



Changes for the Better

MITSUBISHI CNC

PLC Development Manual

M800/M80 Series

A large, grayscale image of the Earth as seen from space, showing cloud patterns and continents. Overlaid on the center of the Earth is the text "MITSUBISHI CNC" in a large, white, stylized font. The text is partially obscured by a semi-transparent, wavy horizontal band that passes through the middle of the letters.

**MITSUBISHI
CNC**

Introduction

This manual explains the PLC development environment.

Peripheral development environment

The user PLC development environment using the MITSUBISHI integrated FA software MELSOFT Series (GX Developer) which is the PLC development tool for MITSUBISHI PLC MELSEC Series, mainly the usage specific to MITSUBISHI CNC, is described.

Built-in edit function (PLC Onboard)

Operations related to the PLC carried out with the MITSUBISHI CNC unit are described.

The M800/M80 Series PLC Onboard is easy to use as it retains the operation system from the M700V/M70V Series. It also provides enhanced support for working together with the MELSEC Series PLC development tool (GX Developer), a robust ladder monitoring function as well as improved ladder editing operation.

Details described in this manual

CAUTION

-  **An effort has been made to describe special handling of this machine, but items that are not described must be interpreted as "not possible".**
-  **Some screens and functions may differ or some functions may not be usable depending on the NC version.**

General precautions

Refer to each manual for details on the MITSUBISHI CNC Series PLC, and for details on the various tools in this manual.

The explanations and screens for the various tools in this manual may differ slightly according to the tool version. Refer to the respective manual for details.

[MELSEC Series Software Package Manual]

GX Developer Version 8 Operating Manual (Startup Section)

GXDEV8-0-IN-E 13JU40 SH-080372E

GX Developer Version 8 Operating Manual

GXDEV8-0-E 13JU41 SH-080373E

GX Converter Version 1 Operating Manual

SW0D5-CNVW (OPE)-E 13J949 IB-080004E

(Caution)

- The version numbers are current as of the editing of this manual, but may be updated in the future.
- GX Developer Version 8 (Model SW8D5C-GPPW) is the new name of the old "Windows Version GPP Function Software Package" (common name GPPW).
- GX Converter Version 1 (Model SW2D5C-CNVW) is the new name of the old "Windows Version Data Conversion Software Package" (common name CNVW).

Precautions for Safety

Always read the specifications issued by the machine tool builder, 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 there is a great risk that the user could be subject to fatalities or serious injuries if handling is mistaken.
 WARNING When the user could be subject to fatalities or serious injuries if handling is mistaken.
 CAUTION When the user could be subject to injuries or when physical damage could 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.

The following signs indicate prohibition and compulsory.

	This sign indicates prohibited behavior (must not do). For example,  indicates "Keep fire away".
	This sign indicates a thing that is compulsory (must do). For example,  indicates "it must be grounded".

The meaning of each pictorial sign is as follows.

 CAUTION	 CAUTION rotated object	 CAUTION HOT	 Danger Electric shock risk	 Danger explosive
 Prohibited	 Disassembly is prohibited	 KEEP FIRE AWAY	 General instruction	 Earth ground

For Safe Use

Mitsubishi CNC is designed and manufactured solely for applications to machine tools to be used for industrial purposes.

Do not use this product in any applications other than those specified above, especially those which are substantially influential on the public interest or which are expected to have significant influence on human lives or properties.



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 tool builder 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 tool builder before starting use.
-  Refer to the Instruction Manual issued by each machine tool builder for details on each machine tool.
-  Some screens and functions may differ or some functions may not be usable depending on the NC version.

2. Items related to start up and maintenance

-  Read this manual carefully and confirm the safety enough before executing the operation of the program change, forced output, RUN, STOP, etc. during operation. Operation mistakes may cause damage of the machine and accidents.

3. Items related to program development

-  Always observe the cautions before development to develop a program.
-  If the data transferred does not follow the file name rule, unexpected operations will occur.
E.g. PLC program erasure
-  Do not read a sequence program on which a conversion error occurred into the GX Developer. The file may include unexpected contents to result an illegal operation.
-  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.

Disposal



(Note) This symbol mark is for EU countries only.
This symbol mark is according to the directive 2006/66/EC Article 20 Information for end-users and Annex II.

Your MITSUBISHI ELECTRIC product is designed and manufactured with high quality materials and components which can be recycled and/or reused.

This symbol means that batteries and accumulators, at their end-of-life, should be disposed of separately from your household waste.

If a chemical symbol is printed beneath the symbol shown above, this chemical symbol means that the battery or accumulator contains a heavy metal at a certain concentration. This will be indicated as follows:

Hg: mercury (0,0005%), Cd: cadmium (0,002%), Pb: lead (0,004%)

In the European Union there are separate collection systems for used batteries and accumulators. Please, dispose of batteries and accumulators correctly at your local community waste collection/recycling centre.

Please, help us to conserve the environment we live in!

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(日本語 /Japanese)

本製品は工業用 (クラス A) 電磁環境適合機器です。販売者あるいは使用者はこの点に注意し、住商業環境以外での使用をお願いいたします。

Handling of our product

(English)

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

본 제품의 취급에 대해서

(한국어 /Korean)

이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며 가정외의 지역에서 사용하는 것을 목적으로 합니다 .

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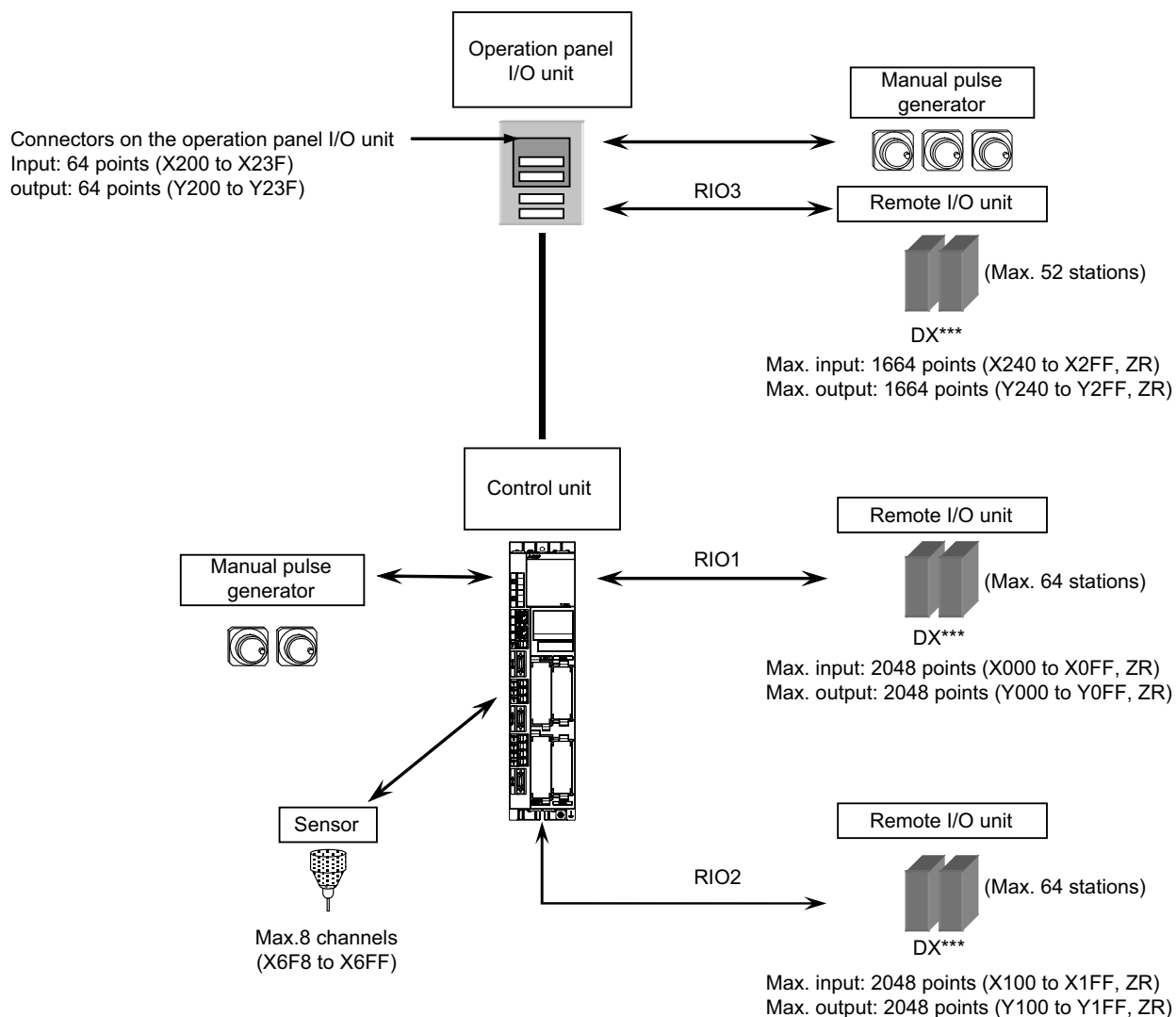
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System Configuration of H/W

1.1 System Configuration

[M800W]



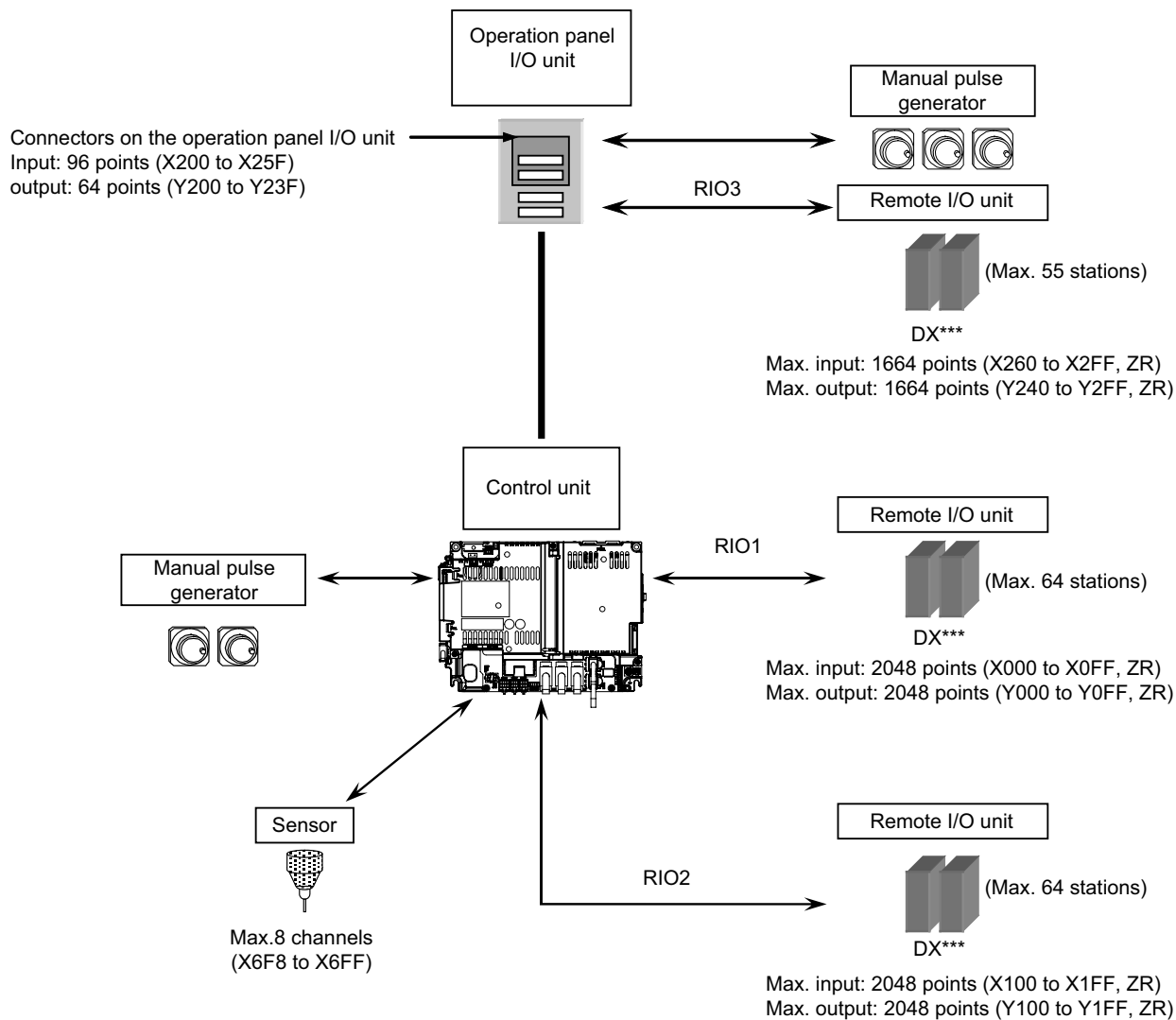
It is possible to connect up to three manual pulse generators.

Refer to "1ST HANDLE AXIS SELECTION CODE m (HS11 to 116)" in "PLC Output Signals (Bit Type: Y***)" for the connection point of the manual pulse generator and the handle No.

Digital signals (DI/DO) can be arbitrarily assigned to PLC devices with the parameters.

Refer to "PLC Device Assignment of Digital Signal (DI/DO)" for details.

[M800S/M80]



It is possible to connect up to three manual pulse generators.

Refer to "1ST HANDLE AXIS SELECTION CODE m (HS11 to 116)" in "PLC Output Signals (Bit Type: Y***)" for the connection point of the manual pulse generator and the handle No.

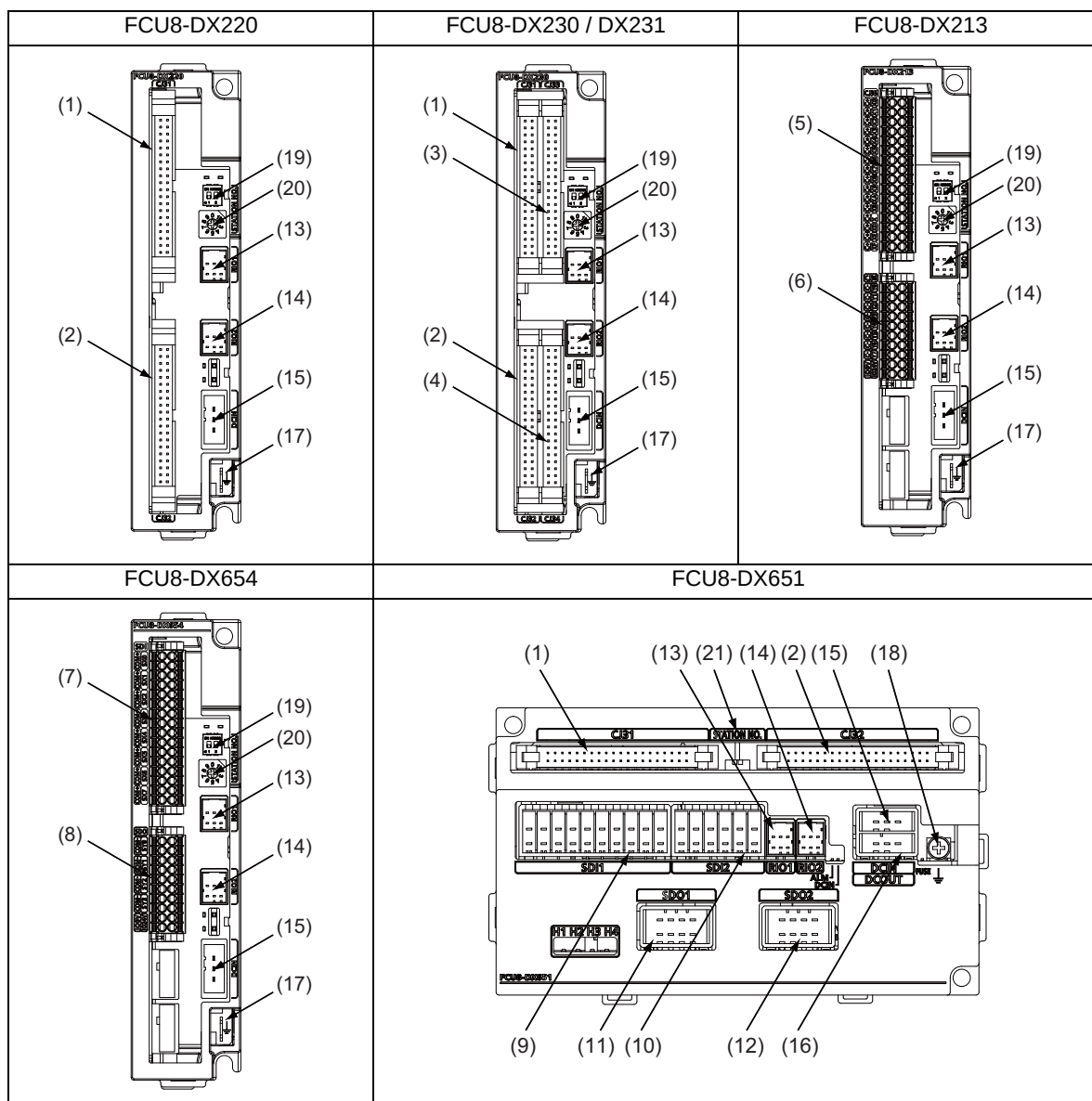
Digital signals (DI/DO) can be arbitrarily assigned to PLC devices with the parameters.

Refer to "PLC Device Assignment of Digital Signal (DI/DO)" for details.

1.2 Relation of RIO Unit and Devices

1.2.1 Outline of the Remote I/O Unit

The specification varies for each remote I/O unit. Each unit has one or two rotary switch(es) for unit No. setting, which links the device Nos. (with X/Y).



No.	Connector name	Function	No.	Connector name	Function
(1)	CJ31	Machine signal input	(10)	SDI2	Safety DI input
(2)	CJ32	Machine signal output	(11)	SDO1	Safety relay output
(3)	CJ33	Machine signal input	(12)	SDO2	Safety relay output
(4)	CJ34	Machine signal output	(13)	RIO1	Remote I/O 2.0 communication
(5)	CJ35	Machine signal input	(14)	RIO2	Remote I/O 2.0 communication
(6)	CJ36	Machine signal output	(15)	DCIN	24VDC input
(7)	SDI	Safety machine signal input	(16)	DCOUT	24VDC output
(8)	SDO	Safety machine signal output	(17)	FG	FG terminal
(9)	SDI1	Safety DI input	(18)	FG	FG terminal (M4 screw)

No.	Switch name	Function
(19)	STATION No.	Station No. group setting switch
(20)		Station No. setting switch
(21)		Station No. setting switch

Unit type	Machine control signals that can be handled	Total	Number of occupied stations
FCU8-DX220	Digital input signal(DI)	32 points	1
	Digital output signal(DO)	32 points	
FCU8-DX230	Digital input signal(DI)	64 points	2
	Digital output signal(DO)	48 points	
FCU8-DX231	Digital input signal(DI)	64 points	2
	Digital output signal(DO)	48 points	
	Analog output(AO)	1 point	
FCU8-DX213	Digital input signal(DI)	16 points	1
	Digital output signal(DO)	8 points	
FCU8-DX654	Safety digital input signal(DI)	8 points	2
	Safety digital output signal(DO)	4 points	
FCU8-DX651	Digital input signal(DI)	32 points	3
	Digital output signal(DO)	32 points	
	Safety digital input signal(DI)	8 points	
	Safety digital output signal(DO)	4 points	

1.2.2 PLC Device Assignment of Digital Signal (DI/DO)

The input/output signals (analog signal, DI/DO, etc.) are assigned to the PLC devices, and the digital signals (DI/DO) can be assigned to the arbitrary PLC devices by the parameters.

Either "Fixed device assignment" which automatically assigns the signals to fixed PLC devices defined by the system or "Arbitrary device assignment" which user can assign the signals the arbitrary PLC devices by the parameters can be selected by setting the RIO assignment parameter "#53001 RIO dev assign (selection of RIO device assignment method)".

[Fixed Device assignment]: Parameter "#53001 RIO dev assign" = 0

Settings are not required because the assignment to the fixed PLC devices are automatically performed.

Refer to "Fixed Device Assignment" for details.

[Arbitrary Device assignment]: Parameter "#53001 RIO dev assign" = 1

Set the PLC devices which are assigned to the DI/DO of each remote I/O unit station by the parameters.

Refer to "Arbitrary Device Assignment" for details.

1.2.2.1 Fixed Device Assignment

- (1) By setting the parameter "#53001 RIO dev assign" to "0", the PLC device assignment method, which is to be used for input/output of each remote I/O unit station, will be the fixed device assignment.
- (2) PLC devices assigned for each remote I/O unit station at the time of the fixed device assignment are as follows:

		Station No.							
Channel No.		1	2	...	8	9	...	63	64
RIO1	Input device	X0000 to X001F	X0020 to X003F	...	X00E0 to X00FF	ZR5000 / ZR5001	...	ZR5108 / ZR5109	ZR5110 / ZR5111
	Output device	Y0000 to Y001F	Y0020 to Y003F	...	Y00E0 to Y00FF	ZR6000 / ZR6001	...	ZR6108 / ZR6109	ZR6110 / ZR6111
RIO2	Input device	X0100 to X011F	X0120 to X013F	...	X01E0 to X01FF	ZR5200 / ZR5201	...	ZR5308 / ZR5309	ZR5310 / ZR5311
	Output device	Y0100 to Y011F	Y0120 to Y013F	...	Y01E0 to Y01FF	ZR6200 / ZR6201	...	ZR6308 / ZR6309	ZR6310 / ZR6311
RIO3	Input device	X0200 to X021F	X0220 to X023F	...	X02E0 to X02FF	ZR5400 / ZR5401	...	ZR5508 / ZR5509	ZR5510 / ZR5511
	Output device	Y0200 to Y021F	Y0220 to Y023F	...	Y02E0 to Y02FF	ZR6400 / ZR6401	...	ZR6508 / ZR6509	ZR6510 / ZR6511

- (3) A part of PLC devices assigned for each station of remote I/O units can input/output signals with PC high speed by setting the high-speed input/output specification parameters or R registers.
- (a) The devices for inputting/outputting signals with PC high speed can be set individually for the high-order and the low-order per 16 points for DI and DO of each remote I/O unit station.
- (b) Only devices of the first to eighth stations for each remote I/O channel can input/output signals with PC high speed. The devices of the ninth to 64th stations input/output with PC medium speed.
- (c) The parameter and R register numbers for the high-speed input/output designation are as follows:

		Station No.			
Channel No.		1 to 4		5 to 8	
		Parameter No.	R register No.	Parameter No.	R register No.
RIO1	High-speed input specification	# 6457	R7828 low-order	# 6458	R7828 high-order
	High-speed output specification	# 6461	R7830 low-order	# 6462	R7830 high-order
RIO2	High-speed input specification	# 6459	R7829 low-order	# 6460	R7829 high-order
	High-speed output specification	# 6463	R7831 low-order	# 6464	R7831 high-order
RIO3	High-speed input specification	# 6465	R7832 low-order	# 6466	R7832 high-order
	High-speed output specification	# 6473	R7836 low-order	# 6474	R7836 high-order

(Note 1) The above parameters are invalid when the devices have been assigned arbitrarily.

(Note 2) Refer to "PLC Programming Manual" for the details of the setting method.

1.2.2.2 Arbitrary Device Assignment

Parameter setting for device arbitrary assignment

- (1) By setting the parameter "#53001 RIO dev assign" to "1", the assignment method for PLC devices to be used for input/output of each remote I/O unit station becomes arbitrary device assignment.
- (2) For arbitrary device assignment, set the PLC devices for input and output to DI/DO (32 points) of each remote I/O unit station by the parameters.
- (3) Turn the power OFF and ON to enable arbitrary device assignment after the parameter settings.
- (4) Set the input/output device assignment and high-speed input/output specification by the parameters for each station of all remote units which have DI/DO function (except safety DI/DO). If all stations have not been set, the alarm "Y05 Initial parameter error" will be issued when the power turns ON.

	Parameter set No. (Note 1)								
Name	#1	...	#64	#65	...	#128	#129	...	#184
Target channel No. #n	#53011	...	#53641	#53651	...	#54281	#54291	...	#54841
Target station No. #n (Note 2)	#53012	...	#53642	#53652	...	#54282	#54292	...	#54842
DI device name #n	#53013	...	#53643	#53653	...	#54283	#54293	...	#54843
DI device No. #n	#53014	...	#53644	#53654	...	#54284	#54294	...	#54844
DO device name #n	#53015	...	#53645	#53655	...	#54285	#54295	...	#54845
DO device No. #n	#53016	...	#53646	#53656	...	#54286	#54296	...	#54846
High-speed input specification #n	#53017	...	#53647	#53657	...	#54287	#54297	...	#54847
High-speed output specification #n	#53018	...	#53648	#53658	...	#54288	#54298	...	#54848

(Note 1) A set of RIO assignment parameters consists of eight parameters (from target channel number to high-speed output specification) for one station.

(Note 2) The seventh to 14th stations of RIO3 can not be assigned arbitrarily because they are used for the system.

- (5) The PLC devices that are valid for arbitrary device assignment are as follows:

PLC device	Word/Bit	Input	Output	Assignable range	PLC device No. format
X	Bit	○	-	X0000 to X05FF (excluding X2C0 to X2FF for RIO3) However, X400 to X5FF is invalid when PROFIBUS option is ON.	Hexadecimal
Y	Bit	-	○	Y0000 to Y05FF (excluding Y2C0 to Y2FF for RIO3) However, Y400 to Y5FF is invalid when PROFIBUS option is ON.	Hexadecimal
ZR	Word	○	○	ZR5000 to ZR5999 (for input) ZR6000 to ZR6999 (for output)	Decimal

(Note) Duplication check is not performed between the PLC devices which are set with machine input/output signal other than the remote I/O such as CC-Link or PROFIBUS and PLC devices which are set with arbitrary device assignment. If the PLC devices have duplicated, NC or PLC ladder can not be carried out correctly. When using machine input/output signal other than the remote I/O, make sure to confirm that the PLC devices do not duplicate the PLC devices set with arbitrary device assignment.

- (6) Even when the RIO assignment parameters are set in the remote I/O unit stations which have the analog input/output and safety DI/DO functions, the input/output is not carried out to the set PLC devices.

- (7) Up to 24 stations can be specified for high-speed input/output specification each for input and output. If 25 or more stations are specified, the alarm "Y05 Initial parameter error" will be issued.
- (8) High-speed input/output specification can be set by R registers below as well as the RIO assignment parameters.

		Station No.							
Channel No.		1 to 8	9 to 16	17 to 24	25 to 32	33 to 40	41 to 48	49 to 56	57 to 64
RIO1	High-speed input specification	R30544 low-order	R30544 high-order	R30545 low-order	R30545 high-order	R30546 low-order	R30546 high-order	R30547 low-order	R30547 high-order
	High-speed output specification	R30560 low-order	R30560 high-order	R30561 low-order	R30561 high-order	R30562 low-order	R30562 high-order	R30563 low-order	R30563 high-order
RIO2	High-speed input specification	R30548 low-order	R30548 high-order	R30549 low-order	R30549 high-order	R30550 low-order	R30550 high-order	R30551 low-order	R30551 high-order
	High-speed output specification	R30564 low-order	R30564 high-order	R30565 low-order	R30565 high-order	R30566 low-order	R30566 high-order	R30567 low-order	R30567 high-order
RIO3	High-speed input specification	R30552 low-order	R30552 high-order	R30553 low-order	R30553 high-order	R30554 low-order	R30554 high-order	R30555 low-order	R30555 high-order
	High-speed output specification	R30568 low-order	R30568 high-order	R30569 low-order	R30569 high-order	R30570 low-order	R30570 high-order	R30571 low-order	R30571 high-order

- (Note 1) Turn the power OFF and ON after the R register settings to enable the settings.
- (Note 2) One bit of each R register is equivalent to one station. The high-speed input/output specification can be performed by turning ON the R register bits of the stations to be input or output with PC high speed. To output the 10th station of RIO1 at high speed, for instance, turn BIT9 of R30544 ON.
- (Note 3) The seventh to 14th stations of RIO3 can not be specified for high-speed input/output because they are used for the system. Even when the BIT6 to BITD of R30552 and R30568 are turned ON, they will be invalid.
- (Note 4) The above settings are invalid with fixed device assignment.
- (9) In the following cases, the alarm "Y05 Initial parameter error" will be issued when the power is turned ON. The number of the RIO assignment parameter with illegal setting state will be displayed.
- (a) The value outside the range of setting has been set to the RIO assignment parameter (except #53001 RIO dev assign).
- (b) Two or more stations of the target channel No. and the target station No. are set redundantly to the RIO assignment parameters.
- (Example)

The power is turned ON in a state where the 1st and 2nd station of RIO1 are set redundantly to the RIO assignment parameter #1 to #5 as shown in the table below. (Both the 1st and 2nd stations are connected to NC control unit.)

Parameter set No.#n	Target channel No. #n (parameter No.)	Target station No. #n (parameter No.)	Setting state
1	1(#53011)	0(#53012)	RIO1 1st station is set
2	1(#53021)	1(#53022)	RIO1 2nd station is set
3	1(#53031)	1(#53032)	RIO1 2nd station is set
4	1(#53041)	0(#53042)	RIO1 1st station is set
5	1(#53051)	0(#53052)	RIO1 1st station is set

Result:

The parameter number (53031) of "Target channel #3" will be displayed on the alarm "Y05 Initial parameter error". Duplication error of RIO1 second station will be detected first because the RIO assignment parameter is checked from the top. Between the parameter set #2 and #3 to which second station of RIO1 are set, parameter set #3 which is the latter will be displayed as the alarm.

- (c) A PLC device outside the assignable range has been set to the RIO assignment parameter.
- (d) 25 or more stations have been specified with the high-speed input or output with the RIO assignment parameters.

- (e) The RIO assignment parameters have not been specified to the remote I/O unit stations with DI/DO functions (except safety DI/DO) that are connected to NC.
- (f) Two or more stations of the PLC devices are set redundantly to the RIO assignment parameters.

(Note) However, these (a) to (f) will not be issued with the alarm "Y05 Initial parameter error" in the following cases:

- "0" has been set to the target channel.
- Remote I/O unit with DI/DO function are not connected to the station which has been specified with the target channel and station number.
- The parameter "#1238 set10/BIT3" is ON (the input from RIO is ignored).

(Example)

The power is turned ON in a state where the X100 and X200 of PLC device are set redundantly to the RIO assignment parameter #1 to #5 as shown in the table below. (All stations which has been set to the RIO assignment parameters #1 to #5 are connected to NC control unit.)

Parameter set No. #n	DI device name #n (parameter No.)	DI device No. #n (parameter No.)	Setting state
1	X(#53013)	100(#53014)	X100 is set
2	X(#53023)	200(#53024)	X200 is set
3	X(#53033)	200(#53034)	X200 is set
4	X(#53043)	100(#53044)	X100 is set
5	X(#53053)	100(#53054)	X100 is set

Result:

The parameter number (53034) of "DI device No. #3" will be displayed on the alarm "Y05 Initial parameter error". Duplication error of X200 will be detected first because the RIO assignment parameter is checked from the top. Between the parameter set #2 and #3 to which the X200 are set, parameter set #3 which is the latter will be displayed as the alarm.

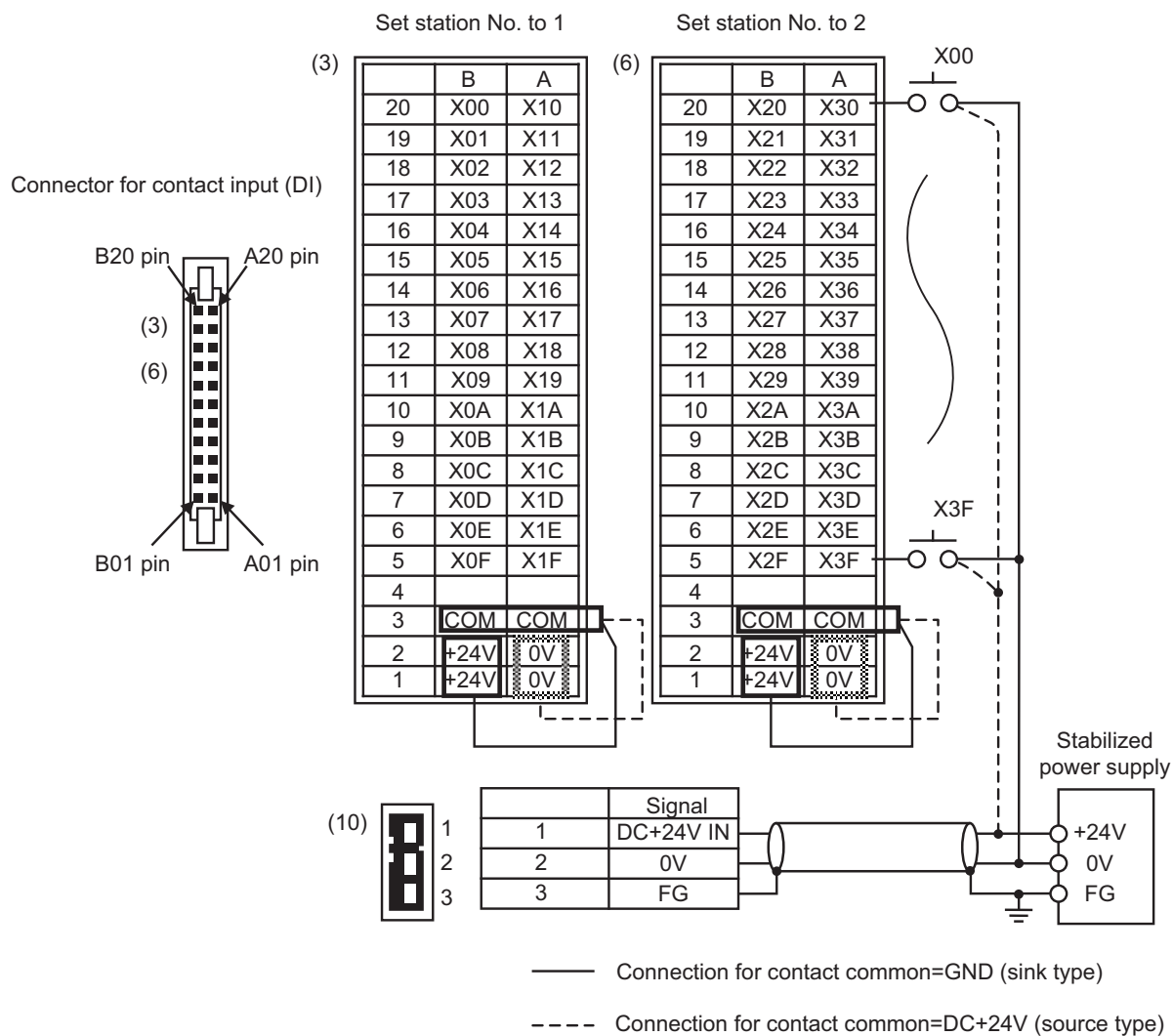
- (10) PLC fixed signals (stroke end +/- and reference position return near-point detection) acquire the input signals from the RIO units assigned to the fixed devices when the arbitrary RIO assignment has been performed.

Operating parameter setting screen

- (1) RIO assignment parameter setting rule
 - (a) For arbitrary device assignment, assign PLC devices to all stations which are connected to the remote units with DI/DO function. Devices can be assigned in random order for arbitrary device assignment. It is unnecessary to assign in order of the target channels, target station numbers, PLC devices, etc.
 - (b) Set the PLC device numbers after setting the PLC device names. A setting error occurs if PLC number is input when the PLC device name is in the unset (blank) state. When a PLC device name is changed, PLC device number of the same parameter set number is cleared to zero.
 - (c) When setting the bit devices, set the DI and DO device numbers in increments of 32 points. A setting error occurs if device number is not a multiple of 32 (20 for hexadecimal).
 - (d) When setting the word devices, set the DI and DO device numbers in increments of two words (32 bits). A setting error occurs if the device number is odd.
 - (e) Set the target channels to "0" for the parameter sets which are not set for device assignment. The setting state of the parameter sets to which "0" has been set for the target channel will not be checked.
 - (f) The RIO assignment parameter setting values are retained even when the fixed device assignment and arbitrary device assignment are switched.
- (2) RIO assignment parameter setting state check
 - (a) The RIO assignment parameter setting state can be checked without rebooting the power by setting the RIO assignment parameter "Device Setting Check" to "1" when performing the arbitrary device assignment. The RIO assignment parameter setting state will not be checked at the fixed device assignment.
 - (b) The RIO assignment parameter settings cannot be valid only by inputting "1" to "Device Setting Check". To enable the arbitrary device assignment, turn the power OFF and ON after the RIO assignment parameter settings.
 - (c) The value of "Device Setting Check" goes back to "0" after the check for the RIO parameter setting state is completed.
 - (d) The RIO assignment parameter setting state of each remote I/O unit station with the analog input/output and safety DI/DO functions will not be checked.
 - (e) The setting state of the parameter set which has been set as the station unconnected to the NC control unit will not be checked.
 - (f) The setting state of the parameter sets of which the target channel number has been set to "0" will not be checked.

1.2.3 Relation of Connector Pins and Device

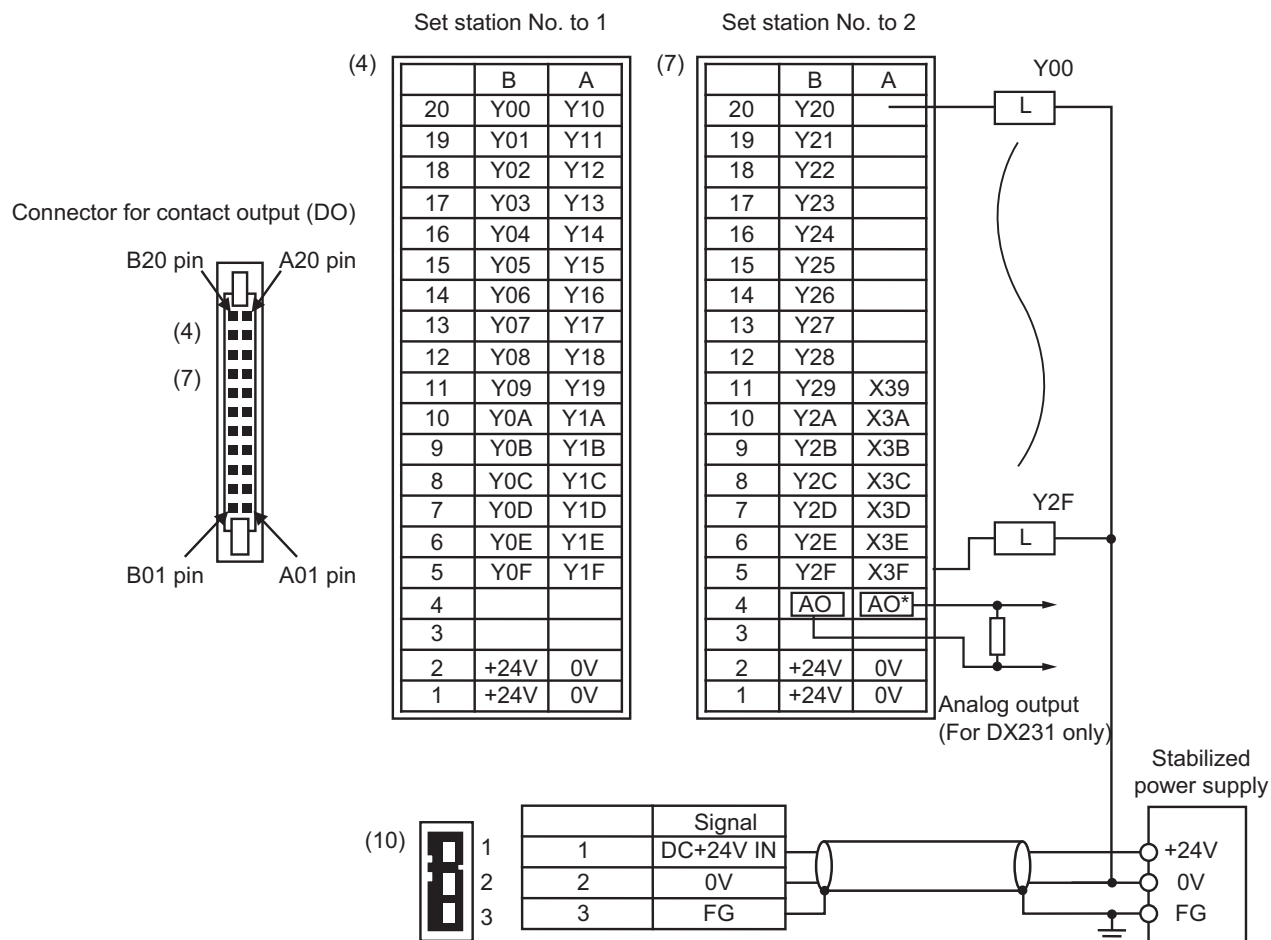
(1) Input (DI) signal



(Note 1) The No. of points (devices) will differ according to the RIO unit type.

(Note 2) The devices shown here show an example for when the station No. of RIO unit is set to "1" and set to "2".

(2) Output (DO) signal



(Note 1) The No. of points (devices) will differ according to the RIO unit type.

(Note 2) The devices shown here show an example for when the station No. of RIO unit is set to "1" and set to "2". Refer to the section "Rotary Switch for Channel No. Setting" for details on the relation of the rotary switch and device No.

(Note 3) The A4 and B4 pin analog output (AO, AO*) in the output connector (7) is found only on the RIO unit DX231. Refer to the section "Outline of Analog Signal Input Circuit" for details on DX220/DX230 connector.

1.3 Fixed Signals

The connector pin Nos. in the input signals that are fixed are shown below.

Note that using the methods below can ignore fixed signals and change the allocations.

Signal name	Device	Signal name	Device
Emergency stop	EMG of main unit	Stroke end -1	X20
Stroke end +1	X28	Stroke end -2	X21
Stroke end +2	X29	Stroke end -3	X22
Stroke end +3	X2A	Stroke end -4	X23
Stroke end +4	X2B	Stroke end -5	X64
Stroke end +5	X6C	Stroke end -6	X65
Stroke end +6	X6D	Stroke end -7	X66
Stroke end +7	X6E	Stroke end -8	X67
Stroke end +8	X6F		
Reference position return near-point detection 1	X18		
Reference position return near-point detection 2	X19		
Reference position return near-point detection 3	X1A		
Reference position return near-point detection 4	X1B		
Reference position return near-point detection 5	X5C		
Reference position return near-point detection 6	X5D		
Reference position return near-point detection 7	X5E		
Reference position return near-point detection 8	X5F		

(Note) When using the multi-part system and the 1st part system has 2 axes and the 2nd part system has 1 axis, the 1st axis in the 2nd part system will correspond to the 3rd axis above.

1.3.1 Ignoring Fixed Signals

The fixed signals can be used as other signals by ignoring them with file registers R248 and R272.

1.3.2 Changing the Addresses of Fixed Signals

The fixed devices can be allocated arbitrarily with the following parameters.

The parameters #2073 to #2075 are valid when 1 is set in #1226 aux10 bit 5.

When the parameters #2073 to #2075 are valid, do not set the same device number. If the same device number exists, an emergency stop occurs. However, no device number check is performed for an axis to which a signal (R248, R272) that ignores the fixed signal is input.

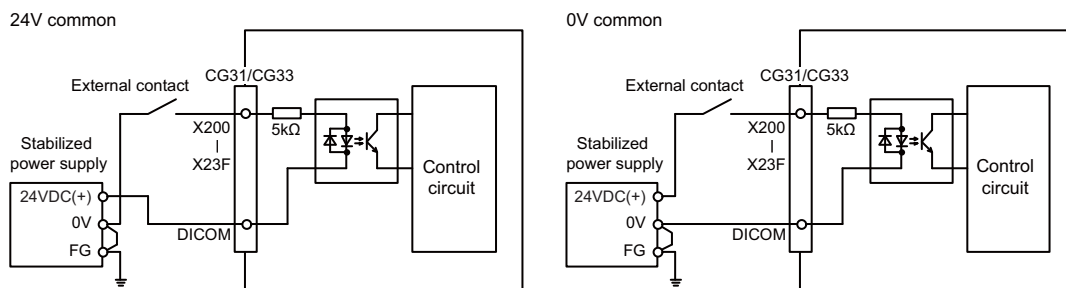
When the arbitrary allocation is valid, the fixed signals can be used as other signals.

#	Items		Details	Setting range (unit)
1226	aux10 (bit5)	Arbitrary allocation of dog signal	Specify whether to enable the arbitrary allocation parameter for the origin dog and H/W OT. 0: Disable arbitrary allocation. (Fixed device) 1: Enable arbitrary allocation. (Device specified by the parameter)	0/1
2073	zrn_dog	Origin dog	Under the standard specifications, the origin dog signal is assigned to a fixed device. When it is desired to assign the origin dog signal to a position other than the fixed device, specify the input device in this parameter. This parameter is enabled in the following conditions. NC axis: When "#1226 aux10/bit5" is set to "1". PLC axis: When "#1246 set18/bit7" is set to "1". - When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. However, no device number check is performed for an axis to which a signal that ignores the near-point dog signal (R272) is input.	0000 to 02FF (HEX)
2074	H/W_OT+	H/W OT+	Under the standard specifications, the OT (+) signal is assigned to a fixed device. When it is desired to assign the OT (+) signal to a position other than the fixed device, specify the input device in this parameter. This parameter is enabled in the following conditions. NC axis: When "#1226 aux10/bit5" is set to "1". PLC axis: When "#1246 set18/bit7" is set to "1". - When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. However, no device number check is performed for an axis to which a signal that ignores the OT signal (R248) is input.	0000 to 02FF (HEX)
2075	H/W_OT-	H/W OT-	Under the standard specifications, the OT (-) signal is assigned to a fixed device. When it is desired to assign the OT (-) signal to a position other than the fixed device, specify the input device in this parameter. This parameter is enabled in the following conditions. NC axis: When "#1226 aux10/bit5" is set to "1". PLC axis: When "#1246 set18/bit7" is set to "1". - When this parameter is valid, do not set the same device number. If the same device number exists, an emergency stop occurs. However, no device number check is performed for an axis to which a signal that ignores the OT signal (R248) is input.	0000 to 02FF (HEX)

1.4 Outline of Digital Signal Input Circuit

Both 24V common and 0V common connections are allowed in the digital signal input circuit.
Follow the wiring diagram below for each type.

Input circuit

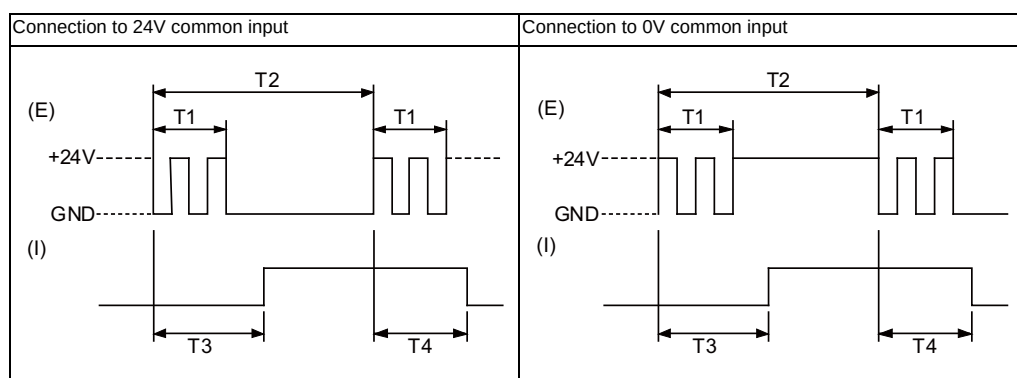


Input conditions

The input signals must be used within the following condition ranges.

		24V common	0V common
1	Input voltage at external contact ON	6V or less	18V or more, 25.2V or less
2	Input current at external contact ON	3mA or more	
3	Input voltage at external contact OFF	20V or more, 25.2V or less	3.8V or less
4	Input current at external contact OFF	0.7mA or less	
5	Input resistance	5kΩ	
6	Tolerable chattering time (T1)	3ms	
7	Input signal holding time (T2)	40ms or more (Note)	
8	Input circuit operation delay time (T3 and T4)	3ms to 16ms	
9	Machine side contact capacity	30V or more, 16mA or more	

(Note) Input signal holding time: The guide is 40ms or more. The input signal will not be recognized unless it is held for the ladder processing cycle time or longer.

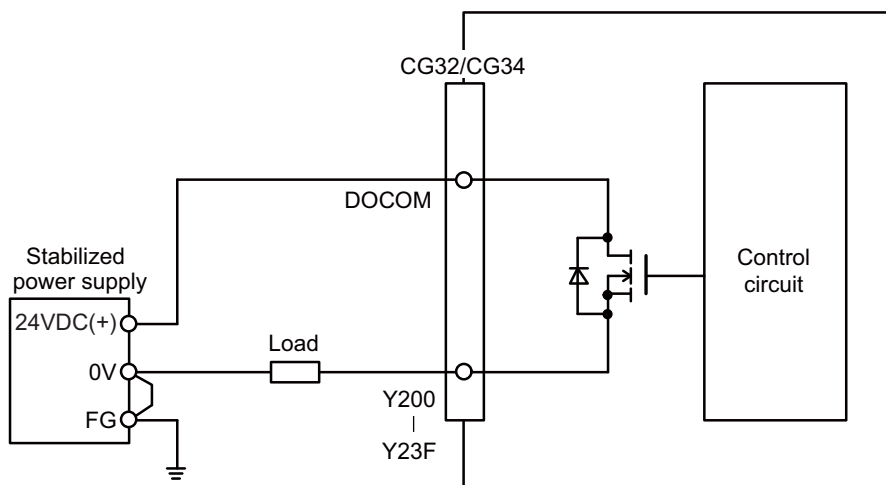


(E) : External signal, (I):Internal signal

1.5 Outline of Digital Signal Output Circuit

Use within the specification ranges shown below.

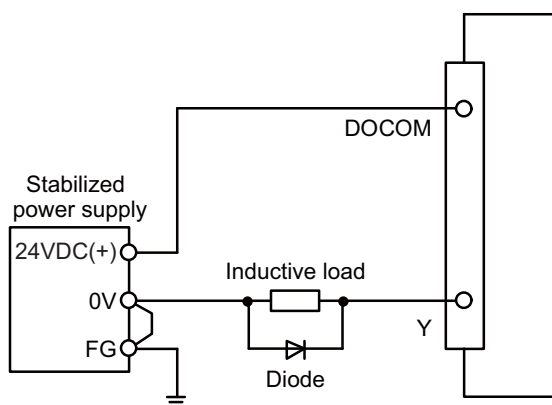
Output circuit



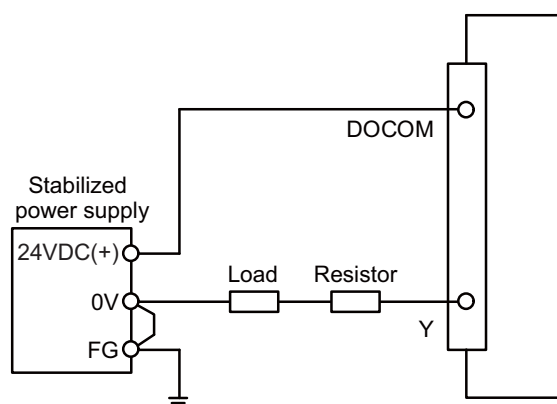
Output conditions

Insulation method	Insulation
Rated load voltage	24VDC
Max. output current	0.2A/point 3.8A or less in the unit
Output delay time	40 μ s

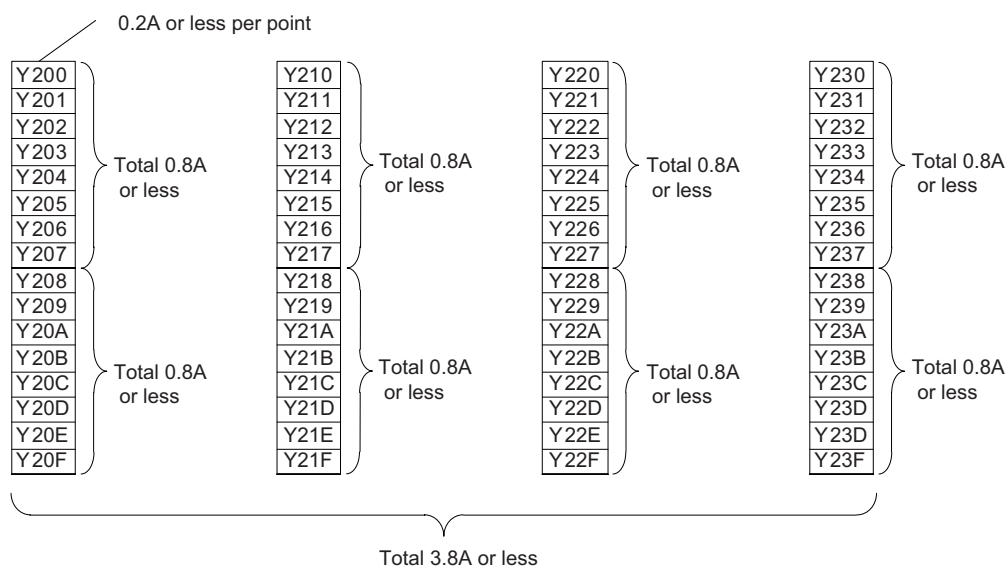
(Note 1) When using an inductive load such as a relay, always connect a diode (voltage resistance 100V or more, twice or more the load current) in parallel to the load.



(Note 2) When the rush current exceeds the maximum output current, always connect a protective resistor ($R=150\ \Omega$) serially to the load to suppress rush currents. Make sure that the current is less than the maximum output current including the momentary current.



(Note 3) Always keep the total sum of output current of each Y00 to Y07, Y08 to Y0F, Y10 to Y17, Y18 to Y1F, Y20 to Y27, Y28 to Y2F, Y30 to Y37 and Y38 to Y3F less than 0.8A.

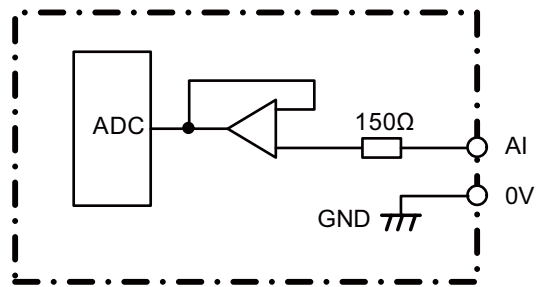


⚠ CAUTION

1. When using an inductive load such as a relay, always connect a diode in parallel to the load to prevent a counter-electromotive force.
2. When the rush current exceeds the maximum output current, always connect a protective resistor serially to the load to suppress rush currents.

1.6 Outline of Analog Signal Input Circuit

Input circuit



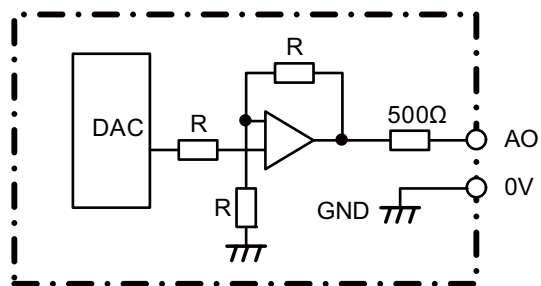
Input conditions

Max. input rating	$\pm 11\text{V}$
Instantaneous max. input voltage (Note)	$\pm 15\text{V}$
Resolution	$ -10 \sim +10\text{V} / 4096 = 4.88\text{mV}$
Precision	Within $\pm 25\text{mV}$
Tolerance	$\pm 0.35\text{V}$

(Note) "Instantaneous" means the pulsing voltage $1\ \mu\text{s}$ or less.

1.7 Outline of Analog Signal Output Circuit

Output circuit



Output conditions

Output voltage	0V ~ $\pm 10\text{V}$ ($\pm 5\%$)
Resolution	12bit($\pm 10\text{V} \times n/4096$) (Note)
Load conditions	10k Ω load resistance
Output impedance	500 Ω

(Note) $n=(2^0 \text{ to } 2^{11})$

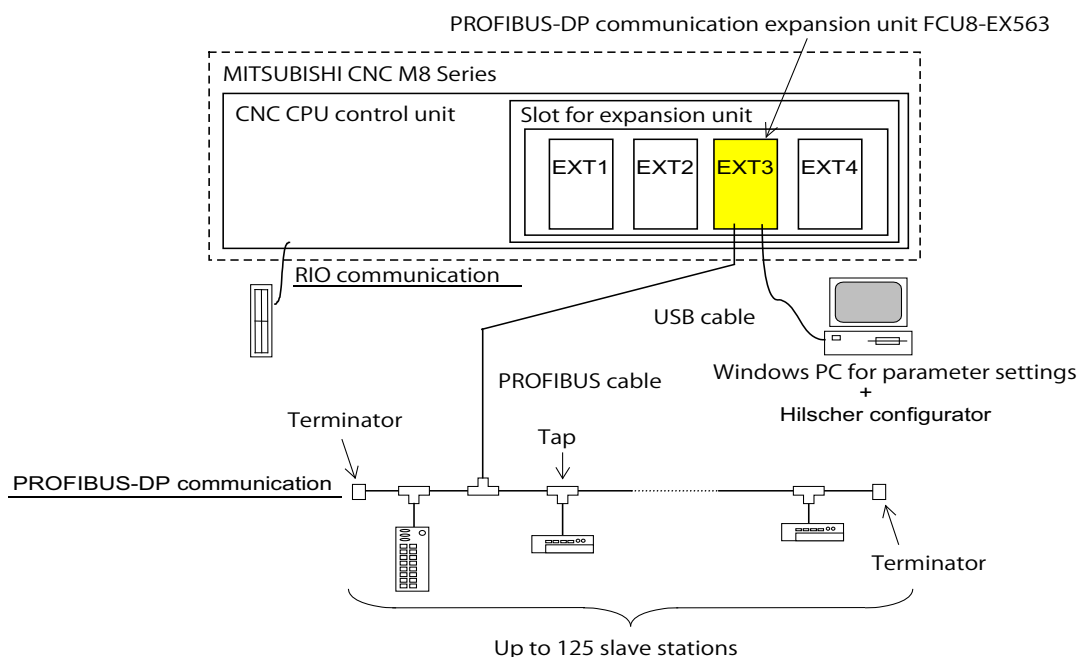
1.8 Outline of I/O Assignment with PROFIBUS-DP

By installing the PROFIBUS-DP communication expansion unit FCU8-EX563 and connecting the slave stations compatible with PROFIBUS-DP communication to M8 Series expansion slot (EXT3 or EXT4), NC can input/output the devices to/from the slave stations as the master station for PROFIBUS-DP communication. However, it is not possible to use the NC with two units of FCU8-EX563 installed at a time. If two units of FCU8-EX563 are installed at a time, both units stop their operation and the error occurs.

Hilscher's Fieldbus communication control unit (COM module) is mounted on FCU8-EX563, and parameters are set using Hilscher configurator "SYCON.net". Up to 125 slave stations can be connected.

Inputs/outputs of the devices from NC's PLC are all handled as bit device data. Up to 512 points can be input/output. Maximum number of inputs/outputs for NC remote I/O unit is 768, whether or not FCU8-EX563 is installed.

<PROFIBUS-DP connection outline (M800W)>

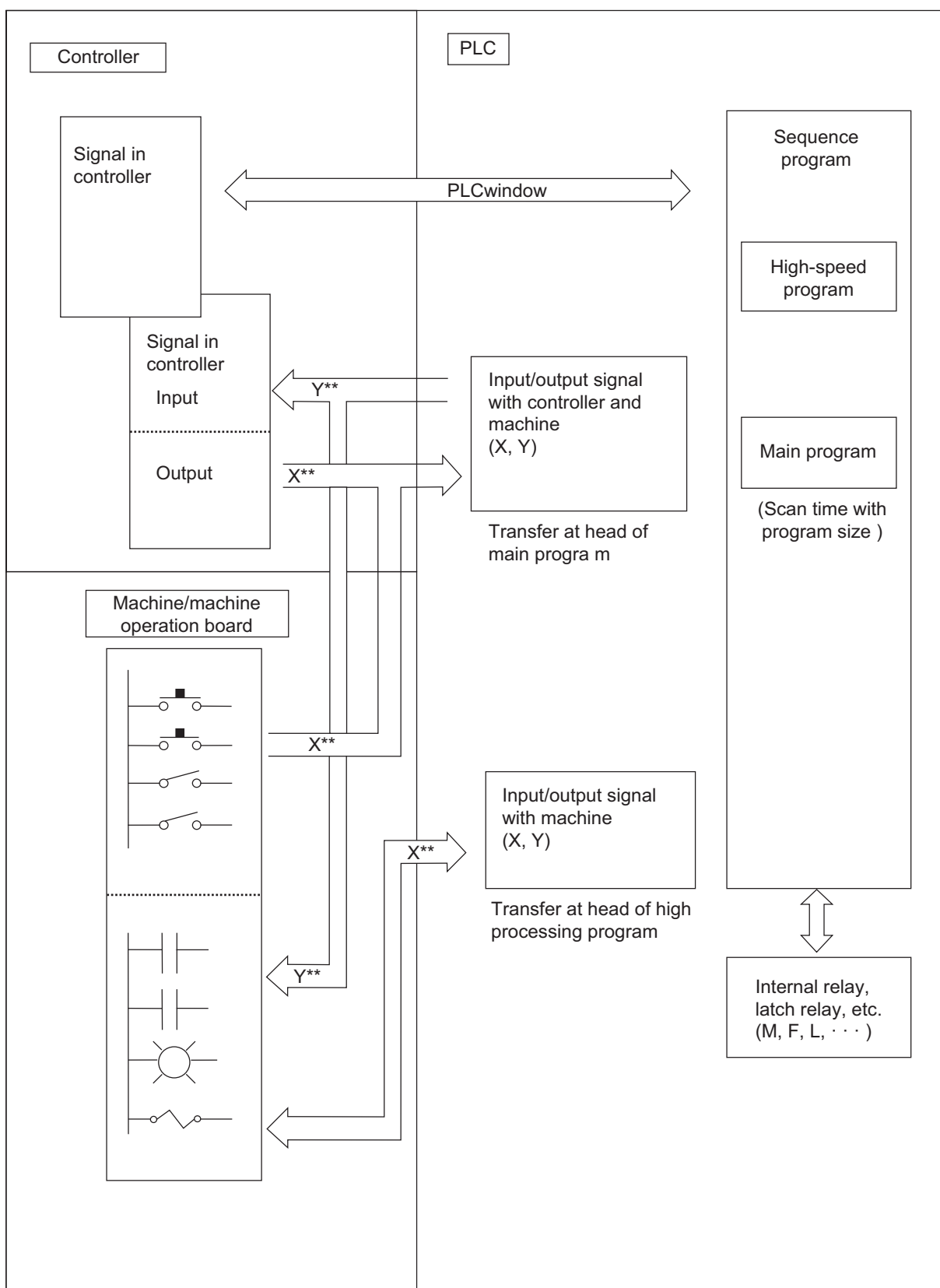


Machine input/output signal allocation

Input/output device allocation when FCU8-EX563 is mounted is as shown below.

	RIO communication only			With PROFIBUS-DP communication			
	RIO1	RIO2	RIO3	RIO1	RIO2	RIO3	PROFIBUS-DP communication
Input	X00 to XFF	X100 to X1FF	X200 to X2FF	X00 to XFF	X100 to X1FF	X200 to X2FF	X400 to X5FF
Output	Y00 to YFF	Y100 to Y1FF	Y200 to Y2FF	Y00 to YFF	Y100 to Y1FF	Y200 to Y2FF	Y400 to Y5FF

1.9 Flow of Signals



1.10 List of Devices

Device	Device No.	Unit	Details
X*	X0 to X1FFF (8192 points)	1 bit	Input signal to PLC: Machine input, etc.
Y*	Y0 to Y1FFF (8192 points)	1 bit	Output signal from PLC: Machine output, etc.
M	M0 to M61439 (61440 points)	1 bit	Temporary memory
F	F0 to F2047 (2048 points)	1 bit	Temporary memory. Alarm message interface
L	L0 to L1023 (1024 points)	1 bit	Latch relay (back up memory)
SM	SM0 to SM2047 (2048 points)	1 bit	Special relay
V	V0 to V511 (512 points)	1 bit	Edge relay
SB	SB0 to SB3FF (1024points)	1 bit	Special relay
B	B0 to BDFFF (57344 points)	1 bit	Link relay
SW	SW0 to SW3FF (1024points)	1 bit	Special register
SD	SD0 to SD2047 (2048 points)	16 bit	Special register
T	T0 to T2047 (2048 points)	1 bit/16 bit	Timer (The variable/fixed boundary is set with a parameter.) (Note 2)
ST	ST0 to ST127 (128 points)	1 bit/16 bit	Integrated timer (100ms unit)
C	C0 to C511 (512 points)	1 bit/16 bit	Counter (The variable/fixed boundary is set with a parameter.)
D	D0 to D4095 (4096 points)	16 bit/32 bit	Data register. Register for calculation
R*	R0 to R32767 (32768 points)	16 bit/32 bit	File register. CNC word interface
ZR	ZR0 to ZR13311 (13312 points)	16 bit/32 bit	File register
W	W0 to W2FFF (12288 points)	16 bit/32 bit	Link register
Z	Z0 to Z13 (14 points)	16 bit	Address index
N	N0 to N14 (15 points)	-	Master controller nesting level
P*	P0 to P4095 (4096 points)	-	Label for conditional jump, subroutine call command
K	K-32768 to K32767	-	Decimal constant for 16-bit command
	K-2147483648 to K2147483647	-	Decimal constant for 32-bit command
H	H0 to HFFFF	-	Hexadecimal constant for 16-bit command
	H0 to HFFFFFFFF	-	Hexadecimal constant for 32-bit command

(Note 1) Devices marked with * in the device column have designated applications. Do not use devices other than those corresponding to the input/output signals with the machine side (input/output signals of the remote I/O unit), even if it is an undefined vacant device.

(Note 2) Distinction of 10ms timer and 100ms timer is performed by command.
(10ms timer is performed by OUTH command, 100ms timer is performed by OUT command.)

1.10.1 Device Range Setting at Multi-projects

Each device will be categorized to either the common device among projects (common device among projects) or the independent device for each projects (independent device among projects) when using the multi-project function.

(a) Common device among projects

Device is influenced by the access from the multiple projects.

The number of device points is fixed without being affected by the number of projects.

For example, the X/ Y/ R devices are common devices among projects.

(b) Independent device among projects

Device can be used independently in the multiple projects.

In addition, Independent device among projects are categorized into variable points or fixed points device.

- Independent device among projects (Fixed points)

The number of device points is fixed without being affected by the number of projects.

For example, the SM/ SD/ Z devices are independent devices among projects (fixed points)

- Independent device among projects (Variable points)

The maximum number of project is allocated to each project and used.

For example, the M/ L/ SB devices are independent devices among projects (variable points)

The list of device categories is as follows.

(1) Category explanation

Category	Details
Common	Common device among projects
Independent (fixed)	Independent device among projects (fixed points)
Independent (variable)	Independent device among projects (variable points)
Common/independent	Independent device among projects (variable points) However, it is possible to set as the common device among projects from the top.

(2) List of categories

Device	Category	Number of device points (Maximum number of projects)
X	Common	8192 points
Y	Common	8192 points
M	Common/Independent	61440 points (122880 points)
L	Independent(Variable)	1024 points (2048 points)
F	Common	2048 points
SB	Independent(Variable)	1024 points (2048 points)
B	Independent(Variable)	57344 points (114688 points)
SM	Independent(Fixed)	2048 points
V	Independent(Variable)	256 points (1024 points)
SW	Independent(Variable)	1024 points (2048 points)
SD	Independent(Fixed)	2048 points
T	Independent(Variable)	2048 points (4096 points)
ST	Independent(Variable)	128 points (256 points)
C	Independent(Variable)	512 points (1024 points)
D	Common/Independent	4096 points (8192 points)
R	Common	32768 points
ZR	Common	13312 points
W	Independent(Variable)	12288 points (24576 points)
Z	Independent(Fixed)	14 points
N	Independent(Fixed)	15 points
P	Independent(Fixed)	4096 points

* Number of points in brackets is for the options.

Refer to "PLC Programming Manual" for details on the independent device among projects and the common device among projects.

1.11 File Register General Map

Device	Details
R00000 to R00199	System common data (NC -> PLC)
R00200 to R00499	System common data (PLC -> NC)
R00500 to R00699	1st part system data (NC -> PLC)
R00700 to R00899	2nd part system data (NC -> PLC)
R00900 to R01099	3rd part system data (NC -> PLC)
R01100 to R01299	4th part system data (NC -> PLC)
R01300 to R02099	System reserve
R02100 to R02397	Pallet program data (Drive unit -> PLC)
R02500 to R02699	1st part system data (PLC -> NC)
R02700 to R02899	2nd part system data (PLC -> NC)
R02900 to R03099	3rd part system data (PLC -> NC)
R03100 to R03299	4th part system data (PLC -> NC)
R03300 to R04099	System reserve
R04100 to R04103	Pallet program data (PLC -> Drive unit)
R04104 to R04499	System reserve
R04500 to R05683	Axis data (NC -> PLC)
R05684 to R05699	System reserve
R05700 to R06371	Axis data (PLC -> NC)
R06372 to R06499	User macro (NC -> PLC: 64 point, PLC -> NC: 64 point)
R06500 to R06549	1st spindle data (NC -> PLC)
R06550 to R06599	2nd spindle data (NC -> PLC)
R06600 to R06649	3rd spindle data (NC -> PLC)
R06650 to R06699	4th spindle data (NC -> PLC)
R06700 to R06749	5th spindle data (NC -> PLC)
R06750 to R06799	6th spindle data (NC -> PLC)
R06800 to R06849	7th spindle data (NC -> PLC)
R06850 to R06899	8th spindle data (NC -> PLC)
R06900 to R06999	System reserve
R07000 to R07049	1st spindle data (PLC -> NC)
R07050 to R07099	2nd spindle data (PLC -> NC)
R07100 to R07149	3rd spindle data (PLC -> NC)
R07150 to R07199	4th spindle data (PLC -> NC)
R07200 to R07249	5th spindle data (PLC -> NC)
R07250 to R07299	6th spindle data (PLC -> NC)
R07300 to R07349	7th spindle data (PLC -> NC)
R07350 to R07399	8th spindle data (PLC -> NC)
R07400 to R07499	System reserve
R07500 to R07949	PLC constants
R07950 to R07999	System reserve
R08000 to R08099	PLC axis indexing
R08100 to R08289	System reserve
R08290 to R08299	Optimum acceleration/deceleration (Spindle)
R08300 to R09799	User backed up area
R09800 to R09899	User work area
R09900 to R09999	J2CT
R10000 to R10099	Remote I/O communication error information
R10100 to R10139	I/O link input
R10140 to R10179	I/O link output
R10180 to R10180	I/O link communication status
R10181 to R10187	System reserve
R10188 to R10189	Base PLC mounting check
R10190 to R10199	MELSEC link II diagnosis I/F

Device	Details
R10200 to R10399	Data buffer for MELSEC link II (machine input)
R10400 to R10599	Data buffer for MELSEC link II (machine output)
R10600 to R12759	ATC data, tool life management for M system / Tool life management I, II for L system
R12760 to R13999	System reserve
R14000 to R14499	EcoMonitorLight data (NC -> PLC)
R14500 to R17299	System reserve
R17300 to R18299	Modbus input/output device
R18300 to R19799	User backup area
R19800 to R19899	User work area
R19900 to R19999	System reserve
R20000 to R20199	System common data (NC -> PLC)
R20200 to R20499	System common data (PLC -> NC)
R20500 to R20699	1st part system data (NC -> PLC)
R20700 to R20899	2nd part system data (NC -> PLC)
R20900 to R21099	3rd part system data (NC -> PLC)
R21100 to R21299	4th part system data (NC -> PLC)
R21300 to R22499	System reserve
R22500 to R22699	1st part system data (PLC -> NC)
R22700 to R22899	2nd part system data (PLC -> NC)
R22900 to R23099	3rd part system data (PLC -> NC)
R23100 to R23299	4th part system data (PLC -> NC)
R23300 to R28299	System reserve
R28300 to R29799	User backup area
R29800 to R29899	User work area
R29900 to R32767	System reserve

(Note) The system reserve is used for function expansion by Mitsubishi, and must not be used by the user.

Input/Output Signals with Machine

Classification of Machine Input/Output Signals

The signals handled by the PLC are classified as shown below.

When designing, refer to the section indicated below and make allocations according to the table in the respective section.

	Signal type		Explanation	Reference
Input	DI	Machine	(1) Allocated to device X. (2) Some connector pin allocations are determined. (a) Stroke end signal (+, -) (b) Reference point return near-point detection signal (3) The high-speed processing input is set with the parameters. (Read in at the head of the high-speed processing scan.)	"Input Signals from Machine"
	PLC switch input (Note)		(1) The switches can be substituted by the setting and display unit. (2) Allocated to device X. (3) The switch names displayed on the setting and display unit are user release switches, and can be created with the ladder message creation.	"PLC Switch/Sensor"
	Sensor input		(1) Differs from other DI signals, and is connected to the controller. This is only used for monitoring on the ladder side.	"PLC Switch/Sensor"
	AI (Analog Input)		(1) The connector pin allocation is determined. (2) Allocated to the file register (R).	"PLC Input Signals (Data Type: R***)"
Output	DO	Machine	(1) Allocated to device Y. (2) The high-speed processing output is set with the parameters.(Output at end of the high-speed processing scan.)	"Output Signals to Machine"
	PLC switch output (Note)		(1) Output used to show that setting and display unit PLC switch input is valid. (2) Allocated to device Y.	"PLC Switch"
	AO (Analog Output)		(1) The connector pin allocation is determined. (2) Data to be D/A converted and output can be output by reading it into the file register (R).	"PLC Out Signals (Data Type: R***)"

(Note) The PLC switches are not signals for directly inputting/outputting with the machine, and are hypothetical switches used by the user on the setting and display unit. When classified by property, they are as shown above.

2.1 Machine Input Signals

2.1.1 Input Signals from Machine

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X0			B20	X8			B12
X1			B19	X9			B11
X2			B18	XA			B10
X3			B17	XB			B09
X4			B16	XC			B08
X5			B15	XD			B07
X6			B14	XE			B06
X7			B13	XF			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X10			A20	X18		* Reference position return near point detection 1	A12
X11			A19	X19		* Reference position return near point detection 2	A11
X12			A18	X1A		* Reference position return near point detection 3	A10
X13			A17	X1B		* Reference position return near point detection 4	A09
X14			A16	X1C			A08
X15			A15	X1D			A07
X16			A14	X1E			A06
X17			A13	X1F			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X20		* Stroke end -1	B20	X28		* Stroke end +1	B12
X21		* Stroke end -2	B19	X29		* Stroke end +2	B11
X22		* Stroke end -3	B18	X2A		* Stroke end +3	B10
X23		* Stroke end -4	B17	X2B		* Stroke end +4	B09
X24			B16	X2C			B08
X25			B15	X2D			B07
X26			B14	X2E			B06
X27			B13	X2F			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X30			A20	X38			A12
X31			A19	X39			A11
X32			A18	X3A			A10
X33			A17	X3B			A09
X34			A16	X3C			A08
X35			A15	X3D			A07
X36			A14	X3E			A06
X37			A13	X3F			A05

(Note 1) For the allocations of the reference position return near-point detection and stroke end signals, refer to the section "Fixed Signals".

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X40			B20	X48			B12
X41			B19	X49			B11
X42			B18	X4A			B10
X43			B17	X4B			B09
X44			B16	X4C			B08
X45			B15	X4D			B07
X46			B14	X4E			B06
X47			B13	X4F			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X50			A20	X58			A12
X51			A19	X59			A11
X52			A18	X5A			A10
X53			A17	X5B			A09
X54			A16	X5C		* Reference position return near point detection 5	A08
X55			A15	X5D		* Reference position return near point detection 6	A07
X56			A14	X5E		* Reference position return near point detection 7	A06
X57			A13	X5F		* Reference position return near point detection 8	A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X60			B20	X68			B12
X61			B19	X69			B11
X62			B18	X6A			B10
X63			B17	X6B			B09
X64		* Stroke end -5	B16	X6C		* Stroke end +5	B08
X65		* Stroke end -6	B15	X6D		* Stroke end +6	B07
X66		* Stroke end -7	B14	X6E		* Stroke end +7	B06
X67		* Stroke end -8	B13	X6F		* Stroke end +8	B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X70			A20	X78			A12
X71			A19	X79			A11
X72			A18	X7A			A10
X73			A17	X7B			A09
X74			A16	X7C			A08
X75			A15	X7D			A07
X76			A14	X7E			A06
X77			A13	X7F			A05

(Note 1) For the allocations of the reference position return near-point detection and stroke end signals, refer to the section "Fixed Signals".

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X80			B20	X88			B12
X81			B19	X89			B11
X82			B18	X8A			B10
X83			B17	X8B			B09
X84			B16	X8C			B08
X85			B15	X8D			B07
X86			B14	X8E			B06
X87			B13	X8F			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
X90			A20	X98			A12
X91			A19	X99			A11
X92			A18	X9A			A10
X93			A17	X9B			A09
X94			A16	X9C			A08
X95			A15	X9D			A07
X96			A14	X9E			A06
X97			A13	X9F			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
XA0			B20	XA8			B12
XA1			B19	XA9			B11
XA2			B18	XAA			B10
XA3			B17	XAB			B09
XA4			B16	XAC			B08
XA5			B15	XAD			B07
XA6			B14	XAE			B06
XA7			B13	XAF			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
XB0			A20	XB8			A12
XB1			A19	XB9			A11
XB2			A18	XBA			A10
XB3			A17	XBB			A09
XB4			A16	XBC			A08
XB5			A15	XBD			A07
XB6			A14	XBE			A06
XB7			A13	XB F			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
XC0			B20	XC8			B12
XC1			B19	XC9			B11
XC2			B18	XCA			B10
XC3			B17	XCB			B09
XC4			B16	XCC			B08
XC5			B15	XCD			B07
XC6			B14	XCE			B06
XC7			B13	XCF			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
XD0			A20	XD8			A12
XD1			A19	XD9			A11
XD2			A18	XDA			A10
XD3			A17	XDB			A09
XD4			A16	XDC			A08
XD5			A15	XDD			A07
XD6			A14	XDE			A06
XD7			A13	XDF			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
XE0			B20	XE8			B12
XE1			B19	XE9			B11
XE2			B18	XEA			B10
XE3			B17	XEB			B09
XE4			B16	XEC			B08
XE5			B15	XED			B07
XE6			B14	XEE			B06
XE7			B13	XEF			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
XF0			A20	XF8			A12
XF1			A19	XF9			A11
XF2			A18	XFA			A10
XF3			A17	XFB			A09
XF4			A16	XFC			A08
XF5			A15	XFD			A07
XF6			A14	XFE			A06
XF7			A13	XFF			A05

2.1.2 PLC Switch/Sensor

PLC Switch Input

Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
X680		PLC switch #1	X688		PLC switch #9
X681		PLC switch #2	X689		PLC switch #10
X682		PLC switch #3	X68A		PLC switch #11
X683		PLC switch #4	X68B		PLC switch #12
X684		PLC switch #5	X68C		PLC switch #13
X685		PLC switch #6	X68D		PLC switch #14
X686		PLC switch #7	X68E		PLC switch #15
X687		PLC switch #8	X68F		PLC switch #16
Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
X690		PLC switch #17	X698		PLC switch #25
X691		PLC switch #18	X699		PLC switch #26
X692		PLC switch #19	X69A		PLC switch #27
X693		PLC switch #20	X69B		PLC switch #28
X694		PLC switch #21	X69C		PLC switch #29
X695		PLC switch #22	X69D		PLC switch #30
X696		PLC switch #23	X69E		PLC switch #31
X697		PLC switch #24	X69F		PLC switch #32
Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
X6A0		PLC switch #33	X6A8		PLC switch #41
X6A1		PLC switch #34	X6A9		PLC switch #42
X6A2		PLC switch #35	X6AA		PLC switch #43
X6A3		PLC switch #36	X6AB		PLC switch #44
X6A4		PLC switch #37	X6AC		PLC switch #45
X6A5		PLC switch #38	X6AD		PLC switch #46
X6A6		PLC switch #39	X6AE		PLC switch #47
X6A7		PLC switch #40	X6AF		PLC switch #48
Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
X6B0		PLC switch #49	X6B8		PLC switch #57
X6B1		PLC switch #50	X6B9		PLC switch #58
X6B2		PLC switch #51	X6BA		PLC switch #59
X6B3		PLC switch #52	X6BB		PLC switch #60
X6B4		PLC switch #53	X6BC		PLC switch #61
X6B5		PLC switch #54	X6BD		PLC switch #62
X6B6		PLC switch #55	X6BE		PLC switch #63
X6B7		PLC switch #56	X6BF		PLC switch #64

(Note) Device Nos. X6A0 to X6BF are assigned when 64 points are provided for the switches.

Sensor Input

Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
X6F0			X6F8		Skip input 1
X6F1			X6F9		Skip input 2
X6F2			X6FA		Skip input 3
X6F3			X6FB		Skip input 4
X6F4			X6FC		Skip input 5
X6F5			X6FD		Skip input 6
X6F6			X6FE		Skip input 7
X6F7			X6FF		Skip input 8

2.2 Machine Output Signals

2.2.1 Output Signals to Machine

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y0			B20	Y8			B12
Y1			B19	Y9			B11
Y2			B18	YA			B10
Y3			B17	YB			B09
Y4			B16	YC			B08
Y5			B15	YD			B07
Y6			B14	YE			B06
Y7			B13	YF			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y10			A20	Y18			A12
Y11			A19	Y19			A11
Y12			A18	Y1A			A10
Y13			A17	Y1B			A09
Y14			A16	Y1C			A08
Y15			A15	Y1D			A07
Y16			A14	Y1E			A06
Y17			A13	Y1F			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y20			B20	Y28			B12
Y21			B19	Y29			B11
Y22			B18	Y2A			B10
Y23			B17	Y2B			B09
Y24			B16	Y2C			B08
Y25			B15	Y2D			B07
Y26			B14	Y2E			B06
Y27			B13	Y2F			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y30			A20	Y38			A12
Y31			A19	Y39			A11
Y32			A18	Y3A			A10
Y33			A17	Y3B			A09
Y34			A16	Y3C			A08
Y35			A15	Y3D			A07
Y36			A14	Y3E			A06
Y37			A13	Y3F			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y40			B20	Y48			B12
Y41			B19	Y49			B11
Y42			B18	Y4A			B10
Y43			B17	Y4B			B09
Y44			B16	Y4C			B08
Y45			B15	Y4D			B07
Y46			B14	Y4E			B06
Y47			B13	Y4F			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y50			A20	Y58			A12
Y51			A19	Y59			A11
Y52			A18	Y5A			A10
Y53			A17	Y5B			A09
Y54			A16	Y5C			A08
Y55			A15	Y5D			A07
Y56			A14	Y5E			A06
Y57			A13	Y5F			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y60			B20	Y68			B12
Y61			B19	Y69			B11
Y62			B18	Y6A			B10
Y63			B17	Y6B			B09
Y64			B16	Y6C			B08
Y65			B15	Y6D			B07
Y66			B14	Y6E			B06
Y67			B13	Y6F			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y70			A20	Y78			A12
Y71			A19	Y79			A11
Y72			A18	Y7A			A10
Y73			A17	Y7B			A09
Y74			A16	Y7C			A08
Y75			A15	Y7D			A07
Y76			A14	Y7E			A06
Y77			A13	Y7F			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y80			B20	Y88			B12
Y81			B19	Y89			B11
Y82			B18	Y8A			B10
Y83			B17	Y8B			B09
Y84			B16	Y8C			B08
Y85			B15	Y8D			B07
Y86			B14	Y8E			B06
Y87			B13	Y8F			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
Y90			A20	Y98			A12
Y91			A19	Y99			A11
Y92			A18	Y9A			A10
Y93			A17	Y9B			A09
Y94			A16	Y9C			A08
Y95			A15	Y9D			A07
Y96			A14	Y9E			A06
Y97			A13	Y9F			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
YA0			B20	YA8			B12
YA1			B19	YA9			B11
YA2			B18	YAA			B10
YA3			B17	YAB			B09
YA4			B16	YAC			B08
YA5			B15	YAD			B07
YA6			B14	YAE			B06
YA7			B13	YAF			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
YB0			A20	YB8			A12
YB1			A19	YB9			A11
YB2			A18	YBA			A10
YB3			A17	YBB			A09
YB4			A16	YBC			A08
YB5			A15	YBD			A07
YB6			A14	YBE			A06
YB7			A13	YBF			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
YC0			B20	YC8			B12
YC1			B19	YC9			B11
YC2			B18	YCA			B10
YC3			B17	YCB			B09
YC4			B16	YCC			B08
YC5			B15	YCD			B07
YC6			B14	YCE			B06
YC7			B13	YCF			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
YD0			A20	YD8			A12
YD1			A19	YD9			A11
YD2			A18	YDA			A10
YD3			A17	YDB			A09
YD4			A16	YDC			A08
YD5			A15	YDD			A07
YD6			A14	YDE			A06
YD7			A13	YDF			A05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
YE0			B20	YE8			B12
YE1			B19	YE9			B11
YE2			B18	YEA			B10
YE3			B17	YEB			B09
YE4			B16	YEC			B08
YE5			B15	YED			B07
YE6			B14	YEE			B06
YE7			B13	YEF			B05

Device	Abbrev.	Signal name	Connector	Device	Abbrev.	Signal name	Connector
YF0			A20	YF8			A12
YF1			A19	YF9			A11
YF2			A18	YFA			A10
YF3			A17	YFB			A09
YF4			A16	YFC			A08
YF5			A15	YFD			A07
YF6			A14	YFE			A06
YF7			A13	YFF			A05

2.2.2 PLC Switch

PLC Switch Output

Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
Y680		PLC switch reversed display #1	Y688		PLC switch reversed display #9
Y681		PLC switch reversed display #2	Y689		PLC switch reversed display #10
Y682		PLC switch reversed display #3	Y68A		PLC switch reversed display #11
Y683		PLC switch reversed display #4	Y68B		PLC switch reversed display #12
Y684		PLC switch reversed display #5	Y68C		PLC switch reversed display #13
Y685		PLC switch reversed display #6	Y68D		PLC switch reversed display #14
Y686		PLC switch reversed display #7	Y68E		PLC switch reversed display #15
Y687		PLC switch reversed display #8	Y68F		PLC switch reversed display #16
Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
Y690		PLC switch reversed display #17	Y698		PLC switch reversed display #25
Y691		PLC switch reversed display #18	Y699		PLC switch reversed display #26
Y692		PLC switch reversed display #19	Y69A		PLC switch reversed display #27
Y693		PLC switch reversed display #20	Y69B		PLC switch reversed display #28
Y694		PLC switch reversed display #21	Y69C		PLC switch reversed display #29
Y695		PLC switch reversed display #22	Y69D		PLC switch reversed display #30
Y696		PLC switch reversed display #23	Y69E		PLC switch reversed display #31
Y697		PLC switch reversed display #24	Y69F		PLC switch reversed display #32
Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
Y6A0		PLC switch reversed display #33	Y6A8		PLC switch reversed display #41
Y6A1		PLC switch reversed display #34	Y6A9		PLC switch reversed display #42
Y6A2		PLC switch reversed display #35	Y6AA		PLC switch reversed display #43
Y6A3		PLC switch reversed display #36	Y6AB		PLC switch reversed display #44
Y6A4		PLC switch reversed display #37	Y6AC		PLC switch reversed display #45
Y6A5		PLC switch reversed display #38	Y6AD		PLC switch reversed display #46
Y6A6		PLC switch reversed display #39	Y6AE		PLC switch reversed display #47
Y6A7		PLC switch reversed display #40	Y6AF		PLC switch reversed display #48
Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
Y6B0		PLC switch reversed display #49	Y6B8		PLC switch reversed display #57
Y6B1		PLC switch reversed display #50	Y6B9		PLC switch reversed display #58
Y6B2		PLC switch reversed display #51	Y6BA		PLC switch reversed display #59
Y6B3		PLC switch reversed display #52	Y6BB		PLC switch reversed display #60
Y6B4		PLC switch reversed display #53	Y6BC		PLC switch reversed display #61
Y6B5		PLC switch reversed display #54	Y6BD		PLC switch reversed display #62
Y6B6		PLC switch reversed display #55	Y6BE		PLC switch reversed display #63
Y6B7		PLC switch reversed display #56	Y6BF		PLC switch reversed display #64

(Note) Device Nos. Y6A0 to Y6BF are assigned when 64 points are provided for the switches.

Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
Y6C0		PLC switch for reverse #1	Y6C8		PLC switch for reverse #9
Y6C1		PLC switch for reverse #2	Y6C9		PLC switch for reverse #10
Y6C2		PLC switch for reverse #3	Y6CA		PLC switch for reverse #11
Y6C3		PLC switch for reverse #4	Y6CB		PLC switch for reverse #12
Y6C4		PLC switch for reverse #5	Y6CC		PLC switch for reverse #13
Y6C5		PLC switch for reverse #6	Y6CD		PLC switch for reverse #14
Y6C6		PLC switch for reverse #7	Y6CE		PLC switch for reverse #15
Y6C7		PLC switch for reverse #8	Y6CF		PLC switch for reverse #16

Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
Y6D0		PLC switch for reverse #17	Y6D8		PLC switch for reverse #25
Y6D1		PLC switch for reverse #18	Y6D9		PLC switch for reverse #26
Y6D2		PLC switch for reverse #19	Y6DA		PLC switch for reverse #27
Y6D3		PLC switch for reverse #20	Y6DB		PLC switch for reverse #28
Y6D4		PLC switch for reverse #21	Y6DC		PLC switch for reverse #29
Y6D5		PLC switch for reverse #22	Y6DD		PLC switch for reverse #30
Y6D6		PLC switch for reverse #23	Y6DE		PLC switch for reverse #31
Y6D7		PLC switch for reverse #24	Y6DF		PLC switch for reverse #32

Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
Y6E0		PLC switch for reverse #33	Y6E8		PLC switch for reverse #41
Y6E1		PLC switch for reverse #34	Y6E9		PLC switch for reverse #42
Y6E2		PLC switch for reverse #35	Y6EA		PLC switch for reverse #43
Y6E3		PLC switch for reverse #36	Y6EB		PLC switch for reverse #44
Y6E4		PLC switch for reverse #37	Y6EC		PLC switch for reverse #45
Y6E5		PLC switch for reverse #38	Y6ED		PLC switch for reverse #46
Y6E6		PLC switch for reverse #39	Y6EE		PLC switch for reverse #47
Y6E7		PLC switch for reverse #40	Y6EF		PLC switch for reverse #48

Common for part systems	Abbrev.	Signal name	Common for part systems	Abbrev.	Signal name
Y6F0		PLC switch for reverse #49	Y6F8		PLC switch for reverse #57
Y6F1		PLC switch for reverse #50	Y6F9		PLC switch for reverse #58
Y6F2		PLC switch for reverse #51	Y6FA		PLC switch for reverse #59
Y6F3		PLC switch for reverse #52	Y6FB		PLC switch for reverse #60
Y6F4		PLC switch for reverse #53	Y6FC		PLC switch for reverse #61
Y6F5		PLC switch for reverse #54	Y6FD		PLC switch for reverse #62
Y6F6		PLC switch for reverse #55	Y6FE		PLC switch for reverse #63
Y6F7		PLC switch for reverse #56	Y6FF		PLC switch for reverse #64

(Note) Device Nos. Y6E0 to Y6FF are assigned when 64 points are provided for the switches.

Input/Output Signals with Controller

Types of Input/Output Signals Tables

The followings are the types of input/output signals tables to be used.

For common devices used in part systems (Sample)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X720			X728		
X721			X729		
X722		Diagnosis data output completic	X72A		
X723		Collecting diagnosis data	X72B		
X724		In remote program input ▲	X72C		
X725		Remote program input completion▲	X72D		
X726		Remote program input error ▲	X72E		
X727		In tool ID communication ▲	X72F		Power OFF required after parameter change

For devices used in each part system (Sample)

Device No.				Abbrev.	Signal name
\$1	\$2	\$3	\$4		
Y7A0	Y7A8	Y7B0	Y7B8	*SVF1	Servo OFF 1st axis
Y7A1	Y7A9	Y7B1	Y7B9	*SVF2	2st axis
Y7A2	Y7AA	Y7B2	Y7BA	*SVF3	3st axis
Y7A3	Y7AB	Y7B3	Y7BB	*SVF4	4st axis
Y7A4	Y7AC	Y7B4	Y7BC	*SVF5	5st axis
Y7A5	Y7AD	Y7B5	Y7BD	*SVF6	6st axis
Y7A6	Y7AE	Y7B6	Y7BE	*SVF7	7st axis
Y7A7	Y7AF	Y7B7	Y7BF	*SVF8	8st axis

For devices used in each spindle (Sample)

Device No.						Abbrev.	Signal name
1stSP	2stSP	3stSP	4stSP	5stSP	6stSP		
R6500	R6550	R6600	R6650	R6700	R6750		Spindle command rotation speed input (L)
R6501	R6551	R6601	R6651	R6701	R6751		(H)
R6502	R6552	R6602	R6652	R6702	R6752		Spindle command final data (rotation speed) (L)
R6503	R6553	R6603	R6653	R6703	R6753		(H)
R6504	R6554	R6604	R6654	R6704	R6754		Spindle command final data (12-bit binary) (L)
R6505	R6555	R6605	R6655	R6705	R6755		(H)
R6506	R6556	R6606	R6656	R6706	R6756		Spindle actual speed (L)
R6507	R6557	R6607	R6657	R6707	R6757		(H)

(Note 1) Signals marked with "*" in the "Abbrev." column are handled as B contacts.

(Note 2) Signals marked with "▲" are prepared for a specific machine tool builder.

(Note 3) Unit is changed by "#1040 M_inch" for the signals marked with [M].

(Note 4) 32bit signals are shown with (L)/(H), which indicates Low/High order. Data structure and the descriptions are as follows.

Rn	—	Low-order (L)
Rn+1	—	High-order (H)

Classification of Input/Output Signals with Controller

There are 1-bit unit, and 16-bit or 32-bit unit controller input/output signals, which are classified as shown below. When designing, refer to the section indicated below and make allocations according to the table in the respective section.

"\$" and "SP" in "Device No." column stand for "part system" and "spindle" respectively.

	Signal type	Explanation	Reference
Input	DI	(1) Allocated to device X. (2) Data calculated in bit units are allocated as a principle. (3) Signals with only \$1 or 1stSP section filled are common for all part systems or all spindles.	"PLC Input Signals (Bit Type: X***)"
	Data	(1) Allocated to device R. (2) Data handled in 16-bit or 32-bit units is allocated as a principle.	"PLC Input Signals (Data Type: R***)"
Output	DO	(1) Allocated to device Y. (2) Data calculated in bit units are allocated as a principle. (3) Signals with only \$1 or 1stSP section filled are common for all part systems or all spindles.	"PLC Output Signals (Bit Type: Y***)"
	Data	(1) Allocated to device R. (2) Data handled in 16-bit or 32-bit units is allocated as a principle.	"PLC Output Signals (Data Type: R***)"
Others	Special relay/ register	(1) Allocated to device SM, SB and SW. (2) The sequence instruction calculation state, results and the signals with special operations are allocated.	"Explanation of Special Relays/Register"
	ZR	(1) Allocated to device ZR. (2) Use in the smart safety observation function.	"ZR device"
	Classified under purpose	Devices are classified under the usage purpose.	"Explanations for Each Application"

3.1 PLC Input Signals (Bit type: X***)

(Note) Signals with "▲" are prepared for specific machine tool builders.

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X2F0	BRST	Board reset			

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X700	IPCEI1	Power consumption computation: Consumption accumulation ON 1	X708	IPCCC1	Power consumption computation: Clearing consumption accumulation 1 complete
X701	IPCEI2	Power consumption computation: Consumption accumulation ON 2	X709	IPCCC2	Power consumption computation: Clearing consumption accumulation 2 complete
X702	IPCEI3	Power consumption computation: Consumption accumulation ON 3	X70A	IPCCC3	Power consumption computation: Clearing consumption accumulation 3 complete
X703	IPCEI4	Power consumption computation: Consumption accumulation ON 4	X70B	IPCCC4	Power consumption computation: Clearing consumption accumulation 4 complete
X704			X70C		
X705			X70D		
X706			X70E	BATWR	Battery warning
X707		Power OFF processing	X70F	BATAL	Battery alarm

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X710			X718		
X711		Optimum acceleration/deceleration switching parameter completion [spindle] ▲	X719		
X712	SMLKO	High-speed simple program check mode ON	X71A		
X713	SPSCO	High-speed simple program check: Coordinate position check ON	X71B		
X714			X71C		
X715	PCHKO	Manual arbitrary reverse run mode ON	X71D		
X716	MOREV	Manual arbitrary reverse run: Reverse run ON	X71E		
X717			X71F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X720		In sampling trace ▲	X728	MDBUSIF	Modbus/TCP communicating ▲
X721		Sampling trace complete ▲	X729	MDBUSE R1	Modbus time-out 1 ▲
X722		Diagnosis data output completion	X72A	MDBUSE R2	Modbus time-out 2 ▲
X723		Collecting diagnosis data	X72B	FLNETO	FL-net : Online ▲
X724		In remote program input ▲	X72C		
X725		Remote program input completion ▲	X72D		
X726		Remote program input error ▲	X72E		
X727		In tool ID communication ▲	X72F		Power OFF required after parameter change

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X730			X738		
X731			X739		
X732			X73A		
X733			X73B		
X734			X73C		
X735			X73D		
X736			X73E		
X737			X73F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X740			X748		
X741			X749		
X742			X74A		
X743			X74B		
X744			X74C		
X745			X74D	MBSTP	Thread, tap block stopping in manual arbitrary reverse run
X746			X74E	MRVNG	Thread, tap reverse run prohibition alarm in manual arbitrary reverse run
X747			X74F		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X750			X758		Pallet program registration Ext. workpiece coordinate transfer completion
X751			X759		
X752	CNOP	24 hours continuous operation	X75A		
X753	MSOE	In multi-step speed monitor ▲	X75B		
X754			X75C		
X755			X75D		
X756			X75E		
X757			X75F		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X760		\$1 Display	X768		
X761		\$2 Display	X769		
X762		\$3 Display	X76A		
X763		\$4 Display	X76B		
X764		\$5 Display	X76C		
X765		\$6 Display	X76D		
X766		\$7 Display	X76E		
X767		\$8 Display	X76F		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X770			X778	GBMOD	G/B spindle synchronizing mode
X771			X779	GBSYN	G/B spindle synchronization: position control synchronizing
X772			X77A	GBPHF	G/B spindle synchronization: phase alignment complete
X773			X77B	GBPCM	G/B spindle synchronization: position error compensating
X774			X77C		
X775			X77D		
X776			X77E		
X777			X77F		

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X780	X788	X790	X798	RDY1	Servo ready 1st axis
X781	X789	X791	X799	RDY2	Servo ready 2nd axis
X782	X78A	X792	X79A	RDY3	Servo ready 3rd axis
X783	X78B	X793	X79B	RDY4	Servo ready 4th axis
X784	X78C	X794	X79C	RDY5	Servo ready 5th axis
X785	X78D	X795	X79D	RDY6	Servo ready 6th axis
X786	X78E	X796	X79E	RDY7	Servo ready 7th axis
X787	X78F	X797	X79F	RDY8	Servo ready 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X7A0	X7A8	X7B0	X7B8	AX1	Axis selection 1st axis
X7A1	X7A9	X7B1	X7B9	AX2	Axis selection 2nd axis
X7A2	X7AA	X7B2	X7BA	AX3	Axis selection 3rd axis
X7A3	X7AB	X7B3	X7BB	AX4	Axis selection 4th axis
X7A4	X7AC	X7B4	X7BC	AX5	Axis selection 5th axis
X7A5	X7AD	X7B5	X7BD	AX6	Axis selection 6th axis
X7A6	X7AE	X7B6	X7BE	AX7	Axis selection 7th axis
X7A7	X7AF	X7B7	X7BF	AX8	Axis selection 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X7C0	X7C8	X7D0	X7D8	MVP1	In axis plus motion 1st axis
X7C1	X7C9	X7D1	X7D9	MVP2	In axis plus motion 2nd axis
X7C2	X7CA	X7D2	X7DA	MVP3	In axis plus motion 3rd axis
X7C3	X7CB	X7D3	X7DB	MVP4	In axis plus motion 4th axis
X7C4	X7CC	X7D4	X7DC	MVP5	In axis plus motion 5th axis
X7C5	X7CD	X7D5	X7DD	MVP6	In axis plus motion 6th axis
X7C6	X7CE	X7D6	X7DE	MVP7	In axis plus motion 7th axis
X7C7	X7CF	X7D7	X7DF	MVP8	In axis plus motion 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X7E0	X7E8	X7F0	X7F8	MVM1	In axis minus motion 1st axis
X7E1	X7E9	X7F1	X7F9	MVM2	In axis minus motion 2nd axis
X7E2	X7EA	X7F2	X7FA	MVM3	In axis minus motion 3rd axis
X7E3	X7EB	X7F3	X7FB	MVM4	In axis minus motion 4th axis
X7E4	X7EC	X7F4	X7FC	MVM5	In axis minus motion 5th axis
X7E5	X7ED	X7F5	X7FD	MVM6	In axis minus motion 6th axis
X7E6	X7EE	X7F6	X7FE	MVM7	In axis minus motion 7th axis
X7E7	X7EF	X7F7	X7FF	MVM8	In axis minus motion 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X800	X808	X810	X818	ZP11	1st reference position reached 1st axis
X801	X809	X811	X819	ZP12	1st reference position reached 2nd axis
X802	X80A	X812	X81A	ZP13	1st reference position reached 3rd axis
X803	X80B	X813	X81B	ZP14	1st reference position reached 4th axis
X804	X80C	X814	X81C	ZP15	1st reference position reached 5th axis
X805	X80D	X815	X81D	ZP16	1st reference position reached 6th axis
X806	X80E	X816	X81E	ZP17	1st reference position reached 7th axis
X807	X80F	X817	X81F	ZP18	1st reference position reached 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X820	X828	X830	X838	ZP21	2nd reference position reached 1st axis
X821	X829	X831	X839	ZP22	2nd reference position reached 2nd axis
X822	X82A	X832	X83A	ZP23	2nd reference position reached 3rd axis
X823	X82B	X833	X83B	ZP24	2nd reference position reached 4th axis
X824	X82C	X834	X83C	ZP25	2nd reference position reached 5th axis
X825	X82D	X835	X83D	ZP26	2nd reference position reached 6th axis
X826	X82E	X836	X83E	ZP27	2nd reference position reached 7th axis
X827	X82F	X837	X83F	ZP28	2nd reference position reached 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X840	X848	X850	X858	ZP31	3rd reference position reached 1st axis
X841	X849	X851	X859	ZP32	3rd reference position reached 2nd axis
X842	X84A	X852	X85A	ZP33	3rd reference position reached 3rd axis
X843	X84B	X853	X85B	ZP34	3rd reference position reached 4th axis
X844	X84C	X854	X85C	ZP35	3rd reference position reached 5th axis
X845	X84D	X855	X85D	ZP36	3rd reference position reached 6th axis
X846	X84E	X856	X85E	ZP37	3rd reference position reached 7th axis
X847	X84F	X857	X85F	ZP38	3rd reference position reached 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X860	X868	X870	X878	ZP41	4th reference position reached 1st axis
X861	X869	X871	X879	ZP42	4th reference position reached 2nd axis
X862	X86A	X872	X87A	ZP43	4th reference position reached 3rd axis
X863	X86B	X873	X87B	ZP44	4th reference position reached 4th axis
X864	X86C	X874	X87C	ZP45	4th reference position reached 5th axis
X865	X86D	X875	X87D	ZP46	4th reference position reached 6th axis
X866	X86E	X876	X87E	ZP47	4th reference position reached 7th axis
X867	X86F	X877	X87F	ZP48	4th reference position reached 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X880	X888	X890	X898	NRF1	Near reference position 1st axis
X881	X889	X891	X899	NRF2	Near reference position 2nd axis
X882	X88A	X892	X89A	NRF3	Near reference position 3rd axis
X883	X88B	X893	X89B	NRF4	Near reference position 4th axis
X884	X88C	X894	X89C	NRF5	Near reference position 5th axis
X885	X88D	X895	X89D	NRF6	Near reference position 6th axis
X886	X88E	X896	X89E	NRF7	Near reference position 7th axis
X887	X88F	X897	X89F	NRF8	Near reference position 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X8A0	X8A8	X8B0	X8B8	PLFN1	Arbitrary axis superimposition complete 1st axis
X8A1	X8A9	X8B1	X8B9	PLFN2	Arbitrary axis superimposition complete 2nd axis
X8A2	X8AA	X8B2	X8BA	PLFN3	Arbitrary axis superimposition complete 3rd axis
X8A3	X8AB	X8B3	X8BB	PLFN4	Arbitrary axis superimposition complete 4th axis
X8A4	X8AC	X8B4	X8BC	PLFN5	Arbitrary axis superimposition complete 5th axis
X8A5	X8AD	X8B5	X8BD	PLFN6	Arbitrary axis superimposition complete 6th axis
X8A6	X8AE	X8B6	X8BE	PLFN7	Arbitrary axis superimposition complete 7th axis
X8A7	X8AF	X8B7	X8BF	PLFN8	Arbitrary axis superimposition complete 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X8C0	X8C8	X8D0	X8D8	ZSF1	Zero point initialization set completed 1st axis
X8C1	X8C9	X8D1	X8D9	ZSF2	Zero point initialization set completed 2nd axis
X8C2	X8CA	X8D2	X8DA	ZSF3	Zero point initialization set completed 3rd axis
X8C3	X8CB	X8D3	X8DB	ZSF4	Zero point initialization set completed 4th axis
X8C4	X8CC	X8D4	X8DC	ZSF5	Zero point initialization set completed 5th axis
X8C5	X8CD	X8D5	X8DD	ZSF6	Zero point initialization set completed 6th axis
X8C6	X8CE	X8D6	X8DE	ZSF7	Zero point initialization set completed 7th axis
X8C7	X8CF	X8D7	X8DF	ZSF8	Zero point initialization set completed 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X8E0	X8E8	X8F0	X8F8	ZSE1	Zero point initialization set error completed 1st axis
X8E1	X8E9	X8F1	X8F9	ZSE2	Zero point initialization set error completed 2nd axis
X8E2	X8EA	X8F2	X8FA	ZSE3	Zero point initialization set error completed 3rd axis
X8E3	X8EB	X8F3	X8FB	ZSE4	Zero point initialization set error completed 4th axis
X8E4	X8EC	X8F4	X8FC	ZSE5	Zero point initialization set error completed 5th axis
X8E5	X8ED	X8F5	X8FD	ZSE6	Zero point initialization set error completed 6th axis
X8E6	X8EE	X8F6	X8FE	ZSE7	Zero point initialization set error completed 7th axis
X8E7	X8EF	X8F7	X8FF	ZSE8	Zero point initialization set error completed 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X900	X908	X910	X918	ILI1	In current limit 1st axis
X901	X909	X911	X919	ILI2	In current limit 2nd axis
X902	X90A	X912	X91A	ILI3	In current limit 3rd axis
X903	X90B	X913	X91B	ILI4	In current limit 4th axis
X904	X90C	X914	X91C	ILI5	In current limit 5th axis
X905	X90D	X915	X91D	ILI6	In current limit 6th axis
X906	X90E	X916	X91E	ILI7	In current limit 7th axis
X907	X90F	X917	X91F	ILI8	In current limit 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X920	X928	X930	X938	ILA1	Current limit reached 1st axis
X921	X929	X931	X939	ILA2	Current limit reached 2nd axis
X922	X92A	X932	X93A	ILA3	Current limit reached 3rd axis
X923	X92B	X933	X93B	ILA4	Current limit reached 4th axis
X924	X92C	X934	X93C	ILA5	Current limit reached 5th axis
X925	X92D	X935	X93D	ILA6	Current limit reached 6th axis
X926	X92E	X936	X93E	ILA7	Current limit reached 7th axis
X927	X92F	X937	X93F	ILA8	Current limit reached 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X940	X948	X950	X958	ARRF1	NC axis up-to-speed 1st axis
X941	X949	X951	X959	ARRF2	NC axis up-to-speed 2nd axis
X942	X94A	X952	X95A	ARRF3	NC axis up-to-speed 3rd axis
X943	X94B	X953	X95B	ARRF4	NC axis up-to-speed 4th axis
X944	X94C	X954	X95C	ARRF5	NC axis up-to-speed 5th axis
X945	X94D	X955	X95D	ARRF6	NC axis up-to-speed 6th axis
X946	X94E	X956	X95E	ARRF7	NC axis up-to-speed 7th axis
X947	X94F	X957	X95F	ARRF8	NC axis up-to-speed 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X960	X968	X970	X978	UCLP1	Unclamp command 1st axis
X961	X969	X971	X979	UCLP2	Unclamp command 2nd axis
X962	X96A	X972	X97A	UCLP3	Unclamp command 3rd axis
X963	X96B	X973	X97B	UCLP4	Unclamp command 4th axis
X964	X96C	X974	X97C	UCLP5	Unclamp command 5th axis
X965	X96D	X975	X97D	UCLP6	Unclamp command 6th axis
X966	X96E	X976	X97E	UCLP7	Unclamp command 7th axis
X967	X96F	X977	X97F	UCLP8	Unclamp command 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X980	X988	X990	X998		In mixed control (cross axis control) 1st axis
X981	X989	X991	X999		In mixed control (cross axis control) 2nd axis
X982	X98A	X992	X99A		In mixed control (cross axis control) 3rd axis
X983	X98B	X993	X99B		In mixed control (cross axis control) 4th axis
X984	X98C	X994	X99C		In mixed control (cross axis control) 5th axis
X985	X98D	X995	X99D		In mixed control (cross axis control) 6th axis
X986	X98E	X996	X99E		In mixed control (cross axis control) 7th axis
X987	X98F	X997	X99F		In mixed control (cross axis control) 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X9A0	X9A8	X9B0	X9B8		In synchronous/superimposition control 1st axis
X9A1	X9A9	X9B1	X9B9		In synchronous/superimposition control 2nd axis
X9A2	X9AA	X9B2	X9BA		In synchronous/superimposition control 3rd axis
X9A3	X9AB	X9B3	X9BB		In synchronous/superimposition control 4th axis
X9A4	X9AC	X9B4	X9BC		In synchronous/superimposition control 5th axis
X9A5	X9AD	X9B5	X9BD		In synchronous/superimposition control 6th axis
X9A6	X9AE	X9B6	X9BE		In synchronous/superimposition control 7th axis
X9A7	X9AF	X9B7	X9BF		In synchronous/superimposition control 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X9C0	X9C8	X9D0	X9D8	MIR1	In mirror image 1st axis
X9C1	X9C9	X9D1	X9D9	MIR2	In mirror image 2nd axis
X9C2	X9CA	X9D2	X9DA	MIR3	In mirror image 3rd axis
X9C3	X9CB	X9D3	X9DB	MIR4	In mirror image 4th axis
X9C4	X9CC	X9D4	X9DC	MIR5	In mirror image 5th axis
X9C5	X9CD	X9D5	X9DD	MIR6	In mirror image 6th axis
X9C6	X9CE	X9D6	X9DE	MIR7	In mirror image 7th axis
X9C7	X9CF	X9D7	X9DF	MIR8	In mirror image 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X9E0	X9E8	X9F0	X9F8		Reference position establishment 1st axis
X9E1	X9E9	X9F1	X9F9		Reference position establishment 2nd axis
X9E2	X9EA	X9F2	X9FA		Reference position establishment 3rd axis
X9E3	X9EB	X9F3	X9FB		Reference position establishment 4th axis
X9E4	X9EC	X9F4	X9FC		Reference position establishment 5th axis
X9E5	X9ED	X9F5	X9FD		Reference position establishment 6th axis
X9E6	X9EE	X9F6	X9FE		Reference position establishment 7th axis
X9E7	X9EF	X9F7	X9FF		Reference position establishment 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XA00	XA08	XA10	XA18		Reference position return direction 1st axis
XA01	XA09	XA11	XA19		Reference position return direction 2nd axis
XA02	XA0A	XA12	XA1A		Reference position return direction 3rd axis
XA03	XA0B	XA13	XA1B		Reference position return direction 4th axis
XA04	XA0C	XA14	XA1C		Reference position return direction 5th axis
XA05	XA0D	XA15	XA1D		Reference position return direction 6th axis
XA06	XA0E	XA16	XA1E		Reference position return direction 7th axis
XA07	XA0F	XA17	XA1F		Reference position return direction 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XA20	XA28	XA30	XA38		In NC axis control 1st axis
XA21	XA29	XA31	XA39		In NC axis control 2nd axis
XA22	XA2A	XA32	XA3A		In NC axis control 3rd axis
XA23	XA2B	XA33	XA3B		In NC axis control 4th axis
XA24	XA2C	XA34	XA3C		In NC axis control 5th axis
XA25	XA2D	XA35	XA3D		In NC axis control 6th axis
XA26	XA2E	XA36	XA3E		In NC axis control 7th axis
XA27	XA2F	XA37	XA3F		In NC axis control 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XA40	XA48	XA50	XA58	ECIL1	Ext. machine coordinate system offset data illegal 1st axis
XA41	XA49	XA51	XA59	ECIL2	Ext. machine coordinate system offset data illegal 2nd axis
XA42	XA4A	XA52	XA5A	ECIL3	Ext. machine coordinate system offset data illegal 3rd axis
XA43	XA4B	XA53	XA5B	ECIL4	Ext. machine coordinate system offset data illegal 4th axis
XA44	XA4C	XA54	XA5C	ECIL5	Ext. machine coordinate system offset data illegal 5th axis
XA45	XA4D	XA55	XA5D	ECIL6	Ext. machine coordinate system offset data illegal 6th axis
XA46	XA4E	XA56	XA5E	ECIL7	Ext. machine coordinate system offset data illegal 7th axis
XA47	XA4F	XA57	XA5F	ECIL8	Ext. machine coordinate system offset data illegal 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XA60	XA68	XA70	XA78		Vertical axis pull-up prevented 1st axis
XA61	XA69	XA71	XA79		Vertical axis pull-up prevented 2nd axis
XA62	XA6A	XA72	XA7A		Vertical axis pull-up prevented 3rd axis
XA63	XA6B	XA73	XA7B		Vertical axis pull-up prevented 4th axis
XA64	XA6C	XA74	XA7C		Vertical axis pull-up prevented 5th axis
XA65	XA6D	XA75	XA7D		Vertical axis pull-up prevented 6th axis
XA66	XA6E	XA76	XA7E		Vertical axis pull-up prevented 7th axis
XA67	XA6F	XA77	XA7F		Vertical axis pull-up prevented 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XA80	XA88	XA90	XA98		Mirror image status 1st axis ▲
XA81	XA89	XA91	XA99		Mirror image status 2nd axis ▲
XA82	XA8A	XA92	XA9A		Mirror image status 3rd axis ▲
XA83	XA8B	XA93	XA9B		Mirror image status 4th axis ▲
XA84	XA8C	XA94	XA9C		Mirror image status 5th axis ▲
XA85	XA8D	XA95	XA9D		Mirror image status 6th axis ▲
XA86	XA8E	XA96	XA9E		Mirror image status 7th axis ▲
XA87	XA8F	XA97	XA9F		Mirror image status 8th axis ▲
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XB00	XB08	XB10	XB18		Clamp command 1st axis ▲
XB01	XB09	XB11	XB19		Clamp command 2nd axis ▲
XB02	XB0A	XB12	XB1A		Clamp command 3rd axis ▲
XB03	XB0B	XB13	XB1B		Clamp command 4th axis ▲
XB04	XB0C	XB14	XB1C		Clamp command 5th axis ▲
XB05	XB0D	XB15	XB1D		Clamp command 6th axis ▲
XB06	XB0E	XB16	XB1E		Clamp command 7th axis ▲
XB07	XB0F	XB17	XB1F		Clamp command 8th axis ▲
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XB40	XB48	XB50	XB58	ROTSPM1	Spindle-mode rotary axis control mode 1st axis
XB41	XB49	XB51	XB59	ROTSPM2	Spindle-mode rotary axis control mode 2nd axis
XB42	XB4A	XB52	XB5A	ROTSPM3	Spindle-mode rotary axis control mode 3rd axis
XB43	XB4B	XB53	XB5B	ROTSPM4	Spindle-mode rotary axis control mode 4th axis
XB44	XB4C	XB54	XB5C	ROTSPM5	Spindle-mode rotary axis control mode 5th axis
XB45	XB4D	XB55	XB5D	ROTSPM6	Spindle-mode rotary axis control mode 6th axis
XB46	XB4E	XB56	XB5E	ROTSPM7	Spindle-mode rotary axis control mode 7th axis
XB47	XB4F	XB57	XB5F	ROTSPM8	Spindle-mode rotary axis control mode 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XB80	XB88	XB90	XB98	VGHLD1	Real-time tuning 1: Speed gain hold-down ON 1st axis
XB81	XB89	XB91	XB99	VGHLD2	Real-time tuning 1: Speed gain hold-down ON 2nd axis
XB82	XB8A	XB92	XB9A	VGHLD3	Real-time tuning 1: Speed gain hold-down ON 3rd axis
XB83	XB8B	XB93	XB9B	VGHLD4	Real-time tuning 1: Speed gain hold-down ON 4th axis
XB84	XB8C	XB94	XB9C	VGHLD5	Real-time tuning 1: Speed gain hold-down ON 5th axis
XB85	XB8D	XB95	XB9D	VGHLD6	Real-time tuning 1: Speed gain hold-down ON 6th axis
XB86	XB8E	XB96	XB9E	VGHLD7	Real-time tuning 1: Speed gain hold-down ON 7th axis
XB87	XB8F	XB97	XB9F	VGHLD8	Real-time tuning 1: Speed gain hold-down ON 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XBA0	XBA8	XBB0	XBB8		
XBA1	XBA9	XBB1	XBB9		
XBA2	XBAA	XBB2	XBBA		
XBA3	XBAB	XBB3	XBBA		
XBA4	XBAC	XBB4	XBBC		
XBA5	XBAD	XBB5	XBBD		
XBA6	XBAE	XBB6	XBBD		
XBA7	XBAF	XBB7	XBBF		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XBC0	XBC8	XBD0	XBD8		
XBC1	XBC9	XBD1	XBD9		
XBC2	XBCA	XBD2	XBDA		
XBC3	XBCB	XBD3	XBDB		
XBC4	XBCC	XBD4	XBDC		
XBC5	XBCD	XBD5	XBDD		
XBC6	XBCE	XBD6	XBDE		
XBC7	XBCF	XBD7	XBDF		

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
XBE0	XBE8	XBF0	XBF8	GQEMGO 1	Machine group-based alarm stop: Machine group-based PLC interlock ON 1st axis
XBE1	XBE9	XBF1	XBF9	GQEMGO 2	Machine group-based alarm stop: Machine group-based PLC interlock ON 2nd axis
XBE2	XBEA	XBF2	XBFA	GQEMGO 3	Machine group-based alarm stop: Machine group-based PLC interlock ON 3rd axis
XBE3	XBEB	XBF3	XBFB	GQEMGO 4	Machine group-based alarm stop: Machine group-based PLC interlock ON 4th axis
XBE4	XBEC	XBF4	XBFC	GQEMGO 5	Machine group-based alarm stop: Machine group-based PLC interlock ON 5th axis
XBE5	XBED	XBF5	XBFD	GQEMGO 6	Machine group-based alarm stop: Machine group-based PLC interlock ON 6th axis
XBE6	XBEE	XBF6	XBFE	GQEMGO 7	Machine group-based alarm stop: Machine group-based PLC interlock ON 7th axis
XBE7	XBEF	XBF7	XBFF	GQEMGO 8	Machine group-based alarm stop: Machine group-based PLC interlock ON 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC00	XD40	XE80	XFC0	X1100	X1240	X1380	X14C0	JO	In jog mode
XC01	XD41	XE81	XFC1	X1101	X1241	X1381	X14C1	HO	In handle mode
XC02	XD42	XE82	XFC2	X1102	X1242	X1382	X14C2	SO	In incremental mode
XC03	XD43	XE83	XFC3	X1103	X1243	X1383	X14C3	PTPO	In manual arbitrary feed mode
XC04	XD44	XE84	XFC4	X1104	X1244	X1384	X14C4	ZRNO	In reference position return mode
XC05	XD45	XE85	XFC5	X1105	X1245	X1385	X14C5	ASTO	In automatic initial set mode
XC06	XD46	XE86	XFC6	X1106	X1246	X1386	X14C6		In JOG-handle simultaneous mode
XC07	XD47	XE87	XFC7	X1107	X1247	X1387	X14C7		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC08	XD48	XE88	XFC8	X1108	X1248	X1388	X14C8	MEMO	In memory mode
XC09	XD49	XE89	XFC9	X1109	X1249	X1389	X14C9	TO	In tape mode
XC0A	XD4A	XE8A	XFCA	X110A	X124A	X138A	X14CA		In online operation mode
XC0B	XD4B	XE8B	XFCB	X110B	X124B	X138B	X14CB	DO	In MDI mode
XC0C	XD4C	XE8C	XFCC	X110C	X124C	X138C	X14CC		
XC0D	XD4D	XE8D	XFCD	X110D	X124D	X138D	X14CD		
XC0E	XD4E	XE8E	XFCE	X110E	X124E	X138E	X14CE	SBSMO	Sub part system control: Sub part system control I mode ON
XC0F	XD4F	XE8F	XFCE	X110F	X124F	X138F	X14CF		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC10	XD50	XE90	XFD0	X1110	X1250	X1390	X14D0	MA	Controller ready completion
XC11	XD51	XE91	XFD1	X1111	X1251	X1391	X14D1	SA	Servo ready completion
XC12	XD52	XE92	XFD2	X1112	X1252	X1392	X14D2	OP	In automatic operation "run"
XC13	XD53	XE93	XFD3	X1113	X1253	X1393	X14D3	STL	In automatic operation "start"
XC14	XD54	XE94	XFD4	X1114	X1254	X1394	X14D4	SPL	In automatic operation "pause"
XC15	XD55	XE95	XFD5	X1115	X1255	X1395	X14D5	RST	In "reset"
XC16	XD56	XE96	XFD6	X1116	X1256	X1396	X14D6	CXN	In manual arbitrary feed
XC17	XD57	XE97	XFD7	X1117	X1257	X1397	X14D7	RWD	In rewind

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC18	XD58	XE98	XFD8	X1118	X1258	X1398	X14D8	DEN	Motion command completion
XC19	XD59	XE99	XFD9	X1119	X1259	X1399	X14D9	TIMP	All axes in-position
XC1A	XD5A	XE9A	XFDA	X111A	X125A	X139A	X14DA	TSMZ	All axes smoothing zero
XC1B	XD5B	XE9B	XFDB	X111B	X125B	X139B	X14DB		
XC1C	XD5C	XE9C	XFDC	X111C	X125C	X139C	X14DC	CXFIN	Manual arbitrary feed completion
XC1D	XD5D	XE9D	XFDD	X111D	X125D	X139D	X14DD		External search finished
XC1E	XD5E	XE9E	XFDE	X111E	X125E	X139E	X14DE		
XC1F	XD5F	XE9F	XFDF	X111F	X125F	X139F	X14DF		In high-speed machining mode (G05)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC20	XD60	XEA0	XFE0	X1120	X1260	X13A0	X14E0	RPN	In rapid traverse
XC21	XD61	XEA1	XFE1	X1121	X1261	X13A1	X14E1	CUT	In cutting feed
XC22	XD62	XEA2	XFE2	X1122	X1262	X13A2	X14E2	TAP	In tapping
XC23	XD63	XEA3	XFE3	X1123	X1263	X13A3	X14E3	THRD	In thread cutting
XC24	XD64	XEA4	XFE4	X1124	X1264	X13A4	X14E4	SYN	In synchronous feed
XC25	XD65	XEA5	XFE5	X1125	X1265	X13A5	X14E5	CSS	In constant surface speed
XC26	XD66	XEA6	XFE6	X1126	X1266	X13A6	X14E6	SKIP	In skip
XC27	XD67	XEA7	XFE7	X1127	X1267	X13A7	X14E7	ZRNN	In reference position return

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC28	XD68	XEA8	XFE8	X1128	X1268	X13A8	X14E8	INCH	In inch unit selection
XC29	XD69	XEA9	XFE9	X1129	X1269	X13A9	X14E9	DLKN	In display lock
XC2A	XD6A	XEA8	XFEA	X112A	X126A	X13AA	X14EA	F1DN	F 1-digit commanded
XC2B	XD6B	XEAB	XFEB	X112B	X126B	X13AB	X14EB	TLFO	In tool life management
XC2C	XD6C	XEAC	XFEC	X112C	X126C	X13AC	X14EC		Tool life management: Temporary cancel of tool life expiration ON
XC2D	XD6D	XEAD	XFED	X112D	X126D	X13AD	X14ED		Tool life management: Temporary cancel of tool group life expiration ON
XC2E	XD6E	XEAE	XFEE	X112E	X126E	X13AE	X14EE	TLOV	Tool life over
XC2F	XD6F	XEAF	XFEF	X112F	X126F	X13AF	X14EF		Tool group life over
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC30	XD70	XEB0	XFF0	X1130	X1270	X13B0	X14F0	F11	F1-digit No. code 1
XC31	XD71	XEB1	XFF1	X1131	X1271	X13B1	X14F1	F12	F1-digit No. code 2
XC32	XD72	XEB2	XFF2	X1132	X1272	X13B2	X14F2	F14	F1-digit No. code 4
XC33	XD73	XEB3	XFF3	X1133	X1273	X13B3	X14F3	F18	F1-digit No. code 8
XC34	XD74	XEB4	XFF4	X1134	X1274	X13B4	X14F4		Timing synchronization between part systems
XC35	XD75	XEB5	XFF5	X1135	X1275	X13B5	X14F5	PCINO	In PLC interrupt
XC36	XD76	XEB6	XFF6	X1136	X1276	X13B6	X14F6		
XC37	XD77	XEB7	XFF7	X1137	X1277	X13B7	X14F7	ASLE	Illegal axis selected
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC38	XD78	XEB8	XFF8	X1138	X1278	X13B8	X14F8		
XC39	XD79	XEB9	XFF9	X1139	X1279	X13B9	X14F9		
XC3A	XD7A	XEBA	XFFA	X113A	X127A	X13BA	X14FA		
XC3B	XD7B	XEBB	XFFB	X113B	X127B	X13BB	X14FB		
XC3C	XD7C	XEBC	XFFC	X113C	X127C	X13BC	X14FC		
XC3D	XD7D	XEBD	XFFD	X113D	X127D	X13BD	X14FD		
XC3E	XD7E	XEBE	XFFE	X113E	X127E	X13BE	X14FE		
XC3F	XD7F	XEBF	XFFF	X113F	X127F	X13BF	X14FF		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC40	XD80	XEC0	X1000	X1140	X1280	X13C0	X1500	DM00	M code independent output M00
XC41	XD81	XEC1	X1001	X1141	X1281	X13C1	X1501	DM01	M code independent output M01
XC42	XD82	XEC2	X1002	X1142	X1282	X13C2	X1502	DM02	M code independent output M02
XC43	XD83	XEC3	X1003	X1143	X1283	X13C3	X1503	DM30	M code independent output M30
XC44	XD84	XEC4	X1004	X1144	X1284	X13C4	X1504		
XC45	XD85	XEC5	X1005	X1145	X1285	X13C5	X1505		
XC46	XD86	XEC6	X1006	X1146	X1286	X13C6	X1506		
XC47	XD87	XEC7	X1007	X1147	X1287	X13C7	X1507		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC48	XD88	XEC8	X1008	X1148	X1288	X13C8	X1508		In manual speed command valid
XC49	XD89	XEC9	X1009	X1149	X1289	X13C9	X1509	MMS	Manual numerical command
XC4A	XD8A	XECA	X100A	X114A	X128A	X13CA	X150A		In tool escape and return mode
XC4B	XD8B	XECB	X100B	X114B	X128B	X13CB	X150B		
XC4C	XD8C	XECC	X100C	X114C	X128C	X13CC	X150C		
XC4D	XD8D	XECD	X100D	X114D	X128D	X13CD	X150D		
XC4E	XD8E	XECE	X100E	X114E	X128E	X13CE	X150E	SBS	Sub part system control: Sub part system processing
XC4F	XD8F	XECF	X100F	X114F	X128F	X13CF	X150F		In circular feed in manual mode
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC50	XD90	XED0	X1010	X1150	X1290	X13D0	X1510		
XC51	XD91	XED1	X1011	X1151	X1291	X13D1	X1511		
XC52	XD92	XED2	X1012	X1152	X1292	X13D2	X1512		
XC53	XD93	XED3	X1013	X1153	X1293	X13D3	X1513	TRTN2	In tool retract and return 2 mode ▲
XC54	XD94	XED4	X1014	X1154	X1294	X13D4	X1514		
XC55	XD95	XED5	X1015	X1155	X1295	X13D5	X1515		
XC56	XD96	XED6	X1016	X1156	X1296	X13D6	X1516		
XC57	XD97	XED7	X1017	X1157	X1297	X13D7	X1517		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC58	XD98	XED8	X1018	X1158	X1298	X13D8	X1518		
XC59	XD99	XED9	X1019	X1159	X1299	X13D9	X1519		
XC5A	XD9A	XEDA	X101A	X115A	X129A	X13DA	X151A		
XC5B	XD9B	XEDB	X101B	X115B	X129B	X13DB	X151B		
XC5C	XD9C	XEDC	X101C	X115C	X129C	X13DC	X151C		
XC5D	XD9D	XEDD	X101D	X115D	X129D	X13DD	X151D		
XC5E	XD9E	XEDE	X101E	X115E	X129E	X13DE	X151E		
XC5F	XD9F	XEDF	X101F	X115F	X129F	X13DF	X151F		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC60	XDA0	XEE0	X1020	X1160	X12A0	X13E0	X1520	MF1	M function strobe 1
XC61	XDA1	XEE1	X1021	X1161	X12A1	X13E1	X1521	MF2	M function strobe 2
XC62	XDA2	XEE2	X1022	X1162	X12A2	X13E2	X1522	MF3	M function strobe 3
XC63	XDA3	XEE3	X1023	X1163	X12A3	X13E3	X1523	MF4	M function strobe 4
XC64	XDA4	XEE4	X1024	X1164	X12A4	X13E4	X1524	SF1	S function strobe 1
XC65	XDA5	XEE5	X1025	X1165	X12A5	X13E5	X1525	SF2	S function strobe 2
XC66	XDA6	XEE6	X1026	X1166	X12A6	X13E6	X1526	SF3	S function strobe 3
XC67	XDA7	XEE7	X1027	X1167	X12A7	X13E7	X1527	SF4	S function strobe 4

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC68	XDA8	XEE8	X1028	X1168	X12A8	X13E8	X1528	TF1	T function strobe 1
XC69	XDA9	XEE9	X1029	X1169	X12A9	X13E9	X1529	TF2	T function strobe 2
XC6A	XDAA	XEEA	X102A	X116A	X12AA	X13EA	X152A	TF3	T function strobe 3
XC6B	XDAB	XEEB	X102B	X116B	X12AB	X13EB	X152B	TF4	T function strobe 4
XC6C	XDAC	XEEC	X102C	X116C	X12AC	X13EC	X152C	BF1	2nd M function strobe 1
XC6D	XDAD	XEED	X102D	X116D	X12AD	X13ED	X152D	BF2	2nd M function strobe 2
XC6E	XDAE	XEEE	X102E	X116E	X12AE	X13EE	X152E	BF3	2nd M function strobe 3
XC6F	XDAF	XEEF	X102F	X116F	X12AF	X13EF	X152F	BF4	2nd M function strobe 4
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC70	XDB0	XEF0	X1030	X1170	X12B0	X13F0	X1530	SF5	S function strobe 5
XC71	XDB1	XEF1	X1031	X1171	X12B1	X13F1	X1531	SF6	S function strobe 6
XC72	XDB2	XEF2	X1032	X1172	X12B2	X13F2	X1532	SF7	S function strobe 7
XC73	XDB3	XEF3	X1033	X1173	X12B3	X13F3	X1533	SF8	S function strobe 8
XC74	XDB4	XEF4	X1034	X1174	X12B4	X13F4	X1534		
XC75	XDB5	XEF5	X1035	X1175	X12B5	X13F5	X1535		
XC76	XDB6	XEF6	X1036	X1176	X12B6	X13F6	X1536		
XC77	XDB7	XEF7	X1037	X1177	X12B7	X13F7	X1537		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC78	XDB8	XEF8	X1038	X1178	X12B8	X13F8	X1538		
XC79	XDB9	XEF9	X1039	X1179	X12B9	X13F9	X1539		
XC7A	XDBA	XEFA	X103A	X117A	X12BA	X13FA	X153A		
XC7B	XDBB	XEFB	X103B	X117B	X12BB	X13FB	X153B		
XC7C	XDBC	XEFC	X103C	X117C	X12BC	X13FC	X153C		
XC7D	XDBD	XEFD	X103D	X117D	X12BD	X13FD	X153D		
XC7E	XDBE	XEFE	X103E	X117E	X12BE	X13FE	X153E		
XC7F	XDBF	XEFF	X103F	X117F	X12BF	X13FF	X153F	CHPRCC	Chopping compensation update prevented
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC80	XDC0	XF00	X1040	X1180	X12C0	X1400	X1540	CHOP	In chopping start
XC81	XDC1	XF01	X1041	X1181	X12C1	X1401	X1541	CHP1	Basic position -> upper dead point path flag
XC82	XDC2	XF02	X1042	X1182	X12C2	X1402	X1542	CHP2	Upper dead point -> bottom dead point path flag
XC83	XDC3	XF03	X1043	X1183	X12C3	X1403	X1543	CHP3	Bottom dead point -> upper dead point path flag
XC84	XDC4	XF04	X1044	X1184	X12C4	X1404	X1544	CHP4	Upper dead point -> basic position path flag
XC85	XDC5	XF05	X1045	X1185	X12C5	X1405	X1545	CHPMD	In chopping mode
XC86	XDC6	XF06	X1046	X1186	X12C6	X1406	X1546		Stroke compensation completion
XC87	XDC7	XF07	X1047	X1187	X12C7	X1407	X1547		Tool escape and return transit point recognition completed

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC88	XDC8	XF08	X1048	X1188	X12C8	X1408	X1548		
XC89	XDC9	XF09	X1049	X1189	X12C9	X1409	X1549		
XC8A	XDCA	XF0A	X104A	X118A	X12CA	X140A	X154A	SSE	Search & start Error
XC8B	XDCB	XF0B	X104B	X118B	X12CB	X140B	X154B	SSG	Search & start Search
XC8C	XDCC	XF0C	X104C	X118C	X12CC	X140C	X154C		
XC8D	XDCD	XF0D	X104D	X118D	X12CD	X140D	X154D		
XC8E	XDCE	XF0E	X104E	X118E	X12CE	X140E	X154E		
XC8F	XDCF	XF0F	X104F	X118F	X12CF	X140F	X154F		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC90	XDD0	XF10	X1050	X1190	X12D0	X1410	X1550		
XC91	XDD1	XF11	X1051	X1191	X12D1	X1411	X1551		
XC92	XDD2	XF12	X1052	X1192	X12D2	X1412	X1552		
XC93	XDD3	XF13	X1053	X1193	X12D3	X1413	X1553	TCP	Tool change position return completion
XC94	XDD4	XF14	X1054	X1194	X12D4	X1414	X1554	TCRQ	New tool change
XC95	XDD5	XF15	X1055	X1195	X12D5	X1415	X1555		All spindles simultaneous control (G47.1)
XC96	XDD6	XF16	X1056	X1196	X12D6	X1416	X1556		Life prediction
XC97	XDD7	XF17	X1057	X1197	X12D7	X1417	X1557		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC98	XDD8	XF18	X1058	X1198	X12D8	X1418	X1558	AL1	NC alarm 1
XC99	XDD9	XF19	X1059	X1199	X12D9	X1419	X1559	AL2	NC alarm 2 (Servo alarm)
XC9A	XDDA	XF1A	X105A	X119A	X12DA	X141A	X155A	AL3	NC alarm 3 (Program error)
XC9B	Xddb	XF1B	X105B	X119B	X12DB	X141B	X155B	AL4	NC alarm 4 (Operation error)
XC9C	XDDC	XF1C	X105C	X119C	X12DC	X141C	X155C	WR1	NC warning (Servo warning)
XC9D	XDDD	XF1D	X105D	X119D	X12DD	X141D	X155D		
XC9E	XDDE	XF1E	X105E	X119E	X12DE	X141E	X155E		
XC9F	XDDF	XF1F	X105F	X119F	X12DF	X141F	X155F		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCA0	XDE0	XF20	X1060	X11A0	X12E0	X1420	X1560		Load monitor I :Teaching/Monitor mode in execution ▲
XCA1	XDE1	XF21	X1061	X11A1	X12E1	X1421	X1561		Load monitor I : Teaching mode valid ▲
XCA2	XDE2	XF22	X1062	X11A2	X12E2	X1422	X1562		Load monitor I : Monitor mode valid ▲
XCA3	XDE3	XF23	X1063	X11A3	X12E3	X1423	X1563		Load monitor I : Adaptive control in execution ▲
XCA4	XDE4	XF24	X1064	X11A4	X12E4	X1424	X1564		
XCA5	XDE5	XF25	X1065	X11A5	X12E5	X1425	X1565	TRVE	Tap retract possible
XCA6	XDE6	XF26	X1066	X11A6	X12E6	X1426	X1566	PCNT	No. of work machining over
XCA7	XDE7	XF27	X1067	X11A7	X12E7	X1427	X1567	ABSW	Absolute position warning

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCA8	XDE8	XF28	X1068	X11A8	X12E8	X1428	X1568		
XCA9	XDE9	XF29	X1069	X11A9	X12E9	X1429	X1569		In axis name switch
XCAA	XDEA	XF2A	X106A	X11AA	X12EA	X142A	X156A		Optimum acceleration/deceleration parameter switch completion [axis] ▲
XCAB	XDEB	XF2B	X106B	X11AB	X12EB	X142B	X156B	ESTSVIN	Optimum acceleration/deceleration selection : NC axis inertia estimation in progress ▲
XCAC	XDEC	XF2C	X106C	X11AC	X12EC	X142C	X156C	GETSVAF	Optimum acceleration/deceleration selection : NC axis estimated resonance frequency acquisition in progress ▲
XCAD	XDED	XF2D	X106D	X11AD	X12ED	X142D	X156D		
XCAE	XDEE	XF2E	X106E	X11AE	X12EE	X142E	X156E	HOBRTM	Hob machining: retracting
XCAF	XDEF	XF2F	X106F	X11AF	X12EF	X142F	X156F	HOBRTF	Hob machining: retract complete
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCB0	XDF0	XF30	X1070	X11B0	X12F0	X1430	X1570		In spindle-NC axis polygon mode
XCB1	XDF1	XF31	X1071	X11B1	X12F1	X1431	X1571	AL5	NC alarm 5
XCB2	XDF2	XF32	X1072	X11B2	X12F2	X1432	X1572		In spindle-spindle polygon mode
XCB3	XDF3	XF33	X1073	X11B3	X12F3	X1433	X1573		Spindle-spindle polygon synchronization completion
XCB4	XDF4	XF34	X1074	X11B4	X12F4	X1434	X1574		
XCB5	XDF5	XF35	X1075	X11B5	X12F5	X1435	X1575		
XCB6	XDF6	XF36	X1076	X11B6	X12F6	X1436	X1576		
XCB7	XDF7	XF37	X1077	X11B7	X12F7	X1437	X1577		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCB8	XDF8	XF38	X1078	X11B8	X12F8	X1438	X1578		
XCB9	XDF9	XF39	X1079	X11B9	X12F9	X1439	X1579		In 3-dimensional coordinate conversion
XCBA	XDFA	XF3A	X107A	X11BA	X12FA	X143A	X157A		
XCBB	XDFB	XF3B	X107B	X11BB	X12FB	X143B	X157B		
XCBC	XDFA	XF3C	X107C	X11BC	X12FC	X143C	X157C		
XCBD	XDFD	XF3D	X107D	X11BD	X12FD	X143D	X157D		
XCBE	XDFA	XF3E	X107E	X11BE	X12FE	X143E	X157E		
XCBF	XDFE	XF3F	X107F	X11BF	X12FF	X143F	X157F		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCC0	XE00	XF40	X1080	X11C0	X1300	X1440	X1580	RTAP	In synchronized tapping selection (M command)
XCC1	XE01	XF41	X1081	X11C1	X1301	X1441	X1581		In small diameter deep hole cycle
XCC2	XE02	XF42	X1082	X11C2	X1300	X1442	X1582		High-speed retract function valid state ▲
XCC3	XE03	XF43	X1083	X11C3	X1303	X1443	X1583		In high-speed retract function operation ▲
XCC4	XE04	XF44	X1084	X11C4	X1304	X1444	X1584		
XCC5	XE05	XF45	X1085	X11C5	X1305	X1445	X1585		
XCC6	XE06	XF46	X1086	X11C6	X1306	X1446	X1586		
XCC7	XE07	XF47	X1087	X11C7	X1307	X1447	X1587		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCC8	XE08	XF48	X1088	X11C8	X1308	X1448	X1588		In barrier valid (left)
XCC9	XE09	XF49	X1089	X11C9	X1309	X1449	X1589		In barrier valid (right)
XCCA	XE0A	XF4A	X108A	X11CA	X130A	X144A	X158A	TLMSFIN	Tool length measurement completion ▲
XCCB	XE0B	XF4B	X108B	X11CB	X130B	X144B	X158B	TLMSERR	Tool length measurement error ▲
XCCC	XE0C	XF4C	X108C	X11CC	X130C	X144C	X158C		
XCCD	XE0D	XF4D	X108D	X11CD	X130D	X144D	X158D		
XCCE	XE0E	XF4E	X108E	X11CE	X130E	X144E	X158E	TLMSSELO	Tool length measurement sub-side selected ▲
XCCF	XE0F	XF4F	X108F	X11CF	X130F	X144F	X158F		Tool retract position reached ▲
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCD0	XE10	XF50	X1090	X11D0	X1310	X1450	X1590	TRME	With tool retract amount command ▲
XCD1	XE11	XF51	X1091	X11D1	X1311	X1451	X1591	TRRP	In tool repositioning ▲
XCD2	XE12	XF52	X1092	X11D2	X1312	X1452	X1592		
XCD3	XE13	XF53	X1093	X11D3	X1313	X1453	X1593		
XCD4	XE14	XF54	X1094	X11D4	X1314	X1454	X1594		
XCD5	XE15	XF55	X1095	X11D5	X1315	X1455	X1595		
XCD6	XE16	XF56	X1096	X11D6	X1316	X1456	X1596		
XCD7	XE17	XF57	X1097	X11D7	X1317	X1457	X1597		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCD8	XE18	XF58	X1098	X11D8	X1318	X1458	X1598		Door open enable
XCD9	XE19	XF59	X1099	X11D9	X1319	X1459	X1599		
XCDA	XE1A	XF5A	X109A	X11DA	X131A	X145A	X159A		
XCDB	XE1B	XF5B	X109B	X11DB	X131B	X145B	X159B		
XCDC	XE1C	XF5C	X109C	X11DC	X131C	X145C	X159C		
XCDD	XE1D	XF5D	X109D	X11DD	X131D	X145D	X159D		
XCDE	XE1E	XF5E	X109E	X11DE	X131E	X145E	X159E		
XCDF	XE1F	XF5F	X109F	X11DF	X131F	X145F	X159F		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCE0	XE20	XF60	X10A0	X11E0	X1320	X1460	X15A0		
XCE1	XE21	XF61	X10A1	X11E1	X1321	X1461	X15A1		
XCE2	XE22	XF62	X10A2	X11E2	X1322	X1462	X15A2		
XCE3	XE23	XF63	X10A3	X11E3	X1323	X1463	X15A3		
XCE4	XE24	XF64	X10A4	X11E4	X1324	X1464	X15A4		
XCE5	XE25	XF65	X10A5	X11E5	X1325	X1465	X15A5		
XCE6	XE26	XF66	X10A6	X11E6	X1326	X1466	X15A6		
XCE7	XE27	XF67	X10A7	X11E7	X1327	X1467	X15A7		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCE8	XE28	XF68	X10A8	X11E8	X1328	X1468	X15A8		Door open enable (2 channels per 1 part system)
XCE9	XE29	XF69	X10A9	X11E9	X1329	X1469	X15A9		
XCEA	XE2A	XF6A	X10AA	X11EA	X132A	X146A	X15AA		
XCEB	XE2B	XF6B	X10AB	X11EB	X132B	X146B	X15AB		
XCEC	XE2C	XF6C	X10AC	X11EC	X132C	X146C	X15AC		
XCED	XE2D	XF6D	X10AD	X11ED	X132D	X146D	X15AD		Optimum machining diagnosis in progress ▲
XCEE	XE2E	XF6E	X10AE	X11EE	X132E	X146E	X15AE		Load monitor I : Cutting torque estimation in progress
XCEF	XE2F	XF6F	X10AF	X11EF	X132F	X146F	X15AF		Load monitor I : Cutting torque estimation completed
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCF0	XE30	XF70	X10B0	X11F0	X1330	X1470	X15B0		
XCF1	XE31	XF71	X10B1	X11F1	X1331	X1471	X15B1		
XCF2	XE32	XF72	X10B2	X11F2	X1332	X1472	X15B2		
XCF3	XE33	XF73	X10B3	X11F3	X1333	X1473	X15B3		
XCF4	XE34	XF74	X10B4	X11F4	X1334	X1474	X15B4		
XCF5	XE35	XF75	X10B5	X11F5	X1335	X1475	X15B5		
XCF6	XE36	XF76	X10B6	X11F6	X1336	X1476	X15B6		
XCF7	XE37	XF77	X10B7	X11F7	X1337	X1477	X15B7		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XCF8	XE38	XF78	X10B8	X11F8	X1338	X1478	X15B8		
XCF9	XE39	XF79	X10B9	X11F9	X1339	X1479	X15B9	GLMT	Torque limitation skip: G160 torque limit ON
XCFA	XE3A	XF7A	X10BA	X11FA	X133A	X147A	X15BA		
XCFB	XE3B	XF7B	X10BB	X11FB	X133B	X147B	X15BB		
XCFC	XE3C	XF7C	X10BC	X11FC	X133C	X147C	X15BC		
XCFD	XE3D	XF7D	X10BD	X11FD	X133D	X147D	X15BD		
XCFE	XE3E	XF7E	X10BE	X11FE	X133E	X147E	X15BE		
XCFE	XE3F	XF7F	X10BF	X11FF	X133F	X147F	X15BF		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XD00	XE40	XF80	X10C0	X1200	X1340	X1480	X15C0		
XD01	XE41	XF81	X10C1	X1201	X1341	X1481	X15C1		
XD02	XE42	XF82	X10C2	X1202	X1342	X1482	X15C2		
XD03	XE43	XF83	X10C3	X1203	X1343	X1483	X15C3		
XD04	XE44	XF84	X10C4	X1204	X1344	X1484	X15C4		
XD05	XE45	XF85	X10C5	X1205	X1345	X1485	X15C5		
XD06	XE46	XF86	X10C6	X1206	X1346	X1486	X15C6		
XD07	XE47	XF87	X10C7	X1207	X1347	X1487	X15C7		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XD08	XE48	XF88	X10C8	X1208	X1348	X1488	X15C8		
XD09	XE49	XF89	X10C9	X1209	X1349	X1489	X15C9		
XD0A	XE4A	XF8A	X10CA	X120A	X134A	X148A	X15CA		
XD0B	XE4B	XF8B	X10CB	X120B	X134B	X148B	X15CB	G0AC	Rapid traverse time constant: In switchover
XD0C	XE4C	XF8C	X10CC	X120C	X134C	X148C	X15CC		
XD0D	XE4D	XF8D	X10CD	X120D	X134D	X148D	X15CD		
XD0E	XE4E	XF8E	X10CE	X120E	X134E	X148E	X15CE		
XD0F	XE4F	XF8F	X10CF	X120F	X134F	X148F	X15CF		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XD10	XE50	XF90	X10D0	X1210	X1350	X1490	X15D0		
XD11	XE51	XF91	X10D1	X1211	X1351	X1491	X15D1		
XD12	XE52	XF92	X10D2	X1212	X1352	X1492	X15D2		
XD13	XE53	XF93	X10D3	X1213	X1353	X1493	X15D3		
XD14	XE54	XF94	X10D4	X1214	X1354	X1494	X15D4		3D coordinate conversion : Manual feed valid ▲
XD15	XE55	XF95	X10D5	X1215	X1355	X1495	X15D5		
XD16	XE56	XF96	X10D6	X1216	X1356	X1496	X15D6		
XD17	XE57	XF97	X10D7	X1217	X1357	X1497	X15D7		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XD18	XE58	XF98	X10D8	X1218	X1358	X1498	X15D8	MJST	Tool axis coordinate system in 3D manual feed (JOG, INC)
XD19	XE59	XF99	X10D9	X1219	X1359	X1499	X15D9	MJSB	Table coordinate system in 3D manual feed (JOG, INC)
XD1A	XE5A	XF9A	X10DA	X121A	X135A	X149A	X15DA	MJSF	Feature coordinate system in 3D manual feed (JOG, INC)
XD1B	XE5B	XF9B	X10DB	X121B	X135B	X149B	X15DB	MH1ST	Tool axis coordinate system in 3D manual feed (1st handle)
XD1C	XE5C	XF9C	X10DC	X121C	X135C	X149C	X15DC	MH1SB	Table coordinate system in 3D manual feed (1st handle)
XD1D	XE5D	XF9D	X10DD	X121D	X135D	X149D	X15DD	MH1SF	Feature coordinate system in 3D manual feed (1st handle)
XD1E	XE5E	XF9E	X10DE	X121E	X135E	X149E	X15DE	MH2ST	Tool axis coordinate system in 3D manual feed (2nd handle)
XD1F	XE5F	XF9F	X10DF	X121F	X135F	X149F	X15DF	MH2SB	Table coordinate system in 3D manual feed (2nd handle)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XD20	XE60	XFA0	X10E0	X1220	X1360	X14A0	X15E0	MH2SF	Feature coordinate system in 3D manual feed (2nd handle)
XD21	XE61	XFA1	X10E1	X1221	X1361	X14A1	X15E1	MH3ST	Tool axis coordinate system in 3D manual feed (3rd handle)
XD22	XE62	XFA2	X10E2	X1222	X1362	X14A2	X15E2	MH3SB	Table coordinate system in 3D manual feed (3rd handle)
XD23	XE63	XFA3	X10E3	X1223	X1363	X14A3	X15E3	MH3SF	Feature coordinate system in 3D manual feed (3rd handle)
XD24	XE64	XFA4	X10E4	X1224	X1364	X14A4	X15E4		
XD25	XE65	XFA5	X10E5	X1225	X1365	X14A5	X15E5		
XD26	XE66	XFA6	X10E6	X1226	X1366	X14A6	X15E6		
XD27	XE67	XFA7	X10E7	X1227	X1367	X14A7	X15E7	TCPRS	In tool center point rotation

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XD28	XE68	XFA8	X10E8	X1228	X1368	X14A8	X15E8	RSSCT	R-Navi: selecting machine surface
XD29	XE69	XFA9	X10E9	X1229	X1369	X14A9	X15E9	RSIND	R-Navi: machine surface indexing
XD2A	XE6A	XFAA	X10EA	X122A	X136A	X14AA	X15EA	RSIDF	R-Navi: machine surface index complete
XD2B	XE6B	XFAB	X10EB	X122B	X136B	X14AB	X15EB		
XD2C	XE6C	XFAC	X10EC	X122C	X136C	X14AC	X15EC		
XD2D	XE6D	XFAD	X10ED	X122D	X136D	X14AD	X15ED		
XD2E	XE6E	XFAE	X10EE	X122E	X136E	X14AE	X15EE		
XD2F	XE6F	XFAF	X10EF	X122F	X136F	X14AF	X15EF		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X1870			X1878		Edit/search window displayed
X1871			X1879		
X1872			X187A		
X1873			X187B		
X1874			X187C		
X1875			X187D		
X1876			X187E		
X1877			X187F		

3 Input/Output Signals with Controller

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X1880	X18E0	X1940	X19A0	X1A00	X1A60	X1AC0	X1B20	SUPP	Spindle rotation upper limit exceeded
X1881	X18E1	X1941	X19A1	X1A01	X1A61	X1AC1	X1B21	SLOW	Spindle rotation lower limit exceeded
X1882	X18E2	X1942	X19A2	X1A02	X1A62	X1AC2	X1B22	SIGE	S command gear No. illegal
X1883	X18E3	X1943	X19A3	X1A03	X1A63	X1AC3	X1B23	SOVE	S command max./min. command value over
X1884	X18E4	X1944	X19A4	X1A04	X1A64	X1AC4	X1B24	SNGE	S command no gear selected
X1885	X18E5	X1945	X19A5	X1A05	X1A65	X1AC5	X1B25	GR1	Spindle gear shift command 1
X1886	X18E6	X1946	X19A6	X1A06	X1A66	X1AC6	X1B26	GR2	Spindle gear shift command 2
X1887	X18E7	X1947	X19A7	X1A07	X1A67	X1AC7	X1B27	-	(Always "0")
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X1888	X18E8	X1948	X19A8	X1A08	X1A68	X1AC8	X1B28		Spindle 2nd in-position
X1889	X18E9	X1949	X19A9	X1A09	X1A69	X1AC9	X1B29	CDO	Current detection
X188A	X18EA	X194A	X19AA	X1A0A	X1A6A	X1ACA	X1B2A	VRO	Speed detection
X188B	X18EB	X194B	X19AB	X1A0B	X1A6B	X1ACB	X1B2B	FLO	In spindle alarm
X188C	X18EC	X194C	X19AC	X1A0C	X1A6C	X1ACC	X1B2C	ZSO	Zero speed
X188D	X18ED	X194D	X19AD	X1A0D	X1A6D	X1ACD	X1B2D	USO	Spindle up-to-speed
X188E	X18EE	X194E	X19AE	X1A0E	X1A6E	X1ACE	X1B2E	ORAO	Spindle in-position
X188F	X18EF	X194F	X19AF	X1A0F	X1A6F	X1ACF	X1B2F	LCSA	In L coil selection
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X1890	X18F0	X1950	X19B0	X1A10	X1A70	X1AD0	X1B30	SMA	Spindle ready-ON
X1891	X18F1	X1951	X19B1	X1A11	X1A71	X1AD1	X1B31	SSA	Spindle servo-ON
X1892	X18F2	X1952	X19B2	X1A12	X1A72	X1AD2	X1B32	SEMG	In spindle emergency stop
X1893	X18F3	X1953	X19B3	X1A13	X1A73	X1AD3	X1B33	SSRN	In spindle forward run
X1894	X18F4	X1954	X19B4	X1A14	X1A74	X1AD4	X1B34	SSRI	In spindle reverse run
X1895	X18F5	X1955	X19B5	X1A15	X1A75	X1AD5	X1B35		Z phase passed
X1896	X18F6	X1956	X19B6	X1A16	X1A76	X1AD6	X1B36	SIMP	Position loop in-position
X1897	X18F7	X1957	X19B7	X1A17	X1A77	X1AD7	X1B37	STLQ	In spindle torque limit
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X1898	X18F8	X1958	X19B8	X1A18	X1A78	X1AD8	X1B38		
X1899	X18F9	X1959	X19B9	X1A19	X1A79	X1AD9	X1B39		
X189A	X18FA	X195A	X19BA	X1A1A	X1A7A	X1ADA	X1B3A		Spindle torque limit reached
X189B	X18FB	X195B	X19BB	X1A1B	X1A7B	X1ADB	X1B3B		
X189C	X18FC	X195C	X19BC	X1A1C	X1A7C	X1ADC	X1B3C		
X189D	X18FD	X195D	X19BD	X1A1D	X1A7D	X1ADD	X1B3D	SD2	Speed detection 2
X189E	X18FE	X195E	X19BE	X1A1E	X1A7E	X1ADE	X1B3E	MCSA	In M coil selection
X189F	X18FF	X195F	X19BF	X1A1F	X1A7F	X1ADF	X1B3F		Index positioning completion

3 Input/Output Signals with Controller

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X18A0	X1900	X1960	X19C0	X1A20	X1A80	X1AE0	X1B40	ENB	Spindle enable
X18A1	X1901	X1961	X19C1	X1A21	X1A81	X1AE1	X1B41	LRUC	In changeover to L coil ▲
X18A2	X1902	X1962	X19C2	X1A22	X1A82	X1AE2	X1B42	HRUC	In changeover to H coil ▲
X18A3	X1903	X1963	X19C3	X1A23	X1A83	X1AE3	X1B43		
X18A4	X1904	X1964	X19C4	X1A24	X1A84	X1AE4	X1B44		
X18A5	X1905	X1965	X19C5	X1A25	X1A85	X1AE5	X1B45		
X18A6	X1906	X1966	X19C6	X1A26	X1A86	X1AE6	X1B46		
X18A7	X1907	X1967	X19C7	X1A27	X1A87	X1AE7	X1B47		Spindle synchronization speed detect ▲
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X18A8	X1908	X1968	X19C8	X1A28	X1A88	X1AE8	X1B48	SPSYN 1	In spindle synchronization
X18A9	X1909	X1969	X19C9	X1A29	X1A89	X1AE9	X1B49	FSPRV	Spindle rotation speed synchronization completion
X18AA	X190A	X196A	X19CA	X1A2A	X1A8A	X1AEA	X1B4A	FSPPH	Spindle phase synchronization completion
X18AB	X190B	X196B	X19CB	X1A2B	X1A8B	X1AEB	X1B4B	SPSYN 2	In spindle synchronization 2
X18AC	X190C	X196C	X19CC	X1A2C	X1A8C	X1AE8C	X1B4C	SPCMP	Chuck close confirmation
X18AD	X190D	X196D	X19CD	X1A2D	X1A8D	X1AED	X1B4D	TSS1	Tool spindle synchronization I (Polygon) ON
X18AE	X190E	X196E	X19CE	X1A2E	X1A8E	X1AEE	X1B4E	SPSYN 3	In tool spindle synchronization II
X18AF	X190F	X196F	X19CF	X1A2F	X1A8F	X1AEF	X1B4F	SPNCH	Spindle superimposition control: Speed change disabled
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X18B0	X1910	X1970	X19D0	X1A30	X1A90	X1AF0	X1B50		
X18B1	X1911	X1971	X19D1	X1A31	X1A91	X1AF1	X1B51	SPILE	Spindle superimposition control ON
X18B2	X1912	X1972	X19D2	X1A32	X1A92	X1AF2	X1B52	SPLCR	Spindle superimposition control: Spindle superimposition clamped
X18B3	X1913	X1973	X19D3	X1A33	X1A93	X1AF3	X1B53	PHOVR	Hob axis delay excess
X18B4	X1914	X1974	X19D4	X1A34	X1A94	X1AF4	X1B54		
X18B5	X1915	X1975	X19D5	X1A35	X1A95	X1AF5	X1B55	EXOFN	In spindle holding force up
X18B6	X1916	X1976	X19D6	X1A36	X1A96	X1AF6	X1B56	SPOFF A	Spindle being excluded
X18B7	X1917	X1977	X19D7	X1A37	X1A97	X1AF7	X1B57		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X18B8	X1918	X1978	X19D8	X1A38	X1A98	X1AF8	X1B58		
X18B9	X1919	X1979	X19D9	X1A39	X1A99	X1AF9	X1B59		
X18BA	X191A	X197A	X19DA	X1A3A	X1A9A	X1AFA	X1B5A		
X18BB	X191B	X197B	X19DB	X1A3B	X1A9B	X1AFB	X1B5B		
X18BC	X191C	X197C	X19DC	X1A3C	X1A9C	X1AFC	X1B5C		
X18BD	X191D	X197D	X19DD	X1A3D	X1A9D	X1AFD	X1B5D		
X18BE	X191E	X197E	X19DE	X1A3E	X1A9E	X1AFE	X1B5E		
X18BF	X191F	X197F	X19DF	X1A3F	X1A9F	X1AFF	X1B5F		

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X18C0	X1920	X1980	X19E0	X1A40	X1AA0	X1B00	X1B60		
X18C1	X1921	X1981	X19E1	X1A41	X1AA1	X1B01	X1B61	SVMD	Spindle position control (Spindle/C axis control): C axis mode ON
X18C2	X1922	X1982	X19E2	X1A42	X1AA2	X1B02	X1B62	GO1	Spindle gear selection output 1
X18C3	X1923	X1983	X19E3	X1A43	X1AA3	X1B03	X1B63	GO2	Spindle gear selection output 2
X18C4	X1924	X1984	X19E4	X1A44	X1AA4	X1B04	X1B64		
X18C5	X1925	X1985	X19E5	X1A45	X1AA5	X1B05	X1B65		
X18C6	X1926	X1986	X19E6	X1A46	X1AA6	X1B06	X1B66		
X18C7	X1927	X1987	X19E7	X1A47	X1AA7	X1B07	X1B67		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev	Signal name
X18C8	X1928	X1988	X19E8	X1A48	X1AA8	X1B08	X1B68		Spindle oscillation in progress
X18C9	X1929	X1989	X19E9	X1A49	X1AA9	X1B09	X1B69		
X18CA	X192A	X198A	X19EA	X1A4A	X1AAA	X1B0A	X1B6A	VGHLD	Real-time tuning 1: Speed gain hold-down ON
X18CB	X192B	X198B	X19EB	X1A4B	X1AAB	X1B0B	X1B6B		
X18CC	X192C	X198C	X19EC	X1A4C	X1AAC	X1B0C	X1B6C		
X18CD	X192D	X198D	X19ED	X1A4D	X1AAD	X1B0D	X1B6D		
X18CE	X192E	X198E	X19EE	X1A4E	X1AAE	X1B0E	X1B6E		
X18CF	X192F	X198F	X19EF	X1A4F	X1AAF	X1B0F	X1B6F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X1CD0		Handy terminal key 1	X1CD8		Handy terminal key 9
X1CD1		Handy terminal key 2	X1CD9		Handy terminal key 10
X1CD2		Handy terminal key 3	X1CDA		Handy terminal key 11
X1CD3		Handy terminal key 4	X1CDB		Handy terminal key 12
X1CD4		Handy terminal key 5	X1CDC		Handy terminal key 13
X1CD5		Handy terminal key 6	X1CDD		Handy terminal key 14
X1CD6		Handy terminal key 7	X1CDE		Handy terminal key 15
X1CD7		Handy terminal key 8	X1CDF		Handy terminal key 16
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X1CE0		Handy terminal key 17	X1CE8		Handy terminal key 25
X1CE1		Handy terminal key 18	X1CE9		Handy terminal key 26
X1CE2		Handy terminal key 19	X1CEA		Handy terminal key 27
X1CE3		Handy terminal key 20	X1CEB		Handy terminal key 28
X1CE4		Handy terminal key 21	X1CEC		Handy terminal key 29
X1CE5		Handy terminal key 22	X1CED		Handy terminal key 30
X1CE6		Handy terminal key 23	X1CEE		Handy terminal key 31
X1CE7		Handy terminal key 24	X1CEF		Handy terminal key 32
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
X1CF0		Handy terminal key 33	X1CF8		Handy terminal key 41
X1CF1		Handy terminal key 34	X1CF9		Handy terminal key 42
X1CF2		Handy terminal key 35	X1CFA		Handy terminal key 43
X1CF3		Handy terminal key 36	X1CFB		Handy terminal key 44
X1CF4		Handy terminal key 37	X1CFC		Handy terminal key 45
X1CF5		Handy terminal key 38	X1CFD		
X1CF6		Handy terminal key 39	X1CFE		
X1CF7		Handy terminal key 40	X1CFF		

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X1D00	X1D20	X1D40	X1D60	PSW1	Position switch 1
X1D01	X1D21	X1D41	X1D61	PSW2	Position switch 2
X1D02	X1D22	X1D42	X1D62	PSW3	Position switch 3
X1D03	X1D23	X1D43	X1D63	PSW4	Position switch 4
X1D04	X1D24	X1D44	X1D64	PSW5	Position switch 5
X1D05	X1D25	X1D45	X1D65	PSW6	Position switch 6
X1D06	X1D26	X1D46	X1D66	PSW7	Position switch 7
X1D07	X1D27	X1D47	X1D67	PSW8	Position switch 8
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X1D08	X1D28	X1D48	X1D68	PSW9	Position switch 9
X1D09	X1D29	X1D49	X1D69	PSW10	Position switch 10
X1D0A	X1D2A	X1D4A	X1D6A	PSW11	Position switch 11
X1D0B	X1D2B	X1D4B	X1D6B	PSW12	Position switch 12
X1D0C	X1D2C	X1D4C	X1D6C	PSW13	Position switch 13
X1D0D	X1D2D	X1D4D	X1D6D	PSW14	Position switch 14
X1D0E	X1D2E	X1D4E	X1D6E	PSW15	Position switch 15
X1D0F	X1D2F	X1D4F	X1D6F	PSW16	Position switch 16
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
X1D10	X1D30	X1D50	X1D70	PSW17	Position switch 17
X1D11	X1D31	X1D51	X1D71	PSW18	Position switch 18
X1D12	X1D32	X1D52	X1D72	PSW19	Position switch 19
X1D13	X1D33	X1D53	X1D73	PSW20	Position switch 20
X1D14	X1D34	X1D54	X1D74	PSW21	Position switch 21
X1D15	X1D35	X1D55	X1D75	PSW22	Position switch 22
X1D16	X1D36	X1D56	X1D76	PSW23	Position switch 23
X1D17	X1D37	X1D57	X1D77	PSW24	Position switch 24

3.2 PLC Input Signals (Data type: R***)

(Note) Signal with " ▲ " is prepared for a specific machine tool builder.

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R0	AI1	Analog input 1	R8		KEY IN 1
R1	AI2	Analog input 2	R9		
R2	AI3	Analog input 3	R10		
R3	AI4	Analog input 4	R11		Clock data Year/Month
R4	AI5	Analog input 5	R12		Clock data Date/Hour
R5	AI6	Analog input 6	R13		Clock data Minute/Second
R6	AI7	Analog input 7	R14		
R7	AI8	Analog input 8	R15		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R16		CNC software version code A	R24		
R17		CNC software version code B	R25		PC high-speed process time
R18		CNC software version code C1	R26		Turret interference check status
R19		CNC software version code C2	R27		Interference object alarm information
R20			R28		
R21			R29		
R22			R30		Remote program input error information ▲
R23			R31		Diagnosis data output
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R32			R40		ASYNC error: exceptional occurrence R register number ▲
R33			R41		
R34			R42		
R35			R43		
R36			R44		
R37		PLC window parameter status	R45		
R38		ASYNC error: exceptional occurrence	R46		
R39		step number ▲	R47		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R48			R56		Battery drop cause
R49			R57		Temperature warning cause
R50			R58		5V/24V error cause
R51			R59		Control unit temperature 2
R52			R60		Control unit temperature
R53			R61		
R54			R62		Tool ID communication error information ▲
R55			R63		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R64			R72		Ball screw thermal displacement compensation Compensation amount 1st [M] axis
R65			R73		Ball screw thermal displacement compensation Compensation amount 2nd [M] axis
R66			R74		Ball screw thermal displacement compensation Compensation amount 3rd [M] axis
R67			R75		Ball screw thermal displacement compensation Compensation amount 4th [M] axis
R68		PLC main scan time	R76		
R69		Emergency stop cause	R77		
R70		DIO card information	R78		
R71			R79		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R80			R88		
R81			R89		
R82			R90		Modbus/TCP connection request monitor ▲
R83		Modbus/RTU received packet monitor ▲	R91		Modbus/TCP number of connections monitor ▲
R84		Modbus/RTU communication error monitor ▲	R92		Modbus/TCP received packet monitor ▲
R85		Modal task data update cycle	R93		Modbus/TCP communication error monitor ▲
R86			R94		Modbus/TCP protocol error packet monitor ▲
R87			R95		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R96	SMDOEN	Speed monitor door open possible	R104		
R97			R105		
R98	SOPFN	Multi-step speed monitor selected speed output ▲	R106		
R99			R107		
R100			R108		
R101			R109		
R102			R110		
R103			R111		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R112			R120	DTPPC	Power consumption computation: Present consumption of entire drive system(L)
R113			R121		Power consumption computation: Present consumption of entire drive system(H)
R114			R122	DTIPC1	Power consumption computation: Accumulated consumption of entire drive system 1(L)
R115			R123		Power consumption computation: Accumulated consumption of entire drive system 1(H)
R116	HS1PCNT	Handle feed: 1st handle pulse counter	R124	DTIPC2	Power consumption computation: Accumulated consumption of entire drive system 2(L)
R117	HS2PCNT	Handle feed: 2nd handle pulse counter	R125		Power consumption computation: Accumulated consumption of entire drive system 2(H)
R118	HS3PCNT	Handle feed: 3rd handle pulse counter	R126	DTIPC3	Power consumption computation: Accumulated consumption of entire drive system 3(L)
R119			R127		Power consumption computation: Accumulated consumption of entire drive system 3(H)
R128	DTIPC4	Power consumption computation: Accumulated consumption of entire drive system 4(L)	R136	NDIPC4	Power consumption computation: Accumulated consumption of devices other than drive system 4(L)
R129		Power consumption computation: Accumulated consumption of entire drive system 4(H)	R137		Power consumption computation: Accumulated consumption of devices other than drive system 4(H)
R130	NDIPC1	Power consumption computation: Accumulated consumption of devices other than drive system 1(L)	R138		
R131		Power consumption computation: Accumulated consumption of devices other than drive system 1(H)	R139		
R132	NDIPC2	Power consumption computation: Accumulated consumption of devices other than drive system 2(L)	R140		
R133		Power consumption computation: Accumulated consumption of devices other than drive system 2(H)	R141		
R134	NDIPC3	Power consumption computation: Accumulated consumption of devices other than drive system 3(L)	R142		
R135		Power consumption computation: Accumulated consumption of devices other than drive system 3(H)	R143		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R160			R168		PLC axis alarm/warning No. 1st axis
R161			R169		PLC axis alarm/warning No. 2nd axis
R162			R170		PLC axis alarm/warning No. 3rd axis
R163			R171		PLC axis alarm/warning No. 4th axis
R164			R172		PLC axis alarm/warning No. 5th axis
R165			R173		PLC axis alarm/warning No. 6th axis
R166			R174		
R167			R175		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R500	R700	R900	R1100	R1300	R1500	R1700	R1900		External search status
R501	R701	R901	R1101	R1301	R1501	R1701	R1901		
R502	R702	R902	R1102	R1302	R1502	R1702	R1902		
R503	R703	R903	R1103	R1303	R1503	R1703	R1903		
R504	R704	R904	R1104	R1304	R1504	R1704	R1904		M code data 1 (L)
R505	R705	R905	R1105	R1305	R1505	R1705	R1905		M code data 1 (H)
R506	R706	R906	R1106	R1306	R1506	R1706	R1906		M code data 2 (L)
R507	R707	R907	R1107	R1307	R1507	R1707	R1907		M code data 2 (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R508	R708	R908	R1108	R1308	R1508	R1708	R1908		M code data 3 (L)
R509	R709	R909	R1109	R1309	R1509	R1709	R1909		M code data 3 (H)
R510	R710	R910	R1110	R1310	R1510	R1710	R1910		M code data 4 (L)
R511	R711	R911	R1111	R1311	R1511	R1711	R1911		M code data 4 (H)
R512	R712	R912	R1112	R1312	R1512	R1712	R1912		S code data 1 (L)
R513	R713	R913	R1113	R1313	R1513	R1713	R1913		S code data 1 (H)
R514	R714	R914	R1114	R1314	R1514	R1714	R1914		S code data 2 (L)
R515	R715	R915	R1115	R1315	R1515	R1715	R1915		S code data 2 (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R516	R716	R916	R1116	R1316	R1516	R1716	R1916		S code data 3 (L)
R517	R717	R917	R1117	R1317	R1517	R1717	R1917		S code data 3 (H)
R518	R718	R918	R1118	R1318	R1518	R1718	R1918		S code data 4 (L)
R519	R719	R919	R1119	R1319	R1519	R1719	R1919		S code data 4 (H)
R520	R720	R920	R1120	R1320	R1520	R1720	R1920		S code data 5 (L)
R521	R721	R921	R1121	R1321	R1521	R1721	R1921		S code data 5 (H)
R522	R722	R922	R1122	R1322	R1522	R1722	R1922		S code data 6 (L)
R523	R723	R923	R1123	R1323	R1523	R1723	R1923		S code data 6 (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R524	R724	R924	R1124	R1324	R1524	R1724	R1924		S code data 7 (L)
R525	R725	R925	R1125	R1325	R1525	R1725	R1925		S code data 7 (H)
R526	R726	R926	R1126	R1326	R1526	R1726	R1926		S code data 8 (L)
R527	R727	R927	R1127	R1327	R1527	R1727	R1927		S code data 8 (H)
R528	R728	R928	R1128	R1328	R1528	R1728	R1928		
R529	R729	R929	R1129	R1329	R1529	R1729	R1929		
R530	R730	R930	R1130	R1330	R1530	R1730	R1930		
R531	R731	R931	R1131	R1331	R1531	R1731	R1931		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R532	R732	R932	R1132	R1332	R1532	R1732	R1932		
R533	R733	R933	R1133	R1333	R1533	R1733	R1933		
R534	R734	R934	R1134	R1334	R1534	R1734	R1934		
R535	R735	R935	R1135	R1335	R1535	R1735	R1935		
R536	R736	R936	R1136	R1336	R1536	R1736	R1936		T code data 1 (L)
R537	R737	R937	R1137	R1337	R1537	R1737	R1937		T code data 1 (H)
R538	R738	R938	R1138	R1338	R1538	R1738	R1938		T code data 2 (L)
R539	R739	R939	R1139	R1339	R1539	R1739	R1939		T code data 2 (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R540	R740	R940	R1140	R1340	R1540	R1740	R1940		T code data 3 (L)
R541	R741	R941	R1141	R1341	R1541	R1741	R1941		T code data 3 (H)
R542	R742	R942	R1142	R1342	R1542	R1742	R1942		T code data 4 (L)
R543	R743	R943	R1143	R1343	R1543	R1743	R1943		T code data 4 (H)
R544	R744	R944	R1144	R1344	R1544	R1744	R1944		2nd M function data 1 (L)
R545	R745	R945	R1145	R1345	R1545	R1745	R1945		2nd M function data 1 (H)
R546	R746	R946	R1146	R1346	R1546	R1746	R1946		2nd M function data 2 (L)
R547	R747	R947	R1147	R1347	R1547	R1747	R1947		2nd M function data 2 (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R548	R748	R948	R1148	R1348	R1548	R1748	R1948		2nd M function data 3 (L)
R549	R749	R949	R1149	R1349	R1549	R1749	R1949		2nd M function data 3 (H)
R550	R750	R950	R1150	R1350	R1550	R1750	R1950		2nd M function data 4 (L)
R551	R751	R951	R1151	R1351	R1551	R1751	R1951		2nd M function data 4 (H)
R552	R752	R952	R1152	R1352	R1552	R1752	R1952		
R553	R753	R953	R1153	R1353	R1553	R1753	R1953		
R554	R754	R954	R1154	R1354	R1554	R1754	R1954		Chopping error No.
R555	R755	R955	R1155	R1355	R1555	R1755	R1955		Manual measurement status
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R556	R756	R956	R1156	R1356	R1556	R1756	R1956		
R557	R757	R957	R1157	R1357	R1557	R1757	R1957		
R558	R758	R958	R1158	R1358	R1558	R1758	R1958		
R559	R759	R959	R1159	R1359	R1559	R1759	R1959		
R560	R760	R960	R1160	R1360	R1560	R1760	R1960		
R561	R761	R961	R1161	R1361	R1561	R1761	R1961		
R562	R762	R962	R1162	R1362	R1562	R1762	R1962		
R563	R763	R963	R1163	R1363	R1563	R1763	R1963		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R564	R764	R964	R1164	R1364	R1564	R1764	R1964		Load monitor I : Warning axis ▲
R565	R765	R965	R1165	R1365	R1565	R1765	R1965		Load monitor I : Alarm axis ▲
R566	R766	R966	R1166	R1366	R1566	R1766	R1966		Load monitor I : Data error information
R567	R767	R967	R1167	R1367	R1567	R1767	R1967		Group in tool life management
R568	R768	R968	R1168	R1368	R1568	R1768	R1968		
R569	R769	R969	R1169	R1369	R1569	R1769	R1969		
R570	R770	R970	R1170	R1370	R1570	R1770	R1970		
R571	R771	R971	R1171	R1371	R1571	R1771	R1971		Load monitor I : Adaptive control override ▲
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R572	R772	R972	R1172	R1372	R1572	R1772	R1972		CNC completion standby status
R573	R773	R973	R1173	R1373	R1573	R1773	R1973		
R574	R774	R974	R1174	R1374	R1574	R1774	R1974		In initialization
R575	R775	R975	R1175	R1375	R1575	R1775	R1975		Initialization incompleteness
R576	R776	R976	R1176	R1376	R1576	R1776	R1976		Reference position adjustment value parameter setting completed
R577	R777	R977	R1177	R1377	R1577	R1777	R1977	APIER	User macro section and sub-section designated execution result
R578	R778	R978	R1178	R1378	R1578	R1778	R1978		Measurement tool tip point No. ▲
R579	R779	R979	R1179	R1379	R1579	R1779	R1979		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R580	R780	R980	R1180	R1380	R1580	R1780	R1980		Near reference position (per reference position) 1st to 4th axis
R581	R781	R981	R1181	R1381	R1581	R1781	R1981		Near reference position (per reference position) 5th to 8th axis
R582	R782	R982	R1182	R1382	R1582	R1782	R1982		Presetter contact
R583	R783	R983	R1183	R1383	R1583	R1783	R1983		Presetter interlock
R584	R784	R984	R1184	R1384	R1584	R1784	R1984		Area signal X axis ON/OFF ▲
R585	R785	R985	R1185	R1385	R1585	R1785	R1985		Area signal Z axis ON/OFF ▲
R586	R786	R986	R1186	R1386	R1586	R1786	R1986		Area signal X axis (-) ON/OFF ▲
R587	R787	R987	R1187	R1387	R1587	R1787	R1987		Area signal Z axis (-) ON/OFF ▲
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R588	R788	R988	R1188	R1388	R1588	R1788	R1988		Takt time (ms) (L)
R589	R789	R989	R1189	R1389	R1589	R1789	R1989		Takt time (ms) (H)
R590	R790	R990	R1190	R1390	R1590	R1790	R1990		Takt time (min) (L)
R591	R791	R991	R1191	R1391	R1591	R1791	R1991		Takt time (min) (H)
R592	R792	R992	R1192	R1392	R1592	R1792	R1992		
R593	R793	R993	R1193	R1393	R1593	R1793	R1993		
R594	R794	R994	R1194	R1394	R1594	R1794	R1994		
R595	R795	R995	R1195	R1395	R1595	R1795	R1995		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R596	R796	R996	R1196	R1396	R1596	R1796	R1996		Load monitor I : Status output (1) ▲
R597	R797	R997	R1197	R1397	R1597	R1797	R1997		Load monitor I : Status output (2) ▲
R598	R798	R998	R1198	R1398	R1598	R1798	R1998		Load monitor I : Status output (3) ▲
R599	R799	R999	R1199	R1399	R1599	R1799	R1999		Load monitor I : Status output (4) ▲
R600	R800	R1000	R1200	R1400	R1600	R1800	R2000		Load monitor I : Status output (5) ▲
R601	R801	R1001	R1201	R1401	R1601	R1801	R2001		Load monitor I : Status output (6) ▲
R602	R802	R1002	R1202	R1402	R1602	R1802	R2002		Load monitor I : Status output (7) ▲
R603	R803	R1003	R1203	R1403	R1603	R1803	R2003		Load monitor I : Status output (8) ▲
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R604	R804	R1004	R1204	R1404	R1604	R1804	R2004		Load monitor I : Status output (9) ▲
R605	R805	R1005	R1205	R1405	R1605	R1805	R2005		Load monitor I : Status output (10) ▲
R606	R806	R1006	R1206	R1406	R1606	R1806	R2006		No. of work machining (current value) (L)
R607	R807	R1007	R1207	R1407	R1607	R1807	R2007		No. of work machining (current value) (H)
R608	R808	R1008	R1208	R1408	R1608	R1808	R2008		No. of work machining (maximum value) (L)
R609	R809	R1009	R1209	R1409	R1609	R1809	R2009		No. of work machining (maximum value) (H)
R610	R810	R1010	R1210	R1410	R1610	R1810	R2010		
R611	R811	R1011	R1211	R1411	R1611	R1811	R2011		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R612	R812	R1012	R1212	R1412	R1612	R1812	R2012		
R613	R813	R1013	R1213	R1413	R1613	R1813	R2013		
R614	R814	R1014	R1214	R1414	R1614	R1814	R2014		
R615	R815	R1015	R1215	R1415	R1615	R1815	R2015		
R616	R816	R1016	R1216	R1416	R1616	R1816	R2016	SBSID	Sub part system control: Sub part system control II identification No.
R617	R817	R1017	R1217	R1417	R1617	R1817	R2017	SBSCL	Sub part system control: Calling sub part system
R618	R818	R1018	R1218	R1418	R1618	R1818	R2018	SBSWT	Sub part system control: Waiting for sub part system completion
R619	R819	R1019	R1219	R1419	R1619	R1819	R2019	SBSSY	Sub part system control: Caller of sub part system

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R620	R820	R1020	R1220	R1420	R1620	R1820	R2020		
R621	R821	R1021	R1221	R1421	R1621	R1821	R2021		
R622	R822	R1022	R1222	R1422	R1622	R1822	R2022		
R623	R823	R1023	R1223	R1423	R1623	R1823	R2023		
R624	R824	R1024	R1224	R1424	R1624	R1824	R2024		Constant torque control: Axis under constant torque/proportional torque stopper control
R625	R825	R1025	R1225	R1425	R1625	R1825	R2025		Constant torque control: Constant torque droop cancel axis status
R626	R826	R1026	R1226	R1426	R1626	R1826	R2026		
R627	R827	R1027	R1227	R1427	R1627	R1827	R2027		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R628	R828	R1028	R1228	R1428	R1628	R1828	R2028		Tool life usage data (L)
R629	R829	R1029	R1229	R1429	R1629	R1829	R2029		Tool life usage data (H)
R630	R830	R1030	R1230	R1430	R1630	R1830	R2030		Number of registered tool life control tools
R631	R831	R1031	R1231	R1431	R1631	R1831	R2031		
R632	R832	R1032	R1232	R1432	R1632	R1832	R2032		
R633	R833	R1033	R1233	R1433	R1633	R1833	R2033		
R634	R834	R1034	R1234	R1434	R1634	R1834	R2034		
R635	R835	R1035	R1235	R1435	R1635	R1835	R2035		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R636	R836	R1036	R1236	R1436	R1636	R1836	R2036		Circular feed in manual mode Current position X (L) [M]
R637	R837	R1037	R1237	R1437	R1637	R1837	R2037		Circular feed in manual mode Current position X (H) [M]
R638	R838	R1038	R1238	R1438	R1638	R1838	R2038		
R639	R839	R1039	R1239	R1439	R1639	R1839	R2039		
R640	R840	R1040	R1240	R1440	R1640	R1840	R2040		Circular feed in manual mode Current position Y (L) [M]
R641	R841	R1041	R1241	R1441	R1641	R1841	R2041		Circular feed in manual mode Current position Y (H) [M]
R642	R842	R1042	R1242	R1442	R1642	R1842	R2042		
R643	R843	R1043	R1243	R1443	R1643	R1843	R2043		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R644	R844	R1044	R1244	R1444	R1644	R1844	R2044		
R645	R845	R1045	R1245	R1445	R1645	R1845	R2045		
R646	R846	R1046	R1246	R1446	R1646	R1846	R2046		Machining mode state ▲
R647	R847	R1047	R1247	R1447	R1647	R1847	R2047		
R648	R848	R1048	R1248	R1448	R1648	R1848	R2048		Thread recutting status
R649	R849	R1049	R1249	R1449	R1649	R1849	R2049		Thread recutting execution status
R650	R850	R1050	R1250	R1450	R1650	R1850	R2050		Thread recutting spindle No.
R651	R851	R1051	R1251	R1451	R1651	R1851	R2051		Thread recutting lead axis No.
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R652	R852	R1052	R1252	R1452	R1652	R1852	R2052	TLMSLNO1	Censor ON Tool length compensation No. (BCD output) ▲
R653	R853	R1053	R1253	R1453	R1653	R1853	R2053	TLMSWNO1	Censor ON Tool wear compensation No. (BCD output) ▲
R654	R854	R1054	R1254	R1454	R1654	R1854	R2054	TLMSLNO2	Compensation data update Tool length compensation No. (BCD output) ▲
R655	R855	R1055	R1255	R1455	R1655	R1855	R2055	TLMSWNO2	Compensation data update Tool wear compensation No. (BCD output) ▲
R656	R856	R1056	R1256	R1456	R1656	R1856	R2056		
R657	R857	R1057	R1257	R1457	R1657	R1857	R2057		
R658	R858	R1058	R1258	R1458	R1658	R1858	R2058		
R659	R859	R1059	R1259	R1459	R1659	R1859	R2059		Ext. machine coordinate: number input compensation offset valid axis ▲
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R660	R860	R1060	R1260	R1460	R1660	R1860	R2060	RSWRK	R-Navi: selecting work number
R661	R861	R1061	R1261	R1461	R1661	R1861	R2061	RSSRF	R-Navi: selecting machine surface number
R662	R862	R1062	R1262	R1462	R1662	R1862	R2062		
R663	R863	R1063	R1263	R1463	R1663	R1863	R2063		
R664	R864	R1064	R1264	R1464	R1664	R1864	R2064		
R665	R865	R1065	R1265	R1465	R1665	R1865	R2065		
R666	R866	R1066	R1266	R1466	R1666	R1866	R2066		
R667	R867	R1067	R1267	R1467	R1667	R1867	R2067		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R668	R868	R1068	R1268	R1468	R1668	R1868	R2068	SVESTAF	Optimum acceleration/deceleration selection : NC axis estimated resonance frequency (in estimating inertia) ▲
R669	R869	R1069	R1269	R1469	R1669	R1869	R2069		
R670	R870	R1070	R1270	R1470	R1670	R1870	R2070		
R671	R871	R1071	R1271	R1471	R1671	R1871	R2071		
R672	R872	R1072	R1272	R1472	R1672	R1872	R2072		
R673	R873	R1073	R1273	R1473	R1673	R1873	R2073		
R674	R874	R1074	R1274	R1474	R1674	R1874	R2074		
R675	R875	R1075	R1275	R1475	R1675	R1875	R2075		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R684	R884	R1084	R1284	R1484	R1684	R1884	R2084		Specific user NC status 1 ▲
R685	R885	R1085	R1285	R1485	R1685	R1885	R2085		
R686	R886	R1086	R1286	R1486	R1686	R1886	R2086		
R687	R887	R1087	R1287	R1487	R1687	R1887	R2087		
R688	R888	R1088	R1288	R1488	R1688	R1888	R2088		Specific user Manual skip Axis in skip motion ▲
R689	R889	R1089	R1289	R1489	R1689	R1889	R2089		Specific user Manual skip Skip motion direction ▲
R690	R890	R1090	R1290	R1490	R1690	R1890	R2090		Specific user Error/Warning detail ▲
R691	R891	R1091	R1291	R1491	R1691	R1891	R2091		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R2400		3D Machine Interference Check : Requested shape group No.1	R2408		
R2401		3D Machine Interference Check : Requested shape group No.2	R2409		
R2402		3D Machine Interference Check : Requested shape group No.3	R2410		
R2403		3D Machine Interference Check : Requested shape group No.4	R2411		
R2404			R2412		
R2405			R2413		
R2406			R2414		
R2407			R2415		

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4500	R4532	R4564	R4596		Machine position 1st axis (L) [M]
R4501	R4533	R4565	R4597		Machine position 1st axis (H) [M]
R4502	R4534	R4566	R4598		
R4503	R4535	R4567	R4599		
R4504	R4536	R4568	R4600		Machine position 2nd axis (L) [M]
R4505	R4537	R4569	R4601		Machine position 2nd axis (H) [M]
R4506	R4538	R4570	R4602		
R4507	R4539	R4571	R4603		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4508	R4540	R4572	R4604		Machine position 3rd axis (L) [M]
R4509	R4541	R4573	R4605		Machine position 3rd axis (H) [M]
R4510	R4542	R4574	R4606		
R4511	R4543	R4575	R4607		
R4512	R4544	R4576	R4608		Machine position 4th axis (L) [M]
R4513	R4545	R4577	R4609		Machine position 4th axis (H) [M]
R4514	R4546	R4578	R4610		
R4515	R4547	R4579	R4611		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4516	R4548	R4580	R4612		Machine position 5th axis (L) [M]
R4517	R4549	R4581	R4613		Machine position 5th axis (H) [M]
R4518	R4550	R4582	R4614		
R4519	R4551	R4583	R4615		
R4520	R4552	R4584	R4616		Machine position 6th axis (L) [M]
R4521	R4553	R4585	R4617		Machine position 6th axis (H) [M]
R4522	R4554	R4586	R4618		
R4523	R4555	R4587	R4619		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4524	R4556	R4588	R4620		Machine position 7th axis (L) [M]
R4525	R4557	R4589	R4621		Machine position 7th axis (H) [M]
R4526	R4558	R4590	R4622		
R4527	R4559	R4591	R4623		
R4528	R4560	R4592	R4624		Machine position 8th axis (L) [M]
R4529	R4561	R4593	R4625		Machine position 8th axis (H) [M]
R4530	R4562	R4594	R4626		
R4531	R4563	R4595	R4627		

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4628	R4660	R4692	R4724		Feedback machine position 1st axis (L) [M]
R4629	R4661	R4693	R4725		Feedback machine position 1st axis (H) [M]
R4630	R4662	R4694	R4726		
R4631	R4663	R4695	R4727		
R4632	R4664	R4696	R4728		Feedback machine position 2nd axis (L) [M]
R4633	R4665	R4697	R4729		Feedback machine position 2nd axis (H) [M]
R4634	R4666	R4698	R4730		
R4635	R4667	R4699	R4731		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4636	R4668	R4700	R4732		Feedback machine position 3rd axis (L) [M]
R4637	R4669	R4701	R4733		Feedback machine position 3rd axis (H) [M]
R4638	R4670	R4702	R4734		
R4639	R4671	R4703	R4735		
R4640	R4672	R4704	R4736		Feedback machine position 4th axis (L) [M]
R4641	R4673	R4705	R4737		Feedback machine position 4th axis (H) [M]
R4642	R4674	R4706	R4738		
R4643	R4675	R4707	R4739		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4644	R4676	R4708	R4740		Feedback machine position 5th axis (L) [M]
R4645	R4677	R4709	R4741		Feedback machine position 5th axis (H) [M]
R4646	R4678	R4710	R4742		
R4647	R4679	R4711	R4743		
R4648	R4680	R4712	R4744		Feedback machine position 6th axis (L) [M]
R4649	R4681	R4713	R4745		Feedback machine position 6th axis (H) [M]
R4650	R4682	R4714	R4746		
R4651	R4683	R4715	R4747		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4652	R4684	R4716	R4748		Feedback machine position 7th axis (L) [M]
R4653	R4685	R4717	R4749		Feedback machine position 7th axis (H) [M]
R4654	R4686	R4718	R4750		
R4655	R4687	R4719	R4751		
R4656	R4688	R4720	R4752		Feedback machine position 8th axis (L) [M]
R4657	R4689	R4721	R4753		Feedback machine position 8th axis (H) [M]
R4658	R4690	R4722	R4754		
R4659	R4691	R4723	R4755		

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4756	R4772	R4788	R4804		Servo deflection amount 1st axis (L) [M]
R4757	R4773	R4789	R4805		Servo deflection amount 1st axis (H) [M]
R4758	R4774	R4790	R4806		Servo deflection amount 2nd axis (L) [M]
R4759	R4775	R4791	R4807		Servo deflection amount 2nd axis (H) [M]
R4760	R4776	R4792	R4808		Servo deflection amount 3rd axis (L) [M]
R4761	R4777	R4793	R4809		Servo deflection amount 3rd axis (H) [M]
R4762	R4778	R4794	R4810		Servo deflection amount 4th axis (L) [M]
R4763	R4779	R4795	R4811		Servo deflection amount 4th axis (H) [M]
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4764	R4780	R4796	R4812		Servo deflection amount 5th axis (L) [M]
R4765	R4781	R4797	R4813		Servo deflection amount 5th axis (H) [M]
R4766	R4782	R4798	R4814		Servo deflection amount 6th axis (L) [M]
R4767	R4783	R4799	R4815		Servo deflection amount 6th axis (H) [M]
R4768	R4784	R4800	R4816		Servo deflection amount 7th axis (L) [M]
R4769	R4785	R4801	R4817		Servo deflection amount 7th axis (H) [M]
R4770	R4786	R4802	R4818		Servo deflection amount 8th axis (L) [M]
R4771	R4787	R4803	R4819		Servo deflection amount 8th axis (H) [M]
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4820	R4836	R4852	R4868		Motor rotation speed 1st axis (L)
R4821	R4837	R4853	R4869		Motor rotation speed 1st axis (H)
R4822	R4838	R4854	R4870		Motor rotation speed 2nd axis (L)
R4823	R4839	R4855	R4871		Motor rotation speed 2nd axis (H)
R4824	R4840	R4856	R4872		Motor rotation speed 3rd axis (L)
R4825	R4841	R4857	R4873		Motor rotation speed 3rd axis (H)
R4826	R4842	R4858	R4874		Motor rotation speed 4th axis (L)
R4827	R4843	R4859	R4875		Motor rotation speed 4th axis (H)

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4828	R4844	R4860	R4876		Motor rotation speed 5th axis (L)
R4829	R4845	R4861	R4877		Motor rotation speed 5th axis (H)
R4830	R4846	R4862	R4878		Motor rotation speed 6th axis (L)
R4831	R4847	R4863	R4879		Motor rotation speed 6th axis (H)
R4832	R4848	R4864	R4880		Motor rotation speed 7th axis (L)
R4833	R4849	R4865	R4881		Motor rotation speed 7th axis (H)
R4834	R4850	R4866	R4882		Motor rotation speed 8th axis (L)
R4835	R4851	R4867	R4883		Motor rotation speed 8th axis (H)
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4884	R4900	R4916	R4932		Motor load current 1st axis (L)
R4885	R4901	R4917	R4933		Motor load current 1st axis (H)
R4886	R4902	R4918	R4934		Motor load current 2nd axis (L)
R4887	R4903	R4919	R4935		Motor load current 2nd axis (H)
R4888	R4904	R4920	R4936		Motor load current 3rd axis (L)
R4889	R4905	R4921	R4937		Motor load current 3rd axis (H)
R4890	R4906	R4922	R4938		Motor load current 4th axis (L)
R4891	R4907	R4923	R4939		Motor load current 4th axis (H)
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4892	R4908	R4924	R4940		Motor load current 5th axis (L)
R4893	R4909	R4925	R4941		Motor load current 5th axis (H)
R4894	R4910	R4926	R4942		Motor load current 6th axis (L)
R4895	R4911	R4927	R4943		Motor load current 6th axis (H)
R4896	R4912	R4928	R4944		Motor load current 7th axis (L)
R4897	R4913	R4929	R4945		Motor load current 7th axis (H)
R4898	R4914	R4930	R4946		Motor load current 8th axis (L)
R4899	R4915	R4931	R4947		Motor load current 8th axis (H)
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4948	R4980	R5012	R5044		Skip coordinate position 1st axis (L) [M]
R4949	R4981	R5013	R5045		Skip coordinate position 1st axis (H) [M]
R4950	R4982	R5014	R5046		
R4951	R4983	R5015	R5047		
R4952	R4984	R5016	R5048		Skip coordinate position 2nd axis (L) [M]
R4953	R4985	R5017	R5049		Skip coordinate position 2nd axis (H) [M]
R4954	R4986	R5018	R5050		
R4955	R4987	R5019	R5051		

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4956	R4988	R5020	R5052		Skip coordinate position 3rd axis (L) [M]
R4957	R4989	R5021	R5053		Skip coordinate position 3rd axis (H) [M]
R4958	R4990	R5022	R5054		
R4959	R4991	R5023	R5055		
R4960	R4992	R5024	R5056		Skip coordinate position 4th axis (L) [M]
R4961	R4993	R5025	R5057		Skip coordinate position 4th axis (H) [M]
R4962	R4994	R5026	R5058		
R4963	R4995	R5027	R5059		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4964	R4996	R5028	R5060		Skip coordinate position 5th axis (L) [M]
R4965	R4997	R5029	R5061		Skip coordinate position 5th axis (H) [M]
R4966	R4998	R5030	R5062		
R4967	R4999	R5031	R5063		
R4968	R5000	R5032	R5064		Skip coordinate position 6th axis (L) [M]
R4969	R5001	R5033	R5065		Skip coordinate position 6th axis (H) [M]
R4970	R5002	R5034	R5066		
R4971	R5003	R5035	R5067		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R4972	R5004	R5036	R5068		Skip coordinate position 7th axis (L) [M]
R4973	R5005	R5037	R5069		Skip coordinate position 7th axis (H) [M]
R4974	R5006	R5038	R5070		
R4975	R5007	R5039	R5071		
R4976	R5008	R5040	R5072		Skip coordinate position 8th axis (L) [M]
R4977	R5009	R5041	R5073		Skip coordinate position 8th axis (H) [M]
R4978	R5010	R5042	R5074		
R4979	R5011	R5043	R5075		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5076	R5092	R5108	R5124		Synchronous error amount 1st, 9th, 17th, 25th axis (L) [M]
R5077	R5093	R5109	R5125		Synchronous error amount 1st, 9th, 17th, 25th axis (H) [M]
R5078	R5094	R5110	R5126		Synchronous error amount 2nd, 10th, 18th, 26th axis (L) [M]
R5079	R5095	R5111	R5127		Synchronous error amount 2nd, 10th, 18th, 26th axis (H) [M]
R5080	R5096	R5112	R5128		Synchronous error amount 3rd, 11th, 19th, 27th axis (L) [M]
R5081	R5097	R5113	R5129		Synchronous error amount 3rd, 11th, 19th, 27th axis (H) [M]
R5082	R5098	R5114	R5130		Synchronous error amount 4th, 12th, 20th, 28th axis (L) [M]
R5083	R5099	R5115	R5131		Synchronous error amount 4th, 12th, 20th, 28th axis (H) [M]

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5084	R5100	R5116	R5132		Synchronous error amount 5th, 13th, 21st, 29th axis (L) [M]
R5085	R5101	R5117	R5133		Synchronous error amount 5th, 13th, 21st, 29th axis (H) [M]
R5086	R5102	R5118	R5134		Synchronous error amount 6th, 14th, 22nd, 30th axis (L) [M]
R5087	R5103	R5119	R5135		Synchronous error amount 6th, 14th, 22nd, 30th axis (H) [M]
R5088	R5104	R5120	R5136		Synchronous error amount 7th, 15th, 23rd, 31st axis (L) [M]
R5089	R5105	R5121	R5137		Synchronous error amount 7th, 15th, 23rd, 31st axis (H) [M]
R5090	R5106	R5122	R5138		Synchronous error amount 8th, 16th, 24th, 32nd axis (L) [M]
R5091	R5107	R5123	R5139		Synchronous error amount 8th, 16th, 24th, 32nd axis (H) [M]
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5140	R5148	R5156	R5164		Optimum acceleration/deceleration parameter group currently selected [axis] ▲ 1st axis
R5141	R5149	R5157	R5165		Optimum acceleration/deceleration parameter group currently selected [axis] ▲ 2nd axis
R5142	R5150	R5158	R5166		Optimum acceleration/deceleration parameter group currently selected [axis] ▲ 3rd axis
R5143	R5151	R5159	R5167		Optimum acceleration/deceleration parameter group currently selected [axis] ▲ 4th axis
R5144	R5152	R5160	R5168		Optimum acceleration/deceleration parameter group currently selected [axis] ▲ 5th axis
R5145	R5153	R5161	R5169		Optimum acceleration/deceleration parameter group currently selected [axis] ▲ 6th axis
R5146	R5154	R5162	R5170		Optimum acceleration/deceleration parameter group currently selected [axis] ▲ 7th axis
R5147	R5155	R5163	R5171		Optimum acceleration/deceleration parameter group currently selected [axis] ▲ 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5172	R5204	R5236	R5268		Cutting feed movement amount 1st axis (L) [M]
R5173	R5205	R5237	R5269		Cutting feed movement amount 1st axis (H) [M]
R5174	R5206	R5238	R5270		
R5175	R5207	R5239	R5271		
R5176	R5208	R5240	R5272		Cutting feed movement amount 2nd axis (L) [M]
R5177	R5209	R5241	R5273		Cutting feed movement amount 2nd axis (H) [M]
R5178	R5210	R5242	R5274		
R5179	R5211	R5243	R5275		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5180	R5212	R5244	R5276		Cutting feed movement amount 3rd axis (L) [M]
R5181	R5213	R5245	R5277		Cutting feed movement amount 3rd axis (H) [M]
R5182	R5214	R5246	R5278		
R5183	R5215	R5247	R5279		
R5184	R5216	R5248	R5280		Cutting feed movement amount 4th axis (L) [M]
R5185	R5217	R5249	R5281		Cutting feed movement amount 4th axis (H) [M]
R5186	R5218	R5250	R5282		
R5187	R5219	R5251	R5283		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5188	R5220	R5252	R5284		Cutting feed movement amount 5th axis (L) [M]
R5189	R5221	R5253	R5285		Cutting feed movement amount 5th axis (H) [M]
R5190	R5222	R5254	R5286		
R5191	R5223	R5255	R5287		
R5192	R5224	R5256	R5288		Cutting feed movement amount 6th axis (L) [M]
R5193	R5225	R5257	R5289		Cutting feed movement amount 6th axis (H) [M]
R5194	R5226	R5258	R5290		
R5195	R5227	R5259	R5291		

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5196	R5228	R5260	R5292		Cutting feed movement amount 7th axis (L) [M]
R5197	R5229	R5261	R5293		Cutting feed movement amount 7th axis (H) [M]
R5198	R5230	R5262	R5294		
R5199	R5231	R5263	R5295		
R5200	R5232	R5264	R5296		Cutting feed movement amount 8th axis (L) [M]
R5201	R5233	R5265	R5297		Cutting feed movement amount 8th axis (H) [M]
R5202	R5234	R5266	R5298		
R5203	R5235	R5267	R5299		

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5300	R5308	R5316	R5324		
R5301	R5309	R5317	R5325		
R5302	R5310	R5318	R5326		
R5303	R5311	R5319	R5327		
R5304	R5312	R5320	R5328		
R5305	R5313	R5321	R5329		
R5306	R5314	R5322	R5330		
R5307	R5315	R5323	R5331		

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5332	R5340	R5348	R5356		Servo alarm/warning No. 1st axis
R5333	R5341	R5349	R5357		Servo alarm/warning No. 2nd axis
R5334	R5342	R5350	R5358		Servo alarm/warning No. 3rd axis
R5335	R5343	R5351	R5359		Servo alarm/warning No. 4th axis
R5336	R5344	R5352	R5360		Servo alarm/warning No. 5th axis
R5337	R5345	R5353	R5361		Servo alarm/warning No. 6th axis
R5338	R5346	R5354	R5362		Servo alarm/warning No. 7th axis
R5339	R5347	R5355	R5363		Servo alarm/warning No. 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5364	R5396	R5428	R5460		Skip coordinate position 1st axis feature coordinate (L) [M]
R5365	R5397	R5429	R5461		Skip coordinate position 1st axis feature coordinate(H) [M]
R5366	R5398	R5430	R5462		
R5367	R5399	R5431	R5463		
R5368	R5400	R5432	R5464		Skip coordinate position 2nd axis feature coordinate (L) [M]
R5369	R5401	R5433	R5465		Skip coordinate position 2nd axis feature coordinate (H) [M]
R5370	R5402	R5434	R5466		
R5371	R5403	R5435	R5467		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5372	R5404	R5436	R5468		Skip coordinate position 3rd axis feature coordinate (L) [M]
R5373	R5405	R5437	R5469		Skip coordinate position 3rd axis feature coordinate (H) [M]
R5374	R5406	R5438	R5470		
R5375	R5407	R5439	R5471		
R5376	R5408	R5440	R5472		Skip coordinate position 4th axis feature coordinate (L) [M]
R5377	R5409	R5441	R5473		Skip coordinate position 4th axis feature coordinate (H) [M]
R5378	R5410	R5442	R5474		
R5379	R5411	R5443	R5475		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5380	R5412	R5444	R5476		Skip coordinate position 5th axis feature coordinate (L) [M]
R5381	R5413	R5445	R5477		Skip coordinate position 5th axis feature coordinate (H) [M]
R5382	R5414	R5446	R5478		
R5383	R5415	R5447	R5479		
R5384	R5416	R5448	R5480		Skip coordinate position 6th axis feature coordinate (L) [M]
R5385	R5417	R5449	R5481		Skip coordinate position 6th axis feature coordinate (H) [M]
R5386	R5418	R5450	R5482		
R5387	R5419	R5451	R5483		

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5388	R5420	R5452	R5484		Skip coordinate position 7th axis feature coordinate (L) [M]
R5389	R5421	R5453	R5485		Skip coordinate position 7th axis feature coordinate (H) [M]
R5390	R5422	R5454	R5486		
R5391	R5423	R5455	R5487		
R5392	R5424	R5456	R5488		Skip coordinate position 8th axis feature coordinate (L) [M]
R5393	R5425	R5457	R5489		Skip coordinate position 8th axis feature coordinate (L) [M]
R5394	R5426	R5458	R5490		
R5395	R5427	R5459	R5491		

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5492	R5500	R5508	R5516		Load monitor I : Cutting torque output value 1st axis
R5493	R5501	R5509	R5517		Load monitor I : Cutting torque output value 2nd axis
R5494	R5502	R5510	R5518		Load monitor I : Cutting torque output value 3rd axis
R5495	R5503	R5511	R5519		Load monitor I : Cutting torque output value 4th axis
R5496	R5504	R5512	R5520		Load monitor I : Cutting torque output value 5th axis
R5497	R5505	R5513	R5521		Load monitor I : Cutting torque output value 6th axis
R5498	R5506	R5514	R5522		Load monitor I : Cutting torque output value 7th axis
R5499	R5507	R5515	R5523		Load monitor I : Cutting torque output value 8th axis

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5524	R5532	R5540	R5548		Actual machining time 1st axis ▲
R5525	R5533	R5541	R5549		Actual machining time 2nd axis ▲
R5526	R5534	R5542	R5550		Actual machining time 3rd axis ▲
R5527	R5535	R5543	R5551		Actual machining time 4th axis ▲
R5528	R5536	R5544	R5552		Actual machining time 5th axis ▲
R5529	R5537	R5545	R5553		Actual machining time 6th axis ▲
R5530	R5538	R5546	R5554		Actual machining time 7th axis ▲
R5531	R5539	R5547	R5555		Actual machining time 8h axis ▲

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5556	R5564	R5572	R5580	SVINER1	Optimum Acceleration/Deceleration Selection : NC axis estimated inertia ratio 1st axis ▲
R5557	R5565	R5573	R5581	SVINER2	Optimum Acceleration/Deceleration Selection : NC axis estimated inertia ratio 2nd axis ▲
R5558	R5566	R5574	R5582	SVINER3	Optimum Acceleration/Deceleration Selection : NC axis estimated inertia ratio 3rd axis ▲
R5559	R5567	R5575	R5583	SVINER4	Optimum Acceleration/Deceleration Selection : NC axis estimated inertia ratio 4th axis ▲
R5560	R5568	R5576	R5584	SVINER5	Optimum Acceleration/Deceleration Selection : NC axis estimated inertia ratio 5th axis ▲
R5561	R5569	R5577	R5585	SVINER6	Optimum Acceleration/Deceleration Selection : NC axis estimated inertia ratio 6th axis ▲
R5562	R5570	R5578	R5586	SVINER7	Optimum Acceleration/Deceleration Selection : NC axis estimated inertia ratio 7th axis ▲
R5563	R5571	R5579	R5587	SVINER8	Optimum Acceleration/Deceleration Selection : NC axis estimated inertia ratio 8th axis ▲
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5588	R5596	R5604	R5612	SVAFLT1	Optimum Acceleration/Deceleration Selection : NC axis estimated resonance frequency 1st axis ▲
R5589	R5597	R5605	R5613	SVAFLT2	Optimum Acceleration/Deceleration Selection : NC axis estimated resonance frequency 2nd axis ▲
R5590	R5598	R5606	R5614	SVAFLT3	Optimum Acceleration/Deceleration Selection : NC axis estimated resonance frequency 3rd axis ▲
R5591	R5599	R5607	R5615	SVAFLT4	Optimum Acceleration/Deceleration Selection : NC axis estimated resonance frequency 4th axis ▲
R5592	R5600	R5608	R5616	SVAFLT5	Optimum Acceleration/Deceleration Selection : NC axis estimated resonance frequency 5th axis ▲
R5593	R5601	R5609	R5617	SVAFLT6	Optimum Acceleration/Deceleration Selection : NC axis estimated resonance frequency 6th axis ▲
R5594	R5602	R5610	R5618	SVAFLT7	Optimum Acceleration/Deceleration Selection : NC axis estimated resonance frequency 7th axis ▲
R5595	R5603	R5611	R5619	SVAFLT8	Optimum Acceleration/Deceleration Selection : NC axis estimated resonance frequency 8th axis ▲

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5620	R5628	R5636	R5644		Load monitoring I: Effective torque output 1st axis
R5621	R5629	R5637	R5645		Load monitoring I: Effective torque output 2nd axis
R5622	R5630	R5638	R5646		Load monitoring I: Effective torque output 3rd axis
R5623	R5631	R5639	R5647		Load monitoring I: Effective torque output 4th axis
R5624	R5632	R5640	R5648		Load monitoring I: Effective torque output 5th axis
R5625	R5633	R5641	R5649		Load monitoring I: Effective torque output 6th axis
R5626	R5634	R5642	R5650		Load monitoring I: Effective torque output 7th axis
R5627	R5635	R5643	R5651		Load monitoring I: Effective torque output 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5652	R5660	R5668	R5676		
R5653	R5661	R5669	R5677		
R5654	R5662	R5670	R5678		
R5655	R5663	R5671	R5679		
R5656	R5664	R5672	R5680		
R5657	R5665	R5673	R5681		
R5658	R5666	R5674	R5682		
R5659	R5667	R5675	R5683		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R6372	R6380	R6388	R6396		User macro output #1132 (NC -> PLC) (L)
R6373	R6381	R6389	R6397		User macro output #1132 (NC -> PLC) (H)
R6374	R6382	R6390	R6398		User macro output #1133 (NC -> PLC) (L)
R6375	R6383	R6391	R6399		User macro output #1133 (NC -> PLC) (H)
R6376	R6384	R6392	R6400		User macro output #1134 (NC -> PLC) (L)
R6377	R6385	R6393	R6401		User macro output #1134 (NC -> PLC) (H)
R6378	R6386	R6394	R6402		User macro output #1135 (NC -> PLC) (L)
R6379	R6387	R6395	R6403		User macro output #1135 (NC -> PLC) (H)

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R6500	R6550	R6600	R6650	R6700	R6750	R6800	R6850		Spindle command rotation speed input (L)
R6501	R6551	R6601	R6651	R6701	R6751	R6801	R6851		Spindle command rotation speed input (H)
R6502	R6552	R6602	R6652	R6702	R6752	R6802	R6852		Spindle command final data (rotation speed) (L)
R6503	R6553	R6603	R6653	R6703	R6753	R6803	R6853		Spindle command final data (rotation speed) (H)
R6504	R6554	R6604	R6654	R6704	R6754	R6804	R6854		Spindle command final data (12-bit binary) (L)
R6505	R6555	R6605	R6655	R6705	R6755	R6805	R6855		Spindle command final data (12-bit binary) (H)
R6506	R6556	R6606	R6656	R6706	R6756	R6806	R6856		Spindle actual speed (L)
R6507	R6557	R6607	R6657	R6707	R6757	R6807	R6857		Spindle actual speed (H)

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R6508	R6558	R6608	R6658	R6708	R6758	R6808	R6858		
R6509	R6559	R6609	R6659	R6709	R6759	R6809	R6859		
R6510	R6560	R6610	R6660	R6710	R6760	R6810	R6860		
R6511	R6561	R6611	R6661	R6711	R6761	R6811	R6861		
R6512	R6562	R6612	R6662	R6712	R6762	R6812	R6862		
R6513	R6563	R6613	R6663	R6713	R6763	R6813	R6863		
R6514	R6564	R6614	R6664	R6714	R6764	R6814	R6864		Optimum acceleration/deceleration estimated inertia ratio [spindle] ▲
R6515	R6565	R6615	R6665	R6715	R6765	R6815	R6865		Optimum acceleration/deceleration parameter group currently selected [spindle] ▲
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R6516	R6566	R6616	R6666	R6716	R6766	R6816	R6866		Spindle synchronization phase error /Hob axis delay angle
R6517	R6567	R6617	R6667	R6717	R6767	R6817	R6867		Spindle synchronization Maximum phase error/ Maximum hob axis delay angle
R6518	R6568	R6618	R6668	R6718	R6768	R6818	R6868		Spindle synchronization Phase offset data
R6519	R6569	R6619	R6669	R6719	R6769	R6819	R6869		Spindle synchronization Phase error monitor
R6520	R6570	R6620	R6670	R6720	R6770	R6820	R6870		Spindle synchronization Phase error monitor (lower limit)
R6521	R6571	R6621	R6671	R6721	R6771	R6821	R6871		Spindle synchronization Phase error monitor (upper limit)
R6522	R6572	R6622	R6672	R6722	R6772	R6822	R6872		Spindle synchronization Phase error 1
R6523	R6573	R6623	R6673	R6723	R6773	R6823	R6873		Spindle synchronization Phase error 2
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R6524	R6574	R6624	R6674	R6724	R6774	R6824	R6874		
R6525	R6575	R6625	R6675	R6725	R6775	R6825	R6875		Spindle motor load ratio
R6526	R6576	R6626	R6676	R6726	R6776	R6826	R6876		
R6527	R6577	R6627	R6677	R6727	R6777	R6827	R6877		Spindle actual machining time ▲
R6528	R6578	R6628	R6678	R6728	R6778	R6828	R6878		Load monitor I : Spindle cutting torque output value
R6529	R6579	R6629	R6679	R6729	R6779	R6829	R6879		Spindle alarm/warning No.
R6530	R6580	R6630	R6680	R6730	R6780	R6830	R6880		
R6531	R6581	R6631	R6681	R6731	R6781	R6831	R6881		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R6532	R6582	R6632	R6682	R6732	R6782	R6832	R6882		Synchronous tapping Current error width (L)
R6533	R6583	R6633	R6683	R6733	R6783	R6833	R6883		Synchronous tapping Current error width (H)
R6534	R6584	R6634	R6684	R6734	R6784	R6834	R6884		Synchronous tapping Maximum error width (L)
R6535	R6585	R6635	R6685	R6735	R6785	R6835	R6885		Synchronous tapping Maximum error width (H)
R6536	R6586	R6636	R6686	R6736	R6786	R6836	R6886		Synchronous tapping Current error angle (L)
R6537	R6587	R6637	R6687	R6737	R6787	R6837	R6887		Synchronous tapping Current error angle (H)
R6538	R6588	R6638	R6688	R6738	R6788	R6838	R6888		Synchronous tapping Maximum error angle (L)
R6539	R6589	R6639	R6689	R6739	R6789	R6839	R6889		Synchronous tapping Maximum error angle (H)

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R6540	R6590	R6640	R6690	R6740	R6790	R6840	R6890		
R6541	R6591	R6641	R6691	R6741	R6791	R6841	R6891		Load monitoring I: Estimated spindle disturbance torque output
R6542	R6592	R6642	R6692	R6742	R6792	R6842	R6892		Load monitoring I: Effective spindle torque output
R6543	R6593	R6643	R6693	R6743	R6793	R6843	R6893		
R6544	R6594	R6644	R6694	R6744	R6794	R6844	R6894		
R6545	R6595	R6645	R6695	R6745	R6795	R6845	R6895		
R6546	R6596	R6646	R6696	R6746	R6796	R6846	R6896		
R6547	R6597	R6647	R6697	R6747	R6797	R6847	R6897		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10000		RIO1 No. of error occurrences 1st ch	R10008		RIO2 No. of error occurrences 1st ch
R10001		RIO1 No. of error occurrences 2nd ch	R10009		RIO2 No. of error occurrences 2nd ch
R10002		RIO1 No. of error occurrences 3rd ch	R10010		RIO2 No. of error occurrences 3rd ch
R10003		RIO1 No. of error occurrences 4th ch	R10011		RIO2 No. of error occurrences 4th ch
R10004		RIO1 No. of error occurrences 5th ch	R10012		RIO2 No. of error occurrences 5th ch
R10005		RIO1 No. of error occurrences 6th ch	R10013		RIO2 No. of error occurrences 6th ch
R10006		RIO1 No. of error occurrences 7th ch	R10014		RIO2 No. of error occurrences 7th ch
R10007		RIO1 No. of error occurrences 8th ch	R10015		RIO2 No. of error occurrences 8th ch

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10016		RIO3 No. of error occurrences 1st ch	R10024		
R10017		RIO3 No. of error occurrences 2nd ch	R10025		
R10018		RIO3 No. of error occurrences 3rd ch	R10026		
R10019		RIO3 No. of error occurrences 4th ch	R10027		
R10020		RIO3 No. of error occurrences 5th ch	R10028		
R10021		RIO3 No. of error occurrences 6th ch	R10029		
R10022		RIO3 No. of error occurrences 7th ch	R10030		
R10023		RIO3 No. of error occurrences 8th ch	R10031		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10064		Connection status of each channel RIO1,2	R10072		
R10065		Connection status of each channel RIO3	R10073		
R10066			R10074		
R10067			R10075		
R10068		CRC warning channel RIO1,2	R10076		
R10069		CRC warning channel RIO3	R10077		
R10070			R10078		
R10071			R10079		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R11800	R11850	R11900	R11950	R12000	R12050	R12100	R12150		T life mgmt (M system)
R11801	R11851	R11901	R11951	R12001	R12051	R12101	R12151		Spare tool: Group No. (L)
R11802	R11852	R11902	R11952	R12002	R12052	R12102	R12152		Spare tool: Group No. (H)
R11803	R11853	R11903	R11953	R12003	R12053	R12103	R12153		Spare tool: Tool No. (L)
R11804	R11854	R11904	R11954	R12004	R12054	R12104	R12154		Spare tool: Tool No. (H)
R11805	R11855	R11905	R11955	R12005	R12055	R12105	R12155		Spare tool: Tool data flag/Status
R11806	R11856	R11906	R11956	R12006	R12056	R12106	R12156		Spare tool: Auxiliary data
R11807	R11857	R11907	R11957	R12007	R12057	R12107	R12157		Spare tool: Cumulative usage time (L)
									Spare tool: Cumulative usage time (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R11808	R11858	R11908	R11958	R12008	R12058	R12108	R12158		Spare tool: Service lifetime (L)
R11809	R11859	R11909	R11959	R12009	R12059	R12109	R12159		Spare tool: Service lifetime (H)
R11810	R11860	R11910	R11960	R12010	R12060	R12110	R12160		Spare tool: Cumulative usage count
R11811	R11861	R11911	R11961	R12011	R12061	R12111	R12161		Spare tool: Service life count
R11812	R11862	R11912	R11962	R12012	R12062	R12112	R12162		Spare tool: Cumulative usage wear amount (L)
R11813	R11863	R11913	R11963	R12013	R12063	R12113	R12163		Spare tool: Cumulative usage wear amount (H)
R11814	R11864	R11914	R11964	R12014	R12064	R12114	R12164		Spare tool: Service life wear amount (L)
R11815	R11865	R11915	R11965	R12015	R12065	R12115	R12165		Spare tool: Service life wear amount (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R11816	R11866	R11916	R11966	R12016	R12066	R12116	R12166		Spare tool: Length compensation amount (L)
R11817	R11867	R11917	R11967	R12017	R12067	R12117	R12167		Spare tool: Length compensation amount (H)
R11818	R11868	R11918	R11968	R12018	R12068	R12118	R12168		Spare tool: Radius compensation amount (L)
R11819	R11869	R11919	R11969	R12019	R12069	R12119	R12169		Spare tool: Radius compensation amount (H)
R11820	R11870	R11920	R11970	R12020	R12070	R12120	R12170		Spare tool: Length wear amount (L)
R11821	R11871	R11921	R11971	R12021	R12071	R12121	R12171		Spare tool: Length wear amount (H)
R11822	R11872	R11922	R11972	R12022	R12072	R12122	R12172		Spare tool: Radius wear amount (L)
R11823	R11873	R11923	R11973	R12023	R12073	R12123	R12173		Spare tool: Radius wear amount (H)

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R11824	R11874	R11924	R11974	R12024	R12074	R12124	R12174		T life mgmt (M system)
R11825	R11875	R11925	R11975	R12025	R12075	R12125	R12175		Active tool: Group No. (L)
R11826	R11876	R11926	R11976	R12026	R12076	R12126	R12176		Active tool: Group No. (H)
R11827	R11877	R11927	R11977	R12027	R12077	R12127	R12177		Active tool: Tool No. (L)
R11828	R11878	R11928	R11978	R12028	R12078	R12128	R12178		Active tool: Tool No. (H)
R11829	R11879	R11929	R11979	R12029	R12079	R12129	R12179		Active tool: Tool data flag/Status
R11830	R11880	R11930	R11980	R12030	R12080	R12130	R12180		Active tool: Auxiliary data
R11831	R11881	R11931	R11981	R12031	R12081	R12131	R12181		Active tool: Cumulative usage time (L)
									Active tool: Cumulative usage time (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R11832	R11882	R11932	R11982	R12032	R12082	R12132	R12182		Active tool: Service lifetime (L)
R11833	R11883	R11933	R11983	R12033	R12083	R12133	R12183		Active tool: Service lifetime (H)
R11834	R11884	R11934	R11984	R12034	R12084	R12134	R12184		Active tool: Cumulative usage count
R11835	R11885	R11935	R11985	R12035	R12085	R12135	R12185		Active tool: Service life count
R11836	R11886	R11936	R11986	R12036	R12086	R12136	R12186		Active tool: Cumulative usage wear amount (L)
R11837	R11887	R11937	R11987	R12037	R12087	R12137	R12187		Active tool: Cumulative usage wear amount (H)
R11838	R11888	R11938	R11988	R12038	R12088	R12138	R12188		Active tool: Service life wear amount (L)
R11839	R11889	R11939	R11989	R12039	R12089	R12139	R12189		Active tool: Service life wear amount (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R11840	R11890	R11940	R11990	R12040	R12090	R12140	R12190		Active tool: Length compensation amount (L)
R11841	R11891	R11941	R11991	R12041	R12091	R12141	R12191		Active tool: Length compensation amount (H)
R11842	R11892	R11942	R11992	R12042	R12092	R12142	R12192		Active tool: Radius compensation amount (L)
R11843	R11893	R11943	R11993	R12043	R12093	R12143	R12193		Active tool: Radius compensation amount (H)
R11844	R11894	R11944	R11994	R12044	R12094	R12144	R12194		Active tool: Length wear amount (L)
R11845	R11895	R11945	R11995	R12045	R12095	R12145	R12195		Active tool: Length wear amount (H)
R11846	R11896	R11946	R11996	R12046	R12096	R12146	R12196		Active tool: Radius wear amount (L)
R11847	R11897	R11947	R11997	R12047	R12097	R12147	R12197		Active tool: Radius wear amount (H)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14000		EcoMonitorLight connection: Station #1	R14008		
R14001		consumed power	R14009		
R14002		EcoMonitorLight connection: Station #1	R14010		EcoMonitorLight connection: Station #2
R14003		regenerated power	R14011		consumed power
R14004			R14012		EcoMonitorLight connection: Station #2
R14005			R14013		regenerated power
R14006			R14014		
R14007			R14015		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14016			R14024		
R14017			R14025		
R14018			R14026		
R14019			R14027		
R14020		EcoMonitorLight connection: Station #3	R14028		
R14021		consumed power	R14029		
R14022		EcoMonitorLight connection: Station #3	R14030		EcoMonitorLight connection: Station #4
R14023		regenerated power	R14031		consumed power
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14032		EcoMonitorLight connection: Station #4	R14040		EcoMonitorLight connection: Station #5
R14033		regenerated power	R14041		consumed power
R14034			R14042		EcoMonitorLight connection: Station #5
R14035			R14043		regenerated power
R14036			R14044		
R14037			R14045		
R14038			R14046		
R14039			R14047		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14048			R14056		
R14049			R14057		
R14050		EcoMonitorLight connection: Station #6	R14058		
R14051		consumed power	R14059		
R14052		EcoMonitorLight connection: Station #6	R14060		EcoMonitorLight connection: Station #7
R14053		regenerated power	R14061		consumed power
R14054			R14062		EcoMonitorLight connection: Station #7
R14055			R14063		regenerated power

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14064			R14072		EcoMonitorLight connection: Station #8 regenerated power
R14065			R14073		
R14066			R14074		
R14067			R14075		
R14068			R14076		
R14069			R14077		
R14070		EcoMonitorLight connection: Station #8 consumed power	R14078		
R14071			R14079		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14080		EcoMonitorLight connection: Station #9 consumed power	R14088		
R14081			R14089		
R14082		EcoMonitorLight connection: Station #9 regenerated power	R14090		EcoMonitorLight connection: Station #10 consumed power
R14083			R14091		
R14084			R14092		EcoMonitorLight connection: Station #10 regenerated power
R14085			R14093		
R14086			R14094		
R14087			R14095		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14096			R14104		
R14097			R14105		
R14098			R14106		
R14099			R14107		
R14100		EcoMonitorLight connection: Station #11 consumed power	R14108		
R14101			R14109		
R14102		EcoMonitorLight connection: Station #11 regenerated power	R14110		EcoMonitorLight connection: Station #12 consumed power
R14103			R14111		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14112		EcoMonitorLight connection: Station #12 regenerated power	R14120		EcoMonitorLight connection: Station #13 consumed power
R14113			R14121		
R14114			R14122		EcoMonitorLight connection: Station #13 regenerated power
R14115			R14123		
R14116			R14124		
R14117			R14125		
R14118			R14126		
R14119			R14127		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14128			R14136		
R14129			R14137		
R14130		EcoMonitorLight connection: Station #14 consumed power	R14138		
R14131			R14139		
R14132		EcoMonitorLight connection: Station #14 regenerated power	R14140		EcoMonitorLight connection: Station #15 consumed power
R14133			R14141		
R14134			R14142		EcoMonitorLight connection: Station #15 regenerated power
R14135			R14143		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14144			R14152		EcoMonitorLight connection: Station #16 regenerated power
R14145			R14153		
R14146			R14154		
R14147			R14155		
R14148			R14156		
R14149			R14157		
R14150		EcoMonitorLight connection: Station #16 consumed power	R14158		
R14151			R14159		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14192			R14200		EcoMonitorLight connection: Station #1 number of reception errors
R14193			R14201		EcoMonitorLight connection: Station #1 maximum number of successive reception errors
R14194			R14202		EcoMonitorLight connection: Station #1 number of transmission errors
R14195			R14203		EcoMonitorLight connection: Station #1 maximum number of successive transmission errors
R14196			R14204		
R14197			R14205		
R14198			R14206		
R14199			R14207		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14208			R14216		
R14209			R14217		
R14210		EcoMonitorLight connection: Station #2 number of reception errors	R14218		
R14211		EcoMonitorLight connection: Station #2 maximum number of successive reception errors	R14219		
R14212		EcoMonitorLight connection: Station #2 number of transmission errors	R14220		EcoMonitorLight connection: Station #3 number of reception errors
R14213		EcoMonitorLight connection: Station #2 maximum number of successive transmission errors	R14221		EcoMonitorLight connection: Station #3 maximum number of successive reception errors
R14214			R14222		EcoMonitorLight connection: Station #3 number of transmission errors
R14215			R14223		EcoMonitorLight connection: Station #3 maximum number of successive transmission errors

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14224			R14232		EcoMonitorLight connection: Station #4 number of transmission errors
R14225			R14233		EcoMonitorLight connection: Station #4 maximum number of successive transmission errors
R14226			R14234		
R14227			R14235		
R14228			R14236		
R14229			R14237		
R14230		EcoMonitorLight connection: Station #4 number of reception errors	R14238		
R14231		EcoMonitorLight connection: Station #4 maximum number of successive reception errors	R14239		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14240		EcoMonitorLight connection: Station #5 number of reception errors	R14248		
R14241		EcoMonitorLight connection: Station #5 maximum number of successive reception errors	R14249		
R14242		EcoMonitorLight connection: Station #5 number of transmission errors	R14250		EcoMonitorLight connection: Station #6 number of reception errors
R14243		EcoMonitorLight connection: Station #5 maximum number of successive transmission errors	R14251		EcoMonitorLight connection: Station #6 maximum number of successive reception errors
R14244			R14252		EcoMonitorLight connection: Station #6 number of transmission errors
R14245			R14253		EcoMonitorLight connection: Station #6 maximum number of successive transmission errors
R14246			R14254		
R14247			R14255		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14256			R14264		
R14257			R14265		
R14258			R14266		
R14259			R14267		
R14260		EcoMonitorLight connection: Station #7 number of reception errors	R14268		
R14261		EcoMonitorLight connection: Station #7 maximum number of successive reception errors	R14269		
R14262		EcoMonitorLight connection: Station #7 number of transmission errors	R14270		EcoMonitorLight connection: Station #8 number of reception errors
R14263		EcoMonitorLight connection: Station #7 maximum number of successive transmission errors	R14271		EcoMonitorLight connection: Station #8 maximum number of successive reception errors

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14272		EcoMonitorLight connection: Station #8 number of transmission errors	R14280		EcoMonitorLight connection: Station #9 number of reception errors
R14273		EcoMonitorLight connection: Station #8 maximum number of successive transmission errors	R14281		EcoMonitorLight connection: Station #9 maximum number of successive reception errors
R14274			R14282		EcoMonitorLight connection: Station #9 number of transmission errors
R14275			R14283		EcoMonitorLight connection: Station #9 maximum number of successive transmission errors
R14276			R14284		
R14277			R14285		
R14278			R14286		
R14279			R14287		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14288			R14296		
R14289			R14297		
R14290		EcoMonitorLight connection: Station #10 number of reception errors	R14298		
R14291		EcoMonitorLight connection: Station #10 maximum number of successive reception errors	R14299		
R14292		EcoMonitorLight connection: Station #10 number of transmission errors	R14300		EcoMonitorLight connection: Station #11 number of reception errors
R14293		EcoMonitorLight connection: Station #10 maximum number of successive transmission errors	R14301		EcoMonitorLight connection: Station #11 maximum number of successive reception errors
R14294			R14302		EcoMonitorLight connection: Station #11 number of transmission errors
R14295			R14303		EcoMonitorLight connection: Station #11 maximum number of successive transmission errors

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14304			R14312		EcoMonitorLight connection: Station #12 number of transmission errors
R14305			R14313		EcoMonitorLight connection: Station #12 maximum number of successive transmission errors
R14306			R14314		
R14307			R14315		
R14308			R14316		
R14309			R14317		
R14310		EcoMonitorLight connection: Station #12 number of reception errors	R14318		
R14311		EcoMonitorLight connection: Station #12 maximum number of successive reception errors	R14319		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14320		EcoMonitorLight connection: Station #13 number of reception errors	R14328		
R14321		EcoMonitorLight connection: Station #13 maximum number of successive reception errors	R14329		
R14322		EcoMonitorLight connection: Station #13 number of transmission errors	R14330		EcoMonitorLight connection: Station #14 number of reception errors
R14323		EcoMonitorLight connection: Station #13 maximum number of successive transmission errors	R14331		EcoMonitorLight connection: Station #14 maximum number of successive reception errors
R14324			R14332		EcoMonitorLight connection: Station #14 number of transmission errors
R14325			R14333		EcoMonitorLight connection: Station #14 maximum number of successive transmission errors
R14326			R14334		
R14327			R14335		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14336			R14344		
R14337			R14345		
R14338			R14346		
R14339			R14347		
R14340		EcoMonitorLight connection: Station #15 number of reception errors	R14348		
R14341		EcoMonitorLight connection: Station #15 maximum number of successive reception errors	R14349		
R14342		EcoMonitorLight connection: Station #15 number of transmission errors	R14350		EcoMonitorLight connection: Station #16 number of reception errors
R14343		EcoMonitorLight connection: Station #15 maximum number of successive transmission errors	R14351		EcoMonitorLight connection: Station #16 maximum number of successive reception errors

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14352		EcoMonitorLight connection: Station #16 number of transmission errors	R14360		
R14353		EcoMonitorLight connection: Station #16 maximum number of successive transmission errors	R14361		
R14354			R14362		
R14355			R14363		
R14356			R14364		
R14357			R14365		
R14358			R14366		
R14359			R14367		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14400		EcoMonitorLight connection: Completion bit			
R14401		EcoMonitorLight connection: Completion status			
R14402		EcoMonitorLight connection: Acquired data			
R14403					
R14404					
R14405					
R14406					
R14407					

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14500		MES interface library: Serial number	R14508		MES interface library: Serial number
R14501			R14509		
R14502			R14510		
R14503			R14511		
R14504			R14512		
R14505			R14513		
R14506			R14514		
R14507			R14515		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14516		MES interface library: Serial number	R14524		MES interface library: Serial number
R14517			R14525		
R14518			R14526		
R14519			R14527		
R14520			R14528		
R14521			R14529		
R14522			R14530		
R14523			R14531		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14532		MES interface library: Operator ID	R14540		MES interface library: Operator ID
R14533			R14541		
R14534			R14542		
R14535			R14543		
R14536			R14544		
R14537			R14545		
R14538			R14546		
R14539			R14547		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14548		MES interface library: Operator ID	R14556		MES interface library: Operator ID
R14549			R14557		
R14550			R14558		
R14551			R14559		
R14552			R14560		
R14553			R14561		
R14554			R14562		
R14555			R14563		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14564		MES interface library: NC unit number	R14572		MES interface library: Line number
R14565			R14573		
R14566			R14574		
R14567			R14575		
R14568			R14576		
R14569			R14577		
R14570			R14578		
R14571			R14579		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14580		MES interface library: Line number	R14588		MES interface library: Machine type
R14581			R14589		MES interface library: DB connection status
R14582			R14590		MES interface library: MES event command info (Registration request register)
R14583			R14591		MES interface library: MES app status info (Registration reception register)
R14584			R14592		MES interface library: MES app result register
R14585			R14593		
R14586			R14594		
R14587			R14595		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R14596		MES interface library: MES app result register	R14604		
R14597			R14605		
R14598			R14606		
R14599			R14607		
R14600			R14608		
R14601			R14609		
R14602			R14610		
R14603			R14611		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20000	FLSYSM	FL-net : System monitor ▲	R20008	RULS	FL-net : Upper layer status of reference node ▲
R20001	LNA	FL-net : Local node address ▲	R20009	RCAD1	FL-net : Common memory area 1 data top address of reference node ▲
R20002	LULS	FL-net : Upper layer status of local node ▲	R20010	RCSZ1	FL-net : Common memory area 1 data size of reference node ▲
R20003	LLKS	FL-net : Link status of local node ▲	R20011	RCAD2	FL-net : Common memory area 2 data top address of reference node ▲
R20004	LSTS	FL-net : Status of local node ▲	R20012	RCSZ2	FL-net : Common memory area 2 data size of reference node ▲
R20005	PNADSP	FL-net : Participating node top address on display ▲	R20013	RLKS	FFL-net : Link status of reference node ▲
R20006	PNALST	FL-net : List of participating nodes ▲	R20014	RMFT	FL-net : Allowable minimum frame interval time of reference node ▲
R20007	RNADSP	FL-net : Reference node address on display ▲	R20015	RCTNO W	FL-net : Present value of refresh cycle measurement time ▲
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20016	RVCYR	FL-net : API return value of cyclic transmission read ▲	R20024		
R20017	RVCYW	FL-net : API return value of cyclic transmission write ▲	R20025		
R20018			R20026		
R20019			R20027		
R20020			R20028		
R20021			R20029		
R20022			R20030		
R20023			R20031		

Device No.								Abbrev.	Signal name
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8		
R20516	R20716	R20916	R21116	R21316	R21516	R21716	R21916		Appropriate machining diagnosis error axis ▲
R20517	R20717	R20917	R21117	R21317	R21517	R21717	R21917	TRTNCNT	Tool retract and return 2 : Number of transit points stored ▲
R20518	R20718	R20918	R21118	R21318	R21518	R21718	R21918		
R20519	R20719	R20919	R21119	R21319	R21519	R21719	R21919		
R20520	R20720	R20920	R21120	R21320	R21520	R21720	R21920		
R20521	R20721	R20921	R21121	R21321	R21521	R21721	R21921		
R20522	R20722	R20922	R21122	R21322	R21522	R21722	R21922		
R20523	R20723	R20923	R21123	R21323	R21523	R21723	R21923		
Device No.								Abbrev.	Signal name
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8		
R20532	R20732	R20932	R21132	R21332	R21532	R21732	R21932		
R20533	R20733	R20933	R21133	R21333	R21533	R21733	R21933		
R20534	R20734	R20934	R21134	R21334	R21534	R21734	R21934		
R20535	R20735	R20935	R21135	R21335	R21535	R21735	R21935		
R20536	R20736	R20936	R21136	R21336	R21536	R21736	R21936		
R20537	R20737	R20937	R21137	R21337	R21537	R21737	R21937		L system T code data
R20538	R20738	R20938	R21138	R21338	R21538	R21738	R21938		
R20539	R20739	R20939	R21139	R21339	R21539	R21739	R21939		

3.3 PLC Output Signals (Bit type: Y***)

(Note) Signals with " ▲ " are prepared for specific machine tool builders.

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y700	IPCC1	Power consumption computation: Clear consumption accumulation 1	Y708	*KEY1	Data protect key 1
Y701	IPCC2	Power consumption computation: Clear consumption accumulation 2	Y709	*KEY2	Data protect key 2
Y702	IPCC3	Power consumption computation: Clear consumption accumulation 3	Y70A	*KEY3	Data protect key 3
Y703	IPCC4	Power consumption computation: Clear consumption accumulation 4	Y70B		
Y704	RHD1	Integration time input 1	Y70C	PDISP	Program display during operation ▲
Y705	RHD2	Integration time input 2	Y70D		Handle pulse encoder communication connector priority
Y706	MDBUSR ST1	Modbus Time-out 1 cancel ▲	Y70E		
Y707	MDBUSR ST2	Modbus Time-out 2 cancel ▲	Y70F		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y710			Y718	*PCD1	PLC axis near point detection 1st axis
Y711		Optimum acceleration/deceleration parameter switch request [spindle] ▲	Y719	*PCD2	PLC axis near point detection 2nd axis
Y712			Y71A	*PCD3	PLC axis near point detection 3rd axis
Y713			Y71B	*PCD4	PLC axis near point detection 4th axis
Y714			Y71C	*PCD5	PLC axis near point detection 5th axis
Y715			Y71D	*PCD6	PLC axis near point detection 6th axis
Y716			Y71E		
Y717			Y71F		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y720	HS1P	PLC axis 1st handle valid	Y728	CRTFN	CRT changeover completion
Y721	HS2P	PLC axis 2nd handle valid	Y729	SCRON	Screen display request
Y722	HS3P	PLC axis 3rd handle valid	Y72A		
Y723		PLC axis control buffering mode valid	Y72B		Collecting diagnosis data stop
Y724	IPCE1	Power consumption computation: Enable consumption accumulation 1	Y72C	SMPTRG	NC data sampling trigger
Y725	IPCE2	Power consumption computation: Enable consumption accumulation 2	Y72D		
Y726	IPCE3	Power consumption computation: Enable consumption accumulation 3	Y72E		Pallet program registration In APC execution
Y727	IPCE4	Power consumption computation: Enable consumption accumulation 4	Y72F		Pallet program registration Ext. workpiece coordinate transfer ready
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y730	DISP1	Display changeover \$1	Y738		
Y731	DISP2	Display changeover \$2	Y739		
Y732	DISP3	Display changeover \$3	Y73A	MSBK	Single block with part systems synchronized
Y733	DISP4	Display changeover \$4	Y73B		
Y734	DISP5	Display changeover \$5	Y73C	MORR	Manual arbitrary reverse run mode
Y735	DISP6	Display changeover \$6	Y73D	MORSP	Manual arbitrary reverse run speed selection
Y736	DISP7	Display changeover \$7	Y73E	SMLK	High-speed simple program check mode
Y737	DISP8	Display changeover \$8	Y73F	CCHK	Interference check valid

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y740		Tool IC new read ▲	Y748		PLC skip 1
Y741		Tool IC exchange read ▲	Y749		PLC skip 2
Y742	MCT	Contactor shutoff test	Y74A		PLC skip 3
Y743			Y74B		PLC skip 4
Y744			Y74C		PLC skip 5
Y745			Y74D		PLC skip 6
Y746			Y74E		PLC skip 7
Y747		Turret interference check valid	Y74F		PLC skip 8
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y750			Y758		
Y751			Y759		
Y752			Y75A		
Y753			Y75B		
Y754			Y75C		
Y755			Y75D		Automatic power OFF request
Y756			Y75E		
Y757			Y75F		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y760			Y768		Door open I
Y761	MRCMD	Actual cutting mode (thread, tap) in manual arbitrary reverse run	Y769		
Y762			Y76A		
Y763			Y76B	SPSC	High-speed simple program check: Enable coordinate position check
Y764		Encoder 1 arbitrary pulse selection	Y76C		Remote program input start ▲
Y765		Encoder 2 arbitrary pulse selection	Y76D		Tool ID data read ▲
Y766		Encoder 1 arbitrary pulse valid	Y76E		Tool ID data write ▲
Y767		Encoder 2 arbitrary pulse valid	Y76F		Tool ID data erase ▲
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y770		PLC axis control valid 1st axis	Y778	GBON	G/B spindle synchronization valid
Y771		PLC axis control valid 2nd axis	Y779		
Y772		PLC axis control valid 3rd axis	Y77A	GBPHS	G/B spindle synchronization: phase alignment
Y773		PLC axis control valid 4th axis	Y77B	GBPHM	G/B spindle synchronization: phase memory
Y774		PLC axis control valid 5th axis	Y77C	GBCMON	G/B spindle synchronization: position error compensation
Y775		PLC axis control valid 6th axis	Y77D	GBOFF	G/B spindle synchronization: temporary cancel
Y776			Y77E	GBCMKP	G/B spindle synchronization: keep position error compensation amount signal
Y777			Y77F		

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y780	Y788	Y790	Y798	DTCH1	Control axis detach 1st axis
Y781	Y789	Y791	Y799	DTCH2	Control axis detach 2nd axis
Y782	Y78A	Y792	Y79A	DTCH3	Control axis detach 3rd axis
Y783	Y78B	Y793	Y79B	DTCH4	Control axis detach 4th axis
Y784	Y78C	Y794	Y79C	DTCH5	Control axis detach 5th axis
Y785	Y78D	Y795	Y79D	DTCH6	Control axis detach 6th axis
Y786	Y78E	Y796	Y79E	DTCH7	Control axis detach 7th axis
Y787	Y78F	Y797	Y79F	DTCH8	Control axis detach 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y7A0	Y7A8	Y7B0	Y7B8	*SVF1	Servo OFF 1st axis
Y7A1	Y7A9	Y7B1	Y7B9	*SVF2	Servo OFF 2nd axis
Y7A2	Y7AA	Y7B2	Y7BA	*SVF3	Servo OFF 3rd axis
Y7A3	Y7AB	Y7B3	Y7BB	*SVF4	Servo OFF 4th axis
Y7A4	Y7AC	Y7B4	Y7BC	*SVF5	Servo OFF 5th axis
Y7A5	Y7AD	Y7B5	Y7BD	*SVF6	Servo OFF 6th axis
Y7A6	Y7AE	Y7B6	Y7BE	*SVF7	Servo OFF 7th axis
Y7A7	Y7AF	Y7B7	Y7BF	*SVF8	Servo OFF 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y7C0	Y7C8	Y7D0	Y7D8	MI1	Mirror image 1st axis
Y7C1	Y7C9	Y7D1	Y7D9	MI2	Mirror image 2nd axis
Y7C2	Y7CA	Y7D2	Y7DA	MI3	Mirror image 3rd axis
Y7C3	Y7CB	Y7D3	Y7DB	MI4	Mirror image 4th axis
Y7C4	Y7CC	Y7D4	Y7DC	MI5	Mirror image 5th axis
Y7C5	Y7CD	Y7D5	Y7DD	MI6	Mirror image 6th axis
Y7C6	Y7CE	Y7D6	Y7DE	MI7	Mirror image 7th axis
Y7C7	Y7CF	Y7D7	Y7DF	MI8	Mirror image 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y7E0	Y7E8	Y7F0	Y7F8	*+EDT1	External deceleration+ 1st axis
Y7E1	Y7E9	Y7F1	Y7F9	*+EDT2	External deceleration+ 2nd axis
Y7E2	Y7EA	Y7F2	Y7FA	*+EDT3	External deceleration+ 3rd axis
Y7E3	Y7EB	Y7F3	Y7FB	*+EDT4	External deceleration+ 4th axis
Y7E4	Y7EC	Y7F4	Y7FC	*+EDT5	External deceleration+ 5th axis
Y7E5	Y7ED	Y7F5	Y7FD	*+EDT6	External deceleration+ 6th axis
Y7E6	Y7EE	Y7F6	Y7FE	*+EDT7	External deceleration+ 7th axis
Y7E7	Y7EF	Y7F7	Y7FF	*+EDT8	External deceleration+ 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y800	Y808	Y810	Y818	*-EDT1	External deceleration- 1st axis
Y801	Y809	Y811	Y819	*-EDT2	External deceleration- 2nd axis
Y802	Y80A	Y812	Y81A	*-EDT3	External deceleration- 3rd axis
Y803	Y80B	Y813	Y81B	*-EDT4	External deceleration- 4th axis
Y804	Y80C	Y814	Y81C	*-EDT5	External deceleration- 5th axis
Y805	Y80D	Y815	Y81D	*-EDT6	External deceleration- 6th axis
Y806	Y80E	Y816	Y81E	*-EDT7	External deceleration- 7th axis
Y807	Y80F	Y817	Y81F	*-EDT8	External deceleration- 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y820	Y828	Y830	Y838	*+AIT1	Automatic interlock+ 1st axis
Y821	Y829	Y831	Y839	*+AIT2	Automatic interlock+ 2nd axis
Y822	Y82A	Y832	Y83A	*+AIT3	Automatic interlock+ 3rd axis
Y823	Y82B	Y833	Y83B	*+AIT4	Automatic interlock+ 4th axis
Y824	Y82C	Y834	Y83C	*+AIT5	Automatic interlock+ 5th axis
Y825	Y82D	Y835	Y83D	*+AIT6	Automatic interlock+ 6th axis
Y826	Y82E	Y836	Y83E	*+AIT7	Automatic interlock+ 7th axis
Y827	Y82F	Y837	Y83F	*+AIT8	Automatic interlock+ 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y840	Y848	Y850	Y858	*-AIT1	Automatic interlock- 1st axis
Y841	Y849	Y851	Y859	*-AIT2	Automatic interlock- 2nd axis
Y842	Y84A	Y852	Y85A	*-AIT3	Automatic interlock- 3rd axis
Y843	Y84B	Y853	Y85B	*-AIT4	Automatic interlock- 4th axis
Y844	Y84C	Y854	Y85C	*-AIT5	Automatic interlock- 5th axis
Y845	Y84D	Y855	Y85D	*-AIT6	Automatic interlock- 6th axis
Y846	Y84E	Y856	Y85E	*-AIT7	Automatic interlock- 7th axis
Y847	Y84F	Y857	Y85F	*-AIT8	Automatic interlock- 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y860	Y868	Y870	Y878	*+MIT1	Manual interlock+ 1st axis
Y861	Y869	Y871	Y879	*+MIT2	Manual interlock+ 2nd axis
Y862	Y86A	Y872	Y87A	*+MIT3	Manual interlock+ 3rd axis
Y863	Y86B	Y873	Y87B	*+MIT4	Manual interlock+ 4th axis
Y864	Y86C	Y874	Y87C	*+MIT5	Manual interlock+ 5th axis
Y865	Y86D	Y875	Y87D	*+MIT6	Manual interlock+ 6th axis
Y866	Y86E	Y876	Y87E	*+MIT7	Manual interlock+ 7th axis
Y867	Y86F	Y877	Y87F	*+MIT8	Manual interlock+ 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y880	Y888	Y890	Y898	*-MIT1	Manual interlock- 1st axis
Y881	Y889	Y891	Y899	*-MIT2	Manual interlock- 2nd axis
Y882	Y88A	Y892	Y89A	*-MIT3	Manual interlock- 3rd axis
Y883	Y88B	Y893	Y89B	*-MIT4	Manual interlock- 4th axis
Y884	Y88C	Y894	Y89C	*-MIT5	Manual interlock- 5th axis
Y885	Y88D	Y895	Y89D	*-MIT6	Manual interlock- 6th axis
Y886	Y88E	Y896	Y89E	*-MIT7	Manual interlock- 7th axis
Y887	Y88F	Y897	Y89F	*-MIT8	Manual interlock- 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y8A0	Y8A8	Y8B0	Y8B8	AMLK1	Automatic machine lock 1st axis
Y8A1	Y8A9	Y8B1	Y8B9	AMLK2	Automatic machine lock 2nd axis
Y8A2	Y8AA	Y8B2	Y8BA	AMLK3	Automatic machine lock 3rd axis
Y8A3	Y8AB	Y8B3	Y8BB	AMLK4	Automatic machine lock 4th axis
Y8A4	Y8AC	Y8B4	Y8BC	AMLK5	Automatic machine lock 5th axis
Y8A5	Y8AD	Y8B5	Y8BD	AMLK6	Automatic machine lock 6th axis
Y8A6	Y8AE	Y8B6	Y8BE	AMLK7	Automatic machine lock 7th axis
Y8A7	Y8AF	Y8B7	Y8BF	AMLK8	Automatic machine lock 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y8C0	Y8C8	Y8D0	Y8D8	MMLK1	Manual machine lock 1st axis
Y8C1	Y8C9	Y8D1	Y8D9	MMLK2	Manual machine lock 2nd axis
Y8C2	Y8CA	Y8D2	Y8DA	MMLK3	Manual machine lock 3rd axis
Y8C3	Y8CB	Y8D3	Y8DB	MMLK4	Manual machine lock 4th axis
Y8C4	Y8CC	Y8D4	Y8DC	MMLK5	Manual machine lock 5th axis
Y8C5	Y8CD	Y8D5	Y8DD	MMLK6	Manual machine lock 6th axis
Y8C6	Y8CE	Y8D6	Y8DE	MMLK7	Manual machine lock 7th axis
Y8C7	Y8CF	Y8D7	Y8DF	MMLK8	Manual machine lock 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y8E0	Y8E8	Y8F0	Y8F8	+J1	Feed axis selection+ 1st axis
Y8E1	Y8E9	Y8F1	Y8F9	+J2	Feed axis selection+ 2nd axis
Y8E2	Y8EA	Y8F2	Y8FA	+J3	Feed axis selection+ 3rd axis
Y8E3	Y8EB	Y8F3	Y8FB	+J4	Feed axis selection+ 4th axis
Y8E4	Y8EC	Y8F4	Y8FC	+J5	Feed axis selection+ 5th axis
Y8E5	Y8ED	Y8F5	Y8FD	+J6	Feed axis selection+ 6th axis
Y8E6	Y8EE	Y8F6	Y8FE	+J7	Feed axis selection+ 7th axis
Y8E7	Y8EF	Y8F7	Y8FF	+J8	Feed axis selection+ 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y900	Y908	Y910	Y918	-J1	Feed axis selection- 1st axis
Y901	Y909	Y911	Y919	-J2	Feed axis selection- 2nd axis
Y902	Y90A	Y912	Y91A	-J3	Feed axis selection- 3rd axis
Y903	Y90B	Y913	Y91B	-J4	Feed axis selection- 4th axis
Y904	Y90C	Y914	Y91C	-J5	Feed axis selection- 5th axis
Y905	Y90D	Y915	Y91D	-J6	Feed axis selection- 6th axis
Y906	Y90E	Y916	Y91E	-J7	Feed axis selection- 7th axis
Y907	Y90F	Y917	Y91F	-J8	Feed axis selection- 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y920	Y928	Y930	Y938	MAE1	Manual/Automatic simultaneous valid 1st axis
Y921	Y929	Y931	Y939	MAE2	Manual/Automatic simultaneous valid 2nd axis
Y922	Y92A	Y932	Y93A	MAE3	Manual/Automatic simultaneous valid 3rd axis
Y923	Y92B	Y933	Y93B	MAE4	Manual/Automatic simultaneous valid 4th axis
Y924	Y92C	Y934	Y93C	MAE5	Manual/Automatic simultaneous valid 5th axis
Y925	Y92D	Y935	Y93D	MAE6	Manual/Automatic simultaneous valid 6th axis
Y926	Y92E	Y936	Y93E	MAE7	Manual/Automatic simultaneous valid 7th axis
Y927	Y92F	Y937	Y93F	MAE8	Manual/Automatic simultaneous valid 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y940	Y948	Y950	Y958	FBE1	Manual feedrate B valid 1st axis
Y941	Y949	Y951	Y959	FBE2	Manual feedrate B valid 2nd axis
Y942	Y94A	Y952	Y95A	FBE3	Manual feedrate B valid 3rd axis
Y943	Y94B	Y953	Y95B	FBE4	Manual feedrate B valid 4th axis
Y944	Y94C	Y954	Y95C	FBE5	Manual feedrate B valid 5th axis
Y945	Y94D	Y955	Y95D	FBE6	Manual feedrate B valid 6th axis
Y946	Y94E	Y956	Y95E	FBE7	Manual feedrate B valid 7th axis
Y947	Y94F	Y957	Y95F	FBE8	Manual feedrate B valid 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y960	Y968	Y970	Y978	AZS1	Zero point initialization set mode 1st axis
Y961	Y969	Y971	Y979	AZS2	Zero point initialization set mode 2nd axis
Y962	Y96A	Y972	Y97A	AZS3	Zero point initialization set mode 3rd axis
Y963	Y96B	Y973	Y97B	AZS4	Zero point initialization set mode 4th axis
Y964	Y96C	Y974	Y97C	AZS5	Zero point initialization set mode 5th axis
Y965	Y96D	Y975	Y97D	AZS6	Zero point initialization set mode 6th axis
Y966	Y96E	Y976	Y97E	AZS7	Zero point initialization set mode 7th axis
Y967	Y96F	Y977	Y97F	AZS8	Zero point initialization set mode 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y980	Y988	Y990	Y998	ZST1	Zero point initialization set start 1st axis
Y981	Y989	Y991	Y999	ZST2	Zero point initialization set start 2nd axis
Y982	Y98A	Y992	Y99A	ZST3	Zero point initialization set start 3rd axis
Y983	Y98B	Y993	Y99B	ZST4	Zero point initialization set start 4th axis
Y984	Y98C	Y994	Y99C	ZST5	Zero point initialization set start 5th axis
Y985	Y98D	Y995	Y99D	ZST6	Zero point initialization set start 6th axis
Y986	Y98E	Y996	Y99E	ZST7	Zero point initialization set start 7th axis
Y987	Y98F	Y997	Y99F	ZST8	Zero point initialization set start 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y9A0	Y9A8	Y9B0	Y9B8	ILC1	Current limit changeover 1st axis
Y9A1	Y9A9	Y9B1	Y9B9	ILC2	Current limit changeover 2nd axis
Y9A2	Y9AA	Y9B2	Y9BA	ILC3	Current limit changeover 3rd axis
Y9A3	Y9AB	Y9B3	Y9BB	ILC4	Current limit changeover 4th axis
Y9A4	Y9AC	Y9B4	Y9BC	ILC5	Current limit changeover 5th axis
Y9A5	Y9AD	Y9B5	Y9BD	ILC6	Current limit changeover 6th axis
Y9A6	Y9AE	Y9B6	Y9BE	ILC7	Current limit changeover 7th axis
Y9A7	Y9AF	Y9B7	Y9BF	ILC8	Current limit changeover 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y9C0	Y9C8	Y9D0	Y9D8	DOR1	Droop release request 1st axis
Y9C1	Y9C9	Y9D1	Y9D9	DOR2	Droop release request 2nd axis
Y9C2	Y9CA	Y9D2	Y9DA	DOR3	Droop release request 3rd axis
Y9C3	Y9CB	Y9D3	Y9DB	DOR4	Droop release request 4th axis
Y9C4	Y9CC	Y9D4	Y9DC	DOR5	Droop release request 5th axis
Y9C5	Y9CD	Y9D5	Y9DD	DOR6	Droop release request 6th axis
Y9C6	Y9CE	Y9D6	Y9DE	DOR7	Droop release request 7th axis
Y9C7	Y9CF	Y9D7	Y9DF	DOR8	Droop release request 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
Y9E0	Y9E8	Y9F0	Y9F8		Workpiece coordinate Measurement 1st axis (Spare)
Y9E1	Y9E9	Y9F1	Y9F9		Workpiece coordinate Measurement 2nd axis
Y9E2	Y9EA	Y9F2	Y9FA		Workpiece coordinate Measurement 3rd axis (Spare)
Y9E3	Y9EB	Y9F3	Y9FB		Workpiece coordinate Measurement 4th axis (Spare)
Y9E4	Y9EC	Y9F4	Y9FC		Workpiece coordinate Measurement 5th axis (Spare)
Y9E5	Y9ED	Y9F5	Y9FD		Workpiece coordinate Measurement 6th axis (Spare)
Y9E6	Y9EE	Y9F6	Y9FE		Workpiece coordinate Measurement 7th axis (Spare)
Y9E7	Y9EF	Y9F7	Y9FF		Workpiece coordinate Measurement 8th axis (Spare)

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YA00	YA08	YA10	YA18	DTCH21	Control axis detach 2 1st axis
YA01	YA09	YA11	YA19	DTCH22	Control axis detach 2 2nd axis
YA02	YA0A	YA12	YA1A	DTCH23	Control axis detach 2 3rd axis
YA03	YA0B	YA13	YA1B	DTCH24	Control axis detach 2 4th axis
YA04	YA0C	YA14	YA1C	DTCH25	Control axis detach 2 5th axis
YA05	YA0D	YA15	YA1D	DTCH26	Control axis detach 2 6th axis
YA06	YA0E	YA16	YA1E	DTCH27	Control axis detach 2 7th axis
YA07	YA0F	YA17	YA1F	DTCH28	Control axis detach 2 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YA20	YA28	YA30	YA38		Unclamp completion 1st axis
YA21	YA29	YA31	YA39		Unclamp completion 2nd axis
YA22	YA2A	YA32	YA3A		Unclamp completion 3rd axis
YA23	YA2B	YA33	YA3B		Unclamp completion 4th axis
YA24	YA2C	YA34	YA3C		Unclamp completion 5th axis
YA25	YA2D	YA35	YA3D		Unclamp completion 6th axis
YA26	YA2E	YA36	YA3E		Unclamp completion 7th axis
YA27	YA2F	YA37	YA3F		Unclamp completion 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YA40	YA48	YA50	YA58		Each axis reference position return 1st axis
YA41	YA49	YA51	YA59		Each axis reference position return 2nd axis
YA42	YA4A	YA52	YA5A		Each axis reference position return 3rd axis
YA43	YA4B	YA53	YA5B		Each axis reference position return 4th axis
YA44	YA4C	YA54	YA5C		Each axis reference position return 5th axis
YA45	YA4D	YA55	YA5D		Each axis reference position return 6th axis
YA46	YA4E	YA56	YA5E		Each axis reference position return 7th axis
YA47	YA4F	YA57	YA5F		Each axis reference position return 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YA60	YA68	YA70	YA78		Mixed control (cross axis control) request 1st axis
YA61	YA69	YA71	YA79		Mixed control (cross axis control) request 2nd axis
YA62	YA6A	YA72	YA7A		Mixed control (cross axis control) request 3rd axis
YA63	YA6B	YA73	YA7B		Mixed control (cross axis control) request 4th axis
YA64	YA6C	YA74	YA7C		Mixed control (cross axis control) request 5th axis
YA65	YA6D	YA75	YA7D		Mixed control (cross axis control) request 6th axis
YA66	YA6E	YA76	YA7E		Mixed control (cross axis control) request 7th axis
YA67	YA6F	YA77	YA7F		Mixed control (cross axis control) request 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YA80	YA88	YA90	YA98	SYNC1	Synchronous control request 1st axis
YA81	YA89	YA91	YA99	SYNC2	Synchronous control request 2nd axis
YA82	YA8A	YA92	YA9A	SYNC3	Synchronous control request 3rd axis
YA83	YA8B	YA93	YA9B	SYNC4	Synchronous control request 4th axis
YA84	YA8C	YA94	YA9C	SYNC5	Synchronous control request 5th axis
YA85	YA8D	YA95	YA9D	SYNC6	Synchronous control request 6th axis
YA86	YA8E	YA96	YA9E	SYNC7	Synchronous control request 7th axis
YA87	YA8F	YA97	YA9F	SYNC8	Synchronous control request 8th axis

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YAA0	YAA8	YAB0	YAB8	PILE1	Superimposition control request 1st axis
YAA1	YAA9	YAB1	YAB9	PILE2	Superimposition control request 2nd axis
YAA2	YAAA	YAB2	YABA	PILE3	Superimposition control request 3rd axis
YAA3	YAAB	YAB3	YABB	PILE4	Superimposition control request 4th axis
YAA4	YAAC	YAB4	YABC	PILE5	Superimposition control request 5th axis
YAA5	YAAD	YAB5	YABD	PILE6	Superimposition control request 6th axis
YAA6	YAAE	YAB6	YABE	PILE7	Superimposition control request 7th axis
YAA7	YAAF	YAB7	YABF	PILE8	Superimposition control request 8th axis

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YAC0	YAC8	YAD0	YAD8		NC axis control selection 1st axis
YAC1	YAC9	YAD1	YAD9		NC axis control selection 2nd axis
YAC2	YACA	YAD2	YADA		NC axis control selection 3rd axis
YAC3	YACB	YAD3	YADB		NC axis control selection 4th axis
YAC4	YACC	YAD4	YADC		NC axis control selection 5th axis
YAC5	YACD	YAD5	YADD		NC axis control selection 6th axis
YAC6	YACE	YAD6	YADE		NC axis control selection 7th axis
YAC7	YACF	YAD7	YADF		NC axis control selection 8th axis

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YAE0	YAE8	YAF0	YAF8		Vertical axis pull-up prevention request 1st axis
YAE1	YAE9	YAF1	YAF9		Vertical axis pull-up prevention request 2nd axis
YAE2	YAEA	YAF2	YAF8		Vertical axis pull-up prevention request 3rd axis
YAE3	YAE8	YAF3	YAFB		Vertical axis pull-up prevention request 4th axis
YAE4	YAEC	YAF4	YAF8		Vertical axis pull-up prevention request 5th axis
YAE5	YAE8	YAF5	YAFD		Vertical axis pull-up prevention request 6th axis
YAE6	YAE8	YAF6	YAFE		Vertical axis pull-up prevention request 7th axis
YAE7	YAE8	YAF7	YAFF		Vertical axis pull-up prevention request 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YB00	YB08	YB10	YB18		Clamp completion 1st axis ▲
YB01	YB09	YB11	YB19		Clamp completion 2nd axis ▲
YB02	YB0A	YB12	YB1A		Clamp completion 3rd axis ▲
YB03	YB0B	YB13	YB1B		Clamp completion 4th axis ▲
YB04	YB0C	YB14	YB1C		Clamp completion 5th axis ▲
YB05	YB0D	YB15	YB1D		Clamp completion 6th axis ▲
YB06	YB0E	YB16	YB1E		Clamp completion 7th axis ▲
YB07	YB0F	YB17	YB1F		Clamp completion 8th axis ▲
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YB20	YB28	YB30	YB38	HOBRTV 1	Hob machining: retract amount selection 1st axis
YB21	YB29	YB31	YB39	HOBRTV 2	Hob machining: retract amount selection 2nd axis
YB22	YB2A	YB32	YB3A	HOBRTV 3	Hob machining: retract amount selection 3rd axis
YB23	YB2B	YB33	YB3B	HOBRTV 4	Hob machining: retract amount selection 4th axis
YB24	YB2C	YB34	YB3C	HOBRTV 5	Hob machining: retract amount selection 5th axis
YB25	YB2D	YB35	YB3D	HOBRTV 6	Hob machining: retract amount selection 6th axis
YB26	YB2E	YB36	YB3E	HOBRTV 7	Hob machining: retract amount selection 7th axis
YB27	YB2F	YB37	YB3F	HOBRTV 8	Hob machining: retract amount selection 8th axis
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YB40	YB48	YB50	YB58	ROTSPC 1	Spindle-mode rotary axis control command 1st axis
YB41	YB49	YB51	YB59	ROTSPC 2	Spindle-mode rotary axis control command 2nd axis
YB42	YB4A	YB52	YB5A	ROTSPC 3	Spindle-mode rotary axis control command 3rd axis
YB43	YB4B	YB53	YB5B	ROTSPC 4	Spindle-mode rotary axis control command 4th axis
YB44	YB4C	YB54	YB5C	ROTSPC 5	Spindle-mode rotary axis control command 5th axis
YB45	YB4D	YB55	YB5D	ROTSPC 6	Spindle-mode rotary axis control command 6th axis
YB46	YB4E	YB56	YB5E	ROTSPC 7	Spindle-mode rotary axis control command 7th axis
YB47	YB4F	YB57	YB5F	ROTSPC 8	Spindle-mode rotary axis control command 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YB60	YB68	YB70	YB78	SLMC1	Stored stroke limit I :Change request 1st axis
YB61	YB69	YB71	YB79	SLMC2	Stored stroke limit I :Change request 2nd axis
YB62	YB6A	YB72	YB7A	SLMC3	Stored stroke limit I :Change request 3rd axis
YB63	YB6B	YB73	YB7B	SLMC4	Stored stroke limit I :Change request 4th axis
YB64	YB6C	YB74	YB7C	SLMC5	Stored stroke limit I :Change request 5th axis
YB65	YB6D	YB75	YB7D	SLMC6	Stored stroke limit I :Change request 6th axis
YB66	YB6E	YB76	YB7E	SLMC7	Stored stroke limit I :Change request 7th axis
YB67	YB6F	YB77	YB7F	SLMC8	Stored stroke limit I :Change request 8th axis

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YB80	YB88	YB90	YB98	VGHLDC1	Real-time tuning 1: Speed control gain hold-down command 1st axis
YB81	YB89	YB91	YB99	VGHLDC2	Real-time tuning 1: Speed control gain hold-down command 2ndaxis
YB82	YB8A	YB92	YB9A	VGHLDC3	Real-time tuning 1: Speed control gain hold-down command 3rd axis
YB83	YB8B	YB93	YB9B	VGHLDC4	Real-time tuning 1: Speed control gain hold-down command 4th axis
YB84	YB8C	YB94	YB9C	VGHLDC5	Real-time tuning 1: Speed control gain hold-down command 5th axis
YB85	YB8D	YB95	YB9D	VGHLDC6	Real-time tuning 1: Speed control gain hold-down command 6th axis
YB86	YB8E	YB96	YB9E	VGHLDC7	Real-time tuning 1: Speed control gain hold-down command 7th axis
YB87	YB8F	YB97	YB9F	VGHLDC8	Real-time tuning 1: Speed control gain hold-down command 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YBA0	YBA8	YBB0	YBB8		
YBA1	YBA9	YBB1	YBB9		
YBA2	YBAA	YBB2	YBBA		
YBA3	YBAB	YBB3	YBBB		
YBA4	YBAC	YBB4	YBBC		
YBA5	YBAD	YBB5	YBBD		
YBA6	YBAE	YBB6	YBBE		
YBA7	YBAF	YBB7	YBBF		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YBC0	YBC8	YBD0	YBD8		
YBC1	YBC9	YBD1	YBD9		
YBC2	YBCA	YBD2	YBDA		
YBC3	YBCB	YBD3	YBDB		
YBC4	YBCC	YBD4	YBDC		
YBC5	YBCD	YBD5	YBDD		
YBC6	YBCE	YBD6	YBDE		
YBC7	YBCF	YBD7	YBDF		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
YBE0	YBE8	YBF0	YBF8	GQEMG1	Machine group-based alarm stop: Machine group-based PLC interlock 1st axis
YBE1	YBE9	YBF1	YBF9	GQEMG2	Machine group-based alarm stop: Machine group-based PLC interlock 2nd axis
YBE2	YBEA	YBF2	YBFA	GQEMG3	Machine group-based alarm stop: Machine group-based PLC interlock 3rd axis
YBE3	YBEB	YBF3	YBFB	GQEMG4	Machine group-based alarm stop: Machine group-based PLC interlock 4th axis
YBE4	YBEC	YBF4	YBFC	GQEMG5	Machine group-based alarm stop: Machine group-based PLC interlock 5th axis
YBE5	YBED	YBF5	YBFD	GQEMG6	Machine group-based alarm stop: Machine group-based PLC interlock 6th axis
YBE6	YBEE	YBF6	YBFE	GQEMG7	Machine group-based alarm stop: Machine group-based PLC interlock 7th axis
YBE7	YBEF	YBF7	YBFF	GQEMG8	Machine group-based alarm stop: Machine group-based PLC interlock 8th axis

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC00	YD40	YE80	YFC0	Y1100	Y1240	Y1380	Y14C0	J	Jog mode
YC01	YD41	YE81	YFC1	Y1101	Y1241	Y1381	Y14C1	H	Handle mode
YC02	YD42	YE82	YFC2	Y1102	Y1242	Y1382	Y14C2	S	Incremental mode
YC03	YD43	YE83	YFC3	Y1103	Y1243	Y1383	Y14C3	PTP	Manual arbitrary feed mode
YC04	YD44	YE84	YFC4	Y1104	Y1244	Y1384	Y14C4	ZRN	Reference position return mode
YC05	YD45	YE85	YFC5	Y1105	Y1245	Y1385	Y14C5	AST	Automatic initialization mode
YC06	YD46	YE86	YFC6	Y1106	Y1246	Y1386	Y14C6		
YC07	YD47	YE87	YFC7	Y1107	Y1247	Y1387	Y14C7		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC08	YD48	YE88	YFC8	Y1108	Y1248	Y1388	Y14C8	MEM	Memory mode
YC09	YD49	YE89	YFC9	Y1109	Y1249	Y1389	Y14C9	T	Tape mode
YC0A	YD4A	YE8A	YFCA	Y110A	Y124A	Y138A	Y14CA		Online operation mode (Computer link B)
YC0B	YD4B	YE8B	YFCB	Y110B	Y124B	Y138B	Y14CB	D	MDI mode
YC0C	YD4C	YE8C	YFCC	Y110C	Y124C	Y138C	Y14CC		
YC0D	YD4D	YE8D	YFCD	Y110D	Y124D	Y138D	Y14CD		
YC0E	YD4E	YE8E	YFCE	Y110E	Y124E	Y138E	Y14CE	SBSM	Sub part system control: Sub part system control I mode
YC0F	YD4F	YE8F	YFCF	Y110F	Y124F	Y138F	Y14CF		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC10	YD50	YE90	YFD0	Y1110	Y1250	Y1390	Y14D0	ST	Automatic operation "start" command (Cycle start)
YC11	YD51	YE91	YFD1	Y1111	Y1251	Y1391	Y14D1	*SP	Automatic operation "pause" command (Feed hold)
YC12	YD52	YE92	YFD2	Y1112	Y1252	Y1392	Y14D2	SBK	Single block
YC13	YD53	YE93	YFD3	Y1113	Y1253	Y1393	Y14D3	*BSL	Block start interlock
YC14	YD54	YE94	YFD4	Y1114	Y1254	Y1394	Y14D4	*CSL	Cutting block start interlock
YC15	YD55	YE95	YFD5	Y1115	Y1255	Y1395	Y14D5	DRN	Dry run
YC16	YD56	YE96	YFD6	Y1116	Y1256	Y1396	Y14D6		
YC17	YD57	YE97	YFD7	Y1117	Y1257	Y1397	Y14D7	ERD	Error detection
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC18	YD58	YE98	YFD8	Y1118	Y1258	Y1398	Y14D8	NRST1	NC reset 1
YC19	YD59	YE99	YFD9	Y1119	Y1259	Y1399	Y14D9	NRST2	NC reset 2
YC1A	YD5A	YE9A	YFDA	Y111A	Y125A	Y139A	Y14DA	RRW	Reset & rewind
YC1B	YD5B	YE9B	YFDB	Y111B	Y125B	Y139B	Y14DB	*CDZ	Chamfering
YC1C	YD5C	YE9C	YFDC	Y111C	Y125C	Y139C	Y14DC	ARST	Automatic restart
YC1D	YD5D	YE9D	YFDD	Y111D	Y125D	Y139D	Y14DD		External search strobe
YC1E	YD5E	YE9E	YFDE	Y111E	Y125E	Y139E	Y14DE	FIN1	M function finish 1
YC1F	YD5F	YE9F	YFDF	Y111F	Y125F	Y139F	Y14DF	FIN2	M function finish 2

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC20	YD60	YEA0	YFE0	Y1120	Y1260	Y13A0	Y14E0	TLM	Tool length measurement 1
YC21	YD61	YEA1	YFE1	Y1121	Y1261	Y13A1	Y14E1	TLMS	Tool length measurement 2
YC22	YD62	YEA2	YFE2	Y1122	Y1262	Y13A2	Y14E2		Synchronization correction mode
YC23	YD63	YEA3	YFE3	Y1123	Y1263	Y13A3	Y14E3	PRST	Program restart
YC24	YD64	YEA4	YFE4	Y1124	Y1264	Y13A4	Y14E4	PB	Playback
YC25	YD65	YEA5	YFE5	Y1125	Y1265	Y13A5	Y14E5	UIT	Macro interrupt
YC26	YD66	YEA6	YFE6	Y1126	Y1266	Y13A6	Y14E6	RT	Rapid traverse
YC27	YD67	YEA7	YFE7	Y1127	Y1267	Y13A7	Y14E7	VRV	Reverse run
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC28	YD68	YEA8	YFE8	Y1128	Y1268	Y13A8	Y14E8	ABS	Manual absolute
YC29	YD69	YEA9	YFE9	Y1129	Y1269	Y13A9	Y14E9	DLK	Display lock
YC2A	YD6A	YEAA	YFEA	Y112A	Y126A	Y13AA	Y14EA	F1D	F1-digit speed change valid
YC2B	YD6B	YEAB	YFEB	Y112B	Y126B	Y13AB	Y14EB	CRQ	Recalculation request
YC2C	YD6C	YEAC	YFEC	Y112C	Y126C	Y13AC	Y14EC	QEMG	PLC emergency stop
YC2D	YD6D	YEAD	YFED	Y112D	Y126D	Y13AD	Y14ED	RTN	Reference position retract
YC2E	YD6E	YEAE	YFEE	Y112E	Y126E	Y13AE	Y14EE	PIT	PLC interrupt
YC2F	YD6F	YEA F	YFE F	Y112F	Y126F	Y13AF	Y14EF		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC30	YD70	YEB0	YFF0	Y1130	Y1270	Y13B0	Y14F0	CHPS	Chopping
YC31	YD71	YEB1	YFF1	Y1131	Y1271	Y13B1	Y14F1	RSST	Search & start
YC32	YD72	YEB2	YFF2	Y1132	Y1272	Y13B2	Y14F2		
YC33	YD73	YEB3	YFF3	Y1133	Y1273	Y13B3	Y14F3		
YC34	YD74	YEB4	YFF4	Y1134	Y1274	Y13B4	Y14F4		Chopping parameter valid
YC35	YD75	YEB5	YFF5	Y1135	Y1275	Y13B5	Y14F5		Inclined axis control valid
YC36	YD76	YEB6	YFF6	Y1136	Y1276	Y13B6	Y14F6		Inclined axis control: No Z axis compensation
YC37	YD77	YEB7	YFF7	Y1137	Y1277	Y13B7	Y14F7	BDT1	Optional block skip 1
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC38	YD78	YEB8	YFF8	Y1138	Y1278	Y13B8	Y14F8	BDT2	Optional block skip 2
YC39	YD79	YEB9	YFF9	Y1139	Y1279	Y13B9	Y14F9	BDT3	Optional block skip 3
YC3A	YD7A	YEBA	YFFA	Y113A	Y127A	Y13BA	Y14FA	BDT4	Optional block skip 4
YC3B	YD7B	YEBB	YFFB	Y113B	Y127B	Y13BB	Y14FB	BDT5	Optional block skip 5
YC3C	YD7C	YEB C	YFFC	Y113C	Y127C	Y13BC	Y14FC	BDT6	Optional block skip 6
YC3D	YD7D	YEBD	YFFD	Y113D	Y127D	Y13BD	Y14FD	BDT7	Optional block skip 7
YC3E	YD7E	YEBE	YFFE	Y113E	Y127E	Y13BE	Y14FE	BDT8	Optional block skip 8
YC3F	YD7F	YEBF	YFFF	Y113F	Y127F	Y13BF	Y14FF	BDT9	Optional block skip 9

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC40	YD80	YEC0	Y1000	Y1140	Y1280	Y13C0	Y1500	HS11	1st handle axis selection code 1
YC41	YD81	YEC1	Y1001	Y1141	Y1281	Y13C1	Y1501	HS12	1st handle axis selection code 2
YC42	YD82	YEC2	Y1002	Y1142	Y1282	Y13C2	Y1502	HS14	1st handle axis selection code 4
YC43	YD83	YEC3	Y1003	Y1143	Y1283	Y13C3	Y1503	HS18	1st handle axis selection code 8
YC44	YD84	YEC4	Y1004	Y1144	Y1284	Y13C4	Y1504	HS116	1st handle axis selection code 16
YC45	YD85	YEC5	Y1005	Y1145	Y1285	Y13C5	Y1505		
YC46	YD86	YEC6	Y1006	Y1146	Y1286	Y13C6	Y1506		
YC47	YD87	YEC7	Y1007	Y1147	Y1287	Y13C7	Y1507	HS1S	1st handle valid
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC48	YD88	YEC8	Y1008	Y1148	Y1288	Y13C8	Y1508	HS21	2nd handle axis selection code 1
YC49	YD89	YEC9	Y1009	Y1149	Y1289	Y13C9	Y1509	HS22	2nd handle axis selection code 2
YC4A	YD8A	YECA	Y100A	Y114A	Y128A	Y13CA	Y150A	HS24	2nd handle axis selection code 4
YC4B	YD8B	YECB	Y100B	Y114B	Y128B	Y13CB	Y150B	HS28	2nd handle axis selection code 8
YC4C	YD8C	YECC	Y100C	Y114C	Y128C	Y13CC	Y150C	HS216	2nd handle axis selection code 16
YC4D	YD8D	YECD	Y100D	Y114D	Y128D	Y13CD	Y150D		
YC4E	YD8E	YECE	Y100E	Y114E	Y128E	Y13CE	Y150E		
YC4F	YD8F	YECF	Y100F	Y114F	Y128F	Y13CF	Y150F	HS2S	2nd handle valid
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC50	YD90	YED0	Y1010	Y1150	Y1290	Y13D0	Y1510	HS31	3rd handle axis selection code 1
YC51	YD91	YED1	Y1011	Y1151	Y1291	Y13D1	Y1511	HS32	3rd handle axis selection code 2
YC52	YD92	YED2	Y1012	Y1152	Y1292	Y13D2	Y1512	HS34	3rd handle axis selection code 4
YC53	YD93	YED3	Y1013	Y1153	Y1293	Y13D3	Y1513	HS38	3rd handle axis selection code 8
YC54	YD94	YED4	Y1014	Y1154	Y1294	Y13D4	Y1514	HS316	3rd handle axis selection code 16
YC55	YD95	YED5	Y1015	Y1155	Y1295	Y13D5	Y1515		
YC56	YD96	YED6	Y1016	Y1156	Y1296	Y13D6	Y1516		
YC57	YD97	YED7	Y1017	Y1157	Y1297	Y13D7	Y1517	HS3S	3rd handle valid
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC58	YD98	YED8	Y1018	Y1158	Y1298	Y13D8	Y1518	OVC	Override cancel
YC59	YD99	YED9	Y1019	Y1159	Y1299	Y13D9	Y1519	OVSL	Manual override method selection
YC5A	YD9A	YEDA	Y101A	Y115A	Y129A	Y13DA	Y151A	AFL	Miscellaneous function lock
YC5B	YD9B	YEDB	Y101B	Y115B	Y129B	Y13DB	Y151B		
YC5C	YD9C	YEDC	Y101C	Y115C	Y129C	Y13DC	Y151C	TRV	Tap retract
YC5D	YD9D	YEDD	Y101D	Y115D	Y129D	Y13DD	Y151D		
YC5E	YD9E	YEDE	Y101E	Y115E	Y129E	Y13DE	Y151E		Tool handle feed mode
YC5F	YD9F	YEDF	Y101F	Y115F	Y129F	Y13DF	Y151F		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC60	YDA0	YEE0	Y1020	Y1160	Y12A0	Y13E0	Y1520	*FV1	Cutting feedrate override code 1
YC61	YDA1	YEE1	Y1021	Y1161	Y12A1	Y13E1	Y1521	*FV2	Cutting feedrate override code 2
YC62	YDA2	YEE2	Y1022	Y1162	Y12A2	Y13E2	Y1522	*FV4	Cutting feedrate override code 4
YC63	YDA3	YEE3	Y1023	Y1163	Y12A3	Y13E3	Y1523	*FV8	Cutting feedrate override code 8
YC64	YDA4	YEE4	Y1024	Y1164	Y12A4	Y13E4	Y1524	*FV16	Cutting feedrate override code 16
YC65	YDA5	YEE5	Y1025	Y1165	Y12A5	Y13E5	Y1525		
YC66	YDA6	YEE6	Y1026	Y1166	Y12A6	Y13E6	Y1526	FV2E	2nd cutting feedrate override valid
YC67	YDA7	YEE7	Y1027	Y1167	Y12A7	Y13E7	Y1527	FVS	Cutting feedrate override method selection
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC68	YDA8	YEE8	Y1028	Y1168	Y12A8	Y13E8	Y1528	ROV1	Rapid traverse override code 1
YC69	YDA9	YEE9	Y1029	Y1169	Y12A9	Y13E9	Y1529	ROV2	Rapid traverse override code 2
YC6A	YDAA	YEEA	Y102A	Y116A	Y12AA	Y13EA	Y152A		
YC6B	YDAB	YEEB	Y102B	Y116B	Y12AB	Y13EB	Y152B		
YC6C	YDAC	YEEC	Y102C	Y116C	Y12AC	Y13EC	Y152C		
YC6D	YDAD	YEED	Y102D	Y116D	Y12AD	Y13ED	Y152D		
YC6E	YDAE	YEEE	Y102E	Y116E	Y12AE	Y13EE	Y152E		
YC6F	YDAF	YEEF	Y102F	Y116F	Y12AF	Y13EF	Y152F	ROVS	Rapid traverse override method selection
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC70	YDB0	YEF0	Y1030	Y1170	Y12B0	Y13F0	Y1530	*JV1	Manual feedrate code 1
YC71	YDB1	YEF1	Y1031	Y1171	Y12B1	Y13F1	Y1531	*JV2	Manual feedrate code 2
YC72	YDB2	YEF2	Y1032	Y1172	Y12B2	Y13F2	Y1532	*JV4	Manual feedrate code 4
YC73	YDB3	YEF3	Y1033	Y1173	Y12B3	Y13F3	Y1533	*JV8	Manual feedrate code 8
YC74	YDB4	YEF4	Y1034	Y1174	Y12B4	Y13F4	Y1534	*JV16	Manual feedrate code 16
YC75	YDB5	YEF5	Y1035	Y1175	Y12B5	Y13F5	Y1535		
YC76	YDB6	YEF6	Y1036	Y1176	Y12B6	Y13F6	Y1536	MCLMP	Manual speed clamp ON
YC77	YDB7	YEF7	Y1037	Y1177	Y12B7	Y13F7	Y1537	JVS	Manual feedrate method selection
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC78	YDB8	YEF8	Y1038	Y1178	Y12B8	Y13F8	Y1538	PCF1	Feedrate least increment code 1
YC79	YDB9	YEF9	Y1039	Y1179	Y12B9	Y13F9	Y1539	PCF2	Feedrate least increment code 2
YC7A	YDBA	YEFA	Y103A	Y117A	Y12BA	Y13FA	Y153A		
YC7B	YDBB	YEFB	Y103B	Y117B	Y12BB	Y13FB	Y153B	JHAN	Jog handle synchronous
YC7C	YDBC	YEFB	Y103C	Y117C	Y12BC	Y13FC	Y153C		Each axis manual feedrate B valid
YC7D	YDBD	Yefd	Y103D	Y117D	Y12BD	Y13FD	Y153D		Manual feedrate B surface speed control valid
YC7E	YDBE	Yefe	Y103E	Y117E	Y12BE	Y13FE	Y153E		Circular feed in manual mode valid
YC7F	YDBF	YEFF	Y103F	Y117F	Y12BF	Y13FF	Y153F		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC80	YDC0	YF00	Y1040	Y1180	Y12C0	Y1400	Y1540	MP1	Handle/incremental feed magnification code 1
YC81	YDC1	YF01	Y1041	Y1181	Y12C1	Y1401	Y1541	MP2	Handle/incremental feed magnification code 2
YC82	YDC2	YF02	Y1042	Y1182	Y12C2	Y1402	Y1542	MP4	Handle/incremental feed magnification code 4
YC83	YDC3	YF03	Y1043	Y1183	Y12C3	Y1403	Y1543		
YC84	YDC4	YF04	Y1044	Y1184	Y12C4	Y1404	Y1544		
YC85	YDC5	YF05	Y1045	Y1185	Y12C5	Y1405	Y1545		
YC86	YDC6	YF06	Y1046	Y1186	Y12C6	Y1406	Y1546		Magnification valid for each handle
YC87	YDC7	YF07	Y1047	Y1187	Y12C7	Y1407	Y1547	MPS	Handle/incremental feed magnification method selection
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC88	YDC8	YF08	Y1048	Y1188	Y12C8	Y1408	Y1548	TAL1	Tool alarm 1/Tool-skip
YC89	YDC9	YF09	Y1049	Y1189	Y12C9	Y1409	Y1549	TAL2	Tool alarm 2
YC8A	YDCA	YF0A	Y104A	Y118A	Y12CA	Y140A	Y154A	TCEF	Usage data count valid
YC8B	YDCB	YF0B	Y104B	Y118B	Y12CB	Y140B	Y154B	TLF1	Tool life management input
YC8C	YDCC	YF0C	Y104C	Y118C	Y12CC	Y140C	Y154C	TRST	Tool change reset
YC8D	YDCD	YF0D	Y104D	Y118D	Y12CD	Y140D	Y154D		Tool escape and return Transit point designation
YC8E	YDCE	YF0E	Y104E	Y118E	Y12CE	Y140E	Y154E		Manual tool length measurement interlock temporarily canceled ▲
YC8F	YDCF	YF0F	Y104F	Y118F	Y12CF	Y140F	Y154F		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC90	YDD0	YF10	Y1050	Y1190	Y12D0	Y1410	Y1550	ZSL1	Reference position selection code 1
YC91	YDD1	YF11	Y1051	Y1191	Y12D1	Y1411	Y1551	ZSL2	Reference position selection code 2
YC92	YDD2	YF12	Y1052	Y1192	Y12D2	Y1412	Y1552		Tool length compensation along the tool axis Compensation amount change mode
YC93	YDD3	YF13	Y1053	Y1193	Y12D3	Y1413	Y1553	RTNST	Tool retract and return 2 : Tool return start ▲
YC94	YDD4	YF14	Y1054	Y1194	Y12D4	Y1414	Y1554		
YC95	YDD5	YF15	Y1055	Y1195	Y12D5	Y1415	Y1555		In balance cut timing synchronization invalid ▲
YC96	YDD6	YF16	Y1056	Y1196	Y12D6	Y1416	Y1556		
YC97	YDD7	YF17	Y1057	Y1197	Y12D7	Y1417	Y1557		Reference position selection method
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YC98	YDD8	YF18	Y1058	Y1198	Y12D8	Y1418	Y1558		Tool life management: Temporary cancel of tool life expiration
YC99	YDD9	YF19	Y1059	Y1199	Y12D9	Y1419	Y1559		Tool life management: Temporary cancel of tool group life expiration
YC9A	YDDA	YF1A	Y105A	Y119A	Y12DA	Y141A	Y155A		
YC9B	Yddb	YF1B	Y105B	Y119B	Y12DB	Y141B	Y155B		
YC9C	YDDC	YF1C	Y105C	Y119C	Y12DC	Y141C	Y155C		
YC9D	YDDD	YF1D	Y105D	Y119D	Y12DD	Y141D	Y155D		Manual speed command valid
YC9E	YDDE	YF1E	Y105E	Y119E	Y12DE	Y141E	Y155E		Manual speed command sign reversed
YC9F	YDDF	YF1F	Y105F	Y119F	Y12DF	Y141F	Y155F		Manual speed command reverse run valid

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCA0	YDE0	YF20	Y1060	Y11A0	Y12E0	Y1420	Y1560	CX11	Manual arbitrary feed 1st axis selection code 1
YCA1	YDE1	YF21	Y1061	Y11A1	Y12E1	Y1421	Y1561	CX12	Manual arbitrary feed 1st axis selection code 2
YCA2	YDE2	YF22	Y1062	Y11A2	Y12E2	Y1422	Y1562	CX14	Manual arbitrary feed 1st axis selection code 4
YCA3	YDE3	YF23	Y1063	Y11A3	Y12E3	Y1423	Y1563	CX18	Manual arbitrary feed 1st axis selection code 8
YCA4	YDE4	YF24	Y1064	Y11A4	Y12E4	Y1424	Y1564	CX116	Manual arbitrary feed 1st axis selection code 16
YCA5	YDE5	YF25	Y1065	Y11A5	Y12E5	Y1425	Y1565		
YCA6	YDE6	YF26	Y1066	Y11A6	Y12E6	Y1426	Y1566		
YCA7	YDE7	YF27	Y1067	Y11A7	Y12E7	Y1427	Y1567	CX1S	Manual arbitrary feed 1st axis valid
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCA8	YDE8	YF28	Y1068	Y11A8	Y12E8	Y1428	Y1568	CX21	Manual arbitrary feed 2nd axis selection code 1
YCA9	YDE9	YF29	Y1069	Y11A9	Y12E9	Y1429	Y1569	CX22	Manual arbitrary feed 2nd axis selection code 2
YCAA	YDEA	YF2A	Y106A	Y11AA	Y12EA	Y142A	Y156A	CX24	Manual arbitrary feed 2nd axis selection code 4
YCAB	YDEB	YF2B	Y106B	Y11AB	Y12EB	Y142B	Y156B	CX28	Manual arbitrary feed 2nd axis selection code 8
YCAC	YDEC	YF2C	Y106C	Y11AC	Y12EC	Y142C	Y156C	CX216	Manual arbitrary feed 2nd axis selection code 16
YCAD	YDED	YF2D	Y106D	Y11AD	Y12ED	Y142D	Y156D		
YCAE	YDEE	YF2E	Y106E	Y11AE	Y12EE	Y142E	Y156E		
YCAF	YDEF	YF2F	Y106F	Y11AF	Y12EF	Y142F	Y156F	CX2S	Manual arbitrary feed 2nd axis valid
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCB0	YDF0	YF30	Y1070	Y11B0	Y12F0	Y1430	Y1570	CX31	Manual arbitrary feed 3rd axis selection code 1
YCB1	YDF1	YF31	Y1071	Y11B1	Y12F1	Y1431	Y1571	CX32	Manual arbitrary feed 3rd axis selection code 2
YCB2	YDF2	YF32	Y1072	Y11B2	Y12F2	Y1432	Y1572	CX34	Manual arbitrary feed 3rd axis selection code 4
YCB3	YDF3	YF33	Y1073	Y11B3	Y12F3	Y1433	Y1573	CX38	Manual arbitrary feed 3rd axis selection code 8
YCB4	YDF4	YF34	Y1074	Y11B4	Y12F4	Y1434	Y1574	CX316	Manual arbitrary feed 3rd axis selection code 16
YCB5	YDF5	YF35	Y1075	Y11B5	Y12F5	Y1435	Y1575		
YCB6	YDF6	YF36	Y1076	Y11B6	Y12F6	Y1436	Y1576		
YCB7	YDF7	YF37	Y1077	Y11B7	Y12F7	Y1437	Y1577	CX3S	Manual arbitrary feed 3rd axis valid
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCB8	YDF8	YF38	Y1078	Y11B8	Y12F8	Y1438	Y1578	CXS1	Manual arbitrary feed Smoothing off
YCB9	YDF9	YF39	Y1079	Y11B9	Y12F9	Y1439	Y1579	CXS2	Manual arbitrary feed Axis independent
YCBA	YDFA	YF3A	Y107A	Y11BA	Y12FA	Y143A	Y157A	CXS3	Manual arbitrary feed EX.F/MODAL.F
YCBB	YDFB	YF3B	Y107B	Y11BB	Y12FB	Y143B	Y157B	CXS4	Manual arbitrary feed G0/G1
YCBC	YDFC	YF3C	Y107C	Y11BC	Y12FC	Y143C	Y157C	CXS5	Manual arbitrary feed MC/WK
YCBD	YDFD	YF3D	Y107D	Y11BD	Y12FD	Y143D	Y157D	CXS6	Manual arbitrary feed ABS/INC
YCBE	YDFE	YF3E	Y107E	Y11BE	Y12FE	Y143E	Y157E	*CXS7	Manual arbitrary feed Stop
YCBF	YDFF	YF3F	Y107F	Y11BF	Y12FF	Y143F	Y157F	CXS8	Manual arbitrary feed Strobe

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCC0	YE00	YF40	Y1080	Y11C0	Y1300	Y1440	Y1580	ILM1	Current limit mode 1
YCC1	YE01	YF41	Y1081	Y11C1	Y1301	Y1441	Y1581	ILM2	Current limit mode 2
YCC2	YE02	YF42	Y1082	Y11C2	Y1302	Y1442	Y1582		
YCC3	YE03	YF43	Y1083	Y11C3	Y1303	Y1443	Y1583	LDWT	Load monitor I : Teaching/Monitor execution ▲
YCC4	YE04	YF44	Y1084	Y11C4	Y1304	Y1444	Y1584		Load monitor I : Teaching mode ▲
YCC5	YE05	YF45	Y1085	Y11C5	Y1305	Y1445	Y1585		Load monitor I : Monitor mode ▲
YCC6	YE06	YF46	Y1086	Y11C6	Y1306	Y1446	Y1586		Load monitor I : Alarm reset
YCC7	YE07	YF47	Y1087	Y11C7	Y1307	Y1447	Y1587		Load monitor I : Warning reset ▲
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCC8	YE08	YF48	Y1088	Y11C8	Y1308	Y1448	Y1588	*ZRIT	2nd reference position return interlock
YCC9	YE09	YF49	Y1089	Y11C9	Y1309	Y1449	Y1589		Load monitor I : Adaptive control execution ▲
YCCA	YE0A	YF4A	Y108A	Y11CA	Y130A	Y144A	Y158A		Small diameter deep hole drilling cycle
YCCB	YE0B	YF4B	Y108B	Y11CB	Y130B	Y144B	Y158B		Chuck barrier ON
YCCC	YE0C	YF4C	Y108C	Y11CC	Y130C	Y144C	Y158C		High-speed retract function valid ▲
YCCD	YE0D	YF4D	Y108D	Y11CD	Y130D	Y144D	Y158D		
YCCE	YE0E	YF4E	Y108E	Y11CE	Y130E	Y144E	Y158E		
YCCF	YE0F	YF4F	Y108F	Y11CF	Y130F	Y144F	Y158F		Tool retract start ▲
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCD0	YE10	YF50	Y1090	Y11D0	Y1310	Y1450	Y1590		Waiting ignore
YCD1	YE11	YF51	Y1091	Y11D1	Y1311	Y1451	Y1591		Spindle-spindle polygon cancel
YCD2	YE12	YF52	Y1092	Y11D2	Y1312	Y1452	Y1592		Synchronous tapping command polarity reversal
YCD3	YE13	YF53	Y1093	Y11D3	Y1313	Y1453	Y1593		Spindle OFF mode
YCD4	YE14	YF54	Y1094	Y11D4	Y1314	Y1454	Y1594		Longitudinal hole drilling axis selection
YCD5	YE15	YF55	Y1095	Y11D5	Y1315	Y1455	Y1595		Optimum acceleration/deceleration parameter switching request [axis] ▲
YCD6	YE16	YF56	Y1096	Y11D6	Y1316	Y1456	Y1596	TRVEC	Tap retract possible state cancel
YCD7	YE17	YF57	Y1097	Y11D7	Y1317	Y1457	Y1597	CHPRCR	Chopping compensation update prevention request
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCD8	YE18	YF58	Y1098	Y11D8	Y1318	Y1458	Y1598		Barrier valid (left)
YCD9	YE19	YF59	Y1099	Y11D9	Y1319	Y1459	Y1599		Barrier valid (right)
YCDA	YE1A	YF5A	Y109A	Y11DA	Y131A	Y145A	Y159A		Tool presetter sub-side valid ▲
YCDB	YE1B	YF5B	Y109B	Y11DB	Y131B	Y145B	Y159B		
YCDC	YE1C	YF5C	Y109C	Y11DC	Y131C	Y145C	Y159C		
YCDD	YE1D	YF5D	Y109D	Y11DD	Y131D	Y145D	Y159D		
YCDE	YE1E	YF5E	Y109E	Y11DE	Y131E	Y145E	Y159E	HOBTRR	Hob machining: retract request
YCDE	YE1F	YF5F	Y109F	Y11DF	Y131F	Y145F	Y159F	HOBARTC	Hob machining: alarm retract control

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCE0	YE20	YF60	Y10A0	Y11E0	Y1320	Y1460	Y15A0		
YCE1	YE21	YF61	Y10A1	Y11E1	Y1321	Y1461	Y15A1		Door open II
YCE2	YE22	YF62	Y10A2	Y11E2	Y1322	Y1462	Y15A2		Door open signal input (spindle speed monitor)
YCE3	YE23	YF63	Y10A3	Y11E3	Y1323	Y1463	Y15A3		Door interlock spindle speed clamp
YCE4	YE24	YF64	Y10A4	Y11E4	Y1324	Y1464	Y15A4		
YCE5	YE25	YF65	Y10A5	Y11E5	Y1325	Y1465	Y15A5		
YCE6	YE26	YF66	Y10A6	Y11E6	Y1326	Y1466	Y15A6		
YCE7	YE27	YF67	Y10A7	Y11E7	Y1327	Y1467	Y15A7		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCE8	YE28	YF68	Y10A8	Y11E8	Y1328	Y1468	Y15A8		Door open II (2 channels per 1 part system)
YCE9	YE29	YF69	Y10A9	Y11E9	Y1329	Y1469	Y15A9		
YCEA	YE2A	YF6A	Y10AA	Y11EA	Y132A	Y146A	Y15AA		
YCEB	YE2B	YF6B	Y10AB	Y11EB	Y132B	Y146B	Y15AB		
YCEC	YE2C	YF6C	Y10AC	Y11EC	Y132C	Y146C	Y15AC		
YCED	YE2D	YF6D	Y10AD	Y11ED	Y132D	Y146D	Y15AD		
YCEE	YE2E	YF6E	Y10AE	Y11EE	Y132E	Y146E	Y15AE		
YCEF	YE2F	YF6F	Y10AF	Y11EF	Y132F	Y146F	Y15AF		Load monitor I : Cutting torque estimation execution
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCF0	YE30	YF70	Y10B0	Y11F0	Y1330	Y1470	Y15B0		
YCF1	YE31	YF71	Y10B1	Y11F1	Y1331	Y1471	Y15B1	RBSSY	Manual arbitrary reverse run: Reverse run block stop designated part system
YCF2	YE32	YF72	Y10B2	Y11F2	Y1332	Y1472	Y15B2		
YCF3	YE33	YF73	Y10B3	Y11F3	Y1333	Y1473	Y15B3		
YCF4	YE34	YF74	Y10B4	Y11F4	Y1334	Y1474	Y15B4	BCHK	Barrier check invalid
YCF5	YE35	YF75	Y10B5	Y11F5	Y1335	Y1475	Y15B5		
YCF6	YE36	YF76	Y10B6	Y11F6	Y1336	Y1476	Y15B6		
YCF7	YE37	YF77	Y10B7	Y11F7	Y1337	Y1477	Y15B7		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCF8	YE38	YF78	Y10B8	Y11F8	Y1338	Y1478	Y15B8	MSYNC	Synchronization between part systems OFF
YCF9	YE39	YF79	Y10B9	Y11F9	Y1339	Y1479	Y15B9		
YCFA	YE3A	YF7A	Y10BA	Y11FA	Y133A	Y147A	Y15BA	DRNC	Dry run invalid
YCFB	YE3B	YF7B	Y10BB	Y11FB	Y133B	Y147B	Y15BB	AUTED	Automatic error detection
YCFC	YE3C	YF7C	Y10BC	Y11FC	Y133C	Y147C	Y15BC	MRPSG	Manual arbitrary reverse run: MSTB reverse run prohibited
YCFD	YE3D	YF7D	Y10BD	Y11FD	Y133D	Y147D	Y15BD		G71 Shape judgement disable ▲
YCFE	YE3E	YF7E	Y10BE	Y11FE	Y133E	Y147E	Y15BE		Appropriate machining diagnosis in progress ▲
YCFE	YE3F	YF7F	Y10BF	Y11FF	Y133F	Y147F	Y15BF		Appropriate machining diagnosis error reset ▲

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YD00	YE40	YF80	Y10C0	Y1200	Y1340	Y1480	Y15C0		
YD01	YE41	YF81	Y10C1	Y1201	Y1341	Y1481	Y15C1		
YD02	YE42	YF82	Y10C2	Y1202	Y1342	Y1482	Y15C2		
YD03	YE43	YF83	Y10C3	Y1203	Y1343	Y1483	Y15C3		
YD04	YE44	YF84	Y10C4	Y1204	Y1344	Y1484	Y15C4		
YD05	YE45	YF85	Y10C5	Y1205	Y1345	Y1485	Y15C5		
YD06	YE46	YF86	Y10C6	Y1206	Y1346	Y1486	Y15C6		
YD07	YE47	YF87	Y10C7	Y1207	Y1347	Y1487	Y15C7		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YD08	YE48	YF88	Y10C8	Y1208	Y1348	Y1488	Y15C8	RVSP	Reverse run from block start
YD09	YE49	YF89	Y10C9	Y1209	Y1349	Y1489	Y15C9	RVIT	Macro interrupt priority
YD0A	YE4A	YF8A	Y10CA	Y120A	Y134A	Y148A	Y15CA	RVMD	Reverse run control mode
YD0B	YE4B	YF8B	Y10CB	Y120B	Y134B	Y148B	Y15CB	ACCG	Rapid traverse time constant: Switchover request
YD0C	YE4C	YF8C	Y10CC	Y120C	Y134C	Y148C	Y15CC		
YD0D	YE4D	YF8D	Y10CD	Y120D	Y134D	Y148D	Y15CD		
YD0E	YE4E	YF8E	Y10CE	Y120E	Y134E	Y148E	Y15CE		
YD0F	YE4F	YF8F	Y10CF	Y120F	Y134F	Y148F	Y15CF		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YD10	YE50	YF90	Y10D0	Y1210	Y1350	Y1490	Y15D0		
YD11	YE51	YF91	Y10D1	Y1211	Y1351	Y1491	Y15D1		
YD12	YE52	YF92	Y10D2	Y1212	Y1352	Y1492	Y15D2		
YD13	YE53	YF93	Y10D3	Y1213	Y1353	Y1493	Y15D3		
YD14	YE54	YF94	Y10D4	Y1214	Y1354	Y1494	Y15D4		3D coordinate conversion : Manual feed coordinates conversion ▲
YD15	YE55	YF95	Y10D5	Y1215	Y1355	Y1495	Y15D5		
YD16	YE56	YF96	Y10D6	Y1216	Y1356	Y1496	Y15D6		
YD17	YE57	YF97	Y10D7	Y1217	Y1357	Y1497	Y15D7		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YD18	YE58	YF98	Y10D8	Y1218	Y1358	Y1498	Y15D8	MJCT	3D manual feed (JOG, INC) in tool axis coordinate system
YD19	YE59	YF99	Y10D9	Y1219	Y1359	Y1499	Y15D9	MJCB	3D manual feed (JOG, INC) in table coordinate system
YD1A	YE5A	YF9A	Y10DA	Y121A	Y135A	Y149A	Y15DA	MJCF	3D manual feed (JOG, INC) in feature coordinate system
YD1B	YE5B	YF9B	Y10DB	Y121B	Y135B	Y149B	Y15DB	MH1CT	3D manual feed(1st handle) in tool axis coordinate system
YD1C	YE5C	YF9C	Y10DC	Y121C	Y135C	Y149C	Y15DC	MH1CB	3D manual feed (1st handle) in table coordinate system
YD1D	YE5D	YF9D	Y10DD	Y121D	Y135D	Y149D	Y15DD	MH1CF	3D manual feed(1st handle) in feature coordinate system
YD1E	YE5E	YF9E	Y10DE	Y121E	Y135E	Y149E	Y15DE	MH2CT	3D manual feed (2nd handle) in tool axis coordinate system
YD1F	YE5F	YF9F	Y10DF	Y121F	Y135F	Y149F	Y15DF	MH2CB	3D manual feed (2nd handle) in table coordinate system

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YD20	YE60	YFA0	Y10E0	Y1220	Y1360	Y14A0	Y15E0	MH2CF	3D manual feed (2nd handle) in feature coordinate system
YD21	YE61	YFA1	Y10E1	Y1221	Y1361	Y14A1	Y15E1	MH3CT	3D manual feed (3rd handle) in tool axis coordinate system
YD22	YE62	YFA2	Y10E2	Y1222	Y1362	Y14A2	Y15E2	MH3CB	3D manual feed (3rd handle) in table coordinate system
YD23	YE63	YFA3	Y10E3	Y1223	Y1363	Y14A3	Y15E3	MH3CF	3D manual feed (3rd handle) in feature coordinate system
YD24	YE64	YFA4	Y10E4	Y1224	Y1364	Y14A4	Y15E4		
YD25	YE65	YFA5	Y10E5	Y1225	Y1365	Y14A5	Y15E5		
YD26	YE66	YFA6	Y10E6	Y1226	Y1366	Y14A6	Y15E6		
YD27	YE67	YFA7	Y10E7	Y1227	Y1367	Y14A7	Y15E7	TCPRC	Tool center point rotation
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YD28	YE68	YFA8	Y10E8	Y1228	Y1368	Y14A8	Y15E8	MFIN1	Miscellaneous Function Command High-speed Output : M function finish 1
YD29	YE69	YFA9	Y10E9	Y1229	Y1369	Y14A9	Y15E9	MFIN2	Miscellaneous Function Command High-speed Output : M function finish 2
YD2A	YE6A	YFAA	Y10EA	Y122A	Y136A	Y14AA	Y15EA	MFIN3	Miscellaneous Function Command High-speed Output : M function finish 3
YD2B	YE6B	YFAB	Y10EB	Y122B	Y136B	Y14AB	Y15EB	MFIN4	Miscellaneous Function Command High-speed Output : M function finish 4
YD2C	YE6C	YFAC	Y10EC	Y122C	Y136C	Y14AC	Y15EC	SFIN1	Miscellaneous Function Command High-speed Output : S function finish 1
YD2D	YE6D	YFAD	Y10ED	Y122D	Y136D	Y14AD	Y15ED	SFIN2	Miscellaneous Function Command High-speed Output : S function finish 2
YD2E	YE6E	YFAE	Y10EE	Y122E	Y136E	Y14AE	Y15EE	SFIN3	Miscellaneous Function Command High-speed Output : S function finish 3
YD2F	YE6F	YFAF	Y10EF	Y122F	Y136F	Y14AF	Y15EF	SFIN4	Miscellaneous Function Command High-speed Output : S function finish 4
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YD30	YE70	YFB0	Y10F0	Y1230	Y1370	Y14B0	Y15F0	TFIN1	Miscellaneous Function Command High-speed Output : T function finish 1
YD31	YE71	YFB1	Y10F1	Y1231	Y1371	Y14B1	Y15F1	TFIN2	Miscellaneous Function Command High-speed Output : T function finish 2
YD32	YE72	YFB2	Y10F2	Y1232	Y1372	Y14B2	Y15F2	TFIN3	Miscellaneous Function Command High-speed Output : T function finish 3
YD33	YE73	YFB3	Y10F3	Y1233	Y1373	Y14B3	Y15F3	TFIN4	Miscellaneous Function Command High-speed Output : T function finish 4
YD34	YE74	YFB4	Y10F4	Y1234	Y1374	Y14B4	Y15F4	BFIN1	Miscellaneous Function Command High-speed Output : 2nd M function finish 1
YD35	YE75	YFB5	Y10F5	Y1235	Y1375	Y14B5	Y15F5	BFIN2	Miscellaneous Function Command High-speed Output : 2nd M function finish 2
YD36	YE76	YFB6	Y10F6	Y1236	Y1376	Y14B6	Y15F6	BFIN3	Miscellaneous Function Command High-speed Output : 2nd M function finish 3
YD37	YE77	YFB7	Y10F7	Y1237	Y1377	Y14B7	Y15F7	BFIN4	Miscellaneous Function Command High-speed Output : 2nd M function finish 4

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YD38	YE78	YFB8	Y10F8	Y1238	Y1378	Y14B8	Y15F8	SFIN5	Miscellaneous Function Command High-speed Output : S function finish 5
YD39	YE79	YFB9	Y10F9	Y1239	Y1379	Y14B9	Y15F9	SFIN6	Miscellaneous Function Command High-speed Output : S function finish 6
YD3A	YE7A	YFBA	Y10FA	Y123A	Y137A	Y14BA	Y15FA		
YD3B	YE7B	YFBB	Y10FB	Y123B	Y137B	Y14BB	Y15FB		
YD3C	YE7C	YFBC	Y10FC	Y123C	Y137C	Y14BC	Y15FC		
YD3D	YE7D	YFBD	Y10FD	Y123D	Y137D	Y14BD	Y15FD		
YD3E	YE7E	YFBE	Y10FE	Y123E	Y137E	Y14BE	Y15FE		
YD3F	YE7F	YFBF	Y10FF	Y123F	Y137F	Y14BF	Y15FF		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
Y1870			Y1878		Edit/search
Y1871			Y1879		
Y1872			Y187A		
Y1873			Y187B		
Y1874			Y187C		
Y1875			Y187D		
Y1876			Y187E		
Y1877			Y187F		

3 Input/Output Signals with Controller

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1880	Y18E0	Y1940	Y19A0	Y1A00	Y1A60	Y1AC0	Y1B20		
Y1881	Y18E1	Y1941	Y19A1	Y1A01	Y1A61	Y1AC1	Y1B21		
Y1882	Y18E2	Y1942	Y19A2	Y1A02	Y1A62	Y1AC2	Y1B22		
Y1883	Y18E3	Y1943	Y19A3	Y1A03	Y1A63	Y1AC3	Y1B23		
Y1884	Y18E4	Y1944	Y19A4	Y1A04	Y1A64	Y1AC4	Y1B24		
Y1885	Y18E5	Y1945	Y19A5	Y1A05	Y1A65	Y1AC5	Y1B25	GFIN	Gear shift completion
Y1886	Y18E6	Y1946	Y19A6	Y1A06	Y1A66	Y1AC6	Y1B26		
Y1887	Y18E7	Y1947	Y19A7	Y1A07	Y1A67	Y1AC7	Y1B27		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1888	Y18E8	Y1948	Y19A8	Y1A08	Y1A68	Y1AC8	Y1B28	SP1	Spindle speed override code 1
Y1889	Y18E9	Y1949	Y19A9	Y1A09	Y1A69	Y1AC9	Y1B29	SP2	Spindle speed override code 2
Y188A	Y18EA	Y194A	Y19AA	Y1A0A	Y1A6A	Y1ACA	Y1B2A	SP4	Spindle speed override code 4
Y188B	Y18EB	Y194B	Y19AB	Y1A0B	Y1A6B	Y1ACB	Y1B2B		
Y188C	Y18EC	Y194C	Y19AC	Y1A0C	Y1A6C	Y1ACC	Y1B2C		
Y188D	Y18ED	Y194D	Y19AD	Y1A0D	Y1A6D	Y1ACD	Y1B2D		
Y188E	Y18EE	Y194E	Y19AE	Y1A0E	Y1A6E	Y1ACE	Y1B2E		
Y188F	Y18EF	Y194F	Y19AF	Y1A0F	Y1A6F	Y1ACF	Y1B2F	SPS	Spindle override method selection
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1890	Y18F0	Y1950	Y19B0	Y1A10	Y1A70	Y1AD0	Y1B30	GI1	Spindle gear selection code 1
Y1891	Y18F1	Y1951	Y19B1	Y1A11	Y1A71	Y1AD1	Y1B31	GI2	Spindle gear selection code 2
Y1892	Y18F2	Y1952	Y19B2	Y1A12	Y1A72	Y1AD2	Y1B32		
Y1893	Y18F3	Y1953	Y19B3	Y1A13	Y1A73	Y1AD3	Y1B33	EXOBS	Spindle holding force up
Y1894	Y18F4	Y1954	Y19B4	Y1A14	Y1A74	Y1AD4	Y1B34	SSTP	Spindle stop
Y1895	Y18F5	Y1955	Y19B5	Y1A15	Y1A75	Y1AD5	Y1B35	SSFT	Spindle gear shift
Y1896	Y18F6	Y1956	Y19B6	Y1A16	Y1A76	Y1AD6	Y1B36	SORC	Spindle orientation
Y1897	Y18F7	Y1957	Y19B7	Y1A17	Y1A77	Y1AD7	Y1B37		Spindle command invalid
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1898	Y18F8	Y1958	Y19B8	Y1A18	Y1A78	Y1AD8	Y1B38	SRN	Spindle forward run start
Y1899	Y18F9	Y1959	Y19B9	Y1A19	Y1A79	Y1AD9	Y1B39	SRI	Spindle reverse run start
Y189A	Y18FA	Y195A	Y19BA	Y1A1A	Y1A7A	Y1ADA	Y1B3A	TL1	Spindle torque limit 1
Y189B	Y18FB	Y195B	Y19BB	Y1A1B	Y1A7B	Y1ADB	Y1B3B	TL2	Spindle torque limit 2
Y189C	Y18FC	Y195C	Y19BC	Y1A1C	Y1A7C	Y1ADC	Y1B3C	WRN	Spindle forward run index
Y189D	Y18FD	Y195D	Y19BD	Y1A1D	Y1A7D	Y1ADD	Y1B3D	WRI	Spindle reverse run index
Y189E	Y18FE	Y195E	Y19BE	Y1A1E	Y1A7E	Y1ADE	Y1B3E	ORC	Spindle orientation command
Y189F	Y18FF	Y195F	Y19BF	Y1A1F	Y1A7F	Y1ADF	Y1B3F	LRSL	L coil selection

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y18A0	Y1900	Y1960	Y19C0	Y1A20	Y1A80	Y1AE0	Y1B40		
Y18A1	Y1901	Y1961	Y19C1	Y1A21	Y1A81	Y1AE1	Y1B41		
Y18A2	Y1902	Y1962	Y19C2	Y1A22	Y1A82	Y1AE2	Y1B42		Spindle position control (C axis)Cutting gain L
Y18A3	Y1903	Y1963	Y19C3	Y1A23	Y1A83	Y1AE3	Y1B43		Spindle position control (C axis)Cutting gain H
Y18A4	Y1904	Y1964	Y19C4	Y1A24	Y1A84	Y1AE4	Y1B44		
Y18A5	Y1905	Y1965	Y19C5	Y1A25	Y1A85	Y1AE5	Y1B45	CMOD	Spindle position control (Spindle/C axis control): C axis selection
Y18A6	Y1906	Y1966	Y19C6	Y1A26	Y1A86	Y1AE6	Y1B46	LRSM	M coil selection
Y18A7	Y1907	Y1967	Y19C7	Y1A27	Y1A87	Y1AE7	Y1B47		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y18A8	Y1908	Y1968	Y19C8	Y1A28	Y1A88	Y1AE8	Y1B48	SWS	Spindle selection
Y18A9	Y1909	Y1969	Y19C9	Y1A29	Y1A89	Y1AE9	Y1B49		
Y18AA	Y190A	Y196A	Y19CA	Y1A2A	Y1A8A	Y1AEA	Y1B4A	SPRR	Spindle rotation reversal
Y18AB	Y190B	Y196B	Y19CB	Y1A2B	Y1A8B	Y1AEB	Y1B4B	SPRS	Spindle rotation direction switch method selection
Y18AC	Y190C	Y196C	Y19CC	Y1A2C	Y1A8C	Y1AEC	Y1B4C		
Y18AD	Y190D	Y196D	Y19CD	Y1A2D	Y1A8D	Y1AED	Y1B4D		
Y18AE	Y190E	Y196E	Y19CE	Y1A2E	Y1A8E	Y1AEE	Y1B4E		
Y18AF	Y190F	Y196F	Y19CF	Y1A2F	Y1A8F	Y1AEF	Y1B4F	MPCSL	PLC coil changeover
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y18B0	Y1910	Y1970	Y19D0	Y1A30	Y1A90	Y1AF0	Y1B50	SPSY	Spindle synchronization
Y18B1	Y1911	Y1971	Y19D1	Y1A31	Y1A91	Y1AF1	Y1B51	SPPHS	Spindle phase synchronization
Y18B2	Y1912	Y1972	Y19D2	Y1A32	Y1A92	Y1AF2	Y1B52	SPSDR	Spindle synchronous rotation direction
Y18B3	Y1913	Y1973	Y19D3	Y1A33	Y1A93	Y1AF3	Y1B53	SSPHM	Phase shift calculation request
Y18B4	Y1914	Y1974	Y19D4	Y1A34	Y1A94	Y1AF4	Y1B54	SSPHF	Phase offset request
Y18B5	Y1915	Y1975	Y19D5	Y1A35	Y1A95	Y1AF5	Y1B55	SPDRPO	Error temporary cancel
Y18B6	Y1916	Y1976	Y19D6	Y1A36	Y1A96	Y1AF6	Y1B56		
Y18B7	Y1917	Y1977	Y19D7	Y1A37	Y1A97	Y1AF7	Y1B57		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y18B8	Y1918	Y1978	Y19D8	Y1A38	Y1A98	Y1AF8	Y1B58	SPSYC	Spindle synchronization/ superimposition cancel
Y18B9	Y1919	Y1979	Y19D9	Y1A39	Y1A99	Y1AF9	Y1B59	SPCMPC	Chuck close
Y18BA	Y191A	Y197A	Y19DA	Y1A3A	Y1A9A	Y1AFA	Y1B5A		
Y18BB	Y191B	Y197B	Y19DB	Y1A3B	Y1A9B	Y1AFB	Y1B5B		
Y18BC	Y191C	Y197C	Y19DC	Y1A3C	Y1A9C	Y1AFC	Y1B5C		
Y18BD	Y191D	Y197D	Y19DD	Y1A3D	Y1A9D	Y1AFD	Y1B5D		
Y18BE	Y191E	Y197E	Y19DE	Y1A3E	Y1A9E	Y1AFE	Y1B5E		
Y18BF	Y191F	Y197F	Y19DF	Y1A3F	Y1A9F	Y1AFF	Y1B5F	SPOFF	Exclude spindle

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y18C0	Y1920	Y1980	Y19E0	Y1A40	Y1AA0	Y1B00	Y1B60		
Y18C1	Y1921	Y1981	Y19E1	Y1A41	Y1AA1	Y1B01	Y1B61		
Y18C2	Y1922	Y1982	Y19E2	Y1A42	Y1AA2	Y1B02	Y1B62		
Y18C3	Y1923	Y1983	Y19E3	Y1A43	Y1AA3	Y1B03	Y1B63		
Y18C4	Y1924	Y1984	Y19E4	Y1A44	Y1AA4	Y1B04	Y1B64		
Y18C5	Y1925	Y1985	Y19E5	Y1A45	Y1AA5	Y1B05	Y1B65		
Y18C6	Y1926	Y1986	Y19E6	Y1A46	Y1AA6	Y1B06	Y1B66		
Y18C7	Y1927	Y1987	Y19E7	Y1A47	Y1AA7	Y1B07	Y1B67		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y18C8	Y1928	Y1988	Y19E8	Y1A48	Y1AA8	Y1B08	Y1B68		Spindle oscillation command
Y18C9	Y1929	Y1989	Y19E9	Y1A49	Y1AA9	Y1B09	Y1B69	WGTSC	Spindle control : Coil changeover gate cutoff timer interruption ▲
Y18CA	Y192A	Y198A	Y19EA	Y1A4A	Y1AAA	Y1B0A	Y1B6A	VGHLDC	Real-time tuning 1: Speed control gain hold-down command
Y18CB	Y192B	Y198B	Y19EB	Y1A4B	Y1AAB	Y1B0B	Y1B6B		
Y18CC	Y192C	Y198C	Y19EC	Y1A4C	Y1AAC	Y1B0C	Y1B6C		
Y18CD	Y192D	Y198D	Y19ED	Y1A4D	Y1AAD	Y1B0D	Y1B6D		
Y18CE	Y192E	Y198E	Y19EE	Y1A4E	Y1AAE	Y1B0E	Y1B6E		
Y18CF	Y192F	Y198F	Y19EF	Y1A4F	Y1AAF	Y1B0F	Y1B6F		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y18D0	Y1930	Y1990	Y19F0	Y1A50	Y1AB0	Y1B10	Y1B70		
Y18D1	Y1931	Y1991	Y19F1	Y1A51	Y1AB1	Y1B11	Y1B71		
Y18D2	Y1932	Y1992	Y19F2	Y1A52	Y1AB2	Y1B12	Y1B72		
Y18D3	Y1933	Y1993	Y19F3	Y1A53	Y1AB3	Y1B13	Y1B73		
Y18D4	Y1934	Y1994	Y19F4	Y1A54	Y1AB4	Y1B14	Y1B74		
Y18D5	Y1935	Y1995	Y19F5	Y1A55	Y1AB5	Y1B15	Y1B75		
Y18D6	Y1936	Y1996	Y19F6	Y1A56	Y1AB6	Y1B16	Y1B75		
Y18D7	Y1937	Y1997	Y19F7	Y1A57	Y1AB7	Y1B17	Y1B77		
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y18D8	Y1938	Y1998	Y19F8	Y1A58	Y1AB8	Y1B18	Y1B78		
Y18D9	Y1939	Y1999	Y19F9	Y1A59	Y1AB9	Y1B19	Y1B79		
Y18DA	Y193A	Y199A	Y19FA	Y1A5A	Y1ABA	Y1B1A	Y1B7A		
Y18DB	Y193B	Y199B	Y19FB	Y1A5B	Y1ABB	Y1B1B	Y1B7B		
Y18DC	Y193C	Y199C	Y19FC	Y1A5C	Y1ABC	Y1B1C	Y1B7C		
Y18DD	Y193D	Y199D	Y19FD	Y1A5D	Y1ABD	Y1B1D	Y1B7D		
Y18DE	Y193E	Y199E	Y19FE	Y1A5E	Y1ABE	Y1B1E	Y1B7E		
Y18DF	Y193F	Y199F	Y19FF	Y1A5F	Y1ABF	Y1B1F	Y1B7F		

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1D00	Y1D20	Y1D40	Y1D60	Y1D80	Y1DA0	Y1DC0	Y1DE0		Position switch 1 interlock
Y1D01	Y1D21	Y1D41	Y1D61	Y1D81	Y1DA1	Y1DC1	Y1DE1		Position switch 2 interlock
Y1D02	Y1D22	Y1D42	Y1D62	Y1D82	Y1DA2	Y1DC2	Y1DE2		Position switch 3 interlock
Y1D03	Y1D23	Y1D43	Y1D63	Y1D83	Y1DA3	Y1DC3	Y1DE3		Position switch 4 interlock
Y1D04	Y1D24	Y1D44	Y1D64	Y1D84	Y1DA4	Y1DC4	Y1DE4		Position switch 5 interlock
Y1D05	Y1D25	Y1D45	Y1D65	Y1D85	Y1DA5	Y1DC5	Y1DE5		Position switch 6 interlock
Y1D06	Y1D26	Y1D46	Y1D66	Y1D86	Y1DA6	Y1DC6	Y1DE6		Position switch 7 interlock
Y1D07	Y1D27	Y1D47	Y1D67	Y1D87	Y1DA7	Y1DC7	Y1DE7		Position switch 8 interlock
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1D08	Y1D28	Y1D48	Y1D68	Y1D88	Y1DA8	Y1DC8	Y1DE8		Position switch 9 interlock
Y1D09	Y1D29	Y1D49	Y1D69	Y1D89	Y1DA9	Y1DC9	Y1DE9		Position switch 10 interlock
Y1D0A	Y1D2A	Y1D4A	Y1D6A	Y1D8A	Y1DAA	Y1DCA	Y1DEA		Position switch 11 interlock
Y1D0B	Y1D2B	Y1D4B	Y1D6B	Y1D8B	Y1DAB	Y1DCB	Y1DEB		Position switch 12 interlock
Y1D0C	Y1D2C	Y1D4C	Y1D6C	Y1D8C	Y1DAC	Y1DCC	Y1DEC		Position switch 13 interlock
Y1D0D	Y1D2D	Y1D4D	Y1D6D	Y1D8D	Y1DAD	Y1DCD	Y1DED		Position switch 14 interlock
Y1D0E	Y1D2E	Y1D4E	Y1D6E	Y1D8E	Y1DAE	Y1DCE	Y1DEE		Position switch 15 interlock
Y1D0F	Y1D2F	Y1D4F	Y1D6F	Y1D8F	Y1DAF	Y1DCF	Y1DEF		Position switch 16 interlock
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1D10	Y1D30	Y1D50	Y1D70	Y1D90	Y1DB0	Y1DD0	Y1DF0		Position switch 17 interlock
Y1D11	Y1D31	Y1D51	Y1D71	Y1D91	Y1DB1	Y1DD1	Y1DF1		Position switch 18 interlock
Y1D12	Y1D32	Y1D52	Y1D72	Y1D92	Y1DB2	Y1DD2	Y1DF2		Position switch 19 interlock
Y1D13	Y1D33	Y1D53	Y1D73	Y1D93	Y1DB3	Y1DD3	Y1DF3		Position switch 20 interlock
Y1D14	Y1D34	Y1D54	Y1D74	Y1D94	Y1DB4	Y1DD4	Y1DF4		Position switch 21 interlock
Y1D15	Y1D35	Y1D55	Y1D75	Y1D95	Y1DB5	Y1DD5	Y1DF5		Position switch 22 interlock
Y1D16	Y1D36	Y1D56	Y1D76	Y1D96	Y1DB6	Y1DD6	Y1DF6		Position switch 23 interlock
Y1D17	Y1D37	Y1D57	Y1D77	Y1D97	Y1DB7	Y1DD7	Y1DF7		Position switch 24 interlock
Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1D18	Y1D38	Y1D58	Y1D78	Y1D98	Y1DB8	Y1DD8	Y1DF8		
Y1D19	Y1D39	Y1D59	Y1D79	Y1D99	Y1DB9	Y1DD9	Y1DF9		
Y1D1A	Y1D3A	Y1D5A	Y1D7A	Y1D9A	Y1DBA	Y1DDA	Y1DFA		
Y1D1B	Y1D3B	Y1D5B	Y1D7B	Y1D9B	Y1DBB	Y1ddb	Y1DFB		
Y1D1C	Y1D3C	Y1D5C	Y1D7C	Y1D9C	Y1DBC	Y1DDC	Y1DFC		
Y1D1D	Y1D3D	Y1D5D	Y1D7D	Y1D9D	Y1DBD	Y1DDD	Y1DFD		
Y1D1E	Y1D3E	Y1D5E	Y1D7E	Y1D9E	Y1DBE	Y1DDE	Y1DFE		
Y1D1F	Y1D3F	Y1D5F	Y1D7F	Y1D9F	Y1DBF	Y1DDF	Y1DFF		

3.4 PLC Output Signals (Data type: R***)

(Note) Signal with " ▲ " is prepared for a specific machine tool builder.

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R200	AO1	Analog output 1	R208		
R201	AO2	Analog output 2	R209		
R202	AO3	Analog output 3	R210		Displayed screen No.
R203	AO4	Analog output 4	R211		
R204			R212		KEY OUT 1
R205			R213		
R206			R214		
R207			R215		Power OFF indication Y device No.
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R216		Detailed screen No.	R224		User sequence program version code A
R217			R225		User sequence program version code B
R218			R226		User sequence program version code C
R219			R227		User sequence program version code D
R220			R228		
R221			R229		
R222			R230		
R223			R231		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R232		User sequence program version code 2 A	R240		APLC version A
R233		User sequence program version code 2 B	R241		APLC version B
R234		User sequence program version code 2 C	R242		APLC version C
R235		User sequence program version code 2 D	R243		APLC version D
R236		User sequence program version code 2 E	R244		
R237		User sequence program version code 2 F	R245		
R238		User sequence program version code 2 G	R246		
R239		User sequence program version code 2 H	R247		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R248		OT ignored (Axis 1 to 8 for part system 1,2)	R256		
R249		OT ignored (Axis 1 to 8 for part system 3,4)	R257		
R250			R258		
R251			R259		
R252			R260		
R253			R261		
R254			R262		
R255		PLC axis OT ignored	R263		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R264			R272		Near-point dog ignored (Axis 1 to 8 for part system 1,2)
R265			R273		Near-point dog ignored (Axis 1 to 8 for part system 3,4)
R266			R274		
R267			R275		
R268			R276		
R269			R277		
R270			R278		
R271			R279		PLC axis near-point dog ignored
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R280			R288		
R281			R289		
R282			R290		
R283			R291		
R284			R292		
R285			R293		
R286			R294		
R287			R295		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R296	SOMD	Speed monitor mode	R304	NDPC	Power consumption computation: Consumption of devices other than drive system(L)
R297		Handy terminal Data area top address	R305		Power consumption computation: Consumption of devices other than drive system(H)
R298		Handy terminal Data valid number of registers	R306	DFPCC	Power consumption computation: Drive system's fixed consumption correction(L)
R299		Handy terminal Cause of communication error	R307		Power consumption computation: Drive system's fixed consumption correction(H)
R300			R308		Operator message I/F 1
R301			R309		Operator message I/F 2
R302			R310		Operator message I/F 3
R303			R311		Operator message I/F 4
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R312			R320		
R313			R321		
R314			R322		
R315			R323		
R316			R324		
R317			R325		
R318			R326		
R319			R327		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R328			R336		Tool I/D R/W pot No. designation ▲
R329			R337		Large diameter tool information ▲
R330			R338		Tool weight (spindle tool) ▲
R331			R339		Tool weight (standby tool) ▲
R332			R340		Unset tool information ▲
R333			R341		
R334			R342		Specified shape interference Shape No. designation
R335			R343		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R344			R352		Remote program input No. (L) ▲
R345			R353		Remote program input No. (H) ▲
R346			R354		Machine manufacturer macro password No. (L)
R347		Skip retract valid	R355		Machine manufacturer macro password No. (H)
R348		Skip retract amount (L) [M]	R356		Direct screen selection A
R349		Skip retract amount (H) [M]	R357		Direct screen selection B
R350		Skip retract speed (L) [M]	R358		Direct screen selection C
R351		Skip retract speed (H) [M]	R359		Direct screen selection D
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R360			R368		
R361		User level-based data protection: Operation level	R369		
R362			R370		
R363			R371		
R364			R372		High-speed simple program check: Time measurement output (L)
R365		Measures against tool setter chattering Movement amount	R373		High-speed simple program check: Time measurement output (H)
R366			R374		
R367			R375		Manual arbitrary reverse run handle selection
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R376			R384		
R377		Load meter comment designation	R385		
R378		High-speed simple program check: Time reduction coefficient	R386		
R379		Manual arbitrary reverse run speed multiplier	R387		
R380			R388		
R381			R389		
R382			R390		G/B spindle synchronization: position error compensation scale, and the number of times of compensations
R383			R391		Optimum acceleration/deceleration parameter switching axis (spindle and bit selection) ▲

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R392			R400		Ball screw thermal displacement compensation Offset amount 1st axis [M]
R393			R401		Ball screw thermal displacement compensation Max. compensation amount 1st axis [M]
R394			R402		Ball screw thermal displacement compensation Part-system, axis No. 1st axis
R395			R403		Ball screw thermal displacement compensation Offset amount 2nd axis [M]
R396		User PLC info program format info	R404		Ball screw thermal displacement compensation Max. compensation amount 2nd axis [M]
R397			R405		Ball screw thermal displacement compensation Part-system, axis No. 2nd axis
R398			R406		Ball screw thermal displacement compensation Offset amount 3rd axis [M]
R399			R407		Ball screw thermal displacement compensation Max. compensation amount 3rd axis
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R408		Ball screw thermal displacement compensation Part-system, axis No. 3rd axis [M]	R416		
R409		Ball screw thermal displacement compensation Offset amount 4th axis [M]	R417		
R410		Ball screw thermal displacement compensation Max. compensation amount 3rd axis [M]	R418		
R411		Ball screw thermal displacement compensation Part-system, axis No. 4th axis	R419		
R412			R420		
R413			R421		
R414			R422		
R415			R423		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R424		PLC window Reading start R register 1	R432		PLC window Reading start R register 3
R425		PLC window Number of read windows 1	R433		PLC window Number of read windows 3
R426		PLC window Writing start R register 1	R434		PLC window Writing start R register 3
R427		PLC window Number of write windows 1	R435		PLC window Number of write windows 3
R428		PLC window Reading start R register 2	R436		
R429		PLC window Number of read windows 2	R437		
R430		PLC window Writing start R register 2	R438		
R431		PLC window Number of write windows 2	R439		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R440		PLC axis control information address 1st axis	R448		PLC axis control buffering mode information address
R441		PLC axis control information address 2nd axis	R449		PLC axis control: droop release invalid axis ▲
R442		PLC axis control information address 3rd axis	R450		
R443		PLC axis control information address 4th axis	R451		
R444		PLC axis control information address 5th axis	R452		
R445		PLC axis control information address 6th axis	R453		
R446			R454		
R447			R455		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R456		Encoder 1 arbitrary pulse 1	R464		G/B spindle synchronization: maximum value of the relative position error during the steady state
R457		Encoder 1 arbitrary pulse 2	R465		G/B spindle synchronization: position error compensation amount
R458		Encoder 2 arbitrary pulse 1	R466		G/B spindle synchronization: phase shift amount
R459		Encoder 2 arbitrary pulse 2	R467		
R460		G/B spindle synchronization: maximum range of the relative position error	R468		
R461		G/B spindle synchronization: maximum value of the relative position error	R469		
R462		G/B spindle synchronization: average value of the relative position error during the steady state	R470		Modbus block 1 transfer position ▲
R463		G/B spindle synchronization: maximum range of the relative position error during the steady state for	R471		Modbus block 1 number of transfer ▲
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R472		Modbus block 2 transfer position ▲	R480		
R473		Modbus block 2 number of transfers ▲	R481		
R474		Modbus block 3 transfer position ▲	R482		
R475		Modbus block 3 number of transfers ▲	R483		
R476		Modbus block 4 transfer position ▲	R484		
R477		Modbus block 4 number of transfers ▲	R485		
R478		Modbus transfer cycle ▲	R486		
R479		Modbus time-out period ▲	R487		
Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R488			R496		
R489			R497		
R490			R498		
R491			R499		
R492					
R493					
R494					
R495					

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2500	R2700	R2900	R3100	R3300	R3500	R3700	R3900		1st cutting feedrate override
R2501	R2701	R2901	R3101	R3301	R3501	R3701	R3901		2nd cutting feedrate override
R2502	R2702	R2902	R3102	R3302	R3502	R3702	R3902		Rapid traverse override
R2503	R2703	R2903	R3103	R3303	R3503	R3703	R3903	CHPOV	Chopping override
R2504	R2704	R2904	R3104	R3304	R3504	R3704	R3904		Manual feedrate (L) [M]
R2505	R2705	R2905	R3105	R3305	R3505	R3705	R3905		Manual feedrate (H) [M]
R2506	R2706	R2906	R3106	R3306	R3506	R3706	R3906		Manual feedrate B (L) [M]
R2507	R2707	R2907	R3107	R3307	R3507	R3707	R3907		Manual feedrate B (H) [M]
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2508	R2708	R2908	R3108	R3308	R3508	R3708	R3908		1st handle/incremental feed magnification (L)
R2509	R2709	R2909	R3109	R3309	R3509	R3709	R3909		1st handle/incremental feed magnification (H)
R2510	R2710	R2910	R3110	R3310	R3510	R3710	R3910		2nd handle feed magnification (L)
R2511	R2711	R2911	R3111	R3311	R3511	R3711	R3911		2nd handle feed magnification (H)
R2512	R2712	R2912	R3112	R3312	R3512	R3712	R3912		3rd handle feed magnification (L)
R2513	R2713	R2913	R3113	R3313	R3513	R3713	R3913		3rd handle feed magnification (H)
R2514	R2714	R2914	R3114	R3314	R3514	R3714	R3914		
R2515	R2715	R2915	R3115	R3315	R3515	R3715	R3915		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2516	R2716	R2916	R3116	R3316	R3516	R3716	R3916		
R2517	R2717	R2917	R3117	R3317	R3517	R3717	R3917		Machine status animated warning display type
R2518	R2718	R2918	R3118	R3318	R3518	R3718	R3918		PLC interrupt program number (L)
R2519	R2719	R2919	R3119	R3319	R3519	R3719	R3919		PLC interrupt program number (H)
R2520	R2720	R2920	R3120	R3320	R3520	R3720	R3920		Load meter display interface 1 (L)
R2521	R2721	R2921	R3121	R3321	R3521	R3721	R3921		Load meter display interface 1 (H)
R2522	R2722	R2922	R3122	R3322	R3522	R3722	R3922		Load meter display interface 2 (L)
R2523	R2723	R2923	R3123	R3323	R3523	R3723	R3923		Load meter display interface 2 (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2524	R2724	R2924	R3124	R3324	R3524	R3724	R3924		Manual feedrate B override
R2525	R2725	R2925	R3125	R3325	R3525	R3725	R3925		External search device No.
R2526	R2726	R2926	R3126	R3326	R3526	R3726	R3926		External search program No. (L)
R2527	R2727	R2927	R3127	R3327	R3527	R3727	R3927		External search program No. (H)
R2528	R2728	R2928	R3128	R3328	R3528	R3728	R3928		External search sequence No. (L)
R2529	R2729	R2929	R3129	R3329	R3529	R3729	R3929		External search sequence No. (H)
R2530	R2730	R2930	R3130	R3330	R3530	R3730	R3930		External search block No. (L)
R2531	R2731	R2931	R3131	R3331	R3531	R3731	R3931		External search block No. (H)

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2532	R2732	R2932	R3132	R3332	R3532	R3732	R3932		
R2533	R2733	R2933	R3133	R3333	R3533	R3733	R3933		
R2534	R2734	R2934	R3134	R3334	R3534	R3734	R3934		
R2535	R2735	R2935	R3135	R3335	R3535	R3735	R3935		
R2536	R2736	R2936	R3136	R3336	R3536	R3736	R3936		
R2537	R2737	R2937	R3137	R3337	R3537	R3737	R3937		
R2538	R2738	R2938	R3138	R3338	R3538	R3738	R3938		
R2539	R2739	R2939	R3139	R3339	R3539	R3739	R3939		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2540	R2740	R2940	R3140	R3340	R3540	R3740	R3940		
R2541	R2741	R2941	R3141	R3341	R3541	R3741	R3941		
R2542	R2742	R2942	R3142	R3342	R3542	R3742	R3942		
R2543	R2743	R2943	R3143	R3343	R3543	R3743	R3943		
R2544	R2744	R2944	R3144	R3344	R3544	R3744	R3944		Manual arbitrary feed 1st axis travel amount (L) [M]
R2545	R2745	R2945	R3145	R3345	R3545	R3745	R3945		Manual arbitrary feed 1st axis travel amount (H) [M]
R2546	R2746	R2946	R3146	R3346	R3546	R3746	R3946		
R2547	R2747	R2947	R3147	R3347	R3547	R3747	R3947		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2548	R2748	R2948	R3148	R3348	R3548	R3748	R3948		Manual arbitrary feed 2nd axis travel amount (L) [M]
R2549	R2749	R2949	R3149	R3349	R3549	R3749	R3949		Manual arbitrary feed 2nd axis travel amount (H) [M]
R2550	R2750	R2950	R3150	R3350	R3550	R3750	R3950		
R2551	R2751	R2951	R3151	R3351	R3551	R3751	R3951		
R2552	R2752	R2952	R3152	R3352	R3552	R3752	R3952		Manual arbitrary feed 3rd axis travel amount (L) [M]
R2553	R2753	R2953	R3153	R3353	R3553	R3753	R3953		Manual arbitrary feed 3rd axis travel amount (H) [M]
R2554	R2754	R2954	R3154	R3354	R3554	R3754	R3954		
R2555	R2755	R2955	R3155	R3355	R3555	R3755	R3955		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2556	R2756	R2956	R3156	R3356	R3556	R3756	R3956		Alarm message I/F 1
R2557	R2757	R2957	R3157	R3357	R3557	R3757	R3957		Alarm message I/F 2
R2558	R2758	R2958	R3158	R3358	R3558	R3758	R3958		Alarm message I/F 3
R2559	R2759	R2959	R3159	R3359	R3559	R3759	R3959		Alarm message I/F 4
R2560	R2760	R2960	R3160	R3360	R3560	R3760	R3960		Operator message I/F
R2561	R2761	R2961	R3161	R3361	R3561	R3761	R3961		
R2562	R2762	R2962	R3162	R3362	R3562	R3762	R3962		Search & start program No. (L)
R2563	R2763	R2963	R3163	R3363	R3563	R3763	R3963		Search & start program No. (H)

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2564	R2764	R2964	R3164	R3364	R3564	R3764	R3964		Manual skip I/F 1 (Manual skip control) ▲
R2565	R2765	R2965	R3165	R3365	R3565	R3765	R3965		Manual skip I/F 2 (Manual skip axis stop/read request) ▲
R2566	R2766	R2966	R3166	R3366	R3566	R3766	R3966		Manual skip I/F 3 (Manual skip axis stop mode) ▲
R2567	R2767	R2967	R3167	R3367	R3567	R3767	R3967		Encoder selection
R2568	R2768	R2968	R3168	R3368	R3568	R3768	R3968		C axis selection
R2569	R2769	R2969	R3169	R3369	R3569	R3769	R3969		
R2570	R2770	R2970	R3170	R3370	R3570	R3770	R3970		
R2571	R2771	R2971	R3171	R3371	R3571	R3771	R3971		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2572	R2772	R2972	R3172	R3372	R3572	R3772	R3972		
R2573	R2773	R2973	R3173	R3373	R3573	R3773	R3973		
R2574	R2774	R2974	R3174	R3374	R3574	R3774	R3974		
R2575	R2775	R2975	R3175	R3375	R3575	R3775	R3975		
R2576	R2776	R2976	R3176	R3376	R3576	R3776	R3976		
R2577	R2777	R2977	R3177	R3377	R3577	R3777	R3977		
R2578	R2778	R2978	R3178	R3378	R3578	R3778	R3978		
R2579	R2779	R2979	R3179	R3379	R3579	R3779	R3979		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2580	R2780	R2980	R3180	R3380	R3580	R3780	R3980		Load monitor I : Axis selection
R2581	R2781	R2981	R3181	R3381	R3581	R3781	R3981		Load monitor I : Load change rate detection axis ▲
R2582	R2782	R2982	R3182	R3382	R3582	R3782	R3982		Load monitor I : Teaching data sub-No. ▲
R2583	R2783	R2983	R3183	R3383	R3583	R3783	R3983		Load monitor I : Adaptive control basic axis selection ▲
R2584	R2784	R2984	R3184	R3384	R3584	R3784	R3984		Each axis reference position selection
R2585	R2785	R2985	R3185	R3385	R3585	R3785	R3985		
R2586	R2786	R2986	R3186	R3386	R3586	R3786	R3986		
R2587	R2787	R2987	R3187	R3387	R3587	R3787	R3987		Chopping control data address
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2588	R2788	R2988	R3188	R3388	R3588	R3788	R3988		Tool life management data sort
R2589	R2789	R2989	R3189	R3389	R3589	R3789	R3989		Synchronous control operation method
R2590	R2790	R2990	R3190	R3390	R3590	R3790	R3990		Tool group No. designation (L)
R2591	R2791	R2991	R3191	R3391	R3591	R3791	R3991		Tool group No. designation (H)
R2592	R2792	R2992	R3192	R3392	R3592	R3792	R3992		Reference position adjustment completion
R2593	R2793	R2993	R3193	R3393	R3593	R3793	R3993		Current limit changeover
R2594	R2794	R2994	R3194	R3394	R3594	R3794	R3994		Wear compensation No. (tool presetter)
R2595	R2795	R2995	R3195	R3395	R3595	R3795	R3995		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2596	R2796	R2996	R3196	R3396	R3596	R3796	R3996		Turret interference object tool No. designation
R2597	R2797	R2997	R3197	R3397	R3597	R3797	R3997		
R2598	R2798	R2998	R3198	R3398	R3598	R3798	R3998		
R2599	R2799	R2999	R3199	R3399	R3599	R3799	R3999		Workpiece coordinate selection ▲
R2600	R2800	R3000	R3200	R3400	R3600	R3800	R4000		Workpiece coordinate offset Measurement tool compensation No./Selected compensation tool No.(main) (L) (Note 1)
R2601	R2801	R3001	R3201	R3401	R3601	R3801	R4001		Workpiece coordinate offset Measurement tool compen. No./Selected compen. tool No.(main) (H)
R2602	R2802	R3002	R3202	R3402	R3602	R3802	R4002		Workpiece coordinate offset Measurement tool No./Selected tool No.(main) (L) (Note 1)
R2603	R2803	R3003	R3203	R3403	R3603	R3803	R4003		Workpiece coordinate offset Measurement tool No./Selected tool No.(main) (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2604	R2804	R3004	R3204	R3404	R3604	R3804	R4004		Selected tool compensation No.(sub) (L)
R2605	R2805	R3005	R3205	R3405	R3605	R3805	R4005		Selected tool compensation No.(sub) (H)
R2606	R2806	R3006	R3206	R3406	R3606	R3806	R4006		Selected tool wear No. (sub) (L)
R2607	R2807	R3007	R3207	R3407	R3607	R3807	R4007		Selected tool wear No. (sub) (H)
R2608	R2808	R3008	R3208	R3408	R3608	R3808	R4008		Tool mounting information 1-16
R2609	R2809	R3009	R3209	R3409	R3609	R3809	R4009		Tool mounting information 17-32
R2610	R2810	R3010	R3210	R3410	R3610	R3810	R4010		Tool mounting information 33-48
R2611	R2811	R3011	R3211	R3411	R3611	R3811	R4011		Tool mounting information 49-64
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2612	R2812	R3012	R3212	R3412	R3612	R3812	R4012		Tool mounting information (65 - 80)
R2613	R2813	R3013	R3213	R3413	R3613	R3813	R4013		
R2614	R2814	R3014	R3214	R3414	R3614	R3814	R4014	SLSPNO	Multiple-spindle control I: Selected spindle No.
R2615	R2815	R3015	R3215	R3415	R3615	R3815	R4015		
R2616	R2816	R3016	R3216	R3416	R3616	R3816	R4016		Ext. machine coordinate: compensation No. ▲
R2617	R2817	R3017	R3217	R3417	R3617	R3817	R4017		Optimum acceleration/deceleration parameter switching axis (axis and bit selection) ▲
R2618	R2818	R3018	R3218	R3418	R3618	R3818	R4018		Tool length measurement 2 Tool No. (L)
R2619	R2819	R3019	R3219	R3419	R3619	R3819	R4019		Tool length measurement 2 Tool No. (H)
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2620	R2820	R3020	R3220	R3420	R3620	R3820	R4020		Constant torque control: Constant torque/proportional torque stopper control request axis
R2621	R2821	R3021	R3221	R3421	R3621	R3821	R4021		Constant torque control: Constant torque droop cancel request axis
R2622	R2822	R3022	R3222	R3422	R3622	R3822	R4022		
R2623	R2823	R3023	R3223	R3423	R3623	R3823	R4023		
R2624	R2824	R3024	R3224	R3424	R3624	R3824	R4024		
R2625	R2825	R3025	R3225	R3425	R3625	R3825	R4025		Servo ready completion output designation
R2626	R2826	R3026	R3226	R3426	R3626	R3826	R4026		Thread recutting command
R2627	R2827	R3027	R3227	R3427	R3627	R3827	R4027		Thread recutting execution operation

(Note 1) When the chuck barrier is checked, "Selected tool compensation No.(main):R2600, R2601" and "Selected tool No.(main):R2602, R2603" are applied.

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2628	R2828	R3028	R3228	R3428	R3628	R3828	R4028		Mechanical axis specifications 1st rotary axis angle (L)
R2629	R2829	R3029	R3229	R3429	R3629	R3829	R4029		Mechanical axis specifications 1st rotary axis angle (H)
R2630	R2830	R3030	R3230	R3430	R3630	R3830	R4030		Mechanical axis specifications 2nd rotary axis angle (L)
R2631	R2831	R3031	R3231	R3431	R3631	R3831	R4031		Mechanical axis specifications 2nd rotary axis angle (H)
R2632	R2832	R3032	R3232	R3432	R3632	R3832	R4032		
R2633	R2833	R3033	R3233	R3433	R3633	R3833	R4033		
R2634	R2834	R3034	R3234	R3434	R3634	R3834	R4034		
R2635	R2835	R3035	R3235	R3435	R3635	R3835	R4035		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2636	R2836	R3036	R3236	R3436	R3636	R3836	R4036		Circular feed in manual mode Operation mode data (L)
R2637	R2837	R3037	R3237	R3437	R3637	R3837	R4037		Circular feed in manual mode Operation mode data (H)
R2638	R2838	R3038	R3238	R3438	R3638	R3838	R4038		Circular feed in manual mode Part system designation
R2639	R2839	R3039	R3239	R3439	R3639	R3839	R4039		
R2640	R2840	R3040	R3240	R3440	R3640	R3840	R4040		Circular feed in manual mode Horizontal axis designation
R2641	R2841	R3041	R3241	R3441	R3641	R3841	R4041		Circular feed in manual mode Vertical axis designation
R2642	R2842	R3042	R3242	R3442	R3642	R3842	R4042		
R2643	R2843	R3043	R3243	R3443	R3643	R3843	R4043		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2644	R2844	R3044	R3244	R3444	R3644	R3844	R4044		Circular feed in manual mode Basic point X data (L)
R2645	R2845	R3045	R3245	R3445	R3645	R3845	R4045		Circular feed in manual mode Basic point X data (H)
R2646	R2846	R3046	R3246	R3446	R3646	R3846	R4046		
R2647	R2847	R3047	R3247	R3447	R3647	R3847	R4047		
R2648	R2848	R3048	R3248	R3448	R3648	R3848	R4048		Circular feed in manual mode Basic point Y data (L)
R2649	R2849	R3049	R3249	R3449	R3649	R3849	R4049		Circular feed in manual mode Basic point Y data (H)
R2650	R2850	R3050	R3250	R3450	R3650	R3850	R4050		
R2651	R2851	R3051	R3251	R3451	R3651	R3851	R4051		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2652	R2852	R3052	R3252	R3452	R3652	R3852	R4052		Circular feed in manual mode Travel range X+ data (L)
R2653	R2853	R3053	R3253	R3453	R3653	R3853	R4053		Circular feed in manual mode Travel range X+ data (H)
R2654	R2854	R3054	R3254	R3454	R3654	R3854	R4054		
R2655	R2855	R3055	R3255	R3455	R3655	R3855	R4055		
R2656	R2856	R3056	R3256	R3456	R3656	R3856	R4056		Circular feed in manual mode Travel range X- data (L)
R2657	R2857	R3057	R3257	R3457	R3657	R3857	R4057		Circular feed in manual mode Travel range X- data (H)
R2658	R2858	R3058	R3258	R3458	R3658	R3858	R4058		
R2659	R2859	R3059	R3259	R3459	R3659	R3859	R4059		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2660	R2860	R3060	R3260	R3460	R3660	R3860	R4060		Circular feed in manual mode Travel range Y+ data (L)
R2661	R2861	R3061	R3261	R3461	R3661	R3861	R4061		Circular feed in manual mode Travel range Y+ data (H)
R2662	R2862	R3062	R3262	R3462	R3662	R3862	R4062		
R2663	R2863	R3063	R3263	R3463	R3663	R3863	R4063		
R2664	R2864	R3064	R3264	R3464	R3664	R3864	R4064		Circular feed in manual mode Travel range Y- data (L)
R2665	R2865	R3065	R3265	R3465	R3665	R3865	R4065		Circular feed in manual mode Travel range Y- data (H)
R2666	R2866	R3066	R3266	R3466	R3666	R3866	R4066		
R2667	R2867	R3067	R3267	R3467	R3667	R3867	R4067		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2668	R2868	R3068	R3268	R3468	R3668	R3868	R4068		Circular feed in manual mode Gradient/arc center X data (L)
R2669	R2869	R3069	R3269	R3469	R3669	R3869	R4069		Circular feed in manual mode Gradient/arc center X data (H)
R2670	R2870	R3070	R3270	R3470	R3670	R3870	R4070		
R2671	R2871	R3071	R3271	R3471	R3671	R3871	R4071		
R2672	R2872	R3072	R3272	R3472	R3672	R3872	R4072		Circular feed in manual mode Gradient/arc center Y data (L)
R2673	R2873	R3073	R3273	R3473	R3673	R3873	R4073		Circular feed in manual mode Gradient/arc center Y data (H)
R2674	R2874	R3074	R3274	R3474	R3674	R3874	R4074		
R2675	R2875	R3075	R3275	R3475	R3675	R3875	R4075		
Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2684	R2884	R3084	R3284	R3484	R3684	R3884	R4084		For specific users NC control signal 1 ▲
R2685	R2885	R3085	R3285	R3485	R3685	R3885	R4085		
R2686	R2886	R3086	R3286	R3486	R3686	R3886	R4086		
R2687	R2887	R3087	R3287	R3487	R3687	R3887	R4087		
R2688	R2888	R3088	R3288	R3488	R3688	R3888	R4088		Specific users Manual skip motion direction (-) ▲
R2689	R2889	R3089	R3289	R3489	R3689	R3889	R4089		Specific users Manual skip motion direction (+) ▲
R2690	R2890	R3090	R3290	R3490	R3690	R3890	R4090		
R2691	R2891	R3091	R3291	R3491	R3691	R3891	R4091		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R4400		3D Machine Interference Check : Enabled shape group No.1			
R4401		3D Machine Interference Check : Enabled shape group No.2			
R4402		3D Machine Interference Check : Enabled shape group No.3			
R4403		3D Machine Interference Check : Enabled shape group No.4			
R4404					
R4405					
R4406					
R4407					

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5700	R5716	R5732	R5748		Ext. machine coordinate system offset data 1st axis (L) [M]
R5701	R5717	R5733	R5749		Ext. machine coordinate system offset data 1st axis (H) [M]
R5702	R5718	R5734	R5750		Ext. machine coordinate system offset data 2nd axis (L) [M]
R5703	R5719	R5735	R5751		Ext. machine coordinate system offset data 2nd axis (H) [M]
R5704	R5720	R5736	R5752		Ext. machine coordinate system offset data 3rd axis (L) [M]
R5705	R5721	R5737	R5753		Ext. machine coordinate system offset data 3rd axis (H) [M]
R5706	R5722	R5738	R5754		Ext. machine coordinate system offset data 4th axis (L) [M]
R5707	R5723	R5739	R5755		Ext. machine coordinate system offset data 4th axis (H) [M]
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5708	R5724	R5740	R5756		Ext. machine coordinate system offset data 5th axis (L) [M]
R5709	R5725	R5741	R5757		Ext. machine coordinate system offset data 5th axis (H) [M]
R5710	R5726	R5742	R5758		Ext. machine coordinate system offset data 6th axis (L) [M]
R5711	R5727	R5743	R5759		Ext. machine coordinate system offset data 6th axis (H) [M]
R5712	R5728	R5744	R5760		Ext. machine coordinate system offset data 7th axis (L) [M]
R5713	R5729	R5745	R5761		Ext. machine coordinate system offset data 7th axis (H) [M]
R5714	R5730	R5746	R5762		Ext. machine coordinate system offset data 8th axis (L) [M]
R5715	R5731	R5747	R5763		Ext. machine coordinate system offset data 8th axis (H) [M]
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5764	R5780	R5796	R5812		Each axis manual feedrate B 1st axis (L) [M]
R5765	R5781	R5797	R5813		Each axis manual feedrate B 1st axis (H) [M]
R5766	R5782	R5798	R5814		Each axis manual feedrate B 2nd axis (L) [M]
R5767	R5783	R5799	R5815		Each axis manual feedrate B 2nd axis (H) [M]
R5768	R5784	R5800	R5816		Each axis manual feedrate B 3rd axis (L) [M]
R5769	R5785	R5801	R5817		Each axis manual feedrate B 3rd axis (H) [M]
R5770	R5786	R5802	R5818		Each axis manual feedrate B 4th axis (L) [M]
R5771	R5787	R5803	R5819		Each axis manual feedrate B 4th axis (H) [M]

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5772	R5788	R5804	R5820		Each axis manual feedrate B 5th axis (L) [M]
R5773	R5789	R5805	R5821		Each axis manual feedrate B 5th axis (H) [M]
R5774	R5790	R5806	R5822		Each axis manual feedrate B 6th axis (L) [M]
R5775	R5791	R5807	R5823		Each axis manual feedrate B 6th axis (H) [M]
R5776	R5792	R5808	R5824		Each axis manual feedrate B 7th axis (L) [M]
R5777	R5793	R5809	R5825		Each axis manual feedrate B 7th axis (H) [M]
R5778	R5794	R5810	R5826		Each axis manual feedrate B 8th axis (L) [M]
R5779	R5795	R5811	R5827		Each axis manual feedrate B 8th axis (H) [M]
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5828	R5836	R5844	R5852		
R5829	R5837	R5845	R5853		
R5830	R5838	R5846	R5854		
R5831	R5839	R5847	R5855		
R5832	R5840	R5848	R5856		
R5833	R5841	R5849	R5857		
R5834	R5842	R5850	R5858		
R5835	R5843	R5851	R5859		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5860	R5868	R5876	R5884		
R5861	R5869	R5877	R5885		
R5862	R5870	R5878	R5886		
R5863	R5871	R5879	R5887		
R5864	R5872	R5880	R5888		
R5865	R5873	R5881	R5889		
R5866	R5874	R5882	R5890		
R5867	R5875	R5883	R5891		
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R5892	R5900	R5908	R5916		
R5893	R5901	R5909	R5917		
R5894	R5902	R5910	R5918		
R5895	R5903	R5911	R5919		
R5896	R5904	R5912	R5920		
R5897	R5905	R5913	R5921		
R5898	R5906	R5914	R5922		
R5899	R5907	R5915	R5923		

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R6052	R6060	R6068	R6076		External deceleration speed selection 1st axis ▲
R6053	R6061	R6069	R6077		External deceleration speed selection 2nd axis ▲
R6054	R6062	R6070	R6078		External deceleration speed selection 3rd axis ▲
R6055	R6063	R6071	R6079		External deceleration speed selection 4th axis ▲
R6056	R6064	R6072	R6080		External deceleration speed selection 5th axis ▲
R6057	R6065	R6073	R6081		External deceleration speed selection 6th axis ▲
R6058	R6066	R6074	R6082		External deceleration speed selection 7th axis ▲
R6059	R6067	R6075	R6083		External deceleration speed selection 8th axis ▲
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R6084	R6092	R6100	R6108		Optimum acceleration/deceleration parameter group selection 1st axis ▲
R6085	R6093	R6101	R6109		Optimum acceleration/deceleration parameter group selection 2nd axis ▲
R6086	R6094	R6102	R6110		Optimum acceleration/deceleration parameter group selection 3rd axis ▲
R6087	R6095	R6103	R6111		Optimum acceleration/deceleration parameter group selection 4th axis ▲
R6088	R6096	R6104	R6112		Optimum acceleration/deceleration parameter group selection 5th axis ▲
R6089	R6097	R6105	R6113		Optimum acceleration/deceleration parameter group selection 6th axis ▲
R6090	R6098	R6106	R6114		Optimum acceleration/deceleration parameter group selection 7th axis ▲
R6091	R6099	R6107	R6115		Optimum acceleration/deceleration parameter group selection 8th axis ▲
Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R6116	R6124	R6132	R6140		Target machining time 1st axis ▲
R6117	R6125	R6133	R6141		Target machining time 2nd axis ▲
R6118	R6126	R6134	R6142		Target machining time 3rd axis ▲
R6119	R6127	R6135	R6143		Target machining time 4th axis ▲
R6120	R6128	R6136	R6144		Target machining time 5th axis ▲
R6121	R6129	R6137	R6145		Target machining time 6th axis ▲
R6122	R6130	R6138	R6146		Target machining time 7th axis ▲
R6123	R6131	R6139	R6147		Target machining time 8th axis ▲

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.					
\$1	\$2	\$3	\$4	Abbrev.	Signal name
R6436	R6444	R6452	R6460		User macro input #1032 (PLC -> NC) (L)
R6437	R6445	R6453	R6461		User macro input #1032 (PLC -> NC) (H)
R6438	R6446	R6454	R6462		User macro input #1033 (PLC -> NC) (L)
R6439	R6447	R6455	R6463		User macro input #1033 (PLC -> NC) (H)
R6440	R6448	R6456	R6464		User macro input #1034 (PLC -> NC) (L)
R6441	R6449	R6457	R6465		User macro input #1034 (PLC -> NC) (H)
R6442	R6450	R6458	R6466		User macro input #1035 (PLC -> NC) (L)
R6443	R6451	R6459	R6467		User macro input #1035 (PLC -> NC) (H)

(Note) The CNC control and CNC status signals are arbitrarily assigned to the device and axis numbers by the parameter "#1603 PLCdev_no" for each axis.

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R7000	R7050	R7100	R7150	R7200	R7250	R7300	R7350		Spindle command rotation speed output (L)
R7001	R7051	R7101	R7151	R7201	R7251	R7301	R7351		Spindle command rotation speed output (H)
R7002	R7052	R7102	R7152	R7202	R7252	R7302	R7352	SLSP	Spindle command selection
R7003	R7053	R7103	R7153	R7203	R7253	R7303	R7353		Optimum acceleration/deceleration parameter group selection [spindle] ▲
R7004	R7054	R7104	R7154	R7204	R7254	R7304	R7354		Spindle target machining time ▲
R7005	R7055	R7105	R7155	R7205	R7255	R7305	R7355		
R7006	R7056	R7106	R7156	R7206	R7256	R7306	R7356		
R7007	R7057	R7107	R7157	R7207	R7257	R7307	R7357		

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R7008	R7058	R7108	R7158	R7208	R7258	R7308	R7358		S command override
R7009	R7059	R7109	R7159	R7209	R7259	R7309	R7359		Multi-point orientation position data
R7010	R7060	R7110	R7160	R7210	R7260	R7310	R7360	ORDIR	Orientation rotation direction ▲
R7011	R7061	R7111	R7161	R7211	R7261	R7311	R7361		
R7012	R7062	R7112	R7162	R7212	R7262	R7312	R7362		
R7013	R7063	R7113	R7163	R7213	R7263	R7313	R7363		
R7014	R7064	R7114	R7164	R7214	R7264	R7314	R7364		
R7015	R7065	R7115	R7165	R7215	R7265	R7315	R7365		

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R7016	R7066	R7116	R7166	R7216	R7266	R7316	R7366		Spindle synchronization reference spindle selection
R7017	R7067	R7117	R7167	R7217	R7267	R7317	R7367		Spindle synchronization Synchronized spindle selection
R7018	R7068	R7118	R7168	R7218	R7268	R7318	R7368		Spindle synchronization Phase shift amount
R7019	R7069	R7119	R7169	R7219	R7269	R7319	R7369		
R7020	R7070	R7120	R7170	R7220	R7270	R7320	R7370		Spindle oscillation amplitude
R7021	R7071	R7121	R7171	R7221	R7271	R7321	R7371		Spindle oscillation frequency
R7022	R7072	R7122	R7172	R7222	R7272	R7322	R7372		
R7023	R7073	R7123	R7173	R7223	R7273	R7323	R7373		

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R7024	R7074	R7124	R7174	R7224	R7274	R7324	R7374		
R7025	R7075	R7125	R7175	R7225	R7275	R7325	R7375		
R7026	R7076	R7126	R7176	R7226	R7276	R7326	R7376		
R7027	R7077	R7127	R7177	R7227	R7277	R7327	R7377		
R7028	R7078	R7128	R7178	R7228	R7278	R7328	R7378		
R7029	R7079	R7129	R7179	R7229	R7279	R7329	R7379		
R7030	R7080	R7130	R7180	R7230	R7280	R7330	R7380		
R7031	R7081	R7131	R7181	R7231	R7281	R7331	R7381		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R12200	R12210	R12220	R12230	R12240	R12250	R12260	R12270		Spindle tool No. (L)
R12201	R12211	R12221	R12231	R12241	R12251	R12261	R12271		Spindle tool No. (H)
R12202	R12212	R12222	R12232	R12242	R12252	R12262	R12272		Standby tool No. (L)
R12203	R12213	R12223	R12233	R12243	R12253	R12263	R12273		Standby tool No. (H)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10600		ATC control parameter	R10608		
R10601			R10609		
R10602			R10610		No.1 magazine number of magazines designation
R10603		Display tool selection parameter	R10611		No.2 magazine number of magazines designation
R10604		AUX data	R10612		No.3 magazine number of magazines designation
R10605			R10613		No.4 magazine number of magazines designation
R10606			R10614		No.5 magazine number of magazines designation
R10607			R10615		No.1 magazine pointer designation

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10616		No.2 magazine pointer designation	R10624		No.1 magazine standby 4 tool (T4-digit)/No.1 magazine standby 2 tool (T8-digit)
R10617		No.3 magazine pointer designation	R10625		No.1 magazine standby 2 tool (T8-digit)
R10618		No.4 magazine pointer designation	R10626		No.1 magazine standby 3 tool (T8-digit)
R10619		No.5 magazine pointer designation	R10627		No.1 magazine standby 3 tool (T8-digit)
R10620		No.1 magazine spindle tool	R10628		No.1 magazine standby 4 tool (T8-digit)
R10621		No.1 magazine standby 1 tool (T4-digit)/ No.1 magazine spindle tool (T8-digit)	R10629		No.1 magazine standby 4 tool (T8-digit)
R10622		No.1 magazine standby 2 tool (T4-digit)/ No.1 magazine standby 1 tool (T8-digit)	R10630		No.2 magazine spindle tool
R10623		No.1 magazine standby 3 tool (T4-digit)/ No.1 magazine standby 1 tool (T8-digit)	R10631		No.2 magazine standby 1 tool (T4-digit)/No.2 magazine spindle tool (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10632		No.2 magazine standby 2 tool (T4-digit)/ No.2 magazine standby 1 tool (T8-digit)	R10640		No.3 magazine spindle tool
R10633		No.2 magazine standby 3 tool (T4-digit)/ No.2 magazine standby 1 tool (T8-digit)	R10641		No.3 magazine standby 1 tool (T4-digit)/No.3 magazine spindle tool (T8-digit)
R10634		No.2 magazine standby 4 tool (T4-digit)/ No.2 magazine standby 2 tool (T8-digit)	R10642		No.3 magazine standby 2 tool (T4-digit)/No.3 magazine standby 1 tool (T8-digit)
R10635		No.2 magazine standby 2 tool (T8-digit)	R10643		No.3 magazine standby 3 tool (T4-digit)/No.3 magazine standby 1 tool (T8-digit)
R10636		No.2 magazine standby 3 tool (T8-digit)	R10644		No.3 magazine standby 4 tool (T4-digit)/No.3 magazine standby 2 tool (T8-digit)
R10637		No.2 magazine standby 3 tool (T8-digit)	R10645		No.3 magazine standby 2 tool (T8-digit)
R10638		No.2 magazine standby 4 tool (T8-digit)	R10646		No.3 magazine standby 3 tool (T8-digit)
R10639		No.2 magazine standby 4 tool (T8-digit)	R10647		No.3 magazine standby 3 tool (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10648		No.3 magazine standby 4 tool (T8-digit)	R10656		No.4 magazine standby 3 tool (T8-digit)
R10649		No.3 magazine standby 4 tool (T8-digit)	R10657		No.4 magazine standby 3 tool (T8-digit)
R10650		No.4 magazine spindle tool	R10658		No.4 magazine standby 4 tool (T8-digit)
R10651		No.4 magazine standby 1 tool (T4-digit)/ No.4 magazine spindle tool (T8-digit)	R10659		No.4 magazine standby 4 tool (T8-digit)
R10652		No.4 magazine standby 2 tool (T4-digit)/ No.4 magazine standby 1 tool (T8-digit)	R10660		No.5 magazine spindle tool
R10653		No.4 magazine standby 3 tool (T4-digit)/ No.4 magazine standby 1 tool (T8-digit)	R10661		No.5 magazine standby 1 tool (T4-digit)/No.5 magazine spindle tool (T8-digit)
R10654		No.4 magazine standby 4 tool (T4-digit)/ No.4 magazine standby 2 tool (T8-digit)	R10662		No.5 magazine standby 2 tool (T4-digit)/No.5 magazine standby 1 tool (T8-digit)
R10655		No.4 magazine standby 2 tool (T8-digit)	R10663		No.5 magazine standby 3 tool (T4-digit)/No.5 magazine standby 1 tool (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10664		No.5 magazine standby 4 tool (T4-digit)/ No.5 magazine standby 2 tool (T8-digit)	R10672		No.1 magazine standby 2 tool D
R10665		No.5 magazine standby 2 tool (T8-digit)	R10673		No.1 magazine standby 3 tool D
R10666		No.5 magazine standby 3 tool (T8-digit)	R10674		No.1 magazine standby 4 tool D
R10667		No.5 magazine standby 3 tool (T8-digit)	R10675		No.2 magazine spindle tool D
R10668		No.5 magazine standby 4 tool (T8-digit)	R10676		No.2 magazine standby 1 tool D
R10669		No.5 magazine standby 4 tool (T8-digit)	R10677		No.2 magazine standby 2 tool D
R10670		No.1 magazine spindle tool D	R10678		No.2 magazine standby 3 tool D
R10671		No.1 magazine standby 1 tool D	R10679		No.2 magazine standby 4 tool D

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10680		No.3 magazine spindle tool D	R10688		No.4 magazine standby 3 tool D
R10681		No.3 magazine standby 1 tool D	R10689		No.4 magazine standby 4 tool D
R10682		No.3 magazine standby 2 tool D	R10690		No.5 magazine spindle tool D
R10683		No.3 magazine standby 3 tool D	R10691		No.5 magazine standby 1 tool D
R10684		No.3 magazine standby 4 tool D	R10692		No.5 magazine standby 2 tool D
R10685		No.4 magazine spindle tool D	R10693		No.5 magazine standby 3 tool D
R10686		No.4 magazine standby 1 tool D	R10694		No.5 magazine standby 4 tool D
R10687		No.4 magazine standby 2 tool D	R10695		No.1 magazine pot head No.

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10696		No.2 magazine pot head No.	R10704		No.1 magazine tool data pot 5 (T4-digit)/pot 3 (T8-digit)
R10697		No.3 magazine pot head No.	R10705		No.1 magazine tool data pot 6 (T4-digit)/pot 3 (T8-digit)
R10698		No.4 magazine pot head No.	R10706		No.1 magazine tool data pot 7 (T4-digit)/pot 4 (T8-digit)
R10699		No.5 magazine pot head No.	R10707		No.1 magazine tool data pot 8 (T4-digit)/pot 4 (T8-digit)
R10700		No.1 magazine tool data pot 1	R10708		No.1 magazine tool data pot 9 (T4-digit)/pot 5 (T8-digit)
R10701		No.1 magazine tool data pot 2 (T4-digit)/ pot 1 (T8-digit)	R10709		No.1 magazine tool data pot 10 (T4-digit)/pot 5 (T8-digit)
R10702		No.1 magazine tool data pot 3 (T4-digit)/ pot 2 (T8-digit)	R10710		No.1 magazine tool data pot 11 (T4-digit)/pot 6 (T8-digit)
R10703		No.1 magazine tool data pot 4 (T4-digit)/ pot 2 (T8-digit)	R10711		No.1 magazine tool data pot 12 (T4-digit)/pot 6 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10712		No.1 magazine tool data pot 13 (T4-digit)/ pot 7 (T8-digit)	R10720		No.1 magazine tool data pot 21 (T4-digit)/pot 11 (T8-digit)
R10713		No.1 magazine tool data pot 14 (T4-digit)/ pot 7 (T8-digit)	R10721		No.1 magazine tool data pot 22 (T4-digit)/pot 11 (T8-digit)
R10714		No.1 magazine tool data pot 15 (T4-digit)/ pot 8 (T8-digit)	R10722		No.1 magazine tool data pot 23 (T4-digit)/pot 12 (T8-digit)
R10715		No.1 magazine tool data pot 16 (T4-digit)/ pot 8 (T8-digit)	R10723		No.1 magazine tool data pot 24 (T4-digit)/pot 12 (T8-digit)
R10716		No.1 magazine tool data pot 17 (T4-digit)/ pot 9 (T8-digit)	R10724		No.1 magazine tool data pot 25 (T4-digit)/pot 13 (T8-digit)
R10717		No.1 magazine tool data pot 18 (T4-digit)/ pot 9 (T8-digit)	R10725		No.1 magazine tool data pot 26 (T4-digit)/pot 13 (T8-digit)
R10718		No.1 magazine tool data pot 19 (T4-digit)/ pot 10 (T8-digit)	R10726		No.1 magazine tool data pot 27 (T4-digit)/pot 14 (T8-digit)
R10719		No.1 magazine tool data pot 20 (T4-digit)/ pot 10 (T8-digit)	R10727		No.1 magazine tool data pot 28 (T4-digit)/pot 14 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10728		No.1 magazine tool data pot 29 (T4-digit)/ pot 15 (T8-digit)	R10736		No.1 magazine tool data pot 37 (T4-digit)/pot 19 (T8-digit)
R10729		No.1 magazine tool data pot 30 (T4-digit)/ pot 15 (T8-digit)	R10737		No.1 magazine tool data pot 38 (T4-digit)/pot 19 (T8-digit)
R10730		No.1 magazine tool data pot 31 (T4-digit)/ pot 16 (T8-digit)	R10738		No.1 magazine tool data pot 39 (T4-digit)/pot 20 (T8-digit)
R10731		No.1 magazine tool data pot 32 (T4-digit)/ pot 16 (T8-digit)	R10739		No.1 magazine tool data pot 40 (T4-digit)/pot 20 (T8-digit)
R10732		No.1 magazine tool data pot 33 (T4-digit)/ pot 17 (T8-digit)	R10740		No.1 magazine tool data pot 41 (T4-digit)/pot 21 (T8-digit)
R10733		No.1 magazine tool data pot 34 (T4-digit)/ pot 17 (T8-digit)	R10741		No.1 magazine tool data pot 42 (T4-digit)/pot 21 (T8-digit)
R10734		No.1 magazine tool data pot 35 (T4-digit)/ pot 18 (T8-digit)	R10742		No.1 magazine tool data pot 43 (T4-digit)/pot 22 (T8-digit)
R10735		No.1 magazine tool data pot 36 (T4-digit)/ pot 18 (T8-digit)	R10743		No.1 magazine tool data pot 44 (T4-digit)/pot 22 (T8-digit)

3 Input/Output Signals with Controller

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10744		No.1 magazine tool data pot 45 (T4-digit)/ pot 23 (T8-digit)	R10752		No.1 magazine tool data pot 53 (T4-digit)/pot 27 (T8-digit)
R10745		No.1 magazine tool data pot 46 (T4-digit)/ pot 23 (T8-digit)	R10753		No.1 magazine tool data pot 54 (T4-digit)/pot 27 (T8-digit)
R10746		No.1 magazine tool data pot 47 (T4-digit)/ pot 24 (T8-digit)	R10754		No.1 magazine tool data pot 55 (T4-digit)/pot 28 (T8-digit)
R10747		No.1 magazine tool data pot 48 (T4-digit)/ pot 24 (T8-digit)	R10755		No.1 magazine tool data pot 56 (T4-digit)/pot 28 (T8-digit)
R10748		No.1 magazine tool data pot 49 (T4-digit)/ pot 25 (T8-digit)	R10756		No.1 magazine tool data pot 57 (T4-digit)/pot 29 (T8-digit)
R10749		No.1 magazine tool data pot 50 (T4-digit)/ pot 25 (T8-digit)	R10757		No.1 magazine tool data pot 58 (T4-digit)/pot 29 (T8-digit)
R10750		No.1 magazine tool data pot 51 (T4-digit)/ pot 26 (T8-digit)	R10758		No.1 magazine tool data pot 59 (T4-digit)/pot 30 (T8-digit)
R10751		No.1 magazine tool data pot 52 (T4-digit)/ pot 26 (T8-digit)	R10759		No.1 magazine tool data pot 60 (T4-digit)/pot 30 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10760		No.1 magazine tool data pot 61 (T4-digit)/ pot 31 (T8-digit)	R10768		No.1 magazine tool data pot 69 (T4-digit)/pot 35 (T8-digit)
R10761		No.1 magazine tool data pot 62 (T4-digit)/ pot 31 (T8-digit)	R10769		No.1 magazine tool data pot 70 (T4-digit)/pot 35 (T8-digit)
R10762		No.1 magazine tool data pot 63 (T4-digit)/ pot 32 (T8-digit)	R10770		No.1 magazine tool data pot 71 (T4-digit)/pot 36 (T8-digit)
R10763		No.1 magazine tool data pot 64 (T4-digit)/ pot 32 (T8-digit)	R10771		No.1 magazine tool data pot 72 (T4-digit)/pot 36 (T8-digit)
R10764		No.1 magazine tool data pot 65 (T4-digit)/ pot 33 (T8-digit)	R10772		No.1 magazine tool data pot 73 (T4-digit)/pot 37 (T8-digit)
R10765		No.1 magazine tool data pot 66 (T4-digit)/ pot 33 (T8-digit)	R10773		No.1 magazine tool data pot 74 (T4-digit)/pot 37 (T8-digit)
R10766		No.1 magazine tool data pot 67 (T4-digit)/ pot 34 (T8-digit)	R10774		No.1 magazine tool data pot 75 (T4-digit)/pot 38 (T8-digit)
R10767		No.1 magazine tool data pot 68 (T4-digit)/ pot 34 (T8-digit)	R10775		No.1 magazine tool data pot 76 (T4-digit)/pot 38 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10776		No.1 magazine tool data pot 77 (T4-digit)/ pot 39 (T8-digit)	R10784		No.1 magazine tool data pot 85 (T4-digit)/pot 43 (T8-digit)
R10777		No.1 magazine tool data pot 78 (T4-digit)/ pot 39 (T8-digit)	R10785		No.1 magazine tool data pot 86 (T4-digit)/pot 43 (T8-digit)
R10778		No.1 magazine tool data pot 79 (T4-digit)/ pot 40 (T8-digit)	R10786		No.1 magazine tool data pot 87 (T4-digit)/pot 44 (T8-digit)
R10779		No.1 magazine tool data pot 80 (T4-digit)/ pot 40 (T8-digit)	R10787		No.1 magazine tool data pot 88 (T4-digit)/pot 44 (T8-digit)
R10780		No.1 magazine tool data pot 81 (T4-digit)/ pot 41 (T8-digit)	R10788		No.1 magazine tool data pot 89 (T4-digit)/pot 45 (T8-digit)
R10781		No.1 magazine tool data pot 82 (T4-digit)/ pot 41 (T8-digit)	R10789		No.1 magazine tool data pot 90 (T4-digit)/pot 45 (T8-digit)
R10782		No.1 magazine tool data pot 83 (T4-digit)/ pot 42 (T8-digit)	R10790		No.1 magazine tool data pot 91 (T4-digit)/pot 46 (T8-digit)
R10783		No.1 magazine tool data pot 84 (T4-digit)/ pot 42 (T8-digit)	R10791		No.1 magazine tool data pot 92 (T4-digit)/pot 46 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10792		No.1 magazine tool data pot 93 (T4-digit)/ pot 47 (T8-digit)	R10800		No.1 magazine tool data pot 101 (T4-digit)/ pot 51 (T8-digit)
R10793		No.1 magazine tool data pot 94 (T4-digit)/ pot 47 (T8-digit)	R10801		No.1 magazine tool data pot 102 (T4-digit)/ pot 51 (T8-digit)
R10794		No.1 magazine tool data pot 95 (T4-digit)/ pot 48 (T8-digit)	R10802		No.1 magazine tool data pot 103 (T4-digit)/ pot 52 (T8-digit)
R10795		No.1 magazine tool data pot 96 (T4-digit)/ pot 48 (T8-digit)	R10803		No.1 magazine tool data pot 104 (T4-digit)/ pot 52 (T8-digit)
R10796		No.1 magazine tool data pot 97 (T4-digit)/ pot 49 (T8-digit)	R10804		No.1 magazine tool data pot 105 (T4-digit)/ pot 53 (T8-digit)
R10797		No.1 magazine tool data pot 98 (T4-digit)/ pot 49 (T8-digit)	R10805		No.1 magazine tool data pot 106 (T4-digit)/ pot 53 (T8-digit)
R10798		No.1 magazine tool data pot 99 (T4-digit)/ pot 50 (T8-digit)	R10806		No.1 magazine tool data pot 107 (T4-digit)/ pot 54 (T8-digit)
R10799		No.1 magazine tool data pot 100 (T4-digit)/ pot 50 (T8-digit)	R10807		No.1 magazine tool data pot 108 (T4-digit)/ pot 54 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10808		No.1 magazine tool data pot 109 (T4-digit)/ pot 55 (T8-digit)	R10816		No.1 magazine tool data pot 117 (T4-digit)/ pot 59 (T8-digit)
R10809		No.1 magazine tool data pot 110 (T4-digit)/ pot 55 (T8-digit)	R10817		No.1 magazine tool data pot 118 (T4-digit)/ pot 59 (T8-digit)
R10810		No.1 magazine tool data pot 111 (T4-digit)/ pot 56 (T8-digit)	R10818		No.1 magazine tool data pot 119 (T4-digit)/ pot 60 (T8-digit)
R10811		No.1 magazine tool data pot 112 (T4-digit)/ pot 56 (T8-digit)	R10819		No.1 magazine tool data pot 120 (T4-digit)/ pot 60 (T8-digit)
R10812		No.1 magazine tool data pot 113 (T4-digit)/ pot 57 (T8-digit)	R10820		No.1 magazine tool data pot 61 (T8-digit)
R10813		No.1 magazine tool data pot 114 (T4-digit)/ pot 57 (T8-digit)	R10821		No.1 magazine tool data pot 61 (T8-digit)
R10814		No.1 magazine tool data pot 115 (T4-digit)/ pot 58 (T8-digit)	R10822		No.1 magazine tool data pot 62 (T8-digit)
R10815		No.1 magazine tool data pot 116 (T4-digit)/ pot 58 (T8-digit)	R10823		No.1 magazine tool data pot 62 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10824		No.1 magazine tool data pot 63 (T8-digit)	R10832		No.1 magazine tool data pot 67 (T8-digit)
R10825		No.1 magazine tool data pot 63 (T8-digit)	R10833		No.1 magazine tool data pot 67 (T8-digit)
R10826		No.1 magazine tool data pot 64 (T8-digit)	R10834		No.1 magazine tool data pot 68 (T8-digit)
R10827		No.1 magazine tool data pot 64 (T8-digit)	R10835		No.1 magazine tool data pot 68 (T8-digit)
R10828		No.1 magazine tool data pot 65 (T8-digit)	R10836		No.1 magazine tool data pot 69 (T8-digit)
R10829		No.1 magazine tool data pot 65 (T8-digit)	R10837		No.1 magazine tool data pot 69 (T8-digit)
R10830		No.1 magazine tool data pot 66 (T8-digit)	R10838		No.1 magazine tool data pot 70 (T8-digit)
R10831		No.1 magazine tool data pot 66 (T8-digit)	R10839		No.1 magazine tool data pot 70 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10840		No.1 magazine tool data pot 71 (T8-digit)	R10848		No.1 magazine tool data pot 75 (T8-digit)
R10841		No.1 magazine tool data pot 71 (T8-digit)	R10849		No.1 magazine tool data pot 75 (T8-digit)
R10842		No.1 magazine tool data pot 72 (T8-digit)	R10850		No.1 magazine tool data pot 76 (T8-digit)
R10843		No.1 magazine tool data pot 72 (T8-digit)	R10851		No.1 magazine tool data pot 76 (T8-digit)
R10844		No.1 magazine tool data pot 73 (T8-digit)	R10852		No.1 magazine tool data pot 77 (T8-digit)
R10845		No.1 magazine tool data pot 73 (T8-digit)	R10853		No.1 magazine tool data pot 77 (T8-digit)
R10846		No.1 magazine tool data pot 74 (T8-digit)	R10854		No.1 magazine tool data pot 78 (T8-digit)
R10847		No.1 magazine tool data pot 74 (T8-digit)	R10855		No.1 magazine tool data pot 78 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10856		No.1 magazine tool data pot 79 (T8-digit)	R10864		No.1 magazine tool data pot 83 (T8-digit)
R10857		No.1 magazine tool data pot 79 (T8-digit)	R10865		No.1 magazine tool data pot 83 (T8-digit)
R10858		No.1 magazine tool data pot 80 (T8-digit)	R10866		No.1 magazine tool data pot 84 (T8-digit)
R10859		No.1 magazine tool data pot 80 (T8-digit)	R10867		No.1 magazine tool data pot 84 (T8-digit)
R10860		No.1 magazine tool data pot 81 (T8-digit)	R10868		No.1 magazine tool data pot 85 (T8-digit)
R10861		No.1 magazine tool data pot 81 (T8-digit)	R10869		No.1 magazine tool data pot 85 (T8-digit)
R10862		No.1 magazine tool data pot 82 (T8-digit)	R10870		No.1 magazine tool data pot 86 (T8-digit)
R10863		No.1 magazine tool data pot 82 (T8-digit)	R10871		No.1 magazine tool data pot 86 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10872		No.1 magazine tool data pot 87 (T8-digit)	R10880		No.1 magazine tool data pot 91 (T8-digit)
R10873		No.1 magazine tool data pot 87 (T8-digit)	R10881		No.1 magazine tool data pot 91 (T8-digit)
R10874		No.1 magazine tool data pot 88 (T8-digit)	R10882		No.1 magazine tool data pot 92 (T8-digit)
R10875		No.1 magazine tool data pot 88 (T8-digit)	R10883		No.1 magazine tool data pot 92 (T8-digit)
R10876		No.1 magazine tool data pot 89 (T8-digit)	R10884		No.1 magazine tool data pot 93 (T8-digit)
R10877		No.1 magazine tool data pot 89 (T8-digit)	R10885		No.1 magazine tool data pot 93 (T8-digit)
R10878		No.1 magazine tool data pot 90 (T8-digit)	R10886		No.1 magazine tool data pot 94 (T8-digit)
R10879		No.1 magazine tool data pot 90 (T8-digit)	R10887		No.1 magazine tool data pot 94 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10888		No.1 magazine tool data pot 95 (T8-digit)	R10896		No.1 magazine tool data pot 99 (T8-digit)
R10889		No.1 magazine tool data pot 95 (T8-digit)	R10897		No.1 magazine tool data pot 99 (T8-digit)
R10890		No.1 magazine tool data pot 96 (T8-digit)	R10898		No.1 magazine tool data pot 100 (T8-digit)
R10891		No.1 magazine tool data pot 96 (T8-digit)	R10899		No.1 magazine tool data pot 100 (T8-digit)
R10892		No.1 magazine tool data pot 97 (T8-digit)	R10900		No.1 magazine tool data pot 101 (T8-digit)
R10893		No.1 magazine tool data pot 97 (T8-digit)	R10901		No.1 magazine tool data pot 101 (T8-digit)
R10894		No.1 magazine tool data pot 98 (T8-digit)	R10902		No.1 magazine tool data pot 102 (T8-digit)
R10895		No.1 magazine tool data pot 98 (T8-digit)	R10903		No.1 magazine tool data pot 102 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10904		No.1 magazine tool data pot 103 (T8-digit)	R10912		No.1 magazine tool data pot 107 (T8-digit)
R10905		No.1 magazine tool data pot 103 (T8-digit)	R10913		No.1 magazine tool data pot 107 (T8-digit)
R10906		No.1 magazine tool data pot 104 (T8-digit)	R10914		No.1 magazine tool data pot 108 (T8-digit)
R10907		No.1 magazine tool data pot 104 (T8-digit)	R10915		No.1 magazine tool data pot 108 (T8-digit)
R10908		No.1 magazine tool data pot 105 (T8-digit)	R10916		No.1 magazine tool data pot 109 (T8-digit)
R10909		No.1 magazine tool data pot 105 (T8-digit)	R10917		No.1 magazine tool data pot 109 (T8-digit)
R10910		No.1 magazine tool data pot 106 (T8-digit)	R10918		No.1 magazine tool data pot 110 (T8-digit)
R10911		No.1 magazine tool data pot 106 (T8-digit)	R10919		No.1 magazine tool data pot 110 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10920		No.1 magazine tool data pot 111 (T8-digit)	R10928		No.1 magazine tool data pot 115 (T8-digit)
R10921		No.1 magazine tool data pot 111 (T8-digit)	R10929		No.1 magazine tool data pot 115 (T8-digit)
R10922		No.1 magazine tool data pot 112 (T8-digit)	R10930		No.1 magazine tool data pot 116 (T8-digit)
R10923		No.1 magazine tool data pot 112 (T8-digit)	R10931		No.1 magazine tool data pot 116 (T8-digit)
R10924		No.1 magazine tool data pot 113 (T8-digit)	R10932		No.1 magazine tool data pot 117 (T8-digit)
R10925		No.1 magazine tool data pot 113 (T8-digit)	R10933		No.1 magazine tool data pot 117 (T8-digit)
R10926		No.1 magazine tool data pot 114 (T8-digit)	R10934		No.1 magazine tool data pot 118 (T8-digit)
R10927		No.1 magazine tool data pot 114 (T8-digit)	R10935		No.1 magazine tool data pot 118 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10936		No.1 magazine tool data pot 119 (T8-digit)	R10944		No.1 magazine tool data (Aux.D) pot 5
R10937		No.1 magazine tool data pot 119 (T8-digit)	R10945		No.1 magazine tool data (Aux.D) pot 6
R10938		No.1 magazine tool data pot 120 (T8-digit)	R10946		No.1 magazine tool data (Aux.D) pot 7
R10939		No.1 magazine tool data pot 120 (T8-digit)	R10947		No.1 magazine tool data (Aux.D) pot 8
R10940		No.1 magazine tool data (Aux.D) pot 1	R10948		No.1 magazine tool data (Aux.D) pot 9
R10941		No.1 magazine tool data (Aux.D) pot 2	R10949		No.1 magazine tool data (Aux.D) pot 10
R10942		No.1 magazine tool data (Aux.D) pot 3	R10950		No.1 magazine tool data (Aux.D) pot 11
R10943		No.1 magazine tool data (Aux.D) pot 4	R10951		No.1 magazine tool data (Aux.D) pot 12

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10952		No.1 magazine tool data (Aux.D) pot 13	R10960		No.1 magazine tool data (Aux.D) pot 21
R10953		No.1 magazine tool data (Aux.D) pot 14	R10961		No.1 magazine tool data (Aux.D) pot 22
R10954		No.1 magazine tool data (Aux.D) pot 15	R10962		No.1 magazine tool data (Aux.D) pot 23
R10955		No.1 magazine tool data (Aux.D) pot 16	R10963		No.1 magazine tool data (Aux.D) pot 24
R10956		No.1 magazine tool data (Aux.D) pot 17	R10964		No.1 magazine tool data (Aux.D) pot 25
R10957		No.1 magazine tool data (Aux.D) pot 18	R10965		No.1 magazine tool data (Aux.D) pot 26
R10958		No.1 magazine tool data (Aux.D) pot 19	R10966		No.1 magazine tool data (Aux.D) pot 27
R10959		No.1 magazine tool data (Aux.D) pot 20	R10967		No.1 magazine tool data (Aux.D) pot 28

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10968		No.1 magazine tool data (Aux.D) pot 29	R10976		No.1 magazine tool data (Aux.D) pot 37
R10969		No.1 magazine tool data (Aux.D) pot 30	R10977		No.1 magazine tool data (Aux.D) pot 38
R10970		No.1 magazine tool data (Aux.D) pot 31	R10978		No.1 magazine tool data (Aux.D) pot 39
R10971		No.1 magazine tool data (Aux.D) pot 32	R10979		No.1 magazine tool data (Aux.D) pot 40
R10972		No.1 magazine tool data (Aux.D) pot 33	R10980		No.1 magazine tool data (Aux.D) pot 41
R10973		No.1 magazine tool data (Aux.D) pot 34	R10981		No.1 magazine tool data (Aux.D) pot 42
R10974		No.1 magazine tool data (Aux.D) pot 35	R10982		No.1 magazine tool data (Aux.D) pot 43
R10975		No.1 magazine tool data (Aux.D) pot 36	R10983		No.1 magazine tool data (Aux.D) pot 44

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R10984		No.1 magazine tool data (Aux.D) pot 45	R10992		No.1 magazine tool data (Aux.D) pot 53
R10985		No.1 magazine tool data (Aux.D) pot 46	R10993		No.1 magazine tool data (Aux.D) pot 54
R10986		No.1 magazine tool data (Aux.D) pot 47	R10994		No.1 magazine tool data (Aux.D) pot 55
R10987		No.1 magazine tool data (Aux.D) pot 48	R10995		No.1 magazine tool data (Aux.D) pot 56
R10988		No.1 magazine tool data (Aux.D) pot 49	R10996		No.1 magazine tool data (Aux.D) pot 57
R10989		No.1 magazine tool data (Aux.D) pot 50	R10997		No.1 magazine tool data (Aux.D) pot 58
R10990		No.1 magazine tool data (Aux.D) pot 51	R10998		No.1 magazine tool data (Aux.D) pot 59
R10991		No.1 magazine tool data (Aux.D) pot 52	R10999		No.1 magazine tool data (Aux.D) pot 60

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11000		No.1 magazine tool data (Aux.D) pot 61	R11008		No.1 magazine tool data (Aux.D) pot 69
R11001		No.1 magazine tool data (Aux.D) pot 62	R11009		No.1 magazine tool data (Aux.D) pot 70
R11002		No.1 magazine tool data (Aux.D) pot 63	R11010		No.1 magazine tool data (Aux.D) pot 71
R11003		No.1 magazine tool data (Aux.D) pot 64	R11011		No.1 magazine tool data (Aux.D) pot 72
R11004		No.1 magazine tool data (Aux.D) pot 65	R11012		No.1 magazine tool data (Aux.D) pot 73
R11005		No.1 magazine tool data (Aux.D) pot 66	R11013		No.1 magazine tool data (Aux.D) pot 74
R11006		No.1 magazine tool data (Aux.D) pot 67	R11014		No.1 magazine tool data (Aux.D) pot 75
R11007		No.1 magazine tool data (Aux.D) pot 68	R11015		No.1 magazine tool data (Aux.D) pot 76

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11016		No.1 magazine tool data (Aux.D) pot 77	R11024		No.1 magazine tool data (Aux.D) pot 85
R11017		No.1 magazine tool data (Aux.D) pot 78	R11025		No.1 magazine tool data (Aux.D) pot 86
R11018		No.1 magazine tool data (Aux.D) pot 79	R11026		No.1 magazine tool data (Aux.D) pot 87
R11019		No.1 magazine tool data (Aux.D) pot 80	R11027		No.1 magazine tool data (Aux.D) pot 88
R11020		No.1 magazine tool data (Aux.D) pot 81	R11028		No.1 magazine tool data (Aux.D) pot 89
R11021		No.1 magazine tool data (Aux.D) pot 82	R11029		No.1 magazine tool data (Aux.D) pot 90
R11022		No.1 magazine tool data (Aux.D) pot 83	R11030		No.1 magazine tool data (Aux.D) pot 91
R11023		No.1 magazine tool data (Aux.D) pot 84	R11031		No.1 magazine tool data (Aux.D) pot 92

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11032		No.1 magazine tool data (Aux.D) pot 93	R11040		No.1 magazine tool data (Aux.D) pot 101
R11033		No.1 magazine tool data (Aux.D) pot 94	R11041		No.1 magazine tool data (Aux.D) pot 102
R11034		No.1 magazine tool data (Aux.D) pot 95	R11042		No.1 magazine tool data (Aux.D) pot 103
R11035		No.1 magazine tool data (Aux.D) pot 96	R11043		No.1 magazine tool data (Aux.D) pot 104
R11036		No.1 magazine tool data (Aux.D) pot 97	R11044		No.1 magazine tool data (Aux.D) pot 105
R11037		No.1 magazine tool data (Aux.D) pot 98	R11045		No.1 magazine tool data (Aux.D) pot 106
R11038		No.1 magazine tool data (Aux.D) pot 99	R11046		No.1 magazine tool data (Aux.D) pot 107
R11039		No.1 magazine tool data (Aux.D) pot 100	R11047		No.1 magazine tool data (Aux.D) pot 108

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11048		No.1 magazine tool data (Aux.D) pot 109	R11056		No.1 magazine tool data (Aux.D) pot 117
R11049		No.1 magazine tool data (Aux.D) pot 110	R11057		No.1 magazine tool data (Aux.D) pot 118
R11050		No.1 magazine tool data (Aux.D) pot 111	R11058		No.1 magazine tool data (Aux.D) pot 119
R11051		No.1 magazine tool data (Aux.D) pot 112	R11059		No.1 magazine tool data (Aux.D) pot 120
R11052		No.1 magazine tool data (Aux.D) pot 113	R11060		No.2 magazine tool data pot 1
R11053		No.1 magazine tool data (Aux.D) pot 114	R11061		No.2 magazine tool data pot 2 (T4-digit)/pot 1 (T8-digit)
R11054		No.1 magazine tool data (Aux.D) pot 115	R11062		No.2 magazine tool data pot 3 (T4-digit)/pot 2 (T8-digit)
R11055		No.1 magazine tool data (Aux.D) pot 116	R11063		No.2 magazine tool data pot 4 (T4-digit)/pot 2 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11064		No.2 magazine tool data pot 5 (T4-digit)/pot 3 (T8-digit)	R11072		No.2 magazine tool data pot 13 (T4-digit)/pot 7 (T8-digit)
R11065		No.2 magazine tool data pot 6 (T4-digit)/pot 3 (T8-digit)	R11073		No.2 magazine tool data pot 14 (T4-digit)/pot 7 (T8-digit)
R11066		No.2 magazine tool data pot 7 (T4-digit)/pot 4 (T8-digit)	R11074		No.2 magazine tool data pot 15 (T4-digit)/pot 8 (T8-digit)
R11067		No.2 magazine tool data pot 8 (T4-digit)/pot 4 (T8-digit)	R11075		No.2 magazine tool data pot 16 (T4-digit)/pot 8 (T8-digit)
R11068		No.2 magazine tool data pot 9 (T4-digit)/pot 5 (T8-digit)	R11076		No.2 magazine tool data pot 17 (T4-digit)/pot 9 (T8-digit)
R11069		No.2 magazine tool data pot 10 (T4-digit)/pot 5 (T8-digit)	R11077		No.2 magazine tool data pot 18 (T4-digit)/pot 9 (T8-digit)
R11070		No.2 magazine tool data pot 11 (T4-digit)/pot 6 (T8-digit)	R11078		No.2 magazine tool data pot 19 (T4-digit)/pot 10 (T8-digit)
R11071		No.2 magazine tool data pot 12 (T4-digit)/pot 6 (T8-digit)	R11079		No.2 magazine tool data pot 20 (T4-digit)/pot 10 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11080		No.2 magazine tool data pot 21 (T4-digit)/pot 11 (T8-digit)	R11088		No.2 magazine tool data pot 29 (T4-digit)/pot 15 (T8-digit)
R11081		No.2 magazine tool data pot 22 (T4-digit)/pot 11 (T8-digit)	R11089		No.2 magazine tool data pot 30 (T4-digit)/pot 15 (T8-digit)
R11082		No.2 magazine tool data pot 23 (T4-digit)/pot 12 (T8-digit)	R11090		No.2 magazine tool data pot 31 (T4-digit)/pot 16 (T8-digit)
R11083		No.2 magazine tool data pot 24 (T4-digit)/pot 12 (T8-digit)	R11091		No.2 magazine tool data pot 32 (T4-digit)/pot 16 (T8-digit)
R11084		No.2 magazine tool data pot 25 (T4-digit)/pot 13 (T8-digit)	R11092		No.2 magazine tool data pot 33 (T4-digit)/pot 17 (T8-digit)
R11085		No.2 magazine tool data pot 26 (T4-digit)/pot 13 (T8-digit)	R11093		No.2 magazine tool data pot 34 (T4-digit)/pot 17 (T8-digit)
R11086		No.2 magazine tool data pot 27 (T4-digit)/pot 14 (T8-digit)	R11094		No.2 magazine tool data pot 35 (T4-digit)/pot 18 (T8-digit)
R11087		No.2 magazine tool data pot 28 (T4-digit)/pot 14 (T8-digit)	R11095		No.2 magazine tool data pot 36 (T4-digit)/pot 18 (T8-digit)

3 Input/Output Signals with Controller

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11096		No.2 magazine tool data pot 37 (T4-digit)/ pot 19 (T8-digit)	R11104		No.2 magazine tool data pot 45 (T4-digit)/pot 23 (T8-digit)
R11097		No.2 magazine tool data pot 38 (T4-digit)/ pot 19 (T8-digit)	R11105		No.2 magazine tool data pot 46 (T4-digit)/pot 23 (T8-digit)
R11098		No.2 magazine tool data pot 39 (T4-digit)/ pot 20 (T8-digit)	R11106		No.2 magazine tool data pot 47 (T4-digit)/pot 24 (T8-digit)
R11099		No.2 magazine tool data pot 40 (T4-digit)/ pot 20 (T8-digit)	R11107		No.2 magazine tool data pot 48 (T4-digit)/pot 24 (T8-digit)
R11100		No.2 magazine tool data pot 41 (T4-digit)/ pot 21 (T8-digit)	R11108		No.2 magazine tool data pot 49 (T4-digit)/pot 25 (T8-digit)
R11101		No.2 magazine tool data pot 42 (T4-digit)/ pot 21 (T8-digit)	R11109		No.2 magazine tool data pot 50 (T4-digit)/pot 25 (T8-digit)
R11102		No.2 magazine tool data pot 43 (T4-digit)/ pot 22 (T8-digit)	R11110		No.2 magazine tool data pot 51 (T4-digit)/pot 26 (T8-digit)
R11103		No.2 magazine tool data pot 44 (T4-digit)/ pot 22 (T8-digit)	R11111		No.2 magazine tool data pot 52 (T4-digit)/pot 26 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11112		No.2 magazine tool data pot 53 (T4-digit)/ pot 27 (T8-digit)	R11120		No.2 magazine tool data pot 61 (T4-digit)/pot 31 (T8-digit)
R11113		No.2 magazine tool data pot 54 (T4-digit)/ pot 27 (T8-digit)	R11121		No.2 magazine tool data pot 62 (T4-digit)/pot 31 (T8-digit)
R11114		No.2 magazine tool data pot 55 (T4-digit)/ pot 28 (T8-digit)	R11122		No.2 magazine tool data pot 63 (T4-digit)/pot 32 (T8-digit)
R11115		No.2 magazine tool data pot 56 (T4-digit)/ pot 28 (T8-digit)	R11123		No.2 magazine tool data pot 64 (T4-digit)/pot 32 (T8-digit)
R11116		No.2 magazine tool data pot 57 (T4-digit)/ pot 29 (T8-digit)	R11124		No.2 magazine tool data pot 65 (T4-digit)/pot 33 (T8-digit)
R11117		No.2 magazine tool data pot 58 (T4-digit)/ pot 29 (T8-digit)	R11125		No.2 magazine tool data pot 66 (T4-digit)/pot 33 (T8-digit)
R11118		No.2 magazine tool data pot 59 (T4-digit)/ pot 30 (T8-digit)	R11126		No.2 magazine tool data pot 67 (T4-digit)/pot 34 (T8-digit)
R11119		No.2 magazine tool data pot 60 (T4-digit)/ pot 30 (T8-digit)	R11127		No.2 magazine tool data pot 68 (T4-digit)/pot 34 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11128		No.2 magazine tool data pot 69 (T4-digit)/ pot 35 (T8-digit)	R11136		No.2 magazine tool data pot 77 (T4-digit)/pot 39 (T8-digit)
R11129		No.2 magazine tool data pot 70 (T4-digit)/ pot 35 (T8-digit)	R11137		No.2 magazine tool data pot 78 (T4-digit)/pot 39 (T8-digit)
R11130		No.2 magazine tool data pot 71 (T4-digit)/ pot 36 (T8-digit)	R11138		No.2 magazine tool data pot 79 (T4-digit)/pot 40 (T8-digit)
R11131		No.2 magazine tool data pot 72 (T4-digit)/ pot 36 (T8-digit)	R11139		No.2 magazine tool data pot 80 (T4-digit)/pot 40 (T8-digit)
R11132		No.2 magazine tool data pot 73 (T4-digit)/ pot 37 (T8-digit)	R11140		No.2 magazine tool data pot 81 (T4-digit)/pot 41 (T8-digit)
R11133		No.2 magazine tool data pot 74 (T4-digit)/ pot 37 (T8-digit)	R11141		No.2 magazine tool data pot 82 (T4-digit)/pot 41 (T8-digit)
R11134		No.2 magazine tool data pot 75 (T4-digit)/ pot 38 (T8-digit)	R11142		No.2 magazine tool data pot 83 (T4-digit)/pot 42 (T8-digit)
R11135		No.2 magazine tool data pot 76 (T4-digit)/ pot 38 (T8-digit)	R11143		No.2 magazine tool data pot 84 (T4-digit)/pot 42 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11144		No.2 magazine tool data pot 85 (T4-digit)/ pot 43 (T8-digit)	R11152		No.2 magazine tool data pot 93 (T4-digit)/pot 47 (T8-digit)
R11145		No.2 magazine tool data pot 86 (T4-digit)/ pot 43 (T8-digit)	R11153		No.2 magazine tool data pot 94 (T4-digit)/pot 47 (T8-digit)
R11146		No.2 magazine tool data pot 87 (T4-digit)/ pot 44 (T8-digit)	R11154		No.2 magazine tool data pot 95 (T4-digit)/pot 48 (T8-digit)
R11147		No.2 magazine tool data pot 88 (T4-digit)/ pot 44 (T8-digit)	R11155		No.2 magazine tool data pot 96 (T4-digit)/pot 48 (T8-digit)
R11148		No.2 magazine tool data pot 89 (T4-digit)/ pot 45 (T8-digit)	R11156		No.2 magazine tool data pot 97 (T4-digit)/pot 49 (T8-digit)
R11149		No.2 magazine tool data pot 90 (T4-digit)/ pot 45 (T8-digit)	R11157		No.2 magazine tool data pot 98 (T4-digit)/pot 49 (T8-digit)
R11150		No.2 magazine tool data pot 91 (T4-digit)/ pot 46 (T8-digit)	R11158		No.2 magazine tool data pot 99 (T4-digit)/pot 50 (T8-digit)
R11151		No.2 magazine tool data pot 92 (T4-digit)/ pot 46 (T8-digit)	R11159		No.2 magazine tool data pot 100 (T4-digit)/pot 50 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11160		No.2 magazine tool data pot 101 (T4-digit)/ pot 51 (T8-digit)	R11168		No.2 magazine tool data pot 109 (T4-digit)/pot 55 (T8-digit)
R11161		No.2 magazine tool data pot 102 (T4-digit)/ pot 51 (T8-digit)	R11169		No.2 magazine tool data pot 110 (T4-digit)/pot 55 (T8-digit)
R11162		No.2 magazine tool data pot 103 (T4-digit)/ pot 52 (T8-digit)	R11170		No.2 magazine tool data pot 111 (T4-digit)/pot 56 (T8-digit)
R11163		No.2 magazine tool data pot 104 (T4-digit)/ pot 52 (T8-digit)	R11171		No.2 magazine tool data pot 112 (T4-digit)/pot 56 (T8-digit)
R11164		No.2 magazine tool data pot 105 (T4-digit)/ pot 53 (T8-digit)	R11172		No.2 magazine tool data pot 113 (T4-digit)/pot 57 (T8-digit)
R11165		No.2 magazine tool data pot 106 (T4-digit)/ pot 53 (T8-digit)	R11173		No.2 magazine tool data pot 114 (T4-digit)/pot 57 (T8-digit)
R11166		No.2 magazine tool data pot 107 (T4-digit)/ pot 54 (T8-digit)	R11174		No.2 magazine tool data pot 115 (T4-digit)/pot 58 (T8-digit)
R11167		No.2 magazine tool data pot 108 (T4-digit)/ pot 54 (T8-digit)	R11175		No.2 magazine tool data pot 116 (T4-digit)/pot 58 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11176		No.2 magazine tool data pot 117 (T4-digit)/ pot 59 (T8-digit)	R11184		No.2 magazine tool data pot 63 (T8-digit)
R11177		No.2 magazine tool data pot 118 (T4-digit)/ pot 59 (T8-digit)	R11185		No.2 magazine tool data pot 63 (T8-digit)
R11178		No.2 magazine tool data pot 119 (T4-digit)/ pot 60 (T8-digit)	R11186		No.2 magazine tool data pot 64 (T8-digit)
R11179		No.2 magazine tool data pot 120 (T4-digit)/ pot 60 (T8-digit)	R11187		No.2 magazine tool data pot 64 (T8-digit)
R11180		No.2 magazine tool data pot 61 (T8-digit)	R11188		No.2 magazine tool data pot 65 (T8-digit)
R11181		No.2 magazine tool data pot 61 (T8-digit)	R11189		No.2 magazine tool data pot 65 (T8-digit)
R11182		No.2 magazine tool data pot 62 (T8-digit)	R11190		No.2 magazine tool data pot 66 (T8-digit)
R11183		No.2 magazine tool data pot 62 (T8-digit)	R11191		No.2 magazine tool data pot 66 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11192		No.2 magazine tool data pot 67 (T8-digit)	R11200		No.2 magazine tool data pot 71 (T8-digit)
R11193		No.2 magazine tool data pot 67 (T8-digit)	R11201		No.2 magazine tool data pot 71 (T8-digit)
R11194		No.2 magazine tool data pot 68 (T8-digit)	R11202		No.2 magazine tool data pot 72 (T8-digit)
R11195		No.2 magazine tool data pot 68 (T8-digit)	R11203		No.2 magazine tool data pot 72 (T8-digit)
R11196		No.2 magazine tool data pot 69 (T8-digit)	R11204		No.2 magazine tool data pot 73 (T8-digit)
R11197		No.2 magazine tool data pot 69 (T8-digit)	R11205		No.2 magazine tool data pot 73 (T8-digit)
R11198		No.2 magazine tool data pot 70 (T8-digit)	R11206		No.2 magazine tool data pot 74 (T8-digit)
R11199		No.2 magazine tool data pot 70 (T8-digit)	R11207		No.2 magazine tool data pot 74 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11208		No.2 magazine tool data pot 75 (T8-digit)	R11216		No.2 magazine tool data pot 79 (T8-digit)
R11209		No.2 magazine tool data pot 75 (T8-digit)	R11217		No.2 magazine tool data pot 79 (T8-digit)
R11210		No.2 magazine tool data pot 76 (T8-digit)	R11218		No.2 magazine tool data pot 80 (T8-digit)
R11211		No.2 magazine tool data pot 76 (T8-digit)	R11219		No.2 magazine tool data pot 80 (T8-digit)
R11212		No.2 magazine tool data pot 77 (T8-digit)	R11220		No.2 magazine tool data pot 81 (T8-digit)
R11213		No.2 magazine tool data pot 77 (T8-digit)	R11221		No.2 magazine tool data pot 81 (T8-digit)
R11214		No.2 magazine tool data pot 78 (T8-digit)	R11222		No.2 magazine tool data pot 82 (T8-digit)
R11215		No.2 magazine tool data pot 78 (T8-digit)	R11223		No.2 magazine tool data pot 82 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11224		No.2 magazine tool data pot 83 (T8-digit)	R11232		No.2 magazine tool data pot 87 (T8-digit)
R11225		No.2 magazine tool data pot 83 (T8-digit)	R11233		No.2 magazine tool data pot 87 (T8-digit)
R11226		No.2 magazine tool data pot 84 (T8-digit)	R11234		No.2 magazine tool data pot 88 (T8-digit)
R11227		No.2 magazine tool data pot 84 (T8-digit)	R11235		No.2 magazine tool data pot 88 (T8-digit)
R11228		No.2 magazine tool data pot 85 (T8-digit)	R11236		No.2 magazine tool data pot 89 (T8-digit)
R11229		No.2 magazine tool data pot 85 (T8-digit)	R11237		No.2 magazine tool data pot 89 (T8-digit)
R11230		No.2 magazine tool data pot 86 (T8-digit)	R11238		No.2 magazine tool data pot 90 (T8-digit)
R11231		No.2 magazine tool data pot 86 (T8-digit)	R11239		No.2 magazine tool data pot 90 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11240		No.2 magazine tool data pot 91 (T8-digit)	R11248		No.2 magazine tool data pot 95 (T8-digit)
R11241		No.2 magazine tool data pot 91 (T8-digit)	R11249		No.2 magazine tool data pot 95 (T8-digit)
R11242		No.2 magazine tool data pot 92 (T8-digit)	R11250		No.2 magazine tool data pot 96 (T8-digit)
R11243		No.2 magazine tool data pot 92 (T8-digit)	R11251		No.2 magazine tool data pot 96 (T8-digit)
R11244		No.2 magazine tool data pot 93 (T8-digit)	R11252		No.2 magazine tool data pot 97 (T8-digit)
R11245		No.2 magazine tool data pot 93 (T8-digit)	R11253		No.2 magazine tool data pot 97 (T8-digit)
R11246		No.2 magazine tool data pot 94 (T8-digit)	R11254		No.2 magazine tool data pot 98 (T8-digit)
R11247		No.2 magazine tool data pot 94 (T8-digit)	R11255		No.2 magazine tool data pot 98 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11256		No.2 magazine tool data pot 99 (T8-digit)	R11264		No.2 magazine tool data pot 103 (T8-digit)
R11257		No.2 magazine tool data pot 99 (T8-digit)	R11265		No.2 magazine tool data pot 103 (T8-digit)
R11258		No.2 magazine tool data pot 100 (T8-digit)	R11266		No.2 magazine tool data pot 104 (T8-digit)
R11259		No.2 magazine tool data pot 100 (T8-digit)	R11267		No.2 magazine tool data pot 104 (T8-digit)
R11260		No.2 magazine tool data pot 101 (T8-digit)	R11268		No.2 magazine tool data pot 105 (T8-digit)
R11261		No.2 magazine tool data pot 101 (T8-digit)	R11269		No.2 magazine tool data pot 105 (T8-digit)
R11262		No.2 magazine tool data pot 102 (T8-digit)	R11270		No.2 magazine tool data pot 106 (T8-digit)
R11263		No.2 magazine tool data pot 102 (T8-digit)	R11271		No.2 magazine tool data pot 106 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11272		No.2 magazine tool data pot 107 (T8-digit)	R11280		No.2 magazine tool data pot 111 (T8-digit)
R11273		No.2 magazine tool data pot 107 (T8-digit)	R11281		No.2 magazine tool data pot 111 (T8-digit)
R11274		No.2 magazine tool data pot 108 (T8-digit)	R11282		No.2 magazine tool data pot 112 (T8-digit)
R11275		No.2 magazine tool data pot 108 (T8-digit)	R11283		No.2 magazine tool data pot 112 (T8-digit)
R11276		No.2 magazine tool data pot 109 (T8-digit)	R11284		No.2 magazine tool data pot 113 (T8-digit)
R11277		No.2 magazine tool data pot 109 (T8-digit)	R11285		No.2 magazine tool data pot 113 (T8-digit)
R11278		No.2 magazine tool data pot 110 (T8-digit)	R11286		No.2 magazine tool data pot 114 (T8-digit)
R11279		No.2 magazine tool data pot 110 (T8-digit)	R11287		No.2 magazine tool data pot 114 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11288		No.2 magazine tool data pot 115 (T8-digit)	R11296		No.2 magazine tool data pot 119 (T8-digit)
R11289		No.2 magazine tool data pot 115 (T8-digit)	R11297		No.2 magazine tool data pot 119 (T8-digit)
R11290		No.2 magazine tool data pot 116 (T8-digit)	R11298		No.2 magazine tool data pot 120 (T8-digit)
R11291		No.2 magazine tool data pot 116 (T8-digit)	R11299		No.2 magazine tool data pot 120 (T8-digit)
R11292		No.2 magazine tool data pot 117 (T8-digit)	R11300		No.2 magazine tool data (Aux.D) pot 1
R11293		No.2 magazine tool data pot 117 (T8-digit)	R11301		No.2 magazine tool data (Aux.D) pot 2
R11294		No.2 magazine tool data pot 118 (T8-digit)	R11302		No.2 magazine tool data (Aux.D) pot 3
R11295		No.2 magazine tool data pot 118 (T8-digit)	R11303		No.2 magazine tool data (Aux.D) pot 4

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11304		No.2 magazine tool data (Aux.D) pot 5	R11312		No.2 magazine tool data (Aux.D) pot 13
R11305		No.2 magazine tool data (Aux.D) pot 6	R11313		No.2 magazine tool data (Aux.D) pot 14
R11306		No.2 magazine tool data (Aux.D) pot 7	R11314		No.2 magazine tool data (Aux.D) pot 15
R11307		No.2 magazine tool data (Aux.D) pot 8	R11315		No.2 magazine tool data (Aux.D) pot 16
R11308		No.2 magazine tool data (Aux.D) pot 9	R11316		No.2 magazine tool data (Aux.D) pot 17
R11309		No.2 magazine tool data (Aux.D) pot 10	R11317		No.2 magazine tool data (Aux.D) pot 18
R11310		No.2 magazine tool data (Aux.D) pot 11	R11318		No.2 magazine tool data (Aux.D) pot 19
R11311		No.2 magazine tool data (Aux.D) pot 12	R11319		No.2 magazine tool data (Aux.D) pot 20

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11320		No.2 magazine tool data (Aux.D) pot 21	R11328		No.2 magazine tool data (Aux.D) pot 29
R11321		No.2 magazine tool data (Aux.D) pot 22	R11329		No.2 magazine tool data (Aux.D) pot 30
R11322		No.2 magazine tool data (Aux.D) pot 23	R11330		No.2 magazine tool data (Aux.D) pot 31
R11323		No.2 magazine tool data (Aux.D) pot 24	R11331		No.2 magazine tool data (Aux.D) pot 32
R11324		No.2 magazine tool data (Aux.D) pot 25	R11332		No.2 magazine tool data (Aux.D) pot 33
R11325		No.2 magazine tool data (Aux.D) pot 26	R11333		No.2 magazine tool data (Aux.D) pot 34
R11326		No.2 magazine tool data (Aux.D) pot 27	R11334		No.2 magazine tool data (Aux.D) pot 35
R11327		No.2 magazine tool data (Aux.D) pot 28	R11335		No.2 magazine tool data (Aux.D) pot 36

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11336		No.2 magazine tool data (Aux.D) pot 37	R11344		No.2 magazine tool data (Aux.D) pot 45
R11337		No.2 magazine tool data (Aux.D) pot 38	R11345		No.2 magazine tool data (Aux.D) pot 46
R11338		No.2 magazine tool data (Aux.D) pot 39	R11346		No.2 magazine tool data (Aux.D) pot 47
R11339		No.2 magazine tool data (Aux.D) pot 40	R11347		No.2 magazine tool data (Aux.D) pot 48
R11340		No.2 magazine tool data (Aux.D) pot 41	R11348		No.2 magazine tool data (Aux.D) pot 49
R11341		No.2 magazine tool data (Aux.D) pot 42	R11349		No.2 magazine tool data (Aux.D) pot 50
R11342		No.2 magazine tool data (Aux.D) pot 43	R11350		No.2 magazine tool data (Aux.D) pot 51
R11343		No.2 magazine tool data (Aux.D) pot 44	R11351		No.2 magazine tool data (Aux.D) pot 52

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11352		No.2 magazine tool data (Aux.D) pot 53	R11360		No.2 magazine tool data (Aux.D) pot 61
R11353		No.2 magazine tool data (Aux.D) pot 54	R11361		No.2 magazine tool data (Aux.D) pot 62
R11354		No.2 magazine tool data (Aux.D) pot 55	R11362		No.2 magazine tool data (Aux.D) pot 63
R11355		No.2 magazine tool data (Aux.D) pot 56	R11363		No.2 magazine tool data (Aux.D) pot 64
R11356		No.2 magazine tool data (Aux.D) pot 57	R11364		No.2 magazine tool data (Aux.D) pot 65
R11357		No.2 magazine tool data (Aux.D) pot 58	R11365		No.2 magazine tool data (Aux.D) pot 66
R11358		No.2 magazine tool data (Aux.D) pot 59	R11366		No.2 magazine tool data (Aux.D) pot 67
R11359		No.2 magazine tool data (Aux.D) pot 60	R11367		No.2 magazine tool data (Aux.D) pot 68

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11368		No.2 magazine tool data (Aux.D) pot 69	R11376		No.2 magazine tool data (Aux.D) pot 77
R11369		No.2 magazine tool data (Aux.D) pot 70	R11377		No.2 magazine tool data (Aux.D) pot 78
R11370		No.2 magazine tool data (Aux.D) pot 71	R11378		No.2 magazine tool data (Aux.D) pot 79
R11371		No.2 magazine tool data (Aux.D) pot 72	R11379		No.2 magazine tool data (Aux.D) pot 80
R11372		No.2 magazine tool data (Aux.D) pot 73	R11380		No.2 magazine tool data (Aux.D) pot 81
R11373		No.2 magazine tool data (Aux.D) pot 74	R11381		No.2 magazine tool data (Aux.D) pot 82
R11374		No.2 magazine tool data (Aux.D) pot 75	R11382		No.2 magazine tool data (Aux.D) pot 83
R11375		No.2 magazine tool data (Aux.D) pot 76	R11383		No.2 magazine tool data (Aux.D) pot 84

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11384		No.2 magazine tool data (Aux.D) pot 85	R11392		No.2 magazine tool data (Aux.D) pot 93
R11385		No.2 magazine tool data (Aux.D) pot 86	R11393		No.2 magazine tool data (Aux.D) pot 94
R11386		No.2 magazine tool data (Aux.D) pot 87	R11394		No.2 magazine tool data (Aux.D) pot 95
R11387		No.2 magazine tool data (Aux.D) pot 88	R11395		No.2 magazine tool data (Aux.D) pot 96
R11388		No.2 magazine tool data (Aux.D) pot 89	R11396		No.2 magazine tool data (Aux.D) pot 97
R11389		No.2 magazine tool data (Aux.D) pot 90	R11397		No.2 magazine tool data (Aux.D) pot 98
R11390		No.2 magazine tool data (Aux.D) pot 91	R11398		No.2 magazine tool data (Aux.D) pot 99
R11391		No.2 magazine tool data (Aux.D) pot 92	R11399		No.2 magazine tool data (Aux.D) pot 100

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11400		No.2 magazine tool data (Aux.D) pot 101	R11408		No.2 magazine tool data (Aux.D) pot 109
R11401		No.2 magazine tool data (Aux.D) pot 102	R11409		No.2 magazine tool data (Aux.D) pot 110
R11402		No.2 magazine tool data (Aux.D) pot 103	R11410		No.2 magazine tool data (Aux.D) pot 111
R11403		No.2 magazine tool data (Aux.D) pot 104	R11411		No.2 magazine tool data (Aux.D) pot 112
R11404		No.2 magazine tool data (Aux.D) pot 105	R11412		No.2 magazine tool data (Aux.D) pot 113
R11405		No.2 magazine tool data (Aux.D) pot 106	R11413		No.2 magazine tool data (Aux.D) pot 114
R11406		No.2 magazine tool data (Aux.D) pot 107	R11414		No.2 magazine tool data (Aux.D) pot 115
R11407		No.2 magazine tool data (Aux.D) pot 108	R11415		No.2 magazine tool data (Aux.D) pot 116

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11416		No.2 magazine tool data (Aux.D) pot 117	R11424		No.3 magazine tool data pot 5 (T4-digit)/pot 3 (T8-digit)
R11417		No.2 magazine tool data (Aux.D) pot 118	R11425		No.3 magazine tool data pot 6 (T4-digit)/pot 3 (T8-digit)
R11418		No.2 magazine tool data (Aux.D) pot 119	R11426		No.3 magazine tool data pot 7 (T4-digit)/pot 4 (T8-digit)
R11419		No.2 magazine tool data (Aux.D) pot 120	R11427		No.3 magazine tool data pot 8 (T4-digit)/pot 4 (T8-digit)
R11420		No.3 magazine tool data pot 1	R11428		No.3 magazine tool data pot 9 (T4-digit)/pot 5 (T8-digit)
R11421		No.3 magazine tool data pot 2 (T4-digit)/pot 1 (T8-digit)	R11429		No.3 magazine tool data pot 10 (T4-digit)/pot 5 (T8-digit)
R11422		No.3 magazine tool data pot 3 (T4-digit)/pot 2 (T8-digit)	R11430		No.3 magazine tool data pot 11 (T4-digit)/pot 6 (T8-digit)
R11423		No.3 magazine tool data pot 3 (T4-digit)/pot 2 (T8-digit)	R11431		No.3 magazine tool data pot 12 (T4-digit)/pot 6 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11432		No.3 magazine tool data pot 13 (T4-digit)/pot 7 (T8-digit)	R11440		No.3 magazine tool data pot 21 (T4-digit)/pot 11 (T8-digit)
R11433		No.3 magazine tool data pot 14 (T4-digit)/pot 7 (T8-digit)	R11441		No.3 magazine tool data pot 22 (T4-digit)/pot 11 (T8-digit)
R11434		No.3 magazine tool data pot 15 (T4-digit)/pot 8 (T8-digit)	R11442		No.3 magazine tool data pot 23 (T4-digit)/pot 12 (T8-digit)
R11435		No.3 magazine tool data pot 16 (T4-digit)/pot 8 (T8-digit)	R11443		No.3 magazine tool data pot 24 (T4-digit)/pot 12 (T8-digit)
R11436		No.3 magazine tool data pot 17 (T4-digit)/pot 9 (T8-digit)	R11444		No.3 magazine tool data pot 25 (T4-digit)/pot 13 (T8-digit)
R11437		No.3 magazine tool data pot 18 (T4-digit)/pot 9 (T8-digit)	R11445		No.3 magazine tool data pot 26 (T4-digit)/pot 13 (T8-digit)
R11438		No.3 magazine tool data pot 19 (T4-digit)/pot 10 (T8-digit)	R11446		No.3 magazine tool data pot 27 (T4-digit)/pot 14 (T8-digit)
R11439		No.3 magazine tool data pot 20 (T4-digit)/pot 10 (T8-digit)	R11447		No.3 magazine tool data pot 28 (T4-digit)/pot 14 (T8-digit)

3 Input/Output Signals with Controller

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11448		No.3 magazine tool data pot 29 (T4-digit)/ pot 15 (T8-digit)	R11456		No.3 magazine tool data pot 37 (T4-digit)/pot 19 (T8-digit)
R11449		No.3 magazine tool data pot 30 (T4-digit)/ pot 15 (T8-digit)	R11457		No.3 magazine tool data pot 38 (T4-digit)/pot 19 (T8-digit)
R11450		No.3 magazine tool data pot 31 (T4-digit)/ pot 16 (T8-digit)	R11458		No.3 magazine tool data pot 39 (T4-digit)/pot 20 (T8-digit)
R11451		No.3 magazine tool data pot 32 (T4-digit)/ pot 16 (T8-digit)	R11459		No.3 magazine tool data pot 40 (T4-digit)/pot 20 (T8-digit)
R11452		No.3 magazine tool data pot 33 (T4-digit)/ pot 17 (T8-digit)	R11460		No.3 magazine tool data pot 41 (T4-digit)/pot 21 (T8-digit)
R11453		No.3 magazine tool data pot 34 (T4-digit)/ pot 17 (T8-digit)	R11461		No.3 magazine tool data pot 42 (T4-digit)/pot 21 (T8-digit)
R11454		No.3 magazine tool data pot 35 (T4-digit)/ pot 18 (T8-digit)	R11462		No.3 magazine tool data pot 43 (T4-digit)/pot 22 (T8-digit)
R11455		No.3 magazine tool data pot 36 (T4-digit)/ pot 18 (T8-digit)	R11463		No.3 magazine tool data pot 44 (T4-digit)/pot 22 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11464		No.3 magazine tool data pot 45 (T4-digit)/ pot 23 (T8-digit)	R11472		No.3 magazine tool data pot 53 (T4-digit)/pot 27 (T8-digit)
R11465		No.3 magazine tool data pot 46 (T4-digit)/ pot 23 (T8-digit)	R11473		No.3 magazine tool data pot 54 (T4-digit)/pot 27 (T8-digit)
R11466		No.3 magazine tool data pot 47 (T4-digit)/ pot 24 (T8-digit)	R11474		No.3 magazine tool data pot 55 (T4-digit)/pot 28 (T8-digit)
R11467		No.3 magazine tool data pot 48 (T4-digit)/ pot 24 (T8-digit)	R11475		No.3 magazine tool data pot 56 (T4-digit)/pot 28 (T8-digit)
R11468		No.3 magazine tool data pot 49 (T4-digit)/ pot 25 (T8-digit)	R11476		No.3 magazine tool data pot 57 (T4-digit)/pot 29 (T8-digit)
R11469		No.3 magazine tool data pot 50 (T4-digit)/ pot 25 (T8-digit)	R11477		No.3 magazine tool data pot 58 (T4-digit)/pot 29 (T8-digit)
R11470		No.3 magazine tool data pot 51 (T4-digit)/ pot 26 (T8-digit)	R11478		No.3 magazine tool data pot 59 (T4-digit)/pot 30 (T8-digit)
R11471		No.3 magazine tool data pot 52 (T4-digit)/ pot 26 (T8-digit)	R11479		No.3 magazine tool data pot 60 (T4-digit)/pot 30 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11480		No.3 magazine tool data pot 61 (T4-digit)/ pot 31 (T8-digit)	R11488		No.3 magazine tool data pot 69 (T4-digit)/pot 35 (T8-digit)
R11481		No.3 magazine tool data pot 62 (T4-digit)/ pot 31 (T8-digit)	R11489		No.3 magazine tool data pot 70 (T4-digit)/pot 35 (T8-digit)
R11482		No.3 magazine tool data pot 63 (T4-digit)/ pot 32 (T8-digit)	R11490		No.3 magazine tool data pot 71 (T4-digit)/pot 36 (T8-digit)
R11483		No.3 magazine tool data pot 64 (T4-digit)/ pot 32 (T8-digit)	R11491		No.3 magazine tool data pot 72 (T4-digit)/pot 36 (T8-digit)
R11484		No.3 magazine tool data pot 65 (T4-digit)/ pot 33 (T8-digit)	R11492		No.3 magazine tool data pot 73 (T4-digit)/pot 37 (T8-digit)
R11485		No.3 magazine tool data pot 66 (T4-digit)/ pot 33 (T8-digit)	R11493		No.3 magazine tool data pot 74 (T4-digit)/pot 37 (T8-digit)
R11486		No.3 magazine tool data pot 67 (T4-digit)/ pot 34 (T8-digit)	R11494		No.3 magazine tool data pot 75 (T4-digit)/pot 38 (T8-digit)
R11487		No.3 magazine tool data pot 68 (T4-digit)/ pot 34 (T8-digit)	R11495		No.3 magazine tool data pot 76 (T4-digit)/pot 38 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11496		No.3 magazine tool data pot 77 (T4-digit)/ pot 39 (T8-digit)	R11504		No.3 magazine tool data pot 85 (T4-digit)/pot 43 (T8-digit)
R11497		No.3 magazine tool data pot 78 (T4-digit)/ pot 39 (T8-digit)	R11505		No.3 magazine tool data pot 86 (T4-digit)/pot 43 (T8-digit)
R11498		No.3 magazine tool data pot 79 (T4-digit)/ pot 40 (T8-digit)	R11506		No.3 magazine tool data pot 87 (T4-digit)/pot 44 (T8-digit)
R11499		No.3 magazine tool data pot 80 (T4-digit)/ pot 40 (T8-digit)	R11507		No.3 magazine tool data pot 88 (T4-digit)/pot 44 (T8-digit)
R11500		No.3 magazine tool data pot 81 (T4-digit)/ pot 41 (T8-digit)	R11508		No.3 magazine tool data pot 89 (T4-digit)/pot 45 (T8-digit)
R11501		No.3 magazine tool data pot 82 (T4-digit)/ pot 41 (T8-digit)	R11509		No.3 magazine tool data pot 90 (T4-digit)/pot 45 (T8-digit)
R11502		No.3 magazine tool data pot 83 (T4-digit)/ pot 42 (T8-digit)	R11510		No.3 magazine tool data pot 91 (T4-digit)/pot 46 (T8-digit)
R11503		No.3 magazine tool data pot 84 (T4-digit)/ pot 42 (T8-digit)	R11511		No.3 magazine tool data pot 92 (T4-digit)/pot 46 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11512		No.3 magazine tool data pot 93 (T4-digit)/ pot 47 (T8-digit)	R11520		No.3 magazine tool data pot 101 (T4-digit)/pot 51 (T8-digit)
R11513		No.3 magazine tool data pot 94 (T4-digit)/ pot 47 (T8-digit)	R11521		No.3 magazine tool data pot 102 (T4-digit)/pot 51 (T8-digit)
R11514		No.3 magazine tool data pot 95 (T4-digit)/ pot 48 (T8-digit)	R11522		No.3 magazine tool data pot 103 (T4-digit)/pot 52 (T8-digit)
R11515		No.3 magazine tool data pot 96 (T4-digit)/ pot 48 (T8-digit)	R11523		No.3 magazine tool data pot 104 (T4-digit)/pot 52 (T8-digit)
R11516		No.3 magazine tool data pot 97 (T4-digit)/ pot 49 (T8-digit)	R11524		No.3 magazine tool data pot 105 (T4-digit)/pot 53 (T8-digit)
R11517		No.3 magazine tool data pot 98 (T4-digit)/ pot 49 (T8-digit)	R11525		No.3 magazine tool data pot 106 (T4-digit)/pot 53 (T8-digit)
R11518		No.3 magazine tool data pot 99 (T4-digit)/ pot 50 (T8-digit)	R11526		No.3 magazine tool data pot 107 (T4-digit)/pot 54 (T8-digit)
R11519		No.3 magazine tool data pot 100 (T4-digit)/ pot 50 (T8-digit)	R11527		No.3 magazine tool data pot 108 (T4-digit)/pot 54 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11528		No.3 magazine tool data pot 109 (T4-digit)/ pot 55 (T8-digit)	R11536		No.3 magazine tool data pot 117 (T4-digit)/pot 59 (T8-digit)
R11529		No.3 magazine tool data pot 110 (T4-digit)/ pot 55 (T8-digit)	R11537		No.3 magazine tool data pot 118 (T4-digit)/pot 59 (T8-digit)
R11530		No.3 magazine tool data pot 111 (T4-digit)/ pot 56 (T8-digit)	R11538		No.3 magazine tool data pot 119 (T4-digit)/pot 60 (T8-digit)
R11531		No.3 magazine tool data pot 112 (T4-digit)/ pot 56 (T8-digit)	R11539		No.3 magazine tool data pot 120 (T4-digit)/pot 60 (T8-digit)
R11532		No.3 magazine tool data pot 113 (T4-digit)/ pot 57 (T8-digit)	R11540		No.3 magazine tool data pot 61 (T8-digit)
R11533		No.3 magazine tool data pot 114 (T4-digit)/ pot 57 (T8-digit)	R11541		No.3 magazine tool data pot 61 (T8-digit)
R11534		No.3 magazine tool data pot 115 (T4-digit)/ pot 58 (T8-digit)	R11542		No.3 magazine tool data pot 62 (T8-digit)
R11535		No.3 magazine tool data pot 116 (T4-digit)/ pot 58 (T8-digit)	R11543		No.3 magazine tool data pot 62 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11544		No.3 magazine tool data pot 63 (T8-digit)	R11552		No.3 magazine tool data pot 67 (T8-digit)
R11545		No.3 magazine tool data pot 63 (T8-digit)	R11553		No.3 magazine tool data pot 67 (T8-digit)
R11546		No.3 magazine tool data pot 64 (T8-digit)	R11554		No.3 magazine tool data pot 68 (T8-digit)
R11547		No.3 magazine tool data pot 64 (T8-digit)	R11555		No.3 magazine tool data pot 68 (T8-digit)
R11548		No.3 magazine tool data pot 65 (T8-digit)	R11556		No.3 magazine tool data pot 69 (T8-digit)
R11549		No.3 magazine tool data pot 65 (T8-digit)	R11557		No.3 magazine tool data pot 69 (T8-digit)
R11550		No.3 magazine tool data pot 66 (T8-digit)	R11558		No.3 magazine tool data pot 70 (T8-digit)
R11551		No.3 magazine tool data pot 66 (T8-digit)	R11559		No.3 magazine tool data pot 70 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11560		No.3 magazine tool data pot 71 (T8-digit)	R11568		No.3 magazine tool data pot 75 (T8-digit)
R11561		No.3 magazine tool data pot 71 (T8-digit)	R11569		No.3 magazine tool data pot 75 (T8-digit)
R11562		No.3 magazine tool data pot 72 (T8-digit)	R11570		No.3 magazine tool data pot 76 (T8-digit)
R11563		No.3 magazine tool data pot 72 (T8-digit)	R11571		No.3 magazine tool data pot 76 (T8-digit)
R11564		No.3 magazine tool data pot 73 (T8-digit)	R11572		No.3 magazine tool data pot 77 (T8-digit)
R11565		No.3 magazine tool data pot 73 (T8-digit)	R11573		No.3 magazine tool data pot 77 (T8-digit)
R11566		No.3 magazine tool data pot 74 (T8-digit)	R11574		No.3 magazine tool data pot 78 (T8-digit)
R11567		No.3 magazine tool data pot 74 (T8-digit)	R11575		No.3 magazine tool data pot 78 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11576		No.3 magazine tool data pot 79 (T8-digit)	R11584		No.3 magazine tool data pot 83 (T8-digit)
R11577		No.3 magazine tool data pot 79 (T8-digit)	R11585		No.3 magazine tool data pot 83 (T8-digit)
R11578		No.3 magazine tool data pot 80 (T8-digit)	R11586		No.3 magazine tool data pot 84 (T8-digit)
R11579		No.3 magazine tool data pot 80 (T8-digit)	R11587		No.3 magazine tool data pot 84 (T8-digit)
R11580		No.3 magazine tool data pot 81 (T8-digit)	R11588		No.3 magazine tool data pot 85 (T8-digit)
R11581		No.3 magazine tool data pot 81 (T8-digit)	R11589		No.3 magazine tool data pot 85 (T8-digit)
R11582		No.3 magazine tool data pot 82 (T8-digit)	R11590		No.3 magazine tool data pot 86 (T8-digit)
R11583		No.3 magazine tool data pot 82 (T8-digit)	R11591		No.3 magazine tool data pot 86 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11592		No.3 magazine tool data pot 87 (T8-digit)	R11600		No.3 magazine tool data pot 91 (T8-digit)
R11593		No.3 magazine tool data pot 87 (T8-digit)	R11601		No.3 magazine tool data pot 91 (T8-digit)
R11594		No.3 magazine tool data pot 88 (T8-digit)	R11602		No.3 magazine tool data pot 92 (T8-digit)
R11595		No.3 magazine tool data pot 88 (T8-digit)	R11603		No.3 magazine tool data pot 92 (T8-digit)
R11596		No.3 magazine tool data pot 89 (T8-digit)	R11604		No.3 magazine tool data pot 93 (T8-digit)
R11597		No.3 magazine tool data pot 89 (T8-digit)	R11605		No.3 magazine tool data pot 93 (T8-digit)
R11598		No.3 magazine tool data pot 90 (T8-digit)	R11606		No.3 magazine tool data pot 94 (T8-digit)
R11599		No.3 magazine tool data pot 90 (T8-digit)	R11607		No.3 magazine tool data pot 94 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11608		No.3 magazine tool data pot 95 (T8-digit)	R11616		No.3 magazine tool data pot 99 (T8-digit)
R11609		No.3 magazine tool data pot 95 (T8-digit)	R11617		No.3 magazine tool data pot 99 (T8-digit)
R11610		No.3 magazine tool data pot 96 (T8-digit)	R11618		No.3 magazine tool data pot 100 (T8-digit)
R11611		No.3 magazine tool data pot 96 (T8-digit)	R11619		No.3 magazine tool data pot 100 (T8-digit)
R11612		No.3 magazine tool data pot 97 (T8-digit)	R11620		No.3 magazine tool data pot 101 (T8-digit)
R11613		No.3 magazine tool data pot 97 (T8-digit)	R11621		No.3 magazine tool data pot 101 (T8-digit)
R11614		No.3 magazine tool data pot 98 (T8-digit)	R11622		No.3 magazine tool data pot 102 (T8-digit)
R11615		No.3 magazine tool data pot 98 (T8-digit)	R11623		No.3 magazine tool data pot 102 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11624		No.3 magazine tool data pot 103 (T8-digit)	R11632		No.3 magazine tool data pot 107 (T8-digit)
R11625		No.3 magazine tool data pot 103 (T8-digit)	R11633		No.3 magazine tool data pot 107 (T8-digit)
R11626		No.3 magazine tool data pot 104 (T8-digit)	R11634		No.3 magazine tool data pot 108 (T8-digit)
R11627		No.3 magazine tool data pot 104 (T8-digit)	R11635		No.3 magazine tool data pot 108 (T8-digit)
R11628		No.3 magazine tool data pot 105 (T8-digit)	R11636		No.3 magazine tool data pot 109 (T8-digit)
R11629		No.3 magazine tool data pot 105 (T8-digit)	R11637		No.3 magazine tool data pot 109 (T8-digit)
R11630		No.3 magazine tool data pot 106 (T8-digit)	R11638		No.3 magazine tool data pot 110 (T8-digit)
R11631		No.3 magazine tool data pot 106 (T8-digit)	R11639		No.3 magazine tool data pot 110 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11640		No.3 magazine tool data pot 111 (T8-digit)	R11648		No.3 magazine tool data pot 115 (T8-digit)
R11641		No.3 magazine tool data pot 111 (T8-digit)	R11649		No.3 magazine tool data pot 115 (T8-digit)
R11642		No.3 magazine tool data pot 112 (T8-digit)	R11650		No.3 magazine tool data pot 116 (T8-digit)
R11643		No.3 magazine tool data pot 112 (T8-digit)	R11651		No.3 magazine tool data pot 116 (T8-digit)
R11644		No.3 magazine tool data pot 113 (T8-digit)	R11652		No.3 magazine tool data pot 117 (T8-digit)
R11645		No.3 magazine tool data pot 113 (T8-digit)	R11653		No.3 magazine tool data pot 117 (T8-digit)
R11646		No.3 magazine tool data pot 114 (T8-digit)	R11654		No.3 magazine tool data pot 118 (T8-digit)
R11647		No.3 magazine tool data pot 114 (T8-digit)	R11655		No.3 magazine tool data pot 118 (T8-digit)

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11656		No.3 magazine tool data pot 119 (T8-digit)	R11664		No.3 magazine tool data (Aux.D) pot 5
R11657		No.3 magazine tool data pot 119 (T8-digit)	R11665		No.3 magazine tool data (Aux.D) pot 6
R11658		No.3 magazine tool data pot 120 (T8-digit)	R11666		No.3 magazine tool data (Aux.D) pot 7
R11659		No.3 magazine tool data pot 120 (T8-digit)	R11667		No.3 magazine tool data (Aux.D) pot 8
R11660		No.3 magazine tool data (Aux.D) pot 1	R11668		No.3 magazine tool data (Aux.D) pot 9
R11661		No.3 magazine tool data (Aux.D) pot 2	R11669		No.3 magazine tool data (Aux.D) pot 10
R11662		No.3 magazine tool data (Aux.D) pot 3	R11670		No.3 magazine tool data (Aux.D) pot 11
R11663		No.3 magazine tool data (Aux.D) pot 4	R11671		No.3 magazine tool data (Aux.D) pot 12

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11672		No.3 magazine tool data (Aux.D) pot 13	R11680		No.3 magazine tool data (Aux.D) pot 21
R11673		No.3 magazine tool data (Aux.D) pot 14	R11681		No.3 magazine tool data (Aux.D) pot 22
R11674		No.3 magazine tool data (Aux.D) pot 15	R11682		No.3 magazine tool data (Aux.D) pot 23
R11675		No.3 magazine tool data (Aux.D) pot 16	R11683		No.3 magazine tool data (Aux.D) pot 24
R11676		No.3 magazine tool data (Aux.D) pot 17	R11684		No.3 magazine tool data (Aux.D) pot 25
R11677		No.3 magazine tool data (Aux.D) pot 18	R11685		No.3 magazine tool data (Aux.D) pot 26
R11678		No.3 magazine tool data (Aux.D) pot 19	R11686		No.3 magazine tool data (Aux.D) pot 27
R11679		No.3 magazine tool data (Aux.D) pot 20	R11687		No.3 magazine tool data (Aux.D) pot 28

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11688		No.3 magazine tool data (Aux.D) pot 29	R11696		No.3 magazine tool data (Aux.D) pot 37
R11689		No.3 magazine tool data (Aux.D) pot 30	R11697		No.3 magazine tool data (Aux.D) pot 38
R11690		No.3 magazine tool data (Aux.D) pot 31	R11698		No.3 magazine tool data (Aux.D) pot 39
R11691		No.3 magazine tool data (Aux.D) pot 32	R11699		No.3 magazine tool data (Aux.D) pot 40
R11692		No.3 magazine tool data (Aux.D) pot 33	R11700		No.3 magazine tool data (Aux.D) pot 41
R11693		No.3 magazine tool data (Aux.D) pot 34	R11701		No.3 magazine tool data (Aux.D) pot 42
R11694		No.3 magazine tool data (Aux.D) pot 35	R11702		No.3 magazine tool data (Aux.D) pot 43
R11695		No.3 magazine tool data (Aux.D) pot 36	R11703		No.3 magazine tool data (Aux.D) pot 44

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11704		No.3 magazine tool data (Aux.D) pot 45	R11712		No.3 magazine tool data (Aux.D) pot 53
R11705		No.3 magazine tool data (Aux.D) pot 46	R11713		No.3 magazine tool data (Aux.D) pot 54
R11706		No.3 magazine tool data (Aux.D) pot 47	R11714		No.3 magazine tool data (Aux.D) pot 55
R11707		No.3 magazine tool data (Aux.D) pot 48	R11715		No.3 magazine tool data (Aux.D) pot 56
R11708		No.3 magazine tool data (Aux.D) pot 49	R11716		No.3 magazine tool data (Aux.D) pot 57
R11709		No.3 magazine tool data (Aux.D) pot 50	R11717		No.3 magazine tool data (Aux.D) pot 58
R11710		No.3 magazine tool data (Aux.D) pot 51	R11718		No.3 magazine tool data (Aux.D) pot 59
R11711		No.3 magazine tool data (Aux.D) pot 52	R11719		No.3 magazine tool data (Aux.D) pot 60

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11720		No.3 magazine tool data (Aux.D) pot 61	R11728		No.3 magazine tool data (Aux.D) pot 69
R11721		No.3 magazine tool data (Aux.D) pot 62	R11729		No.3 magazine tool data (Aux.D) pot 70
R11722		No.3 magazine tool data (Aux.D) pot 63	R11730		No.3 magazine tool data (Aux.D) pot 71
R11723		No.3 magazine tool data (Aux.D) pot 64	R11731		No.3 magazine tool data (Aux.D) pot 72
R11724		No.3 magazine tool data (Aux.D) pot 65	R11732		No.3 magazine tool data (Aux.D) pot 73
R11725		No.3 magazine tool data (Aux.D) pot 66	R11733		No.3 magazine tool data (Aux.D) pot 74
R11726		No.3 magazine tool data (Aux.D) pot 67	R11734		No.3 magazine tool data (Aux.D) pot 75
R11727		No.3 magazine tool data (Aux.D) pot 68	R11735		No.3 magazine tool data (Aux.D) pot 76

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11736		No.3 magazine tool data (Aux.D) pot 77	R11744		No.3 magazine tool data (Aux.D) pot 85
R11737		No.3 magazine tool data (Aux.D) pot 78	R11745		No.3 magazine tool data (Aux.D) pot 86
R11738		No.3 magazine tool data (Aux.D) pot 79	R11746		No.3 magazine tool data (Aux.D) pot 87
R11739		No.3 magazine tool data (Aux.D) pot 80	R11747		No.3 magazine tool data (Aux.D) pot 88
R11740		No.3 magazine tool data (Aux.D) pot 81	R11748		No.3 magazine tool data (Aux.D) pot 89
R11741		No.3 magazine tool data (Aux.D) pot 82	R11749		No.3 magazine tool data (Aux.D) pot 90
R11742		No.3 magazine tool data (Aux.D) pot 83	R11750		No.3 magazine tool data (Aux.D) pot 91
R11743		No.3 magazine tool data (Aux.D) pot 84	R11751		No.3 magazine tool data (Aux.D) pot 92

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11752		No.3 magazine tool data (Aux.D) pot 93	R11760		No.3 magazine tool data (Aux.D) pot 101
R11753		No.3 magazine tool data (Aux.D) pot 94	R11761		No.3 magazine tool data (Aux.D) pot 102
R11754		No.3 magazine tool data (Aux.D) pot 95	R11762		No.3 magazine tool data (Aux.D) pot 103
R11755		No.3 magazine tool data (Aux.D) pot 96	R11763		No.3 magazine tool data (Aux.D) pot 104
R11756		No.3 magazine tool data (Aux.D) pot 97	R11764		No.3 magazine tool data (Aux.D) pot 105
R11757		No.3 magazine tool data (Aux.D) pot 98	R11765		No.3 magazine tool data (Aux.D) pot 106
R11758		No.3 magazine tool data (Aux.D) pot 99	R11766		No.3 magazine tool data (Aux.D) pot 107
R11759		No.3 magazine tool data (Aux.D) pot 100	R11767		No.3 magazine tool data (Aux.D) pot 108

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R11768		No.3 magazine tool data (Aux.D) pot 109	R11776		No.3 magazine tool data (Aux.D) pot 117
R11769		No.3 magazine tool data (Aux.D) pot 110	R11777		No.3 magazine tool data (Aux.D) pot 118
R11770		No.3 magazine tool data (Aux.D) pot 111	R11778		No.3 magazine tool data (Aux.D) pot 119
R11771		No.3 magazine tool data (Aux.D) pot 112	R11779		No.3 magazine tool data (Aux.D) pot 120
R11772		No.3 magazine tool data (Aux.D) pot 113	R11780		
R11773		No.3 magazine tool data (Aux.D) pot 114	R11781		
R11774		No.3 magazine tool data (Aux.D) pot 115	R11782		
R11775		No.3 magazine tool data (Aux.D) pot 116	R11783		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14700	R14950	R15200	R15450	R15700	R15950	R16200	R16450		MES interface library: Machining start time
R14701	R14951	R15201	R15451	R15701	R15951	R16201	R16451		
R14702	R14952	R15202	R15452	R15702	R15952	R16202	R16452		
R14703	R14953	R15203	R15453	R15703	R15953	R16203	R16453		MES interface library: Machining end time
R14704	R14954	R15204	R15454	R15704	R15954	R16204	R16454		
R14705	R14955	R15205	R15455	R15705	R15955	R16205	R16455		MES interface library: Program (O) number at machining start
R14706	R14956	R15206	R15456	R15706	R15956	R16206	R16456		
R14707	R14957	R15207	R15457	R15707	R15957	R16207	R16457		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14708	R14958	R15208	R15458	R15708	R15958	R16208	R16458		MES interface library: Program (O) number at machining start
R14709	R14959	R15209	R15459	R15709	R15959	R16209	R16459		
R14710	R14960	R15210	R15460	R15710	R15960	R16210	R16460		
R14711	R14961	R15211	R15461	R15711	R15961	R16211	R16461		
R14712	R14962	R15212	R15462	R15712	R15962	R16212	R16462		
R14713	R14963	R15213	R15463	R15713	R15963	R16213	R16463		
R14714	R14964	R15214	R15464	R15714	R15964	R16214	R16464		
R14715	R14965	R15215	R15465	R15715	R15965	R16215	R16465		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14716	R14966	R15216	R15466	R15716	R15966	R16216	R16466		MES interface library: Program (O) number at machining start
R14717	R14967	R15217	R15467	R15717	R15967	R16217	R16467		
R14718	R14968	R15218	R15468	R15718	R15968	R16218	R16468		
R14719	R14969	R15219	R15469	R15719	R15969	R16219	R16469		
R14720	R14970	R15220	R15470	R15720	R15970	R16220	R16470		MES interface library: N number at machining start
R14721	R14971	R15221	R15471	R15721	R15971	R16221	R16471		
R14722	R14972	R15222	R15472	R15722	R15972	R16222	R16472		MES interface library: B number at machining start
R14723	R14973	R15223	R15473	R15723	R15973	R16223	R16473		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14724	R14974	R15224	R15474	R15724	R15974	R16224	R16474		MES interface library: Spindle 1 maximum load
R14725	R14975	R15225	R15475	R15725	R15975	R16225	R16475		MES interface library: Spindle 2 maximum load
R14726	R14976	R15226	R15476	R15726	R15976	R16226	R16476		MES interface library: Power consumption value
R14727	R14977	R15227	R15477	R15727	R15977	R16227	R16477		
R14728	R14978	R15228	R15478	R15728	R15978	R16228	R16478		MES interface library: Power regeneration value
R14729	R14979	R15229	R15479	R15729	R15979	R16229	R16479		
R14730	R14980	R15230	R15480	R15730	R15980	R16230	R16480		MES interface library: Number of machined workpieces
R14731	R14981	R15231	R15481	R15731	R15981	R16231	R16481		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14732	R14982	R15232	R15482	R15732	R15982	R16232	R16482		MES interface library: Tool number 1
R14733	R14983	R15233	R15483	R15733	R15983	R16233	R16483		MES interface library: Tool number 2
R14734	R14984	R15234	R15484	R15734	R15984	R16234	R16484		MES interface library: Tool number 3
R14735	R14985	R15235	R15485	R15735	R15985	R16235	R16485		MES interface library: Tool number 4
R14736	R14986	R15236	R15486	R15736	R15986	R16236	R16486		MES interface library: Tool number 5
R14737	R14987	R15237	R15487	R15737	R15987	R16237	R16487		MES interface library: Tool offset number 1
R14738	R14988	R15238	R15488	R15738	R15988	R16238	R16488		MES interface library: Tool offset number 2
R14739	R14989	R15239	R15489	R15739	R15989	R16239	R16489		MES interface library: Tool offset number 3

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14740	R14990	R15240	R15490	R15740	R15990	R16240	R16490		MES interface library: Tool offset number 4
R14741	R14991	R15241	R15491	R15741	R15991	R16241	R16491		MES interface library: Tool offset number 5
R14742	R14992	R15242	R15492	R15742	R15992	R16242	R16492		MES interface library: Tool length offset 1
R14743	R14993	R15243	R15493	R15743	R15993	R16243	R16493		
R14744	R14994	R15244	R15494	R15744	R15994	R16244	R16494		MES interface library: Tool length offset 2
R14745	R14995	R15245	R15495	R15745	R15995	R16245	R16495		
R14746	R14996	R15246	R15496	R15746	R15996	R16246	R16496		MES interface library: Tool length offset 3
R14747	R14997	R15247	R15497	R15747	R15997	R16247	R16497		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14748	R14998	R15248	R15498	R15748	R15998	R16248	R16498		MES interface library: Tool length offset 4
R14749	R14999	R15249	R15499	R15749	R15999	R16249	R16499		
R14750	R15000	R15250	R15500	R15750	R16000	R16250	R16500		MES interface library: Tool length offset 5
R14751	R15001	R15251	R15501	R15751	R16001	R16251	R16501		
R14752	R15002	R15252	R15502	R15752	R16002	R16252	R16502		MES interface library: Tool radius offset 1
R14753	R15003	R15253	R15503	R15753	R16003	R16253	R16503		
R14754	R15004	R15254	R15504	R15754	R16004	R16254	R16504		MES interface library: Tool radius offset 2
R14755	R15005	R15255	R15505	R15755	R16005	R16255	R16505		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14756	R15006	R15256	R15506	R15756	R16006	R16256	R16506		MES interface library: Tool radius offset 3
R14757	R15007	R15257	R15507	R15757	R16007	R16257	R16507		
R14758	R15008	R15258	R15508	R15758	R16008	R16258	R16508		MES interface library: Tool radius offset 4
R14759	R15009	R15259	R15509	R15759	R16009	R16259	R16509		
R14760	R15010	R15260	R15510	R15760	R16010	R16260	R16510		MES interface library: Tool radius offset 5
R14761	R15011	R15261	R15511	R15761	R16011	R16261	R16511		
R14762	R15012	R15262	R15512	R15762	R16012	R16262	R16512		
R14763	R15013	R15263	R15513	R15763	R16013	R16263	R16513		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14780	R15030	R15280	R15530	R15780	R16030	R16280	R16530		MES interface library: Time of alarm occurrence
R14781	R15031	R15281	R15531	R15781	R16031	R16281	R16531		
R14782	R15032	R15282	R15532	R15782	R16032	R16282	R16532		
R14783	R15033	R15283	R15533	R15783	R16033	R16283	R16533		MES interface library: Alarm number 1
R14784	R15034	R15284	R15534	R15784	R16034	R16284	R16534		
R14785	R15035	R15285	R15535	R15785	R16035	R16285	R16535		
R14786	R15036	R15286	R15536	R15786	R16036	R16286	R16536		
R14787	R15037	R15287	R15537	R15787	R16037	R16287	R16537		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14788	R15038	R15288	R15538	R15788	R16038	R16288	R16538		MES interface library: Alarm number 1
R14789	R15039	R15289	R15539	R15789	R16039	R16289	R16539		
R14790	R15040	R15290	R15540	R15790	R16040	R16290	R16540		
R14791	R15041	R15291	R15541	R15791	R16041	R16291	R16541		
R14792	R15042	R15292	R15542	R15792	R16042	R16292	R16542		
R14793	R15043	R15293	R15543	R15793	R16043	R16293	R16543		
R14794	R15044	R15294	R15544	R15794	R16044	R16294	R16544		
R14795	R15045	R15295	R15545	R15795	R16045	R16295	R16545		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14796	R15046	R15296	R15546	R15796	R16046	R16296	R16546		MES interface library: Alarm number 1
R14797	R15047	R15297	R15547	R15797	R16047	R16297	R16547		MES interface library: Alarm number 2
R14798	R15048	R15298	R15548	R15798	R16048	R16298	R16548		
R14799	R15049	R15299	R15549	R15799	R16049	R16299	R16549		
R14800	R15050	R15300	R15550	R15800	R16050	R16300	R16550		
R14801	R15051	R15301	R15551	R15801	R16051	R16301	R16551		
R14802	R15052	R15302	R15552	R15802	R16052	R16302	R16552		
R14803	R15053	R15303	R15553	R15803	R16053	R16303	R16553		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14804	R15054	R15304	R15554	R15804	R16054	R16304	R16554		MES interface library: Alarm number 2
R14805	R15055	R15305	R15555	R15805	R16055	R16305	R16555		
R14806	R15056	R15306	R15556	R15806	R16056	R16306	R16556		
R14807	R15057	R15307	R15557	R15807	R16057	R16307	R16557		
R14808	R15058	R15308	R15558	R15808	R16058	R16308	R16558		
R14809	R15059	R15309	R15559	R15809	R16059	R16309	R16559		
R14810	R15060	R15310	R15560	R15810	R16060	R16310	R16560		
R14811	R15061	R15311	R15561	R15811	R16061	R16311	R16561		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14812	R15062	R15312	R15562	R15812	R16062	R16312	R16562		MES interface library: Alarm number 2
R14813	R15063	R15313	R15563	R15813	R16063	R16313	R16563		
R14814	R15064	R15314	R15564	R15814	R16064	R16314	R16564		
R14815	R15065	R15315	R15565	R15815	R16065	R16315	R16565		MES interface library: Alarm number 3
R14816	R15066	R15316	R15566	R15816	R16066	R16316	R16566		
R14817	R15067	R15317	R15567	R15817	R16067	R16317	R16567		
R14818	R15068	R15318	R15568	R15818	R16068	R16318	R16568		
R14819	R15069	R15319	R15569	R15819	R16069	R16319	R16569		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14820	R15070	R15320	R15570	R15820	R16070	R16320	R16570		MES interface library: Alarm number 3
R14821	R15071	R15321	R15571	R15821	R16071	R16321	R16571		
R14822	R15072	R15322	R15572	R15822	R16072	R16322	R16572		
R14823	R15073	R15323	R15573	R15823	R16073	R16323	R16573		
R14824	R15074	R15324	R15574	R15824	R16074	R16324	R16574		
R14825	R15075	R15325	R15575	R15825	R16075	R16325	R16575		
R14826	R15076	R15326	R15576	R15826	R16076	R16326	R16576		
R14827	R15077	R15327	R15577	R15827	R16077	R16327	R16577		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14828	R15078	R15328	R15578	R15828	R16078	R16328	R16578		MES interface library: Alarm number 3
R14829	R15079	R15329	R15579	R15829	R16079	R16329	R16579		MES interface library: Alarm number 4
R14830	R15080	R15330	R15580	R15830	R16080	R16330	R16580		
R14831	R15081	R15331	R15581	R15831	R16081	R16331	R16581		
R14832	R15082	R15332	R15582	R15832	R16082	R16332	R16582		
R14833	R15083	R15333	R15583	R15833	R16083	R16333	R16583		
R14834	R15084	R15334	R15584	R15834	R16084	R16334	R16584		
R14835	R15085	R15335	R15585	R15835	R16085	R16335	R16585		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14836	R15086	R15336	R15586	R15836	R16086	R16336	R16586		MES interface library: Alarm number 4
R14837	R15087	R15337	R15587	R15837	R16087	R16337	R16587		
R14838	R15088	R15338	R15588	R15838	R16088	R16338	R16588		
R14839	R15089	R15339	R15589	R15839	R16089	R16339	R16589		
R14840	R15090	R15340	R15590	R15840	R16090	R16340	R16590		
R14841	R15091	R15341	R15591	R15841	R16091	R16341	R16591		
R14842	R15092	R15342	R15592	R15842	R16092	R16342	R16592		
R14843	R15093	R15343	R15593	R15843	R16093	R16343	R16593		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14844	R15094	R15344	R15594	R15844	R16094	R16344	R16594		MES interface library: Alarm number 4
R14845	R15095	R15345	R15595	R15845	R16095	R16345	R16595		
R14846	R15096	R15346	R15596	R15846	R16096	R16346	R16596		
R14847	R15097	R15347	R15597	R15847	R16097	R16347	R16597		MES interface library: Power ON time
R14848	R15098	R15348	R15598	R15848	R16098	R16348	R16598		MES interface library: O number at alarm
R14849	R15099	R15349	R15599	R15849	R16099	R16349	R16599		
R14850	R15100	R15350	R15600	R15850	R16100	R16350	R16600		
R14851	R15101	R15351	R15601	R15851	R16101	R16351	R16601		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14852	R15102	R15352	R15602	R15852	R16102	R16352	R16602		MES interface library: O number at alarm
R14853	R15103	R15353	R15603	R15853	R16103	R16353	R16603		
R14854	R15104	R15354	R15604	R15854	R16104	R16354	R16604		
R14855	R15105	R15355	R15605	R15855	R16105	R16355	R16605		
R14856	R15106	R15356	R15606	R15856	R16106	R16356	R16606		
R14857	R15107	R15357	R15607	R15857	R16107	R16357	R16607		
R14858	R15108	R15358	R15608	R15858	R16108	R16358	R16608		
R14859	R15109	R15359	R15609	R15859	R16109	R16359	R16609		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14860	R15110	R15360	R15610	R15860	R16110	R16360	R16610		MES interface library: O number at alarm
R14861	R15111	R15361	R15611	R15861	R16111	R16361	R16611		
R14862	R15112	R15362	R15612	R15862	R16112	R16362	R16612		
R14863	R15113	R15363	R15613	R15863	R16113	R16363	R16613		
R14864	R15114	R15364	R15614	R15864	R16114	R16364	R16614		MES interface library: N number at alarm
R14865	R15115	R15365	R15615	R15865	R16115	R16365	R16615		
R14866	R15116	R15366	R15616	R15866	R16116	R16366	R16616		MES interface library: B number at alarm
R14867	R15117	R15367	R15617	R15867	R16117	R16367	R16617		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14868	R15118	R15368	R15618	R15868	R16118	R16368	R16618		MES interface library: G code modal status
R14869	R15119	R15369	R15619	R15869	R16119	R16369	R16619		
R14870	R15120	R15370	R15620	R15870	R16120	R16370	R16620		
R14871	R15121	R15371	R15621	R15871	R16121	R16371	R16621		
R14872	R15122	R15372	R15622	R15872	R16122	R16372	R16622		
R14873	R15123	R15373	R15623	R15873	R16123	R16373	R16623		
R14874	R15124	R15374	R15624	R15874	R16124	R16374	R16624		
R14875	R15125	R15375	R15625	R15875	R16125	R16375	R16625		

3 Input/Output Signals with Controller

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14876	R15126	R15376	R15626	R15876	R16126	R16376	R16626		MES interface library: G code modal status
R14877	R15127	R15377	R15627	R15877	R16127	R16377	R16627		
R14878	R15128	R15378	R15628	R15878	R16128	R16378	R16628		
R14879	R15129	R15379	R15629	R15879	R16129	R16379	R16629		
R14880	R15130	R15380	R15630	R15880	R16130	R16380	R16630		
R14881	R15131	R15381	R15631	R15881	R16131	R16381	R16631		
R14882	R15132	R15382	R15632	R15882	R16132	R16382	R16632		
R14883	R15133	R15383	R15633	R15883	R16133	R16383	R16633		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14884	R15134	R15384	R15634	R15884	R16134	R16384	R16634		MES interface library: G code modal status
R14885	R15135	R15385	R15635	R15885	R16135	R16385	R16635		
R14886	R15136	R15386	R15636	R15886	R16136	R16386	R16636		
R14887	R15137	R15387	R15637	R15887	R16137	R16387	R16637		
R14888	R15138	R15388	R15638	R15888	R16138	R16388	R16638		
R14889	R15139	R15389	R15639	R15889	R16139	R16389	R16639		
R14890	R15140	R15390	R15640	R15890	R16140	R16390	R16640		
R14891	R15141	R15391	R15641	R15891	R16141	R16391	R16641		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14892	R15142	R15392	R15642	R15892	R16142	R16392	R16642		MES interface library: G code modal status
R14893	R15143	R15393	R15643	R15893	R16143	R16393	R16643		
R14894	R15144	R15394	R15644	R15894	R16144	R16394	R16644		
R14895	R15145	R15395	R15645	R15895	R16145	R16395	R16645		
R14896	R15146	R15396	R15646	R15896	R16146	R16396	R16646		
R14897	R15147	R15397	R15647	R15897	R16147	R16397	R16647		
R14898	R15148	R15398	R15648	R15898	R16148	R16398	R16648		
R14899	R15149	R15399	R15649	R15899	R16149	R16399	R16649		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R14900	R15150	R15400	R15650	R15900	R16150	R16400	R16650		MES interface library: Spindle 1 maximum load
R14901	R15151	R15401	R15651	R15901	R16151	R16401	R16651		MES interface library: Spindle 2 maximum load
R14902	R15152	R15402	R15652	R15902	R16152	R16402	R16652		MES interface library: Tool number 1
R14903	R15153	R15403	R15653	R15903	R16153	R16403	R16653		MES interface library: Tool offset number 1
R14904	R15154	R15404	R15654	R15904	R16154	R16404	R16654		MES interface library: Tool length offset 1
R14905	R15155	R15405	R15655	R15905	R16155	R16405	R16655		
R14906	R15156	R15406	R15656	R15906	R16156	R16406	R16656		MES interface library: Tool radius offset 1
R14907	R15157	R15407	R15657	R15907	R16157	R16407	R16657		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20200		Skip coordinate (PLC axis 1st axis) ▲	R20208		Skip coordinate (PLC axis 3rd axis) ▲
R20201			R20209		
R20202			R20210		
R20203			R20211		
R20204		Skip coordinate (PLC axis 2nd axis) ▲	R20212		Skip coordinate (PLC axis 4th axis) ▲
R20205			R20213		
R20206			R20214		
R20207			R20215		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20216		Skip coordinate (PLC axis 5th axis) ▲	R20224		
R20217			R20225		
R20218			R20226		
R20219			R20227		
R20220		Skip coordinate (PLC axis 6th axis) ▲	R20228		
R20221			R20229		
R20222			R20230		
R20223			R20231		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20232		Feedback machine position axis (PLC axis 1st axis) ▲	R20240		Feedback machine position axis (PLC axis 3rd axis) ▲
R20233			R20241		
R20234			R20242		
R20235			R20243		
R20236		Feedback machine position axis (PLC axis 2nd axis) ▲	R20244		Feedback machine position axis (PLC axis 4th axis) ▲
R20237			R20245		
R20238			R20246		
R20239			R20247		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20248		Feedback machine position axis (PLC axis 5th axis) ▲	R20256		
R20249			R20257		
R20250			R20258		
R20251			R20259		
R20252		Feedback machine position axis (PLC axis 6th axis) ▲	R20260		
R20253			R20261		
R20254			R20262		
R20255			R20263		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20264		Servo deflection amount(PLC axis 1st axis) ▲	R20272		Servo deflection amount(PLC axis 5th axis) ▲
R20265			R20273		
R20266		Servo deflection amount(PLC axis 2nd axis) ▲	R20274		Servo deflection amount(PLC axis 6th axis) ▲
R20267			R20275		
R20268		Servo deflection amount(PLC axis 3rd axis) ▲	R20276		
R20269			R20277		
R20270		Servo deflection amount(PLC axis 4th axis) ▲	R20278		
R20271			R20279		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20280	RNASP	FL-net : Reference node address designation ▲	R20288		EcoMonitorLight connection: Read start bit
R20281	PNASP	FL-net : Participating node top address designation ▲	R20289		EcoMonitorLight connection: Station No.
R20282			R20290		EcoMonitorLight connection: Register address
R20283			R20291		EcoMonitorLight connection: Size of data to read
R20284			R20292		
R20285			R20293		
R20286			R20294		
R20287			R20295		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
R20480	TP_INVALID	Touchscreen operation disabled	R20488		
R20481			R20489		
R20482			R20490		
R20483			R20491		
R20484			R20492		
R20485			R20493		
R20486			R20494		
R20487			R20495		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R22500	R22700	R22900	R23100	R23300	R23500	R23700	R23900		Program restart : Restart position return check invalid ▲
R22501	R22701	R22901	R23101	R23301	R23501	R23701	R23901		
R22502	R22702	R22902	R23102	R23302	R23502	R23702	R23902		
R22503	R22703	R22903	R23103	R23303	R23503	R23703	R23903		
R22504	R22704	R22904	R23104	R23304	R23504	R23704	R23904		
R22505	R22705	R22905	R23105	R23305	R23505	R23705	R23905		
R22506	R22706	R22906	R23106	R23306	R23506	R23706	R23906		
R22507	R22707	R22907	R23107	R23307	R23507	R23707	R23907		

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R22692	R22892	R23092	R23292	R23492	R23692	R23892	R24092		Load monitor I : Cutting torque estimation target axis
R22693	R22893	R23093	R23293	R23493	R23693	R23893	R24093		Hob machining: work piece axis selection ▲
R22694	R22894	R23094	R23294	R23494	R23694	R23894	R24094	SPPWS	Tool spindle synchronization IB : Spindle-spindle polygon cut workpiece axis selection ▲
R22695	R22895	R23095	R23295	R23495	R23695	R23895	R24095		
R22696	R22896	R23096	R23296	R23496	R23696	R23896	R24096		
R22697	R22897	R23097	R23297	R23497	R23697	R23897	R24097		
R22698	R22898	R23098	R23298	R23498	R23698	R23898	R24098		
R22699	R22899	R23099	R23299	R23499	R23699	R23899	R24099		

3.5 Special Relay/Register

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SM00			SM08		
SM01			SM09		
SM02			SM10		
SM03			SM11		
SM04			SM12		
SM05			SM13		
SM06			SM14		
SM07			SM15		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SM16		Temperature rise	SM24		
SM17			SM25		
SM18			SM26		
SM19			SM27		
SM20			SM28		
SM21			SM29		
SM22			SM30		
SM23			SM31		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SM32			SM40		
SM33			SM41		
SM34			SM42		
SM35			SM43		
SM36			SM44		
SM37			SM45		
SM38			SM46		
SM39			SM47		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SM48			SM56		
SM49			SM57		
SM50			SM58		
SM51			SM59		
SM52			SM60		
SM53			SM61		
SM54			SM62		
SM55			SM63		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SM64			SM72		
SM65			SM73		
SM66			SM74		
SM67			SM75		
SM68			SM76		
SM69			SM77		
SM70			SM78		
SM71			SM79		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SM80			SM88		
SM81			SM89		
SM82			SM90		
SM83			SM91		
SM84			SM92		
SM85			SM93		
SM86			SM94		
SM87			SM95		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SM96			SM104		
SM97			SM105		
SM98			SM106		
SM99			SM107		
SM100			SM108		
SM101			SM109		
SM102			SM110		
SM103			SM111		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SM112			SM120		
SM113			SM121		
SM114			SM122		
SM115			SM123		
SM116			SM124		
SM117			SM125		
SM118			SM126		
SM119			SM127		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SB0000		Data link restart	SB0008		Line test request
SB0001		Refresh instruction at standby master switching	SB0009		Parameter setting test request
SB0002		Data link stop	SB000A		
SB0003			SB000B		
SB0004		Temporary error cancel request	SB000C		Forced master switching
SB0005		Temporary error cancel canceling request	SB000D		
SB0006			SB000E		
SB0007			SB000F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SB0040		Data link restart acceptance	SB0048		Temporary error cancel acceptance status
SB0041		Data link restart complete	SB0049		Temporary error cancel complete status
SB0042		Refresh instruction acknowledgment status at standby master switching	SB004A		Temporary error cancel acceptance status
SB0043		Refresh instruction complete status at standby master switching	SB004B		Temporary error cancel acceptance status
SB0044		Data link stop acceptance	SB004C		Line test acceptance status
SB0045		Data link stop complete	SB004D		Line test complete status
SB0046		Forced master switching executable status	SB004E		Parameter setting test acknowledgment status
SB0047			SB004F		Parameter setting test completion status

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SB0050		Offline test status	SB0058		
SB0051			SB0059		
SB0052			SB005A		Master switching request acknowledgment
SB0053			SB005B		Master switching request complete
SB0054		Shipping test acceptance	SB005C		Forced master switching request acknowledgment
SB0055		Shipping test complete status	SB005D		Forced master switching request complete
SB0056			SB005E		
SB0057			SB005F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SB0060		Host mode	SB0068		
SB0061		Host type	SB0069		
SB0062		Host standby master station setting status	SB006A		Switch setting status
SB0063			SB006B		Host station operation status
SB0064			SB006C		Link status
SB0065		Host station operation status	SB006D		Parameter setting status
SB0066		Number of host occupied stations	SB006E		Host station operation status
SB0067			SB006F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SB0070		Master station information	SB0078		Host station switch change detection
SB0071		Standby master station information	SB0079		Master station return specification information
SB0072			SB007A		
SB0073		Operation specification when driver has an error	SB007B		Host master/standby master operation status
SB0074		Reserved station specified status	SB007C		
SB0075		Error cancel station specified status	SB007D		
SB0076		Temporary error cancel station setting information	SB007E		
SB0077		Parameter receive status	SB007F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SB0080		Other station data link status	SB0088		
SB0081		Other station watchdog timer error status	SB0089		
SB0082		Other station fuse blown status	SB008A		
SB0083		Other station switch change status	SB008B		
SB0084			SB008C		
SB0085			SB008D		
SB0086			SB008E		
SB0087			SB008F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SB0090		Host line status	SB0098		
SB0091			SB0099		
SB0092			SB009A		
SB0093			SB009B		
SB0094		Transient transmission status	SB009C		
SB0095		Master station transient transmission status	SB009D		
SB0096			SB009E		
SB0097			SB009F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SB00B0			SB00B8		
SB00B1			SB00B9		
SB00B2			SB00BA		
SB00B3			SB00BB		
SB00B4		Standby master station test result	SB00BC		
SB00B5			SB00BD		
SB00B6			SB00BE		
SB00B7			SB00BF		

3 Input/Output Signals with Controller

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW0000			SW0008		Line test station setting
SW0001			SW0009		Monitoring time setting
SW0002			SW000A		Driver monitoring time setting
SW0003		Multiple temporary error cancel station specification	SW000B		
SW0004		Temporary error cancel station specification	SW000C		
SW0005			SW000D		
SW0006			SW000E		
SW0007			SW000F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW0040			SW0048		
SW0041		Data link restart result	SW0049		Temporary error cancel station result
SW0042			SW004A		
SW0043		Refresh instruction at standby master switching result	SW004B		Temporary error cancel station specification cancel result
SW0044			SW004C		
SW0045		Data link stop result	SW004D		Line test result
SW0046			SW004E		
SW0047			SW004F		Parameter setting test result

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW0050			SW0058		Interface board status
SW0051			SW0059		Transmission speed setting
SW0052			SW005A		Add-on board switch setting status
SW0053			SW005B		
SW0054			SW005C		
SW0055			SW005D		Forced master switching instruction result
SW0056			SW005E		
SW0057			SW005F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW0060		Mode setting status	SW0068		Host parameter status
SW0061		Host station number	SW0069		Installation status
SW0062		Operation setting status	SW006A		Switch setting status
SW0063			SW006B		Host station operation status
SW0064		No. of retries information	SW006C		Host data link status
SW0065		No. of automatic return stations	SW006D		Max. link scan time
SW0066		Delay timer	SW006E		Current link scan time
SW0067			SW006F		Min. link scan time

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW0070		Total number of stations	SW0078		Error cancel station specified status
SW0071		Max. communication station number	SW0079		
SW0072		Number of connected modules	SW007A		
SW0073		Standby master station number	SW007B		
SW0074		Reserved station specified status	SW007C		Temporary error cancel status
SW0075			SW007D		
SW0076			SW007E		
SW0077			SW007F		

3 Input/Output Signals with Controller

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW0080		Other station data link status	SW0088		Other station fuse blown status
SW0081			SW0089		
SW0082			SW008A		
SW0083			SW008B		
SW0084		Other station watchdog timer error occurrence status	SW008C		Other station switch change status
SW0085			SW008D		
SW0086			SW008E		
SW0087			SW008F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW0090		Line status	SW0098		Station number overlap status
SW0091			SW0099		
SW0092			SW009A		
SW0093			SW009B		
SW0094		Transient transmission status	SW009C		Installation/Parameter matching status
SW0095			SW009D		
SW0096			SW009E		
SW0097			SW009F		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW00B0			SW00B8		Line test 2 result
SW00B1			SW00B9		
SW00B2			SW00BA		
SW00B3			SW00BB		
SW00B4		Line test 1 result	SW00BC		
SW00B5			SW00BD		
SW00B6			SW00BE		
SW00B7			SW00BF		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW00C0		No. of retries	SW00C8		Overflow
SW00C1		TIME error	SW00C9		
SW00C2		CRC error	SW00CA		
SW00C3		Abort error	SW00CB		
SW00C4		H/W error	SW00CC		
SW00C5		Line error	SW00CD		
SW00C6		S/W error	SW00CE		
SW00C7		Illegal XCD	SW00CF		

Device	Abbrev.	Signal name	Device	Abbrev.	Signal name
SW0140		Station type (3)	SW0148		Parameter mode
SW0141			SW0149		Host parameter mode
SW0142			SW014A		
SW0143			SW014B		
SW0144		Installation/Parameter matching status (2)	SW014C		
SW0145			SW014D		
SW0146			SW014E		
SW0147			SW014F		

3.6 ZR Devices

PLC → CNC

Device	Abbrev.	Signal name
ZR256	*SLSRm	SLS OBSERVATION REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR257	*SLSRm	SLS OBSERVATION REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR258	*SLPRm	SLP OBSERVATION REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR259	*SLPRm	SLP OBSERVATION REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR260	*SSMRm	SSM REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR261	*SSMRm	SSM REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR262	*SCARm	SAFE CAM REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR263	*SCARm	SAFE CAM REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR264	*SOSRm	SOS OBSERVATION REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR265	*SOSRm	SOS OBSERVATION REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR266	*SS1Rm	SAFE STOP 1 REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR267	*SS1Rm	SAFE STOP 1 REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR268	*SS2Rm	SAFE STOP 2 REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR269	*SS2Rm	SAFE STOP 2 REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR270	*STORm	SAFE TORQUE OFF REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR271	*STORm	SAFE TORQUE OFF REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR272	*SBCRm	SBC MOTOR BRAKE STARTING REQUEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR273	*SBCRm	SBC MOTOR BRAKE STARTING REQUEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR274	SBTSTEXm	EXTERNAL BRAKE SBT START (CONTROL AXIS) 1st axis ~ 16th axis
ZR275	SBTSTEXm	EXTERNAL BRAKE SBT START (CONTROL AXIS) 17st axis ~ 32th axis
ZR276	SBTSTMOm	MOTOR BRAKE SBT START (CONTROL AXIS) 1st axis ~ 16th axis
ZR277	SBTSTMOm	MOTOR BRAKE SBT START (CONTROL AXIS) 17st axis ~ 32th axis
ZR278	SFABSPFXm	SAFETY ABSOLUTE POSITION CONFIRM (CONTROL AXIS) 1st axis ~ 16th axis
ZR279	SFABSPFXm	SAFETY ABSOLUTE POSITION CONFIRM (CONTROL AXIS) 17st axis ~ 32th axis
ZR280	SRSTm	SAFETY RESET (CONTROL AXIS) 1st axis ~ 16th axis
ZR281	SRSTm	SAFETY RESET (CONTROL AXIS) 17st axis ~ 32th axis

Device	Abbrev.	bit	Signal name
ZR312 ~ ZR343	SLSMlImn	bit0	SLS SPEED CHANGE INPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLSMlImn	bit1	SLS SPEED CHANGE INPUT (CONTROL AXIS) 1st axis ~ 32th axis
		bit2	vacant
		bit3	vacant
	SLSOVRlImn	bit4	SLS SPEED OVERRIDE INPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLSOVRlImn	bit5	SLS SPEED OVERRIDE INPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLSOVRlImn	bit6	SLS SPEED OVERRIDE INPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLSOVRlImn	bit7	SLS SPEED OVERRIDE INPUT (CONTROL AXIS) 1st axis ~ 32th axis
		bit8	vacant
		bit9	vacant
		bitA	vacant
		bitB	vacant
		bitC	vacant
		bitD	vacant
		bitE	vacant
		bitF	vacant

Device	Abbrev.	bit	Signal name
ZR344 ~ ZR375	SLPMImn	bit0	SLP POSITION CHANGE INPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLPMImn	bit1	SLP POSITION CHANGE INPUT (CONTROL AXIS) 1st axis ~ 32th axis
		bit2	vacant
		bit3	vacant
		bit4	vacant
		bit5	vacant
		bit6	vacant
		bit7	vacant
		bit8	vacant
		bit9	vacant
		bitA	vacant
		bitB	vacant
		bitC	vacant
		bitD	vacant
		bitE	vacant
		bitF	vacant

Device	Abbrev.	Signal name
ZR440	*SLSSRm	SLS OBSERVATION REQUEST (SPINDLE) 1st SP ~ 8th SP
ZR442	*SSMSRm	SSM REQUEST (SPINDLE) 1st SP ~ 8th SP
ZR444	*SOSSRm	SOS OBSERVATION REQUEST (SPINDLE) 1st SP ~ 8th SP
ZR445	*SS1SRm	SAFE STOP 1 REQUEST (SPINDLE) 1st SP ~ 8th SP
ZR446	*SS2SRm	SAFE STOP 2 REQUEST (SPINDLE) 1st SP ~ 8th SP
ZR447	*STOSRm	SAFE TORQUE OFF REQUEST (SPINDLE) 1st SP ~ 8th SP
ZR452	SRSTSm	SAFETY REQUEST (SPINDLE) 1st SP ~ 8th SP

Device	Abbrev.	bit	Signal name
ZR468 ~ ZR475	SLSSMImn	bit0	SLS SPEED CHANGE INPUT (SPINDLE) 1st SP ~ 8th SP
	SLSSMImn	bit1	SLS SPEED CHANGE INPUT (SPINDLE) 1st SP ~ 8th SP
		bit2	vacant
		bit3	vacant
	SLSSOVRImn	bit4	SLS SPEED OVERRIDE INPUT (SPINDLE) 1st SP ~ 8th SP
	SLSSOVRImn	bit5	SLS SPEED OVERRIDE INPUT (SPINDLE) 1st SP ~ 8th SP
	SLSSOVRImn	bit6	SLS SPEED OVERRIDE INPUT (SPINDLE) 1st SP ~ 8th SP
	SLSSOVRImn	bit7	SLS SPEED OVERRIDE INPUT (SPINDLE) 1st SP ~ 8th SP
		bit8	vacant
		bit9	vacant
		bitA	vacant
		bitB	vacant
		bitC	vacant
		bitD	vacant
		bitE	vacant
		bitF	vacant

Device	Abbrev.	Signal name
ZR532	SARLS	SPECIAL SAFETY ALARM CANCEL (SYSTEM COMMON)
ZR1280	SIOFFCHK	OUTPUT OFF CHECK REQUEST

CNC → PLC

Device	Abbrev.	Signal name
ZR544	SLSEm	SLS OBSERVATION IS ACTIVE (CONTROL AXIS) 1st axis ~ 16th axis
ZR545	SLSEm	SLS OBSERVATION IS ACTIVE (CONTROL AXIS) 17st axis ~ 32th axis
ZR546	SLSSm	UNDER SLS LIMIT (CONTROL AXIS) 1st axis ~ 16th axis
ZR547	SLSSm	UNDER SLS LIMIT (CONTROL AXIS) 17st axis ~ 32th axis
ZR548	SLPEm	SLP OBSERVATION IS ACTIVE (CONTROL AXIS) 1st axis ~ 16th axis
ZR549	SLPEm	SLP OBSERVATION IS ACTIVE (CONTROL AXIS) 17st axis ~ 32th axis
ZR550	SLPSm	IN SLP RANGE (CONTROL AXIS) 1st axis ~ 16th axis
ZR551	SLPSm	IN SLP RANGE (CONTROL AXIS) 17st axis ~ 32th axis
ZR552	SSMEem	SSM IS ACTIVE (CONTROL AXIS) 1st axis ~ 16th axis
ZR553	SSMEem	SSM IS ACTIVE (CONTROL AXIS) 17st axis ~ 32th axis
ZR554	SCAEem	SAFE CAM IS ACTIVE (CONTROL AXIS) 1st axis ~ 16th axis
ZR555	SCAEem	SAFE CAM IS ACTIVE (CONTROL AXIS) 17st axis ~ 32th axis
ZR556	SOSEem	SOS IS ACTIVE (CONTROL AXIS) 1st axis ~ 16th axis
ZR557	SOSEem	SOS IS ACTIVE (CONTROL AXIS) 17st axis ~ 32th axis
ZR558	SOSSm	IN SOS STOP (CONTROL AXIS) 1st axis ~ 16th axis
ZR559	SOSSm	IN SOS STOP (CONTROL AXIS) 17st axis ~ 32th axis
ZR560	SS1Em	SS1 IS ACTIVE (CONTROL AXIS) 1st axis ~ 16th axis
ZR561	SS1Em	SS1 IS ACTIVE (CONTROL AXIS) 17st axis ~ 32th axis
ZR562	SS1Sm	IN SAFE STOP 1 (CONTROL AXIS) 1st axis ~ 16th axis
ZR563	SS1Sm	IN SAFE STOP 1 (CONTROL AXIS) 17st axis ~ 32th axis
ZR564	SS2Em	SS2 IS ACTIVE (CONTROL AXIS) 1st axis ~ 16th axis
ZR565	SS2Em	SS2 IS ACTIVE (CONTROL AXIS) 17st axis ~ 32th axis
ZR566	STOEm	STO IS ACTIVE (CONTROL AXIS) 1st axis ~ 16th axis
ZR567	STOEm	STO IS ACTIVE (CONTROL AXIS) 17st axis ~ 32th axis
ZR568	STOSm	IN SAFE TORQUE OFF (CONTROL AXIS) 1st axis ~ 16th axis
ZR569	STOSm	IN SAFE TORQUE OFF (CONTROL AXIS) 17st axis ~ 32th axis
ZR570	SBCEm	IN SBC MOTOR BRAKE ENABLED (CONTROL AXIS) 1st axis ~ 16th axis
ZR571	SBCEm	IN SBC MOTOR BRAKE ENABLED (CONTROL AXIS) 17st axis ~ 32th axis
ZR572	SBCSm	IN SBC MOTOR BRAKE START SIGNAL (CONTROL AXIS) 1st axis ~ 16th axis
ZR573	SBCSm	IN SBC MOTOR BRAKE START SIGNAL (CONTROL AXIS) 17st axis ~ 32th axis
ZR574	SBTNFEXm	EXTERNAL BRAKE SBT INCOMPLETE (CONTROL AXIS) 1st axis ~ 16th axis
ZR575	SBTNFEXm	EXTERNAL BRAKE SBT INCOMPLETE (CONTROL AXIS) 17st axis ~ 32th axis
ZR576	SBTEXBRm	IN SBT EXTERNAL BRAKE TEST (CONTROL AXIS) 1st axis ~ 16th axis
ZR577	SBTEXBRm	IN SBT EXTERNAL BRAKE TEST (CONTROL AXIS) 17st axis ~ 32th axis
ZR578	SBTNFMOm	MOTOR BRAKE SBT INCOMPLETE (CONTROL AXIS) 1st axis ~ 16th axis
ZR579	SBTNFMOm	MOTOR BRAKE SBT INCOMPLETE (CONTROL AXIS) 17st axis ~ 32th axis
ZR580	SFABSPESTm	IN SAFETY ABSOLUTE POSITION ESTABLISHING (CONTROL AXIS) 1st axis ~ 16th axis
ZR581	SFABSPESTm	IN SAFETY ABSOLUTE POSITION ESTABLISHING (CONTROL AXIS) 17st axis ~ 32th axis
ZR582	SFERR_SVm	SMART SAFETY OBSERVATION ERROR OCCURING SERVO AXIS (CONTROL AXIS) 1st axis ~ 16th axis
ZR583	SFERR_SVm	SMART SAFETY OBSERVATION ERROR OCCURING SERVO AXIS (CONTROL AXIS) 17st axis ~ 32th axis
ZR584	SFWRG_SVm	SMART SAFETY OBSERVATION WARNING OCCURING SERVO AXIS (CONTROL AXIS) 1st axis ~ 16th axis
ZR585	SFWRG_SVm	SMART SAFETY OBSERVATION WARNING OCCURING SERVO AXIS (CONTROL AXIS) 17st axis ~ 32th axis

Device	Abbrev.	bit	Signal name
ZR608 ~ ZR639	SLSMOmn	bit0	SLS SPEED CHANGE OUTPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLSMOmn	bit1	SLS SPEED CHANGE OUTPUT (CONTROL AXIS) 1st axis ~ 32th axis
		bit2	vacant
		bit3	vacant
	SLSOVROmn	bit4	SLS SPEED OVERRIDE OUTPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLSOVROmn	bit5	SLS SPEED OVERRIDE OUTPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLSOVROmn	bit6	SLS SPEED OVERRIDE OUTPUT (CONTROL AXIS) 1st axis ~ 32th axis
	SLSOVROmn	bit7	SLS SPEED OVERRIDE OUTPUT (CONTROL AXIS) 1st axis ~ 32th axis
		bit8	vacant
		bit9	vacant
		bitA	vacant
		bitB	vacant
		bitC	vacant
		bitD	vacant
		bitE	vacant
		bitF	vacant

Device	Abbrev.	Signal name
ZR640 ~ ZR671	SLPMOmn	SLP POSITION CHANGE OUTPUT (CONTROL AXIS) 1st axis ~ 32th axis
ZR672 ~ ZR703	SSMSmn	UNDER SSM SAFE SPEED (CONTROL AXIS) 1st axis ~ 32th axis
ZR704 ~ ZR767	SCASmn	SAFE CAM POSITION (CONTROL AXIS) 1st axis ~ 32th axis
ZR768 ~ ZR893	SBTPOSm	SBT START POSITION (CONTROL AXIS) 1st axis ~ 32th axis

Device	Abbrev.	Signal name
ZR1024	SLSSEm	SLS OBSERVATION IS ACTIVE (SPINDLE) 1st SP ~ 8th SP
ZR1025	SLSSSm	UNDER SLS LIMIT (SPINDLE) 1st SP ~ 8th SP
ZR1028	SSMSEm	SSM IS ACTIVE (SPINDLE) 1st SP ~ 8th SP
ZR1030	SOSSEm	SOS IS ACTIVE (SPINDLE) 1st SP ~ 8th SP
ZR1031	SOSSSm	IN SOS STOP (SPINDLE) 1st SP ~ 8th SP
ZR1032	SS1SEm	SS1 IS ACTIVE (SPINDLE) 1st SP ~ 8th SP
ZR1033	SS1SSm	IN SAFE STOP (SPINDLE) 1st SP ~ 8th SP
ZR1034	SS2SEm	SS2 IS ACTIVE (SPINDLE) 1st SP ~ 8th SP
ZR1035	STOSEm	STO IS ACTIVE (SPINDLE) 1st SP ~ 8th SP
ZR1036	STOSSm	IN SAFE TORQUE OFF (SPINDLE) 1st SP ~ 8th SP
ZR1043	SFERR_SPm	SMART SAFETY OBSERVATION ERROR OCCURING SPINDLE (SPINDLE) 1st SP ~ 8th SP
ZR1044	SFWRG_SPm	SMART SAFETY OBSERVATION WARNING OCCURING SPINDLE (SPINDLE) 1st SP ~ 8th SP

Device	Abbrev.	bit	Signal name
ZR1056 ~ ZR1063	SLSSMOmn	bit0	SLS SPEED CHANGE OUTPUT (SPINDLE) 1st SP ~ 8th SP
	SLSSMOmn	bit1	SLS SPEED CHANGE OUTPUT (SPINDLE) 1st SP ~ 8th SP
		bit2	vacant
		bit3	vacant
	SLSSOVROmn	bit4	SLS SPEED OVERRIDE OUTPUT (SPINDLE) 1st SP ~ 8th SP
	SLSSOVROmn	bit5	SLS SPEED OVERRIDE OUTPUT (SPINDLE) 1st SP ~ 8th SP
	SLSSOVROmn	bit6	SLS SPEED OVERRIDE OUTPUT (SPINDLE) 1st SP ~ 8th SP
	SLSSOVROmn	bit7	SLS SPEED OVERRIDE OUTPUT (SPINDLE) 1st SP ~ 8th SP
		bit8	vacant
		bit9	vacant
		bitA	vacant
		bitB	vacant
		bitC	vacant
		bitD	vacant
		bitE	vacant
		bitF	vacant

Device	Abbrev.	Signal name
ZR1088 ~ ZR1095	SSMSSmn	UNDER SSM SAFE SPEED (SPINDLE) 1st SP ~ 8th SP

Device	Abbrev.	Signal name
ZR1264	SEXTEMG	IN SAFETY EXTERNAL EMERGENCY STOP (SYSTEM COMMON)
ZR1268	SFERR_VNO	V NUMBER OF SMART SAFETY OBSERVATION ERROR (SYSTEM COMMON)
ZR1269	SFERR_ENO	E NUMBER OF SMART SAFETY OBSERVATION ERROR (SYSTEM COMMON)
ZR1270	SFWRG_VNO	V NUMBER OF SMART SAFETY OBSERVATION WARNING (SYSTEM COMMON)
ZR1271	SFWRG_ENO	W NUMBER OF SMART SAFETY OBSERVATION WARNING (SYSTEM COMMON)

Device	Abbrev.	Signal name
ZR1536	SIOERRSTS	SAFETY I/O OBSERVATION STATE
ZR1538	SIOERRUNIT	SAFETY I/O UNIT OBSERVATION STATE
ZR1540	SIOERRUNIT STS1n	SAFETY I/O UNIT OBSERVATION ERROR DETAILS Unit1
ZR1541	SIOERRUNIT STS2n	SAFETY I/O UNIT OBSERVATION ERROR DETAILS Unit2
ZR1542	SIOERRUNIT STS3n	SAFETY I/O UNIT OBSERVATION ERROR DETAILS Unit3
ZR1543	SIOERRUNIT STS4n	SAFETY I/O UNIT OBSERVATION ERROR DETAILS Unit4
ZR1544	SIOERRUNIT STS5n	SAFETY I/O UNIT OBSERVATION ERROR DETAILS Unit5
ZR1545	SIOERRUNIT STS6n	SAFETY I/O UNIT OBSERVATION ERROR DETAILS Unit6
ZR1546	SIOERRUNIT STS7n	SAFETY I/O UNIT OBSERVATION ERROR DETAILS Unit7
ZR1547	SIOERRUNIT STS8n	SAFETY I/O UNIT OBSERVATION ERROR DETAILS Unit8

3.7 Classified for Each Application

(Note) Signals with " ▲ " are prepared for specific machine tool builders.

(1) PLC axis indexing interfaces

Device No.		Abbrev.	Signal name
	bit		
R8098	bit0		PLC indexing axis operation adjustment mode valid (common for all axes)

PLC indexing axis						Abbrev.	Signal name
1st axis	2nd axis	3rd axis	4th axis	5th axis	6th axis		
R8050	R8056	R8062	R8068	R8074	R8080	AUXCM4	PLC axis indexing control command 4
R8051	R8057	R8063	R8069	R8075	R8081	AUXCM3	PLC axis indexing control command 3
R8052	R8058	R8064	R8070	R8076	R8082	AUXCM2	PLC axis indexing control command 2
R8053	R8059	R8065	R8071	R8077	R8083	AUXCM1	PLC axis indexing control command 1
R8054	R8060	R8066	R8072	R8078	R8084		PLC axis indexing control command position (L)
R8055	R8061	R8067	R8073	R8079	R8085		PLC axis indexing control command position (H)

Device No.		Abbrev.	Signal name
	bit		
R8048	bit0		PLC indexing axis in operation adjustment mode 1st axis
	bit1		PLC indexing axis in operation adjustment mode 2nd axis
	bit2		PLC indexing axis in operation adjustment mode 3rd axis
	bit3		PLC indexing axis in operation adjustment mode 4th axis
	bit4		PLC indexing axis in operation adjustment mode 5th axis
	bit5		PLC indexing axis in operation adjustment mode 6th axis

PLC indexing axis						Abbrev.	Signal name
1st axis	2nd axis	3rd axis	4th axis	5th axis	6th axis		
R8000	R8006	R8012	R8018	R8024	R8030	AUXST4	PLC axis indexing control status 4
R8001	R8007	R8013	R8019	R8025	R8031	AUXST3	PLC axis indexing control status 3
R8002	R8008	R8014	R8020	R8026	R8032	AUXST2	PLC axis indexing control status 2
R8003	R8009	R8015	R8021	R8027	R8033	AUXST1	PLC axis indexing control status 1
R8004	R8010	R8016	R8022	R8028	R8034		PLC axis indexing control machine position (L)
R8005	R8011	R8017	R8023	R8029	R8035		PLC axis indexing control machine position (H)

(2) Other file registers (R)

Device No.	Signal name		
R2100 to R2397	Pallet program data (Drive unit -> PLC)		
R4100 to R4103	Pallet program data (PLC -> Drive unit)		
R7500 to R7799	PLC constant parameters (corresponds to parameters #18001 to #18150)		
R7800 to R7897	PLC bit selection parameters (corresponds to parameters #6401 to #6596)		
R8290 to R8299	Optimum acceleration/deceleration estimated inertia level (spindle)		
R12800 to R13099	Computer link interfaces		
R13200 to R13299	Special table interfaces		
R17300 to R18299	Modbus input/output device ▲		
M system		L system	
R10600 to R11779	ATC command control information	R10600 and later	Tool life management interfaces I, II
R11800 and later	Tool life management interfaces		

(3) Other inputs/outputs (X, Y)

Device No.	Signal name
X680 to X6BF	PLC switch #1 to 64
X6F8 to X6FF	Skip input 1 to 8 for monitor
Y680 to Y6BF	PLC switch reversed display #1 to 64
Y6C0 to Y6FF	PLC switch for reverse #1 to 64

(4) Fixed (semi-fixed) devices

Device No.	Signal name
X18 to X1B	Reference position return near-point detection 1 to 4
X20 to X23	Stroke end (-) 1 to 4
X28 to X2B	Stroke end (+) 1 to 4
X5C to X5F	Reference position return near-point detection 5 to 8
X64 to X67	Stroke end (-) 5 to 8
X6C to X6F	Stroke end (+) 5 to 8

(5) Maintenance

Device No.	Signal name
R13170	CRC count (servo #1)
R13171	CRC count (servo #2)
R13172	Address illegal (servo #1)
R13173	Address illegal (servo #2)
R13174	CRC count (display unit)
R13175	Address illegal (display unit)
R13176	CRC count (servo #3)
R13177	Address illegal (servo #3)

(6) Spindle related devices

CNC -> PLC

Device No.								Abbrev.	Signal name
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP		
X1880	X18E0	X1940	X19A0	X1A00	X1A60	X1AC0	X1B20	SUPP	Spindle rotation upper limit exceeded
X1881	X18E1	X1941	X19A1	X1A01	X1A61	X1AC1	X1B21	SLOW	Spindle rotation lower limit exceeded
X1882	X18E2	X1942	X19A2	X1A02	X1A62	X1AC2	X1B22	SIGE	S command gear No. illegal
X1883	X18E3	X1943	X19A3	X1A03	X1A63	X1AC3	X1B23	SOVE	S command max./min. command value over
X1884	X18E4	X1944	X19A4	X1A04	X1A64	X1AC4	X1B24	SNGE	S command no gear selected
X1885	X18E5	X1945	X19A5	X1A05	X1A65	X1AC5	X1B25	GR1	Spindle gear shift command 1
X1886	X18E6	X1946	X19A6	X1A06	X1A66	X1AC6	X1B26	GR2	Spindle gear shift command 2
X1887	X18E7	X1947	X19A7	X1A07	X1A67	X1AC7	X1B27	-	(Always "0")
X1888	X18E8	X1948	X19A8	X1A08	X1A68	X1AC8	X1B28		Spindle 2nd in-position
X1889	X18E9	X1949	X19A9	X1A09	X1A69	X1AC9	X1B29	CDO	Current detection
X188A	X18EA	X194A	X19AA	X1A0A	X1A6A	X1ACA	X1B2A	VRO	Speed detection
X188B	X18EB	X194B	X19AB	X1A0B	X1A6B	X1ACB	X1B2B	FLO	In spindle alarm
X188C	X18EC	X194C	X19AC	X1A0C	X1A6C	X1ACC	X1B2C	ZSO	Zero speed
X188D	X18ED	X194D	X19AD	X1A0D	X1A6D	X1ACD	X1B2D	USO	Spindle up-to-speed
X188E	X18EE	X194E	X19AE	X1A0E	X1A6E	X1ACE	X1B2E	ORAO	Spindle in-position
X188F	X18EF	X194F	X19AF	X1A0F	X1A6F	X1ACF	X1B2F	LCSA	In L coil selection
X1890	X18F0	X1950	X19B0	X1A10	X1A70	X1AD0	X1B30	SMA	Spindle ready-ON
X1891	X18F1	X1951	X19B1	X1A11	X1A71	X1AD1	X1B31	SSA	Spindle servo-ON
X1892	X18F2	X1952	X19B2	X1A12	X1A72	X1AD2	X1B32	SEMG	In spindle emergency stop
X1893	X18F3	X1953	X19B3	X1A13	X1A73	X1AD3	X1B33	SSRN	In spindle forward run
X1894	X18F4	X1954	X19B4	X1A14	X1A74	X1AD4	X1B34	SSRI	In spindle reverse run
X1895	X18F5	X1955	X19B5	X1A15	X1A75	X1AD5	X1B35		Z phase passed
X1896	X18F6	X1956	X19B6	X1A16	X1A76	X1AD6	X1B36	SIMP	Position loop in-position
X1897	X18F7	X1957	X19B7	X1A17	X1A77	X1AD7	X1B37	STLQ	In spindle torque limit
X1898	X18F8	X1958	X19B8	X1A18	X1A78	X1AD8	X1B38		
X1899	X18F9	X1959	X19B9	X1A19	X1A79	X1AD9	X1B39		
X189A	X18FA	X195A	X19BA	X1A1A	X1A7A	X1ADA	X1B3A		Spindle torque limit reached
X189D	X18FD	X195D	X19BD	X1A1D	X1A7D	X1ADD	X1B3D	SD2	Speed detection 2
X189E	X18FE	X195E	X19BE	X1A1E	X1A7E	X1ADE	X1B3E	MCSA	In M coil selection
X189F	X18FF	X195F	X19BF	X1A1F	X1A7F	X1ADF	X1B3F		Index positioning completion

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
X18A0	X1900	X1960	X19C0	X1A20	X1A80	X1AE0	X1B40	ENB	Spindle enable
X18A8	X1908	X1968	X19C8	X1A28	X1A88	X1AE8	X1B48	SPSYN1	In spindle synchronization
X18A9	X1909	X1969	X19C9	X1A29	X1A89	X1AE9	X1B49	FSPRV	Spindle rotation speed synchronization completion
X18AA	X190A	X196A	X19CA	X1A2A	X1A8A	X1AEA	X1B4A	FSPPH	Spindle phase synchronization completion
X18AB	X190B	X196B	X19CB	X1A2B	X1A8B	X1AEB	X1B4B	SPSYN2	In spindle synchronization 2
X18AC	X190C	X196C	X19CC	X1A2C	X1A8C	X1AEC	X1B4C	SPCMP	Chuck close confirmation
X18AD	X190D	X196D	X19CD	X1A2D	X1A8D	X1AED	X1B4D		Tool spindle synchronization I (Polygon) ON
X18AE	X190E	X196E	X19CE	X1A2E	X1A8E	X1AEE	X1B4E	SPSYN3	In tool spindle synchronization II
X18AF	X190F	X196F	X19CF	X1A2F	X1A8F	X1AEF	X1B4F	SPNCH	Spindle superimposition control: Speed change disabled
X18B1	X1911	X1971	X19D1	X1A31	X1A91	X1AF1	X1B51	SPILE	Spindle superimposition control ON
X18B2	X1912	X1972	X19D2	X1A32	X1A92	X1AF2	X1B52	SPLCR	Spindle superimposition control: Spindle superimposition clamped
X18B3	X1913	X1973	X19D3	X1A33	X1A93	X1AF3	X1B53	PHOVR	Hob axis delay excess
X18B5	X1915	X1975	X19D5	X1A35	X1A95	X1AF5	X1B55	EXOFN	In spindle holding force up
X18B6	X1916	X1976	X19D6	X1A36	X1A96	X1AF6	X1B56	SPOFFA	In spindle holding force up
X18C1	X1921	X1981	X19E1	X1A41	X1AA1	X1B01	X1B61	SVMD	Spindle position control (Spindle/C axis control): C axis mode ON
X18C2	X1922	X1982	X19E2	X1A42	X1AA2	X1B02	X1B62	GO1	Spindle gear selection output 1
X18C3	X1923	X1983	X19E3	X1A43	X1AA3	X1B03	X1B63	GO2	Spindle gear selection output 2
X18C8	X1928	X1988	X19E8	X1A48	X1AA8	X1B08	X1B68		Spindle oscillation in progress
X18CA	X192A	X198A	X19EA	X1A4A	X1AAA	X1B0A	X1B6A	VGHLD	Real-time tuning 1: Speed gain hold-down ON

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
XC64	XDA4	XEE4	X1024	X1164	X12A4	X13E4	X1524	SF1	S function strobe 1
XC65	XDA5	XEE5	X1025	X1165	X12A5	X13E5	X1525	SF2	S function strobe 2
XC66	XDA6	XEE6	X1026	X1166	X12A6	X13E6	X1526	SF3	S function strobe 3
XC67	XDA7	XEE7	X1027	X1167	X12A7	X13E7	X1527	SF4	S function strobe 4
XC70	XDB0	XEF0	X1030	X1170	X12B0	X13F0	X1530	SF5	S function strobe 5
XC71	XDB1	XEF1	X1031	X1171	X12B1	X13F1	X1531	SF6	S function strobe 6
XC72	XDB2	XEF2	X1032	X1172	X12B2	X13F2	X1532	SF7	S function strobe 7
XC73	XDB3	XEF3	X1033	X1173	X12B3	X13F3	X1533	SF8	S function strobe 8
XCB0	XDF0	XF30	X1070	X11B0	X12F0	X1430	X1570		In spindle-NC axis polygon mode
XCB2	XDF2	XF32	X1072	X11B2	X12F2	X1432	X1572		In spindle-spindle polygon mode
XCB3	XDF3	XF33	X1073	X11B3	X12F3	X1433	X1573		Spindle-spindle polygon synchronization completion

CNC -> PLC

Device No.								Abbrev.	Signal name
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP		
R6500	R6550	R6600	R6650	R6700	R6750	R6800	R6850		Spindle command rotation speed input (L)
R6501	R6551	R6601	R6651	R6701	R6751	R6801	R6851		Spindle command rotation speed input (H)
R6502	R6552	R6602	R6652	R6702	R6752	R6802	R6852		Spindle command final data (rotation speed) (L)
R6503	R6553	R6603	R6653	R6703	R6753	R6803	R6853		Spindle command final data (rotation speed) (H)
R6504	R6554	R6604	R6654	R6704	R6754	R6804	R6854		Spindle command final data (12-bit binary) (L)
R6505	R6555	R6605	R6655	R6705	R6755	R6805	R6855		Spindle command final data (12-bit binary) (H)
R6506	R6556	R6606	R6656	R6706	R6756	R6806	R6856		Spindle actual speed (L)
R6507	R6557	R6607	R6657	R6707	R6757	R6807	R6857		Spindle actual speed (H)
R6508	R6558	R6608	R6658	R6708	R6758	R6808	R6858		
R6514	R6564	R6614	R6664	R6714	R6764	R6814	R6864		Optimum acceleration/deceleration estimated inertia ratio [spindle] ▲
R6515	R6565	R6615	R6665	R6715	R6765	R6815	R6865		Optimum acceleration/deceleration parameter group currently selected [spindle] ▲
R6516	R6566	R6616	R6666	R6716	R6766	R6816	R6866		Spindle synchronization phase error /Hob axis delay angle
R6517	R6567	R6617	R6667	R6717	R6767	R6817	R6867		Spindle synchronization Maximum phase error/ Maximum hob axis delay angle
R6518	R6568	R6618	R6668	R6718	R6768	R6818	R6868		Spindle synchronization Phase offset data
R6519	R6569	R6619	R6669	R6719	R6769	R6819	R6869		Spindle synchronization Phase error monitor
R6520	R6570	R6620	R6670	R6720	R6770	R6820	R6870		Spindle synchronization Phase error monitor (lower limit)
R6521	R6571	R6621	R6671	R6721	R6771	R6821	R6871		Spindle synchronization Phase error monitor (upper limit)
R6522	R6572	R6622	R6672	R6722	R6772	R6822	R6872		Spindle synchronization Phase error 1
R6523	R6573	R6623	R6673	R6723	R6773	R6823	R6873		Spindle synchronization Phase error 2
R6525	R6575	R6625	R6675	R6725	R6775	R6825	R6875		Spindle motor load ratio
R6527	R6577	R6627	R6677	R6727	R6777	R6827	R6877		Spindle actual machining time ▲
R6528	R6578	R6628	R6678	R6728	R6778	R6828	R6878		Load monitor I : Spindle cutting torque output value
R6529	R6579	R6629	R6679	R6729	R6779	R6829	R6879		Spindle alarm/warning No.
R6532	R6582	R6632	R6682	R6732	R6782	R6832	R6882		Synchronous tapping Current error width (L)
R6533	R6583	R6633	R6683	R6733	R6783	R6833	R6883		Synchronous tapping Current error width (H)
R6534	R6584	R6634	R6684	R6734	R6784	R6834	R6884		Synchronous tapping Maximum error width (L)
R6535	R6585	R6635	R6685	R6735	R6785	R6835	R6885		Synchronous tapping Maximum error width (H)
R6536	R6586	R6636	R6686	R6736	R6786	R6836	R6886		Synchronous tapping Current error angle (L)
R6537	R6587	R6637	R6687	R6737	R6787	R6837	R6887		Synchronous tapping Current error angle (H)
R6538	R6588	R6638	R6688	R6738	R6788	R6838	R6888		Synchronous tapping Maximum error angle (L)
R6539	R6589	R6639	R6689	R6739	R6789	R6839	R6889		Synchronous tapping Maximum error angle (H)
R6541	R6591	R6641	R6691	R6741	R6791	R6841	R6891		Load monitoring I: Estimated spindle disturbance torque output
R6542	R6592	R6642	R6692	R6742	R6792	R6842	R6892		Load monitoring I: Effective spindle torque output

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R512	R712	R912	R1112	R1312	R1512	R1712	R1912		S code data 1 (L)
R513	R713	R913	R1113	R1313	R1513	R1713	R1913		S code data 1 (H)
R514	R714	R914	R1114	R1314	R1514	R1714	R1914		S code data 2 (L)
R515	R715	R915	R1115	R1315	R1515	R1715	R1915		S code data 2 (H)
R516	R716	R916	R1116	R1316	R1516	R1716	R1916		S code data 3 (L)
R517	R717	R917	R1117	R1317	R1517	R1717	R1917		S code data 3 (H)
R518	R718	R918	R1118	R1318	R1518	R1718	R1918		S code data 4 (L)
R519	R719	R919	R1119	R1319	R1519	R1719	R1919		S code data 4 (H)
R520	R720	R920	R1120	R1320	R1520	R1720	R1920		S code data 5 (L)
R521	R721	R921	R1121	R1321	R1521	R1721	R1921		S code data 5 (H)
R522	R722	R922	R1122	R1322	R1522	R1722	R1922		S code data 6 (L)
R523	R723	R923	R1123	R1323	R1523	R1723	R1923		S code data 6 (H)
R524	R724	R924	R1124	R1324	R1524	R1724	R1924		S code data 7 (L)
R525	R725	R925	R1125	R1325	R1525	R1725	R1925		S code data 7 (H)
R526	R726	R926	R1126	R1326	R1526	R1726	R1926		S code data 8 (L)
R527	R727	R927	R1127	R1327	R1527	R1727	R1927		S code data 8 (H)

PLC -> CNC

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
Y1885	Y18E5	Y1945	Y19A5	Y1A05	Y1A65	Y1AC5	Y1B25	GFIN	Gear shift completion
Y1888	Y18E8	Y1948	Y19A8	Y1A08	Y1A68	Y1AC8	Y1B28	SP1	Spindle speed override code 1
Y1889	Y18E9	Y1949	Y19A9	Y1A09	Y1A69	Y1AC9	Y1B29	SP2	Spindle speed override code 2
Y188A	Y18EA	Y194A	Y19AA	Y1A0A	Y1A6A	Y1ACA	Y1B2A	SP4	Spindle speed override code 4
Y188F	Y18EF	Y194F	Y19AF	Y1A0F	Y1A6F	Y1ACF	Y1B2F	SPS	Spindle override method selection
Y1890	Y18F0	Y1950	Y19B0	Y1A10	Y1A70	Y1AD0	Y1B30	GI1	Spindle gear selection code 1
Y1891	Y18F1	Y1951	Y19B1	Y1A11	Y1A71	Y1AD1	Y1B31	GI2	Spindle gear selection code 2
Y1893	Y18F3	Y1953	Y19B3	Y1A13	Y1A73	Y1AD3	Y1B33	EXOBS	Spindle holding force up
Y1894	Y18F4	Y1954	Y19B4	Y1A14	Y1A74	Y1AD4	Y1B34	SSTP	Spindle stop
Y1895	Y18F5	Y1955	Y19B5	Y1A15	Y1A75	Y1AD5	Y1B35	SSFT	Spindle gear shift
Y1896	Y18F6	Y1956	Y19B6	Y1A16	Y1A76	Y1AD6	Y1B36	SORC	Spindle orientation
Y1897	Y18F7	Y1957	Y19B7	Y1A17	Y1A77	Y1AD7	Y1B37		Spindle command invalid
Y1898	Y18F8	Y1958	Y19B8	Y1A18	Y1A78	Y1AD8	Y1B38	SRN	Spindle forward run start
Y1899	Y18F9	Y1959	Y19B9	Y1A19	Y1A79	Y1AD9	Y1B39	SRI	Spindle reverse run start
Y189A	Y18FA	Y195A	Y19BA	Y1A1A	Y1A7A	Y1ADA	Y1B3A	TL1	Spindle torque limit 1
Y189B	Y18FB	Y195B	Y19BB	Y1A1B	Y1A7B	Y1ADB	Y1B3B	TL2	Spindle torque limit 2
Y189C	Y18FC	Y195C	Y19BC	Y1A1C	Y1A7C	Y1ADC	Y1B3C	WRN	Spindle forward run index
Y189D	Y18FD	Y195D	Y19BD	Y1A1D	Y1A7D	Y1ADD	Y1B3D	WRI	Spindle reverse run index
Y189E	Y18FE	Y195E	Y19BE	Y1A1E	Y1A7E	Y1ADE	Y1B3E	ORC	Spindle orientation command
Y189F	Y18FF	Y195F	Y19BF	Y1A1F	Y1A7F	Y1ADF	Y1B3F	LRLS	L coil selection
Y18A2	Y1902	Y1962	Y19C2	Y1A22	Y1A82	Y1AE2	Y1B42		Spindle position control (C axis) Cutting gain L
Y18A3	Y1903	Y1963	Y19C3	Y1A23	Y1A83	Y1AE3	Y1B43		Spindle position control (C axis) Cutting gain H
Y18A5	Y1905	Y1965	Y19C5	Y1A25	Y1A85	Y1AE5	Y1B45	CMOD	Spindle position control (Spindle/C axis control): C axis selection
Y18A6	Y1906	Y1966	Y19C6	Y1A26	Y1A86	Y1AE6	Y1B46	LRSM	M coil selection
Y18A8	Y1908	Y1968	Y19C8	Y1A28	Y1A88	Y1AE8	Y1B48	SWS	Spindle selection
Y18AA	Y190A	Y196A	Y19CA	Y1A2A	Y1A8A	Y1AEA	Y1B4A	SPRR	Spindle rotation reversal
Y18AB	Y190B	Y196B	Y19CB	Y1A2B	Y1A8B	Y1AEB	Y1B4B	SPRS	Spindle rotation direction switch method selection
Y18AF	Y190F	Y196F	Y19CF	Y1A2F	Y1A8F	Y1AEF	Y1B4F	MPCSL	PLC coil changeover
Y18B0	Y1910	Y1970	Y19D0	Y1A30	Y1A90	Y1AF0	Y1B50	SPSY	Spindle synchronization
Y18B1	Y1911	Y1971	Y19D1	Y1A31	Y1A91	Y1AF1	Y1B51	SPPHS	Spindle phase synchronization
Y18B2	Y1912	Y1972	Y19D2	Y1A32	Y1A92	Y1AF2	Y1B52	SPSDR	Spindle synchronization rotation direction
Y18B3	Y1913	Y1973	Y19D3	Y1A33	Y1A93	Y1AF3	Y1B53	SSPHM	Phase shift calculation request
Y18B4	Y1914	Y1974	Y19D4	Y1A34	Y1A94	Y1AF4	Y1B54	SSPHF	Phase offset request
Y18B5	Y1915	Y1975	Y19D5	Y1A35	Y1A95	Y1AF5	Y1B55	SPDRP O	Error temporary cancel
Y18B8	Y1918	Y1978	Y19D8	Y1A38	Y1A98	Y1AF8	Y1B58	SPSYC	Spindle synchronization/ superimposition cancel
Y18B9	Y1919	Y1979	Y19D9	Y1A39	Y1A99	Y1AF9	Y1B59	SPCMP C	Chuck close
Y18BF	Y191F	Y197F	Y19DF	Y1A3F	Y1A9F	Y1AFF	Y1B5F	SPOFF	Spindle Off Request
Y18C8	Y1928	Y1988	Y19E8	Y1A48	Y1AA8	Y1B08	Y1B68		Spindle oscillation command
Y18C9	Y1929	Y1989	Y19E9	Y1A49	Y1AA9	Y1B09	Y1B69	WGTC	Spindle control : Coil changeover gate cutoff timer interruption ▲
Y18CA	Y192A	Y198A	Y19EA	Y1A4A	Y1AAA	Y1B0A	Y1B6A	VGHLC	Real-time tuning 1: Speed control gain hold-down command

PLC -> CNC

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
YCD1	YE11	YF51	Y1091	Y11D1	Y1311	Y1451	Y1591		Spindle-spindle polygon cancel
YCD2	YE12	YF52	Y1092	Y11D2	Y1312	Y1452	Y1592		Synchronized tapping command polarity reversal
YCD3	YE13	YF53	Y1093	Y11D3	Y1313	Y1453	Y1593		Spindle OFF mode
YCE1	YE21	YF61	Y10A1	Y11E1	Y1321	Y1461	Y15A1		Door open II
YCE2	YE22	YF62	Y10A2	Y11E2	Y1322	Y1462	Y15A2		Door open signal input (spindle speed monitor)
YCE3	YE23	YF63	Y10A3	Y11E3	Y1323	Y1463	Y15A3		Door interlock spindle speed clamp

PLC -> CNC

Device No.									
1stSP	2ndSP	3rdSP	4thSP	5thSP	6thSP	7thSP	8thSP	Abbrev.	Signal name
R7000	R7050	R7100	R7150	R7200	R7250	R7300	R7350		Spindle command rotation speed output (L)
R7001	R7051	R7101	R7151	R7201	R7251	R7301	R7351		Spindle command rotation speed output (H)
R7002	R7052	R7102	R7152	R7202	R7252	R7302	R7352	SLSP	Spindle command selection
R7003	R7053	R7103	R7153	R7203	R7253	R7303	R7353		Optimum acceleration/deceleration parameter group selection [spindle] ▲
R7004	R7054	R7104	R7154	R7204	R7254	R7304	R7354		Spindle target machining time ▲
R7008	R7058	R7108	R7158	R7208	R7258	R7308	R7358		S command override
R7009	R7059	R7109	R7159	R7209	R7259	R7309	R7359		Multi-point orientation position data
R7016	R7066	R7116	R7166	R7216	R7266	R7316	R7366		Spindle synchronization Reference spindle selection
R7017	R7067	R7117	R7167	R7217	R7267	R7317	R7367		Spindle synchronization synchronized spindle selection
R7018	R7068	R7118	R7168	R7218	R7268	R7318	R7368		Spindle synchronization Phase shift amount
R7020	R7070	R7120	R7170	R7220	R7270	R7320	R7370		Spindle oscillation amplitude
R7021	R7071	R7121	R7171	R7221	R7271	R7321	R7371		Spindle oscillation frequency

Device No.									
\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	Abbrev.	Signal name
R2567	R2767	R2967	R3167	R3367	R3567	R3767	R3967		Encoder selection

Other Devices

In addition to X, Y and R devices described above, the following devices exist:

Name	Symbol	Description
Internal relay Latch relay	M F L	(1) Internal and latch relays are auxiliary relays in the sequence that cannot directly be output to the external. (2) The latch relay L will be backed up even if the power is turned OFF. (3) The internal relay F may be used as the interface for the alarm message display.
Timer	T ST	(1) Timers T are count-up timers. (2) Timer T and ST can set the timer value from either the sequence program or setting and display unit. (3) The 100ms, 10ms and 100ms integral timer are available.
Counter	C	(1) Counters C are count-up counters. (2) Counter C can set the counter value from either the sequence program or setting and display unit.
Data register	D	(1) The data register stores sequence data. (2) One data register consists of 16 bits and can be read or written in 16-bit units. To handle 32-bit data, two data registers are used. The data register addressed by a 32-bit command is used as the low-order 16 bits; the data register addressed by the specified data register number +1 is used as the high-order 16 bits.
File register	R	(1) The file register release area can be used in the same manner as the data register. (2) To handle 32-bit data, two file registers are used. The file register addressed by a 32-bit command is used as the low-order 16 bits; the file register addressed by the specified file register number +1 is used as the high-order 16 bits.

The assignment tables are on the following pages. Copy and use them as necessary.

<Format>

Device	Abbreviation	Signal name	Device	Abbreviation	Signal name
Device	Abbreviation	Signal name	Device	Abbreviation	Signal name
Device	Abbreviation	Signal name	Device	Abbreviation	Signal name
Device	Abbreviation	Signal name	Device	Abbreviation	Signal name

System Configuration of Development Environment

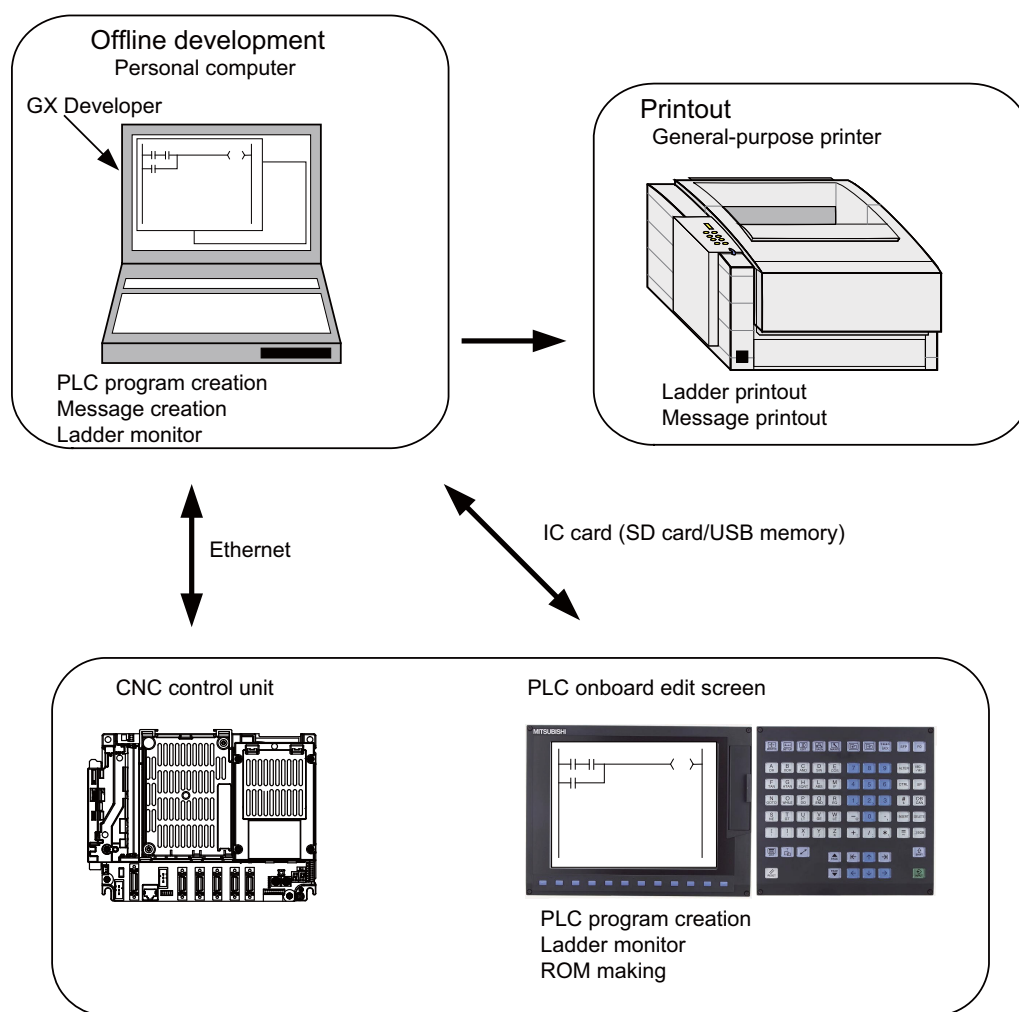
5.1 System Configuration for PLC Development

The general configuration of the development environment is shown below.

Most of the development work is carried out with "GX Developer", which runs on a personal computer. GX Developer and the CNC control unit are connected with Ethernet at this time.

On the CNC unit PLC onboard edit screen, it is possible to use the data saved with GX Developer or develop PLC programs, as well. Note that some functions may be limited. (Print output, Japanese input, etc.)

(Note) Do not use GX Developer simultaneously when several PCs are connected with NC.



General configuration of development environment

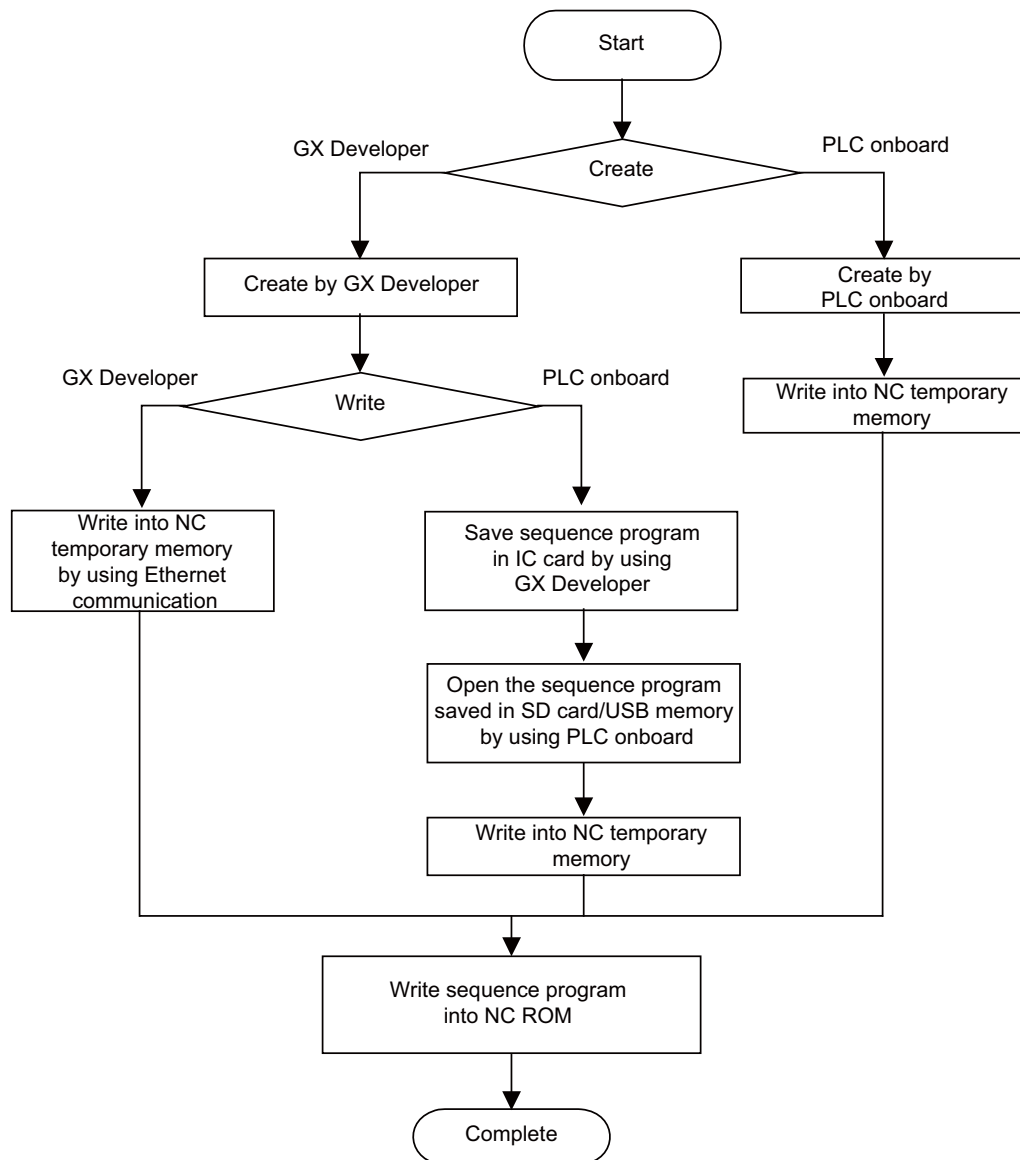
Note the following points when using the SD card or USB memory.

- (1) Do not remove the SD card/USB memory during reading data.
- (2) If a card must be inserted and removed while the power is ON, make sure to take sufficient time (approve. ten seconds or more) between the insertion and removal.
- (3) Do not pull out the card or turn OFF the power during access to the SD card. Failure to observe this could cause the memory contents to be erased.
- (4) Do not connect devices other than USB memory (including extension cable and USB hub).
- (5) It is recommended to use genuine SD cards. MITSUBISHI is unable to guarantee the machine operation when a commercially available SD card/USB memory is used. In that case, performance check must be made carefully by machine tool builder.

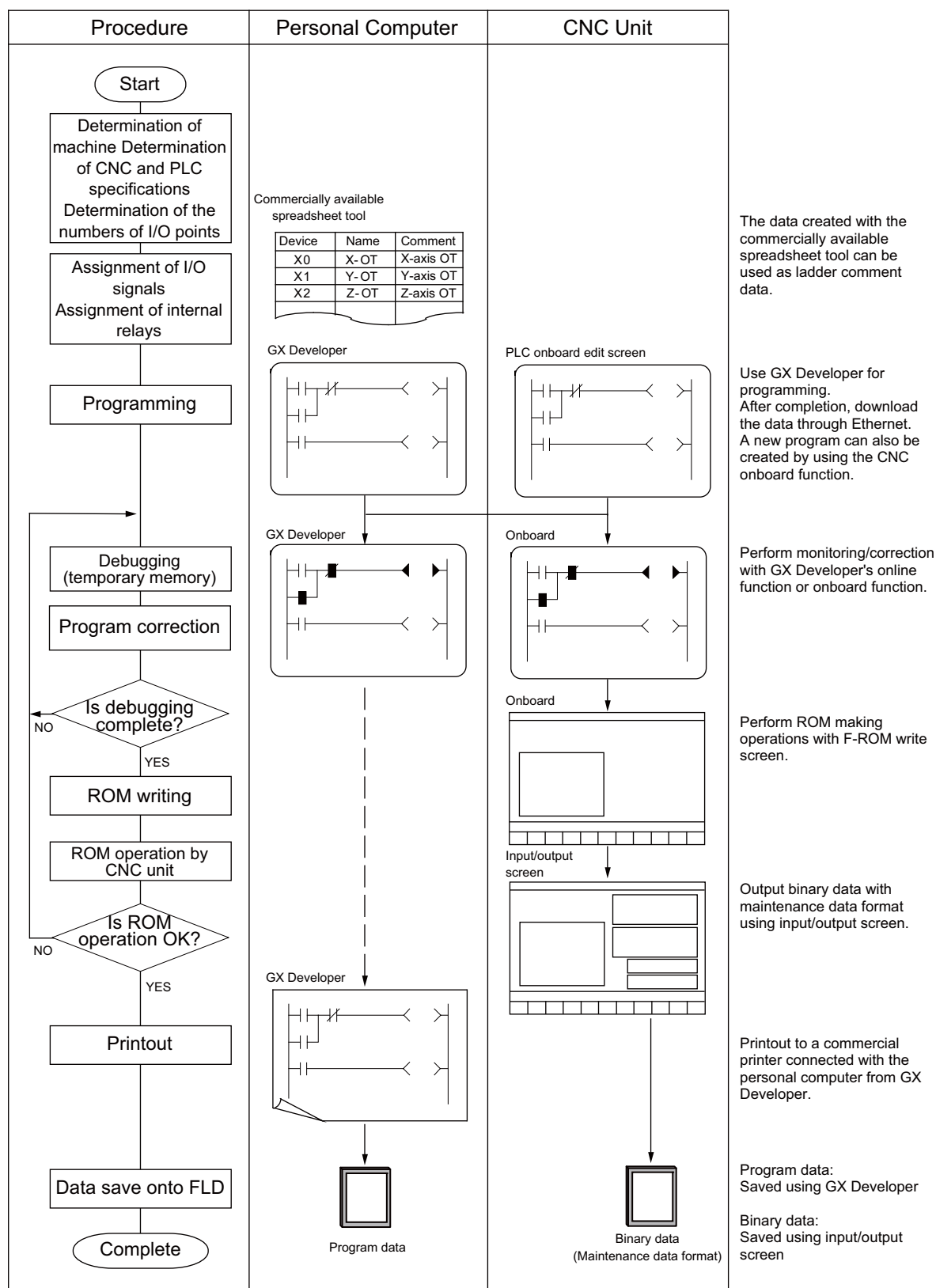
5.2 User PLC (Ladder) Development Procedure

User PLC programs can be created and input by means of either GX Developer installed in the external PC or PLC onboard edit screen.

Procedures for creating/inputting PLC programs with either method are shown below.



Next, procedures for creating sequence programs are shown below.



It is recommended to use genuine SD cards.

MITSUBISHI is unable to guarantee the machine operation when a commercially available SD card is used.

In that case, performance check must be made carefully by machine tool builder.

Peripheral Development Environment

6.1 Outline

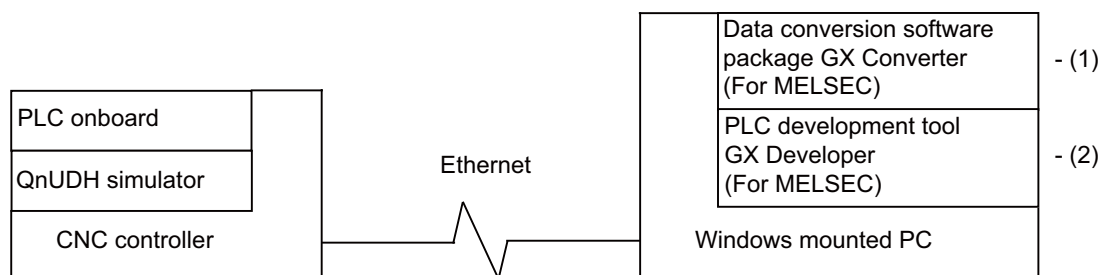
This CNC supports the user PLC development environment which uses the Mitsubishi integrated FA software MELSOFT Series (GX Developer), which is the PLC development tool for the Mitsubishi PLC MELSEC Series.

This manual explains user PLC development environment using GX Developer, mainly usage specific to MITSUBISHI CNC.

(Note 1) Do not connect GX Developer while displaying PLC onboard.

(Note 2) Do not use GX Developer simultaneously when several PCs are connected with NC.

6.1.1 Software Configuration



(1) 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:
GX Converter is an add-on tool of GX Developer and is started from the GX Developer menu.

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

This tool is a software package for various MELSEC support. GX Converter Version 2.25B (SW2D5C-CNVW) needs to be used with the versions following GX Developer Version 6.01B. Refer to the GX Developer Operating Manual for function details.

(2) GX Developer (PLC development software package)

GX Developer is a programming software package (model name: SW8D5C-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 the MITSUBISHI CNC Series. Note that some functions specific to the "MELSEC Series" may not be unavailable.

For MITSUBISHI CNC Series sequence program development, we recommend you to use GX Developer Version 8.114U (SW8D5C-GPPW) or later. For function details, refer to the GX Developer Operating Manual.

6.1.2 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 8.114U" operating environment. For the specifications of different versions, check them in the respective Operating Manuals (startup).

Item		Contents
Peripheral device	Personal computer	Personal computer in which Windows operates.
Personal computer main body	CPU	See "Applicable operating system and the corresponding required PC performance" shown below.
	Required memory	
Available hard disk space		200MB or more
Disk drive		CD-ROM drive (if using CD-ROM media)
Monitor		Resolution 800x600 pixels or higher *1
Communication interface		Ethernet port
Operating system *2		Microsoft Windows Vista Home Basic Operating System Microsoft Windows Vista Home Premium Operating System Microsoft Windows Vista Business Operating System Microsoft Windows Vista Ultimate Operating System Microsoft Windows Vista Enterprise Operating System Microsoft Windows 7 Starter Operating System Microsoft Windows 7 Home Premium Operating System Microsoft Windows 7 Professional Operating System Microsoft Windows 7 Ultimate Operating System Microsoft Windows 7 Enterprise Operating System Microsoft Windows 8 Operating System Microsoft Windows 8 Pro Operating System Microsoft Windows 8 Enterprise Operating System

*1: Resolution 1024 × 768 pixels or higher is recommended for Windows Vista or later.

*2: 64-bit Windows Vista is not supported.

Applicable operating system and the corresponding required PC performance.

Item	Required PC performance	
	CPU	Required memory
Windows Vista	Pentium 1GHz or higher	1GB or more
Windows 7	Pentium 1GHz or higher	1GB or more (32-bit Windows 7)
		2GB or more (64-bit Windows 7)
Windows 8	Pentium 1GHz or higher	1GB or more (32-bit Windows 8)
		2GB or more (64-bit Windows 8)

6.2 GX Developer Functions Supported by MITSUBISHI CNC

The GX Developer functions explained here are those supported by this CNC in the "offline functions" operated with the GX Developer independently, and the "online functions" carried out in connection with the CNC controller. Refer to the enclosed Operating Manual for function details.

6.2.1 Function Support Conditions (General Section)

The GX Developer outline functions supported by this CNC are listed below.

The © mark indicates functions that can be used with this CNC. An r 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	×	
ST	×	

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		△	Q26UDH fixed
	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	◎	
	Macro	Registration macros	◎	
		Macro utilize	◎	
		Delete macros	◎	
		Macro reference path	◎	
	Function block	Utilize	◎	
		Change FB name	◎	
		Set unit head I/O No.	×	
	Security operation	User management	×	
		Set waiting time	×	
		Operation lock	×	
	Printer setup		◎	
	Print		◎	
	Start new GX Developer session		◎	
	Exit GX Developer		◎	

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

Function	Menu	Sub menu	Support	Remarks
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		◎	
	Read mode (all windows)		◎	
	Write mode (all windows)		◎	
	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	◎	
		Falling pulse	◎	
		Rising pulse open branch	◎	
		Falling pulse close branch	◎	
		Rising pulse negation	×	
		Falling pulse negation	×	
		Rising pulse OR negation	×	
		Falling pulse OR negation	×	
		Invert operation results	◎	
		Convert operation results to rising pulse	◎	
		Convert operation results to falling pulse	◎	
	Documentation	Comment	◎	
		Statement	◎	
		Note	◎	
		Statement/Note block edit	◎	

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		◎	
	Find comment		◎	
	Replace device		◎	
	Batch replacement of 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 (All program)		◎	
	Convert (Online change)		△	

List of general section functions (4)

◎ : Possible, △ : Limitedly possible, × : Not possible

Function	Menu	Sub menu	Support	Remarks
View	Comment		◎	
	Statement		◎	
	Note		◎	
	Alias		◎	
	Device		◎	
	Macro instruction format display		◎	
	Current value monitor row		◎	
	Comment format	4*8 characters	◎	
		3*5 characters	◎	
	Alias format display	Replace device name and display	◎	
		Arrange with device and display	◎	
	Device format display	Upper/lower split	◎	
		Right/left split	◎	
	Device comment row	1 row	◎	
		2 rows	◎	
		3 rows	◎	
		4 rows	◎	
	Toolbar		◎	
	Status bar		◎	
	Zoom	50%	◎	
		75%	◎	
		100%	◎	
		150%	◎	
		Specify	◎	
		Auto	◎	
	Project data list		◎	
	Project data format	No sorting	◎	
		Data name ascending sort	◎	
		Data name descending sort	◎	
	Instruction list		◎	
	Set the contact	9 contacts	◎	
		11 contacts	◎	
	Elapsed time		×	
	Display step synchronization		×	
Online	Refer to "List of on-line section functions"	Refer to "2.2 Function Support Conditions (Online Section)"		
Diagnostics	PLC diagnostics		△	Limited partly
	Ethernet diagnostics		×	
	CC IE Control diagnostics		×	
	MELSECNET diagnostics		×	
	CC-Link/CC-Link/LT		×	
	System monitor		×	
	Online module change		×	

List of general section functions (5)

◎ : Possible, △ : Limitedly possible, × : Not possible

Function	Menu	Sub menu	Support	Remarks
Tools	Check program		◎	
	Calculate memory capacity		×	
	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	×	
	Start LCPULogging setting tool		×	
	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	CPU error		×	
	Special relay/register		×	
	Key operation list		◎	
	Product information		◎	
	Connect to MELFANSweb		◎	
	Connect to setting guidance		×	

6.2.2 Function Support Conditions (Online Section)

The GX Developer functions supported by this CNC are listed below.

The ◎ mark indicates functions that can be used currently with this CNC. An r mark indicates that the function cannot be used because it is related to "MELSEC Series" characteristic functions.

List of online 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 QnUDHCPU
		Other station	×	
		Network route	×	
		Co-existence network route	×	
		Specify multi CPU	△	CNC unique specification (multi-project)
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		×	

List of online section functions (2)

◎ : Possible, △ : Limitedly possible, ×: Not possible

Menu	Sub menu	Detailed function	Support	Remarks
Monitor	Monitor mode/Start/Stop	ON/OFF state	◎	
		Scan time display	◎	
		CPU state display	◎	
	Monitor [Write mode]		×	
	Start monitor [All windows]		◎	
	Stop monitor [All windows]		◎	
	Change current value monitor [Decimal]		◎	
	Change current value monitor [Hexadecimal]		◎	
	Local device monitor		×	
	Device batch	Device	◎	
		Connect	◎	
		Coil	◎	
		Setting value	◎	
		Current value	◎	
		Monitor format : Bit & word	◎	
		Monitor format : Bit	◎	
		Monitor format : word	◎	
		Display : 16bit integer	◎	
		Display : 32bit integer	◎	
		Display : Real number (single-precision/double-precision)	×	
		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 (single-precision/double-precision)	×	
		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		◎	

List of online 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	◎	
		Forced input output registration/ cancellation	×	
		Buffer memory	×	
	Debug		×	
	Skip execution		×	
	Partial execution		×	
	Step execution		×	
Trace	Sampling trace	Wizard setting/execution	◎	
		Individual setting/execution	◎	
		Trace data storage destination	◎	
		No. of traces	◎	
		Trigger position	◎	
		Trace additional information	△	
		Trace point setup	◎	
		Trigger point setup	△	
		Device point setup	△	
		Trace operation	◎	
		Trace status	◎	
		Trace result	△	
		CSV file creation	◎	
		Trace settings file operation	◎	
		Trace settings PLC operation	△	
		Data retention at power OFF	×	
Remote operation		PLC status	◎	
		RUN	◎	
		STOP	◎	
		PAUSE	×	Use when writing into ROM
		STEP-RUN	×	
		Reset	×	
		Operation during RUN	×	
		Specify execution destination	×	
Password setup	Register		◎	
	Delete		◎	
	Disable		◎	
Clear PLC memory			×	
Format PLC memory		Target memory	△	
		Format Type	×	
Arrange PLC memory			×	
Set time		YY MM DD Hr. Min. Sec.	△	Only read
		Day of week	×	
		Specify execution destination	×	

6.3 Preparation

6.3.1 Installing the Tools

In this CNC's PLC development environment, it is assumed that the various tools are used with a Windows mounted personal computer. Prepare each tool so that it is compatible with Windows mounted personal computer.

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

6.3.2 Preparation for Ethernet Communication

Procedures for preparing for Ethernet communication is as follows. Refer to each respective instruction manual for details.

- (1) Confirm IP address of the CNC unit.
- (2) Set IP address for the personal computer side.
- (3) Connect the Ethernet cable.
- (4) Set the connection target of GX Developer.

6.3.2.1 Confirming IP Address of the CNC Unit

Confirm the IP address set in the CNC unit. IP address is set in the parameters below.

Base common parameter	Item	Details	Setting example
#1926	Global IP address	IP address of the CNC unit looking from outside	192.168.200.1
#1927	Global Subnet mask	Subnet mask of #1926	255.255.255.0

Example given here is the case where "192.168.200.1" is set as the initial value after SRAM clear.

6.3.2.2 Setting IP Address for the Personal Computer Side

For the personal computer for which GX Developer is available, IP address has to be set within the same subnet mask as NC unit.

In the case of the above mentioned "Confirming IP Address of the CNC Unit", set the address other than "192.168.200.1", using from "192.168.200.0" to "192.168.200.255".

Note that when other CNC and devices are connected on the same network, be careful not to duplicate the address with other CNC and devices.

6.3.2.3 Connecting the Ethernet Cable

Connect the Ethernet cable to the connector LAN1 (or LAN) of the control unit. If the connector is already connected, connect the cable to the HUB of the connection target, etc.

6.3.2.4 Setting the Connection Target

The connection target must be specified before performing online operations from GX Developer to the CNC controller. The following TCP connection method is supported when connecting with Ethernet.

- TCP protocol: Connection type used with typical networks. The communication amount is high so the speed is not as fast, but the reliability is high. (A resend request is made when there is a lapse in communication.)

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

[Online] → [Transfer Setup]

Set the following items in order.

Setting item	Setting content	Remark
PC side I/F	Ethernet board	
Network No	1	(*1)
Station No.	1	(*1)
Protocol	TCP	(*1)
PC side I/F	Ethernet unit	
Type name	QJ71E71	(*2)
Station No.	1	(*2)
IP address	IP address of CNC	(*2)
Routing parameter conversion method	Automatic conversion method	(*2)
Other station	Other station (same network)	
Time out check (sec.)	Arbitrary time (from about 10 sec.)	(*3)
Number of retry	0	(*3)
Network communication path	Ethernet	
Access to the Ethernet unit that is set with PC side I/F		(*4)

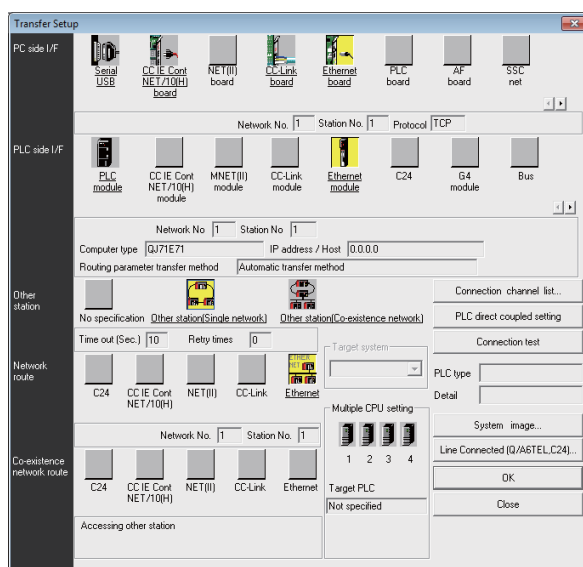
*1: The setting items are displayed by double-clicking the Ethernet board selection field.

*2: The setting items are displayed by double-clicking the Ethernet unit selection field.

*3: The setting items are displayed by double-clicking the other station (different network) selection field.

*4: The setting items are displayed by double-clicking the Ethernet unit.

■ SW8D5C-GPPW setting screen



When the above setting is completed, press the "Connection test" button.

When the communication succeeds, the message "Connected with Q26UDCPUU." will appear and the connection status of multi CPU is displayed below the message. This is the connection status of each project as is.

6.4 Common Items

6.4.1 Precautions before Development

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

CAUTION

Always observe the following precautions during work.

(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 sequence program to the CNC controller if another PLC type is selected.

CAUTION

Select "Q26UDH" for CPU type.

(2) Device Setting

The number of device points must always be set when developing the sequence program for the CNC controller. The sequence program will not be transferred to the CNC controller correctly if it is developed with the setting values given later.

CAUTION

Always set the number of devices.

(3) PLC Instructions

MELSEC-specific PLC instructions cannot be used in the sequence program development for the CNC controller. The format, etc., are changed with some instructions.

CAUTION

MELSEC-specific PLC instructions cannot be used.

(4) Saving the sequence program

The sequence program transferred from the GX Developer or PLC onboard to the CNC controller is stored in the temporary memory. The temporary memory is erased when the power is turned OFF. (This is because the sequence program stored in the ROM in CNC is validated when the power is turned ON again.)

Thus, if the sequence program is to be held even when the power is turned ON again, always write it to the ROM in CNC.

CAUTION

Sequence programs that are not saved in the ROM in CNC are not held when the power is turned OFF.

6.4.2 Multi-project Function

Multi CPU configuration of MELSEC PLC is mounted as CNC specification. This function enables the projects to be divided by each machine sequence and the divided multiple projects to be independently controlled/started by one CNC. To enable multi-project, set the multi-project parameter and then the power needs to be turned ON again.

6.4.2.1 Switching access destination of project

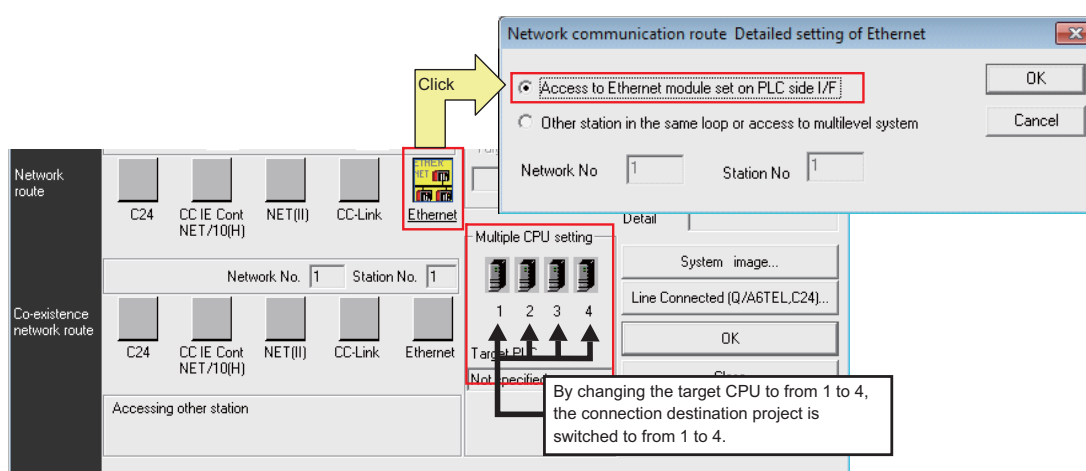
Switch the access destination of the project in CNC. If this setting is not carried out, it will be connected to the project 1.

The No. of projects that can be connected differs depending on the maximum project No. parameter of the multi-project parameter.

(1) How to connect to projects 1 to 4

The following is the method to connect to the projects from 1 to 4.

Screen specifying the connection target

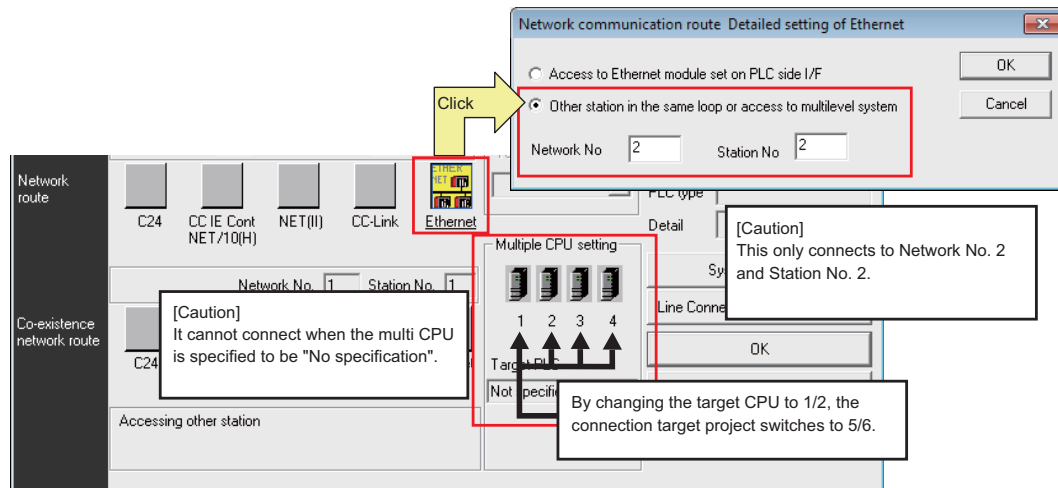


Setting items	Setting contents	Remarks
Network communication path	Ethernet	
Access to the Ethernet unit that is set with PC side I/F		(*1)
Multi CPU setting		
Machine 1 to 4	Switches to multi-project 1 to 4	

(*1) The setting items are displayed by double-clicking the Ethernet unit.

- (2) How to connect to projects 5/6
The following is the method to connect to the projects 5/6.

Screen specifying the connection target

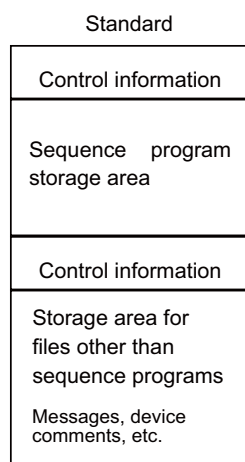


Setting item		Setting contents	Remarks
Network communication path		Ethernet	
	Accessing other stations in the same loop or multi-level system		(*1)
	Network No.	1	
	Station No.	1	
Multi CPU setting			
	Machine 1/2	Switch to multi-project 5/6	

(*1) The setting items are displayed by double-clicking the Ethernet unit.

6.4.3 PLC Data Storage Areas

The M8 Series stores the PLC data in the ROM in CNC. The following shows the storage area structure. (Refer to "PLC Programming Manual" on data size.)

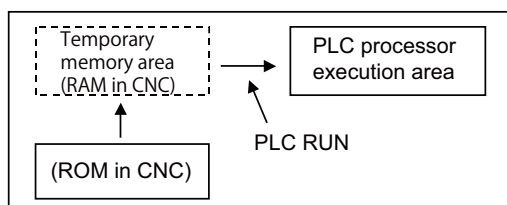


6.4.3.1 Executing Sequence Program

The sequence program transferred from GX Developer or PLC onboard is executed with the following path.

(1) At power ON

The data is transferred from the ROM in CNC to the PLC processor execution area via the temporary memory (RAM in CNC), and is then executed.

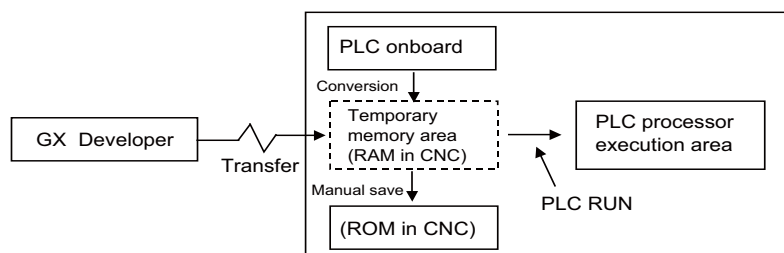


However, by setting "1" to the rotary switch 2 of the CNC unit ("0" is set as default), it turns to the mode "PLC RUN is not executed".)

(2) During PLC development

The sequence program transferred from the GX Developer or PLC onboard is stored in the volatile RAM for the temporary memory. The sequence program is transferred to the PLC processor execution area before PLC execution, and is then executed.

The temporary memory area (RAM in CNC) is not held when the power is turned OFF. If the data needs to be held even after the power is turned OFF, it must be stored in the ROM in CNC. (Refer to "Sequence Program Development: Writing the Sequence Program to the ROM in CNC")



6.4.3.2 Relationship between the areas in CNC and the areas that can be selected on GX Developer

The following table indicates the relationship between the PLC data storage area in CNC and the storage areas that can be selected on GX Developer.

Refer to "PLC Programming Manual" for the data which can be stored in each area.

PLC data storage area in CNC	Target memory which can be selected on GX Developer	PLC data which can be stored from GX Developer
Sequence program storage area / temporary memory area (RAM in CNC)	Program memory / Device memory	Sequence program Parameter
Data storage area/ Storage area (ROM in CNC)	Memory card (RAM)	Device comment PLC message Source information
Execution area	Standard RAM	—

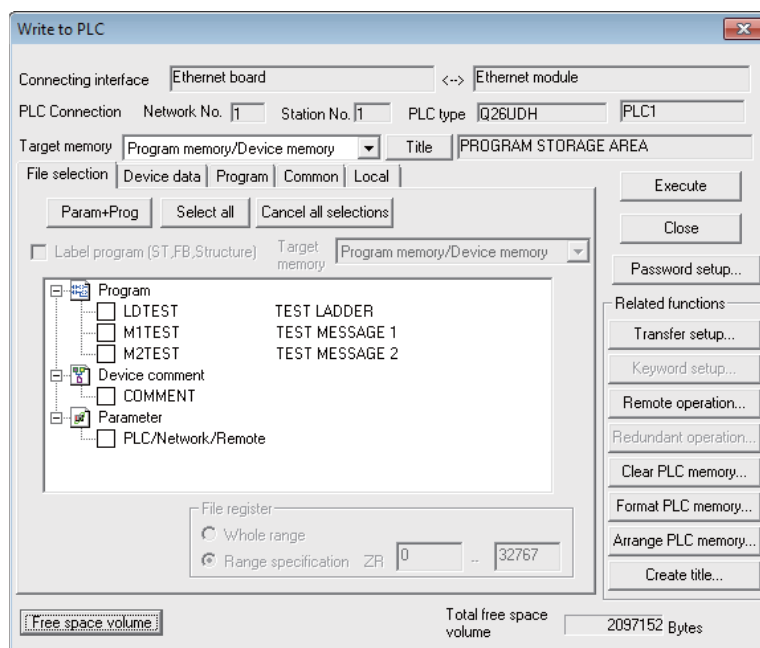
6.4.3.3 Online function that can select target memory with GX Developer

The following table indicates the online functions that can select the target memory in GX Developer.

Online function of GX Developer	Storage area that can be selected	Use
Read from PC	Program memory/ Device memory	Read from sequence program, PC parameter
	Memory card (RAM)	Read from device comment, PLC message, source information
	Standard RAM	Check execution step No. of sequence program
Write to PC	Program memory/ Device memory	Write to sequence program, PC parameter
	Memory card (RAM)	Write to device comment, PLC message, source information
Delete PC data	Program memory/ Device memory	Write to sequence program, PC parameter
	Memory card (RAM)	Write to device comment, PLC message, source information
Format PC memory	Program memory/ Device memory	Write to sequence program, PC parameter
	Memory card (RAM)	Write to device comment, PLC message, source information

6.4.3.4 Display of storage area on GX Developer

Any of the storage areas that can be selected for the online functions 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.



The free space in the area selected at [Target memory] will appear when the "Free space volume" button is pressed.

The following table indicates the relationships between the [Target memory] items and storage areas.

Target memory	Meaning in M800 series	Title indication	Free area indication
Program memory / Device memory	Sequence program storage area(temporary memory area (RAM in CNC))	PROGRAM STORAGE AREA	Total free space volume: Free space in sequence program storage area
Memory card (RAM)	Data storage area(Storage area (ROM in CNC))	DATA STORAGE AREA	Total free space volume: Free space in data storage area
Memory card (ROM)	Not used (cannot be selected)	None	
Standard RAM	Checking execution step No.	LAD. EXEC. SIZE AREA	Not used
Standard ROM	Not used (cannot be selected)	None	

6.4.4 File Name

The PLC related data, such as the sequence programs and message data, are controlled and stored with the following categories in this CNC. Therefore, they are also developed in the same categories.

CAUTION

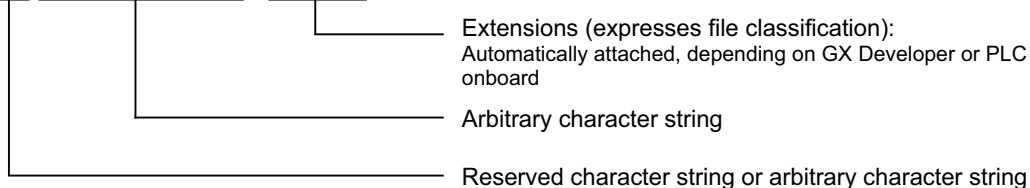
If the data transferred does not follow the file name rule, unexpected operations will occur.

E.g. PLC program erasure

6.4.4.1 File Name Rule for Sequence Program, Parameter, and Device Comment

File name rule (Sequence program, parameter, device comment)

y x x x x x x x . W x x



When storing data with GX Developer or PLC onboard, the data type is identified with the file name. Up to 8 one-byte alphanumeric characters (excluding the extension), hyphen (-) and underline (_) can be used to the file name. The extension is automatically attached and expresses classification of the file. Note that the first character may be reserved for expressing the data type.

[Caution] Reserved file names

The file name is reserved on the NC side if the following head character is used.

• "H"

Do not use file name in combination with this head character.

List of sequence program, parameter, and device comment

	Data class	Data type	File name	Storage quantity	Remarks
1	Sequence program	High-speed process	H+[Arbitrary character string].WPG	Total 32 programs	Execution type (scan) *1
		Main process	[Arbitrary character string].WPG		Execution type (scan) *1
		Initialization process	[Arbitrary character string].WPG		Execution type (initialization) *1
		Standby process	[Arbitrary character string].WPG		Execution type (standby/low-speed) *1
2	Parameter	PLC parameters	PARAM.WPA (fixed)	1 parameter	
		Network parameters			
3	Device comment	Common comment	COMMENT.WCD (fixed)	Total 10 comments	Common for all sequence programs
		Comment for each program	[Arbitrary character string].WCD		For sequence programs having same name

"Arbitrary character string" means a character string consisted of up to 8 one-byte alphanumeric characters, hyphen (-) and underline (_).

*1: The execution type is the sequence program operation type designated with the parameters.

6.4.4.2 File Name Rule for Message Data

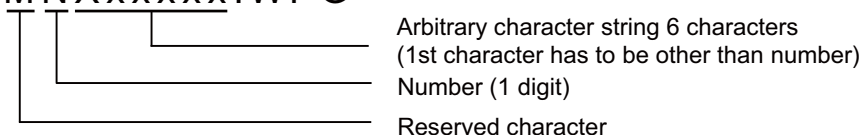
There are two methods for the message data language selection. Method 2 (Method linked with language selection on the setting and display screen) is recommended although both methods are available.

(Method 1) Specify with 3 bits of bit selection parameter #6453 bit 0 to 2. (Language selection method using PLC alone)

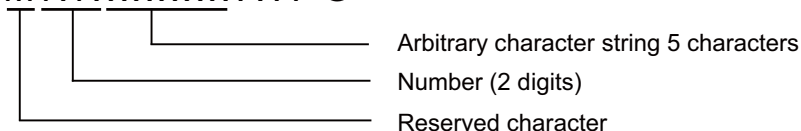
(Method 2) Specify with display language selection parameter. (Base specifications parameter #1043) (Method linked with language selection on the setting and display screen)

File name rule (Message data)

(Method 1) **M N X x x x x x . W P G**



(Method 2) **M N N x x x x x . W P G**



Alphanumeric characters, hyphen (-) and underline (_) can be used for the arbitrary character string. The extension is automatically attached and expresses classification of the file.
Note that the first character may be reserved for expressing the data type.

Specify which method is valid with the name of the message file to be stored.
If the file with condition 1 and 2 exist together, the method 1 will be valid.

(Condition 1) Method 1 is valid when the first two characters of the file name is "M + 1-digit number".
(Condition 2) Method 2 is valid when the first three characters of the file name is "M + 2-digit number".

(1) Method 1

Language is specified with bit 3 of the bit selection parameter #6453 bit 0 to 2, and the No. corresponds to the No. used in message file name.

List of message file name (Method 1)

Data class	Bit selection parameter #6453 bit0-2	Data type	File name	Storage quantity	Storage quantity
Message (Method 1)	0	1st language	M1Xxxxxx.WPG	One for each language	It is not possible to store multiple files having the same language Nos. even if their names are different. A message confirming overwriting the same language No. is displayed.
	1	2nd language	M2Xxxxxx.WPG		
	2	3rd language	M3Xxxxxx.WPG		
	3	4th language	M4Xxxxxx.WPG		
	4	5th language	M5Xxxxxx.WPG		
	5	6th language	M6Xxxxxx.WPG		
	6	7th language	M7Xxxxxx.WPG		
	7	8th language	M8Xxxxxx.WPG		

* "Xxxxxx" part of a file name consists of up to 6 arbitrary alphanumeric characters including hyphen (-) and underline (_). Note that however, the third character "X" has to be other than numerical character.
(To avoid confusion with method 2.)

(2) Method 2

Language is specified with the language parameter #1043 on the setting and display screen, and the No. corresponds to the 2-digit No. used in message file name.

When no corresponding message file for a certain language parameter is stored, an English language display file (M00xxxxx.WPG) is referred to as an alternative file. Thus, message data file for the English language display must be stored.

List of message file name (Method 2)

Data class	Language parameter (Base specifications parameter #1043)	File name	Storage quantity	Remarks
Message (Method 2)	0 (English) [mandatory]	M00xxxxx.WPG	One for each language Total 8 languages	When no corresponding file for a certain language parameter is stored, an English language display file (M00xxxxx.WPG), if stored, is referred to as an alternative file. It is not possible to store multiple files having the same language Nos. even if their names ("xxxxx" part) are different. A message confirming overwriting the same language No. is displayed.
	1 (Japanese)	M01xxxxx.WPG		
	11 (German)	M11xxxxx.WPG		
	12 (French)	M12xxxxx.WPG		
	13 (Italian)	M13xxxxx.WPG		
	14 (Spanish)	M14xxxxx.WPG		
	15 (Chinese -traditional-)	M15xxxxx.WPG		
	16 (Korean)	M16xxxxx.WPG		
	17 (Portuguese)	M17xxxxx.WPG		
	18 (Dutch)	M18xxxxx.WPG		
	19 (Swedish)	M19xxxxx.WPG		
	20 (Hungarian)	M20xxxxx.WPG		
	21 (Polish)	M21xxxxx.WPG		
	22 (Chinese -simplified-)	M22xxxxx.WPG		
Other than above;up to 99	If the message for a corresponding No. exists, it is displayed. If not, an English file (M00xxxxx.WPG) is displayed.			
Other than above;above 100	An English file (M00xxxxx.WPG) is displayed.			

(3) Precautions

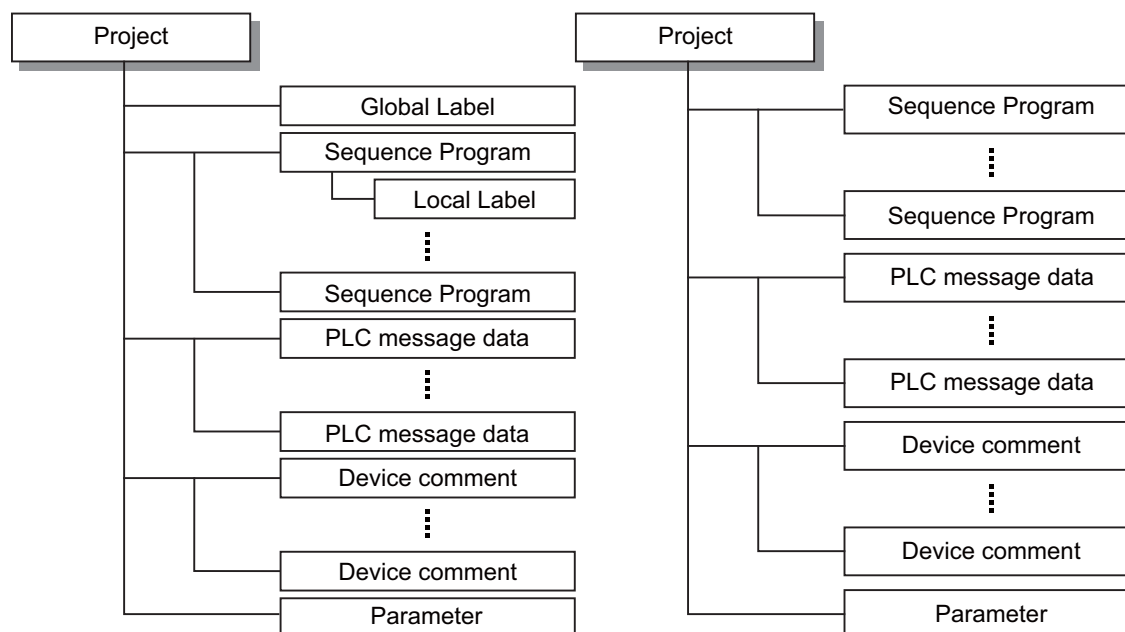
- Even if the file is made with the conventional specifications method 1, when the third character of the file name is a numerical character, it may be identified as method 2 (language selection parameter).
(Example) "M1720V02.WPG", "M750MESS.WPG", "M65S-MES.WPG", etc.
- Files having the same No. and different arbitrary names are identified as the same files and will be overwritten.
(Example) "M1TEST.WPG" and "M1JAPAN.WPG", "M00ENG01.WPG" and "M00ENG02.WPG", etc.
- Files having the same arbitrary name ("xxxxx" part) and different method types are not identified as the same files and will not be overwritten. If method 1 and 2 exist together, method 1 will be valid.
(Example) "M1TEST.WPG" and "M01TEST.WPG", "M1JAPAN.WPG" and "M01JAPAN.WPG", etc.
- Files that are not applied to condition 1 and 2 are not identified as a message file. They are identified as a sequence program (ladder), instead.
(Example) "M0TEST.WPG", "M9MESS.WPG", "M0-1TEST.WPG", "M-01JPN.WPG", "MM00ENG.WPG", etc.

6.4.5 Creating a Project

GX Developer treats PLC related data such as sequence program and message data collectively as a "project". In this section, the method of creating a project is explained.

6.4.5.1 Project

Project is a collection of sequence program, device comment, PLC message data and parameters. Usually, data is controlled by the project level per machine type or version.



Item	Details
Sequence program	Sequence program for MITSUBISHI CNC (User PLC)
PLC message data	This defines PLC messages such as alarm message and PLC switch.
Device comment	This is the comment for a sequence program device. There are "common comment" which is common for a project and "comment by program" which is particular for each program.
Parameter	This sets the device range and execution order of the sequence program.

- (1) One project per GX Developer
Only one project can be edited with a GX Developer. Therefore, if two or more projects are to be edited, multiple GX Developers must be operated.
- (2) Device comment

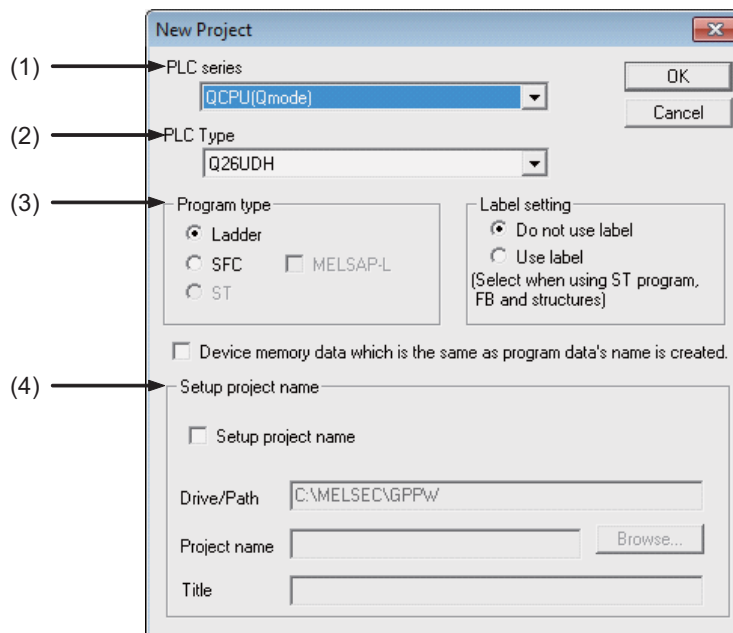
Comment type	Number to be created	Details
Common comment	1	Common device comment for all the programs existed in the project.
Comment by program	Same as the number of programs	Device comment set for each program. Always set the same name as that of program.

6.4.5.2 Operating Procedures

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

[Project] → [New Project]

Set the PLC series, PLC type and project name required to create a new project with the screen below.



Set the following items on the "New Project" screen, and press "OK".

- (1) PLC series
Sets the series name of PLC (Programmable controller). Select "QCPU (Q mode)" here.
- (2) PLC type
Set the PLC type. Set "Q26UDH" here.
- (3) Program type / Label setting
Default values are set for these items. Refer to the enclosed Operating Manual for details.
- (4) Project name / Title
Set drive/path+project name (8 or more characters can be set) with up to 154 one-byte alphanumeric characters together. Title must be set with up to 32 one-byte characters.
Refer to the enclosed Operating Manual for details on the available characters.
When inputting/outputting built-in PLC editing function (PLC onboard function) and project data by turns, consider the following restrictions and set.

PLC onboard function	Alphanumerical display	Alphanumerical input	Japanese display	Japanese input	Number of characters
Project name	○	○	○	×	18 (abbreviated hereafter)
Title	×	○	×	×	32

6.4.6 Setting the Parameters

The GX Developer parameters must be set before the CNC controller sequence program can be developed with GX Developer. The required parameter settings are shown below. Refer to the GX Developer's Programming Explanation for details on each setting item.

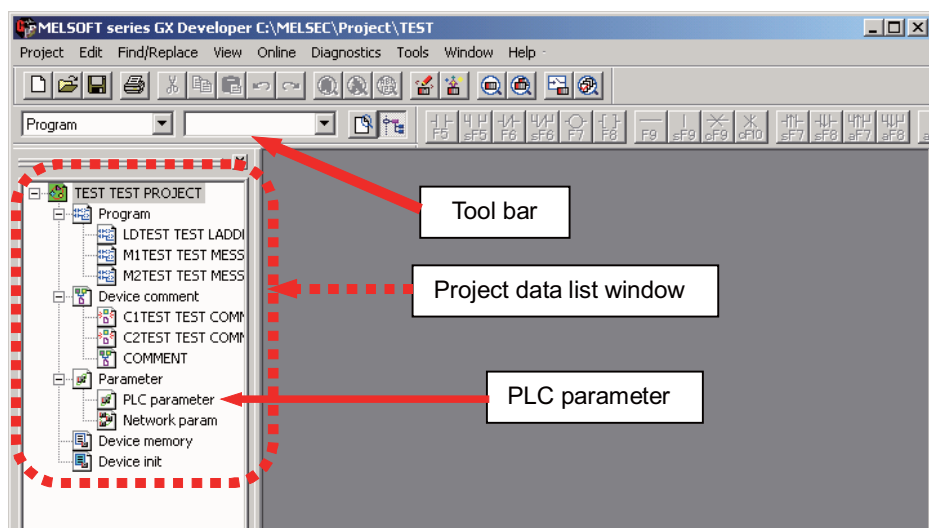
- Setting the number of device points
- Setting the number of common pointer points
- Setting the program execution order

6.4.6.1 Parameter Setting Screen

(1) Displaying the project data list and Parameter Setting screen

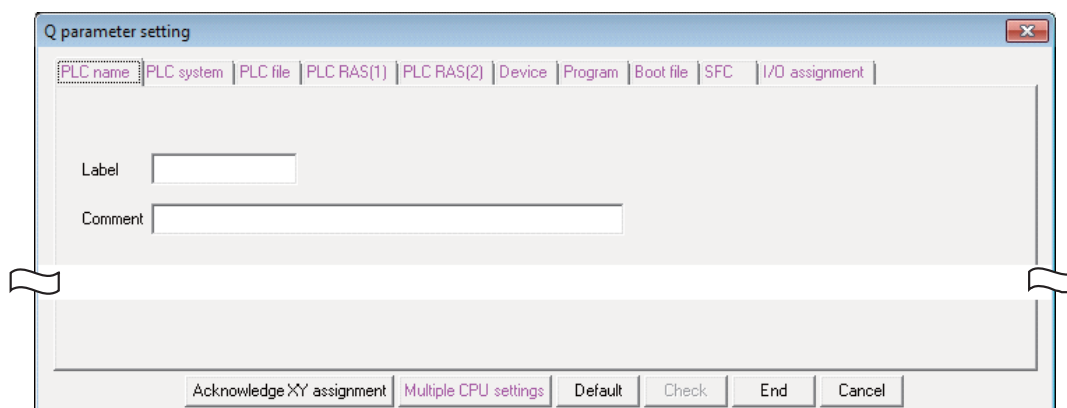
Open the "Project data list" window with the following operations. Double-click on "PLC parameter" to open the parameter setting screen. The same operation can be completed by designating the data type "Parameter" and data name "PLC parameter" from the tool bar.

Double-click on "PLC parameter" under [View] → [Project data list].



(2) Displaying the Parameter Setting screen

If the characters on the tab are "red", the default values are set.



6.4.6.2 Setting the Number of Device Points

After creating the area (project) for controlling the sequence program, the number of devices used in that project must be set first. This operation must be carried out each time a new project is created.

[Caution] An error will occur if the sequence program is downloaded to the CNC controller without completing this operation.

Select the [Device] tab

The range of device, which each project can use, changes under the multi-project environment. For the number of device points to set to parameter, input the "number of device points + common number of points" that are set at "device setting screen of built-in PLC (built-in edit function)".

Set the value for the number of device points on the following screen, and then click on [End].

Set the number of device points that matches the currently connected project in the section in red square below. When the setting for the number of device points is completed, press "End" button to finish the edit.

	Sym.	Dig.	Dev. point	Latch(1) start	Latch(1) end	Latch(2) start	Latch(2) end	Local dev. start	Local dev. end
Input relay	X	16	8K						
Output relay	Y	16	8K						
Internal relay	M	10	60K						
Latch relay	L	10	1K						
Link relay	B	16	56K						
Annunciator	F	10	2K						
Link special	SB	16	1K						
Edge relay	V	10	512						
Step relay	S	10	0K						
Timer	T	10	2K						
Retentive timer	ST	10	128						
Counter	C	10	512						
Data register	D	10	4K						
Link register	W	16	12K						
Link special	SW	16	1K						
Index	Z	10	20						

Device total: 28.5 K words Word device: 19.7 K words Bit device: 125.8 K bits [Help-Device setting](#)

File register extended setting: Capacity: 0 K points [Help-File register extended setting](#)

	Sym.	Dig.	Dev. point	Latch(1) start	Latch(1) end	Latch(2) start	Latch(2) end	Device No. start	Device No. end
File register	ZR(R)	10							
Ext. data req.	D	10							
Ext. link req.	W	16							

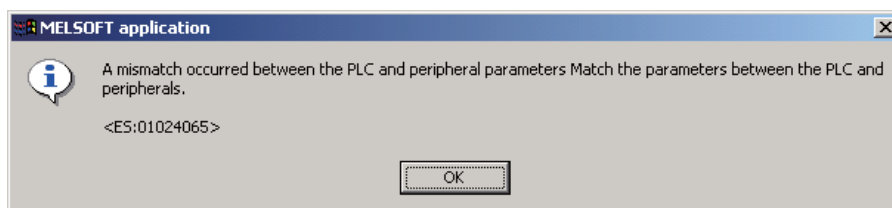
32 bit Indexing
☒ Use Z after (0 to 18)
☐ Use ZZ

[Acknowledge XY assignment](#) [Multiple CPU settings](#) [Default](#) [Check](#) [End](#) [Cancel](#)

[Note] If a non-designated value is set, an error will occur when downloading to the CNC controller.

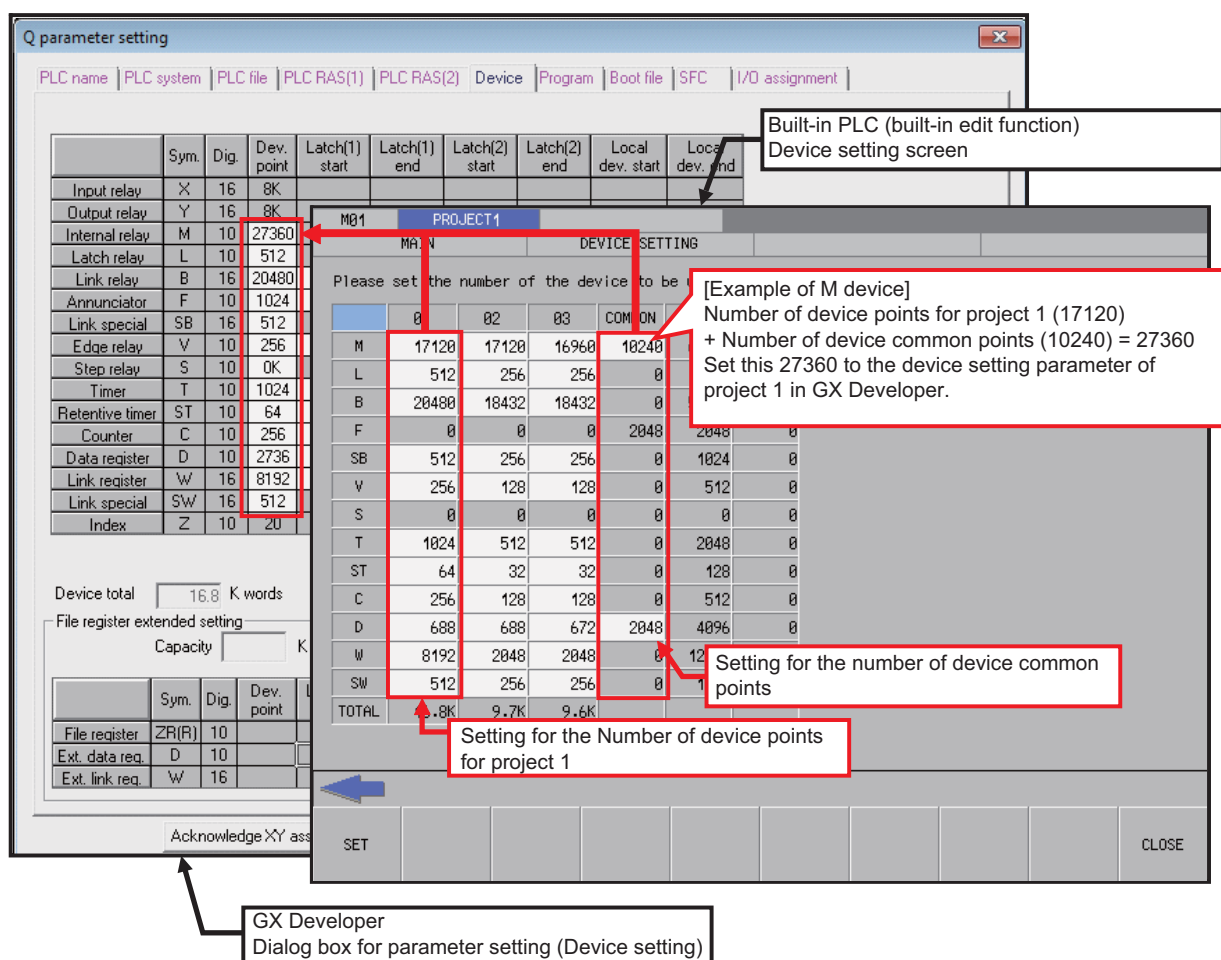
(1) When device setting value is illegal

If there is a problem with the device setting value, the following error dialog will appear when writing the sequence programs to the CNC controller. Set the number of device points as explained above in this case.



(2) Setting example of the number of device points (Project 1)

The setting example of the number of device points for the project 1 is described below. Follow this example and set the "Number of device points for project 1 + number of device common points", which is set to the built-in PLC (built-in edit function), to the device setting parameter of GX Developer.



6.4.6.3 Setting the Number of Common Pointer Points

When creating the sequence programs with the multi-program method, the number of common pointers must be set for each sequence program. This operation must be carried out each time a new project is created and the parameter file is written to the CNC controller.

[Note] The default value will be used for the number of common pointer points if this operation is not completed.

Select the [PLC System] tab

Set the "Common pointer No." value on the following screen, and then click on [End].

The screenshot shows the 'Q parameter setting' dialog box with the 'PLC system' tab selected. The 'Common pointer No. P' field is highlighted with a red arrow. The dialog box contains various settings for the PLC system, including timer limits, RUN-PAUSE contacts, latch data backup, remote reset, output mode, floating point arithmetic, intelligent function module, module synchronization, system interrupt settings, interrupt program settings, A-PLC settings, service processing settings, and PLC module change settings.

Common pointer No. P Alter (0-4095)

Points occupied by empty slot (*) 16 Points

System interrupt settings

Interrupt counter start No. C (0-768)

Fixed scan interval (0.5ms-1000ms)

I28 100.0 ms I29 40.0 ms High speed interrupt setting

I30 20.0 ms I31 10.0 ms

Interrupt program / Fixed scan program setting

☐ High speed execution

A-PLC

☐ Use special relay / special register from SM/SD1000

Service processing setting

☒ Execute the process as the scan time proceeds. 10 %

☐ Specify service process time. ms (0.2ms-1000ms)

☐ Specify service process execution counts. times (1-10 times)

☐ Execute it while waiting for constant scan setting.

PLC module change setting

PLC module change setting

Acknowledge XY assignment Multiple CPU settings Default Check End Cancel

6.4.6.4 Setting the Program Execution Order

When creating the sequence programs with the multi-program method, the execution method and execution order of each sequence program must be set. This operation is carried out before the sequence program is executed with the CNC controller. The parameter file must be written to the CNC controller.

[Caution] If this operation is not completed when using the multi-program method, an error will occur when RUN is executed in the sequence program.

Select the [Program] tab

Select the sequence program name to be registered for execution from the program list on the left of the following screen, and then press the "Insert" button. Select the execution mode from the registration program list on the right side. After registering all sequence programs to be executed, click on [End].

Q parameter setting

PLC name | PLC system | PLC file | PLC RAS(1) | PLC RAS(2) | Device | **Program** | Boot file | SFC | I/O assignment

Program list (left):

- MAIN
- HLAD1
- HLAD2
- INIT
- MLAD1
- MLAD2
- SUB1

Buttons: Insert, Delete

	Program name	Execute type	Fixed scan interval	In unit
1	MAIN	Scan		
2	HLAD1	Scan		
3	HLAD2	Scan		
4	MLAD1	Scan		
5	MLAD2	Scan		
6	SUB1	Wait		
7	INIT	Initial		
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				

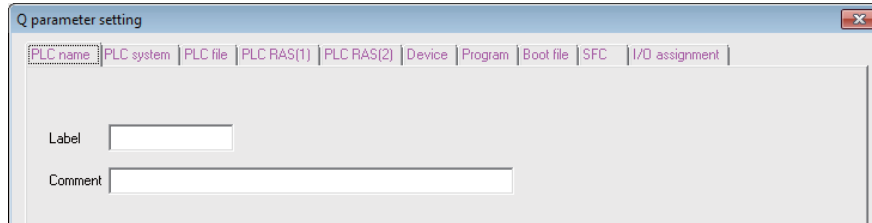
Buttons: File usability setting, I/O refresh setting

Bottom buttons: Acknowledge XY assignment | Multiple CPU settings | Default | Check | End | Cancel

6.4.6.5 Setting the label/comment for each project

To clarify the function of the operating program etc. in each project, the label/comment for each project can be set. The label/comment can be set using the GX Developer or the built-in edit function in the built-in PLC.

The below is the setting screen on GX Developer.



The table below shows the setting details of the above screen.

Parameter name	Tab name	Setting item	No. of characters	Setting details
PC parameter	PC name	Label	10 (one-byte)	Label for project
		Comment	64 (one-byte)	Comment for project

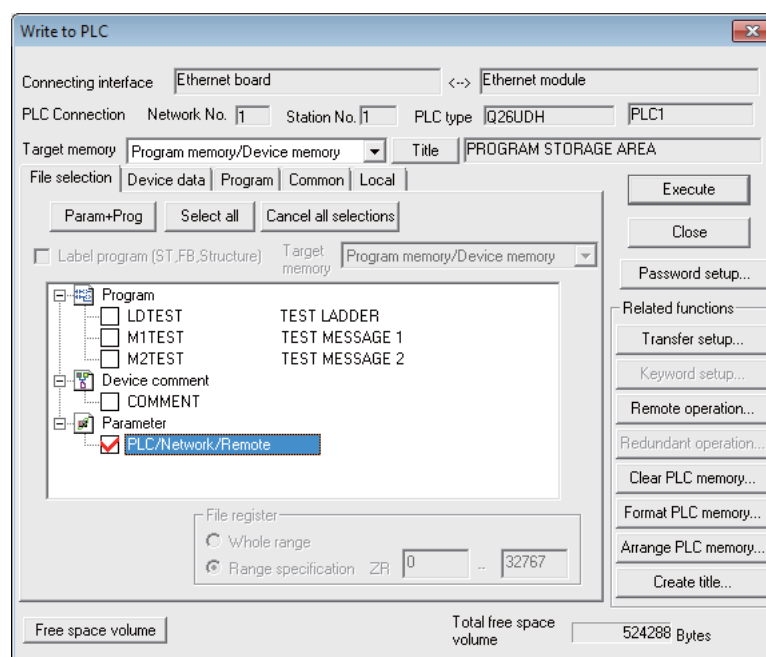
6.4.6.6 Writing and Reading Parameters to and from the CNC Controller

When creating the sequence programs with the multi-program method, the parameter file must be written to the CNC controller. The parameter file can also be read from the CNC controller and used with GX Developer. The operation methods are the same as reading and writing the sequence programs.

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

[Online] → [Write to PLC]

On the following screen, choose the parameter [PLC/Network/Remote password] file to be written from the [File selection] tab and click [Execute]. RUN/STOP of PLC can be specified from the [Remote operation] of [Related functions].



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

6.4.7 Starting/Stopping the PLC

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

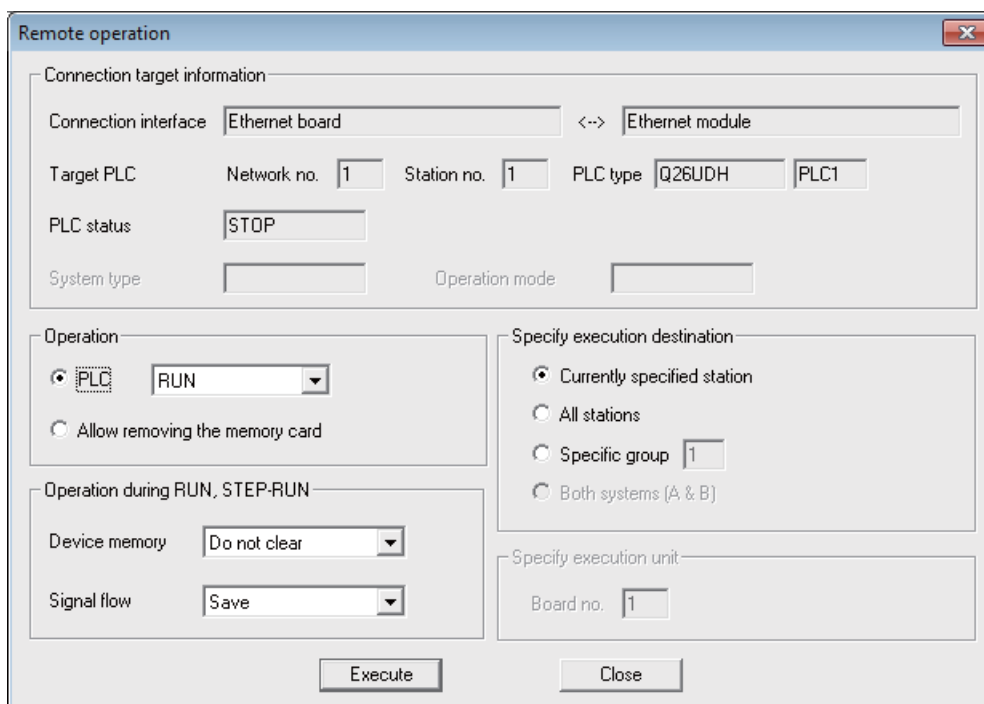
PLC stop and restart, which is generally confirmed before and after the operation requiring PLC stop, can be done in advance by the following procedures.

6.4.7.1 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].



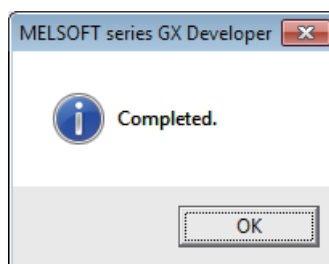
The "Remote operation" dialog box is shown with the following fields and options:

- Connection target information:**
 - Connection interface: Ethernet board
 - Ethernet module: Ethernet module
 - Target PLC: Network no. 1, Station no. 1, PLC type Q26UDH, PLC1
 - PLC status: STOP
 - System type: (empty)
 - Operation mode: (empty)
- Operation:**
 - ☒ PLC: RUN (dropdown)
 - ☐ Allow removing the memory card
- Operation during RUN, STEP-RUN:**
 - Device memory: Do not clear (dropdown)
 - Signal flow: Save (dropdown)
- Specify execution destination:**
 - ☒ Currently specified station
 - ☐ All stations
 - ☐ Specific group: 1
 - ☐ Both systems (A & B)
- Specify execution unit:**
 - Board no.: 1

Buttons: Execute, Close

[Note] Operations other than RUN and STOP cannot be executed.

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 controller side.



6.5 Sequence Program Development

The sequence program development procedures are explained in this section focusing on usage methods unique to MITSUBISHI CNC.

6.5.1 Development Procedures

Develop sequence programs with GX Developer.

6.5.1.1 Creating New Sequence Programs with GX Developer

Procedure		Description	Reference
1	Start GX Developer		
2	Create a new project		"Common Items: Creating a project"
3	Set connection with CNC controller		"Preparation: Setting the Connection Target"
4	Set parameters	Program setting of PLC parameters, the number of device points in CNC, and the number of device points in GX Developer must be consistent.	"Common Items: Setting the Parameters"
5	Edit sequence programs		
6	Write sequence programs and parameters into CNC RAM	Sequence programs are written into temporary memory (CNC RAM).	"Common Items: Writing and Reading Parameters to and from the CNC Controller" "Sequence Program Development: Writing the Sequence Program to the CNC Controller"
7	Monitor (debug) sequence programs	Return to procedure 5 if any bug is found.	
8	Write sequence programs into CNC ROM	Sequence programs in temporary memory (CNC RAM) is transferred to CNC ROM.	

6.5.2 Writing the Sequence Program to the CNC Controller

The following section explains how to write sequence programs from GX Developer to the CNC controller (especially the restrictions and CNC-specific operations.)

(Note) In this operation, data is written to the temporary memory in the CNC (CNC RAM). The data in the temporary memory (CNC RAM) is not held after the power is turned OFF. To hold the data after the power is turned OFF, write the sequence program to the CNC ROM by following the procedure shown in the section "Sequence Program Development: Writing the Sequence Program to the CNC Controller".

6.5.2.1 Operation Procedure

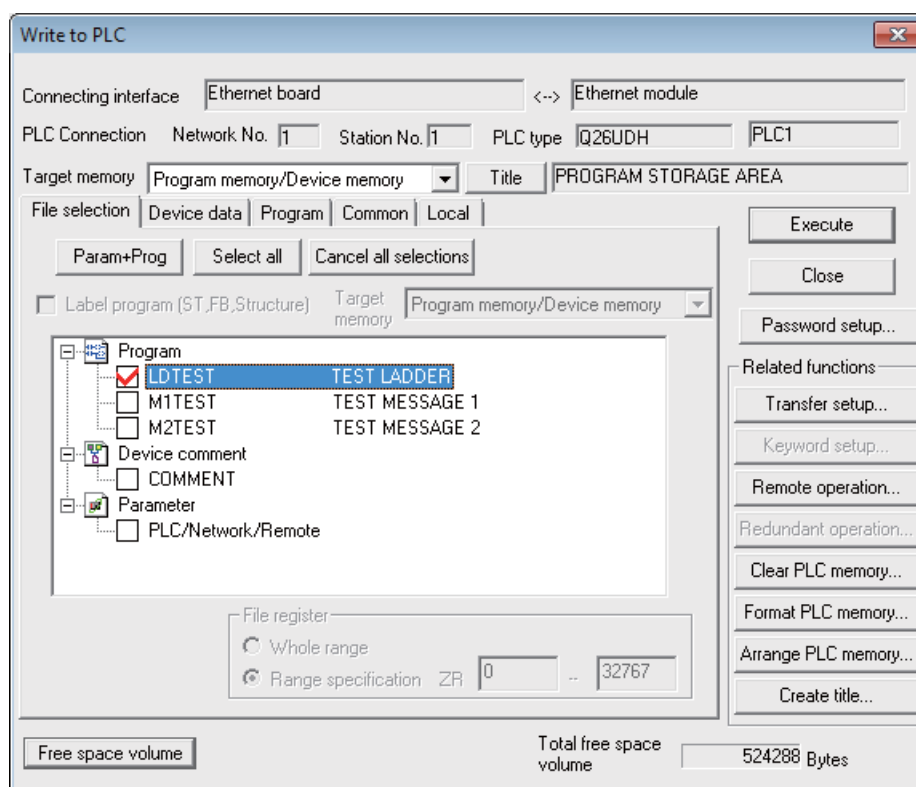
(1) Operation procedure for a project "without labels"

The following is the operation procedure for a project in which labels are not used.

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

[Online] → [Write to PLC]

On the following screen, choose the sequence program 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 "Program memory/Device memory" is valid.

Do not set the other tabs ([Device data], [Program], [Common], [Local]) than [File selection].

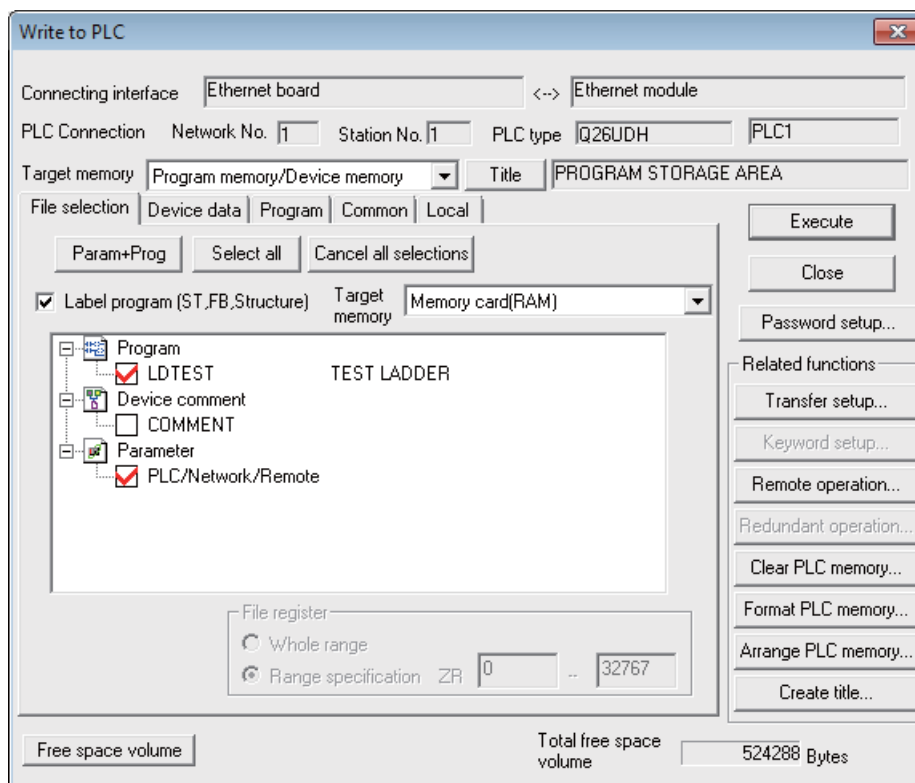
(2) Operation procedure for a project "with labels"

The following is the operation procedure for label programming.

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

[Online] -> [Write to PLC]

On the following screen, choose the sequence program file to be written from the [File selection] tab and click [Execute].
PLC RUN/STOP can be commanded with [Remote operation] under "Related functions".



[Note 1] As [Target memory] for writing sequence programs, only [Program memory/Device memory] is valid.

[Note 2] Do not set the other tabs ([Device data], [Program], [Common], [Local]) than [File selection].

[Note 3] As [Target memory] for writing label programs, only [Memory card(RAM)] is valid.

6.5.2.2 Writing Operation

As soon as a ladder is written from GX Developer to the CNC controller, the CNC controller converts it into the CNC-specific ladder machine code.

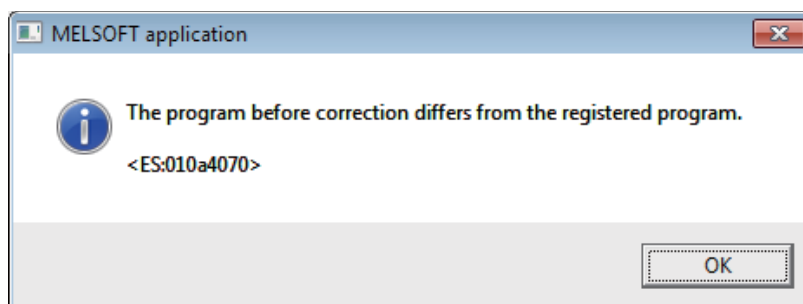
A conversion error occurs if any of the devices and instruction formats not supported by the CNC controller side is used. The writing will not stop even if a conversion error occurs. The instruction causing an error is converted into a "NOP instruction" (no process instruction), and the sequence program is transferred up to the last step.

[Note] A ladder resulting in an error cannot be RUN for safety purposes.

6.5.2.3 Operations and Check Items at Conversion Error

(1) Operations at conversion error

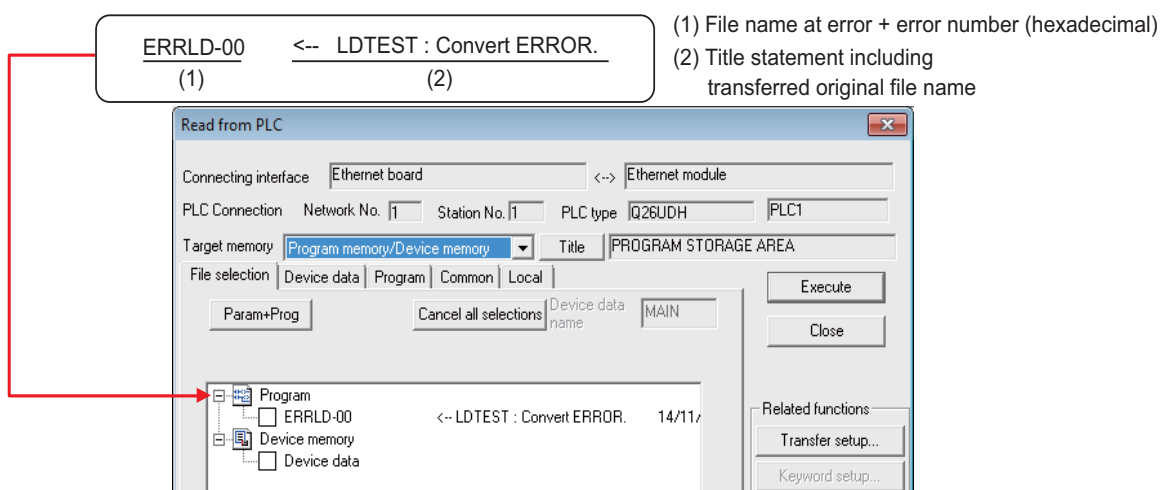
The following dialog appears on the GX Developer screen when a conversion error occurs.



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

If the ladder file resulting in a conversion error is selected with the [File Selection] tab on the [Read from PLC] screen, the file name and title will change and be displayed as shown below.

If this ladder file is read out to the GX Developer, it will be stored under the file name "ERRLD-00" ("00" is a hexadecimal number given to the error file in the order starting from "0").



CAUTION

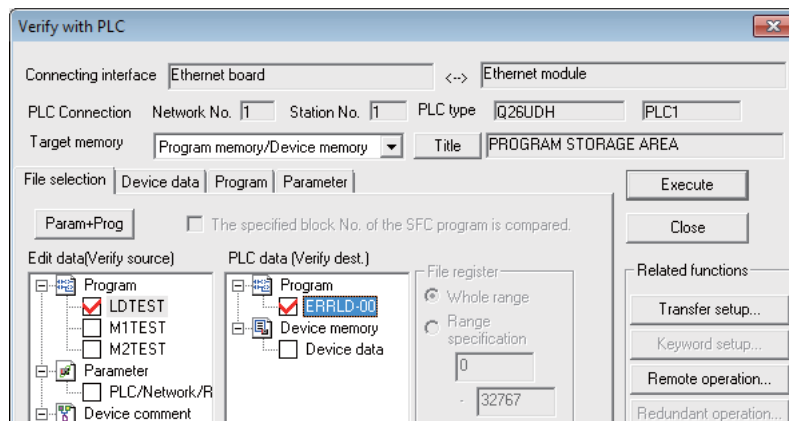
Do not read out a ladder file resulting in a conversion error to the GX Developer and use it. It may contain unexpected data, and result in incorrect operations.

(2) How to confirm the conversion error step No.

The PLC verification function can be used to confirm the error step. For details of the PLC verification function, refer to "Sequence Program Development: Verifying the Sequence Programs".

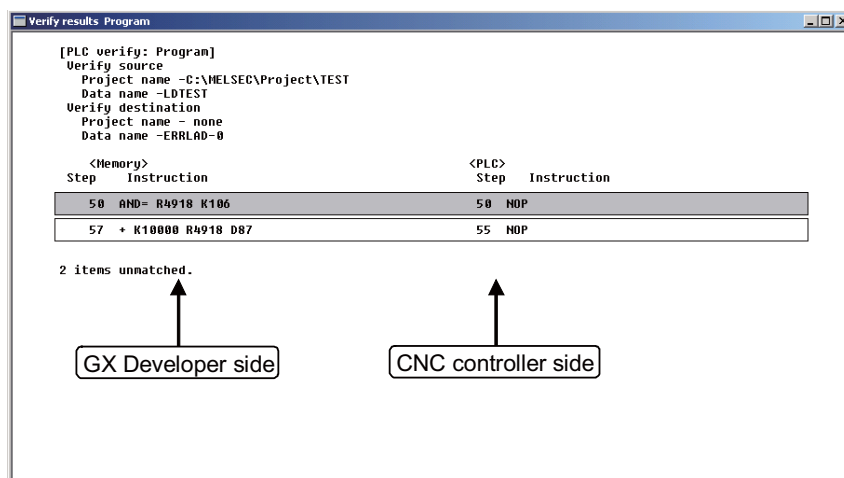
Verify source: Select the ladder file (source file) on the GX Developer side

Verify dest.: Select the file resulting in an error "ERRLD-00" on the CNC controller side



When PLC verification is executed, the mismatching details will appear as shown in the following example. The NOP instruction section in the CNC controller side is the step with the conversion error. Double-click the mismatch to display and to edit the corresponding part of the GX Developer side.

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



6.5.2.4 Operations and Check Items at the Other Errors

(1) Other errors

Some of the popular errors that would occur in writing sequence programs are given below.

Note that the description of the dialogue message may be applicable only to the MELSEC PLC, and the precise description of the error may not be available for the CNC side. The last 4 digits of display No. are indicated in "Status".

For the other errors, refer to "Troubleshooting:List of Errors During GX Developer Online Operations".

Status	Message	Cause	Remedy
4005 (Note 1)	Writing of data which exceeds the capacity of the PLC was attempted. Execute again within the capacity of the PLC.	The maximum number of steps that can be executed with NC has been exceeded.	Check the size of execution area. (Refer to (2) of this section.) Reduce the number of steps for the sequence program to be executed according to that value.
4010	Cannot write because the PLC is executing a RUN command. Stop the PLC, then execute again.	The PLC of the NC is running.	After stopping the PLC of the NC, start execution again.
4021	The applicable drive is not ready. Check the applicable drive, then execute again.	The specified target memory does not exist or is not in a usable status.	Change the target memory.
4029	Insufficient file capacity. Execute again after deleting unnecessary files.	An attempt was made to write a file that exceeds the storage capacity.	Examine the file structure so that the data falls within the limited capacity.
4052	The file is write protected. Change the file attributes to enable writing to the file.	The specified target memory is a write-disabled device (CNC ROM).	Specify "Program memory/Device memory" as the target memory.
4065	A mismatch occurred between the PLC and peripheral parameters Match the parameters between the PLC and peripherals.	There is a problem in the device setting value.	Set the number of device points. (Refer to "Common Items: Setting the Parameters".)
4070	The program before correction differs from the registered program.	A ladder instruction outside the specification is included.	Perform verification to identify the instruction that is the cause of the problem. (Refer to "Writing the Sequence Program to the CNC Controller: Operations and Check Items at Conversion Error".)

(2) How to confirm the size of execution area

Confirm the size of execution area in the following manner when "error status (4005): Execution area size over" (See (Note 1) in the list of errors above.) occurs. Refer to "PLC Programming Manual" for details on execution area.

When [Target memory] Standard RAM is selected with "Read from PLC" operation, the file name and title are changed and displayed as follows.

(a) indicates the settings of target memory. (Regular reading from PLC is executed with "Program memory/device memory".)

(b) indicates the number of steps at execution when the title section is replaced.

An alphabet before the number of steps at execution represents the state of parameter designation.

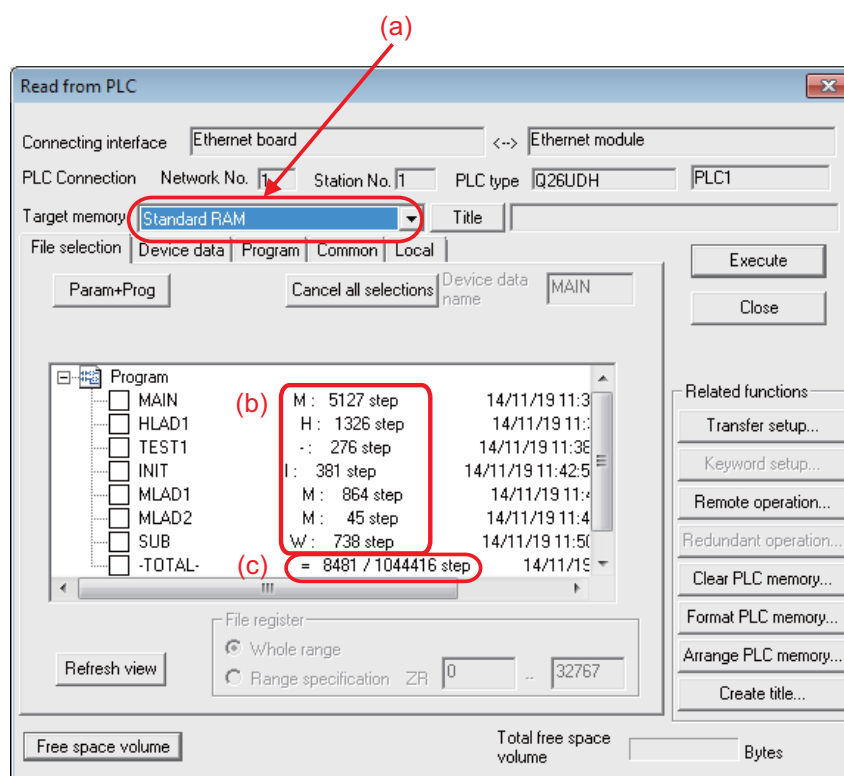
I: Initial H: High speed M: Medium speed W: Wait

-: No parameters or parameters not stored.

(c) indicates the total number of steps at execution. (Total of "initial", "high speed", "medium speed" and "wait to be executed".)

The denominator indicates the maximum size of the execution area.

When there is no parameter, the single program method is applied and "TOTAL" will not be displayed.



In the screen example above, the sequence program size must be adjusted so that the total number of steps at execution of (c) (8481) is smaller than the maximum size of the denominator's execution area (1044416).

6.5.3 Reading the Sequence Program from the CNC Controller

The following indicates how to read a sequence program from the CNC controller to GX Developer.

6.5.3.1 Operation Procedure

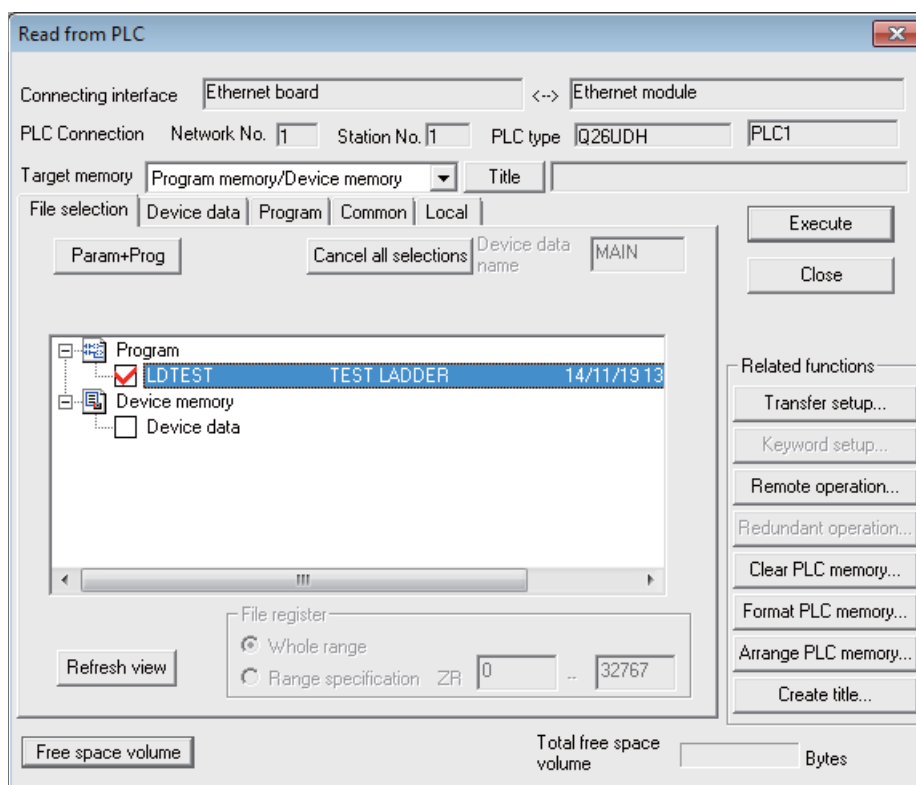
(1) Operation procedure for a project "without labels"

The following is the operation procedure for a project in which labels are not used.

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

[Online] → [Read from PLC]

On the following screen, choose the sequence program file to be read after clicking [Refresh view] from the [File selection] tab, and click [Execute].

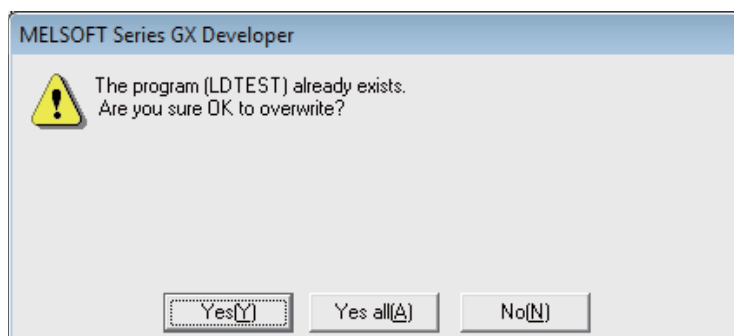


[Note] As [Target memory], only "Program memory/Device memory" is valid.

Do not set the other tabs ([Device data], [Program], [Common], [Local]) than [File selection].

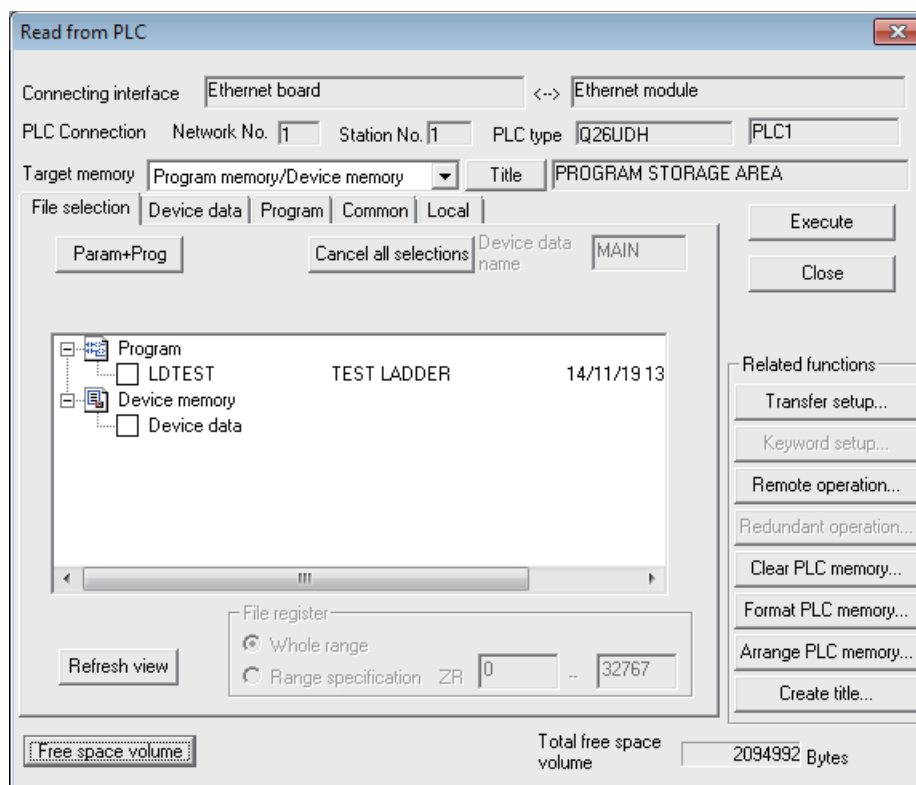
Always click [Refresh view] before reading sequence programs.

If a sequence program 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 sequence program file. The file before overwriting will be erased. Confirm the file enough before choosing [Yes (Y)].

The [Read from PLC] screen can also be used as a CNC controller side file listing function. Move the scroll bar 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.



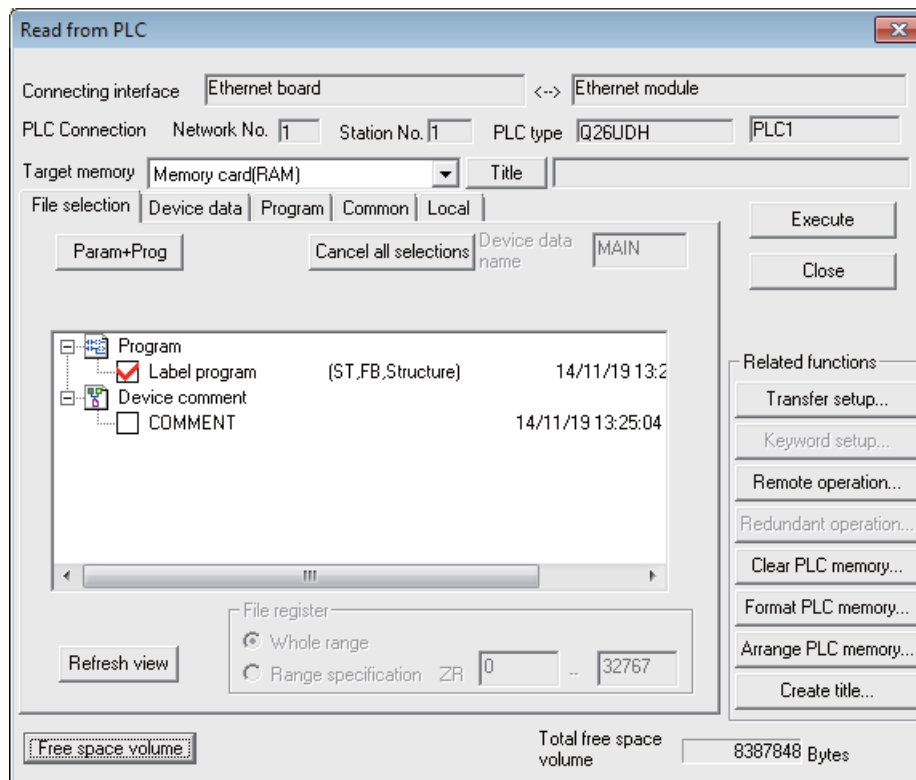
(2) Operation procedure for a project "with labels"

The following is the operation procedure for label programming.

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

[Online] -> [Write to PLC]

On the following screen, choose the sequence program file to be read from the [File selection] tab after clicking [Refresh view]. Click [Execute].



[Note 1] As [Target memory], only [Memory card(RAM)] is valid.

[Note 2] Do not set the other tabs ([Device data], [Program], [Common], [Local]) than [File selection].

[Note 3] Always click [Refresh view] before reading sequence programs and labels.

[Note 4] Refer to "4.6.6 Writing and Reading Parameters to and from the CNC Controller", and always read parameters before reading sequence programs and labels.

6.5.4 Writing Sequence Programs to CNC ROM

The sequence program transferred from the GX Developer or built-in PLC edit function to the CNC controller is stored in the temporary memory. The temporary memory is erased when the power is turned OFF. (This is because the sequence program stored in the internal flash ROM is validated when the power is turned ON again.)

If the sequence program is to be held even when the power is turned ON again, transfer it to the CNC ROM using the following steps.

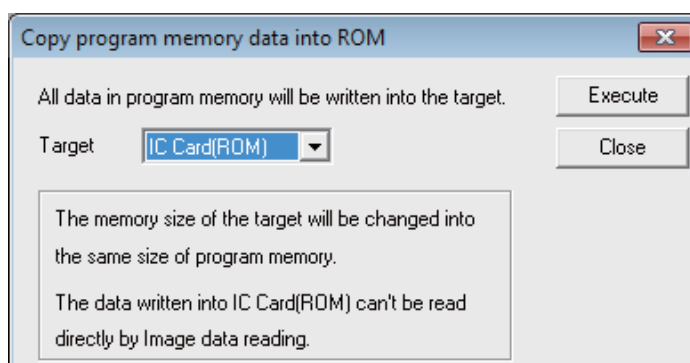
The following steps show how to use GX Developer to transfer sequence programs in the temporary memory to the ROM in the CNC controller.

(Note) The "ROM-Write incomplete" error occurs if an updated sequence program in the temporary memory (CNC RAM) is not written to the CNC ROM.

6.5.4.1 Operation Procedure

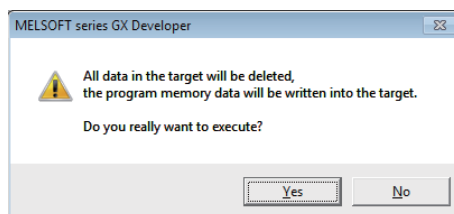
Perform the following operation from GX Developer to start the operation screen.

[Online] -> [Write to PLC (Flash ROM)] -> [Copy program memory data into ROM]

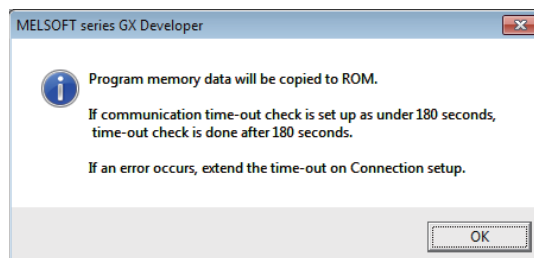


(Note) Only "IC Card (ROM)" is valid for "Target".

The following dialog appears if you click [Execute].

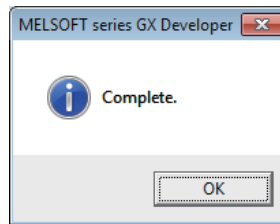


The following dialog appears if you click [Yes].



(Note) If you select [OK] in the dialog, the sequence programs in the ROM of CNC controller are deleted and overwritten. Confirm well before you click [OK].

The following dialog appears when the operation is completed. Click [OK].



6.5.5 Verifying the Sequence Programs

The following indicates how to verify sequence program between the CNC controller and GX Developer.

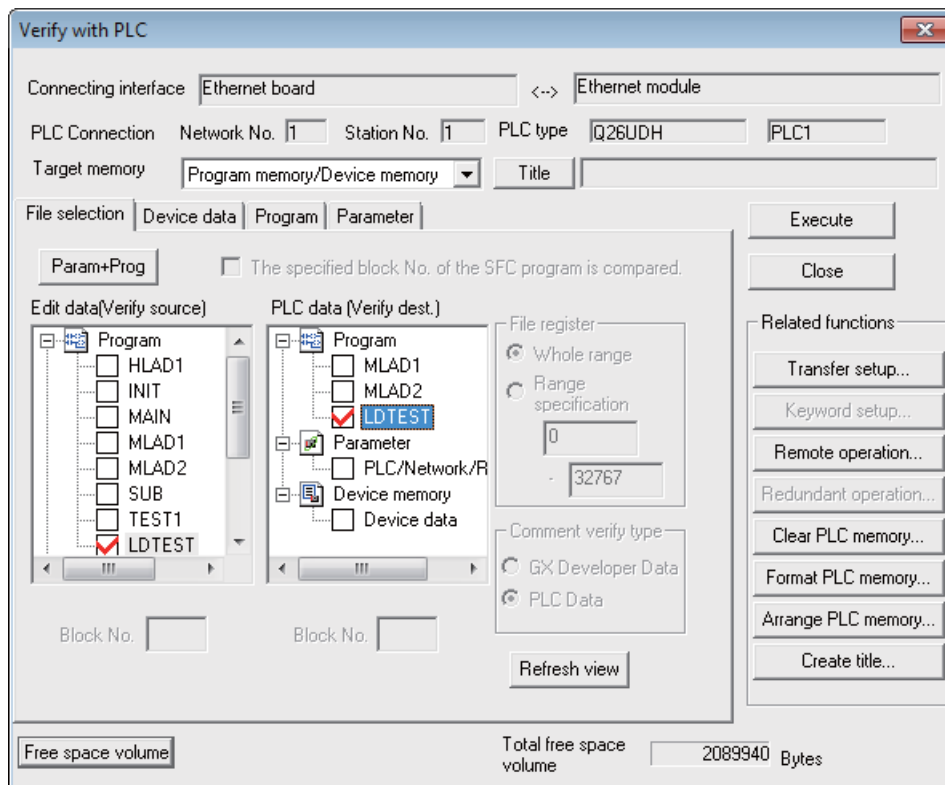
6.5.5.1 Operation Procedure

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

[Online] → [Verify with PLC]

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

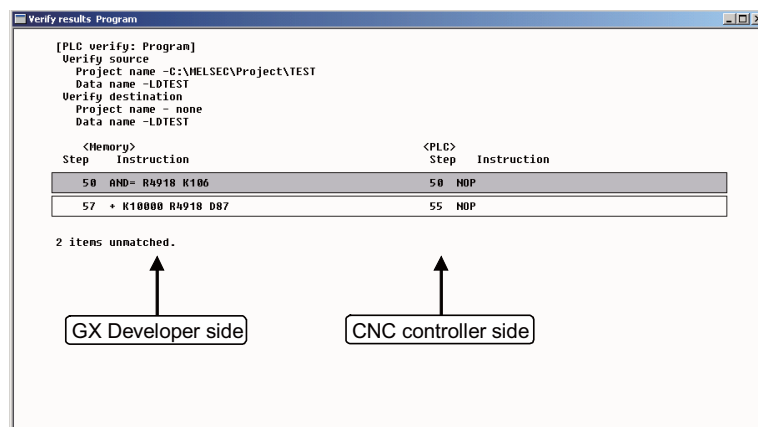
[Verify source] : GX Developer side, [Verify dest] : CNC side



[Note] As [Target memory], the fitted memory is valid.

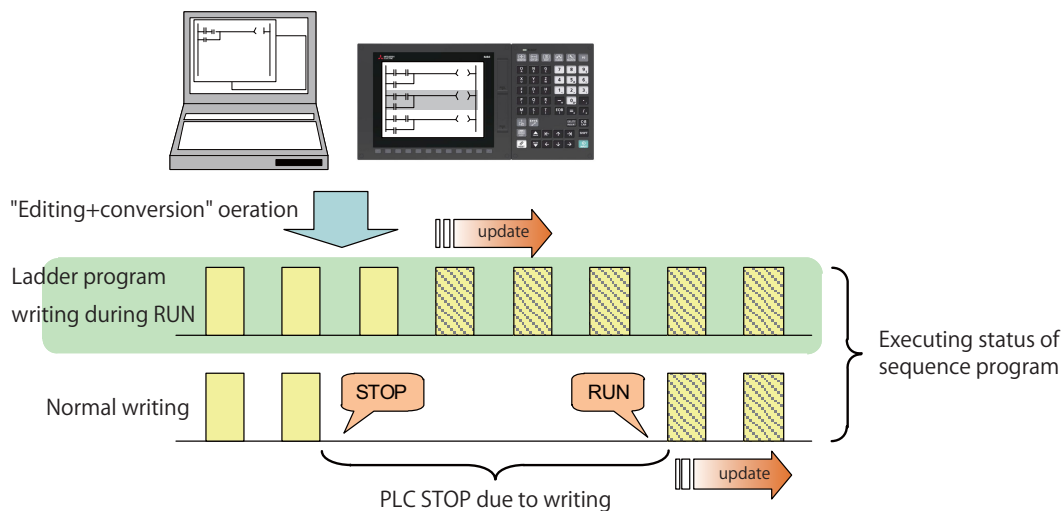
Do not set the other tab ([Program], [Device data]) than [File selection].

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



6.5.6 Executing Ladder Program Writing during RUN

Ladder program writing during RUN (or RUN write/online change) enables to edit and change the sequence program from either GX Developer or built-in PLC (built-in edit function) without stopping PLC operation.



⚠ CAUTION

Only the person who knows well about sequence programs can execute ladder program writing during RUN. When the RUN write is enabled, the modification will be immediately effective after the data editing and conversion.

The machine might operate in unexpected way when the ladder program is incomplete.

Consider well the influence of the modification in advance. Also, always make sure that the system's safe operation with the sequence programs.

6.5.6.1 Setting Ladder Program Writing during RUN

Turn ON the corresponding bit selection parameter and turn the power ON again to enable ladder program writing during RUN.

(1) Bit selection parameter

# No.	Bit	Item	Details	Setting range	Standard value
6455	Bit 6	Enable ladder program writing during RUN (in high-speed processing)	Select whether to permit ladder program writing during RUN to built-in PLC (in high-speed processing). 0: Not permit ladder program writing during RUN 1: Permit ladder program writing during RUN	0,1	0
6455	Bit 7	Enable ladder program writing during RUN	Select whether to permit ladder program writing during RUN to built-in PLC (except in high-speed processing). 0: Not permit ladder program writing during RUN 1: Permit ladder program writing during RUN	0,1	0

(2) Precautions

- These parameters will be enabled after the power is turned ON again.
- When the multi-project function is enabled, the enabled or disabled status of ladder program write during RUN is switched for all the projects.
- Turning ON "#6455 Bit6 (Enable ladder program writing during RUN (in high-speed processing))" alone does not take effect.
When setting "#6455 bit 6" to "1", also set "#6455 bit 7 (Enable ladder program writing during RUN)" to "1".
- When "Enable ladder program writing during RUN (in high-speed processing)" is set to "1", a high-speed processing program will use 8,000 steps of execution area. Thus, if the program size before the setting change is close to the maximum, the error of insufficient execution area may occur after the setting change.

6.5.6.2 PLC Data Available for Ladder Program Writing during RUN

The following shows the PLC data which can be stored in CNC controller and available for ladder program writing during RUN.

Data type available for RUN write

Data class	Data type	GX Developer	Built-in PLC (built-in edit function)
Sequence program (independent program method)	-	×	×
Sequence program (Multi-program method) (Note 1)	High-speed process	○ (Note 2)	○ (Note 2)
	Main process	○	○
	Initialization process	○	○
	Standby process	○	○
Parameters device comments message data	-	×	×

(Note 1) Only the program whose execution order has been registered in the parameter is available.

(Note 2) There are some restrictions on the contents of high-speed processing programs.

(For the details, refer to later precautions in this chapter.)

6.5.6.3 Data Unit for Writing

The following is the data unit available for ladder program writing during RUN. Ladder blocks are written at the conversion after edited. Up to 512 steps are allowed to be written at once. File operation is not allowed in RUN write.

Data unit available for RUN write

Data unit	GX Developer	Built-in PLC (built-in edit function)
Ladder block (single/ multiple)	○	○
File	×	×

6.5.6.4 Available Number of Steps for Writing

Ladder program writing during RUN is available until the total number of steps needed for executing the sequence program set in the parameter reaches the maximum number of steps of the program execution area. (For the maximum number of steps in the sequence program execution area, refer to the PLC programming manual.)

Note that when RUN write in high-speed processing is enabled, the number of steps in the sequence program execution area will be as shown below.

[When the multi-project function is disabled]

The maximum number of executable steps in a high-speed processing is fixed to 4,000. If this number is exceeded, NC will show an alarm and RUN write will be disabled.

In addition, the maximum number of executable steps in a main processing program decreases by 8,000 steps.

The following shows the relation between the settings and available number of steps for RUN write.

Settings and available number of steps

Setting of "Enable ladder program writing during RUN"		Number of steps available for execution	
High-speed process	Main process	High-speed processing program	Main processing program
ON	ON	High-speed processing program $\leq$ 4,000 steps	Main processing program $\leq$ (Number of execution area steps - 8,000 steps.)
OFF	ON	(Total number of steps in high-speed processing program and main processing program) $\leq$ Number of steps in execution area	
OFF	OFF		

[When the multi-project is enabled]

The maximum number of executable steps in a high-speed processing program is fixed to 4,000 in total of all the projects, regardless of the multi-project parameters. If the number of steps exceeds 4,000, NC will show an alarm and RUN write will be disabled.

In addition, the whole sequence program execution area decreases by 8,000 steps.

The number of steps of sequence program storage area per project is calculated by subtracting 8,000 steps from the total size.

The following shows the relation between the settings and available number of steps for RUN write.

Settings and available number of steps

Setting of "Enable ladder program writing during RUN"		Number of steps available for execution	
High-speed process	Main process	High-speed processing program	Main processing program
ON	ON	[total of whole project] High-speed processing program $\leq$ 4,000 steps	[per one project] Main processing program $\leq$ ((Number of execution area steps - 8,000 steps) x project percentage)
OFF	ON	[per one project] (Total number of steps in high-speed processing program and main processing program) $\leq$ (Number of steps in execution area multiplied by project ratio)	
OFF	OFF		

If high-speed processing program does not need to be written during RUN, the execution steps for a sequence program in main processing program can be increased by setting OFF the bit selection parameter "Enable ladder program writing during RUN (in high-speed processing)".

6.5.6.5 RUN Write Target Storage Area

The following table indicates the available storage areas for RUN write.

The operation target of RUN write is temporary memory storage. The Run write is reflected in the PLC processor execution area at the same time and is carried out.

A write to the storage area (in CNC) needs to be done separately using the ROM write operation.

ROM writing operation is available while PLC is running.

RUN write target storage area

Storage area	RUN write availability for each development environment	
	GX Developer	Built-in PLC (built-in edit function)
Temporary memory storage (RAM in CNC)	○ (when converted)	○ (when converted)
Storage for execution	○ (when converted)	○ (when converted)
Storage area (ROM in CNC)	× (Note 1)	× (Note 1)

(Note 1) Storage area is not updated at the time of conversion.

A write to the storage area (in CNC) needs to be done separately using the ROM write operation.

6.5.6.6 Operation method on the GX Developer

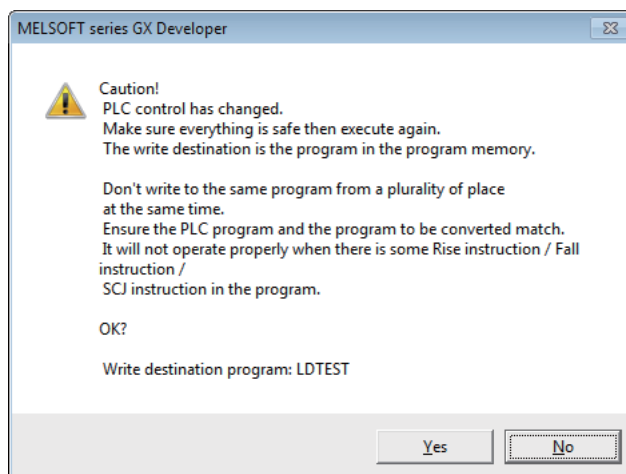
There are three ways to execute ladder program writing during RUN with GX Developer.

- Executing "Conversion (online)"
- Set the RUN write in "Options" window before executing "Conversion".
- Execute "Conversion" in "Monitor (write) mode" window.

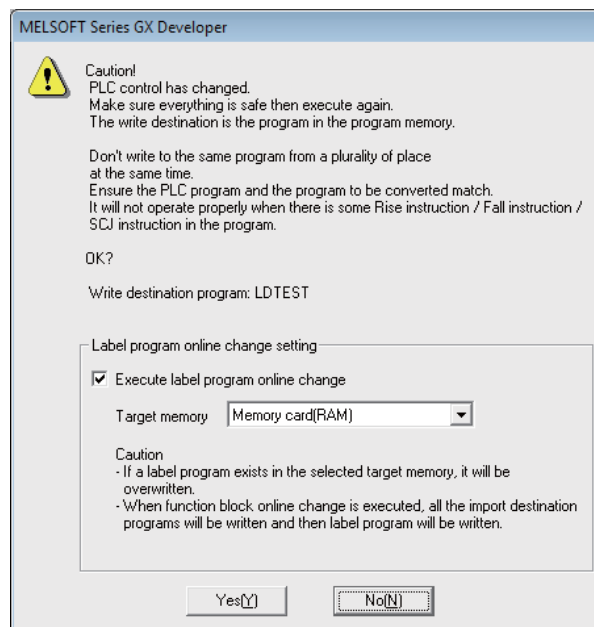
Common "Conversion" Operation

Conversion procedure in RUN write is the same in any methods. Regardless of PLC status, either "RUN" or "STOP", operation procedure is the same. When "Conversion" is executed, the following dialog box will be displayed.

The dialog displayed for a project "without labels"



The dialog displayed for a project "with labels"

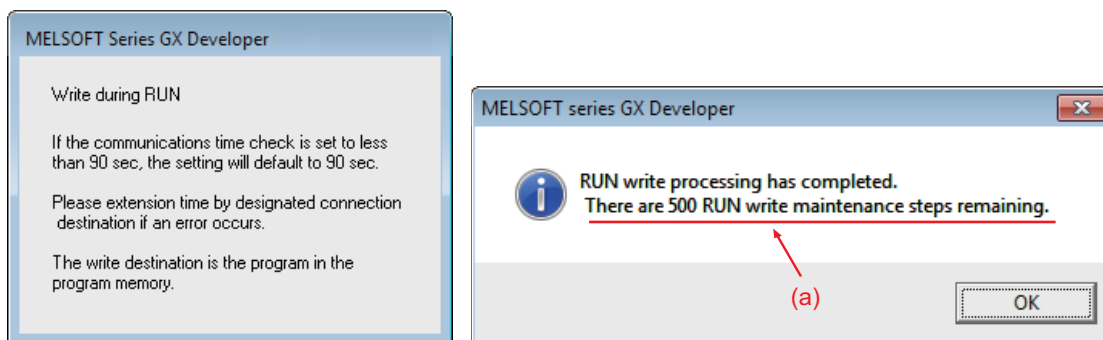


[Note 1] As [Target memory] for writing label programs, only [Memory card(RAM)] is valid.

[Note 2] The labels must be written together with sequence programs during RUN. Otherwise, a mismatch occurs between labels and sequence programs when "Read from PLC" is executed.

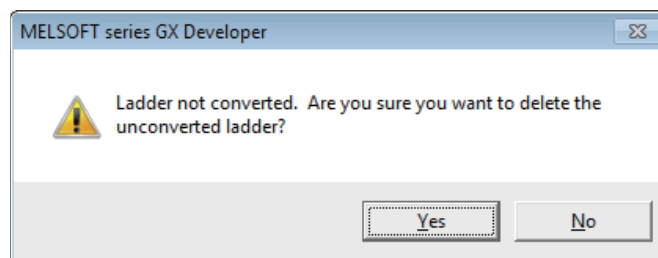
- (1) Pressing [Yes] button executes the RUN write, displaying the following dialog box.

Processing time of RUN write depends on the total number of steps used in the ladder programs and the points where the steps are written in.



Ignore (a) "There are xxx RUN write maintenance steps remaining." in the completion dialog box. CNC does not use such kind of steps.

- (2) Pressing [No] button cancels the conversion and the RUN write, displaying the following dialog box.



If you click [Yes], the unconverted ladder is canceled and the previous ladder display returns.

If you click [No], the unconverted ladder is retained.

Executing "Conversion (online change)"

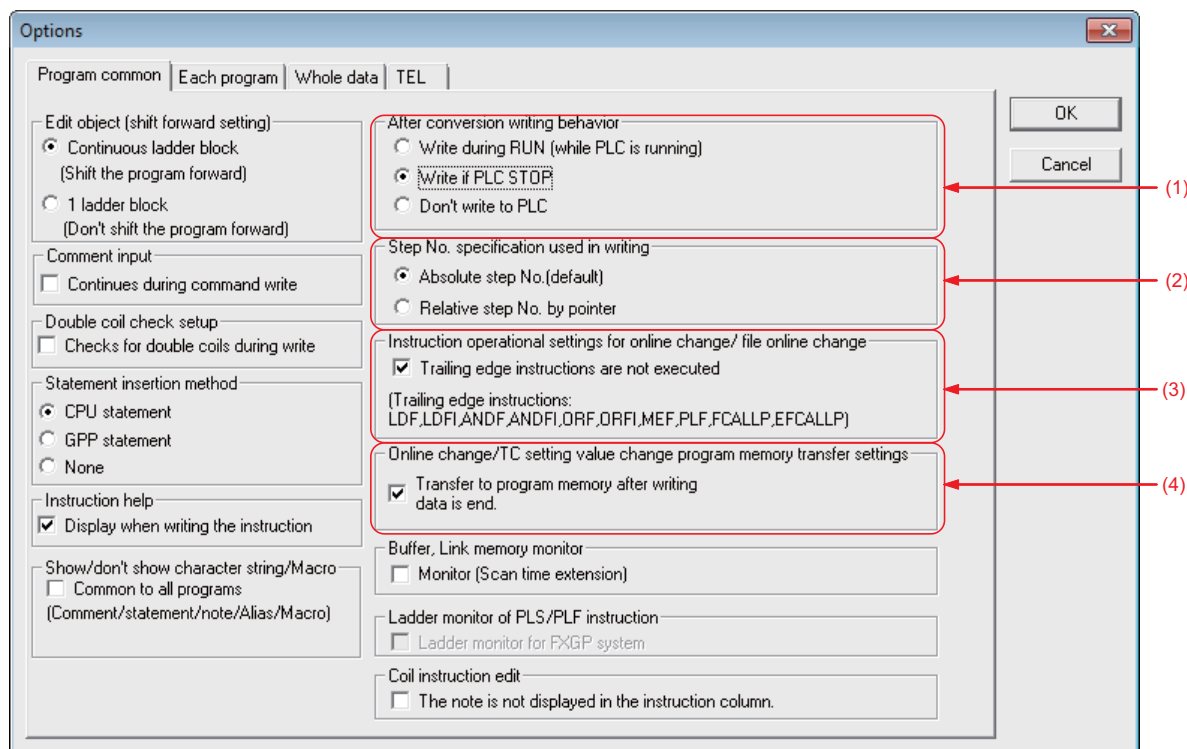
"Conversion (online change)", dedicated to conversion writing, is provided separately from common conversion. After editing ladder program as usual, do as follows for conversion. Further operation is the same as that in "Common Conversion" Operation.

Select [Conversion] → [Conversion(online change)] or Press "shift" and "F4" key together.

Setting Ladder Program Writing during RUN before Executing "Conversion"

The following explains how to change the settings to execute ladder program writing during RUN instead of common conversion.

Set (1) to (4) in [Options (Program common)] tab, and click [OK]. After setting these items, ladder program writing during RUN can be executed with the normal conversion operation. The operation after conversion writing is the same as described in the section "Common "Conversion" Operation".



(1) Select "Write during RUN (while PLC is running)" in "After conversion writing behavior".

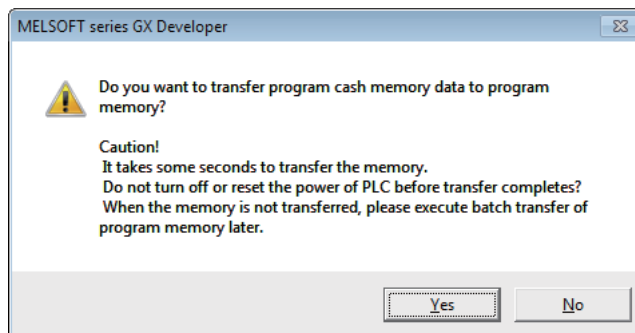
(Note) If "Write if PLC STOP" is selected, the ladder program will be written to the temporary memory concurrently with the conversion only when the PLC is STOP state.
If "Don't write to PLC" is selected, the program will not be written to the temporary memory when it is converted.

(2) Select "Absolute step No. (default)" in "Step No. specification used in writing".

(Note) "Relative step No. by pointer" is not supported. Do not select "Relative step No. by pointer" as this is not supported.
If selected and when a pointer (P) is included in the ladder block to be written during RUN, an error will occur.

(3) "Instruction operational setting for online change/ file online change" is not supported. This is invalid.

- (4) "Online change / TC setting value change program memory transfer settings" is not supported.
Check "Transfer to program memory after writing data is end".
If no item is checked, the following dialog is displayed during RUN write operation.



CNC performs RUN write only regardless of whether you choose "Yes" or "No".

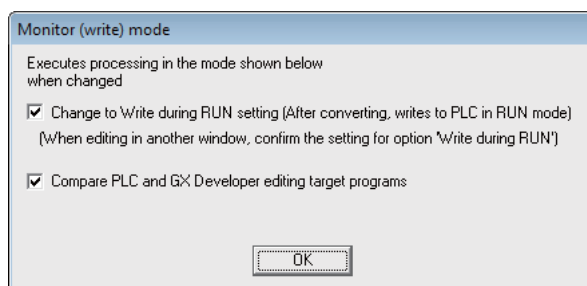
Executing "Conversion" in "Monitor (Write mode)"

"Monitor (Write mode)" is the mode that enables editing, conversion, and conversion writing while executing ladder monitor.

Do as follows:

Select [Online] → [Monitor] → [Monitor(Write mode)] or Press "Shift" and "F3" key together.

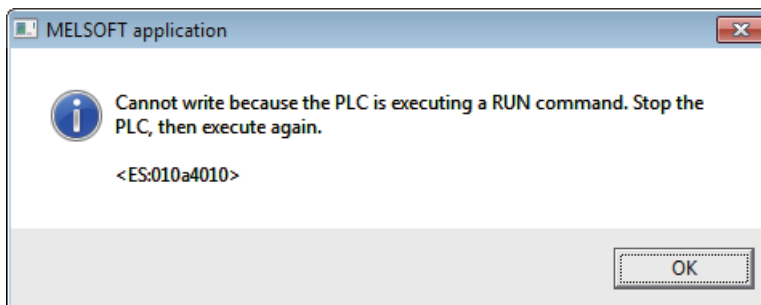
The following confirmation dialog box will be displayed. Clicking [OK] starts the preparation for the monitor (write mode): compares the program on the GX Developer ladder screen with the stored files in NC.



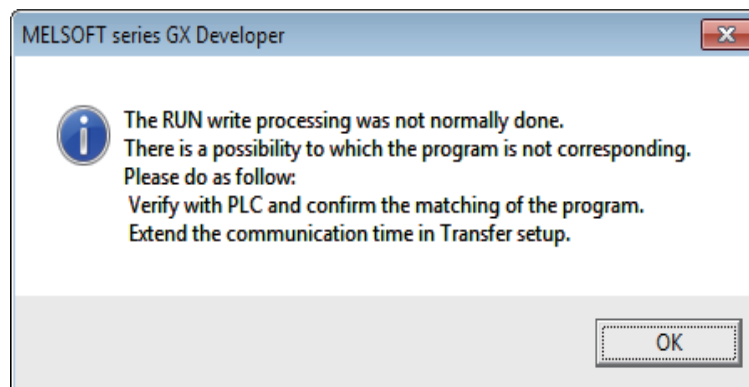
After the comparison, ladder editing can be executed on the ladder monitoring screen. RUN write can also be executed with the common conversion operation. Further operation is the same as described in the section "Common "Conversion" Operation".

Operation when Ladder Program Writing during RUN is Disabled

Without settings for enabling ladder program writing during RUN, the followings will occur at the RUN write execution. The action will be the same when RUN write is executed for the CNC system which does not support the function. If "Yes" is pressed in the section "Common "Conversion" Operation" dialog box after any operation at "Executing "Conversion (online change)"" , "Setting Ladder Program Writing during RUN before Executing "Conversion"" or "Executing "Conversion" in "Monitor (Write mode)"" , the following error dialog box will appear.



Pressing [OK] will cause another error dialog box as follows.



6.5.6.7 Precautions

Limitations on Program Configuration

(1) Limitations on independent program method

Ladder program writing during RUN is not available for the sequence program in independent program method. Bit selection parameter setting is not available. Still, program execution is available.

(2) Limitations on high-speed processing program

If you set the bit selection parameter to enable "ladder program writing during RUN (in high-speed processing)", a write to a high-speed processing program is enabled during RUN. However the following limitations are imposed:

(a) Available execution steps

The following is the maximum number of available execution steps for a high-speed processing program.

If the number has been exceeded during RUN write, an error will occur.

- The maximum number of available execution steps is 4,000.

(When the multi-project function is enabled, the total number of steps for all projects will be 4,000).

- 8,000 steps of execution area will be used regardless of the size of high-speed processing program.

(b) Available number of local labels

The following is the number of available local labels in a high-speed processing program.

If the number has been exceeded during RUN write, an error will occur.

- The maximum number of local labels is 256.

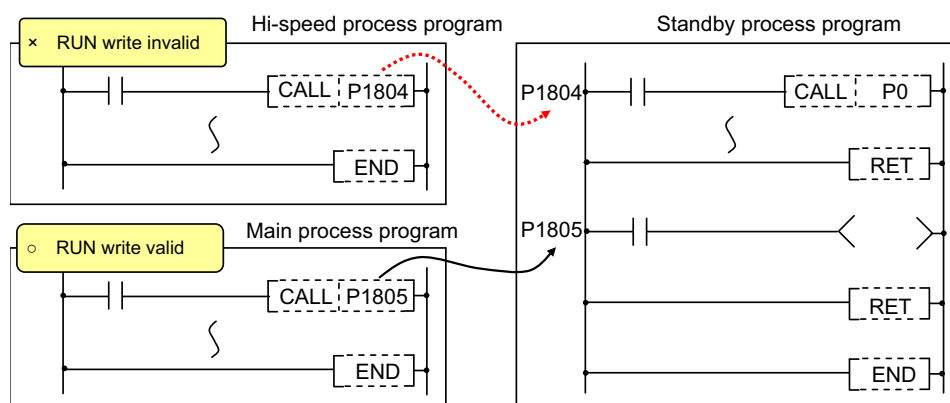
(When the multi-project function is enabled, the maximum number of local labels will be 256 per project.)

- If the number of local labels is set to 256 or less, the set number will be the maximum number of local labels.

(c) Use of common pointers in high-speed processing program

RUN write is disabled when the common pointer is used in a high-speed processing program. In this case, the bit selection parameter for enabling RUN write will be disabled. Still, program execution is available.

If you perform RUN write for a high-speed processing program, use a local point only. The following is an example of the use of common pointer for subroutine call from standby processing program.



(3) Limitations when the multi-project function is enabled

RUN write cannot be performed to different projects through multiple development tools at the same time.

If attempted simultaneously, an error will occur. Try RUN write again after shifting the timing.

Precautions for Command Operation in Ladder Programming Writing during RUN

(1) When commanding rising/ falling edge

When rising or falling edge is commanded in ladder program writing during RUN, the following action will be taken after the command. The rising/falling edge may not always be executed in the first processing cycle due to the change of operation path such as subroutine call or jump junction.

	The first execution after change	The second execution after change
Rising/falling commands in contact system LDP, LDF, ANDP, ..., MEP, MEF, ... PLS, PLF, FF, MOVP, ~ P, ...	Command status is OFF	Normal execution

(2) When a device is deleted in the program

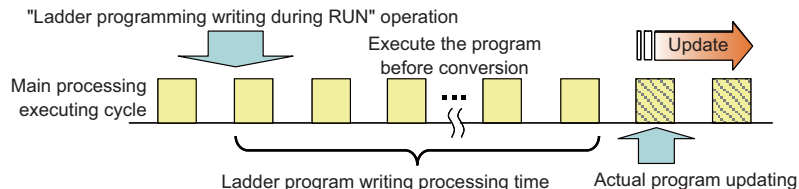
If an output command is deleted in the program, the output status of the device designated by the command will be kept as before the deletion.

(3) When a program error occurs in RUN write

When a program error occurs in the process of RUN write, the display of the error step may be inaccurate regardless of the relation of the command and the error point.

(4) Actual updating timing of program in RUN write

An updated program may not be executed in the cycle right after the RUN write (after executing the ladder conversion). The actual execution of the updated program may be delayed by a few or a few dozens cycles, because the processing time of RUN write depends on the total number of steps used in the sequence programs and the points where the steps are written in.



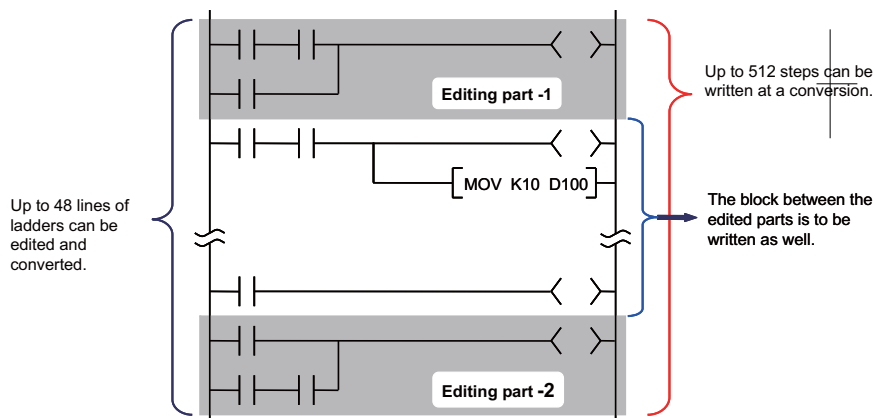
Other Precautions

(1) Number of steps that can be conversion writing

Up to 48 lines of ladders can be edited and converted in GX Developer and PLC onboard edit function.

Ladder blocks to be written at a conversion include the block between the edited ones. Up to 512 steps can be written during RUN at a conversion.

When editing two or more detached ladder blocks



(2) Change of processing time in conversion writing

The processing time until ladder program writing during RUN completion depends on the total number of steps used in the sequence programs and the points where the steps are written in.

Error Occurs at Ladder Program Writing during RUN

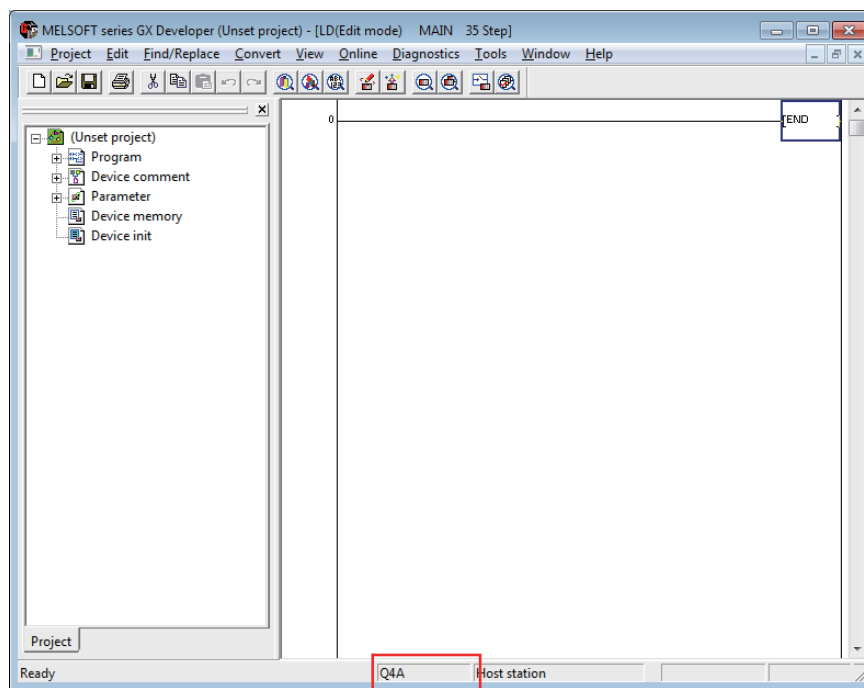
If an error occurs at ladder program writing during RUN, refer to "Troubleshooting:List of Errors During GX Developer Online Operations" to find out the causes and remedies.

6.5.7 Using Sequence Programs Created for M700V/M70V/M700/M70 and E70 Series

In M700V/M70V/M700/M70 and E70 series, the PLC CPU Q4A was emulated. In M8 series, the emulation target was changed to CPU Q26UDH. For this reason, the old project data that have been used with GX Developer are no more valid in M8 series. Using the following procedure, convert old project data to new ones so that it can be used with M8.

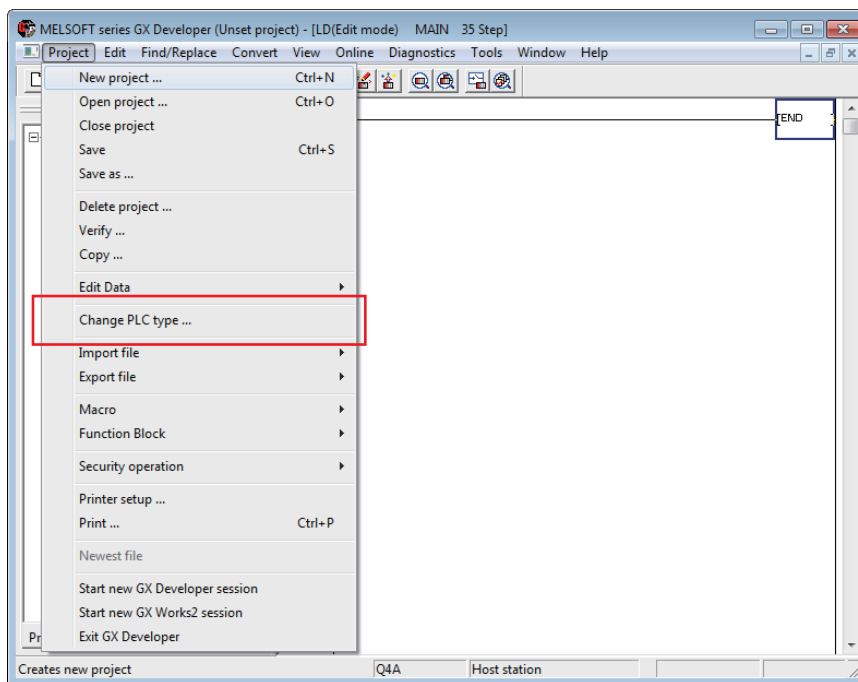
6.5.7.1 Opening Project Data to be Converted Using GX Developer

Open the project data (with PC type Q4A) from GX Developer.

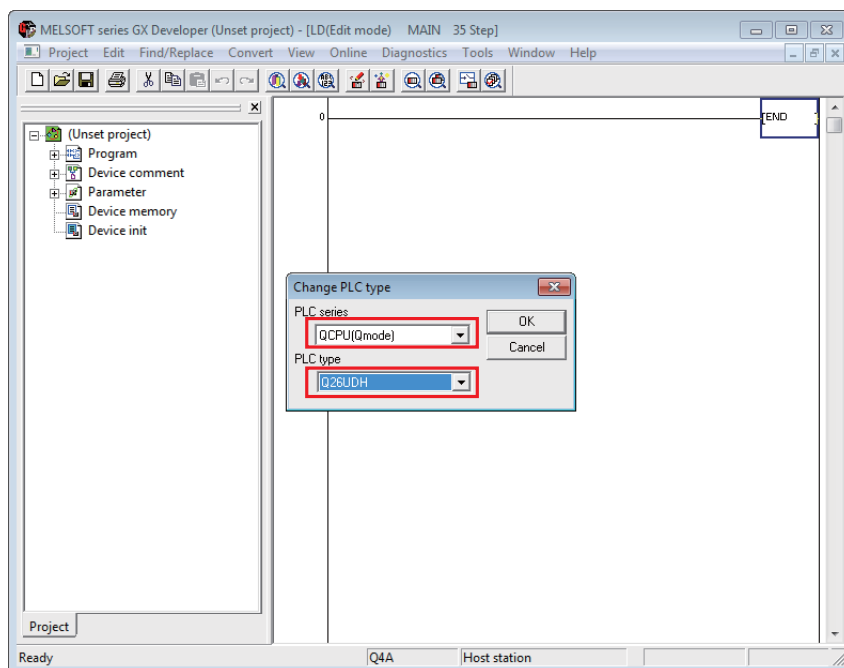


6.5.7.2 Changing PC Type

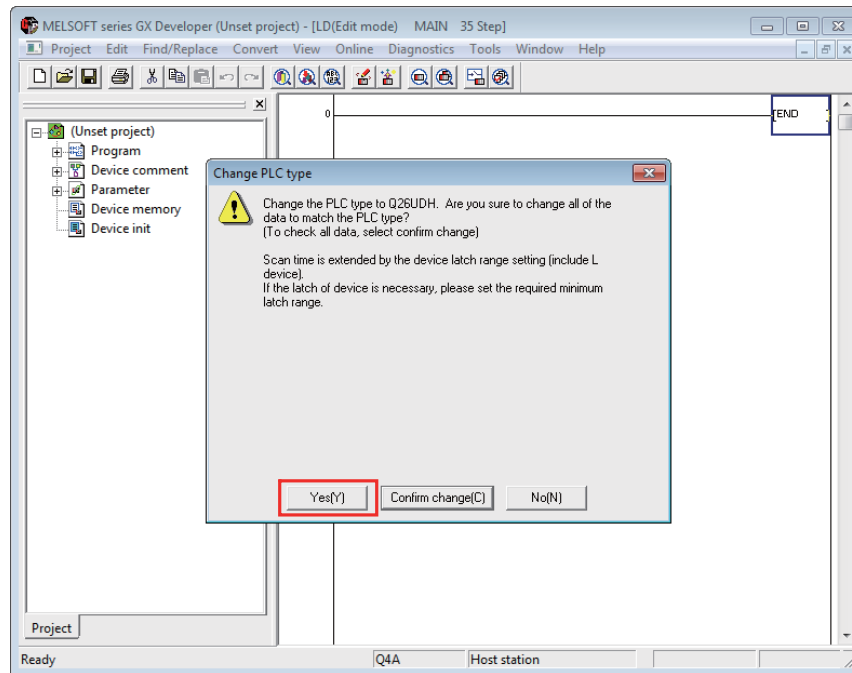
(1) From [Project], select "Change PLC type".



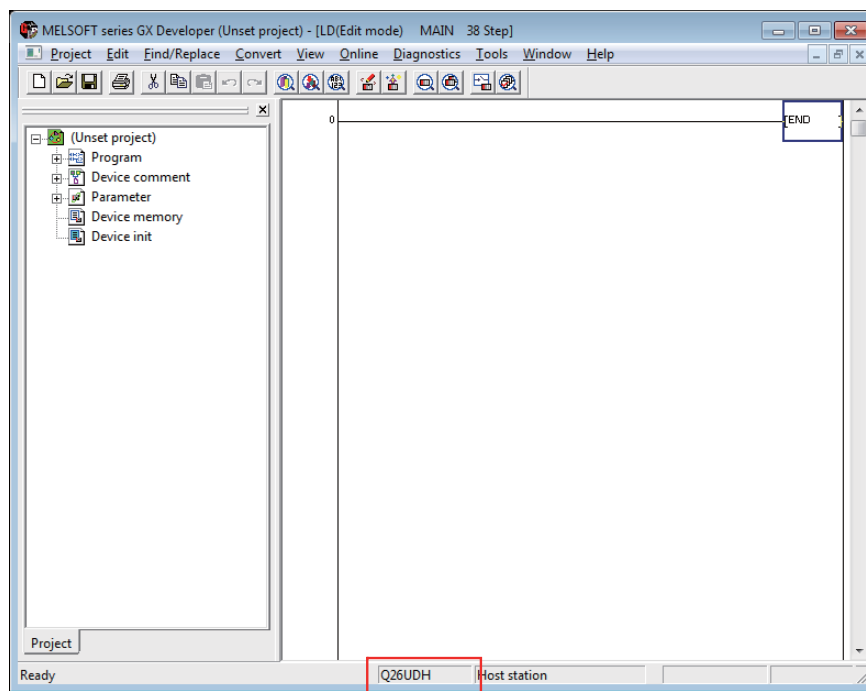
(2) Change the PC series to "QCPU (Q mode)" and select "Q26UDH" from the PC types. Click [OK].



(3) The confirmation dialog is displayed. Click [Yes].



(4) Confirm that the PC type is changed to Q26UDH.



Conversion is completed.

The settings of "Connection Setup" and "PC parameter" are reset when conversion is executed.

Set these items again by referring to "Setting the Connection Target" section in "Preparation: Preparation for Ethernet Communication" and "Common Items: Setting the Parameters".

The SM/SD device assignment is automatically changed at conversion. Using the following tables, re-examine the locations at which SM/SD devices are used.

Project data before conversion (Q4A) (M7 series)	Project data after conversion (Q26UDH) (M8 series)		Project data before conversion (Q4A) (M7 series)	Project data after conversion (Q26UDH) (M8 series)
SM54	SM1255		SD54	SD1255
SM212	SM1255		SD251	SD1255
SM251	SM1255		SD714	SD1255
SM711	SM1255		SD812	SD1255
SM712	SM1255		SD1000	SD60
SM714	SM1255		SD1001	SD1255
SM808	SM1255		SD1002	SD61
SM821	SM1255		SD1003	SD1255
SM822	SM1255		SD1004	SD1255
SM825	SM1255		SD1005	SD53
SM1000	SM60		SD1006	SD1255
SM1001	SM1255		SD1007	SD1255
SM1002	SM61		SD1008	SD0
SM1003	SM1255		SD1009	SD62
SM1004	SM1255		SD1010	SD1255
SM1005	SM53		SD1011	SD1255
SM1006	SM52		SD1012	SD1255
SM1007	SM51		SD1013	SD1255
SM1008	SM1		SD1014	SD1255
SM1009	SM62		SD1015	SD203
SM1010	SM1255		SD1016	SD1255
SM1011	SM56		SD1017	SD524
SM1012	SM700		SD1018	SD520
SM1013	SM1255		SD1019	SD526
SM1014	SM1255		SD1020	SD1255
SM1015	SM1255		SD1021	SD1255
SM1016	SM1255			
SM1017	SM1255			
SM1018	SM1255			
SM1019	SM1255			
SM1020	SM420			
SM1021	SM421			
SM1022	SM422			
SM1023	SM423			

6.5.8 Monitoring the Sequence Program

There are no MITSUBISHI CNC-specific operations to monitor a sequence program. Refer to the Operating Manual for the operation methods. For usable functions, refer to "GX Developer Functions Supported by MITSUBISHI CNC:Function Support Conditions (Online Section)". This section explains the operation procedure outline and precautions.

6.5.8.1 Operation Procedure

Perform the following operation from GX Developer to start monitoring.

(1) Display the sequence 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 "F4" key

(3) Perform the following operation to stop monitoring.

[Online] → [Monitor] → [Stop monitor] or Press "Alt" and "F3" key together.

[Caution] If the sequence program being RUN with CNC controller differs from the sequence program displayed on GX Developer, monitoring will not result in an error but will appear to continue normally.

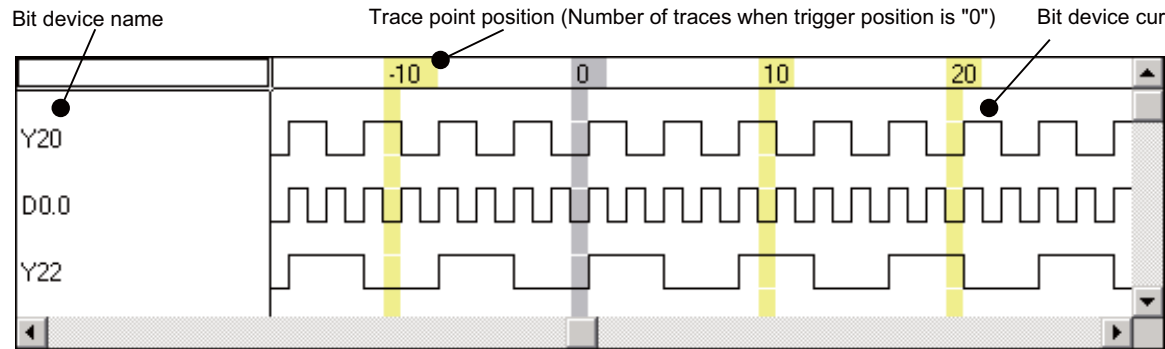
Confirm that the sequence program on the CNC controller side and GX Developer are the same before starting monitoring.

6.5.9 Executing Sampling Trace on Device

Status of various devices that are used for the CNC controller external signals and for the user ladder can be traced by using GX Developer. Trace result at an arbitrary point will be read out from CNC controller and displayed on a screen or output in a CSV file format.

[Example of trace result display for bit devices]

Current value of bit device per sampling point is displayed.



Example of bit device trace result display

[Example of trace result display for word devices]

Current value of word device per sampling point is displayed.

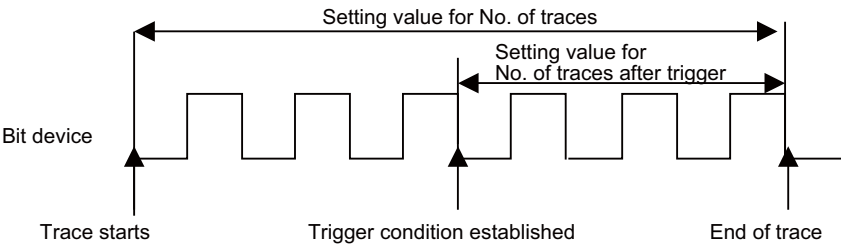
Word device name	Trace point position (Number of traces when trigger position is "0".)						Word device current value
	-2	-1	0	1	2	3	
D10	56	52	48	44	40	36	
R1200	500	250	125	62	31	15	
R1210	185	100	57	35	23	17	
K4Y20	3	2	2	7	7	6	
D0	514	513	512	511	510	509	
D1	-32767	-32767	-32767	-32767	-32767	-32767	
D2	0	0	0	0	0	0	

Example of word device trace result display

No. of traces, trace condition, trigger condition, and No. of traces after trigger can be set as trace setting.

Trace is executed when the trace condition is set.

After the trigger condition is set, execute "No. of traces after trigger" only and end sampling. Sampling the status before and after the trigger is set is also possible.



Specifications chart (Establishment of trigger condition to the end of sampling)

6.5.9.1 Basic Operation

Use GX Developer for operation. Execute sampling trace function, following the procedures below.
The sampling trace function can be executed for each project when the multi-project is enabled.

(1) Carry out trace setting.

Setting item	Setting details
No. of traces	Set the number of traces to be saved. The latest data is saved for the number of traces. If exceeds the number of traces, oldest data is erased in order.
No. of traces after trigger	Set the number of traces taken place after trigger has been established until sampling is completed.
Trace point	Set the data trace timing. "Each scan" and "Detail" can be selected. "Detail" enables the trace execution condition setting.
Trigger point	Set the trigger timing. When trigger is established, status of trace device is taken in. "At the time of trigger operation from GX Developer" and "Detail" can be selected. "Detail" enables the trigger establishment condition setting.
Trace device	Set the device for sampling.

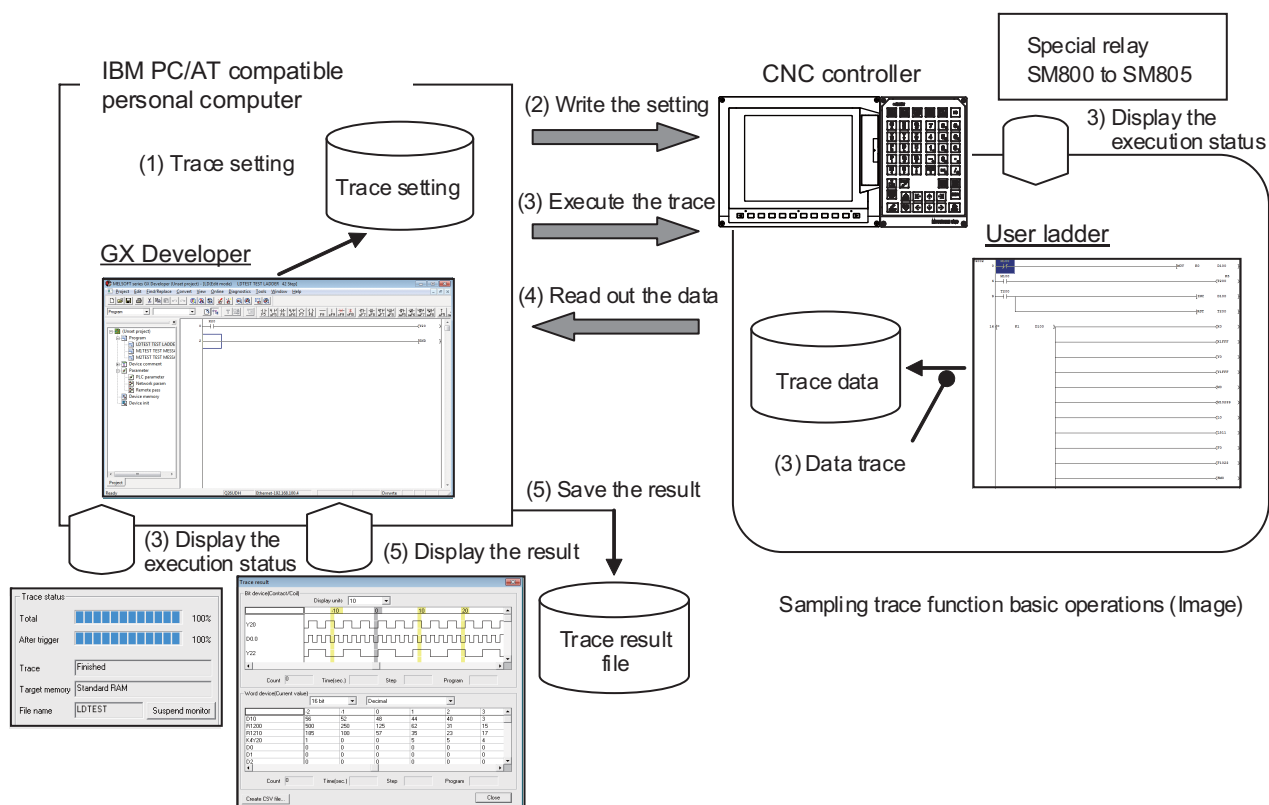
(2) Write the trace settings into CNC controller.

(3) Execute tracing. CNC controller starts tracing the device. Tracing execution status can be checked with GX Developer tracing status display or CNC special relay SM800 to SM805. Tracing will be continued until the following conditions are set.

- (a) Tracing is completed upon establishment of trigger.
- (b) Stop tracing from GX Developer.
- (c) Turn the CNC controller power OFF.
- (d) PLC turns to STOP mode.

(4) Read trace data out from CNC controller.

(5) Display the result and output in a file format, if necessary.



6.5.9.2 Basic Specifications

Basic specifications list

Item	Specifications		
Multi-project	Sampling trace can be executed for each project. Refer to (Note 6) for the timing of sampling when the multi-project is enabled.		
No. of traces	The number between 1 and 8192 can be set. Note that, however, the total trace data size has to be smaller than 220kbyte. (The data size for a project depends on the number of usable projects.) Refer to (Note 1) for trace data size calculation.		
No. of traces after trigger	Sets the number smaller than the No. of traces.		
Trace point (Two types of setting - "Each scan" and "Detail" - are available.)	Each scan	Traces per scan of the main process.	
	Detail (Refer to (Note 4) for precaution.)	Word device	Applicable device: Refer to (Note 2). Setting condition: Sets the condition and the value to be used for judgment. Sets the value to be used for judgement. When the setting value becomes equal to the word device value, or when the value of the word device changes judgement will be effective and trigger is executed.
		Bit device	Applicable device: Refer to (Note 2). Setting condition: Sets ↑ or ↓ . When the setting condition is satisfied, trace is executed.
Trigger point (Two types of setting - "At the time of trigger operation from GX Developer" and "Detail" are available.)	At the time of trigger operation from GX Developer	Executes trigger by GX Developer operations.	
	Detail (Refer to (Note 5) for precaution.)	Word device	Applicable device: Refer to (Note 2). Setting condition: Sets the value to be used for judgement. When the setting value becomes equal to the word device value, judgement will be effective and trigger is executed. Refer to (Note 5) for when writing to the device.
		Bit device	Applicable device: Refer to (Note 2). Setting condition: Sets ↑ or ↓ . When the setting condition is satisfied, trace is executed.
Trace device	50 points of word device, 50 points of bit device can be set. Note that, however, the total trace data size has to be smaller than 220kbyte. Refer to (Note 1) for trace data size calculation. (The data size for a project depends on the number of usable projects.) Refer to (Note 3) for applicable devices.		

(Note 1) Calculation of trace data size

The size of trace data per project depends on the number of usable multi-projects.

The size of trace data per project for different numbers of usable multi-projects

Usable projects	Size (byte) required for one trace
6 projects	25k
5 projects	32k
4 projects	44k
3 projects	64k
2 projects	103k
1 projects	220k

For example, if the number of usable projects is 6, set the number of traces and the trace devices so that the trace data size is 25kbyte or smaller. Trace data size will be calculated as follows.

$$[\text{Trace data size (byte)}] = [\text{Size required for one trace (byte)}] \times [\text{Number of traces}]$$

Size required for one trace is calculated from word device points and bit device points of the trace device and the size required for one trace of each device.

Size required for one trace of each device

Trace device type	Size (byte) required for one trace
Word device	2byte per 1 point
Bit device	2byte per 1 unit (1 unit = 16 points) 1 to 16 points → 1 unit → 2byte 17 to 32 points → 2 units → 4byte 33 to 48 points → 3 units → 6byte 49 to 50 points → 4 units → 8byte

Calculation example for trace data size is shown below.

Trace data size calculation example (when three projects are being used)

No.	Bit device points	Word device points	Trace points	Trace data size	Sampling
1	16 points (1 Unit)	2 points	8192 points	$(1 \times 2 + 2 \times 2) \times 8192$ = 49152 byte	Possible
2	8 points (1 Unit)	8 points	1000 points	$(1 \times 2 + 8 \times 2) \times 1000$ = 18000 byte	Possible
3	50 points (4 Unit)	50 points	606 points	$(4 \times 2 + 50 \times 2) \times 606$ = 65448 byte	Possible
4	50 points (4 Unit)	50 points	607 points	$(4 \times 2 + 50 \times 2) \times 607$ = 65556 byte	Not possible

(Note 2) Applicable devices with trace/trigger point details setting

Applicable device
Bit device: X, Y, M, L, F, SB, B, SM, T(contact), ST(contact), C(contact) Word device: T(current value), ST(current value), C(current value), D, R, SW, SD, W, ZR Following qualifications are available for the above devices. - Bit device digit designation - Word device bit designation

Process following an inapplicable device setting will be an error occurrence at trace execution.

(Note 3) Applicable devices with device setting

Applicable device
Bit device: X, Y, M, L, F, SB, B, SM, T(contact), T(coil), ST(contact), ST(coil), C(contact), C(coil) Word device: T(current value), ST(current value), C(current value), D, R, SW, SD, W, ZR Following qualifications are available for the above devices. - Bit device digit designation - Word device bit designation

Process following an inapplicable device setting is as follows.

- If one or more applicable devices already exist, the setting of the inapplicable device will be ignored.
- If no applicable devices exist, an error will occur at trace execution.

(Note 4) Precautions for trace point details setting

- When trace point is set only with "Step No.", an error will occur at trace execution.
- When trace point is set with AND condition of "Step No." and "Device", "Step No." setting will be ignored and only "Device" setting will be effective.
- When only devices that are not corresponding with MITSUBISHI CNC are set for "Device", an error will occur at trace execution.

Operations at the time of trace point details setting are as shown in the table below.

List of operations at trace point details setting

Setting (O → Yes x → No)		Operations
Device	Step No.	
○	○	Valid setting available in device → Device
		Valid setting not available in device → Error display
○	x	Valid setting available in device → Device
		Valid setting not available in device → Error display
x	○	Error display
x	x	Setting disabled (Error is displayed on GX Developer)

(Note 5) Precautions for trigger point details setting

- When trigger point is set only with "Step No.", an error will occur at trace execution.
- When trigger point is set only with "Step No.", the operation will be same as when trigger point is set to "At the time of trigger operation from GX Developer".
- When trigger point is set only with "Step No.", the operation will be same as when trigger point is set to "At the time of trigger operation from GX Developer".

Operations at the time of trigger point details setting are as shown in the table below.

List of operations at trigger point details setting

Setting (O → Yes x → No)				Operations
Device			Step No.	
○	Word device	Value matching	○	Valid setting available in device -> Device
				Valid setting not available in device -> Error display
	Bit device	Writing to device	○	Error display
				Valid setting available in device -> Device
○	Word device	Value matching	x	Valid setting not available in device -> Error display
				Error display
	Bit device	Writing to device	x	Valid setting available in device -> Device
				Valid setting not available in device -> Error display
x				Error display
x				Setting disabled (Error is displayed on GX Developer)

(Note 6) Precautions on multi-project function

When the multi-project is enabled, one scan is executed in the order specified by the user. Sampling is started after one scan is executed. Therefore, there may be some restrictions in operation depending on the settings.

Example 1: Three projects

Project execution order		1 → 2 → 3
Program (ladder) Device R: project-common Device D: project-specific	Project 1	Device R0 <- 1, Device D0 <- 1
	Project 2	Device R0 <- 2, Device D0 <- 2
	Project 3	Device R0 <- 3, Device D0 <- 3
Sampling trace (project 1 to 3) common		Trace point: Each scan Trace device: R0, D0
Sampling trace result (1 sampling extracted)	Project 1	R0: 3, D0: 1
	Project 2	R0: 3, D0: 2
	Project 3	R0: 3, D0: 3

In the above example, sampling is executed after the operation of project 3. Therefore, the result of update performed in project 3 is used as the sampling data for R0 (the device common to all projects) of all projects.

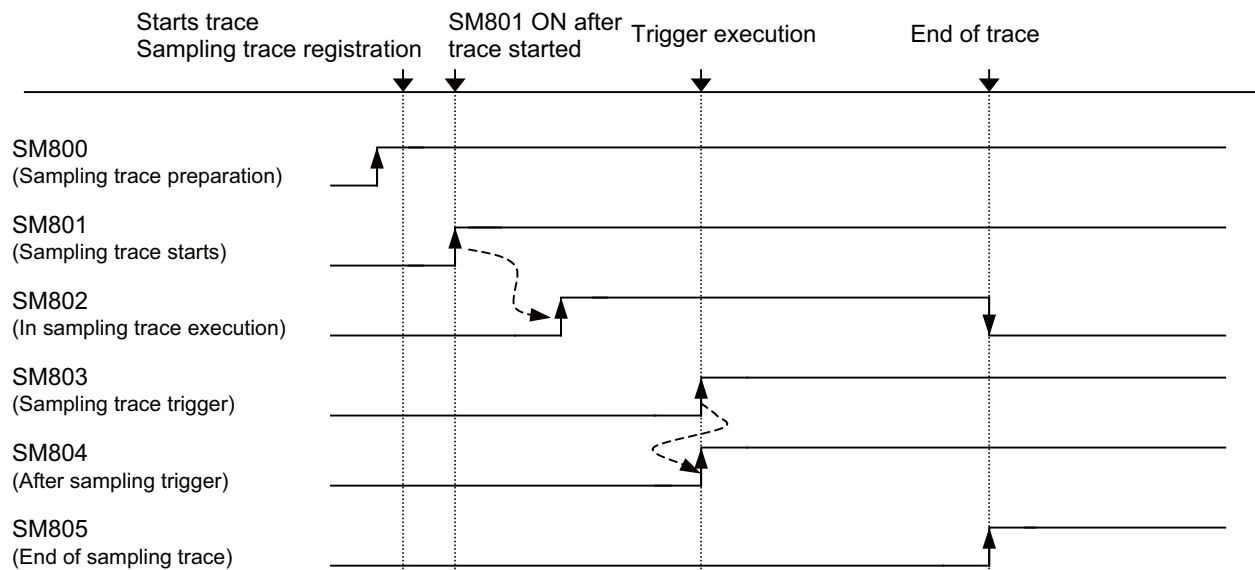
Example 2: Six projects

Project execution order		6 → 1 → 5 → 2 → 4 → 3
Program (ladder) Device R: project-common Device D: project-specific	Project 1	Device R0 <- 1, Device D0 <- 1
	Project 2	Device R0 <- 2, Device D0 <- 2
	Project 3	Device R0 <- 3, Device D0 <- 3
	Project 4	Device R0 <- 4, Device D0 <- 4
	Project 5	Device R0 <- 5, Device D0 <- 5
	Project 6	Device R0 <- 6, Device D0 <- 6
Sampling trace	Project 1 to 3 common	Trace point: Each scan Trace device: R0, D0
	Project 4 to 6 Common	Trace point: Detailed setting Trace device: R0, D0 when device R0 is 5
Sampling trace result (1 sampling extracted)	Project 1	R0: 3, D0: 1
	Project 2	R0: 3, D0: 2
	Project 3	R0: 3, D0: 3
	Project 4	No trace
	Project 5	No trace
	Project 6	No trace

In the above example, sampling is executed after the operation of project 3. Therefore, the result of update performed in project 3 is used as the sampling data for R0 (the device common to all projects) of all projects. For project 4 to 6 for which the trace point is specified as "when device R0 is 5", tracing is not performed because R0 is "3" at the sampling timing.

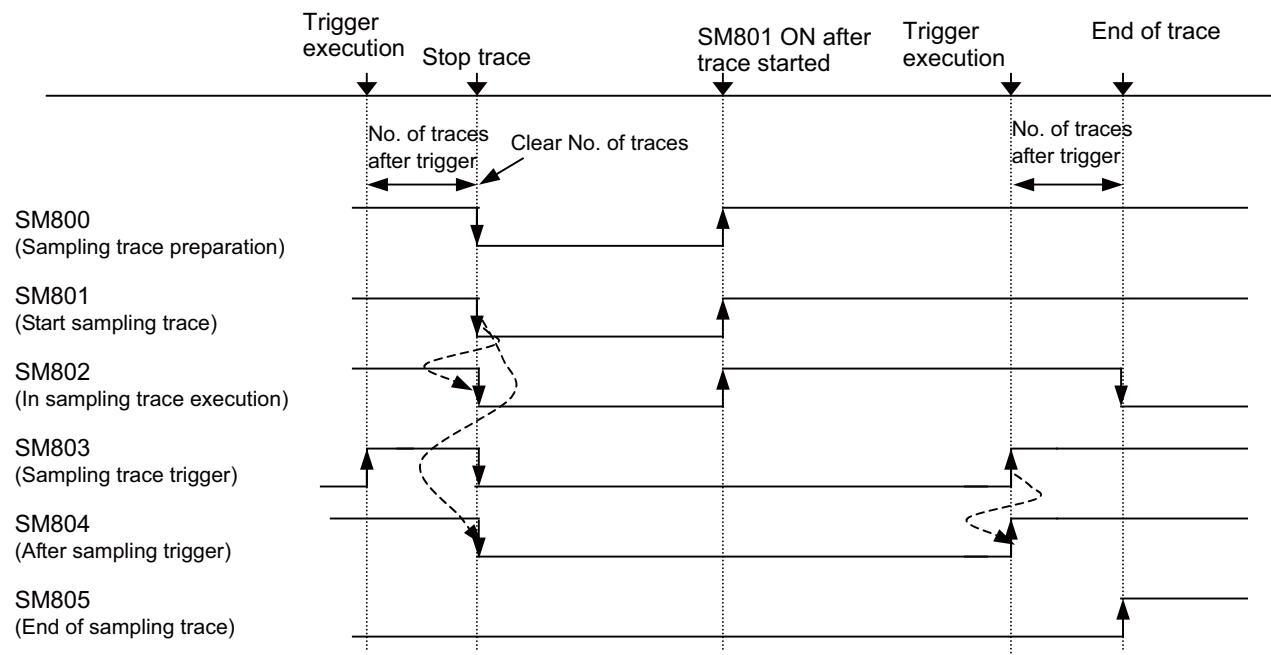
6.5.9.3 Status of Special Relay during Sampling Trace

Status during sampling trace function being executed can be checked by the status of SM device 800 to 805.



*SM800 automatically turns ON when sampling trace preparation is done.

Device status when trace execution operation is carried out.



Device status when trace stop operation is carried out

Specifications for SM800 to SM805 is as shown below.

Specifications list for the devices that are related with sampling trace function

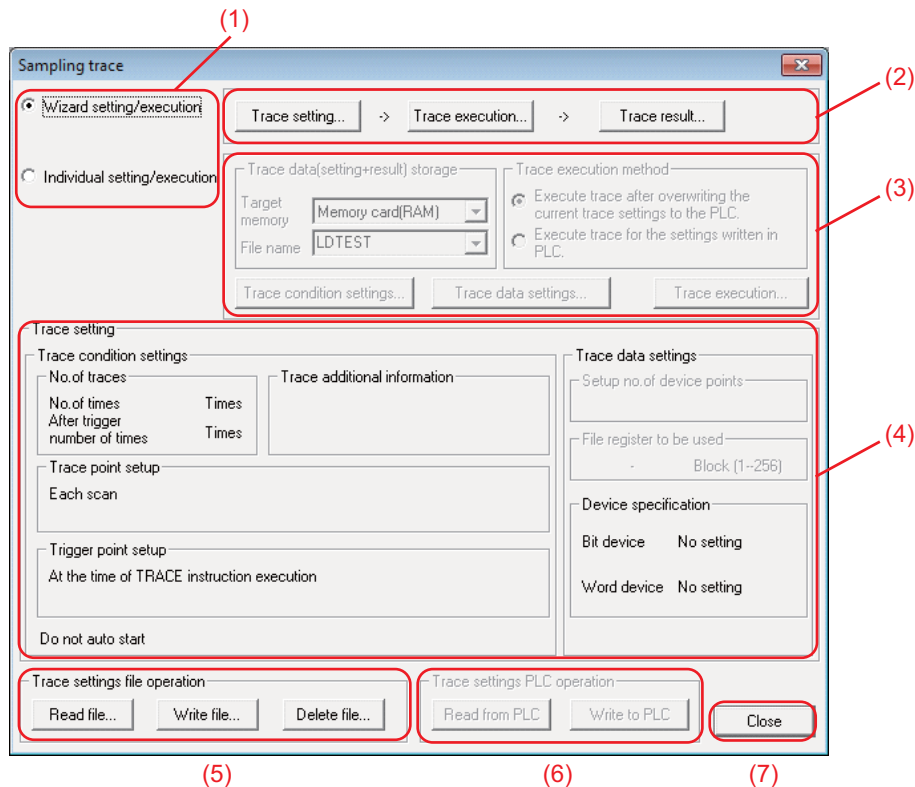
No.	Name	Details
SM800	Sampling trace preparation	OFF: Preparation not completed ON: Preparation completed
SM801	Starts sampling trace	OFF: Cancel ON: Start
SM802	In sampling trace execution	OFF: Cancel ON: Start
SM803	Sampling trace trigger	OFF → ON : Trigger execution
SM804	After sampling trace trigger	OFF: Not after trigger ON: After trigger
SM805	End of sampling trace	OFF: Not completed ON: Completed

6.5.9.4 Sampling Trace Operation Screen

In this section, outline of the operation procedures and precautions are explained, using the case where wizard setting/execution is applied. Individual setting/execution is also available. For available functions, refer to "GX Developer Functions Supported by MITSUBISHI CNC:Function Support Conditions (Online Section)". Refer to GX Developer Version 8 Operating Manual (SW8D5C-GPPW-*) for basic operations.

Sampling Trace Main Screen

Start the sampling trace main screen below by selecting [Online] → [Trace] → [Sampling trace]. All the operations for sampling trace functions are carried out on this main screen.



Sampling trace main screen

- (1) Set the sampling trace execution method. Select either "wizard setting/execution" method or "Individual setting/execution" method. Necessary setting items are set in an order by using the wizard setting/execution method.
- (2) This is the menu when the wizard setting/execution method is applied. Sampling trace execution method is valid when wizard setting/execution is applied. Click the button in the order of "Trace setting...", "Trace execution..." and "Trace result..."
- (3) This is the menu when the individual setting/execution method is applied. Sampling trace execution method is valid when individual setting/execution is applied. Click the button in the order of "Trace condition setting", "Trace data setting" and "Trace execution". Setting details are same as when wizard setting/execution is applied. (except "Registry trace" of trace execution)
- (4) Display the details of setting for the trace currently valid.

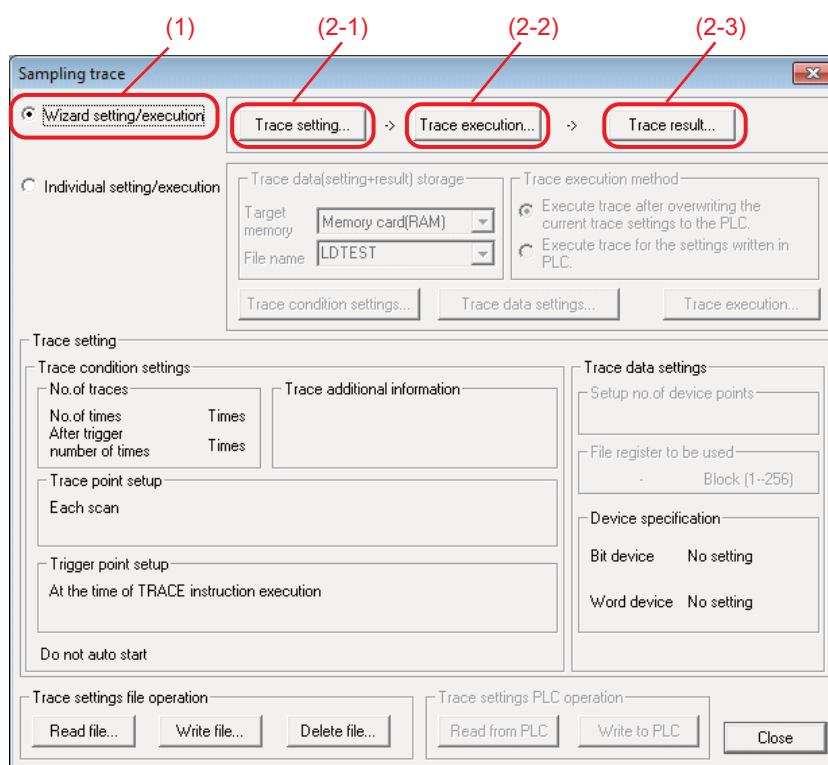
- (5) This is the menu for trace setting file operation. Saving of the currently valid trace settings in the local area is possible, as well as reading and deleting of the saved file.
- (6) This is the menu for trace setting PC operation. Currently valid trace settings can be written into CNC, and also the trace settings currently set in CNC can be read out.
- (7) The [Close] button closes the "Sampling trace" screen. Tracing will continue even if the screen is closed during trace execution.

Wizard Setting/Execution Screen

Perform the following operation from GX Developer to start the sampling trace.

[Online] → [Trace] → [Sampling trace]

- (1) Select wizard setting/execution with radio button.
- (2) Click in the following order and operate according to the wizard.
 - (2-1) Trace setting : Refer to "Trace Setting" for details.
 - (2-1) Trace setting : Refer to "Trace Execution" for details.
 - (2-3) Trace result : Refer to "Trace Result" for details.

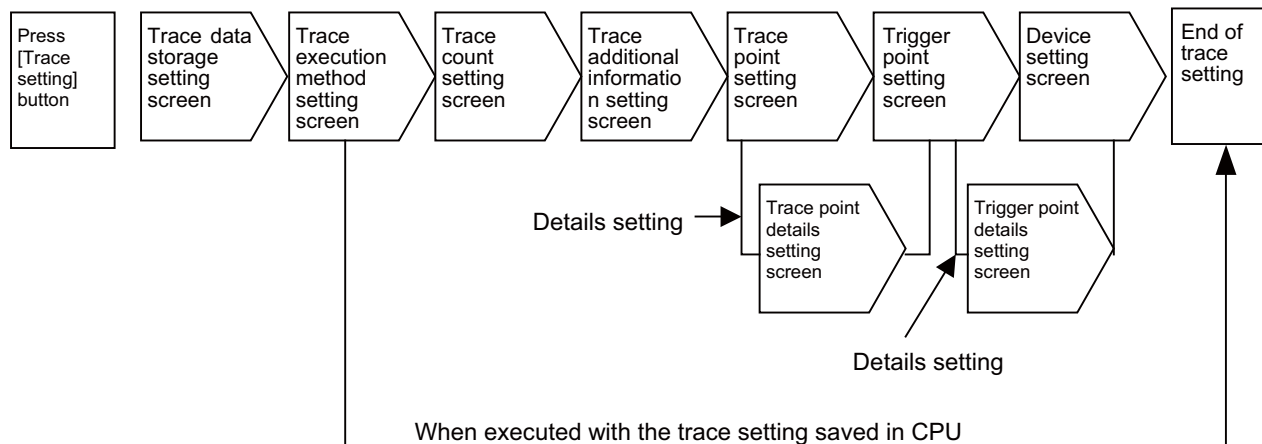


Explanation of wizard setting/execution

Trace Setting

Start "Sampling trace setting wizard" screen by clicking [Trace setting].
Set the conditions and data required for sampling trace according to the wizard.

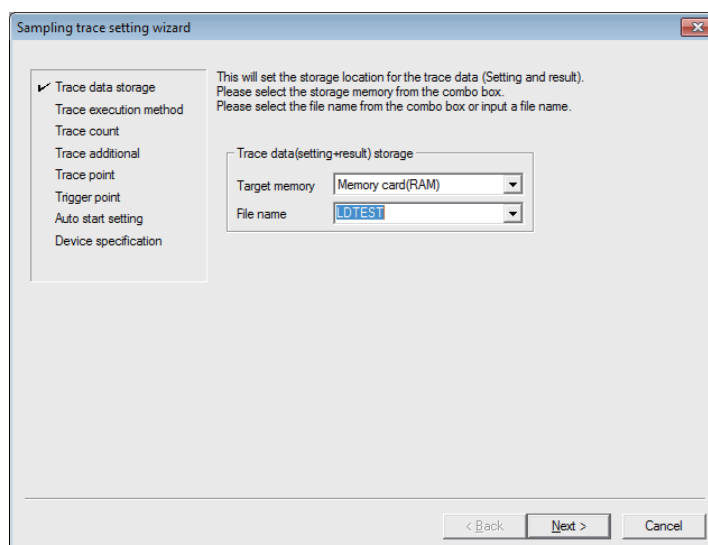
Screen transitions for trace setting is as shown below.



Trace setting screen transitions at wizard setting/execution

(1) Trace data (setting/result) storage setting screen

"Target memory" and "File name" cannot be set. Click [Next >] and proceed to the trace execution method setting screen.



[Note]

- Since "Target memory" is CNC RAM, trace data (setting+result) will be deleted when the power is turned OFF.
- Trace data (setting+result) that can be saved on CNC controller is only one. Trace data result is overwritten every [Trace execution] execution.
- When file name is changed, the overwriting confirmation dialogue may not be displayed at PC write operation.
- When file name has been changed, trace result may not be displayed with [Trace result]. Read the data out from PLC, then click [Trace result] again.
- An error will occur at the start of tracing if "Memory card(RAM)" is selected as "Target memory".

(2) Trace execution method setting screen

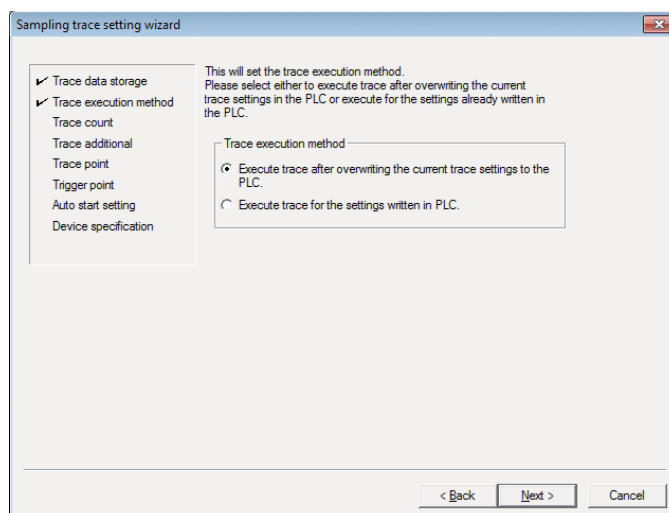
Select a trace execution method and click [Next >].

When "Execute trace after overwriting the current trace settings to the PLC" is selected:

Proceed to the trace count setting screen.

When "Execute trace for the settings written in PLC" is selected:

End "Sampling trace setting wizard" and return to the "Sampling trace" screen.

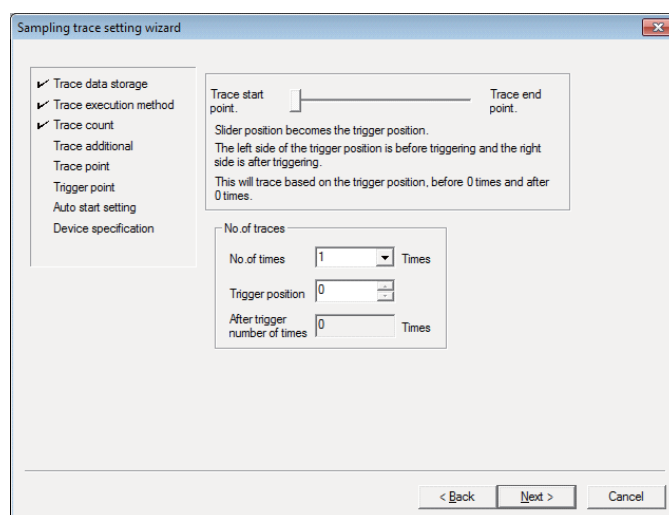


At wizard setting/execution . Sampling trace setting wizard . Trace additional information setting screen

(3) Trace count setting screen

Set the number of traces and trigger position, click [Next >] and proceed to the trace additional information setting screen.

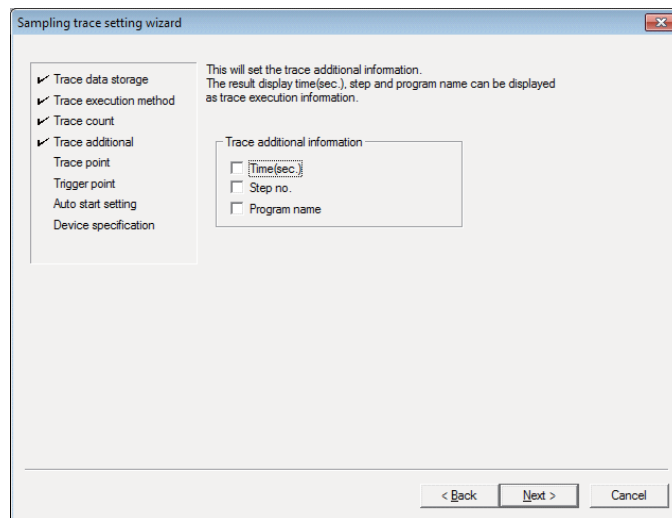
Refer to "Basic Specifications" for details on trace count that can be set.



At wizard setting/execution . Sampling trace setting wizard . No. of traces setting screen

(4) Trace additional information setting screen

Only "Time" can add information. Put a check mark at "Time" to display time when the trace result is shown. Click [Next >] and proceed to the trace point setting screen.



At wizard setting/execution . Sampling trace setting wizard . Trace additional information setting screen

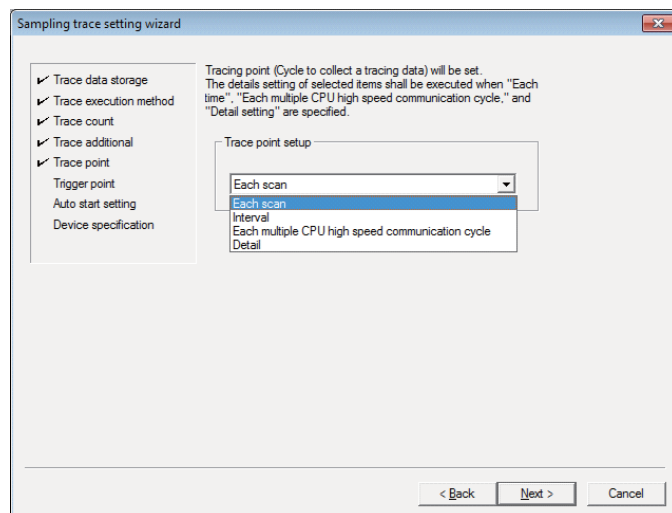
(5) Trace point setting screen

Select "Each scan" or "Detail" and click [Next >].

When "Detail" is selected, proceed to the trace point details setting screen. Set "Device" at [Trace point setting].

When "Detail" is selected, proceed to the trace point details setting screen. Set "Device" at [Trace point setting].

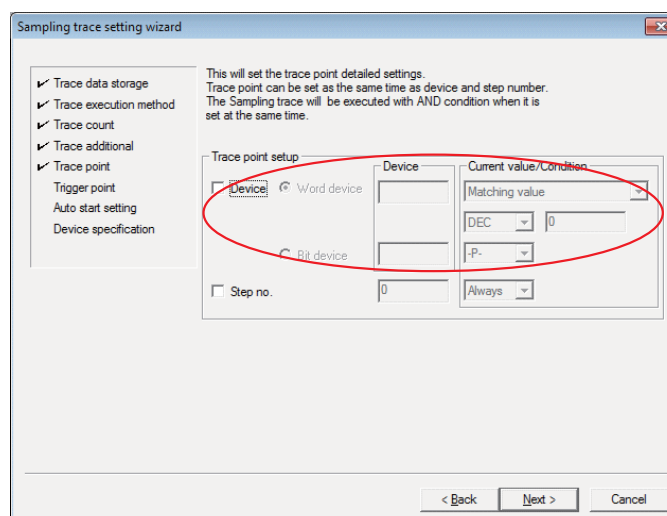
- "Each scan": Trace is executed after scanning the main process.
- "Detail": Trace is executed when the device set with trace point setting satisfies its condition after scanning the main process.



At wizard setting/execution . Sampling trace setting wizard . Trace point setting screen

[Note] Only "Each scan" and "Detail" are valid for trace point setting.

When "Interval" or "Each Multiple CPU high speed transmission cycle" is set, the movement will be the same as when "Each scan" is set.



At wizard setting/execution . Sampling trace setting wizard . Trace point setup . Details setting screen

[Note] Only "Device" is valid for trace point setting.

Do not set "Step No.".

Refer to "Basic Specifications" for the devices that can be set.

(6) Trigger point setting screen

Select "At the time of trigger operation from GX Developer" or "Detail" and click [Next >].

When "At the time of trigger operation from GX Developer" is selected, proceed to the device setting screen.

When "Detail" is selected, set "Device" at [Trigger point setting].

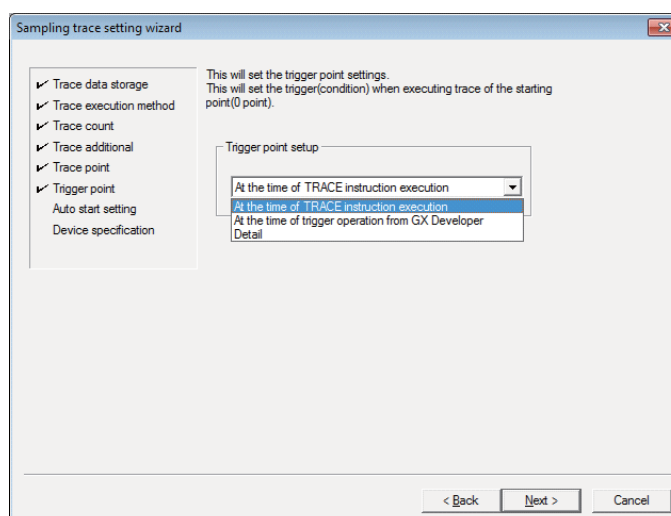
"At the time of trigger operation from GX Developer":

When executing trace, carry out "Execute trigger" from the "Sampling trace setting wizard execution" screen.

The data at the time of "Execute trigger" after scanning of the main process will be the start point (0 point).

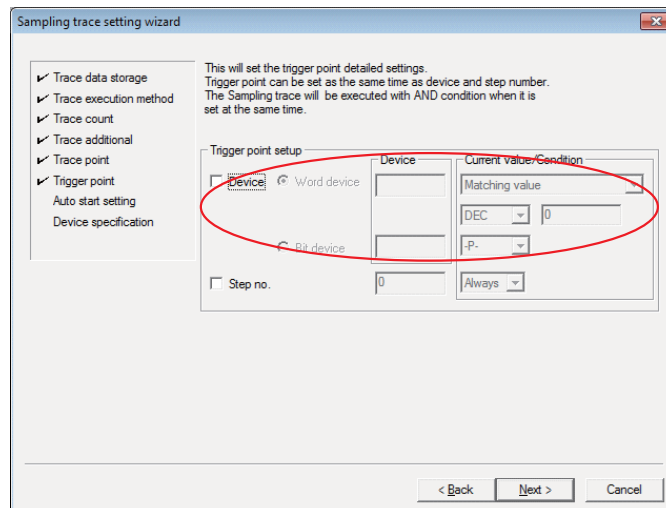
"Detail":

Check trigger conditions after scanning of the main process. The data at the time of trigger condition establishment will be the start point (0 point). (Refer to "PLC Programming Manual" for explanation of 'Main process'.)



At wizard setting/execution . Sampling trace setting wizard . Trigger point setting screen

[Note] Only "At the time of trigger operation from GX Developer" and "Detail" are valid for trigger point setting.
When "At the time of TRACE instruction execution" is set, operation will be the same as when "At the time of trigger operation from GX Developer" is set.

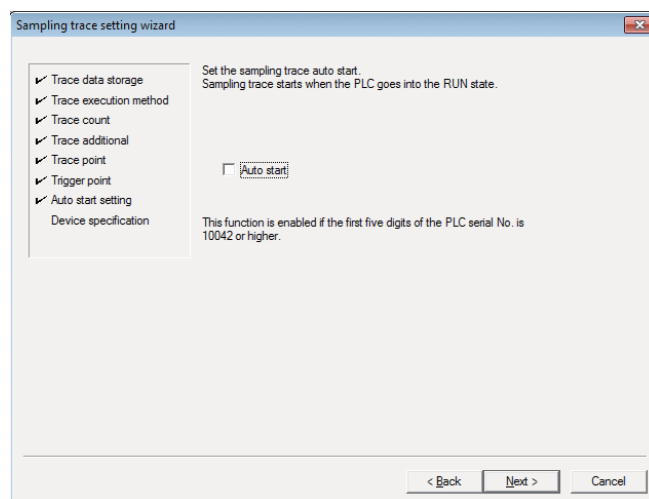


At wizard setting/execution . Sampling trace setting wizard . Trigger point setup . Details setting screen

[Note] Only "Device" is available for trigger point "Details" setting.
Do not set "Step No.". Refer to "Basic Specifications" for the devices that can be set.

(7) Auto start setting screen

The auto-start setting is disabled.
Click [Next>] without checking "Auto start".



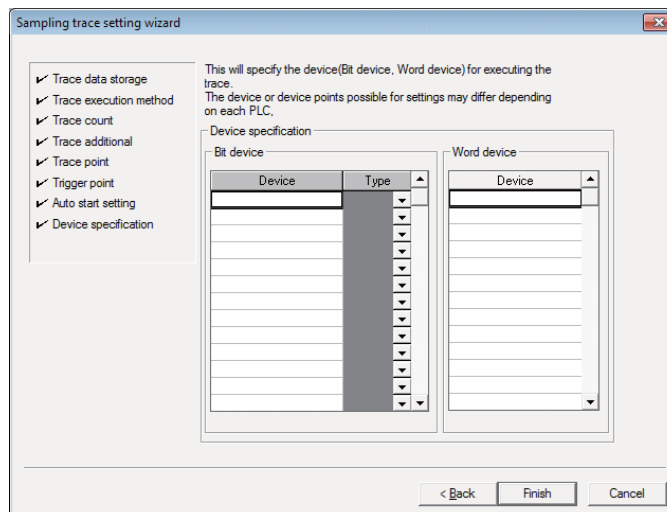
Wizard setting/execution - Sampling trace setting wizard -Auto start setting screen

(8) Device setting screen

Set the devices of which trace is executed and click [Next >].

After setting the device, click [Finish] and end the trace setting.

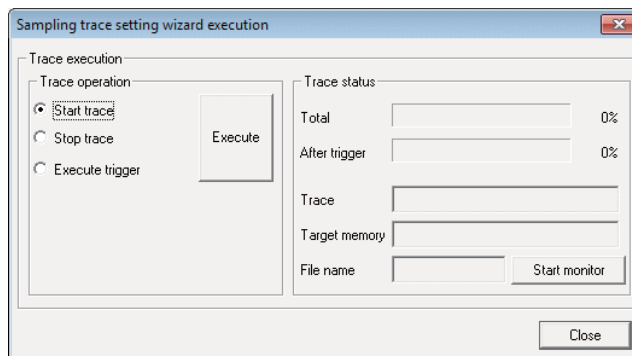
Refer to "Basic Specifications" for the devices that can be set.



At wizard setting/execution . Sampling trace setting wizard . Trigger point setting . Device setting screen

Trace Execution

Start the "Sampling trace setting wizard execution" screen below by clicking [Trace execution].
Carry out "Start trace", "Stop trace" and "Execute trigger".



At wizard setting/execution . Trace execution screen

(1) Starting trace

Select "Start trace" under [Trace operation] and click [Execute]. Trace begins.
Tracing progress can be checked at [Trace status].

Status of each device under tracing can be check with [Trace result].

Display the current status by clicking [Trace result] after closing the trace execution screen by clicking [Close].

Tracing will continue even after [Close] is clicked.

Once [Close] is clicked and display the trace execution screen again, click [Trace execution]. Since [Trace status] is hidden at this point, click [Start monitor].

[Note] Once trace is resumed, trace data up to the previous time will be deleted.

If resuming trace after once executing trace, end trace in the following manner.

- After trigger execution, execute trace after trigger.
- Execute "Stop trace" at [Trace operation].
- CNC power is turned OFF.
- PLC status is turned to "STOP".

(2) Trigger execution

Trigger can be executed at an arbitrary timing. Select "Execute trigger" and click [Execute].

(3) Stopping trace

To stop tracing, select "Stop trace" and click [Execute].

To display the trace result before stop, click [Trace result] after pressing [Close].

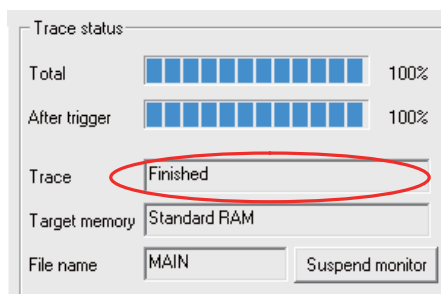
[Note] Once "Stop trace" is executed, trace cannot be resumed.

When the trace information before stop is required, save the data in CSV file with [Trace result].

If "Start trace" is executed before saving the data, the data before "Stop trace" will be deleted.

(4) End of trace

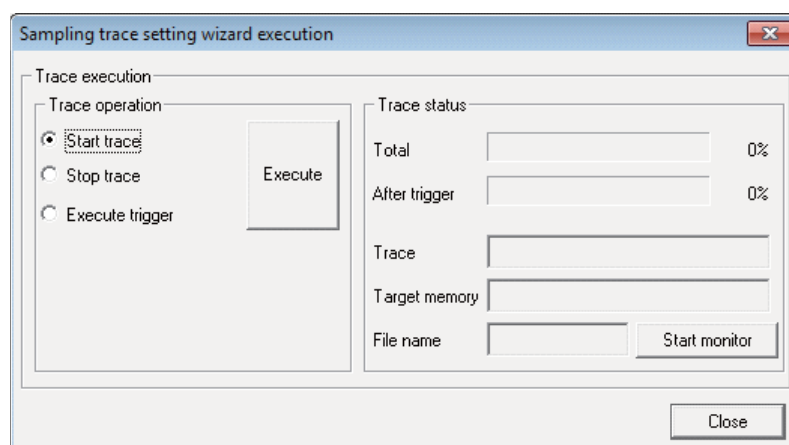
When trace after trigger has been completed after trigger execution, "Finished" is displayed on [Trace status], and then trace will be finished. Click [Close] upon completion of tracing and end the "Sampling trace setting wizard execution" screen.



At wizard setting/execution . Trace execution screen . Trace status display at trace "Finished"

(5) Trace registration

Start the "Execute sampling trace" screen by clicking [Trace execution] for the individual setting/execution. On this screen, set the start trace, stop trace, execute trigger and registry trace. Operation concerning starting/stopping/executing trace is the same as that for the wizard setting/execution.



Individual setting/execution - Trace execution screen

Select "Registry trace" from [Trace operation], and click [Execute]. The trace setting is registered. Use this function to control the device for start tracing (SM801) in the ladder.

(6) Trace status display

When trace status is being monitored, the button displays [Suspend monitor]. To stop monitoring, click the button. When not monitoring, the button displays [Start monitor]. To start monitoring, click the button.

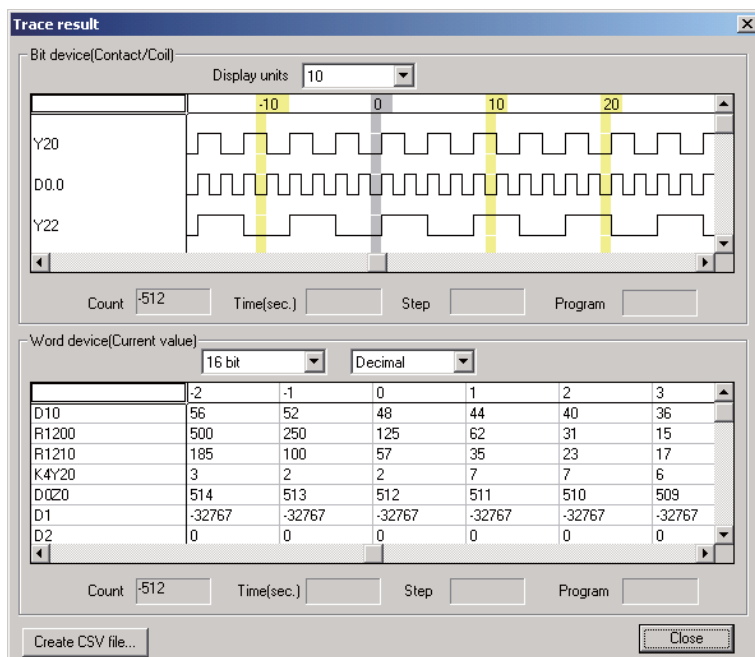
[Trace] within [Trace status] includes the following 6 display items.

Display	Status
Executing (waiting for trigger), Executing (after trigger)	Trace is being executed.
Suspend	Trace has been stopped.
Execution failed (not registered), Execution failed (registered)	Trace is not executed.
Finished	Trace has been completed.

Trace Result

Start the "Trace result" screen below by clicking [Trace result].

Trace result of bit device is chronologically shown in the upper section and word device in the lower section. Trace result can be saved in the CSV file format. Trace result can be displayed even during trace execution.



ON/OFF status of bit device is displayed per trace count

Value of word device is displayed per trace count

At wizard setting/execution – Trace result screen

"Count": Counts are displayed. (Trigger execution point is set as start point or 0 point)

"Time(sec.)": Time is displayed. (Head of trace data is set as standard or 0.000 sec.)

If trace interval exceeds 65 seconds, correct time will not be displayed.

"Step", "Program": Not displayed.

[Create CSV file]

The following screen is displayed by clicking [Create CSV file].

The 'Create CSV file' dialog box contains fields for 'Drive/Path' and 'File name', with a 'Browse...' button next to the 'Drive/Path' field. Below these fields is a section for 'Device storage method' with two radio buttons: 'Horizontally arrange and store.' (selected) and 'Vertically arrange and store.'. At the bottom are 'Execute' and 'Close' buttons.

At wizard setting/execution – Trace result screen – Create CSV file

Save the trace result data following the procedures (1) to (4) below.

(1) Click [Browse] and select the storage destination.

(2) Input the file name.

(3) Select [Device storage method].

(Refer to the Operating Manual for details on [Device storage method].)

(4) Click [Execute].

[Note]

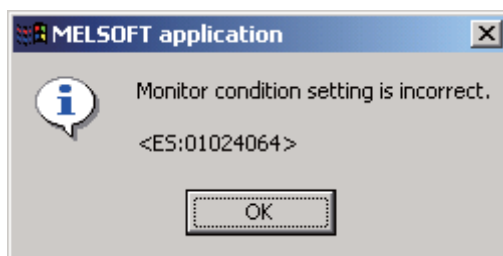
Trace result data is overwritten per each trace execution. Always save the necessary data in CSV file.

6.5.9.5 Operation at Error

Error will occur under the following conditions. The following dialog will be displayed on the GX Developer screen when parameter check during trace execution is carried out.

Error details

No.	Error definition	Remedies
1	No applicable device for sampling trace is set with device setting.	Set the applicable device for sampling trace with device setting.
2	An invalid condition is set for trace point.	Set a valid condition set for trace point.
3	No applicable device is set for trace point.	Set an applicable device set for trace point.
4	An invalid condition is set for trigger point.	Set a valid condition for trigger point.
5	No applicable device is set for trigger point.	Set an applicable device for trigger point.
6	The size of trace data exceeded the specified size per project.	Set a size of trace data that falls within the range of the specified size per project.



Error dialogue

When sampling trace cannot be executed, check the following items.

- Check if CPU type is Q26UCPU.
- Check the trace execution status. (Trace execution command is not possible during tracing.)
- When trace execution method is set to "Execute trace for the settings written in PLC.", check if setting file is saved in CNC.
- Check if devices on the program and that set by trace match.

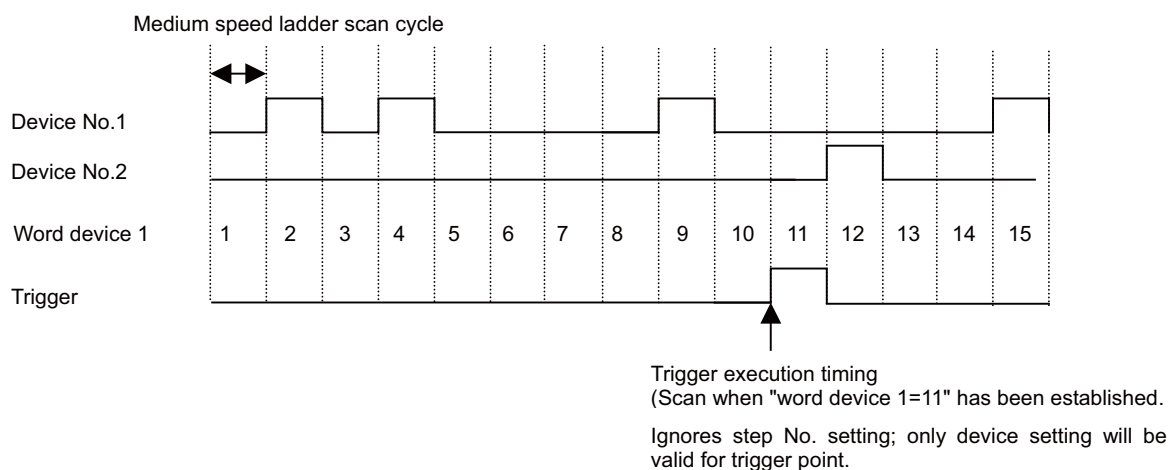
6.5.9.6 Operation Example

Example 1 Trigger judgment and trace result with device setting

[Setting details]

Trace setting details for example 1

Setting item	Setting value	Setting item	Setting value
Target memory	Memory card(RAM)	Trigger point setting	■ Device Word device Word device 1 = 11 ■ Step 30
File name	MAIN		
Total number	10		
Number after trigger	4	Device setting	■ Bit device Device No.1 Device No.2 ■ Word device Word device 1
Trace additional information	Time, step No.		
Trace point setting	Interval: 10msec		



Device status when sampling trace is executed at example 1

[Trace result]

Trace result display for example 1

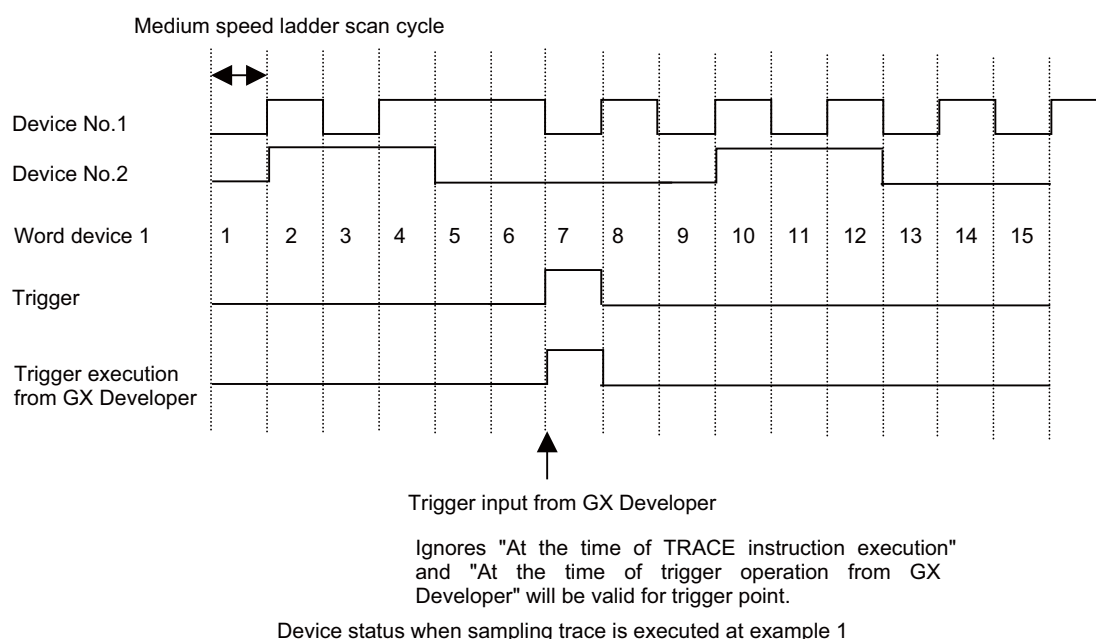
Count	-6	-5	-4	-3	-2	-1	0	1	2	3	
Device No.1											← The scan in which trigger has been executed is regarded as count "0". Trace data is retrieved when trigger has been established. Thus, when trigger establishment and trace execution happen simultaneously, count "0" and count "1" will be the same data.
Device No.2											← "Interval" trace point setting is ignored. Execute trace per scan.
Word device 1	5	6	7	8	9	10	11	11	12	13	← Word device is shown as numerical value.
Time	0	0.007	0.014	0.021	0.028	0.035	0.042	0.042	0.049	0.056	← Time is displayed as trace additional information.
Step No	-	-	-	-	-	-	-	-	-	-	← Nothing is displayed as trace additional information other than time.
File name	-	-	-	-	-	-	-	-	-	-	

Example 2 Trace judgment and trace result with device setting

[Setting details]

Trace setting details for example 2

Setting item	Setting value	Setting item	Setting value
Target memory	Memory card(RAM)	Trigger point setting	■ At the time of TRACE instruction execution
File name	MAIN		
Total number	6		
Number after trigger	4		
Trace additional information	None	Device setting	■ Bit device Device No.1 Device No.2 ■ Word device Word device 1
Trace point setting	■ Device Bit device Device No.1 ↑		



[Trace result]

Trace result display for example 2

Count	-2	-1	0	1	2	3
Device No.1						
Device No.2						
Word device 1	2	4	7	8	10	12

← The scan in which trigger has been executed is regarded as count "0".

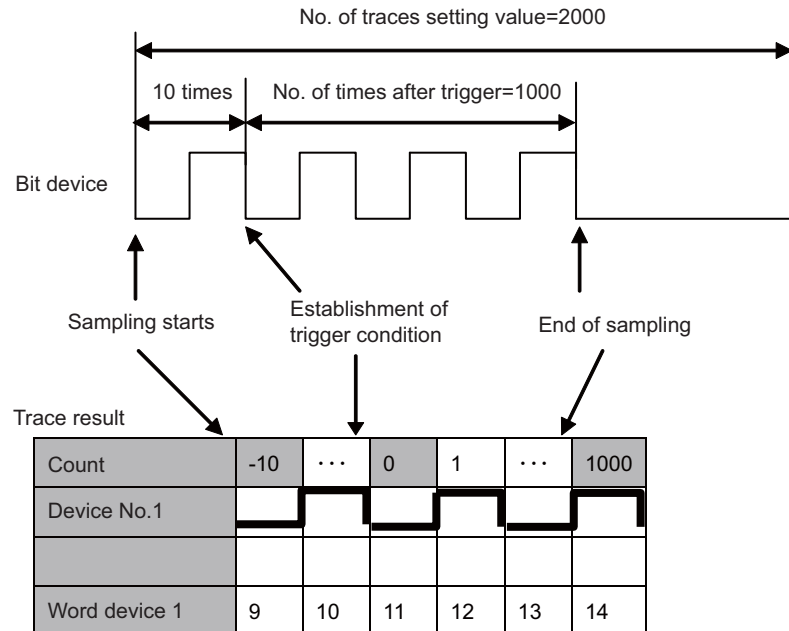
← Trace is executed only for the scan where device No.1 turns ON from OFF.
Note that, however, the device data for the scan when trigger has been executed will be saved.

6.5.9.7 Precautions

- (1) Sampling can be executed for the other stations on network or with serial communication connection. Note that, however, sampling is not possible from multiple areas at the same time.
- (2) Since trace conditions and trace data that have been registered in CNC controller are saved in DRAM area, when the CNC power is turned OFF, the data will be deleted.
- (3) Sampling trace is executed by connecting CNC controller and GX Developer.
- (4) Trace data within CNC is deleted during trace execution. So, please be aware that the data up to previous time will be deleted.

- (5) When trace is ended before reaching the set No. of traces, such as when trigger occurs as soon as trace is started, the shortened data will not be displayed.

<Example> Trigger occurred at 10th trace when No. of traces is set to 2000 and No. of traces after trigger is set to 1000.



- (6) Descriptions about sampling trace in this manual are given under the assumption of GX Developer Ver.8 specifications.

Sampling trace setting wizard is not available for the version prior to GX Developer Ver.8.

Refer to the precautions for each setting item described in this manual and perform settings respectively.

- (7) When the trace setting that is invalid with this CNC is performed, the setting is forcibly corrected to the valid one within CNC controller. Refer to "Sampling Trace Operation Screen" for trace settings that can be used.

- (8) Status of SM800 to SM805 cannot be checked on CNC controller screen. Check the sampling trace status with GX Developer.

6.6 PLC Message Development

This section describes the procedures to develop PLC-related data such as alarm messages, operator messages, and PLC switches.

6.6.1 Adding PLC Messages

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

(1) Writing PLC messages from the standard screen

Development procedure		Description	Reference
1	Creating PLC messages using a text editor	Develop PLC messages.	
2	Writing PLC messages	Transfer PLC messages to CNC controller using HMI screen.	

(2) Writing PLC messages from GX Developer

Development procedure		Description	Reference
1	Creating PLC messages using a text editor or GX Developer	Develop PLC messages.	
2	Writing PLC messages	Transfer PLC messages to onboard ROM using GX Developer.	"Writing into CNC controller using GX Developer"

6.6.2 Development Procedure Using Standard Screen

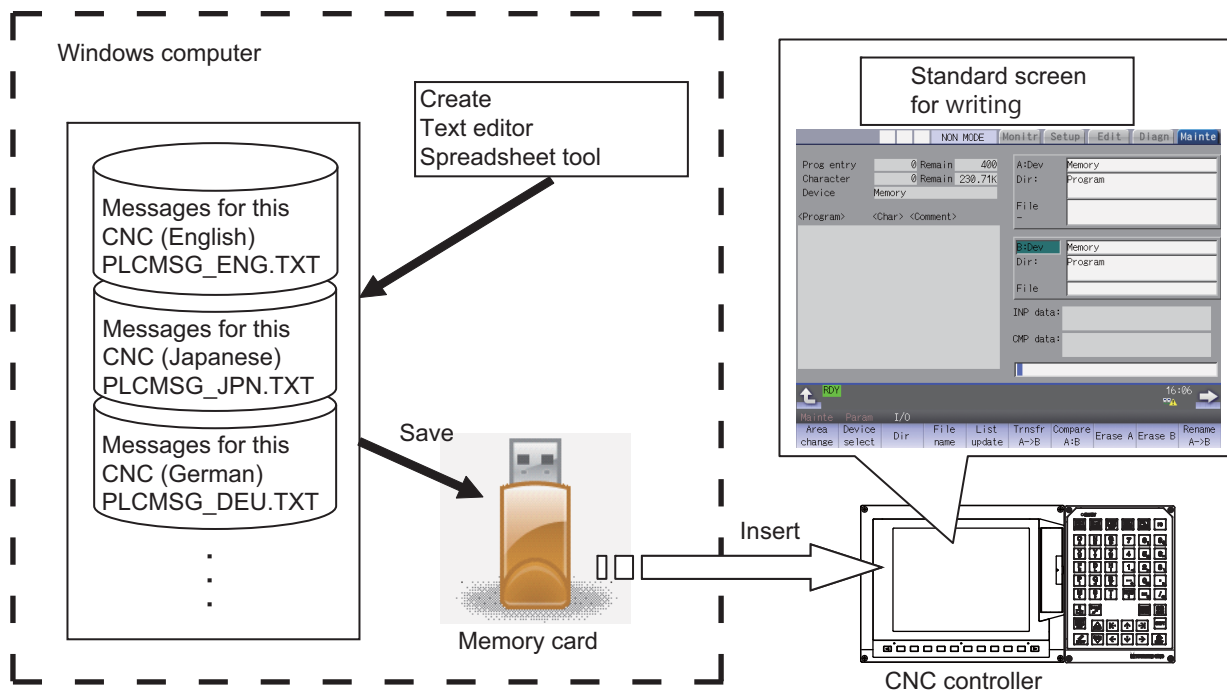
The procedures of message data development is shown below.

(1) Creation

Describe the message data using a general text editor. The description format and method will be shown later.

(2) Writing

Write the data into the CNC controller from the input/output screen of the standard screen.



6.6.2.1 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.

The message file must be created with one-byte alphanumeric characters or multi-byte characters according to the target language.

Description Format

The message data is described using the following description format.

Use commas (,) as the separator between descriptions.

The description format cannot be abbreviated. Comma(,) and Line feed code 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	Line feed code
Operator message	O ,	index No.	data register No.	message character string	Line feed code
PLC switch	P ,	switch No.	message character string	Line feed code	
Comment message	M ,	device	device No.	message character string	Line feed code

Message classification code : A one-byte alphabetic character expressing each message classification

Index No. : One-byte number

Switch No. : One-byte number

Data register No. : One-byte number

Device : One-byte number (1: Spindle/standby name)

Device No. : One-byte number (Always "0" if the device is the spindle/standby name)

Message character string : One-byte alphanumeric character, or multi-byte characters.

Semicolons, commas, spaces and tabs can also be used.

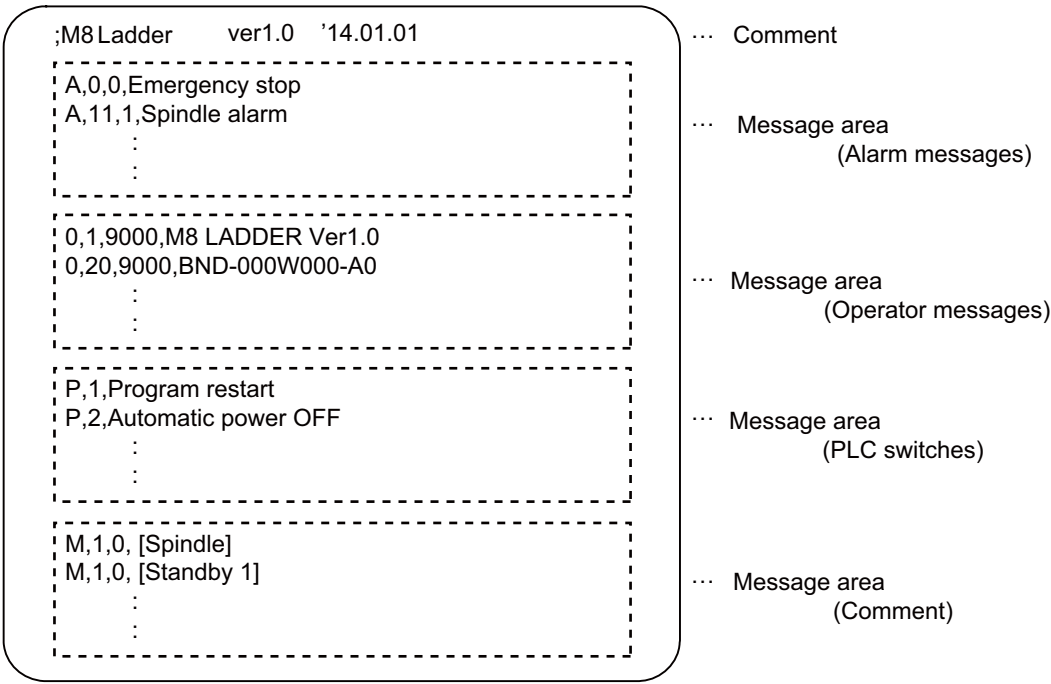
Note that the tab at the head of the message character string is ignored.

Line feed code : (CR/LF) or (LF).

Refer to the section "Precautions" for the maximum value of the message data.

Description Method

The message data is described as text data by the following description format.
The applicable character code is different depending on the target language. Refer to the section "File name rule" for details.



- (1) Comment
- A line with a semicolon (;) at the head of the line are interpreted as comments.

```
; comment character string [LF]
```

- (2) Message area
- Collect similar messages in a group and describe them. The latter description is validated if there are descriptions with the same factors (index No., etc.).

File Name Rule

The following table shows the names of files written to the CNC controller and the character codes used to describe messages.

The CNC controller switches the file for PLC message display according to the setting of the display language selection parameter (#1043 lang).

#1043 lang		File name	Character code
0	English	PLCMMSG_ENG.TXT	Windows-1252
1	Japanese	PLCMMSG_JPN.TXT	Shift-JIS
11	German	PLCMMSG_DEU.TXT	Windows-1252
12	French	PLCMMSG_FRA.TXT	Windows-1252
13	Italian	PLCMMSG_ITA.TXT	Windows-1252
14	Spanish	PLCMMSG_SPA.TXT	Windows-1252
15	Chinese (traditional)	PLCMMSG_CHI2.TXT	Big5
16	Korean (Hangeul)	PLCMMSG_KOR.TXT	KS C 5601-1987
17	Portuguese	PLCMMSG_POR.TXT	Windows-1252
18	Dutch	PLCMMSG_DUT.TXT	Windows-1252
19	Swedish	PLCMMSG_SWE.TXT	Windows-1252
20	Hungarian	PLCMMSG_HUN.TXT	Windows-1250
21	Polish	PLCMMSG_POL.TXT	Windows-1250
22	Chinese (simplified)	PLCMMSG_CHI1.TXT	GB2312
23	Russian	PLCMMSG_RUS.TXT	Windows-1251
24	Turkish	PLCMMSG_TUR.TXT	CP1254
25	Czech	PLCMMSG_CZE.TXT	Windows-1250

Precautions

(1) Message file language priority

The English message file is used when the PLC message file written in the same language as the displayed language does not exist in the CNC controller.

(2) Message data maximum value

The maximum value of the described messages is shown below.

Message classification	Max. message length	Max. No. of messages
Alarm messages	46 byte	1024
Operator messages	60 byte	512
PLC switches	14 byte	64
Comments	60 byte	100

When maximum number of characters is exceeded: An error will not occur, but the excessive characters will not be displayed.

When maximum number of messages is exceeded: An error will not occur, but the excessive messages will not be displayed.

A two-byte character is handled as two characters (2 bytes).

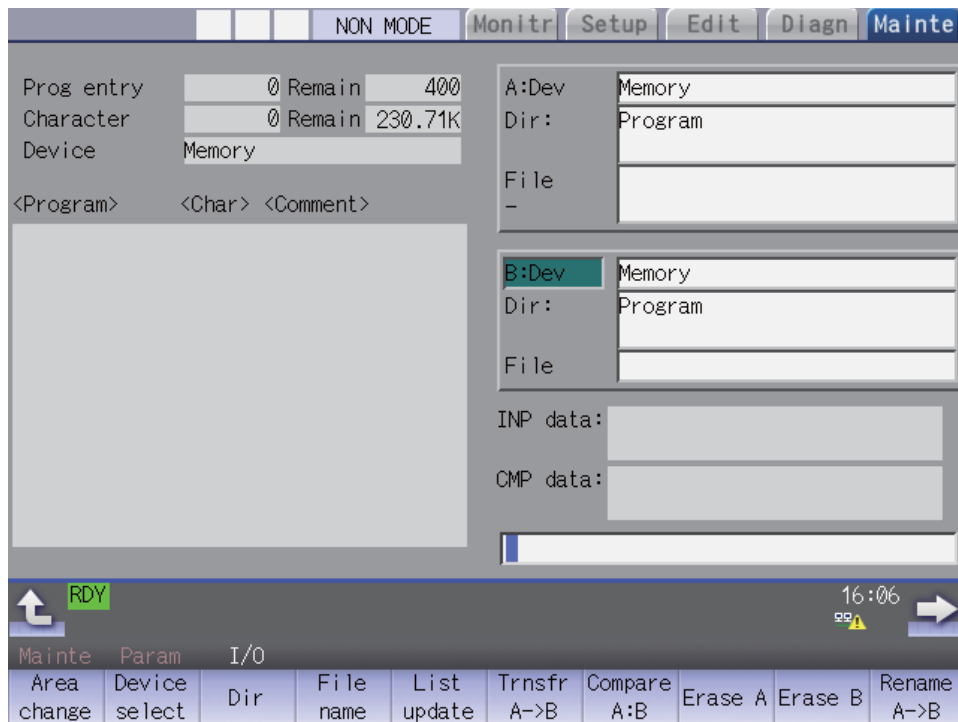
6.6.2.2 Writing into CNC Controller Using Standard Screen

The following operation procedure shows how to write messages to the CNC controller.

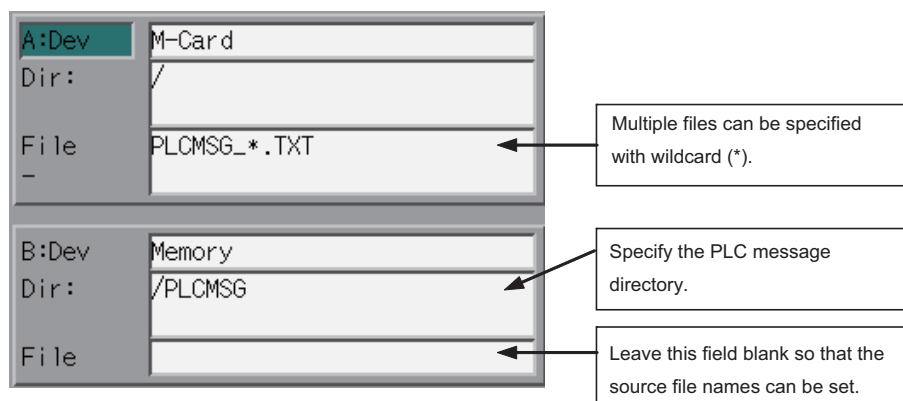
For how to operate the input/output screen, refer to the instruction manual of the CNC controller.

Operation Procedure

- (1) Press [I/O] menu on the Maintenance screen.



- (2) Specify the source file to be transferred, and set the device name, directory and file name of the destination as follows.



- (3) Press the menu key "Trnsfr A->B" to start file transfer.

6.6.2.3 Reading out from CNC Controller Using Standard Screen

Operation Procedure

- (1) Press [I/O] menu on the Maintenance screen.
- (2) Set the device name, directory and file name of the source as follows. Specify the output file in the destination field.

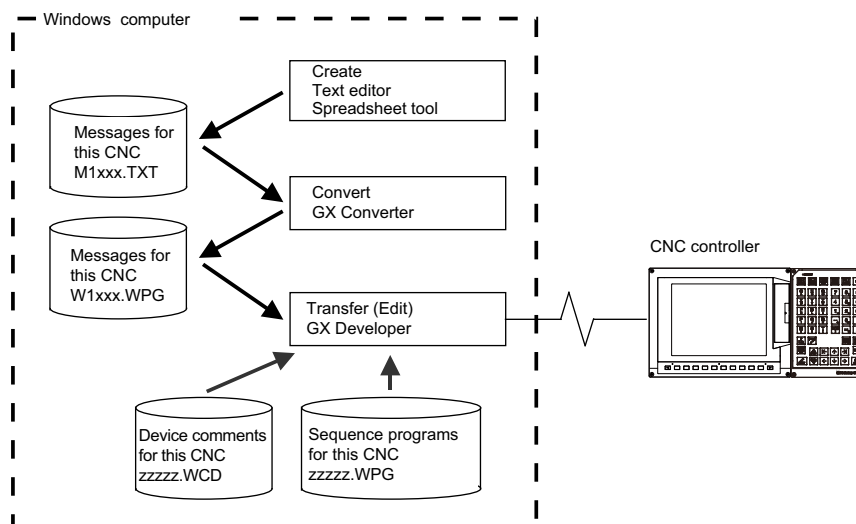
A:Dev	M-Card
Dir:	/PLCMMSG
File	PLCMMSG_*.TXT
-	

- (3) Press the menu key "Trnsfr A->B" to start file transfer.

6.6.3 Development Procedure Using GX Developer

There are the following two methods as a general development procedure of message data.
Refer to the Operating Manual for details on how to create a new message.

- 1) Converting into GX Developer data using a general text editor or spreadsheet tool and the 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 you want to add or correct data, for example)



(Note)

You cannot develop PLC messages in a GX Developer project for which you set "Use label".

When you created a sequence program as a labeled program, you cannot control the program and PLC messages in the same project.

In this case, develop PLC messages in either of the following methods.

- Develop and control PLC messages in a project created only for PLC messages. (Label setting is not allowed.)
- Develop and control PLC messages with the procedure shown in the section "Development Procedure Using Standard Screen".

6.6.3.1 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 sequence program interlinear comment, and can also be edited. The message data is transferred to the CNC controller using the GX Developer, in the same manner as the sequence program.

6.6.3.2 Entering Messages Directly from GX Developer

(1) Creation

The message data is described directly from GX Developer. The message data is handled as a sequence 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 controller in the same manner as the sequence program.

6.6.3.3 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.

Description Format

The message data is described using the following description format.

The description format cannot be abbreviated. Comma(,) and Line feed code 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	Line feed code
Operator message	O ,	index No.	data register No.	message character string	Line feed code
PLC switch	P ,	switch No.	message character string	Line feed code	
Comment message	M ,	device	device No.	message character string	Line feed code

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, 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)

Line feed code : (CR/LF) or (LF).

Back slash (\) : Continue to next line. If the end of the description is a back slash, continue to head character on next line.

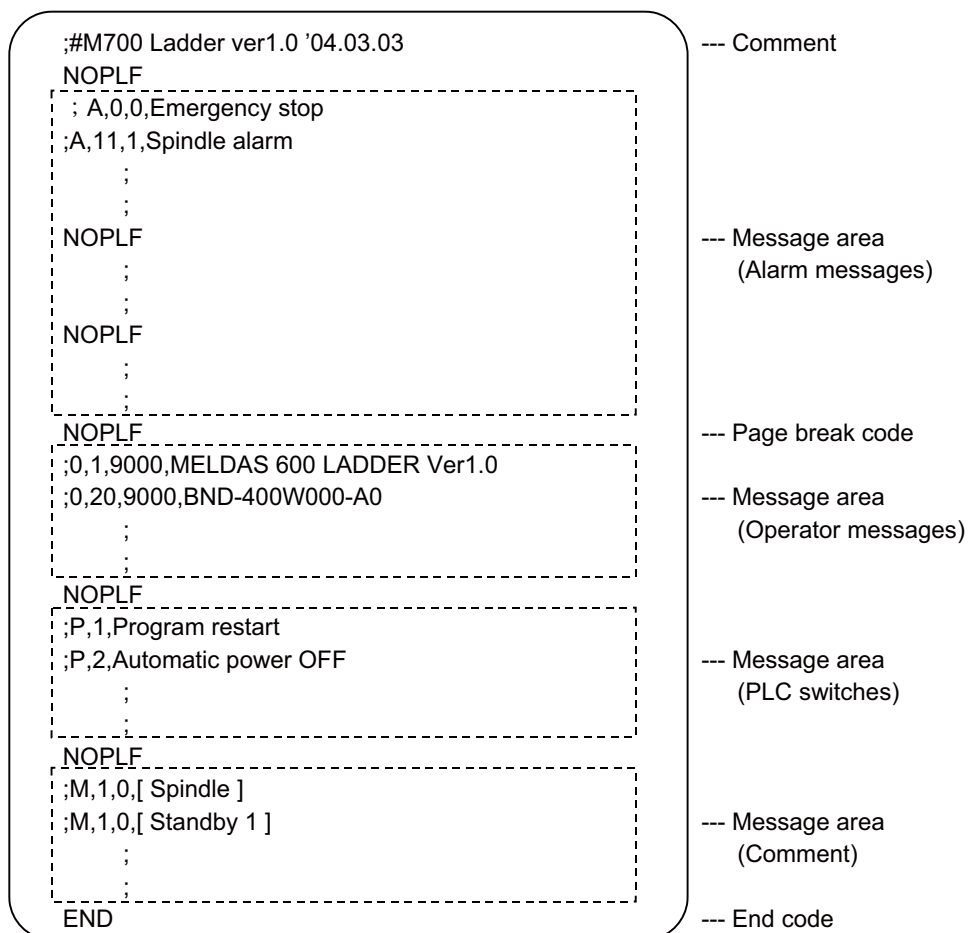
(Note) Setting area

The setting area (each message's message length and message quantity declaration) used with the old models is no longer required. The storage area in the CNC controller is always stored in the most efficient state.

Even if the old setting area remains in the data, it will be ignored and will not result in an error.

Description Method

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



(1) Comment

A line with a semicolon (;) followed by a sharp (#) at the head of the line are interpreted as comments.

```
; # comment character string [LF]
```

(2) 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.).

(3) 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.

(4) 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.

(5) Other descriptions

A description that does not have a semicolon (;) at the head will result in an error. A description with a format other than the above will also result in an error.

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

The maximum value of the described messages is shown below.

Message classification	Max. message length	Max. No. of messages
Alarm messages	46 byte	1024
Operator messages	60 byte	512
PLC switches	14 byte	64
Comments	60 byte	100

When maximum number of characters is exceeded: An error will not occur, but the excessive characters will not be displayed.

When maximum number of messages is exceeded: An error will occur when writing.

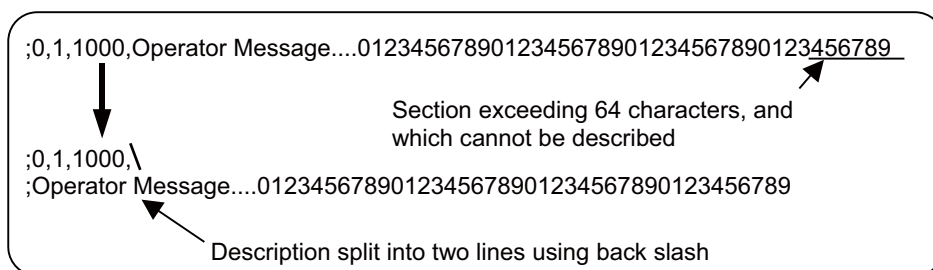
(Note)

Two-byte data in the message character string is handled as two characters.

(2) When message cannot be described on one line

With GX Developer, up to 64 characters can be input on one line as an interlinear statement. However, information other than the message character string (such as message classification code, index No., data register No., etc.), so a 60-character message character string cannot be described on one line.

A 60-character description is possible by splitting the message into two lines using a back slash (\) at the end of the line.



(Note)

If the message is split into two lines, an asterisk (*) cannot be used as the head character of the second line. Use another character, such as a space, in this case.

6.6.3.4 Converting Data into GX Developer Format

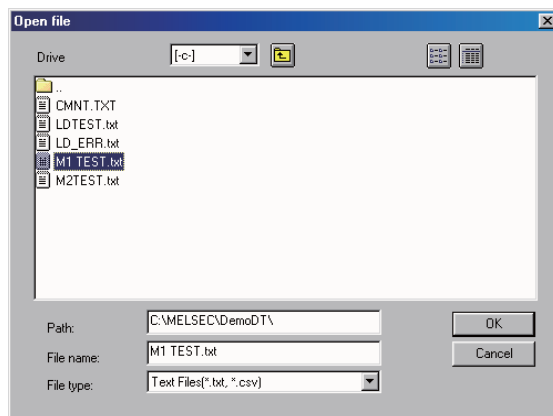
Convert the message data, which was described using a text editor or like, into GX Developer data in the following method. Use "GX Converter (data conversion software package)" for conversion. GX Converter can be started from the GX Developer menu.

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].

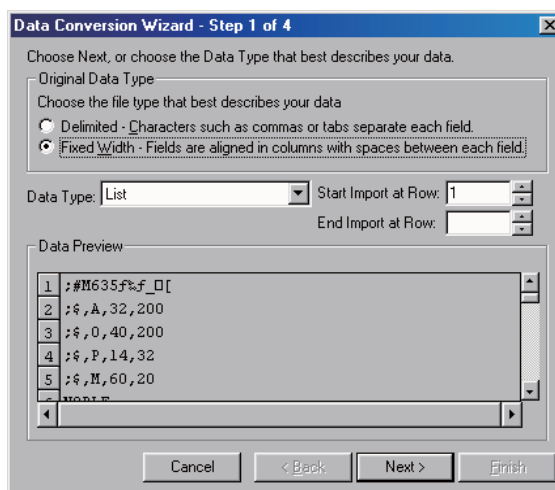


Conversion Format Setting

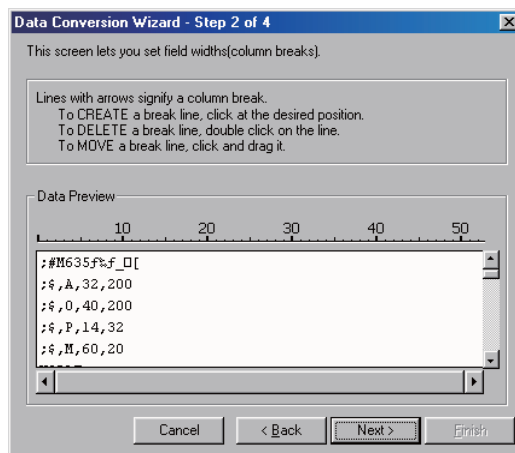
Set the conversion format on the following data conversion wizard screen.

(1) Data conversion wizard 1/4

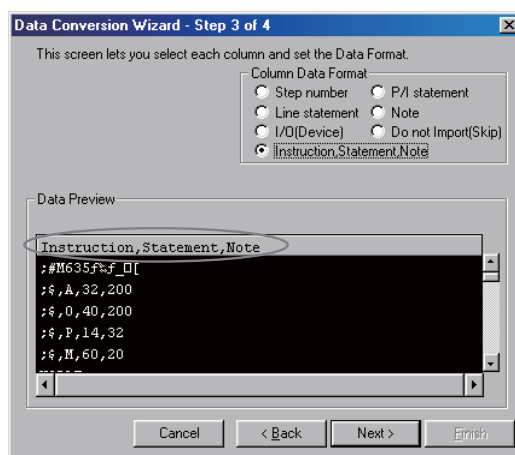
Choose [Original Data Type]-[Fixed Width] and [Data Type]-[List], and click [Next>].



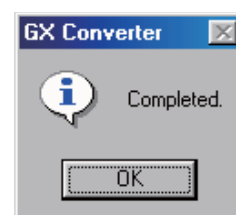
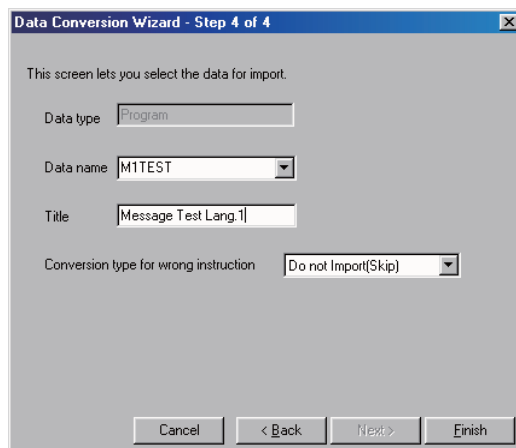
- (2) Data conversion wizard 2/4
Just click [Next>].



- (3) Data conversion wizard 3/4
Choose to highlight the instruction 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].



6.6.3.5 Entering/Editing Data using GX Developer

The message data in GX Developer are handled as the "integrated type interlinear statements" of a sequence program. "Integrated type interlinear statements" are interlinear comments provided to assist the understanding of the sequence program, and those transferred to the controller together with the sequence program are called the "integrated type". "Interlinear statements" can be displayed and edited using [Ladder] or [Instruction list].

Interlinear Statement Display using Circuit Display

(1) Display of project data list

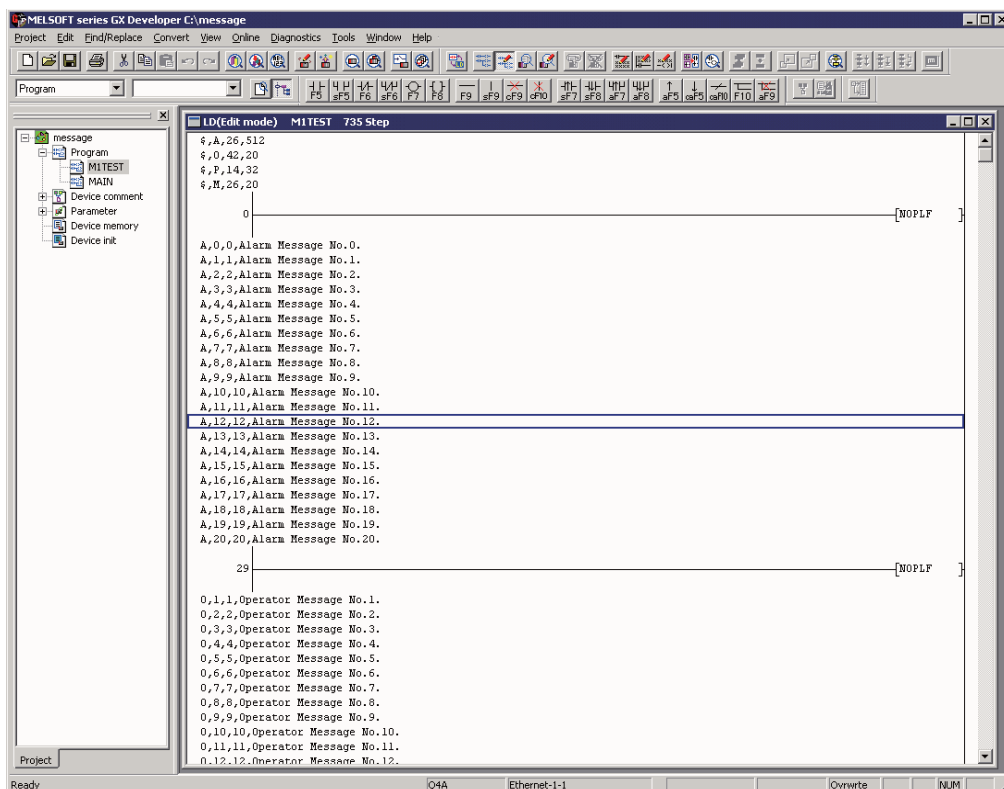
Perform the following operation to display the "Project data list" window and double-click the file name to display the edit screen. First, the normal ladder screen appears.

[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]



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].

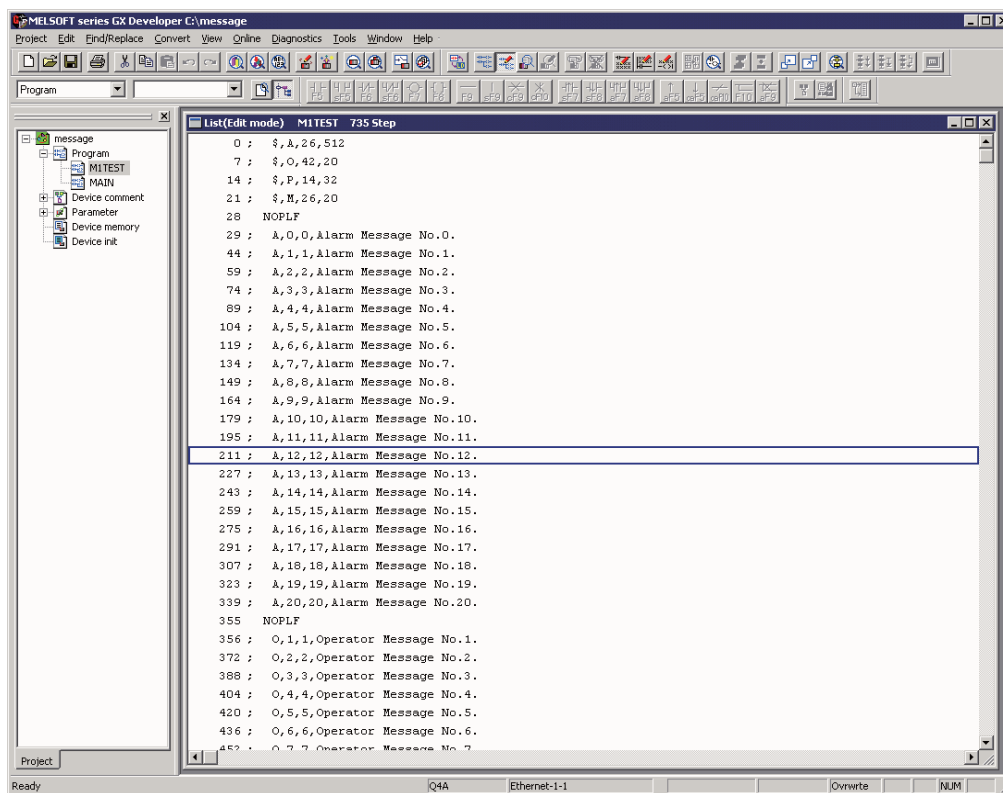
(2) Display of list data

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]



Editing of Integrated Type Interlinear Statements

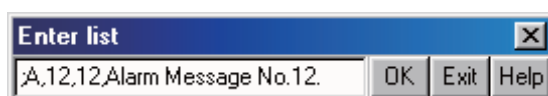
(1) Circuit display

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].

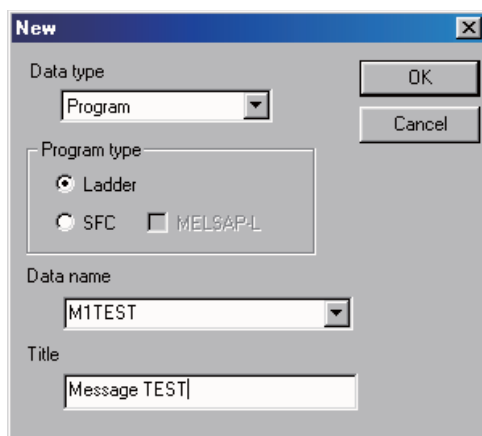


(3) Entering new message data

- 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 "(2) List display", and then press "Enter" on the next line and enter message data.



6.6.3.6 Writing to the CNC Controller Using GX Developer

The following shows the method of transferring a message from the GX Developer to the CNC controller. The transfer method is the same as the sequence program transfer method. Sequence program and message data are distinguished by their file names only.

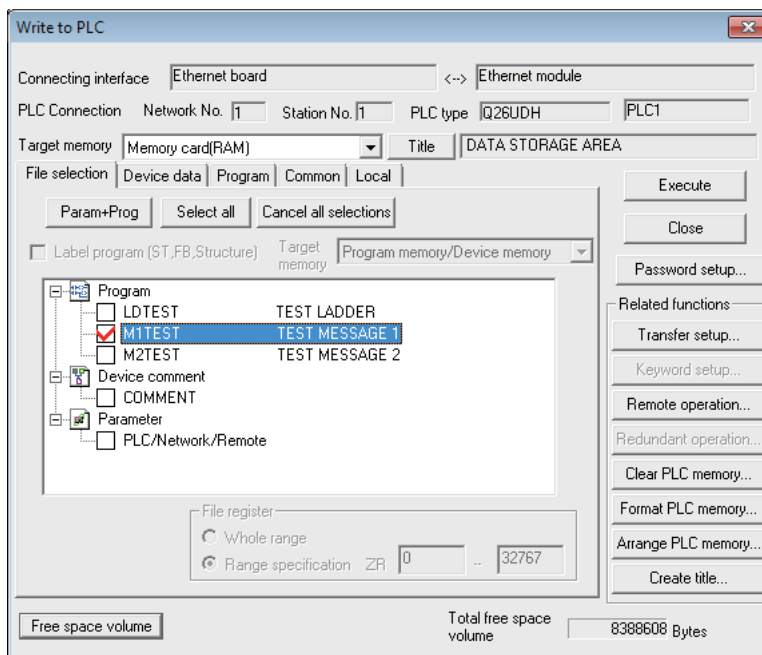
Operation Procedure

Perform the following operation to display the "Write to PLC" screen, and select the file to be written.

[Online] → [Write to PLC]

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

Change the target memory to "Memory card(RAM)".



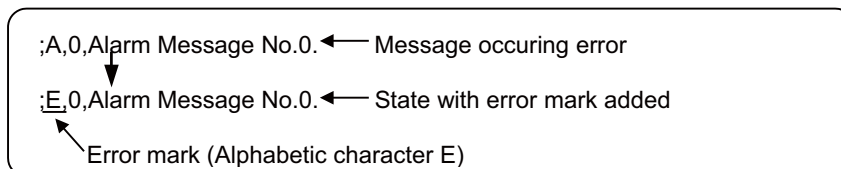
(Note) Restrictions for writing message data

Only one message data file can be stored in the same language. If message data in the same language, but having a different file name, is overwritten, a dialog confirming overwrite will occur.

Writing Operation

When executing message write from GX developer, the data will be checked by the CNC controller.

A conversion error will occur if there is a description exceeding the specifications. An error mark will be added to the description section in which the error occurred, and the data will be transferred to the last step.



(Note) The message data file in which an error occurred cannot be displayed.

Operation at Write Error

The following dialog appears on the GX Developer screen when a conversion error occurs.

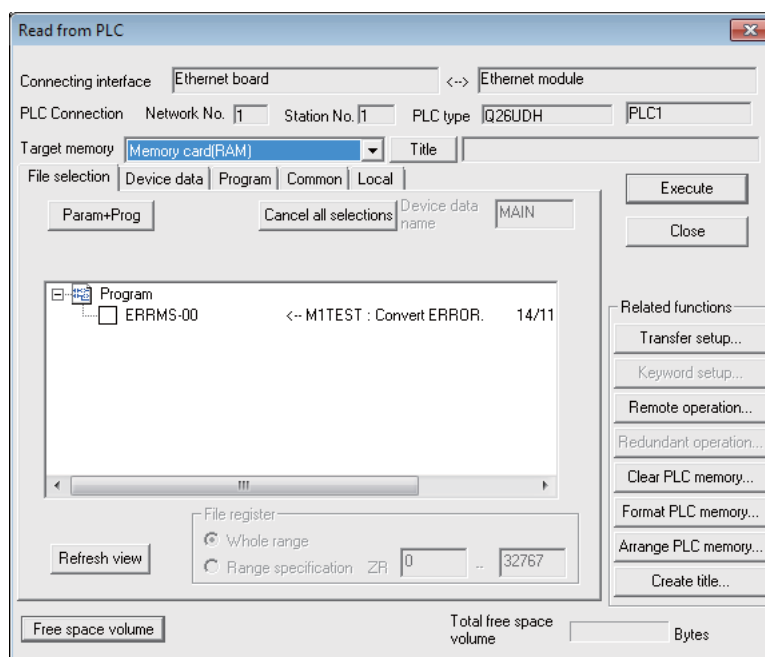


If the message file resulting in a conversion error is selected with the [File Selection] tab on the [Read from PLC] screen, the file name and title will change and be displayed as shown below.

If this message file is read out to the GX Developer, it will be stored under the file name "ERRMS-00" ("00" is a hexadecimal number given to the error file in the order starting from "0").

<u>ERRMS-00</u>	<u><-- M1TEST : Convert ERROR.</u>
(1)	(2)

- (1) File name at error + error number (hexadecimal)
(2) Title statement including transferred original file name



CAUTION

Do not read out a message file resulting in a conversion error to the GX Developer and use it. It may contain unexpected data, and result in incorrect operations.

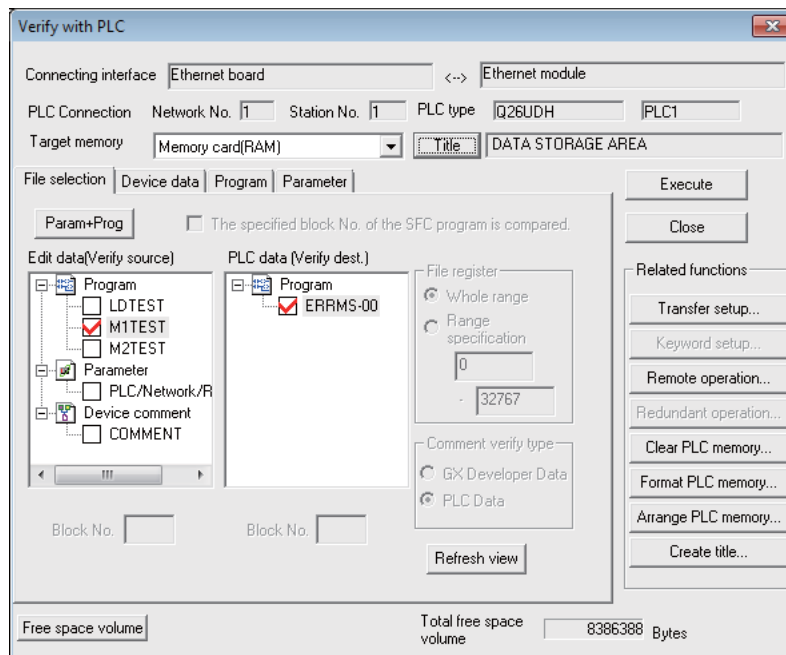
How to Confirm the Error Position

The error position can be confirmed with the PLC verification function. Refer to section "Sequence Program Development: Verifying the Sequence Programs" for details on the PLC verification function.

Target memory: Select "Memory card(RAM)"

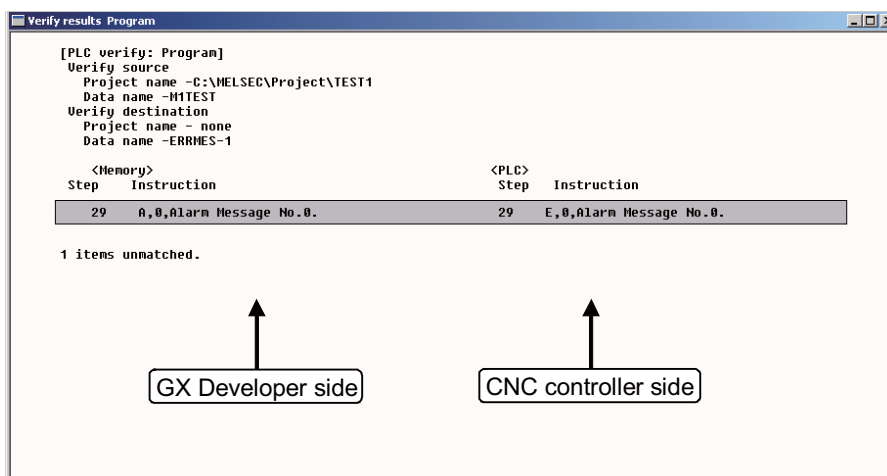
Verify source: Select the message file transferred to the GX Developer

Verify dest.: Select the message file resulting in an error "ERRMS-00" on the CNC controller



When PLC verification is executed, the mismatching details will appear as shown in the following example. The section with the error mark in the CNC controller side is the message description section with the check error. Double-click the mismatch to display and to edit the corresponding part of the GX Developer side.

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



6.6.3.7 Reading and Verifying from the CNC Controller

The method of reading and verifying a message from the CNC controller to the GX Developer is the same as that of sequence program except selecting "Memory card(RAM)" for the target memory.. Sequence program and message data are distinguished by their file names only.

Refer to the following sections for operation methods.

For read: "Sequence Program Development: Reading the Sequence Program from the CNC Controller"

For verification: "Sequence Program Development: Verifying the Sequence Programs"

6.7 Device Comment Creation

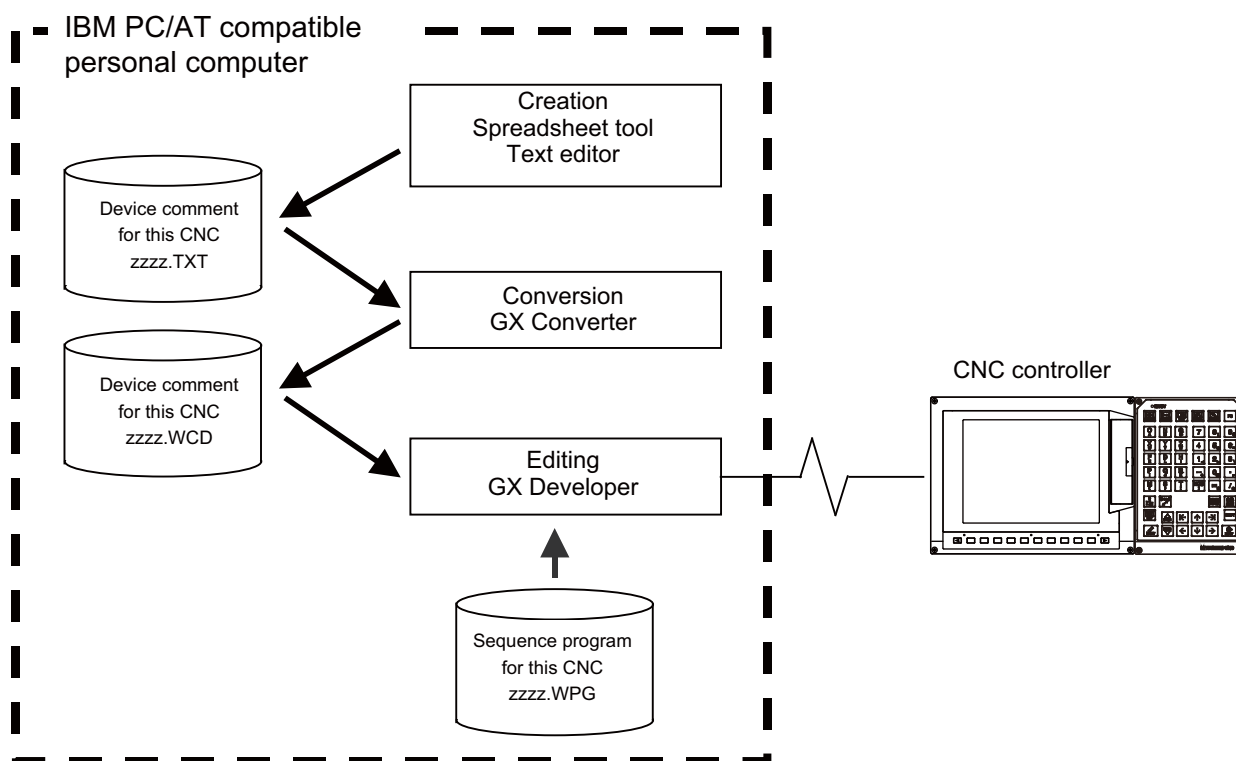
There are no MITSUBISHI CNC-specific operations for device comments. Therefore, refer to the Operating Manual for the development method. This section describes the device comment development procedure outline, the development method and the input/output method using a general-purpose tool.

6.7.1 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 the old model 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 sequence program creation
- Making addition/correction to device comments in the created sequence program

6.7.2 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. - 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. - 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. - 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
```

6.7.3 Converting Comment Data into GX Developer Data

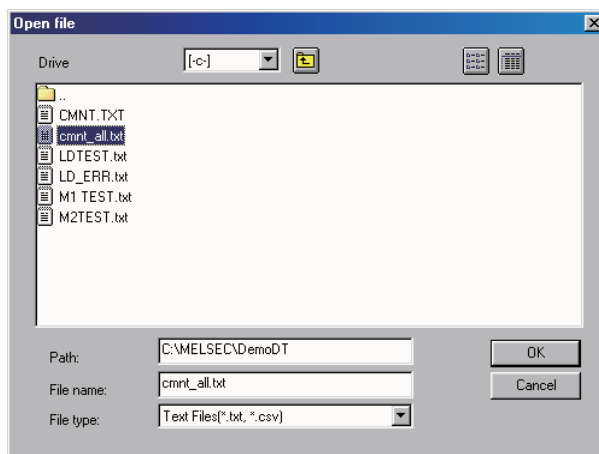
Convert the comment data (CSV format), which was created using a spreadsheet tool or like, into GX Developer data in the following method. Use "GX Converter (data conversion software package)" for conversion. GX Converter can be started from the GX Developer menu.

6.7.3.1 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 (cmnt_all.txt) and click [OK].

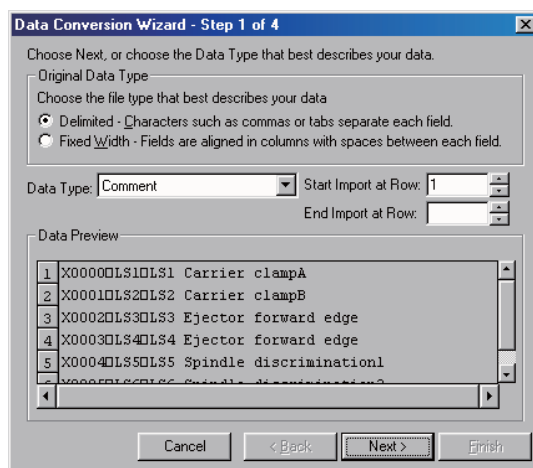


6.7.3.2 Conversion Format Setting

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

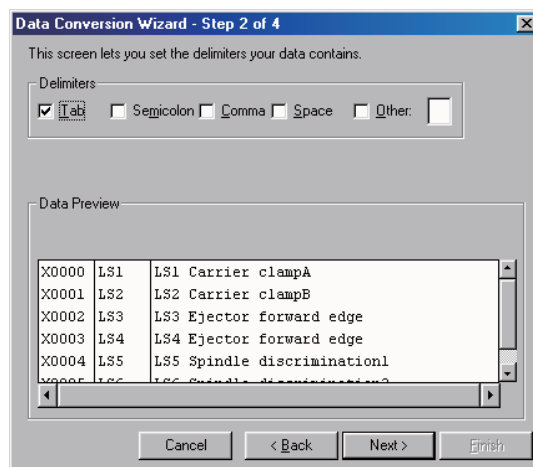
(1) Data conversion wizard 1/4

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



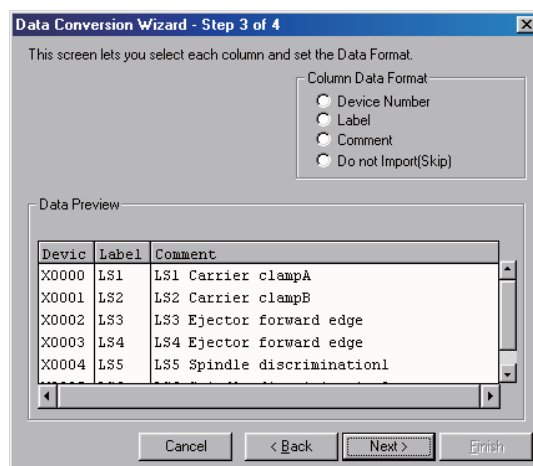
(2) Data conversion wizard 2/4

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



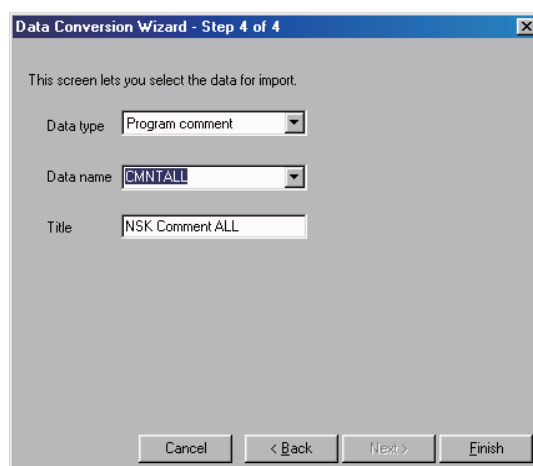
(3) Data conversion wizard 3/4

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].



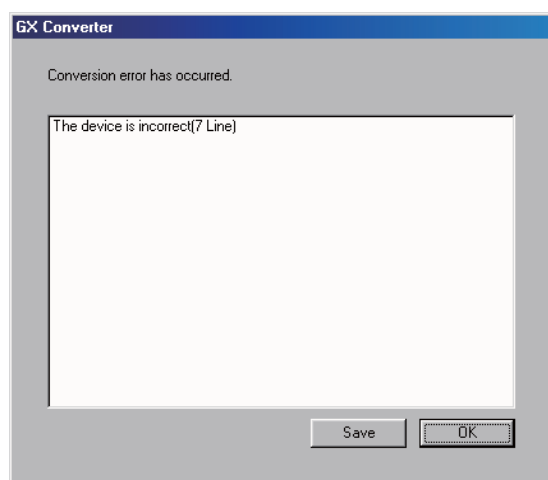
(5) Completion

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.



6.7.4 Writing Device Comments to CNC Controller

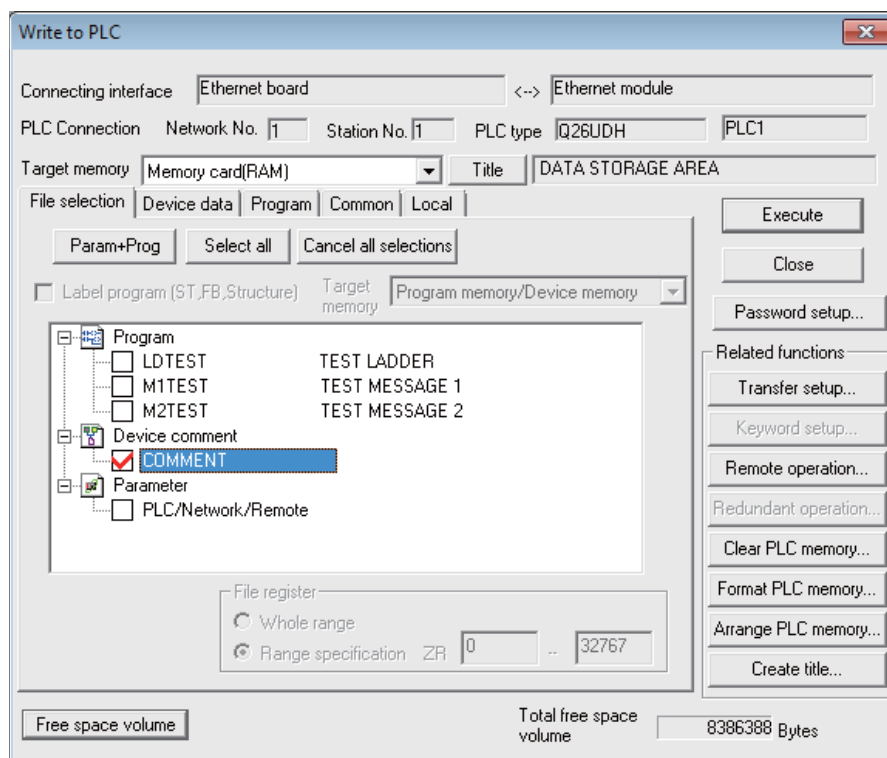
This section describes how to write device comments to the CNC controller using GX Developer. (Especially the information on the restriction and CNC-specific operation is given.)

6.7.4.1 Operation procedure

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

[Online] -> [Write to PLC]

On the following screen, select [Memory card (RAM)] from [Target memory] options. Then, in the [File selection] tab, select the device comment file to be written, and click [Execute].



(Note) Only [Memory card (RAM)] is valid for [Target memory].

Do not set the other tabs ([Device data], [Program], [Common], [Local]) than [File selection].

6.7.5 Reading Device Comments from CNC Controller

This section describes how to read device comments from the CNC controller using GX Developer. (Especially the information on the restriction and CNC-specific operation is given.)

6.7.5.1 Operation Procedure

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

[Online] -> [Read from PLC]

On [Read from PLC] screen, select [Memory card (RAM)] from [Target memory] options. Then, in the [File selection] tab, select the device comment file to be read, and click [Execute].

(Note) Only [Memory card (RAM)] is valid for [Target memory].

Do not set the other tabs ([Device data], [Program], [Common], [Local]) than [File selection].

Always click [Refresh view] button before start reading of data.

6.8 File Password Function

The file password function prohibits programming tools from reading/writing data such as programs in the CNC. A password can be set for each file.

6.8.1 Data Protected by a File Password

A file password can be set for each file in a project currently opened on GX Developer including sequence program, device comment and PLC message. "File read protection" and "file write protection" can be specified when registering a password. Set a password using 4 one-byte alphanumeric characters. (Case sensitive)

6.8.2 File Password Function

Passwords can be registered, cleared and disabled from GX Developer.

- Registering a file password means that you set a password.
- Clearing a file password means that you delete a password.
- Disabling a file password means that you temporarily disable the lock set by a password for a program file.

6.8.3 File Password Attribute

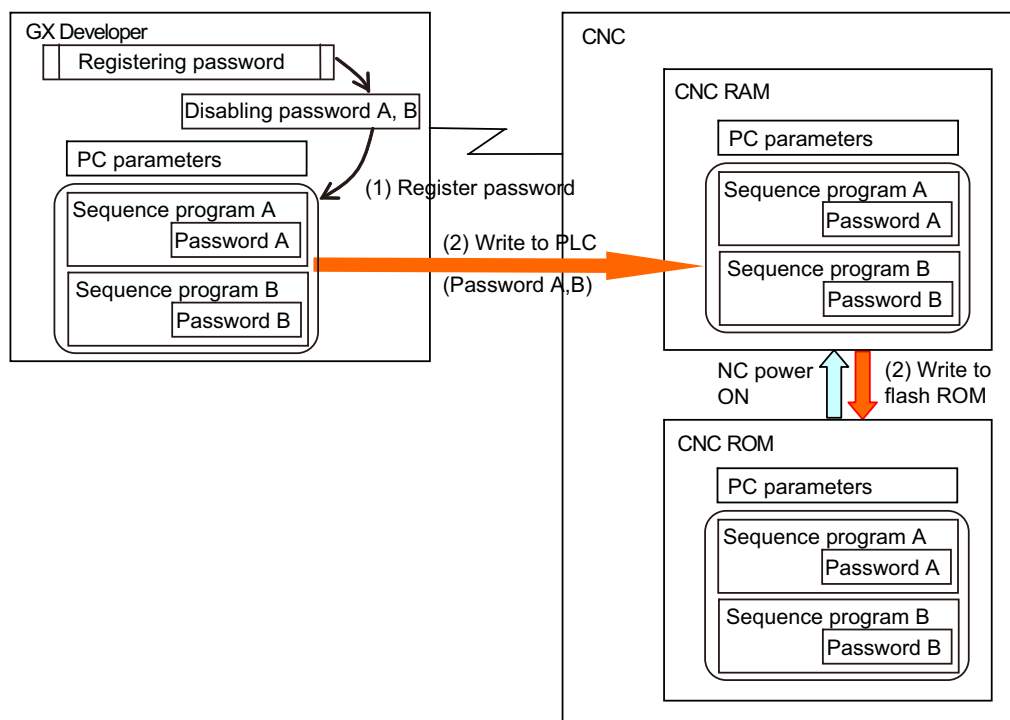
A file password has Write (enable/disable writing) and Read (enable/disable reading) attributes.

From GX Developer, the following attributes can be set.

- Write protection: Writing and editing are prohibited.
- Read/Write protection: Reading, verification, writing and editing are prohibited.

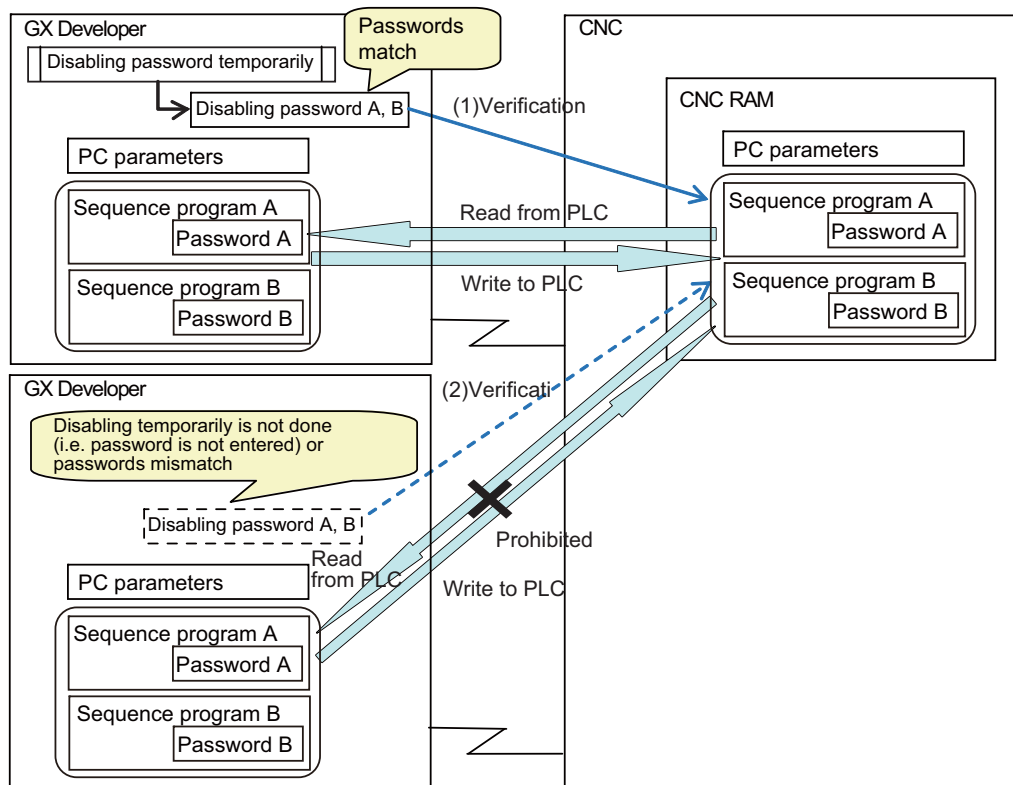
6.8.4 Outline of File Password Setting

6.8.4.1 Registering a File Password



- (1) Register a file password to prohibit reading/writing of files of sequence programs, device comments and PLC messages. When a file password is registered on GX Developer, the file password information (file password and its attribute) for a sequence program in the currently edited project is set. At the same time, the registered password information is saved in GX Developer as the Disabling password.
- (2) When "Write to PLC" function is executed, the data containing the file password information is saved in the CNC RAM. When "Write to PLC (Flash ROM)" function is executed, the data containing the file password information is saved in the CNC ROM.

6.8.4.2 Operating a File for which a File Password is Set



- (1) To operate a file for which a file password is set, first you need to disable the file password temporarily. When the file password is disabled temporarily, it is saved in a GX Developer as the Disabling password. The password is temporarily disabled only for the GX Developer which you used for disabling. If you terminate the GX Developer and start it again, you need to disable the file password temporarily again. When you attempt to operate a file on the GX Developer, the Disabling password is sent to the CNC. In the CNC, the password is compared with the registered password for verification. The file can be operated only when these passwords match.
- (2) Operation of the file is not allowed when you don't disable password temporarily using the GX Developer or when a password mismatch occurred between the Disabling password and the registered password.

6.8.5 Statuses of Password and Registration Condition for Operations Performed with GX Developer

The following table shows the statuses of password and registration condition for operations performed with GX Developer.

GX Developer operation		Statuses of password and registration condition
Read from/Write to PLC		
	Read from PLC	If passwords exist in the read source PLC, the password settings are also read.
	Write to PLC	Password settings are written to the write destination PLC.
Edit project		
	Open project	If passwords exist in the read source, the password settings are also read.
	Save	If passwords exist in the save source, the password settings are also saved.
	Save as	If passwords exist in the save source, the password settings are also saved.
	Delete project	The password is deleted together with the project.
	Copy (project)	If passwords exist in the copy source, the password settings are also copied.
	Copy (data)	If passwords exist in the copy source, the password settings are also copied.
	Save and write after data name change	If passwords exist in the old data name, the password settings are also saved.
	Edit ladder (paste ladder to other GX Developer)	Password settings are not added.
	Merge data	Password settings are not added.
	Automatic save	If passwords exist in the save source, the password settings are also saved.

6.8.6 When You Forgot the Password You Set

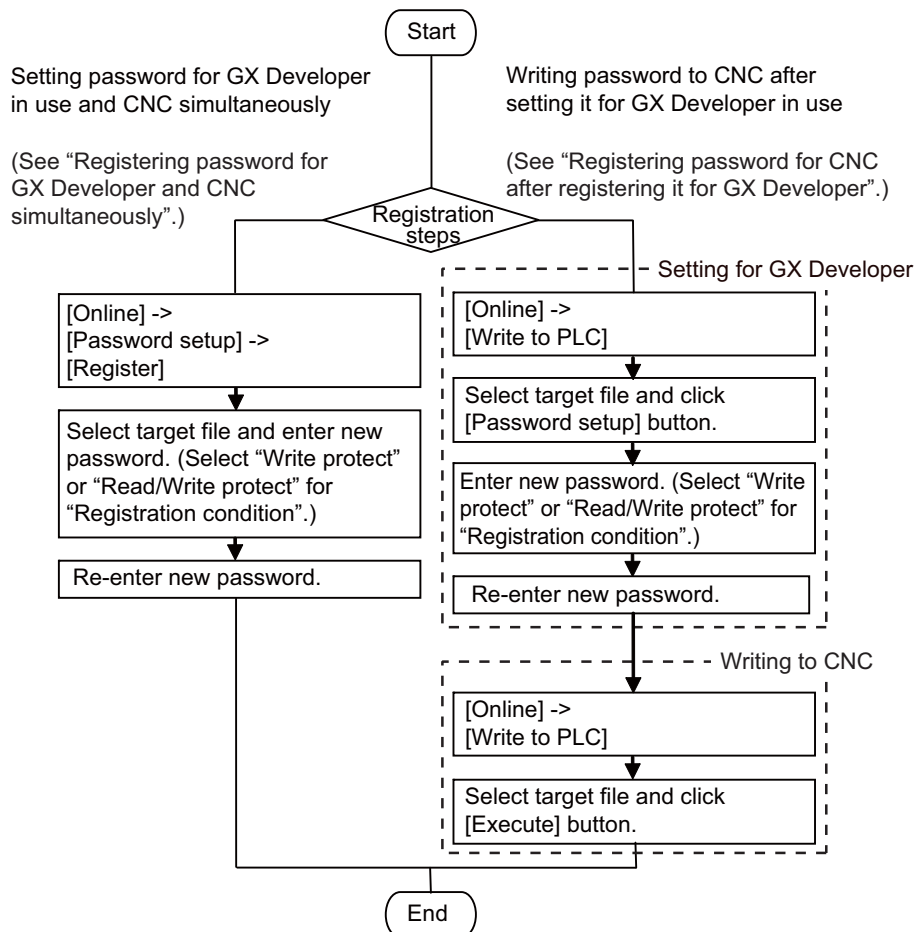
When you forgot the registered password, you need to format the PLC memory. However, doing so will delete all data along with the password. To restore the deleted data, open the data file on GX Developer and execute "Write to PLC" function.

Note that if you execute "Write to PLC" for a file whose password was forgotten, the forgotten password will also be written to the memory. To avoid this, copy and paste the data (e.g. ladders) into a newly started GX Developer. Then, execute "Write to PLC" to restore data using the GX Developer in which the data is pasted.

6.8.7 File Password Setting Procedure

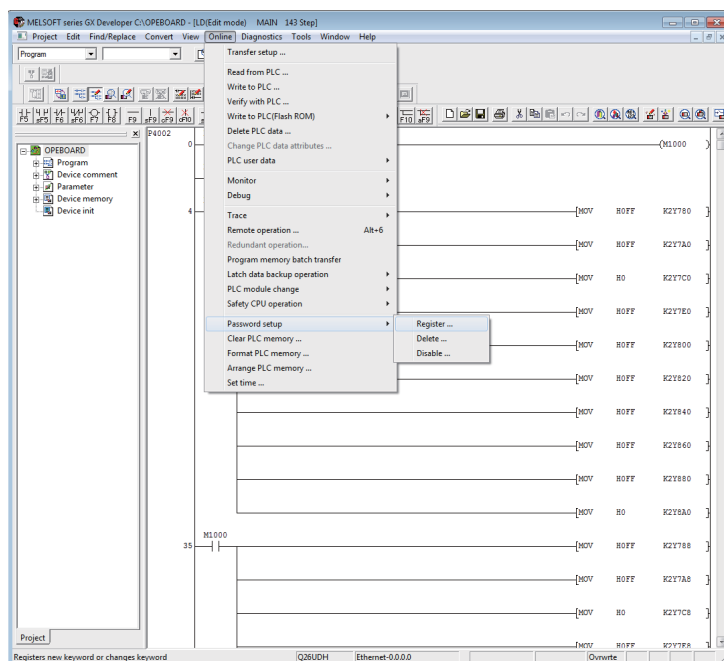
6.8.7.1 Registering New File Password

The following flowchart shows the procedure of registering new file passwords.



Registering password for GX Developer and CNC simultaneously

- (1) Select [Online] -> [Password setup] -> [Register].



- (2) The following Password registration/change screen is displayed.

Password registration/change

Password is set up for the PLC and the project currently selected on GX Developer.

Target memory: Program memory/Device memory

	Data type	Data name	Registration	Password	Registration condition
1	Program	MAIN			Write protect
2	Program	HMAIN			Write protect

Characters that can be used in password
4 characters. Numbers and A-Z, a-z. Case sensitive.

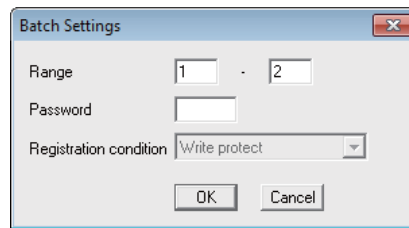
Batch Settings... Execute Close

Select the target memory that contains files for which you want to set password. The list of files in the selected memory will be displayed on the Password registration/change screen. If you want to specify sequence programs, select "Program memory/Device memory" for "Target memory". If you want to specify device comments or PLC messages, select "Memory card (RAM)" for "Target memory".

To register new password for each file, enter a password consisting of 4 one-byte alphanumeric characters (case sensitive) in each "Password" field. The entered password is shown as asterisks. For "Registration condition", select "Write protect" or "Read/Write protect". After setting these items, click [Execute] and go to step (5).

When you want to set password for multiple files simultaneously, click [Batch Settings].

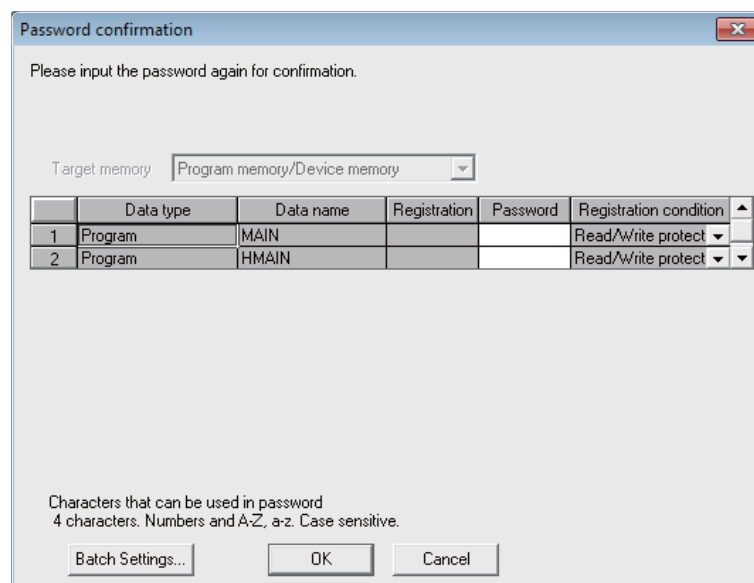
- (3) On the displayed Batch Settings screen, enter the file range (the file numbers displayed on the Password registration/change screen) and a new password consisting of 4 one-byte alphanumeric characters (case sensitive), and select the registration condition. Click [OK] to close the Batch Settings screen.



The Batch Settings dialog box contains the following fields and controls:

- Range: Two input boxes with values 1 and 2, separated by a dot.
- Password: A text input box.
- Registration condition: A dropdown menu with "Write protect" selected.
- Buttons: OK and Cancel.

- (4) The Password registration/change screen is displayed with the entered password. Click [Execute].
- (5) The Password confirmation screen is displayed. For confirmation, enter the new password again, and click [OK].



The Password confirmation dialog box contains the following elements:

- Text: "Please input the password again for confirmation."
- Target memory: A dropdown menu with "Program memory/Device memory" selected.
- Table:

	Data type	Data name	Registration	Password	Registration condition
1	Program	MAIN			Read/Write protect
2	Program	HMAIN			Read/Write protect

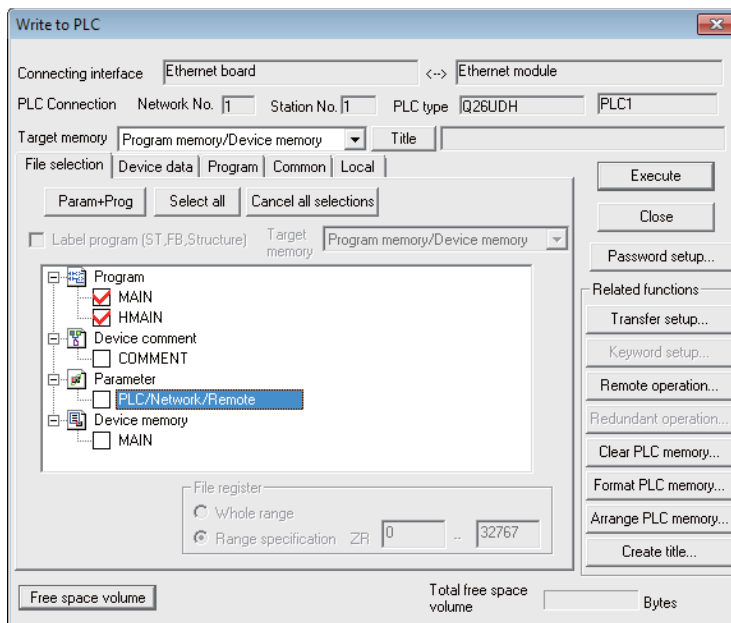
- Text: "Characters that can be used in password
4 characters. Numbers and A-Z, a-z. Case sensitive."
- Buttons: Batch Settings..., OK, and Cancel.

Or, you can enter password for the selected range of files in the following way: click [Batch Settings], enter the new password on the displayed Batch Settings screen, and click [OK].

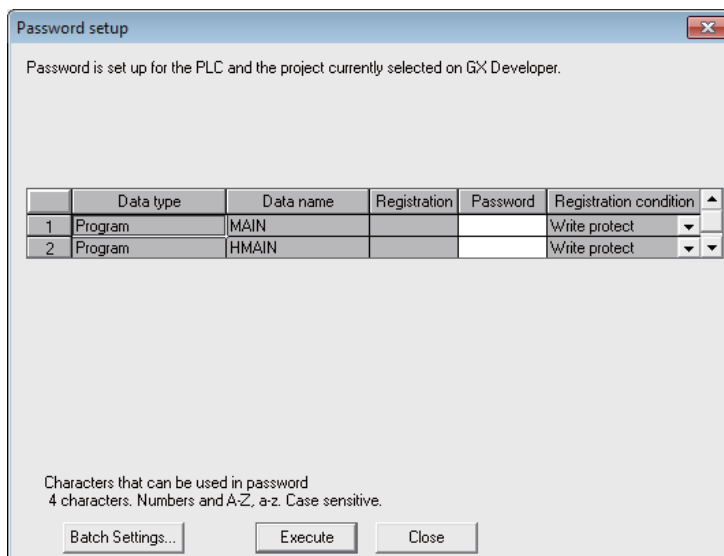
- (6) If the message "The password will be registered for GX Developer's data. The password registered before is cancelled." is displayed, click [OK].
- (7) When the message "Complete." is displayed, click [OK]. The registration is completed.

Registering password for CNC after registering it for GX Developer

- (1) Select [Online] -> [Write to PLC].
- (2) On the displayed Write to PLC screen, select the target memory. If you want to specify sequence programs, select "Program memory/Device memory" for "Target memory". If you want to specify device comments or PLC messages, select "Memory card (RAM)" for "Target memory". After setting "Target memory", check files for which you want to set password, and click [Password setup] button.



- (3) The following Password setup screen is displayed.

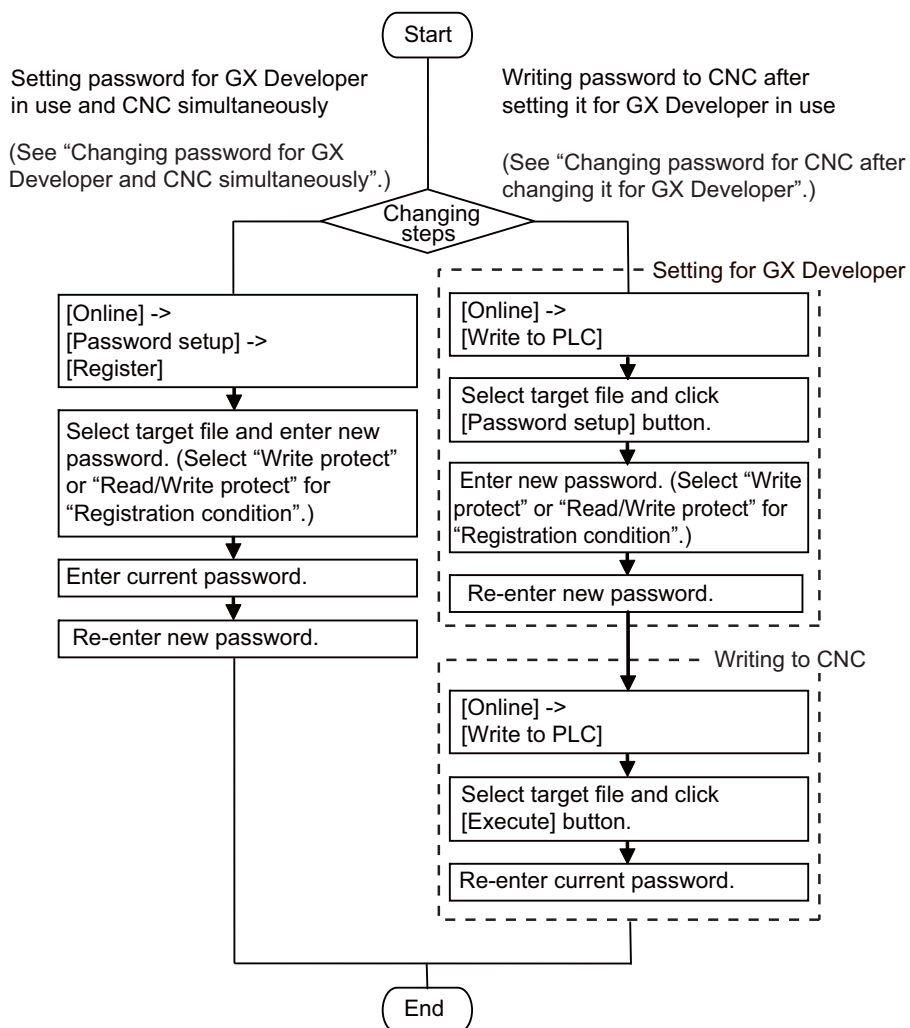


To register password for each file, enter a new password consisting of 4 one-byte alphanumeric characters (case sensitive) in each "Password" field. The entered password is shown as asterisks. For "Registration condition", select "Write protect" or "Read/Write protect". After setting these items, click [Execute] and go to step (6). When you want to register password for multiple files simultaneously, click [Batch Settings].

- (4) On the displayed Batch Settings screen, enter the file range (the file numbers displayed on the Password registration/change screen) and a new password consisting of 4 one-byte alphanumeric characters (case sensitive), and select the registration condition. Click [OK] to close the Batch Settings screen.
- (5) The Password setup screen is displayed with the entered password. Click [Execute].
- (6) The Password confirmation screen is displayed. For confirmation, enter the new password again, and click [OK]. Or, you can re-enter password for the selected range of files in the following way: click [Batch Settings], enter the new password on the displayed Batch Settings screen, and click [OK].
- (7) On the Write to PLC screen, confirm that the files for which you entered password are displayed with a check mark. Click [Execute].
- (8) If the message "The program (MAIN) already exists. Are you sure OK to overwrite?" is displayed, click [Yes] or [Yes all].
- (9) When the message "Completed." is displayed, click [OK]. The registration is completed.

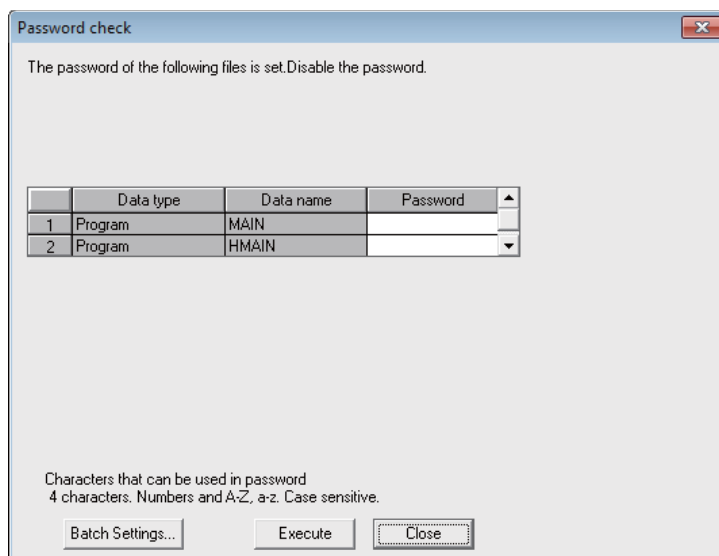
6.8.7.2 Changing File Passwords

The following flowchart shows the procedure of changing file passwords.



Changing password for GX Developer and CNC simultaneously

- (1) Select [Online] -> [Password setup] -> [Register].
- (2) The Password registration/change screen is displayed.
Select the target memory that contains files whose password you want to change. The list of files in the selected memory will be displayed on the Password registration/change screen. If you want to specify sequence programs, select "Program memory/Device memory" for "Target memory". If you want to specify device comments or PLC messages, select "Memory card (RAM)" for "Target memory". For files for which a password is already registered, asterisks appear in their "Password" field.
To change password for each file, enter a new password consisting of 4 one-byte alphanumeric characters (case sensitive) in each "Password" field. The entered password is shown as asterisks. For "Registration condition", select "Write protect" or "Read/Write protect". After setting these items, click [Execute] and go to step (5). When you want to change password for multiple files simultaneously, click [Batch Settings].
- (3) On the displayed Batch Settings screen, enter the file range (the file numbers displayed on the Password registration/change screen) and a new password consisting of 4 one-byte alphanumeric characters (case sensitive), and select the registration condition. Click [OK].
- (4) The Password registration/change screen is displayed with the entered password. Click [Execute].
- (5) The Password check screen is displayed. Enter the password before change and click [Execute].



Or, you can enter password for the selected range of files in the following way: click [Batch Settings], enter the password before change on the displayed Batch Settings screen, and click [OK].

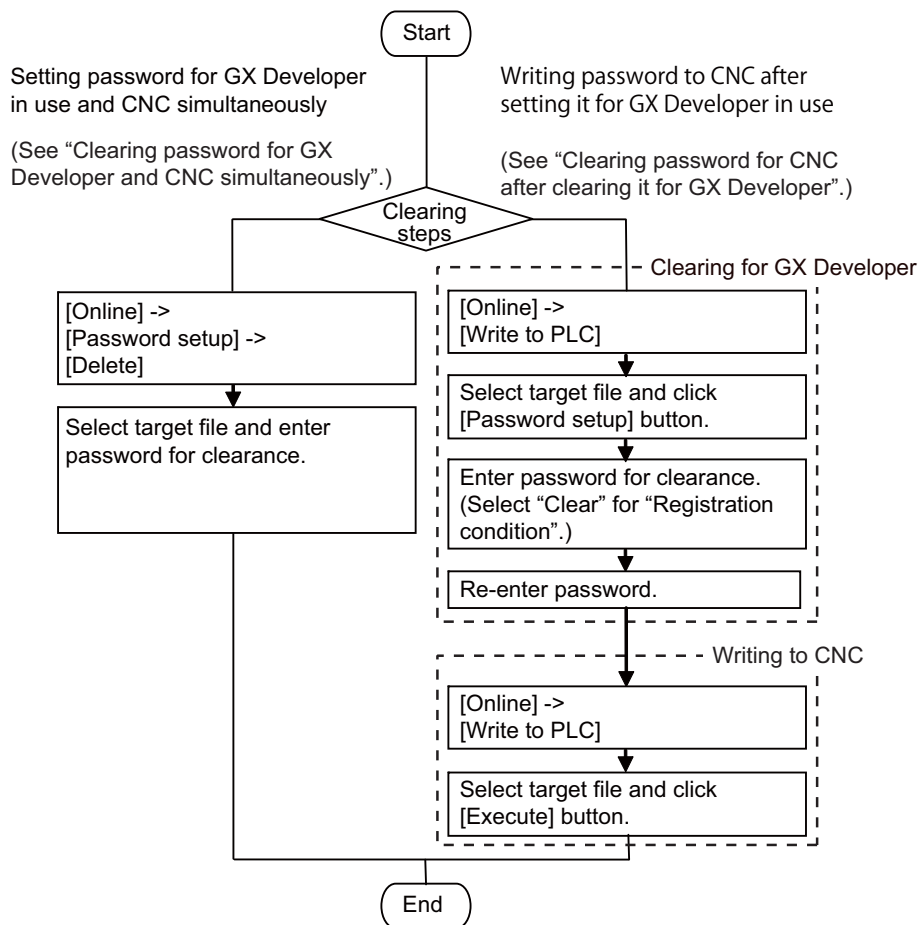
- (6) The Password confirmation screen is displayed. For confirmation, enter the new password again, and click [OK].
Or, you can re-enter password for the selected range of files in the following way: click [Batch Settings], enter the new password on the displayed Batch Settings screen, and click [OK].
- (7) If the message "The password will be registered for GX Developer's data. The password registered before is cancelled." is displayed, click [OK].
- (8) When the message "Complete." is displayed, click [OK]. The registration is completed.

Changing password for CNC after changing it for GX Developer

- (1) Select [Online] -> [Write to PLC].
- (2) On the displayed Write to PLC screen, select the target memory. If you want to specify sequence programs, select "Program memory/Device memory" for "Target memory". If you want to specify device comments or PLC messages, select "Memory card (RAM)" for "Target memory". After setting "Target memory", check files for which you want to change password, and click [Password setup] button.
- (3) The Password setup screen is displayed.
On this screen, all applicable files stored in the CNC are listed. For files for which a password is already registered, asterisks appear in their "Password" fields.
To change password for each file, enter a new password consisting of 4 one-byte alphanumeric characters (case sensitive) in each "Password" field. The entered password is shown as asterisks. For "Registration condition", select "Write protect" or "Read/Write protect". After setting these items, click [Execute] and go to step (6). When you want to change password for multiple files simultaneously, click [Batch Settings].
- (4) On the displayed Batch Settings screen, enter the file range (the file numbers displayed in the Password registration/change screen) and a new password consisting of 4 one-byte alphanumeric characters (case sensitive), and select the registration condition. Click [OK] to close the displayed Batch Settings screen.
- (5) The Password setup screen is displayed with the entered password. Click [Execute].
- (6) The Password confirmation screen is displayed. For confirmation, enter the new password again, and click [OK].
Or, you can re-enter password for the selected range of files in the following way: click [Batch Settings], enter the new password on the displayed Batch Settings screen, and click [OK].
- (7) On the Write to PLC screen, confirm that the files for which you entered password are displayed with a check mark. Click [Execute].
- (8) If you did not disable password temporarily with the GX Developer which you are currently using, the following Password check screen will appear. Enter the password before change in each "Password" field and click [Execute].
- (9) If the message "The program (MAIN) already exists. Are you sure OK to overwrite?" is displayed, click [Yes] or [Yes all].
- (10) When the message "Completed." is displayed, click [OK]. The change is completed.

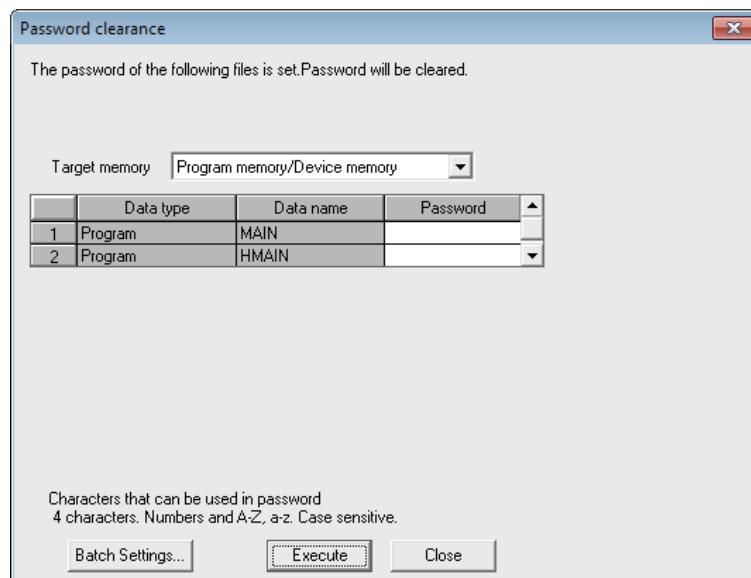
6.8.7.3 Clearing File Password

The following flowchart shows the procedure of clearing a file password.



Clearing password for GX Developer and CNC simultaneously

- (1) Select [Online] -> [Password setup] -> [Delete].
- (2) The following Password clearance screen is displayed.



Select the target memory that contains files whose password you want to delete. The list of files in the selected memory will be displayed on the Password clearance screen. If you want to specify sequence programs, select "Program memory/Device memory" for "Target memory". If you want to specify device comments or PLC messages, select "Memory card (RAM)" for "Target memory".

To delete password for each file, enter the password registered for the target file, click [Execute], and go to step (4). When you want to delete password for multiple files simultaneously, click [Batch Settings].

- (3) On the displayed Batch Settings screen, enter the file range (the file numbers displayed on the Password clearance screen) and the registered password. Click [OK] to close the Batch Settings screen.
- (4) The Password clearance screen is displayed with the entered password. Click [Execute].
- (5) If the message "The password for GX Developer's data will be cleared, too." is displayed, click [OK].
- (6) When the message "Complete." is displayed, click [OK]. The clearance is completed.

Clearing password for CNC after clearing it for GX Developer

- (1) Select [Online] -> [Write to PLC].
- (2) On the displayed Write to PLC screen, select the target memory. If you want to specify sequence programs, select "Program memory/Device memory" for "Target memory". If you want to specify device comments or PLC messages, select "Memory card (RAM)" for "Target memory". After setting "Target memory", check files for which you want to delete password, and click [Password setup] button.
- (3) The Password setup screen is displayed.
To delete password for each file, enter the password registered for the target file and select "Clear" for "Registration condition". Click [Execute] and go to step (6). When you want to delete password for multiple files simultaneously, click [Batch Settings].
- (4) On the displayed Batch Settings screen, enter the file range (the file numbers displayed on the Password registration/change screen) and the registered password, and select "Clear" for "Registration condition". Click [OK] to close the Batch Settings screen.
- (5) The Password setup screen is displayed with the entered password. Click [Execute].
- (6) The Password confirmation screen is displayed. For confirmation, enter the password again for the target file, and click [OK].
Or, you can re-enter password for the selected range of files in the following way: click [Batch Settings], enter the password on the displayed Batch Settings screen, and click [OK].
- (7) On the Write to PLC screen, confirm that the files for which you entered password are displayed with a check mark. Click [Execute].
- (8) If the message "The program (MAIN) already exists. Are you sure OK to overwrite?" is displayed, click [Yes] or [Yes all].
- (9) When the message "Completed." is displayed, click [OK]. The clearance is completed.

6.8.7.4 Disabling File Password Temporarily

Disabling file password temporarily is required when you use GX Developer to perform the following operations for a file for which a password is registered. Disabling file password temporarily means that a registered file password and entered password are compared for verification, and file locking is released to allow you to operate the file. If the password verification fails, you cannot operate the file.

For example, a file password needs to be verified and disabled temporarily in the following situation: you set a file password for a program file using a GX Developer to prohibit reading. Then, you start another GX Developer and execute "Read from PLC" for the program file.

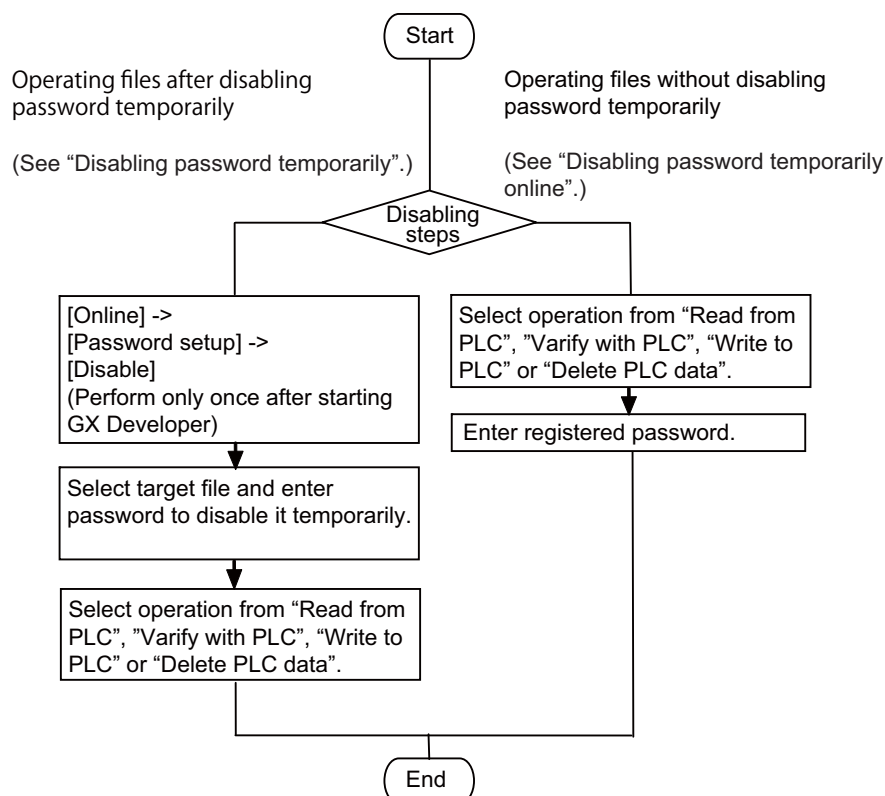
Only the program for which the file password was temporarily disabled can be operated by the GX Developer which was used for disabling. To operate the same file using a newly started GX Developer, you must disable the file password temporarily again.

Once you disabled the file password using a GX Developer, you can use the GX Developer continuously to operate the program until the operation is completed.

GX Developer operation	Disabling password required/not required
[Online] -> [Read from PLC] [Online] -> [Verify with PLC]	Disabling file password temporarily is required if the password is set for "Read/Write protection".
[Online] -> [Write to PLC] [Online] -> [Delete PLC data]	Disabling file password temporarily is required if the password is set for "Write protection".

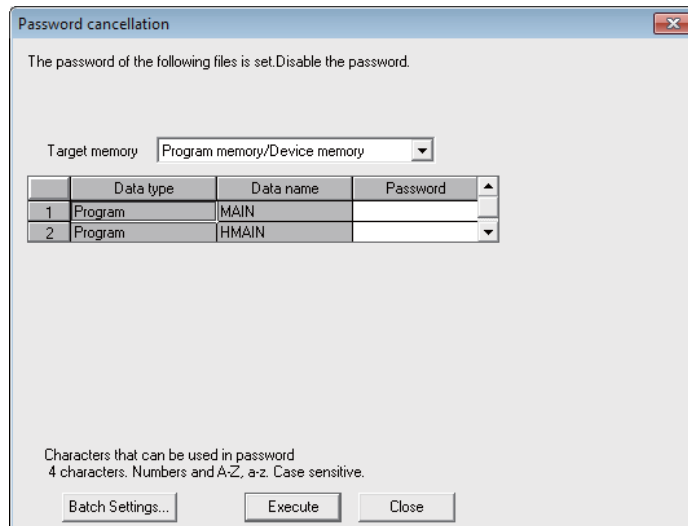
There are two ways to disable file password temporarily.

The following flowchart shows the procedure of disabling file password temporarily.



Disabling password temporarily

- (1) Select [Online] -> [Password setup] -> [Disable].
- (2) The following Password cancellation screen is displayed.

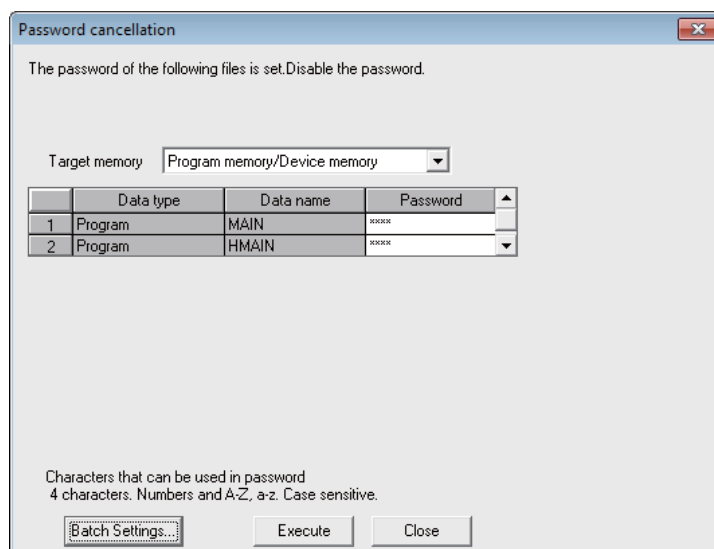


Select the target memory that contains files whose password you want to disable. The list of files in the selected memory will be displayed on the Password cancellation screen. If you want to specify sequence programs, select "Program memory/Device memory" for "Target memory". If you want to specify device comments or PLC messages, select "Memory card (RAM)" for "Target memory".

To disable password temporarily for each file, enter the password registered for the target file, click [Execute], and go to step (4).

When you want to enter password for multiple files simultaneously, click [Batch Settings].

- (3) On the displayed Batch Settings screen, enter the file range (the file numbers displayed on the Password cancellation screen) and the registered password. Click [OK] to close the Batch Settings screen.
- (4) The Password cancellation screen is displayed with the entered password. Click [Execute].



- (5) When the message "Complete." is displayed, click [OK]. The disabling is completed.

Disabling password temporarily online

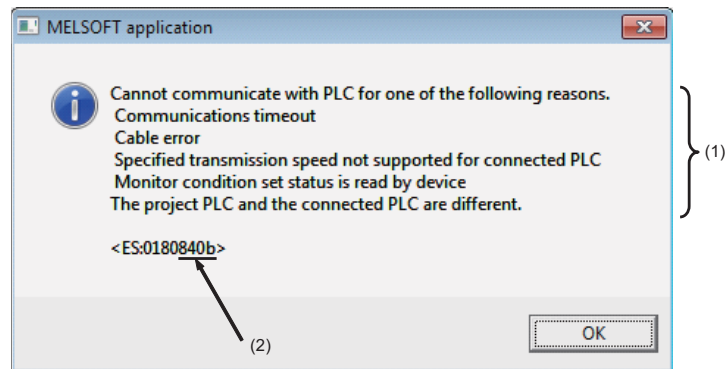
If you execute the following functions, the password check screen is displayed and you must enter the registered password: "Read from PLC"/"Verify with PLC" function for a file for which "Read/Write protect" file password is set, or, "Write to PLC"/"Delete PLC data" function for a file for which "Write protect" file password is set. After entering password, click [Execute].

Or, you can enter password for the selected range of files in the following way: click [Batch Settings], enter the password on the displayed Batch Settings screen, and click [OK].

6.9 Troubleshooting

6.9.1 List of Errors During GX Developer Online Operations

If an error has occurred in GX Developer, the following dialog appears. The error message and error status are displayed in the dialog. Note that the display error messages may be applicable only to the MELSEC PLC. Therefore, they are not necessarily accurate for the CNC side. Error status is shown in the last 4 digits of the number displayed.



(1) Error message

(2) Error status

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 GX Developer Operating Manual.

Status	Message	Cause	Remedy
4001 4002	The executed function is not supported. Please check the manual and other documentation.	An operation not supported by the specifications was attempted.	Check the operation procedures.
4005	Writing the data exceeding the size of PLC was attempted. Execute again within the range of PLC size.	Maximum number of steps that can be executed with NC has been exceeded.	Check the size of execution area. (Refer to the section "Sequence Program Development: Operations and Check Items at the Other Errors".) Reduce the number of steps for the relevant sequence program to be executed with reference that value.
4010	Cannot write because the PLC is executing a RUN command. Stop the PLC, then execute again.	The PLC of the NC is running.	After stopping the PLC of the NC, start execution again.
4021	The applicable drive is not ready. Check the applicable drive, then execute again.	The specified target memory does not exist or is not in a usable status.	Change the target memory.
4022	A file which does not exist in the PLC was specified.	Ladder program writing during RUN was attempted to nonexistent sequence program.	Check the editing program whether it exists in NC or not.
4024	The executed function is not supported. Please check the manual and other documentation.	Writing unavailable files (files except sequence program, comment, message, and parameters) was conducted.	Check the operation procedures.

Status	Message	Cause	Remedy
4025	Processing is in progress from another peripheral device. Please wait until the other processing is completed, then execute again.	Multiple peripheral development tools (Built-in PLC edit function/ GX Developer) were accessed to the same file.	Wait for completion of access from other peripheral development tool, then execute again.
4029	Insufficient file capacity. Execute again after deleting unnecessary files.	An attempt was made to write a file that exceeds the storage capacity.	Examine the file structure so that the data falls within the limited capacity.
4031	The specified device No. exceeds the permissible range. Specify a device No. that is within the range set in the parameter.	The access request given is outside the accessible device range.	Check the number range of each device.
4052	The file is write protected. Change the file attributes to enable writing to the file.	The specified target memory is a write-disabled device (internal ROM).	Specify "Program memory/ Device memory" or "Memory card(RAM)" as the target memory.
4061	No condition set. Check the settings and program.	Ladder program writing during RUN was attempted in the following situations: 1) A sequence program is run with independent program method. 2) A high-speed processing program using common pointers is run. 3) The writing was attempted into a high-speed processing program while the high-speed processing is disabled. 4) A common pointer CALL instruction writing was attempted into a high-speed processing program. 5) Execution size of the high-speed processing program exceeds 4000 steps.	Execute following operations. 1) Change the method into multi-program one. 2) Delete the command which uses common pointers from the high-speed processing program. 3) Turn ON the bit selection parameter "Enable ladder program writing during RUN (for high-speed processing)". 4) Change the CALL instruction into local pointer one. 5) Reduce the number of steps in the high-speed processing program. (Refer to of status 4005's remedy)
4065	A mismatch occurred between the PLC and peripheral parameters Match the parameters between the PLC and peripherals.	There is a problem in the device setting value.	Set the number of device points. (Refer to "Common Items: Setting the Parameters".)
4070	The program before correction differs from the registered program.	(1) In writing into PLC, an unspecified sequence instruction is included in the program. (2) In ladder program writing during RUN, the program before the modification does not match with the one in the NC.	(1) Verify the program and specify the instruction which has caused the error. (2) Check whether the target program is the same as the running one in the NC. Check the device setting in PC parameter as well.
4080	Incorrect abnormal.	When executing "Read from PLC" or "Verify PLC" function: Data not included in the specifications was found in the designated file.	The sequence program or message data in the CNC controller may be damaged. Delete the corresponding file and start again, or initialize the PLC data storage area. If the problem cannot be resolved, contact the Mitsubishi System Department.
		When executing "Write to PLC": Multiple END instructions were found in the designated sequence program file.	Edit the sequence program in the list mode to delete END instructions except only one at the last line.
4083	A program without registered parameters exists in PLC. Set PLC parameters in the program.	Ladder program writing during RUN was attempted to an unregistered sequence program.	The RUN writing is available only to a registered program. Check the program registration.

Status	Message	Cause	Remedy
4086	The specified P and I are already in use. Please use another P and I.	The label to be written during RUN has already been used.	Designate a different label.
4087	The accessible pointers in the PLC exceed the specified range.	The number of labels written during RUN has exceeded the allowable number of local labels.	Check the number of local labels used in high-speed processing and main processing.
412b	The select drive was write protected. Cancel write protect, then execute again.	Built-in ROM write was executed during ROM write function lock.	Cancel the ROM write function lock, and re-execute the ROM write.
41c5	The specified file does not exist. Please execute again after confirming the file.	Files which are not stored in NC were written/read.	Press "Refresh view" button on write/read menu to update the file list.
8008	An unusable port or IP address was specified. Execute again after checking the port/IP address setting.	The Ethernet setting on the GX Developer is incorrect.	Check the Ethernet setting, or check the cable connection.
8201	Cannot communicate with the PLC. Execute again after checking the connections with the PLC.	The serial communication cable is faulty. - Not connected - DTR signal off	Check the serial port setting and cable connection.
8301	Cannot communicate with the PLC. Execute again after checking the connections with the PLC.	There was no response from the NC connected with Ethernet.	Check the following: - CNC status - Cable connection - Ethernet address setting
840b	Cannot communicate with PLC for one of the following reasons. Communications timeout Cable error Specified baud rate not supported for connected PLC Monitor condition set status is read by device The project PLC and the connected PLC are different.	There is no response from the NC.- The CNC has not started properly.- The connection channel of the CNC side serial port is different.- The serial cable outside the specifications is used for signal connection.- An incorrect Ethernet address is set on the NC side	Check the following. - CNC side status - Cable connection - Bit selection: GPP communication valid - Set the Ethernet address

[Note] Read "PLC" in the message as "CNC controller".

6.9.2 Confirmation of PLC Alarms on CNC Controller Side

When an error occurs during starting or executing a sequence program, user PLC alarm status will be entered. There are three methods of confirming alarm details.

- Method by using the "ALARM" screen on the CNC controller setting display unit.
- Method by using the "PLC DIAGNOSIS" screen of the internal PLC edit function.
- Method by using the GX Developer "PLC diagnostics" window.

In the GX Developer "PLC diagnostics" window, the same kind of information as displayed in the "ALARM" screen of the CNC controller setting display unit is displayed in a simple manner. In addition, the ladder in which error has occurred is displayed, as well.

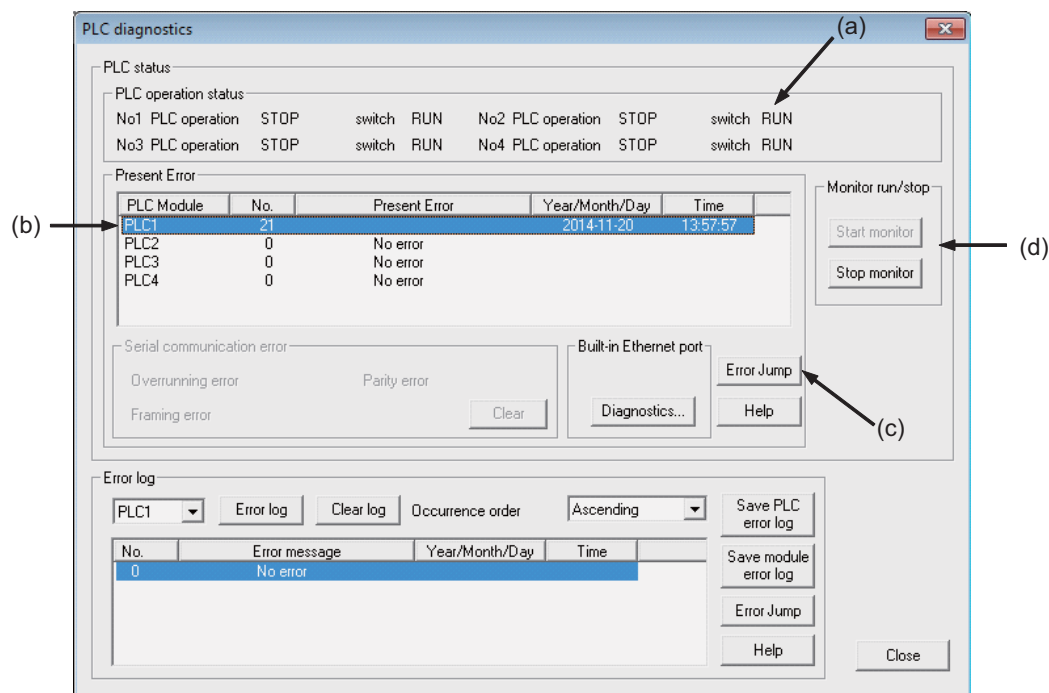
Refer to the section "List of PLC Alarms" for causes and remedies for the displayed PLC alarm.

6.9.2.1 Operating Procedures

With the GX Developer, follow the procedures given below to startup the "PLC diagnostics" window.

[Diagnostics] → [PLC diagnostics]

The following screen is displayed. Error information is indicated in the area (a) to (f).



(a) PLC operation status display: RUN/STOP status of PLC is displayed.

(b) Error information display: Error No. and error occurrence time are displayed.

- If there is no error, "No error" is displayed.

- Error No. is the upper 2 digits of the CNC side alarm sub status1.

- Further detail is available upon double-click. (Described later)

- When the multi-project is enabled, the CPU unit that is displayed depends on the project to which GX Developer is connected.

When connected to project 1 to 4: Errors related to project 1 to 4 are displayed on CPU1 to CPU4.

When connected to project 5 and 6: Errors related to project 5 to 6 are displayed on CPU1 and CPU2.

Errors that are common to all projects are displayed on the same location as the project 1.

(c) Error jump button: Ladder in which error has occurred is displayed. (Described later)

(d) Error display, start monitor and stop monitor button: Monitoring error information is started/stopped.

[Note] All the buttons other than (a) to (d) and [CLOSE] are not supported.

6.9.2.2 Details of Each Display

Error information is generated or cleared based on the following rules.

- The error that occurred last after PLCRUN is displayed until a new error occurs.
- Error display will be cleared only when RUN is executed from PLC STOP.
- When multi-project is enabled and errors are present in multiple projects, the project in which the last error occurred in the execution order is displayed.
- As for the errors that occurred before PLC execution, the error display starts from project 1.
- Errors that are common to all projects (e.g. PLC system error) are displayed on CPU No.1.

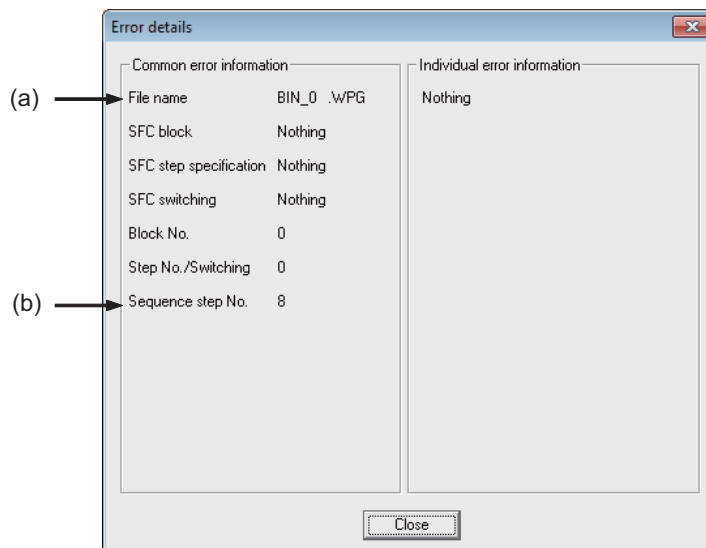
6.9.2.3 Detailed Error Information Display

Detailed error information can be displayed in the "PLC diagnostics window" following the operating procedures below.

Double-click "(b) error display list box" in the "PLC diagnostics window".

The "Error details" screen (see below) is displayed.

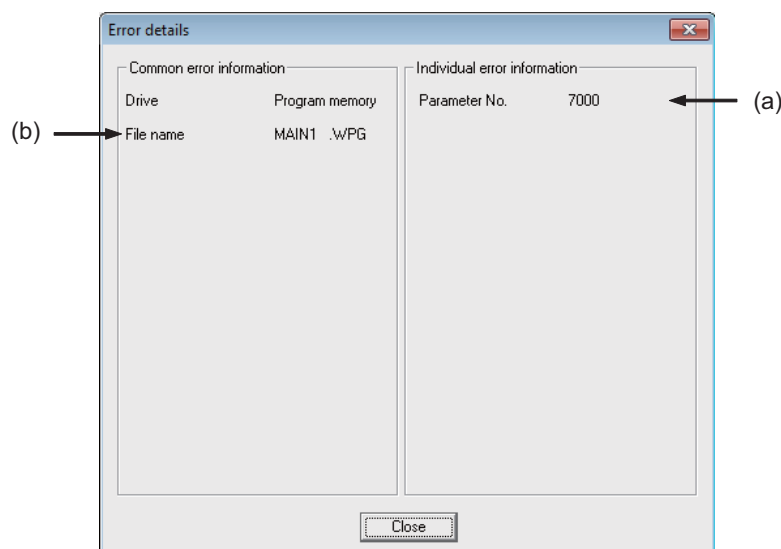
(1) When there is a cause in the sequence program:



(a) File name: The name of sequence program file in which error has occurred is displayed.

(b) Sequence step No.: The step No. for which an error occurred in (a) is displayed.

(2) When there is a cause in the parameter setting:



(a) Parameter No.: Illegal parameter No. is displayed.

1005: Common pointer No.

7000: Program setting

(b) File name: The name of parameter setting file relating with the error is displayed.

[Note]

The displays other than (a) and (b) in (1) and (2) above have no significant meanings.

Also, depending on the error factors, (a) or (b) may not be displayed.

6.9.2.4 Display of the Error-generated Ladder

The ladder in which an error has occurred is displayed in the "PLC diagnostics" window. By following the operations below, the error-generated ladder which exists in the project currently opened with the GX Developer can be displayed in the edit mode.

Click "Error Jump" button (c) in the "PLC diagnostics" window.

The ladder of the file in which an error has occurred is displayed in the other window. Then the cursor moves to the step where the error has occurred.

The following conditions are required to accurately display the error-generated ladder section.

- The file name and sequence program No. must be displayed in the "Error details" screen.
(In this case, no response or error dialog display will be given even if the button is clicked.)
- A project including the sequence program currently in operation in the CNC controller side must be opened.
(Even when a project not in operation is opened, if the same program name already exists, a ladder different from the actual error-generated ladder is displayed. So, be careful.)
- Depending on the type of error, sequence step No. does not show the error-generated ladder accurately.

6.9.3 Initialization for PLC Data Storage Area

In the following cases, initialize the CNC controller's temporary memory area and start again.

The CNC ROM is not initialized by this initialization operation. To hold the recovered state after the power is turned OFF, it must be stored in the CNC ROM.

- If an error occurs while writing to the CNC controller
- If the state cannot be recovered even after remedying the error
- To delete the stored data at once

By initialization operation, the initializable area and data to be initialized are as follows.

For the details of PLC data storage area, refer to "Common Items: PLC Data Storage Areas".

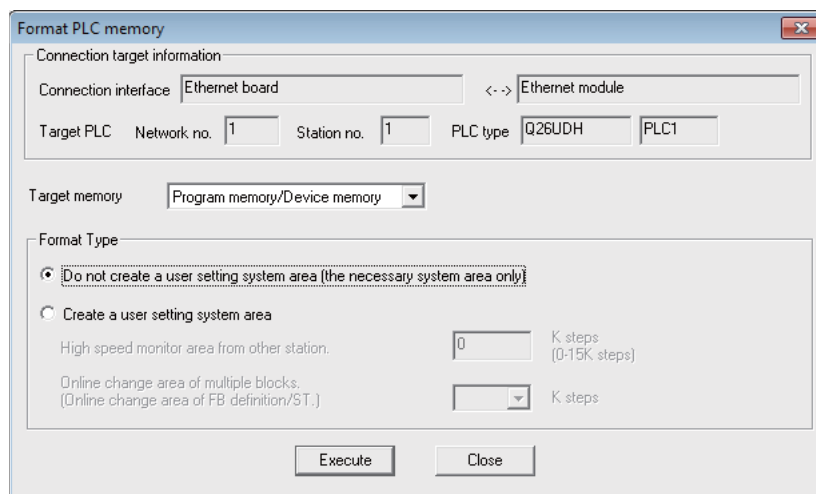
Target area	Target memory	Target data
Temporary memory area (RAM in CNC)	Program memory/Device memory	Sequence program Parameter
Storage area (ROM in CNC)	Memory card (RAM)	PLC message Device comment Source information

6.9.3.1 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 "Program memory/Device memory" or "Memory card(RAM)" 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 area selected with "Target memory" have been deleted and initialized.



6.10 Procedures for Backing Up Data Such as Sequence Programs

This section explains the methods for backing up the developed sequence programs and PLC related data in a personal computer.

6.10.1 Backing up All PLC Related Data by Batch

This section explains the procedure for backing up all data related to PLC by batch.

This procedure backs up the data of all projects by batch when the multi-project function is enabled.

6.10.1.1 Backup Target Data

The following data can be backed up.

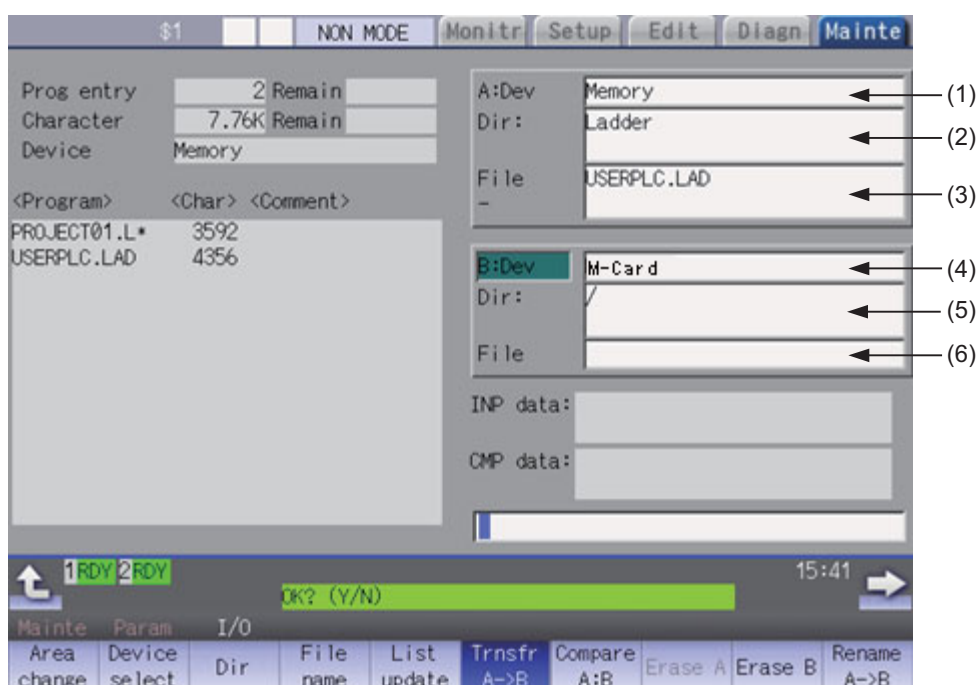
	Related data classification	Remarks
1	Sequence program	Sequence program code
2	Parameter	Execution order setting information, etc.
3	Sequence program comment	GX Developer comment data
4	Message	Message data such as alarm messages, operator messages and PLC switches in each language
5	Multi-project setting parameter	Multi-project function setting information

6.10.1.2 Backup Procedures

The data is backed up from the CNC controller's input/output screen.

Designate the transmission source information (CNC controller side) and transmission target information (personal computer side) on the input/output screen. When transmission is started, the sequence programs, etc., stored in the ROM will be backed up in the personal computer.

The input/output screen and operation procedures are shown below.



Refer to the instruction manual for the respective model for details on the input/output screen.

CNC controller settings

Set the "Device name", "Directory" and "File name" at "A: Device".

(1) Setting "Device name"

Select "Memory".

(2) Setting "Directory"

Input the character string "/LAD".

(3) Setting "File name"

"USERPLC.LAD" is automatically set when "Directory" is set.

Personal computer settings (Setting "Device name", "Directory" and "File name")

Set the "Device name", "Directory" and "File name" at "B: Device".

(4) Setting "Device name"

Select "Memory card".

(5) Setting "Directory"

Input the character string "/".

(6) Setting "File name"

Set the name of the file to be stored. When omitted, "USERPLC.LAD" is assigned.

Transmission

The backup process starts when the menu key "Send A → B" is pressed.

6.10.1.3 Restoring Backed Up Data

The data is restored following the backup operation in reverse (Set personal computer settings in "A: Device" and the CNC controller settings in "B: Device".)

The PLC must be STOP before restoration can be started.

6.10.1.4 Precautions

If the large capacity PLC (256KStep)/large capacity PLC (512Kstep) option is enabled, the size of sequence programs that can be stored in CNC is increased.

The USERPLC.LAD file that was output when the large capacity PLC (256KStep)/ large capacity PLC (512Kstep) option was enabled may not be input to the system that switched the disable/enable setting of the large capacity PLC option.

Whether the USERPLC.LAD file can be input depends on the size of the sequence program contained in the USERPLC.LAD file when it was output.

Large capacity PLC option, type of input USERPLC.LAD, and operation

	Inputting USERPLC.LAD that was output when it contained more than 256Kstep sequence programs.	Inputting USERPLC.LAD that was output when the following was true: "128Kstep < Number of contained sequence program steps $\leq$ 256Kstep"
Large capacity PLC option is disabled in M800 series	"Can't write file for dev B" error occurs.	"Can't write file for dev B" error occurs.
Large capacity PLC (256KStep) option is enabled in M800 series	"Can't write file for dev B" error occurs.	Writing and PLC execution is possible.
Large capacity PLC (512Kstep) option is enabled in M800 series	Writing and PLC execution is possible.	Writing and PLC execution is possible.

If the PLC project extension (3 projects)/PLC project extension (6 projects) option is enabled, the numbers of usable projects and devices are increased when the multi-project function is enabled.

The USERPLC.LAD file that was output when the PLC project extension (3 projects)/PLC project extension (6 projects) option was enabled may not be input to the system that switched the disable/enable setting of the PLC project extension option. Whether the USERPLC.LAD file can be input depends on the numbers of projects and devices that were set when the USERPLC.LAD file was output.

PLC project extension option, type of input USERPLC.LAD, and operation 1

	Inputting USERPLC.LAD that was output when the maximum project No. was set to 4 or larger	Inputting USERPLC.LAD that was output when the maximum project No. was set to 2 or 3
PLC project extension option is disabled in M800series	"Can't write file for dev B" error occurs.	"Can't write file for dev B" error occurs.
PLC project extension (3 projects) option is disabled in M800series	"Can't write file for dev B" error occurs.	Writing and PLC execution is possible.
PLC project extension (6 projects) option is disabled in M800series	Writing and PLC execution is possible.	Writing and PLC execution is possible.

PLC project extension option, type of input USERPLC.LAD, and operation 2

	Inputting USERPLC.LAD that was output when a number which was larger than the standard (Note 1) was set as the number of device points.
PLC project extension option is disabled in M800series	"Can't write file for dev B" error occurs.
PLC project extension (3 projects) option is disabled in M800series	"Can't write file for dev B" error occurs.
PLC project extension (6 projects) option is disabled in M800series	Writing and PLC execution is possible.

(Note 1) The following tables show the "standard" number of device points and "extended" number of device points.
 (The number shown below is the total number of points set in all projects.)

Device	Device points "standard"		Device	Device points "extended"
M	61440		M	122880
L	1024		L	2048
F	2048		F	4096
SB	1024		SB	2048
B	57344		B	114688
SM	6144		SM	12288
V	256		V	1024
SW	1024		SW	2048
SD	6144		SD	12288
T	2048		T	4096
ST	128		ST	256
C	512		C	1024
D	4096		D	8192
W	12288		W	24576
Z	60		Z	120
N	48		N	96
P	12288		P	24576

6.10.2 Backing up PLC Related Data of Each Project by Batch

This section explains the procedure for backing up PLC related data of each project by batch when the multi-project function is enabled.

6.10.2.1 Backup Target Data

The following data can be backed up.

When backup is executed, only data of the specified project is output.

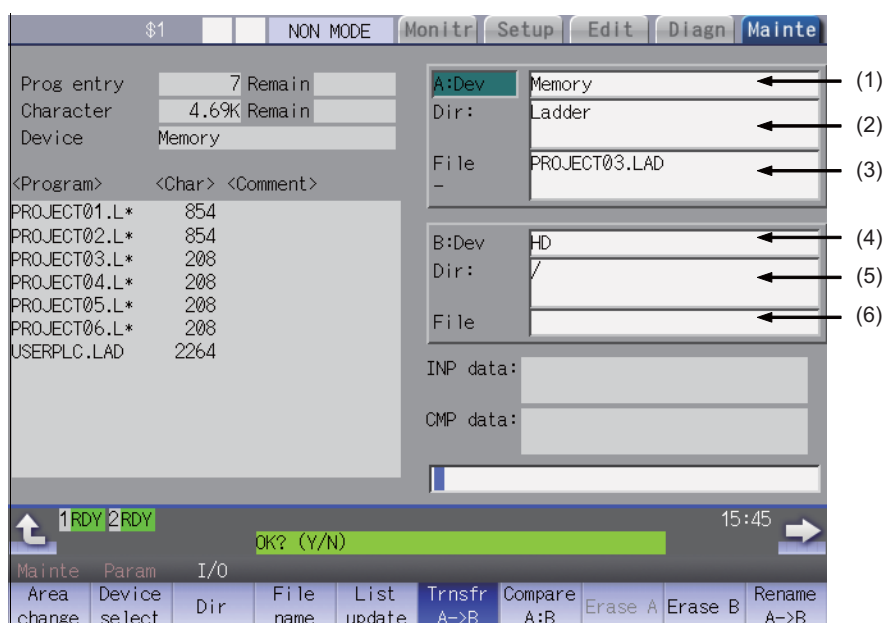
	Related data classification	Remarks
1	Sequence program	Sequence program code
2	Parameter	Execution order setting information, etc.
3	Sequence program comment	GX Developer comment data
4	Message	Message data such as alarm messages, operator messages and PLC switches in each language
5	Multi-project setting parameter (Device point settings only)	Device points setting information for multi-projects function

6.10.2.2 Backup Procedures

The data is backed up from the CNC controller's input/output screen.

Designate the transmission source information (CNC controller side) and transmission target information (personal computer side) on the input/output screen. When transmission is started, the data such as sequence programs of the specified project stored in the CNC ROM will be backed up in the personal computer.

The input/output screen and operation procedures are shown below.



Refer to the instruction manual for the respective model for details on the input/output screen.

CNC controller settings

Set the "Device name", "Directory" and "File name" at "A: Device".

(1) Setting "Device name"

Select "Memory" using the menu key.

(2) Setting "Directory"

Input the character string "/LAD".

(3) Setting "File name"

Select "From list" using the menu key and select "PROJECTxx.LAD" (xx: output project number) from the file list.

Press the "INPUT" key.

Personal computer settings (Setting "Device name", "Directory" and "File name")

Set the "Device name", "Directory" and "File name" at "B: Device".

(1) Setting "Device name"

Select "HD" using the menu key.

(2) Setting "Directory"

Input the character "/".

(3) Setting "File name"

Set the name of the file to be stored. When omitted, "PROJECTxx.LAD" (xx: output project number) is assigned.

Transmission

The backup process starts when the menu key "Send A -> B" is pressed.

6.10.2.3 Restoring Backed Up Data

The data is restored following the backup operation in reverse (Set personal computer settings in "A: Device" and the CNC controller settings in "B: Device".)

The PLC must be STOP before restoration is started.

6.10.2.4 Precautions

Project-based backup data (PROJECTxx.LAD) may not be able to be input depending on the CNC's status (Stored sequence programs, data size, etc.).

The table below lists the factors that disable input of the project-based backup data and their solutions.

Factors that disable input of project-based backup data and their solutions

Error details	Factor	Solutions
The data size has exceeded the available device size.	The data to input is exceeding the device size available for all the projects.	The device is short of free capacity. Correct the multi-project parameter (number of device points) to increase the free capacity.
Input has been attempted for an unavailable project.	An attempt to input the data to unavailable project.	Input the data to any available project.
Data to input is too large.	Size of data to input is greater than the storage area.	Correct the multi-project parameter (project percentage) to increase the storage area size to be greater than the PLC data (sequence program and comment) of the project-based backup data.

Explanation of Built-in Editing Function

7.1 Outline

This chapter describes the PLC (built-in editing function) built into the Mitsubishi CNC M8 Series products. (Operations related to the PLC carried out with the CNC unit are collectively referred to as "onboard" and hereinafter referred to as PLC Onboard.)

The M8 series PLC Onboard is easy to use as it retains the operation system from the M700V/M70V series. It also provides enhanced support for working together with the MELSEC series PLC development tool (GX Developer), a robust ladder monitoring function as well as improved ladder editing operation.

The onboard functions are listed as follows.

Function	Purpose of function
■ Ladder monitoring	
Monitor	This switches to the ladder monitor mode.
Entry Device Monitor	This monitors the ladder and the status of any registered devices simultaneously.
Entry Ladder Monitor	This monitors the ladder and any registered ladders simultaneously.
Register Monitor	This registers desired devices and ladders to the device registration monitor and the ladder registration monitor.
Registered Ladder All Delete	This deletes all the ladders registered in the entry ladder monitor.
Device Test	This turns the bit devices on/off and changes the current values of word devices.
Current Value Monitor Changeover (10/16)	This changes the display of the current device values on the ladder monitor between decimal and hexadecimal.
■ Ladder editing	
Edit	This changes to the ladder edit mode.
Insert Line	This inserts a blank line at the cursor position.
Delete Line	This deletes the line at the cursor position.
Mark	This selects the desired range of ladders.
Copy & Paste	This copies the ladders in the selected range and pastes these ladders to the specified position.
Edit Ladder	This edits ladders.
Statement Edit	This edits statements.
Note Edit	This edits notes.
Convert Ladder	This converts edited circuits and enables them to be executed. The behavior is different according to the setting of ladder program write during RUN (#6455 bit6/bit7). [When ladder program writing during run is disabled] The conversion is done only when PLC is in STOP state. If PLC is running, the conversion will be done after PLC is stopped. [When ladder program writing during run is enabled] The conversion can be done when PLC is running or stopped.
Undo	This undoes the last edit operation.
■ Ladder searching	
Find	This searches for specified devices, specified device contacts, and specified device coils.
Find Step No.	This searches specified step numbers.
Contact Coil Usage List	This displays the index position, usage status, and step number used by specified devices.
List of Used Devices	This displays the usage list for each device type as a batch.
■ Ladder display	
Comment Display Setting	This configures the display of comments, statements, notes, and device names.
Ladder Display	This sets the ladder display size and the maximum number of contacts for each line.
Switch Program	This changes the programs in the current display.

Function	Purpose of function
Zoom Display	This switches the ladder display size between three sizes.
	- Reduced [Equivalent to a full-screen display of 11 contacts at 640 x 480 resolution]
	- Standard [Equivalent to a full-screen display of 11 contacts at 1024 x 768 resolution]
	- Enlarged (120%) [Equivalent to a full-screen display of 11 contacts at 1280 x 1024 resolution]
Comment ON/OFF	This switches the display of comments as configured by [COMMENT DISPLAY SETTING].
Monitor Value Display	This changes displays of the current value for the device on the ladder monitor between on/off.
■ Ladder checks	
Check Program	This checks programs (ladders).
■ PLC data operation	
Add New Data	This adds new PLC data.
Delete Data	This deletes PLC data.
Rename Data	This changes the name of PLC data.
■ Device operation	
Device Batch Monitor	This monitors from the specified device on one screen.
Entry Device Monitor	This monitors devices at separated positions in circuits or different types of devices simultaneously on one screen.
■ Parameters	
Program Setting	This configures the execution order of sequence programs.
Device Setting	This configures the range of devices used in a project.
Common Pointer Setting	This enables confirmation of common pointer settings used in a project.
Multiple Project Parameters	This configures parameters related to the operation of multiple projects.
■ NC file operation	
PLC data auto load	This automatically reads PLC data from temporary memory upon startup.
Open	This displays the PLC data in temporary memory at the onboard editing area.
ROM Write	This saves the PLC data in temporary memory to ROM.
Delete	This deletes PLC data in temporary memory.
Format	This formats the temporary memory.
PLC RUN/STOP	This runs and stops the PLC.
■ External file operations	
External → NC	This reads PLC data on external media into the NC and opens it on the onboard.
NC → External	This saves NC PLC data to external media.
Delete Project	This deletes projects on external media.
Verify Project	This verifies NC PLC programs and PLC programs on external media.
■ Diagnosis	
PLC diagnosis	This displays errors that occur during program (ladder) execution.

7.2 Screen Configuration

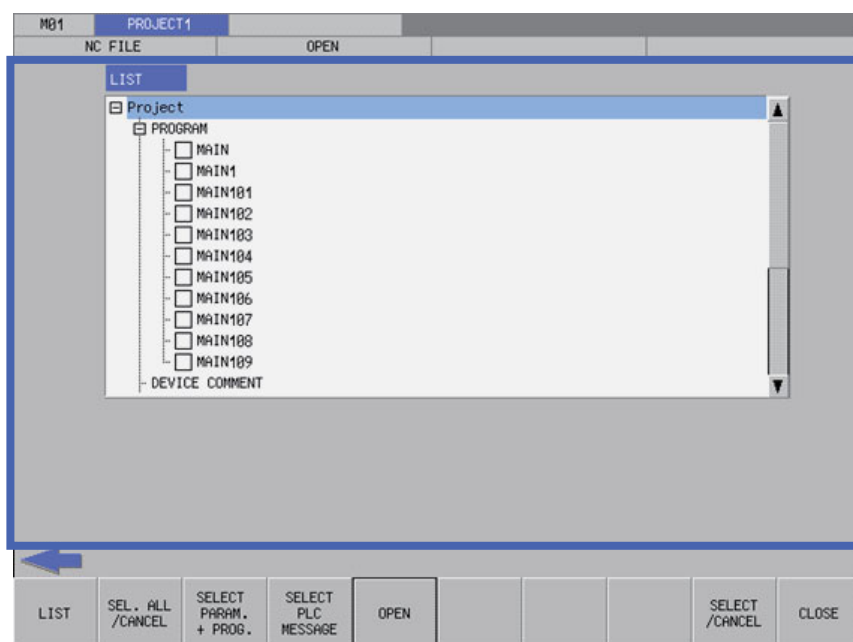
7.2.1 Type

The following three types of screens are used to configure the PLC Onboard.

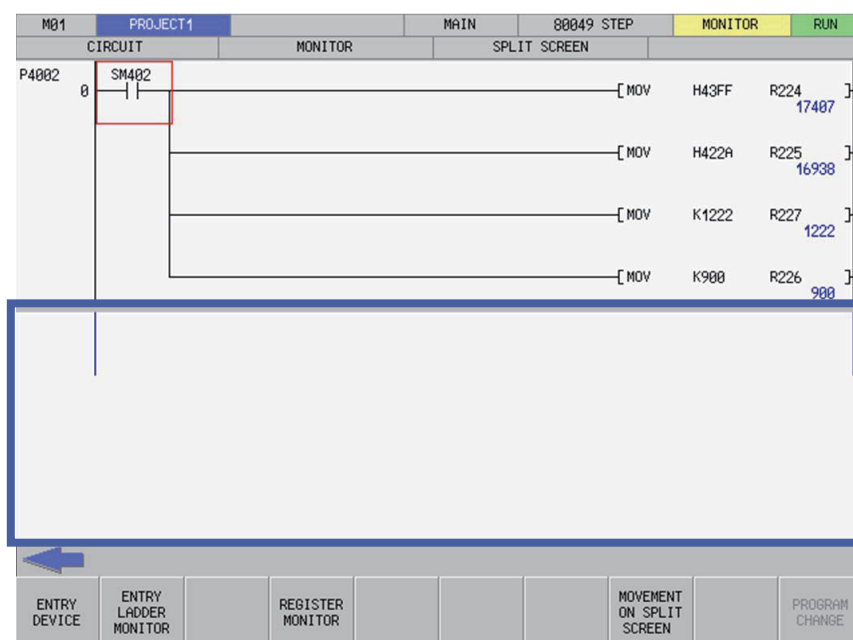
Full screen	This screen is used to display the entire screen.
Split screen	This screen splits the full screen into two areas and displays.
Popup screen	This screen is displayed over the full screen display or split screen.
Message screen	This screen displays confirmation messages, error messages, and other messages.

The following diagrams illustrate examples of these screens. The area inside the blue lines in each diagram represents the screen.

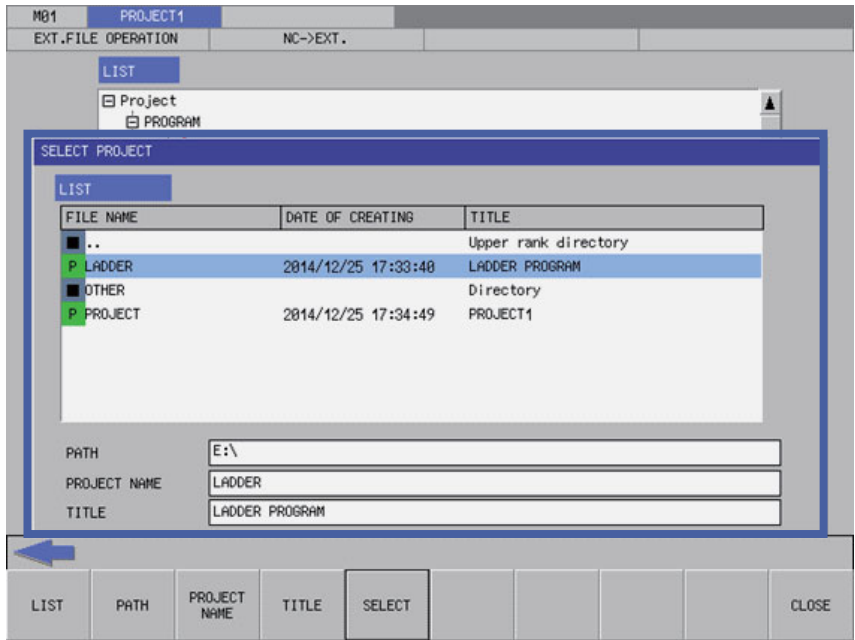
• Full screen



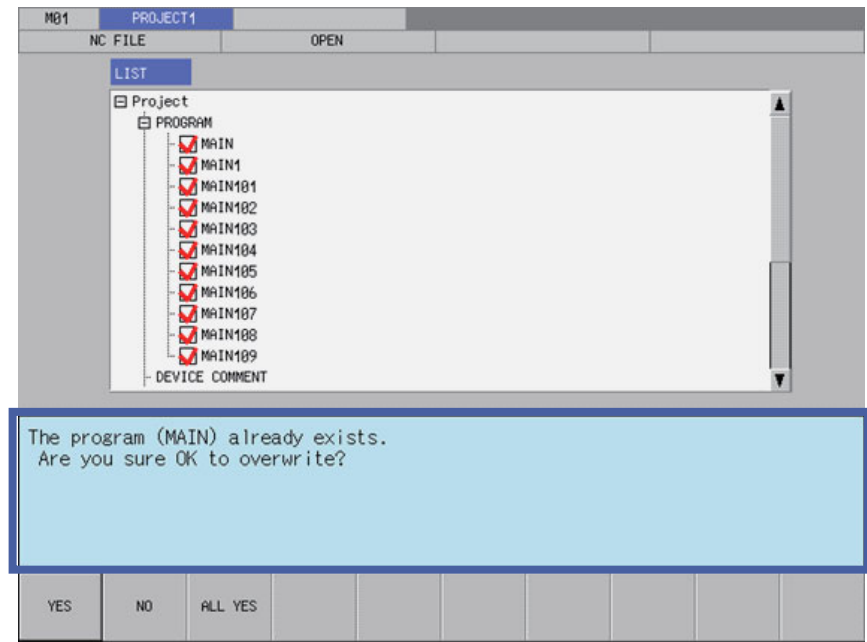
• Split screen



• Popup screen



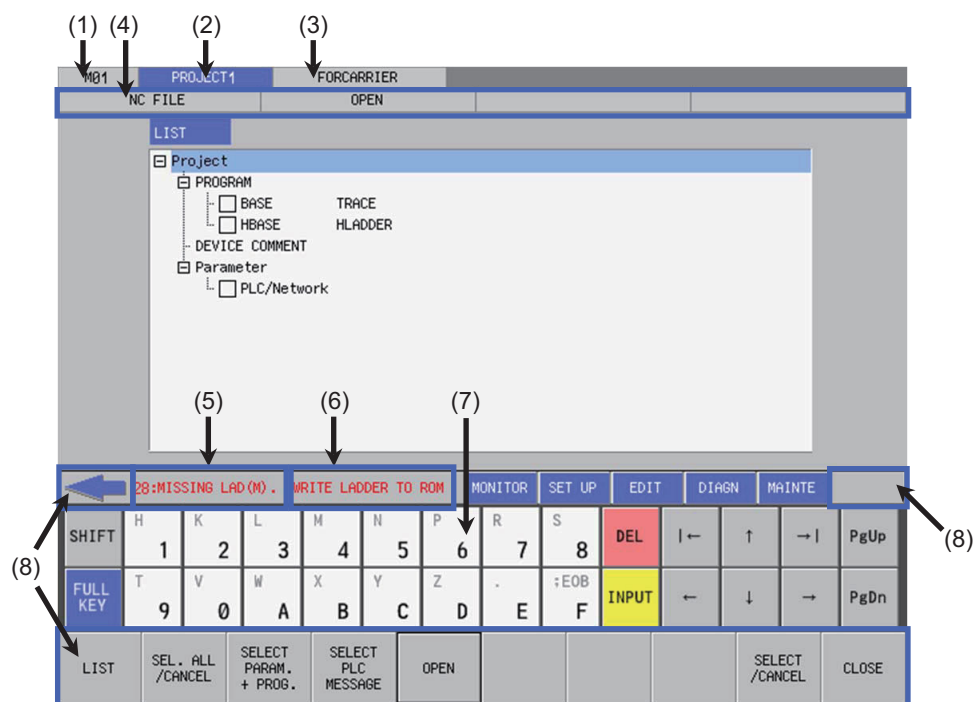
• Message screen



7.2.2 Configuration

7.2.2.1 Common Screen Items

The following diagram illustrates the common screen items.

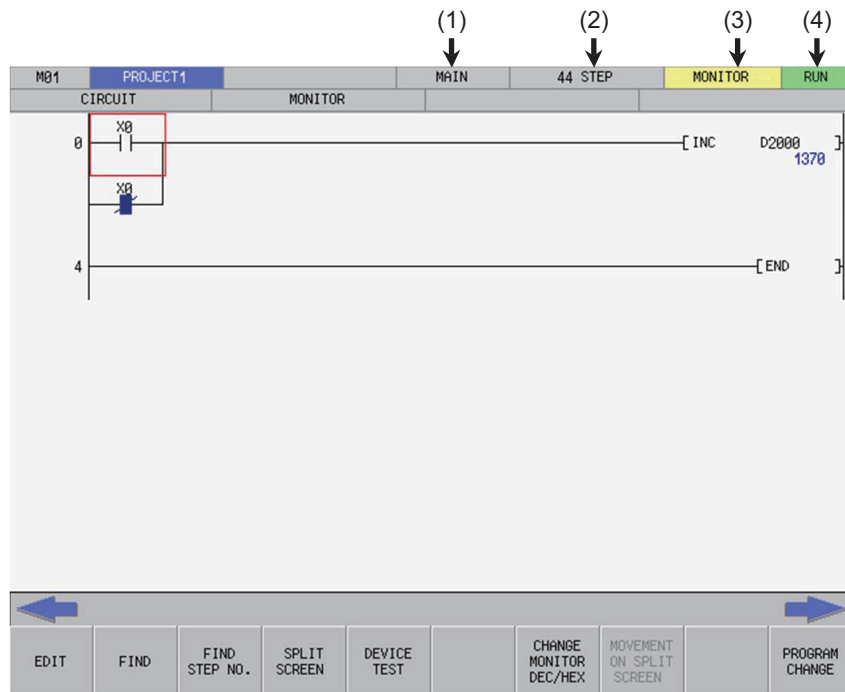


No.	Item name	Description
(1)	Connected NC name	This displays the name of the connected NC.
(2)	Current project No.	This displays the current project number.
(3)	Current project label	This displays labels assigned to projects.
(4)	Menu position display	This displays the menu position for the currently displayed full screen.
(5)	PLC alarm message	This displays alarm messages when a PLC alarm occurs.
(6)	Unsaved data alarm message	This displays alarm messages when data has not been saved to the internal ROM.
(7)	Soft keyboard	Soft keyboard (only when the soft keyboard parameter is enabled)
(8)	Menu keys	This menu is used to operate screens.

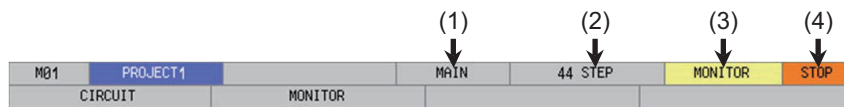
7.2.2.2 Items Displayed on the Ladder Screen

The following diagram illustrates the items displayed on the ladder screen.

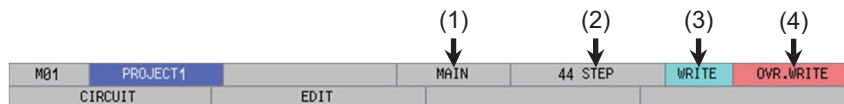
- Ladder screen (Monitor (RUN))



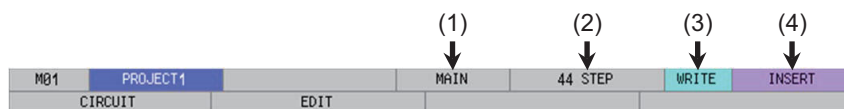
- Ladder screen (Monitor (STOP))



- Ladder screen (Edit (Overwrite))



- Ladder screen (Edit (Insert))

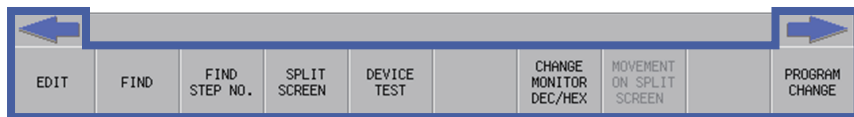


No.	Item name	Description
(1)	Program name	This displays the name of the currently displayed program.
(2)	Step number	This displays the step number of the currently displayed program.
(3)	Monitor/Edit display	This displays whether the current ladder screen is in the monitored state or the edit state.
(4)	Monitored: PLC status display (RUN/STOP) Edit: Overwrite/Insert display	This displays the PLC status (RUN/STOP) when the ladder screen is in the monitored state. This displays whether the edit mode is in overwrite or insert mode when the ladder screen is in the edit state.

7.2.3 Menu Keys

The menu keys consist of the 10 buttons arranged on the bottom of the PLC Onboard and the arrow keys arranged on the left and right edges. (area inside the blue lines)

The menu keys may be enabled (black character display) or disabled (gray character display) depending on the state of the NC and the PLC Onboard.



Item name	Description
Menu keys	These execute functions and the display of screens corresponding to the menu names written on the buttons. Blank menu keys are disabled.
Left arrow key	This closes displayed popup screens (described later) and transitions to upper-tier menus.
Right arrow key	This transitions to same-tier menus.

7.2.3.1 Menu Key Tiers and Transitions

The menu keys are divided into several tiers. Pressing corresponding menu keys enables transitions to lower tiers.

Pressing the left arrow key enables transitions to higher tiers, and pressing the right arrow key enables transitions on the same tier.

The following table summarizes each menu tier.

Corresponding menu			
Level 1	Level 2	Level 3	Level 4
Main	NC file operation		
	External file operation		
	Circuit	Monitor 1 Monitor 2	
		Edit 1 Edit 2	Circuit symbol 1
			Circuit symbol 2
	Device	Device batch monitor	Copy/Insert line
		Device register monitor	
	Parameters	Multi-project parameter	Project settings
	PLC diagnosis		Device settings
	Environment settings		



Switch pages

Transition to same-tier menus

7.2.3.2 Menu Key Details

7.2.3.3 Developer Mode Menu Keys

The following describes the menu keys in each tier. (The enabled/disabled status of each menu key is described later.)

(1) [MAIN] menu keys

This is the highest tier of the PLC Onboard menu. Other types of functions are called from this menu.

- This is the menu available when the sequence program is stored in the connected project.

NC FILE	EXT.FILE OPERATION	LADDER	DEVICE	PARAM.	PLC DIAGNOSIS	ENVIRON. SETTING			SELECT PROJECT

NC file operation	This changes to the [NC FILE OPERATION] menu keys.
External file operation	This changes to the [EXT. FILE OPERATION] menu keys.
Ladder	This displays the ladder screen and starts the monitor.
Device	This changes to the [DEVICE] menu keys.
Parameter	This changes to the [PARAMETER] menu keys.
PLC diagnosis	This displays the [PLC DIAGNOSIS] screen.
Environment Settings	This changes to the [ENVIRON. SETTING] menu keys.
Select Project	This selects the current project. *This is only enabled when using multiple projects.

- This is the menu available when the sequence program is not stored in the connected project.

FILE OPE.	EXT.->NC	ROM WRITE	PROJECT SETTING	DEVICE SETTING		PLC DIAGNOSIS	CONNECT NC CHANGING		SELECT PROJECT

File operation	This displays the [FILE OPERATION] screen.
External -> NC	This displays the [EXT.->NC] screen.
ROM write	This displays the [ROM WRITE] popup screen.
Project settings	This displays the [PROJECT SETTING] screen.
Device settings	This displays the [DEVICE SETTING] screen.
PLC diagnosis	This displays the [DIAGNOSIS] screen.
Connected NC switch	This displays the [CONNECT NC CHANGE] screen.
Select project	This selects the current project. *This is only enabled when using multiple projects.

(2) [NC FILE OPERATION] menu keys

This menu contains various operations for files stored in the NC such as opening files stored in and confirming information of files stored in the NC.

LIST	OPEN	FILE OPE.	FORMAT	ROM WRITE	PLC RUN/STOP	PASSWORD CANCEL.			BACK

File list	This displays the [FILE LIST] screen.
Open	This displays the [OPEN] screen.
File operation	This displays the [FILE OPERATION] screen.
Format	This displays the [FORMAT] popup screen.
ROM Write	This displays the [ROM WRITE] popup screen.
PLC RUN/STOP	This displays the [PLC RUN/STOP] popup screen.
Password Cancellation	This displays the [PASSWORD CANCELLATION] popup screen.
Return	This returns to the [MAIN] menu keys.

(3) [EXT. FILE OPERATION] menu keys

This menu contains various operations for external files such as saving files stored in SD cards and USB memory devices into NC.

EXT.→NC	NC→EXT.	DELETE EXT. FILE	VERIFY EXT.FILE				PLC RUN/STOP	PASSWORD CANCEL.	BACK

External → NC	This displays the [EXT. → NC] screen.
NC → External	This displays the [NC -> EXT.] screen.
Delete external file	This displays the [DELETE EXT. FILE] screen.
Verify external file	This displays the [VERIFY EXT. FILE] screen.
PLC RUN/STOP	This displays the [PLC RUN/STOP] popup screen.
Password Cancellation	This displays the [PASSWORD CANCELLATION] popup screen.
Return	This returns to the [MAIN] menu keys.

(4) [LADDER] menu keys

(4-1) Monitor menu

This menu contains functions used to monitor circuits.

• First page

EDIT	FIND	FIND STEP NO.	SPLIT SCREEN	DEVICE TEST		CHANGE MONITOR DEC/HEX	MOVEMENT ON SPLIT SCREEN		PROGRAM CHANGE

• Second page

CROSS REF. LIST	LIST OF USED DEVICES		COMMENT ON/OFF					ZOOM DISPLAY	PLC RUN/STOP

Edit	This switches to the [EDIT] mode.
Find	This displays the [FIND] popup screen.
Find Step No.	This displays the [FIND STEP NO.] popup screen.
Split screen	This displays the [SPLIT SCREEN] menu.
Device test	This displays the [DEVICE TEST] popup screen.
Current value monitor changeover (10/16)	This changes the current value display between decimal and hexadecimal.
Transition to split screen	This transitions the focus between the split screens.
Switch Program	This changes to the selected program.
Contact coil usage list	This displays the [CONTACT COIL USAGE] popup screen.
List of used devices	This displays the [LIST OF USED DEVICES] popup screen.
Comment on/off	This turns the device comment display on and off.
Zoom display	This changes the display magnification of the ladder screen.
PLC RUN/STOP	This displays the [PLC RUN/STOP] popup screen.

(4-2) Split screen menu

This menu contains functions used to operate the split screen.

ENTRY DEVICE	ENTRY LADDER MONITOR		REGISTER MONITOR				MOVEMENT ON SPLIT SCREEN		PROGRAM CHANGE

Entry device monitor	This turns the [ENTRY DEVICE MONITOR] screen on and off.
Entry Ladder monitor	This turns the [ENTRY LADDER MONITOR] screen on and off.
Register monitor	This registers the ladder on the cursor position in the ladder registration monitor.
Transition to split screen	This transitions the focus between the split screens.
Switch Program	This changes to the selected program.

(4-2-1) Entry data monitor (split screen) menu

This menu contains functions used to operate the device registration monitor (split screen).

DEVICE TEST			16BIT/32BIT	DEC/HEX		MOVEMENT ON SPLIT SCREEN	PLC RUN/STOP		CLOSE

Device test	This displays the [DEVICE TEST] popup screen.
16 bit/32 bit switch	This switches the current value display between 16 bits/32 bits.
Decimal/Hexadecimal switch	This changes the current value display between decimal and hexadecimal.
Transition to split screen	This transitions the focus between the split screens.
PLC RUN/STOP	This displays the [PLC RUN/STOP] popup screen.
Close	This closes the [ENTRY DEVICE MONITOR] screen.

(4-2-2) Entry Ladder monitor (split screen) menu

This menu contains functions used to operate the Entry Ladder monitor (split screen).

FIND	DEVICE TEST		ENTRY LADDER ALL DEL.	DIVISION RATIO CHANGE	MOVEMENT ON SPLIT SCREEN	ZOOM DISPLAY	PLC RUN/STOP		CLOSE

Find	This displays the [FIND] popup screen.
Device test	This displays the [DEVICE TEST] popup screen.
Registered ladder all delete	This deletes all circuits registered in the Entry Ladder monitor.
Division ratio change	This changes the ratio of the split screens for the ladder registration monitor.
Transition to split screen	This transitions the focus between the split screens.
Zoom display	This changes the display magnification of the ladder screen.
PLC RUN/STOP	This displays the [PLC RUN/STOP] popup screen.
Close	This closes the [ENTRY LADDER MONITOR] screen.

(4-3) Edit menu

This menu contains functions used to edit circuits.

• First page

MONITOR	LADDER SYMBOL1	LADDER SYMBOL2	COPY/INSERT	FIND	FIND STEP NO.	CONVERT LADDER	UNDO		PROGRAM CHANGE

• Second page

CROSS REF. LIST	LIST OF USED DEVICES	CHECK PROGRAM	COMMENT ON/OFF			CANCEL EDIT LADDER		ZOOM DISPLAY	OVR.WRITE /INSERT

Monitor	This switches to the [MONITOR] mode.
Ladder symbol 1	This switches to the [LADDER SYMBOL1] menu.
Ladder symbol 2	This switches to the [LADDER SYMBOL2] menu.
Copy/Insert	This switches to the [COPY/INSERT] menu.
Find	This displays the [FIND] popup screen.
Find Step No.	This displays the [FIND STEP NO.] popup screen.
Convert ladder	This converts edited circuits.
Undo	This returns the pre-converted ladder to the last previous state while editing.
Switch Program	This changes to the selected program.
Contact coil usage list	This displays the [CONTACT COIL USAGE] popup screen.
List of used devices	This displays the [LIST OF USED DEVICES] popup screen.
Check program	This opens the [CHECK PROGRAM] popup screen.
Comment ON/OFF	This turns the device comment display on and off.
Cancel edit ladder	This discards the unconverted ladder.
Zoom display	This changes the display magnification of the ladder screen.
Overwrite/Insert	This switches the edit mode between overwrite and insert mode.

(4-3-1) Ladder Symbol 1 menu, Ladder Symbol 2 menu

This menu contains ladder symbols used to edit circuits.

• Ladder Symbol 1 menu

┌┐	┌┐┌	┌┐┐	┌┐┐┐	< >┐	┐┐┐	—		CONVERT LADDER	UNDO

• Ladder Symbol 2 menu

┌┐┐┐	┌┐┐┐	┌┐┐┐┐	┌┐┐┐┐	↑	↓	-/-	 DELETE	CONVERT LADDER	UNDO

Ladder symbols other than the following	This opens the [ENTER SYMBOL] popup screen.
- (Horizontal bar)	Writes the [Horizontal bar] to the cursor position.
(Vertical bar)	Writes the [Vertical bar] to the cursor position.
Delete (Vertical bar)	This deletes the [Vertical bar] at the cursor position.
Convert ladder	This converts edited circuits.
Undo	This returns the pre-converted ladder to the last previous state while editing.

(4-3-2) Copy/Insert menu

This menu contains the copy, paste, line insert, and line delete functions.

MARK	COPY	PASTE	INSERT LINE	DELETE LINE				CONVERT LADDER	UNDO

Mark	Ladder groups are selected by designating start points and end points.
Copy	This copies the ladder in the designated range.
Paste	This pastes copied circuits at the cursor position.
Insert Line	This inserts one blank line at the cursor position.
Delete Line	This deletes the line at the cursor position.
Convert Ladder	This converts edited circuits.
Undo	This returns the pre-converted ladder to the last previous state while editing.

(5) [DEVICE] menu keys

This menu contains functions used to monitor desired devices.

DEVICE BATCH	ENTRY DEVICE								BACK

Device Batch Monitor	This opens the [DEVICE BATCH MONITOR] screen.
Entry Device Monitor	This displays the [ENTRY DEVICE MONITOR] screen.
Return	This returns to the [MAIN] menu keys.

(6) [PARAMETER] menu keys

This menu contains functions used to configure operation of programs and multiple projects.

PROGRAM SETTING	COMMON POINTER SETTING			MULTI PROJECT PARAM.					BACK

Program Setting	This displays the [PROGRAM SETTING] screen.
Common Pointer Setting	This displays the [COMMON POINTER SETTING] screen.
Multiple Project Parameters	This switches to the [MULTIPLE PROJECT PARAMETERS] menu keys.
Return	This returns to the [MAIN] menu keys.

(7) [ENVIRON. SETTING] menu keys

This menu contains functions used to configure the PLC Onboard usage environment such as ladder screen settings and locations to store device comments.

COMMENT DISPLAY	LADDER DISPLAY			CONNECT NC CHANGING					BACK

Comment Display Setting	This displays the [COMMENT DISPLAY SETTING] screen.
Ladder Display	This screen displays the [LADDER DISPLAY] screen.
Return	This returns to the [MAIN] menu keys.

7.3 Operation Key List

7.3.1 Basic Operation Keys

The following table lists the keys used to operate the PLC Onboard.

Key	Description
A to Z, 0 to 9	These keys are used to enter data.
INSERT	This key changes the edit mode when editing circuits between the overwrite and insert modes.
DELETE	This key deletes the last character input that has not yet been issued.
C.B	This key deletes input character strings that have not yet been issued.
INPUT	This key issues the input data. It also selects data.
↑, ↓, →, ←	These keys are used to move the cursor up, down, left and right and to select items.
→	This key moves screen items in the forward order.
←	This key moves screen items in the reverse order.
 or ESC	These keys transition to the next highest menu tier and close popup windows.
	This transitions to same-tier menus.
Page Up	This key moves screens up in pages.
Page Down	This key moves screens down in pages.
SP	This key enters and removes checks from check boxes.
<,>	The <,> key may not be available depending on the specific model. In such a case, use the (,) key as a substitute.
EOB	This key turns the display of device comments on the ladder screen on and off.
#	This key switches between screens when using the split screen display.

7.3.2 Screen Items (Control)

Table background colors

Some of the tables used in PLC Onboard screens contain both areas where values are input and areas where values are selected. For this reason, different background colors are used to visually distinguish between input areas and selection areas. The following table describes these background colors.

Background color	Description
White	Indicates areas where values are input. (area inside the green lines in the following diagram)
Yellow	Indicates areas where values are selected. (area inside the blue lines in the following diagram)
Light blue	Indicates the position of the current selection under focus. (area inside the red lines in the following diagram)
Gray	Indicates areas where values cannot be input or selected.

PROJECT No.	01	02	03	04	05	06
PROJ. RATIO(%)	20	16	16	16	16	16
EXECUTE PROJECT	ON	OFF	OFF	OFF	OFF	OFF
EXE.ORDER	1	2	3	4	5	6

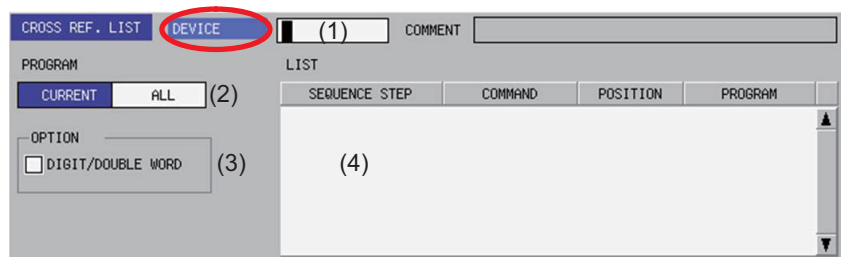
Selecting input and selection items

There are two methods used to select input and selection items.

- (1) Select using the Tab keys (→|,|←)

Select and enable items that can be input or selected in a predetermined order. The background color of the title of a selected item changes to blue. (Refer to the area of the following diagram with a red circle.)

Ex.) [CONTACT COIL USAGE LIST] screen



Operation	Description
Press [→]	Selects items in order from (1) → (2) and so on returning back to (1) after (4).
Press [←]	Selects items in order from (4) → (3) and so on returning back to (2) after (1).

- Select and enable input and selection items by pressing the menu keys corresponding to the input and selection items. The background color of the title of a selected item changes to blue.

CROSS REF. LIST

PROGRAM LIST

CURRENT ALL

OPTION

☐ DIGIT/DOUBLE WORD

SEQUENCE STEP COMMAND POSITION PROGRAM

Menu key pressed

DEVICE PROGRAM OPTION EXECUTE LIST JUMP CLOSE

There are multiple input positions when inputting values into lists and tables. Select the desired input position by using the following method.

- (2) Use the [↑], [↓], [←], and [→] keys to move to the desired input position.

[illegible]

Inputting values

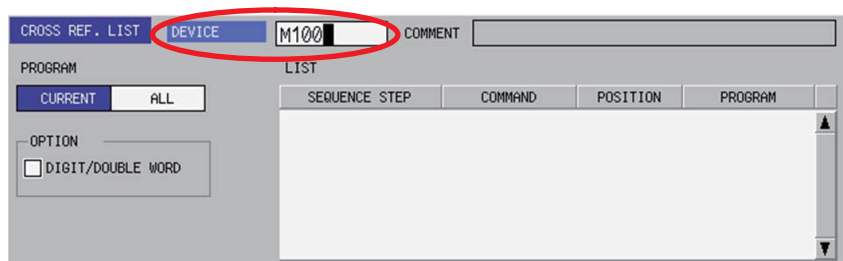
(1) Items that can be input directly

Perform the following operation to input values (text strings and numbers) into direct-input items such as that marked by the red circle in the following diagram.

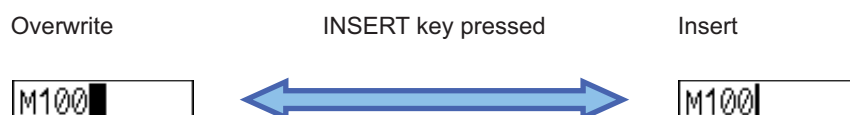
(a) Select the input item. (Refer to "Selecting input and selection items")

(b) Use the keyboard to input values.

Ex.) [CONTACT COIL USAGE LIST] screen



*Press the INSERT key to switch between the two edit modes (overwrite/insert). Switching the edit mode changes the shape of the cursor.



(2) Items that cannot be input directly

Perform the following operation to input values (text strings and numbers) into input items not capable of direct input such as lists.

(a) Select the input position in the list. (Refer to "Selecting the input position")

(b) Use the keyboard to issue the [INPUT] key.

Issuing the INPUT key displays and selects the input item (area inside the blue lines in the following diagram).



(3) Use the keyboard to input values.

(4) Use the keyboard to issue the [INPUT] key.

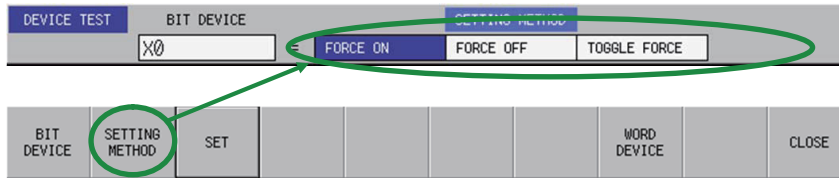
Issuing the INPUT key closes the input item and displays the input item at the selected position.

DEVICE	ON/OFF/CURRENT	DATA	CONN.	COIL
D100				

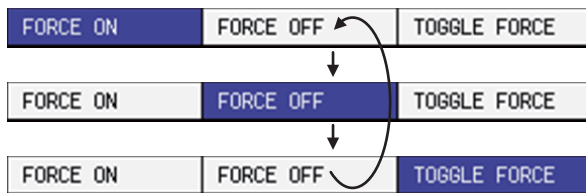
Configuring unique selection items

Only one data item is selected from two or more data items. The highlighted data is the currently selected item. There are two methods used to change selections.

- (1) Press the menu key with the same name as the item to move the selection data move in the right direction. The selection will move to the left-most position when the currently selected item is at the right-most position.



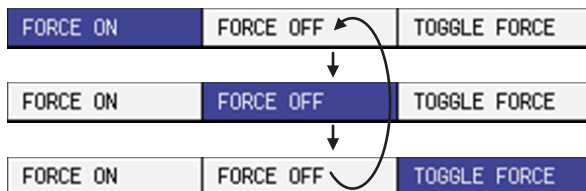
Pressing the applicable menu key moves the selection as illustrated in the following diagram.



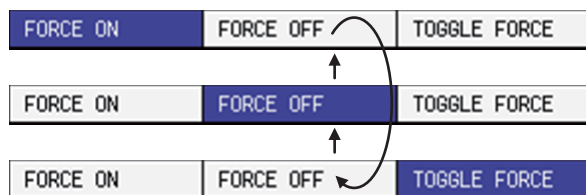
- (2) After selecting an item with the Tab key, press the [←] and [→] to move the selection. If the currently selected item is at the right-most position, the selection moves to the left-most position. If the currently selected item is at the left-most position, the selection moves to the right-most position.



The selection moves to the right as illustrated in the following figure when the [→] key is pressed.



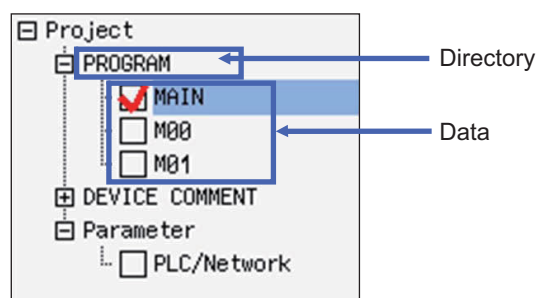
The selection moves to the left as illustrated in the following figure when the [←] key is pressed.



Selecting tree-structure data

Tree-structure data is configured of directories and data.

Directories and data are illustrated in the following diagram.



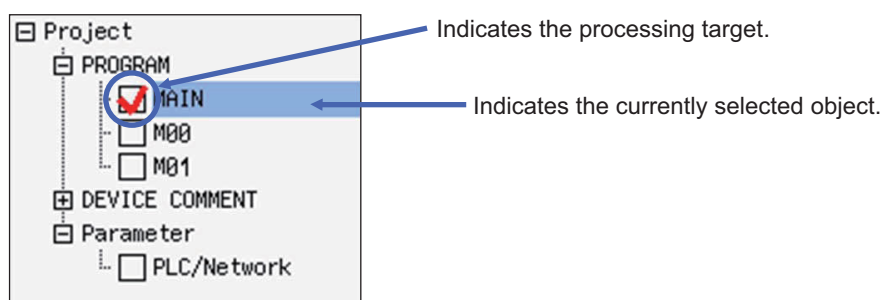
<Transitioning between/selecting directories and data>

Use the [↑], [↓], [←], and [→] arrow keys to move between and select data one unit at a time. Use the [Page Up] and [Page Down] keys to move between pages one at a time and to select data.

<Enabling and disabling data to be processed>

There are two methods used to enable and disable selections.

- Move to and select the data to be set and press the [SP (space code)] key.
 Selections that are checked are enabled and selections that are not checked are disabled.
 Each press of the [SP] key switches between the enabled and disabled state.
- Move to and select the data to be set and press the [SELECT/CANCEL] menu key.
 Selections that are checked are enabled and selections that are not checked are disabled.
 Each press of the [SELECT/CANCEL] menu key switches between the enabled and disabled state.



<[+] and [-] symbols next to directories>

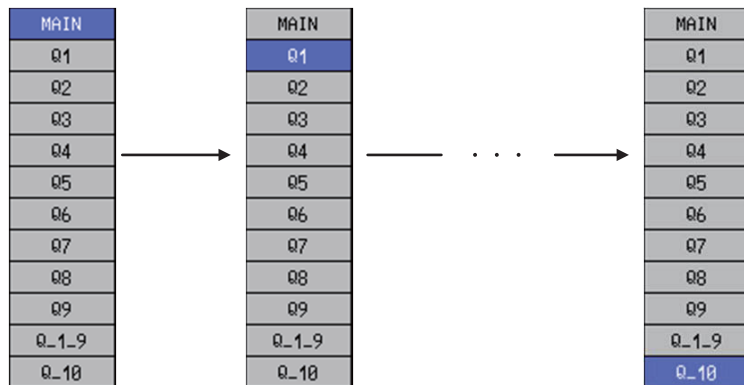
- Pressing the [→] key for directories marked with the [+] symbol expands the directory to display the data within.
- Pressing the [←] key for directories marked with the [-] symbol collapses the directory to no longer display the data within.

Setting selection items in lists

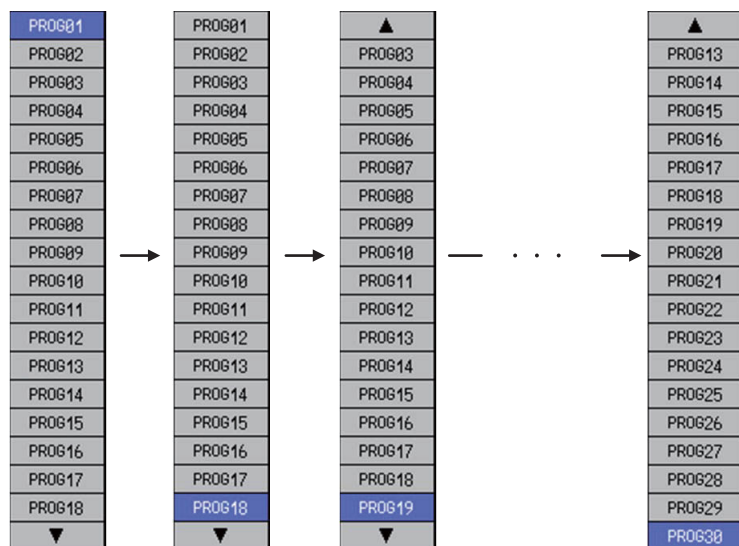
Select one item of data from lists containing multiple entries of data. The example used to describe the selection method is a screen containing UI elements for selecting data from a list.

(1) Switching between programs or other types of data

Pressing the [SWITCH PROGRAM] menu key displays the name of the programs stored in NC in the list. The currently displayed data is selected (highlighted). Use the [↑] and [↓] arrow keys to change the selected data. Press the [INPUT] key to issue the selection.



If there are multiple stored programs that cannot be displayed on one screen, a triangle pointing down is displayed under the final data display on the screen as illustrated in the following diagram. As illustrated in the preceding diagram, use the [↑] and [↓] arrow keys to move the selection to the triangle pointing downward and display the next page. Repeat this operation to move to the last page.



(2) Selecting external projects or other data

Directories and project data displayed in the [LIST] can be selected and the contents of directories can be displayed.

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P LADDER	2014/12/25 17:33:40	LADDER PROGRAM
■ OTHER		Directory
P PROJECT	2014/12/25 17:34:49	PROJECT1

Use the [↑] and [↓] arrow keys to change selections when lists as in the preceding diagram are displayed. The background color of selected items is light blue.

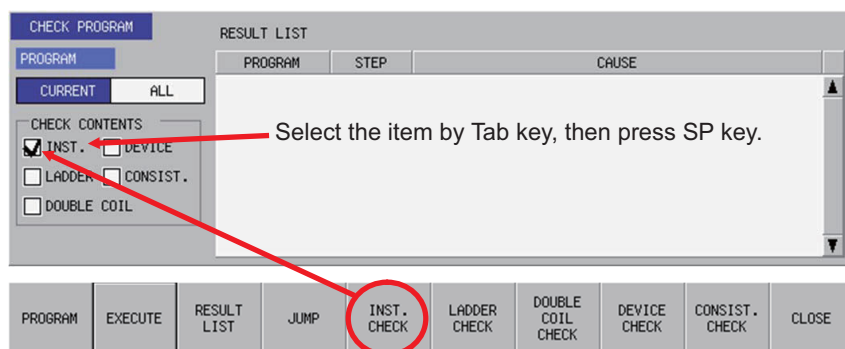
Select items marked with the [■] icon in the name display column and labeled as [DIRECTORY] in the title column and press the [INPUT] key or "Select" menu key to display the information within the selected directory. Select directory icons indicated by ".." and press the [INPUT] key to display information in parent directories.

Items indicated by the icon [P] in the name display column indicate GX Developer project data. Use the [↑] and [↓] arrow keys to select data and then operate the menu keys on the screen to issue the selection.

Enabling and disabling selected parameters

You can enable and disable various parameters. There are two methods used to make these settings.

- (1) Press the menu key with the same name as the parameter to select the parameter if not already selected. Press the same menu key again to enable (add a check mark to) the parameter. If the parameter is already selected, the parameter is enabled (check mark is added) when the menu key is pressed. Pressing the menu key when the parameter is enabled disables (clears the check mark from) the parameter. Continually pressing the same menu key switches between the enabled and disabled state.
- (2) After selecting the parameter with the Tab key, press the [SP] key to switch between the enabled and disabled state.



7.4 Language

7.4.1 Screen Display Language

The following table describes the effect of the different NC language parameter settings on the display of text strings, error messages, device names and instructions on ladder screens, and monitor values described in the various controls displayed by the PLC Onboard.

The following table describes the timing at which additional languages can be changed.

Timing to change additional languages
Startup and display of the PLC Onboard after changing the language parameter

Language parameter	Screen additional languages
0: Japanese display	Displays text strings on screens in Japanese.
1: English display	Displays text strings on screens in English.
11: German display 12: French display 13: Italian display 14: Spanish display 15: Chinese (traditional) display 16: Korean (Hangul) 17: Portuguese 18: Dutch 19: Swedish 20: Hungarian 21: Polish 22: Chinese (simplified) 23: Russian 24: Turkish 25: Czech	Displays text strings on screens in English.

7.4.2 Language for Device Comments, Statements, Notes, and Machine Names

Device comments, statements, notes, and machine names are displayed in the language selected by the language parameter.

Language parameter	Additional languages
0: Japanese display	Displays text strings on screens in Japanese.
1: English display	Displays text strings on screens in English.
11: German display 12: French display 13: Italian display 14: Spanish display 15: Chinese (traditional) display 16: Korean (Hangul) 17: Portuguese 18: Dutch 19: Swedish 20: Hungarian 21: Polish 22: Chinese (simplified) 23: Russian 24: Turkish 25: Czech	Displays text strings on screens in English.

7.5 PLC Data

7.5.1 PLC Data Used by the PLC Onboard

The PLC Onboard uses the same data as GX Developer as illustrated in the following table.

Data type	Data name	Application
Sequence programs	Data names are configured by up to eight one-byte uppercase alphanumeric characters (*1).	The user PLC, statements, and notes are stored.
PLC messages	Data names are configured by up to eight one-byte uppercase alphanumeric characters (*1) and in accordance with PLC message naming conventions (*3).	PLC messages (alarms, operators, PLC switches, and comments) are stored.
Device comments	Data names are configured by up to eight one-byte uppercase alphanumeric characters (*1).	Comments and device names are stored.
Parameters	Parameter names are fixed and cannot be changed.	Program execution sequences and such are stored.

*1 Characters that cannot be used in data names

- Reserved characters (AUX, CON, PRN, NUL, COM1 to COM9, LPT1 to LPT9, and CLOCK\$)
- Data names that include these characters result in error: " = | : ; , \ [] + * ? < > . / .

The following characters also cannot be used.

- Special NEC selected IBM extended characters (character codes: 0xED40 to 0xEEEC)
- IBM extended characters (character codes: 0xFA40 to 0xFC4B)
- Characters of character codes that have the same appearance as NEC selected IBM extended characters and IBM extended characters within the range of character codes 0x849F to 0x879C

Ex.: Roman numerals (I to X), $\frac{1}{2}$, $\frac{3}{4}$, $\frac{5}{8}$, $\frac{7}{8}$, $\frac{9}{16}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, $\frac{1}{64}$, $\frac{1}{128}$, $\frac{1}{256}$, $\frac{1}{512}$, $\frac{1}{1024}$, $\frac{1}{2048}$, $\frac{1}{4096}$, $\frac{1}{8192}$, $\frac{1}{16384}$, $\frac{1}{32768}$, $\frac{1}{65536}$, $\frac{1}{131072}$, $\frac{1}{262144}$, $\frac{1}{524288}$, $\frac{1}{1048576}$, $\frac{1}{2097152}$, $\frac{1}{4194304}$, $\frac{1}{8388608}$, $\frac{1}{16777216}$, $\frac{1}{33554432}$, $\frac{1}{67108864}$, $\frac{1}{134217728}$, $\frac{1}{268435456}$, $\frac{1}{536870912}$, $\frac{1}{1073741824}$, $\frac{1}{2147483648}$, $\frac{1}{4294967296}$, $\frac{1}{8589934592}$, $\frac{1}{17179869184}$, $\frac{1}{34359738368}$, $\frac{1}{68719476736}$, $\frac{1}{137438953472}$, $\frac{1}{274877906944}$, $\frac{1}{549755813888}$, $\frac{1}{1099511627776}$, $\frac{1}{2199023255552}$, $\frac{1}{4398046511104}$, $\frac{1}{8796093022208}$, $\frac{1}{17592186044416}$, $\frac{1}{35184372088832}$, $\frac{1}{70368744177664}$, $\frac{1}{140737488355328}$, $\frac{1}{281474976710656}$, $\frac{1}{562949953421312}$, $\frac{1}{1125899906842624}$, $\frac{1}{2251799813685248}$, $\frac{1}{4503599627370496}$, $\frac{1}{9007199254740992}$, $\frac{1}{18014398509481984}$, $\frac{1}{36028797018963968}$, $\frac{1}{72057594037927936}$, $\frac{1}{144115188075855872}$, $\frac{1}{288230376151711744}$, $\frac{1}{576460752303423488}$, $\frac{1}{1152921504606846976}$, $\frac{1}{2305843009213693952}$, $\frac{1}{4611686018427387904}$, $\frac{1}{9223372036854775808}$, $\frac{1}{18446744073709551616}$, $\frac{1}{36893488147419103232}$, $\frac{1}{73786976294838206464}$, $\frac{1}{147573952589676412928}$, $\frac{1}{295147905179352825856}$, $\frac{1}{590295810358705651712}$, $\frac{1}{1180591620717411303424}$, $\frac{1}{2361183241434822606848}$, $\frac{1}{4722366482869645213696}$, $\frac{1}{9444732965739290427392}$, $\frac{1}{18889465931478580854784}$, $\frac{1}{37778931862957161709568}$, $\frac{1}{75557863725914323419136}$, $\frac{1}{151115727451828646838272}$, $\frac{1}{302231454903657293676544}$, $\frac{1}{604462909807314587353088}$, $\frac{1}{1208925819614629174706176}$, $\frac{1}{2417851639229258349412352}$, $\frac{1}{4835703278458516698824704}$, $\frac{1}{9671406556917033397649408}$, $\frac{1}{19342813113834066795298816}$, $\frac{1}{38685626227668133590597632}$, $\frac{1}{77371252455336267181195264}$, $\frac{1}{154742504910672534362390528}$, $\frac{1}{309485009821345068724781056}$, $\frac{1}{618970019642690137449562112}$, $\frac{1}{1237940039285380274899124224}$, $\frac{1}{2475880078570760549798248448}$, $\frac{1}{4951760157141521099596496896}$, $\frac{1}{9903520314283042199192993792}$, $\frac{1}{19807040628566084398385987584}$, $\frac{1}{39614081257132168796771975168}$, $\frac{1}{79228162514264337593543950336}$, $\frac{1}{158456325028528675187087900672}$, $\frac{1}{316912650057057350374175801344}$, $\frac{1}{633825300114114700748351602688}$, $\frac{1}{1267650600228229401496703205376}$, $\frac{1}{2535301200456458802993406410752}$, $\frac{1}{5070602400912917605986812821504}$, $\frac{1}{10141204801825835211973625643008}$, $\frac{1}{20282409603651670423947251286016}$, $\frac{1}{40564819207303340847894502572032}$, $\frac{1}{81129638414606681695789005144064}$, $\frac{1}{162259276829213363391578010288128}$, $\frac{1}{324518553658426726783156020576256}$, $\frac{1}{649037107316853453566312041152512}$, $\frac{1}{1298074214633706907132624082305024}$, $\frac{1}{2596148429267413814265248164610048}$, $\frac{1}{5192296858534827628530496329220096}$, $\frac{1}{10384593717069655257060992658440192}$, $\frac{1}{20769187434139310514121985316880384}$, $\frac{1}{41538374868278621028243970633760768}$, $\frac{1}{83076749736557242056487941267521536}$, $\frac{1}{166153499473114484112975882535043072}$, $\frac{1}{332306998946228968225951765070086144}$, $\frac{1}{664613997892457936451903530140172288}$, $\frac{1}{1329227995784915872903807060280344576}$, $\frac{1}{2658455991569831745807614120560689152}$, $\frac{1}{5316911983139663491615228241121378304}$, $\frac{1}{10633823966279326983230456482242756608}$, $\frac{1}{21267647932558653966460912964485513216}$, $\frac{1}{42535295865117307932921825928971026432}$, $\frac{1}{85070591730234615865843651857942052864}$, $\frac{1}{170141183460469231731687303715884105728}$, $\frac{1}{340282366920938463463374607431768211456}$, $\frac{1}{680564733841876926926749214863536422912}$, $\frac{1}{1361129467683753853853498429727072845824}$, $\frac{1}{2722258935367507707706996859454145691648}$, $\frac{1}{5444517870735015415413993718908291383296}$, $\frac{1}{10889035741470030830827987437816582766592}$, $\frac{1}{21778071482940061661655974875633165533184}$, $\frac{1}{43556142965880123323311949751266331066368}$, $\frac{1}{87112285931760246646623899502532662132736}$, $\frac{1}{174224571863520493293247799005065324265472}$, $\frac{1}{348449143727040986586495598010130648530944}$, $\frac{1}{696898287454081973172991196020261297061888}$, $\frac{1}{1393796574908163946345982392040522594123776}$, $\frac{1}{2787593149816327892691964784081045188247552}$, $\frac{1}{5575186299632655785383929568162090376495104}$, $\frac{1}{11150372599265311570767859136324180752990208}$, $\frac{1}{22300745198530623141535718272648361505980416}$, $\frac{1}{44601490397061246283071436545296723011960832}$, $\frac{1}{89202980794122492566142873090593446023921664}$, $\frac{1}{178405961588244985132285746181186892047843328}$, $\frac{1}{356811923176489970264571492362373784095686656}$, $\frac{1}{713623846352979940529142984724747568191373312}$, $\frac{1}{1427247692705959881058285969449495136382746624}$, $\frac{1}{2854495385411919762116571938898990272765493248}$, $\frac{1}{5708990770823839524233143877797980545530986496}$, $\frac{1}{11417981541647679048466287755595961091061972992}$, $\frac{1}{22835963083295358096932575511191922182123945984}$, $\frac{1}{45671926166590716193865151022383844364247891968}$, $\frac{1}{91343852333181432387730302044767688728495783936}$, $\frac{1}{182687704666362864775460604089535377456991567872}$, $\frac{1}{365375409332725729550921208179070754913983135744}$, $\frac{1}{730750818665451459101842416358141509827966271488}$, $\frac{1}{1461501637330902918203684832716283019655932542976}$, $\frac{1}{2923003274661805836407369665432566039311865085952}$, $\frac{1}{5846006549323611672814739330865132078623730171904}$, $\frac{1}{11692013098647223345629478661730264157247460343808}$, $\frac{1}{23384026197294446691258957323460528314494920687616}$, $\frac{1}{46768052394588893382517914646921056628989841375232}$, $\frac{1}{93536104789177786765035829293842113257979682750464}$, $\frac{1}{187072209578355573530071658587684226515959365500928}$, $\frac{1}{374144419156711147060143317175368453031918731001856}$, $\frac{1}{748288838313422294120286634350736906063837462003712}$, $\frac{1}{1496577676626844588240573268701473812127674924007424}$, $\frac{1}{2993155353253689176481146537402947624255349848014848}$, $\frac{1}{5986310706507378352962293074805895248510699696029696}$, $\frac{1}{11972621413014756705924586149611790497021399392059392}$, $\frac{1}{23945242826029513411849172299223580994042798784118784}$, $\frac{1}{47890485652059026823698344598447161988085597568237568}$, $\frac{1}{95780971304118053647396689196894323976171195136475136}$, $\frac{1}{191561942608236107294793378393788647952342390272950272}$, $\frac{1}{383123885216472214589586756787577295904684780545900544}$, $\frac{1}{766247770432944429179173513575154591809369561091801088}$, $\frac{1}{1532495540865888858358347027150309183618739122183602176}$, $\frac{1}{3064991081731777716716694054300618367237478244367204352}$, $\frac{1}{6129982163463555433433388108601236734474956488734408704}$, $\frac{1}{12259964326927110866866776217202473468949912977468817408}$, $\frac{1}{24519928653854221733733552434404946937899825954937634816}$, $\frac{1}{49039857307708443467467104868809893875799651909875269632}$, $\frac{1}{98079714615416886934934209737619787751599303819750539264}$, $\frac{1}{196159429230833773869868419475239575503198607639501078528}$, $\frac{1}{392318858461667547739736838950479151006397215279002157056}$, $\frac{1}{784637716923335095479473677900958302012794430558004314112}$, $\frac{1}{1569275433846670190958947355801916604025588861116008628224}$, $\frac{1}{3138550867693340381917894711603833208051177722232017256448}$, $\frac{1}{6277101735386680763835789423207666416102355444464034512896}$, $\frac{1}{12554203470773361527671578846415332832204710888928069025792}$, $\frac{1}{25108406941546723055343157692830665664409421777856138051584}$, $\frac{1}{50216813883093446110686315385661331328818843555712276103168}$, $\frac{1}{100433627766186892221372630771322662657637687111424552206336}$, $\frac{1}{200867255532373784442745261542645325315275374222849104412672}$, $\frac{1}{401734511064747568885490523085290650630550748445698208825344}$, $\frac{1}{803469022129495137770981046170581301261101496891396417650688}$, $\frac{1}{1606938044258990275541962092341162602522202993782792835301376}$, $\frac{1}{3213876088517980551083924184682325205044405987565585670602752}$, $\frac{1}{6427752177035961102167848369364650410088811975131171341205504}$, $\frac{1}{12855504354071922204335696738729300820177623950262342682411008}$, $\frac{1}{25711008708143844408671393477458601640355247900524685364822016}$, $\frac{1}{51422017416287688817342786954917203280710495801049370729644032}$, $\frac{1}{102844034832575377634685573909834406561420991602098741459288064}$, $\frac{1}{205688069665150755269371147819668813122841983204197482918576128}$, $\frac{1}{411376139330301510538742295639337626245683966408394965837152256}$, $\frac{1}{822752278660603021077484591278675252491367932816789931674304512}$, $\frac{1}{1645504557321206042154969182557350504982735865633579863348609024}$, $\frac{1}{3291009114642412084309938365114701009965471731267159726697218048}$, $\frac{1}{6582018229284824168619876730229402019930943462534319453394436096}$, $\frac{1}{13164036458569648337239753460458804039861886925068638906788872192}$, $\frac{1}{26328072917139296674479506920917608079723773850137277813577744384}$, $\frac{1}{52656145834278593348959013841835216159447547700274555627155488768}$, $\frac{1}{105312291668557186697918027683670432318895095400549111254310977536}$, $\frac{1}{210624583337114373395836055367340864637790190801098222508621955072}$, $\frac{1}{421249166674228746791672110734681729275580381602196445017243910144}$, $\frac{1}{842498333348457493583344221469363458551160763204392890034487820288}$, $\frac{1}{1684996666696914987166688442938726917102321526408785780068975640576}$, $\frac{1}{3369993333393829974333376885877453834204643052817571560137951281152}$, $\frac{1}{6739986666787659948666753771754907668409286105635143120275902562304}$, $\frac{1}{13479973333575319897333507543509815336818572211270286240551805124608}$, $\frac{1}{26959946667150639794667015087019630673637144422540572481103610249216}$, $\frac{1}{53919893334301279589334030174039261347274288845081144962207220498432}$, $\frac{1}{107839786668602559178668060348078522694548577690162289924414440996864}$, $\frac{1}{215679573337205118357336120696157045389097155380324579848828881993728}$, $\frac{1}{431359146674410236714672241392314090778194310760649159697657763987456}$, $\frac{1}{862718293348820473429344482784628181556388621521298319395315527974912}$, $\frac{1}{1725436586697640946858688965569256363112777243042596638790631055949824}$, $\frac{1}{3450873173395281893717377931138512726225554486085193277581262111899648}$, $\frac{1}{6901746346790563787434755862277025452451108972170386555162524223799296}$, $\frac{1}{13803492693581127574869511724554050904902217944340773110325048447598592}$, $\frac{1}{27606985387162255149739023449108101809804435888681546220650096895197184}$, $\frac{1}{55213970774324510299478046898216203619608871777363092441300193790394368}$, $\frac{1}{110427941548649020598956093796432407239217743554726184882600387580788736}$, $\frac{1}{220855883097298041197912187592864814478435487109452369765200775161577472}$, $\frac{1}{441711766194596082395824375185729628956870974218904739530401550323154944}$, $\frac{1}{883423532389192164791648750371459257913741948437809479060803100646309888}$, $\frac{1}{1766847064778384329583297500742918515827483896875618958121606201292619776}$, $\frac{1}{3533694129556768659166595001485837031654967793751237916243212402585239552}$, $\frac{1}{7067388259113537318333190002971674063309935587502475832486424805170479104}$, $\frac{1}{14134776518227074636666380005943348126619871175004951664972849610340958208}$

7.5.1.1 Sequence Program Details

The following details for created data can be saved as program data.

Saved details	Outline
Program (ladder) circuits	 This is data used to edit and monitor the user PLC with ladder diagrams consisting of XXX.
Statements	Statements are text strings added to each program ladder block to make it easier to understand the flow of the entire program. Statements include integrated statements that can be stored in the NC and peripheral statements that cannot be stored in the NC. (Refer to *1)
Notes	Similar to statements, notes are text strings added to each coil and function instruction in the program ladder to make it easier to understand the flow of the entire program. Notes include integrated notes that can be stored in the NC and peripheral notes that cannot be stored in the NC. (Refer to *1)

*1 Integrated statements, notes, and peripheral statements

Integrated type	Integrated types can be saved in the NC. Note that the program data takes up a large amount of memory when stored in the NC.
Peripheral types	Peripheral types are deleted when saved to the NC. For this reason, when using peripheral statements or notes, they must be managed as GX Developer projects.

7.5.1.2 PLC Message Details

The following table lists the PLC message types.

Saved details	Outline
Alarm messages	PLC alarm messages displayed on the NC.
Operator messages	PLC operator messages displayed on the NC.
PLC switches	Text strings used to name PLC switches.
Comment messages	PLC comment text strings displayed on the NC.

7.5.1.3 Device Comment Details

The following table lists the device comment types and details.

Saved details	Outline
Device comments	Text string data added to each device. Programs are easier to understand when comments are assigned to the devices.
Aliases	These text strings are displayed in place of the device name. These text strings make it easier to visually distinguish between programs.

7.5.1.4 Parameter Details

The following table lists the parameter types and details.

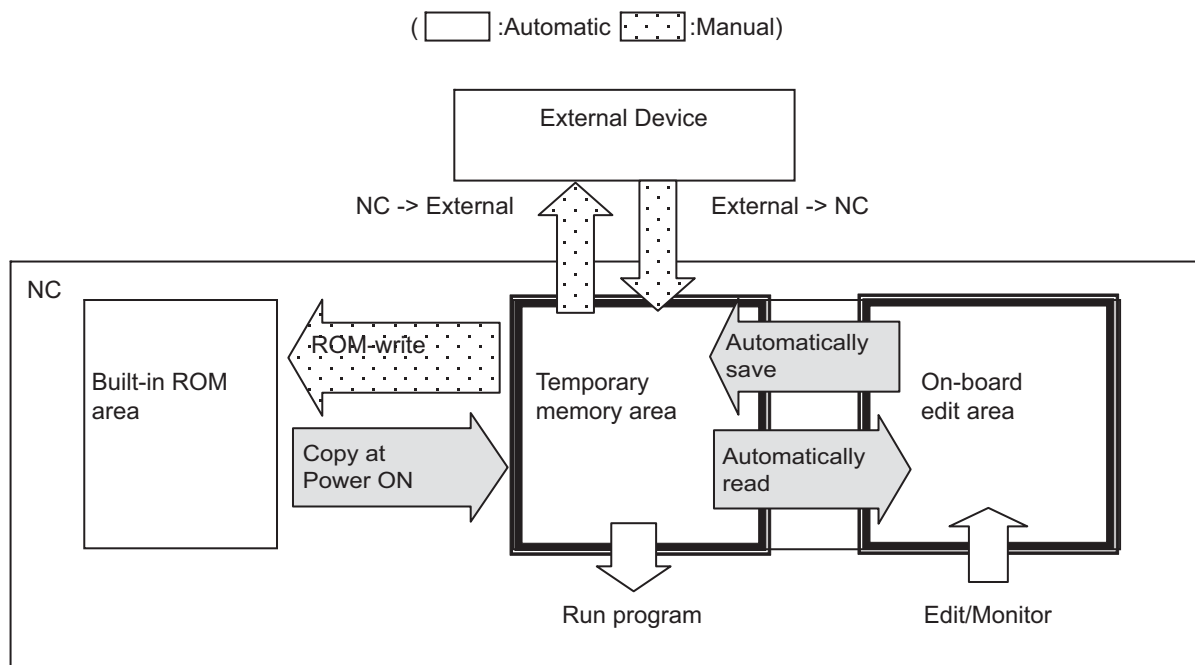
Saved details	Outline
Program settings	These are execution sequences for multiple programs (ladders).
Common pointer settings	These are numbers placed at the beginning of common pointers.

7.5.2 PLC Data Storage Areas

PLC data used by the PLC Onboard is stored in the following locations.

Storage area	Application
Temporary memory area	This area stores data used to execute the PLC. This data is editable with the PLC Onboard and GX Developer but is deleted when power to the NC is turned off.
Internal ROM area	This area stores the PLC data. The data in this area is not lost when the power to the NC is turned off. (Note) The data in the temporary memory is lost when power to the NC is turned off, so always save the data in the internal ROM area.
Onboard editing area	This area is used when editing and monitoring the PLC data with the onboard. When editing or monitoring, open the PLC data that is in the temporary memory into the onboard editing area.
External devices (SD cards/USB memory)	PLC data can be read from external devices to the onboard editing area and the temporary memory area. GX Developer project data can be read.

Configuration diagram of the PLC data storage areas



7.5.3 Passwords for PLC Data Files

Passwords are set on some PLC data files to protect PLC data.

Passwords for PLC data files stored in the NC can be temporarily cleared by the PLC Onboard.

*The PLC Onboard cannot be used to register, change, or delete file passwords.

Perform the following operations on GX Developer.

Refer to "Peripheral Development Environment Description: File Password Function".

7.5.3.1 File Password Attributes

File passwords have write attributes (writes allowed/not allowed) and read attributes (reads allowed/not allowed). The following table describes the operation restrictions corresponding to these attributes.

Attribute	Restricted operation
Writes not allowed	PLC data cannot be overwritten, deleted or changed after editing circuits.
Reads and writes not allowed	In addition to the preceding restrictions, PLC data cannot be read or viewed.

7.5.3.2 Clearing File Passwords

As illustrated in the following table, the screen used to cancel passwords is displayed in accordance with the proper matching of operations performed and file attributes marked with "○" in the [Attribute criteria].

Data protection mechanisms can be temporarily cleared by entering the password on the screen.

Operations			Attribute criteria	
			Writes not allowed	Reads and writes not allowed
NC File Operation ->	Open -> Close		-	Yes
	File Operation ->	Delete Data -> Delete	Yes	Yes
		Rename Data name -> Change	Yes	Yes
	Password Cancellation		Not relevant	
External File Operation ->	External -> NC -> Execute		Yes	Yes
	NC -> External -> Execute		-	Yes
	Verify External File -> Execute		-	Yes
	Password Cancellation		Not relevant	
Edit ladder -> Perform edits -> Change			Yes	Yes

Refer to "Canceling File Passwords" for information on clearing file passwords.

7.5.3.3 Valid Period of File Password Clears

The password cancel state is valid until the PLC Onboard is restarted or the connected project is changed.

Passwords do not need to be entered again when reading PLC data again or overwriting PLC data for which passwords have been cleared.

Passwords must be entered again and cleared when passwords for PLC data are changed in GX Developer.

7.6 Starting

7.6.1 Starting the Onboard

There are two methods used to start the PLC Onboard.

- (1) Start from the Mitsubishi standard display

There is a [Ladder Monitor] menu on the [Save] screen in the Mitsubishi standard display. (area inside the red lines in the following diagram)

Selecting this menu starts the PLC Onboard and displays the main screen.

Mainte	Param	I/O							
Screen	Console	Open	Open			Ladder			HMI
size	exec	dev par	SRAM			Monitor			Quit

- (2) Start by pressing the [F0] key

Pressing the [F0] key when the bit selection parameter that enables the PLC Onboard is set starts the PLC Onboard and displays the main screen.

7.7 Ending the PLC Onboard and Transitioning to the Mitsubishi Standard Display

7.7.1 Ending the PLC Onboard

There is no end menu in the PLC onboard. For this reason, to end the PLC Onboard, transition to the Mitsubishi standard display or turn off the power to the NC.

7.7.2 Transitioning to the Mitsubishi Standard Display

7.7.2.1 Method to transition to the Mitsubishi standard display

The following table describes the method used to transition from the PLC onboard to the Mitsubishi standard display.

Method to transition to the Mitsubishi standard display
Press the [MONITOR], [SET UP], [EDIT], [DIAGNOSIS], or [MAINTENANCE] key on the NC hardware keyboard to transition to the screen corresponding to the Mitsubishi standard display.
Press the [OPERATE], [ARRANGE], [EDIT], [DIAGNOSIS], or [SAVE] key on the PLC onboard soft keyboard to transition to the screen corresponding to the Mitsubishi standard display.

7.8 Basic Operation

This section describes the basic operational procedures to use the PLC onboard. Refer to the operational procedures for each screen (described later) for information on operating specific screens.

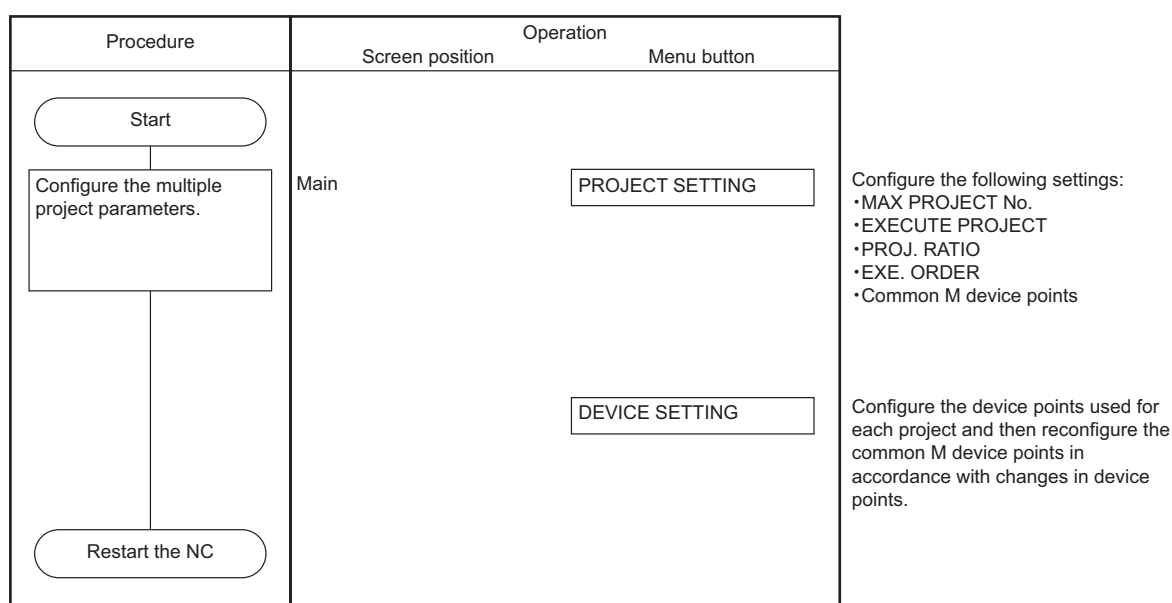
7.8.1 Basic Operation 1 (Configuring Multiple Project Parameters)

The following information describes the configuration procedure when using multiple projects.

7.8.1.1 Cases in which sequence programs are not stored

If the sequence programs are not stored, the menu key used to configure multiple project parameters is displayed on the main screen.

*The NC must be restarted to update the multiple project parameter configuration.



7.8.1.2 Cases in which sequence programs are stored

If the sequence programs are stored in the NC, use the following procedure to configure the multiple project parameters.

Procedure	Operation
1	Backing up the sequence programs
2	Configure the multiple project parameters

Backing up the sequence programs

An external device such as an SD card or USB memory is required to backup sequence programs. Perform these operations after mounting an external device.

(1) To use only one project

Procedure	Operation	
	Screen position	Menu button
Start	After the PLC onboard starts, the system automatically reads PLC data and transitions to the ladder screen. The monitor also starts.	
Return to the main screen.	Ladder	
PLC data stored in the NC is stored in external devices.	Main	EXT. FILE OPERATION
	Main/External file operation	NC -> EXT.
	Main/External file operation/NC -> External	SELECT/CANCEL
	Save external project	WRITE
		PATH
		PROJECT NAME
		TITLE
		SELECT
Return to the main screen.	Main/External file operation	
Complete		

Select the data to back up.

The save external project screen displays.

Enter the [Project Name], [Title], and [Path] used to store the backup PLC data.

Run the [Select] operation after entering the path.

Return to the main screen.

(2) To use multiple projects

Procedure	Operation	
	Screen position	Menu button
Start		
Select the current project.	Main	SELECT PROJECT
Store the PLC data stored in the current project into an external device.	Main	EXT. FILE OPERATION
	Main/External file operation	NC -> EXT.
	Main/External file operation/NC -> External	SELECT/CANCEL
		WRITE
	Save external project	PATH
		PROJECT NAME
		TITLE
		SELECT
Return to the main screen.	Main/External file operation	
Complete		

Select the current operation project.

Select the data to back up.

The save external project screen displays.

Enter the [Project Name], [Title], and [Path] used to store the backup PLC data.

Run the [Select] operation after entering the path.

Return to the main screen.

Repeat this procedure until all PLC data stored in all projects is backed up.

7.8.2 Basic Operation 2 (Creating Your First Program)

If the sequence programs are not stored in the NC, follow the sequence of operations as described in the following table to create your first sequence program.

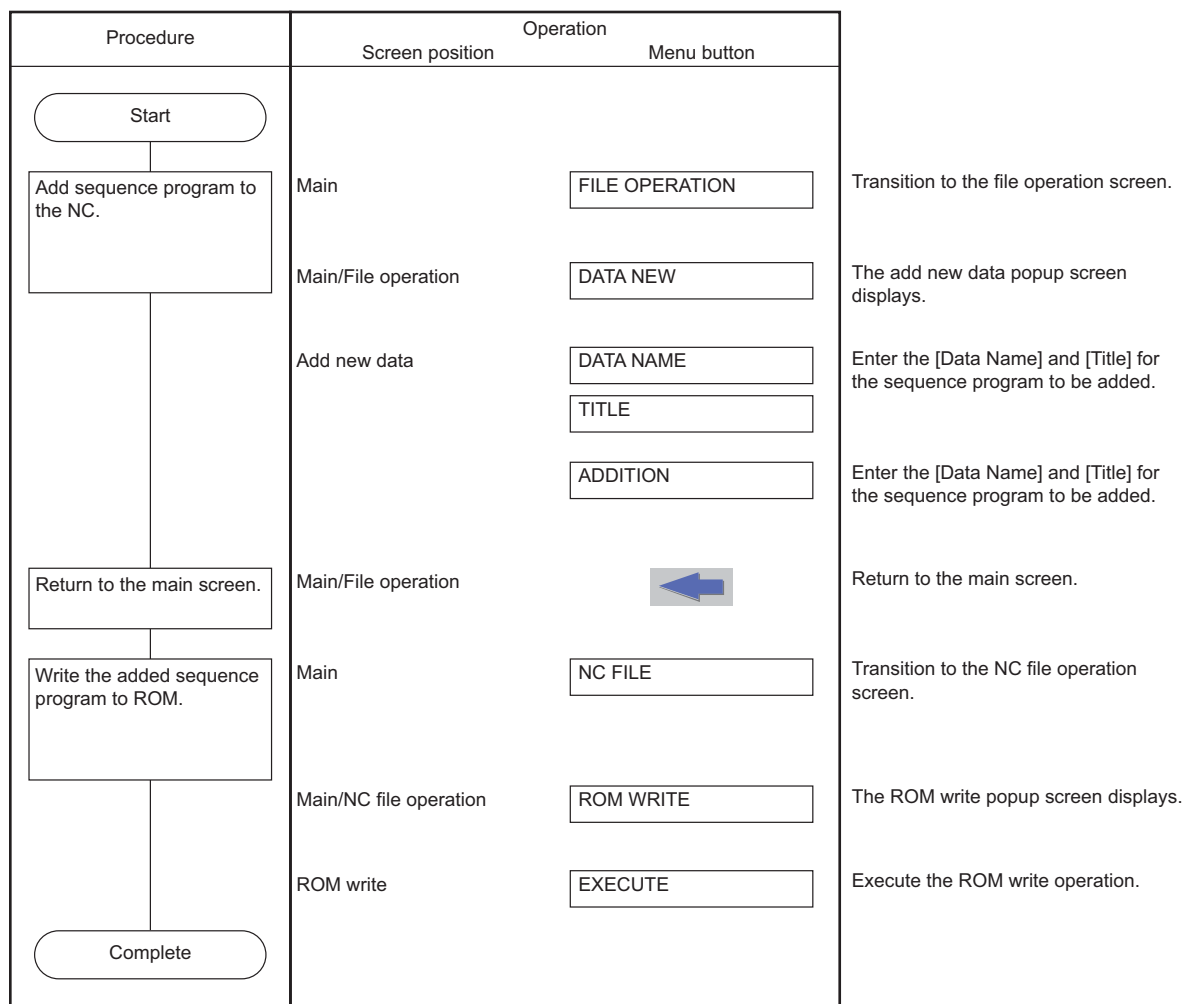
Procedure	Operation
1	Create a new sequence program
2	Edit the sequence program
3	Monitor the sequence program

*The procedure described is an example when using only one sequence program.
An example of using multiple programs will be described later.

7.8.2.1 Adding New Sequence Programs

The following diagrams illustrate the procedure to add new sequence programs.

To use only one project



To use multiple projects

Procedure	Operation	
	Screen position	Menu button
Start		
Select the current project.	Main	SELECT PROJECT
Add the sequence program to the current project.	Main	FILE OPERATION
	Main/File operation	DATA NEW
	Add new data	DATA NAME
		TITLE
Return to the main screen.	Main/File operation	ADDITION
		
Write the added sequence program to ROM.	Main	NC FILE
	Main/NC file operation	ROM WRITE
	ROM write	EXECUTE
Complete		

Select the current operation project.

Transition to the file operation screen.

The add new data popup screen displays.

Enter the [Data Name] and [Title] for the sequence program to be added.

Enter the information for the added data and execute the [ADD] operation.

Return to the main screen.

Repeat this procedure until the sequence program has been added to all projects.

Transition to the NC file operation screen.

The ROM write popup screen displays.

Execute the ROM write operation.

7.8.2.2 Editing the Sequence Program

The following diagrams illustrate the procedure to edit sequence programs.

To use only one project

Procedure	Operation	
	Screen position	Menu button
Start Display the ladder screen.	Main	LADDER
	Transition to the ladder screen.	
Return to the main screen.	Main/ladder	EDIT
	Switch to the edit mode.	
	Main/ladder	CONVERT LADDER
Write the added sequence program to ROM.	Main/ladder	
	Return to the main screen.	
Complete	Main	NC FILE
	Transition to the NC file operation screen.	
	Main/NC file operation	ROM WRITE
	The ROM write popup screen displays.	
	ROM write	EXECUTE
		Execute the write operation.

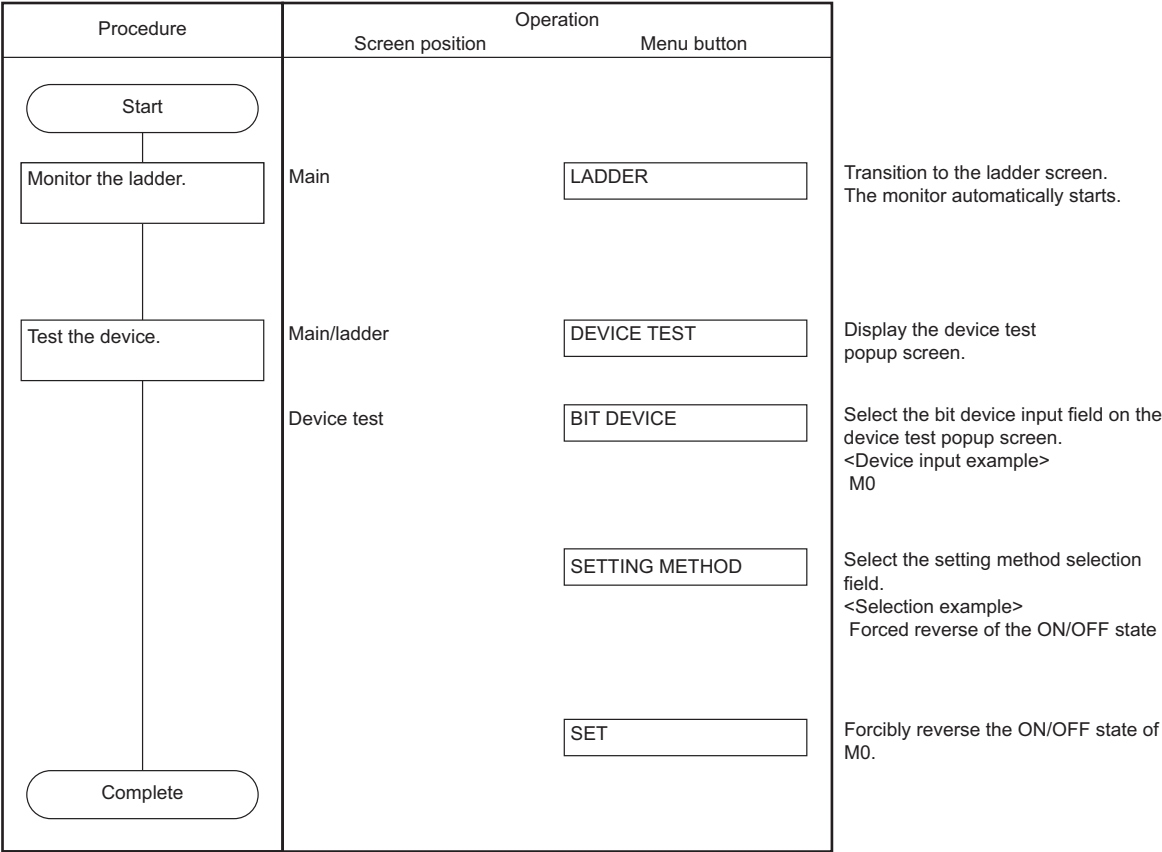
To use multiple projects

Procedure	Operation	
	Screen position	Menu button
Start		
Select the current project.	Main	SELECT PROJECT
Display the ladder screen.	Main	LADDER
	Main/ladder	EDIT
		Create a program. <Ladder sample> M0 P4002 -/ -----[INC D0]-
	Main/ladder	CONVERT LADDER
Return to the main screen.	Main/ladder	
		Repeat this procedure until the sequence program has been stored in all projects.
Write the added sequence program to ROM.	Main	NC FILE
	Main/NC file operation	ROM WRITE
	ROM write	EXECUTE
Complete		

7.8.2.3 Monitoring Sequence Programs

The following diagrams illustrate the procedure to monitor sequence programs.

To use only one project



To use multiple projects

Procedure	Operation	
	Screen position	Menu button
Start		
Select the current project.	Main	SELECT PROJECT
Monitor the ladder.	Main	LADDER
Test the device.	Main/ladder	DEVICE TEST
	Device test	BIT DEVICE
		SETTING METHOD
		SET
Return to the main screen.	Main/ladder	
Complete		

Select the current operation project.

Transition to the ladder screen.
The monitor automatically starts.

Display the device test popup screen.

Select the bit device input field on the device test popup screen.
<Device input example>
M0

Select the setting method selection field.
<Selection example>
Forced reverse of the ON/OFF state

Forcibly reverse the ON/OFF state of M0.

Return to the main screen.

Select the project at the main screen to select a different project to monitor.

7.8.3 Basic Operation 3 (Editing Programs Stored in the NC)

If the sequence programs are stored in the NC, follow the sequence of operations as described in the following table to edit the sequence programs.

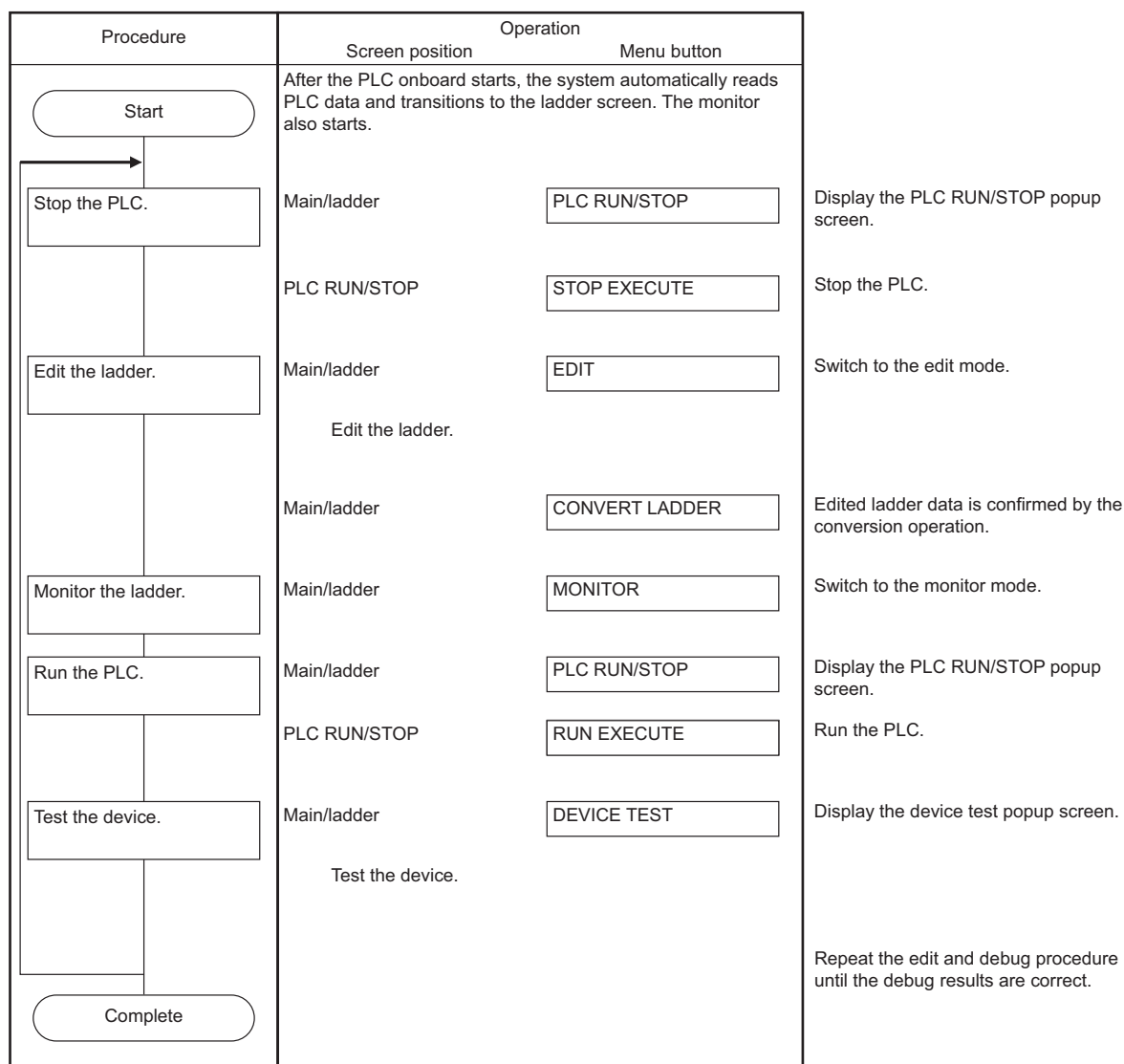
Procedure	Operation
1	Edit and debug the sequence program
2	Save the sequence program to the internal ROM

*The procedure described is an example when using only one sequence program.

7.8.3.1 Editing and Debugging the Sequence Program

The following diagrams illustrate the procedure to edit and debug sequence programs stored in the NC.

To use only one project

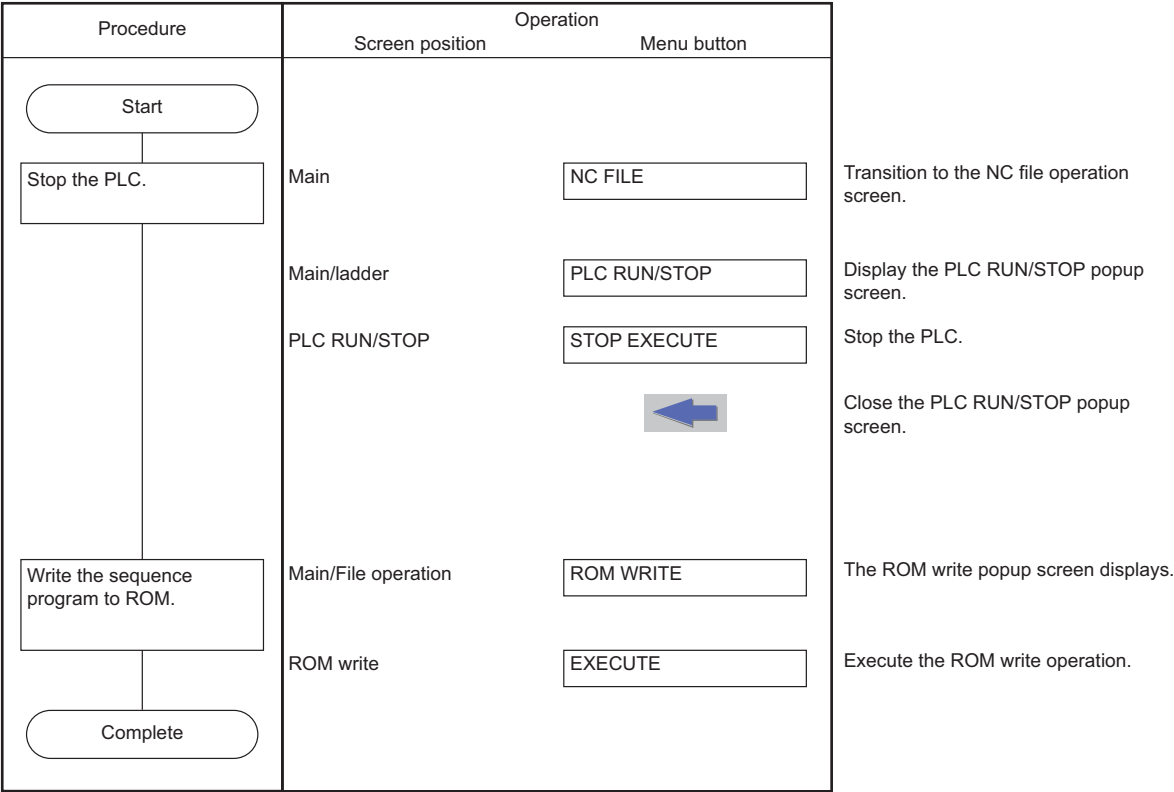


To use multiple projects

Procedure	Operation		
	Screen position	Menu button	
Start			
Select the current project.	Main	SELECT PROJECT	Select the current operation project.
Transition to the ladder screen.	Main	LADDER	PLC data is automatically read and the system transitions to the ladder screen. The monitor also automatically starts.
Stop the PLC.	Main/ladder	PLC RUN/STOP	Display the PLC RUN/STOP popup screen.
	PLC RUN/STOP	STOP EXECUTE	Stop the PLC.
Edit the ladder.	Main/ladder	EDIT	Switch to the edit mode.
	Edit the ladder.		
	Main/ladder	CONVERT LADDER	Edited ladder data is confirmed by the conversion operation.
Monitor the ladder.	Main/ladder	MONITOR	Switch to the monitor mode.
Run the PLC.	Main/ladder	PLC RUN/STOP	Display the PLC RUN/STOP popup screen.
	PLC RUN/STOP	RUN EXECUTE	Run the PLC.
Test the device.	Main/ladder	DEVICE TEST	Display the device test popup screen.
	Test the device.		Repeat the edit and debug procedure until the debug results are correct.
Return to the main screen.	Main/ladder		Return to the main screen.
Complete			Select the project at the main screen to select a different project storing the sequence program to be edited.

7.8.3.2 Saving the Sequence Program to the Internal ROM

The following diagram illustrates the procedure to save sequence programs ,which have been edited and debugged, to the internal ROM. The same procedure is executed whether using only one project or using multiple projects.



7.8.4 Basic Operation 4 (Creating Multiple Sequence Programs)

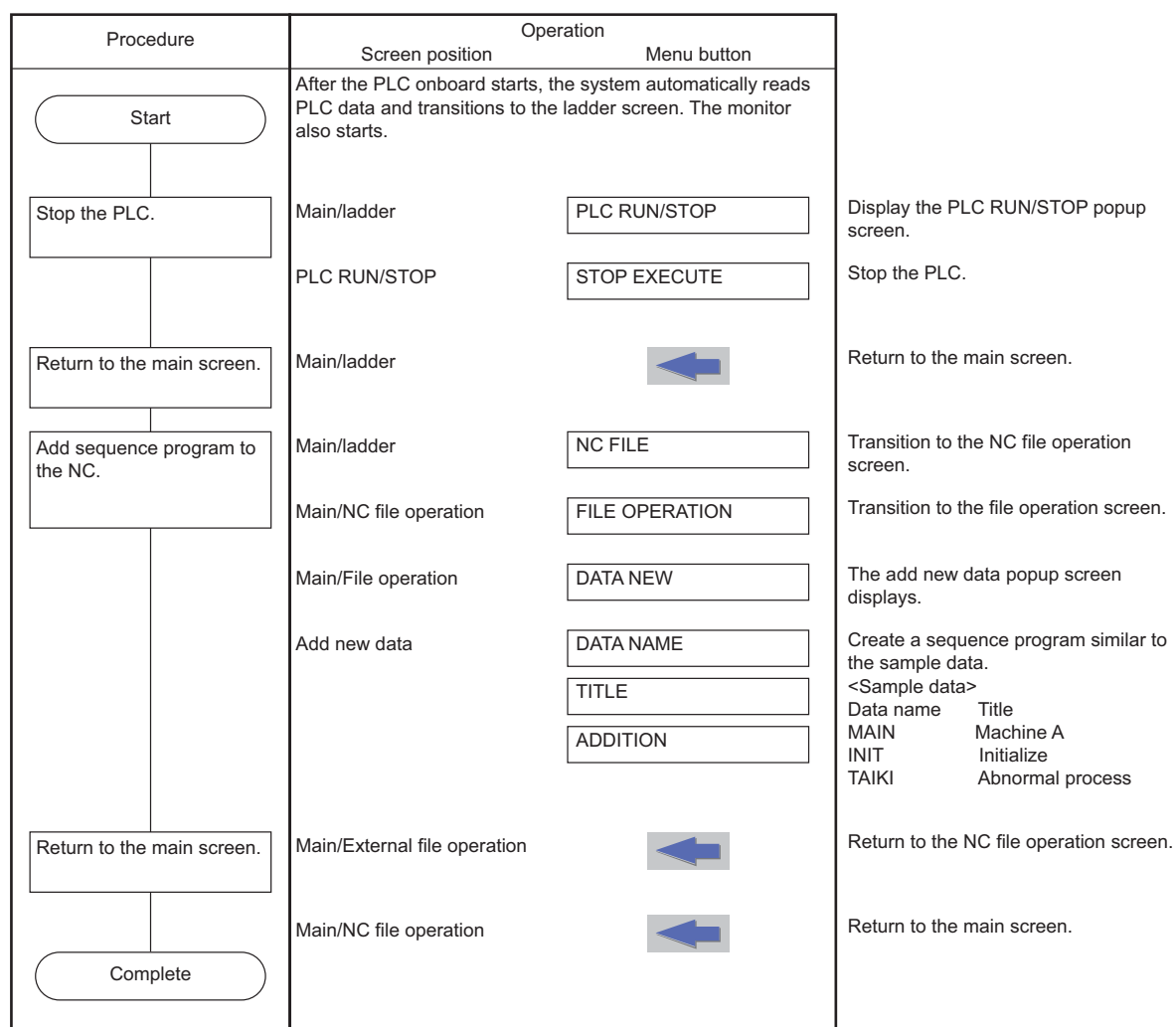
Follow the sequence of operations as described in the following table to create multiple programs.

Procedure	Operation
1	Add a sequence program
2	Configure the execution order of sequence programs
3	Edit and debug the sequence program
4	Save the sequence program to the internal ROM

7.8.4.1 Adding Sequence Programs

The following diagrams illustrate the procedure to add sequence programs.

To use only one project



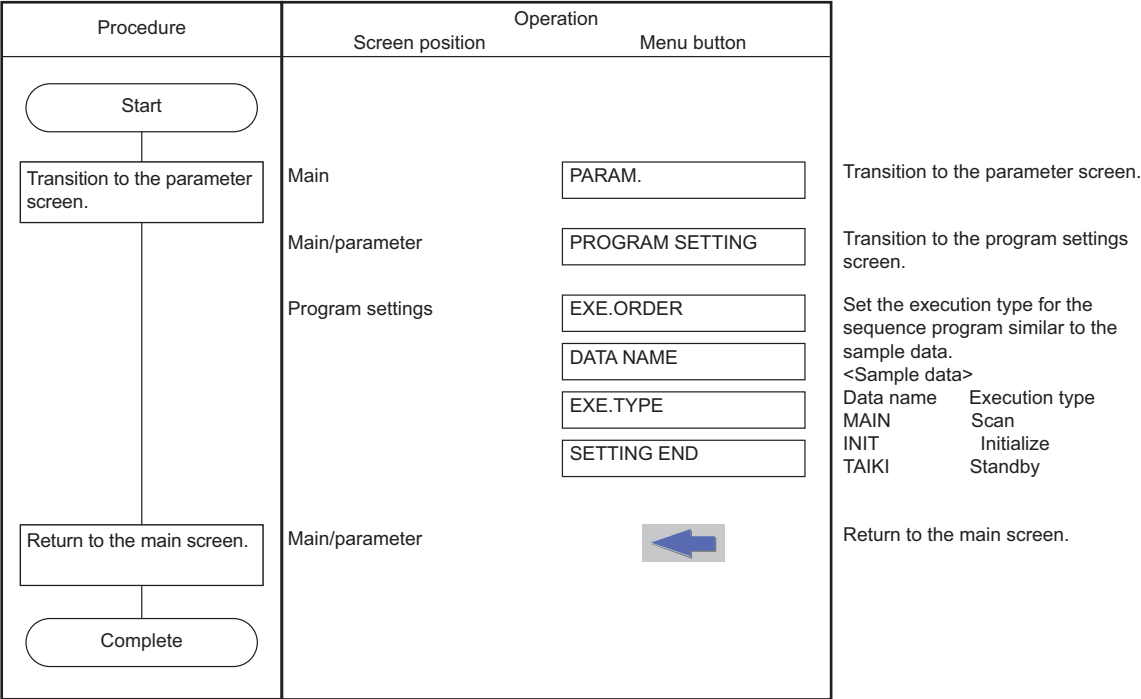
To use multiple projects

Procedure	Operation		
	Screen position	Menu button	
Start			
Select the current project.	Main	SELECT PROJECT	Select the current operation project.
Stop the PLC.	Main	NC FILE	Transition to the NC file operation screen.
	Main/NC file operation	PLC RUN/STOP	Display the PLC RUN/STOP popup screen.
	PLC RUN/STOP	STOP EXECUTE	Stop the PLC.
			Return to the NC file operation screen.
Add sequence program to the NC.	Main/NC file operation	FILE OPERATION	Transition to the file operation screen.
	Main/file operation	DATA NEW	The add new data popup screen displays.
	Add new data	DATA NAME	Create a sequence program similar to the sample data. <Sample data> Data name Title MAIN Machine A INIT Initialize TAIKI Abnormal process
		TITLE	
		ADDITION	
Return to the main screen.	Main/file operation		Return to the NC file operation screen.
	Main/NC file operation		Return to the main screen.
Complete			Repeat this procedure until the sequence program has been added to all projects.

7.8.4.2 Configuring the Execution Order of Sequence Programs

The following diagrams illustrate the procedure to configure the execution order of sequence programs.

To use only one project



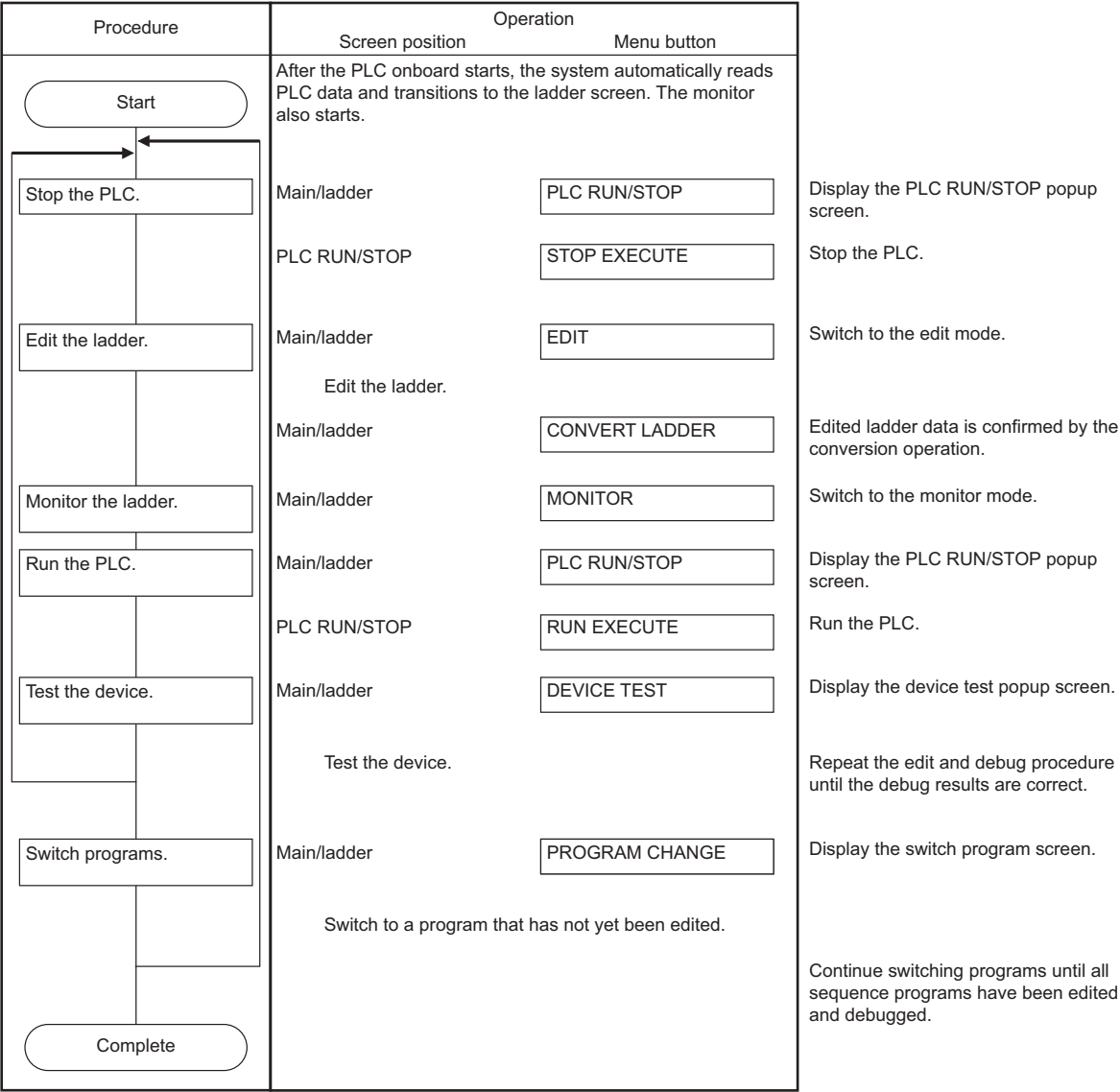
To use multiple projects

Procedure	Operation	
	Screen position	Menu button
Start → Select the current project. ↓ Transition to the parameter screen. ↓ ↓ ↓ ↓ Return to the main screen. ↓ Complete	Main SELECT PROJECT Main PARAM. Main/parameter PROGRAM SETTING Program settings EXE.ORDER DATA NAME EXE.TYPE SETTING END Main/parameter 	Select the current operation project. Transition to the parameter screen. Transition to the program settings screen. Set the execution type for the sequence program similar to the sample data. <Sample data> Data name Execution type MAIN Scan INIT Initialize TAIKI Standby Return to the main screen. Repeat this procedure until the execution sequence is set for sequence programs in all projects.

7.8.4.3 Editing and Debugging the Sequence Program

The following diagrams illustrate the procedure to edit and debug sequence programs stored in the NC.

To use only one project

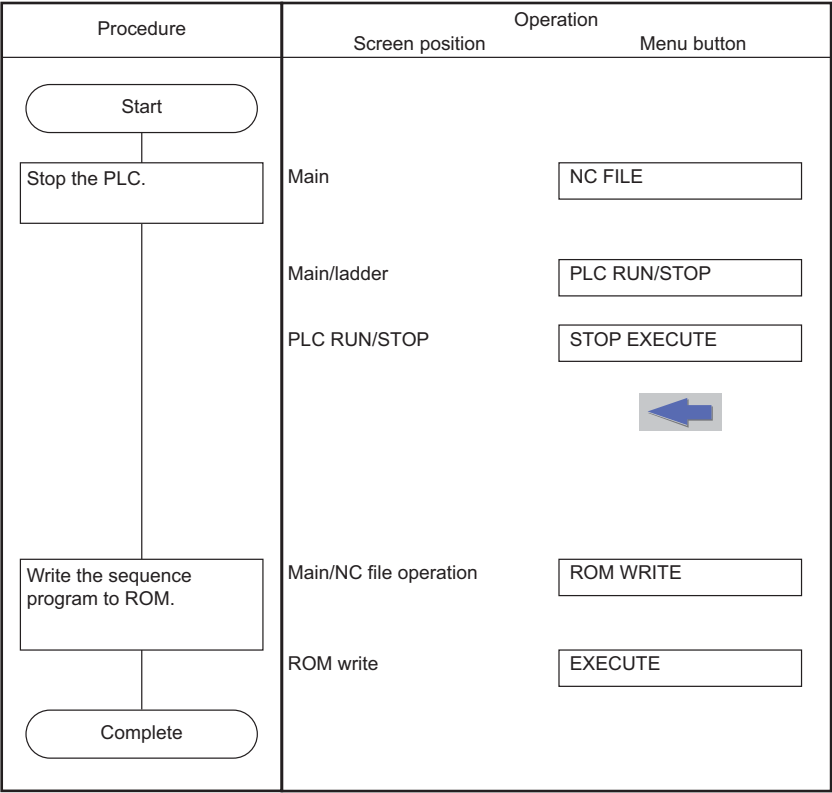


To use multiple projects

Procedure	Operation		
	Screen position	Menu button	
Start			
Select the current project.	Main	SELECT PROJECT	Select the current operation project.
Transition to the ladder screen.	Main	LADDER	PLC data is automatically read and the system transitions to the ladder screen. The monitor also automatically starts.
Stop the PLC.	Main/ladder	PLC RUN/STOP	Display the PLC RUN/STOP popup screen.
	PLC RUN/STOP	STOP EXECUTE	Stop the PLC.
Edit the ladder.	Main/ladder	EDIT	Switch to the edit mode.
	Edit the ladder.		
	Main/ladder	CONVERT LADDER	Edited ladder data is confirmed by conversion operation.
Monitor the ladder.	Main/ladder	MONITOR	Switch to the monitor mode.
Run the PLC.	Main/ladder	PLC RUN/STOP	Display the PLC RUN/STOP popup screen.
	PLC RUN/STOP	RUN EXECUTE	Run the PLC.
Test the device.	Main/ladder	DEVICE TEST	Display the device test popup screen.
	Test the device.		Repeat the edit and debug procedure until the debug results are correct.
Switch programs.	Main/ladder	PROGRAM CHANGE	Display the switch program screen.
	Switch to a program that has not yet been edited.		Continue switching programs until all sequence programs have been edited and debugged.
Return to the main screen.	Main/ladder	←	Return to the main screen.
Complete			Select the project at the main screen to select a different project storing the sequence program to be edited.

7.8.4.4 Saving the Sequence Program to the Internal ROM

The following diagram illustrates the procedure to save sequence programs ,which have been edited and debugged, to the internal ROM. The same procedure is executed whether using only one project or using multiple projects.



Transition to the NC file operation screen.

Display the PLC RUN/STOP popup screen.

Stop the PLC.

Close the PLC RUN/STOP popup screen.

The ROM write popup screen displays.

Execute the ROM write operation.

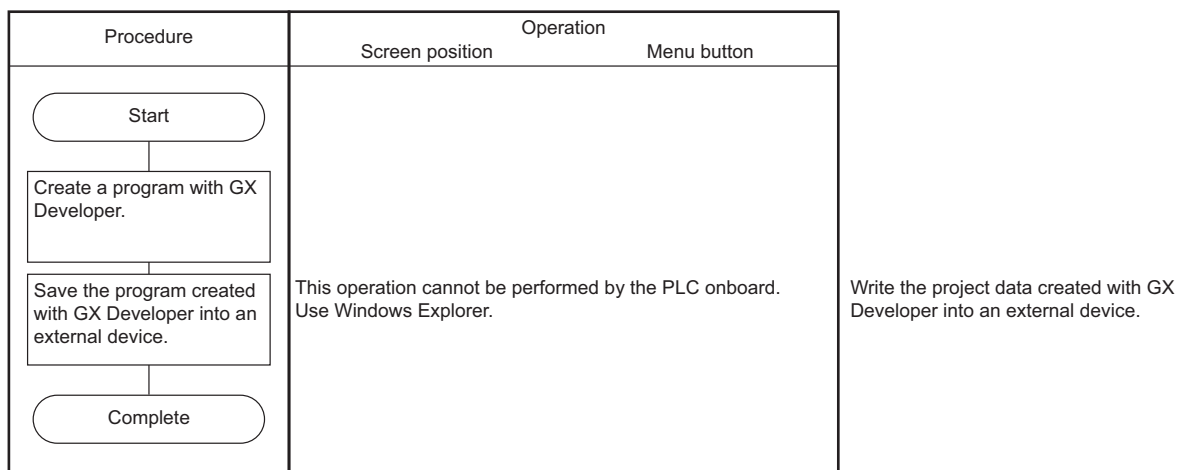
7.8.5 Basic Operation 5 (Loading Programs Created with GX Developer)

Follow the sequence of operations as described in the following table to load and adjust ladders created with GX Developer.

Procedure	Operation
1	Save PLC data to an external device
2	Save PLC data in external devices to the NC

7.8.5.1 Saving PLC data to an External Device

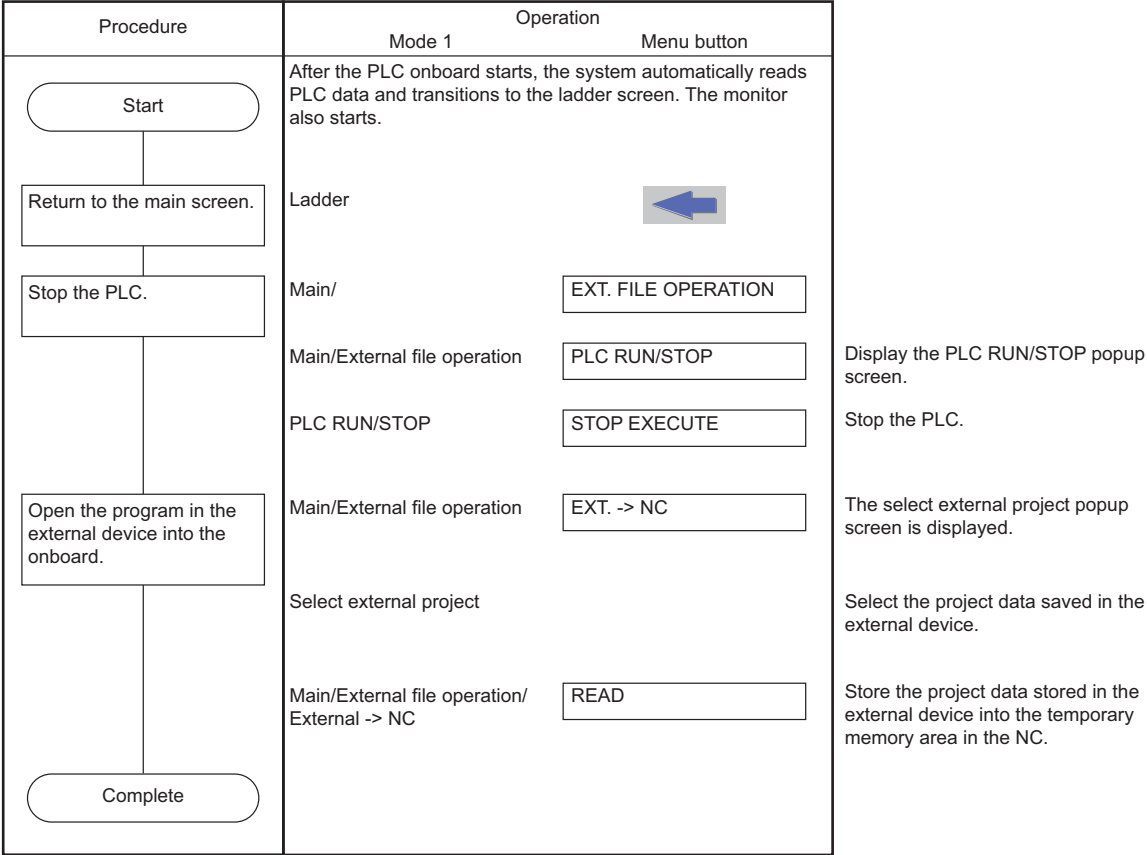
The following diagram illustrates the procedure to save PLC data to an external device. The same procedure is executed whether using only one project or using multiple projects.



7.8.5.2 Saving PLC data in External Devices to the NC

The following diagram illustrates the procedure to save PLC data in external devices to the NC.

To use only one project



To use multiple projects

Procedure	Operation		
	Mode 1	Menu button	
<pre>graph TD; Start([Start]) --> Select[Select the current project.]; Select --> Stop[Stop the PLC.]; Stop --> Open[Open the program in the external device into the onboard.]; Open --> Complete([Complete]);</pre>			
	Main	SELECT PROJECT	Select the current operation project.
	Main/	EXT. FILE OPERATION	
	Main/External file operation	PLC RUN/STOP	Display the PLC RUN/STOP popup screen.
	PLC RUN/STOP	STOP EXECUTE	Stop the PLC.
	Main/External file operation	EXT. -> NC	The select external project popup screen is displayed.
	Select external project		Select the project data saved in the external device.
	Main/External file operation/ External -> NC	READ	Store the project data stored in the external device into the temporary memory area in the NC.
			Repeat this procedure until all PLC data in all projects is stored.

7.9 Main Screen

The multiple projects you may want to use can be selected at the main (highest tier) PLC Onboard screen. This screen also displays the status of the currently connected NC.

7.9.1 Switching Menu Keys

The menu keys on the main screen change depending on whether sequence programs are stored or not stored in the NC.

Sequence programs	Menu keys
Stored	Menu keys for all usable functions are displayed.
Not stored	Menu keys related to storing and creating sequence programs and menu keys for configuring the NC environment are displayed.

7.9.1.1 Cases in which sequence programs are stored

- (1) To use multiple projects

When using multiple projects, information for up to the maximum number of projects stored in the NC is displayed. The desired project can also be selected.

The screenshot shows the main screen of the M800/M80 Series PLC. At the top, there is a header bar with 'M81' and 'PROJECT1'. Below this is a 'MAIN' menu bar. The main area displays the text 'Please select the operation target project.' followed by a table of projects. The table has columns for LABEL, PROGRAM, READ, EXE.ORDER, and PROJ. RATIO. The first row, 'PROJECT1', is highlighted in blue and shows 'EXIST' for PROGRAM and 'READY' for READ. The other rows show 'NONE' for PROGRAM and READ. Below the table, there is a large empty space and a small text 'END-2000W200-'. At the bottom, there is a menu bar with various options: NC FILE, EXT.FILE OPERATION, LADDER, DEVICE, PARAM., PLC DIAGNOSIS, ENVIRON. SETTING, and SELECT PROJECT.

	LABEL	PROGRAM	READ	EXE.ORDER	PROJ. RATIO
PROJECT1		EXIST	READY	1	50
PROJECT2		NONE	NONE	2	10
PROJECT3		NONE	NONE	3	10
PROJECT4		NONE	NONE	4	10
PROJECT5		NONE	NONE	5	10
PROJECT6		NONE	NONE	6	10

END-2000W200-

NC FILE EXT.FILE OPERATION LADDER DEVICE PARAM. PLC DIAGNOSIS ENVIRON. SETTING SELECT PROJECT

- When using only one project, there is no need to select the desired project. For this reason, after the PLC Onboard starts and the main screen displays, the system automatically reads PLC data, transitions to the ladder screen and starts the monitor.

*A progress bar is displayed indicating the status of reading PLC data.

The menu keys change as follows.

The message to confirm the suspension appears when the suspend menu is pressed.

YES	NO								

- IB-1501270-B

7.9.1.2 Cases in which sequence programs are not stored

(1) To use multiple projects

When using multiple projects, information for up to the maximum number of projects stored in the NC is displayed. The desired project can also be selected.

M81		PROJECT1							
MAIN									
Please select the operation target project.									
	LABEL	PROGRAM	READ	EXE.ORDER	PROJ. RATIO				
PROJECT1		NONE	NONE	1	50				
PROJECT2		NONE	NONE	2	10				
PROJECT3		NONE	NONE	3	10				
PROJECT4		NONE	NONE	4	10				
PROJECT5		NONE	NONE	5	10				
PROJECT6		NONE	NONE	6	10				
BND-2000W200-									
FILE OPE.	EXT.->NC	ROM WRITE	PROJECT SETTING	DEVICE SETTING		PLC DIAGNOSIS	CONNECT NC CHANGING		SELECT PROJECT

(2) To use only one project

When using only one project, there is no need to select the desired project. As no sequence programs are stored, you cannot transition to the ladder screen. PLC data is also not automatically read.

M81		PROJECT1							
MAIN									
Please select the operation target project.									
	LABEL	PROGRAM	READ	EXE.ORDER	PROJ. RATIO				
PROJECT1		NONE	NONE	1	100				
BND-2000W200-									
FILE OPE.	EXT.->NC	ROM WRITE	PROJECT SETTING	DEVICE SETTING		PLC DIAGNOSIS	CONNECT NC CHANGING		SELECT PROJECT

7.9.2 Screen Display Items

The following table describes the screen display items on the main screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the number of the current project.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Soft keyboard	This is displayed only when parameters are enabled.

The information in the following table is displayed in the main screen.

Item	Description
Project No.	Displays project numbers up to the maximum number of projects
Labels	This displays labels assigned to projects.
Programs	This displays whether or not programs are stored in the projects.
Read	This displays whether or not PLC data has been read.
Execution sequence	This displays the execution sequence set for each project. This is left blank if the execution sequence has not been set.
Project ratio	This displays the project ratio set for each project.

7.9.3 Enabled/Disabled State of Menu Keys

The following information describes the conditions upon which menu keys displayed on the main screen are enabled.

7.9.3.1 Cases in which sequence programs are stored

The following table describes the conditions upon which menu keys are enabled/disabled when sequence programs are stored.

The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Ladder	Disabled when the function is restricted.
Parameter	Disabled when the function is restricted.
Environment Setting	Disabled when the function is restricted.
Select project	Always enabled when using multiple projects. Disabled when using only one project.

7.9.3.2 Cases in which sequence programs are not stored

The following table describes the conditions upon which menu keys are enabled/disabled when sequence programs are not stored.

The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
File Operation	Disabled when the function is restricted.
External -> NC	Disabled when the function is restricted.
ROM Write	Disabled when the function is restricted.
Project Setting	Disabled when the function is restricted.
Device Setting	Disabled when the function is restricted.
Select project	Always enabled when using multiple projects Disabled when using only one project.

7.9.4 Selecting the Current Project

When using multiple projects, the current project needs to be selected. The area with the blue background color in the list displayed in the main screen represents the current project. Multiple projects cannot be selected as the current project for operation.

When using only one project, project 01 automatically becomes the current project and thus there is no need to select the current project.

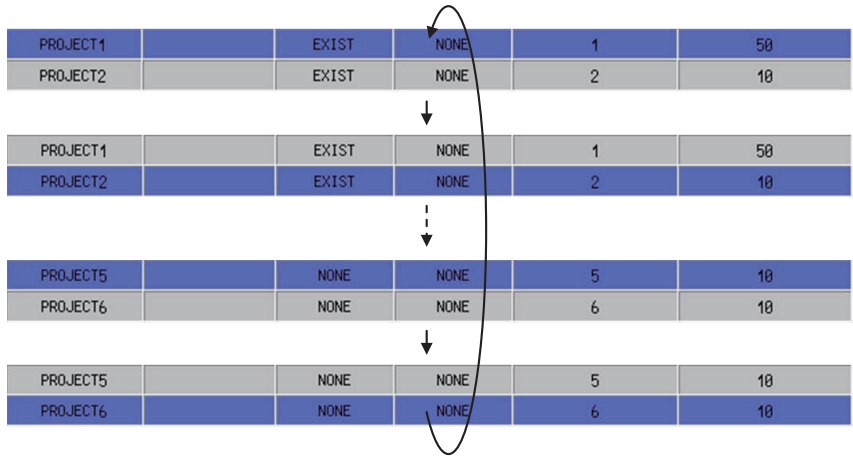
If the current project selected is changed, the menu keys change in correspondence with how sequence programs are stored.

Use one of the following two methods to change the currently selected project.

1. Method using the project selection menu key

Pressing the project selection menu key moves down the selected position in the list of project information.

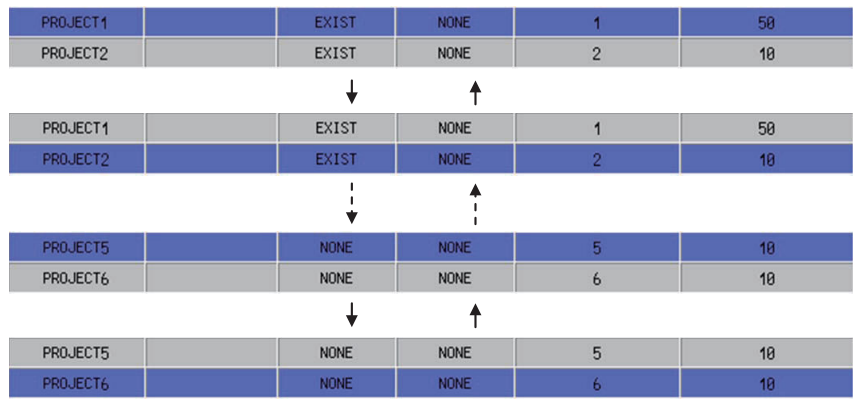
Pressing the menu key when the project at the bottom of the list is selected selects the project at the top of the list.



2. Method using the up and down arrow keys

Pressing the down arrow key moves down the selected position in the list of project information.

Pressing the up arrow key moves up the selected position in the list of project information.



7.9.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

7.9.5.1 Cases in which sequence programs are stored

Item name	Operation
NC file operation	This transitions to the NC file operation main screen.
External file operation	This transitions to the external file operation main screen.
Ladder	This automatically reads the PLC data stored in the current project and transitions to the ladder screen. This also automatically starts the ladder monitor.
Device	This transitions to the device main screen.
Parameter	This transitions to the parameter main screen.
PLC diagnosis	This transitions to the PLC diagnosis screen. This enables the status of projects other than the current project to be checked.
Environment settings	This transitions to the environment settings main screen.

7.9.5.2 Cases in which sequence programs are not stored

Item name	Operation
File operation	This transitions to the file operation screen.
External -> NC	This transitions to the external -> NC screen.
ROM write	This transitions to the ROM write screen.
Project settings	This transitions to the project settings screen.
Device settings	This transitions to the device settings screen.
PLC diagnosis	This transitions to the PLC diagnosis screen. This enables the status of projects other than the current project to be checked.

7.9.6 Returning to the Main Screen from Other Screens

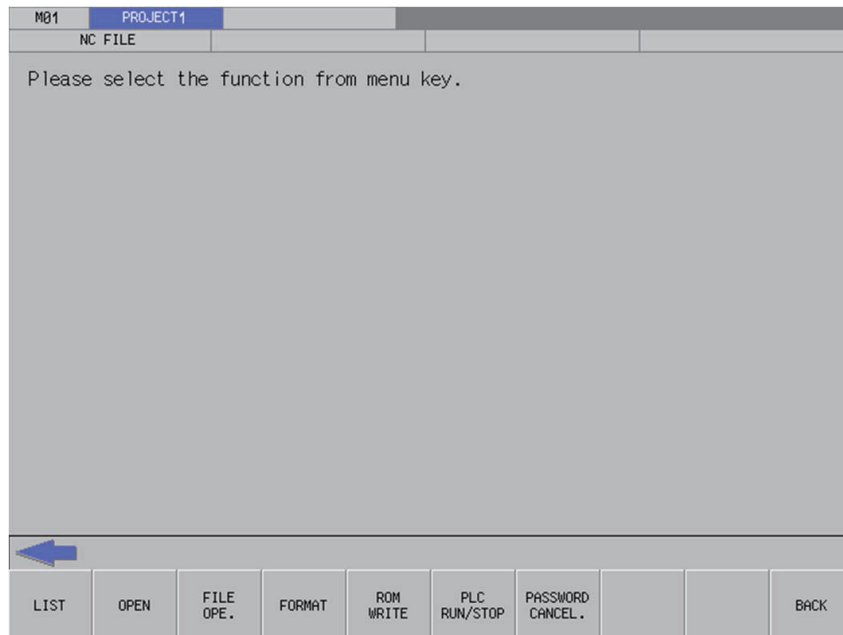
When transitioning to the main screen and there are no sequence programs stored in the current project, the menu keys corresponding to the state when there are no sequence programs stored are displayed.

7.10 NC File Operation Menu

7.10.1 NC File Operation Main Screen

7.10.1.1 Outline

This screen contains menus of operations for PLC data stored in the NC.



7.10.1.2 Screen Display Items

The following table describes the screen display items for the NC file operation screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.

7.10.1.3 Enabled/Disabled State of Menu Keys

The following information describes the conditions upon which menu keys displayed on the NC file operation screen are enabled/disabled. The menu keys which are not described in the following table are always enabled..

Menu name	Condition upon which it is enabled/disabled
ROM Write	Disabled when the function is restricted.
File Operation	Disabled when the function is restricted.
Format	Disabled when the function is restricted.
PLC RUN/STOP	Disabled when the function is restricted.
Password Cancellation	Disabled when the function is restricted.

7.10.1.4 Operation of Button Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

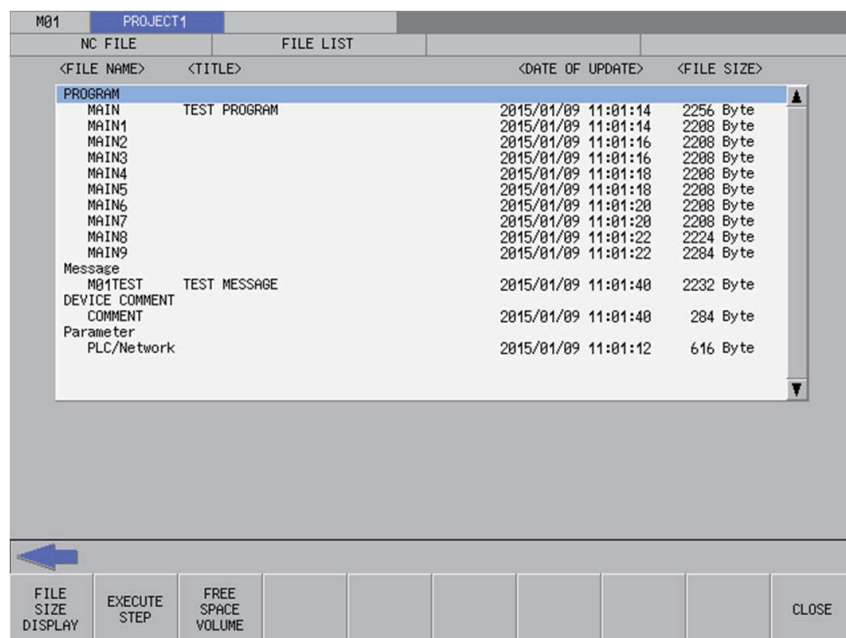
Item name	Operation
Left arrow key/return menu key	These transition to the main menu.
Various menu keys	This displays the specified screen.

7.10.2 File List Screen

7.10.2.1 Outline

This displays the [file size] and [execution step] for the PLC data stored in the current project. The [amount of free space] for each project in the NC is also displayed.

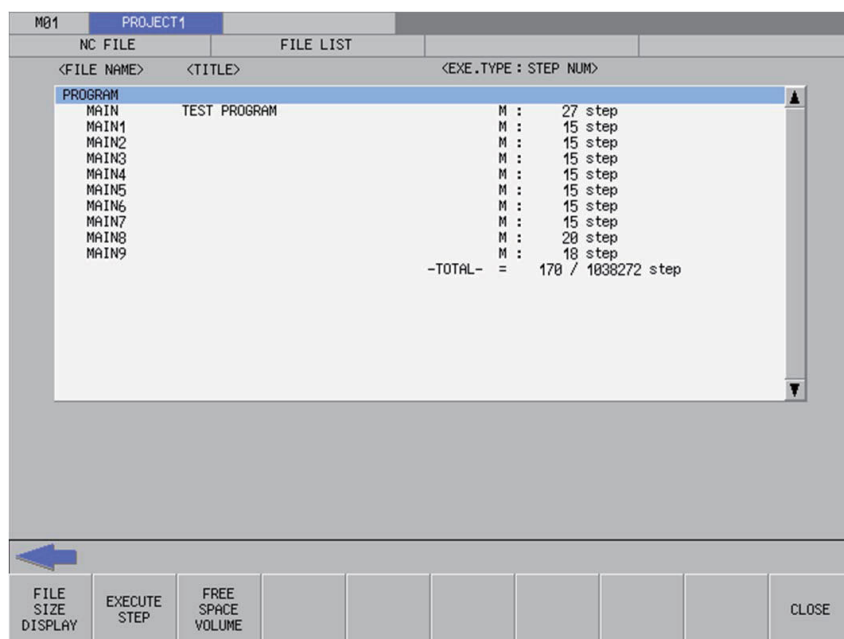
(1) File size display screen



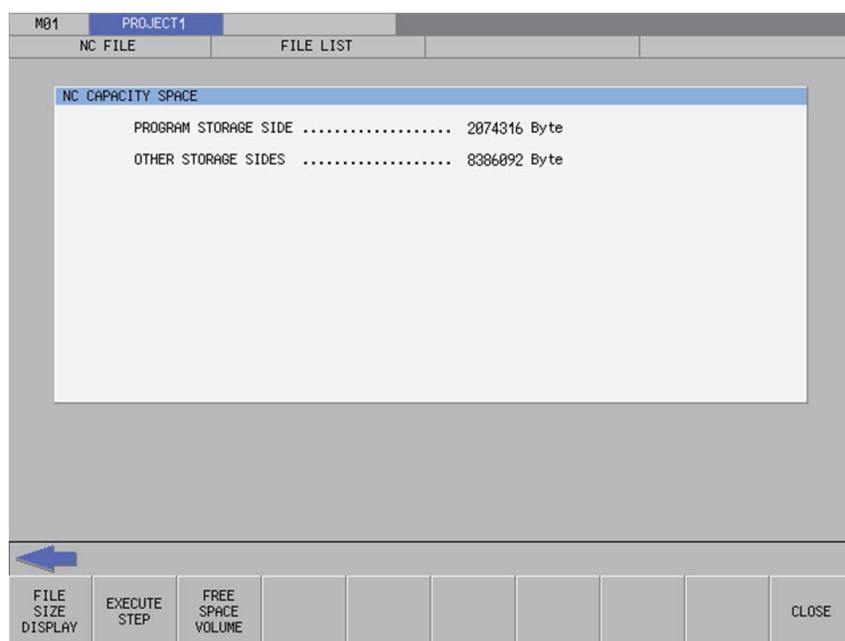
FILE NAME	TITLE	DATE OF UPDATE	FILE SIZE
PROGRAM			
MAIN	TEST PROGRAM	2015/01/09 11:01:14	2256 Byte
MAIN1		2015/01/09 11:01:14	2208 Byte
MAIN2		2015/01/09 11:01:16	2208 Byte
MAIN3		2015/01/09 11:01:16	2208 Byte
MAIN4		2015/01/09 11:01:18	2208 Byte
MAIN5		2015/01/09 11:01:18	2208 Byte
MAIN6		2015/01/09 11:01:20	2208 Byte
MAIN7		2015/01/09 11:01:20	2208 Byte
MAIN8		2015/01/09 11:01:22	2224 Byte
MAIN9		2015/01/09 11:01:22	2284 Byte
Message			
M01TEST	TEST MESSAGE	2015/01/09 11:01:40	2232 Byte
DEVICE COMMENT			
COMMENT		2015/01/09 11:01:40	284 Byte
Parameter			
PLC/Network		2015/01/09 11:01:12	616 Byte

At the bottom of the screen, there are buttons: FILE SIZE DISPLAY, EXECUTE STEP, FREE SPACE VOLUME, and CLOSE.

(2) Execution step display screen



(3) Amount of free space display screen



7.10.2.2 Screen Display Items

The following table describes the screen display items for the file list screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
List	[File Size Display] This displays the file size of the PLC data stored in the current project. This displays nothing if there is nothing stored. [Execution Step Display] This displays the execution step of the sequence program stored in the current project. This displays nothing if there is nothing stored. [Amount of Free Space Display] This displays the amount of free space allocated to the current project.

7.10.2.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the file list screen are always enabled.

7.10.2.4 Status during Screen Displays

The following table describes the status when displaying the file list screen.

Item name	Operation
List	This is the default focus position when the screen is displayed. This displays the file size of the PLC data stored in the current project.

7.10.2.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the File List Screen".
File size display	This displays the size of files stored in the connected project.
Execution step	This displays the execution step of programs stored in the current project.
Amount of free space display	This displays the amount of free space available in the region used to store programs and the region used to store other data.
Close	Refer to "Closing the File List Screen".

7.10.2.6 Closing the File List Screen

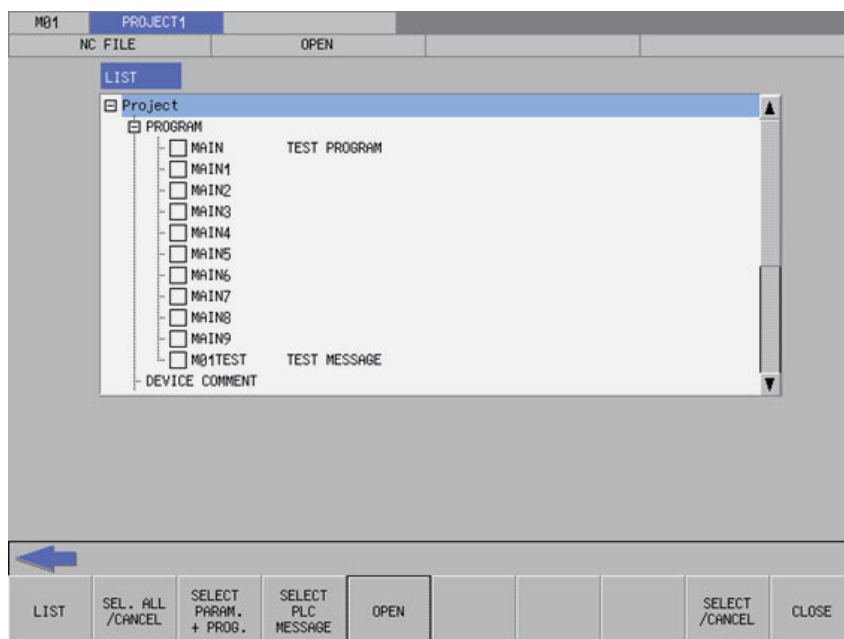
Use any of the following methods to close the file list screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.10.3 Opened Screen

7.10.3.1 Outline

This displays a list of PLC data stored in the current project and reads the selected data.



7.10.3.2 Screen Display Items

The following table describes the screen display items for the opened screens.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
List	This displays the PLC data stored in the current project. This displays nothing of there is nothing stored.

7.10.3.3 Enabled/Disabled State of Menu Keys

The following information describes the conditions upon which menu keys displayed on the opened screen are enabled/disabled.

The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Select/cancel all data	Enabled when selectable PLC data has been added to the list
Parameter + Program	Enabled when selectable PLC data has been added to the list
PLC messages	Enabled when selectable PLC data has been added to the list
Open	Enabled when selectable PLC data has been added to the list
Select/cancel data	Enabled when selectable PLC data has been added to the list

7.10.3.4 Status during Screen Displays

The following table describes the status when the opened screen is displayed.

Item name	Operation
List	This is the default focus position when the screen is displayed. This displays the PLC data stored in the current project. All enabled PLC data has their check boxes selected.

7.10.3.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

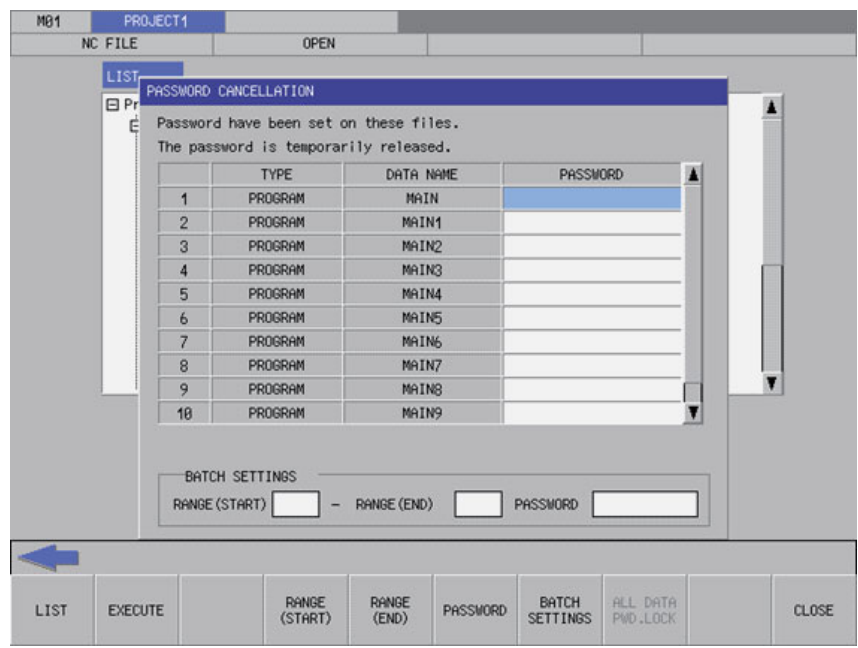
Item name	Operation
Left arrow key	Refer to "Closing the Opened Screen".
List	The focus is applied to the list.
Select/cancel all data	This selects/deselects the check boxes for all data in the list.
Parameter + Program	This selects/deselects the check boxes for parameters and programs in the list. This does not include PLC messages however.
PLC messages	This selects/deselects the check boxes for the PLC messages in the list.
Open	Refer to "Opening PLC Data".
Select/cancel data	This selects/deselects the check boxes for the selected data in the list.* This operation can also be performed with the [SP (space)] key.
Close	Refer to "Closing the Opened Screen".

7.10.3.6 Opening PLC Data

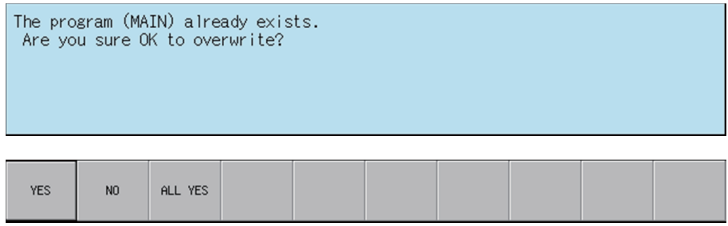
Normal operation

1. Press the [LIST] menu key to move the focus to the list. Select the desired PLC data from the list. Deselect the check boxes for data you do not want read.
2. After selecting data, press the [OPEN] menu key. After pressing the key, the PLC data selected from the list is read.

* If a password to protect reads/writes has been registered to the selected files, the cancel password screen is displayed.
Enter the password to temporarily cancel the password.
If the password is canceled, processing will continue.
Refer to "Canceling File Passwords" for information on entering and canceling passwords.



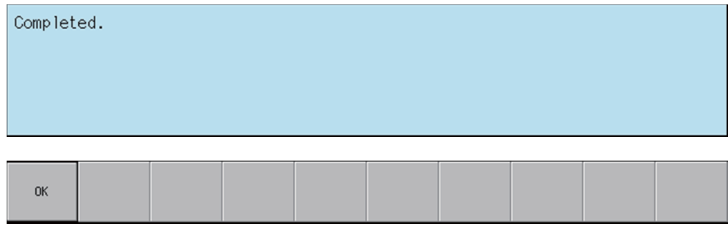
* If PLC data with the same name has already been read, the confirm overwrite popup screen is displayed.



* A progress bar is displayed indicating the status of reading PLC data.



3. After the selected PLC data has been read, the complete message is displayed.



Abnormal operation

This information describes the details of error messages displayed on the opened screen and the corrective action thereof.

Error message	Error description	Corrective action
Read data has not been selected.	This is displayed when the [OPEN] menu key is pressed before any PLC data has been selected from the displayed list.	Select PLC data from the displayed list before pressing the [OPEN] menu key.

7.10.3.7 Closing the Opened Screen

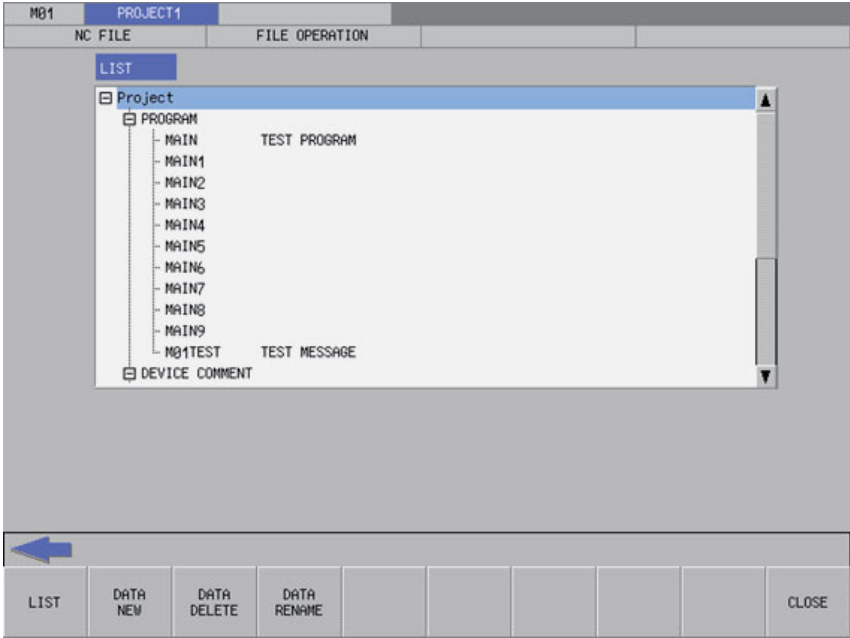
Use any of the following methods to close the opened screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.10.4 File Operation Screen

7.10.4.1 Outline

This displays a list of PLC data stored in the current project as well as creates and deletes new PLC data and changes the name of this data.



7.10.4.2 Screen Display Items

The following table describes the screen display items for the file operation screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
List	This displays the PLC data stored in the current project. This displays nothing if there is nothing stored.

7.10.4.3 Enabled/Disabled State of Menu Keys

The following information describes the conditions upon which menu keys displayed on the file operation screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Data Delete	Enabled when PLC data is displayed in the list.
Data Rename	Enabled when PLC data is displayed in the list.

7.10.4.4 Status during Screen Displays

The following table describes the status when displaying the file operation screen.

Item name	Operation
List	This is the default focus position when the screen is displayed. This displays the PLC data stored in the current project.

7.10.4.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the File Operation Screen" *Returns to the screen from where the file operation screen was displayed.
List	The focus is applied to the list.
Add New Data	The add new data popup screen is displayed. (Refer to "Add New Data Popup Screen".)
Delete Data	This displays the delete data popup screen. (Refer to "Delete Data Popup Screen".)
Rename Data	This displays the rename data popup screen. (Refer to "Rename Data Popup Screen".)
Close	Refer to "Closing the File Operation Screen".

7.10.4.6 Closing the File Operation Screen

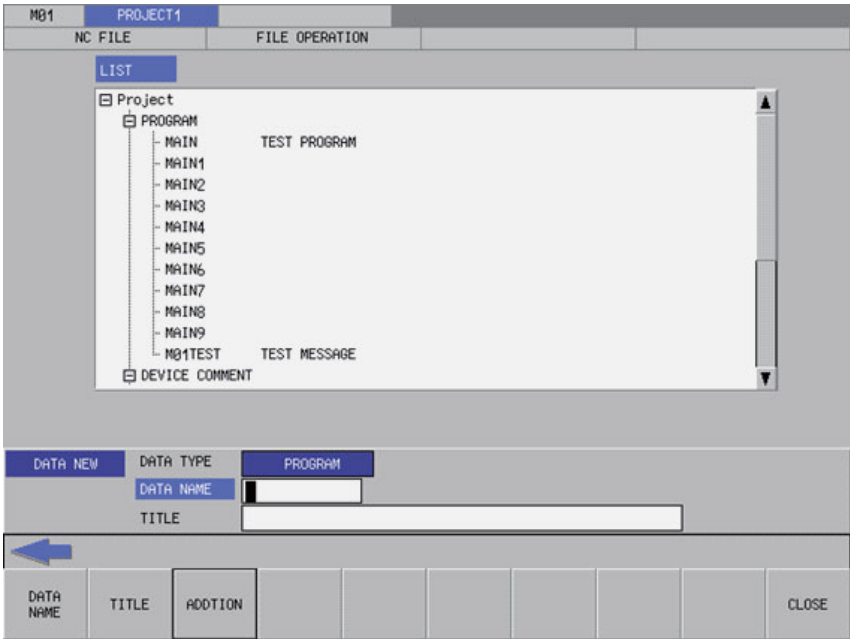
Use any of the following methods to close the file operation screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.10.5 Add New Data Popup Screen

7.10.5.1 Outline

This enables new PLC data to be created for the current project.



7.10.5.2 Screen Display Items

The following table describes the screen display items for the add new data popup screen.

Item name	Display state
Data type	This displays only programs.
Data name	This is left blank. These are restricted to a maximum of 8 single-byte alphanumeric numeric characters.
Title	This is left blank. These are restricted to a maximum of 32 single-byte alphanumeric numeric characters. *

*Refer to "PLC Data: PLC Data Used by the PLC Onboard" for information on restrictions to PLC data names and titles.

7.10.5.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the add new data popup screen are always enabled.

7.10.5.4 Status during Screen Displays

The following table describes the status when displaying the add new data popup screen.

Item name	Operation
Data name	This is the default focus position when the screen is displayed.

7.10.5.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Add New Data Popup Screen".
Data name	This selects the data name input field.
Title	This selects the title input field.
Add	Refer to "Adding PLC Data".
Close	Refer to "Closing the Add New Data Popup Screen".

7.10.5.6 Adding PLC Data

Normal operation

1. Press the [DATA NAME] menu key and enter the desired PLC data name into the data name input field.
 2. Press the [TITLE] menu key and enter a title that identifies the PLC data you are adding into the title input field. (Entering titles is optional.)
 3. Press the [ADD] menu key. Pressing this key closes the add new data popup screen and adds the PLC data with the entered name and title. The name of the added PLC data displays in the list on the file operation screen.
- * If PLC data with the same name already exists, the confirm overwrite popup screen is displayed.

The program (MAIN) already exists.
Are you sure OK to overwrite?

YES	NO	ALL YES							

* If PLC data is added while the PLC is running, a message confirming whether or not to pause the PLC is displayed. Select [YES] to stop the PLC and continue adding the PLC data. If [NO] is selected, the PLC does not stop which results in an error and the display of an error message. (Refer to "Abnormal operation")

* If the PLC stops, a message displays to confirm whether or not to restart the PLC immediately after data has been added. Select [YES] to continue running the PLC. Select [NO] to keep the PLC stopped.

PLC is in a RUN state.
Is data addition performed after stop PLC?

YES	NO								

PLC is in a STOP state.
Is PLC changed into a RUN state?

YES	NO								

Abnormal operation

This information describes the details of error messages displayed on the add new data popup screen and the corrective action thereof.

Error message	Error description	Corrective action
A data name has not been entered. Enter a data name.	This is displayed when the [ADD] menu key is pressed while the data name input field is still blank.	Enter a valid data name before pressing the [ADD] menu key.
This project/data name is a reserved device name. Please choose another name.	This is displayed after the [ADD] menu key is pressed when a reserved device name*1 has been entered as the data name.	Enter a valid data name before pressing the [ADD] menu key.
Prohibited characters were used in the file name. / Do not use the following characters in file names: ;,;,*,?,"',<,>, .	This is displayed when the [ADD] menu key is pressed and the data name contains prohibited characters*1.	Enter a valid data name before pressing the [ADD] menu key.
File name includes the Multi-byte character code. Please confirm file name.	This is displayed when the [ADD] menu key is pressed and the data name contains double-byte characters.	Enter a valid data name before pressing the [ADD] menu key.
Illegal characters have been used for a data name. Use legal characters.	This is displayed when the [ADD] menu key is pressed and the final character of the data name is a period.	Enter a valid data name before pressing the [ADD] menu key.
New data cannot be added because the PLC is running. Execute again after the PLC stops.	This is displayed when trying to add new data without stopping the PLC.	Add new data when the PLC is not running.

*1: Refer to "PLC Data: PLC Data Used by the PLC Onboard".

7.10.5.7 Closing the Add New Data Popup Screen

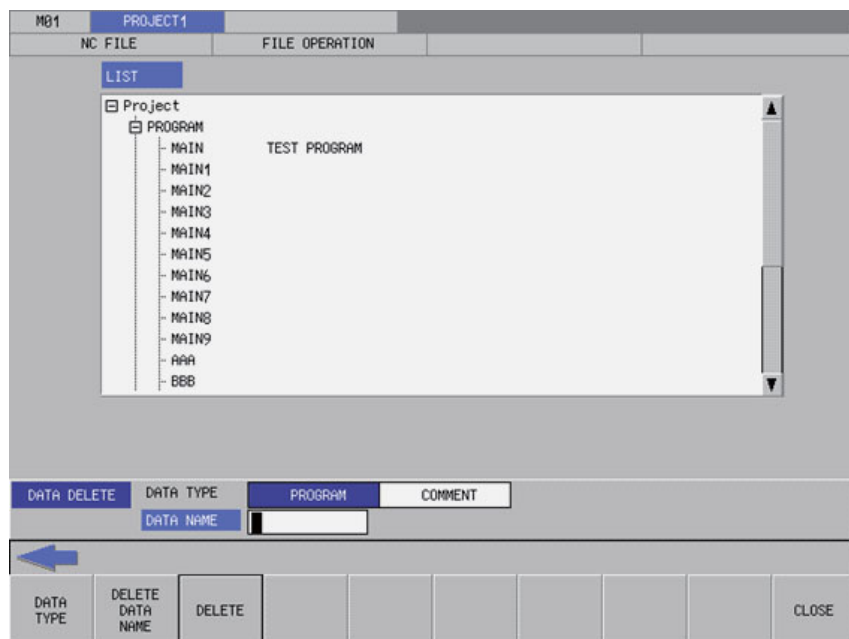
Use any of the following methods to close the add new data popup screen.

Methods to close the screen
This adds new PLC data.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.10.6 Delete Data Popup Screen

7.10.6.1 Outline

This enables PLC data stored in the current project to be deleted.



7.10.6.2 Screen Display Items

The following table describes the screen display items for the delete data popup screen.

Item name	Display state
Data type	This displays programs and comments. Programs are the default selection.* 1
Data name	This is left blank.* 1 These are restricted to a maximum of 8 single-byte alphanumeric numeric characters.* 2

- *1: Selecting data of different types (program and comments) from the list on the file operation screen and displaying this data on the delete data screen causes the data type and data name of the selected data to be selected and displayed.
- *2: Refer to "PLC Data: PLC Data Used by the PLC Onboard" for information on restrictions to PLC data names and titles.

7.10.6.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the delete data popup screen are always enabled.

7.10.6.4 Status during Screen Displays

The following table describes the status when displaying the delete data popup screen.

Item name	Operation
Data type	This is the default focus position when the screen is displayed. This selects either programs or the data type of selected data.
Data name	This selects either blank displays or the data names of selected data.

7.10.6.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Delete Data Popup Screen".
Data type	This selects either the data type selection field or changes the data type selection.
Data name	This selects the data name input field.
Delete	Refer to "Deleting PLC Data".
Close	Refer to "Closing the Delete Data Popup Screen".

7.10.6.6 Deleting PLC Data

Normal operation

1. Press the [DATA TYPE] menu key and select the data type you want to delete from the data type selection field.
2. Press the [DATA NAME] menu key and enter the desired PLC data name into the data name input field.
3. Press the [DELETE] menu key. Press the delete menu key to display the confirm delete message. If [YES] is selected, the confirm delete message and the delete data popup screen closes and the data is deleted. The name of the deleted PLC data is removed from the list on the file operation screen. If [NO] is selected, the confirm delete message closes and then the system returns to the delete data popup screen.

The specified file is deleted.
Is it all right?

YES	NO								

* If a password to protect against reads or reads/writes has been registered to the selected files, the cancel password screen is displayed.

Enter the password to cancel the password.

If the password is canceled, processing will continue.

Refer to "Canceling File Passwords" for information on clearing passwords.

PWD.CANCEL.	The password is temporarily released.									
	PASSWORD									
EXECUTE										CLOSE

* If PLC data is deleted while the PLC is running, a message confirming whether or not to pause the PLC is displayed. Select [YES] to stop the PLC and continue deleting the PLC data. If [NO] is selected, the PLC does not stop which results in an error and the display of an error message. (Refer to "Abnormal operation")

* If the PLC stops, a message displays to confirm whether or not to restart the PLC immediately after data has been deleted. Select [YES] to continue running the PLC. Select [NO] to keep the PLC stopped.

PLC is in a RUN state.
Is data deletion performed after stop PLC?

YES

NO

PLC is in a STOP state.
Is PLC changed into a RUN state?

YES

NO

Abnormal operation

This information describes the details of error messages displayed on the delete data popup screen and the corrective action thereof.

Error message	Error description	Corrective action
A data name has not been entered. Enter a data name.	This is displayed when the [DELETE] menu key is pressed while the data name input field is still blank.	Enter a valid data name before pressing the [DELETE] menu key.
A file was specified which does not exist in the NC.	This is displayed when the [DELETE] menu key is pressed after specifying a data type or data name in the data name input field that is not stored in the NC.	Press the [DELETE] menu key after specifying a data type or data name in the data name that is stored in the NC.
Data cannot be deleted because the PLC is running. Execute again after the PLC stops.	This is displayed when trying to delete data without stopping the PLC.	Delete data when the PLC is not running.

7.10.6.7 Closing the Delete Data Popup Screen

Use any of the following methods to close the delete data popup screen.

Methods to close the screen

Delete PLC data.

Press the [CLOSE] menu key.

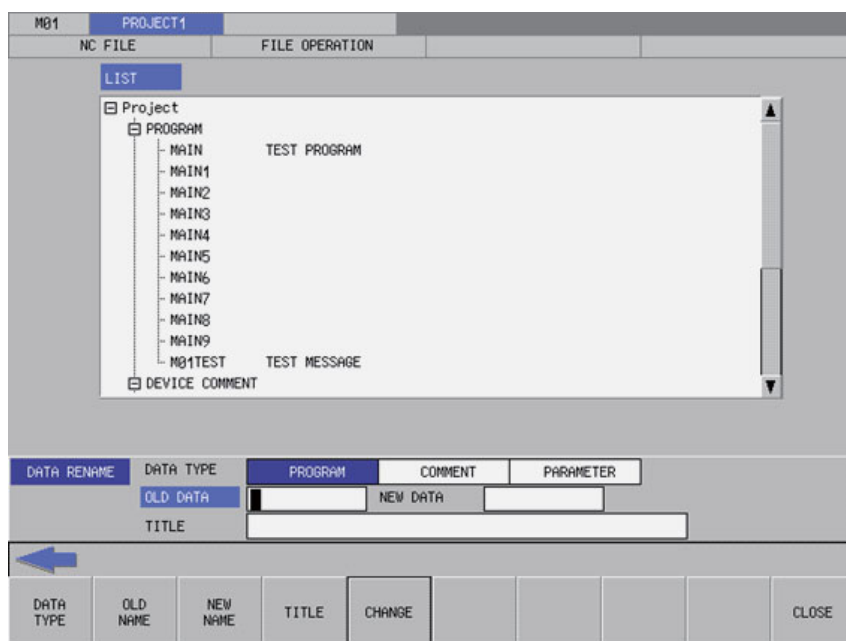
Press the left arrow key.

Press the [ESC] key on the soft keyboard.

7.10.7 Rename Data Popup Screen

7.10.7.1 Outline

This enables the name of PLC data stored in the current project to be changed.



7.10.7.2 Screen Display Items

The following table describes the screen display items for the rename data popup screen.

Item name	Display state
Data type	This displays programs, comments, and parameters. Programs are the default selection.* 1
Old data name	This is left blank.* 1 These are restricted to a maximum of 8 single-byte alphanumeric numeric characters.* 2
New data name	This is left blank. These are restricted to a maximum of 8 single-byte alphanumeric numeric characters. 2
Title	This is left blank. These are restricted to a maximum of 32 single-byte alphanumeric numeric characters. * 2

*1 Selecting data of different types (program, comments, and parameters) from the list on the file operation screen and displaying this data on the rename data screen causes the data type and data name of the selected data to be selected and displayed. If parameter data is selected, however, characters cannot be entered into blank fields for old data names and new data names.

*2 Refer to "PLC Data: PLC Data Used by the PLC Onboard" for information on restrictions to PLC data names and titles.

7.10.7.3 Enabled/Disabled State of Menu Keys

The following information describes the conditions upon which menu keys displayed on the rename data popup screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Old data name	Enabled when data type is other than parameter.
New data name	Enabled when data type is other than parameter.

7.10.7.4 Status during Screen Displays

The following table describes the status when displaying the rename data popup screen.

Item name	Operation
Data type	This is the default focus position when the screen is displayed. This selects either programs or the data type of selected data.
Old data name	This selects either blank displays or the data names of selected data. If the data type is parameter, data input is disabled for blank fields.
New data name	This is left blank. If the data type is parameter, data input is disabled for blank fields.
Title	This selects either blank fields or the titles of selected data.

7.10.7.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Rename Data Popup Screen".
Data type	This selects either the data type selection field or changes the data type selection.
Old data name	This selects the old data name input field.
New data name	This selects the new data name input field.
Title	This selects the title input field.
Change	Refer to "Changing PLC Data Names".
Close	Refer to "Closing the Rename Data Popup Screen".

7.10.7.6 Renaming the PLC Data

Normal operation

1. Press the [DATA TYPE] menu key and select the data type you want to change from the data type selection field.
2. Press the [DATA NAME] menu key and enter the current PLC data name into the old data name input field.
3. Press the [DATA NAME] menu key and enter the new PLC data name into the new data name input field.
4. Press the [CHANGE] menu key. Pressing the [CHANGE] menu key closes the rename data popup screen and changes the data name. The old PLC data name is removed from the list on the file operation screen and the new PLC data name is displayed.

* If a password to protect against reads or reads/writes has been registered to the selected data, the cancel password screen is displayed.

Enter the password to cancel the password.

If the password is canceled, processing will continue.

Refer to "Canceling File Passwords" for information on clearing passwords.

P.WD.CANCEL.		The password is temporarily released.									
		PASSWORD									
EXECUTE											CLOSE

- * If PLC data names are changed while the PLC is running, a message confirming whether or not to pause the PLC is displayed. Select [YES] to stop the PLC and continue changing the PLC data name. If [NO] is selected, the PLC does not stop which results in an error and the display of an error message. (Refer to "Abnormal operation")
- * If the PLC stops, a message displays to confirm whether or not to restart the PLC immediately after the data name has been changed. Select [YES] to continue running the PLC. Select [NO] to keep the PLC stopped.

PLC is in a RUN state.
Is data name change performed after stop PLC?

YES	NO								

PLC is in a STOP state.
Is PLC changed into a RUN state?

YES	NO								

Abnormal operation

This information describes the details of error messages displayed on the rename data popup screen and the corrective action thereof.

Error message	Error description	Corrective action
An old data name has not been inputted. Please input an old data name.	This is displayed when the [CHANGE] menu key is pressed while the old data name input field is still blank.	Enter a valid old data name before pressing the [CHANGE] menu key.
Please input a new data name. Enter the new data name.	This is displayed when the [CHANGE] menu key is pressed while the new data name input field is still blank.	Enter a valid new data name before pressing the [CHANGE] menu key.
This project/data name is a reserved device name. Please choose another name.	This is displayed after the [CHANGE] menu key is pressed when a reserved device name*1 has been entered as the old data name or the new data name.	Enter a valid old data name or new data name before pressing the [CHANGE] menu key.
Prohibited characters were used in the file name. Do not use the following characters in file names: /, :, ,, ;, *, ?, \, ", <, >, .	This is displayed after the [CHANGE] menu key is pressed and the old data name or the new data name contains prohibited characters*1.	Enter a valid old data name or new data name before pressing the [CHANGE] menu key.
File name includes the Multi-byte character code. Please confirm file name.	This is displayed after the [CHANGE] menu key is pressed and the old data name or the new data name contains double-byte characters.	Enter a valid old data name or new data name before pressing the [CHANGE] menu key.
Illegal characters have been used for a data name. Use legal characters.	This is displayed after the [CHANGE] menu key is pressed and the final character of the old data name or the new data name is a period.	Enter a valid old data name or new data name before pressing the [CHANGE] menu key.
A file was specified which does not exist in the NC.	This is displayed when the [CHANGE] menu key is pressed after specifying a data type or data name that is not stored in the NC.	Press the [CHANGE] menu key after specifying a data type or data name in the data name that is stored in the NC.
The same data name has already been set. Change to a different data name.	This is displayed when the [CHANGE] menu key is pressed after specifying a new data name that already exists.	Specify a new data name that does not exist in the NC before pressing the [CHANGE] menu key.
Data names for device comments cannot be changed.	This is displayed when the [CHANGE] menu key is specified after a comment is specified for the old data name.	Specify something other than a comment for the old data name and press the [CHANGE] menu key.
It cannot change into the same name as a common device comment. Please choose another name.	This is displayed when the [CHANGE] menu key is specified after a comment is specified for the new data name.	Specify something other than a comment for the new data name and press the [CHANGE] menu key.
Data name cannot be changed because the PLC is running. Execute again after the PLC stops.	This is displayed when trying to change data names without stopping the PLC.	Change data names when the PLC is not running.

*1: Refer to "PLC Data: PLC Data Used by the PLC Onboard".

7.10.7.7 Closing the Rename Data Name Popup Screen

Use any of the following methods to close the rename data popup screen.

Methods to close the screen
Change the data name.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.10.8 Format Popup Screen

7.10.8.1 Outline

This is used to format the temporary storage area in the NC.

7.10.8.2 Screen Display Items

The following table describes the screen display items for the format popup screen.

Item name	Display state
Create default data after formatting	This is displayed with the check box not selected.

7.10.8.3 Default Data

If the [Create default data after formatting] check box in the format popup screen is selected, the following PLC data is created after formatting the temporary storage area in the NC.

Data classification	Data name	Description
Program	MAIN	Blank program with only an END instruction
Parameter	PARAM	Parameters inherited from device settings for the formatted project.

7.10.8.4 Enabled/Disabled State of Menu Keys

The menu keys displayed on the format popup screen are always enabled.

7.10.8.5 Status during Screen Displays

The following table describes the status when displaying the format popup screen.

Item name	Operation
Create default data after formatting	This is displayed with the check box not selected.

7.10.8.6 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Format Popup Screen"
Yes	Refer to "Formatting the Temporary Memory Area in the NC"
No	Closes the format popup screen and transitions to the file operation screen.
Default data	Selects the selection field to create the default data or changes the selection to create the default data.
Close	Refer to "Closing the Format Popup Screen"

7.10.8.7 Formatting the Temporary Memory Area in the NC

Normal operation

1. Press the [DEFAULT DATA] menu key to select whether or not to create the default data after formatting.
2. Press the [YES] menu key to format the temporary memory area. If the create default data setting is configured, the default data is created after formatting. After the process is complete, the format popup screen closes.

Abnormal operation

This information describes the details of error messages displayed on the format popup screen and the corrective action thereof.

Error message	Error description	Corrective action
Write executions cannot be performed because the PLC is running. Execute again after the PLC stops.	This is displayed when trying to format memory without stopping the PLC.	Format memory when the PLC is not running.

7.10.8.8 Closing the Format Popup Screen

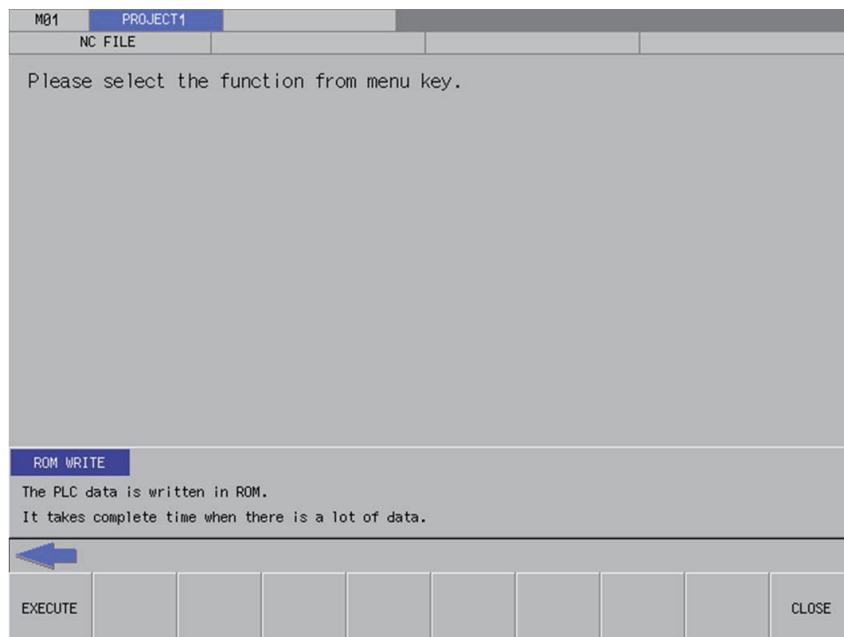
Use any of the following methods to close the format popup screen.

Methods to close the screen
Format the memory.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.10.9 ROM Write Popup Screen

7.10.9.1 Outline

This is used to store PLC data stored in the temporary memory area inside the NC into an SD card.



7.10.9.2 Screen Display Conditions

If automatic ROM write is set, the ROM write menu is not displayed in the NC file operation menu.

7.10.9.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the ROM write popup screen are always enabled.

7.10.9.4 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the ROM Write Screen"
Execute	Refer to "Writing PLC Data in the Temporary Memory Area into ROM"
Close	Refer to "Closing the ROM Write Screen"

7.10.9.5 Writing PLC Data in the Temporary Memory Area into ROM

1. Press the [RUN] menu key to display the execute ROM write confirmation message. If [YES] is selected, the execute ROM write confirmation message and the ROM write popup screen closes, and the data is written to ROM. After the process is complete, the completion message is displayed.

All data in the target will be deleted,
the program memory data will be written into the target.
Do you really want to execute?

YES	NO								

Completed.

OK									

7.10.9.6 Closing the ROM Write Screen

Use any of the following methods to close the ROM Write screen.

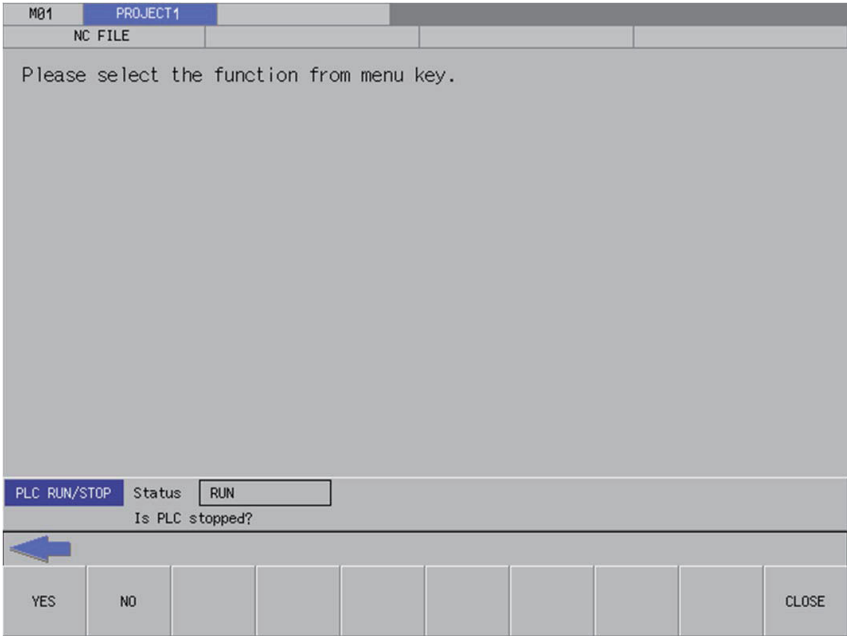
Methods to close the screen
Execute the ROM write operation.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.10.10 PLC RUN/STOP Popup Screen

7.10.10.1 Outline

This displays the current PLC state (running or stopped) and enables run and stop control of the PLC. The current status display on the screen changes depending on whether the PLC is currently running or is stopped.

The PLC RUN/STOP popup screen can be called from several different screens.



7.10.10.2 Screen Display Menu

The PLC RUN/STOP popup screen can be displayed from the following menus.

- [NC FILE OPERATION] - [PLC RUN/STOP]
- [EXT. FILE OPERATION] - [PLC RUN/STOP]
- [LADDER MONITOR] - [PLC RUN/STOP]
- [LADDER MONITOR] - [LADDER RATIO] - [ENTRY DEVICE MONITOR] - [PLC RUN/STOP]
- [LADDER MONITOR] - [LADDER RATIO] - [ENTRY LADDER MONITOR] - [PLC RUN/STOP]
- [DEVICE] - [DEVICE BATCH MONITOR] - [PLC RUN/STOP]
- [DEVICE] - [ENTRY DEVICE MONITOR] - [PLC RUN/STOP]
- [SAMPLING TRACE] - [TRACE EXECUTION] - [PLC RUN/STOP]

7.10.10.3 Screen Display Items

The following table describes the screen display items for the PLC RUN/STOP popup screen.

Item name	Display state
Current state	This displays the PLC state for the current project.

7.10.10.4 Enabled/Disabled State of Menu Keys

The menu keys displayed on the PLC RUN/STOP popup screen are always enabled.

7.10.10.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the PLC RUN/STOP Popup Screen".
Yes	Refer to "Changing the PLC State for the Specified Project".
No	Refer to "Closing the PLC RUN/STOP Popup Screen".
Close	Refer to "Closing the PLC RUN/STOP Popup Screen".

7.10.10.6 Changing the PLC State for the Specified Project

To run

1. Press the [YES] menu key to run the PLC for the specified project. PLC may not run depending on the ladder status, parameter settings, or other factors.

To stop

1. Press the [YES] menu key to stop the PLC for the specified project.

7.10.10.7 Closing the PLC RUN/STOP Popup Screen

Use any of the following methods to close the PLC RUN/STOP popup screen.

Methods to close the screen
Press the [YES] menu key.
Press the [NO] menu key.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.10.11 Cancel Password Popup Screen

7.10.11.1 Outline

Passwords registered to PLC data files stored in the NC can be temporarily canceled.

Cancel password popup screen

PROJECT1

NC FILE

Please select

PASSWORD CANCELLATION

Password have been set on these files.
The password is temporarily released.

	TYPE	DATA NAME	PASSWORD
1	PROGRAM	MAIN	
2	PROGRAM	MAIN1	
3	PROGRAM	MAIN2	
4	PROGRAM	MAIN3	
5	PROGRAM	MAIN4	
6	PROGRAM	MAIN5	
7	PROGRAM	MAIN6	
8	PROGRAM	MAIN7	
9	PROGRAM	MAIN8	
10	PROGRAM	MAIN9	

BATCH SETTINGS

RANGE (START) - RANGE (END) PASSWORD

LIST EXECUTE RANGE (START) RANGE (END) PASSWORD BATCH SETTINGS ALL DATA PWD. LOCK CLOSE

7.10.11.2 Screen Display Items

The following table describes the screen display items for the cancel password popup screen.

Item name		Display state
Type		This displays the type of file for which the password is cleared.
Data name		This displays the name of the file for which the password is cleared.
Password		Entered passwords are displayed on-screen using asterisks.
Batch settings	Range start	Enter the start number for batch settings. Input range: 001 to 999 (highest number)
	Range end	Enter the end number for batch settings. Input range: 001 to 999 (highest number)
	Password	Enter the password for batch settings. Input range: 4 single-byte alphanumeric characters

7.10.11.3 Enabled/Disabled State of Menu Keys

The following information describes the conditions upon which menu keys displayed on the cancel password popup screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
PWD lock for all data	Enabled when the following menu keys are operated • [NC FILE OPERATION] - [PASSWORD CANCELLATION] • [EXT. FILE OPERATION] - [PASSWORD CANCELLATION]

7.10.11.4 Status during Screen Displays

The following table describes the status when displaying the cancel password popup screen.

Item name		Operation
Type		If the file selected to have the password cleared exists, the file type is displayed. If it does not exist, the display is blank.
Data name		If the file selected to have the password cleared exists, the file name is displayed. If it does not exist, the display is blank.
Password		This is the default focus position when the screen is displayed. This is left blank.
Batch settings	Range start	This displays the lowest number.
	Range end	This displays the highest number.
	Password	This is left blank.

7.10.11.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Cancel Password Popup Screen"
List	This sets the focus to the password.
Execute	Refer to "Canceling Passwords".
Range start	Batch settings: Sets the focus to the start of the range.
Range end	Batch settings: Sets the focus to the end of the range.
Password	Batch settings: Sets the focus is applied to the password.
Batch settings	This sets the password for the files set from the start of the range to the end of the range in accordance with the specification of the [BATCH SETTINGS: PASSWORD] parameter. Refer to "Batch input".
PWD lock for all data	This sets all files set with passwords to the password not entered state (password locked state). Refer to "Locking the Password for All Data".
Close	Refer to "Closing the Cancel Password Popup Screen"

7.10.11.6 Entering Passwords

Separate entry

Use the following procedure to enter the file password.

1. Press the [LIST] menu key to select the list.
2. Use the up/down arrow keys, Page Up key, and Page Down key to move to the password display column for the desired file.
3. Press the [INPUT] key to display the password input field at the bottom of the list and move the focus.

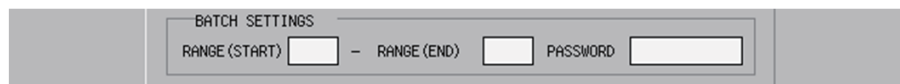


4. Enter the password and then press the [INPUT] key. Press the INPUT key to close the password input field. The password entered at the cursor position in the list is displayed using asterisks.
- * Passwords are displayed using asterisks as they are input.
5. Pressing the [CLOSE] menu key cancels the password being entered, closes the password input field, and returns to the cursor position to the list.

Batch input

Passwords can be cleared in batches if multiple files have the same password.

Use the following procedure to enter batch settings.



1. Press the [RANGE (START)] menu key to select the start of the range.
2. Enter the start number for batch settings.
3. Press the [RANGE (END)] menu key to select the end of the range.
4. Enter the end number for batch settings.
5. Press the [PASSWORD] menu key to select the password.
6. Enter the password for batch settings.
- * Passwords are displayed using asterisks as they are input.
7. Press the [BATCH SETTINGS] menu key. Pressing the batch settings key displays the password entered for the specified range using asterisks.
- * Batch settings are enabled only when files are consecutively displayed in the list.

Abnormal operation

This information describes the details of error messages displayed when entering passwords and the corrective action thereof.

(1) Separate entry

Error message	Error description	Corrective action
A password has not been entered.	This is displayed when trying to confirm a password before entering the password.	Enter the password before confirming it.
The password is incorrect.	This is displayed when trying to confirm a password entered using less than 4 characters.	Correctly enter the 4-character password before confirming it.

(2) Batch input

Error message	Error description	Corrective action
The range start is not input.	This is displayed when the [BATCH SETTINGS] menu key is pressed before entering the start of the range.	Enter the start of the range before pressing the [BATCH SETTINGS] menu key.
The range end is not input.	This is displayed when the [BATCH SETTINGS] menu key is pressed before entering the end of the range.	Enter the end of the range before pressing the [BATCH SETTINGS] menu key.
A password has not been entered.	This is displayed when the [BATCH SETTINGS] menu key is pressed before entering the password.	Enter the password before pressing the [BATCH SETTINGS] menu key.
The range start is not input.	This is displayed when the [Batch Settings] menu key is pressed while the start of the range is not within the range of numbers in the list.	Edit the start of the range and then press the [Batch Settings] menu key again.
The range is illegal.	This is displayed when the [Batch Settings] menu key is pressed while the start of the range is higher than the end.	Edit the start of the range so that it is higher than the end and then press the [Batch Settings] menu key again.
The range end is illegal.	This is displayed when the [BATCH SETTINGS] menu key is pressed while the end of the range is not within the range of numbers in the list.	Edit the end of the range and then press the [BATCH SETTINGS] menu key again.
The password is incorrect.	This is displayed when the [BATCH SETTINGS] menu key is pressed while the password entered is less than 4 characters.	Edit the password with all 4 characters before pressing the [BATCH SETTINGS] menu key.

7.10.11.7 Deleting Passwords

Deleting entered passwords

1. Use the up/down arrow keys, Page Up key, and Page Down key to move to the password display column for the desired file.
2. Press the [DELETE] key. Pressing the DELETE key deletes the password at the cursor position.

Locking the password for all data

1. Press the [ALL DATA PWD. LOCK] menu key. Pressing the ALL DATA PWD. LOCK menu key displays the following message screen.

I want to password lock state. Would you like?

YES	NO								

2. Pressing the [YES] menu key closes the message screen and resets all files to the password not set state (password locked state). The cancel password popup screen closes and the PLC data stored in the NC is retrieved again.

Pressing the [NO] menu key closes the message screen and returns to the cancel password popup screen.

7.10.11.8 Canceling Passwords

Normal operation

1. Press the [EXECUTE] menu key. Pressing this key removes successfully cleared files from the list. Files that were not successfully cleared remain displayed.
 * Files for which a password was not entered are also removed from the list as clearing the password for these files is no longer needed.

Abnormal operation

This information describes the details of error messages displayed on the cancel password popup screen and the corrective action thereof.

Error message	Error description	Corrective action
The entered password is not correct. Enter the correct password.	This is displayed when the [EXECUTE] menu key is pressed after entering an incorrect password.	The file for which an incorrect password was entered is displayed again. Enter the correct password and then press the [EXECUTE] menu key again.

7.10.11.9 Closing the Cancel Password Popup Screen

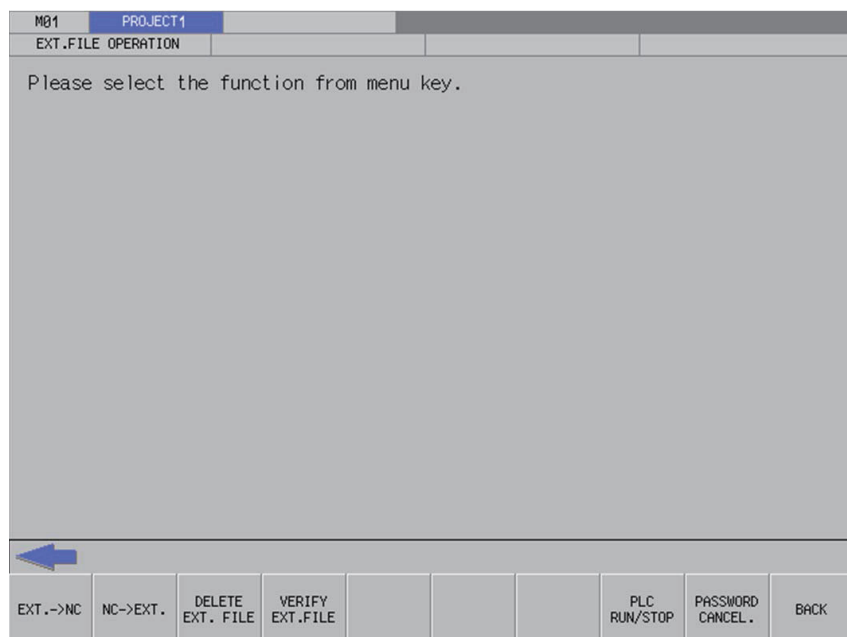
Use any of the following methods to close the cancel password popup screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.11 External File Operation Menu

7.11.1 External File Operation Main Screen

This is used to perform operations on PLC data stored in external devices.



7.11.1.1 Screen Display Items

The following table describes the screen display items for the external file operation screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.

7.11.1.2 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the external file operation screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
External → NC	Disabled when the function is restricted.
PLC RUN/STOP	Disabled when the function is restricted.
Cancel password	Disabled when the function is restricted.

Operation of Key Presses

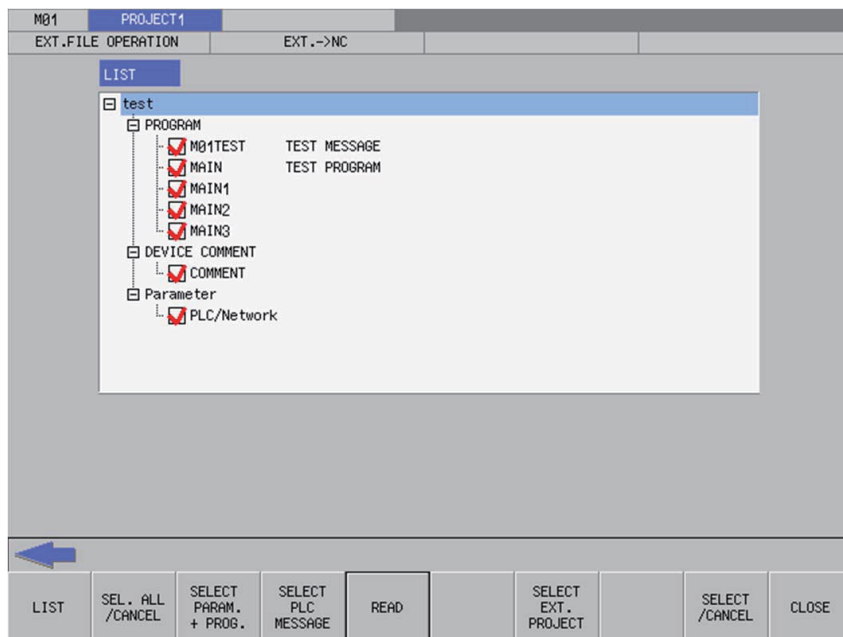
The following table describes the operation of the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key/return menu key	These transition to the main menu.
Various menu keys	This displays the specified screen.

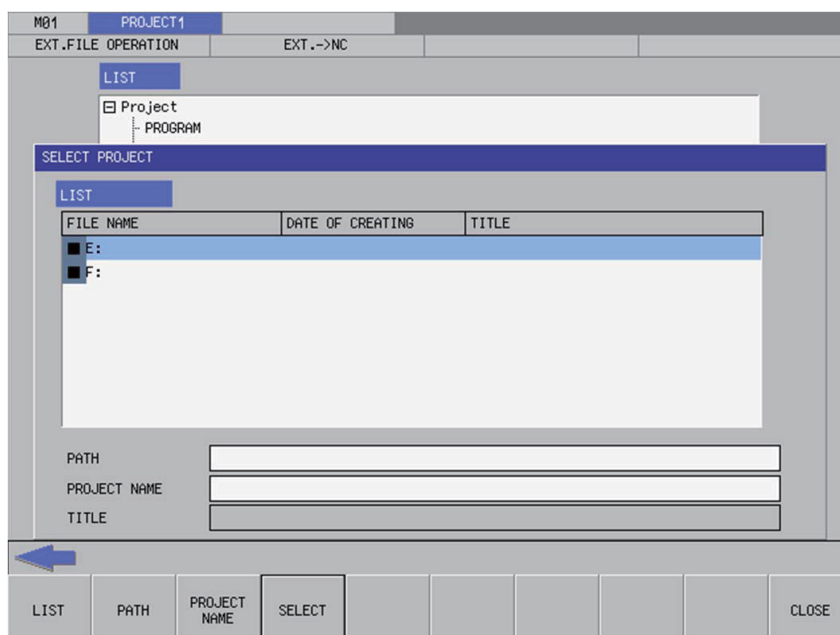
7.11.2 External → NC

7.11.2.1 Outline

This reads the project data stored in external device and writes to the temporary memory area of the current project in the NC.



Pressing the [EXT. → NC] menu from the external file operation screen displays the select external project popup screen as illustrated in the following diagram. If this screen displays while an external project is not selected, PLC data cannot be displayed in the list.



7.11.2.2 Screen Display Items

The following table describes the screen display items for the External → NC screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
List	This displays PLC data stored in the selected on the select external project screen. This displays nothing if there is nothing stored or no PLC data has been selected.

7.11.2.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the External → NC screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Select/Cancel all data	Enabled when selectable PLC data has been added to the list
Parameter + Program	Enabled when selectable PLC data has been added to the list
PLC messages	Enabled when selectable PLC data has been added to the list
Execute	Enabled when selectable PLC data has been added to the list
Select/Cancel data	Enabled when selectable PLC data has been added to the list

7.11.2.4 Status during Screen Displays

The following table describes the status when displaying the External → NC screen.

Item name	Operation
List	This is the default focus position when the screen is displayed. This displays PLC data stored in the selected on the select external project screen. This displays nothing if there is nothing stored or no PLC data has been selected.

7.11.2.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the External → NC Screen".
List	The focus is applied to the list.
Select/Cancel all data	This selects/deselects the check boxes for all data in the list.
Parameter + Program	This selects/deselects the check boxes for parameters and programs in the list. This does not include PLC messages however.
PLC messages	This selects/deselects the check boxes for the PLC messages in the list.
Execute	Refer to "Reading External Project Data and Storing in the NC".
Select external project	This displays the select external project popup screen. Refer to "Select External Project Popup Screen".
Select/Cancel data	This selects/deselects the check boxes for data selected in the list. *This operation can also be performed with the [SP (space)] key.
Close	Refer to "Closing the External → NC Screen".

7.11.2.6 Reading External Project Data and Storing in the NC

Normal operation

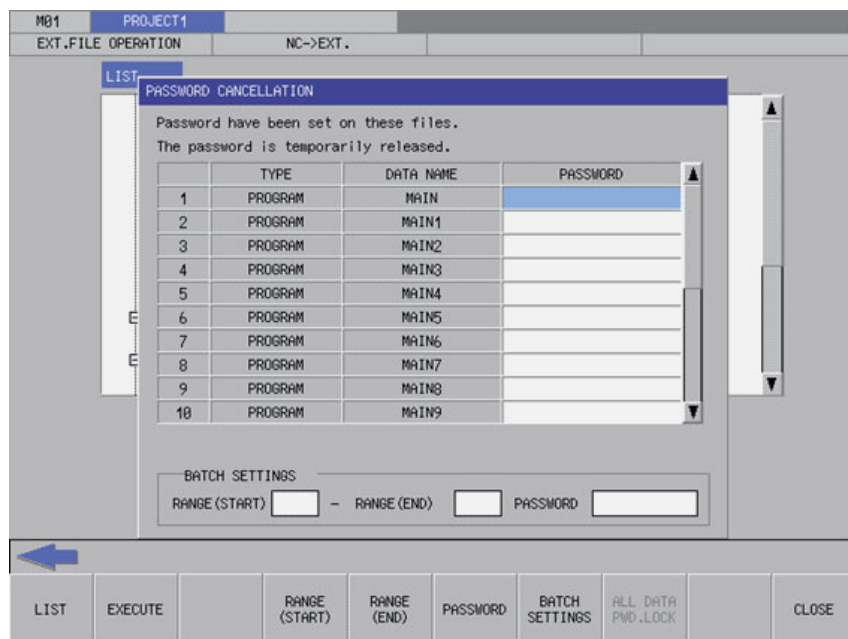
1. Press the [LIST] menu key to move the focus to the list. Select the desired PLC data from the list. Deselect the check boxes for data you do not want to store.
2. After selecting data, press the [EXECUTE] menu key. After pressing this menu key, the PLC data selected in the list is read from the project stored in an external device and then stored in the specified project in the NC.

* If a password to protect against reads or reads/writes has been registered to the selected files, the cancel password screen is displayed.

Enter the password to temporarily cancel the password.

If the password is temporarily canceled, processing will continue.

Refer to "Canceling File Passwords" for information on entering and clearing passwords.



- * If PLC data with the same name has already been read, the confirm overwrite popup screen is displayed.

The program (MAIN) already exists.
Are you sure OK to overwrite?

YES NO ALL YES

- * A progress bar is displayed indicating the status of reading and writing PLC data.

← Reading... PROGRAM MAIN

- After the selected PLC data has been read and written, the complete message is displayed.

Completed.

OK

- * If PLC data is written while the PLC is running, a message confirming whether or not to pause the PLC is displayed. Select [YES] to stop the PLC and continue writing the PLC data. If [NO] is selected, the PLC does not stop which results in an error and the display of an error message. (Refer to "Abnormal operation")
- * If the PLC stops, a message displays to confirm whether or not to restart the PLC immediately after data has been written. Select [YES] to continue running the PLC. Select [NO] to keep the PLC stopped.

PLC is in a RUN state.
Is read performed after stop PLC?

YES NO

PLC is in a STOP state.
Is PLC changed into a RUN state?

YES NO

Abnormal operation

This information describes the details of error messages displayed on the External → NC screen and the corrective action thereof.

Error message	Error description	Corrective action
Read data has not been selected.	This is displayed when the [EXECUTE] menu key is pressed before any PLC data has been selected from the displayed list.	Select PLC data from the displayed list before pressing the [EXECUTE] menu key.
Write executions cannot be performed because the PLC is running. Execute again after the PLC stops.	This displays when attempting to store PLC data stored in an external device into the NC without stopping the PLC.	Store PLC data stored in an external device into the NC after stopping the PLC.

7.11.2.7 Closing the External → NC Screen

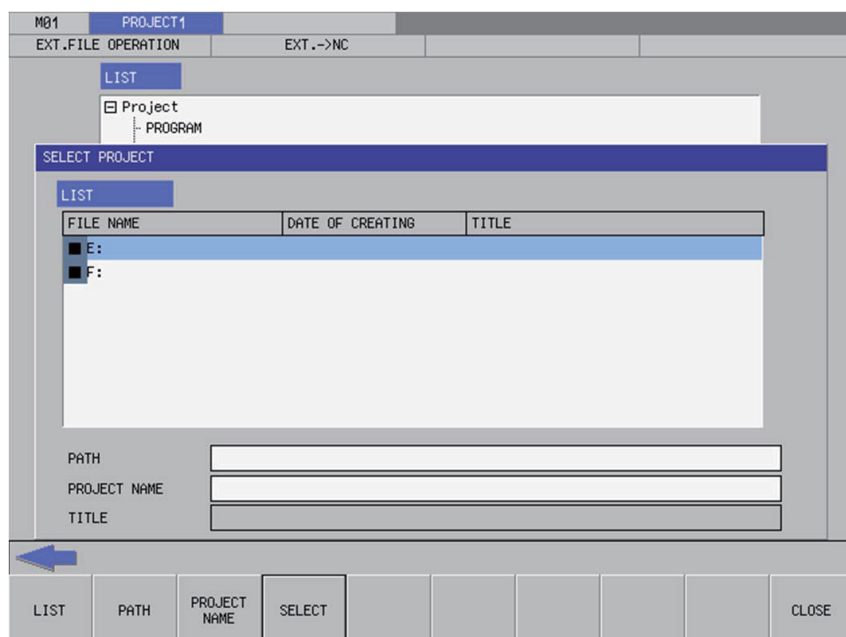
Use any of the following methods to close the External → NC screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.11.3 Select External Project Popup Screen

7.11.3.1 Outline

This displays a list of project data stored in external devices and selects the project data to be read.



7.11.3.2 Screen Display Items

The following table describes the screen display items for the select external project popup screen.

Item name	Display state
List	This displays the directory and PLC data stored at the specified path.
Path	This displays the path where the project data is stored. (the path can be entered)
Project name	This displays the name of the project data selected in the list. (the project name can be entered)
Title	This displays the title set in the project data selected in the list.

7.11.3.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the select external project popup screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Select	Enabled when the path and project name are not blank

7.11.3.4 Status during Screen Displays

The following table describes the status when displaying the select external project popup screen.

Item name	Operation
List	Refer to "Displaying PLC Data"
Path	This is blank or displays the path that is displayed in the list.
Project name	This is blank or displays the project data that is selected in the list.
Title	This is blank or displays the title specified in the project data that is selected in the list.

7.11.3.5 Displaying PLC Data

This displays the directory and project data stored directly under the root path of the default external device when the select external project popup screen is displayed for the first time.

This displays the details of the path where the previously selected project is stored when the select external project popup screen is displayed after a project is already selected. This displays path details directly under the root of the default external device when there is no specified path.

<List display for the initial display of the screen>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P LADDER	2014/12/25 17:33:40	LADDER PROGRAM
■ OTHER		Directory
P PROJECT	2014/12/25 17:34:49	PROJECT1



<List display when a project is selected>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P BASE	2015/01/05 11:43:44	



<List for the next display>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P BASE	2015/01/05 11:43:44	

7.11.3.6 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Select External Project Popup Screen".
List	This selects the list.
Path	This selects the password input field.
Project name	This selects the project name input field.
Select	Refer to "Selecting External Projects".
Close	Refer to "Closing the Select External Project Popup Screen".

7.11.3.7 Select External Projects

Normal operation**(1) To directly input the path and project name**

1. Press the [PATH] menu key to move the focus to the path input field. Input the path where the project data is stored.

*This operation is not necessary if the read source does not need to be changed.

2. Press the [PROJECT NAME] menu key to move the focus to the project name input field. Enter the name for the project data.
3. Pressing the [SELECT] menu key closes the select external project popup screen and returns to the External → NC screen. The PLC data stored in the selected project is displayed in the list on the External → NC screen.

(2) To select a project from the list

1. Press the [LIST] menu key to move the focus to the list. Use the up and down arrow keys to select existing project data.
2. Pressing the [INPUT] menu key or pressing the [SELECT] menu key closes the select external project popup screen and returns to the External → NC screen. The PLC data stored in the selected project is displayed in the list on the External → NC screen.

<List for the select external project screen>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P LADDER	2014/12/25 17:33:40	LADDER PROGRAM
■ OTHER		Directory
P PROJECT	2014/12/25 17:34:49	PROJECT1

Select the project data in the GX Developer format.



<List for the External → NC screen>

PROJECT1	
PROGRAM	
☐ M1MSG	MESSAGE 1
☐ M2MSG	MESSAGE 2
☒ MAIN	
DEVICE COMMENT	
☒ CMNT	ADDITIONAL COMMENT
☒ COMMENT	
Parameter	
☒ PLC/Network	

Display the PLC data stored in the selected project.

Abnormal operation

This information describes the details of error messages displayed on the select project popup screen and the corrective action thereof.

Error message	Error description	Corrective action
The specified project does not exist. Specify an existing project path/project name.	This is displayed when the [SELECT] menu key is pressed after entering a path or project name that does not exist.	Enter the correct path and project name and then press the [SELECT] menu key again.

7.11.3.8 Closing the Select External Project Popup Screen

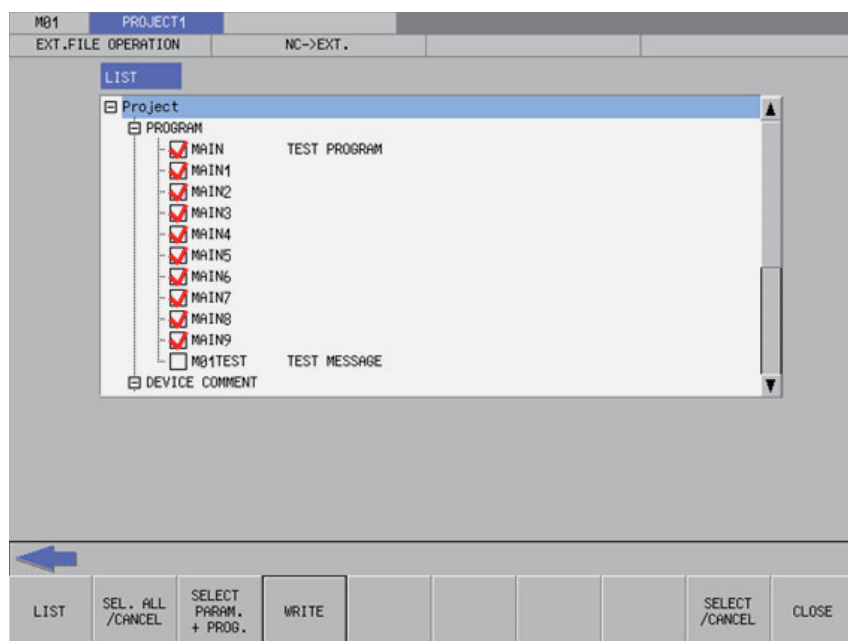
Use any of the following methods to close the select external project popup screen.

Methods to close the screen
Select the project and then press the [SELECT] menu key.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.11.4 NC → External

7.11.4.1 Outline

This reads the project data stored in the current project and stored it into external media in GX Developer format.



7.11.4.2 Screen Display Items

The following table describes the screen display items for the NC → External screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
List	This displays the PLC data stored in the current project. This displays nothing if there is nothing stored.

7.11.4.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the NC → External screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Select/Cancel all data	Enabled when selectable PLC data has been added to the list
Parameter + Program	Enabled when selectable PLC data has been added to the list
Write	Enabled when selectable PLC data has been added to the list
Select/Cancel data	Enabled when selectable PLC data has been added to the list

7.11.4.4 Status during Screen Displays

The following table describes the status when displaying the NC → External screen.

Item name	Operation
List	This is the default focus position when the screen is displayed. This displays the PLC data stored in the current project.

7.11.4.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

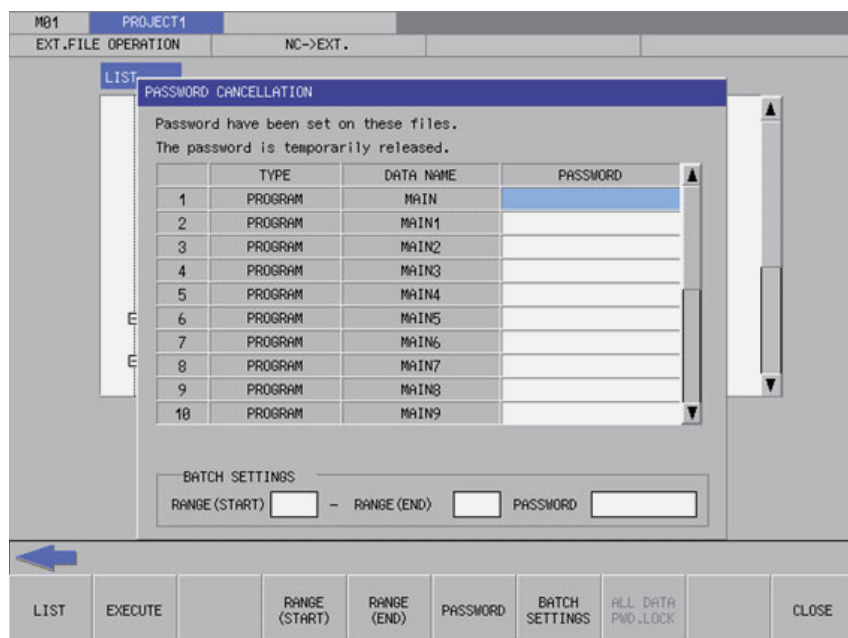
Item name	Operation
Left arrow key	Refer to "Closing the NC → External Screen".
List	The focus is applied to the list.
Select/Cancel all data	This selects/deselects the check boxes for all data in the list.
Parameter + Program	This selects/deselects the check boxes for parameters and programs in the list. This does not include PLC messages however.
Write	Refer to "Storing PLC Data Stored in the Current Project into an External Device".
Select/Cancel data	This selects/deselects the check boxes for data selected in the list. *This operation can also be performed with the [SP (space)] key.
Close	Refer to "Closing the NC → External Screen".

7.11.4.6 Storing PLC Data Stored in the Current Project into an External Device

Normal operation

1. Press the [LIST] menu key to move the focus to the list. Select the desired PLC data from the list. Deselect the check boxes for data you do not want to store.
 2. After selecting data, press the [WRITE] menu key. After pressing this menu key, the [SAVE EXTERNAL PROJECT] popup screen displays.
 3. At the [SAVE EXTERNAL PROJECT] popup screen, specify the project you want to save and then press the [SELECT] menu key. The PLC data selected in the list on the [NC -> EXT.] screen is saved to the project specified on the [SAVE EXTERNAL PROJECT] popup screen in GX Developer format.
After the save process completes, the [SAVE EXTERNAL PROJECT] popup screen closes.
- * Refer to "Save External Project Popup Screen" for more information on the process performed with the [SAVE EXTERNAL PROJECT] popup screen.

- * If a password to protect reads/writes has been registered to the selected files, the cancel password screen is displayed.
Enter the password to temporarily cancel the password.
If the password is temporarily canceled, processing will continue.
Refer to "Canceling File Passwords" for information on entering and clearing passwords.



Abnormal operation

This information describes the details of error messages displayed on the NC → External screen and the corrective action thereof.

Error message	Error description	Corrective action
Write data has not been selected.	This is displayed when the [EXECUTE] menu key is pressed before any PLC data has been selected from the displayed list.	Select PLC data from the displayed list before pressing the [EXECUTE] menu key.

7.11.4.7 Closing the NC → External Screen

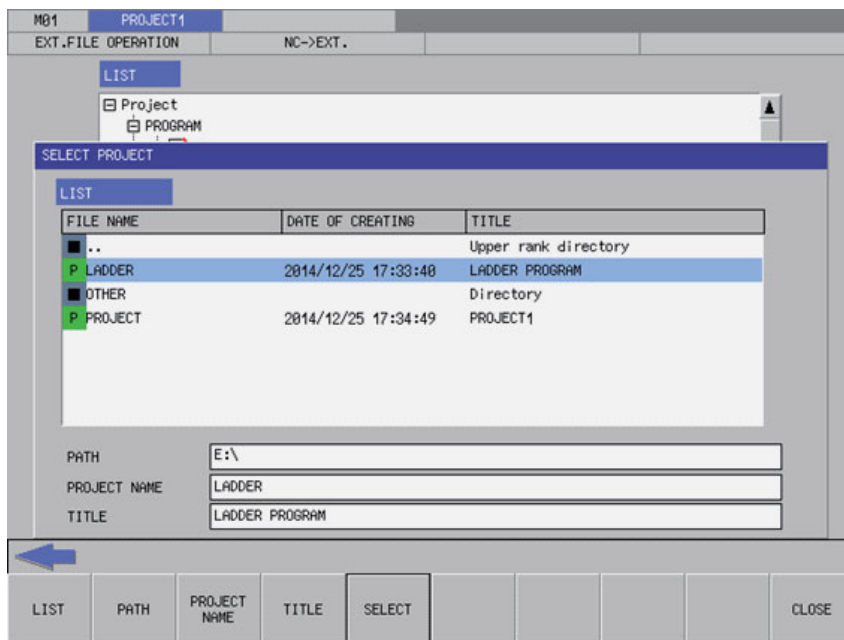
Use any of the following methods to close the NC → External screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.11.5 Save External Project Popup Screen

7.11.5.1 Outline

This displays a list of project data stored in external devices, selects the project data to be saved, and also creates new data.



7.11.5.2 Screen Display Items

The following table describes the screen display items for the save external project popup screen.

Item name	Display state
List	This displays the directory and PLC data stored at the specified path.
Path	This displays the path where the project data is stored. (the path can be entered)
Project name	This displays the name of the project data selected in the list. (the project name can be entered)
Title	This displays the title set in the project data selected in the list. (the title can also be entered)

7.11.5.3 Enabled/Disabled State of Menu Keys

The menu key displayed on the save external project popup screen are always enabled.

7.11.5.4 Status during Screen Displays

The following table describes the status when displaying the save external project popup screen.

Item name	Operation
List	Refer to "Displaying PLC Data"
Path	This is blank or displays the path that is displayed in the list.
Project name	This is blank or displays the project data that is selected in the list.
Title	This is blank or displays the title specified in the project data that is selected in the list.

7.11.5.5 Displaying PLC Data

This displays the directory and project data stored directly under the root path of the default external device when the save external project popup screen is displayed for the first time.

This displays the details of the path where the previously saved project is stored when the save external project popup screen is displayed after a project is already saved. This displays path details directly under the root of the default external device when there is no specified path.

<List display for the initial display of the screen>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P LADDER	2014/12/25 17:33:40	LADDER PROGRAM
■ OTHER		Directory
P PROJECT	2014/12/25 17:34:49	PROJECT1



<List display when a project is selected>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P BASE	2015/01/05 11:43:44	



<List for the next display>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P BASE	2015/01/05 11:43:44	

7.11.5.6 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Save External Project Popup Screen".
List	This selects the list.
Path	This selects the password input field.
Project name	This selects the project name input field.
Title	This selects the title input field.
Select	Refer to "Saving to External Projects".
Close	Refer to "Closing the Save External Project Popup Screen".

7.11.5.7 Saving to External Projects

Normal operation

(1) To save to new projects

1. Press the [PATH] menu key to move the focus to the path input field. Enter the save destination for the project data.
*This operation is not necessary if the save destination does not need to be changed.
2. Press the [PROJECT NAME] menu key to move the focus to the project name input field. Enter the name for the project data.
3. Press the [TITLE] menu key to move the focus to the title input field. Enter the title for the project data.
*Titles are optional.
4. Pressing the [SELECT] menu key creates the project data according to the specified name and tile at the specified path and then stores the PLC data selected at the NC → External screen.

* A progress bar is displayed indicating the status of writing PLC data.



5. After the selected PLC data has been written, the complete message is displayed.
Pressing the [OK] menu key closes the complete message and also ends the save external project screen.



(2) To save to existing projects

1. Press the [LIST] menu key to move the focus to the list. Use the up and down arrow keys to select existing project data.
2. Pressing the [INPUT] key or the [SELECT] menu key saves the PLC data selected at the NC → External screen to the selected project data.

* If PLC data with the same name already exists, the confirm overwrite popup screen is displayed.

The program (MAIN) already exists.
 Are you sure OK to overwrite?

YES

NO

ALL YES

* A progress bar is displayed indicating the status of writing PLC data.

←

Writing... MAIN

3. After the selected PLC data has been written, the complete message is displayed.
Pressing the [OK] menu key closes the complete message and also ends the save external project screen.

Completed.

OK

Abnormal operation

This information describes the details of error messages displayed on the save external project popup screen and the corrective action thereof.

Error message	Error description	Corrective action
This project/data name is a reserved device name. Please choose another name.	This is displayed after the [SELECT] menu key is pressed when a reserved device name*1 has been entered as the data name.	Enter a suitable data name before pressing the [SELECT] menu key.
Prohibited characters were used in the file name. Do not use the following characters in file names: /, :, ,, ., *, ?, \, ", <, >, .	This is displayed when the [SELECT] menu key is pressed and the data name contains prohibited characters*1.	Enter a suitable data name before pressing the [SELECT] menu key.
File name includes the Multi-byte character code. Please confirm file name.	This is displayed when the [SELECT] menu key is pressed and the data name contains double-byte characters.	Enter a suitable data name before pressing the [SELECT] menu key.
Illegal characters have been used for a data name. Use legal characters.	This is displayed when the [SELECT] menu key is pressed and the final character of the data name is a period.	Enter a suitable data name before pressing the [SELECT] menu key.

*1: Refer to "PLC Data: PLC Data Used by the PLC Onboard".

7.11.5.8 Closing the Save External Project Popup Screen

Use any of the following methods to close the save external project popup screen.

Methods to close the screen
Save the project data to the external device.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.11.6 Delete External File Popup Screen

7.11.6.1 Outline

This displays a list of project data stored in external devices and deletes the specified project data.

MB1 PROJECT1

EXT.FILE OPERATION

Please select the function from menu key.

DELETE PROJECT

LIST

FILE NAME	DATE OF CREATING	TITLE
..		Upper rank directory
P LADDER	2014/12/25 17:33:48	LADDER PROGRAM
OTHER		Directory
P PROJECT	2014/12/25 17:34:49	PROJECT1

PATH: E:\

PROJECT NAME: LADDER

TITLE: LADDER PROGRAM

← LIST PATH PROJECT NAME SELECT CLOSE

7.11.6.2 Screen Display Items

The following table describes the screen display items for the delete external file popup screen.

Item name	Display state
List	This displays the directory and PLC data stored at the specified path.
Path	This displays the path where the project data is stored. (the path can be entered)
Project name	This displays the name of the project data selected in the list. (the project name can be entered)
Title	This displays the title set in the project data selected in the list.

7.11.6.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the delete external project popup screen are always enabled.

7.11.6.4 Status during Screen Displays

The following table describes the status when displaying the delete external file popup screen.

Item name	Operation
List	Refer to "Displaying PLC Data"
Path	This is blank or displays the path that is displayed in the list.
Project name	This is blank or displays the project data that is selected in the list.
Title	This is blank or displays the title specified in the project data that is selected in the list.

7.11.6.5 Displaying PLC Data

This displays the directory and project data stored directly under the root path of the default external device when the delete external file popup screen is displayed for the first time.

This displays the details of the path where the previously selected project is stored when the delete external file popup screen is displayed after a project is already selected. This displays path details directly under the root of the default external device when there is no specified path.

<List display for the initial display of the screen>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P LADDER	2014/12/25 17:33:40	LADDER PROGRAM
■ OTHER		Directory
P PROJECT	2014/12/25 17:34:49	PROJECT1



<List display when a project is selected>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P BASE	2015/01/05 11:43:44	



<List for the next display>

FILE NAME	DATE OF CREATING	TITLE
■ ..		Upper rank directory
P BASE	2015/01/05 11:43:44	

7.11.6.6 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Delete External File Popup Screen".
List	This selects the list.
Path	This selects the password input field.
Project name	This selects the project name input field.
Select	Refer to "Deleting External Projects".
Close	Refer to "Closing the Delete External File Popup Screen".

7.11.6.7 Deleting External Projects

Normal operation

(1) To directly input the path and name of the project to delete

1. Press the [PATH] menu key to move the focus to the path input field. Input the path where the project data is stored.
*This operation is not necessary if the read source does not need to be changed.
2. Press the [PROJECT NAME] menu key to move the focus to the project name input field. Enter the name for the project data.
3. Press the [SELECT] menu key to display the confirm delete message. If [YES] is selected, the confirm delete message and the delete external file popup screen closes and the data is deleted. If [NO] is selected, the confirm delete message closes and then the system returns to the delete external file popup screen.

Delete the specified project.
Are you sure you want to delete the entire
contents of the specified project?

YES	NO								

(2) To select a project to delete from the list

1. Press the [LIST] menu key to move the focus to the list. Use the up and down arrow keys to select existing project data.
2. Press the [INPUT] menu key or the [SELECT] menu key to display the confirm delete message. If [YES] is selected, the confirm delete message and the delete external file popup screen closes and the data is deleted. If [NO] is selected, the confirm delete message closes and then the system returns to the delete external file popup screen.

Delete the specified project.
Are you sure you want to delete the entire
contents of the specified project?

YES

NO

Abnormal operation

This information describes the details of error messages displayed on the delete external project popup screen and the corrective action thereof.

Error message	Error description	Corrective action
The specified project does not exist. Specify an existing project path/project name.	This is displayed when the [SELECT] menu key is pressed after entering a path or project name that does not exist.	Enter the correct path and project name and then press the [SELECT] menu key again.

7.11.6.8 Closing the Delete External File Popup Screen

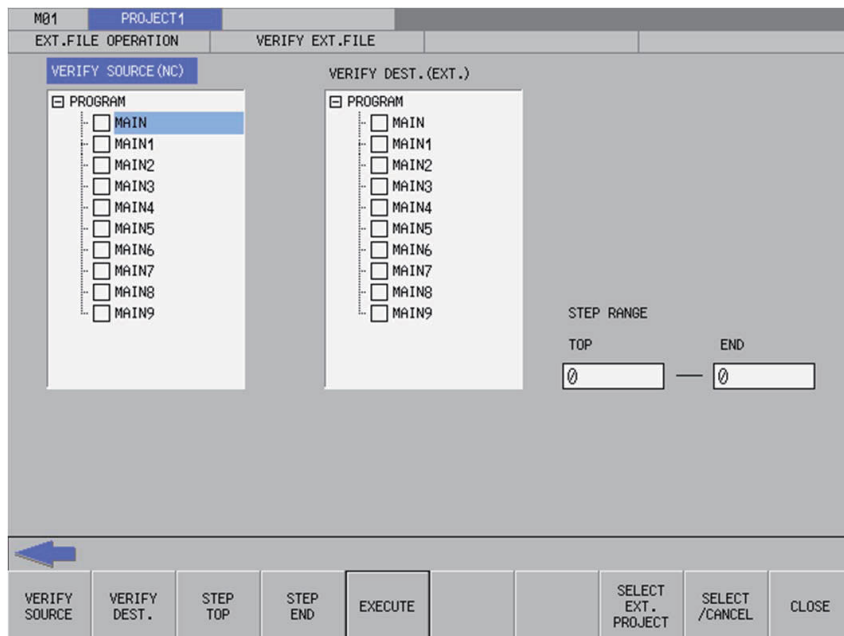
Use any of the following methods to close the delete external file popup screen.

Methods to close the screen
Delete the external files.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.11.7 Verify External File Screen

7.11.7.1 Outline

This compares the PLC data (sequence programs and parameters) stored in external devices with PLC data (sequence programs and parameters) stored in projects.



7.11.7.2 Screen Display Items

The following table describes the screen display items for the verify external file screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Verify source (NC)	This displays the PLC data stored in the current project. This displays nothing if there is nothing stored.
Verify destination (external)	This displays PLC data stored in the selected on the select external project screen. This displays nothing if there is nothing stored or no PLC data has been selected.
Top of step range	This displays the top step number in the step range. A zero is displayed if there is nothing stored.
End of step range	This displays the end step number in the step range. A zero is displayed if there is nothing stored.

7.11.7.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the verify external file screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Select/Cancel data	Enabled when selectable PLC data has been added to the list

7.11.7.4 Status during Screen Displays

The following table describes the status when displaying the verify external file screen.

Item name	Operation
Verify source (NC)	This displays the PLC data stored in the current project. This displays nothing if there is nothing stored.
Verify destination (external)	This displays PLC data stored in the selected on the select external project screen. This displays nothing if there is nothing stored or no PLC data has been selected.
Top of step range	This displays the top step number in the step range. A zero is displayed if there is nothing stored.
End of step range	This displays the end step number in the step range. A zero is displayed if there is nothing stored.

7.11.7.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Verify External File Screen".
Verify source	This sets the focus to verify source (NC) data.
Verify destination	This sets the focus to verify destination (external) data.
Top step	This sets the focus to the top of the step range.
End step	This sets the focus to the end of the step range.
Execute	Refer to "Verifying PLC Data".
Select external project	This displays the select external project popup screen. Refer to "Select External Project Popup Screen".
Select/Cancel data	This selects/deselects the check boxes for data selected in the list that is highlighted, which is either the verify source (NC) data or the verify destination (external) data. *This operation can also be performed with the [SP (space)] key.
Close	Refer to "Closing the Verify External File Screen".

7.11.7.6 Verifying PLC Data

Normal operation

1. Press the [VERIFY SOURCE] menu key to move the focus to the verify source (NC) data. Use the up and down arrow keys to select PLC data to verify. Use the [SELECT/DELETE DATA] menu key or the SP key to select the check boxes for the desired PLC data.
 2. Press the [SELECT EXTERNAL PROJECT] menu key to display the select external project popup screen. Select the project data to verify in the select external project popup screen.
*Refer to "Select External Project Popup Screen" for more information on operations within the [SELECT EXTERNAL PROJECT] popup screen.
 3. Press the [VERIFY SOURCE] menu key to move the focus to the verify destination (external) data. Use the up and down arrow keys to select the category of PLC data as selected for the verify source data. Use the [SELECT/DELETE DATA] menu key or the SP key to select the check boxes for the desired PLC data.
 4. After selecting data, press the [EXECUTE] menu key. Pressing this menu key compares the verify source PLC data with the verify destination PLC data and then displays the verify results popup screen.
*Refer to "Verify Results Popup Screen" for more information on the operations within the verify results popup screen.
- * If a password to protect reads/writes has been registered to the selected files, the cancel password screen is displayed.
Enter the password to cancel the password.
If the password is canceled, processing will continue.
Refer to "Canceling File Passwords" for information on clearing passwords.

P.WD.CANCEL.		The password is temporarily released.							
		PASSWORD							
EXECUTE									CLOSE

Abnormal operation

This information describes the details of error messages displayed on the verify external file screen and the corrective action thereof.

Error message	Error description	Corrective action
Verify source PLC data is not selected. Select verify source PLC data and execute again.	This is displayed when the [EXECUTE] menu key is pressed before any PLC data has been selected from the displayed verify source data list.	Select PLC data from the displayed verify source data list before pressing the [EXECUTE] menu key.
Verify destination PLC data is not selected. Select verify source PLC data and execute again.	This is displayed when the [EXECUTE] menu key is pressed before any PLC data has been selected from the displayed verify destination data list.	Select PLC data from the displayed verify destination data list before pressing the [EXECUTE] menu key.
Different types of data are selected. Check the files and execute again.	This is displayed when the [EXECUTE] menu key is pressed when the types of PLC data selected for the verify source data list and the verify destination data list are different.	Select the same types of data from the verify source data list and the verify destination data list and then press the [EXECUTE] menu key again.

7.11.7.7 Closing the Verify External File Screen

Use any of the following methods to close the verify external file screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.11.8 Verify Results Popup Screen

7.11.8.1 Outline

This displays the results of comparing the PLC data (sequence programs and parameters) stored in external devices with PLC data (sequence programs and parameters) stored in projects.

<Verify sequence program results popup screen>

VERIFY RESULTS

LIST <NC> <--> <EXT.>

STEP	COMMAND	STEP	COMMAND

RESULT

No unmatched areas.

LIST CLOSE

<Verify parameter results popup screen>

VERIFY RESULTS

LIST <NC> <--> <EXT.>

STEP	COMMAND	STEP	COMMAND
0	LD X0	0	LD X1
1	OUT Y0	1	OUT Y1

RESULT

2 items unmatched.

LIST CLOSE

7.11.8.2 Screen Display Items

The following table describes the screen display items for the verify results popup screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
List	This displays the information that does not match. This is a blank display if there all data matches.
Result	This displays the verification result.

7.11.8.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the verify results popup screen are always enabled.

7.11.8.4 Status during Screen Displays

The following table describes the status when displaying the verify results popup screen.

Item name	Operation
List	This displays the information that does not match. This is a blank display if there all data matches.

7.11.8.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Verify Results Popup Screen".
List	This is the default focus position when the screen is displayed. This displays the information that does not match.
Close	Refer to "Closing the Verify Results Popup Screen".

7.11.8.6 Closing the Verify Results Popup Screen

Use any of the following methods to close the verify results popup screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.11.9 Cancel Password Popup Screen

7.11.9.1 Outline

Passwords registered to PLC data files stored in the NC can be temporarily canceled.

Cancel password popup

Please select

PASSWORD CANCELLATION

Password have been set on these files.
The password is temporarily released.

	TYPE	DATA NAME	PASSWORD
1	PROGRAM	MAIN	
2	PROGRAM	MAIN1	
3	PROGRAM	MAIN2	
4	PROGRAM	MAIN3	
5	PROGRAM	MAIN4	
6	PROGRAM	MAIN5	
7	PROGRAM	MAIN6	
8	PROGRAM	MAIN7	
9	PROGRAM	MAIN8	
10	PROGRAM	MAIN9	

BATCH SETTINGS

RANGE (START) - RANGE (END) PASSWORD

← LIST EXECUTE RANGE (START) RANGE (END) PASSWORD BATCH SETTINGS ALL DATA PWD. LOCK CLOSE

Refer to "NC File Operation Menu: Cancel Password Popup Screen" for more information.

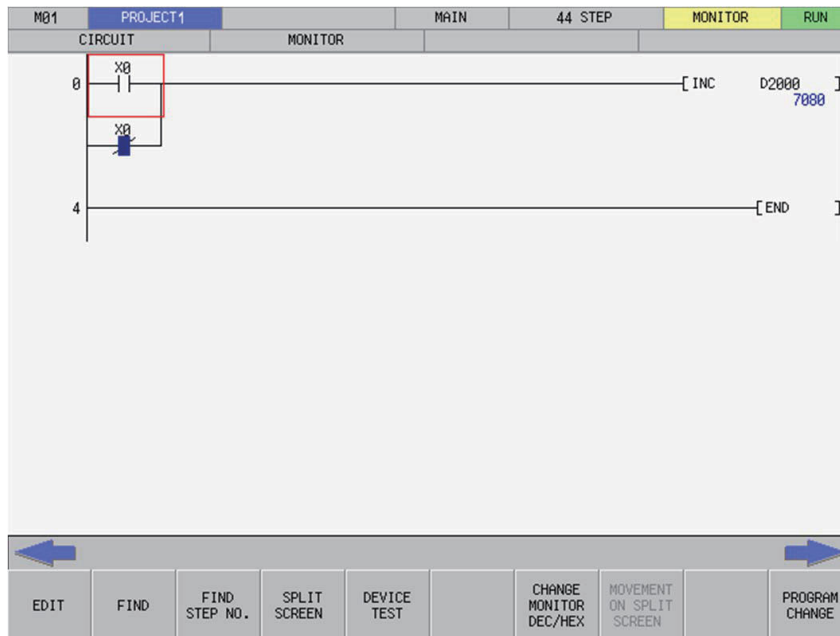
7.12 Ladder Menu

7.12.1 Ladder Monitor

7.12.1.1 Outline

The continuity state of contacts and coils can be monitored while displaying the PLC ladders.

- (1) Ladder display and first page of the ladder monitor menu



- (2) Second page of the ladder monitor menu



7.12.1.2 Screen Display Items

The following table describes the screen display items for the ladder monitor screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Program name	This displays the name of the currently displayed program.
Step number	This displays the step number of the currently displayed program.
Monitor/Edit display	This displays the [MONITOR].
PLC status and overwrite/insert display	This displays the PLC state (RUN/STOP).
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Right arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.

7.12.1.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the NC file operation screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

- (1) First page of the ladder monitor menu

Menu name	Condition upon which it is enabled/disabled
Edit	Enabled when not displaying PLC messages. Disabled when the function is restricted.
Transition to split screen	Enabled when using split screen mode
Switch Program	Enabled when using multiple programs

- (2) Second page of the ladder monitor menu

Menu name	Condition upon which it is enabled/disabled
PLC RUN/STOP	Disabled when the function is restricted.

7.12.1.4 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	This transitions to the main screen.
Right arrow key	First page of the menu: Transitions to the second page of the menu. Second page of the menu: Transitions to the first page of the menu.
Edit	This transitions to the edit menu. This also stops the ladder monitor and changes to the edit ladder mode.
Find	This displays the find popup screen.
Find Step No.	This opens the Find Step No. popup screen.
Split screen	This transitions to the split screen menu.
Device test	This displays the device test popup screen.
Current value monitor changeover (10/16)	This changes the currently monitored value display between decimal and hexadecimal.
Transition to split screen	This moves the focus to the split screen when the split screen is displayed.
Switch Program	This displays the switch program screen.
Contact coil usage list	This opens the contact coil usage list popup screen.
List of used devices	This opens the list of used devices popup screen.
Comment ON/OFF	This turns the device comment display on and off.
Zoom display	This switches the screen magnification of the ladder screen in this order: Reduced → Standard → Enlarged → Reduced.
PLC RUN/STOP	Display the PLC RUN/STOP popup screen.

7.12.1.5 Ladder display

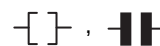
Monitor display

During monitoring, the contact and coil ON/OFF state and the device's current value are displayed. These will change according to the PLC operation state.

The following diagram illustrates ladder ON/OFF state.

OFF:  *1

ON:  *1

*1:  and  can be used only for comparative instruction, which is equivalent to the contact and SET, RST, PLS, PLF, SFT and MC, which is equivalent to coils.

Restrictions

The following restrictions apply to the ladder display on the [LADDER DISPLAY] screen.

- One ladder block must be created with 24 or less lines. An error will occur if there are more than 24 lines in one ladder block.
- The maximum number of contacts in one ladder line can be changed with the [LADDER DISPLAY SETTING] popup screen.
- The following table describes the number of characters displayed in comments.

Type	Number of characters displayed on ladder screen
Device comments	This is changed by the settings configured on the comment display setting screen.
Statements	All set characters are displayed.
Notes	
Aliases	

7.12.1.6 Moving the Cursor

To move the cursor displayed on the ladder screen, use the keys as described in "Operation Key List: Basic Operation Keys."

The following table describes the cursor movement that occurs when each key is pressed.

Key	Operation
Up and down arrow keys	This moves the cursor on the ladder screen vertically for one increment.
Left and right arrow keys	This moves the cursor on the ladder screen horizontally in one increment.
→ key	This moves the cursor on the ladder screen forward (to the right) in increments of ladders. The cursor does not move in a horizontal line.
← key	This moves the cursor on the ladder screen backward (to the left) in increments of ladders. The cursor does not move in a horizontal line.
Page Up key	This moves the cursor on the ladder screen up one page.
Page Down key	This moves the cursor on the ladder screen down one page.

7.12.1.7 Starting and Stopping the Monitor

The following table describes the timings at which the monitor is started and stopped.

Start monitor	Stop monitor
Timing at which the PLC Onboard starts and the ladder screen displays	Timing at which the system transitions to the edit menu
Timing at which the system transitions to the monitor menu	Timing at which the system transitions to the main menu
Timing at which the system transitions to the ladder screen	Timing at which the system transitions to a screen other than the ladder screen
	Timing at which the system transitions to the Mitsubishi standard display

7.12.2 Editing Ladders

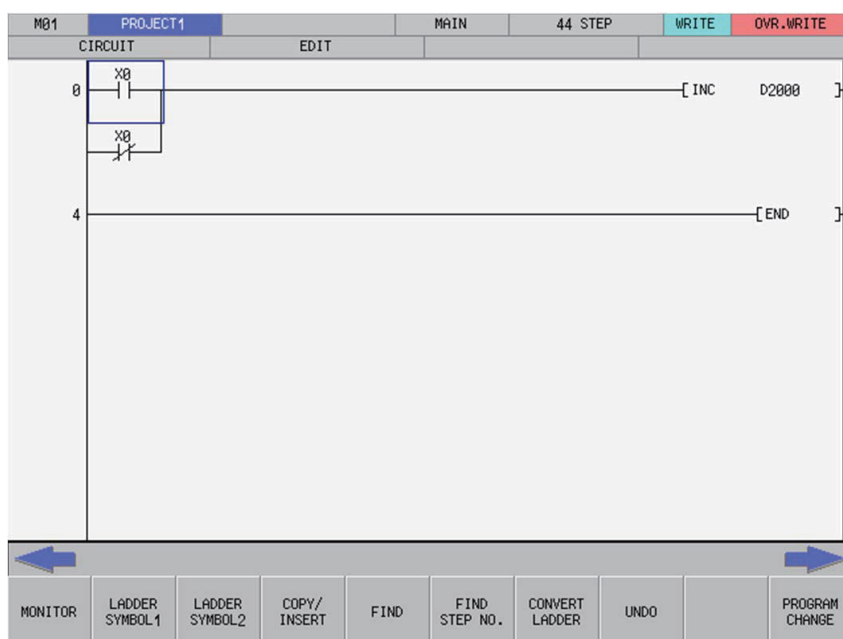
7.12.2.1 Outline

This enables sequence programs, statements, and notes to be edited (overwrite, insert, and delete).

The following table describes which information displayable on the ladder screen can be edited.

	Editable
Sequence programs (ladder circuits)	Yes
PLC messages	No
Device comments	No
Statements	Yes
Notes	Yes
Aliases	No

(1) Ladder display and first page of the ladder edit menu



(2) Second page of the ladder edit menu



7.12.2.2 Screen Display Items

The following table describes the screen display items for the ladder edit screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Program name	This displays the name of the currently displayed program.
Step number	This displays the step number of the currently displayed program.
Monitor/Edit display	This displays [EDIT].
PLC status and overwrite/insert display	This displays either [OVR. WRITE] or [INSERT] in correspondence with the edit mode.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Right arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.

7.12.2.3 Enabled/Disabled State of Menu Keys

The following tables describe the conditions upon which menu keys displayed on the ladder edit screen are enabled/disabled.

The menu keys which are not described in the following table are always enabled.

(1) First page of the ladder edit menu

Menu name	Condition upon which it is enabled/disabled
Convert Ladder	Enabled when there are unconverted ladders. Disabled when the function is restricted.
Undo	Enabled when there are unconverted ladders
Switch Program	Enabled when using multiple programs

(2) Second page of the ladder monitor menu

Menu name	Condition upon which it is enabled/disabled
Cancel edit ladder	Enabled when there are unconverted ladders
Zoom display	Enabled when the screen resolution is 640x480

7.12.2.4 Operation of Key Presses

The following table describes the operation of each menu key, and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	This transitions to the main screen.
Right arrow key	First page of the menu: Transitions to the second page of the menu. Second page of the menu: Transitions to the first page of the menu.
Monitor	This transitions to the monitor menu. This also starts the ladder monitor.
Ladder Symbol 1	This transitions to the ladder symbol 1 menu.
Ladder Symbol 2	This transitions to the ladder symbol 2 menu.
Find	This displays the find popup screen.
Step No. search	This opens the Find Step No. popup screen.
Convert Ladder	This converts ladders not yet converted and edits details.
Undo	This returns to the unconverted ladder to the last previous state.
Switch Program	This displays the select program screen.
Contact coil usage list	This opens the contact coil usage list popup screen.
List of used devices	This opens the list of used devices popup screen.
Check program	This opens the check program popup screen.
Comment ON/OFF	This turns the device comment display on and off.
Cancel edit ladder	This cancels the unconverted ladder and returns it to the state before any edits were made.
Zoom display	This switches the screen magnification of the ladder screen in this order: Reduced → Standard → Enlarged → Reduced.
Overwrite/Insert	This switches the edit mode between overwrite and insert mode.

7.12.2.5 Moving the Cursor

Refer to "Ladder Monitor: Moving the Cursor."

7.12.2.6 Editing Ladders

Editing with instructions

Ladders can be edited using the following procedure.

- (1) Move to the edit position

Use the basic operation keys to move the cursor to the edit position. (Refer to "Ladder Monitor: Moving the Cursor.")

- (2) Display the enter symbol popup screen

Use the following procedure to display the enter symbol popup screen used to edit ladders.

- (2-1) To use the ladder symbol menu

Pressing the [LADDER SYMBOL 1] or the [LADDER SYMBOL 2] menu key on the first page of the ladder edit menu changes the menu keys as illustrated in the following diagram.

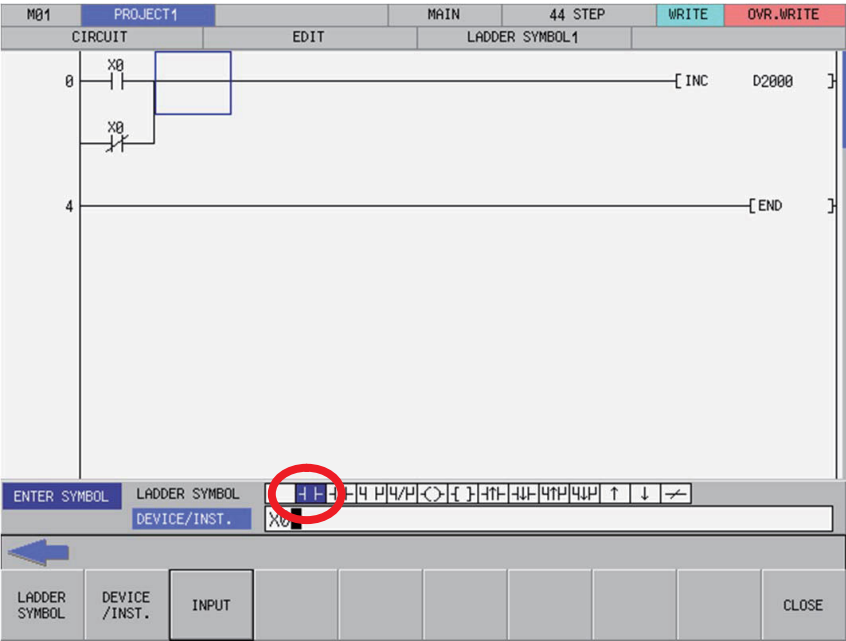
[LADDER SYMBOL 1] menu



[LADDER SYMBOL 2] menu



Pressing any of the menu keys in the area inside the red lines changes the display in accordance with the ladder symbol selected from the enter symbol popup screen.



- (2-1) To use the INPUT key
- Move the cursor to the ladder you want to edit on the ladder screen and press the [INPUT] key. The ladder symbol used for the ladder at the cursor position on the enter symbol popup screen is selected and the display changes in accordance with the instruction and device entered in the device/instruction field for the ladder at the cursor position.



- (3) Ladder input patterns
- (3-1) To use ladder symbols
- The following information describes the basic input patterns when entering ladders to be edited on the enter symbol popup screen.

- Inputting contact instructions

(Example)  XXX symbol:

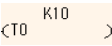
Ladder symbol	Instruction
	Device name (Ex.: X0)

- Inputting coil instructions

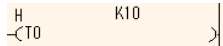
(Example)  XXX symbol:

Ladder symbol	Instruction
	Device name (Ex. Y0)

- Inputting timer and counter coil instructions

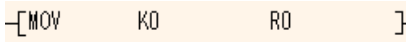
(Example)  XXX symbol: *[SP] space code

Ladder symbol	Instruction
-< >-	Device [SP] device (Ex. T0 K10)

(Example)  XXX symbol: *[SP] space code

Ladder symbol	Instruction
-< >-	Device [SP] device [SP] (Ex. H T0 K10)

- Inputting function instructions

(Example)  XXX symbol: *[SP] space code

Ladder symbol	Instruction
-[]-	Instruction [SP] device [SP] device (Ex. MOV K0 R0)

- Inputting labels

Ex.: Label of P4002

Ladder symbol	Instruction
(blank)	Device (Ex. P4002)

(3-2) Enter symbols in list format

A list of instruction text strings can be directly entered and edited. (For most cases, enter the symbols using ladder symbols.)

The following information describes the input method using a contact instruction as an example.

(Example)  XXX symbol: *[SP] space code

Ladder symbol	Instruction
blank	Instruction [SP] Device name (Ex. LD X0)

(4) Checking entered ladders

After entering the ladder symbols in accordance with the preceding input patterns, press the [INPUT] menu key.

After pressing the input menu key, the enter symbol popup screen closes and the ladder edit screen is updated with the details of entry. The background color of entered ladder symbols updated on the ladder edit screen is changed to gray for each ladder block.

(5) Deleting circuits

Move the cursor to the ladder position to be edited and press the [DELETE] key to delete the ladder at that cursor position.

Inputting lines (vertical and horizontal)

(1) Move to the edit position

Use the basic operation keys to move the cursor to the edit position. (Refer to "Ladder Monitor: Moving the Cursor.")

(2) Input lines

Pressing the [LADDER SYMBOL 1] or the menu key on the first page of the ladder edit menu changes the menu keys as illustrated in the following diagram.

[LADDER SYMBOL 1] menu



Pressing any of the menu keys in the area inside the red lines inputs a vertical or horizontal line as illustrated in the following diagrams.

- Vertical lines: A vertical line is input at the bottom-left of the cursor.



- Horizontal lines: A horizontal line is input at the cursor position.



(3) Deleting lines

(3-1) Deleting vertical lines

Move the cursor to the position such that the vertical line to be deleted is at the bottom-left of the cursor and then press the [DELETE] menu key in the [LADDER SYMBOL 2] menu keys.



Pressing the [DELETE] menu key deletes the vertical line at the position to the bottom-left of the cursor.



(3-2) Deleting horizontal lines

Move the cursor to the horizontal line position to be deleted and press the [DELETE] key to delete the horizontal line at the cursor position.

Inserting lines

New lines can be inserted at the cursor position using the following procedure.

- (1) Move to the position where the line is to be inserted
Move the cursor to the position where the line is to be inserted using the basic operation keys. (Refer to "Ladder Monitor: Moving the Cursor.")
- (2) Display the copy/insert menu.
Pressing the [COPY/INSERT] menu key on the first page of the ladder edit menu changes the menu keys as illustrated in the following diagram.
[COPY/INSERT] menu

MARK	COPY	PASTE	INSERT LINE	DELETE LINE				CONVERT LADDER	UNDO

- (3) Insert line menu key
Pressing the [INSERT LINE] menu key in the [COPY/INSERT] menu keys on the first page of the ladder edit menu inserts one blank line at the cursor position as illustrated in the following diagram.



Deleting lines

Lines can be deleted at the cursor position using the following procedure.

- (1) Move to the position where the line is to be deleted
Move the cursor to the position where the line is to be deleted using the basic operation keys. (Refer to "Ladder Monitor: Moving the Cursor.")
- (2) Display the copy/insert menu.
Pressing the [COPY/INSERT] menu key on the first page of the ladder edit menu changes the menu keys as illustrated in the following diagram.
[COPY/INSERT] menu

MARK	COPY	PASTE	INSERT LINE	DELETE LINE				CONVERT LADDER	UNDO

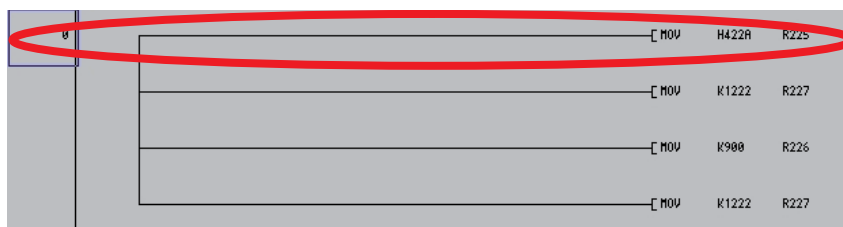
(3) Delete line menu key

Pressing the [DELETE LINE] in the [COPY/INSERT] menu keys on the first page of the ladder edit menu inserts one blank line at the cursor position as illustrated in the following diagram.

"Before deleting the line"



"After deleting the line"



Marking ranges

Ranges can be designated in units of ladder blocks or circuits.

(1) Designating the range in ladder blocks

Ranges can be selected in units of ladder blocks using the following procedure.

(a) Move to the position to select the range

Use the basic operation keys to move the cursor to the left end (position displaying the label number and step number) of the ladder block of the desired range.

(b) Display the copy/insert menu.

Pressing the [COPY/INSERT] menu key on the first page of the ladder edit menu changes the menu keys as illustrated in the following diagram.

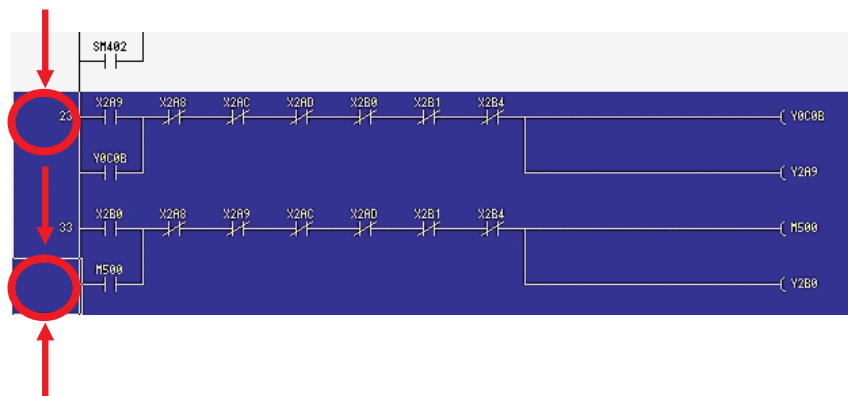
[COPY/INSERT] menu

MARK	COPY	PASTE	INSERT LINE	DELETE LINE				CONVERT LADDER	UNDO

(c) Select the range

Press the [SELECT RANGE] menu key in the [COPY/INSERT] menu keys and move the cursor vertically until you reach the last ladder block in the desired range. The background color of the selected range will change to blue.

Start point



End point

(d) Restrictions

The following restrictions apply to ranges selected in ladder blocks.

- Deletes and copy & paste operations cannot be performed in batches on circuits in ranges designated in ladder blocks.

(2) Designating ranges in circuits

(a) Move to the position to select the range

Move the cursor to the position of the ladder of the desired range using the basic operation keys.

(b) Display the copy/insert menu.

Pressing the [COPY/INSERT] menu key on the first page of the ladder edit menu changes the menu keys as illustrated in the following diagram.

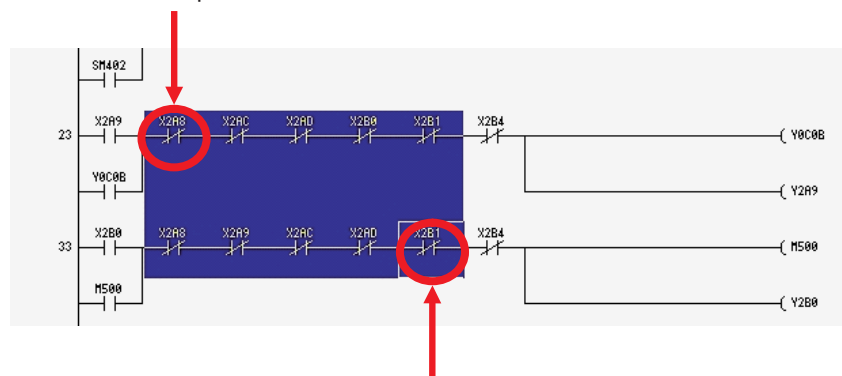
[COPY/INSERT] menu

MARK	COPY	PASTE	INSERT LINE	DELETE LINE				CONVERT LADDER	UNDO

(c) Select the range

Press the [SELECT RANGE] menu key in the [COPY/INSERT] menu keys and move the cursor horizontally and vertically until you reach the last ladder in the desired range. The background color of the selected range will change to blue.

Start point



End point

(3) Canceling marked ranges

Press the [SELECT RANGE] menu key in the [COPY/INSERT] menu keys again over the selected range (areas with a blue background color) to cancel the range selection and return the background color to the original color.

Batch deletes

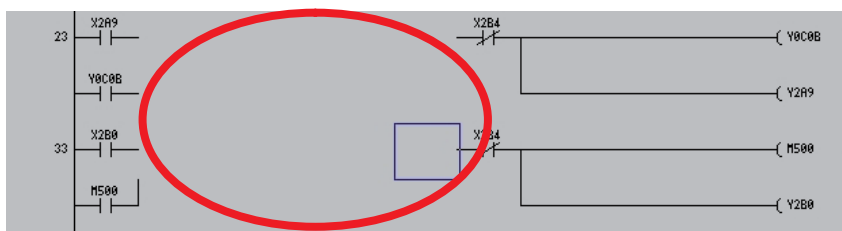
Ladder circuits can be deleted in batches using the following procedure.

(1) Designate the range of circuits to be deleted

Designate the range of circuits to be deleted using the procedure described in "Designating ranges in circuits."

(2) Delete circuits

While a range of circuits has been designated, press the [DELETE] key to delete all circuits in the range.

**(3) Restrictions**

The following restrictions apply to batch deletions of circuits.

- Deletes cannot be performed in batches on circuits in ranges designated in ladder blocks.

Copy & paste

Circuits can be copied and pasted at another position or in another program using the following procedure.

(1) Designate the range of circuits to be copied

Designate the range of circuits to be copied using the procedure described in "Designating ranges in circuits."

(2) Display the copy/insert menu.

Pressing the [COPY/INSERT] menu key on the first page of the ladder edit menu changes the menu keys as illustrated in the following diagram.

[COPY/INSERT] menu

MARK	COPY	PASTE	INSERT LINE	DELETE LINE				CONVERT LADDER	UNDO

(3) Copy circuits

Press the [COPY] menu key in the [COPY/INSERT] menu keys. Pressing the [COPY] menu key cancels the selected range (blue background color).

- * If necessary memory could not be secured for the copied ladder, an error is displayed and the selected area to be copied is cleared.

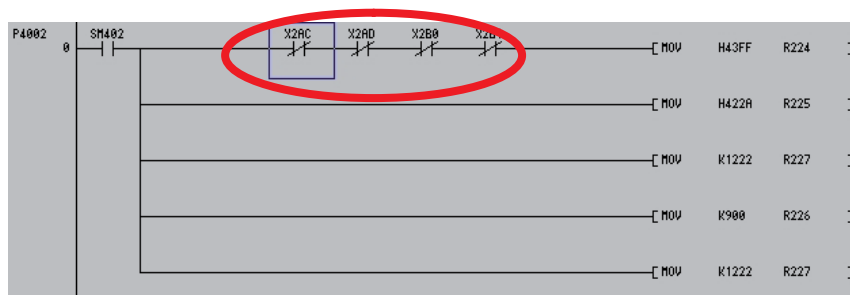
(4) Move to the position where circuits are to be pasted

Move the cursor to the position where the copied ladder is to be pasted using the basic operation keys.

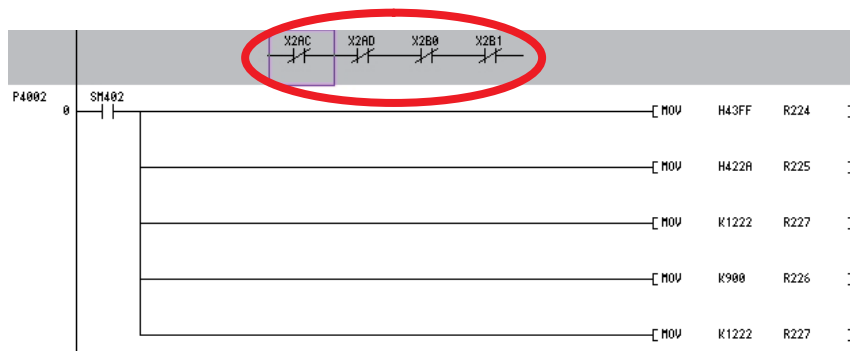
(5) Paste the circuits

Press the [PASTE] menu key in the [COPY/INSERT] menu keys. Pressing the [PASTE] menu key pastes the copied ladder into the ladder screen in accordance with the overwrite/insert mode.

• Pasting in overwrite mode



• Pasting in insert mode



Restrictions when editing ladders

The following information details restrictions when editing ladders.

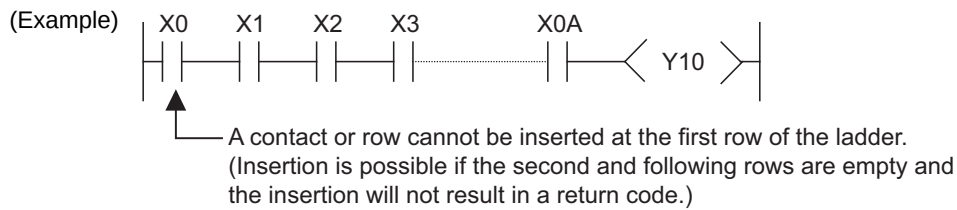
- Up to 24 lines can be edited in one ladder block.
- Up to 24 lines in one block and up to 48 lines in total can be edited.
- The maximum number of contacts in one ladder line can be changed with the [LADDER DISPLAY SETTING] popup screen.
- The master control (MC) symbol cannot be edited. The MC symbol is displayed during ladder monitoring.
(The MC symbol does not appear during ladder editing.)
- If a series ladder exceeding the maximum number of contacts is created in one line, the line will automatically return and move to the next line. The return symbol is created with K0 to K99. The OUT () and IN (>-) return symbol No. always have to be the same.
- Another ladder cannot be inserted between the OUT () line and IN (>-) line of the return line.
- When writing the ladder, the return symbol is assigned with a serial number even if it is not in the same ladder block.
Note that in the ladder block read out with the read function, the return number is assigned in order from No. 0.
- If the contact and coil to be overwritten extends over several contacts, the ladder cannot be edited with the write (overwrite) mode.



An instruction that uses multiple contacts such as "-[= D0 D1]-" at this position cannot be overwritten in overwrite mode. (This is because the next instruction will also be overwritten.)

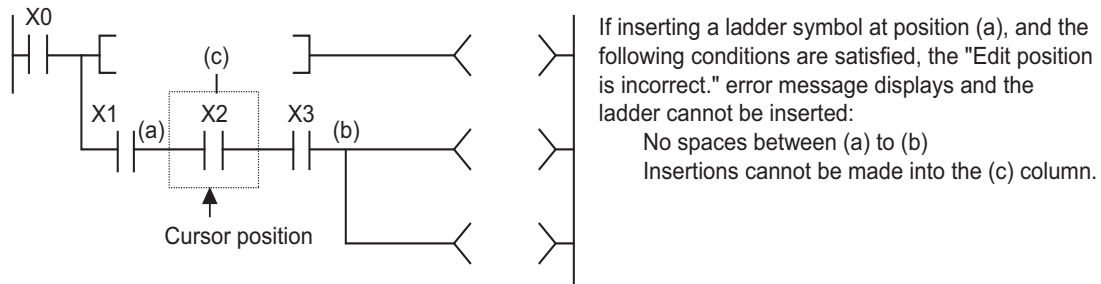
If the contact and coil to be overwritten extends over several contacts, the ladder cannot be edited with the write (overwrite) mode.

- If a return results from the insertion of a contact in the first row of the ladder, the contact cannot be inserted.



- Insertion of the ladder symbol is processed by right alignment and row insertion, so there may be causes when the symbol cannot be inserted because of the ladder shape.

(Example)



(Note) The position (b) is the closest position to the cursor position among the branch symbols and the coil-equivalent instructions.

- If one ladder block has two or more lines, and the instruction does not fit on one line, enter a new line before entering the instruction.
- Create the number of steps for one ladder block within approx. 4k steps. The NOP instruction in the ladder block is also included in the number of steps. The NOP instruction between ladder blocks is irrelevant.
- If there is an unconverted ladder, the screen movement range may be limited.

7.12.2.7 Converting Programs

Details of edits cannot be checked when using the preceding edit procedures to edit ladders and transitioning to the ladder screen will cause these edits to be lost. For this reason, you perform conversions to check the details of edits. The currently displayed program will be the program that is converted. The converted details are updated in the program stored in the temporary storage area and so these edits will be lost when the power to the NC is turned off if you do not execute a ROM write operation.

The maximum number of steps that can be converted at one time is 512.

The behavior is different according to the setting of ladder program write during RUN (#6455 bit6/bit7).

This chapter describes the behavior when ladder program writing during RUN is disabled.

For the behavior when it is enabled, refer to "Ladder Program Writing during RUN by Conversion".

When the PLC is running

If a conversion is executed while the PLC is running, a message confirming whether or not to stop the PLC is displayed.

PLC is in a RUN state. Is convert performed after stop PLC?									
YES	NO								

The following information describes the resulting operation depending on whether the [YES] or the [NO] menu key is pressed.

(1) [YES] menu key is pressed

The PLC stops and the conversion process executes. Once the conversion is complete, the background color of the edited portion of the ladder screen (gray) changes to white.

Once the conversion process is complete, a message confirming whether or not to continue running the PLC is displayed.

PLC is in a STOP state. Is PLC changed into a RUN state?									
YES	NO								

If the [YES] menu key is pressed, the PLC continues running. If the [NO] menu key is pressed, the PLC state is not changed.

(2) [NO] menu key is pressed

The following error message is displayed and the conversion process is canceled.

The PLC is running, so writing cannot be executed. Execute again after the PLC stops.									
OK									

When the PLC is stopped

If the PLC is stopped, the conversion process starts without displaying any confirmation messages. Once the conversion is complete, the background color of the edited portion of the ladder screen (gray) changes to white.

Edit files with write-protect passwords configured

If a password to protect against writes or reads/writes has been configured for the edit files, the cancel password screen is displayed.

Enter the password to cancel the password.

Refer to "Canceling File Passwords" for information on clearing passwords.



7.12.2.8 Undoing the Last Edit Operation

When editing ladders, you can undo the last edit operation and return the ladder this previous state. This undo operation is only valid for the last single operation.

Use either of the following methods to execute the undo operation.

- Press the [UNDO] menu key
- Press and hold the Ctrl key and then press the Z key.

The following table describes which edit operations can and cannot be undone.

Operations that can be undone	Operations that cannot be undone
Editing contacts/coils/lines/etc. (adds/changes/deletes)	When a ladder is changed, the state prior to the change cannot be restored.
Editing statements/notes	When an unconverted ladder is discarded, the state prior to discarding cannot be restored.
Line insertions/line deletions	Editing circuits in the split display
Pasting in units of ladder blocks	When pasting ladder blocks, the state prior to pasting cannot be restored.

7.12.2.9 Editing Statements

Outline

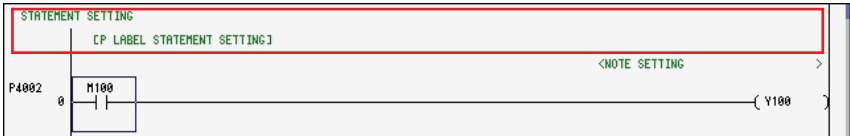
Statements can be added to the program displayed on the [LADDER] screen.

A statement is text string data added to each ladder block to make it easy to understand the flow of the entire program.

Statements can be edited in accordance with the following restrictions.

	Input character range	Storage destination data type
Statements	64 single-byte alphanumeric characters	Sequence programs

Example display of a statement



Integrated statements and peripheral statements

Statements include integrated types and peripheral types. Integrated types and peripheral types are designated by the first character in the string.

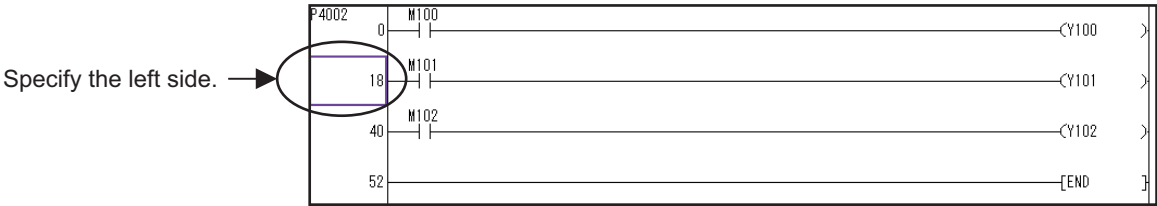
The first character is an asterisk.	Peripheral statements
The first character is not an asterisk.	Integrated statement

Note the following precautions regarding integrated statements.

Precautions
Saving user PLCs containing an integrated statement is saved in the NC requires a large amount of memory in the user PLC.

Edit method

- (1) Entering statements between lines
- Statements can be entered between ladders using the following procedure.
- (a) Move to the edit position
- Move the cursor to the position to the left end of the line where the statement is to be entered using the basic operation keys.
- (Refer to "Ladder Monitor: Moving the Cursor.")



- (b) Switch to the edit mode
- Press the [OVR. WRITE/INSERT] menu key to switch to the insert mode.
- (c) Display the enter symbol popup screen
- Press the [INPUT] key to display the [ENTER SYMBOL] popup screen.
- (d) Enter the statement
- Enter the statement into the [ENTER SYMBOL] popup screen as in the following example. Add a semicolon at the beginning when entering.
- Ex.) Entering a statement



After the entry is complete, press the [INPUT] menu key. Press the [INPUT] menu key to input the statement between the lines at the cursor.

- (e) Check the details of edits
- After entering the statement, press the [CONVERT LADDER] menu key to confirm the edit. (Refer to "Converting Programs")

(2) Entering statements into P labels

Statements can be entered into P labels using the following procedure.

- (a) Move to the edit position
Move the cursor to the position of the P label where the statement is to be entered using the basic operation keys.
(Refer to "Ladder Monitor: Moving the Cursor.")
- (b) Display the enter symbol popup screen
Press the [INPUT] key to display the [ENTER SYMBOL] popup screen.
- (c) Enter the statement
Enter the statement into the [ENTER SYMBOL] popup screen as in the following example. Add a semicolon after the label when entering.
Ex.) Entering a P label statement



After the entry is complete, press the [INPUT] menu key. Press the [INPUT] menu key to input the statement in the P label.

- (d) Check the details of edits
After entering the statement, press the [CONVERT LADDER] menu key to confirm the edit. (Refer to "Converting Programs")

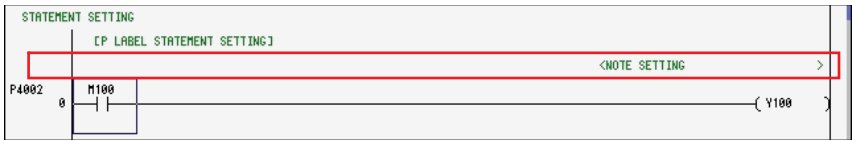
7.12.2.10 Editing Notes

Outline

Notes can be added to the program displayed on the [LADDER] screen.
A note, just like a statement, is text string data added to each coil and function instruction to make it easy to understand the flow of the entire program.
Notes can be edited in accordance with the following restrictions.

	Input character range	Storage destination data type
Notes	64 single-byte alphanumeric characters	Sequence programs

Example display of a note



Integrated notes and peripheral notes

Notes include integrated types and peripheral types. Integrated types and peripheral types are designated by the first character in the string.

The first character is an asterisk.	Peripheral note
The first character is not an asterisk.	Integrated note

Note the following precautions regarding integrated notes.

Precautions
Saving user PLCs containing an integrated note is saved in the NC requires a large amount of memory in the user PLC.

Edit method

Notes can be entered using the following procedure.

- (1) Move to the edit position
Move the cursor to the position to the function instruction in the line where the note is to be entered using the basic operation keys.
(Refer to "Ladder Monitor: Moving the Cursor.")
- (2) Display the enter symbol popup screen
Press the [INPUT] key to display the [ENTER SYMBOL] popup screen.
- (3) Enter the note
Enter the note into the [ENTER SYMBOL] popup screen as in the following example. Add a semicolon after the instruction when entering.
Ex.) Entering a note



After the entry is complete, press the [INPUT] menu key. Press the [INPUT] menu key to input the note.

- (4) Check the details of edits
After the inputting the note, press the [CONVERT LADDER] menu key to confirm the edit.
(Refer to "Converting Programs")

7.12.2.11 Ladder Program Writing during RUN by Conversion**Outline**

Ladder program writing during RUN (or RUN write) enables to edit and change sequence programs without stopping PLC operation. When RUN write is enabled in bit selection parameter, RUN write will be available with normal operation.

Refer to section "6.5.6 Executing Ladder Program Writing during RUN" for the details of RUN write.

⚠ CAUTION

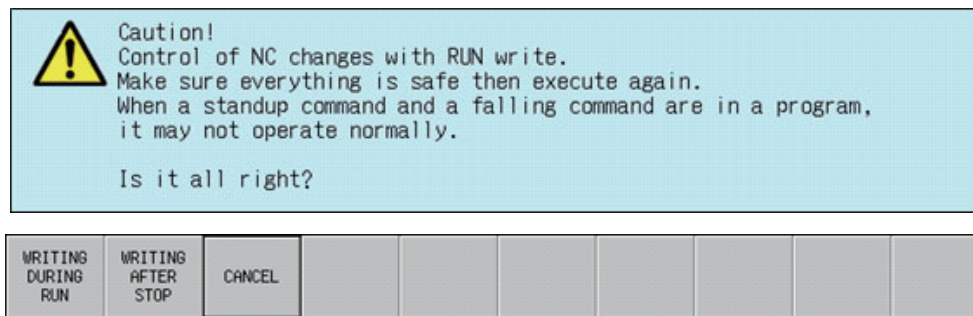
Only the person who knows well about sequence programs can execute ladder program writing during RUN. When the RUN write is enabled, the modification will be immediately effective after the data editing and conversion.

The machine might operate in unexpected way when the ladder program is incomplete.

Consider well the influence of the modification in advance. Also, always make sure that the system's safe operation with the sequence programs.

RUN write execution

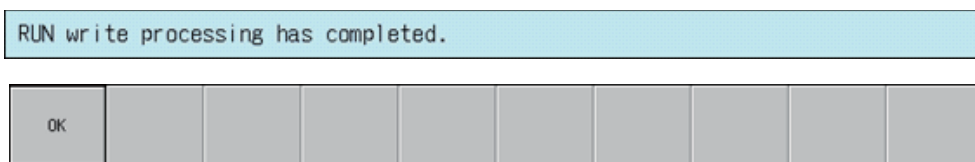
When you execute a conversion during PLC RUN, the following message will appear to confirm whether to continue the RUN write execution.



The following information describes the resulting operation by pressing each menu key.

- (1) [WRITING DURING RUN] key is pressed.

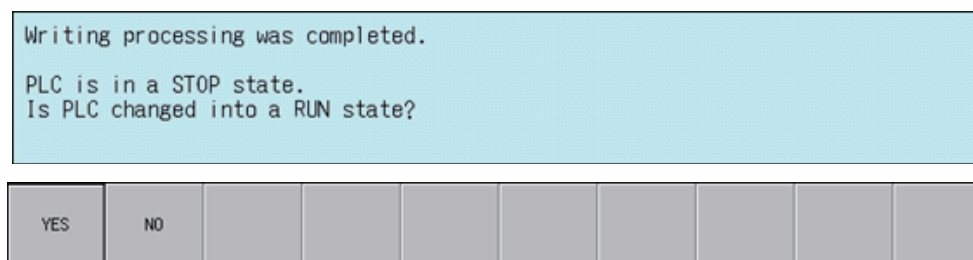
RUN write is executed. Processing time of RUN write depends on the total number of steps used in the ladder programs and the points where the steps are written in (from one second or less to several seconds). The following message will appear when RUN write is completed.



- (2) [WRITING AFTER STOP] key is pressed.

The PLC stops and the conversion process executes. Once the conversion is complete, the background color of the edited portion of the ladder screen (gray) changes to white.

After the conversion has been completed, a message confirming whether to have PLC returned to the RUN state is displayed.



If the [YES] menu key is pressed, the PLC continues running. If the [NO] menu key is pressed, the PLC state is not changed.

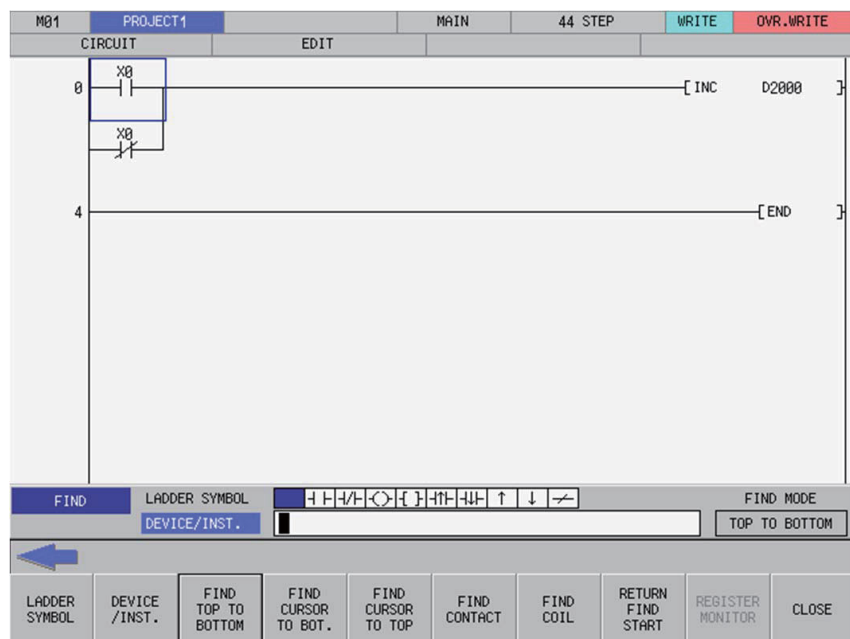
- (3) [CANCEL] key is pressed

PLC will be back to the state before conversion.

7.12.3 Find Popup Screen

7.12.3.1 Outline

Contacts, coils, and instructions can be searched while editing and monitoring circuits.



7.12.3.2 Screen Display Items

The following table describes the screen display items for the find popup screen.

Item name	Display state
Ladder symbol	This displays the ladder symbol used in the search.
Device/Instruction	This displays the device or instruction to be searched.
Current search mode	This displays the current search mode.

7.12.3.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the find popup screen are enabled/disabled.

The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Register monitor	Enabled when the ladder screen is selected and being in monitoring.

7.12.3.4 Status during Screen Displays

The following table describes the status when displaying the find popup screen.

Item name	Operation
Ladder symbol	This selects the ladder symbol at the cursor position.
Device/Instruction	This displays the device name at the cursor position. This also sets the alias for the device at the cursor position and displays the alias if attempting to display the alias. This is left blank if there is no device at the cursor position. This is the default focus position when the screen is displayed.
Current search mode	This displays from the top to the bottom.

7.12.3.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Find Popup Screen."
Ladder symbol	This selects the ladder symbol selection or changes the ladder symbol selection.
Device/Instruction	This selects the device/instruction input field.
Find top to bottom	Refer to "Find Operation. "
Find cursor to bottom	
Find cursor to top	
Find contact	
Find coil	
Return to the start position	Refer to "Returning to the Start Position."
Register monitor	Refer to "Register Monitor Operation."
Close	Refer to "Closing the Find Popup Screen."

7.12.3.6 Displaying the Find Popup Screen

The display method for the find popup screen differs depending on the state of the ladder screen.

The following table describes the display method for the find popup screen.

State of the ladder screen	Display method for the find popup screen
Ladder screen is selected	
Monitoring	Press the [FIND] menu key.
	Press the [INPUT] key.
	Press any character key.
Edit	Press the [FIND] menu key.
Entry ladder monitor is selected	
Monitoring	Press the [FIND] menu key.
	Press the [INPUT] key.
	Press any character key.

* The following message is displayed when attempting to display the find screen when a ladder is being edited (area with a gray background color).

Ladder not converted. Are you sure you want to delete the unconverted ladder?									
YES	NO								

Pressing the [NO] menu key returns to the ladder screen without displaying the find screen.

Pressing the [YES] menu key cancels the edits made to the ladder, returns the ladder to its previous state before editing, and then displays the find popup screen.

7.12.3.7 Find Operation

Normal find

1. Press the [LADDER SYMBOL] menu key to select the ladder symbol for the ladder to be searched.
* Ladder symbols can be searched even if not selected.
2. Press the [DEVICE/INST.] menu key and then enter either the device or instruction to be searched into the device/instruction input field.
* Instructions cannot be searched if they do not match the ladder symbol.
3. To execute the corresponding find operation, press either the [INPUT] key or one of the following menu keys: [FIND TOP TO BOTTOM], [FIND CURSOR TO BOT.], [FIND CURSOR TO TOP], [FIND CONTACT], and [FIND COIL]. If the search finds a match, the cursor moves to the position where the match was found.

The following table describes the direction and types of searches.

Menu item	Search direction and type
Find top to bottom	This searches the designated device or instruction from the top of the currently displayed program. The find top to bottom search is performed when displaying the find popup screen and pressing the [INPUT] key.
Find cursor to bottom	This searches the designated device or instruction downward from the cursor position.
Find cursor to top	This searches the designated device or instruction upward from the cursor position.
Find contact	This searches the designated device contact instruction from the top of the currently displayed program. The status of [LADDER SYMBOL] is ignored at this time. (Example: When a contact is searched in the "-()- M0" state, the M0 contact is searched instead of resulting in an error.)
Find coil	This searches the designated device coil instruction from the top of the program. The status of [LADDER SYMBOL] is ignored at this time.

(1) Continuous search

Perform the following operations to search continuously.

- Once the search is started after pressing the [INPUT] keys or one of the search menu keys, the executed search menu key changes to [FIND NEXT].
- Press the [FIND NEXT] menu key or the [INPUT] key to continue the search.

(2) Consecutive searching of multiple programs

When multiple programs are opened, the program is searched until the end of the program. Then the following message is displayed and the search can continue on to the next program.

- When a search match is found in the first program:
* (The message is not displayed after the second program.)

Find completed. Find another program.

YES NO

- When a search match is not found in the first program:

* (The message is not displayed after the second program.)

The find target could not be found. Find another program.

YES NO

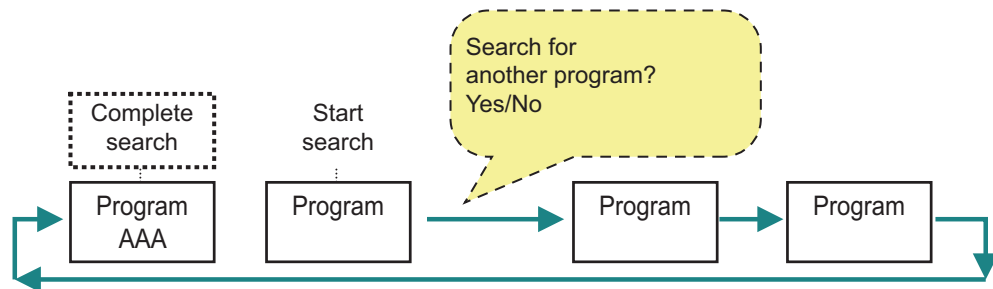
The search ends if the [NO] menu key is pressed.

The search continues to the next program if the [YES] menu key is pressed. The following message is displayed when all programs have been searched.



Pressing the [OK] menu key closes the message and returns to the find popup screen.

(Example)



(3) Consecutive searching of multiple projects

Ladder searches cannot be performed across multiple projects. Change to a different project and execute the search again.

Search using the alias

Searches can be performed using aliases in the same way as for devices by specifying the alias configured for the device into the [DEVICE/INST.] input field. Only aliases configured with single-byte alphanumeric characters can be searched by the PLC Onboard.

Use either of the following formats to specify the alias.

- Single quotation mark" + "Desired alias"
- "Period" + "Desired alias"

Changes to the direction and type of search and continuous searches are performed in the same way as for normal searches.

7.12.3.8 Returning to the Start Position

Pressing the [RETURN TO START POSITION] menu key enables you to return to the step position when the search was started in the program that was displayed when the search was started. The [FIND START] position is updated if a new search is started.

7.12.3.9 Register Monitor Operation

Pressing the [REGISTER MONITOR] menu key enables you to register ladders including the cursor position device and cursor position into the split screen entry ladder monitor screen or the entry device monitor screen.

Use the following procedures to register to these registration monitors.

Registering to the entry ladder monitor

Ladders including the cursor position can be registered to the entry ladder monitor for the following cases.

- Pressing the [REGISTER MONITOR] menu key when not using the split screen mode.
- Pressing the [REGISTER MONITOR] menu key when displaying the entry ladder monitor.

Registering to the entry device monitor

Devices at the cursor position can be registered to the entry ladder monitor for the following cases.

- Pressing the [REGISTER MONITOR] menu key when displaying the entry device monitor.

7.12.3.10 Find Popup Screen Errors

This information describes the details of error messages displayed on the find popup screen and the corrective action thereof.

Error message	Error description	Corrective action
Device setting is wrong. The following causes may be responsible: • The device No. is over the usable range. • An unusable device has been designated.	This is displayed when the search-related menu keys are pressed when the range of the specified device is unusable or an unusable device is specified.	Enter a suitable device into the device/instruction input field and then press a search-related menu key again.
Device setting is wrong. The following causes may be responsible: • An unusable device has been designated. • Index modification, module specification setting is wrong. • Special function module device, link direct device setting is wrong.	This is displayed when the search-related menu keys are pressed when the range of the specified device is unusable or a mistake was made in the specification of the index modification, module specification, etc.	Enter a suitable device into the device/instruction input field and then press a search-related menu key again.
The relationship between the ladder code and instruction is incorrect. Change one of them.	This is displayed when search-related menu keys are pressed when the ladder symbol and instruction do not match. Ex.) Ladder symbol: -[]- Device/instruction: LD	Correct the relationship between the ladder symbol and instruction and then press a search-related menu key again. Ex.) Ladder symbol: -[]- Device/instruction: MOV
The instruction or device is incorrect.	This is displayed when the search-related menu keys are pressed when a non-existent device or non-existent instruction is entered into the device/instruction input field without selecting a ladder symbol.	Enter an existing device or instruction into the device/instruction input field and then press a search-related menu key again.
A device that corresponds to the alias has not been assigned. Check the device comment window.	This is displayed when the search-related menu keys are pressed after entering an alias not allocated to a device.	Enter an alias allocated to a device and then press a search-related menu key again.

7.12.3.11 Closing the Find Popup Screen

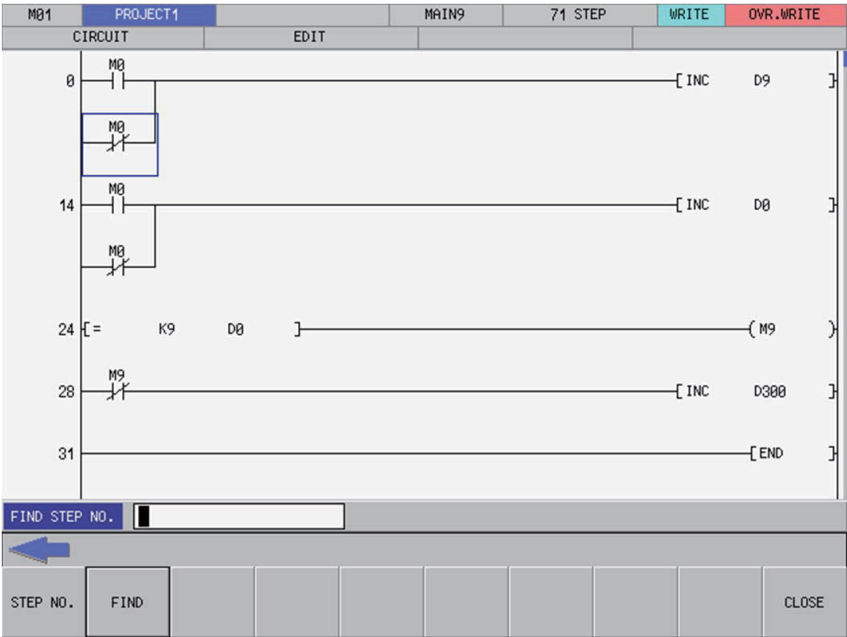
Use any of the following methods to close the find popup screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.12.4 Find Step No. Popup Screen

7.12.4.1 Outline

This enables transitions to the specified step position when editing and monitoring ladders.



7.12.4.2 Screen Display Items

The following table describes the screen display items for the find step No. popup screen.

Item name	Display state
Find step No.	This displays the step No. position to which you want to transition.

7.12.4.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the find step No. popup screen are always enabled.

7.12.4.4 Status during Screen Displays

The following table describes the status when displaying the find step No. popup screen.

Item name	Operation
Find step No.	This is left blank. This is the default focus position when the screen is displayed.

7.12.4.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Find Step No. Popup Screen."
Find step No.	This selects the find step No. input field.
Find	Refer to "Finding Step Numbers."
Close	Refer to "Closing the Find Step No. Popup Screen."

7.12.4.6 Displaying the Find Step No. Popup Screen

The find step No. popup screen can be displayed using several different methods.

The following table describes the display method for the find step No. popup screen.

Display method for the Find step No. popup screen
Press the [FIND STEP NO.] menu key.
Press any number key.

7.12.4.7 Finding Step Numbers

Normal operation

1. Press the [FIND STEP NO.] menu key and enter the desired step number into find step No. input field.
2. Press the [FIND] menu key. Pressing the menu key closes the find step No. popup screen and transitions the cursor to the entered position.

*If the entered step number is larger than the number of steps in the ladder, the cursor is transitioned to the ladder end position.

Abnormal operation

This information describes the details of error messages displayed on the find step No. popup screen and the corrective action thereof.

Error message	Error description	Corrective action
The specified step is out of the range. Set a valid step No.	This is displayed when an incorrect step number is specified such as setting a negative number in the find step No. input field.	Enter a positive integer into the find step No. input field and press the [FIND] menu key again.

7.12.4.8 Closing the Find Step No. Popup Screen

Use any of the following methods to close the find step No. popup screen.

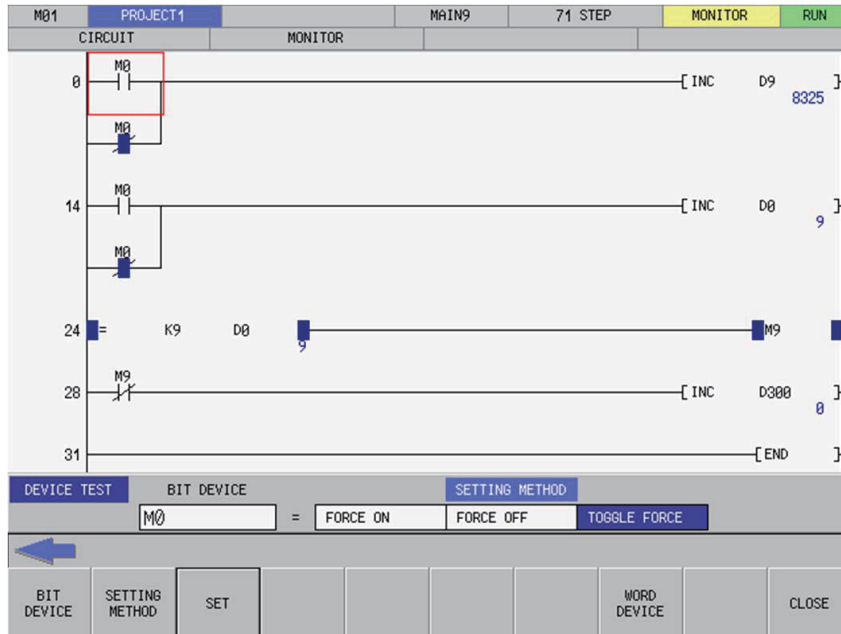
Methods to close the screen
Execute the find step No. operation.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.12.5 Device Test Popup Screen

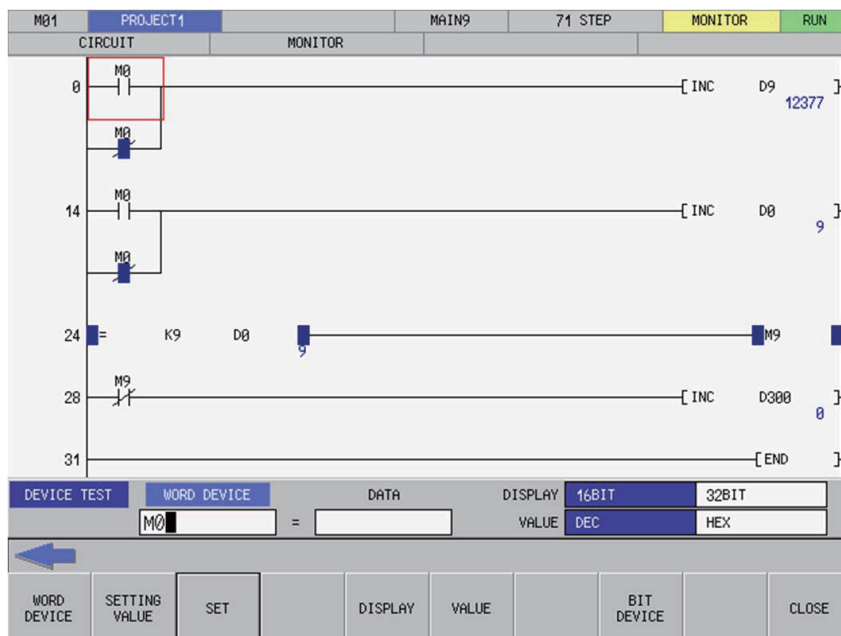
7.12.5.1 Outline

The bit devices can be turned ON and OFF forcibly and the word device current value can be changed.

<Bit device setting screen (ladder screen)>



<Word device setting screen (ladder screen)>



7.12.5.2 Screen Display Items

The following table describes the screen display items for the device test popup screen.

Item name		Display state
Bit device setting screen		
	Bit device	This displays the bit device at the cursor position. This is left blank if there is no bit device.
	Device ON/OFF settings	This displays the forced ON, forced OFF, and toggle between forced ON/OFF.
Word device setting screen		
	Word device	This displays the word device at the cursor position. This is left blank if there is no word device.
	Setting value	This displays the value set for the word device. This is left blank when displaying screens.
	Display	This displays 16-bit integers and 32-bit integers.
	Format	This displays values in either decimal or hexadecimal format.

7.12.5.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the device test popup screen are always enabled.

7.12.5.4 Status during Screen Displays

The following table describes the status when displaying the device test popup screen.

Item name		Operation
Bit device setting screen		
	Bit device	This is the default focus position when the screen is displayed. This displays the bit device at the cursor position. This is left blank if there is no bit device.
	Setting method	This selects the toggle between forced ON/OFF.
Word device setting screen		
	Word device	This displays the word device at the cursor position. This is left blank if there is no word device.
	Setting value	This is left blank.
	Display	This selects 16-bit integers.
	Format	This selects decimal numbers.

7.12.5.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Menu name		Operation
Left arrow key		Refer to "Closing the Device Test Popup Screen."
Bit device setting screen		
	Bit device	This selects the bit device input field.
	Setting method	This sets the focus to the device ON/OFF setting. This changes the setting method selection when the focus is already set.
	Settings	Refer to "Testing Bit Devices."
	Switch word device	This switches to the word device setting screen.
	Close	Refer to "Closing the Device Test Popup Screen."
Word device setting screen		
	Word device	This selects the word device input field.
	Setting value	This selects the setting value input field.
	Settings	Refer to "Testing Word Devices."
	Display	This sets the focus to the display. This changes the display selection when the focus is already set.
	Format	This sets the focus to the format. This changes the format selection when the focus is already set.
	Switch bit device	This switches to the bit device setting screen.
	Close	Refer to "Closing the Device Test Popup Screen."

7.12.5.6 Testing Bit Devices

Normal operation

1. Press the [BIT DEVICE] menu key and enter the desired bit device.
2. Press or press and hold the [SETTING METHOD] menu key in accordance with the following conditions.
 - To use a forced ON: Select [FORCE ON].
 - To use a forced OFF: Select [FORCE OFF].
 - To toggle between forced ON/OFF: Select [TOGGLE FORCE].
3. Press the [SET] menu key.

Abnormal operation

This information describes the details of error messages displayed when testing bit devices and the corrective action thereof.

Error message	Error description	Corrective action
The device name has not been entered. Enter the device name.	This is displayed when the [SET] menu key is pressed without entering the device name.	Enter the bit device before pressing the [SET] menu key.
The device is incorrect. Specify a bit device.	This is displayed when the [SET] menu key is pressed when something other than a bit device was entered.	Enter the bit device before pressing the [SET] menu key.
The device No. is outside the range. Check using the parameter device.	This is displayed when the [SET] menu key is pressed when a device outside of the range is specified in the bit device name input field.	Enter a bit device number within range before pressing the [SET] menu key.

7.12.5.7 Testing Word Devices

Normal operation

1. Press the [DISPLAY] menu key and select whether the devices are displayed in 16-bit integers or 32-bit integers.
2. Press the [FORMAT] menu key and select whether the device setting values are entered as decimal or hexadecimal numbers.
3. Press the [WORD DEVICE] menu key and enter the desired word device.
4. Press the [SETTING VALUE] menu key and enter the desired value in the format selected in the format selection field.
5. Press the [SET] menu key.

Abnormal operation

Error message	Error description	Corrective action
The device name has not been entered. Enter the device name.	This is displayed when the [SET] menu key is pressed without entering the device name.	Enter the word device before pressing the [SET] menu key.
The device is incorrect. Specify a word device.	This is displayed when the [SET] menu key is pressed when something other than a word device was entered.	Enter the word device before pressing the [SET] menu key.
A value has not been entered.	This is displayed when the [SET] menu key is pressed without entering a setting value.	Enter a setting value before pressing the [SET] menu key.
The device No. is outside the range. Check using the parameter device.	This is displayed when the [SET] menu key is pressed when a device outside of the range is specified in the word device name input field.	Enter a word device number within range before pressing the [SET] menu key.

7.12.5.8 Closing the Device Test Popup Screen

Use any of the following methods to close the device test popup screen.

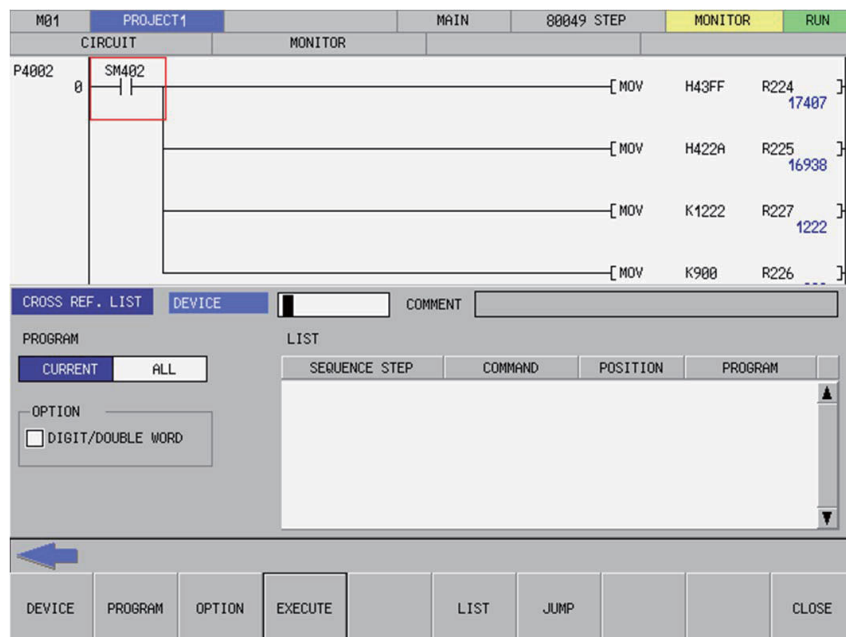
Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.12.6 Contact Coil Usage List Popup Screen

7.12.6.1 Outline

The steps, instructions and position in which the designated device is used can be listed.

The program searched is the one stored in the current project.



7.12.6.2 Screen Display Items

The following table describes the screen display items for the contact coil usage list popup screen.

Item name	Display state
Device	This displays the device to be searched.
Comment	This displays comments set for the device to be searched.
Program	This displays the currently displayed or all programs.
Options	This displays specified search options for digits/double words.
List	This displays the search results.

7.12.6.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the contact coil usage list popup screen are always enabled.

7.12.6.4 Status during Screen Displays

The following table describes the status when displaying the contact coil usage list popup screen.

Item name	Operation
Device	This displays the device at the cursor position in the ladder screen. This also sets the alias for the device at the cursor position and displays the alias if attempting to display the alias. This is left blank if there is no device at the cursor position. This is the default focus position when the screen is displayed.
Comment	This is left blank.
Program	This selects the current display.
Options	The check box is deselected.
List	This is left blank.

7.12.6.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Contact Coil Usage List Popup Screen."
Device	This selects the device input field.
Program	This selects the search program selection field or changes the selection of the program to be searched.
Options	This selects the search options selection field or changes the selection of the search options.
Execute	Refer to "Investigating Usage States of Specified Devices."
List	This selects the list.
Jump	This moves the cursor on the ladder screen to the step position selected in the list.
Close	Refer to "Closing the Contact Coil Usage List Popup Screen."

7.12.6.6 Investigating Usage States of Specified Devices

Normal operation

(1) When devices are used

1. Press the [DEVICE] menu key and enter the device for which you want to investigate the usage state.
2. Press the [PROGRAM] menu key and select whether the program to be searched is the currently displayed program or the entire program stored in the current project.
3. Press the [OPTION] menu key and select whether or not to use the search option.
4. Press the [EXECUTE] menu key to investigate the usage state. The investigation results are displayed in the list. Comments specified for the searched device are displayed in the comment field.
5. Press the [LIST] menu key to select the list. Use the up/down arrow keys, Page Up key, and Page Down key to select the area of the ladder you want to check.
6. Press the [JUMP] menu key. Move the cursor on the ladder screen to the program or step position present in the ladder selected in the list.

When aliases are used

Usage states can be investigated using aliases in the same way as for devices by specifying the alias configured for the device into the [DEVICE/INST.] input field. Only aliases configured with single-byte alphanumeric characters can be investigated by the PLC Onboard.

Use either of the following formats to specify the alias.

- "Single quotation mark" + "Desired alias"
- "Period" + "Desired alias"

Processes other than device specifications are performed in the same way as normal.

Abnormal operation

This information describes the details of error messages displayed on the contact coil usage list popup screen and the corrective action thereof.

Error message	Error description	Corrective action
Device setting is wrong. The following causes may be responsible: • An unusable device has been designated. • Index modification, module specification setting is wrong. • Special function module device, link direct device setting is wrong.	This is displayed when the [EXECUTE] menu key is pressed when the range of the specified device is unusable or a mistake was made in the specification of the index modification, module specification, etc.	Enter a suitable device into the device/instruction input field and then press the [EXECUTE] menu key again.
Device setting is wrong. The following causes may be responsible: • The device No. is over the usable range. • An unusable device has been designated.	This is displayed when the [EXECUTE] menu key is pressed when the range of the specified device is unusable or an unusable device is specified.	Enter a suitable device into the device/instruction input field and then press the [EXECUTE] menu key again.
A device that corresponds to the alias has not been assigned. Check the device comment window.	This is displayed when the [EXECUTE] menu key is pressed after entering an alias not allocated to a device.	Enter an alias allocated to a device and then press the [EXECUTE] menu key again.

7.12.6.7 Closing the Contact Coil Usage List Popup Screen

Use any of the following methods to close the contact coil usage list popup screen.

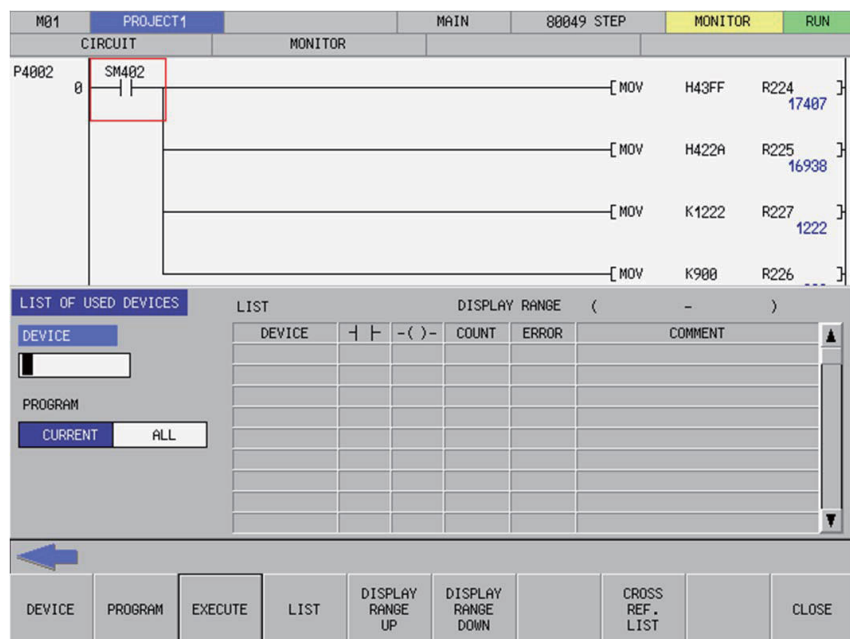
Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.12.7 List of Used Devices Popup Screen

7.12.7.1 Outline

The usage state of devices in the program can be displayed for each designated device. The ladder symbols, usage quantity and presence of errors can be displayed by designating the device.

The program searched is the one stored in the current project.



7.12.7.2 Screen Display Items

The following table describes the screen display items for the list of used devices popup screen.

Item name	Display state
Device	This displays the device to be searched.
Program	This displays the currently displayed or all programs.
List	This displays the search results.
Display range	This displays the range of devices displayed in the current list.

7.12.7.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the list of used devices popup screen are always enabled.

7.12.7.4 Status during Screen Displays

The following table describes the status when displaying the list of used devices popup screen.

Item name	Display state
Device	This displays the device at the cursor position in the ladder screen. This also sets the alias for the device at the cursor position and displays the alias if attempting to display the alias. This is left blank if there is no device at the cursor position. This is the default focus position when the screen is displayed.
Program	This selects the current display.
List	This is left blank.
Display range	The range is not displayed.

7.12.7.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the List of Used Devices Popup Screen."
Device	This selects the device input field.
Program	This selects the search program selection field or changes the selection of the program to be searched.
Execute	Refer to "Investigating Usage States of Devices."
List	This selects the list.
Display range upward	This moves the range of devices displayed in the list upward by one page (128 points).
Display range downward	This moves the range of devices displayed in the list downward by one page (128 points).
Contact coil usage list	This displays the contact coil usage list popup screen.
Close	Refer to "Closing the List of Used Devices Popup Screen."

7.12.7.6 Investigating Usage States of Devices

Normal operation

(1) When devices are used

1. Press the [DEVICE] menu key and enter the device for which you want to investigate the usage state.
2. Press the [PROGRAM] menu key and select whether the program to be searched is the currently displayed program or the entire program stored in the current project.
3. Press the [EXECUTE] menu key to investigate the usage state. The investigation results are displayed in the list.
4. Press the [DISPLAY RANGE UPWARD] and [DISPLAY RANGE DOWNWARD] menu keys to transition to the range that includes the devices for which you want to check the results.
5. Press the [LIST] menu key to select the list. Use the up/down arrow keys, Page Up key, and Page Down key to select the area of the status you want to check.
6. Press the [CONTACT COIL USAGE LIST] menu key. An investigation is automatically performed to determine the manner in which the device at the cursor position in the list is used and then the contact coil usage list popup screen displays.
(Refer to "Contact Coil Usage List Popup Screen.")

When aliases are used

Usage states can be investigated using aliases in the same way as for devices by specifying the alias configured for the device into the [DEVICE/INST.] input field. Only aliases configured with single-byte alphanumeric characters can be investigated by the PLC Onboard.

Use either of the following formats to specify the alias.

- "Single quotation mark" + "Desired alias"
- "Period" + "Desired alias"

Processes other than device specifications are performed in the same way as normal.

Abnormal operation

This information describes the details of error messages displayed on the list of used devices popup screen and the corrective action thereof.

Error message	Error description	Corrective action
Device setting is wrong. The following causes may be responsible: • An unusable device has been designated. • Index modification, module specification setting is wrong. • Special function module device, link direct device setting is wrong.	This is displayed when the [EXECUTE] menu key is pressed when the range of the specified device is unusable or a mistake was made in the specification of the index modification, module specification, etc.	Enter a suitable device into the device/instruction input field and then press the [EXECUTE] menu key again.
Device setting is wrong. The following causes may be responsible: • The device No. is over the usable range. • An unusable device has been designated.	This is displayed when the [EXECUTE] menu key is pressed when the range of the specified device is unusable or an unusable device is specified.	Enter a suitable device into the device/instruction input field and then press the [EXECUTE] menu key again.
A device that corresponds to the alias has not been assigned. Check the device comment window.	This is displayed when the [EXECUTE] menu key is pressed after entering an alias not allocated to a device.	Enter an alias allocated to a device and then press the [EXECUTE] menu key again.

7.12.7.7 Closing the List of Used Devices Popup Screen

Use any of the following methods to close the list of used devices popup screen.

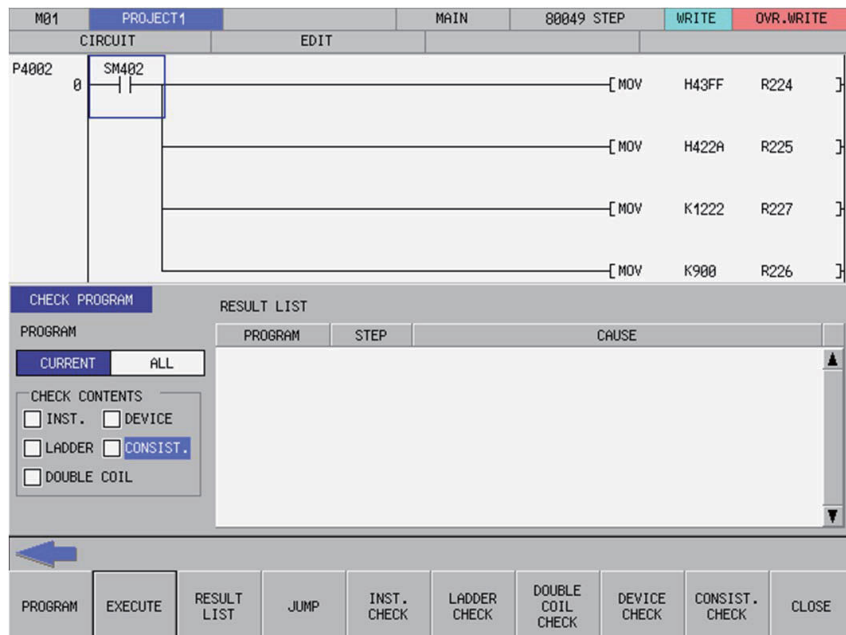
Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.12.8 Check Program Popup Screen

7.12.8.1 Outline

This enables checking of logical errors and input mistakes in the program.

The program searched is the one stored in the current project.



7.12.8.2 Screen Display Items

The following table describes the screen display items for the check program popup screen.

Item name	Display state
Program	This displays the currently displayed or all programs.
Check details	
Instruction	This displays whether or not the instruction check is executed.
Ladder	This displays whether or not the ladder check is executed.
Double coil	This displays whether or not the double coil check is executed.
Device	This displays whether or not the device check is executed.
Consistency	This displays whether or not the consistency check is executed.
Result list	This displays the results of the check program operation.

7.12.8.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the check program popup screen are always enabled.

7.12.8.4 Status during Screen Displays

The following table describes the screen display items for the check program popup screen.

Item name	Display state
Program	This selects the current display.
Check details	
Instruction	This displays the execution of the instruction check (when applicable).
Ladder	This displays the execution of the ladder check (when applicable).
Double coil	This displays the execution of the double coil check (when applicable).
Device	This displays the execution of the device check (when applicable).
Consistency	This displays the execution of the consistency check (when applicable).
Result list	This is left blank.

7.12.8.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Check Program Popup Screen."
Program	This selects the check program selection field or changes the selection of the program to be checked.
Execute	Refer to "Checking Programs."
Result list	This selects the result list.
Jump	This moves the cursor on the ladder screen to the step position selected in the list.
Instruction check	This selects the check instruction selection field or changes the selection to execute/not execute the instruction check.
Ladder check	This selects the check ladder selection field or changes the selection to execute/not execute the ladder check.
Double coil check	This selects the check double coil selection field or changes the selection to execute/not execute the double coil check.
Device check	This selects the check device selection field or changes the selection to execute/not execute the device check.
Consistency check	This selects the check consistency selection field or changes the selection to execute/not execute the consistency check.
Close	Refer to "Closing the Check Program Popup Screen."

7.12.8.6 Checking Programs

1. Press the [CHECK PROGRAM] menu key and select whether the program to be checked is the currently displayed program or the entire program stored in the current project.
2. Press the [INST. CHECK] menu key to select whether or not to perform the instruction check.
3. Press the [LADDER CHECK] menu key to select whether or not to perform the ladder check.
4. Press the [DOUBLE COIL CHECK] menu key to select whether or not to perform the double coil check.
5. Press the [DEVICE CHECK] menu key to select whether or not to perform the device check.
6. Press the [CONSIST. CHECK] menu key to select whether or not to perform the consistency check.
7. Press the [EXECUTE] menu key to start the checks.

* A progress bar is displayed indicating the status during the program checks.



8. Press the [RESULT LIST] menu key to select the result list. Use the up/down arrow keys, Page Up key, and Page Down key to select the area where errors occurred in the ladder you want to check.
9. Press the [JUMP] menu key. Move the cursor on the ladder screen to the program or step position present in the ladder selected in the result list.

M01	PROJECT1	MAIN	80049 STEP	MONITOR	RUN
CIRCUIT		MONITOR		ENTRY DEVICE MONITOR	
P4002	SM402	0 MOV H43FF R224 17407 MOV H422A R225 16938 MOV K1222 R227 1222 MOV K900 R226 900			
10	X2A8 X2A9 X2AC X2AD X2B0 X2B1 X2B4 Y8C08 Y2A8	Y8C08 Y2A8			

DEVICE	ON/OFF/CURRENT	DATA	CONN.	COIL	DEVICE	ON/OFF/CURRENT	DATA	CONN.	COIL
									7.8ms
									RUN

←

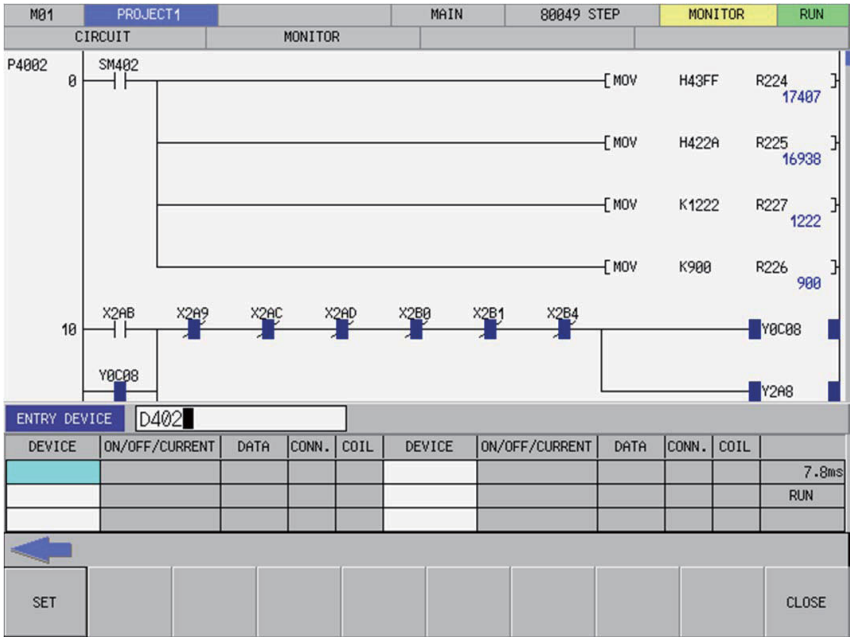
DEVICE TEST			16BIT/32BIT	DEC/HEX		MOVEMENT ON SPLIT SCREEN	PLC RUN/STOP		CLOSE

Use the [SPLIT SCREEN] transition menu key to transition between the ladder screen and the split screen (entry device monitor). Pressing the [SPLIT SCREEN TRANSITION] menu key transitions the selection to the split screen when the ladder screen is selected and transitions the selection to the ladder screen when the split screen is selected.

Pressing the [REGISTER MONITOR] menu key registers the device or ladder at the cursor position to the registration monitor in accordance with the following rules.

Status	Operation when the register monitor menu key is pressed
Not using split screen mode	Registers the ladder at the cursor position to the entry ladder monitor.
Displaying the entry ladder monitor	
Displaying the entry device monitor	Registers the device at the cursor position to the entry device monitor.
Selecting the entry device monitor	

The entry device popup screen displays after pressing the [INPUT] key while the entry device monitor screen is selected.



Register devices using the following operations.

1. Use the keys as described in "Operation Key List: Basic Operation Keys" to select the devices you want to register in the device field of the entry device monitor. The background color of the selected areas becomes blue.
2. Press the [DEVICE] menu key to select the device input field and enter the device you want to monitor.
3. Press the [REGISTER] menu key to select the device at the position selected in the entry device monitor. Close the entry device popup screen.

Changing the display of monitor values

Select the entry device monitor and then use the [16-BIT/32-BIT SWITCH] menu key or the [DEC./HEX.] menu key to change the display of setting values.

Closing the Entry Device Monitor

Use any of the following methods to close the entry device monitor popup screen.

Methods to close the screen
Select the entry device monitor and press the [CLOSE] menu key.
Select the entry device monitor and press the left arrow key.
Select the entry device monitor and press the [ESC] key on the soft keyboard.
Select the entry device monitor and press the [ENTRY DEVICE MONITOR] menu key.

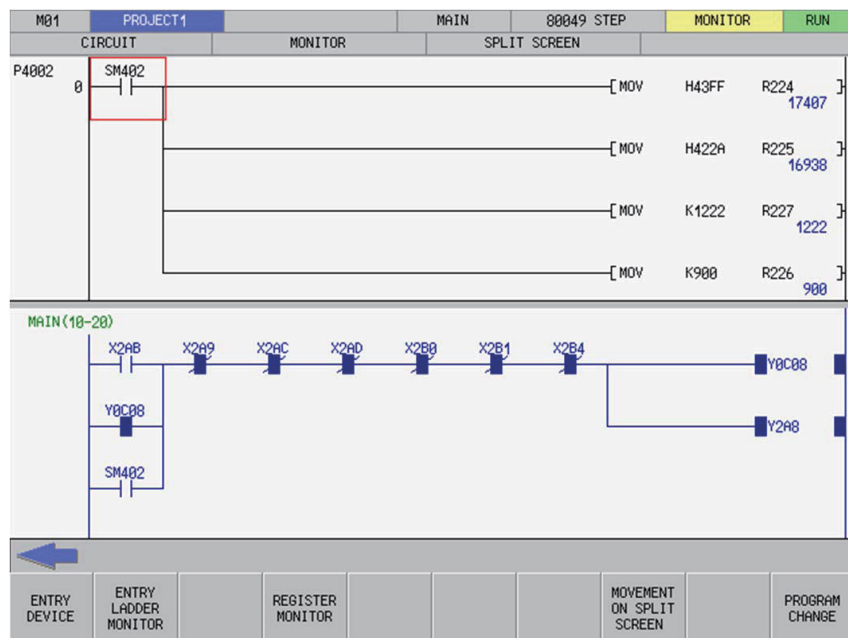
7.12.9.2 Entry Ladder Monitor

Outline

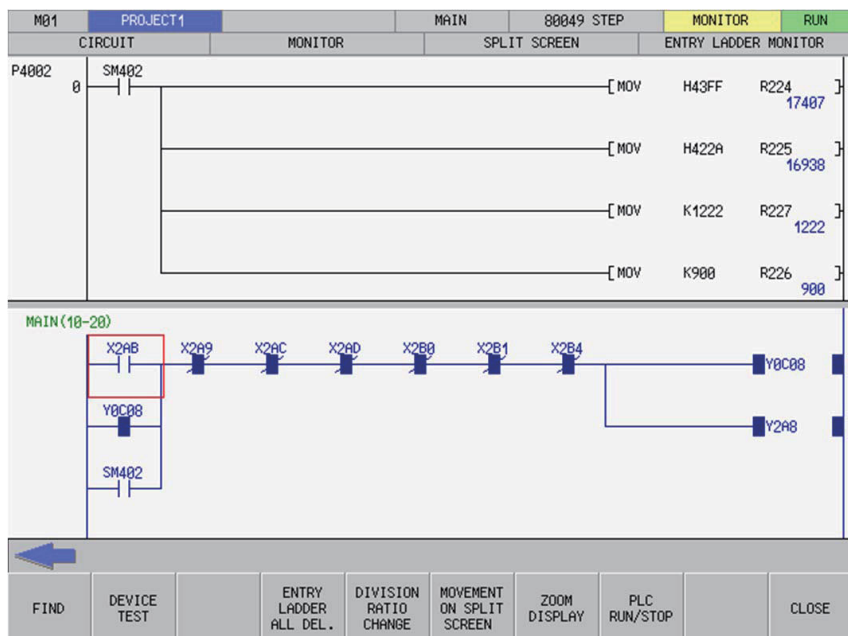
This splits the ladder screen (monitor) and enables the registered ladders to be monitored together with the ladder monitor display.

The display of menu keys changes depending on whether the ladder screen or the entry ladder monitor is selected.

<Selecting the ladder screen>



<Selecting the entry ladder monitor>



Transitioning between the ladder screen and the split screen

Use the [SPLIT SCREEN] movement menu key to transition between the ladder screen and the split screen (entry ladder monitor). Pressing the [SPLIT SCREEN TRANSITION] menu key transitions the selection to the split screen when the ladder screen is selected and transitions the selection to the ladder screen when the split screen is selected.

Registering ladders to the entry ladder monitor

Pressing the [REGISTER MONITOR] menu key registers the device or ladder at the cursor position to the registration monitor in accordance with the following rules.

Status	Operation when the register monitor menu key is pressed
Not using split screen mode	Registers the ladder at the cursor position to the entry ladder monitor.
Displaying the entry ladder monitor	
Displaying the entry device monitor	Registers the device at the cursor position to the entry device monitor.
Selecting the entry device monitor	

Deleting registered ladders**(1) Deleting individual ladder blocks**

Perform the following operations in order to delete ladder circuits registered in the entry ladder monitor one block at a time.

1. Use the [SPLIT SCREEN TRANSITION] menu key to select the entry ladder monitor.
2. Use the keys as described in "Operation Key List: Basic Operation Keys" to transition to the left end of the ladder block you want to delete. The background color of the ladder block changes to blue after transitioning to the left end of the ladder block.
3. Press the [DELETE] key.

(2) Deleting all registered circuits

Perform the following operations in order to delete all ladder circuits registered in the entry ladder monitor.

1. Use the [SPLIT SCREEN TRANSITION] menu key to select the entry ladder monitor.
2. Press the [DELETE ALL REG. CIRCUITS] menu key. Pressing the [DELETE ALL REG. CIRCUITS] menu key displays the following message.

Deleting all the registered ladder.
OK?

YES

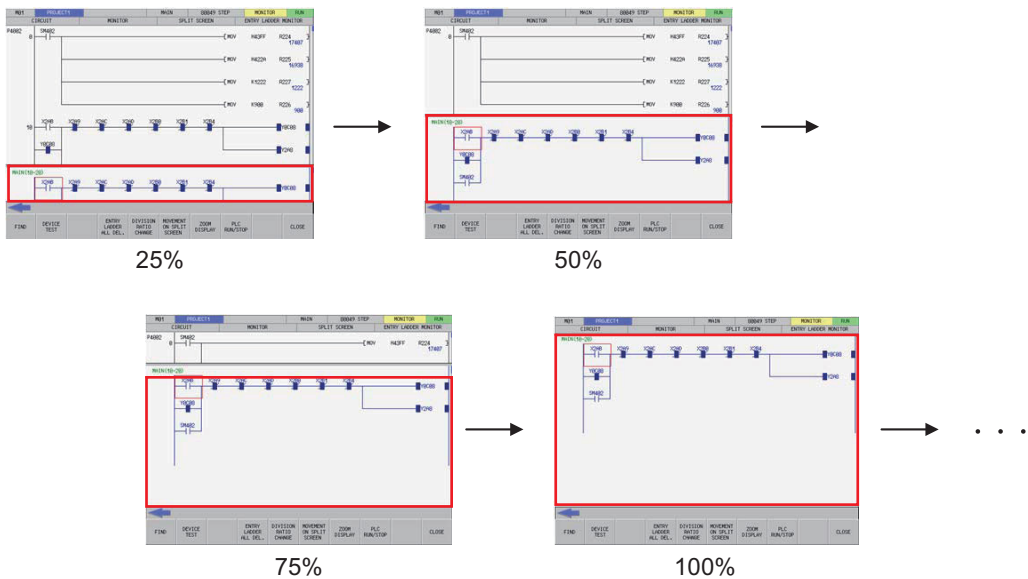
NO

3. Pressing the [YES] menu key closes the message screen and all ladder circuits registered in the entry ladder monitor are deleted.

Pressing the [NO] menu key closes the message. The ladder circuits registered in the entry ladder monitor are not deleted.

Changing the split screen ratio for the entry ladder monitor

The split ratio between the display of the [ENTRY LADDER MONITOR] and [LADDER] screens can be changed. When the "CHANGE SPLIT RATIO" menu key is pressed, the split ratio changes between "25%" → "50%" → "75%" → "100%" → "25%". The default split ratio is 50%.



Closing the Entry Ladder Monitor

Use any of the following methods to close the entry ladder monitor popup screen.

Methods to close the screen
Select the entry ladder monitor and press the [CLOSE] menu key.
Select the entry ladder monitor and press the left arrow key.
Select the entry ladder monitor and press the [ESC] key on the soft keyboard.
Select the entry ladder monitor and press the [ENTRY LADDER MONITOR] menu key.

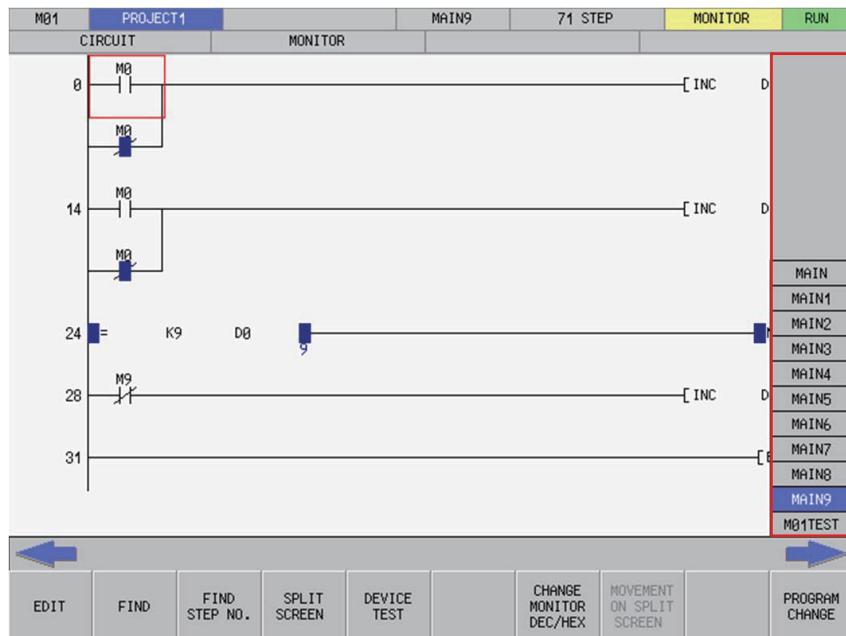
7.12.10 Switching Programs

7.12.10.1 Outline

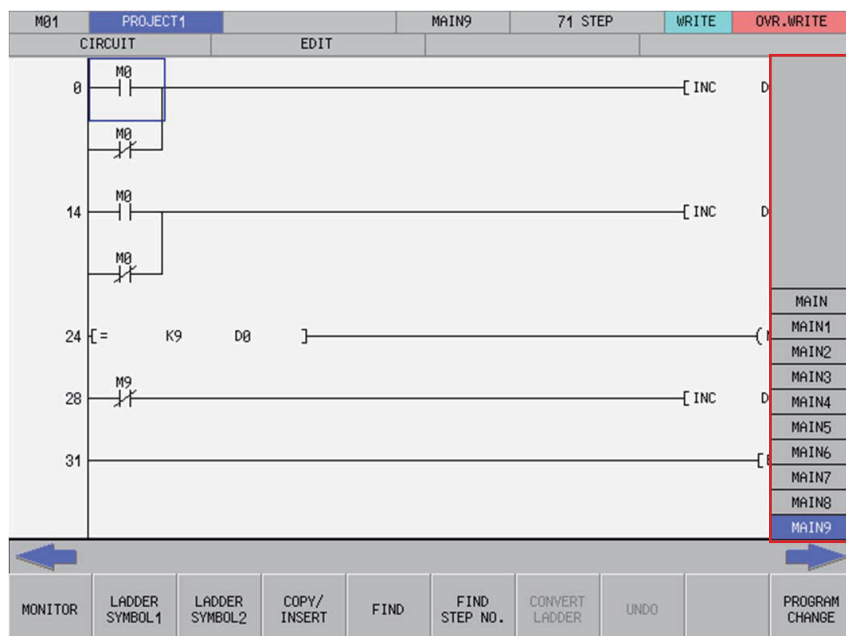
The programs displayed on the ladder screen can be changed.

The programs that can be selected differ depending on whether selecting to switch programs while monitoring ladders or while editing ladders.

<Monitoring ladders>



<Editing ladders>



7.12.10.2 Selecting and Switching Programs

Refer to "(1) Switching between programs or other types of data" under "Setting selection items in lists" in "Operation Key List :Basic Operation Keys" to select and switch programs.

Switching programs while monitoring ladders enables you to switch between programs and PLC messages.

Switching programs while editing ladders enables you to switch programs only.

Note that the following message screen displays when attempting to switch programs when there are unconverted ladders.

Ladder not converted. Are you sure you want to delete the unconverted ladder?									
YES	NO								

Pressing the [YES] menu key cancels the unconverted ladder and switches to the program selected on the switch program screen.

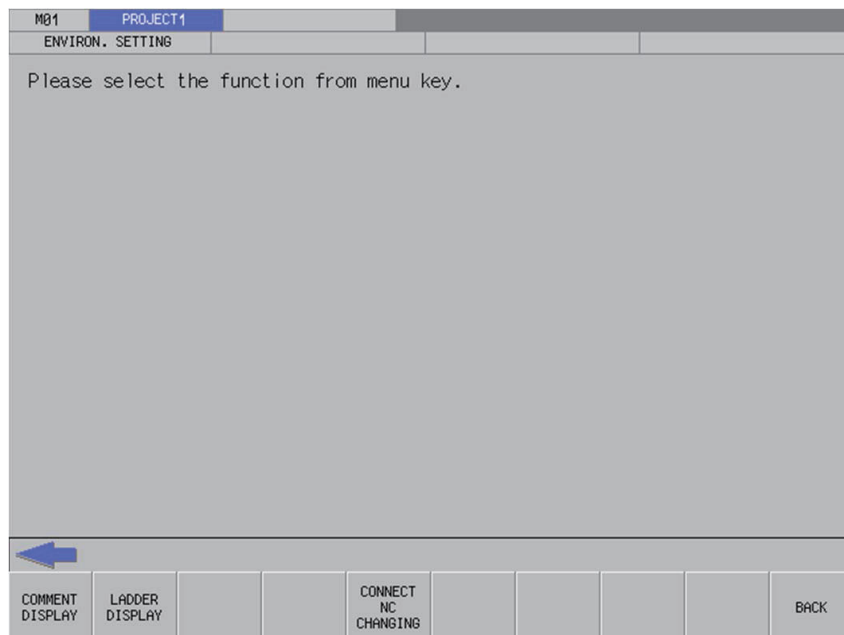
Pressing the [NO] menu key returns to the ladder screen without switching to the program selected on the switch program screen.

7.13 Environment Setting Menu

7.13.1 Environment Settings Main Screen

7.13.1.1 Outline

This section describes the various settings for using the PLC Onboard.



7.13.1.2 Screen Display Items

The following table describes the screen display items for the environment settings screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.

7.13.1.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the environment settings screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Comment Display setting	This is enables when reading the sequence program in the current project.
Ladder Display	This is enables when reading the sequence program in the current project.

7.13.1.4 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key/return menu key	These transition to the main menu.
Various menu keys	This displays the specified screen.

7.13.2 Comment Display Settings Screen

7.13.2.1 Outline

This configures settings for device comments stored in projects.

The screenshot shows the 'COMMENT DISPLAY SETTING' screen. At the top, there are tabs for 'ENVIRON. SETTING' and 'COMMENT DISPLAY SETTING'. Below the tabs, there are several settings:

- COMMENT LINE:** A row of buttons for '4 LINE', '3 LINE', '2 LINE', and '1 LINE'. '4 LINE' is currently selected.
- COMMENT DISPLAY:** A row of buttons for 'YES' and 'NO'. 'YES' is currently selected.
- STATE. DISPLAY:** A row of buttons for 'YES' and 'NO'. 'YES' is currently selected.
- NOTE DISPLAY:** A row of buttons for 'YES' and 'NO'. 'YES' is currently selected.
- ALIAS DISPLAY:** A row of buttons for 'YES' and 'NO'. 'YES' is currently selected.
- ALIAS DISPLAY FORM:** A row of buttons for 'REPLACE' and 'PARALLEL'. 'REPLACE' is currently selected.
- COMMON COMMENT:** A section with two options: 'COMMENT (GX Developer COMPATIBLE)' and 'DESIGNATE OTHER COMMENT FILES'. The first option is selected, and the text 'GX83CHK' is entered in the adjacent field.
- SELECT FILE:** A file selection dialog box showing a list of files, with 'COMMENT' and 'GX83CHK' visible.

At the bottom of the screen, there is a navigation bar with buttons for 'COMMENT LINE', 'COMMENT', 'STATE.', 'NOTE', 'ALIAS', 'ALIAS DISPLAY FORM', 'COMMON COMMENT', 'SELECT COMMENT FILE', 'SET', and 'CLOSE'. A blue arrow points to the 'COMMENT LINE' button.

7.13.2.2 Screen Display Items

The following table describes the screen display items for the comment display settings screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Comment line	This displays the [4 LINE], [3 LINE], [2 LINE], and [1 LINE] options.
Comment display	This displays the [YES] and [NO] options.
Statement display	
Note display	
Alias display	
Alias display form	This displays the [REPLACE] and [PARALLEL] options.
Common comment file	This displays the [COMMENT (GX Developer compatible)] and [Specify other comment file] options.
Select comment file	This displays the name of the device comment file stored in the current project.

7.13.2.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the comment display settings screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Common comment file	This is enabled when device comments are stored in the current project.
Select comment file	This is enabled when device comments are stored in the current project and the selection of the common comment file is [Specify other comment file].

7.13.2.4 Status during Screen Displays

The following table describes the status when displaying the comment display settings screen for the first time. (The details of the configuration made on the comment display settings screen are stored. The screen is displayed with the updated settings configured previously the next time it is displayed. However, the comment file name displayed in the select comment file field is updated every time the screen is displayed.)

Item name	Operation
Comment line	This selects the [4 LINE] option.
Comment display	This selects the [NO] option.
Statement display	This selects the [NO] option.
Note display	This selects the [NO] option.
Alias display	This selects the [NO] option.
Alias display form	This selects the [REPLACE] option.
Common comment file	This selects the [COMMENT (GX Developer compatible)] option.
Select comment file	This displays the name of the device comment file stored in the current project.

7.13.2.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

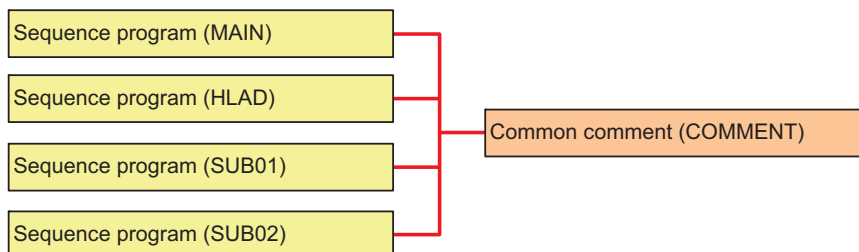
Item name	Operation
Left arrow key	Refer to "Closing the Comment Display Settings Screen."
Comment line	This sets the focus to the comment line. This changes the comment line selection when the focus is already set.
Comment display	This sets the focus to the comment display. This changes the comment display selection when the focus is already set.
Statement display	This sets the focus to the statement display. This changes the statement display selection when the focus is already set.
Note display	This sets the focus to the note display. This changes the note display selection when the focus is already set.
Alias display	This sets the focus to the alias display. This changes the alias display selection when the focus is already set.
Alias display form	This sets the focus to the alias display form. This changes the alias display form selection when the focus is already set.
Common comment file	This sets the focus to the common comment file. This changes the common comment file selection when the focus is already set.
Select comment file	This sets the focus to the select comment file.
Settings	Refer to "Setting the Comment Display State."
Close	Refer to "Closing the Comment Display Settings Screen."

7.13.2.6 Common Comment File

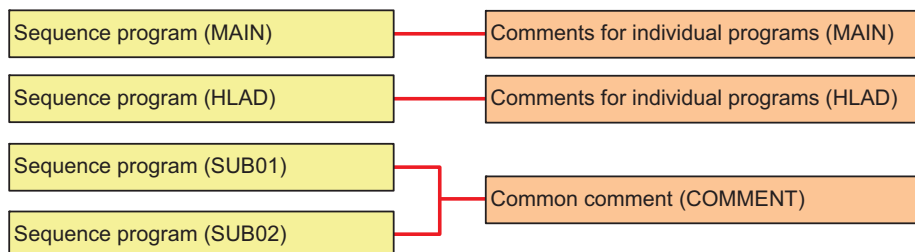
COMMENT (GX Developer compatible)

When [COMMENT (GX Developer compatible)] is selected as the common comment file, a correspondence is created between the sequence program and device comments as illustrated in the following diagram.

1. Contains common comments.
Common comments are referenced in all sequence programs.

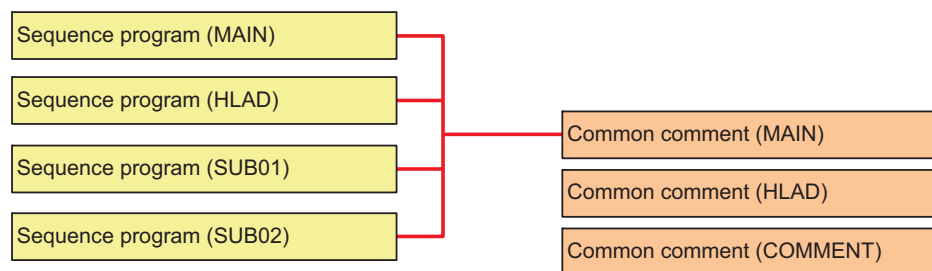


2. Contains both common comments and program-specific comments.
Program-specific comments are only referenced in sequence programs with the same name. Common comments are referenced in the other sequence programs.



Specifying other comment files

When [Specify other comment file] is selected as the common comment file, you can specify one comment file referenced by all sequence programs.

**7.13.2.7 Setting the Comment Display State**

1. Press the [COMMENT LINE] menu key and select the number of comment lines to display on the ladder screen.
2. Press the [COMMENT DISPLAY] menu key and select whether or not to display comments on the ladder screen.
3. Press the [STATE. DISPLAY] menu key and select whether or not to display statements on the ladder screen.
4. Press the [NOTE DISPLAY] menu key and select whether or not to display notes on the ladder screen.
5. Press the [ALIAS DISPLAY] menu key and select whether or not to display aliases on the ladder screen.
6. Press the [ALIAS DISPLAY FORM] menu key and select whether to replace the format of the alias display with the device name or to display both the alias and device name vertically in parallel.
7. Press the [COMMON COMMENT] menu key and select whether to use COMMENT (GX Developer compatible) common comments or to specify some other comment file.
8. Perform this step only when [Specify other comment file] was selected at step 8.
 - 8-1. Press the [SELECT COMMENT FILE] menu key and select the select comment file field.
 - 8-2. Press the up and down arrow keys and select the comment file to use as the common comment file.
 - 8-3. Press the [INPUT] key and issue the common comment file selection.
9. Press the [SET] menu key and issue the comment display configuration.
Pressing the [SET] menu key also closes the comment display settings screen and returns to the environment settings screen.

7.13.2.8 Closing the Comment Display Settings Screen

Use any of the following methods to close the comment display settings screen.

Methods to close the screen
Press the [SET] menu key.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.13.3 Ladder Display Settings Screen

7.13.3.1 Outline

This configures settings for the ladder screen. These settings are common between different projects.

The screenshot shows the 'Ladder Display' settings screen. At the top, there are tabs for 'ENVIRON. SETTING' and 'LADDER DISPLAY'. The 'LADDER DISPLAY' tab is active. Below the tabs, there are three main settings sections: 'NUMBER OF CONTACT' with buttons for '11 CONTACTS' and '9 CONTACTS'; 'ZOOM DISPLAY' with buttons for 'REDUCTION', 'STANDARD', and 'EXPANSION'; and 'MONITOR VALUE DISPLAY' with buttons for 'YES' and 'NO'. A blue arrow points to the 'NUMBER OF CONTACT' section. At the bottom, there is a navigation bar with buttons for 'NUMBER OF CONTACT', 'ZOOM DISPLAY', 'MONITOR VALUE DISPLAY', 'SET', and 'CLOSE'.

7.13.3.2 Screen Display Items

The following table describes the screen display items for the ladder display settings screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Maximum number of contacts	This displays [11 CONTACTS] and [9 CONTACTS] options.
Zoom display	This displays the [REDUCE], [STANDARD], and [ENLARGE] options.
Monitor Value Display	This displays the [YES] and [NO] options.

7.13.3.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the ladder display settings screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Zoom display	Enabled when the screen resolution is 640 x 480

7.13.3.4 Status during Screen Displays

The following table describes the status when displaying the ladder display settings screen for the first time.
(The details of the configuration made on the comment display settings screen are stored. The screen is displayed with the updated settings configured previously the next time it is displayed.)

Item name	Operation
Maximum number of contacts	This selects the [11 CONTACTS] option.
Zoom display	This selects the [STANDARD] option.
Monitor Value Display	This selects the [YES] option.

7.13.3.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Ladder Display Settings Screen."
Maximum number of contacts	This sets the focus to the number of contacts. This changes the number of contacts selection when the focus is already set.
Zoom display	This sets the focus to the zoom display. This changes the zoom display selection when the focus is already set.
Monitor Value Display	This sets the focus to the monitor value display. This changes the monitor value display form selection when the focus is already set.
Settings	Refer to "Setting the Ladder Display State."
Close	Refer to "Closing the Ladder Display Settings Screen."

7.13.3.6 Setting the Ladder Display State

1. Press the [NUMBER OF CONTACT] menu key and select either [11 CONTACTS] or [9 CONTACTS] for the number of contacts to be displayed on the ladder screen.
2. Press the [ZOOM DISPLAY] menu key and select [REDUCE], [STANDARD], or [ENLARGE] for the magnification of the ladder screen.
3. Press the [MONITOR VALUE DISPLAY] menu key and select wither or not to display the current value on the ladder monitor.
4. Press the [SET] menu key and issue the ladder display configuration.
Pressing the [SET] menu key also closes the ladder display settings screen and returns to the environment settings screen.

The following table describes the relationship between the screen resolution and the zoom level of the ladder screen.

Screen resolution	Maximum number of contacts	Reduced display	Standard display	Expanded display
VGA (640 x 480)	11 contacts	Entire ladder can be displayed	Horizontal scroll appears	Horizontal scroll appears
	9 contacts	Entire ladder can be displayed	Entire ladder can be displayed	Horizontal scroll appears
XGA (1024 x 768)	11 contacts		Entire ladder can be displayed	
	9 contacts		Entire ladder can be displayed	
SXGA (1280 x 1024)	11 contacts			Entire ladder can be displayed
	9 contacts			Entire ladder can be displayed

7.13.3.7 Closing the Ladder Display Settings Screen

Use any of the following methods to close the ladder display settings screen.

Methods to close the screen
Press the [SET] menu key.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

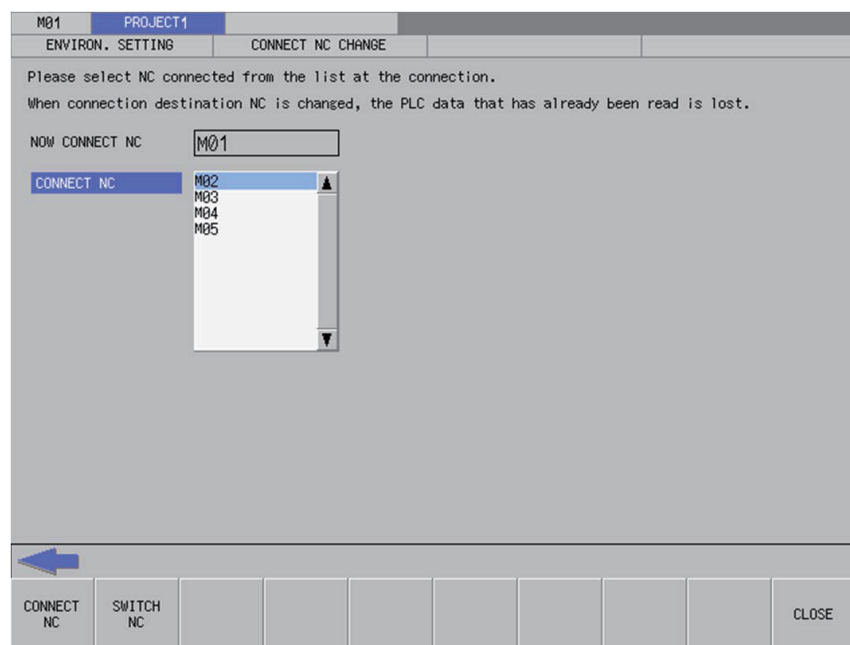
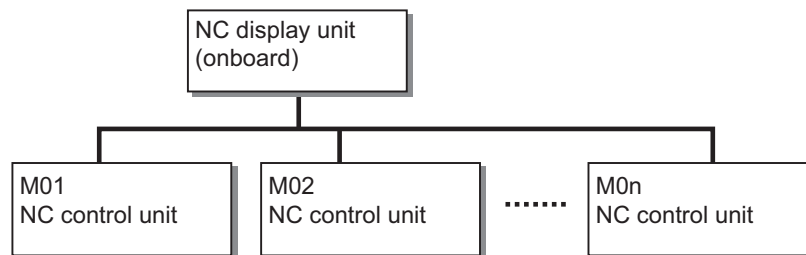
7.13.4 Change NC Connection

7.13.4.1 Outline

When the NC display unit and the NC control unit are connected in a ratio of one display unit to multiple NC control units, the NC unit connected with the PLC Onboard can be selected. (At the initial start-up of the PLC Onboard, the system connects to the same NC unit as the HMI screen side.)

(Note 1) When switching to another connected NC (control unit), the following information will be discarded.

- All PLC data in the onboard editing area will be discarded. (Program data with unconverted ladders will also be discarded.)



7.13.4.2 Screen Display Items

The following table describes the screen display items for the change NC connection screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow button	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Currently connected NC	This displays the name of the currently connected NC.
Available NCs	This displays the names of NCs available for connection.

7.13.4.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the change connected NC screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Switch NC	Enabled when NCs other than the currently connected NC are not displayed for the available NCs.

7.13.4.4 Status during Screen Displays

The following table describes the status when displaying the change NC connection screen.

Item name	Operation
Currently connected NC	This displays the name of the currently connected NC.
Available NCs	This displays the names of NCs available for connection.

7.13.4.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Change NC Connection Screen."
Available NCs	This selects the available NCs.
Switch NC	Refer to "Changing the NC Connection."
Close	Refer to "Closing the Change NC Connection Screen."

7.13.4.6 Changing the NC Connection

1. Press the [AVAILABLE NCS] menu key to select the available NCs screen.
2. Use the up/down arrow keys, Page Up key, and Page Down key to select the name of the NC connection.
3. Pressing the [SWITCH NC] menu key closes the change NC connection screen and changes the NC connection.
The system transitions to the main screen when changing NC connections so as to read PLC data stored in the newly connected NC.

7.13.4.7 Closing the Change NC Connection Screen

Use any of the following methods to close the change NC connection screen.

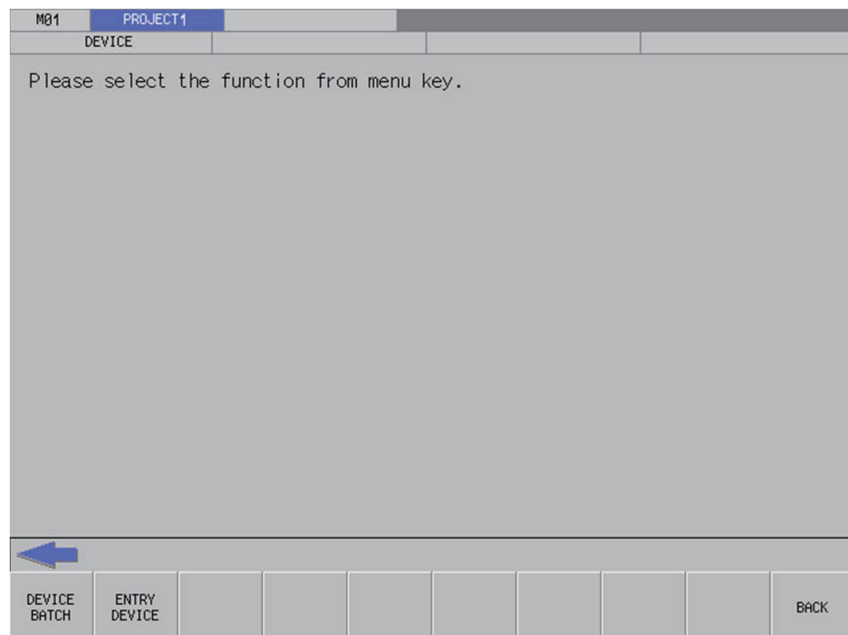
Methods to close the screen
Press the [SWITCH NC] menu key.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.14 Device Menu

7.14.1 Device Main Screen

7.14.1.1 Outline

This screen contains menus used to monitor devices.



7.14.1.2 Screen Display Items

The following table describes the screen display items on the device main screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.

7.14.1.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the comment device main screen are always enabled.

7.14.1.4 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key/return menu key	These transition to the main menu.
Various menu keys	This displays the specified screen.

7.14.2 Device Batch Monitor Screen

7.14.2.1 Outline

This enables multiple consecutive devices to be monitored simultaneously in list format after designating one type of device.

DEVICE	+F E D C	+B A 9 8	+7 6 5 4	+3 2 1 0	
D65	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D66	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D67	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D68	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D69	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D70	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D71	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D72	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D73	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D74	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D75	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0
D76	0 0 1 0	0 1 1 1	0 0 0 1	0 0 0 0	10000
D77	0 0 1 0	0 1 1 0	1 1 0 0	0 0 0 0	9920
D78	0 0 0 0	0 0 0 0	0 1 0 1	0 0 0 0	80
D79	0 0 1 0	0 1 1 1	0 0 0 1	0 0 0 0	10000

Menu bar: DEVICE, FORMAT, DISPLAY, VALUE, LIST, START MONITOR, STOP MONITOR, DEVICE TEST, PLC RUN/STOP, CLOSE

7.14.2.2 Screen Display Items

The following table describes the screen display items on the device batch monitor screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Monitor/edit display	Starting the monitor displays [MONITOR]. Stopping the monitor cancels the display.
PLC status and overwrite/insert display	This displays the PLC status (RUN/STOP) for the monitored project.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Device	This displays the device to be monitored.
Format	This displays the [BIT & WORD], [BIT MULTIPOINT], and [WORD MULTIPOINT] options.
Display	This displays the [16 BIT INTEGER] and [32 BIT INTEGER] options.
Format	This displays the [DEC] and [HEX] options.
List	This displays the monitoring results.

7.14.2.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the device batch monitor screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Start monitor	Disabled after the monitor is started
Stop monitor	Disables after the monitor is stopped

7.14.2.4 Status during Screen Displays

The following table describes the status when displaying the device batch monitor screen.

Item name	Operation
Device	This is left blank.
Format	This selects the [BIT & WORD] option.
Display	This selects the [16 BIT INTEGER] option.
Format	This selects the [DEC] option.
List	This is left blank.

7.14.2.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Device Batch Monitor Screen."
Device	This selects the device input field.
Format	This sets the focus to the format. This changes the format selection when the focus is already set.
Display	This sets the focus to the display selection field. This changes the selection in the display selection field when the focus is already set.
Format	This sets the focus to the value selection field. This changes the selection in the value selection field when the focus is already set.
List	The focus is applied to the list.
Start monitor	Refer to "Starting and Stopping the Monitor for the Selected Device."
Stop monitor	Refer to "Starting and Stopping the Monitor for the Selected Device."
Device test	This displays the device test popup screen. Refer to "Ladder Menu: Device Test Popup Screen."
PLC RUN/STOP	This displays the PLC RUN/STOP screen. Refer to "NC File Operation Menu :PLC RUN/STOP Popup Screen."
Close	Refer to "Closing the Device Batch Monitor Screen."

7.14.2.6 Starting and Stopping the Monitor for the Selected Device

Starting the monitor

1. Press the [DEVICE] menu key and enter the device you want to monitor into the device selection field.
2. Press the [FORMAT] menu key and select the format from the format selection field.
3. Press the [DISPLAY] menu key and select the display format for the current value from the display selection field.
4. Press the [VALUE] menu key and select the type of value to display for the current value from the value section field.
5. Press the [START MONITOR] menu key to start the monitor. Starting the monitor moves the focus to the list. [MONITOR] is also displayed in the top-right of the screen.



6. Use the up/down arrow keys, Page Up key, and Page Down key to move within the list and check the monitoring status of the devices downstream and upstream from the specified device.

Stopping the monitor

1. Pressing the [STOP MONITOR] menu key while monitoring devices stops the monitor. The [MONITOR] display in the top-right of the screen is also canceled.



7.14.2.7 Closing the Device Batch Monitor Screen

Use any of the following methods to close the device batch monitor screen.

Methods to close the screen

Press the [CLOSE] menu key.

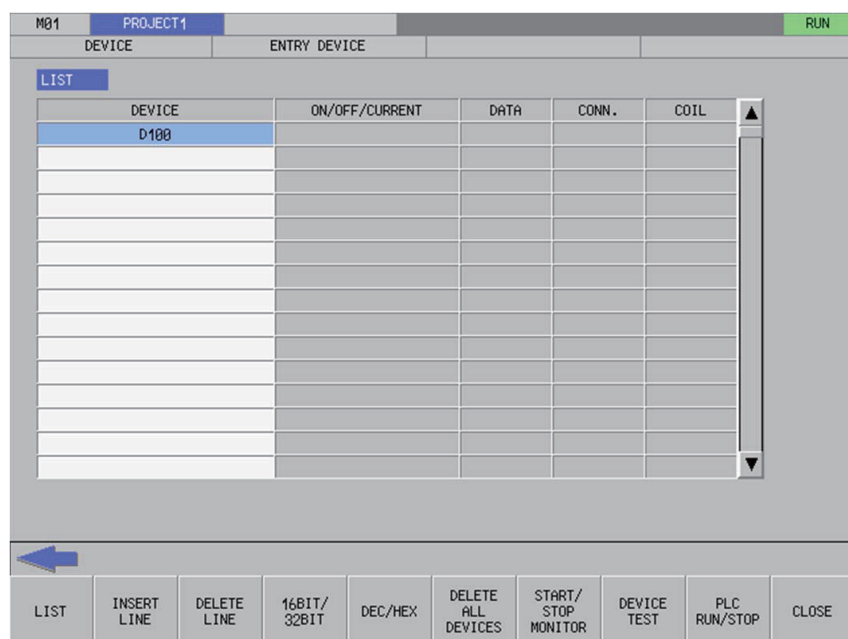
Press the left arrow key.

Press the [ESC] key on the soft keyboard.

7.14.3 Entry Device Monitor Screen

7.14.3.1 Outline

This monitors devices at separated positions in ladders or different types of devices simultaneously on one screen.



7.14.3.2 Screen Display Items

The following table describes the screen display items for the file list screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Monitor/edit display	Starting the monitor displays [MONITOR]. Stopping the monitor cancels the display.
PLC status (RUN/STOP) display	This displays the PLC status (RUN/STOP) for the monitored project.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
List	This displays the monitored device, current project, and monitoring results.

7.14.3.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the entry device monitor screen are always enabled.

7.14.3.4 Status during Screen Displays

The following table describes the status when displaying the entry device monitor screen.

Item name	Operation
List	This is left blank.

7.14.3.5 Operation of Key Presses

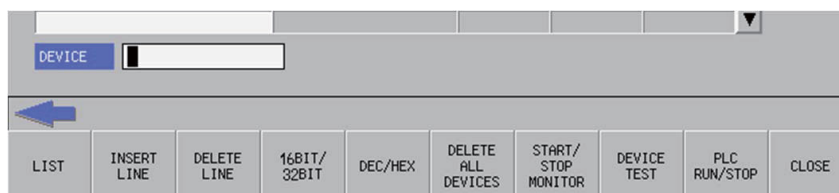
The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Entry Device Monitor Screen."
List	The focus is applied to the list.
Insert line	This inserts a blank line at the cursor position in the list.
Delete line	This deletes one blank line at the cursor position in the list.
16 bit/32 bit switch	This switches the display of the current value in the list between a 16-bit display and a 32-bit display.
Decimal/Hexadecimal switch	This switches the display of the current value in the list between a decimal display and a hexadecimal display.
Delete all devices	This deletes all the devices registered in the list. Refer to "Deleting All Devices."
Start/stop monitor	Refer to "Starting and Stopping the Monitor for the Selected Device."
Device test	This displays the device test popup screen. Refer to "Ladder Menu: Device Test Popup Screen."
PLC RUN/STOP	This displays the PLC RUN/STOP screen. Refer to "NC File Operation Menu :PLC RUN/STOP Popup Screen."
Close	Refer to "Closing the Entry Device Monitor Screen."

7.14.3.6 Entering Devices for Monitoring

Use the following procedure to enter devices for monitoring.

1. Press the [LIST] menu key to select the list.
2. Use the up/down arrow keys, Page Up key, and Page Down key to move to the desired position in the device display column in the list.
3. Press the [INPUT] key to display the device entry field at the bottom of the list and move the focus.



4. Enter the device you want to monitor and then press the [INPUT] key. Press the INPUT key to close the device entry field. The entered device displays at the cursor position in the list.

7.14.3.7 Deleting Devices

Single deletions (1)

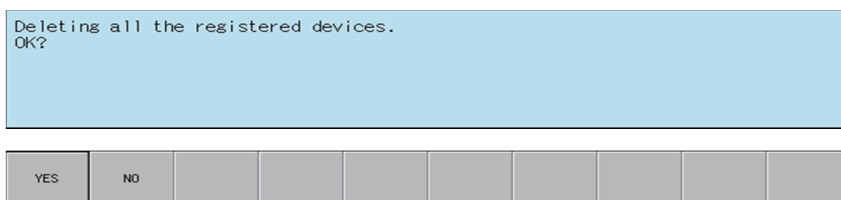
1. Use the up/down arrow keys, Page Up key, and Page Down key to move to the position where the device you want to delete is displayed in the device display column in the list.
2. Press the [DELETE] key. Pressing the [DELETE] key deletes the device at the cursor position. The project No. display in the same line is also removed.

Single deletions (2)

1. Use the up/down arrow keys, Page Up key, and Page Down key to move to the position where the device you want to delete is displayed in the device display column in the list.
2. Press the [DELETE LINE] menu key. Pressing the [DELETE LINE] menu key deletes the line at the cursor position in the list and moves the remaining lines below the cursor position up one line.

Delete all devices

1. Press the [DELETE ALL DEVICES] menu key. Pressing the [DELETE ALL DEVICES] menu key displays the following message screen.



2. Pressing the [YES] menu key closes the message screen and all devices registered in the list are deleted. The project No. display in the same line as the device is also deleted. Pressing the [NO] menu key closes the message screen and returns to the entry device monitor screen.

7.14.3.8 Starting and Stopping the Monitor for the Selected Device

1. Refer to "Entering Devices for Monitoring" and enter the device you want to monitor into the list.
2. Press the [SWITCH 16-BIT/32-BIT] menu key and select whether the current value is displayed in 16-bit integers or 32-bit integers.
3. Press the [SWITCH DEC/HEX] menu key and select whether the current value is displayed in decimal or hexadecimal numbers.
4. Press the [START/STOP MONITOR] menu key to start the monitor. Starting the monitor moves the focus to the list. [MONITOR] is also displayed in the top-right of the screen.



5. Use the up/down arrow keys, Page Up key, and Page Down key to move within the list and check the monitoring status of other specified devices.

Stopping the monitor

1. Pressing the [START/STOP MONITOR] menu key while monitoring devices stops the monitor. The [MONITOR] display in the top-right of the screen is also canceled.



7.14.3.9 Closing the Entry Device Monitor Screen

Use any of the following methods to close the entry device monitor popup screen.

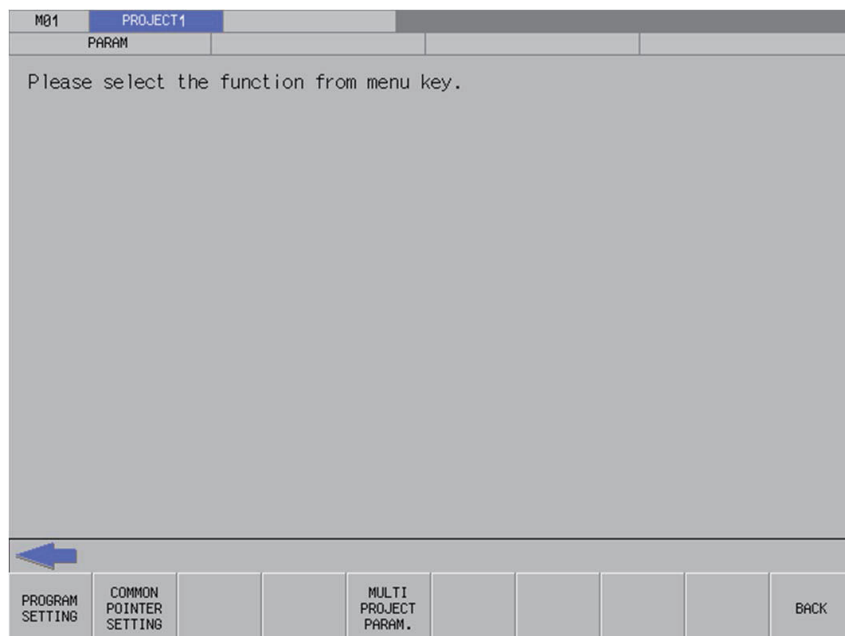
Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.15 Parameter Menu

7.15.1 Parameter Main Screen

7.15.1.1 Outline

This displays menus for parameters that control PLC operation.



7.15.1.2 Screen Display Items

The following table describes the screen display items on the parameter main screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.

7.15.1.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the parameter main screen are always enabled.

7.15.1.4 Operation of Key Presses

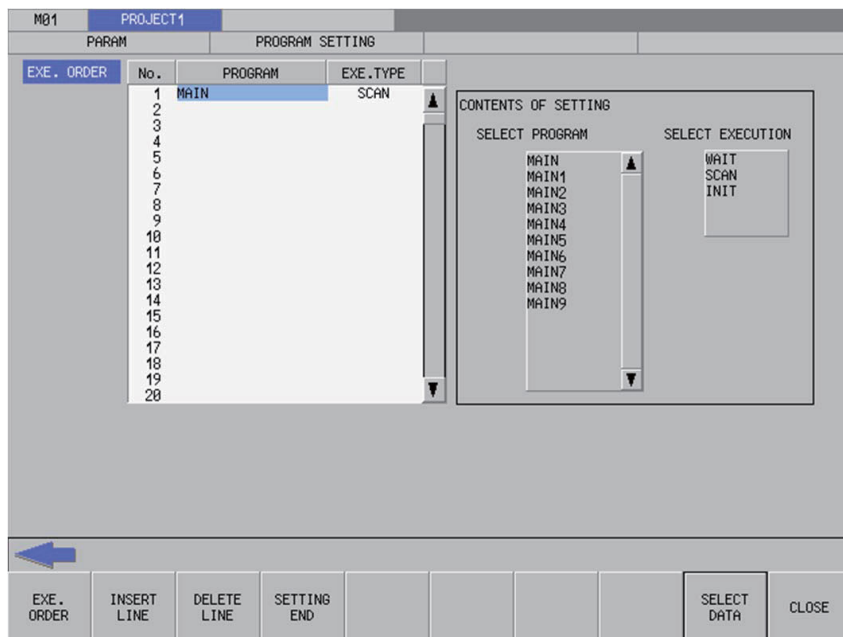
The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key/return menu key	These transition to the main menu.
Various menu keys	This displays the specified screen.

7.15.2 Program Settings Screen

7.15.2.1 Outline

The execution order of programs when running multiple PLCs stored in the current project on the NC can be specified. Programs are executed in order from the lowest number configured in the set list as illustrated in the following diagram.



7.15.2.2 Screen Display Items

The following table describes the screen display items for the program settings screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Execution sequence	The details of the program settings are displayed.
Contents of setting	This displays the file names of sequence programs and the selected type of execution.

7.15.2.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the program settings screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Insert line	Enabled when the focus is set on the execution sequence
Delete line	Enabled when the focus is set on the execution sequence

7.15.2.4 Status during Screen Displays

The following table describes the status when displaying the program settings screen.

Item name	Operation
Execution sequence	This displays the details of the program settings for the current project.
Contents of setting	This displays the selectable execution type and files names of sequence programs stored in the current project.

7.15.2.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Program Settings Screen."
Execution sequence	This sets the focus to the execution sequence.
Insert line	This inserts one blank line at the cursor position in the execution sequence. Lines are not inserted when data is already set at the last line in the set list.
Delete line	This deletes one line at the cursor position in the execution sequence and moves remaining data up one line.
Complete settings	Refer to "Setting the Program Execution Sequence."
Close	Refer to "Closing the Program Settings Screen."

7.15.2.6 Setting the Program Execution Sequence

1. Press the [EXE. ORDER] menu key to select the execution order.
2. Use the up/down arrow keys, Page Up key, and Page Down key to move the cursor to the position in the program name column to set the execution sequence for programs.
3. Press the [INPUT] key. Pressing the [INPUT] key selects the select program field of Contents of setting.
4. Use the up/down arrow keys, Page Up key, and Page Down key to select the program for which you want to set the program execution sequence.
5. Press the [INPUT] key. Pressing the [INPUT] key displays the name of the program selected in the select program field at the cursor position in the the execution order.
[WAIT] is automatically set for the execution type in the line where the program is displayed.
6. Use the right arrow key to move the cursor from the program name column to the execution type column.
7. Press the [INPUT] key. Pressing the [INPUT] key selects the selection execution field of Contents of setting.
8. Use the up/down arrow keys, Page Up key, and Page Down key to select the execution type for the program.
9. Press the [INPUT] key. Pressing the [INPUT] key displays the execution type selected in the select execution field at the cursor position in the execution order.
10. Repeat steps 3-8 to set the execution sequence for all programs.
11. Press the [COMPLETE SETTINGS] menu key after all settings are complete.

The following message screen displays when the PLC is running.

PLC is in a RUN state. Is preservation performed after stop PLC?									
YES	NO								

- 12-1.Pressing the [NO] menu key displays the following error message.
- Closing the error message returns to the program settings screen.

The PLC is running, so writing cannot be executed. Execute again after the PLC stops.									
OK									

- 12-2.Pressing the [YES] menu key closes the message screen and executes the program settings. The following message displays after the settings are complete.

PLC is in a STOP state. Is PLC changed into a RUN state?									
YES	NO								

- Press the [YES] menu key restarts the PLC stopped to complete the settings and closes the message screen.
- Pressing the [NO] menu key closes the message screen without restarting the PLC.
13. The complete message displays if the program settings complete without error. Closing the complete message returns the system to the program settings screen.

Completed.									
OK									

7.15.2.7 Closing the Program Settings Screen

Use any of the following methods to close the program settings screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.15.3 Common Pointer Settings Screen

7.15.3.1 Outline

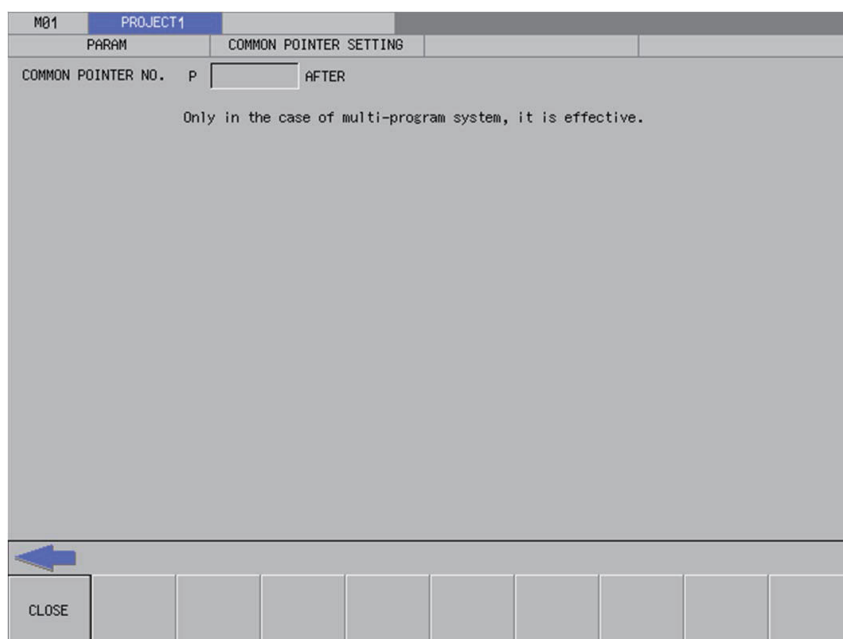
The initial P number can be checked for common pointers (pointers used to call subroutines from all programs) in the current project.

*Note 1: Configure common pointers using GX Developer in range between P0-P4095.

*Note 2: The initial P number in common pointers is enabled when executing multiple programs.

*Note 3: When executing single programs, leave this blank (press the [SET] button without configuring any settings).

*Note 4: If the common pointer setting is left blank (not configuring any settings) when using multiple programs, this is set to the default of P1800 or higher.



7.15.3.2 Screen Display Items

The following table describes the screen display items for the common pointer settings screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Common pointer No.	This displays the initial P number for common pointers.

7.15.3.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the common pointer settings screen are always enabled.

7.15.3.4 Status during Screen Displays

The following table describes the status when displaying the common pointer settings screen.

Item name	Operation
Common pointer No.	This is the default focus position when the screen is displayed. This displays the initial P number for common pointers set to the project specified for operation.

7.15.3.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Common Pointer Settings Screen."
Close	

7.15.3.6 Closing the Common Pointer Screen

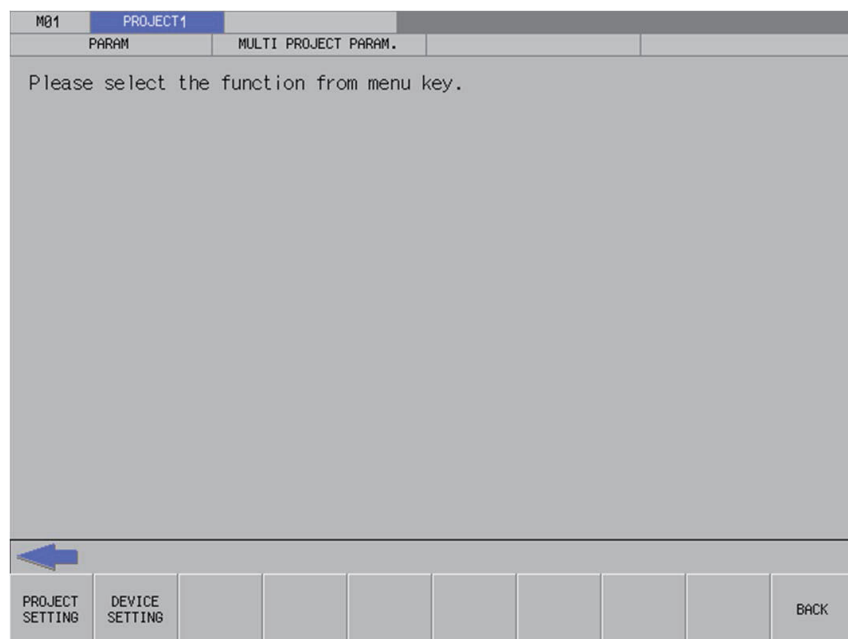
Use any of the following methods to close the common pointer settings screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.15.4 Multiple Project Parameters Main Screen

7.15.4.1 Outline

This configures parameters for multiple projects.



7.15.4.2 Screen Display Items

The following table describes the screen display items on the multiple project main screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.

7.15.4.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the multiple project parameters main screen are always enabled.

7.15.4.4 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key/return menu key	This transitions to the parameter main screen.
Various menu keys	This displays the specified screen.

7.15.5 Project Settings Screen

7.15.5.1 Outline

This enables parameters for operating multiple projects to be configured such as the maximum project No. and the project to execute.

PROJECT No.	01	02	03	04	05	06
PROJ. RATIO (%)	100	0	0	0	0	0
EXECUTE PROJECT	ON	OFF	OFF	OFF	OFF	OFF
EXE.ORDER	1	2	3	4	5	6

7.15.5.2 Screen Display Items

The following table describes the screen display items for the project settings screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Maximum project No.	This displays the number of usable projects.
List	This displays the project ratio, execution project, and the execution sequence.

7.15.5.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the project settings screen are always enabled.

7.15.5.4 Status during Screen Displays

The following table describes the status when displaying the project settings screen.

Item name	Operation
Maximum project No.	This is the default focus position when the screen is displayed. This displays the highest project number that can be used within the project numbers set in the NC.
List	This displays the project ratio, execution project, and execution sequence set for each project.

7.15.5.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Project Settings Screen."
Maximum project No.	This sets the focus to the maximum project No. This changes the maximum project no. selection when the focus is already set.
List	This selects the list.
Settings	Refer to "Configuring the Project Settings."
Close	Refer to "Closing the Project Settings Screen."

7.15.5.6 Setting the Project Ratio

Rules for project ratio settings

The following table describes the rules and precautions regarding the configuration of project ratio settings using the PLC Onboard.

Setting Rules and Precautions
Set the total ratios for all usable projects so that it is no more than 100.
The ratio cannot be set for projects that are not usable.
The size of each setting should be 4 steps/byte. (Fractions are added to project 1 to prevent multiples of 4.)
The size of the project ration cannot be set to a value less than the size of the data and sequence programs currently stored.

Entering the project ratio

1. Press the [LIST] menu to select the list.
2. Use the up and down arrow keys to move to a position in the project ratio column in the list.
3. Press the [INPUT] key to display the label input field at the bottom of the list and move the focus.



4. Enter the project ratio in accordance with the previously described rules and precautions, and then press the [INPUT] key. Press the INPUT key to close the project ratio input field. The entered project ratio is displayed at the cursor position in the list.

Deleting ratios

1. Press the [LIST] menu to select the list.
2. Use the up and down arrow keys to move to a position in the project ratio column in the list.
3. Press the [DELETE] menu key. Pressing the [DELETE] key deletes the project ratio at the cursor position. The project ratio at the deleted position becomes 0%.

7.15.5.7 Setting Execution Projects

Rules for execution project settings

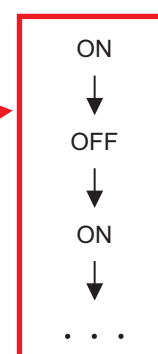
The following table describes the rules and precautions regarding the configuration of execution project settings using the PLC Onboard.

Setting Rules and Precautions
Projects that are not usable will not execute even if set to ON.
You cannot turn off all projects.

Entering the execution projects

1. Press the [LIST] menu to select the list.
2. Use the up and down arrow keys to move to the position of the line for the project in the list for which the execution is to be set.
3. Refer to "Setting selection items in lists" in "Operation Key List :Basic Operation Keys." Pressing the [INPUT] key while the cursor is in the execution project display field changes the display between [ON] and [OFF].

PROJECT No.	01	02	03	04	05	06
PROJ. RATIO (%)	100	0	0	0	0	0
EXECUTE PROJECT	ON	OFF	OFF	OFF	OFF	OFF
EXE.ORDER	1	2	3	4	5	6



4. In accordance with the previously described rules and precautions, select [ON] to execute the project at the set position or select [OFF] to not execute the project.

7.15.5.8 Setting the Execution Sequence

Rules for execution sequence settings

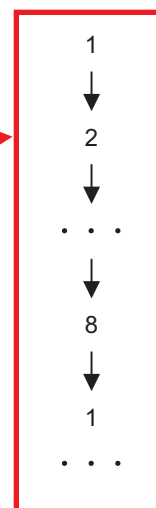
The following table describes the rules and precautions regarding the configuration of execution sequence settings using the PLC Onboard.

Setting Rules and Precautions
The sequence cannot be set for projects that are not usable.
The same execution sequence number cannot be set to multiple projects for which the execution project is set to [ON].
The execution sequence is ignored if the execution project is set to [OFF].
The execution sequence when the execution project is set to [OFF] is automatically set to the next sequence number from the execution end position of executing projects set in the NC.
Projects for which the execution project is set to [ON] are executed in order from the lowest number set in the execution sequence.

Entering the execution sequence

1. Press the [LIST] menu to select the list.
2. Use the up and down arrow keys to move to the position of the line for the execution sequence to be set in the list.
3. Refer to "Setting selection items in lists" in "Operation Key List :Basic Operation Keys." Pressing the [INPUT] key while the cursor is in the execution sequence display field changes the display of the sequence between one to the maximum project no. from the lowest number.

PROJECT No.	01	02	03	04	05	06
PROJ. RATIO(%)	100	0	0	0	0	0
EXECUTE PROJECT	ON	OFF	OFF	OFF	OFF	OFF
EXE.ORDER	1	2	3	4	5	6



4. In accordance with the previously described rules and precautions, select the execution sequence for the project at the set position.

7.15.5.9 Configuring the Project Settings**Normal operation**

1. Press the [MAX PROJECT No.] and select the number of projects to use.
2. Refer to "Setting the Project Ratio" and enter the project ratio.
3. Refer to "Setting Execution Projects" and select the execution projects.
4. Refer to "Setting the Execution Sequence" and enter the execution sequence.
5. Press the [SET] menu key.
6. The following message screen displays if the project settings complete without error. Closing the message screen closes the project settings screen and returns to the multiple project parameters screen.

Completed.
To enable the setting, please restart the NC.



Abnormal operation

This information describes the details of error messages displayed on the project settings screen and the corrective action thereof.

Error message	Error description	Corrective action
The project ratio is not 100%.	This is displayed if the set project ratio is less than or more than 100%.	Set the ratios so that the total ratio is 100%.
The project ratio is less than the size of PLC data.	This is displayed if the set project ratio is less than the storage size of PLC data.	Format the PLC data storing the project ratio or set the ratio larger than the size of the PLC data.
All execution projects are turned off.	This is displayed if all execution projects are turned off.	Turn on at least one of the execution projects.
Execution projects are set with the same execution sequence number.	This is displayed if used projects are set with the same execution sequence number.	Set each used project with a different execution sequence number.

7.15.5.10 Closing the Project Settings Screen

Use any of the following methods to close the project settings screen.

Methods to close the screen
Press the [SET] menu key to complete the project settings without errors.
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.15.6 Device Settings Screen

7.15.6.1 Outline

This enables the number of devices used in multiple projects to be set.

Please set the number of the device to be used for each project.

	01	02	03	04	05	06	COMMON	TOTAL	REMAIN
M	20480	20480	20480	20480	20480	20480	0	122880	0
L	512	512	256	256	256	256	0	2048	0
B	20480	20480	18432	18432	18432	18432	0	114688	0
F	0	0	0	0	0	0	2048	2048	2048
SB	512	512	256	256	256	256	0	2048	0
V	256	256	128	128	128	128	0	1024	0
S	0	0	0	0	0	0	0	0	0
T	1024	1024	512	512	512	512	0	4096	0
ST	64	64	32	32	32	32	0	256	0
C	256	256	128	128	128	128	0	1024	0
D	2048	2048	1024	1024	1024	1024	0	8192	0
W	8192	8192	2048	2048	2048	2048	0	24576	0
SW	512	512	256	256	256	256	0	2048	0
TOTAL	15.7K	15.7K	7.6K	7.6K	7.6K	7.6K			

Navigation buttons: [Left Arrow] [SET] [CLOSE]

7.15.6.2 Screen Display Items

The following table describes the screen display items for the device settings screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	This is displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
List	This displays the number of devices and the number of common M devices set in projects.

7.15.6.3 Enabled/Disabled State of Menu Keys

The menu keys displayed on the device settings screen are always enabled.

7.15.6.4 Status during Screen Displays

The following table describes the status when displaying the device settings screen.

Item name	Operation
List	This displays the status of the number of devices for projects set in the NC.

7.15.6.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Device Settings Screen."
Maximum project No.	This sets the focus to the maximum project No. This changes the maximum project no. selection when the focus is already set.
Settings	Refer to "Configuring Device Settings."
Close	Refer to "Closing the Device Settings Screen."

7.15.6.6 Entering the Number of Devices

Rules for setting the number of devices

The following table describes the rules and precautions regarding the setting of the number of devices using the PLC Onboard.

Setting Rules and Precautions
Set the number of devices in intervals of 16 (multiples of 16).
Up to 61,440 points can be set for each device, but the number of devices cannot be set over the maximum number of all devices.
The total number of devices that can be used in one project is 29,000 words.
The total number of devices set in a project cannot be changed.
Changing the number of devices clears the number of common M devices.
The number of devices can be set to projects that are not used, but this decreases the number of devices that can be set for used projects.

Entering the number of devices

1. Use the cursor keys to move the position to set the number of devices.
2. Press the [INPUT] key to display the device number entry field at the bottom of the list and move the focus.



3. Enter the number of devices in accordance with the previously described rules and precautions, and then press the [INPUT] key. Press the INPUT key to close the device number entry field. The entered number of devices displays at the cursor position in the list.

Enter the number of common M devices

1. Use the cursor keys to move the position to set the number of common devices.
2. Press the [INPUT] key to display the common device number entry field at the bottom of the list and move the focus.



3. Enter the number of common devices and press the [INPUT] key. Press the INPUT key to close the common device number entry field. The entered number of common devices displays at the cursor position in the list.

7.15.6.7 Configuring Device Settings

Normal operation

1. Refer to "Entering the Number of Devices" and specify the number of devices.
2. Refer to "Entering the Number of Devices" and specify the number of common M devices.
3. Press the [SET] menu key.
4. The following message screen displays if the device settings complete without error. Closing the message screen closes the device settings screen and returns to the multiple project parameters screen.

Completed.
To enable the setting, please restart the NC.

OK

Abnormal operation

This information describes the details of error messages displayed on the device settings screen and the corrective action thereof.

Error message	Error description	Corrective action
Please set the number of devices by delimiting 16 points.	This is displayed when the number of devices is not delimited by 16.	Enter a device number that is an interval of 16.
Set the total number of devices per project to 29,000 words or less.	This is displayed when the total number of devices per project is over 29,000 words.	Enter the device numbers so that the total number of devices per project is less than 29,000 words.
The maximum number of devices that can be set is 60,000.	This is displayed when there are areas where the number of devices entered is more than 60,000.	Enter a number of devices that is less than 60,000.

7.15.6.8 Closing the Device Settings Screen.

Use any of the following methods to close the device settings screen.

Methods to close the screen

Press the [SET] menu key to complete the device settings without errors.

Press the [CLOSE] menu key.

Press the left arrow key.

Press the [ESC] key on the soft keyboard.

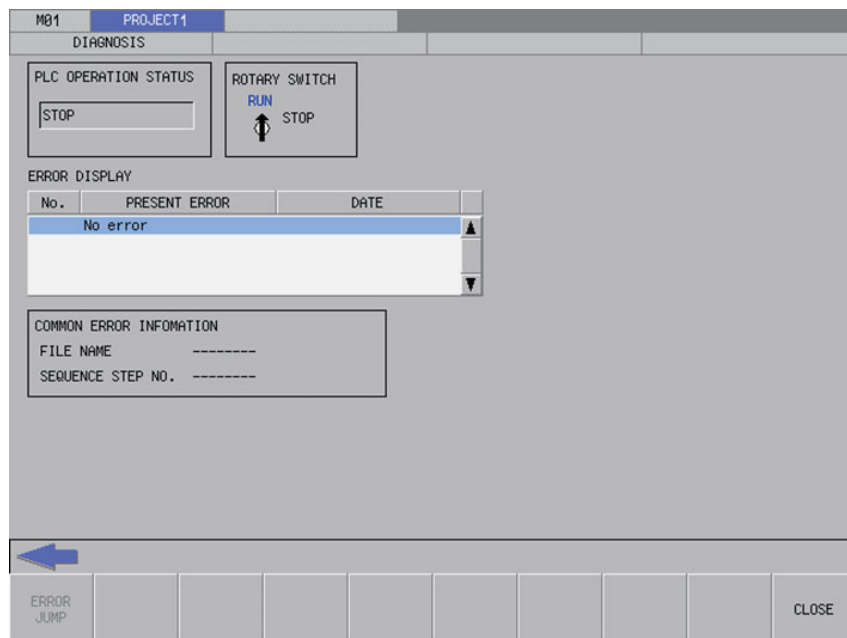
7.16 PLC Diagnosis Menu

7.16.1 PLC Diagnosis Screen

7.16.1.1 Outline

This displays the details of error that occur when executing sequence programs.

Refer to "Peripheral Development Environment Description: Checking PLC Alarms on the CNC Controller" for details on errors.



7.16.1.2 Screen Display Items

The following table describes the screen display items for the PLC diagnosis screen.

Item name	Display state
Connected NC name	This displays the name of the connected NC.
Current project No.	This displays the current project number.
Current project label	This displays the project label.
Alarm messages	Alarm messages are displayed when alarms occur.
Left arrow key	This is displayed when enabled.
Soft keyboard	This is displayed only when parameters are enabled.
Rotary switch	This displays the status of the "CS2" rotary switch on the NC device body.
PLC operation status	This displays the PLC operation status of the currently used project.
Error display	This displays information on errors that occurred with the currently used project.
Common error information	This displays detailed information on errors that occurred with the project selected in the error information.

7.16.1.3 Enabled/Disabled State of Menu Keys

The following table describes the conditions upon which menu keys displayed on the program settings screen are enabled/disabled. The menu keys which are not described in the following table are always enabled.

Menu name	Condition upon which it is enabled/disabled
Error jump	This is enabled when an error occurs with a sequence program and the sequence step No. that generated the error is known.

7.16.1.4 Status during Screen Displays

The following table describes the status when displaying the PLC diagnosis screen.

Item name	Operation
Rotary switch	This displays the current status of the rotary switch.
PLC operation status	This displays the PLC operation status of the currently used project.
Error display	This displays information on errors that occurred with the currently used project.
Common error information	This displays detailed information on errors that occurred with the project selected in the error information.

7.16.1.5 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the PLC Diagnosis Screen."
Error jump	Refer to "Error Jump."
Close	Refer to "Closing the PLC Diagnosis Screen."

7.16.1.6 Rotary Switch Status

This displays the status of the "CS2" rotary switch on the NC device body. The display changes depending on the status of the "CS2" rotary switch as illustrated in the following diagram.

- When 0 (normal)



- When 1 (PLC is not running)



7.16.1.7 Error Display

This displays the project number, error number, type of error, date and time the error occurred (hour, minute, seconds), file name, sequence step number, and the parameter number.

This displays "-----" for errors in which the file name, sequence step number, and parameter number are unknown.

The date is displayed using 4 digits according to the Western calendar. (2000-2099)

7.16.1.8 Error Jump

This jumps to the step in the ladder program shown in the common error information regarding the current error. If the project in which the error occurred is different from the current project, this changes the connected project and then opens the ladder screen.

If the error jump cannot be performed, perform the corrective action steps according to the "PLC Alarm List."

7.16.1.9 Closing the PLC Diagnosis Screen

Use any of the following methods to close the PLC diagnosis screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.17 Soft Keyboard

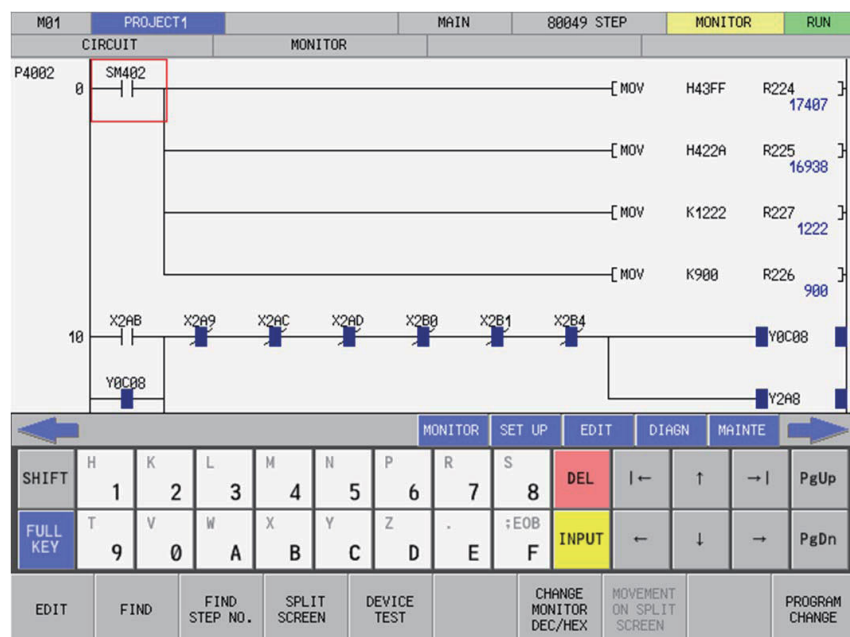
7.17.1 Outline

A soft keyboard is placed on the screen of touch panel display devices to enable operation by the user.

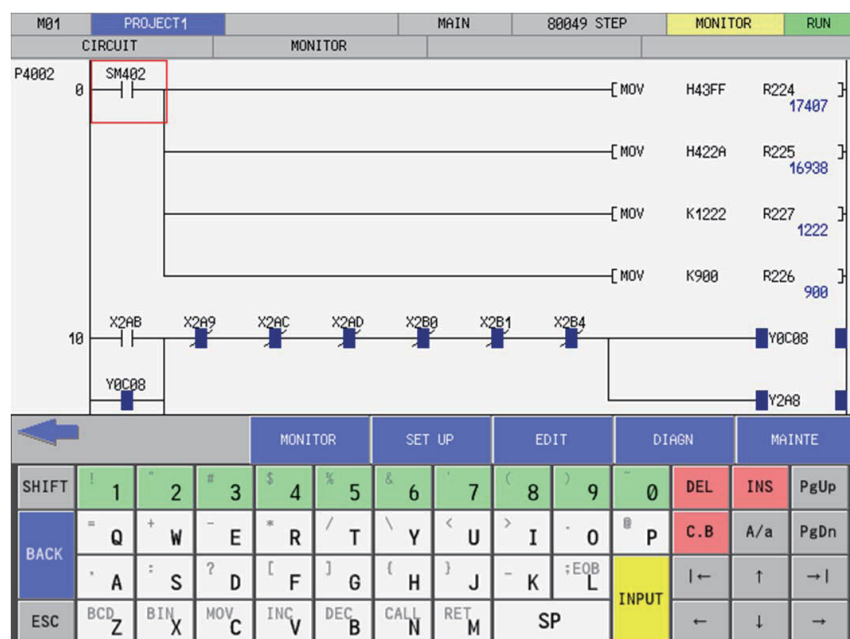
A 2-row keyboard is displayed for normal use. The 2-row keyboard displays quick keys intended for entering step numbers and devices.

A 4-row keyboard displays when it is necessary to enter commands and text strings. Menu keys are not displayed when the 4-row keyboard is displayed.

- 2-row keyboard display



- 4-row keyboard display



7.17.2 Description of Keys

7.17.2.1 Alphanumeric Keys, Symbol Keys

Key	Operation
	The entry of each character key is displayed in the corresponding input parameter. Enabling the Caps mode allows switching between uppercase and lowercase English letters (same as a normal keyboard).
	Pressing the [Shift] key plus some character key issues the corresponding control.

7.17.3 Special Keys

Key	Operation
	Pressing the [Enter] key issues the command to the corresponding input parameter.
	Pressing the [ESC] key issues the command to the corresponding input parameter.
	Turns the keyboard CapsLock on. Pressing this again turns CapsLock off. CapsLock is disabled while pressed. (lower case input) CapsLock is enables when released. (uppercase input)
	Sets the keyboard to the Shift mode so that the key to the upper-left of keys can be input. Pressing again or entering one character cancels the Shift mode. Pressing [Ctrl] does not cancel the Shift mode. Pressing Ctrl+Shift+some other key issues the key code corresponding to the combination of Ctrl and the key. Shift mode is enabled by being pressed. Shift mode is disabled by being released.
	Pressing the [Page Up] key issues the command to the corresponding input parameter.
	Pressing the [Page Down] key issues the command to the corresponding input parameter.

Key	Operation
	This changes the input mode from overwrite to insert and from insert to overwrite. Pressing the [Insert] key issues the command to the corresponding input parameter.
	This deletes one character before the cursor. Pressing the [Delete] key issues the command to the corresponding input parameter.
	This deletes all data input into the corresponding parameter. Pressing the [Shift + Home] keys issues the command to the corresponding input parameter.
	These move the cursor. Press the cursor keys issues the command to the corresponding input parameter.
	Pressing the TAB key issues the command to the corresponding input parameter.
	Pressing the Shift + TAB keys issues the command to the corresponding input parameter.
	This switches from the PLC Onboard to the operation screen in the Mitsubishi Standard Display.
	This switches from the PLC Onboard to the set up screen in the Mitsubishi Standard Display.
	This switches from the PLC Onboard to the edit screen in the Mitsubishi Standard Display.
	This switches from the PLC Onboard to the diagnosis screen in the Mitsubishi Standard Display.
	This switches from the PLC Onboard to the maintenance screen in the Mitsubishi Standard Display.

* The operation of each key must be supported by the processing performed for the corresponding input parameter.
If not supported, there is no resulting operation from pressing these buttons.

* Only the cursor keys, the Tab key, the reverse Tab key, the Pg Up key, and the Pg Dn key can issue repeatedly by pressing and holding the keys.

7.18 Canceling File Passwords

7.18.1 Outline

There are two methods to cancel file passwords: canceling with menu keys (password cancellation menu) and canceling when accessing files.

* Refer to "NC File Operation Menu: Cancel Password Popup Screen" for information on canceling passwords with menu keys.

The screen for canceling passwords when accessing files displays when the file access attribute matches the password attribute due to key operation.

* Refer to "PLC Data: PLC Data File Passwords" for more information.

Operation	Registered attribute		Displayed password cancellation screen
	Writes not allowed	Reads and writes not allowed	
NC File Operation Menu			
Open (Opened screen display) → Open	No	Yes	List cancellation
File operation (file operation screen display)			
Delete data (delete data popup display) → Delete	Yes	Yes	Single deletion
Rename data (rename data popup display) → Change	Yes	Yes	Single deletion
Cancel password	Not applicable		List cancellation
External file operation menu			
External -> NC (External -> NC screen display) → Execute	Yes	Yes	List cancellation
NC -> External (NC -> External screen display) → Execute	No	Yes	List cancellation
Verify external file (verify external file screen) → Execute	No	Yes	Single deletion
Cancel password	Not applicable		List cancellation
Ladder edit menu			
Ladder edit (ladder screen) → Edit → Convert ladder	Yes	Yes	Single deletion
Starting PLC Onboard with single project settings	Not applicable		Not displayed
Changing projects with multiple project settings	Not applicable		Not displayed

7.18.2 Canceling Individual File Passwords

7.18.2.1 Screen Display Items

The following table describes the screen display items for the cancel individual file password screen.

Item name	Display state
Password	Enter the password. Entered passwords are displayed using asterisks. Input range: 4 single-byte alphanumeric characters

7.18.2.2 Enabled/Disabled State of Menu Keys

The menu keys displayed on the cancel individual file passwords screen are always enabled.

7.18.2.3 Status during Screen Displays

The following table describes the status when displaying the cancel individual file passwords screen.

Item name	Operation
Password	This is the default focus position when the screen is displayed. This is left blank.

7.18.2.4 Operation of Key Presses

The following table describes the operation of each menu key and the keys on the NC keyboard when pressed.

Item name	Operation
Left arrow key	Refer to "Closing the Cancel Individual File Passwords Screen."
Execute	Refer to "Canceling Passwords."
Close	Refer to "Closing the Cancel Individual File Passwords Screen."

7.18.2.5 Canceling Passwords

Normal operation

1. Enter the password.
2. Press the [EXECUTE] menu key.

Pressing the menu key closes the password cancellation screen and continues with the original process.

Abnormal operation

This information describes the details of error messages displayed when entering passwords and pressing the [EXECUTE] menu key and the corrective action thereof.

Error message	Error description	Corrective action
Invalid Password. Enter correct password.	This is displayed when the [EXECUTE] menu key is pressed after entering an incorrect password.	The file for which an incorrect password was entered is displayed again. Enter the correct password and then press the [EXECUTE] menu key again.

7.18.2.6 Closing the Cancel Individual File Passwords Screen

Use any of the following methods to close the cancel individual file passwords screen.

Methods to close the screen
Press the [CLOSE] menu key.
Press the left arrow key.
Press the [ESC] key on the soft keyboard.

7.18.3 Canceling Batch File Passwords

Refer to "NC File Operation Menu: Cancel Password Popup Screen" for more information on canceling batch file passwords.

Appendix 1

Comparison of PLC Related Sections in Each Model

Appendix 1.1 Device Comparison

Table 1.1 List of device differences (Machining center system)

		M7 Series Device range		M8 Series Device range	
X		X0 to X1FFF	8192 points	X0 to X1FFF	8192 points
Y		Y0 to Y1FFF	8192 points	Y0 to Y1FFF	8192 points
M		M0 to M10239	10240 points	M0 to M61439	61440 points
L		L0 to L511	512 points	L0 to L1023	1024 points
F		F0 to F1023	1024 points	F0 to F2047	2048 points
SB		SB0 to SB1FF	512 points	SB0 to SB3FF	1024 points
B		B0 to B1FFF	8192 points	B0 to BDFFF	57344 points
SM		SM0 to SM1023	1024 points	SM0 to SM2047	2048 points
V		V0 to V255	256 points	V0 to V511	512 points
SW		SW0 to SW1FF	512 points	SW0 to SW3FF	1024 points
SD		SD0 to SD1023	1024 points	SD0 to SD2047	2048 points
T		T0 to T703	704 points	T0 to T2047	2048 points
ST		ST0 to ST63	64 points	ST0 to ST127	128 points
C		C0 to C255	256 points	C0 to C511	512 points
D		D0 to D2047	2048 points	D0 to D4095	4096 points
R		R0 to R32767	32768 points	R0 to R32767	32768 points
ZR		Unsupported		ZR0 to ZR13311	13312 points
W		W0 to W1FFF	8192 points	W0 to W2FFF	12288 points
Z		Z0 to Z13	14 points	Z0 to Z13	14 points
N		N0 to N7	8 points	N0 to N14	15 points
P		P0 to P2047 P4000 to P4005	2048 points	P0 to P4095	4096 points
K	16-bit command	K-32768 to K32767		K-32768 to K32767	
	32-bit command	K-2147483648 to K2147483647		K-2147483648 to K2147483647	
H	16-bit command	H0 to HFFFF		H0 to HFFFF	
	32-bit command	H0 to HFFFFFFFF		H0 to HFFFFFFFF	

Appendix 2

List of PLC Alarms

PLC diagnosis for each CNC PLC alarm, as well as the error details, causes and remedies are provided below.

NC alarm display (M8 Series)				NC operating status	PLC diagnosis				
Message	Level	Sub-status			Error code SD0	Diagnosis display character string	File name	Step No.	
		1	2						
U01 No user PLC	ALM (Red)	-	-	Emergency stop (S/W EMG)	-	-	-	-	
U10 Illegal PLC (User PLC is illegal) "xx" in the lower 16 bits of the sub-status 1 indicates the program No. The sub-alarm No. "yy" of sub- status 1 indicates the project No. ("yy" is not displayed when the maximum number of projects is 1)	ALM (Red)	0x04xx	Number of steps	Emergency stop (S/W EMG)	4	S/W INT. ERR	○	○	
	ALM (Red)	0x100*	-	Emergency stop (S/W EMG)	10	H/W ERR			
	ALM (Red)	0x110*	-	Emergency stop (S/W EMG)	11	PLC SYS INIT ERR			
	ALM (Red)	0x20xx.yy	Number of steps	Emergency stop (S/W EMG)	20	JUMP LABEL ERR	○	○	
	ALM (Red)	0x21xx.yy	Number of steps	Emergency stop (S/W EMG)	21	DUP. LABEL(P)	○	○	
	ALM (Red)	0x22xx.yy	-	Emergency stop (S/W EMG)	22	LOCAL LABEL OVER	○		
	ALM (Red)	0x230*.yy	-	Emergency stop (S/W EMG)	23	LABEL PARA. ERR			
	ALM (Red)	0x24xx.yy	Number of steps	Emergency stop (S/W EMG)	24	RSV. LABEL ERR	○	○	
	ALM (Red)	0x25xx.yy	-	Emergency stop (S/W EMG)	25	PRG. PARA. ERR	○		
	ALM (Red)	0x26xx.yy	-	Emergency stop (S/W EMG)	26	MISSING RET INS.	○		
	ALM (Red)	0x27xx.yy	Number of steps	Emergency stop (S/W EMG)	27	LAD. CODE ERR	△	△	

	Error Contents and Cause	Remedy
	No sequence program is included in the built-in ROM or temporary memory area. (1) Sequence program is not stored in the built-in ROM. (2) Sequence program is not written from the GX Developer or internal PLC edit function. (3) Sequence program cannot be read due to broken built-in ROM. (4) No large capacity PLC option.	(1) Write the sequence program from the GX Developer or internal PLC edit function, and then execute the built-in ROM writing. (2) Check the large-capacity PLC option and reconsider the size that can be stored. (3) If (1) or (2) does not solve the problem, there is a possibility that built-in ROM is broken.
	Software instruction interruption illegal An error was found in data for the sequence program in execution. (1) Sequence program stored in the built-in ROM is broken. (2) Sequence program under development (before writing into F-ROM) is broken.	Contact Mitsubishi.
	A H/W error was detected during the PLC execution.	Contact Mitsubishi.
	The PLC system execution preparation failed.	Contact Mitsubishi.
	Label branching error (Before executing PLC) Occurs only when the bit selection parameter (#6452 bit6) "branch destination label check valid" is set to "1". (1) The CJ and CALL instructions were placed to a nonexistent label. (2) The CJ instruction was placed to the global label. (Branching is possible only with the CALL instruction.)	Check the branch destination of the CJ and CALL instructions existing in the steps occurred.
	Label duplication error (Before executing PLC) (1) When using the multi-programming method: - Global labels are duplicated - Local labels are duplicated within the same file (2) When using the independent program method, labels are duplicated.	Correct the duplication of the labels existing in the steps occurred.
	Local label over (Before executing PLC) The boundary value set with the PC parameter (global label boundary value) has been exceeded by the total number of local labels.	(1) Reduce the number of local labels used. - Use as sequentially as possible from P0. (2) Reset the PC parameter (global label boundary value).
	Global label boundary value error (Before executing PLC) The content of PC parameter (global label boundary value) is not normal. (1) When using the multi-programming method, a value greater than the maximum value is set. (2) When using the independent program method, the global label boundary value is set.	(1) When using the multi-programming method, correct the global label boundary value to an appropriate value. (2) When using the independent program method, delete the global label boundary value.
	Reserved label error (Before executing PLC) (1) When using the multi-programming method, disabled reserved label exists. (2) When using the independent program method, reserved labels are duplicated.	(1) When using the multi-programming method, delete the reserved label. (2) When using the independent program method: - Delete the PC parameter program settings. - Correct the duplication of reserved labels.
	Program setting error (Before executing PLC) (1) When using the multi-programming method, PC parameter setting is not correct. - PC parameter (program setting) is not set. - Unstored program name is set. - The contents of the program name is abnormal. - More than the maximum number of programs that can be set (120 programs) are set (2) When using the independent program method, multiple programs are stored. (3) When the multi-project is valid, the sum of all projects exceeds the number of the programs which can be set (120 programs).	(1) When using the multi-programming method, check the PC parameter program settings. - Check the program settings. - Check the program name stored in the NC. - Review the program name and rename it if necessary. e.g. The program name and the M device number in the PLC program are overlapped. - Set the number to 120 or less. (2) When using the independent program method: - Store only one program file. (3) When the multi-project is valid, set the number of programs that can be set to be less than 120 programs as the sum of all projects.
	RET instruction error (1) RET instruction was not executed at the branch destination of the CALL instruction. (2) RET instruction was executed without execution of CALL instruction.	Check the following matters for the entire sequence program to be executed. (1) Check if RET instruction is programmed at the end of sub-routine (2) Check if diverged to the other operation in the middle of sub-routine and RET instruction is not executed. (3) Check if jumped to the END reservation label (P4005) in the middle of sub-routine. (4) Check if there is delimiter (FEND instruction) between adjacent program and sub-routine program.
	Ladder code error (Before executing PLC) An error was found in data for the sequence program to be executed. (1) Disabled PLC instruction is used. (2) Sequence program stored in the built-in ROM is broken. (3) Sequence program under development (before writing into the built-in ROM) is broken.	Transferring, storing and F-ROM writing of the sequence program must be re-executed with the GX Developer or PLC onboard edit function.

NC alarm display (M8 Series)				NC operating status	PLC diagnosis				
Message	Level	Sub-status			Error code SD0	Diagnosis display character string	File name	Step No.	
		1	2						
U10 Illegal PLC (User PLC is illegal) "xx" in the lower 16 bits of the sub-status 1 indicates the program No. The sub-alarm No. "yy" of sub-status 1 indicates the project No. ("yy" is not displayed when the maximum number of projects is 1)	ALM (Red)	0x280*	-	Emergency stop (S/W EMG)	28	MISSING LAD(M)			
	ALM (Red)	0x29xx.yy	-	Emergency stop (S/W EMG)	29	EXE. AREA OVER	○		
	ALM (Red)	0x30xx.yy	Number of steps	Emergency stop (S/W EMG)	30	FOR INS. OVER	○	○	
	ALM (Red)	0x31xx.yy	Number of steps	Emergency stop (S/W EMG)	31	NEXT INS. ERR	△	△	
	ALM (Red)	0x32xx.yy	Number of steps	Emergency stop (S/W EMG)	32	BREAK INS. ERR	○	○	
	ALM (Red)	0x400*	-	Emergency stop (S/W EMG)	40	PLC SYSTEM DOWN			
	ALM (Red)	0x500*	-	Emergency stop (S/W EMG)	50	MLT PRJ NUM ILL			
	ALM (Red)	0x510*	-	Emergency stop (S/W EMG)	51	PRJ RATE PRM ILL			
	ALM (Red)	0x520*	-	Emergency stop (S/W EMG)	52	LAD TMP AREA OVR			
	ALM (Red)	0x530*	-	Emergency stop (S/W EMG)	53	LAD ROM AREA OVR			
	ALM (Red)	0x540*	-	Emergency stop (S/W EMG)	54	COM AREA OVR			
	ALM (Red)	0x550*	-	Emergency stop (S/W EMG)	55	MLT EXE-TYPE ILL			
	ALM (Red)	0x560*	-	Emergency stop (S/W EMG)	56	MLT EXE-NO ILL			
	ALM (Red)	0x570*	-	Emergency stop (S/W EMG)	57	COM DEV PARA ILL			

Error Contents and Cause	Remedy
No main processing ladders (Before executing PLC) Main processing program to be executed cannot be identified. (1) When using the multi-programming method, main processing "scan" is not set in the PC parameter (program setting). (2) When using the independent program method, no reservation ladder for the main processing ladder is available.	(1) When using the multi-programming method, check the PC parameter program settings. (2) When using the independent program method, add the reservation label (P4002) for the medium speed ladder.
Execution area over (Before executing PLC) The total number of steps for the ladder to be executed has exceeded the size of PLC processor execution area.	Check the PC parameter (program setting) and set so that the total number of steps for the ladder to be executed does not exceed the PLC processor execution area.
FOR instruction nesting over 17th level of nesting for FOR instruction was executed.	Check the number of FOR instruction's nestings in the steps generated, and keep the number to 16 or less.
NEXT instruction error (1) NEXT instruction was executed before FOR instruction. (2) After FOR instruction, END(FEND) was executed before NEXT instruction.	(1) Check the NEXT instruction existing in the number of steps generated and correct. (2) Check the ladder circuit of the program No. generated and correct. (Note that the number of steps at the error position is displayed as "0".) - Check if JMP,CALL,CJ instructions were executed between FOR and NEXT instruction, and NEXT instruction was jumped. - Check if FOR instruction and NEXT instruction are all paired.
BREAK instruction error BREAK was executed outside the range between FOR and NEXT instruction.	Check the BREAK instruction existing in the step generated and correct.
PLC system error	Contact Mitsubishi.
Maximum project No. illegal (at PLC system startup) Multi-project parameter setting is illegal (due to the following reason). - The value outside the setting range (1 to number of usable project) was detected.	(1) Check the expansion project option and reconsider the setting range. (2) The multi-project parameter (maximum project No.) setting is illegal. Set the multi-project parameter again. (3) If (1) or (2) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.
Project ratio illegal Multi-project parameter setting is illegal (due to the following reason). - It was detected that the total of ratios of all projects was outside the range from 0 to 100.	(1) The multi-project parameter (project ratio) setting is illegal. Set the multi-project parameter again. (2) If (1) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.
Temporary memory area over (at the PLC system startup) Multi-project parameter setting is illegal (due to the following reason). - The ratio to which the area after the project ratio setting is smaller than the size of ladder stored in the temporary memory area was detected.	(1) Check the large-capacity PLC option and reconsider the size that can be stored. (2) The multi-project parameter (project ratio) setting is illegal. Set the multi-project parameter again. (3) If (1) or (2) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.
Built-in ROM area over (at the PLC system startup) Multi-project parameter setting is illegal (due to the following reason). - The ratio to which the area after the project ratio setting is smaller than the size of ladder stored in the built-in ROM area was detected.	(1) Check the large-capacity PLC option and reconsider the size that can be stored. (2) The multi-project parameter (project ratio) setting is illegal. Set the multi-project parameter again. (3) If (1) or (2) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.
Comment area over (at the PLC system startup) Multi-project parameter setting is illegal (due to the following reason). - The ratio to which the area after the project ratio setting is smaller than the size of comment and message stored in the built-in ROM area.	(1) The multi-project parameter (project ratio) setting is illegal. Set the multi-project parameter again. (2) If (1) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.
Execution project illegal (at the PLC system startup) Multi-project parameter setting is illegal (due to the following reasons). - The value outside the setting range (ON/OFF) was detected. - All execution projects are OFF.	(1) The multi-project parameter (execution project) setting is illegal. Set the multi-project parameter again. (2) If (1) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.
Project execution order illegal (at the PLC system startup) Multi-project parameter setting is illegal (due to the following reasons). - The value outside the setting range (1 to 6) was detected. - The redundant project execution order number was detected.	(1) The multi-project parameter (project execution order) setting is illegal. Set the multi-project parameter again. (2) If (1) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.
Parameter setting illegal for the number of common device points (at PLC system startup) Multi-project parameter setting is illegal (due to the following reasons). - The value outside the setting range (0 to the minimum number of points in all projects) was detected. - It was detected that the number of points was not a multiple of 16.	(1) Check the expansion project option, reconsider the setting range. (2) The multi-project parameter setting is illegal. Set the multi-project parameter again. (3) If (1) or (2) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.

NC alarm display (M8 Series)				NC operating status	PLC diagnosis				
Message	Level	Sub-status			Error code SD0	Diagnosis display character string	File name	Step No.	
		1	2						
U10 Illegal PLC (User PLC is illegal) "xx" in the lower 16 bits of the sub-status 1 indicates the program No. The sub-alarm No. "yy" of sub-status 1 indicates the project No. ("yy" is not displayed when the maximum number of projects is 1)	ALM (Red)	0x580*.yy	-	Emergency stop (S/W EMG)	58	DEV NUM PARA ILL			
	WNG (Yellow)	0x700*.yy	-	PLC RUN	70	RUNWRT ILL. MODE			
	WNG (Yellow)	0x71xx.yy	Number of steps	PLC RUN	71	RUNWRT CPOINT(F)	○	○	
	WNG (Yellow)	0x720*	-	PLC RUN	72	RUNWRT SIZOVR(F)			
	WNG (Yellow)	0x730*.yy	-	PLC RUN	73	RUNWRT LLABEL(F)			
	WNG (Yellow)	0x80xx.yy	Number of steps	PLC RUN	80	EXC.INT(BCD)	○	○	
	WNG (Yellow)	0x81xx.yy	Number of steps	PLC RUN	81	EXC.INT(BIN)	○	○	
	ALM (Red)	0x82xx.yy	Number of steps	Emergency stop (S/W EMG)	82	EXC.INT(D-BUS)	△	△	
	ALM (Red)	0x83xx.yy	Number of steps	Emergency stop (S/W EMG)	83	EXC.INT(INST.)	△	△	
	ALM (Red)	0x84xx.yy	Number of steps	Emergency stop (S/W EMG)	84	EXC.INT(I-FMT)	△	△	
	ALM (Red)	0x85xx.yy	Number of steps	Emergency stop (S/W EMG)	85	EXC.INT(I-BUS)	△	△	
	ALM (Red)	0x86xx.yy	Number of steps	Emergency stop (S/W EMG)	86	EXC.INT(CALL)	△	△	
	ALM (Red)	0x8Bxx.yy	Number of steps	Emergency stop (S/W EMG)	91	EXC.INT(A-BUS)	△	△	
U50 Ladder stopped	WNG (Yellow)	-	-	Emergency stop (S/W EMG)	-	-	-	-	

	Error Contents and Cause	Remedy
	Parameter setting illegal for number of device points (at PLC system startup) (1) The parameter setting for the number of device points is illegal (due to the following reasons). - The total number of points in one project 29K or more was set. - The illegal value (-1 point or less, or 61441 points or more) for the number of device points was detected. - It was detected that the number of device points was not a multiple of 16. - The number outside the usable number of device points in whole projects was detected.	(1) The parameter setting for the number of device points is illegal. Set the parameter of the number of device points again and reboot the system. (2) If (1) does not solve the problem, there is a possibility that the NC system is broken. Contact Mitsubishi.
	Caution; Ladder program writing during RUN is disabled (In independent program method) With RUN write ON, sequence program is operated in independent program method. Run write is not available with this condition.	The ladder program writing (RUN write) can not be used in independent program method. Disable RUN write, or change the method into multi-program one.
	Caution; Ladder program writing during RUN is disabled (common pointer is used in high-speed processing) With RUN write is ON, high-speed program with common pointer is running. RUN write is not available with this condition.	RUN write is not available when high-speed processing with common pointer is running. Change the high-speed processing program to the one without common pointer.
	Caution; Ladder program writing during RUN is disabled (high-speed processing size is exceeding) With RUN write ON, the execution size of high-speed processing program has exceeded 4000 steps. RUN write is not available with this condition.	RUN write is not available when execution size of high-speed processing program exceeds 4000 steps. Edit the high-speed processing program to reduce the execution size to 4000 steps or less. (When multi-project is valid, edit the program to reduce the execution size to 4000 steps or less in total of all the project.)
	Caution; Ladder program writing during RUN is disabled (number of labels in high-speed processing is beyond the capacity) With RUN write ON, the number of local labels in high-speed processing program has exceeded 256. RUN write is not available with this condition.	RUN write is not available when the number of local labels in high-speed processing program exceeds 256. Edit the high-speed program to reduce the number of local labels to less than 256. (When multi-project is valid, edit the program to reduce the number of local labels to less than 256 per project.)
	Software exceptional interruption (BCD instruction error) has occurred. With BCD and DBCD instructions, BIN value outside its input range was attempted to be converted into BCD.	Check the usage of BCD, DBCD instructions existing in the steps occurred.
	Software exceptional interruption (BIN instruction error) has occurred. With BIN and DBIN instructions, BCD value outside its input range was attempted to be converted into BIN.	Check the usage of BIN, DBIN instructions existing in the steps occurred.
	Software exceptional interruption (Bus error) has occurred.	Contact Mitsubishi.
	Software exceptional interruption (Unmounted instruction error) has occurred. (1) When the bit selection parameter (#6452 bit6) "branch destination label check valid" is set to "0", jumped to an undefined label. (2) Sequence program in execution is broken.	(1) Set the bit selection parameter (#6452 bit6) "branch destination label check valid" to "1" and check the branching step to the undefined label. (2) Contact Mitsubishi.
	Software exceptional interruption (Instruction format error) has occurred.	Contact Mitsubishi.
	Software exceptional interruption (Instruction bus error) has occurred. (1) When the bit selection parameter (#6452 bit6) "branch destination label check valid" is set to "0", jumped to an undefined label. (2) Sequence program in execution is broken.	(1) Set the bit selection parameter (#6452 bit6) "branch destination label check valid" to "1" and check the branching step to the undefined label. (2) Contact Mitsubishi.
	Software exceptional interruption (CALL/RET instruction error) has occurred.	Contact Mitsubishi.
	Software exceptional interruption (ASYNC BUS error) has occurred.	Contact Mitsubishi.
	The ladder is stopped.	RUN the PLC

Revision History

Date of revision	Manual No.	Revision details
May. 2015	IB(NA)1501270-A	First edition created.
Sep. 2015	IB(NA)1501270-B	The descriptions were revised corresponding to S/W version A4 of Mitsubishi CNC M800/M80 series. The following chapters were added/revised. - 6.5.6 Executing Ladder Program Writing during RUN - 7.12.2.11 Ladder Program Writing during RUN by Conversion The following chapters were revised. - Appendix 2 List of PLC Alarms (Errors for ladder program writing during RUN were added.) Other mistakes were corrected.

M800/M80 Series Manual List

These contents are described in the presupposition that all functions of M8 Series are available.

Some functions or screens may not be available depending on the machine or specifications set by MTB. (Confirm the specifications before use.)

The manuals issued by MTB take precedence over these manuals.

Manual	IB No.	Purpose and Contents
M800/M80 Series Instruction Manual	IB-1501274	- Operation guide for NC - Explanation for screen operation, etc.
M800/M80 Series Programming Manual (Lathe System) (1/2)	IB-1501275	- G code programming for lathe system - Basic functions, etc.
M800/M80 Series Programming Manual (Lathe System) (2/2)	IB-1501276	- G code programming for lathe system - Functions for multi-part system, high-accuracy function, etc.
M800/M80 Series Programming Manual (Machining Center System) (1/2)	IB-1501277	- G code programming for machining center system - Basic functions, etc.
M800/M80 Series Programming Manual (Machining Center System) (2/2)	IB-1501278	- G code programming for machining center system - Functions for multi-part system, high-accuracy function, etc.
M800/M80 Series Alarm/Parameter Manual	IB-1501279	- Alarms - Parameters

Manuals for MTBs (NC)

Manual	IB No.	Purpose and Contents
M800/M80 Series Specifications Manual	IB-1501267	- Model selection - Specifications of hardware unit - Outline of various functions
M800W Series Connection and Setup Manual	IB-1501268	- Detailed specifications of hardware unit - Installation, connection, wiring, setup (startup/adjustment)
M800S/M80 Series Connection and Setup Manual	IB-1501269	- Detailed specifications of hardware unit - Installation, connection, wiring, setup (startup/adjustment)
M800/M80 Series PLC Development Manual	IB-1501270	- Electrical design - I/O relation (assignment, setting, connection), field network - Development environment (PLC on-board, peripheral development environment), etc.
M800/M80 Series PLC Programming Manual	IB-1501271	- Electrical design - Sequence programming - PLC support functions, etc.
M800/M80 Series PLC Interface Manual	IB-1501272	- Electrical design - Interface signals between NC and PLC

Manuals for MTBs (drive section)

Manual	IB No.	Contents
MDS-E/EH Series Specifications Manual	IB-1501226	- Specifications for power supply regeneration type
MDS-E/EH Series Instruction Manual	IB-1501229	- Instruction for power supply regeneration type
MDS-EJ/EJH Series Specifications Manual	IB-1501232	- Specifications for regenerative resistor type
MDS-EJ/EJH Series Instruction Manual	IB-1501235	- Instruction for regenerative resistor type
MDS-EM Series Specifications Manual	IB-1501238	- Specifications for multi-hybrid, power supply regeneration type
MDS-EM Series Instruction Manual	IB-1501241	- Instruction for multi-hybrid, power supply regeneration type
DATA BOOK	IB-1501252	- Specifications of servo drive unit, spindle drive unit, motor, etc.

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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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