Changes for the Better

MITSUBISHI

PROGRAMMABLE CONTROLLERS

MELSEC-F

OPERATION MANUAL

FX Configurator-FP

FX

Safety Precautions

(Read these precautions before using.)

Before installing, operating, maintenance or inspecting this product, thoroughly read and understand this manual and the associated manuals. Also pay careful attention to handle the module properly and safety.

This manual classifies the safety precautions into two categories: DANGER and CAUTION.

DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by CAUTION may also be linked to serious results.
In any case, it is important to follow the directions for usage.
Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

1. DESIGN PRECAUTIONS

DANGER	Reference
• Provide a safety circuit on the outside of the PLC so that the whole system operates to ensure the safety even when external power supply trouble or PLC failure occurs. Otherwise, malfunctions or output failures may result in an accident. 1) An emergency stop circuit, a protection circuit, an interlock circuit for opposite movements, such as normal and reverse rotations, and an interlock circuit for preventing damage to the machine at the upper and lower positioning limits should be configured on the outside of the PLC. 2) When the PLC CPU detects an error, such as a watch dog timer error, during self-diagnosis, all outputs are turned off. When an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled. Design external circuits and mechanisms to ensure safe operations of the machine in such a case. 3) When some sort of error occurs in a relay, triac or transistor of the output unit, output may be kept on or off. For output signals that may lead to serious accidents, design external circuits and mechanisms to ensure safe operations of the machine in such cases.	56

CAUTION	Reference
• Observe the following items. Failure to do so may cause incorrect data-writing by noise to PLCs and result the PLC failure, machine damage or an accident. 1) Do not lay close or bundle with the main circuit line, high-voltage line, or load line. Noise and Surge induction interfere with the system operation. Keep a safe distance of least 100 mm (3.94") from the above lines during wiring. 2) Ground the shield wire or shield of a shielded cable at one point on the PLC. However, do not ground at the same point as high voltage lines. • Install in a manner which prevents excessive force from being applied to the built-in connectors dedicated to programming, power connectors and I/O connectors. Failure to do so may result in wire breakage or failure of the PLC.	56

2. INSTALLATION PRECAUTIONS

⚠DANGER	Reference
• Make sure to cut off all phases of the power supply externally before starting the installation or wiring work. Failure to do so may cause electric shock.	56

⚠CAUTION	Reference
• Fit the extension cables, peripheral device connecting cables, input/output cables and battery connecting cable securely to the designated connectors. Contact failures may cause malfunctions. • Make sure to attach the terminal cover offered as an accessory to the product before turning on the power or starting the operation after installation or wiring work. Failure to do so may cause electric shock.	56

3. STARTUP AND MAINTENANCE PRECAUTIONS

⚠DANGER	Reference
• Do not touch any terminal while the PLC's power is on. Doing so may cause electrical shock or malfunctions. • Before cleaning or retightening terminals, externally cut off all phases of the power supply. Failure to do so may expose you to shock hazard. • Before modifying the program under operation or performing operation for forcible output, running or stopping, carefully read the manual, and sufficiently ensure the safety. An operation error may damage the machine or cause accidents. • To test Zero-return, JOG operation and Positioning data, throughly read this manual, ensure the safe system operation An operation error may damage the machine or cause accidents. The response, such as the JOG operation, may be slow according to the running state of the personal computer at the time of the test operation. In the test operation, the PLC performance can be slower due to the busy state of personal computer. - End all other applications running except FX Configurator-FP. - At destination specification (refer to chapter 6), set the transmission speed at 38.4kbps or higher.	57

⚠CAUTION	Reference
• Do not disassemble or modify the PLC. Doing so may cause failures, malfunctions or fire. For repair, contact your local Mitsubishi Electric distributor. • Before connecting or disconnecting any extension cable, turn off power. Failure to do so may cause unit failure or malfunctions. • Before attaching or detaching the following devices, turn off power. Failure to do so may cause device failure or malfunctions. - Peripheral devices, expansion boards and special adapters - I/O extension blocks/units and terminal blocks	57

FX Configuration-FP

Operation Manual

Manual number	JY997D21801
Manual revision	A
Date	12/2005

Foreword

This manual describes FX Configurator-FP Setting/Monitoring Tool and should be read and understood before attempting installation or operation of software.
Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

Outline Precautions

- This manual provides information for the use of the FX3U Series Programmable Controllers. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows;
  1) Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual should be of a competent nature, trained and qualified to the local and national standards required to fulfill that role. These engineers should be fully aware of all aspects of safety with regards to automated equipment.
  2) Any commissioning or service engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfill that job. These engineers should also be trained in the use and maintenance of the completed product. This includes being completely familiar with all associated documentation for the said product. All maintenance should be carried out in accordance with established safety practices.
  3) All operators of the completed equipment should be trained to use that product in a safe and coordinated manner in compliance to established safety practices. The operators should also be familiar with documentation which is connected with the actual operation of the completed equipment.

  Note: the term 'completed equipment' refers to a third party constructed device which contains or uses the product associated with this manual
- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.
- When combining this product with other products, please confirm the standard and the code, or regulations with which the user should follow. Moreover, please confirm the compatibility of this product to the system, machine, and apparatus with which a user is using.
- If in doubt at any stage during the installation of the product, always consult a professional electrical engineer who is qualified and trained to the local and national standards. If in doubt about the operation or use, please consult the nearest Mitsubishi Electric distributor.
- Since the examples indicated by this manual, technical bulletin, catalog, etc. are used as a reference, please use it after confirming the function and safety of the equipment and system. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- This manual content, specification etc. may be changed without a notice for improvement.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you have noticed a doubtful point, a doubtful error, etc., please contact the nearest Mitsubishi Electric distributor.

Registration

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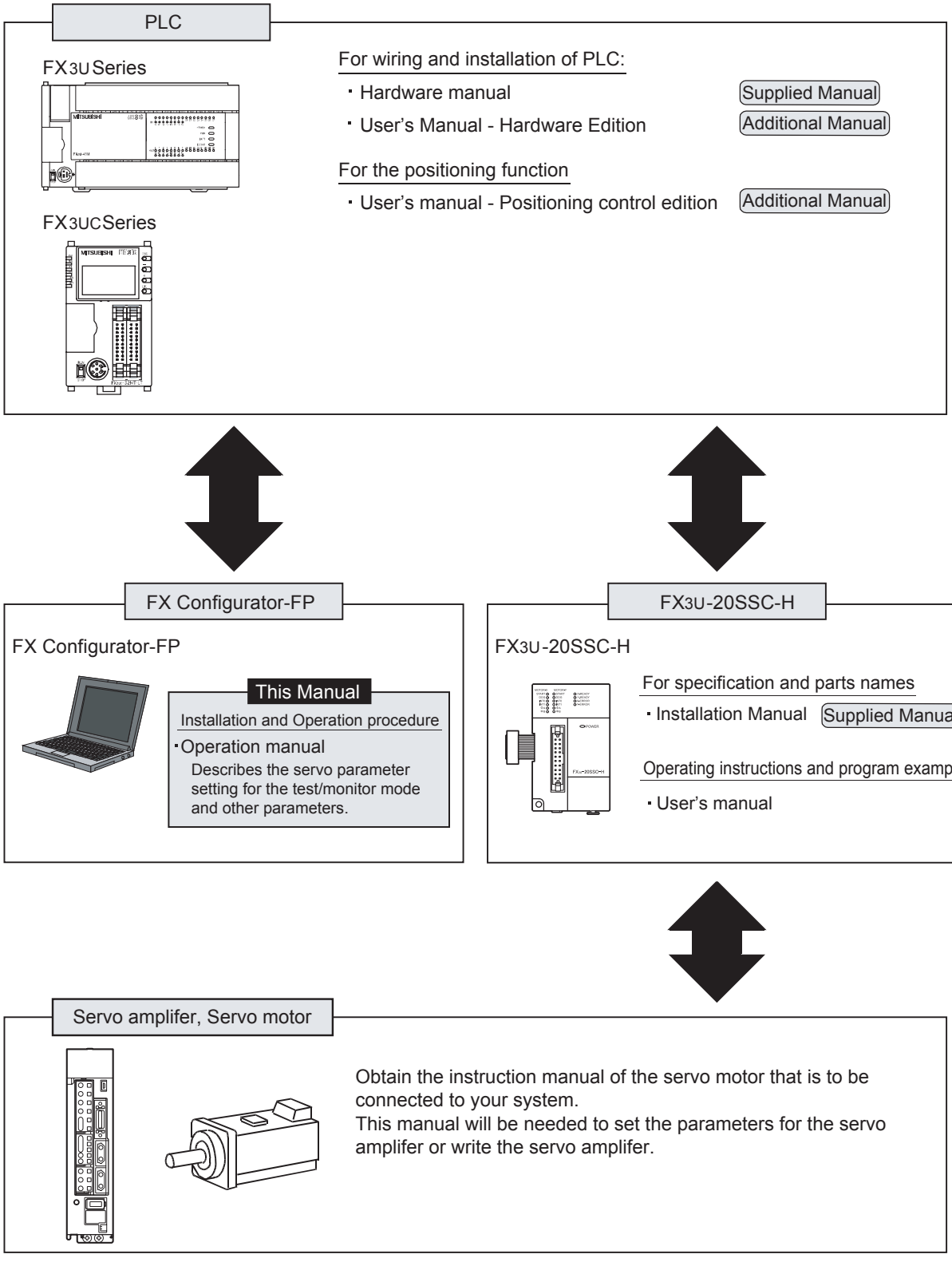
- The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Table of Contents

Functions and Use of This Manual

FX Configurator-FP is the setting/monitor tool for use with a personel computer.
FX Configurator-FP is a setting/monitor tool for the FX3U-20SSC-H positioning block and the servo amplifier applicable to SSCNETIII can perform the parameter setup, the table information setting, the monitor, and the test.



Associated Manuals

For detailed explanation of FX Configurator-FP Configuration Software, refer to this manual.
For the hardware information and instruction on the PLC main unit, other special function unit/block, etc., refer to it's respective manual.
For acquiring required manuals, contact the distributor from who you have purchased the product.

⊙ Refer to these manuals
○ Refer to the manual required depending on the equipment used
△ For detail explanation, refer to an additional manual

		Title of manual	Document number	Description	Model code
Manual for the Main Module					
FX3U Series PLCs Main Unit					
△	Supplied Manual	FX3U Series Hardware Manual	JY997D18801	Describes FX3U Series PLC specification for I/O, wiring and installation extracted from the FX3U User's Manual - Hardware Edition. For details, refer to FX3U Series User's Manual - Hardware Edition.	-
⊙	Additional Manual	FX3U Series User's Manual - Hardware Edition	JY997D16501	Describes FX3U Series PLC specification details for I/O, wiring, installation and maintenance.	09R516
FX3UC Series PLCs Main Unit					
△	Supplied Manual	FX3UC Series Hardware Manual (Only Japanese document)	JY997D12701	Describes FX3UC Series PLC specification for I/O, wiring and installation extracted from the FX3UC User's Manual - Hardware Edition. For details, refer to FX3UC Series User's Manual - Hardware Edition (Only Japanese document).	-
⊙	Additional Manual	FX3UC Series User's Manual - Hardware Edition (Only Japanese document)	JY997D11601	Describes FX3UC Series PLC specification details for I/O, wiring, installation and maintenance. (Only Japanese document)	09R513
Programming for FX3U/FX3UC Series					
⊙	Additional Manual	FX3U / FX3UC Series Programming Manual - Basic & Applied Instruction Edition	JY997D16601	Describes FX3U / FX3UC Series PLC programming for basic/ applied instructions and devices.	09R517
Manuals for FX3U-20SSC-H Positioning Block					
△	Supplied Manual	FX3U-20SSC-H Installation Manual	JY997D21101	Describes FX3U-20SSC-H positioning block specification for I/O, power supply extracted from the FX3U-20SSC-H User's Manual. For details, refer to FX3U-20SSC-H User's Manual.	-
⊙	Additional Manual	FX3U-20SSC-H User's Manual	JY997D21301	Describes FX3U-20SSC-H Positioning block details.	09R622
⊙	Supplied Manual	FX Configurator-FP Operation Manual	JY997D21801	Describes operation details of FX Configurator-FP Setting/Monitoring Tool.	09R916

Generic Names and Abbreviations Used in Manuals

Generic name or abbreviation	Description
PLC	
FX3U series	Generic name for FX3U Series PLC
FX3U PLC or main unit	Generic name for FX3U Series PLC main unit
FX3UC series	Generic name for FX3UC Series PLC
FX3UC PLC or main unit	Generic name for FX3UC Series PLC main unit Only manuals in Japanese are available for these products.
Expansion board	
Expansion board	Generic name for expansion board The number of connectable units, however, depends on the type of main unit. To check the number of connectable units, refer to the User's Manual - Hardware Editon of main unit to be used for your system.
Special adapter	
Special adapter	Generic name for high-speed input/output special adapter, communication special adapter, and analog special adapter The number of connectable units, however, depends on the type of main unit. To check the number of connectable units, refer to the User's Manual - Hardware Editon of main unit to be used for your system.
Special function unit/block	
Special function unit/block or Special extension unit	Generic name for special function unit and special function block The number of connectable units, however, depends on the type of main unit. To check the number of connectable units, refer to the User's Manual - Hardware Edition of main unit to be used for your system.
Special function unit	Generic name for special function unit
Special function block	Generic name for special function block The number of connectable units, however, depends on the type of main unit. To check the number of connectable units, refer to the User's Manual - Hardware Edition of main unit to be used for your system.
Positioning special function block or 20SSC-H	Abbreviated name of FX3U-20SSC-H
Optional unit	
Memory cassette	FX3U-FLROM-16, FX3U-FLROM-64, FX3U-FLROM-64L
Battery	FX3U-32BL
FX Series terminal block	FX-16E-TB, FX-32E-TB
Input/output cable or Input cable	FX-16E-500CAB-S, FX-16E-□□□CAB, FX-16E-□□□CAB-R □□□ represents 150, 300, or 500.
Input/output connector	FX2C-I/O-CON, FX2C-I/O-CON-S, FX2C-I/O-CON-SA
Power cable	FX2NC-100MPCB, FX2NC-100BPCB, FX2NC-10BPCB1
Peripheral unit	
Peripheral unit	Generic name for programming software, handy programming panel, and indicator
Programming tool	
Programming tool	Generic name for programming software and handy programming panel
Programming software	Generic name for programming software
GX Developer	Generic name for SW□D5C-GPPW-J/SW□D5C-GPPW-E programming software package
FX-PCS/WIN(-E)	Generic name for FX-PCS/WIN or FX-PCS/WIN-E programming software package
Handy programming panel (HPP)	Generic name for FX-20P(-E) and FX-10P(-E)

Generic name or abbreviation	Description
Setting/Monitoring Tool	
Setting/monitoring tool or FX Configurator-FP	Abbreviated name of FX Configurator-FP Setting/Monitoring Tool
Indicator	
GOT1000 series	Generic name for GT15 and GT11
GOT-900 series	Generic name for GOT-A900 series and GOT-F900 series
GOT-A900 series	Generic name for GOT-A900 series
GOT-F900 series	Generic name for GOT-F900 series
ET-940 series	Generic name for ET-940 series Only manuals in Japanese are available for these products
Drive unit for servo motor and stepping motor	
Servo motor	Generic name for servo motor or stepping motor Including servo amplifier corresponding to SSCNET III.
Servo amplifier	Generic name for servo amplifier corresponding to SSCNET III
MELSERVO series	Generic name for MELSERVO-J3 series
Other unit	
Manual pulse generator	Generic name for manual pulse generator (prepared by user)
Manual	
FX3U hardware Edition	FX3U Series User's Manual - Hardware Edition
FX3UC hardware Edition	This manual is available only in Japanese.
Programming manual	FX3U/FX3UC Series Programming Manual - Basic and Applied Instructions Edition
Communication control Edtion	FX Series User's Manual - Data Communication Edition
Analog control Edition	FX3U/FX3UC Series User's Manual - Analog Control Edition
Positioning control Edition	FX3U/FX3UC Series User's Manual - Positioning Control Edition

Reading of the Manual

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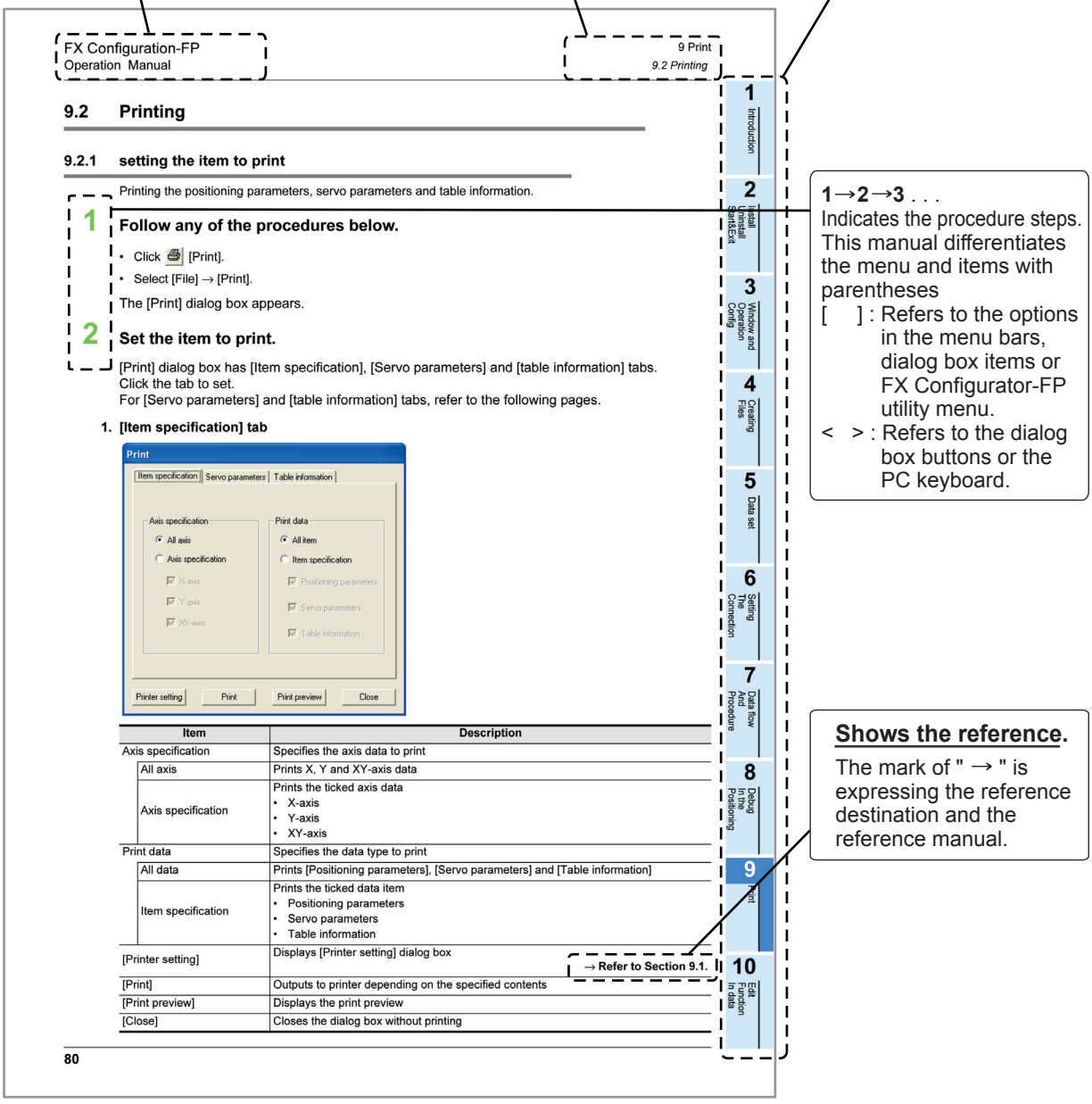
Indexes the chapter number.

The right side of each page indexes the chapter number for the page currently opened.



1→2→3 . . .
Indicates the procedure steps. This manual differentiates the menu and items with parentheses
[ ] : Refers to the options in the menu bars, dialog box items or FX Configurator-FP utility menu.
< > : Refers to the dialog box buttons or the PC keyboard.

Shows the reference.

The mark of " → " is expressing the reference destination and the reference manual.

Included items

Type (model name)	Product Name	Quantity
FX Configurator-FP (SW1D5C-FXSSC-E)	FX Configurator-FP Version 1(1-license product) (CD-ROM)	1
	Softwere license agreement	1
	Software registration Card (Japanese document)	1
	FX Configurator- FP Operation Manual (this manual)	1

1. Introduction

1.1 Product Outline

The FX Configurator-FP is a personal computer software for FX3U-20SSC-H and servo amplifiers, applicable to SSCNET III.

- Setting, monitoring and testing the parameters and table information of FX3U-20SSC-H.
- Setting the parameters of servo amplifiers, applicable to SSCNET III.

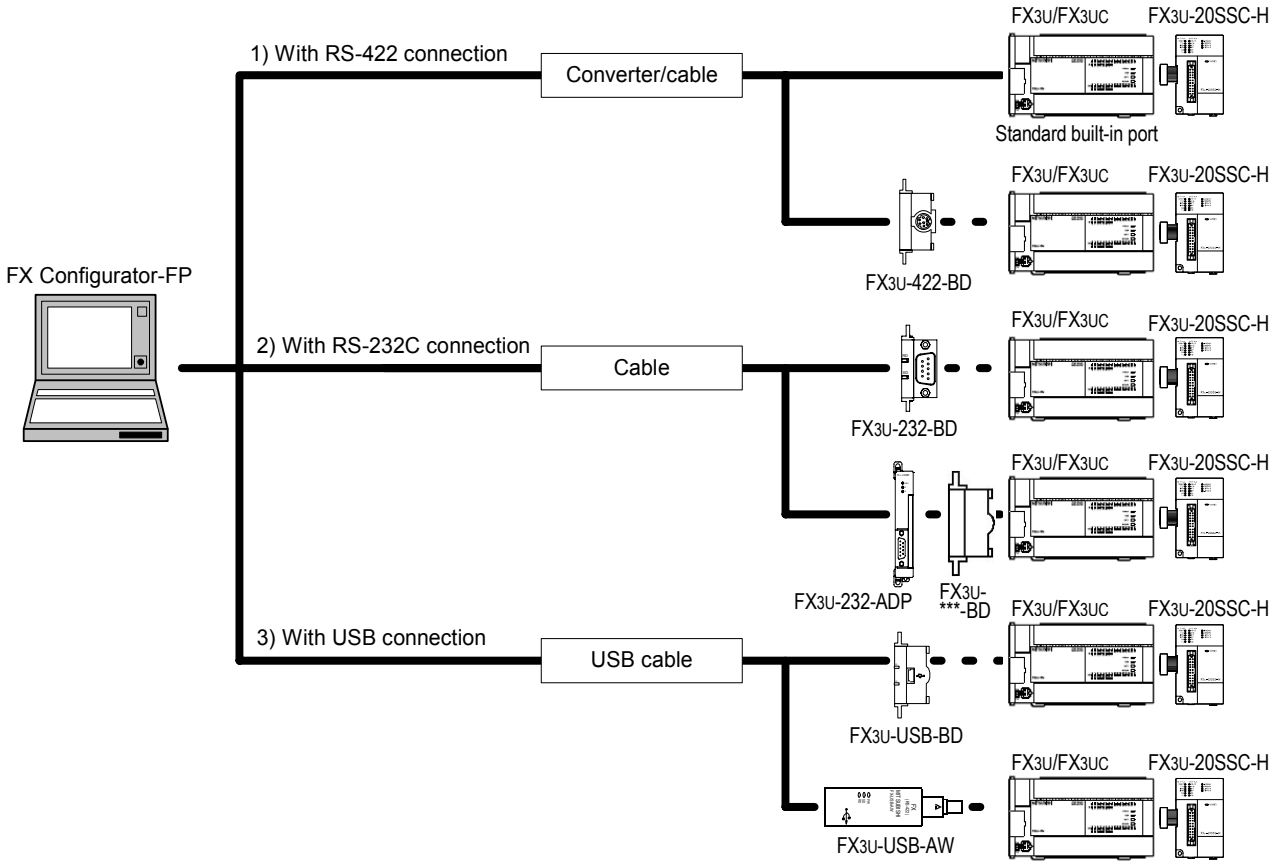
1.2 Function List

Function			Contents	Reference
File	New/Open/Save/Print		Reads, saves and prints the contents	Chapter 4, 9
Edit	Setting positioning parameters in 20SSC-H		Sets the operation parameter, pulse rate, feed rate, MAX/JOG speed	Section 5.1
	Setting parameters in servo amplifiers		Sets the basic, extension, gain/filter and I/O parameters	Section 5.2
	Setting table information		Sets the X/Y/XY-axis Table information	Section 5.3
Online	Read/Write/Verify the module data		Reads, writes and verifies the parameter information in positioning modules	Chapter 7
Monitor	Monitoring table information		Monitors the present address, status info and servo status	Section 8.1
	Operation monitor	Operation monitor	Monitors the present address, present speed, axis status of all axis	Section 8.1
		Signal	Monitors the module status and servo status	
		Operation status monitor	Monitors the parameters and operation status of all axis	
Test	Operation test	Positioning starting	Specifies the table number and tests the operation	Section 8.2
		Present value change	Tests the feed present value change	
		Speed change	Tests the speed change	
		OPR	Tests the OPR	
		JOG/MPG Operation	Tests the operation by JOG/MPG	

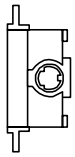
1.3 System Configuration

1.3.1 System Configuration

This subsection shows the system configuration, connectable with USB and Serial ports of personal computer.

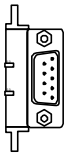


1) The equipment for RS-422 connection

Personal Computer Connector	Converter/Cable			PLC Connector
	RS-232C Cable	Converter (interface)	RS-422 Cable	
D-SUB 9Pin	F2-232CAB-1[3m(9'10")]  (D-SUB 9Pin ⇔ D-SUB 25Pin)	FX-232AWC-H 	FX-422CAB0[1.5m(4'11")]  (D-SUB 25Pin ⇔ MINI DIN 8Pin)	Built-in dedicated programming connector of the main unit FX3U-422-BD 

→ **When using FX3U-422-BD, refer to the cautions on communication settings**

2) The equipment for RS-232C connection

Personal computer connector	RS-232C Cable	PLC Connector
D-SUB 9Pin	FX-232CAB-1[3m(9'10")]  (D-SUB 9Pin ⇔ D-SUB 9Pin)	FX3U-232-BD 
		FX3U-232ADP*1 

→ **When using FX3U-232-BD, FX3U-232ADP, refer to the cautions on communication settings**

*1. An expansion board is necessary for FX3U-232ADP.

3) The equipment for USB connection

Personal Computer Connector	Converter/Cable		PLC Connector
	USB Cable*2	Converter (interface)	
USB	 (USB connector A plug [male] ⇔ MINI B plug [male])	FX-USB-AW*3 	Built-in dedicated programming connector of the main unit
		—	FX3U-USB-BD*3 

→ **When using FX3U-USB-BD, refer to the cautions on communication setting**

*2. The USB cable comes with FX-USB-AW and FX3U-USB-BD.

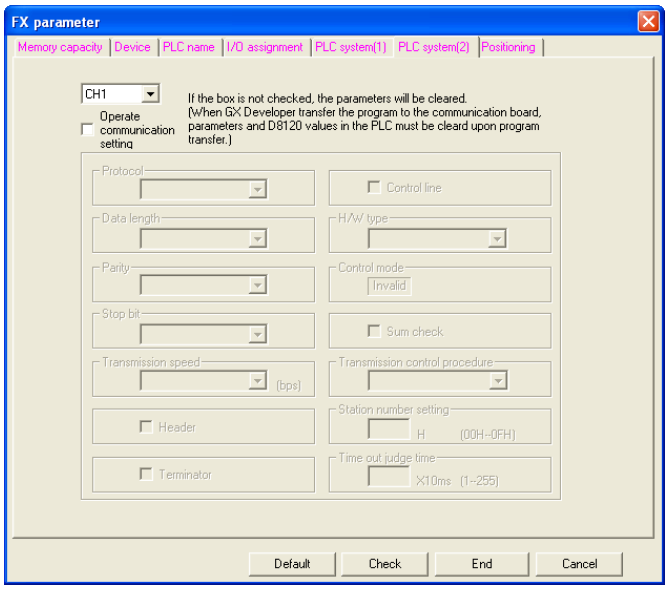
*3. For the applicable Windows® Operating Systems, refer to each manual.

Cautions on communication setting

Do not change the communication settings for outside modules via parameters or sequence program.
If changed, a communication error occurs between FX Configurator-FP and PLC (20SSC-H).

1) Check that the format of the communication connector to be used is correct.
(D8120, D8400, D8420 = K0)
Also, with peripheral devices, check that parameters for communication setting are correct.

How to check parameters with GX Developer
A check mark to [Operate communication setting] on [PLC system (2)] tab in [PLC parameter] of GX Developer disables the communication through the selected port between FX Configurator-FP and PLC(20SSC-H). When the communication fails, write the parameter that clears the check box [Operate communication setting] to the PLC via the built-in dedicated programming connector with GX Developer.



When the PLC type of the project is the FX3U(C), the channel specification (CH1/CH2) combo box appears. When using the FX3U-422-BD, FX3U-232-BD, FX3U-USB-BD or the first FX3U-232ADP connected to the FX3U-CNV-BD, set CH1 and check the settings.
When using the FX3U-232ADP connected to other than the FX3U-CNV-BD or the second FX3U-232ADP connected to the FX3U-CNV-BD, set CH2 and check the settings.

2) Check that RS and RS2 instructions are not programmed for the corresponding communication connector.
Do not execute RS and RS2 instructions in this case.

3) When an inverter communication instruction is programmed for the corresponding communication connector, delete the instruction first, and reboot the PLC's power.

1.3.2 Applicable models

- FX3U-20SSC-H type positioning module
- Servo amplifier, applicable to SSCNET III (up to 2pcs)
Connect these servo amplifiers to the FX3U-20SSC-H via SSCNET III.

1.3.3 Operating System Requirements

Item	Description	
OS	Microsoft® Windows® 95 English version (Service Pack 1 or later)	
	Microsoft® Windows® 98 English version	
	Microsoft® Windows® Millennium Edition English version	
	Microsoft® WindowsNT® 4.0 Workstation English version (Service Pack 3 or later)	
	Microsoft® Windows® 2000 professional English version	
	Microsoft® Windows® XP English version (Home Edition or Professional)	
PC main body	Microsoft® Windows® 95:	CPU Pentium133MHz or higher
	Microsoft® Windows® 98:	CPU Pentium133MHz or higher
	Microsoft® Windows® Millennium Edition:	CPU Pentium150 MHz or higher
	Microsoft® WindowsNT® 4.0:	CPU Pentium133MHz or higher
	Microsoft® Windows® 2000:	CPU Pentium133MHz or higher
	Microsoft® Windows® XP:	CPU Pentium300MHz or higher
Required memory	Microsoft® Windows® 95:	64MB or more
	Microsoft® Windows® 98:	64MB or more
	Microsoft® Windows® Millennium Edition:	64MB or more
	Microsoft® WindowsNT® 4.0:	64MB or more
	Microsoft® Windows® 2000:	64MB or more
	Microsoft® Windows® XP:	128MB or more
Hard disk capacity	65MB or more	
Disk drive	CD-ROM drive	
Display	SVGA (800 × 600) or higher	
Interface	RS-232C port or USB port	
Printer	Printer, applicable to those OS above	
Others	Mouse or other pointing device	

2. Installation, Uninstallation, Startup and Exit

2.1 Installation

1 **Insert the FX Configurator-FP CD-ROM into the CD-ROM drive.**

2 **Execute SETUP.EXE in the CD-ROM.**

3 **Follow the guidance on the PC display to complete the installation.**

Caution

FX Configurator-FP requires the following softwares:

- GX Developer (Ver. 8.23Z or later)

When GX Developer (Ver. 8.23Z or later) is installed after FX Configurator-FP, re-install the FX Configurator-FP.

2.2 Uninstallation

1 **Double-click [Add or Remove Programs] in the control panel.**

Note

[Add/Remove Programs] appears in Windows® 95, Windows® 98, Windows® Millennium Edition, Windows NT® 4.0 and Windows® 2000

2 **Select [Change or Remove Programs] in [Add or Remove Programs] window.**

Note

Click [Add/Remove] on [Add/Remove Programs] property in Windows® 95, Windows® 98, Windows® Millennium Edition, Windows NT® 4.0 and Windows® 2000

3 **Click [FX Configurator-FP] to uninstall.**

4 **Click [Change/Remove] button.**

5 **Follow the guidance on the PC display to complete the uninstallation.**

2.3 Starting FX Configurator-FP

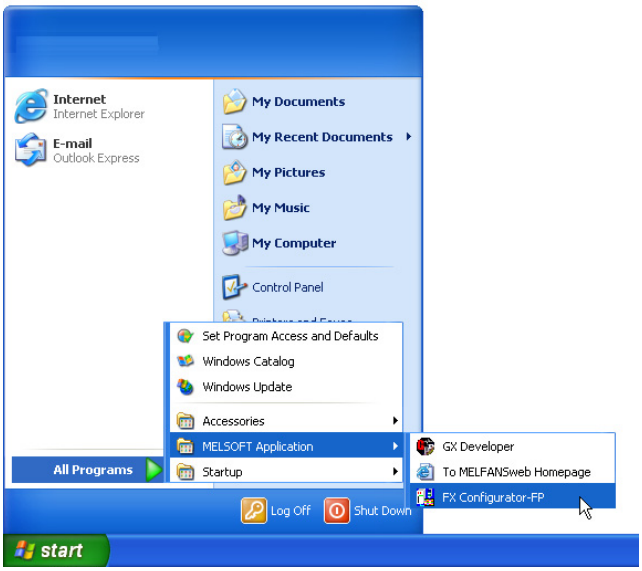
To start up FX Configurator-FP, follow the 2 procedures below.

2.3.1 Starting FX Configurator-FP from the start menu.

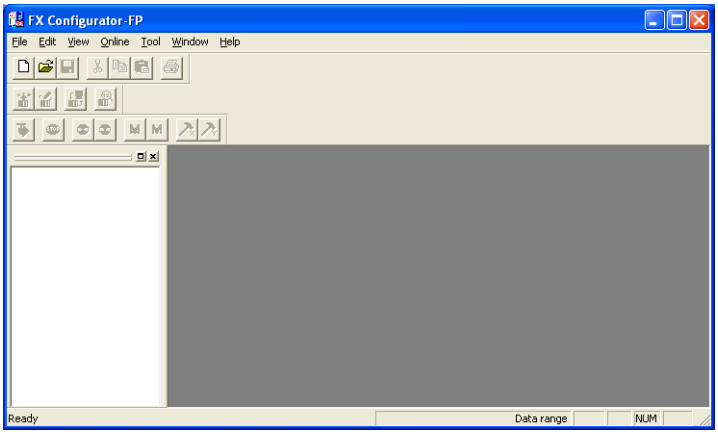
1 **Click [Start] → [Programs] → [MELSOFT Application]. Select [FX Configurator-FP].**

Note

[All programs] appears in Windows® XP Professional and Home Edition.

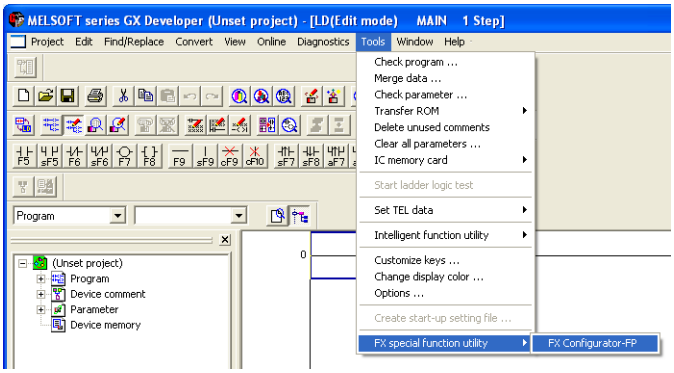


2 **FX Configurator-FP starts up.**



2.3.2 Starting FX-Configurator-FP from the tool menu in GX Developer.

1 **Select [Tools] at the menu bar in GX Developer, click [FX special function utility] → [FX Configurator-FP] to start FX Configurator-FP.**

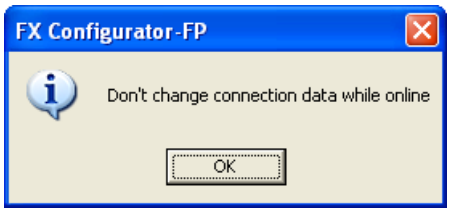


2 **FX Configurator-FP starts up.**

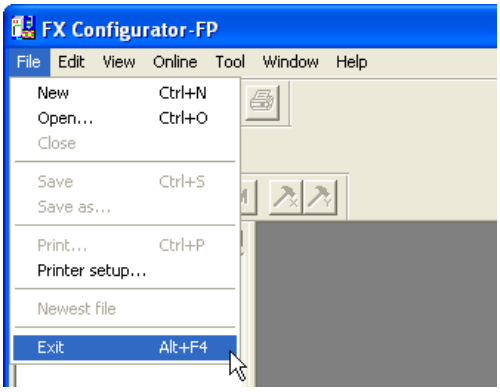
2.4 Closing FX Configurator-FP

Note

When closing files or the application while online, i.e. Monitor Mode, Test Mode, the message bellow appears. Close the application while offline.



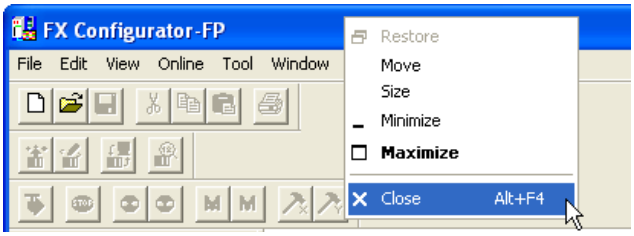
1 Select [File] → [Exit].



2 FX Configurator-FP closes.

How to close the application from the title bar

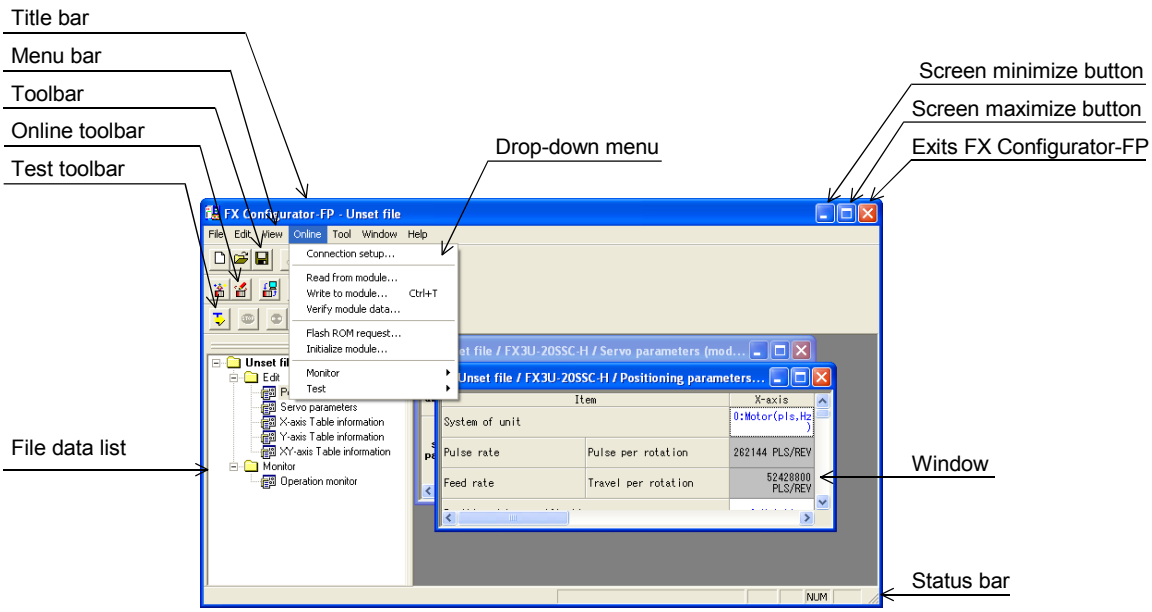
- Right-click on the title bar and select [Close].



- Click  on the right edge of the title bar.

3. Window configuration and basic operation

3.1 Window configuration

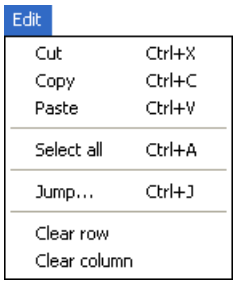


3.2 Menu configuration

1) File

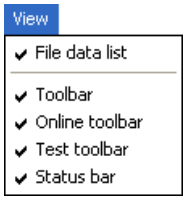
Creates a new file, reads a stored file and prints a content being edited.
Also shows the history of the files recently opened.

2) Edit



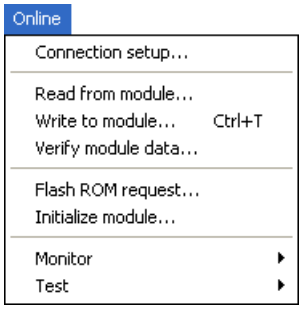
Cuts, copies, pastes and clears row/column.

3) View



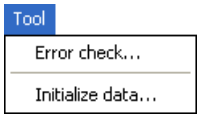
Shows /hides the tool bar, status bar and file data list.

4) Online



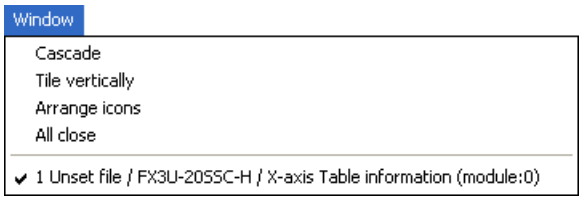
Reads/Writes/Verifies, monitors and tests the module data.

5) Tool



Enables Error check and data initialization.

6) Window



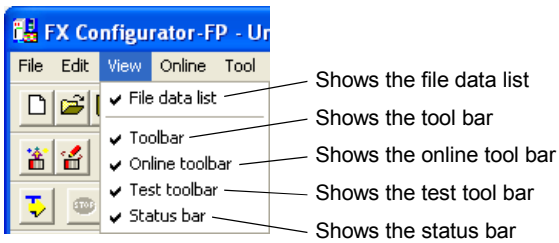
Cascades multiple windows and arranges icons.

7) Help

Shows product information.

3.3 Tool menus and tool button list

The tool bar has the menus below.
Click the toolbar to show (checked)/hide (unchecked).



Tool button list

Tool bar menu	Tool button	Name	Description
Tool bar		New	Creates a new file
		Open	Opens an existing file
		Save	Saves the file being edited
		Cut	Cuts
		Copy	Copies
		Paste	Pastes
		Print	Prints
Online tool bar		Read from module	Reads from the module
		Write to module	Writes to the module
		Verify module data	Verifies the module data
		Monitor On/Off switch	Switches the table information window into monitor mode/edit mode
Test tool bar		Test On/Off switch	Switches into test mode
		All axis stop	Stops all axis
		Error reset X-axis	Resets errors at X-axis
		Error reset Y-axis	Resets errors at Y-axis
		m code off X-axis	Turns off the m code at X-axis
		m code off Y-axis	Turns off the m code at Y-axis
		Operation test X-axis	Test-operates X-axis
		Operation test Y-axis	Test-operates Y-axis

3.4 Shortcut key list

Item			Shortcut key
File		New (N)	Ctrl + N
		Open (O)	Ctrl + O
		Save (S)	Ctrl + S
		Print (P)	Ctrl + P
Edit		Cut (T)	Ctrl + X
		Copy (C)	Ctrl + C
		Paste (V)	Ctrl + V
	–	Select all (A)	Ctrl + A
	–	Jump (J)	Ctrl + J
Online		Write to module (W)	Ctrl + T
		Monitor On/Off (S)	Ctrl + M

3.5 Basic operation

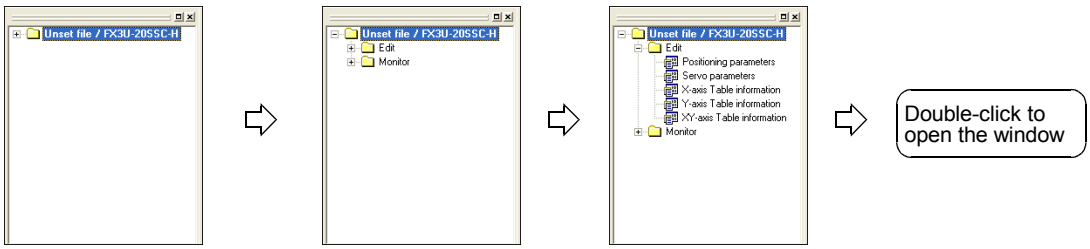
3.5.1 Basic operations in the file data list

[File data list] shows the currently opened file. To open the window, operate as follows. Right-click menu does not appear for all items below.

1) To display functions, double-click the file name, or click <+>.
(In keyboard operation, select the file name and press <→>)

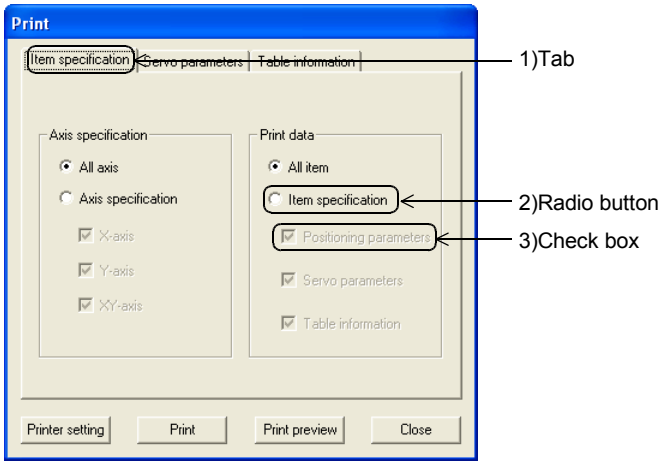
2) To display the windows, double-click the function name, or click <+>.
(In keyboard operation, select the function name and press <→>)

3) To open the window, double-click the window name.
(In keyboard operation, select the window name and press <Space> bar)

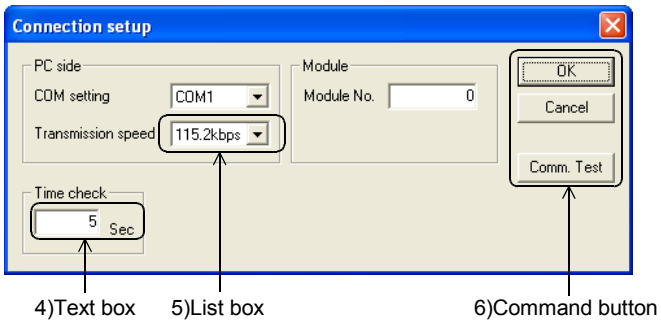


[File name (e.g. unset file)] Double-click [Edit]

3.5.2 Basic operations in dialog box



1) Tab
Click to switch the items.
2) Radio button
Click <○> to select 1 out of multiple items.
3) Check box
Click <☐> to put ✔ mark to execute the item.



4) Text box
Input numbers/characters.
5) List box
Click ▼ to display the selection list, and click the item to select.
6) Command button
Command buttons appears with <OK> and <Cancel>, etc. Click those buttons to execute.

Note

In keyboard operations, select the item with <Tab> key. To select more items, use <←>, <→>, <↑>, <↓> keys.

3.6 Help

This function shows FX Configurator-FP version in the product information.

1 **Select [Help] → [Product information].**

The product information appears.

4. Creating files

FX Configurator-FP sets and controls the data in the table below.

Data	Description
Positioning parameter	Parameters for positioning operations, i.e. pulse rate, feed rate and maximum speed of 20SSC-H
Table information	Setting data for table operations of X/Y/XY-axis
Servo parameter	Data to be transferred from 20SSC-H to servo amplifiers, including servo amplifier series, gain/ filter, expansion, I/O, basic setting parameters.

Caution

When creating and saving-as files, the characters and symbols below are not available for the file paths and names.
/ , : ; * " < > | \ COM LPT AUX CON PRN NUL CLOCK

4.1 Creating a new file

4.1.1 Creating a new file

This subsection shows how to create a new file.

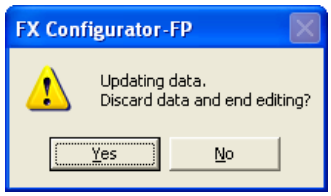
Caution

When creating a new file while other files are opened, the following messages appear.

1) When the opened file is not changed

- Click <Yes> to close the current file, and to create a new file.
- Click <No> to cancel the operation.

2) When the opened file is changed

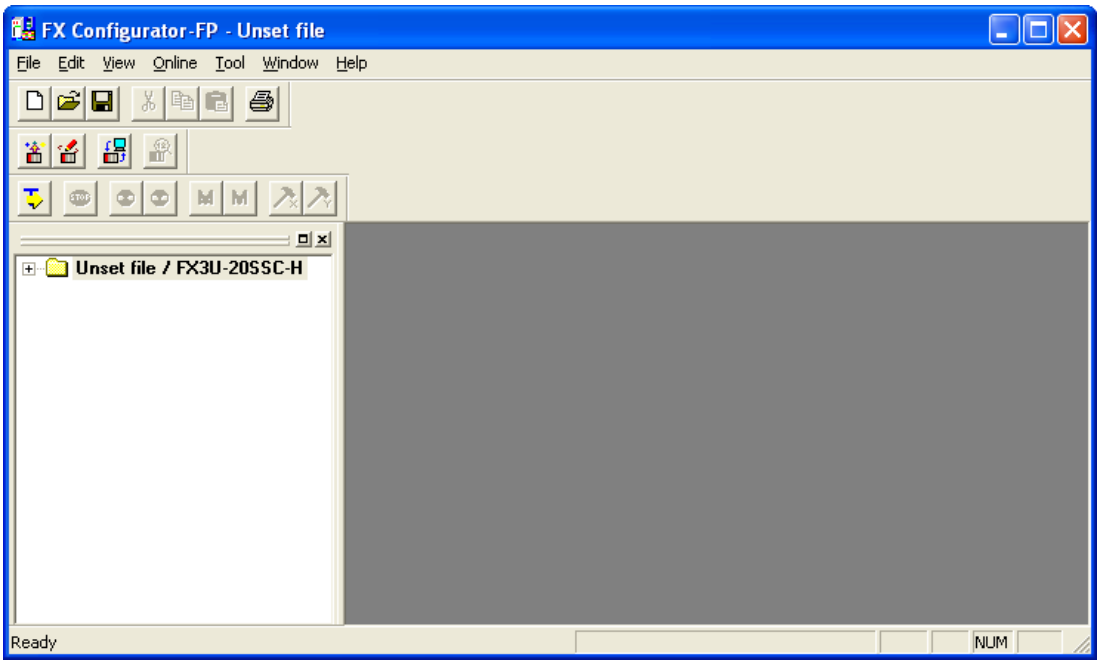


- Click <Yes> to close the current file without saving, and to create a new file.
- Click <No> to cancel the operation.

1 Follow any of the procedures below to create a new file.

- Click (New).
- Select [File] → [New].

FX Configurator-FP creates a new file.



4.1.2 Creating a new file with the data inside 20SSC-H.

Creating a new file with the data stored in 20SSC-H.

1 **Create a new file.**

→ For the details, refer to Subsection 4.1.2.

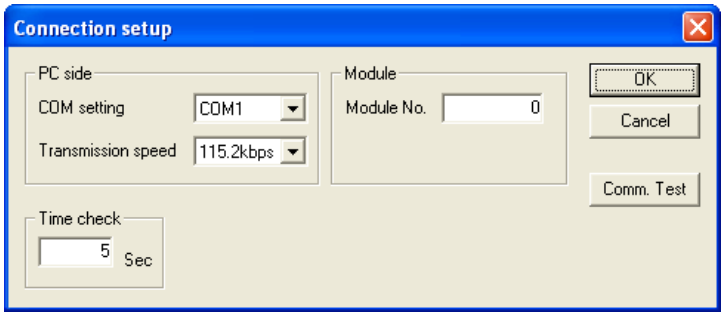
2 **Connect FX3U/3UC PLC with Personal Computer.**

→ For the connection cables configuration, refer to Subsection 1.3.1

3 **Select [Online] → [Connection setup].**

Set the destination in [Connection setup] dialog box.

→ For the details, refer to Chapter 6.



4 **Click <Comm. Test>.**

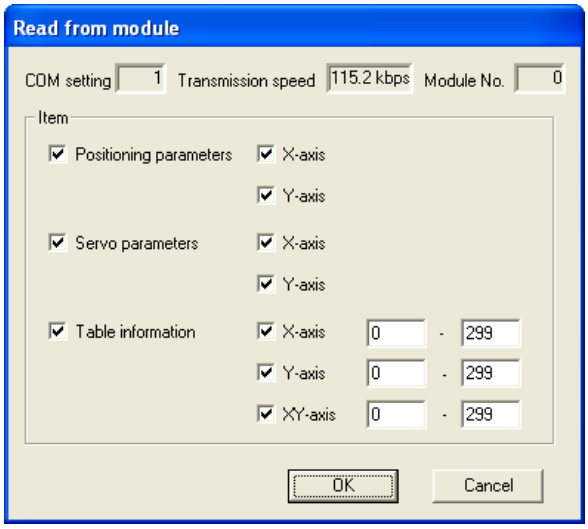
Check that the communication is properly executed.

5 **Click <OK>.**

[Connection setup] dialog box closes.

6 **Select [Online] → [Read from module], and specify the data to be read.**

→ For the details, refer to Section 7.2.



7 **Click <OK>.**

The specified data is read out.

4.2 Opening a stored file

Opening a stored file.

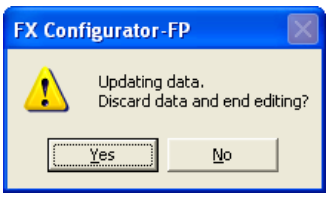
Caution

When opening a stored file while other files are opened, the following messages appear.

1) When the opened file is not changed

- Click <Yes> to close the current file, and to open a stored file.
- Click <No> to cancel the operation.

2) When the opened file is changed



- Click <Yes> to close the current file without saving, and to open a stored file.
- Click <No> to cancel the operation.

Other messages

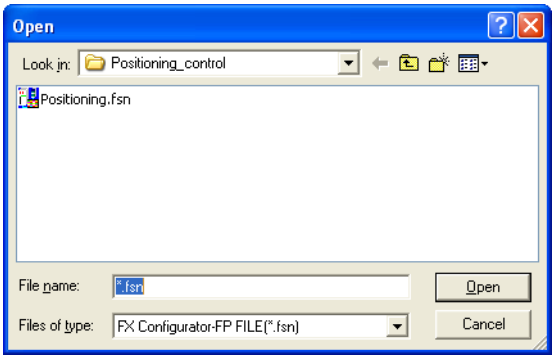
Messages	Conditions
The allowable No. of characters has been exceeded. Set to less than 150 characters	The total amount of the character in the file path and name exceeded 150 characters
Selected file type is not supported	The extension of the selected file is not supported
Failed to open the file. Because the module-type is not supported	Can't read the file when the module type is not supported
There is a possibility not to read the data correctly. Because this file has been made with a product newer than this version	The file was saved by different FX Configurator-FP version. The file can be opened by clicking <OK> but can't be opened propely
Failed to open the file. The following causes are thought • The specified file does not exist • The data in the file is completely damaged • The data is created by other S/W	Could not open the file. The following causes are thought • The specified file does not exist • The data in the file is completely damaged • The data is created by other S/W

1 Follow any of the procedures below to open a stored file.

- Click (Open).
- Select [File] → [Open].

The dialog box to open a file appears.

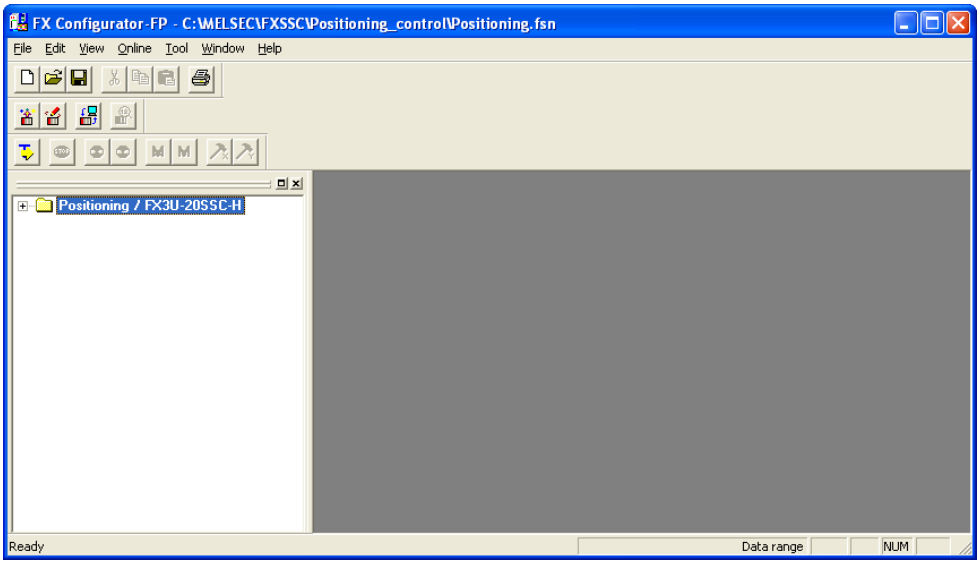
2 Select a file to open.



Item	Description
Look in	Select a file location
File name	Enter the file name to open
Files of type	Select the files of type to open FX Configurator-FP FILE (*.fsn) : opens data for FX Configurator-FP

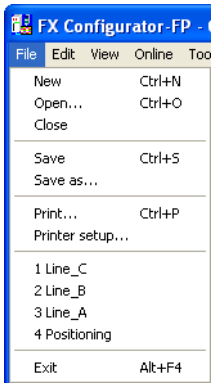
3 Click [Open].

The selected file opens.



Opening a file in Recent file history

A file in Recent file history can be opened. The history shows the latest 4 files. [Recent file] appears at the default setting. The number of files simultaneously opened is a single file only.



4.3 File storage

Storable information

- Versions of files
- Module type
- Positioning parameters
- Servo parameters
- Table information
- Connection Destination

Messages

Messages	Conditions
The allowable No. of characters has been exceeded. Set to less than 150 characters	The total amount of the character in the file path and name exceeded 150 characters
Failed to save data to the file in selected drive. The following causes are thought. • The error occurred while saving project. • The target Memory is low. • The medium of selected drive is incorrect.	Could not save the file. The following causes are thought • The specified file does not exist • The data in the file is completely damaged • The data is created by other S/W

4.3.1 Saving files

Saving stored files after editing.

1 **Follow any of the procedures below to save as files.**

- Click  (Save).
- Select → [File] → [Save].

The currently opened file is saved.

When using a floppy disk (FD).

When saving a file in a floppy disk, Floppy disk itself needs the same amount of another free space with the file to be saved, so floppy disk sometimes does not save the file due to the out of disk space.
When the file cannot be saved in floppy disk, save the file once in the hard drive of PC, and copy the file to floppy disk.

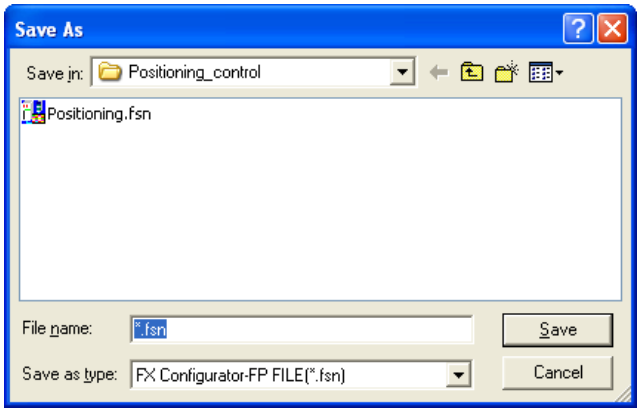
4.3.2 Saving as files

Saving newly created files, and stored files in different names.

1 **Select [File] → [Save as].**

The dialog box to save as files appears.

2 **Select a file location and file name to save as.**



Item	Description
Look in	Select a file location
File name	Enter the file name to open
Files of type	Select the files of type to open FX Configurator-FP FILE (*.fsn) : opens data for FX Configurator-FP

Caution

- Set the total amount of the character in the file path and name at 150 characters or below.
- The characters and symbols below are not available for file names.

  / , : ; * " < > | \ COM LPT AUX CON PRN NUL CLOCK

3 **Click [Save].**

Files are saved as in the specified name.

4.4 Closing files

Closing currently opened files.

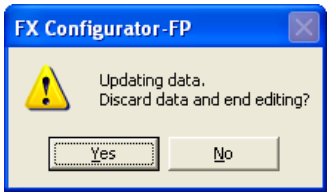
1 Select [File] → [Close].

2 A message appears depending on the situation. Follow the message.

1) When the opened file is not changed

- Click <Yes> to close the current file.
- Click <No> to cancel the operation.

2) When the opened file is changed



- Click <Yes> to close the current file without saving.
- Click <No> to cancel the operation.

5. Data set

This chapter explains the procedures to set and error-check Positioning parameters, Servo parameters and Table information.

→ For the detail on Positioning parameters and Table information, refer to FX3U-20SSC-H user's manual.

→ For the detail on Servo parameters, refer to the manual of servo amplifier to be used.

5.1 User unit and Converted pulse data.

5.1.1 User unit

User units appear as follows, depending on the unit setting and position data magnification.

Position data magnification	Unit settings (Positioning units)				Unit settings (Velocity units)			
	PLS	μm	0.0001 inch	mdeg	Hz	cm/min	inch/min	10deg/min
1 times	PLS	μm	×0.0001 inch	mdeg	Hz	cm/min	inch/min	×10deg/min
10 times	×10PLS	×10μm	×0.001 inch	×10mdeg				
100 times	×100PLS	×100μm	×0.01 inch	×100mdeg				
1000 times	×1000PLS	mm	×0.1 inch	deg				

5.1.2 Converted pulse data

For items within a data set range, make sure to set the value does not overlap the range of converted pulse data.
Pulse conversion procedures are as follows.

1) Travel distance
   Travel distance by converted pulse data =
   Travel distance(μm, 10^{-4}inch, mdeg) × (Position data magnification) × (Pulse rate ÷ Feed rate)
2) Operation speed
   Operation speed by converted pulse data =
   Operation speed(μm/min, inch/min, 10deg/min) × 10^4 × (Pulse rate ÷ Feed rate) ÷ 60

5.1.3 Rotation and operation speed of servo motor (Converted pulse data)

When setting operation speed (incl. Maximum speed, JOG speed, Zero return speed), make sure to set the value within the Max. rotation speed range of servo motor. The formula to calculate the rotation speed of servo motor from the operation speed (Converted pulse data) is as follows.

Rotation speed of the servo motor (r/min) =
operation speed by converted pulse data × 60 ÷ resolution per servo motor rotation.

Servo amplifier	Resolution per servo motor rotation
MR-J3B	262144

5.2 Setting positioning parameters

Setting parameters (positioning parameters) for positioning control.

1 Double-click [File name] → [Edit] → [Positioning parameters] in the file data list.

An edit window for positioning parameters appears.

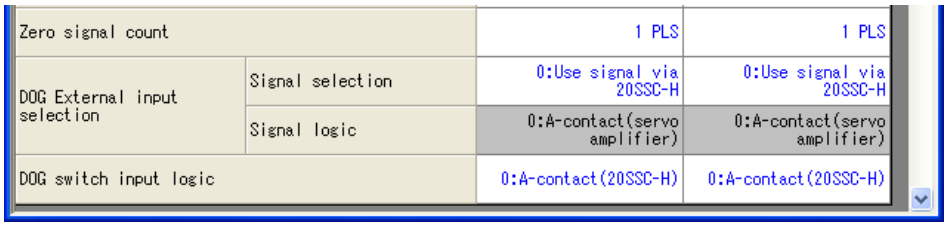
2 Set the items for positioning parameters.

To enter texts and select items, double-click the cell.

→ **For positioning parameter details, refer to FX3U-20SSC-H User's Manual.**

Unset file / FX3U-20SSC-H / Positioning parameters (module:0)

Item		X-axis	Y-axis
System of units		0:Motor(pls,Hz)	0:Motor(pls,Hz)
Pulse rate	Pulse per rotation	262144 PLS/REV	262144 PLS/REV
Feed rate	Travel per rotation	52428800 PLS/REV	52428800 PLS/REV
Position data magnification		0:X 1 times	0:X 1 times
Maximum speed		4000000 Hz	4000000 Hz
JOG speed		2000000 Hz	2000000 Hz
JOG instruction evaluation time		300 ms	300 ms
ACC/DEC mode		0:Trapezoid ACC/DEC	0:Trapezoid ACC/DEC
ACC time		200 ms	200 ms
DEC time		200 ms	200 ms
Interpolation time constant		100 ms	100 ms
Stop mode		0:Positioning end	0:Positioning end
Software limit(upper)		0 PLS	0 PLS
Software limit(lower)		0 PLS	0 PLS
FLS,RLS External input selection	Signal selection	0:Use signal via FX3U(C)	0:Use signal via FX3U(C)
	Signal logic	1:B-contact(servo amplifier)	1:B-contact(servo amplifier)
Torque limit		3000 x0.1 %	3000 x0.1 %
Servo ready check		1:Valid	1:Valid
Servo end check		1:Valid	1:Valid
Servo end evaluation time		5000 ms	5000 ms
OPR mode		0:DOG	0:DOG
OPR direction		0:Decrease present value	0:Decrease present value
Mechine zero point address		0 PLS	0 PLS
OPR speed(High speed)		4000000 Hz	4000000 Hz
OPR speed(Creep)		100000 Hz	100000 Hz
OPR torque limit value		3000 x0.1 %	3000 x0.1 %
OPR interlock setting		1:Valid	1:Valid
Zero signal count start timing		0:Backward end of DOG	0:Backward end of DOG



Item		Description	Default value
System of unit		Sets the system of unit for positioning motions at X/Y-axis. 0: Motor system (PLS, Hz) 1: Mechanical system (μm, cm/min) 2: Mechanical system (inch, inch/min) 3: Mechanical system (mdeg, 10deg/min) 4: Composite system (μm, Hz) 5: Composite system (inch, Hz) 6: Composite system (mdeg, Hz)	0:Motor system (PLS, Hz)
Pulse rate	Pulse per rotation	Sets the pulse rate at X/Y-axis. Set the resolution per servo motor rotation. Setting range : 1~200,000,000 PLS/REV	262,144 PLS/REV
Feed rate	Travel per rotation	Sets the feed rate at X/Y-axis. Setting range : 1~200,000,000 [User unit]*1/REV	52,428,800 PLS/REV
Position data magnification		Sets the position data magnification at X/Y-axis. 0: ×1 1: ×10 2: ×100 3: ×1000	0: ×1
Maximum speed		Sets the maximum speed at X/Y-axis. Set the speed at or below the maximum rotation speed*2 of servo motor. Setting range : 1~2,147,483,647 [User unit]*1 Set the value within 1~50,000,000Hz in the converted pulse data.	4,000,000Hz
JOG speed		Sets the JOG speed at X/Y-axis. Set the speed at or below the maximum rotation speed*2 of servo motor. Setting range : 1~Maximum speed [User unit]*1 Set the value within 1~50,000,000Hz in the converted pulse data.	2,000,000Hz
JOG instruction evaluation time		Sets the JOG instruction evaluation time at X/Y-axis. Setting range : 0~5000ms	300ms
ACC/DEC mode		Sets the ACC/DEC mode at X/Y-axis. 0: Trapezoid ACC/DEC 1: Approximate S curve ACC/DEC	0:Trapezoid ACC/DEC
ACC time		Sets the ACC time at X/Y-axis. Setting range : 1~5000ms	200ms
DEC time		Sets the DEC time at X/Y-axis. Setting range : 1~5000ms	200ms
Interpolation time constant		Sets the interpolation time constant at X/Y-axis. Setting range : 1~5000ms	100ms
STOP mode		Sets the STOP mode at X/Y-axis. 0: Positioning end 1: Remaining distance operation	0:Positioning end
Software limit (upper)		Sets the software limit (upper) address at X/Y-axis. Setting range : -2,147,483,648~2,147,483,647 [User unit]*1 Set the value within -2,147,483,648~2,147,483,647PLS in the converted pulse data*1.	0 PLS

Item		Description	Default value
Software limit (lower)		Sets the software limit (lower) address at X/Y-axis. Setting range : -2,147,483,648~2,147,483,647 [User unit]*1 Set the value within -2,147,483,648~2,147,483,647PLS in the converted pulse data.*1	0 PLS
FLS,RLS External input selection	Signal selection	Sets the FLS, RLS signals servo amplifier to be used/not used. FLS, RLS on PLC side are always used. 0: FX3U(C) signal only 1: FX3U(C) and servo amp signal both	0:FX3U(C) signal only
	Signal logic	Sets the FLS, RLS signal logic at servo amplifier. 0: NO contact (servo amplifier) 1: NC contact (servo amplifier)	1:NC contact (servo amplifier)
Torque limit		Sets the torque limit at X/Y-axis. Setting range : 1~10000×0.1%	3000×0.1%
Servo ready check		Sets the servo ready check valid/invalid at X/Y-axis. 0: Invalid 1: Valid	1:Valid
Servo end check		Sets the servo end check valid/invalid at X/Y-axis. 0:Invalid 1:Valid	1:Valid
Servo end evaluation time		Sets the servo end evaluation time at X/Y-axis. Setting range : 1~5000ms	5000ms
OPR mode		Sets the OPR mode at X/Y-axis. 0:DOG 1: Data set 2: Stopper #1 3: Stopper #2	0:DOG
OPR direction		Sets the OPR direction at X/Y-axis. 0: Decrease present value 1: Increase present value	0:Decrease present value
Machine zero point address		Sets the OPR address at X/Y-axis. Setting range : -2,147,483,648~2,147,483,647 [User unit]*1 Set the value within -2,147,483,648~2,147,483,647PLS in the converted pulse data.*1	0 PLS
OPR speed (High speed)		Sets the OPR speed (High speed) at X/Y-axis. Set the speed at or below the maximum rotation speed*2 of servo motor. Setting range : 1~Maximum speed [User unit]*1 Set the value within 1~50,000,000Hz in the converted pulse data. *1	4,000,000Hz
OPR speed (Creep)		Sets the OPR speed (Creep) at X/Y-axis. Set the speed at or below the maximum rotation speed*2 of servo motor. Setting range : 1~OPR speed (High speed) [User unit]*1 Set the value within 1~50,000,000Hz in the converted pulse data. *1	100,000Hz
OPR torque limit value		Sets the torque limit at X/Y-axis in OPR. Setting range : 1~10000×0.1%	3000×0.1%
OPR interlock setting		Sets the OPR interlock setting valid/invalid. 0: Invalid 1: Valid	1:Valid
Zero signal count start timing		Sets the Zero signal count start timing at X/Y-axis. 0: Backward end of DOG 1: Forward end of DOG	0:Backward end of DOG
Zero signal count		Sets the Zero signal count at X/Y-axis. Setting range : 0~32767PLS	1 PLS

Item		Description	Default value
DOG External input selection	Signal selection	Sets the DOG signal to be used. 0: 20SSC-H signal 1: Servo amp signal	0: 20SSC-H signal
	Signal logic	Sets the DOG signal logic at servo amp. 0: NO contact (servo amplifier) 1: NC contact (servo amplifier)	0:NO contact (servo amplifier)
DOG switch input logic		Sets the DOG switch input logic at X/Y-axis. 0: NO contact (20SSC-H) 1: NC contact (20SSC-H)	0:NO contact (20SSC-H)

*1. For the user unit and the converted pulse data, refer to the following.

→ **Refer to Section 5.1.**

*2. For the servo motor rotation speed and the operation speed (converted pulse data), refer to the following.

→ **Refer to Subsection. 5.1.3**

Display colors of the positioning parameters edit window

Display colors of the positioning parameters edit window have meanings as follows.

Display color of the characters and frame	Description
Blue	Default settings.
Black	Nondefault settings with no error.
Red	The content has a setting range error.
Gray	NA items. • When the unit system is [Motor system], [Pulse rate] and [Feed rate] are not available. • When [Signal selection] in [FLS,RLS External input selection] is [FX3U(C) signal only], [Signal logic] is not available. • When [Servo end check] is [0 : valid], [Servo end evaluation time] is not available. • When [Signal selection] in [DOG External input selection] is [20SSC-H signal], [Signal logic] is not available. • When [Signal selection] in [DOG external input selection] is [1 : Servo amp signal], [DOG switch input logic] is not available.

5.3 Setting servo parameters

Setting the parameters (servo parameters) to transfer from 20SSC-H to servo amplifiers via SSCNET III.

1 Double-click [File name] → [Edit] → [Servo parameters] in the file data list.

An edit window for servo parameters appears.

2 Set the items of servo parameters.

To enter texts and select items, double-click the cell.

→ **For servo parameter details, refer to the FX3U-20SSC-H User's Manual and Servo Amplifier Instruction Manuals.**

Servo series [Servo parameteres (Basic setting)]

This parameter must be set to transfer information between 20SSC-H and the servo amplifier. Set the servo parameters according to the servo amplifier being used.

Unset file / FX3U-20SSC-H / Servo parameters (module:0)

Kind	Item		X-axis	Y-axis
Servo amplifier series	Servo amplifier series		0:Not used	0:Not used
Basic setting parameters	Regenerative brake option	Selection of regenerative brake option	00: Regenerative brake option is not used	00: Regenerative brake option is not used
	Absolute position detection system	Selection of absolute position detection system	0:Used in incremental system	0:Used in incremental system
	Function selection A-1	Output signal 3 function selection	0:Signal allocated by Output signal 3 function selection	0:Signal allocated by Output signal 3 function selection
		Servo forced stop selection	0:Valid (Use the forced stop signal.)	0:Valid (Use the forced stop signal.)
	Auto tuning	Gain adjustment mode setting	1:Auto tuning mode 1	1:Auto tuning mode 1
	Auto tuning response		12:37.0Hz	12:37.0Hz
	In-position range		100 pulse	100 pulse
	Rotation direction selection		0:Forward rotation (CCW) with the increase of the positioning address.	0:Forward rotation (CCW) with the increase of the positioning address.
	Encoder output pulse		4000 pulse/rev	4000 pulse/rev
Gain/filter parameters	Adaptive tuning mode (Adaptive filter II)	Filter tuning mode selection	0:Filter OFF	0:Filter OFF
	Vibration suppression control filter tuning mode (Advanced vibration suppression control)	Vibration suppression control tuning mode	0:Vibration suppression control OFF	0:Vibration suppression control OFF
	Feed forward gain		0 %	0 %
	Ratio of load inertia moment to servo motor inertia moment		7.0 times	7.0 times
	Model loop gain		24 rad/s	24 rad/s
	Position loop gain		37 rad/s	37 rad/s
	Speed loop gain		823 rad/s	823 rad/s
	Speed integral compensation		33.7 ms	33.7 ms
	Speed differential compensation		980	980
	Machine resonance suppression filter 1		4500 Hz	4500 Hz
	Notch form selection 1	Notch depth selection	0:Deep(-40dB)	0:Deep(-40dB)
		Notch width selection	0:Standard(a=2)	0:Standard(a=2)
	Machine resonance suppression filter 2		4500 Hz	4500 Hz
	Notch form selection 2	Machine resonance suppression filter 2 selection	0:Invalid	0:Invalid
		Notch depth selection	0:Deep(-40dB)	0:Deep(-40dB)
		Notch width selection	0:Standard(a=2)	0:Standard(a=2)

Gain/filter parameters	Low-pass filter		3141 rad/s	3141 rad/s
	Vibration suppression control vibration frequency setting		100.0 Hz	100.0 Hz
	Vibration suppression control resonance frequency setting		100.0 Hz	100.0 Hz
	Low pass filter selection	Low pass filter selection	0:Automatic setting	0:Automatic setting
	Slight vibration suppression control selection	Slight vibration suppression control selection	0:Invalid	0:Invalid
		PI-PID control switch-over	0:PI control is always valid.	0:PI control is always valid.
	Gain changing selection	Gain changing selection	0:Invalid	0:Invalid
	Gain changing condition		10	10
	Gain changing time constant		1 ms	1 ms
	Gain changing ratio of load inertia moment to servo motor inertia moment		7.0 times	7.0 times
	Gain changing position loop gain		37 rad/s	37 rad/s
	Gain changing speed loop gain		823 rad/s	823 rad/s
	Gain changing speed integral compensation		33.7 ms	33.7 ms
	Gain changing vibration suppression control vibration frequency setting		100.0 Hz	100.0 Hz
	Gain changing vibration suppression control resonance frequency setting		100.0 Hz	100.0 Hz
Extension setting parameters	Error excessive alarm level		3 rev	3 rev
	Electromagnetic brake sequence output		0 ms	0 ms
	Encoder output pulses selection	Encoder pulse output phase changing	0:CCW progress to A phases 90 degree	0:CCW progress to A phases 90 degree
		Encoder output pulse setting selection	0:Output pulse setting	0:Output pulse setting
	Function selection C-1	Encoder cable communication system selection	0:Two-wire type	0:Two-wire type
	Function selection C-2	Motor-less operation selection	0:Invalid	0:Invalid
	Zero speed		50 r/min	50 r/min
	Analog monitor output 1	Analog monitor (MO1) output selection	0:Servo motor speed(+/-8V/Max. speed)	0:Servo motor speed(+/-8V/Max. speed)
	Analog monitor output 2	Analog monitor (MO2) output selection	1:Torque(+/-8V/Max. torque)	1:Torque(+/-8V/Max. torque)
	Analog monitor 1 offset		0 mV	0 mV
	Analog monitor 2 offset		0 mV	0 mV
	Function selection C-4	OPR set condition selection	1:It is not necessary to pass through the Z phase after the power on.	1:It is not necessary to pass through the Z phase after the power on.
I/O setting parameters	Output signal device selection 1	Output signal 1 function selection	5:MBR	5:MBR
	Output signal device selection 2	Output signal 2 function selection	4:INP	4:INP
	Output signal device selection 3	Output signal 3 function selection	3:ALM	3:ALM

Display colors of the servo parameters edit window

Display colors of the servo parameters edit window have meanings as follows.

Display color of the characters and frame	Description
Blue	Default settings.
Black	Nondefault settings with no error.
Red	The content has a setting range error.
Gray	NA items. Depending on the CDP content, CDS is not available.

5.4 Setting table information

5.4.1 The common items in table information.

Setting the table information at X, Y, XY-axis. Set the contents below for each axis.

→ **For table information details, refer to the 20SSC-H user's manual.**

1. The number of table information available for X, Y, XY-axis is as follows.

	Table information	The available table information number
Independent operation	X-axis table information	300
	Y-axis table information	300
Simultaneous operation at XY-axis	XY-axis table information	300

2. Items of each operation information for table information

✓: Available –: Not available

Operation info	Available axis	Address	Speed	Arc center	Arc radius	Wait time	Jump desination	m code
Positioning at 1-step speed*1	X, Y, XY-axis	✓	✓	–	–	–	–	✓
Interrupt stop at 1-step speed*1	X, Y, XY-axis	✓	✓	–	–	–	–	✓
Positioning at 2-step speed*1*2	X, Y, XY-axis	✓	✓	–	–	–	–	✓
Positioning at 2-step speed (Paired line)*1*2	X, Y, XY-axis	✓	✓	–	–	–	–	–
Interrupt stop at 2-step speed*1*2	X, Y, XY-axis	✓	✓	–	–	–	–	✓
Interrupt stop at 2-step speed (Paired line)*1*2	X, Y, XY-axis	–	✓	–	–	–	–	–
Interrupt stop*1	X, Y, XY-axis	✓	✓	–	–	–	–	✓
Operation at multi-step speed*1	X, Y, XY-axis	✓	✓	–	–	–	–	✓
Linear interpolation	XY-axis	✓	✓*3	–	–	–	–	✓
Linear interpolation (interrupt)	XY-axis	✓	✓*3	–	–	–	–	✓
Circular interpolation (CNT,CW)	XY-axis	✓	✓*3	✓	–	–	–	✓
Circular interpolation (CNT,CCW)	XY-axis	✓	✓*3	✓	–	–	–	✓
Circular interpolation (RAD,CW)	XY-axis	✓	✓*3	–	✓	–	–	✓
Circular interpolation (RAD,CCW)	XY-axis	✓	✓*3	–	✓	–	–	✓
Machine zero return*1	X, Y, XY-axis	–	–	–	–	–	–	✓
Present address changing*1	X, Y, XY-axis	✓	–	–	–	–	–	✓
Absolute address specification	X, Y, XY-axis	–	–	–	–	–	–	✓
Incremental address specification	X, Y, XY-axis	–	–	–	–	–	–	✓
Dwell	X, Y, XY-axis	–	–	–	–	✓	–	✓
Jump	X, Y, XY-axis	–	–	–	–	–	✓	–
m code	X, Y, XY-axis	–	–	–	–	–	–	✓
No processing	X, Y, XY-axis	–	–	–	–	–	–	–
End	X, Y, XY-axis	–	–	–	–	–	–	–

*1. XY-axis table information also sets X-axis and Y-axis independently.
*2. [Positioning at 2-step speed] and [Interrupt stop at 2-step speed] occupy 2 lines in table information.
*3. Available at X-axis only.
When selecting the items only for X-axis or Y-axis at the operation information in the XY-axis table information, the items for the other axis are not available.

5.4.2 Setting X/Y-axis table information

Setting X/Y-axis table information

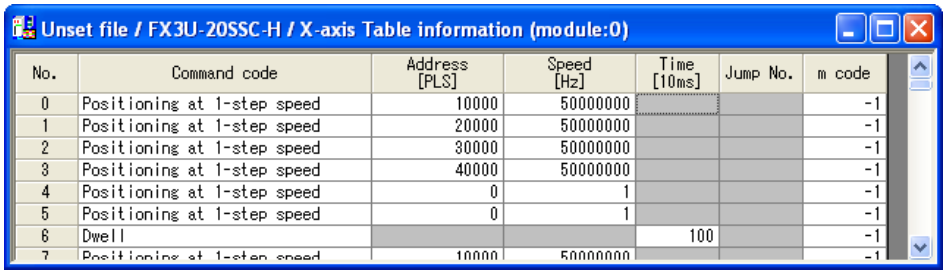
1 Double-click [File name] → [Edit] → [X-axis table information] or [Y-axis table information] in the file data list.

The selected X or Y-axis table information edit window appears.

2 Set each item for the table information.

To enter texts and select items, double-click the cell.

→ **For table information details, refer to FX3U-20SSC-H User's Manual.**



This window displays [X-axis table information] edit window.

Item	Description	Note
No.	Table information number	→ **Refer to Subsection 5.3.1**
Operation information	Sets operation information	
Address [User unit]	Sets the address. Setting range : -2,147,483,648~2,147,483,647 [User unit]*1 Set the value within -2,147,483,648~2,147,483,647PLS in the converted pulse data.	[User unit] varies depending on positioning parameters. → **Refer to Section 5.2**
Speed [User unit]	Sets the operation speed. Set the speed at or below the maximum rotation speed*2 of servo motor. Setting range : 1~Maximum speed [User unit]*1 Set the value within 1~50,000,000Hz in the converted pulse data.	
Time [10ms]	Sets the wait time. Setting range : 0~32767×10ms	
Jump No.	Sets the jump No. Setting range : 0~299	
m code	Sets the m code. Setting range : -1~32767*3	

*1. For the user unit and the converted pulse data, refer to the following.

→ **Refer to Section 5.1.**

*2. For the servo motor rotation speed and the operation speed (converted pulse data), refer to the following.

→ **Refer to Subsection. 5.1.3**

*3. When the operation information is m code, the setting range is 0~32767.

5.4.3 Setting XY-axis table information

Setting XY-axis table information.

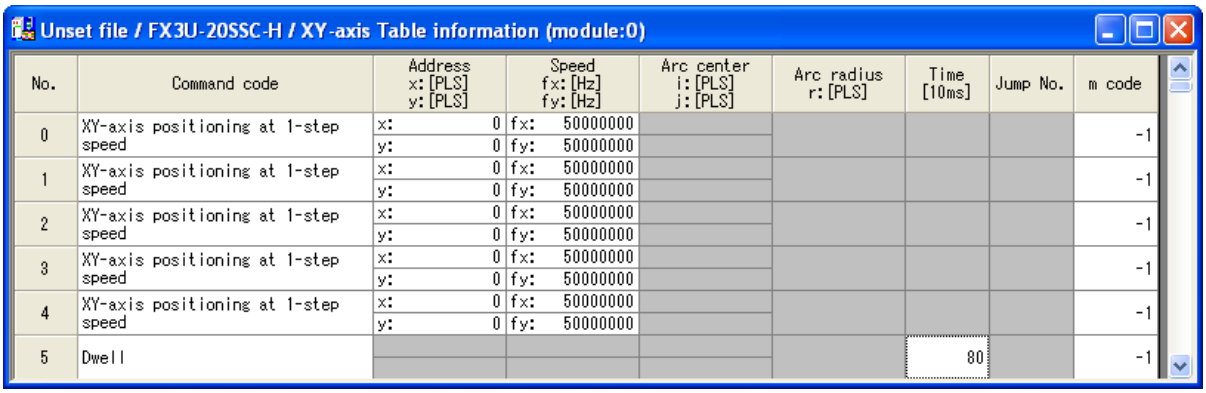
1 **Double-click [File name] → [Edit] → [XY-axis table information] in the file data list.**

XY-axis table information edit window appears.

2 **Set each item for the table information.**

To enter texts and select items, double-click the cell.

→ **For table information details, refer to FX3U-20SSC-H User's Manual.**



Item	Description	Note
No.	Table information number	→ **Refer to Subsection 5.3.1**
Operation information	Sets operation information	
Address x: [User unit] (Upper) y: [User unit] (Lower)	Sets the address. Setting range : -2,147,483,648~2,147,483,647 [User unit]*1 Set the value within -2,147,483,648~2,147,483,647PLS in the converted pulse data.	[User unit] varies depending on positioning parameters. → **Refer to Section 5.2**
Speed fx: [User unit] (Upper) fy: [User unit] (Lower)	Sets the operation speed. Set the speed at or below the maximum rotation speed*2 of servo motor. Setting range : 1 ~ Maximum speed [User unit]*1 Set the value within 1~50,000,000Hz in the converted pulse data.	
Arc center i: [User unit] (Upper) j: [User unit] (Lower)	Sets the arc center. Setting range : -2,147,483,648~2,147,483,647 [User unit]*1 Set the value within -2,147,483,648~2,147,483,647PLS in the converted pulse data.	
Arc radius r: [User unit]	Sets the arc radius. Setting range : -2,147,483,648~2,147,483,647 [User unit]*1 Set the value within -2,147,483,648~2,147,483,647PLS in the converted pulse data.	
Time [10ms]	Sets the wait time. Setting range : 0~32767×10ms	
Jump No.	Sets the jump No. Setting range : 0~299	
m code	Sets the m code. Setting range : -1~32767*3	

*1. For the user unit and the converted pulse data, refer to the following.
→ **Refer to Section 5.1.**

*2. For the servo motor rotation speed and the operation speed (converted pulse data), refer to the following.
→ **Refer to Subsection. 5.1.3**

*3. When the operation information is m code, the setting range is 0~32767.

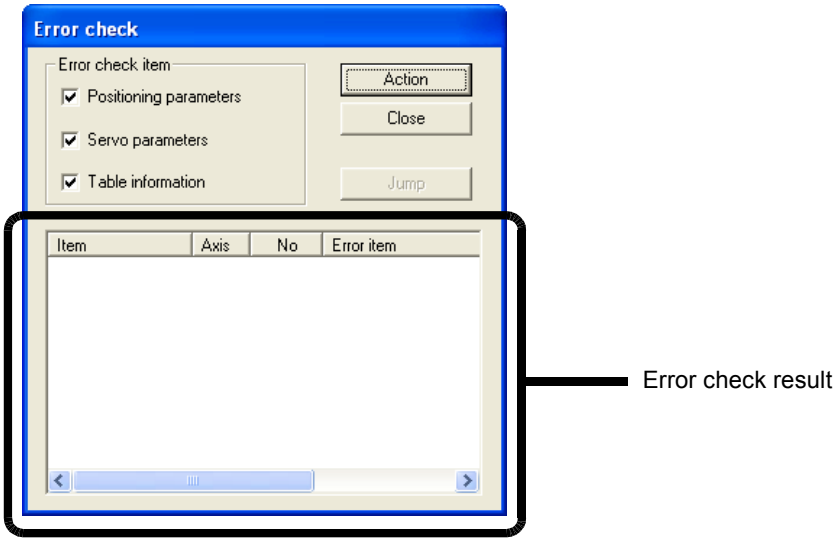
5.5 Error check

Checking the consistency and the incomplete settings in positioning parameters, servo parameters and table information.

1 Select [Tool] → [Error check].

Error check dialog box appears.

2 Select the item to be checked.



Item		Description
Error check items		Select the item targeted for Error check
	Positioning parameters	Checks the positioning parameters when ticked off here
	Servo parameters	Checks the servo parameters when ticked off here
	Table information	Checks the table information when ticked off here
Error check result		Displays the items, axis, No. and error items after the error check
	Item	Displays the positioning parameter, servo parameter or table information with errors
	Axis	Displays X, Y, XY-axis with errors
	No.	Displays the table information No. with errors It is blank here when any error in the positioning parameter or servo parameter
	Error items	Displays the details of the error items
<Action>		Executes [Error check]
<Close>		Closes the dialog box
<Jump>		Displays the selected error location Enabled only with error detection

3 Click <Action>.

The error check result of the selected item appears.

6. Setting the connection destination

Setting the connection destination (COM port, transmission speed and the 20SSC-H module No.).

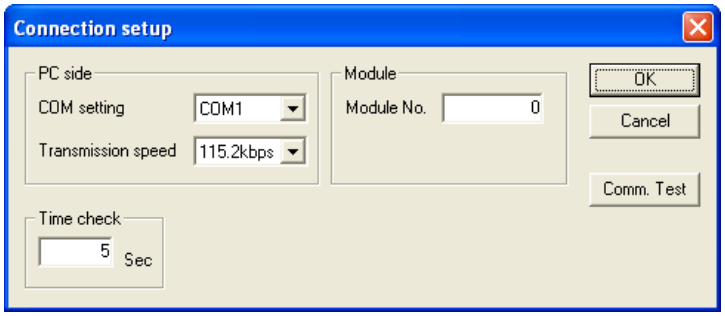
Cautions on communication

- When connecting the personal computer interfaces to the same COM port in FX Configurator-FP and GX Developer, set the same baud rate for both. When FX Configurator-FP and GX Developer are running simultaneously, the baud rate that was set first has priority.
- An error may occur in the communication with FX PLC when used with the resume function, suspend setting, power-saving function and standby mode of the peripheral device. For this reason, do not set the functions above when communicating with the 20SSC-H.
- A communication error may occur depending on the combination of the personal computer model, USB cable and so on. In that case, refer to the message displayed and perform the operation again.
- When the baud rate changes for the fast communication at the serial port of the personal computer, it may disable the communication, or communication may delay due to too many retries depending on the personal computer spec. When the fast communication is not enabled, reduce the baud rate and restart communication.

1 Select [Online] → [Connection setup].

Connection setup dialog box appears.

2 Set each item.



Item		Description	Default setting
PC side		Sets the COM port and transmission speed at PC side.	
	COM setting	Sets the COM port at PC side. Setting range : COM1 to 10	COM1
	Transmission speed	Sets the transmission speed. Setting range : 9.6kbps to 115.2kbps	115.2kbps
Module		Sets the module No. for 20SSC-H.	
	Module No.	Sets the module No. for 20SSC-H. Setting range : 0 to 7	0
Time check		Sets the timeout determination time. Unit : second Setting range : 1 to 9999 seconds	5 seconds
<Comm. Test>		Executes the communication test.	

Displayed messages

The message below appears depending on the communication setting.

Displayed Message	Description
Cannot communicate with the PLC. Execute again after checking the connections with the PLC. <ES: Error code>	A communication error has occurred. Check the connection with PLC, and the communication settings at the destination.
The connected PLC does not support this function. Please execute again after confirming the version of the PLC.	The connected PLC is not supported. Confirm the version of the PLC.
The module which supported this function is not found. Please execute again after confirming the module.	The special function block with assigned module No. is not 20SSC-H. Confirm the module No. and the connection between PLC and 20SSC-H.
Don't change connection data while online.	User has selected [Connection setup] menu while monitoring. (displaying operation monitor or the table information edit window for monitoring). Select [Connection setup] menu after disrupting the monitoring.
Module No. is range over.	User set the value outside the module No. range. Confirm the module No.
Time check is range over.	User set the value outside the time check range. Confirm the time check setting.

7. Read / Write / Verify / Initialize

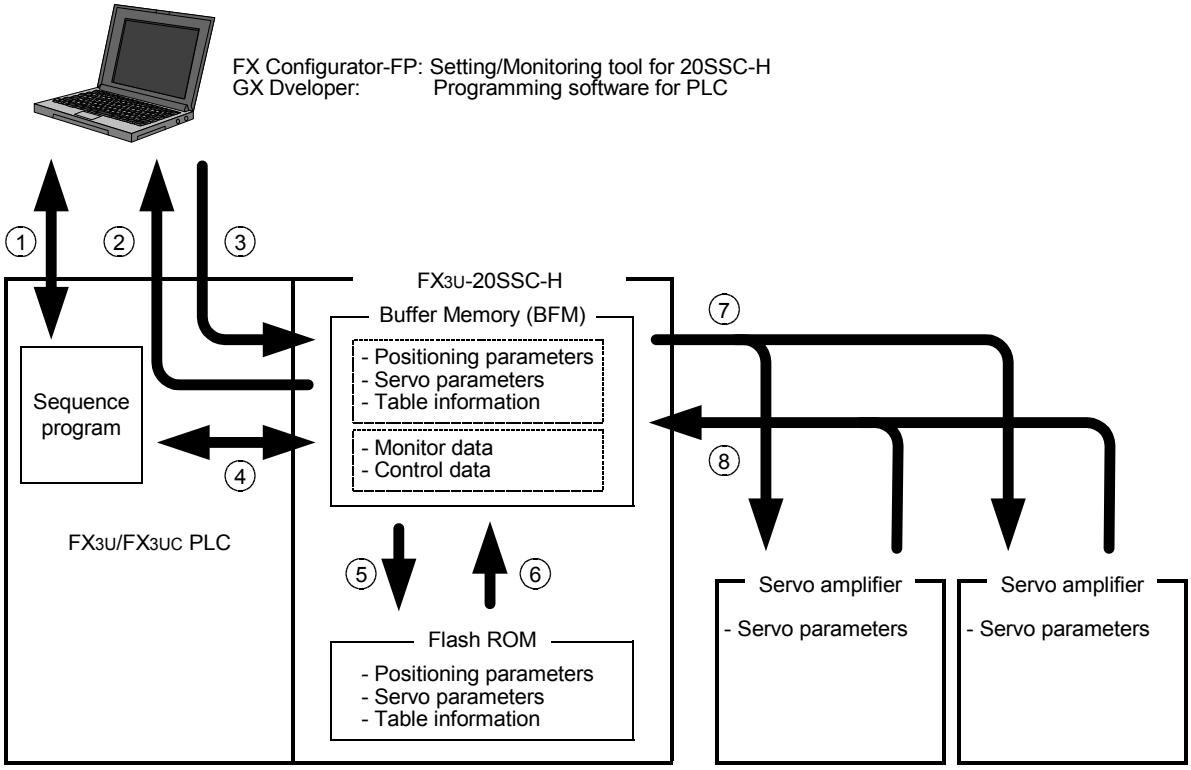
Reading, Writing and Verifying the data (positioning parameters, servo parameters and table information) for each axis, and initializing the 20SSC-H.

7.1 Data type and storage location

1. Data type

Data type	Description	Storage location
Positioning parameters	The parameters required for positioning control. → **For positioning parameters details, Refer to 20SSC-H User's manual.** → **For setting procedures of positioning parameters, refer to Section 5.1.** • Positioning parameters for X-axis. • Positioning parameters for Y-axis	• The BFM in 20SSC-H • Flash ROM in 20SSC-H
Servo parameters	The parameters of servo amp. 20SSC-H transfers servo parameters to servo amps via SSCNET III at power on. → **For servo parameters details, refer to the manual of the servo amp to be used.** → **For setting procedures of servo parameters, refer to Section 5.3.** • Servo parameters for X-axis. • Servo parameters for Y-axis	• The BFM in 20SSC-H • Flash ROM in 20SSC-H
Table information	The data for table operation. • Table information for X-axis. • Table information for Y-axis. • Table information for XY-axis.	• The BFM in 20SSC-H • Flash ROM in 20SSC-H

2. Data flow



No.	Description
①	Read/Write/Monitor/Test the sequence programs with GX Developer.
②	Read out the following data from the 20SSC-H BFM to Configurator-FP. • Positioning parameters • Servo parameters • Table information • Monitor data (Operation status, motion status and input signal status, etc.)
③	Write the following data from Configurator-FP to the 20SSC-H BFM. • Positioning parameters • Servo parameters • Table information • Control data (The present value change, speed change and operation test command, etc.)
④	Read/Write the following data in BFM with sequence program. • Positioning parameters • Servo parameters • Table information • Monitor data (Operation status, motion status and input signal status, etc.) • Control data (The present value change, speed change and operation test command, etc.)
⑤	Store the following BFM data to the Flash ROM by the store command from the sequence program or Configurator-FP. • Positioning parameters • Servo parameters • Table information
⑥	Positioning/servo parameters and table information transfer from the Flash ROM to the BFM in 20SSC-H at power ON, simultaneously servo parameters transfer to servo amps.
⑦	Servo parameters in the BFM transfer to servo amps at power ON. → **For transfer procedure, refer to the next page.**
⑧	20SSC-H retrieves servo parameters changed at servo amp sides, and updates the servo parameters in its BFM.

How to transfer (write) servo parameters to servo amplifiers

Store servo parameters in the Flash ROM beforehand since servo parameters transfer to servo amps at power ON.

1) Store to the Flash ROM the servo series (BFM#15000, #15200) of servo parameters assigned to the servo amp to be connected.
2) Power ON the servo amp first and then 20SSC-H.

Note

When turning OFF and then ON the servo parameter transfer command [BFM #519 b9 (X-axis), #619 b9 (Y-axis)], the following parameters in BFM transfer to servo amps.

1) Servo parameters to be transferred (a part of basic setting parameters).
   No parameter in Gain/filter, Extension and I/O setting parameters transfers by servo parameter transfer command.
   - Auto tuning mode
   - Auto tuning response
   - Feed forward gain
   - Load moment of inertia ratio to servo motors
   - Model control gain
   - Position control gain
   - Speed control gain
   - Velocity integral compensation
   - Velocity derivative compensation
2) The execution condition of the servo parameter transfer command [BFM #519 b9 (X-axis), #619 b9 (Y-axis)] 20SSC-H ignores the servo parameter transfer command during positioning motion.
3) Servo parameters in transmission [BFM #28 b10 (X-axis), #128 b10 (Y-axis)]
   [Servo parameters in transmission] in status information turns ON during servo parameters in transmission.

→ **For details, refer to the FX3U-20SSC-H User's Manual.**

7.2 Reading [positioning/servo parameters and table information]

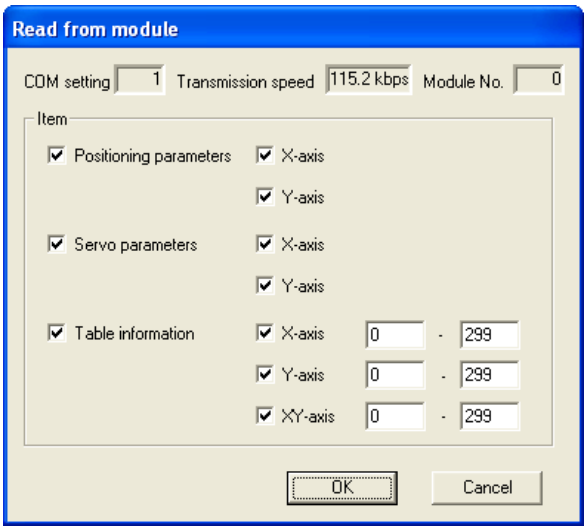
Reading [positioning/servo parameters and table information] from the 20SSC-H BFM.

1 Operate any of the following procedures

- Click [Read from module].
- Select [Online] → [Read from module].

[Read from module] dialog box appears.

2 Select the data to be read.



Item		Description
COM setting		Displays [COM setting] in [Connection setup] dialog box
Transmission speed		Displays [Transmission speed] in [Connection setup] dialog box
Module No.		Displays [Module No.] in [Connection setup] dialog box
Item		Ticks off the data to be read
	Positioning parameters	Ticks off the axis of positioning parameters to be read • X-axis • Y-axis
	Servo parameters	Ticks off the axis of servo parameters to be read • X-axis • Y-axis
	Table information	Sets the reading range after ticking off the axis of table information to be read Setting range : 0 to 299 • X-axis • Y-axis • XY-axis
<OK>		Reads the selected data from the BFM
<Cancel>		Cancels selecting and closes the dialog box

3 Click <OK>.

FX Configurator-FP reads out the selected data from the 20SSC-H BFM.

→ **For the displayed messages, refer to Section 7.6.**

7.3 Writing [positioning/servo parameters and table information]

Data writing procedures comprise of [Write to module] and [Flash ROM write].

7.3.1 Writing to the BFM

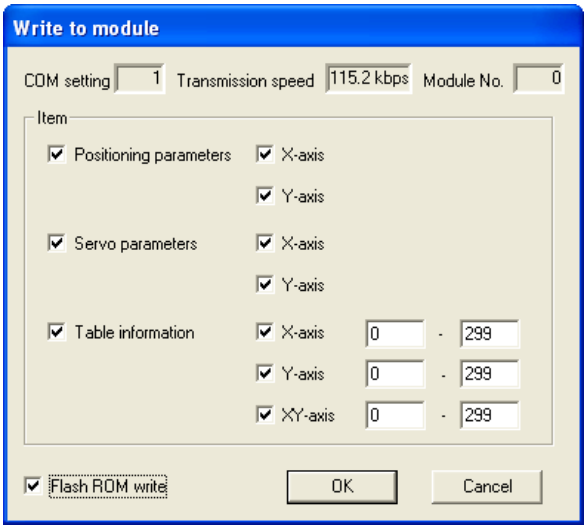
Writing [positioning parameters, servo parameters table information] to the 20SSC-H BFM.

1 **Operate any of the following procedures**

- Click [Write to module].
- Select [Online] → [Write to module].

[Write to module] dialog box appears.

2 **Select the data to be written.**



Item		Description
COM setting		Displays [COM setting] in [Connection setup] dialog box
Transmission speed		Displays [Transmission speed] in [Connection setup] dialog box
Module No.		Displays [Module No.] in [Connection setup] dialog box
Item		Ticks off the data to be read
	Positioning parameters	Ticks off the axis of positioning parameters to be written • X-axis • Y-axis
	Servo parameters	Ticks off the axis of servo parameters to be written • X-axis • Y-axis
	Table information	Sets the writing range after ticking off the axis of table information to be written Setting range : 0 to 299 • X-axis • Y-axis • XY-axis
Flash ROM write		Ticks off when writing the data selected in [Item] to Flash ROM
<OK>		Writes the selected data to the BFM
<Cancel>		Cancels selecting and closes the dialog box

3 **Click <OK>.**

FX Configurator-FP writes the selected data to the 20SSC-H BFM.

→ **For the displayed messages, refer to Section 7.6.**

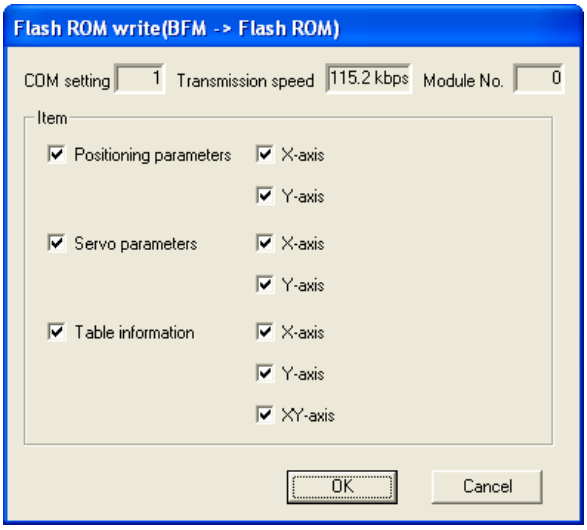
7.3.2 Writing to the Flash ROM

Storing [positioning parameters, servo parameters and table information written beforehand in the 20SSC-H BFM] in the Flash ROM. After setting up and adjusting the system, it is handy when storing [positioning parameters, servo parameters and table information] in the BFM.

1 Select [Online] → [Flash ROM write].

[Flash ROM write (BFM -> Flash ROM)] appears.

2 Select the data to be stored in the Flash ROM.



Item		Description
COM setting		Displays [COM setting] in [Connection setup] dialog box
Transmission speed		Displays [Transmission speed] in [Connection setup] dialog box
Module No.		Displays [Module No.] in [Connection setup] dialog box
Item		Ticks off the data to be stored
	Positioning parameters	Ticks off the axis of positioning parameters to be stored • X-axis • Y-axis
	Servo parameters	Ticks off the axis of servo parameters to be stored • X-axis • Y-axis
	Table information	Ticks off the axis of table information to be stored • X-axis • Y-axis • XY-axis
<OK>		Store the selected data in the BFM
<Cancel>		Cancels selecting and closes the dialog box

3 Click <OK>.

FX Configurator-FP stores the selected 20SSC-H BFM data in the Flash ROM.

7.4 Verifying [positioning parameters, servo parameters table information]

Verifying the following FX Configurator-FP data with the 20SSC-H BFM.

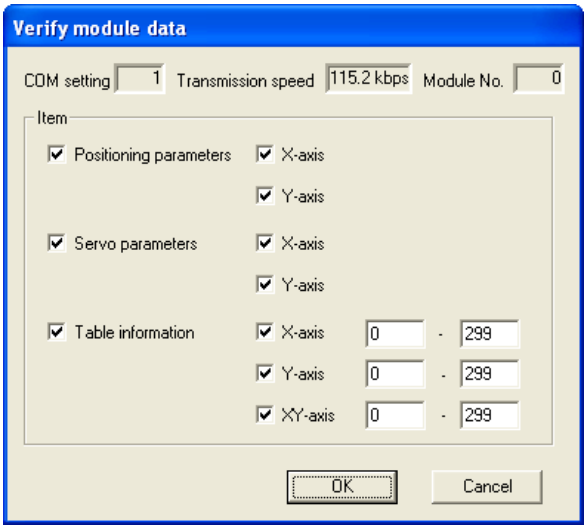
- Positioning parameters
- Servo parameters
- Table information

1 Operate any of the following procedures

- Click  [Verify module data].
- Select [Online] → [Verify module data].

[Verify module data] dialog box appears.

2 Select the data to be verified.

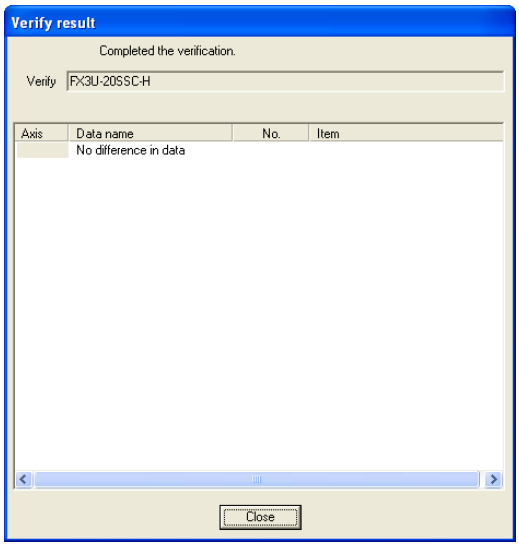


Item		Description
COM setting		Displays [COM setting] in [Connection setup] dialog box
Transmission speed		Displays [Transmission speed] in [Connection setup] dialog box
Module No.		Displays [Module No.] in [Connection setup] dialog box
Item		Ticks off the data to be verified
	Positioning parameters	Ticks off the axis of positioning parameters to be verified • X-axis • Y-axis
	Servo parameters	Ticks off the axis of servo parameters to be verified • X-axis • Y-axis
	Table information	Sets the verifying range after ticking off the axis of table information to be verified Setting range : 0 to 299 • X-axis • Y-axis • XY-axis
<OK>		verifies the selected data by FX Configurator-FP and the BFM
<Cancel>		Cancels selecting and closes the dialog box

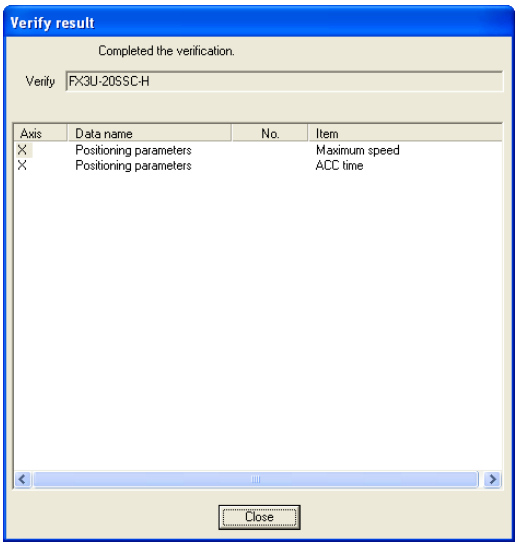
3 Click <OK>.

The verification result of selected data appears.

When the verification result agrees.



When the verification result disagrees.



Item		Description
Verifying destination		Displays the special function unit/block name of verifying destination
Verification result		Displays the item, axis, No. and error item when completing the verification
	Axis	Displays the disagreed axis by X, Y or XY
	Data name	Displays the positioning parameter, servo parameter or table information as a disagreed data name
	No.	Displays the disagreed table information No. It is blank here when any disagreement in positioning parameters and servo parameters
	Item	Displays the details of the disagreed positioning parameter, servo parameter or table information
<Close>		Closes the dialog box

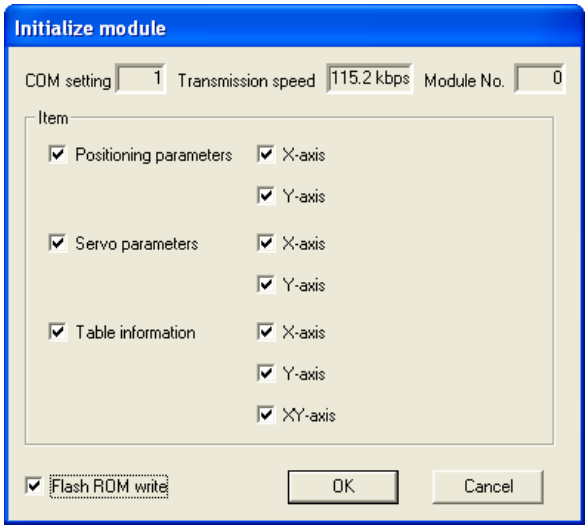
7.5 Initializing the BFM and Flash ROM

Initializing [positioning parameters, servo parameters and table information] in the 20SSC-H BFM and Flash ROM.

1 Select [Online] → [Initialize module].

[Initialize module] dialog box appears.

2 Select the data to be initialized.



Item		Description
COM setting		Displays [COM setting] in [Connection setup] dialog box
Transmission speed		Displays [Transmission speed] in [Connection setup] dialog box
Module No.		Displays [Module No.] in [Connection setup] dialog box
Item		Ticks off the data to be initialized
	Positioning parameters	Ticks off the axis of positioning parameters to be initialized • X-axis • Y-axis
	Servo parameters	Ticks off the axis of servo parameters to be initialized • X-axis • Y-axis
	Table information	Ticks off the axis of table information to be initialized • X-axis • Y-axis • XY-axis
Flash ROM write		Ticks off when initializing the Flash ROM data selected in [Item]
<OK>		Initializes the selected data
<Cancel>		Cancels selecting and closes the dialog box

3 Click <OK>.

FX Configurator-FP initializes the selected data in the 20SSC-H BFM.

→ **For the displayed messages, refer to Section 7.6.**

7.6 The displayed messages and countermeasures

This section explains the countermeasures for error messages.

Displayed Message	Description
Cannot communicate with the PLC. Execute again after checking the connections with the PLC. <ES: Error code>	A communication error has occurred. Check the connection with PLC, and the communication settings at the destination.
The connected PLC dose not support this function. Please execute again after confirming the version of the PLC.	The connected PLC is not supported. Confirm the version of the PLC.
The module which supported this function is not found. Please execute again after confirming the module.	The special function block with assigned module No. is not 20SSC-H. Confirm the module No. and the connection between PLC and 20SSC-H.
It is range over. Check that the value is correct, and execute again.	It is range over.
Because the disagreement has exceeded 100, the verify processing is interrupted.	The disagreement in verification has exceeded 100.

8. Debug in the positioning

DESIGN PRECAUTIONS ⚠DANGER

- Provide a safety circuit on the outside of the PLC so that the whole system operates to ensure the safety even when external power supply trouble or PLC failure occurs.
  Otherwise, malfunctions or output failures may result in an accident.
  1) An emergency stop circuit, a protection circuit, an interlock circuit for opposite movements, such as normal and reverse rotations, and an interlock circuit for preventing damage to the machine at the upper and lower positioning limits should be configured on the outside of the PLC.
  2) When the PLC CPU detects an error, such as a watch dog timer error, during self-diagnosis, all outputs are turned off. When an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled.
  Design external circuits and mechanisms to ensure safe operations of the machine in such a case.
  3) When some sort of error occurs in a relay, triac or transistor of the output unit, output may be kept on or off.
  For output signals that may lead to serious accidents, design external circuits and mechanisms to ensure safe operations of the machine in such cases.

DESIGN PRECAUTIONS ⚠CAUTION

- Observe the following items. Failure to do so may cause incorrect data-writing by noise to PLCs and result the PLC failure, machine damage or an accident.
  1) Do not lay close or bundle with the main circuit line, high-voltage line, or load line.
  Noise and Surge induction interfere with the system operation.
  Keep a safe distance of least 100 mm (3.94") from the above lines during wiring.
  2) Ground the shield wire or shield of a shielded cable at one point on the PLC. However, do not ground at the same point as high voltage lines.
- Install in a manner which prevents excessive force from being applied to the built-in connectors dedicated to programming, power connectors and I/O connectors.
  Failure to do so may result in wire breakage or failure of the PLC.

INSTALLATION PRECAUTIONS ⚠DANGER

- Make sure to cut off all phases of the power supply externally before starting the installation or wiring work.
  Failure to do so may cause electric shock.

INSTALLATION PRECAUTIONS ⚠CAUTION

- Fit the extension cables, peripheral device connecting cables, input/output cables and battery connecting cable securely to the designated connectors.
  Contact failures may cause malfunctions.
- Make sure to attach the terminal cover offered as an accessory to the product before turning on the power or starting the operation after installation or wiring work.
  Failure to do so may cause electric shock.

STARTUP AND MAINTENANCE PRECAUTIONS **DANGER**

- Do not touch any terminal while the PLC's power is on.
  Doing so may cause electrical shock or malfunctions.
- Before cleaning or retightening terminals, externally cut off all phases of the power supply.
  Failure to do so may expose you to shock hazard.
- Before modifying the program under operation or performing operation for forcible output, running or stopping, carefully read the manual, and sufficiently ensure the safety.
  An operation error may damage the machine or cause accidents.
- To test Zero-return, JOG operation and Positioning data, throughly read this manual, ensure the safe system operation
  An operation error may damage the machine or cause accidents.
  The response, such as the JOG operation, may be slow according to the running state of the personal computer at the time of the test operation. In the test operation, the PLC performance can be slower due to the busy state of personal computer.
  - End all other applications running except FX Configurator-FP.
  - At destination specification (refer to chapter 6), set the transmission speed at 38.4kbps or higher.

STARTUP AND MAINTENANCE PRECAUTIONS **CAUTION**

- Do not disassemble or modify the PLC.
  Doing so may cause failures, malfunctions or fire.
  For repair, contact your local Mitsubishi Electric distributor.
- Before connecting or disconnecting any extension cable, turn off power.
  Failure to do so may cause unit failure or malfunctions.
- Before attaching or detaching the following devices, turn off power.
  Failure to do so may cause device failure or malfunctions.
  - Peripheral devices, expansion boards and special adapters
  - I/O extension blocks/units and terminal blocks

The monitors/tests debug the positioning operation.

Caution

When the communication error due to the forced termination of FX Configurator-FP, peripheral devices' power OFF and the connection cable unplugging occurs, all axis stops.

1) Operate any of the following procedures when turning OFF m code while monitoring/testing.
   - Click [M code off X-axis] / [M code off Y-axis].
   - Click [Online] → [Test] → [m code off] → [M code off X-axis] / [M code off Y-axis].
2) Operate any of the following procedures when suspending all axis in operation due to peripheral the devices' error, etc. while monitoring/testing.
   - Click [All axis stop].
   - Click [Online] → [Test] → [All axis stop].

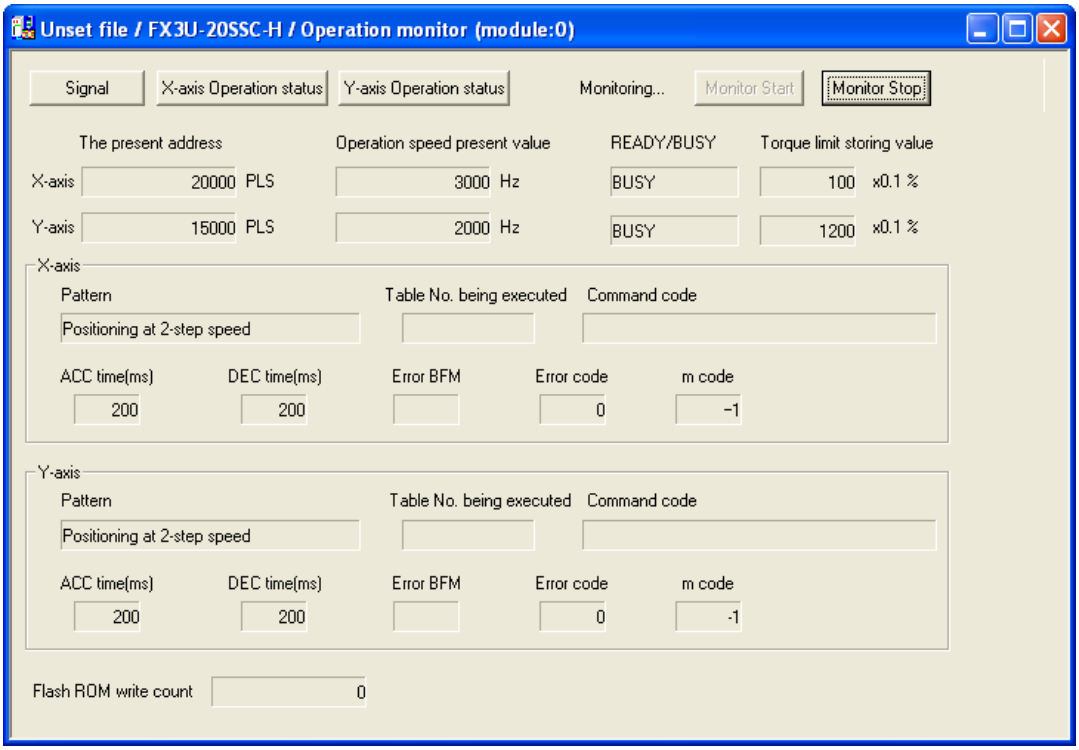
8.1 Monitor

8.1.1 Monitoring the operation

Monitoring the operation status along each axis.

1 **Double-click [File name] → [Monitor] → [Operation monitor] in the file data list.**

[Operation monitor] dialog box appears.



Item	Description
Present address	Displays the present address of X/Y-axis [Unit : User unit*1]
Operation speed present value	Displays the operation speed present value along X/Y-axis [Unit : User unit*1]
READY/BUSY	Displays READY/BUSY status along X/Y-axis • READY : Standby • BUSY : Active
Torque limit storing value	Displays the value stored in the X/Y-axis torque limit
Pattern	Displays the pattern along X/Y-axis
Table No. in execution	Displays the X/Y-axis table No. in execution It is blank here at other than table operation
Command code	Displays the X/Y-axis command code in table operation It is blank here at other than table operation
ACC time	Displays the ACC time set in the X/Y-axis positioning parameter
DEC time	Displays the DEC time set in the X/Y-axis positioning parameter
Error BFM	Displays the error BFM numbers along the X/Y-axis It is blank here with no error
Error code	Displays the X/Y-axis error code Displays 0 with no error
m code	Displays the X/Y-axis ON-state m code Displays -1 with no ON-state m code

Item	Description
Flash ROM write count	Displays the writing count to Flash ROM
<Signal>	Opens the signal monitor window, available only while monitoring → **For the signal monitor window, refer to Section 8.1.2**
<X-axis Operation status>	Opens the X-axis Operation status monitor window, available only while monitoring → **For the X-axis Operation status monitor window, refer to 8.1.3**
<Y-axis Operation status>	Opens the Y-axis Operation status monitor window, available only while monitoring → **For the Y-axis Operation status monitor window, refer to 8.1.3**
Monitoring	Displays [Monitoring] when monitoring
<Monitor Start>	Starts operation monitor, validating [Signal], [X-axis Operation status], [Y-axis Operation status] and [Monitor Stop].
<Monitor Stop>	Stops the operation monitor, closing the signal, X/Y-axis operation status monitor widow

*1. For the user unit and the converted pulse data, refer to the following.

→ **Refer to Section 5.1.**

2 Click <Monitor Start>.

The operation monitor starts

8.1.2 Signal monitor

Monitoring the status information and servo status information.

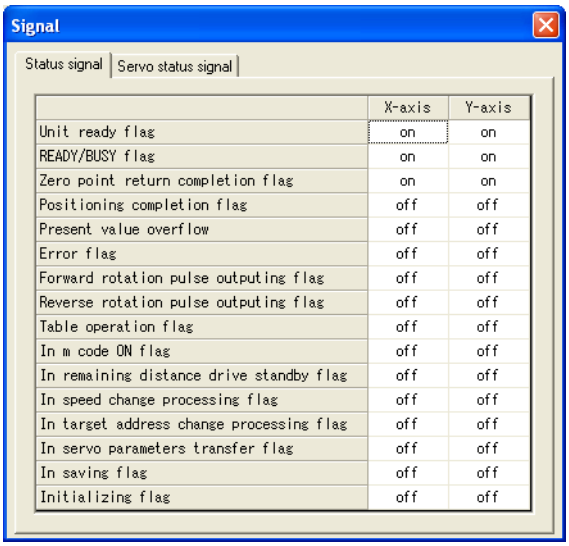
1 Double-click [File name] → [Monitor] → [Operation monitor] → [Signal] in the file data list.

[Status signal] tab in [Signal] dialog box appears.

2 Click the status tab to be monitored.

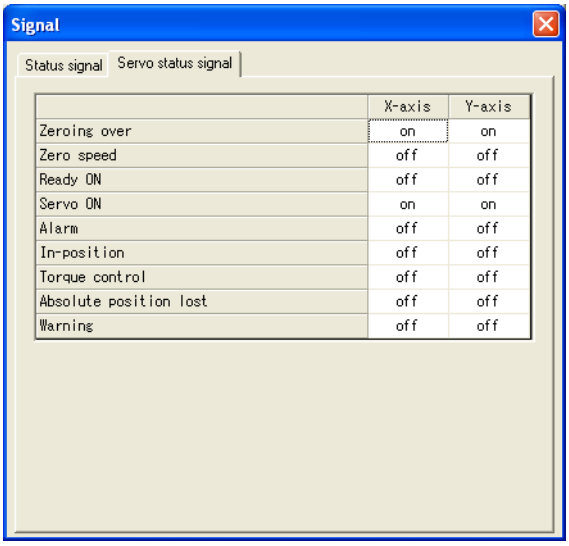
- Click [Status signal] tab to display the status signal.
- Click [Servo status signal] tab to display the servo status signal.

1. Status signal tab



Item	Description
Unit ready flag	Displays each flag status along X/Y-axis as follows on : ON off : OFF
READY/BUSYflag	
Zero point return completion flag	
Positioning completion flag	
Present value overflow	
Error flag	
Forward rotation pulse outputing flag	
Reverse rotation pulse outputing flag	
Table operation flag	
In m code ON flag	
In remaining distance drive standby flag	
In speed change processing flag	
In target address change processing flag	
In servo parameter transfer flag	
In saving flag	
Initializing flag	

2. Servo status signal tab



Item	Description
Zeroing over	Displays each flag status along X/Y-axis as follows on : ON off : OFF
Zero speed	
Ready ON	
Servo ON	
Alarm	
In-position	
Torque control	
Absolute position lost	
Warning	

8.1.3 Operation status monitor

Monitoring the detailed operation status along X/Y-axis.

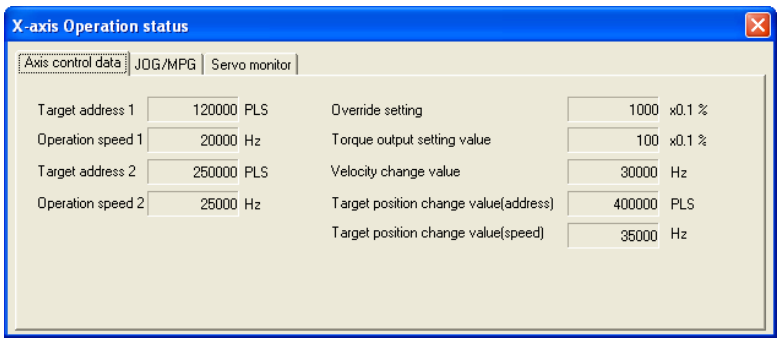
1 Double-click [File name] → [Monitor] → [Operation monitor] → [X-axis Operation status] / [Y-axis Operation status] in the file data list.

[Axis control data] tab in [X/Y-axis Operation status] dialog box appears.

2 Click the tab to be monitored.

- Click [Axis control data] tab to display the axis control data.
- Click [JOG/MPG] tab to display the JOG/MPG.
- Click [Servo monitor] to display the servo monitor

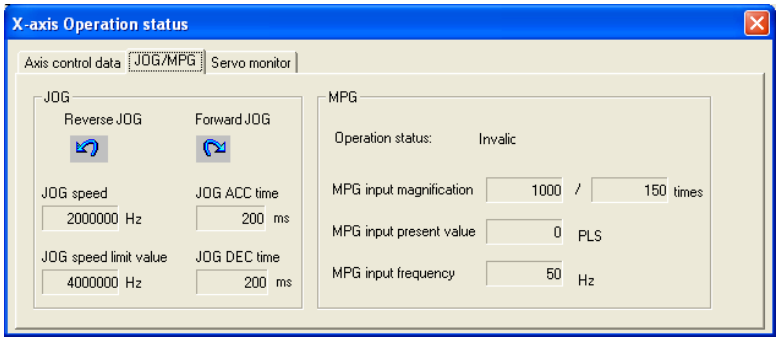
1. Axis control data tab



This window displays [X-axis Operation status] dialog box.

Item	Description	Note
Target address1	Displays target address1 [Unit : User unit]	→ **For [user unit], refer to Section 5.1**
Operation speed1	Displays operation speed1 [Unit : User unit]	
Target address2	Displays target address2 [Unit : User unit]	
Operation speed2	Displays operation speed2 [Unit : User unit]	
Override setting	Displays the override setting [Unit : 0.1%]	
Torque output setting value	Displays the torque output setting value [Unit : 0.1%]	
Velocity change value	Displays the Velocity change value [Unit : User unit]	→ **For [user unit], refer to Section 5.1**
Target position change value (address)	Displays Target position change value (address) [Unit : User unit]	
Target position change value (speed)	Displays Target position change value (speed) [Unit : User unit]	

2. JOG/MPG tab



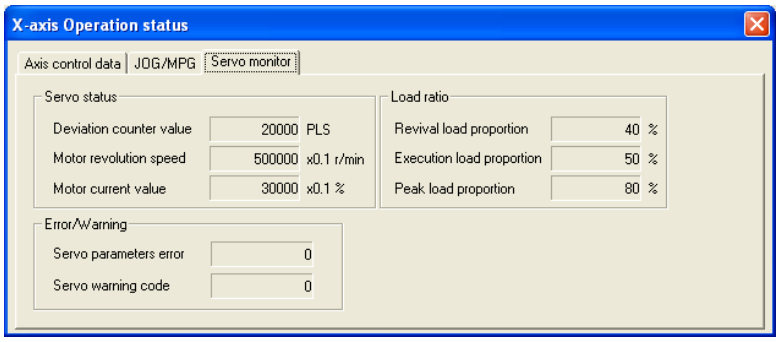
This window displays [X-axis Operation status] dialog box.

Item		Description
JOG		Displays the JOG monitor
	Forward JOG,Reverse JOG	Displays the JOG rotation direction
	JOG speed	Displays the JOG speed [Unit : User unit*1]
	JOG ACC time	Displays the JOG ACC time [Unit : ms]
	JOG speed limit value	Displays the JOG speed limit value [Unit : User unit*1]
	JOG DEC time	Displays the JOG DEC time [Unit : ms]
MPG		Displays the MPG monitor
	Operation status	Displays the pattern
	MPG input magnification	Displays the MPG input magnification
	MPG input present value	Displays the MPG input present value [Unit : PLS]
	MPG input frequency	Displays the MPG input frequency [Unit : Hz]

*1. For the user unit and the converted pulse data, refer to the following.

→ **Refer to Section 5.1.**

3. Servo monitor tab



This window displays [X-axis Operation status] dialog box.

Item		Description
Servo status		Displays Servo status
	Deviation counter value	Displays the deviation counter value [Unit : PLS]
	Motor revolution number	Displays the motor revolution number [Unit : 0.1r/min]
	Motor current value	Displays the motor current value [Unit : 0.1%]
Load ratio		
	Revival load proportion	Displays the revival load proportion [Unit : %]
	Execution load proportion	Displays the execution load proportion [Unit : %]
	Peak load proportion	Displays the peak load proportion [Unit : %]
Error/Warning		
	Servo parameter error	Displays the servo parameter error
	Servo warning code	Displays the servo warning code

8.1.4 Monitoring table information

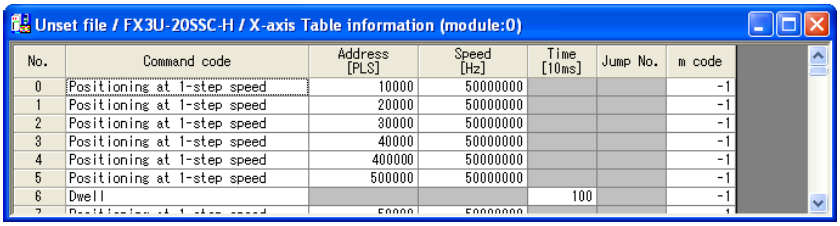
Monitoring the table information in execution, from the table information edit window.

Caution

Monitor mode doesn't allow each item to change. Change/set the value after switching the window into the edit mode.

1 Display the X-axis, Y-axis and XY-axis edit window.

→ **To display the windows, refer to Section 5.3.**



This window displays [X-axis table information edit window].

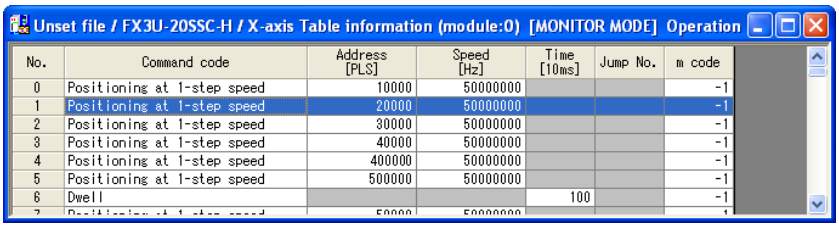
2 Follow any of the procedures below.

- Click  [Monitor On/Off].
- Select [Online] → [Monitor] → [Monitor On/Off].

X, Y, XY-axis table information edit window changes into monitor mode.
The items in table information edit window of each axis is the same as those in the table information edit window.

- X or Y-axis table information changes into monitor mode when operating from the X-axis table information or Y-axis table information edit window.
- Only XY-axis table information changes into monitor mode when operating from XY-axis table information edit window.

→ **For table information edit windows, refer to Section 5.3.**



This window displays [X-axis table information edit window].

Item	Description
Title bar	Displays X/Y-axis status information • In operation • Standby • Under suspension
—	Highlights table No. line in execution

8.2 Testing the Operation

STARTUP AND MAINTENANCE PRECAUTIONS **DANGER**

- Do not touch any terminal while the PLC's power is on.
  Doing so may cause electrical shock or malfunctions.
- Before cleaning or retightening terminals, externally cut off all phases of the power supply.
  Failure to do so may expose you to shock hazard.
- Before modifying the program under operation or performing operation for forcible output, running or stopping, carefully read the manual, and sufficiently ensure the safety.
  An operation error may damage the machine or cause accidents.
- To test Zero-return, JOG operation and Positioning data, throughly read this manual, ensure the safe system operation
  An operation error may damage the machine or cause accidents.
  The response, such as the JOG operation, may be slow according to the running state of the personal computer at the time of the test operation. In the test operation, the PLC performance can be slower due to the busy state of personal computer.
  - End all other applications running except FX Configurator-FP.
  - At destination specification (refer to chapter 6), set the transmission speed at 38.4kbps or higher.

Testing each operation in the position start, Feed present value change, velocity change, zero return, JOG and MPG, switching the 20SSC-H into the test mode while operation monitoring.

8.2.1 Switching into test mode

Switching into FX Configurator-FP into test mode.

1 **Follow any of the procedures below.**

- Click  [Test On/Off].
- Select [Online] → [Test] → [Test On/Off].

FX Configurator-FP switches into test mode.

When switching test mode into monitor mode

1) Follow any of the procedures below when switching the test mode into monitor mode.
   - Click  [Test On/Off].
   - Select [Online] → [Test] → [Test On/Off].
2) FX Configurator-FP starts monitoring

8.2.2 Operation test in the positioning (except JOG/MPG)

Testing the operation in the 20SSC-H positioning (except into JOG/MPG) by test mode.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**

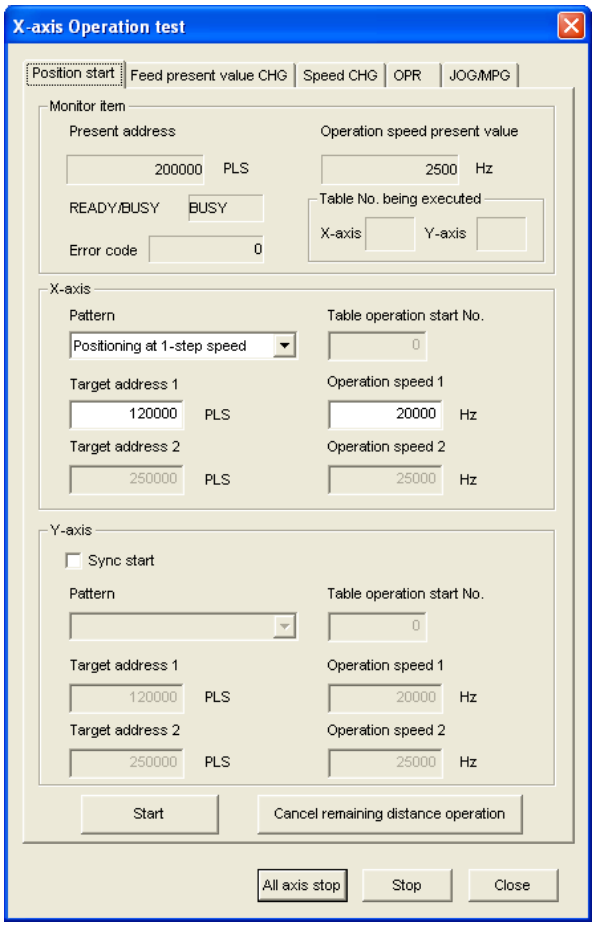
1 Follow any of the procedures below when switching the test mode into monitor mode.

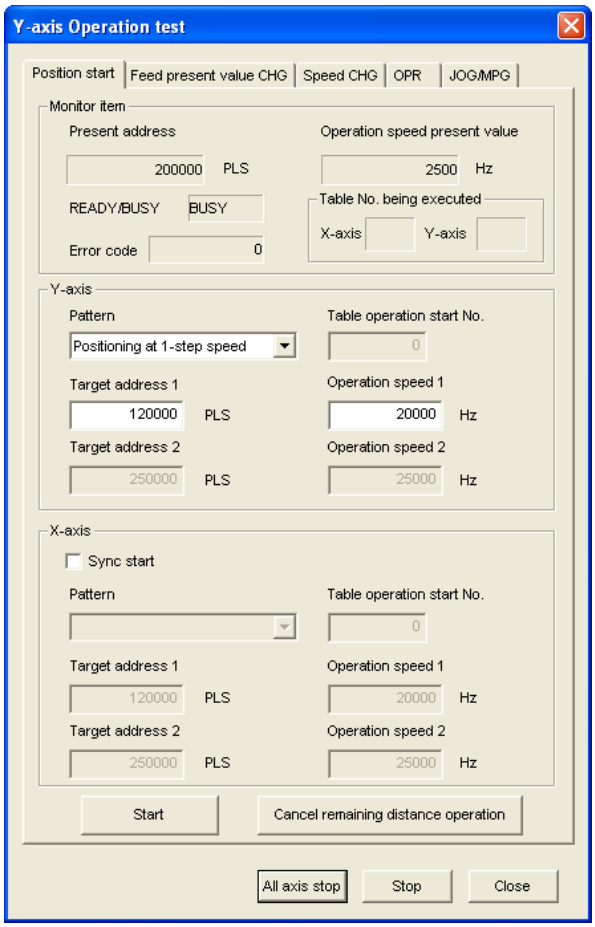
- Click [Operation test X-axis] / [Operation test Y-axis].
- Select [Online] → [Test] → [Operation test] → [Operation test X-axis] / [Operation test Y-axis].

The position start tab in [Operation test X-axis] / [Operation test Y-axis] dialog box appears.

→ **For Feed present value CHG tab, refer to Subsection 8.2.3.**
→ **For velocity change tab, refer to Subsection 8.2.4.**
→ **For zero return tab, refer to Subsection 8.2.5.**
→ **For JOG/MPG tab, refer to Subsection 8.2.6.**

2 Set the items below.





Item		Description
Monitoring items		Displays present address, Operation speed present value, status information and Error code
	Present address	Displays the present address [Unit : User unit*1]
	Operation speed present value	Displays the operation speed present value [Unit : User unit*1]
	READY/BUSY	Displays status information • READY : ON • BUSY : OFF
	Table No. being execution	Displays X/Y-axis table No. in execution It is blank here at other than table operation
	Error code	Displays error codes Displays 0 with no error
X/Y-axis		Sets the positioning operation along X/Y-axis
	Simultaneous start	Ticks off to start X and Y-axis simultaneously [Operation test X-axis] dialog box displays the check box in the Y-axis item [Operation test Y-axis] dialog box displays the check box in the X-axis item
	Patterns	Sets/displays the pattern Available in [X-axis operation test] only • Positioning at 1-step speed • Interrupt stop at 1-step speed • Positioning at 2-step speed • Interrupt stop at 2-step speed • Interrupt stop • Variable speed operation • MPG operation*2 • Linear interpolation*2 • Linear interpolation(interrupt)*2 • X-axis table operation (available in [Operation test X-axis] dialog box) • Y-axis table operation (available in [Operation test y-axis] dialog box) • XY-axis table operation*2
	Table operation start No.	Sets the table operation No. to start table operation Setting range : 0 to 299
	Target address1*3	Sets the Target address1 Setting range : -2,147,483,648 to 2,147,483,647 [User unit]*1 Set the value within -2,147,483,648 to 2,147,483,647PLS in the converted pulse data*1
	Operation speed1*3	Sets the Operation speed1 Set the speed at or below the maximum rotation speed*4 of servo motor Setting range : 1 to Maximum speed[User unit]*1 Set the value within 1 to 50,000,000Hz in the converted pulse data*1
	Target address2*3	Sets the Target address2 Setting range : -2,147,483,648 to 2,147,483,647 [User unit]*1 Set the value within -2,147,483,648 to 2,147,483,647PLS in the converted pulse data*1
	Operation speed2*3	Sets the Operation speed2 Set the speed at or below the maximum rotation speed*4 of servo motor Setting range : 1 to Maximum speed[User unit]*1 Set the value within 1 to 50,000,000Hz in the converted pulse data*1
<Start>		Starts the positioning operation with the pre-set contents
<Cancel remaining distance operation>		Cancels the standby in remaining distance operation, and ends the positioning operation
<All axis stop>		Stops all axis
<Stop>		Stops the axis in operation test
<Close>		Cancels the setting, and closes the dialog box

*1. For the user unit, refer to the following.

→ **Refer to Section 5.1.**

*2. Not available when ticking off [Simultaneous start].

*3. Not available depending on the operation pattern

*4. For the servo motor rotation speed and the operation speed (converted pulse data), refer to the following.

→ **Refer to Section 5.1.3.**

3 Click <Start>

20SSC-H starts the table operation with the pre-set contents.

8.2.3 Changing the present value

Changing the present value the 20SSC-H's present value by test mode.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**

1 Follow any of the procedures below.

- Click [Operation test X-axis] / [Operation test Y-axis].
- Select [Online] → [Test] → [Operation test] → [Operation test X-axis] / [Operation test Y-axis].

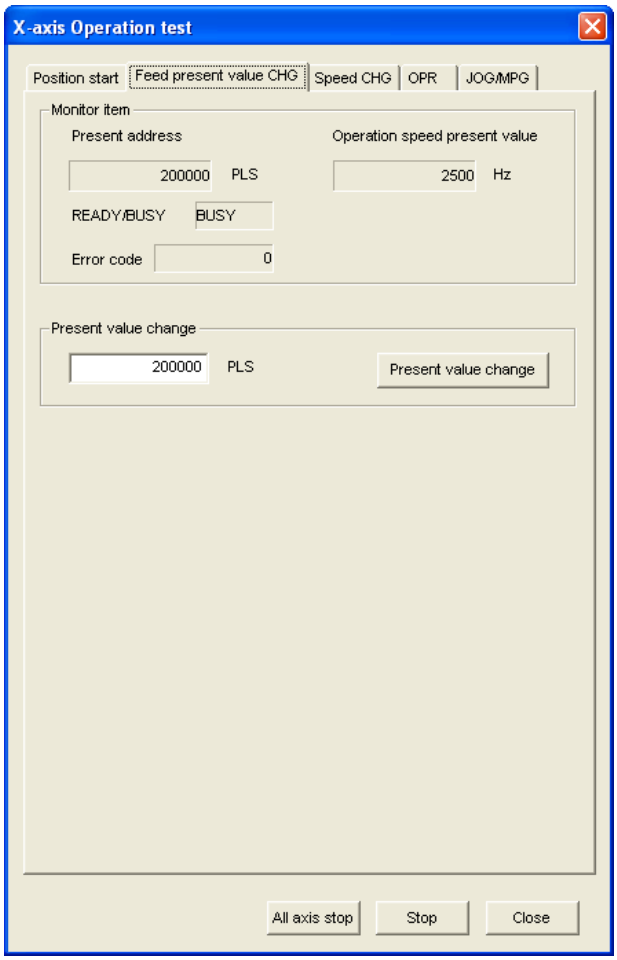
The position start tab in [Operation test X-axis] / [Operation test Y-axis] dialog box appears.

→ **For position start tab, refer to Subsection 8.2.2.**
→ **For velocity change tab, refer to Subsection 8.2.4.**
→ **For zero return tab, refer to Subsection 8.2.5.**
→ **For JOG/MPG tab, refer to Subsection 8.2.6.**

2 Click [Feed present value CHG] tab.

The display switches into [Feed present value CHG] tab.

3 Set each item for [Feed present value CHG].



This window displays [X-axis Operation status] dialog box.

Item		Description
Monitoring items		Displays present address, Operation speed present value, status information and Error code
	Present address	Displays the present address [Unit : User unit*1]
	Operation speed present value	Displays the operation speed present value [Unit : User unit*1]
	READY/BUSY	Displays status information • READY : ON • BUSY : OFF
	Table No. in execution	Displays X/Y-axis table No. in execution It is blank here at other than table operation
	Error code	Displays error codes Displays 0 with no error
Present value change		Changes the present address to the specified one
	Address	Sets the present address to be changed Setting range : -2,147,483,648 to 2,147,483,647 [User unit]*1
	<Present value change>	Executes the present value change
<All axis stop>		Stops all axis
<Stop>		Stops the axis in operation test
<Close>		Cancels the setting, and closes the dialog box

*1. For the user unit, refer to the following.

→ **Refer to Section 5.1.**

4 Click <Present value change>.

FX Configurator-FP changes the present address to the specified value.

8.2.4 Speed change

Changing the operation speed and speed override setting in the following operations, by test mode.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**
→ **For details of each operation and the speed override function, refer to FX3U-20SSC-H user's manual.**

Function	Applicable operation
Operation speed change	Mechanical zero return, JOG, Positioning at 1-step/2-step speed, Interrupt stop at 1-step/2-step speed, Interrupt stop, Linear interpolation, Linear interpolation(interrupt)
Speed override	Mechanical zero return(High speed)/(Creep), JOG, JOG/MPG, Positioning at 1-step/2-step speed, Interrupt stop at 1-step/2-step speed, Interrupt stop, Operation at multi-step speed, variable speed operation, Linear interpolation, Linear interpolation(interrupt), Circular interpolation

1 Follow any of the procedures below.

- Click [Operation test X-axis] / [Operation test Y-axis].
- Select [Online] → [Test] → [Operation test] → [Operation test X-axis] / [Operation test Y-axis].

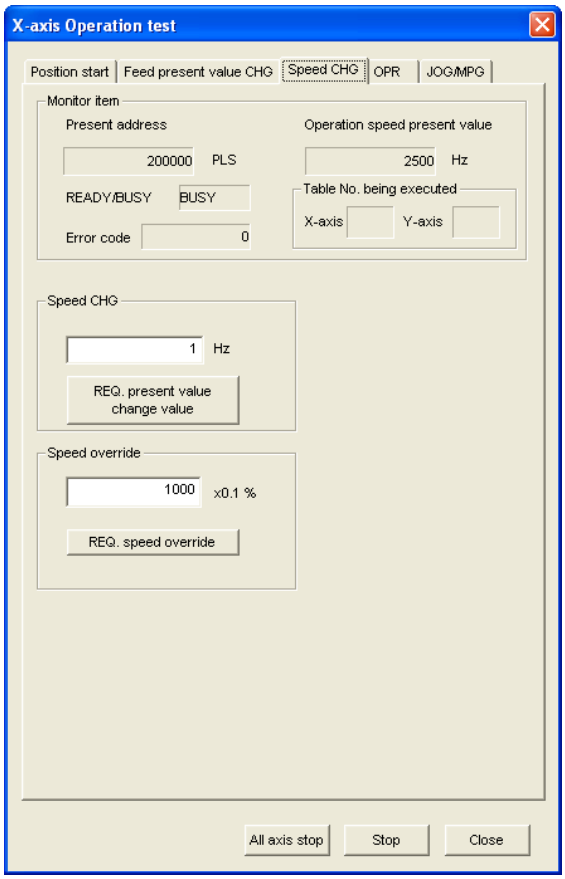
The position start tab in [Operation test X-axis] / [Operation test Y-axis] dialog box appears.

→ **For position start tab, refer to Subsection 8.2.2.**
→ **For Feed present value CHG tab, refer to Subsection 8.2.3.**
→ **For zero return tab, refer to Subsection 8.2.5.**
→ **For JOG/MPG tab, refer to Subsection 8.2.6.**

2 Click [Speed CHG] tab.

The display switches into [Speed CHG] tab.

3 Set each item for [Speed CHG].



This window displays [X-axis Operation status] dialog box.

Item		Description
Monitoring items		Displays present address, Operation speed present value, status information and Error code
	Present address	Displays the present address [Unit : User unit*1]
	Operation speed present value	Displays the operation speed present value [Unit : User unit*1]
	READY/BUSY	Displays status information • READY : ON • BUSY : OFF
	Error code	Displays error codes Displays 0 with no error
Speed change		Changes the speed to the specified one
	Speed change	Sets the Operation speed When setting the speed at or above the maximum speed, the speed is set to the maximum speed. Set the speed at or below the maximum rotation speed*2 of servo motor Setting range : 1 to Maximum speed[User unit]*1 Set the value within 1 to 50,000,000Hz in the converted pulse data
	<REQ. present value change value>	Executes the speed change
Speed override		Changes the operation speed override setting
	Speed override	Sets the speed override ratio Setting range : 1 to 30000 [×0.1%]
	<REQ. speed override>	Executes the speed override change
<All axis stop>		Stops all axis
<Stop>		Stops the axis in operation test
<Close>		Cancels the setting, and closes the dialog box

*1. For the user unit, refer to the following.

→ **Refer to Section 5.1.**

*2. For the servo motor rotation speed and the operation speed (converted pulse data), refer to the following.

→ **Refer to Section 5.1.3.**

4 Click <REQ. present value change value> / <REQ. speed override>.

1. **<REQ. present value change value>**
   FX Configurator-FP changes the operation speed to the specified value.

2. **<REQ. speed override>**
   FX Configurator-FP changes the operation speed at the specified ratio.

8.2.5 Zero return

Executing the mechanical zero return by the OPR mode specified in test mode.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**

1 Follow any of the procedures below.

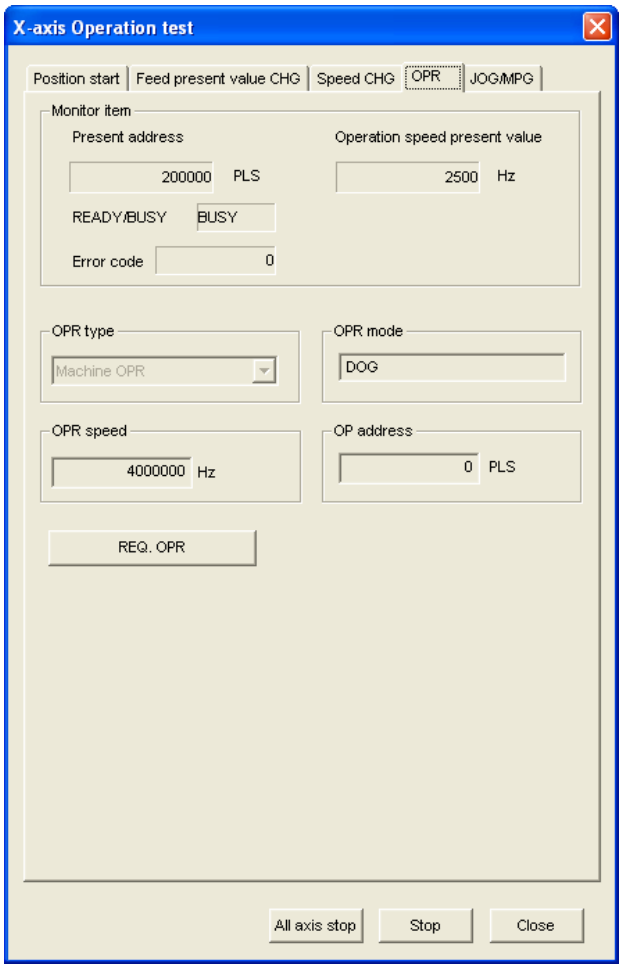
- Click [Operation test X-axis] / [Operation test Y-axis].
- Select [Online] → [Test] → [Operation test] → [Operation test X-axis] / [Operation test Y-axis].

The position start tab in [Operation test X-axis] / [Operation test Y-axis] dialog box appears.

→ **For position start tab, refer to Subsection 8.2.2.**
→ **For Feed present value CHG tab, refer to Subsection 8.2.3.**
→ **For velocity change tab, refer to Subsection 8.2.4.**
→ **For JOG/MPG tab, refer to Subsection 8.2.6.**

2 Click [OPR] tab.

The display switches into [OPR] tab.



This window displays [X-axis Operation status] dialog box.

Item		Description
Monitoring items		Displays present address, Operation speed present value, status information and Error code
	Present address	Displays the present address [Unit : User unit*1]
	Operation speed present value	Displays the operation speed present value [Unit : User unit*1]
	READY/BUSY	Displays status information • READY : ON • BUSY : OFF
	Error code	Displays error codes Displays 0 with no error
OPR type		Displays the mechanical OPR as an OPR type
OPR mode		Displays the OPR mode (Displays the OPR mode in the 20SSC-H positioning parameter) • DOG • Data set • Stopper #1 • Stopper #2
OPR speed		Displays the OPR speed(High speed) stored in the positioning parameter [Unit : User unit*1]
OP address		Displays the OP address stored in the positioning parameter [Unit : User unit*1]
<REQ. OPR>		Executes the mechanical OPR by the specified OPR type
<All axis stop>		Stops all axis
<Stop>		Stops the axis in operation test
<Close>		Cancels the setting, and closes the dialog box

*1. For the user unit, refer to the following.

→ **Refer to Section 5.1.**

3 Click <REQ. OPR>.

20SSC-H starts the OPR.

8.2.6 JOG/MPG

Executing the JOG/MPG in test mode, also confirming the following operations, by JOG/MPG in the positioning control debug.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**

- Forward/Reverse rotation direction
- ON/OFF of the external input signals, i.e. Upper/Lower limit switch, zero signal and near-point DOG. signal
- Operation speed test(JOG only)
- Correction of Forward/Reverse rotation Backlash
- Travel distance

1 Follow any of the procedures below.

- Click [Operation test X-axis] / [Operation test Y-axis].
- Select [Online] → [Test] → [Operation test] → [Operation test X-axis] / [Operation test Y-axis].

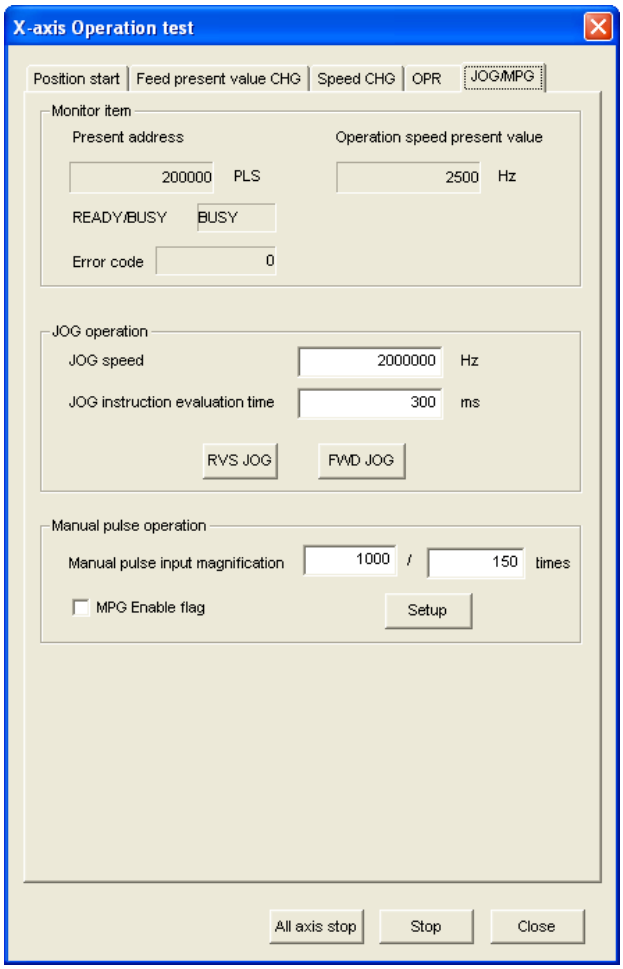
The position start tab in [Operation test X-axis] / [Operation test Y-axis] dialog box appears.

→ **For position start tab, refer to Subsection 8.2.2.**
→ **For Feed present value CHG tab, refer to Subsection 8.2.3.**
→ **For velocity change tab, refer to Subsection 8.2.4.**
→ **For zero return tab, refer to Subsection 8.2.5.**

2 Click [JOG/MPG] tab.

The display switches into [JOG/MPG] tab.

3 Set each item for JOG/MPG.



This window displays [X-axis Operation status] dialog box.

Item		Description
Monitoring items		Displays present address, Operation speed present value, status information and Error code
	Present address	Displays the present address [Unit : User unit*1]
	Operation speed present value	Displays the operation speed present value [Unit : User unit*1]
	READY/BUSY	Displays status information • READY : ON • BUSY : OFF
	Error code	Displays error codes Displays 0 with no error
JOG		Executes the JOG at the specified JOG speed and JOG instruction evaluation time
	JOG speed	Sets the JOG speed in 20SSC-H positioning parameter Setting range : 1 to Maximum speed[User unit*1] Set the value within 1 to 50,000,000Hz in the converted pulse data.
	JOG instruction evaluation time	Sets the JOG instruction evaluation time in 20SSC-H positioning parameter Setting range : 0Å`5000ms
	<RVS JOG>	Executes reverse JOG while held
	<FWD JOG>	Executes forward JOG while held
JOG/MPG		Sets the JOG/MPG operation
	Manual pulse input magnification	Sets the manual pulse input magnification(numerator/denominator) Setting range : (Numerator) 1 to 1,000,000 (Denominator) 1 to 1,000,000
	MPG Enable flag	Enables the MPG operation when ticked off
	<Setup>	Sets the MPG Enable flag and manual pulse input magnification (numerator/ denominator)
<All axis stop>		Stops all axis
<Stop>		Stops the axis in operation test
<Close>		Cancels the setting, and closes the dialog box

*1. For the user unit, refer to the following.

→ **Refer to Section 5.1.**

4 Click <RVS JOG>, <FWD JOG> or <Setup>.

1. **<RVS JOG>**
   20SSC-H executes the reverse JOG operation at the specified JOG speed and JOG instruction evaluation time.

2. **<FWD JOG>**
   20SSC-H executes the forward JOG operation at the specified JOG speed and JOG instruction evaluation time.

3. **<Setup>**
   FX Configurator-FP sets the MPG Enable flag and manual pulse input magnification (numerator/ denominator).

8.2.7 Turning OFF M codes

Turning off the M code while monitor/test mode.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**

1 **Follow any of the procedures below.**

- Click [M code off X-axis] / [m code off Y-axis].
- Select [Online] → [Test] → [m code off] → [m code off X-axis] / [m code off Y-axis].

The M code at the selected axis turns OFF.

8.2.8 Stopping all axis

Stopping all axis while test mode.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**

1 **Follow any of the procedures below.**

- Click [All axis stop].
- Select [Online] → [Test] → [All axis stop].

All axis stops.

8.2.9 Error rest

Resetting the errors in monitor/test mode.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**

1 **Follow any of the procedures below.**

- Click [Error reset X-axis] / [Error reset Y-axis].
- Select [Online] → [Test] → [Error rest] → [Error reset X-axis] / [Error reset Y-axis].

The errors are reset at the selected axis.

8.2.10 Servo ON/OFF

Executing servo ON/OFF while test mode.
By servo ON/OFF, the servo motor turns into the state in the following table.

→ **For the procedure to switch into test mode, refer to Section 8.2.1.**

	The servo motor state
Servo ON	Locks servo motors and turns them into the standby state
Servo OFF	Unlocks servo motors, and also turns OFF the servo motor electromagnetic brake

The execution conditions for servo ON/OFF

Servo ON/OFF is executable when the execution conditions in the following table are fulfilled.

Menu	Operation	Execution conditions
All axis Servo ON/OFF	Servo ON all axis	• All axis (X and Y-axis) are executable for servo ON
	Servo OFF all axis	• X or Y-axis are executable for servo OFF
X-axis servo ON/OFF command	Servo ON X-axis	• X-axis status information in 20SSC-H is READY • X-axis servo status is READY ON and servo OFF
	Servo OFF X-axis	• X-axis status information in 20SSC-H is READY • X-axis servo status is servo ON
Y-axis servo ON/OFF command	Servo ON Y-axis	• Y-axis status information in 20SSC-H is READY • Y-axis servo status is READY ON and servo OFF
	Servo OFF Y-axis	• Y-axis status information in 20SSC-H is READY • Y-axis servo status is servo ON

1 **Follow any of the procedures below depending on the content to be executed.**

- When executing all axis servo ON/OFF
  Select [Online] → [Test] → [All axis Servo On/Off].
- When executing servo ON/OFF along the specified axis
  Select [Online] → [Test] → [Tool] → [X-axis Servo On/Off command] / [Y-axis Servo On/Off command]

Note

✓ mark appears on the left of the menu items while the servo is ON.

9. Print

9.1 Setting the printer

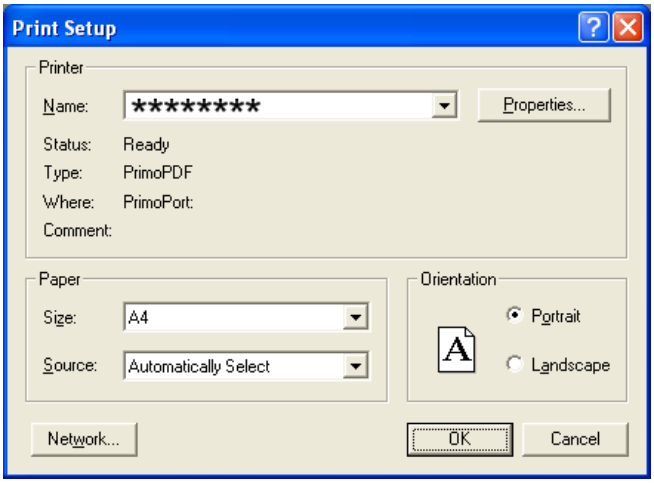
Setting the printer, paper and orientation.

1 **Select → [File] → [Printer setup].**

[Print Setup] dialog box appears.

2 **Set each item for the print setup.**

→ For print setup details, refer to the OS manual to be used.
→ For the printer property, refer to the printer manual to be used.



9.2 Printing

9.2.1 setting the item to print

Printing the positioning parameters, servo parameters and table information.

1 Follow any of the procedures below.

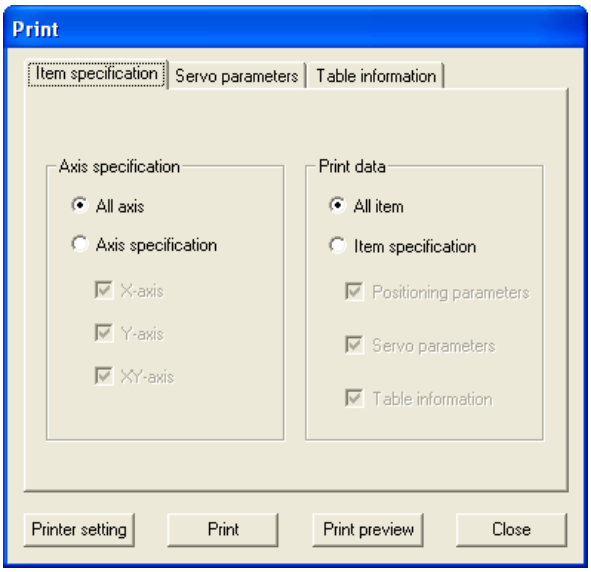
- Click [Print].
- Select [File] → [Print].

The [Print] dialog box appears.

2 Set the item to print.

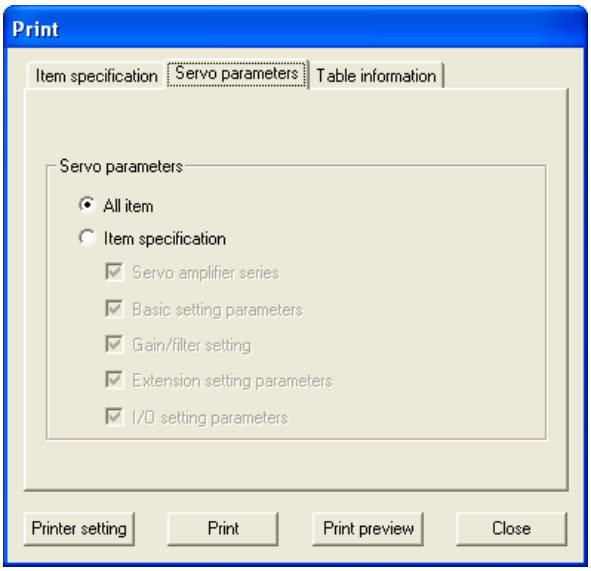
[Print] dialog box has [Item specification], [Servo parameters] and [table information] tabs.
Click the tab to set.
For [Servo parameters] and [table information] tabs, refer to the following pages.

1. [Item specification] tab



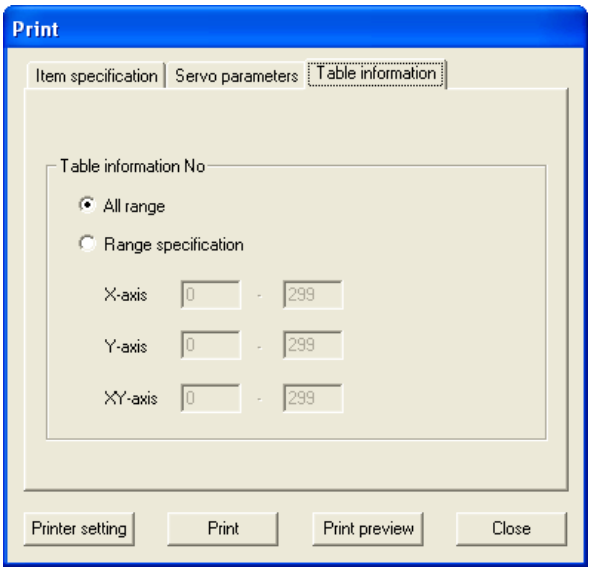
Item		Description
Axis specification		Specifies the axis data to print
	All axis	Prints X, Y and XY-axis data
	Axis specification	Prints the ticked axis data • X-axis • Y-axis • XY-axis
Print data		Specifies the data type to print
	All data	Prints [Positioning parameters], [Servo parameters] and [Table information]
	Item specification	Prints the ticked data item • Positioning parameters • Servo parameters • Table information
<Printer setting>		Displays [Printer setting] dialog box → **Refer to Section 9.1.**
<Print>		Outputs to printer depending on the specified contents
<Print preview>		Displays the print preview
<Close>		Closes the dialog box without printing

2. [Servo parameters] tab



Item		Description
Servo parameters		Specifies the axis data to print
	All item	Prints X, Y and XY-axis data
	Item specification	Prints the ticked items • Servo amplifier series • Basic setting parameters • Gain/filter setting • I/O setting parameters
<Printer setting>		Displays [Printer setting] dialog box → **Refer to Section 9.1.**
<Print>		Outputs to printer depending on the specified contents
<Print preview>		Displays the print preview
<Close>		Closes the dialog box without printing

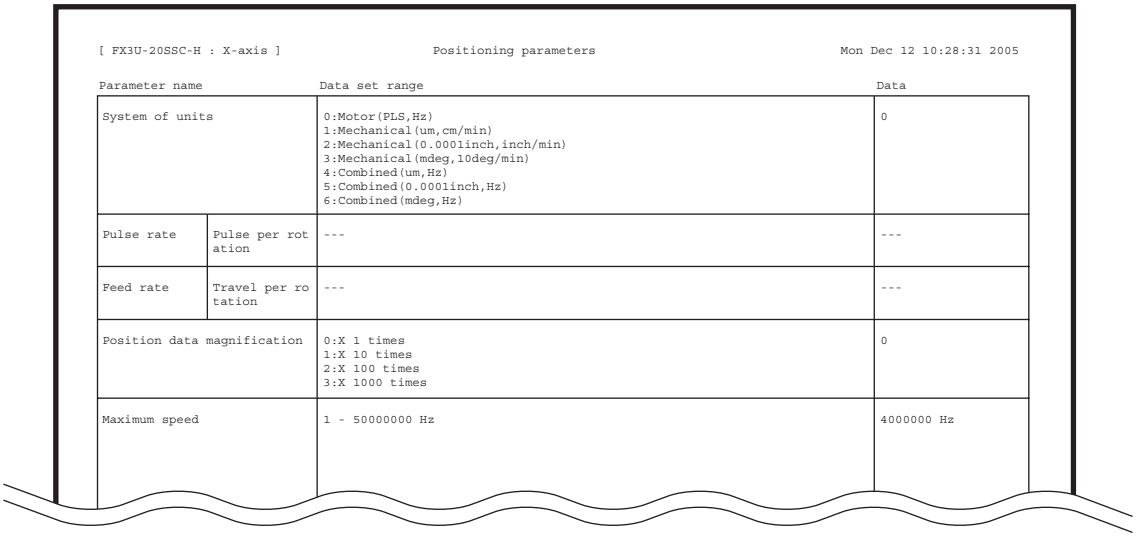
3. [Table information] tab



Item		Description
Table information No.		Specifies the axis data to print
	All range	Prints all range of the table information
	Range specification	Sets the table information printing range for each axis Each axis setting range : 0 to 299 • X-axis • Y-axis • XY-axis
<Printer setting>		Displays [Printer setting] dialog box → **Refer to Section 9.1.**
<Print>		Outputs to printer depending on the specified contents
<Print preview>		Displays the print preview
<Close>		Closes the dialog box without printing

9.2.2 Printing examples

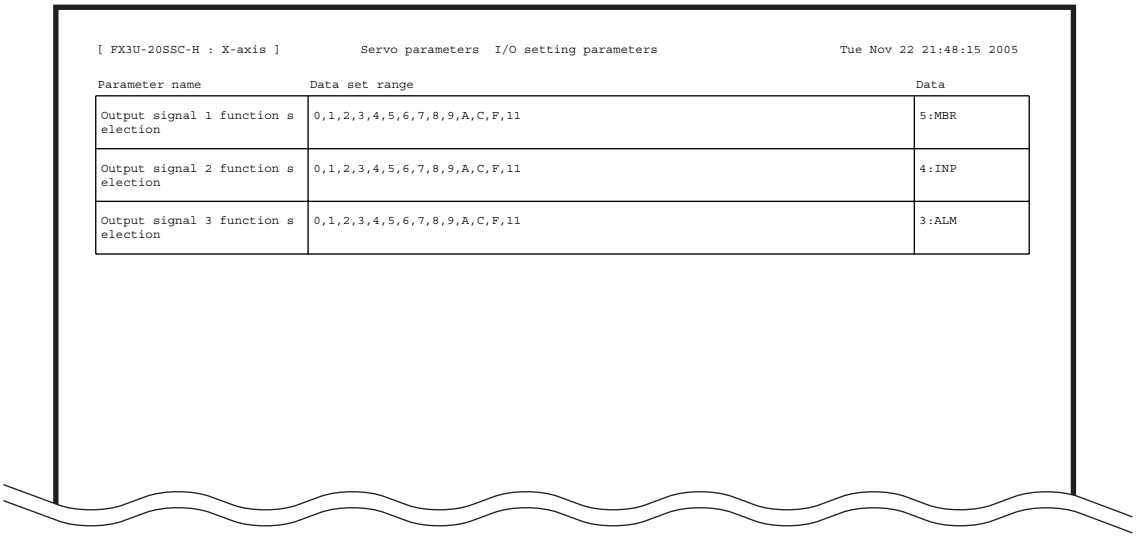
1. Positioning parameters printing examples



[FX3U-20SSC-H : X-axis] Positioning parameters Mon Dec 12 10:28:31 2005

Parameter name		Data set range	Data
System of units		0:Motor(PLS,Hz) 1:Mechanical(um,cm/min) 2:Mechanical(0.0001inch,inch/min) 3:Mechanical(mdeg,10deg/min) 4:Combined(um,Hz) 5:Combined(0.0001inch,Hz) 6:Combined(mdeg,Hz)	0
Pulse rate	Pulse per rotation	---	---
Feed rate	Travel per rotation	---	---
Position data magnification		0:X 1 times 1:X 10 times 2:X 100 times 3:X 1000 times	0
Maximum speed		1 - 50000000 Hz	4000000 Hz

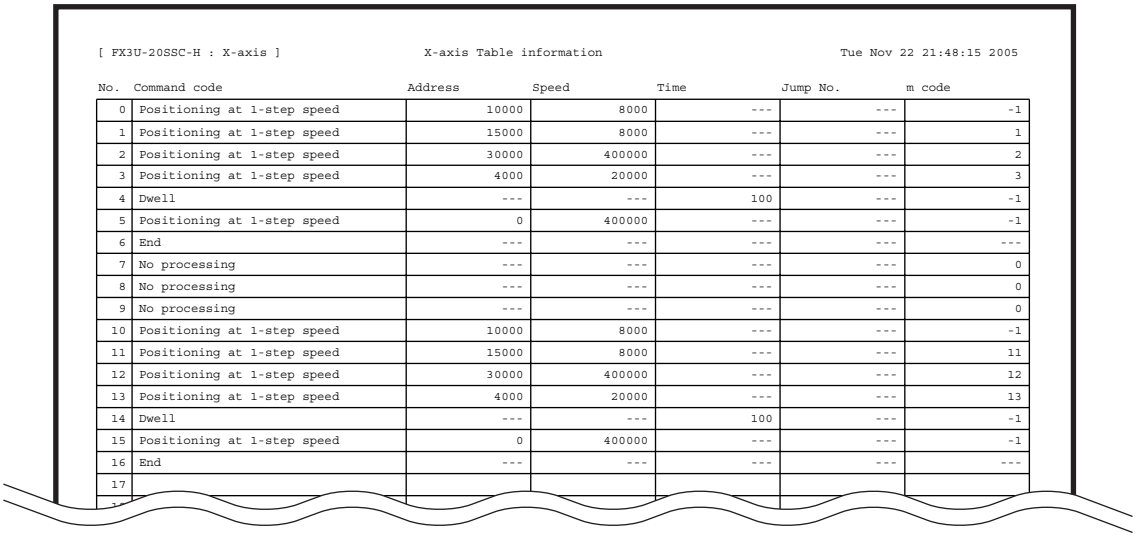
2. Servo parameters printing examples



[FX3U-20SSC-H : X-axis] Servo parameters I/O setting parameters Tue Nov 22 21:48:15 2005

Parameter name	Data set range	Data
Output signal 1 function selection	0,1,2,3,4,5,6,7,8,9,A,C,F,11	5:MBR
Output signal 2 function selection	0,1,2,3,4,5,6,7,8,9,A,C,F,11	4:INP
Output signal 3 function selection	0,1,2,3,4,5,6,7,8,9,A,C,F,11	3:ALM

3. Table information printing examples



[FX3U-20SSC-H : X-axis] X-axis Table information Tue Nov 22 21:48:15 2005

No.	Command code	Address	Speed	Time	Jump No.	m code
0	Positioning at 1-step speed	10000	8000	---	---	-1
1	Positioning at 1-step speed	15000	8000	---	---	1
2	Positioning at 1-step speed	30000	400000	---	---	2
3	Positioning at 1-step speed	4000	20000	---	---	3
4	Dwell	---	---	100	---	-1
5	Positioning at 1-step speed	0	400000	---	---	-1
6	End	---	---	---	---	---
7	No processing	---	---	---	---	0
8	No processing	---	---	---	---	0
9	No processing	---	---	---	---	0
10	Positioning at 1-step speed	10000	8000	---	---	-1
11	Positioning at 1-step speed	15000	8000	---	---	11
12	Positioning at 1-step speed	30000	400000	---	---	12
13	Positioning at 1-step speed	4000	20000	---	---	13
14	Dwell	---	---	100	---	-1
15	Positioning at 1-step speed	0	400000	---	---	-1
16	End	---	---	---	---	---
17						

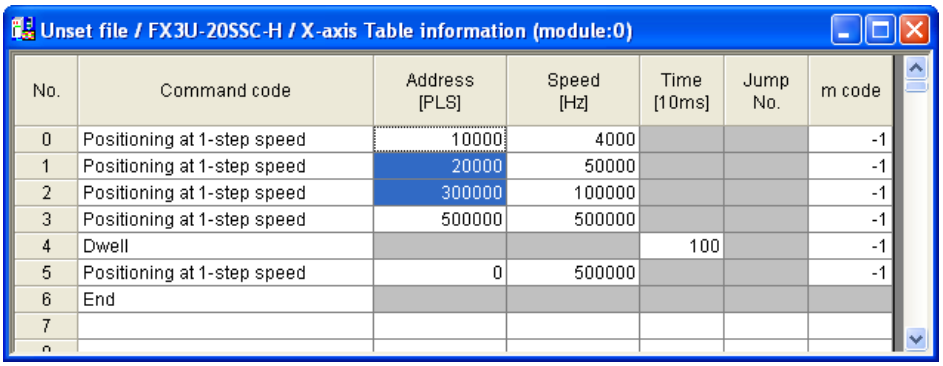
10. Edit function in data setting

10.1 Cut / Copy / Paste / Select all

Partially cutting/copying/pasting the positioning parameter settings. Also Cutting/copying the value in a table of Microsoft® Excel or Word, and pasting the data cut/copied onto the FX Configurator-FP positioning parameters.

10.1.1 Cut/Copy

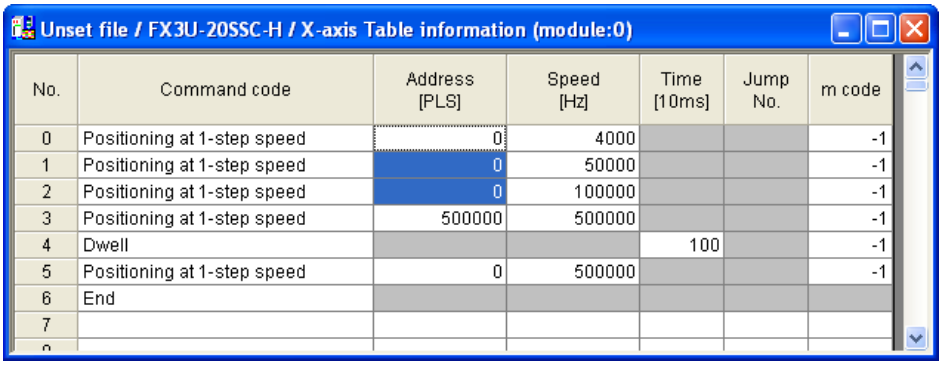
1 **Select cells to cut/copy.**



No.	Command code	Address [PLS]	Speed [Hz]	Time [10ms]	Jump No.	m code
0	Positioning at 1-step speed	10000	4000			-1
1	Positioning at 1-step speed	20000	50000			-1
2	Positioning at 1-step speed	300000	100000			-1
3	Positioning at 1-step speed	500000	500000			-1
4	Dwell			100		-1
5	Positioning at 1-step speed	0	500000			-1
6	End					
7						

2 **Follow any of the procedures below.**

- Click [Cut] / [Copy].
- Right-click to select [Cut] / [Copy].
- Select [Edit] →□□ [Cut] / [Copy].



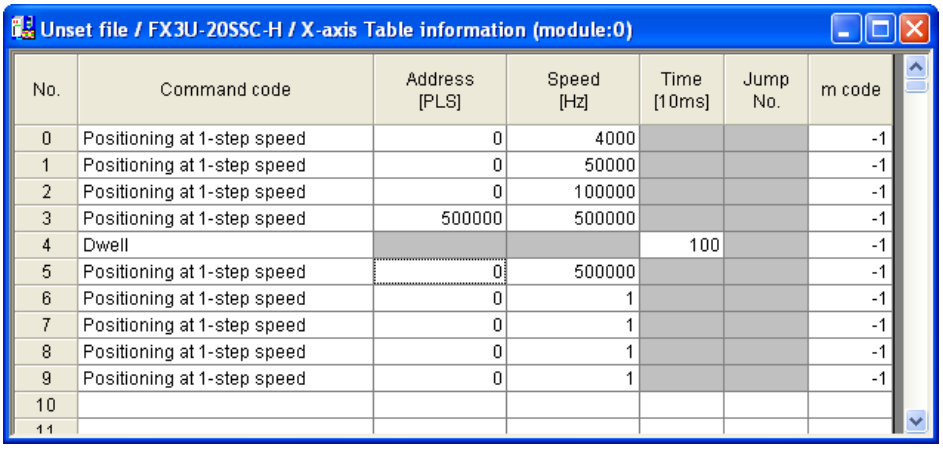
No.	Command code	Address [PLS]	Speed [Hz]	Time [10ms]	Jump No.	m code
0	Positioning at 1-step speed	0	4000			-1
1	Positioning at 1-step speed	0	50000			-1
2	Positioning at 1-step speed	0	100000			-1
3	Positioning at 1-step speed	500000	500000			-1
4	Dwell			100		-1
5	Positioning at 1-step speed	0	500000			-1
6	End					
7						

Caution on cutting

The selected range is treated as default value.

10.1.2 Paste

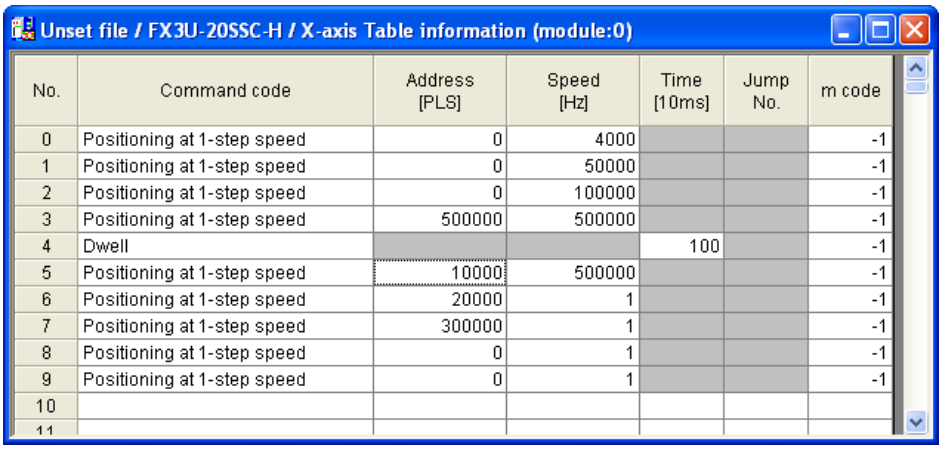
1 Select cells to paste.



No.	Command code	Address [PLS]	Speed [Hz]	Time [10ms]	Jump No.	m code
0	Positioning at 1-step speed	0	4000			-1
1	Positioning at 1-step speed	0	50000			-1
2	Positioning at 1-step speed	0	100000			-1
3	Positioning at 1-step speed	500000	500000			-1
4	Dwell			100		-1
5	Positioning at 1-step speed	0	500000			-1
6	Positioning at 1-step speed	0	1			-1
7	Positioning at 1-step speed	0	1			-1
8	Positioning at 1-step speed	0	1			-1
9	Positioning at 1-step speed	0	1			-1
10						
11						

2 Follow any of the procedures below.

- Click [Paste].
- Right-click to select [Paste].
- Select [Edit] → [Paste].



No.	Command code	Address [PLS]	Speed [Hz]	Time [10ms]	Jump No.	m code
0	Positioning at 1-step speed	0	4000			-1
1	Positioning at 1-step speed	0	50000			-1
2	Positioning at 1-step speed	0	100000			-1
3	Positioning at 1-step speed	500000	500000			-1
4	Dwell			100		-1
5	Positioning at 1-step speed	10000	500000			-1
6	Positioning at 1-step speed	20000	1			-1
7	Positioning at 1-step speed	300000	1			-1
8	Positioning at 1-step speed	0	1			-1
9	Positioning at 1-step speed	0	1			-1
10						
11						

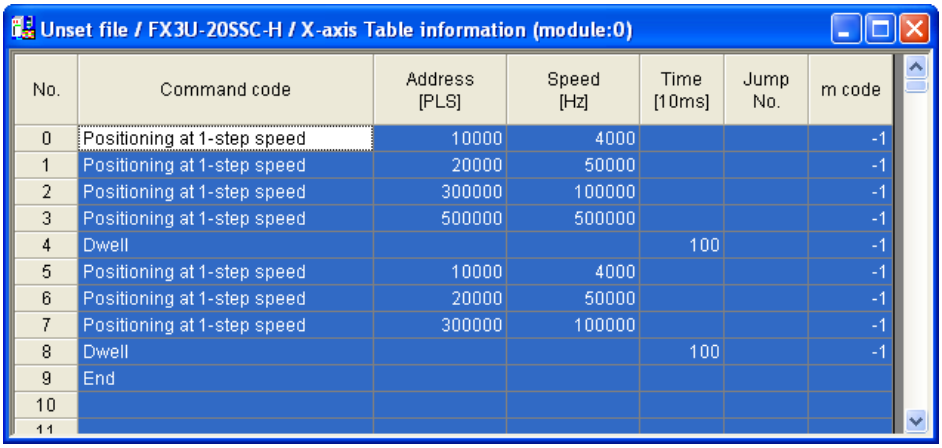
Caution on pasting

When the destination item differs from the cut/copied, the items cut/copied are not pastable.

10.1.3 Select all

Cutting/copying all range of table information, and pasting.
The data items inconsistency between axis disables all-range-paste.

1 **Select [Edit] → [Select all].**



2 **Paste the all range data.**

→ **For the procedure to paste, refer to Section 10.1.2.**

10.2 Cursor jump

The cursor jumps to the table information No. specified by the table information edit window.

1 **Select [Edit] → [Jump].**

[JUMP] dialog box appears.

2 **Set the destination table information No. in the table information edit window.**

Item	Description
JUMP No.	Sets the destination table information No. in the table information edit window Setting range : 0 to 299

The Displayed message

When the value input is out of range, the following message appears.

3 **Click <OK>.**

The cursor jumps to the table information No. specified by JUMP No.

10.3 Initializing rows/columns

Initializing the rows/columns selected in the table information edit window.
Multiple rows/columns are selectable to initialize.

1 Select the part of rows/columns to initialize.

2 Follow any of the procedures below.

- Right-click to select [Clear row] / [Clear column].
- Select [Edit] → [Clear row] / [Clear column].

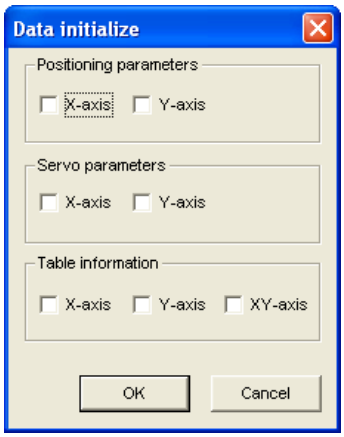
10.4 Initializing data

Initializing the positioning parameters, servo parameters and table information along each axis.

1 Select [Tool] → [Initialize data].

[Initialize data] dialog box appears.

2 Set the data to initialize.



Item	Description
Positioning Parameters	Initializes the positioning parameters along the ticked axis • X-axis • Y-axis
Servo Parameters	Initializes the servo parameters along the ticked axis • X-axis • Y-axis
Table Information	Initializes the table information along the ticked axis • X-axis • Y-axis • XY-axis

MEMO

Warranty

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company. However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
   a) Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
   b) Failure caused by unapproved modifications, etc., to the product by the user.
   c) When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
   d) Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
   e) Relay failure or output contact failure caused by usage beyond the specified Life of contact (cycles).
   f) Failure caused by external irresistible forces such as fires or abnormal voltages, and failure caused by force majeure such as earthquakes, lightning, wind and water damage.
   g) Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
   h) Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.
   Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user or third person by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
2) The Mitsubishi programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable logic controller applications.
   In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable logic controller range of applications.
   However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

Revised History

Date	Revision	Discription
12/2005	A	First Edition

OPERATION MANUAL

FX Configurator-FP

MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE: TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
HIMEJI WORKS: 840, CHIYODA CHO, HIMEJI, JAPAN

MODEL	SW-FXSSC-O-E
MODEL CODE	09R916

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