

Shibaura Machine

COMPO ARM

■ ■ ■ BA *SERIES*

■ ■ ■ BA-II *SERIES*

■ ■ ■ BA-III *SERIES*

■ ■ ■ BA-C *SERIES*

PC SOFTWARE

SF-98D

Operating Manual

SHIBAURA MACHINE CO., LTD.

Keep this manual at hand after operators have read it thoroughly.

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Chapter 1 Introduction

Personal computer software SF-98D is designed to support you in creating programs for ROIBOT when you use a personal computer as the host computer.

Before creating a program, you are requested to read through and completely understand this manual.

■ 1.1 Safety

To use our arm robot ROIBOT series safely, the items you have to strictly observe are contained in the appropriate robot instruction manual and the safety booklet attached to the robot. Be sure to completely read them.

This software controls axis motions by teaching and program execution. To assure safety, equip an emergency stop pushbutton switch near the operator before starting such operations.

■ 1.2 Features

- This software can be used on the personal computer where the English versions of Microsoft Windows 7/8/10 run.
- A program can be edited easily by using the multi-window screen editor.
- Data such as program and table can be sent to and received from the robot controller. It is also possible to save the data as a file.
- Axis motions can be controlled by teaching and program execution.
- At program printing (i.e., output to the printer), a title and comment can be added, which is very convenient to debug and verify the program.

■ 1.3 About Instruction Manual

■ 1.3.1 Descriptions on Operations

For the basic Windows operations and terms, refer to the Windows manual and help.

In this manual, the hard disk drive unit of the personal computer is assigned to "C" and the CD-ROM drive unit to "D".

Additionally, the robot controller is explained based on BA-II series controller CA20-M00.

■ 1.3.2 Structure of Instruction Manual

1. Introduction

This section deals with introduction of applicable devices and software installing procedures.

2. Basic operations

This section deals with the basic operations covering from the start to end of the software.

3. File editing

This section deals with the procedures for using the SF-98D, including the basic ones.

4. Menu bar

This section deals with each command on the menu bar.

5. Others

This section deals with the descriptions and remedies of errors.

■ 1.3.3 Notation in the Manual

[XXX] : Signifies the button named "XXX" or the menu named "XXX".

"XXX" : Represents the display of "XXX".

Sequential program, palletizing program and so on are generically called the "program".

Point table, MVM table and so on are generically called the "table".

Program and table are generically called the "data".

CA25-M10/M40/M80, CA20-M00/M01, CA10-M00/M01 and CA10-M00B/01B are generically called the "enhanced master unit".

CA20-M10/M40 and CA10- M10/M40 are generically called the "master unit".

But the axis numbers of CA25-M10/M40/M80 are A0 to A3 as well as "master unit".

■ 1.3.4 Corporate Name

Microsoft Windows, Microsoft Windows NT and Windows logo mark are the registered trademarks or trademarks.

■ 1.4 System Structure

The minimum hardware required for installing and operating the SF-98D is as follows:

- Personal computer

The personal computer where the English versions of Microsoft Windows 7/8/10 run.

The following are required for the hardware environment.

CD-ROM drive unit

Serial port

Hard disk free area: 10M byte or more

Memory free area: 12M byte or more

- Printer

Printer that can be connected with your personal computer and allows printing from the Windows.

- Communication cable

Connects the controller and computer. Use the PCBL-31.

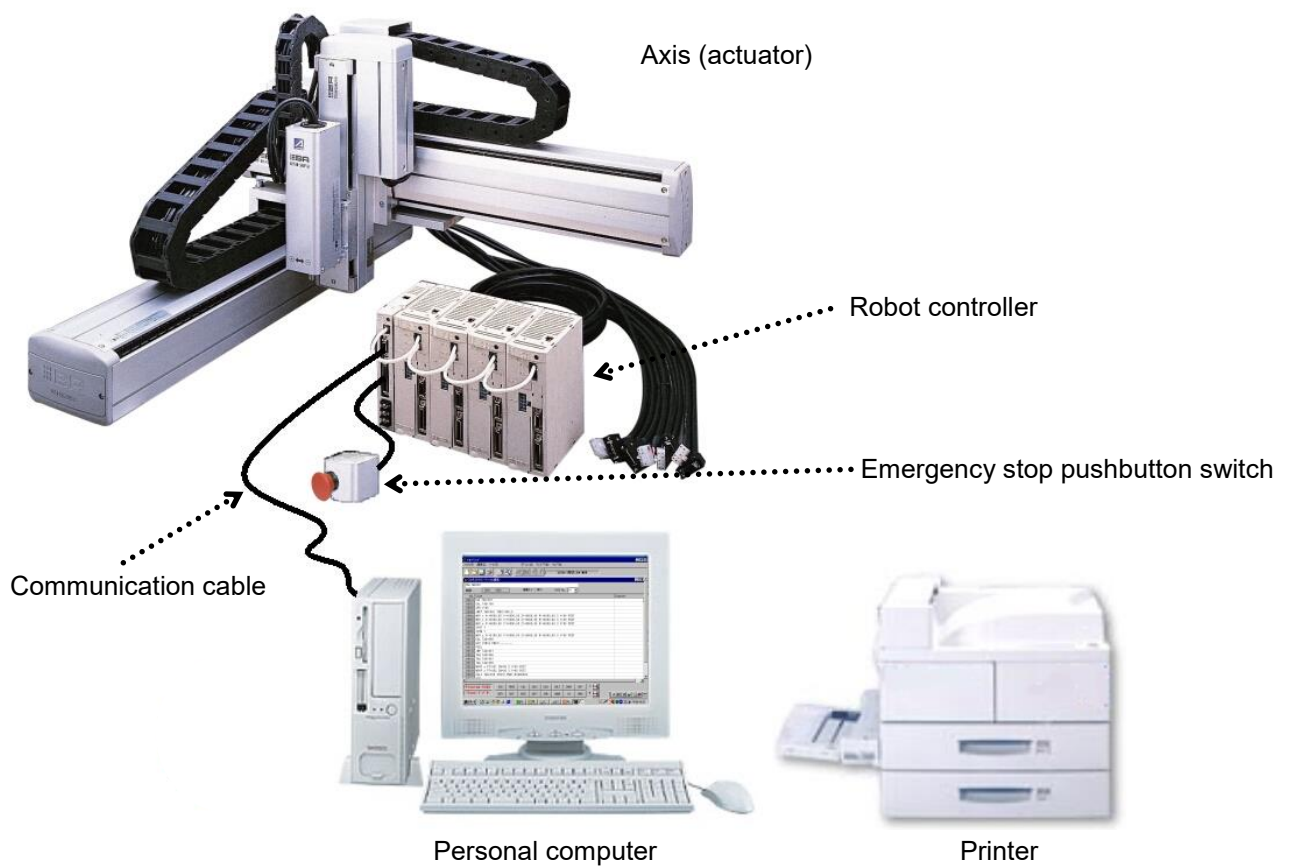
- Display

Resolution 800 × 600 pixel or more

■ 1.5 Connecting with Robot Controller

Connect the personal computer where the SF-98D software is already installed with the robot controller, etc., in the manner below.

- Applicable controller
CA25-M10/M40/M80,
CA20-M00/M01,
CA10-M00/M01, CA10-M00B/M01B,
CA20-M10/M40, CA10-M10/M40,
CA01-M05
- Connection with robot controller



Connect the controller side of the communication cable with the teach pendant connector, and the personal computer side of the same cable with the RS232C terminal.

■ 1.6 Installing

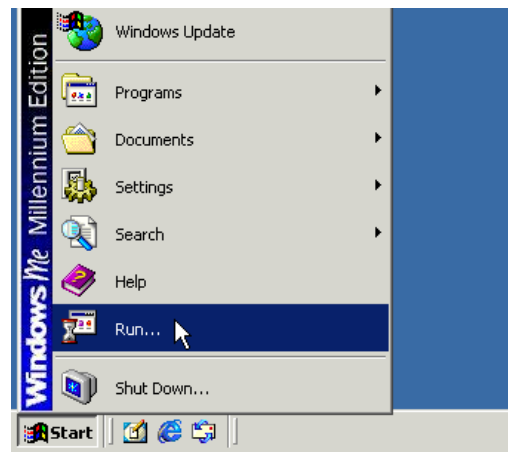
Before using the SF-98D software, you have to install it on your personal computer first. Install the software according to the procedures given below.

Before installing, terminate all application programs which are in operation.

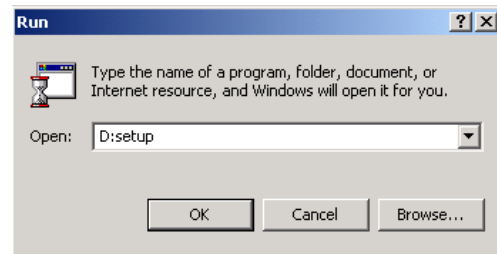
The following explanations are made with the hard disk drive unit of the personal computer assigned to "C" and the CD-ROM drive unit to "D".

■ 1.6.1 Installing to the Windows

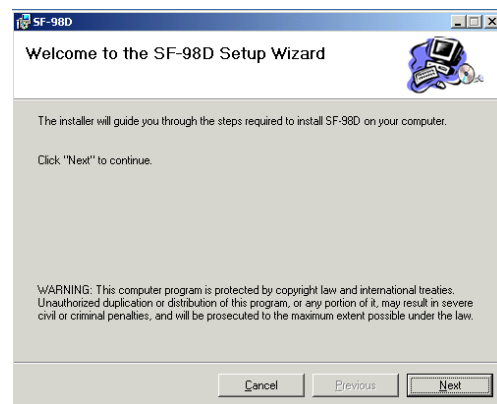
1. Insert the install disk into the CD-ROM drive unit.
2. Click the [Start] button on the Windows task bar, then click [Run (R)] of the [Start] menu.



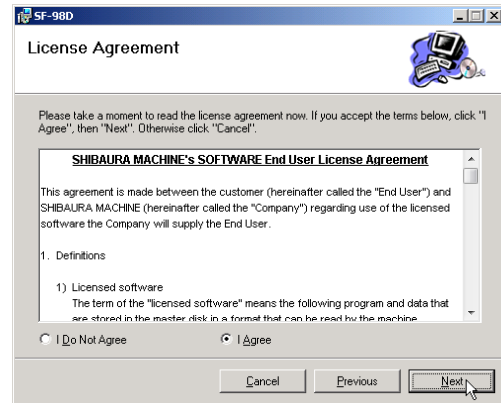
3. When the "Run" screen appears, enter "D:¥Eng¥setup.exe" under the column of "Open (O) " and click the [OK] button.



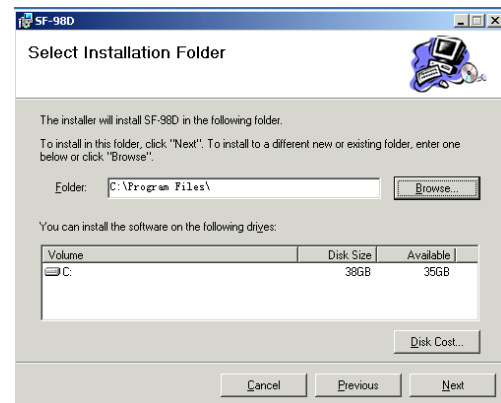
4. The "SF-98D" setup screen opens. Click the [Next] according to the instructions on the screen.



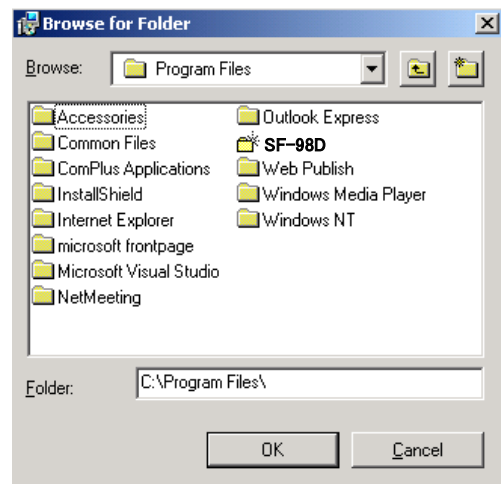
5. Next, the “End User License Agreement” screen is called. Read through and completely understand the Agreement first. Then click the “Agree (A)” option button. Click the [Next] button.



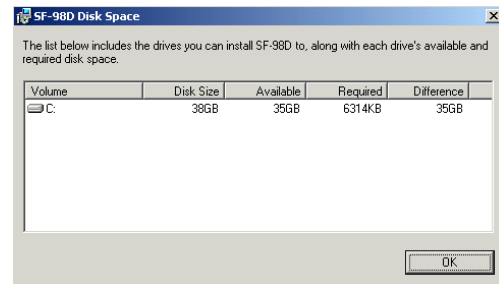
6. Specify the folder where you wish to install the SF-98D. Normally, a folder named "SF-98D" is automatically created in the [Program files] folder in the C-drive to install the software. Make sure of the folder name where the SF-98D is to be installed, then click the [Next] button.



- 6.1 When you wish to specify the new folder on the “[Select Installation Folder]” screen, click the [Browse] button. When the “Browse for Folder” screen is displayed, select the drive and folder where you wish to install the software, and click the [OK] button.

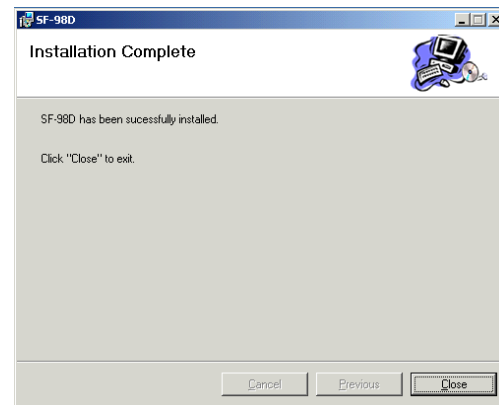


6.2 When you click the [Disk Cost] button on the “Select Installation Folder” screen, the “SF-98D Disk Space” screen appears, where the disk space, available space and disk size required for installing the SF-98D of each drive are displayed.

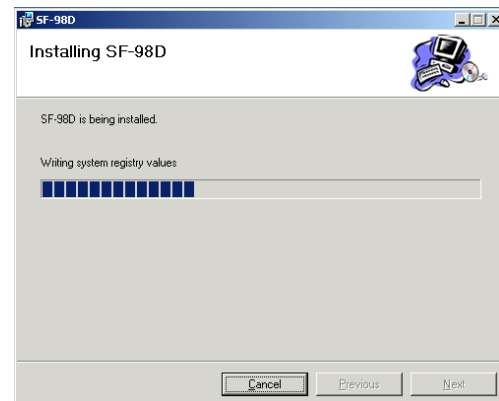


7. When you click the [Next] button on the “Select Installation Folder” screen, the “Install Confirmation” screen is displayed.

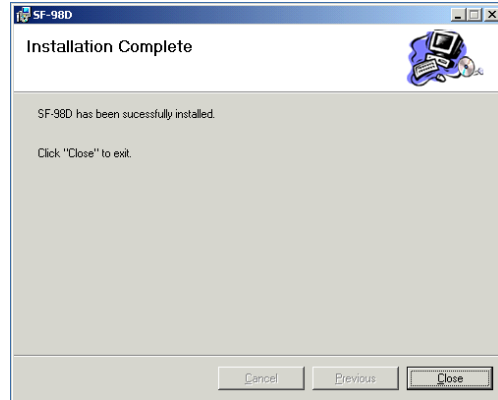
To start installing the software, click the [Next] button, and the installation starts.



8. While the software is installed, the screen as shown right is displayed. Wait until the installation completes.



9. When the software has been installed, the screen as shown right is automatically displayed. Now, the installation has finished. Click the [Close] button to quit the setup screen.

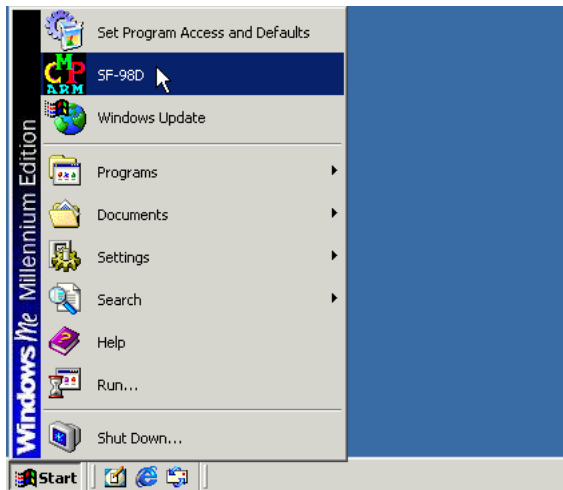


Chapter 2 Basic Operations

■ 2.1 How to Start

First, let's start the SF-98D.

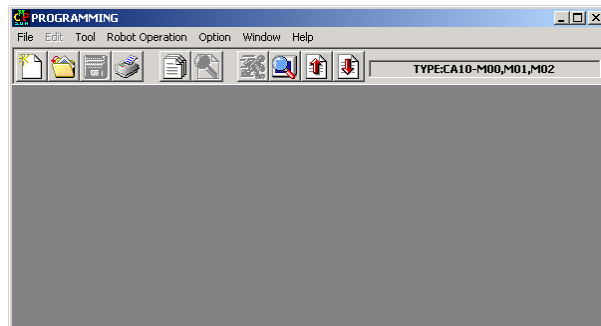
1. Click the [Start] button on the Windows task bar.
2. The [Start] menu is displayed.
3. Set the mouse pointer to [Programs].
4. Click the [SF-98D] file folder.
5. Click [SF-98D].



6. When the menu screen is displayed, startup of the SF-98D has finished.
 - * The SF-98D can be started also by double-clicking the [SF-98D] icon shown on the desktop.



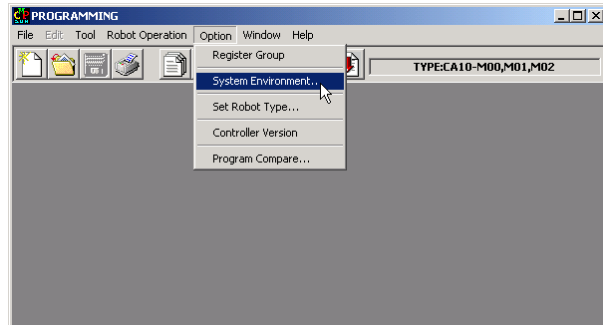
[SF-98D] icon → Shortcut to sf-98d.exe



2.2 Setting Type of Robot Controller

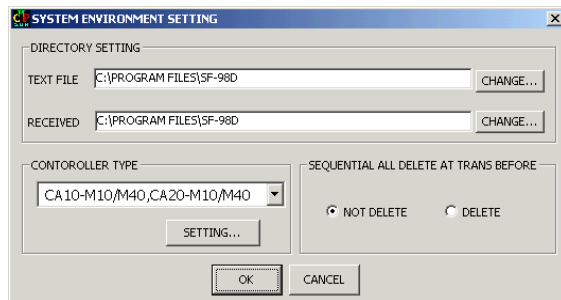
When the SF-98D has been installed newly, or when the robot controller has been replaced, specify the type of the robot controller first.

1. Click [Option (O)] on the menu bar.
2. Select and click [System Environment Setting (E)] from the command list.



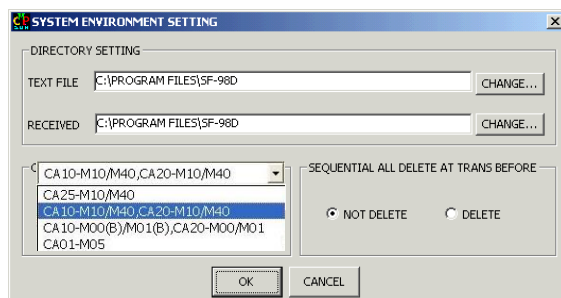
3. The [SYSTEM ENVIRONMENT SETTING] screen appears.

* For the column of "ALL-CLEAR SEQUENTIAL BEFORE TRANSMIT", see Para. 4.6.2.

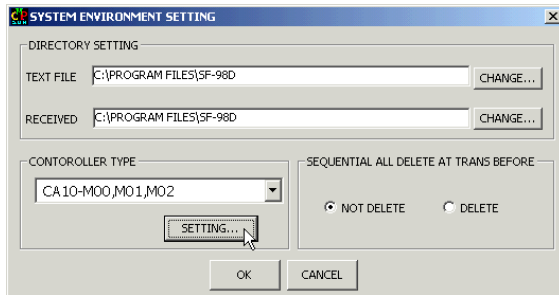


4. Click [▼] of the "CONTROLLER TYPE" setting box.

5. Select the connected controller from the dropdown menu, then click it.



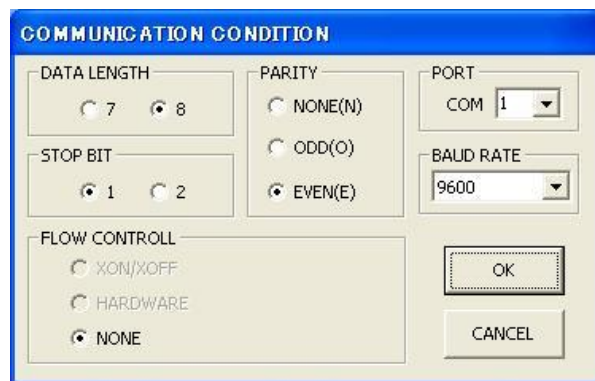
-
-
- Click [SETTING] of the "SYSTEM ENVIRONMENT SETTING" screen.



-
-
- The "[COMMUNICATION CONDITION]" screen appears.

- DO NOT change the following four (4) items.

DATA LENGTH: 8
STOP BIT: 1
PARITY: EVEN (E)
FLOW CONTROL: NONE



- Select the communication port, referring to the instruction manual of your personal computer and Windows instruction manual.

- Click [OK] and return to the "SYSTEM ENVIRONMENT SETTING" screen.

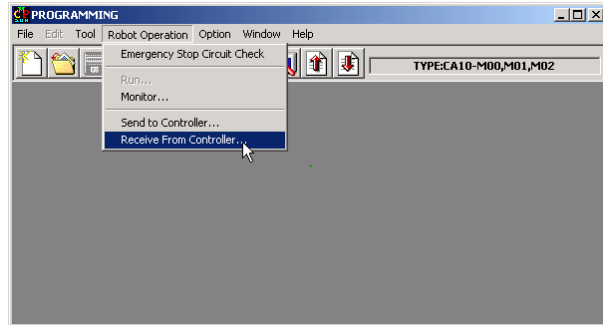
- Click the [OK] button on the "SYSTEM ENVIRONMENT SETTING" screen.
-
-

■ 2.3 Data Transfer and Saving from Robot Controller to PC

A sequential program in the robot controller can be transferred to the personal computer (SF-98D) and saved as a file.

Before starting this operation, connect the personal computer with the robot controller.

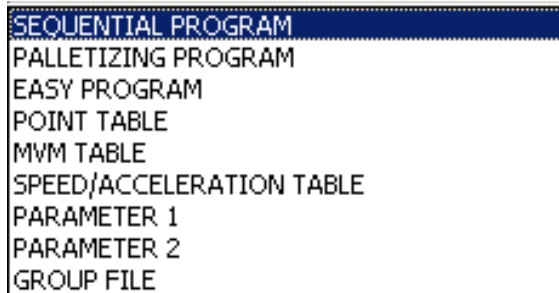
1. Click [Operation (C)] on the menu bar.
2. Select and click [Receive from Controller (U)] from the command list.



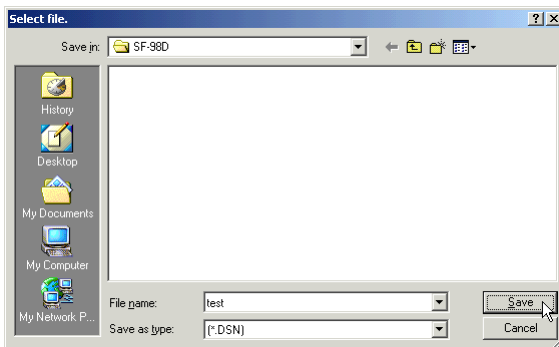
3. The "RECEIVE (HOST COMPUTER <- CONTROLLER)" screen appears.
4. Click [▼] of the "Text Data" box.
 - * "Text Data" box
→ SEQUENTIAL PROGRAM
5. The dropdown menu opens.



6. Click [SEQUENTIAL PROGRAM] from the dropdown menu.
7. Click [OK] on the "RECEIVE (HOST COMPUTER <- CONTROLLER)" screen.

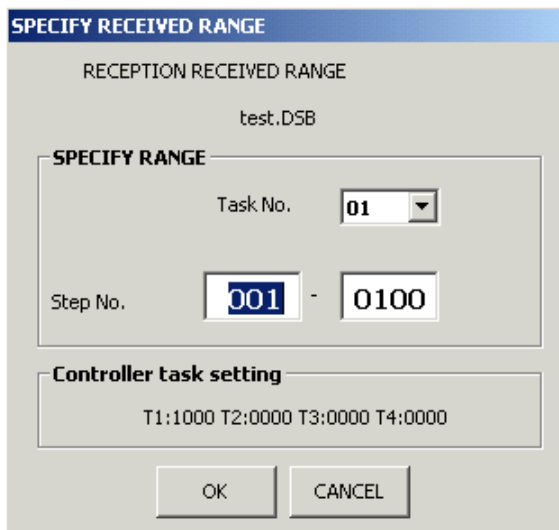


8. The "Select file" screen appears.
9. Make sure that the SF-98D folder is shown in the "Save in (I)" box.
- * SF-98D holder →

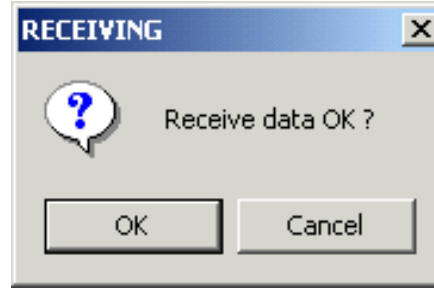


10. Specify the file name under "File name (N)". Here, enter "test" temporarily.
11. DO NOT change the type of the file set under "Save as type".
12. Click the [Save] button.

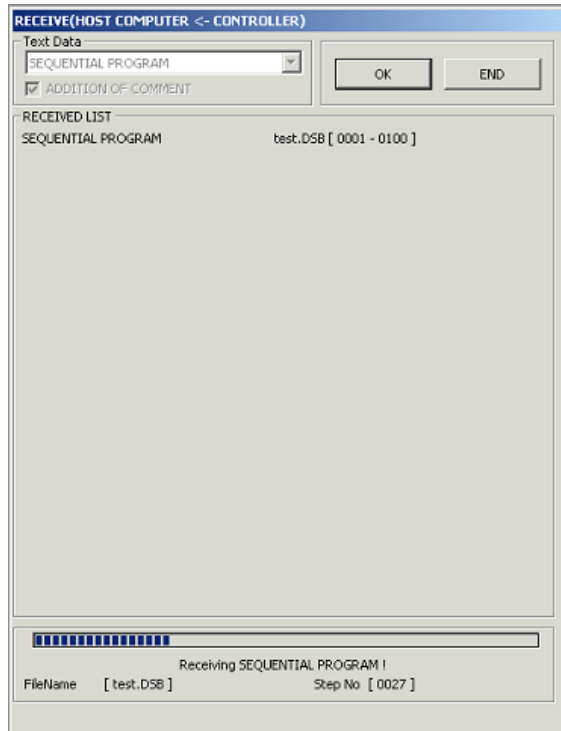
13. The "SPECIFY RECEIVED RANGE" screen is called on the display.
14. Select the task number you wish to receive from the "Task No." box. Here, select "01" temporarily.
15. Specify the range of the steps you wish to receive under "Step No.". Here, enter "0001 – 0100" temporarily.
16. Click the [OK] button.



-
17. The "receiving" confirmation screen is displayed.
 18. Click the [OK] button.

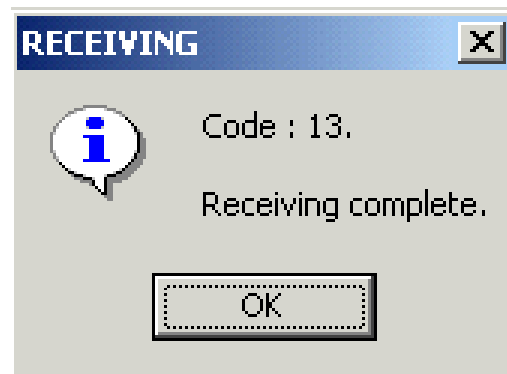


-
19. The message saying "Receiving SEQUENTIAL PROGRAM!" is displayed under the lower side of the "RECEIVE (HOST COMPUTER <- CONTROLLER)" screen, and receiving of the file starts.
Wait until the file has reached.



-
20. The "Receiving" finish screen is displayed.
 21. Click the [OK] button.
 22. Click the [END] button on the "RECEIVE (HOST COMPUTER <- CONTROLLER)" screen to exit from the same screen.

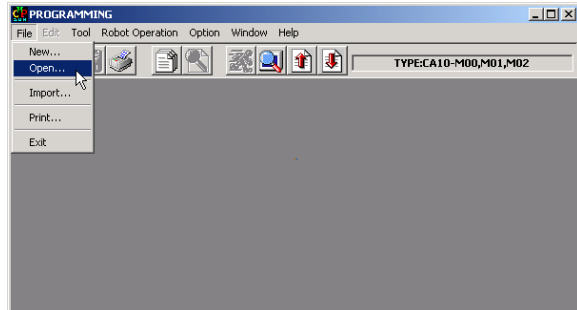
Now, receiving and saving of the sequential program complete.



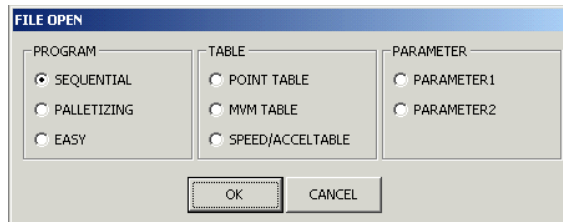
■ 2.4 Data Display and Editing

Let's display the sequential program saved in Para. 2.3 above on the editing screen.

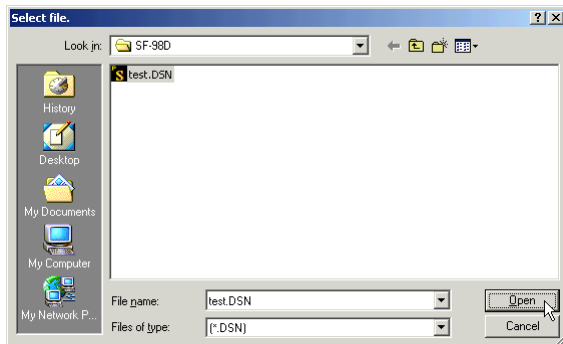
1. Click [File (F)] on the menu bar.
2. Select and click [Open (O)] from the command list.



3. The [FILE OPEN] screen is displayed.
4. Select [SEQUENTIAL].
5. Click the [OK] button.



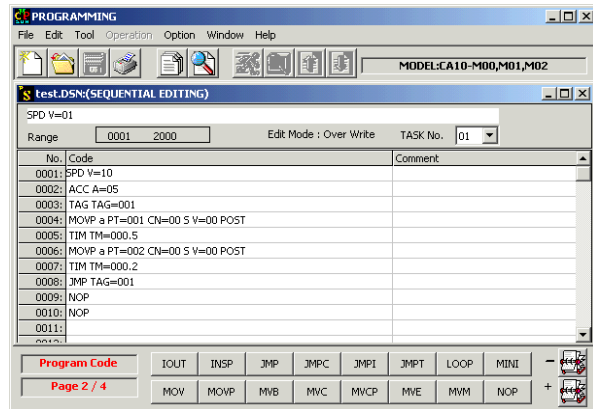
6. The [Select file] screen appears.
7. Select the sequential program file as saved before.
8. Click the [Open (O)] button.



9. The [SEQUENTIAL EDITING] screen opens to display the program.

* This program can be added, changed and deleted at your discretion. For the editing operation, see Para. 3.2.

10. After display and editing of the program, click [File] – [Close] from the menu bar to close the editing screen.

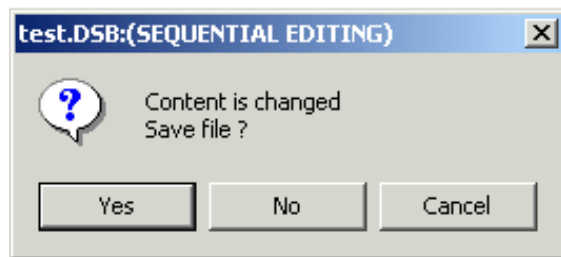


* When the contents of the file have been changed on the “SEQUENTIAL EDITING” screen, the “FILE SAVE CONFIRMATION”, “SYNTAX CHECK CONFIRMATION” and “TASK No. CONFIRMATION” screens are displayed.

11. To save the contents you have changed, click [Yes]. Otherwise, click [No].

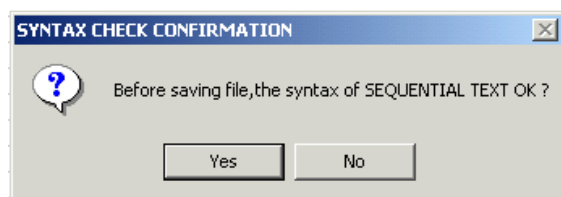
When you click [Cancel], the [SEQUENTIAL EDITING] screen is called again.

* Unless the changed contents are saved, proceed to Para. 2.5



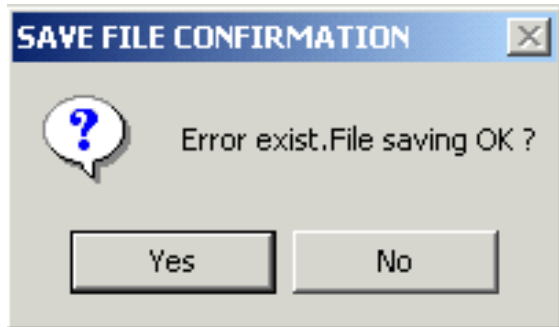
12. To perform program check, click [Yes]. Otherwise, click [No].

* Unless the program check is performed, proceed to Step 16 of this paragraph.



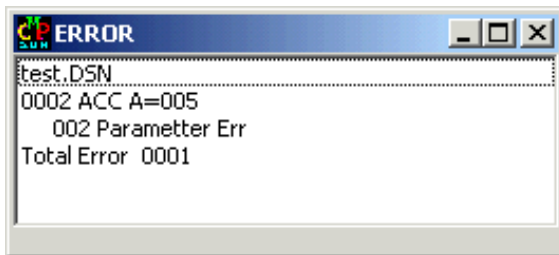
13. If an error has been found during program check, click [No] to correct the program.

- * Unless a program error is found, or when [Yes] is selected on the right screen, proceed to Step 16 of this paragraph.



14. Correct the program, referring to the [ERROR] screen.

15. After the program has been corrected, click the [X] button on the upper right side of the [ERROR] screen to close it. Then repeat the above steps, starting from Step 10.

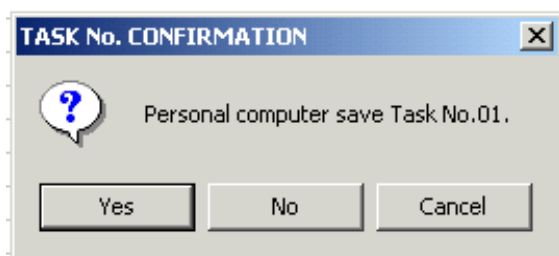


16. The [TASK No. CONFIRMATION] screen is displayed.

When you click [Yes], the file is saved and the [SEQUENTIAL EDITING] screen closes.

When you click [No], the file is not saved and the [SEQUENTIAL EDITING] screen closes.

When you click [Cancel], the file is not saved and the system returns to the [SEQUENTIAL EDITING] screen.



■ 2.5 File Transmission

Let's transmit the sequential program as displayed and edited in Para. 2.4 to the robot controller.

When the edited sequential program is transmitted, the same program range as that in the controller is deleted, then overwritten. Therefore, receive and save it in another file on the controller side as necessary.

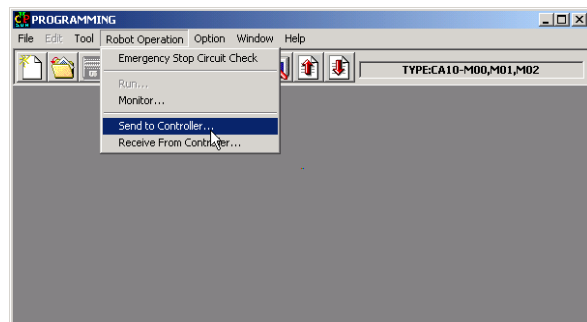
When you wish to clear all sequential programs before transmission, click [DELETE] under "ALL-CLEAR SEQUENTIAL BEFORE TRANSMIT" of the [SYSTEM ENVIRONMENT SETTING] screen in Para. 2.2.

Before transmitting the program to the controller, it is recommended to make sure by the program check (Para. 4.4.2.) that no error is included in the program.

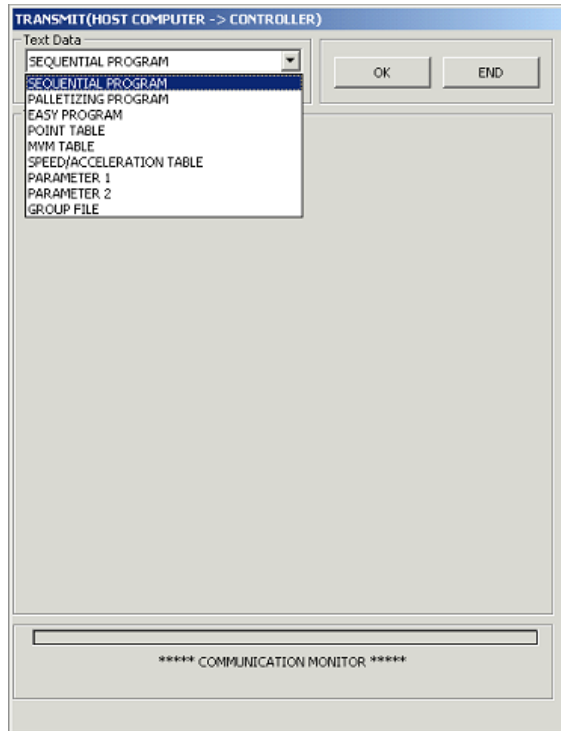
If data that does not conform to the communication format is sent, a parameter error will occur.

Before starting this operation, connect the personal computer with the robot controller.

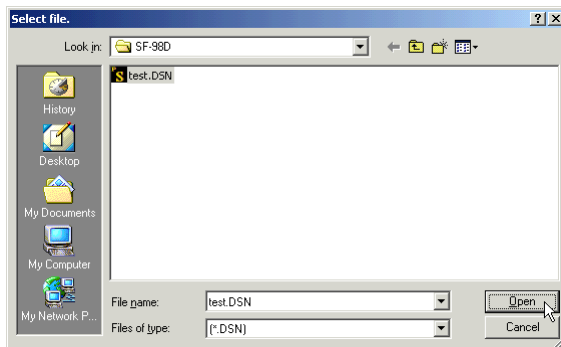
1. Click [Operation (C)] on the menu bar.
2. Select and click [Send to Controller (D)] from the command list.



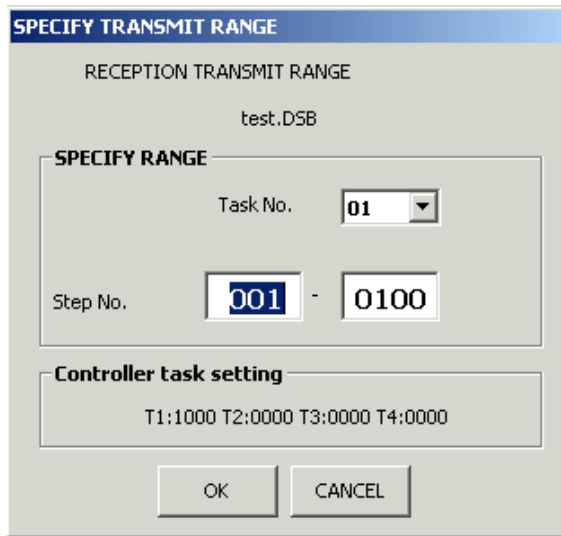
3. The [TRANSMIT (HOST COMPUTER -> CONTROLLER)] screen appears.
4. Click [▼] of the [Text Data] box.
5. Click [SEQUENTIAL PROGRAM] from the dropdown menu.
6. Click the [OK] button on the [TRANSMIT (HOST COMPUTER -> CONTROLLER)] screen.



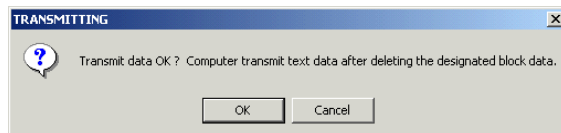
7. The [Select file] screen appears.
8. Select the sequential program file as saved before.
9. Click the [Open (O)] button.



-
10. The [SPECIFY TRANSMIT RANGE] screen is displayed.
 11. Select the task number you wish to send from the [Task No.] box. Here, select "01".
 12. Specify the range of the steps you wish to send under [Step No.]. Here, enter "0001 – 0100".
 13. Click the [OK] button.
When you click [Cancel], the system returns to the [TRANSMIT (HOST COMPUTER -> CONTROLLER)] screen in Step 3 above.
-

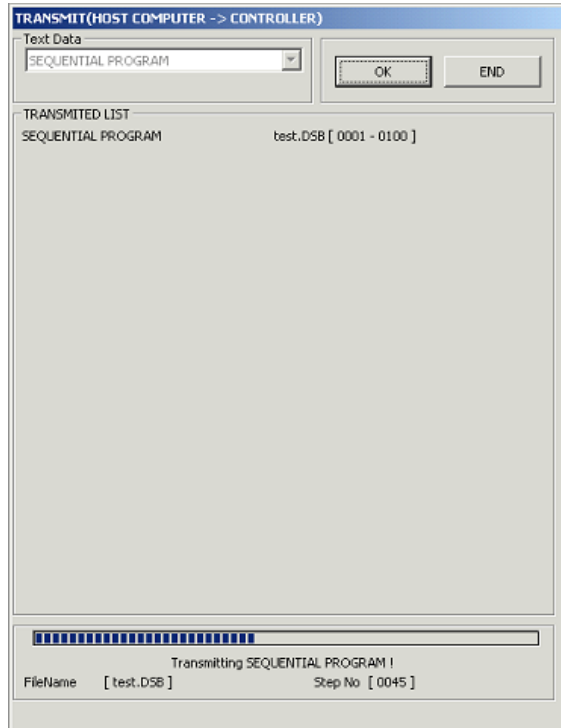


-
14. The transmitting confirmation screen is displayed.
When you wish to send the file, click the [OK] button.
When you wish to stop sending the file, click the [Cancel] button.
-



15. The [TRANSMIT (HOST COMPUTER -> CONTROLLER)] screen is called on the display.

- * When you click the [END] button during transmission, the transmission is interrupted (or canceled) and the data up to the interrupted point is sent to the controller.



16. When the transmission has finished, the transmitting confirmation screen appears. Click the [OK] button then.

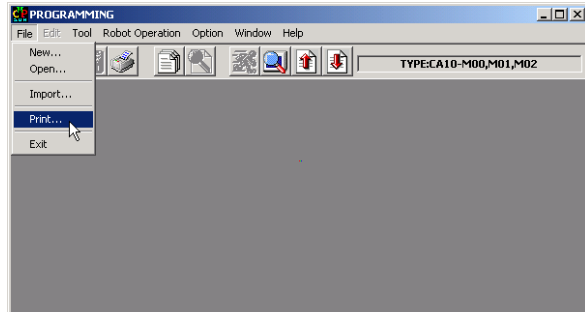


17. To exit from the [TRANSMIT (HOST COMPUTER -> CONTROLLER)] screen, click the [END] button.

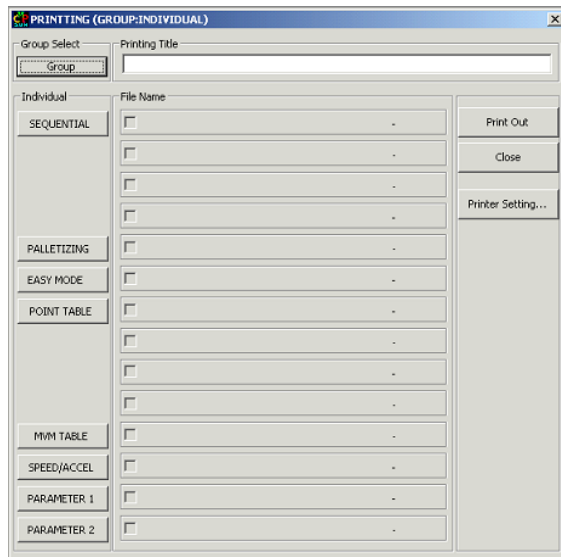
■ 2.6 Printing Program

Let's print the program saved as the file in Para. 2.4.

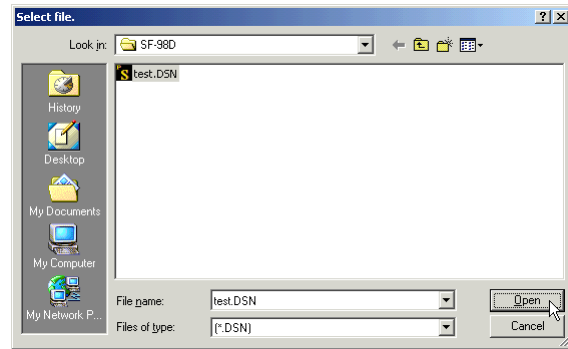
1. Click [File (F)] on the menu bar.
2. Select and click [Print (P)] from the command list.



3. The [PRINTING] screen appears.
4. To print the sequential program as saved in Para. 2.4 above, click [SEQUENTIAL] under the column of [Individual].



5. The [Select file] screen appears.
6. Select the file as saved in Para. 2.4, then click the [OK] button.

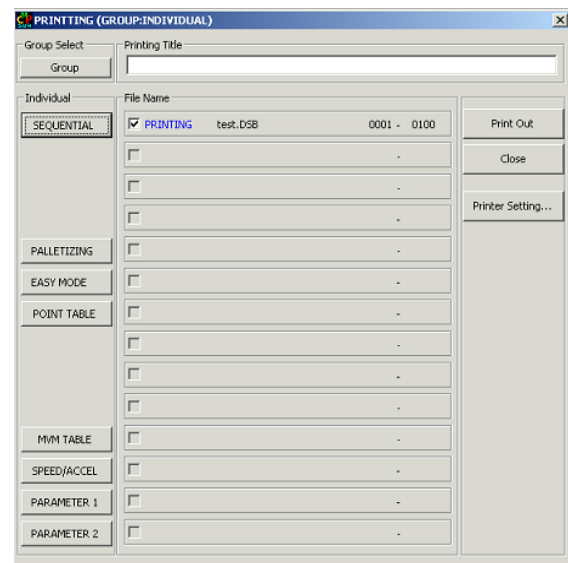


7. The check box under the column of [File Name] is checked with "PRINTING" displayed.

- * When you click the [Printer Setting] button, the [PRINTER SETTING] screen is called, where you can select the printer, paper size, etc.

The printer installed beforehand in the Windows can be used.

For the printer installing method and individual setting, see each printer manual.



8. Click the [Print Out] button.

9. The printout confirmation screen is displayed.
10. When you click [OK], printing starts. When the printing has finished, the [PRINTING] screen is closed automatically.

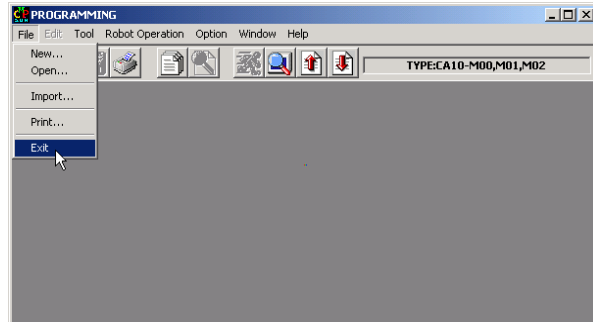
When you click [Cancel], the system returns to Step 7 of this paragraph.



■ 2.7 Terminating the SF-98D

Let's terminate the SF-98D software.

1. Click [File (F)] on the menu bar.
 2. Select and click [Exit (X)] from the command list.
- * If data not saved is present, a message for conformation is displayed.



■ 2.8 Tool Buttons

The menu items which are used frequently are arranged as the tool buttons on the upper side of the screen.

The menu which is executed when you click the button and the reference paragraph in this manual are shown below.



[File (F)] – [New (N)] See Para. 4.2.1.



[File (F)] – [Open (O)] See Para. 4.2.2.



[File (F)] – [Save (S)] See Para. 4.2.4.



[File (F)] – [Print (P)] See Para. 4.2.7.



[Option (O)] – [Register Group (G)] See Para. 4.6.1.



[Tool (T)] – [Syntax Check (G)] See Para. 4.4.2.



[Operation (C)] – [Run (R)] See Para. 4.5.2.



[Operation (C)] – [Monitor(M)] See Para. 4.5.3.



[Operation (C)] – [Send to Controller (D)] See Para. 4.5.4.





[Operation (C)] – [Receive from Controller (U)] See Para. 4.5.5.

Chapter 3 File Editing

■ 3.1 How to Open and Close File Editing Screen

■ 3.1.1 How to Open

To open the file editing screen, you can select one of the following five (5) manners.

- Click [File] – [New] from the [File] menu. (See Para. 4.2.1.)
- Click the  button on the tool bar. (See Para. 4.2.1.)
- Click [File] – [Open] from the [File] menu. (See Para. 4.2.2.)
- Click the  button on the tool bar. (See Para. 4.2.2.)
- Click [File] – [Import] from the [File] menu. (See Para. 4.2.6.)

* You cannot open the parameter file by clicking [File] – [New].

Additionally, you can open only the two (2) types of data (i.e., sequential program and point table) in the [Import].

■ 3.1.2 How to Close

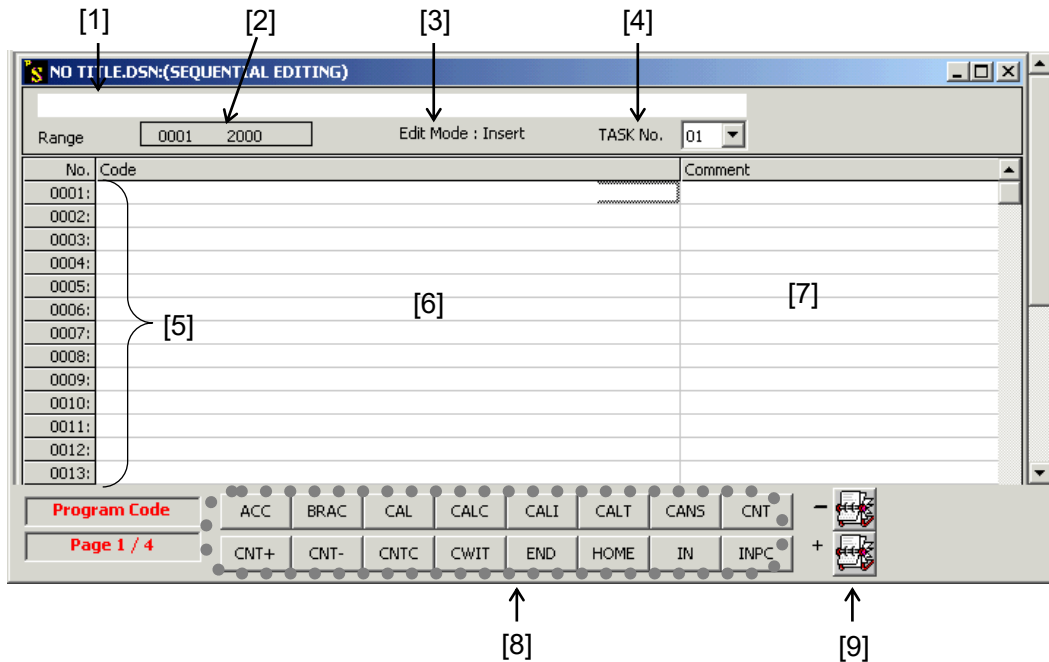
Click [File] – [Close] from the [File] menu, or click the [X] button on the upper right of the editing screen. Then the file editing screen closes. (See Para. 4.2.3.)

■ 3.2 Editing Sequential Program

The sequential program is the most popularized program where you can control the robot by writing instruction words under respective step numbers.

When the setting of the controller is CA01-M05, Editing sequential program is not valid.

■ 3.2.1 Structure of Sequential Program Editing Screen



- [1] Program code default display column
Displays the format of an instruction word.
You can change over the default display by clicking [Tool] – [Code-Display On(Off)] of the menu bar.
For details, see Para. 4.4.4.
- [2] Edit range
Displays the step range of the sequential program, which can be edited.
To change the edit range, click [Tool] – [Set Range] of the menu bar.
For details, see Para. 4.4.1.
- [3] Edit mode display
Indicates whether input through the keyboard is done in the “insert” mode or “overwrite” mode.

- * You can change over the insert mode and overwrite mode by means of the "Insert" key on the keyboard.

- [4] Task No. setting box
Displays the task number of the sequential program, which you are editing now.
To change the task number, select a desired task number from the dropdown list of "Task No."

- [5] Step No.
Displays the step numbers in the edit range lengthwise.

- [6] Program code (instruction word) input column
Enter the sequential program in this column.

- [7] Comment column
You can enter a comment here.

- [8] A group of instruction words
The instruction words used for editing the sequential program are arranged in the alphabetical order.

- [9] "Group of instruction words" changeover buttons (+, -)
Changes over the group of instruction words.

■ 3.2.2 Editing Sequential Program

Program input

To input a program, set the cursor to the program code input column of a desired step number and input an instruction word.

Entry of an instruction word comes in the two (2) types; using a group of instruction words shown on the bottom side of the sequential editing screen and input of an instruction word directly through the keyboard.

When you use a group of instruction words, change over the display of "a group of instruction words" by clicking the changeover button (+, -), followed by the instruction word button you wish to input. Then the instruction word and the initial value of its parameter are input under the program code input column where the cursor is seated. You can edit the parameter value at your discretion.

When you enter an instruction word directly through the keyboard, set ON the program code default display column. When you enter an instruction word followed by a space, the default parameter of this instruction word is displayed in the program code default display column. Enter the parameter value, referring to the value then.

* Enter the instruction word in single-byte capital letters.

For the parameters, discrimination of capital letters from small letters is necessary. Refer to the program code default display column.

When you press the "Enter" key, the input completes and the cursor moves to the comment column. To correct the character, delete it by the "BS" key or "Del" key by moving the cursor, then input a new character. Or press the "Ins" key to select the overwrite mode and overwrite the character.

To replace an instruction word of some step number with another instruction word, set the cursor to this step, and select and click a desired instruction word from a group of instruction words. Then the instruction word is overwritten under the current step number.

The meaning of the main parameters is given below.

For the other parameters, see the descriptions on each command described in the controller instruction manual.

Parameter	Meaning
CN	Counter number
TN	Timer number
TAG	Tag number
OFS	Counter value of BRAC command

Parameter	Meaning
STN	Station number
PN	I/O port number
TM	Timer value
GRP	Group number

Input of coordinate value

Entry of a coordinate value comes in the three (3) types; MDI teaching (i.e., direct input through the keyboard), remote teaching and direct teaching.

When you use the MDI teaching function, you can omit a plus (+) sign preceding a numerical value and a leading zero (0).

The number of digits of coordinate value you can input is four (4) digits for the integer and two (2) digits for the decimal.

When you use the remote teaching or direct teaching function, click [Tool] – [Coordinate Entry] of the menu bar, and the teaching screen is called on the display, where you can input a coordinate value.

For further information, see Para. 4.4.3.

[Edit] menu

You can execute the following commands from the [Edit] menu of the menu bar.

Undo (See Para. 4.3.2.)

Line Insert (See Para. 4.3.3.)

Line Delete (See Para. 4.3.4.)

Insert By Line Number Range (See Para. 4.3.5.)

Delete By Line Number Range (See Para. 4.3.6.)

Program Clear (See Para. 4.3.7.)

Cut, Copy, Paste (See Para. 4.3.8.)

Select All, Select Range (See Para. 4.3.9.)

Cancel Range Select (See Para. 4.3.10.)

Step Search (See Para. 4.3.11.)

Tag Search (See Para. 4.3.12.)

Program check

Click [Tool] – [Syntax Check] of the menu bar, and you can perform check and automatic correction of the described program.

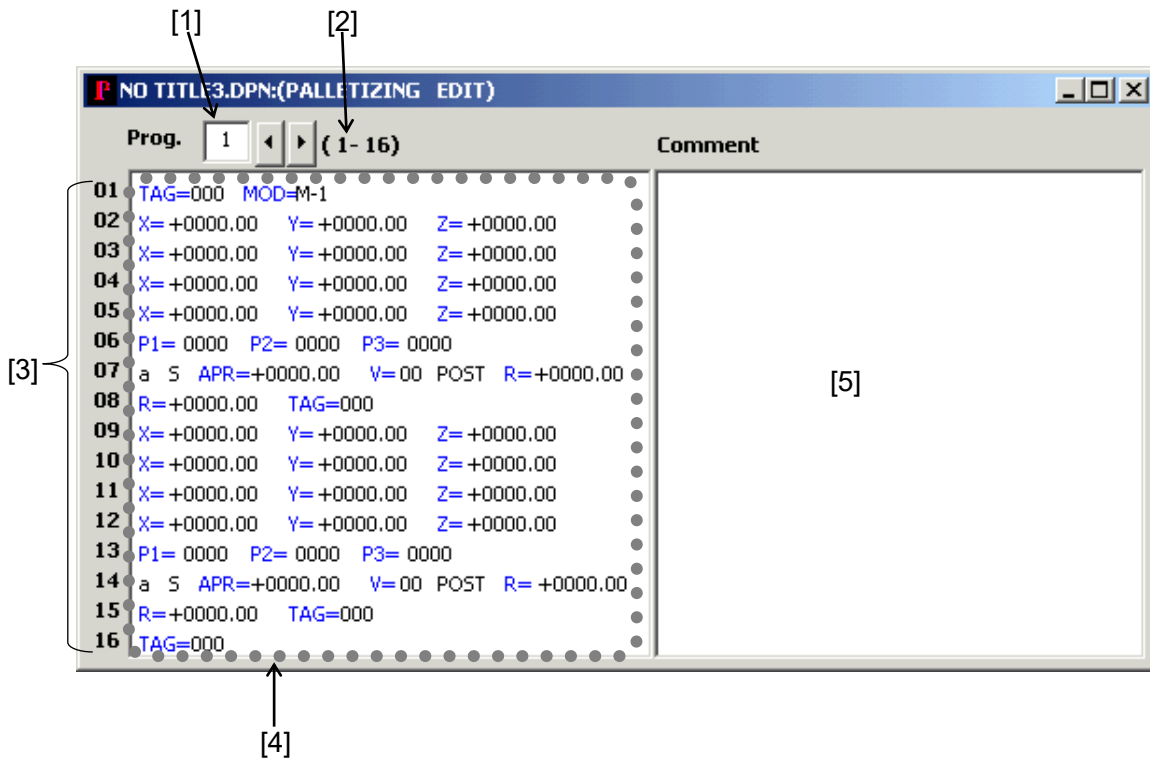
For details, see Para. 4.4.2.

■ 3.3 Editing Palletizing Program

The palletizing program is an exclusive program for allowing the robot to move and load a pallet. All you have to do is setting the relevant parameters.

When the setting of the controller is CA01-M05, Editing palletizing program is not valid.

■ 3.3.1 Structure of Palletizing Editing Screen



[1] "Prg." column

Selects the palletizing program number.

Enter the program number directly to the "Prg." column, or select the program number by using the arrow-mark buttons shown on the right side.

[2] Edit range

Displays the edit range of the palletizing program.

To change the edit range, click [Tool] – [Set Range] of the menu bar.

For details, see Para. 4.4.1.

[3] Edit items

The palletizing program consists of sixteen (16) items when the controller serves as an enhanced master unit. It is comprised of fourteen (14) items when the controller serves as a master unit.

The contents of each item are shown below.

Step No.	Enhanced master unit	Master unit
1	Start tag No. and mode	Start tag No. and mode
2	Home point coordinate value on S-side	Home point coordinate value on S-side
3	P1 coordinate value on S-side	P1 coordinate value on S-side
4	P2 coordinate value on S-side	P2 coordinate value on S-side
5	P3 coordinate value on S-side	No. of points on S-side
6	No. of points on S-side	Approach from S-side to D-side
7	Approach from S-side to D-side	Hand tag No. on S-side
8	Hand tag No. on S-side	Home point coordinate value on D-side
9	Home point coordinate value on D-side	P1 coordinate value on D-side
10	P1 coordinate value on D-side	P2 coordinate value on D-side
11	P2 coordinate value on D-side	No. of points on D-side
12	P3 coordinate value on D-side	Approach from D-side to S-side
13	No. of points on D-side	Hand tag No. on D-side
14	Approach from D-side to S-side	End tag No.
15	Hand tag No. on D-side	—
16	End tag No.	—

[4] Program edit column

You can edit each item of the palletizing program.

[5] Comment column

You can enter a comment here.

■ 3.3.2 Editing Palletizing Program

Program input

To input a program, click the program edit column of a desired edit item. Then the item you have clicked can be edited.

For the item having choices such as M-1 and 1-M, double-click the relevant characters or press the space key. The choice is changed over and displayed then.

Mode (M-1 \Rightarrow 1-M \Rightarrow M-M)
a (Absolute) \Leftrightarrow i (Relative)
S (Axis speed) \Leftrightarrow T (Linear speed)
POST (Position) \Leftrightarrow PASS (Pass point)

Enter a numerical value other than the coordinate value directly through the keyboard.

When you press the "Enter" key, the input completes and the cursor moves to the next item.

Input of coordinate value

Entry of a coordinate value comes in the three (3) types; MDI teaching (i.e., direct input through the keyboard), remote teaching and direct teaching.

When you use the MDI teaching function, you can omit a plus (+) sign preceding a numerical value and a leading zero (0).

When you use the remote teaching or direct teaching function, click [Tool] – [Coordinate Entry] of the menu bar, and the teaching screen is called on the display, where you can input a coordinate value.

For further information, see Para. 4.4.3.

[Edit] menu

You can execute the following commands from the [Edit] menu of the menu bar.

Cut, Copy, Paste (See Para. 4.3.8.)

Select All, Select Range (See Para. 4.3.9.)

Input of subroutine program

When you specify the subroutine program tag of Start, Hand or End, you can jump to the step of the tag number written in the sequential program and execute its subroutine.

* When the tag number is "000", the controller passes without doing any operation.

Enter the subroutine program on the sequential program editing screen.

Specify the same tag number as the tag number used for specifying the subroutine at the top of the program, and the RET (return) command at the end of the program.

■ 3.4 Editing Easy Program

The easy program is a program without writing instruction words to create a program. All you have to do is set each move point, already provided hand subroutine, start subroutine, end subroutine and speed values.

When the setting of the controller is CA01-M05 or CA25-M10/M40/M80, Editing easy program is not valid.

■ 3.4.1 Structure of Easy Editing Screen

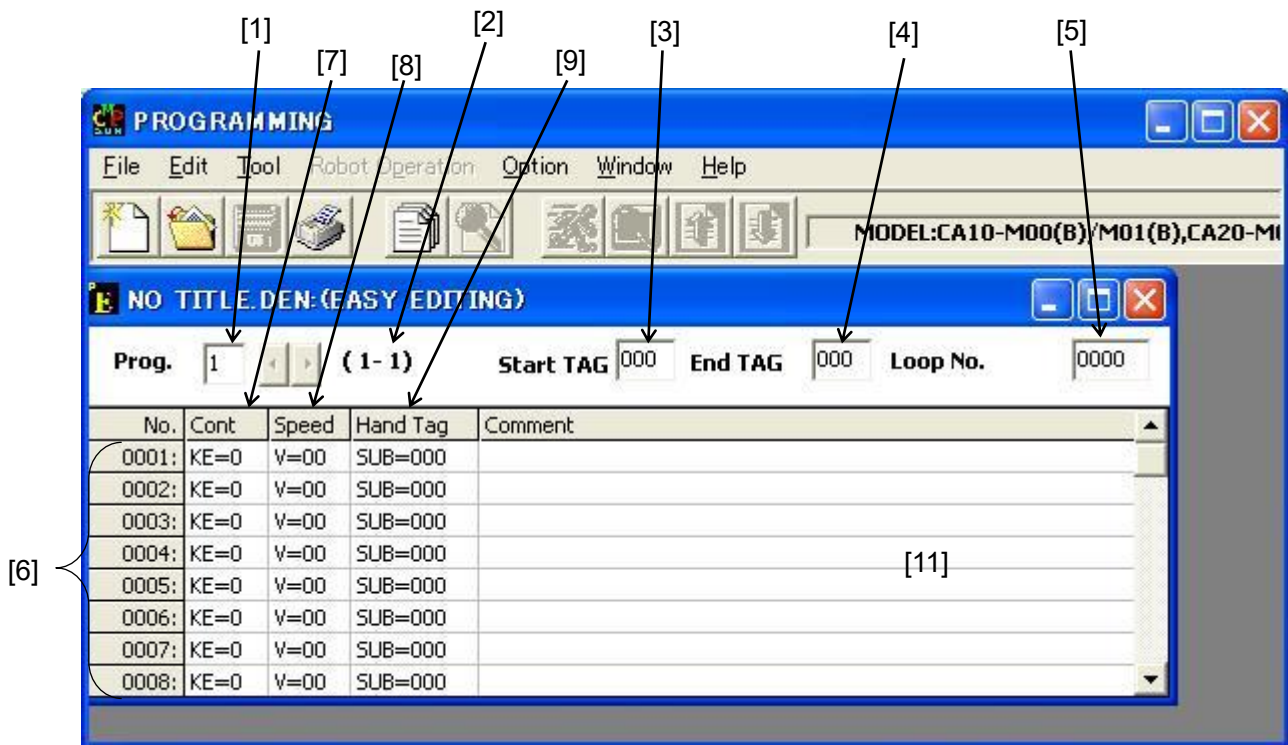
Easy Editing Screen for CA20-M10/M40, CA10-M10/M40

Labels in the image:

- [1] points to the Program number field.
- [2] points to the Start TAG field.
- [3] points to the End TAG field.
- [4] points to the Loop No. field.
- [5] points to the window title bar.
- [6] is a bracket encompassing the table.
- [7] points to the Cont column.
- [8] points to the Speed column.
- [9] points to the Hand Tag column.
- [11] is a label in the Comment column of row 0004.
- [12] is a label next to the instruction word buttons.

No.	Cont	Speed	Hand Tag	Branch	Comment
0001:	KE=0	V=00	SUB=000	JMP TAG=000	
0002:	KE=0	V=00	SUB=000	JMP TAG=000	
0003:	KE=0	V=00	SUB=000	JMP TAG=000	
0004:	KE=0	V=00	SUB=000	JMP TAG=000	[11]
0005:	KE=0	V=00	SUB=000	JMP TAG=000	
0006:	KE=0	V=00	SUB=000	JMP TAG=000	
0007:	KE=0	V=00	SUB=000	JMP TAG=000	
0008:	KE=0	V=00	SUB=000	JMP TAG=000	

Easy Editing Screen for CA20-M00/M01, CA10-M00(B)/M01(B)



[1] "Prg." column

Select the easy program number.

Enter the program number directly to the "Prg." column, or select the program number by using the arrow-mark buttons shown on the right side.

[2] Edit range

Displays the edit range of the easy program.

To change the edit range, click [Tool] – [Set Range] of the menu bar.

For details, see Para. 4.4.1.

[3] [Start TAG] column

Specify the tag number of the start subroutine program which is executed before moving the robot to each point.

When the tag number is "000", the system interprets it that the tag number is not designated.

[4] [End TAG] column

Specify the tag number of the sequential program which is to be executed after the end of the easy program.

When the tag number is "000", the system interprets it that the tag number is not designated.

- [5] Repetitive counts column
Specify the number of repetitive counts of consecutive motions.
When zero (0) is specified, such motions are repeated endlessly.
- [6] Step No.
Displays the step numbers in the edit range lengthwise. The edit range is 1 to 100.
- [7] [Cont] (Continue) column
Specifies the continuation under the column of "KE=". When zero (0) is specified, the selected motion is executed successively. When number "1" is specified, the system stops after executing the relevant step.
- [8] [Speed]
Specify the speed at which the robot moves to each point.
- [9] [Hand Tag] (Hand subroutine tag)
Specify the tag number of the sequential program which is to be executed at that point after the robot moves to a point.
When the tag number is "000", the system interprets it that the tag number is not designated.
- [10] Branch (Only CA20-M10/M40, CA10-M10/M40)
Specify the branch condition.
The instruction word can be easily changed by clicking [12] instruction word for branch.
- [11] Comment column
You can enter a comment here.
- [12] Instruction word for branch (Only CA20-M10/M40, CA10-M10/M40)
Change the instruction word of the branch of a cursor raw by clicking an instruction word.

■ 3.4.2 Editing Easy Program

Open editing screen

Coordinate data used in the easy program is written to the point table bearing the same number of point table as the step number.

When editing the easy program, therefore, it is convenient to open the point table editing screen also.

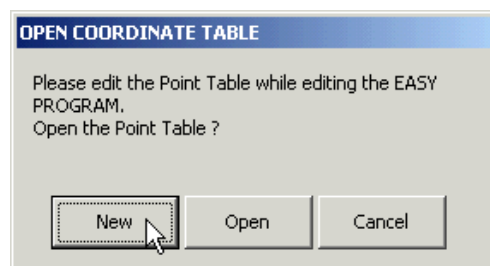
Additionally, as the hand subroutine uses the sequential program, it is convenient to display the sequential program editing screen at the same time.

When you open the easy program editing screen, the right screen appears.

Click [New] to open the new point table.

Click [Open] to open the saved point table file.

Click [Cancel] to open only the easy program editing screen.



Input of numerical value

When you click the parameter area where you wish to input by using the mouse, the input area is selected and you can enter a numerical value there. When you press the "Ctrl" key and arrow-mark key at the same time, you can change the input position. When you press the "Enter" key, the next parameter input area is selected.

[Edit] menu

You can execute the following commands from the [Edit] menu of the menu bar.

Line Insert (See Para. 4.3.3.)

Line Delete (See Para. 4.3.4.)

Program Clear (See Para. 4.3.7.)

Cut, Copy, Paste (See Para. 4.3.8.)

Select All, Select Range (See Para. 4.3.9.)

Cancel Range Select (See Para. 4.3.10.)

Search (See Para. 4.3.14.)

Input of subroutine program

When you specify the subroutine program tag of Start, Hand or End, you can jump to the step of the tag number written in the sequential program and execute its subroutine.

* When the tag number is "000", the controller passes without doing any operation.

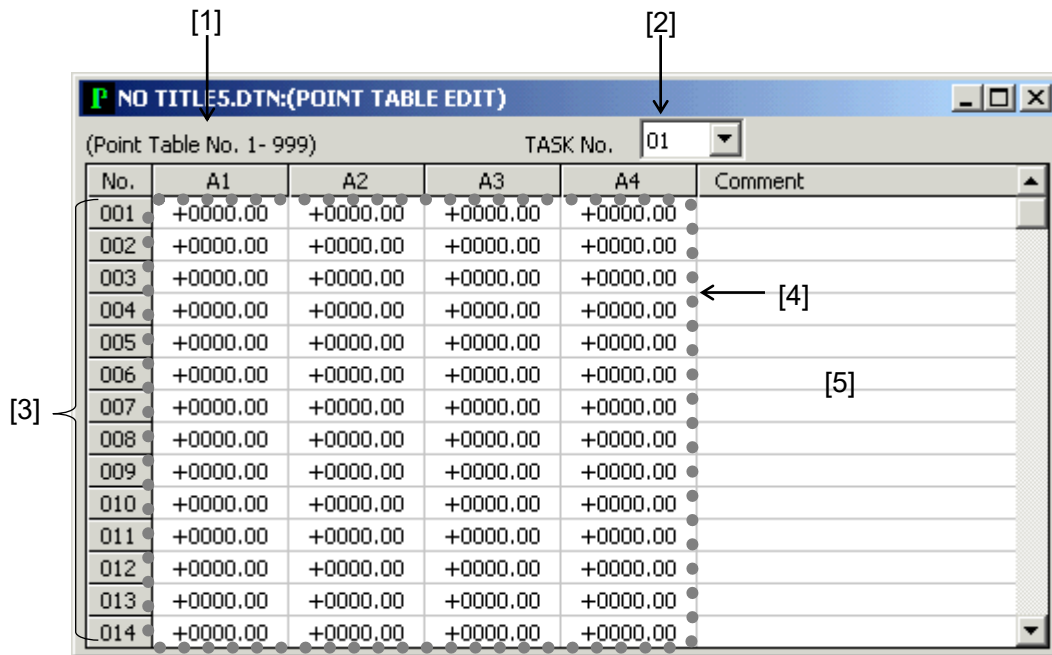
Enter the subroutine program on the sequential program editing screen.

Specify the same tag number as the tag number used for specifying the subroutine at the top of the program, and the RET (return) command at the end of the program.

■ 3.5 Editing Point Table

Coordinates when the robot starts and stops can be registered in the table as shown below.
Refer to [3.12 Editing Point Table] for editing point table of CA01-M05.

■ 3.5.1 Structure of Point Table Editing Screen



[1] Edit range

Displays the table range of the point table, which can be edited.
To change the edit range, click [Tool] – [Set Range] of the menu bar.
For details, see Para. 4.4.1.

[2] Task No. setting box

Displays the task number of the point table, which you are editing now.
To change the task number, select a desired task number from the dropdown list of "Task No.".

[3] Table No.

Displays the step numbers in the edit range lengthwise.

[4] Coordinate Entry column

You can enter a coordinate value here.

* A1 to A4 signify the axis 1 to axis 4, respectively. (For enhanced master unit)

[5] Comment column

You can enter a comment here.

■ 3.5.2 Editing Point Table

Input of coordinate value

When you click an item of the Coordinate Entry column, where you wish to input by using the mouse, the item is selected and you can enter a coordinate value there. When you press the "Enter" key after you have input a numerical value, the next item is selected. When you press the "Ctrl" key and arrow-mark key at the same time, you can change the input item.

Entry of a coordinate value comes in the three (3) types; MDI teaching (i.e., direct input of the robot coordinates through the keyboard), remote teaching and direct teaching.

When you use the MDI teaching function, you can omit a plus (+) sign preceding a numerical value and a leading zero (0).

The number of digits of coordinate value you can input is four (4) digits for the integer and two (2) digits for the decimal.

When you use the remote teaching or direct teaching function, click [Tool] – [Coordinate Entry] of the menu bar, and the teaching screen is called on the display, where you can input a coordinate value.

For further information, see Para. 4.4.3.

[Edit] menu

You can execute the following commands from the [Edit] menu of the menu bar.

Cut, Copy, Paste (See Para. 4.3.8.)

Select All, Select Range (See Para. 4.3.9.)

Cancel Range Select (See Para. 4.3.10.)

Search (See Para. 4.3.13.)

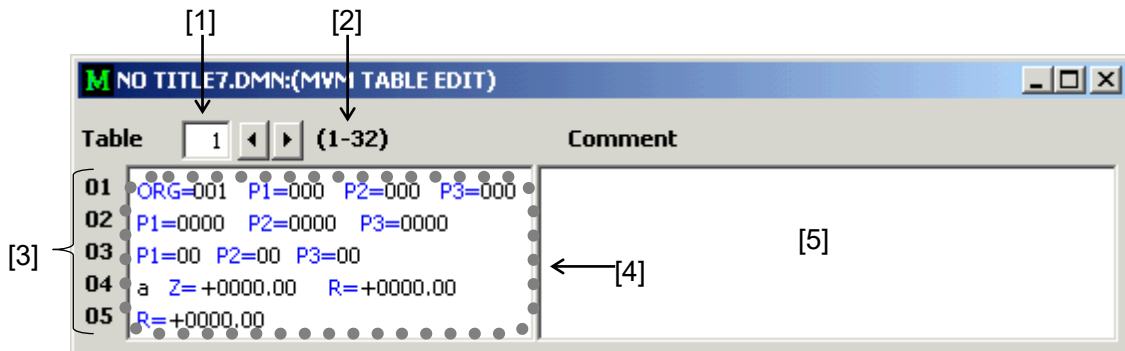
■ 3.6 Editing MVM Table

The palletizing program described in Para. 3.3 allows the robot to perform palletizing operation when you only set various data without using any instruction.

Due to moded palletizing operation, however, the degree of freedom of motions is restricted to some extent. In the sequential program using MVM command, the degree of freedom of motions becomes higher and complex palletizing motions (1 to M, M to 1, sequential movement on matrix, etc.) are possible to compensate for the defects of the palletizing program.

When the setting of the controller is CA01-M05, Editing MVM table is not valid.

■ 3.6.1 Structure of MVM Table Editing Screen



- [1] “Table” column
Select the MVM table number.
Enter the table number directly to the “Table” column, or select the table number by using the arrow-mark buttons shown on the right side.
- [2] Edit range
Displays the edit range of the MVM table.
To change the edit range, click [Tool] – [Set Range] of the menu bar.
For details, see Para. 4.4.1.
- [3] Edit items
The MVM table consists of five (5) items when the controller serves as a enhanced master unit. It is comprised of three (3) items when the controller serves as a master unit.
The contents of each item are shown below.

Step No.	Description
1	Point table number covering matrix origin (ORG), P1 to P2 (P3)
2	No. of points between P1 and P2 (P3)
3	Counter number from P1 to P2 (P3)
4	Z-axis, R-axis approach point (for enhanced master unit only)
5	R-axis destination point (for enhanced master unit only)

[4] Table edit column
You can edit each item of the MVM table.

[5] Comment column
You can enter a comment here.

■ 3.6.2 Editing MVM Table

Input of table contents

To input the table contents, click the edit column of a desired edit item. Then the item you have clicked can be edited.

For the item having choices (Step No.4), double-click the relevant characters, and the choice is changed over and displayed then.

a (Absolute) ⇔ i (Relative)

Enter a numerical value other than the coordinate value directly through the keyboard.

When you press the "Enter" key, the input completes and the cursor moves to the next item.

Input of coordinate value

Entry of a coordinate value comes in the three (3) types; MDI teaching (i.e., direct input through the keyboard), remote teaching and direct teaching.

When you use the MDI teaching function, you can omit a plus (+) sign preceding a numerical value and a leading zero (0).

When you use the remote teaching or direct teaching function, click [Tool] – [Coordinate Entry] of the menu bar, and the teaching screen is called on the display, where you can input a coordinate value.

For further information, see Para. 4.4.3.

Edit range

Displays the edit range of the MVM table.

To change the edit range, click [Tool] – [Set Range] of the menu bar.

For details, see the descriptions on [Set Range].

[Edit] menu

You can execute the following commands from the [Edit] menu of the menu bar.

Cut, Copy, Paste (See Para. 4.3.8.)

Select All (See Para. 4.3.9.)

■ 3.7 Editing Speed and Acceleration/Deceleration Table

The speed table registers the travel speeds of the robot.

The acceleration/deceleration table registers the time until the speed reaches the predetermined speed.

■ 3.7.1 Structure of Speed and Acceleration/Deceleration Table Editing Screen

[1] Table select button

When you click the option button, you can change over the speed table editing screen or acceleration/deceleration table editing screen.

- Speed table

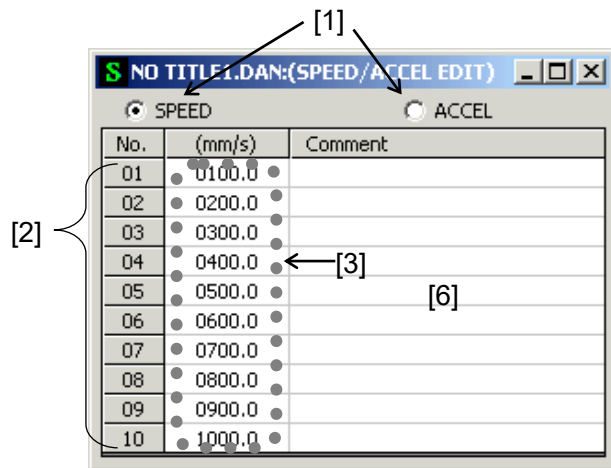
[2] Speed table No.

Displays the speed table numbers lengthwise.

The speed table edit range is 1 through 20 when the setting of the controller is CA25-M10/M40 /M80. When the setting of the controller is CA01-M05, the range is 1 through 8. When the setting of the controller is the others, the range is 1 through 10.

[3] Speed setting column

Specify the speed under the column of "(mm/s)".



- Acceleration/deceleration table

[4] Acceleration/deceleration table No.
 Displays the acceleration/
 deceleration table numbers
 lengthwise.
 The acceleration/deceleration table
 edit range is 1 through 20.
 When the setting of the controller is
 CA01-M05, the range is 1 through 8.

[5] Acceleration/deceleration table
 editing screen
 Specify the acceleration/ deceleration
 under the column of "(s)".

[6] Comment column
 You can enter a comment here.

No.	(s)	Comment
01	0.10	
02	0.15	
03	0.20	
04	0.25	
05	0.30	
06	0.35	
07	0.40	
08	0.45	
09	0.50	
10	0.55	
11	0.60	
12	0.65	
13	0.70	
14	0.75	
15	0.80	
16	0.85	
17	0.90	
18	0.95	
19	1.00	
20	1.05	

■ 3.7.2 Editing Speed and Acceleration/Deceleration Table

Table changeover

The speed table and acceleration/deceleration table are contained in the same editing screen. To change over the speed table editing or acceleration/ deceleration table editing, click the table select button.

Input of numerical value (speed table)

When you click a desired item where you wish to input data by using the mouse, the item is selected and you can enter a numerical value there through the keyboard.

The number of digits of speed you can input is four (4) digits for the integer and one (1) digit for the decimal. The unit is "mm/sec".

You can omit a leading zero (0).

Input of numerical value (acceleration/deceleration table)

When you click a desired item where you wish to input data by using the mouse, the item is selected and you can enter a numerical value there through the keyboard.

The number of digits of acceleration or deceleration you can input is one (1) digit for the integer and two (2) digits for the decimal. The unit is "sec".

[Edit] menu of speed table

You can execute the following command from the [Edit] menu of the menu bar.

Cut, Copy, Paste (See Para. 4.3.8.)

[Edit] menu of acceleration/deceleration table

You can execute the following command from the [Edit] menu of the menu bar.

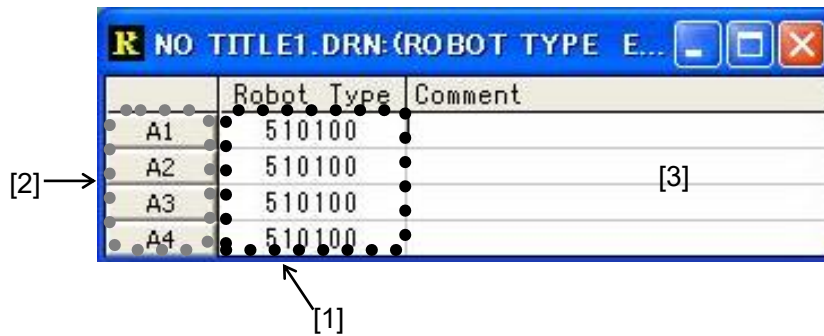
Cut, Copy, Paste (See Para. 4.3.8.)

■ 3.8 Editing Robot Type

The robot type editing screen allows the robot type editing.

The correct robot type is input automatically by selecting an axis model.

■ 3.8.1 Structure of Robot Type Editing Screen



[1] Robot type setting column

Specify the robot type.

[2] Axis number button

A1 to A4 represent the axis 1 to axis 4, respectively. (For enhanced master unit)

When you click the axis number button, the [ROBOT TYPE SELECT] screen of the clicked axis open.

The [ROBOT TYPE SELECT] screen is explained at next page.

You cannot click it in case of [CA25-M10/M40/M80].

[3] Comment column

You can enter a comment here.

■ 3.8.2 Editing Robot Type

Input of robot type

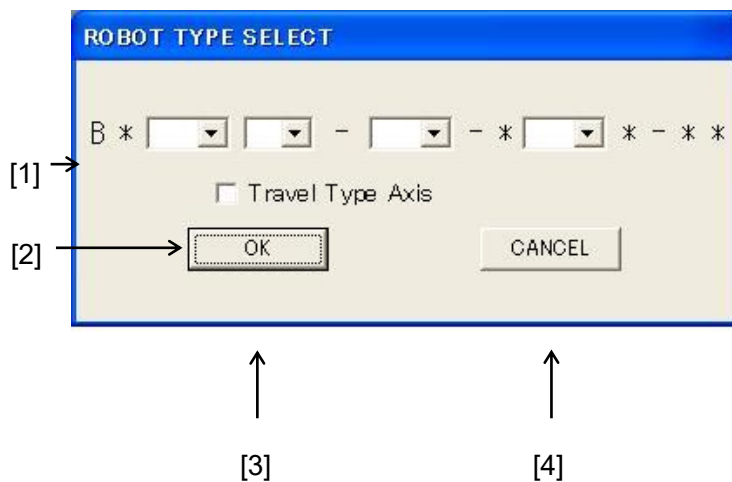
Click a set item you wish to edit, using the mouse and enter a new value.

To move to another input position, press the "Ctrl" key and cursor key at the same time.

Enter a numerical value in the MDI teaching mode. The number of digits of coordinate value you can input is six (6) digits for the integer.

And when you click the axis number button, the [ROBOT TYPE SELECT] screen of the clicked axis open. By selecting the axis model at this screen, the robot type is set automatically.

You cannot set robot type at the [ROBOT TYPE SELECT] screen in case of [CA25-M10/M40/M80].



[1] Dropdown list for robot type select

select an axis model from the dropdown list from the left sequentially.

[2] Check box for robot type select Check the [Travel Type Axis] check box in case of a travel type axis.

When an axis model is selected, in case of the axis that the travel type cannot be selected for, the check box is disable.

[3] OK button

The [ROBOT TYPE SELECT] screen close, the robot type of the selected axis is input at the robot type setting column of robot type editing screen.

And the selected axis model is input automatically at the comment column.

[4] CANCEL button

The [ROBOT TYPE SELECT] screen close, and the system returns to the robot type editing screen.

■ 3.9 Editing Parameter 1

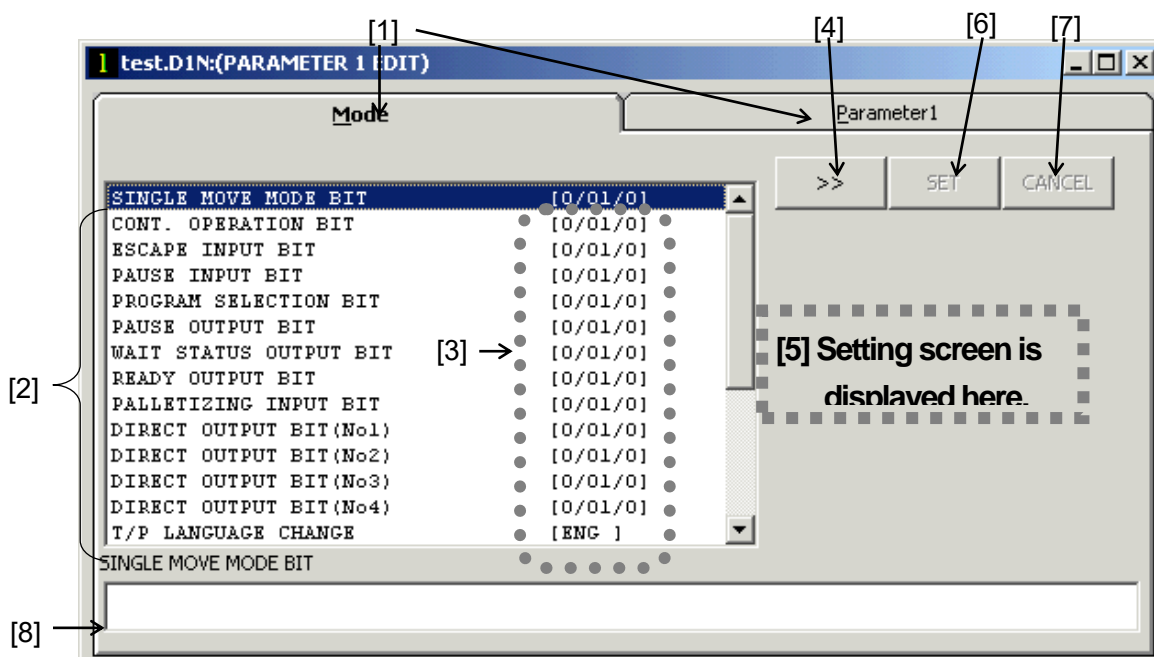
The parameter 1 editing screen allows the mode editing and parameter 1 editing.

As the parameter 1 edit items include the parameter which bans the robot from moving if a value other than the specified range is entered, the parameter 1 cannot be created newly.

To edit the parameter 1, receive it once from the controller and edit.

■ 3.9.1 Structure of Parameter 1 Editing Screen

- Mode setting sheet



- [1] Edit item select tab

The parameter 1 editing screen consists of the two (2) sheets; mode setting sheet and parameter 1 setting sheet.

To select the mode setting sheet, click the [Mode] tab. To select the parameter 1 setting sheet, click the [Parameter1] tab.

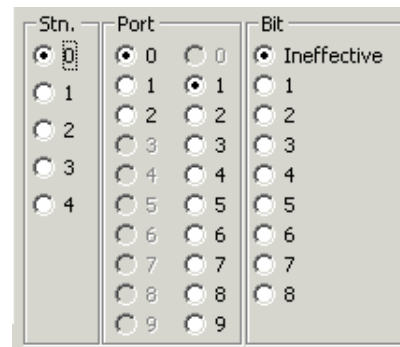
- [2] Set items

The items that can be set on the mode setting sheet are displayed.

[3] Set contents
The set contents of each item are displayed.

[4] Setting screen display button
When you click this button, you can call the setting screen of a selected set item.

[5] Setting screen
You can perform setting of each item.
The setting screen differs with each set item.
Use the option buttons to perform setting.

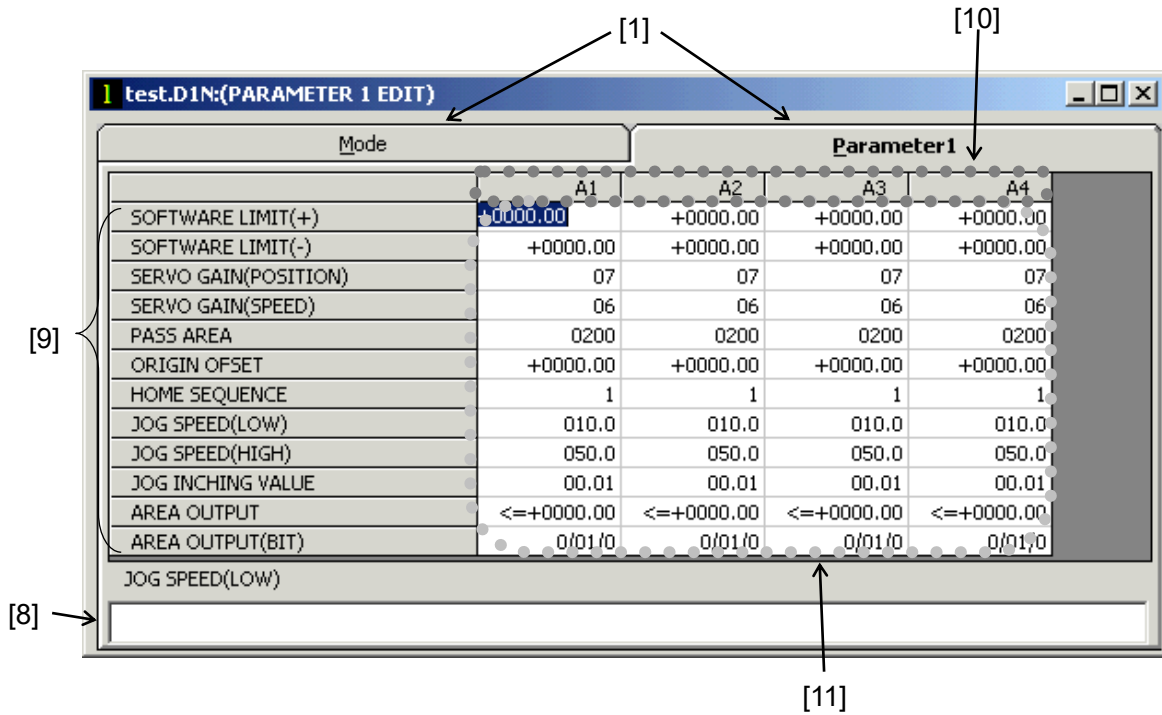


[5] Setting screen

[7] [CANCEL] button
The contents as changed on the setting screen are invalid, and the set contents remain unchanged.

[8] Comment column
You can enter a comment here. The comment can be input for each item.

- Parameter 1 setting sheet



- [9] Set items

The items that can be set on the parameter 1 setting sheet are displayed.

- [10] Axis display

A1 to A4 represent the axis 1 to axis 4, respectively. (For enhanced master unit)

- [11] Numerical value input column

Perform setting of each item.

■ 3.9.2 Editing Parameter 1

- Mode setting sheet

Mode setting

Display a set item you wish to edit by using the scroll bar.

Double-click a desired item, or click the item followed by the setting screen display button [>>], and the setting screen is displayed according to the type of selected item.

Perform setting on the setting screen, using the option buttons.

After the setting has finished, click the [SET] button, and the set contents are updated.

When you click the [CANCEL] button, the new setting becomes invalid with the setting screen closed.

- Parameter 1 setting sheet

Parameter 1 setting

Click a set item you wish to edit, using the mouse and enter a new value.

To move to another input position, press the "Ctrl" key and cursor key at the same time.

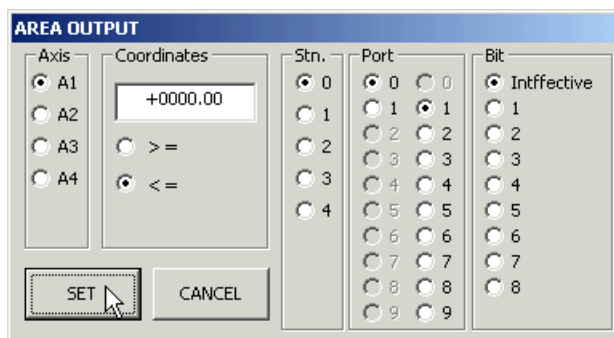
Input of numerical value

Enter a numerical value in the MDI teaching mode.

You can omit a plus (+) sign preceding the numerical value and a leading zero (0). The number of digits of coordinate value you can input is four (4) digits for the integer and two (2) digits for the decimal.

Setting of area output

When you press the "Enter" key under the column of "AREA OUTPUT (Coordinates)" or "AREA OUTPUT (BIT)", the "AREA OUTPUT" setting screen as shown right appears. Perform setting of the area output on this screen.



- [Axis] column
Specify the axis for which the area output is to be set.
A1 to A4 signify the axis 1 to axis 4, respectively.
- [Coordinates] column
Specify the coordinate for area output of the axis as designated under the [Axis] column.
Also, select ">=" or "<=" by means of the option button.
- "Stn.", "Port" and "Bit" columns
Specify the station number [Stn.], port number [Port] and bit number [Bit] to be output, using the option buttons.

Click the [SET] button, and the area output is set.

■ 3.10 Editing Parameter 2

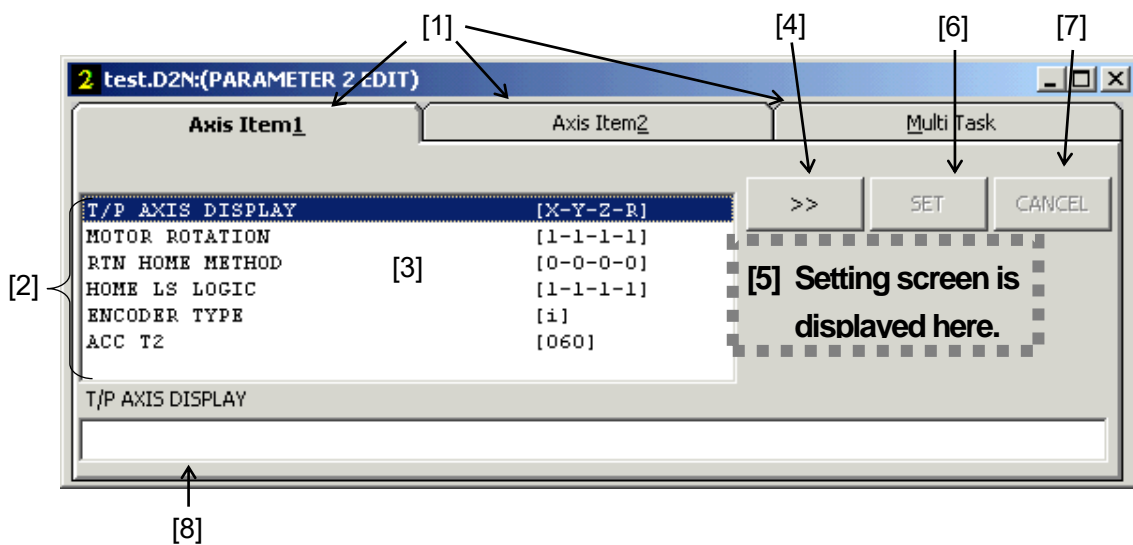
The parameter 2 editing screen allows the parameter 2 editing.

As the parameter 2 edit items include the parameter which bans the robot from moving if a value other than the specified range is entered, the parameter 2 cannot be created newly.

To edit the parameter 2, receive it once from the controller and edit.

■ 3.10.1 Structure of Parameter 2 Editing Screen

- Axis Item 1 setting sheet



- [1] Edit item select tab

The parameter 2 editing screen consists of the three (3) sheets; [Axis Item1] setting sheet, [Axis Item2] setting sheet and [Multi Task] setting sheet.

To select the [Axis Item1] setting sheet, click the [Axis Item1] tab. Likewise, to select the [Axis Item2] setting sheet, click the [Axis Item2] tab. To choose the [Multi Task] setting sheet, click the [Multi Task] tab.

- [2] Set items

The items that can be set on the [Axis Item1] setting sheet are displayed.

- [3] Set contents

The set contents of each item are displayed.

[4] Setting screen display button

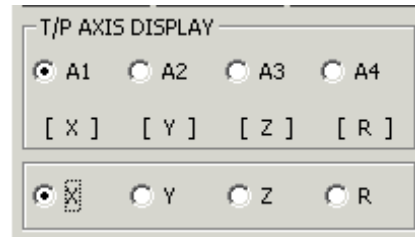
When you click this button, you can call the setting screen of a selected set item.

[5] Setting screen

You can perform setting of each item.

The setting screen differs with each set item.

Use the option buttons to perform setting.



[5] Setting screen

[6] [SET] button

The set contents change to those as set on the setting screen.

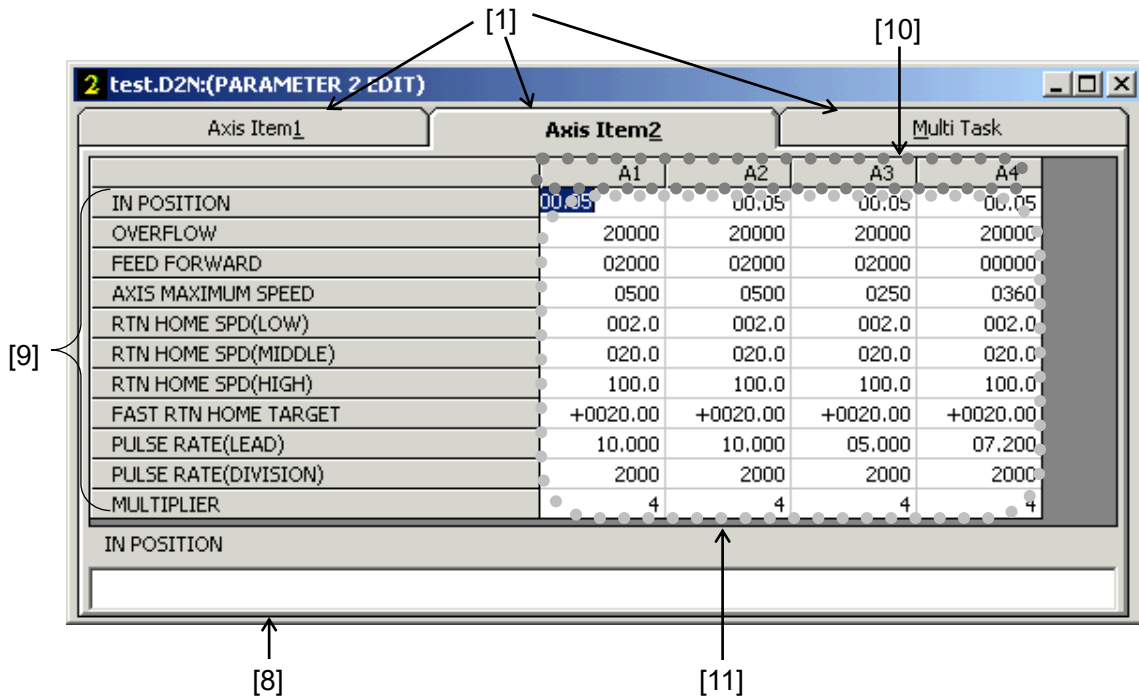
[7] [CANCEL] button

The contents as changed on the setting screen are invalid, and the set contents remain unchanged.

[8] Comment column

You can enter a comment here. The comment can be input for each item.

- [Axis Item2] setting sheet



[9] Set items

The items that can be set on the [Axis Item2] setting sheet are displayed.

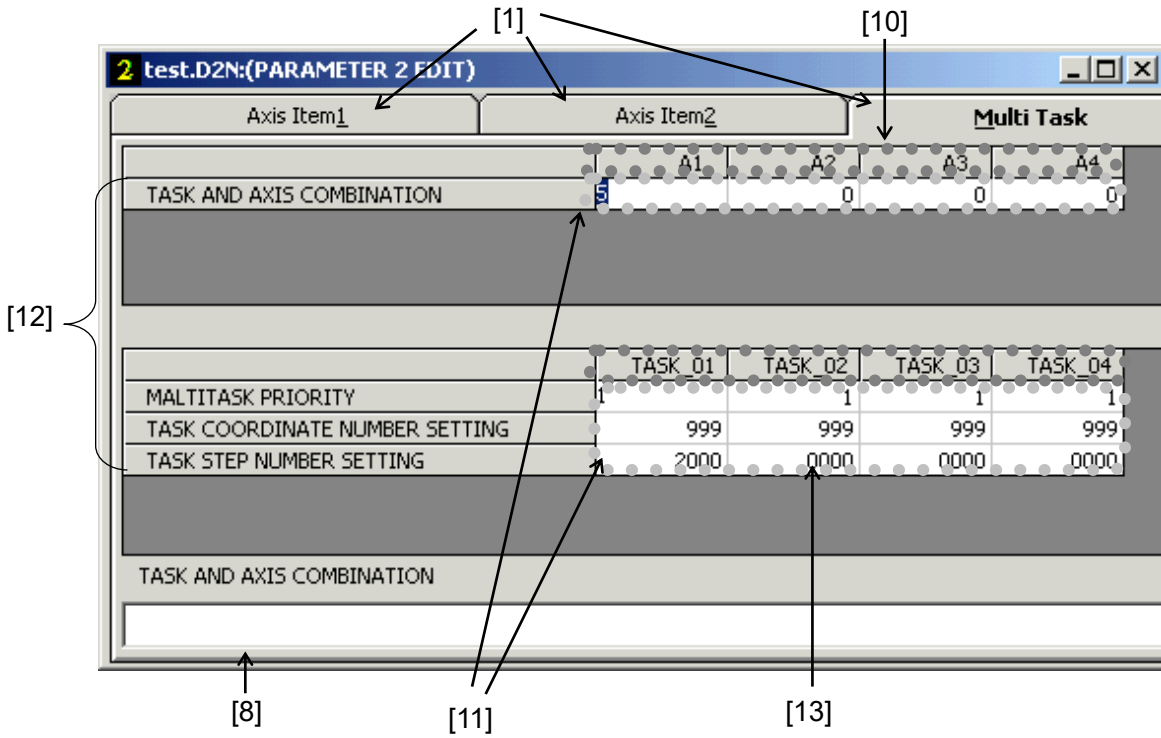
[10] Axis display

A1 to A4 represent the axis 1 to axis 4, respectively. (For enhanced master unit)

[11] Numerical value input column

Perform setting of each item.

- [Multi Task] setting sheet



[12] Set items

The items that can be set on the [Multi Task] setting sheet are displayed.

[13] Task display

Task 1 to task 4 are displayed.

■ 3.10.2 Editing Parameter 2

- [Axis Item1] setting sheet

[Axis Item1] setting

Double-click a desired item, or click the item followed by the setting screen display button [>>], and the setting screen is displayed according to the type of selected item.

Perform setting on the setting screen, using the option buttons.

After the setting has finished, click the [SET] button, and the set contents are updated.

When you click the [CANCEL] button, the new setting becomes invalid with the setting screen closed.

- [Axis Item2] setting sheet

[Axis Item2] setting

Click a set item you wish to edit, using the mouse and enter a new value.

To move to another input position, press the "Ctrl" key and cursor key at the same time.

Input of numerical value

Enter a numerical value in the MDI teaching mode.

You can omit a plus (+) sign preceding the numerical value and a leading zero (0). The number of digits of coordinate value you can input is four (4) digits for the integer and two (2) digits for the decimal.

- [Multi Task] setting sheet

[Multi Task] setting

Click a set item you wish to edit, using the mouse and enter a new value.

To move to another input position, press the "Ctrl" key and cursor key at the same time.

Input of numerical value

Enter a numerical value in the MDI teaching mode.

You can omit a leading zero (0) of the numerical value.

■ 3.11 Editing Parameter 3

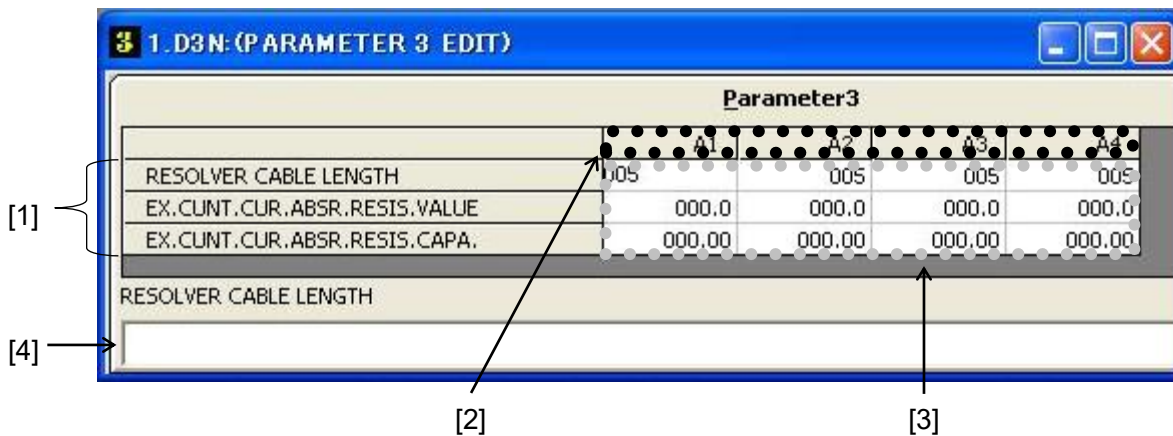
The parameter 3 editing screen allows the parameter 3 editing.

As the parameter 3 edit items include the parameter which bans the robot from moving if a value other than the specified range is entered, the parameter 3 cannot be created newly.

To edit the parameter 3, receive it once from the controller and edit.

* Only when the setting of the controller is CA20-M00/M01, CA10-M00(B)/M01(B), Editing parameter 3 is valid.

■ 3.11.1 Structure of Parameter 3 Editing Screen and Editing



[1] Set items

The items that can be set on the parameter 3 file are displayed.

[2] Axis display

A1 to A4 represent the axis 1 to axis 4, respectively. (For enhanced master unit)

[3] Numerical value input column

Perform setting of each item.

Click a set item you wish to edit, using the mouse and enter a new value.

To move to another input position, press the "Ctrl" key and cursor key at the same time.

Enter a numerical value in the MDI teaching mode. You can omit a plus (+) sign preceding the numerical value and a leading zero (0).

[4] Comment column

You can enter a comment here. The comment can be input for each item.

3.12 Editing Point Table (for CA01-M05)

The point table editing screen allows the point table editing.

* Only when the setting of the controller is CA01-M05, Editing point table is valid.

3.12.1 Structure of Point table (CA01-M05) Editing Screen

The top screenshot shows the 'POINT TABLE EDIT' screen with the following table structure:

No.	UPPER ROW: NORMAL OPERATION							LOWER ROW: TORQUE LIMIT OPERATION	
	OPERATION METHOD	COORDINATE	SPEED TABLE No.	ACCEL TABLE No.	DECEL TABLE No.	AREA TABLE No.	MOVEMENT MODE	UNUSED TRQ LIMIT TABLE No.	TIMER TRQ LIMIT JUDGMENT TIME
01	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
02	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
03	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
04	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
05	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
06	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
07	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
08	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
09	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
10	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
11	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
12	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
13	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
14	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000
15	NORMAL	0000.00	1	5	5	0	a, AGING=OFF	8	0.000

The bottom screenshot shows the 'POINT TABLE EDIT' screen with the following table structure:

No.	UPPER ROW: NORMAL OPERATION			LOWER ROW: TORQUE LIMIT OPERATION		Comment
	TIMER TRQ LIMIT JUDGMENT TIME	IN-POSITION 2 TRQ LIMIT MOVE AMOUNT	UNUSED TRQ LIMIT MOVE SPEED	UNUSED TRQ LIMIT OPTION		
01	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
02	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
03	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
04	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
05	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
06	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
07	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
08	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
09	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
10	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
11	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
12	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
13	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
14	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		
15	0.000	000.00	010.0	TE=OFF, LE=OFF, AE=OFF, DD=ON		

- [1] Point table No.
Displays the point table numbers lengthwise.
The point table edit range is 1 through 15.
- [2] Set items
The items that are common in normal operation and torque limit operation are displayed.
- [3] Set items
The items that are used in normal operation are displayed in the upper side. The items that are used in torque limit operation are displayed in the lower side.
- [4] Numerical value input column
Perform setting of each item.
- [5] Comment column
You can enter a comment here.

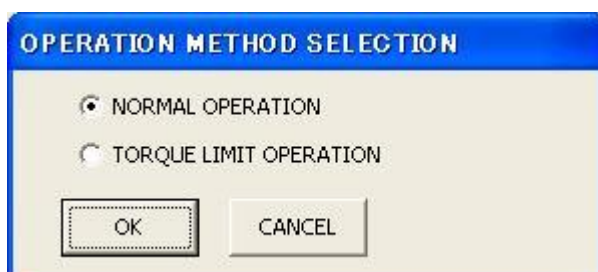
■ 3.12.2 Editing Point Table (CA01-M05)

Input of numerical value

Click a set item you wish to edit, using the mouse and enter a new value. To move to another input position, press the "Ctrl" key and cursor key at the same time. Enter a numerical value in the MDI teaching mode. You can omit a plus (+) sign preceding the numerical value and a leading zero (0). The number of digits of coordinate value you can input is four (4) digits for the integer and two (2) digits for the decimal.

Setting of operation method

When a numeric keypad is pushed in operation method column, operation method selection screen appears. Setting of operation method is performed in this screen. Specify normal operation or torque limit operation.



Setting of movement mode

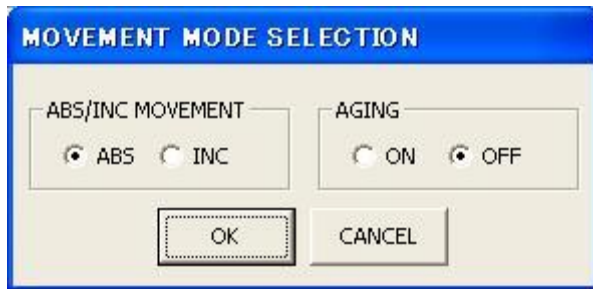
When a numeric keypad is pushed in movement mode column, movement mode selection screen appears. Setting of operation method is performed in this screen.

- ABS/INC movement

Specify absolute movement or incremental movement.

- Aging

Specify aging operation is on or off.



Setting of torque limit option

When a numeric keypad is pushed in trq limit option column, torque limit option selection screen appears. Setting of torque limit option is performed in this screen.

- Torque limit end

Specify torque limit end is on or off.

- Lock end

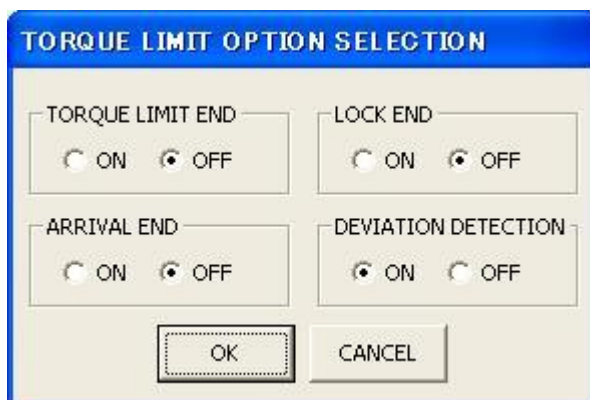
Specify lock end is on or off.

- Arrival end

Specify torque limit end is on or off.

- Deviation detection

Specify positional deviation exceeded detection is on or off.



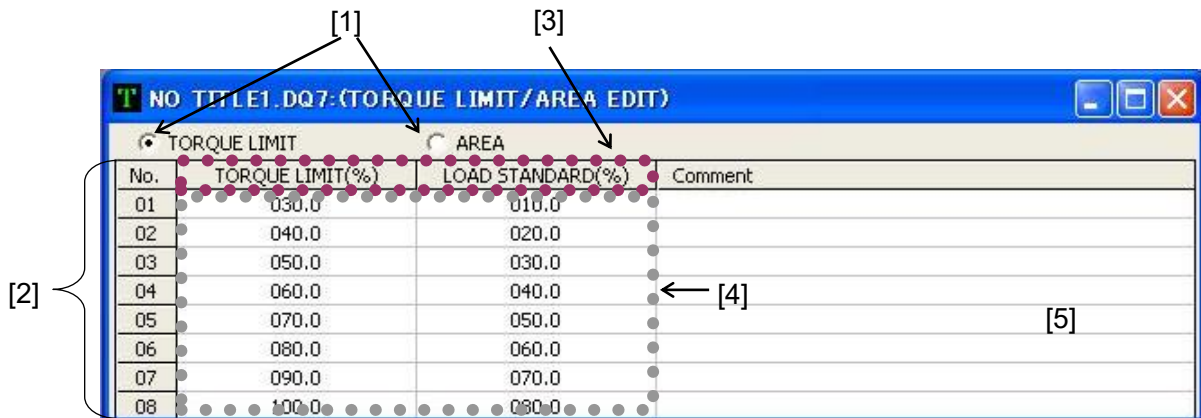
■ 3.13 Editing Torque Limit and Area Table

The torque limit and area table editing screen allows the torque limit and area table editing.

* Only when the setting of the controller is CA01-M05, Editing torque limit and area table is valid.

■ 3.13.1 Structure of Torque Limit and Area Table Editing Screen

•Torque limit table editing screen



[1] Table select button

When you click the option button, you can change over the torque limit table editing screen or area table editing screen.

[2] Torque limit table No.

Displays the torque limit table numbers lengthwise.

The torque limit table edit range is 1 through 8.

[3] Set items

The items that can be set on the torque limit table are displayed.

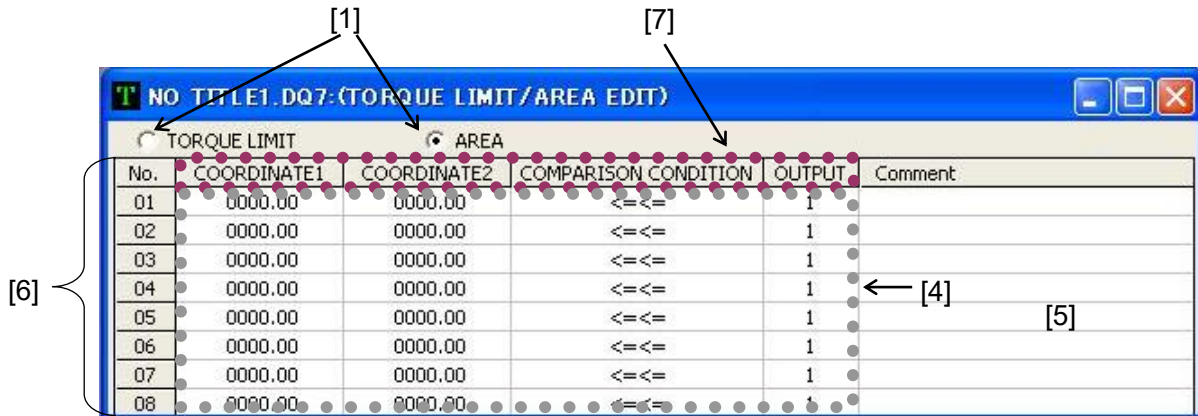
[4] Numerical value input column

Perform setting of each item.

[5] Comment column

You can enter a comment here.

•Area table editing screen



[6] Area table No.

Displays the area table numbers lengthwise.

The area table edit range is 1 through 8.

[7] Set items

The items that can be set on the area table are displayed.

■ 3.13.2 Editing Torque Limit and Area Table

Table changeover

The torque limit table and area table are contained in the same editing screen.

To change over the torque limit table editing or area table editing, click the table select button.

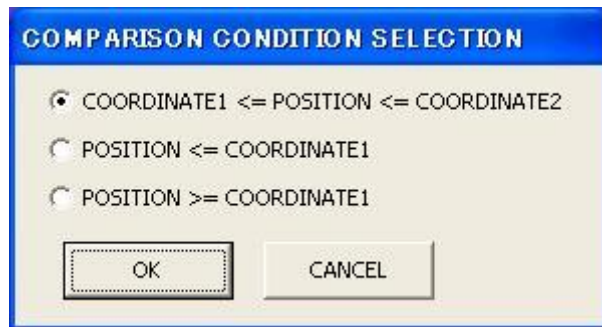
Input of numerical value

Click a set item you wish to edit, using the mouse and enter a new value. To move to another input position, press the "Ctrl" key and cursor key at the same time. Enter a numerical value in the MDI teaching mode. You can omit a plus (+) sign preceding the numerical value and a leading zero (0). The number of digits of coordinate value you can input is four (4) digits for the integer and two (2) digits for the decimal.

Setting of comparison condition

When a numeric keypad is pushed in comparison condition column, comparison condition selection screen appears. Setting of comparison condition is performed in this screen.

Specify one from the three of [coordinate1 <= position <= coordinate2] and [position <= coordinate1] and [position >= coordinate1].



COMPARISON CONDITION SELECTION

COORDINATE1 <= POSITION <= COORDINATE2

POSITION <= COORDINATE1

POSITION >= COORDINATE1

OK CANCEL

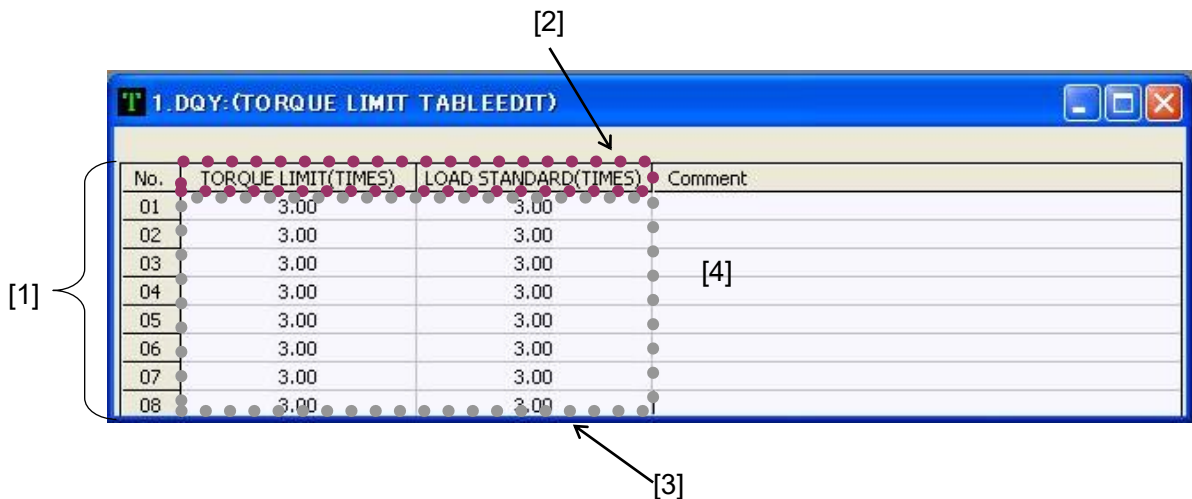
■ 3.14 Editing Torque Limit Table

The torque limit table editing screen allows the torque limit table editing.

* Only when the setting of the controller is CA25-M10/M40/M80, Editing torque limit table is valid.

■ 3.14.1 Structure of Torque Limit Table Editing Screen

•Torque limit table editing screen



[1] Torque limit table No.

Displays the torque limit table numbers lengthwise.

The torque limit table edit range is 1 through 8.

[2] Set items

The items that can be set on the torque limit table are displayed.

[3] Numerical value input column

Perform setting of each item.

[4] Comment column

You can enter a comment here.

■ 3.14.2 Editing Torque Limit and Area Table

Input of numerical value

Click a set item you wish to edit, using the mouse and enter a new value. To move to another input position, press the "Ctrl" key and cursor key at the same time. Enter a numerical value in the MDI teaching mode.

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Chapter 4 Menu Bar

■ 4.1 Details of Menu Bar Items

■ 4.1.1 Start, Edit and Run Screens

This tool comprises the three (3) types of screen; start screen, edit screen and run screen, and the contents of commands of the menu bar which can be executed differ with each screen.

The contents of the three (3) different screens are as follows:

Start screen

The initial screen which appears where this tool was started.

Neither a program, table or parameter is being edited, and program execution or monitor is not going on.

Edit screen

A program, table or parameter is being edited.

Run screen

A program sent to the controller is being executed, jog operation is being executed and they are being monitored.

Once this tool has started, the start screen prevails. Then, when you wish to edit a program or table, or wish to execute a program, the edit screen or run screen can be called on the display, respectively.

In other words, no program can be executed during editing. Or no program can be edited during execution.

■ 4.1.2 Details of Menu Bar Items

The contents of commands of the menu bar which can be executed differ with each screen (start screen, edit screen and run screen).

The table below shows the contents of commands of the menu bar when each screen is called on the display. Mark "O" signifies the command that can be executed. Mark "X" means the command that cannot be executed.

Though the [Edit] various commands can be executed only on the edit screen, commands that can be executed differ further according to the file being edited. For details, see Para. 4.3.1.


Menu	Command	Start	Edit	Run
[File]	New	O	O	X
	Open	O	O	X
	Close	X	O	X
	Save	X	O	X
	Save As	X	O	X
	Import	O	X	X
	Print	O	O	X
	End	O	O	X
[Edit]	[Edit] various commands	X	O	X
	* The contents of [Edit] commands differ with the file being edited.			
[Tool]	Set Range	X	O	X
	Syntax Check	X	O	X
	Coordinate Entry	X	O	X
	Code-Display On(Off)	X	O	X
[Operation]	Emergency Stop Circuit Check	O	X	X
	Run	O	X	X
	Monitor	O	X	X
	Send to Controller	O	X	X
	Receive from Controller	O	X	X
	Online edit	O	X	X

Menu	Command	Start	Edit	Run
[Option]	Group Setting	O	O	X
	System Environment	O	X	X
	Set Robot Type	O	X	X
	Controller Version	O	X	X
	File Convert	O	X	X
	Program Compare	O	X	X
	Error History	O	X	X
	Memory Initialization	O	X	X
[Window]	Cascade	X	O	O
	Horizontal Tile	X	O	O
	Vertical Tile	X	O	X
[Help]	About SF-98D	O	O	O

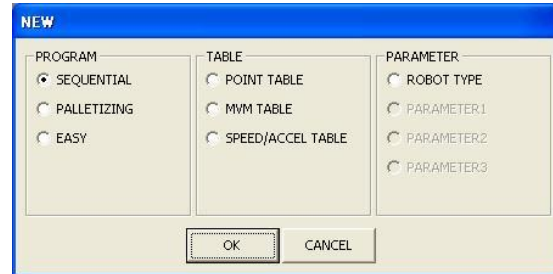
■ 4.2 File

■ 4.2.1 New

This command is used to create a new program or table.

Click [File] – [New] of the menu bar, or click the  button on the tool bar.

A window for selecting the program or table you wish to edit is displayed. Select the desired one and click the [OK] button. Then the selected program or table editing screen opens.



* As the Parameter 1, Parameter 2 and Parameter 3 include the parameters which prohibit the robot from moving if a value other than the specified range is entered, they cannot be created newly. To edit the parameter, receive it once from the controller and edit.


* When any editing screens are not opened, the screen as shown right is displayed.

Select the used controller and click the [OK] button.

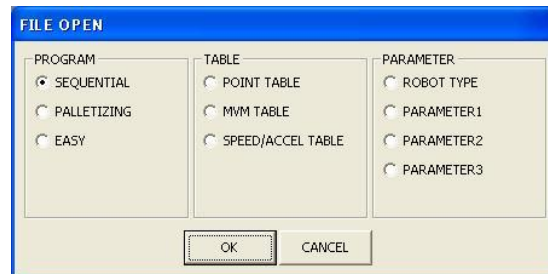


■ 4.2.2 Open

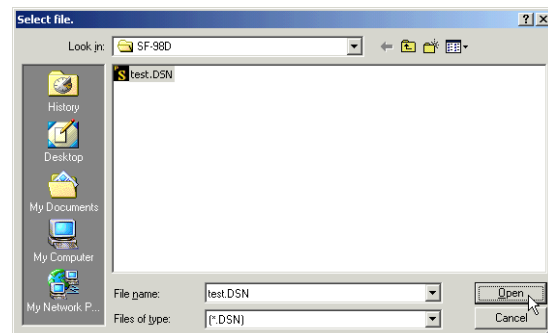
This command is used to edit the existing program or table.

Click [File] – [Open] of the menu bar, or click the  button on the tool bar.

A window for selecting the program, table or parameter you wish to edit is displayed. Select the desired one and click the [OK] button.



Next, a window for specifying the file is displayed. Specify the file you wish to edit and click the [Open] button. Then the selected file editing screen opens.

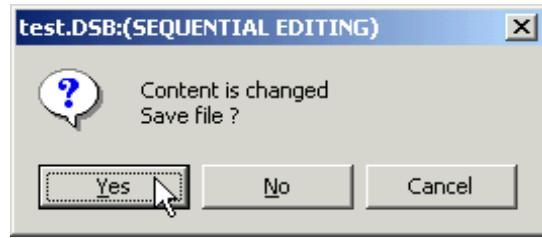


■ 4.2.3 Close

This command is used to close the active screen.

Click [File] – [Close] of the menu bar, and the editing screen closes.

If the file contents have been changed, the system displays a message for confirming the saving. When you wish to close the screen after saving, click [Yes].

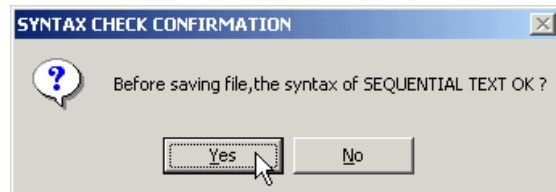


When you wish to close the screen without saving, click [No]. When you wish to return to the editing screen, click [Cancel].

When saving the newly created program or table, a window for specifying the file name is displayed. Specify the file name and click the [Save] button.

* When saving the sequential program, a message of [SYNTAX CHECK CONFIRMATION] is also displayed.

When you wish to perform program check, click [Yes]. When you do not wish, click [No].



■ 4.2.4 Save

This command is used to save the contents of the active screen under the same file name as that when the file was opened.

Click [File] – [Save] of the menu bar, or click the  button on the tool bar, and the file is saved.

* When saving the sequential program, a message of [SYNTAX CHECK CONFIRMATION] is also displayed.

When you wish to perform program check, click [Yes]. When you do not wish, click [No].

■ 4.2.5 Save As

This command is used to save the contents of the active screen under a new file name.

Click [File] – [Save As] of the menu bar, and a window for specifying the file name is displayed. Specify the file name and click the [Save] button.

* When saving the sequential program, a message of [SYNTAX CHECK CONFIRMATION] is also displayed.

When you wish to perform program check, click [Yes]. When you do not wish, click [No].

■ 4.2.6 Import

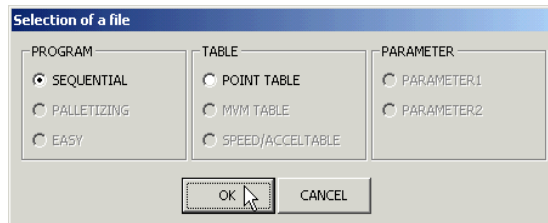
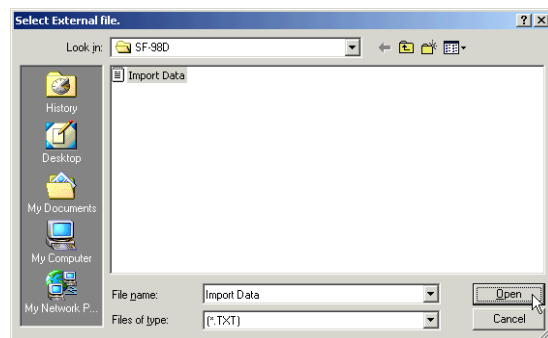
It is possible to open a file with [.CSV] or [.TXT] extension as the sequential program file or point table file.

Click [File] – [Import] of the menu bar, and the [Select External file] screen appears. Select [*.*CSV] or [*.*TXT] from the dropdown menu of “Files of type”, specify the file you wish to open under the column of “File name”, then click [Open].

Next, as the screen for specifying the file format is displayed, select either [SEQUENTIAL] or [POINT TABLE], and click the [OK] button.

The external data file opens according to the specified file format.

When the external data file has been imported, the screen is as shown below.



- When the file with [.TXT] extension has been opened as the sequential file:

```

Import Data - Notepad
File Edit Format Help
ACC A=01
SPD V=01
OFS X=+0100.00 Y=+0100.00 Z=+0000.00 R=+0000.00
CNT CN01=0000
TAG TAG=001
CNT+ CN01=0001
MOV a PT=001 CN=00 T V=00 PASS
MOV a PT=002 CN=00 T V=00 PASS
MVCP a PT=003 CN=00 V=00 PASS
MVCP a PT=004 CN=00 V=00 PASS
MVCP a PT=006 CN=00 V=00 PASS
MVCP a PT=007 CN=00 V=00 PASS
JMPC TAG=002 CN01= 0002
JMP TAG=001
TAG TAG=002
MOV a PT=001 CN=00 T V=00 PASS
HOME
END

```



Import Data.D5B:(SEQUENTIAL EDITING)

ACC A=01

Range: 0001 0018 Edit Mode: Insert TASK No. 01

No.	Code	Comment
0001	ACC A=01	
0002	SPD V=01	
0003	OFS X=+0100.00 Y=+0100.00 Z=+0000.00 R=+0000.00	
0004	CNT CN01=0000	
0005	TAG TAG=001	
0006	CNT+ CN01=0001	
0007	MOV a PT=001 CN=00 T V=00 PASS	
0008	MOV a PT=002 CN=00 T V=00 PASS	
0009	MVCP a PT=003 CN=00 V=00 PASS	
0010	MVCP a PT=004 CN=00 V=00 PASS	
0011	MVCP a PT=006 CN=00 V=00 PASS	
0012	MVCP a PT=007 CN=00 V=00 PASS	
0013	JMPC TAG=002 CN01= 0002	
0014	JMP TAG=001	
0015	TAG TAG=002	
0016	MOV a PT=001 CN=00 T V=00 PASS	
0017	HOME	
0018	END	

- When the file with [.CSV] extension has been opened as the point table file:

```

Import Data.csv - Notepad
File Edit Format Help
20,0,192.8,30
6,0,*
1.75,20,*,24,
0,15,*
0,30.55,*
1.1,36.55
0
6.52,41.02
8,44.83,*
6,96,51.3,*
4,5,57.2,*
4,5,83.36,*
7,4,86.51,*
8,25,89.6,*

```




Import Data.DTN:(POINT TABLE EDIT)

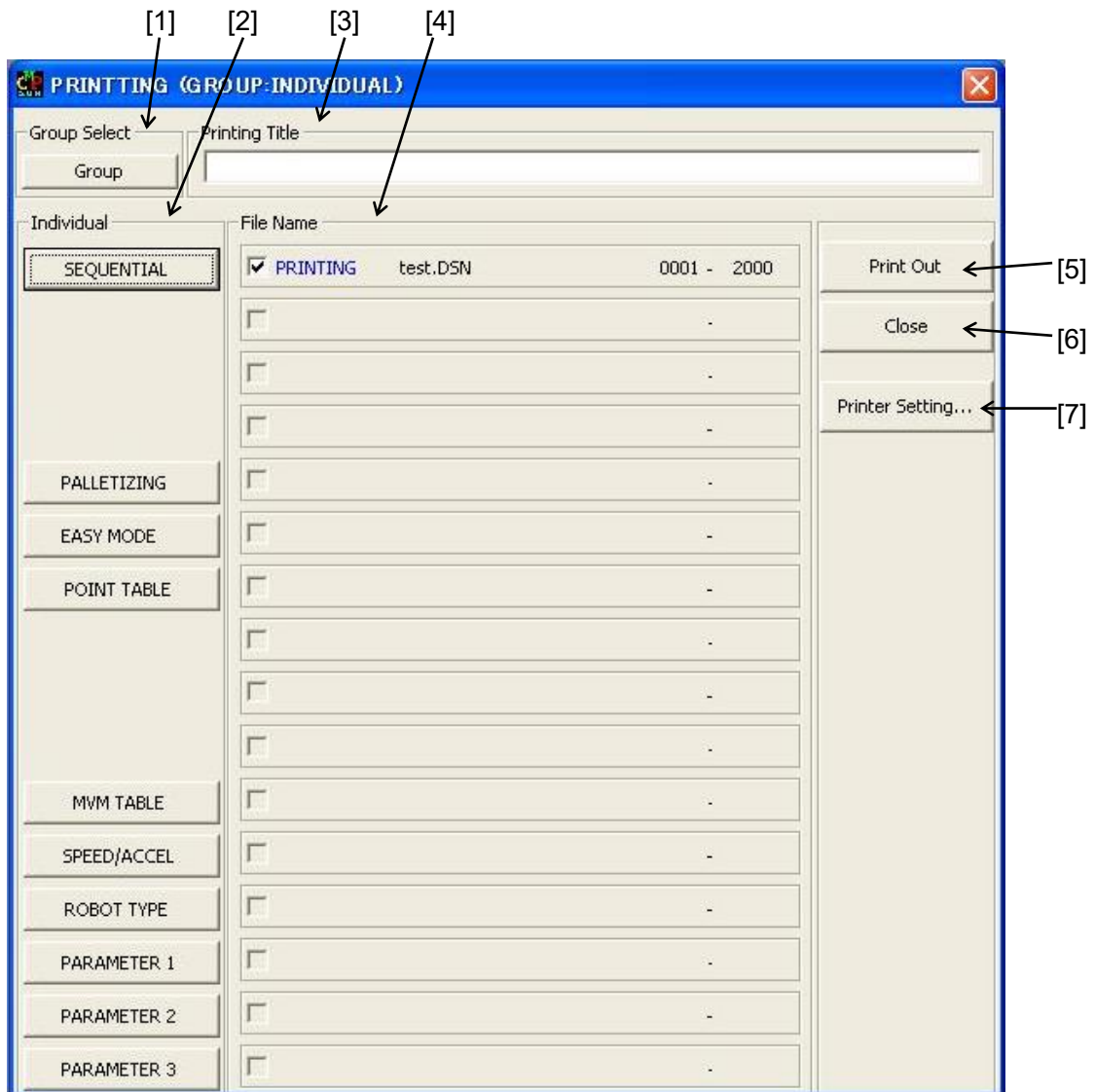
(Point Table No. 1- 16) TASK No. 01

No.	A1	A2	A3	A4	Comment
001	+0020.00	+0000.00	+0192.80	+0030.00	
002	+0006.00	+0000.00	*****	+0000.00	
003	+0001.75	+0020.00	*****	+0024.00	
004	+0000.00	+0015.00	*****	+0000.00	
005	+0000.00	+0030.55	*****	+0000.00	
006	+0001.10	+0036.55	+0000.00	+0000.00	
007	+0000.00	+0000.00	+0000.00	+0000.00	
008	+0006.52	+0041.02	+0000.00	+0000.00	
009	+0008.00	+0044.83	*****	+0000.00	
010	+0006.96	+0051.30	*****	+0000.00	
011	+0004.50	+0057.20	*****	+0000.00	
012	+0004.50	+0083.36	*****	+0000.00	
013	+0007.40	+0086.51	*****	+0000.00	
014	+0008.25	+0089.60	*****	+0000.00	
015	+0000.00	+0000.00	+0000.00	+0000.00	
016	+0000.00	+0000.00	+0000.00	+0000.00	

■ 4.2.7 Print

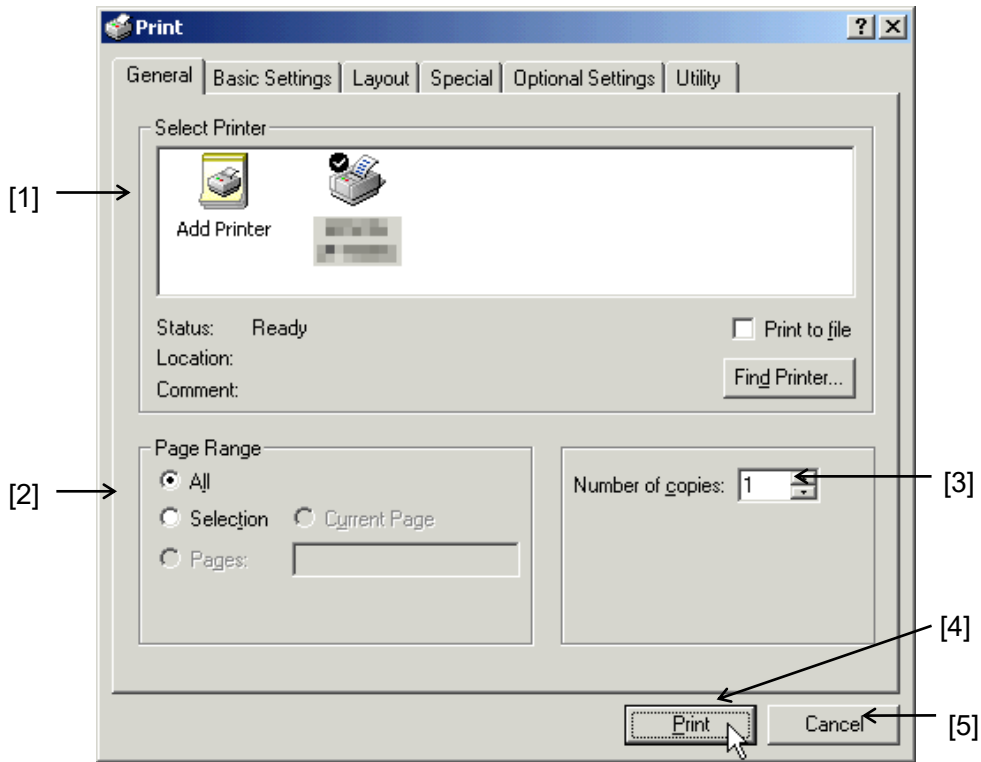
Click [File] – [Print] of the menu bar, or click the  button on the tool bar. Then the printing screen is displayed as shown below.

- Structure of printing screen



- [1] [Group Select] column
 [Group] Used to specify the group file.
- [2] [Individual] column
 [SEQUENTIAL] Used to specify the sequential text file.
 [PALLETIZING] Used to specify the palletizing text file.
 [EASY MODE] Used to specify the easy text file.
 [POINT TABLE] Used to specify the point table file.
 [MVM TABLE] Used to specify the MVM table file.
 [SPEED/ACCEL] Used to specify the speed or acceleration/
 deceleration table file.
 [PARAMETER1] Used to specify the parameter 1 file.
 [PARAMETER2] Used to specify the parameter 2 file.
 [PARAMETER3] Used to specify the parameter 3 file.
 [TORQUE LIMIT/AREA TABLE] Used to specify the torque limit / area table file.
 [TORQUE LIMIT TABLE] Used to specify the torque limit table file.
- [3] "Printing Title" column
 When you enter characters as the printing title under this column, they are printed on all pages.
- [4] "File Name" column
 The file name and edit range of each file as selected under "Group Select" or "Individual" are displayed. It is also possible to select printing ON or OFF of each file by setting ON or OFF the check box.
- [5] [Print Out] button
 When the file or files you wish to print have been established, click the [Print Out] button. All files whose printing are specified by each check box are printed.
- [6] [Close] button
 To close this screen, click the [Close] button.
- [7] [Printer Setting] button
 To perform setting of the printer connected to the computer, click the [Printer Setting] button. Then the printer setting screen appears on the display.

- Printer setting screen



[1] "Select Printer" column

When two (2) or more printers are connected to the personal computer, select a printer you wish to use from the "Printer Name" list.

When you click the [Property] button, the property of the selected printer is displayed.

The set contents of the [Property] screen differ with the printer to be used.

For the setting, see each printer instruction manual.

[2] [Page Range] column

Set the printing range by using the option button.

[3] [Number of copies]

Specify the number of copies to be printed.

[4] [OK] (or [Print]) button

When you wish to make the setting operative, click the [OK] button. Then the setting becomes effective with the printing screen closed.

[5] [Cancel] button

When you wish to cancel the setting, click the [Cancel] button. Then the changed setting becomes ineffective with the printing screen closed.

- How to print

Firstly, specify the program or table file you wish to print from [Group Select] or [Individual].

When you select [Group Select], click the [Group] button. When you choose [Individual], click a desired button signifying the program or table name. Then the screen for specifying the file appears.

Specify a file you wish to print and click the [Open] button.

The specified file is displayed under [File Name] and a check mark is put to the "PRINTING" check box.

To stop printing of the specified file, clear the check mark put to the "PRINTING" check box.

When the file or files you wish to print have been established, click the [Print Out] button. All files whose printing are specified by each check box are printed.

■ 4.2.8 End

Click [File] – [End] of the menu bar, or click the close [X] button on the upper right of the screen. Then this tool terminates.

When you execute the [End] command on the edit screen, the screen for confirming the saving appears if the file contents have been changed.

When you wish to close the screen after saving, click [Yes].

When you wish to close the screen without saving, click [No]. When you wish to return to the editing screen, click [Cancel].

When saving the newly created program or table, a window for specifying the file name is displayed. Specify the file name and click the [Save] button.

* When saving the sequential program, a message of [SYNTAX CHECK CONFIRMATION] is also displayed.

When you wish to perform program check, click [Yes]. When you do not wish, click [No].

■ 4.3 Editing

■ 4.3.1 Details of Edit Commands

For the [Edit] various commands, commands which can be executed differ with the file currently edited.

The table below shows the contents of the edit commands. Mark "O" signifies the command that can be executed. Mark "X" means the command that cannot be executed.

Edit menu	Program			Table				
	Seq.	Pal.	Esy.	Point	MVM	Spd.	Pnt.	Trq.
Undo	0	X	X	X	X	X	X	X
Line Insert	0	X	0	X	X	X	X	X
Line Delete	0	X	0	0	X	X	X	X
Insert By Line Number Range	0	X	X	X	X	X	X	X
Delete By Line Number Range	0	X	X	X	X	X	X	X
Program Clear	0	X	0	X	X	X	X	X
Cut	0	0	0	0	0	0	0	0
Copy	0	0	0	0	0	0	0	0
Paste	0	0	0	0	0	0	0	0
Select All	0	0	0	0	0	X	X	X
Select Range	0	X	0	0	X	X	X	X
Cancel Range Select	0	X	0	0	X	X	X	X
Step Search (Search)	0	X	0	0	X	X	X	X
Tag Search	0	X	X	X	X	X	X	X
I/O usage	0	X	X	X	X	X	X	X

* The abbreviations shown on top of the above table signify as follows.

- Seq. : Sequential program
- Pal. : Palletizing program
- Esy. : Easy program
- Point : Point table
- MVM : MVM table
- Spd. : Speed and acceleration/deceleration table
- Pnt. : Point table for "CA01-M05"
- Trq. : Torque limit / Area table, Torque limit table

For the Parameter 1, Parameter 2 and Parameter 3, the [Edit] menu cannot be used.

■ 4.3.2 Undo

When you have input a wrong command by mistake during editing of the sequential program, click [Edit] – [Undo]. Then you can return the relevant step to the condition before the input.

■ 4.3.3 Line Insert

Click the step (or line) where you wish to insert, and show the cursor. When you click [Edit] – [Line Insert], one (1) step (or line) is inserted there.

* The line where one (1) line has been inserted and the subsequent lines are shifted down in turn by one (1) line at a time. If a command is described on the final line of the program, the [Line Insert] function cannot be used there.

■ 4.3.4 Line Delete

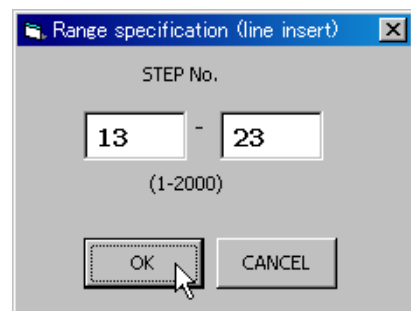
When you click [Edit] – [Line Delete], you can delete the line where the cursor is located.

■ 4.3.5 Insert By Line Number Range

It is possible to insert two (2) or more lines by specifying the number of steps.

When you click [Edit] – [Insert By Line Number Range], the screen as shown right appears.

Enter the step range you wish to insert under the column of "STEP No.", then click the [OK] button.



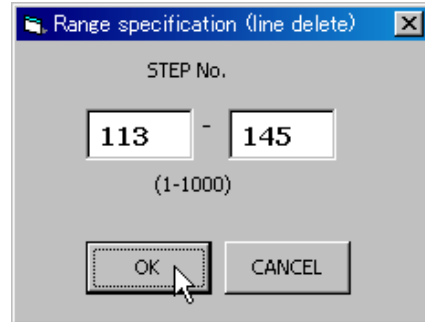
* The line where the specified lines have been inserted and the subsequent lines are shifted down in turn. If the program command will not fall under the edit range by this function, a message saying that the insertion is not allowed is displayed and the line insertion is not executed.

■ 4.3.6 Delete By Line Number Range

It is possible to delete two (2) or more lines by specifying the number of steps.

When you click [Edit] – [Delete By Line Number Range], the screen as shown right appears.

Enter the step range you wish to delete under the column of “STEP No.”, then click the [OK] button.



■ 4.3.7 Program Clear

When you click [Edit] – [Program Clear], you can clear the entire program you are editing now.

■ 4.3.8 Cut, Copy and Paste (Editing of Characters)

[Cut] While the range is selected, click [Edit] – [Cut]. Then the selected range is deleted and stored in the program internal buffer.

[Copy] While the range is selected, click [Edit] – [Copy]. Then the selected range is stored in the program internal buffer.

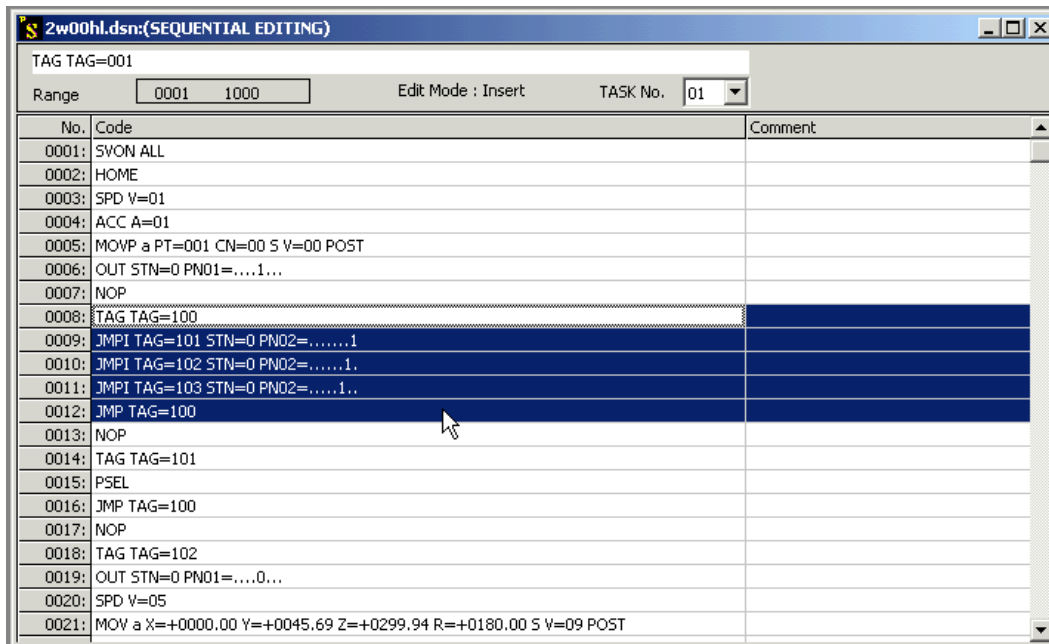
[Paste] When you click [Edit] – [Paste], the range stored in the buffer by the [Cut] or [Copy] function is inserted at the cursor position.

* These menu items correspond to the Windows shortcut keys (Ctl+X, Ctl+C, Ctl+V).

■ 4.3.9 Select All and Select Range

[Select All] ····· When you click [Edit] – [Select All], the entire file you are editing now is selected.

[Select Range] ····· When you click [Edit] – [Select Range], black borders are shown on the line where the cursor is located. Select the step range by dragging the mouse.



■ 4.3.10 Cancel Range Select

When you click [Edit] – [Cancel Range Select], you can cancel the range selected by [Select All] or [Select Range].

■ 4.3.11 Step Search (Editing of Sequential Program)

When you wish to move the cursor to a specified step of the program during editing of the sequential program, this step number search function is useful.

When you click [Edit] – [Step Search], the “STEP No. SEARCH” screen appears. Enter the step number to which you wish to move and click the [OK] button. Then the cursor moves to the specified step.

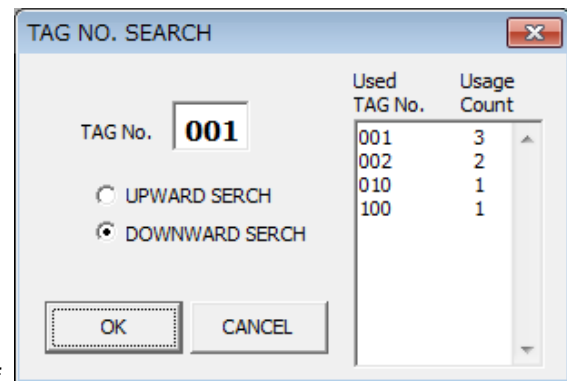


■ 4.3.12 Tag Search

This function can be used only when editing the sequential program.

When you wish to move the cursor to a specified tag of the program during editing of the sequential program, this tag number search function is useful.

When you click [Edit] – [Tag Search], the “TAG No. SEARCH” screen appears. Enter the tag number you wish to search under the column of “TAG No.”.



When you wish to search in the upward direction from the current cursor position, click “UPWARD SEARCH”. When you wish to search in the downward direction from the current cursor position, click “DOWNWARD SEARCH”. Then click the [OK] button.

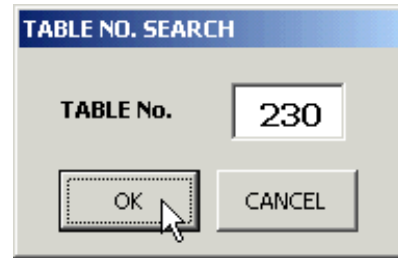
If two (2) or more tag numbers are specified, each time you click the [OK] button, the cursor moves to the next tag.

Unless the specified tag number is found in the program, a message saying that the specified tag No. is not found is displayed.

■ 4.3.13 Search (Editing of Point Table)

When you wish to move the cursor to a specified table number of the program during editing of the point table, this table number search function is useful.

When you click [Edit] – [Table Search], the “TABLE No. SEARCH” screen appears. Enter the table number to which you wish to move and click the [OK] button. Then the cursor moves to the specified table.



■ 4.3.14 Search (Editing of Easy Program)

When you wish to move the cursor to a specified step of the program during editing of easy program, this step number search function is useful.

When you click [Edit] – [Search], the “STEP No. SEARCH” screen appears. Enter the step number to which you wish to move and click the [OK] button. Then the cursor moves to the specified step.



■ 4.3.15 I/O usages

This function can be used only when editing the sequential program. When you wish to know the I/O using in the program, this I/O usages function is useful.

When you click [Edit] – [I/O usages], the “I/O usages” screen appears.

The usage counts of every bit are displayed.

When you click the count, the step Nos. where the bit is used are displayed in the right side of the screen.

I/O usages									
INPUT	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	
STN=0 PNO1				1	1				
STN=0 PNO2									
STN=0 PNO3									
STN=0 PNO4									
STN=0 PNO5									
STN=0 PNO6									
STN=0 PNO7									
STN=0 PNO8									
STN=1 PNO1									
STN=1 PNO2									
STN=1 PNO3									
STN=2 PNO1									
STN=2 PNO2			1					1	
STN=2 PNO3									
STN=3 PNO1									
STN=3 PNO2									
STN=3 PNO3									
OUTPUT	bit8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	
STN=0 PNO1									
STN=0 PNO2									
STN=0 PNO3									
STN=0 PNO4									
STN=0 PNO5									
STN=0 PNO6									
STN=0 PNO7									
STN=0 PNO8									
STN=1 PNO1	1	2	2	1	1	1	1	1	
STN=1 PNO2									
STN=2 PNO1									
STN=2 PNO2									
STN=3 PNO1									
STN=3 PNO2	1						1		

INPUT
STN=2 PNO2 bit6
STEP No. where used
0006

■ 4.4 Tool

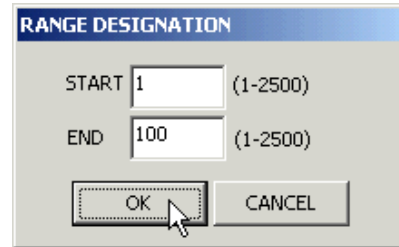
■ 4.4.1 Set Range

You can specify the required range of each file. Thus, you can avoid transmission and printing of unnecessary step or steps.

- * During editing of the point table, at least 16 rows are displayed.

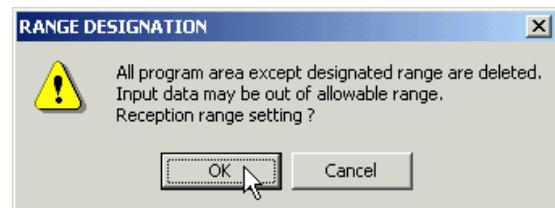
Click [Tool] – [Set Range], and the “SET RANGE” screen appears.

Enter the values under “START” and “END”, then click the [OK] button.




- * During editing of the sequential program, the screen for confirming the range is displayed before setting the range. When you wish to set the range, click [OK]. Otherwise, click [Cancel].

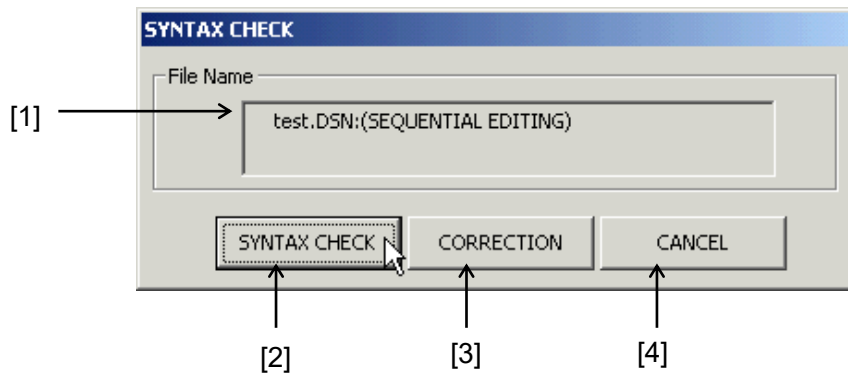
When the range has been changed, the described program may be deleted according to the changed value.



■ 4.4.2 Syntax Check

This function performs program check and automatic correction of the edited sequential program. Click [Tool] – [Syntax Check] of the menu bar, or click the  button on the tool bar. Then the “SYNTAX CHECK” screen is displayed as shown below.

- “SYNTAX CHECK” screen



- [1] [File Name] column

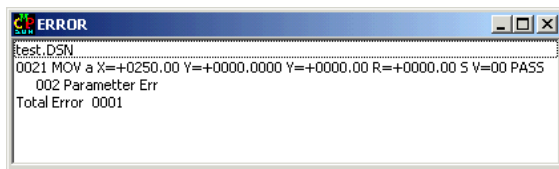
The file name of the sequential program subject to program check is displayed.

- [2] [SYNTAX CHECK] button

When you click the [SYNTAX CHECK] button, program check starts on the sequential program you are editing now.

The contents of the check are as follows:

- Search and check of instruction words
- Check on parameter descriptions
- Check on the number of space characters



The results of the check are shown on the [ERROR] screen.

[3] [CORRECTION] button

When you click the [CORRECTION] button, the “CORRECTION” screen appears.

[4] [CANCEL] button

When you click the [CANCEL] button, you can return to the editing screen.

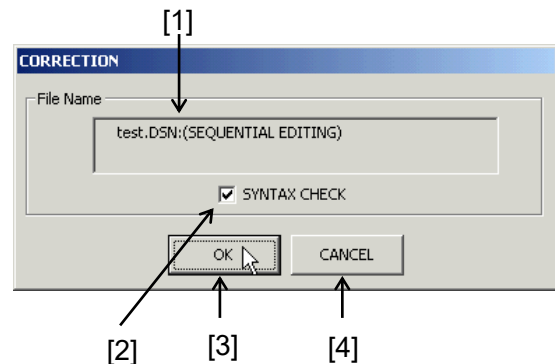
- [CORRECTION] screen

[1] [File Name] column

The file name of the sequential program subject to automatic correction is displayed.

[2] “SYNTAX CHECK” check box

When you check this check box beforehand, program check is performed on the same file after automatic correction.



[3] [OK] button

When you click the [OK] button, automatic correction starts on the sequential text you are editing now.

[4] [CANCEL] button

When you click the [CANCEL] button, the system returns to the “SYNTAX CHECK” screen.

* When you click [File] – [Print] while the screen of program check results is active, details of the error currently displayed are printed.

■ 4.4.3 Coordinate Entry

It is possible to input a coordinate value to the program or table by using the remote teaching or direct teaching function.

Before executing this operation, connect the personal computer with the robot controller and make the controller ready for the operation.

Also, click [Operation] – [Emergency Stop Circuit Check], then click the [EXECUTION ENABLE] button beforehand. Otherwise, you cannot enter the teaching screen. (See Para. 4.5.1.)

- How to enter the teaching mode

At editing of sequential program:

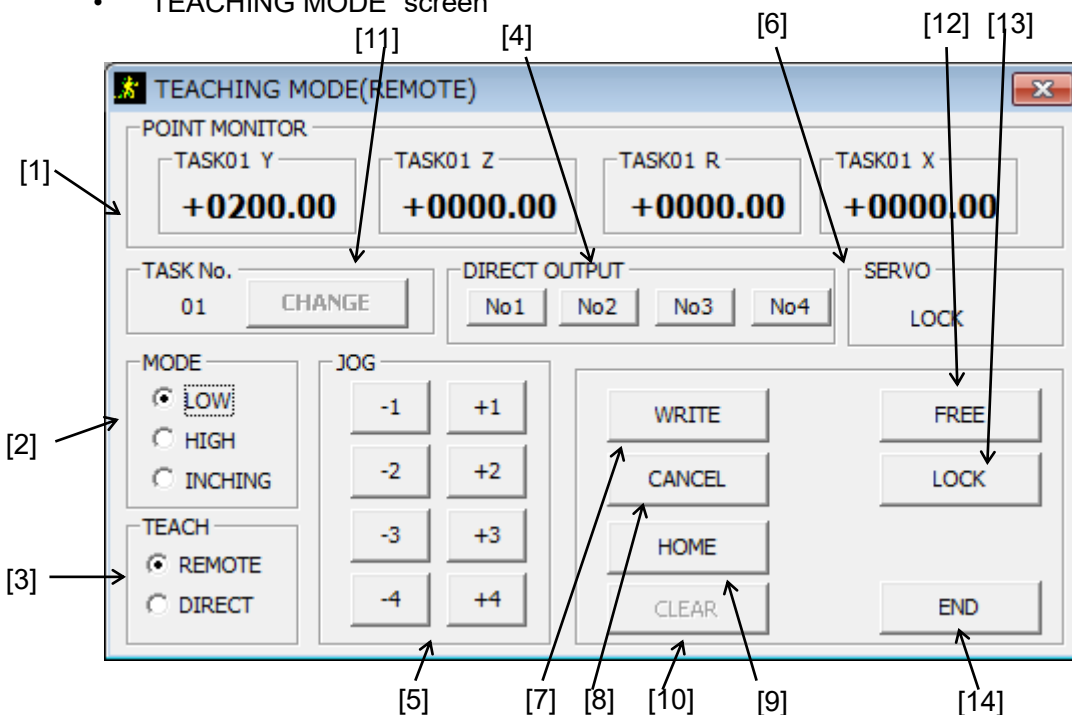
When the cursor is located in the step where MOV, MVC, OFS or RSMV command is input, click [Tool] – [Coordinate Entry].

At editing of palletizing program and point table:

When the cursor is located at the X coordinate, click [Tool] – [Coordinate Entry].

Now, the “TEACHING MODE” screen is displayed.

- “TEACHING MODE” screen



[1] "POINT MONITOR"

Coordinates of the axis 1 to axis 4 are displayed real-time.

[2] "MODE"

Select the travel speed when you click the "JOG" button.

Select either of [LOW], [HIGH] or [INCHING] by means of the option button.

[LOW] : Jog speed L (low speed) of Parameter 1. The axis moves at the predetermined speed.

[HIGH] : Jog speed H (high speed) of Parameter 1. The axis moves at the predetermined speed.

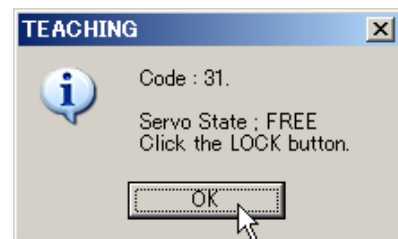
[INCHING] : The axis will not move continuously but moves only by the predetermined distance in the specified direction. The travel distance per click can be specified by the inching distance of Parameter 1.

[3] "TEACH"

Select the teaching mode.

Select the remote teaching mode or direct teaching mode by clicking the option button.

If you have changed the teaching mode, a comment instructing change of the servo status is displayed. Observe the instructions then.



Also, this button is interlocked with the servo status and changed over automatically.

When the servo lock is selected, the remote teaching mode takes effect. When the servo free is selected, the direct teaching mode becomes operative.

[4] "DIRECT"

Used to turn on and off the general-purpose outputs as specified by "Direct Output" of Parameter 1.

When you set the hand tool open/close signals, etc., in advance, you can turn them on and off through the jog screen during operation.

The status in which the button under the column of [DIRECT] is depressed is ON and the initial status is OFF.

[5] “JOG”

Used to move the axis in the remote teaching mode.

When you click the button under the column of “JOG”, the axis moves at jogging in the specified direction at a speed selected by “MODE”.

Signs “+” and “-” signify the axis travel direction, and the direction in which the distance from the home point increases is the “+” direction.

Numbers 1 to 4 represent the axis 1 to axis 4, respectively.

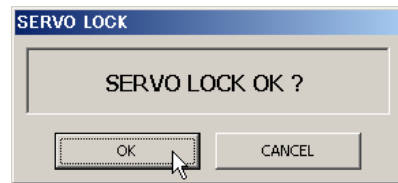
When [LOW] or [HIGH] of “MODE” is selected, the specified axis moves as long as the button is kept pressed. In the [INCHING] mode, the specified axis moves only by the specified travel distance each time the button under [JOG] is clicked once.

[6] “SERVO”

Used to change the servo status.

When you click the [FREE] button, the servo becomes free.

When you click the [LOCK] button, the [SERVO LOCK] confirmation screen appears to assure safety.



When you click the [OK] button, the servo is locked.

The buttons under the column of “SERVO” are interlocked with the buttons under the column of “TEACH”.

[7] “WRITE”

Used to write a coordinate value.

When you click the [WRITE] button, current coordinates shown in “POINT MONITOR” are written as the coordinate value.

[8] “CANCEL”

Used to cancel a coordinate value written by coordinate teaching.

When you click the [CANCEL] button, coordinates shown on the editing screen are replaced by those shown before the teaching screen was displayed.

[9] “HOME”

When you click the [HOME] button, the robot returns to the home position.

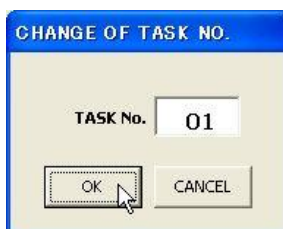
During the home return, all buttons become inoperative.

[10] “CLEAR”

When you click the [CLEAR] button, you can clear an error status at the time of error generation.

[11] “TASK No.”

You can change the task No.
by using the [CHANGE] button.



[12] “FREE”

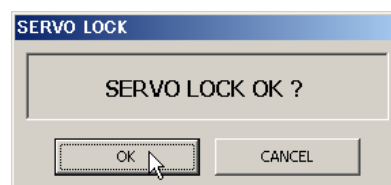
When you click the [FREE] button, the servo enters a free state.

[13] “LOCK”

When you click the [LOCK] button,
the [SERVO LOCK] confirmation screen
is displayed to assure safety.

When you click the [OK] button, the servo is locked.

When you click the [CANCEL] button, the servo is not locked.



[14] “END”

Used to terminate the teaching operation.

When you click the [END] button, the teaching screen closes.

■ 4.4.4 Code-Display On(Off)

When you click [Tool] – [Code-Display On], the default display column of instruction word and parameter is shown on the upper side of the editing screen.

When you press the space key after entering an instruction word, using the button for instruction word or through the keyboard, the default value of the relevant instruction word is displayed.

If you move the cursor to the line where an instruction word is already input, the default value of this instruction word is displayed.

Enter each parameter value, referring to the contents of this display.

When you click [Code-Display Off] of the [Tool] menu by using the mouse, this display column disappears.

- [Code-Display On(Off)] is effective only for editing of the sequential program.

■ 4.5 Robot Operation

■ 4.5.1 Emergency Stop Circuit Check

To assure safety, the SF-98D prohibits the axis feed without executing the [Emergency Stop Circuit Check] command.


When you click [Operation] – [Emergency Stop Circuit Check], the “EMERGENCY STOP CONFIRMATION” screen appears on display. Make sure that the emergency stop circuit check is connected, then click the [EXECUTION ENABLE] button.



* After making sure that the emergency stop circuit check is connected, a warning message is always displayed under the tool bar.

To command prohibition of the robot operation through the personal computer, click [Operation] – [Emergency Stop Circuit Check] from the menu bar in the same manner as above, then click [EXECUTION DISABLE]. Thus, the robot operation can be prohibited. When this happens, the warning message is cleared.

■ 4.5.2 Run

When you click [Operation] – [Run] of the menu bar, or click the  button on the tool bar, the program execution screen is displayed.

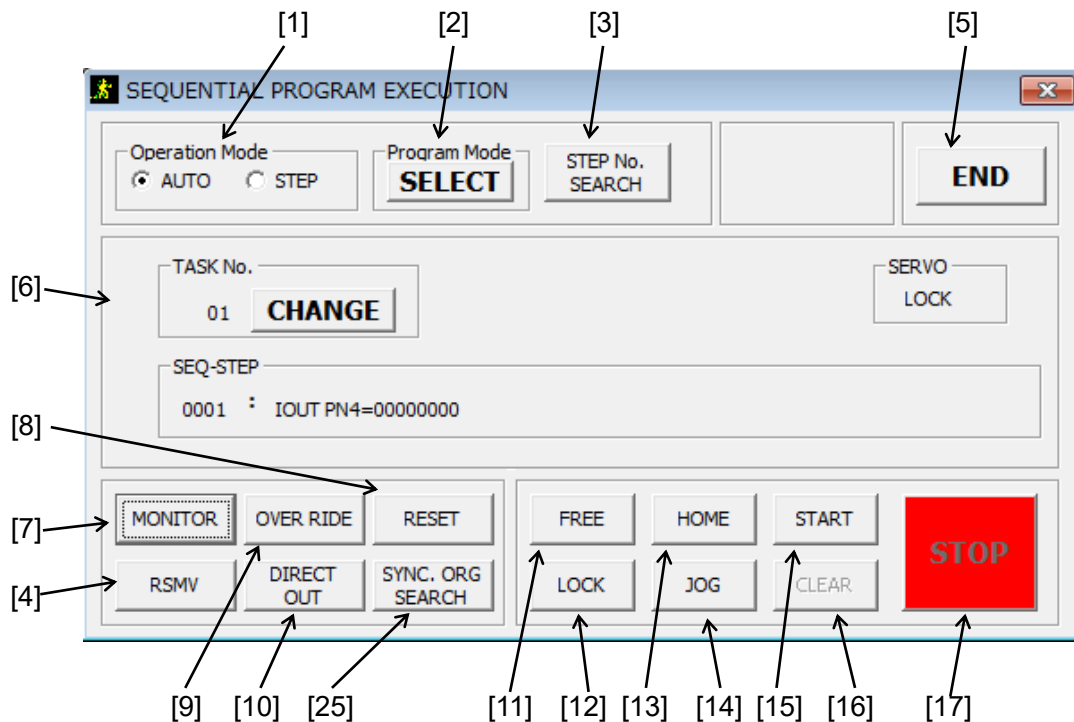
Before executing this operation, connect the personal computer with the robot controller and make the controller ready for the operation.

Also, before the [Run] command is executed, the [Emergency Stop Circuit Check] command should be executed.

- * Don't disconnect the communication cable before closing the program execution screen.
- * When you close the program execution screen during operation without CC-Link communication in case of the controller for CC-Link, the operation stops.

1. Execution screen of Enhanced master unit, Master unit

- * The program run mode (initial setting) is determined with the controller mode effective when you have clicked [Run].



[1] [Operation Mode]

Select the AUTO mode or STEP mode for program execution by using the option button under the column of "Operation Mode".

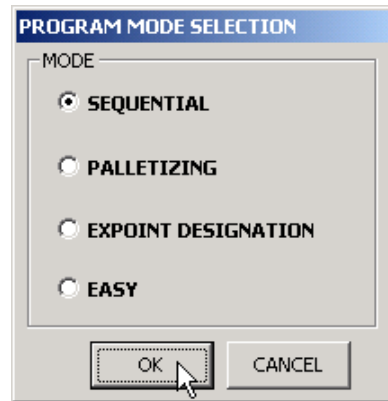
*When the external point designation mode "EXPOINT DESIGNATION" is selected for the program mode, "STEP" is always selected for "Operation Mode".

[2] [Program Mode]

Select the type of the program you wish to execute.

When you click the [SELECT] button under the column of "Program Mode", the "RUN MODE SELECTION" screen appears on the display.

Select either of the sequential mode "SEQUENTIAL", palletizing mode "PALLETIZING", external point designation mode "EXPOINT DESIGNATION" or easy mode "EASY" by means of the option button, and click the [OK] button.

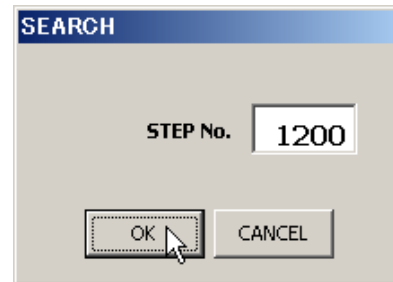


*When the setting of the controller is CA25-M10/M40, "EASY" is not represented.

[3] [SEARCH]

When you click the [SEARCH] button, the "SEARCH" screen is called on the display.

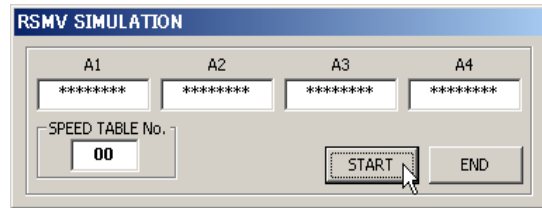
Either of the following is searched according to the program run mode selected then.



- Sequential mode Search of step number
- Palletizing mode Search of program number
- Easy mode Search of program number
- External point designation mode
 Search of table number

[4] [RSMV] (only for enhanced master unit)

When you click the [RSMV] button, the "RSMV SIMULATION" screen is called on the display.



When you have executed the RSMV command of the SEQUENTIAL mode, enter the coordinates through this screen.

- [A1] ~ [A4]
Enter the coordinates you wish to transmit.
A1 to A4 signify the axis 1 to axis 4, respectively, and only relative coordinates can be specified. Also, only the [POST] (position) mode can be specified for the RSMV command.
- [SPEED TABLE No.]
Specify the speed table number.
- [START] button
Used to start entering coordinates.
- [END] button
Used to close the [RSMV SIMULATION] screen.

[5] [END]

When you click the [END] button, the program execution screen closes.

[6] Step monitor column

Currently executed program step monitor is displayed.

For details, see Para. 4.5.3.

[7] [MONITOR]

When you click the [MONITOR] button, you can see various monitoring.

For details, see Para. 4.5.3.

[8] [RESET]

When you click the [RESET] button, you can reset the step numbers of the sequential program and easy program and counters of the palletizing program.

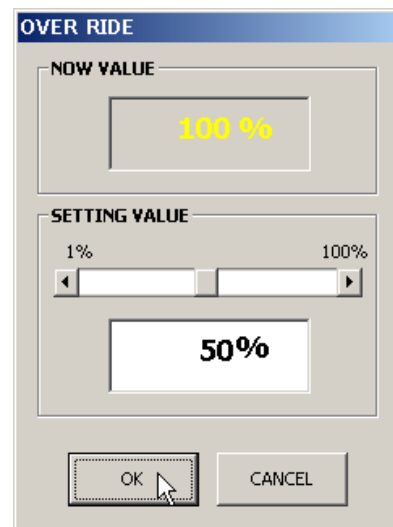
Some may not be reset according to the setting of the continuous start mode, however.

For details, see the descriptions on continuous start input carried in the controller instruction manual provided separately.

[9] [OVER RIDE]

When you click the [OVER RIDE] button, the “OVER RIDE” setting screen is displayed.

- [NOW VALUE]
Displays the currently set override value.
- [SETTING VALUE]
Enter the override value in the setting column, or set the override value by using the scroll bar.
- [OK] button
When you click the [OK] button, the override value you just entered is set.
- [CANCEL] button
When you click the [CANCEL] button, the “OVER RIDE” screen closes and the override value effective before the setting remains.



[10] DIRECT OUT

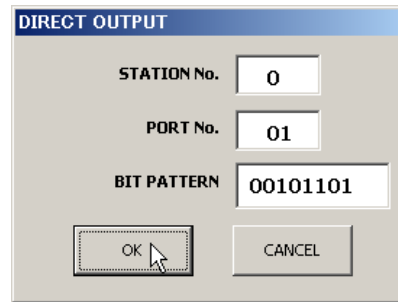
It is possible to manually output any bits.

When you click the [DIRECT OUT] button, the “DIRECT OUTPUT” screen is displayed.

Specify the values for “STATION No.,” “PORT No.” and “BIT PATTERN” and click the [OK] button, and the output bits of the specified general-purpose output are turned on.

To close the “DIRECT OUTPUT” screen, click the [CANCEL] button.

* “1” means on, “0” means off, “.” means the current output state is kept.



[11] [FREE]

When you click the [FREE] button, the servo enters a free state.

[12] [LOCK]

When you click the [LOCK] button, the [SERVO LOCK] confirmation screen is displayed to assure safety.

When you click the [OK] button, the servo is locked.

When you click the [CANCEL] button, the servo is not locked.



[13] [HOME]

When you click the [HOME] button, the robot returns to the home point.

During the home return, all buttons become inoperative.

[14] [JOG]

The jog operation means the manual axis feed during program execution or stop. When you click the [JOG] button, the “JOG MODE” screen is called on the display.

For the “TEACHING MODE” screen, see Para. 4.4.3.

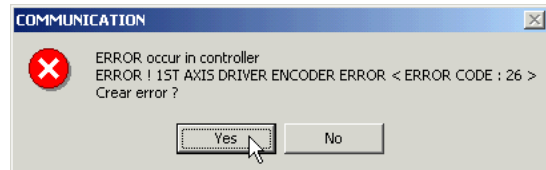
[15] [START]

When you click the [START] button, the program you selected under the column of “Program Mode” is executed.

[16] [CLEAR]

Used to clear an error status at the time of error generation.

When you click the [CLEAR] button during error generation, the screen shown right is displayed.



(* The screen display will differ with the error contents.)

When you click [Yes], the error is cleared.

[17] [STOP]

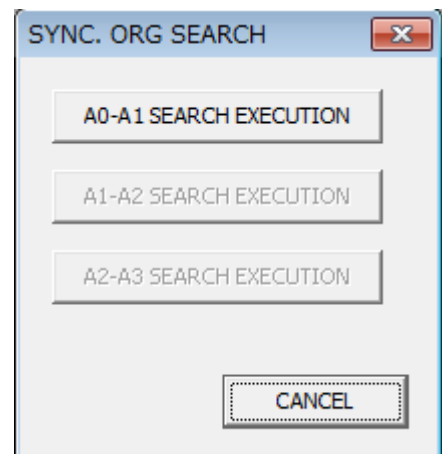
When you click the [STOP] button, the program stops only after the currently executed step has been executed.

[25] [SYNC. ORG SEARCH]

When you click the [SYNC. ORG SEARCH] button, the [SYNC. ORG SEARCH] screen is displayed.

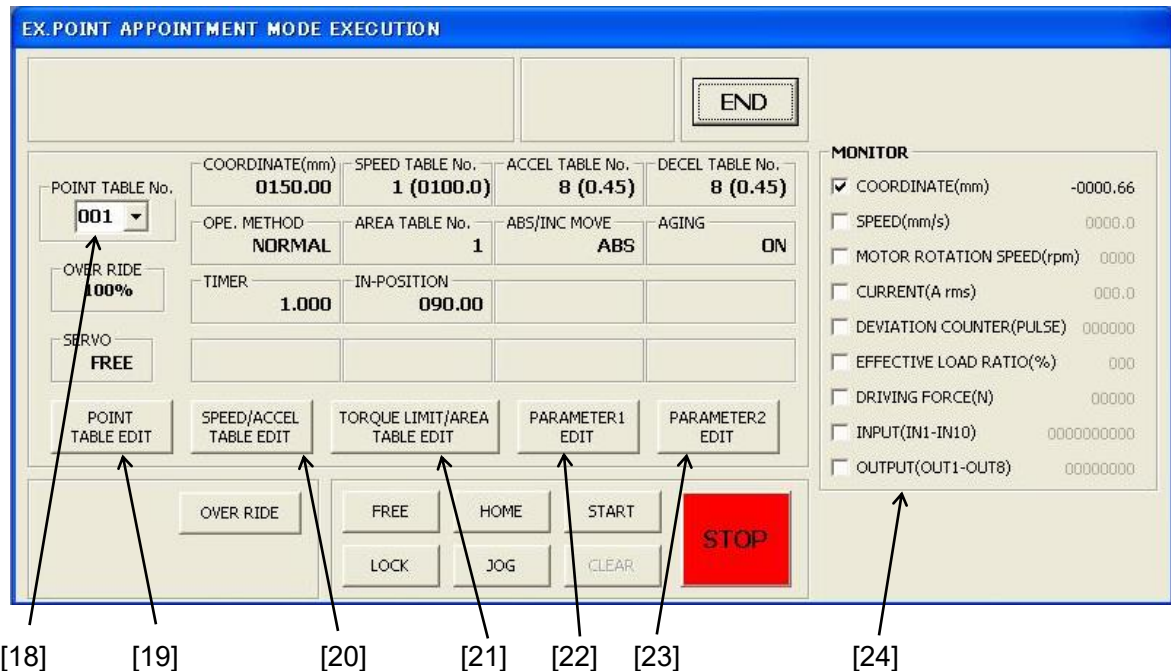
When you click the [A0-A1 SEARCH EXECUTION], [A1-A2 SEARCH EXECUTION] or [A2-A3 SEARCH EXECUTION] button, the synchronized axis origin search of the indicated axes is executed.

When you click the [CANCEL] button, the [SYNC. ORG SEARCH] screen is closed.



2. Execution screen of CA01-M05

- * Only "COORDINATE(mm)" is checked firstly in the monitor column.
- * Refer to 1. about the button which there is not a number for.



[18] POINT TABLE No. set column

The set point table is represented. Select the point table No. that you wish to operate.

[19] POINT TABLE EDIT

When you click the [POINT TABLE EDIT] button, the point table editing screen (see Para. 3.12) appears. When the screen closes, if some data are changed, all data are transmitted to the controller.

[20] SPEED/ACCEL TABLE EDIT

When you click the [SPEED/ACCEL TABLE EDIT] button, the speed and acceleration/deceleration table editing screen (see Para. 3.7) appears. When the screen closes, if some data are changed, all data are transmitted to the controller.

[21] TORQUE LIMIT/AREA TABLE EDIT

When you click the [TORQUE LIMIT/AREA TABLE EDIT] button, the torque limit and area table editing screen (see Para. 3.13) appears. When the screen closes, if some data are changed, all data are transmitted to the controller.

[22] PARAMETER 1 EDIT

When you click the [PARAMETER 1 EDIT] button, the parameter 1 editing screen (see Para. 3.9) appears. When the screen closes, if some data are changed, all data are transmitted to the controller.

[23] PARAMETER 2 EDIT

When you click the [PARAMETER 2 EDIT] button, the parameter 1 editing screen (see Para. 3.10) appears. When the screen closes, if some data are changed, all data are transmitted to the controller.

[24] Monitor column


COORDINATE(mm), SPEED(mm/s), MOTOR ROTATION SPEED(rpm), CURRENT(A rms), DEVIATION COUNTER(PULSE), EFFECTIVE LOAD RATIO(%), DRIVING FORCE(N), INPUT(IN1-IN10), OUTPUT(OUT1-OUT8) are represented in real time.

The items that are checked are renewed. The fewer the items that are checked are, the faster the renewal speed is.

“0” represents the OFF state and “1” the ON state. The right end is bit 1.

■ 4.5.3 Monitor Function

It is possible to monitor the contents of the robot controller connected.

When you click [Operation] – [Monitor] of the menu bar, or click the  button on the tool bar, or click the [MONITOR] button on the program execution screen. Then the monitor screen is displayed.

1. Monitor screen of Enhanced master unit, Master unit

- * Initially, the step monitor status prevails on the display.

(1) Step monitor

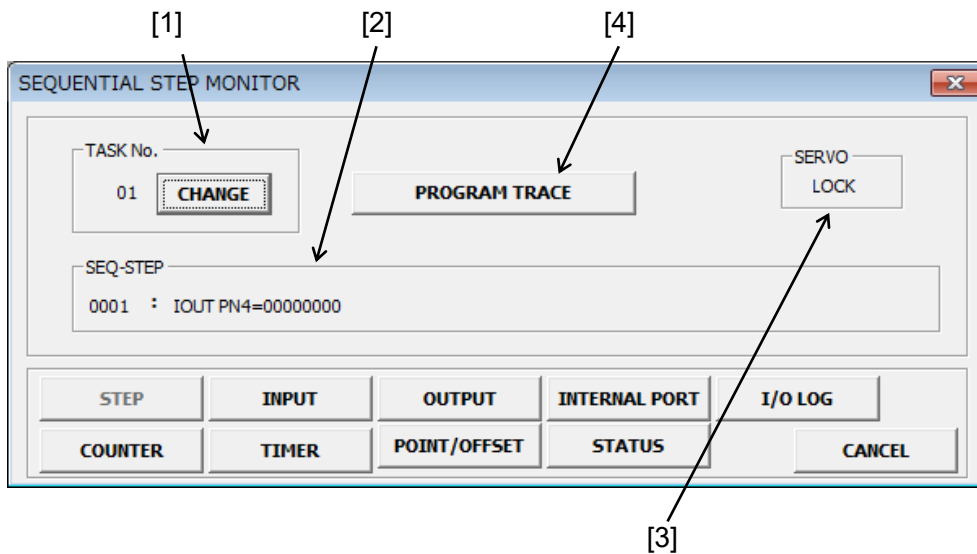
When you click the [STEP] button, the step monitor screen appears.

The monitored items change automatically according to the program mode of the controller.

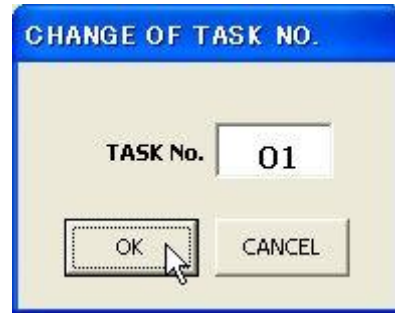
While the controller is in the sequential mode, external point designation mode or pulse frequency mode, the [SEQUENTIAL STEP MONITOR] screen is displayed.

When the controller is in the palletizing mode or easy mode, the [PALLETIZING RUN MONITOR] screen or [EASY RUN MONITOR] screen is displayed, respectively.

Sequential step monitor



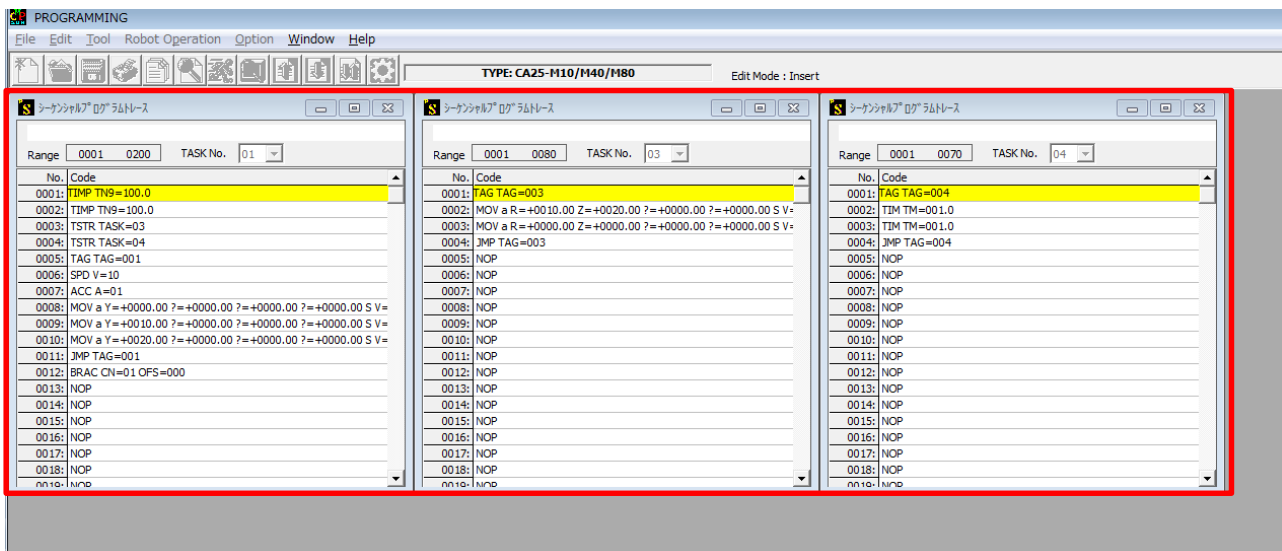
[1] [Task No.]
 You can change the task No. by using the [CHANGE] button.



[2] [SEQ-STEP]
 The step number of the controller connected and program code of this step are displayed real-time.

[3] SERVO
 The servo state is displayed.

[4] PROGRAM TRACE
 The each sequential program screen of the task which has steps is opened by clicking this button.

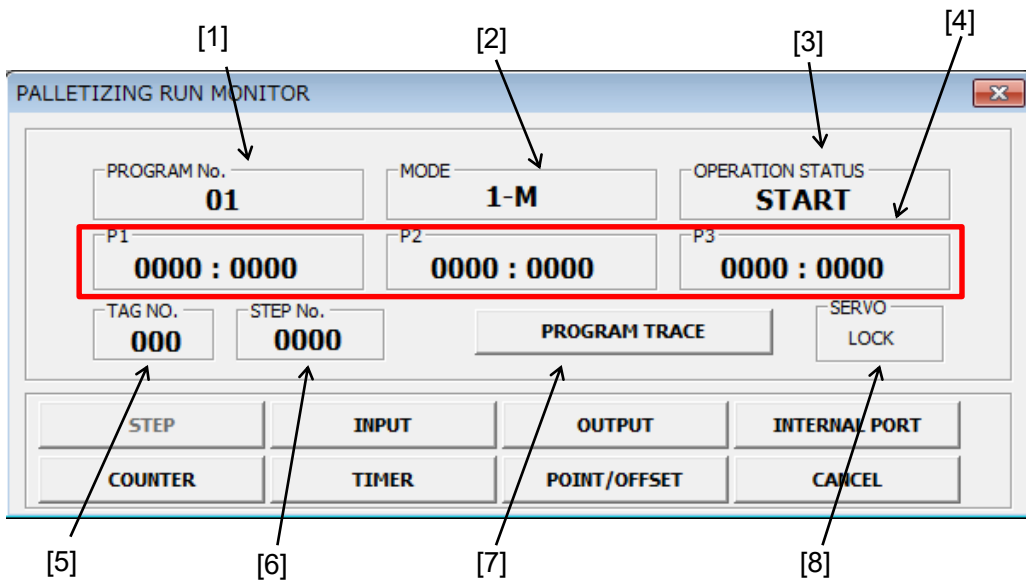


The present step is highlighted with yellow.

While robot stops, the present step is changed by clicking the number in No. column.

Each screen is closed by clicking the [x] in the upper right of a screen.

Palletizing run monitor



[1] [PROGRAM No.]

The palletizing program number is displayed.

[2] [MODE]

Either mode of "1 to M", "M to 1" or "M to M" is displayed.

[3] [OPERATION STATUS]

The palletizing operation status is indicated by [START], [SOURCE], [DISTI.] or [END].

[4] [P1], [P2], [P3]

The current point is indicated by "Current quantities : Total quantities".

[5] [TAG No.]

The tag number of the currently executed start program, hand program or end program is indicated.

Unless either of the start program, hand program or end program is executed currently, "000" is displayed.

[6] [STEP No.]

The sequential step number of the start program, hand program or end program is displayed.

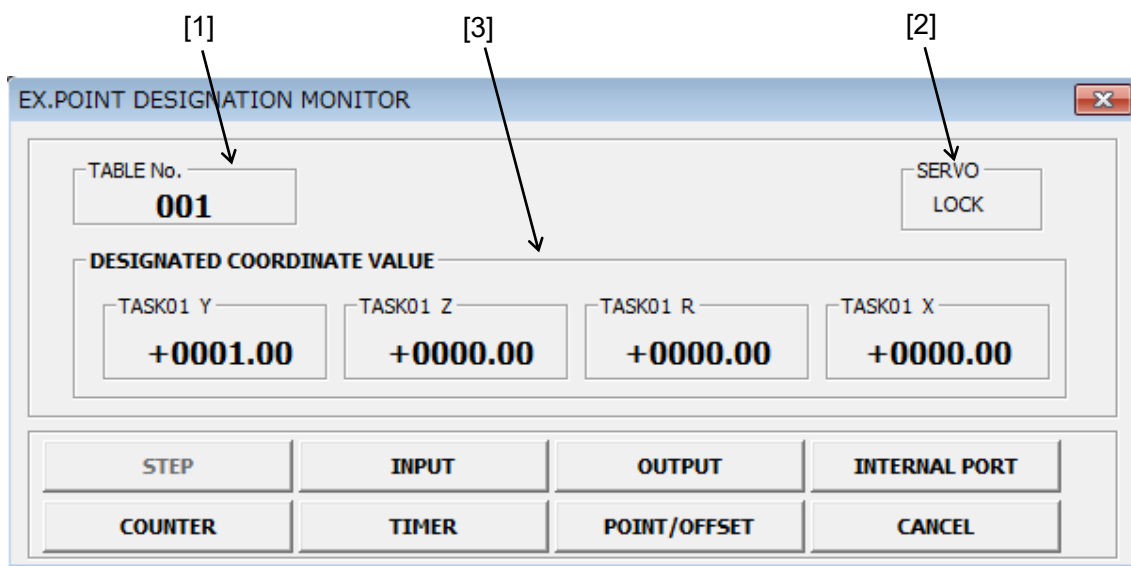
[7] [STEP No.]

The sequential step number of the start program, hand program or end program is displayed.

[8] [STEP No.]

The sequential step number of the start program, hand program or end program is displayed.

Ex. Point Designation monitor



[1] [TABLE No.]

The point table number is displayed.

When this is opened from execution screen, it is same as execution screen. When this is opened directly, the point table number designated by general inputs is displayed.

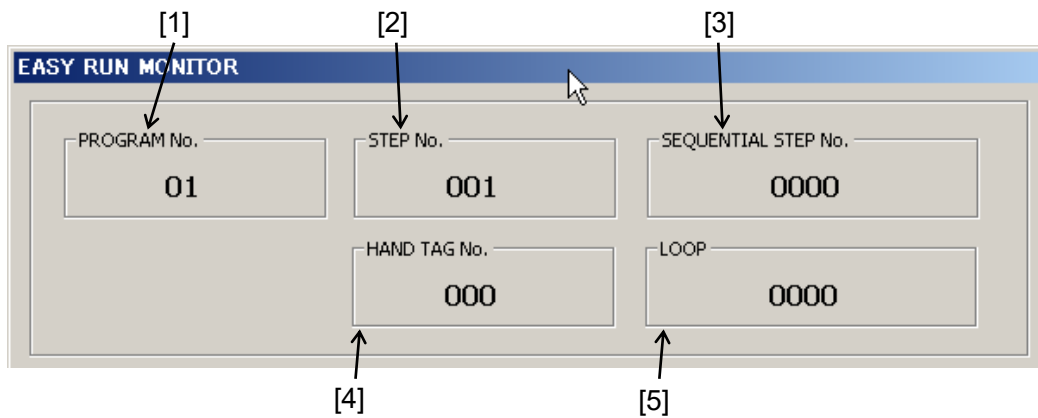
[2] [SERVO]

The servo state is displayed.

[3] [DESIGNATED COORDINATE VALUE]

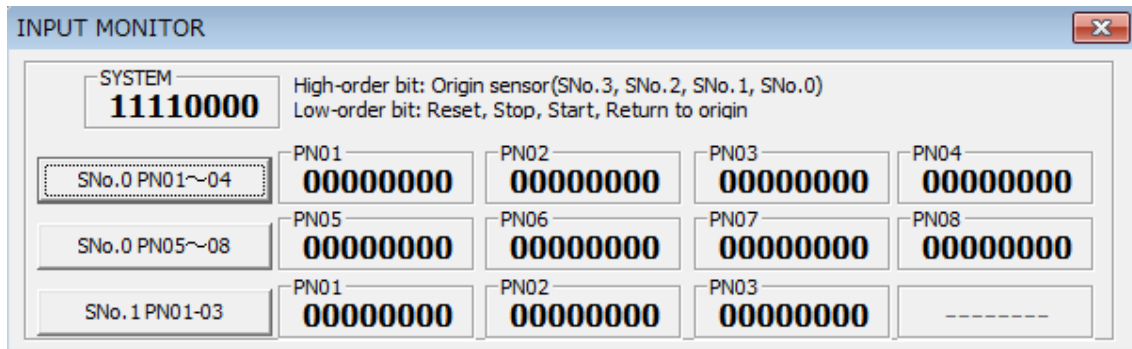
The point value designated by the table number of [1] is displayed.

Easy run monitor



- [1] [PROGRAM No.]
The program number of the easy mode is displayed.
- [2] [STEP No.]
The program step number of the easy mode is displayed.
- [3] [SEQUENTIAL STEP No.]
The sequential step number currently executed is displayed during execution of the start subroutine program, hand subroutine program or end subroutine program.
- [4] [TAG No.]
The tag number of the currently executed start subroutine program, hand subroutine program or end subroutine program is indicated.
Unless each subroutine program is executed currently, "000" is displayed.
- [5] [LOOP]
The number of repetitive counts of the predetermined operation is displayed. (0 to 9999)
When zero (0) is specified, the operation is repeated endlessly.

(2) Input monitor



When you click the [INPUT] button, the "INPUT MONITOR" screen is displayed, where the condition of the current system input port and general-purpose input ports are displayed bit-by-bit.

"00000000" signifies the 8-bit data. The right end is bit 1, and the left end is bit 8. "0" represents the OFF state and "1" the ON state.

The System input is displayed in [SYSTEM]. The meaning of each bit is written on the right hand..

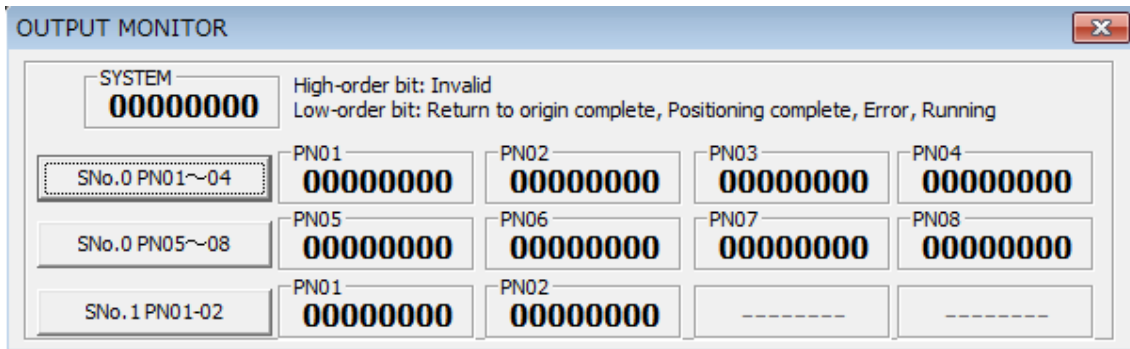
When you click the display port changeover button provided on the left side of the screen, appropriate display port list is shown, where you can select a port you wish to display.

The meaning of each abbreviation is as follows:

[SNo.] : Station number

[PN] : Port number

(3) Output monitor



When you click the [OUTPUT] button, the “OUTPUT MONITOR” screen is displayed, where the condition of the current system output port and general-purpose output ports are displayed bit-by-bit.

“00000000” signifies the 8-bit data. The right end is bit 1, and the left end is bit 8. “0” represents the OFF state and “1” the ON state.

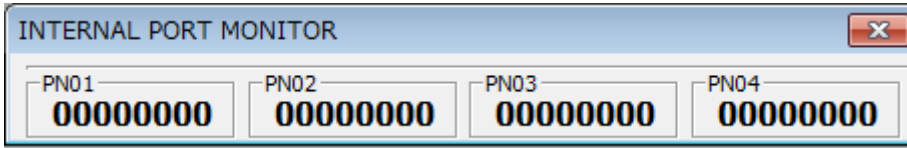
The System output is displayed in [SYSTEM]. The meaning of each bit is written on the right hand.

When you click the display port changeover button provided on the left side of the screen, appropriate display port list is shown, where you can select a port you wish to display.

The meaning of each abbreviation is as follows:

- [SNo.] : Station number
- [PN] : Port number

(4) Internal port monitor

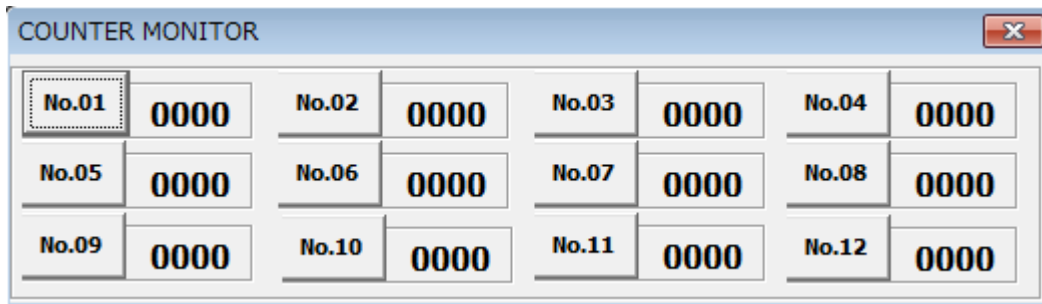


When you click the [INTERNAL PORT] button, the “INTERNAL PORT MONITOR” screen is displayed, where the condition of the current internal ports are displayed bit-by-bit.

The meaning of the abbreviation is as follows:

[PN] : Port number

(5) Counter monitor



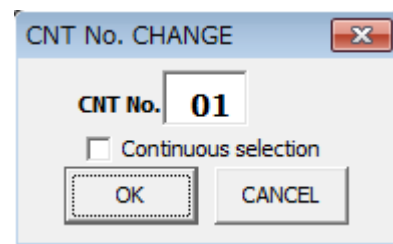
When you click the [COUNTER] button, the “COUNTER MONITOR” screen is displayed. Up to twelve (12) counters can be monitored. You can set each counter number you wish to monitor in the following manner.

Changeover of display counter:

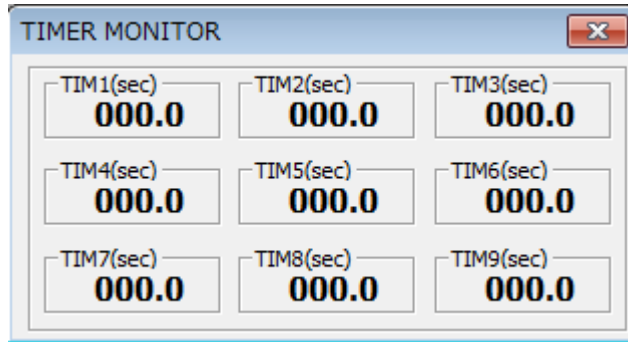
Click the [CNT**] button of the counter monitor you wish to set, and the “CNT No. CHANGE” screen appears on the display.

When you enter the counter number you wish to monitor and click the [OK] button, the display counter number is replaced by the set value.

When you click and check the “CONTINUOUS selection” check box on the “CNT No. CHANGE” screen beforehand, the counter numbers after the set counter number are set in turn automatically.

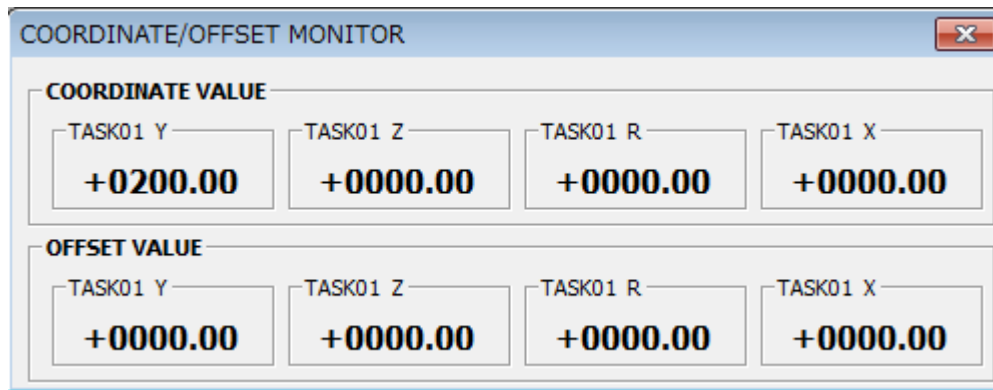


(6) **Timer monitor**



When you click the [TIMER] button, the “TIMER MONITOR” screen is displayed, where the value of each timer is displayed real-time.

(7) **Coordinate/offset monitor**



When you click the [POINT/OFFSET] button, the “COORDINATE/OFFSET MONITOR” screen is displayed, where current coordinate and offset of each axis are in all tasks displayed.

(8) I/O log

No.	ELAPSED TIME	MARGIN(s)	I/O	PORT	VALUE	T1 STEP	T3 STEP	T4 STEP
01	000hour 00min 00sec 375	---	IN	0-01	0000 0010	0001	0001	0001
02	000hour 00min 00sec 978	0.603	OUT	Jog	0001 0000	0001	0001	0001
03	000hour 00min 06sec 325	5.347	IN	0-01	0000 0000	0001	0001	0001
04	000hour 00min 08sec 382	0.057	IN	0-01	0000 0001	0001	0001	0001
05	000hour 39min 37sec 058	2370.676	OUT	Jog	0000 0000	0001	0001	0001
06	000hour 39min 44sec 454	7.396	OUT	Jog	0001 0000	0001	0001	0001
07								
08								
09								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								

When you click the [I/O LOG] button, the "I/O LOG MONITOR" screen is displayed.

I/O logs are added one by one from No.1 to No.99 every time I/O is changed. I/O logs are overwritten from No.1 after No.99.

ELAPSED TIME: Elapsed time from power on of the controller

MARGIN(s): Margin of the elapsed time with previous No.

I/O: IN in the case of input, OUT in the case of output

PORT: Input/output port (SYSTEM/JOG/In-1~4(Internal port)/0~3-01~08(General))

VALUE: Value after changing

T1~4 STEP: Step No. at the time of changing (T1~4: Task 1~4)

Click the [START] button, and the indications of No.1 to No.99 are erased and the new log is added from No.1.

Click the [END] button, and the addition of the log is ended.

Click the [PREV] button, and the previous No. is displayed.

Click the [NEXT] button, and the next No. is displayed.

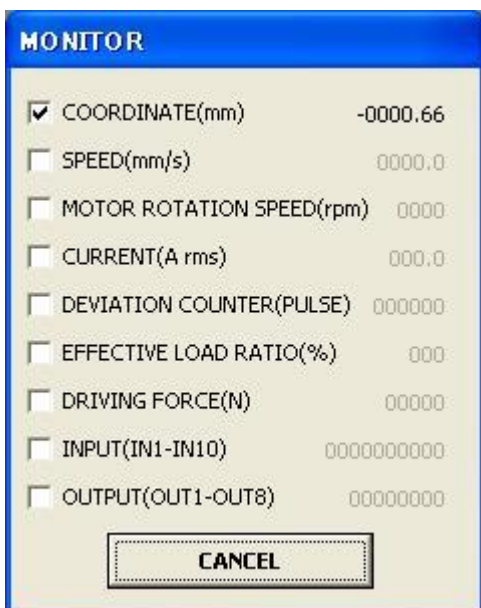
Click the [FILE OUTPUT] button, and the file designation screen is displayed. The I/O log of all No. can be saved with a CSV file.

(9) Cancel

When you click the [CANCEL] button, the monitor screen closes.

2. Monitor screen of CA01-M05

- * Only "COORDINATE(mm)" is checked firstly in the monitor column.



COORDINATE(mm), SPEED(mm/s), MOTOR ROTATION SPEED(rpm), CURRENT(A rms), DEVIATION COUNTER(PULSE), EFFECTIVE LOAD RATIO(%), DRIVING FORCE(N), INPUT(IN1-IN10), OUTPUT(OUT1-OUT8) are represented in real time.

The items that are checked are renewed. The fewer the items that are checked are, the faster the renewal speed is.


"0" represents the OFF state and "1" the ON state. The right end is bit 1.

Cancel

When you click the [CANCEL] button, the monitor screen closes.

■ 4.5.4 Transmission to Controller

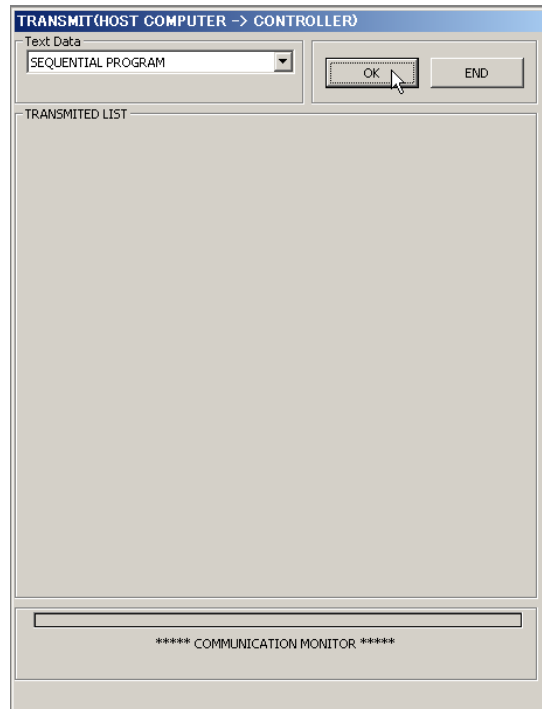
It is possible to send an edited program, table or parameter data to the controller.

When you click [Operation] – [Send to Controller] of the menu bar, or click the  button on the tool bar, the [TRANSMIT] screen is displayed.

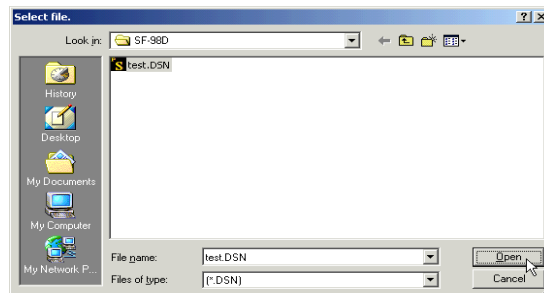
* Cannot transmit while robot is running.

Select the type of the file you wish to send from the dropdown list of “Text Data” and click the [OK] button. Then the [Select file] screen is called on the display.

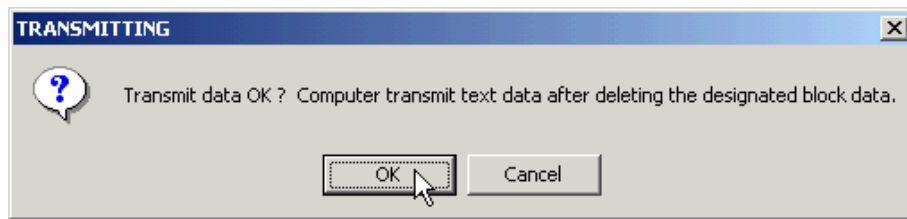
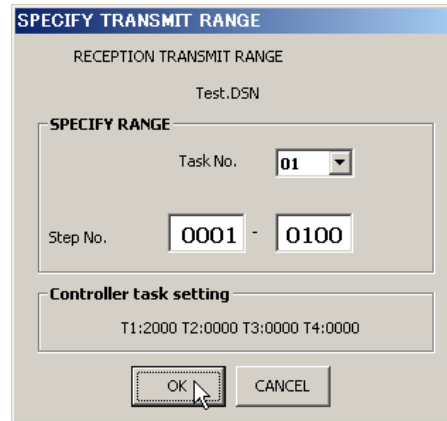
* Any comment in the data is not transmitted to the controller.



Select the file you wish to send and click the [OK] button.



- * When sending the sequential program, palletizing program, easy program, point table or MVM table, the “SPECIFY TRANSMIT RANGE” screen is displayed. Specify the range you wish to send, then click the [OK] button. To stop transmission, click the [CANCEL] button.

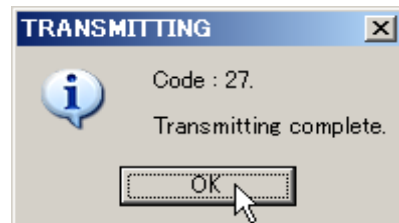


The [TRANSMITTING] confirmation screen is displayed. When you wish to send, click the [OK] button. Otherwise, click the [Cancel] button.

When you click the [END] button during transmission, the transmission is interrupted (or canceled), and the data up to the interrupted point is sent to the controller.

When transmission of group files currently under way is interrupted, an interrupted file is sent by up to the point of interruption, together with the preceding file or files, and a file or files after the interruption are not sent.

When the transmission has finished normally, a message saying that the transmission has finished is displayed. Click the [OK] button then.




After Robot type or Parameter 2 or Parameter 3 has been sent, the controller power has to be turned off once. After the controller power is turned on again, the parameter transmitted is valid.

*When the setting of the controller is CA01-M05, if the value of Robot type or Parameter 2 is not changed, the controller power doesn't have to be turned off once.

To terminate the [TRANSMIT] screen, click the [END] button.

■ 4.5.5 Receiving from Controller

It is possible to receive a program, table or parameter data from the controller.

When you click [Operation] – [Receive from Controller] of the menu bar, or click the  button on the tool bar, the “RECEIVE” screen is displayed.

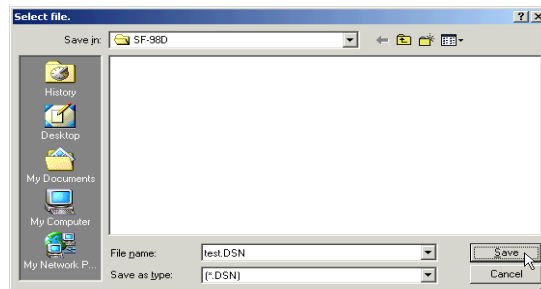
Select the type of the file you wish to receive from the dropdown list of “Text Data” and click the [OK] button. Then the [Select file] screen is called on the display.

* When you have checked the [ADDITION OF COMMENT] check box beforehand, a comment included in the received file is recalled.

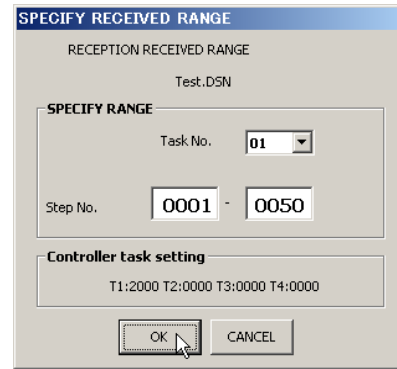
When you have canceled the check of the check box, a comment in the received file is deleted.



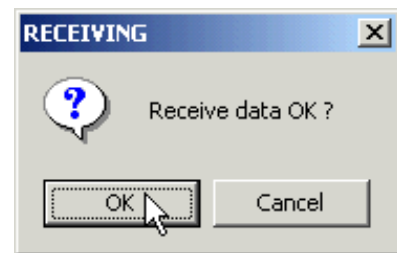
When you wish to receive the data in a new file, input the file name and click the [Save] button. When you wish to receive the data in the existing file, select the file and click the [Save] button.



- * When receiving the sequential program, palletizing program, easy program, point table or MVM table, the “SPECIFY RECEIVED RANGE” screen is displayed. Specify the range you wish to receive, then click the [OK] button. To stop receiving, click the [CANCEL] button.



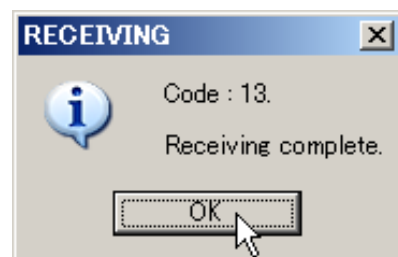
The [RECEIVING] confirmation screen is displayed. When you wish to receive, click the [OK] button. Otherwise, click the [Cancel] button.



*The sequential program can be received during operation. (Also it is in group file)
 Only after the data has reached normally, it is written to the specified file.
 If the communication has been severed while the data was received in the SAVE mode (i.e., overwriting of the exiting file), the previous file remains.
 If the communication has been disconnected while the data was received in the SAVE AS mode (writing of the new file), the new file is not created and the operation finishes.
 If the communication has been interrupted while group files were received, a file or files after the interrupted file are not received. A file or files before the interruption are already received.


When the receiving has finished normally, a message saying that the receiving has finished is displayed. Click the [OK] button then.

To terminate the [RECEIVE] screen, click the [END] button.



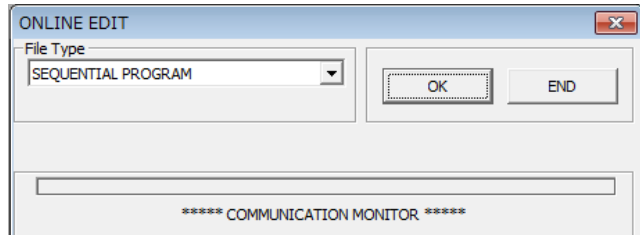
■ 4.5.6 Online edit

It is possible to do online edit a program, table or parameter data.

When you click [Operation] – [Online edit] of the menu bar, or click the  button on the tool bar, the “ONLINE EDIT” screen is displayed.

* Cannot do online edit while robot is running.

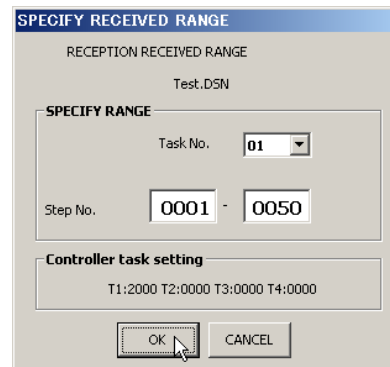
Select the type of the file you wish to do online edit from the dropdown list of “File Type”.



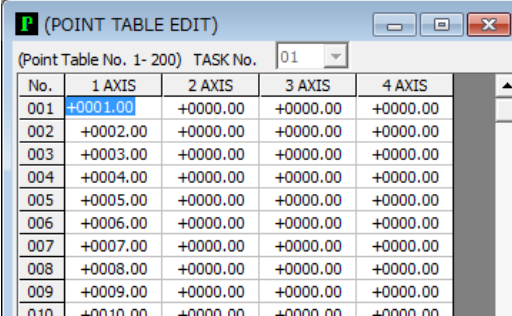
* Any comment cannot be used.

* When receiving the sequential program, palletizing program, easy program, point table or MVM table, the “SPECIFY RECEIVED RANGE” screen is displayed.

Specify the range you wish to do online edit, then click the [OK] button. To stop doing online edit, click the [CANCEL] button.



The edit screen of the specified file type is opened.



(POINT TABLE EDIT)

(Point Table No. 1- 200) TASK No. 01

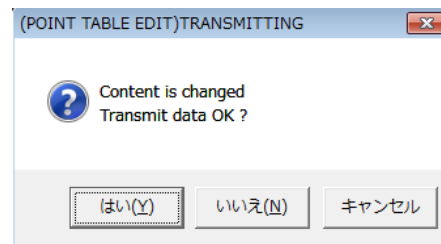
No.	1 AXIS	2 AXIS	3 AXIS	4 AXIS
001	+0001.00	+0000.00	+0000.00	+0000.00
002	+0002.00	+0000.00	+0000.00	+0000.00
003	+0003.00	+0000.00	+0000.00	+0000.00
004	+0004.00	+0000.00	+0000.00	+0000.00
005	+0005.00	+0000.00	+0000.00	+0000.00
006	+0006.00	+0000.00	+0000.00	+0000.00
007	+0007.00	+0000.00	+0000.00	+0000.00
008	+0008.00	+0000.00	+0000.00	+0000.00
009	+0009.00	+0000.00	+0000.00	+0000.00
010	+0010.00	+0000.00	+0000.00	+0000.00

Click [x] in upper right of the screen after editing.

When the contents are changed, transmission confirmation screen is displayed.

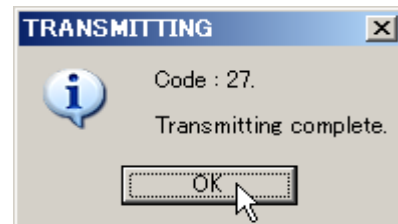
If you wish to transmit, click the [OK] button.

If not, click the [CANCEL] button.



When you click the [END] button during transmission, the transmission is interrupted (or canceled), and the data up to the interrupted point is sent to the controller.

When the transmission has finished normally, a message saying that the transmission has finished is displayed. Click the [OK] button then.



After Robot type or Parameter 2 or Parameter 3 has been sent, the controller power has to be turned off once. After the controller power is turned on again, the parameter transmitted is valid.


*When the setting of the controller is CA01-M05, if the value of Robot type or Parameter 2 is not changed, the controller power doesn't have to be turned off once.

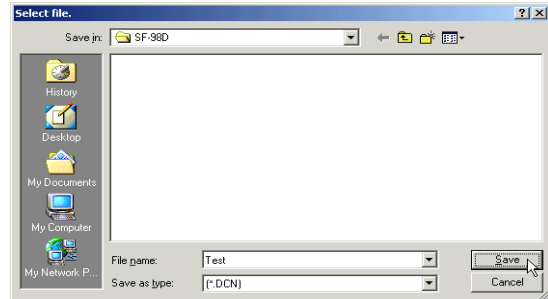
To terminate the [ONLINE EDIT] screen, click the [END] button.

■ 4.6 Option

■ 4.6.1 Register Group

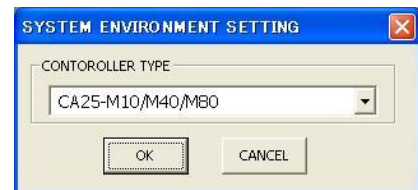
It is possible to register and edit group files by opening the [GROUP FILE EDIT] screen.

When you click [Option] – [Register Group] of the menu bar, or click the  button on the tool bar, the screen for specifying the group file [Select file] appears.



When you wish to create a new group file, enter the file name and click the [Save] button. To edit the existing group file, select it and click the [Save] button. Then the “GROUP FILE EDIT” screen is called on the display.

- * When any editing screens are not opened, the screen as shown right is displayed. Select the used controller and click the [OK] button.



- [GROUP FILE EDIT] screen

[1] [Printing Title]

When you enter characters as the printing title under this column, they are printed on all pages.

[2] Each file ON/OFF

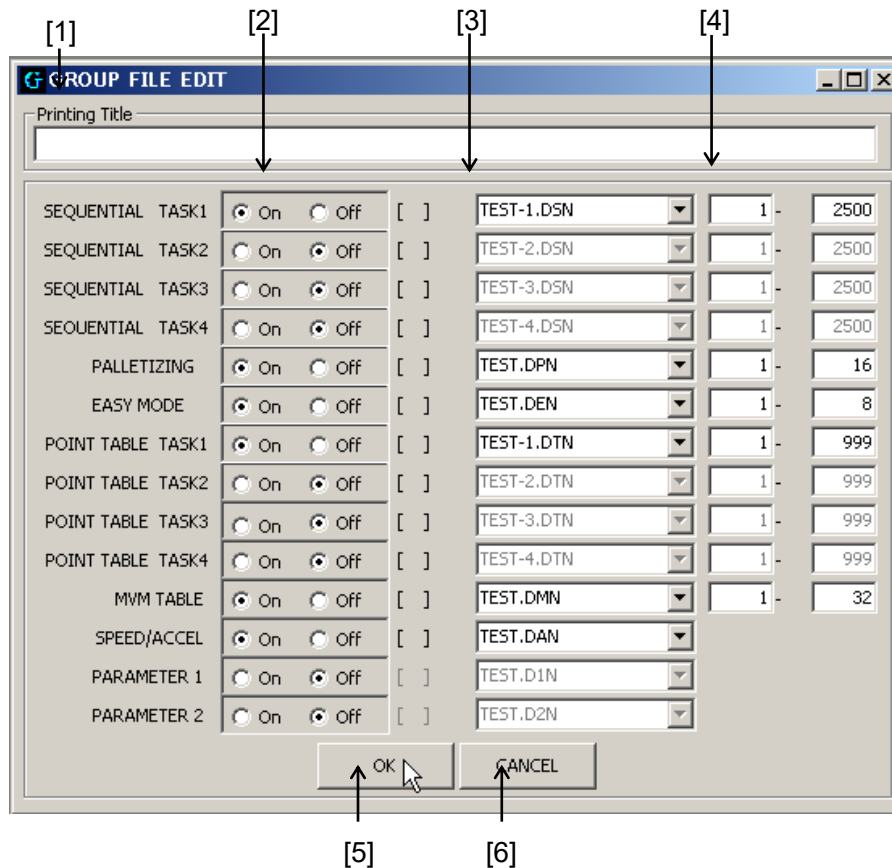
Select ON or OFF of each file by means of the option button.

A file which is made valid is included in the group, and a file which is made invalid is excluded from it.

[3] File name

A program and table in the same holder containing the group files can be added to the group as the group files.

The default of the file name is the same as the group file name, which can be changed, however.



[4] Range setting

The edit range can be selected for each file. Thus, unnecessary step or steps are not transmitted or not printed.

For the new group file, a default value is displayed under the column of the setting range. Specify the value within this range.

[5] Register Group

When you click the [OK] button, relevant file or files are registered as the group file.

[6] [CANCEL]

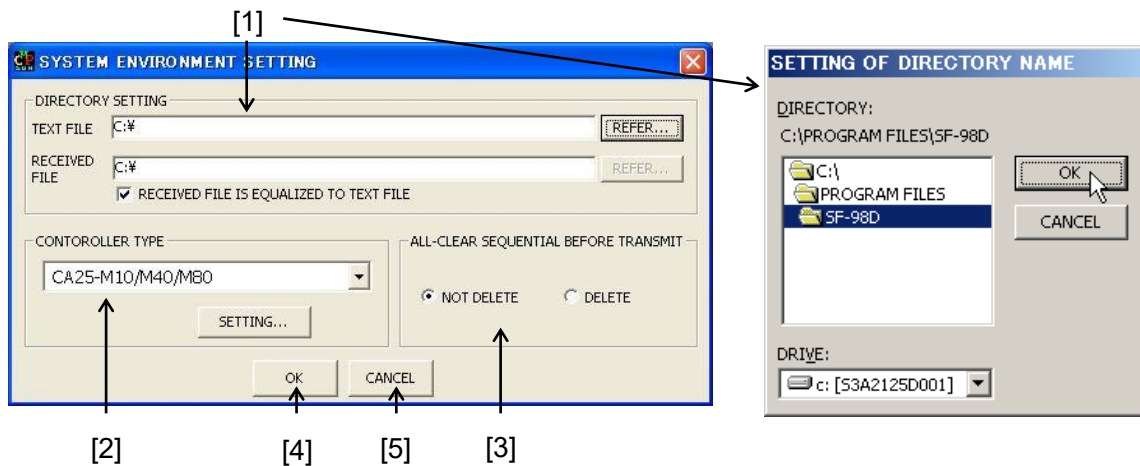
When you click the [CANCEL] button, the contents of the [GROUP FILE EDIT] screen are not saved, and the same screen closes.

■ 4.6.2 Setting of System Environment

It is possible to set a text file holder, received file holder, type of the controller to be connected and communication conditions.

When you click [Option] – [System Environment], the “SYSTEM ENVIRONMENT SETTING” screen opens.

- [SYSTEM ENVIRONMENT SETTING] screen



[1] [DIRECTORY SETTING] column

Specify the folders under the column of “TEXT FILE” and “RECEIVED”.

When you wish to change the folder, click the [REFER...] button to open the [SETTING OF DIRECTORY NAME] screen. Select another folder and click the [OK] button. To stop the change, click the [CANCEL] button.

When [RECEIVED FILE IS EQUALIZED TO TEXT FILE] is checked, received file is equalized to text file and the folder of received file cannot be changed

[2] [CONTROLLER TYPE] column

Select the type of the controller connected to the personal computer from the dropdown list, then click it.

When you click the [SETTING] button, the “COMMUNICATION CONDITION” screen opens.

[3] [ALL-CLEAR SEQUENTIAL BEFORE TRANSMIT] column

When you select “DELETE”, all sequential programs in the controller are cleared before transmission. When you select “NOT DELETE”, only the range of the sequential file to be transmitted is overwritten.

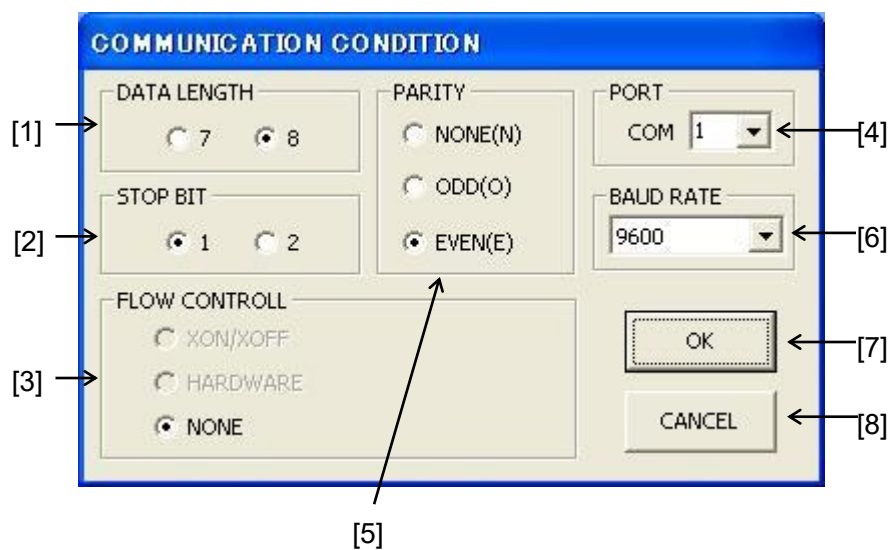
[4] [OK] button

When you wish to set the change you have done on the “SYSTEM ENVIRONMENT SETTING” screen, click the [OK] button. Then the new system environment is set with the “SYSTEM ENVIRONMENT SETTING” screen closed.

[5] [CANCEL] button

When you do not wish to set the change you have done on the “SYSTEM ENVIRONMENT SETTING” screen, click the [CANCEL] button. Then the existing system environment remains unchanged with the “SYSTEM ENVIRONMENT SETTING” screen closed.

- [COMMUNICATION CONDITION] screen



[1] [DATA LENGTH]: 8

[2] [STOP BIT]: 1

[3] [PARITY]: EVEN (E)

[4] [FLOW CONTROL]: NONE

DO NOT change the setting of the above four (4) items.

[5] [PORT]

Select the communication port you wish to use from the dropdown list.

For the communication port, see the instruction manual of the personal computer you are using now, and the Windows instruction manual.

[6] [BAUD RATE]

Select the baud rate from drop down list. This setting is valid for the controller from BA2 series forth. In case of the controller this setting is invalid for, any setting is regarded as [9600].

[7] [OK] button

When you wish to set the change you have done on the “COMMUNICATION CONDITION” screen, click the [OK] button. Then the new communication conditions are set with the “COMMUNICATION CONDITION” screen closed.

[8] [CANCEL] button

When you do not wish to set the change you have done on the “COMMUNICATION CONDITION” screen, click the [CANCEL] button. Then the existing communication conditions remain unchanged with the “COMMUNICATION CONDITION” screen closed.

■ 4.6.3 Setting of Robot Type

Once you have specified the robot type, you can set various parameters to the values optimized for the axis (or actuator) to be used.

When you click [Option] – [Set Robot Type], the “ROBOT TYPE SETTING” screen appears on the display.

* Before executing this operation, connect the personal computer with the robot controller and make the controller ready for the operation.

For the key parameters relating to the robot motions, when you have specified the robot type, the optimal values for the axis (or actuator) to be used are input.

For the robot type (i.e., six (6)-digit number), see the actuator instruction manual provided separately.

Once you have set the robot type, the parameter values return to the default values. When you use the robot after changing the parameter values, take careful precautions.

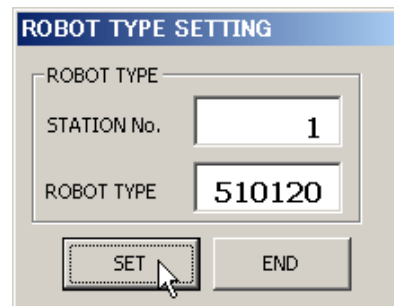
* [ROBOT TYPE SETTING] screen

[Station No.]

When you specify the station number you wish to set under the column of “Station No.”, the robot type currently set is shown under “ROBOT TYPE”.

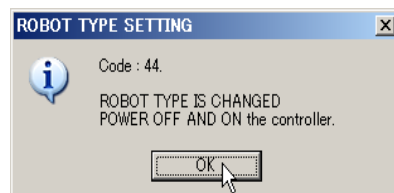
[ROBOT TYPE]

When you wish to change the robot type, enter a six (6)-digit number under “ROBOT TYPE” and click the [SET] button. If you have entered an illegal robot type, the previous robot type is shown again.



[END] button

After you have set the robot type, click the [END] button. Then the message urging you to turn off the controller power once, and on again is displayed.



Unless you have turned off the controller power once, then on again after entering the robot type, the controller will not run. When this happens, turn off the controller power once, then on again according to the comment displayed, then click the [OK] button.

*When the setting of the controller is CA01-M05, if the value of Robot type is not changed, the controller power doesn't have to be turned off once.

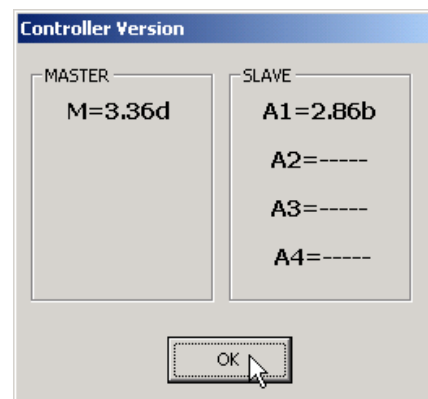
■ 4.6.4 Confirmation of Controller Version

It is possible to display the controller ROM version.

* Before executing this operation, connect the personal computer with the robot controller and make the controller ready for the operation.

When you click [Option] – [Controller Version], the “Controller Version” screen is called, where the version of the master unit and slave units (axis 1 to axis 4) are displayed.

To close the same screen, click the [OK] button.

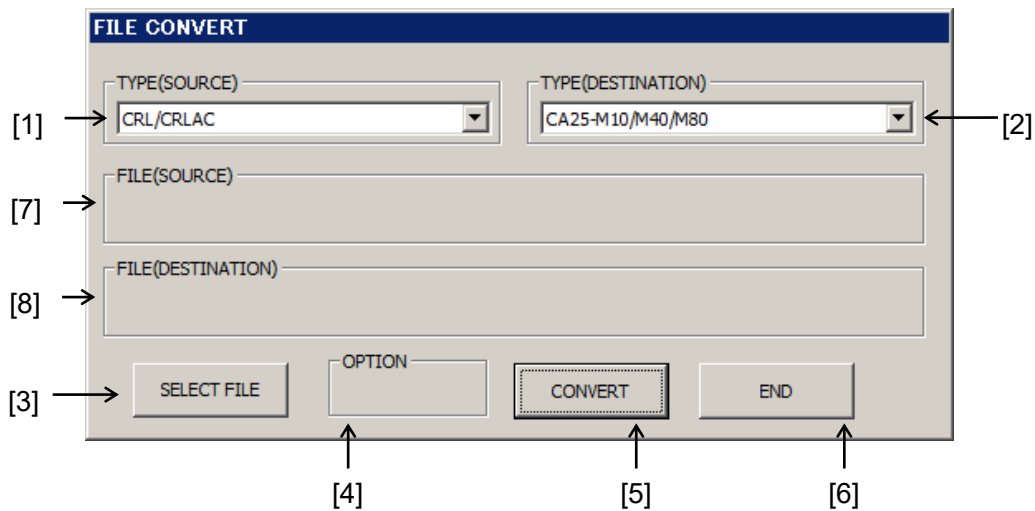


4.6.5 File Convert

This function can convert the data that are edited and saved with old personal computer software SF-98C into the data that can be edited with this personal computer software SF-98D or the data of BA, BA2 series controller into the data of BA3 series controller.

The data that can be converted are sequential program and point table in the former, all data that are common to before and after converting in the latter.

When you click [Option] – [File Convert], the “FILE CONVERT” screen appears

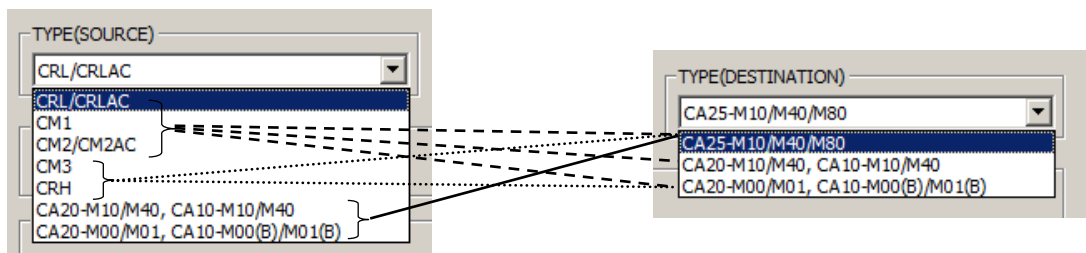


[1] [TYPE (SOURCE)]

Select the type (source) from the drop down list.

[2] [TYPE (DESTINATION)]

Select the type (destination) from the drop down list. The selectable types (destination) are different by the type (source) as the following.



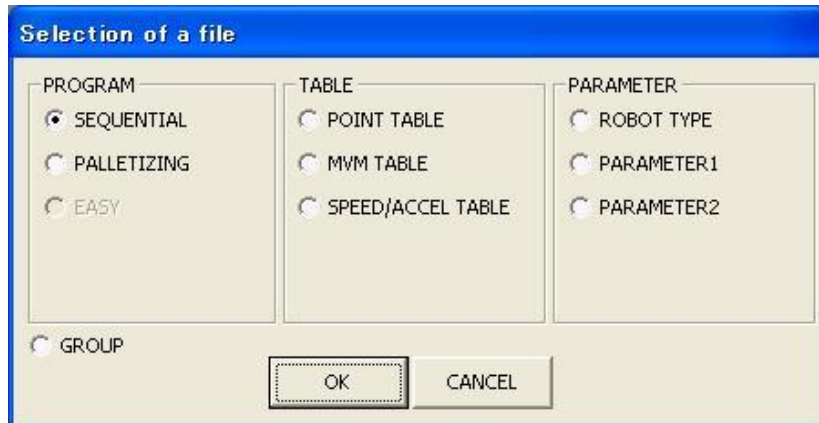
[3] [SELECT FILE] button

"Selection of a file" screen appears, then select a file type and click [OK] button.

File selection dialogue appears, then select the file you want to convert.

* When the setting of [1], [2] is changed after selection the file, the file selection is invalid. So select the file again.

* When "GROUP" is selected, the files whose setting is valid in the "GROUP" are also converted.



[4] OPTION

When [TYPE (SOURCE)] is [CRL/CRLAC] or [CM1] or [CM2/CM2AC] and [TYPE (DESTINATION)] is [CA20-M10/M40, CA10-M10/M40] in file convert of sequential program, MOV command cannot be converted because it does not exist in type (destination).

And OFS command cannot be converted because the input format of the setting value is different.

Accordingly, when conversion, a point table is made and these 2 commands can be converted. (Conversion of MOV, OFS)

- Option column is checked (Conversion of MOV, OFS)

Input the coordinate of MOV command and OFS command to the same point table No. as the step No. of MOV command and OFS command.

MOV command is converted to MOVP command, and MOVP command is converted to NOP command at this time.

The point table No. specified the converted MOVP command and OFS command is the same step No. of the commands.

The point table file made in conversion is made in the same folder as the file of type (source). And the file's name is the same as the file of type (source) (not same only extension).

- Option column is not checked

MOV command and OFS command is converted to NOP command

[5] [CONVERT] button

After selecting a file at [3], convert the selected file by clicking the [CONVERT] button.

The converted file is made in the same folder as the file of type (source). And the file's name is the same as the file of type (source) (not same only extension).

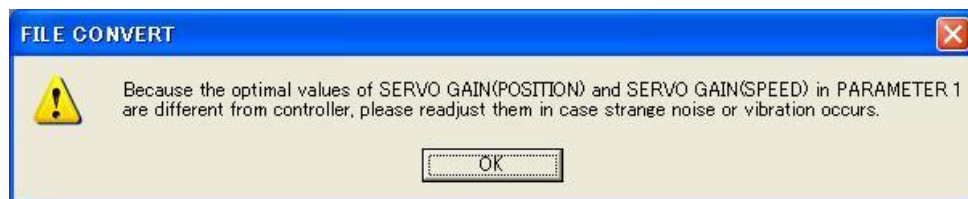
* In case of option column is checked, the two file of sequential file and point file are made at the same time.

* In case of the file whose name is the same as the converted file's name has already existed, the overwriting confirmation screen appears.

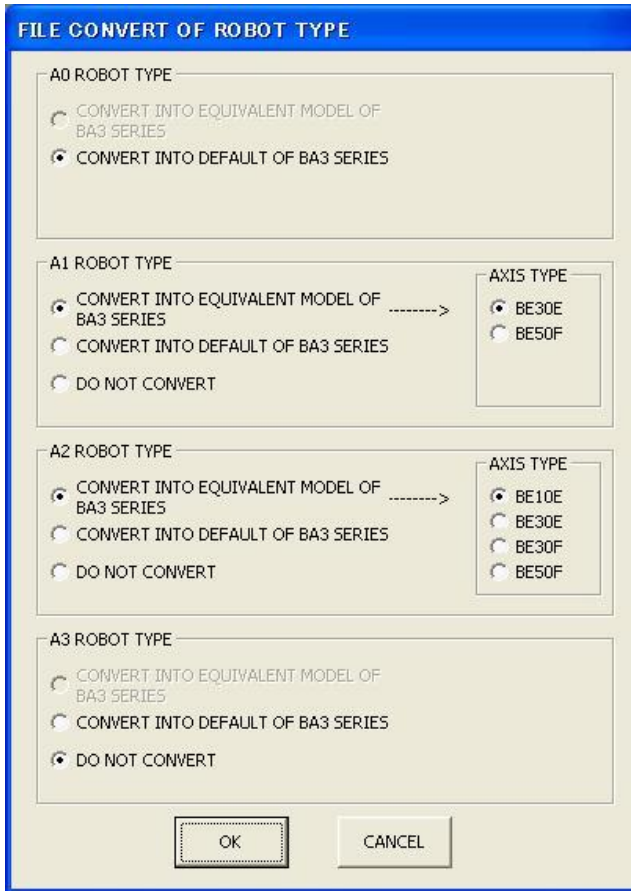
* "File(source)" is not deleted.

* When a file of parameter 1 is converted, the message below is displayed.

Click the [OK] button, after confirmation.



* When a file of robot type is converted, the screen below is displayed. Select how to convert robot type from A0 to A3 and click the [OK] button. In case of [CANCEL] button is clicked, robot type is not converted.

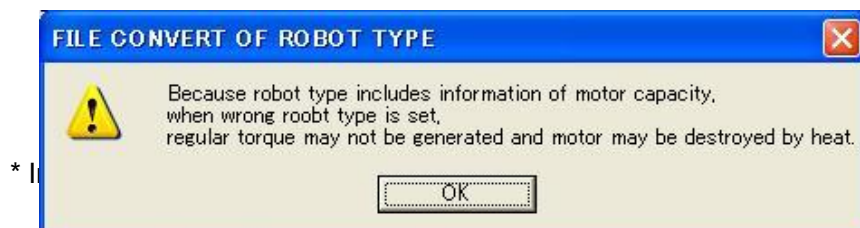


1. Case of selection "CONVERT INTO EQUIVALENT MODEL OF BA3 SERIES"

Select it in case of exchanging for the same model in BA3. In addition, select "AXIS TYPE" of the model. (There are instances where several proposed robot type exist because a robot type correspond several models in BA2.)

When "AXIS TYPE" is changed, the message below is displayed.

Click the [OK] button, after confirmation.



2. Case of selection "CONVERT INTO DEFAULT OF BA3 SERIES"

Select it in case of no same model in BA3 series or in case of exchanging for the

different model in BA3. Input robot type before operating robot.

3. Case of selection "DO NOT CONVERT"

Select it in case of not exchanging in BA3 series.

[6] [END] button

The "FILE CONVERT" screen closes and end "File Convert" by clicking the [END] button.

[7] [FILE (SOURCE)] button

After selecting a file in [3], the path of the selected file is displayed.

[8] [FILE (DESTINATION)] button

After selecting a file in [3], the path of the made file when the selected file is converted is displayed.

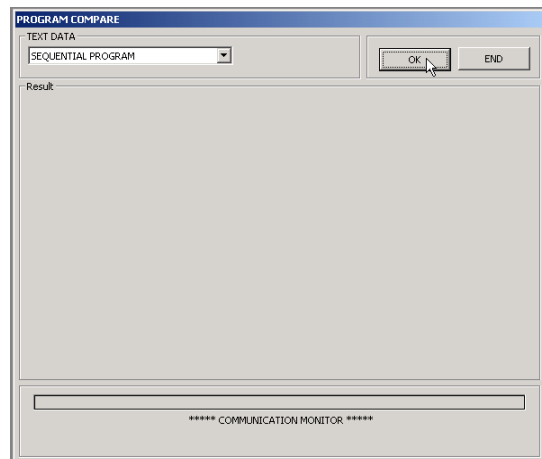
■ 4.6.6 Program Compare

It is possible to compare the data in the robot controller with the file saved in the personal computer and to display the difference, if any.

* Before executing this operation, connect the personal computer with the robot controller and make the controller ready for the operation.

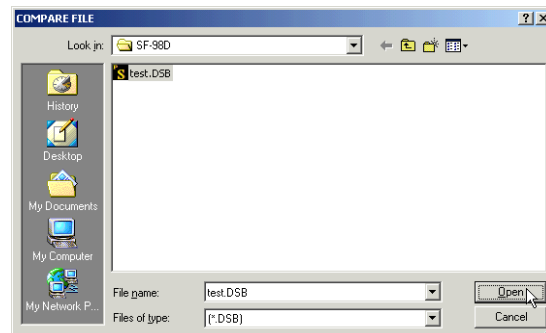
In the [Program Compare] mode, the data in the controller is once sent to the personal computer and compared there.

When you click [Option] – [Program Compare], the “PROGRAM COMPARE” screen appears on the display.

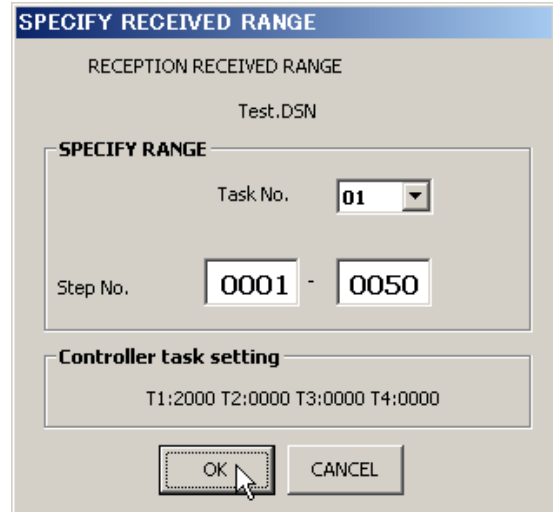


Select the type of the file from the dropdown list of “TEXT DATA” and click the [OK] button. Then the [COMPARE FILE] screen is displayed.

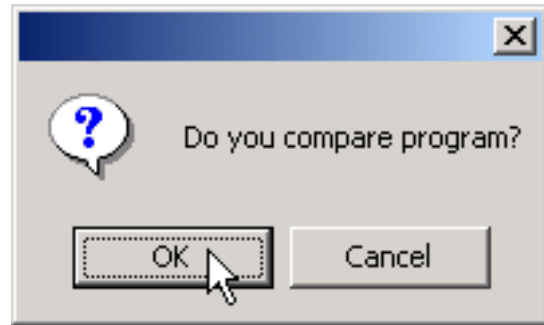
Specify the file you wish to compare, and click the [Open] button.



- * When you wish to compare the sequential program, palletizing program, easy program, point table or MVM table, the “SPECIFY RECEIVED RANGE” screen appears. Specify the range for program comparison and click the [OK] button. To stop the program comparison, click the [CANCEL] button.



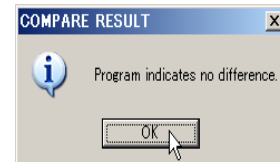
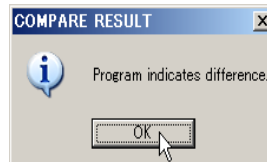
When the confirmation screen is displayed, click the [OK] button if you wish to receive the data from the controller. If you do not wish, click the [Cancel] button.



*The sequential program can be received during operation.

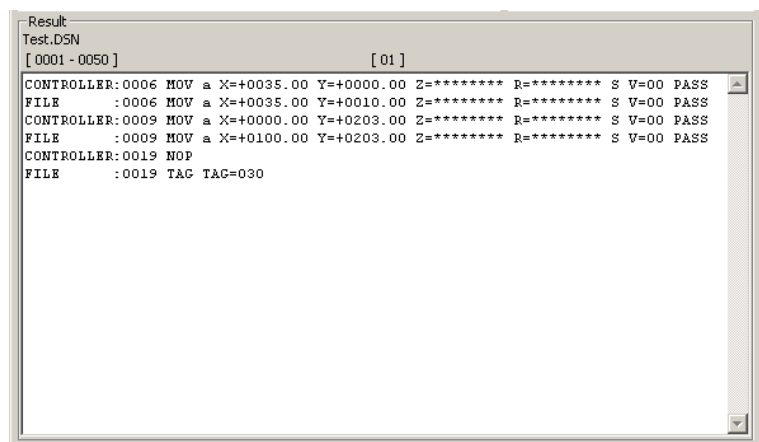
If you click the [END] button during receiving of the data, it is interrupted (or canceled).

When the data has reached normally, the [COMPARE RESULT] screen is displayed.



If the difference has been found in the program, the details are displayed.

To exit from the “PROGRAM COMPARE” screen, click the [END] button.



■ 4.6.7 Error History

Represent error history of the controller.

When the setting of the controller is CA20-M10/M40, CA10-M10/M40, this function is invalid.

* Before executing this operation, connect the personal computer with the robot controller and make the controller ready for the operation.

When you click [Option] – [Error History], the “ERROR HISTORY” screen appears.

ERROR HISTORY			
<div style="display: flex; justify-content: space-between; align-items: center;"> [RENEWAL] [END] [PREV] [NEXT] [FILE OUTPUT] </div>			
No.	ERROR CODE	CONTENT	ELAPSED TIME
01	**	POWER ON	***H**M**S
02	13	EMERGENCY STOP	002H55M02S
03	**	POWER ON	***H**M**S
04	A8	PARAMETER ERROR	000H55M45S
05	**	POWER ON	***H**M**S
06	13	EMERGENCY STOP	000H01M59S
07	**	POWER ON	***H**M**S
08	13	EMERGENCY STOP	005H08M21S
09	13	EMERGENCY STOP	005H01M49S
10	13	EMERGENCY STOP	004H52M22S
11	13	EMERGENCY STOP	004H50M12S
12	13	EMERGENCY STOP	004H49M47S
13	13	EMERGENCY STOP	000H49M56S
14	13	EMERGENCY STOP	000H37M29S
15	**	POWER ON	***H**M**S
16	B0	STEP NO. ERROR	002H37M18S
17	B0	STEP NO. ERROR	002H37M00S
18	13	EMERGENCY STOP	000H33M07S
19	13	EMERGENCY STOP	000H18M50S
20	**	POWER ON	***H**M**S

When you click [RENEWAL], the error history is renewed.

When you click [END], the “ERROR HISTORY” screen is closed and end the error history.

When you click [PREV], the error history of the previous 20 items is represented.

When you click [NEXT], the error history of the next 20 items is represented.

When you click [FILE OUTPUT], the file designation screen is displayed. The error history of all No. can be saved with a CSV file.

*When the setting of the controller is CA25-M10/M40, “ALARM CODE” is not represented.

*When the setting of the controller is CA01-M05, “ALARM CODE” and “ELAPSED TIME” are not represented.

■ 4.6.8 Memory Initialization

Initialize the memory of the controller. The items that can be selected depend on the setting of the controller.

* Before executing this operation, connect the personal computer with the robot controller and make the controller ready for the operation.

When you click [Option] – [Memory Initialization], the “MEMORY INITIALIZATION” screen appears.

Select an item you want to initialize,
and click [OK] button.

When you cancel it, click [CANCEL] button.



The confirmation screen appears.

When you initialize it, click [OK] button.

When you cancel it, click [CANCEL] button.



The result screen appears.

The controller power has to be turned off once in case of “MEMORY ALL CLEAR”.

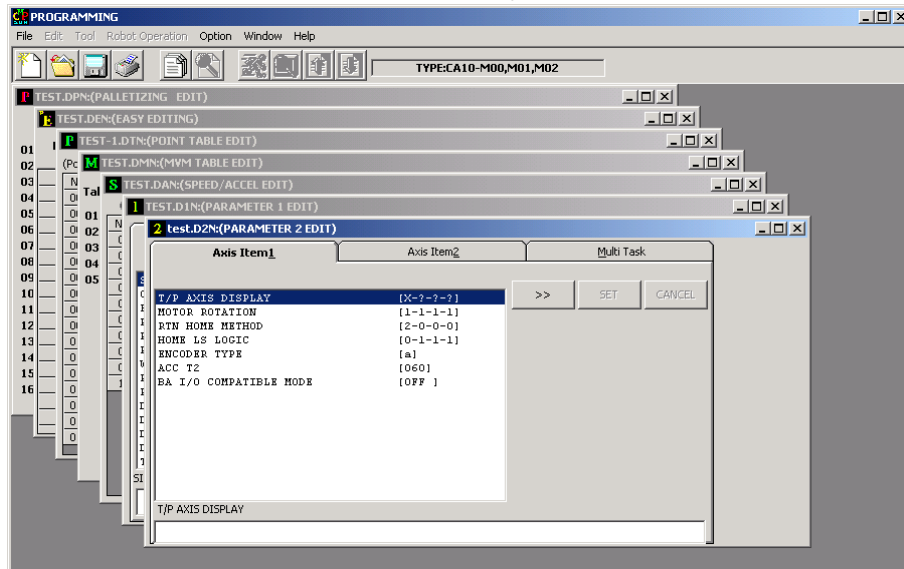
The controller power does not have to be turned off once in case of the other.



4.7 Window

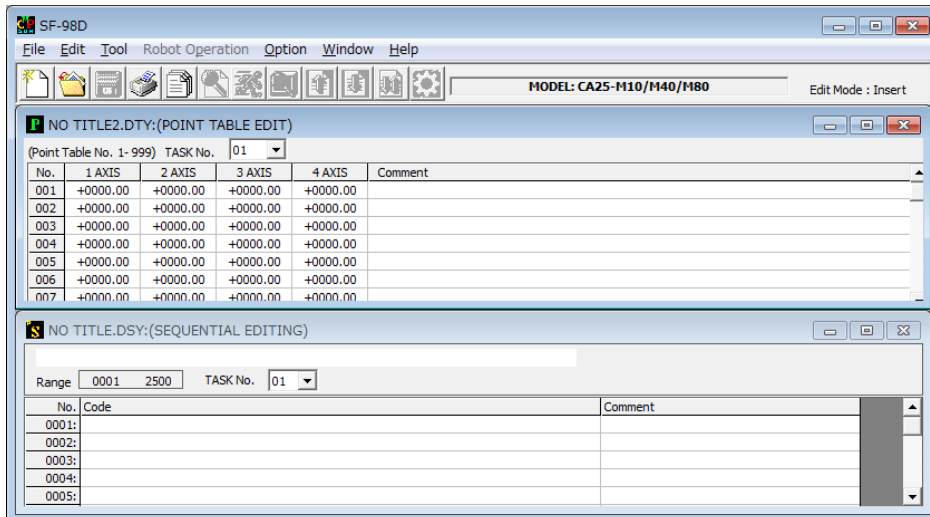
4.7.1 Cascade

When a plural number of windows are opened at the same time on the editing screen, click [Window] – [Cascade], and the windows are displayed in cascade.



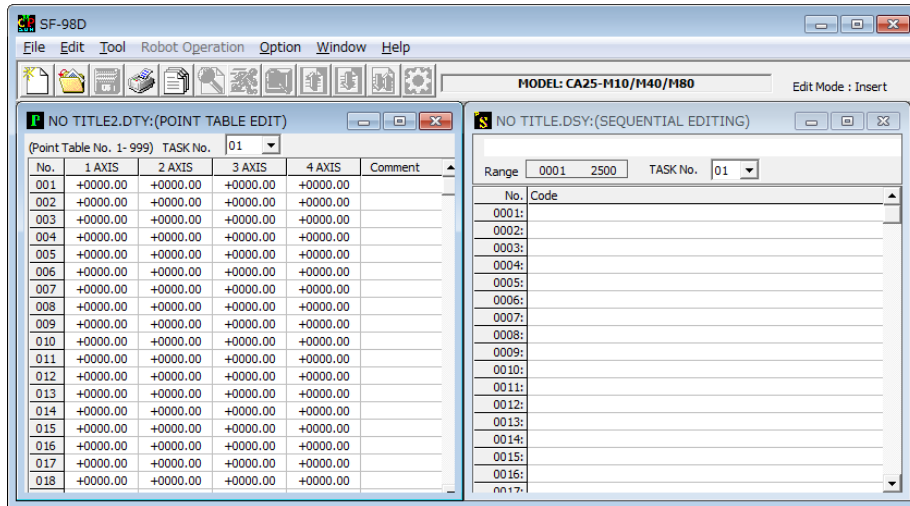
4.7.2 Horizontal Tile

When a plural number of files are opened at the same time on the editing screen, click [Window] – [Horizontal Tile], and the windows are displayed in horizontal tile.



■ 4.7.3 Vertical Tile

When a plural number of files are opened at the same time on the editing screen, click [Window] – [Vertical Tile], and the windows are displayed in vertical tile.



■ 4.8 Help

■ 4.8.1 About SF-98D

When you click [Help (H)] – [About SF-98D], the version information of this tool is displayed.

Chapter 5 Others

■ 5.1 Error

The errors displayed by the SF-98D are as follows:

•	<p>[Code] : 3</p> <p>[Display] : Could not send to the controller.</p> <p>[Timing of error generation] : File transmission</p> <p>[Meaning/Cause] : Communication line error, or stop of transmission.</p> <p>[Remedy] : Check for the communication line and controller power.</p>
•	<p>[Code] : 4.0</p> <p>[Display] : Communication error. Stop the robot. Check for the communication line and controller power. Before resuming the program, close the execution screen once.</p> <p>[Timing of error generation] : Execution screen</p> <p>[Meaning/Cause] : Communication line error.</p> <p>[Remedy] : Check for the communication line and controller power. Before restarting the program, close the execution screen once.</p>
•	<p>[Code] : 4.1</p> <p>[Display] : Communication error. Could not execute the monitor. Check for the communication line and controller power. Before resuming the monitor, close the monitor screen once.</p> <p>[Timing of error generation] : Monitor screen</p> <p>[Meaning/Cause] : Communication line error.</p> <p>[Remedy] : Check for the communication line and controller power. Before restarting the monitor, close the monitor screen once.</p>

<ul style="list-style-type: none"> • 	<p>[Code] : 4.3</p> <p>[Display] : Communication error. File transmission stops. Check for the communication line and controller power. Before resuming file transmission, close the transmit screen once.</p> <p>[Timing of error generation] : File transmission</p> <p>[Meaning/Cause] : Communication line error.</p> <p>[Remedy] : Check for the communication line and controller power. Before restarting the transmission, close the transmit screen once.</p>
<ul style="list-style-type: none"> • 	<p>[Code] : 4.4</p> <p>[Display] : Communication error. File receiving stops. Check for the communication line and controller power. Before resuming file receiving, close the receive screen once.</p> <p>[Timing of error generation] : File receiving</p> <p>[Meaning/Cause] : Communication line error.</p> <p>[Remedy] : Check for the communication line and controller power. Before restarting the receiving, close the receive screen once.</p>
<ul style="list-style-type: none"> • 	<p>[Code] : 4.8</p> <p>[Display] : Communication error. Stop the setting of robot type. Check for the communication line and controller power. Before resuming the setting of robot type, close the robot type setting screen once.</p> <p>[Timing of error generation] : Setting of robot type</p> <p>[Meaning/Cause] : Communication line error.</p> <p>[Remedy] : Check for the communication line and controller power. Before restarting the setting of robot type, close the robot type setting screen once.</p>

•	<p>[Code] : 4.9</p> <p>[Display] : Communication error. Stop the robot. Check for the communication line and controller power. Before resuming the teaching, close the teaching screen once.</p> <p>[Timing of error generation] : Teaching</p> <p>[Meaning/Cause] : Communication line error.</p> <p>[Remedy] : Check for the communication line and controller power. Before restarting the teaching, close the teaching screen once.</p>
•	<p>[Code] : 5</p> <p>[Display] : No transmit data is found. File (File Name) transmission stops.</p> <p>[Timing of error generation] : File transmission</p> <p>[Meaning/Cause] : No data to be transmitted is available.</p> <p>[Remedy] : Check for the file on the editing screen.</p>
•	<p>[Code] : 9</p> <p>[Display] : File could not be loaded.</p> <p>[Timing of error generation] : File transmission and receiving.</p> <p>[Meaning/Cause] : Access to the file is not possible.</p> <p>[Remedy] : Check for the file contents on the editing screen.</p>
•	<p>[Code] : 10</p> <p>[Display] : No text file exists in the group file.</p> <p>[Timing of error generation] : File transmission and receiving.</p> <p>[Meaning/Cause] : No file exists in the group file.</p> <p>[Remedy] : Check for the setting of the group file. (See Para. 4.6.1.)</p>
•	<p>[Code] : 12</p> <p>[Display] : Communication line could not open. Check for the setting of communication conditions.</p> <p>[Timing of error generation] : At the start of communication.</p> <p>[Meaning/Cause] : The communication port is not correct.</p> <p>[Remedy] : Check for the setting of the communication conditions. (See Para. 4.6.2.)</p>

•	<p>[Code] : 14</p> <p>[Display] : Receiving stops.</p> <p>[Timing of error generation] : File receiving</p> <p>[Meaning/Cause] : Communication error</p> <p>[Remedy] : Check the communication cable and connector for connections.</p>
•	<p>[Code] : 16</p> <p>[Display] : Could not save file. RUN-TIME ERROR CODE:</p> <p>[Timing of error generation] : File receiving</p> <p>[Meaning/Cause] : Saving of received data was not possible.</p> <p>[Remedy] : Terminate the SF-98D once, then restart and try again.</p>
•	<p>[Code] : 17</p> <p>[Display] : Controller setting is illegal.</p> <p>[Timing of error generation] : At the start of communication.</p> <p>[Meaning/Cause] : The type of the controller is not identical.</p> <p>[Remedy] : Check the controller for the setting. (See Para. 4.6.2.)</p>
•	<p>[Code] : 20</p> <p>[Display] : Cannot execute. (Parameter 2 was changed. Turn off the controller power once, then on again.)</p> <p>[Timing of error generation] : At the start of the execution screen.</p> <p>[Meaning/Cause] : The Parameter 2 was changed partially.</p> <p>[Remedy] : Turn off the controller power once, then on again.</p>
•	<p>[Code] : 21</p> <p>[Display] : Cannot send file.</p> <p>[Timing of error generation] : File transmission</p> <p>[Meaning/Cause] : The controller was in operation. An error was found in the controller.</p> <p>[Remedy] : Stop the controller, then try again.</p>

•	<p>[Code] : 22</p> <p>[Display] : While program is running, SEQUENTIAL PROGRAM receiving is impossible..</p> <p>[Timing of error generation] : Sequential program receiving</p> <p>[Meaning/Cause] : The controller was in operation.</p> <p>[Remedy] : Stop the controller, then try again.</p>
•	<p>[Code] : 23</p> <p>[Display] : Cannot set the robot type.</p> <p>[Timing of error generation] : Setting of robot type</p> <p>[Meaning/Cause] : The controller was in operation.</p> <p>[Remedy] : Stop the controller, then try again.</p>
•	<p>[Code] : 24</p> <p>[Display] : Cannot teach. (Parameter 2 was changed. Turn off the controller power once, then on again.)</p> <p>[Timing of error generation] : Teaching</p> <p>[Meaning/Cause] : The Parameter 2 was changed partially.</p> <p>[Remedy] : The parameter 2 was changed partially. Turn off the controller power once, then on again.</p>
•	<p>[Code] : 25</p> <p>[Display] : Cannot teach.</p> <p>[Timing of error generation] : Teaching</p> <p>[Meaning/Cause] : The controller was in operation.</p> <p>[Remedy] : Stop the controller, then try again.</p>
•	<p>[Code] : 31</p> <p>[Display] : Servo is not locked. Lock the servo.</p> <p>[Timing of error generation] : Teaching or jog or execution screen</p> <p>[Meaning/Cause] : Home return of the robot was commanded while the servo was set free. While the servo was set free, change to remote teaching mode was commanded.</p> <p>[Remedy] : Lock the servo.</p>

•	<p>[Code] : 32</p> <p>[Display] : Home return was not done. Execute home return.</p> <p>[Timing of error generation] : Teaching</p> <p>[Meaning/Cause] : While the robot was yet to return to the home point, you have written the jog data or clicked the [RUN] button.</p> <p>[Remedy] : Return the robot to the home point first.</p>
•	<p>[Code] : 33</p> <p>[Display] : Program is running and you cannot terminate.</p> <p>[Timing of error generation] : Execution screen</p> <p>[Meaning/Cause] : While the program was running, you were about to close the execution screen.</p> <p>[Remedy] : After the program execution has finished, close the screen.</p>
•	<p>[Code] : 34</p> <p>[Display] : Servo is locked. Set the servo free.</p> <p>[Timing of error generation] : Teaching</p> <p>[Meaning/Cause] : The direct teaching mode has been selected while the servo was locked.</p> <p>[Remedy] : Set the servo in the free state.</p>
•	<p>[Code] : 35</p> <p>[Display] : Could not lock the servo.</p> <p>[Timing of error generation] : Servo lock screen</p> <p>[Meaning/Cause] : The servo lock is not possible.</p> <p>[Remedy] : Quit the robot execution screen once, then call the execution screen again. Then the error code is displayed. Remedy according to the error code table (See Para. 5.2) and descriptions on error messages as carried in the controller instruction manual.</p>

•	<p>[Code] : 36</p> <p>[Display] : Monitoring now. Cannot stop. Stop by closing the monitor screen?</p> <p>[Timing of error generation] : Execution screen</p> <p>[Meaning/Cause] : The [STOP] button has been clicked during monitoring.</p> <p>[Remedy] : Click the [OK] button, and you can close the monitor screen and stop the program.</p>
•	<p>[Code] : 40</p> <p>[Display] : Controller mode is wrong. Cannot send group file.</p> <p>[Timing of error generation] : Group file transmission</p> <p>[Meaning/Cause] : The controller is in a mode other than the SEQUENTIAL and PALLETIZING modes.</p> <p>[Remedy] : Select the SEQUENTIAL mode. (See Para. 4.5.2.)</p>
•	<p>[Code] : 41</p> <p>[Display] : Controller mode is wrong. Cannot send sequential program.</p> <p>[Timing of error generation] : File transmission</p> <p>[Meaning/Cause] : The controller is in a mode other than the SEQUENTIAL and PALLETIZING modes.</p> <p>[Remedy] : Select the SEQUENTIAL mode. (See Para. 4.5.2.)</p>
•	<p>[Code] : 42</p> <p>[Display] : Controller mode is wrong. Cannot send palletizing program.</p> <p>[Timing of error generation] : File transmission</p> <p>[Meaning/Cause] : The controller is in a mode other than the SEQUENTIAL and PALLETIZING modes.</p> <p>[Remedy] : Select the SEQUENTIAL mode. (See Para. 4.5.2.)</p>

•	<p>[Code] : 43</p> <p>[Display] : Robot type No. error</p> <p>[Timing of error generation] : Setting of robot type</p> <p>[Meaning/Cause] : Robot type setting error.</p> <p>[Remedy] : See the descriptions on the robot type as described in the actuator instruction manual.</p>
•	<p>[Code] : 51-60, 63-67</p> <p>[Display] : A parameter which is neglected due to different controller version exists.</p> <p>Parameter name: *****</p> <p>[Timing of error generation] : File transmission</p> <p>[Meaning/Cause] : The parameter which is neglected is transmitted to the controller.</p> <p>[Remedy] : Upgrade the controller version.</p>
•	<p>[Display] : Error occurred in the controller. Cancel [ErrCode] error?</p> <p>[Timing of error generation] : At the start of communication.</p> <p>[Meaning/Cause] : Communication was about to start while an error was found in the controller.</p> <p>[Remedy] : Cancel the error. Unless it can be canceled, remedy according to the error code table (See Para. 5.2) and descriptions on error messages as carried in the controller instruction manual.</p>
•	<p>[Display] : Illegal text is found in the file.</p> <p>[Timing of error generation] : At the time of file reading.</p> <p>[Meaning/Cause] : Reading of some data in the data area is not possible. (File created by using other software.)</p> <p>[Remedy] : Check for the contents of the relevant file by using other software such as editor.</p>
•	<p>[Display] : Cannot open any further due to memory or resource shortage.</p> <p>[Timing of error generation] : At the time of file reading.</p> <p>[Meaning/Cause] : Access error at file loading.</p> <p>[Remedy] : Close the other screen.</p>

•	<p>[Display] : Path name is illegal.</p> <p>[Timing of error generation] : At the time of file reading and saving.</p> <p>[Meaning/Cause] : The path name was specified illegally.</p> <p>[Remedy] : Enter the legal path name.</p>
•	<p>[Display] : Cannot read the drive. Try again?</p> <p>[Timing of error generation] : At the time of file reading and saving.</p> <p>[Meaning/Cause] : No floppy disk is inserted.</p> <p>[Remedy] : Make sure that the floppy disk is set correctly.</p>
•	<p>[Display] : Cannot edit any more.</p> <p>[Timing of error generation] : At the time of file reading.</p> <p>[Meaning/Cause] : The number of program editing screens exceeds the predetermined value.</p> <p>[Remedy] : Close the other window or windows.</p>
•	<p>[Display] : The file is already open.</p> <p>[Timing of error generation] : At the time of file reading.</p> <p>[Meaning/Cause] : You are about to read the file bearing the same name.</p> <p>[Remedy] : The file already opened cannot be opened again.</p>
•	<p>[Display] : Illegal value.</p> <p>[Timing of error generation] : At the time of data editing.</p> <p>[Meaning/Cause] : The number of digits below the decimal point is not identical.</p> <p>[Remedy] : Enter the legal value.</p>
•	<p>[Display] : Illegal file name ****.</p> <p>[Timing of error generation] : At the time of group setting.</p> <p>[Meaning/Cause] : The specified file name is illegal.</p> <p>[Remedy] : Enter the legal file name.</p>
•	<p>[Display] : Illegal input range of ****.</p> <p>[Timing of error generation] : At the time of group setting.</p> <p>[Meaning/Cause] : The specified range is illegal.</p> <p>[Remedy] : Enter the legal range.</p>

•	<p>[Display] : Line ** of program ** is already input. Cannot input any more.</p> <p>[Timing of error generation] : At the time of line insertion.</p> <p>[Meaning/Cause] : The data has been input to the final line of the setting range.</p> <p>[Remedy] : Increase the range, or delete any unnecessary step or steps.</p>
•	<p>[Display] : Line ** of program ** is already input. Cannot input any more.</p> <p>[Timing of error generation] : At the time of paste during editing of sequential program.</p> <p>[Meaning/Cause] : The data has been input to the final line of the setting range.</p> <p>[Remedy] : Increase the range, or delete any unnecessary step or steps.</p>
•	<p>[Display] : Specified step No. cannot be found.</p> <p>[Timing of error generation] : At the time of step number search.</p> <p>[Meaning/Cause] : The specified step number cannot be found.</p> <p>[Remedy] : Check for the setting range.</p>
•	<p>[Display] : Exceeds the range of the program opened now.</p> <p>[Timing of error generation] : At the time of step number search (easy program).</p> <p>[Meaning/Cause] : The specified program number is illegal.</p> <p>[Remedy] : Check for the setting range.</p>
•	<p>[Display] : File to be printed is not specified.</p> <p>[Timing of error generation] : At the time of printing.</p> <p>[Meaning/Cause] : No file is specified.</p> <p>[Remedy] : Specify the file.</p>
•	<p>[Display] : One or more visual basic applications are running. Please close those applications, then choose OK to continue.</p> <p>[Timing of error generation] : At the time of installing.</p> <p>[Meaning/Cause] : The install program will not run because other program created by using the Visual Basic of Microsoft is running now.</p> <p>[Remedy] : Terminate the relevant program, then install again. You have to restart the Windows after terminating the relevant program under some occasions.</p>

■ 5.2 Error Code Table

This paragraph describes the error messages and error codes.

For details on each error, see "Err Messages" of the controller instruction manual provided separately.

1. Enhanced master unit, Mater unit

Code	Description	Code	Description
12	WDT (watchdog timer) error	3D	Axis 2 Encoder changeover error
13	Emergency stop	3F	Axis 2 Driver error
20	Axis 1 Communication error	40	Axis 3 Communication error
21	Axis 1 Overspeed error	41	Axis 3 Overspeed error
22	Axis 1 Overcurrent error	42	Axis 3 Overcurrent error
23	Axis 1 Overload error	43	Axis 3 Overload error
24	Axis 1 Overflow	44	Axis 3 Overflow
26	Axis 1 Encoder error	46	Axis 3 Encoder error
28	Axis 1 Soft limit over (at execution)	48	Axis 3 Soft limit over (at execution)
29	Axis 1 Soft limit over (at execution)	49	Axis 3 Soft limit over (at execution)
2A	Axis 1 Overvoltage error	4A	Axis 3 Overvoltage error
2B	Axis 1 Motor overheat error	4B	Axis 3 Motor overheat error
2C	Axis 1 Encoder backup error	4C	Axis 3 Encoder backup error
2D	Axis 1 Encoder changeover error	4D	Axis 3 Encoder changeover error
2F	Axis 1 Driver error	4F	Axis 3 Driver error
30	Axis 2 Communication error	50	Axis 4 Communication error
31	Axis 2 Overspeed error	51	Axis 4 Overspeed error
32	Axis 2 Overcurrent error	52	Axis 4 Overcurrent error
33	Axis 2 Overload error	53	Axis 4 Overload error
34	Axis 2 Overflow	54	Axis 4 Overflow
36	Axis 2 Encoder error	56	Axis 4 Encoder error
38	Axis 2 Soft limit over (at execution)	58	Axis 4 Soft limit over (at execution)
39	Axis 2 Soft limit over (at execution)	59	Axis 4 Soft limit over (at execution)
3A	Axis 2 Overvoltage error	5A	Axis 4 Overvoltage error
3B	Axis 2 Motor overheat error	5B	Axis 4 Motor overheat error
3C	Axis 2 Encoder backup error	5C	Axis 4 Encoder backup error

Code	Description	Code	Description
5D	Axis 4 Encoder changeover error	B5	Port No. error
5F	Axis 4 Driver error	B6	Table No. error
60	Cannot execute continuously.	B7	Group No. error
61	Home return is yet to complete.	B8	Robot No. error
62	Cannot execute.	B9	Easy program No. error
63	Task cannot be started.	BA	Task No. error
90	ID error	C0	Axis 1 Soft limit over plus "+"
91	Sequential program memory error	C1	Axis 1 Soft limit over minus "-"
92	Palletizing program memory error	C2	Axis 2 Soft limit over plus "+"
93	Parameter memory error	C3	Axis 2 Soft limit over minus "-"
94	Point table memory error	C4	Axis 3 Soft limit over plus "+"
95	Speed table memory error	C5	Axis 3 Soft limit over minus "-"
96	Acceleration/deceleration table memory error	C6	Axis 4 Soft limit over plus "+"
97	MVM table memory error	C7	Axis 4 Soft limit over minus "-"
98	Easy program memory error	E0	Other error
99	Slave ID error		
A0	Command error (Impossible error)		
A1	No tag designation		
A2	Tag duplicated definition		
A3	Stack over flow		
A4	Stack under flow		
A8	Parameter error		
B0	Step No. error		
B1	Tag No. error		
B2	Palletizing program No. error		
B3	Counter No. error		
B4	Timer No. error		

2. CA01-M05

Code	Description
11	Over current
21	Over load
31	Over speed
41	Position counter overflow
42	Positional deviation exceeded
51	Over heat
61	Sensor error(Disconnection while power is on)
62	Sensor error(Disconnection during backup)
63	Sensor error(1-rotation count)
64	Sensor error(Mixing)
65	Sensor error(Overflow)
66	Battery error
67	Backup error
71	Over voltage
72	Voltage down
81	Emergency stop
91	Nonvolatile memory read error
92	Nonvolatile memory write error
98	CPU error
99	Parameter error
101	Execution Impossible
102	Return To Origin Not Completed
103	+ Soft limit over
104	- Soft limit over
105	Writing Impossible

■ 5.3 BS Alarm Code Table

This paragraph describes the BS alarm messages and the codes.

For details on each alarm, see "Err Messages" of the controller instruction manual provided separately.

Code	Description	Code	Description
001	Over-current	030	Present value over
002	Over voltage	032	Zero point saving error
003	Low PN voltage	033	ABS invalid zero point
004	Main power supply input trouble	034	+ Soft limit over
005	Charging resistor overheat	035	- Soft limit over
006	Resolver disconnected	036	ABS battery cable broken or
007	Power status error	038	Overrun
008	Servo amplifier overheating	040	Encoder line broken
009	Counter current resistance overheating	041	Encoder communication error
010	Reverse current absorption error	042	Encoder backup error
012	DSP error	043	Encoder checksum error
013	ABS battery low voltage	044	Encoder battery alarm
014	Brake error	045	Encoder ABS phase error
015	Over-current detection	046	Encoder overspeed
016	Speed amplifier saturation	047	Encoder communication error
017	Motor overload	048	Encoder initialization error
018	Instant thermal	049	Encoder sensor phase error
019	Resolver error	054	Magnetic pole detect error
020	Overspeed	251	PON error
021	Deviation counter over		
022	Resolver ABS phase error		
023	Resolver ABS broken line		
024	ABS battery alarm		
025	Option alarm		
026	Parameter setting error		
027	Resolver ABS error		
028	Link error		
029	Command value over		

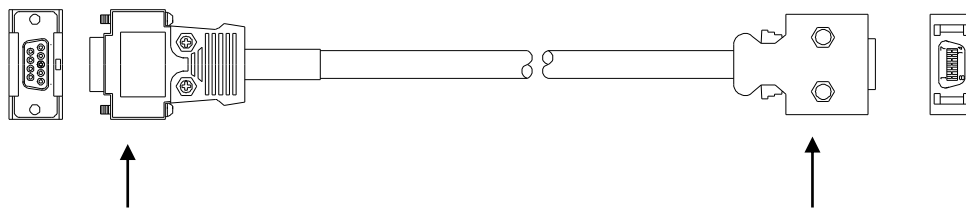
■ 5.4 Check Items When Communication Is Not Possible

If the communication with the controller is not possible, perform check on the following items.

- Make sure that the communication setting is done correctly.
For details, see Para. 4.6.2 above.
- RS232C cable connection
Make sure that the cable is connected properly as shown below, without being broken.

Personal computer cable pin assignment table

PC side		PCBL-31	Controller side	
D-SUB 9-pin (female)			Half pitch 14-pin	
Signal name	Pin No.		Pin No.	Signal name
RXD	2		2	GND
TXD	3		5	TXD
DTR	4		6	RXD
GND	5		8	GND
DSR	6		FG (ground plate)	
RTS	7			
CTS	8			
FG	Hood case			FG



Socket: XM2D-0911
(OMRON-make, or equivalent)
Hood: XM2S-0911
(OMRON-make, or equivalent)

Plug: 10114-3000VE (3M-make)
Shell: 10314-52F0-008 (3M-make)

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