

Changes for the Better

MITSUBISHI CNC

EZMotion-NC E60/E68 Series

**PLC DEVELOPMENT SOFTWARE MANUAL
(MELSEC Tool Section)**

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Precautions for Safety

Always read the specifications issued by the machine maker, this manual, related manuals and attached documents before installation, operation, programming, maintenance or inspection to ensure correct use.

Understand this numerical controller, safety items and cautions before using the unit. This manual ranks the safety precautions into "Danger", "Warning" and "Caution".



DANGER

When the user may be subject to imminent fatalities or major injuries if handling is mistaken.



WARNING

When the user may be subject to fatalities or major injuries if handling is mistaken.



CAUTION

When the user may be subject to bodily injury or when physical damage may occur if handling is mistaken.

Note that even items ranked as "**CAUTION**", may lead to major results depending on the situation. In any case, important information that must always be observed is described.



DANGER

Not applicable in this manual.








WARNING

Not applicable in this manual.




CAUTION

1. Items related to product and manual

-  For items described as "Restrictions" or "Usable State" in this manual, the instruction manual issued by the machine maker takes precedence over this manual.
-  An effort has been made to describe special handling of this machine, but items that are not described must be interpreted as "not possible".
-  This manual is written on the assumption that all option functions are added. Refer to the specifications issued by the machine maker before starting use.
-  Refer to the Instruction Manual issued by each machine maker for details on each machine tool.
-  Some screens and functions may differ depending on the NC system or its version, and some functions may not be possible. Please confirm the specifications before use.





2. Precautions for startup and maintenance

-  Before starting program modification, forced output, RUN, STOP or similar operation during running, read the manual carefully and ensure safety fully. Not doing so can cause machine damage or accidents due to operation mistakes.

(Continued on next page)

CAUTION

3. Items related to program development

-  If the data transferred does not follow the file name rule, the NC will mistake it for another data, resulting in unexpected operation, e.g. PLC program erasure.
-  Do not read a ladder file on which a conversion error occurred into the GX Developer side. The file may include unexpected contents to result an illegal operation.
-  If the ladder program being run by the CNC differs from the one being displayed on GX Developer, monitoring will not result in an error but will continue.
-  When an error occurred at GX Developer On-line function, the error message may not explain exactly the state in the CNC side.
Always refer to the error list.

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1. INTRODUCTION


In the EZMotion-NC E60/E68, the user PLC development environment is supported using MELSEC PLC development tool, which is Mitsubishi integrated FA software MELSOFT series (GX Developer) in addition to the onboard ladder tool.

This manual explains user PLC development environment using GX Developer, mainly usage specific to EZMotion-NC E60/E68.

Details described in this manual

CAUTION

 Items not described in this manual must be interpreted as "not possible".

 Some screens and functions may differ depending on the NC system or its version, and some functions may not be possible. Please confirm the specifications before use.

General precautions

Refer to the respective manuals for details of the EZMotion-NC E60/E68 PLCs and for details of various tools described in this manual.

[EZMotion-NC E60/E68 PLC related documents]

EZMotion-NC E60/E68 Series PLC Onboard Instruction Manual IB-1500179(ENG)
EZMotion-NC E60/E68 Series PLC Programming Manual
(Ladder section with MELSEC tool) IB-1500178(ENG)

[MELDAS Series Software Package Manual]

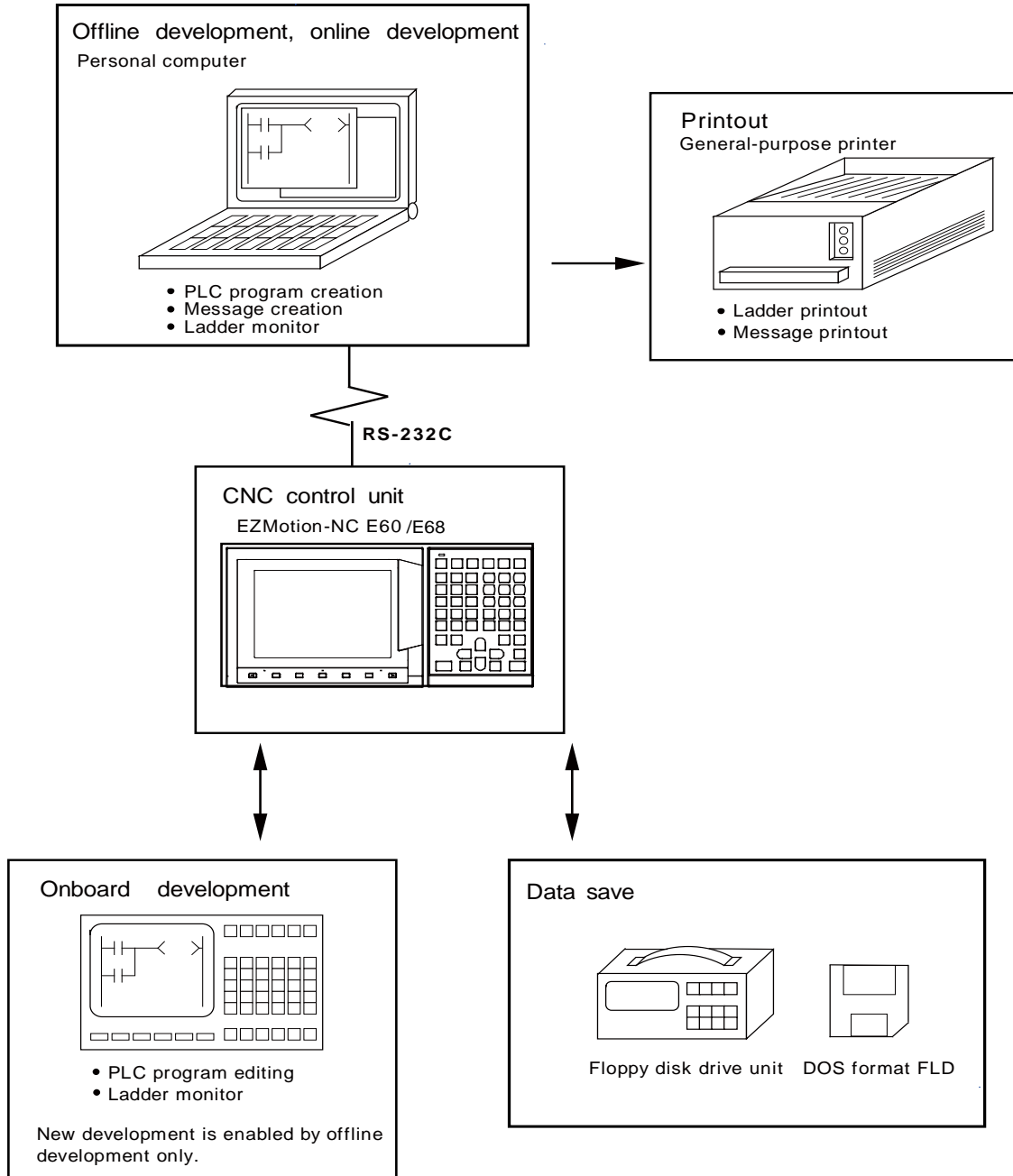
GX Developer Version8	Operating Manual (Startup)		
 SW8D5C-GPPW	13JU40	SH-080372
GX Developer Version8	Operating Manual		
 SW8D5C-GPPW	13JU41	SH-080373
GX Converter Version1	Operating Manual		
 SW0D5C-CNVW	13J949	IB-0800004

2. SYSTEM CONFIGURATION
2.1 Development Environment Configuration

2. SYSTEM CONFIGURATION

2.1 Development Environment Configuration

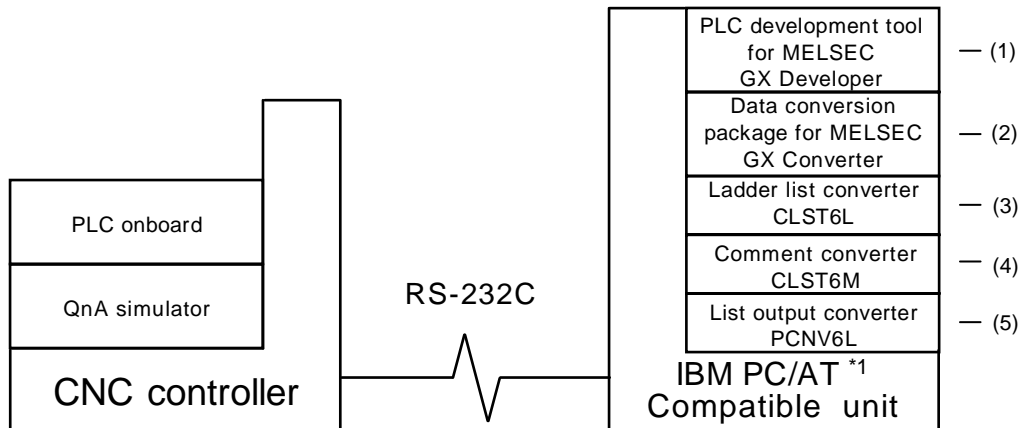
Most of the development work can be done by connecting a personal computer and a CNC unit by an RS-232C cable.



2. SYSTEM CONFIGURATION

2.2 Software Configuration

2.2 Software Configuration



*1: IBM PC/AT compatible personal computer with Windows OS

(1) GX Developer (PLC development software package)

GX Developer is a programming software package (model name: SW7D5C-GPPW) designed for Mitsubishi Electric's MELSEC series programmable logic controllers. By performing operations similar to those of the MELSEC series, you can develop user PLC ladders for EZMotion-NC E60/E68. Note that some functions specific to the "MELSEC series" may not be unavailable.

For EZMotion-NC E60/E68 ladder development, we recommend you to use GX Developer Version 4 (SW4D5C-GPPW) or later. For function details, refer to the operating manual supplied.

(2) GX Converter (data conversion software package)

The GX Converter is a tool that carries out file conversion of GX Developer data files and the following:

- Ladder list files and comment text files output by the CLIST6L
- Alarms and operator messages created by the text editor
- Data files of commercially available spreadsheet software, word processors and editors

GX Converter is an add-on tool of GX Developer and is started from the GX Developer menu. This tool is a software package for various MELSEC support. GX Converter needs to be used with the versions following GX Developer Version 3 (SW3D5C-GPPW). Refer to the enclosed Operating Manual for function details.

(3) CLST6L (Ladder list converter)

This tool converts the user PLC ladder list data developed with PLC4B to EZMotion-NC E60/E68 specification commands and devices, and outputs the data in a ladder list format. The user PLC ladder developed with PLC4B can be used for EZMotion-NC E60/E68 with the GX Developer by using the GX Converter to further convert the conversion results of this tool. Refer to the instruction manual for function details.

(4) CLST6M (Device comment converter)

This tool outputs the contact/coil comment data of a user PLC ladder developed with PLC4B in the text format of the EZMotion-NC E60/E68 device specifications. The contact/coil comment data developed with PLC4B can be used with GX Developer by using GX Converter to further convert the conversion results of this tool. Refer to the instruction manual for function details.

2. SYSTEM CONFIGURATION

2.3 Operating Environment

(5) PCNV6L (List output converter)

This tool outputs a with PLC4B specification ladder printout image with cross information in a text format from the GX Developer specification ladder list and comment data. Refer to the instruction manual for function details.

[Note] PLC4B is MELDAS PLC programming tool.

2.3 Operating Environment

The tools that make up the development environment can be used with the personal computer that satisfies the following operating environment of GX Developer.
The following are the specifications of the "GX Developer Version 7" operating environment. For the specifications of different versions, check them in the respective operating manuals (startup).

Item		Description
Computer unit		133MHz or more* ¹ Pentium (recommended) personal computer on which Windows operates.
Required memory		32MB or more* ² recommended
Hard disk area	For installation	150MB or more
	For operation	150MB or more
Disk drive		CD-ROM disk drive 3.5 inch floppy disk drive* ³
Display		800 × 600 pixel or more resolution
Communication interface		RS-232C port
Basic software		Microsoft Windows 95 operating system Microsoft Windows 98 operating system Microsoft Windows Millennium Edition operating system * ⁴ Microsoft WindowsNT Workstation 4.0 operating system Microsoft Windows 2000 Professional operating system * ⁴

*1 : 150MHz or more Pentium is recommended for use of Windows Me.

*2 : 64MB or more is recommended for use of Windows 2000.

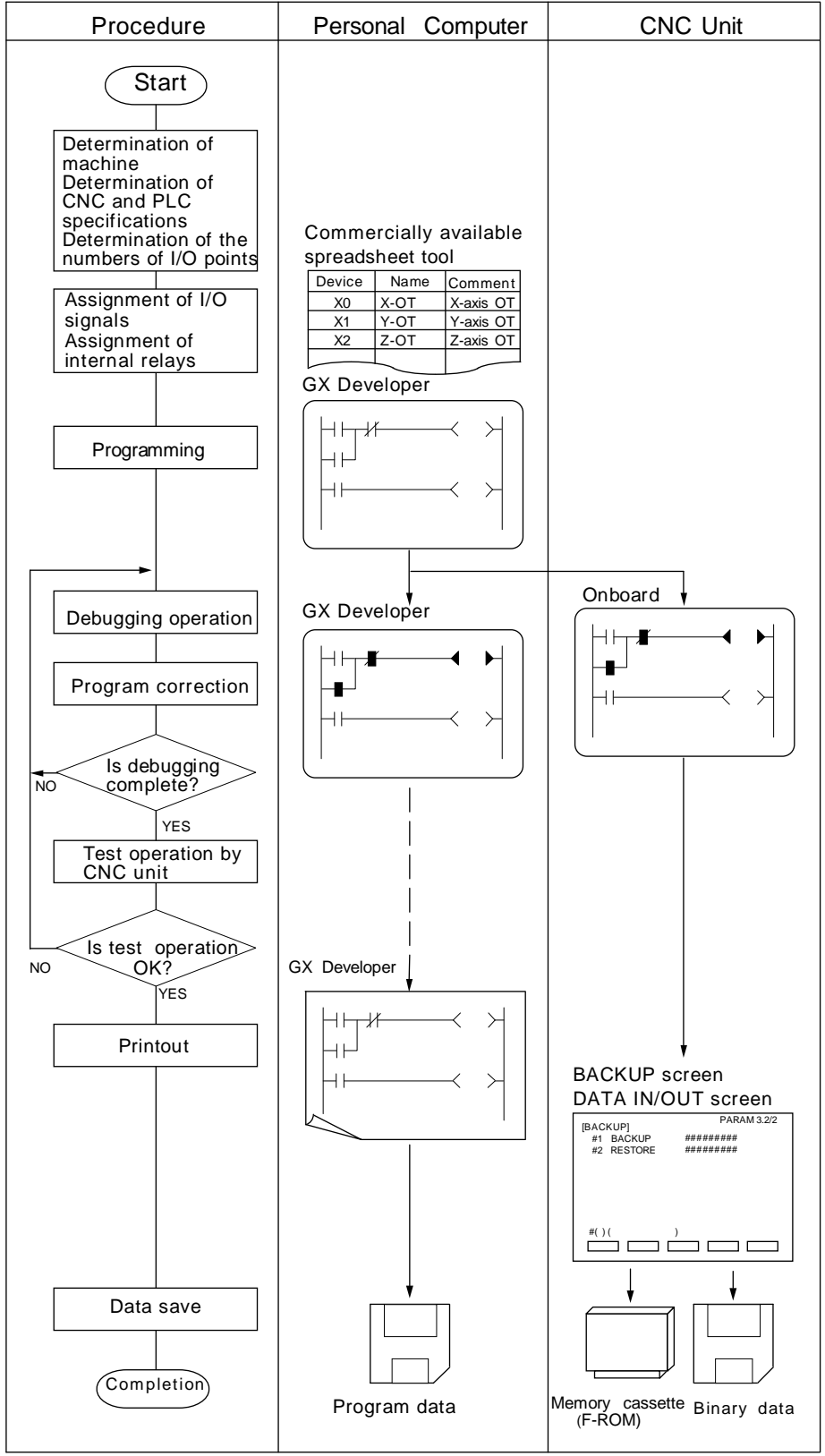
*3 : Required for GX Developer Version 6 or earlier (to provide protection by FLD).

*4 : The PC-9800 is unusable.

2. SYSTEM CONFIGURATION
2.4 User PLC (Ladder) Development Procedure

2.4 User PLC (Ladder) Development Procedure

The following indicates a procedure for creating a general user PLC ladder.



The data created with the commercially available spreadsheet tool can be used as ladder comment data.

Use GX Developer for programming. After completion, download the data through RS-232C.

Perform monitoring/correction with GX Developer's online function or onboard function.

Printout to a commercial printer connected with the personal computer from GX Developer.

Execute the ROM backup operation on the BACKUP screen. Execute the binary data output on the DATA IN/OUT screen.

Program data:
 Saved using GX Developer

Binary data:
 Saved using DATA IN/OUT screen

3. GX Developer FUNCTIONS SUPPORTED BY EZMotion-NC E60/E68
3.1 Function Support Conditions (general section)

3. GX Developer FUNCTIONS SUPPORTED BY EZMotion-NC E60/E68

The GX Developer functions explained here are those supported by the EZMotion-NC E60/E68 in the "off-line functions" operated with the GX Developer independently and "on-line functions" carried out connected to the CNC.

Refer to the enclosed Operating Manual for function details.

3.1 Function Support Conditions (general section)

The following shows a list of GX Developer outline functions supported by the EZMotion-NC E60/E68. A ☉ mark indicates functions that can be used by the EZMotion-NC E60/E68. An ✕ mark indicates that the function cannot be used because it is related to "MELSEC Series" characteristic functions. The function details during on-line are described in the next section.

List of general section functions (1) ☉ : Possible, △ : Limitedly possible, ✕ : Not possible

Program type	Support	Remarks
Ladder	☉	
List	☉	
SFC	✕	
MELSAP-L	✕	
Function block	✕	

Function	Menu	Sub menu	Support	Remarks	
Project	New project		☉		
	Open project		☉		
	Close project		☉		
	Save		☉		
	Save as		☉		
	Delete project		☉		
	Verify		☉		
	Copy		☉		
	Edit Data	New		☉	
		Copy		☉	
		Delete		☉	
		Rename		☉	
		Change program type		☉	
	Change PLC type			△	Fixed Q4A
	Import file	Import from GPPQ format file		☉	
		Import from GPPA format file		✕	
		Import from FXGP[WIN] format file		✕	
		Import from FXGP[DOS] format file		✕	
		Import from TEXT ,CSV format file		☉	
	Export file	Export to GPPQ format files		☉	
Export to GPPA format files			✕		
Export to FXGP[WIN] format file			✕		
Export to FXGP[DOS] format file			✕		
Export to TEXT ,CSV format file			☉		

3. GX Developer FUNCTIONS SUPPORTED BY EZMotion-NC E60/E68
3.1 Function Support Conditions (general section)

List of general section functions (2) ◎ : Possible, △ : Limitedly possible, ✕ : Not possible

Function	Menu	Sub menu	Support	Remarks	
(Project)	Macro	Registration macros	◎		
		Macro utilize	◎		
		Delete macros	◎		
		Macro reference path	◎		
	Function Block	Diversion	✕		
		Rename FB	✕		
	Printer setup		◎		
	Print		◎		
	Start new GX Developer session		◎		
	Exit GX Developer		◎		
Edit	Undo		◎		
	Restore after ladder conversion		◎		
	Cut		◎		
	Copy		◎		
	Paste		◎		
	Insert line		◎		
	Delete line		◎		
	Insert row		◎		
	Delete row		◎		
	Insert NOP batch		◎		
	Delete NOP batch		◎		
	Draw line		◎		
	Delete line		◎		
	Change TC setting		◎		
	Read mode		◎		
	Write mode		◎		
	Ladder symbol	Open contact		◎	
		Close contact		◎	
		Open branch		◎	
		Close branch		◎	
		Coil		◎	
		Application instruction		◎	
		Vertical line		◎	
		Horizontal line		◎	
		Delete vertical line		◎	
		Delete horizontal line		◎	
		Rising pulse		△	Instead of DEFR
		Falling pulse		✕	
		Rising pulse open branch		✕	
		Falling pulse close branch		✕	
		Invert operation results		✕	
		Convert operation results to rising pulse		✕	
		Convert operation results to falling pulse		✕	
		Documentation	Comment		◎
	Statement			◎	
	Note			◎	
	Statement/Note block edit			◎	

3. GX Developer FUNCTIONS SUPPORTED BY EZMotion-NC E60/E68
3.1 Function Support Conditions (general section)

List of general section functions (3) ◎ : Possible, △ : Limitedly possible, ✕ : Not possible

Function	Menu	Sub menu	Support	Remarks	
Find/Replace	Find device		◎		
	Find instruction		◎		
	Find step no.		◎		
	Find character string		◎		
	Find contact or coil		◎		
	Replace device		◎		
	Replace instruction		◎		
	Change open/close contact		◎		
	Replace character string		◎		
	Change module start address		◎		
	Replace statement/note type		◎		
	Cross reference list		◎		
	List of used devices		◎		
Convert	Convert		◎		
	Convert (All programs being edited)		◎		
	Convert (Online change)		✕		
View	Comment		◎		
	Statement		◎		
	Note		◎		
	Alias		◎		
	Macro instruction format display		◎		
	Comment format	4*8 characters		◎	
		3*5 characters		◎	
	Alias format display	Replace device name and display		◎	
		Arrange with device and display		◎	
	Toolbar		◎		
	Status bar		◎		
	Zoom	50%		◎	
		75%		◎	
		100%		◎	
		150%		◎	
		Auto		◎	
	Project data list		◎		
Instruction list		◎			
Set the contact	9 contacts		◎		
	11 contacts		◎		
Elapsed time			✕		
Online	Refer to "List of on-line section functions"	Refer to "List of on-line section functions"			
Diagnostics	PLC diagnostics		✕		
	Network diagnostics		✕		
	Ethernet diagnostics		✕		
	CC-Link diagnostics		✕		
	System monitor		✕		

3. GX Developer FUNCTIONS SUPPORTED BY EZMotion-NC E60/E68
3.1 Function Support Conditions (general section)

List of general section functions (4) ◎ : Possible, △ : Limitedly possible, ✕ : Not possible

Function	Menu	Sub menu	Support	Remarks	
Tools	Check program		◎		
	Merge data		◎		
	Check parameter		✕		
	Transfer ROM		Read	✕	
			Write	✕	
			Verify	✕	
			Write to file	✕	
	Delete unused comments		◎		
	Clear all parameters		✕		
	IC memory card		Read IC memory card	✕	
			Write IC memory card	✕	
			Read image data	✕	
			Write image data	✕	
	Start ladder logic test		✕		
	Set TEL data		Connection	✕	
			Disconnection	✕	
			TEL data	✕	
AT command			✕		
Call book			✕		
Intelligent function utility	Utility list	✕			
Customize keys		◎			
Change display color		◎			
Options		△	Limited partly		
Create start-up setting file		◎			
Window	Cascade		◎		
	Tile vertically		◎		
	Tile horizontally		◎		
	Arrange icons		◎		
	Close all windows		◎		
Help	PLC error		✕		
	Special relay/register	A/QnA/FX series	✕		
		Q series	✕		
	Key operation list		◎		
	Product information		◎		
Connect to MELFANS web		◎			

3. GX Developer FUNCTIONS SUPPORTED BY EZMotion-NC E60/E68
3.2 Function Support Conditions (on-line section)

3.2 Function Support Conditions (on-line section)

The following shows a list of GX Developer on-line functions supported by the EZMotion-NC E60/E68.

A **◎** mark indicates functions that can currently be used by the EZMotion-NC E60/E68. An **✕** mark indicates that the function cannot be used because it is related to "MELSEC Series" characteristic functions.

List of on-line section functions (1) ◎ : Possible, △ : Limitedly possible, ✕ : Not possible

Menu	Sub menu	Detailed function	Support	Remarks
Transfer setup		PC side I/F	◎	
		PLC side I/F	△	Only for QnACPU
		Other station	✕	
		Network route	✕	
		Co-existence network route	✕	
Read from PLC		Target memory	◎	
		Title	◎	
		File selection	◎	
		Device data	✕	
		Program	✕	
		Common	✕	
		Local	✕	
		Refresh view	◎	
		Free space volume	◎	
		Create title	✕	
Write to PLC		Target memory	△	
		Title	◎	
		File selection	◎	
		Device data	✕	
		Program	✕	
		Common	✕	
		Local	✕	
		Free space volume	◎	
		Create title	✕	
		Verify with PLC		Target memory
Title	◎			
File selection	◎			
Program	✕			
Refresh view	◎			
Free space volume	◎			
Create title	✕			
Write to PLC [Flash ROM]	Write the program memory to ROM		✕	
	Write to PLC [Flash ROM]		✕	
Delete PLC data		Target memory	◎	
		Title	◎	
		File selection	◎	
		Refresh view	◎	
		Free space volume	◎	
		Create title	✕	
Change PLC data	Attributes		✕	
PLC user data	Read PLC user data		✕	
	Write PLC user data		✕	
	Delete PLC user data		✕	

3. GX Developer FUNCTIONS SUPPORTED BY EZMotion-NC E60/E68
3.2 Function Support Conditions (on-line section)

List of on-line section functions (2) ○ : Possible, △ : Limitedly possible, ✕ : Not possible

Menu	Sub menu	Detailed function	Support	Remarks	
Monitor	Monitor mode	ON/OFF state	○		
		Scan time display	✕		
		CPU state display	○		
	Monitor [Write mode]		✕		
	Start monitor [All windows]		○		
	Stop monitor [All windows]		○		
	Start monitor		○		
	Stop monitor		○		
	Change current value monitor [Decimal]		○		
	Change current value monitor [Hexadecimal]		○		
	Local device monitor				
	Device batch	Device		○	
		Connect		○	
		Coil		○	
		Setting value		○	
		Current		○	
		Monitor format : Bit & word		○	
		Monitor format : Bit		○	
		Monitor format : word		○	
		Display : 16bit integer		○	
		Display : 32bit integer		○	
		Display : Real number		✕	
		Display : ASCII character		✕	
		Value : DEC		○	
		Value : HEX		○	
		T/C set value Reference program		○	
		Device test		○	
		Entry data monitor	Device		○
	ON/OFF/Current			○	
	Setting value			○	
	Connect			○	
	Coil			○	
	Display : 16bit integer			○	
	Display : 32bit integer			○	
	Display : Real number			✕	
	Display : ASCII character			✕	
	Value : DEC			○	
	Value : HEX			○	
	T/C setting value, Local label Reference program			○	
	Device test			○	
	Buffer memory batch		✕		
	Monitor condition setup	Device		○	
		Step No.		○	
	Monitor stop condition setup	Device		○	
		Step No.		○	
	Program monitor list		✕		
	Interrupt program monitor list		✕		
	Scan time measurement		✕		
	Entry ladder monitor		○		
	Delete all entry ladder		○		

3. GX Developer FUNCTIONS SUPPORTED BY EZMotion-NC E60/E68
3.2 Function Support Conditions (on-line section)

List of on-line section functions (3) ◎ : Possible, △ : Limitedly possible, ✕ : Not possible

Menu	Sub menu	Detailed function	Support	Remarks
Debug	Device test	FORCE ON	◎	
		FORCE OFF	◎	
		Toggle force	◎	
		Device	◎	
		Buffer memory	✕	
	Forced input output registration/cancellation		✕	
	Debug		✕	
	Skip execution		✕	
	Partial execution		✕	
	Step execution		✕	
Trace	Sampling trace		✕	
Remote operation		PLC status	◎	
		RUN	◎	
		STOP	◎	
		PAUSE	✕	
		Latch clear	✕	
		STEP-RUN	✕	
		Reset	✕	
		Operation during RUN, STEP-RUN	✕	
		Specify execution destination	✕	
Keyword setup	Register		✕	
	Delete		✕	
	Disable		✕	
Clear PLC memory			✕	
Format PLC memory		Target memory	△	For only internal F-ROM
		Format Type	△	
Arrange PLC memory			✕	
Set time		YY MM DD Hr. Min. Sec.	◎	
		Day	✕	
		Specify execution target	✕	

4. SETUP
4.1 Installing the Tools

4. SETUP

4.1 Installing the Tools

In the EZMotion-NC E60/E68 PLC development environment, it is assumed that the various tools are used with an IBM PC/AT compatible personal computer. Prepare each tool so that it is IBM PC/AT compatible personal computer.

Refer to the enclosed Operating Manual (Startup section) and Operating Manual for the setup and start procedures of each tool.

4.2 Connecting the Serial Cable

For the position of the serial port, etc., refer to the Connection Manual.

Between the IBM PC/AT compatible personal computer that uses GX Developer and the CNC, use an RS-232C serial cable equivalent to the one shown below in the RS-232C connection diagram.

[Note]

The cables given in the connection diagrams of the GX Developer Operating Manual cannot be used.

NC side (25-pin D-SUB)		Cable connection and signal direction	Personal computer side (9-pin D-SUB)	
Signal name	Pin No.		Pin No.	Signal name
CD	8	-----	1	DC
SD	2	—————→	2	RD
RD	3	←————	3	SD
DR (DSR)	6	←————	4	ER (DTR)
SG	7	←————→	5	SG
ER (DTR)	20	—————→	6	DR (DSR)
CS (CTS)	5	←————	7	RS (RTS)
RS (RTS)	4	—————→	8	CS (CTS)
	22	-----	9	RI

* The above shows a general RS-CS method connection format.

* The pin Nos. of dotted lines are not used.

5. COMMON ITEMS

5.1 Precautions before Development

Pay careful attention to the following items before developing ladder programs using the GX Developer.


(1) PLC Type Selection

The PLC type must be set when newly creating programs, etc. Select the following CPU type when requested to select the PLC type by the GX Developer. An error will occur during transfer of the ladder program to the CNC if another PLC type is selected.

 **CAUTION** Select "Q4A" for CPU type.

(2) Device Setting

Do not set the devices when developing the ladder program for the CNC. Develop the program with the device settings (No. of points, etc.) left at their default values applied when GX Developer was started. The ladder program cannot be transferred to the CNC normally when it is developed with settings other than the default values.

 **CAUTION** Do not set the devices.

(3) PLC Commands

MELSEC-specific PLC commands cannot be used in the ladder program development for the CNC. The format, etc., are changed with some commands. Refer to "Appendix 1. DIFFERENCES IN DEVELOPMENT ENVIRONMENT BETWEEN PLC4B AND EZMotion-NC E60/E68" for details.

 **CAUTION** MELSEC-specific PLC commands cannot be used.


(4) Label at the beginning of ladder program

In a EZMotion-NC E60/E68 ladder program, a processing unit is differentiated by specifying a reserved label number at the beginning of processing. There are the following different processing units.

P251 : PLC high-speed processing program starting label

P252 : PLC main processing program starting label

If only the PLC main processing is to be performed, do not omit but describe the above label at the beginning of a ladder program. Unless the label is described, normal RUN cannot be performed.

 **CAUTION** Specify a label at the beginning of a ladder program.

5. COMMON ITEMS

5.2 NC-Related Parameters

(5) Statements and notes

GX Developer allows a ladder program to be commented (with interlinear statements and notes). They are available in two types: integrated and peripheral.

Integrated type : Can be downloaded together with a ladder program to the CNC.

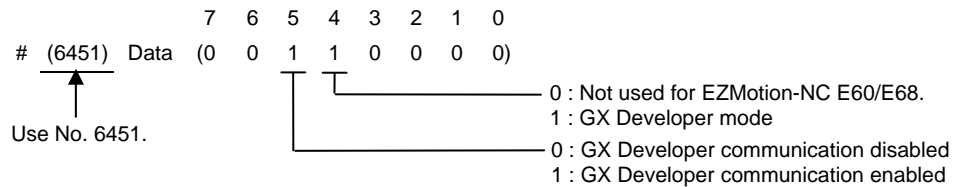
Peripheral type : Cannot be downloaded.

The integrated type cannot be used with the EZMotion-NC E60/E68. If it is used, a ladder program cannot be transferred to the CNC properly.

 **CAUTION** Do not use integrated type interlinear statements and notes.

5.2 NC-Related Parameters

Parameters in the NC side have bit selection parameters related to GX Developer. If an appropriate value is not set in the parameters, an error will occur in communication with GX Developer.



[Reference] #6451 corresponds to the low side of the file register R2925.

[Note] Turn the CNC power OFF after the parameter setting.
Parameters are valid after the power is turned ON again.

(a) PLC environment selection

Choose the GX Developer mode (bit4=1).

[Note] The onboard will not start if the ladder format stored in the CNC is other than the GX Developer.

Bit 4 = 0
Not used for EZMotion-NC E60/E68.

Bit 4 = 1
The PLC development environment of GX Developer.

(b) GX Developer communication use selection

Choose to use the serial port in GX Developer or in the other functions.

Bit 5 = 0
The serial port is not used for communication with GX Developer.
(When the serial port is used for another function, set "0".)

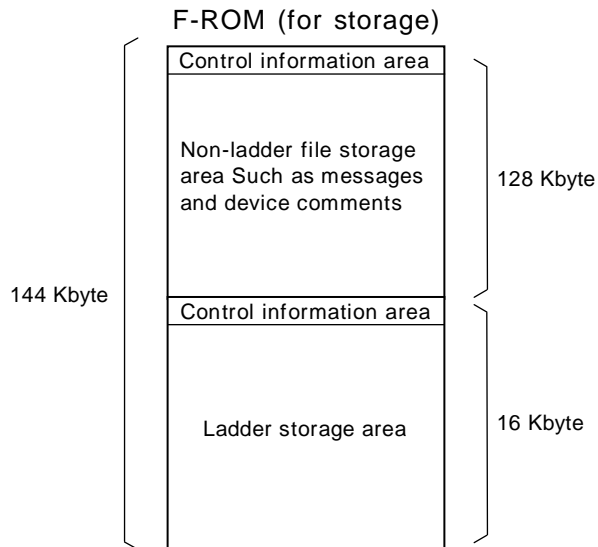
Bit 5 = 1
The serial port is used for communication with GX Developer.
At this time, the onboard function is not started if bit 4 = 1.
This serial port cannot be used concurrently with the other function.

5. COMMON ITEMS

5.3 PLC Data Storage Areas

5.3 PLC Data Storage Areas

The EZMotion-NC E60/E68 stores PLC data onto flash ROM (hereafter abbreviated to the F-ROM). The following shows the storage area structure.



The data transferred from GX Developer are stored into the F-ROM area designed for both storage and execution.



5. COMMON ITEMS

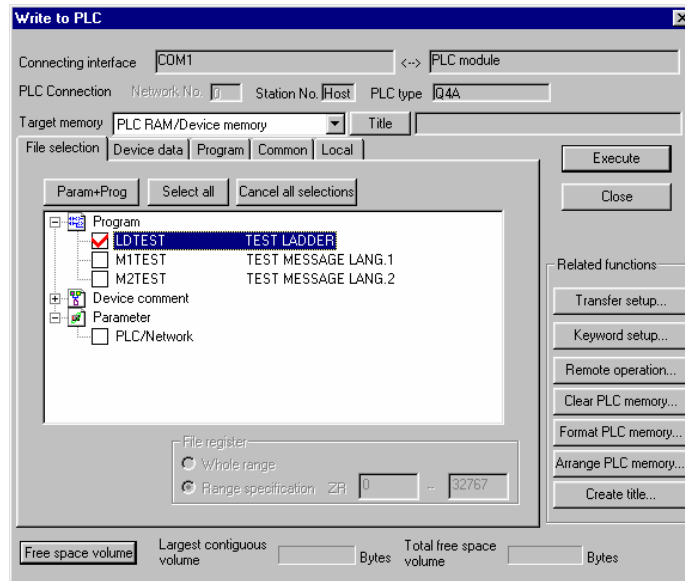
5.3 PLC Data Storage Areas

(1) Display of storage area on GX Developer

Any of the storage areas that can be selected for the online functions (Write to PLC, Read from PLC, Verify with PLC) of GX Developer can be specified as a [Target memory] item on the corresponding operation screen.

Also, pressing the [Title] button displays the comment of that storage area if PLC data exists. It is not displayed if the storage memory is not fitted or the data does not exist.

Further, pressing the [Free space volume] button displays [Total free space volume] and [Largest continuous volume] of the selected area.



Some storage areas displayed as the target memory differ from the actual storage areas of the CNC. The following tables indicates the relationships between the [Target memory] items and storage areas.

Screen indication	Meaning	Title indication	Free area indication
PLC RAM/Device memory	Internal F-ROM	ON BOARD F-ROM	Target : All storage areas of Internal F-ROM
IC Card A[RAM]	Not used		
IC Card A[ROM]	Not used		
IC Card B[RAM]	Not used		
IC Card B[ROM]	Not used		


5. COMMON ITEMS

5.4 File Name

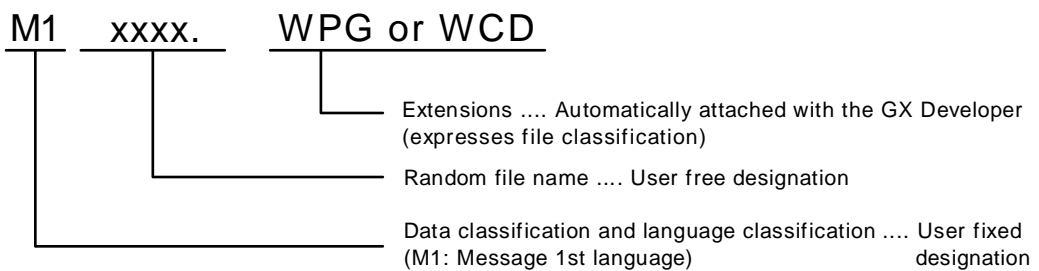
5.4 File Name

Inside the EZMotion-NC E60/E68, PLC-related data are controlled and stored in the following categories. Therefore, they are also developed in the same categories.

CAUTION

 If the data transferred does not follow the file name rule, the NC will mistake it for another data, resulting in unexpected operation, e.g. PLC program erasure.

File name rule



When data is transferred by GX Developer, its data type is distinguished by the file name. An extension indicates a file type, and the first two characters denote a data type and a language type.

xxxx can be specified within eight characters freely with the exception of the extension.

[Note] Unusable file name

Data type : "M", "C" or "H" (alphabet)

Language type : "0" to "9" (numeral)

at the beginning of a file name are reserved on the NC side. Do not use the file name of this combination.

List of PLC related data

	Related data classification	File name (GX Developer)	Remarks
1	PLC program (ladder)	zzzzzz.WPG	PLC ladder code
2	PLC program comment	zzzzzz.WCD	Comment data for GX Developer
3	Message 1st language	M1xxxx.WPG	Message 1st language data such as alarm messages/operator messages/PLC switches
4	Message 2nd language	M2xxxx.WPG	Same as above (2nd language data)

5. COMMON ITEMS

5.4 File Name

1) PLC program (ladder)

- Ladder program developed using GX Developer.
- Only one file can be stored in the NC.

2) PLC program comment

- Program comment for GX Developer display
- Only one file can be stored in the NC with the same file name as the ladder program.
- A device comment (32 characters) and a device name (10 characters) can be defined for each device.
- Stored mainly when it is read to GX Developer and used as a comment.

3) Message 1st language, 4) Message 2nd language

- Alarm message/operator message/PLC switch/comment message data.
- One 1st language file and one 2nd language file can be stored in the NC.
- The messages can be handled and edited as "integrated type interlinear statements" by GX Developer.
- The maximum message length and the number of messages can be specified for each message type.

5. COMMON ITEMS

5.5 Specifying the Connection Target

5.5 Specifying the Connection Target

You must specify the connection target before performing online operations from GX Developer to the CNC.

5.5.1 Operation procedure

Perform the following operation from GX Developer to start the setting screen.

[Online] → [Transfer setup]

Set only the following items. Leave the other items unchanged from the initial values.

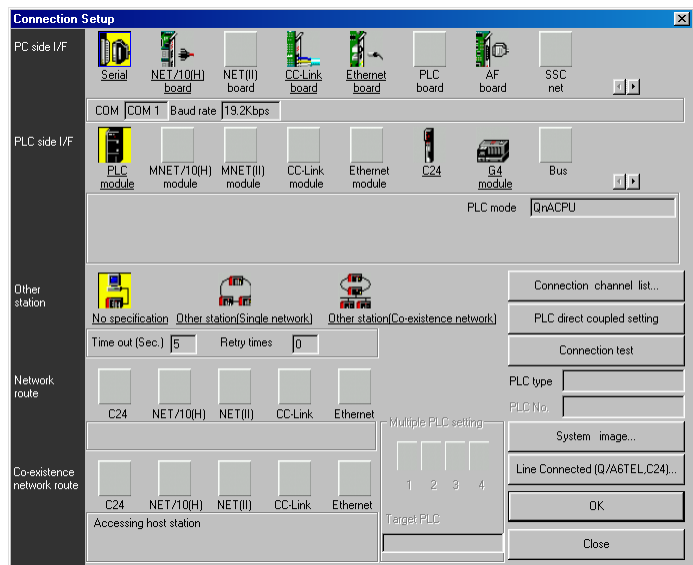
1) Personal computer side

Interface : [Serial interface]
Serial port name : [COM1] or [COM2]
Baudrate : [19.2Kbps]

2) PLC side

Interface : [CPU unit]

■ Setting screen of SW4D5-GPPW



5. COMMON ITEMS

5.6 Starting/Stopping the PLC of the CNC

5.6 Starting/Stopping the PLC of the CNC

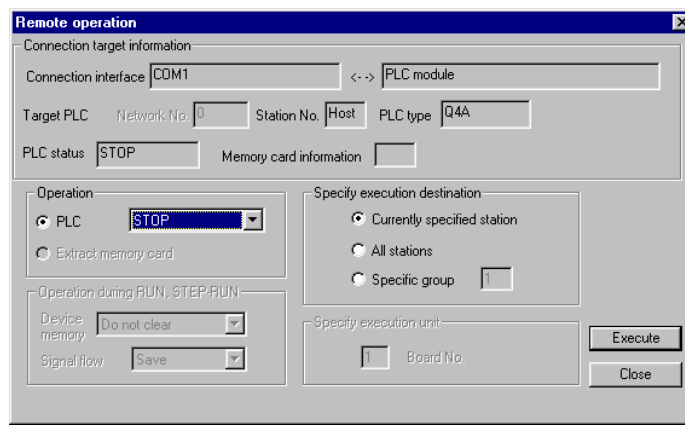
Before writing a ladder program, you must stop the PLC of the CNC.

5.6.1 Operation procedure

Perform the following operation from GX Developer to start the operation screen.

[Online] → [Remote operation] or **[Alt] + [6]**

On the following screen, set "STOP" or "RUN" in the [PLC] part under [Operation] and click [Execute]. The current status is displayed in [PLC status] under [Connection target information].



The operation is completed when the following dialog appears. Click [OK]. The status after completion appears in [PLC status] on the remote operation screen displayed behind. If the status does not change, check whether an alarm is displayed or not on the CNC side.



6. PLC PROGRAM DEVELOPMENT

6.1 Development Procedure

6. PLC PROGRAM DEVELOPMENT

This chapter mainly describes EZMotion-NC E60/E68-specific usage about the PLC program development procedure.

6.1 Development Procedure

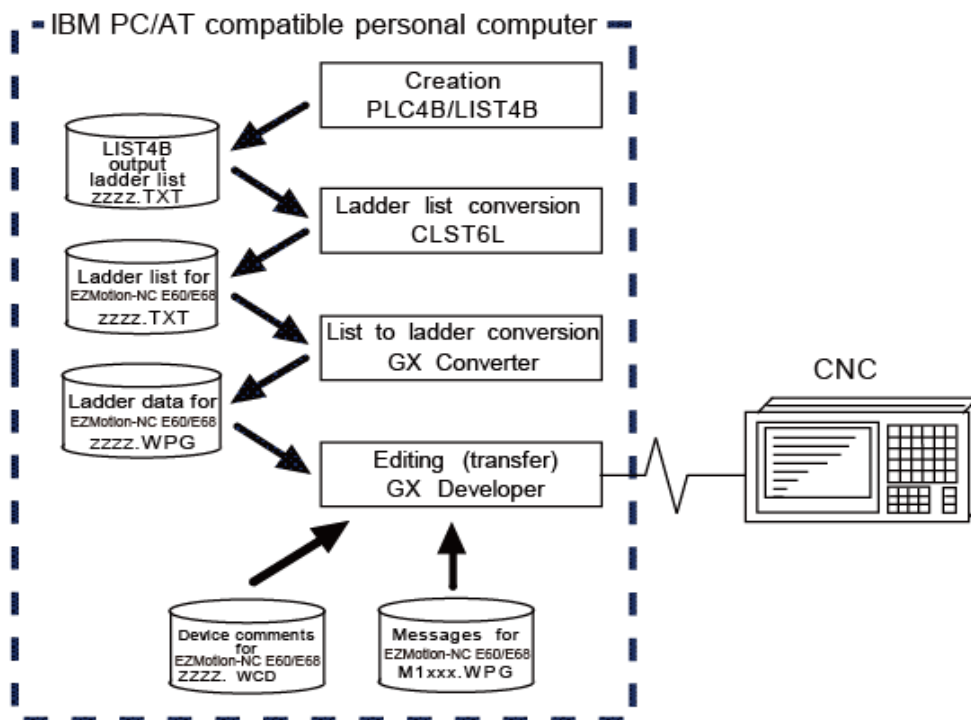
There are the following two methods as a general development procedure of a PLC program.

- 1) Creating a new program using GX Developer.
- 2) Diverting the PLC program that was developed using the conventional MELDAS PLC programming tool (PLC4B).

6.1.1 Creating a New Program

For the way to create a new program, refer to the Operating Manual

6.1.2 Diverting the PLC program that was developed using PLC4B



1) Creation

The PLC program created with PLC4B is output in a list format.

2) Conversion

Using CLST6L (ladder list converter), the output program is converted into a PLC program for EZMotion-NC E60/E68 (list format). Using GX Converter (data conversion software package), the list format program is converted into the GX Developer data. For the data conversion using GX Converter, refer to the section "6.6 Converting the Data Using GX Converter".

3) Editing/transfer

The resultant program can be handled like a newly created PLC program.

6. PLC PROGRAM DEVELOPMENT

6.2 Writing the PLC Program to the CNC

6.2 Writing the PLC Program to the CNC

The following indicates how to write ladders from GX Developer to the CNC (especially the restrictions and EZMotion-NC E60/E68-specific operations).

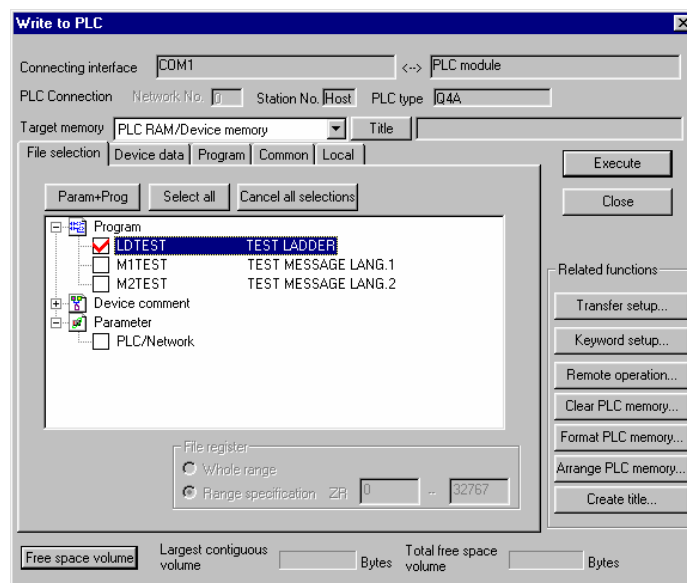
6.2.1 Operation procedure

Perform the following operation from GX Developer to start the operation screen.

[Online] → [Write to PLC]

On the following screen, choose the ladder file to be written from the [File selection] tab and click [Execute].

You can command RUN/STOP of the PLC using [Remote operation] under [Related functions].



[Note] As [Target memory], only [PLC RAM/Device memory] is valid.
Do not set the other tabs ([Device data], [Program], [Common], [Local]) than [File selection].

6.2.2 Writing operation

When a ladder is written from the GX Developer to the CNC, the CNC converts it into the CNC-specific ladder machine code. A conversion error occurs if any of the devices and command formats not supported by the CNC is used. Writing will not interrupted midway even if a conversion error occurs. A command in which an error occurs is converted into the "NOP" command (no processing command), and ladder up to the last step is transferred.

After writing, a ladder is written in the flash ROM whether an error occurs or not.

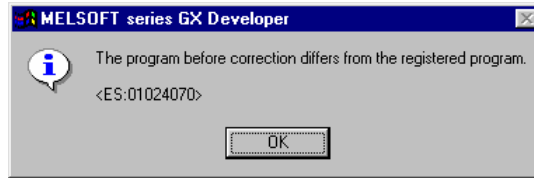
[Note] A ladder on which an error occurs cannot be run because of security.

6. PLC PROGRAM DEVELOPMENT

6.2 Writing the PLC Program to the CNC

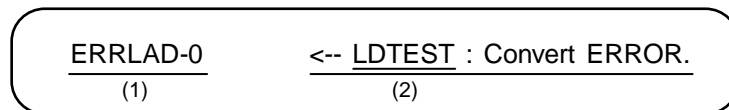
6.2.3 Operation to be performed at write error

At a conversion error, the following dialog is displayed in the GX Developer screen.

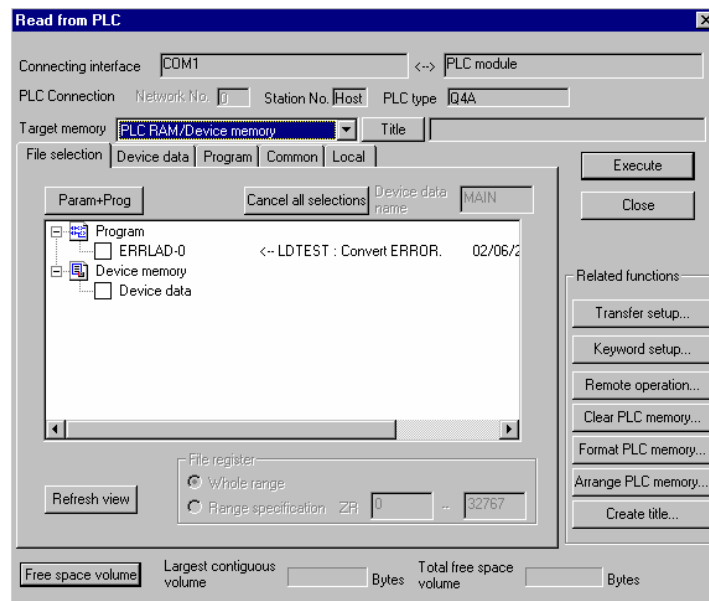


If you execute RUN the PLC as-is, an alarm occurs on the PLC side and the PLC does not run.

When the ladder file that resulted in a conversion error is displayed with the [File selection] tab of the [Read from PLC] screen, the file name and the title are changed and displayed as below. When this ladder file is read into the GX Developer side, it is stored by the name of "ERRLAD-0".



- (1) File name during error
- (2) Title including the name of the original transferred file



⚠ CAUTION

- ⚠ Do not read a ladder file on which a conversion error occurred into the GX Developer side and use it. The file may include unexpected contents to result in an illegal operation.

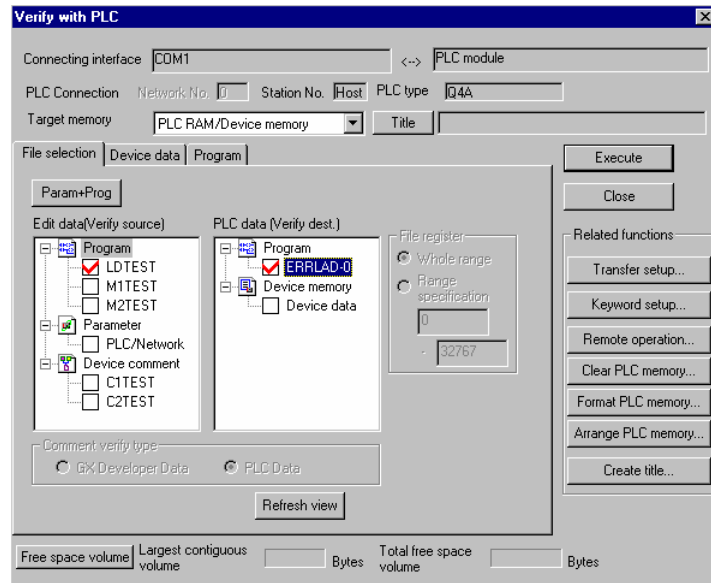
6. PLC PROGRAM DEVELOPMENT

6.2 Writing the PLC Program to the CNC

6.2.4 How to confirm the error step number

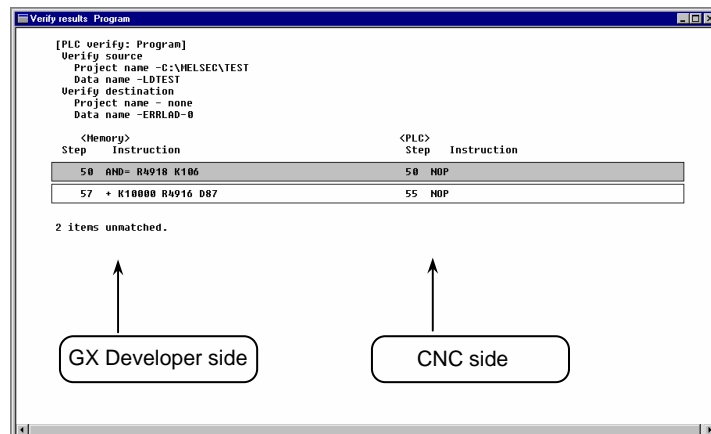
The PLC verification function can be used to confirm the error step. For details on the PLC verification function, refer to "6.4 Verifying the PLC Programs".

- Verification source : A transferred ladder file in the GX Developer side is selected.
- Verification direction : An error occurrence ladder file "ERRLAD-0" in the CNC side is selected.



Executing verification with PLC displays mismatches as in the following example. Following example shows the step where NOP command part of the CNC side becomes a conversion error. Double-click the mismatch to display and to edit the corresponding part of the file in the GX Developer side.

<Memory> indicates the GX Developer side, and <PLC> the CNC side.



6. PLC PROGRAM DEVELOPMENT

6.3 Reading the PLC Program from the CNC

6.3 Reading the PLC Program from the CNC

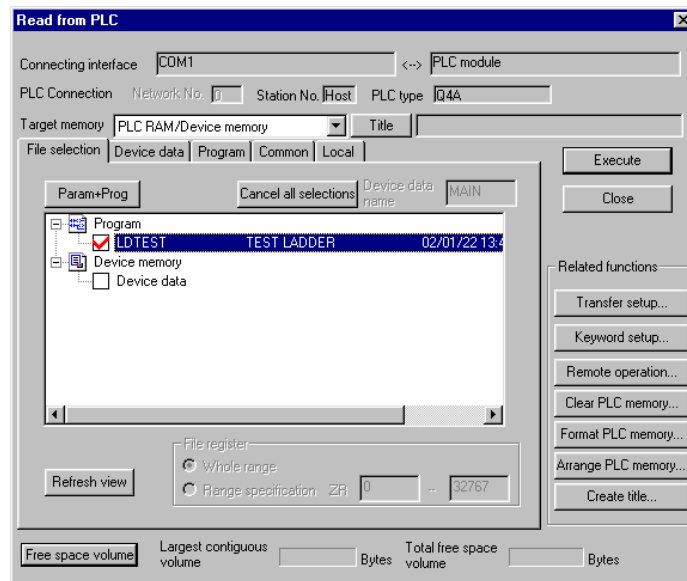
The following indicates how to read a ladder from the CNC to GX Developer.

6.3.1 Operation procedure

Perform the following operation from GX Developer to start the operation screen.

[Online] → [Read from PLC]

On the following screen, choose the ladder file to be read from the [File selection] tab, and click [Execute].



[Note] As [Target memory], the fitted memory is valid.
Do not set the other tabs ([Device data], [Program], [Common], [Local]) than [File selection].

If a ladder file with the same name already exists in the GX Developer side, following dialogue will appear.

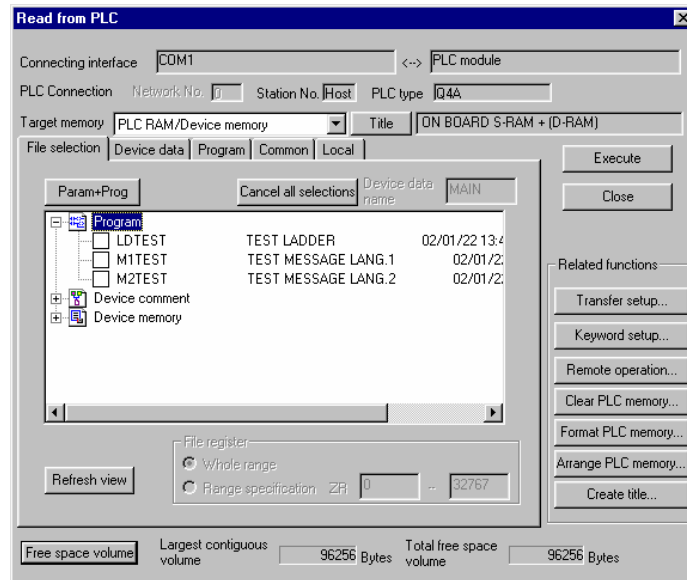


[Note] Choosing [Yes (Y)] in the dialogue will overwrite the GX Developer side ladder file. The file before overwriting will be erased.
Confirm the file enough before choosing [Yes (Y)].

6. PLC PROGRAM DEVELOPMENT

6.3 Reading the PLC Program from the CNC

The [Read from PLC] screen can also be used as a CNC side file listing function. Move the scrollbar of the [File selection] tab to the right to display the write date and size of each file. Click [Free space volume] to display the free area of the target memory.



6. PLC PROGRAM DEVELOPMENT

6.4 Verifying the PLC Programs

6.4 Verifying the PLC Programs

The following indicates how to verify ladders between the CNC and GX Developer.

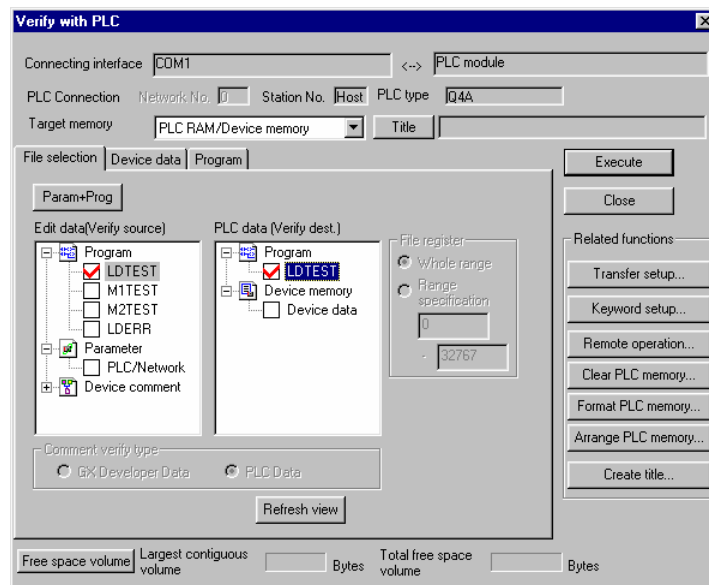
6.4.1 Operation procedure

Perform the following operation from GX Developer to start the operation screen.

[Online] → [Verify with PLC]

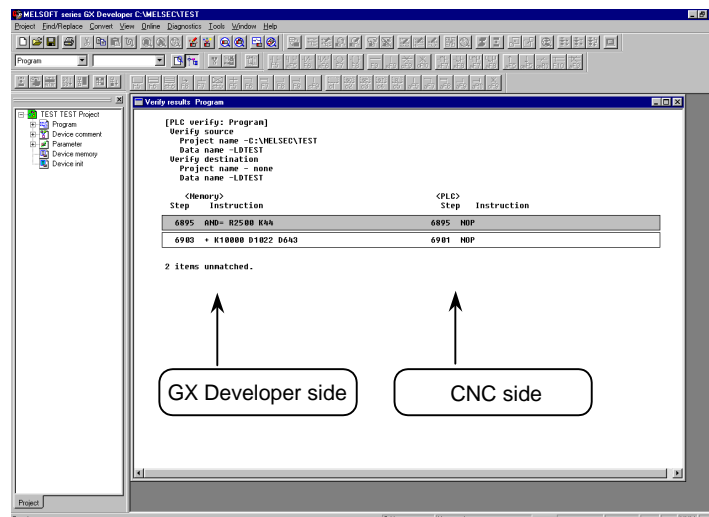
On the following screen, choose the ladder files to be verified from the [File selection] tab, and click [Execute].

[Verify source] : GX Developer side [Verify dest] : CNC side



[Note] As [Target memory], the fitted memory is valid.
Do not set the other tab ([Program], [Device data]) than [File selection].

If verification mismatches occur, the following mismatch screen appears. Double-click the mismatch to display the corresponding part of the GX Developer side file.



6.5 Monitoring the PLC Program

There are no EZMotion-NC E60/E68-specific operations to monitor a PLC program. Refer to the operating manual for the operation methods. For usable functions, refer to "3.2 Function Support Conditions (on-line section)". This section explains the operation procedure outline and precautions.

6.5.1 Operation procedure

Perform the following operation from GX Developer to start monitoring.


- (1) Display the ladder program to be monitored and move to the circuit part to be monitored.
- (2) Perform the following operation to start monitoring.

[Online] → [Monitor] → [Monitor mode] or F3

- (3) Perform the following operation to stop monitoring.

[Online] → [Monitor] → [Stop monitor] or Alt + F3

CAUTION

-  If the ladder program being run by the CNC differs from the one being displayed on GX Developer, monitoring will not result in an error but will continue.

6. PLC PROGRAM DEVELOPMENT

6.6 Converting the Data Using GX Converter

6.6 Converting the Data Using GX Converter

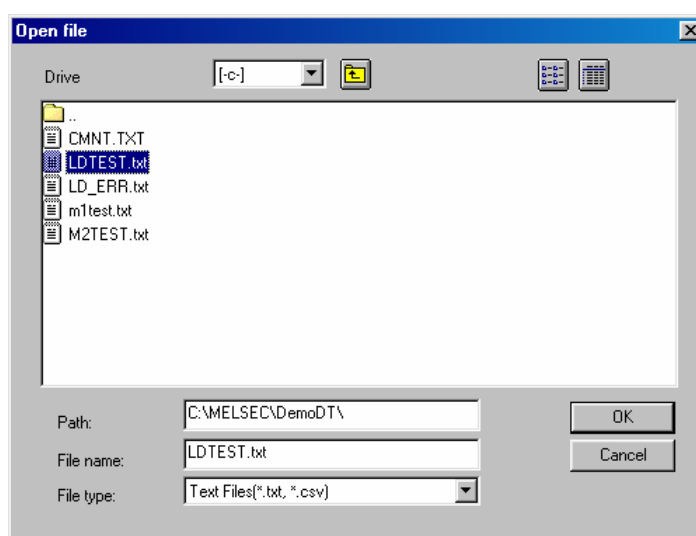
Convert the ladder list, which was converted using a ladder list converter or like, into GX Developer data in the following method. Use "GX Converter (data conversion software package)" for conversion. GX Converter can be started from the GX Developer menu.

6.6.1 Starting GX Converter and specifying the file to be converted

Perform the following operation from GX Developer to start GX Converter (read).

[Project] → [Import file] → [Import to TEXT ,CSV format file]

On the following screen, choose the file to be converted (LDTEST.TXT) and click [OK].

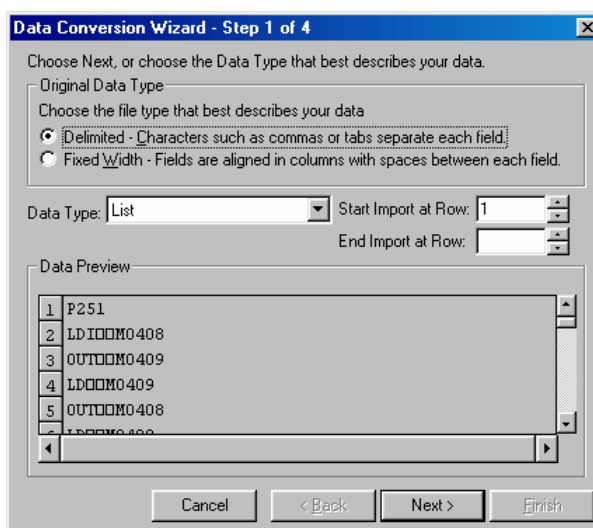


6.6.2 Conversion format setting

Set the conversion format on the following data conversion wizard screen.

1) Data conversion wizard 1/4

Choose [Original Data Type]-[Delimited] and [Data Type]-[List], and click [Next>].

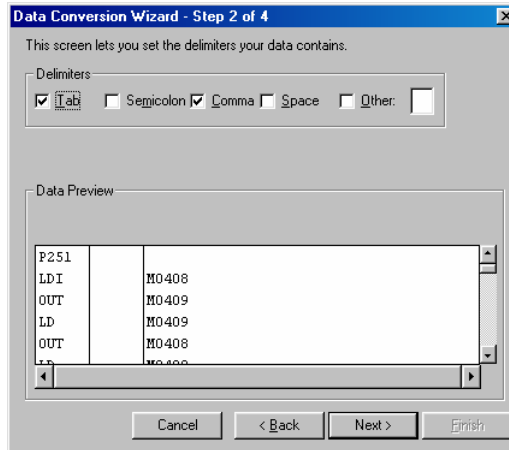


6. PLC PROGRAM DEVELOPMENT

6.6 Converting the Data Using GX Converter

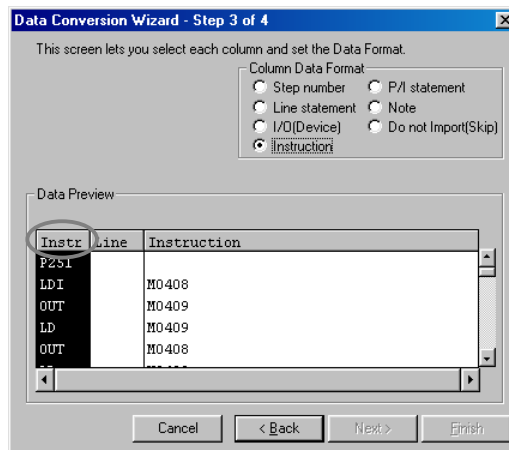
2) Data conversion wizard 2/4

Choose [Delimiters]-[Tab] and click [Next>].



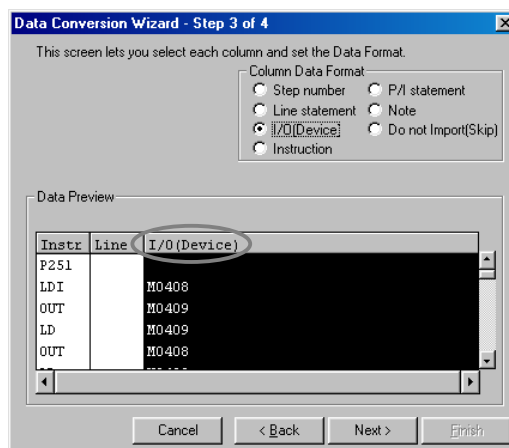
3) Data conversion wizard 3/4

Choose to highlight the Command column part in the [Data Preview] list and choose [Column Data Format]-[Instr].



4) Data conversion wizard 3/4

Further, choose to highlight the Argument column part in the [Data Preview] list and choose [Column Data Format]-[I/O(Device)]. Click [Next>].

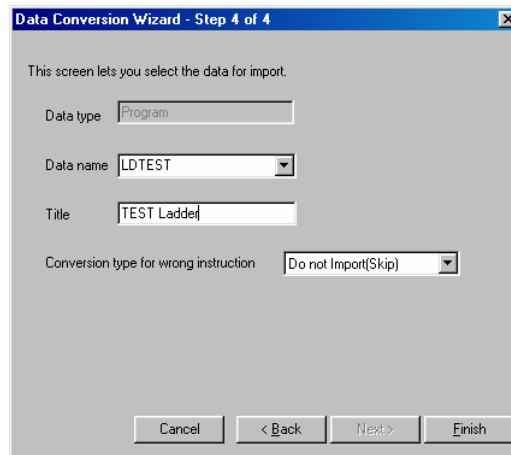


6. PLC PROGRAM DEVELOPMENT

6.6 Converting the Data Using GX Converter

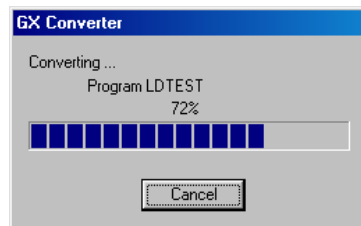
5) Data conversion wizard 4/4

Set the program name used on GX Developer at [Data name] column and a ladder annotation at [Title] column, and click [Finish].



6) Completion

The setting is complete when the following completed dialog appears after the converting dialog. Click [OK].



7. PLC MESSAGE DEVELOPMENT

7.1 Development Procedure

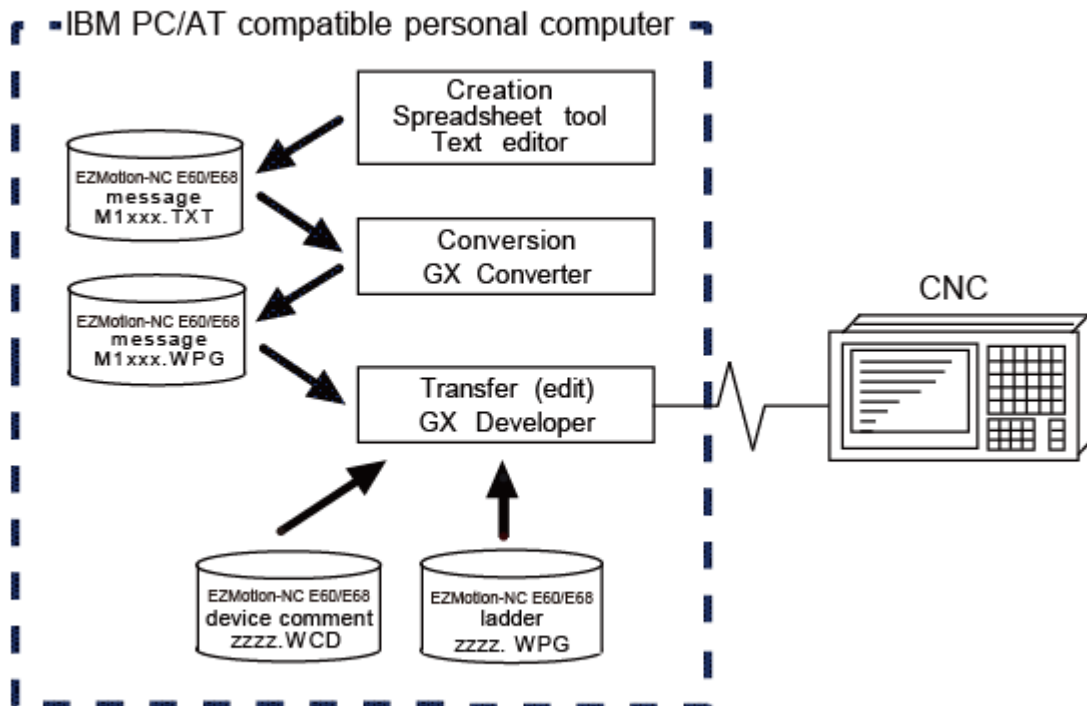
7. PLC MESSAGE DEVELOPMENT

This chapter describes a procedure for developing PLC-related data such as alarm messages, operator messages, and PLC switches.

7.1 Development Procedure

There are the following two methods as a general development procedure of message data.

- 1) Making conversion into GX Developer data using a general text editor or spreadsheet tool and data conversion package.
(When there is a large volume of message data and you want to control them with a commercially available tool, for example)
- 2) Entering messages directly from GX Developer
(When there is a small volume of message data or when addition or correction is to be made, for example)



7. PLC MESSAGE DEVELOPMENT

7.1 Development Procedure

7.1.1 Using a general text editor

1) Creation

The message data is described using a general text editor. The description method and format will be described later.

2) Conversion

The conversion from text data to GX Developer data is carried out using the "GX Converter (data conversion software package)".

3) Transfer

With the GX Developer, the message data is handled as a PLC program interlinear comment, and can also be edited.

The message data is transferred to the CNC using the GX Developer, in the same manner as the ladder program.

7.1.2 Entering messages directly from GX Developer

1) Creation

The message data is described directly from GX Developer. The message data is handled as a PLC program interlinear comment by GX Developer. The description method and format will be described later.

2) Transfer

The message data is transferred from GX Developer to the CNC in the same manner as the ladder program.

7. PLC MESSAGE DEVELOPMENT
7.2 Message Data Description Method

7.2 Message Data Description Method

The message data can be described as text data by a general text editor and also by commercially available spreadsheet software in addition to the direct input with GX Developer.

7.2.1 Description Format

Message data is classified into setting areas to store the setting for each message and message areas to store message data. It is described in the following respective description format.

1) Setting area

The message length and No. of messages are set for each message in the setting area. The message data region secured by the CNC can be adjusted to the most efficient status using these settings. The respective maximum values are set if nothing is set. (Refer to "7.2.3 Precautions" for the maximum values.)

;\$, message classification code, maximum message length, No. of messages [CR]

2) Message area

The message area is described using the following description format.

The description format cannot be abbreviated. Comma(,) and [CR] must be described, even the message character string is blank.

Message classification	Description format
Alarm message	;\$A, index No., data register No., message character string [CR]
Operator message	;\$O, index No., data register No., message character string [CR]
PLC switch	;\$P, switch No., message character string [CR]
Comment message	;\$M, device, device No., message character string [CR]

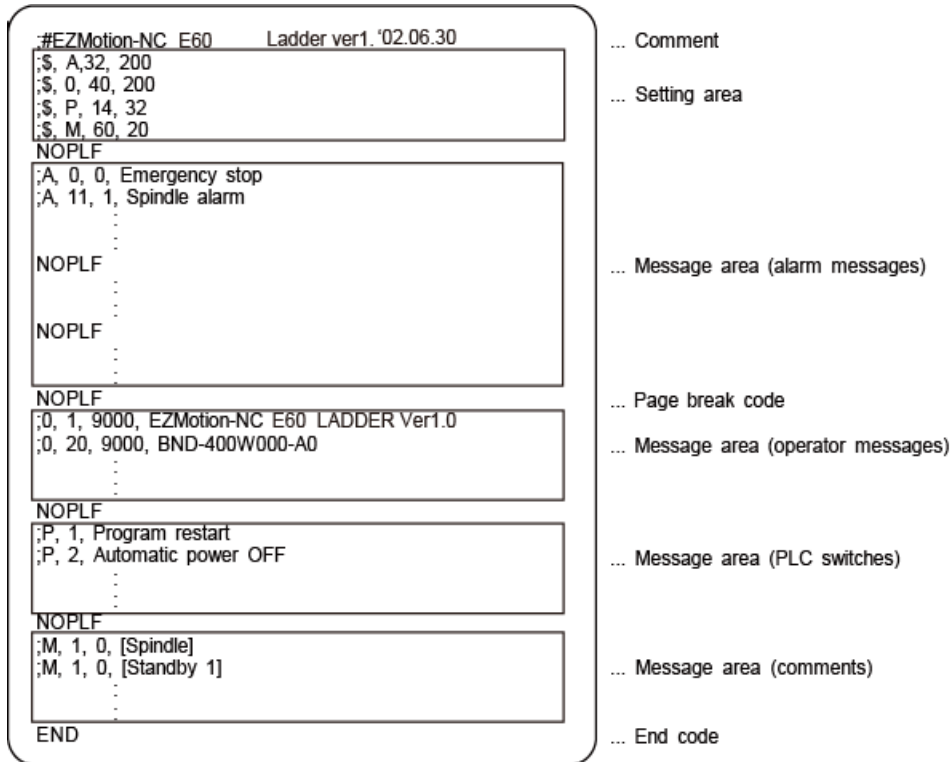
Message classification code	: A one-byte alphabetic character expressing each message classification
Index No.	: One-byte number (0 to No. of messages in the setting area - 1)
Switch No.	: One-byte number (0 to No. of messages in the setting area - 1)
Data register No.	: One-byte number
Device	: One-byte number (1 or 2)
Device No.	: One-byte number (0 to 10)
Message character string	: One-byte alphanumeric character, shift JIS Code 1 character, No. of characters in the setting area message length. Semicolons, commas, spaces and tabs can also be used. Note that the tab at the head of the message character string is ignored.
Semicolon(;)	: Message data identification code
Comma(,)	: Separator between each description (a comma only is used to leave a message character string blank)
[CR]	: Line feed code, (CR/LF) or (LF).

7. PLC MESSAGE DEVELOPMENT

7.2 Message Data Description Method

7.2.2 Description Method

The message data is described as text data by the following description format.



1) Comment

Statements having a semicolon (;) at the head of the line, in a different format than described in "7.2.1 Description format", are regarded as comments. These comments are handled as comment data in the GX Developer also, but are erased during the transfer to the CNC. An error will occur if there is no semicolon at the head of the line.

2) Setting area

Each message is set here. This area must be described before the message area of the relevant message. That setting will be ignored if it is described in the middle of or after the relevant message description.

3) Message area

Collect similar messages in a group and describe them. There is no description order in the respective messages, but the latter description is validated if there are descriptions with the same factors (index No., etc.).

4) Page break code

A page break code is described at one or more places approx. every 15 lines in the setting area and message area. The message data may skip if there is no page break code.

7. PLC MESSAGE DEVELOPMENT

7.2 Message Data Description Method

5) End code

An end code is described at the end of the description. Description after the end code are ignored.

An error will occur if there is no end code.

7.2.3 Precautions

No. of characters, quantity limitations, handling of information other than settings, handling of information other than format are described below.

1) Message data maximum value

Processing will be carried out with the following values considered as the maximum values if the setting is not carried out in the setting area, or if the description position in the setting area is illegal.

Message classification	Max. message length	Max. No. of messages	Data size by multiplying max. message length by max. No. of messages
Alarm messages	32 byte	512	16 Kbyte
Operator messages	60 byte	512	30 Kbyte
PLC switches	14 byte	32	0.5 Kbyte
Comments	60 byte	100	6 Kbyte

[Note] Two-byte data in the message character string is handled as two characters.
GX Developer accepts 64 characters as an interlinear comment. However, since that includes information other than a message character string (e.g. message classification code, index No. and data register No.), the message character string is actually up to 58 characters long.

2) When the setting value and message data do not match

When the message data contents (such as index No, switch No. and message character string) overflows from the settings in the setting area, the data that overflowed is ignored.

7. PLC MESSAGE DEVELOPMENT

7.3 Converting Data into GX Developer Format

7.3 Converting Data into GX Developer Format

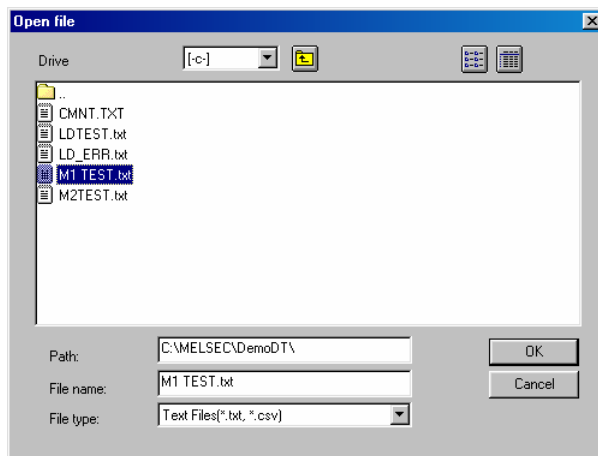
Convert the message data, which was described using a text editor or like, into GX Developer data in the following method. Use "GX Converter (data conversion software package)" for conversion. GX Converter can be started from the GX Developer menu.

7.3.1 Starting GX Converter and specifying the file to be converted

Perform the following operation from GX Developer to start GX Converter (read).

[Project] → [Import file] → [Import from TEXT ,CSV format file]

On the following screen, specify the file to be converted (M1TEST.TXT) and click [OK].

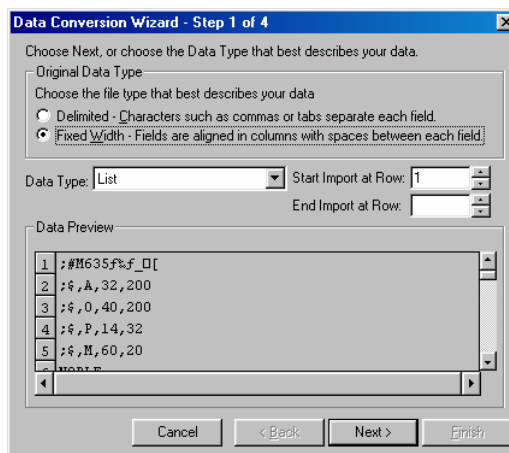


7.3.2 Conversion format setting

Set the conversion format on the following data conversion wizard screen.

1) Data conversion wizard 1/4

Choose [Original Data Type]-[Fixed Width] and [Data Type]-[List], and click [Next>].

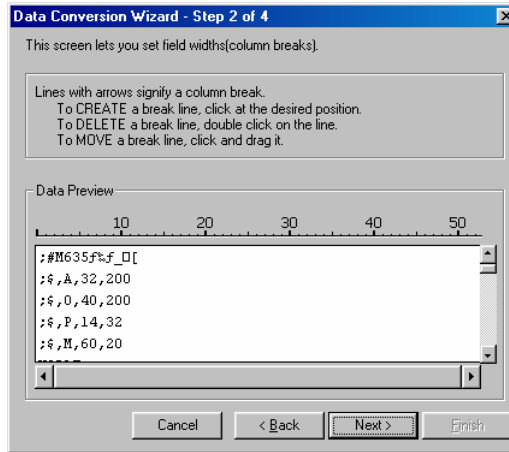


7. PLC MESSAGE DEVELOPMENT

7.3 Converting Data into GX Developer Format

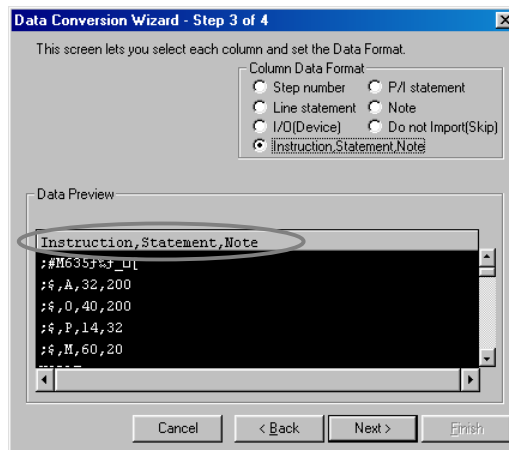
2) Data conversion wizard 2/4

Just click [Next>].



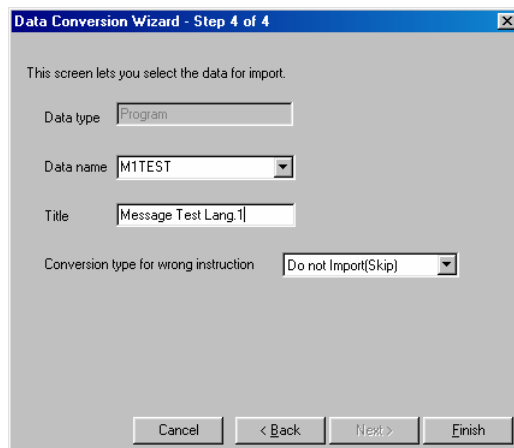
3) Data conversion wizard 3/4

Choose to highlight the command column part in the [Data Preview] list and choose [Column Data Format]-[Instruction ,Statement ,Note]. Click [Next>].



4) Data conversion wizard 4/4

Set the program name used on GX Developer in [Data name] and a data annotation in [Title], and click [Finish]. The setting is complete when the completed dialog appears. Click [OK].



7. PLC MESSAGE DEVELOPMENT

7.4 Entering/Editing Data Using GX Developer

7.4 Entering/Editing Data Using GX Developer

The message data in GX Developer are handled as the "integrated type interlinear statements" of a PLC program. "Integrated type interlinear statements" are interlinear comments provided to assist the understanding of the PLC program, and those transferred to the CNC together with the PLC program are called the "integrated type".

"Interlinear statements" can be displayed and edited using [Ladder] or [Instruction list].

7.4.1 Interlinear statement display using circuit display

1) Display of project data list

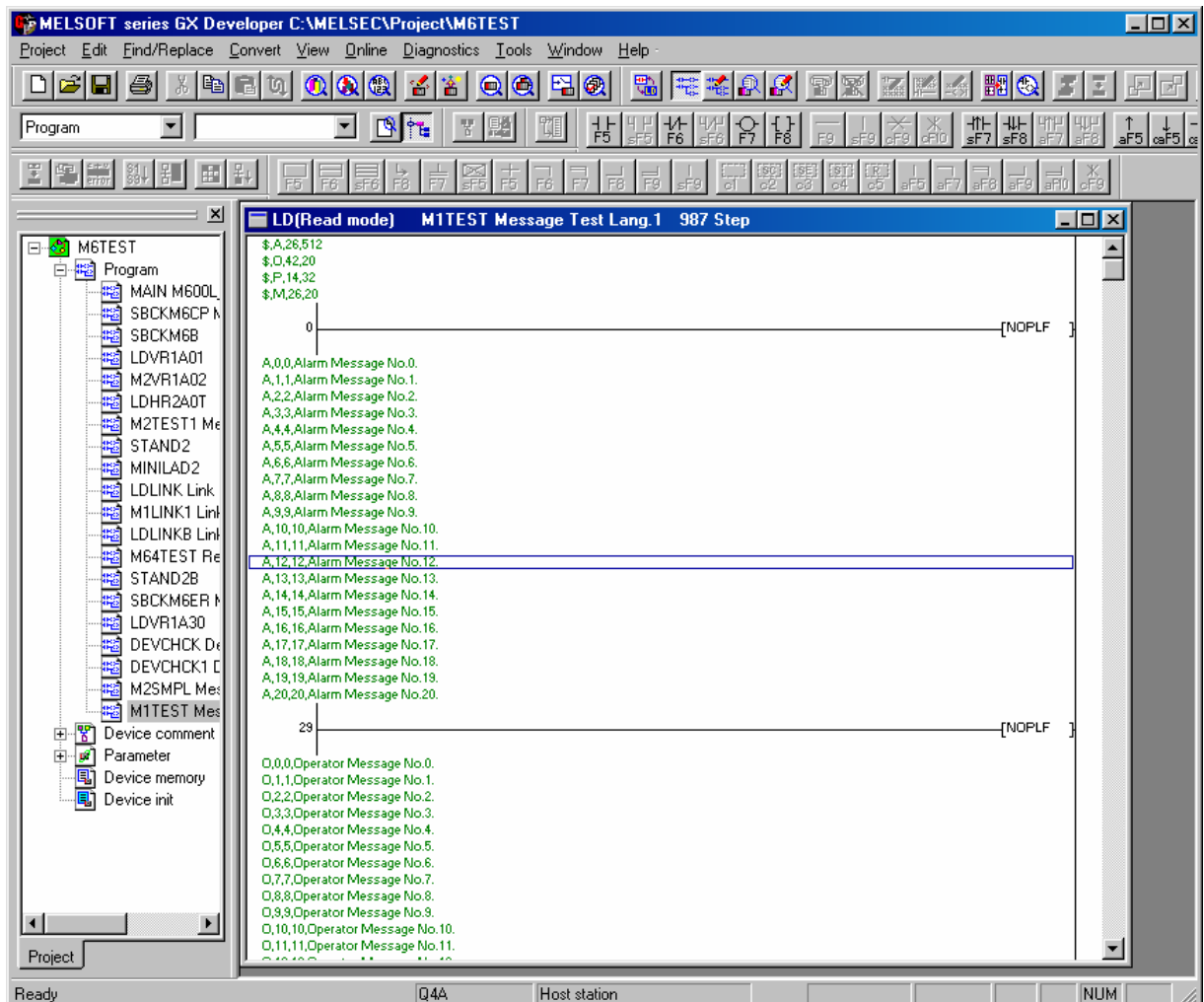
Perform the following operation to display the Project data list window and double-click the file name to display the edit screen. First, the normal ladder screen appears.

[View] → [Project data list], then double-click [File name you want to display].

2) Display of message data

Perform the following operation to display the message data that are integrated type interlinear statements.

[View] → [Statement]



7. PLC MESSAGE DEVELOPMENT

7.4 Entering/Editing Data Using GX Developer

7.4.2 Interlinear statement display using list display

1) Display of project data list

Perform the following operation to display the Project data list window and double-click the file name to display the edit screen. First, the normal ladder screen appears.

[View] → [Project data list], then double-click [File name you want to display].

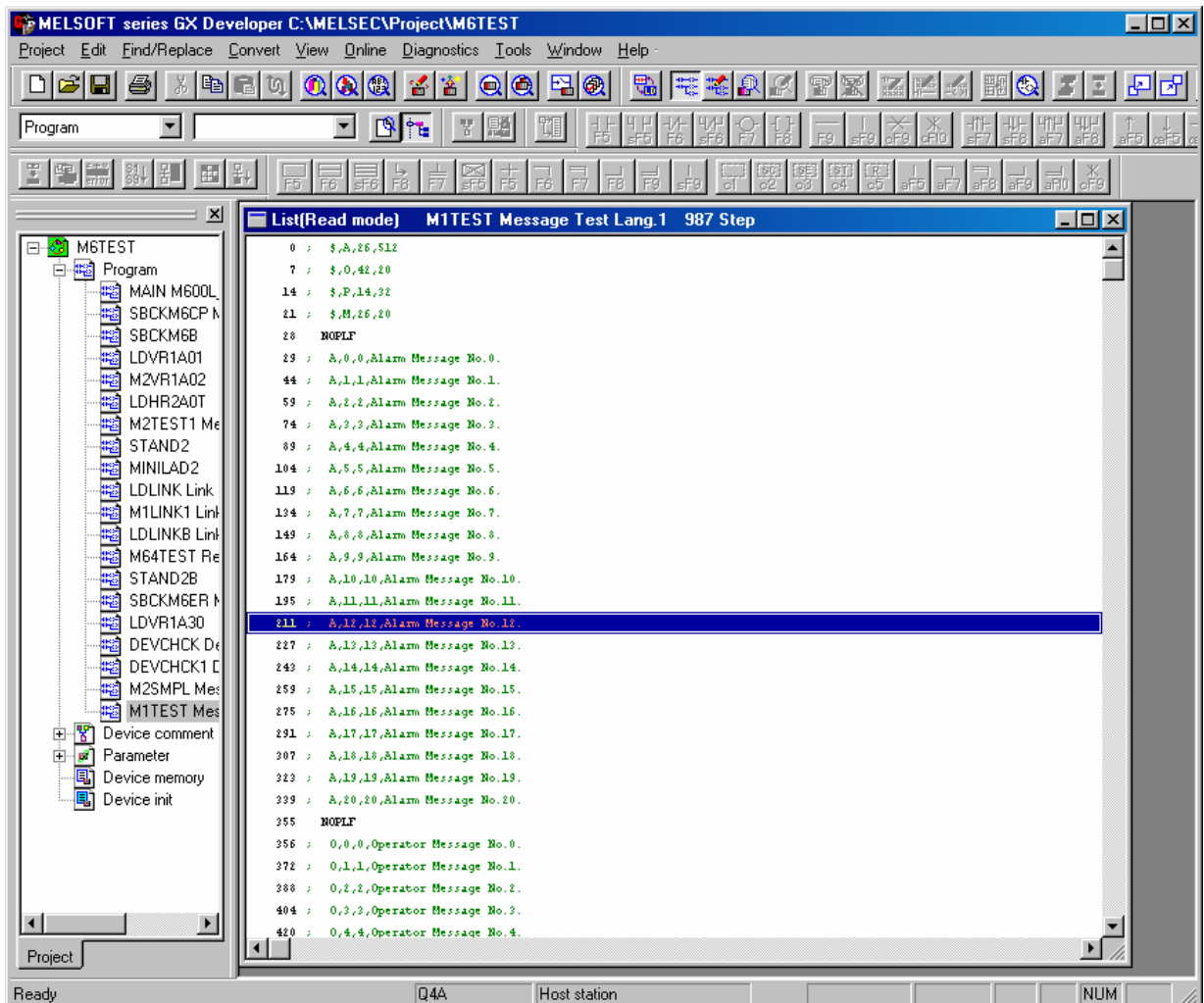
2) Display of list data

Perform the following operation to display the list data. The list display also shows the message data that are integrated type interlinear statements.

[View] → [Instruction list]

Perform the following operation to return to the circuit display.

[View] → [Ladder]



7. PLC MESSAGE DEVELOPMENT

7.4 Entering/Editing Data Using GX Developer

7.4.3 Editing of integrated type interlinear statements

1) Circuit display

On the circuit display screen that shows the integrated type interlinear statements, double-clicking the interlinear statement you want to edit displays the following dialog. Perform editing operation on the dialog and click [OK] or press [Enter].



2) List display

On the list display screen, double-clicking the interlinear statement you want to edit displays the following dialog. Perform editing operation on the dialog and click [OK] or press [Enter].

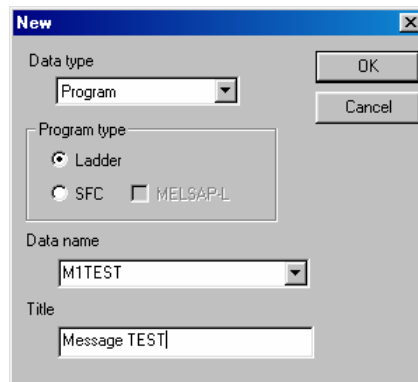


3) Entering new message data

- Displaying new edit screen

Perform the following operation to display the [New] dialog, and set the [Data name] and [Title]. After setting, click [OK].

[Project] → [Edit Data] → [New]



- Changing to list display mode

Perform the following operation to display the list data.

[View] → [Instruction list]

- Entering message data

Press "Enter" on the "END" line, enter data as in the section above "List display", and then press "Enter" on the next line and enter message data.



7. PLC MESSAGE DEVELOPMENT

7.5 Writing to the CNC

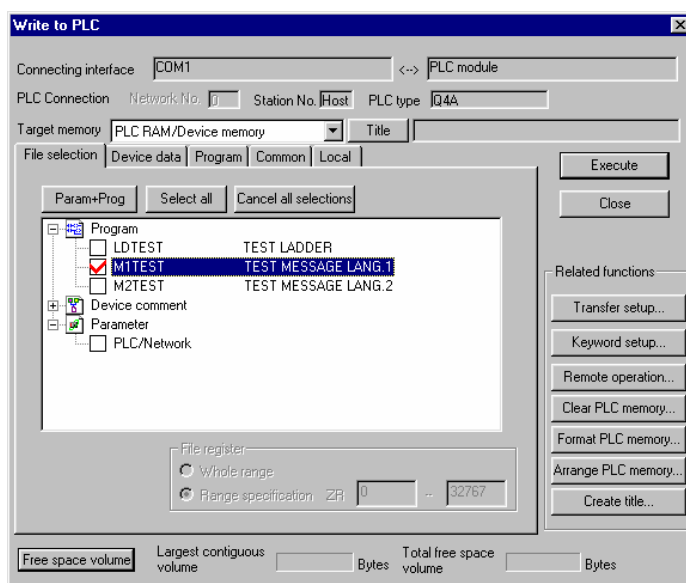
7.5 Writing to the CNC

The following shows the method of transferring a message from the GX Developer to the CNC. The transfer method is the same as the ladder code transfer method. Ladder codes and message data are distinguished by their file names only.

Perform the following operation to display the [Write to PLC] screen, and choose the file to be written.

[Online] → [Write to PLC]

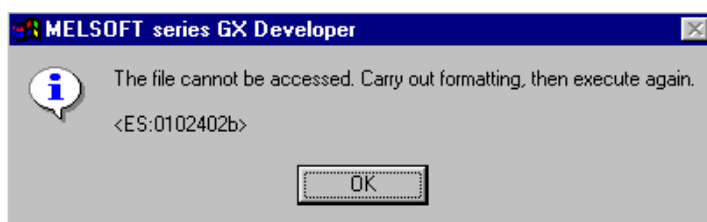
The following example transfers a message first language file "M1TEST.GPG".



[Note] Restrictions for writing message data

As for message data, only the same file name can be rewritten.

The following error dialog is displayed if the message data having the different name in the same classification is rewritten. (Example: When the message file "M1DATA" is rewritten to "M1TEST".)



In such case, delete the corresponding file in the CNC first, and then execute writing. (It is not necessary to execute the format.)

The deletion screen is displayed by the following operation. For details, refer to the Operating Manual.

[Online] → [Delete PLC data]

7.6 Reading and Verifying from the CNC

The following shows the method of reading and verifying a message from the CNC to the GX Developer. The method of reading and verifying is the same as that of ladder codes. Ladder codes and message data are distinguished by their file names only.

7.6.1 Menu Selection/Screen Operation

Refer to the following sections for operation methods.

For read : "6.3 Reading the PLC Program from the CNC"
For verification : "6.4 Verifying the PLC Programs"

7.6.2 Message Read Format

The message description format was shown in "7.2.1 Description format", but there are no special rules concerning provision of descriptions in the setting area or the order of message description in the message area. For that reason, the description format may differ between transfer and reading of the message data.

The following shows the format during reading as the "Standard description format".

Standard description format of message data

Alarm message setting	...(1)
Operator message setting	
PLC switch setting	
Comment message setting	
Alarm messages	...(2)
Operator messages	...(3)
PLC switches	...(4)
Comment messages	...(5)
NOPLF	
END	

(1) Setting area

The settings are described in order of alarm, operator, PLC switch and comment.
The maximum value is described if the setting is abbreviated.

(2) Alarm messages

Each message data is described in order of the index Nos.

(3) Operator messages

The same as the alarm messages.

(4) PLC switches

Each message data is described in order of the switch Nos.

(5) Comment messages

These messages are described in the same order as described before transfer.

(6) Others

- Spaces and tabs are not included before and after the comma(,) separating the message data factors.
- The message character string is handled the same as normal data even when blank.
- The NOPLF code between messages is described to the position to which the message data following the NOPLF code during transfer moved.

8. DEVICE COMMENT CREATION

8.1 Development Procedure

8. DEVICE COMMENT CREATION

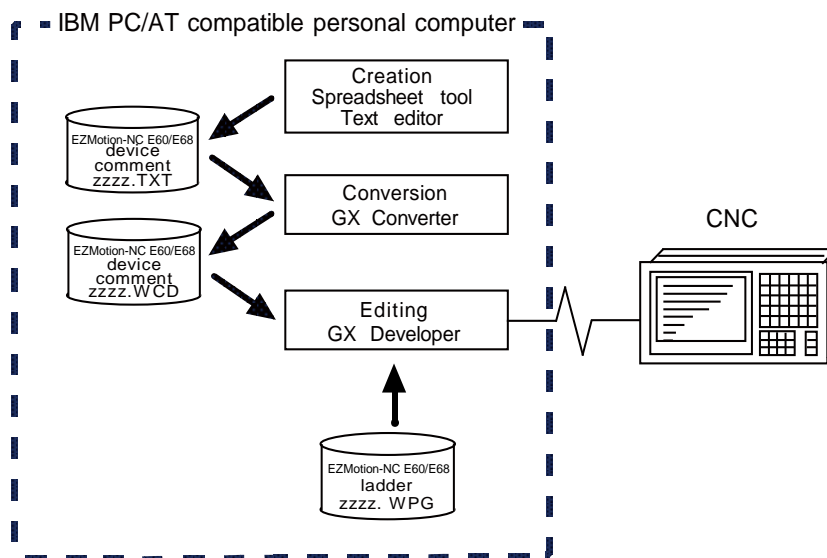
There are no EZMotion-NC E60/E68-specific operations for device comments. Therefore, refer to the operating manual for the development method. This section describes the device comment development procedure outline and the development method using a general-purpose tool.

8.1 Development Procedure

There are the following two methods as a general development procedure of device comments.

1) Indirect entry

In this method, device comments are converted into GX Developer data using a general text editor or spreadsheet tool and data conversion package. Use this method when you want to divert the device comments of PLC4B or when a device comment volume is large and you want to control them with a commercially available tool, for example.



2) Direct entry

In this method, device comments are entered directly from GX Developer. Use this method when a device comment volume is small or when addition or correction is to be made, for example.

There are the following three methods for direct entry from GX Developer. Refer to the operating manual for details.

- Creating comments on the device comment edit screen
- Creating device comments after circuit creation during ladder circuit creation
- Making addition/correction to device comments in the created ladder circuit

8. DEVICE COMMENT CREATION
8.2 Description Method for Indirect Entry

8.2 Description Method for Indirect Entry

The following explains the description method for creating device comments using a spreadsheet tool or like. The following example describes device comments using a spreadsheet tool.

	A	B	C	
1	X0	SAFETY	Safety unit run	Describe device, equipment name and comment on the same line.
2	X1	COVER	Safety cover close	
3	X2	READY	Operation ready complete	
4	X3	OIL-M	Oil pressure motor	
5	X4	PARTS-A	Parts A ready complete	

↑	↑	↑
Device-only column	Equipment name-only column	Comment-only column

Column data format	Explanation
Device	(1) Describe a device. <ul style="list-style-type: none"> Conversion cannot be made if a device has not been described. Always describe a device. (2) A device is a required item. Describe it in one-byte code.
Comment	(1) Describe a comment. <ul style="list-style-type: none"> It is not registered if the device part on the same row is blank or the device is illegal. (2) You can describe a comment of up to 32 characters.
Equipment name	(1) Describe an equipment name. <ul style="list-style-type: none"> It is not registered if the device part on the same row is blank or the device is illegal. (2) You can describe an equipment name of up to 8 characters.

[Note] Describe data in any of the following combinations.

- (1) Device, equipment name, comment
- (2) Device, comment
- (3) Device, equipment name

Save the above data in the CSV format. The following example shows the above data saved in the CSV format.

X0, SAFETY, Safety unit run
 X1, COVER, Safety cover close
 X2, READY, Operation ready complete
 X3, OIL-M, Oil pressure motor
 X4, PARTS-A, Parts A ready complete

8. DEVICE COMMENT CREATION

8.3 Converting Comment Data into GX Developer Data

8.3 Converting Comment Data into GX Developer Data

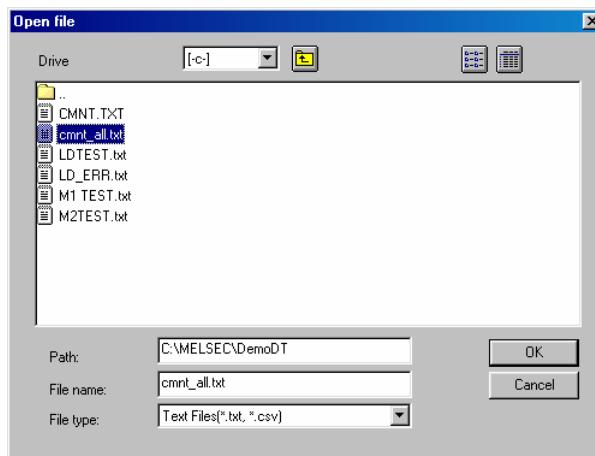
Convert the comment data (CSV format), which was created using a spreadsheet tool or like, into GX Developer data in the following method. Use "GX Converter (data conversion software package)" for conversion. GX Converter can be started from the GX Developer menu.

8.3.1 Starting GX Converter and specifying the file to be converted

Perform the following operation from GX Developer to start GX Converter (read).

[Project] → [Import file] → [Import from TEXT ,CSV format file]

On the following screen, specify the file to be converted (cmnt_all.txt) and click [OK].

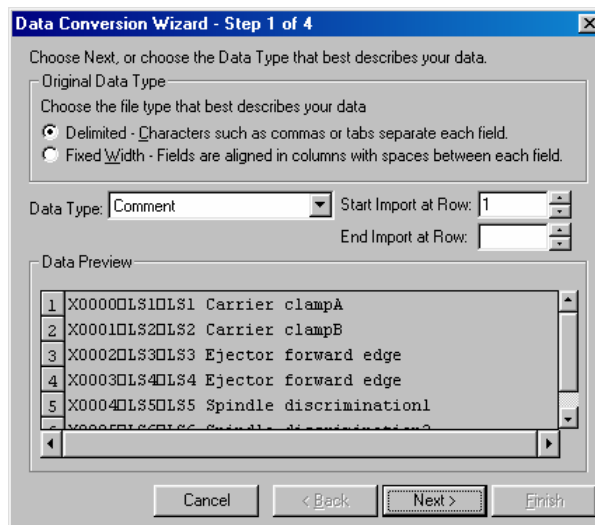


8.3.2 Conversion format setting

Set the conversion format on the following data conversion wizard screen.

1) Data conversion wizard 1/4

Choose [Original Data Type]-[Delimited] and [Data Type]-[Comment], and click [Next>].

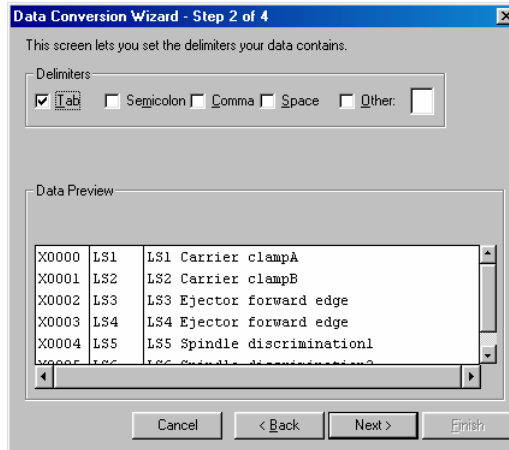


8. DEVICE COMMENT CREATION

8.3 Converting Comment Data into GX Developer Data

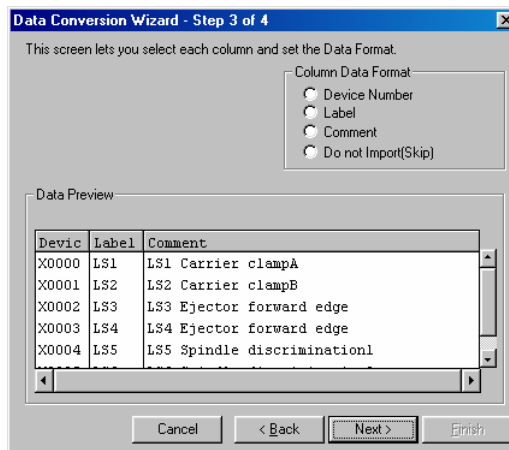
2) Data conversion wizard 2/4

Choose [Delimiters]-[Tab] and click [Next>].



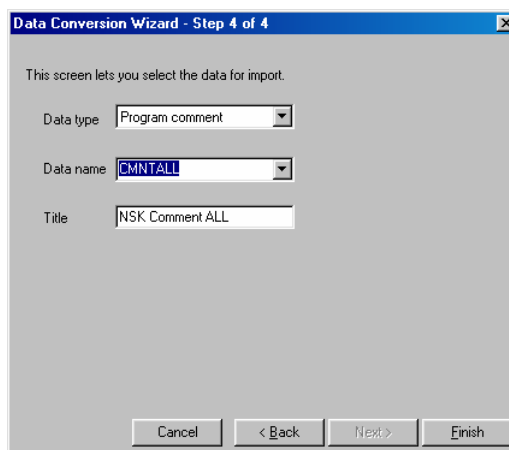
3) Data conversion wizard 3/4

Make sure that the column parts in the [Data Preview] list are in order of [Device Number], [Label] and [Comment], and click [Next>].



4) Data conversion wizard 4/4

Choose [Data type]-[Common comment] or [Program comment], set the comment file name used on GX Developer in [Data name] and a comment annotation in [Title], and click [Finish].



8. DEVICE COMMENT CREATION

8.3 Converting Comment Data into GX Developer Data

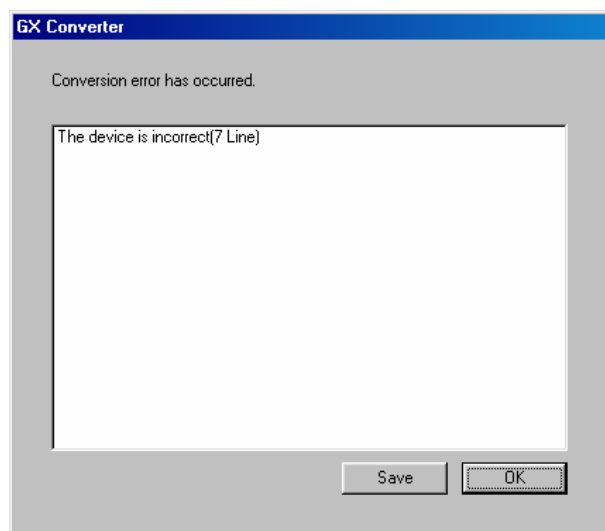
5) Completion

The setting is complete when the following dialog appears. Click [OK].



6) Error status

If an error occurred during conversion, its status and the line where it occurred are displayed.



9. RELATIONSHIPS BETWEEN GX Developer AND ONBOARD FUNCTIONS
9.1 Function Differences

9. RELATIONSHIPS BETWEEN GX Developer AND ONBOARD FUNCTIONS

The CNC has onboard functions as the PLC development environment that does not use GX Developer. The onboard functions have monitoring and editing functions for ladder program testing and adjustment.

This chapter explains the items related to GX Developer and onboard functions.

9.1 Function Differences

The onboard functions do not have the following functions among the main functions as the PLC development environment.

- **Function to create a new ladder program**
- **All PLC message-related functions**
- **All device comment-related functions**

9.2 Specification Differences

There are the following differences in specifications between GX Developer and onboard functions.

(1) Restriction specifications related to circuit display/editing

The restriction specifications related to circuit display/editing differ between GX Developer and onboard functions. Since the restriction specifications of the onboard functions are narrower than those of GX Developer, care should be taken when creating a circuit on the GX Developer side.

(a) Restriction specifications

		Onboard	GX Developer
Display specifications of single screen	Number of contacts	8 contacts, 1 coil	11 contacts, 1 coil
	Number of lines	9 lines	Depending on window size and screen reduction ratio
Restriction specifications of single circuit		18 lines (return count: 0) (Note 1)	24 lines of 200 or more series contacts

(Note 1) The relationships between the return count and the maximum value of the vertical width of the circuit that can be created at that time are as follows.

Return count (times)	0	1	2	3	4	5	6	7	8
Vertical width of circuit (lines)	18	11	7	5	4	3	3	2	2

Excess over the above will result in "LADDER ERROR".

(b) Handling of the circuit that exceeds the restriction specifications

If the circuit created on the GX Developer side exceeds the circuit restriction specifications of the onboard functions, the following message is displayed.

Operation	Message	Handling
When "read" or "monitor" function is used to display circuit	"DISPLAY OVER FLOW"	Circuit is not displayed. (Only bus is displayed)
When "write", "insertion", "deletion" or "conversion" function is selected	"NOT WRITE"	Editing operation is inhibited.

9. RELATIONSHIPS BETWEEN GX Developer AND ONBOARD FUNCTIONS

9.2 Specification Differences

(2) Step count calculation specifications

The step count specifications in the individual commands of the MELSEC and EZMotion-NC E60/E68 differ in some commands. Therefore, steps may be different when the same circuit is displayed by GX Developer and onboard functions.

This will give rise to a problem especially when the circuit diagram printed from GX Developer is used for maintenance with the onboard functions. To resolve this problem, a tool (PCNV6LM) to print a circuit diagram in the EZMotion-NC E60/E68 step specifications is available.

(3) Command character string display specifications

The commands of the EZMotion-NC E60/E68 original specifications that cannot be handled by GX Developer are used after they have been replaced by the substitute commands that can be handled by GX Developer. When these commands are displayed by the onboard functions, the specifications are as indicated below.

Classification	Command symbol	Onboard display	GX Developer display
Bit	DEFR	—[DEFR D]—	D — ↑ —
Average value	AVE	—[AVE S D n]—	—[S.AVE S D n]—
Carry flag set	STC	—[STC]—	—[S.STC]—
Carry flag reset	CLC	—[CLC]—	—[S.CLC]—
ATC	ATC	—[ATC Kn Rn Rm Mm]—	—[S.ATC Kn Rn Rm Mm]—
ROT	ROT	—[ROT Kn Rn Rm Mm]—	—[S.ROT Kn Rn Rm Mm]—
TSRH	TSRH	—[TSRH Rm Rn Mn]—	—[S.TSRH Rm Rn Mn]—
DDBA	DDBA	—[DDBA Rn/Dn]—	—[S. DDBA Rn/Dn]—
DDBS	DDBS	—[DDBS Rn]—	—[S. DDBS Rn]—
CAL1	CAL1	—[CAL1 Pn]—	—[S. CAL1 Pn]—
BIT	LDBIT	[<= S1 n]—	[<= S1 n]—
	ANDBIT	—[<= S1 n]—	—[<= S1 n]—
	ORBIT	└[<= S1 n]┘	└[<= S1 n]┘
	LDBII	[<> S1 n]—	[<> S1 n]—
	ANDBII	—[<> S1 n]—	—[<> S1 n]—
	ORBII	└[<> S1 n]┘	└[<> S1 n]┘

(4) Circuit representation specifications

The circuit of the END command is not displayed by the onboard functions.

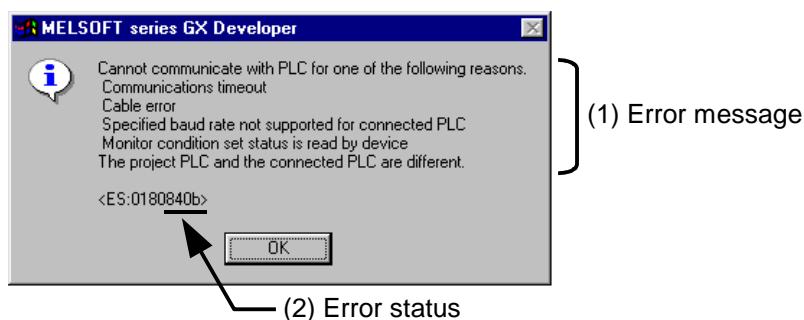
10. ERROR STATUS

10.1 GX Developer Errors

10. ERROR STATUS

10.1 GX Developer Errors

If an error has occurred in GX Developer, the following dialog appears. The error message and error status are displayed in the dialog.



CAUTION

When an error occurred at GX Developer On-line function, the error message may not explain exactly the state in the CNC side. Always refer to the error list.

The following table indicates the causes and remedies of the errors that can occur during online operation with the CNC. For other errors, refer to the operating manual.

Status	Message	Cause	Remedy
4002	The executed function is not supported.	An operation outside the specification was performed.	Check the operation procedure.
4010	The PLC is in RUN mode, so writing cannot be done.	The PLC of the NC is running.	After stopping the PLC of the NC, start execution again.
4021	The applicable drive is not ready.	The specified target memory does not exist or is not in a usable status.	Change the target memory.
4029	Insufficient file capacity.	An attempt was made to write a file that exceeds the storage capacity.	Examine the file structure that falls within the limited capacity.
402b	The file cannot be accessed.	An attempt was made to write the same type of file.	After deleting the same type of file from the NC side, start execution again.
4031	The specified device No. exceeds the permissible range.	The access request given is outside the accessible device range.	Check the number range of each device.
4052	The file is write protected.	The specified target memory is a write-disabled device (F-ROM).	Specify "internal RAM" as the target memory.
4053	Writing to the flash ROM failed.	An error occurred in the process to erase or to write data into the flash ROM.	Perform initialization for the PLC data storage area. If the normal state is not recovered in spite of remedies, the hardware may have inferiority or deterioration aspects. Contact our system department.

10. ERROR STATUS

10.1 GX Developer Errors

Status	Message	Cause	Remedy
4070	The program before correction differs from the registered program.	A ladder command outside the specification is included.	Perform verification to identify the command that is the cause of the problem.
4080	Incorrect abnormal.	When the "Read from PLC" or "Verify with PLC" is executed (CNC -> PLC): The data outside the specification is included in the specified file.	A ladder or message in the CNC side may be damaged. Delete the corresponding file to retry, or perform initialization for the PLC data storage area. If the normal state is not recovered in spite of remedies, contact our system department.
		When the "Write to PLC" is executed (PLC -> CNC): Two or more END commands are included in the specified ladder file.	Edit the ladder program in the list mode to delete END commands except only one at the last line.
8201	Cannot communicate with the PLC.	The communication cable is faulty. <ul style="list-style-type: none"> • Not connected • DTR signal off 	Check the serial port setting and cable connection.
840b	Cannot communicate with PLC for one of the following reasons.	There is no response from the NC. <ul style="list-style-type: none"> • The NC has not started properly. • The connection channel of the NC side serial port is different. • The serial cable outside the specifications is used for signal connection. 	Check the following. <ul style="list-style-type: none"> • CNC side status • Cable connection • Bit selection : GX Developer communication valid

[Note] For "PLC" in the message, read "CNC".

10. ERROR STATUS

10.2 Initialization for PLC Data Storage Area

10.2 Initialization for PLC Data Storage Area

When an error has occurred during writing to the CNC, or when the normal state is not recovered in spite of error handling, perform initialization for the PLC data storage area, and retry from the first.

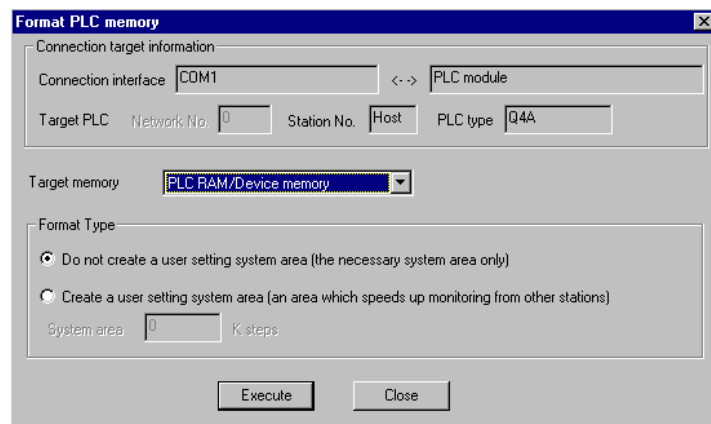
[Note] When this operation is performed, all ladders and messages currently stored in the CNC are erased. Do not use this operation other than when the error cannot be solved.

10.2.1 Operation procedure

Perform the following operation from GX Developer to start the operation screen.

[Online] → [Format PLC memory]

On the following screen, click [Execute].



[Note] As [Target memory], only "PLC RAM/Device memory" is valid.
The setting is not necessary for [Format Type].

The setting is completed when the following dialog appears. Click [OK]. All data stored in the F-ROM have been deleted and initialized.



**APPENDIX 1. DIFFERENCES IN DEVELOPMENT ENVIRONMENT BETWEEN PLC4B
AND EZMotion-NC E60/E68**

Appendix 1.1 Development Tools, etc.

**APPENDIX 1. DIFFERENCES IN DEVELOPMENT ENVIRONMENT
BETWEEN PLC4B AND EZMotion-NC E60/E68**

This section explains differences between the PLC4B development environment and EZMotion-NC E60/E68 PLC development environment.

Appendix 1.1 Development Tools, etc.

In the EZMotion-NC E60/E68, a user PLC development environment that used the MELSEC PLC development tool was constructed. Consequently, the tools used at each development process differ. A comparison of each process is shown in "Table 1.1 List of development tool comparisons". Refer to the respective Instruction Manuals for details on each tool.

Table 1.1 List of development tool comparisons

Development process		PLC4B development environment	MELSEC PLC development environment
List -> ladder conversion	Tool	PLC development software (list section) (LIST4B) PC9801/PC-AT	GX Converter
	Hardware		PC-AT
Ladder creation	Tool	PLC development software (ladder section) (PLC4B) PC9801/PC-AT	GX Developer
	Hardware		PC-AT
Message creation	Tool	PLC development software (ladder section) (PLC4B) PC9801/PC-AT	Text editor -> GX Converter -> GX Developer
	Hardware		PC-AT
Transfer to the CNC	Tool	PLC4B <-> RS-232C <-> controller	GX Developer <-> RS-232C <-> CNC
	Hardware	Via RS-232C	Via RS-232C
Monitor	Tool (1) Hardware		GX Developer PC-AT <-> CNC
	Tool (2) Hardware	PLC onboard (ONBD) controller	PLC onboard CNC
ROM writing	Tool	PLC onboard -> F-ROM controller	I/O screen -> F-ROM CNC
	Hardware		
Print output	Tool (1) Hardware	PLC development software (ladder section) (PLC4B) PC9801/PC-AT	GX Developer
	Tool (2) Hardware		PC-AT
	Tool (2) Hardware	PLC onboard (ONBD) controller	

**APPENDIX 1. DIFFERENCES IN DEVELOPMENT ENVIRONMENT BETWEEN PLC4B
AND EZMotion-NC E60/E68**

Appendix 1.2 Devices and Device Assignments

Appendix 1.2 Devices and Device Assignments

PLC4B and GX Developer differ in the devices and assignments used for the user PLC development.

Table List of device differences

PLC4B device No.			GX Developer device No.		Remarks
X	X0 to X4BF	->	X0 to X4BF		
U	U0 to U17F	->	X4C0 to X63F		Not used
I	I0 to I3FF	->	X640 to XA3F		Not used
S	S0 to S1F	->	XA40 to XA5F	X	Not used
S	S40 to S5F	->	XA60 to XA7F		Not used
S	S80 to S9F	->	XA80 to XA9F		Not used
S	SC0 to SDF	->	XAA0 to XABF		Not used
Y	Y0 to Y53F	->	Y0 to Y53F		
W	W0 to W1FF	->	Y540 to Y73F		Not used
J	J0 to J63F	->	Y740 to YD7F		Not used
S	S20 to S3F	->	YD80 to YD9F	Y	Not used
S	S60 to S7F	->	YDA0 to YDBF		Not used
S	SA0 to SBF	->	YDC0 to YDDF		Not used
S	SE0 to SFF	->	YDE0 to YDFF		Not used
M	M0 to M5119	->	M0 to M5119	M	
G	G0 to G3071	->	M5120 to M8191		
F	F0 to F127	->	F0 to F127	F	
L	L0 to L255	->	L0 to L255	L	
E	E0 to E127	->	SM0 to SM127	SM	
T	T0 to T15	->	T0 to T15		10ms timer
Q	Q0 to Q39	->	T16 to T55		10ms timer (fixed timer)
T	T16 to T95	->	T56 to T135	T	100ms timer
Q	Q40 to Q135	->	T136 to T231		100ms timer (fixed timer)
T	T96 to T103	->	T232 to T239		100ms integrated timer
Q	Q136 to Q151	->	T240 to T255		100ms integrated timer (fixed timer)
C	C0 to C23	->	C0 to C23		
B	B0 to B103	->	C24 to C127	C	
D	D0 to D1023	->	D0 to D1023	D	
R	R0 to R8191	->	R0 to R8191	R	
A	A0, A1	->			Discontinued (replaced by D, R registers)
Z	Z	->	Z0	Z	
V	V	->	Z1		
N	N0 to N7	->	N0 to N7	N	
P	P0 to P255	->	P0 to P255	P	
K	K-32768 to K32767 K-2147483648 to K2147483647	->	K-32768 to K32767 K-2147483648 to K2147483647	K	
H	H0 to HFFFF H0 to HFFFFFFFF	->	H0 to HFFFF H0 to HFFFFFFFF	H	

**APPENDIX 1. DIFFERENCES IN DEVELOPMENT ENVIRONMENT BETWEEN PLC4B
AND EZMotion-NC E60/E68
Appendix 1.3 PLC Commands**

Appendix 1.3 PLC Commands

The EZMotion-NC E60/E68 and the GX Developer differ in usable types and numbers of PLC commands.

Differences are classified into the three following types.

- Commands that cannot be handled with the GX Developer
- Commands that the format differs from that of the GX Developer
- Commands that can be used by the GX Developer, but cannot be used by the EZMotion-NC E60/E68

Appendix 1.3.1 Commands that cannot be Handled with the GX Developer

Commands that cannot be handled with the GX Developer are substituted with alternate commands that can be handled with the GX Developer. Commands that can be alternated are shown in "Table 1.3.1 Table of alternate command correspondence".

When some commands described in "Table 1.3.1 Table of alternate command correspondence" are created with the GX Developer with the EZMotion-NC E60/E68 command sign left as is, an error results and creation cannot be carried out. Create the commands using the GX Developer command sign described in the correspondence table.

When PLC programs containing alternate commands are written from the GX Developer to the EZMotion-NC E60/E68, they are rewritten to the EZMotion-NC E60/E68 commands.

Table 1.3.1 Table of alternate command correspondence

Classification	EZMotion-NC E60/E68 command		GX Developer command	
	Command sign	Symbol	Command sign	Symbol
Bit	DEFR	—[DEFR D]—	ANDP	$\begin{array}{c} D \\ \uparrow \\ \text{---} \end{array}$
Average value	AVE	—[AVE S D n]—	S.AVE	—[S.AVE S D n]—
Carry flag set	STC	—[STC]—	S.STC	—[S.STC]—
Carry flag reset	CLC	—[CLC]—	S.CLC	—[S.CLC]—
ATC	ATC	—[ATC Kn Rn Rm]-< Mm >—	S.ATC	—[S.ATC Kn Rn Rm Mm]—
ROT	ROT	—[ROT Kn Rn Rm]-< Mm >—	S.ROT	—[S.ROT Kn Rn Rm Mm]—
TSRH	TSRH	—[TSRH Rm Rn]-< Mn >—	S.TSRH	—[S.TSRH Rm Rn Mn]—
DDBA	DDBA	—[DDBA Rn / Dn]—	S.DDBA	—[S.DDBA Rn / Dn]—
DDBS	DDBS	—[DDBS Rn]—	S.DDBS	—[S.DDBS Rn]—
CAL1	CAL1	—[CAL1 Pn]—	S.CAL1	—[S.CAL1 Pn]—
BIT	LDBIT	[BIT S1 n] —	LD<=	[<= S1 n] —
	ANDBIT	— [BIT S1 n] —	AND<=	— [<= S1 n] —
	ORBIT	└ [BIT S1 n] ┘	OR<=	└ [<= S1 n] ┘
	LDBII	[BII S1 n] —	LD<>	[<> S1 n] —
	ANDBII	— [BII S1 n] —	AND<>	— [<> S1 n] —
	ORBII	└ [BII S1 n] ┘	OR<>	└ [<> S1 n] ┘

**APPENDIX 1. DIFFERENCES IN DEVELOPMENT ENVIRONMENT BETWEEN PLC4B
AND EZMotion-NC E60/E68
Appendix 1.3 PLC Commands**

Appendix 1.3.2 Commands with the Format that Differs from that of the GX Developer

The EZMotion-NC E60/E68 and the GX Developer differ in the device types and assignments. The format of the EZMotion-NC E60/E68 "commands used by inputting or outputting an accumulator (A0, A1)" is changed so that the general word register can be designated with arguments without fixing by A0 or A1 input or output. Format-changed commands are shown in "Table 1.3.2 Table of format-changed command correspondence".

When some commands described in "Table 1.3.2 Table of format-changed command correspondence" are created with the GX Developer with the EZMotion-NC E60/E68 command sign left as is, an error results and creation cannot be carried out. Create the commands using the GX Developer command sign described in the correspondence table.

Table 1.3.2 Table of format-changed command correspondence

Classification	EZMotion-NC E60/E68 command		Format-changed command		Remarks
	Command sign	Symbol	Command sign	Symbol	
Right rotation	ROR	—[ROR n]—	ROR	—[ROR D n]—	*1
	RCR	—[RCR n]—	RCR	—[RCR D n]—	
	DROR	—[DROR n]—	DROR	—[DROR D n]—	
	DRCR	—[DRCR n]—	DRCR	—[DRCR D n]—	
Left rotation	ROL	—[ROL n]—	ROL	—[ROL D n]—	
	RCL	—[RCL n]—	RCL	—[RCL D n]—	
	DROL	—[DROL n]—	DROL	—[DROL D n]—	
	DRCL	—[DRCL n]—	DRCL	—[DRCL D n]—	
Search	SER	—[SER S1 S2 n]—	SER	—[SER S1 S2 D n]—	*2
Quantity of 1	SUM	—[SUM S]—	SUM	—[SUM S D]—	*3

*1 : D is the head No. of the rotation device

*2 : D is the head No. of the device that stores the search results

*3 : D is the head No. of the device that stores the total No. of bits

**APPENDIX 1. DIFFERENCES IN DEVELOPMENT ENVIRONMENT BETWEEN PLC4B
AND EZMotion-NC E60/E68
Appendix 1.3 PLC Commands**

**Appendix 1.3.3 Commands that can be Used with the GX Developer, but cannot be Used
by the EZMotion-NC E60/E68**

When commands that cannot be used by the EZMotion-NC E60/E68 are written from the GX Developer to the EZMotion-NC E60/E68, they are rewritten to "NOP" commands, and if they are run, an alarm will occur. (Note that commands described in "Table 1.3.1 Table of alternate command correspondence" are rewritten to the corresponding EZMotion-NC E60/E68 commands.)

"Commands that can be used by the GX Developer, but cannot be used in the EZMotion-NC E60/E68" are defined by the following expression.

"Commands that can be used by the GX Developer, but cannot be used in the EZMotion-NC E60/E68"

= "All commands described in the QnA Programming Instruction Manual"
- ("All commands described in the PLC Programming Instruction Manual"
+ "Table 1.3.1 Table of alternate command correspondence"
+ "Table 1.3.2 Table of format-changed command correspondence")

Refer to "Appendix 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer".

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.1 Sequence Commands

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer

The following command lists are excerpts from the "QnACPU Programming Manual (Common Commands)" (model name: QNACPU-P (KYOUTU) 13J522).

In these lists, the commands "marked **X**" are unavailable for the EZMotion-NC E60/E68. (When written from GX Developer to the EZMotion-NC E60/E68, they are replaced by "NOP" commands.)

Appendix 2.1 Sequence Commands

Contact commands

Classification	Command sign	Symbol
Contact	LD	
	LDI	
	AND	
	ANI	
	OR	
	ORI	
	LDP	
	LDF	
	ANDP	
	ANDF	
	ORP	
	ORF	

Coupling commands

Classification	Command sign	Symbol
Coupling	ANB	
	ORB	
	MPS	
	MRD	
	MPP	
	INV	
	MEP	
	MEF	
	EGP	
	EGF	

Output commands

Classification	Command sign	Symbol
Output	OUT	
	SET	
	RST	
	PLS	
	PLF	
	FF	
	DELTA	
	DELTAP	

Shift commands

Classification	Command sign	Symbol
Shift	SFT	
	SFTP	

Master control commands

Classification	Command sign	Symbol
Master control	MC	
	MCR	

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.2 Comparison Operation Commands

End commands

Classification	Command sign	Symbol
Program end	FEND	
	END	

Other commands

Classification	Command sign	Symbol
Stop	STOP	
No operation	NOP	
	NOPLF	
	PAGE	

Appendix 2.2 Comparison Operation Commands

Comparison operation commands

Classification	Command sign	Symbol
16-bit data comparison	LD=	
	AND=	
	OR=	
	LD<>	
	AND<>	
	OR<>	
	LD>	
	AND>	
	OR>	
	LD<=	
	AND<=	
	OR<=	
	LD<	
	AND<	
	OR<	
	LD>=	
	AND>=	
	OR>=	

Comparison operation commands (Continued)

Classification	Command sign	Symbol
32-bit data comparison	LDD=	
	ANDD=	
	ORD=	
	LDD<>	
	ANDD<>	
	ORD<>	
	LDD>	
	ANDD>	
	ORD>	
	LDD<=	
	ANDD<=	
	ORD<=	
	LDD<	
	ANDD<	
	ORD<	
	LDD>=	
	ANDD>=	
	ORD>=	

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.2 Comparison Operation Commands

Comparison operation commands (Continued)

Classification	Command sign	Symbol
Real number data comparison	LDE =	
	ANDE =	
	ORE =	
	LDE <>	
	ANDE <>	
	ORE <>	
	LDE >	
	ANDE >	
	ORE >	
	LDE <=	
	ANDE <=	
	ORE <=	
	LDE <	
	ANDE <	
	ORE <	
	LDE >=	
ANDE >=		
ORE >=		

Comparison operation commands (Continued)

Classification	Command sign	Symbol
Character string data comparison	LD\$ =	
	AND\$ =	
	OR\$ =	
	LD\$ <>	
	AND\$ <>	
	OR\$ <>	
	LD\$ >	
	AND\$ >	
	OR\$ >	
	LD\$ <=	
	AND\$ <=	
	OR\$ <=	
	LD\$ <	
	AND\$ <	
	OR\$ <	
	LD\$ >=	
AND\$ >=		
OR\$ >=		
Block data comparison	BKCMP =	
	BKCMP <>	
	BKCMP >	
	BKCMP <=	
	BKCMP <	
	BKCMP >=	
	BKCMP =P	
	BKCMP <>P	
	BKCMP >P	
	BKCMP <=P	
BKCMP <P		
BKCMP >=P		

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.2 Comparison Operation Commands

Arithmetic operation commands

Classification	Command sign	Symbol
BIN 16-bit addition/ subtraction	+	— + — S D —
	+P	— +P — S D —
	+	— + — S1 S2 D —
	+P	— +P — S1 S2 D —
	-	— - — S D —
	-P	— -P — S D —
	-	— - — S1 S2 D —
	-P	— -P — S1 S2 D —
BIN 32-bit addition/ subtraction	D+	— D+ — S D —
	D+P	— D+P — S D —
	D+	— D+ — S1 S2 D —
	D+P	— D+P — S1 S2 D —
	D-	— D- — S D —
	D-P	— D-P — S D —
	D-	— D- — S1 S2 D —
	D-P	— D-P — S1 S2 D —
BIN 16-bit multipli- cation/ division	*	— * — S1 S2 D —
	*P	— *P — S1 S2 D —
	/	— / — S1 S2 D —
	/P	— /P — S1 S2 D —
BIN 32-bit multipli- cation/ division	D*	— D* — S1 S2 D —
	D*P	— D*P — S1 S2 D —
	D/	— D/ — S1 S2 D —
	D/P	— D/P — S1 S2 D —

Arithmetic operation commands (Continued)

Classification	Command sign	Symbol
BCD 4-digit addition/ subtraction	B+	— B+ — S D —
	B+P	— B+P — S D —
	B+	— B+ — S1 S2 D —
	B+P	— B+P — S1 S2 D —
	B-	— B- — S D —
	B-P	— B-P — S D —
	B-	— B- — S1 S2 D —
	B-P	— B-P — S1 S2 D —
BCD 8-digit addition/ subtraction	DB+	— DB+ — S D —
	DB+P	— DB+P — S D —
	DB+	— DB+ — S1 S2 D —
	DB+P	— DB+P — S1 S2 D —
	DB-	— DB- — S D —
	DB-P	— DB-P — S D —
	DB-	— DB- — S1 S2 D —
	DB-P	— DB-P — S1 S2 D —
BCD 4-digit multipli- cation/ division	B*	— B* — S1 S2 D —
	B*P	— B*P — S1 S2 D —
	B/	— B/ — S1 S2 D —
	B/P	— B/P — S1 S2 D —
BCD 8-digit multipli- cation/ division	DB*	— DB* — S1 S2 D —
	DB*P	— DB*P — S1 S2 D —
	DB/	— DB/ — S1 S2 D —
	DB/P	— DB/P — S1 S2 D —

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.2 Comparison Operation Commands

Arithmetic operation commands (Continued)

Classification	Command sign	Symbol
Floating-point data addition/subtraction	E+	$\overline{\text{E+}} \quad \text{S} \quad \text{D}$
	E+P	$\overline{\text{E+P}} \quad \text{S} \quad \text{D}$
	E+	$\overline{\text{E+}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
	E+P	$\overline{\text{E+P}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
	E-	$\overline{\text{E-}} \quad \text{S} \quad \text{D}$
	E-P	$\overline{\text{E-P}} \quad \text{S} \quad \text{D}$
	E-	$\overline{\text{E-}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
	E-P	$\overline{\text{E-P}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
Floating-point data multiplication/division	E*	$\overline{\text{E*}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
	E*P	$\overline{\text{E*P}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
	E/	$\overline{\text{E/}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
	E/P	$\overline{\text{E/P}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
BIN block addition/subtraction	BK+	$\overline{\text{BK+}} \quad \text{S1} \quad \text{S2} \quad \text{D} \quad \text{n}$
	BK+P	$\overline{\text{BK+P}} \quad \text{S1} \quad \text{S2} \quad \text{D} \quad \text{n}$
	BK-	$\overline{\text{BK-}} \quad \text{S1} \quad \text{S2} \quad \text{D} \quad \text{n}$
	BK-P	$\overline{\text{BK-P}} \quad \text{S1} \quad \text{S2} \quad \text{D} \quad \text{n}$
Character string data coupling	\$+	$\overline{\text{\$+}} \quad \text{S} \quad \text{D}$
	\$+P	$\overline{\text{\\$+P}} \quad \text{S} \quad \text{D}$
	\$+	$\overline{\text{\$+}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
	\$+P	$\overline{\text{\\$+P}} \quad \text{S1} \quad \text{S2} \quad \text{D}$
BIN data increment	INC	$\overline{\text{INC}} \quad \text{D}$
	INCP	$\overline{\text{INCP}} \quad \text{D}$
	DINC	$\overline{\text{DINC}} \quad \text{D}$
	DINCP	$\overline{\text{DINCP}} \quad \text{D}$
	DEC	$\overline{\text{DEC}} \quad \text{D}$
	DECP	$\overline{\text{DECP}} \quad \text{D}$
	DDEC	$\overline{\text{DDEC}} \quad \text{D}$
	DDECP	$\overline{\text{DDECP}} \quad \text{D}$

Data conversion commands

Classification	Command sign	Symbol
BCD conversion	BCD	$\overline{\text{BCD}} \quad \text{S} \quad \text{D}$
	BCDP	$\overline{\text{BCDP}} \quad \text{S} \quad \text{D}$
	DBC	$\overline{\text{DBC}} \quad \text{S} \quad \text{D}$
	DBC	$\overline{\text{DBC}} \quad \text{S} \quad \text{D}$

Data conversion commands (Continued)

Classification	Command sign	Symbol
BIN conversion	BIN	$\overline{\text{BIN}} \quad \text{S} \quad \text{D}$
	BINP	$\overline{\text{BINP}} \quad \text{S} \quad \text{D}$
	DBIN	$\overline{\text{DBIN}} \quad \text{S} \quad \text{D}$
	DBINP	$\overline{\text{DBINP}} \quad \text{S} \quad \text{D}$
BIN -> floating-point conversion	FLT	$\overline{\text{FLT}} \quad \text{S} \quad \text{D}$
	FLTP	$\overline{\text{FLTP}} \quad \text{S} \quad \text{D}$
	DFLT	$\overline{\text{DFLT}} \quad \text{S} \quad \text{D}$
	DFLTP	$\overline{\text{DFLTP}} \quad \text{S} \quad \text{D}$
Floating-point -> BIN conversion	INT	$\overline{\text{INT}} \quad \text{S} \quad \text{D}$
	INTP	$\overline{\text{INTP}} \quad \text{S} \quad \text{D}$
	DINT	$\overline{\text{DINT}} \quad \text{S} \quad \text{D}$
	DINTP	$\overline{\text{DINTP}} \quad \text{S} \quad \text{D}$
BIN 16-bit <-> 32-bit conversion	DBL	$\overline{\text{DBL}} \quad \text{S} \quad \text{D}$
	DBLP	$\overline{\text{DBLP}} \quad \text{S} \quad \text{D}$
	WORD	$\overline{\text{WORD}} \quad \text{S} \quad \text{D}$
	WORDP	$\overline{\text{WORDP}} \quad \text{S} \quad \text{D}$
BIN -> gray code conversion	GRY	$\overline{\text{GRY}} \quad \text{S} \quad \text{D}$
	GRYP	$\overline{\text{GRYP}} \quad \text{S} \quad \text{D}$
	DGRY	$\overline{\text{DGRY}} \quad \text{S} \quad \text{D}$
	DGRYP	$\overline{\text{DGRYP}} \quad \text{S} \quad \text{D}$
Gray code -> BIN conversion	GBIN	$\overline{\text{GBIN}} \quad \text{S} \quad \text{D}$
	GBINP	$\overline{\text{GBINP}} \quad \text{S} \quad \text{D}$
	DGBIN	$\overline{\text{DGBIN}} \quad \text{S} \quad \text{D}$
	DGBINP	$\overline{\text{DGBINP}} \quad \text{S} \quad \text{D}$
2's complement	NEG	$\overline{\text{NEG}} \quad \text{D}$
	NEGP	$\overline{\text{NEGP}} \quad \text{D}$
	DNEG	$\overline{\text{DNEG}} \quad \text{D}$
	DNEGP	$\overline{\text{DNEGP}} \quad \text{D}$
	ENEG	$\overline{\text{ENEG}} \quad \text{D}$
	ENECP	$\overline{\text{ENECP}} \quad \text{D}$
Block conversion	BKBCD	$\overline{\text{BKBCD}} \quad \text{S} \quad \text{D} \quad \text{n}$
	BKBCDP	$\overline{\text{BKBCDP}} \quad \text{S} \quad \text{D} \quad \text{n}$
	BKBIN	$\overline{\text{BKBIN}} \quad \text{S} \quad \text{D} \quad \text{n}$
	BKBINP	$\overline{\text{BKBINP}} \quad \text{S} \quad \text{D} \quad \text{n}$

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.2 Comparison Operation Commands

Data transfer commands

Classification	Command sign	Symbol
16-bit data transfer	MOV	— MOV S D —
	MOV	— MOV S D —
32-bit data transfer	DMOV	— DMOV S D —
	DMOV	— DMOV S D —
Floating-point data transfer	EMOV	— EMOV S D —
	EMOV	— EMOV S D —
Character string data transfer	\$MOV	— \$MOV S D —
	\$MOV	— \$MOV S D —
16-bit data NOT transfer	CML	— CML S D —
	CML	— CML S D —
32-bit data NOT transfer	DCML	— DCML S D —
	DCML	— DCML S D —
Block transfer	BMOV	— BMOV S D n —
	BMOV	— BMOV S D n —
Same data block transfer	FMOV	— FMOV S D n —
	FMOV	— FMOV S D n —
16-bit data change	XCH	— XCH S D —
	XCH	— XCH S D —
32-bit data change	DXCH	— DXCH S D —
	DXCH	— DXCH S D —
Block data change	BXCH	— BXCH S D n —
	BXCH	— BXCH S D n —
Upper/lower byte change	SWAP	— SWAP D —
	SWAP	— SWAP D —

Program branch commands

Classification	Command sign	Symbol
Jump	CJ	— CJ Pn —
	CJ	— CJ Pn —
	SCJ	— SCJ Pn —
	SCJ	— SCJ Pn —
	JMP	— JMP Pn —
	JMP	— JMP Pn —
	GOEND	— GOEND —

Program execution control commands

Classification	Command sign	Symbol
Interrupt disable	DI	— DI —
Interrupt enable	EI	— EI —
Interrupt disable/enable setting	IMASK	— IMASK S —
Return	IRET	— IRET —

I/O refresh commands

Classification	Command sign	Symbol
I/O refresh	RFS	— RFS D n —

Other useful commands

Classification	Command sign	Symbol
Up/down counter	UDCNT1	— UDCNT1 S D n —
	UDCNT1	— UDCNT1 S D n —
	UDCNT2	— UDCNT2 S D n —
	UDCNT2	— UDCNT2 S D n —
Teaching timer	TTMR	— TTMR D n —
Special timer	STMR	— STMR S n D —
Nearest access control	ROTC	— ROTC S n1 n2 D —
Ramp signal	RAMP	— RAMP n1 n2 D1 n3 D2 —
Pulse density	SPD	— SPD S n D —
Pulse output	PLSY	— PLSY n1 n2 D —
Pulse width modulation	PWM	— PWM n1 n2 D —
Matrix input	MTR	— MTR S D1 D2 n —

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.3 Application Commands

Appendix 2.3 Application Commands

Logical operation commands

Classification	Command sign	Symbol
AND	WAND	— WAND S D —
	WANDP	— WANDP S D —
	WAND	— WAND S1 S2 D —
	WANDP	— WANDP S1 S2 D —
	DAND	— DAND S D —
	DANDP	— DANDP S D —
	DAND	— DAND S1 S2 D —
	DANDP	— DANDP S1 S2 D —
	BKAND	— BKAND S1 S2 D n —
	BKANDP	— BKANDP S1 S2 D n —
OR	WOR	— WOR S D —
	WORP	— WORP S D —
	WOR	— WOR S1 S2 D —
	WORP	— WORP S1 S2 D —
	DOR	— DOR S D —
	DORP	— DORP S D —
	DOR	— DOR S1 S2 D —
	DORP	— DORP S1 S2 D —
	BKOR	— BKOR S1 S2 D n —
	BKORP	— BKORP S1 S2 D n —
Exclusive OR	WXOR	— WXOR S D —
	WXORP	— WXORP S D —
	WXOR	— WXOR S1 S2 D —
	WXORP	— WXORP S1 S2 D —
	DXOR	— DXOR S D —
	DXORP	— DXORP S D —
	DXOR	— DXOR S1 S2 D —
	DXORP	— DXORP S1 S2 D —
	BKXOR	— BKXOR S1 S2 D n —
	BKXORP	— BKXORP S1 S2 D n —

Logical operation commands (Continued)

Classification	Command sign	Symbol
NOT-exclusive OR	WXNR	— WXNR S D —
	WXNRP	— WXNRP S D —
	WXNR	— WXNR S1 S2 D —
	WXNRP	— WXNRP S1 S2 D —
	DXNR	— DXNR S D —
	DXNRP	— DXNRP S D —
	DXNR	— DXNR S1 S2 D —
	DXNRP	— DXNRP S1 S2 D —
	BKXNOR	— BKXNOR S1 S2 D n —
	BKXNORP	— BKXNORP S1 S2 D n —

Rotation commands

Classification	Command sign	Symbol
Right rotation	ROR	— ROR D n —
	RORP	— RORP D n —
	RCR	— RCR D n —
	RCRP	— RCRP D n —
Left rotation	ROL	— ROL D n —
	ROLP	— ROLP D n —
	RCL	— RCL D n —
	RCLP	— RCLP D n —
Right rotation	DROR	— DROR D n —
	DRORP	— DRORP D n —
	DRCR	— DRCR D n —
	DRCRP	— DRCRP D n —
Left rotation	DROL	— DROL D n —
	DROLP	— DROLP D n —
	DRCL	— DRCL D n —
	DRCLP	— DRCLP D n —

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.3 Application Commands

Shift commands

Classification	Command sign	Symbol
n-bit shift	SFR	- SFR D n -
	SFRP	- SFRP D n -
	SFL	- SFL D n -
	SFLP	- SFLP D n -
1-bit shift	BSFR	- BSFR D n -
	BSFRP	- BSFRP D n -
	BSFL	- BSFL D n -
	BSFLP	- BSFLP D n -
1-word shift	DSFR	- DSFR D n -
	DSFRP	- DSFRP D n -
	DSFL	- DSFL D n -
	DSFLP	- DSFLP D n -

Bit processing commands

Classification	Command sign	Symbol
Bit set/reset	BSET	- BSET D n -
	BSETP	- BSETP D n -
	BRST	- BRST D n -
	BRSTP	- BRSTP D n -
Bit test	TEST	- TEST S1 S2 D -
	TESTP	- TESTP S1 S2 D -
	DTEST	- DTEST S1 S2 D -
	DTESTP	- DTESTP S1 S2 D -
Bit device Batch reset	BKRST	- BKRST S n -
	BKRSTP	- BKRSTP S n -

Data processing commands

Classification	Command sign	Symbol
Data search	SER	- SER S1 S2 D n -
	SERP	- SERP S1 S2 D n -
	DSER	- DSER S1 S2 D n -
	DSERP	- DSERP S1 S2 D n -
Bit check	SUM	- SUM S D -
	SUMP	- SUMP S D -
	DSUM	- DSUM S D -
	DSUMP	- DSUMP S D -
Decode	DECO	- DECO S D n -
	DECOP	- DECOP S D n -
Encode	ENCO	- ENCO S D n -
	ENCOP	- ENCOP S D n -
7-segment decode	SEG	- SEG S D -
	SEGP	- SEGP S D -
Dissociation • Association	DIS	- DIS S D n -
	DISP	- DISP S D n -
	UNI	- UNI S D n -
	UNIP	- UNIP S D n -
	NDIS	- NDIS S1 D S2 -
	NDISP	- NDISP S1 D S2 -
	NUN	- NUN S1 D S2 -
	NUNIP	- NUNIP S1 D S2 -
	WTOB	- WTOB S D n -
	WTOBP	- WTOBP S D n -
	BTOW	- BTOW S D n -
	BTOWP	- BTOWP S D n -

APPENDIX 2. LIST OF COMMANDS THAT CAN BE USED WITH GX Developer
Appendix 2.3 Application Commands

Data processing commands (Continued)

Classification	Command sign	Symbol
Retrieval	MAX	— MAX S D n —
	MAXP	— MAXP S D n —
	MIN	— MIN S D n —
	MINP	— MINP S D n —
	DMAX	— DMAX S D n —
	DMAXP	— DMAXP S D n —
	DMIN	— DMIN S D n —
	DMINP	— DMINP S D n —
Sort	SORT	— SORT S1 n S2 D1 D2 — S2: Number of data blocks to be compared at a time. D1: Device to be forced ON at sort completion D2: Used by system
	DSORT	— DSORT S1 n S2 D1 D2 — S2: Number of data blocks to be compared at a time. D1: Device to be forced ON at sort completion D2: Used by system
Total value calculation	WSUM	— WSUM S D n —
	WSUMP	— WSUMP S D n —
	DWSUM	— DWSUM S D n —
	DWSUMP	— DWSUMP S D n —

Table operation commands

Classification	Command sign	Symbol
Table processing	FIFW	— FIFW S D —
	FIFWP	— FIFWP S D —
	FIFR	— FIFR S D —
	FIFRP	— FIFRP S D —
	FPOP	— FPOP S D —
	FPOPP	— FPOPP S D —
	FINS	— FINS S D n —
	FINSP	— FINSP S D n —
	FDEL	— FDEL S D n —
	FDELP	— FDELP S D n —

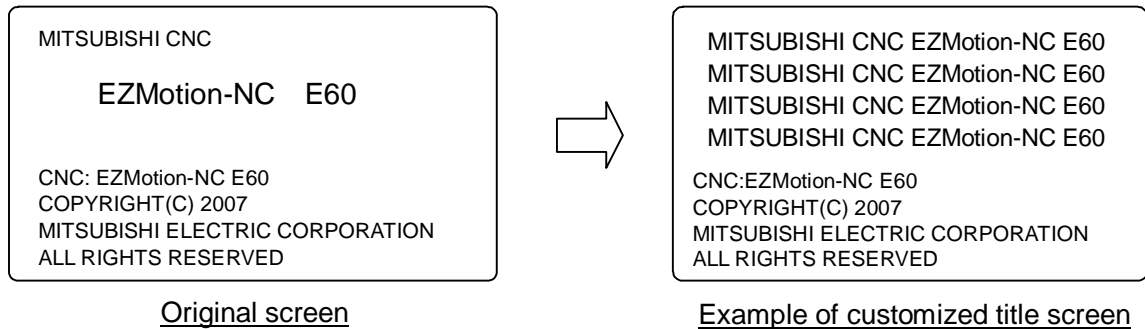
Structuring commands

Classification	Command sign	Symbol
Repeat	FOR	— FOR n —
	NEXT	— NEXT —
	BREAK	— BREAK D Pn —
	BREAKP	— BREAKP D Pn —
	Sub-routine program call	CALL
	CALLP	— CALLP Pn S1~Sn —
	RET	— RET —
	FCALL	— FCALL Pn S1~Sn —
	FCALLP	— FCALLP Pn S1~Sn —
	ECALL	— SORT * Pn S1~Sn — *: Program name
	ECALLP	— ECALLP * Pn S1~Sn — *: Program name
	EFCALL	— EFCALL * Pn S1~Sn — *: Program name
	EFCALLP	— EFCALLP * Pn S1~Sn — *: Program name
	COM	— COM —
Fixed index qualification	IX	— IX S — Device qualification circuit
	IXEND	— IXEND —
	IXDEV	— IXDEV —
	IXSET	— IXSET Pn D — Designation of qualification value

APPENDIX 3. TITLE SCREEN CUSTOMIZATION

Appendix 3.1 Outline

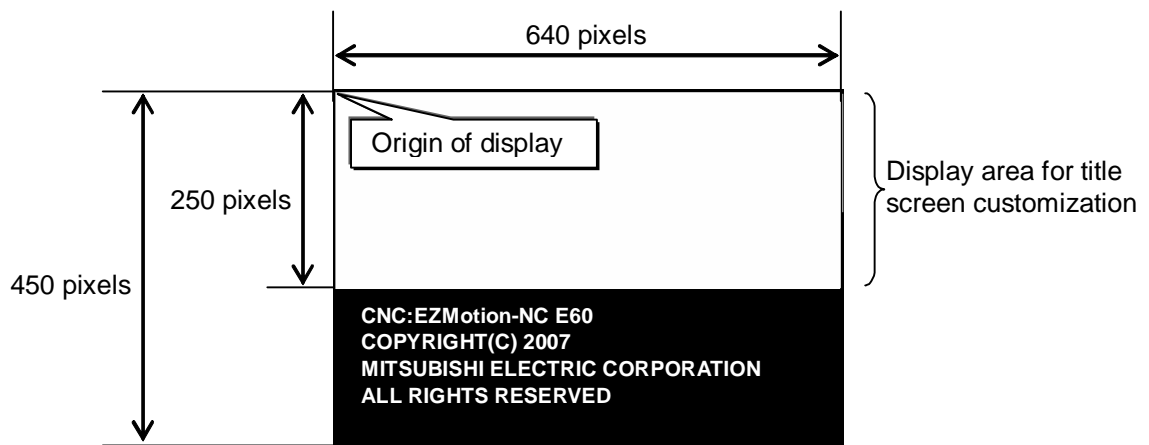
This function is for customizing the title screen which appears when the power is turned ON. By customizing, a machine tool builder name, machine tool model name, etc can be displayed. By inputting an image file created by PC into the NC with the RS-232C input/output function, the image data can be displayed as the title screen.



Appendix 3.2 Details

Appendix 3.2.1 Display Specification

The area for customization is as below.



No.	Item	Specification	Note
1	Display area	640 pixels × 250 pixels	Full size of screen is 640 pixels × 450 pixels. (The bottom part of screen (640 pixels × 200 pixels) is not open for customization.)
2	Color	Monochrome	
3	Origin of display	Left top of screen	

APPENDIX 3. TITLE SCREEN CUSTOMIZATION
Appendix 3.2 Details

Appendix 3.2.2 Input Data Specification

Input the data to display in the title screen customization area into the NC as bitmap data. The specifications of bitmap data to input are as follows. Data that doesn't satisfy the specifications below cannot be input.

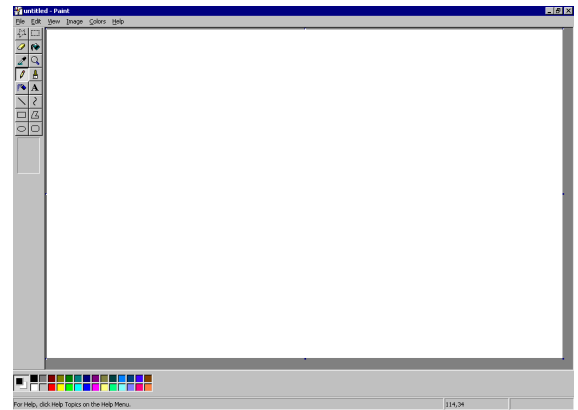
No.	Item	Specification	Note
1	File type	Bitmap File format for Windows	Data whose format is other than Bitmap File for Windows cannot be input. (For example, OS/2 File)
2	The number of bits per pixel	Monochrome (1 bit)	Data other than monochrome bitmap cannot be input.
3	Data compression method	Non-compression only (BI_RGB)	Data other than non-compression (BI_RGB) cannot be input.
4	Width	Within 640 pixels	Data for an image whose length is longer than 640 pixels cannot be input.
5	Height	Within 250 pixels	Data for an image whose length is longer than 250 pixels cannot be input.

[Note1] Bitmap data that doesn't apply the specified format causes an error. For the error messages, refer to "Appendix 3.5 Error". For the data input method, refer to "Appendix 3.2.4 Data Input/Output Method".

Appendix 3.2.3 Data Creation Method

Create image data whose format is Windows Bitmap with a general drawing software. In this manual, a method by using Microsoft Windows' Microsoft(R) Paint is explained.

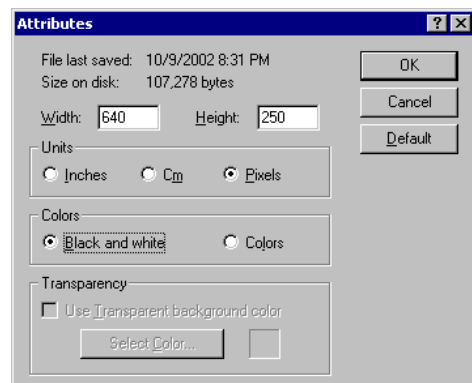
Start Microsoft(R) Paint.



Define a canvas.



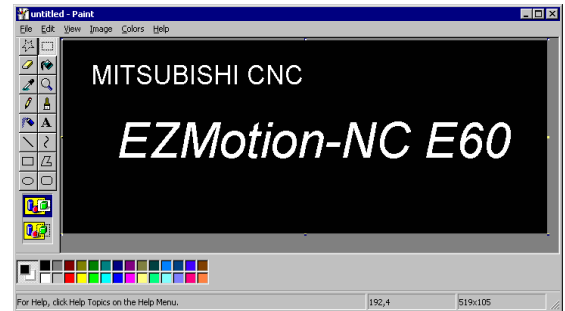
- 1) From among "Image", select "Attributes...".
- 2) In the Attributes dialogue box, set as follows, Width=640, Height=250, Units=Pixels, Color=Black and White, and click "OK".



APPENDIX 3. TITLE SCREEN CUSTOMIZATION

Appendix 3.2 Details

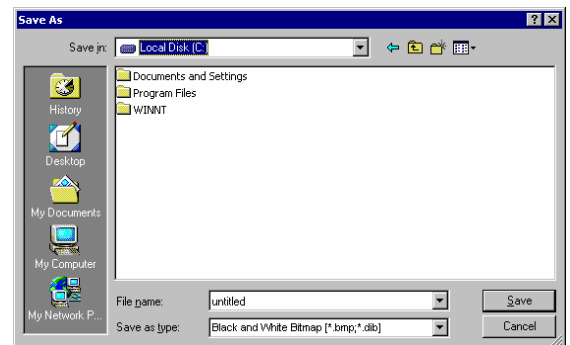
Create the image.



Save the data.



- 1) From among "File", select "Save As...".
- 2) Input the name of the file and save.



[Note] Set the background color of the bitmap data as black.

APPENDIX 3. TITLE SCREEN CUSTOMIZATION
Appendix 3.2 Details

Appendix 3.2.4 Data Input/Output Method

Bitmap data for the title screen customization area can be input/output or compared by the RS-232C input/output function. The RS-232C input/output function is to input/output NC data by connecting the serial port of NC and an RS-232C device.

To input/output the bitmap data, set the PLC bit selection parameter (#6451/bit5) to "0". In this input/output method, image data whose format is Bitmap File for Windows can be input/output directly.

The PC side setting for communication between NC and PC is as in the table below. The RS-232C setting on the NC side is automatically done.



<Setting on PC side>

No.	Item	Setting
1	Communication protocol	XMODEM-CRC
2	Baud rate	38400bps
3	Data bit	8bits
4	Parity	No setting
5	Stop bit	1
6	Flow control	No setting

Procedure on the NC side (Eg. Inputting) and on the PC side are as follows.

<Procedure on NC side>

Connect an RS-232C input/output device.

Push , then  to display the data input screen.



[DATA INPUT]
IN/OUT 1

<LOCK>

1 MAIN PROGRAM

2 TOOL DATA OFF

3 PARAMETER OFF

5 COMMON VARI OFF

#30 MACRO PROGRAM

<INPUT DATA>

<COMP. DATA>

#() DATA()()

#10 MODE

#11 PORT No.2

#12 DEVICE No.1

(FDD:9600bps)

#28 AUX-PARA

#60 TRACE DATA

#99 MAINTENANCE

INPUT
OUTPUT
ERASE
FILE
MENU

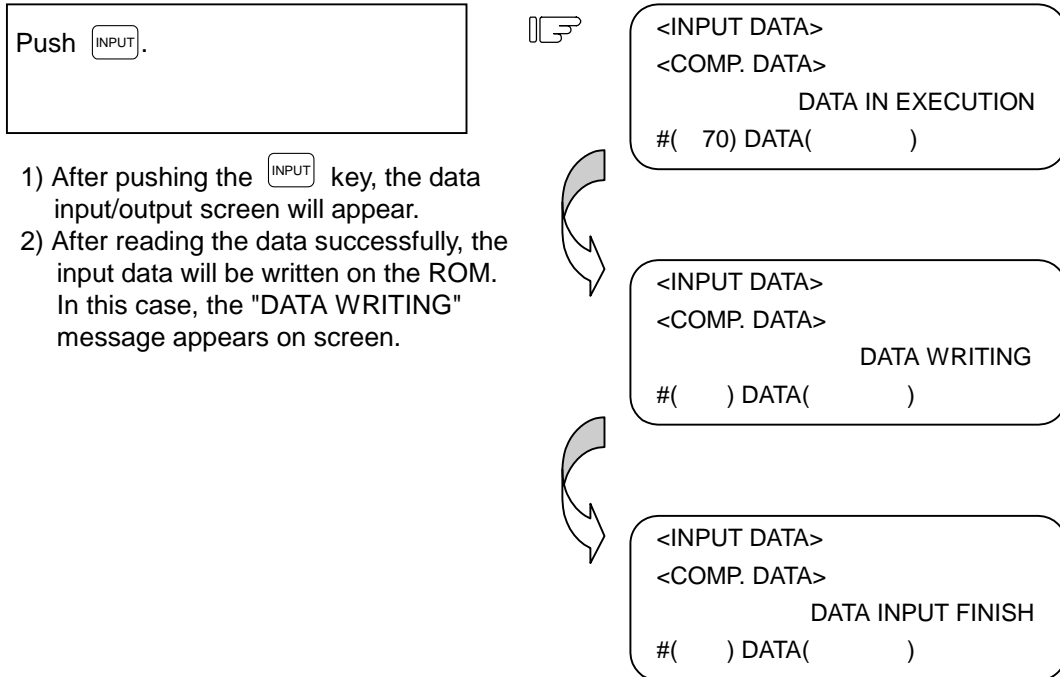
Input "70" in the # bracket.

#(70) DATA()



#(70) DATA()

APPENDIX 3. TITLE SCREEN CUSTOMIZATION
Appendix 3.2 Details



[Note1] In the case of comparison, after the data input screen appears, input "10" in the # bracket and "2" in the DATA bracket.

[Note2] In the case of output, push then to display the data output screen, and perform the same procedure as in input.

APPENDIX 3. TITLE SCREEN CUSTOMIZATION

Appendix 3.2 Details

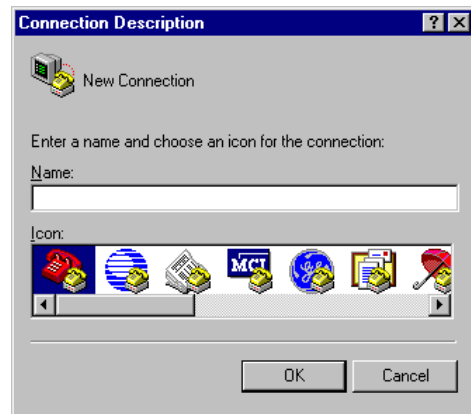
<Procedure on PC side>

In this manual, a method to use Hyper Terminal that accompanies with Microsoft Windows is explained.

Connect an RS-232C input/output device.

Start-up Hyper Terminal.

Set the connection name and icon.



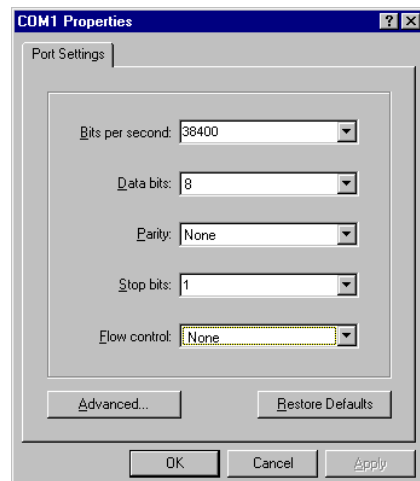
Select a phone number and serial port (COM) to connect.



* The setting and selection above are not necessary if they have already been set



Set the setting of the serial port (COM).



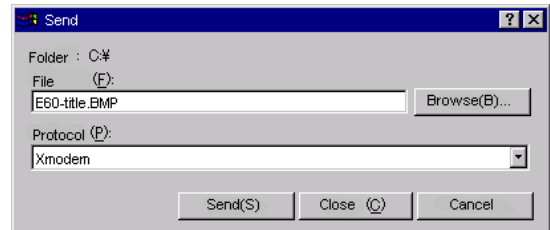
APPENDIX 3. TITLE SCREEN CUSTOMIZATION

Appendix 3.2 Details

Send the bitmap data from the PC.



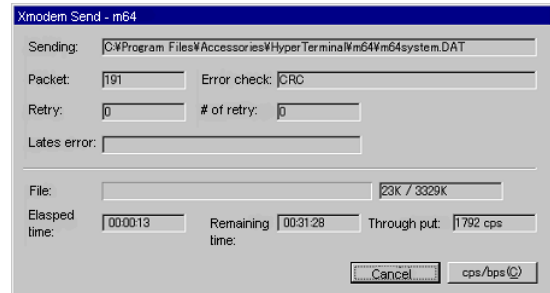
- * Select "Send" or "Receive" from among the transfer menu. Input the file name, and select XMODEM for protocol.



Sending/Receiving the data starts.



- * During sending/receiving, the number of packets is renewed.



[Note1] Trying data output without inputting bitmap data beforehand causes an error. For details of the error message, refer to "Appendix 3.5 Error".

[Note2] Trying to input bitmap data that doesn't apply "Appendix 3.2.2 Input Data Specification" causes an error. For the error message, refer to "Appendix 3.5 Error".

[Note3] When the NC is in "DATA IN EXECUTION" or "DATA OUTPUTTING", if no communication exists for more than ten seconds, the timeout error will occur.

[Note4] By inputting the NC reset, data communication can be interrupted. However, it is ignored while data is being written.

[Note5] Turning the power OFF while data is being written may destroy the data. Do not turn the power OFF while data is being written.



[Note6] When "70" is set in the # bracket, a value in the DATA bracket is ignored.

[Note7] Availability of bitmap data output depends on the software's version.

APPENDIX 3. TITLE SCREEN CUSTOMIZATION
Appendix 3.2 Details

<Output procedure>

Stop the user PLC.

Push , then  to bring the data input/output screen.

Input "99" in the # bracket.
 #(99) DATA(ALL3)



#(99) DATA(ALL3)

Push .



<INPUT DATA>
 <COMP. DATA>
 DATA OUTPUTTING
 #(99) DATA(ALL3)



<INPUT DATA>
 <COMP. DATA>
 DATA OUTPUT FINISH
 #() DATA()

[Note1] In the output above, data isn't output in the bitmap format, So the output data cannot be edited with a general drawing software such as Microsoft Paint(R).

[Note2] If no bitmap data is registered, output won't be performed.

[Note3] By inputting the NC reset, data communication can be interrupted. However, it is ignored while data is being written.

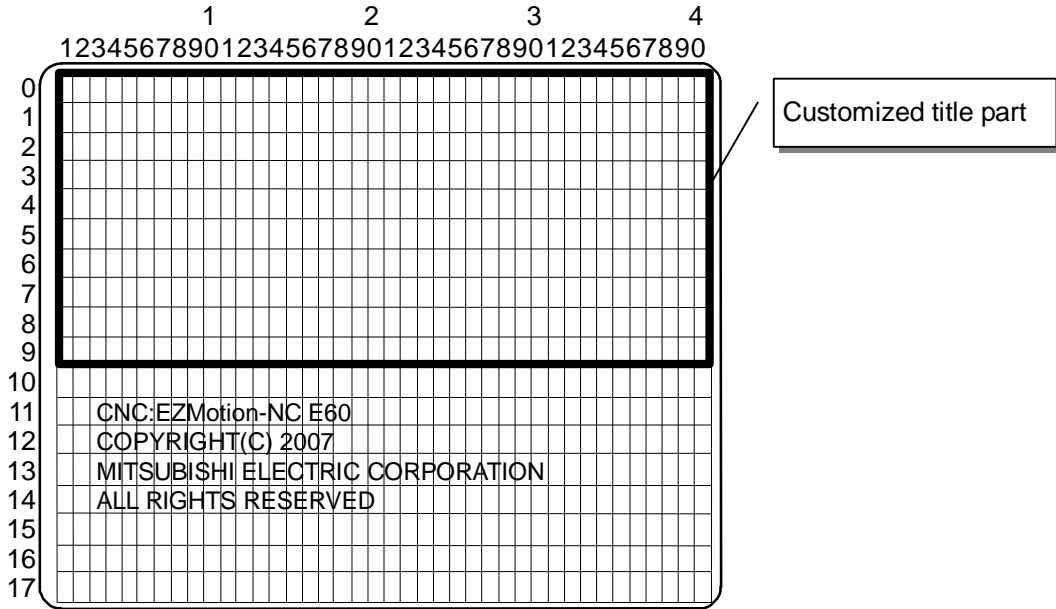
[Note4] Turning the power OFF while data is being written may destroy the data. Do not turn the power OFF while data is being written.

[Note5] The setting of the data protection key is ignored.

APPENDIX 3. TITLE SCREEN CUSTOMIZATION
Appendix 3.2 Details

Appendix 3.2.6 Screen Display

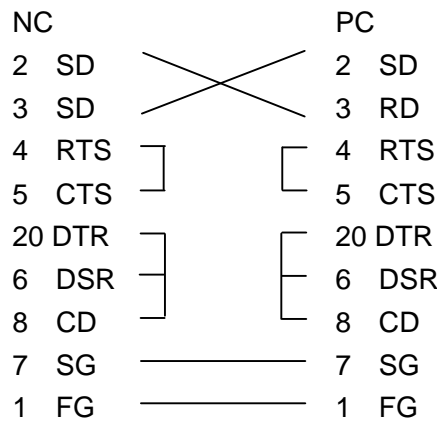
By validating the base specification parameter #1217/bit4, the customized title screen will appear. The title screen appears only immediately after turning the power ON.



[Note1] If no bitmap data is registered, nothing will be displayed in the title screen customization area.

Appendix 3.3 Connection

Use serial cables (cloth cable) for the connection between the NC and PC. Wiring in the case of 25 pins / 3 connections is as follows.



APPENDIX 3. TITLE SCREEN CUSTOMIZATION
Appendix 3.4 Parameter

Appendix 3.4 Parameter

(1) Base specification parameter

#	Item		Detail	Setting range
1217	aux01	Bit4	Title screen customization valid	0/1

Appendix 3.5 Error

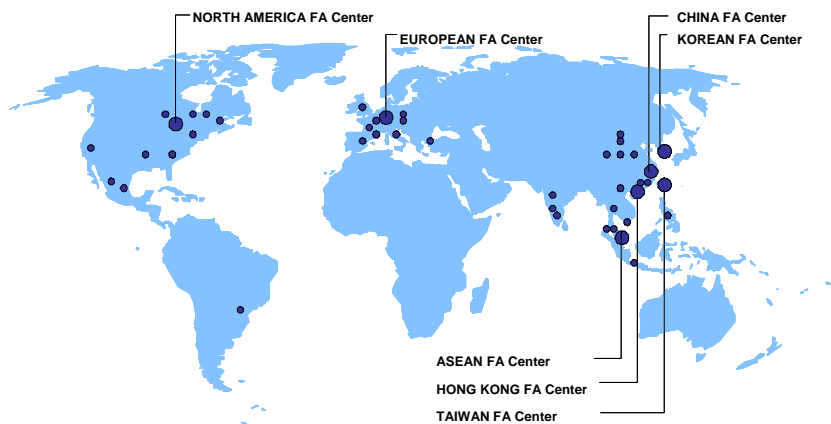
(1) Operation error

Error #	Meaning	Remedy
E350 title error 1	No title screen customization data.	Data output is performed without inputting title screen customization data beforehand.
E351 title error 2	Format of title screen customization data illegal.	The title screen customization data which have been input is not Bitmap File for Windows. Perform the input after converting the data into Bitmap File for Windows.
E352 title error 3	Color type of title screen customization data illegal.	The setting of the title screen customization data which have been input is not monochrome bitmap for Bitmap File for Windows. Perform the input after converting the data into the monochrome setting of Bitmap File for Windows.
E353 title error 4	Compression method of title screen customization data illegal.	The compression setting of the title screen customization data which have been input is not non-compression that applies to the Bitmap File for Windows. Perform the input after saving the data with another drawing software.
E354 title error 5	Display size of title screen customization data illegal.	The size of the customized title part is exceeding 640 pixels × 250 pixels. Perform the input after changing the size to be 640 pixels × 250 pixels.
E355 title error 6	Communication error.	A communication error occurred during input/output of the bitmap data. Check the communication cables and parameters.

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Global service network



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Notice

Every effort has been made to keep up with software and hardware revisions in the contents described in this manual. However, please understand that in some unavoidable cases simultaneous revision is not possible.

Please contact your Mitsubishi Electric dealer with any questions or comments regarding the use of this product.

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