

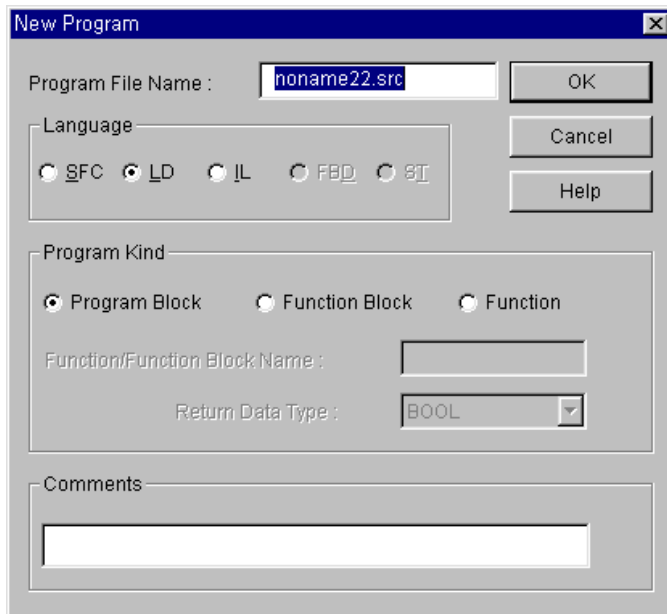
Chapter 5 Edit a Program

5.1. Create a Program	5-1
5.2. Open a Program	5-2
5.3. Save a Program.....	5-3
5.4. Program Properties	5-4
5.5. Edit a Variable	5-5
5.6. Edit LD.....	5-9
5.7. Edit SFC	5-30
5.8. Edit IL	5-56

5.1. Create a Program

To create a new program,

- Select **Program - New Program...** () in the pull-down menu.



- Enter Program File Name.
- Select a language in **Language** radio option button.
(GMWIN supports SFC, LD and IL. FBD and ST will be supported later.)
- Select a program in **Program Kind** radio option button.
If you select **Function/Function Block** to create a user-defined function/function block, refer to chapter.11 Library. In this chapter, select **Program Block** option.

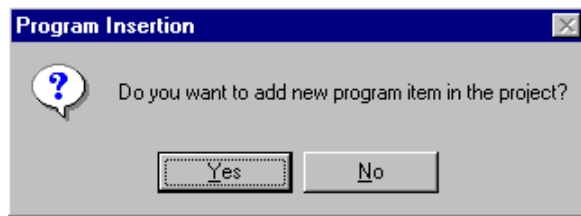
Note

You can select a **Function** option button in only case of LD or IL language.
You cannot create a user-defined function in SFC.

Note

Function/Function Block Name is only in active when **Function/Function Block** option button is selected and **Output Data Type** is in active only when **Function** option button is selected.
(Refer to '10.3. Making a library file defined by user' for detail comment)

- Enter comments in **Comment** text box.
- Click **OK** button.
- If there is not any new program in the project, the following dialog box appears.




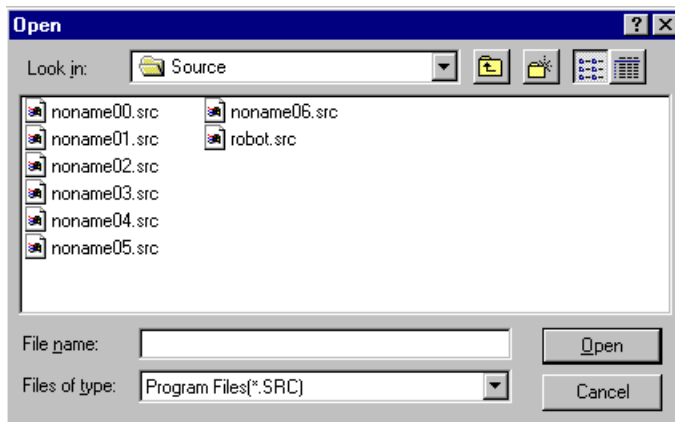
- Click **Yes** button. Then **Define Program** dialog box appears. (refer to the section 4.4.8.)
- Define a program. Then it is inserted in the project as an item.
(In case of GM1 and there are more than two resources, you can select a resource to be inserted for the definition of the program)

5.2 Open a Program

There are two ways to open an existing program. One is selecting in the pull-down menu and the other is opening the designated program in the project directly.

1) Open by selecting in the pull-down menu

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



- Select a program and click **Open** button.

2) Opening a program file included in Project.

- If you want to open a program file included in Project, double-click a mouse on the appropriate program item in Project window list.


Note

You cannot open the same program more than two in Edit or Debug mode.

In case of monitor mode, if you cannot see a long program at the same time, open the same program more than two and monitor a different part in each program.

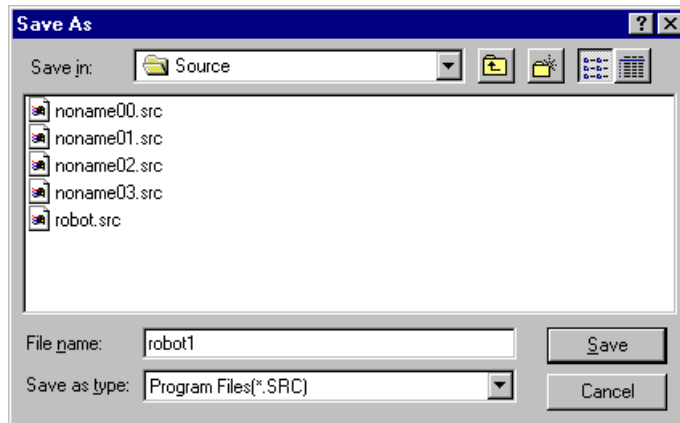
5.3. Save a Program

To save a program as file.

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

To save an existing program file, there is no message for saving.

- If you save a new file or select **Program - Save as...** in the pull-down menu, the following dialog box appears.

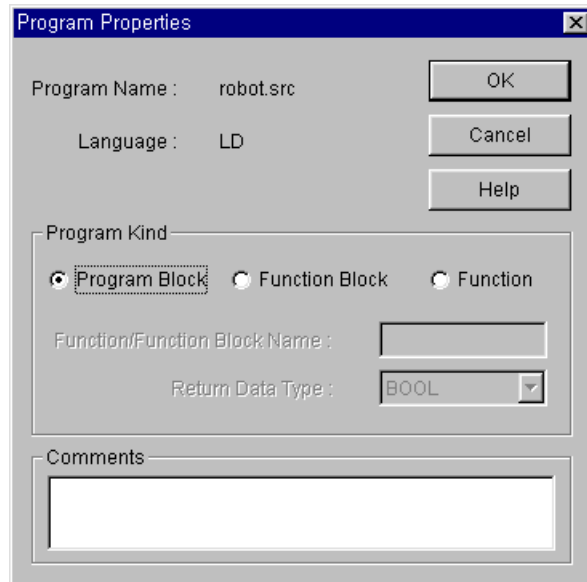


- Enter the file name and click **Save** button.

5.4. Program Properties

You can change the kind or comment of program on editing.

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

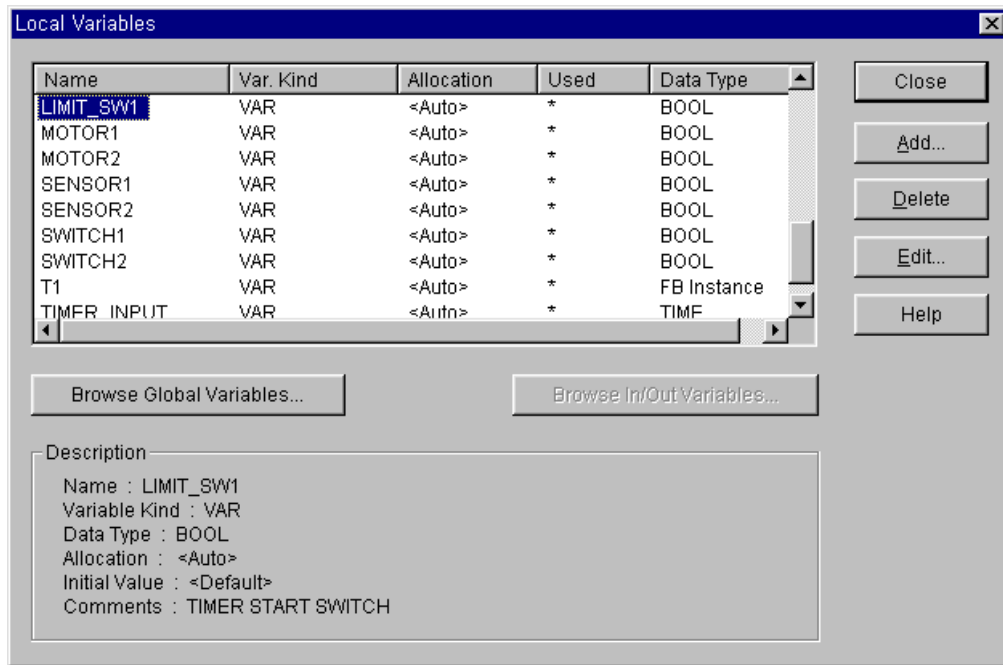


In this dialog box, you can't change the already registered language

- Edit an item that you wish to change and click **OK** button.

5.5. Edit a Variable

- Select **Program - Local Variables**



- Add, Delete or Edit each variable.
- Click **Close** button after editing the variables.

Note

In the list box of **Local Variables**, you can see another variables besides local variables that user enter. In case of function/function block, you can see I/O variable and output variable name to return and in case of SFC, you can see executive condition variable 'TRANS'. but you cannot edit or delete these variables.

Examples for these variables are as below.

RETVAL	<Return Variable>	INT - output variable name to be returned in function
IN1	VAR_INPUT	BOOL - input variable in function/function block
IN2	VAR_INPUT	INT - input variable in function/ function block(FB)
OUT1	VAR_OUTPUT	BOOL - output variable in function/FB
TRANS	<SFC transition>	BOOL - SFC execution condition variable

1) Add a Variable

- Open **Add/Edit Variables** dialog box by clicking **Add ...** button.

- Enter Variable Name in **Variable Name** text box.

Note

Maximum size for Variable Name is 16 characters.
However, in case of Function Block, the size is limited to 8 characters.

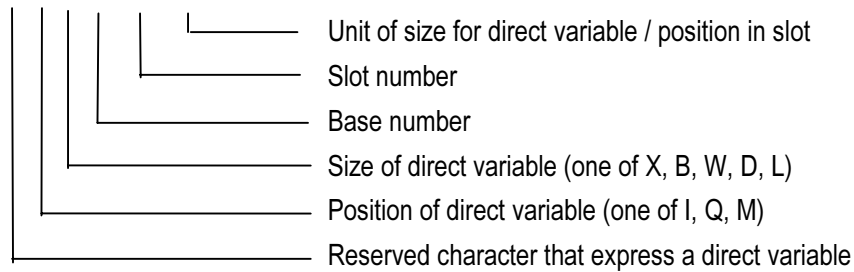
- Select Variable Kind in **Variable Kind** list box.
- Select one of **Data Type** option buttons (**Elementary Data Type**, **Function Block Instance**, or **Array**) and its type in that list box.
- Select one of **Memory Allocation** option buttons (**Auto** and **Assign**), and in case of selecting **Assign** enter the exact position in the text box.

Auto : When you compile a program, declared variable is automatically assigned to data area by type.

User Define : User assigns the declared variable to I,Q,M area.

- In case of **User Define**, designation of I,Q,M area to input is as follows

% I W 2 . 3 . 1



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

Examples)

%QX3.1.4 or %Q3.1.4 : 4th bit of slot 1 on base 3

%IW2.4.2 : 2nd word of slot 4 on base 2

%MD48 : 48th double words for internal memory (start from 0)

%MW10.3 : 3rd bit of 10th word in the internal memory

(There is no general concept about base and slot in the internal memory)

- If there is an initial value, enter the value in the text box of **Initial Value**.
- Enter the comment in **Comments** text box.

2) Delete a Variable

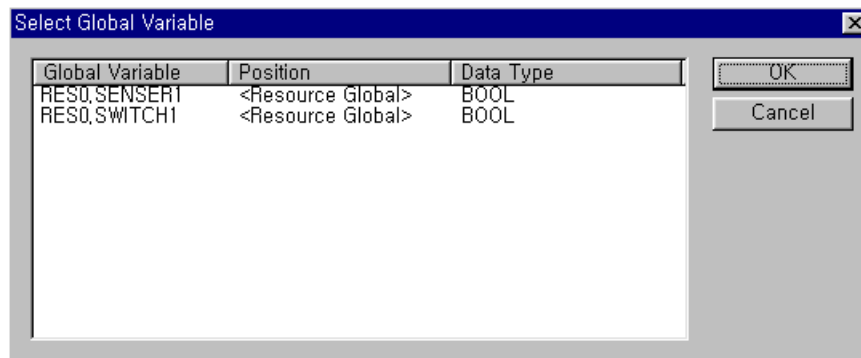
- Select a variable to delete in the list box of **Local Variables**.
- Click **Delete** button.

3) Edit a Variable

- Select a variable to edit in the list box of **Local Variables**.
- In the list box of **Add/Edit Variable**, edit a variable in the same way as inserting a variable and click **OK** button.

4) Browse Global Variable

- This Function is used when you use a declared global variable in the program.
- Click **Browse Global Variable** button.



- Select a global variable to use in the program and click **OK** button.
- Selected global variable will be declared as **VAR_EXTERNAL** automatically and be added in **Local Variable List**.

Note

When you declare a variable, if the program belongs to the project, the variable declared as VAR_EXTERNAL is registered to VAR_GLOBAL automatically.

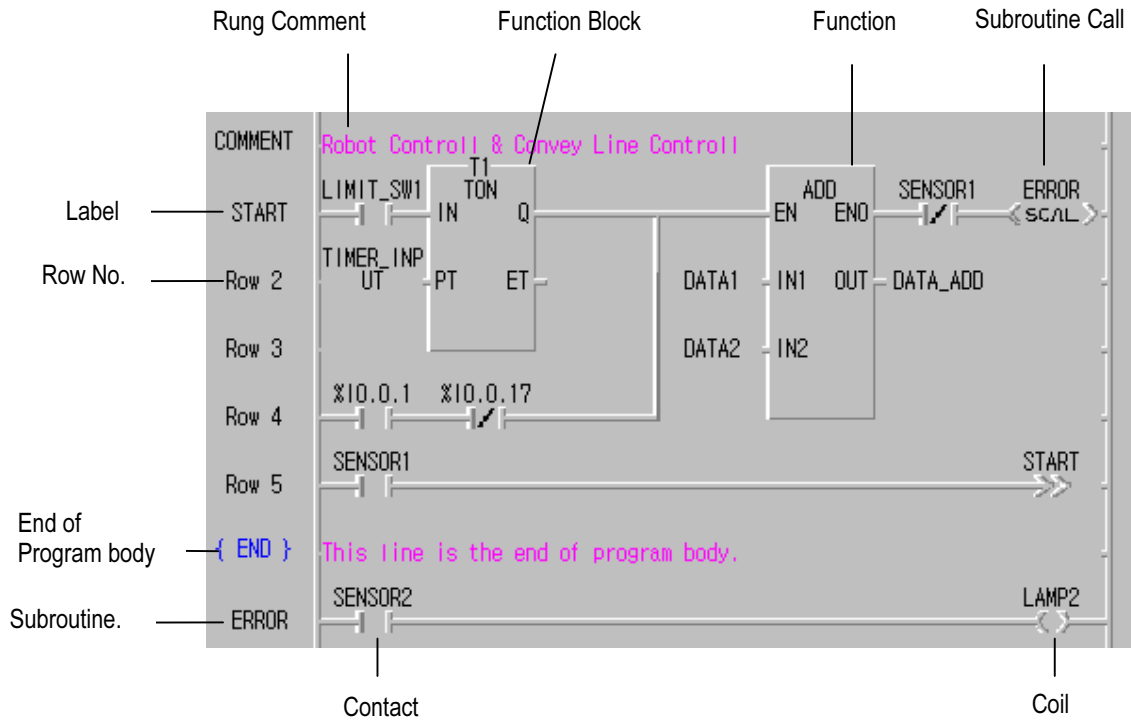
5) Browse In/Out Variables

- This Function is used when you want to refer to the currently declared I/O variable without closing **Local Variables** dialog box.
- Click **Browse In/Out Variables** button. You can add, edit or delete the I/O variable in the same way.

5.6. Edit LD

LD program creates a PLC program with a graphic symbol like coil or contact, which is used in relay logic diagram. In the below picture, 'Rung Comment' is the comment for the appropriate rung.

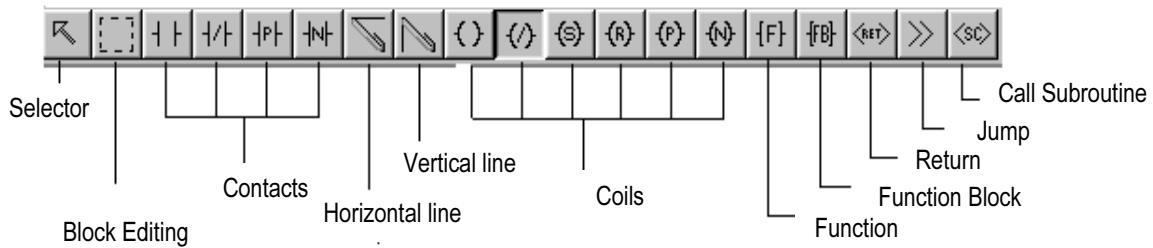
Rung is a unit of continuous line, which is connected vertically. i.e., in the below picture, a rung is from Row '1' to Row '4' and row '5' is also a rung.



{ **END** } in Row '7' expresses the end of the main program.

Error management, which is continued in the next column, is one type of subprogram and calls this subroutine in Row 1, Column 7.

Toolbox for LD Program
















The shape and meaning of each element is as below.

Symbol	Hot Key	Comment
	F2	Normally open contact
	F3	Normally closed contact
	shift-F1	Positive transition-sensing contact
	shift-F2	Negative transition-sensing contact
	F6	Normal coil
	F7	Reverse coil
	shift-F1	Latched coil
	shift-F1	Unlatched coil
	shift-F1	Positive transition-sensing coil
	shift-F1	Negative transition-sensing coil
	F4	Horizontal line
	F5	Vertical line
	F8	Function
	F9	Function block
	shift-F7	End command of LD program and subroutine
	shift-F8	Jump command (the branch of LD program and subroutine)
	shift-F9	Call a subroutine

If you select an arbitrary element in toolbox, the shape of the mouse is changed into that of the element.

5.6.1. Create a Contact



- Select a desired contact (, , , , , ) in toolbox.
- In LD program window, move the mouse to a desired position and click the left button.
- When you draw a line (, ), after moving the mouse from a desired position, drag a mouse by clicking the left button and you can draw a long line.
- When you draw a continuous line as the above way, if there is another contact under the mouse position, that contact is conserved.
- To change a contact (, , , ) under the mouse position to horizontal line (), double-click on a desired contact.









- Move the cursor to the position that you want to input a contact in.
- Select a desired contact(F2,F3,Shift-F1,Shift-F2,F4,F5) of commands in **Toolbox**.

In case of contact, you can insert it between column '1' of program and column '30'.

In case of vertical line, however, you can insert it between column '2' and column '29'.

5.6.2. Create a Coil



- Select a desired coil (, , , , , ) in toolbox.
- In LD program window, move the mouse to a desired position and click the left button.




- Move the cursor to the position that you want to insert a coil in.
- Select a desired coil (F6,F7,Shift-F3,Shift-F4,Shift-F5,Shift-F6) of commands in **Toolbox**.

Coil is inserted in the last (31st) column of LD program automatically.

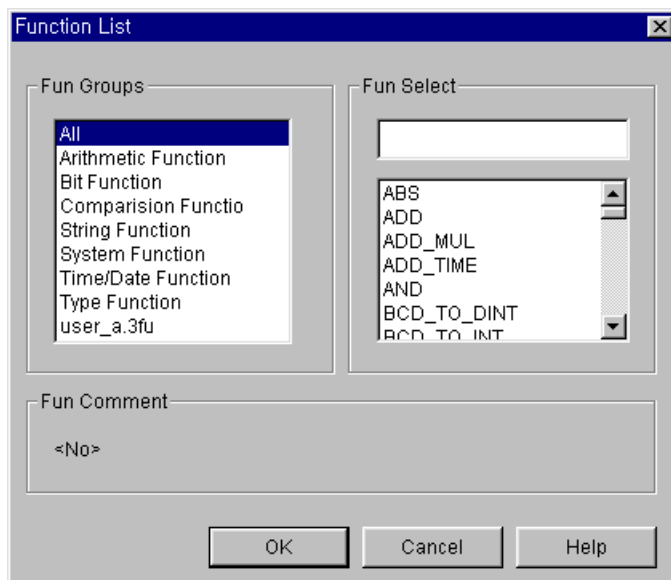
5.6.3. Create a Function



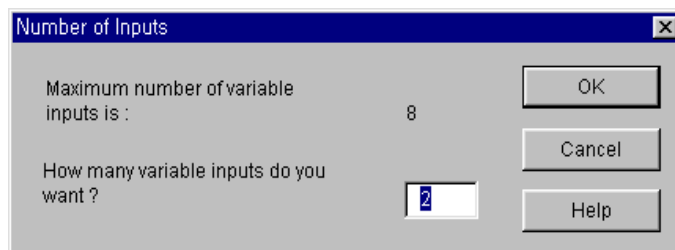
- Select () in toolbox.
- In LD program window, move the mouse to a desired position and click the left button.



- Move the cursor to the position that you want to insert a function in.
- Select a function (F8) of commands in **Toolbox**.




- Select a function group in **Function List** dialog box. Then only appropriate functions appear in the list.
- Select a desired function in **Function List** dialog box and click **OK** button.
- If the selected function is an extensible function (you can adjust input_number in this function), the following dialog box appears automatically.



- Enter the desired input_number.
You can enter a function between column '2' and column '30' in LD program.

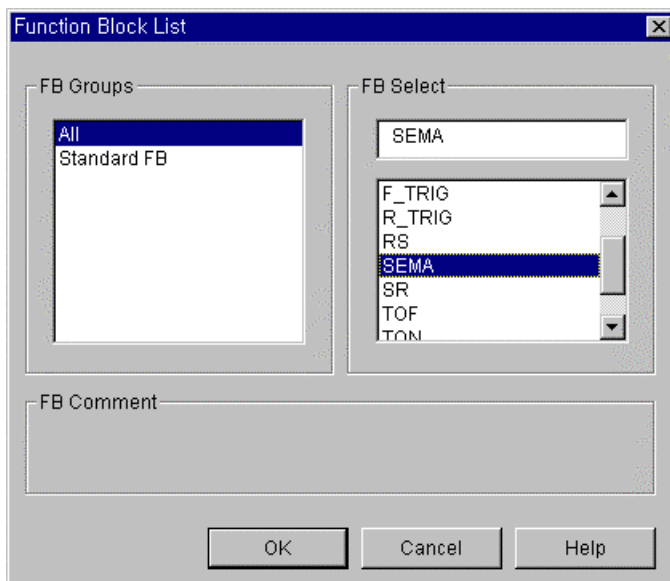
5.6.4. Create a Function Block



- Select () in toolbox.
- In LD program window, move the mouse to a desired position and click the left button.




- Move the cursor to the position that you want to insert a function block in.
- Select a function block (F9) of commands in **Toolbox**.



- Select a function block groups in **Function Block List** dialog box.
Then only appropriate function blocks appear in the list.
- Select a desired function block in **Function Block List** dialog box and click **OK** button.
- Insert a desired variable name of function block in **Variables** dialog box.
You can insert a function block between column '2' and column '30' in LD program.

5.6.5. Return



- Select () in toolbox.
- In LD program window, move the mouse to a desired position and click the left button.



- Move the cursor to the position that you want to insert Return in.
- Select Return (Shift-F7) of commands in **Toolbox**.
Return is inserted in the last (31st) column of LD program.

5.6.6. Jump and Label


In LD program, **Jump** command allows you to go directly to the position that you want to branch out.

A **Label** indicates a destination. Position of label must be column '0'.

In LD program having subroutine, Jump included in the main program must use the label included in the main program and Jump included in subroutine must use the label included in subroutine.

1) Jump




- Select () in toolbox.
- In LD program window, move the mouse to a desired position and click the left button.
To jump to the label, you need to enter the label name on the jump command.
Double-click on the jump command after selecting the selector (arrow mode).

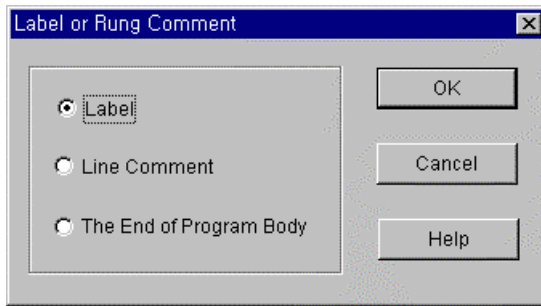


- Move the cursor to the position that you want to insert a jump in.
- Select a jump(Shift-F8) of commands in **Toolbox**.
Jump is inserted in the last (31st) column of LD program.

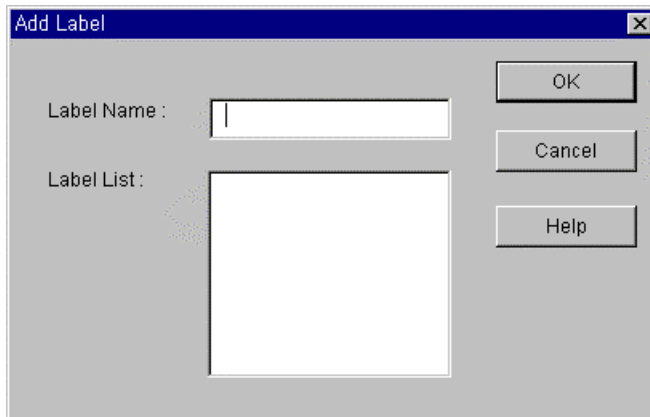
2) Label



- Select () in toolbox. To select the selector button in toolbox, click the right button of the mouse.
Then select 'To arrow mode' command.
- In LD program window, move the mouse to column '0' and double-click the left button.

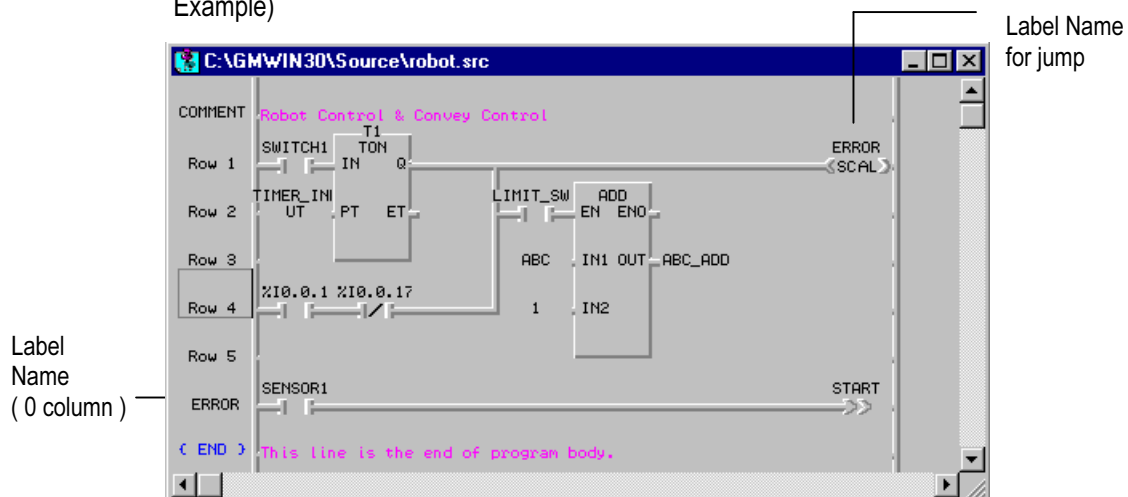


- Select **Label** in **Label or Rung Comment** dialog box.
- Input a label name in **Add Label** dialog box. (Maximum size of label name is 16 characters.)




- In LD program window, move the cursor to column '0'
- Press **OK** button.
- Select **Label** in **Label or Rung Comment** dialog box.
- Input a label name in **Add Label** dialog box.

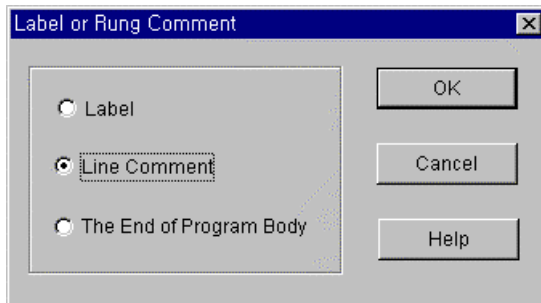
Example)



5.6.7. Rung Comment



- Select () in toolbox.
- In LD program window, move the mouse to column '0' of the first line in a desired rung and double-click the left button. But, if you want to edit an already existing rung comment, move the mouse to that comment and double-click the left button on it.
- Select **Line Comment** in dialog box.

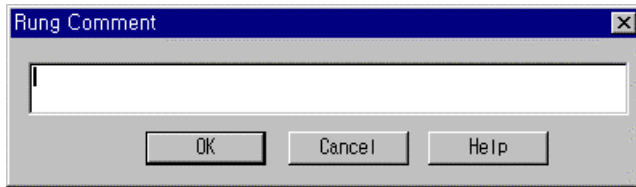


- Enter the content of rung comment in **Rung Comment** dialog box.
(Maximum size of comment is 170 characters.)

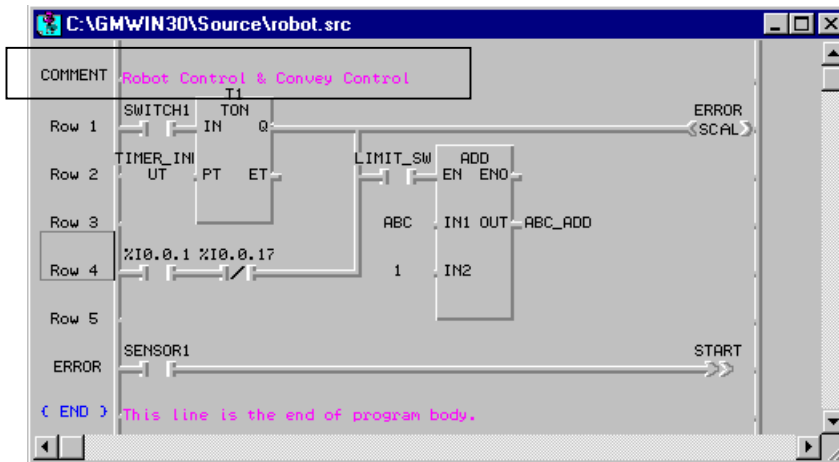


- In LD program window, move the cursor to column '0' of the first line in a desired rung.
But, if you want to edit an already existing rung comment, move a cursor to that comment.
- Press **Enter** key.

- Select **Line Comment** in **Label or Rung Comment** dialog box.
- Input a rung comment in **Rung Comment** dialog box.




Rung comment is displayed in all through one line as below.



5.6.8. Subroutine Call




- Select () in toolbox.
- In LD program window, move the mouse to a desired position and click the left button.



- In LD program window, move the cursor to the position that you want to insert a subroutine name in.
- Select **Toolbox - <SCAL>** in the pull-down menu
 - Insert a subroutine name (Label list) on **Label List** dialog box.
 - Subroutine call is inserted in the last (31st) column of LD program.

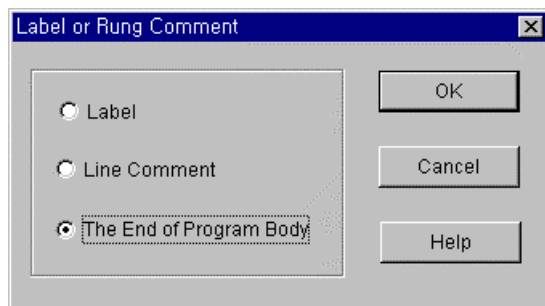
5.6.9. End of Main Program



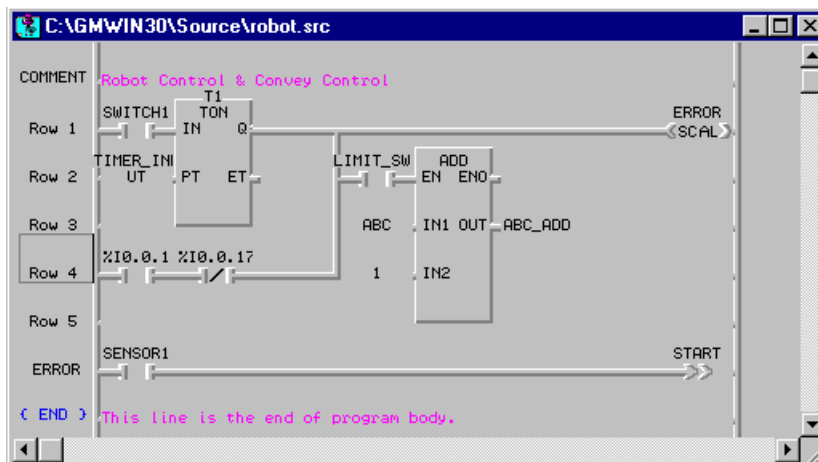
- Select () in toolbox.
- In LD program window, move the mouse to column '0' of the row to designate as the end of main program and double-click the left button.
- Select **The end of Program Body** in **Label or Rung Comment** dialog box.



- Move the cursor to column '0' of the row to designate as 'the end of main program.'
- Press **Enter** key
- Select **The end of Program Body** in **Label or Rung Comment** dialog box.




In the end of main program, like below picture, **{END}** is displayed in column '0' of the appropriate row and "This line is the end of main program." is displayed from column '1'.



Program logic under the end sign of the main program is regarded as subroutine area.

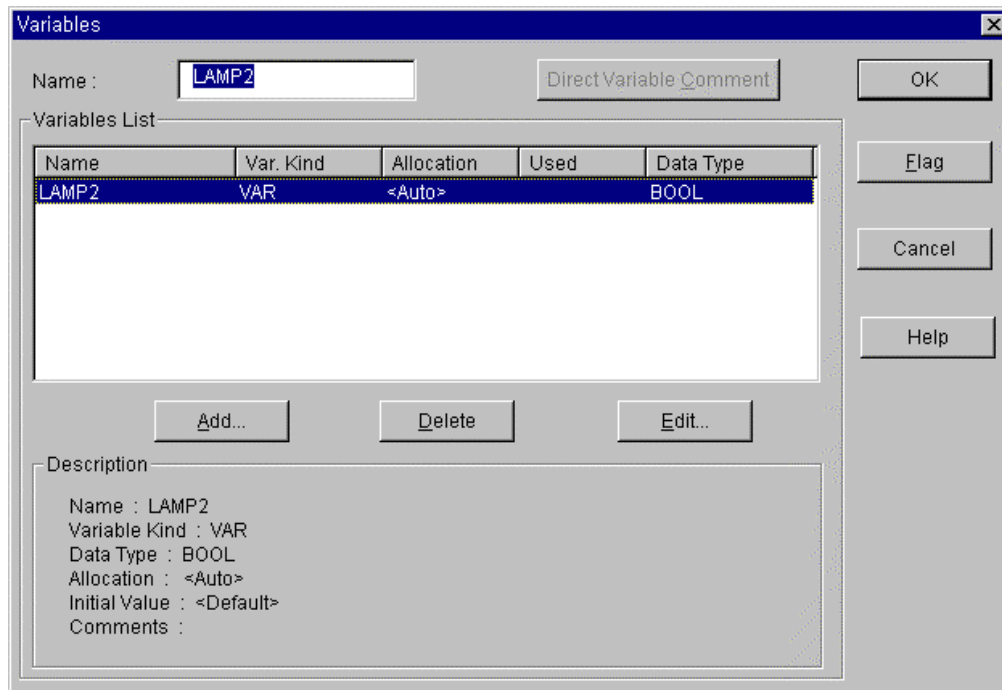
5.6.10. Variable Input



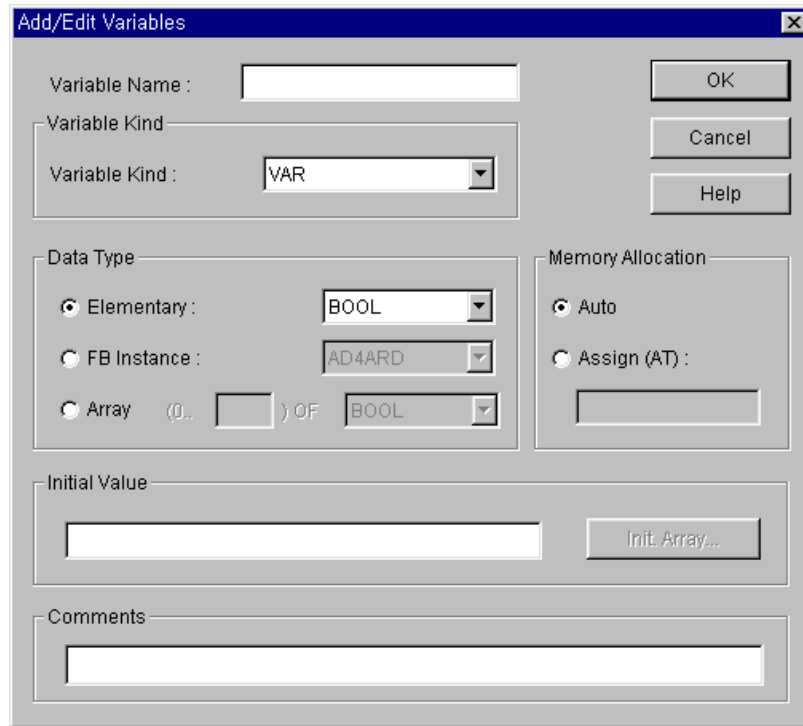
- Select () in toolbox.
- In LD program window, move the mouse on a desired contact, coil or I/O position of Function/Function block and double-click the left button.



- In LD program window, move the cursor on a desired contact, coil or I/O position of Function/Function block and double-click the left button.
- Call a variables dialog box by pressing **Enter** key.



- You can add, delete or edit a variable in **Variables** dialog box.
- In **Variables** dialog box, enter the variable name to be used and click **OK** button.
If you enter an already declared variable name, then variable input is over here.
- If you enter a new variable name, **Add/Edit Variables** dialog box, which determines the variable properties, appears.



Refer to the '5.5 Edit a Variable' for detail information about **Add/Edit Variables** dialog box


- Press **OK** button.

5.6.11. Edit a Block

Before editing a block, you must setup the range to be applied as a block.

Namely, if you want to copy or delete a continuous program, you must designate a range desired as a block before selecting a block editing command.



- Select () in toolbox.
- In LD program window, after moving a mouse to the start point of a block by pressing the left button, drag the selected range to the last row of the range to select.




- In LD program window, move the cursor to the start point of a block.
- With pressing **Shift** key, move the cursor with arrow key to the last row of range to select.

Note

When you setup a block, if the end of block range is in a function or function block, the function or function block is automatically included in the block.

5.6.11.1 Cut

After selecting a block,

- Select **Edit - Cut** (**Ctrl+X**, ).


5.6.11.2 Copy

After selecting a block,

- Select **Edit - Copy** (**Ctrl+C**, ).

5.6.11.3 Paste

After copying or cutting a block,

- In LD program window, move the cursor to the position that you want to paste on.
- Select **Edit - Paste** (**Ctrl+V**, ).


5.6.11.4 Delete

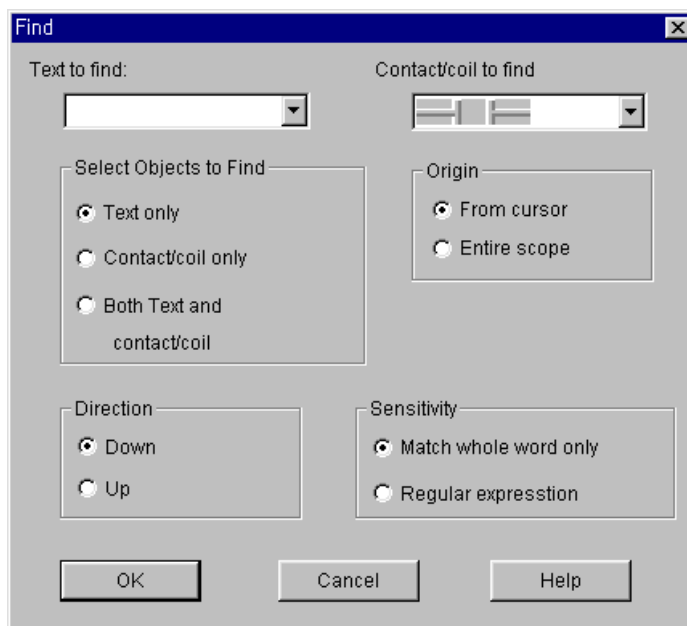
After selecting a block.

- Select **Edit - Delete** (**Delete**, ).

5.6.12. Find

This command allows you to find a variable name, position of contact and etc, which are used in the program.

Call **Find** dialog box by selecting **Edit - Find** ().



- In **Text to find** edit box of **Find** dialog box, enter the string that you want to find.
- Select the following options to find and click **OK** button.

1) Contact/Coil to find

Select the contact or coil that you want to find.

2) Select Objects to find

Text only : Find only the content of character.

Contact/Coil only: Find only LD program elements like contact, coil or etc.

Both text and Contact/Coil : Find a content of character and LD program elements like contact, coil or etc. simultaneously.

3) Origin

Select the range where find command is executed.

From cursor : Find from current cursor position.

Entire Scope : Find through the whole program.

4) Direction

Select the direction that find command is executed.

Down: Find command is executed downward.

Up : Find command is executed upward.


5) Sensitivity

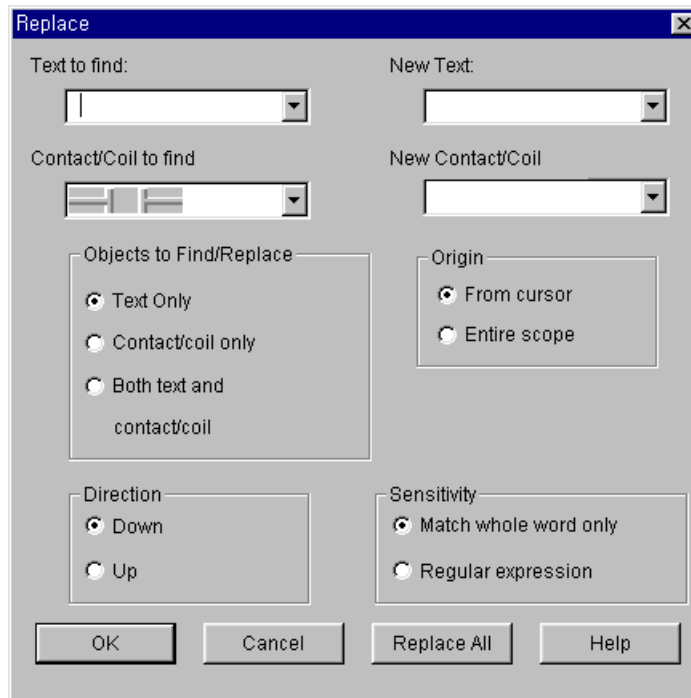
Select an accordance degree in finding a content of character.

Match whole word only : Find only an exactly corresponding word.

Regular expression : Find also a partially corresponding word.

5.6.13. Replace

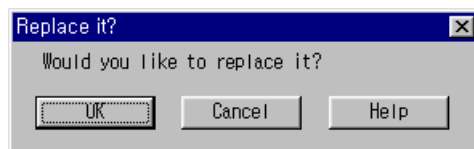
Call **replace** dialog box by selecting **Edit-Replace** ()



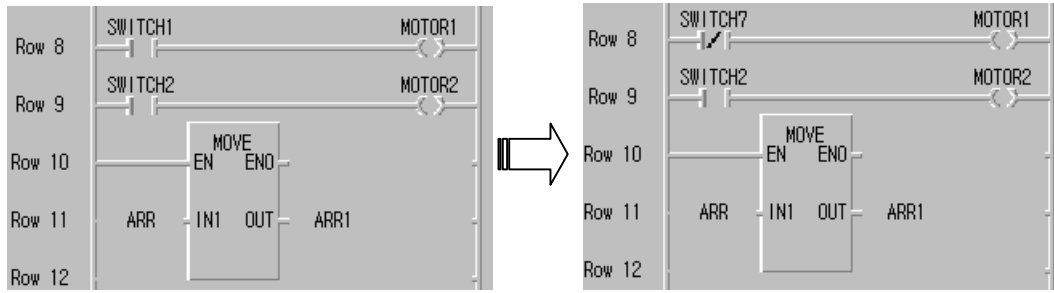
- Enter the character that you want to change in **Text to find** edit box.
- Select the element of LD program to change in **Contact/Coil** list box.

LD program element						
			LABEL	FUN	FB	FUN/FB-IO

- Enter the character that you want to replace in **New Text** edit box.
- Select the element of LD program to replace in **New Contact/Coil** list box.
- Select the options in the same way of find command and click **OK** button.



- Click **OK** button.



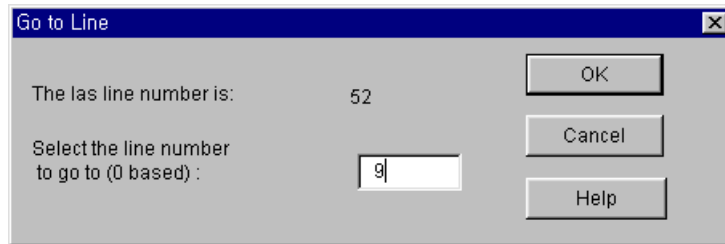
5.6.14. Find / Replace Again

If you executed Find/Replace command before, execute that command again with the condition that designated before.

- Select **Edit - Again** (*Ctrl+F3*, ).

5.6.15. Goto

- Select **Edit - Goto**.
- In **Go to Line** dialog box, enter the row number that you want to find.



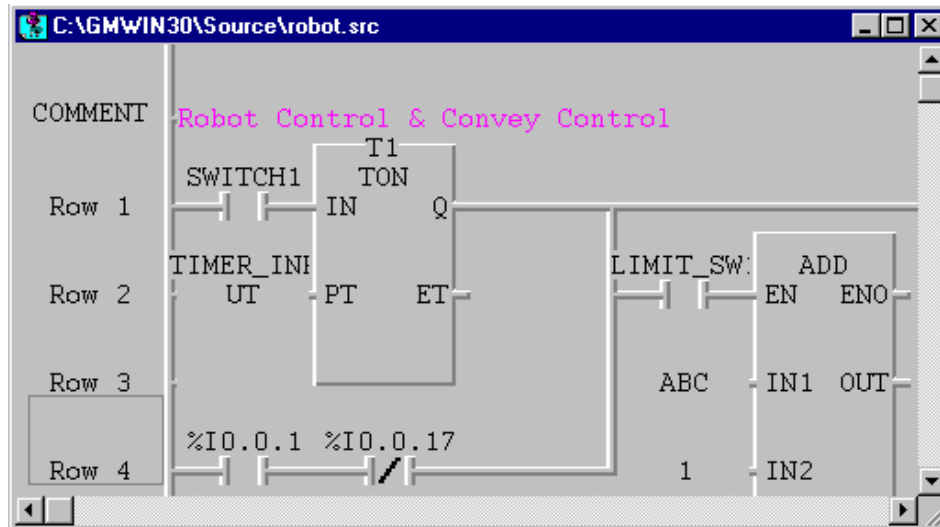
- Click **OK** button.

5.6.16. Zoom In/Out

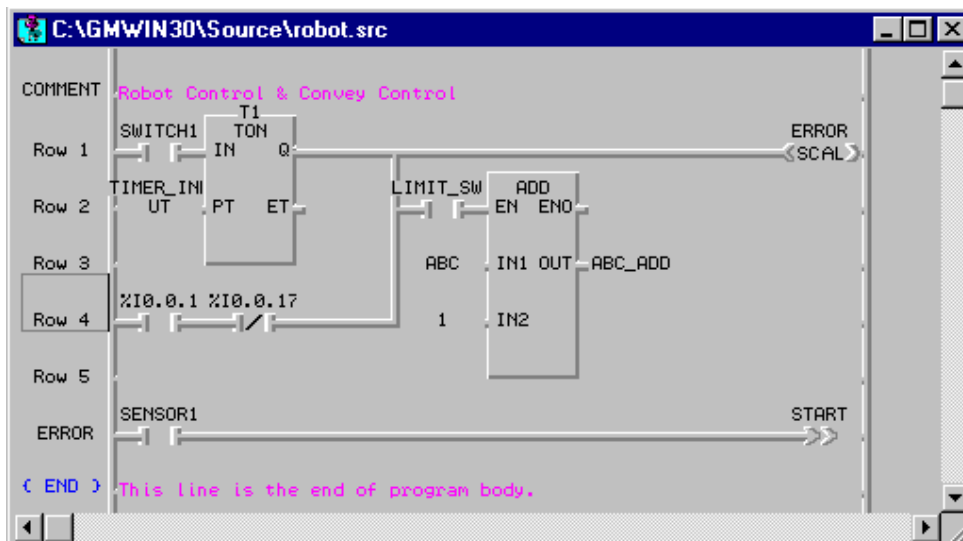
This command allows you to adjust the size of LD Program element.

- Call a dialog box by selecting **Edit - Condense**
- Select a desired screen size in **Condense Level** dialog box.
(100%, 80%, 70%, 50%, 25%, 12%)

Example) In case that compression rate is 100%



In case that compression rate is 70%



Note

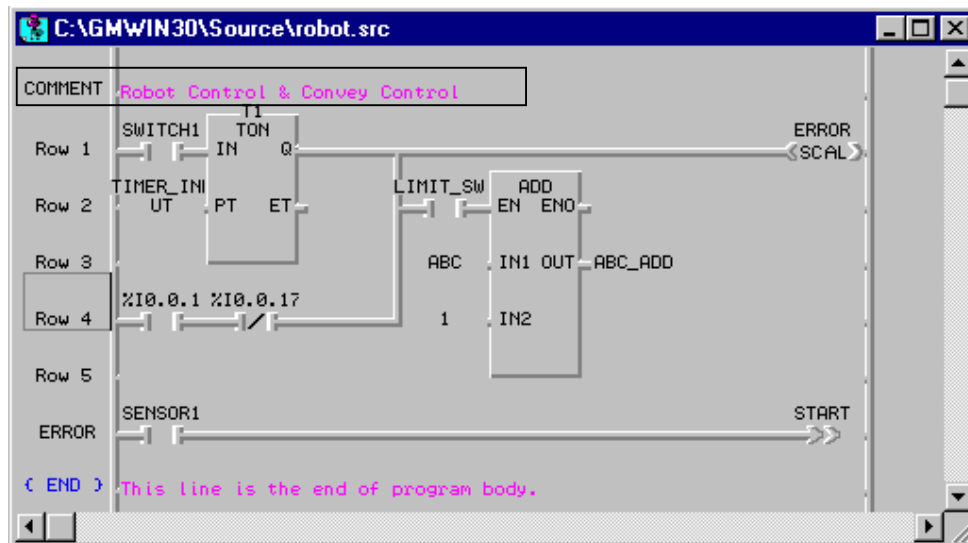
In case that compression rate is 25%,12%, LD program is not displayed as 3D type.

5.6.17. Variable Comment

LD program supports the function that indicates the comment of each variable.


- Select **Edit - Variable Comment (Ctrl+M)** in the pull-down menu.
- If there is a check mark at the left side of **Edit - Variable Comment (Ctrl+M)**, a current window is in the state that shows a variable comment and if there is not, the window is in the state that does not show the comment.

Example) In case that express a variable comment



5.6.18. Delete Row



- Select () in toolbox.
- In LD program window, move the mouse to the row that you want to delete and move the cursor with clicking a left button.
- Select **Edit - Delete Line**.




- In LD program window, move the cursor to the row that you wish to delete.
- Select **Edit - Delete Line (Ctrl+D)**.

5.6.19. Delete Cell

Delete the cell that cursor is on.

If the current position of the cursor is empty space, this function deletes the empty cell by one column.




- Select () in toolbox.
- In LD program window, move the mouse to the cell you want to delete and move the cursor with clicking a left button.
- Select **Edit - Delete Cell**.



- In LD program window, move a cursor to the cell to be deleted.
- Select **Edit - Delete Cell (Delete)**.

5.6.20. Insert Line



- Select () in toolbox.
- In LD program window, move the mouse to the position that you want to insert the row and move the cursor with clicking a left button.
- Select **Edit - Insert Line (Ctrl+N)**.




- In LD program window, move the cursor to the position that you want to enter the row.
- Select **Edit - Insert Line (Ctrl+N)**.

5.6.21. Insert Cell

Insert an empty cell in the position where a cursor is on.



- Select () in toolbox.
- In LD program window, move the mouse to the position where you want to insert a cell and clicking a left button.
- Select **Edit - Insert Cell (Ctrl+I)**.




- In LD program window, move the cursor to the position where you want to insert the cell.
- Select **Edit - Insert Cell (Ctrl+I)**.

5.6.22. Move/Copy Cell



(for copy, mouse and keyboard are used simultaneously)

- Select () in toolbox.
- In LD program window, move the mouse to the cell to move/copy.
- Drag to a desired position with clicking a left button of mouse.
- In case of moving, release the left button of the mouse.
In case of copy, release a left button of mouse with pressing **Ctrl** key

5.6.23. Pop-Up Menu



- Click a right button of the mouse on an arbitrary position or desired position.
- Select a desired command in menu that is appeared in right side.

Pop-up Menus are various according to the position of the mouse. You can select frequently used functions in Pop-up Menu


To Arrow mode	Ctrl+A
Undo (Replace)	Ctrl+Z
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Delete	Del
Find...	Ctrl+F
Replace...	Ctrl+H
Again	Ctrl+F3
Goto...	
Condense...	Ctrl+E
✓ Variable comment...	Ctrl+M
Delete line	Ctrl+D
Delete cell(H)	Del
Insert Line	Ctrl+L
Insert cell	Ctrl+I

If you use a Pop-up menu, then you don't need to use each command through the pull-down menu. In the upper menu, **To Arrow Mode** is the command that changes the input state of a current mouse into arrow mode to select or enter the data or elements of the program.

5.6.24. Undo

This command allows you to cancel previously edited action.



- Select **Undo** (*Ctrl+Z*, ).

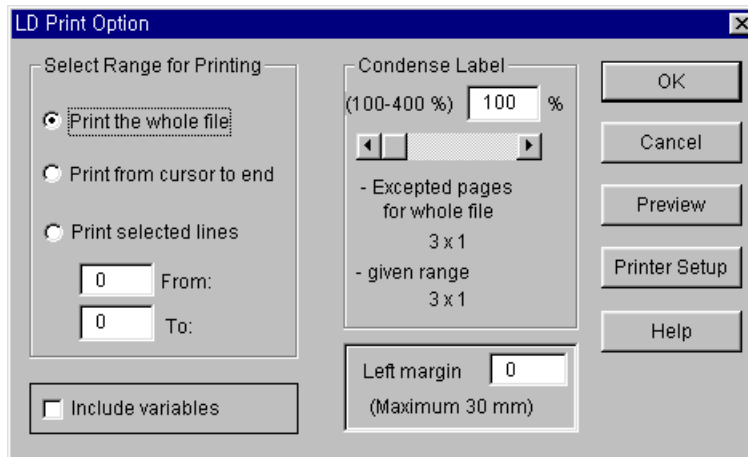


- Select **Undo** (*Ctrl+Z*).

5.6.25. Print and Preview

Print

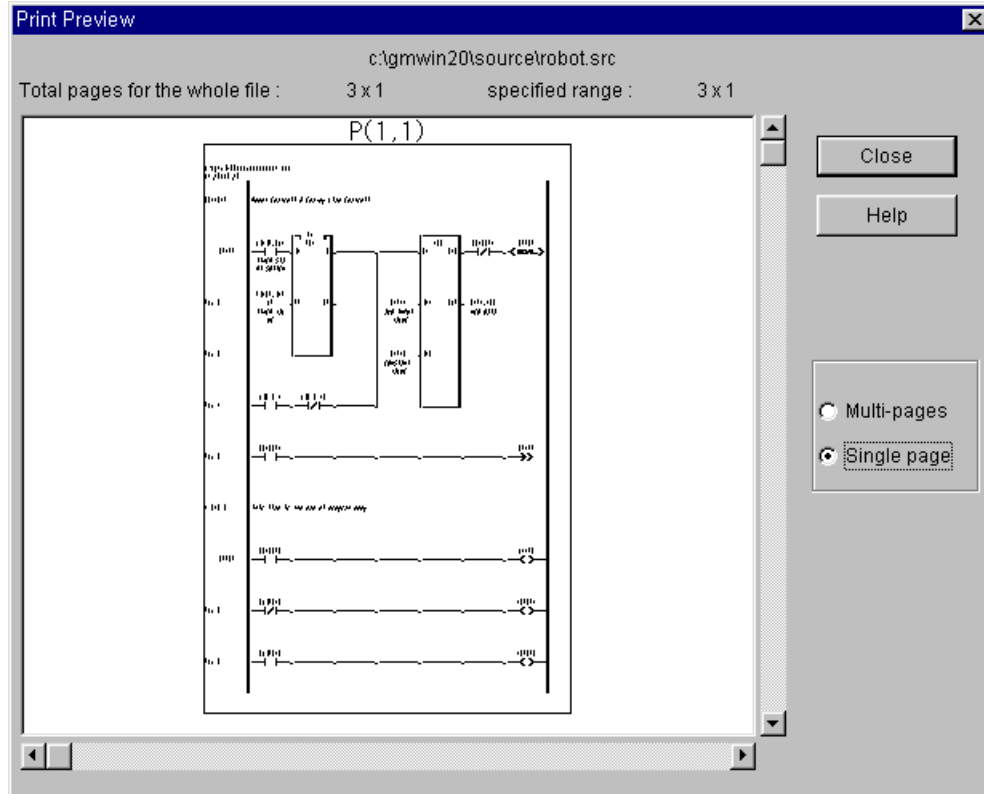
- Call a LD Print Option dialog box by selecting **Project - Print**.



- In **Select Range for Printing** group box of **LD Print Option** dialog box, select the range of LD program to print.
- In **Left Margin** group box, enter the left blank in mm. (Maximum size is 30mm)
- In **Condense Label** group box, enter the compression rate of content to print within the range that is from 100% to 400%. Indicates the required page number of printing the whole file and the required page number of printing the given range that user designate in **Select Range for Printing**.

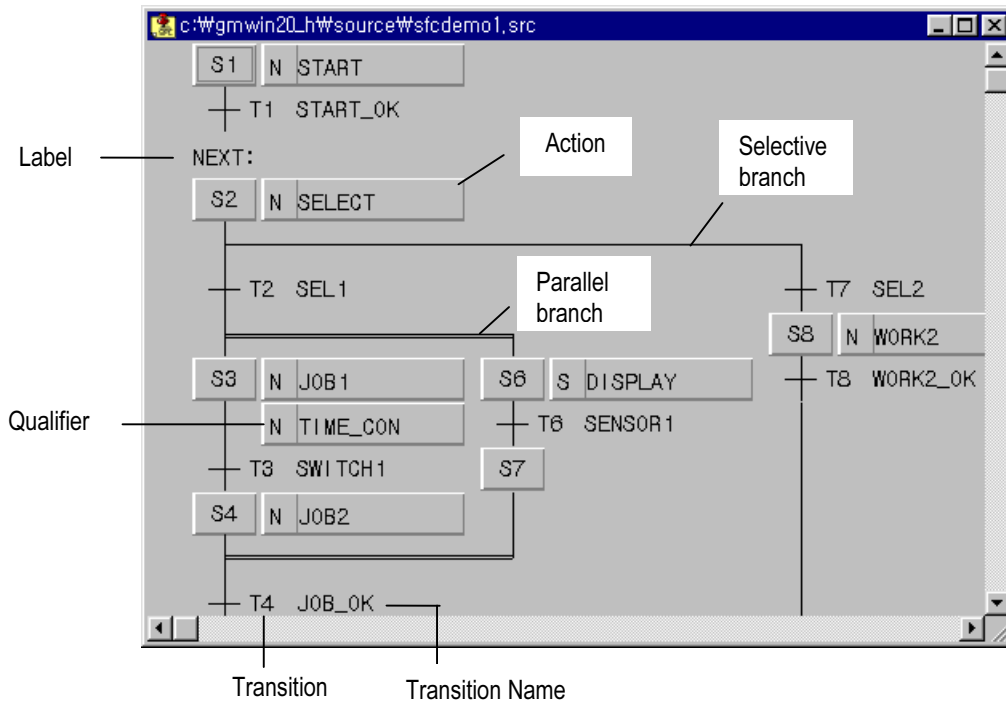
Preview

- **Preview** button of **LD Print Option** dialog box is used when you want to see the outline of contents to print before printing actually on paper.
- In **Preview** dialog box, you can determine either showing several pages simultaneously in a screen or by one page.



5.7. Edit SFC

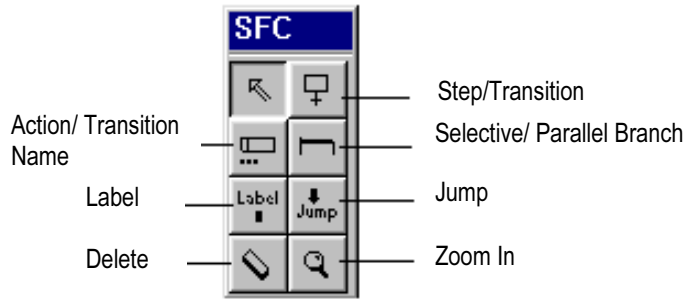
SFC supports the method that divides a PLC language (IL, LD) into step and transition according to the execution order. SFC consists of the following elements.








Note

In case of executing the automatic control of a machine with PLC, SFC(Sequential Function Chart) is the most optimal structural programming method.

SFC Toolbox



	Step	Indicates the unit of a sequence control with connecting to action
	Transition	Indicates the condition for executing from an active step to next step
	Selective Branch	The executive flow is determined by executive condition
	Parallel Branch	Used to control several sequences simultaneously
	Label	The position where an executive flow start by jump
	Jump	Used to change an executive flow
	Action	Indicates an executing content in the specified step

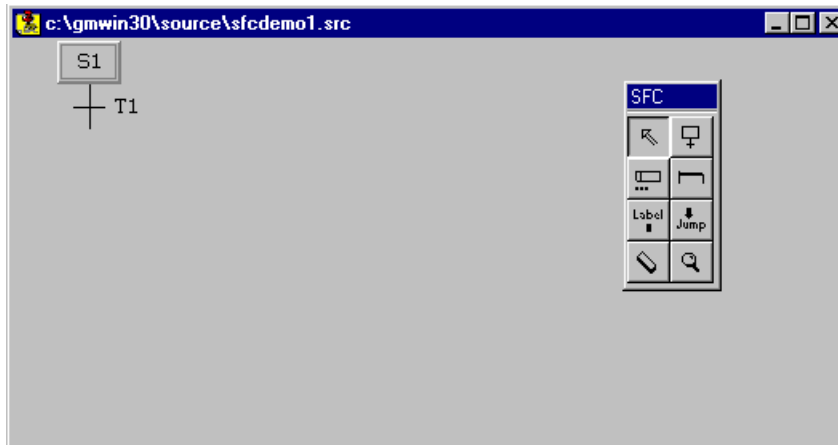
Select the element to insert and click the left button of the mouse on a desired position.





5.7.1. Create a Step/Transition

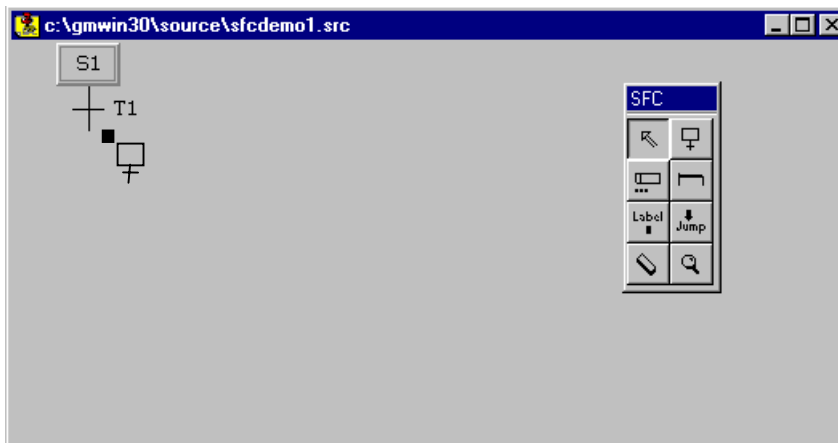
Step/Transition or Transition/Step is created in pairs by current position.




- Initial screen of SFC program is as below.



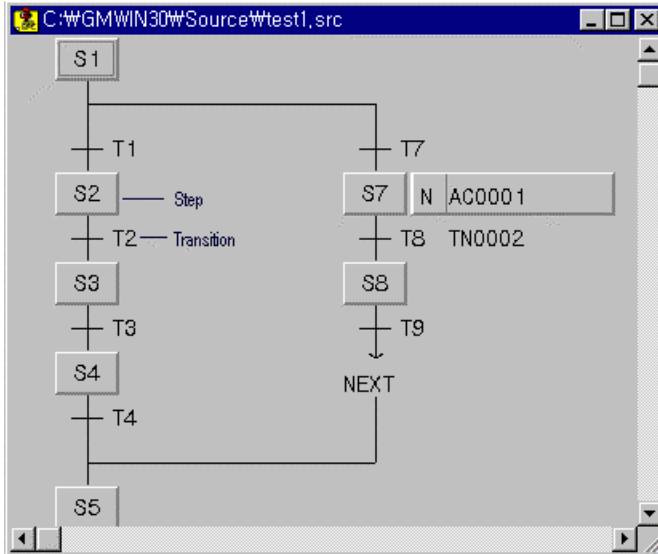
- Select () in toolbox.
- Move the mouse to the position marked . Then () symbol appears in the screen.
- Click the left button of mouse on the position marked .



- New Step/Transition is created on the position marked .





- Move the cursor with key to the position that you want to create step/transition.
- Select **Toolbox - Step (F2)**.

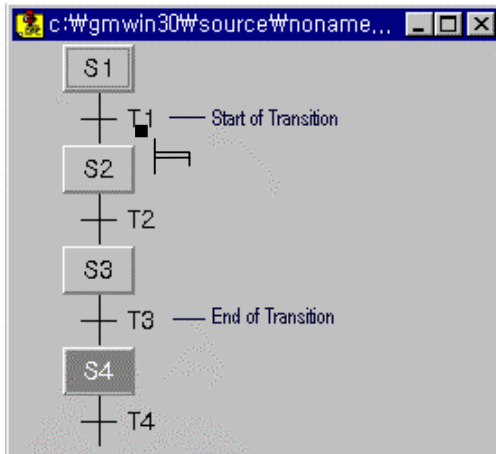


5.7.2. Create a Parallel Branch

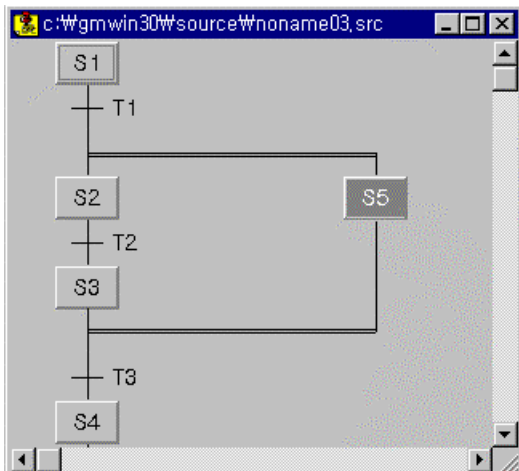
1) To create a parallel branch for the first time,



Select () in toolbox and move the mouse to the transition (T1) where branch starts and click a left button (You can see a mark ()).



- Transition (T2,T3,T4) are active in red.
- Move the mouse to the transition (T3) where branch ends and click a left button.




- Parallel branch and new step (S5) are created.

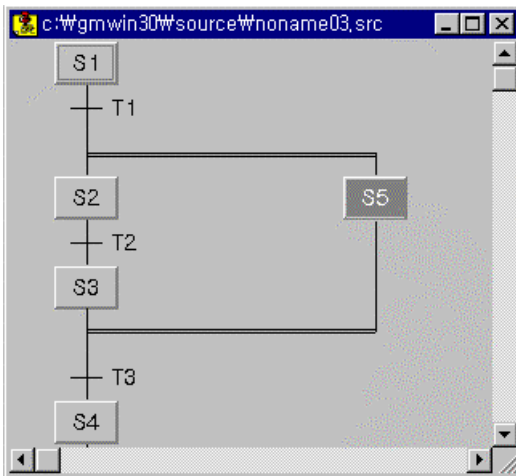


- Move the cursor to the transition where branch starts with key.
- Select **Toolbox-Branch (F3)**.
- Move the cursor to the transition where branch ends with key.
- Select **Toolbox-Branch (F3)**.

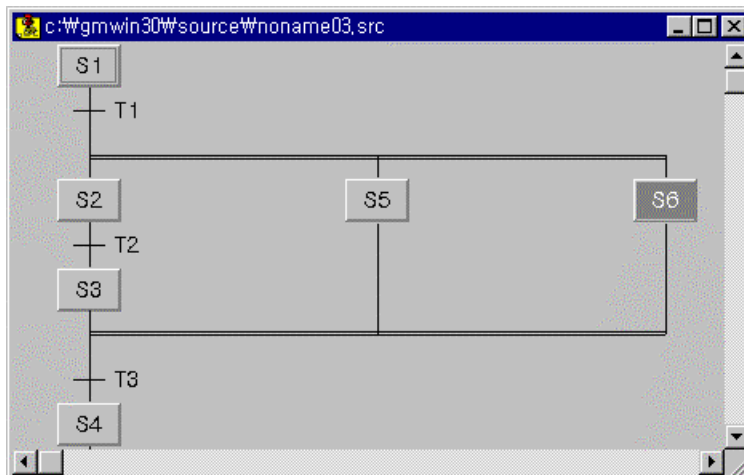
2) To expand a parallel branch,



- Select () in toolbox.
- Move the mouse to the start position of the parallel branch and click a left button.



- Parallel branch and new step (S6) are created.







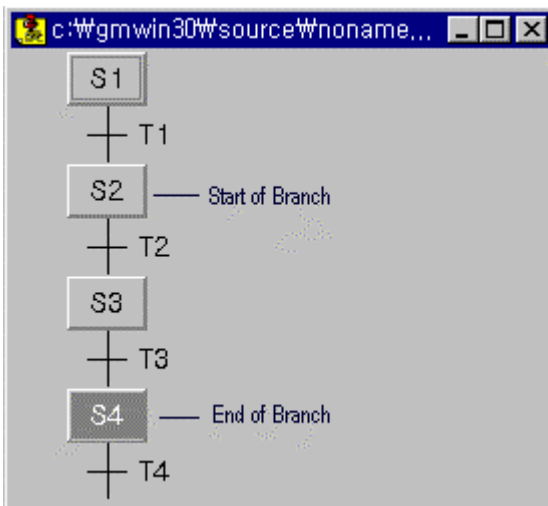
- Move the cursor to the start position of a parallel branch where you want to insert a branch with key.
- Select **Toolbox – Branch (F3)**.

5.7.3. Create a Selective Branch

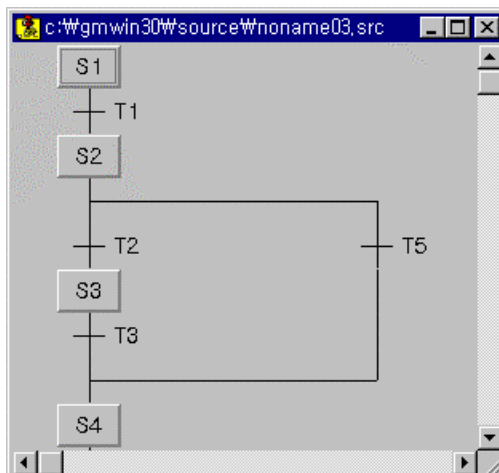
1) To create a selective branch initially,



- Select () in toolbox and move the mouse to the step (S2) where branch starts and click a left button(You can see a mark ()).



- Steps (S3,S4) are active in red.
- Move the mouse to the step (S4) where branch ends and click a left button.




- Selective branch and new transition (T5) are created.

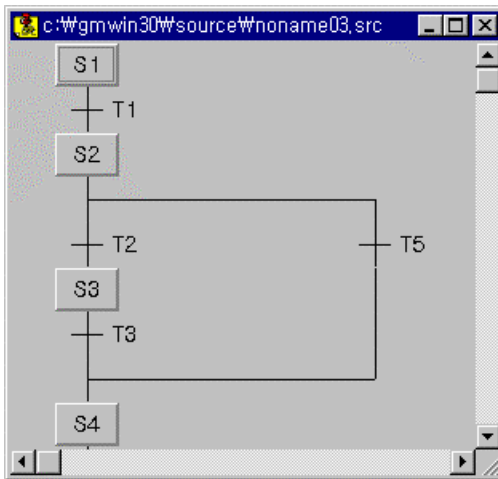


- Move the cursor to the step where branch starts with key.
- Select **Toolbox – Branch (F3)**.
- Move the cursor to the step where branch ends with key.
- Select **Toolbox – Branch (F3)**.

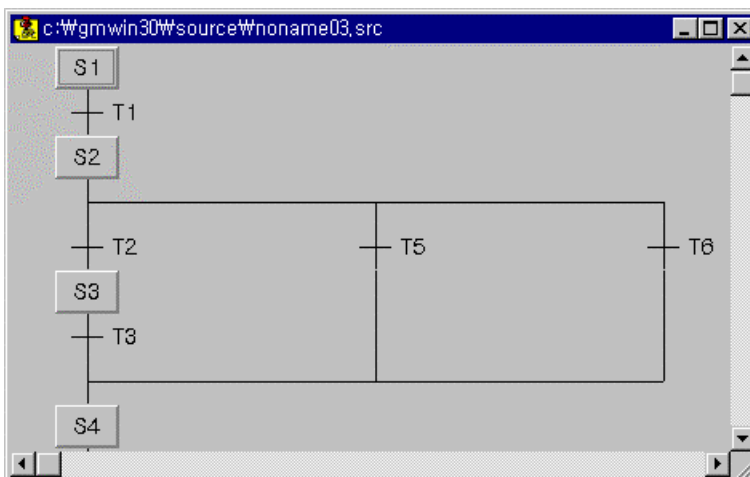
2) To expand a selective branch,



- Select () in toolbox.
- Move the mouse to the start position of a selective branch and click a left button.



- Selective branch and new transition (T6) are created.





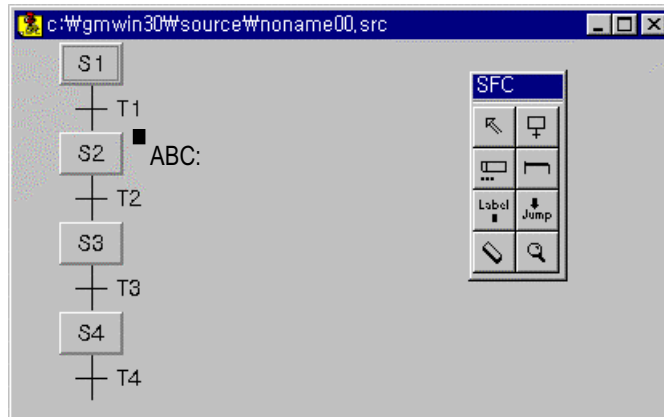


- Move the cursor to the start position of a selective branch where you want to insert a branch with key.
- Select **Toolbox – Branch (F3)**.

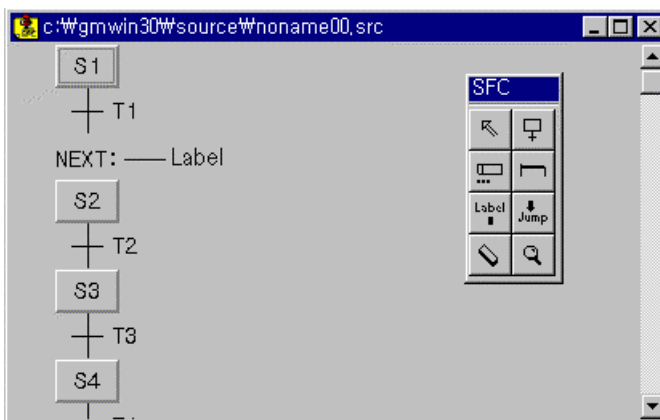
5.7.4. Create a Label



- Select () in toolbox.
- Move the mouse to the step (is marked with( ABC:)) and click a left button.



- Input a label name in **Label** dialog box and click **OK** button.
- Maximum size of a label name is 10 characters.





Note : Label is only inserted in the front of Step.

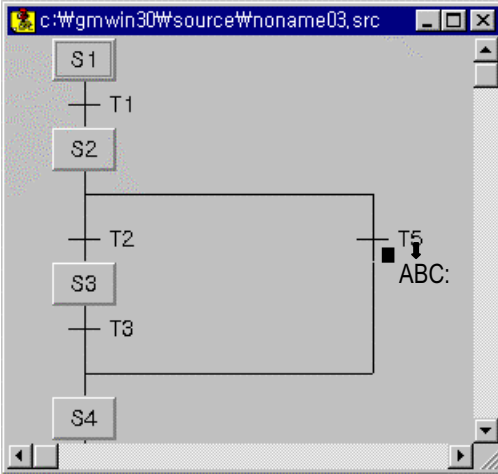


- Move a cursor to the step with key.
- Select **Toolbox – Label (F5)**.
- Input a label name in **Label** dialog box and click **OK** button.

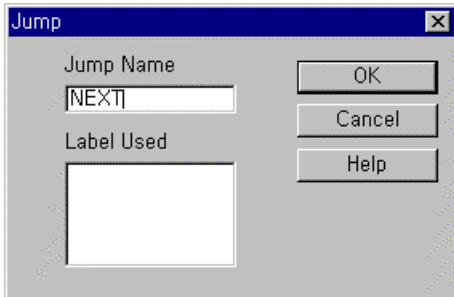
5.7.5. Create a Jump



- Select () in toolbox.
- Move the mouse to a desired position(is marked with ( ABC:)) for jump and click a left button.



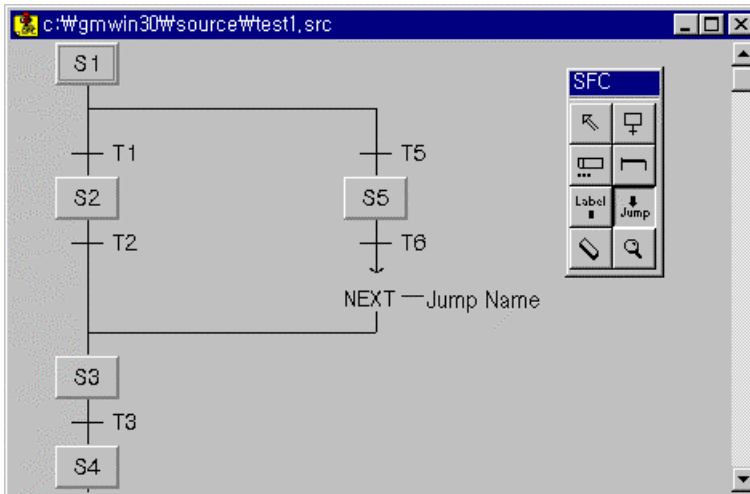
- Enter the jump name in **Jump** dialog box and click **OK** button.



- Maximum size of the jump name is 10 characters.

Note

- Available position for Jump
- Transition at the end of the selective branch
 - Transition at the last end of SFC program



- Move a cursor to a desired position (is marked with (ABC:)) for jump with key.
- Select **Toolbox – Jump (F6)**.
- Enter the jump name in **Jump** dialog box and click **OK** button.

5.7.6. Create an Action

To connect an action to a step,



- Select () in toolbox.
- Move the mouse to a step and click a left button (ABC)



- Move the cursor to the step with key.

Name	Kind
START	IL
SELECT	LD
WORK2	LD
JOB1	IL

- Select **Toolbox – Action/Transition (F4)**.

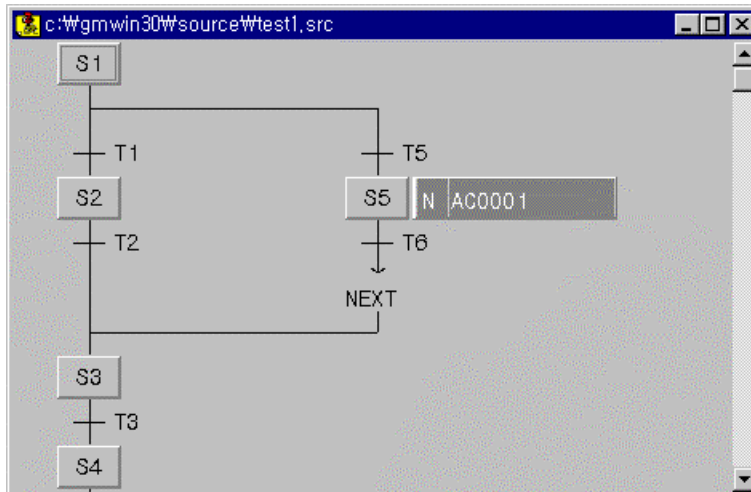
- Select whether you setup an action as a program or as a Boolean variable output in **Kind** radio button of **Action** dialog box.
If you setup an action as a variable output, the designated variable is outputted as '1' when the action is in active.

1) In case of setting up an action as a program

- Enter the action name in the **Name** edit box (maximum size is 16 characters).
When you want to connect an already used action, select the action in list box.
- Enter the comment for the action in the **Comment** edit box (maximum size is 40 characters).

2) In case of setting up an action as a variable

- Enter the variable name in the **Name** edit box (maximum size is 16 characters).
When you want to connect an already declared variable, select the variable in list box.
Select a desired qualifier in **Qualifier** list box.
- If the selected qualifier has a time value (D, L, SD, SL, DS), enter the time value in the **Time** edit box.
Example) T#10S
- Click **OK** button.




3) Kind and Function of Qualifier

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

5.7.7. Create a Transition

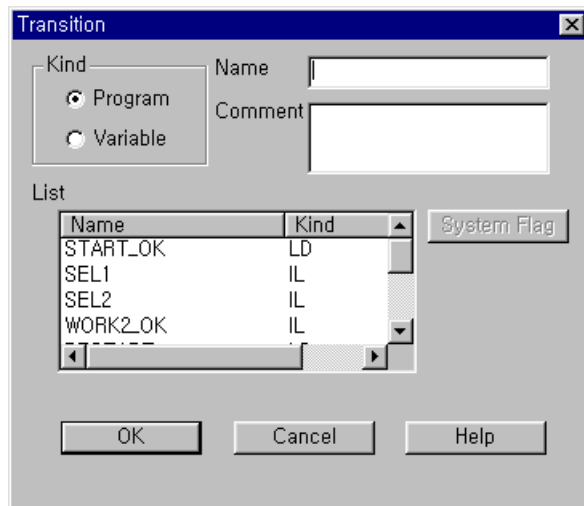
To connect Name to Transition,



- Select () in toolbox.
- Move the mouse to a transition and call a transition dialog box by clicking a left button.



- Move the cursor to a transition with key.
- Select **Toolbox – Action/Transition (F4)**.



- Select whether you setup an executive condition as a program or as a Boolean variable in **Kind** button of **Transition** dialog box.

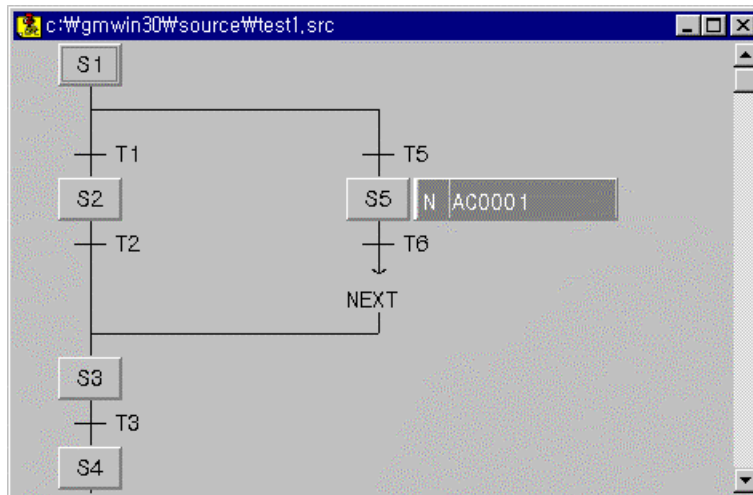
If you setup an executive condition as a Boolean variable, the condition becomes '1' when a variable becomes '1'. And the program executes the next step.

1) In case of setting up Transition as a program,

- Enter the transition name in the **Name** edit box (maximum size is 16 characters).
When you want to connect the already declared transition, select the transition in list box.
- Enter the comment for the transition in the **Comment** edit box (maximum size is 40 characters).

2) In case of setting up Transition as a variable,


- Enter the transition name in the **Name** edit box (maximum size is 16 characters).
When you want to connect the already declared variable, select the variable in list box.
- Enter the comment for the transition in the **Comment** edit box (maximum size is 40 characters).
- Click **OK** button.

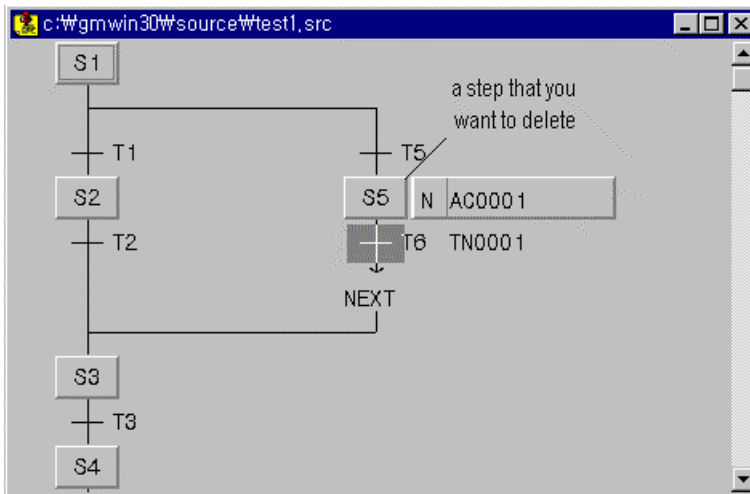


5.7.8. Delete

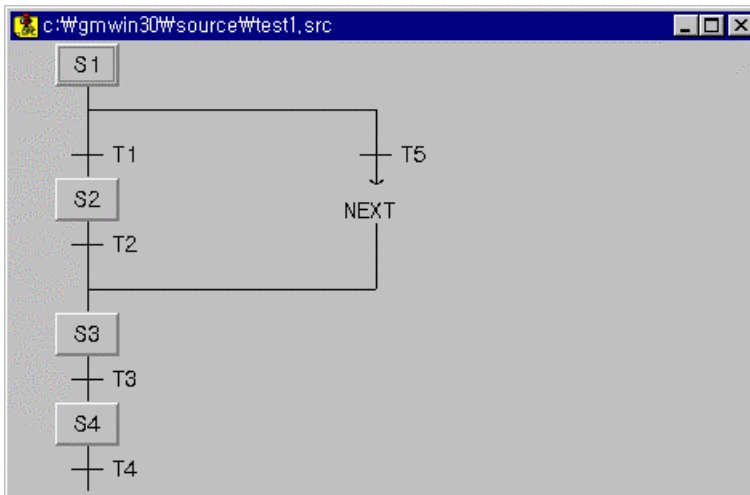
5.7.8.1 Delete a Step/Transition



- Select () in toolbox.
- Move the mouse to the step or transition that you want to delete.



- Click the left button of the mouse.



- Move the cursor to a step or transition that you want to delete with key.
- Select **Edit – Delete**.

Note



Although you delete a transition in SFC program, a transition program is not deleted. If you want to delete the program, you must delete it in transition list. (select **Program – Transition List**)

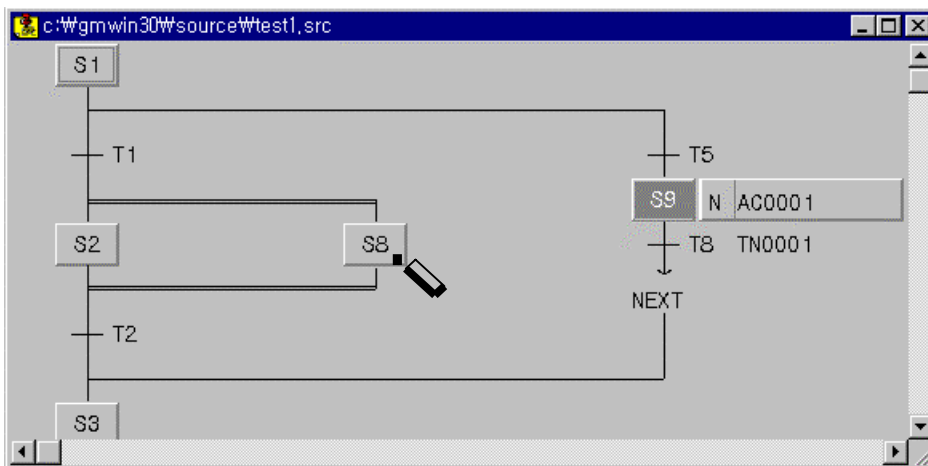
5.7.8.2 Delete a Branch

To delete the branch, All elements must be deleted before deleting a branch.

Namely, there must be only Step (in case of parallel branch) or Transition (in case of selective branch) in branch.




- Select () in toolbox.
- Move the mouse to Step (in case of parallel branch, is marked with ()) or transition (in case of selective branch) in branch and click a left button.



- Move the cursor to a step (or transition) in the branch that you want to delete.
- Select **Edit – Delete**.

5.7.8.3 Delete a Label




- Select () in toolbox.
- Move the mouse to the label that you want to delete and click a left button.



- Move the cursor to the label that you want to delete.
- Select **Edit – Delete**.

5.7.8.4 Delete a Jump




- Select () in toolbox.
- Move the mouse to the jump that you want to delete and click a left button.



- Move the cursor to the jump that you want to delete with key.
- Select **Edit – Delete**.

5.7.8.5 Delete an Action



- Select () in toolbox.
- Move the mouse to the action that you want to delete and click a left button.



- Move the cursor to the action to be deleted with key.
- Select **Edit – Delete**.

Note


Although you delete an action in SFC program, an action program is not deleted.
If you want to delete the program, you must delete it in action list (select **Program – Action list**).

5.7.9. Zoom In Action/Transition

This Function is used for editing an action or transition program.

Note : A variable used in action or transition is commonly shared in other actions or transitions.



- Select () in toolbox.
- Move the mouse to an action or transition and call a **Select Language** dialog box by clicking a left button.

At this time, if it is declared as a variable, you cannot zoom in.

- Selecting a language type is omitted for the action or transition that selected a program type before.



- Select a desired language type in **Language** option button of **Select Language** dialog box.
- Call the screen of making a program by clicking **OK** button, and create a program.
- When you edit a transition, the execution condition must be outputted as **TRANS** variable.

Example: Action Program(LD)

Command			
ST SENSOR1			
Nu...	Instruction	Input...	Variable
0	ST		SENSOR1
1	CAL	TON	TIMER3
2		IN:=	RESET
3		PT:=	T#4S
4	LD		TIMER3.Q
5	ST		SENSOR1

Example: Transition Program(IL)

Note

Action and transition programs are not saved by individually. They are also saved when SFC program is saved. So if you save SFC program in window, then action and transition are also saved.

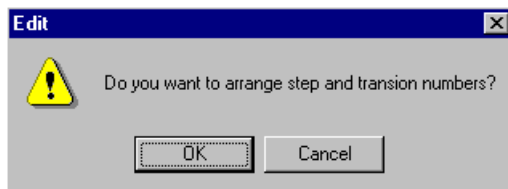
5.7.10. Arrange Number

This is the function for putting the number added to Step and Transition in order.

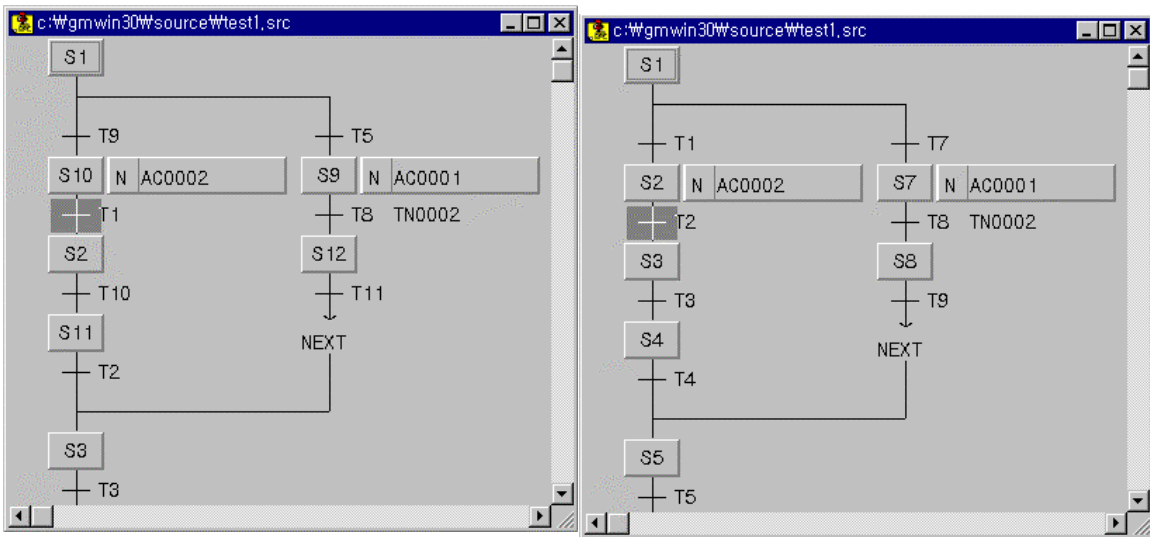
Step or Transition number is added in inserted order, and they have no other meaning.

It is arranged automatically when you compile or save the program.

- Select **Edit – Arrange Number**.



- Click **OK** button and the numbers are given in order.

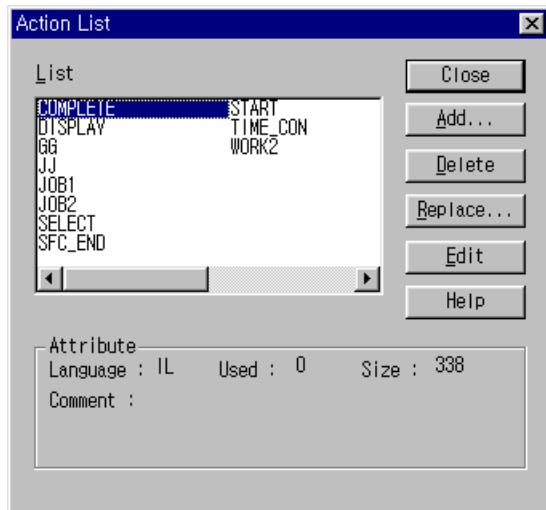


Before arrangement

After arrangement

5.7.11. Action/Transition List

- Select **Program - Action List** (or **Transition List**).



- Action list and the attribute of the selected action appears in **Action List** dialog box.

Language : Language type of the action
 Used : The number of being used in SFC program
 Size : Program size of the action(byte)
 Comment : Comment for the action

1) Add the action

- Click **Add** button in **Action List** dialog box.
- Enter the action name and comment, and click **OK** button.

2) Replace the action name

- Click **Replace** button in **Action List** dialog box.
- Enter the action name and comment that you want to replace, and click **OK** button.
 At this time, the action on using in SFC program is also replaced in SFC program.

3) Delete the action

- Click **Delete** button in **Action List** dialog box.
 At this time, you cannot delete the action on using in SFC program.

4) Edit the action

To edit an action program,

- Click **Edit** button in **Action List** dialog box.

5.7.12. Edit a Block

Before editing a block, you must setup the range to be applied as a block.


Namely, if you want to copy or delete a continuous program, you must designate the desired content as a block before selecting edit a block function.

When you fix a block in SFC, a correct program is only available.

For example, you must setup the block, which starts from a step, as a transition for the end of the program.

To setup a block,



- Select () in toolbox.
- In SFC program window, move the mouse to the start point of the block and drag it to the last row of the range to select with clicking the left button.



- In SFC program window, move the cursor to the start point of the block.
- With pressing **Shift** key, move the cursor with arrow key to the last row of the range to select.

5.7.12.1 Cut

After selecting a block,

- Select **Edit-Cut** (**Ctrl+X**, ).


5.7.12.2 Copy

After selecting a block,

- Select **Edit-Copy** (**Ctrl+C**, ).

5.7.12.3 Paste

After copying or cutting,

- In SFC program window, move the cursor to the position that you want to paste .
- Select **Edit-Paste** (**Ctrl+V**, ).

5.7.12.4 Delete

After selecting a block.

- Select **Edit-Delete** (**Delete**, ).

5.7.13. Find

- Select **Edit – Find** ()



- In **Name** edit box of **Find** dialog box, enter the string that you want to find.
- Select the following option and click **OK** button.

1) Kind

Select the type of string that you want to find.

2) Origin

Select the range where Find function is executed.

From cursor : Find from current cursor position.

Entire scope : Find through the whole range.

3) Direction

Select the direction that Find function is executed.

Forward : Find function is executed forward.

Backward : Find function is executed backward.

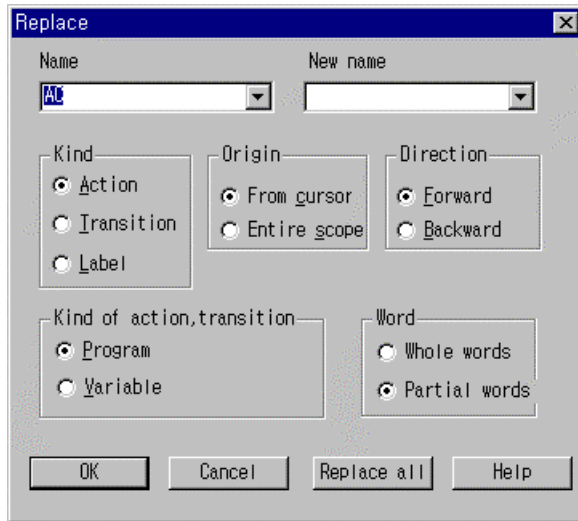
4) Word

Select Whole word or Partial word to find

5.7.14. Replace

- Select **Edit-Replace** ()

- In **Name** edit box of **Replace** dialog box, enter the character that you want to find.
- Enter the new character in **New Name** edit box of **Replace** dialog box,
- Select options in the same way as Find function and click **OK** button.



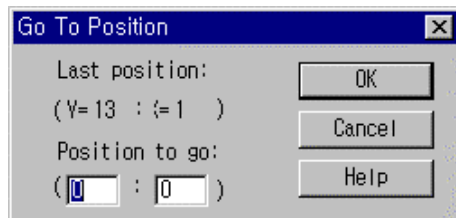
5.7.15. Again

If you executed Find/Replace function before, executes the function again with the condition that designated before.

- Select **Edit – Again** (**Ctrl+F3**, ).

5.7.16. Goto

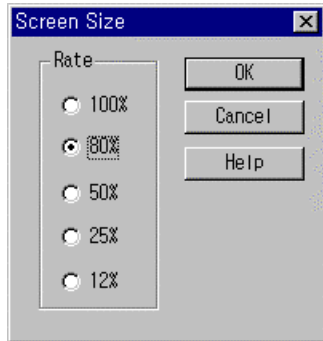
- Select **Edit - Goto**.
- In **Go to Position** dialog box, enter the Y(vertical),X(horizontal) coordinates that you want to go.



5.7.17. Condense Screen

To adjust the screen size,

- Select **Edit – Condense Screen**.
- Select a desired screen size in **Condense Screen** dialog box and click **OK** button.

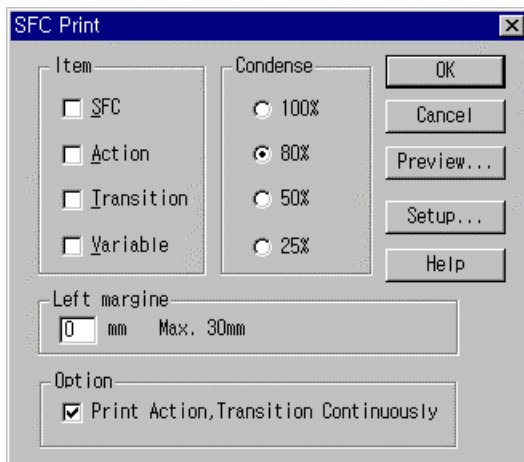


5.7.18. View Comment

If you click **View comment** button to see the comments that you edited in the program.

5.7.19. Print

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



- Setup the conditions to print in SFC program.
- To preview the program, select **Preview** button.
- Close **Preview** screen and click **OK** button to print.

5.8. Edit IL

IL is a language that consists of instructions, whose elements are operators, functions, function block and label. The input of an instruction and a variable is accomplished in edit control box for command and the input of a comment is accomplished in a comment input box.

A blank separates instruction from variable and in case of several variables, they are separated by ','.

Example) ADD A, B, 2

Edit control box for command

Comment box

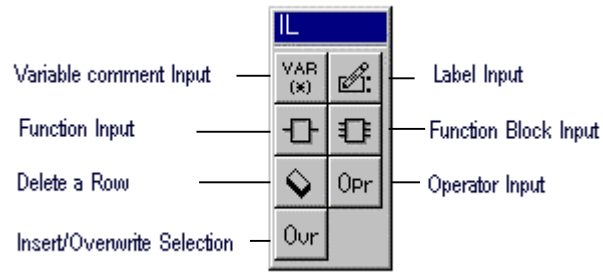
The screenshot shows the GMWIN IL editor window with the following table of instructions:










Nu...	Instruction	Input...	Variable	Comment	Value
0	LD		AR		
1	ST		AR		
2	LD		AR[3]		
3	ST		AR[0]		
4	LD		AR[1]		
5	ADD	IN1:=	CURRENT RESULT		
6		IN2:=	1		
7	ST		AR[2]		
8	NOP				

The interface includes a 'Command' dropdown menu set to 'ADD', a 'Comment' input box, and a 'Toolbox' with buttons for 'VAR (x)', 'Opr', and 'Ovr'. The window title is 'c:\Wgmwin30\source\wname01.src'.

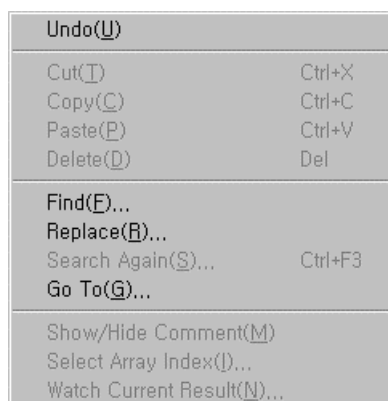
Display region

Toolbox for IL



	Function Input	Select a function to input
	Function Block Input	Select a function block to input
	Label Input	Input a label
	Operator Input	Select an operator to input
	Delete a Row	Delete a present row
	Row Comment Input	Input a row comment
	Variable Comment Input	Input a variable comment
	Insert Mode	Change into insert mode
	Overwrite Mode	Change into overwrite mode

The below picture is the menu that is displayed with clicking the right button of the mouse in IL. You can execute each command simply using this menu.



5.8.1. Operator Input

End indicates the end of the main program and the program after **End** is a subroutine program.


If there is not **End**, the whole program is the main program.

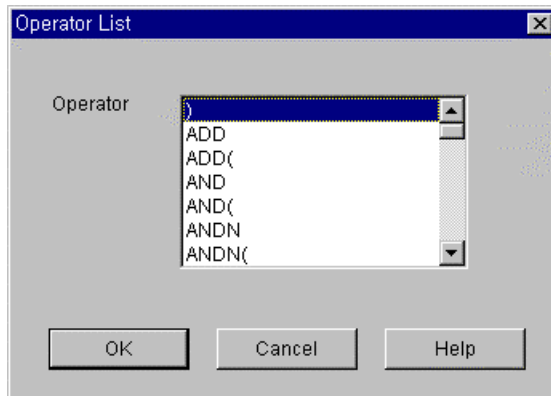
You can use **SCAL**, **SCALC**, **SCALN** for calling a subroutine and **RET**, **RETC**, **RETN** for return from a subroutine. The name created in **SCAL(C,N)** must not be in front of **End**.

If **JMP(C, N)** is in front/rear of **End**, the appropriate label is in front/rear of **End**. Although **RET(C,N)** is not in the rear of **End**, the last is regarded as the return from a subroutine.

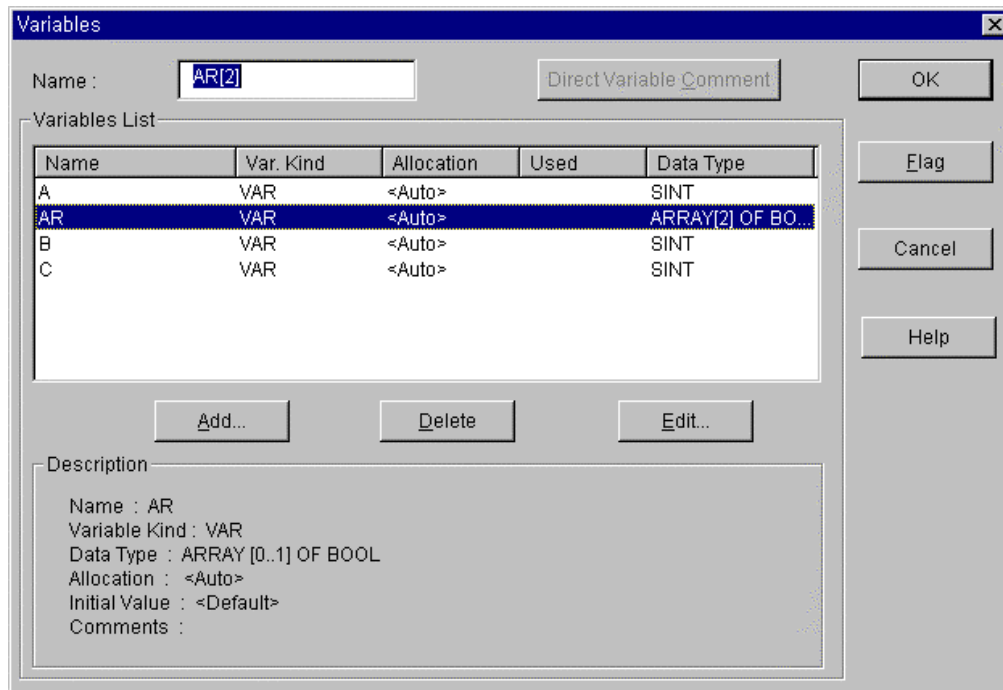


To insert the operator,

- Click () in toolbox.



- Select the operator in **Operator List** dialog box.



- Enter the variable name in **Name** edit box of **Variables** dialog box.
- Click **OK** button.

Note

If you want to enter the already declared variable as a variable, select the variable in list box of **Variable** dialog box.



method 1

- Move the cursor in program region to the position in where you want to insert an operator.
- Input an operator and object in **Command** edit box.




- Press **Enter** key.

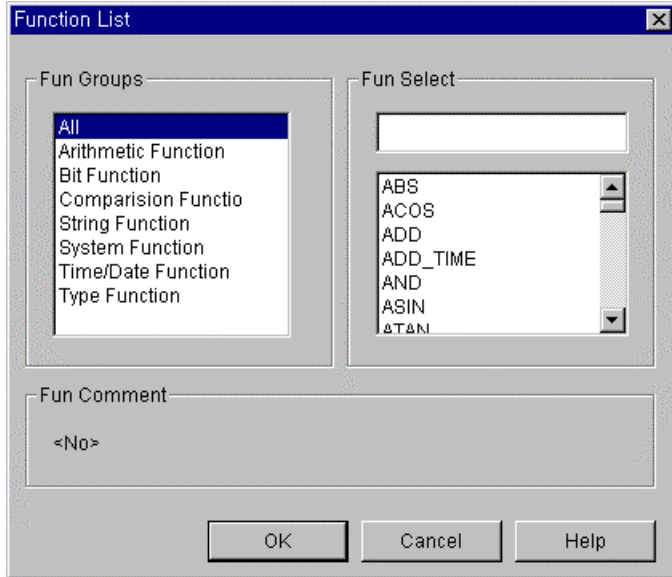
method 2

- Move the cursor in the display region which you want to insert an operator.
- Select **Toolbox - Operator**.
- Select an operator in **Operator List** dialog box.
- Enter the variable name in **Name** edit box of **Variables** dialog box.
- Press **Enter** key.

5.8.2. Function Input



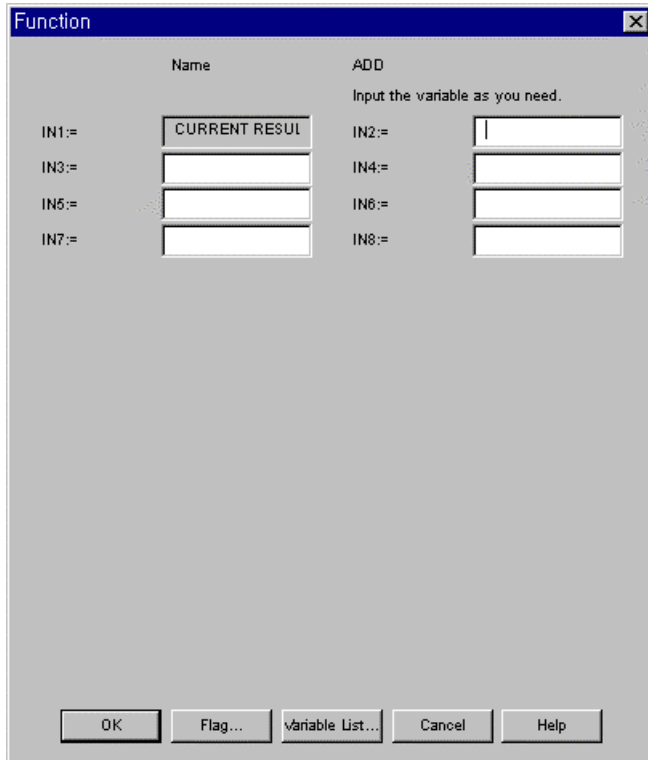
- To insert the Function in IL,
- Click () in toolbox.



- Select the function in **Function List** dialog box.
- Enter the variables as many as you want in edit box of **Function List** dialog box.
- Click **OK** button.

Note

If you want to use the already declared variables as the variable, click Variable list button of **Function** dialog box and select the variable in the list box of **Variables** dialog box.



method 1

- Move the cursor in the display region which you want to insert a function.
- Enter the function and variable in **Command** edit box.



- Press an **Enter** key.


method 2

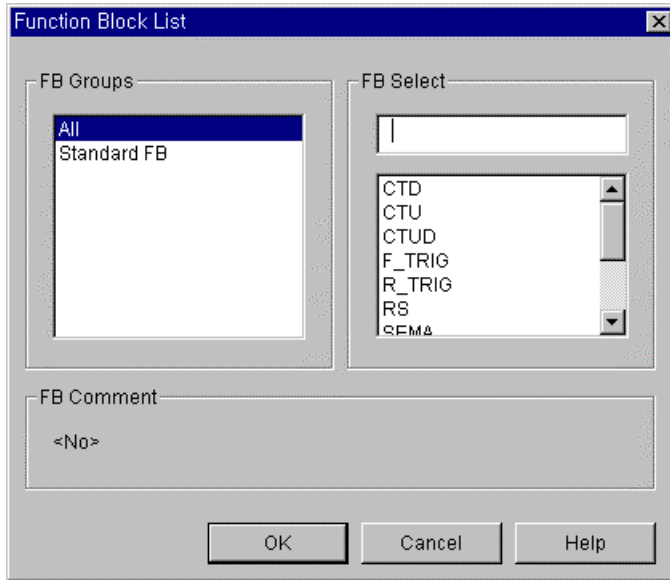
- Move the cursor in the display region which you want to insert a function.
- Select **Toolbox - Function**.
- Select the function that you want to insert in **Function List** dialog box.
- Enter the variables for the function in **Function** dialog box.
- Press **OK** button.

Note
<p>I case of extensible function (refer to GMWIN commands for the detail information), the number of input for the variable is not designated.</p>

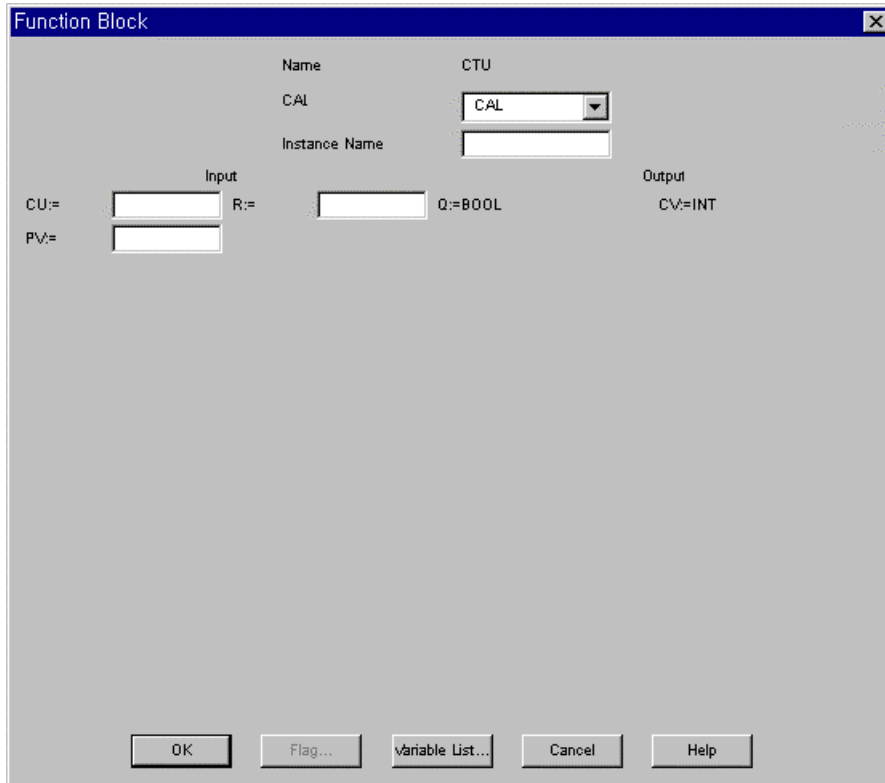
5.8.3. Function Block Input



- To insert the Function Block,
- Click () in toolbox.



- After selecting a function block to use in **Function Block List** dialog box, click **OK** button.



- Input an instance name in **Instance Name** edit box.
- Click **OK** button.

Note

If you want to insert the already declared variable for a new variable, click Variable list button of **Function Block** dialog box and select the variable in list box of **Variables** dialog box.



method 1

- Move the cursor in the display region which you want to insert a function block.
- Enter CAL/CALC/CALN in **Command** edit box.




- Select the function block in **Function Block List** dialog box.
- Enter the instance name and variables in **Function Block** dialog box.
- Press **Enter** key.

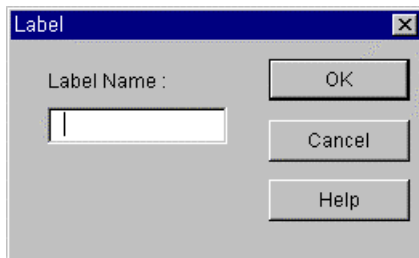
method 2

- Move the cursor in the display region which you want to insert a function block.
- Select **Toolbox - Function Block**.
- Select the function block in **Function Block List** dialog box.
- Enter the instance name and variables in **Function Block** dialog box.
- Press **Enter** key.

5.8.4. Label Input



- To input the Label,
- Click () in toolbox.



- Enter the label name (maximum size is 8 characters) in **Label** dialog box.
- Click **OK** button.



method 1

- Move the cursor in the display region which you want to insert a label.
- Enter the label name and ':' in **Command** edit box.



- Press **Enter** key.

method 2

- Move the cursor in the display region which you want to insert a label.
- Select **Toolbox - Label**.
- Enter the label name in **Label** dialog box.
- Click **OK** button.

5.8.5. Comment Input

Comment is created in **Comment** edit box in IL program screen. You can insert a line comment and variable comment separately by the comment display of toolbox. You can edit directly the comment in **Comment** edit box.



- Move the cursor in the display region which you want to insert a comment.
- Make a comment (maximum size is 24 characters) in **Comment** edit box.




- Move the cursor in the display region which you want to insert a comment.
- Select **Toolbox – Variable Comment (Line Comment)**.
- Enter the comment in **Comment** edit box.

5.8.6. Change an Inset/Overwrite Mode of Program

To change into Insert Mode,



- Click () in toolbox.



- Select **Toolbox - Insert**

To change into Overwrite Mode,




- Click () in toolbox.



- Select **Toolbox - Overwrite**

5.8.7. Delete a Program



- Move the cursor in the display region which you want to delete.
- Click () in toolbox.



- Move the cursor in the display region which you want to delete.
- Select **Toolbox - Delete**.

5.8.8. Edit a Block

Before editing a block, you must setup the range to be applied as a block.

Namely, if you want to copy or delete a continuous program, you must designate a desired range as a block before selecting Edit Block Function.



- Move the mouse to the row of the display range to select.
- Drag the mouse to the last row of the range to select with clicking the left button.



- Move the cursor to the row of the display range to select.
- With pressing **Shift** key, move the cursor with arrow key to the last row of the range to select.

5.8.8.1 Cut

After selecting a block,

- Select **Edit-Cut (Ctrl+X, )**.


5.8.8.2 Copy

After selecting a block,

- Select **Edit-Copy (Ctrl+C, )**.

5.8.8.3 Paste

After copying or cutting,

- Move the cursor in the display region which you want to paste.
- Select **Edit-Paste (Ctrl+V, )**.

5.8.8.4 Delete

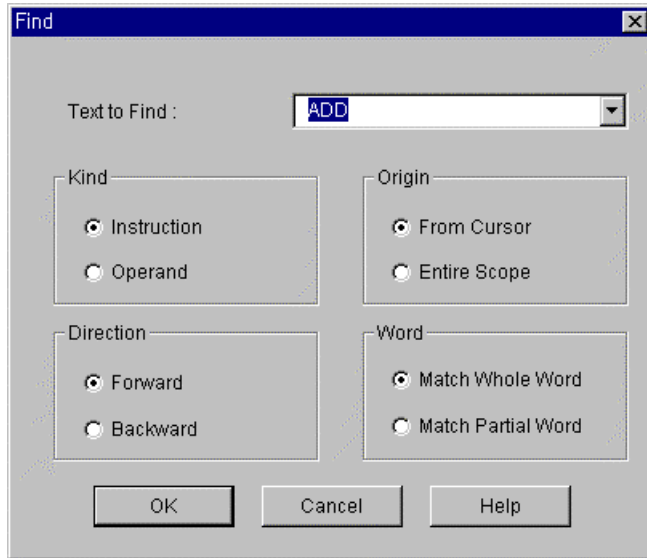
After selecting a block,

- Select **Edit – Delete (Delete, )**.

5.8.9. Find

To find an instruction or variable in the program on editing,

- Select **Edit-Find** ().



- In **Text to Find** edit box of **Find** dialog box, enter the string that you want to find.
- Select the following option and click **OK** button.

1) Kind

Select the string type to find.

2) Origin

Select the range where Find function is executed.

From cursor : Find from the current cursor position.

Entire scope : Find through the whole program.

3) Direction

Select the direction that Find function is executed.

Forward : Find function is executed forward.

Backward : Find function is executed backward.

4) Word

Select an accordance degree in finding a word.

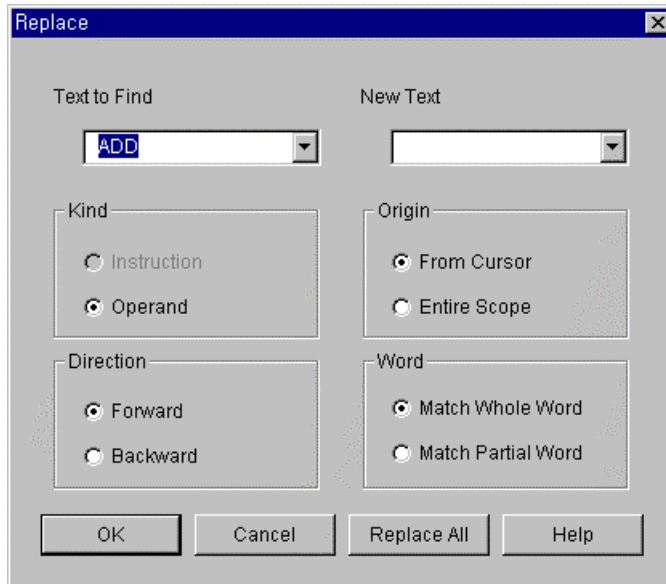
Match Whole Word : Find only an exact same word.

Match Partial Word : Find also a partial same word.

5.8.10. Replace

To replace a variable with a desired variable in the program on editing,

- Select **Edit – Replace** ()



- In **Text to Find** edit box of **Replace** dialog box, enter the string that you want to find.
- In **New Text** edit box, enter the new string.
- Select options in the same way as Find function and click **OK** button.
- Click **Replace All** button to replace all string at once.

Note

You can replace the string only for a variable.

5.8.11. Again

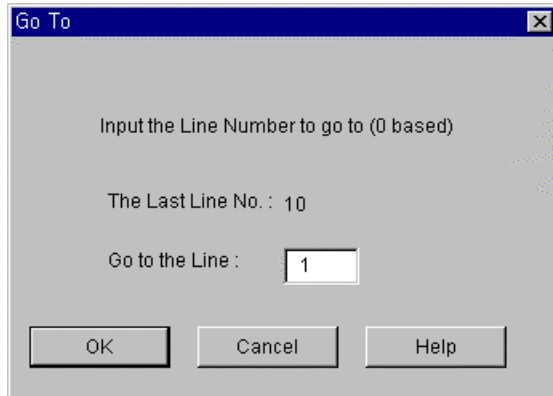
If you executed Find/Replace command before, execute the command again with condition that designated before.

- Select **Edit – Again** (**Ctrl+F3**, )

5.8.12. Go to

This function allows you to find the desired line in the program.

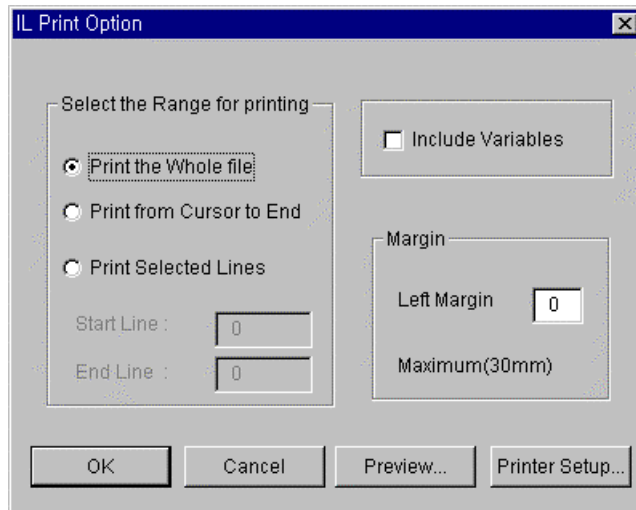
- Select **Edit - Goto**.
- In **Goto** dialog box, enter the line number that you want to find.
- Click **OK** button.



5.8.13. Print

If you click a **Preview** button before printing a program, the outline of content is printed on the screen.

- Select **Project - Print**.



- Select the Range for printing in **IL Print Option** dialog box.
 - Print the Whole file : Print the whole program.
 - Print from Cursor to End : Print from a cursor to the end
 - Print selected lines : Print from start line to end line
- To print variables, select **Include Variables** check box.
- Setup the margin to print in **Margin** edit box.