

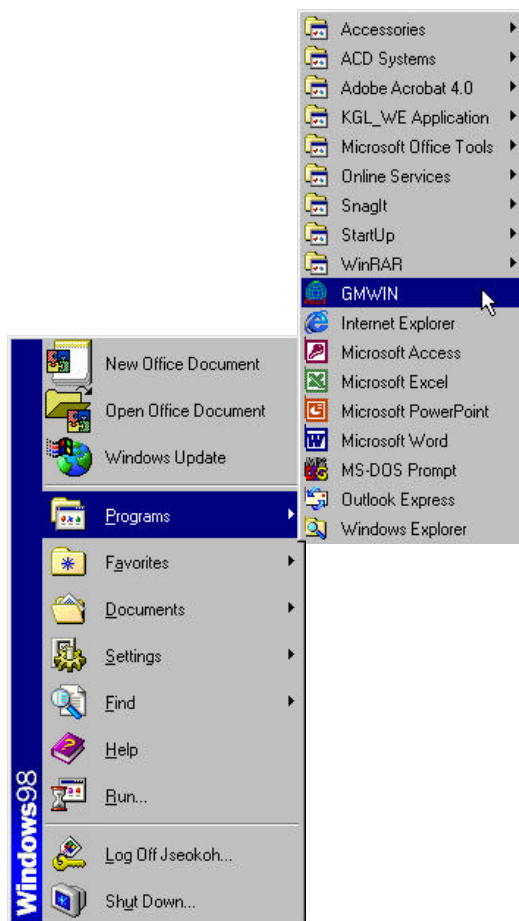
Chapter 3. Getting Started

GMWIN is a programming tool that compiles a program, makes an execution file, transfers a file to PLC, monitors and debugs PLC data. GMWIN uses the multiple document interface (MDI) method, so that it is possible to compile and debug several programs at the same time.

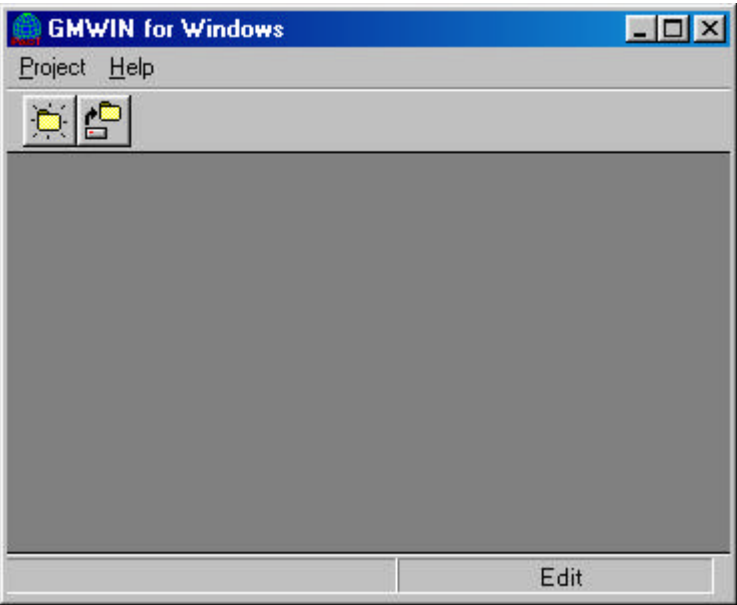
3.1. Create a Program




Click  button.
Click **Programs - GMWIN**.

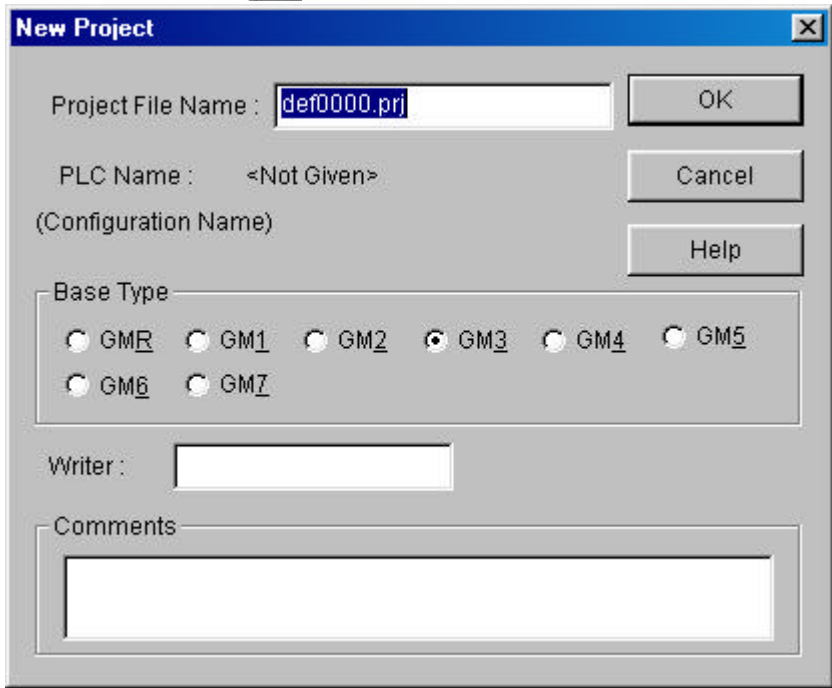


Then the initial window is shown as below.



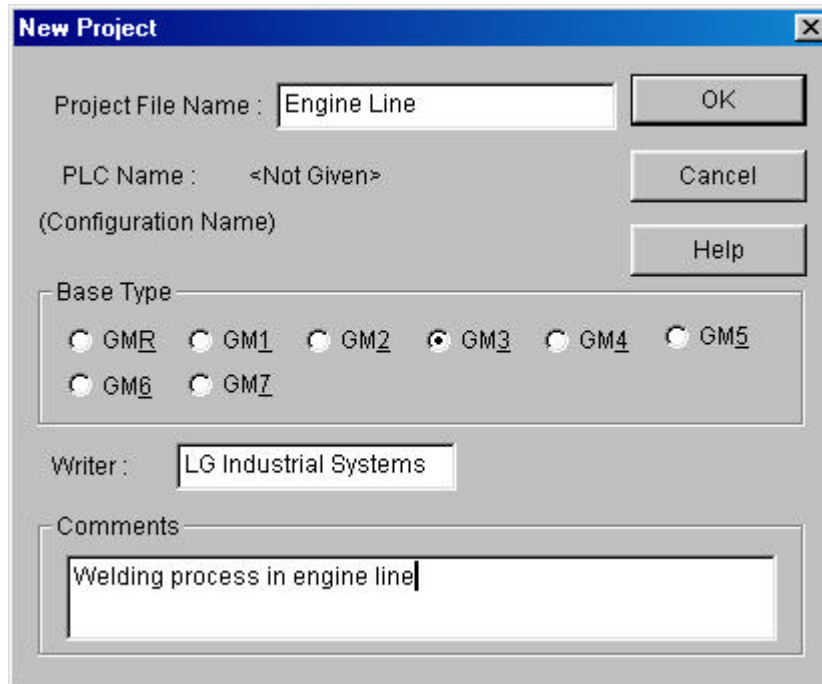
Step 1 : Create a Project

Click **New Project** ( icon or select the dialog box by clicking **Project - New...**



Enter the information to the text boxes on **New Project** dialog box.

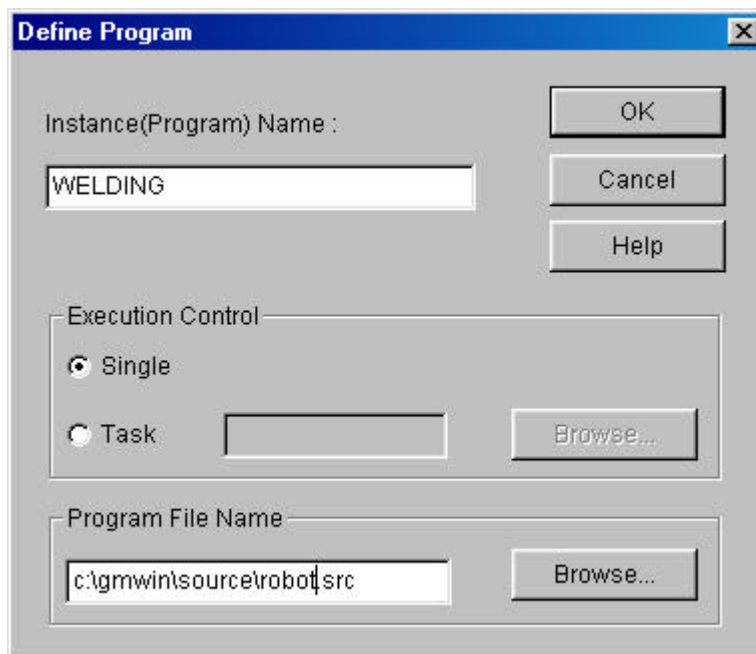
Project File Name	Engine Line
Base Type	GM3
Writer	LG Industrial Systems
Comments	Welding Process in engine line



Click **OK** button.

Step 2 : Define a Program

Enter the information on the **Define Program** dialog box.

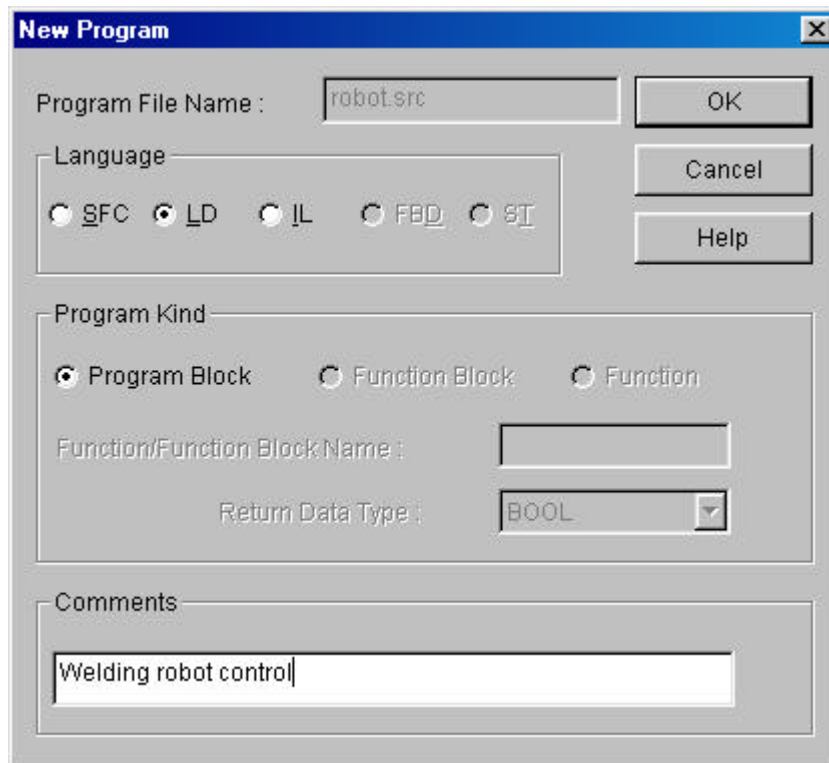


Enter an instance(program) name in **Instance Name** text box.

Enter ' robot.src' for Program File Name and click **OK** button.

Open **New Program** dialog box.

Select kind of language to use for the new program.
Type Comments for the description of the program in **Comments** box.
Press **Enter** or **OK** button.




The 'New Program' dialog box is shown with the following fields and options:

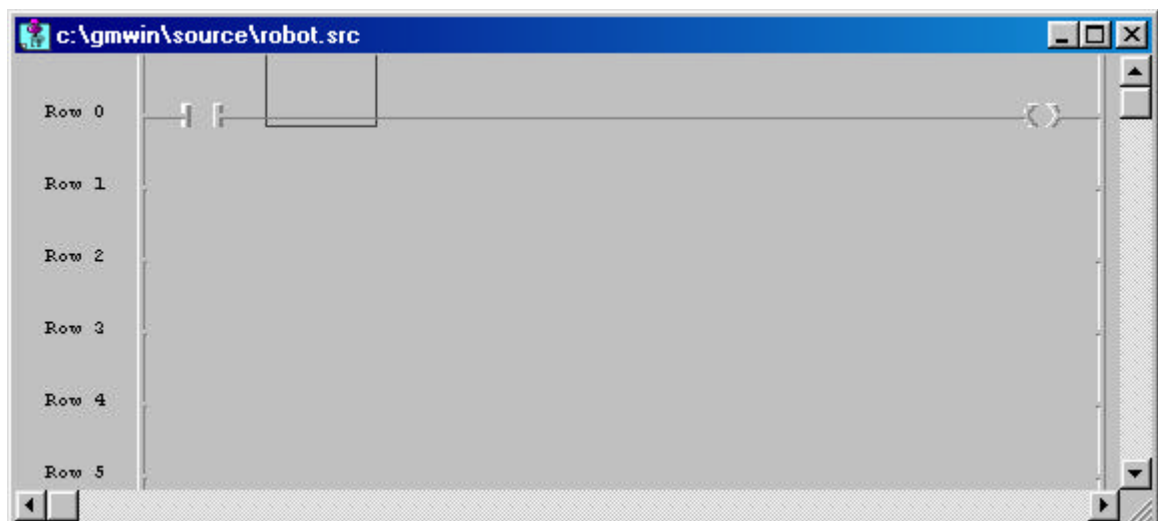
- Program File Name :** robot.src
- Language:**
 - ☐ SFC
 - ☒ LD
 - ☐ IL
 - ☐ FBD
 - ☐ ST
- Program Kind:**
 - ☒ Program Block
 - ☐ Function Block
 - ☐ Function
- Function/Function Block Name :** (empty text box)
- Return Data Type :** BOOL (dropdown menu)
- Comments:** Welding robot control

Buttons: OK, Cancel, Help

Step 3 : Editing a Program

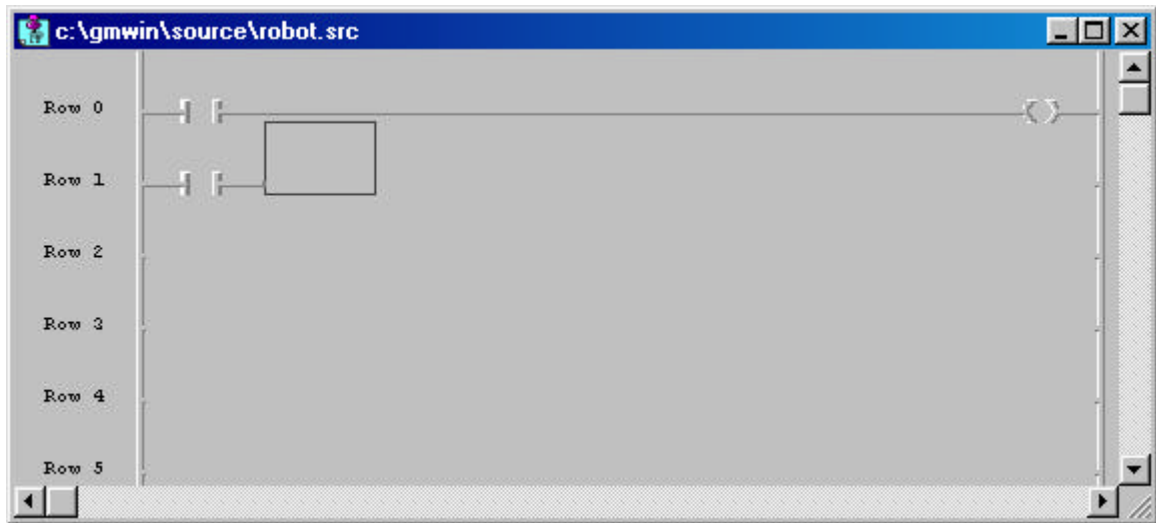
- 1) Input a contact and output coil
Click the left button of the mouse on the position of Row '0' and Column '1' in the LD window after selecting() icon in the toolbox.

Click the mouse on the right side of contact of  after selecting  the toolbox as below.




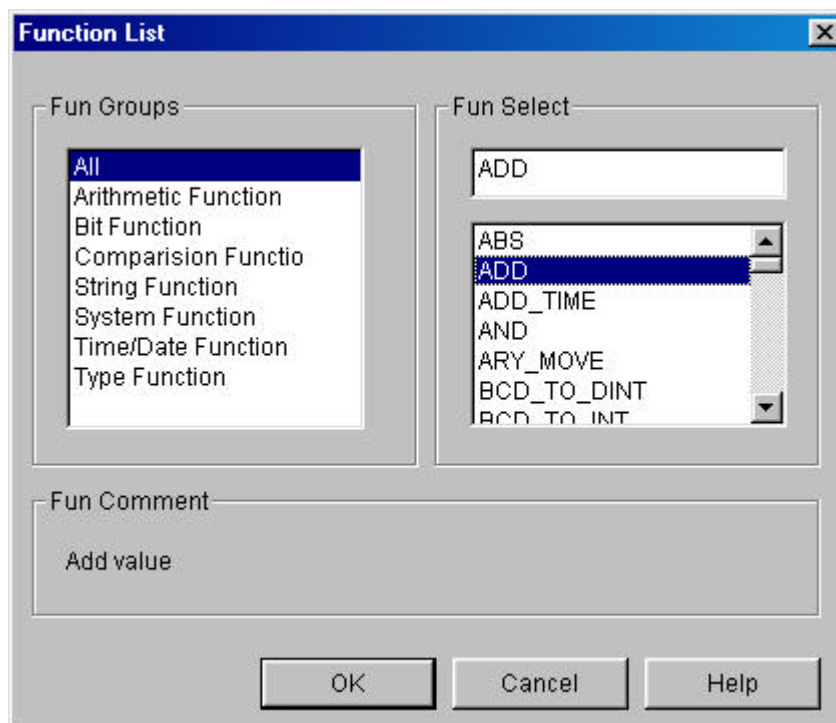
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Select  in the toolbox and click the left button on the location of Row ' 1 ' and Column ' 1 ' .

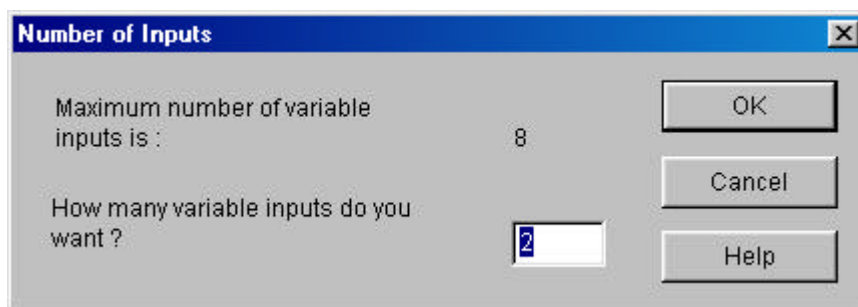


2) Insert a Function

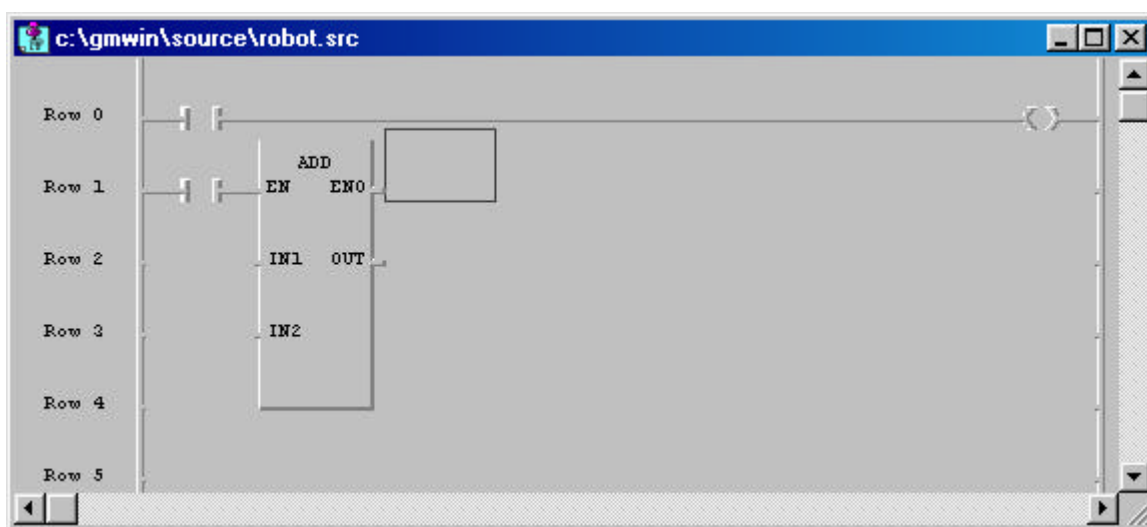
Select  in the toolbox using a mouse.
Click the left button of mouse on the position of Row ' 1 ' and Column ' 2 ' .




Select Arithmetic Function 'ADD' in **Fun Select** box and click **OK** button.

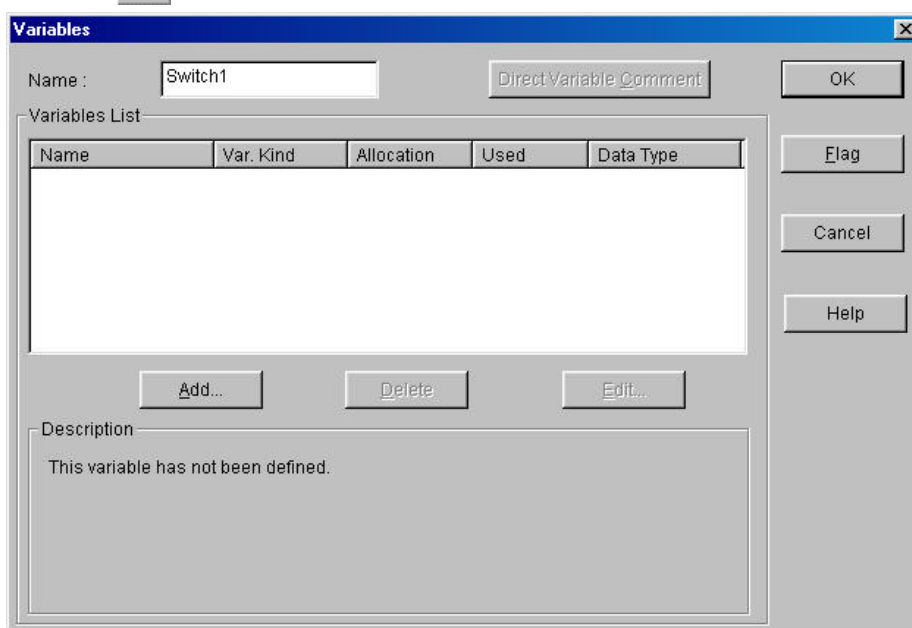


Enter ' 2 ' for the number of inputs.
Click **OK** button.



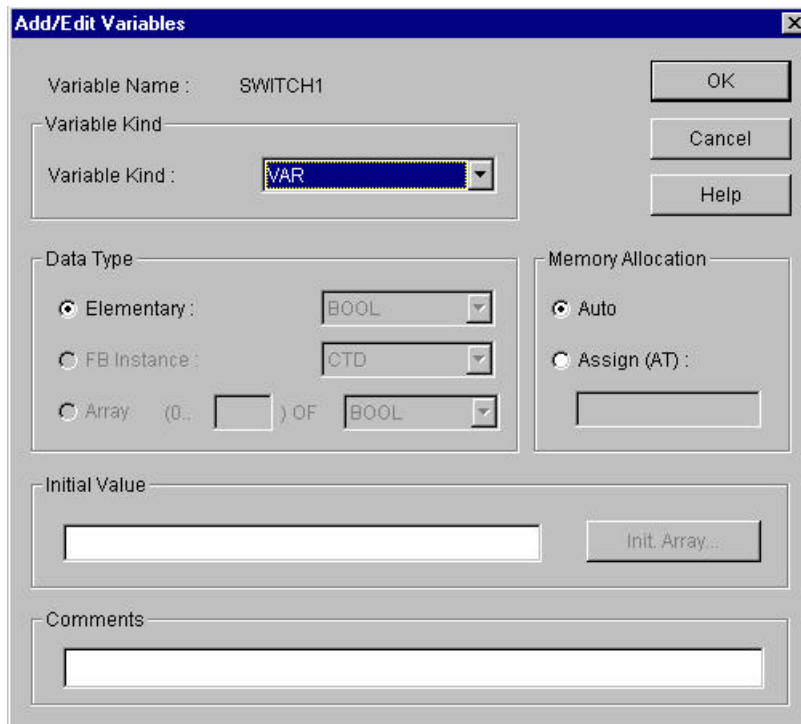
3) Variable Input

Select  in the toolbox and double-click the left button of mouse on the location  Row '0' and Column '1'.



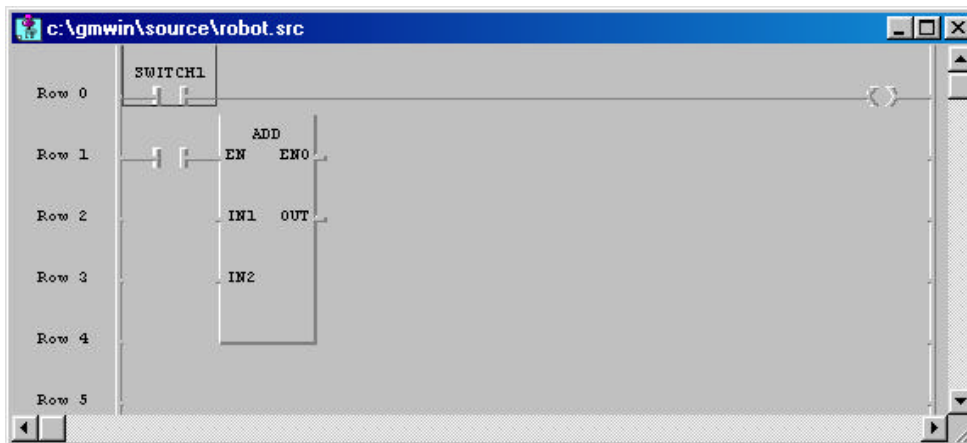
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Enter ' SWITCH 1' in the **Name** edit control.
Click **OK** button.

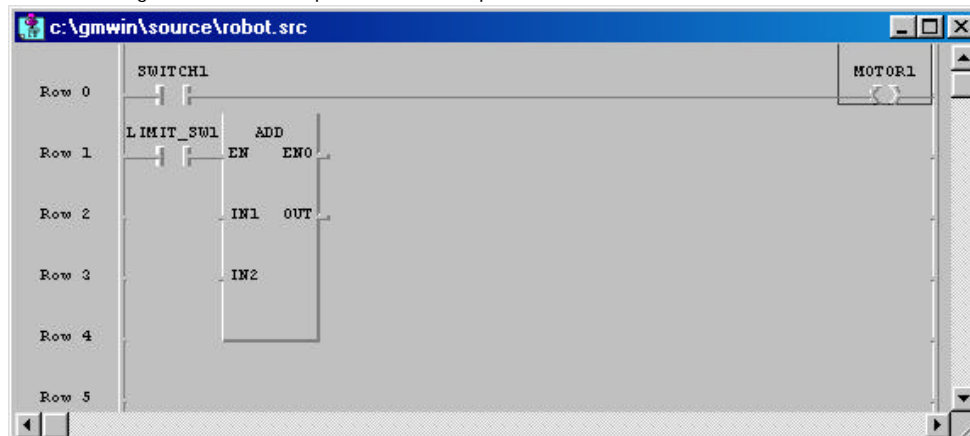


The 'Add/Edit Variables' dialog box is shown. The 'Variable Name' field contains 'SWITCH1'. The 'Variable Kind' dropdown is set to 'VAR'. The 'Data Type' section has 'Elementary' selected with 'BOOL' chosen from the dropdown. The 'Memory Allocation' section has 'Auto' selected. The 'Initial Value' field is empty, and the 'Comments' field is also empty. The 'OK', 'Cancel', and 'Help' buttons are visible on the right.

Click **OK** button.



How to assign a variable to output coil and the input contact for ADD Function are same as the above one.



Double-click the left button of mouse on the left of 'IN1' position (row '2', column '1') in the function 'ADD'.
Enter the variable name 'ABC' on the **Name** edit control in **Variables** dialog box.

Variables

Name :

Variables List

Name	Var. Kind	Allocation	Used	Data Type
LIMIT_SW1	VAR	<Auto>		BOOL
MOTOR1	VAR	<Auto>		BOOL
SWITCH1	VAR	<Auto>		BOOL

Description

This variable has not been defined.

Click **OK** button. Then **Add/Edit Variables** dialog box appears.

Add/Edit Variables

Variable Name :

Variable Kind

Variable Kind :

Data Type

☒ Elementary :

☐ FB Instance :

☐ Array : (0..) OF

Memory Allocation

☒ Auto

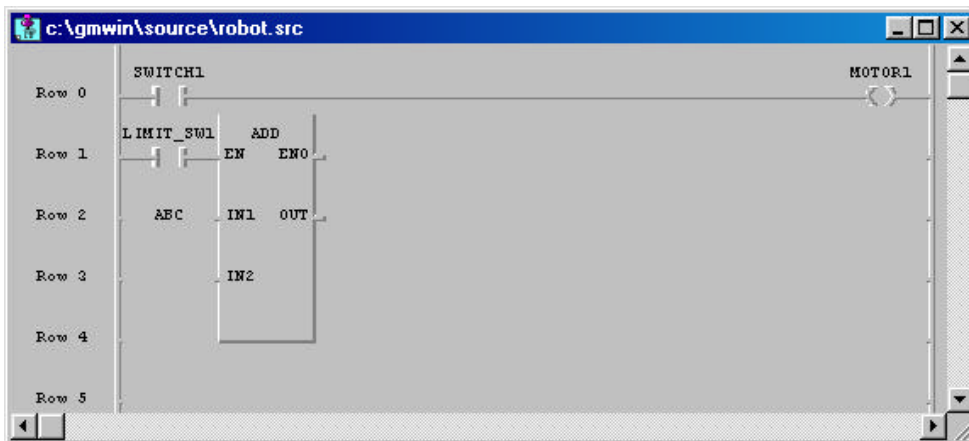
☐ Assign (AT) :

Initial Value

Comments

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Click **OK** button. Then variable name 'ABC' is assigned as 'IN1' of the function 'ADD'.



Double-click the left button of the mouse on 'IN2' position (Row '3', Column '1').

Then **Variables** dialog box appears.

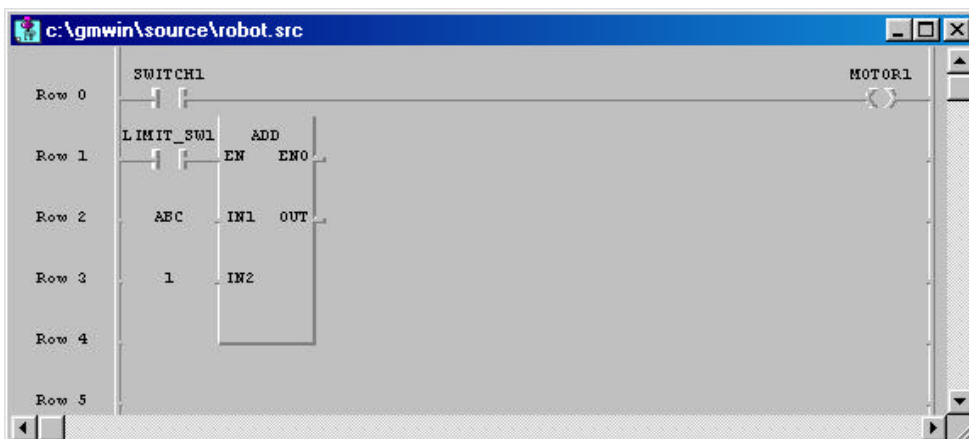
Enter Constant '1' in the edit control of **Name**.

The screenshot shows the 'Variables' dialog box. The 'Name' field contains '1'. The 'Variables List' table is as follows:

Name	Var. Kind	Allocation	Used	Data Type
ABC	VAR	<Auto>		SINT
LIMIT_SW1	VAR	<Auto>		BOOL
MOTOR1	VAR	<Auto>		BOOL
SWITCH1	VAR	<Auto>		BOOL

The 'Description' field contains the text: 'This variable has not been defined.'

Click **OK** button. Then Constant '1' is assigned as 'IN2' of the function 'ADD'.



Double-click the left button of the mouse on 'OUT' position (Row '2', Column '3') in the function 'ADD'.
Enter the variable name 'ABC_ADD' in the edit control of **Name** in the Variables dialog box.

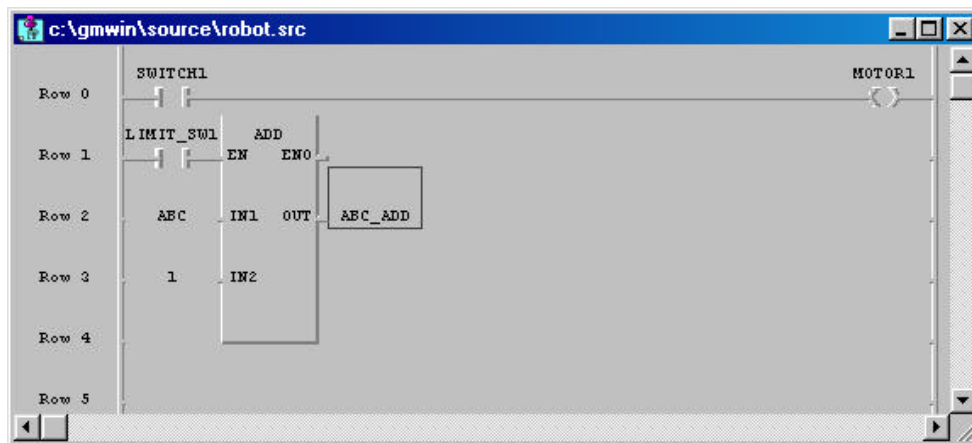
The Variables dialog box has a title bar with a close button. It contains a 'Name' field with 'ABC_ADD' and a 'Direct Variable Comment' field. Below these is a 'Variables List' table with columns: Name, Var. Kind, Allocation, Used, and Data Type. The table lists four variables: ABC, LIMIT_SW1, MOTOR1, and SWITCH1, all with Var. Kind 'VAR' and Allocation '<Auto>'. The Data Type for ABC is 'SINT', and for the others is 'BOOL'. To the right of the table are buttons for 'OK', 'Flag', 'Cancel', and 'Help'. Below the table are buttons for 'Add...', 'Delete', and 'Edit...'. At the bottom is a 'Description' field containing the text 'This variable has not been defined.'

Name	Var. Kind	Allocation	Used	Data Type
ABC	VAR	<Auto>		SINT
LIMIT_SW1	VAR	<Auto>		BOOL
MOTOR1	VAR	<Auto>		BOOL
SWITCH1	VAR	<Auto>		BOOL

Click **OK** button.

The Add/Edit Variables dialog box has a title bar with a close button. It contains a 'Variable Name' field with 'ABC_ADD'. To the right are buttons for 'OK', 'Cancel', and 'Help'. Below the name field is a 'Variable Kind' section with a dropdown menu set to 'VAR'. Below that is a 'Data Type' section with three radio buttons: 'Elementary' (selected), 'FB Instance', and 'Array'. The 'Elementary' option has a dropdown menu set to 'SINT'. The 'FB Instance' option has a dropdown menu set to 'CTD'. The 'Array' option has a text field for '(0..)' and a dropdown menu set to 'BOOL'. To the right of the 'Data Type' section is a 'Memory Allocation' section with two radio buttons: 'Auto' (selected) and 'Assign (AT)'. Below these is a text field. At the bottom is an 'Initial Value' section with a text field and an 'Init. Array...' button. At the very bottom is a 'Comments' section with a text area.

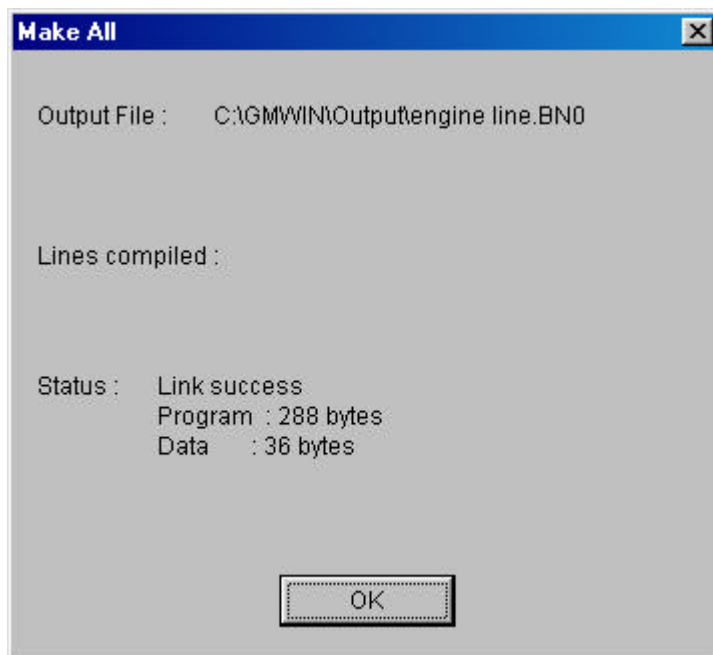
Click **OK** button. Then the variable name 'ABC_ADD' is assigned as 'OUT' in the function 'ADD'.



Step 4 : Compile a Program

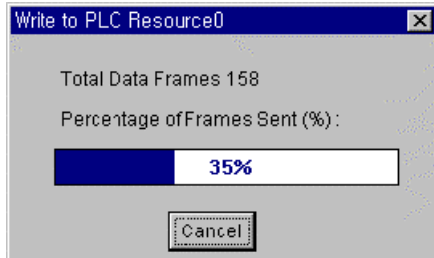
Select **Compile - Make** in the pull-down menu.

Build the project file for the execution by running compiler.



Step 5 : Download a Program

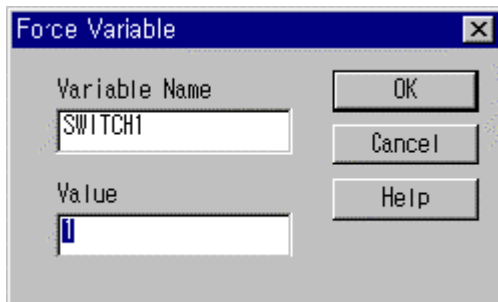
Be sure to connect the cable between PC and PLC before downloading the program.
Select **Online - Connect + Write + Run + Monitor On**.



Then the execution file is downloaded to PLC.

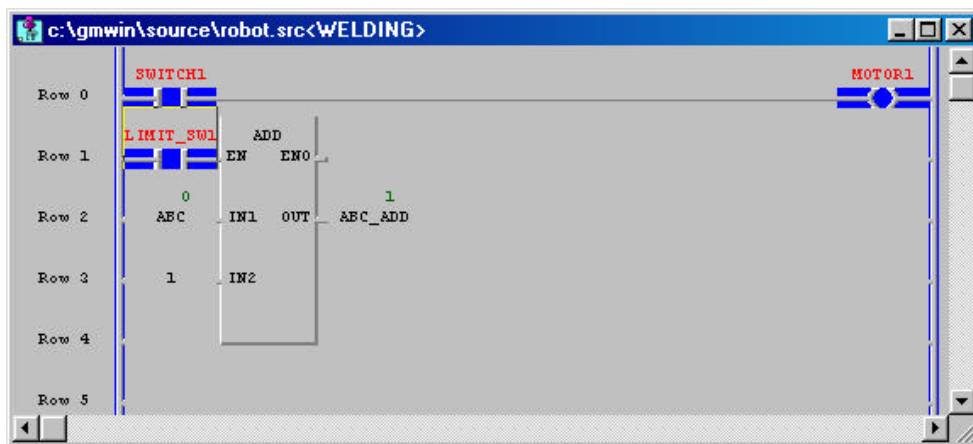
After downloading the program, PLC must be 'Run' mode to enable monitoring.

In order to turn 'SWITCH1' On forcibly, double-click the left button of the mouse on the position of the contact. Then **Force Variable** dialog box appears.



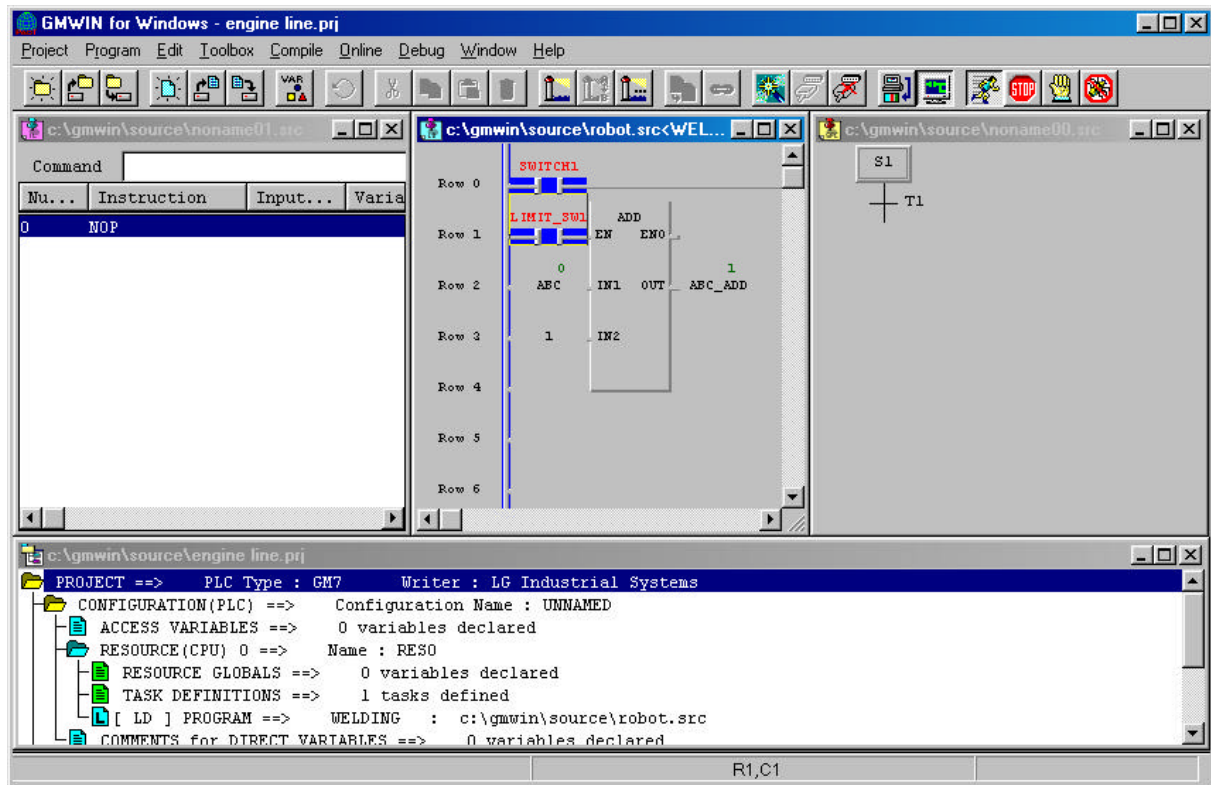
Enter the value of the contact as '1' in the edit control of **Value** and click **OK** button.

To turn 'LIMIT_SW1' On forcibly, execute the same order as the above.

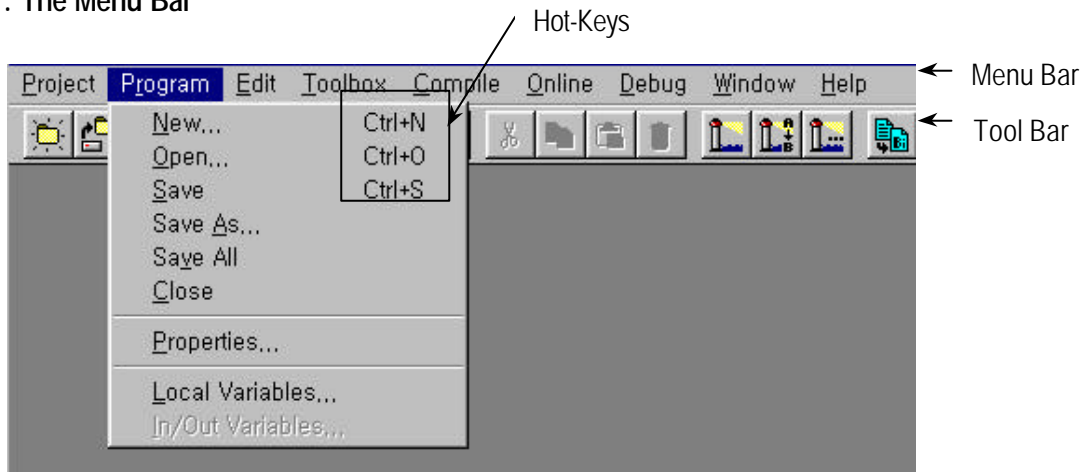


The output coil 'MOTOR1' gets On/Off according to the condition of the input 'SWITCH1'.
Variable 'AEC_ADD' is increased by 1 according to the result of variable 'AEC'.

3.2. Configuration of Screen



3.2.1. The Menu Bar



To access the pull-down menus, click on a menu using a mouse or key.

If menu item has the hot-key (Ctrl+X, Ctrl+C ...), you can select the menu directly by pressing hot-keys.

1) Project

Items	Description
New	Create a new project
Open	Open an existing project
Open From PLC	Up-load and open a project in PLC
Save	Save a project (Not program)
Save as	Save a program as another name
Close	Close a project
Add Project Item	Add new items (Program or Resource.: Resource can be added only in GM1.) to a project
Edit Project Item	Edit an item in a project
Delete Project Item	Delete items(Program, Resource) in a project
Up(Program) Ctrl+U	Exchange a program order with the upper item in the project window
Down(Program) Ctrl+W	Exchange a program order with the lower item in the project window
Edit M Region	Edit M area
Print	Print all or part of the contents in the active window
Printer Setup	Select the printer and Setup the options of the printer
Options	Setup options in GMWIN Connect Option, Monitor/Debug Option...)
Library Manager	Create or edit library files
Insert Library	Insert a library file into the project
Start Simulation	Start or stop the simulation
Exit	Quit the application

2) Program

Items	Description
New Ctrl+N	Make a new program
Open Ctrl+O	Open an existing program
Save Ctrl+S	Save a program
Save as	Save a program as another name
Close	Close a program
Properties	Change program properties
Local Variables	Show and edit local variable
In/Out Variables	Show and edit Input/Output variables for Function or Function block

In SFC Program Menu, more menus are added as below.

Items	Description
Action List	Show action lists
Transition List	Show transition lists

3) Edit

Items	Description
Undo Ctrl+Z	Undo the last action
Cut Ctrl+X	Cut the selection and move it to Clipboard
Copy Ctrl+C	Copy the selection to Clipboard
Paste Ctrl+V	Copy the selection to edit window from Clipboard
Delete Del	Delete the selection
Find Ctrl+F	Search for letter
Replace Ctrl+H	Search for letter and replace with another letter
Find Again Ctrl+F3	Run again 'Find' or 'Replace' command
Find-Move	Move a cursor to desired place

In SFC Program Menu, more menus are added as below.

Items	Description
Condense screen Ctrl_P	Determine the rate of the screen size
Comments	Show comments of action and transition
Arrange Number	Readjust step and transition numbers

In LD Program Menu, more menus are added as below.

Items	Description
Condense screen Ctrl+E	Determine the rate of the screen size
Variable Comments Ctrl+M	Show comments of variable in LD window
Delete Line Ctrl+D	Delete a line
Delete Cell Del	Delete a cell
Insert Line Ctrl+L	Insert a line
Insert Cell Ctrl+I	Insert a cell

4) Toolbox

In IL mode,

Item	Description
Toolbox Type	Open/close a toolbox and adjust a position of toolbox

In LD mode,

Items	Description
Function F2	Insert a function
Function Block F3	Insert a function block
Label F4	Insert a label
Operator F5	Insert an operator
Delete F6	Delete one line of program
Variable Comment F7	Show or hide comment column
Insert/Overwrite F8	Change a mode (Toggled)

Insert contact, coil, function, function block, jump, return and etc.

In SFC mode,

Items		Description
Step	F2	Insert a step or transition
Branch	F3	Insert a selective or simultaneous branch
Action/Transition	F4	Define a name of action or transition including Qualifier
Label	F5	Insert a label
Jump	F6	Insert a jump
Zoom	F7	Open action or transition window
Arrow Mode	Ctrl+A	Switch to Arrow mode

In monitoring mode for LD and IL,

Item	Description
Select Array Subscript	Specify array index for monitoring

In Variable monitoring mode,

Items		Description
Start/Stop	F2	Select start/stop mode for monitoring
View	F3	Select an information of the variable to monitor
Force	F4	Enter the specified value for variable forcibly
Select	F5	Select a variable to monitor
Display Form	F6	Show the variable to be monitored with hexadecimal or decimal format selectively
Array Number select	F7	Specify array range of variable for the type of Array

In Time Chart monitoring mode,

Items		Description
Start/Stop	F2	Select start/stop mode for monitoring
View	F3	Select an information of the variable to monitor
Force	F4	Enter the specified value for variable forcibly
Select	F5	Select a variable to monitor
Time	F6	Select the period to monitor

In case of monitoring I/O

Items		Description
Select Base F2		Select a base board to monitor
Start/Stop	F3	Select start/stop mode for monitoring

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5) Compile

Items	Description
Compile	Compile a program
Make	Build a PLC execution file after compiling an active program in a project
Build All	Make a PLC execution file after compiling all programs in a project
Message	Show an error message after compiling
Memory Reference	Show used global or direct variables

6) Online

Items		Description
Connect+Write+Run+Monitor On Ctrl+R		Connect GMWIN to PLC, write a program created by user, change the operation mode and monitor it
Connect		Connect GMWIN to PLC
Disconnect		Disconnect GMWIN from PLC
Read		Read PLC data
Write		Write to PLC
Monitor	Monitor On/Off	Start monitoring / Stop monitoring
	Variable Monitor	Monitor variables
	I/O Monitor	Monitor I/O' s
	Time Chart Monitor	Monitor Boolean variables in time chart format
	Link Parameter Monitor	Monitor High speed link parameter
Mode Change		Change PLC operation mode
Data Clear		Clear PLC data as '0'
Reset		Reset CPU of PLC
Flash Memory		Show the type of the flash memory in CPU Write data on a flash memory
Link Enable		Enable or disable the execution of the high speed link
PLC Info		Show PLC information
I/O Info		Show the information of PLC I/O' s
I/O Forcing		Setup the forced I/O
Link Info		Show the information of link module
Comm Info		Show the information of communication status
Mnet Parameter		Show the information of Mnet parameter
Mnet Info		Show Mnet information
I/O Skip		Specify I/O to skip
Fault Mask		Set Fault Mask
Initialize Special Modules		Initialize Special Modules
Start Online Edit		Select a target source
Write for Online Edit		Compile and write for Online Edit
Cancel Online Edit		Cancel current Online Edit
Data Share		Share the data for monitoring

7) Debug

Items	Description
Debug Start/Stop	Start/stop debugging (Toggled)
Go Ctrl+F9	Start or continue the program execution
Step Over Ctrl+F8	Step over the next statement
Step Into	Step into the next statement
Step Out	Step out of the current function or function block
Pause	Pause the program execution
Run to Cursor Ctrl+F2	Run to cursor position
Add/Remove Breakpoint Ctrl+F5	Insert or remove a breakpoint
Breakpoint List/Condition	Show breakpoints and break conditions
Task Enable	Enable or disable the task execution

8) Window

Items	Description
Cascade	Arrange the windows as overlapping tiles
Tile Horizontally	Arrange the windows as horizontal, non- overlapping tiles
Tile Vertically	Arrange the windows as vertical, non-overlapping tiles
Arrange Icons	Arrange icons
Close All	Close all active windows

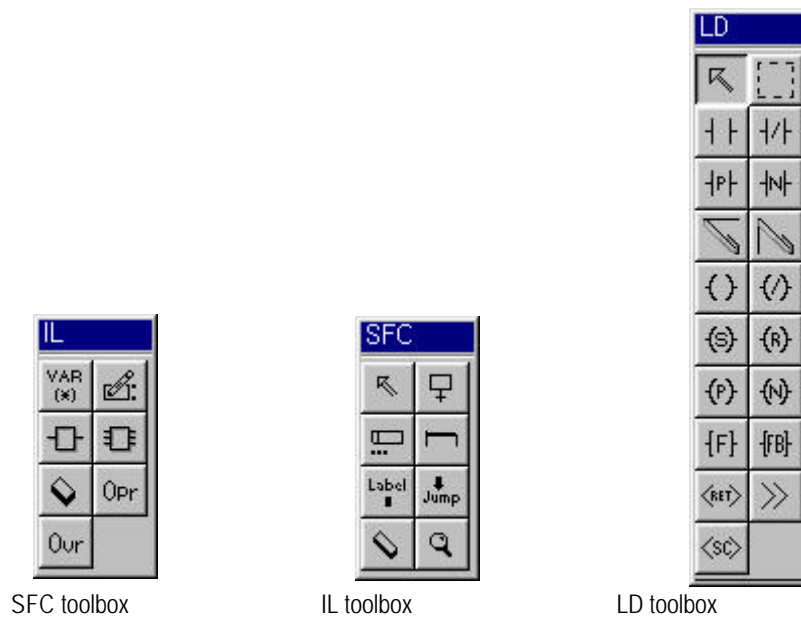
3.2.2. The Tool Bar



Tool Bar buttons represent single action functions that you can perform by simply clicking on the appropriate button.

Tool	Comment	Tool	Comment
	New Project		Connect + Write + Mode Change To Run + Start Monitor
	Open Project		Connect
	Save Project		Disconnect
	New Program		Write
	Open Program		Monitor Start/Stop
	Save Program		Run
	Local Variable		Stop
	Undo		Pause
	Cut		Debug Start
	Copy		Debug Run
	Paste		Step Over
	Delete		Step Into
	Find		Step Out
	Replace		Pause
	Find Again		Run to Cursor
	Compile		Add/Remove Breakpoint
	Make Execution File		

3.2.3. The Toolbox



You can create or edit a program using the toolboxes for each language.
 You can also execute the same function as the toolboxes by clicking **Toolbox** in the pull-down menu.
 You can change the position of the toolbox or the property by selecting **Toolbox - Toolbox Type** in the pull-down menu.

3.2.4. The Status Bar



1) Description Mode

Describes the function of the command or menu.

2) PLC Mode

Shows PLC type, PLC operating mode, Monitoring mode and more.

3) Cursor Position

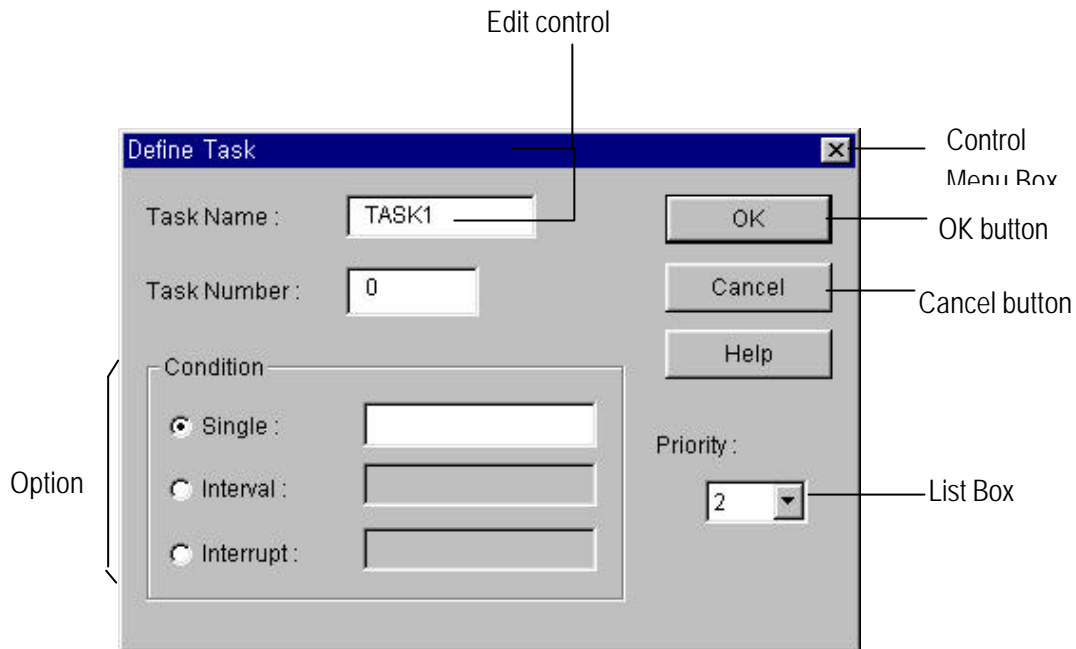
Shows the location of the cursor in the screen as Row/Column.

4) Status of GMWIN

Shows the status of GMWIN(Edit mode, Monitor mode and Debug mode).

3.3. How to use a Dialog Box

Edit control, OK/Cancel/Help button, Option and List Box are in dialog box so you can define a required value or input.



Edit control : Enter a required name or letter.

Option Radio Button : It is used to select only one in the same group.
: Click a mouse on a desired item.

List Box : Select one in the list.

: List is appeared by clicking a mouse on arrow in list box and you can select a list by clicking.

OK button : Click OK button to close a dialog box after entering a designated value.

Cancel button : Click Cancel button or double-click a mouse on adjustment menu box to cancel the setup and close the dialog box.

3.4. Files being created in GMWIN

If a user create a PLC execution file through building a project and editing a program, the following files are created.

<Project Name>.PRJ : Project file created by user.

<Project Name>.BNO : PLC execution file.

In GM1, files are created as many as resource.

<Project Name>.BNO <Project Name>.BNI,(i is resource number).

<Project Name>.MON : Information file for Monitoring.

<Project Name>.CRO : It is created when user builds a PLC execution file.

It is the text file that expresses the global or direct variable used in each program (Cross Reference).

<Program Name>.SRC : Program file created by user

<Program Name>.ASV : Program created by user is saved as this name periodically.

To create this file, you must setup the time value by setting up the time cycle in **Option - Auto Save** in the pull-down menu. This file is deleted automatically by closing a program window normally.

<Program Name>.OP? : It is created as object file when user compiles a program.
(in case of Program Block)

<Program Name>.OB? : It is created as object file when user compiles a program.
(in case of Function Block)

<Program Name>.OF? : It is created as object file when user compiles a program.
(in case of Function)

Example (OP3 : program block for GM3, OF4 : Function for GM4)

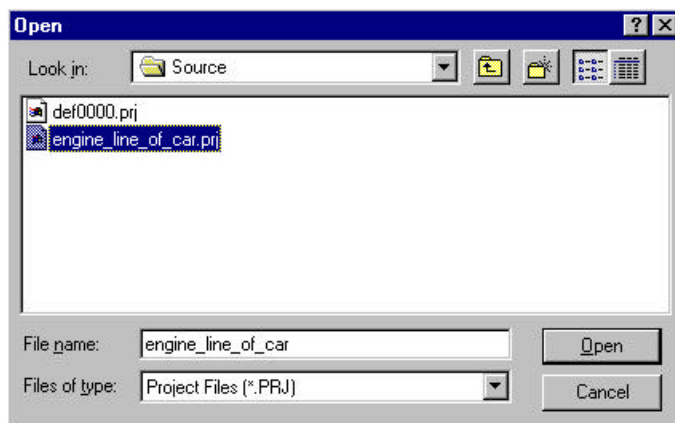
3.5. Open a File

To open a Project

Select **Project - Open** in the pull-down menu.

To open a Program

Select **Program - Open** in the pull-down menu.



Look in the folder to open and select the file to open

List box displays only files having an extension name selected in **Files of type** list box.

(Project File : *.PRJ, Program File : *.SRC)

Click **Open** button.

3.6. Save a File

3.6.1. Save a New File

Save a new file that is not ever saved.

To save a Project

Select **Project - Save** in the pull-down menu.

To save a Program

Select **Program - Save** in the pull-down menu.

Select a drive and folder to save the file.

Enter a file name in the **File Name** text box.

Input a **PRJ** extension for Project File and a **SRC** extension for Program File.

Click **Save** button.

3.6.2. Save a File on Working

To save a project

Select **Project - Save** in the pull-down menu.

To save a program

Select **Program - Save** in the pull-down menu.

3.6.3. Save as another name

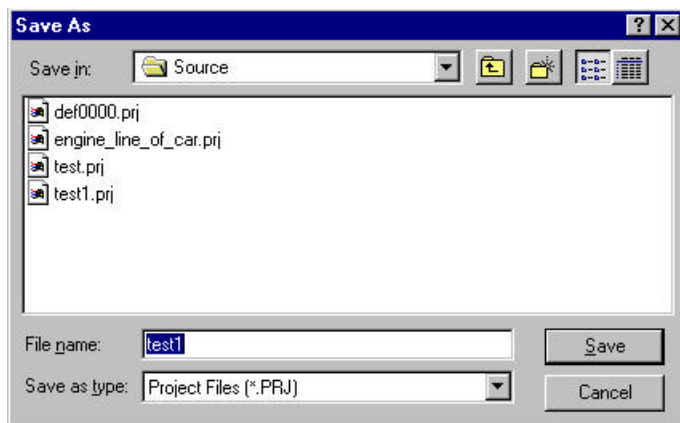
You can save a project or program as another file name.

To save a Project

Select **Project-Save as...** in the pull-down menu.

To save a Program

Select **Program - Save as...** in the pull-down menu.



Select a drive and folder to save the file.

Enter a file name in the **File Name** text box.

Input a **PRJ** extension for Project File and a **SRC** extension for Program File.

Click **Save** button.

3.7. Close a File

<Method 1>

Click a mouse on the Adjustment Menu Box on the right-upper corner of the active window.

<Method 2>

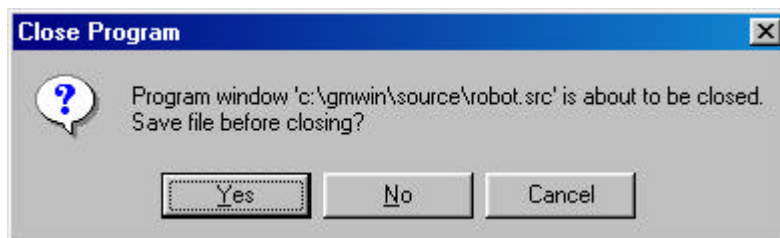
To close a Project

Select **Project - Close** in the pull-down menu.

To close a Program

Select **Program - Close** in the pull-down menu.

If the file was not saved, then following dialog box appears.



To save a file

Click **Yes** button.

Not to save a file

Click **No** button.

Click **Cancel** button to cancel