Section 2 Offline Operations

Page

2-1 Preparations for Programming 2-1

2-1-1 Opening a new file 2-1

2-1-2 Menus and tool bars used to edit program 2-2

2-1-3 Setting tag entry/display 2-3

(1) Setting program editor 2-3

2-2 Programming 2-6

2-2-1 Writing contacts and outputs 2-6

(1) Writing a series line 2-6

(2) Writing branches 2-10

(3) Writing branch outputs 2-14

(4) Writing branch skip lines 2-16

2-2-2 Writing a returning 2-19

(1) Writing returning (output) 2-19

(2) Writing returning (input) 2-20

2-2-3 Writing Inverse instruction 2-21

2-2-4 Writing ON-delay timer 2-22

2-2-5 Writing Up counter 2-23

2-2-6 Writing a shift register 2-26

2-2-7 Writing Data Transfer (MOV) instruction 2-28

2-2-8 Writing Data Table Definition (TABL) 2-30

2-3 Program Modification 2-32

2-3-1 Changing instructions/addresses 2-32

2-3-2 Addition of lines/instructions 2-34

(1) Inserting a new line 2-34

(2) Inserting a new contact 2-35

(3) Editing connecting lines 2-39

(4) Compressing a program (deleting blanks) 2-41

(5) Inserting a row (blank row) 2-42

(6) Creating an OR circuit of coils 2-43

(7) Creating an OR circuit of data instructions 2-43

(8) Deleting contacts and outputs 2-44

(9) Merging lines 2-45

(10) Dividing lines 2-46

2-3-3 Changing Tags 2-47

2-4 Line Copy/Insert/Delete 2-48

2-4-1 Selecting a line block 2-48

(1) Selecting a single line block 2-48

(2) Selecting two or more line blocks 2-49

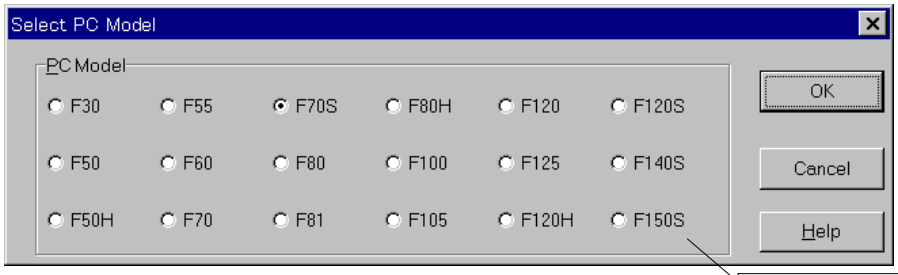
(3) Selecting a line block with page specification 2-49

2-4-2 Copying and pasting a line block 2-50
(1) Copying a line block 2-50
(2) Pasting the copy of line block 2-50
2-4-3 Cutting and pasting line block (move) 2-51
(1) Cutting a line block 2-51
(2) Pasting the cut line block 2-51
2-4-4 Deleting a line block 2-52
(1) Deleting a single line block 2-52
(2) Deleting two or more line blocks at a time 2-52
2-5 Tag Editor 2-53
2-5-1 Outline of Tag Editor 2-53
2-5-2 Operation with Tag Editor 2-54
(1) Configuration of Tag Editor 2-54
(2) Inserting a new tag 2-55
2-5-3 Importing tag text file 2-56
(1) Text file format 2-56
(2) Importing text file 2-57
(3) Display of tag after inporting text file 2-57
2-6 Find/Replace Functions 2-58
2-6-1 [Address/Tag] Find function 2-58
(1) First retrieval 2-58
(2) Succeeding search 2-59
2-6-2 [Address/Tag] Replace function 2-59
2-6-3 Line Search function 2-61
2-6-4 Instruction Search Function 2-62
2-7 System Definition 2-63
2-7-1 Display of dialog box in system definition 2-63
2-7-2 Operation in system definition dialog box 2-64
(1) System Registration dialog box 2-64
(2) T-Link Registration dialog box 2-64
(3) P/PE-Link & ME-NET Registration dialog box 2-65
(4) Message Module Registration dialog box 2-65
2-8 Program Save/Open 2-66
2-8-1 Saving a program 2-66
(1) Saving a program to a file 2-66
(2) Contents of file during program save 2-67
2-8-2 Opening a program file 2-68
2-9 Block Diagram Instruction 2-69
2-9-1 Edit Area in Block Diagram 2-69
2-9-2 Example of Editing of Block Diagram 2-70
2-9-3 Notes on Editing Block Diagram 2-76
(1) Instructions that can be connected to each terminal 2-76
(2) Deleting instructions, connecting lines, etc. 2-76
(3) Inserting instructions, connecting lines, etc. 2-76
(4) Arranging block diagram input (output) 2-76
(5) Right-angled connection of block diagram
(right-angled connection of a vertical line and a horizontal line) 2-77
2-9-4 Limitations on Block Diagram 2-79

2-1-1 Opening a new file

To create a new program, start the personal computer loader and open a new file (program window) by the following operations.

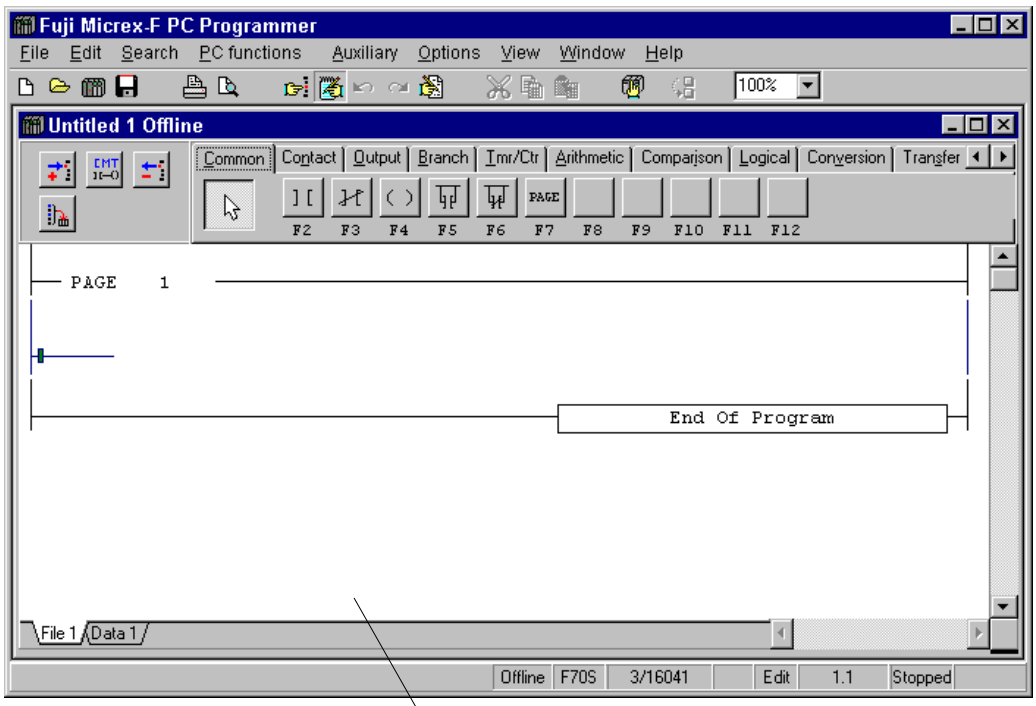
◊ Select the [New] command from the [File] menu. The {Select PC Model} dialog box is displayed.



The programming instructions that can be used and the contents of the system definition are determined by the PC model selected here.

* The models displayed in the above dialog box depend on the version of the loader software.

◊ After selecting the appropriate PC model, left-click the [OK] button.
A program window is displayed in the main window of the loader.



This is the program window. You can start writing a program in this window.

2-1-2 Menus and tool bars used to edit program

The commands in the menus and the tool bars (buttons) that are mainly used when editing a program are explained below. All the functions of the tool bars are included in the menus.

Command name (Button name)	Button	Menu	Explanation (use)
New...		File	Creates a new program file.
Open...		File	Opens a program file which has already been created.
Online		File	Opens an online PC program.
Save		File	Saves a program file. If a program file of the same file name already exists, it is overwritten.
Print...		File	Prints an active program file.
Print Preview		File	Permits the result of printout to be checked on the screen.
Find		Search	Searches for any specified address and tag name.
Jump to specified line		Search	Displays a line with a specified number.
Edit Mode		Edit	Sets a program ready to be edited.
Undo Editing		Edit	Cancels the last operation performed and restores the original condition.
Redo Editing		Edit	Reverses the operation that has been canceled by the [Undo] command.
Tag Editor		Auxiliary	Starts {Tag Editor} to permit tags to be edited.
Cut		Edit	Copies any selected line block to the clipboard. The selected line block is deleted.
Copy		Edit	Copies any selected line block to the clipboard.
Paste		Edit	Pastes a line block that has been copied to the clipboard to a specified location.
Run / Stop		PC functions	Starts or stops the online-connected processor.
Step execution		PC Function	Executes the program step by step.
Insert Line		Edit	Inserts a line block starting point which is necessary when preparing a new line block.
Insert / Modify Comment...		Edit	Inserts a new line comment or modifies an existing line comment. A line comment is used to explain a particular line of a program.
Delete Line		Edit	Deletes a selected line block.
Insert block diagram		Edit	Allocates the area to create a new block diagram.
Download changes to PC		Edit	Downloads ladder lines changed in an online window to a PC attched.

2-1-3 Setting tag entry/display

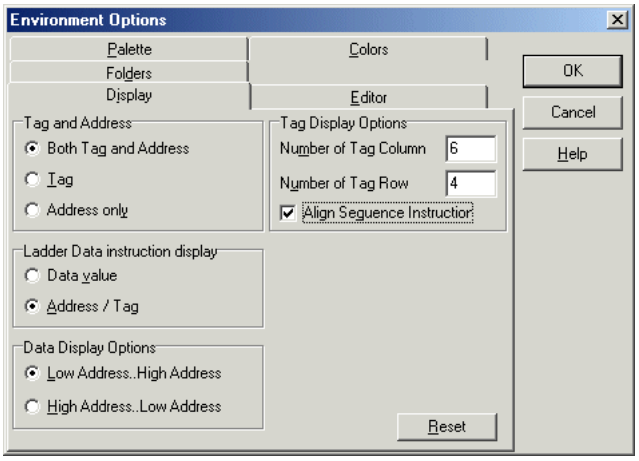
During program editing, it is possible to enter tags while writing instructions in the program. It is also possible to display the tag entries on the program. The methods of setting tag entry/display are explained below.

The tag is a label (name) which is in one-to-one correspondence with an address. It corresponds to a comment in the MS-DOS-based loader.

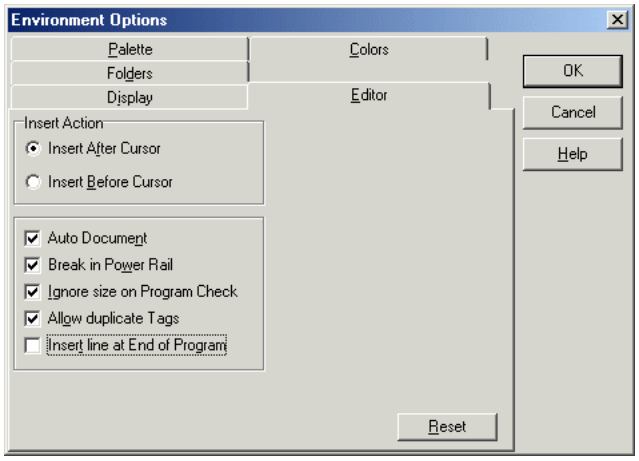
(1) Setting program editor

◊ Select the [Environment...] command from the [Option] menu.
The {Environment Options} dialog box is displayed.
◊ Left-click the [Display] or [Editor tab].
The items to set to edit and display the program are displayed.

[Display] tab



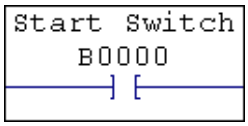
[Editor] tab



1) Setting display option

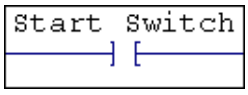
[Both Tag and Address] option button

Displays an address and a tag above the instruction symbol.



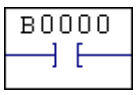
[Tag] option button

Displays only a tag above the instruction symbol. (Note, however, that when no tag has been set for the instruction address, the instruction address is displayed.)



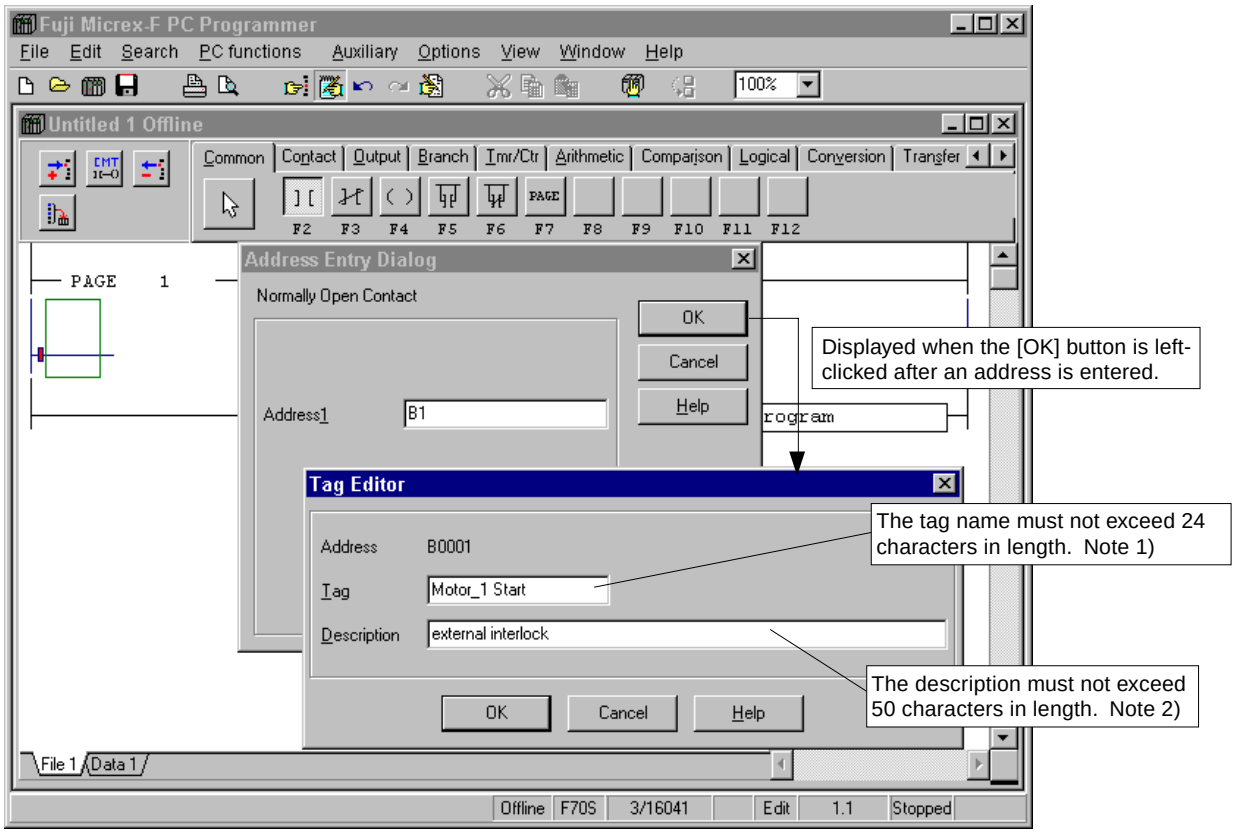
[Address only] option button

Displays only an address above the instruction symbol.



2) Setting automatic tag entry

When the [Auto Document] box is checked, the {Untitled 1 Offline} dialog box shown below is displayed during program editing.

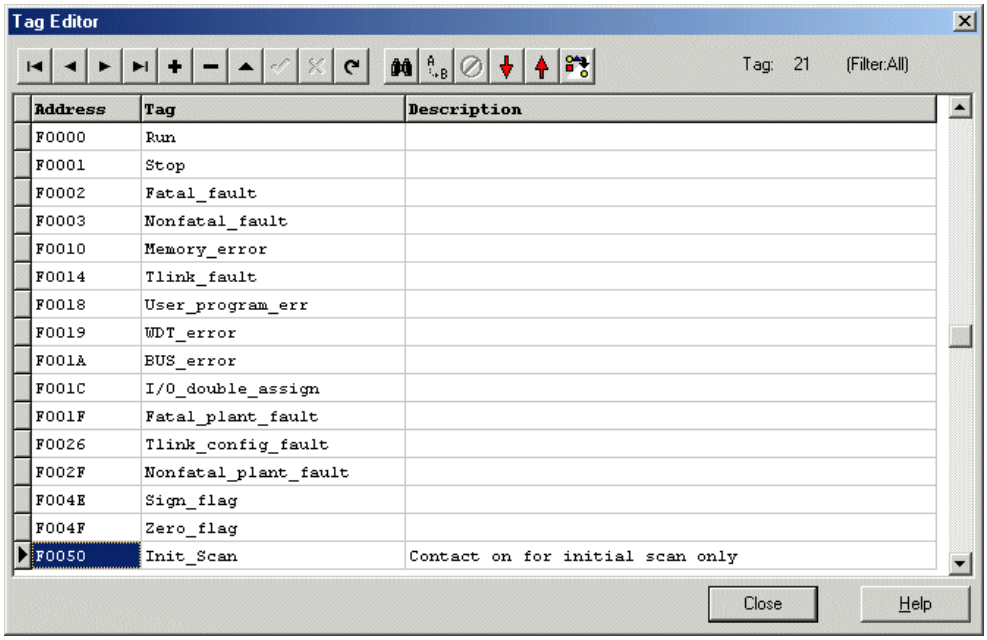


Note 1: In a tag name, the comma (,) cannot be used.

2: In a description, the comma (,) cannot be used. If a comma is included in the description, it is automatically deleted when the description is added to the data base. Note that the description is not displayed on a ladder program.

<Tag Editor>

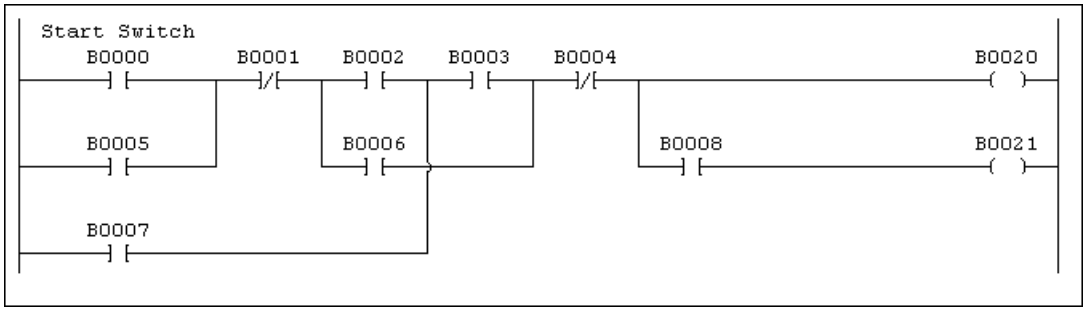
There are two methods of entering a tag name. One is using the {Untitled 1 Offline} dialog box described above, and the other is using [Tag Editor].



For the method of using [Tag Editor], refer to “2-5 Tag Edit.”

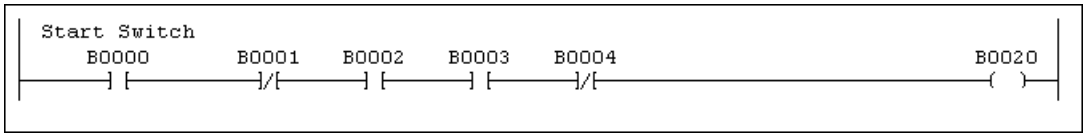
2-2-1 Writing contacts and outputs

Here, the method of preparing a line which combines contacts and outputs as shown below is explained.



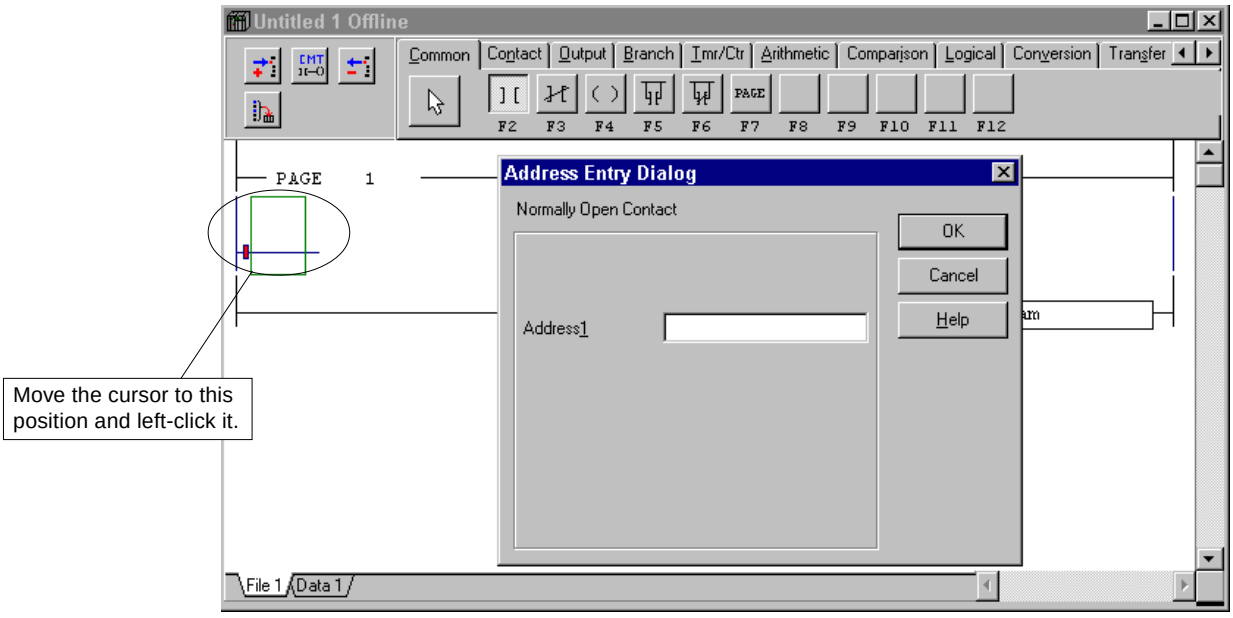
(1) Writing a series line

The method of writing a series line shown below is explained.

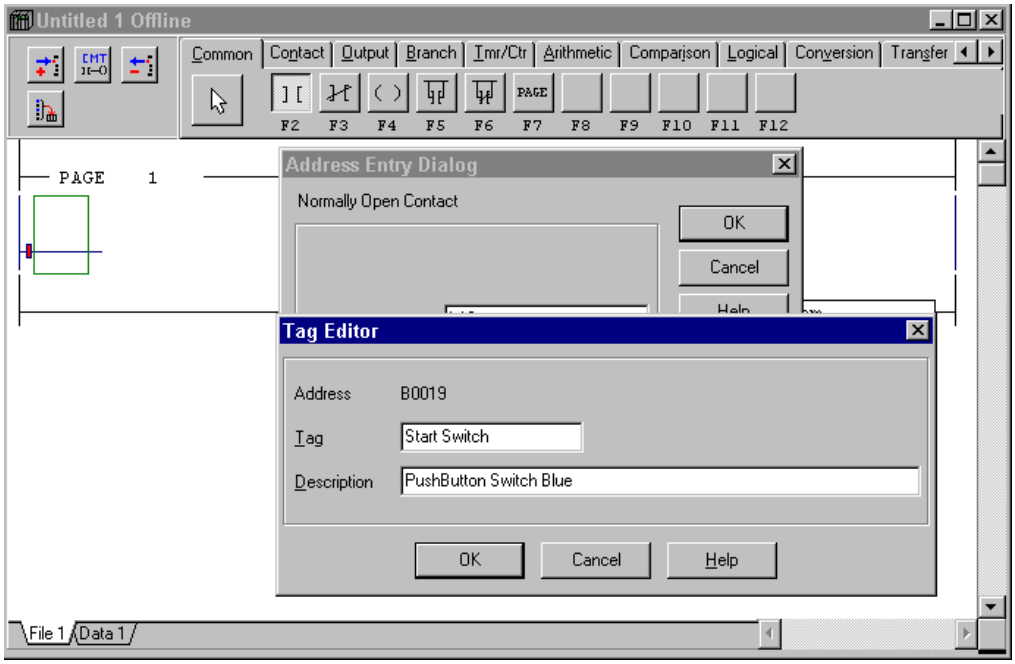


1) Writing contacts

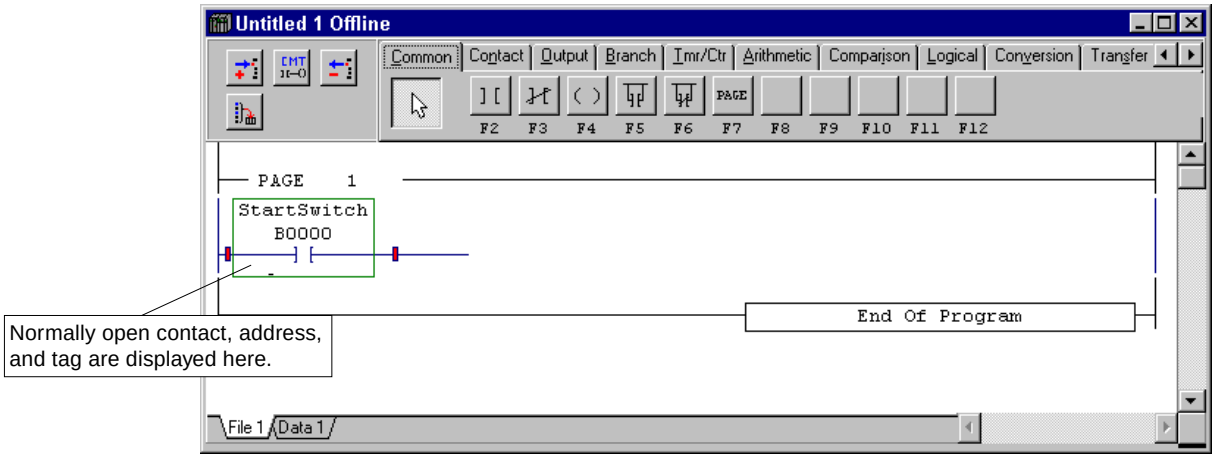
◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the][[Normally Open Contact] button.
◊ Move the cursor to the position in which to describe an instruction and left-click that position.
The {Address Entry} dialog box is displayed.



◊ Enter the address of the contact in the [Address] text box.
In this example, <B0> is entered.
◊ Left-click the [OK] button.
When in the {Environment Options} dialog box the [Auto Document] box has been checked, the {Untitled 1 Offline} dialog box as shown in the following diagram is displayed. When the [Auto Document] box has been unchecked, the {Untitled 1 Offline} dialog box is not displayed and the contact is described in the program window.

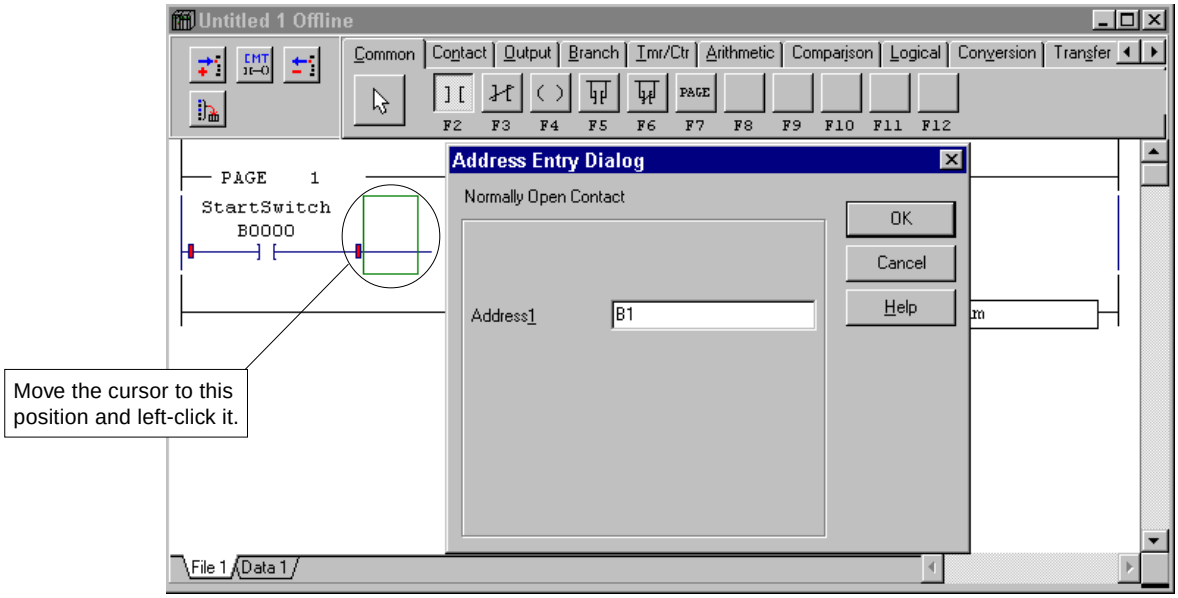


◊ Enter a tag name in the [Tag] text box as required.
In this example, <Start Switch> is entered.
◊ Enter a description in the [Description] text box as required.
In this example, <Pushbutton Switch Blue> is entered.
◊ Left-click the [OK] button.
The normally open contact, address, and tag are displayed as illustrated below.



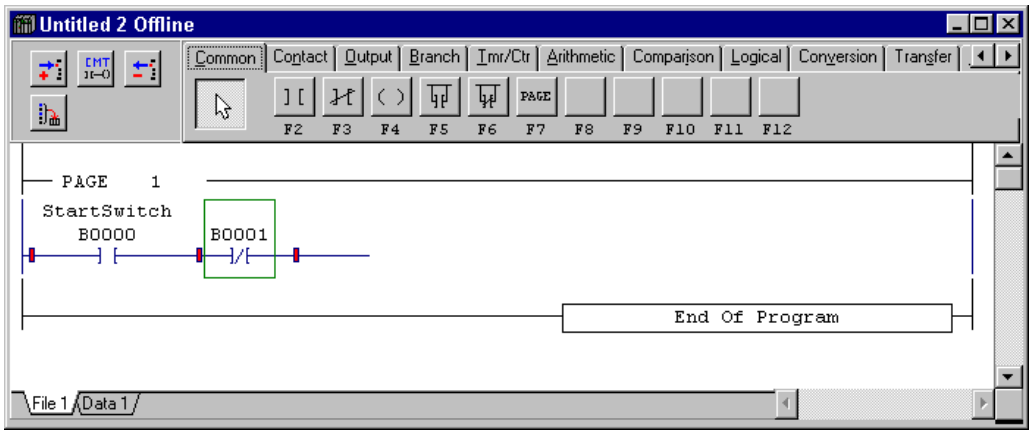
2) Writing series contacts

◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [Normally Closed Contact] button.
◊ Move the cursor to the position in which to describe an instruction and left-click that position.
The {Address Entry} dialog box is displayed.

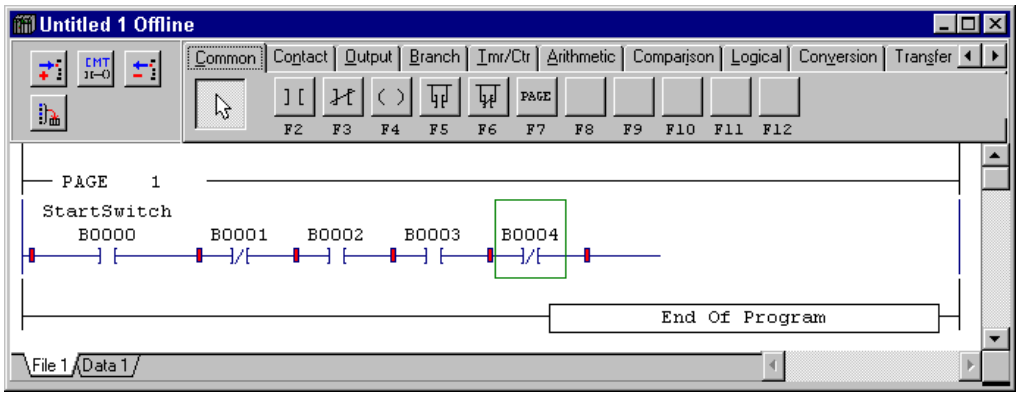


◊ Enter the address of the contact in the [Address] text box.
In this example, <B1> is entered.

◊ Left-click the [OK] button.
As shown below, the normally closed contact is connected in series to the normally open contact. Note that when in the {Environment Options} dialog box the [Auto Document] box has been checked, the {Untitled 1 Offline} dialog box is displayed. The explanation about this shall be omitted here.

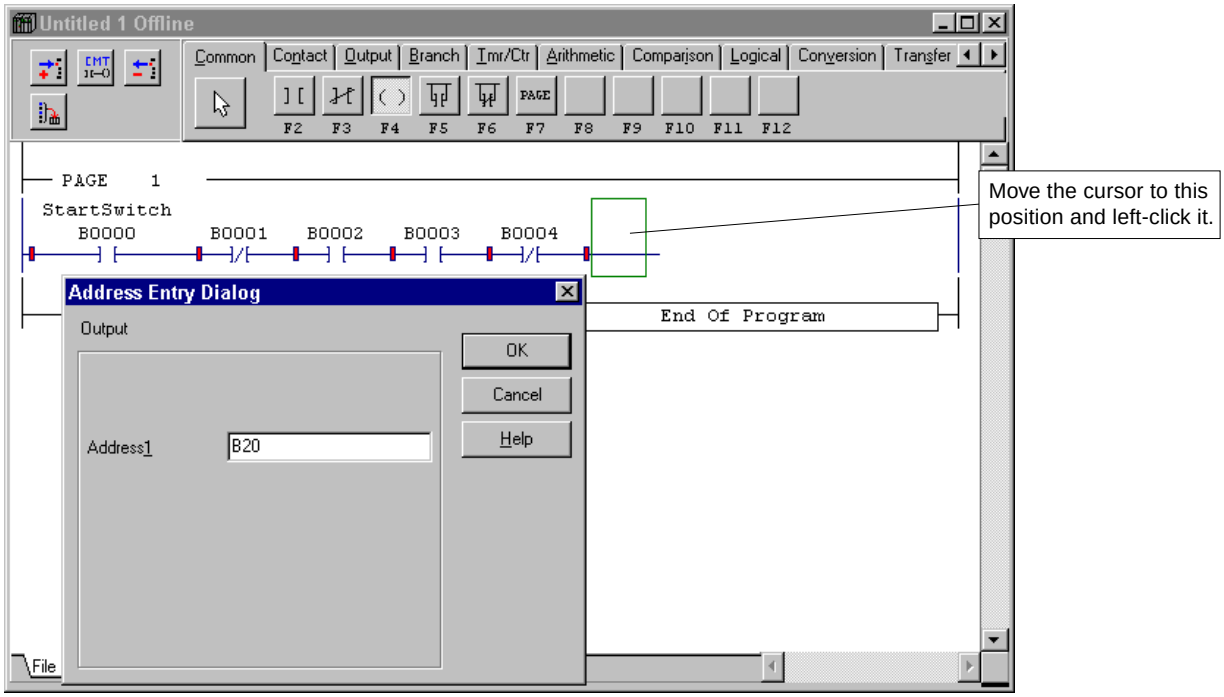


◊ In the same way as described above, write normally open contacts “B0002” and “B0003” and normally closed contact “B0004” as shown in the following diagram.

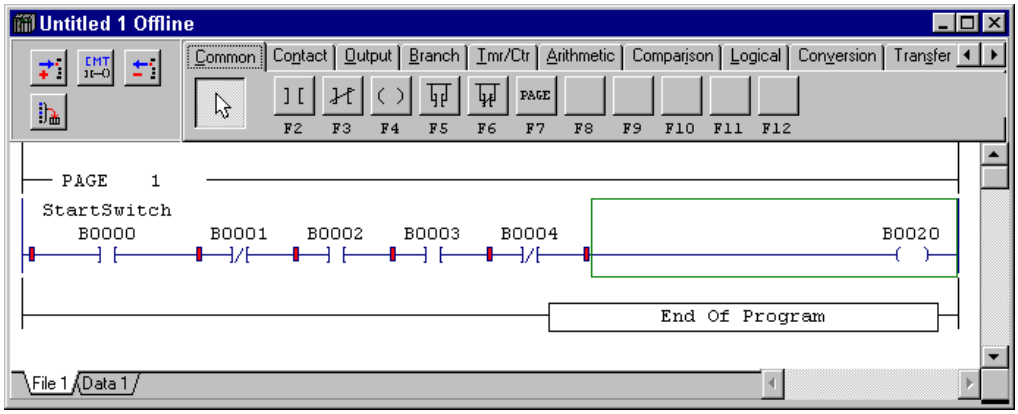


3) Writing outputs

◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [Output] button.
◊ Left-click the right-hand part of the node in the position in which to describe an instruction.
The {Address Entry} dialog box is displayed.

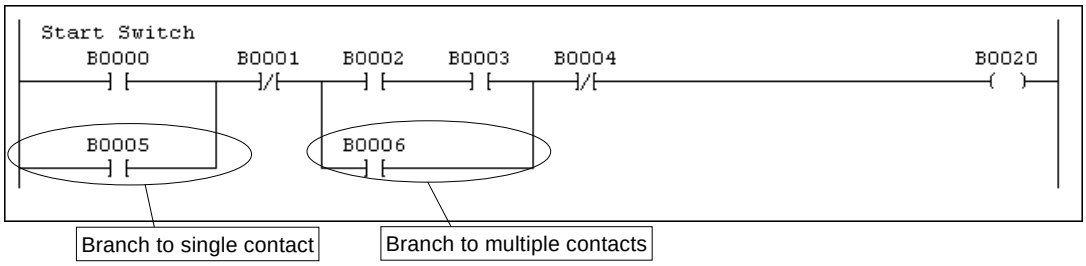


◊ Enter the address of the output in the [Address] text box.
In this example, <B20> is entered.
◊ Left-click the [OK] button.
As shown below, the output is connected in series to the normally closed contact.



(2) Writing branches

Here, the method of writing a branch of a line shown below is explained.

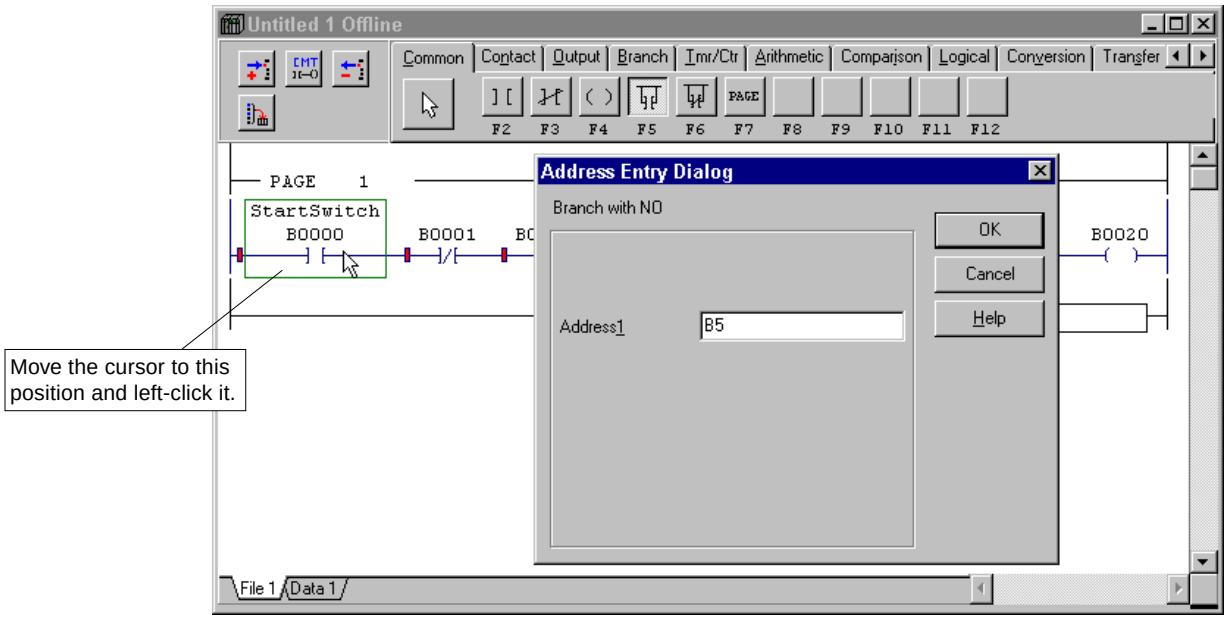


1) Writing branch to single contact

◊ Left-click the [Common] or [Branch] tab of the [Instruction group] tab on the ladder edit tool bar.

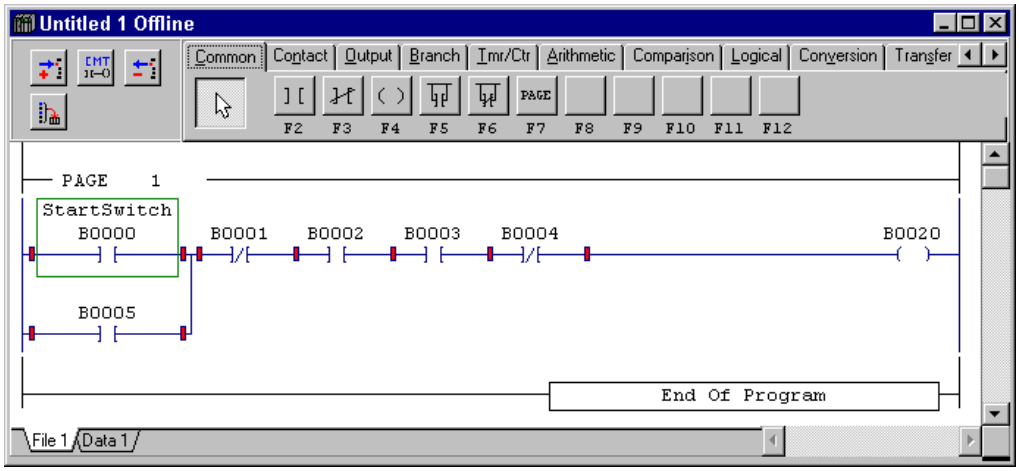
◊ Left-click the [Branch with NO] button.

◊ Move the cursor to the contact (B0000) in the position in which to describe an instruction, and left-click that position. (In this case, a green instruction selection frame is displayed.)
The {Address Entry} dialog box is displayed.



◊ Enter the address of the branch in the [Address] text box.
In this example, <B5> is entered.

◊ Left-click the [OK] button.
As shown below, the normally open contact is connected in parallel with the contact.



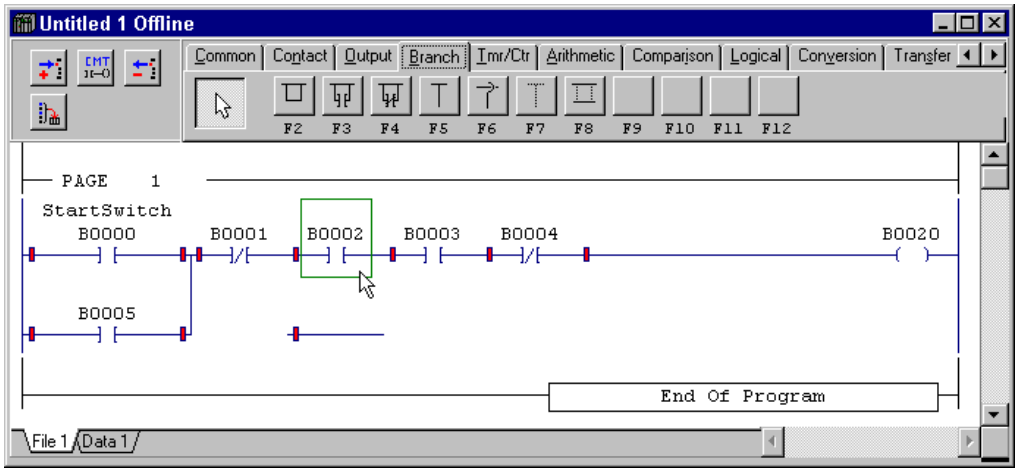
2) Writing branch to multiple contacts

<Description of pass>

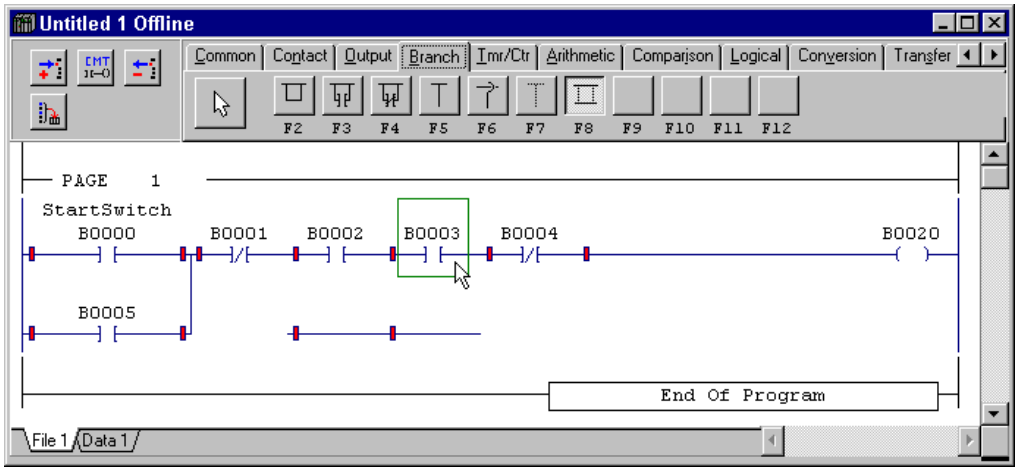
◊ Left-click the [Branch] tab of the [Instruction group] tab on the ladder edit tool bar.

◊ Left-click the [Pass Below] button.

◊ Move the cursor to the contact (B0002) above the position in which to describe a branch, and left-click that position. (In this case, a green instruction selection frame is displayed.)
As shown in the following diagram, a “pass” is displayed.



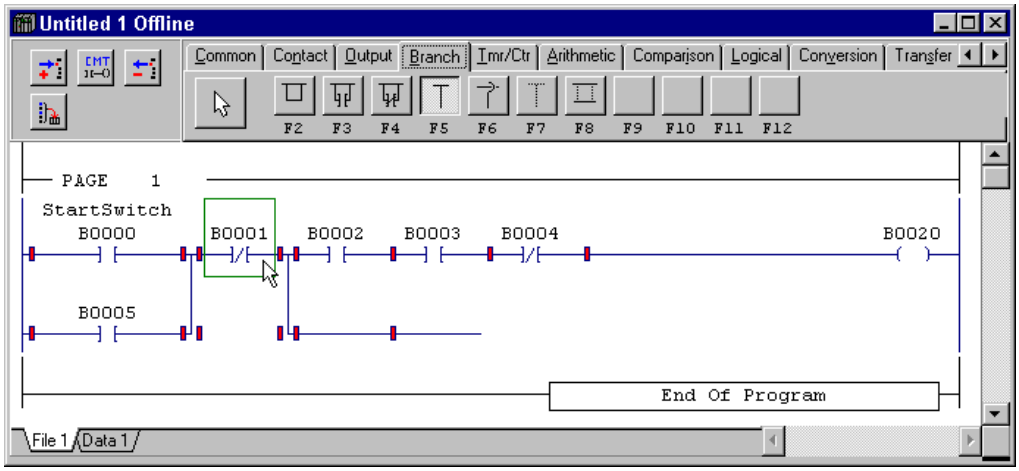
◊ In the same way as described above, describe “passes” below contact (B0003) as shown below.



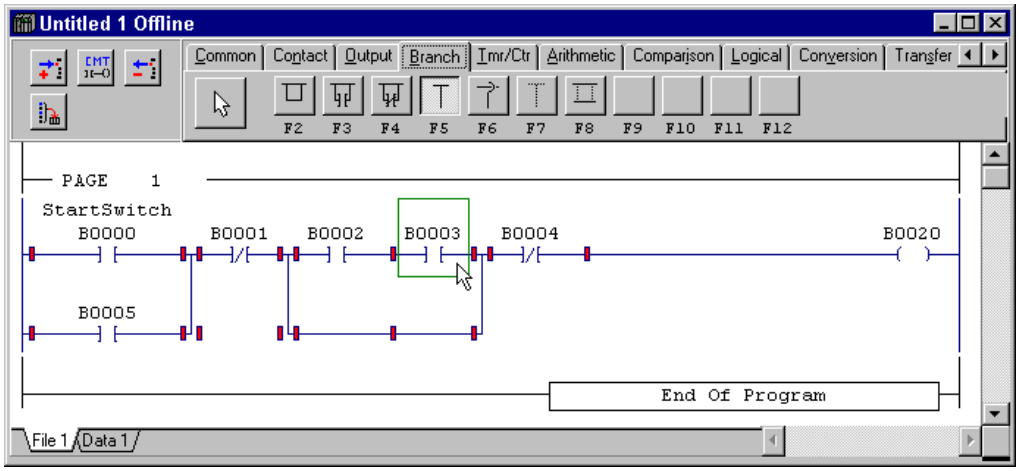
<Description of branch down>

◊ Left-click the [Branch Down] button.

◊ Left-click a selected contact (B0001) in this example.
A branch is described downward from the right end of the selected contact.

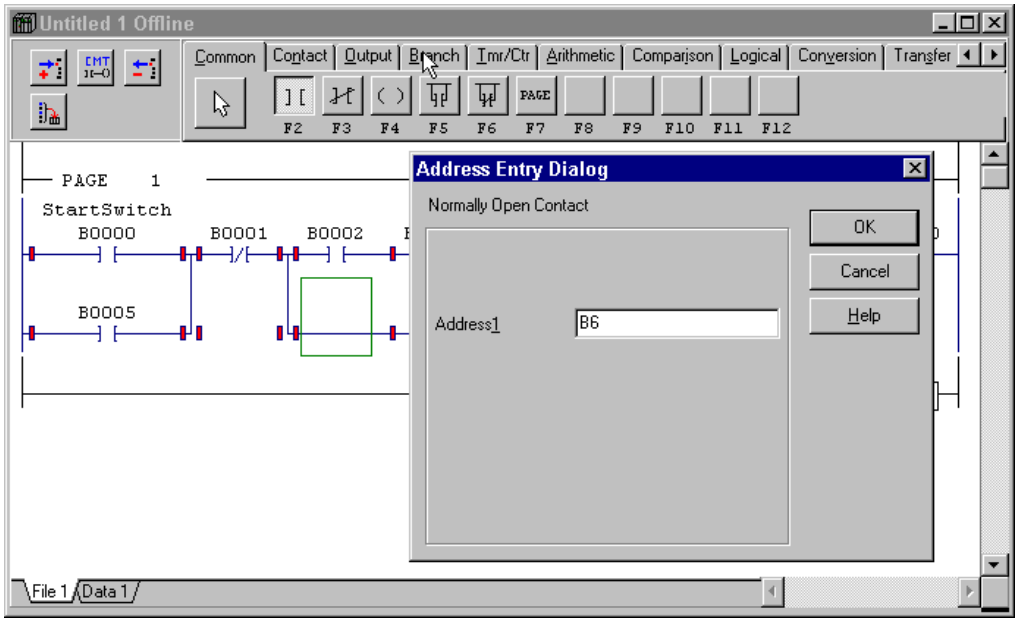


◊ In the same way as described above, describe a branch down from the right end of another contact (B0003) in this example.

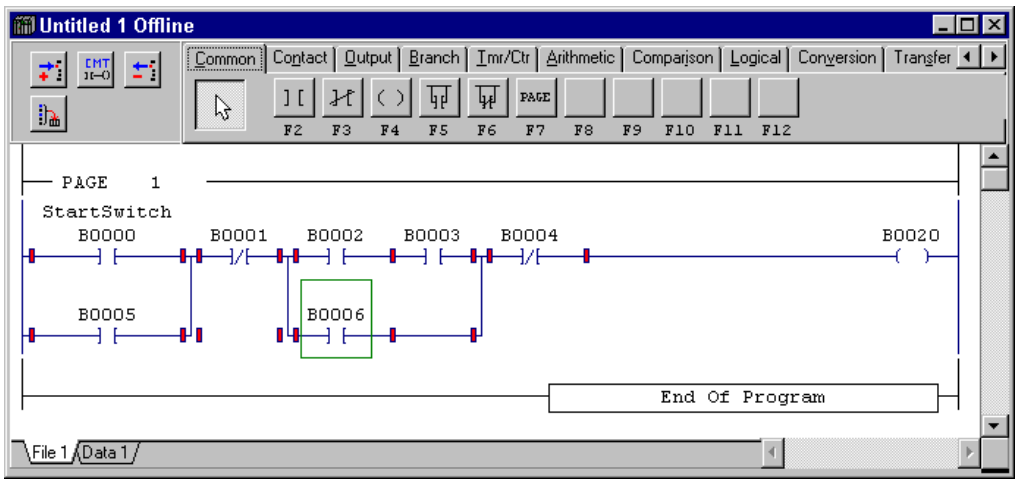


<Changing pass to contact>

◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the][[Normally Open Contact] button.
◊ Move the cursor to the pass that is to be changed to a contact, and left-click the pass.
The {Address Entry} dialog box is displayed.

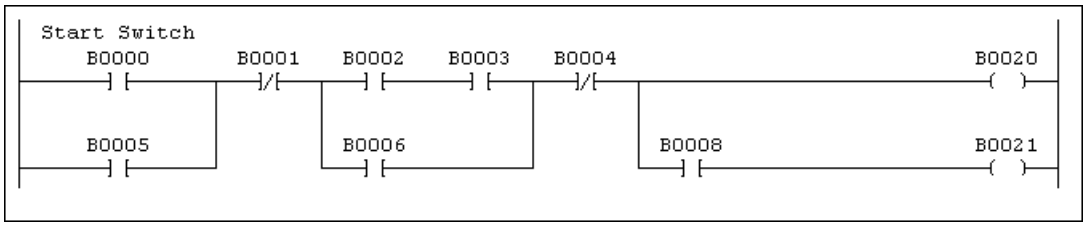


◊ Enter the address of the contact in the [Address] text box.
In this example, <B6> is entered.
◊ Left-click the [OK] button.
As shown in the following diagram, the pass is changed to a normally open contact.

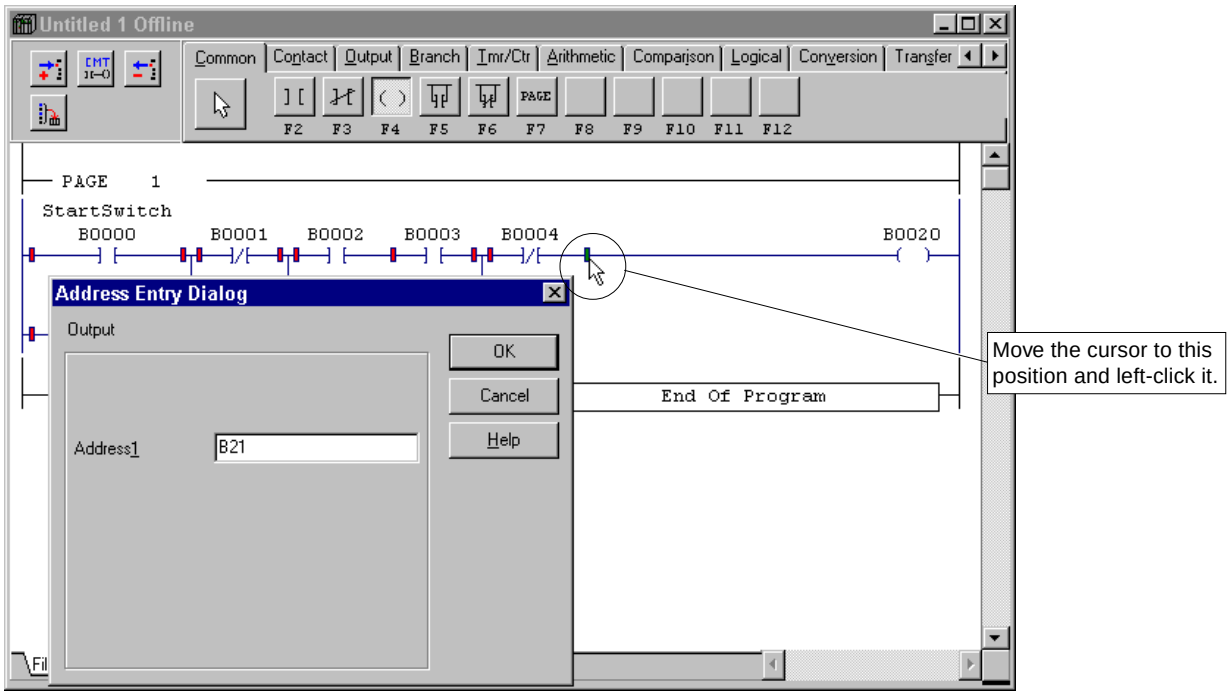


(3) Writing branch outputs

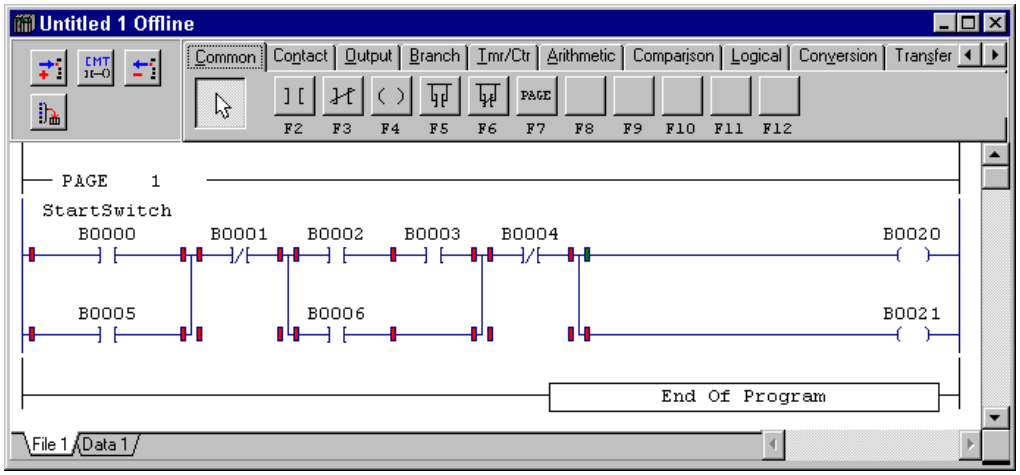
Here, the method of writing a branch output shown below is explained.



◊ Left-click the [Common] or [Output] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [( )] [Output] button.
◊ Move the cursor to the node at the position in which to describe an instruction, and left-click that node.
The {Address Entry} dialog box is displayed.

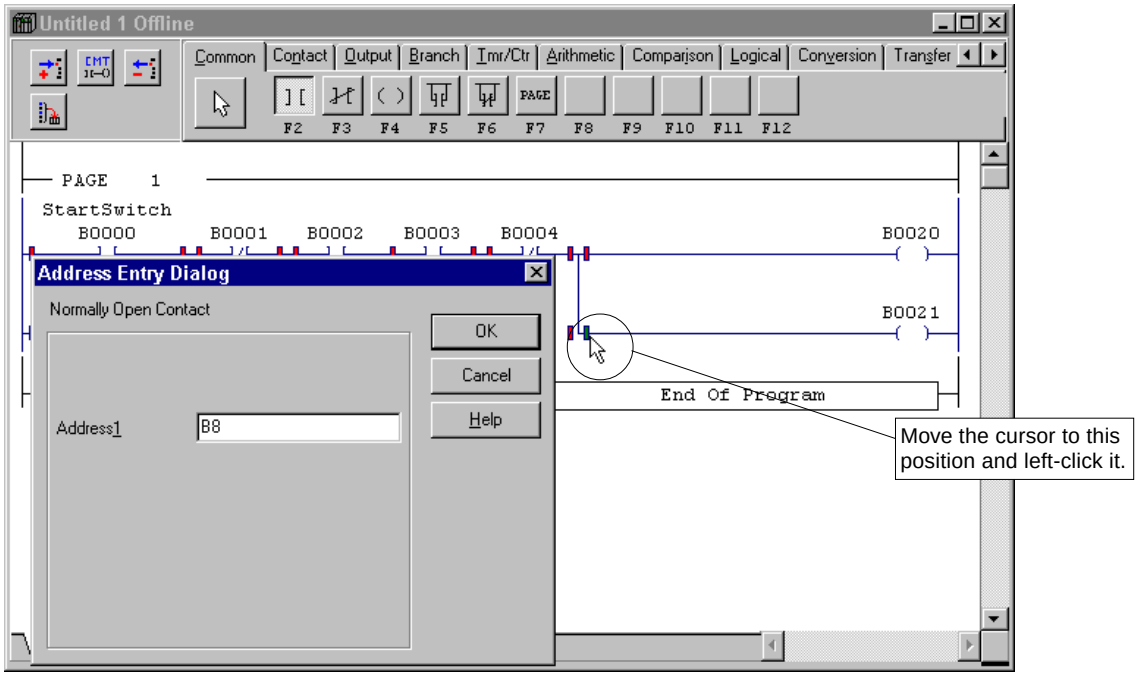


◊ Enter the address of the output in the [Address] text box.
In this example, <B21> is entered.
◊ Left-click the [OK] button.
The branch output is connected as shown below.

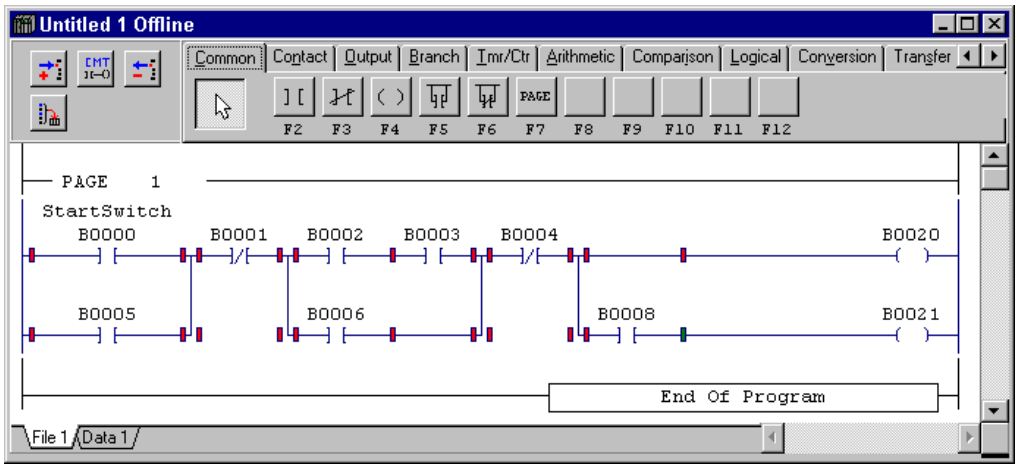


<Writing contact “B0008”>

◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the][[Normally Open Contact] button.
◊ Move the cursor to the node at the position in which to describe an instruction, and left-click that node.
The {Address Entry} dialog box is displayed.

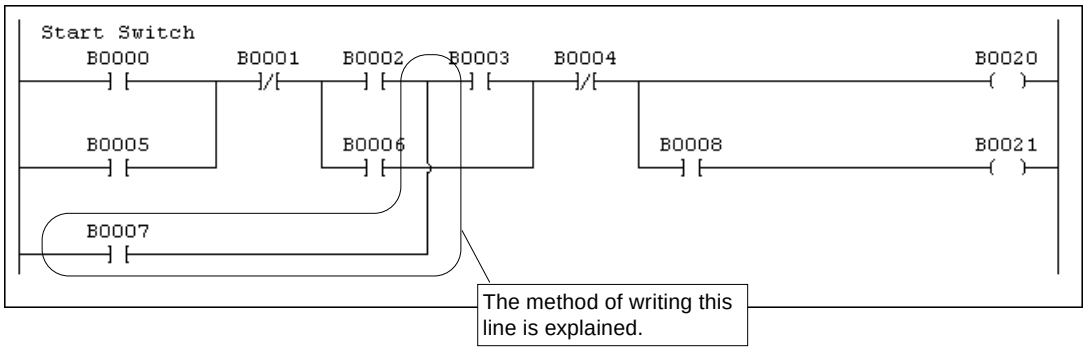


◊ Enter the address of the contact in the [Address] text box.
In this example, <B8> is entered.
◊ Left-click the [OK] button.
As shown below, the contact is connected to the left side of output “B0021.”

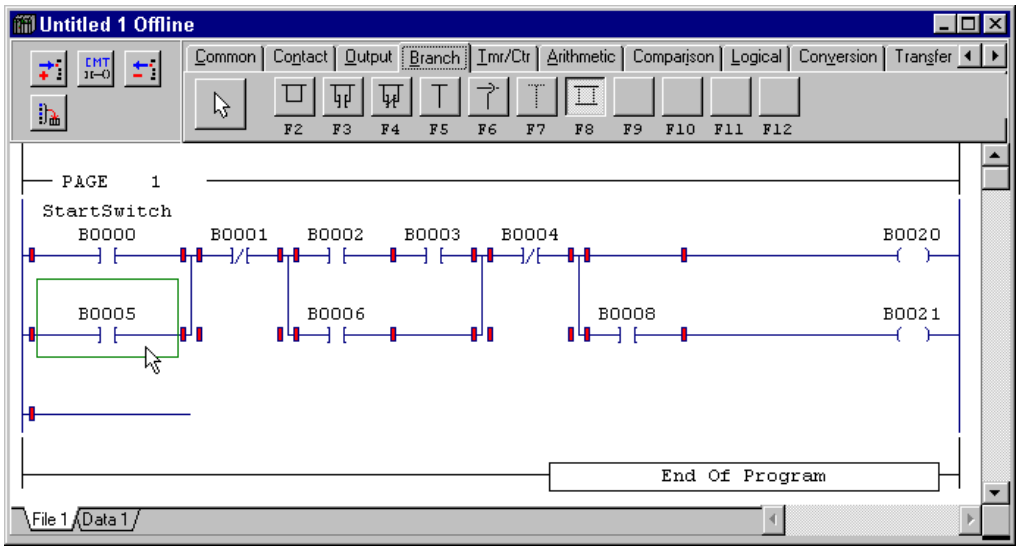


(4) Writing branch skip lines

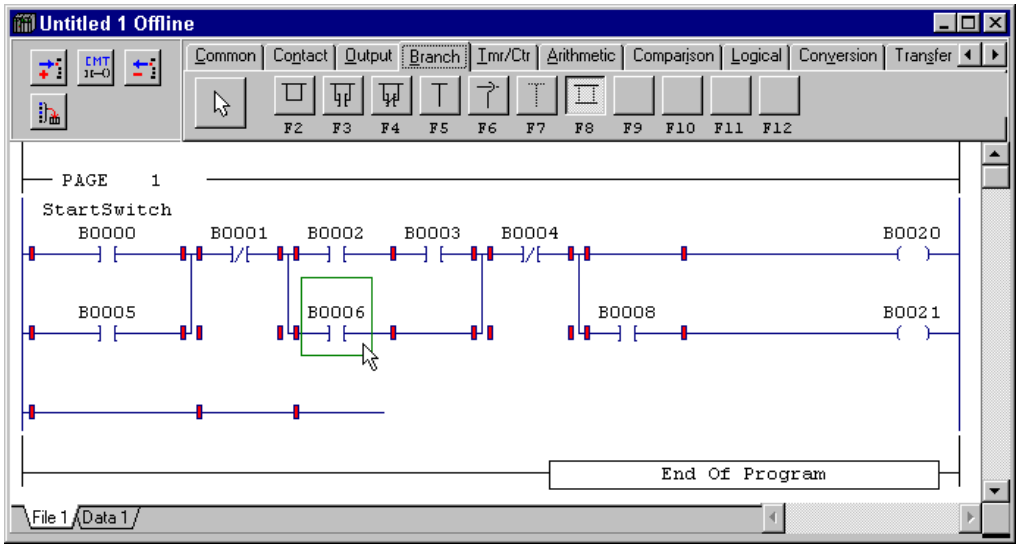
The method of writing a branch skip line is explained below.



◊ Left-click the [Banch] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [Pass Below] button.
◊ Move the cursor to the contact (B0005) above the position in which to describe a branch contact, and left-click the contact.
◊ A “pass” is displayed as shown in the following diagram.

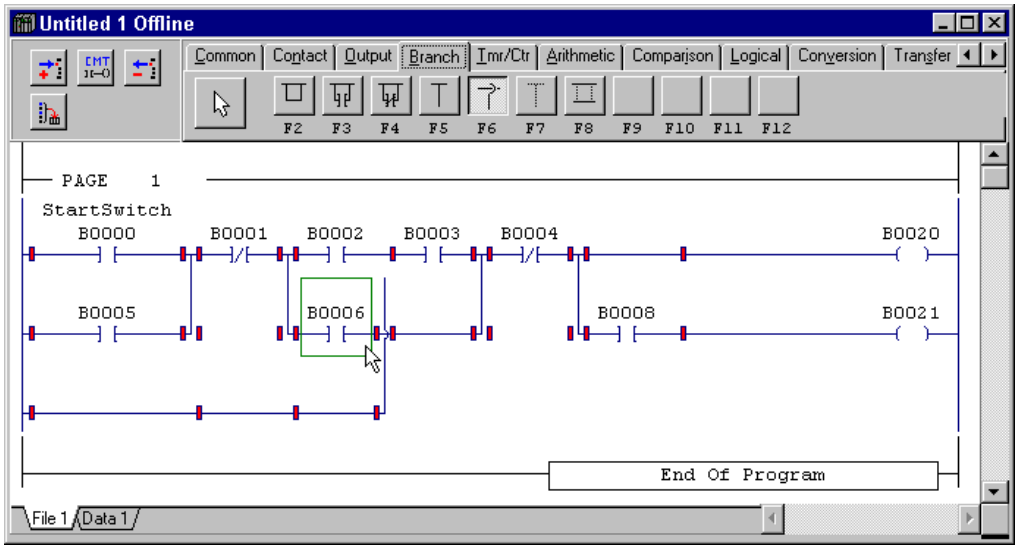


◊ In the same way as described above, describe the “pass” to the position below contact (B0006).



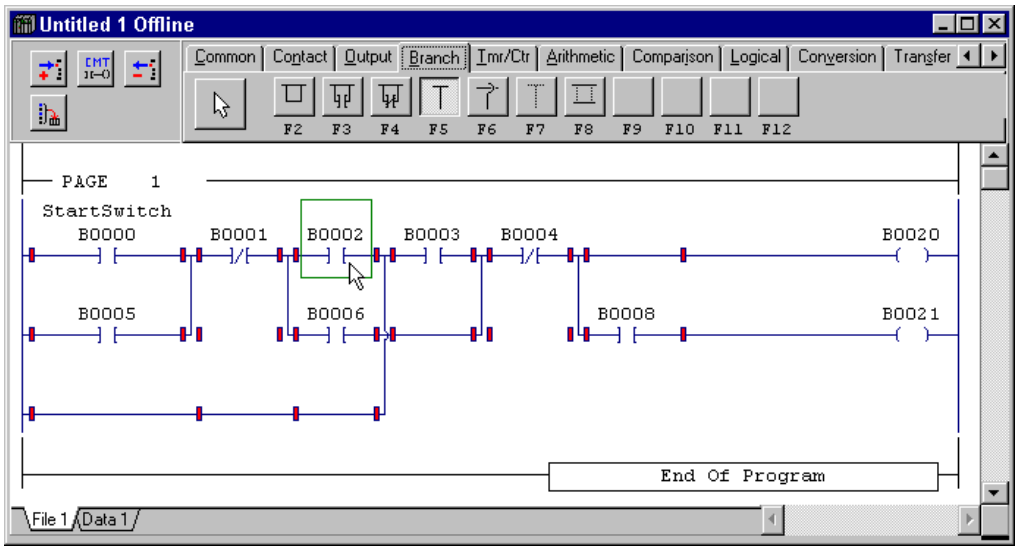
1) Writing branch skip

◊ Left-click the [Branch Skip] button.
◊ Move the cursor to contact (B0006) and left-click the contact.
◊ A “branch skip line” is described at the right end of the selected contact (B0006) as shown in the following diagram.



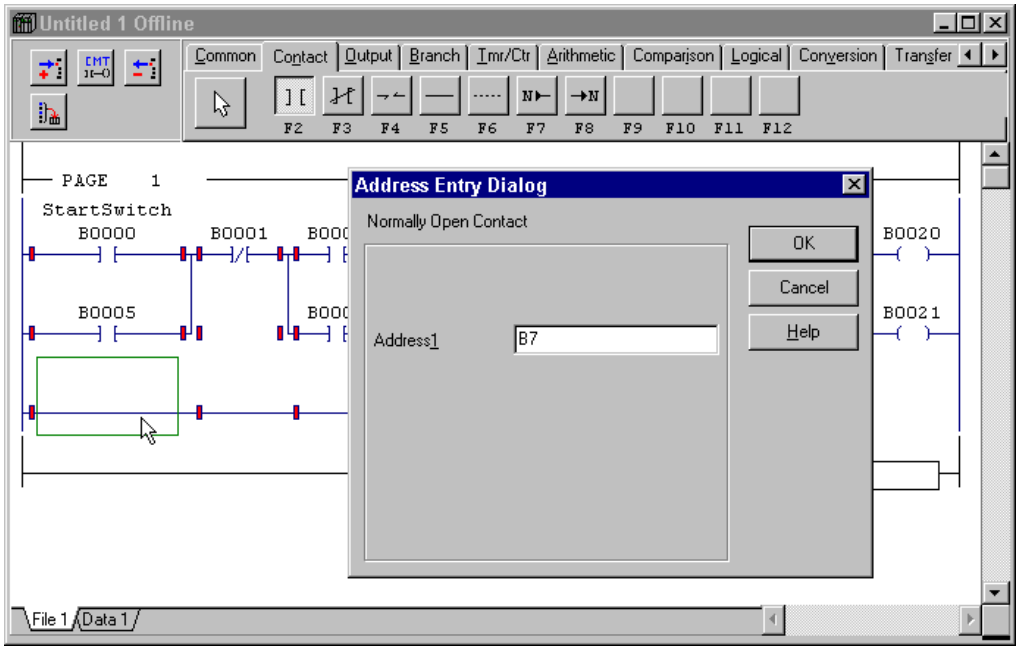
2) Writing branch down

◊ Left-click the [Branch Down] button.
◊ Move the cursor to contact (B0002) and left-click the contact.
◊ A branch down is described from the right end of the selected contact (B0002) and connected to the branch skip as shown in the following diagram.



3) Changing pass to contact

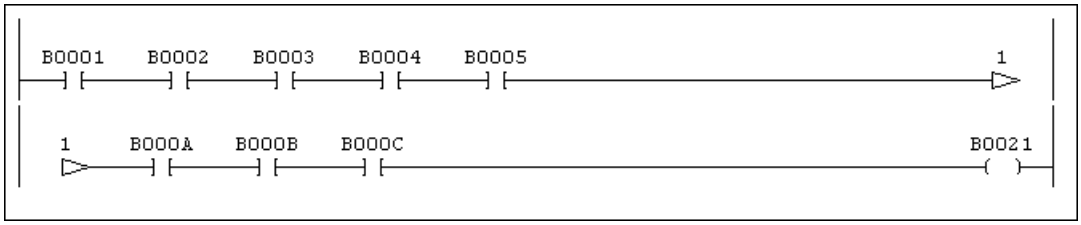
◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the][[Normally Open Contact] button.
◊ Move the cursor to the pass that is to be changed to a contact, and left-click that pass.
The {Address Entry} dialog box is displayed.



◊ Enter the address of the contact in the [Address] text box.
In this example, <B7> is entered.
◊ Left-click the [OK] button.
The pass is changed to a contact.

2-2-2 Writing a returning

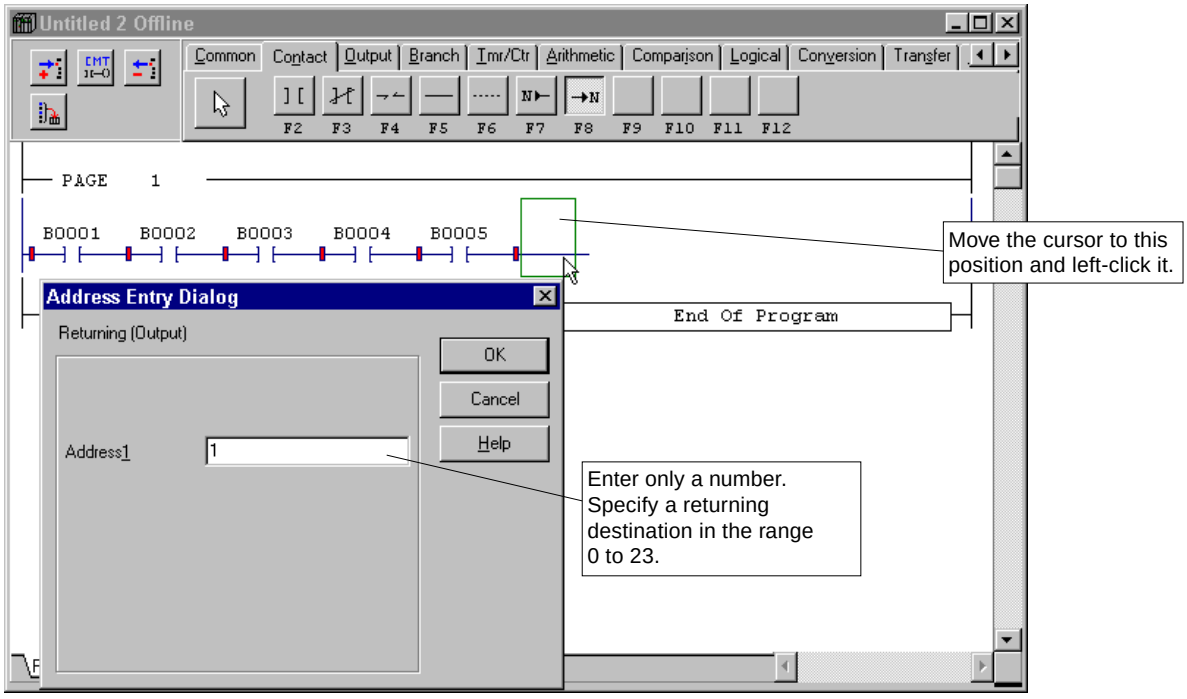
The method of describing a “Returning” instruction is explained below.



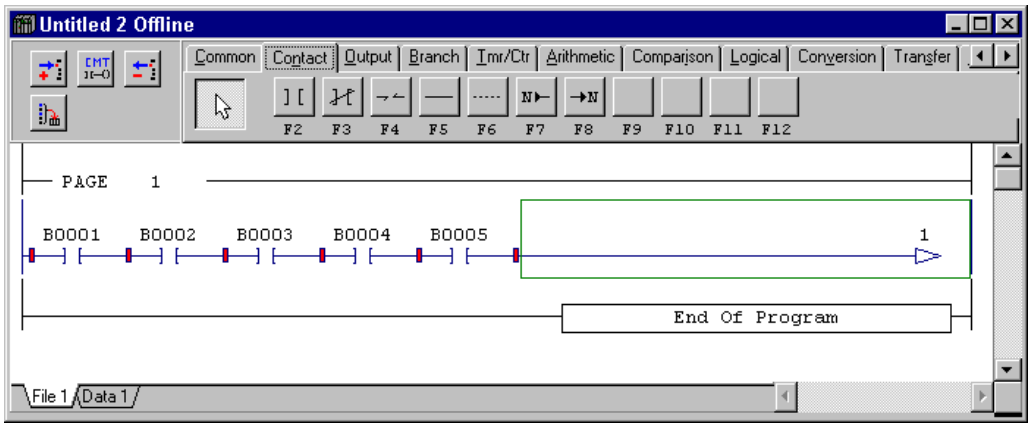
(1) Writing returning (output)

First, the method of writing a returning (output) is explained.

◊ Left-click the [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [→N] [Returning (Output)] button.
◊ Move the cursor to the right of the node in which to describe an instruction, and left-click that node.
The {Address Entry} dialog box is displayed.



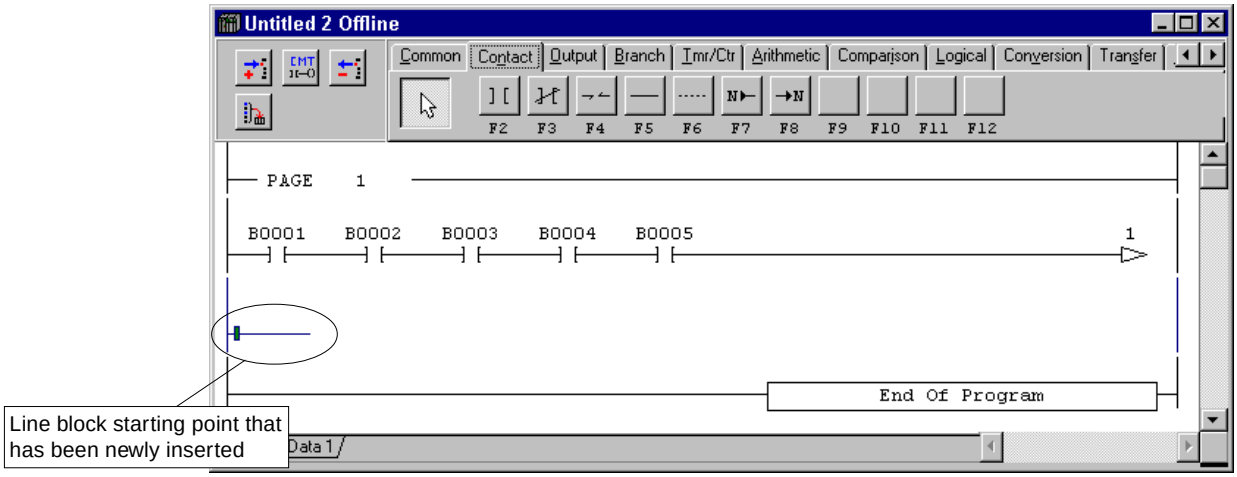
◊ Enter a returning destination number in the [Address] text box.
In this example, <1> is entered.
◊ Left-click the [OK] button.
A returning (output) is described in the program window.



(2) Writing returning (input)
Next, the method of describing a returning (input) is explained.

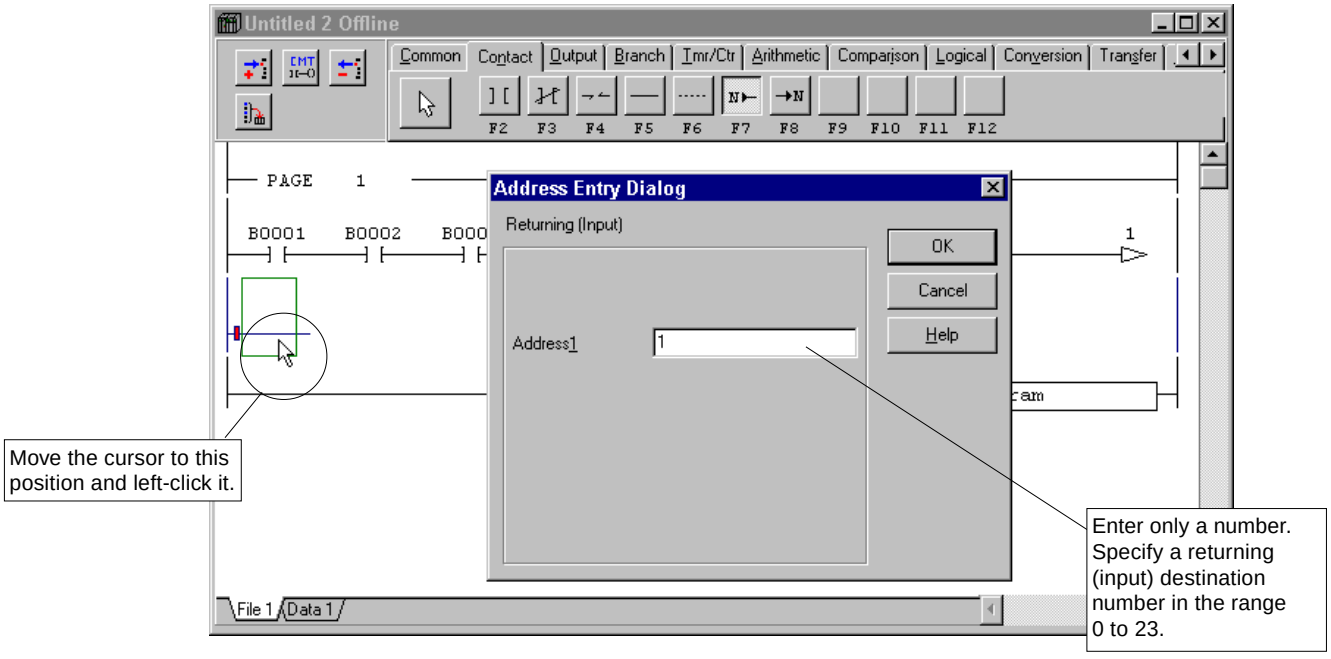
1) Preparing line block starting point
Since a returning (output) and a returning (input) cannot be prepared in the same line block, it is necessary first to insert a line block starting point for preparing a new line.

◊ Left-click the line (symbol) above the position in which to insert a line block starting point.
◊ Left-click the [Insert Line] button on the ladder edit tool bar.
A line block starting point is inserted.

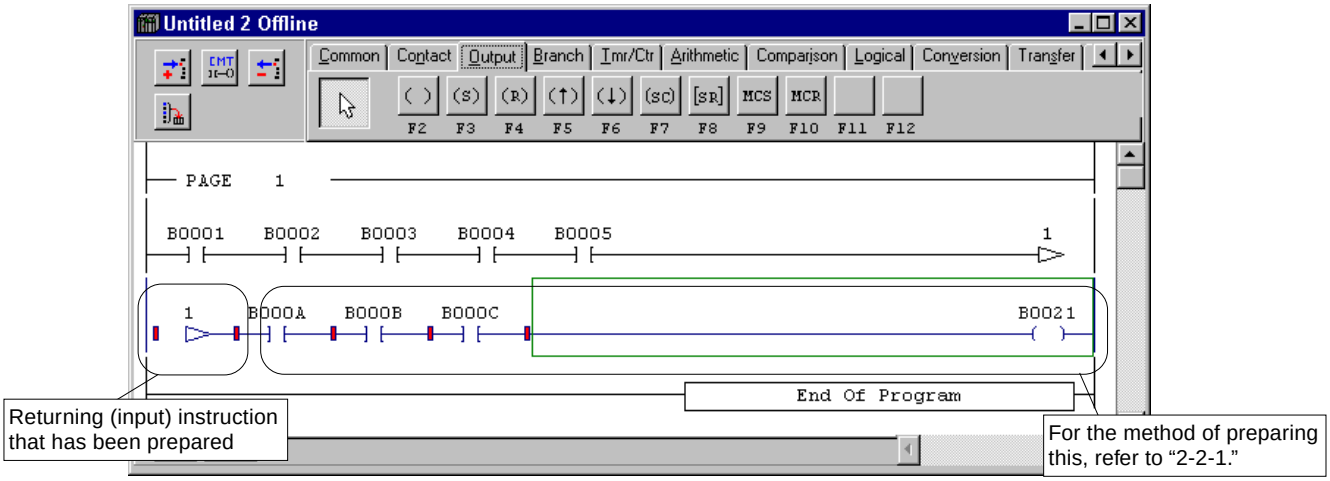


2) Writing returning (input)

◊ Left-click the [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [Returning (Input)] button.
◊ Move the cursor to the node in which to describe an instruction, and left-click that node.
The {Address Entry} dialog box is displayed.



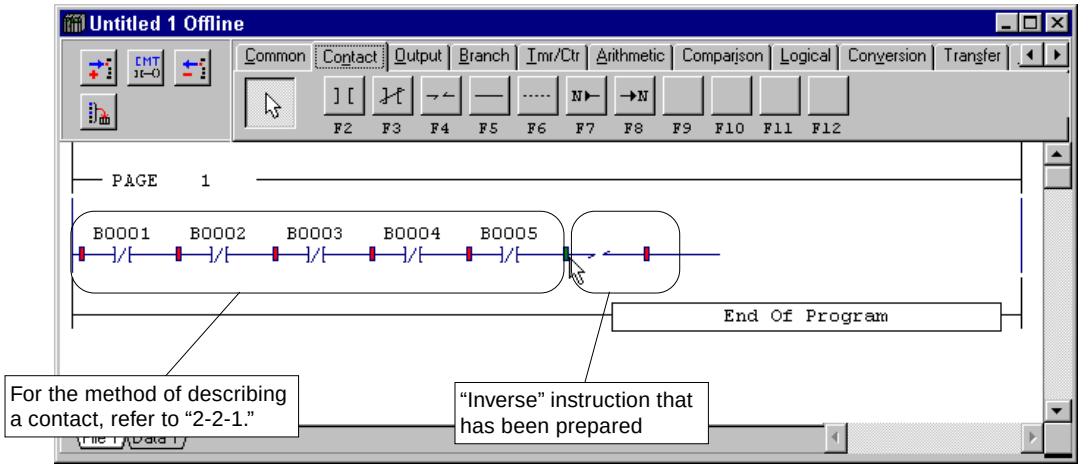
◊ Enter a returning (input) destination number in the [Address] test box.
In this example, <1> is entered.
◊ Left-click the [OK] button.
A returning (input) is described in the program window.



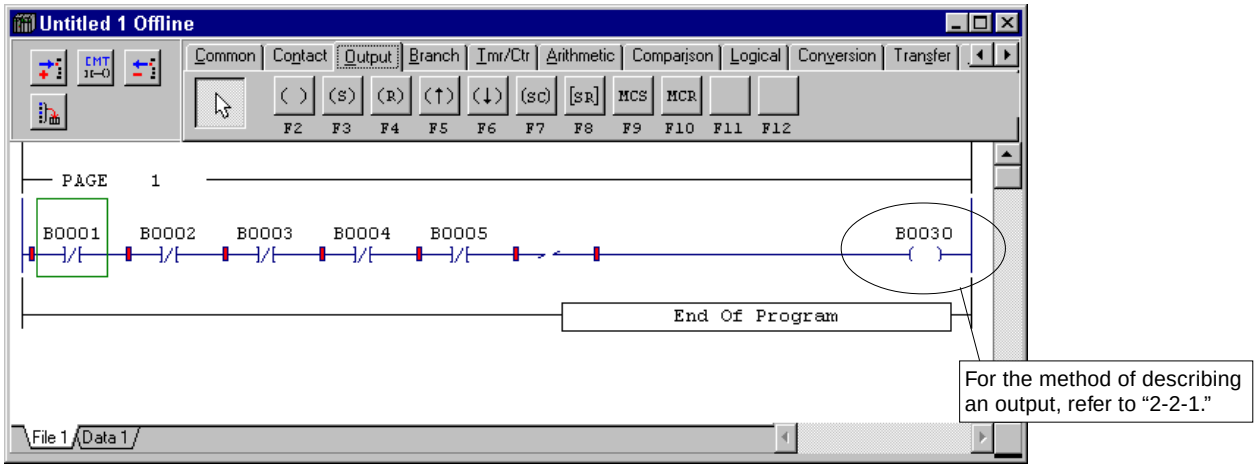
2-2-3 Writing Inverse instruction

The method of describing an “Inverse” instruction is explained below.

◊ Left-click the [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [Invert] button.
◊ Move the cursor to the node in which to describe an instruction, and left-click that node.
An “Inverse” instruction is described in the program window.



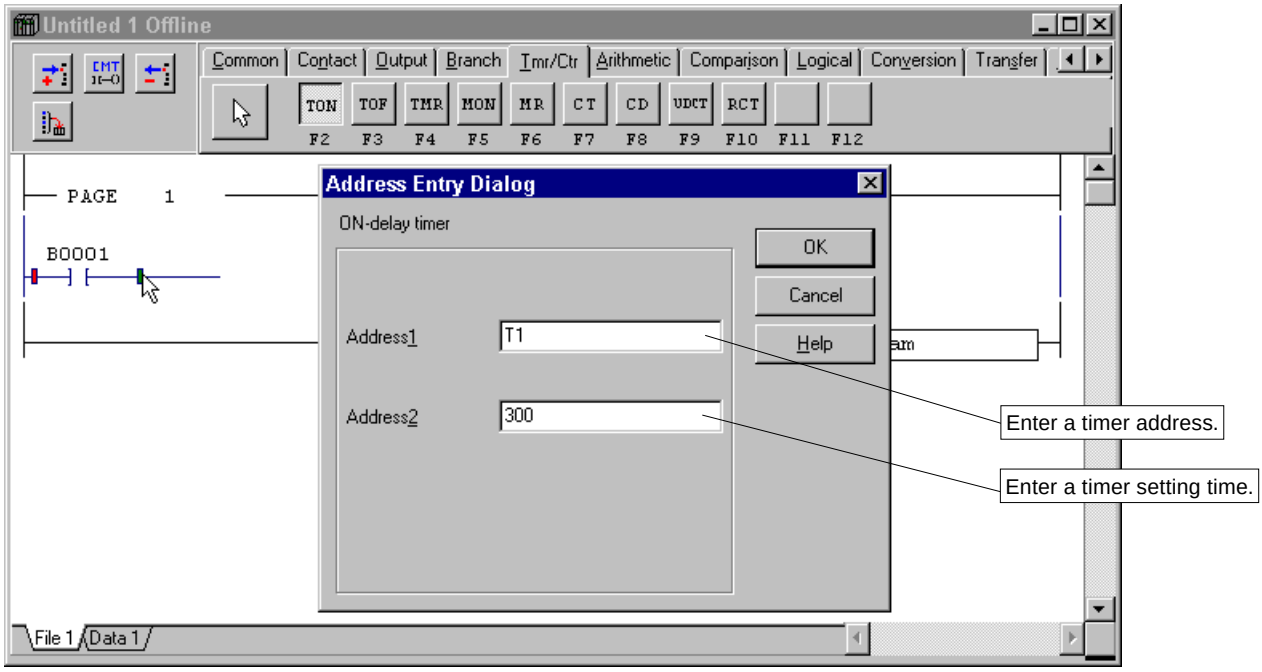
◊ Write in the output to complete the line.



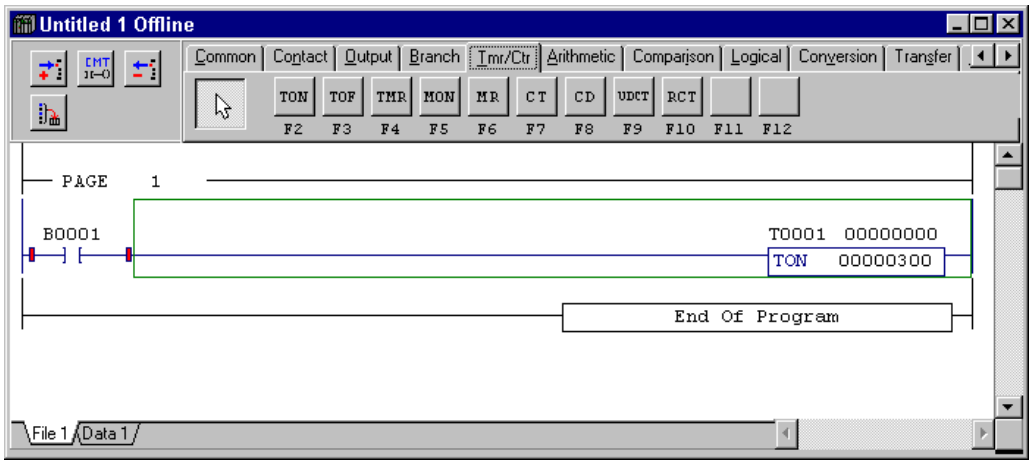
2-2-4 Writing ON-delay timer

The method of describing an “ON-delay timer” is explained below.

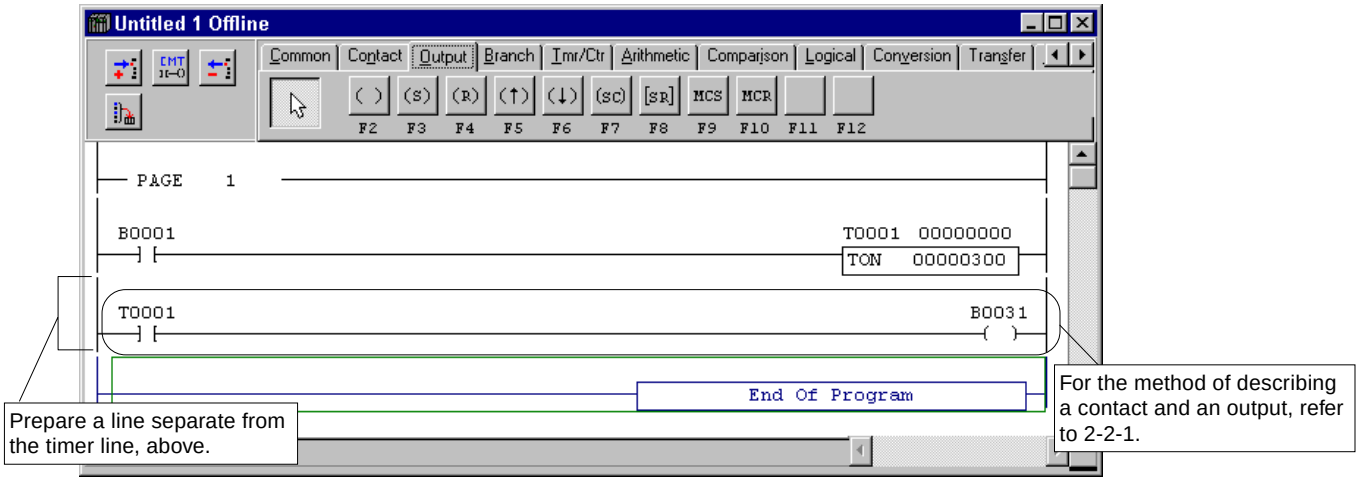
◊ Left-click the [Tmr/Counter] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [TON] [ON-Delay Timer] button.
◊ Move the cursor to the node in which to describe an instruction, and left-click that node.
The {Address Entry} dialog box is displayed.



◊ Enter a timer address in the [Address 1] text box. The timer identifier “T” has been described automatically.
In this example, <1> is entered.
◊ Enter a timer setting time in the [Address 2] text box.
In this example, <300> is entered (the timer starts three seconds later).
◊ Left-click the [OK] button.
An “ON-delay timer” is described in the program window.

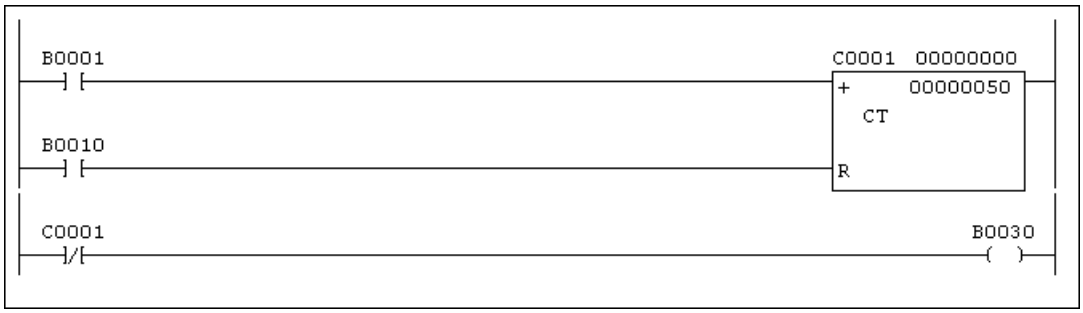


◊ Write in a timer output contact and an output line to complete the line block.

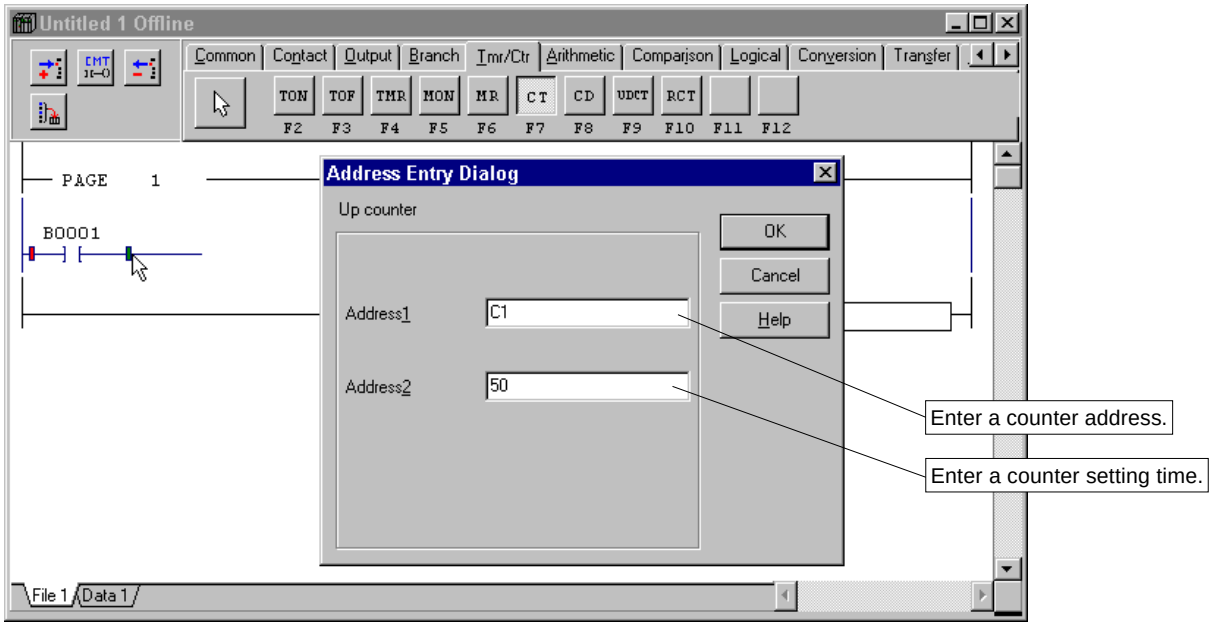


2-2-5 Writing Up counter

The method of describing an “Up counter” is explained below.

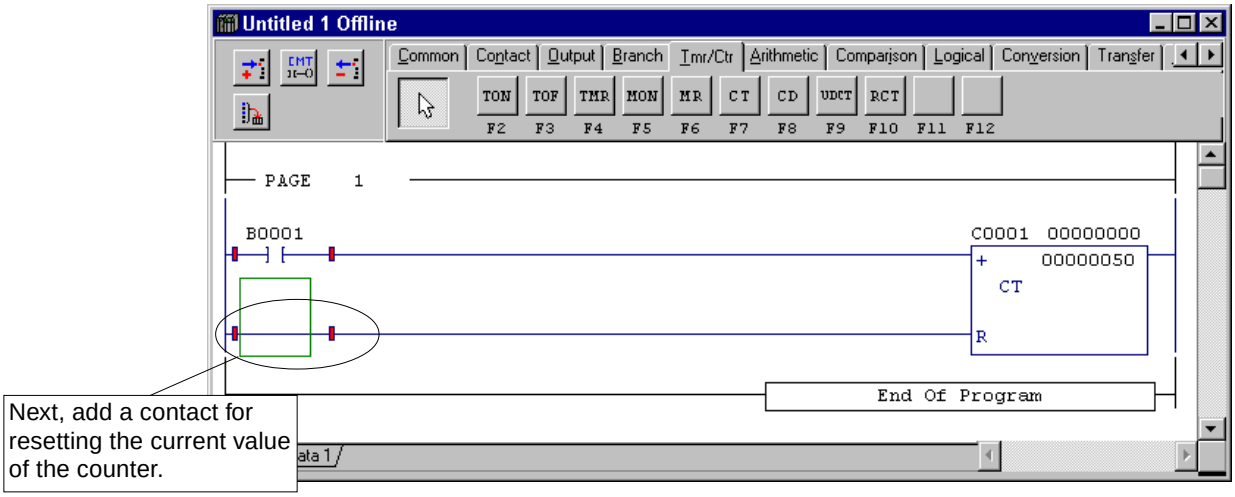


◊ Prepare a normally open contact (address: B0001) beforehand.
◊ Left-click the [Tmr/Ctr] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the CT [Up Counter] button.
◊ Move the cursor to the node in which to describe an instruction, and left-click that node.
The {Address Entry} dialog box is displayed.

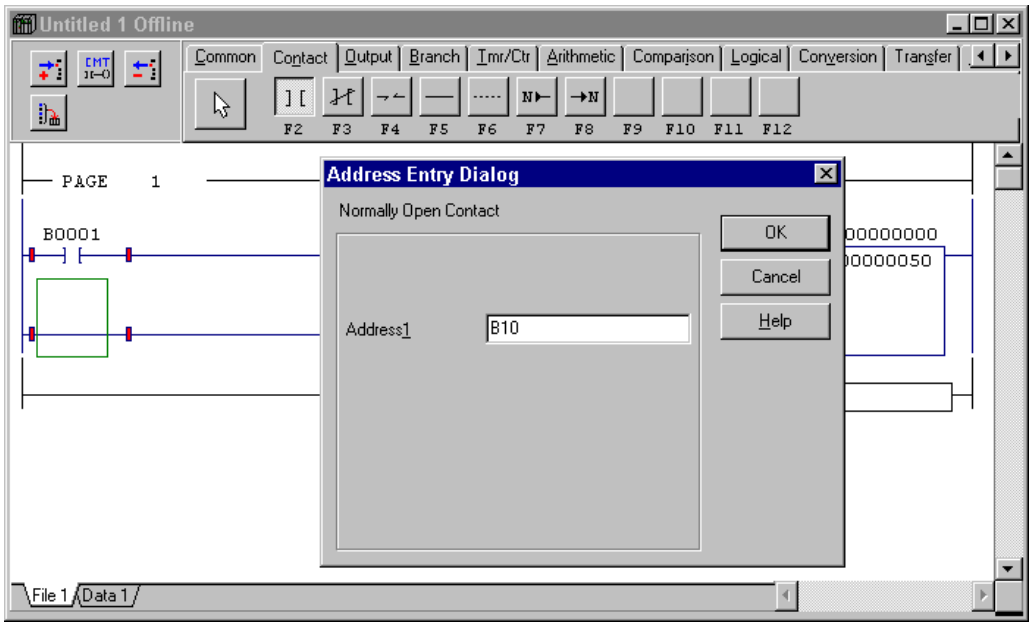


◊ Enter a counter address in the [Address 1] text box. The counter identifier “C” has been described automatically.
In this example, <1> is entered.

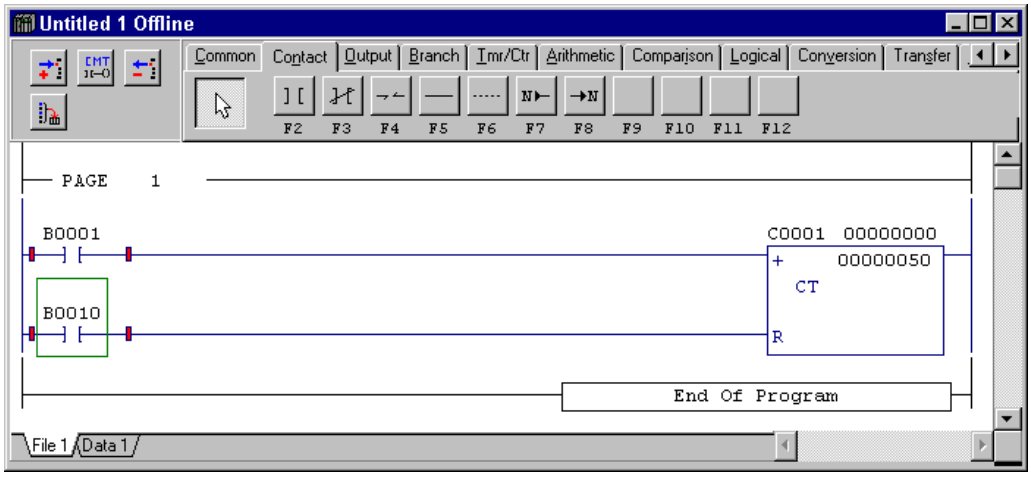
◊ Enter a counter setting time in the [Address 2] text box.
In this example, <50> is entered.
◊ Left-click the [OK] button.
An “Up counter” is described in the program window.



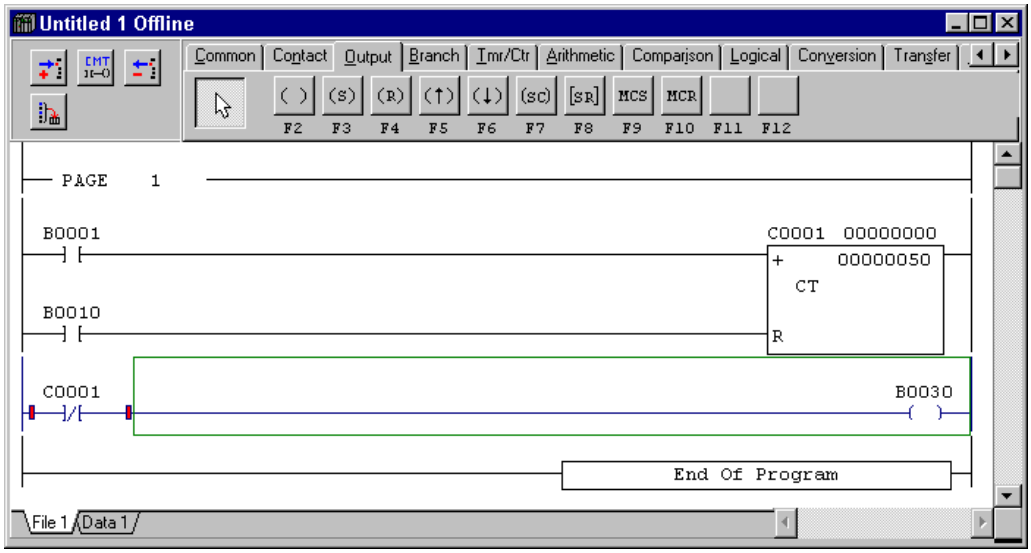
◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the][[Normally Open Contact] button.
◊ Move the cursor to the node in which to describe an instruction, and left-click that node.
The {Address Entry} dialog box is displayed.



◊ Enter the address of the contact in the [Address] text box.
In this example, <B10> is entered.
◊ Left-click the [OK] button.
A contact is inserted as shown below.



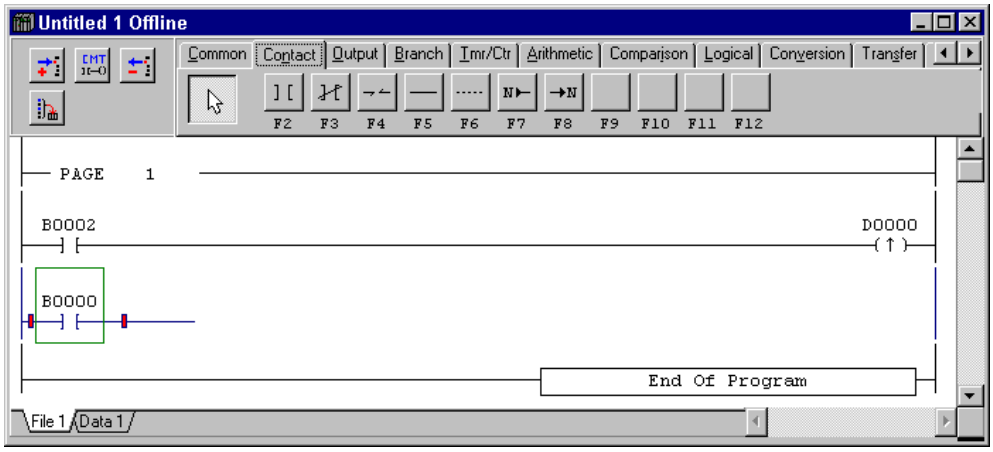
◊ Write in a counter output contact and an output line to complete the line block.



2-2-6 Writing a shift register

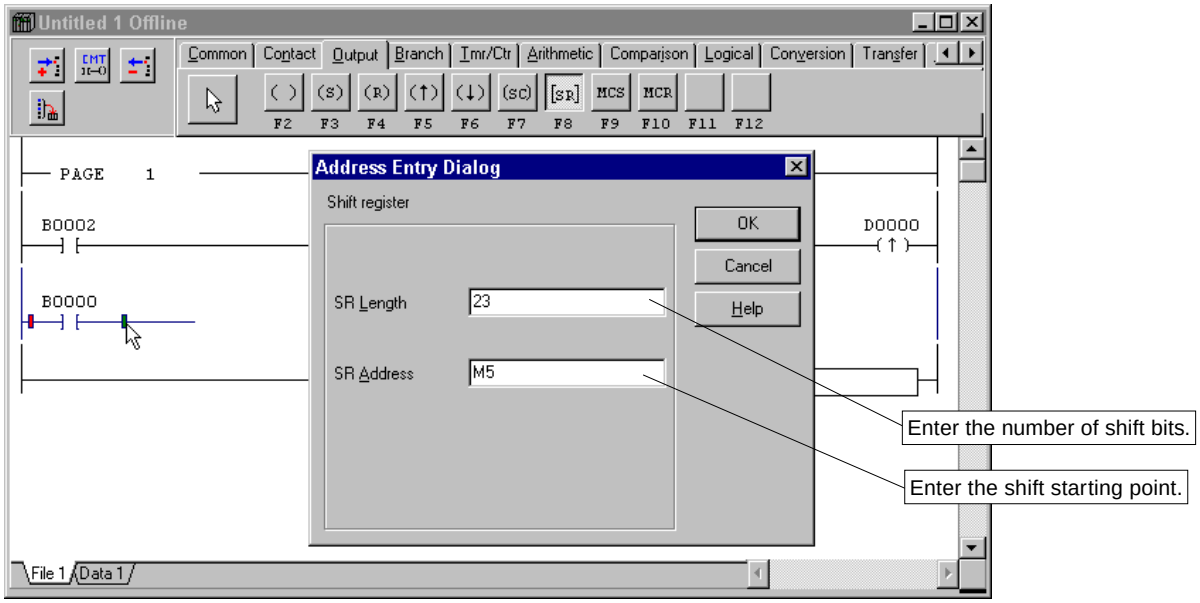
The method of describing a “shift register” (SR) is explained below.

◊ Prepare a differentiation line (pulse line) which provides a clock signal for the shift register.
◊ Describe a contact which provides an input signal for the shift register. (Use a line different from the differentiation line.)
Prepare a line shown in the following diagram beforehand.

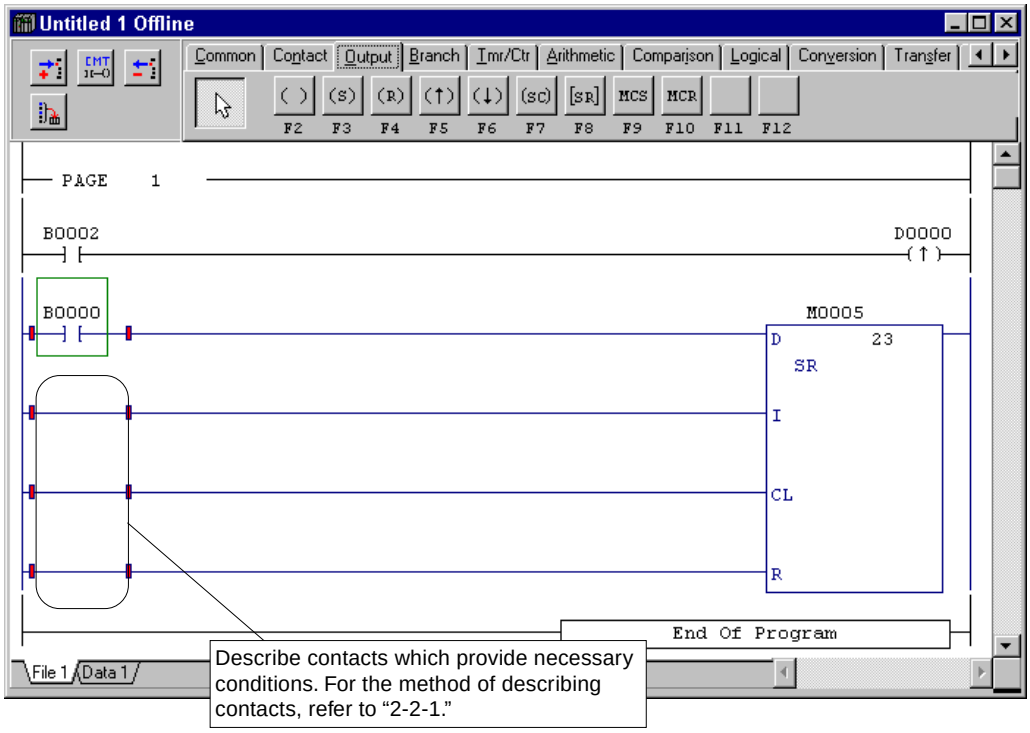


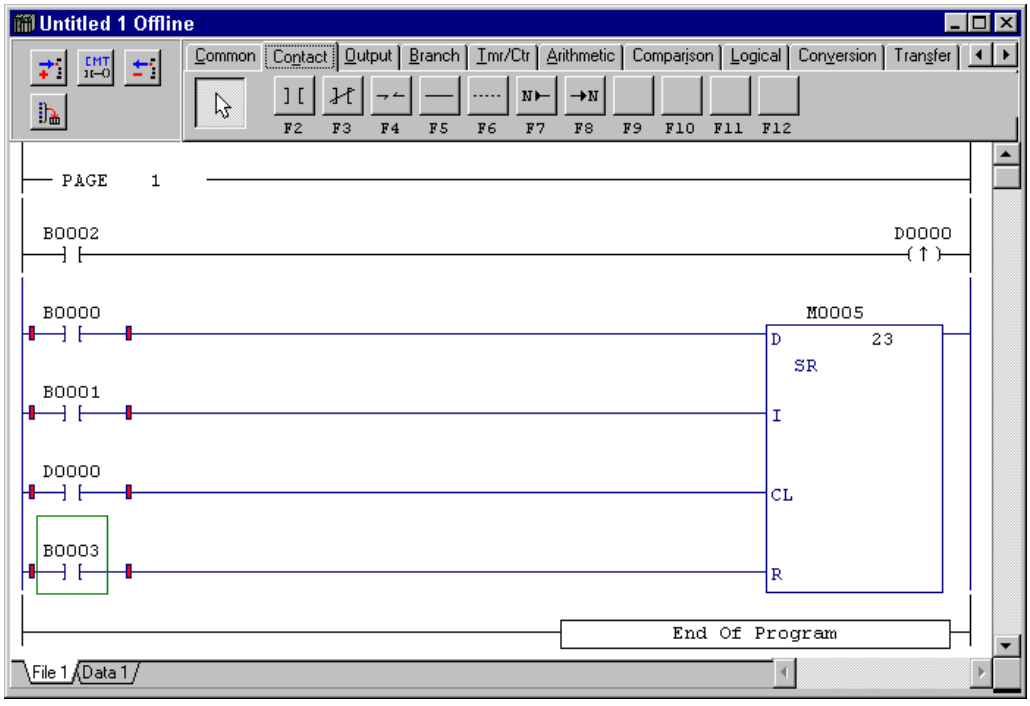
<Writing shift register instruction>

◊ Left-click the [Output] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [SR] [Shift register] button.
◊ Move the cursor to the node in which to describe an instruction, and left-click the node.
The {Address Entry} dialog box is displayed.



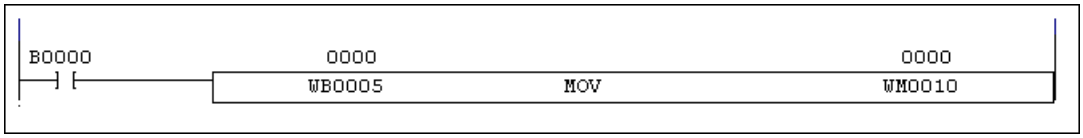
◊ Enter the number of shift bits in the [SR Length] text box.
In this example, <23> is entered.
◊ Enter a memory address from which to start the shift in the [SR Address] text box.
In this example, <M5> is entered (shift from M0005 to M001B).
◊ Left-click the [OK] button.
A “shift register” instruction is described in the program window.



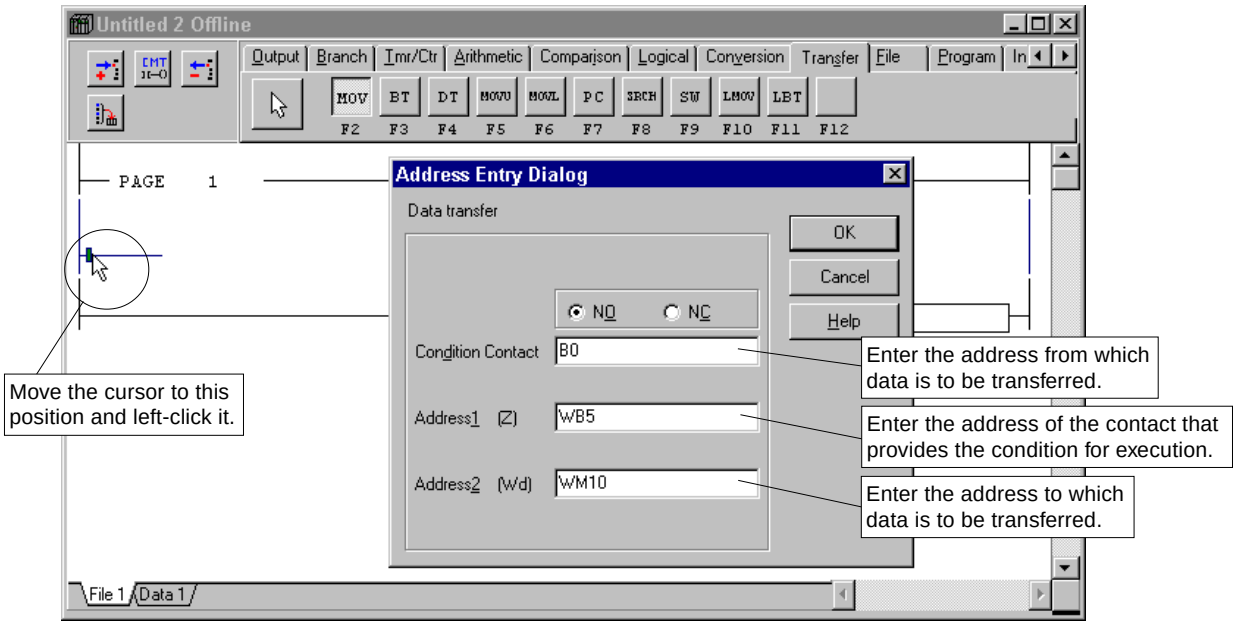


2-2-7 Writing Data Transfer (MOV) instruction

The method of describing a “Data Transfer” (MOV) instruction is explained below.



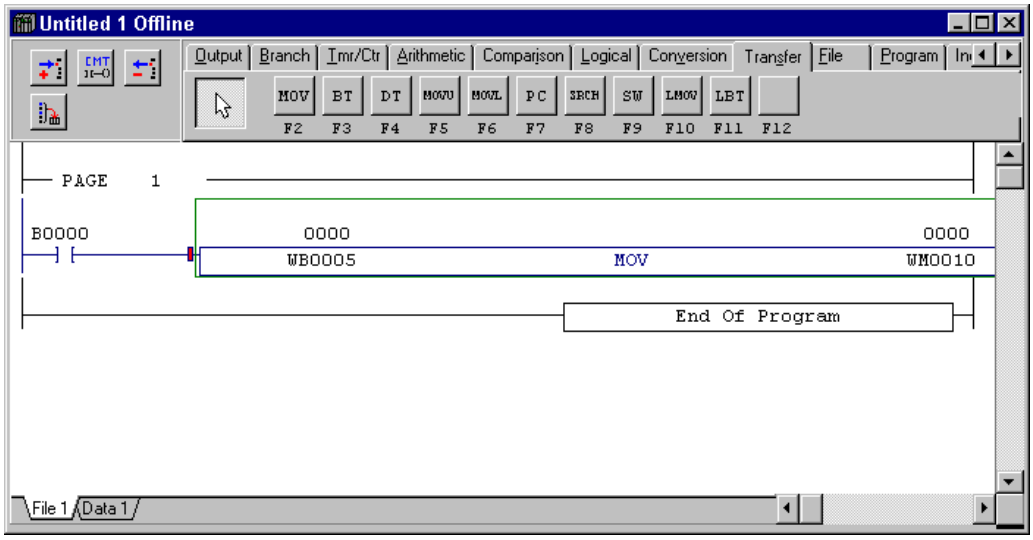
◊ Left-click the [Transfer] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [MOV] button.
◊ Move the cursor to the node in which to describe the instruction, and left-click the node.
The {Address Entry} dialog box is displayed.



◊ Select either the optional [NO] or [NC] (contact) button.
◊ Enter the address of the contact that provides the condition for execution of the instruction in the [Condition Contact] text box.
In this example, <B0> is entered.

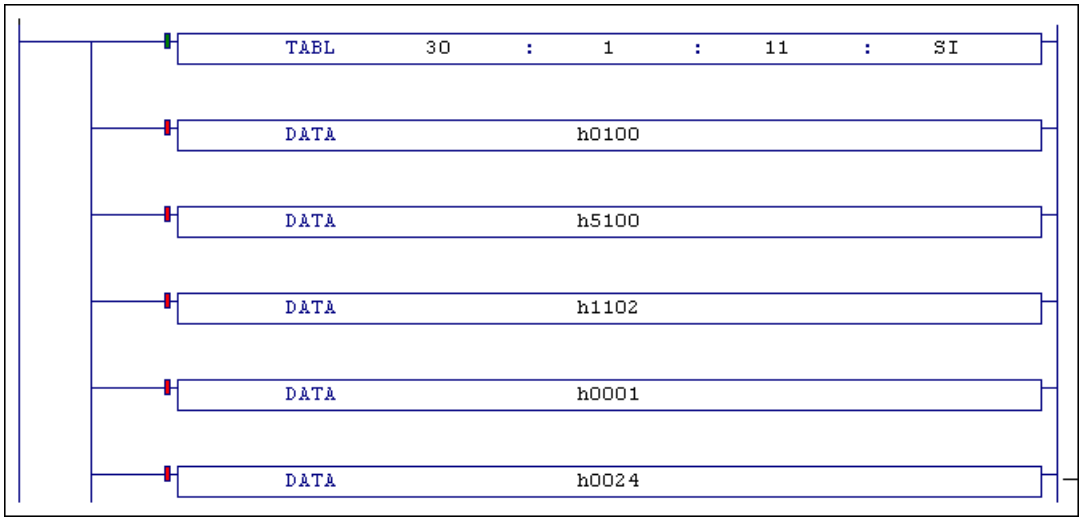
Method of describing the condition for execution of instruction
- When the instruction is to be executed “unconditionally,” leave the [Condition Contact] text box blank.
- When a “Returning (input)” instruction is used as the condition for execution of the instruction, enter the returning (input) number in the [Condition Contact] text box.

◊ Enter the address from which to transfer data in the [Address 1] text box.
In this example, <WB5> is entered.
◊ Enter the address to which data is to be transferred in the [Address 2] text box. In this example, <WM10> is entered.
◊ Left-click the [OK] button.
A Data Transfer instruction (MOV) with a condition contact is described as shown in the following diagram.

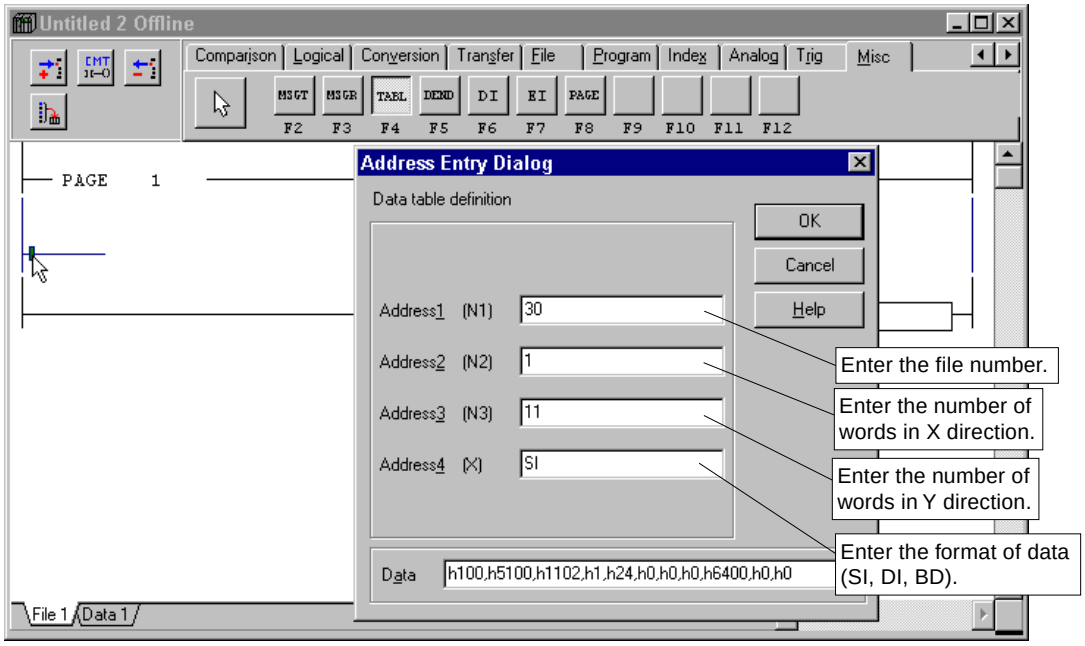

Untitled 1 Offline
Output
Branch
Tmr/Ctr
Arithmetic
Comparison
Logical
Conversion
Transfer
File
Program
MOV
BT
DT
MOVU
MOVL
PC
SRCH
SW
LMOV
LBT
F2
F3
F4
F5
F6
F7
F8
F9
F10
F11
F12
PAGE 1
B0000
0000
WB0005
MOV
0000
WM0010
End Of Program
File 1
Data 1

2-2-8 Writing Data Table Definition (TABL)

The method of describing “Data Table Definition” (TABL) instruction is explained below.



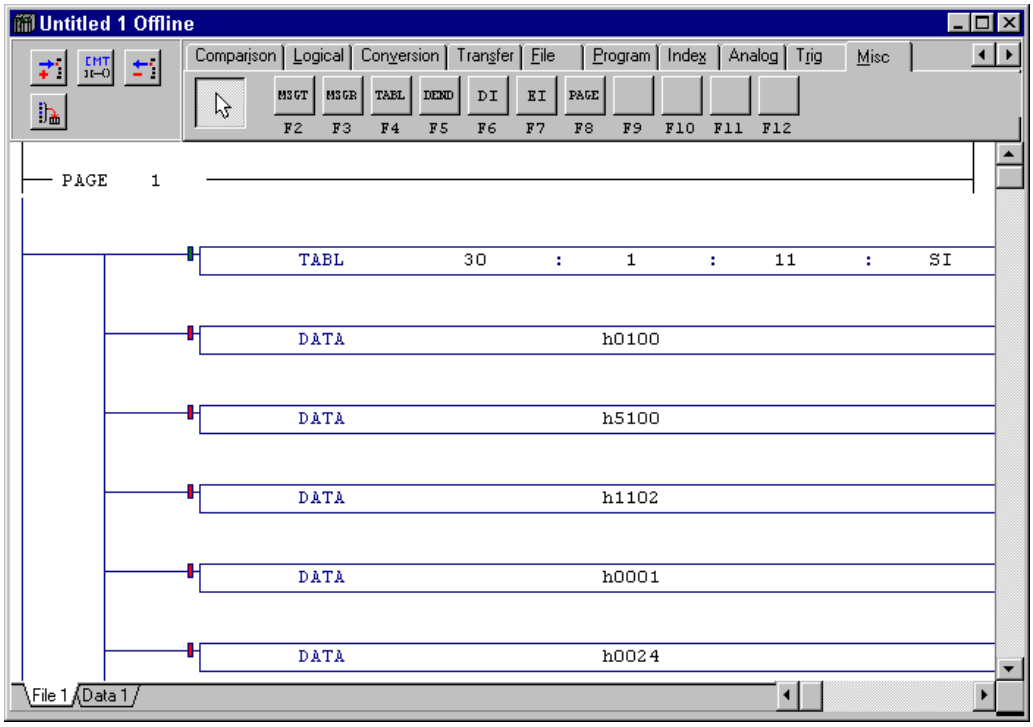
◊ Left-click the [Misc] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [TABL] [TABL] (Data Table Definition) button.
◊ Move the cursor to the node in which to describe the instruction, and left-click the node.
The {Address Entry} dialog box is displayed.



- **Entry in Data (A)**
  Describe the data items of the DATA statement, each separated by a comma (,).
  For data of SI or DI type, prefix an “h” to each data item.
  For data of BD type, do not prefix an “h.”
  For DI-type data, each data item entered must be a numerical value five digits or more in length. (For example, write h00000, not h0.)

◊ Enter the appropriate data in each of the text boxes.

◊ Left-click the [OK] button.
Data Table Definition (TABL), and Data (DATA) are described as shown in the following diagram.



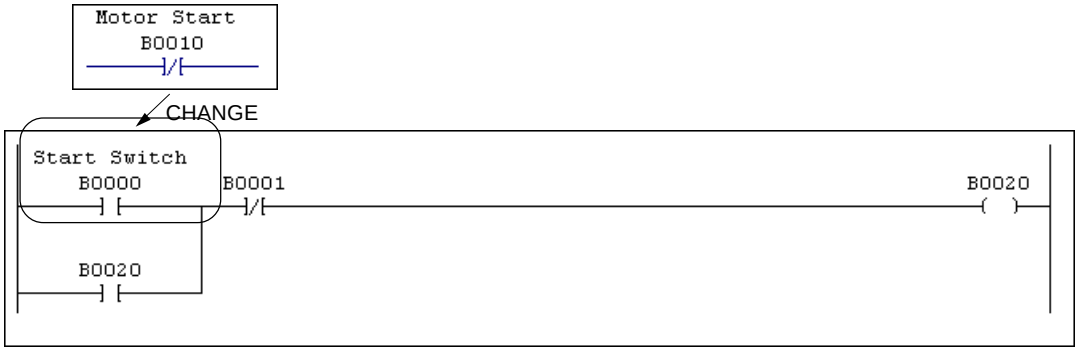
Note: With the data table definition (TABL), data end (DEND) is required at the end of the DATA statement.

2-3 Program Modification

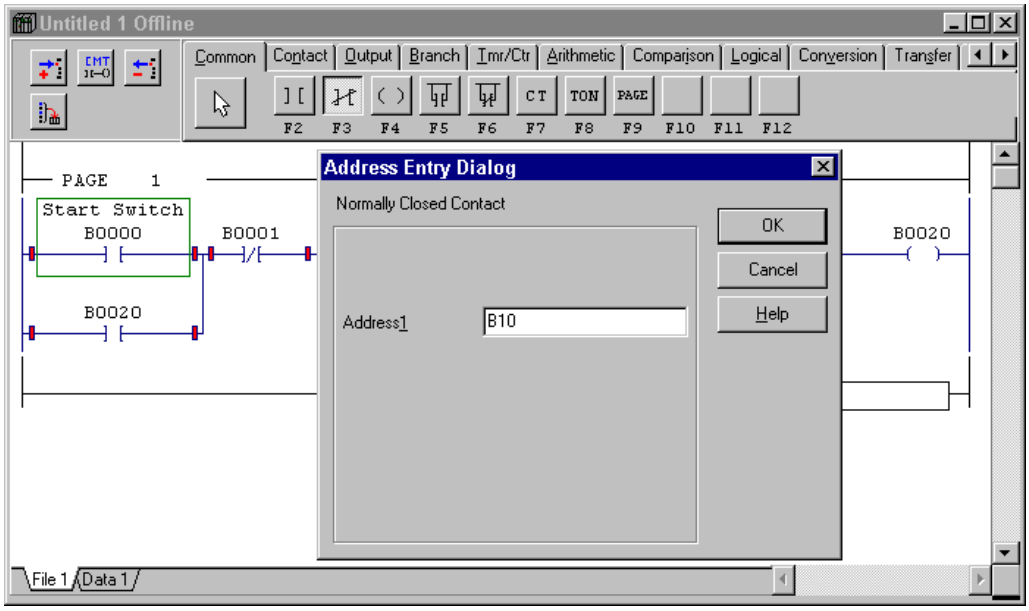
Here, the method of modifying or changing a program that has been prepared is explained.

2-3-1 Changing instructions/addresses

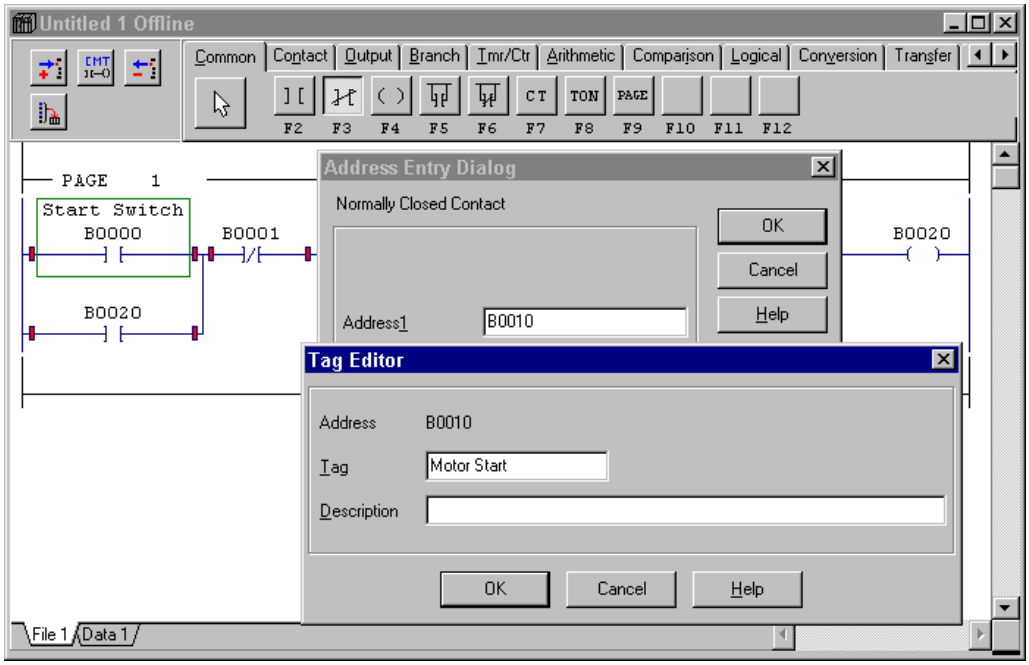
The method of changing an instruction (symbol) and an address in the following program is explained below.



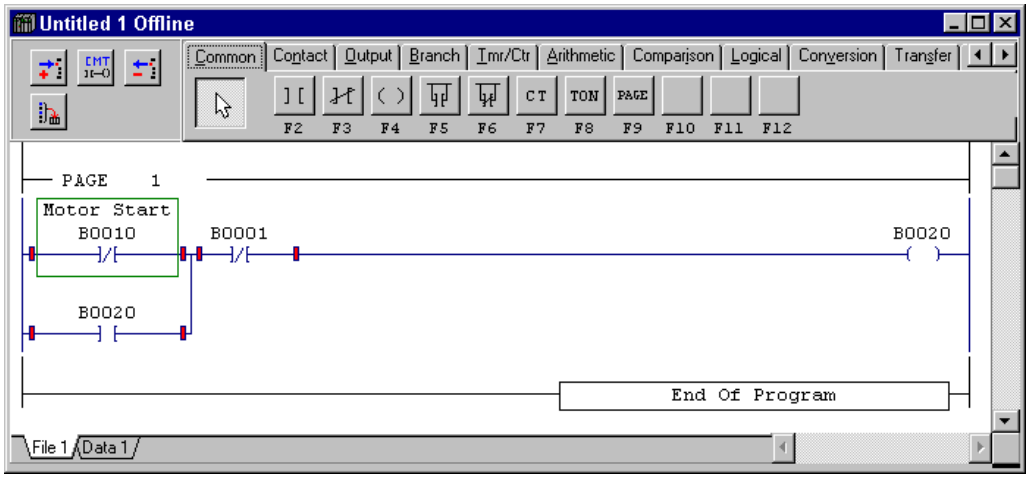
◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar. (To change an instruction too, previously select the new instruction button by left-clicking it.)
◊ Left-click the [Normally Closed Contact] button.
◊ Move the cursor to the instruction (symbol) to be changed, and left-click the instruction.
The {Address Entry} dialog box is displayed.



◊ Change the address that is displayed in the [Address] text box (the address that has been entered).
In this example, <B10> is entered.
◊ Left-click the [OK] button.
The {Tag Edit} dialog box is displayed.
Note, however, that the {Tag Edit} dialog box is not displayed when the [Auto Document] box has been checked in the environment setting session.



◊ Enter a tag name in the [Tag] text box.
In this example, <Motor Start Switch> is entered.
◊ Enter an explanatory statement in the [Description] text box as required.
◊ Left-click the [OK] button.
The contact and tag name are changed.



Tag
If once the tag name is defind(“B0000:Start Switch” in this sample), it is stored in a tag data base. For information on changeing or deleting it.
refer to “2-5 tag Editor”.

2-3 Program Modification

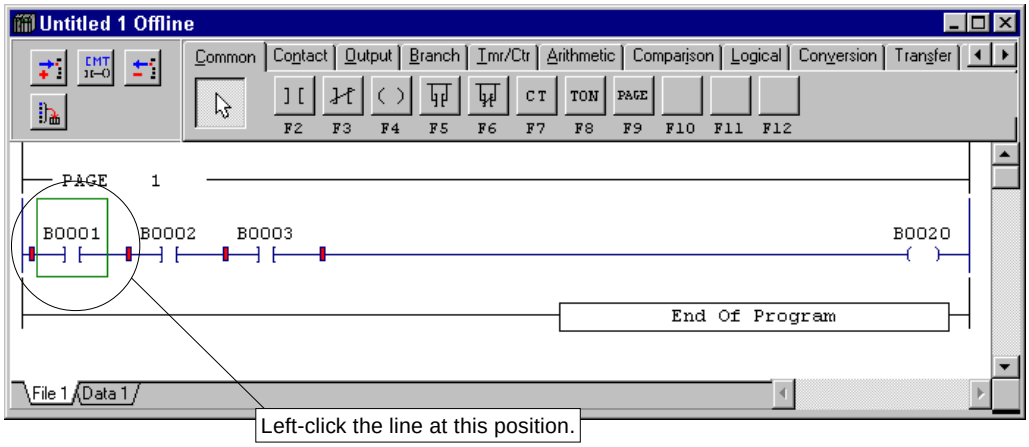
2-3-2 Addition of lines/instructions

Here, the method of adding a new line or instruction to an existing program is explained.

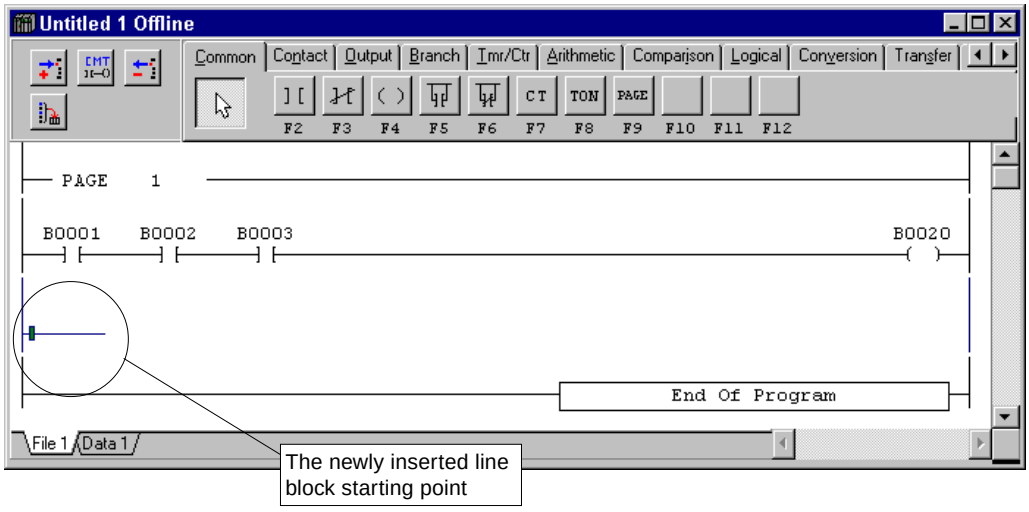
(1) Inserting a new line

The method of inserting a new line into a program is explained below.

◊ Left-click the [Selection tool] button on the ladder edit tool bar.
◊ Left-click the line (instruction symbol) above the position into which to insert the line block starting point.

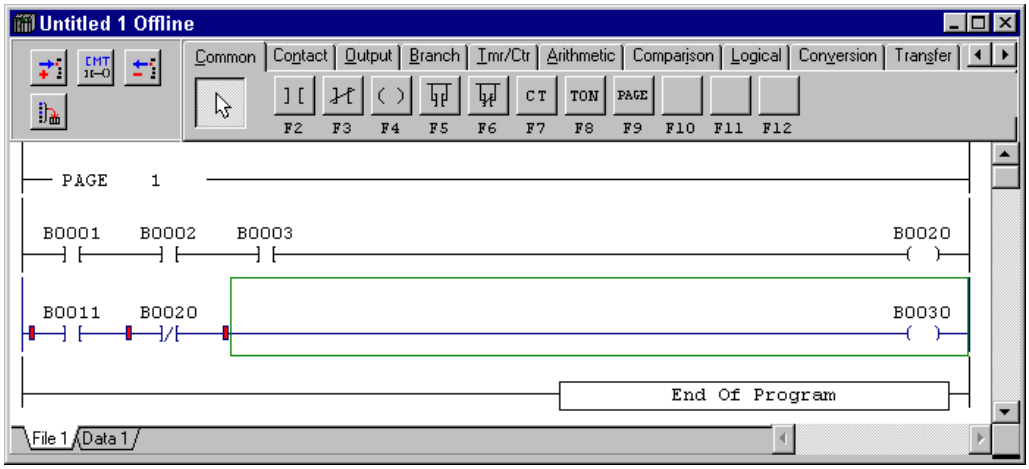


◊ Left-click the [Insert Line] button on the ladder edit tool bar.
The line block starting point is inserted.



Position of [line insertion]
By using [Editor Options] of the [Environment Options] menu, it is possible to specify whether a line is to be inserted before or after the line on which the cursor is positioned.

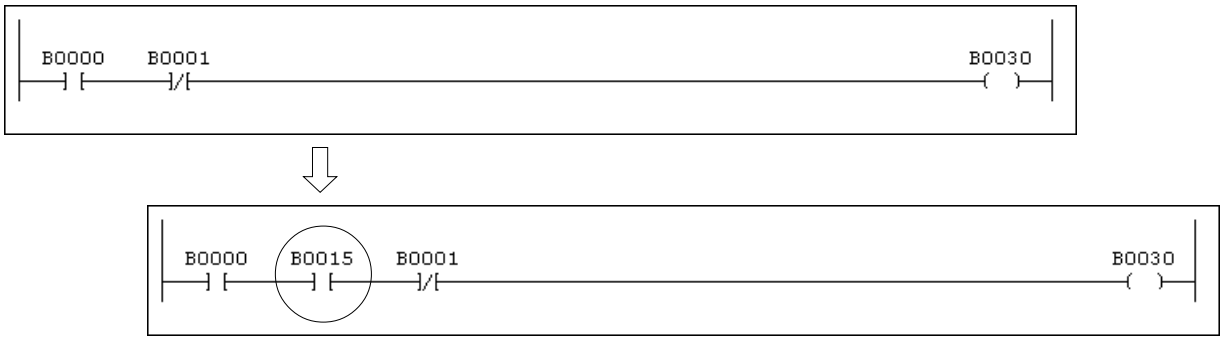
◊ Write a contact and an output at the newly inserted “line block starting point” as shown in the following diagram.



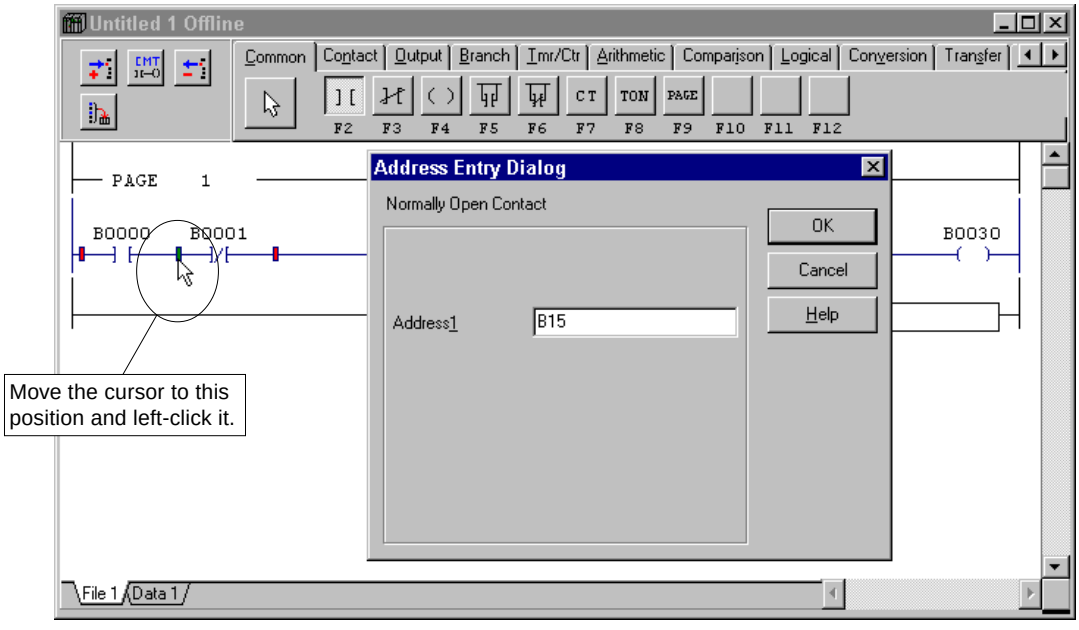
(2) Inserting a new contact

The method of inserting a contact into a series line and the method of inserting a contact into a branch line are explained below.

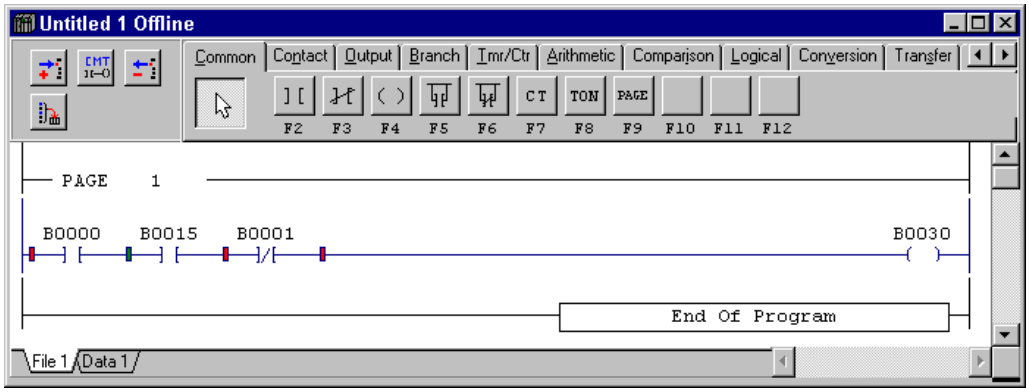
1) Inserting a contact into a series line



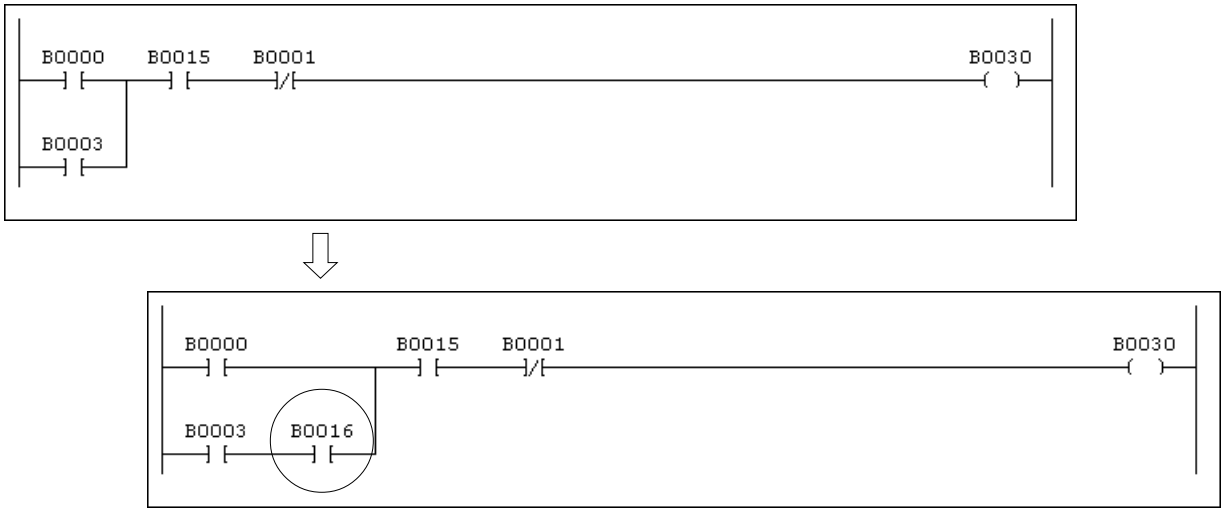
◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the][[Normally Open Contact] button.
◊ Move the cursor to the node into which to insert the instruction, and left-click the node.
The {Address Entry} dialog box is displayed.



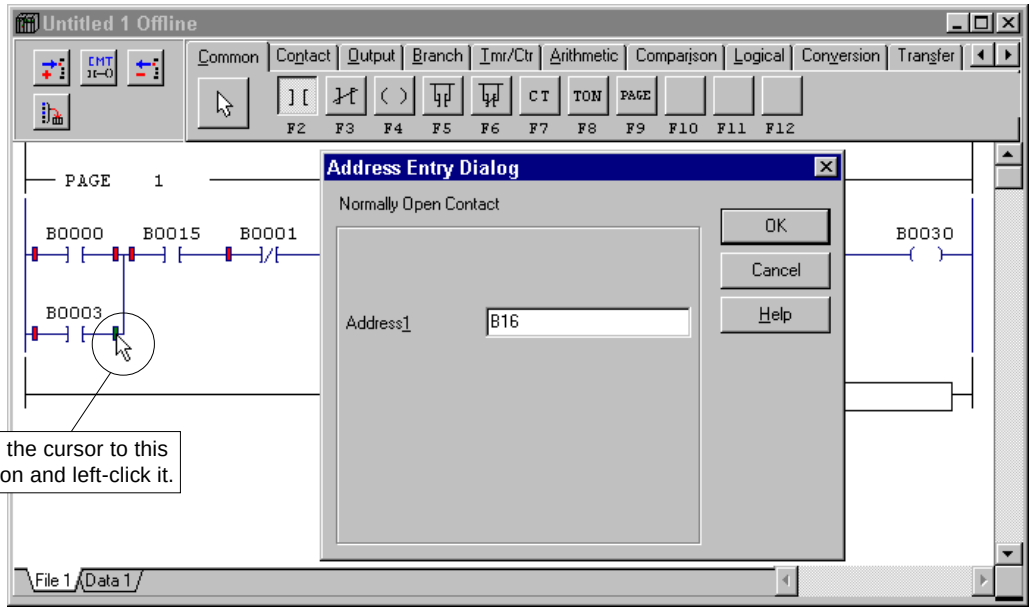
◊ Enter the address of the contact in the [Address] text box.
In this example, <B15> is entered.
◊ Left-click the [OK] button.
The contact is inserted in series between contacts as shown in the following diagram.



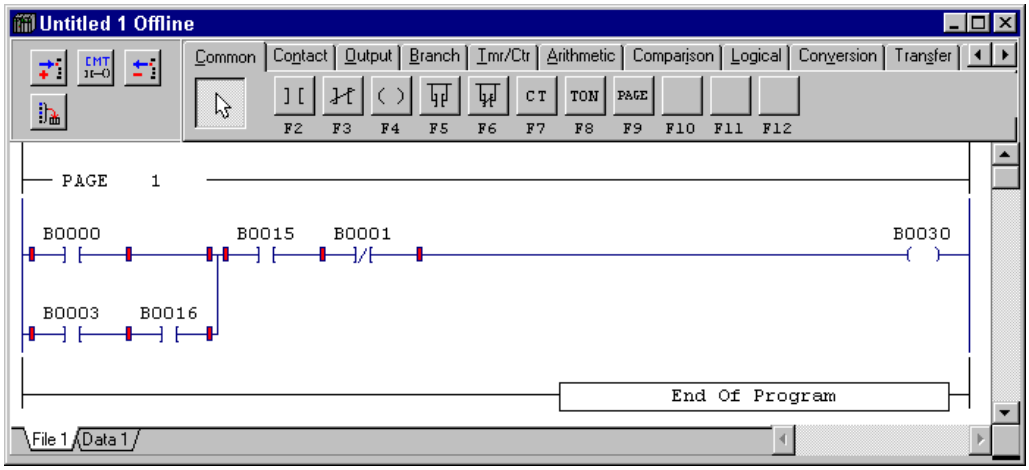
2) Inserting series contact into branch line



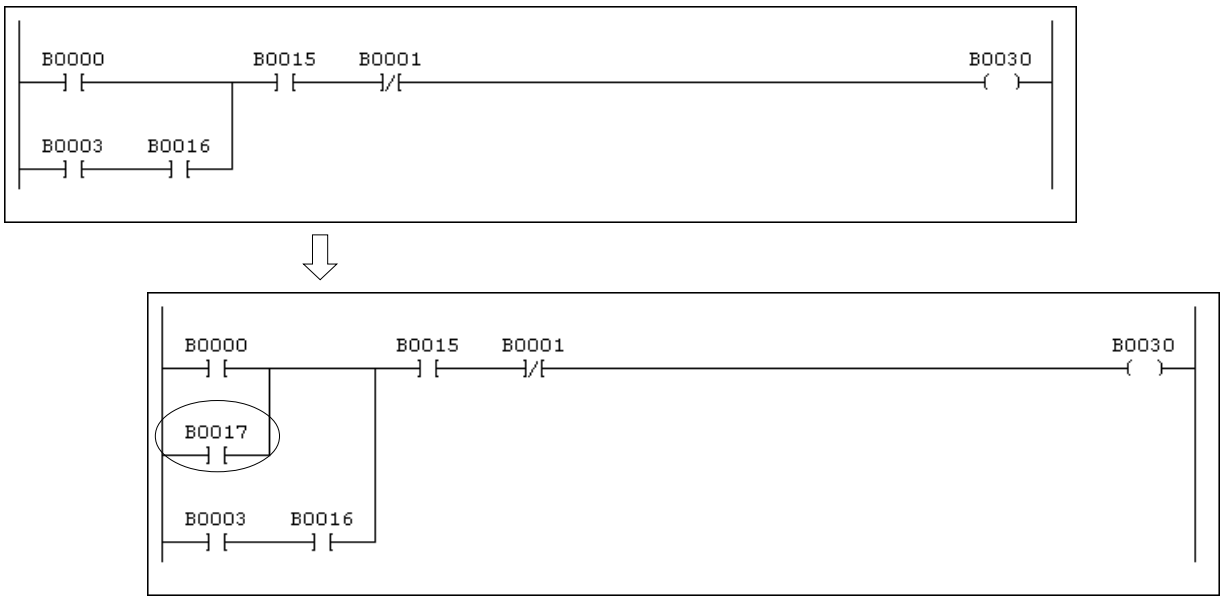
◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the][[Normally Open Contact] button.
◊ Move the cursor to the node into which to insert the instruction, and left-click the node.
The {Address Entry} dialog box is displayed.



◊ Enter the address of the contact in the [Address] text box.
In this example, <B16> is entered.
◊ Left-click the [OK] button.
As shown below, the contact is inserted and the “branch down” shifts to the right.

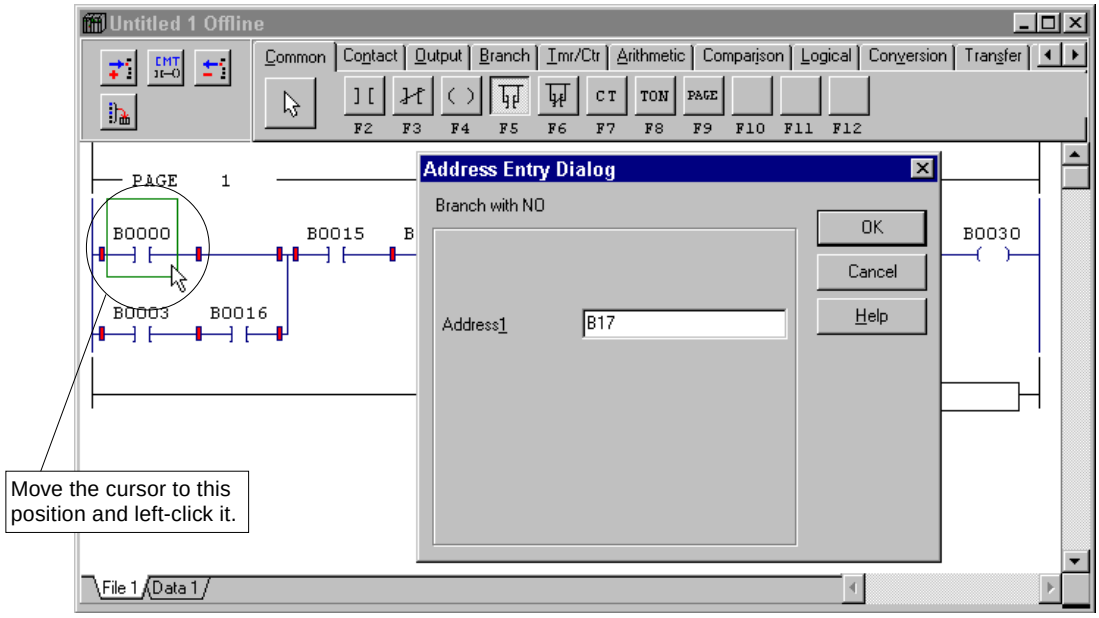


3) Inserting branch contact into branch line



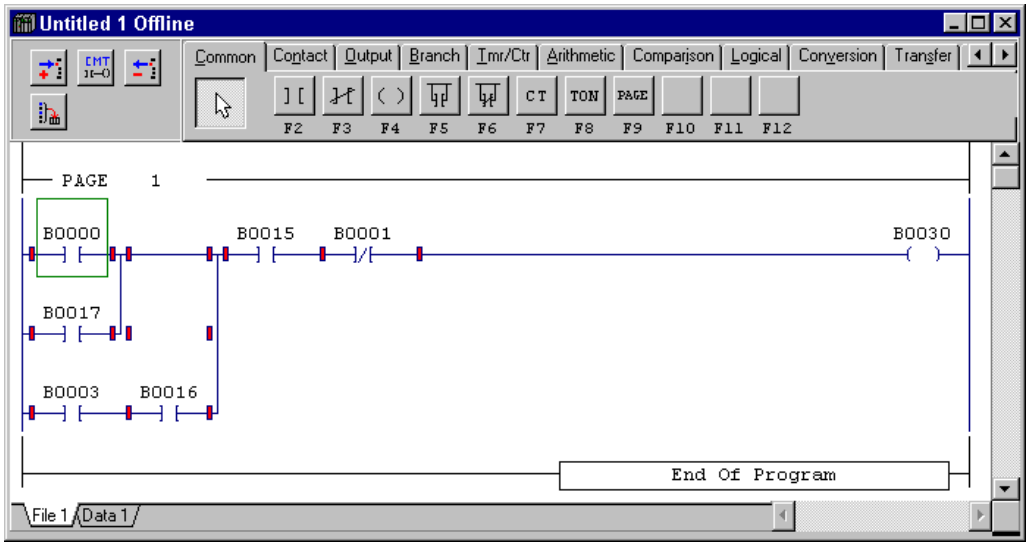
◊ Left-click the [Common] or [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [Branch with NO] button.
◊ Move the cursor to the node into which to insert the instruction, and left-click the node.
The {Address Entry} dialog box is displayed.

2-3 Program Modification



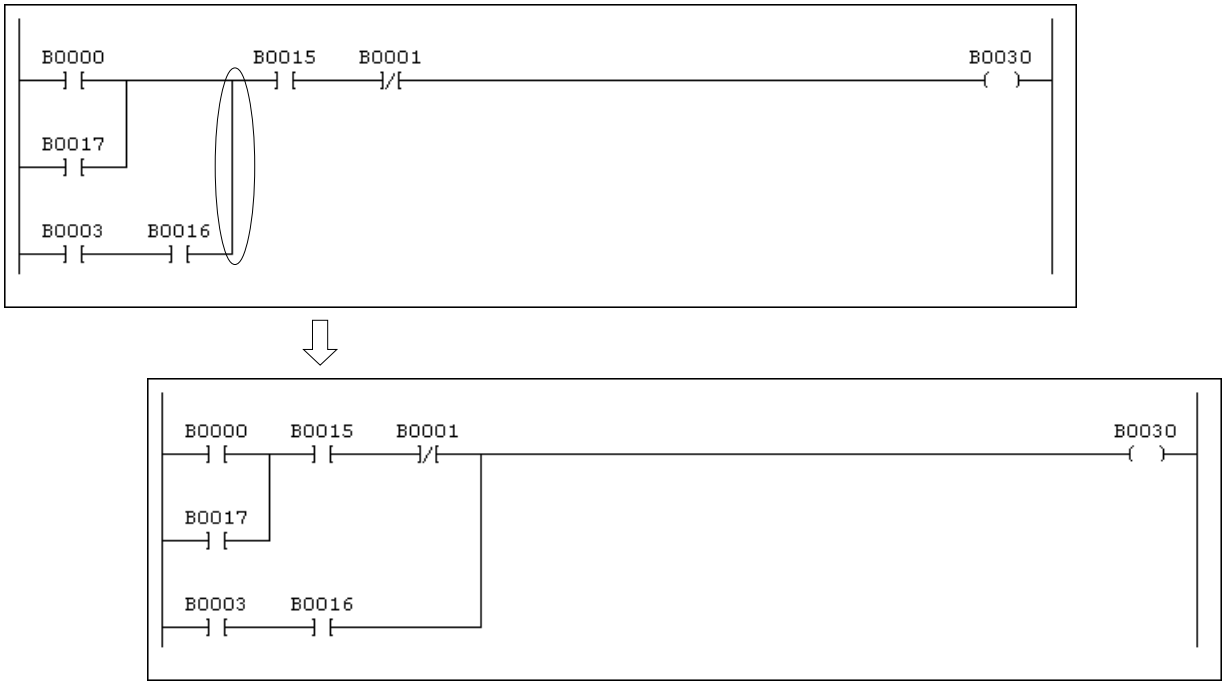
◊ Enter the address of the contact in the [Address] text box.
In this example, <B17> is entered.

◊ Left-click the [OK] button.
As shown below, the contact is inserted in parallel between the upper and lower contacts.



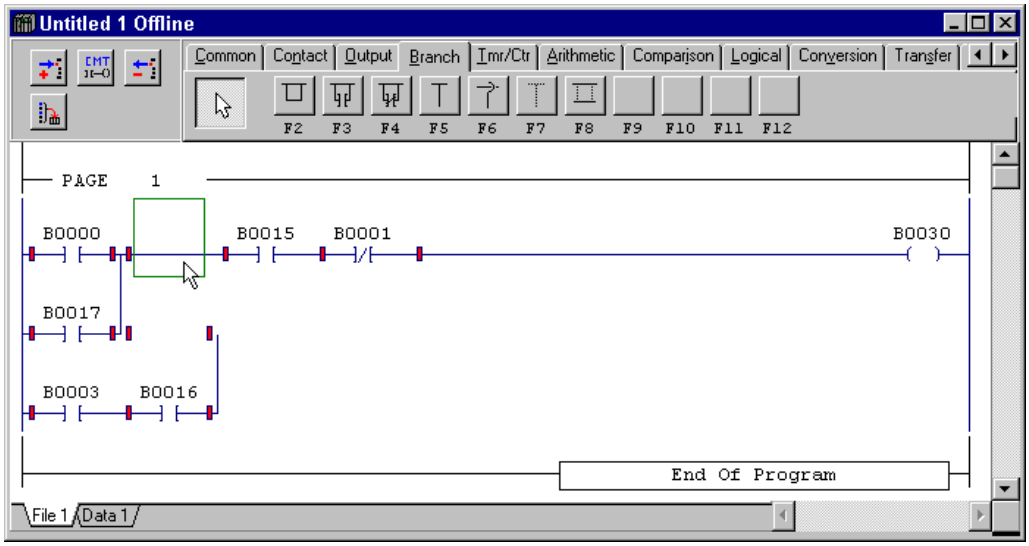
(3) Editing connecting lines

Here, the method of inserting or deleting connecting lines between instruction symbols (vertical and horizontal lines) is explained.

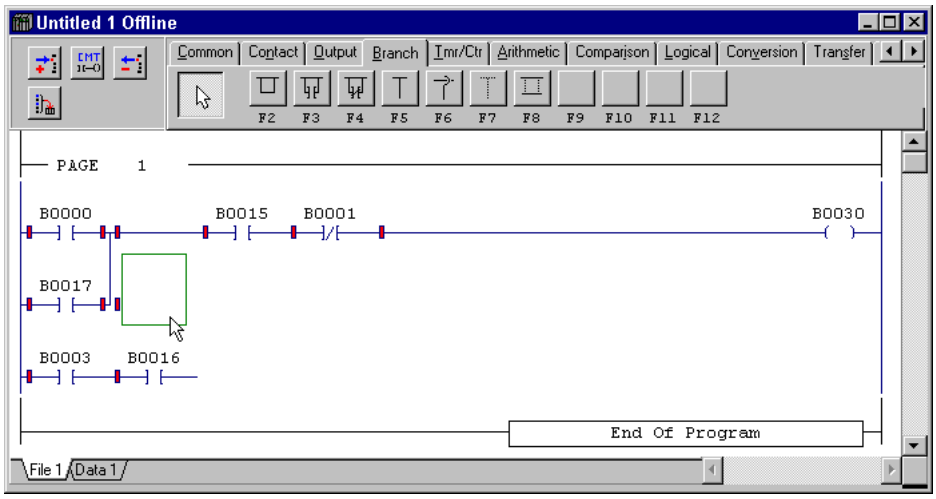


1) Deleting vertical connecting line

◊ Left-click the [Branch] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [Branch Clear] button.
◊ Left-click the instruction symbol located at the top, left of the vertical connecting line to be deleted.
As shown in the following diagram, the vertical connecting line is deleted.



◊ In the same way as described above, delete the remaining vertical connecting lines to prepare the line shown in the following diagram.

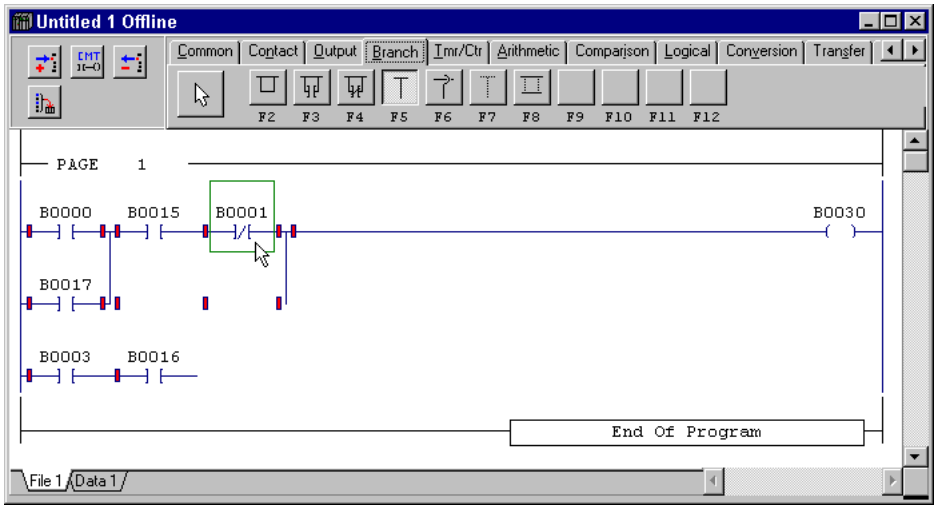


2) Inserting a vertical connecting line

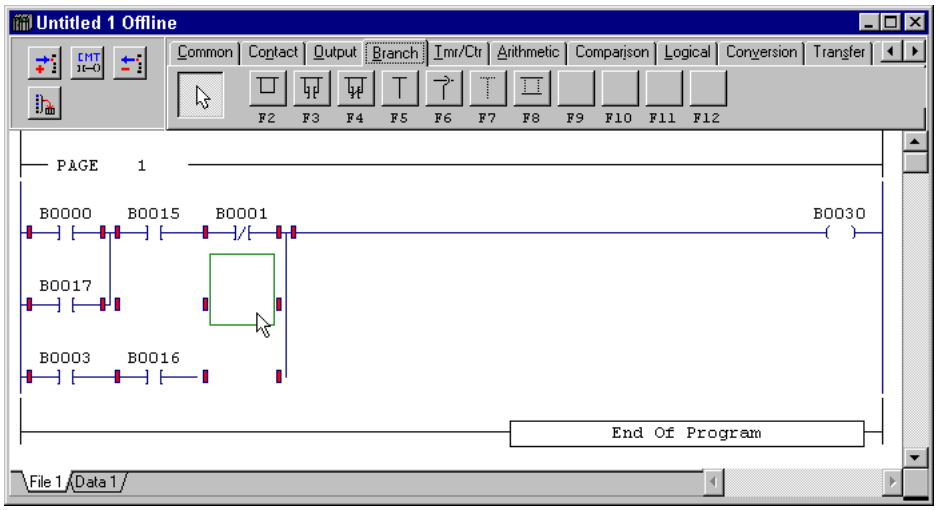
◊ Left-click the [Branch] tab of the [Instruction group] tab on the ladder edit tool bar.

◊ Left-click the [Branch Down] button.

◊ Left-click the instruction symbol (B15) located at the top, left of the position in which to describe a vertical connecting line. As shown in the following diagram, the vertical connecting line is described from the right end of the selected instruction symbol downward.

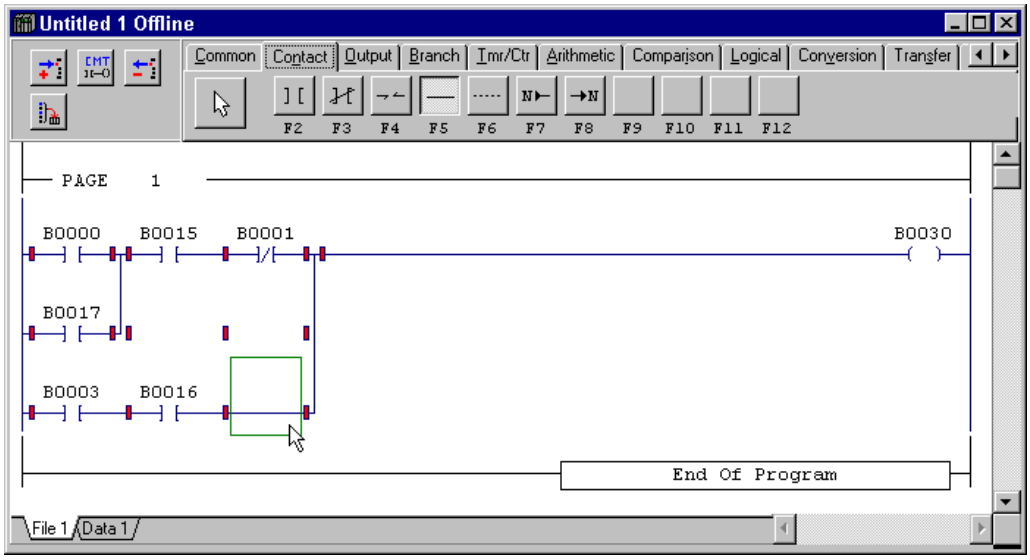


◊ In the same way as explained above, describe the remaining vertical connecting lines to prepare the line shown in the following diagram.



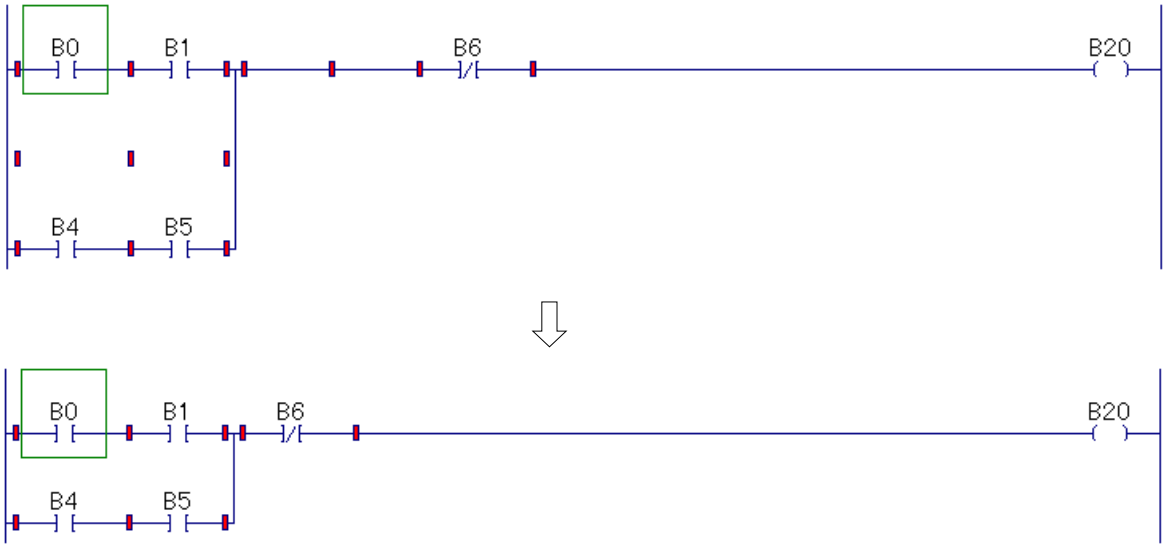
3) Writing horizontal connecting line (pass)

◊ Left-click the [Contact] tab of the [Instruction group] tab on the ladder edit tool bar.
◊ Left-click the [—][Pass] button.
◊ Left-click the blank part in which to describe a pass (horizontal connecting line).
As shown in the following diagram, a pass is described.

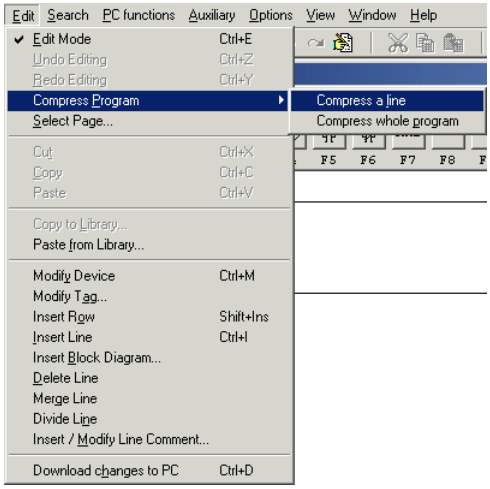


(4) Compressing a program (deleting blanks)

If a line can be compressed vertically (horizontally) after deleting unnecessary blanks during programming, it is compressed upward (to the left). The method of compressing a program is explained below.



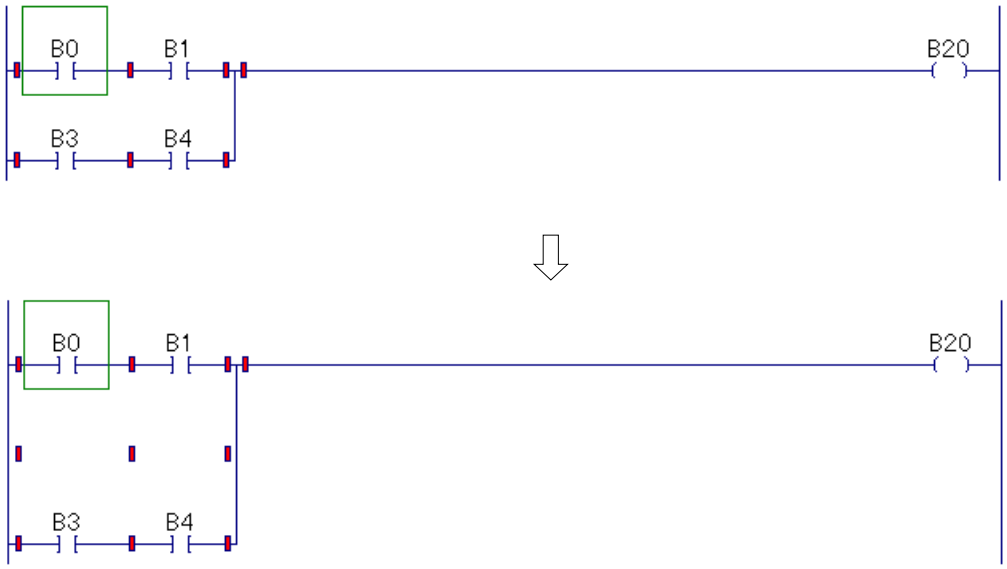
◊ Select [Compress Program] from the [Edit] menu and then select [Compress a line] or [Compress whole program].



- When [Compress a line] is selected, only the line at the current cursor position is compressed.
- When [Compress whole program] is selected, all the lines are compressed.

(5) Inserting a row (blank row)

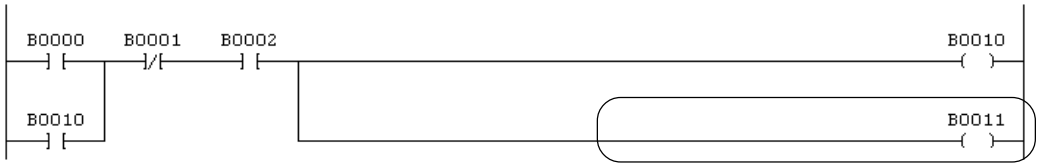
This function is used to create a blank row in a line.
(The operation is different from line insertion.) If a parallel line is created, editing can be made easily.



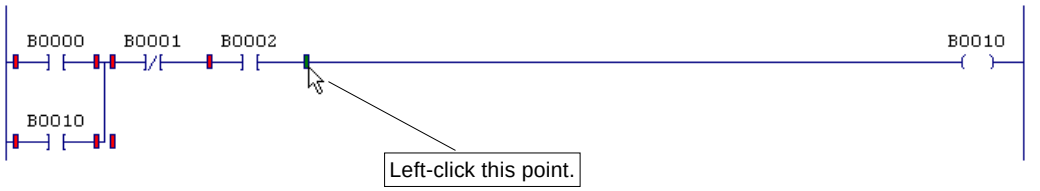
◊ Select [Insert Row] from the [Edit] menu. A blank row is created under the instruction lint at the current cursor position.

(6) Creating an OR circuit of coils

Here, the method of creating an OR circuit of coils is explained.

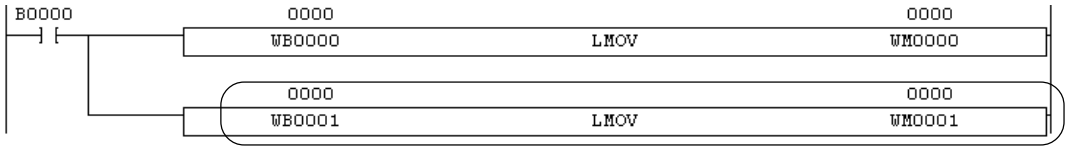


◊ Move the cursor to the circuit to be edited.
◊ Left-click the [Coil] button.
◊ Left-click the node at which a coil is to be connected.
Then an OR circuit of coils is created.

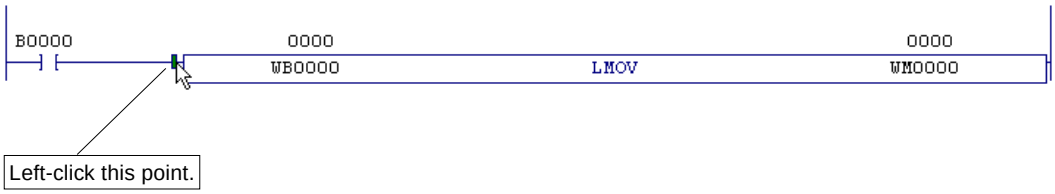


(7) Creating an OR circuit of data instructions

Move the cursor to the circuit to be edited.



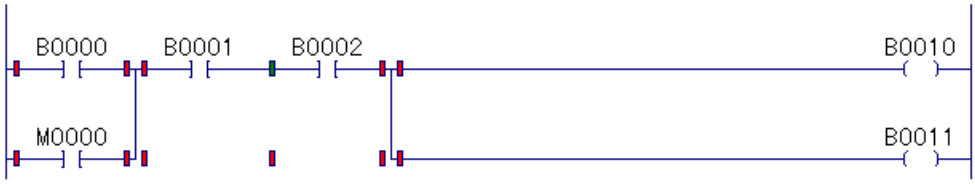
◊ Left-click the [Data Instructions] button.
◊ Left-click the node at which data instructions are to be connected,
◊ Then an OR circuit of data instructions is created.
Here, the method of copying or cutting one or more line blocks and pasting them to some other place and the method of deleting unnecessary line blocks are explained.



(8) Deleting contacts and outputs

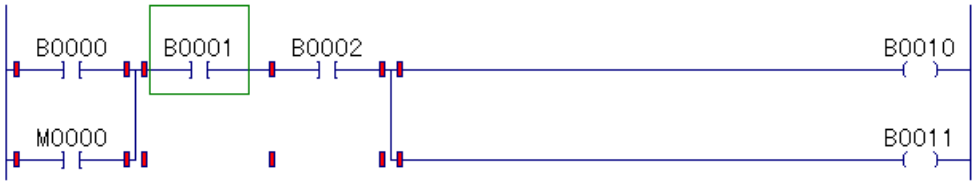
A contact and output can be deleted by selecting it with the mouse and then pressing the [DEL] key. However, the output at the 1st row of the line cannot be deleted.

Example: Deleting a contact or output in the following line

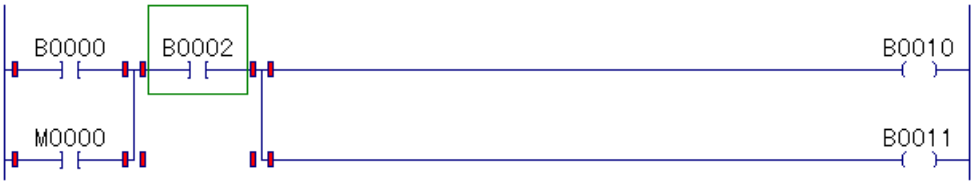


• Deleting contact B1

◊ Select B1 with the mouse.



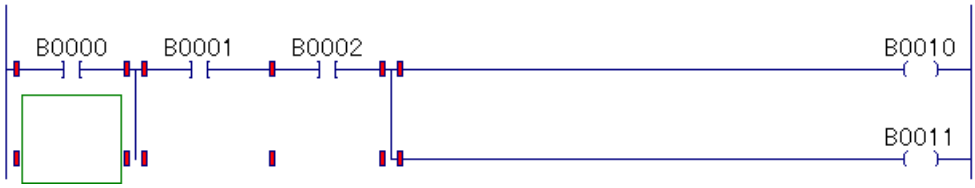
◊ Press the [DEL] key.



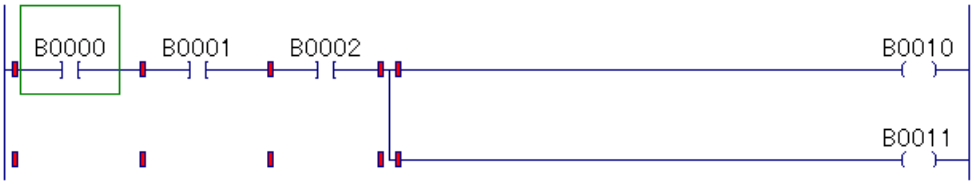
• Deleting contact M0

In this case, the connecting line remains even if the [DEL] key is used. Therefore, use the [Blank] and [Clear vertical connection] buttons instead of it.

◊ Left-click the [Blank] button of the [Contact(N)] tab.
◊ Left-click the M0. M0 is deleted.

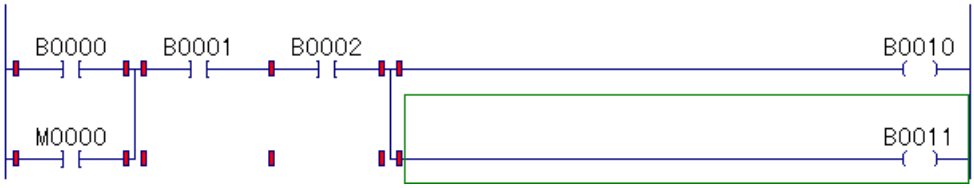


◊ Left-click the [Clear vertical connection] button of the [Parallel(B)] tab.
◊ Left-click the B0. the vertical line is deleted.

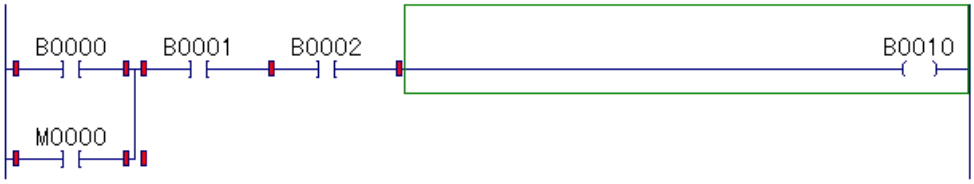


• Deleting output B11

◊ Select B11 with the mouse.



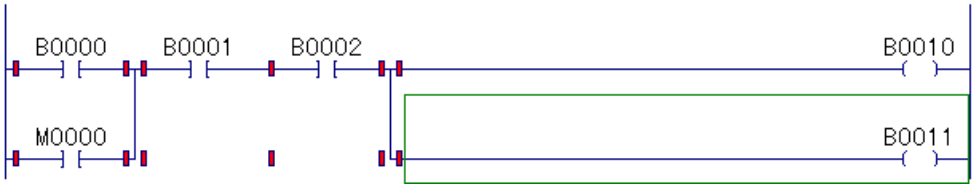
◊ Press the [DEL] key.



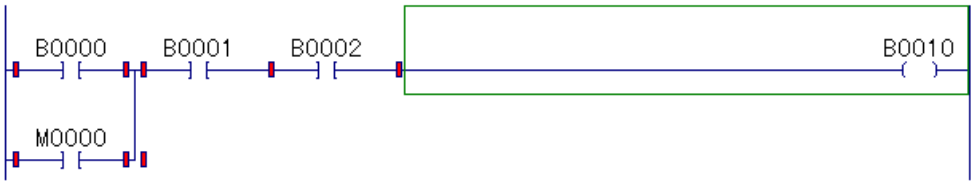
• Deleting output B10

Since the output at the 1st row cannot be deleted directly, delete the output at the 2nd row first and then change the address of the output at the 1st row from B10 to B11.

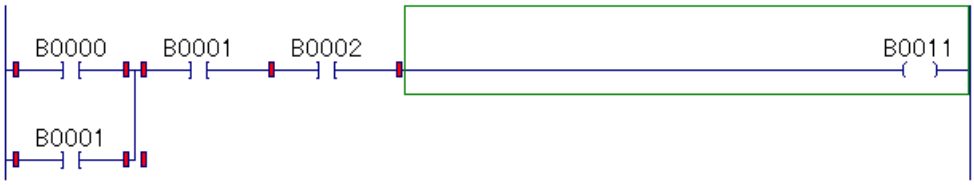
◊ Select B11 with the mouse.



◊ Press the [DEL] key.



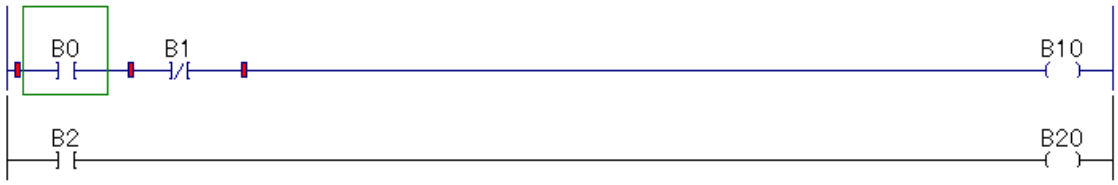
◊ Double-click B10 and change the address to B11.



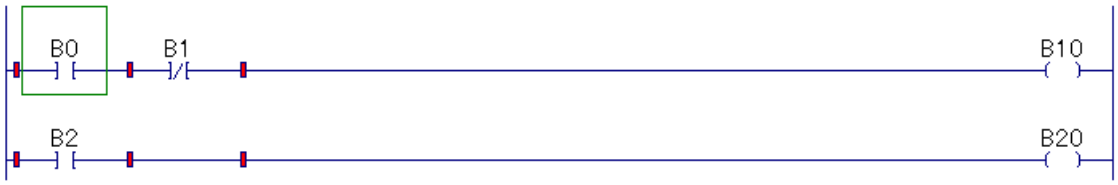
(9) Merging lines

This function is used to merge two independent lines to make a single line. It is used to make vertical connection of two independent lines.

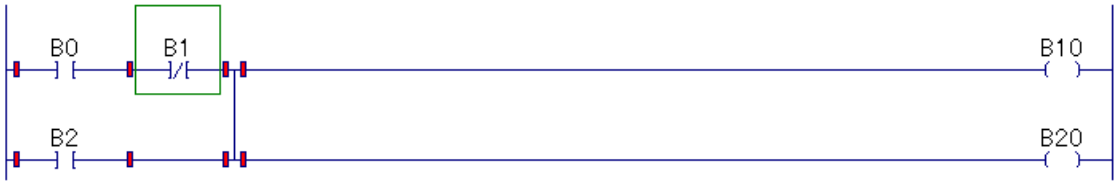
◊ Position the cursor on a line to make vertical connection.



◊ Select [Merge Line] from the [Edit] menu. The line at the current cursor position and the line just below it are merged to form a single line.



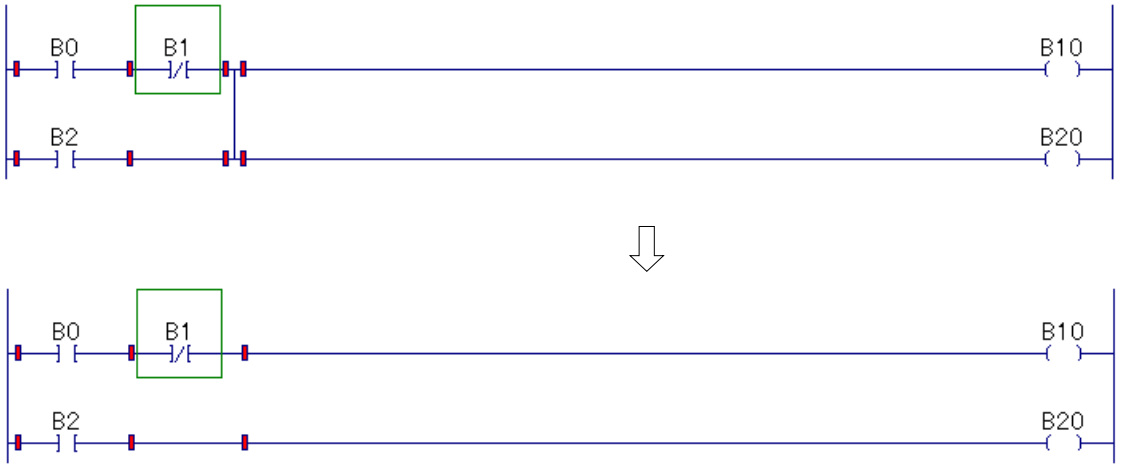
◊ Left-click the [Parallel] tab of the [Instruction group] tab in the Ladder edit tool bar.
◊ Left-click the [T] [Vertical connection] button.
◊ Move the cursor to B1 (contact B) and then left-click it. A vertical connecting line is drawn.



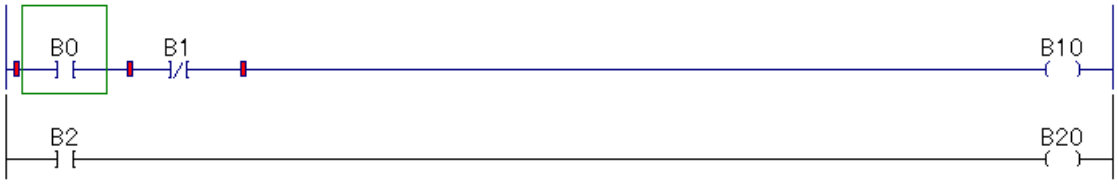
(10) Dividing lines

This function performs an operation opposite to {Merging lines} in the previous section. Use this function after clearing a vertical connecting line.

◊ Left-click the [Parallel] tab of the [Instruction group] tab of the Ladder edit tool bar.
◊ Left-click the [T] [Clear vertical connection] button.
◊ Move the cursor to B1 (B contact) and then left-click it. The vertical connecting line is cleared.



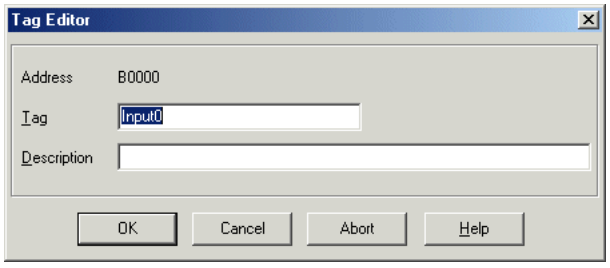
◊ Select [Divide Line] from the [Edit] menu. The line at the current cursor position and the line just below it are divided into two lines.



2-3-3 Changing tags

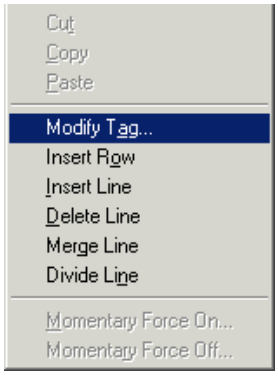
The following explains the procedure for changing a tag in the Ladder screen.

◊ Move the cursor to B0.
◊ Select [Modify Tag] from the [Edit] menu. The {Tag Editor} dialog box is displayed.



◊ Input <Switch 0> in the [Tag] text box.
◊ Left-click the [OK] button. The tag is changed.

About the {right-click} menu
A tag can also be changed by moving the cursor to B0, pressing the right mouse button to display the {Right click menu} (see below), then selecting [Modify Tag].

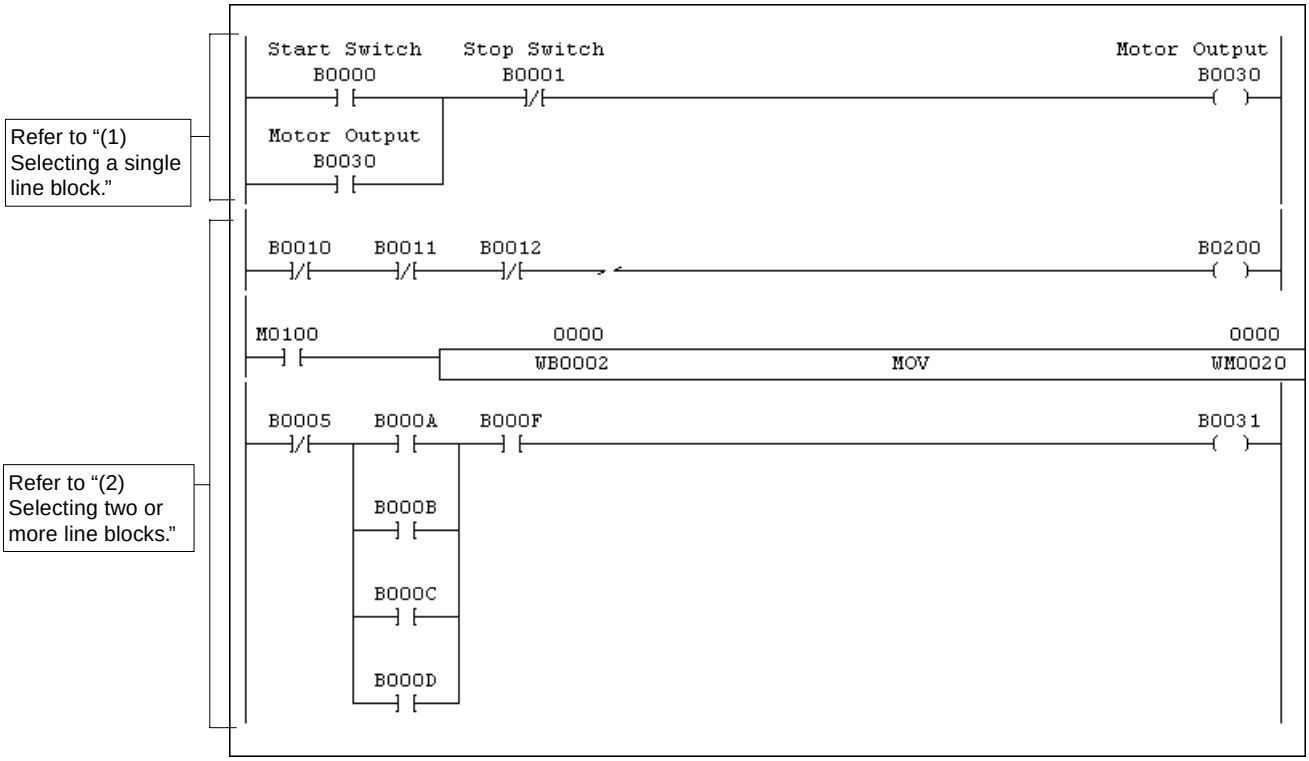


2-4 Line Copy/Insert/Delete

Here, the method of copying or cutting one or more line blocks and pasting them to some other place and the method of deleting unnecessary line blocks are explained.

2-4-1 Selecting a line block

In order to copy, cut, or delete a line, it is necessary first to select a or groups of line.

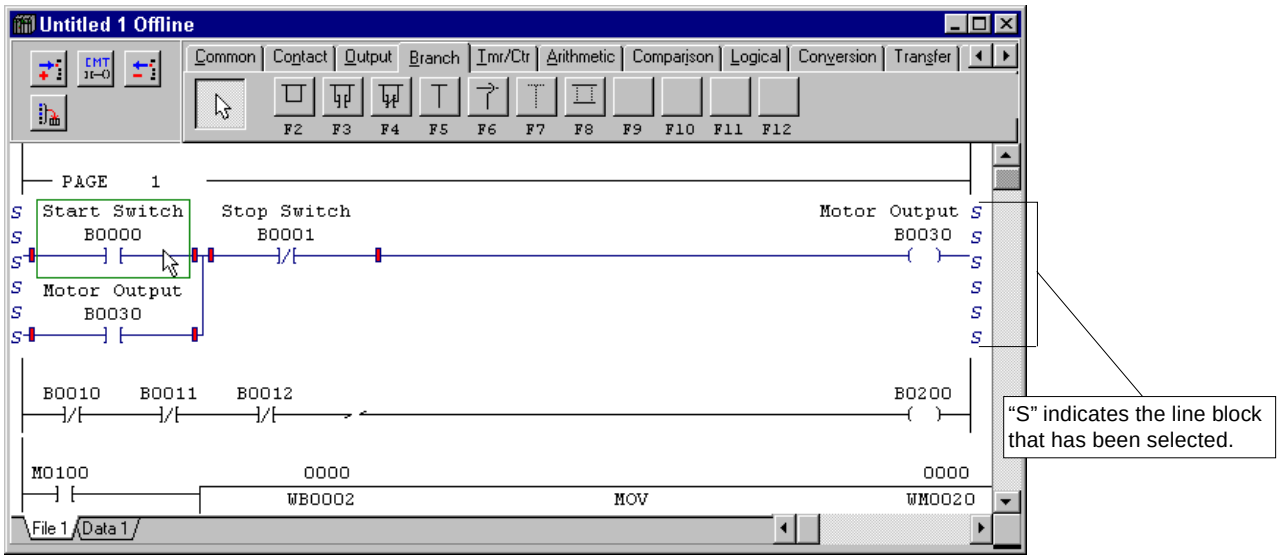


(1) Selecting a single line block

◊ Move the cursor to the line to be selected.

◊ Left-click the mouse with the <Shift> key kept pressed.

An “S” (select) is displayed on the bus on the right and left of the line block selected.



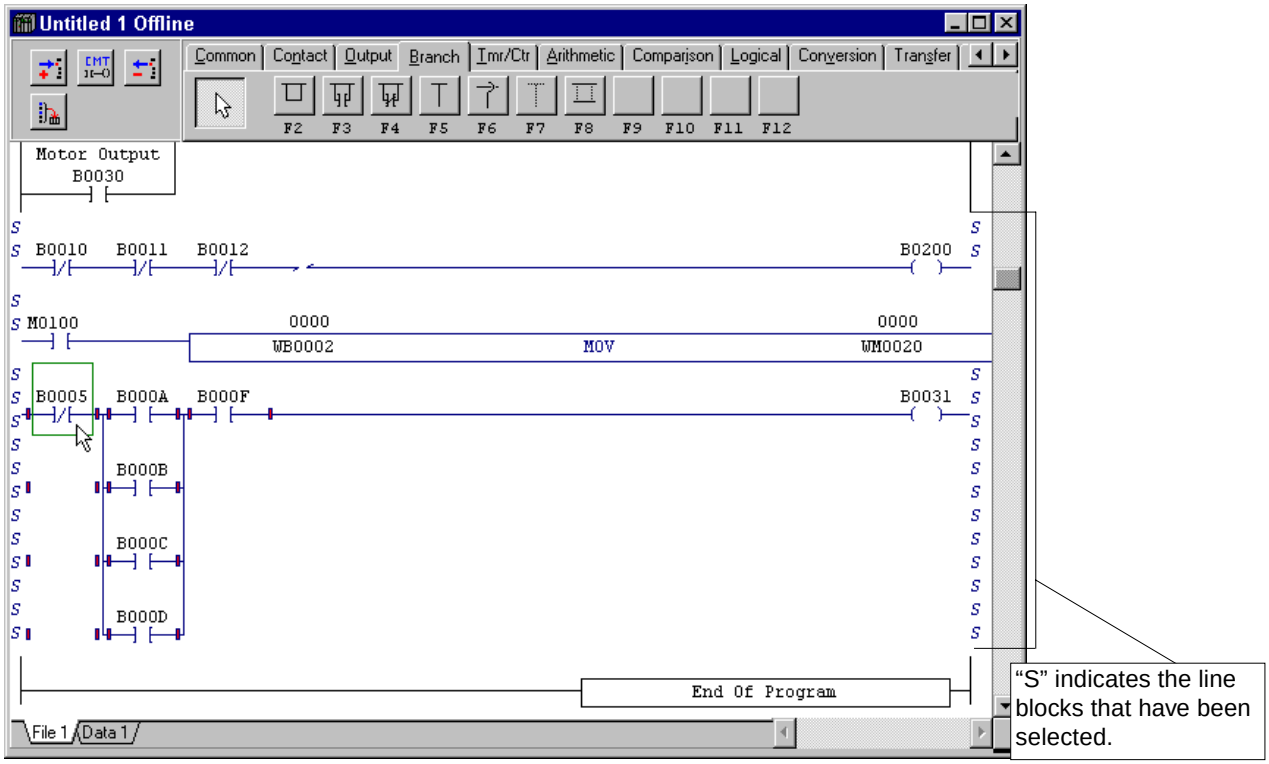
* Releasing select status

To release the select status, move the cursor to the selected line block and left-click it.

(2) Selecting two or more line blocks

◊ Move the cursor to the first one of the line blocks to be selected and left-click it.

◊ Using the scroll bar, let the last one of the line blocks to be selected be displayed. Then, left-click that line block with the <Shift> key kept pushed.
(When the last line block to be selected is outside the program window, use the [Scroll] bar, [Arrow] buttons, <Page up> and <Page down> keys to cause it to be displayed.)
"S" (select) is displayed on the buses on the right and left of the selected line blocks.

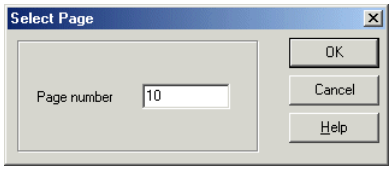


* Releasing select status
To release the select status, move the cursor to any one of the selected line blocks and left-click the line block.

(3) Selecting a line block with page specification

This function is used when selecting all the lines in a page with page specification.

◊ Select [Select Page] from the [Edit] menu.
The {Select Page} dialog box is displayed.



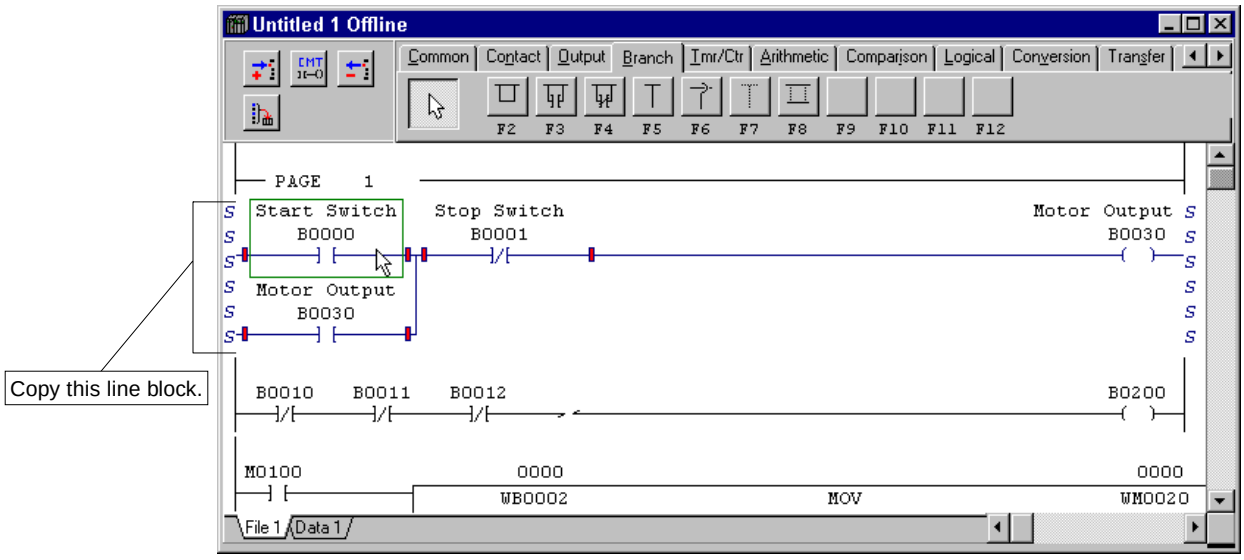
◊ Input a page number in the [Page number] text box and then left-click the [OK] button.

2-4 Line Copy/Insert/Delete

2-4-2 Copying and pasting a line block

The method of copying a selected line block to the clipboard and pasting it to some other location is explained below.

(1) Copying a line block



◊ Select a line block to be copied.
(For the method of selecting a line block, refer to “2-4-1.”)

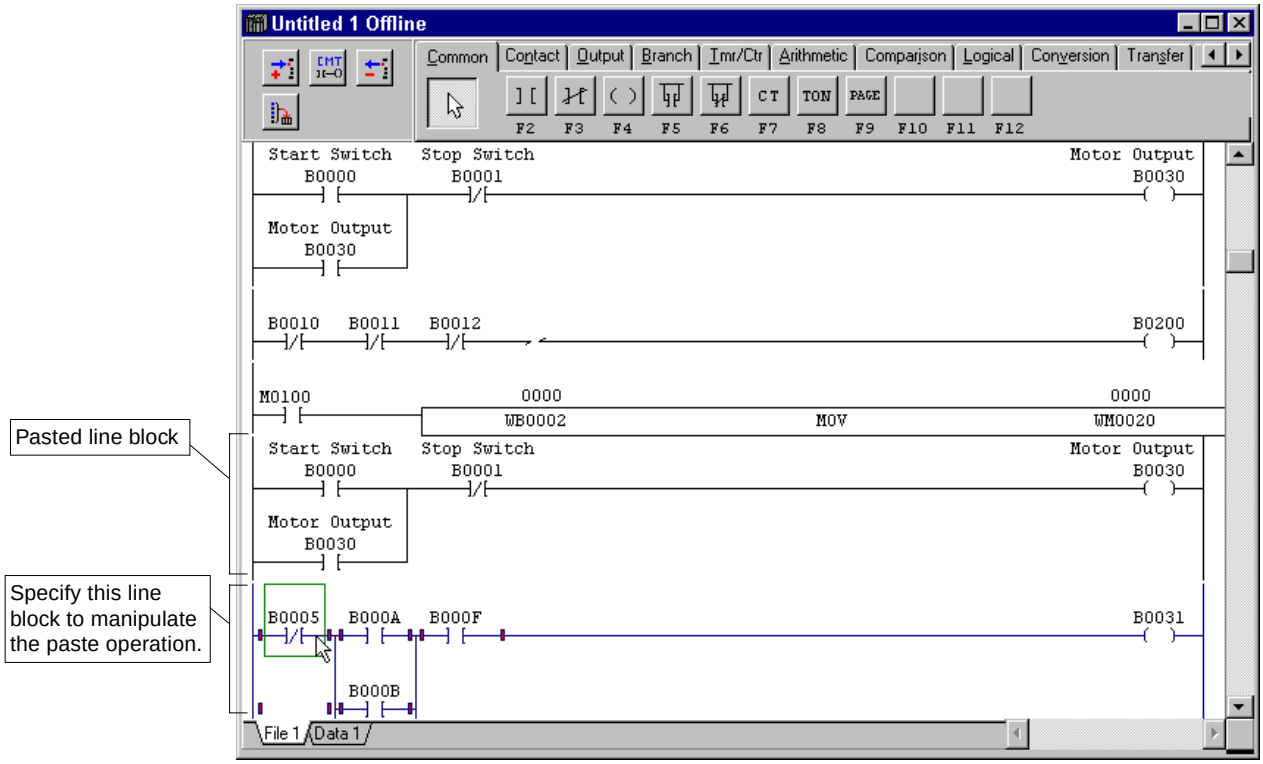
◊ Left-click the [Copy] button in the main window. (Alternatively, use the [Copy] command in the [Edit] menu or the <Ctrl> + <C> keys.)
The selected line block is copied to the clipboard.

(2) Pasting the copy of line block

The method of pasting the copy of the line block to the position shown in the following diagram is explained.

◊ Move the cursor to the line containing contact address “B0005” (normally closed contact), and left-click the mouse.

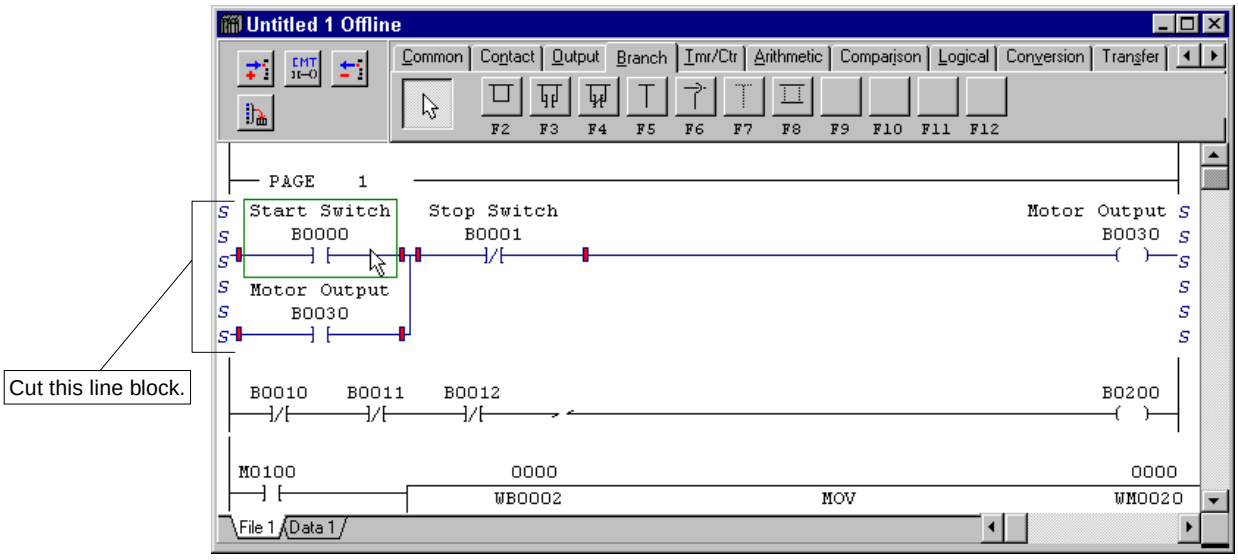
◊ Left-click the [Paste] button in the main window. (Alternatively, use the [Paste] command in the [Edit] menu or the <Ctrl> + <V> keys.)
As shown in the following diagram, the copy of the line block is inserted before the line block at the specified paste location.



2-4-3 Cutting and pasting line block (move)

Here, the method of cutting a selected line block, copying it to the clipboard, and pasting it to some other location is explained.

(1) Cutting a line block



◊ Select a line block to be cut.
(For the method of selecting a line block, refer to “2-4-1.”)

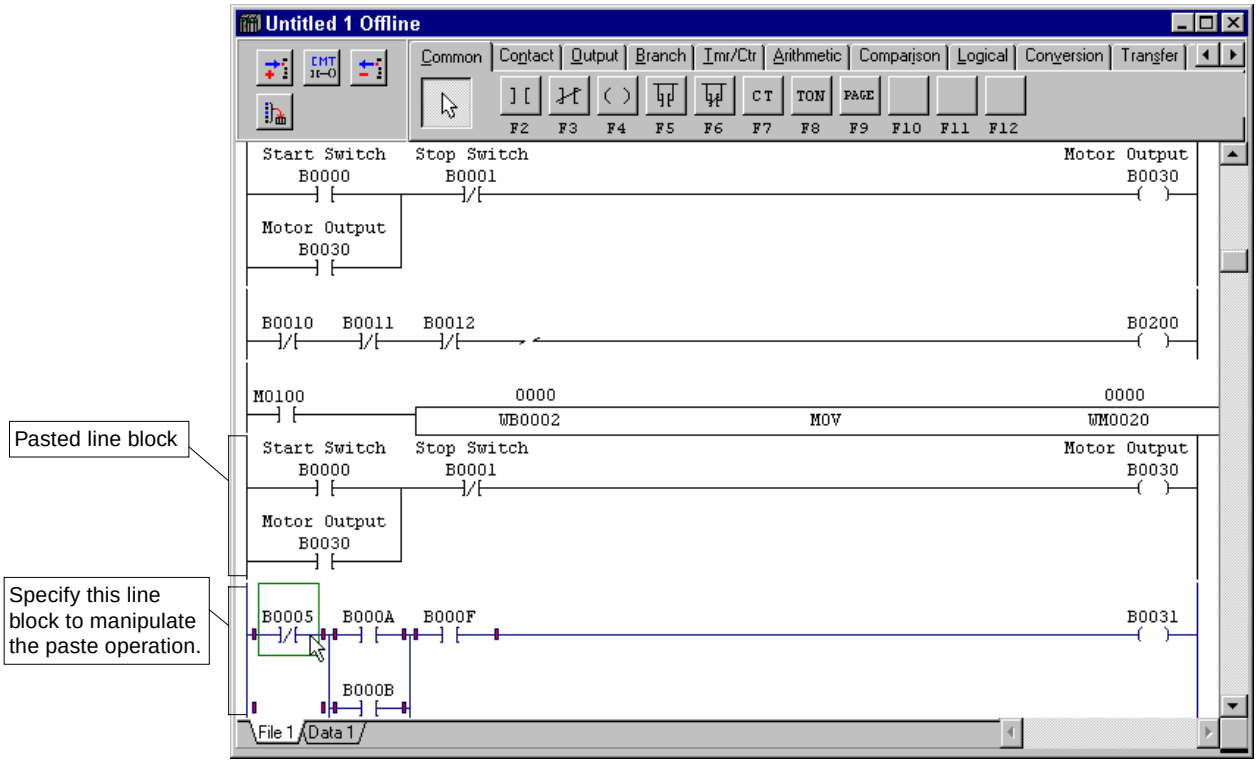
◊ Left-click the [Cut] button in the main window. (Alternatively, use the [Cut] command in the [Edit] menu or the <Ctrl> + <X> keys.)
The selected line block is copied to the clipboard, and the line block in the program window is deleted.

(2) Pasting the cut line block

The method of pasting the cut line block to the location shown in the following diagram is explained.

◊ Move the cursor to the line containing contact address “B0005” (normally closed contact) and left-click the line.

◊ Left-click the [Paste] button in the main window. (Alternatively, use the [Paste] command in the [Edit] menu or the <Ctrl> + <V> keys.)
As shown in the following diagram, the cut line block is inserted before the line block at the specified paste location.

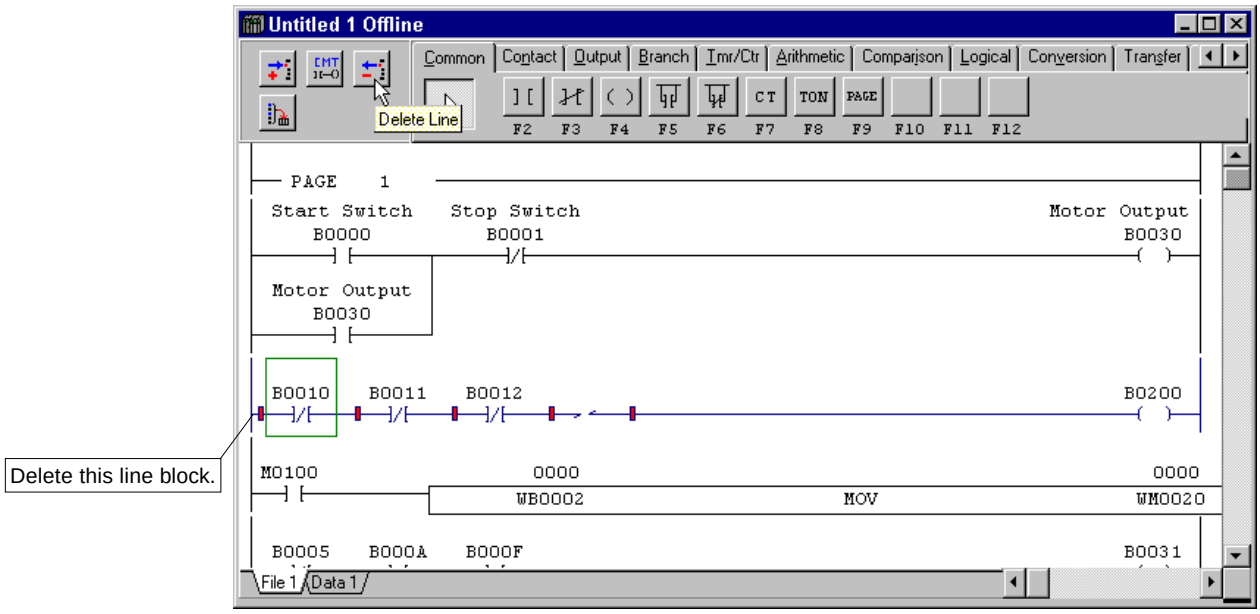


2-4 Line Copy/Insert/Delete

2-4-4 Deleting a line block

Here, the method of deleting a selected line block is explained.

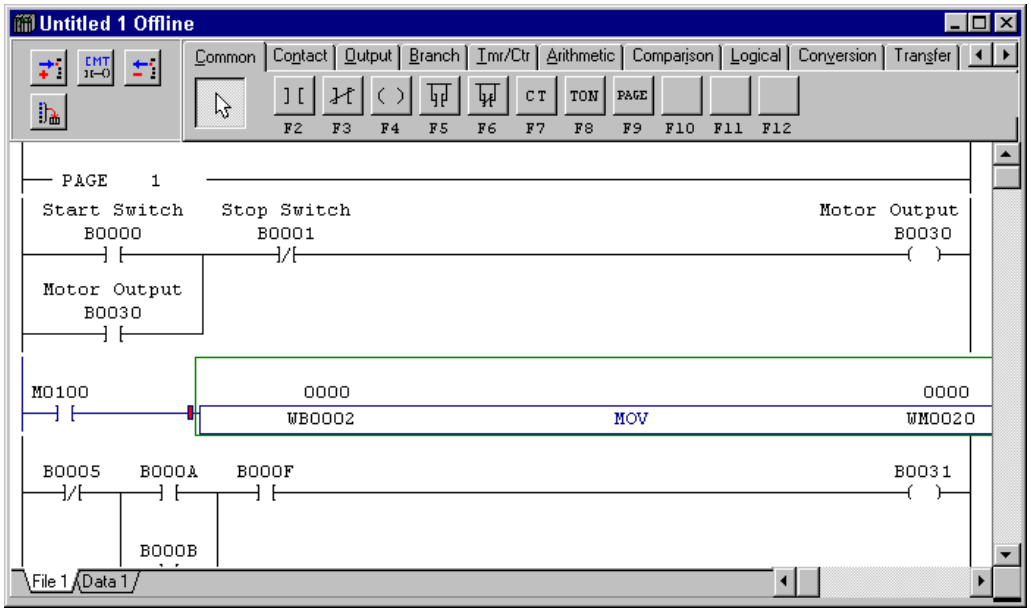
(1) Deleting a single line block



◊ Move the cursor to the line block to be deleted and left-click the line block.

◊ Left-click the [Delete Line] button on the [Edit Line] tool bar.

The selected line block is deleted.



(2) Deleting two or more line blocks at a time

For the method of deleting two or more line blocks at a time, refer to “2-4-3 Cutting line blocks.”

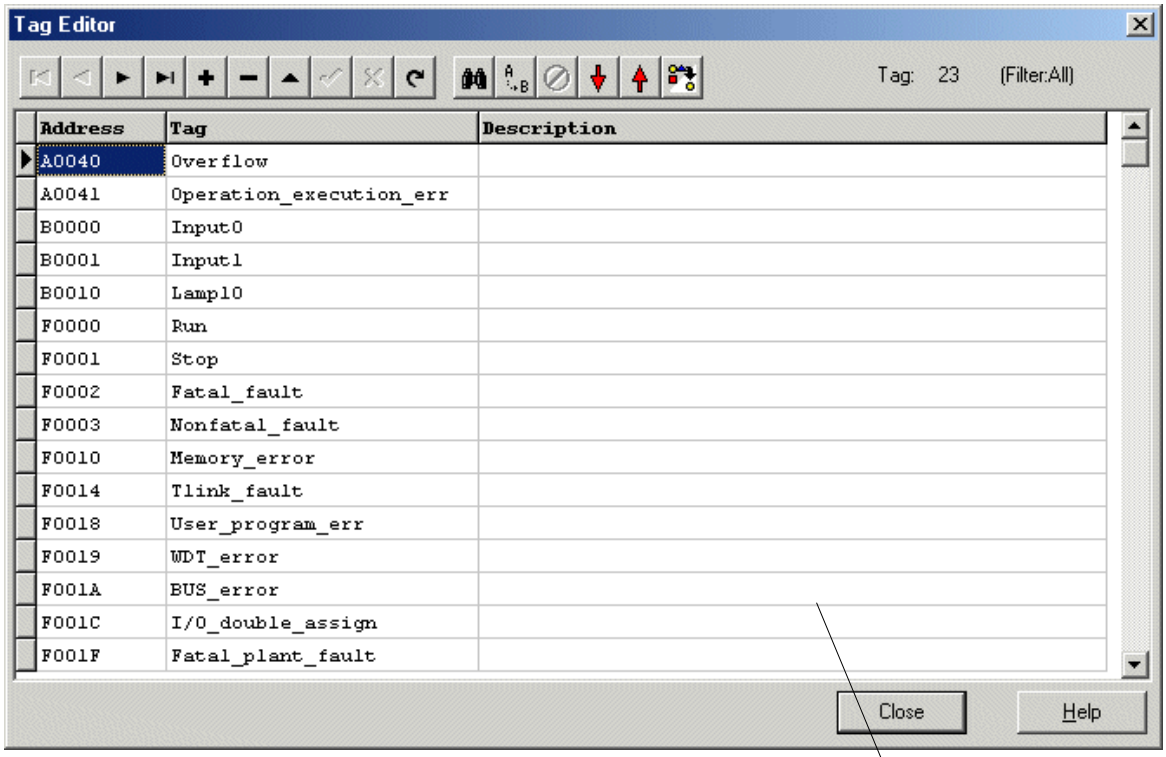
There are two methods for preparing tags. One is using the {Tag Editor} dialog box that is displayed after the entry of an instruction address during program editing. The other is using the {Tag Editor} window explained below.

2-5-1 Outline of Tag Editor

The {Tag Editor} is capable of directly editing address/tag data bases. This editor can be used only when the program window is in the Edit mode.

<Getting the Tag Editor to be displayed>

◊ Left-click the [Tag Editor] button or select the [Edit Tag] command from the [Auxiliary Functions] menu in the main window.
The {Tag Editor} window is displayed.



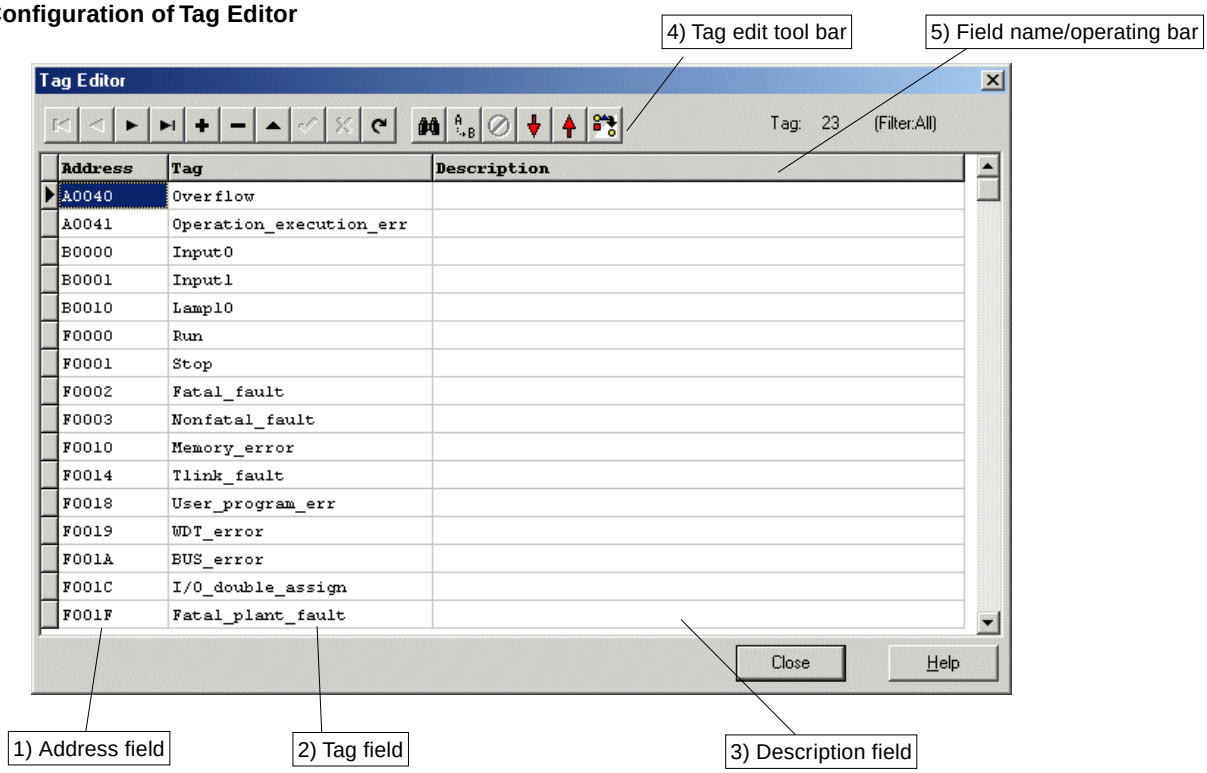
{Tag Editor} window in initial state

2-5 Tag Editor

2-5-2 Operation with Tag Editor

Here, the controls and fields on the tag Editor and the method of editing records (contents of records) are explained.

(1) Configuration of Tag Editor



1) Address field

"Addresses" of the PC memory are described in this field. Describe "addresses" within the PC memory capacity.

2) Tag field

"Tags" are described in this field. Each tag must be within 24 characters in length. The quotation marks (" and '), comma (,), and period (.) cannot be used in tag names. Any tag name must not consist entirely of numeric characters. It must not be the associated address either. The same tag name cannot be set for different addresses.

3) Description field

"Descriptions" are described in this field. Each description must be within 50 characters in length. The comma (,) cannot be used in descriptions. Any commas in a description are automatically deleted when the description is added to the data base.

4) Tag edit tool bar

- [First record] Moves the cursor to the first record in the data base.
- [Prior record] Moves the cursor to the prior record in the data base.
- [Next record] Moves the cursor to the next record in the data base.
- [Last record] Moves the cursor to the last record in the data base.
- [Insert record] Inserts a blank record right in front of the record at which the cursor is positioned.
- [Delete record] Deletes the record at which the cursor is positioned. Before the record is deleted, the {Confirm} dialog box is displayed.
- [Edit record] Sets the record at which the cursor is positioned in the Edit mode to enable the record to be edited.

[Post edit] Registers the record that is being edited. The record is registered after it is confirmed that the record contains both an address and a tag, that the address format is valid, and that there is no tag duplication.

[Cancel edit] Cancels the Edit mode and resets the record in the pre-edit state.

[Refresh data] Refreshes the record displayed from the data base.

[Find] Searches for an address or a tag from database.

[Replace] Replaces a tag or explanation of database.

[Forward/Replace] Executes search and replace above and then perform Forward/Replace.

[Backward/Replace] Executes search and replace above and then perform Backward/Replace.

[Filter] Used to limit the tags to be displayed and edited using the address identifier.

5) Field name/operating bar

Displays field names. It also has the following functions.

<Changing field width>

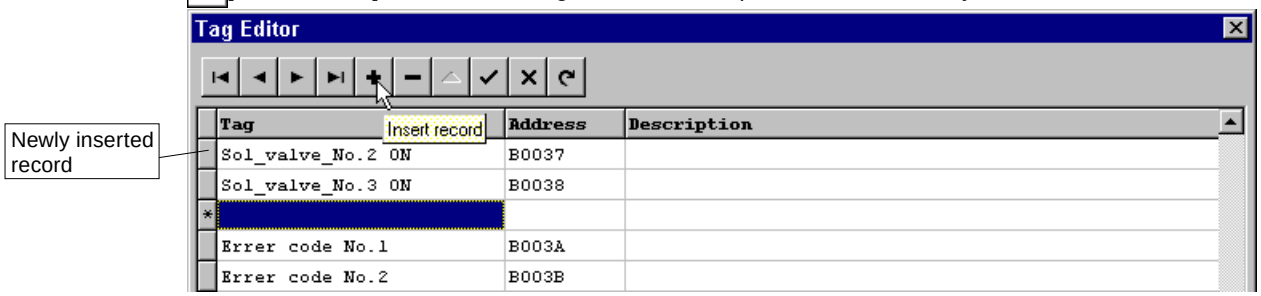
To change the field width, move the cursor to any of the boundary lines between Address, Tag, and Description, and shift it right or left with the left button of the mouse kept pushed.

<Changing order of display of fields>

Move the cursor into any of the frames of Address, Tag, and Description, and shift the frame right or left with the left button of the mouse kept pushed.

(2) Inserting a new tag

◊ Left-click the [+] [Insert record] button on the tag edit tool bar or push the <Insert> key. A blank record is inserted.



◊ Enter addresses, tags, and descriptions.

The <Tab> key can be used to shift from the address to the tag to the description. The entry of a description may be omitted. However, be sure to enter an address and a tag before the record is registered in the data base. Each time a new record is registered, the records in the data base are automatically sorted (rearranged) in order of address.

2-5-3 Importing tag text file

A text file (file extension: *.txt or *.csv) prepared by a word processor, data base application program, etc. can be imported as tag data.

* CSV-format data
CSV (Comma Separated Value) refers to text data, each data item of which is separated by a comma (,).

(1) Text file format

For a text file to be input as tag data, it is necessary to describe each of its lines in the following format.

1) Text format

[Address],[Tag],[Description],[CR/LF]

- For [Address], describe a valid PC address (e.g., B0, B0010, M20, C15, etc.).
- For [Tag], describe a tag which does not exceed 24 characters in length.
  If it exceeds 24 characters in length, only 24 characters are input from the first character. A duplicate tag name is ignored.
- For [Description], the entry of a description may be omitted. When entered, the description must not exceed 50 characters in length.
- [CR/LF] refers to carriage return. Be sure to put a [CR/LF] at the end of each line.

A tag cannot be read on an address to which a tag has already been assigned.
Before loading a tag, delete the existing tag using a tag editor.

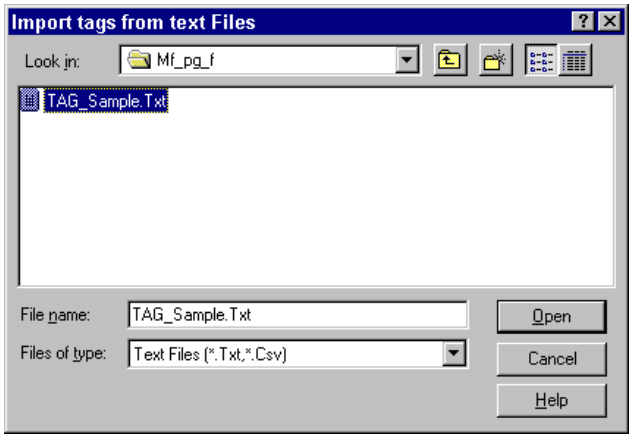
2) Example of description of text data

```
B003D,Errer code No.4,
B003E,Stop indicator ON,
B003F,Running indicator ON,
F0000,Firm exection,
F0001,firm OFF,
F0050,Init_Scan,Contact on for initial scan only
M0002,Coupling,
M0008,Punch,
M0009,Stoper board descent,
M000E,Hold board down,
M000F,Hold board up,
M003F,Plate detection support,
WB0040,Set up Data 1,Reception Data
```

An example of display on the program when the above text data is input as tag data is given later in “(3) Display of tag after input to file.”

(2) Importing text file

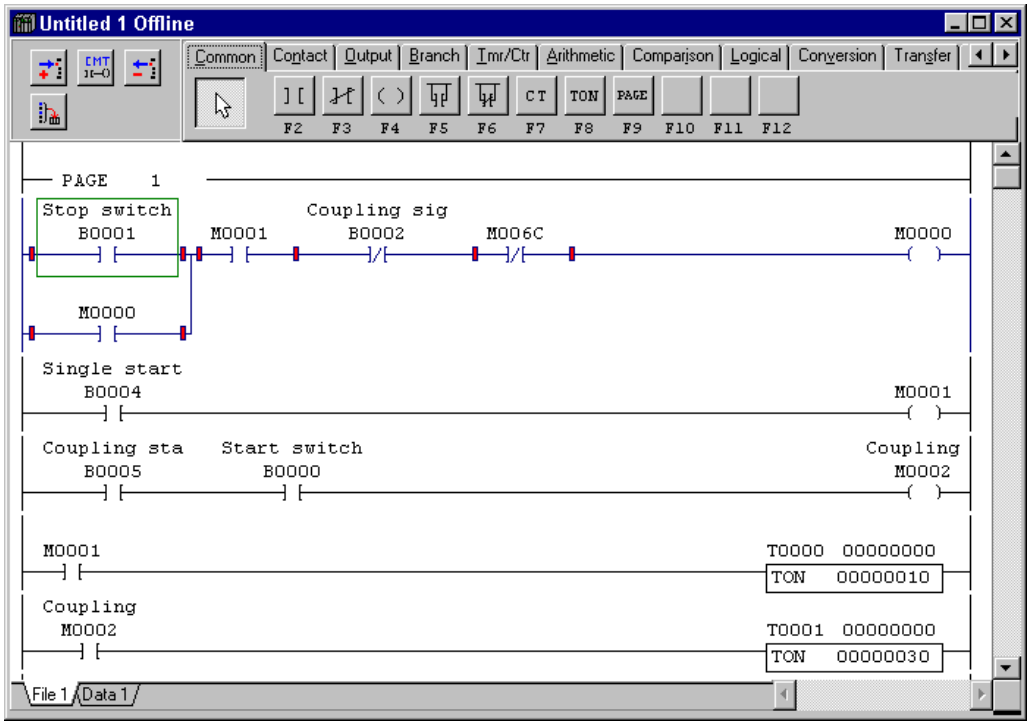
◊ Open the program (file) to which the text data is to be input.
◊ Select the [Import Tag File...] command of the [Documentation] from the [Auxiliary] menu.
The {Import Tags from text Files} dialog box is displayed.



◊ Select a drive and a folder to which the file is to be saved from the [Look in] list box.
◊ Select from or enter in the [File name] list box a text filename to be input.
◊ Left-click the [Open] button.
The text file (data) is input to the specified tag file.

(3) Display of tag after inporting text file

Tag imported from text file are immediately displayed in ladder display. (provided that “tag display” in editor setting in the environment setting session is valid).
An example of display is given below.



2-6 Find/Replace Functions

It is possible to retrieve or replace an instruction address and a tag in the program that is being displayed in the program window.

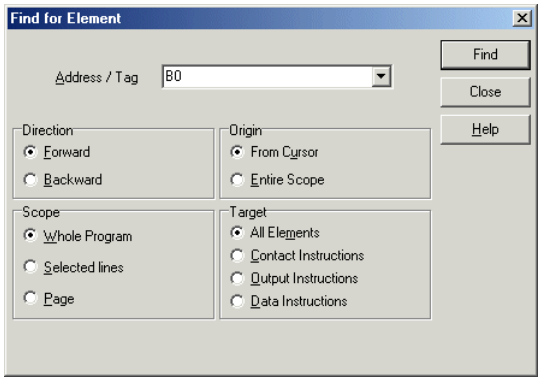
2-6-1 [Address/Tag] Find function

The method of retrieving an instruction address and a tag in the program being displayed in the program window is explained below.

(1) First retrieval

◊ Get the appropriate program to be displayed in the program window.

◊ Left-click the [Find] button or select the [Find] command from the [Search] menu.
The {Find for Element} dialog box is displayed.



◊ Enter an address or a tag name in the [Address/Tag] text box and left-click the [Find] button to start the search operation.
When the address (or tag name) is found, the associated line is displayed at the top of the screen. Since the dialog box remains the same, press the [Find] button for the next search. If it is not found, the message “Serch item not found” is displayed in the message box.
This find function searches for only a character string which completely coincides with the input character string.

<Explanation of the {Search} dialog box>

Direction:

Either “Forward” (search from the beginning of the scope of search toward the end) or “Backward” (search from the end of the scope of search toward the beginning) can be selected.

Origin:

This option specifies the starting point of search. As the starting point, either “Cursor position” or “Beginning of selected scope of search” can be specified.

Scope:

This option specifies the scope of search.

- Whole Program : This is the default, searching the entire program.
- Selected Lines : Only a previously selected line block is searched. For the method of selecting a particular line block, refer to “2-4-1 Selecting a line block.”
- Page : Only a specified page is searched. Enter a page number to be searched in the [Page Number] box.

Target:

This option specifies an instruction to be searched for.

- All Elements : All instructions are searched for.
- Contact Instructions : Only contact instructions are searched for (normally open contact and normally closed contact).
- Output Instructions : Only output instructions are searched for (normal Output/Set/Reset/Rising Differentiation Output/ Falling Differentiation Output/Step Control/Master Control/Timer/Counter instructions).
- Data Instructions : All instructions, other than the contact instructions and output instructions shown above, are searched for.

(2) Succeeding search

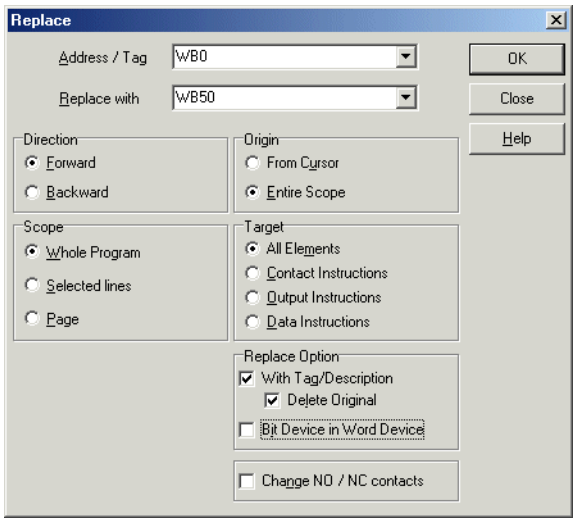
This item is used, after searching for an address or a tag name using the [Search] command explained in {(1) First search}, to search for the same address or tag name.The search options that have been selected in the [Search] command remain valid. The search operation is started from the last address or tag name that has been found.

◊ By selecting the [Search Next] command from the [Search] menu, it is possible to continue the search operation.

2-6-2 [Address/Tag] Replace function

The method of searching for an instruction address and a tag name in the program being displayed in the program window and replacing them with any specified character strings is explained below.
The Replace function can be used only when the program window is in the Edit mode.

◊ Get the appropriate program to be displayed in the program window.
◊ Left-click the [Edit] button or select the [Edit Mode] command from the [Edit] menu. The program window enters the Edit mode.
◊ Select the [Replace] command from the [Search] menu.
The {Replace} dialog box is displayed.



◊ Enter the address or tag to be replaced in the [Address/Tag] text box.
◊ Enter the new replacement address or tag in the [Replace with] text box.

Consecutive addresses can be specified as the Origin address for Replace, like "B10-B-2F."
Specify only the starting address as the Target address for Replace.

◊ Left-click the [OK] button to start the replace operation.
When the replace operation is completed, the {Information} dialog box is displayed and the number of replaced addresses or tags is displayed.

<Explanation of the {Replace} dialog box>

Items related to search:

For the explanation of the search options (direction, scope, origin, target), refer to “2-6-1 [Address/Tag] Search function.”

2-6 Find/Replace Functions

Replace option :

This item is effective only when the entire program is to be searched for.
When [With Tag/Description(G)] is selected, the tag is changed at the same time as the address. The tag name of the address before replacement remains the same.
When [Delete Original(L)] is selected, the tag name of the address before replacement is deleted.

<Example of simultaneous tag change>

When replacing address WB0 with WB50, processing is performed as follows:

(Before replacement)

Address	Tag
WB0	Analog 0CH
WB50	Reserved

This tag is changed

Delete Original not selected

(After replacement)

Address	Tag
WB0	Analog 0CH
WB50	Analog 0CH

Delete Original selected

Address	Tag
WB0	
WB50	Analog 0CH

Deleted

When [Bit Device in Word Device(I)] is selected, the bit addresses corresponding to the changed word address are changed simultaneously.

Change NO/NC Contacts:

This option replaces all NO and NC contacts of specific addresses in the specified scope. When this option box is checked, the [Replace] text box is hidden. Here, enter the address in the [Address/Tag] text box. All instructions of NO and NC contacts are replaced.

Key-point

Address replacement
All specific addresses in a specified scope are replaced with different addresses. Enter the address to be replaced in the [Address/Tag] text box, and enter the replacement address in the [Replace with] text box. A bit address can be only replaced with another bit address, and a word address can be only replaced with another word address. As the bit address/word address to be replaced, either an address or a tag may be entered. During the replace operation, the system checks whether or not the replacement address can be used for the instruction to be executed. If the replacement address cannot be used, the replace operation is not performed.

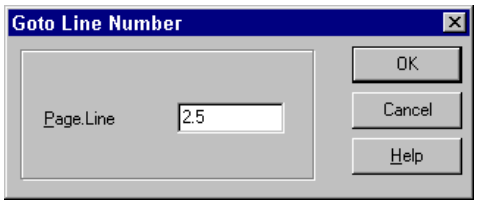
- Bit address → Bit address
- Word address → Word address
- Tag → Address (bit/word)
- Address (bit/word) → Tag

- Bit address ✗→ Word address
- Word address ✗→ Bit address

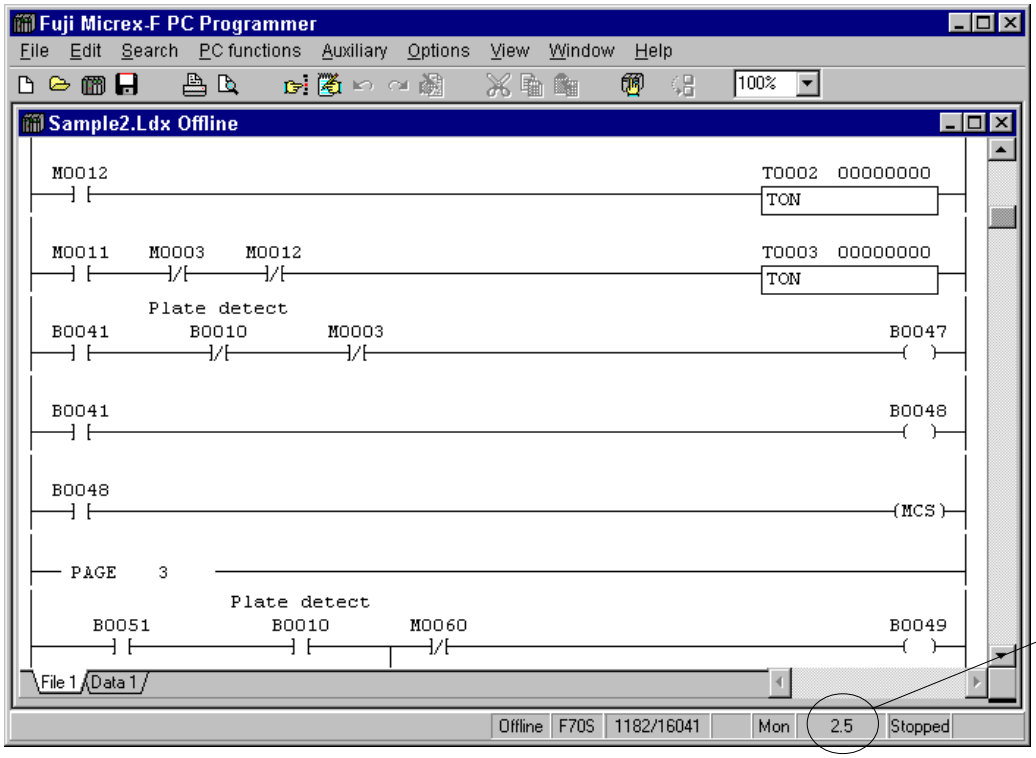
2-6-3 Line Search function

This function searches for the program of any specified line number and displays it at the top of the screen.

◊ Select the [Go to Line Number...] command from the [Search] menu.
The {Go to Line Number} dialog box is displayed.



◊ Enter the line number to be searched for in the [Page.Line] text box.
◊ Left-click the [OK] button.
The specified line is displayed at the top of the screen.



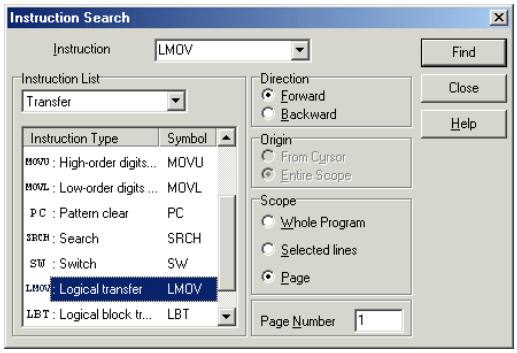
2-6 Find/Replace Functions

2-6-4 Instruction Search function

The following explains the procedure for searching for an instruction in the program currently displayed in the program window.

◊ Display the program to be searched for in the window.

◊ Select the [Instruction Search...] from the [Search] menu.
The {Instruction Search} dialog box is displayed.



◊ Select an instruction group with [Instruction List], select an instruction ([LMOV] in the example above), then left-click the [Find] button to start search.
If the instruction is found, the line is displayed at the top of the screen. Since the dialog box remains the same, left-click the [Find] button again to search for the following instruction.
If it is not found, the [Not Found] message box is displayed.

<Explanation of Search dialog box>

{Direction}, {Origin}, and {Scope} are the same as those in 2-6-1, “Address/tag search function.”

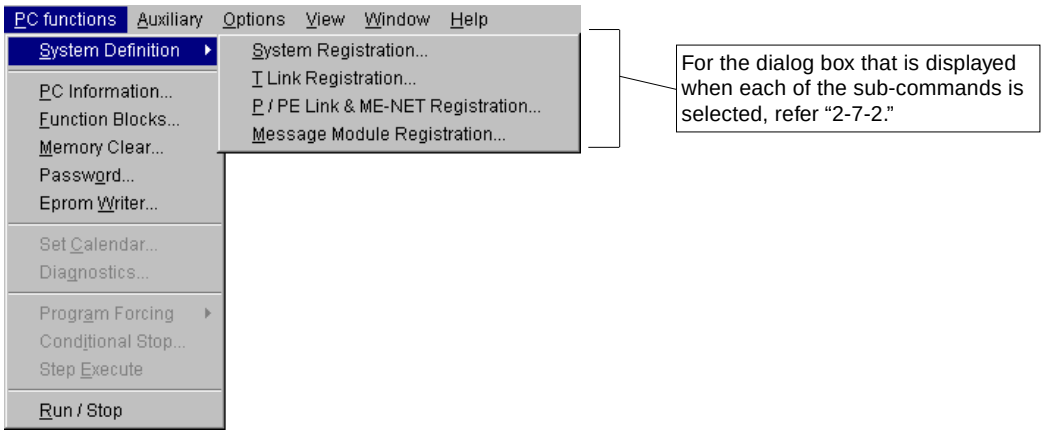
System definition is unnecessary as long as the MICREX-F series is used as it is. It is necessary whenever the system is expanded (with P/PE link, direct access, protection against system failure, etc.).

In this manual, the method of display of each of the dialog boxs for system definition and the method of operation in each dialog box are explained.
For a detailed explanation of system definition, refer to the “User’s Manual <Instructions>.”

2-7-1 Display of dialog box in system definition

Here, the method of display of the dialog box for system definition is explained.
System definitions are registered in the program file. Therefore, it is necessary first to open the program (file) for system definition.

◊ Open the program (file).
◊ Select the [Define System] command from the [PC Functions] menu.
The following four sub-commands are displayed.



◊ Select the appropriate sub-command.

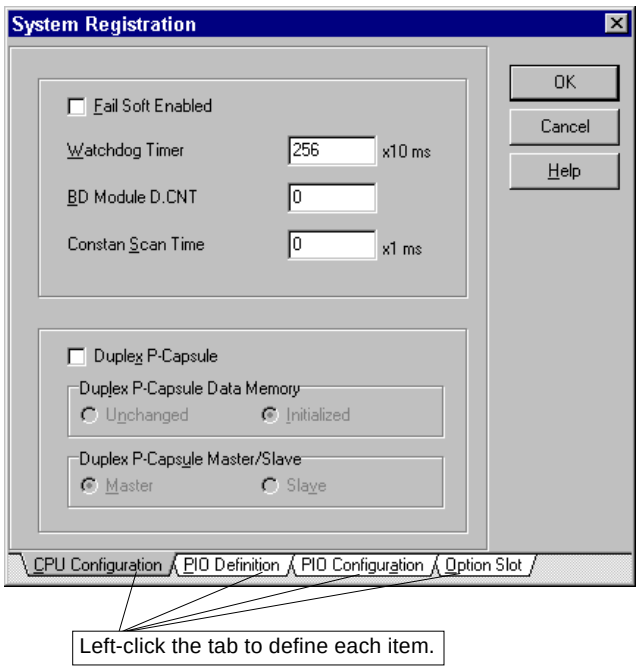
2-7 System Definition

2-7-2 Operation in system definition dialog box

There are roughly four types of dialog box which are provided for system definition. Here, the method of operation in each of those dialog box is explained, together with an example of display of each dialog box.

(1) System Registration dialog box

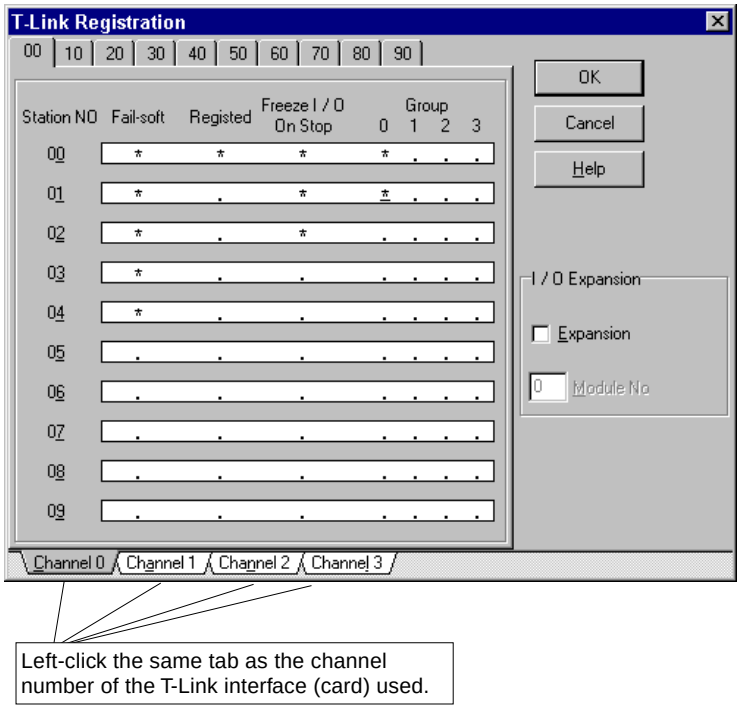
This is a dialog box for defining operations of the entire PC system, processor, and modules of the base board on which the processor is mounted (direct access, etc.) the appropriate tab.



(2) T-Link Registration dialog box

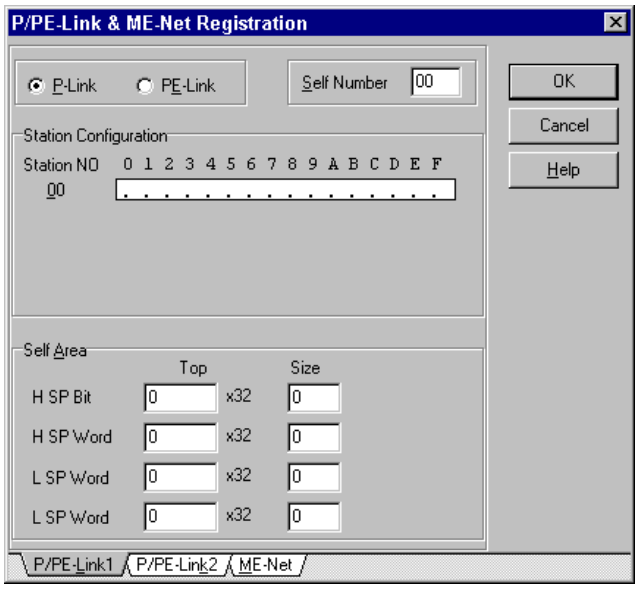
This is a dialog box for defining operations of the individual devices that are connected to the T-Link.

◊ Left-click the appropriate items.



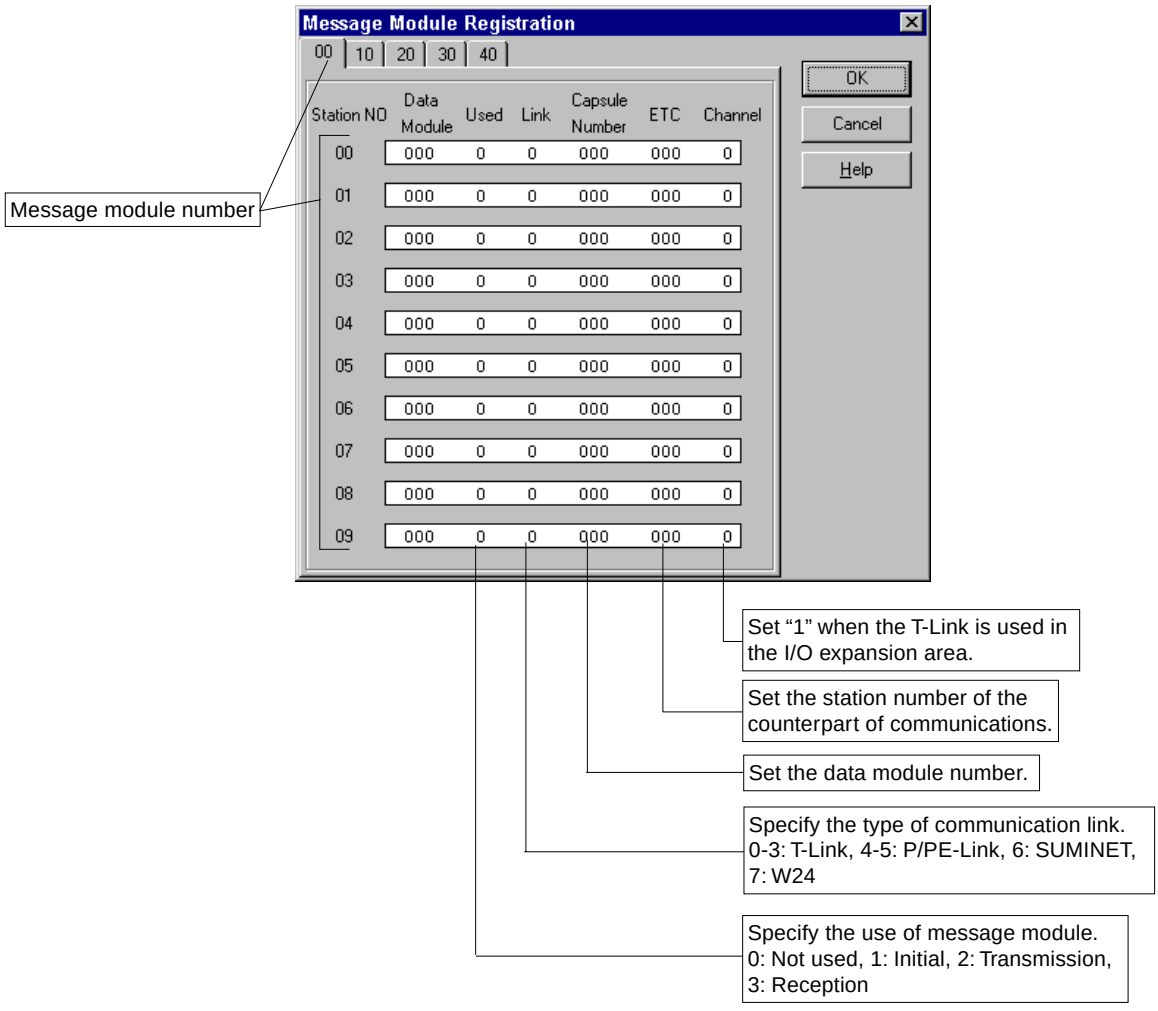
(3) P/PE-Link & ME-NET Registration dialog box

This is a dialog box for defining a P/PE-Link and ME-Net interface module (card).



(4) Message Module Registration dialog box

This is a dialog box for defining message communications.



2-8 Program Save/Open

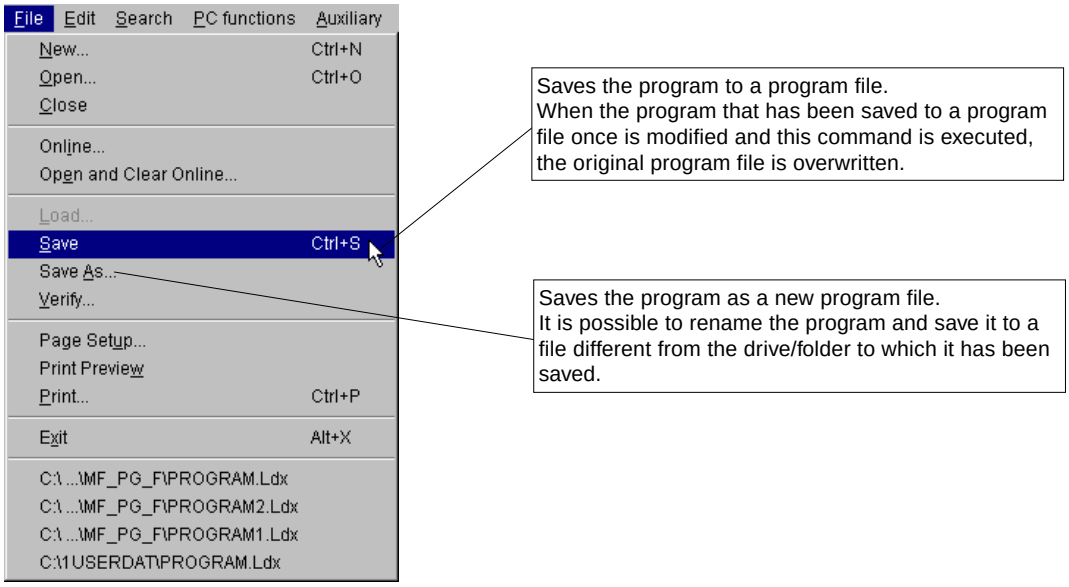
Here, the method of saving a program which is being prepared and the method of opening a program which has been saved are explained.

2-8-1 Saving a program

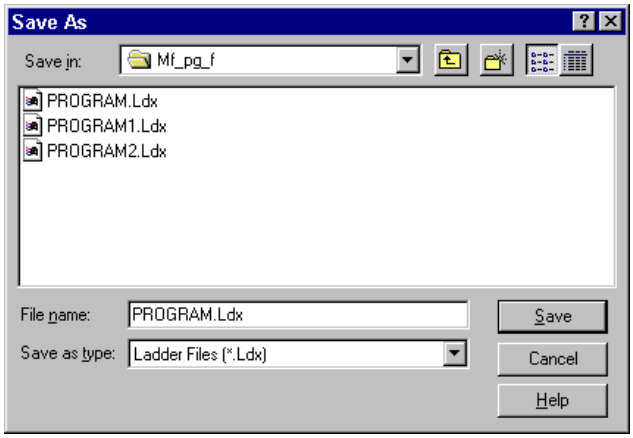
The method of saving a program which is being prepared (the content of the active program window) is explained below.

(1) Saving a program to a file

◊ Select the [File] menu.
The following commands are displayed.



◊ Select the [Save As...] command.
The {Save As} dialog box is displayed.



◊ Select a drive/folder to which the program is to be saved from the [Save in] list box or create a new folder.
◊ Enter the file name to which the program is to be saved in the [File name] text box.
◊ Left-click the [OK] button.
The program is saved as a new file.

(2) Contents of file during program save

When a program is saved in a file, the following contents are saved at the same time.

- **To save in ladder file (.Ldx) format:**

<* .LDX file>

- Information about the PC model
- System definitions
- Ladder program

<* .TAG file>

- Address/tag name and descriptive statement

<* .CCT file>

- Line comment (text statement only; the instruction that points to the position of display of line comment is saved in "* .LDX file."

<* .CFG file>

- Configuration file (print environment setting, etc.)

- **To save in D25P loader file (.Pgs) format:**

<*.PGS file>

- To save in D25P loader file (.Pgs) format:Information about the PC model
- System definition
- Ladder program

<*.CMM file>

- Comment files management file

<*.C?? file>

- Comment files with the following identifiers

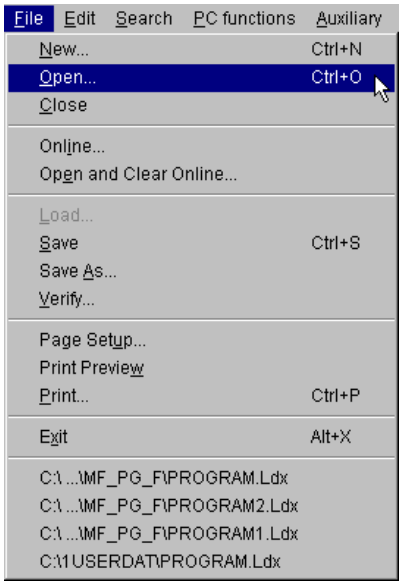
Identifier	Description
.CMM	Comment files management file
.CB1	Comment file with B identifier
.CM1	Comment file with M identifier
.CK1	Comment file with K identifier
.CT1	Comment file with T identifier
.CC1	Comment file with C identifier
.CD1	Comment file with D identifier
.CF1	Comment file with F identifier
.CA1	Comment file with A identifier
.CL1	Comment file with L identifier
.CS1	Comment file with S identifier
.CBW	Comment file with WB identifier
.CMW	Comment file with WM identifier
.CKW	Comment file with WK identifier
.CFW	Comment file with WF identifier
.CAW	Comment file with WM identifier
.CLW	Comment file with WL identifier
.CSW	Comment file with WS identifier
.CST	Comment file with TS identifier
.CRT	Comment file with TR identifier
.CSC	Comment file with CS identifier
.CRC	Comment file with CR identifier
.CDB	Comment file with BD identifier

2-8 Program Save/Open

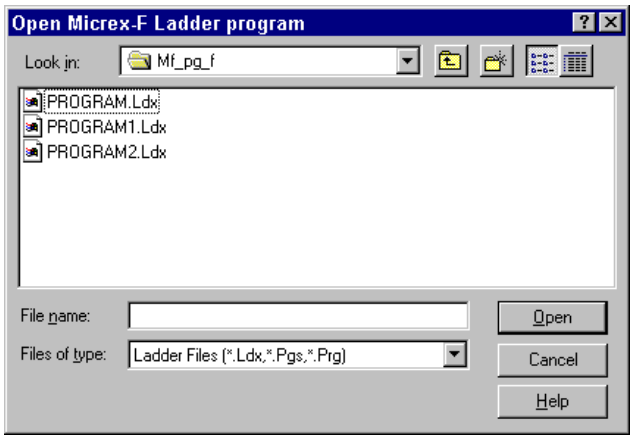
2-8-2 Opening a program file

The method of opening a program file which has been saved is explained below.

◊ Select the [File] menu.
The following commands are displayed.



◊ Select the [Open...] command.
The {Open Micrex-F Ladder Program} dialog box is displayed.

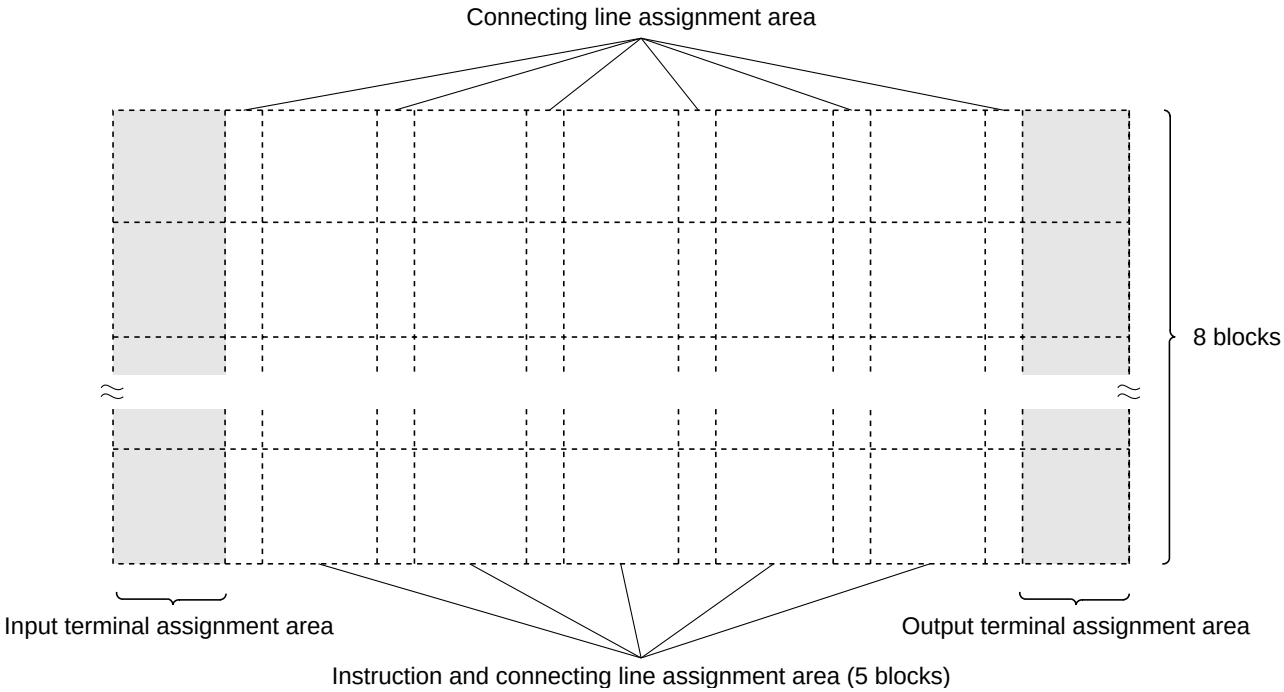


◊ Select the drive/folder to which the program file has been saved from the [Look in] list box.
◊ Select or enter the saved file name in the [File name] text box.
◊ Left-click the [Open] button.
The program file is displayed in the window.

The following explains editing of the block diagram.

2-9-1 Edit area in block diagram

The edit area for a single line in the block diagram is shown below. Inputs, outputs, and instructions, etc. are assigned to this area.



Input terminal assignment area: Only [Block diagram input] can be assigned.

Output terminal assignment area: Only [Block diagram output] and [Output] can be assigned.

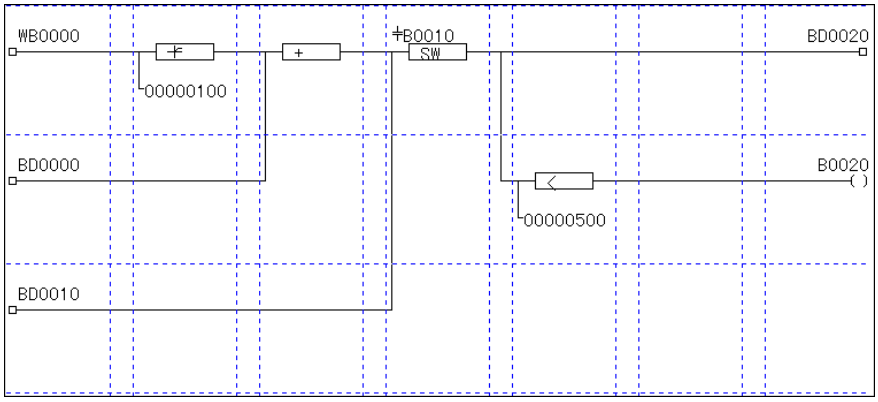
Connecting line assignment area: Only [Vertical connection], [Jump], and [Path] can be assigned.

Instruction/connecting line assignment area: Instructions and connecting lines can be assigned.

2-9 Block Diagram Instruction

2-9-2 Example of editing of block diagram

The following explains the procedure for creating a block diagram using the following line as an example.
In this case, the tag input is omitted.

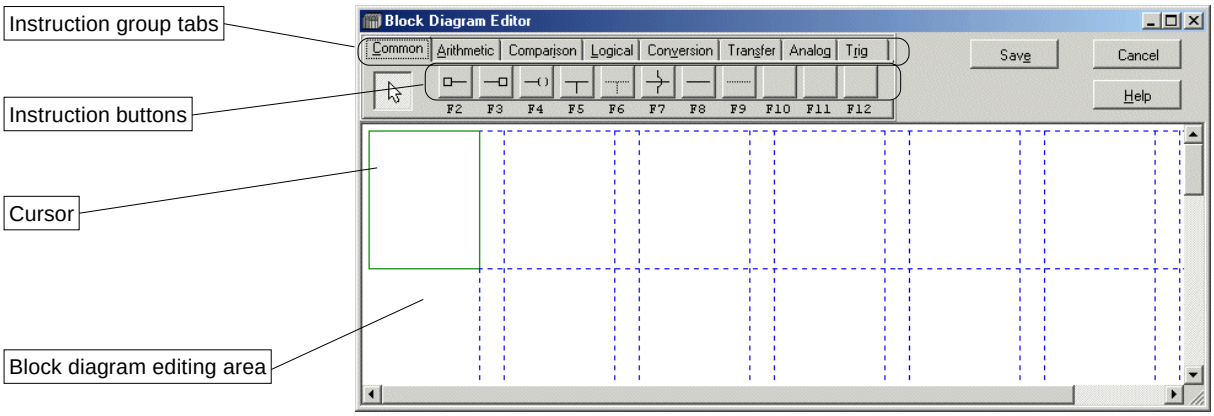


<Program description>

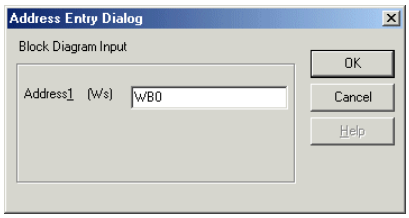
1) Data input from WB0 is limited to 100.
2) Data of 1) and data of BD0 are added.
3) SW of B10 is ON: The result of 2) is output to BD20 and used as an input of a comparison instruction.
   SW of B10 is OFF: The contents of BD10 is output to BD20 and used as an input of a comparison instruction.
4) If the result of 3) is smaller than 500, B20 is turned ON; otherwise, B20 is turned OFF.

<Example of operation>

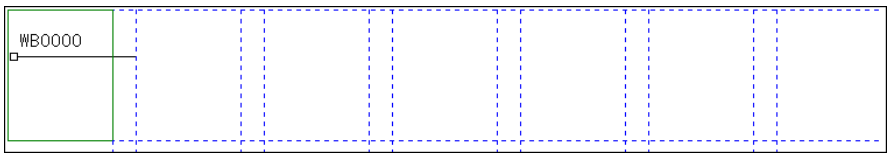
◊ Select [Insert Block Diagram] from the [Edit] menu.
The “Block Diagram Editor” window is displayed.



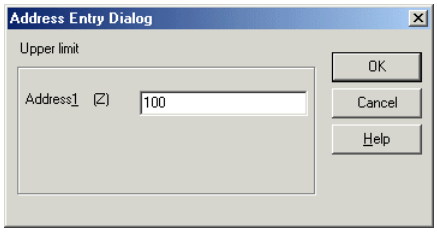
◊ Basically, input a program from the left to right, from the top downward.
Left-click [Input block diagram] from the [Common] tab.
◊ Move the cursor to the upper left portion in the block diagram and then left-click it.
The {Address Entry Dialog} box is displayed.
Input <WB0> for {Address1} and then left-click the [OK] button.



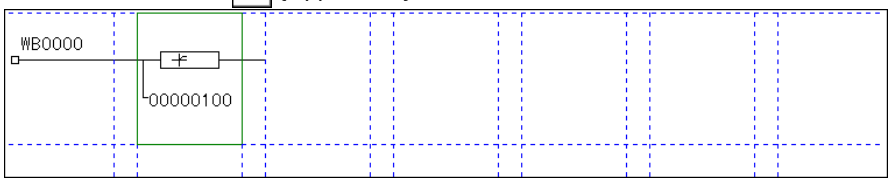
◊ As shown below, block diagram input {WB0} is displayed.



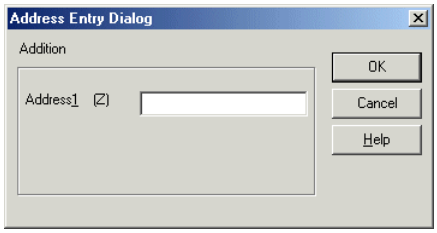
◊ Left-click the [Upper limit] button of the [Analog] tab.
◊ Move the cursor to the right of {Block diagram input} and then left-click it.
The {Address Entry Dialog} box is displayed.
Input <100> in {Address1} and then left-click the [OK] button.



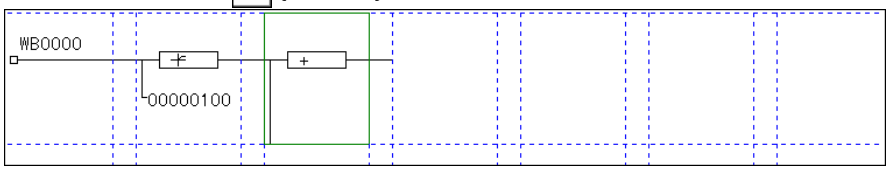
◊ As shown below, the {Upper limit} instruction is connected.



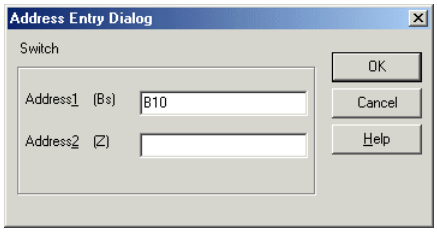
◊ Left-click the [Addition] button of the [Arithmetic] tab.
◊ Move the cursor to the right of the {Upper limit} instruction and then left-click it.
The {Address Entry Dialog} box is displayed. The address will be input later when connecting {Block diagram input}.
In this case, left-click the [OK] button without inputting any data.



◊ As shown below, the {Addition} instruction is connected.

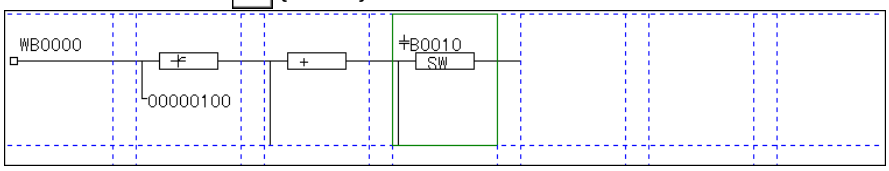


◊ Left-click the [Switch] button of the [Transfer] tab.
◊ Move the cursor to the right of the {Addition} instruction and then left-click it.
The {Address Entry Dialog} box is displayed.
Input <B10> in {Address1}, leave {Address 2} blank (it will be input later) and then left-click the [OK] button.

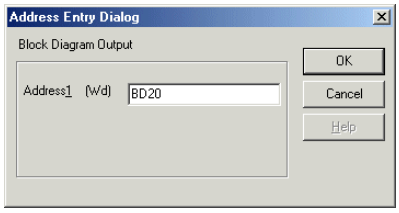


2-9 Block Diagram Instruction

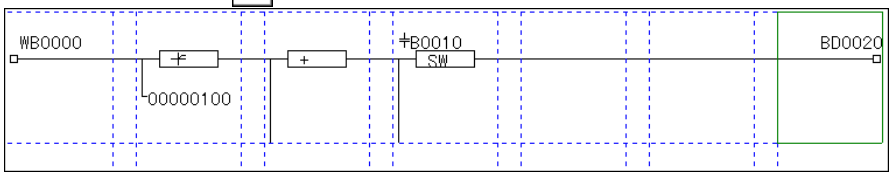
◊ As shown below, the [SW] {Switch} instruction is connected.



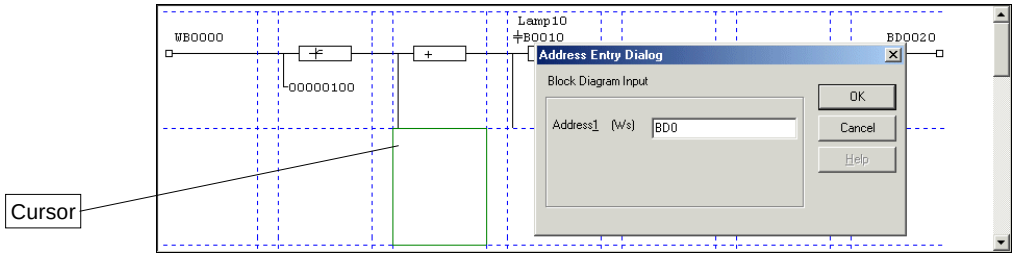
◊ Left-click the [—□] [Block diagram output] button of the [Common] tab.
◊ Move the cursor to the right of the {SW} instruction and then left-click it.
The {Address Entry Dialog} box is displayed.
Input <BD20> in {Address1} and then left-click the [OK] button.



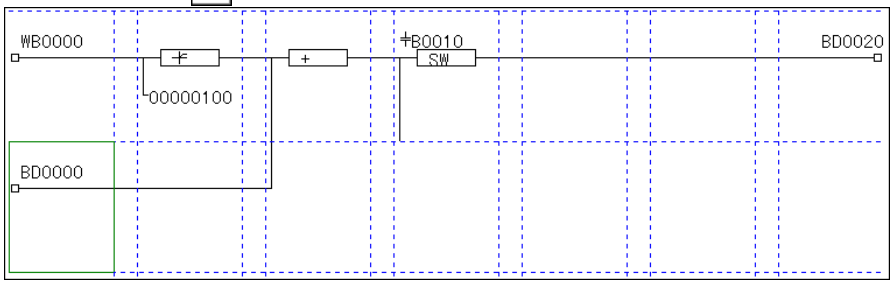
◊ As shown below, the [—□] {Block diagram output} is connected.



◊ Connect the {Block diagram input} for the {Addition} instruction.
Left-click the [□—] [Block diagram input] button.
◊ Move the cursor below the {Addition} instruction and then left-click it.
The {Address Entry Dialog} box is displayed.
Input <BD0> in {Address1} and then left-click the [OK] button.

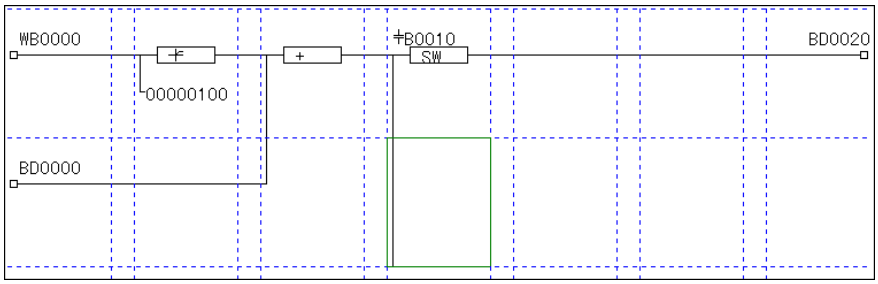


◊ As shown below, [□—] {Block diagram input} is connected to the {Addition} instruction.

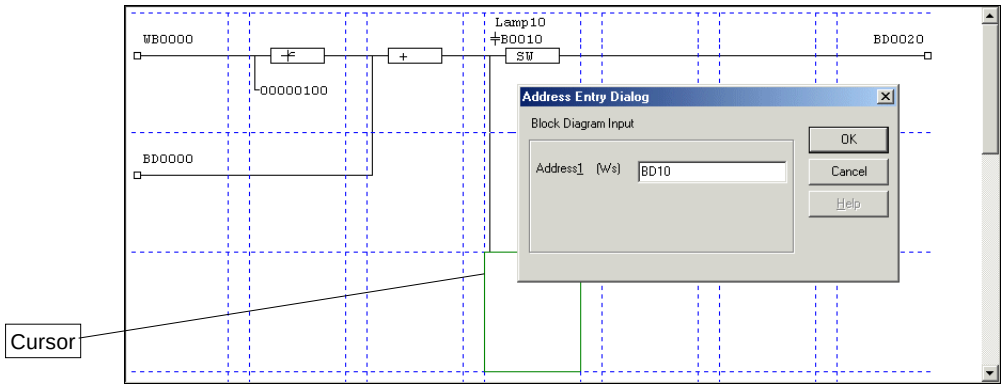


◊ Extend the vertical connecting line of {SW}.
Left-click the [┬] [Vertical connection] button.

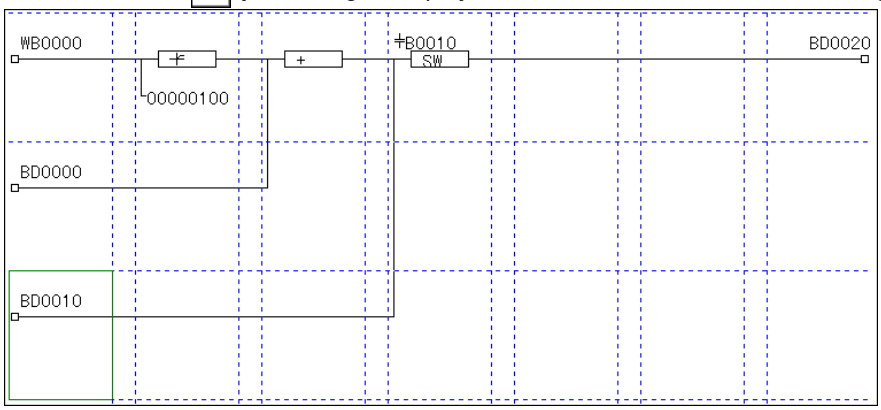
◊ Move the cursor below the {SW} instruction.
A vertical connecting line is connected.



◊ Connect {Block diagram input} to the vertical connecting line.
Left-click the [Block diagram input] button.
◊ Move the cursor below the vertical connecting line and then left-click it.
The {Address Entry Dialog} box is displayed.
Input <BD10> in {Address1} and then left-click the [OK] button.

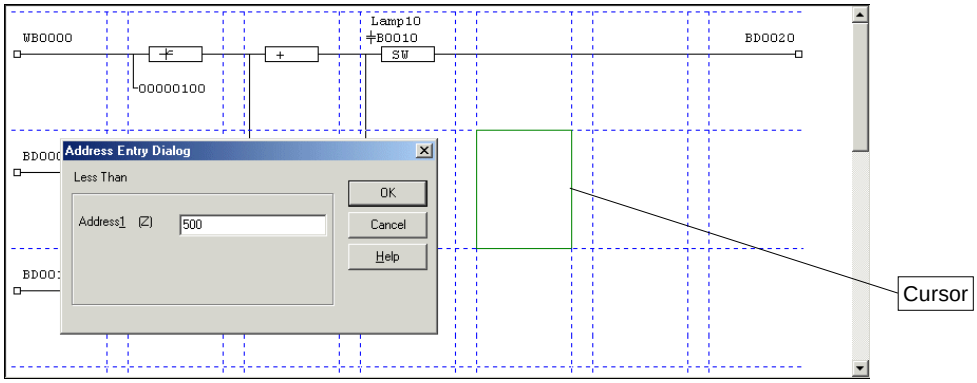


◊ As shown below, {Block diagram input} is connected to the vertical connecting line.

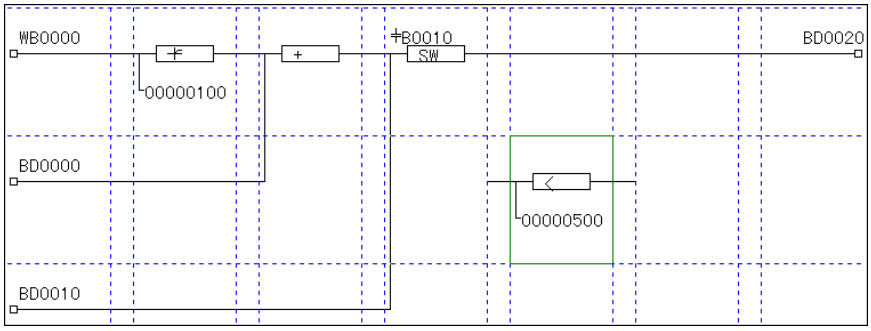


2-9 Block Diagram Instruction

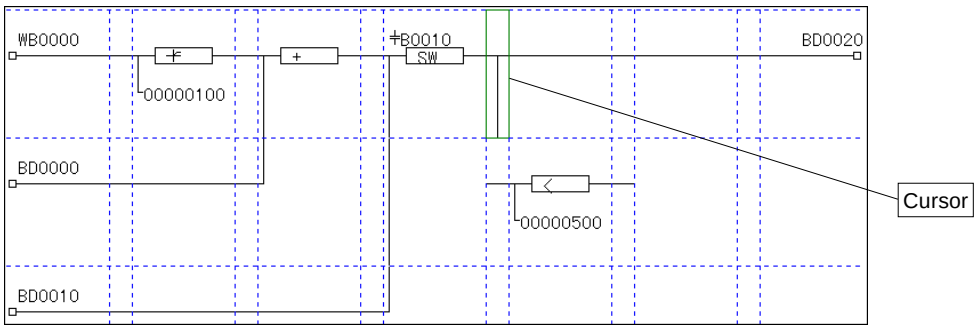
◊ Place the {Comparison} instruction.
Left-click the [<] [Comparison result is smaller] button of the [Comparison(I)] tab.
◊ Move the cursor to the bottom right portion of the {SW} instruction.
The {Address Entry Dialog} box is displayed.
Input <500> in {Address1} and then left-click the [OK] button.



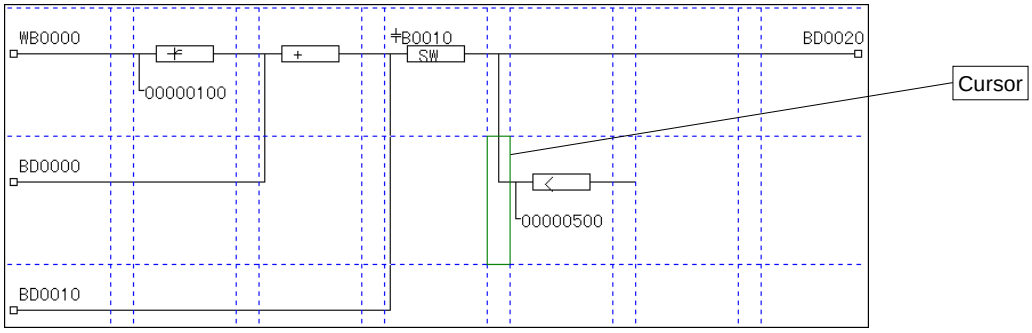
◊ The {Comparison} instruction is displayed as shown below.



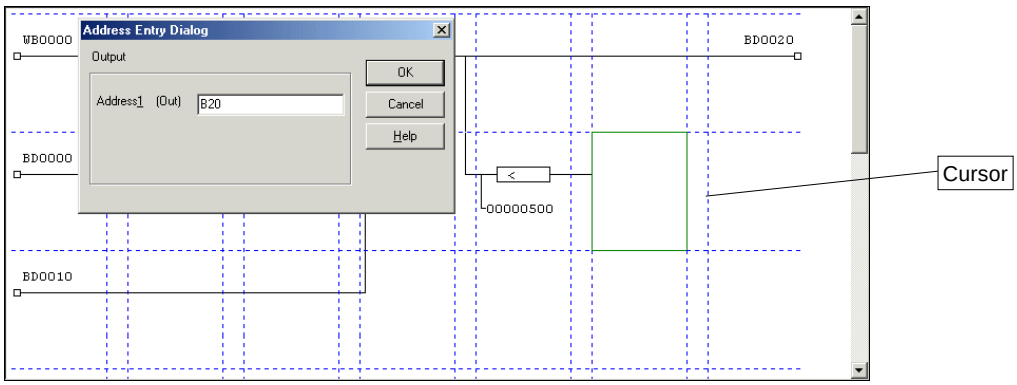
◊ Connect the output of the {SW} instruction and the input of the {Comparison} instruction.
Left-click the [⊤] [Vertical connection] button of the [Common(C)] tab.
◊ Move the cursor to the {Vertical connection assignment area} to the right of the {SW} instruction. A vertical connecting line is connected.



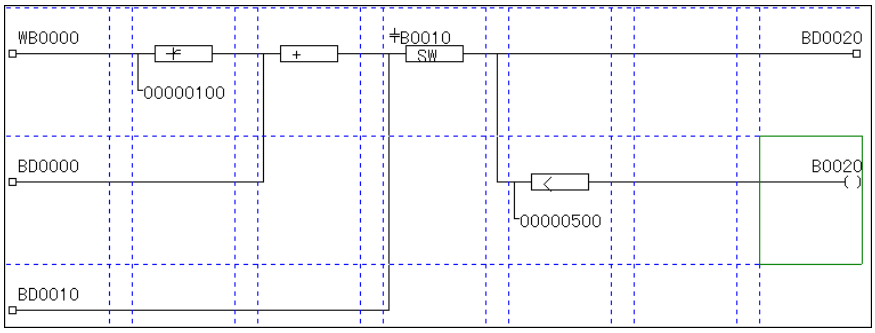
◊ Left-click the [⊤] [Vertical connection] button again.
◊ Move the cursor below the vertical connecting line and then left-click it.
As shown below, a vertical connecting line and the input of the {SW} instruction are connected.



◊ Left-click the [Output] button.
◊ Move the cursor to the right of the {Comparison} instruction and then left-click it.
The {Address Entry Dialog} box is displayed.
Input <B20> in {Address1} and then left-click the [OK] button.



◊ As shown below, {Output} is connected to the output of the {Comparison} instruction.



◊ Left-click the [Save] button. The {Block Diagram Editor} window closes.
The block diagram created is inserted into the Ladder edit screen.

If the [Save] button is left-clicked before completing creation of a line, an error results. In this case, the edit screen cannot be closed.

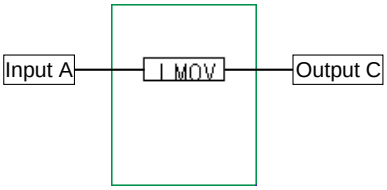
2-9 Block Diagram Instruction

2-9-3 Notes on editing block diagram

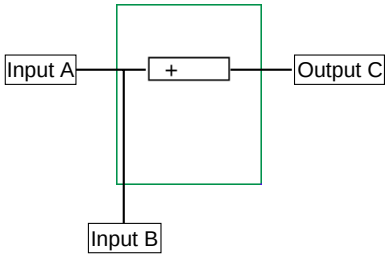
(1) Instructions that can be connected to each terminal
Instructions are categorized into the following three types according to the number of I/O terminals and the type of output.

1) 1 input (WORD), 1 output (WORD) type ... INV, LMOV instructions, etc.
2) 2 inputs (WORD), 1 output (WORD) type ... Addition, subtraction, a maximum, AND instructions, etc.
3) 2 inputs (WORD), 1 output (output) type ... Comparison, TBIT instructions, etc.

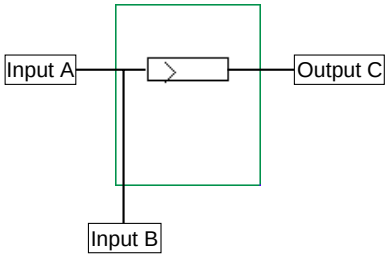
Example of 1)



Example of 2)



Example of 3)

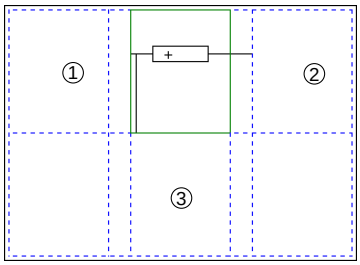


- For {Input A}, only [Block diagram input] or a connecting line can be connected.
- For {Input B}, [Block diagram input] and a connecting line can be connected and an address or constant can be input.
- For {Output C}, [Block diagram output] or a connecting line can be connected for cases 1) and 2), and only [Output] can be connected for case 3).

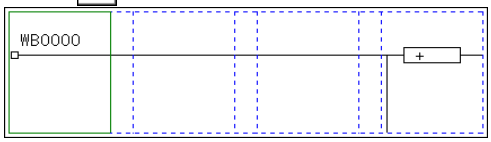
(2) Deleting instructions, connecting lines, etc.
To delete, move the cursor to the cell (frame) and then press the [DEL] key.

(3) Inserting instructions, connecting lines, etc.
There is no insertion function. Overwrite is possible.

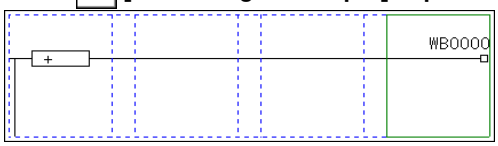
(4) Arranging block diagram input (output)
For block diagram input (output), a connecting line is automatically connected to input (output) terminal assignment area. It is not necessary to use [Path] to connect connecting lines. When it is placed under a 2 input type instruction, it is vertically connected to an instruction input.



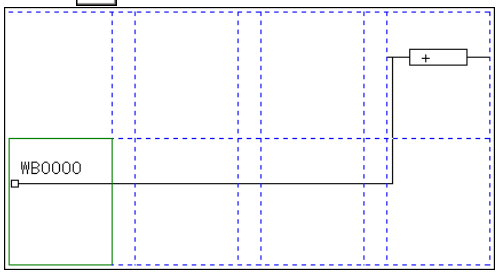
When [Block diagram input] is placed in cell 1)



When [Block diagram output] is placed in cell 2)

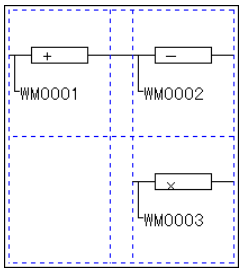


When [Block diagram input] is placed in cell 3)

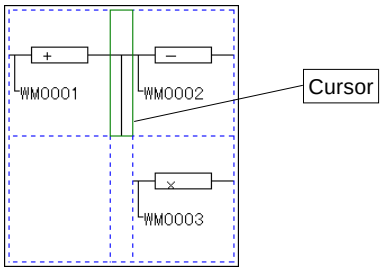


(5) Right-angled connection of block diagram (right-angled connection of a vertical line and a horizontal line)

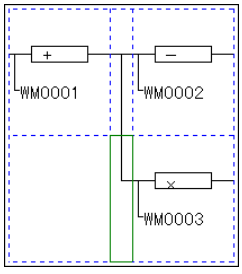
In the line below, follow the steps below to make right-angled connection of the output of [+] [Addition] and the input of [×] [Multiplication].



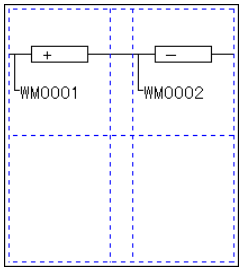
◊ Left-click the [⊤] [Vertical connection] button of the [Common] tab.
◊ Move the cursor to the {Vertical connection assignment area} between [+] [Addition] and [-] [Subtraction] and the left-click it. A vertical connecting line is connected.



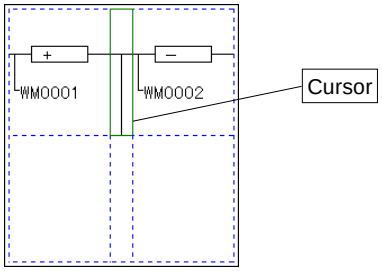
◊ Left-click the [⊤] [Vertical connection] button again.
◊ Move the cursor below the vertical connecting line and then left-click it.
As shown below, the vertical connecting line and the input of the [×] [Multiplication] instruction is connected in the right angle.



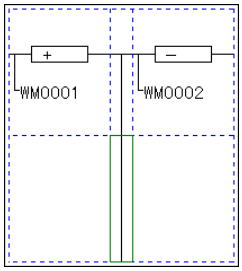
Follow the steps below to write the [Multiplication] instruction later.



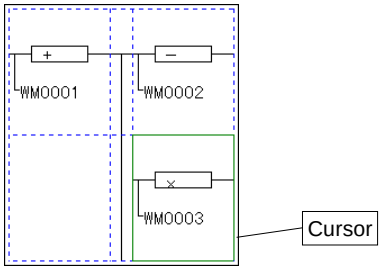
◊ Left-click the [Vertical connection] button of the [Common] tab.
◊ Move the cursor to the {Vertical connection assignment area} between [+] [Addition] and [-] [Subtraction]. A vertical connecting line is connected.



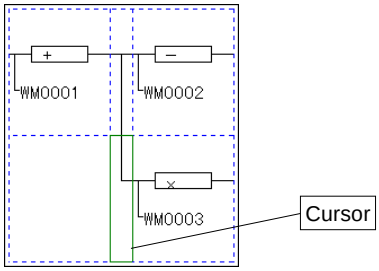
◊ Left-click the [Vertical connection] button.
◊ Move the cursor below the vertical connecting line and then left-click it. A vertical connecting line is connected.



◊ Left-click the [×] [Multiplication] button of the [Arithmetic operation] tab.
◊ Move the cursor under the [-] [Subtraction] instruction and then left-click it. When the {Address Entry Dialog} box is displayed, input an address and then left-click the [OK] button.

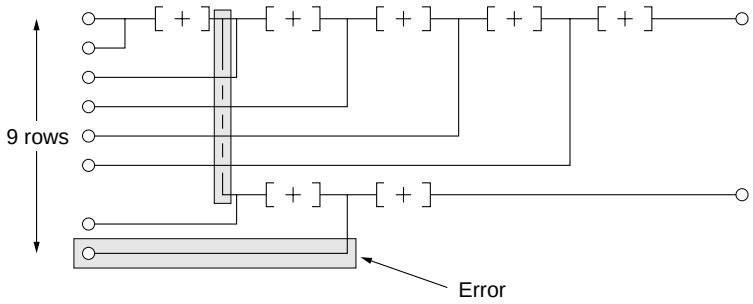


◊ Left-click the [Vertical connection] button of the [Common] tab.
◊ Move the cursor to the vertical connecting line to the right of the [×] [Multiplication] instruction and then left-click it. The vertical connecting line changes to right-angled connection.

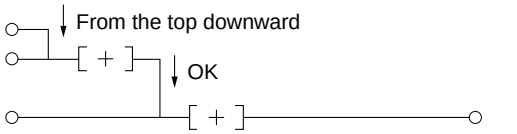


2-9-4 Limitations on block diagram

1) A line consisting of 9 rows or more cannot be created.

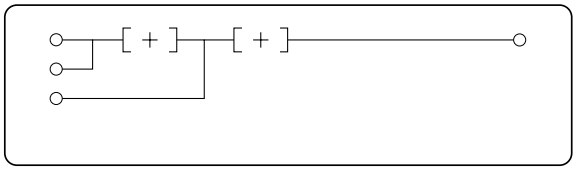


2) For the leftmost symbol, a line in which an input signal flows from the top downward cannot be created.



Input signal direction in a block diagram is from the left to right and from the bottom upward.

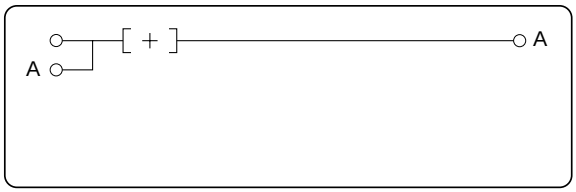
Solution



3) A line in which a signal flows from the right to left cannot be created.

Signal direction is from the left to right.

Solution



4) A line in which outputs are ORed cannot be created.
This is a logical error which must not be done.

Solution