422: max. 500M	·				
Diagnosis function	Loop-Back Test Mode	Test1/Test2 Mode				
-	Action status indication thru 16 LE	D 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.



P	0	W	e	r	E	n	.i	ir	

Option	<u>?</u> ×
Make Option Monitor/Debug Option Auto Save Set Folder Connection Option General Option	1
Standard library	
c.\gmwin 4 eng Search	
Source file	
ctigmwin 4 englisource	
Output file	
c1gmwin 4 engtoutput Search	
Temporary file	
c:\gmwin 4 eng\temp Search	
OK Cancel H	elp

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

Choose Folder
Please choose the installation folder.
Path:
C:\GMWIN 4
Directories:
Growin (C:) Growin Governments Growin office2000(1) Growin office2000(2) Phu Phu
OK Cancel

- 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.

Open Lib	rary File 🔀
8	Cannot find standard library files in the assigned directory.
	ОК

- 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].

Directory	Error		×
8	c:\gmwin\so Doyou creat	urDirectory is no te directory ?	t exist
C	OK)	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].

		?
Set Folder Make Option	Connection Option	General Option Auto Save
Auto save time cycle Every 0 Min (0~60 min. 0 : r		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.)

Option			? >
Make Option Monitor/Debug Option Auto Save	e Set Folder	Password Genera	Option
Set up a Password.	Delet	e	
Old Password :]		
New Password :	1		
Confirm :			
	ОК	Cancel	Help

- 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

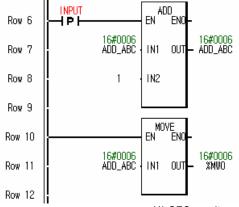
Available to set various options related to monitor.

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

Option			? ×
Set Folder Make Option	Password Monitor/Debug Option	General (Au	Option to Save
Monitor option			
Monitor display type			
O Display as Def	ault Type		
C Dispplay as De	cimal		
C Display as Hex	a		
SFC monitor			
SFC Auto Scrol			
I SFC Auto Scrol			
Debug option	it		
Point	C Line		
	NO LINC		
		1	
	OK	Cancel	Help

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.

2-20



2.2.7 Make option

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

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

Option ?	×
Make Option Monitor/Debug Option Auto Save Set Folder Password General Option	
Select compile type	
Select output file Set %M area size	
✓ Upload Program %M area size:	
Content of upload program 2 KByte Include Comment	
C Exclude Comment	
Method of data type check	
Strict Check Only Warning if Size is Equal	
OK Cancel Help	

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.

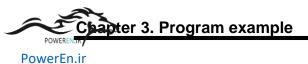


2.3 File created in GMWIN

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

File name	Description		
<project name="">.PRJ</project>	The user prepared project file		
<bundle file=""> .MUK</bundle>	Bundle file for the project		
<project name="">.BN0</project>	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></project>		
<project name="">.MON</project>	Information file for monitoring		
<project name="">.CR0</project>	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</project>	Upload file		
<project name="">.EW0</project>	File for online edit		
<project name="">.INF</project>	File for monitor and debug		
<project name="">.TW0</project>	File to online edit.		
<project name="">.VAR</project>	File to preserve the user designated variables from variable monitor		
<program name="">.SRC</program>	The user prepared program file		
<program name="">.ASV</program>	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</program>	Partial compile information file		
<program name="">.PCB</program>	PCI Backup file		
<program name="">.MPS</program>	Data ram file of simulator		
<program name="">.OP?</program>	Created when compiling the program. (In case of program block)		
<program name="">.OB?</program>	Created when compiling the program. (In case of function block)		
<program name="">.OF?</program>	Created when compiling the program (in case of function)		
	(OP3: in case of GM3, OP4: in case of GM4)		
<program name="">.SP?</program>	Created when simulation compiling the program. (In case of program block)		
<program name="">.SB?</program>	Created when simulation compiling the program. (In case of function block)		
<program name="">.SF?</program>	Created when simulation compiling the program. (In case of function)		

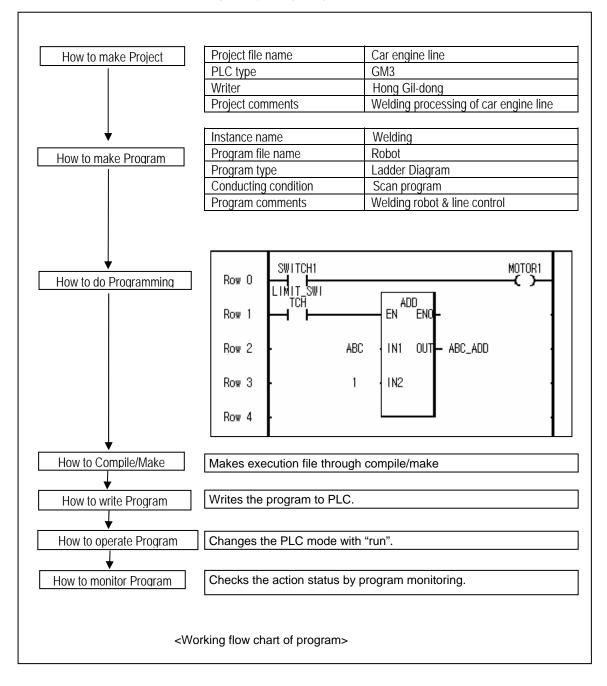
Point Directory construction in GMWIN V4.0 is as follows. (Ex) Project name: Project1.prj, Program name: Program	1.src		
Project1	Program1.bak Program1.pci Program1.src Project1.bak Project1.prj		
Output	Program1.obu Program1.op4 Project1.BNO Project1.DL0 Project1.TWO	- 20),/	

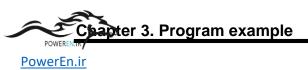


Chapter 3. Program example

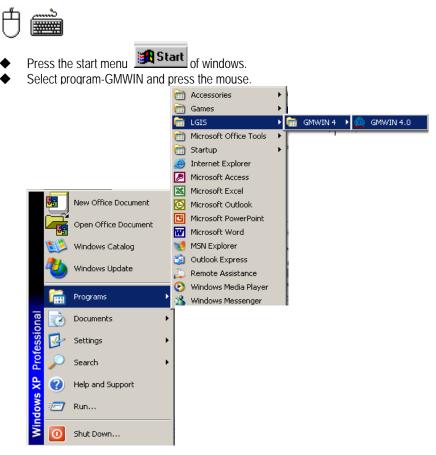
3.1 How to make Project and open Program

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

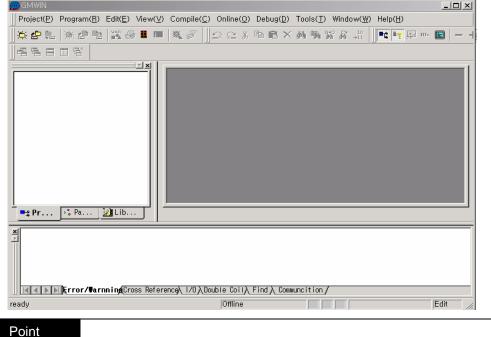




3.1.1 How to execute GMWIN



• The initial screen of GMWIN appears as below :



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

ISHV

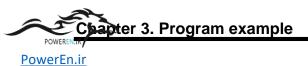
PowerEn.ir

3.1.2 How to make Project

Select [Project]-[new project, it is start the wizard.	×
Enter project file name def0043 Location : c:\gmwin 4\source\def0043	Browse
PLC(Configuration) name: <not given=""> [* You can set PLC name in basic parameter setting page after project created Select PLC type G GMR G GM1 G GM2 G GM3 G GM4</not>	.1
C GM4 <u>B</u> C GM4 <u>C</u> C GM <u>6</u> C GM <u>7</u> Writer :	-
< <u>Back</u> <u>Next</u> > <u>Cancel</u>	Help

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

lew Project		×
Enter project file name Location :	ENGIN_LINE c:\gmwin 4\source\ENGIN_LINE	Browse
Select PLC type	in basic parameter setting page after p C GM <u>2</u> C GM <u>3</u> C GM <u>4</u>	project created.]
Writer :	Hong Gil-Dong	
Comments	ng line	
	< <u>B</u> ack <u>N</u> ext >	Cancel Help



3.1.3 How to make Program

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

Enter program file name c:\gmwin 4\source\engin_line\robot.src	Browse	
Enter program instance name		
[* Instance is identifier in program memory]		
© Scan program © TASK	Browse	
[* First program is registered as scan program.]		

Input instance name

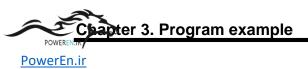
Input program name robot.src and then click [Next]to move to new program page.

	ct file name		robot.src			
Select lan	guage					
C <u>S</u> FC	€LD	с⊩	O FBD	o si		
Select kin	d of program	n				
Progra	m block	O Function	bloc 🔿 Funct			
		data type :		-		
			1			
(* First pro	gram is regis	stered at progr	am block.]			
	gram comm					
	; robot and li	ne control				
VVeilding						
Vveilding						
vveilding						
Vveilding						
Vveilding						
Vveilding						
Vveilding						
Vveilding			< Back	Finish	Cancel	Hel

- 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

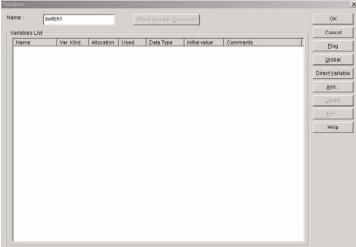
below uppedis.		
🛄 gmwin - [c:\gmwin 3 eng\source\engin.	_line₩robot, src]	IJŇ
Roject(P) Program(<u>R</u>) Edit(<u>E</u>) View(<u>V</u>) Compile(C) Online(Q) Debug(D) Tools(T) Window(W) Help(H) $\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $	1×
)) 🎘 🖨 🐛 🎘 🖨 🐂 🎇 🍮 🔳 💷	▓ # ⊇ ⊆ ≵ 🖻 🛍 🗙 # 🎙 🖓 # # 📲 📑 # 🕞 -	
PLC Type : GM3, engin_line,prj	Variable Name Data Type Memory Allocat Initial Value Vi	
CONFIGURATION(PLC) : UNN		-1/
Direct variable Comments : RESOURCE(CPU) 0 : RES0 RESOURCE GLOBALS : 1	Row ()	≥ ≥
E E Scan Program E E WEILDING : c:₩gmwin E E TASK DEFINITIONS : 2 v	Row 1 . (5)	
HASK DEPINITIONS : 2 V	Row 2 ·	
	Row 3 ·	
	Row 4	
	Row 5	
■: Pr Pa 2 Lib	robot	
		_
	ceλ 1/0λDouble Coilλ Findλ Communcition /	_
ready	Offline R0,C0 Edit	





3.2 How to do Programming

- 3.2.1 How to insert contact / output coil
 - Select + F 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].
 Add/Edit Variables

Variable Kind Variable Kind 💌	Cancel
Cata Type Elementary: FB Instance: CTD Array (0) OF BOOL	Memory Allocation C Auto C Assign(AT) : %
nitial Value	Init Array

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

🚼 c:\#gn	nwin 3 eng₩sou	ırce₩engin_lin	e₩robot,src +			×
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	
1	SWITCH1	BOOL	<auto></auto>	,	VAR	
•						
Row 0	SWITCH1					
Row 1	ł					
Row 2	ł					
Row 3	ł					
Row 4	ŀ				1	J
					<u>_</u>	

pter 3. Program example from toolbox and click the mouse on the side position of contact. Select Name MOTOR1 0K Cancel Variables List-Name SWITCH1
 Var. Kind
 Allocation
 Used
 Data Type
 Initial value

 VAR
 <Auto>
 BOOL
 <t Comment <u>F</u>lag <u>G</u>lobal Direct ⊻ariable <u>A</u>dd... Help

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

Variable MOTOR1			ОК
Variable Kind			Cancel
Variable Kind : VAR	-		Help
Data Type		Memory Allo	ocation
Elementary: BOOL	~	 Auto 	
C FB Instance : CTD	~	C Assign(/	AT) :
C Array (0) OF BOOL	-	%	
- Initial Value			
		Ini	t. Array
Comments			

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

(≹ с:₩gr	nwin 3 eng₩sou	ırce₩engin_lin				IJŇ
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	
1	MOTOR1	BOOL	<auto></auto>		VAR	
2	SWITCH1	BOOL	<auto></auto>		VAR	
						►
	SWITCH1				MOTOR1	
Row 0						
Row 1	•					
Row 2	ł					
Row 3					1	
Row 4	ŀ				1	

ſ

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Select + from toolbox and click the mouse on the row 1 position of LD window.

/ariables	×
Name : LIMIT_SWITCH Direct Variable Comment	ок
_ Variables List	Cancel
Name Var. Kind Allocation Used Data Type Initial value Comments MOTOR1 VAR <auto> BOOL BOOL</auto>	Elag
SWITCH1 VAR <auto> BOOL</auto>	Global
	Direct Variable
	Add
	Delete
	Edit
	Help

POWERENTER 3. Program example

PowerEn.ir

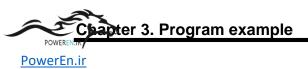
• After input the variable name (limit switch 1), click [OK].

Variable Kind VAR	Cancel
Data Type © Elementary : BOOL C FB Instance : C Array (0,	Memory Allocation
Initial Value Comments	Init. Array

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

🚼 c:\#gmwin 3 eng\#source\#engin_line\#robot,src *						
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	
1	LIMIT_SWITCH	BOOL	<auto></auto>		VAR	
2	MOTOR1	BOOL	<auto></auto>		VAR	
3	SWITCH1	BOOL	<auto></auto>		VAR	
						►
Row 0 Row 1 Row 2 Row 3						
•	1					





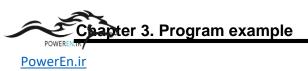
- 3.2.2 How to make Function

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

Select I diffición		
Time/Date Function All System F	- Set input number	ОК
ADD	Max number: 8	Cancel
ABS ADD	Required number:	Help
ADD_TIME AND ARY_MOVE	2	
Comment: Add value		
ADD	<u>_</u>	
EN ENO NOTYPE OUT		
	_	

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.

🎥 c∶₩gn	nwin 3 eng₩sou				_ [IJŇ
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	
1	LIMIT_SWITCH	BOOL	<auto></auto>		VAR	
2	MOTOR1	BOOL	<auto></auto>		VAR	
3	SWITCH1	BOOL	<auto></auto>	-	VAR	
•						Þ
Row 0 Row 1 Row 2 Row 3 Row 4					MOTOR1	
Row 5	1				1	_
▲						<u> //</u>



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.

Name	Var. Kind	Allocation	Used	Data Type	Initial value	Comments	
LIMIT_SWITCH	VAR	<auto></auto>		BOOL			 <u> </u>
MOTOR1 SWITCH1	VAR VAR	<auto> <auto></auto></auto>		BOOL BOOL			<u>G</u> lobal
Divition1	YAN	-Auto-		BOOL			Direct <u>V</u> aria
							<u>A</u> dd
							Delete
							Edit
							Help

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

2
ок
Cancel
Help
Memory Allocation
 Auto
C Assign(AT) :
%
Init. Array

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

POWERENTRY

Po	w	e	rE	n	.iı	r

🚼 c:\#gn	nwin 3 eng₩sou	ırce₩engin_lin	e₩robot,src *			×ا
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	
1	ABC	SINT	<auto></auto>		VAR	
2	LIMIT_SWITCH	BOOL	<auto></auto>		VAR	
3	MOTOR1	BOOL	<auto></auto>		VAR	
4	SWITCH1	BOOL	<auto></auto>		VAR	
•						
Row O Row 1 Row 2 Row 3	SWITCHI LIMIT SWI TCH ABC INI					
Row 4						1

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

Vari	ables				1	(x
	ame : 1			Dir	ect Variable <u>C</u> or	nment		OK Cancel
	Name	Var. Kind	Allocation	Used	Data Type	Initial value	Comments	Elag
	ABC	VAR	<auto></auto>		SINT			
	LIMIT_SWITCH	VAR	<auto></auto>		BOOL			Global
	MOTOR1	VAR	<auto></auto>		BOOL			
	SWITCH1	VAR	<auto></auto>		BOOL			Direct <u>V</u> ariable
								<u>A</u> dd
								Delete
								<u>E</u> dit
								Help

• 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.

🚼 c∶₩gn	nwin 3 eng₩sou	urce₩engin_line	e₩robot,src *			IX
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	
1	ABC	SINT	<auto></auto>		VAR	
2	LIMIT_SWITCH	BOOL	<auto></auto>		VAR	
3	MOTOR1	BOOL	≺Auto≻		VAR	
4	SWITCH1	BOOL	<auto></auto>		VAR	₋_
Row 0 Row 1 Row 2 Row 3 Row 4	SWITCHI LIMIT SWI TCH EN • ABC INI • 1 IN2					-
<u>الله</u>	1					

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

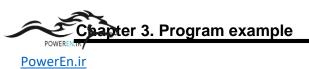
Vai	iables							×
Ν	lame : ABC	_ADD		Dire	ect Variable <u>C</u> orr	iment		ОК
Г	Variables List							 Cancel
	Name	Var. Kind	Allocation	Used	Data Type	Initial value	Comments	Elag
	ABC	VAR	<auto></auto>		SINT			
	LIMIT_SWITCH MOTOR1	VAR VAR	<auto> <auto></auto></auto>		BOOL BOOL			Global
	SWITCH1	VAR	<auto></auto>		BOOL			Direct ⊻ariable
								<u>A</u> dd
								Delete
								<u>E</u> dit
								Help

Input the variable name(ABC_ADD) to the variable input column of variable dialogue box and click [OK].
Add/Edit Variables

Variable ABC_ADD	ОК
Variable Kind	Cancel
Variable Kind : VAR	Help
Data Type	Memory Allocation
Elementary : SINT	 Auto
C FB Instance : CTD	C Assign(AT) :
C Array (0) OF BOOL	%
_ Initial Value	
	Init. Array
Comments	

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

🚼 c:\#g	mwin 3 eng₩sou	urce₩engin_lin	e₩robot, src ★			
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	
1	ABC	SINT	<auto></auto>		VAR	
2	ABC_ADD	SINT	<auto></auto>		VAR	
3	LIMIT_SWITCH	BOOL	<auto></auto>		VAR	
4	MOTOR1	BOOL	<auto></auto>		VAR	
5 .	SWITCH1	BOOL	<auto></auto>		VAR	_
•						•
Row 1 Row 2 Row 3			סט			
Row 4						-



3.3 How to compile/write Program

3.3.1 How to Compile/Make

Wo

lf yo pos

Select menu [Compile]-[Compile, 1].

Compile		×
Source File :	robot.src	
Lines compiled :	11 Lines compiled.	
Status :	Compiled Successfully.	
	ок	
	Source File : Lines compiled :	Source File : robot.src Lines compiled : 11 Lines compiled. Status : Compiled Successfully.

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

	Make All	×
	Output File : engin_line.BN0	
	Lines compiled :	
nfirm Make	Status : Make completed	
Yould you like to make? 'you make the program, online editting will be possible ifter changing mode to stop and writing program to PLC.	Link success Program : 14622 Bytes(12%, Max.128KB) Data : 4132 Bytes(8%, Max.52KB) Upload file : 2964 Bytes(3%, Max.128KB)	
Do not show this dialog box next time	The size of program + upload file sholud be less than 128KB.	
Yes No	OK	

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. Chapter 3. Program example



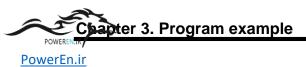
3.3.2 How to write Program

- 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].

Ar	ea
	O Basic Parameter
	🔿 I/O Parameter
	HS Link Parameter
	🔿 Redundancy Parameter
	C Communication Parameter
	 Program Upload Program
	Parameter and Program
	🔽 Upload Program
	O Upload Program
	OK Cancel Help

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

Write to PLC	Write to PLC Upload program
Percentage of Frames Sent (%):	Percentage of Frames Sent (%):
40%	51 %
Cancel	Cancel



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.

🚼 с:\#gr				S0-WEILDING>	_	Ш×
	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Va
1	ABC	16#00	SINT	<auto></auto>		VAR
	ABC_ADD	16#00	SINT	<auto></auto>		VAF
	LIMIT_SWITCH	16#00	BOOL	<auto></auto>		VAF
	MOTOR1	16#00	BOOL	<auto></auto>		VAF
i	SWITCH1	16#00	BOOL	<auto></auto>		VAF
4	_		-	-1		Γ
Row 1 Row 2 Row 3 Row 4	16#00 ABC IN1)			
Row 4		-			1	· •

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.

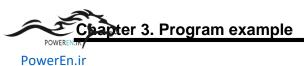
	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Var
	ABC	16#00	SINT	<auto></auto>		VAR
2	ABC_ADD	16#00	SINT	≺Auto≻		VAR
}	LIMIT_SWITCH	16#00	BOOL	<auto></auto>		VAR
ļ	MOTOR1	16#00	BOOL	<auto></auto>		VAR
;	SWITCH1	16#00	BOOL	<auto></auto>		VAR
Row O	SWITCH1		Force Variable	Data	NOTOD4	
Row 1		ADD ENO-	Variable N:	ame:	ОК	
Row 2	16#00 ABC IN1	16#0C OUT— ABC_AC	SWITCH1		Cancel	
Row 3	1 IN2	2	Value: 16#1		Help	
Row 4			1			

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

	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Var
	ABC	16#00	SINT	<auto></auto>		VAR
2	ABC_ADD	16#00	SINT	<auto></auto>		VAR
	LIMIT_SWITCH	16#00	BOOL	≺Auto≻		VAR
	MOTOR1	16#01	BOOL	≺Auto≻		VAR
	SWITCH1	16#01	BOOL	<auto></auto>		VAR
Row 1 Row 2 Row 3			ן			
Row 4						

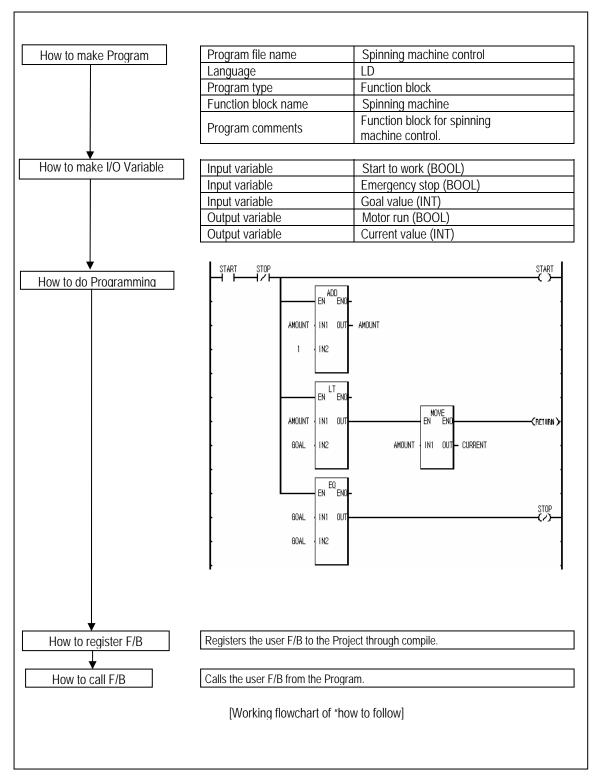
- If switch 1 is "ON", it is available to monitor that motor 1 becomes "ON".
- Execute the force input variable for limit switch 1 as the same method to the above.
- It is available to monitor that the value of variable ABC_ADD increases 1 by 1 according to the input of variable ABC from LD program window.

🚼 c 🕅 gr	mwin 3 eng₩sou	ırce₩engin_line	₩robot, src <re< th=""><th></th><th>_</th><th></th></re<>		_	
	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Vari
1	ABC	16#00	SINT	<auto></auto>		VAR
2	ABC_ADD	16#01	SINT	<auto></auto>		VAR
3	LIMIT_SWITCH	16#01	BOOL	<auto></auto>		VAR
4	MOTOR1	16#01	BOOL	<auto></auto>		VAR
5	SWITCH1	16#01	BOOL	<auto></auto>		VAR
Row O Row 1 Row 2 Row 3	SWITCHI LTMIT_SWI TCH 16#00 ABC IN1 1 IN2)		MOTOR1	A



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 :



- 3.5.1 How to make the User defined function/function block
 - Select menu [Program]-[new Program, 🏥] in the status of open program.

ogram file name : MACHIN.src	ок
Language	Cancel
O <u>S</u> FC ⊙LD OLL OFB <u>D</u> OST	Help
Program type	
O Program block 💿 FB 🔿 Fu	n
Fun/FB name : SPINNIN	G
Return data type : BOOL	T
Comments	
This is a program for spinning machine control.	
Add Program to Project	
Add In/Out variables	

- 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.

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

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

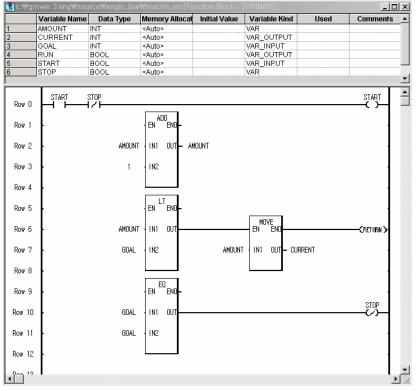
In/Out Variables		×
VAR_IN/VAR_IN_OUT(N):	VAR_OUT()	c 🔤
	<== Add VAR_INPUT()	
	<== Add VAR_IN_OUT(B)	
	Add VAR_OUTPUT(<u>O</u>) ==>	
	Edit(<u>E</u>)	
	Delete(D)	
	Up(<u>U</u>)	
	Down(D)	
(*:denotes		
	Cancel Help	

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

IN/OUT VARIABLES	: VAR_OUT():
START BOOL GOAL INT	<== Add VAR_INPUT()
	Add VAR_OUTPUT(<u>O</u>)==>
	Edit(E)
	Delete(D)
	Up(U)
	Down(D)
(*:denotes	
	Cancel Help

- 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)



POWEREN.IK	ter 3. Program example
PowerEn.ir	

- 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.

-	Compile		×
	Source File :	machin.src	
	Lines compiled :	36 Lines compiled.	
Confirm Compile	Status :	Compiled Successfully.	
Would you like to compile?			
If you compile the program, online editting will be			
possible after changing mode to stop and writing			
Do not show this dialog box next time			
Yes No		ок	
Click [OK] and start F/FB Wizard.	×		
Start wizard of Function/Funcion Block			
F/FB name: SPINNING			
Type: Function Block			
Language: LD			
Src file name: c:\gmwin 4\source\machin\ma	achine .src		
Comment			
< <u>B</u> ack. <u>N</u> ext > Cancel	Help		
F/FB Wizard		×	
Select Fun/FB for addressing to library.			
Select library file			
C In Project			
	~		
New USER1	.4fb		
C Maked			
.4fb	Search		
Content of selected library			
		_]	
< <u>B</u> ack <u>N</u> ext > Can	cel Help		

Chapter 3. Program example

PowerEn.ir

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

(1

Insert library to	o project.			
_ Do you want	to insert library	file to proje	ect?	
Yes				
C No				

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

/FB Wizard	<u></u>
Are you sure ?	
F/FB name: :	SPINNING
Type:	Function Block
Library file name:	c:\gmwin 4\lib\USER1.4fb
Source file name:	c:\gmwin 4\source\machin\machine .src
Project name:	c:\gmwin 4\source\machin\machin. prj
< <u>B</u> ack	Finish Cancel Help

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.

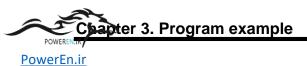
Project willow	
🚯 Library	
📄 💼 📰 Function	
😟 🛅 Standard Function	
Enction Block	
Standard Function Block	
USER1	
Project → Parameter	-

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([FB]) 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.)
 - - Variable Name Data Type Memory Allocat Initial Value Variable Kind

1 INST0 2 SWITCH1	Select Function Block	
	Standard FB All USER1.4fb FB instance	OK Cancel
Row 1	SPINNING	Help
Row 2	Instance yype: VAR	Theip
Row 3		
Row 4	Search	
Row 5 ·	FB information	
Row 6	Comment:	
Row 7	SPINNING BOOL START RUN BOOL	
Row 8	INT GOAL CURRENT INT	
Row 9 ·		
Row 10		
<u>.</u> I		

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

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Use
1	INST1	FB Instance	<auto></auto>		VAR	
2	SWITCH1	BOOL	<auto></auto>		VAR	
•						Þ
Row 0 Row 1 Row 2 Row 3 Row 4 Row 5	T	NSTI In Run- Ir Run- Il Curr- Ent				

Input the variable and complete the program.

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	
	INSTO	FB Instance	<auto></auto>		VAR		
	INST1	FB Instance	<auto></auto>		VAR		-
	INST2	FB Instance	<auto></auto>		VAR		
	MOTOR1	BOOL	<auto></auto>		VAR		
	MOTOR2	BOOL	<auto></auto>		VAR		ð
	T 7	UCTI				<u>,</u>	1
Row O		NST1 INNING IR MOTO				TOR1	
Row 1	• STOP_A • STO	IP CURR - VALUE	1				
Row 2	· 30000 · 604	۱L					
Row 3		NST2 -				-	
Row 4	SWITCH2 SPI	NST2 INN ING IR MOTO R			M0' 	TOR2	
Row 5	• STOP_B • STO	PCURR - VALUE	2				
Row 6	· 20000 · 604	۹L					
Row 7							

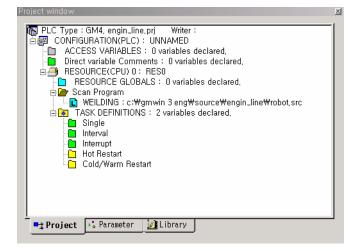
If program is completed, start to compile and write. (For the subsequent processing, refer to 3.3 how to compile/write Program, 3.4 how to run and monitor Program.)

Chapter 4. How to make Project/Program

4.1 Overview

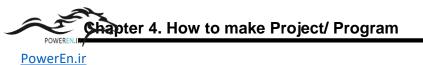
4.1.1 Configuration of Project

Project is composed of Configuration, Parameter and Library.



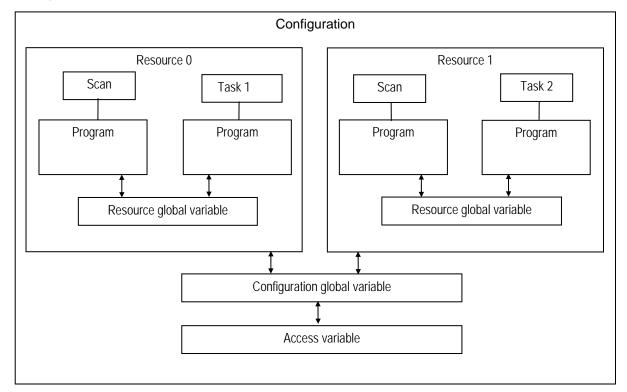
Project has the layer structure as follows :

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

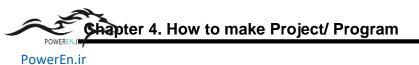
Configuration is composed as follows:



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

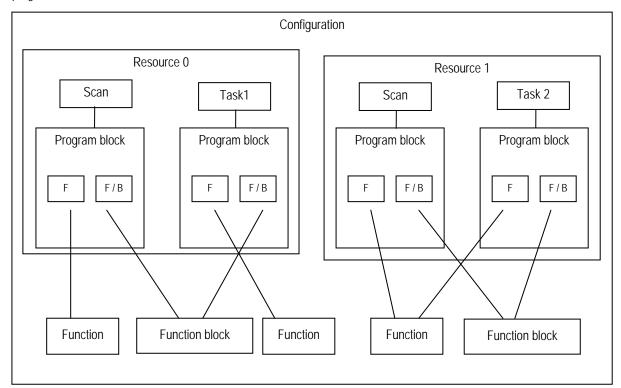
The number of program available to compose for one project is as follows: $\blacklozenge~$ GMR \sim GM4 : 180 , ~~ GM6 \sim GM7 : 100



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

ew Project			oject,		-	
Enter project file name		de	f0043			
Location :	c:\gmwin	4\source\de	ef0043			Browse
PLC(Configuration) na	me: <not< td=""><td>given></td><td></td><td></td><td></td><td></td></not<>	given>				
(* You can set PLC nam	e in basic p	oarameter s	etting page a	ifter proje	t created.]	
Select PLC type						
⊂ GM <u>R</u> ⊂ GM <u>1</u>	⊂ GM <u>2</u>	⊙ GM <u>3</u>	⊂ GM <u>4</u>			
C GM4 <u>B</u> C GM4 <u>C</u>	2 C GM <u>6</u>	⊂ GM <u>7</u>				
Writer :	r					
	ļ					
Comments						

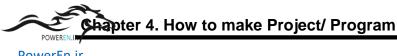
- Input the project file name.
- Select the PLC type to apply from the option button of PLC type.
- Input the writer name to the writer name column.
- Input the comments to the comments column.
- Click [Next] and the program "Define Program" box appears.

2) How to define Program

Enter program	m instance name	_		
	s identifier in prog	ram memory]		
Select cond	lition for run			
💿 Scan pr	ogram			
O TASK			Browse	
[* First progr	am is registered a	as scan 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.



- PowerEn.ir
- 3) How to create Program
 - Makes new progra

Enter projec	ct file name		noname	00.src	
Select lan	guage				
C <u>S</u> FC	⊙LD	O IL	C FB <u>D</u>	O SI	
Select kin	d of program				
Progra	m block	O Function	bloc O Func	tion	
		ata type :		7	
-Enter prog	gram comme	nts			

- Select Program language. Select Program type. The program to be inserted to the project should be 'program block'. ٠
- Input Program comments. ٠
- Click [Finish] and the program window appears. ٠

4.2.2 How to open/save Project

1) How to open Project

Opens the already prepared project.

Select mer	u [Project]	l-[Open,]].		?
	Cource		•	+ 🗈 💣 🎫	
My Recent Documents Desktop My Documents My Computer	AAA				
My Network	File name:			•	Open
Places	Files of type:	Project Files (*.PRJ)		•	Cancel

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



- <u>PowerEn.ir</u>
- 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.

ļ	Save Project As				×
	Project file name:				
	def0043				
	Location :				
	c:\gmwin 4\source\def0043	}		Browse	
	(Programs is copied here.)				
	ОК		Cancel		

- 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.

Program file name : noname00.src	<u>ок</u>
	Canc
	Help
Program type	
Program block C FB C Fu	ı
Fun/FB name :	
Return data type : BOOL	7
Comments	
1	

- 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.

Chapter 4. How to make Project/ Program

PowerEn.ir

c:\gmwin 4\source\ud	lint_to_tod\nona	me00.src	
istance(Program) Nar	ne : EN	IGINE	
Execution control			
Scan Program			
C Task			
,			

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

Point			
button and out	Add In/Out variables now shall be activated only in case of selecting function/function bout data type is activated only in case of selecting function option button. formation, refer to 3.5 how to make the user defined function/function block.)	olock opt	tion

4.2.4 How to open/save Program

1) How to open program

Opens the already prepared program.

Select menu	I [Program]-[Open,]. ? ×
Look jn: 🔂 def	0043	- 🗈 🜌	<u>r (</u>
def0043.prj i line1.src i line2.src i robot1.src i robot2.src	in robot4.src		
File <u>n</u> ame:			<u>O</u> pen
Files of <u>type</u> : Al	files (*.*)	•	Cancel

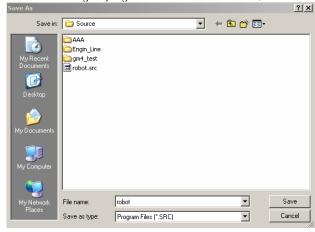
- After selecting the desired program file, click [OK].
- The selected program is generated in the program window.

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].



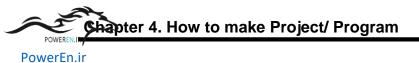
4.2.5 How to change Program Properties

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.)

Program Properties	dotorrininod	langue	
Program name :	robot4.src		ОК
Language :	LD		Cancel
			Help
Program kind			
Program block	C FB	0	Fun
Fun/F8 r	ame :		
Retur	n data type :	ВОО	L
Comments			

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



4.3 How to prepare Configuration

Prepares Global variables, Access variables, Resource contents etc. Project wind

😰 PLC Type : GM1, engine,prj 🛛 Writer :			
CONFIGURATION(PLC): UNNAMED			
ACCESS VARIABLES : 0 variables declared,			
Direct variable Comments : 0 variables declared,			
□ 🕀 🗃 RESOURCE(CPU) 0 : RESO			
📄 📄 RESOURCE GLOBALS : 0 variables declared,			
🚊 🗁 Scan Program 🔰 👘			
🛛 📘 INSTO : c:\#gmwin 4 eng\source\engine\noname00, src			
SFC : c:₩gmwin 4 eng₩source₩engine₩sfc.src			
🗖 IL : c:\#gmwin 4 eng\source\#engine\il.src			
TASK DEFINITIONS : 3 variables declared.			
Single			
Cold/Warm Restart			
System Error			
Project 📲 Parameter 📝 Library			

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.

xI



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 Ľ : SFC program
 - I : IL program

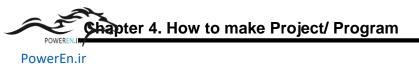
4.3.1 How to edit Configuration

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. Add[] Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Delete(D) Up(Program)(U) Down(Program)(W) Properties(E) Allow Docking Hide Float In Main Window By using this function, the user can edit Project easily.	
 Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Add[1) Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Add(1) Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Add(1) Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Properties(E) Allow Docking Hide Float In Main Window 	Point
 Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Add[1) Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Add(1) Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Add(1) Click the mouse on the temporary position or the desired position from the project window and the following figure appears. Properties(E) Allow Docking Hide Float In Main Window 	Popup menu (Project)
the following figure appears. Add[] Model(D) Up(Program)[U) Down(Program)[W] Properties(E) Allow Docking Hide Float In Main Window	
Add[1] ➤ Delete[D) Up(Program)[U) Down(Program)[W]) Properties[E] ✓ Allow Docking Hide Float In Main Window	
 ➤ Delete(D) Up(Program)(U) Down(Program)(W) Properties(E) ✓ Allow Docking Hide Float In Main Window 	
Up(Program)[<u>U</u>) Down(Program)[<u>W</u>) Properties[<u>E</u>) ✓ Allow Docking Hide Float In Main Window	
Down(Program)[₩] Properties(E) ✓ Allow Docking Hide Float In Main Window	X Delete(D)
Down(Program)[₩] Properties(E) ✓ Allow Docking Hide Float In Main Window	U. (D)(U)
Properties(<u>E)</u> ✓ Allow Docking Hide Float In Main Window	Up(Program)(U)
 Allow Docking Hide Float In Main Window 	Down(Program)(<u>W/</u>)
 Allow Docking Hide Float In Main Window 	
Hide Float In Main Window	Properties(<u>E</u>)
Hide Float In Main Window	
Float In Main Window	Allow Docking
	Hide
By using this function, the user can edit Project easily.	Float In Main Window
By using this function, the user can edit Project easily.	
by using this function, the user can earl Project easily.	Pulusing this function, the user can edit Dreject easily

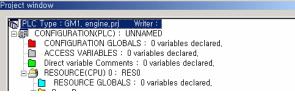




4.3.2 How to modify the Project contents

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].

×

· · · · · · · · · · · · · · · · · · ·	
Project file name: engine.prj	ок
PLC(Configuration) name: UNNAMED	Cancel Help
PLC Type	
CGM <u>R</u> © GM <u>1</u> CGM <u>2</u> CGM <u>3</u> CGM <u>4</u>	Ł
CGM4 <u>B</u> CGM4 <u>C</u> CGM <u>6</u> CGM <u>7</u>	
Writer :	
Comments	

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

Point

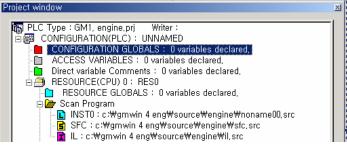
If PLC type is changed, it is required to select again library file except standard library and load it. (For details, refer to Chapter 4.5 how to edit Library.)



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].

u	ubai vanabie	3						
-	Name	Var. Kind	Allocat	Used	Data Type	Initial	Commen	Close
								Add(<u>A</u>)
								Delete(<u>D</u>)
								Edit(<u>E</u>)
								Help
ĺ								

1) How to add configuration global variable

/ariable name :		_	OK
Variable Kind :	VAR_GLOBAL	•	Cancel
Data Type © Elementary : © FB Instance : © Array (0.,	BOOL CTD) OF BOOL	v v	Help Memory Allocation C Auto C Assign(AT) : %
- Initial Value			Init. Array

- 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.

D	n	Ir	۱t	
	U		IL	

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.

Υl

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



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

Name	Access Path	Direction	Close
ACCESS_SW1	RES0.A	READ_ONLY	
ACCESS_VALUE	RES0.ADD	READ_ONLY	
			Add(<u>A</u>)
			Delete(D)
			Edit(E)
			Help
•		I	Пер
Description —			
	: ACCESS_VALUE		
Access Path : Direction : REA			

Shapter 4. How to make Project/ Program

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- 1) How to add Access Variable
 - Click [Add]

	ок
Access PathC	ancel
Browse	Help

- 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 ==> %10.0.0

Press [Browse] to select access path.

elect Access Path			×
Global Variable RESO.BYTE_MAX	Position <resource global=""></resource>	Data Type (OK Cancel

- 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.

Project window
🚯 PLC Type : GM1, time_to_string.prj Writer :
🗄 🗃 CONFIGURATION(PLC) : UNNAMED
CONFIGURATION GLOBALS : 0 variables declared,
ACCESS VARIABLES : 0 variables declared,
📄 Direct variable Comments : 0 variables declared,
BESOURCE(CPU) 0 : RESO
🗄 🛅 RESOURCE GLOBALS : 1 variables declared,
🗄 🗁 Scan Program
- I PP : c:₩gmwin source폴더₩gm7프로그램최대98₩byte_to_sint2,src
Select popup menu [Add]-[Resource].

Resource(CPU) Name	×
Enter new resource(CPU) name :	ОК
	Cancel
,	Help

- 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.

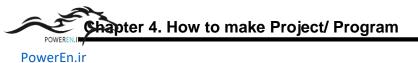
There are two types of program; Scan program and Task program. In case that several scan programs exist, it is executed according to the defined order and the task program is executed according to the task condition.

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.

R PLC Type : GM1, engine,prj Writer :
CONFIGURATION(PLC) : UNNAMED
CONFIGURATION GLOBALS : 0 variables declared,
ACCESS VARIABLES : 2 variables declared,
Direct variable Comments : 0 variables declared,
ESOURCE(CPU) 0 : RESO
RESOURCE GLOBALS : 2 variables declared,
Scan Program
🔤 🛯 🗠 🗈 INSTO : c:\#gmwin 4 eng\source\#engine\#noname00,src



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

Instance(Program) Name :	
Execution control	
Scan Program	
C Task Brow	se

- 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

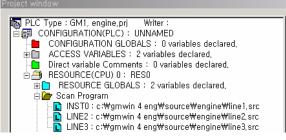
- Select the program to delete.
- Press popup menu [Delete] or press [Del] key.

3) How to modify Program

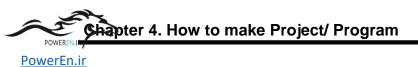
- Select program from the list of project window.
- Double click the program to modify or select popup menu [Properties].
- Input as the same method as that of adding program and then click [OK].

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.



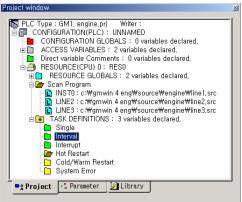
Select popup menu [Project]-[Up(Program)] or [Project]-[Down(Program)].



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]

Interval Task D	etine	×
Task name :	PERIODIC	ОК
Task number	: 0	Cancel
┌ Condition —		Help
Single :		Priority :
		2 💌
Interval :	T#5S	
Interrupt :		

- 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.

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(2) In case of Interval

The constant value showing the proceeding time	T#10S, T#1H10M10S10MS etc.
(3) In case of Interrupt	

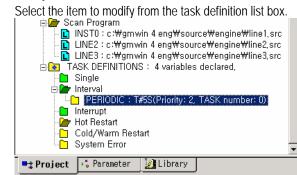
Interrupt no. (available up to GM1~3:0~15, GM4~7: 0~7)	0, 1, 2 15
(GM6/7 : Direct variable %I)	%IX0.0.0

- 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



- 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.

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4.4 How to set Parameter

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

PARAMETERS BASIC PARAMETERS I/O PARAMETERS LINK PARAMETERS
Project • Parameter

4.4.1 How to edit Basic parameter

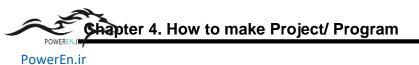
It sets the basic parameter.

• 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,

	X
Configuration(PLC) name: UNNAME	D
PLC version: v1.0 🔽 Remote /	Access Right
Hot Restart	Restart mode C Cold Restart Warm Restart
Resource(CPU) property Name Type Resource 0 RESO A V	Scan W.D timer 200 ms
OK Cant	el Help

- 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,

LC version:	PLC) name:	UNNAMED	Right
LC Version.	VI.0	ie nemote Access	rugin
🥅 Hot Resta	rt		
hr	min	sec	
Restart mode	,	Milti CPU running mo	de
C Cold Rest	tart	Scan Synchronou	IS
 Warm Re 	start	C Scan Asynchrono	us
Resource(CP	U) properties		
	Name	WatchDog timer du	ration
Resource 0	RESO	200 ms	
Resource 1		ms	
Resource 2		ms	
	í	ms	

- 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,

Configuration(PLC) name:	UNNAMED
PLC version: v1.0	🔽 Remote Access Right
	Communication
🔲 Can't Pause by Key	Station number: 0
	Baud rate: 19200 💌
Restart mode	C Master © Slave
C Cold Restart	Time out: 50 *10ms
 Warm Restart 	Read Status of Slave PLC
Resource(CPU) property	
Name Resource 0 RES0	Scan W.D timer 200 ms
OF	Cancel Help

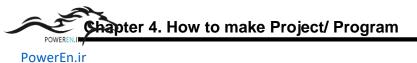
- For GM6, 7, it is available to select "Can't pause by key". If selected, it maintains the run mode despite of placing the key switch on PAUSE mode of CPU.
- For GM6, there is communication setting mode. In case of using the built-in communication of CPU, it is required to set station number, communication 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,

Basic Parameter	×
Configuration(PLC) name: PLC v1.0	UNNAMED
Can't Pause by Key	Software on/off delay time:
Restart mode C Cold Restart C Warm Restart	Puise catch input (%I0.0.x):
Resource(CPU) property Name Resource 0: RES0	Scan W.D timer
OK	Cancel Help

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,

Help

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.

Base OSlot 0/O Parameter	×
Select type	Point
DEF_MODULE	• •
0K Cancel	Help

- ◆ 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.

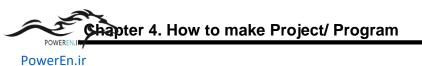
DEF_EMPTY.
Point
To read the currently installed I/O and write it to the I/O parameter, refer to Chapter 8 How to monitor,
I/O synchronization.

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.)

0	Reset All	Close
ase selection		
🔿 Local A	C Redundancy	C Convert
O configuration		
Slot 0	AC 110V Input 16poi	nt
Slot 1	DEF_MODULE	
Slot 2	DEF_MODULE	
Slot 3	DEF_MODULE	
Slot 4	DEF_MODULE	
	DEF_MODULE	
Slot 5		
Slot 5 Slot 6	DEF_MODULE	





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

0	 Reset Al 		Close
10			Help
O configuration			
Slot 0	CPU 0	DEF_MODULE	
Slot 1	CPU 0	DEF_MODULE	
Slot 2	CPU 0	DEF_MODULE	
Slot 3	CPU 0	DEF_MODULE	
Slot 4	CPU 0	DEF_MODULE	
Slot 5	CPU 0	DEF_MODULE	
Slot 6	CPU 0	DEF_MODULE	
Slot 7	CPU 0	DEF_MODULE	
			Reset

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].

Base 0Slot 0/0 Parameter X Select CPU © CPU 0 C CPU 1 C CPU 2 C CPU 3 C All	Base OSlot Q/O Parameter
Select type Point DEF_EMPTY	
OK Cancel Help	OK Cancel Help
GM1	GM2 ~ GM6

P	oir	It		

GM1 CPU have a item to select the CPU.

Reference
Reletence

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	
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.

Hig	gh Speed Link Parameter	_	×
	High Speed Link 1	Close	
	High Speed Link 2	Help	
	High Speed Link 3		
	High Speed Link 4		

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.

n Speed I	LINKI				
ink set-					
Networ	rk type:	GLOFA Fnet			
Slot:	0	Self station No.:	0		
					Edit
Entry list-					
No.	Туре	Send/Receive	Read Area	Store Area	Size
0 Lo 1 2 3 4 5 6 7 8 9 10	cal0.Send0	D(200ms)	%MVV0		1 -
		Delet	ie (Copy	Edit

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.

Network type]
GLOFA Fnet	ОК
C GLOFA Mnet	Cancel
C GLOFA Enet	Help
C GLOFA Fdnet Network	
C GLOFA Fdnet Cable	
C GLOFA Dnet	
C GLOFA Pnet	
C GLOFA FEnet	
C GLOFA FDEnet	
C GLOFA Rnet	
Slot No.: 0 💌 Self-sta No.: 0	

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.

C Receive Send period Area			0		nd	O	
From: ©%MW C%W C%QW 0 D(200ms) - Size(Word)	C Remote			C Red	eive:		
	Area					Se	and period
	From:		0 %IW 0	%QW	0		(200ms) 💌
	To:	C %MVV	C %IW C	%QVV		- Sit	ze(Word)

- ◆ 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].

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- 4) How to copy Entry list
 - (1) Copy between links

elect	the desire	d list to copy	' by a mo	ouse or ke	eyboard
gh Speec	I Link1				
Link set					
Netw	ork type:	GLOFA Fnet			
Slot:	0	Self station No.:	0		
Base	: 0				Edit
Entry list					
No.	Туре	Send/Receive	Read Area	Store Area	Size
	ocal0.Send0 ocal1.Receive0	D(200ms) D(200ms)	%MVV0	%QVV0.0.0	1 🔺
3 L 4 L	ocal0.Send0 ocal2.Receive0	D(200ms) D(200ms)	%MVV0	%QVV0.0.0	1
5 6 7					
8 9					
10					-
		Delet	e	Copy	Edit
				Close	Help

Click [Copy].

Copy Link Parameter		X
Destination	Target	
Between Links	C Link 1	C Link 2
	C Link 3	C Link 4
C Bewteen Entries	Number:	
ОК	Cancel	Help

- 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

Ĥ

- 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

Ð

◆ 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].

Destination	Target	
C Between Links	🕲 Link 1	C Link 2
	C Link 3	C Link 4
Bewteen Entries	Number:	3
ок	Cancel	Help

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.

ommunication me	thod		
Station No.:	0 💌		
Baud rate:	1200 💌	Data bit:	8 💌
Parity bit:	None 💌	Stop bit:	1 💌
Communication	channel		
RS232C Null	Modem or RS422/-	485	
C RS232C Mod	em (Dedicated Lin	e) Initial comma	and:
C RS232C Dial	-up Modem		
rotocol and mode-	Timeout	in master mode:	0 ms
	Inneodi	in master mode.]
Dedicated			
🔿 Master		lead Status of Slave I	PLC List
Slave			
Modbus			
C Slave		Transmission mod	ie: ASCII
User defined			
C Master			1.1-1
C Slave			List
FIELDBUS			
🔿 Master			List
C Slave			



◆ 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	If setting as master, it shall be the subject of communication system and it is available
/ Slave	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.

- Protocol and mode		
	Timeout in master mode: 5	00 ms
Dedicated		
Master	Read Status of Slave PLC	List
○ Slave		

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

Dedicated					
Entry list					
No.	Туре		Read Are	a Store Are	a Size
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19					1
		Delet	9	Copy	Edit
				Close	Help

- 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.

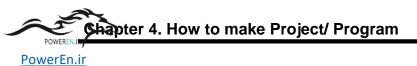
 Dedicated 1
 IOem
 Edit
 IOem
 IO

		Send
Size(Word):	1	C Receive
Area		
From area: 💿 %MW	C %IW C	%QVV 0
To area: C %MVV	۰	%QW
ок	Cancel	Help

- 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.

Protocol and mode		
Trotocol and mode	Timeout in master mode:	ms
Dedicated		
C Master	🔲 Read Status of Slave PLC	List
C Slave		
Modbus		
Master	Transmission mode:	ASCII
C Slave		

• Select the transmission mode of Modbus.

Point	
	bus communication uses function block (MOD0102,MOD0203,MOD0506,MOD1516). Ietails, refer to GM7 instructions '8.3 Modbus Protocol Communication'.

x

3) User defined communication

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

Modbus C Master C Slave	Transmission mode:	ASCII
User defined		
 Master 		List
C Slave		

Click [List] and User Defined dialog box appears.

0 Not defined 1 Not defined	Frame information
2 Not defined 3 Not defined	Tx/Rx: Not defined Header:
4 Not defined 5 Not defined 6 Not defined	861: 862:
7 Not defined 8 Not defined	863: 864:
9 Not defined 10 Not defined 11 Not defined	804. 805:
12 Not defined 13 Not defined	SG6: SG7:
14 Not defined 15 Not defined	SG8:
	Tailer: BCC:

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

Frame 0	×
Header:	Tx/Rx: Send
Segment 1	- Segment 5
Type: NONE	Type: NONE
C Hexinput C ASCII Input Size: Byte	C Hexinput C ASCII Input Size: Byte
Segment 2	Segment 6
Type: NONE	Type: NONE
Hexinput O ASCII input Size: Byte	C Hexinput C ASCII Input Size: Byte
Segment 3	Segment 7
Type: NONE	Type: NONE
C Hexinput C ASCII input Size: Byte	C Hexinput C ASCII Input Size: Byte
Segment 4	Segment 8
Type: NONE	Type: NONE
C Hexinput C ASCII Input Size: Byte	Hex Input O ASCII Input Size: Byte
Tailer: BCC Setting	OK Cancel

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

Frame U	2
Header: [ENQ]	Tx/Rx: Send
Segment 1	Segment 5
Type: CONST 07wSS0106	Type: NONE
C Hex Input C ASCII Input Size: Byte	C Hex Input C ASCII Input Size: Byte
Segment 2	Segment 6
Type: CONST %MW/200	Type: NONE
C Hex Input ASCII Input Size: Byte	Hex Input O ASCII Input Size: Byte
Segment 3	Segment 7
Type: ARRAY V %MB200	Type: NONE
Send by ASCII Converting Size: 2 Byte	Hex Input C ASCII Input Size: Byte
Segment 4	Segment 8
Type: NONE 💌	Type: NONE
C Hexinput C ASCII Input Size: Byte	Hex Input C ASCII Input Size: Byte
Tailer: [EOT][BCC] BCC Setting	OK Cancel

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.

ie	dundancy Parameter		×
	Set Input Circuit	Close	
	Set Output Circuit	Help	
	Set Fault Mask		

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.

-	Redundancy	Transfer	Time Monitor
0			É
2			
4 5 6			
67			
lo.			
		Delete	Copy Edit

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.

Set input circuit	<u>^</u>
Redundancy base input position	ОК
%IVV 0 0 0	Cancel
	Help
Transfer base input position	Set timer monitor:
%IVV 0 0 0	200 msec

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].

Copy Entry	×
Position	ок
From 0 To 0	Cancel
	Help

• 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].

Set Input Circuit	2
Redundancy base input position	ок
%IW 0 0	Cancel
	Help
Transfer base input position %IVV 0 0 0	Set timer monitor:

2) How to set output circuit

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

Output	Feedback	Feedback	Master Control		Master Control M	onitor
				More	Сору	Edit

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.

Set Output Circuit	
Output word position: %	QW 0 0
Feedback input word position: %	SIVV O O O
Feedback time:	50 msec
Master control	Master control monitor
Master Control	🗖 Master Control Monitor
A:%QX 0 0	A:%IX 0 0
B:%QX 0 0	B:%IX 0 0
ОК	Cancel Help

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].

Copy Entry	×
Position	ОК
From 0 To 0	Cancel
	Help

◆ 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].

Output word position: % Feedback input word position: %	QW 0 0 0
Feedback time:	50 msec
	1
Master control	Master control monitor
🥅 Master Control	🔲 Master Control Monitor
A:%QX 0 0	A:%IX 0 0 0
B:%QX 0 0	B:%IX 0 0
ок	Cancel Help

3) How to set failure mask

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

Set fault	mask		
No.	Error N	Wask	
0 1 2 3 4 5 6			
	Delete	Copy	Edit
		Close	Help



- PowerEn.ir
- 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.

Fault Mask Set	X
Error mask	ок
%IQ 0 0	Cancel

- 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].

Copy Entry	x
Position	ОК
From 0 To 0	Cancel
	Help

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].
Fault Mask Set

	-
Error mask	ок
%IQ 0	Cancel



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

Project window	2
Library Function MSTDLIB Function Block How Standard Function Block How COMMUNI How SPECIAL	
Project 🧃 Parameter 🗾 Library]

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	stdlib.*fu,
-	(Available to use promptly by calling from the program)	stdlib.*fb
Dedicated library	The gathering file of function block used for special	special.*fb,
	communication module (A/D, D/A, Link etc.)	communi.*fb
Extension library	Library file provided by the manufacturer for the convenience	APP.*fu
, ,	of the user using the existing product.	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

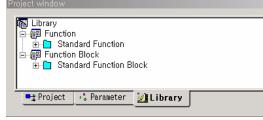
1) How to load standard library

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.

🔝 Library	•
	-
Standard Function	
ADD ADD	
NOT	
MUL	
MOVE	
STOP	
ESTOP	
WDT_RST	
WORD_TO_STRING	
ACOS	
ADD_TIME	
ASIN	
ATAN	
	-
■\$ Project → Parameter 1/1 Library	

Point
View library properties.
To see properties, select function/function block of relevant library and then select popup menu [Properties].
Property of F/FB
Information of F/FB
Comment 더하기
ADD
I EN ENO- NOTYPE - OUT-
NOTYPE • OUT•
ок

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.

Open		-			<u>, , , , , , , , , , , , , , , , , , , </u>			,	?	×
Look jn: 🔂	Lib			_	•	£	<u></u>	e *		
APP.4fb APP.4fu COMMUN mkstdlib.41 REMOTE:	iu 3.4fb			D						
File <u>n</u> ame:	Stdlib.4	fb			_				<u>O</u> pen	
Files of <u>type</u> :	Library	File(*.4f*)					•		Cancel	

• 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.

Ibrary Image: Properties of the second standard function Image: Properties of the second standard function Block Image: Properties of the second standard functing standard functing standard standard sta	
Project - Parameter	

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.

Library E-term Eunction term Standard Function term Standard Function term Function Block term Standard Function Block			
 ☐ ☐ Function ☐ ☐ Standard Function ☐ ☐ Function Block ⊕ ☐ Standard Function Block 			
⊕- Standard Function □- Function Block ⊕- Standard Function Block			
E-∰ Function Block ⊕-⊡ Standard Function Block			
🗄 🛅 Standard Function Block			
i COSMO_2			
🗄 🖻 SPECIAL			
E REMOTE4			
🔩 Project 🛛 📲 Parameter 🛛 🗾 Library 🛛			

Press Del key or select popup menu [Delete].

Designed		Late of the same that a	
Do you want	to delete the se	eleted library item	In the project?
	예(Y)	아니오(<u>N</u>)	

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

Library - P Function - Standard Function - Standard Function Block - Standard Function Block - COSMO_2 - COMMUNI - SPECIAL
Parameter 🗾 Library



×



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. BNO
 But, in GM1, the execution file is generated as much as the number of the defined resource.
 (a) File of the defined resource.
 (b) File of the defined resource.
 (c) File of the def

(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.

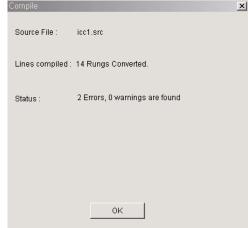
Select menu [Compile]-[Compile, 2].

	<u>Compile</u> <u>Online</u> <u>Debug</u> <u>T</u> ools	<u>W</u> indow <u>H</u> elp
]☆ & Q. ☆ & P. % @	🔮 <u>C</u> ompile	🖻 🖻 🗙 👫
	Build All	

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

	Complie	X
	Source File :	icc1.src
	Lines compiled :	418 Lines compiled.
Confirm Compile	Status :	Compiled Successfully.
Would you like to compile?		
If you compile the program, online editting will be possible after changing mode to stop and writing		
🗖 Do not show this dialog box next time		
Yes No		ОК

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



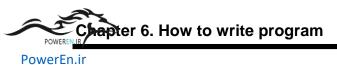
• Click **[OK]** of Compile dialogue box.

SW1	EN ENO
DATA	2 Output Window 조 Compile c;#gmwin source플더#dr전공#iccl.src . Line = 121 Column = 2 Input of F/FB is not assigned ! Line = 125 Column = 2 Input of F/FB is not assigned !
 	INI OUT_ OUT2
DATA	

- 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,

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help

 Project Program Edit View Compile Online Debug Tools Window Help
- Click **[OK]** from execution file make dialogue box.

	Make All
	Output File : line2.BN0
	Lines compiled :
Confirm Make	Status : Make completed
Would you like to make? If you make the program, online editting will be possible after changing mode to stop and writing program to PLC. Do not show this dialog box next time	Link success Program : 14622 Bytes(11%, Max.128KB) Data : 6180 Bytes(11%, Max.52KB) Upload file : 3080 Bytes(2%, Max.128KB) The size of program + upload file sholud be less than
Yes No	OK

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

(Execution program + upload program) size

Point	Point					
 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. 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. 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 <	In case of flash memory installed, saved in flash memory				

after verified by user.

hapter 6. How to write program

PowerEn.ir

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

Source File :
Lines compiled :
Status : < Linking >
Error occured when link.
ОК

• Click **[OK]** from make dialogue box.

Output Window	X
Linking Program c:#gmwin 4 eng#source#line2#Output#line2.op4 : Variable ADD is not declared or type mismatched in Gobal Variables! Program c:#gmwin 4 eng#source#line2#Output#line2.op4 : Variable ADD is not declared or type mismatched in Gobal Variables!	
∢ ∢ ▶ ▶ Fror/#arnning Cross Reference∖ 1/0 \ Double Coil \ Find \ Communcition /	

• 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].	
Roject P <u>r</u> ogram <u>E</u> dit <u>V</u> iew <u>Compile</u> <u>O</u> nline <u>D</u>	ebug <u>T</u> ools <u>W</u> indow <u>H</u> elp
🄆 🔓 🔁 🄆 🔐 📴 🎇 🚭 🕸 Compile 🛗 <u>M</u> ake	🖻 💼 🗙 🏘
	Build All
	Output File : line2.BN0
	Lines compiled :
Confirm Compile All	Status : Make completed
Would you like to build all? If you build all, online editting will be possible after changing mode to stop and writing program to PLC.	Link success Program : 14622 Bytes(11%, Max.128KB) Data : 6180 Bytes(11%, Max.52KB) Upload file : 3080 Bytes(2%, Max.128KB) The size of program + upload file sholud be less than
🗖 Do not show this dialog box next time	
Yes No	ок
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 If executing only program compile, execution file is not generated. That is, it is not available to write program in PLC. 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].

POWERENLIR POWERENLIR PowerEn.ir

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].

[Project Program Edit View Compile		
🔆 🔓 😓 🔅 🖨 📴 🐹 🎯 🔳 🔳		10 -+11
22202	Connect	

×

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

Module Change Error		
More Error/Warning Information – Base 0,Slot 2		
	Close	Help
		rielp

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.

Select Hedundan	t CPU	×
Redundant Cl	PU	
CPU-A		
C CPU-B		
	ок	Cancel



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.

Broject Program Edit View Compile Online Del	bug <u>T</u> ools <u>W</u> indow <u>H</u> elp
🛛 🔆 🔄 🔁 🔄 📸 🖓 🖓 📕 🔳 🏧	t+Write+Run+Monitor On Ctrl+R
📲 🖶 🖿 🖀 🔛 🖉 🔛 🖉 🚱 🖉	
<u>B</u> ead	
📴 PLC Type : GM4B, line2.prj 🛛 Writer : 🗒 🔐 Write	
- { 白 📾 CONFIGURATION(PLC): UNNAMED 🛄 Monitor	On/Off to>
ACCESS VARIABLES : 0 variables PLC M	ode 🔸 🛌

Select the area to write from the write dialog box.

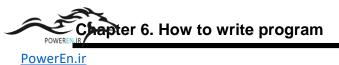
_ Are	ea	
	C Basic Parameter	
	🔿 I/O Parameter	
HS Link Parameter		
 Redundancy Parameter 		
C Communication Parameter		
	 Program Upload Program 	
	 Parameter and Program Upload Program 	
	C Upload Program	
	OK Cancel Help	

- 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. Image: Switch to stop mode? Image: Switch to stop mode to REMOTE STOP, write program again. Image: Switch to stop mode to REMOTE STOP, write program again. Image: Switch to stop mode to REMOTE STOP, write program again. Image: Switch to stop mode to REMOTE STOP, write program again. Image: Switch to stop mode to REMOTE STOP. Image: Switch to stop mode to REMOTE STOP. Image: Switch to

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].

Selection of Resource	×
Selection of All Resource	
,	
User Select	
Resource 2 Resource 3	
OK Cancel Help]



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 men	nory]-[Read Type]
	Flash Memory	×

– Type of Flash Memory	
512K Flash Memory	
	ОК

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.

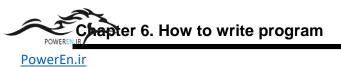
Select menu [Online]-[Flash Memory]-[Write Program].		
Write to the Flash Memory	×	

- OWY CAU	eral flash momory—
O Proj	gram
O Upl	oad Program
Pro	gram and Upload Program
C Writ	e to external flash memory (GM7)

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. GMWIN Image: PLC is ROM driving mode. If you restart or reset the PLC, execution program in PLC is changed to a program in flash memory. Write execution program to flash memory? Yes No ◆ 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].

Rea	ding	>
	Percentage of Frames Sent (%):	
	46%	
	Cancel	

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

umwin				X	J
File line2.prj alrea Do you want to up					
Yes	<u>A</u> ll	<u>N</u> ew name	No	<u>C</u> ancel	

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

File C:\GMWIN 4 Do you want to u	ENG\Source\line2\li pload this file?	ine2.src already exis	sts.	×
Yes	<u>A</u> ll	<u>N</u> ew name	<u>N</u> o	<u>C</u> ancel

- In this case, click [ALL] to monitor and modify correct in the run.
- [Yes]: Override the same name's project or program.
- [AII]: 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.

Save as	<u>×</u>
Project File Name:	ок
LINE3	Cancel
Location:	
C:\GMWIN 4 ENG\Source\LINE3	
Browse	

- [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.

?	You can monitor and Make project?	online-edit after makin	g project,
	<u>Y</u> es	No	



POWERENLIE	pter 6. How	to write	program
PowerEn.ir			

	Build All	×		
	Output File :	line2.BN0		
	Lines compiled :			
	Status :	Make completed		
	Data : 618 Upload file : 308	22 Bytes(11%, Max.128KB) 0 Bytes(11%, Max.52KB) 0 Bytes(2%, Max.128KB) ram + upload file sholud be less than		
		ок		
Po	int			
	 [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 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. 			
		m Monitor/Debug Option Auto Save Set Folder Co		
		Standard library	Search	
		c.\gmwin 4\source	Search	

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



6.5.2 How to write parameter

Writes parameters to PLC on run.

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

rr meter arameter am		
meter 'arameter		
'arameter		
am		
C Parameter and Program		

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

If selecting GMWIN	ng I/O Paramete	er, the following message
?	To write to PLC, Switch to stop m	PLC must be a stop mode, node?
	Yes	No

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

Point

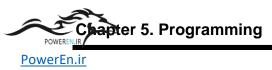
- As writing parameter in **[Online Edit]**, PLC's parameter is not changed.
- In this case, be sure to write parameter using menu [Online]-[Write]
- Parameter can be edited regardless to using menu [Online Edit] and use menu [Online]-[Write].

6.5.3 How to read parameter

- Uploads the parameter information saved in PLC RAM.
- Select menu [Online]-[Read].

🖲 Basi	c Parameter	
○ I/O P	arameter	
O HS L	ink Parameter	
C Redundancy Parameter		
C Com	munication Parameter	

- 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.

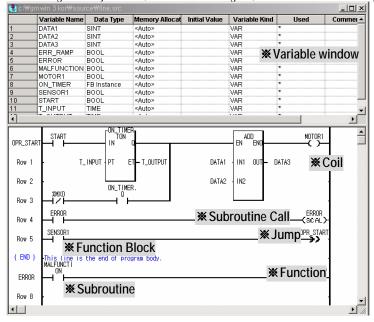


Chapter 5. Programming

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. × LD Z []] + + + + + √ √ () () () () () () () (SC) Function Block Horizantal Return Subroutine Mode Link Call Vertical Contact Coil Function Jump Block Link

5-1



The shape and function of each factor is as follows.

Symbol	Short-cut key	Description
4 F	F2	Normally open contact
474	F3	Normally closed contact
	F4	Horizantal link
	F5	Vertical link
$\left(\right)$	F6	Coil
$\langle \rangle$	F7	Negated coil
{F}	F8	Function
{FB}	F9	Function Block
Hef	Shift+F1	Positive transition-sensing contact
-141-	Shift+F2	Negative transition-sensing contact
\$	Shift+F3	Set (latch) coil
(R)	Shift+F4	Reset (unlatch) coil
(P)	Shift+F5	Positive transition-sensing coil
\otimes	Shift+F6	Negative transition-sensing coil
(RET)	Shift+F7	LD program exit and subroutine exit command
\gg	Shift+F8	Jump command indicating LD program branch (to lable position)
<sc⊳< td=""><td>Shift+F9</td><td>Command to call subroutine</td></sc⊳<>	Shift+F9	Command to call subroutine

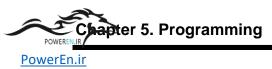
After selecting ay factor of toolbox, the mouse is changed with the same shape as the factor.

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:

To Arrow mode Block mask general input mode Add project	Ctrl+A
⊻ Undo (Coil Insert)	Ctrl+Z
— —	
\cong Redo (\underline{Y})	Ctrl+Y
K Cut(<u>T</u>)	Ctrl+X
□ Copy(<u>C</u>)	Ctrl+C
💼 Paste(P)	Ctrl+V
× Delete(D)	Del
· () 0.000 (<u>0</u>)	
// Find(<u>F</u>)	Ctrl+F
⁸ Replace(<u>R</u>)	Ctrl+H
Hex Replace Direct Variables	s(<u>D</u>)
🔏 Find Next(<u>S</u>)	Ctrl+F3
¹⁰ Go To(<u>G</u>)	
Find to cursor	
🙀 Find in Files(<u>A</u>)	
Delete Line(<u>E</u>)	Ctrl+D
Insert Line(<u>L</u>)	Ctrl+L
Insert Cell(<u>I</u>)	Ctrl+l
Toolbox(<u>O</u>)	•
∎_∎ Caculate M Area	

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].

	Browse in	Out variables		Bri	owse global vari:	ables	Close
Name	Var. Kind	Allocation	Used	Data Type	Initial value	Comments	
DATA1	VAR	<auto></auto>	*	SINT			
DATA2	VAR	<auto></auto>	*	SINT			
DATA3	VAR	<auto></auto>	*	SINT			Add(A)
ERR_RAMP	VAR	<auto></auto>	*	BOOL			Add(A)
ERROR	VAR	<auto></auto>	*	BOOL			
MALFUNCTION	VAR	<auto></auto>	*	BOOL			
MOTOR1	VAR	<auto></auto>	*	BOOL			Edit(E)
ON_TIMER	VAR	<auto></auto>	*	FB Instance			
SENSOR1	VAR	<auto></auto>	*	BOOL			
START	VAR	<auto></auto>	*	BOOL			
T_INPUT	VAR	<auto></auto>	*	TIME			
T_OUTPUT	VAR	<auto></auto>	*	TIME			
							Help

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

1) Add/Edit Variables

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

2
ОК
Cancel
Help
Memory Allocation
 Auto
C Assign(AT):
%
Init. Array

• 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:

ů ů	<u>% I W 2 . 3 . 1</u>
% means direct variable	____† † † † † †
Kind of direct variable(Q,I,M)	
Direct variable size	
Base number	I
Slot number	
In case of %#X#.#.0 0 means	; bit number
In case of %#B#.#.0 0 means	s byte number in the slot (fisrt byte, second byte)
In case of %#W#.#.0 0 mean	s word number in the slot (fisrt word, second word) ノ

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

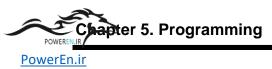
Ex.) %QX3.1.4 or %Q3.1.4 %IW2.4.2 %MD48 %MW10.3 : 4th bit of Slot 1 of Base 3
: 2nd Word of Slot 4 of Base 2
: Double word 48 of Internal Memory (It starts from 0.)
: 3rd bit of Word 10 of Internal Memory (no concept of base or slot in the internal memory)

◆ If there is initial value, input the initial 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. Row 6 Row 7 Row 7 Image: Row 7 Row 8 Image: Row 9 Row 10 1 Row 11 Image: Row 11

4) Global variable

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

•	Click	[Glo	bal]

S	elect Global Variable			x
	Global Variable	Position	Data Type	ок
	RES0.DATA1	<resource global=""></resource>	SINT	Cancel

- 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.

A C1 1 11						
After selecting	augog i	menu	IAdd	New	Varible	, add it.

The second population (The New Variate), and it.						
	Variable Name	Data Type	Memory	/ Allocat	Initial Value	Variable Kind
1	DATA1	SINT	<auto></auto>			VAR_EXTERNA
2	DATA2	SINT	<auto></auto>	Add	New Variable	
3	DATA3	SINT	<auto></auto>	AUU _	<u>iv</u> ew vanable	
4	ERR_RAMP	BOOL	≺Auto≻	<u>C</u> ut		2
5	ERROR	BOOL	≺Auto≻	Del		2
6	MALFUNCTION	BOOL	<auto></auto>	Dei		}
7	MOTOR1	BOOL	<auto></auto>			VAR

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.

🔨 To Arrow mode	Ctrl+A
Block mask	
A spot input mode	
Add project	
🗠 Undo	Ctrl+Z
<u> Redo(Y</u>)	Ctrl+Y

Ladder option
🔽 Display Ladder In 3D
✓ Input Contact/Coil with Variable

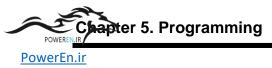
Point

- 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.

Ů

- 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).



ne:	SWITCH1		D	rectivariable <u>Go</u>	mment		OK
riables List							Cancel
Name	Var. Kind	Allocation	Used	Data Type	Initial value	Comments	Elag
							Global
							Direct Variabl
							Add
							Delete
							Edt.
							Help
							Help

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

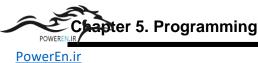
The variable add/edit dialogue box that defines the variable properties appears.

Add/Edit Variables Variable SWITCH1	ок
Variable Kind VAR	Cancel
Data Type C Elementary: BOOL C FB Instance: OTD	Memory Allocation Auto C Assign(AT) :
C Array (0) OF BOOL	%
Comments	Init. Array

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

🖁 c:\#gm.win 3 kor\#source\#input_test, src +								
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind			
1	SWITCH1	BOOL	<auto></auto>		VAR			
•						\mathbf{F}		
Row 0 Row 1 Row 2 Row 3	SWITCH1							

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



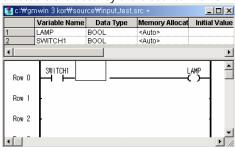
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind
	LAMP	BOOL	<auto></auto>		VAR
2	SWITCH1	BOOL	<auto></auto>		VAR
•					
Row O Row 1	SWITCH1				LAMP ()
Row 2	ŀ				

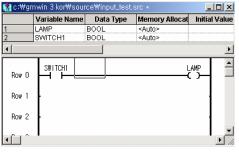
2) Line

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

- Û
 - 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.

POWEREN.IR	apter 5. Programming
PowerEn.ir	

Select Function		×
Time/Date Function All System F	Set input number	ок
ADD	Max number: 8	Cancel
ABS ADD	Required number:	Help
ADD_TIME AND ARY_MOVE	2	
BCD_TO_DINT		
Function information		
Comment: Add value		
	<u>*</u>	
	<u>_</u>	

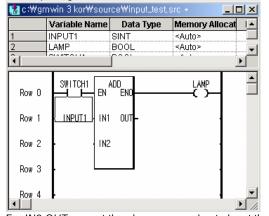
After selecting function and the number of input from function selection window, click [OK].

LAMP	BOOL			
	TOAC	<auto></auto>		VAR
SWITCH1	BOOL	<auto></auto>		VAR
				▶
	ADD ENO			
- IN1	і оцт-			
- · IN2	2			
} └─				
ŀ				L_
			IN1 OUT-	

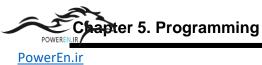
- Select from toolbox or popup menu [**To Arrow mode**]. After moving the mouse to the position of function variable IN1 input column, double click.

🎇 c∶₩gn	nwin 3 kor₩sou	rce₩input_test,	src *	- 🗆 ×
	Variable Name	Data Type	Memory Allo	cat Init
1	LAMP	BOOL	≺Auto≻	
2	SWITCH1	BOOL	<auto></auto>	
•				Þ
Row 0		ADD ENO		^
Row 1		оит-		
Row 2	• • • • • • • • • • • • • • • • • • •	2	·	
Row 3				
Row 4	ŀ			۲ //

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.



🕌 c :₩gm	win 3 kor₩sou	ırce₩input_test,	.src *	
۱	Variable Name	Data Type	Memory Allocat	Initial Value
1	NPUT	SINT	<auto></auto>	
	NPUT1	SINT	<auto></auto>	
	_AMP	BOOL	<auto></auto>	
	DUT1	SINT	<auto></auto>	
5 8	SWITCH1	BOOL	<auto></auto>	
4				Þ
Row 0 Row 1		ADD ENO	(AMP
Row 2	- INPUT IN			
Row 3				
Row 4	ŀ			

4) Function block

Ĥ

- Select FB 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.

Select Function Block		
Standard FB All	FB instance	ОK
TON	Instance name:	Cancel
RS RTC_SET SEMA	Instance yype:	Help
SR TOF		
TON TP	Search	
FB information		
Comment: ON delay timer		
TON BOOL • IN Q TIME • PT ET	BOOL • TIME	
1	_	

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

v	/ariable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used
1 11	INPUT SINT		<auto></auto>		VAR	
1	NPUT1	SINT	<auto></auto>		VAR	
3 11	NST0	FB Instance	<auto></auto>		VAR	
L	AMP	BOOL	<auto></auto>		VAR	
0	OUT1	SINT	<auto></auto>		VAR	
S	WITCH1	BOOL	<auto></auto>		VAR	
					1	
Row 1 Row 2 Row 3 Row 4 Row 5	INPUTI IN1					



- \triangleleft
- 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.

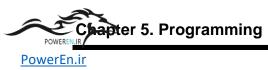
me: p	PRE_VALUE		Dir	ect Variable <u>C</u> or	nment		0K
ariables List-							 Cancel
Name	Var. Kind	Allocation	Used	Data Type	Initial value	Comments	Elag
INPUT	VAR	<auto></auto>		SINT			
INPUT1	VAR	<auto></auto>		SINT			Global
INSTO	VAR	<auto></auto>		FB Instance			
LAMP	VAR	≺Auto≻		BOOL			Direct Variable
OUT1	VAR	≺Auto≻		SINT			
SWITCH1	VAR	≺Auto≻		BOOL			Add
INST0.Q	VAR	≺Auto≻		BOOL			
INST0.ET	VAR	<auto></auto>		TIME			Delete
							Edit
							Help

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

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	
1	INPUT	SINT	<auto></auto>		VAR		
2	INPUT1	SINT	<auto></auto>		VAR		
3	INSTO	FB Instance	<auto></auto>		VAR		
4	LAMP	BOOL	<auto></auto>		VAR		
5	OUT1	SINT	<auto></auto>		VAR		_
6	PRE_VALUE	TIME	<auto></auto>		VAR		•
4						•	
	SWITCH1	ADD			LA	<i>•</i> 0	
Row O		ENO			(5	
					-	- -	
Row 1	INPUT1 IN1	OUT 0UT1					
Row 2	INPUT IN2	,					
HOW L							
D 0							
Row 3		NSTO -				1	
	SWITCH1	NSTO TON					
		0 -					
Row 4							
Row 4							
Row 4 Row 5	PRE VALUE PT	ET-					
		ET-					
		ET-					•

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

🚼 c :₩gr	nwin 3 kor₩sou	rce₩input_test					_ 🗆 🗙
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	Comr 🔺
1	CURRENT_VA	TIME	<auto></auto>		VAR		
2	INPUT	SINT	<auto></auto>		VAR		
3	INPUT1	SINT	<auto></auto>		VAR		
4	INSTO	FB Instance	<auto></auto>		VAR		
5	LAMP	BOOL	<auto></auto>		VAR		
i	OUT1	SINT	<auto></auto>		VAR		
'	PRE_VALUE	TIME	<auto></auto>		VAR		
1	SWITCH1	BOOL	<auto></auto>		VAR		
) ∢[T OUTPUT	BOOL	<auto></auto>		VAR		· · ·
Row 0 Row 1 Row 2 Row 3 Row 4	INPUTI IN1		UT			(``)	
Row 5 Row 6	PRE_VALUE PT		Υ 				



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.

INPUT SINT Auto> VAR INPUT SINT Auto> VAR INSTO FB instance Auto> VAR UNSTO FB instance Auto> VAR UNPUT SINT Auto> VAR UNPUT BOOL Auto> VAR OUT1 SINT<+ Auto> VAR OUT1 SINT<+ Auto> VAR OUT1 SINT<+ Auto> VAR SWITCH1 BOOL +Auto> VAR T_OUTPUT BOOL +Auto> VAR SWITCH1 BOOL +Auto> VAR T_OUTPUT BOOL +Auto> VAR Row 0 SWITCH1 END LAPP Row 1 INPUT1 INI OUT1 Row 3 SWITCH1 INO T_OUTPUT Row 5 FRE_VALUE PT ET AUE* INSTID_0 LAUE* LAPP	Variable Nam		Memory Allocat	Initial Value	Variable Kind	Used	Comments	
INPUT1 SINT Auto> VAR INSTO FB instance Auto> VAR UAMP BOOL Auto> VAR OUT1 SINT Auto> VAR PRE_VALUE TIME Auto> VAR SWITCH1 BOOL Auto> VAR SWITCH1 BOOL Auto> VAR Row 0 SWITCH1 EN OUT Auto> VAR Row 1 INPUT1 IN1 OUT Auto> VAR Row 2 INPUT1 IN1 OUT Auto> VAR Row 3 SWITCH1 IN1 OUT Auto> VAR Row 5 FRE_VALUE PT ET AUTO INPUT Row 6 INSTO LAUE INSTO INSTO INSTO			<auto></auto>		VAR			
INST0 FB Instance Auto> VAR LAMP Bool Auto> VAR OUT1 SINT Auto> VAR OUT1 SINT Auto> VAR SWTCH1 BOOL Auto> VAR SWTCH1 BOOL Auto> VAR T_OUTPUT BOOL Auto> VAR Row 0 SWTCH1 EN Auto> Row 1 INPUT1 IN1 OUT1 OUT1 Row 3 SWTCH1 IN1 OUT1 OUT1 Row 5 FRE_VALUE PT ET AUE INPUT INST0 URPUT INTO URPUT INPUT								
UAMP BOOL Auto> VAR OUT1 SINT Auto> VAR OUT PRE_VALUE TIME Auto> VAR OUT SWITCH1 BOOL Auto> VAR OUT Row 0 SWITCH1 ENO Auto> VAR Row 1 INPUTI IN1 OUT OUT1 Row 2 INPUTI IN2 IN2 INPUTI IN2 Row 3 SWITCH1 INTO T_OUTPUT OUT1 IN2 Row 4 SWITCH1 INTO T_OUTPUT IN2 INPUTI IN2 Row 5 PRE_VALUE PT ET OURENT_V INPUTI IN2 INSTD 0 INSTD 0 INSTD 0 INSTD 0 INPUTI INPUTI INPUTI INPUTI								
OUT1 SINT Auto> VAR PRE_VALUE TME Auto> VAR SWITCH1 BOOL Auto> VAR T_OUTPUT BOOL Auto> VAR Row 0 SWITCH1 END Auto> VAR Row 1 INPUT1 IN1 OUT1 OUT1 Row 3 SWITCH1 IN2 INPUT1 IN2 Row 4 SWITCH1 IN10 T_OUTPUT OUT1 Row 5 PRE_VALUE PT ET AUE								
PRE_VALUE TIME Auto> VAR SWITCH1 BOOL Auto> VAR T_OUTPUT BOOL Auto> VAR Row 0 SWITCH1 ENO Auto> VAR Row 1 INPUTI IN1 OUT OUT1 IN2 Row 2 INPUTI IN10 OUT OUT1 IN2 Row 3 SWITCH1 INTO T_OUTPUT IN2 INPUTI IN2 Row 5 PRE_VALUE PT ET AUE INPUTI INPUTI								
SWITCH1 BOOL *Auto> VAR T_OUTPUT BOOL *Auto> VAR								
T_OUTPUT BOOL «Auto» VAR Row 0 SWITCHI ENO LAMP Row 1 INPUTI IN1 OUT Row 2 INPUTI IN1 Row 3 SWITCHI INSTO Row 4 SWITCHI INTON FRE_VALUE PT CURPUT Row 5 PRE_VALUE PT ET AULE INSTO INSTO LAMP					VAR			
Row 0 SWITCHI EN ADD Row 1 INPUTI INI OUT Row 3 INPUTI IN2 Row 4 SWITCHI INTON O T_OUTPUT Row 5 PRE_VALUE PT ET ALUE V ALUE V		BOOL			VAR			
Row 0 INPUT IN1 OUT OUT Row 2 INPUT IN1 OUT OUT Row 2 INPUT IN2 INSTO INSTO Row 3 INSTO INSTO INSTO Row 4 SWITCH INTO INTO Row 5 PRE_VALUE PT ET ALUE INSTO INSTO INSTO	T_OUTPUT	BOOL	<auto></auto>		VAR			
Variable of FB instance name	Row 3		ŢĻŸ	ce name				
For function block, it is available to inut from column 2 to column 30 of LD proc	Dow 0							

5) Return

டூ

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

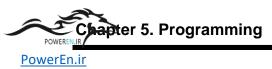
- Select from tool box.
- Click the mouse on the desired position of LD program window.

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

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	Comments	
	CURRENT_VA	TIME	<auto></auto>		VAR			-
	E_SW	BOOL	<auto></auto>		VAR			
	INPUT	SINT	<auto></auto>		VAR			
	INPUT1	SINT	<auto></auto>		VAR			
	INSTO	FB Instance	<auto></auto>		VAR			
	LAMP	BOOL	<auto></auto>		VAR			
	OUT1	SINT	<auto></auto>		VAR			
	PRE_VALUE	TIME	<auto></auto>		VAR			
	SWITCH1	BOOL	<auto></auto>		VAR			
0	T_OUTPUT	BOOL	<auto></auto>		VAR			
Row 1 Row 2	SWITCH1	ADD ENO OUT- OUT1					Return	LAMP C>
	INPUTI IN1	OUT- OUT1	v					LMP

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.

ф

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

🚼 c 🕬 gr								
	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	Comments	
1	CURRENT_VA	TIME	<auto></auto>		VAR			
2	E_SW	BOOL	<auto></auto>		VAR			
3	INPUT	SINT	<auto></auto>		VAR			
4	INPUT1	SINT	<auto></auto>		VAR			
5	INSTO	FB Instance	<auto></auto>		VAR			
6	LAMP	BOOL	<auto></auto>		VAR			
7		OINT	Autos		ÎVAD Î		1	
Row 0 Row 1 Row 2 Row 3							LAMP ()	_ Jump
Row 4	ļĹĹ]						•

- R
- 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.

adel	X
Label List	ок
EMERGENCY	Cancel
	Help

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

Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	Comments	
CURRENT_VA	TIME	<auto></auto>		VAR			
E_SW	BOOL	<auto></auto>		VAR			
INPUT	SINT	<auto></auto>		VAR			
INPUT1	SINT	<auto></auto>		VAR			
INSTO	FB Instance	<auto></auto>		VAR			
LAMP	BOOL	<auto></auto>		VAR			
011111	CINIT	Autos		WAD	1		1 🔟
	END OUT- OUT1				Jump		
		Variable Name Data Type CURRENT_VA TIME SW BOOL NPUT SINT NST0 FB instance AMP BOOL SWITCHI EINT SWITCHI END SWITCHI END INPUTI INT	CURRENT_VA TIME <auto> SW BOOL <auto> NPUT SINT <auto> NPUT SINT <auto> NST0 FB Instance <auto> AMP BOOL <auto> SUT1 SINT <auto> SUT2 FB Instance <auto> SUT4 SINT <auto> INT SINT <auto> INT SAUto> <auto> INT SAUto> <auto> INT SINT <auto> INT SAUto> <auto> INT SUT4 <auto> INT OUT <auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto>	Variable Name Data Type Memory Allocat Initial Value UURRENT_VA TIME <auto> SW BOOL <auto> NPUT SINT <auto> NST0 FB Instance <auto> AMP BOOL <auto> SWITCH ENV <auto> SWITCH ENV <auto> INT <auto> INT <auto> INT <auto> INT <auto> INT <auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto></auto>	Variable Name Data Type Memory Allocat Initial Value Variable Kind UURRENT_VA TIME <auto> VAR SW BOOL <auto> VAR NPUT SINT <auto> VAR NPUT SINT <auto> VAR NST0 FB Instance <auto> VAR </auto></auto></auto></auto></auto>	Variable Name Data Type Memory Allocat Initial Value Variable Kind Used UURRENT_VA TIME <auto> VAR SWU SOLL <auto> VAR NPUT SINT <auto> VAR NPUT SINT <auto> VAR NST0 FB Instance <auto> VAR Auto> VAR Auto> VAR SWITCH SINT <auto> VAR Auto> VAR SWITCH SINT <auto> VAR Auto> VAR A</auto></auto></auto></auto></auto></auto></auto>	Variable Name Data Type Memory Allocat Initial Value Variable Kind Used Comments UURRENT_VA TIME <auto> VAR SWU Comments VAR DPUT SINT -Auto> VAR NPUT SINT -Auto> VAR NST0 FB Instance -Auto> VAR AMP BOOL <auto> VAR SWITCH EN BOOL -Auto> VAR LAMP BOOL -Auto> VAR LAMP BOOL -Auto> VAR LAMP BOOL -Auto> VAR ITT - VAD EMERGENCY LAMP INFT - UNT - OUT1</auto></auto>

Point

Jump should be used with Label.

poweren <u>ir</u> verEn.ir 7) L	r 5. Programming
/) L	щал. Ф
	 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.
	Cancel
	C Rung comment Help
	The end of program body
	After selecting label from label or rung comment dialogue box, click [OK]. Add Label
	Label Name : OK
	EMERGENCY
	Label List : Help
	EMERGENCY
	After insutting label game as calent label from label list aligh [OV]
	◆ After inputting label name or select label from label list, click [OK]. ♥ of the select with the select select label from label list, click [OK]. ♥ of the select select label from label list, click [OK]. ♥ of the select select select label from label list, click [OK]. ♥ of the select sel
	Valuate Name Data type methody Anotagi minad Value Valuate Nutu Oseu Comments 1 CORRENT VA Title -Auto> VAR 2 E_LAMP BOOL -Auto> VAR 3 E_STOP BOOL -Auto> VAR
	4 E, SW BOOL <auto> VAR 5 INPUT SINT <auto> VAR 6 INPUT1 SINT <auto> VAR</auto></auto></auto>
	Row 2 - INPUTI - IN1 0UT- 0UT1 Row 3 - INPUT - IN2
	Row 4



8) Subroutine

Row 2

Row 3 Row 4

INPUT1 IN1 OUT

_ IN970 _

INPUT IN2 OUT1

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.

	CURRENT_VA T	IME <	lemory Allocat Auto>	Initial Value	Variable Kind VAR	Used	Comments
Row 0	E_SW						
Row 1		D ENO					Subroutine call
Row 2	• INPUT1 • IN1	OUT- OUT1					
Row 3	• INPUT • IN2						
Row 4		π					
) 囲							
Label L			OK Cancel Help				

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PowerEn.ir		

(2) The end of program body ഫ് 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.

Label or Rung Comment	x
O Label	ок
	Cancel
C Rung comment	Help
The end of program body	

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

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	Comments	
	CURRENT_VA	TIME	<auto></auto>		VAR			-
	E_LAMP	BOOL	<auto></auto>		VAR			
Row 7			of program					

(3) how to write Subroutine

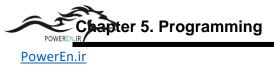
- Select from tool box or popup menu [To Arrow mode]. After moving the mouse to column 0 of the row that subroutine program shall be located, double click.

© Label	ОК
Capel	Cancel
C Rung comment	Help
C The end of program body	

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

Add Label	×
Label Name :	ок
SUB_A	Cancel
Label List :	Help
SUB_A	

After inputting label name in "Add Label" dialogue box, click [OK].



		Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	Comments	
1		CURRENT_VA	TIME	<auto></auto>		VAR			
2		E_LAMP	BOOL	<auto></auto>		VAR			
R	low 6 low 7 END }	PRE_VALUE PT	ET ALUE						
	SUB_A	INSTO.Q							LAMP

From row 9(SUB_A), write subroutine program. ٠

Point

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

	🚼 c 🐨 gm v	win 3 kor#sourceWinput_test, src +
	Row O	E_SWSubroutine callSUB_A
	Row 1	
	Row 2	· INPUTI · INI OUT- OUTI ·
	Row 3	· INPUT · IN2 ·
	Row 4	SWITCHI TON
	Row 5	
	Row 6	PRE_VALUE PT ETALUE .
	Row 7	
	{ END }	This line is the end of program body.
Label		MOTORI
	Row 10	
	•	



9) Rung comment

ĽЦ R from toolbox or popup menu [To Arrow mode]. Select 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. OK C Label Cancel Rung comment Help C The end of program body Select rung statement from label or rung comment dialogue box. Input the contents of rung comment in rung comment dialogue box (max.170 letters). X This line is a example for writing a lung comment. Cancel оĸ Help Rung comment is displayed over one row of LD program as shown below. COMMENT This line is a example for writing a lung comment.

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.

- Ð
 - Select Se
 - 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.

ariables List								Cancel
Name	Var. Kind	Allocation	Used	Data Type	Initial value	Comments	8.10	Elag
CURRENT_VAL	VAR	«Auto»		TIME				17.0.2
E_LAMP	VAR	=Auto=		BOOL				Global
E_STOP	VAR	<auto=< td=""><td></td><td>BOOL</td><td></td><td></td><td></td><td></td></auto=<>		BOOL				
INPUT	VAR	«Auto»		BINT				Direct Variable
INPUTI	VAR	«Auto»		BINT				
INGTO	VAR	«Auto»		FB Instance				600
LAMP	VAR	=Auto=		BOOL				
MOTOR1	VAR	<auto+< td=""><td></td><td>BOOL</td><td></td><td></td><td></td><td>2211010</td></auto+<>		BOOL				2211010
OUTI	VAR	«Auto»		BINT				
PRE_VALUE	VAR	<auto=< td=""><td></td><td>TIME</td><td></td><td></td><td></td><td></td></auto=<>		TIME				
SWITCHI	VAR	<auto></auto>		BOOL				Help.
T_OUTPUT INSTO.Q	VAR	<auto></auto>		BOOL BOOL				
INSTO.ET	VAR	=Auto=		TIME				
14010.21	1000	-2010-		1 IPPILL				



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

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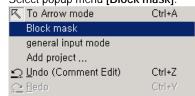
- PowerEn.ir
- After inputting the variable name to use in the variable dialogue box, click **[OK]**. If selecting the already declared variable name, the input of varible shall be completed right here.
- In case of inputting the new variable name, the variable add/edit dialogue box that defines the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

Variable Kind :	'AR	•		Cance Help
Cata Type C Elementary : C FB Instance : C Array (0.,	TIME CTD) OF BOOL	T T	Memory Allo Auto Assign(A %	cation —
nitial Value			Init	. Array

- 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.

	C:₩gm	win 3 kor\source\input_test,src +	. <u> </u>
Block mask	Row 0 Row 1 Row 2 Row 3 Row 4 Row 5 Row 6 Row 7	E-SW SWITCHI EN ADD INPUTI INI OUT- OUTI INPUTI IN2 SWITCHI IN OUT- OUTI INPUT IN2 SWITCHI INTO O-T_OUTPUT PRE_VALUE PT ET CURPENT_V	
	{ END } SUB_A	-This line is the end of program body. MOTORI C	
	Row 10	CRETURN >	_
			<u> </u>

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.



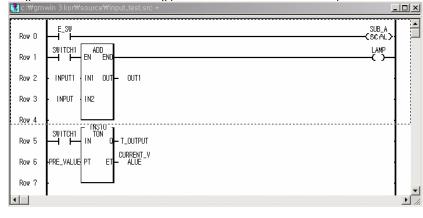
- Select ____ from toolbox.
- After moving the mouse to the starting position of block from LD program window, click the left button and drag the mouse to the final row of the area to select.



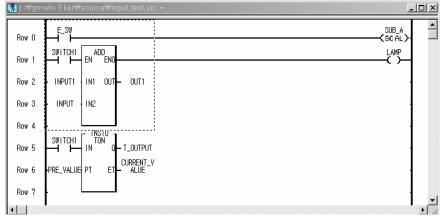




- Move the cursor to the starting position of the block from LD program window.
- In the state of pressing Shift key, move the cursor to the final row of the area to select by using the arrow key.
- (1) In case of setting the block by row unit
- Drag the mouse from the starting position of block, row 0 to the end position, row 4 from in the LD program window.

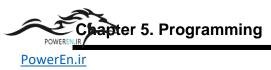


- (2) In case of setting the block of random size
 - Drag the mouse from the starting position of the block to the end position in the LD program window.



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

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,

Only one time redo is available after undo the edit.

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, 1)] 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, 1)] or popup menu [Put].

(4) Delete

In the condition of designating the cell or block,

Select menu [Edit]-[Delete (Delete, X)] 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
Find	X	-

Text to find	Contact/coil to find
MOTOR1	
Select Objects to Find	Origin © From cursor © Entire scope
C Both Text and contact/coil	Word Match whole word
Direction Forward Backward	Match partial word Include comment area
ок	Cancel Help

- 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.

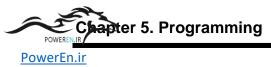
D) Word

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.

Row O	
Row 1	SWITCH1 ADD EN ENO
Row 2	• INPUTI INI OUT- OUTI
Row 3	· INPUT · IN2
Row 4	

(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, 4)] 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, 1] or popup menu [Find in files].

-Ind in Files	
Name:	ОК
E_SW	Cancel
🥅 Match whole	
Where to find	
In Project	
C In folder	
C:\GMWIN 3 ENG\Source	Browse

- 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.

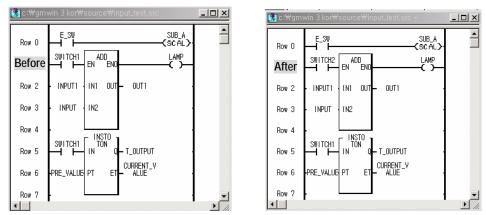
If executing [Find in files], the result is displayed in the output window and if you double click the result, it moves to the relevant variable.



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erEn.ir	
4) Goto	
•	Select menu [Edit]-[Goto, →11]] or popup me [Goto].
•	Input the row no. to find from [Go to Line] dialogue box. Go to Line
	The last line number is : 41 OK
	Select the line number
	to go to (0 based) : Help
•	Click [OK].
5) Repla	
Sele	ect menu [Edit]-[Replace, 🚻] or popup menu [Replace] to call [Replace] dialogue box.
	Replace X
	Text to find: New text: SWITCH1 SWITCH2
	Contact/Coil to find New Contact/Coil
	Objects to Find/Replace Origin
	Text Only C From cursor
	C Contact/Coil only
	C Both text and C Word
	© Forward
	C Backward
	OK Cancel Replace All Help
•	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]. Replace it?
	Would you like to replace it?
	OK Cancel Help
•	
•	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.

Replace All			×
Would you link re	eplace it?		
ок	All	No	Cancel

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.

PADT Win	x
8	It isn't equal to any string any more.
	ОК

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

Replace All			
Would you link re	eplace it?		
OK	All	No	Cancel

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

PADT Win	x
8	It isn't equal to any string any more.
	ОК



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]

Area	Туре	Address	
© 1		Replaced start address	Replaced end address
	C B (byte type)		~
0 Q	C W (word type)	Annelis di stati a delucara	
ОМ	C D (double word type)	Applied start address	
	C L (long type)		
Comment]
In %I area	a, Replaced only bit type of direct	variable.	
			OK Cancel

A) Area : Direct variable area to replace

B) Type : Direct variable data type to raplace

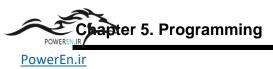
C) Address : Start address/end address to replace and start address to apply. (Ex1) In case of replacing %IX0.0.0-%IX0.1.0 to %IX0.3.0-%IX0.4.0

				<u>~</u>
Area	Туре	Address		
©		Replaced start address		Replaced end address
00	⊂ B (byte type)	0.0.0	~	0.1.0
	C W (word type)	Applied start address		
СM	C D (double word type)	0.3.0	1	
	C L (long type)			
Comment-	, Replaced only bit type of direc	tvariable.		
				OK Cancel
¥IX0.0. ➡◀ ► ¥IX0.1.	-			*IX0.3.0 *IX0.4.0

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

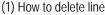
Area	Туре	Address				
01		Replaced start address	Replaced end address			
	C B (byte type)	W100.0	~ W110.0			
0 Q	C W (word type)					
€M	C D (double word type)	Applied start address				
	C L (long type)	W150.0				
Comment						
			OK Cancel			

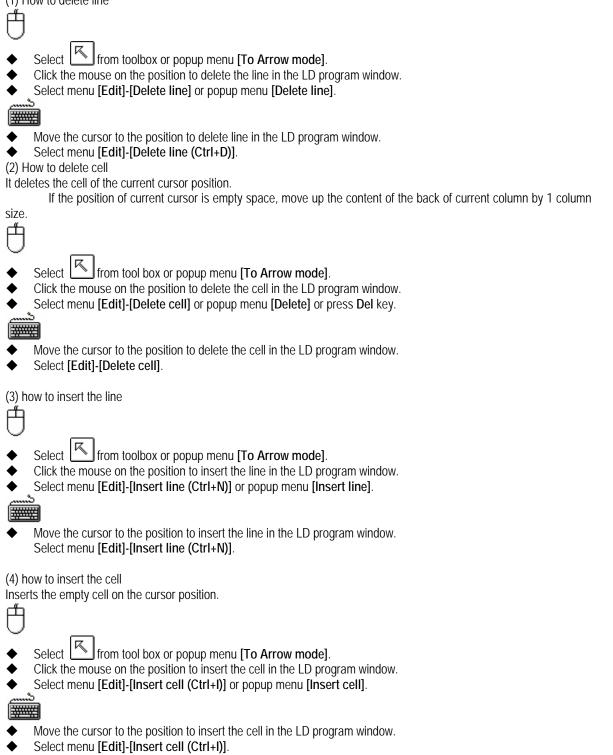
As above it is nessarary to input address with W(W means word unit) If replacing %MD100.0 input D100.0 in the address.



7) Delete or Insert cell/line

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





8) Zoom in/out

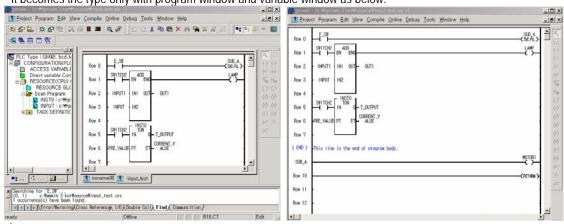
It provides the function to adjust the size of scrren in writing the LD program.

- 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 (

r.owf

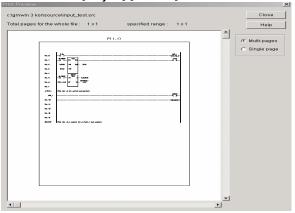


- 9) Full screen
 - It is the function to maximize the size of program window in writing the LD program.
 - Select menu [View]-[Full screen, [].
 - It becomes the type only with program window and variable window as below.



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

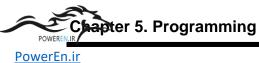
- 10) Preview
 - ◆ It provides the function to preview LD, SFC, IL program screen.
 - Select menu [Project]-[Preview].

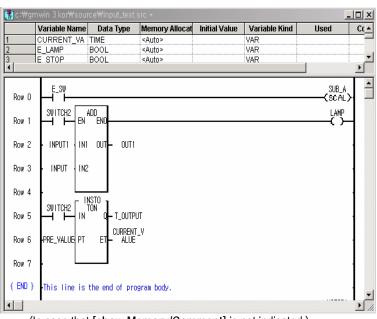


11) Show Memory/Comment

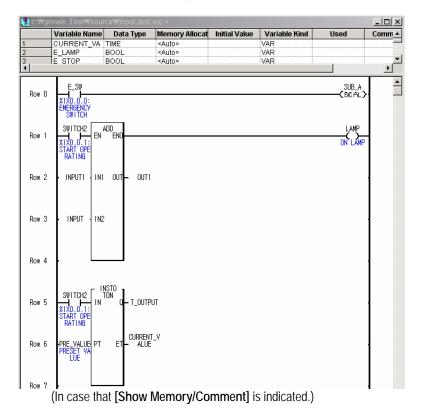
LD program provides the function to indicate the memory position of each variable and variable statement.

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





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

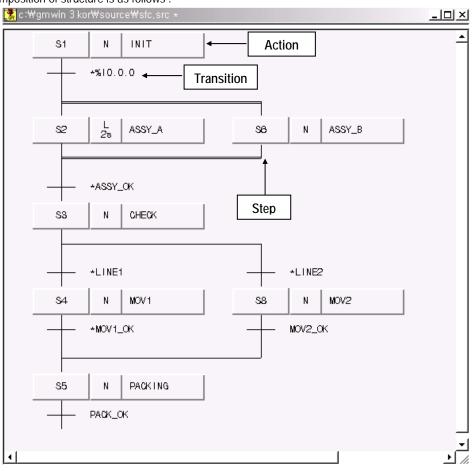




5.2 SFC Programming

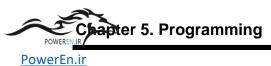
5.2.1 Structure of SFC Program

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.

	SFC				×
			.abe ∎	, ₽ Jump	q
Step Action/Transition Branch Label Jump Open program					

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	12	The conditon to move from the active step to next step.
-	Selection branch	F3	Defines Execution flow according to transition condition.
	Parallel branch	15	Used when control several sequence simultaneously.
	Action/Transition	F4	Indicates the processing content within the step.
Label	Label	F5	The place where execution fow starts by Jump.
Jump	Jump	F6	Used to change the execution flow.
ď	Zoom-in	F7	Used to open step and action program.
R	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:

📧 To Arrow Mode	
Add to Project	
<u>רה U</u> ndo	Ctrl+Z
<u>C B</u> edo	Ctrl+Y
∦ Cu <u>t</u>	Ctrl+X
🗈 <u>С</u> ору	Ctrl+C
<u> P</u> aste	Ctrl+V
🗙 <u>D</u> elete	Del
🏘 <u>F</u> ind	Ctrl+F
aro <u>R</u> eplace	Ctrl+H
н _{ех} Replace <u>D</u> irect Varia	ables,,,
🔏 Find <u>N</u> ext	Ctrl+F3
,10 <u>G</u> o To	
🙀 Find <u>i</u> n Files	
T <u>o</u> olbox	+

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

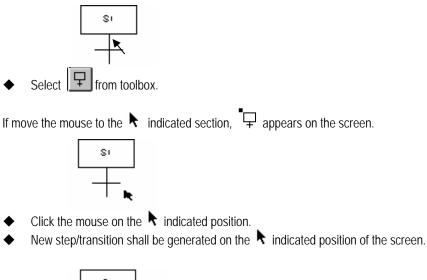
5.2.3 How to input SFC command

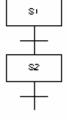
1) Step/Transition

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



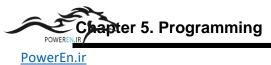
The initial screen of SFC program is as below.





• Move the cursor to one place among the followings by using a key.

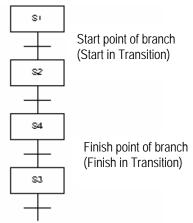
Select menu [Toolbox]-[Step (F2)].



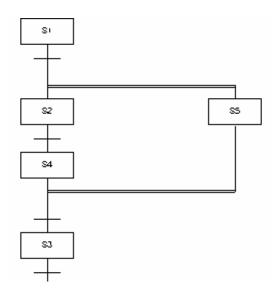
2) Parallel Branch

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

- Ĥ
 - 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.



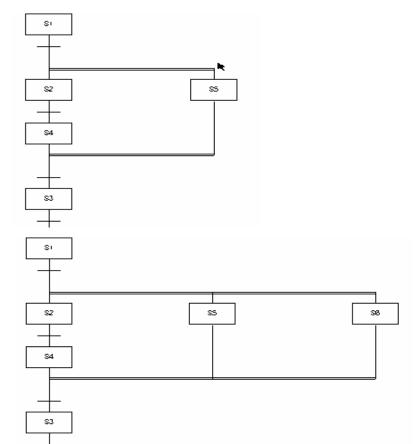
Parallel branch shall be generated and new step (S5) shall be generated.



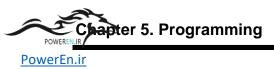
- Move the cursor to the transition to start Branch by a key.
- Select menu [Toolbox]-[Branch (F3)].
- Move the cursor to the transition to finish the branch by a key.
- Select menu [Toolbox]-[Branch (F3)].



- (2) In case of extending and generating the parallel branch
- Ű
 - Select from toolbox.
- Click the mouse on the starting position of parallel branch (high 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)].

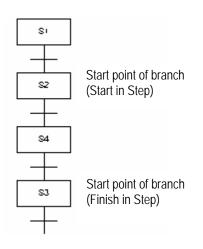


Ĥ

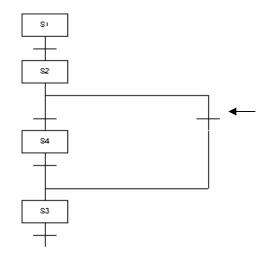
3) Selection Branch

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

• After selecting Imp 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.

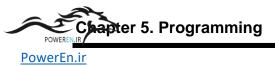


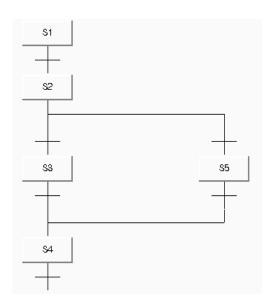
After generating Selection Branch and making new Transition, add Step to new Trasition.

- ◆ Select from toolbox.
- ◆ If move the mouse the <a>the <a>the indicated position, <a>the appears on the screen.
- ♦ Click the mouse on the indicated position.
- New step sall be generated in the **k** 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)].



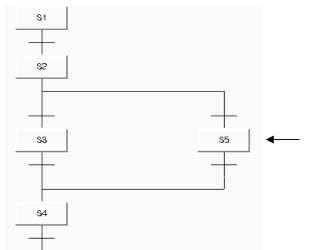


(2) In case of extending and generating Selection Branch

Select from toolbox.

Ð

Click the mouse on the starting position of selection branch (\mathbf{k} Indication of the figure).

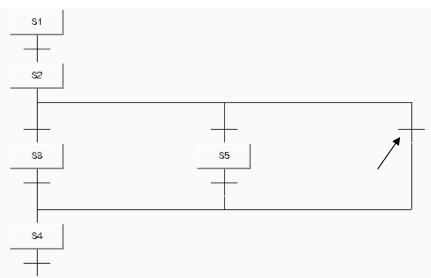


- If generating selection branch and making new transition, add the Step to new transition.
- Select From toolbox.
- If move the mouse to the \clubsuit indicated position, \blacktriangledown appears on the screen.
- Click the mouse on the \clubsuit indicated position. New step shall be generated on the \clubsuit lindicated position of the screen. ٠

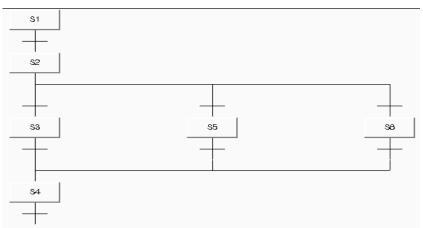


.....

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



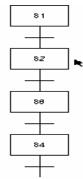
[Before inserting the step to the transition of selection branch]



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

4) Label

- Ĥ Select
- from toolbox. ٠
- Move the mouse to the step (\blacktriangleright Indication of the figure) and click.



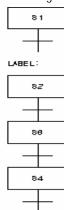




- Input the label name in Label dialogue box and click [Verify].
- For Label name of label dialogue box, it is available to input Alphabet 16 letters (Korean 8 letters).
 Label

Laber	<u>^</u>
Label name:	ок
LABEL	Cancel
	Help

• Label shall be generated.



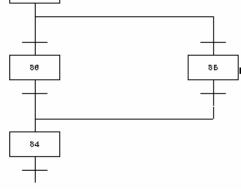
Point

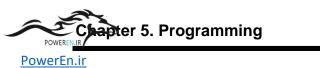
Label shall be inserted before Step, and used with Jump.

- 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.

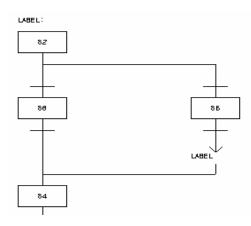




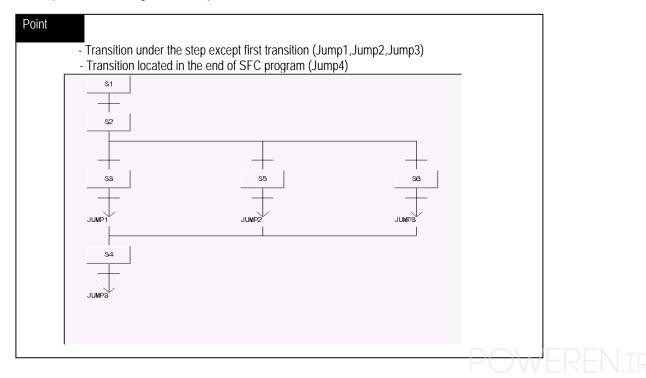
- After moving the mouse to the step (Indication of the figure) above the desired transition to generate Jump, click [OK].
- Input Jump name in Jump dialogue box and then click [OK].
- Select the label to jump among the using labels in Jump dialogue box and double click, and the name of label will appear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

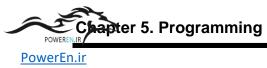
Jump	×
Jump name:	ок
LABEL	Cancel
Used label: LABEL	Help

♦ Jump shall e generated.



The place available to generate Jump :





- - 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.

Step	2
Step name: S5	ОК
Action:	Cancel
Name Qualifi Time	
	Add Action
	Delete Action
	Move Up
	Move Down
, IZ Postscan	

- 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.

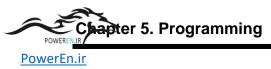
Ű

- 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.

Action					~
Kind	Name:	LINE1			1
Program	Comment	:			1
🔿 Variab					
List		1			
Name		Kind		Flags	1
			_		
•			F		
Qualifier		Time			
N(Non-stored))	•			1
0K	Ca	incel		Help	

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.

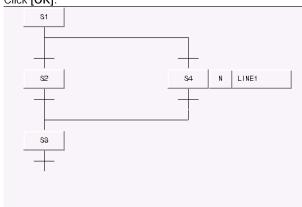


1) In case of designating Action as Program

- 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

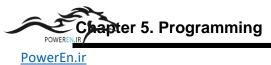
- Input Variable name (Alphabet 16 letters/Korean 8 letters) in name input column. When connecting the already declared variable, select it in the list box. Select the desired Qualifier from qualifier list box.
- If the selected qualifier has the time value (D,L,SD,SL,DS), input the time value in 'time'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



Point

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

POWEREN.IR



< The type and function of Qualifier >

Symbol	Function	Active Inactive
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.	R
L(time Limited)	After Step is in active, an action is executed as long as setting time.	Setting Time
		✓ Setting Time
D(time Delayed)	After Step is in active, the execution of action is delayed as long as setting time.	Setting Time
P(Pulse)	Action is executed at the only moment when Step is in active.	11 Scan
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.	

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8) Transition

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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

Transition		×
Kind Program Variable	Name Comment:	
List:		
Name	Kind	Flags
4	Þ	
ок	Cancel	Help

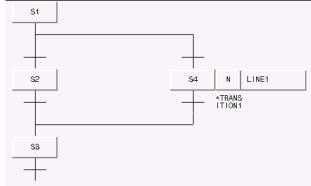
Select whether or not to designate the transition condition as program or BOOL variable in 'kind' option of Transition dialogue box. If designating BOOL variable, the condition shall be 1 when the variable is 1 and move to next step.

(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.

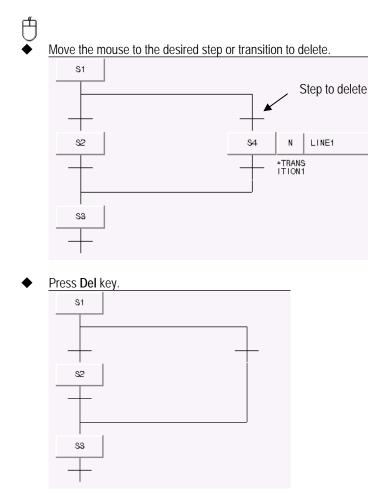
TRANS



5.2.4 How to edit SFC

1) Delete

(1) How to delete Step/Transition



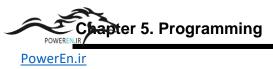
Move the cursor to the step to delete by using a key.

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]).

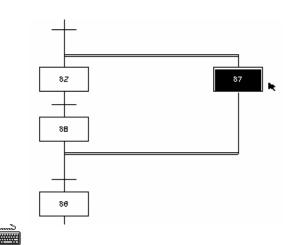
POWEREN.IR



(2) How to delete Branch

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• 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

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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

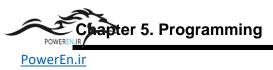
After moving the mouse to the action to delete, press **Del** key.

ĽЦ

- 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 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 Language	2	<
Language	ок	
C SFC	Cancel	
ΟIL	Help	
€LD		

- 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)].

Comment		
		Add
		<u>D</u> elete
		Deview
		<u>R</u> eplace
		<u>E</u> dit
	•	Help
Used :	Size :	
	Used :	

- 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 Se
- 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.

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_	

- Move the cursor to the startng position 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, 1)] or popup menu [Copy].

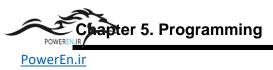
(3) Paste

- After [cut] or [copy],
 - Move the cursor to the position to <u>exec</u>ute [Paste] in LD program window.
 - Select menu [Edit]-[Put (Ctrl+V, ¹]) or popup menu [Paste].

(4) Delete

In the condition of designating a block,

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



- 5) Find, Find again, Find from several files (1) Find
 - Select menu [Edit]-[Find (Ctrl+F, Mag)] × Text to find: OUT1 • Direction Range Forward • From cursor C Backward C Entire scope Word Match whole word Match partial word Find in actions and transitions Find in comments Cancel Help 0K
 - 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, 4)] or popup menu [Find Next].

(3) Go

- ♦ Select menu [Edit]-[Go To, →¹⁰/→¹¹] 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, 1] 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, 1)] 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

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used	Comme
	END	BOOL	%QX0.0.1	٧	'AR		
2	START	BOOL	%IX0.0.0	V	'AR		
•							Þ
Instru		onut Va	rishle		mment	Variah	<u> </u>
			uriable	User Defi	Line Comment	Variab	▼ le
lnstr Nu		STA %QX	RT (0.0.0		Line Comment INPUT CONTACT. SAVE		 le
	Instru Ir LD	STA %QX	RT	User Defi	Line Comment		<u>•</u> le

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.

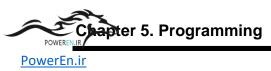


2) How to use Short-cut key

₽	Function	Select the function to input.
₽	Function block	Select the function block to input.
\$:	Label	Input the label.
Opr	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.

POWEREN.Ir



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.

Add Project	
<u> U</u> ndo	Ctrl+Z
<u> ∩ B</u> edo	Ctrl+Y
<mark>∦</mark> Cu <u>t</u>	Ctrl+X
Ba <u>C</u> opy	Ctrl+C
😤 <u>P</u> aste	Ctrl+V
🗙 <u>D</u> elete	Del
🏘 <u>E</u> ind	Ctrl+F
🏘 <u>F</u> ind 같 <mark>:</mark> Replace	Ctrl+F Ctrl+H
	Ctrl+H
ano <u>R</u> eplace	Ctrl+H
Bolace Hex Replace <u>D</u> irect Variabl	Ctrl+H
<mark>№ Веріасе</mark> н∝ Replace <u>D</u> irect Variabi ≩ Find <u>N</u> ext	Ctrl+H
Hex Replace Hex Replace <u>D</u> irect Variabl Marking Go To	Ctrl+H

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.

ï
IJ
\smile

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

•	Click	0pr	from toolbox.

Operator List		x
Operator		
) ADD ADD(AND AND(ANDN ANDN(×
ОК	Cancel	Help

Select operator in operator list dialogue box.

1	Name :	DATA1		Di	rect Variable <u>C</u> ol	mment		ОК
Г	-Variables List-							 Cancel
	Name	Var. Kind	Allocation	Used	Data Type	Initial value	Comments	Elag
	END	VAR	%QX0.0.1		BOOL			
	START	VAR	%IX0.0.0		BOOL			<u>G</u> lobal
								Direct <u>V</u> ariable
								Add
								Delete
								Edit
								Help



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.

InstructiLD %QXO.O.O

	•
--	---

Press Enter key.

Method 2

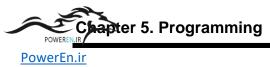
- Move the cursor of program indication scope to the position to input.
- Select menu [Edit]-[Toolbox]-[Operator] to call operator list dialogue box.
- Select operator in Operator list dialogue box.
- Input operand in the variable name input column of variable dialogue box.
- Click [OK].

2) Function

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

Select Function		_ 🗆 X
Time/Date Function All System F	- Set input number	ОК
ADD	Max number: 8	Cancel
ABS ADD	Required number:	Help
ADD_TIME AND ARY_MOVE	2	
Function information		
Comment: 더하기		
ADD • EN ENO•	<u>_</u>	
NOTYPE • OUT •		
	*	

Select the function from function list dialogue box.



Setting			
Name :	ADD		
nput			
IN1:=	CURRENT RESULT	IN2:=	

- 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.
 Instruct i ADD E, F, G
- 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.

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	er 5. Programming	
PowerEn.ir	 Function Block Move the cursor of program indication scope to the position to input. Click from toolbox. 	
	Standard FB All FB instance OK CTD Instance name: Cancel CTU Instance wype: Cancel F_TRIG F_TRIG Help PTC RET Search	
	FB information Comment: 감산 카운터	

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

etting Name :	CTD				
CAL :	CAL				
Instance Name :	INST0		i i		
put CD:= PV:=	LD=	.[Output	0=800L	CV=INT

- 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.

 Instruct i CAL
- 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

Щ

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

Press from toolbox to	call Label dialogue
Label Name :	ок
	Cancel
	Help

• Input the label name (Alphabet: 16 letters/Korean 8 letters) in Label dialogue box.

box.

• Click [OK].

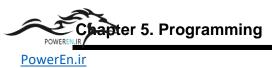


Method 1

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

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

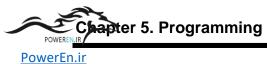
In the condition of designating the block

Select menu [Edit]-[Cut (Ctrl+X, ¹)] or popup menu [Cut].

(2) Copy

In the condition of designating the block

Select menu [Edit]-[Copy (Ctrl+C, 1)] 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, ¹])] or popup menu [Put].

(4) Delete

In the condition of designating the block

- Select menu [Edit]-[Delete, 1] 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, ^{Max})] or popup menu [Find].

ption Kind	- Scope		
 Instruction 	From Cursor		
Operand	C Entire Scope		
Direction	-Word		
Forward	 Match Whole Word 		
C Backward	C Match Partial Word		
🗖 Find Include Variable	Comment		

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.

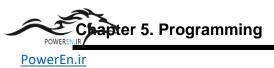
D) Word

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, 4)] 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, 1] 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, ¹)] or popup menu [Replace].

Replace	x
Text to Replace	New Text
START	START1
Kind	Scope
C Instruction	From Cursor
Operand	O Entire Scope
Direction	Word
Forward	Match Whole Word
C Backward	C Match Partial Word
OK Cancel	Replace All Help

- 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].	
Go To		×
Input the Line Numbe	er to go to (O ba	ased)
The Last Line No. :	3	
Go to the Line :		
ок	Cancel	Help

- 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]. ٠

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].

GMWIN			×
?	Clear da Continu	ata. e anyway?	
<u>Y</u> e:	;	<u>N</u> o	
Click [Yes	s].		

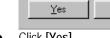
7.2.2 Reset

This is the function to reset PLC. Restart mode is the mode set as Cold and Warm.

Select menu [Online]-[Reset].



No



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.

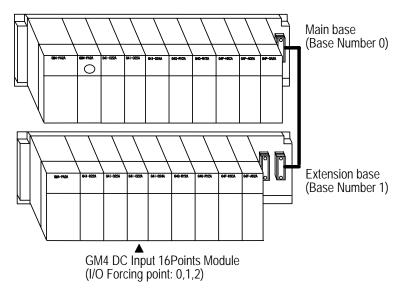
Select menu [Online]-[OVERALL Reset].



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 (\blacktriangle) part of PLC system composed as the below figure is as follows:



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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.

Select	base		Select slot	Enable VO forc	ing	Close
0	-	View	0 -	F Input F	Output Set	Ciose
VO forc	ing set-					Reset All.
Flag	Data	Flag Data	Flag Data	Flag Data	Write to PLC	Reseran
0 1	Γ0	16 - 16	32 32	48 - 48		Set All
1 E	Г1	17 - 17	33 F F 33	49 - 49		Help
2 Г	Γ2	18 🗆 🗖 18	34 🗖 🗖 34	50 🗂 🗂 50	Write to PLC After	rseth
зГ	ГЗ	18 - 19	35 Г Г 35	51 🗆 🗆 51	Set All	
4 Г	□ 4	20 🖵 🖵 20	36 🗂 🗂 36	52 🖵 🖵 52		
5 F	Γ5	21 - 21	37 - 37	53 🗆 🗆 53	Write to PLC After	
6 Г	Γ6	22 🗆 🗆 22	38 🗖 🗖 38	54 🖂 🏳 54	ResetAll	
7 1	Γ7	23 🗆 🗆 23	39 🗆 🗆 39	55 🗂 🗂 55		
8 Г	F 8	24 🖂 🗖 24	40 - 40	56 🗖 🗖 56		
9 17	Γ9	25 🗆 🗆 25	41 - 41	57 🗖 🗂 57		
10 -	□ 10	26 🗖 🗖 26	42 🗖 🗖 42	58 F F 58		
11 Г	F 11	27 🗆 🗆 27	43 🗖 🗖 43	59 🗂 🗂 59		
12 Г	□ 12	28 🗆 🗆 28	44 🗂 🗂 44	60 🖵 🖵 60		
13 Г	□ 13	29 🖂 🗂 29	45 🖂 🖂 45	61 🖂 🗂 61		
14 🗆	□ 14	30 🗆 🗆 30	46 🖵 🖵 46	62 🖵 🖵 62		
15 [F 15	31 🗆 🗆 31	47 - 47	63 F F 63		

- 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 AII], all contact of the selected slot shall be ON and if you click [Write to PLC After Reset AII], 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).

Point No.		0	Close
Slot 0	Flag Data	111000000000000000000000000000000000000	Reset.
Slot 1	Flag Data	000000000000000000000000000000000000000	<< Back
Slot 2	Flag Data	000000000000000000000000000000000000000	<u>N</u> ext >>
Slot 3	Flag Data	000000000000000000000000000000000000000	Help
Slot 4	Flag Data	000000000000000000000000000000000000000	
Slot 5	Flag Data	000000000000000000000000000000000000000	
Slot 6	Flag Data		
Slot 7	Flag Data	000000000000000000000000000000000000000	
Point No.		0	

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 AII], all contact of PLC shall be ON and if you click [Reset AII], 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. ٠

Sel	ect menu [Onlin	e]-[Network]-[Ena	ble Link].
Link	Enable Setting		×
_			
	🔲 H-S Link 1	🗖 H-S Link 2	
	🥅 H-S Link 3	🦵 H-S Link 4	
L			
	ок	Cancel He	ql

After selecting 'high speed link', click [OK].

Point			
As for GM7, it is available to in with the message below witho			he communication is allowed
	GMWIN	×	
	į	Communication Permission	
		ОК	



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.

- Network Information
Base 0 Slot 1 ETHERNET Station No.:1.1.1.10
IP Address1.1.1.10 GM3 Stop Mode ErrorNo Link, Slot1
Base 0 Slot 3 GLOFA Fnet Station No.:20
Station No.20 GM3 Stop Mode ErrorNo Link, Slot3
⊟ Base 0 Slot 7 GLOFA Fnet Station No.:10
Station No.10 GM3 Stop Mode ErrorNo Link Slot7
01-12
Close Help

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.

rse 1 kip Set Base Select-			OK
1	•		Cancel
			Help
Base Skip	Γ	Set	
Slot 0	•		
Slot 1	V		
Slot 2	Γ		
Slot 3	V		
Slot 4	Г		
Slot 5	Γ		
Slot 6	Г		
Slot 7	Г		

- 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]. Base 1 ault Mask Set Base Select Cancel Help

			Guncer	
l			 Help	
	Base Mask	C Set		
	Slot 0			
	Slot 1	v		
	Slot 2	V		
	Slot 3			
	Slot 4			
	Slot 5			
	Slot 6	Γ		
	Slot 7	Г		

X

- 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].

Select menu [Online]-[In	itialize Special
Special Module	×
Base Select	ок
1	Cancel
Slot Select	Help

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.

GMWIN	
8	Remote Connection Error - There is no link card or Can't serve remote connection,
	ок

- 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.



AD Initial Value Set			×
Initial Data Set			
BASE : 0			ОК
SLOT : 6			Cancel
CH : Array	0-15	Initial	Help
DATA TYPE : Array	0-15	Initial	
FILN_EN : Array	0-3	Initial	
FILN_VAL : Array	0-3	Initial	
AVG_EN : Array	0-3	Initial	
AVG_SEL : Array	0-3	Initial	
NUM/TIME : Array	0-3	Initial	

- 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.

Array Na	me :	CH : ARRAY [015] OF BOOL	Close
○ <u>N</u> o In	it	🕤 Initialize	Help
[0]	1	<u> </u>	<u>E</u> dit
[1] [2]	Ó		
[3]	Ō		
[4]	0		
[5]	0		
[6]	0		
[7]	0		
[8]	0		
[9]	0		
[10]	0		
[11]	0		
[12]	0	-	
1/1/21	0		

• 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.

X

After connecting to FSM module, select [Online]-[FSM].

Select base		Select slot	Enable I/O for	cing	Close
	View	0 💌	🗖 Input 🛛	Output Set	Close
//O forcing set—					Decester 1
Flag Data	Flag Data	Flag Data	Flag Data	Write to PLC	Reset All
0	16 🔲 🗖 16	32 🔲 🗖 32	48 🔲 🗖 48		Set All
1 🗖 🗖 1	17 🖂 🗖 17	33 🗖 🗖 33	49 🗖 🗖 49		Help
2 🗖 🗖 2	18 🔲 🗖 18	34 🔲 🗖 34	50 🕅 🔲 50	Write to PLC After	
3 🗖 🗖 3	19 🔲 🗖 19	35 🔲 🗖 35	51 🔲 🗖 51	Set All	
4 🗆 🗖 4	20 🗖 🗖 20	36 🗖 🗖 36	52 🗖 🗖 52		
5 🗖 🗖 5	21 🔲 🗖 21	37 🗖 🗖 37	53 🗖 🗖 53	Write to PLC After Reset All	
6 🗖 🗖 6	22 🗖 🗖 22	38 🗖 🗖 38	54 🔲 🗖 54		
	23 🔲 🗖 23	39 🔲 🗖 39	55 🔲 🗖 55		
	24 🗖 🗖 24	40 🗖 🗖 40	56 🔲 🗖 56		
9 F F 9 10 F F 10	25 🗖 🗖 25 26 🗖 🗖 26	41 🗖 🗖 41 42 🗖 🗖 42	57 🗖 🗖 57 58 🗖 🗖 58		
	20 [] 20	43 🗖 🗖 43	59 T T 59		
12 🗖 🗖 12	28 🗖 🗖 28	44 🗖 🗖 44	60 T T 60		
13 🗖 🗖 13	29 🗖 🗖 29	45 🗖 🗖 45	61 [61		
14 🗖 🗖 14	30 🗖 🗖 30	46 🔲 🗖 46	62 🗖 🗖 62		
15 🔲 🗖 15	31 🔲 🗖 31	47 🔲 🗖 47	63 🔲 🗖 63		





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. Variable Name Variable Value Data Type Memory Allocat Initial Value \ WORD DISPLAY 16#0000 <Auto> ₩ ₩ NPUT_SW 0 BOOL <Auto> <Auto> <Auto> BOOL BOOL ₩ ₩ LIMIT_SW 0 0 RESET 4 ◀ F -RESET XMX100 — ())— Row O ĪPŀ LIMIT_SW INPUT_SW MOVE EN ENC Row 1 16#0000 DISPLAY 16#0000 %QW0.3.0 IN1 OUT Row 2 Row 3 Row 4 • ۶l
- 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.

	Variable Name	Data Type	Memory Allocat	Initial Value	Variable Kind	Used
	DISPLAY	WORD	<auto></auto>		VAR	*
	INPUT_SW	BOOL	<auto></auto>		VAR	*
	LIMIT_SW	BOOL	<auto></auto>		VAR	*
	RESET	BOOL	<auto></auto>		VAR	*
	T					<u> </u>
	_T1S F	RESET			2	MX100 📕 💳
Row O	⊢Ĩ PĨ ⊢ →	I∕I——			~	<u>~</u> –
Row 0 Row 1		IZI PUT_SW I I	MOVE EN ENO-			Õ
		∕ ───	EN ENO-	0.3.0		<u> </u>
Row 1		IZE PUT_SW IE	EN ENO-	0.3.0	×	~~

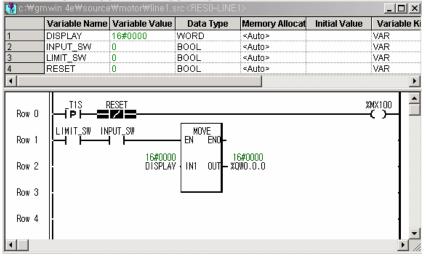
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7.9.2 Online Edit Write

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)

х

• 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.

and all and head and	
Programs were changed. Would you like to write upload progra	m to the PLC?
Not show this dialog box next tim (If you check this,upload program will disconnecting to the PLC.)	
Write Now	Write during Disconnecting

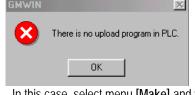
- Write Now: the upload is written immediately to PLC.
- Write during Disconnecting: when selecting [Online]-[Disconnect], the upload file is written to PLC.
- Not show this dialog box next time: If selecting it operates like [Write during Disconnecting] and the dialog box doesn't appear any more. (if 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]

GMWIN					×
8	These is no res Caution : if it is therefore it car would you cor	not connecte n't save upload		upload progran	n to PLC.
	Г	<u>R</u> etry	Cancel	1	

- 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.



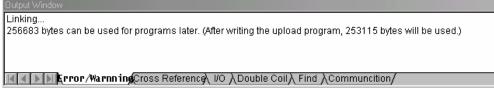
In this case, select menu [Make] and write to PLC to do [Upload Project From PLC].

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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].

Area Edit				2
Resource Resou	irce O	Size		Open
C Resou	irce 1	C Doubl	e word	Save
C Resou	irce 2			Read to PLC
C Resou				Write to PLC
Area	Hex	Dec	Unsigne 🔺	Edit
%MV/0	16#0000	0	0	Initialize
%MVV1	16#0000	0	0	initialize
%MW2	16#0000	0	0	Close
%MW3	16#0000	0	0	Cluse
%MVV4	16#0000	0	0	
%MVV5	16#0000	0	0	
%MVV6	16#0000	0	0	
%MVV7	16#0000	0	0	
%MVV8	16#0000	0	0	
%MVV9	16#0000	0	0	
%MVV10	16#0000	0	0	
%MVV11	16#0000	0	0	
%MVV12	16#0000	0	0	
%MW13	16#0000	0	0	
%MVV14	16#0000	0	0	
%MVV15	16#0000	0	0	
≪MNA/1.6	16±0000	n		

- 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].
 XM Area Editing File Select
 Look in: C Dutput
 Dutput
 Dutput
 Dutput

) iine1.mwd Iine2.mwd		
File <u>n</u> ame:	line2.mwd	<u>O</u> pen
Files of type:	الالم المراجع المراجع المراجع MX (۲.MWD)	Cancel

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×



- 2) Save
 - It saves the written %M area file.
 - Click [Save].

Save As					<u>? ×</u>
Save in	🗀 Output		•	+ 🗈 💣 🎟+	
My Recent Desktop My Documents My Documents My Computer	Dine1.mwd				
My Network	File name:	line1		•	Save
Places	Save as type:	%M Area Edit Files (*.MWD)		▼	Cancel

- 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].

Hex	🔿 Dec
O Unsigned Dec	O Real
%MVV0 : 16#	:0000
	0000

- 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...].

PLC Information							>
System-							
PLC type:	GM4B		PLC version	:	v2.6		
PLC mode:	Run		Restart type:		COLD		
Key position:	Pause/Remot	te	PLC state:	Warnir	ng		
Memory pack:	Type4		GMWIN conr	nection:	Local		
Mode transfer s	source: N	lode chai	nged by GMW	'IN			
Remote acces	s right:	Yes					
Forced I/O:	Off		I/O module s	skip:	≺en	npty≻	
Scan time							
Max: 8 ms	Min:	1 ms		Cur.:	3 ms		
Current time							
FRI 2002.10.0	04 17:16:44					iet	
				Close		Help	

To set or modify the current time,

Click current time [Set] from PLC information dialogue box to call [Date/Time Set] dialogue.

	^
	Synchronize with PC Clock
Date	Time
2002 . 10 . 04	17 : 16 : 14
ок с	ancel Help

- 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..].

Module Change Error		
More Error/Warning Info	rmation	
More Error/Warning Info Base 0,Slot 5	rmation	
	rmation —	

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].

DT#2003-10-7-16:34			
OT#2002-10-4-17:16 OT#2002-10-4-14:39			
DT#2002-10-4-14:39 DT#2002-10-4-14:24			
DT#2002-10-4-14:24			
DT#2002-10-4-11:18	:40.200 41		
DT#2002-9-26-13:46			
DT#2002-9-26-13:45			
OT#2002-9-26-11:26 OT#2002-9-26-10:29			
DT#2002-9-26-10:29 DT#2002-9-17-14:42			
DT#2002-9-17-14:22			
DT#2002-9-17-14:20	:22.000 41		
DT#2002-9-17-14:19			
DT#2002-9-17-14:17			
DT#2002-9-17-14:12	:2.620 34		
		I	
	More	Update	Delete

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..].

	<u>^</u>
Cause of error Desertion or insert of module is occurred during run.	Close
Method of fixing error 1. After confirmming desertion/insertion of module, restart.	



8.1.5 Mode Change History

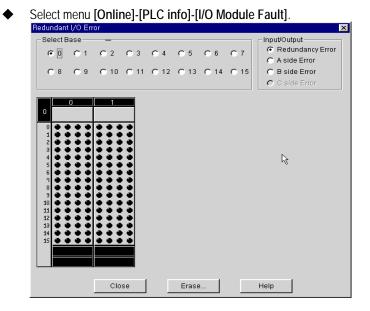
This shows the history that PLC mode is changed.

Select menu [Online]-[PLC info]-[History]-[Mode Change History].

DT#2002-10-4-17:1	6:44.840 Run C 6:44.840 Stop	OLD	
DT#2002-10-4-17:1	6:44.840 Run V		
DT#2002-10-4-14:3 DT#2002-10-4-14:2			
DT#2002-10-4-14:2			
DT#2002-10-4-14:2			
DT#2002-10-4-14:2			
DT#2002-10-4-14:1 DT#2002-10-4-13:5		OLD	
DT#2002-10-4-13:5		OLD	
DT#2002-10-4-13:5			
DT#2002-10-4-13:5 DT#2002-10-4-13:5		OLD	
DT#2002-10-4-13.5			
DT#2002-10-4-12:1			
	More	Update	Delete

8.1.6 How to view I/O failure detail information

This shows the failure information of I/O contact for redundant system.



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

lt sh

Select base —		
0		Close
		Help
I/O configuratior	۱	
Slot 0	DEF_EMPTY	
Slot 1	POSITION CONTROL (open collector) 3-CH MODULE	
Slot 2	DEF_EMPTY	
Slot 3	DEF_EMPTY	
Slot 4	POSITION CONTROL (pulse) 2-CH MODULE	
Slot 5	POSITION CONTROL (line driver) 1-CH MODULE	
Slot 6	DEF_EMPTY	
Slot 7	DEF_EMPTY	
	Write at I/O Parameter	 [

Designate Base number.

If designating Slot no. in I/O type setting dialogue box, it is available to read the information of special module. × Base

Special/Link module additional information		
PPO3 2002 06 V21		
	Close	

I/O Synchronization 8.2.2

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 Instance		×
Resource	Instance	ОК
RES0 RES0	LINE1 LINE2	Help
	LINE2	
Program File: c:\gmwin 4e\so	urce\motor\line2.src	

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></auto>		VAR
2	ABC_ADD	21	SINT	<auto></auto>		VAR
3	ADD	0	SINT	<auto></auto>		VAR
4	LIMIT_SW1	1	BOOL	<auto></auto>		VAR
5	MOTOR1	1	BOOL	<auto></auto>		VAR
6	SWITCH1	1	BOOL	<auto></auto>		VAR
•						►
Row 0 Row 1 Row 2	SWITCH1	EN EN	21		MOTOR1	
Row 3 Row 4		1 IN2				
Row 5	ļ					• //

(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.

	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Variat
	ABC	20 🕳	SINT	<auto></auto>		VAR
2	ABC_ADD	21	SINT	<auto></auto>		VAR
}	ADD	0	SINT	<auto></auto>		VAR
	LIMIT_SW1	1	BOOL	<auto></auto>		VAR
j	MOTOR1	1	BOOL	<auto></auto>		VAR
<u>)</u>	SWITCH1	1	BOOL	<auto></auto>		VAR
Dom 1	LIMIT_SW1		1			
Row 1 Row 2 Row 3 Row 4	LIMIT_SW1 P 	EN ADD EN EN ABC IN1 OU 1 IN2	21			

- (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].

	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Variab
1	ABC	20	SINT	<auto></auto>		VAR
2	ABC_ADD	21	SINT	≺Auto≻		VAR
3	ADD	0	SINT	<auto></auto>		VAR
4	LIMIT_SW1	1	BOOL	<auto></auto>		VAR
5	MOTOR1	1	BOOL	<auto></auto>		VAR
6	SWITCH1	1	BOOL	<auto></auto>		VAR
•						•
Row 1 Row 2	LIMIT IF Var	/ariable Data iable Name: IC		OK		
Row 3 Row 4 Row 5				Help		•

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].

Monitoring A	rray Variables	1	×
Name :	ARR	OK	
Indine .	000	Cancel	
Index :	2	Help	

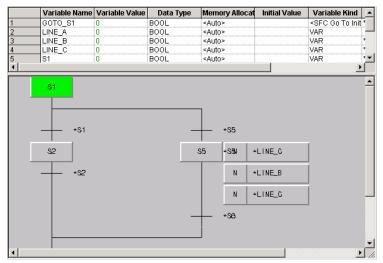
- After inputting the desired element no. to monitor in the 'Monitoring Array Variables' dialogue box, and click [OK]. It is available to monitor array variable by using a short-cut key instead of 'Monitoring Array Variables' dialogue box.
- Move the cursor to the array variable to monitor.
- To increase the element no., input $Ctrl+\uparrow$ and to decrease it, input $Ctrl+\downarrow$.



8.3.2 SFC Monitoring

0

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

	Variable I	Vame Vai	iable Value	Data Type	Memory Allocat	Initial Value	\ <u></u> ▲
1	_28	0		BOOL	<auto></auto>		VÆ
2	OUT1	0		BOOL	<auto></auto>		V/
3	OUT2	0		BOOL	<auto></auto>		VÆ
4	SW1	0		BOOL	<auto></auto>		VÆ
5	SW2	0		BOOL	<auto></auto>		V/
6.	18\A/3	10		BUUI	<auto></auto>		VI 🔨
•]		<u> </u>
Nu	Ins	Input P	a Vari	able	User Defi	Value	
כ	LD		S₩1	0			
1	ST		OUT1	0			
2	LD		_2S	0			
3	ST			.0.20			
4	LD		S#2	0			
5	AND		S#3	0			
6	AND		S₩4	0			
7	AND		S#5	0			
3	AND		S#6	0			
Э	AND		S#7	0			
10	AND		S#8	0			
11	AND		S#9	0			-
4							ЪĒ

2) How to write forced variable

Double click the line of forced variable to write.

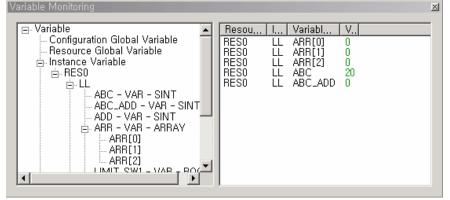
FUICE VAIIADIE Data	
Variable Name:	ок
ARRY[0]	Cancel
Value:	Help

- 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.

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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 Confiduration global variable.
- Select the variable to monitor.

2) Selection of resource global variable

It registers Resource global variable.

- 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].

Input Direct Variable	×
Direct Variable :	
%MVV0-%MVV10	
Ex) %IX0.0.0 Or %QX0.1.0-%QX0.1.8	
OK	Cancel

5) Registration of system flag

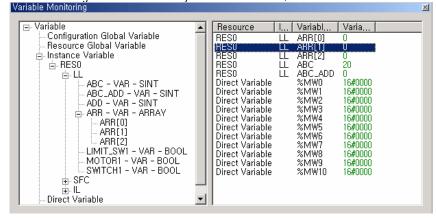
- Select the flag to monitor.

The registered variables shall be displayed in variable list.

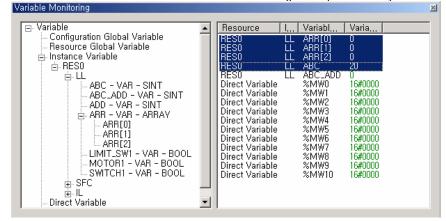


8.4.2 How to delete the registered variables

♦ 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.

- Variable	Resource	l	Variabl	Varia	
- Configuration Global Variable	RESO	LL	ARR[0]	0	
Resource Global Variable	RESO	ĹĹ	ABB[1]	Ō	
📥 Instance Variable	IRES0	LL	ARR[2]	0	
🗍 🛱 RESO	RESO	LL	ABC	20	
	RESO	LL	ABC_ADD	0	
ABC - VAR - SINT	Direct Varia		%MW0	16#0000	
ABC_ADD - VAR - SINT	Direct Varia		%MW1	16#0000	
ADD - VAR - SINT	Direct Varia		%MW2	16#0000	
🖻 ABB - VAB - ABBAY	Direct Varia		%MW3	16#0000	
	Direct Varia		%MW4	16#0000	
- ABB[1]	Direct Varia		%MW5	16#0000	
ABB[2]	Direct Varia		%MW6	16#0000	
LIMIT_SW1 - VAR - BOOL	Direct Varia		%MW7	16#0000	
MOTOR1 - VAR - BOOL	Direct Varia		%MW8	16#0000	
	Direct Varia		%MW9	16#0000	
SWITCH1 - VAR - BOOL	Direct Varia	ble	%MW10	16#0000	
i SFC					
i⊥. IL Direct Variable					



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].

Option					? ×
Make Option	Monitor/Debug Opt	ion Auto Save Set	Folder Connec	tion Option Ge	neral Option
_ Monitor o	ption ———				
Monito	or display type ——				
•	Display as Default ⁻	Гуре			
0	Dispplay as Decim	al			
0	Display as Hexa				
SFCr	nonitor				
L E	SFC Auto Scroll				
-Debug of	ption				
۹	Point	C Line			
			OK	Cancel	Help

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.

Force Variable Data	x
Variable Name:	ОК
ABC	Cancel
Value:	Help
20	

- 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. Force Variable Data

Variable name:	%IX0.0.0	ок
-Kind		Cancel
 Force I/O 	🗖 Data 🗖 Flag	Help
C Force interna	al memory 🔲 Data	

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 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.

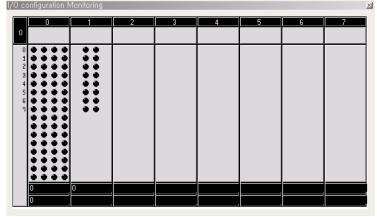
1) Base selection

μЩ

Select popup menu [Base] from I/O monitoring window to call the base selection dialogue box.

Selection of Base		×
Select a Base Nu	ımber. (0	3)
2		
ОК	Cancel	Help

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



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].

									_
No	Туре	Class	From	Area To Area		S Mode	Trx	Err	0 🔺
0	Loca IO, SendO	D(200ms)	%MWO		1	0	0	0	
1	Loca15.Receive0	D(200ms)		%MWO	1	0	0	0	
2	Loca10.Send1	D(200ms)	%MW10		3	0	0	0	
3	Local10.Receive1	D(200ms)		%MW20	10	0	0	0	
4						0	0	Ō	
5						Ū.	ñ.	Ő.	
6						ň	ň	ň	-

When changing the link number, use popup menu as follows.
 Select link parameter...



• If selecting [Select link parameter] the following dialog box appears.

<u>, e</u>	ieut Link Falanietei		<u> </u>
	- HS Link Parameter -	ОK	
	HS link1	Cancel	
	C HS link2	Cancer	
	C HS link3		
	C HS link4		



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]

<u>D</u> ebug <u>T</u> ools <u>W</u> indow <u>H</u> elp	
Debug <u>S</u> tart	
T Go	Ctrl+F9
The Step Over	Ctrl+F8
🖓 Step In	Ctrl+F7
{∱ Step O <u>u</u> t	
📥 <u>P</u> ause	
*{} Run To Curs <u>o</u> r	Ctrl+F2
^B _↓ Insert/Remove <u>B</u> reakpoint	Ctrl+F5
Breakpoint List/ <u>C</u> ondition <u>T</u> ask Enable	

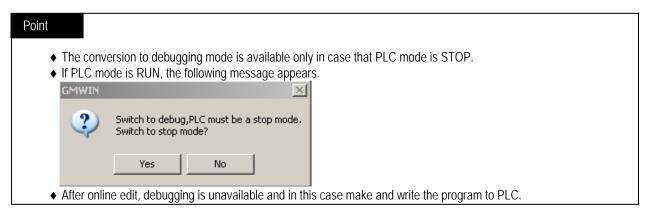
- [Step Over]: The method to find program error by proceeding the program step by step.
- [Step In]: The method to find the user defined FB.
- [Step Out]: The method to out from debugging the user defined FB.
- ♦ [Run To Cursor]: starts debugging to the current cursor position.
- [Insert/Remove Breakpoint]: 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





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]-[Ins	ert/Remo	/e Breakp	oint (Ctrl-	+F5)].

	Variable Name	Variable Value	Data Type	Memory Allocat	Initial Value	Variable I
1	A	0	BOOL	<auto></auto>		VAR
•						•
Row O		RESET			5	MX100
Row 1	LIMIT_SW IN	PUT_SW	EN ENO			
Row 2		16#0000 DISPLAV) 7.IN1 OUT 2	16#0000 QW0.0.0		
Row 3						
Row 4	LIMIT_SW2					PUMP
Row 5	SW10	SW11 SW12	SW13			FAN1
C (^	VALVE	MAX				
•						<u>ا ا ا</u>

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.

	eak point is deleted here, the break point set in the program sha
•	Select menu [Debug]-[Breakpoint List/Condition].

	File Name	Instance Name	Line Number	No of times	
1	udint_to_tod.src	UDINT_TO_TOD	(2,1)	1	
1	udint_to_tod.src	UDINT_TO_TOD		1	
1	udint_to_tod.src	UDINT_TO_TOD	(2,31)	1	

It is available to view and delete the currently set break points all and available to reduce the break number.

Click [OK].

PowerEn.ir

- (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] . Edit Break Count	x
Source udint_to_tod.src	ОК
Line number: (2,1)	Cancel
Number of times to 1	

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.

reakpoints Break Condition	
Scan break	
🔽 Enable scan break	Number of scans 0
Variable break	
🔽 Enable variable break	- When
During 1	
Variable name Browse	C Write(<u>W</u>)
	C Read or Write(B)
Value break	
🔽 Enable value break	
Value to break : 21	

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].



x Kind ОK O Configuration global variables Cancel C Resource global variables Help ● Instance variables Ex) %IX0.0.0 O Direct variable Resource ⊻ariable list VAR VAR INT INT Resource0 • ABC ADD ABC VAR BOOL INPUT OUT1 VAR BOOL Instance: OUT2 VAR BOOL OUT3 OUT51 BOOL BOOL UDINT_TO_TOD • VAR VAR OUTPUT VAR INT

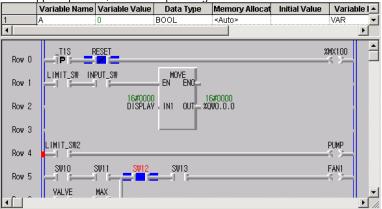
- After selecting the variable in variable registration dialogue box, click [OK].
- Select one from option button starting [When.] [Read]: stops when reading the variable [Write]: stops when writing the random value to the variable. [Reading/Write]: stops when reading or writing random value to the variable
- 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.

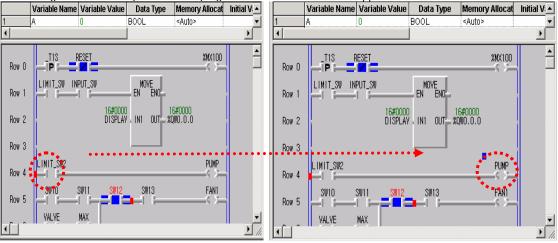
In case of setting by contact unit, it is available to execute the program and debug by one contact or function/function block. In case of setting by rung unit, execute the program and debug by rung unit.

First select menu [Option]-[Monitor/Debug Option] and then select Debug option by contact unit or rung unit.

Jption	<u></u>
Make Option Monitor/Debug Option Auto Save Set Folder Password Genera	l Option
Monitor option	
Monitor display type	
 Display as Default Type 	
C Dispplay as Decimal	
C Display as Hexa	
SFC monitor	
F SFC Auto Scroll	
Debug option	
Select LD debug unit	
C Line	
OK Cancel	Help

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]

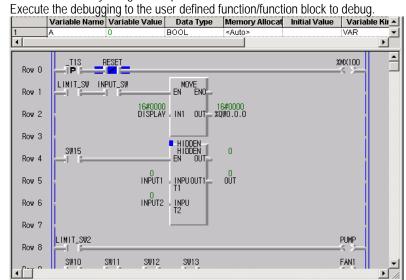
[After]

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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.



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].

Enable Task				x
Enable/Disal	Task list			E a l'inca
Disable	PROHIBIT	(SINGLE := %10.3.0,	PRIORITY :	Enabling
				Enable
				Disable
				Enable all
				Disable all
		ОК	Cancel	Help

- 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)].

	Variabl	e Name	Variable V	alue	Data Type	M	lemory Allocat	Initial Value	Vari_
1	DATA1		16#0000		INT	<	Auto≻		VAR -
•									▶
Nu	ln	Input	Param	٧a	riable		Value	Line Co	Variab
0	LD			%IX	0.0.0		16#00		
1	ST			MOT	OR3		16#00		
2	LD			DAT	A1		16#0000		-
3	ADD	IN1:=		CUF	RENT RESULT				
4		IN2:=		DAT	A2		16#0000		
5	ST			DAT	АЗ		16#0000		
6	LD			SWI	TCH3		16#00		
7	ST			LAM	IP3		16#00		
8	NOP								-
•									

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.

	eak Condition	1	<u> </u>	1 x x x	
Res No	File Name	Instance Name	Line Number	No of times	
1	noname00.src noname00.src	IL IL	1	1	
1	nonameoo.sit		1	1	
		Edit(E		ete(D) De	lete Al
		EUIILE		(D) De	

- It is available to view and delete the currently set break point all and available to reduce the break number.
- Click [OK].

POWEREN	ter 9. Debugging
PowerEn.ir	
(*	I) Delete
	 Select the break point to delete in the list box. Click [Delete].
(2	2) Delete All
	Click [Delete all].
(3	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]. Edit Break Count
	Source ik.src OK Line number : 1
	Number of times to 1

• 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	e Name	Variable Va	lue Da	ita Type	Memory Allocat	Initial Value	Vari 🔺
1	DATA1		16#0000	INT		<auto></auto>		VAR 🔻
•						1		
Nu	ln	Input	Param	Variab	le	Value	Line Co	Variabl
0	LD			%IXO.O.	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			DATAG		16#0000		
6	LD			S#ITCH3		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.



	Variable Na	me Variable	Value	Data Type	Memory Alloca	t Initial Value	Vari
1	DATA1	16#0000		INT	<auto></auto>		VAR 💌
•							►
Nu	In In	put Param.	Va	riable	Value	Line Co	Variabl
0	LD		%IX	(0.0.0	16#00		
1	ST		MOT	'0R3	16#00		
2	LD		DAT	'A1	16#0000		
3	ADD IN1	:=	CUF	RENT RESULT			
4	I N2	2:=	DAT	'A2	16#0000		
5	ST		DAT	'A3	16#0000		
6	LD		S₩I	TCH3	16#00		
7	ST		LAM	1P3	16#00		
8	NOP						-
•							

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:

	Variable	e Name	Variable Va	lue	Data Type	Me	emory Allocat	Init	ial Value	Vari 🔺
1	DATA1		16#0000		INT	<a< th=""><th>luto≻</th><th></th><th></th><th>VAR 🔻</th></a<>	luto≻			VAR 🔻
•										►
Nu	ln	Input	Param	Va	riable		Value	Line	Со	Variabl
0	LD			%IX	0.0.0		16#00			
	ST			MOT	OR3		16#00			
2	LD			DAT	A1		16#0000			
3	ADD	IN1:=		CUR	RENT RESULT					
4		IN2:=		DAT	A2		16#0000			
5	ST			DAT	AS		16#0000			
6	LD			S₩I	ТСНЗ		16#00			
7	ST			LAM	P3		16#00			
8	NOP									•
•										

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)].

S1 N ACTION1 + T1 TBAN1	2	3
S2 N ACTION2 + T2 TRAN2	S4 N ACTION4	S5 N ACTION5
S3 N ACTION3		

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.

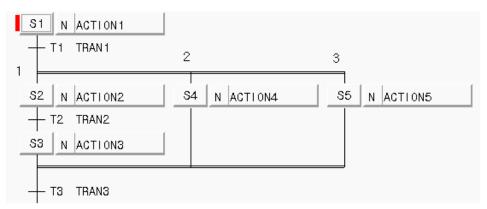
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9.3.2 Step Over

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.

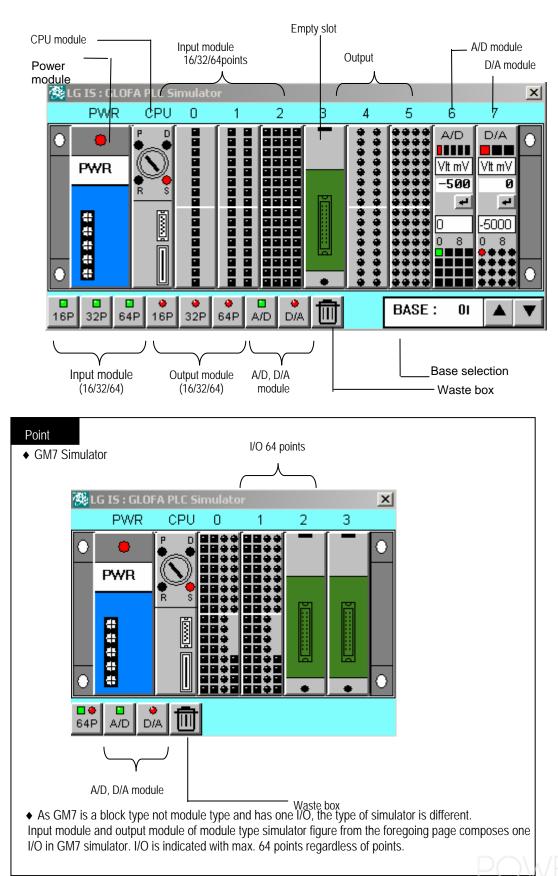
	ool]-[Start Simulation].	
Make All		×
Output File :	line1.BN0	
Lines compiled	1:	
Status :	Make completed	
	av. 1	
	ОК	

After the execution file is made as the above, click [OK].

😤 LG	G IS : GLOF	A PLC Sir	nulato	r							×
	PWR	CPU	0	1	2	3	4	5	6	7	
	•									_	
<u> </u>		$\overline{\mathbf{N}}$				ě					Ĕ
_	PWR	×,				-					
		R S	•			-	ē	l	l	ē	
	4 4	Ň									
	4					ž					
						ž					
						-	•	•	•	٠	\mathbb{M}
16P	32P 64		● 32P	04P A/		一冊	ſ	BASE	: 01		
TOP	32F 04	I TOP	JZP	04F A/							

• The screen that enables to conduct the simulator function as above appears.





The explanation for GLOFA PLC Simulator is shown as below:

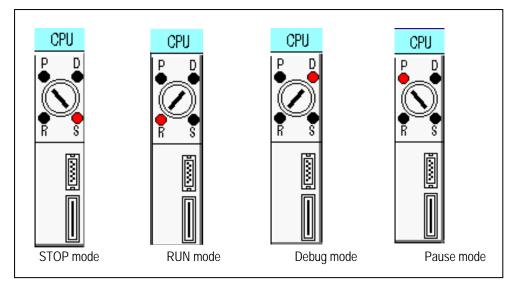


10.3 How to install/delete Module

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
Х	0 ~15	16 ~31	32 ~63
В	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

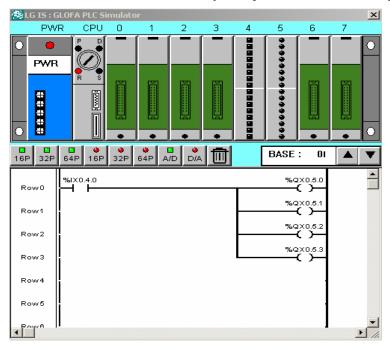
• Drag the desired slot module to delete by using a mouse to the waste box.



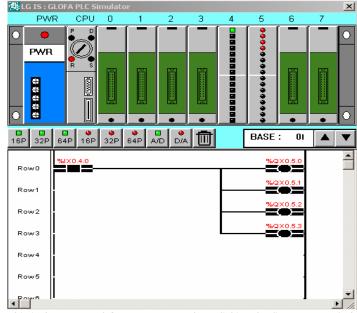
10.4 Simulation

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.

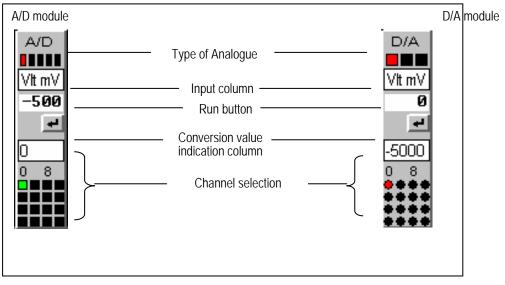


10.4.2 Power simulation

- 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 (\pm 5V, \pm 10V, \pm 20,4 \sim 20 mA) and D/A output power (\pm 5V, \pm 10V, 4,20 mA).
- 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:mV, current: #A 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 $\pm 5V$ (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

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low/high limit, take the low/high value.

(Example)

If digital value 17000 is inputted in the state that analog type is $\pm 5V$ (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

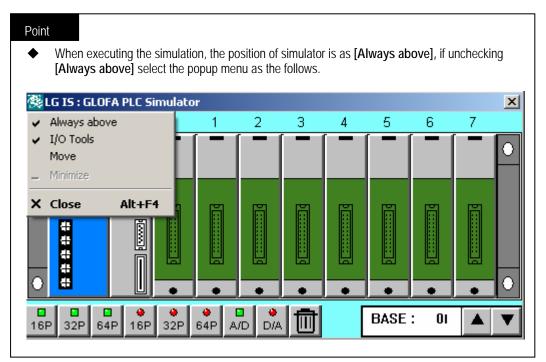
For details, refer to Chapter 9. Debugging function.

- 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].





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.

Name	Var, Kind	Allocation	Used	Data Type	Initial value	Comments	
4	VAR	<auto></auto>	10000	BOOL	India value	Commente	 <u>F</u> lag
ABC	VAR	<auto></auto>		INT			Global
ABC_ADD	VAR	<auto></auto>		INT			
ADD	VAR	<auto></auto>	*	SINT			Direct <u>V</u> ariabl
Э	VAR	<auto></auto>		BOOL			
LIMIT_SW1	VAR	<auto></auto>		BOOL			<u>A</u> dd
MOTOR1	VAR	<auto></auto>		BOOL			
SWITCH1	VAR	<auto></auto>		BOOL			Delete
							<u>E</u> dit
							Help

- 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.

Direct	variable Cull	Intent	<u> </u>
Vari	able Name :	%QX0.7.0	
The	e signal of valv	/e 1	
	ок	Cancel	Help

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.

)irect Varia	Comments		
QX0.7.0	The signal of valve 1		
		ок	Help



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.

Project window	1
📾 PLC Type : GM4, line1,prj Writer :	
CONFIGURATION(PLC) : UNNAMED	
ACCESS VARIABLES : 0 variables declared,	
🕒 Direct variable Comments : 1 variables declared,	
BESOURCE(CPU) 0 : RESO	
RESOURCE GLOBALS : 0 variables declared,	
📄 🗁 Scan Program	
🔲 🗈 INSTO : c:\gmwin 4e\source\line1.src	
🖃 💽 TASK DEFINITIONS : 2 variables declared.	
📲 Single	
📄 Interval	
📄 Interrupt	
- Hot Restart	-
Project V. Parameter Library	

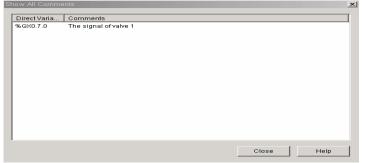
Double click or select popup menu [Properties].

Address	Direct Variables	
%IX0.0.0		
61×0.0.1		
61×0.0.2		
6IX0.0.3		
%IX0.0.4		
%IX0.0.5		
%IX0.0.6		
%IX0.0.7		
%IX0.0.8		
%IX0.0.9		
%IX0.0.10		
%IX0.0.11		
%IX0.0.12		
6IX0.0.13		
%IX0.0.14		
6		
7		
8		
9		

Input the address to write the comment in [Address %]. If inputting M0, Address is moved to the relevant column.

Address	Direct Variables	
%MX0		
%MX1		
%MX2		
%MX3		
%MX4		
%MX5		
6MX6		
6MX7		
6MX8		
6MX9		
6MX10		
6MX11		
6MX12		
6MX13		
6MX14		
6		
7		
8		
9		

To view the previously made comment, select [Show all].



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- 3) Direct variable edit
 - Copy: After selecting the comment to edit and if calling the popup menu the following dialog box appears.
 - Cut Ctrl+X Copy Ctrl+C Paste Ctrl+V
 - 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.

Address		Dir	ect Variab	les		
%MX0	SWITCH1					
%MX1						
%MX2						
%MX3						
%MX4						
%MX5						
%MX6						
%MX7						
%MX8						
%MX9						
%MX10						
%MX11						
%MX12						
%MX13						
%MX14						
16						
17						
18						
19						

Address	Direct Variables	
%MX0	SWITCH1	
%MX1	SWITCH2	
%MX2	SWITCH3	
%MX3	SWITCH4	
%MX4	SWITCH5	
%MX5	SWITCH6	
%MX6		
%MX7		
%MX8		
%MX9		
%MX10		
%MX11		
%MX12		
%MX13		
%MX14		
16		
17		
18		
19		

- 4) Compatibility with MS Excel
 - To use excel function, copy the direct variable comment and paste it to Excel

ddress %	MO	Show all	🖳 Bo			_	
52.0720.00 I		00000		A	В	С	D
Address	Direct Variables		1	SWITCH1			
NEMXO	SWITCHI		2	SWITCH2			
GMX1	SWITCH2						
6M032 6M033	SWITCH3 SWITCH4		3	SWITCH3			
6MX3 6MX4	SWITCH4 SWITCH5						
6MX5	SWITCH5		4	SWITCH4			
6M26	SMICIO		5	SWITCH5			
SMX7							
6MX8			6	SWITCH6			
exma			1 7				
sMX10			1				
6MX11			8				
6MX12			9				
6MX13							
sMX14			10				
5	-		11				
0			<u> </u>				
6 7 8 9		_	12				
	· · · · · · · · · · · · · · · · · · ·		13				
	OK	Cancel Help		N Shoot1	/Sheet2/Shi		

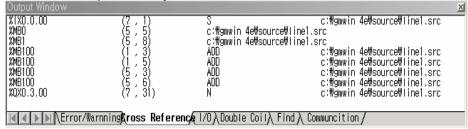




11.1.2 Memory Reference

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

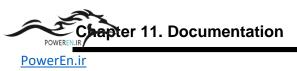
1) How to make the used I/O status table of direct variable

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].

output window														_
	15	14	13	12	11	10	9	8	7	6	5	4	3	
%IW0,0,0														
%QW0,3,0														Ť.
%MWO	1	1	1	1	1	1	1	1	1	1	1	1	1	1
%MW50									4	4	4	4	4	Ť 💌
K A D N Erro	Karning)Cross Reference 1/0 (Double Coil) Find Communcition /													

- 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 required 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 bun	dle is saved in the source fold	ler which is designated in [Option].
	GMWIN	x	
	Project hundle c;₩a	mwin 4e₩source₩line1 muk	

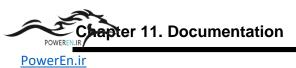
Project bullule i	Project bandle cowgni win 4ewsbarcewiner, mak				
is made successfully,					
	ок				

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 (1)].

		- (_ /]
Source	•	🗧 🗈 📸 🎟 -
☐ gm4b ☐ gm6 ☐ line1 ☐ MOTOR ☐ time_to_string 줽 line1,muk 줽 motor,muk		

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].

	P(1,1)		_	C Multi-page
	la			G Single page G Single page Single page G Single page G Single page G Single page Single page Single page G Single page G Single page Single page
2				
11	-n			
1				
17		-peqpeq		
=				
12				
2				
		<u> </u>		
2				

 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.

Project IL LD SF	c	Print
Project hierarchy	🗖 Library	Preview
Project contents	🔽 All programs	Setup
🔲 Basic parameter	✓ Title	
🔲 I/O parameter	Cross reference	Close
🗖 Link parameter	🗖 Used IO	
Margin 0		

- 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.

Print		×
Program	🗖 Variables	Print
Whole program		Preview
C Selected line		Setup
Condensation: 0	% (25~100%)	Close
Margin: 0		

- 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.



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