HITACHI PROGRAMMABLE CONTROLLER

EH-150 EHV series
MICRO-EHV series
Ladder Programming Software
Control Editor

INSTRUCTION MANUAL

○ Replacement

There is a charge for replacement when the Control Editor Software system disk (CD) is damaged. Please contact either your supplier or the local Hitachi Distributor.
When contacting us for repair, ordering parts or inquiring about other items, please have the following details ready before contacting the place of purchase.

(1)　Model
(2)　Details of the malfunction

The content of this manual may be changed without notice.

Revision History

No.	Page	Item	Description of Revision	Date of Revision	Manual No.
1		First edition		June 2007	NJI-486(X)
2		Second edition		March 2009	NJI-537(X)
3			New modules are supported. Ethernet timeout is supported. Bugs of Ver.2.17 are fixed.	September 2009	NJI-537A(X)
	5-2	PC Communication setting	Added Ethernet timeout.		
4			Improvement of the I/O configuration window with having supported new modules. Bugs of Ver.2.18 are fixed.	December 2009	NJI-537B(X)
	3-2	I/O Configuration	Improvement of the I/O configuration window.		
5			Corresponding to Chinese. Bugs of Ver.2.30 are fixed.	March 2010	NJI-537C(X)
	8-17	Option Settings	Corresponding to Chinese.		
6			PLC Download / Upload / Verify with data memory is supported. PRJ file with data memory is supported. Bugs of Ver.2.31 are fixed.	October 2010	NJI-537D(X)
	2-19, 20	Project File	PRJ file with data memory is supported.		
	5-5 to 8	Program Up/Downloading	PLC Download / Upload / Verify with data memory is supported.		
	7-1	CPU Communication Parameters	PLC Download / Upload / Verify with data memory is supported.		
	10-5	Troubleshooting	Q16, A16, Q17, A17 are added.		
7			Multi-Comment is supported. [Note] A prj file size is upped because Multi-Comment is supported in Ver.2.41 or higher. Therefore, it takes more time than before for prj file operating and build.	April 2011	NJI-537E(X)
	2-14	Toolbar icons	Added Multi-Comment icon.		
	2-19	Project File	PRJ file with Multi-Comment is supported.		
	3-12	FL-net Parameter	Revise wrong descriptions.		
	4-16	Copy, Move and Delete of Ladder	Multi-Comment is supported.		
	4-23 to 26	Comment	Multi-Comment is supported.		
	4-27	Change I/O Addresses	Multi-Comment is supported.		
	5-6, 9	Program Up/Downloading	PLC Download / Upload / Verify with Multi-Comment is supported.		
	6-2	I/O Monitor	Revise wrong descriptions.		
	9-2 to 5	Improvement of Comment Format	Multi-Comment is supported.		
	10-6	Troubleshooting	Q18, A18 are added.		
	A1-2	Function Menu List	Added Multi-Comment.		

No.	Page	Item	Description of Revision	Date of Revision	Manual No.
8			Control Editor supports the Windows 7.	October 2011	NJI-537F(X)
	1-8	System Requirements	Windows7 is added to a support OS.		
	2-16	Toolbar icons	The explanation that does not support FBD function is added.		
	8-15	Option Settings	The explanation that does not support Range of Master Control function is added.		
	8-17	Option Settings	Folder to store an auto-save file was changed.		
	A3-1	USB Driver	Update procedure of USB driver is added.		
9			Redundant CPU module is supported.	April 2012	NJI-537G(X)
	1-7	Instruction Manual	Illustration of redundant system module was added.		
	1-8	System Requirements	Windows XP (SP2) --> Windows XP (SP2 or higher)		
	1-12	Control Editor and LADDRE EDITOR for Windows®	LADDER EDITOR --> LADDER EDITOR for Windows® Support CPU module was changed. File saving of I/O monitor table was changed.		
	1-13	Version	Wrong descriptions were revised.		
	2-6	Window Structure	Wrong descriptions were revised.		
	2-8	Project Tree	Fig. 2.4.1 Project tree was changed. Wrong descriptions were revised.		
	2-18	I/O List	In illustration of "*4 Text string", number of the word I/O was corrected.		
	3-7	Operation Parameters	*3 were added.		
	3-10	Link Parameter	Illustration of "Clear at RUN/STOP" was changed.		
	4-4	Input Symbols	Illustration of "Fig. 4.1.10" was changed.		
	4-21	Comments	Illustration of "Reference 1" was changed.		
	4-31	Auto Programming	"Note 4" was deleted.		
	4-34	Find contact <=> Coil	Wrong descriptions were revised. Fig. 4.10.2 was added.		
	5-8	Program Up/Downloading	Wrong descriptions were revised.		
	6-3	I/O Monitor	Wrong descriptions were revised.		
	6-4	Set and Reset	Wrong descriptions were revised.		
	6-8	CPU Status	CPU Status of EHV-CPR128 was added to Fig. 6.7.1. Fig. 6.7.4 and Fig. 6.7.5 was added.		
	7-2	CPU Communication Parameters	Wrong descriptions were revised. "Note" was added.		
	7-7	Ethernet Port Setting	Illustration of "Port" was changed.		
	9-5	Improvement of Comment Format	Illustration of the priority of the I/O comment was changed.		
	A1-2	Function Menu List	Wrong descriptions were revised.		
10			MICRO-EHV and USB driver for 64-bit Windows 7 are supported.	January 2013	NJI-537H(X)
	1-1	Introduction	The description of MICRO-EHV was added.		
	1-2	Features of Control Editor	The description of MICRO-EHV was added.		
	1-7	Instruction Manual	The description of MICRO-EHV related manuals was added on Table 1.3.1.		
	1-8	System Requirements	The description of support OS on Table 1.4.1 was changed.		
	1-12	Control Editor and LADDRE EDITOR for Windows®	The item of Support unit was added on Table 1.6.1.		
	1-13	Version	The description of Ver.4.02 was added on Table 1.7.1.		
	2-2	Startup	The description of creating new project was changed. NOTE was added.		
	2-4	File Handling	The description of the setting range on the cyclic program about MICRO-EHV was added.		
	2-5	File Handling	The description of OBC export / import was added.		
	2-7	Window Structure	Fig. 2.3.2 was changed. The item of Input / Output refresh disabled was added on Table 2.3.1. Table 2.3.3 was added.		
	2-10	Project Tree	Fig. 2.4.2 was added.		
	2-12	Toolbar icons	The description of OBC export / import was added on Table 2.5.1.		
	2-13	Toolbar icons	The description of Usable I/O on MICRO-EHV was added on Table 2.5.1.		
	2-14	Toolbar icons	The description of Usable I/O on MICRO-EHV was added on Table 2.5.1.		
	2-16	Toolbar icons	The description of Input / Output refresh disabled was added on Table 2.5.1.		

No.	Page	Item	Description of Revision	Date of Revision	Manual No.
10	2-17	Toolbar icons	The description of Modbus-TCP/RTU, Option board settings was added on Table 2.5.1.	January 2013	NJI-537H(X)
	2-20	I/O List	The description of MICRO-EHV was added.		
	2-22	Project File	The description of MICRO-EHV was added.		
	2-23	Project File	The description of MICRO-EHV was added on Table 2.7.1.		
	2-24	Project File	The description of OBC file was added.		
	3-1	Before Programming	The description of MICRO-EHV was added.		
	3-3	I/O Configuration	The description of MICRO-EHV was added.		
	3-4	I/O Configuration	Special I/O configuration for MICRO-EHV was added.		
	3-6	Retentive area	The description of MICRO-EHV was added on Note.		
	3-10	Operation Parameters	The description of MICRO-EHV was added.		
	3-12	Link Parameter	The description that MICRO-EHV doesn't support link modules was added.		
	3-14	FL-net Parameter	The description that MICRO-EHV doesn't support FL-net modules was added.		
	4-21	Comments	The description of MICRO-EHV was added.		
	4-26	Comments	The description of MICRO-EHV was added.		
	5-2	PC Communication Setting	The description of MICRO-EHV was added.		
	5-3	CPU Initialization and Release Occupation	Modbus-TCP/RTU was added on Table 5.3.1.		
	5-11	Online change in RUN	The description of (2) Online change in RUN of Comments was changed. The description of Note was changed.		
	5-13	Online change in RUN	The description of MICRO-EHV was added.		
	5-14	Online change in RUN	The description of MICRO-EHV was added on Table 5.5.2.		
	5-15	Online change in RUN	The description of MICRO-EHV was added on Reference.		
	5-16	Online change in RUN	The description of Special I/O settings was added on Table 5.5.3.		
	6-4	Set and Reset	The description of MICRO-EHV was added.		
	6-8	CPU Status	Fig. 6.7.1 was changed.		
	6-11	CPU Log	The description of the operation was added on Table 6.8.1.		
		Input / Output Refresh Disabled	The description of Input / Output refresh disabled was added.		
	7-2	CPU Communication Parameters	The description of MICRO-EHV was added.		
	7-6	Serial Port Setting	The description of MICRO-EHV was added.		
	7-9	Ethernet Port Setting	The description of MICRO-EHV was added.		
	7-10	Ethernet Port Setting	The description of MICRO-EHV was added.		
	7-11	Ethernet Port Setting	The description of MICRO-EHV was added.		
	7-12	Ethernet Port Setting	The description of Modbus-TCP/RTU was added.		
	7-14	Default Parameters of CPU	Table 7.5.2 was added.		
	7-16	Option Board Setting	The description of Option board settings was added.		
	8-1	Print	The description of MICRO-EHV was added.		
	8-8	Print	The description of Parameter Settings for MICRO-EHV was added.		
	8-9	Print	The description of CPU settings for MICRO-EHV was added.		
	8-10	Print	The description of Option board settings was added.		
	9-2	Improvement of Comment Format	The description of Note was added.		
	9-3	Improvement of Comment Format	The description of MICRO-EHV was added.		
	10-3	Troubleshooting	The description of MICRO-EHV was added.		
	A1-1	Function Menu List	OBC export and OBC import was added on Table Appendix 1.		
	A1-2	Function Menu List	Input refresh disabled, Output refresh disabled, Modbus-TCP/RTU, Option board settings was added on Table Appendix 1.		
	A2-2	Caution on Conversion	The description of MICRO-EHV was added.		
	A3-1	Installation Procedure of USB Driver	The description of MICRO-EHV was added.		
	A3-3	Installation Procedure of USB Driver	The description of Windows 7 was added.		
	A3-5	Update Procedure of USB Driver	The description of MICRO-EHV was added.		

No.	Page	Item	Description of Revision	Date of Revision	Manual No.
11			EHV-CPU Modbus-TCP Server is supported.	April 2013	NJI-537I(X)
	1-8	System Requirements	The description about CPU on Table 1.4.1 was changed.		
	1-13	Version	The description of Ver.4.03 was added on Table 1.7.1.		
	2-9 to 10	Project Tree	Fig. 2.4.1 and Fig. 2.4.2 were changed.		
	2-17	Toolbar icons	The description of Modbus-TCP on Table 2.5.1 was changed.		
	5-3	CPU Initialization and Release Occupation	The setting name of Modbus-TCP on Table 5.3.1 was changed.		
	6-11	CPU Log	The description of Modbus-TCP on Table 6.8.1 was changed.		
	7-12	Ethernet Port Setting	The description of EHV-CPU was added.		
	7-13	Ethernet Port Setting	Fig. 7.4.5 was changed.		
	7-14	Default Parameters of CPU	The description of Modbus-TCP was added on Table 7.5.1.		
	7-15	Default Parameters of CPU	The setting name of Modbus-TCP on Table 7.5.2 was changed.		
	7-17 to 18	Option Board Setting	Fig. 7.7.1 and 7.7.2 were changed.		
	8-9	Print	Fig. 8.1.14 was changed.		
	A1-2	Function Menu List	The setting name of Modbus-TCP on Table Appendix 1 was changed.		
12			Bug in the I/O comment display processing is fixed.	May 2013	NJI-537J(X)
	1-13	Version	The description of Ver.4.04 was added on Table 1.7.1.		
13			Bug in the PLC Upload is fixed.	July 2013	NJI-537K(X)
	1-13	Version	The description of Ver.4.05 was added on Table 1.7.1.		
14				September 2013	NJI-537L(X)
	1-13	Version	New features of Ver.4.06 were added on Table 1.7.1.		
	4-1	Input symbols	Description of skip comment entry was added.		
	4-3,4-4	Input symbols	Processing box image was updated.		
	4-6	Input symbols	Right click menu image was updated.		
	5-1	CPU operation mode	New behavior of circuit monitor was added.		
	6-1	I/O monitor	New behavior of I/O monitor was added.		
	7-12, 13	Ethernet port setting	Menu name Modbus-TCP → Modbus-TCP/RTU		
	7-14, 15	Default parameters of CPU	- Table 7.5.1 Modbus-TCP → Modbus-TCP/RTU - Table 7.5.2 Modbus-TCP → Modbus-TCP/RTU		
	8-16 to 22	Option settings	New features in option settings were added.		
	A1-2	Appendix 1 Function menu list	Menu name Modbus-TCP → Modbus-TCP/RTU		
15			Bug fix in signed double word in I/O monitor sheet.	March 2014	NJI-537M(X)
	1-14	Version	The description of Ver.4.07 was added on Table 1.7.1.		
16				June 2014	NJI-537N(X) (Ver.4.10)
	1-8	System Requirements	Table 1.4.1 was updated. Note for Windows XP was added.		
	1-8 to 11	Installation and uninstallation	Description was updated.		
	1-14	Version	New features of Ver.4.10 were added on Table 1.7.1.		
	2-1	Startup	Open/New project dialog was updated.		
	2-3	File handling	MICRO-EHV mode was added.		
	2-13	Project tree	Project tree was updated. "*" mark was changed to red color.		
	2-14 to 20	Toolbar icon	Toolbar icon was update and added.		
	3-7 to 12	Operation parameters	Data memory backup function was added.		
	4-6	Input symbols	Location of "ON/OFF" in right-click menu was changed. Insert line and insert column were added.		
	4-16	Copy, move and delete of ladder	Insert mode was added.		
	4-33	Find/Replace/Jump	Target symbol icons were added.		
	4-36 to 39	Cross reference	Description was updated.		
	4-42 to 43	Project Password	Sheet password for MICRO-EHV was added.		
	5-8 to 10	Program up/downloading	Verification function was improved.		
	6-4	Set and Reset	Location of "ON/OFF" in right-click menu was changed. Insert line and insert column were added.		
	7-12	Ethernet port Setting	Fig. 7.4.4 was updated.		
	8-14	Option settings	Fig. 8.2.1 was updated.		
	8-15	Option settings	Table 8.2.1 Paste mode (Insert) was added.		
	8-19	Option settings	Width of ladder-grid 12th column was added.		
	8-20	Option settings	Setting of New project was added.		
	A2-2	Position of Convert Tool	Description of Convert Tool was updated.		
	A2-4	A2.2 Caution on conversion	Description about FUN command with ADRIO was added.		
	A2-5 to 11	Conversion format	Command format was updated for new support command.	June 2014	NJI-537N(X) (Ver.4.10)

No.	Page	Item	Description of Revision	Date of Revision	Manual No.
17			Bug in the reverse build is fixed.	July 2014	NJI-537O(X) (Ver.4.11)
	1-14	Version	The description of Ver.4.11 was added on Table 1.7.1.		
	7-5 to 18	Chapter 7	Description was updated.		
18			Bug fix.	August 2014	NJI-537P(X) (Ver.4.12)
	1-14	Version	The description of Ver.4.12 was added on Table 1.7.1.		
	10-5	Chapter 10	Description was updated.		
19			New features	February 2015	NJI-537Q(X) (Ver.4.20)
		Control Editor and LADDRE EDITOR for Windows®	File extension"*.prjh" added.		
	1-13	Version	New features of Ver.4.20 were added on Table 1.7.1.		
	3-16	Data Logging	The description of Data Logging was added.		
	4-21	Comments	The description of Bit cut I/O Comments was added.		
	4-38	Cross Reference	The description of Cross Reference was added.		
	6-11	CPU Log	Updated.		
	6-13	CPU Log File	New chapter.		
	6-14	Time Chart Monitor	New chapter.		
	7-17	Option Board Setting	Communication settings updated.		
20			Bug fix.	July 2015	NJI-537R(X) (Ver.4.21)
	1-14	Version	The description of Ver.4.21 was added on Table 1.7.1.		
21	1-7	Instruction Manual	Table 1.3.1 was updated. Control Editor Polynomials Edit Manual for ladder programming software was added.	June 2016	NJI-537S(X) (Ver.5.00)
	1-12	Control Editor and LADDER EDITOR for Windows®	Project file extension "*.prjx" was added.		
	1-14	Version	New features of Ver.5.00 were added on Table 1.7.1..		
	2-3	File Handling	Selection of "File Type" was supported in "Save as".		
	2-8	Window Structure	Display window of input force was added.		
	2-11	Project Tree	"Extended Environment Setting" was added. "Simplified Positioning Parameter Setting" was added. "Simplified Positioning Trial Operation" was added in "Monitor". "CH.1" ~ "CH.3" was added.		
	2-14	Toolbar icons	"Input Force" and "Simplified Positioning Parameter Setting" were added.		
	2-25	Project File	Modification of Ver.5.00 was added.		
	3-4	I/O Configuration	A new window of "Special I/O Configuration" was added in MICRO-EHV series.		
	3-21	FL-net Parameter	EH-FLN3 module parameters setting feature was supported.		
	3-26	Simplified Positioning Parameter Setting	Simplified positioning parameters setting feature was supported in MICRO-EHV series.		
	3-30	Simplified Positioning Trial Operation	Simplified positioning trial operation was supported in MICRO-EHV series.		
	4-1	Input Symbols	Polynomials editing in processing box feature was supported.		
	5-5	Program Up/Downloading	Modification of Ver.5.00 was added.		
	5-15	Online change in RUN	"Change Project Name" and "Change Program Name" features were supported.		
	6-7	Force Input	Input force feature was supported in EHV-CPU series.		
	6-12	Circuit Monitor	Modification of Ver.5.00 was added.		
	6-22	Time Chart Monitor	Feature of opening the file created by data logging of MICRO-EHV series was supported.		
	8-15	Option Settings	Processing box monitor setting feature was supported.		
	8-21	Option Settings	Displayed width setting of 12th column in ladder window was supported.		
	8-22	Option Settings	Change record of CSV file saving feature was added.		
	8-25	Option Settings	Switching of special I/O configuration window feature in MICRO-EHV series was supported.		
	9-1	Compatibility of File	Modification of Ver.5.00 was added.		
	A1-1	Function Menu List	Menu of Simplified Positioning Trial Operation. Input Force. Extended Environment Setting. - Simplified Positioning Parameter Setting was added.		
	A2-1	Position of Convert Tool	Instructions of Convert Tool were added. Modification of Ver.5.00 was added.		
	A2-5	Caution on Conversion	Convert range of extended timer was changed.	June 2016	NJI-537S(X) (Ver.5.00)
	A2-7	Caution on Conversion	Converting feature of "Running Definition", "Delay Check Time", "Run Mode in Exception", "Transfer Mode in Exception" and "CPU Link Parameters" was supported.		
	A2-11	Conversion Format	More commands which can be converted by Convert Tool were added.		

No.	Page	Item	Description of Revision	Date of Revision	Manual No.
22			Bug fix.	September 2016	NJI-537T(X) (Ver.5.01)
	1-8	System Requirements	Table 1.4.1 was updated. Control Editor supports the Windows 8.1 (32/64bit) and Windows 10 (32/64bit).		
	1-14	Version	The description of Ver.5.01 was added on Table 1.7.1.		
	9-1	Compatibility with CPU	New chapter		
	A2-11	Caution on Conversion	(9) Convert of wrong connection was added.		
23			New features	April 2017	NJI-537U(X) (Ver.6.00)
	1-6	Features Control Editor	FL-net monitor was added. Debugging of ladder program by simulator was added.		
	1-8	Instruction Manual	Table 1.3.1 was updated. A Simulator Manual was added to Control Editor, which is a ladder programming software.		
	1-17	Version	New features of Ver.6.00 were added on Table 1.7.1.		
	2-9 to 10	Window Structure	Operation contents in the simulation mode were added to the status bar.		
	2-13	Project Tree	FL-net monitor was added.		
	2-20 to 23	Toolbar icon	Data Memory view icon was added. Simulation icon and Simulation settings icon were added. Debug icons were added.		
	2-34 to 36	Data memory view	New chapter Data memory view was added.		
	3-13	Retentive area	Content added to Retentive area window were added.		
	4-35 to 38	Find / Replace / Jump	Content that improved Find / Replace / Jump windows were added.		
	6-31 to 32	FL-net Monitor	FL-net monitor was added.		
	8-1 to 3	Print	Content improved on the printing were added.		
	8-18 to 19	Option Settings	Comment type was divided and Setting item was added.		
	A2-12 to 38	Conversion Format	Conversion format of arithmetic commands were added. Conversion format of application commands were added. Conversion format of control commands were added. Conversion format of High-function module transfer commands were added. Conversion format of transfer commands were added.		
24	1-9	System Requirements	Changing Operating System Change Windows XP operating environment (SP2 or higher) to (SP 3).	September 2017	NJI-537V(X) (Ver.6.00)
25			New features	August 2018	NJI-537W(X) (Ver.6.02)
	1-9	System Requirements	Table 1.4.1 was updated. Control Editor supports the Windows 8.1 (32/64bit) and Windows 10 (32/64bit).		
	1-17	Version	New features of Ver.6.02 were added on Table 1.7.1.		
	2-24	I/O List	Expansion of counter address of EHV-CPU.		
	2-35	Data Memory view	A filter item was added.		
	3-3	I/O Configuration	Improvement of the I/O configuration window with having supported new modules.		
	4-24	Comments	Improved CSV storage function of I/O comment window.		
	4-44	Cross Reference	I/O comment editing function is added to the Cross Reference (I/O list) window.		
	6-19	CPU Status	Change CPU status window and improve display method.		
	6-35	Time chart monitor	Improved operability of time chart monitor window.		
	10-6	Troubleshooting	1 Program added conversion message of project containing more than 10,000 lines of program.		
	A2-11	Conversion of I/O assignment	I/O assignment conversion list was added.		
	A2-13	Conversion of special internal output	Added difference in function assignment of special internal output.		
	A2-14	Error code	Add error code of conversion error message.		
26			New features	April 2019	NJI-537X(X) (Ver.7.01)
	1-18	Version	New features of Ver.7.01 were added on Table 1.7.1.		
	2-1 to 4	Startup	Add a new startup window.		
	2-32 to 34	Project File	Remove the old version description.		
	3-3	I/O Configuration	Improvement of the I/O configuration window with having supported new CPU and modules.		
	3-26	FL-net Parameter	Common memory 2 data clear specification was added on Table 3.5.2.		
	5-2 to 5	PC communication setting	Add communication setting assistance window.		
	5-8 to 13	Program Up / Downloading	Remove the old version description.		

MEMO

Table of Contents

Chapter 1　　Introduction

Thank you very much for choosing Hitachi Programmable Controller (hereinafter called PLC) EH-150 series.
This manual describes how to use Control Editor (hereinafter called CTE) and LADDER EDITOR for Windows®
(hereinafter called LEW), which are ladder programming software for EHV-CPU series and MICRO-EHV series
(hereinafter called CPU). Please read this manual and the "LADDER EDITOR for Windows® Instruction Manual
(NJI-342*(X) and NJI-673*(X))" thoroughly and make good use of this software.
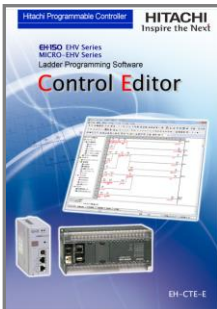
1.1　　Check the package

Great care has been taken in the manufacture of this product, but we advise you to check the following points
immediately after purchase.

    (1)　Product name, Model name

    (2)　If any damage in the product

    (3)　If there is any missing item in the package contents

Please contact your dealer if you have any problem.

Table 1.1.1　List of accessories supplied with Control Editor

No.	Product name	Model name	Outlook	Pcs	Remarks
1	Control Editor	EH-CTE-E	The package contents | Folder	Contents | | EH-CTE-E | Root folder | | CTE | Set up file for installation | | Driver | USB driver | | Manual | Manual data |	1	

1.2   Features of Control Editor

CTE, which makes the best use of performance of EH-150 series EHV-CPU / MICRO-EHV and very easy to use, is a programming software for EHV-CPU and MICRO-EHV.

CTE has full functions supporting the progress in development for PLC ladder program and the efficiency of programming and debugging can make great progress, using merits of applications for Windows.

(1) Project tree which shows setting and the structure of ladder program sheet
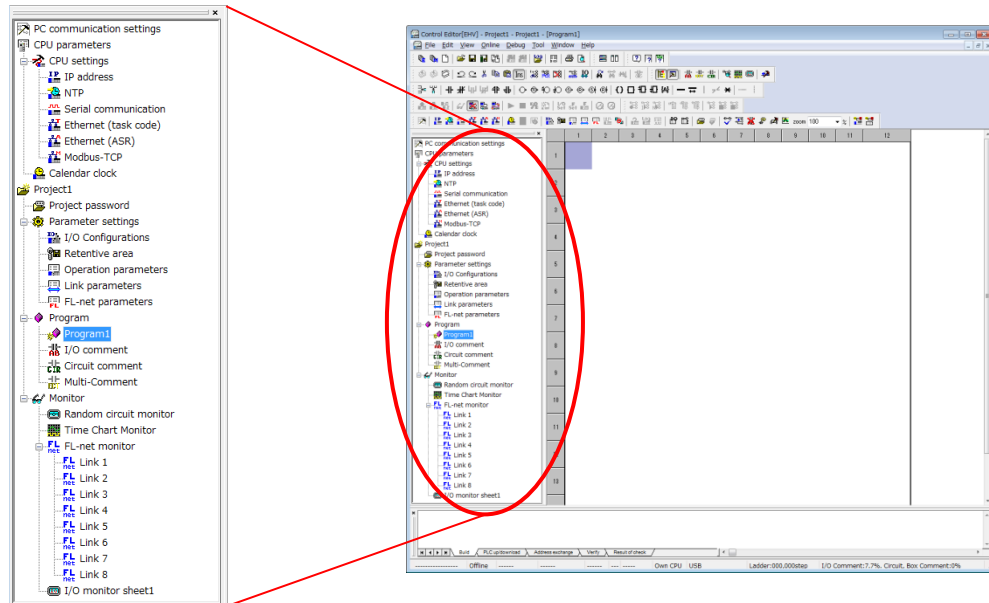
Fig. 1.2.1   Project tree

(2) Total control of Ladder, Comment, Project
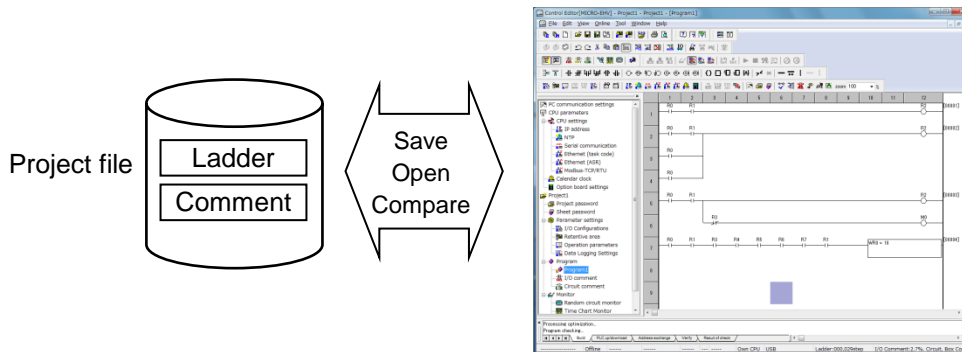
Fig. 1.2.2   Project file

(3) Simple icon interface
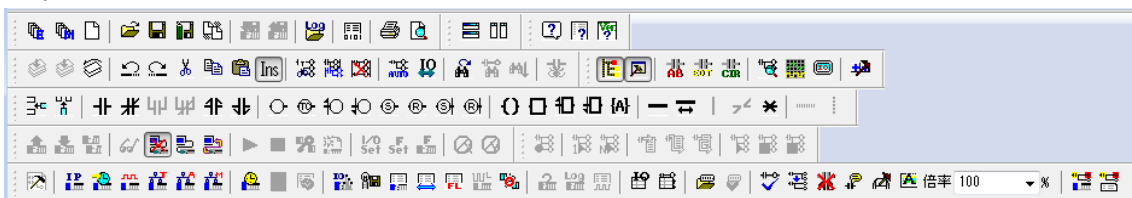
Fig. 1.2.3   Toolbar icon

(4) Program sheet structure makes programming easy
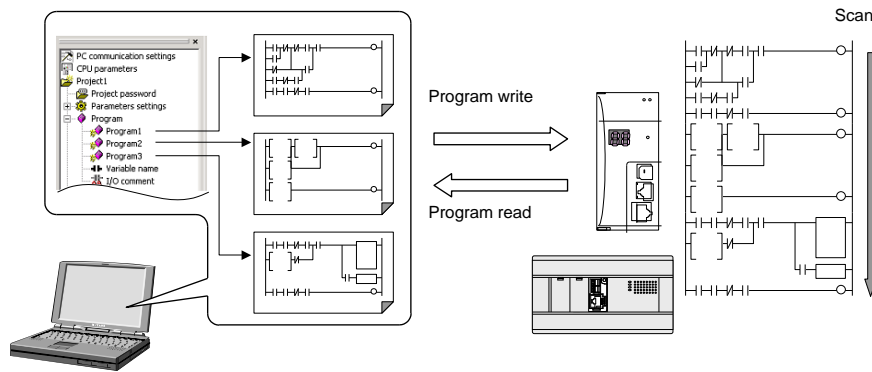
Fig. 1.2.4   Program sheet structure

(5) Simple interface
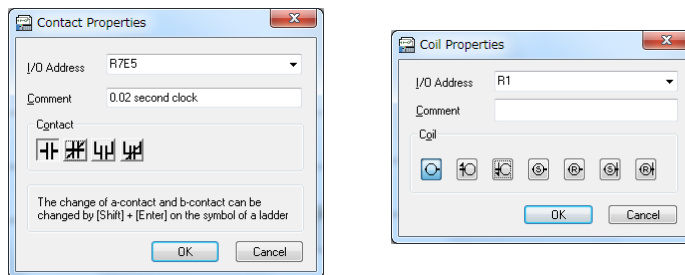
Fig. 1.2.5   Input windows

(6) Usability of setting window

Each setting window is easily opened in project tree.
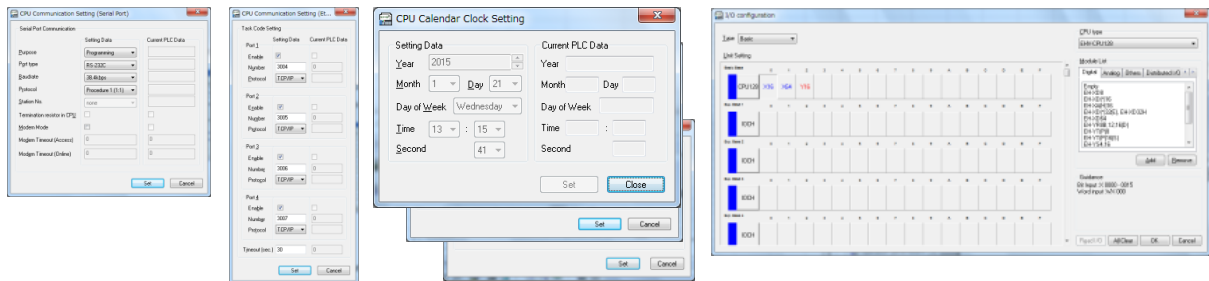
Fig. 1.2.6   Setup windows

(7) Three communication ports are available (USB / Ethernet / Serial)
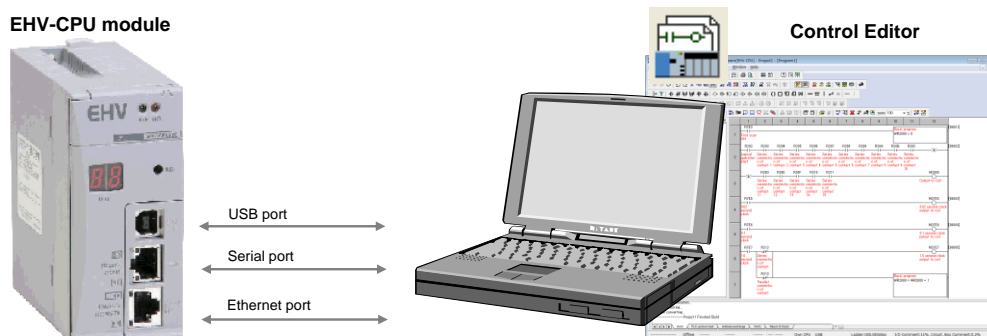
Fig. 1.2.7   Communication type of CPU connection

(8) Expanded ladder area

1] Max. 11 contacts and 32 coils per one ladder are supported.

＊Return symbol
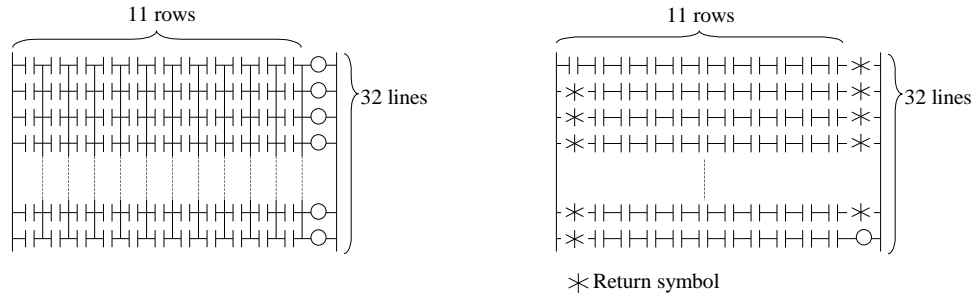
Fig. 1.2.8   Maximum configuration in one circuit

2] Arithmetic expression can be input up to 32 lines in a processing box.
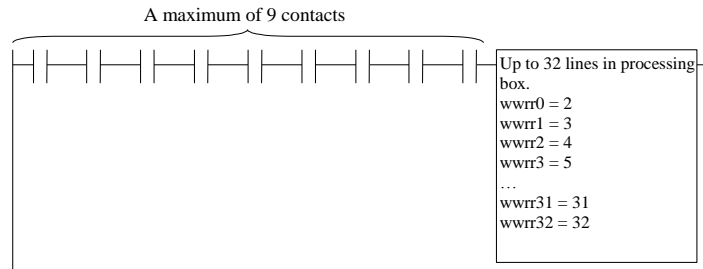
Fig. 1.2.9   Processing box

3] A processing box and a coil can be input in parallel.
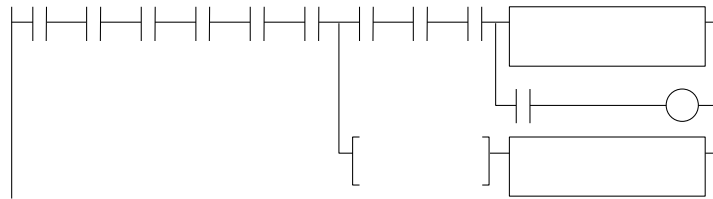
Fig. 1.2.10   Parallel description of processing box and coil

4] Return symbol, comparison box and processing box can be input.
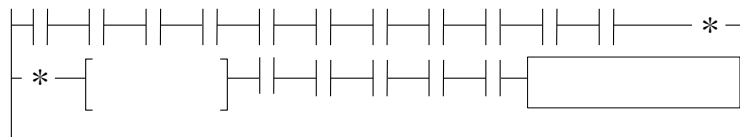
Fig. 1.2.11   Return ladder combination

5] Supporting edge coil and processing box
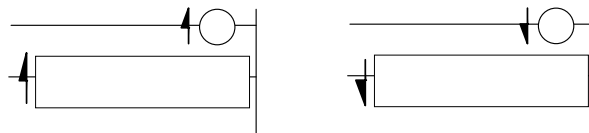
Fig. 1.2.12   Edge coil and processing box

6] Edge (DIF/DFN) No. is unnecessary (Internal automatic control)

Fig. 1.2.13   Edge
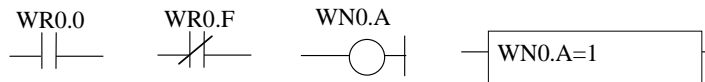
1 – 4
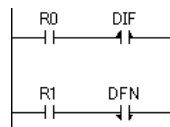
7] Bit cut (Example: WR0.0, WR100.B and etc.)

WR0.0   WR0.F   WN0.A

WN0.A=1

Fig. 1.2.14   Bit cut word

8] Supporting the extension external I/O (EX/EY, WEX/WEY, and DEX/DEY)

EX0   EY0

WEY0=H1000

WEY10=WEX30
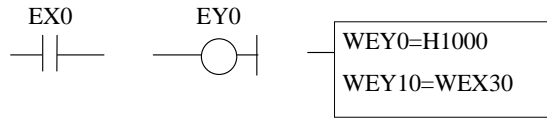
Fig. 1.2.15   Extension external I/O

9] Data indication format (singed, floating point, text)

DR10.FL = 12.345
DR20.S = -100
WR30.ASC.7 = "ABCDEFG"
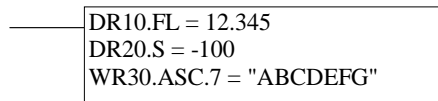
Fig. 1.2.16   Data indication format

(9) Monitor function improvement

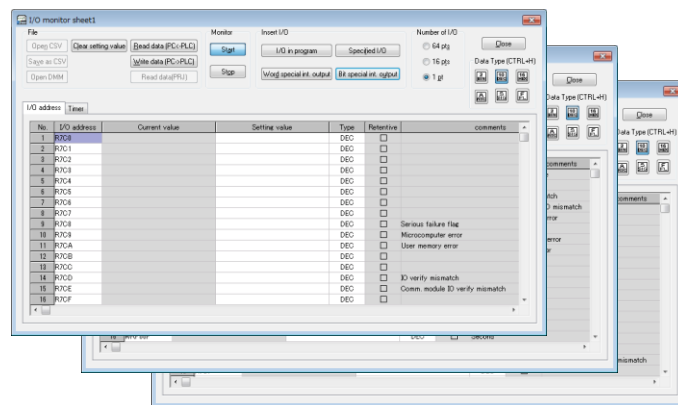1] Supporting two or more I/O monitor sheets

Fig. 1.2.17   I/O monitoring pattern

2] I/O monitor sheet can be saved to CSV format and opened.

3] Specifies the indication format together or separately (binary / decimal / hexadecimal etc.)

4] I/O batch write function

5] Random circuit monitor window which monitors random circuits in one sheet differently from the normal circuit monitor.
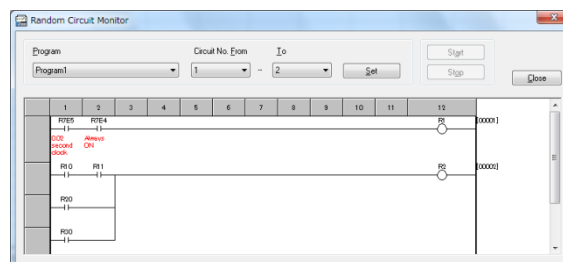

Fig. 1.2.18   Random circuit monitor

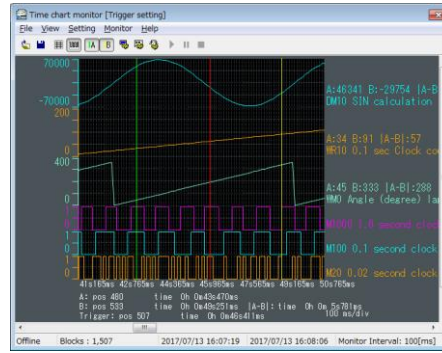6] Graphic display in time chart monitor function.

Fig. 1.2.19　　Time Chart Monitor

7] Displays the status of nodes participating in FL-net network in FL-net monitor function.
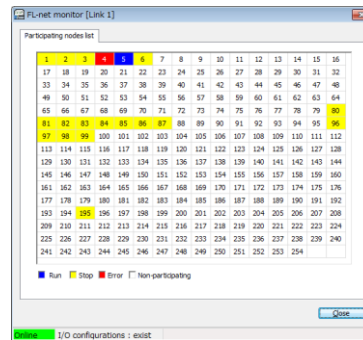

Fig. 1.2.20　　FL-net Monitor

(10) Function to verify the timing of the online change in RUN

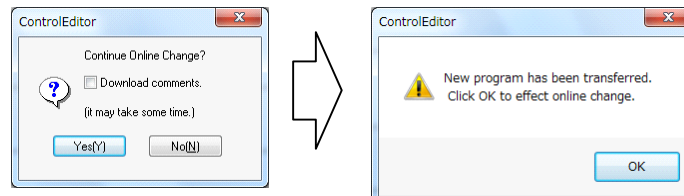User can determine when to execute the online change in RUN.

Fig. 1.2.21　　Confirming dialog of the online change in RUN

(11) Two or more CTE can be run on one PC.

Two or more CTE can be run on one PC. The program can be copied between projects. And when connecting using Ethernet, it can access two or more CPU.

(12) Conversion software for ladder program (*.prn) in LEW

Support tool which can convert the ladder program created using LEW into the project file for CTE are provided.

Current program can be utilized. (I/O comments can be read in CSV format.)
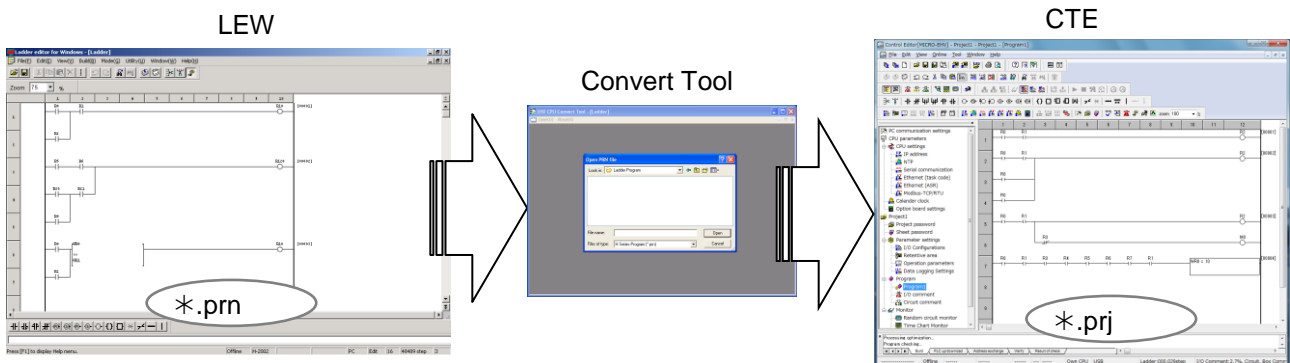

Fig. 1.2.22   Convert tool

N o t e

After converting by the convert tool, some commands need conversion manually. Refer to Appendix 2 in this manual for further information.

(13) Debugging a ladder program with a simulator.

A simulator that operates similarly to an actual machine PLC on a personal computer is prepared. Execution and debugging of ladder program is possible in an environment without actual PLC.
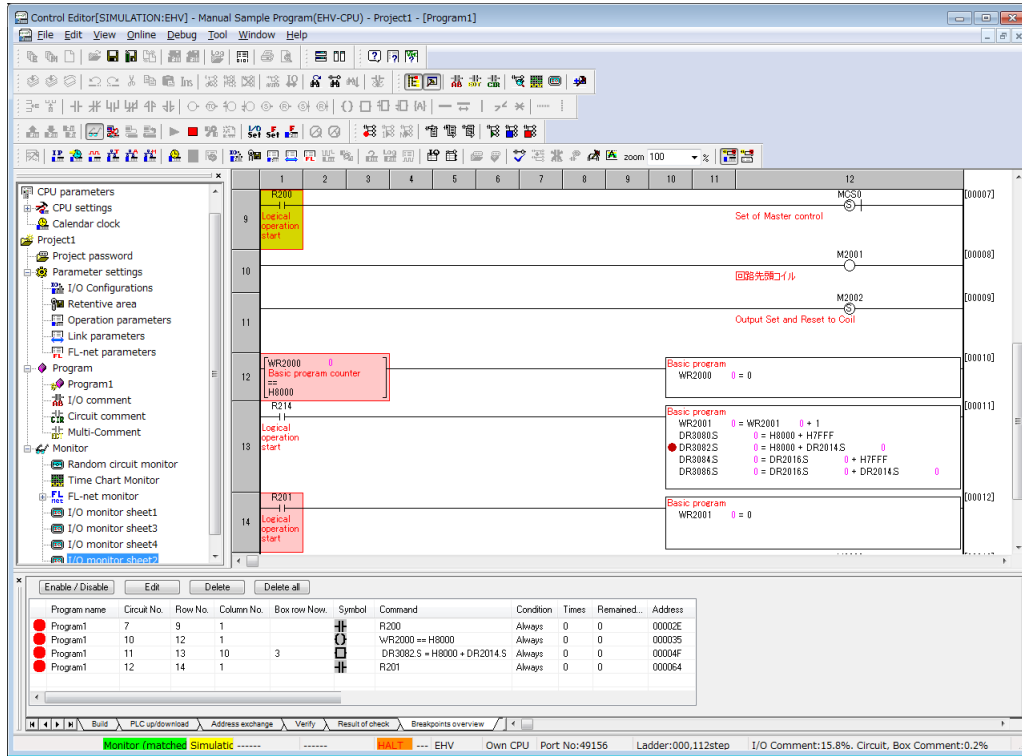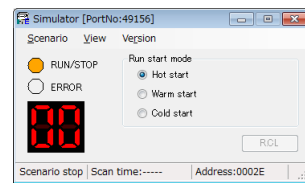

Fig. 1.2.23　　Simulation window

Ethernet
(localhost)

Fig. 1.2.24　　Simulator window

N o t e

Please refer to "Control Editor Simulator Manual" (NJI-641 *) for simulation operation and debugging function.

1.3   Instruction Manual

There are the following manuals relating to CTE. Refer to these if necessary.

Table 1.3.1   List of related manuals

Manual No.	Title	Description
NJI-481*(X)	EH-150 EHV-CPU Application Manual	Details of modules which can be used combining with EHV-CPU, PLC installation, how to wire, how to use special functions, and etc.
NJI-482*(X)	EH-150 EHV-CPU PROGRAMMING MANUAL	EHV-CPU user program creation method, instruction specification, etc.
NJI-491*(X)	EH-150 (EHV-CPU) Application Manual for Network	EHV-CPU of the communication port setting, communication function, network configuration, etc.
NJI-589*	MICRO-EHV Hardware Manual	There is only a Japanese manual.
NJI-590*	MICRO-EHV Programming Manual	There is only a Japanese manual.
NJI-591*	MICRO-EHV User's Manual	There is only a Japanese manual.
NJI-640*(X)	EH-150 (EHV Series)　(MIRO-EHV Series) Ladder Programming Software Control Editor Polynomials Edit Manual	Control Editor polynomial input method and notes
NJI-641*(X)	EH-150 (EHV Series)　(MICRO-EHV Series) Ladder Programming Software Control Editor Simulator Manual	Operation method related to simulator of control editor (operation of debugging function, operation of external input function, etc.)
NJI-342*(X)	H-SERIES LADDER EDITOR for Windows ® Instruction Manual	Operating instructions for LADDER EDITOR for Windows® (In Ver.3.08 or lower)
NJI-673*(X)	H-SERIES LADDER EDITOR for Windows ® Instruction Manual	Operating instructions for LADDER EDITOR for Windows® (In Ver.3.10 or higher)

* The end of manual No. changes according to version-up, etc.

■ Common terms

Common terms used in whole chapters are shown below. Refer to each page for the other terms.

"Peripheral devices" means the external devices which communicate with PLC. For example, a touch panel and SCADA.

And CTE is a kind of peripheral devices.

■ Symbols used in this manual

☞   The reference section of a related explanation

Reference   An additional explanation and useful information

Note   Matters that require attention in programming

W Glossary   Explanation for special terms used in sentence

■ When using redundant CPU module (EHV-CPR128)

When using redundant CPU module, please read this manual with replacing "CPU128" by "CPR128".

■ When using hybrid CPU module (EHV-CPU**RP)

When using hybrid CPU module, please read this manual with replacing "CPU**" by "CPU**RP".

1.4   System Requirements

Operation environment of a personal computer for CTE is as follows.

Table 1.4.1   Operation environment for CTE

No.	Item	Detailed item	Description
1	Specification of personal computer	Operating System	Windows XP (SP3) *1 / Windows 7 / Windows 8.1 (32/64 bit) / Windows 10 (32/64 bit) *3
		CPU performance	Pentium 1.00 GHz or higher (Recommended:Core2 Duo 2.00 GHz or higher) *4
		Memory	512Mbyte or more (Recommended:1.00 Gbyte or more) *4
		Free space of Hard disk	Approximate 160 Mbyte for installation
2	CPU module connecting cable	Serial connecting	EH-VCB02 *2
		Ethernet connecting	UTP/STP (RJ45)
		USB connecting	USB cable connector B type
3	USB Driver	Operating System	Windows XP (SP3) *1 / Windows 7 / Windows 8.1 (32/64 bit) / Windows 10 (32/64 bit) *3

*1 Windows XP support by Microsoft has ended 9th April 2014. It is possible to use CTE on Windows XP after the support, but it

   is not possible for us to respond inquiries relating to Windows XP.

*2 D-sub9 pin connector is used PC side. When connecting the cable with the personal computer directly, prepare a personal

   computer with serial port or use a USB serial converter.

   (But, there is a case where communication with the USB serial converter is unstable.)

*3 CTE can be operated on Windows 8.1 (32/64 bit) / Windows 10 (32/64 bit) from Ver. 5.01.

*4 Even if the recommended conditions are satisfied, the performance of the CTE may differ depending on the performance of

   the personal computer to be used.

1.5   Installation and Uninstallation

Please start to install the CTE after closing other applications for Windows. Otherwise, you cannot install the CTE properly.

(1) Installation

1] Double-click "setup.exe" in the folder "CTE" in the installation CD.

2] Choose the language and click [OK] button.

Fig.1.5.1   Dialog for language setting

3] The installation window of the items necessary for installing CTE is displayed, so click [Install] button.

* This window is not displayed on PCs already installed with items required to install CTE. Proceed to step 5].
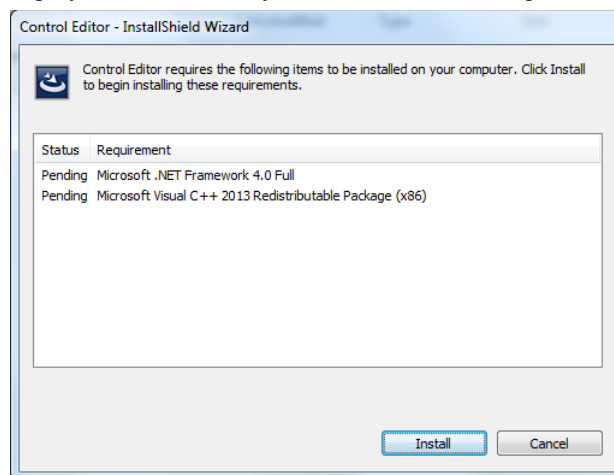

Fig. 1.5.2   Required item installation window

4] When installation of the item is completed, it goes to the Preparation for installation window. Please wait for a while until preparation is completed.
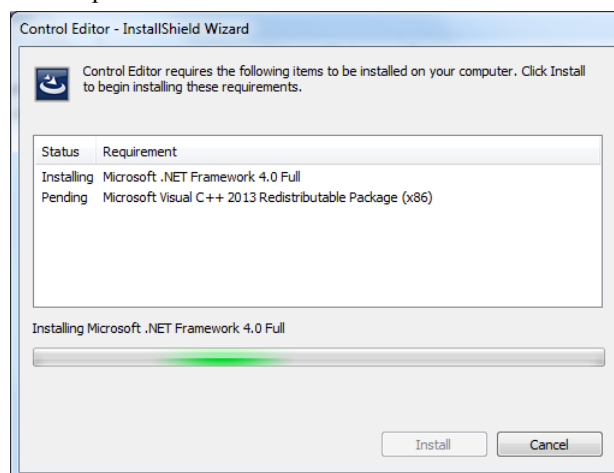

Fig. 1.5.3   Preparation for installation window

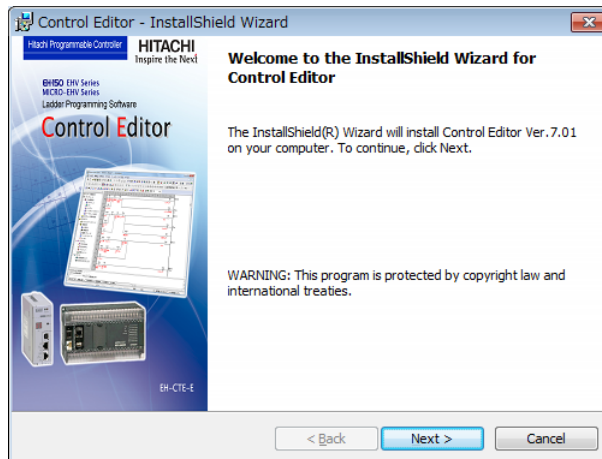5] New wizard dialog appears. Click [Next] button.

Fig. 1.5.4   Wizard dialog

6] Attention about compatibility appears. If old version of CTE and LEW are already installed, cancel the installation and uninstall the old CTE and LEW. After uninstallation, install the latest version again. If not, click [Next] button to proceed.
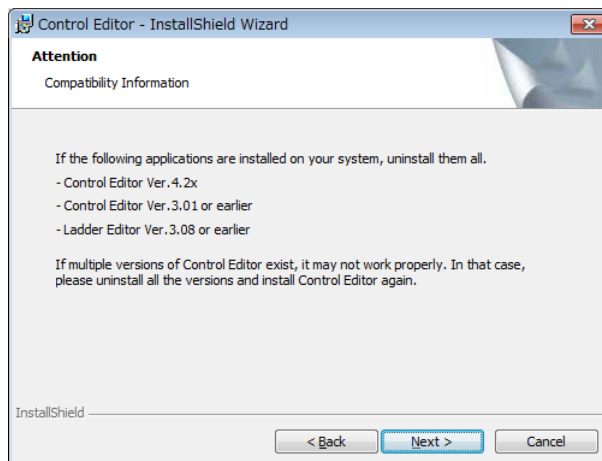
Fig. 1.5.5   Attention dialog

7] License agreement appears. Read carefully and click at "I accept the terms in the license agreement" if accepted. Click [Next] button to proceed.
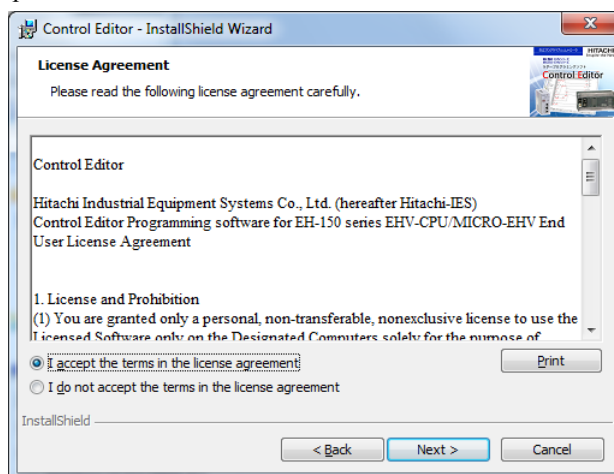
Fig.1.5.6   License agreement dialog

1 – 12

8] Customer information dialog appears. Input user name, organization and serial number and click [Next] button to proceed. Serial number is printed on plastic case of the CD (6 alphameric characters).
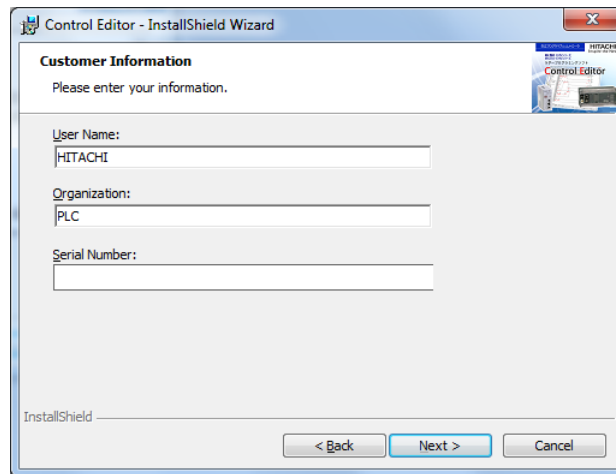

Fig.1.5.7   Customer information dialog

9] Destination folder dialog appears. Click [Next] button to proceed. If necessary, click [Change] button to change installation folder.
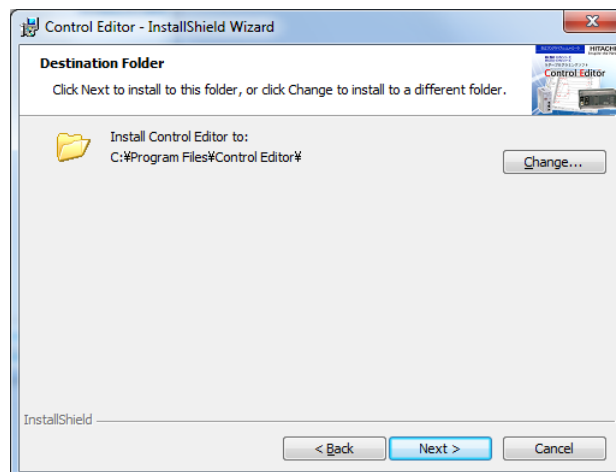

Fig. 1.5.8   Destination folder dialog

10] Ready to Install Program dialog appears. Check the entered information and click [Install] to proceed.
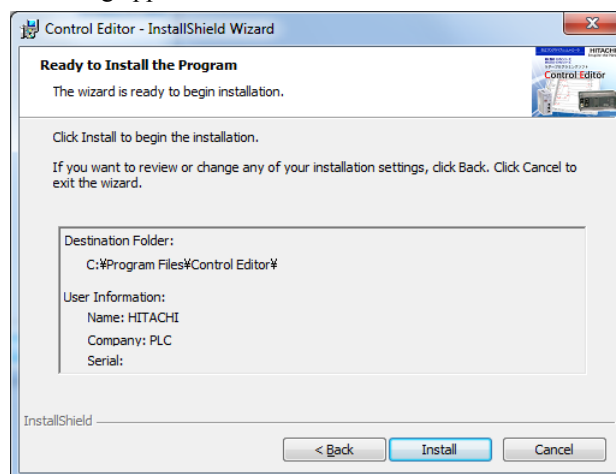
Fig. 1.5.9   Ready to Install the Program dialog

11] Click [Finish] button to complete the installation.
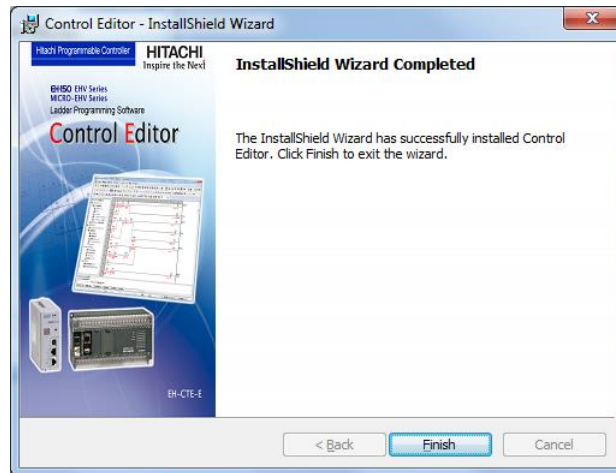
Fig.1.5.10   Installation complete dialog

12] After installation completed, New icon for Control Editor Launcher is created in the desktop.
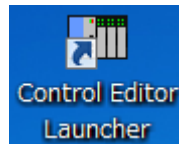
Fig.1.5.11   Icon

N o t e

- If CTE of Ver.3.01 or earlier or Ver.4.2 * is installed on your computer, we will exit this wizard once, uninstall installed CTE, then install this product please.

- If CTE of Ver.4.0 * or Ver.4.1 * is installed, it will be upgraded.

- In Ver.7.01 or higher, the icon Control Editor Launcher is created on the desktop to launch the integrated version of CTE.

(2) Uninstallation

Follow the procedure for uninstallation shown below.

- procedure1

1] Open [Add or Remove Programs] in [Control Panel] in [Setting] in [Start].

2] Click [Change or Remove Programs]

3] Choose Control Editor, and click [Remove]

4] Click [Yes] in the confirming dialog.

5] Uninstallation is started.

* You can un-install also from [Uninstall] in [Control Editor] in [Programs] in [Start].

- procedure2

1] Click [Start] - [All Programs] - [Control Editor] - [Uninstall CE].

2] Click [Yes] in the confirming dialog.

3] Uninstallation is started.

N o t e

"Do you remove common files?" may be displayed on the way of uninstallation. You must click "No" or "All No" in this window. If you click "Yes" or "All Yes", other application programs installed already may not work properly.

1.6   Control Editor and LADDER EDITOR for Windows®

Difference between CTE and LADDRE EDITOR for Windows® which is a programming software for EH-150 series
EH-CPU is shown in the following table.

Table 1.6.1   Difference between LEW and CTE

No.	Item	LEW	CTE
1	Support CPU module	EH-CPU104A / 208A / 316A / 516 / 548 / 548RP H-200 / 250 / 252B / 252C H-302 / 702 / 1002 / 2002	EHV-CPU08 / 16 / 32 / 64 / 128 / 128RP EHV-CPR128
2	Support unit	MICRO-EH series	MICRO-EHV series
3	Program configuration	1 sheet	EHV-CPU：Maximum of 99 sheets MICRO-EHV：Maximum of 32 sheets
4	Maximum of ladder configuration	9-contact 1-coil × 7 lines	11-contact 1-coil × 32 lines
5	The number of lines for command in processing box	19 lines	32 lines
6	Polynomials input in processing box	—	✓
7	Display of reduced processing box	Enable 1-cell display But, contents of box are not displayed.	Always display in 3-cell width
8	DIF/DFN address input	Necessary	Not necessary
9	Edge coil	–	✓
10	Edge processing box	–	✓
11	OR between coil and processing box	–	✓
12	OR between two or more processing boxes	–	✓
13	The number of occupied lines in processing box	Depending of the number of lines for command in box.	Always 1 line
14	File saving before building	–	✓
15	Circuit control under edit	Only circuit No.	Line No. and circuit No.
16	Circuit alignment	✓	✓
17	CPU communication setting	By DIP switch and special internal output.	By setting parameters with CTE.
18	FL-net parameters	Should be set by other tools, so it is excluded from CPU initialization.	Set as one of environment configurations
19	Remote RUN/STOP	–	Enables when RUN SW is STOP
20	I/O monitor table	1 sheet	16 sheets
21	File saving of I/O monitor table	– (It is possible by data memory edit.)	✓
22	Data memory edit	Isolated function	Integrated function into I/O monitor
23	Short cut key of default	Contact: [Shift] + [A] Coil: [Shift] + [C]	Contact: [F5] Coil: [F8]
24	Indication position of vertical line	The upper right of cursor	The low left of cursor
25	CPU status	✓	✓
26	Confirmation mode for Online change in RUN	–	✓
27	Comment	I/O comment Memo comment Box comment Circuit comment	I/O comment Multi-comment Box comment Circuit comment
28	File	Ladder: *.prn I/O comment: *.iot Memo comment: *.mec BOX comment: *.boc Circuit comment: *.cic	Project file: *.prj, *.prjh, *.prjx (Ladder and Comment)

1.7   Version

Table 1.7.1   Version of Control Editor

Version	Description	Released date
2.00	1st English version	July 2007
2.17	Improvement of operability and functionality	March 2009
2.18	New modules are supported. Ethernet timeout is supported. Bugs of Ver.2.17 are fixed.	September 2009
2.30	Improvement of the I/O configuration window with having supported new modules. Bugs of Ver.2.18 are fixed.	December 2009
2.31	Corresponding to Chinese. Bugs of Ver.2.30 are fixed.	March 2010
2.40	PLC Download / Upload / Verify with data memory is supported. PRJ file with data memory is supported. Bugs of Ver.2.31 are fixed.	October 2010
2.41	Multi-Comment is supported.	April 2011
3.00	Control Editor supports the Windows 7.	October 2011
3.01	Redundant CPU module is supported.	April 2012
4.02	MICRO-EHV is supported. USB driver for 64-bit Windows 7 is supported.	January 2013
4.03	EHV-CPU Modbus-TCP Server is supported.	April 2013
4.04	Bug in the I/O comment display processing is fixed.	May 2013
4.05	Bug in the PLC Upload is fixed.	July 2013
4.06	New features - ON/OFF directly by right mouse clicking at a contact. - Message dialog when searching finished. - Improvements in option settings - Automatic start monitoring (I/O monitor and circuit monitor)	September 2013
4.07	Bug fix in signed double word in I/O monitor sheet.	March 2014
4.10	- Open/New project dialog improved - Project tree updated and the color of "*" mark changed to red. - Data memory back up setting added in operation parameter. - The location of "ON/OFF" in right-click menu changed. - Insert line and insert column added in right-click menu. - Width of ladder-grid 12th column configurable. - Paste mode added. - Timer setting value kept when copied. - Search function improved. - Cross reference improved. - Verification function improved. - Sheet password added for MICRO-EHV. - Convert Tool started directly in the Control Editor - Convertible commands added.	June 2014
4.11	Bug in the reverse build is fixed.	July 2014
4.12	Japanese language supported in the Convert Tool Bug fix in paste mode Bug fix in I/O comment file handling	August 2014
4.20	- File extension changed. - Print function improved. - I/O bit comment supported. (ex. Comment for WR10.2) - Time chart monitor function supported. - Data logging function supported. - CPU log function improved. - Cross reference function improved. - Data can be monitored when timer setting value is variable. - Menu layout modified. - Unnecessary icons deleted. - User symbol deleted as it is not available. - Dialog of PLC download modified. - UI of circuit comment improved. - Monitor interval setting added. - Memory board commands (MBRD, MBWR) added. - Analog filter added in option board setting. - Link/Remote waiting time added. - Wrong view of status bar fixed.	February 2015

Version	Description	Released date
4.21	- Bug fix in retentive area setting. - I/O comment supported in the Convert Tool. - INT command conversion improved in the Convert Tool. - Messages corrected in the Convert Tool.	July 2015
5.00	- File extension changed to ".prjx". - Fl-net3 module setting added, and FL-net setting improved. (Only for EHV-CPU) - Special I/O configuration window improved. (Only for MICRO-EHV) - Simplified positioning parameter setting added for MICRO-EHV. - Processing box improved. (Polynomials supported.) - ASCII characters → Floating point conversion command (ASCFL) added. - Linear increasing/decreasing command (specifying acceleration/deceleration time) (SLOPT) added. - Linear increasing/decreasing command (specifying acceleration/deceleration rate) (SLOPR) added. - Start pulse output (ac(de)celeration/10ms) command (PLSTAR) is added. - Start controlling speed of pulse (ac(de)celeration/10ms) command (PLSPDR) is added. - Change frequency in controlling speed of pulse (ac(de)celeration/10ms) command (PLSNGR) is added. - Stop pulse output (ac(de)celebration/10ms) command (PLSTPR) is added. - Origin return command (PLHM) added. - I/O comment display style in processing box is changed. - I/O monitored value display in processing box is changed. - Force input function supported. - Simplified positioning trial operation function added. - Data logging file reading function is added in time chart monitor. - CSV file saving/reading procedure changed. - Used I/O selecting operability in cross reference improved. - Online change in RUN of project/program name is enabled. - Multi-execution in different languages is enabled. - Initial state of a file converted by Convert Tool is changed. - Operation parameters converting function in Convert Tool is added. - Extension timer (TM) converting function in Convert Tool is improved.	June 2016
5.01	- Bug fix in online change in RUN. - Bug fix in processing of comment reading from CPU. - Check function in Convert Tool is improved. (Range of setting value for retentive memory will be checked.) - Convert tool was improved. - Apply to Windows 8.1 (32/64 bit) / Windows 10 (32/64 bit).	September 2016
6.00	- Added data memory view window, added current value display function. - Added FL-net monitor window, added state display function of participating nodes. - Improvement of print font size. - Added function to read data memory file output by LADDER EDITOR on the I/O monitor pattern window. - Added a function to display comment display colors individually with external / internal input / output I/O. - Improve operability of retentive aria window. - Search / Replace / Jump window size reduced. - Add simulator function.	April 2017
6.02	- EHV-CPU128RP added to EHV-CPU series. - Communication module (EH-RMD") added. (Only for EHV-CPU) - 32 additional module added. (Only for MICRO-EHV) - Change CPU status window and improve display method - Improved operability of time chart monitor window - Extend the correspondence range of counter instructions - Extend the number of lines of one sheet that can be read from the project file - Add filter items to data memory view window - Improved CSV storage function of I/O comment window - I/O comment input function is added to the cross reference window - Change display order of I/O comment in processing box - Bug fix in bit constant conversion. - Bug fix in word or double word constant PLC collation.	August 2018
7.01	- Integrates LADDER EDITOR for Windows ®. - EHV-CPU08 added to EHV-CPU series. - Counter module (EH-CUEL) added. (Only for EHV-CPU) - Add TRNS5, TRNS6 conversion function to Convert Tool. - Improved I/O assignment conversion function of Convert Tool.	April 2019

N o t e

Current CTE does not support the following functions.

Unsupported functions

   1) Modem function in Communication Setting

   2) Security function

   3) Variable Name function

MEMO

Chapter 2 Basic Operation

This chapter describes about a basic operation of Control Editor.

2.1 Startup

In Ver. 7.01 or higher, the functions of LADDER EDITOR for Windows® have been integrated into Control Editor. Start the corresponding editor according to the target CPU. CTELauncher is launched using the icon "Control Editor Launcher" on the desktop or the shortcut "Control Editor Launcher". To launch CTE directly as before, launch it in the shortcut "Control Editor". Similarly, to launch LEW directly as before, launch it with the shortcut "Ladder Editor".

Furthermore, it is possible to connect via CPU link in a system where EH-CPU / H-CPU and EHV-CPU are mixed. There is no change in the operating procedure of CTE / LEW that has been started.

(1) Start of CTELauncher

1] Double-click an icon on the desktop or select [Control Editor Launcher] in [Control Editor] in [Program] in [Start].

Fig. 2.1.1   CTELauncher splash window

2] The project selection window is displayed after displaying the splash window.
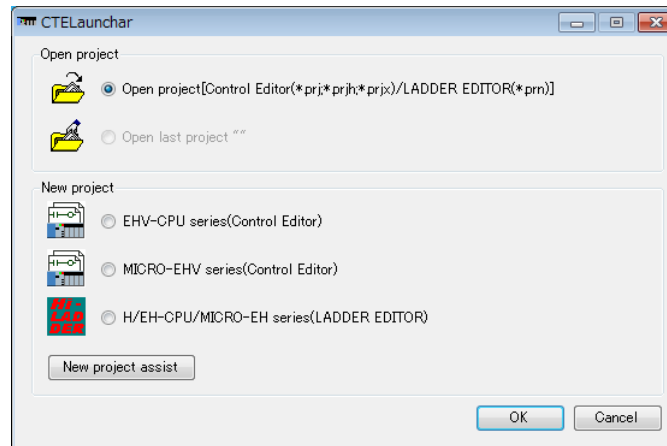

Fig. 2.1.2   Project selection window

Please choose from 5 options below to open a project.

When creating a new project, if you do not know which editor to select, click the [New project assist] button.

By selecting the type and configuration of CPU to be connected along the two steps, CTELauncher determines and starts the appropriate editor.

- Open project

>Open the file selection window, select an existing project file and open it.

>Please refer to "Fig. 2.1.3   Open window".

- Open last project

>Open the last edited project.

>(It is inactive immediately after installation.)

- EHV-CPU series (Control Editor)

>Start of CTE and create a new project in EHV-CPU mode.

- MICRO-EHV series (Control Editor)

>Start of CTE and create a new project in MICRO-EHV mode.

- H / EH-CPU / MICRO-EH series (LADDER EDITOR)

>Start of LEW. A window will appear asking you to confirm that you want to delete the last backup that LEW holds before launching.

>Please refer to "Fig. 2.1.4   LEW new creation confirmation window".

[New project assist] button

>Open the New project assist window.

>Please refer to "Fig. 2.1.5   New project assist window".
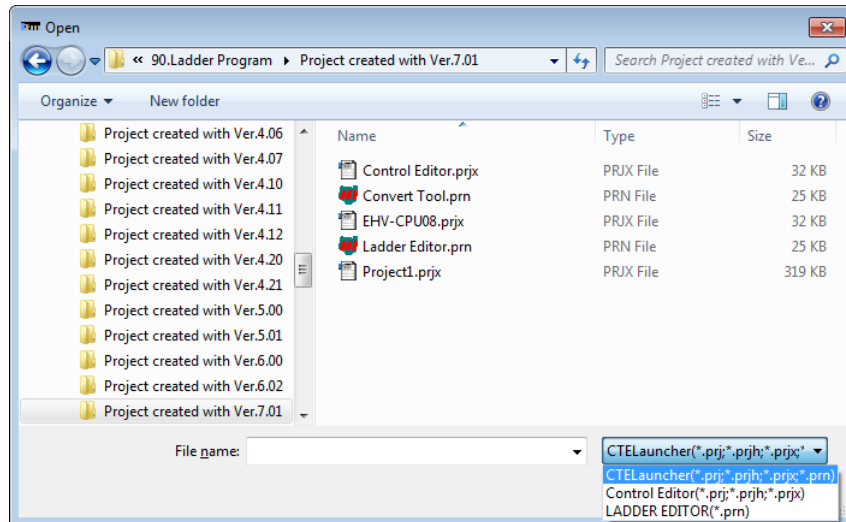
Fig. 2.1.3   Open window

File name: Select the file type displayed on the display.

    CTELauncher (*.prj;*.prjh;*.prjx;*.prn)   Display CTE and LEW project files.

    Control Editor (*.prj;*.prjh;*.prjx)   Display the CTE project file.

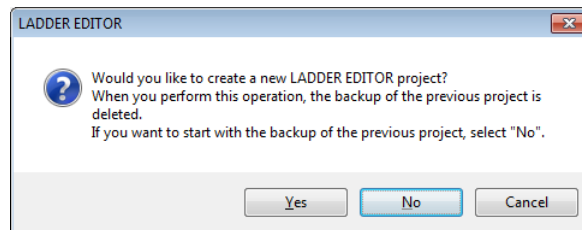   LADDER EDITOR (*.prn)   Display the LEW project file.

Fig. 2.1.4   LEW new creation confirmation window

Yes   Delete the last backup and create a new project.

No   Open the last backup file.

Cancel   Return to the project selection window.
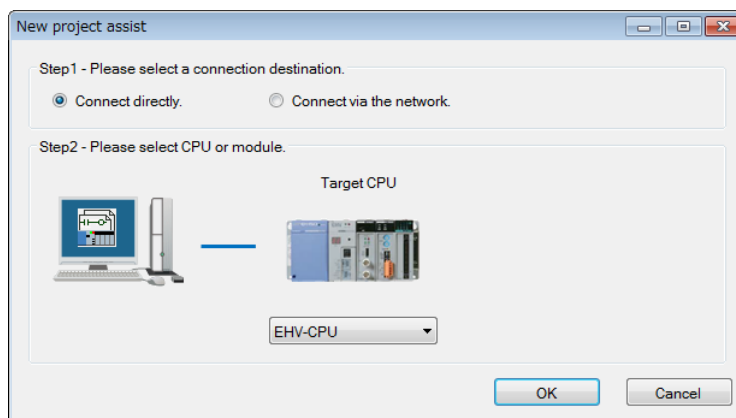
Fig. 2.1.5　New project assist window

Step1 - Please select a connection destination.

Connect directly　　　　Select when connecting PC (Editor) and CPU (Target CPU) directly.

Connect via the network　Select when connecting PC (Editor) and CPU (Target CPU) via a network.

Step2 – Please select CPU or module.

When connecting directly, selecting the target CPU starts up the editor (CTE / LEW) corresponding to the selected target CPU.

When connecting via a network, selecting the relay CPU or module and the target CPU starts up the editor (CTE / LEW) that corresponds to the selected target CPU.

Table 2.1.1　Connection destination and target CPU

Connection destination	Relay CPU or module	Target CPU	Launcher editor	
			CTE	LEW
Directly	-	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓
		MICRO-EHV	✓	
		MICRO-EH		✓
Via network	EHV-CPU	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓
	EH-CPU	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓
	H-CPU	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓
	Ethernet module (EHV)	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓
	Ethernet module (EH)	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓
	Ethernet module (H)	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓
	Remote station (EHV)	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓
	Remote station (H)	EHV-CPU	✓	
		EH-CPU		✓
		H-CPU		✓

(2)   Start of Control Editor

1] Select [Control Editor] in [Control Editor] in [Program] in [Start].
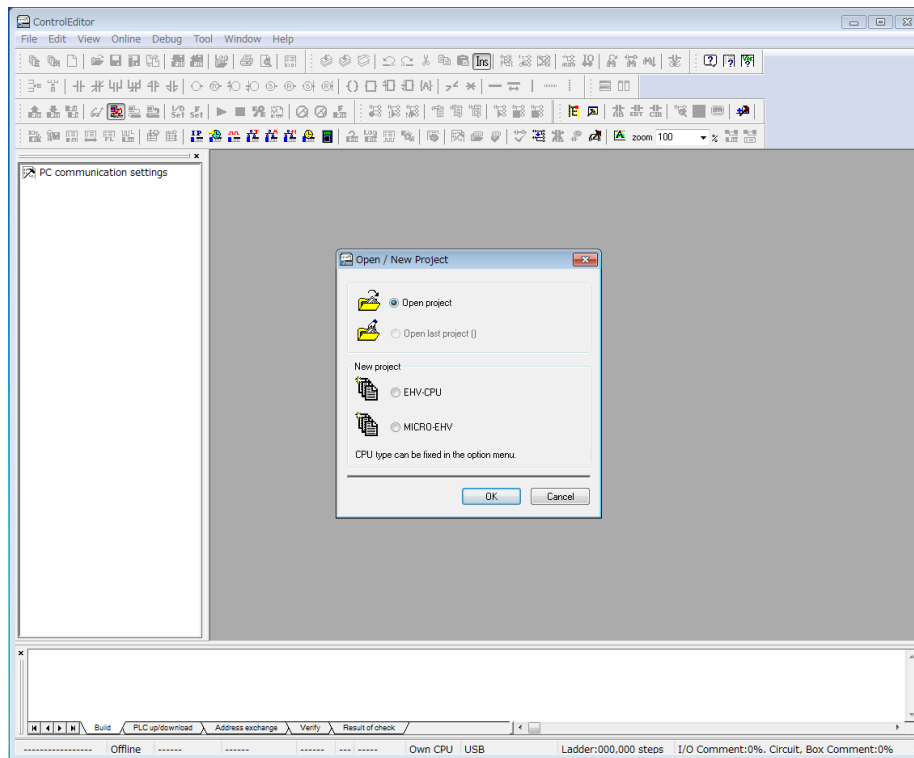

Fig. 2.1.6   Control Editor Splash window

Fig. 2.1.7   Start window of Control Editor

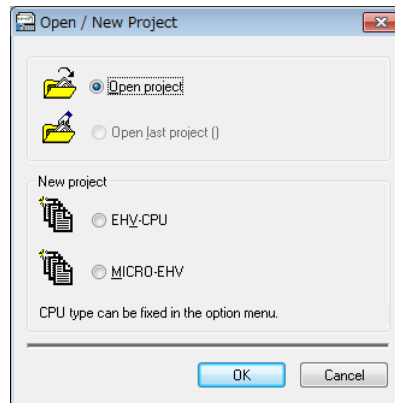2] Open / New Project window is displayed at first.

Fig. 2.1.8   Project selection window

Select from four choices and click [OK] button.

- Open project: A saved project file is opened.

- Open last project: A project file used in the last time is opened.

- New project EHV-CPU: A new project file for EHV-CPU is created.

- New project MICRO-EHV: A new project file for MICRO-EHV is created.

N o t e

When opening the file of which capacity is large in selecting "Open project", it may take time to display it (some seconds to dozens of seconds).

3] If "Open project" is chosen and click OK, Program Setting window appears.

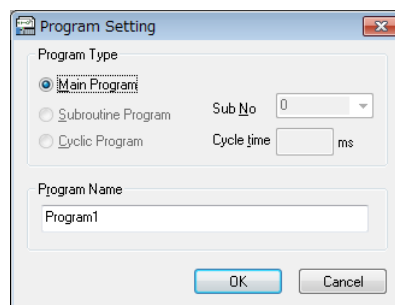Since it is new project, only "Main Program" is active.

Enter a program name.

Fig. 2.1.9   Programming Setting window
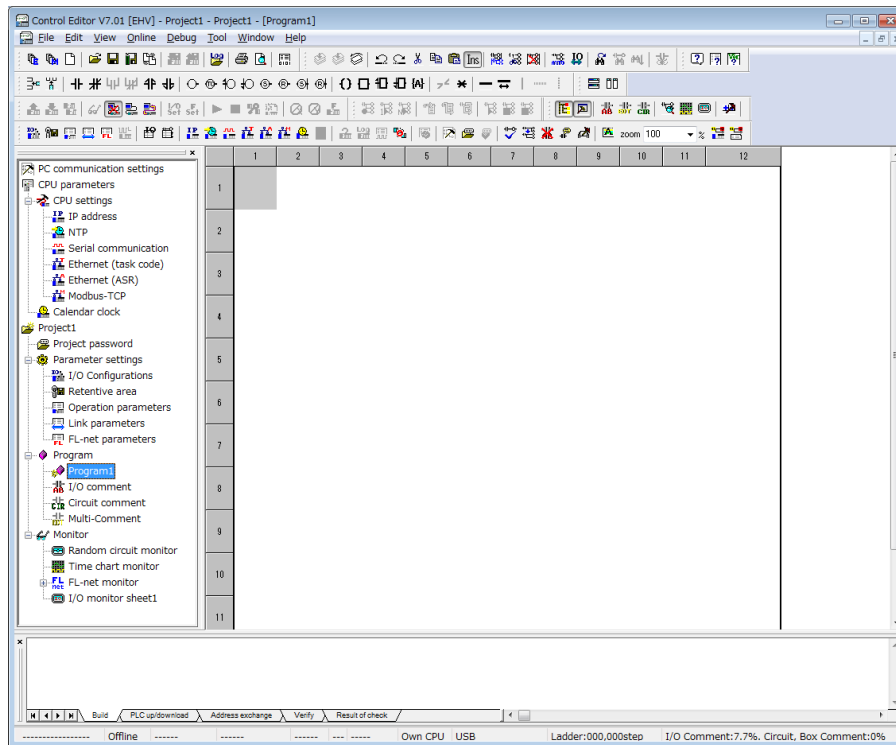
4] The following window is displayed.

Fig. 2.1.10　Initial window

N o t e

The model mode that you select when you create a new project is fixed to operate the following.

- Open an existing project

- Read PLC

(3)　Start of LADDER EDITOR for Windows®

Please refer to "LADDER EDITOR for Windows® Instruction Manual (NJI-342*(X) and NJI-673*(X))" for information on LEW operation.

2.2   File Handling

This section describes the handling of files for Control Editor.

(1) Creating a new project

When you want to create a new project file, you can create a new project by clicking the following menu or icon. Control Editor can open only one project.

a) For EHV-CPU

Menu: [File] - [New] - [New Project] - [EHV-CPU]

Icon:

b) For MICRO-EHV

Menu: [File] - [New] - [New Project] - [MICRO-EHV]

Icon:

(2) Creating a new program

When a program sheet is added within the same project, you can add a new program sheet by clicking the following menu or icon. A window shown in the Fig. 2.1.9 appears. Select a program type, enter a program name, and then click the [OK] button. The program type includes three types shown below.

Menu: [File] - [New] - [New Program]

Icon:

a) Main program

This program is always executed. Multiple main programs can be registered (up to 99 sheets for EHV-CPU series; up to 32 sheets for MICRO-EHV). The program is executed from the top in the order indicated in the project tree.

b) Subroutine

A subroutine is a program executed only when the CAL command is called. One subroutine program is between the SB n (n is a subroutine No.) and the RTS commands. If the subroutine program is selected when adding a new program sheet, a circuit enclosed in the SB and RTS commands is automatically inserted. A maximum of 200 subroutine programs can be created. (SB 0 to 199).
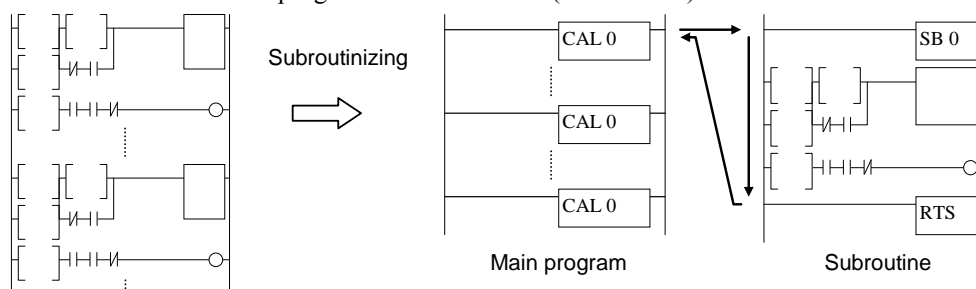

Fig. 2.2.1   Sub routinizing of Main program

c) Cyclic program

A program executed at a fixed cycle periodically is called a cyclic program. One cyclic program is between the INT(n) (n is a cyclic time [ms]) and the RTI commands. If the cyclic program is selected when adding a new program sheet, a circuit enclosed in the INT and RTI commands is automatically inserted. A maximum of 4 cyclic programs can be created (cycle is EHV-CPU series: 1 to 60,000 [ms], MICRO-EHV series: 5 to 60,000 [ms]).

N o t e

- You cannot create two or more cyclic scans with the same cycle cannot be created.
- When a subroutine or a cyclic program is used, the subroutine and cyclic programs have to be behind a main program of which the END command is always input at the end of it (at the end of the last program sheet if a main program has several sheets). Between the subroutine and cyclic programs, both can be preceded.

(3) Open file

When a project stored in a file is opened, you can open the file by clicking the following menu or icon. If the file size is larger, it may take some time to display it. (some seconds to several tens of seconds)

Menu: [File] - [Open]

Icon:

(4) Close

You can close a project by clicking

Menu: [File] - [Close]

(5) Save file

You can save a project by clicking the following menus or icon.

Menu: [File] - [Save As]

Menu: [File] - [Save]

Icon: (Save)

Ｎ ｏ ｔ ｅ

- When the Save is performed, an existing file is overwritten without displaying anything on the window. This function can be used only when a file has been created by performing the Save As. When the file name does not exist, the Save As window appears.

- A project created newly and a project downloaded from the CPU module do not have their file names. When a project is downloaded to the CPU and then that project is uploaded even if the project is opened from the file, its file name is cleared. Therefore, the Save As dialog appears even if the Save is performed.

- File extension has been changed from "prj" to "prjh" since Ver.4.20 because of incompatibility in bit comment of word register. For this reason, save dialog will open by [File]-[save] operation for prj file. Be sure to save as prjh format file.

- File extension has been changed to "prjx" since Ver.5.00 and a file size is smaller than Ver.4.21 and early version. Furthermore, saving in the previous file formats is also supported.

  Refer to "Fig. 2.2.2　Save AS" for the 4 selectable formats. If the format before Ver.4.21 is selected, the information about unsupported functions is not saved. Save the project by following the confirmation massage.

  Refer to "Fig. 2.2.3　Project saving confirmation massage" for the confirmation massage. And, refer to "Table. 2.2.1 File formats and supported functions" for supported functions of each format.

  Save the project by following the file format of current editing project. As an example, [prj] file will be overwritten by using the format of Ver.4.01 to 07 if the current editing project was saved by the format of Ver.4.01 to 07. The project is not saved in different format.
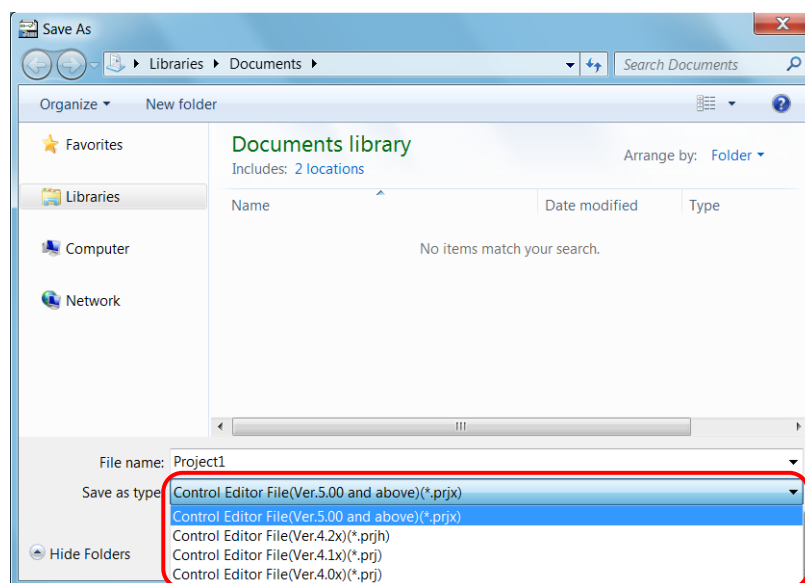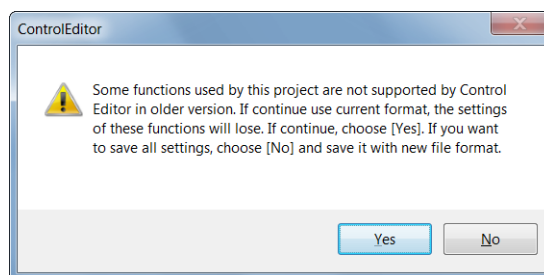

Fig. 2.2.2　Save AS

Fig. 2.2.3   Project saving confirmation massage

Table 2.2.1   File formats and supported functions

Added function	(1)	(2)	(3)	(4)	(5)	(6)	(7)
MICRO-EHV	—	✓	✓	✓	✓	✓	✓
Scan Time Error [Interrupt scan]	—	✓	✓	✓	✓	✓	✓
Sheet password	—	—	✓	✓	✓	✓	✓
Data memory backup	—	—	✓	✓	✓	✓	✓
Project File Version Manage	—	—	✓	✓	✓	✓	✓
I/O configuration of new modules	—	—	✓	✓	✓	✓	✓
Memory board commands (MBRD, MBWR)	—	—	—	✓	✓	✓	✓
Analog filter in option board setting	—	—	—	✓	✓	✓	✓
Data logging function	—	—	—	✓	✓	✓	✓
Time chart monitor	—	—	—	✓	✓	✓	✓
Memory board battery error (H73)	—	—	—	✓	✓	✓	✓
Separate I/O comment on each bit	—	—	—	✓	✓	✓	✓
Monitored interval setting	—	—	—	✓	✓	✓	✓
Link/Remote waiting time	—	—	—	✓	✓	✓	✓
ASCII characters to Floating point conversion command (ASCFL)	—	—	—	—	✓	✓	✓
Linear increasing/decreasing command (specifying acceleration/deceleration time) (SLOPT)	—	—	—	—	✓	✓	✓
Linear increasing/decreasing command (specifying acceleration/deceleration rate) (SLOPR)	—	—	—	—	✓	✓	✓
Origin return command (PLHM)	—	—	—	—	✓	✓	✓
Force input	—	—	—	—	✓	✓	✓
Fl-net3 module setting	—	—	—	—	✓	✓	✓
Polynomials supported	—	—	—	—	✓	✓	✓
Special I/O configuration (additional settings)	—	—	—	—	✓	✓	✓
Simplified positioning parameter setting	—	—	—	—	✓	✓	✓
Assignment of EHV-CPU08	—	—	—	—	—	—	✓
Assignment of module compatible counter unit (EH-CUEL) for H series	—	—	—	—	—	—	✓

(1) : Ver.3.01 or lower

(2) : Ver.4.01 to Ver.4.07

(3) : Ver.4.10 to Ver.4.12

(4) : Ver.4.20 to Ver.4.21

(5) : Ver.5.00 to Ver.5.01

(6) : Ver.6.00 to Ver.6.02

(7) : Ver.7.01 or higher

✓ :This function is saved in the project.

— :This function is not saved in the project. (Unsupported)

N o t e

When open the project file created by Ver.3.01 Control Editor, please select [Control Editor File (Ver.4.0*)].

However, it does not support MICRO-EHV, so it is unable to read project file of MICRO-EHV mode.

(6) Verification

Specify a project file stored in the hard disc, etc. A project opened currently and a specified project are verified and then the result is displayed in the Output result window.

Menu: [File] - [Verify With file]

(7) OBC export (Only for MICRO-EHV series)(Ver.4.01 or higher)

An OBC file for downloading the user program from an external storage device to PLC is saved.

Menu: [File] - [OBC export]

Icon:

(8) OBC import (Only for MICRO-EHV series)(Ver.4.01 or higher)

Control Editor reads an OBC file.

If you want to import large files, it may take some time to be done (several seconds to several tens of seconds).

Menu: [File] - [OBC import]

Icon:

(9) Data Memory view (Ver.6.00 or higher)

To view the data memory information saved in the project file, open the file with the following menu or icon.

Menu: [File] - [Data Memory view]

Icon:

(10) Open CPU Log File (Ver.4.20 or higher)

To view the CPU log saved in the file, please open the file with the following menu or icon. For details, refer to "Section 6.10 CPU Log File".

Menu: [File]－[Open CPU Log File]

Icon:

(11) Exit Control Editor

You can close Control Editor.

Menu: [File] - [Exit]

2.3   Window Structure

An initial window of Control Editor is shown below. This consists of a project tree window in the left side, a ladder window in the middle, and an output result window in the bottom.

Title bar   Project name or program name currently opening is displayed.

Menu bar   Selects an operation to execute from pull-down menu.

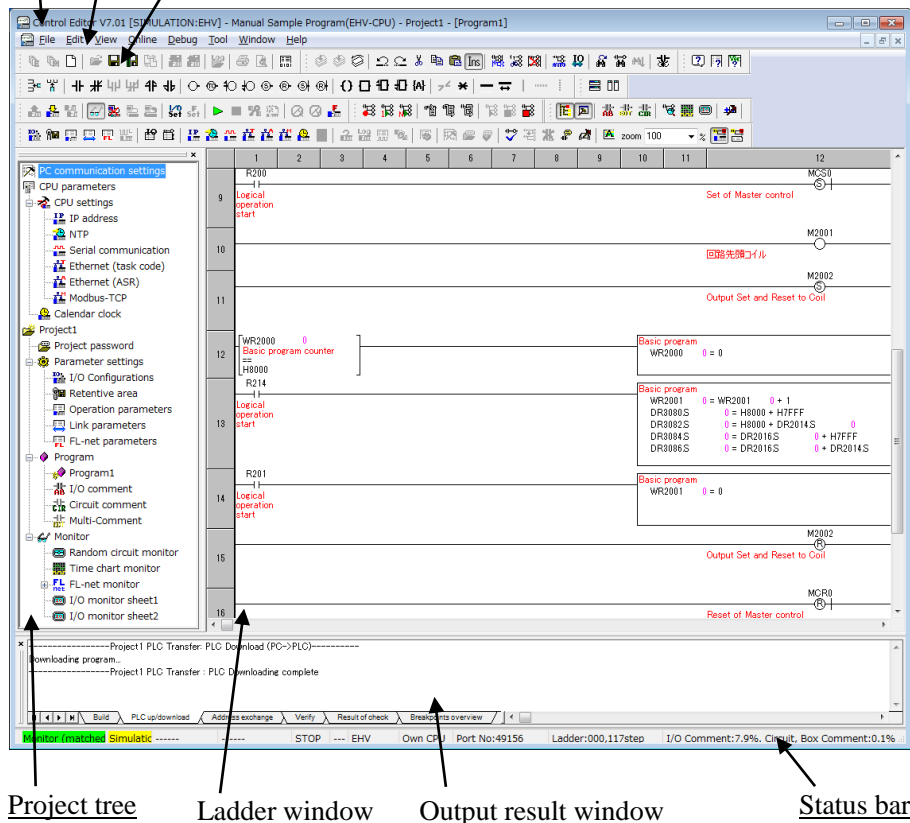Tool bar   Each function icon is displayed.

Project tree   Ladder window   Output result window   Status bar

Fig. 2.3.1   Window structure of Control Editor

Ladder window:	Window to create a ladder program
	This consists of Line No. in vertical direction and Row No. (1 to 12) in horizontal direction.
Project tree:	Parameter settings information downloaded to CPU such as I/O configuration, Retentive area and etc., Program comment, I/O monitor information, and etc are displayed in tree structure.
Output window:	Processing result such as error information in Build is displayed.

Icons in the toolbar can be customized.

It can select whether to display Project tree and Output result windows.

Status bar:

Monitor (matched)	Online	In ref. disabled	Out ref. disabled	RUN	--- MVH	Own CPU	USB	Ladder:000,149step	I/O Comment:1.5% Circuit, Box Comment:0%
(A)	(B)	(C)/(M)	(D)	(E)	(F)(G)	(H)	(I)	(J)	(K) (L)

Fig. 2.3.2   Status bar

Table 2.3.1   Description of Status bar

	Status	Description
A	Monitor	Indicates if program PC and CPU is matched.
B	Mode	Indicates Online/Offline/On-direct/Simulation. (Simulation is added from Ver.6.00)
C	Input refresh disabled	Indicates the status of input refresh disabled. (MICRO-EHV only)
D	Output refresh disabled	Indicates the status of output refresh disabled. (MICRO-EHV only)
E	CPU operation	Indicates RUN / STOP / HALT. (HALT state is added from Ver.6.00)
F	ERR	When CPU detects error, "ERR" is displayed.
G	CPU type	Indicates accessed CPU type.
H	CPU of connecting destination	Indicates the connecting destination in on-line mode. Displays own station, link No., or link station No.
I	Connecting method	Indicates communication type. In case of Ethernet, IP address is indicated as well.
J	Ladder	Indicates the number of ladder steps used. This is updated when "Build" is operated.
K	I/O comment	Indicates the I/O comments used.
L	Circuit, Box comment	Indicates comment used for Circuit and Box.
M	Input is forcing	Indicates if accessed PLC input is forcing. (Only for EHV-CPU)(Ver.5.00 or higher)

(A) Monitor

Indicates if program PC and CPU is matched.

Table 2.3.2   Display Pattern of Monitor Status

Display Pattern	Status
------	Not in monitor status
Monitor(matched)	In monitor status, and programs are consistent
Monitor (unmatched)	In monitor status, and programs are inconsistent

(B) Mode

Indicates Online/Offline/On-direct/Simulation.

Table 2.3.3   Display Pattern of Mode Status

Display Pattern	Status
Offline	In offline mode
Online	In online mode
On-direct	In on-direct mode
Simulation	In monitor status, and program are consistent with simulation mode (Ver.6.00 or higher)
Simulation	In monitor status, and program are inconsistent with simulation mode (Ver.6.00 or higher)

(C) Input refresh disabled (Only for MICRO-EHV)(Ver.4.01 or higher)

Indicates the status of input refresh disabled.

Table 2.3.4   Display Pattern of Input Refresh Disabled Status

Display Pattern	Status
------	Input refresh enabled (normal status)
In ref. disabled	Input refresh disabled status

(D) Output refresh disabled (Only for MICRO-EHV)(Ver.4.01 or higher)

Indicates the status of output refresh disabled.

Table 2.3.5   Display Pattern of Output Refresh Disabled Status

Display Pattern	Status
------	Output refresh enabled (normal status)
Out ref. disabled	Output refresh disabled status

(E) CPU operation

Indicates RUN / STOP.

Table 2.3.6   Display Pattern of Operation Status

Display Pattern	Status
STOP	Stopped
RUN	Running
HALT	During stop (Ver.6.00 or higher)

(F) ERR

When CPU detects error, "ERR" is displayed.

Table 2.3.7   Display Pattern of Error Status

Display Pattern	Status
------	No error
Err	Error

(G) CPU type

Indicates accessed CPU type.

Table 2.3.8   Display Pattern of PLC Type

Display Pattern	Status
------	Offline
EHV	Connecting with EHV-CPU series in online / on direct / simulation mode
MVL	Connecting with the standard version of MICRO-EHV in online / on direct / simulation mode (Ver.4.01 or higher)
MVH	Connecting with high performance version of MICRO-EHV in online / on direct / simulation mode (Ver.4.01 or higher)

(H) CPU of connecting destination

Indicates the connecting destination in on-line mode. Displays own station, link No., or link station No.

(Please refer [5.2 PC Communication Settings] from details about connection)

Example 1: Case of local station

[Own CPU] is displayed.

Example 2: Case of link No.1, link station No.10

[Other CPU 01-10] is displayed.

Example 3: Case of link No.3, link station No.8

[Other CPU 03-08] is displayed

(I) Connecting method

Indicates communication type. In case of Ethernet, IP address is indicated as well.

Table 2.3.9   Display Pattern of Connection Type

Display Pattern	Status
USB	USB connection
Serial:4.8Kbps	Serial port connection. Speed: 4,800 bps
Serial:9.6Kbps	Serial port connection. Speed: 9,600 bps
Serial:19.2Kbps	Serial port connection. Speed: 19,200 bps
Serial:38.4Kbps	Serial port connection. Speed: 38,400 bps
Serial:57.6Kbps	Serial port connection. Speed: 57,600 bps
Serial:115.2Kbps	Serial port connection. Speed: 115,200 bps (Only for MICRO-EHV)(Ver.4.01 or higher)
Serial:Auto	Serial port connection. Speed: automatically detected
IP:***.***.***.***	Ethernet connection * is IP address
Port No.:*****	Indicates the port No. to be Ethernet connected in simulation mode. * Is the port number. (Ver.6.00 or higher)

(J) Ladder

Indicates the number of ladder steps used. This is updated when "Build" is operated.

(K) I/O comments

Indicates the I/O comments used.

(L) Circuit, Box comment

Indicates comment used for Circuit and Box.

(M) Input is forcing (Only for EHV-CPU)(Ver.5.00 or higher)

Indicates if accessed PLC input is forcing.

Table 2.3.10   Display Pattern of Input Force Status

Display Pattern	Status
------	Input force removed
Force	In input force

N o t e

In monitor mode, it will show the determination that whether programs are matched or not. About the unrelated comments and data logging information, PLC verification or file verification can still check the consistency of the programs.

Table 2.3.11   Determinate Contents of Monitor Status

Display Pattern	Status			
	Program	Parameter Setting	Comments Information	Data Logging Setting
------	Excluded	Excluded	Excluded	Excluded
Monitor(matched)	Consistent	Consistent	Excluded	Excluded
Monitor(unmatched)	Consistent	Inconsistent	Excluded	Excluded
	Inconsistent	Consistent	Excluded	Excluded
	Inconsistent	Inconsistent	Excluded	Excluded

Ladder and Comment

(1) Ladder

Ladder is shown in the unit called "step". Although a user program is created combining some commands, the number of steps used for each command is different. (Refer to the manual of EHV-CPU for the number of steps of each command.) The number of steps written in CPU module is the sum of all number of steps of a normal scan, a cyclic scan, a subroutine, and etc. The maximum number of steps of CPU module is fixed. Therefore, create a program not to exceed this.

Table 2.3.12   Program capacity (EHV-CPU series)

Item	EHV-CPU128	EHV-CPU64	EHV-CPU32	EHV-CPU16	EHV-CPU08	[Reference] EH-CPU548
Program capacity	131,070 steps	65,534 steps	32,766 steps	16,382 steps	8,190 steps	48,511 steps
Command size	48 bits per 1 step					32 bits per 1 step
Comment capacity	from 1M bytes (See chapter 9)	from 512 K bytes (See chapter 9 for details)				No comment storage function

Table 2.3.13   Program capacity (MICRO-EHV series)

Item	MVH-*64**	MVH-*40**	MVL-*64**	MVL-*40**	MVL-*20**	[Reference] EH-*64**
Program capacity	16,382 steps					16,382 steps
Command size	48 bits per 1 step					32 bits per 1 step
Comment capacity	from 128 K bytes (See chapter 9 for details)					(No comment storage function)

N o t e

Since the END command is added to the program inside automatically, the number of steps written in CPU module is the value that 2 steps of the END command is added to the ladder displayed. Therefore, a program capacity of EHV-CPU128 is 131,072 steps but 131,070 steps can be used actually.

(2) Comment

Not only user programs but also comments are transferred to the CPU and stored to the Flash memory. Since the comment is stored to the memory for comment, the comment capacity is different from the number of ladder steps.

N o t e

The I/O comment capacity is not 0% at the time of creation of a new project because comments in the special internal output are included. If the I/O comment capacity is insufficient, unnecessary comments in the special internal output can be deleted.

2.4   Project Tree

This section describes the project tree window.

[EHV-CPU mode]
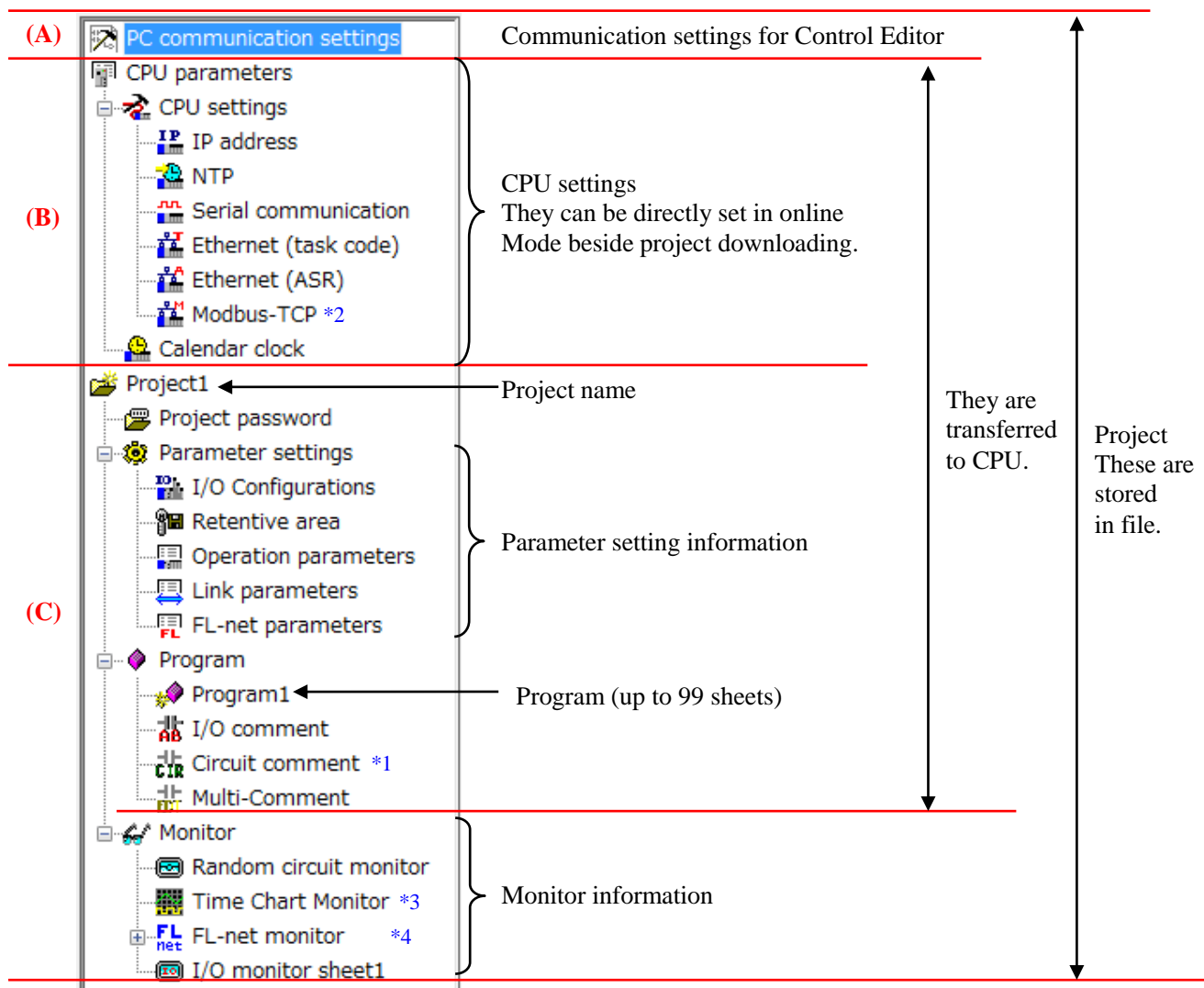
Fig. 2.4.1   Project tree (EHV-CPU series)

(A) PC communication settings information

This is communication setting of PC. Chose USB, Ethernet or serial. This setting is valid only in offline mode.

(B) CPU parameters information

This is communication setting in CPU module. If it is set in online mode, information is sent immediately after setting. The setting information will be reflected after the next rebooting of CPU.

(C) Information related with project

This setting information is a part of user program. It is up/downloaded from/to CPU together with ladder program.

N o t e

*1 "Circuit comment list" is added from Ver.2.14.

*2 "Modbus-TCP" is added from Ver.4.03.

*3 "Time Chart Monitor" is added from Ver.4.20.

*4 "FL-net monitor" is added from Ver.6.00.

[MICRO-EHV mode]
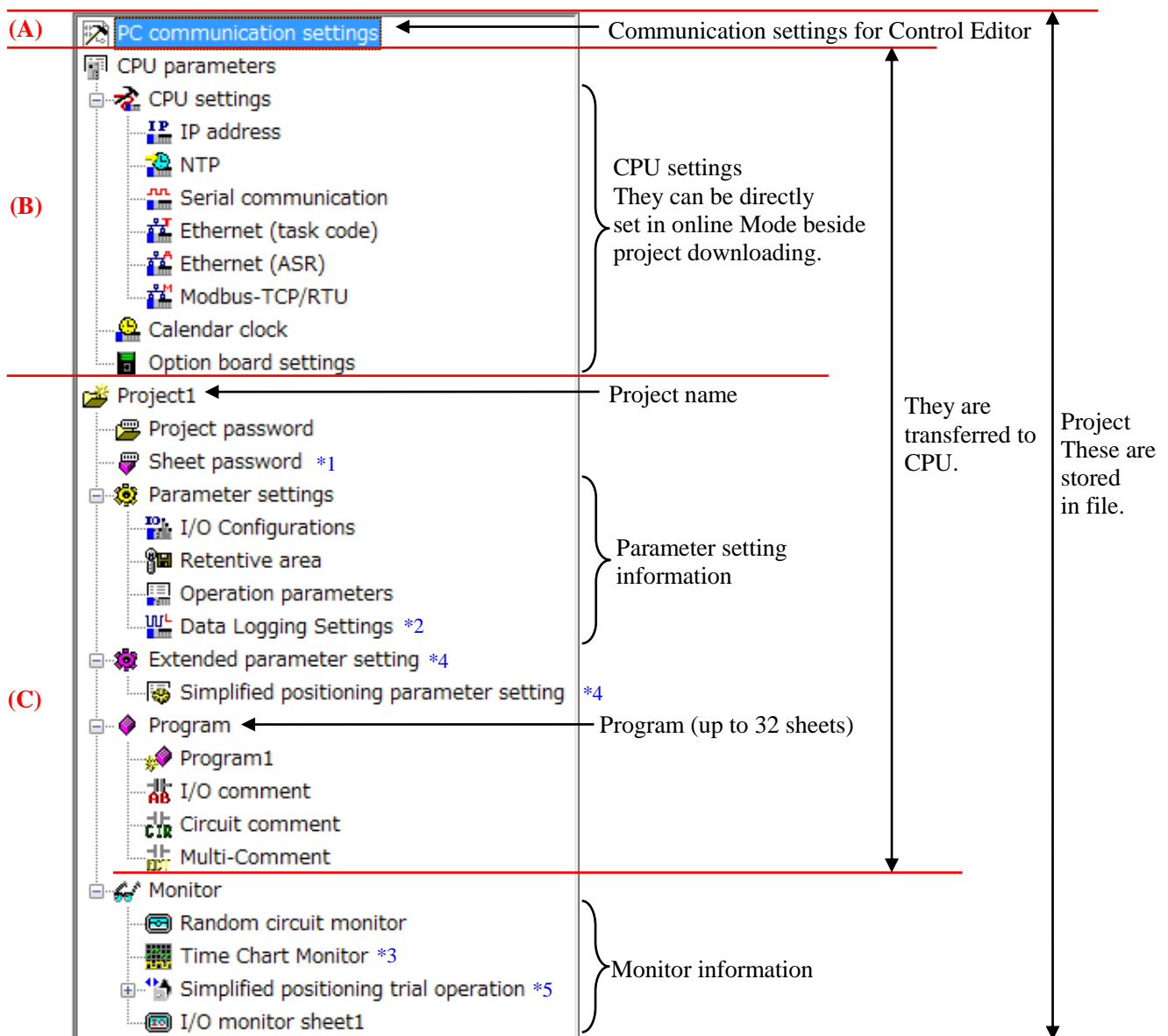
Fig. 2.4.2   Project tree (MICRO-EHV series)

(A) PC communication settings information

This is communication setting of PC. Chose USB, Ethernet or serial. This setting is valid only in offline mode.

(B) CPU parameters information

This is communication setting in CPU module. If it is set in online mode, information is sent immediately after setting. The setting information will be reflected after the next rebooting of CPU.

(C) Information related with project

This setting information is a part of user program. It is up/downloaded from/to CPU together with ladder program.

N o t e

*1 "Sheet password" is added from Ver.4.10.

*2 "Data Logging Settings" is added from Ver.4.20.

*3 "Time Chart Monitor" is added from Ver.4.20.

*4 "Extended parameter setting" is added from Ver.5.00.

*5 "Simplified positioning trial operation (Ch.1, Ch.2, Ch.3)" is added from Ver.5.00.

N o t e

If the program, comment or parameter are changed, the symbol "*" is displayed as the right figure. Program cannot be downloaded to CPU when this symbol is displayed. Be sure to execute "Build (refer to section 4.3)" operation before downloading. The program is checked in Build operation. If no error found, "*" disappears and, the program can be downloaded.
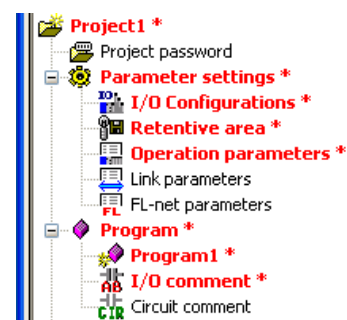
Fig. 2.4.3   "*" mark

N o t e

Project and program sheet

Several program sheets (up to 99 sheets for EHV-CPU series; up to 32 sheets for MICRO-EHV series) can be registered into one project. But Control Editor can open only one project. If you want to open several projects, you should run several Control Editors. Even if Control Editor has been already run, another Control Editor can be run from the Start menu or by double-clicking the prj file(*1) as usual. Refer to section 4.5 for more information.

Project
    (Several program sheets, comments, and each setting information are included)

Parameter setting information
    (I/O configuration, operation parameter, etc.)

Program sheet (up to 99 sheets per project)
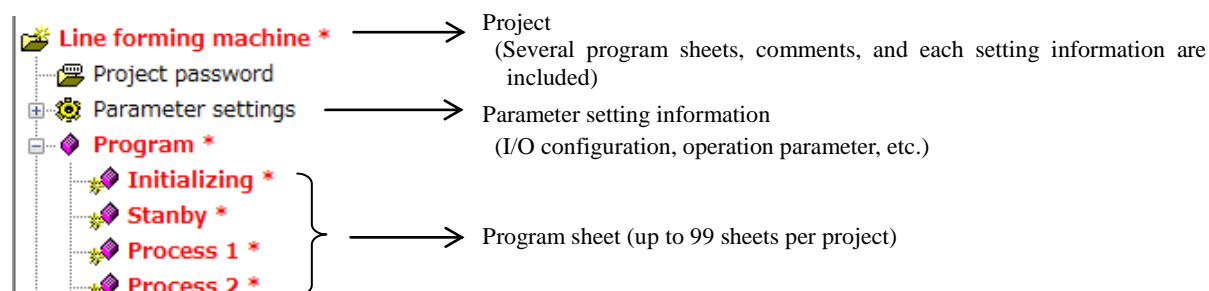
Fig. 2.4.4   Project and Program sheet

N o t e

*1 File extension has been changed from "prj" to "prjh" since Ver.4.20. Previous prj file can be opened with Ver.4.20.

And, File extension has been changed from "prjh" to "prjx" since Ver.5.00.

Previous "prj" and "prjh" file can be opened with Ver.5.00.

2 – 20

2.5   Toolbar icons

This section describes icons in the tool bar.

Table 2.5.1   Icons in tool bar

Icon	Function name	Description
	New project (EHV-CPU)	Creates a new project for EHV-CPU. (Ver.4.10 or higher)
	New project (MICRO-EHV)	Creates a new project for MICRO-EHV. (Ver.4.10 or higher)
	New program	Adds a new program sheet.
	Open	Opens an existing project.
	Save	Saves a project.
	Save As	Saves under a new project name.
	Verify	Checks a project saved in a computer against a project displayed on the Control Editor.
	OBC export	Exports an OBC file. (Only for MICRO-EHV)
	OBC import	Imports an OBC file. (Only for MICRO-EHV)
	CPU Log open	Opens log file and it is shown in CPU log dialog. (Ver.4.20 or higher)
	Data Memory view	Displays information on the data memory (internal output data) included in the project file. (Ver.6.00 or higher)
	Print	Prints ladder program, comment, CPU parameter, etc.
	Print preview	Displays an image of printing.
	Build	Executes error check. If there is no error, the circuit is settled and can be transferred to CPU. Online change in RUN is executed in on-direct mode.
	Build without I/O Config	Can execute the Build even if external I/Os which do not exist in the I/O configuration are used in a program. When this is executed, a "*" mark is attached to "I/O Configurations" in Project tree. PLC Downloading and On-direct connection cannot be executed even if this operation is executed properly. In order to execute these operations, execute the Build after performing the I/O configuration.
	Reverse Build	Back to the last built project. Currently Edited circuit is cancelled.
	Undo	Back to the last operation. Once circuits are built, undo does not work.
	Redo	Redoes once more an operation undone by "Undo" function.

(Continued from the preceding page)

Icon	Function name	Description	
	Cut	Cuts highlighted area. It can be pasted on the specified position until next copy or cut operation is executed.	
	Copy	Copies highlighted area. It can be pasted on the specified position until next copy or cut operation is executed.	
	Paste	Pastes the cut area or the specified area fro copy on the specified position.	
Ins	Paste Mode (Insert)	Switches insert mode when pasting circuits. (overwrite mode / insert mode) (Ver.4.10 or higher)	
	Move circuit	Moves a circuit range specified with the circuit No. to the specified circuit No.	
	Copy circuit	Copies a circuit range specified with the circuit No. to the specified circuit No.	
	Delete circuit	Deletes a circuit range specified with the circuit No.	
	Auto Programming	Creates two or more circuits of which I/O No. is different regularly. Creates I/O No. automatically, memorizing the consecutive circuit, and can create another circuit which is consecutive.	
IO	Change address	I/O No. change by the I/O No., by the slot, and by the remote master station, and executes the contact A ←→ the contact B in the range of the specified circuit No.	
	Find	Goes to specified 'Circuit No.' and 'Line No.' Finds and replaces specified 'I/O No.' and 'Comment'.	
	Contact <=> Coil	Finds a coil from the specified contact, or a contact from the coil.	
	Continue search	Finds continually when there are come targets to find.	
	Property	Displays a property window for each symbol.	
	Insert Line	Inserts one line between circuits.	
	Insert Column	Inserts one row in vertical.	
	Normally open-contact	Circuit connects when .reference is ON.	Usable I/O: [EHV-CPU series] X, Y, R, M, L, EX, EY, WRx.x, WNx.x TD, TDN, SS, MS, TMR, WDT, CU, RCU, CT [MICRO-EHV series] X, Y, R, M, WRx.x, TD, TDN, SS, MS, TMR, WDT, CU, RCU, CT
	Normally closed-contact	Circuit connects when .reference is OFF.	
	Normally open-contact (OR connection)	Normally open-contact connecting to an upper circuit by OR.	
	Normally closed-contact (OR connection)	Normally closed-contact connecting to an upper circuit by OR.	

(Continued from the preceding page)

Icon	Function name	Description
	DIF	Detecting contact of rising edge. Detects the rising of the preceding contact or the comparison box, and only one scan is turned on. DIF No. is unnecessary.
	DFN	Detecting contact of falling edge. Detects the falling of the preceding contact or the comparison box, and only one scan is turned on. DFN No. is unnecessary.
	Coil	Activated when conditions are fulfilled.	
	EU coil	Activated in one scan time at rising edge of conditions	Usable I/O: [EHV-CPU series] Y, R, M, L, EY, WRx.x, WNx.x, CL [MICRO-EHV series] Y, R, M, WRx.x, CL
	ED coil	Activated in one scan time at falling edge of conditions	
	Set coil	Activated when conditions are fulfilled and the status is kept.	
	Reset coil	Deactivated when conditions are fulfilled.	
	Timer / Counter	Timer or counter coil	Usable I/O: TD, TDN, SS, MS, TMR, WDT CU, RCU, CTU, CTD
	MCS coil	I/O addresses are used as MCS n (n=0 to 49) and a circuit between MCS n and MCR n is executed when a MCS coil turns on.
	MCR coil	This is used combined with MCS. I/O addresses are MCR n (n=0 to 49). Do not enter the input condition.
	Comparison box	Circuit connects when the result of arithmetic box is true.
	Processing box	When conditions are fulfilled, commands in the box are executed from the 1st line.
	EU processing box	Commands in the box are executed from the 1st line at rising edge of conditions.
	ED processing box	Commands in the box are executed from the 1st line at falling edge of conditions.
	Circuit comment	A box to input circuit comment *1
	NOT	Reverses the operation result up to that time.
	Loop back	Uses when more than 11 contacts are needed. Put this symbols in 12th column and 1st column of the next line. They are connected.
	Horizontal line	Draws a horizontal line on the specified position (or range).
	Draw horizontal line	Draws a horizontal line on whole free space (area without symbol) in the line pointed with cursor.
	Vertical line	Draws a vertical line at the lower left of the specified position (or range).

(Continued from the preceding page)

Icon	Function name	Description
	Delete horizontal line	Deletes the horizontal line in the specified position (or range).
	Delete vertical line	Deletes the vertical line in the lower left of the specified position (or range).
	Project Tree Displayed/Not-displayed	Switches whether to display the project tree or not.
	Output Window	Switches whether to display the output window or not.
	I/O Comments	Displays a window of I/O comments.
	Circuit comments List	Displays a Circuit comments list.
	Multi-Comment	Displays a window for setting Multi-Comment.
	Random circuit monitor	A window for displaying circuits chosen from a program being displayed in the ladder window area is a random circuit monitor.
	Time Chart Monitor	Displays time chart monitor.
	Add I/O monitor pattern	Adds an I/O monitor pattern sheet.
	Toolbar	Displays a window for customizing the toolbar.
	PLC Upload	Uploads the program comment from PLC. It can be executed in Online mode and On-direct mode.
	PLC Download	Downloads the program comment to PLC. It can be executed in Online mode.
	PLC Verify	Verifies a program, comments, and CPU parameters which are being edited with PLC. It can be executed in Online mode.
	Circuit monitor	Executes the circuit monitor in Online mode.
	Offline	Switches to Offline mode.
	Online	Switches to Online mode.
	On-Direct	Switches to On-Direct mode in which the online change in RUN is executed. Programs in CPU and Editor have to be matched.
	RUN	Run the remote operation. It is available when RUN/STOP switch of CPU module is turned to Stop.
	STOP	Stop the remote operation. It is available when RUN/STOP switch of CPU module is turned to RUN.

(Continued from the preceding page)

Icon	Function name	Description
	Release occupation	Releases the status occupied from other peripherals or host.
	CPU initialize	Initializes CPU module. It can be executed in Online mode.
	Set / Reset	A function to set or reset the random I/O in Online mode.
	Force Set	A function to output only one random output while the CPU stops. It is useful function for wiring check.
	Force input	Displays a window for Force input. A function to fix value of random input forcibly. (Only for EHV-CPU)(Ver.5.00 or higher)
	Input refresh disabled	Disables output refresh. (Only for MICRO-EHV)
	Output refresh disabled	Disables output refresh. (Only for MICRO-EHV)
	Breakpoint list	Display the breakpoint list in the output result window. (Only for Simulation mode)(Ver.6.00 or higher)
	1 scan execution	Execute once from the beginning of the program to END command. (Only for Simulation mode)(Ver.6.00 or higher)
	N scans execution	Execute N times from the beginning of the program to END command. (Only for Simulation mode)(Ver.6.00 or higher)
	Step into	Execute one command. If the cursor position is immediately before the CAL command, the process transits to the subroutine. (Only for Simulation mode)(Ver.6.00 or higher)
	Step over	Execute one command. If the cursor position is CAL command, and stops at the next command CAL command by executing a subroutine. (Only for Simulation mode)(Ver.6.00 or higher)
	Step out	Execute one command. If the cursor position is within the subroutine, exit from the subroutine and stop at the command following the CAL command. (Only for Simulation mode)(Ver.6.00 or higher)
	Continue	Restart execution from the stopped position. (Only for Simulation mode)(Ver.6.00 or higher)
	Stop	Stop execution. (Only for Simulation mode)(Ver.6.00 or higher)
	CPU reset	Return to the initial state. Do not initialize the program. (Only for Simulation mode)(Ver.6.00 or higher)

(Continued from the preceding page)

Icon	Function name	Description
	Editor Communication Setting	Displays a window for setting Editor communication.
	IP Address	Displays a window for setting IP address.
	Setting NTP	Displays a window for setting NTP
	Serial Setting	Displays a window for setting Serial communication.
	Setting Ethernet (Task code)	Displays a window for setting Ethernet (Task code) communication.
	Setting Ethernet (ASR)	Displays a window for setting Ethernet (ASR) communication.
	Modbus-TCP/RTU	Displays a window for setting Modbus-TCP/RTU. MICRO-EHV series: Ver.4.01 or higher EHV-CPU series: Ver.4.03 or higher
	Calendar Clock Setting	Displays a window for setting Calendar clock.
	Option board settings	Displays a window for setting Option board. (Only for MICRO-EHV)
	Project Password Setting	Displays a window for setting a project password.
	Sheet Password Setting	Displays a window for setting a sheet password.
	I/O Configuration	Displays a window for setting I/O configuration.
	Retentive Area	Displays a window for setting Retentive area.
	Operation Parameters	Displays a window for setting Operation parameters.
	Link Parameters	Displays a window for setting Link parameters.
	FL-net Parameters	Displays a window for setting FL-net parameters.
	Data Logging Settings	Displays a window for setting Data logging settings. (Only for MICRO-EHV)(Ver.4.20 or higher)
	Simplified positioning parameter setting	Displays a window for setting simplified positioning parameter. (Only for MICRO-EHV)(Ver.5.00 or higher)
	CPU status	Displays the status of CPU module which is connected in Online mode and On-Direct mode.
	CPU Log	Indicates the CPU Log information such as error information, etc.

(Continued from the preceding page)

Icon	Function name	Description
	Data Logging status	Indicates the status window of data logging. (Only for MICRO-EHV)(Ver.4.20 or higher)
	Cross reference (Single I/O)	Indicates line No. and row No. for which the specified I/O is used.
	Cross reference (I/O list)	Indicates how all I/O or the specified I/O are used. The used I/O is marked '*', and the not used I/O is marked '–'.
	Program Check	Executes the duplex coil check and the edge command count.
	Circuit alignment	Carries out Circuit alignment.
	Delete unused I/O comment	Deletes I/O comments not used in the program at a time.
	Manual online change	Can determine the timing of online change in RUN by user.
	Skeleton Mode	Can input only circuit symbols without inputting I/O addresses. Symbol is inputted without displaying properties window for inputting I/O address by clicking icon for various ladder. And a cursor moves to next.
	Keyboard customize	Can customize the assignment of shortcut keys.
	View Setting	Can set various display color, a display format at the circuit monitor, a display magnification, etc.
	Simulation	Switch to simulation mode and start simulator. (Ver.6.00 or higher)
	Simulation settings	Displays a window for Simulation settings. (Ver.6.00 or higher)
	Tile Horizontal	Arranges programs side-by-side.
	Tile Vertical	Arranges programs one behind another.
	Using Help	Displays a Help window.
	Special Internal Output List	Displays a special internal output list.
	Version	Displays version information.

* When symbols cannot be input onto the current cursor position, those symbols are deactivated (gray indication).

* Icons for function not to operate may be activated. (Icon for monitor in offline mode, etc.)

* Displayed icons can be added and deleted by selecting [Customize] in [Tool] menu in [View] on the menu bar.

* Current Control Editor does not support the FBD function in [Symbol] in the Toolbar Customize.

* In Ver.4.12 or higher, there was an icon FBD in [Symbol], but FBD function is not supported by all the version.

* In Ver.6.00 or higher, "Debug" has been added to "Toolbar".
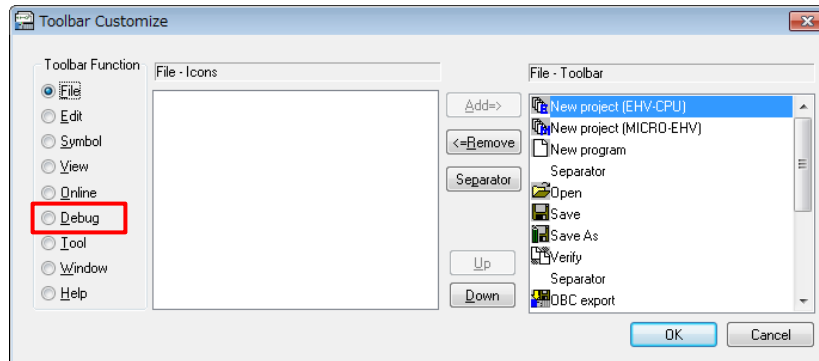
Fig. 2.5.1   Toolbar Customize window

N o t e

※1 Circuit comment is overwritten on the line a cursor is in.

2.6   I/O List

[EHV-CPU series]

EHV-CPU supports I/Os shown in the following list. Refer to the application manual (NJI-481*(X)) and the programming manual (NJI-482*(X)) for EHV-CPU for details of each I/O.

Table 2.6.1   I/O list (EHV-CPU)

	Type	Address	Bit cut *1	Signed *2	Real number *3	Text string *4	Details
Bit (1)	X	r u s 00 to r u s 95 *6		-	-	-	External input (shared with WX and DX), only lower 2-digits is decimal.
	Y	r u s 00 to r u s 95 *6	-	-	-	-	External output (shared with WY and DY), only lower-2digits is decimal.
	EX	u s 000 to u s 7FF *6	-	-	-	-	Expand external input (shared with WEX and DEX) *8
	EY	u s 000 to u s 7FF *6	-	-	-	-	Expand external output (shared with WEY and DEY) *8
	R	0 to 7BF	-	-	-	-	Internal output (different area from WR and DR)
	M	0 to 7FFFF	-	-	-	-	Internal output shared with bit and word (shared with WM and DM)
	L	n 0000 to n 3FFF *7	-	-	-	-	Link area (shared with WL and DL)
	TD	0 to 2559 (decimal) (Timer and Counter cannot overlap)	-	-	-	-	On-delay timer
	TDN		-	-	-	-	Off-delay timer
	SS		-	-	-	-	Single shot timer
	MS		-	-	-	-	Mono stable timer
	TMR		-	-	-	-	Integrating timer
	WDT		-	-	-	-	Watchdog timer
	CU	0 to 2047 (decimal) *9 (Timer and Counter cannot overlap)	-	-	-	-	Counter
	RCU		-	-	-	-	Ring counter
	CTU		-	-	-	-	Up-down counter (up-coil)
	CTD		-	-	-	-	Up-down counter (down-coil)
	CT		-	-	-	-	Up-down counter (contact)
	CL	0 to 2559 (decimal)	-	-	-	-	Counter clear (only coil)
Word (16) *5	WX	r u s 0 to r u s 7 *6	-	O	-	O	External input (shared with X and DX)
	WY	r u s 0 to r u s 7 *6	-	O	-	O	External output (shared with Y and DY)
	WEX	u s 00 to u s 7F *6	-	O	-	O	Expand external input (shared with EX and DEX) *8
	WEY	u s 00 to u s 7F *6	-	O	-	O	Expand external output (shared with EY and DEY) *8
	WR	0 to EFFF	O	O	-	O	Internal output (different area from R, shared with DR)
	WM	0 to 7FFF		O	-	O	Internal output shared with bit and word (shared with M and DM)
	WN	0 to 1FFFF (CPU128) 0 to 7FFF (CPU16-64)	O	O	-	O	Internal output (shared with DN) *10
	WL	n 000 to n 3FF *7		O	-	O	Link area (shared with L and DL)
	TC	0 to 2559 (decimal)	-	-	-	-	Timer / counter progress value
Double word (32) *5	DX	r u s 0 to r u s 6 *6	-	O	O	-	External output (shared with X and WX)
	DY	r u s 0 to r u s 6 *6	-	O	O	-	External input (shared with Y and WY)
	DEX	u s 00 to u s 7E *6	-	O	O	-	Expand external input (shared with EX and WEX) *8
	DEY	u s 00 to u s 7E *6	-	O	O	-	Expand external output (shared with EY and WEY) *8
	DR	0 to EFFE	-	O	O	-	Internal output (different area from R, shared with WR)
	DM	0 to 7FFE	-	O	O	-	Internal output shared with bit and word (shared with M and WM)
	DN	0 to 1FFFE (CPU128) 0 to 7FFE (CPU16-64)	-	O	O	-	Internal output (shared with WN)
	DL	n 000 to n 3FE *7	-	O	O	-	Link area (shared with L and WL)

[MICRO-EHV series]
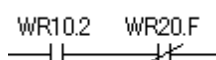
MICRO-EHV supports I/Os shown in the following list. Refer to the application manual (NJI-589*) and the programming manual (NJI-590*) for MICRO-EHV for details of each I/O.

Table 2.6.2   I/O list (MICRO-EHV)

	Type	Address	Bit cut *1	Signed *2	Real number *3	Text string *4	Details
Bit (1)	X	r u s 00 to r u s 95 *6		-	-	-	External input (shared with WX and DX), only lower 2-digits is decimal.
	Y	r u s 00 to r u s 95 *6	-	-	-	-	External output (shared with WY and DY), only lower-2digits is decimal.
	R	0 to 7BF	-	-	-	-	Internal output (different area from WR and DR)
	M	0 to 7FFF	-	-	-	-	Internal output shared with bit and word (shared with WM and DM)
	TD	0 to 2047 (decimal) (Timer and Counter cannot overlap)	-	-	-	-	On-delay timer
	TDN		-	-	-	-	Off-delay timer
	SS		-	-	-	-	Single shot timer
	MS		-	-	-	-	Mono stable timer
	TMR		-	-	-	-	Integrating timer
	WDT		-	-	-	-	Watchdog timer
	CU	0 to 2047 (decimal) *9 (Timer and Counter cannot overlap)	-	-	-	-	Counter
	RCU		-	-	-	-	Ring counter
	CTU		-	-	-	-	Up-down counter (up-coil)
	CTD		-	-	-	-	Up-down counter (down-coil)
	CT		-	-	-	-	Up-down counter (contact)
	CL	0 to 2047 (decimal)	-	-	-	-	Counter clear (only coil)
Word (16) *5	WX	r u s 0 to r u s 7 *6	-	○	-	○	External input (shared with X and DX)
	WY	r u s 0 to r u s 7 *6	-	○	-	○	External output (shared with Y and DY)
	WR	0 to 7FFF	○	○	-	○	Internal output (different area from R, shared with DR)
	WM	0 to 7FF		○	-	○	Internal output shared with bit and word (shared with M and DM)
	TC	0 to 2047 (decimal)	-	-	-	-	Timer / counter progress value
Double word (32) *5	DX	r u s 0 to r u s 6 *6	-	○	○	-	External output (shared with X and WX)
	DY	r u s 0 to r u s 6 *6	-	○	○	-	External input (shared with Y and WY)
	DR	0 to 7FFE	-	○	○	-	Internal output (different area from R, shared with WR)
	DM	0 to 7FE	-	○	○	-	Internal output shared with bit and word (shared with M and WM)

*1 Bit cut: The bit access is possible by adding ".**n**" (n is bit No. 0 to F in hexadecimal) to the end of a word I/O.

Example:

```
WR10.2    WR20.F
 ─┤ ├──────┤╱├─
```

*2 Signed: A negative number can be represented by adding ".**S**" to the end of a word I/O or a double word I/O.

Range (word)   -32768 to 32767 (H8000 to H7FFF)

Range (double word)   -2147483648 to 2147483647 (H80000000 to H7FFFFFFF)

Example:

```
─┤WR10.S = (−5)  │├
 │DR20.S = (−100)│
```
Parentheses are automatically inserted without inputting.

*3 Real number: A real number (floating point) can be represented by adding ".**FL**" to the end of a double word I/O. Since a real number data is 32-bit single precision, the range of value is from -3.40282×10^{38} to 3.40282×10^{38} but the number of significant figure is 6 digits. Therefore, if the processing box is closed even if the value over 6 digits is inputted, the value is indicated in the value rounded off or the format of power of 10 (IEEE format).

Example:

Command	
No.	Command
1:	DR10.FL = 123456789
2:	DR20.FL = 0.0000123456789
3:	DR30.FL = 123.456789

If a processing box is closed, it is converted to IEEE format.

DR10.FL = 1.23457E+008
DR20.FL = 1.23457E−005
DR30.FL = 123.457

*4 Text string: By enclosing in double quotations after adding "**.ASC.n**" (n is the number of characters, 1 to 30) to the end of a word I/O, the test string can be represented directly. The test string data is available only for a left side of a substitution statement and not available for a right side and a comparison box. The number of the word I/O to be shown in the following calculating is occupied.

Quotient of ((text length that was defined) / 2) + Remainder of ((text length that was defined) / 2)

Example:

WR10.ASC.5 = "123AB"

If a command shown in the left is executed, the following data is actually stored into WR10 – WR12.

WR10 = H3132   ← ASCII of "12"

WR11 = H3341   ← ASCII of "3A"

WR12 = H4200   ← ASCII of "B"

*5 Relation between word and double word:

A double word consists of 2 words as the following order.

Example:

M101
M100
DM11   M10F

WM12	WM11	WM10

M12F   M120

DM10
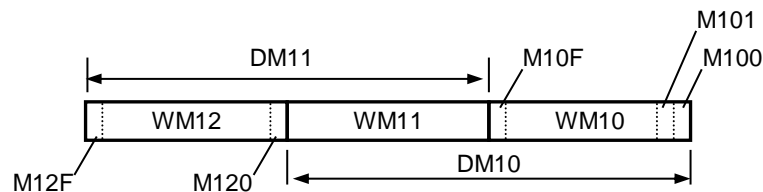
*6 Address of external I/O (meaning of r u s):

r = Remote No. (1 to 4 (0 is basis and expansion base))

u = Remote No. 0:   Unit No. (0 to 5)

Remote No. 1 to 4:   Remote slave No. (0 to F)

s = Slot No. (0 to F)

"0" of the upper digits can be omitted. For example, X00000 → X0 and Y00195 → Y195

The number of expansion steps depends on the type of CPU module.

(CPU128: 5 steps, CPU64: 4 steps, and CPU16-32: 2 steps)

*7 Link area:

"n" of Link area L n 0000 to n 3FFF / WL n 000 to WL n 3FF is the Link area No. 1 to 8.

For example, Link area No.3 : L20000 to L23FFF / WL2000 to WL23FF

*8 Expansion external I/O:

Expansion external I/O is a 128-word area prepared for I/O in individual slot of basic and expansion units, and an external I/O area for modules which use many I/O areas, such as Any Wire module, 4 axes positioning module, etc. In addition, the slot which does not mount a special module can use this as a normal internal output.

*9 Counter address:

In Ver.6.02 or higher, the counter of EHV-CPU and MICRO-EHV has been expanded from 0 to 2047.

*10 WN, DN address range:

It cannot be used with EHV-CPU08 added from Version 7.01.

2.7   Project File

(1) File configuration

Programs and all setting information are saved as prj file (extension is prj) called a project file. The information included in the project file and the information transferred to CPU are shown as follows.
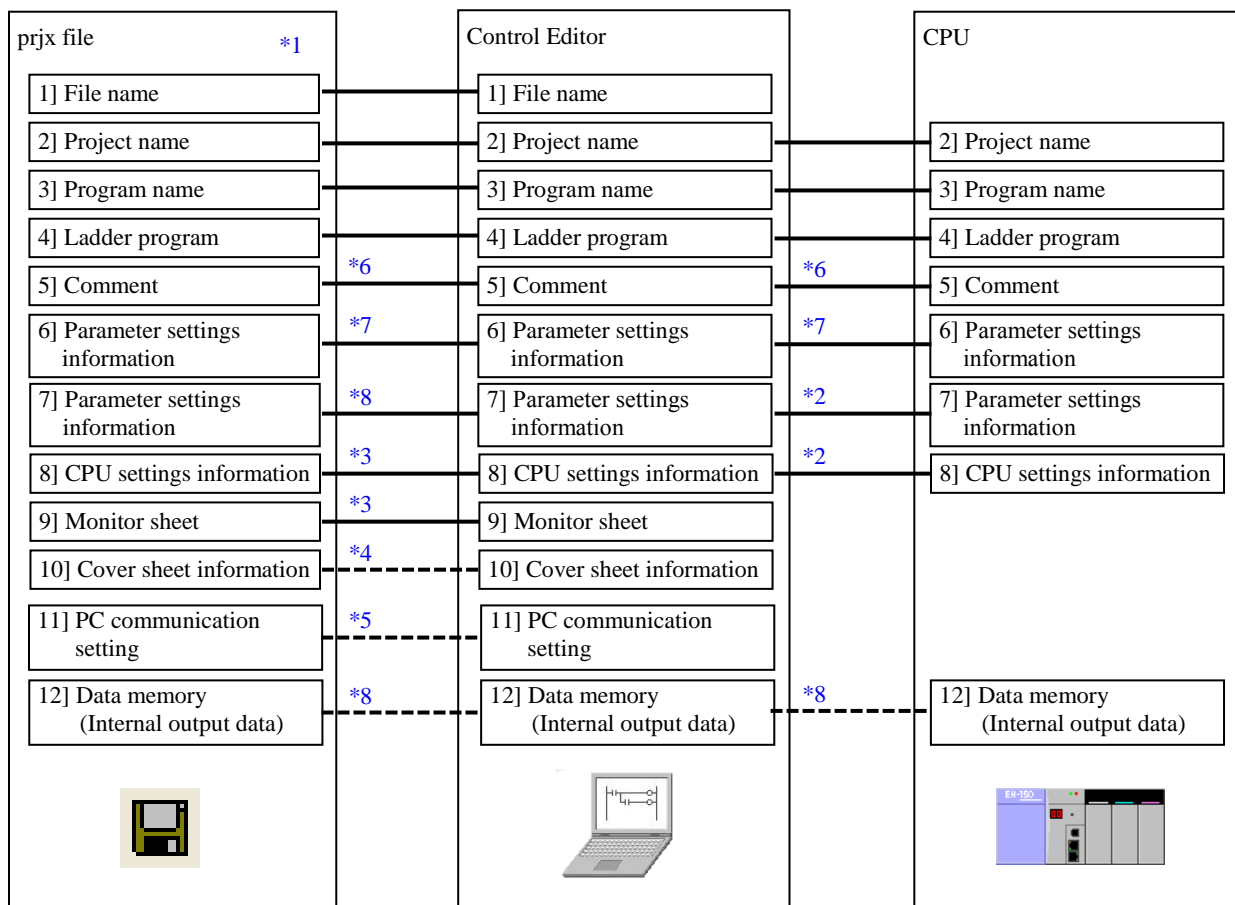
Fig. 2.7.1   File configuration

*1   File extension has been changed from "prj" to "prjh" since Ver.4.20.

File extension has been changed from "prjh" to "prjx" since Ver.5.00.

Previous "prj" and "prjh" file can be opened with Ver.5.00 or higher.

*2   Parameter settings information and CPU settings information access the CPU in online mode and configure directly.

*3   Parameter for time chart monitor can be saved in prjh file since Ver.4.20.

*4   PC communication settings can be saved to a prj file in Ver.2.14 or higher. If the check box for "Save to this prj file" is enabled (default setting), this data is saved.

*5   Data memory can be saved to a prj file, up/downloaded from/to CPU and verified with CPU in Ver.2.40 or higher. Data memory addresses are shown as below.

　　[EHV-CPU series]

　　　R0 to R7BF

　　　WR0 to WREFFF

　　　WM0 to WM7FFF

    WN0 to WN1FFFF (EHV-CPU128)

    WN0 to WN7FFF (EHV-CPU64/32/16)

    WLn000 to WLn3FF ("n" is the Link area No. 1 to 8. For example, Link area No.3 : WL2000 to WL23FF.)

    TC0 to TC2559

  [MICRO-EHV series]

    R0 to R7BF

    WR0 to WR7FFF

    WM0 to WM7FF

    TC0 to TC2047

Data memory information cannot be modified with CTE unless directly accessed to CPU in online mode.

Data memory information is not verified in "verify with file" function.

*6 Multi-Comment is supported in Ver.2.41 or higher. The comment of four groups can be input. It can be chosen that the comment of all the groups or one group is transmitted to CPU.

In Ver.4.20 or higher, separate comments can be put on each bit of following word I/Os.

  [EHV-CPU series]

    WR0 to WREFFF

    WN0 to WN1FFFF (EHV-CPU128)

    WN0 to WN7FFF (EHV-CPU64/32/16)

  [MICRO-EHV series]

    WR0 to WR7FFF

*7 Parameters for data logging function can be saved in prjh file since Ver.4.20. (Only for MICRO-EHV)

*8 Simplified positioning parameter setting can be saved as parameter settings information since Ver.5.00. (Only for MICRO-EHV)
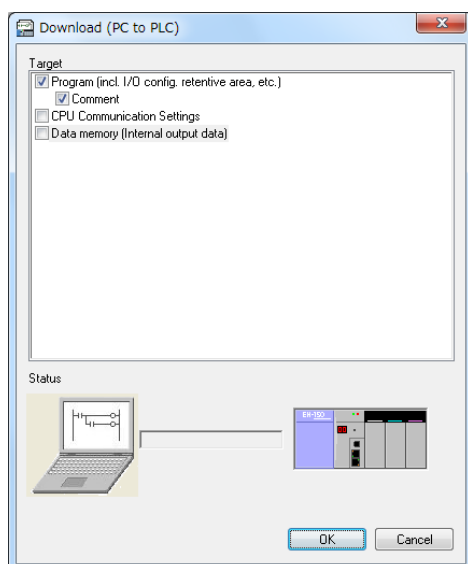
Fig. 2.7.2 Download (PC to PLC) (EHV-CPU series)   Fig. 2.7.3 Download (PC to PLC) (MICRO-EHV series)
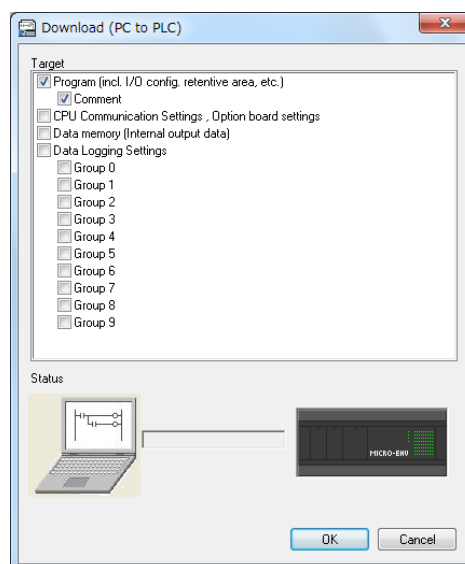
Table 2.7.1   Meanings of words

Items	Meanings of words
1] File name	File name is stored in CPU.
2] Project name	Name of all programs and setting information. Project name is saved in CPU.
3] Program name	Each program sheet has program name.
4] Ladder program	Layer structure
5] Comment	I/O comment, Box comment, Circuit comment
6] Parameter settings information	I/O configuration, Retentive area, Operation parameter, Link parameter, FL-net parameter, Data logging settings (Only for MICRO-EHV series)
7] Extended parameter settings information	Simplified positioning parameter information (Only for MICRO-EHV) (It is downloaded from simplified positioning parameter setting window to CPU. (Not Download (PC to PLC) window))
8] CPU settings information	IP address, NTP, Serial port settings, Ethernet port settings
9] Monitor sheet	I/O monitor sheet, Random circuit monitor sheet, Time chart monitor sheet(Ver.4.20 or higher)
10] Cover sheet information	Project title, programmer, version and etc. for cover sheet, priming
11] PC communication setting	Network address, connecting method, etc.

12] Data memory (Internal output data)	[EHV-CPU series]
	    Data memory(R,WR,WM,WN,WL,TC)
	[MICRO-EHV series]
	    Data memory(R,WR,WM,TC)

N o t e

12] Data memory (internal output data) can be saved to a prj file in Ver.2.40 or higher. If an old prj file saved with Ver.2.31 or lower is opened with Ver.2.40 or higher, data memory information is filled by 0 since it was not saved. In this case, if "Data memory (Internal output data)" is enabled in download dialog box as below, please note that all-zero data is transferred to CPU.

(2) File size

The project of Control Editor is a file of which the extension is "prj". Since the file size on the computer depends on programs, a rough standard size is 2 to 3 Mbytes per 10k steps.

A prj file size is upped because Multi-Comment is supported in Ver.2.41 or higher. Therefore, it takes more time than before for prj file operating and build.

A prjh file size is upped because Data logging and Time chart monitor are supported in Ver.4.20 or higher.

File extension has been changed from "prjh" to "prjx" since Ver.5.00. And, because of changing the file format, a prjx file size is smaller than prj file or prjh file.

(3) OBC files

Control Editor Version 4 can create the OBC files (extension is obc). The information included in the OBC file and transferred to CPU is shown as follows.

A obc file size is upped because Data logging is supported in Ver.4.20 or higher. (*1)

A obc file size is upped because simplified positioning information is added in Ver.5.00 or higher. (*2)
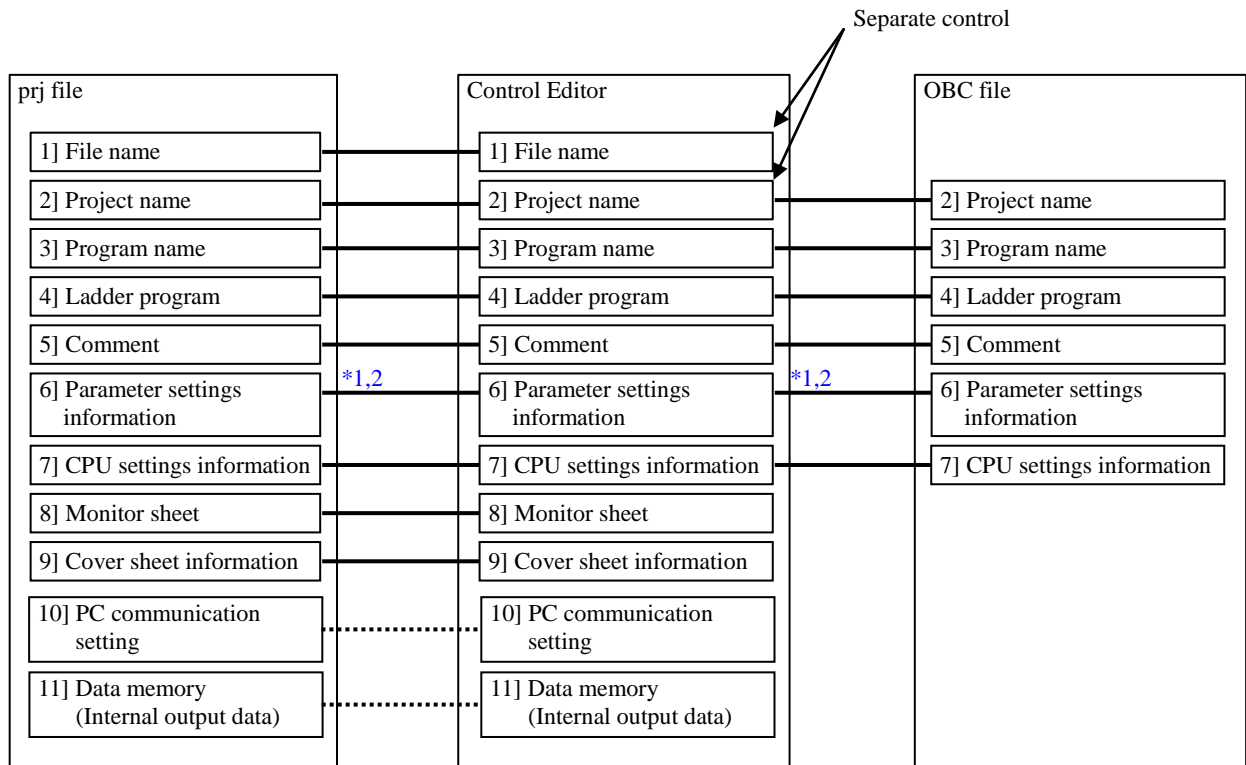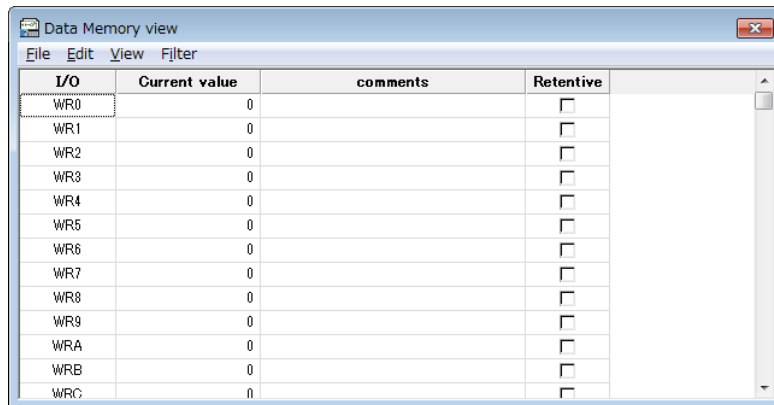
Fig. 2.7.4   OBC file composition

2.8   Data Memory view

In Ver.6.00 or higher, it is now possible to display information on the data memory (internal output data) contained in the project file.

Menu: [File] - [Data Memory view]

Icon:

Fig. 2.8.1   Data Memory view

I/O   The I/O address is displayed, but it cannot be edited.

The I/O address of the data memory is displayed in the order of WR, WM, WN, WL, TC, R.

Depending on the CPU model, there are I/O addresses that are not supported, but all I/O addresses are displayed.

Current value   The current value is displayed but it cannot be edited.

Displays the value stored in the project file or the value read from the PLC in decimal or hexadecimal.

comments   Comments are displayed but it cannot be edited.

Display I/O comments set in the project.

Retentive   The retentive area is displayed but it cannot be edited.

A check mark is set for the I/O address set in the Retentive area.

Menu

In the menu operation, you can change the conditions of I/O to be displayed and display necessary information.
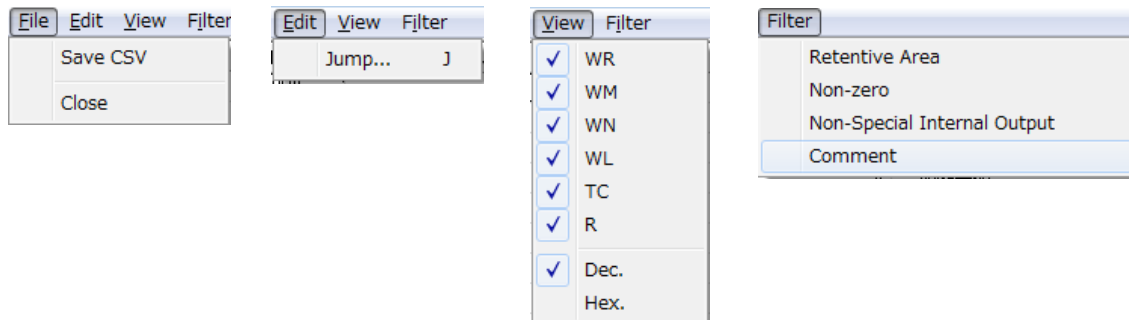
Fig. 2.8.2   Data memory display window menu

■File

Save CSV   Data memory information can be saved as a CSV file separately from the project file.

The contents stored in the CSV file are shown in the table below.

Table 2.8.1   Contents of the saved CSV file

No.	Item	Contents
1	I/O Address	Data memory All I/O addresses are saved.
2	Current value	If the current value is displayed in decimal, save it as a decimal, and if it is displayed in hexadecimal, save it in hexadecimal.
3	Comment	Displayed comments are saved.
4	Retentive Aria Setting	1: specified or 0: not specified is saved.

Close   Close the Data Memory view window.

■Edit

Jump   The jump window is displayed.

After entering the I/O address and pressing the [OK] button, it moves to the input I/O address.
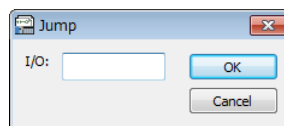
Fig. 2.8.3   Jump window

■<u>V</u>iew

You can select the I/O type to display. You can also change the display format to display the current value.

<u>W</u>R　　　　　You can switch display / non-display of WR. Check it and it will be displayed.

W<u>M</u>　　　　　You can switch display / non-display of WM. Check it and it will be displayed.

W<u>N</u>　　　　　You can switch display / non-display of WN. Check it and it will be displayed.

W<u>L</u>　　　　　You can switch display / non-display of WL. Check it and it will be displayed.

<u>T</u>C　　　　　You can switch display / non-display of TC. Check it and it will be displayed.

<u>R</u>　　　　　You can switch display / non-display of R. Check it and it will be displayed.

<u>D</u>ec.　　　　If checked, the current value is displayed in decimal.

<u>H</u>ex.　　　　If checked, the current value is displayed in hex decimal.

■<u>F</u>ilter

You can narrow down the I/O address to be displayed.

<u>R</u>etentive Area　　　　　　　　If checked, the I/O address set in the retentive area is displayed.

Non-zero　　　　　　　　　　If checked, only the I/O address with the current value other than 0 is displayed.

Non-<u>S</u>pecial Internal Output　If checked, the I/O address except the special internal output is displayed.

Comment　　　　　　　　　　If checked, only the I/O address for which comment is set will be displayed.

Chapter 3   Before Programming

Parameter settings are necessary for preparation of programming.

Parameter settings are described in this chapter.

[EHV-CPU series]
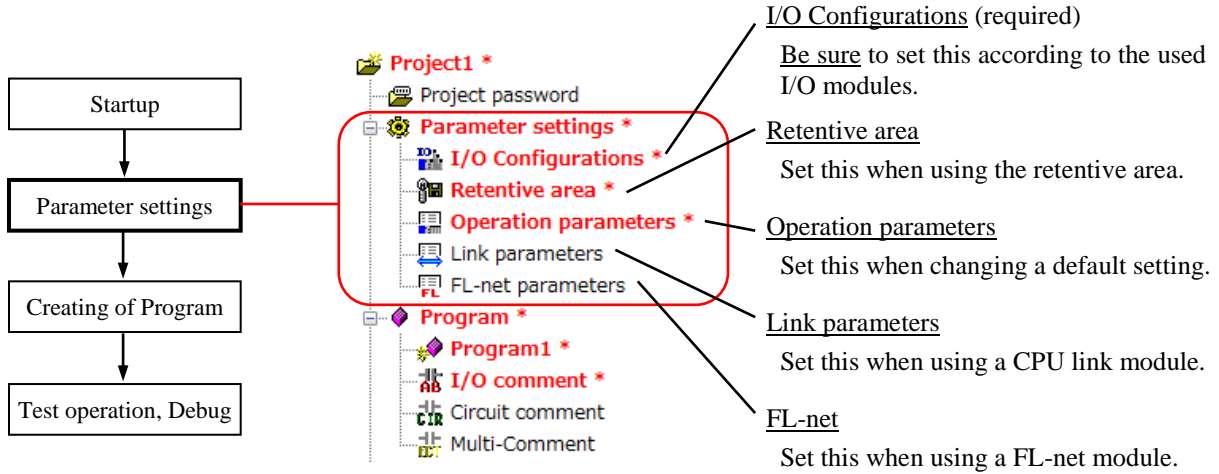
Fig. 3.0.1   Programming flow chart

The windows for parameter settings can be opened from the following menus or by directly clicking each item on the project tree.

Menu: [Tool] - [Parameter settings] - [I/O Configuration]

Menu: [Tool] - [Parameter settings] - [Retentive Area]

Menu: [Tool] - [Parameter settings] - [Operation Parameters]

Menu: [Tool] - [Parameter settings] - [Link Parameters]

Menu: [Tool] - [Parameter settings] - [FL-net Parameters]

Menu: [Tool] - [Parameter settings] - [Data Logging Settings] *1
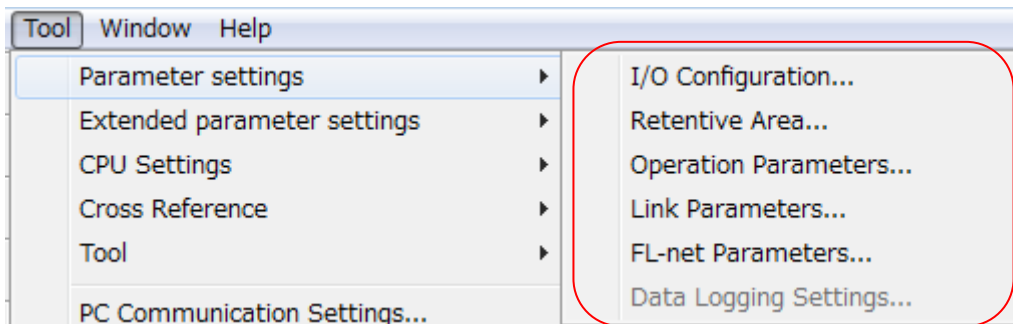
Fig. 3.0.2   Parameter settings

*1 When using EHV-CPU, it is deactivated because it is not supported.

[MICRO-EHV series]
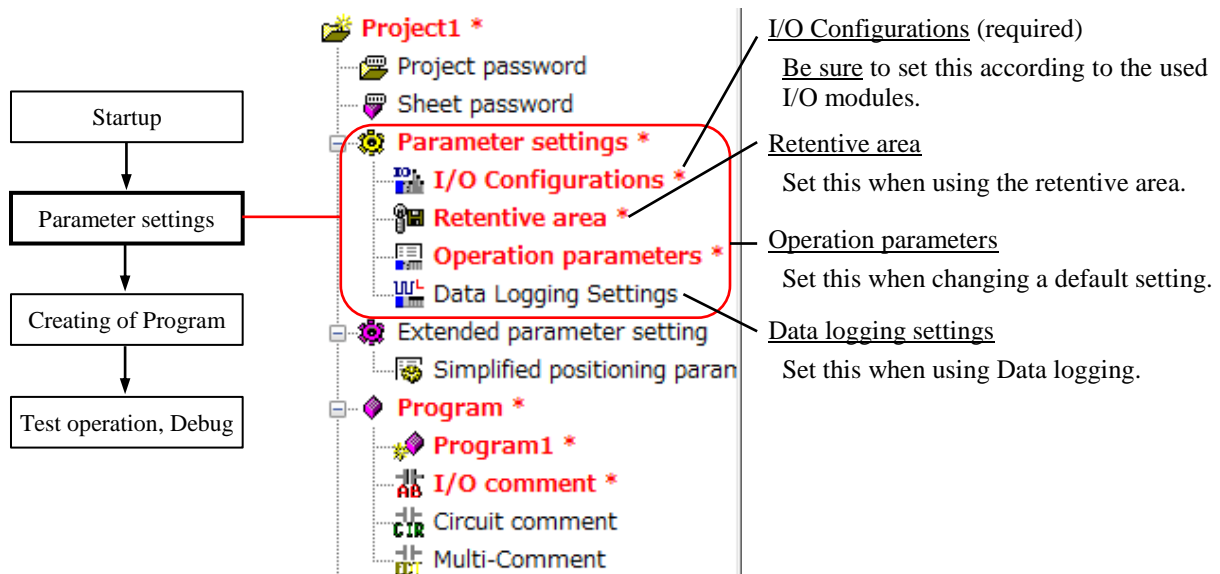
Fig. 3.0.3   Programming flow chart

The windows for parameter settings can be opened from the following menus or by directly clicking each item on the project tree.

Menu: [Tool] - [Parameter settings] - [I/O Configuration]

Menu: [Tool] - [Parameter settings] - [Retentive Area]

Menu: [Tool] - [Parameter settings] - [Operation Parameters]

Menu: [Tool] - [Parameter settings] - [Link Parameters] *1

Menu: [Tool] - [Parameter settings] - [FL-net Parameters] *1

Menu: [Tool] - [Parameter settings] - [Data Logging Settings]
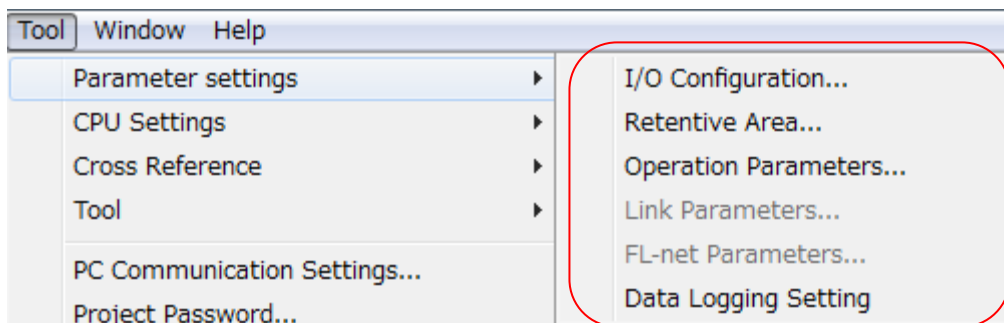
Fig. 3.0.4   Parameter settings

*1 When using MICRO-EHV, it is deactivated because it is not supported.

3.1　I/O Configuration

Create the I/O configuration list according to the used I/O module configuration.

　　Menu:　　　　[Tool] - [Parameter settings] - [I/O Configuration]

[EHV-CPU series]
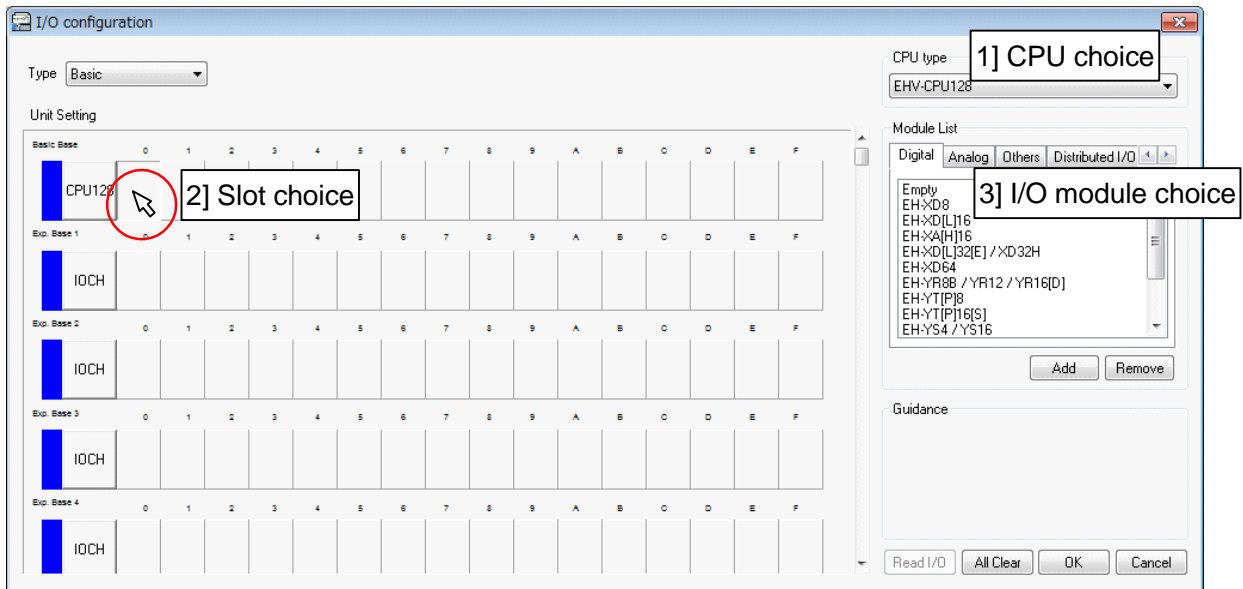
Fig. 3.1.1　I/O configuration window (EHV-CPU)

Manual setting

1] Select used CPU model type from the drop-down list for CPU setting.

2] Click a slot position (a position to mount the I/O module) to register I/O assignment.

3] To assign an I/O module, choose the I/O module to assign from the Module list and then click the [Add] button or double-click the I/O module.

4] Repeat the step 2] and 3] to assign all I/O modules used. (Assigned I/O module can be removed by clicking the [Remove] button.)

5] I/O configuration setting completes by clicking [OK] button.

Auto setting (Read I/O)

Only in the online mode, information of I/O modules actually mounted can be read to create automatically the I/O configuration sheet by clicking the [Read I/O] button. (See the Note on page 3-12.)

Guidance indication

After creating the I/O configuration sheet, the address for one I/O module is displayed on the Guidance area when a slot to which the I/O module is assigned is clicked.

[Example] When EH-YT32 is assigned to the slot No.4 on the Expansion Base 1,
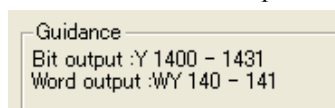
Fig. 3.1.2　Example of Guidance indication

Reference

- In Ver.5.00 or higher, Fl-net3 module is added. To assign Fl-net3 module, choose "EH-FLN2 / FLN3" from [Module List] - [Others].

- In Ver.5.00 or higher, EH-RMP2 module is added. To assign EH-RMP2 module, choose "EH-RMP[2]" from [Module List] - [Others].

- In Ver.6.01 or higher, EHV-CPU128RP CPU module is added. To select EHV-CPU128RP CPU module, select "EHV-CPU128[RP]" from [CPU type].

- In Ver.6.02 or higher, EH-RMD2 module is added. To assign according to the setting of the module, choose "EH-RMD[2] (LINK)" or "EH-RMD[2] (REMOTE2)" or "EH-RMD2 (REMOTE RMM)" from [Module List] - [Others].

- In Ver.7.01 or higher, EHV-CPU08 CPU module is added. To assign EHV-CPU08 CPU module, select "EHV-CPU08" from [CPU Type].

- In Ver.7.01 or higher, EH-CUEL module is added. To assign according to the setting of the module, choose "EH-CUEL (X)" or "EH-CUEL (C)" from [Module List] - [Others].

[MICRO-EHV series]

(1) I/O configuration
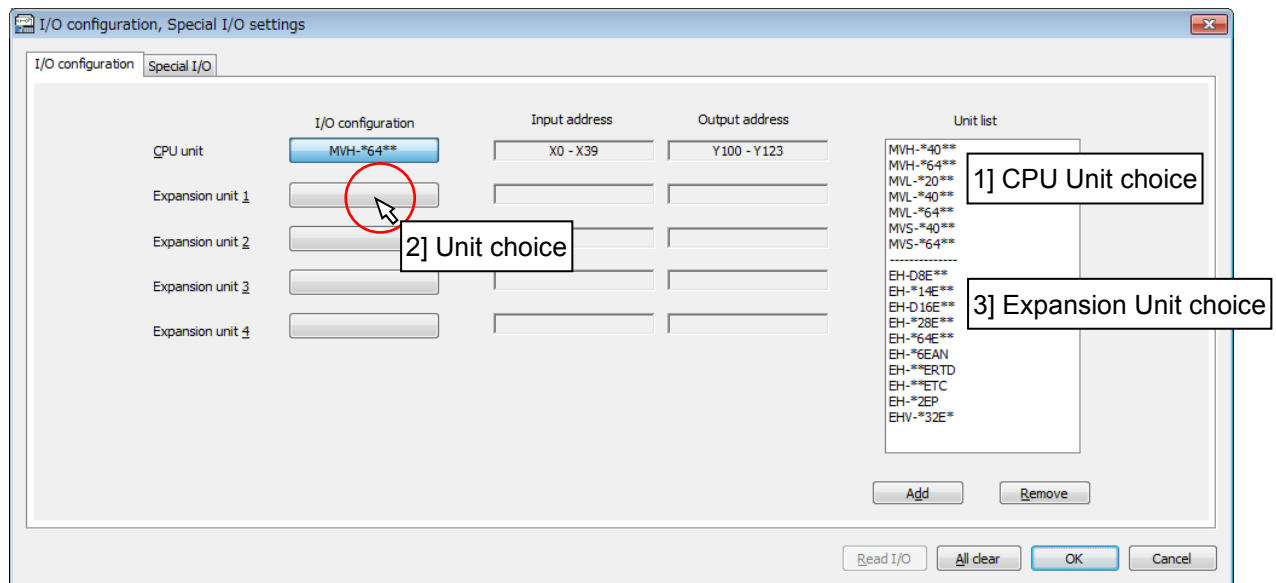
Fig. 3.1.3   I/O configuration window (MICRO-EHV)

Manual setting

1] Select the model name of CPU Unit from the Unit list.

2] If you use the expansion units, Click the textbox beside the "Expansion unit x (1 - 4)".

3] Choose the model name of Expansion Unit from the Unit list and then click the [Add] button or double-click it.

4] Repeat the step 2] and 3] to configure all units used. (Assigned units can be removed by clicking the [Remove] button.)

5] I/O configuration setting completes by clicking [OK] button.

Auto setting (Read I/O)

Only in the online mode, information of units actually mounted can be read to create automatically the I/O configuration sheet by clicking the [Read I/O] button. (See the Note on page 3-12.)

Input address / Output address indication

After creating the I/O configuration sheet, the address for the unit is displayed on Input address area and Output address area.

[Example] 64-point Basic unit (MVH-*64**) is assigned to CPU unit, and 28-point Expansion unit (EH-*28E**) is
assigned to Expansion unit 1.

Input address	Output address
X0 - X39	Y100 - Y123
X1000 - X1015	Y1016 - Y1027

Fig. 3.1.4　Example of Input address / Output address indication

Reference

In Ver.6.02 or higher, 32-points output expansion unit is added. To assign 32-points output expansion unit, choose "EHV-*32E*" from [Unit list].

(2) Special I/O configuration (Ver.4.21 or lower)

This is a window for setting special I/O function of CPU unit. Set these parameters, if you use the function of a high-speed counter, and pulse output.
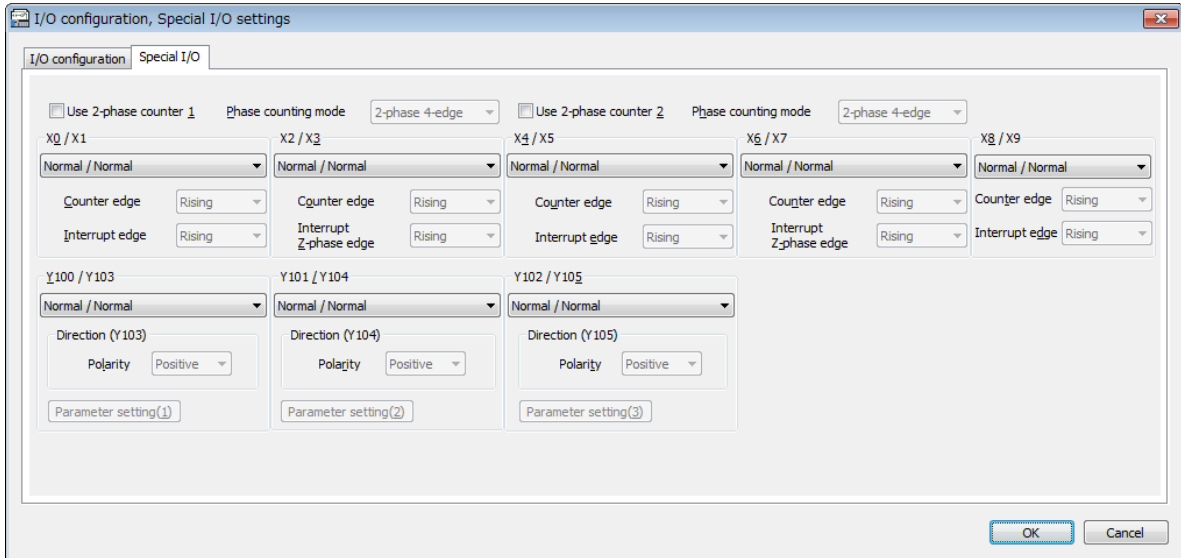
Fig. 3.1.5   Special I/O configuration window (MICRO-EHV)

X* / X*:	Set the function of each input terminal. When using 2-phase counter, the function is changed.
Counter edge:	Specify the edge direction (Rising or Falling) of single-phase counter.
Interrupt edge:	Specify the edge direction (Rising or Falling) of interrupt counter.
2-phase counter:	Mark the checkbox, if you use 2-phase counter. 2-phase counter occupy 2 channels.
Phase counting mode:	Specify the pulse input method of 2-phase counter.
Y* / Y*:	Set the function of each output terminal.
Polarity:	Specify the polarity, if you set "Pulse / Direction signal" to the function of an output terminal.

(3) Special I/O configuration (Ver.5.00 or higher)

Set these parameters to the special I/O of CPU unit, if you use the functions of simplified positioning, high-speed counter, pulse output, etc. Refer to Table 3.1.1 for the available functions.

Former high-speed counter, pulse output, etc can also be set by using the same way.

And this window can be changed to the old-style window. Refer to section 8.2 more information about the option settings.
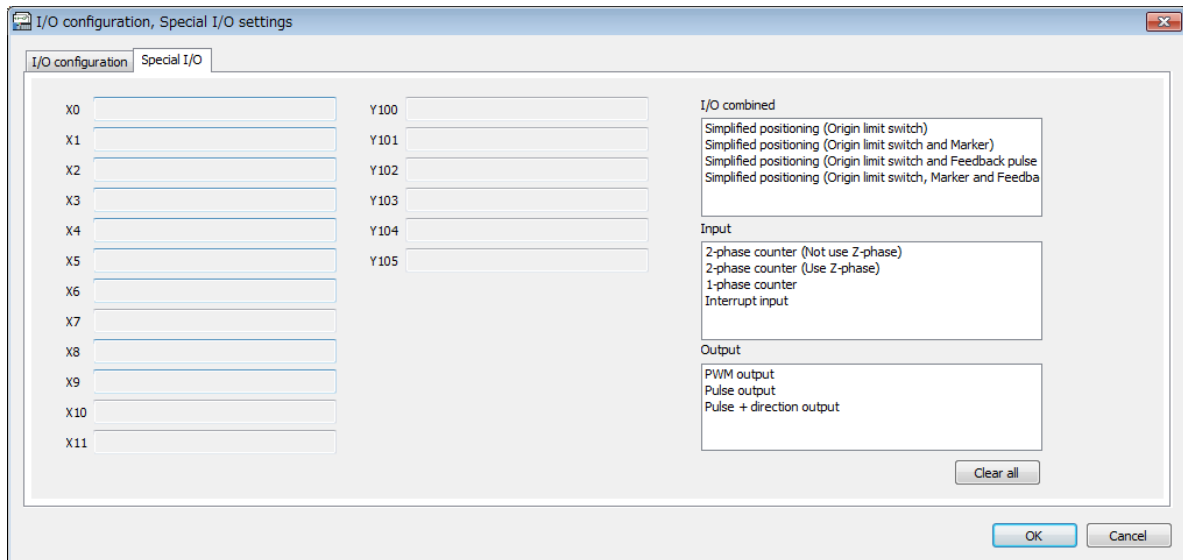
Fig. 3.1.6   Special I/O configuration window (MICRO-EHV)

Table 3.1.1   Function List

No.	Categories	Items	Details
1	I/O combined	Simplified positioning	Origin limit switch
2			Origin limit switch and Marker
3			Origin limit switch and Feedback pulse count
4			Origin limit switch, Marker and Feedback pulse count
5	Input	2-phase counter	Not use Z-phase
6			Use Z-phase
7		1-phase counter	—
8		Interrupt input	—
9	Output	PWM OUTPUT	—
10		Pulse output	—
11		Pulse + direction output	—

Setting method

Select a function from [I/O combined], [Input] or [Output]. After selecting, the simplified positioning parameter setting window is displayed.

Setting by Drag & Drop

Set function by Drag & Drop.

1] Select a function from [I/O combined], [Input] or [Output].

The color of the available I/O area changes to blue. Refer to Fig. 3.1.7.

2] Drag the selected function and drop in the blue I/O area you want to assign. If the function is dropped in the gray I/O area, the warning message is displayed.

3] Confirmation dialog is displayed, and click [OK] with the mouse.The selected function is assigned to the dropped Ch. area, and the simplified positioning parameter setting window is displayed.

Setting by double-clicking

Set function by double-clicking.

1] Select a function from [I/O combined], [Input] or [Output], and double-click it.

2] Confirmation dialog is displayed, and click [OK] with the mouse. The selected function is assigned to the available Ch. area whose Ch. No. is smaller than the other available Ch. areas, and the simplified positioning parameter setting window is displayed
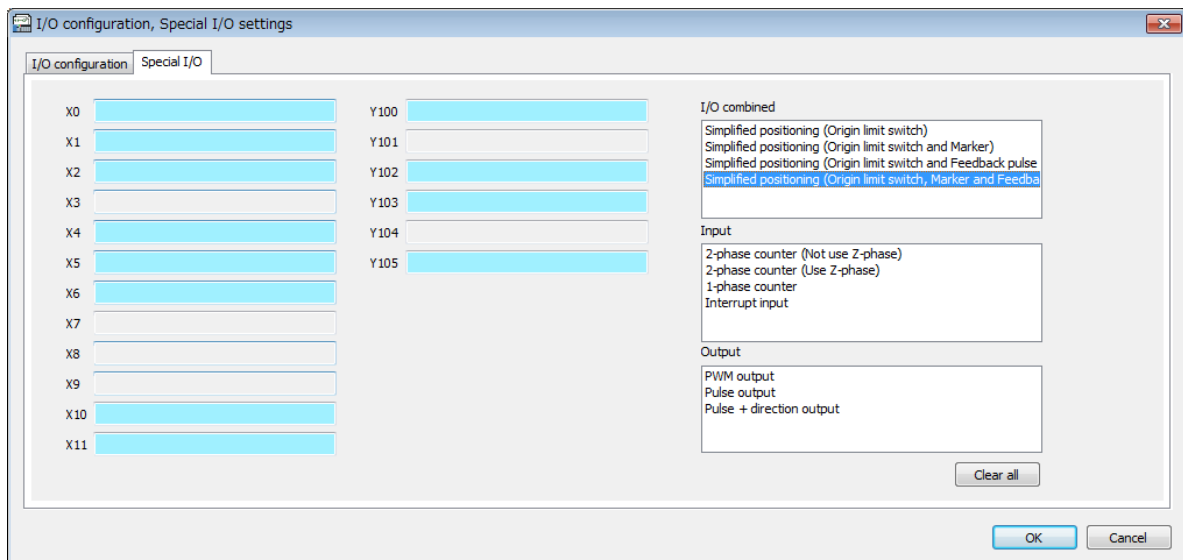
Fig. 3.1.7   Display on being selecting function

If the parameter setting is canceled by clicking [Cancel] in the simplified positioning parameter setting window, the color of the Ch. area changes to yellow. (Refer to Fig. 3.1.8.)
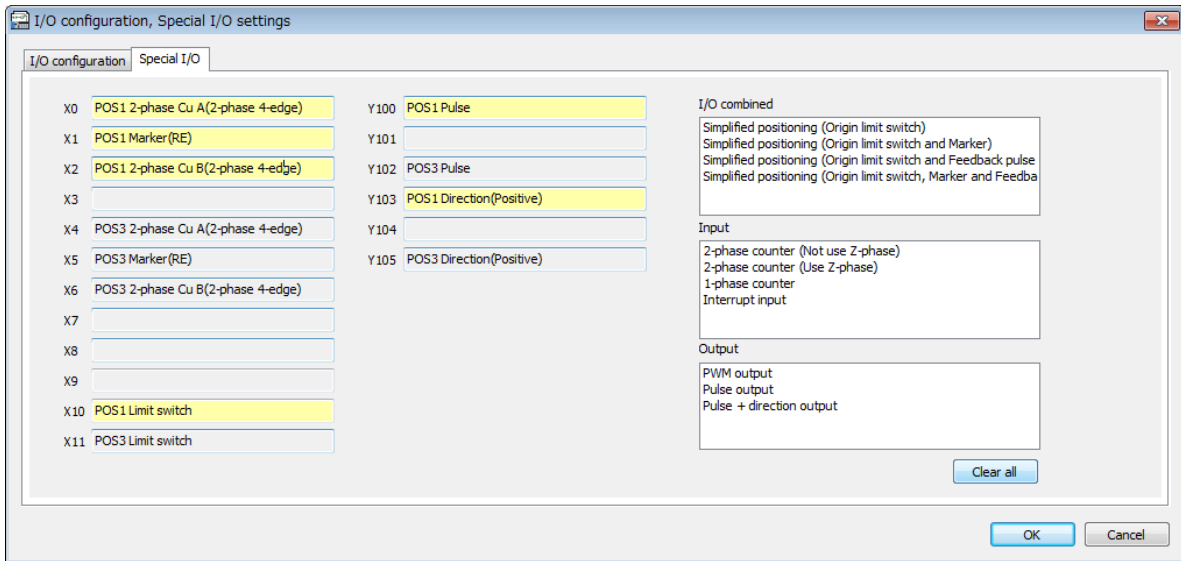
Fig. 3.1.8   Display on not setting parameter

When the yellow area is double-clicked, the simplified positioning parameter setting window is displayed again.
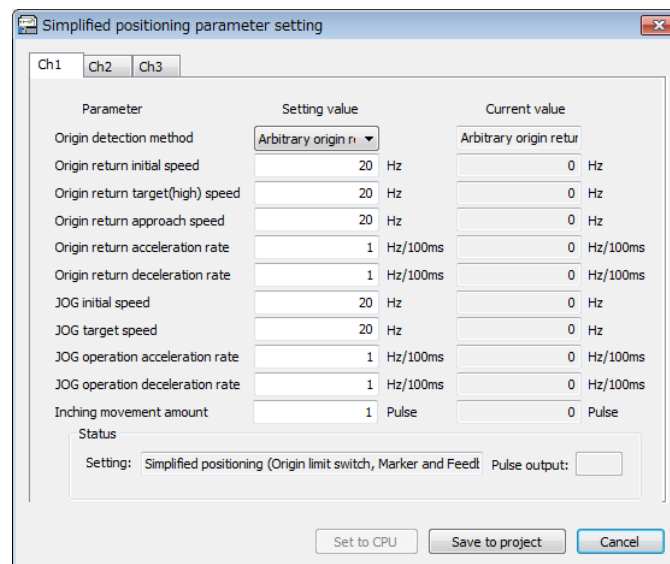
Fig. 3.1.9   Simplified positioning parameter setting window

When the parameter setting is completed, the color of the assigned area changes to gray.

Refer to section 3.7 for more information about the parameter setting.

Display on being selecting the assigned I/O area

1] I/O combined (completed the simplified positioning parameter setting), Input, Output

When the assigned I/O area (which is completed the simplified positioning parameter setting in the case of I/O combined) is clicked, the color of the same group area (not the same Ch. area) changes to dark gray. (Refer to Fig. 3.1.10.)

Example)

When the "2-phase counter" of Ch.3 is selected, the color of the related function area changes dark gray but the color of the "interrupt input" of Ch.3 and the "pulse + direction output" of Ch.3 doesn't change.
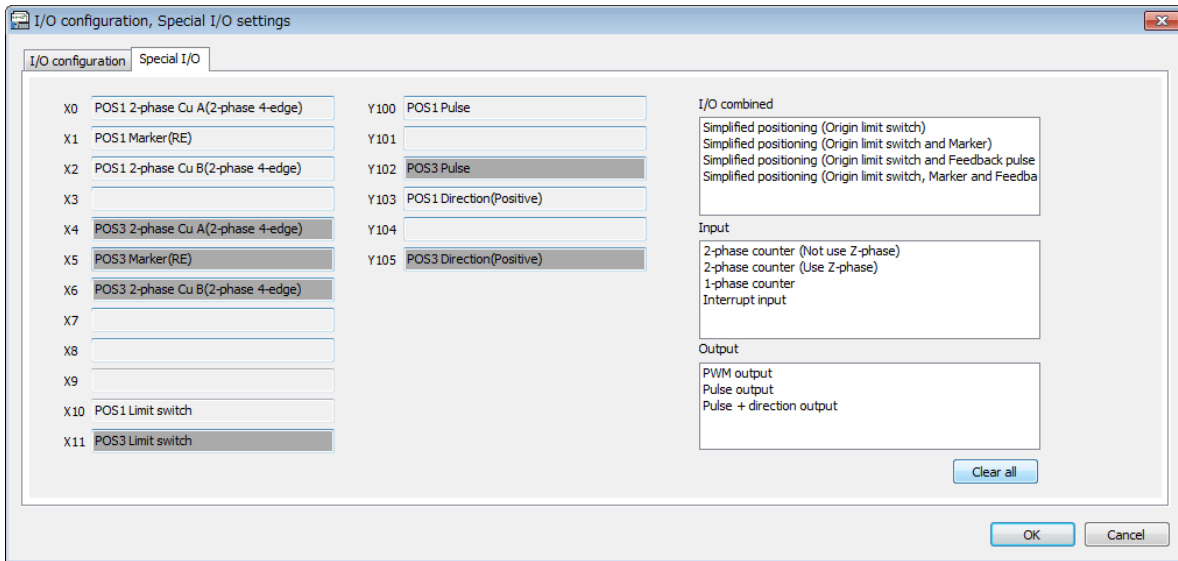
Fig. 3.1.10   Display on being selecting the assigned I/O area

2] I/O combined (not completed the simplified positioning parameter setting)

When the simplified positioning parameter setting is not completed, the color of the area changes to yellow regardless of selecting or not.
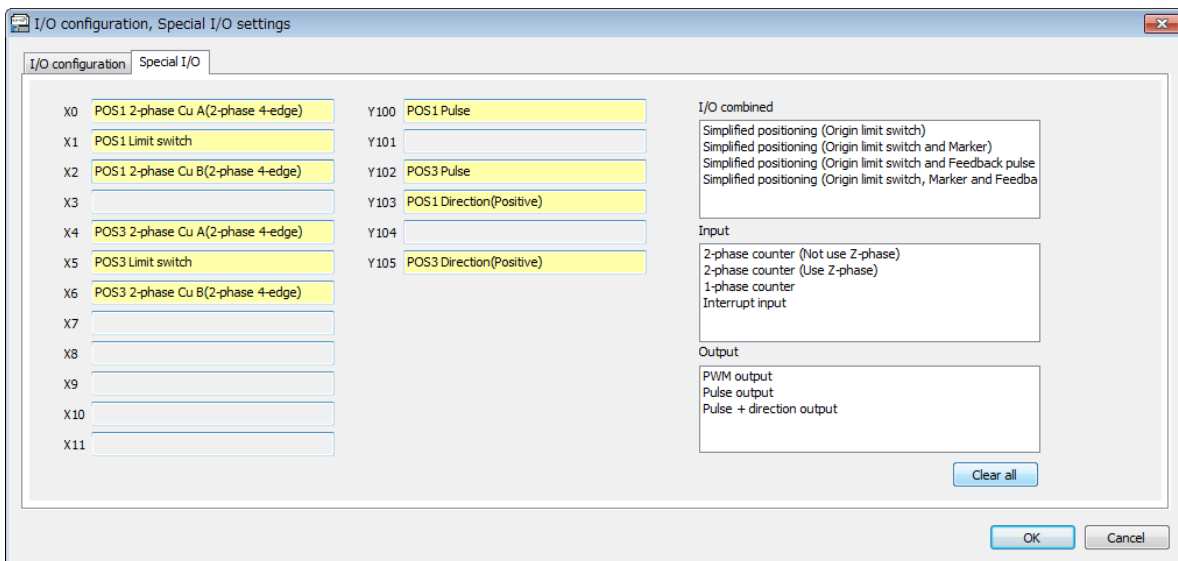
Fig. 3.1.11   Display on not setting parameter

Right-click menu

In the function of input and output areas,the setting of the assigned function can be changed right-click menu after assigning functions. Refer to Table 3.1.2 for the available functions and settings.

Table 3.1.2   Function and Setting List

Function	Setting	Details
1-phase counter	Rising edge	Fig. 3.1.12 Please refer to Menu 1
	Falling edge	
2-phase counter Phase counting mode (Include simplified positioning)	2-phase 4-multiplication	Fig. 3.1.12 Please refer to Menu 2
	2-phase	
	Pulse + direction inputs	
	CW/CCW	
2-phase counter Marker input edge (Include simplified positioning)	Rising edge	Fig. 3.1.12 Please refer to Menu 1
	Falling edge	
Interrupt input	Rising edge	Fig. 3.1.12 Please refer to Menu 1
	Falling edge	
Pulse + direction output Direction signal polarity(Include simplified positioning)	Positive	Fig. 3.1.12 Please refer to Menu 3
	Negative	

Menu 1
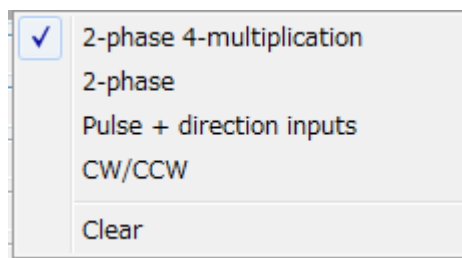
Menu 2
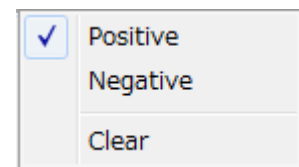
Menu 3

Fig. 3.1.12   Right-click menu

Removing settings

When [Clear] or [Clear all], which are in Right-click menu on the assigned area, are clicked, the assigned functions are removed. The simplified positioning parameter setting of the removed Ch. is initialized.

Removing individual setting

When [Clear] which is Right-click menu on the assigned area is clicked, all the assigned function of the same group is removed. (Refer to Fig. 3.1.13)

Example)

When the "2-phase counter" setting of Ch.3 is removed by right-click menu on X4, The setting for X6 and X7 is also removed but the "Interrupt input" setting of Ch.3 and the "Pulse + direction output" setting of Ch.3 are not removed.
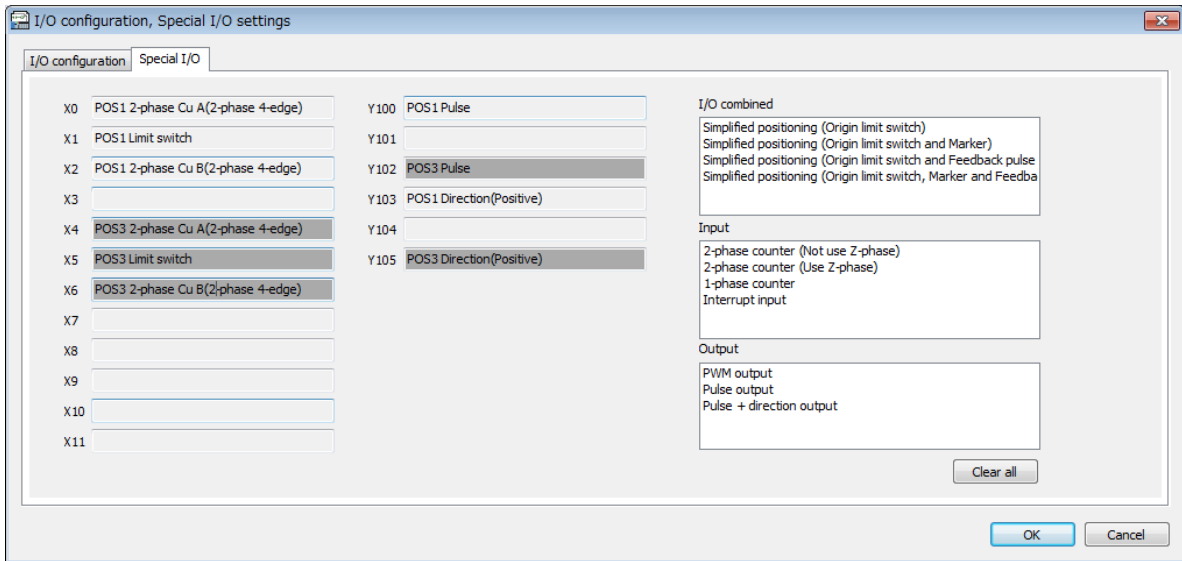
Fig. 3.1.13   Removing individual setting

Removing all setting

When [Clear all] is clicked, all the setting is removed and all the simplified positioning parameter setting is initialized.

■ Old setting window

Parameters setting is added since Ver5.00. Parameter setting is, after selecting [Pulse / Sign Signal] in [Y*/Y* Setting], [Simplified Positioning Parameter Setting] window will open, JOG operation parameters are able to be set from the old setting window. Also, since <Parameter Setting(*)> button is enabled, it is able to change the settings by pressing this button.
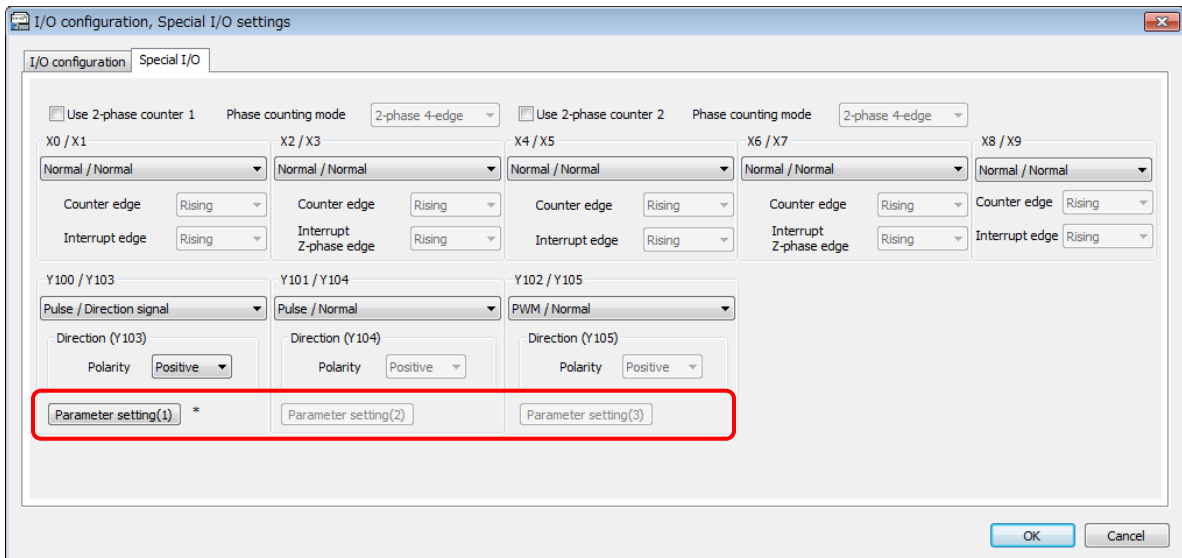
Fig. 3.1.14   Special I/O configuration Window

Parameter setting(*):   Simplified positioning parameter setting window will open. Pleae set the JOG operation
parameters.
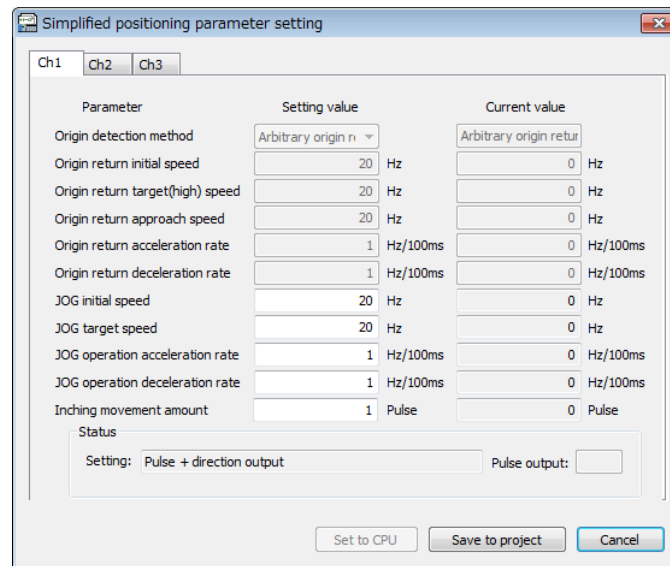
Fig. 3.1.15   Simplified Positioning Paramter Setting Window

N o t e

Each function of special I/O are controled from ladder program. For details, refer to MICRO-EHV Programming
manual (NJI-590*) and Users manual (NJI-591*). The configuration of each function of special I/O is required
before using them.

Reference   What is I/O configuration?

I/O configuration is a specific I/O information for each module. For example, I/O configuration for a 32-point
output module (EH-YT32) is "Y32" and I/O configuration of a 8-ch. analog input module (EH-AX8V) is "X8W".
The I/O configuration sheet is a table in which each I/O configuration is arranged in order of mounting and a
setting data for defining the information of slot number on which one module is mounted to the CPU module. If a
user creates the I/O configuration sheet according to the component of I/O modules actually being used and
transfers ladder programs to the CPU module, the created I/O configuration is transferred automatically together
with the ladder program.
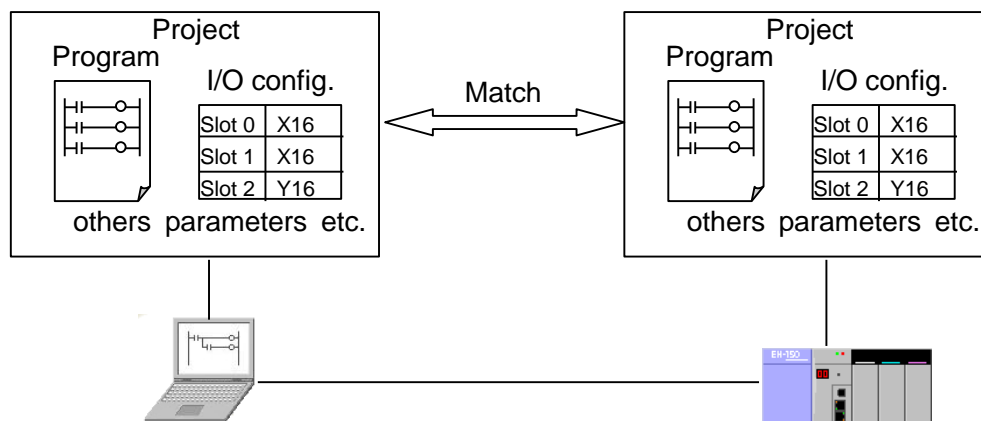
Fig. 3.1.16   Overview of I/O configuration

N o t e

Even if an I/O configuration different from actual component of I/O module is transferred to the CPU module, the CPU module does not run (I/O verification error: 41). However, if the [I/O configuration error] in the Operation Mode on the Operation Parameters dialog is set to the [RUN], the CPU module does run even if actual I/O module component is different from the I/O configuration.

N o t e

Uploaded data by [Read I/O] is information of I/O modules actually mounted on the base, not the I/O configuration sheet within the CPU module. For this reason, even if there is no information in the I/O configuration sheet in the CPU module, data can be read by [Read I/O] if I/O modules have been mounted. In other words, proper Read I/O operation does not mean that exact I/O configuration is set into the CPU module. Therefore, be sure to transfer the ladder program by PLC Download operation to set properly the I/O configuration sheet into the CPU module whenever the I/O configuration sheet.
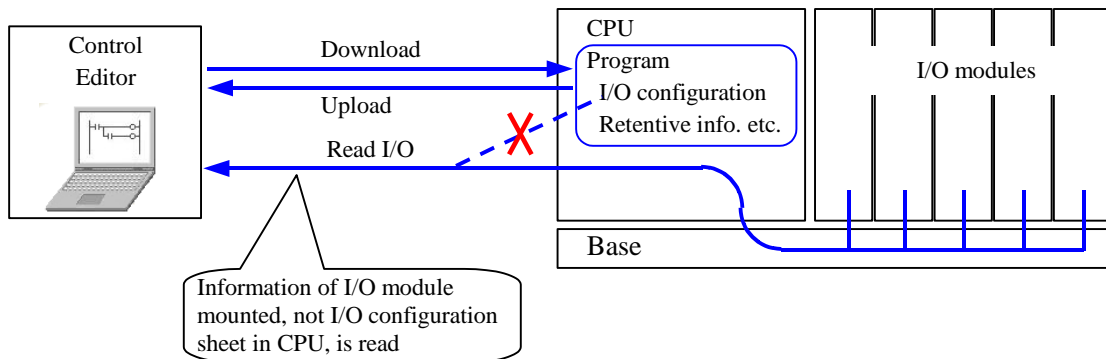
Fig. 3.1.17   Overview of Read I/O

3.2   Retentive area

I/O of internal output set to the retentive area retains the value by the battery even if the power supply of PLC is cut. The internal output which is not set to the retentive area is cleared to 0 at the start of RUN, but I/O set to the retentive area is not cleared to 0.

　　Menu:　　　[Tool] - [Parameter settings] - [Retentive Area]

Choose [I/O type] from the drop-down list and enter [Start No.] and [End No.]. Assgined retentive areas are displayed on the lower part of the window. You can set any internal output as the retentive area.

A total of 16 different retentive areas can be set to all I/O types. You can also seprately-assign several retentive areas to each I/O type.
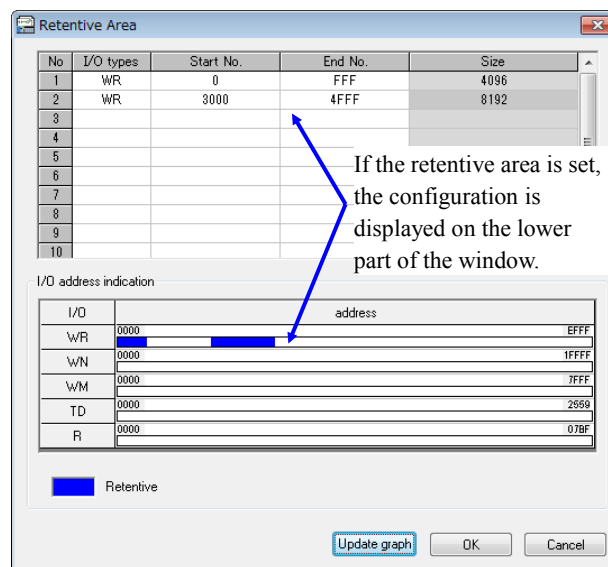
Fig. 3.2.1   Retentive area window

Note

- [EHV-CPU] If the power failure clear switch (R.CL switch) of CPU module is pressed, data in retentive area is all cleared.

  [MICRO-EHV] By setting one to R7EB, data in retentive area is all cleared.

- [Update graph] button was added from Ver.6.00.

  Clicking the [Update graph] button reflects the setting in the I/O address indication. The window does not close.

  To close the Retentive Area window, please click on the [OK] button.

3.3 Operation Parameters

Various parameters concerned in operation are set. The operation parameter is information related to ladder program and the operation parameter is written and read to CPU with the program.

> Menu: [Tool] - [Parameter settings] - [Operation Parameters]

[EHV-CPU series]
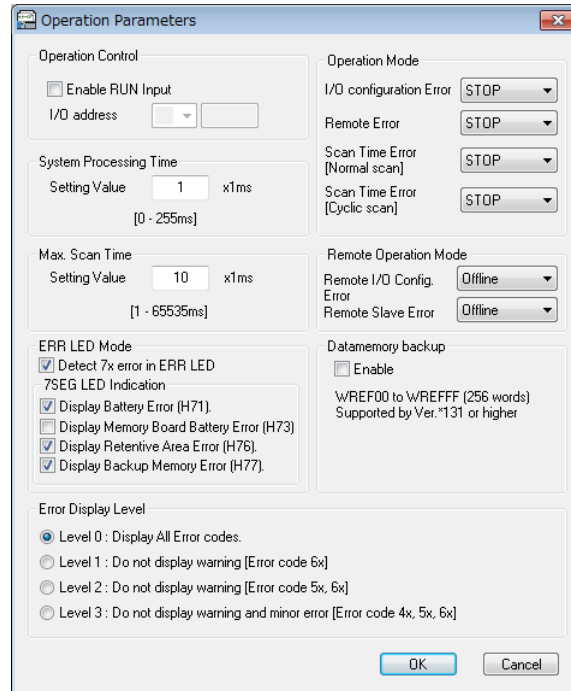
Fig. 3.3.1   Operation Parameters window (EHV-CPU)

Parameters set as operation parameters are shown in the following table.

Table 3.3.1   List of Operation Parameters

Item	Description	Default
Operation control	Uncheck: RUN/STOP of CPU is performed by the RUN switch on CPU or by instruction from Control Editor ([Online] menu on the menu bar or icon for RUN/TOP). Checked: CPU operation can be controlled by specified bit I/O. (When a value of specified I/O address is 1, it is RUN and when the value is 0, it is STOP.) This is enabled only when the RUN switch on CPU is turned to RUN because of normal operation conditions and AND conditions. I/O which can be specified is X of the external input, and R, M, and L of the internal output.	None
System Processing Time	The time that the CPU keeps for system processing is set. Since this time is inserted after every scan, each scanning time is extended to the time adding the set value. Please set the system processing time from 1 to 5ms when a program is small and a scanning time is extremely-short. CPU has a arithmetic processor to perform a user program and a main processor to perform communication and system processing. Communication is performed simultaneously while an arithmetic processor executes a user program, but processing such as scan monitor, etc. is performed at the end of every scan. So, when the scanning time for program is extremely-short, the time for communication processing performed during scanning may not be able to be kept because the frequency of the processing, such as scan monitor, etc. , which is performed by a main processor at every scan end increases. The system processing time is set in order to prevent this.	1 ms
Max. scan time	Overload error (error code is 44) occurs if normal scan time exceeds the maximum scan time. Normal scanning time is the time for executing from the top of a program to the last END command. When the cyclic scan is performed, the normal scanning time is extended.	10 ms

N o t e

When the program is small and the scanning time is short, communication error may occur on communication with the computer or devices such as HMI, etc. if the system processing time is set to 0.

Table 3.3.2   List of Operation Parameters

Item	Description			Default
Operation Mode	I/O configuration Error	STOP:	CPU does not run when set I/O configuration and actual I/O configuration do not match. (error code 41, I/O verification error) *1	STOP
		RUN:	CPU does run even if set I/O configuration and actual I/O configuration do not match.	
	Remote error	STOP:	CPU will stop if error occurs on a remote module. (error code 43, remote error) *1	STOP
		RUN:	CPU will continue running even if error occurs on a remote module.	
	Scan Time Error [Normal scan]	STOP:	CPU will stop if overload error of normal scan occurs. (error code 44, overload error (normal)) *1	STOP
		RUN:	CPU will continue running even if overload error of normal scan occurs.	
	Scan Time Error [Cyclic scan]	STOP:	CPU will stop if overload error of cyclic scan occurs. (error code 45, overload error (cyclic)) *1	STOP
		RUN:	CPU will continue running even if overload error of cyclic scan occur. However, the program which cannot be performed within the cyclic time is not executed	
Remote Operation Mode	I/O configuration Error	Offline:	Communication between remote master and slave is not performed when I/O configuration for a remote slave which is set and actual I/O configuration do not match.	Offline
		Online:	Communication between remote master and slave is performed even if I/O configuration for a remote slave which is set and actual I/O configuration do not match. *2	
	Slave Error	Offline:	Communication between remote master and slave will stop if error occurs on a remote slave.	Offline
		Online:	Communication between remote master and slave will continue running even if error occurs on a remote slave. *2	
ERR LED Mode	Checked:	ERR LED next to RUN LED will flash if one of battery error (71), memory board battery error (73), retentive area error (76), or backup memory error (77) occurs.		Checked
	Uncheck:	ERR LED next to run LED will not flash even if one of battery error, retentive area error, or backup memory error occurs. Also 71, 73, 76, or 77 of error code is not displayed on the 7SEG LED indicator.		
7SEG LED Indication	This is an activated setting when checking the ERR LED Mode. Checked: Error code is displayed on the 7SEG LED indicator at the time of appropriate error occurrence. Uncheck: Error code is not displayed on the 7SEG LED indicator at the time of appropriate error occurrence.			Checked
Error Display Level *3	Level of error code displayed on the 7SEG LED indicator can be specified. The smaller the number of error code is, the more important the error is. Level 0: Display all error codes (1x to 9x). Level 1: Display error codes 1x to 5x, do not display error codes 6x to 9x. Level 2: Display error codes 1x to 4x, do not display error codes 5x to 9x. Level 3: Display error codes 1x to 3x, do not display error codes 4x to 9x.			Level 0
Data memory backup (Ver.4.10 or higher)	When this function is enabled and special internal output R810 (Request to write data) is ON (rising edge), data in WREF00 to WREFFF (256 words) are written to FLASH memory. When PLC starts running, the data is loaded from FLASH to WREF00 to WREFFF. (Note: Since the life time of flash memory is limited, do not write data too frequently.)			Unchecked

*1 When the setting is turned to RUN and each error occurs, error code is not displayed on the 7SEG LED indicator, but the error code is stored into the address (WRF000) of self-diagnostic error code of special internal output.

*2 When these setting is turned to "Online" in the Remote Operation Mode, <u>be sure to set the "Remote error" to "Run" in the Operation Mode</u>. If the "Remote error" is set to "STOP", CPU will stop even if these settings in the Remote Operation Mode are set to "Online".

*3 When using redundant CPU module, the redundant system error code is displayed on the 7SEG LED indicator by the following conditions regardless of indication level setting.

When CPU runs or warning level error occurs, redundant system error code and self-diagnostic error code are displayed in turn.

When CPU was stopped by error, redundant system error code is not displayed. (Only self-diagnostic error code is displayed.)

[About System Processing Time]

When the scan time is not enough (less than 1ms as a standard), communicative response performance deteriorates because the executed frequency of the scan monitor processing (scan END processing such as I/O refresh, etc.) by a main processor increases and enough time for system processing (communication processing) cannot be kept.

Since EHV-CPU can set the time for system processing within scan monitor processing, please set the system processing time of operation parameters when communicative response performance is not enough.

When "System Processing Time" is 0

When it is set as "System Processing Time"
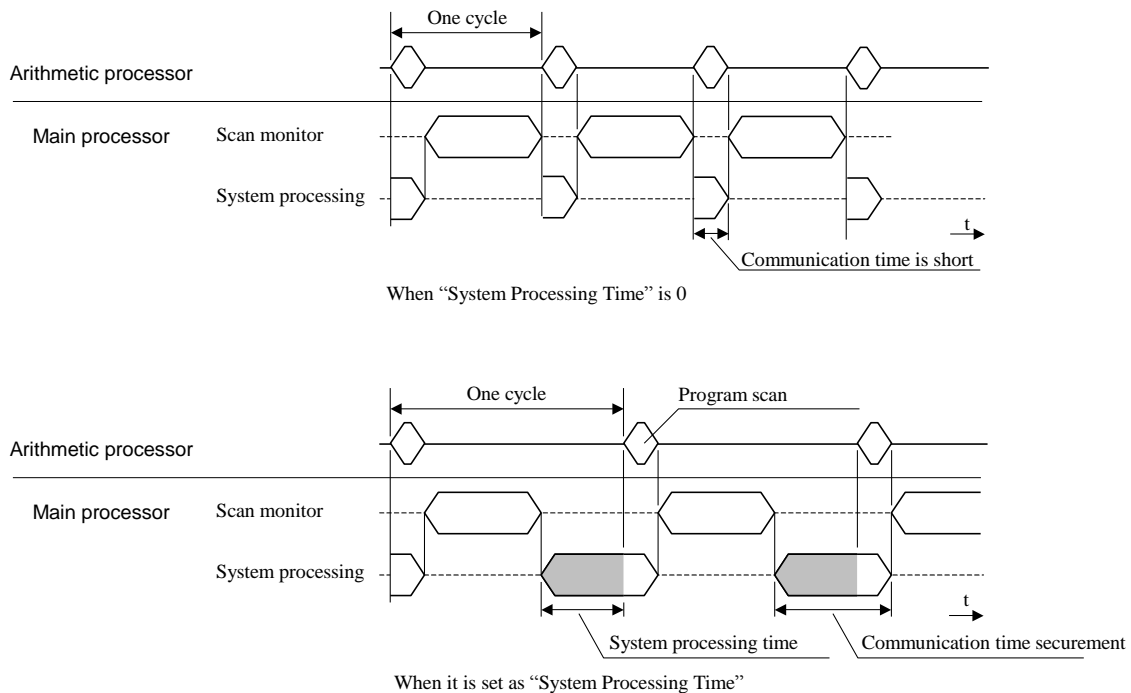
Fig. 3.3.2   Motion of System (in setting System processing time)

[MICRO-EHV series]
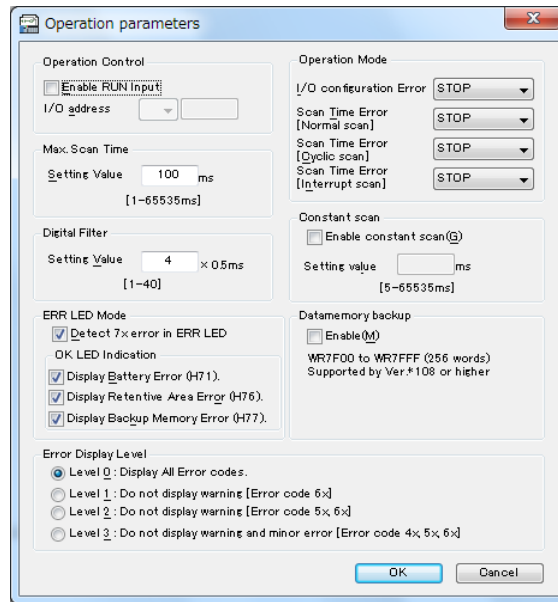
Fig. 3.3.3   Operation Parameters window (MICRO-EHV)

Operation parameters are shown in the following table. System Processing Time on MICRO-EHV is fixed to 2ms.

Table 3.3.3   List of Operation Parameters

Item	Description	Default
Operation control	Uncheck: RUN/STOP of CPU is performed by the RUN switch on CPU or by instruction from Control Editor ([Online] menu on the menu bar or icon for RUN/TOP). Checked: CPU operation can be controlled by specified bit I/O. (When a value of specified I/O address is 1, it is RUN and when the value is 0, it is STOP.) This is enabled only when the RUN switch on CPU is turned to RUN because of normal operation conditions and AND conditions. I/O which can be specified is X of the external input, and R, M of the internal output.	None
Max. scan time	Overload error (error code is 44) occurs if normal scan time exceeds the maximum scan time. Normal scanning time is the time for executing from the top of a program to the last END command. When the cyclic scan is performed, the normal scanning time is extended.	100 ms
Digital Filter	Specify the sampling time of the digital filter in units of 0.5ms. The value of 0 means the filter is disabled and more than 40 means 40. This setting applies to all input terminal of the basic unit.	4 (2ms)

Table 3.3.4   List of Operation Parameters

Item	Description			Default
Operation Mode	I/O configuration Error	STOP: RUN:	CPU does not run when set I/O configuration and actual I/O configuration do not match. (error code 41, I/O verification error) . *1 CPU does run even if set I/O configuration and actual I/O configuration do not match	STOP
	Scan Time Error [Normal scan]	STOP: RUN:	CPU will stop if overload error of normal scan occurs. (error code 44, overload error (normal)) *1 CPU will continue running even if overload error of normal scan occurs.	STOP
	Scan Time Error [Cyclic scan]	STOP: RUN:	CPU will stop if overload error of cyclic scan occurs. (error code 45, overload error (cyclic)) _ *1 CPU will continue running even if overload error of cyclic scan occur. However, the program which cannot be performed within the cyclic time is not executed	STOP
	Scan Time Error [Interrupt scan]	STOP: RUN:	CPU will stop if overload error of interrupt scan occurs. (error code 46, overload error (interrupt)) . *1 CPU will continue running even if overload error of interrupt scan occur	STOP
Constant scan	Checked: User program are executed on the normal scan. Uncheck: User program are executed in the constant period. The valid range is 5 – 65535[ms].			Unchecked
ERR LED Mode	Checked: OK LED will flicker if one of battery error (71), retentive area error (76), or backup memory error (77) occurs. Uncheck: OK LED will stay lighting even if one of battery error, retentive area error, or backup memory error occurs.			Checked
Error Display Level	Level of error code displayed on OK LED can be specified. The smaller the number of error code is, the more important the error is. Level 0: Display all error codes (1x to 9x). Level 1: Display error codes 1x to 5x, do not display error codes 6x to 9x. Level 2: Display error codes 1x to 4x, do not display error codes 5x to 9x. Level 3: Display error codes 1x to 3x, do not display error codes 4x to 9x.			Level 0
Data memory backup (Ver.4.10 or higher)	If this function is enabled and bit internal output R810 (Write backup data) is activated (rising edge), data in WR7F00 to WR7FFF (256 words) are written to FLASH memory. When CPU starts running, the saved data is loaded toWR7F00 to WR7FFF automatically. Be noted that frequent writing can shorten the life time of FLASH memory.			Unchecked

*1 When the setting is turned to RUN and each error occurs, error code is not displayed on the LED, but the error code is stored into the address (WRF000) of self-diagnostic error code of special internal output.

3.4   Link Parameter

When using link modules (EH-LNK, EH-OLNK) and DeviceNet module (EH-RMD) in the link mode, it is necessary to set the link parameter. A CPU module can have up to 8 link areas and one link parameter per module is set. Before setting the link parameters, be sure to set LINK module in I/O configuration. Otherwise LINK parameter setting window is deactivated.

MICRO-EHV dose not support link modules.

  Menu: [Tool] - [Parameter settings] - [Link Parameters]
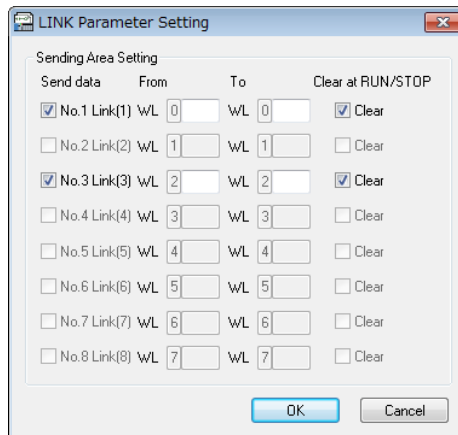
Fig. 3.4.1   LINK Parameter Setting window

[What is Link area]

Link area is a data memory area where several CPUs connected on the CPU link network can share, and is represented with L (bit), WL (word), and DL (double word). Although all CPU on network can read the link area, user must assign writable area so that each CPU does not overlap. An area where one CPU can write is called the "sending area" and an area where the CPU can read only is called the "receiving area". The sending area for one CPU is the receiving area for all other CPU.
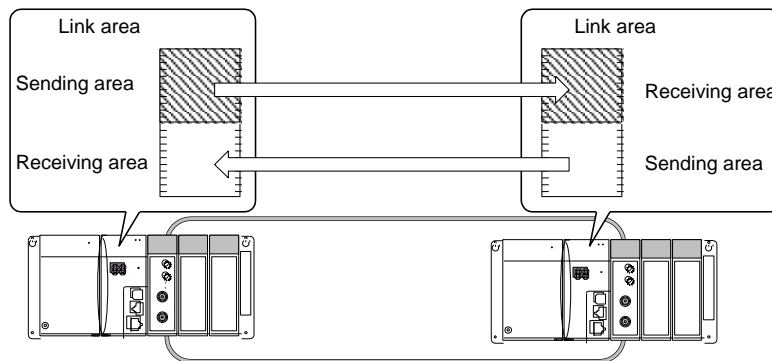
Fig. 3.4.2   Outline of Link data area

And, all link area can be used as the internal output when not using the link module.

Send data: Check the box when setting the sending area. All is a receiving (read-only) area if the

                        check box is not marked.

From / To: Set the first and last address of the sending area. An area set here is a sending area and

                        others are a receiving area.

Clear at RUN/STOP: The link area(only sending area) is cleared at RUN/STOP of CPU if the check box is

                        checked. The last value is retained without clearing the link area even at RUN/STOP with

                        unchecking.

Relation between I/O configuration and Link parameter

Ex. Link module (LINK) configuration

Slot.0 LINK module → No.1 Link

Slot.2 LINK module → No.3 Link

No. 3 Link area

Receiving area	WL2000
	WL20FF
Sending area	WL2100
	WL216F
Receiving area	WL2170
	WL23FF

1,024 words

Set area is a sending area (write area) and others are a receiving area (read area).
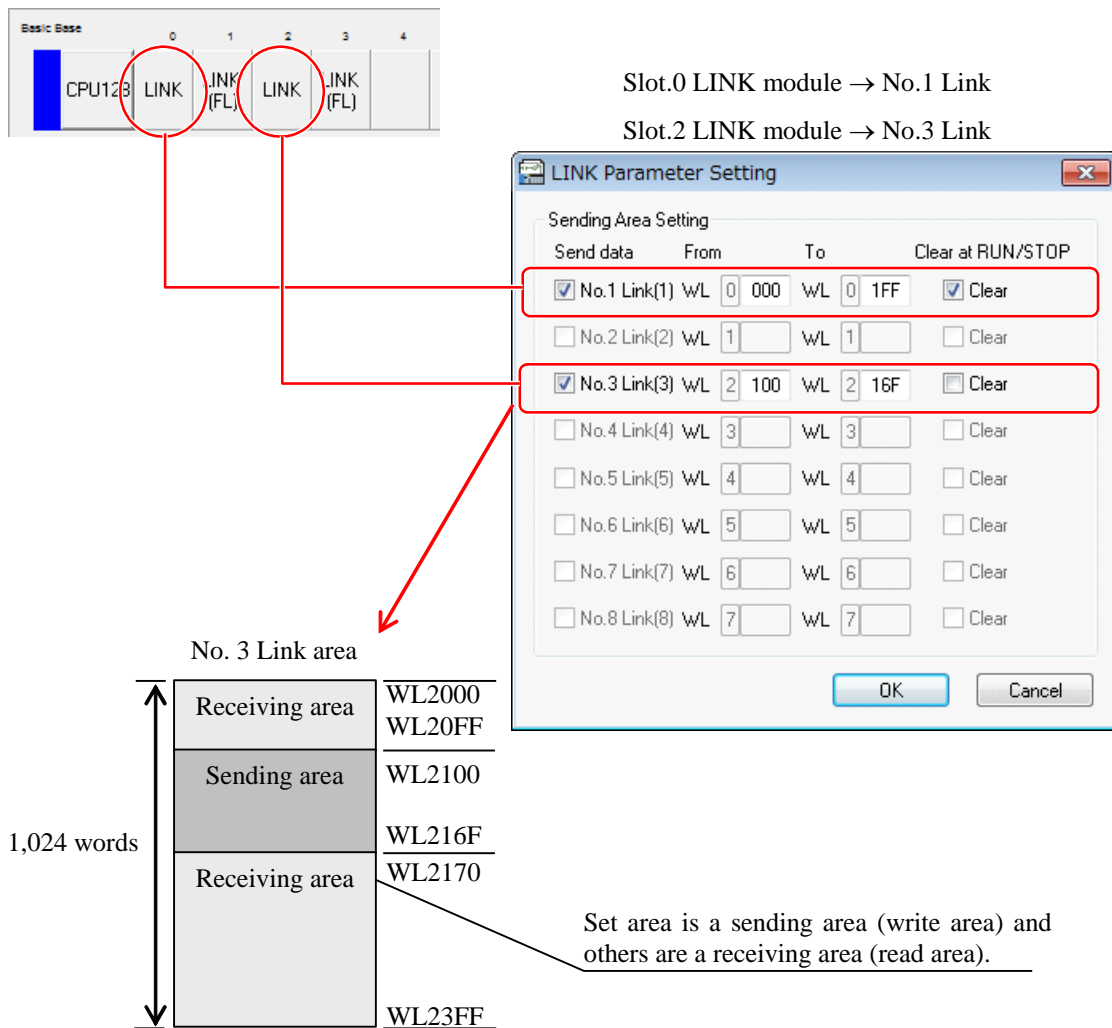
Fig. 3.4.3   Outline of Link parameter

3.5   FL-net Parameter

In Ver.5.00 or higher, FL-net module (EH-FLN3) is added.

When using a FL-net module (EH-FLN2, EH-FLN3), it is necessary to set the FL-net parameter. One link area is assigned to one FL-net module and a CPU module can mount up to 2 FL-net modules. However, the FL-net module can be mounted at the slot No. 0 to 7 on the basic base. And when setting the FL-net parameter, always assign the FL-net module in the I/O configuration setting. Otherwise, the FL-net parameter setting remains inactive.

MICRO-EHV dose not support FL-net modules.

Menu: [Tool] - [Parameter settings] - [FL-net Parameters]
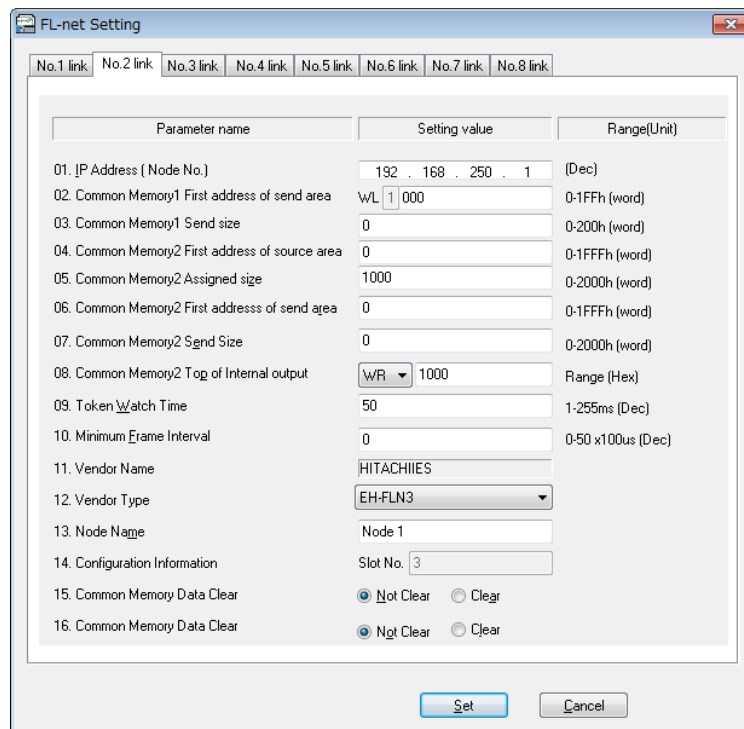
Fig. 3.5.1   FL-net Setting window

<u>Relation between I/O configuration and FL-net parameter</u>

Example: Assignment of FL-net module (LINK(FL))

FL-net module at Slot. 1 → No.2 link

FL-net module at Slot. 3 → No.4 link
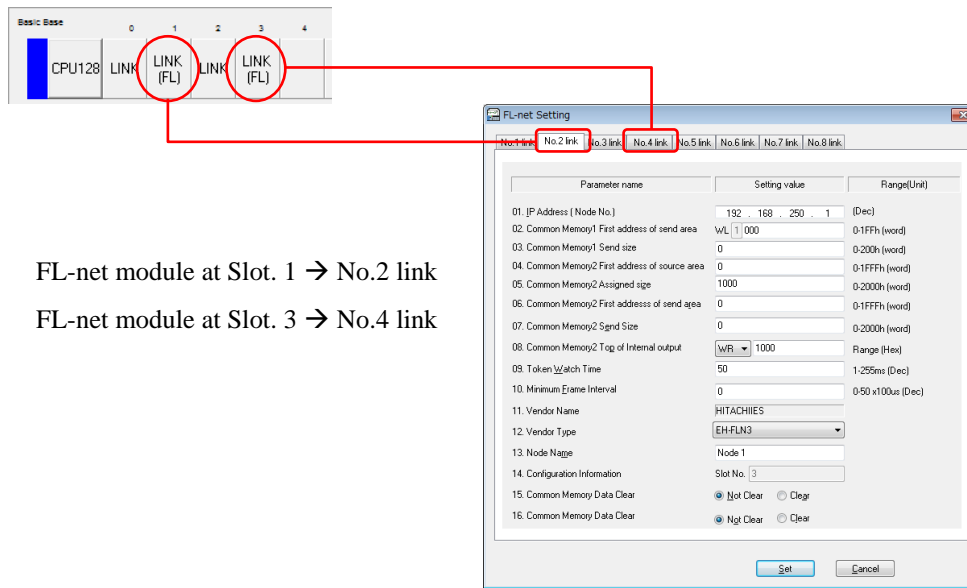
Fig. 3.5.2   FL-net parameter

Table 3.5.1 shows the FL-net setting parameters.

Table 3.5.1   FL-net setting parameters(1/2)

Item	Description	Default
01.IP Address (Node No.)	Specify IP address.	192.168.250.1
02.Common Memory 1 First address of send area	In Ver.5.00 or higher, the address of WL area is fixed. Specify a value from 0 to 1FF (HEX). *1	000
03.Common Memory 1 Send size	Specify a value from 0 to 200 (HEX). *1	0
04.Common Memory 2 First address of source area	Specify a value from 0 to 1FFF (HEX). *1	0
05.Common Memory 2 Assigned size	Specify a value from 0 to 2000 (HEX). *1	1000
06.Common Memory 2 First address of send area	Specify a value from 0 to 1FFF (HEX). *1	0
07.Common Memory 2 Send Size	Specify a value from 0 to 2000 (HEX). *1	0
08.Common Memory 2 First address of internal output	Select a memory area from WR/WM/WN. Specify a value within the limit of the selected area. *1	1000
09.Token Watch Time	Specify a value from 1 to 255 (DEC). The unit is [ms].	50
10.Minimum Frame Interval	Specify a value from 0 to 50 (DEC). The unit is 100[μs].	0
11.Vendor Name	In Ver.5.00 or higher, the vendor name (HITACHIIES) for EH-FLN3 is added. The vendor name is specified according to "12. Vendor Type". The vendor name cannot be changed directly. "HITACHI" is set if EH-FLN2 is selected in "12. Vendor Type". "HITACHIIES" is set if EH-FLN3 is selected in "12. Vendor Type".	HITACHI
12.Vendor Type	In Ver.5.00 or higher, EH-FLN3 is added. Select EH-FLN2/EH-FLN3 from the list.	EH-FLN2

Table 3.5.1   FL-net setting parameters(2/2)

Item	Description	Default
13.Node Name	Set the name of node. At most 10 ASCII characters can be used at here.	Node 1
14.Confugration Information	Displays the slot No. which is assigned in I/O configuration. This setting cannot be changed.	0

15.Common Memory 1 Data Clear	**Not Clear**
	    The data is cleared at only Power-ON.
	Clear
	    The data is cleared at RUN/STOP or Power-ON.
		Not clear

16.Common Memory 2 Data Clear *2	**Not clear**
	    The data is cleared at only Power-ON.
	Clear
	    The data is cleared at RUN or Power-ON.
	    However, it does not cleared when except retained area.
		Not clear

*1 Please refer to [Area Configuration of Microcomputer Memory] for the information of Microcomputer memory 1 and
   Microcomputer memory 2 area.

*2 Please refer to [Table 3.5.2 Data Clear specification of Common Memory 2] for the information of data
   clear specification.

Area Configuration of Microcomputer Memory

The FL-net standard has a common memory 1 which is 8k bits and a common memory 2 which is 8k words in the
data area that each node shares. Hitachi PLC assigns the common memory 1 to the WL area and the common
memory 2 to some one of the WR/WM/WN area. Fig.3.5.3 shows the relationship of data memory between FL-net
and CPU module.
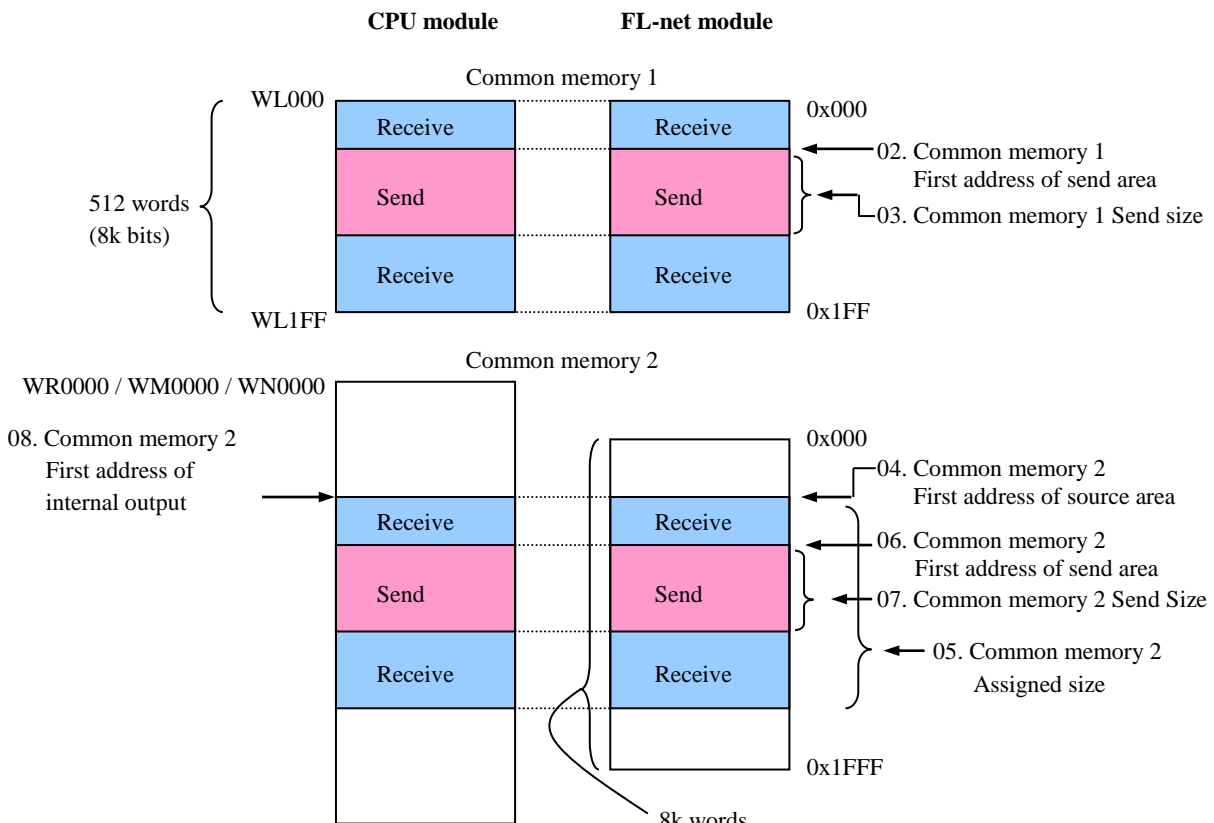
Fig. 3.5.3   Setting area of FL-net

Common memory 2 data clear operation

The data clear operation of WR, WM and WN set as common memory 2 can be matched with either CPU link area (WL) or normal internal output (WR, WM, WN).

    Not clear   Behavior of CPU link area (WL)

    Clear   Behavior of normal internal output (WR, WM, WN)

The settings "Not clear" and "Clear" indicate the clear operation at the start of operation (form STOP to RUN), but when the area of common memory 2 is set as the retentive area, It will be different operation.

The relationship between each setting and data clear operation is shown in Table 3.5.2.

Table 3.5.2   Data clear specification of Common memory 2

Configuration		Data clear / retain state of common memory 2		
Data clear Specification	Retentive area	Power-ON	RUN start	Press "R,CL" switch
Not clear	Assgined	Data cleared	Data retaind	Data retaind
	Not Assgined	Data cleared	Data retaind	Data retaind
Clear	Assgined	Data retaind	Data retaind	Data cleared
	Not Assgined	Data cleared	Data cleared	Data retaind

Whether or not retentive area is assigned indicates whether common memory 2 is assgined as retentive area.

3.6 Data Logging

This function is supported by MICRO-EHV series only. EHV-CPU does not support it.

Parameters for data logging are configured as below.

  Menu: [Tool] - [Parameter settings] - [Data Logging Settings]

  Menu: [Tool] - [Data Logging status]
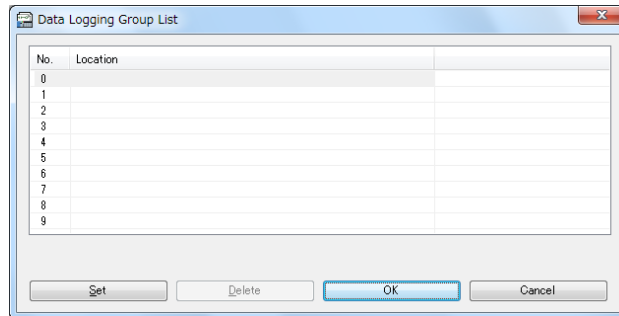
Fig.3.6.1 Data logging group list
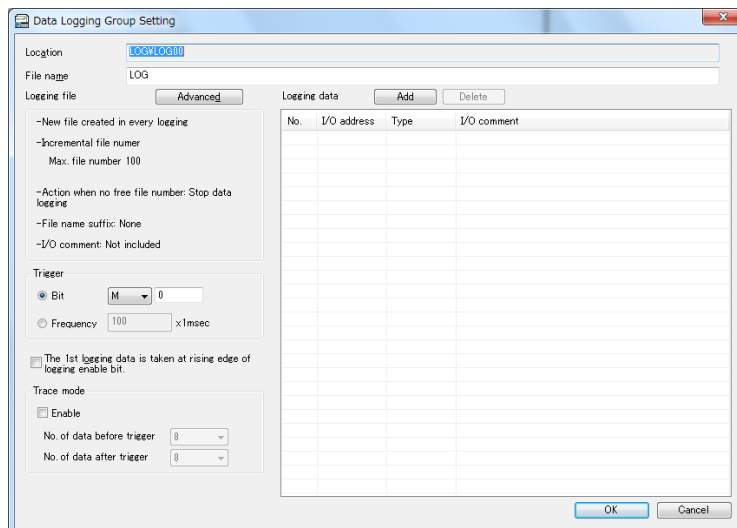
Fig.3.6.2 Data logging group setting
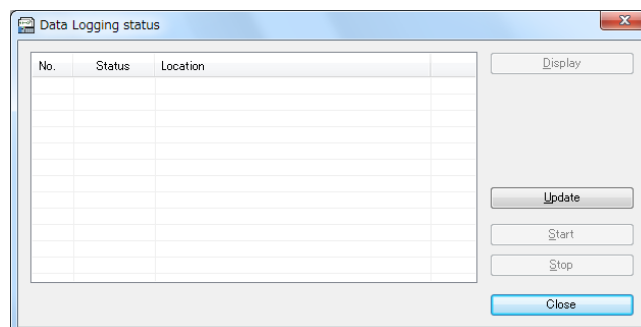
Fig.3.6.3 Data logging status

Please refer to the "MICRO-EHV User's Manual (NJI-591 *)" for further information.

3.7   Simplified Positioning Parameter Setting

This function is supported by MICRO-EHV series only. EHV-CPU does not support this.

The pulse output function of MICRO-EHV is improved. Therefore the simplified positioning control can be operated by a simple program. Principal improvements are shown below. Refer to "MICRO-EHV Programming manual [NJI-590*]" for more information.

  (1)   Origin return command supported

     The origin return control for the targeted axis can be performed by the pulse output when origin return command is operated.

     The program can be simplified because it is not necessary to control the pulse output while monitoring the input.

  (2)   [Absolute Position] supported in Pulse Output Control Command

     The target position can be assigned by [Absolute Position]. Since it is assigned by absolute position, when axis is operating, the calculations for the moving direction and distance from current position are not necessary.

  (3)   JOG operation and Inching operation supported

     JOG operation and inching operation can be performed. The target point can be checked by operating axis actually. And external wiring can be checked smoothly by JOG operation and inching operation.

  (4)   Linkage with 2-phase counter

     The actual position can be detected by connecting 2-phase counter with the feedback pulse from the encoder. (But the divergence of position is not corrected.) And when the origin return control is completed to perform, the current value of the counter is set "0" forcibly.

In order to perform these functions, carry out the setting for the pulse output after assigning functions in the special I/O configuration window.

Please note that the behavior of the simplified positioning parameter setting window opened from the special I/O configuration window is different from that opened from the project tree or the menu.

     Menu: [Tool] - [Extended parameter setting] - [Simplified positioning parameter setting]
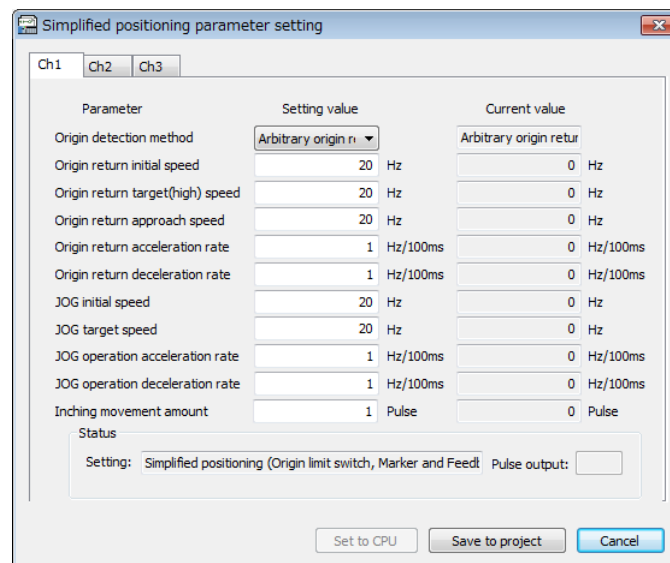
Fig. 3.7.1   Simplified positioning parameter setting window

Display from the special I/O configuration window

Ch.Tab:	The tab of the assigned channel is displayed. This cannot be changed.
Setting value:	This can be changed.
Current value	
Offline:	"Arbitrary origin return" is displayed as origin detection method. And "0" is displayed in the other items.
Online:	The setting values of the connected CPU are displayed.
On-direct:	The setting values of the connected CPU are displayed.
Status:	The setting function and the state of pulse output are displayed.
Setting:	The function assigned to the corresponding channel is displayed.
Pulse output:	The current state of pulse output is displayed. "ON" is displayed in outputting and "NG" is displaying in stopping output.
Set to CPU:	This is not active regardless of the CPU operation mode.
Save to project:	When this is clicked, the setting parameters are confirmed. If the setting parameters are not invalid, the setting parameters are saved in the project file.

N o t e

When the setting is canceled in I/O configuration window, the setting parameters in the simplified positioning parameter setting window are removed. And, when the setting of the corresponding channel in the special I/O settings window is removed, the setting value is initialized.

Display from the project tree・menu window

Ch.Tab:	The tab of Ch.1 is displayed firstly. Ch. can be changed.
Setting value:	Only the channel assigned to the simplified positioning can be changed.
Current value	
Offline:	Arbitrary origin return" is displayed as origin detection method. And "0" is displayed in the other items.
Online:	The setting values of the connected CPU are displayed.
On-direct:	The setting values of the connected CPU are displayed.
Status:	The setting function and the state of pulse output are displayed.
Setting:	The function assigned to the corresponding channel is displayed.
Pulse output:	The current state of pulse output is displayed. "ON" is displayed in outputting and "NG" is displaying in stopping output.
Set to CPU	
Offline:	This is not active.
Online:	When this is clicked, the setting parameters are confirmed. If the setting parameters are not invalid, the setting parameters are set in CPU.
	The setting window is not closed. After that, it is able to change the values.
	If the CPU which does not support this function (ROM Ver. *110 or lower) is connected, the message is displayed and the parameters is not set.
On-direct:	This is not active.

Save to project

Offline:　　　　　　　　When this is clicked, the setting parameters are confirmed. If the setting parameters are not invalid, the setting parameters are set in CPU.

Online:　　　　　　　　When this is clicked, the setting parameters are confirmed. If the setting parameters are not invalid, the setting parameters are set in CPU.

On-direct:　　　　　　This is not active.

Initial value

Refer to Table 3.7.1　for the initial value.

Table 3.7.1　Initial value

No.	Setting	Initial value	Details
1	Origin detection method	Arbitrary origin return	—
2	Origin return initial speed [Hz]	20	—
3	Origin return target(high) speed [Hz]	20	—
4	Origin return approach speed [Hz]	20	—
5	Origin return acceleration rate [Hz/100ms]	1	—
6	Origin return deceleration rate [Hz/100ms]	1	—
7	JOG initial speed [Hz]	20	—
8	JOG target speed [Hz]	20	—
9	JOG operation acceleration rate [Hz/100ms]	1	—
10	JOG operation deceleration rate [Hz/100ms]	1	—
11	Inching movement amount [Pulse]	1	—

Settings

Please refer to [Table 3.7.2 Setting Range] for the valid range of each item.

Table 3.7.2   Setting Range

No.	Setting	Setting value		Details
		Lower limit value	Upper limit value	
1	Origin detection method	Arbitrary origin return High speed Marker stop 1 High speed Marker stop 2 Constant speed origin limit switch stop		Select the origin detection method.
2	Origin return initial speed [Hz]	20	65,535	Origin return target(high) spee ≧ Origin return approach speed ≧ Origin return initial spee
3	Origin return target(high) speed [Hz]	20	100,000	Origin return target(high) speed ≧ Origin return approach speed ≧ Origin return initial spee
4	Origin return approach speed [Hz]	20	65,535	Origin return target(high) speed ≧ Origin return approach speed ≧ Origin return initial spee
5	Origin return acceleration rate [Hz/100ms]	1	65,535	—
6	Origin return deceleration rate [Hz/100ms]	1	65,535	—
7	JOG initial speed [Hz]	20	65,535	JOG target speed ≧ JOG initial speed
8	JOG target speed [Hz]	20	100,000	JOG target speed ≧ JOG initial spped
9	JOG operation acceleration rate [Hz/100ms]	1	65,535	—
10	JOG operation deceleration rate [Hz/100ms]	1	65,535	—
11	Inching movement amount [Pulse]	1	65,535	—

Confirmation process for setting parameters

When [Set to CPU] or [Save to project] is clicked, the setting parameters are confirmed. If the setting parameters are invalid, the massege which shows the error factor is displayed.

1] Confirmation of range

The setting values from No.2 to No.11 will be confirmed. If there is any parameter outside the range, the message is displayed.

2] Confirmation of validity

Each speed parameters for "Origin return" and "JOG operation" is comfirmed validity. If the setting parameters are invalid, the massege is displayed.

3.8   Simplified Positioning Trial Operation

This function is supported by MICRO-EHV series only. EHV-CPU does not support this.

3.8.1 Preparation for Simplified Positioning Trial Operation

In order to do simplified positioning trial operation, it is required to set special I/O, set simplified positioning parameters and write them into PLC in advance.

1] Special I/O configuration

It is able to select the functions described in [Table 3.8.1 Overview of Possible Functions in Trial Operation]. The windows cannot be displayed, and trial operation cannot be performed if functions excluded in that table are selected.

Table 3.8.1   Overview of Possible Functions in Trial Operation

No.	Functions			Trial Operation Enable
	Categories	Items	Details	
1	I/O combined	Simplified positioning	Origin limit switch	✓
2			Origin limit switch and Marker	✓
3			Origin limit switch and Feedback pulse count	✓
4			Origin limit switch, Marker and Feedback pulse count	✓
5	Input	2-phase counter	Not use Z-phase	—
6			Use Z-phase	—
7		1-phase counter	—	—
8		Interrupt input	—	—
9	Output	PWM output	—	—
10		Pulse output	—	—
11		Pulse + direction output	—	✓ *1

✓: Trial operation can be performed

—: Trial operation cannot be performed

*1: Trial operation can be performed (No origin return)

2] Simplified Positioning Parameters Configuration

Simplified positioning parameters configuration is performed. Please refer to [3.7 Simplified Positioning Parameters Setting] for the details.

3] PLC Download

In order to set the special I/O and simplified positioning parameters in CPU, please do PLC download operation. If fail to do PLC download operation, simplified positioning trial operation cannot be performed, or the operations, which is different from the intended operations, will occur.

3.8.2 Operation of Simplified Positioning Trial Operation

Simplified positioning trial operation window will display from project tree window or menu. Windows with maximum 3 channels can be displayed at the same time.

In simplified positioning trial operation window, every button is valid and able to manipulate in the online mode.
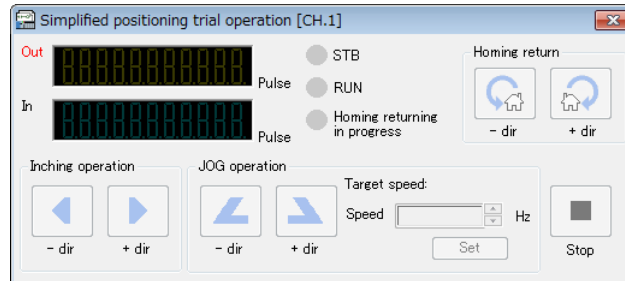
Fig. 3.8.1　Simplified positioning trial operation window

Out:	Number of output pulses is displayed.
In:	The counter input value is displayed.
STB:	This is turned ON (●:Green) when the origin return control is completed. This is turned OFF (●:Gray) during operating the origin return.
RUN:	This is turned ON (●:Green) during outputting pulse. This is turned OFF (●:Gray) when outputting pulse is stopped.
Homing returning in progress:	This is turned ON (●:Green) during operating the origin return. This is turned OFF (●:Gray) when the origin return control is completed or during stopping outputting pulse.
Homing return	
- dir:	The requirement of the origin return (- dir) is output to CPU.
+ dir:	The requirement of the origin return (+ dir) is output to CPU.
Inching operation	
- dir:	The requirement of the inching operation (- dir) is output to CPU.
+ dir:	The requirement of the inching operation (+ dir) is output to CPU.
JOG operation	
- dir:	When this button is clicked once, the requirement of the JOG operation (- dir) is output to CPU. When this button is clicked again, the requirement is stopped.
+ dir:	When this button is clicked once, the requirement of the JOG operation (+ dir) is output to CPU. When this button is clicked again, the requirement is stopped.
Target Speed:	Display the set JOG operation speed.
Speed:	Adjust JOG operation spped by directly inputing speed[HZ] or using mouse wheel.
Set:	Set the JOG operation speed by the speed displayed, output the requirement of JOG operation speed change, and change the configuration in CPU.
Stop:	The requirement of stopping operation is output to CPU.

MEMO

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Chapter 4   Programming

This chapter describes Ladder program edit. Refer to 2.5 Toolbar icons for meanings of symbols and usable I/O type.

4.1   Input Symbols

(1) Contact and Coil
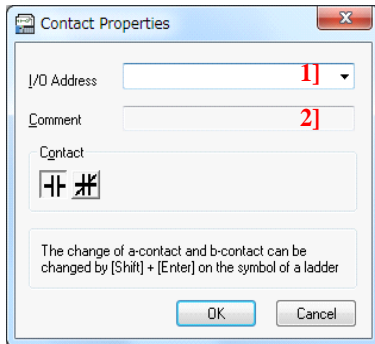
Fig. 4.1.1   Contact Properties
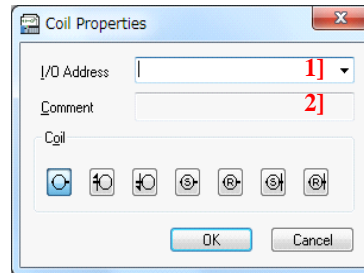
Fig. 4.1.2   Coil Properties

A series of operations of each property window can be completed with only the [Enter] key.

1] I/O Address input➔ [Enter] ➔ 2] Comment input➔ [Enter]

(Also type of contact and coil can be selected by mouse or keyboard operation ([Tab] + [space] keys).)

If [Enter] key is hit at I/O Address and comment data has been already input, comment entry is skipped and the window will close (Ver.4.06 or higher). Refer to chapter "8.2 Option settings" for further information.

Reference

By pressing the [Shift] + [Enter] keys when the cursor is on the contact symbol, it is possible to replace the a-contact and the b-contact from Ver.2.14. Refer to the "chapter 4.2 Intelligent shortcut key" for details.

N o t e

Icons of "Coil" and "Timer/Counter" are different in Control Editor but same in LADDER EDITOR.

(2) Timer / Counter
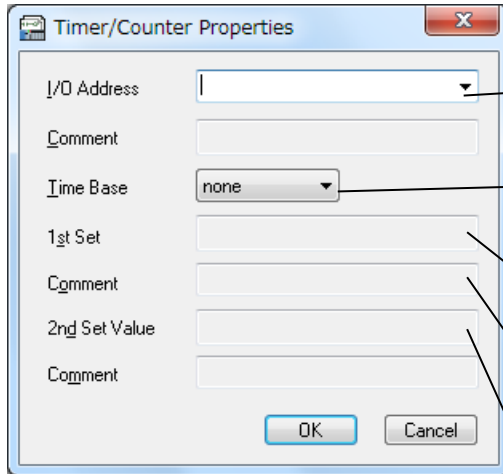
Fig. 4.1.3   Timer/Counter Properties

I/O input
  Timer: TD, TDN, SS, MS, TMR, WDT
  Counter: CU, RCU, CTU, CTD

Time base
  Specify only in using the timer.
  This is not active in using the counter.

The 1st Set Value
  Set a constant from 0 to 65535 or Word internal output.
  (ex. WR10)
  Real set time = (Time base)×(Set value)

Comment of the 1st Set Value
  Comment can be input when using I/O (a variable) for
  the 1st set value.

The 2nd Set Value
  Only Watchdog timer (WDT) uses here.
  Set a constant from 0 to 65535 or Word internal output.
  (ex. WR10)

(3) DIF (Rising edge detection) / DFN (Falling edge detection)

Differently from current LADDER EDITOR, numbering DIF and DFN is unnecessary.
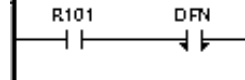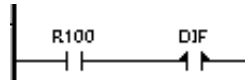
Fig. 4.1.4   DIF / DFN

(4) Comparison Box
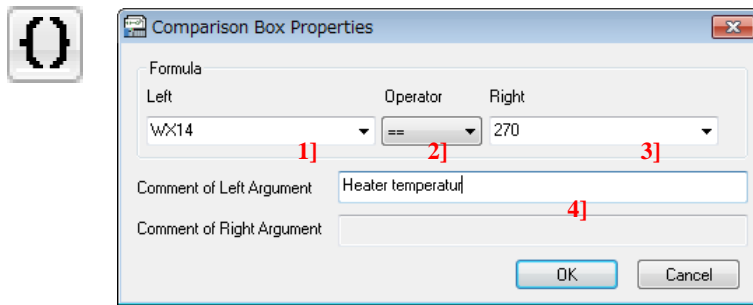
Fig. 4.1.5　Comparison Box Properties

1] Input the Left.

2] Select the Operator from the pull-down list.

3] Input the Right.

4] Comment can be input when using a variable in the left member/the right member.

One comparison box occupies three contacts width. The comparison box can be considered the contact which is turned on when the conditions in the box are satisfied.
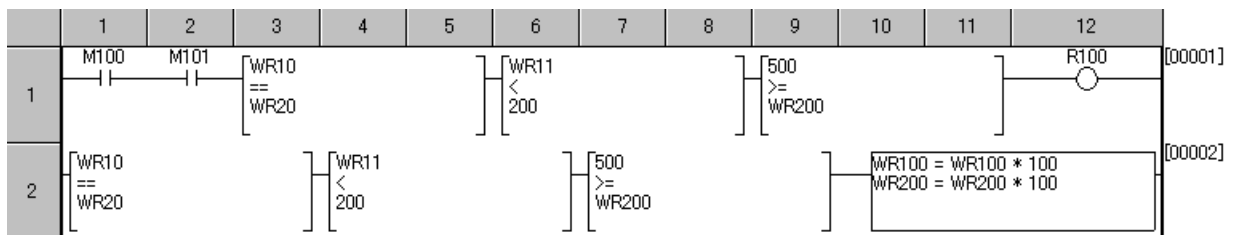
Fig. 4.1.6　Description of Comparison box

(5) Processing Box

Box comment
(Up to 64 characters)

I/O comment can be edited up to 32 characters. [Ver.2.00] (But, it is not displayed in the ladder.)

Details can be displayed and closed by clicking [Command>>] button. By double-clicking a command in the list on the lower left, that command
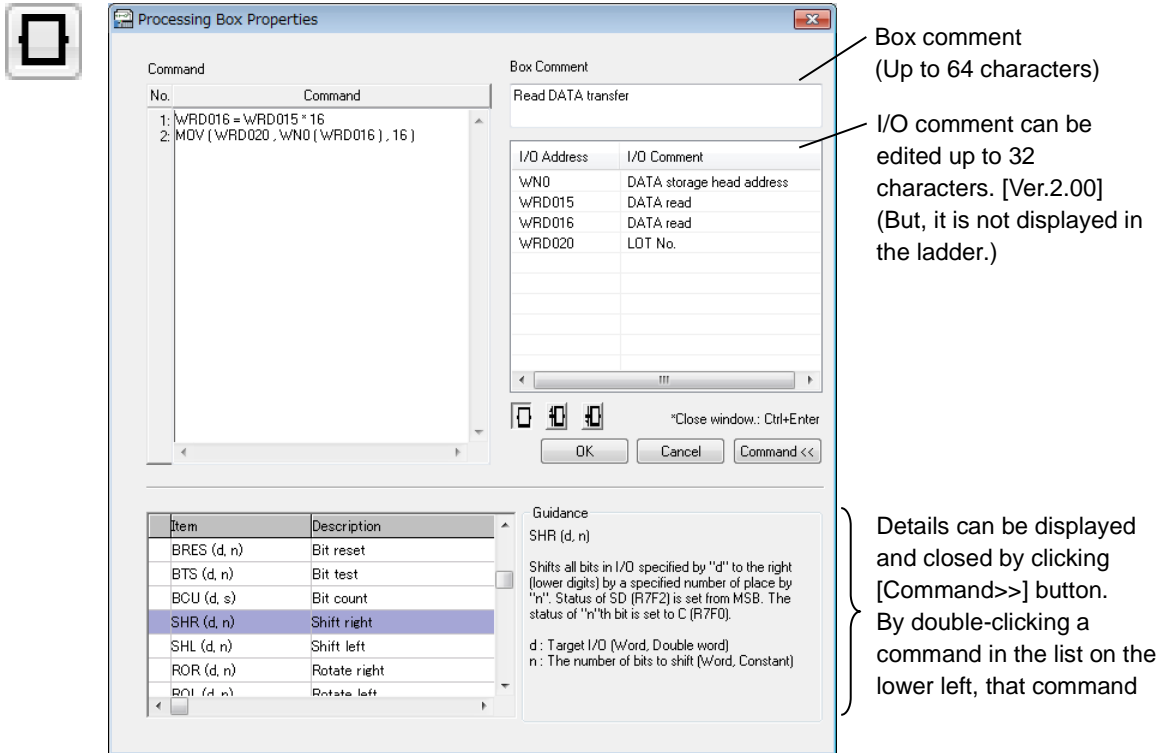
Fig. 4.1.7   Processing Box Properties

1] A space is unnecessary in front of and behind an equal sign (=) and arithmetic operators.

WR100 = WR101 + WR102   ⟹   WR100=WR101+WR102

2] The arithmetic expression can be input up to 32 lines.

3] When comments are input in the Box Comment on the upper right in the Processing Box Property, it is displayed on the 1st line in the processing box.
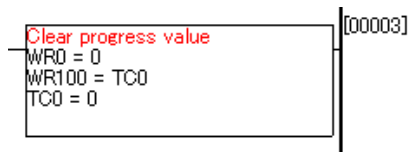
Fig. 4.1.8   Comment in Processing box

Since the processing box occupies rows from the 10th to the 12th, a maximum of 9 contacts can be input.
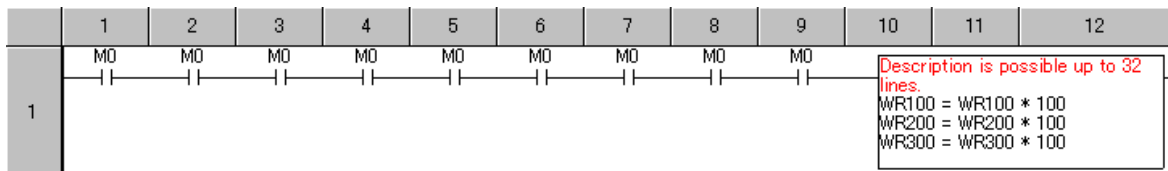
Fig. 4.1.9   Description of Processing box

4] The command list is displayed by clicking [Command>>] button. As a result, the complicated command also can be input by watching a command guide.
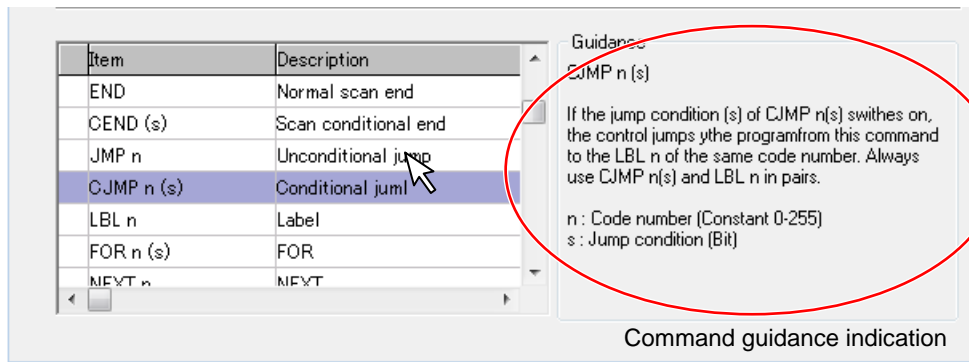
Fig. 4.1.10　Command Guidance of Processing box

There are also edge processing boxes as the processing box. The type of processing box can be changed also in the Processing Box Property window.

　EU processing box　　　　ED processing box
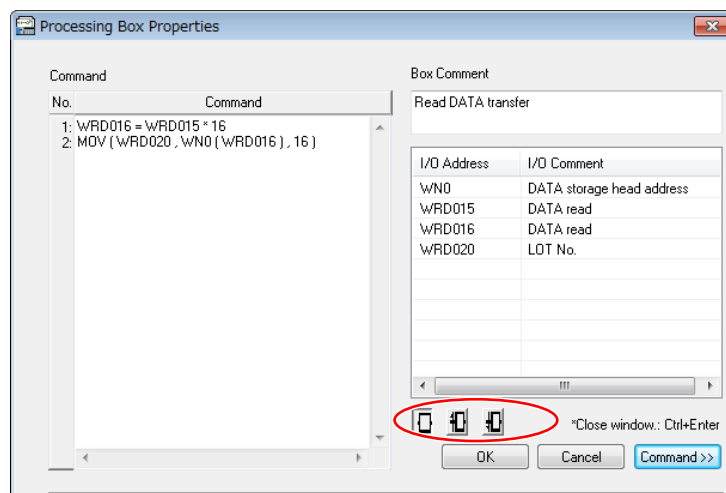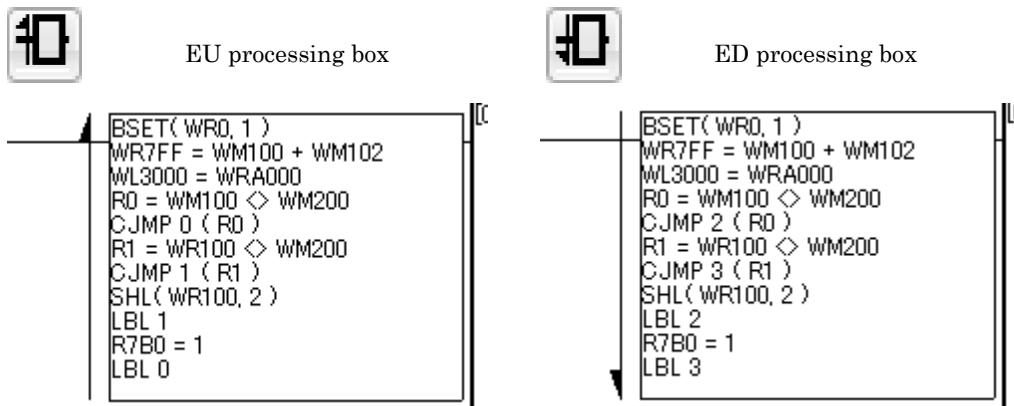
Fig. 4.1.11　Edge processing box

Reference

- Ver.5.00 than the input of the polynomial to the input of the arithmetic expression is now possible. For details of input method, please refer to "Control Editor Polynomial Edit Edition (NJI - 640 *)".

```
Polynomial Input                                    [00017]
WR10 = ( WR0 + WR1 ) * ( WR2 + WR3 )
DR100.FL = SINR ( DR102.FL ) + COSR ( DR104.FL )
```
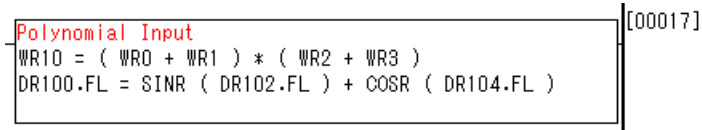
Fig. 4.1.12   Polynomial edit of processing box

- When you move the mouse pointer to the processing box from Ver.5.00, the I/O comment of the I/O address used in the processing box is displayed with the tooltip. I/O comment is displayed in online mode and on direct mode as well.
- From Ver.6.00, if you move the mouse pointer to the processing box even in the simulation mode, the I/O comment of the I/O address used in the processing box is displayed with the tooltip.
- The display method was changed for the monitor value that was displayed in versions prior to Version 4.21. For details, refer to "Section 6.5 Circuit Monitor".
- In Ver.6.02 or higher, the order of displaying the I/O comment of the I/O address used in the processing box has changed from the I/O address order to the order of description.

```
Read data block transfer                    [00001]
WRD018 = WRD015 * WRD016
MOV ( WRD020 , WN0 ( WRD018 ) , WRD014 )

                                            [00002]
WRD018:Transfer DATA transfer start blo
WRD015:Transfer DATA block No. 15
WRD016:Transfer DATA block No. 16
WRD020:Transfer destination DATA storag
WN0:Source DATA storage address             [00003]
WRD014:Number of transfer DATA transfer
```

In order of comment display of used I/O
WRD 018	1st line,	1st I/O
WRD 015	1st line,	2nd I/O
WRD 016	1st line,	3rd I/O
WRD 020	2nd line,	1st I/O
WN 0	2nd line,	2nd I/O
(WRD 018	2nd line,	3rd I/O) (*)
WRD 014	2nd line,	4th I/O

* Because it is being used in duplication, it is not displayed

Fig. 4.1.13   I/O comment display in processing box

Note

- When you move the mouse pointer to the processing box from Ver.5.00, the I/O comment is displayed as a tooltip, but the number of characters that can be displayed with the tooltip is 1,024 characters. Comments exceeding 1,024 characters are not displayed. In order to display all I/O comments, please divide the processing box into multiple areas so that the number of characters of the I/O comment does not exceed the upper limit of 1,024 characters.

(6) Horizontal Line

Horizontal line is drawn on the cursor position. Horizontal line is drawn also on the whole range specified by mouse.

(7) Draw Horizontal Line

Horizontal line is drawn on the whole free space of the line in which the cursor is.

(8) Vertical Line

Vertical line is drawn on the lower left of the cursor. Vertical line is drawn also on the whole range specified by mouse.

* In LADDER EDITOR, note that a vertical line is drawn on the upper right.
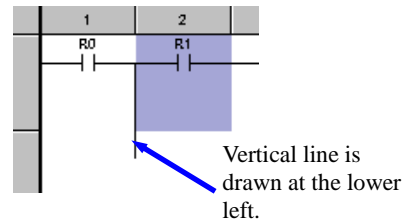
Fig. 4.1.14   Drawing vertical line

(9) Delete vertical Line

Vertical line at the lower left of the cursor is deleted. All vertical lines in the whole range specified by mouse are also deleted.

Reference

Horizontal line and vertical line can be drawn and deleted using the [Ctrl] + Arrow keys from Ver.2.14. Refer to the "chapter 4.2 Intelligent shortcut key" for details.

(10)   Loop back

The loop back is used when using more than 11 contacts. Two lines are connected by inputting this symbol in the 12th row and the 1st row of next line. Differently from LADDER EDITOR, the OR command, a comparison box, and a processing box can be described behind the loop back.
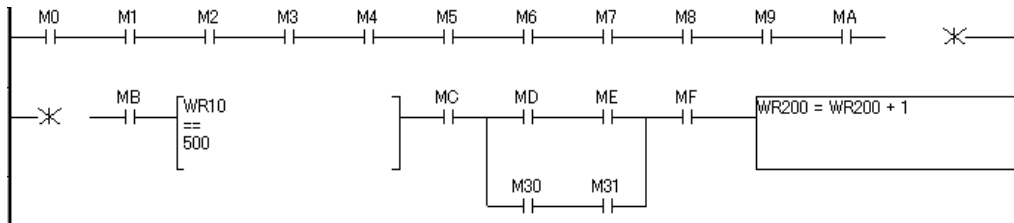
Fig. 4.1.15   Loop back symbol

N o t e

Note that the following circuit which consists of two OR circuits before and behind the loop back cannot complete the Build operation, one is M1 and M2, the other is M2 and the loop back symbol
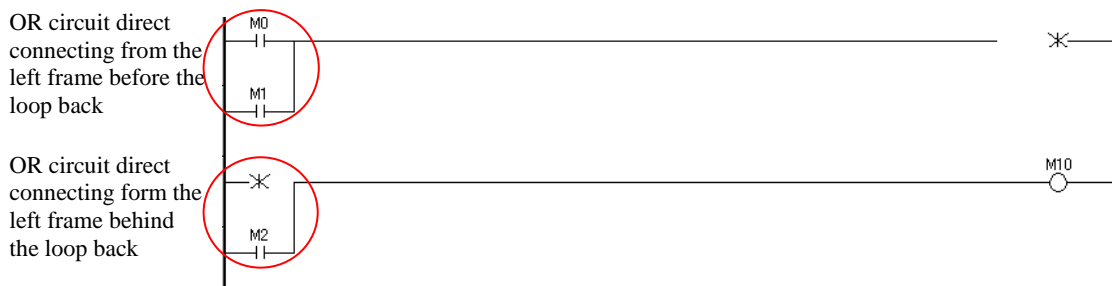
Fig. 4.1.16   Prohibited usage of loop back

(11)   Right-click menu

In Ladder window, you can operate efficiently using the menu displayed by the right-click.
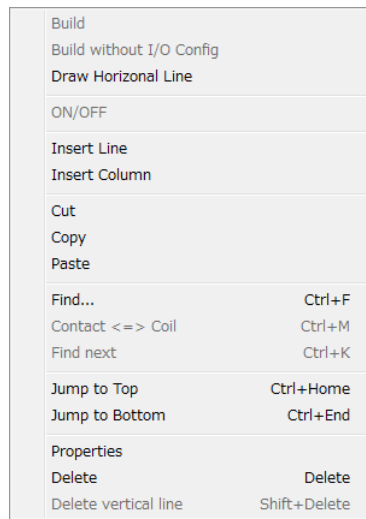
Fig. 4.1.17   Right-click menu

Build:	Executes Build operation.
Build without I/O Config:	Executes Build in disregard for I/O configuration.
Draw Horizontal Line:	Draws horizontal line between symbols.
ON/OFF:	Sets or resets a contact. Refer to "6.2 Set and Reset" for further information.
Insert Line	Inserts line at the cursor position.
Insert Column	Inserts column at the cursor position.
Cut:	Cuts highlighted area and stores it in the clipboard.
Copy:	Copies highlighted area and stores it in the clipboard.
Paste:	Pastes a circuit stored in the clipboard at cursor position.
Find:	Finds a symbol I/O on the cursor.
Contact <=> Coil:	Finds a coil from the contact or a contact from the coil.
Find next:	Finds continuatively when there are some targets to find in Contact<=>Coil.
Jump to Top:	Moves to the first line of activated sheet.
Jump to Bottom:	Moves to the last line of activated sheet.
Properties:	Opens the symbol property window.
Delete:	Deletes the circuit in the specified range.
Delete vertical line:	Vertical line at the lower left of the cursor is deleted. All vertical lines in the whole range specified by mouse are also deleted.

(12)   Insert Line and Insert Column

1] Insert Line

Inserts one line at cursor position.

Line insertion
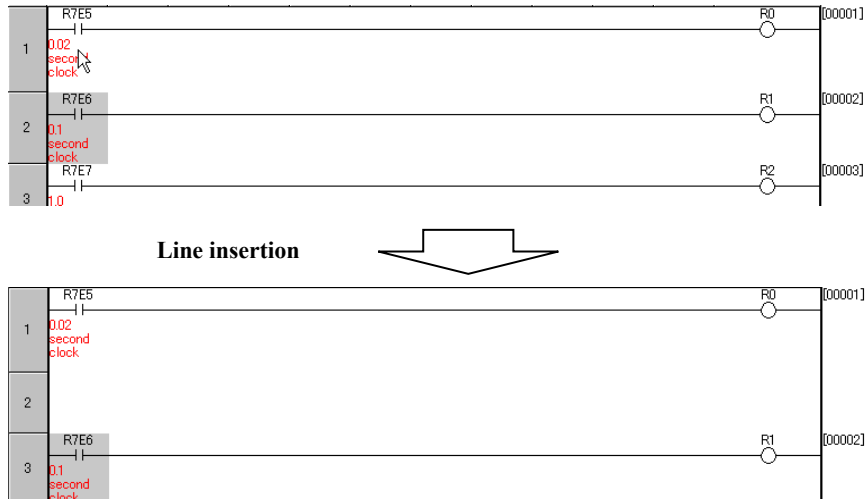
Fig. 4.1.18   Insert Line

2] Insert Column

Inserts one space at cursor position.

Row Insertion
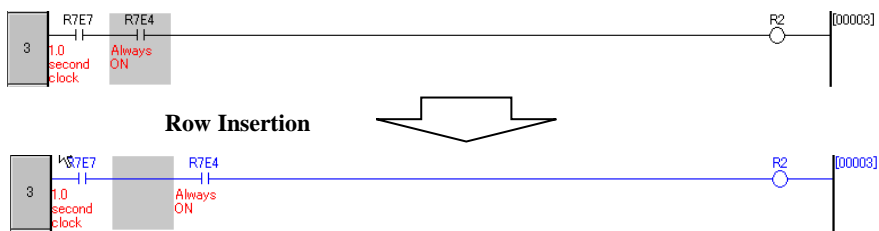
Fig. 4.1.19   Insert Column

4.2   Intelligent Shortcut Key

The input assist function is added from Ver.2.00. In adding the ladder symbol such as the contact and the coil, it is necessary to click each icon in current version or before but you can input the ladder symbol by double-clicking or pushing the [Enter] key on the program sheet in Ver.2.00. By combining the [Ctrl] and [Shift] key, 6 symbols can be inputted easy. At the cell where a symbol has already been inputted, the properties window for that symbol appears.

From Ver.2.21, the following functions are added, a previous symbol can be deleted using the [Backspace] key, vertical and horizontal line can be drawn and deleted by pressing the arrow key while holding down the [Ctrl] key, and a-contact and b-contact can be replaced by pressing [Enter] key while holding down the [Shift] key. The details of input method is shown in Table 4.2.1.

Table 4.2.1   Input method

Operation	Position	Inputted symbol
Press [Enter] key, or double-clicking	1st to 11th column	Normally open contact
	12th column	Coil
Press [Enter] key or double-clicking while holding down [Ctrl] key,	1st to 11th column	Normally closed contact
	12th column	Timer/Counter coil
Press [Enter] key or double-clicking while holding down [Ctrl] + [Shift] keys	1st to 9th column	Comparison box
	10th to 12th column	Processing box
[Backspace] key	1st column	Delete a symbol at 12th column on a previous line
	2nd to 12th column	Delete a symbol of a previous column
Press Arrow key while holding down [Ctrl] key	No vertical/horizontal line	Draw vertical/horizontal line
	Vertical/horizontal line	Delete vertical/horizontal line
Press [Enter] key while holding down [Shift] key	Open-contact	Closed-contact
	Closed-contact	Open-contact

Press [Enter] key or double-click on a blank space.

Press [Enter] key or double-clicking on a blank space.
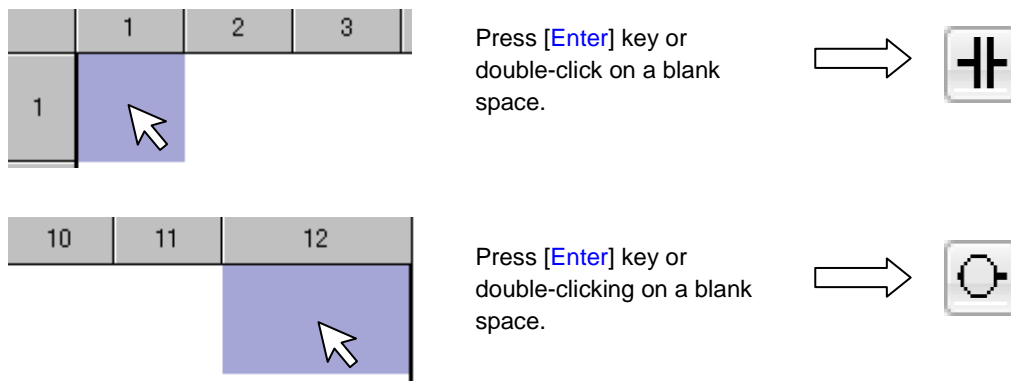
Fig. 4.2.1   Intelligent shortcut

A symbol on a cell before a cell of the current cursor is deleted by pressing the [Backspace] key on a program sheet , and the cursor moves to the first cell of deleted symbol.

When the cursor is on the 1st column, a symbol on the 12th column on a row before that row is deleted.
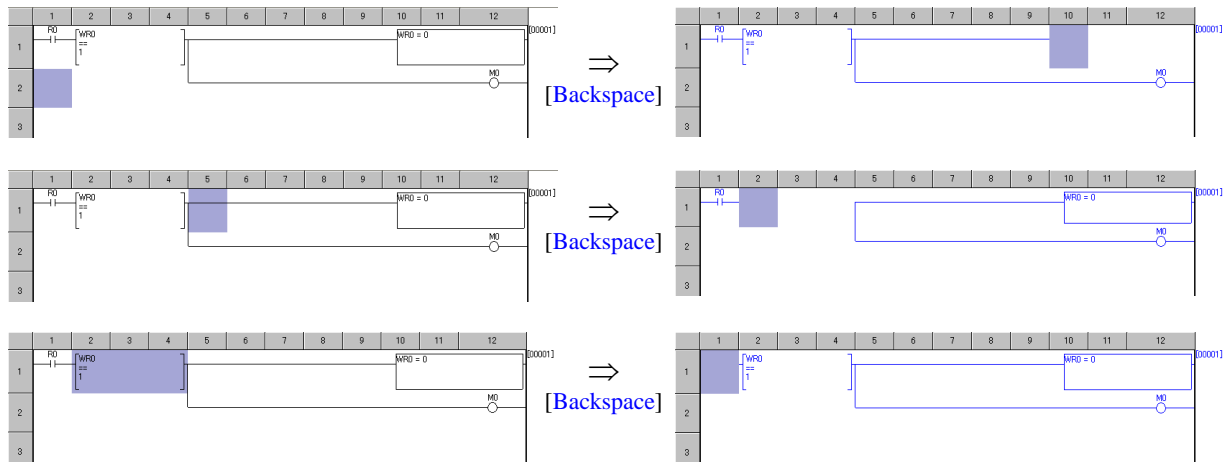
Fig. 4.2.2   Deletion by [Backspace]

By pressing the [Ctrl] + Arrow keys on a program sheet, a vertical line or horizontal line is drawn if the line has not been drawn and a vertical line or horizontal line is deleted if the line has been drawn. If a contact or comparison box is on a destination the cursor moves, the symbol is overwritten with a horizontal line.
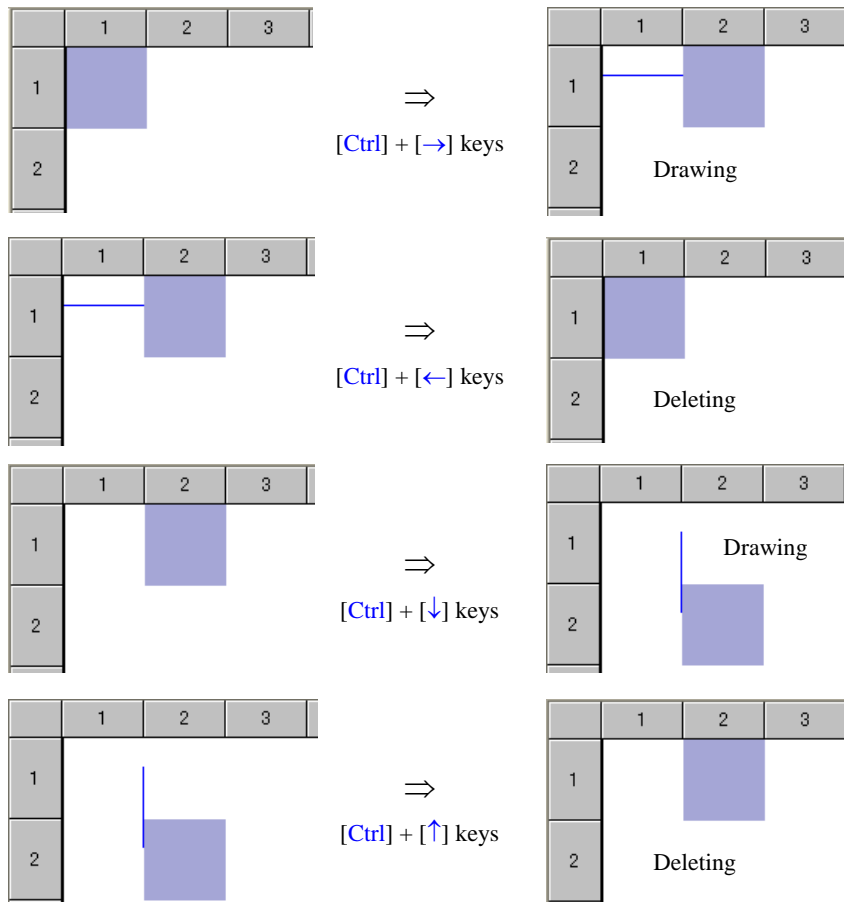
Fig. 4.2.3   Drawing of vertical line and horizontal line

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By pressing the [Enter] key while holding down the [Shift] key on the open-contact or closed-contact in a program sheet, the open-contact is toggled to the closed-contact and the closed-contact is toggled to the open contact.
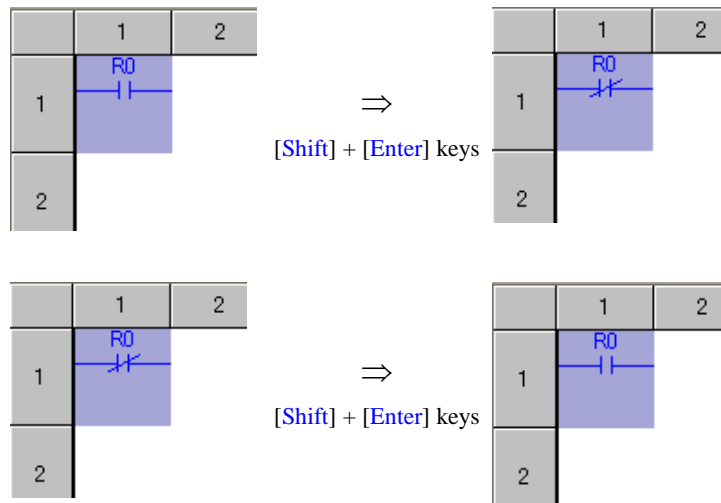
Fig. 4.2.4   Toggle of open-contact and closed-contact

4.3   Build

Execute the Build operation by selecting [Build] in [Edit] of menu, clicking "Build" in the right-click menu, or clicking the icon ⬇ after inputting the circuit. Control Editor regularizes and checks the circuit. If the circuit is proper, a color of circuit changes from blue to black. If there is error, the color of the circuit does not change and error details are displayed on the output window in the bottom of the window.
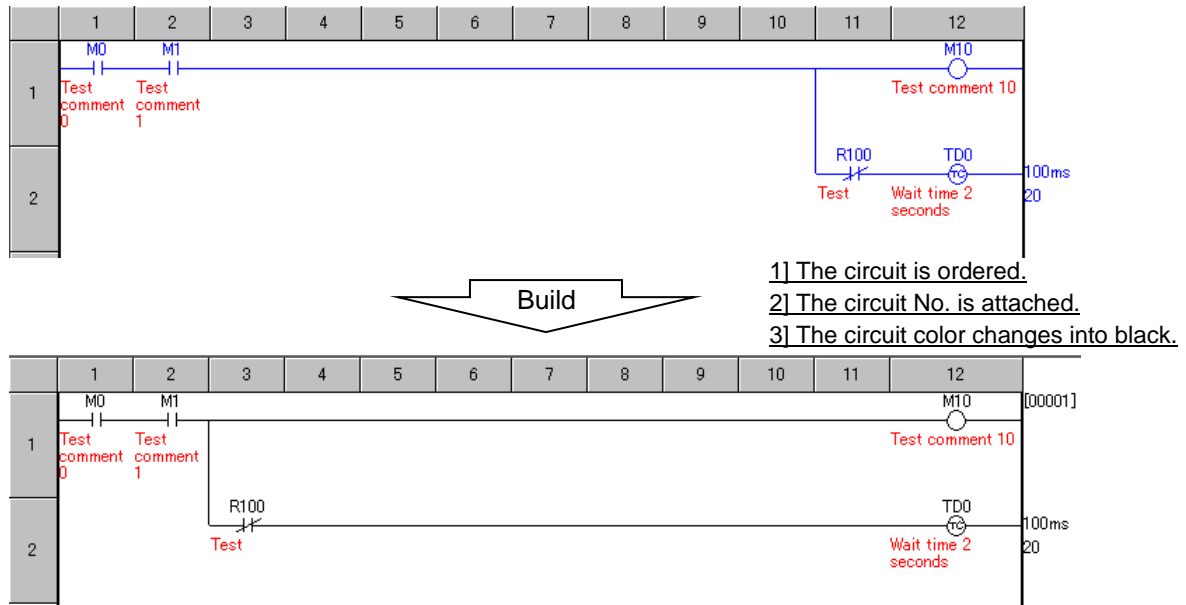
Fig. 4.3.1   Build

If there is error in the circuit, a color of the circuit does not change into black and error message is displayed in the Build section on the bottom of the window.
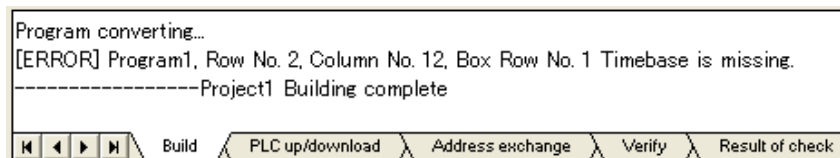
Fig. 4.3.2   Error message in the output result window of Build

* The cursor jumps to the error point by double-clicking the error message.

Execute the Build again after correcting errors following messages when error was found.

According to error types, error point is indicated by row No. and column No. , row No. only or circuit No.

N o t e

The double coil is not detected in checking for Build. In order to check the double coil, you should use the Program Check function in the Tool menu on the Menu bar.

[W]   Glossary

The Build operation is converting a Ladder program created by user into a language called "an intermediate language". Always execute the Build when creating a Ladder program. You can execute the Build operation whenever one circuit is created and after creating several circuits. The Ladder program that the Build operation is not completed properly cannot be transferred to the CPU, but can be saved to the computer as a file.

From Ver.2.14, the Build operation can be executed in disregard for I/O configuration.

If the Build without I/O Config is executed, error does not occur even if external I/Os which do not exist in the I/O configuration are used in the program. However, (*) mark will be attached to the I/O Configuration in the project tree if the Build without I/O Config is executed.
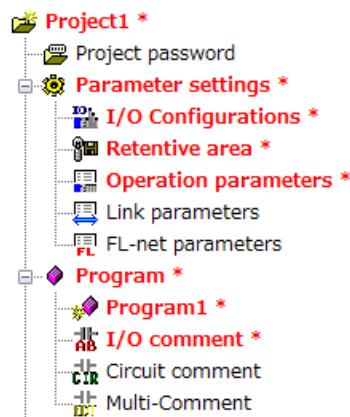
Fig. 4.3.3   Program tree after Build without I/O Config

In that case, the PLC Download cannot be executed to the CPU module. Also, the mode cannot be switched to the On-direct mode even if programs are matched by the PLC Verify operation. Execute the normal Build operation when the PLC Download and On-direct mode are performed.

Auto-ordering in Build operation

Control Editor has an Auto-ordering function. Drawing horizontal line, upper alignment, left alignment and short circuit correction are contained in the Auto-ordering function and the incomplete circuits shown below are automatically normalized by the Build operation.

(1) Drawing horizontal line

Draws horizontal line in blank area.
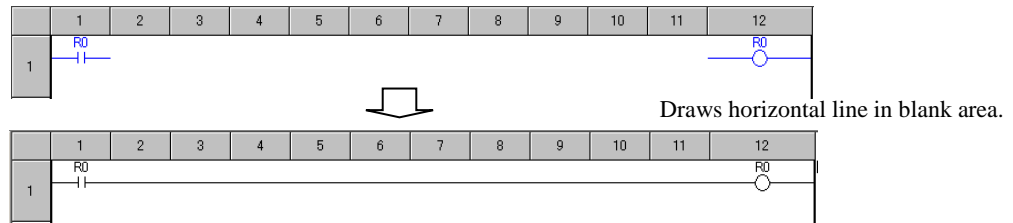
Fig. 4.3.4   Circuit alignment (1)

(2) Upper alignment

Aligns unnecessary unlevel circuit.
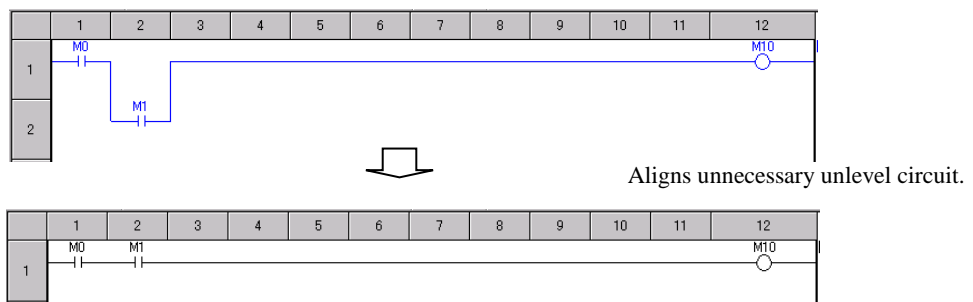
Fig. 4.3.5   Circuit alignment (2)

(3) Left alignment

Left-aligns unoptimized circuit.
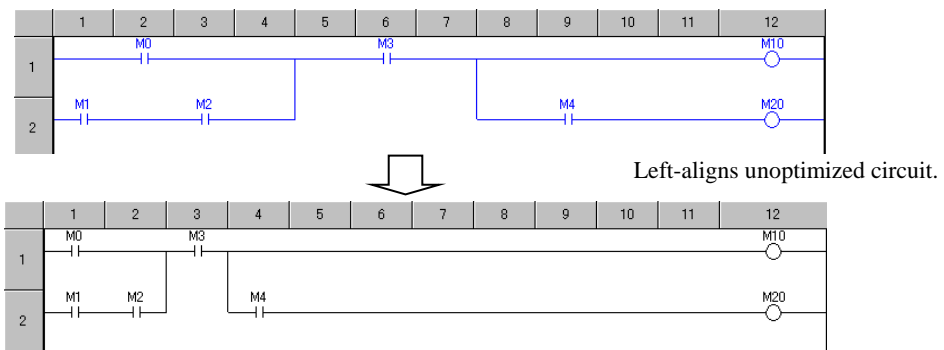
Fig. 4.3.6   Circuit alignment (3)

(4) Short circuit correction

Corrects short circuit.
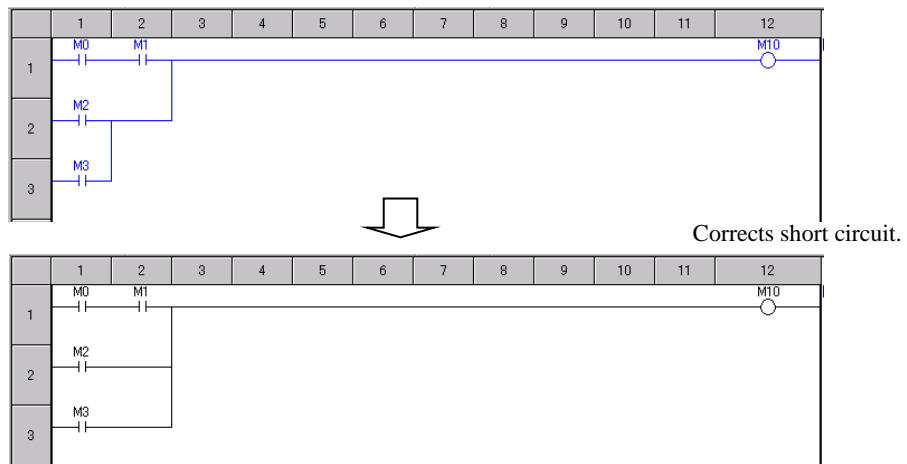
Fig. 4.3.7   Circuit alignment (4)

N o t e

Auto-ordering functions is reviewed in Ver.2.13 in higher to prevent unnecessary short-circuit from being created. Depending on the circuit's pattern, Auto-ordering does not complete in some cases as below. In those cases, reorder circuits manually by selecting [Tool]-[Circuits alignment] after circuit building.

(1) Delete R2 contact and execute "Build"
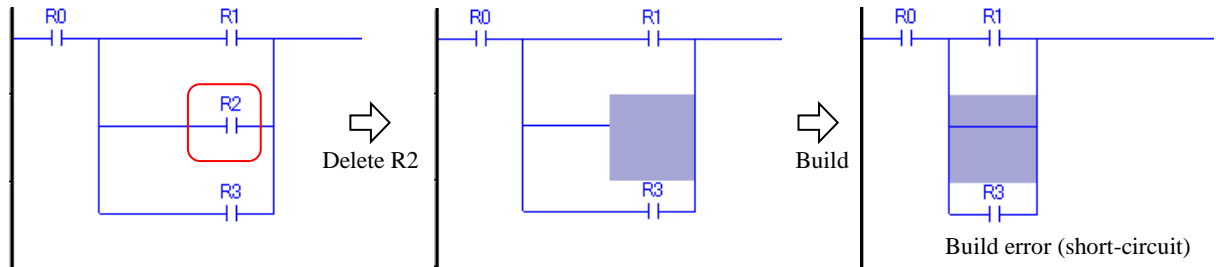
Fig. 4.3.8   Alignment incomplete circuit (1)

(2) Delete M10 contact and execute "Build"
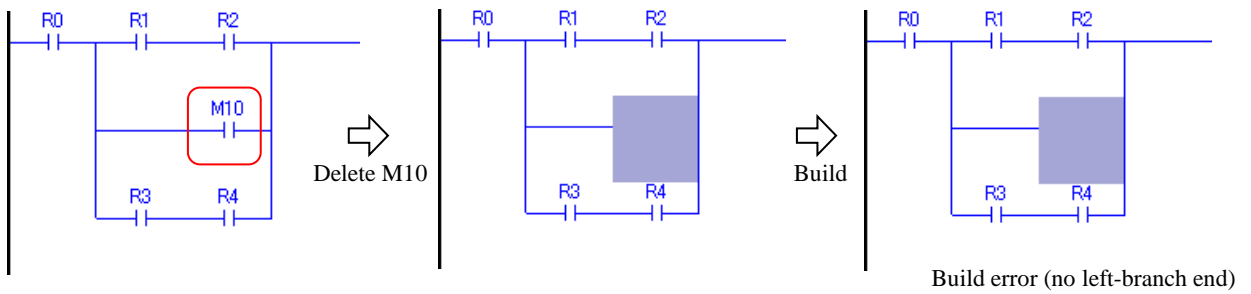
Fig. 4.3.9   Alignment incomplete circuit (2)

(3) Delete symbols between vertical lines and execute "Build"
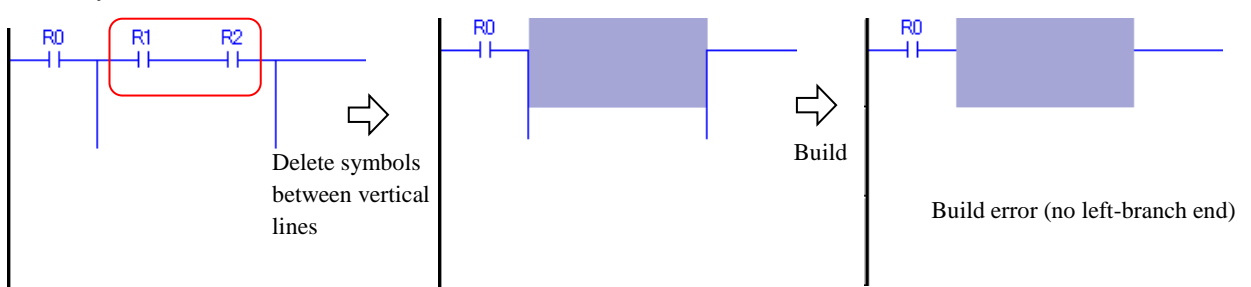
Fig. 4.3.10   Alignment incomplete circuit (3)

N o t e

- Normalization function of circuit does not work when Build error occurs. So, re-create a circuit.
- In case of above (3), the circuit is normalized completely by executing the Build again.
- The circuit which is not completely normalized may be included in the program created by Ver.2.12 or lower. You can read a complete normalized program by reading a deformalized program after writing the program to CPU. However, note that if the program before being written is compared with a read program, those programs are not matched.

4.4   Reverse Build

Back to the last built circuit.

    Menu: [Edit] - [Reverse build]

    Icon:

By [Build] operation, picture information of ladder program is converted to object data, which CPU can execute. The reverse conversion to [Build] is [Reverse build]. In other words, the object data is converted back to the picture information by [Reverse build]. As a result, the Ladder program is back to the last built circuits by [Reverse build].

Picture of ladder program (under edit, color = blue)

(A)

Build (Compile)

Object (ready to download to CPU, color = black)

(B)

Edit (add a contact)
→ Color changes to blue.

Reverse build (Back to (B))

(C)
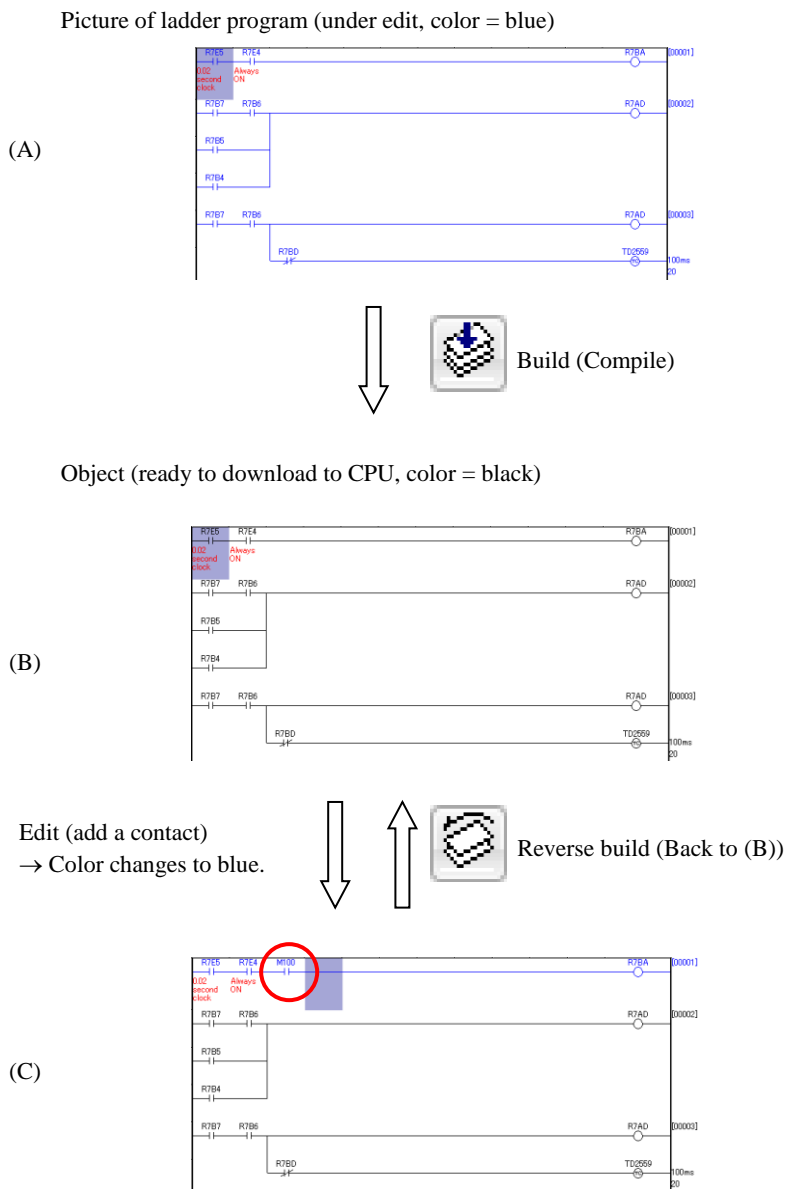
Fig. 4.4.1   Reverse build

4.5　Copy, Move and Delete of Ladder

It is possible to copy, cut, paste, and delete the specified range program as well as another applications for Windows.

Menu:　　　　[Edit] - [Cut]

Icon:

Menu:　　　　[Edit] - [Copy]

Icon:

Menu:　　　　[Edit] - [Paste]

Icon:

"Delete" is not included in the Edit menu. Press the [Delete] key or use the "Cut" after selecting the range. The range cannot be deleted by the [Backspace] key.

N o t e

When pasting circuits, existing circuits will be overwritten. Secure the required space by inserting lines in advance.

Paste mode (insert) has been added since Ver.4.10.

Paste mode	Description	Menu	Icon
Overwrite	Existing circuits are overwritten by pasted circuits. Ver. 4.07 or lower supports this mode only.	[Edit]-[Paste Mode (Insert)] Disabled	Ins
Insert	Existing circuits is moved rightward or downward and new circuits is pasted.	[Edit]-[Paste Mode (Insert)] Enabled	Ins

Click the right mouse button on a program sheet in the project tree if you want to copy and paste each sheet.

A sheet is inserted between Program 2 and Program 3.
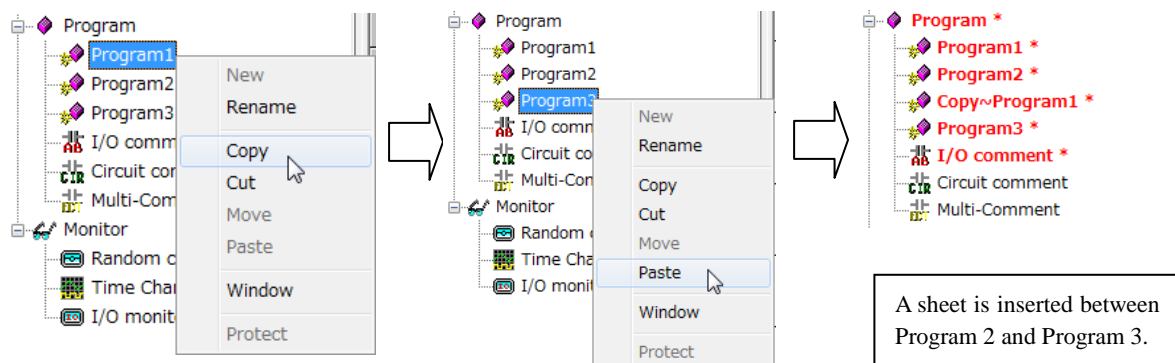
Fig. 4.5.1　Copy/Paste of program sheet

N o t e

The order of sheets can be changed by dragging the mouse.

(1) Copy/Paste from other project

Control Editor can open only one project. Therefore, if you want to copy and paste a program from other project which is different from the current opened project file, **some Control Editors have to be run** to copy and paste. It is also possible to copy and paste each sheet by clicking the right mouse button on a program sheet in the project tree.

One or more Control Editor are run.
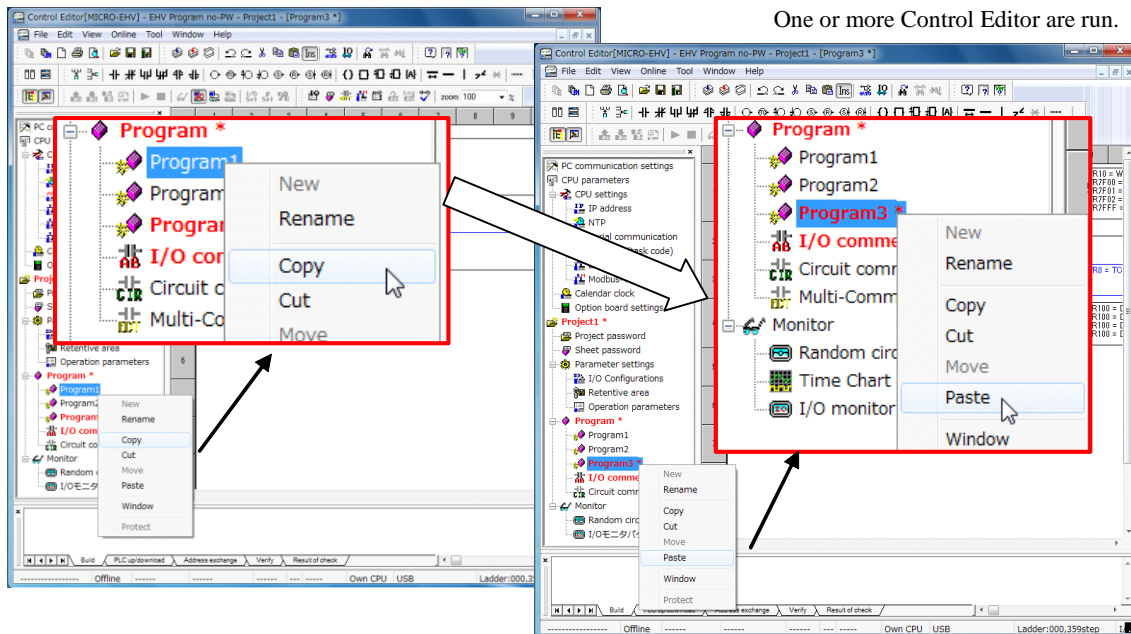
Fig. 4.5.2   Copy/Paste from other project

N o t e

Precaution on program diversion from other project

- **I/O comments are not copied** when a range specified by a mouse or keyboard is copied and pasted.
- When each sheet is copied and pasted by right-click of the project tree, a message dialog shown in the Fig.4.5.3 appears. Buttons and functions are shown below.

Although I/O comments are copied, I/O comments in source project are not taken over because I/O comments in the destination project have priority if the same I/O addresses exist in the destination project.

Although I/O comments are copied, I/O comments in destination project are overwritten because I/O comments in the source project have priority if the same I/O addresses exist in the destination project.

I/O comments are copied. Only programs and box and circuit comments are carried over to the destination project.

Fig. 4.5.3   Message dialog in sheet copy

* Although this message is displayed also when the sheet is copied and pasted within the same project, I/O comments are the same on all program sheets in one project. Therefore, any choice except "Cancel" brings the same result. (I/O comments neither increase nor decrease.)

* In Ver.2.41 or higher which supports Multi-Comment, judgment of a priority is whether at least one group has a comment.

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(2) Specify Circuit No. and Copy/Move/Delete

Copy, Move, and Delete of specifying range are possible. But, the Build needs to be completed properly and the circuit No. needs to be attached to the circuit.

1] Copy: Copies (Inserts) the circuit range specified using the circuit No. to the specified circuit No.
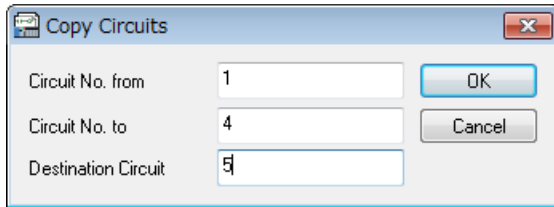
Ex.: Copies the circuits from No.1 to No.4 to the 5th circuit.

Fig. 4.5.4   Circuit Copy

2] Move: Moves (Inserts) the circuit range specified using the circuit No. to the specified circuit No.
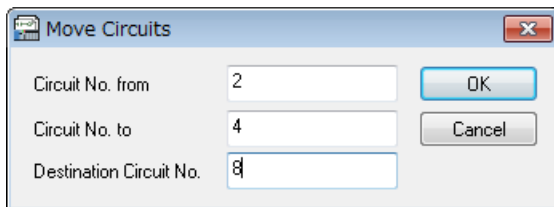
Ex.: Moves the circuits from No.2 to No.4 to the 8th circuit (The circuits at the original positions are deleted.)

Fig. 4.5.5   Circuit Move

3] Delete: Deletes the circuit range specified using the circuit No.
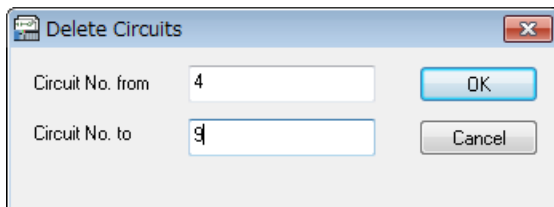
Ex: Deletes the circuits from No.4 to No.9.

Fig. 4.5.6   Circuit Delete

4.6　Comments

Comments include 3 types of comments, I/O comment, box comment and circuit comment as shown in the table 4.6.1 and Fig. 4.6.1. These comments are saved as a part of a project file. And these comments can be read and written to the CPU.

(1) Comment type and Number of input characters

Table 4.6.1　Comment type

No.	Comment name	Number of input characters
1	I/O comment *1	32 characters
2	Box comment	64 characters
3	Circuit comment	128 characters

Since Control Editor handles a test string as data called Unicode, the number of characters which can be inputted is same irrespective of double- byte and one-byte. **Refer to section 9.3 for maximum usable numbers of each comment**.
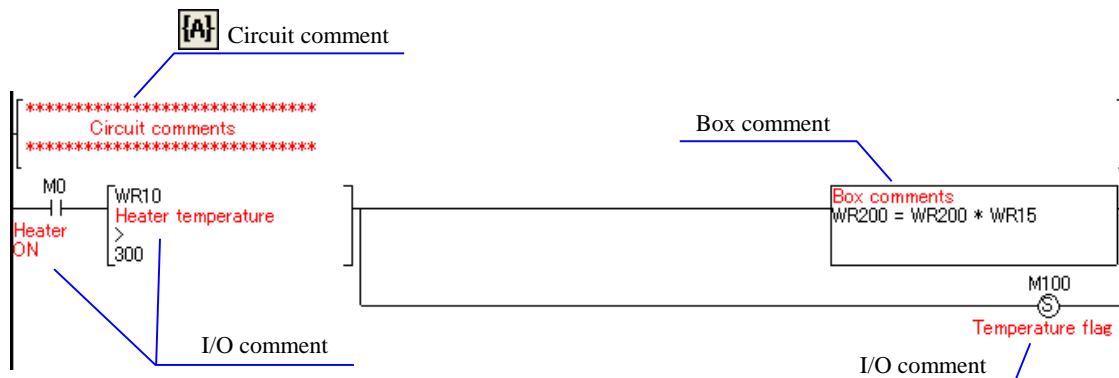
Fig. 4.6.1　Comment type

N o t e

*1 Each bit of word internal output WR/WN can be accessed by suffix dot, such as "WR100.A".

It has been possible to put separate I/O comment on each bit since Ver. 4.20.

(2) Input method of I/O comment

I/O comments can be entered on the properties window of each symbol (contact properties, coil properties, and processing box properties). I/O comment edit is displayed by double-clicking I/O address or I/O comment cell in the Processing box properties window.
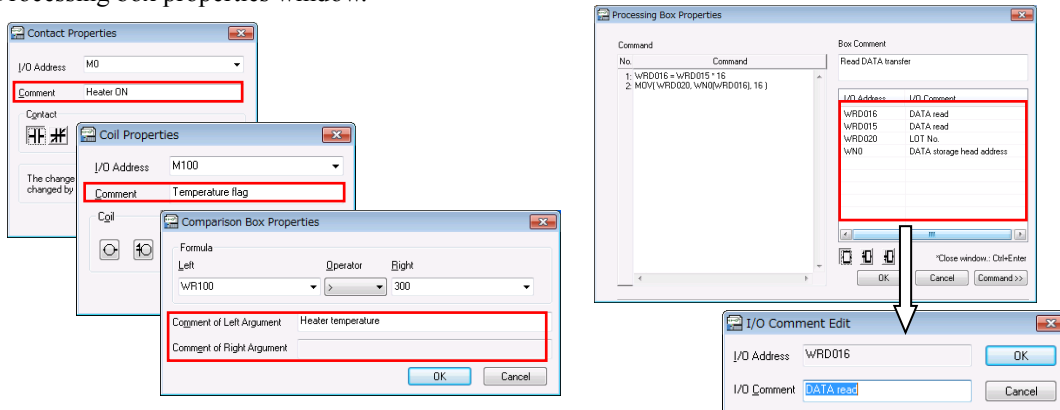
Fig. 4.6.2　Comment input

Reference

When the cursor comes to comment entry field shown at red rectangle in Fig. 4.6.2, input mode changes to IME automatically since Ver.2.11. This function can be disabled in the option settings (Ver.4.06 or higher). Refer to chapter 8.2 for further information.

[Enabled]　　　　　　　　　　　　　　　　　　　　　　Switched to IME mode

 Focus at I/O comment field

[Disabled]　　　　　　　　　　　　　　　　　　　　　Not switched to IME mode

 Focus at I/O comment field
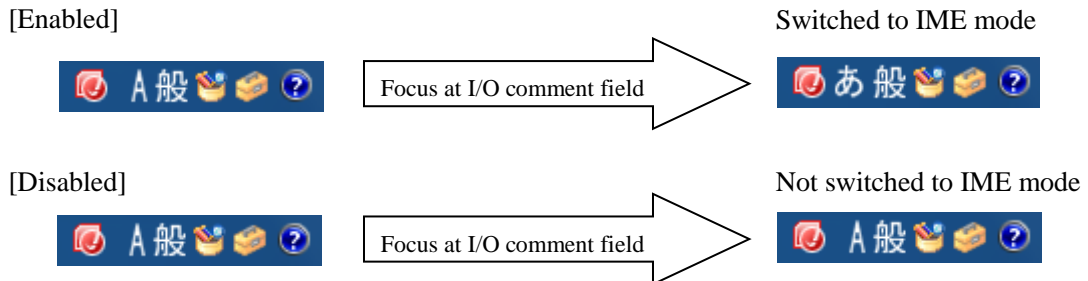
Fig. 4.6.3　Enable IME automatically at comment entry.

(3) Comment capacity

When you build circuits, percentage of used comments is calculated and indicated in status bar in the bottom of window as Fig.4.6.4.

Fig. 4.6.4　Comment indication in status bar

If total comments exceeds the comment memory in CPU, error message appears when circuits building as Fig.4.6.5 (Transfer to PLC is allowed because it is not Error but Warning) and the background color of the status bar for Comment changes to the red as Fig.4.6.6. In addition, when the total comment is 100%, the background color is red or gray. When the background is gray, the comment does not exceed the capacity.

Fig. 4.6.5　Error message when used comments exceeds comment memory

Fig. 4.6.6　Status bar when used comments exceeds comment memory

When the comment capacity exceeds 100%, program can be transferred to CPU but comment cannot be transferred. If the check box of Comment is clicked in the Download window, you cannot check the box because the following message dialog box appears. Therefore, download only program to PLC without checking the box of Comment.
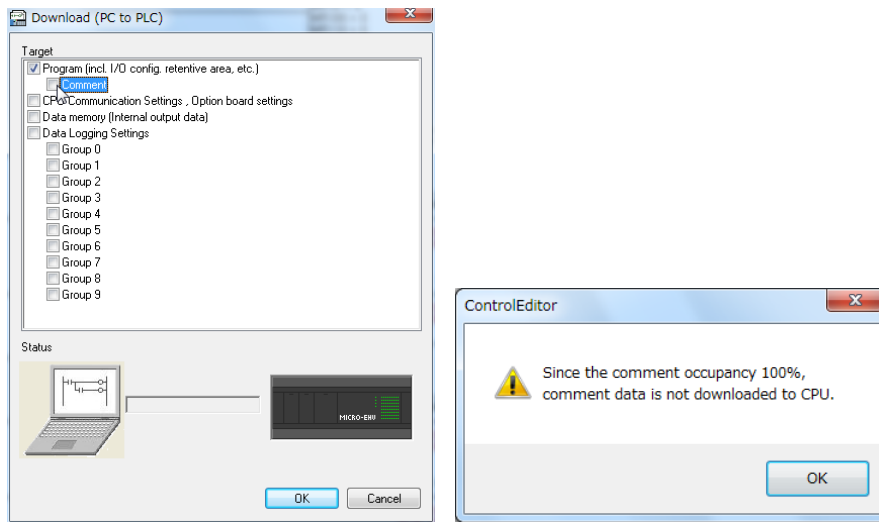
Fig. 4.6.7　Message when comment is exceeding 100%

Reference

Refer to section 5.4 for Program Up/Downloading. And refer to section 5.5 for Online change in RUN.

(4) I/O comment

Multiple I/O comments can be inputted at once. And a CSV file can be opened and displayed I/O comments can be saved as a CSV file.

Menu:　　　　　[View] - [I/O Comment Window]

Project tree:　　Program ─ I/O comment

A CSV file of I/O comment saved by LADDER EDITOR can be read.

The function to select the information to be saved in a CSV file has been added in version 6.02 or higher.
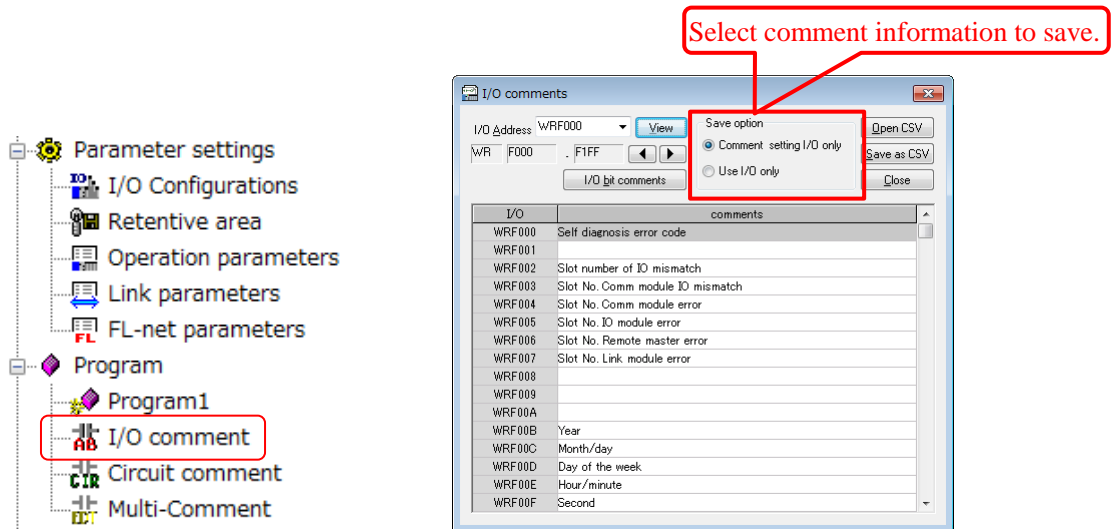
Fig. 4.6.8　I/O comments window

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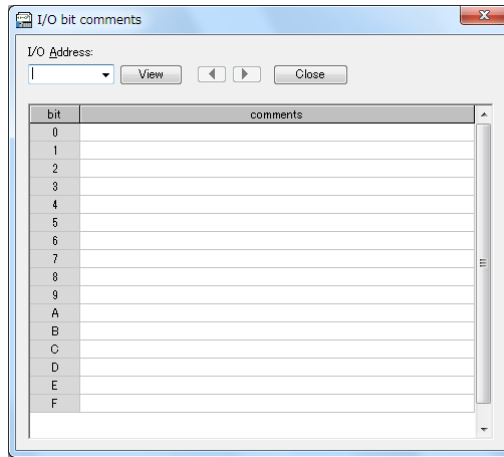
Fig. 4.6.9   I/O bit comments window

1] Open CSV

A CSV file created by MS-EXCEL can be opened by Control Editor. When comments are created by EXCEL, arrange "I/O address" in column "A" and "I/O comment" in column "B" as shown Fig. 4.6.10. I/O addresses in column A can be arranged in random order.

N o t e

Always close the EXCEL files before opening a CSV file in I/O comment window. Otherwise, this function does not work properly.

If I/O comments are already used in the program when a CSV file is opened, the message dialog shown in Fig. 4.6.10 appears.
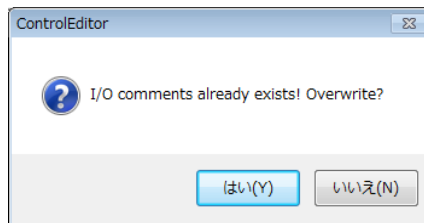
Fig. 4.6.10   Overwrite message in I/O comment read

2] Save as CSV

A CSV file is a text file in which a test string is separated with comma (","). I/O comments displayed on I/O comment window are saved as CSV format when clicking the [Save as CSV] button. Saved CSV file can be opened using spreadsheet software such as MS-EXCEL. I/O address is arranged in column A and I/O comment is arranged in column B in the format as shown in Fig. 4.6.11.

	A	B
1	R7C8	Serious failure flag
2	R7C9	Microcomputer error
3	R7CA	User memory error
4	R7CD	I/O verify mismatch
5	R7CE	Comm. module IO verify mismatch

Fig. 4.6.11   CSV format of I/O comment

3] Manual Copy / Past

You can copy and paste I/O comments from EXCEL to Control Editor and from Control Editor to EXCEL manually without CSV format by right-clicking I/O comments selected using a mouse.

(5) Comment deletion of unused device

From Ver.2.14, when unnecessary comments are inputted in unused device in the program, unused I/O comments can be deleted at a time.

Menu: [Tool] - [Deletion of unused I/O comment]

N o t e

Although Control Editor alerts users by always displaying the following message when performing this operation, note that even if I/O comments are inputted in the area used by array, I/O comments of a device not directly used in the program are also deleted.
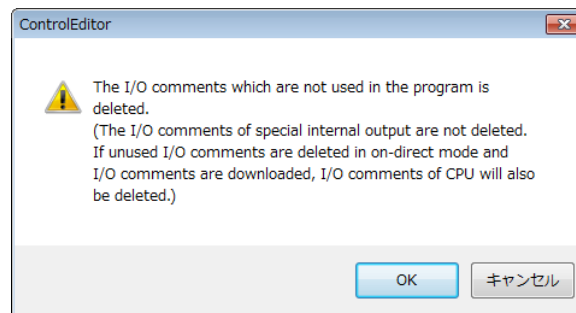
Fig. 4.6.12   Warning of unused comment deletion

Reference

1. "I/O Comment" displayed on the status bar at the bottom of window is about 5% on EHV-CPU128 and about 10% on EHV-CPU16-64, 1.6% on MICRO-EHV series because comments of special internal output are read to a project when a new project is created.

2. "I/O Comment" on the status bar at the bottom of window is updated when the Build is executed.

3. Comment memory of EHV-CPU128 is 1M bytes and EHV-CPU16-64 is 512k bytes, MICRO-EHV series is128k bytes. I/O comment, circuit comment, and box comment use this memory.

4. Comments can be transferred to CPU by PLC Download in online mode. See the chapter 5.

5. Each bit of word internal output WR/WN can be accessed by suffix dot, such as "WR0.F". I/O comment for each bit is common for I/O comment for corresponding word register in Ver. 4.12 or older version.

6. It has been possible to put separate I/O comment on each bit of word register with dot suffix since Ver. 4.20.

(6) Circuit comment list

The circuit comment list is added from Ver.2.16.

When a circuit comment list is displayed, circuit comments in the program are displayed as a list. By selecting any one comment on the list and then clicking the [Jump] or by double-clicking the comment, the appropriate circuit comment appears at the top of comments on the program sheet.
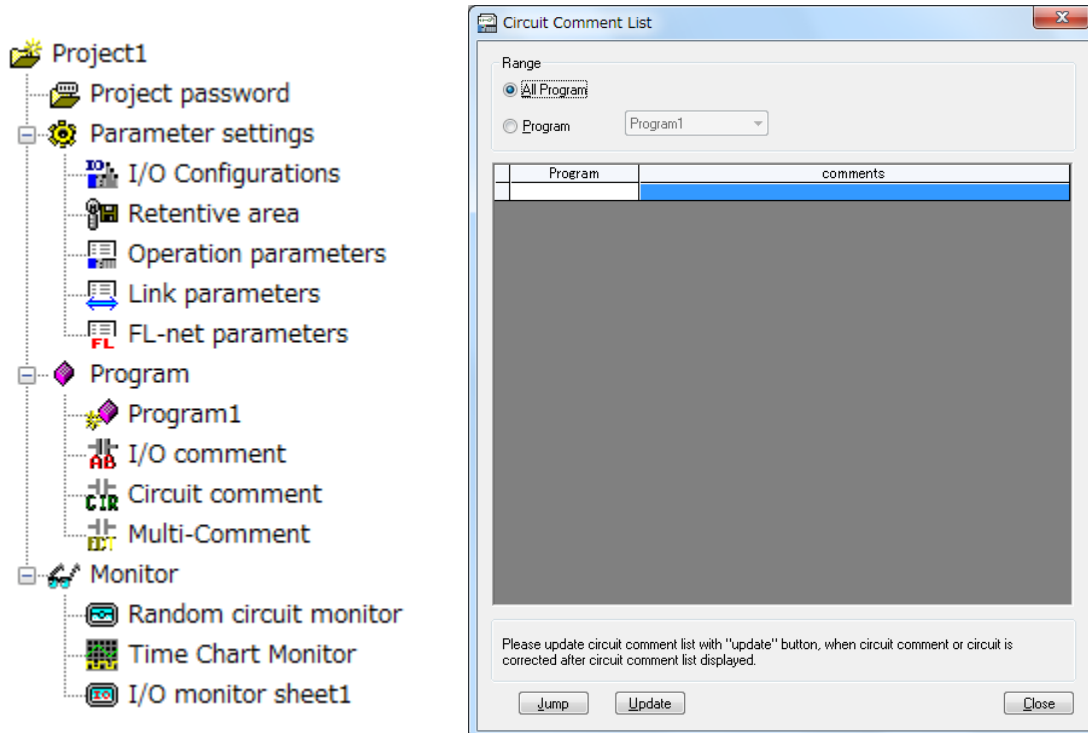
Fig. 4.6.13   Circuit comment list

N o t e

It is possible to edit the circuit on the program sheet while displaying the Circuit Comment List window. But, if the circuit comment is edited or the number of circuits and the number of lines are change in this condition, these changes are not reflected to the circuit comment list. Therefore, in this case, always click the [Update] button.

By clicking the [Update] button, the circuit comments, the number of circuit and the number of lines are reflected to the circuit comment list.

(7) Multi-Comment

　　Multi-Comment is supported in Ver.2.41 or higher.

　　Multi-Comment is the function which can input the comment of four groups and choose a group of comment displayed on Control Editor.

　　It is useful for selecting the language of comment, if comments of multiple languages are input in advance (for example like "Japanese" and "English").

selectable
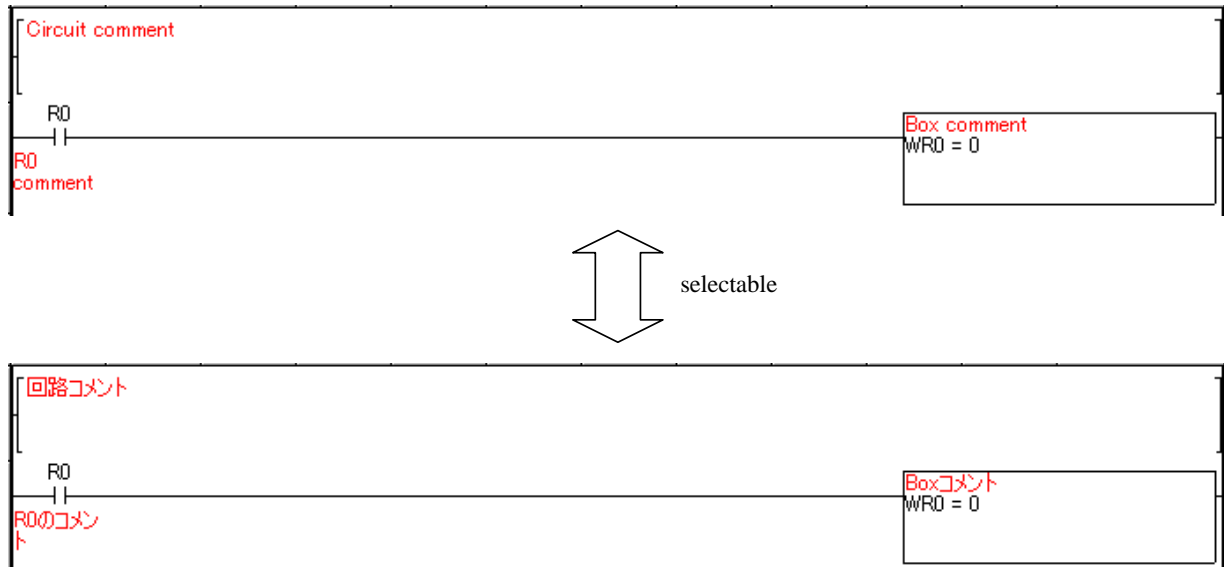
　　Multi-Comment can be input on Multi-Comment window.

　　This windows can be opened from "[menu bar]-[View]-[Multi-Comment]".
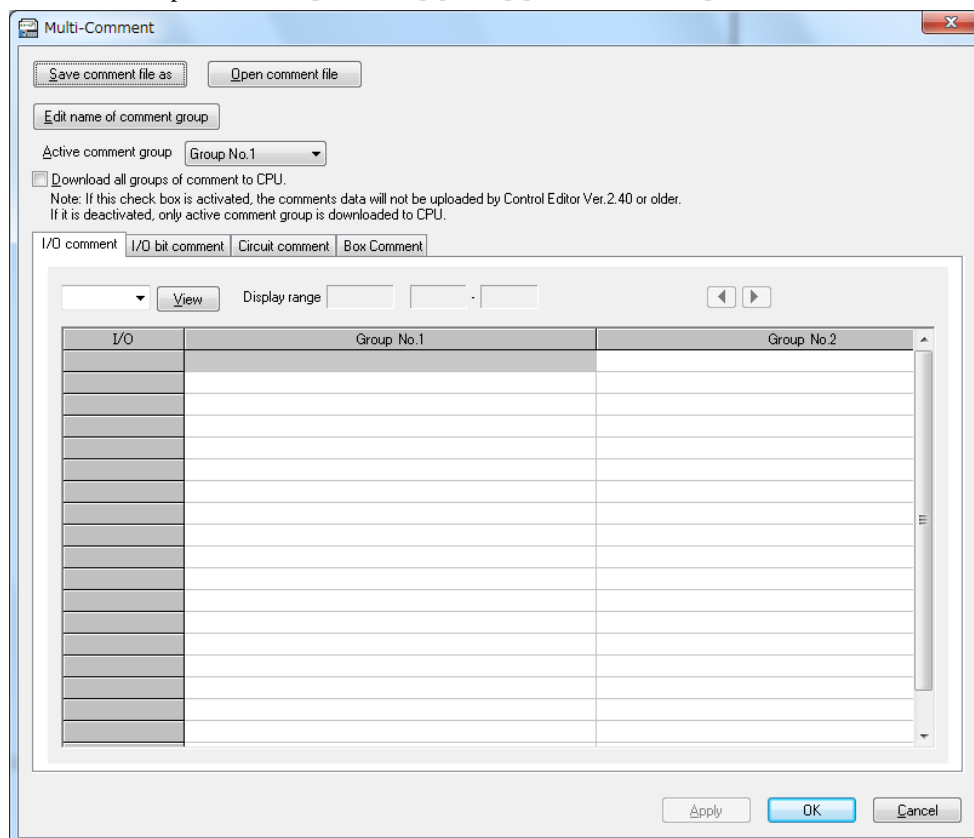
1] Name of comment group

The comment group can be named. The maximum characters of this name is 32.

2] Save comment file

Multi-Comment can be saved as text file. This text file in which a text string is separated with tab can be opened using spreadsheet software such as MS-EXCEL.

This text file is saved for every comment. For example, if a file name is specified as "xxx.txt", the I/O comment file is saved as "xxx_io*.txt", the box comment file is saved as "xxx_box*.txt", the circuit comment file is saved as "xxx_circuit*.txt", and the comment name file is saved as "xxx_name.txt". "*" of these file name shows a number and expresses the order of files. The maximum lines per a text file is 65535. If it exceeds the maximum lines, it saves at another text file.

At the time of text file preservation, when the existing "xxx_io1.txt" is chosen, the file name "xxx" is taken out and it can save from the above-mentioned contents. In this case, all the files according to the above-mentioned naming rule that already exist are deleted, and are newly saved.

Program (Program name 「Program1」)

Save comment file
(file name 「xxx.txt」)

I/O comment (file name 「xxx_io1.txt」)

	A	B	C	D	E
1	I/O Address	Group No.1	Group No.2	Group No.3	Group No.4
2	R0	R0 comment	R0のコメント		
3	R1	R1 comment	R1のコメント		

Circuit comment (file name 「xxx_circuit1.txt」)

	A	B	C	D	E	F
1	Program	Line	Group No.1	Group No.2	Group No.3	Group No.4
2	Program1	1	Circuit comment 1	回路コメント 1		
3	Program1	3	Circuit comment 2	回路コメント 2		

Box comment (file name 「xxx_box1.txt」)

	A	B	C	D	E	F
1	Program	Line	Group No.1	Group No.2	Group No.3	Group No.4
2	Program1	2	Box comment 1	Boxコメント 1		
3	Program1	4	Box comment 2	Boxコメント 2		

Comment group name (file name 「xxx_name.txt」)

	A	B	C	D
1	Group No.1	Group No.2	Group No.3	Group No.4

3] Open comment file

A text file in which a text string is separated with tab can be opened by Control Editor. It can import comment from the text file. When a comment file is specified, relevant all comment files in same folder are imported. I/O comments are set up based on I/O Addresses. Circuit comments and box comments are set up sequentially from the top of the program without referring to program name and line number in the text file.

I/O comment (file name 「xxx_io1.txt」)

	A	B	C	D	E
1	I/O Address	Group No.1	Group No.2	Group No.3	Group No.4
2	R0	R0 comment	R0のコメント		
3	R1	R1 comment	R1のコメント		

Circuit comment (file name 「xxx_circuit1.txt」)

	A	B	C	D	E	F
1	Program	Line	Group No.1	Group No.2	Group No.3	Group No.4
2	Program1	1	Circuit comment 1	回路コメント 1		
3	Program1	3	Circuit comment 2	回路コメント 2		

Box comment (file name 「xxx_box1.txt」)

	A	B	C	D	E	F
1	Program	Line	Group No.1	Group No.2	Group No.3	Group No.4
2	Program1	2	Box comment 1	Boxコメント 1		
3	Program1	4	Box comment 2	Boxコメント 2		

Comment group name (file name 「xxx_name.txt」)

	A	B	C	D
1	Group No.1	Group No.2	Group No.3	Group No.4

Open comment file
(file name 「xxx_io1.txt」)

Program (Program name 「ProgramSheet」)
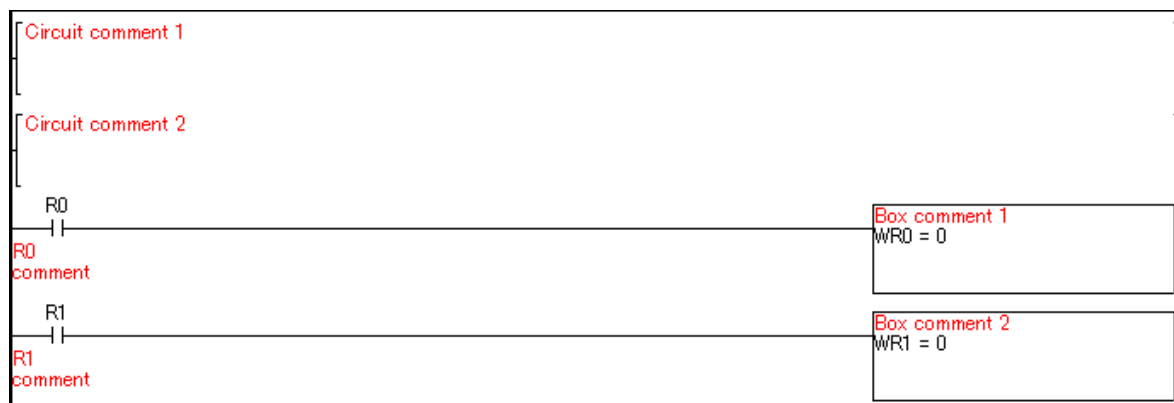
Note

When the number of characters of a comment exceeds the maximum characters of each comment, it sets up to the maximum number of characters.

Because a linefeed cannot be input into I/O comments and comment name, even if the comment with linefeed is saved at the text file, it is set up without linefeed.

In the case of circuit comment and box comment, there is the case that the number of comments differ between in program on Control Editor and in text file. When there are more comments in the text file than in program on Control Editor, the comment to have exceeded is not imported. When there are few comments in the text file than in program on Control Editor, insufficient comments will be blank. In addition, an error is not displayed in these cases.

4] The comment transmitted to CPU

It can be chosen that the comment of all the groups or one group is transmitted to CPU. Multi-Comment can not be uploaded from CPU by Ver.2.40 or higher which do not support Multi-Comment. If Multi-Comment is uploaded from CPU by Ver.2.40 or higher, warning occurs. However, program can be uploaded from CPU.

This setting can be set by the check box "Download all groups of comment to CPU". If it is not checked, only active comment group is downloaded to CPU.

This checkbox is inactive on MICRO-EHV mode because MICRO-EHV handles every comment as Multi-Comment.

5] Compatibility with Ver.2.40 or higher

The prj file without Multi-Comment can be opened by Ver.2.41 or higher, the comment in prj file is set into "Group No.1" and blank is set into "Group No.2"-"Group No.4".
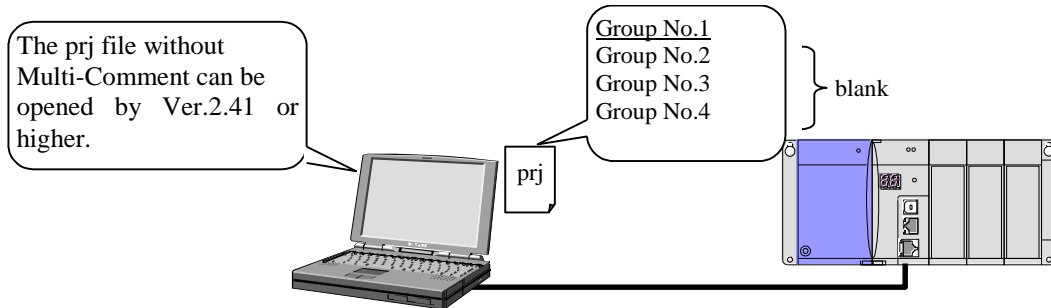
The prj file without Multi-Comment can be opened by Ver.2.41 or higher.

Group No.1
Group No.2
Group No.3
Group No.4

blank

prj

The prj file with Multi-Comment can be opened by Ver.2.40 or higher which do not support Multi-Comment. However, only active comment group is read. If the prj file is saved in this situation, only active comment group is saved in the prj file and other comment group is not saved in the prj file.

The prj file with Multi-Comment can be opened by Ver.2.40 or higher which do not support Multi-Comment.

Group No.1
Group No.2
Group No.3
Group No.4

only active comment group is read

prj

If the prj file is saved in this situation, only active comment group is saved in the prj file and other comment group is not saved in the prj file.

prj

only active comment group
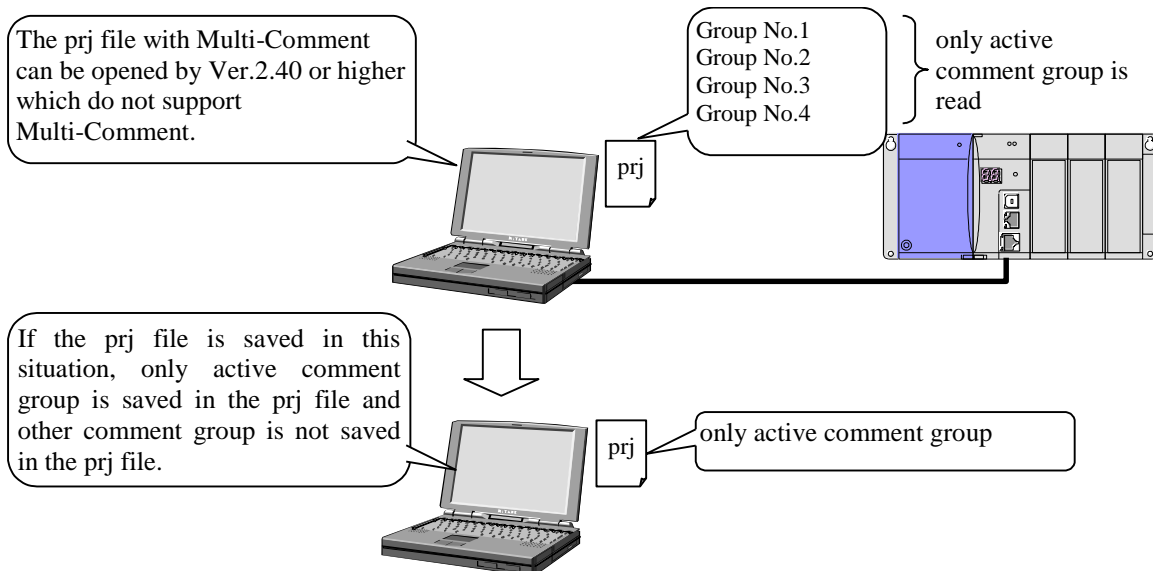
A prj file size is upped because Multi-Comment is supported in Ver.2.41 or higher. Therefore, it takes more time than before for prj file operating and build.

4.7　Change I/O Addresses

This is a function to change I/O addresses used in the program at a time. The registered I/O comment is chosen from the followings, "Move Comments", "Not Move Comments", and "Copy Comments", when changing I/O addresses by this function.

Menu:　　　　　[Edit] - [Change I/O Addresses]

Icon:

1] Change I/O addresses
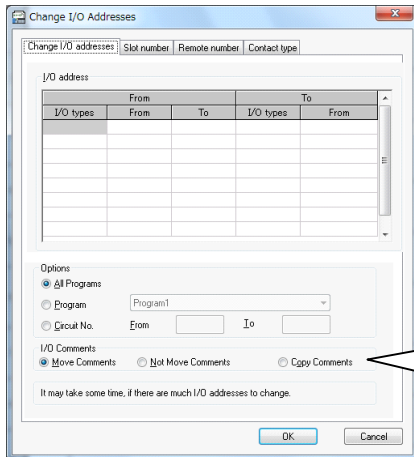
Specify the start and end I/O addresses you want to change, and specify the start I/O address which will be change.

You can choose the I/O comment at the time of execution of this function. (from Ver.2.14)
I/O comment of all groups is targeted in Ver.2.41 or higher which supports Multi-Comment.

Fig. 4.7.1　Change I/O Address

Example of the change

Circuit before change

I/O address

From			To	
I/O types	From	To	I/O types	From
R	0	F	M	10

Setting for changing I/O addresses from R0 to RF into I/O address from M10

Circuit after change (in editing)
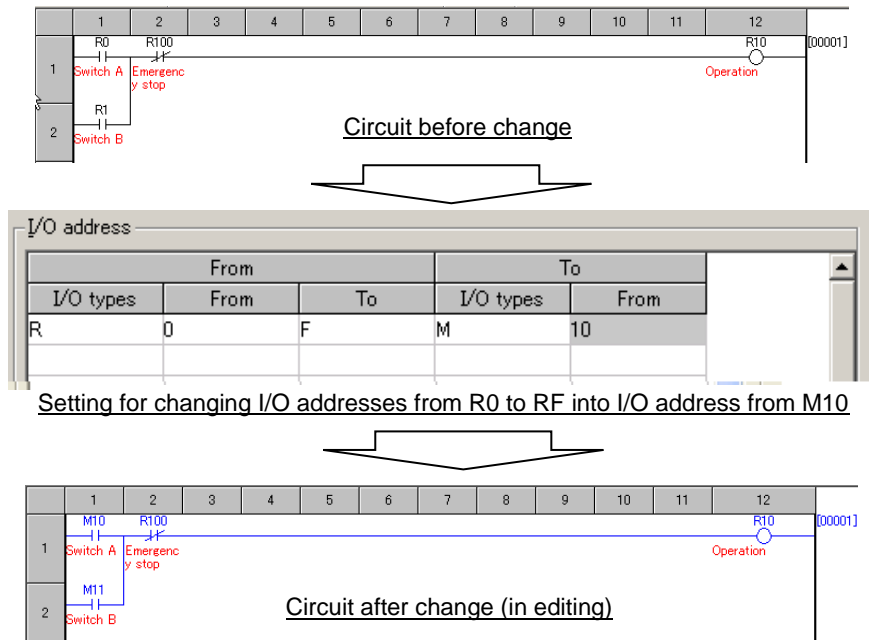
Fig. 4.7.2　Change I/O addresses

N o t e

When I/Os specified newly exist in the circuit already, the warning message is displayed.

2] Slot number
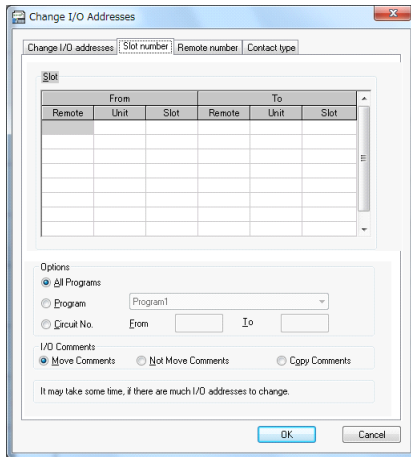
All external I/O No. corresponding to any specified slot is changed to the No. corresponding to the specified slot.

Fig. 4.7.3   Slot number

3] Remote number
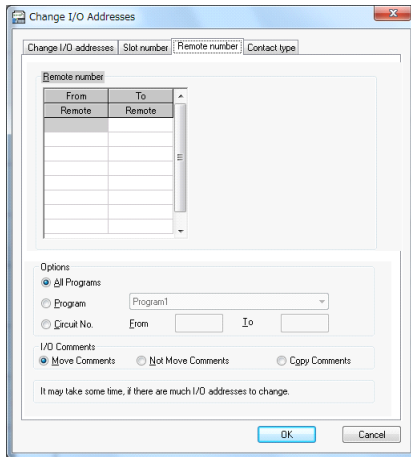
All external I/O No. corresponding to any specified remote master module No. is changed to the slave module No. corresponding to the specified remote master module No.

Fig. 4.7.4   Remote number

4] Contact type
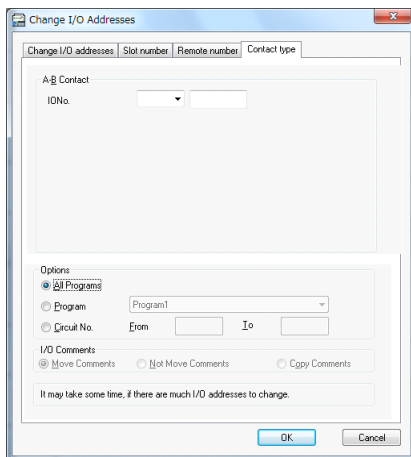
Contact type inverts the logic of a contact of specified I/O.
This mean is that a normally open-contact is changed to a normally closed-contact and a normally closed-contact is changed a normally open-contact.

Choose the I/O type from a pull-down menu in the left box and enter the address in the right box.

For example, M100
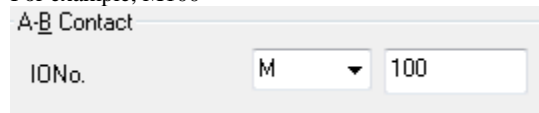
Fig. 4.7.5   Contact type

[Options] in each window

All Programs: Select this when changing I/O addresses of all programs at a time.

Program: Select this when changing I/O addresses of only specified program at a time.

Circuit No.:   Select this when changing I/O addresses between the specified start and end circuit number at a time.

N o t e

This function can change two or more ranges at a time. However, when the specified I/O numbers before and after changing are overlapped as shown below, you need to care because the changes are performed in order from the top.

From			To	
I/O types	From	To	I/O types	From
R	10	1F	R	20
R	20	2F	R	30

R10 - 1F are changed to R20 –2F and then R20 – 2F are changed to R30 – 3F.

From			To	
I/O types	From	To	I/O types	From
R	20	2F	R	30
R	10	1F	R	20

Switch

Switch the order with consideration for being performed in order from the top.
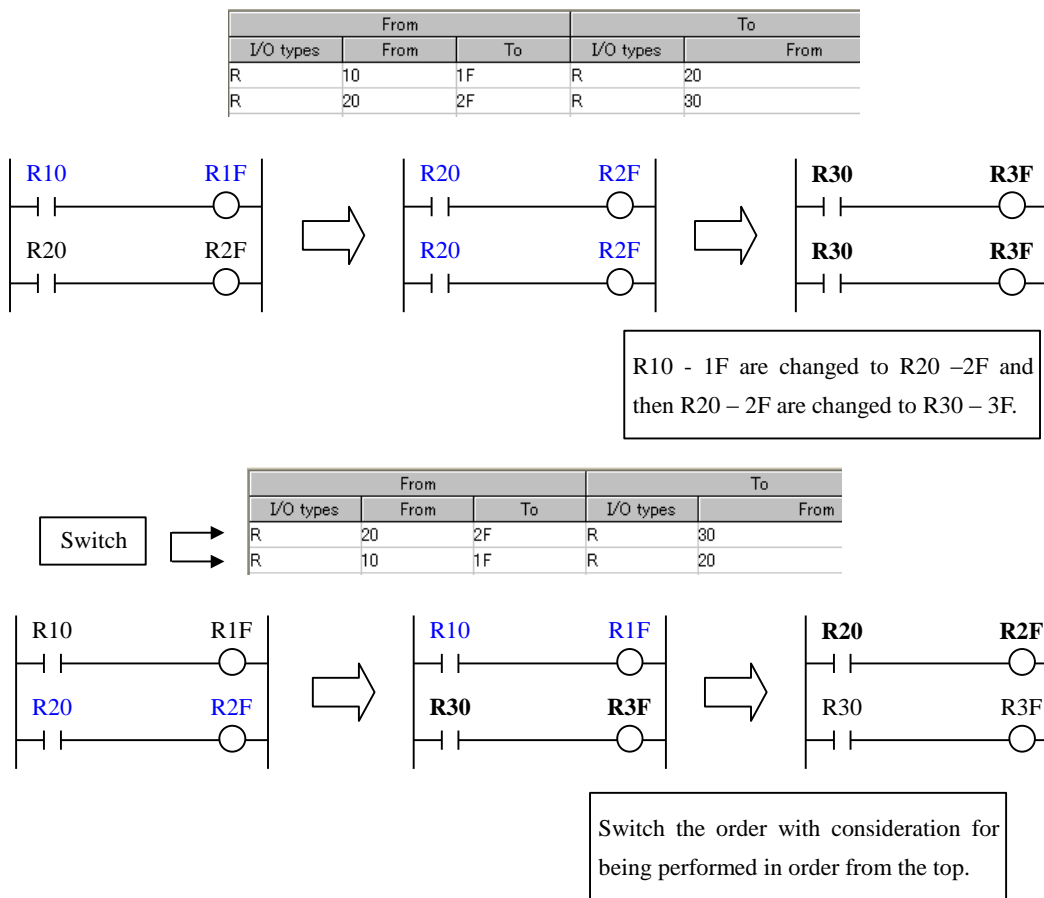
Fig. 4.7.6   Contact type

4.8   Auto Programming

The specified circuit is copied once or more (specified times), shifting I/O addresses by increment. This function is useful when creating the circuit of which structure is same but I/O addresses are different.

Menu: [Edit] - [Auto Programming]

Icon:
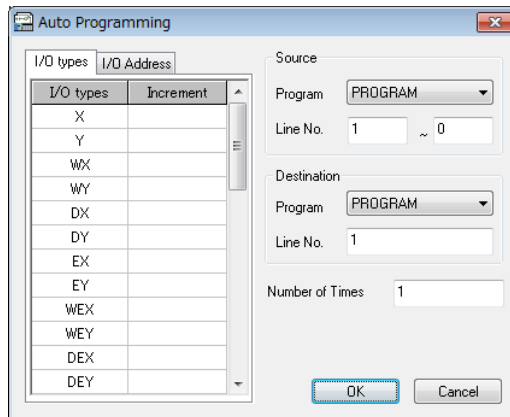
Fig. 4.8.1   Auto Programming window

Example of Auto Programming

An example to add two ladder circuits which consist of the same circuit by using the auto programming function is shown blow.
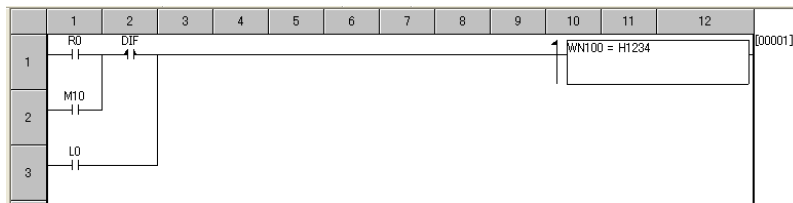
Fig. 4.8.2   Source ladder

I/O No.   increment

No.	I/O	Increment
1	R	0
2	M	2
3	L	3
4	WN	1

Fig. 4.8.3   Auto programming setting

Click [OK] in the Auto Programming window on the previous page, and the ladder program changes as follows.
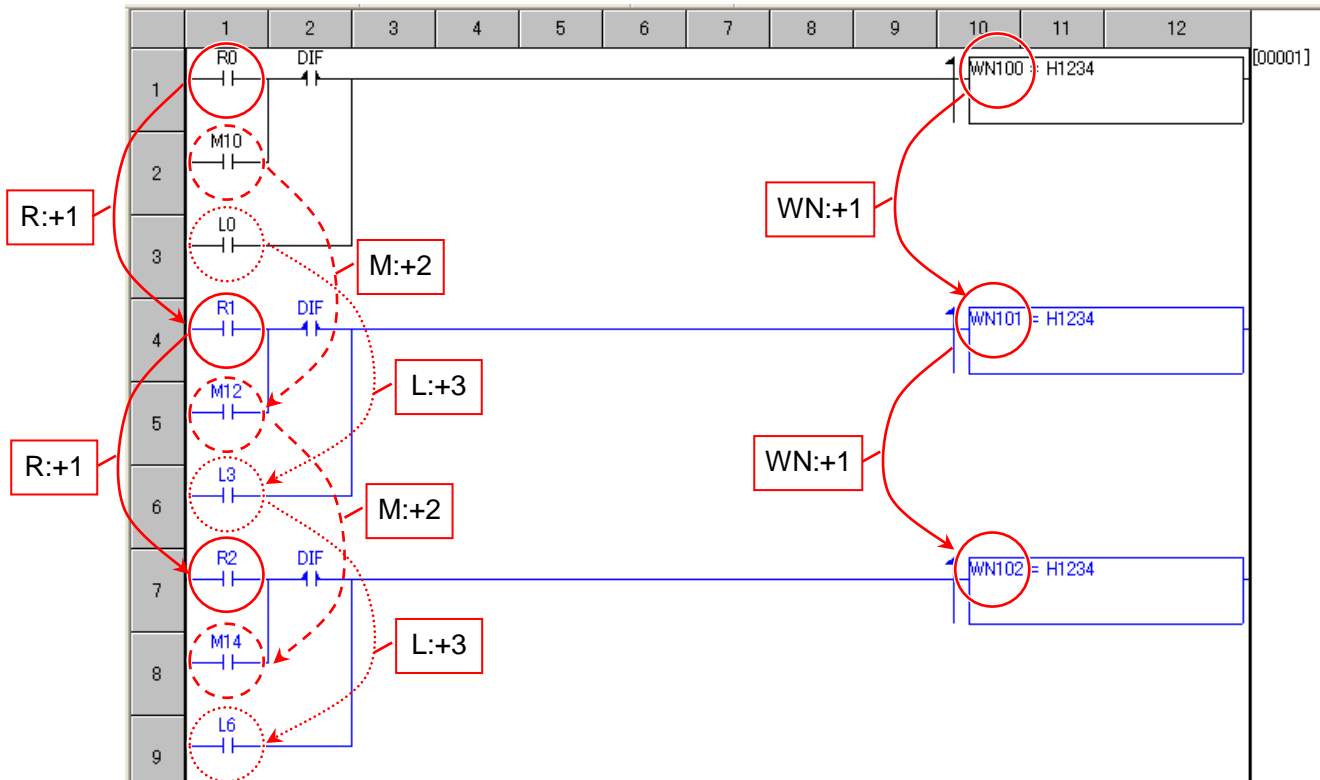
Fig. 4.8.4   Auto Programming execution

N o t e

1: The circuits in the source and destination are specified with not Circuit No. but Line No.
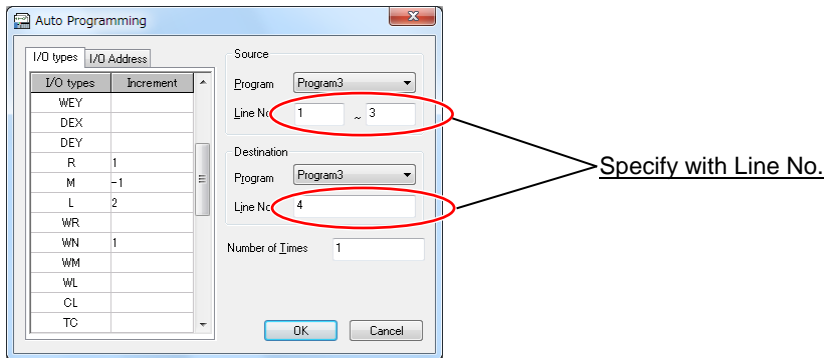
Fig. 4.8.5   Auto Programming – Line No. specification

2: Increment of automatically created I/O is specified in decimal. For example, if the increment of R0 is set to 10, it becomes RA. If the decrement of RA is set to -10, it becomes R0.

3: When automatically created I/O address exceeds the maximum value, it returns to 0.

4.9   Find / Replace / Jump

Symbols and comments used in the program can be found and replaced, and Jump to the specified row and circuit can be specified.

Menu: [Edit] - [Find]

Icon:

(1) Find

Find / Replace / Jump window can be opened by executing this function from menu or icon when a cursor is on the symbol, and by pressing any alphabet (a to z, A to Z) on the keyboard when a cursor is in the Ladder area. In Ver.6.00 or higher, the display content of the search window has been changed. There is no change in operation, function, search condition.
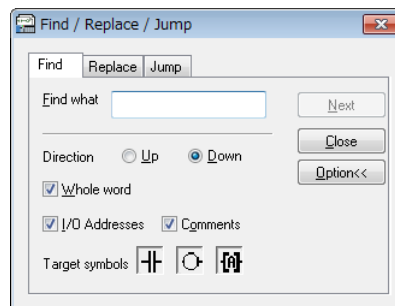
Fig. 4.9.1   Search window
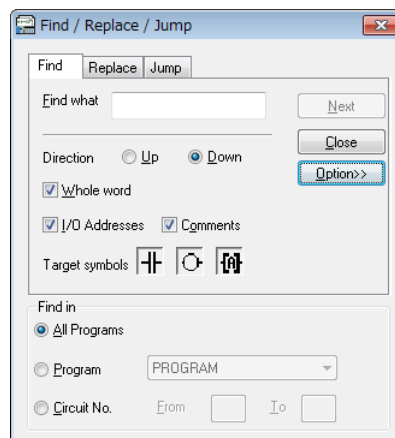
Fig. 4.9.2   Search option window

1] Program specification

Specifies targeted program from "All program", "Program", and "Circuit No.".

2] I/O Addresses / Comments

Selects targeted object from "I/O Addresses" and "Comments".

3] Direction

Selects the direction from "Up" and "Down".

4] Whole word

When finding as whole word, check this check box. The spaces in both sides need in finding. When finding WR0 in "WR0.S", do not check this check box.

(2) Replace

Targeted text string is replaced with specified text string. This function can be applied to I/O addresses and comments

In Ver.6.00 or higher, the display content of the replace window has been changed. There is no change in operation, function, replace condition.
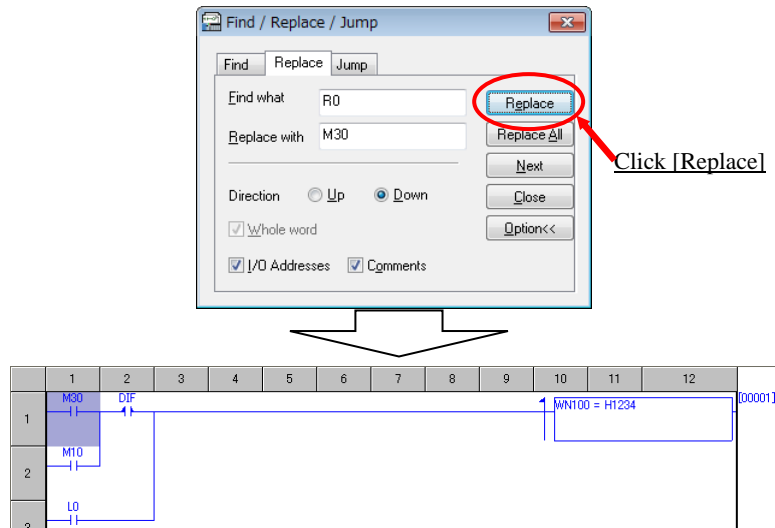
Fig. 4.9.3   Replace operation

Note

Even if I/O address is replaced, I/O comment is not replaced.

If you want to replace I/O comments together with I/O address, use "Change I/O address" function.

(3) Jump

If the number key is pressed when a cursor is in the Ladder area, [Jump] tag in the "Find/Replace/Jump" dialog can be opened.

Specifies Line No. or Circuit No., and specifies No.

In Ver.6.00 or higher, the display content of the jump window has been changed. There is no change in operation or function.
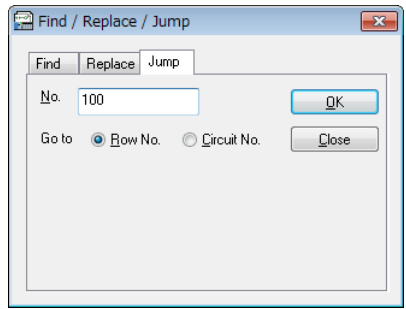
Fig. 4.9.4   Jump window(Ver.6.00 or higher)
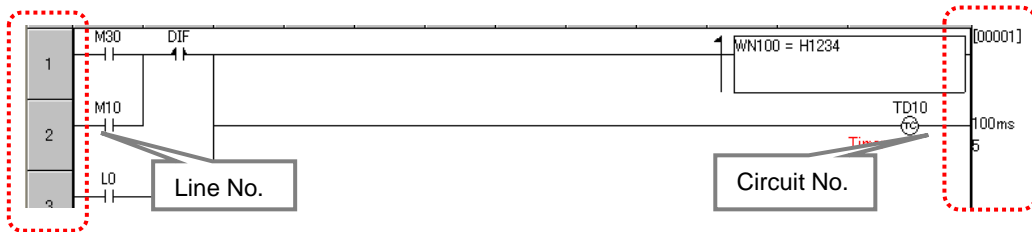
Fig. 4.9.5   Line No. and Circuit No.

4.10 Find contact <=> Coil

When the cursor is on the contact, a coil of the same I/O is found. When the cursor is on the coil, a contact of the same I/O is found. Bit I/O in the processing box is searched as a coil. However, you cannot execute "Contact <=> Coil", setting the processing box as a starting point because two or more operation expressions can be input in the processing box. When there are two or more finding targets, use "Find Next".

Menu: [Edit] - [Contact <=> Coil]

Icon:

Menu: [Edit] - [Find next]

Icon:
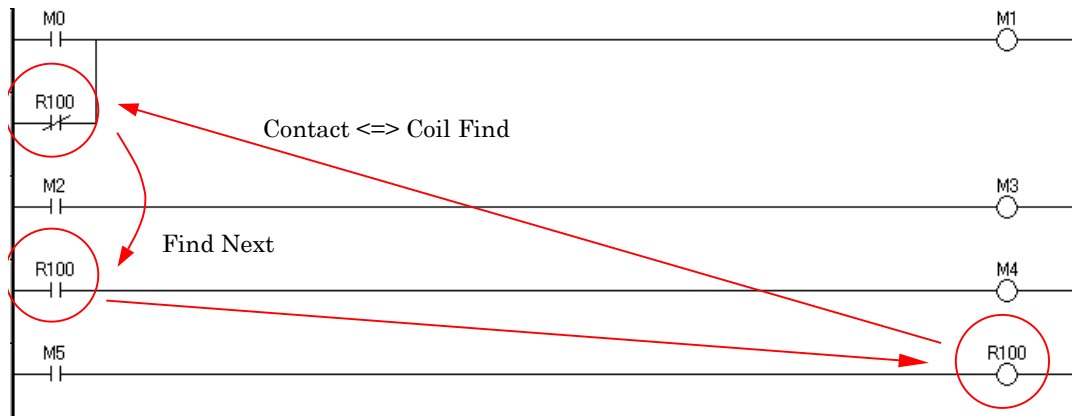
Fig. 4.10.1   Contact <=> Coil Find
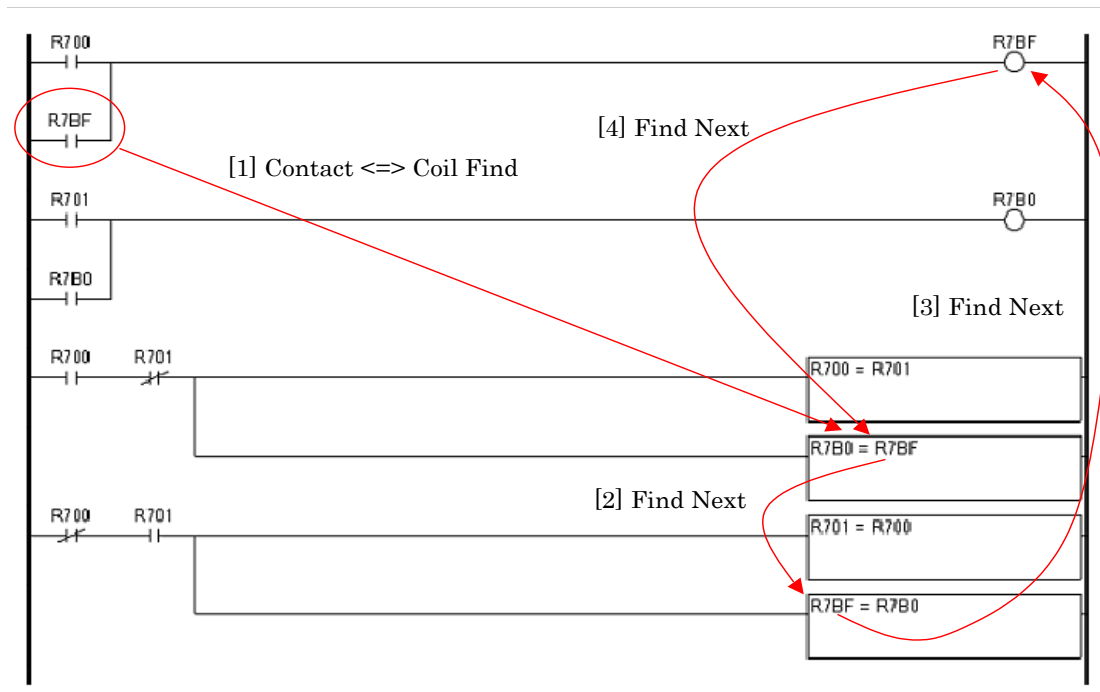
Fig. 4.10.2   Contact <=> Coil Find (within the processing box)

4.11 Cross Reference

I/O addresses used in the created program are displayed. Cross reference is divided into two functions shown below.

1] Address-Line No.   2] Address List

(1) Address-Line No. (Single I/O)

It is indicated where the specified I/O address is used in the program. Program name, circuit, row No., and column No. are displayed.

Menu: [Tool] - [Cross reference] - [Address-Line No.]

Icon:
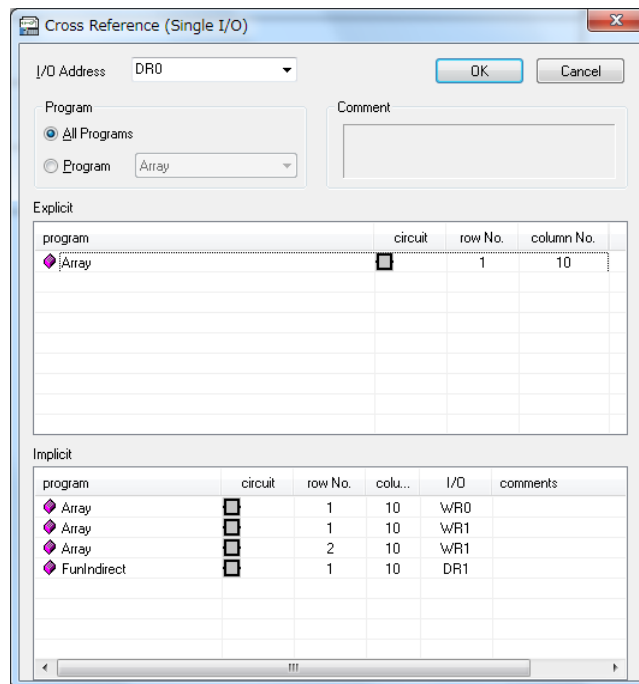
Fig. 4.11.1   Address-Line No.

1] I/O Address:	Inputs I/O address to display after search.
2] Program:	Specifies a targeted program to search.
All Programs:	Select to search all programs.
Program:	Select this if you want to specify a program and perform a search.
3] Comment:	Display I/O comment of target I/O.
4] Explicit:	Displays a list of search results of places directly using target I/O.
5] Implicit:	Displays a list of search results of the target indirectly used I/O.
	[Example] When DR0 and WR0 are used in the program
	DR0 and WR0 are indirectly related to each other.
	When searching target I/O as DR 0, WR 0 using DR 0 indirectly is displayed in the search result.
6] OK:	Execute search.
7] Cancel:	Close the window.

The Ladder area is displayed by single-clicking the displayed line in the search result.
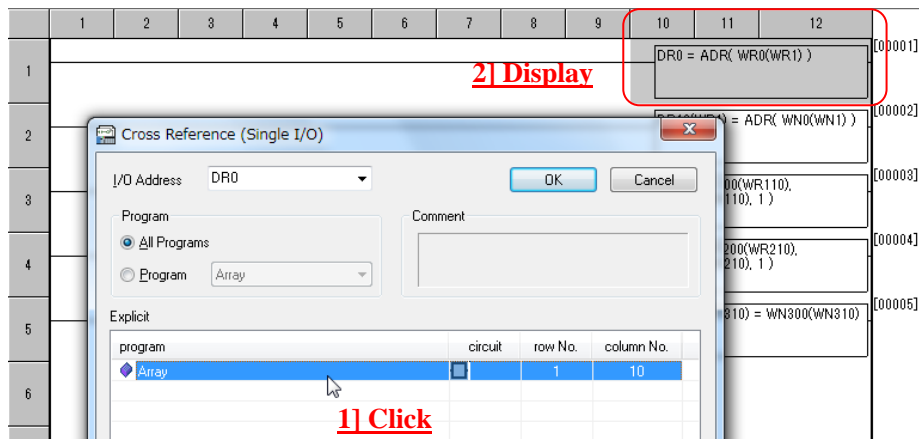
Fig. 4.11.2   Jump by clicking the line

(2) Address List (I/O list)

　　　　Menu:　　[Tool] - [Cross Reference] - [Address list]

　　　　Icon:

In Ver.6.02 or higher, the button position of the common part has been changed and it is now possible to edit comments.
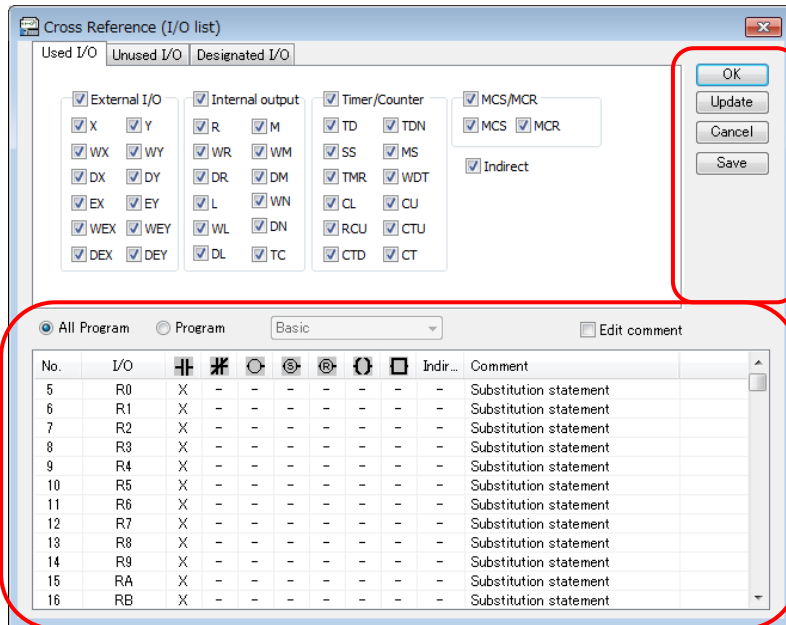
Fig. 4.11.3　Cross reference (I/O list)
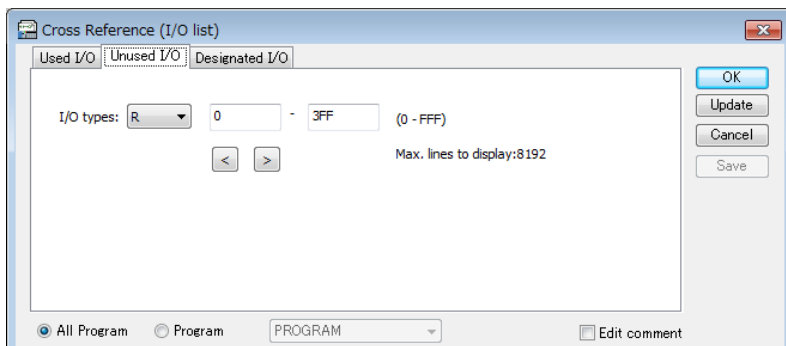
Fig. 4.11.4　Cross reference (I/O list) Unused I/O
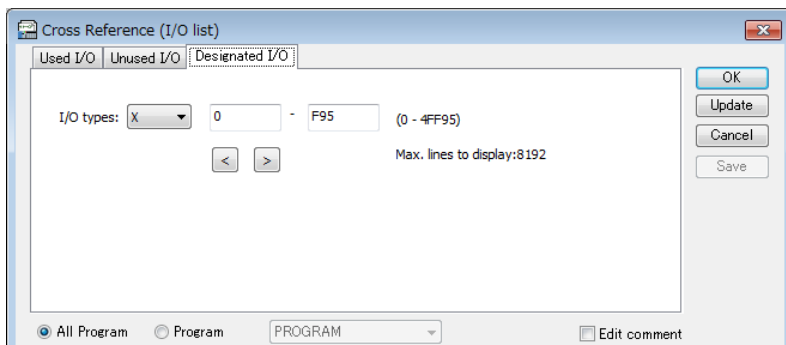
Fig. 4.11.5　Cross reference (I/O list) Designated I/O

Common part

Operation and search results that are the common part of "used I / O", "unused I / O" and "designated I / O" are displayed.

All Program: All programs will be searched.

Program: Select the program in the project from the list. The selected program will be searched.

OK: Search is performed according to the selection contents of the displayed window, and a list of results is displayed.

Update: After changing the program with the window open, press the button to update the result list.

Cancel: Close the window.

Save: Save the search results in a file in CSV format.

Edit comment: By checking, the comment column of the result list becomes editable.

By unchecking, you will return to the conventional function.

Result list: List search results.

[Display content]

"*": Use (indirect use I / O in case of indirect column)

"+": Use of array (*1)

"-": unused

"@": Instruction indirect use (indirect column only)

*1 Example of using array

WR0 (WR10) = WN0 (WN10)

In this case, it is displayed in WR0 and WN0 as array use.

[Display order]

Click the content name of the column to be sorted.

[Display of Cross Reference (Single I/O) window]

It operates with the comment editing check unchecked.

Double-click on the line in use ("*" is displayed) or press the [Enter] key to open the [Cross Reference (Single I/O) window. On the window, the result of executing the search with the I/O address specified is displayed.

[Edit comment]

It operates with the comment editing check checked.

Double-click the displayed line or press the [Enter] key to enter the edit comment state.

After editing the comment, press the [Enter] key to confirm the comment.

When editing a comment, "*" is added to "I / O comment" in the project tree and it changes to red letter display.

N o t e

If you use polynomials in your project, unused special internal output appears in the search result list.

When the displayed special internal output is within the polynomial use range shown in "Table 4.11.1 Special internal output range used in polynomial", it is used for polynomial calculation. Please do not use in the project. Calculation results may differ when used. Please be careful.

Table 4.11.1 Special internal output range used in polynomial

No.	Polynomial use range		Comment
1	WRF056	- WRF05F	System use area
2	WRF078	- WRF07F	System use area

■ Indirect use

[1] Indirectly used I/O

The I/O is not used directly, same memory area can be used indirectly by different data type. In this case, it is listed in the column "Indirect".

Three examples, bit, word and double word, of Indirect use are shown as follows.
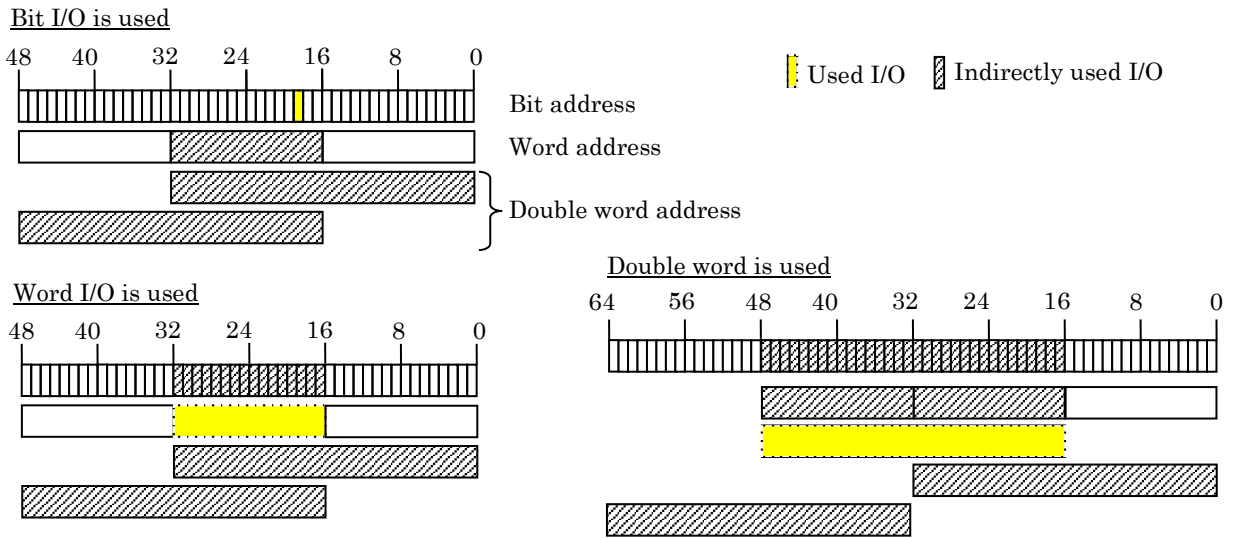
Fig. 4.11.6   Indirect I/O

Indirect use is effective for following I/O types.

WR, DR, M, WM, DM, L, WL, DL, WN, DN

[2] Indirectly used I/O in command

Some commands reserves several I/Os. These reserved I/O is listed as indirectly use in commands.

Example

CCCL(s) commands occupies 7 words from s to s+6.

I/O from s+1 to s+6 are listed as indirectly use in commands.

Applied commands are listed below.

Table   4.11.1 Applied commands for Indirectly used I/O in command

Command	EHV-CPU	MICRO-EHV	Command	EHV-CPU	MICRO-EHV
*	✓	✓	UWINFO	✓	—
B*	✓	✓	QP4INIT	✓	—
BINDA	✓	✓	QP4CTRL	✓	—
SBINDA	✓	✓	P4INIT	✓	—
BINHA	✓	✓	P4CTRL	✓	—
BCDDA	✓	✓	XYRW	✓	—
DABIN	✓	✓	SCRW	✓	—
SDABIN	✓	✓	UFNC	—	✓
HABIN	✓	✓	CUSTA	—	✓
DABCD	✓	✓	CURD	—	✓
UNIT	✓	✓	CUWR	—	✓
DIST	✓	✓	CUPRE	—	✓
INTPL	✓	—	PLSTA	—	✓
DSRCH	✓	✓	PLSPD	—	✓
VSRCH	✓	✓	PLCNG	—	✓
RECSET	✓	✓	PLSTP	—	✓
RECEXE	✓	✓	PLSRD	—	✓
CCCL	✓	✓	PLSWR	—	✓
CCCMP	✓	✓	PWMSTA	—	✓
IFR	✓	✓	INV1	—	✓
PGEN	✓	—	OMST1	—	✓
EXMEIT	✓	—	OCTP1	—	✓
TRNS 0	✓	✓	MOV(*1)	✓	✓
RECV 0	✓	✓	COPY(*1)	✓	✓
TRNS 7	✓	—	PLSTAR	—	✓
RECV 7	✓	—	PLSPDR	—	✓
TRNS 9	✓	—	PSCNGR	—	✓
FLMEIT	✓	—	PLSTPR	—	✓
MBMST	✓	✓			
MBTCL	✓	—			

✓ : Supported

— : Not supported

*1   n will search in the case of constant.

[3] I/O indirect use of instruction indirect use

For I/O searched by command indirect use, I/O sharing the address is indicated by "@" as I/O indirect use of indirect use.

4.12 Program Check

In the created program, necessary check is done by "Build" operation. However, the content which is not checked by "Build" operation can be checked by "Program Check" function. There are "Double coil" and "Count edge commands" in the program check function. There is a case where the double coil is used on purpose. So, this is not checked in "Build" operation.

Menu: [Tool] - [Program check]
Icon:
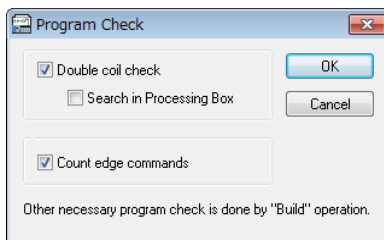
Fig. 4.12.1   Program Check window

(1) Double coil check

If the same I/O is used in the combination of coils such as No.1 to No.5 shown below, it is checked as the double coil and the results are displayed in the output result area on the bottom of the window. If the box of "Search in Processing Box" is checked, also the combinations such as No.6 to No.9 are check. In case of processing box, the bit I/O in the left side is checked regardless of the value in the right side. For example, when the operation equations of R0=1 and R0=0 are used separately, it is searched as the double coil.

Table 4.12.1   Target of Double check coil

No.	Check item
1	Normal coil – Normal coil
2	Normal coil – Set coil
3	Normal coil – Reset coil
4	Set coil – Set coil
5	Reset coil – Reset coil
6	Normal coil – The left of the operation expression in the processing box (bit I/O)
7	Set coil – The left of the operation expression in the processing box (bit I/O)
8	Reset coil – The left of the operation expression in the processing box (bit I/O)
9	The left of the operation expression in the processing box (bit I/O) – The left of the operation expression in the processing box (bit I/O)
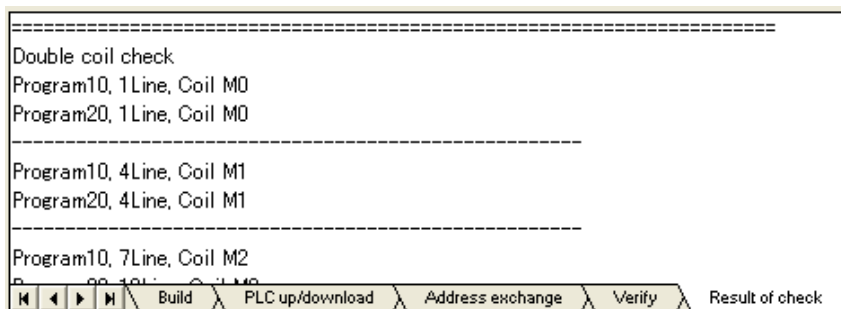
Fig. 4.12.2   Output result of double coil check

(2) Count edge commands

The number DIF, DFN, edge coil and edge processing box is counted and displayed in the output result window.

```
=====================================================================
Count the number of edge command
Rising edge detection(DIF): 0/512
Falling edge detection(DFN): 0/512
Rising edge coil (EU coil): 21/1024
Falling edge coil (ED coil): 21/1024
Rising edge processing box (EU processing box): 1/1024
Falling edge processing box (ED processing box): 1/1024
=====================================================================
```

Fig. 4.12.3   Result sample of edge counting

4.13 Password

(1) Project password

You can set the password to the project. Dialog for setting and cancelling is shown in Fig.4.13.1. Up to 8 characters of alphameric character and code is available for the password.

Menu: [Tool] - [Project Password]

Password authentication dialog (Fig.4.13.2) appears in the following cases.

(a) Read the program after writing the program to CPU.

(b) Open the project file after saving data to the project file.

The project cannot be opened unless entering exact password on the authentication dialog. This means password-protected project cannot be opened from the file and transferred to CPU and password-protected project cannot be read from CPU and saved to the file.
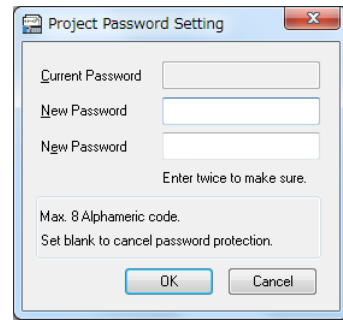
Fig. 4.13.1   Password setting dialog box
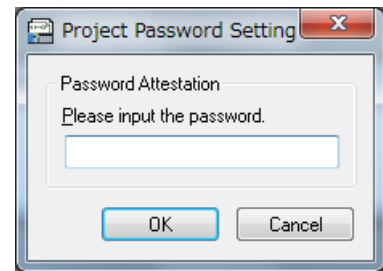
Fig. 4.13.2   Password authentication

Normal project

Cancellation of password

Password setting
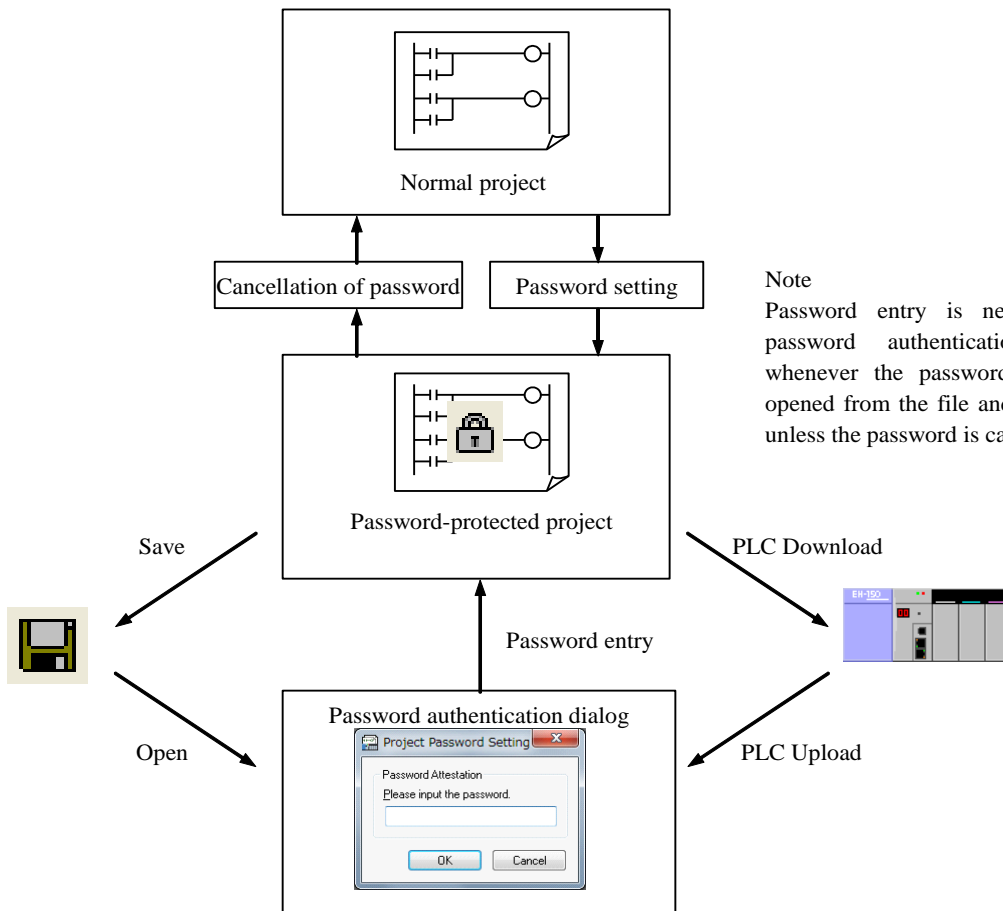
Note
Password entry is necessary because the password authentication dialog appears whenever the password-protected project is opened from the file and uploaded from CPU unless the password is cancelled

Password-protected project

Save

PLC Download

Password entry

Open

Password authentication dialog

PLC Upload

Fig. 4.13.3   Password summary

(2) Sheet password setting (Only for MICRO-EHV)

Individual program sheet can be protected by different password from project password. In order use sheet password function, project password must be set in advance. Sheet password can be set in project tree (Fig. 4.13.4).

After setting sheet password (Fig. 4.13.5), right-click on the sheet and choose "Protect" to enable protection. Once protection is enabled, the color of icon is changed. (Fig. 4.13.8).

Limitation when protection is enabled

When sheet protection is enabled, following functions are not available.

To display	[Auto programming]
Copy sheet	[Change I/O address]
Delete sheet	[Find]
Move sheet	Random circuit monitor
[Edit circuit] – [Copy]	Open circuit comment list
[Edit circuit] – [Move]	Cross reference
[Edit circuit] – [Delete]	

The behavior of each status is shown as below.

	Without sheet password	With sheet password	
		Not authenti-cated	Authenti-cated
Behavior	No limitation	Limitation	No limitation

If following operations is performed for password protected project, project file becomes unauthenticated status.

・Upload from PLC

・Open the project file

・Reverse build or Circuits alignment

・OBC import

After entering a correct password in the password dialog (Fig. 4.13.9), project becomes authenticated status, which has no limitation in function. Be noted that a sheet password is common for all the sheets.

Fig. 4.13.4   Password authentication

Fig. 4.13.5   Password setting dialog box

Fig. 4.13.6   Menu to protect sheet

Fig. 4.13.7   Unprotected sheet
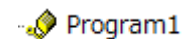
Fig. 4.13.8   Protected sheet

Fig. 4.13.9   Password

4.14 Caution on Programming

(1) Timer

■ Update of progress value

The progress value of the timer is updated at the execution of the timer command. Therefore, the timer may not turn on properly on condition that the timer command is not scanned in the program which is using the JMP command and the master control (MCS). (If the time not to scan the timer command exceeds "time base×65535", the timer does not turn on properly.) And the timer progress value retains the preceding value until the timer command is executed.

■ Start conditions of Timer

The timer command cannot be connected from the main frame directly. The condition is always necessary before the timer command.

OK   **NG**
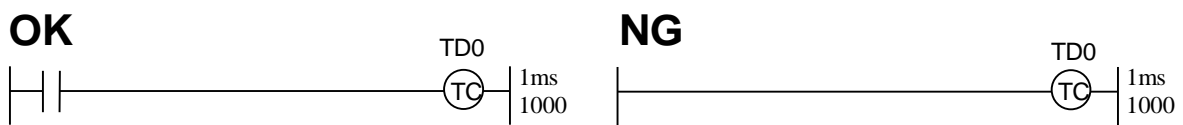
Fig. 4.14.1   Start condition of Timer

(2) OR of Coil/Processing box

When a coil and a processing box are connected with OR, the CPU module is scanned in order from the top. Therefore, operations under OR may not be executed according to operations above OR.
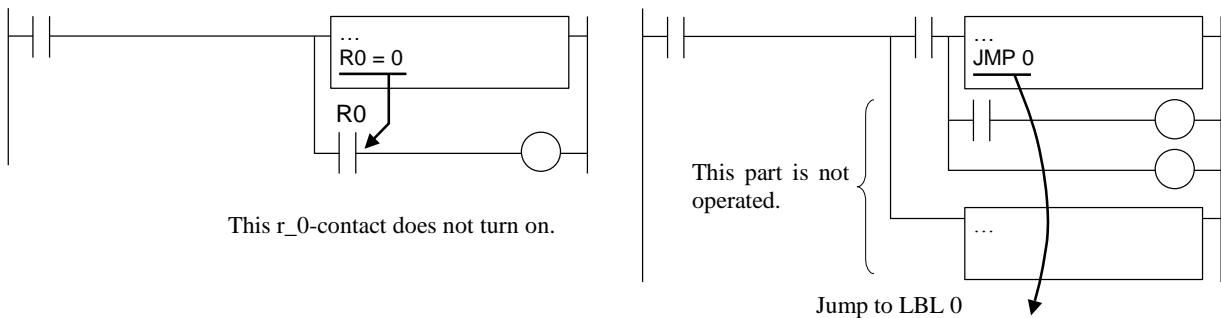
Fig. 4.14.2   OR of Coil / Processing box

(3) Edge, Edge coil, and Edge processing box

Edge, edge coil, and edge processing box commands (up / down) search the status change of the conditions on the left side of the edge command. Therefore, the condition is necessary on the left side of the edge command.
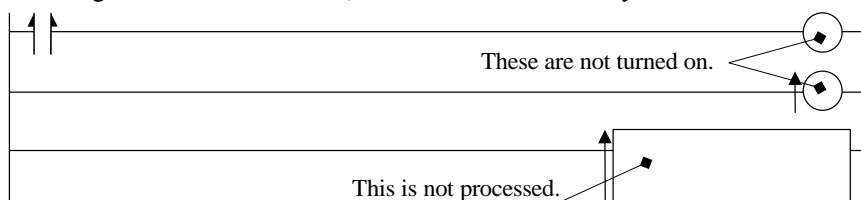
Fig. 4.14.3   Edge, Edge coil, Edge processing box

N o t e

In the special internal output (R7E3) of which the 1st scan is ON after RUN, only 1st scan is ON after start of RUN, and the 2nd scan and scans after the 2nd are OFF. Therefore, it does not work even if DIF is used together. (DIF from OFF to ON cannot be searched.)

OK   **NG**

R7E3　Only the 1st scan turns on after RUN.　　　R7E3　DIF　It does not turn on.
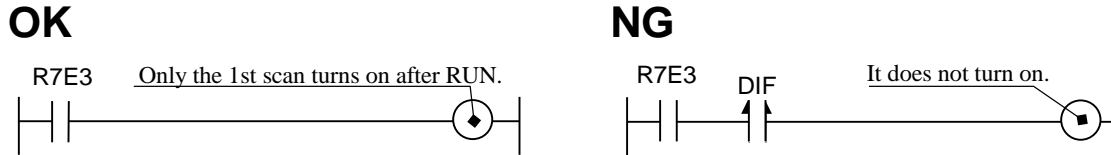
Fig. 4.14.4　Note of R7E3 (The 1st scan ON)

(4) Condition code

Bit internal output called a condition code is used for many commands. Since the condition code is used for each command in common, the status may be changed after the command execution. Therefore, input the program as follows when referring to the condition code.

(a) Stores in another internal output immediately after executing the command.

SHR (WR0, 1)
R0 = R7F0

Memorizes the status of "R7F0" which is the condition code.
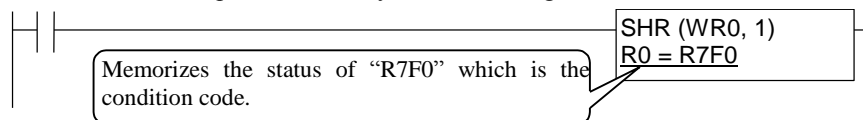
(b) Branches output on the same condition, and inputs the contact of the condition code before the processing after branching.

SHR (WR0, 1)

R7F0

Processing that the carry flag (R7F0) turns on with SHR command is described.
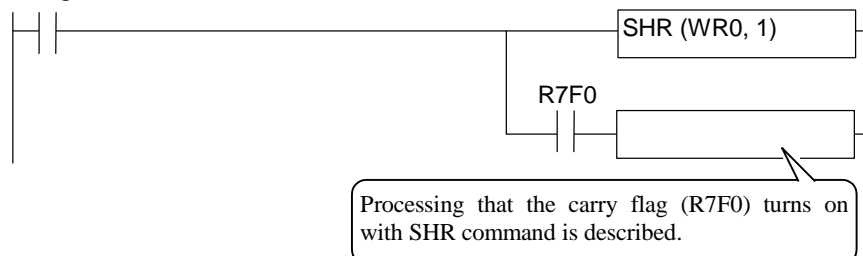
Fig. 4.14.5　Condition code

(5) Floating point

Since the number of significant digits of floating point is limited, an error occurs between calculation result and the true value.

In case of the program that floating point is used for data type and calculation result and invariable are compared (especially "= =" and "< >"), the expected result may not be obtained owing to error.

When comparing the calculation result of floating point, we recommend decision on not match or mismatch but range.

Reference

There are 3 types in error of floating point operation as shown below.

Table 4.14.1   Error of Floating point

Name	Description
Round off error	Since the operation result is shown in the number of significant digits, error occurs by deleting the lower digits with rounding down / rounding up / rounding. Ex: If decimal number 0.1 is converted to binary, it becomes a recurring decimal. It is an approximation to 0.1 within the limited number of significant digits, but not 0.1.
Underflow by large difference	In addition and subtraction of numbers with a very large and a small value, the small value is not reflected to the calculation result. Ex: When adding 1234 and 0.0056, the expected calculation result is 1234.0056. But number in mantissa of the number with smaller exponent bits is rounded down because calculation is performed based on the number with large exponent bits.
Underflow by small difference	When subtraction of two close numbers, the number of significant digits decreases. Ex: When subtracting 1.23789 from 1.23456, the number of significant digits before calculation is 6. But the number of significant digits of the calculation result is 3 because the calculation result is - 0.00333

(6) Cyclic scan

In the program which uses a cyclic scan and a normal scan or in the program which uses two or more cyclic scans, the value set in a scan which has higher priority may be lost if the same I/O is operated inside scans of which priority is different.
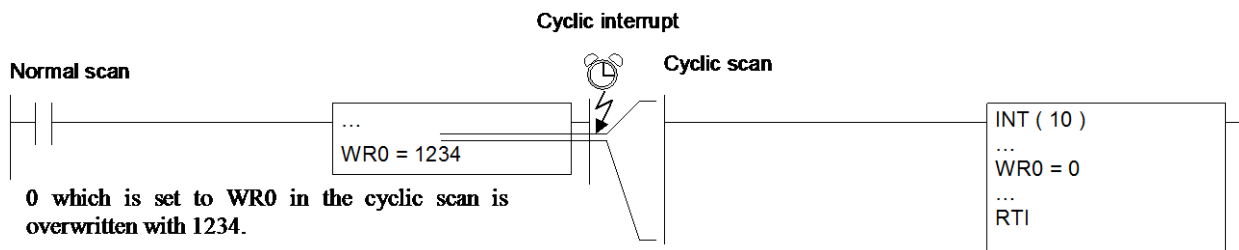
Fig. 4.14.6   Caution on cyclic scan (1)

One example of method to program so that data is not lost is shown.

(a) Do not use the same I/O in scans of which priority is different.

(b) Do not use the I/O which is set in the scan which has higher priority for other scans. Only refer.

(c) Stores the I/O used for the top of the scan which has higher priority in another I/O, then puts it back at the end of scan.
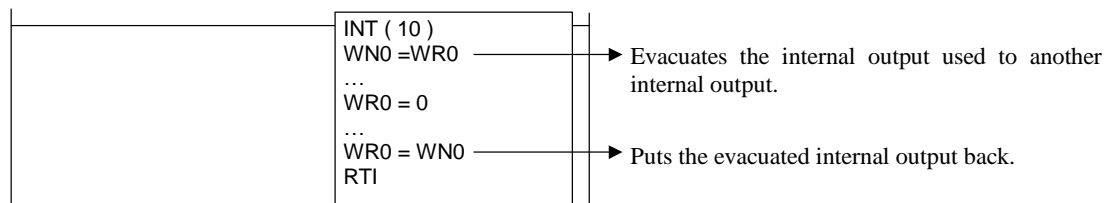
Fig. 4.14.7   Caution on cyclic scan (2)

And the external I/O is refreshed at the end of the normal scan. Refer the latest input information inside the cyclic scan, and use the I/O refresh command when operating output.

Chapter 5   Program Up/Downloading

This section explains an operation of program transfer between Control Editor and CPU module.

5.1   CPU Operation Mode

The connection mode between Control Editor and CPU module divides into three types as shown below.

Menu: [Online] - [Mode] - [Offline] / [Online] / [On-direct]

Icon: Offline

Online

On-direct

(1) Offline mode

Control Editor and EHV-CPU have not been connected in this mode. The program cannot be downloaded to EHV-CPU and uploaded from EHV-CPU in this mode. This mode is used for creating new program and modifying the program without connecting to EHV-CPU.

New creating, etc.
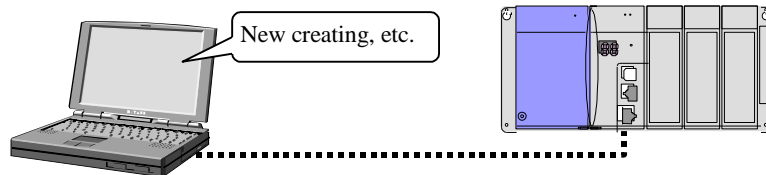
(2) Online mode

Control Editor and EHV-CPU are connected with communication cable. User program can be written or read to/from EHV-CPU by "PLC download" and "PLC upload" operations in this mode. This mode is used for debugging, commissioning and etc.

Monitoring starts automatically when starting online mode (Ver.4.06 or higher).

Modifying, debugging, etc.

Download ⟹

⟸ Upload
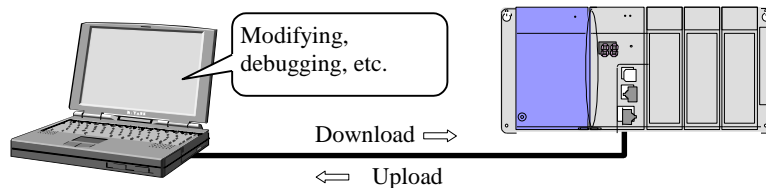
(3) On-direct mode

Control Editor and EHV-CPU have been connected in this mode, and the online change in RUN is possible in this mode. The connection mode can be shifted to On-direct mode only when programs of Control Editor and CPU module match. If "Build" operation is executed after changing the program, that change is reflected to CPU module in real time. This mode is used for the program modification in the test run and the system operation Monitoring starts automatically when starting on-direct mode (Ver.4.06 or higher).

Test run, in regulating, etc.

⟸ Program match ⟹
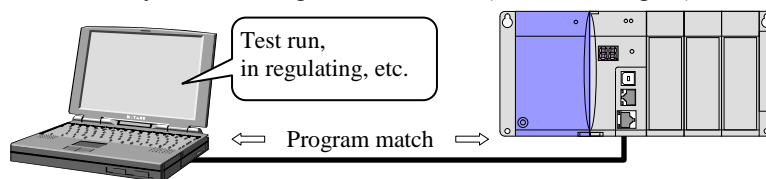
Fig. 5.1.1   CPU connection mode

5.2　PC Communication Setting

Communication Setting is the settings for connecting Control Editor and CPU module in Online/On-direct mode.

　　　Menu:　　　　　　[Tool] - [PC Communication Settings]
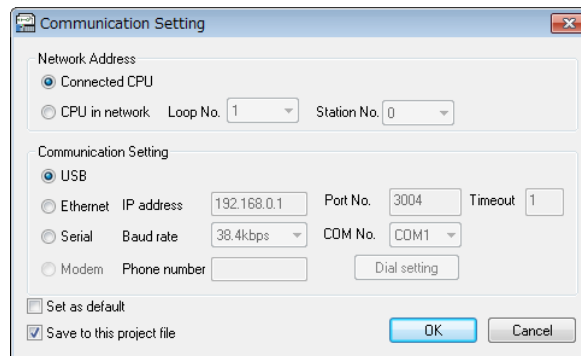
Fig. 5.2.1　PC communication settings window

PC Communication settings can be stored on the project file from Ver.2.14. But, when the check box is cleared, these settings are not stored and default information is set when opening the file.

If a check box of "Set as default" on the right lower is checked and [OK] button is clicked, that setting information becomes effective from the next time starting up.

In Ver.7.01 or higher, Communication setting assistance window has been added.

(1) Network Address

　　Connected CPU:　　Choose this when connecting directly with CPU.

　　CPU in network:　　Choose this when accessing other CPU from one CPU via CPU link network. In this case, specify Loop No. (1 to 8) and Station No. (0 to 63).

　　MICRO-EHV does not support link network.

(2) Communication Setting

　　Connection method to CPU module is chosen.

　　1] USB

　　　Choose when communicating with USB.

　　　This is USB2.0 Full Speed (12Mbps).

　　2] Ethernet

　　　Choose when connecting with Ethernet.

　　　Specify IP address and Port No. (0 to 65535).

　　　Ethernet timeout can be set in Ver.2.18 or higher. Please set the timeout at 1 -30 seconds. However, even if the timeout is set 20 seconds or more, it becomes a timeout in about 20 seconds by the specification of Ethernet of Windows.

　　3] Serial

　　　Choose when connecting with Serial.

　　　Baud rate: Select from 4.8kbps / 9.6kbps / 19.2kbps / 38.4kbps / 57.6kbps / 115.2kbps / Auto.

　　　COM No.: Select from between COM 1 and COM 16.

(3) Communication setting assistance window

The communication setting assistance window allows you to set communication settings step by step if you do not know how to set it.

1] When directly connecting PC (CTE) and PLC (target CPU)
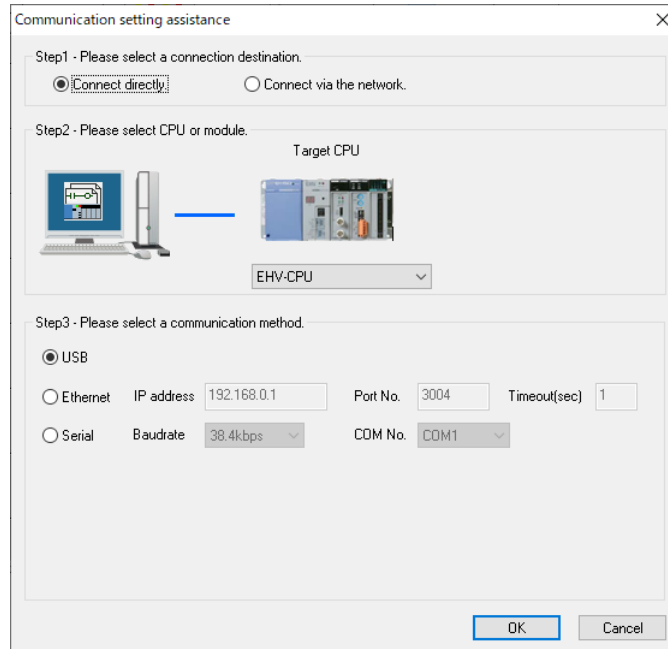
Fig. 5.2.2   Communication setting assistance window (Connect directly)

Step1 - Please select a connection destination.

Select "Connect directly".

Step2 - Please select CPU or module.

Select "EHV-CPU".

Step3 - Please select a communication method.

Select the communication method and set the setting items required for communication.

Table 5.2.1   Communication Setting

Connection method	Setting items	Remarks
USB	—	Initial value Displays the settings in the Communication Setting window.
Ethernet	IP address	
	Port No.	
	Timeout (sec)	
Serial	Baud rate	
	COM No.	

2] When connecting PC (CTE) and PLC (target CPU) via network.
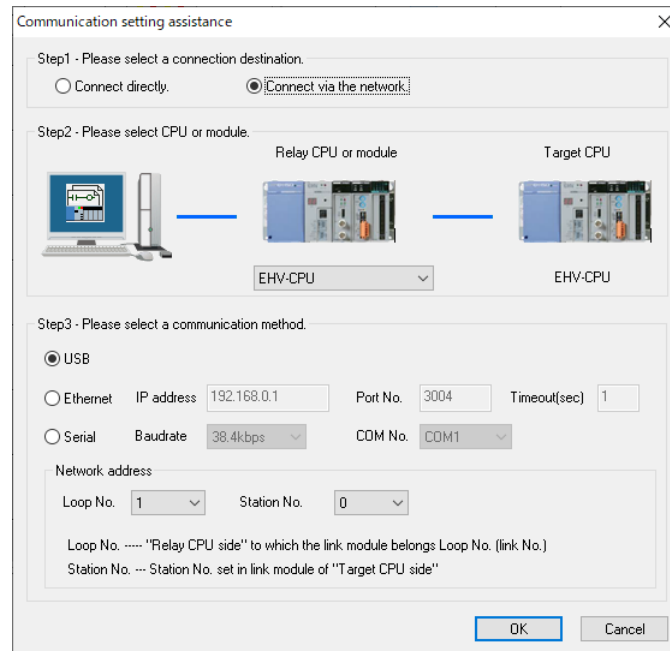
Fig. 5.2.3   Communication setting assistance (Connect via the network)

Step1 - Please select a connection destination.

Select "Connect via the network".

Step2 - Please select CPU or module.

A] Connect directly to the PC(CTE), and select the CPU or module that relay the connection with the target CPU.

B] Target CPU is fixed to "EHV-CPU".

Step3 - Please select a communication method.

A] Select the communication method, and set the setting items required for communication.

Refer to "Table 5.2.2   Relay CPU or module and Connection method2 for setting items.

B] Set up the network address.

Loop No.:   "Relay CPU side" to which the link module belongs Loop No. (Link No.)

Station No.:   Station No. set in link module of "target CPU side".

Table 5.2.2   Relay CPU or module and Connection method

Relay CPU or module	Connection method	Setting items	Remarks
EHV-CPU	USB	-	Initial value Displays the settings in the Communication Setting window.
	Ethernet	IP address	
		Port No.	
		Timeout (sec)	
	Serial	Baud rate	
		COM No.	
EH-CPU	Serial	Baud rate	-
		COM No.	-
H-CPU	Serial	Baud rate	-
		COM No.	-
Ethernet module (H)	Ethernet	IP address	-
		Port No.	-
		Timeout (sec)	-
Ethernet module (EH)	Ethernet	IP address	-
		Port No.	-
		Timeout (sec)	-
Ethernet module (EHV)	Ethernet	IP address	-
		Port No.	-
		Timeout (sec)	-
Remote station (H)	Serial	Baud rate	-
		COM No.	-
Remote station (EHV)	Ethernet	IP address	-
		Port No.	-
		Timeout (sec)	-

Table 5.2.3   Relay CPU or module and Network address

Relay CPU or module	Network address		Remarks
	Items	Range	
EHV-CPU	Loop No.	1 to 8	Initial value Displays the settings in the Communication Setting window.
	Station No.	0 to 63	
EH-CPU	Loop No.	1 to 2	-
	Station No.	0 to 63	-
H-CPU	Loop No.	1 to 2	-
	Station No.	0 to 63	-
Ethernet module (H)	Loop No.	1 to 2	-
	Station No.	0 to 63	-
Ethernet module (EH)	Loop No.	1 to 2	-
	Station No.	0 to 63	-
Ethernet module (EHV)	Loop No.	1 to 8	-
	Station No.	0 to 63	-
Remote station (H)	Loop No.	1 to 2	-
	Station No.	0 to 63	-
Remote station (EHV)	Loop No.	1 to 8	-
	Station No.	0 to 63	-

N o t e

- Current Control Editor does not support the "Modem" function in the communication setting.

- EHV-CPU series does not support 115.2kbps.

- The setting of relay CPU or module is not saved in the project file. Every time the Communication setting assistance window is opened, the initial status (EHV-CPU is set) is set.

5.3   CPU Initialization and Release Occupation

(1) CPU initialization

Memory in the CPU module is initialized. Connect in the online mode to executed this.

　　Menu:　　[Online] - [Mode] - [Online]

　　Icon:

　　Menu:　　[Online] - [Operate CPU] - [Initialize]

　　Icon:

After unpacking of CPU, an error code 76 (retentive area is indefinite) may be displayed on the 7 segment LED because the memory in the CPU is indefinite. Initialize the memory according to the above step after connecting the battery. Performance is enabled while the CPU stops.
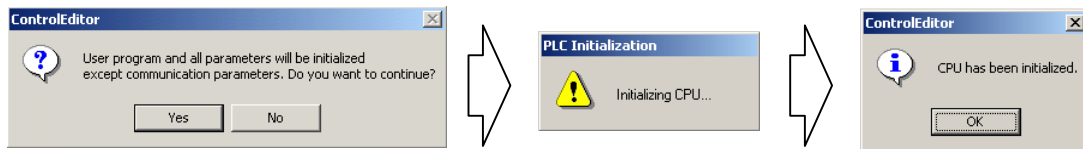
Fig. 5.3.1   CPU initialize

This operation initializes the user program, data memory (Internal output), and a part of parameters. Communication parameters are not initialized.

Table 5.3.1   Parameters not to be initialized

No.	Communication parameter
1	IP address
2	NTP
3	Serial communication setting
4	Ethernet communication setting (Task code)
5	Ethernet communication setting (ASR)
6	Modbus-TCP/RTU

(2) CPU Release occupation

The occupation status from other peripheral devices and host is released forcibly.

N o t e

- Since this operation releases occupation of CPU, the operating is interrupted owing to communication error if a program is being transferred from other Control Editor or the online change in RUN is being executed. Therefore, always make sure that CPU is not being accessed from other peripheral devices to execute the initialization.
- After CPU initialization after creating new project, the result from performance of PLC Verify is "unmatched". The reasons are that special internal output comments are registered in a new project but initialized CPU does not have comments (comments are initialized).

[About occupation]

In Hitachi Programmable controller, there is an occupation status in order to avoid the access to one CPU from peripherals (Control Editor) via network. The occupation has two types, READ occupation and WRITE occupation, and Control Editor automatically controls them.

READ occupation:

READ occupation enables use programs to be read, etc. and simultaneous occupation from up to 4 peripheral devices is allowed. However, it is a precondition that WRITE occupation has not been performed.

WRITE occupation:

WRITE occupation enables user programs to be written and enables the online change in RUN to be executed. Simultaneous occupation from one or more peripheral devices is not allowed. And it is precondition that READ occupation has not been performed at all.

5.4   Program Up/Downloading

(1) PLC Download

Created program is transferred to the CPU module.

Menu: [Online] - [PLC Transfer] - [Download (PC to PLC)]

Icon:

In Ver.2.40 or higher, data memory (internal output data) can be downloaded to CPU. It is useful for replacing CPU in the field for example.

● Execute the Build operation   when the Download in menu and icon are deactivated. Download function will be activated if the Build operation completes properly without error.

● If CPU type set in the I/O configuration window is different from CPU type connected actually, "PLC Download" operation cannot be executed.

EHV-CPU mode

Program
Transfer cannot be performed if this check box is cleared.

Status
Current status is indicated.

Comments
This checkbox is available only when the checkbox at program is enabled. If comments is disabled, comments will not be downloaded but downloading time is shorter.

CPU communication settings
IP address, serial port setting parameters and other communication parameters can be downloaded. Default setting is disabled since they can be set independent from program downloading.

Data memory
Data memory (data in internal outputs) can be downloaded. All data memory except retentive area will be reset when start running. Default setting is disabled.

Fig. 5.4.1   Download (PC to PLC) window (EHV-CPU mode)

MICRO-EHV mode

Program
   Transfer cannot be performed if this check box is cleared.

Status
   Current status is indicated.

Comments
   This checkbox is available only when the checkbox at program is enabled. If comments is disabled, comments will not be downloaded but downloading time is shorter.

CPU communication settings
   IP address, serial port setting parameters, option board parameters and other communication parameters can be downloaded. Default setting is disabled since they can be set independent from program downloading.

Data memory
   Data memory (data in internal outputs) can be downloaded. All data memory except retentive area will be reset when start running. Default setting is disabled.

Data logging parameters
   Each group's parameters can be updated individually.

Fig. 5.4.2   Download (PC to PLC) window (MICRO-EHV mode)

(2) PLC Upload

User programs in the CPU module are read from the CPU to the computer. Program, comment, etc. which are editing currently are lost. Please save them to the file beforehand if necessary.

Menu: [Online] - [PLC Transfer] - [Upload (PLC to PC)]

Icon:

In Ver.2.40 or higher, data memory (internal output data) can be uploaded from CPU. It is useful for replacing CPU in the field for example.
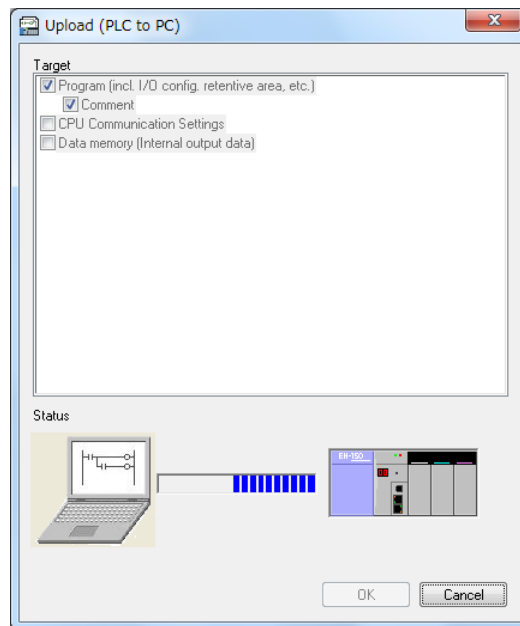
Fig. 5.4.3   Upload (PLC to PC) window (EHV-CPU mode)
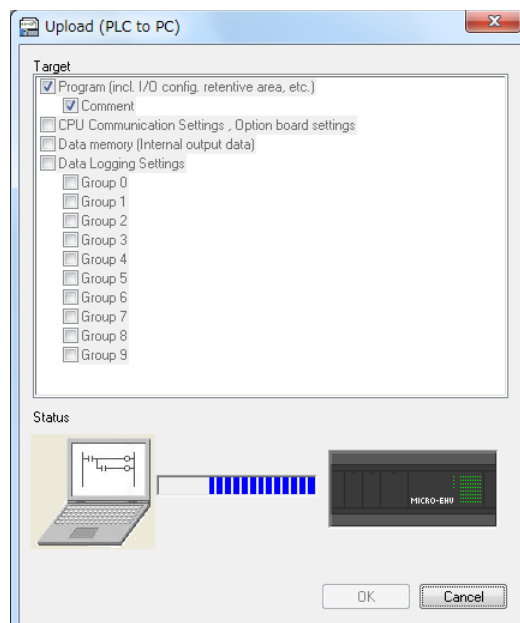
Fig. 5.4.4   Upload (PLC to PC) window (MICRO-EHV mode)

If the Upload is executed when both check boxes of Program and Comment are checked (default setting), the programs and comments currently displayed by Control Editor are removed and programs and comments in the CPU module are uploaded to the Control Editor. Even though the comment capacity you are editing is 50% and the comment capacity within the CPU is 10%, the comment capacity becomes 10% after uploading. (Comments are not combined.)

CPU communication settings and data memory remain since they are disabled.

Item
☑ Program (incl. I/O config. retentive area, etc.)
☑ Comment
☐ CPU Communication Settings
☐ Data memory (Internal output data)

Replaced

Programs you are editing	←	Programs in CPU
Comments you are editing	←	Comments in CPU
CPU Communication Settings		CPU Communication Settings in CPU
Data memory		Data memory in CPU

Remain
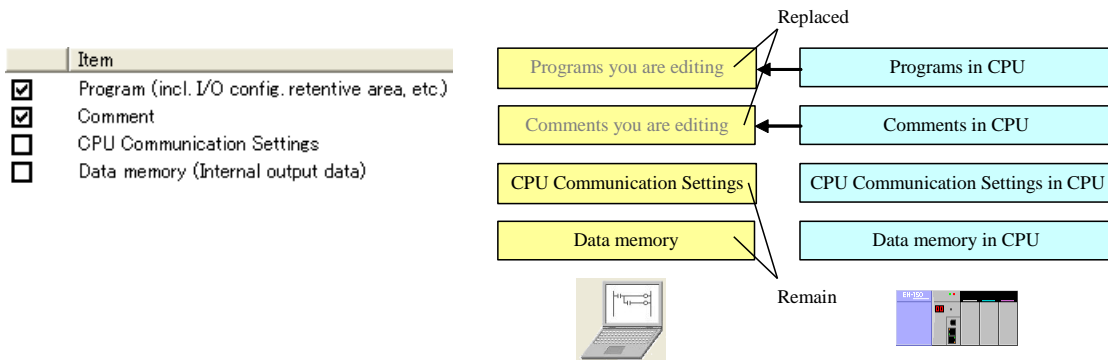
N o t e

Multi-Comment can not be uploaded from CPU by Ver.2.40 or higher which do not support Multi-Comment. If Multi-Comment is uploaded from CPU by Ver.2.40 or higher, warning occurs and comment can not be uploaded. If Multi-Comment would like to be uploaded from CPU, please use Ver.2.41 or higher which supports Multi-Comment.

If the Upload is executed after clearing the check box for Comment, comments you are editing remain.

Item
☑ Program (incl. I/O config. retentive area, etc.)
☐ Comment
☐ CPU Communication Settings
☐ Data memory (Internal output data)

Be sure to disable "comment" when comments of the project you are editing exceed 100%.

Replaced

Programs you are editing	←	Programs in CPU
Comments you are editing		Comments in CPU
CPU Communication Settings		CPU Communication Settings in CPU
Data memory		Data memory in CPU

Remain

Comments you are editing remain and are combined with uploaded program from CPU.

N o t e

If the capacity of comments you are editing exceeds 100% and attempting CPU upload, be sure to disable the check box of Comment.

If the check box of Comment is disabled, only program is replaced and comments remain. If the check box of all items are enabled, all items will be replaced by uploaded program, comments, CPU communication settings and data memory information.

	Item
☑	Program (incl. I/O config. retentive area, etc.)
☑	Comment
☑	CPU Communication Settings
☑	Data memory (Internal output data)

Removed

Programs you are editing	→	Programs in CPU
Comments you are editing	→	Comments in CPU
CPU Communication Settings	→	CPU Communication Settings in CPU
Data memory	→	Data memory in CPU
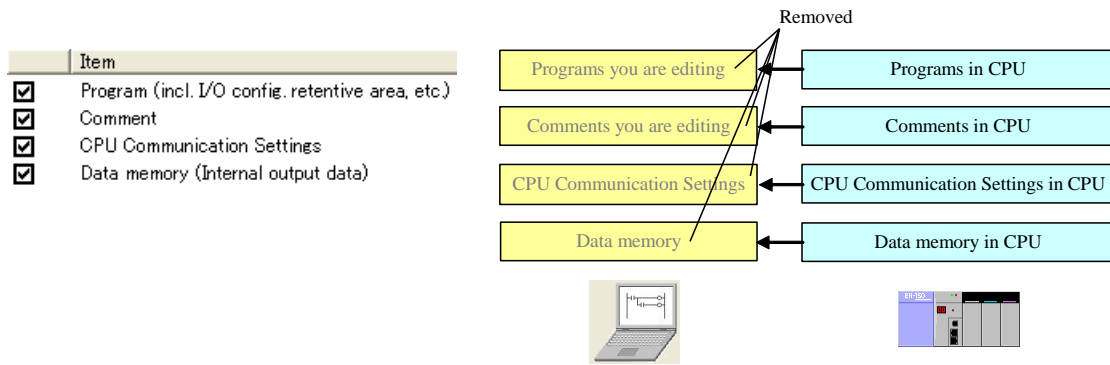
Note

- When opening the big file, it takes some time to display. (several seconds to dozens seconds)

- If CPU communication setting box is marked, CPU communication parameters, such as IP address, serial port setting, ASR setting, etc., are up/downloaded from/to CPU together with ladder program.

(3) PLC Verify

Program and Comment within the CPU modules and same ones opened by Control Editor are compared.

Menu: [Online] - [PLC Transfer] - [Verify With PLC]

Icon:

In Ver.2.40 or higher, data memory (internal output data) can be verified with CPU. It is useful for replacing CPU in the field for example.
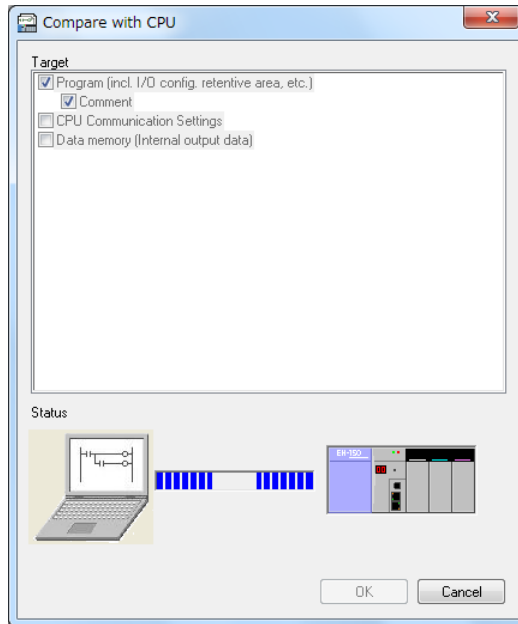
Fig. 5.4.5   Compare with CPU window (EHV-CPU mode)
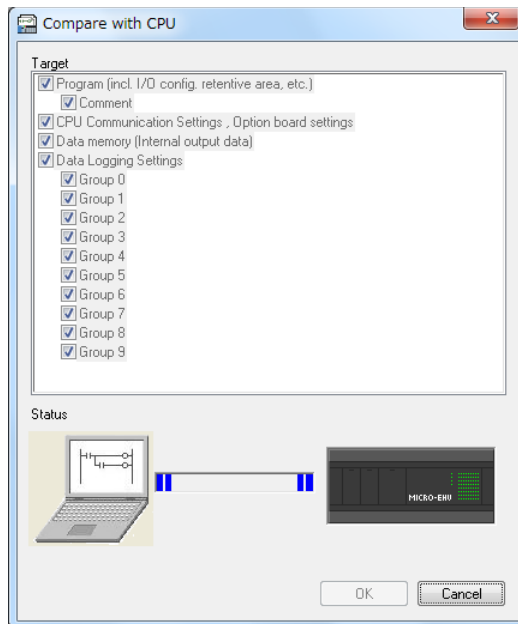
Fig. 5.4.6   Compare with CPU window (MICRO-EHV mode)

Match

```
---------------- PLC Transfer : PLC Verify ----------------
Program and parameters  successfully matched
Comment successfully matched
CPU communication settings successfully matched
Data memory successfully matched
----------------Project1 PLC Transfer : Finished Verify program
```

Mismatch

```
---------------- PLC Transfer : PLC Verify ----------------
Program1,2,3unmatched
I/O assignment unmatched
Retentive area unmatched
Operation parameters unmatched
Link Parameters unmatched
FL-net parameters unmatched
M1 comments unmatched
CPU communication settings - IP settings unmatched
Data memory mismatched 1
The result of data mismatching has been saved in C:¥Program Files¥Control Editor¥verified.txt.
----------------Project1 PLC Transfer : Finished Verify program
```

If mismatched values are found, the result will be saved as a text file. The result windows shows verifying result, the number of mismatched data and path of saved file as above. Text file format is shown below.

```
I/O Address        PC        PLC        IO Comment
WM0                H0000     H0001      Comment
```

| I/O address of mismatched data | Value in Control Editor | Value in PLC data memory | I/O comment in Control Editor |

Program mismatch
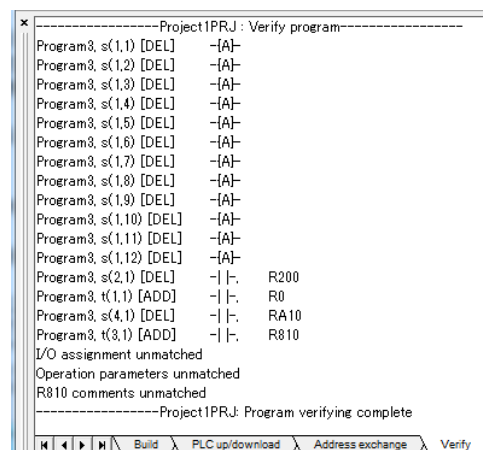
The algorithm of verification has been improved since Ver.4.10 so that only unmatched circuits are displayed.

In case program is mismatched, the result shows operations for source program to create target program in PLC.

<u>Displayed format</u>

[Sheet name], [Location], [Operation], [Symbol], [I/O]

Item	Description
Sheet name	Sheet name containing mismatched symbol
Location	Location of mismatched symbol (line, column). "s" and "t" mean as follows. s : source (program in Control Editor) t : target (program in PLC)
Operation	ADD : Adding the symbol in the target program to source program DEL : Deleting the symbol in the source program
Symbol	Ladder symbols (listed as below)
I/O	I/O address in case of contact or coil

<u>Symbols</u>

Name	Symbol	Name	Symbol
Blank	blank	MCR	-(R)|-|
Vertical line	-	EUC	-(EU)-|
A contact	-| |-	EDO	-(ED)-|
B contact	-|/|-	Timer coil	-(T)-|
DIF contact	-|EU|-	Counter coil	-(C)-|
DFN contact	-|ED|-	Comparison box	-{ }-
NOT	-/-	Processing box	-[ ]-|
Coil	-( )-|	EU processing box	-[EU]-|
Set coil	-(S)-|	ED processing box	-[ED]-|
Reset coil	-(R)-|	Circuit comment box	-{A}-
MCS	-(S)|-|	Loop back	-(*)-|

Source (Control Editor)
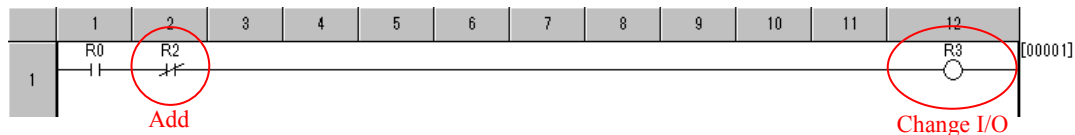
Target (PLC)
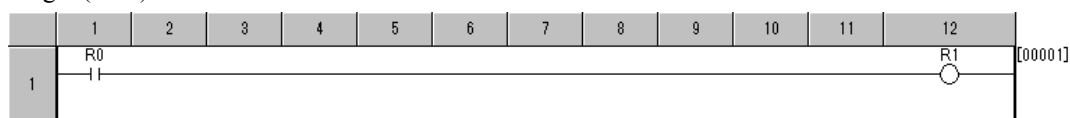
Result
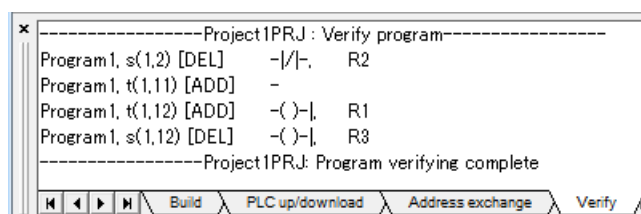
Fig. 5.4.7   Example of verification

If displayed operations are applied to source program, then the same program can be created as target program.

N o t e

All groups of Multi-Comment can not be verified by PLC Verify. Only active comment group is verified. If it verify CPU with Multi-Comment by Ver.2.40 or higher, all comments are unmatched, because Multi-Comment can not be uploaded from CPU.

5.5   Online change in RUN

Modifying part of user program while CPU is running is called the "Online change in RUN". The "Online change in RUN" operation can modify the user program while the status of output and data memory can be retained.

(1) Procedure of Online change in RUN

The mode must be changed to the On-direct mode to execute the Online change in RUN. Unless a program which is being edited and a program stored in the CPU are matched, changing to the On-direct mode is not allowed. If programs are not matched, you cannot change the mode to the On-direct. Therefore, execute the mode change again after making programs match, by reading the program from the CPU, etc.

Menu: [Online] - [Mode] - [On-direct]

Icon:

In the On-direct mode, if the circuit is changed and then the Build operation is executed, the changed program will be transferred to the CPU module at that time. A flow for the Online change in RUN is shown below.
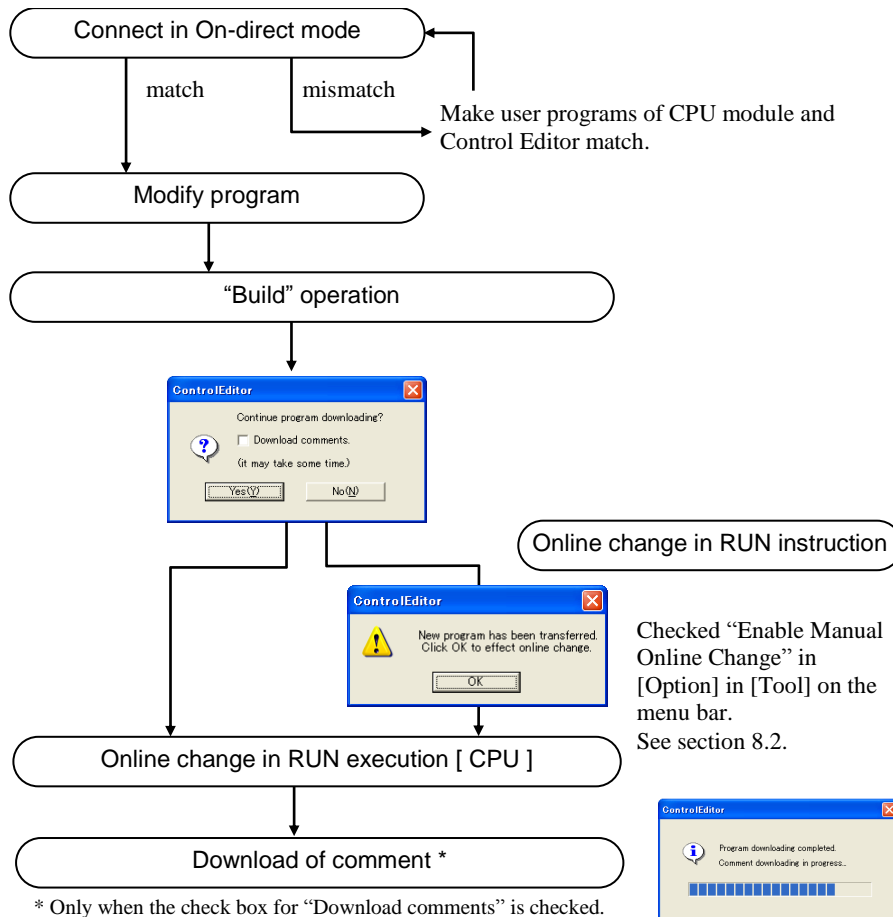
Fig. 5.5.1   Flow for Online change in RUN

Furthermore, the circuit after "Build" operation is transferred to the CPU module under connection in On-direct mode even if CPU module stops.

(2) Online change in RUN of Comments

Comment can be transferred to the CPU with programs simultaneously by the Online change in RUN from Control Editor Ver.2.11. (however, CPU version Hx114 or later is required for EHV-CPU series.) Therefore, the messages to verity are changed.
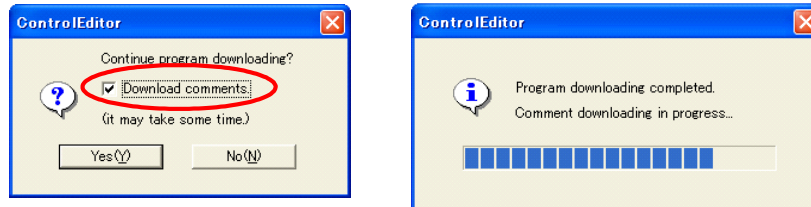
Fig. 5.5.2   Message and dialogs in Online change in RUN

Check the check box for "Download comments" on the left dialog in fig.5.5.2 when you want to transfer comments after changing the program. The right dialog is displayed when the comment is being transferred. CPU continues the operation when comments are being transferred because the program change has been already completed.

All of I/O comments, box comments, and circuit comments are transferred at a time. It is not necessary to always check the check box to transfer comments. However, Control Editor does not have a function to transfer only comment. If you want to transfer comments, execute the Online change in RUN after changing a part of program to the edited state. The program can be changed to the edited state by clicking [OK] button without changing the program after double-clicking any symbol in the program.

N o t e

(1) Control Editor compares programs at the time of connecting in the On-direct and at the time of performing the Circuit monitor. If programs in the CPU and program on Control Editor are matched, two actions are performed but comments are not compared at this time. Therefore, attention is required because comments are also overwritten by the online change in RUN even if comments are not matched. The PLC Verify function compares comments also. Upload only program at the PLC upload execution(clear the check box for Comment) when it is uncertain that the comments in CPU is latest.

(2) When the CPU version is Hx111 or older on EHV-CPU series, the on-direct connection and online change in RUN are not executed if the following steps are carried out.

1] CPU initialization → 2] PLC Upload → 3] On-direct connection

The above steps are not performed in general. However, execute the Build operation and PLC Download operation between step 2] and 3] if necessary, and then connect in on-direct mode after transferring a blank program to the CPU.

(3) Comment capacity excess at the time of online change in RUN

When the comment exceeds the capacity at the time of online change in RUN in the on-direct mode, the action depends on whether the check box for Download comments is checked or not.

1] The check box for Download comments are not checked (Comments are not transferred)
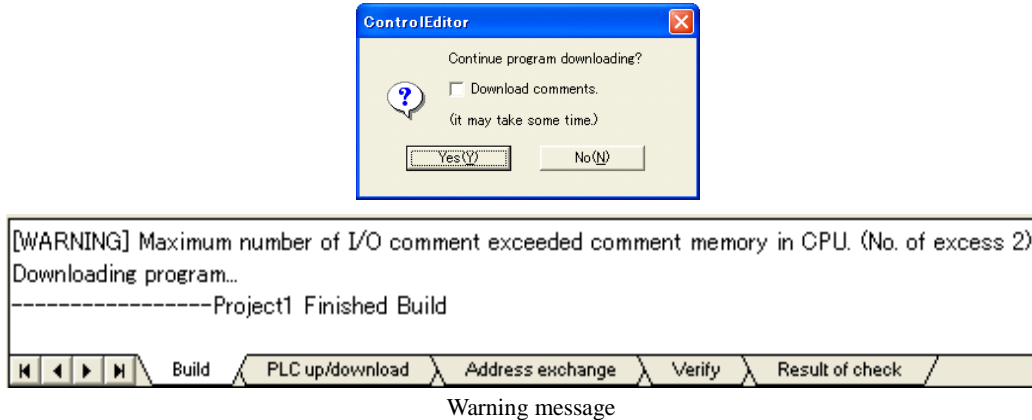
Warning message

 ←Comment capacity display on the status bar (red)

Fig. 5.5.3   Online change in RUN at comment excess (1)

Since the comment is not transferred to the CPU even if the comment exceeds the capacity, the warning message is displayed but the dialog appeared and the online change in RUN is enabled.

2] The check box for Download comments is checked (Comments are transferred)

Warning message
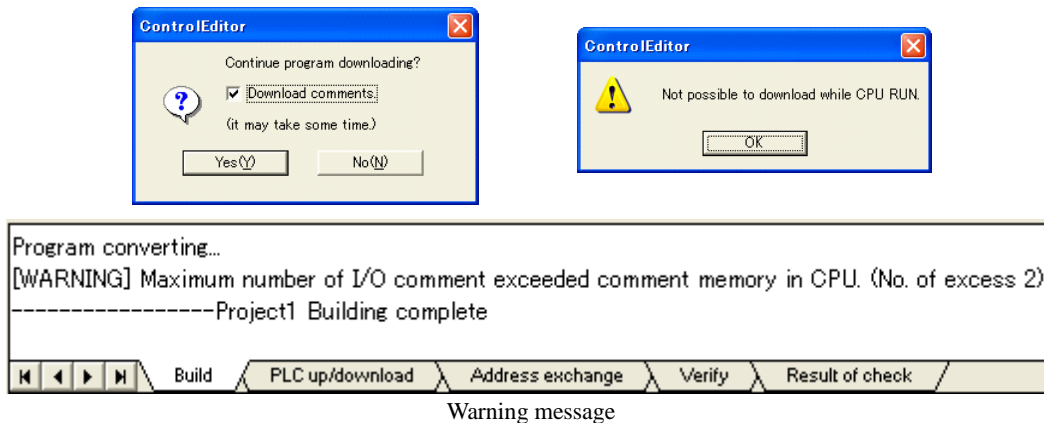
 ←Comment capacity display on the status bar (gray)

Fig. 5.5.4   Online change in RUN at comment excess (2)

Since comments cannot be transferred when the comment has exceeded the capacity, program also cannot be transferred. The message dialog appears and the online change in RUN processing stops. Note that the displayed area for comment capacity on the status bar at the bottom of window is not changed from gray at this time.

(4) Conditions that Online change in RUN cannot be executed

In the following cases, Online change in RUN cannot be executed. Operate after conditions are met.

Table 5.5.1   Conditions that Online change in Run cannot be executed

No.	Conditions	Concrete cases	How to meet conditions
1	READ occupation is performed.	Other programming tool etc. is connected.	Set other programming tool to Offline mode.
2		Monitor is performed connecting PC, touch panel, etc.	Set PC and touch panel to Off line mode. *
3	END command is not executed.	Program of limitless loop is running.	Modify the program not so as to be limitless loop.

* Hi-Protocol which is communication protocol of EHV-CPU has a command which needs occupation and a command which does not need occupation even if those are same requests. When executing Monitor and Set/Reset by the command which does not need occupation, there is not need to set to Offline mode.

(5) HALT time

If Online change in RUN is executed, the scan stops for only a few time in changing the program. This scan stop time is called HALT time.

[EHV-CPU series]

HALT time is 100μs or less except Online change in RUN including the following conditions.

■ Time base change of Timer

It is extended 6 ms regardless of the number of points of timer that is changed.

■ Addition / Delete of edge command

It is extended 1μs in proportion to the number of edge commands including in the target circuit of Online change in RUN.

Edge commands: DIF, DFN, Edge coil, and Edge processing box

[MICRO-EHV series]

HALT time is calculated by the following formula except Online change in RUN including the following conditions.

MVH   (HALT time [ms]) = (program capacity [k step]) $\times$ 2.25 + 1.2 [ms]

MVL   (HALT time [ms]) = (program capacity [k step]) $\times$ 2.30 + 1.2 [ms]

■ The number of points of Timer

It is extended 0.25 μs in proportion to the number of points of timer that is used in the program.

■ Addition / Delete of edge command

It is extended 100 μs regardless of the number of edge commands including in the target circuit of Online change in RUN.

Edge commands: DIF, DFN, Edge coil, and Edge processing box

(6) Online change in RUN of control command

EHV-CPU and MICRO-EHV can execute "Online change in RUN" operation for control command. However, the program in which grammar error occurs cannot execute "Online change in RUN" operation in Control Editor.

Table 5.5.2   Grammar error factor of control command

Command	Grammar error factor
END	There are two END commands. The start condition is put in END command.
CEND (s)	CEND (s) is behind END command.
JMP n / CJMP n	There is no corresponding LBL n. Tries to jump to other program area.
LBL	LBL is duplex definition.
FOR n (s) / NEXT	FOR is duplex definition. NEXT is not defined. Nesting-over between FOR and NEXT. FOR and NEXT are not in the same area.
CAL / SB n / RTS	SB is not defined. Nesting-over. SB is duplex definition. RTS is not defined. SB and RTS are not in the same area. The start condition is attached to RTS.
INT (s) / RTI	INT is not defined. The same cycle time is defined twice. RTI is not defined. INT and RTI are not in the same area. The start condition is attached to RTI.
XINT (s) / XRTI	XINT is not defined. The same cycle time is defined twice. XRTI is not defined. XINT and XRTI are not in the same area. The start condition is attached to XRTI.
CINTP (s) / CRTIP	CINTP is not defined. The same cycle time is defined twice. CRTIP is not defined. CINTP and CRTIP are not in the same area. The start condition is attached to CRTIP.
CINTN (s) / CRTIN	CINTN is not defined. The same cycle time is defined twice. CRTIN is not defined. CINTN and CRTIN are not in the same area. The start condition is attached to CRTIN.

(7) Online change in RUN including cyclic scan

When executing "Online change in RUN" operation including cyclic scan, the cyclic scan is skipped once if the start timing of Online change in RUN and the cyclic scan are same time. (This is only when the timing is same time.)
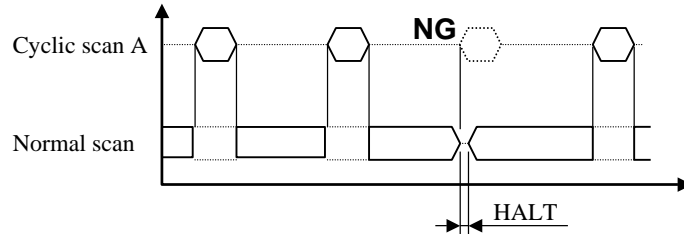
Fig. 5.5.5   Online change in RUN of program including cyclic scan

Reference

EHV-CPU and MICRO-EHV can change the cycle time of the cyclic scan and add / delete the cyclic scan in Online change in RUN. The cycle change and added cyclic scan start counting the cycle after Online change in RUN is completed.
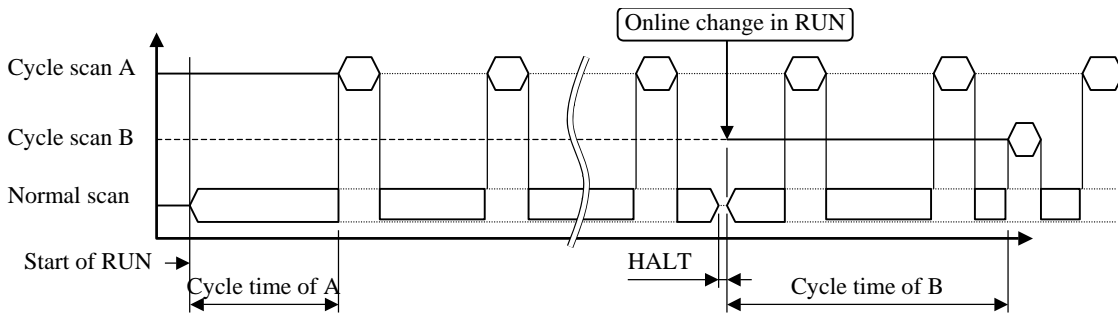
Fig. 5.5.6   Online change in RUN for adding cyclic scan (1)

When adding the cyclic scan in Online change in RUN, motion may be changed a little, compared with a case programmed first.

For example, adds the cyclic scan B (cycle time: 2ms, processing time: 2ms) to the program which has the cyclic scan A (cycle time: 5ms, processing time: 1ms). If the cyclic scan B is added 9ms later after starting the cyclic scan A in Online change in RUN, the cyclic scan A will start while the cyclic scan B is running. Therefore, the cyclic scan B always becomes a cycle such as start, suspension and restart. (start➔suspension➔restart)

And if the cyclic scans A and B are input in the program first, A and B will try to start simultaneously, but the cyclic scan A will start before the cyclic scan B because the cyclic scan A has priority over B.
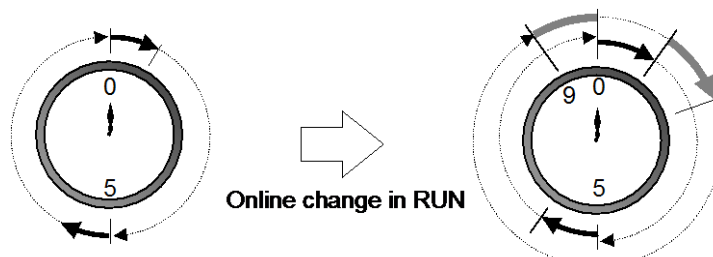
Fig. 5.5.7   Online change in RUN for adding cyclic scan (2)

(8) Items that Online change in RUN does not enable to be changed

Online change in RUN does not enable the following items to be changed.

Table 5.5.3   Items that Online change in RUN does not enable to be changed

No.	Classification	Items
1	Parameter Settings	I/O Configurations (including Special I/O settings)
2		Link parameters
3		FL-net parameters
4	Project information	Change of project name (*1)
5		Change of program name (*1)
6		Addition of sheet
7		Delete of sheet

*1 In Ver.5.00 or higher, "Online change in RUN" operation for project name and program name can be executed.

(9) Timing of Online change in RUN by user

User can set the timing of Online change in RUN by checking the box of [Enable Manual Online Change] in the Options window which appears by choosing [Options] in [Tool] on the menu bar. Refer to section 8.2.

N o t e

(1) If communication error occurs in operating Online change in RUN, the changed program information is not transferred to CPU properly. In this case, CPU cancels the Online change in RUN and restores to the program before the Online change in RUN, after that, CPU continues the operation. Therefore, although Control Editor displays the normal end of Online change in RUN , the Online change in RUN cannot be executed after that because programs in CPU and Control Editor are not matched. In this case, upload the program from CPU to PC after setting to Online mode.

(2) If the circuit deletion and the circuit addition are performed by one Online change in RUN when program memory is almost full, the Online change in RUN may not be able to be executed and the following message is displayed even if the final program size is within memory capacity. In this case, execute the Online change in RUN for circuit deletion first and execute the Online change in RUN for circuit addition.

```
Program converting...
[ERROR] Program size (24 steps) exceeded. If circuits are both added and deleted at once or circuits are moved, please delete circuits at first, and then add.
----------------Project1 Building complete
```
| H | ◄ | ► | H | Build | PLC up/download | Address exchange | Verify | Result of check |
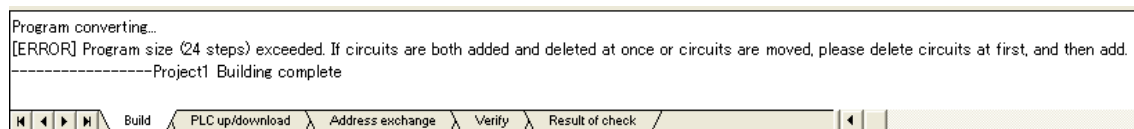
(3) The number is unnecessary to DIF and DFN, but they are controlled by the number inside. When adding or deleting DIF and DFN in Online change in RUN, they are numbered inside automatically. But the connection is returned to Online mode or Off-line mode after Online change in RUN, and then if the Build operation is executed, DIF and DFN are re-numbered from the circuit No.1 in order. Therefore, it cannot connect in On-direct mode because of program mismatch. In this case, download the program to PLC again after CPU is stopped or upload the running program from CPU, and connect in On-direct mode.

MEMO

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Chapter 6   Monitor

This section explains each monitor functions in Online mode.

6.1   I/O Monitor

You can monitor I/Os in the CPU module in online mode or on-direct mode.

Menu: [View] - [Add I/O Monitor Sheet]

Project tree: Monitor ── I/O monitor sheet n

I/O monitor sheet shown in Fig.6.1.1 appears by double-clicking the "I/O monitor sheet1" at the bottom of project tree. Monitoring starts automatically. (Ver.4.06 or higher.)
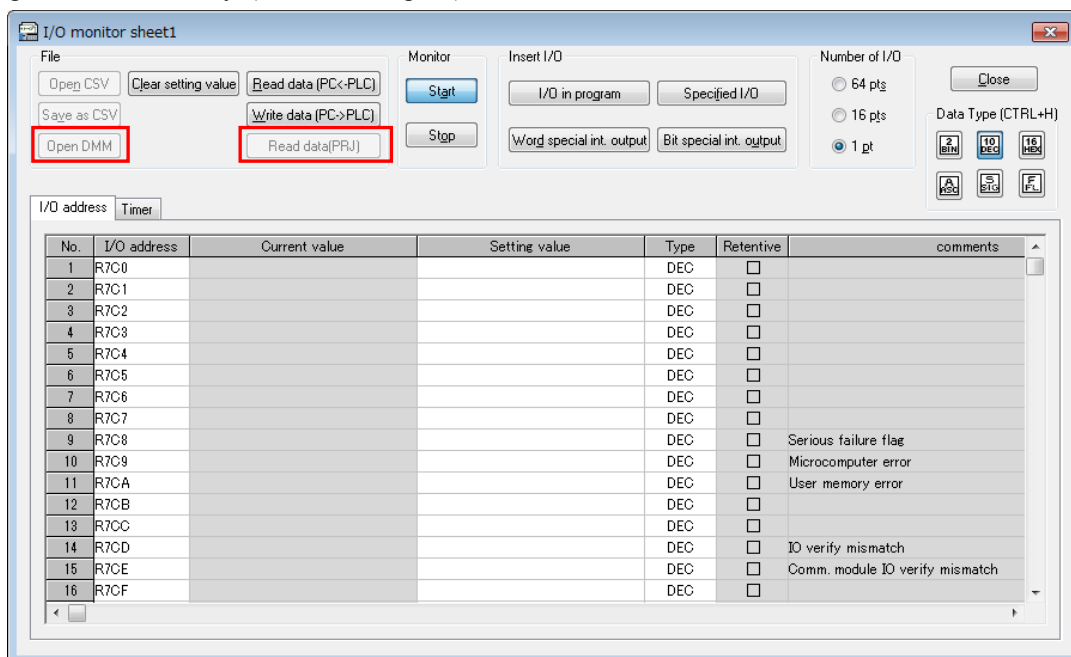
Fig. 6.1.1   I/O monitor patter sheet

(1) Meaning of each button

Open CSV: A file saved as CSV format by CSV save function is opened on a monitor sheet. When a CSV file is opened onto a monitor sheet which includes already I/Os, I/Os in the file are not added to existing I/Os. Only I/Os in the file are displayed.

Save as CSV: I/O monitor information in the sheet is saves to the CSV format

Open DMM: Open the data memory file (*.dmm) saved by LADDER EDITOR on the monitor pattern sheet. Opening a data memory file (*.dmm) with I/O already on the sheet does not add the file I/O to the existing I/O but only the file I/O is displayed So please be careful.
                 (Ver.6.00 or higher)

N o t e

When data saved by the CSV save function is opened by the [Open CSV], data which is read into the Setting value field can be selected. If [Current value] is selected, data which was the current data in saving can be read as the setting value. This is a useful function for CPU replacing. If [Setting value] is selected, data which was the setting value in saving is read into the Setting value field again.
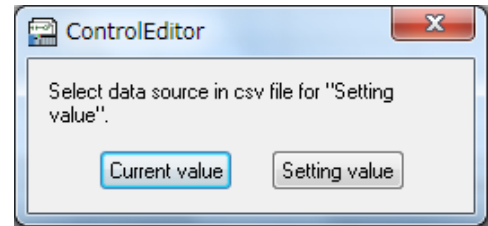
Fig. 6.1.2   Select data for setting value

Clear setting value:	All values in setting values are cleared.
Read data (PC ← PLC):	Current data of all I/Os in I/O monitor sheet is retrieved from CPU only once. (Only displayed data is retrieved with the monitoring normally.) While data is being read, Fig 6.1.3 is displayed.
Write data (PC → PLC):	All values in "Setting data" field are written to CPU.
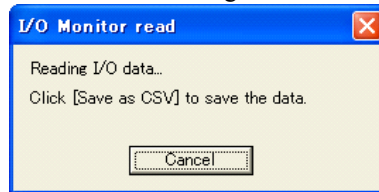
Fig. 6.1.3   Data reading
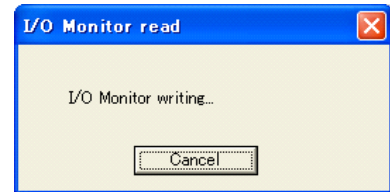
Fig. 6.1.4   Data writing

Read data (PRJ):	Read the value of the internal output I/O registered on the I/O monitor pattern sheet from the data memory information saved in the project file (*.prj, *.prjh, *.prjx) and display it. The value of the external input / output I/O is not updated. (Ver.6.00 or higher)
Start:	I/O monitoring is started. Only displayed I/Os in the window are updated. If all I/O data in the sheet are retrieved, use the [Read data (PC<-PLC)].
Stop:	I/O monitoring is stopped.
I/O in program:	All I/Os used in the program are added in I/O monitor sheet.
Specified I/O:	I/Os of specified range are added in I/O monitor sheet.
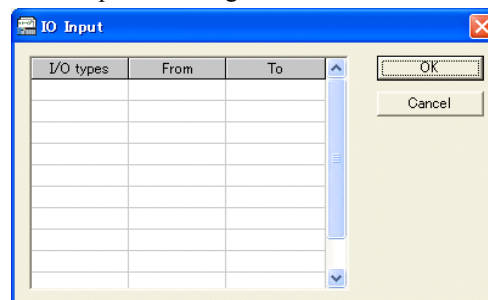
Fig. 6.1.5   Specified I/O

Word special int. output:	Word special internal output (WRF000-WRFFFF) are added in I/O monitor sheet.
Bit special int. output:	Bit special internal output (R7C0-RFFF) are added in I/O monitor sheet.

> **N o t e**
>
> - The maximum number of I/O is 65,534 per sheet. (WR is from WR0 to WRFFFD)
>
> - Several I/O monitor sheets can be registered and opened, but only one sheet can be monitored at once.
>
> - Opening multiple I/O monitor pattern sheets and switching inactive sheets to active state will not update monitor values. In this case, please press the [Start] button of the sheet switched to the active state. The monitor value is updated. In addition, the monitor which was being monitored until then is in the monitor stop state.

(2) Number of I/O

Enter I/Os you want to monitor in a monitor sheet because any I/O has not been registered in an initial I/O monitor sheet. If the [Enter] key is pressed after any I/O address is entered into the I/O address field, continuous 16 of I/O addresses which begin from the entered I/O address are inputted. You can choose the number of I/O from 64 points, 15 points and 1 point. When you want to add all I/O used in the program and add much more range I/O, use the [I/O in program] and [Specified I/O] buttons.
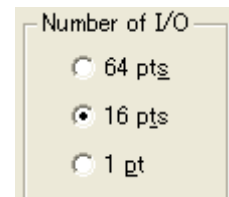
Fig. 6.1.6   Number of I/O

(3) Data type BIN/DEC/HEX/ASC/SIG/FL

Data format (binary/decimal/hexadecimal/ASCII/signal/fl (floating point)) can be switched by icons in the "Data Type". And you can change the data format of each I/O from the drop-down list by clicking the "Type" field as shown in Fig. 6.1.7. Selection by icon can switch all the I/Os at once, and selection from list can switch individual I/O.
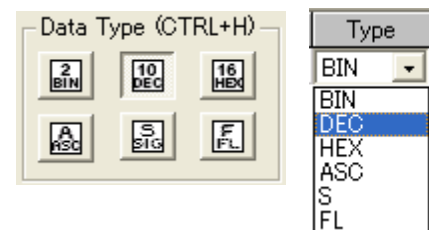
Fig. 6.1.7   Data type

(4) Retentive area

When I/Os which are specified to the retentive area are added, the check box of the retentive area is checked as Fig.6.1.8. However, even if the retentive area is changed after creating the I/O monitor sheet, that change is not reflected to the I/O monitor sheet. In addition, retentive information for double word data is not reflected in I/O monitor sheet because one double word can consist of retentive word and non-retentive word.
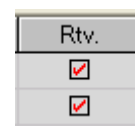
Fig. 6.1.8   Retentive area

(5) Create new I/O monitor sheet

New project has one I/O monitor sheet. If more I/O sheets are necessary, add the sheet by clicking right mouse on "Monitor" in the project tree as shown in Fig. 6.1.9 or choosing the [Add I/O monitor sheet] in the [View] menu on the menu bar. A maximum of 16 sheets can be created.

(6) I/O deletion

Selected range can be deleted by the [Delete] key. The range can be specified by clicking while holding down the [Shift] key.

N o t e

- Current Control Editor does not support Variable Name function.

- Ver.4.20 or higher, the "Variable Name" tab is not displayed.
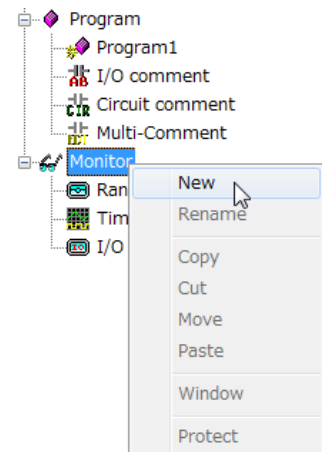
Fig. 6.1.9　Create new I/O monitor sheet

6.2   Set and Reset

Specified value can be set to the specified I/O. This is available in both RUN and STOP state of the CPU module.

Menu:　　　　　[Online] - [Set/Reset]

Icon:

(1) Set/Reset of Bit

I/O:　　　　　　Enter I/O address. I/O address can be increased and decreased using buttons to the right of the input box.

Current value:　The current value of the specified I/O is displayed.

ON:　　　　　　1 is written to the specified I/O.

OFF:　　　　　0 is written to the specified I/O.

ON/OFF:　　　1 is written if the specified I/O is 0 and 0 is written if it is 1.

Set/Reset log:　The history of performance result is displayed. Double-click enables re-performance.

[Supported I/O]

- EHV-CPU series

    X, Y, R, M, L, EX, EY, WRx.x, and WNx.x

- MICRO-EHV series

    X, Y, R, M, WRx.x
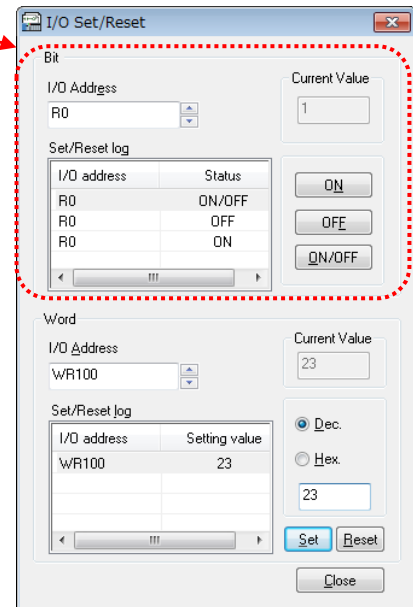
Fig. 6.2.1   I/O Set/Reset window(Bit)

It is possible to write 1 or 0 by right mouse clicking and choosing ON/OFF at a contact when online or on-direct mode. (Ver.4.06 or higher)

Choose ON/OFF

Confirmation dialog can be disabled in option settings (Refer to 8-21).
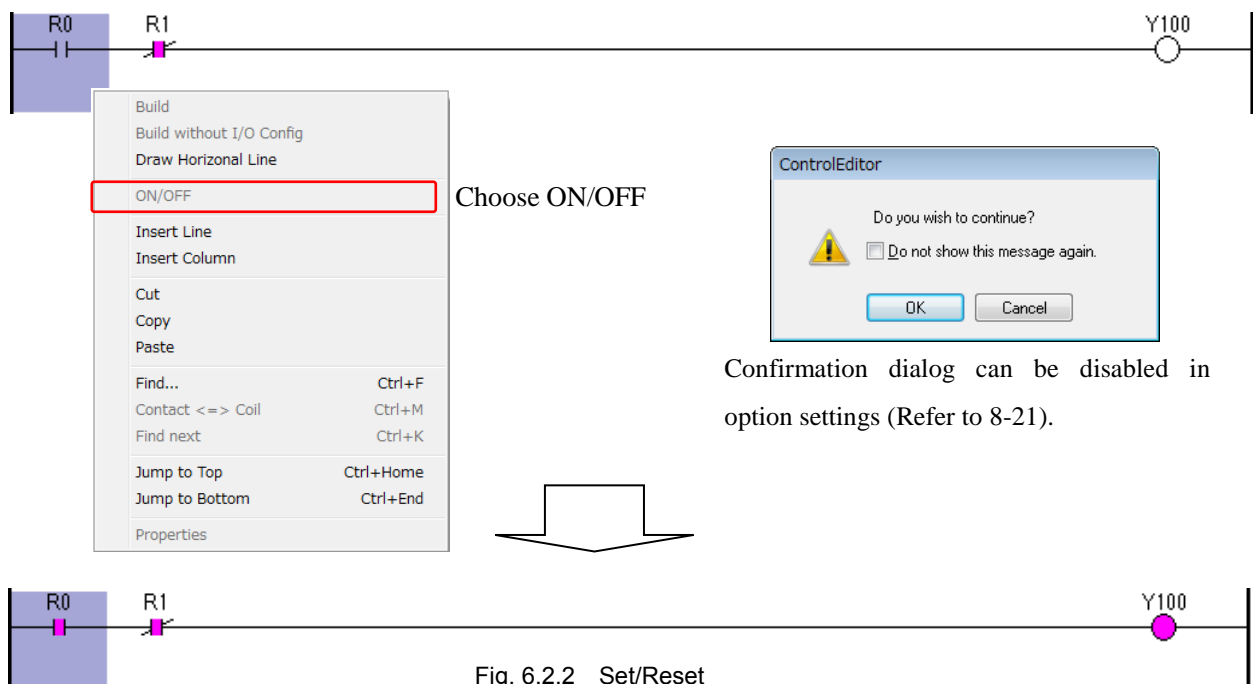
Fig. 6.2.2   Set/Reset

(2) Set/Reset of Word

I/O:　　　　　　Enter I/O address. I/O address can be increased and decreased using buttons to the right of the input box.

Current value:　The current value of the specified I/O is displayed.

Dec./Hex:　　　Select either.

Setting Value:　Enter setting value. (It is unnecessary to add a prefix "H" to a hexadecimal number)

Set:　　　　　　The value in the input box is written to the specified I/O.

Reset:　　　　　0 is written to the specified I/O.
　　　　　　　　　 (The input box is also cleared.)

Set/Reset log:　The history of performance result is displayed.
　　　　　　　　　 Double-click enables re-performance.

[Supported I/O]

- EHV-CPU series

　 WX, WY, WR, WM, WN, WL, WEX, WEY, TC, DX, DY, DR, DM, DN, DL, DEX, and DEY

- MICRO-EHV series

　 WX, WY, WR, WM, TC, DX, DY, DR, DM

Fig. 6.2.3　　I/O Set/Reset window(Word)

N o t e

(1) Since X, WX, and DX are refreshed (updated) by the CPU, the value is overwritten by the CPU even if the value is set.

(2) Current Control Editor does not support Variable Name.

6.3   Force Output

Specified value is written to the specified external output. This is useful function for the wiring check, etc.

Menu: [Online] - [Force Output]

Icon:
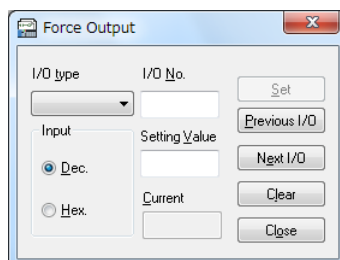
Fig. 6.3.1   Force Output

I/O type: Chose one of Y, WY, and DY.

I/O No.:   Enter I/O address. If specified I/O does not have configuration information, this function is not executed. Therefore, always execute this function after transferring a program in which I/O is assigned.

Setting Value: Enter setting value.

Input: Select either Dec. or Hex. if I/O address is WY or DY.

Current: Current value of the specified I/O is displayed.

Set: Setting value is written to the specified I/O of CPU. All output except the specified I/O is automatically cleared to 0.

Precious I/O: I/O address is decremented.

Next I/O: I/O address is incremented.

Clear: I/O address and the setting value are cleared. The CPU module which is being output is not affected.

Close: Close the Force Output window.

Table 6.3.1   Difference between force output and Set/Reset

Classification	Set / Reset	Force Output
Usable I/O type	All I/O (including Timer)	Y, WY, and DY
CPU operation status	RUN and STOP	Stop
Function	Changes data memory of CPU to the specified value.	Only one specified external output (1 point or 1 data) is set to ON/OFF or data output. Other external outputs are all OFF.
Usage	Set and change of retentive area data, Check at debug	Wiring check of external output.

6.4   Force Input

Specified value is written to the specified input (X, EX, WX, WEX, DX, DEX). The value of specified input can be forcibly fixed regardless of actual input or CPU state (RUN/STOP).

Menu: [Online] - [Force input]
Icon:

(1) Force Input

1] Force Input of Bit

I/O Address: Enter I/O address. I/O address can be increased and decreased using buttons to the right of the input box.

Current Value: The current value of the specified I/O is displayed.

ON: "1" is written to the specified input. And the message window for force input (Fig. 6.4.2) is displayed.

OFF: "0" is written to the specified input. And the message window for force input (Fig. 6.4.2) is displayed.
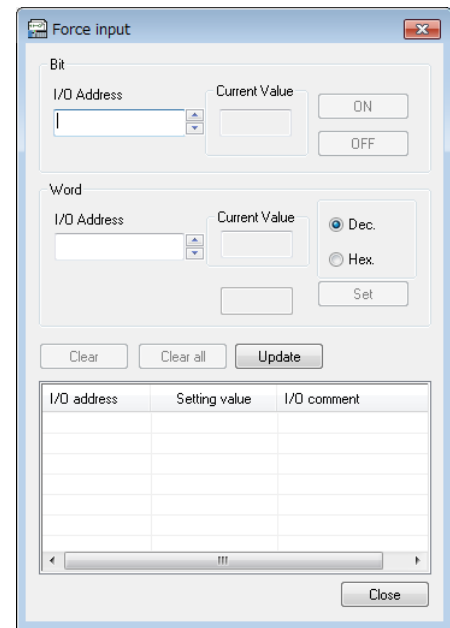
Fig. 6.4.1   Force input window

2] Force Input of Word

I/O Address: Enter I/O address. I/O address can be increased and decreased using buttons to the right of the input box.

Current Value: The current value of the specified I/O is displayed.

Dec. / Hex.:   Select either. According to the selection, the display of the current value, the setting value and the value in the input box is changed.

Setting Value: Enter setting value. (It is unnecessary to add a prefix "H" to a hexadecimal number)

Set: The value in the input box is written to the specified input. And the message window for force input (Fig. 6.4.2) is displayed.
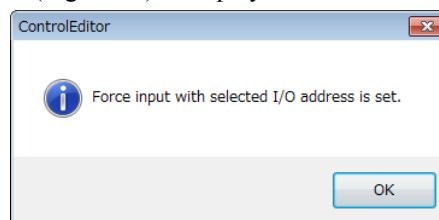
Fig. 6.4.2   Message window for setting force input

3] I/O Address List

I/O Address List: I/O address, setting value and I/O comments, which are set this function, is displayed.
                   When the I/O address which is already registered in the list is set this function, the I/O
                   address is not added to the list and only the setting value is changed.

Clear: Message dialog for removing force input of selected I/O address is displayed (Fig. 6.4.3).
                   When clicking [Yes] with the mouse, the setting is removed and the display of the I/O
                   address is cleared from the list.

Clear all: Message dialog for removing force input of all I/O address registered in the list is
                   displayed (Fig. 6.4.4). When clicking [Yes] with the mouse, the setting is removed and
                   the display of the I/O address is cleared from the list.

Update: I/O address, setting value and I/O comments, which are set this function in CPU, is
                   registered in the list.

Reference

When two or more Control Editor are connected one CPU module, each Control Editor can display the I/O address set by itself but cannot display that set by other Control Editor. In order to display them, click [Update] with the mouse or open the force input window again after closing it.

ControlEditor		ControlEditor	
? Do you want to remove force input with selected I/O address?		? Do you want to remove force input of all I/O addresses which are set?	
	Yes No		Yes No
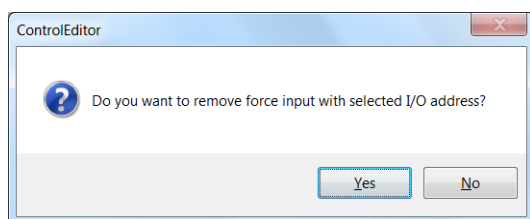
Fig. 6.4.3   Message dialog for removing force input   Fig. 6.4.4   Message dialog for removing all force input
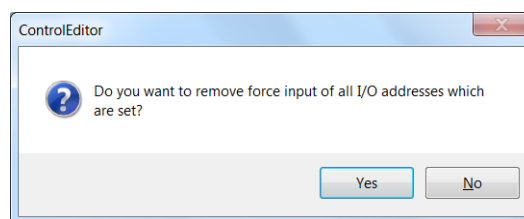
(2) CPU Log

Starting forcing input and stopping forcing input are stored in the CPU module as operation histories. Adding the I/O address which is set this function and changing setting value are not stored.

No.	Hour	Log
10	2000.01.01 11:10 53	Start forcing input
9	2000.01.01 11:10 48	Stop forcing input
8	2000.01.01 11:10 31	Start forcing input
7	2000.01.01 11:10 11	Stop forcing input
6	2000.01.01 10:33 14	Start forcing input
5	2000.01.01 09:02 32	Comment transfer
4	2000.01.01 09:02 32	Program transfer
3	2000.01.01 09:00 00	[71] Battery error
2	2000.01.01 09:00 00	[76] Retentive area undefined status

Save   Update   Close

Fig. 6.4.5   CPU Log window

Start forcing input: Indicates setting this function when no input is forced.
Stop forcing input: Indicates removing this function for all input.

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(3) CPU Status

The connected CPU state which is forcing input or not is displayed on the CPU status window and the status bar. Refer to section 6.8 for more information about the CPU status window. And refer to section 2.3 for more information about the status bar.

Display on the CPU status window
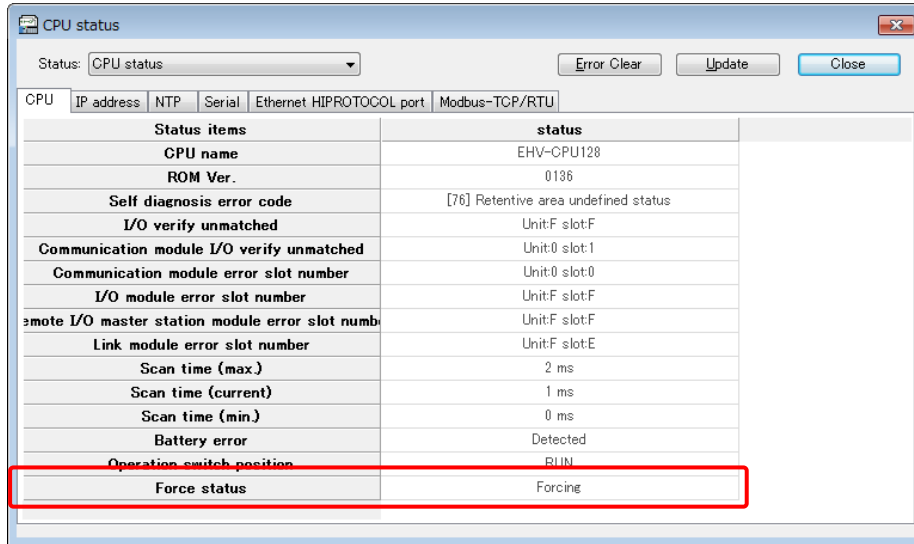
Fig. 6.4.7　CPU status window(Ver.6.02 or higher)

Forcing　　　　:Forcing
Force Stopped :-----

Display on the status bar
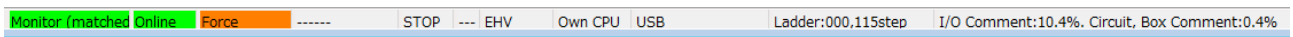
Fig. 6.4.8　Status bar

Forcing　　　　:Force
Force Stopped :------

N o t e

- "Force Input" is added since Ver.5.00.

- The CPU which is not supported this function (ROM Ver.*132 or lower)(MICRO-EHV) cannot force input. In

  this case, the warning massage (Fig. 6.4.8) is displayed when [Force input] is clicked with the mouse.
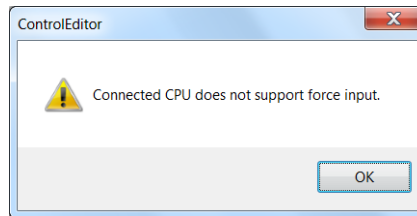
Fig. 6.4.9   Warning message for unsupported force input

- Up to 64 input points can be forced. Refer to "EHV-CPU16/32/64/128 APPLICATION MANUAL"

  (NJI-481*X) for more information.

- The setting information for this function is not saved in the project file. When Control Editor is closed, the

  setting information for this function is lost. And the setting information for this function is not verified.

- The input which overlaps with the forced input in I/O memory area cannot be forced. Therefore, set again after

  removing the setting for the overlapped input.

  Example) In the case that WX10 is set force input to 2 when X100 is forced to 1.

    WX10 cannot be forced because WX10 overlaps with X100 in I/O memory area. And the warning massage

    (Fig. 6.4.9) is displayed. Set WX10 again after removing the setting of X100.
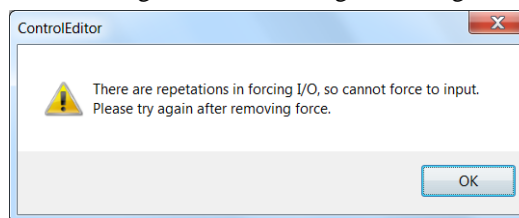
Fig. 6.4.10   Warning message for overlapping in I/O memory area

- The setting of force input is removed by CPU Initialization, changing I/O configuration or occurring retentive

  area undefined status error (76E).

- In Ver.5.00 or higher, message dialog for removing force input (Fig. 6.4.10) is displayed when Control Editor is

  closed in the state of forcing input.
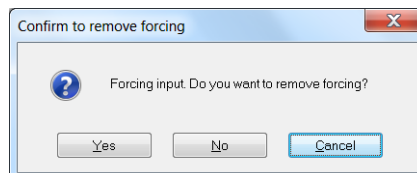
Fig. 6.4.11   Message dialog for removing force input

Yes: Control Editor is closed and the setting for force input is removed.
No: Control Editor is closed and the setting for force input is retained.
Cancel: Control Editor is not closed.
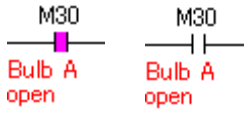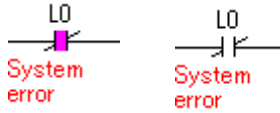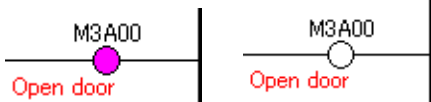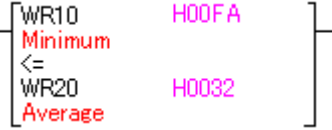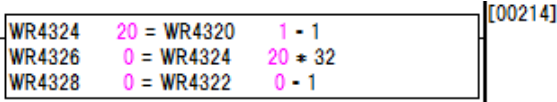
- In Ver.6.02 or higher, the contents displayed on the CPU status window have been changed. For details, refer to

  "6.8 CPU States".

6.5   Circuit Monitor

ON/OFF of Contacts and Coils in the ladder program and values of data are monitored.

Menu: [Online] - [Circuit monitor]

Icon:

Normally open-contact: It is red (conduction state) by ON, and white by
                          OFF.

Normally closed-contact: It is red (conduction state) by OFF, and white
                          by ON.

Coil: It is red by ON, and white by OFF.

Timer coil: It is red by ON, and white by OFF. and the
                          progress value of Timer/counter is displayed.

Comparison box: The current value in both sides are
                          displayed.(Decimal and Hexadecimal are
                          toggled by [Ctrl] + [h] keys.)

Processing box: When monitor starts, the width of 12th column will enlarge, and the current values are
                          displayed in the right side of I/O in the processing box.
                          (Switch between decimal and hexadecimal by using [Ctrl] + [h] keys.)
                          When monitoring stops, the width of 12th column will return to the normal width.

Reference

From Ver.5.00, the display of current I/O values in processing box changed. Please notify that accompanying with the change of display of current values, I/O comments in processing box also changed. Please refer to [Section 4.1 Input Symbols] for information about comment display. If the input commands cannot fit in one line, or the commands cannot fit in one line when monitor starts, the width of 12th column can change.

[Example] Current I/O values displayed in processing box
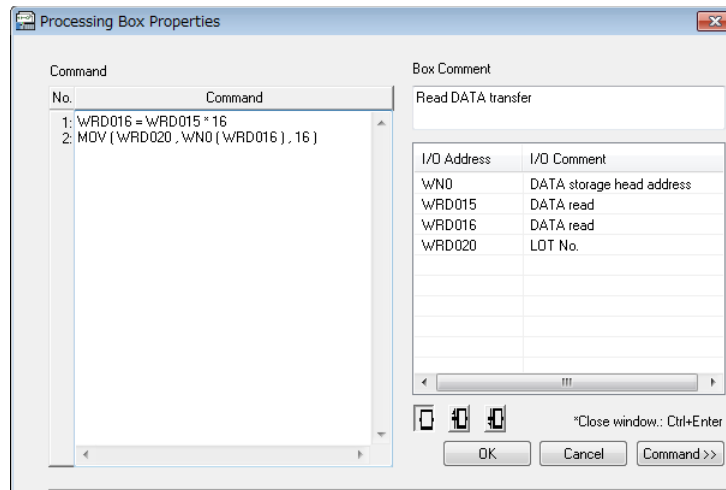
Fig. 6.5.1 Processing Box Input Example

Monitor stopped
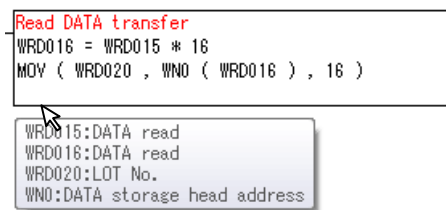
Fig. 6.5.2   Comment Display in Processing Box

Comment display

Display by tooltips if the cursor suspends on the processing box.

Monitoring
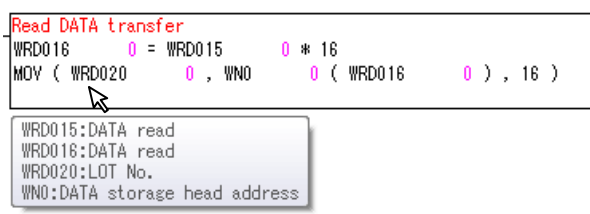
Fig. 6.5.2   Current Value Display in Processing Box

Comment display

Display by tooltips if the cursor suspends on the processing box.

Current value display

The width of 12th column will enlarge, and the current values are always displayed in the right side of I/O.

N o t e

Program verification is automatically performed before starting the Circuit monitor. If they are matched, it will shift to the monitor mode but if not matched, the following dialog will appear. Though the circuit monitor can be executed in the unmatched state by clicking the [OK] button, the monitoring operation is not guaranteed. Execute the circuit monitor in the state that programs are matched between CPU and Control Editor as much as possible.
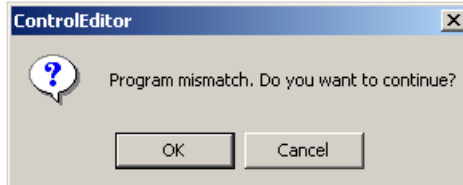
Fig. 6.5.3   Dialog to verify for Circuit Monitor

When using circuit monitor, based on the current values, the display width is different when using variable width font, the monitor display position will frequently change. Additionally, it is possible that the line break will occur in the processing box, and the last line will extend beyond the processing box. In order to fix the display position of the current values when using circuit monitor, please use a fix width font. Please refer to [8.2 Option Configuration] for changing font.

Display Position Deviation

Extend Beyond The Processing Box

Recommended Font

・MS Gothic

6.6   Random Circuit Monitor

Only any parts can be extracted to perform the circuit monitor. (Several parts can be specified.) This is a useful function for monitoring the separated circuits in the same sheet on one ladder editor window.

Menu: [View] - [Random Circuit Monitor]

Project tree: Monitor — Random circuit monitor
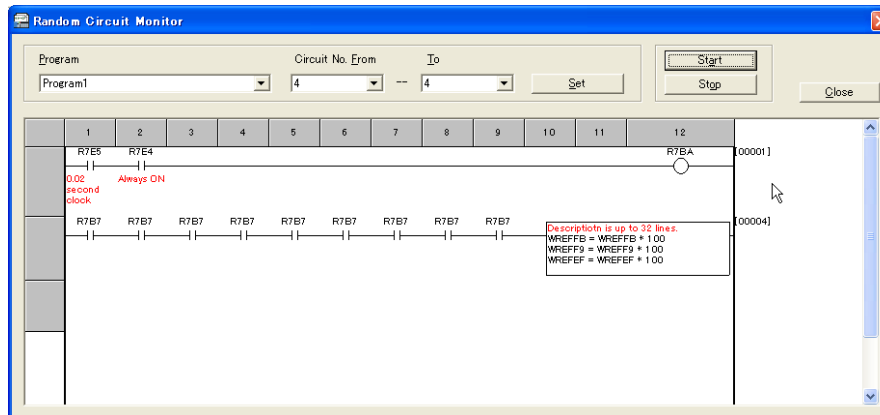
Fig. 6.6.1   Random Circuit Monitor

Program:	Specifies a program sheet.
Circuit No. From:	Specifies the first Circuit No. of the circuit to monitor.
To:	Specifies the last Circuit No. of the circuit to monitor.
Set:	Add the specified circuit to the Random circuit monitor sheet.
Start:	Random circuit monitor is started.
Stop:	Random circuit monitor is stopped.

6.7   Remote RUN and STOP

Communication enables RUN and STOP of the CPU module to execute from Control Editor. However, this function is enabled only when the RUN/STOP switch of CPU is turned to the STOP. And the RUN/STOP switch of CPU has a priority. (After the CPU is run by remote operation, if the RUN/STOP switch of the CPU is turned to STOP and to RUN, and then to STOP, the CPU will stop.)

Menu: [Online] - [Operate CPU] - [RUN] / [STOP]

Icon:

Note

This is a remote operation instruction. Perform this operation with great care.

We recommend using this function as a desk debug.

6.8   CPU Status

Error information for CPU and various status information for communication modules, etc. can be monitored.

Menu: [Tool] - [CPU status]

Icon:

-   The selection of the displayed state is selected from the pull-down menu; Detailed display of each status is changed for each tab.
-   "ROM Ver." Has been added to the CPU status item.
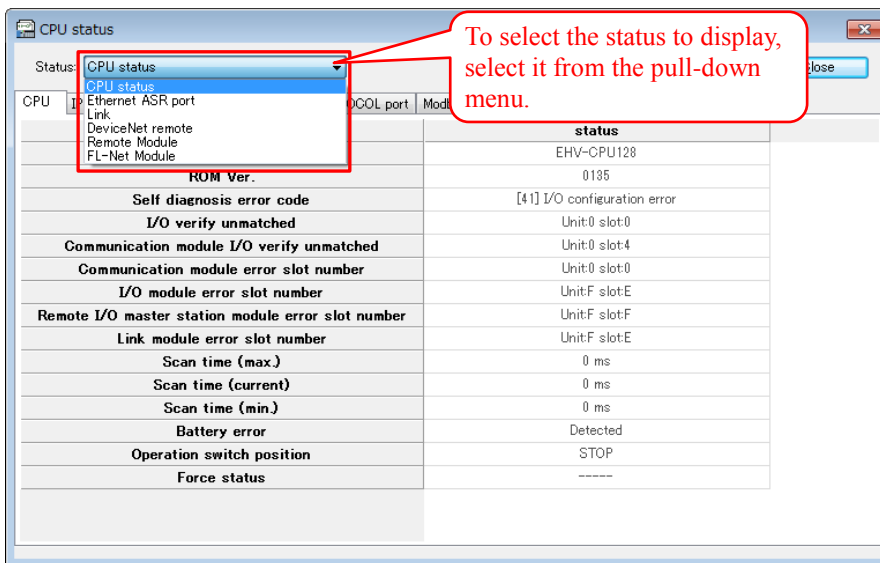
Fig. 6.8.1   Status selection (Ver.6.02 or higher)
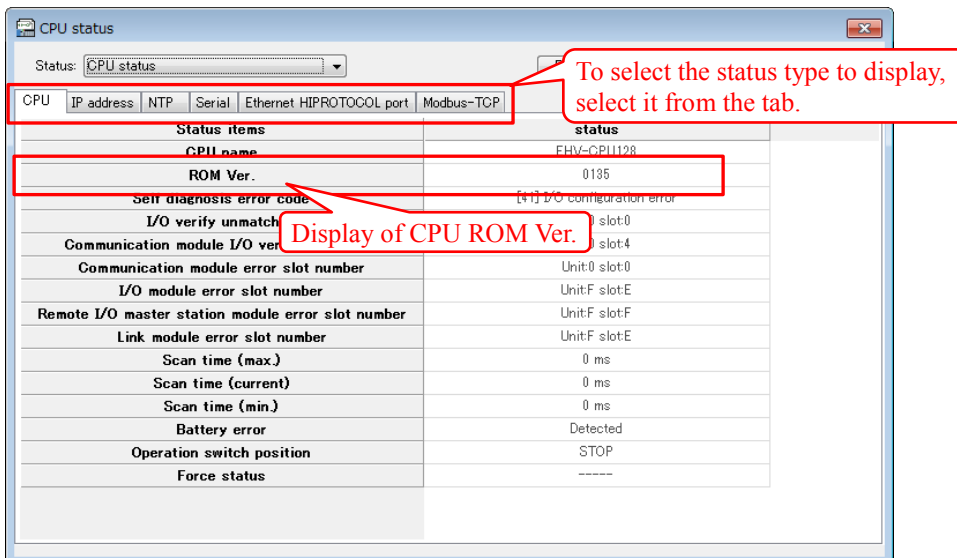
Fig. 6.8.2   Status type selection (Ver.6.02 or higher)

CPU status

EHV-CPU128
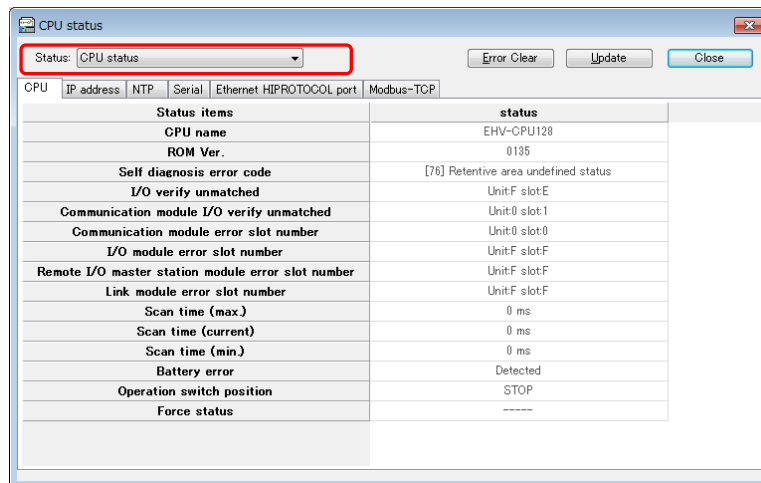
EHV-CPR128
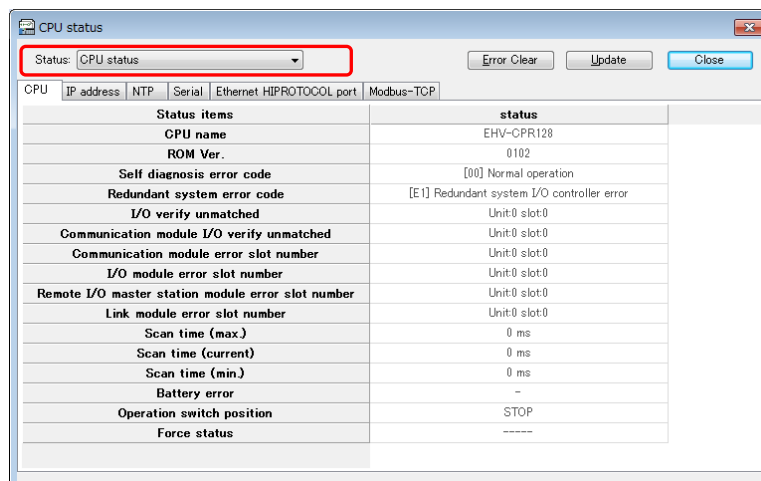
MICRO-EHV
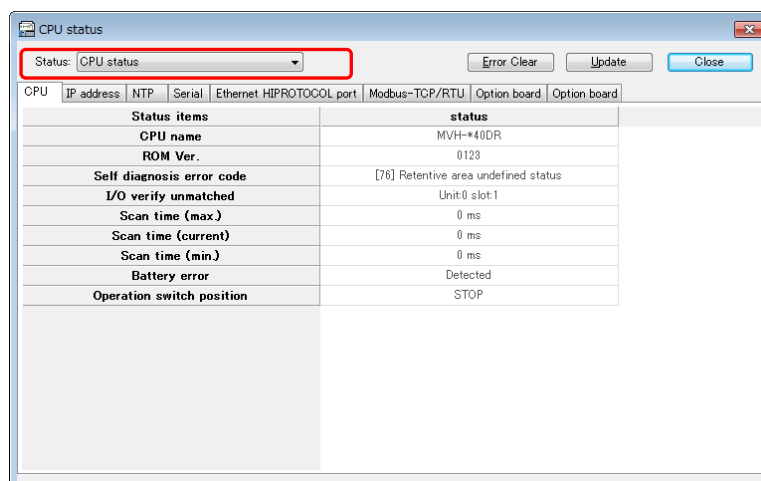
Fig. 6.8.3   CPU status

Status: Select "CPU status" from the pull-down menu.
Error Clear: Clears error information.
Update: Updates the status information.
Close: Close the CPU Status window.

Link
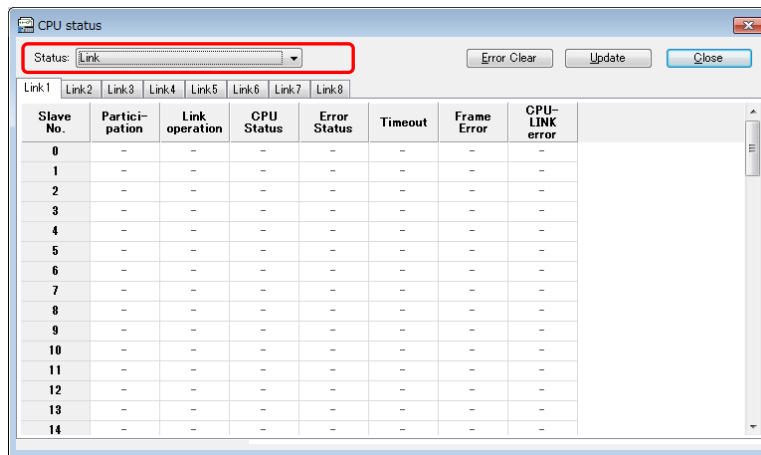
Fig. 6.8.4   Link status

Status: Select "Link" from the pull-down menu.
Error Clear: Clears error information.
Update: Updates the Link status information.
Close: Close the CPU Status window.

DeviceNet remote
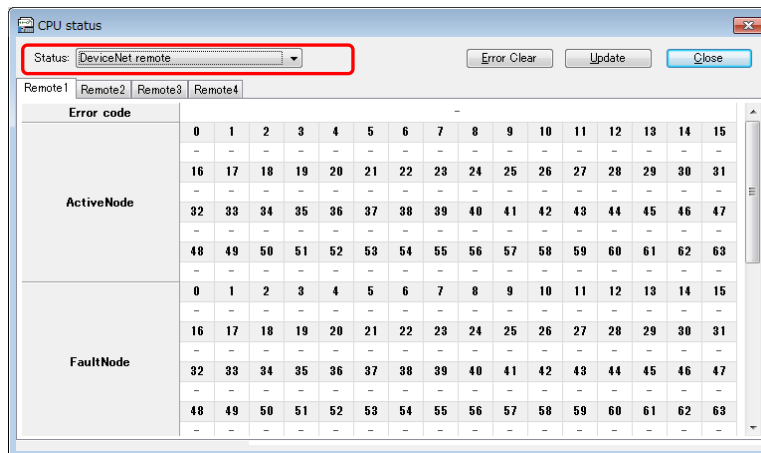
Fig. 6.8.5   DeviceNet remote status

Status: Select "DeviceNet remote" from the pull-down menu.
Error Clear: Clears error information.
Update: Updates the DeviceNet remote status information.
Close: Close the CPU Status window.

Remote Module
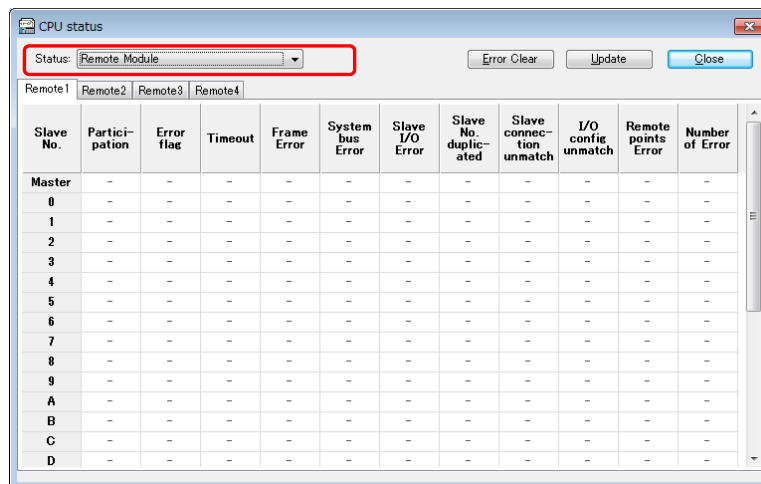
Fig. 6.8.6　　Remote Module status

Status:　　　　　　Select "Remote Module" from the pull-down menu.

Error Clear:　　　　Clears error information.

Update:　　　　　　Updates the Remote Module status information.

Close:　　　　　　　Close the CPU Status window.

FL-Net Module
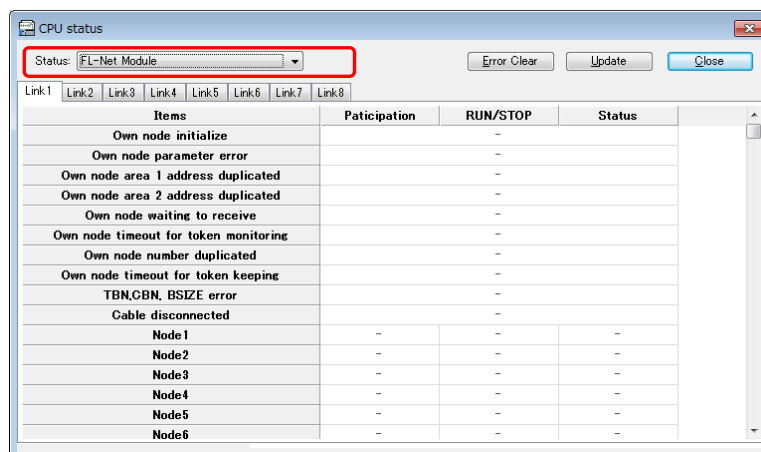
Fig. 6.8.7　　FL-Net Module status

Status:　　　　　　Select "FL-Net Module" from the pull-down menu.

Error Clear:　　　　Clears error information.

Update:　　　　　　Update the FL-Net module status information.

Close:　　　　　　　Close the CPU Status window.

6.9   CPU Log

Operation histories stored in the CPU module and information of error code, etc. can be monitored.

Menu: [Tool] - [CPU log]

Icon:

EHV-CPU can store up to 32 log information. MICRO-EHV can store up to 128 logs. Since the CPU log area is a link buffer, the oldest log is overwritten if the log exceeds the capacity. Although the user cannot clear the log area, the memorized logs are deleted if the battery is dead, and then the log is memorized from the first.
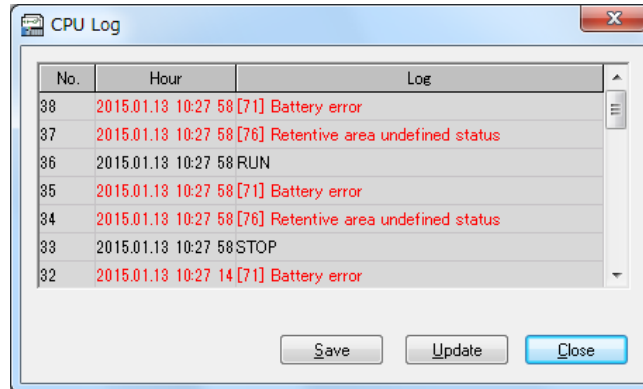
Fig. 6.9.1   CPU Log window

Save: CPU log information will be saved as csv format.
                       This file can be opened in CPU log file window.
Update: The latest log information is read out from CPU.
Close: Close the CPU Log window.

Operations to be stored and those codes are shown below.

Table 6.9.1   CPU Log codes

No.	Operation	Details
1	CPU initialize	CPU was initialized.
2	Program transfer	Online change in RUN was competed. Programs are transferred from buffer memory to internal memory. *1
3	Online change	Online change in RUN was executed.
4	Retentive area clear	Retentive area was cleared.
5	Error clear	Error was cleared.
6	7 segment clear	Error display was cleared.
7	Buttery error recovery	Buttery error is cancelled due to replacement of buttery.
8	Power on	The power supply was turned on.
9	RUN	RUN start
10	STOP	Stop
11	Change calendar data	Clock data was changed.
12	Setting change (from C/E)	Communication parameters such as IP address, etc. were changed.
13	Program recovery by system	Online change in RUN was not properly executed owing to any reason, and programs were back to the programs before online change in RUN.
14	Comment transfer	Online change in RUN is completed and comments are transferred from a buffer memory to an internal memory. *1 (from Ver.2.10 or higher)
15	USB download completed	Downloading of the data from the USB memory completed successfully.
16	USB upload completed	Uploading of the data to the USB memory completed successfully. *4
17	USB download failure	Downloading of the data from the USB memory failed. *4
18	USB upload failure	Uploading of the data to the USB memory failed. *4
19	IP address changed.	IP address was changed. *2, *4
20	NTP settings changed.	NTP settings were changed. *2, *4
21	Serial communication settings changed.	Serial communication settings were changed. *2, *4
22	Ethernet (task code) settings changed.	Ethernet (task code) settings were changed. *2, *4
23	Ethernet (ASR) settings changed.	Ethernet (ASR) settings were changed. *2, *4
24	ASR sending byte size changed.	ASR sending byte size was changed. *2, *3, *4
25	Modbus-TCP/RTU settings changed.	Modbus-TCP/RTU settings were changed. *2, *4
26	Option board RS-232C settings changed.	Option board RS-232C settings were changed. *4
27	Option board RS-485 settings changed.	Option board RS-485 settings were changed. *4
28	Option board analog settings changed.	Option board analog settings were changed. *4
29	Data Logging Group setting	Data logging setting ware changed. *5
30	Input Force start	Input Force is set. *6
31	Input Force end	Input Force is removed. *6

*1 Since the program transfer is an operation within the CPU, both histories of the online change in RUN and the program transfer are stored if the online change in RUN is executed. "Online change", "Program transfer", "Online change", and "Comment transfer" are stored if comments are transferred at the online change processing from Ver.2.10.

*2 On EHV-CPU mode, the messages are displayed as "Setting change (from C/E)".

*3 This message is also displayed when changed the Ethernet (ASR) settings.

*4 Supported by Ver.4.01 or higher.

*5 Supported by Ver.4.20 or higher.

*6 Supported by Ver.5.00 or higher.

6.10 CPU Log File

CPU log file can be opened and displayed in this dialog.

    Menu: [File] - [Open CPU log file]

    Icon:
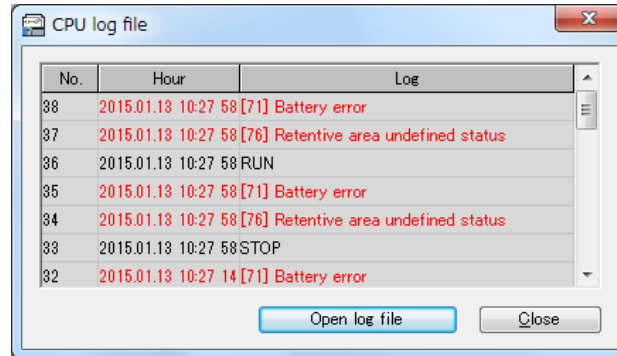
Fig. 6.10.1   CPU log file window

CPU log file is csv format. This file can be created with following ways.

- To save with CPU log window.

- If a USB memory is plugged to MICRO-EHV (MVH type) Ver.0109 or higher, CPU log file is created under the folder
  name LOG¥CPU_LOG

Please refer to MICRO-EHV user's manual (NJI-591*) for further information.

6.11 Input / Output Refresh Disabled

Input and Output refresh can be disabled temporarily by this function. This is useful function when debugging.

    Menu: [Online] - [Operate CPU] - [Input refresh disabled] / [Output refresh disabled]

    Icon:

While this function is active, MICRO-EHV does not refresh Input and Output. However, you can browse the
status of Input and Output at I/O monitor.

N o t e

This function is supported by MICRO-EHV only.

6.12 Time Chart Monitor

Values of requested I/O are read out with task code communication and graphically displayed as follows.

Menu: [View] - [Time chart monitor]

Project tree: | Monitor |─| Time chart monitor |

Icon:

In Ver. 6.02 or higher, part of the display and operation of the window has been changed.

- A display window in tabular form has been added to the monitor window.

- A part of the menu has been changed.

- Toolbar was added.

- Vertical and horizontal sliders have been added to the timing chart format window.

- The horizontal axis of the timing chart format window has been changed.

- The time display format has been changed.

Fig. 6.12.1   Timing chart format window

Fig. 6.12.2   Tabular format window

Timing chart format Monitor window
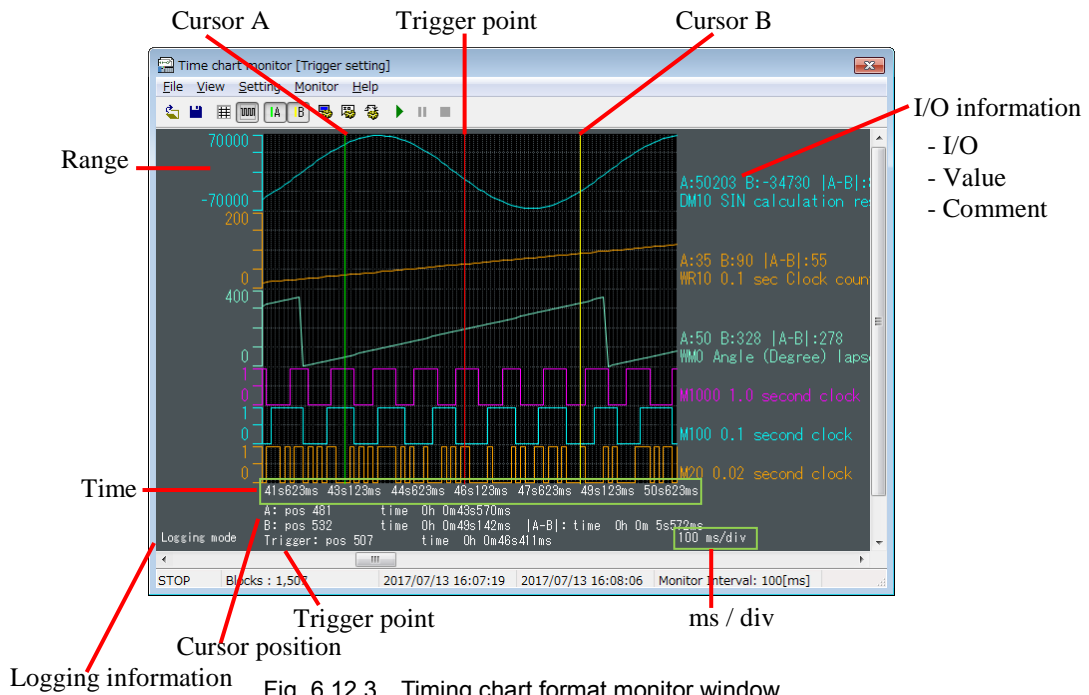
Fig. 6.12.3   Timing chart format monitor window

Table 6.12.1   Display contents of the timing chart format monitor window

Name	Description		
Trigger point	When the trigger condition is satisfied, the trigger detection point is displayed.		
Cursor	Cursors A and B are displayed.		
Range	The range is displayed for each I/O. The display range can be changed on the [Display Setting] window.		
Time	Displays the relative time from the start of monitoring.		
I/O information	Display I/O information.		
	I/O	Display I/O address.	
	Value	No cursor	It does not display.
		With cursor	Displays the value of the cursor position. Bit I/O is not displayed.
	Comment	Display comments. It can be set separately from the I/O comment. The setting is done on the [Add I/O] window.	
Cursor position	Displays the elapsed time from the start of monitoring.		
Trigger position	Displays the elapsed time since monitoring start of the point where the trigger was detected.		
ms / div	Display time (display time unit) per division (1 grid column). The setting can be changed on the [Display Setting] window.		
Logging information	Display execution of logging mode to save monitor data to a file. Logging mode Logging in progress (No display) No logging The setting of the logging mode can be set on the [Options] window of the time chart monitor.		

Table 6.12.2   Operation contents of timing chart type monitor window

Name	Device	Operation	Description	Condition
I/O selection	Mouse	Left click	Select display I/O. Change the background color of the selected I/O.	-
Move I/O	Mouse	Drag & Drop	Drag the selected I / O and drop it to the destination.	-
Context menu	Mouse	Right click	Context menu is displayed.	-
Cursor A	Mouse	Drag	Drag the cursor A to move. *1	-
Cursor B	Mouse	Drag	Drag the cursor B to move. *1	-
Horizontal scroll	Keyboard	[←] / [→] key	Scroll the displayed data. *2	When monitoring is stopped
	Mouse	Drag	Drag the horizontal slider to scroll the display data. *2	When monitoring is stopped
Vertical scroll	Mouse	Drag	Drag the vertical slider to scroll the display data.	-
Change number of columns	Mouse &Keyboard	[Ctrl] key + wheel	Change the number of columns displayed in the grid.	-
Change number of lines	Mouse & Keyboard	[Alt] key + wheel	Change the number of lines displayed in the grid.	-
Change ms / div	Mouse & Keyboard	[Shift] key + wheel	Change the setting value of ms / div.	-

*1 The cursor position and time are displayed for word I / O and double word I / O during monitoring and

　　monitor stop.

*2 Scroll the data and display it. The cursor moves with the data.

Tabular format Monitor window
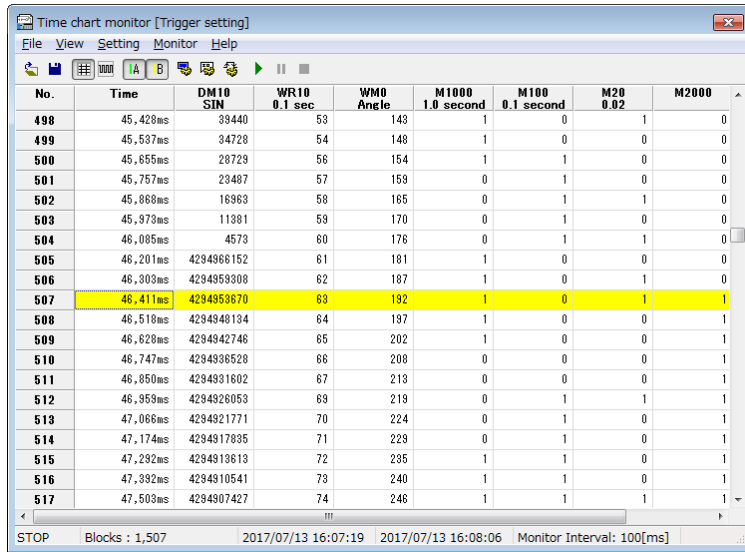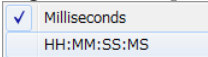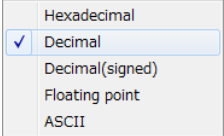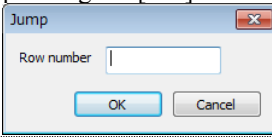
Fig. 6.12.4   Tabular format monitor window

Table 6.12.3   Display contents of the tabular format monitor window

Name	Description
No.	Displays the data acquisition number from the start of monitoring.
Time	Displays the elapsed time from the start of monitoring. Right-click the [Time] cell and change the display format from the context menu.
I/O information	Display I/O information. I/O — Display I/O address. Comment — Display comments. Right-click the [I/O Information] cell and change the display type from the context menu.
Cursor position	Press [Ctrl] + [Home] key to move the cursor to the begin.
	Press [Ctrl] + [End] key to move the cursor to the end.
	By pressing the [E] key, the cursor is moved to the next line of the latest data and the latest data is always displayed on the last line. The already acquired data is scrolled up and displayed.
	You can move the cursor to the trigger point by pressing the [T] key. For the trigger point information, the background color is displayed in "yellow".
	By pressing the [J] key, the Jump window will be displayed. Enter the line number (No.) on the Jump window and move to the specified line by pressing the [OK] button.
	Press the [↑] / [↓] / [←] / [→] key to move the cursor. To stop displaying the latest data while displaying the latest data, press the [↑] key. To resume displaying the latest data, press the [E] key.
Display	Press [Ctrl] + [H] key to switch hexadecimal display to decimal notation.
	Press [Ctrl] + [H] key to switch decimal display to hexadecimal notation.

Status bar

Monitor　　Blocks : 662　　　　2018/07/18 14:42:07　2018/07/18 14:42:46　Monitor Interval: 100[ms]

(1)　　　　　(2)　　　　　　　　(3)　　　　　　(4)　　　　　　　(5)

Fig. 6.12.5　Display status bar

Table 6.12.4　Status bar display contents

No.	Name	Description
1	Monitoring status	Monitoring status is indicated. Monitor　　:Monitor is running PAUSE　　:Pause(possible to restart) STOP　　　:Monitor is stopped.
2	Number of sampling	Accumulated number of sampling is indicated. Max. Number is 10,000,000. *1
3	Monitor start time	The time when the monitor was started is indicated.
4	Trigger time	The time when the trigger detected is indicated.
5	Monitor interval	Interval time of monitoring is indicated. This can be set in the menu [Tool] - [Options].

*1 When the number of acquired data exceeds the maximum sampling data number, the monitor

automatically stops.

The table below shows guidelines for the time that can be recorded with continuous operation.

Table 6.12.5　Approximate time to record with continuous operation

No.	Monitor interval		Recordable time	
1	1	[ms]	2.8	hours
2	2	[ms]	5.6	hours
3	5	[ms]	13.9	hours
4	10	[ms]	1.2	days
5	20	[ms]	2.3	days
6	50	[ms]	5.7	days
7	100	[ms]	11.5	days

Menu

[File] menu

Time chart monitor information is saved in the time chart file (*.cetimechart).

Open…

Menu: [File] - [Open…]

The time chart file is read and displayed on the window.

To select the type of file to be read, select from the pull-down menu of the "File name" of the [Open]

window.

- Time chart file(*.cetimechart)
- Time chart file(Ver.6.00 or lower)(*.csv;*.xml)
- MICRO-EHV logging file(*.csv)

Save…

Menu: [File] - [Save…]

Save the acquired monitor value in the time chart file.

Select the type of file to save from the [Save as type] pull-down menu on the [Save as] window.

- Time chart file(*.cetimechart)
- CSV file(*.csv)

Close

Menu: [File] - [Close]

Close the [Time chart Monitor] window.

[View] menu

Cursor A

Menu: [View] - [Cursor A]

Cursor A can be enabled or disabled.

Cursor B

Menu: [View] - [Cursor B]

Cursor B can be enabled or disabled.

Tabular display

Menu: [View] - [Tabular display]

Display the tabular format window.

On the tabular format window, you can check the monitor value with more detailed numerical values than the

display of the timing chart format window.

Timing chart format display

Menu: [View] - [Timing chart format display]

Display the timing chart format window.

[Setting] menu

View setting…

Menu: [Setting] - [View setting…]

View settings can be set in this dialog.
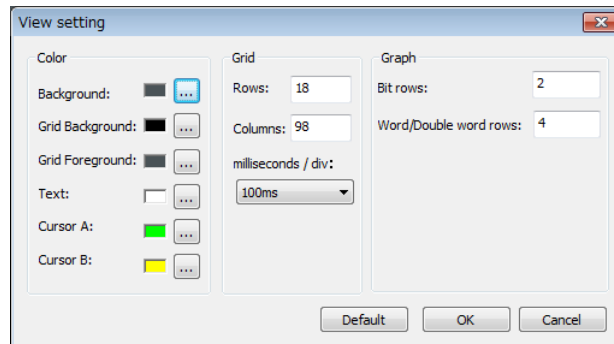
Fig. 6.12.6   View setting window

Table 6.12.6   Window contents of view settings

Name		Description	Default	Remarks
Color	Background	Background color can be set.	(Black25%)	-
	Grid foreground	Grid foreground color can be set.	(Black25%)	-
	Grid background	Grid background color can be set.	(Black)	-
	Text	Select the character color to display elapsed time, cursor position information, ms/div information.	(White)	-
	Cursor A	Cursor A color can be set.	(Green)	-
	Cursor B	Cursor B color can be set.	(Yellow)	-
Grid	Rows	Number of grid row can be set. Range : 10 to 100	32	*1
	Column	Number of grid column can be set. Range : 10 to 100	20	-
	milliseconds / div	Sets the elapsed time of the grid 1 row. Please select in the range of 1 to 1,000,000.	10	-
Graph	Bit rows	Number of rows for bit I/O can be set. Range : 1 to 10	2	*1
	Word / Double word rows	Number of word/double word I/O can be set. Range : 1 to 10	4	*1
[Default] button		Setting parameters are changed to the default.	-	-
[OK] button		Dialog is closed with setting parameters updated.	-	-
[Cancel] button		Dialog is closed with setting parameters cancelled.	-	-

*1 The maximum number of I/Os that can be registered does not depend on the number of rows in the grid.

Adding more I/O than the number of rows in the grid will automatically increase the number of rows.

I/O setting…

Menu: [Setting] - [I/O setting…]

[I/O setting] window is displayed.
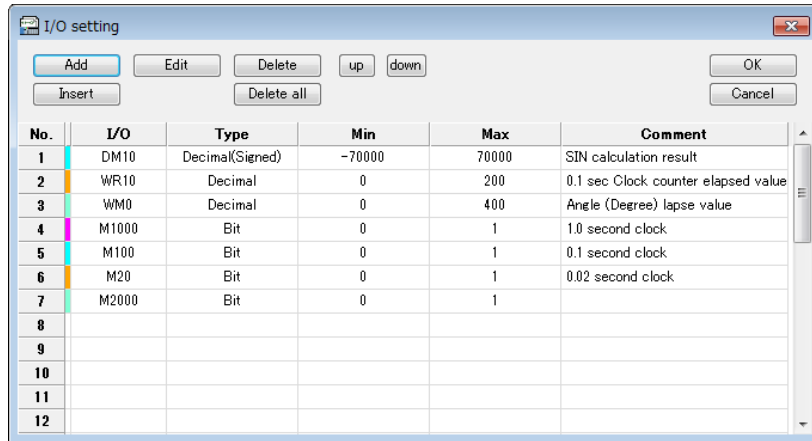
Fig. 6.12.7   I/O setting window

Table 6.12.7   Display contents and operation method

Name	Description
No.	Indicates the registration number. In the timing chart format display, it is displayed in the same order as the [I/O setting] window. In tabular format display, it is displayed in order of number from left to right.
I/O	The I/O information set on the [Add I/O] window is displayed. *1
Type	The data type selected from [Format] is displayed in the [Add I/O] window. *1
Min	The minimum value of the display range set on the [Add I/O] window is displayed. *1
Max	The maximum value of the display range set on the [Add I/O] window is displayed. *1
Comment	The comment set on the [Add I/O] window is displayed. *1
[Add] button	When you press the button, the [Add I/O] window will be displayed. The information registered on the [Add I/O] window is added to the last line of registered information.
[Insert] button	Select the line to be inserted and press the button to display the [Add I/O] window. The information registered on the [Add I/O] window is displayed to the selected line. If you select a blank line and press the button, the [Add I/O] window will not be displayed.
[Edit] button	Select the line you want to edit and press the button to display the [Add I/O] window. Update the settings of the selected line with the information edited on the [Add I/O] window.
[Delete] button	Select the line to be deleted and press the button to delete the selected line.
[Delete all] button	When you press the button, it deletes all registered data.
[up] button	When you select a line to move and press the button, it moves the selected line upward.
[down] button	When you select a line to move and press the button, it moves the selected line downward.
[OK] button	Reflect the edited content and close the window.
[Cancel] button	Discard the edited content and close the window.
[↑] / [↓] / [←] / [→] key	When you press the [↑] / [↓] / [←] / [→] key, the cursor moves to the direction of the key you entered.
[F] key	Selecting a line to move and entering the [F] key will move the selected line upwards.
[D] key	Selecting a line to move and entering the [D] key moves the selected line downward.

Table 6.12.7   Display contents and operation method

Name	Description
[Enter] key	Select the line you want to edit and enter the [Enter] key to display the [Add I/O] window. Update the settings of the selected line with the information edited on the [Add I/O] window. Selecting a blank line and entering the [Enter] key displays the [Add I/O] window. The information registered on the [Add I/O] window is added to the last line of the registration information.

*1 It cannot be registered / edited.

Trigger setting…

    Menu: [Setting] - [Trigger setting…]

  Trigger conditions can be set in this dialog.
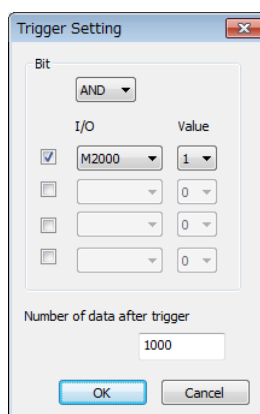
Fig. 6.12.8   Trigger setting window

Table 6.12.8   Window contents of trigger settings

Name		Description
Bit	Logical condition	Set the logical condition. AND: Trigger occurs when all trigger conditions are satisfied. OR: Trigger occurs when even one trigger condition is satisfied.
	[Check-box]	If checked, it is subject to the trigger condition.
	I/O	Select bit I/O. Selectable I/O only applies to registered bit I/O.
	Value	Select the trigger condition. 1: When the value of I/O is 1, the trigger condition is satisfied. 0: When the value of I/O is 0, the trigger condition is satisfied.
Number of data after trigger		Specify the number of data to be acquired after the trigger condition is satisfied. When you acquire the set number of data, the monitor stops.
[OK] button		Dialog is closed with setting parameters updated.
[Cancel] button		Dialog is closed with setting parameters cancelled.

Option…

Menu: [Setting] - [Option…]

[Option] Display the window.

Sets the logging mode to save monitor data to a file.
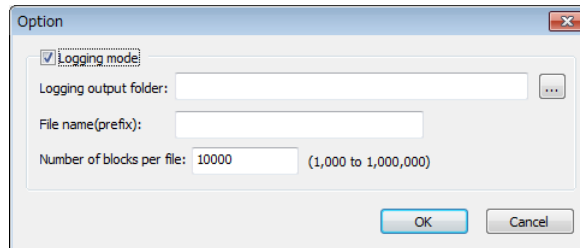
Fig. 6.12.9   Option window

Table 6.12.9   Setting contents of logging mode

Name	Description
Logging mode	No check: Acquire data without saving to file. Check: Save the acquired data in a file according to the setting contents.
Logging output folder	Specify the folder to output the file.

File name(prefix)	Specify the identifier (prefix) of the file name.
	Example) When prefix is specified, the file name is
	                "prefix_YYYYMMDD_hhmmss_nnnnn.cetimechart".
	   YYYYMMDD_hhmmss: File creation date, hour, minute second
	   nnnnn: Serial number from the start of monitoring

Number of blocks per file	Save as 1 file for each specified number of blocks.
[OK] button	Dialog is closed with setting parameters updated.
[Cancel] button	Dialog is closed with setting parameters cancelled.

[Monitor] menu

Start

Menu: [Monitor] - [Start]

Start monitoring.

Pause

Menu: [Monitor] - [Pause]

Pause the monitor.

Stop

Menu: [Monitor] - [Stop]

Stop the monitor.

[Help] menu

Shortcut key list

Menu: [Help] - [Shortcut key list]

The page on which the trace monitor window operation of the Instruction Manual (NJI-537**) is described is

displayed.

Toolbar

Details of toolbar are described as below.

Table 6.12.10　Toolbar contents

Icon	Name	Description
	Open	Menu:[File] - [Open…] Same The time chart file is read and displayed on the window.
	Save	Menu:[File] - [Save…] Same Save the acquired monitor value in the time chart file.
	Tabular display	Menu:[View] - [Tabular display)] Same Display the tabular format window.
	Timing chart format display	Menu:[View] - [Timing chart format display] Same Display the timing chart format window.
	Cursor A	Menu:[View] - [Cursor A] Same Cursor A can be enabled or disabled.
	Cursor B	Menu:[View] - [Cursor B] Same Cursor B can be enabled or disabled.
	View setting	Menu:[Setting] - [View setting…] Same Displays the [View setting] window.
	I/O setting	Menu:[Setting] - [I/O setting…] Same Displays the [I/O setting] window.
	Trigger setting	Menu:[Setting] - [Trigger setting…] Same Displays the [Trigger setting] window.
	Start	Menu:[Monitor] - [Start] Same Start monitoring.
	Pause	Menu:[Monitor] - [Pause] Same Pause the monitor.
	Stop	Menu:[Monitor] - [Stop] Same Stop the monitor.

Context menu

Details of context menu are described as below.
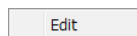
Edit

Fig. 6.12.10　Context menu

Table 6.12.11　Context menu contents

Name	Description	Conditions
Edit	The [Add I/O] window is displayed with the selected I/O setting contents.	-

6.13 FL-net monitor

The participation status (operation, stop, abnormality) of the nodes participating in the FL-net network is displayed on each link (Link: 1 to 8). (Only for EHV-CPU)

Menu: [View] - [FL-net monitor] - [Link n]   (n = 1 to 8)

Project tree: | Monitor |─| FL-net monitor |─| Link n (n = 1 to 8) |
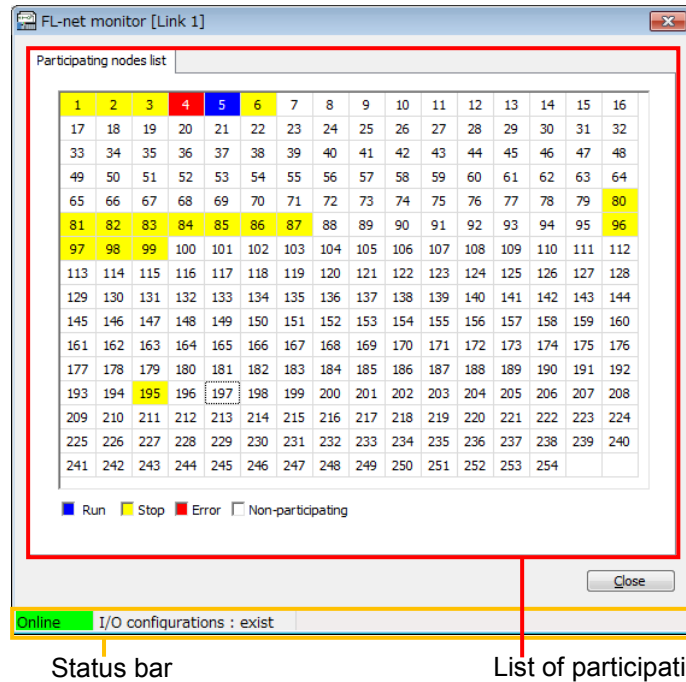
Fig. 6.13.1   FL-net monitor window

■ List of participating nodes

The participation status (operation, stop, abnormality) of the node No. participating in the FL-net network is displayed.

[n (blue)] : Indicates participation status and driving status.

[n (yellow)] : Indicates participation status and stop status.

[n (red)] : Indicates participation status and abnormal status. It is necessary to check the cause of the abnormality and take countermeasures.

[n (white)] : Indicates an unattached state.

n : 1 to 254

■Status bar

Table 6.13.1   Status bar

No.	Name	Description
1	Mode status	Indicates the mode state. Online : In online mode Offline : In offline mode
2	I/O configurations	Indicates the exist / none of I/O Configuration. I/O configurations : exist : FL-net module is assigned. I/O configurations : none : FL-net module is not assigned.

N o t e

While connected in online mode / on direct mode / simulation mode, the state is updated with the setting of monitor interval (*1) cycle.

*1 Monitor interval setting can be set on the Options window. For details, refer to "8.2 Option setting" in section.

MEMO

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Chapter 7   CPU Communication Parameters

This section explains setting of CPU parameters.

Each setting window can be displayed by selecting from [CPU Settings] in [Tool] on the menu bar or double-clicking a setting name in the project tree window.

Each CPU parameter settings is avilable by choosing from as follows.
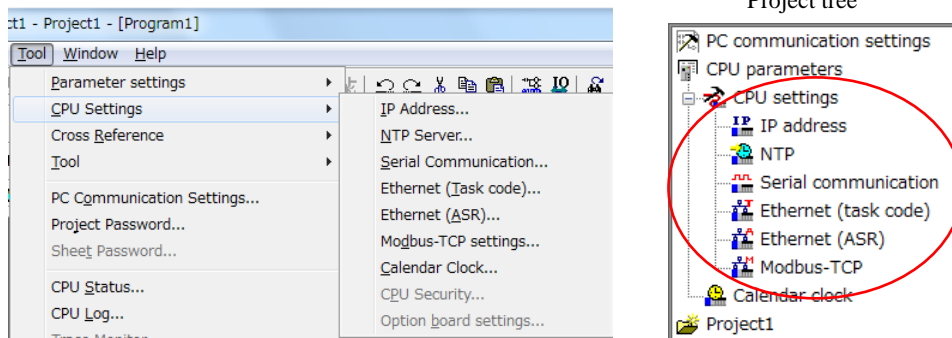
Fig. 7.0.1   CPU communication parameters

There are two methods to set the CPU parameters.

(1) In online mode, just when the [Set] button is pressed after setting each CPU parameter, the setting data is written to the CPU module. CPU parameters settings except NTP are reflected when power is restored to the CPU module.
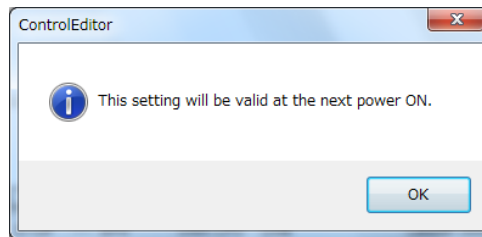
Fig. 7.0.2   Display after online setting

(2) After CPU parameters are set in offline mode, CPU settings are transferred together with program if the check box for the "CPU Communication Settings" is checked in the Download window. Also in this case, the setting information is reflected when power is restored to the CPU module.
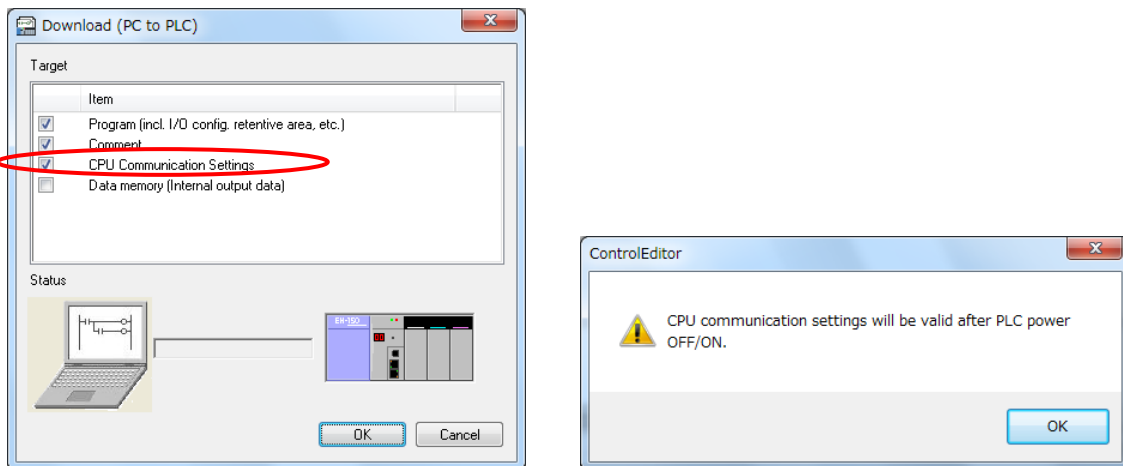
Fig. 7.0.3   Setting in Download

If CPU settings fails, following dialog box appears. Check the parameters again.
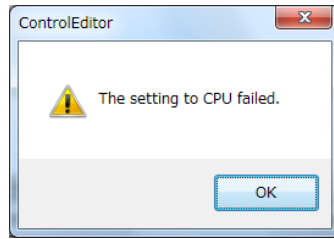
Fig. 7.0.4   Setting failure

N o t e

Though the CPU writes the setting information into the FLASH memory after setting CPU parameters, the parameters are not set properly if the power supply of CPU is turned off in this period.

[EHV-CPU series]

The dot LED between 2 digits is lit while the information is being written to the FLASH memory. Turn off the power supply and then turn on after this dot LED is tuned off.
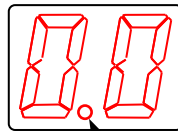
Dot LED is lit while writing FLASH.

[MICRO-EHV series]

STATUS LED on the Basic Unit flickers while the information is being written to the FLASH memory. Turn off the power supply and then turn on after this STATUS LED is turned off.

N o t e

- In Ver.2.13 or lower, CPU communication parameters are only set directly to the CPU in online mode and the setting information cannot be saved in the file, but Ver.2.00 or higher can be saved in the project file. Refer to the section 2.7 for more information.
- When CPU type is chosen as EHV-CPR128, "NTP Setting" and "Ethernet Port Setting" cannot be chosen in Control Editor Ver.3.01 or higher.

7.1   IP Address Setting

IP address information for Ethernet port of CPU is set.

Menu: [Tool] - [CPU Settings] - [IP Address]

Enter new parameter data and press [Set]] button when changing the setting information.
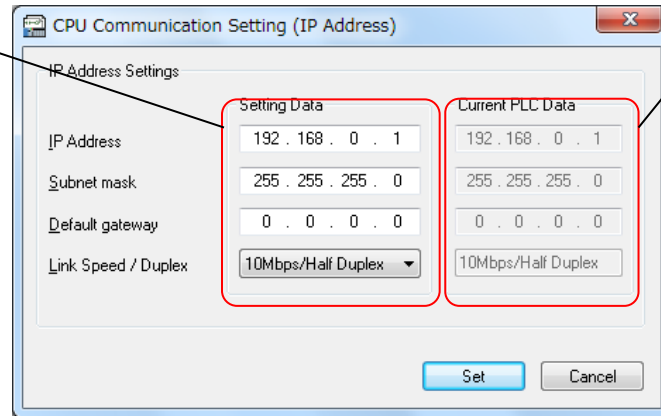
Current data in CPU.. Visible only in onlinee mode.

Fig. 7.1.1   IP Address setting

Subnet mask: This is a mask value used for searching a network address of subnet from IP address. It is a subnet address if IP address is connected to subnet mask using AND.

Default gateway: A default gateway to perform the routing is set when communicating data with the Node not existing on the same LAN in the network.

Link Speed / Duplex Mode: Choose one from Auto Negotiation, 100Mbps/Full Duplex, 100Mbps/Half Duplex, 10Mbps/Full Duplex, and 10Mbps/Half Duplex. Auto Negotiation is that CPU automatically decides the best Duplex method.

The information is saved by clicking the [Set] button in offline mode, and the information is transferred together with program to the CPU if the box for the "CPU Communication Settings" is checked in the Download. The setting value is directly written to the CPU by clicking the [Set] button in online mode. In both cases, the set parameters are reflected when power is restored to the CPU. If this setting window is opened without powering on the CPU again, the information before changing is displayed. Press [Ctrl] + [h] keys in order to check the parameters you have set.

N o t e

IP address cannot be set to "0.0.0.0", "255.255.255.255", "*.*.*.0", "*.*.*.255" and etc.

7.2   NTP Setting

NTP setting is a setting for NTP (Network Time Protocol) server.

    Menu: [Tool] - [CPU Settings] - [NTP Server]

When NTP server is on the network that CPU is connected via Ethernet, CPU can retrieve the time data from this server.

This is enabled only in Online and On-direct modes. This is set when retrieving the time data from the clock server on the network. The retrieved data is registered and reflected to the calendar clock in the special internal output.
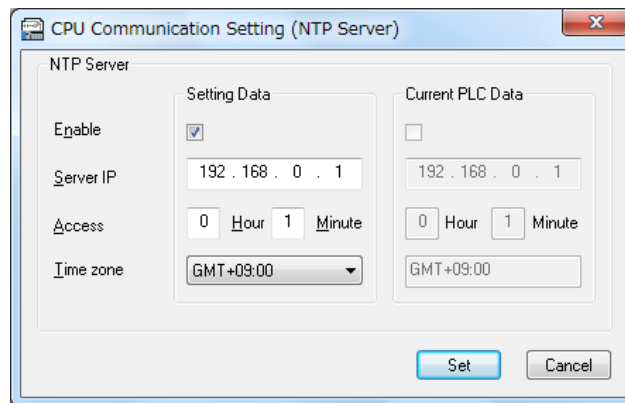
Fig. 7.2.1   NTP setting

Enable:	Mark this check box when enabling NTP server.
Server IP Address:	Enter the IP address of NTP server.
Access interval:	Set the interval to retrieve the time data. This is an interval not for updating the clock inside the CPU but for setting the time of the CPU by the time of the server. The clock IC inside the CPU updates the clock.
Time zone:	Since the time on NTP server uses GMT, a time difference from GMT is set. GMT + 09:00 hours (summer time is '+08:00') in Japan.

N o t e

Since CPU has a clock IC inside, the clock can work even if the time is not retrieved from NTP server. If the time is retrieved from NTP server, the current value of the clock IC is rewritten and after that, own clock IC updates the time.

W **Glossary**

NTP: Abbreviation of Network Time Protocol. This is a mechanism for setting the time on the terminal through network. If one time server is provided, synchronization is possible by checking the time from other node at regular intervals. (But, delay of network and delay of this processing occur.)

7.3   Serial Port Setting

Serial port of CPU is set.

Menu: [Tool] - [CPU Settings] - [Serial Communication]

[EHV-CPU series]
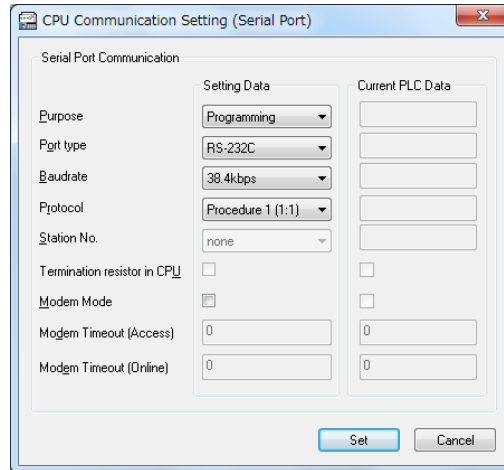
Fig. 7.3.1   Serial port setting (EHV-CPU)

Purpose: Programming: In this mode, communication protocol is Hitachi special protocol

(H-Protocol). Since CPU automatically replies to command from host station, no

user program is necessary for H-Protocol communication. H-Protocol has 2 modes

of communication, procedure 1 and 2, which can be set "Protocol" combo box.

Example) Control Editor, HMI, SCADA

General purpose: In this mode, communication protocol is free and up to user

program. Be sure to prepare ladder program handling communication by using

TRNS0 or RECV0 command. Since the baud rate is configured by TRNS/RECV

command, no need to set in this window.

Example) Electric scale, barcode reader, etc.

Port type: Choose RS-232C or RS-422/RS-485.

Baud rate: Choose one from 2.4kbps to 57.6kbps in case of programming port

Protocol, station No.:   Choose one from Procedure 1 (1:1), Procedure 1 (1:n), Procedure 2 (1:1) and

Procedure 2 (1:n) in case of programming port. "1:n" is used for communicating

with several PLCs and enabled only in RS-422/485. When "1:n" is chosen, set the

Station No.

Termination resistor in CPU: This is enabled only in RS-422/485 setting. If the box is checked, a built-in 120Ω

(1/2W) termination resistor in CPU is connected between serial port 6 pins (RX-)

and 7 pins (RX+).

The information is saved by clicking the [Set] button in offline mode, and the information is transferred together with

program to the CPU if the box for the "CPU Communication Settings" is checked in the Download. . The setting

value is directly written to the CPU by clicking the [Set] button in online mode. In both cases, the set parameters are

reflected when power is restored to the CPU. If this setting window is opened without powering on the CPU again,

the information before changing is displayed. Press [Ctrl] + [h] keys in order to check the parameters you have set.

[MICRO-EHV series]
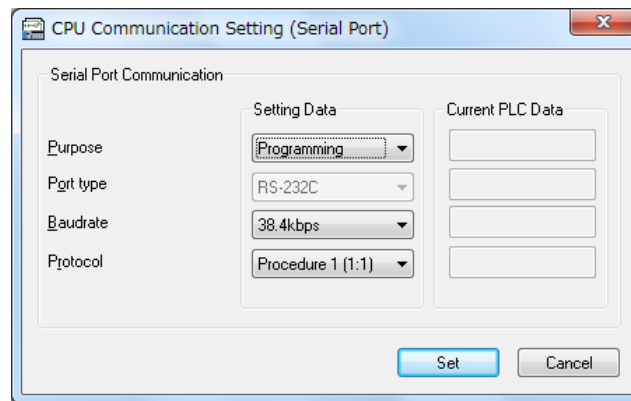
Fig. 7.3.2   Serial port setting (MICRO-EHV)

Purpose: Programming: In this mode, communication protocol is Hitachi special protocol (H-Protocol). Since CPU automatically replies to command from host station, no user program is necessary for H-Protocol communication. H-Protocol has 2 modes of communication, procedure 1 and 2, which can be set "Protocol" combo box.

Example) Control Editor, HMI, SCADA

General purpose: In this mode, communication protocol is free and up to user program. Be sure to prepare ladder program handling communication by using TRNS0 or RECV0 command. Since the baud rate is configured by TRNS/RECV command, no need to set in this window.

Example) Electric scale, barcode reader, etc.

Port type: This is fixed to RS-232C.

Baud rate: Choose one from 4.8kbps to 115.2kbps in case of programming port.

Protocol: Choose one from Procedure 1 (1:1) and Procedure 2 (1:1) in case of programming port.

7.4   Ethernet Port Setting

(1) Task code port setting

Task code of CPU Ethernet port is set. Set this when connecting Control Editor, indicator, and SCADA software via Ethernet.

Menu: [Tool] - [CPU Settings] - [Ethernet (Task code)]
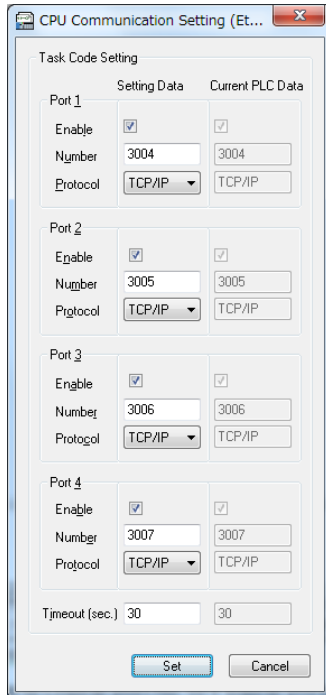
Fig. 7.4.1   Ethernet Task Code setting

Enable: Check this box when using applicable task code No.

Number: Sets a logical port No. 1024 to 65535 are available.

  Avoid overlap in Logical port No. of 4 logical ports.

Protocol: Choose TCP/IP or UDP/IP.

  Protocol is "TCP/IP" when connecting Control Editor.

Timeout: Set the timeout of access interval from the host. The unit is second.

  0 to 65535 are available. The watch of timeout is not performed when setting 0.

W   Glossary   Task code communication

EHV-CPU performs communication with a programming communication protocol usually. This programming protocol is called "HiProtocol". Since a command inside communication format prescribed by HiProtocol is called task code, the communication by a programming protocol is called also "Task code communication".

The information is saved by clicking the [Set] button in offline mode, and the information is transferred together with program to the CPU if the box for the "CPU Communication Settings" is checked in the Download. . The setting value is directly written to the CPU by clicking the [Set] button in online mode. In both cases, the set parameters are reflected when power is restored to the CPU. If this setting window is opened without powering on the CPU again, the information before changing is displayed. Press [Ctrl] + [h] keys in order to check the parameters you have set.

(2) Ethernet (ASR)

ASR communication (message communication) of CPU Ethernet port is set.

Menu:　　　　　[Tool] - [CPU Settings] - [Ethernet (ASR)]
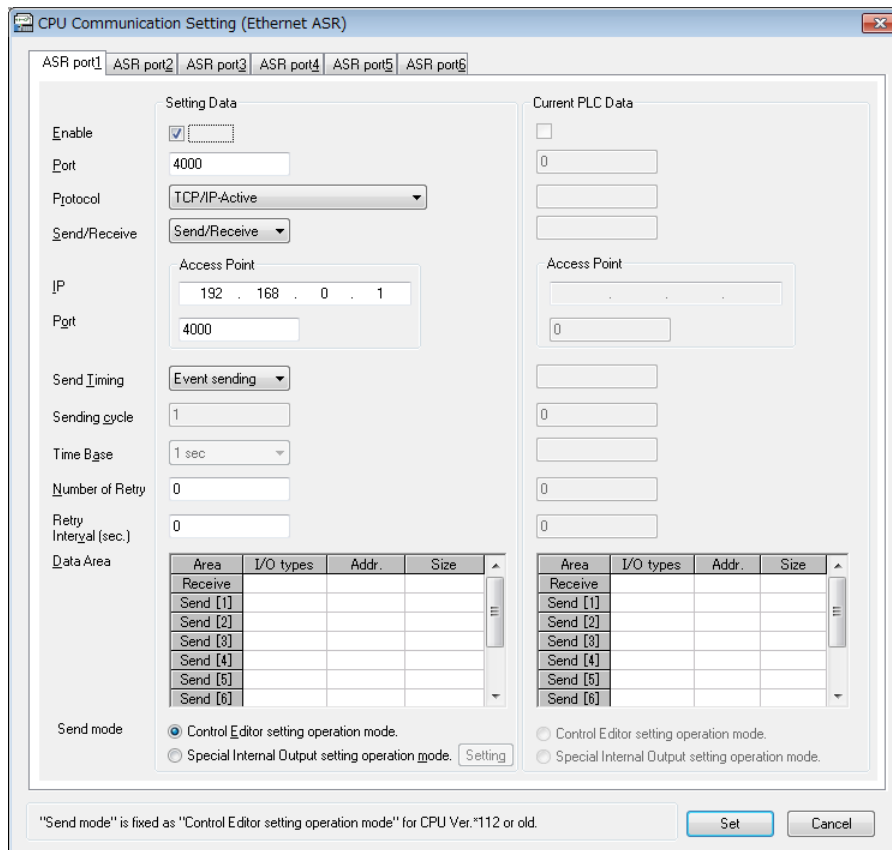
Fig. 7.4.2　Ethernet ASR setting

Enable:	Check this box when using applicable ASR port.
Port:	Enter a logical port No. 1024 to 65535 are available.
	Port numbers including ASR port and task code port cannot be overlapped.
Protocol:	Choose one from 5 types shown below.

TCP/IP-Active:	Opens the connection to a device of specified IP address.
TCP/IP-Passive, Designated IP:	Waits the connection open request from a device of specified IP address.
TCP/IP-Passive, Undesignated IP:	Waits the connection open request from any device.
UDP/IP, Designated IP:	Communicates with a device of specified IP address via ASR.
UDP/IP, Undesignated IP:	Communicates with any device via ASR.

Send/Receive:	Choose one from Send, Receive, and Send/Receive
Access Point:	Sets IP address and port No. (1024 to 65535) of access point.
	Unnecessary setting when choosing the "Undesignated IP" in the Protocol.

Send Timing:　　　Choose Event sending or Cyclic sending

　Even sending:　　When the sending request bit of the special internal output ASR port and the control

　　　　　　　　　register (from WRF600) changes from OFF to ON, data in I/O memory specified as the

　　　　　　　　　sending area is sent.

　　　　　　　　　Addresses for the sending request bit of each port are as follows.

　　　　　　　　　[EHV-CPU series]

　　　　　　　　　　Port 1: WRF601.1　　(1st bit of WRF601)

　　　　　　　　　　Port 2: WRF605.1　　(1st bit of WRF605)

　　　　　　　　　　Port 3: WRF609.1　　(1st bit of WRF609)

　　　　　　　　　　Port 4: WRF60D.1　　(1st bit of WRF60D)

　　　　　　　　　　Port 5: WRF611.1　　(1st bit of WRF611)

　　　　　　　　　　Port 6: WRF615.1　　(1st bit of WRF615)

　　　　　　　　　[MICRO-EHV series]

　　　　　　　　　　Port 1: WRF061.1　　(1st bit of WRF061)

　　　　　　　　　　Port 2: WRF065.1　　(1st bit of WRF065)

　　　　　　　　　　Port 3: WRF069.1　　(1st bit of WRF069)

　　　　　　　　　　Port 4: WRF06D.1　　(1st bit of WRF06D)

　　　　　　　　　　Port 5: WRF071.1　　(1st bit of WRF071)

　　　　　　　　　　Port 6: WRF075.1　　(1st bit of WRF075)

　Cyclic sending:　　Data in the area specified as the sending area is periodically sent.

Sending cycle:　　　Set an integer from 1 to 65535 only in selecting the Cyclic sending.

　　　　　　　　　The sending cycle of the cyclic sending is "Time Base" × "Setting value of Sending

　　　　　　　　　cycle ".

Time Base:　　　　Choose '×40msec' or '×1 sec' only in selecting the Cyclic sending.

Number of Retry:　When setting Protocol to TCP/IP-Active, specifies the number of open retries when failing

　　　　　　　　　in the connection open.

Retry Interval:　　When setting to TCP/IP active station, specifies the open retry interval when failing in the

　　　　　　　　　connection open.

Data Area:　　　　Specifies the data area. One area as a receiving area and up to 10 areas as a transmission

　　　　　　　　　area can be set. Specifies I/O type, first I/O No., and Number of I/O (1 to 730).

Send mode: Specifies the send mode.

    Control Editor setting operation mode: Operates by the points of the sending area set by

                                                      Control Editor.

    Special Internal Output setting operation mode: Operates by the sending size set by the special internal

                                                      output. You can set the size from Control Editor

                                                      because the window shown in Fig.7.4.3 appears by

                                                    clicking the Setting button.

        [EHV-CPU series]

            Port 1: WRF631 – WRF63A

            Port 2: WRF641 – WRF64A

            Port 3: WRF651 – WRF65A

            Port 4: WRF661 – WRF66A

            Port 5: WRF671 – WRF67A

            Port 6: WRF681 – WRF68A

        [MICRO-EHV series]

            Port 1: WRF081 – WRF08A

            Port 2: WRF091 – WRF09A

            Port 3: WRF0A1 – WRF0AA

            Port 4: WRF0B1 – WRF0BA

            Port 5: WRF0C1 – WRF0CA

            Port 6: WRF0D1 – WRF0DA
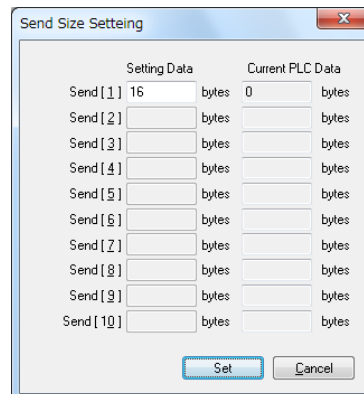
Fig. 7.4.3   Send Size Setting in Send mode

N o t e

Besides "Enable" setting, and regardless of protocol (active/passive), a user needs to control Used/Unused of ASR port in the special internal output, using ladder program. "Port open request bit" to control the Used/Unused is shown below. When the TIP/IP-Active is set, the port open request is done when the bit turns on. When the TCP/IP-Passive is set, it is the port open request standby state when the bit turns on.

<u>Port open request bit   Special internal output</u>

[EHV-CPU series]

    Port 1: WRF601.0   (0th bit of WRF601)

    Port 2: WRF605.0   (0th bit of WRF605)

    Port 3: WRF609.0   (0th bit of WRF609)

    Port 4: WRF60D.0 (0th bit of WRF60D)

    Port 5: WRF611.0   (0th bit of WRF611)

    Port 6: WRF615.0   (0th bit of WRF615)

[MICRO-EHV series]

    Port 1: WRF061.0   (0th bit of WRF061)

    Port 2: WRF065.0   (0th bit of WRF065)

    Port 3: WRF069.0   (0th bit of WRF069)

    Port 4: WRF06D.0 (0th bit of WRF06D)

    Port 5: WRF071.0   (0th bit of WRF071)

    Port 6: WRF075.0   (0th bit of WRF075)

The information is saved by clicking the [Set] button in offline mode, and the information is transferred together with program to the CPU if the box for the "CPU Communication Settings" is checked in the Download. . The setting value is directly written to the CPU by clicking the [Set] button in online mode. In both cases, the set parameters are reflected when power is restored to the CPU. If this setting window is opened without powering on the CPU again, the information before changing is displayed. Press [Ctrl] + [h] keys in order to check the parameters you have set.

(3) Modbus-TCP/RTU

Modbus-TCP server and Modbus RTU of CPU Ethernet port is set.

[EHV-CPU series]

Menu: [Tool] - [CPU Settings] - [Modbus-TCP]
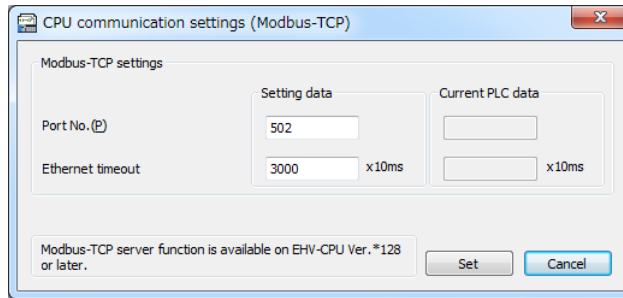
Fig. 7.4.4   Modbus-TCP setting (EHV-CPU)

Port No.:   Enter a logical port No. 502 and 1024 to 65535 are available. Port numbers including
                    ASR port and task code port cannot be overlapped.
Ethernet timeout: Set the Ethernet communication timeout value.

Note

Modbus-TCP server function is available on EHV-CPU software version *128 or higher and Control Editor Ver.
4.03 on EHV-CPU mode.

[MICRO-EHV series]

Menu: [Tool] - [CPU Settings] - [Modbus-TCP/RTU]
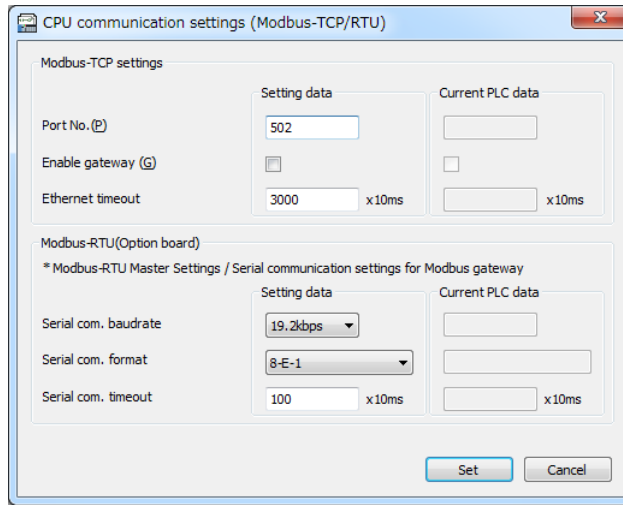
Fig. 7.4.5   Modbus-TCP/RTU setting (MICRO-EHV)

Port No.:   Enter a logical port No. 502 and 1024 to 65535 are available. Port numbers

including ASR port and task code port cannot be overlapped.

Enable gateway: Mark this checkbox when using the gateway function.

Ethernet timeout: Set the Ethernet communication timeout value.

Serial com. baudrate: Choose the serial communication baud rate.

Serial com. format: Choose the serial communication format.

Serial com. timeout: Set the serial communication timeout value.

7.5   Default Parameters of CPU

Factory default value of CPU parameter is shown in the table below.

[EHV-CPU series]

Table 7.5.1   Parameters for EHV-CPU series (factory default value)

No.	Parameter			Factory default value
1	IP address	IP Address		192. 168. 0. 1
		Subnet mask		255. 255. 255. 0
		Default getaway		0. 0. 0. 0
		Link Speed / Duplex		10Mbps/Half Duplex
2	NTP	Enable / Disable		Disable
		Time zone		GMT + 09:00
3	Serial communication	Purpose		Programming
		Port type		RS-232C
		Baud rate		38.4 kbps
		Protocol		Procedure 1 (1:1)
		Modem mode		None
4	Ethernet (task code)	Port 1	Enable/Disable	Enable
			No.	3004
			Protocol	TCP/IP
		Port 2	Enable/Disable	Enable
			No.	3005
			Protocol	TCP/IP
		Port 3	Enable/Disable	Enable
			No.	3006
			Protocol	TCP/IP
		Port 4	Enable/Disable	Enable
			No.	3007
			Protocol	TCP/IP
		Modem Timeout		30
5	Ethernet (ASR)	Port 1 Enable/Disable		Disable
		Port 2 Enable/Disable		Disable
		Port 3 Enable/Disable		Disable
		Port 4 Enable/Disable		Disable
		Port 5 Enable/Disable		Disable
		Port 6 Enable/Disable		Disable
6	Modbus-TCP	Port No.		502
		Ethernet timeout		3000

Note

Modbus-TCP server function is available on EHV-CPU software version *128 or higher and Control Editor Ver. 4.03 on EHV-CPU mode.

[MICRO-EHV series]

Table 7.5.2   Parameters for MICRO-EHV series (factory default value)

No.	Parameter			Factory default value
1	IP address	IP Address		192. 168. 0. 1
		Subnet mask		255. 255. 255. 0
		Default getaway		0. 0. 0. 0
		Link Speed / Duplex		AUTO
2	NTP	Enable / Disable		Disable
		Time zone		GMT + 09:00
3	Serial communication	Purpose		Programming
		Port type		RS-232C
		Baud rate		38.4 kbps
		Protocol		Procedure 1 (1:1)
4	Ethernet (task code)	Port 1	Enable/Disable	Enable
			No.	3004
			Protocol	TCP/IP
		Port 2	Enable/Disable	Enable
			No.	3005
			Protocol	TCP/IP
		Port 3	Enable/Disable	Enable
			No.	3006
			Protocol	TCP/IP
		Port 4	Enable/Disable	Enable
			No.	3007
			Protocol	TCP/IP
		Modem Timeout		30
5	Ethernet (ASR)	Port 1 Enable/Disable		Disable
		Port 2 Enable/Disable		Disable
		Port 3 Enable/Disable		Disable
		Port 4 Enable/Disable		Disable
		Port 5 Enable/Disable		Disable
		Port 6 Enable/Disable		Disable
6	Modbus-TCP/RTU	Port No.		502
		Enable gateway		Disable
		Ethernet timeout		3000
		Serial com. baudrate		38.4kbps
		Serial com. format		8-E-1
		Serial com. timeout		100

7.6   CPU Calendar Clock Setting

Clock information of CPU can be set.

    Menu: [Tool] - [CPU Settings] - [Calendar Clock]

    Project tree: | CPU Parameters |—| Calendar clock |
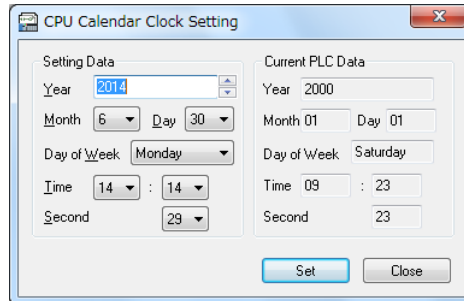
Fig. 7.6.1   CPU Calendar setting

The calendar (real time clock) inside the CPU is set. The right side on the window is the set value and the default value is the clock data in the personal computer. The left side on the window is the current value and it is monitored on real time. When clicking the [Set] button, the set value on the right is written into the CPU.

7.7   Option Board Setting

This is a setting for Option board for MICRO-EHV series.

Menu: [Tool] - [CPU Settings] - [Option board settings]

Project tree: CPU Parameters —— Option board settings

(1) RS-232C
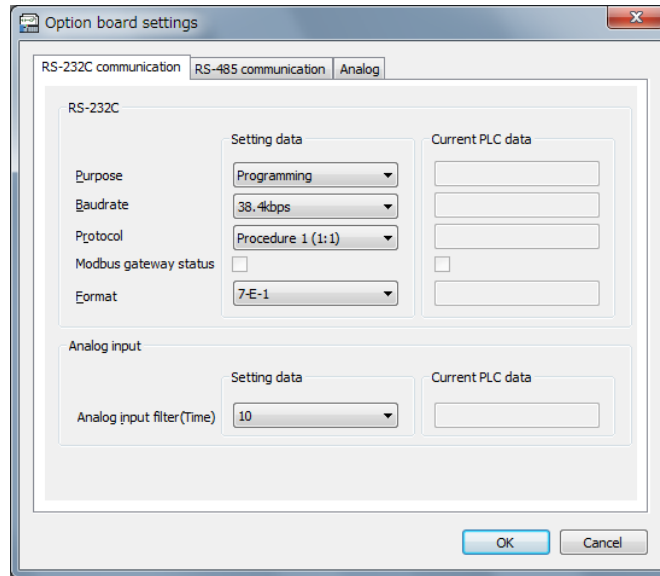
Fig. 7.7.1   Option board settings (RS-232C)

Purpose:	Choose one from 4 types below.
Programming:	This is a port used only for Hitachi H-Protocol. This is used when connecting Control Editor and a touch panel. If a device such as a PC sends messages conforming to H-Protocol, CPU responds automatically.
General purpose:	This is a port used for Serial communication with general-purpose devices such as a bar code reader and a thermostat. User creates data which is sent and received by general-purpose port on the user program using TRNS and RECV commands.
Modbus Master:	This is a port used for communicating with external devices that supports Modbus serial communication protocols. CPU receives the response from external devices to the query. Users are required to create the query data on the user program using MBMST or INVn commands.
Modbus Slave:	This is a port used for communicating with an external device that supports Modbus serial communication protocols. CPU automatically responds to the query from an external device.
Baudrate:	Choose one from 4.8kbps to 115.2kbps in case of programming port. This is valid only when the setting of "Purpose" is Programming or Modbus Slave.
Protocol:	Choose one from Procedure 1 (1:1) and Procedure 2 (1:1) in case of programming port. This is valid only when the setting of "Purpose" is Programming.

Modbus gateway status: This is marked when the gateway function of Modbus-TCP/RTU is enabled in CPU communication settings.

Format: Users can select the combination of Data Bits (7-bit/8-bit) and Parity (Even/Odd/None), Stop Bits (1-bit/2-bit).

This is valid when setting of "Purpose" is Programming or Modbus Slave.

Analog input filter: Set the number of sampling times of analog input by 1 to 40.

(2) RS-485
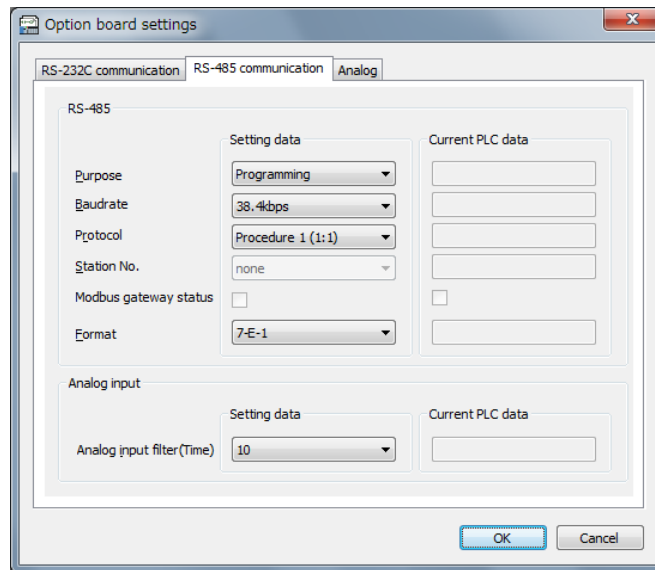
Fig. 7.7.2   Option board settings (RS-485)

Purpose: This is same as RS-232C setting.

Baudrate: This is same as RS-232C setting.

Protocol: Choose one from Procedure 1 (1:1), Procedure 1 (1:n), Procedure 2 (1:1) and Procedure 2 (1:n) in case of programming port.

This is valid only when the setting of Purpose is "Programming".

Station No.:   If the setting of Protocol is "(1:n)", the configuration of Station No. (0-31) is required. Also when the setting of purpose is "Modbus Slave", this is required.

Modbus gateway status: This is same as RS-232C setting.

Format: This is same as RS-232C setting.

Analog input filter: This is same as RS-232C setting.

Target option board : OBV-485A, OBV-485TAI

(3) Analog
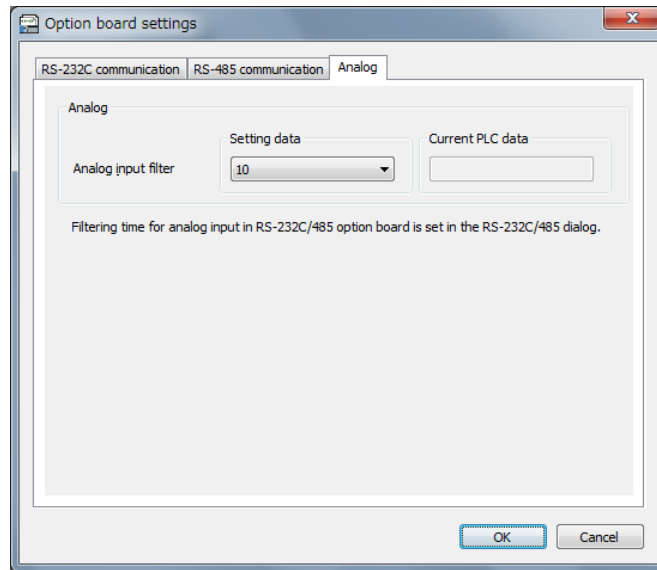
Fig. 7.7.3   Option Board Setting(Analog communication)

Analog input filter: Set filtering times for analog input of the option board.

Target option board : OBV-AIO

MEMO

Chapter 8   Print and Option Settings

8.1   Print

Print of a ladder diagram and items regarding print are set.

Menu: [File] - [Print]

Icon:

Menu: [File] - [Print preview]

Icon:

(1) Print of Ladder diagram

The Print setting dialog is shown in Fig.8.1.1.
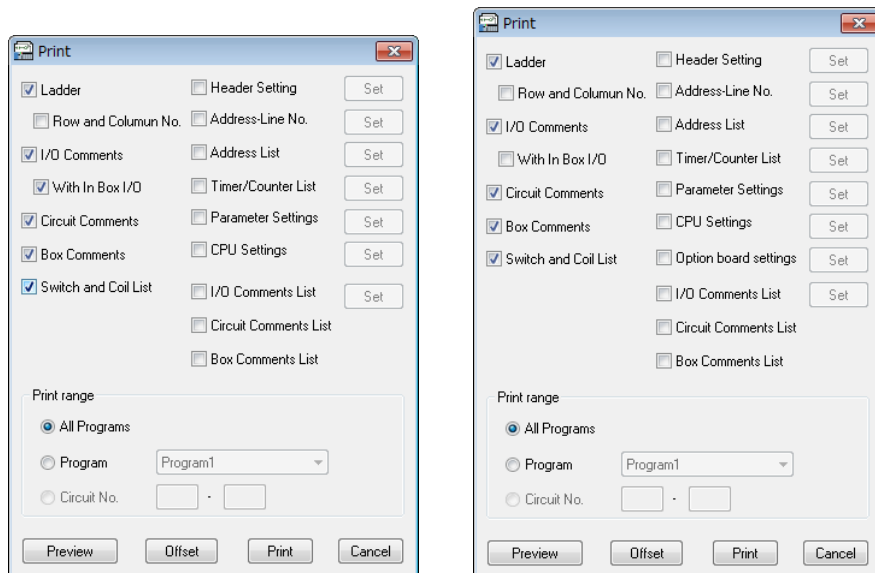
Fig. 8.1.1   Print setting dialog (Left: EHV-CPU series, Right: MICRO-EHV series)

1] Row and Column No.

Choose whether to print the Row and Column No. to a ladder diagram which is printed.

2] I/O Comments

Choose whether to print I/O comments to a ladder diagram which is printed.

3] With In Box I/O

Choose whether to print I/O comments to I/O addresses in processing boxes.

4] Circuit Comments

Choose whether to print circuit comments to a ladder diagram which is printed.

5] Box Comments

Choose whether to print box comments to a ladder diagram which is printed.

6] Switch and Coil List

Choose whether to print switch and coil list to a ladder diagram which is printed.

Printing, printing fonts by extending the print range to reduce the margin than Ver.6.00 is now easy to see increases. Refer to Fig. 8.1.2 Ladder print example (Ver.6.00 or higher).
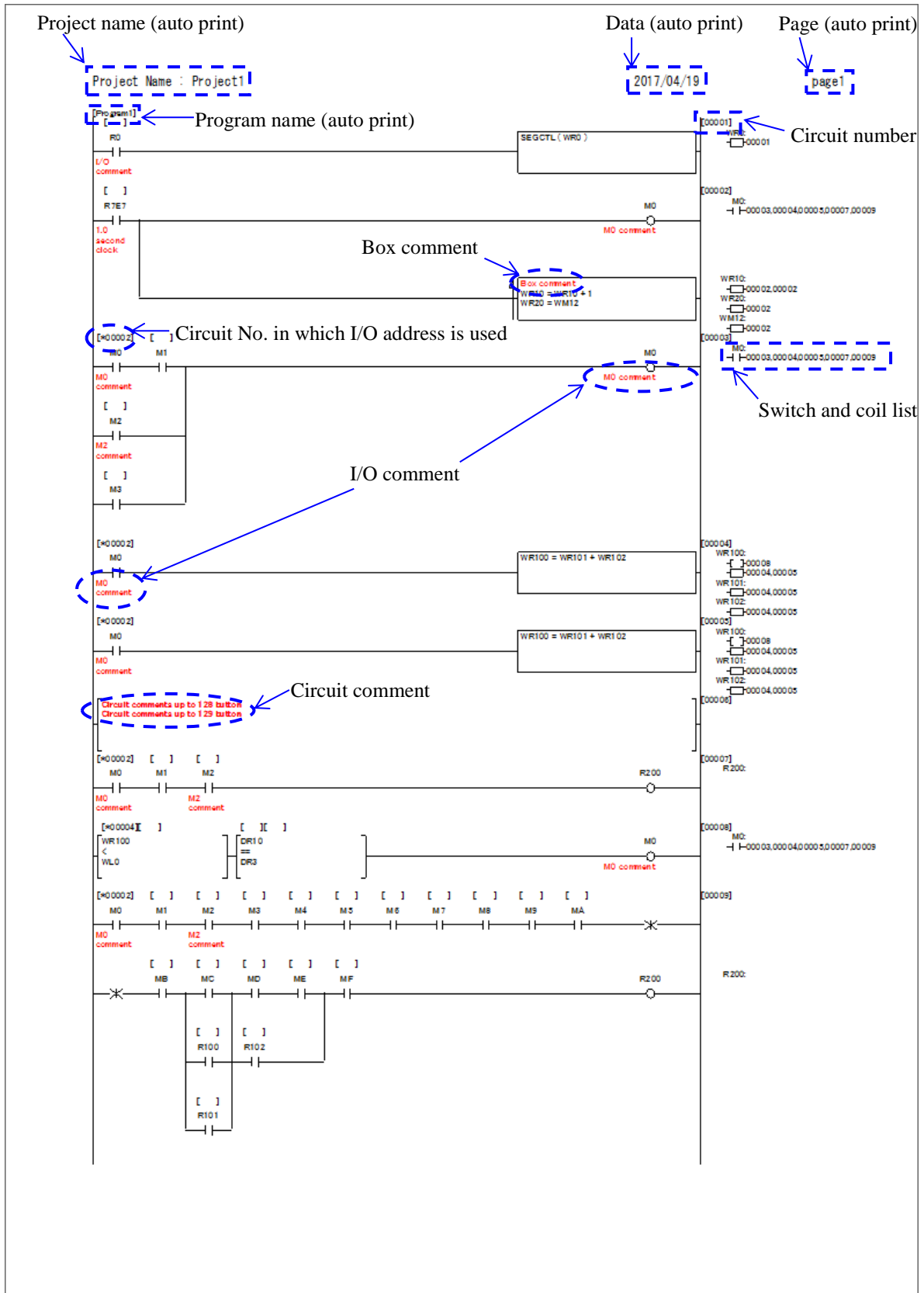
Fig. 8.1.2　Example of print of Ladder diagram

(2) Print

The dialog for printing as follows is displayed by clicking the [Print] button at the bottom of the Print dialog. Set the Printer to use, the Print range and the Copies. The printing is started by clicking the [OK] button. Refer to manuals attached to the printers which are being used, for various settings of printers.

The dialog for printing depends on the operating system used in the computer.
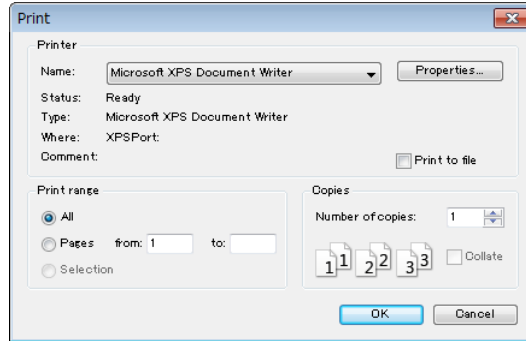
Fig. 8.1.3   Print dialog

(3) Cover setting

The Cover Setting dialog shown in Fig.8.1.4 appears by clicking the [Set] button to the right after checking the check box for Header Setting. Enter items printed on the cover sheet.
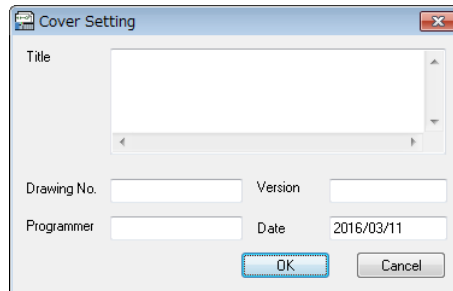
Fig. 8.1.4   Cover Setting

In addition, the number of input able characters is as follows.

Table 8.1.1   The number of input able characters

No.	Item	Number of characters which can be input
1	Title	512 characters
2	DWG No.	16 characters
3	Programmer	16 characters
4	Version	16 characters
5	Date	Date of system (changeable by user)

Example of cover is shown in Fig.8.1.5

```
                                             8 - 4                                        page1




        ==============================================================================
        [Title]
         SAMPLE program
        ==============================================================================

















        [DWGNo. ]:xxxxxx                    [Version]:2.16
        ------------------------------------------------------------------------------
        [Programmer]:AAA                    [Date]:2009/02/16
        ------------------------------------------------------------------------------
```
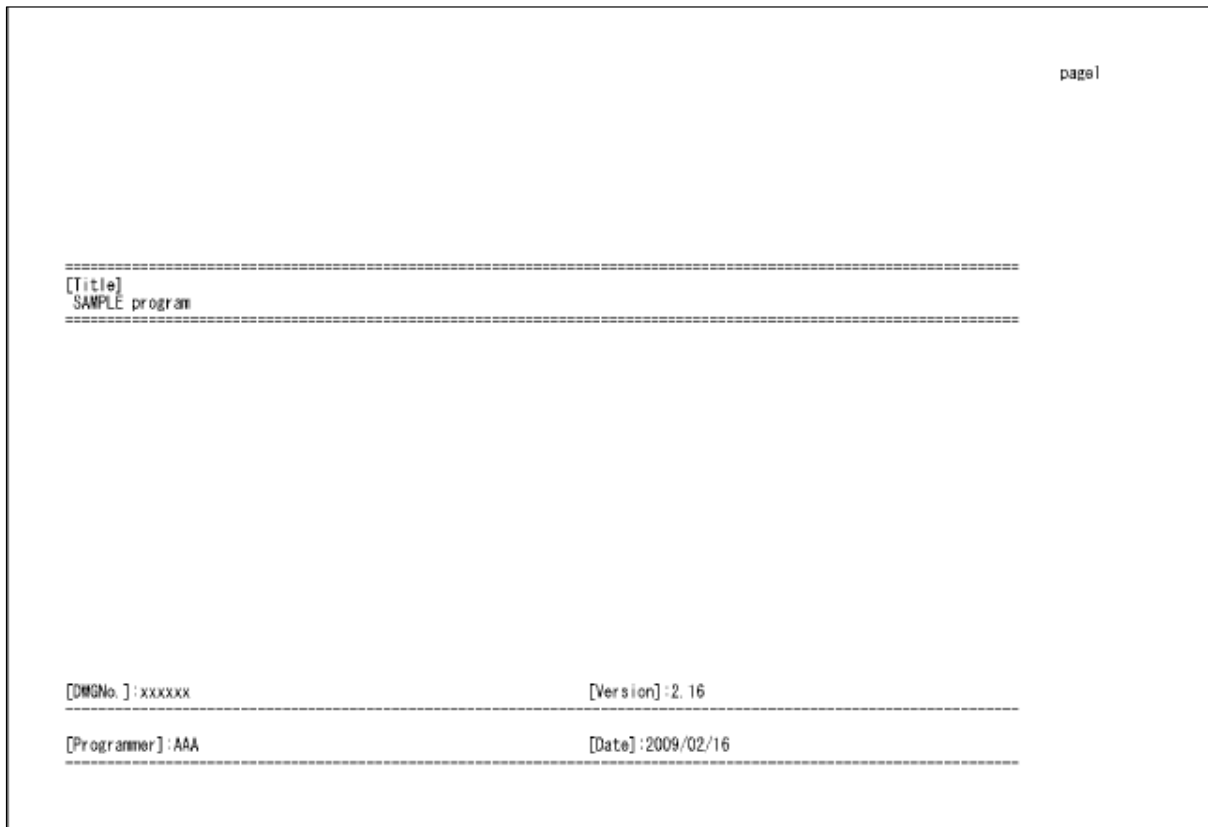
Fig. 8.1.5   Example of cover

(4) Address-Line No.

When checking the check box for Address-Line No. and clicking the [Set] button to the right of it, the following

dialog appears.
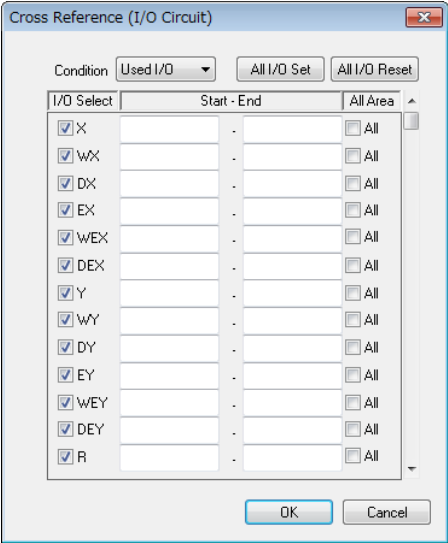
Fig. 8.1.6   Address-Line No. output setting

1] Condition

Choose one from Used I/O, All I/O, and Unused I/O.

2] All I/O Set

Click this button when checking all check boxes of I/O Select and All Area.

3] All I/O Reset

Click this button when clearing all check boxes of I/O Select and All area.

4] I/O Select

Select whether to print I/O address individually.

5] Start – End

Enter the start and end I/O addresses of a print range of selected I/O type.

6] All Area

Check this box when specifying all range of selected I/O type.

Example of print of Address-Line No. is shown below.

Fig. 8.1.7   Example of print of Address-Line No.

(5) Address List

When checking the check box for Address List and clicking the [Set] button to the right of it, the following dialog appears.
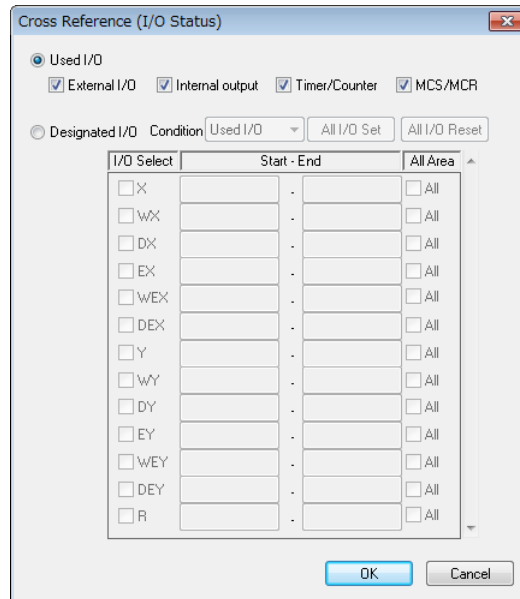
Fig. 8.1.8   Address List output setting

1] Used I/O

Select this when specifying all of used I/O.

2] External I/O

Select whether to print external I/O and expansion I/O in used I/Os.

3] Internal output

Select whether to print internal output in used I/Os.

4] Timer/Counter

Select whether to print timer/counter in used I/Os.

5] MCS/MCR

Select whether to print MCS/MCR in used I/Os.

6] Designated I/O

Select this when specifying any I/O address.

7] Condition

Choose one from Used I/O, All I/O, and Unused I/O.

8] All I/O Set

Click this button when checking all check boxes of I/O Select and All Area.

9] All I/O Reset

Click this button when clearing all check boxes of I/O Select and All Area.

10] I/O Select

Select whether to print I/O address individually.

11] Start – End

Enter the start and end I/O addresses of a print range of selected I/O type.

12] All Area

Check this box when specifying all range of selected I/O type.

Example of print of Address List is shown

Fig. 8.1.9   Example of print of Address List

(6) Timer/Counter List

When checking the check box for Timer/Counter List and clicking the [Set] button to the right of it, the following dialog appears.
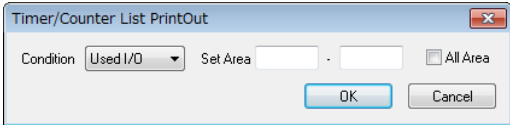
Fig. 8.1.10   Timer/Counter List setting

1] Condition

Choose one from Used I/O, All I/O, and Unused I/O.

2] Set Area

Specify a print range in the range 0 to 2559.

3] All Area

Check this box when specifying all range from 0 to 2559.

Example of print of Timer/Counter List is shown below.

Fig. 8.1.11   Example of print of Timer/Counter List

(7) Parameter Settings

When checking the check box for Parameter Settings and clicking the [Set] button to the right it, the following dialog appears.
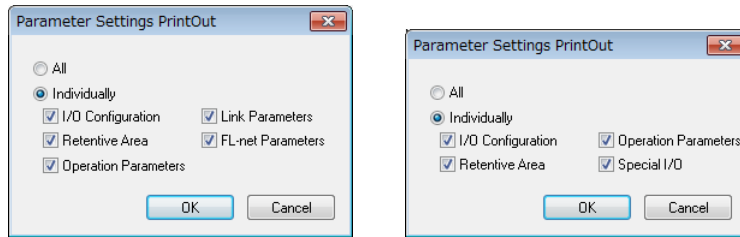
Fig. 8.1.12   Parameter Settings (Left: EHV-CPU series, Right: MICRO-EHV series)

[EHV-CPU series]

1] All

Select this when printing all of I/O configuration, retentive area, operation parameters, and link parameters.

2] Individually

Select this when printing I/O configuration, retentive area, operation parameters, and link parameters individually.

[MICRO-EHV series]

1] All

Select this when printing all of I/O configuration, retentive area, operation parameters, and special I/O setting.

2] Individually

Select this when printing I/O configuration, retentive area, operation parameters, and special I/O individually.

Example of print of parameter settings is shown below.

Fig. 8.1.13   Example of print of Parameter Settings

(8) CPU Settings

When checking the check box for CPU Settings and clicking the [Set] button to the right of it, the following dialog appears.
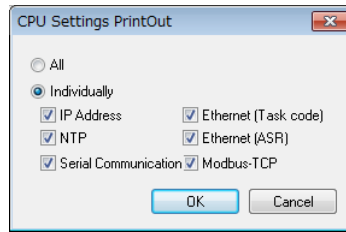
Fig. 8.1.14   CPU Settings

1] All

Select this when printing all of IP address, NTP, Serial communication, Ethernet (task code), Ethernet (ASR) and Modbus-TCP settings.

2] Individually

Select this when printing IP address, NTP, Serial communication, Ethernet (task code), Ethernet (ASR) and Modbus-TCP settings individually.

Example of print of CPU Settings is shown below.

Fig. 8.1.15   Example of print of CPU Settings

(9) Option board Settings (Only for MICRO-EHV)

When checking the check box for Option board Settings and clicking the [Set] button to the right of it, the

following dialog appears.
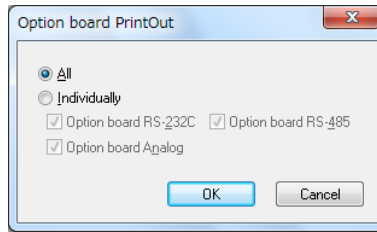
Fig. 8.1.16   Option board

1] All

Select this when printing the settings of RS-232C, RS-485 and Analog.

2] Individually

Select this when printing the settings of RS-232C, RS-485 and Analog individually.

Example of print of Option board Settings is shown below.
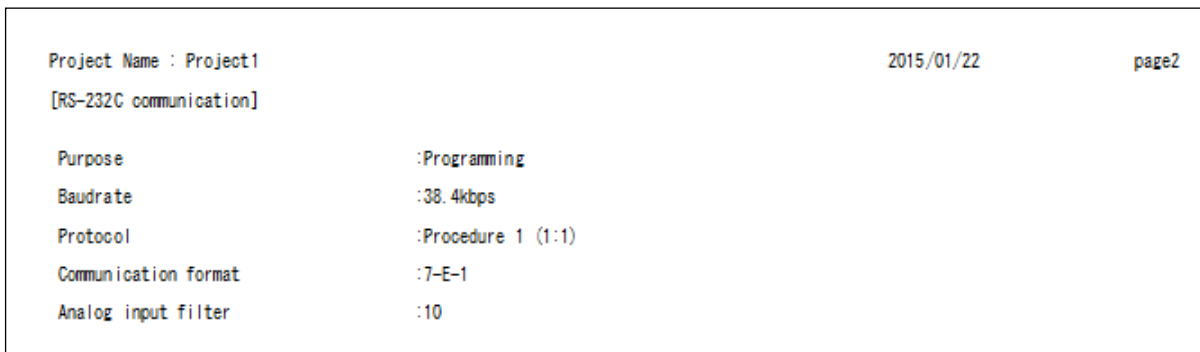
Fig. 8.1.17   Example of print of Option board Settings

(10) I/O Comments List

When checking the check box for I/O Comments List and clicking the [Set] button to the right of it, the following dialog appears.
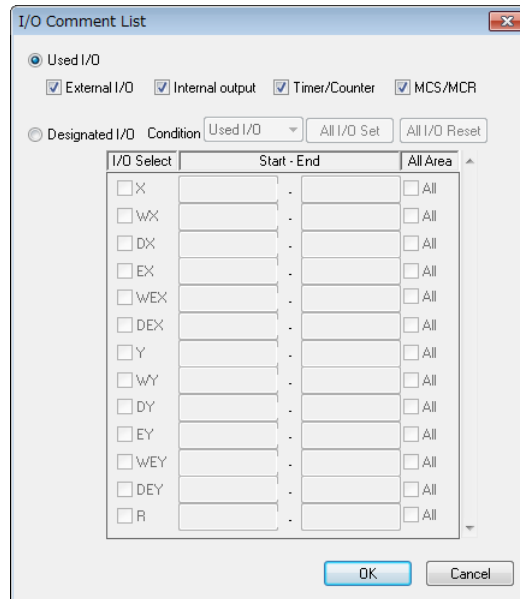
Fig. 8.1.18   I/O Comments List

1] Used I/O

Select this when specifying all used I/O.

2] External I/O

Select whether to print external I/O and expansion I/O in used I/O.

3] Internal output

Select whether to print internal output in used I/O.

4] Timer/Counter

Select whether to print timer/counter in used I/O.

5] MCS/MCR

Select whether to print MCS/MCR in used I/O.

6] Designated I/O

Select this when specifying any I/O address.

7] Condition

Choose one from Used I/O, All I/O, and Unused I/O.

8] All I/O Set

Click this button when checking all check boxes of I/O Select and All Area.

9] All I/O Reset

Click this button when clearing all check boxes of I/O Select and All Area.

10] I/O Select

Select whether to print I/O address individually.

11] Start – End

Enter the start and end I/O address of a print range of selected I/O type.

12] All Area

Check this box when specifying all range of selected I/O type.

Example of print of I/O Comments List is shown below.

```
Project Name : Project1                          2009/02/17        page2


Address     :R0 - RFFF Used I/O
Program     :All Programs

  I/O Address                                Comment

 R7CA        User memory error
 R7DE        Link module error
 R7E3        First scan ON
 R7E4        Always ON
 R7E5        0.02 second clock
```

Fig. 8.1.19   Example of print of I/O Comments List

(11) Circuit Comments List

When checking the check box for Circuit Comments List and clicking the [Print] button at the bottom of the Print

dialog, the circuit comments list is printed.

```
Project Name : Project1                          2009/02/17        page2


Program     :All Programs

Row No.   Cir. No.    Program Name                  Comment

    4        2     Program1        This is Circuit comments - xxxxxxxxxx
```

Fig. 8.1.20   Example of print of Circuit Comments List

(12) Box Comments List

When checking the check box for Box Comments List and clicking the [Print] button at the bottom of the Print

dialog, the box comments list is printed.

```
Project Name : Project1                          2009/02/17        page2


Program     :All Programs

Row No.   Cir. No.    Program Name                  Comment

    1        1     Program1        Box comment - xxxxx
```

Fig. 8.1.21   Example of print of Box Comments List

(13) Print range

The print range can be chosen from All Programs, Program, and Circuit No.. When choosing the "Program",

select one from pull-down menu and when choosing the "Circuit No.", specify the start and end circuit No. of a

range.

(14) Preview

You can check print images of selected items on the window by clicking the [Preview] button at the bottom of the Print dialog.

(15) Offset

The following dialog is displayed by clicking the [Offset] button at the bottom of the Print dialog.
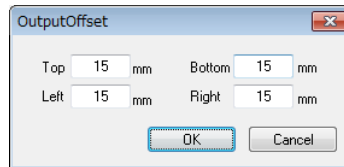
Fig. 8.1.22   Offset dialog

The margins (left, right, top and bottom) on a page can be set on this dialog. The settable range is from 0 to 50. When the margins are set, objects such as a ladder diagram, etc. are printed with reduced-size appropriate to the margin.

8.2   Option Settings

Option functions of Control Editor are set.

     Menu: [Tool] - [Options]
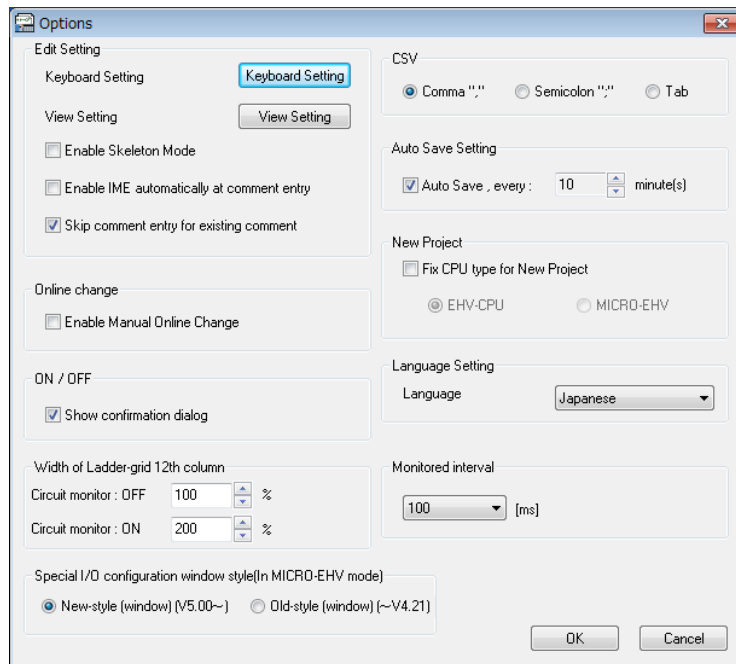
Fig. 8.2.1   Options window

(1) Shortcut Key setting

    Shortcut keys of each symbol and operation are set. By clicking the [Keyboard Setting] button in the above

    Options window, the following window appears.
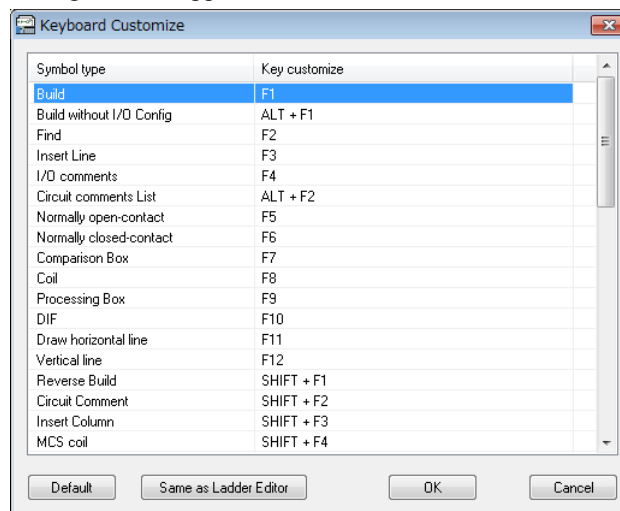
Fig. 8.2.2   Keyboard Customize window

Default: Key codes are changed back to the default setting.

Save as Ladder Editor: Key codes are set to the same assignment as LADDER EDITOR which is

                                     Hitachi's programming software.

By pressing the [Enter] key after selecting a line, or by double-clicking a line, the Key setting dialog appears.

Press directly any key you want to set as a shortcut key. The pressed keys are indicated and set by clicking the

[OK] button as a shortcut key.
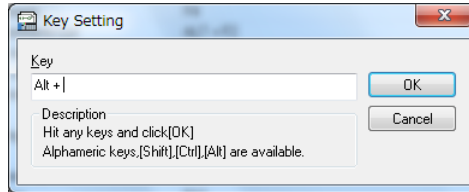
Fig. 8.2.3   Key Setting window

Table 8.2.1   Default setting of Shortcut key

No.	Shortcut key Operation	Default	Click [Same as Ladder Editor] button
1	Build	F1	Ctrl + E
2	Build without I/O Configuration	Alt + F1	Alt + F1
3	Find	F2	Ctrl + F
4	Insert line	F3	Ctrl + L
5	IO comments	F4	Shift + I
6	Circuit Comment List	Alt + F2	Alt + F2
7	Normally open-contact	F5	Shift + A
8	Normally closed-contact	F6	Shift + B
9	Comparison Box	F7	Shift + M
10	Coil	F8	Shift + C
11	Processing Box	F9	Shift + P
12	DIF	F10	Shift + U
13	Draw horizontal line	F11	Ctrl + Shift + V
14	Vertical line	F12	Shift + V
15	Reverse Build	Shift + F1	Ctrl + U
16	Circuit Comment	Shift + F2	Shift + K
17	Insert Column	Shift + F3	Ctrl + J
18	MCS coil	Shift + F4	Ctrl + Shift + S
19	Normally open-contact (OR connection)	Shift + F5	Ctrl + Shift + A
20	Normally closed-contact (OR connection)	Shift + F6	Ctrl + Shift + B
21	Set Coil	Shift + F7	Shift + S
22	EU coil	Shift + F8	Ctrl + Shift + U
23	EU processing box	Shift + F9	Shift + W
24	DFN	Shift + F10	Shift + D
25	Horizontal line	Shift + F11	Shift + H
26	Delete vertical line	Shift + F12	Shift + Del
27	Link Parameters	Ctrl + F1	Ctrl + F1
28	FL-net	Ctrl + F2	Ctrl + F2
29	ED coil	Ctrl + F3	Ctrl + Shift + D
30	MCR coil	Ctrl + F4	Ctrl + Shift + R
31	NOT	Ctrl + F5	Shift + N
32	Loop back	Ctrl + F6	Shift + L
33	Reset coil	Ctrl + F7	Shift + R
34	Timer / Counter	Ctrl + F8	Shift + T
35	ED processing box	Ctrl + F9	Shift + Q
36	I/O Configuration	Ctrl + F10	Ctrl + F10
37	Retentive Area	Ctrl + F11	Ctrl + F11
38	Operation Parameters	Ctrl + F12	Ctrl + F12
39	Circuit monitor	Alt + F5	Alt + F5
40	Set / Reset	Alt + F6	Alt + F6
41	Online	Alt + F7	Alt + F7
42	Offline	Alt + F8	Alt + F8
43	On-Direct	Alt + F9	Alt + F9
44	RUN	Alt + F10	Alt + F10
45	STOP	Alt + F11	Alt + F11
46	BIN / DEC / HEX	Ctrl + H	Ctrl + H
47	ON / OFF	Alt + I	Alt + I
48	Paste Mode (Insert)	Insert	Insert

(2) View Setting

Display colors of Ladder, Font, etc are set.

In Ver.6.00 or higher, the display content of the view setting window has been changed.
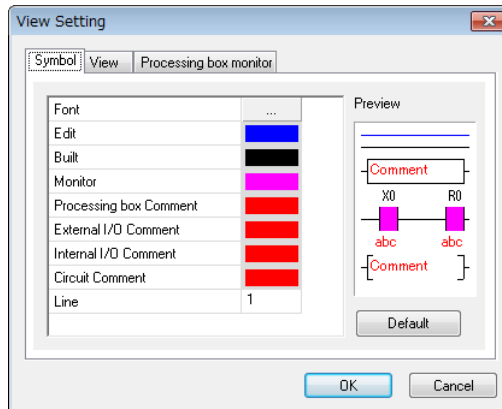
Fig. 8.2.4   View setting window
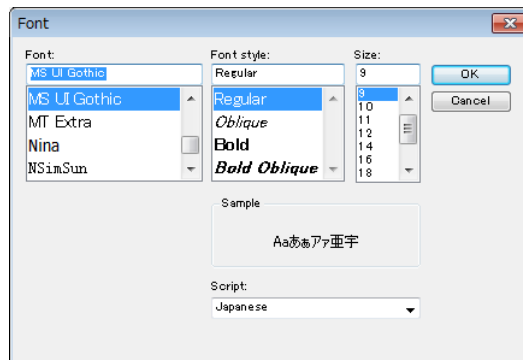
Fig. 8.2.5   Font setting window

Font:	Displays Font setting window. (Fig. 8.2.5)
Edit:	Specifies the display color of Circuit and Circuit No. being editing.
Built:	Specifies the display color of Circuit built already.
Monitor:	Specifies the display color of the ON state for Contact and Coil.
Processing box Comment:	Specifies the text color of Box comments.
External I/O Comment:	Specifies the text color of External I/O comments.
Internal I/O Comment:	Specifies the text color of Internal I/O comments.
Circuit Comment:	Specifies ther text color of Circuit comments.
Line:	Specifies the display line width of Circuit.

Table 8.2.2   I/O division and I/O type

I/O type \ I/O division	Bit I/O					Word I/O				Double word I/O		
	X Y	EX EY	R L M	TD SS MS CU CT	TDN WDT TMR RCU	WX WY	WEX WEY	WR WL WM WN	TC	DX DY	DEX DEY	DR DL DM DN
External I/O	✓					✓				✓		
Internal I/O		✓	✓	✓			✓	✓	✓		✓	✓

✓ : Corresponding I/O

In Ver.6.02 or higher, the setting content of the view setting window has been changed.
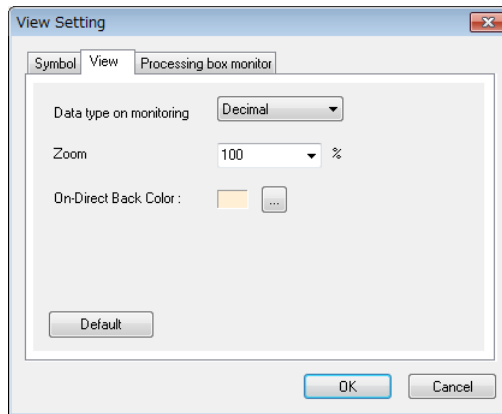
Fig. 8.2.6   View setting

Data type on monitoring: Specifies the data type on monitoring (Decimal / Hexadecimal)

Zoom: Specifies the display magnification at the ladder window.

On Direct Back Color: Switch the back color of the ladder window during on direct mode. Switching the back color makes it easier to understand the mode currently being operated.

* Current Control Editor does not support the Range of Master Control function.

- In Ver. 6.02 or higher, Master control range color setting has been changed to background color display setting in on direct mode.
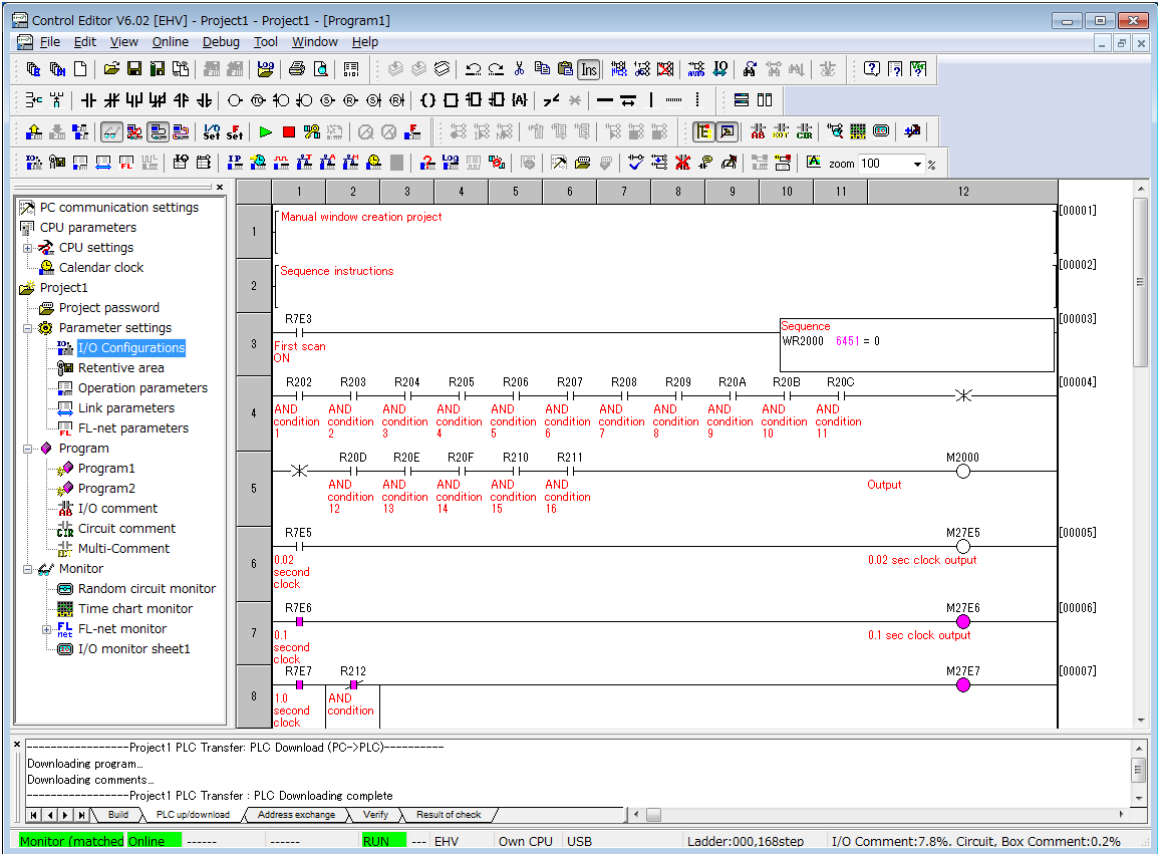
Fig. 8.2.7   Ladder Window Background Color (Online Mode)
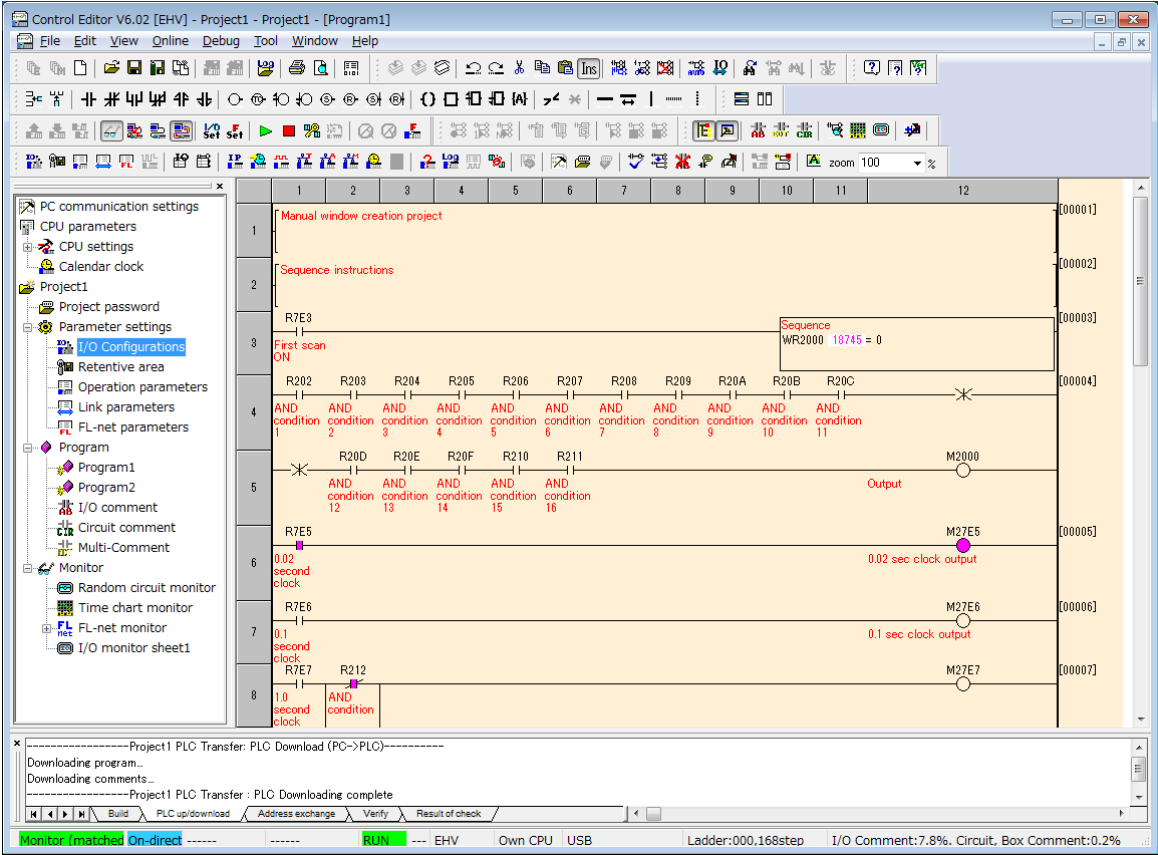
Fig. 8.2.8   Ladder Window Background Color (On Direct Mode)
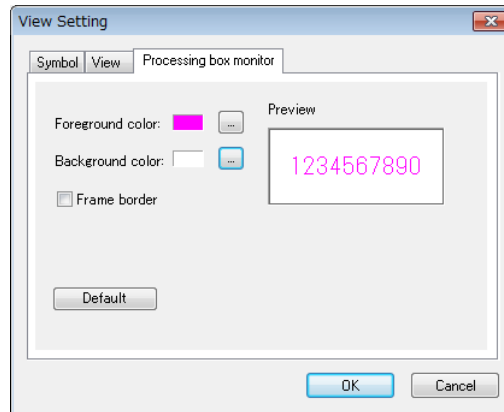
Fig. 8.2.9   Processing box monitor setting

Foreground color: Specifies the text color of the current value displayed on processing box.

Background color: Specifies the background color of the current value displayed on processing box.

Frame border: Flame border is displayed on the area of the current value.

Reference

Color of the circuit comment can be changed from Ver.2.14.

The setting of processing box monitor can be changed from Ver.5.00.

The display color setting of the I/O comment can be changed individually from Ver. 6.00 by 1] Processing box comments, 2] External I/O comments, 3] Internal I/O comments.

(3) Skeleton Mode

The Ladder program is displayed in the Skeleton Mode by checking the check box for the "Enable Skeleton Mode" on the Options dialog. The Skeleton mode is a mode to input only symbol without inputting I/O address and comments. When a program written on a paper is transplanted, the usage of inputting only ladder symbols beforehand and inputting I/O No., comments and arithmetic expressions afterwards can be done. Since there is no I/O address, error occurs in the Build operation and the circuit cannot be transferred to CPU.
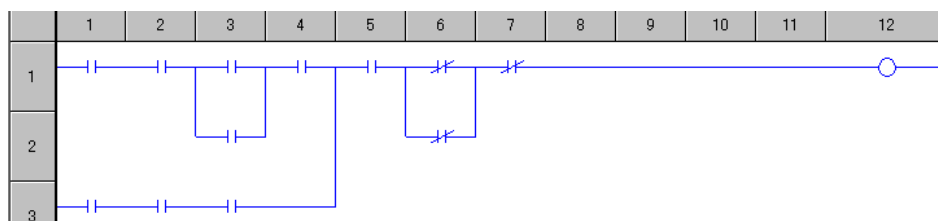
Fig. 8.2.10   Skeleton Mode

(4) Enable IME automatically at comment entry

When the cursor comes to comment entry field, input mode changes to IME automatically since Ver.2.11. This function can be disabled in the option settings (Ver.4.06 or higher).

(5) Skip comment entry for existing comment (Ver.4.06 or higher)

If [Enter] key is hit at I/O Address and comment data has been already input, comment entry is skipped and the window will close.

[Enabled]   [Disabled]
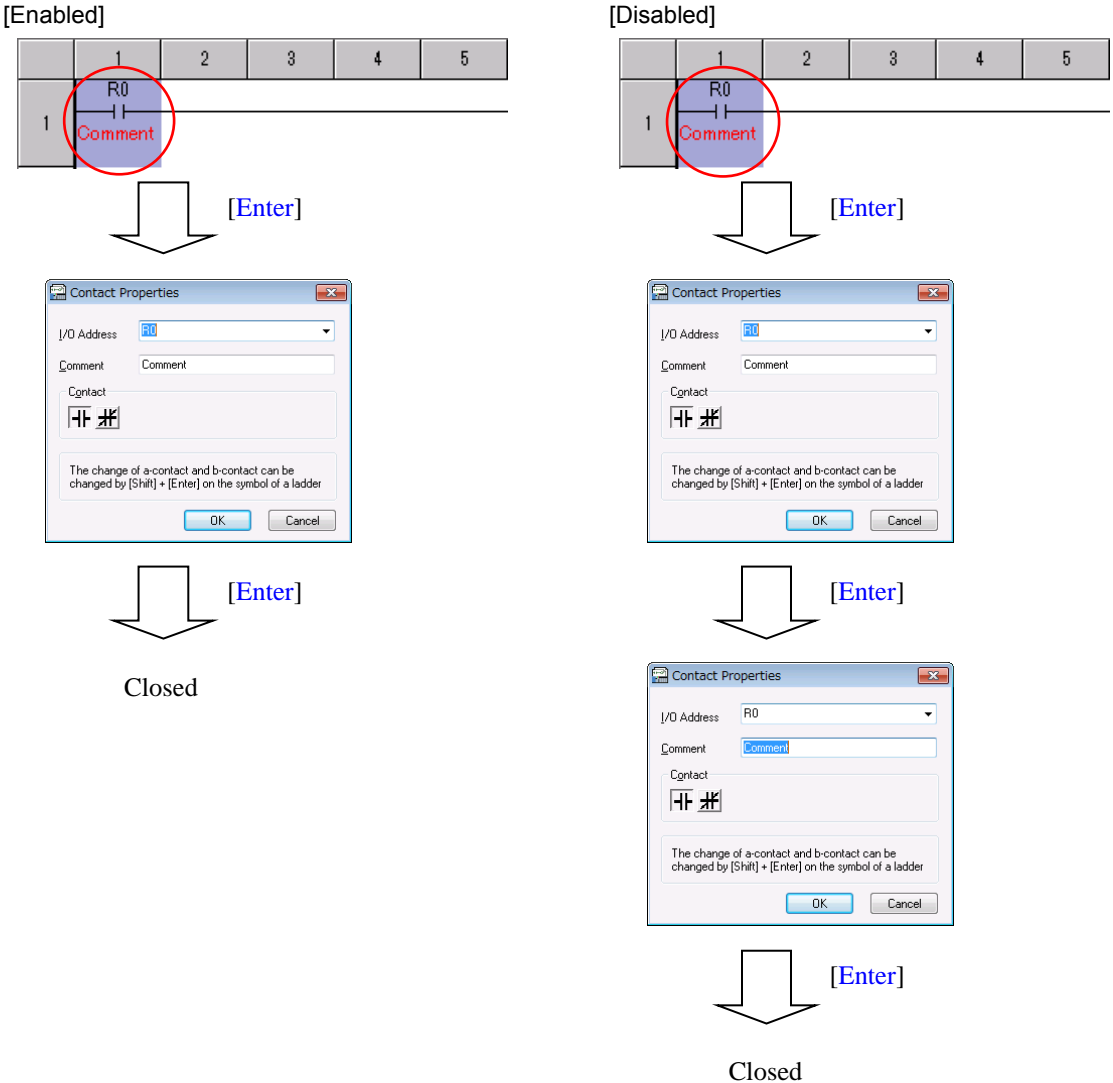
Fig. 8.2.11   Enable comment entry for existing comment

(6) Setting of Online change in RUN   ---   Enable Manual Online change

This is a mode to execute Online change in RUN at the target timing of user. In normal Online change, there is a lag is different according to a size of the changing program and the communication status, the program change at the target timing is sometimes difficult. If "Enable Manual Online Change" is marked, the following message is displayed immediately before CPU changes the program after executing the Build operation, and the program can be changed anytime. It switches to the changed program from the moment the [OK] button is pushed.

Flow of Online change in RUN

```
        ┌─────────────────────────────────────┐
        │  Delete/change/addition of program  │◄──────┐
        └─────────────────────────────────────┘       │
                          │                            │
                          ▼                            │
        ┌─────────────────────────────────────┐        │
        │  [icon]          Build               │        │
        └─────────────────────────────────────┘        │
                          │                            │
                          ▼                            │
        ┌──────────────────────────────┐               │
        │ ControlEditor            [X]  │     NO        │
        │  Continue program downloading?│───────────────┘
        │  ☐ Download comments.         │
        │  (it may take some time.)     │
        │   [Yes(Y)]      [No(N)]       │
        └──────────────────────────────┘
                          │ YES
                          ▼
        ┌───────────────────────────────────────┐
        │ Data transfer (Communication processing)│
        └───────────────────────────────────────┘
                          │
                          ▼
        ┌───────────────────────────────────┐
        │  Memory rewriting processing in CPU│
        └───────────────────────────────────┘
                          │
                          ▼
        ┌───────────────────────────┐
        │  Ready for program change  │
        └───────────────────────────┘
                          │
                          ▼
             ◇ Setting of Online change ◇ ──── Displayed message
                    in RUN
```

Message

```
┌──────────────────────────────────┐
│ ControlEditor                [X]  │
│ ⚠  New program has been transferred.│
│    Click OK to effect online change.│
│            [OK]                   │
└──────────────────────────────────┘
```

No message

Old program
....
New program

┌─────────────────────────────┐
│ Program memory switching   │
└─────────────────────────────┘

If the check box for "Enable Manual Online Change" is checked, the message is displayed immediately before the program is switched, and it is on standby for the Online change in RUN.

Fig. 8.2.12   Verification of Online change in RUN

(7) ON/OFF Show confirmation dialog (Ver.4.06 or higher)

It is possible to write 1 or 0 by right mouse clicking and choosing ON/OFF at a contact (Ver.4.06 or higher). When this function is used, the confirmation dialog shown at Fig. 8.2.13 appears before writing contact. If "Do not show this message again" is enabled, this message will not appear. This dialog can be shown again by enabling "Show confirmation dialog" in the option settings.
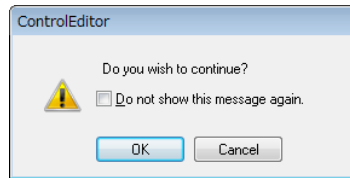
Fig. 8.2.13   Confirmation dialog

(8) Width of Ladder-grid 12th column

The width of 12th column has been configurable from 1 to 400% since Ver.4.10 so that long formula can be displayed in one line. The default value is 100%, which is same width as previous version.

In Ver.5.00 or higher, the current value of the used I/O in processing box is displayed on the right side of the I/O. Therefore, the display height of processing box on monitoring may become higher than stopping monitoring. Hereupon, the display width on monitoring can be set in addition to previous setting. The default width setting on monitoring is 200%. The display width is automatically changed on monitoring. And the display width automatically becomes normal on stopping monitoring.
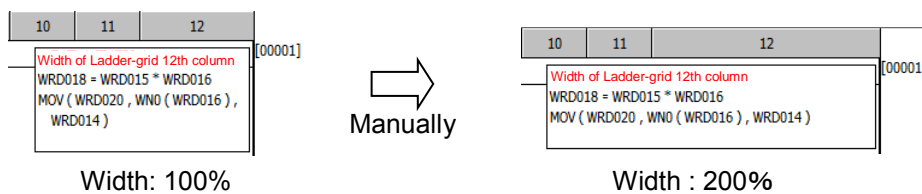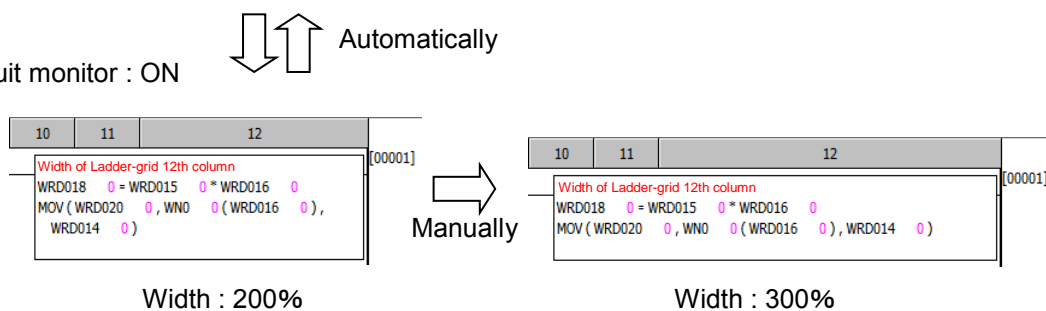
Fig. 8.2.14   Width of Ladder-grid 12th column

(9) Setting of CSV file

Although the monitor data and the I/O comment data in the I/O monitor sheet can be saved to CSV format, the delimiter of CSV data can be set. It is set apart by a comma "," usually in Japan, but it is set apart by a semicolon ";" in a part of Europe. Therefore, the data format can be change by this setting.

In Ver.5.00 or higher, a "tab" can be set as the delimiter. In Ver.4.21 or lower, CSV data is absolutely saved by the delimiter selected here. Though, in Ver.5.00 or higher, the delimiter selected here become the default setting. Therefore, the delimiter can be selected again when CSV data is saved. In [Open], the delimiter can be selected, too.
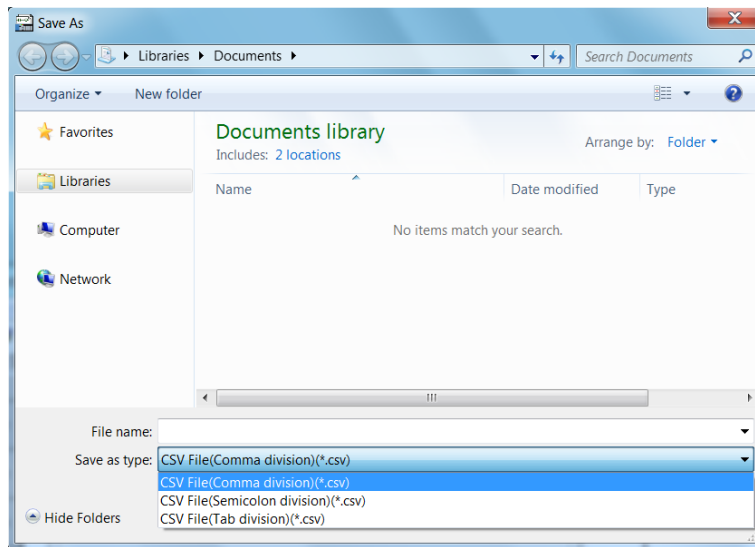
Fig. 8.2.15   Save CSV data
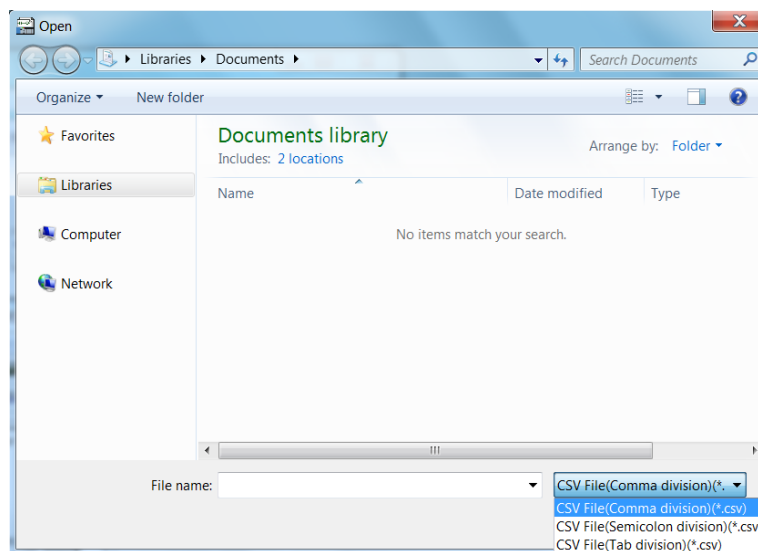
Fig. 8.2.16   Open CSV data

Table 8.2.3   Targeted data for changing CSV format

No.	Targeted data
1	Monitored data of I/O monitor pattern sheet
2	I/O comment data

(10) Setting of Auto-Save

The file under edit is automatically saved for every set time. The file automatically saved is stored in the "Sysbak" folder which is in directly under the folder as shown by the following table. Since two or more Control Editor can be started, the file is named ay random, such as "5E8.prj". When there are two or more backup files, search for a file by date information, etc. And, the file automatically saved is left in the Sysbak folder only when Control Editor is shut down improperly. Note that the file automatically saved is eliminated when the file is saved properly, or when "No" is chosen in the message for saving.

Table 8.2.4   Auto-save folder

Control Editor	OS	Auto-save folder
Ver.2.00 - Ver.2.41	Windows2000 Windows XP	The folder of Control Editor including the execution file.
Ver.3.00 – Ver.5.00	Windows XP	Documents and Settings¥<username>¥Application data¥Hitachi-ies¥Control Editor¥
	Windows 7	Users¥<username>¥AppData¥Roaming¥Hitachi-ies¥Control Editor¥ (AppData folder is a hidden file.)
Ver.5.01 -	Windows 7 Windows 8.1 Windows 10	Users¥<username>¥AppData¥Roaming¥Hitachi-ies¥Control Editor¥ (AppData folder is a hidden file.)

(*) <username> shows a user name carrying out Control Editor.

Fig. 8.2.17   Auto-save folder

(11) Fix CPU type for New Project

CPU type for new project can be fixed since Ver.4.10. If only either EHV-CPU mode or MICRO-EHV mode is needed, it is useful to enable this option.
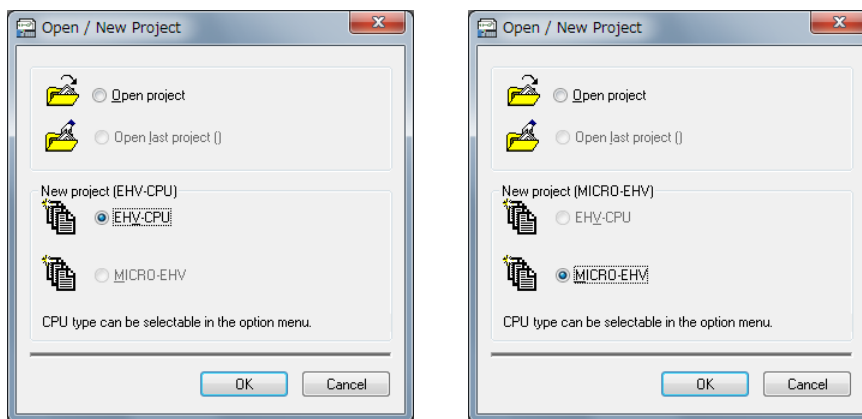
EHV-CPU mode   MICRO-EHV mode

Fig. 8.2.18   New project dialog for EHV-CPU mode or MICRO-EHV mode

(12) Setting of Language

The language of Control Editor can be switched. When the language setting is changed, it is reflected at the next start of Control Editor.

Table 8.2.5   Supported language

Control Editor	Supported language
Ver.2.00 - Ver.2.30	Japanese, English
Ver.2.31 -	Japanese, English, Chinese (Simplified, Traditional)
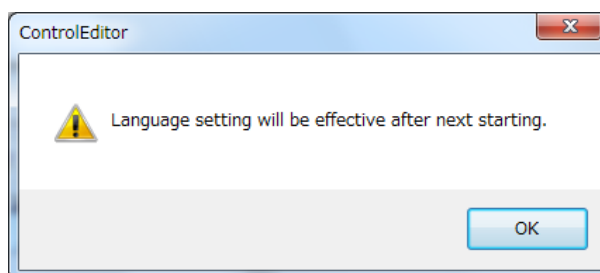
Fig. 8.2.19   Message of language change

If language setting of the Control Editor is not same as that of operating system (Windows), displayed characters in the Control Editor could be garbled depending on PC. But it has nothing to do with operation and performance of the Control Editor.

(13) Monitor interval setting

In online monitor mode, I/O data is accessed in cyclic. This cycle time can be set in monitor interval time. This setting affects following functions.

Table 8.2.6   Monitor function

Icon	Name
	Circuit monitor
	Random circuit monitor
	Add I/O monitor pattern
	Time chart monitor
-	FL-net monitor

N o t e

If this time is shorter, communication load per time is bigger. In case of Ethernet, it could affect other equipment in the network.

(14) Display of special I/O configuration window (Only for MICRO-EHV)

In Ver.5.00 or higher, special I/O configuration window is changed due to the addition of simplified positioning function. If you don't need this additional function, click [Old-style (window) (V4.21 or lower,)] with the mouse.
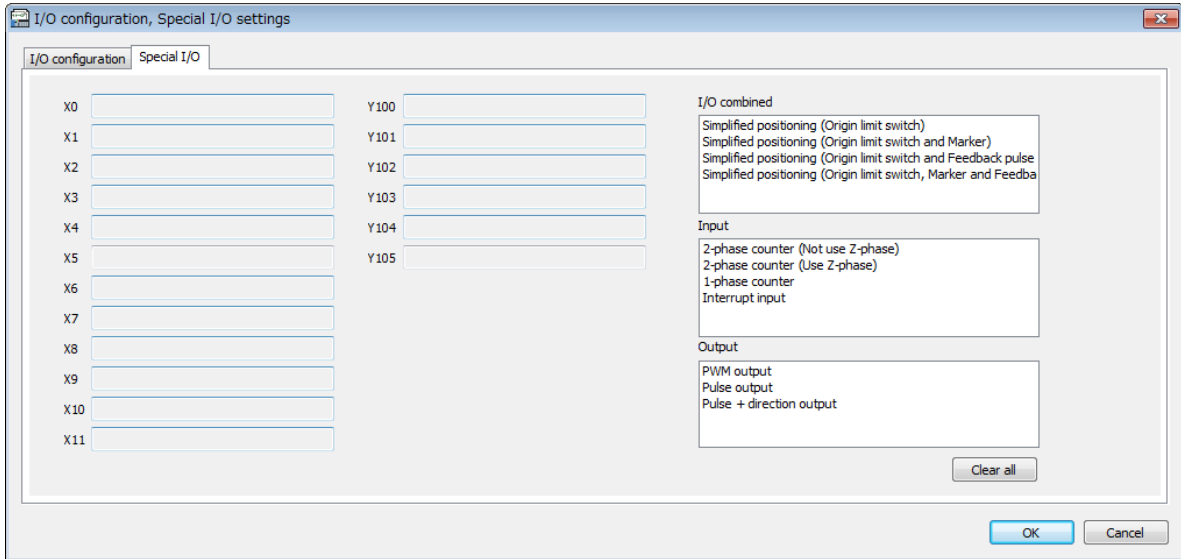
Fig. 8.2.20 New-style window (Ver.5.00 or higher)
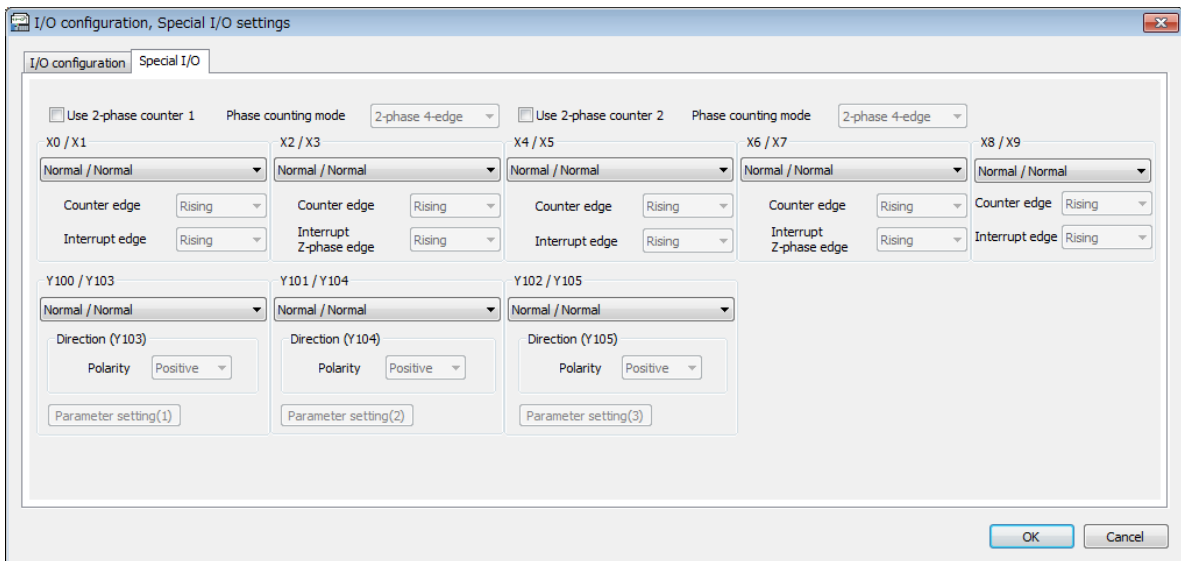
Fig. 8.2.21 Old-style window (Ver.4.21 or lower,)

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MEMO

Chapter 9　Compatibility

9.1　Compatibility of File

Basically, a file saved by the old version's Control Editor can be opened by the new version's one but the old once cannot open a file saved by the old one.
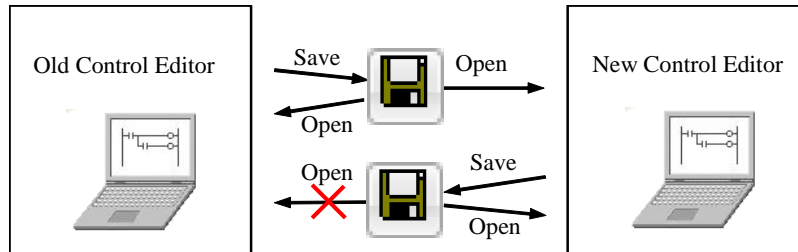
Fig. 9.1.1　Compatibility of file

In Ver.5.00 or higher, the file format can be selected on saving. The project file saved by old format can be opened by Control Editor which is even the old version. Refer to section 2.2 for more information.

9.2   Compatibility with CPU

Several commands were improved from Ver.5.00. Therefore, it is possibility that you cannot connect Control Editor (Ver.5.00 or higher) to CPU by On-direct mode.

As to the improved commands, please refer to Table 9.2.1.

(1) Ver.2.00 to 4.21 ➔ Ver.5.00 or higher

If you open your program which was made by Ver.2.00 – Ver.4.21, you cannot connect Control Editor to CPU by On-direct mode depends on your Control Editor's operation.

Stored program in CPU	Opened program by Control Editor	OK/NG
Program made by Ver.2.00 – 4.21	Before build operation.	OK
Program made by Ver.2.00 – 4.21	After build operation.	NG

(2) Ver.1.23 or before ➔ Ver.5.00 or higher

When you open your program which was made by Ver.1.23 or lower, you have to execute the build operation. After build operation, some commands will be compiled to another code. Therefore, you cannot connect Control Editor to CPU by On-direct mode.

If you want to connect by On-direct mode, please upload the program from CPU once.
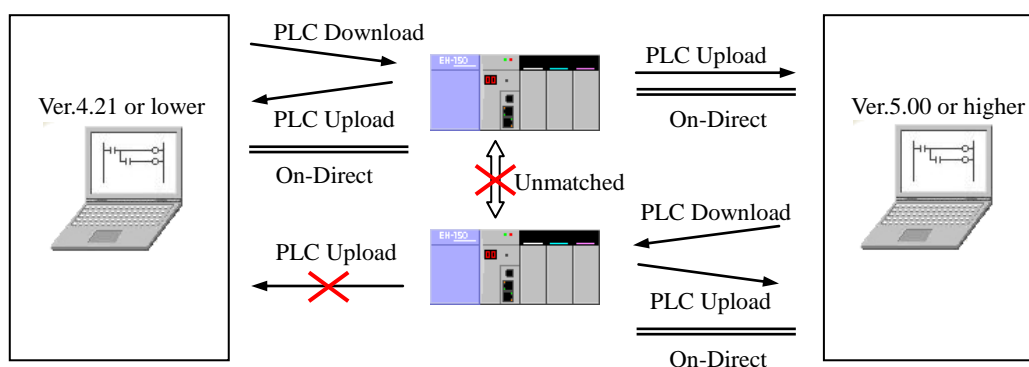
Fig. 9.2.1   Compatibility with CPU (Ver.5.00 or higher)

Table 9.2.1   Modified command list by Ver.5.00

Item No.	Command	Pattern
1	d = s	d: Bit I/O s: Bit I/O [Ex.] R1 = R0
2	d = s	d: Double word I/O Array (Double word I/O) s: Double word I/O Array (Constant) [Ex.] DR0 (DN10) = DM0 (H0)
3	d.S = s.S	d: Signed double word I/O Array (Double word I/O) s: Signed double word I/O Array (Constant) [Ex.] DR0.S (DN10) = DM0.S (H0)
4	MOV (d, s, n)	d: Bit I/O Array (Constant) s: Bit I/O Array (Constant) n: Word I/O [Ex.] MOV (R0 (0), M0 (1), WR0)
5	MOV (d, s, n)	d: Word I/O Array (Constant) s: Word I/O Array (Word I/O) n: Word I/O [Ex.] MOV (WR10 (H0), WM0 (WN10), WR0)

9.3   Improvement of Comment Format

(1) Format of comment

Format of comment has been changed because CPU of which version is Hx114 or later supports newly a function that comments are transferred during RUN (x depends on the CPU). Variable-length format is improved for using a comment memory efficiently. Ver.2.11 or higher supports this new comment format. (This format is expressed as "variable-length format" after this.)

Multi-Comment is supported in Ver.2.41 or higher. Multi-Comment is the function which can input the comment of four groups. Format of comment has been changed to store Multi-Comment in CPU. Variable-length format is improved for using more comment in a compressed way. (This format is expressed as "Multi-Comment format" after this.)

The fixed-length format has the maximum number of used comments irrespective of the number of characters of comments. (This format is expressed as "fixed-length format" after this.)

Control Editor creates comment data by the Build operation [ ] . If a new CPU is connected, the comment data is created with a variable-length format or a Multi-Comment format, and if an old CPU is connected, the comment data is created with a fixed-length format. A variable-length format or a Multi-Comment format can be set up the check box "Download all groups of comment to CPU" in Multi-Comment window. And in the offline mode, the comment data is created only with a variable-length format. Details are shown below.

Table 9.3.1   Comment format

Control Editor	Offline	Online CPU version	
		Hx111 or before	Hx114 or later
Ver.2.00 - Ver.2.02	Fixed-length format	Fixed-length format	Fixed-length format
Ver.2.11 - Ver.2.40	Variable-length format (*1)	Fixed-length format	Variable-length format
Ver.2.41 -	Variable-length format (*1)	Fixed-length format	Variable-length format or Multi-Comment format (*2)

*1 The default setting is the variable-length format in offline mode. However, if the CPU is connected in online mode once, the CPU version connected last is retained even if it is connected in offline mode after that. Therefore, even if the old CPU is connected in offline mode after connecting in online mode, the format of comment data is old version without changing also after Build operation.

*2 A variable-length format or a Multi-Comment format depends on setting of the check box "Download all groups of comment to CPU" in Multi-Comment window.

N o t e

The Comment format for MICRO-EHV is fixed to Multi-Comment format.

(2) Extension of Comment memory area

Although I/O comments, box comments, and circuit comments are used one comment memory in the fixed-length format, only I/O comments use current comment memory, and a new comment memory is created for box comments and circuit comments.

The Comment format for MICRO-EHV is fixed to Multi-Comment format. The size of I/O comments is 128kB. The total size of box comments and circuit comments is 19kB.

Table 9.3.2   Comment memory size

Comment memory		EHV-CPU 08 – 64		EHV-CPU 128	
Fixed-length format	I/O comment	512 kB		1 MB	
	Box comment				
	Circuit comment				
Variable-length format	I/O comment	512 kB	Total 592 kB	1 MB	Total 1.2 MB
	Box comment	80 kB		156 kB	
	Circuit comment				

Old format

Size 1MB

I/O comment
Box comment
Circuit comment

New format

Size 1MB

I/O comment

Size 156kB

Box comment
Circuit comment
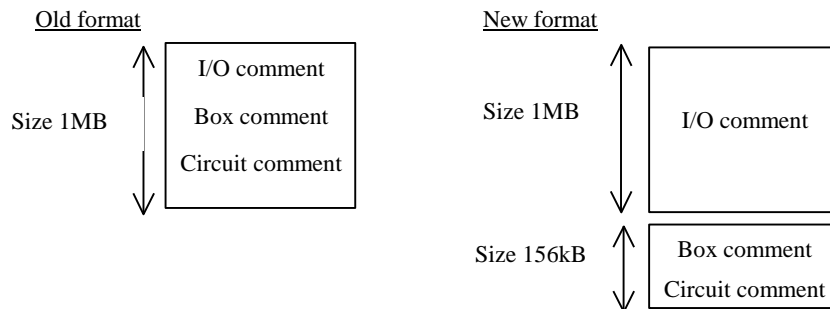
Fig. 9.3.1   Outline of comment format (EHV-CPU128)

(3) Number of used comments

Although the fixed-length format has the maximum number of used comments irrespective of the number of characters of comments, the number of used comments depends on the number of characters in the variable-length format. Therefore, the less the number of characters is, the more the number of comments can be used. See Table 9.3.3 to 9.3.5 for the number of used comments.

Table 9.3.3   The number of I/O comments (*1)

Comment name	12 characters	16 characters	32 characters	Fixed-length format (reference)
Number of I/O comments (CPU128)	32,765	26,212	14,562	14,562 (*2)
Number of I/O comments (CPU08-64)	16,381	13,105	7,280	7,280 (*2)

Table 9.3.4   The number of Box comments

Comment name	16 characters	32 characters	64 characters	Fixed-length format (reference)
Number of box comments (CPU128)	3,994	2,219	1,175	7,709 (*2)
Number of box comments (CPU08-64)	2,048	1,138	602	3,854 (*2)

These are value in case the circuit comments are not used. When the circuit comments are used, the area for box comments is reduced because the circuit comments use the same area.

Table 9.3.5   The number of Circuit comments

Comment name	32 characters	64 characters	128 characters	Fixed-length format (reference)
Number of circuit comments (CPU128)	2,219	1,175	605	3,971 (*2)
Number of circuit comments (CPU08-64)	1,138	602	310	1,985 (*2)

These are value in case the box comments are not used. When the box comments are used, the area for circuit comments is reduced because the box comments use the same area.

*1 The number of I/O comments shown in Table 9.3.3 does not include the I/O comments for special internal output. Therefore, actually the number of usable I/O comments is less than value shown in Table 9.3.3. (The number of comments of special internal output is about 1,500 because one comment is calculated as 12 characters.)

*2 Since all comments use one comment memory in the fixed-length format, value in each table is data in case only that comment is used and other 2 comment types are not used. For example, up to 7,709 box comments can be used in the fixed-length format of EHV-CPU128. In that case, I/O comment and circuit comment are not used and each value is 0.

In addition, by Multi-Comment, because comment data is compressed, the number which can be used according to the contents of the comment changes a lot. An about 3 times of a variable-length format comment can be used only as a guide.

The display of the status bar at the bottom of window is different between old and variable-length formats.

Old format   :   Comment:8.1%

New format   :   I/O Comment:7.2% Circuit, Box Comment:0%

Fig. 9.3.2   Comment capacity display on status bar

N o t e

Fixed-length format remainder

Since a maximum size of the comment memory is defined in the CPU, priority of each comment type is established. The first priority is I/O comment, the 2nd is box comment, and the 3rd is circuit comment. Therefore, if a maximum of 14,562 I/O comments at maximum are used, neither box comment nor circuit comment can be used. When a maximum of 3,971 circuit comments are used, the capacity of circuit comment exceeds the maximum value if I/O comments are added. (The excess is from last created circuit comment.)

Example: If I/O comment of top priority is added when the comment memory is all used, the circuit comment of lowest priority becomes the capacity excess.
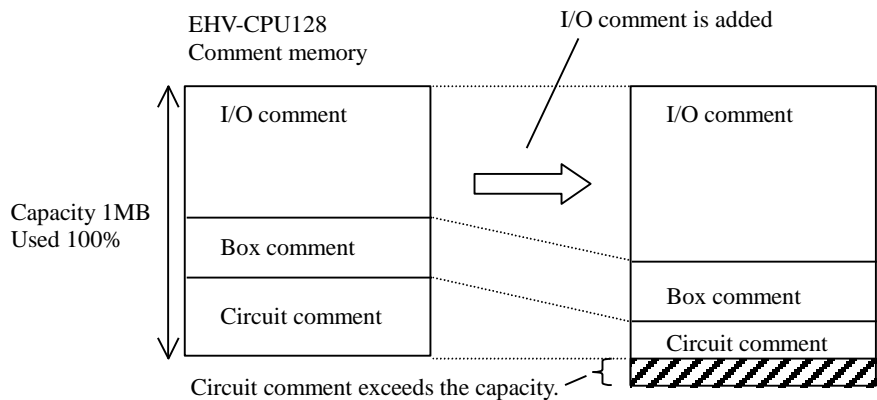
Fig. 9.3.3   Outline of excess of comment capacity

In the I/O comment, priority is established by individual symbol in the order shown below.

(Higher)   [Priority]

X, Y, R, L, M, CL, WX, WY, WR, WM, TC, DX, DY, DR, DL, DM, MCS, MCR, WN, DN, EX, EY, WEX, WEY,

(Lower)

TD, TDN, SS, WDT, MS, TMR, CU, RCU, CTU, and CT

Chapter 10   Troubleshooting

Please check the following respects first if you think your Control Editor is in failure.

Q1. Not possible to download program to CPU because the icon and menu are not active.

A1. Execute the Build operation . Download function is not activated unless the Build operation is executed in the updated information for programs, parameter settings, and comments. Check the Build field of the Output result window at the middle of the Control Editor window.

Q2. What does the * mark indicated on the project tree mean?

A2. It means that it is necessary to perform the Build operation because the program is being edited. The * mark is displayed even if various setting window such as I/O configuration, retentive area, etc. are opened and closed.

So, execute the Build operation . (See page 2-16.)

Q3. When the CSV file is opened on the I/O monitor sheet, a hourglass does not turn into a pointer.

A3. If the appropriate CSV file to open is being used by another application, the CSV file cannot be opened properly. Open the CSV file again after closing the file which has been opened using another application.

Q4. Upload operation does not complete. The program is not displayed even if the upload is completed only in the Upload window.

A4. If symbols such as , * / ¥ : ; " | < > ? are included in the project name, the Upload operation does not complete in Ver.2.20 or higher. Perform the operation again after modifying the project name. And the Reverse Build operation does not complete due to the same reason.
In Ver.2.21 or higher, Upload and Reverse Build operations are completed properly even if these symbols are included in the project name.

Q5. USB communication is not opened.

A5. Install a USB driver. A guidance dialog appears in the lower right portion of the window if the USB cable is unplugged and plugged in. A USB driver has to be installed for each USB port of your computer individually. (Specifications for Windows)

Q6. Ethernet communication is not opened.

A6. Connect to CPU via serial or USB cable according to the following steps first. Then check the IP address and the port No. set to the CPU module.

1] Select [PC Communication Settings] in the [Tool] menu on the menu bar and then select Serial or USB as Communication setting. (When you select serial, you need to set the Baud rate and COM port Number. We recommend USB because no setting is required.)

2] Connect the CPU module and the computer in the Online mode by clicking the icon or by selecting [Online] in the [Mode] in the [Online] menu on the menu bar.

3] Check the current IP address (Current PLC Data at the right side on the dialog) set to the CPU module by double-clicking [IP address] in the CPU settings on the project tree.

4] Check the current Port number (Current PLC Data at the right side on the dialog) set to the CPU module by double-clicking [Ethernet (task code)] in the CPU settings on the project tree.
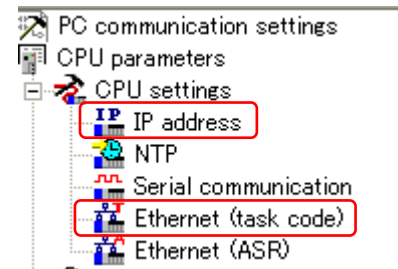
5] Change the mode to Offline by clicking the icon or by selecting [Offline] in the [Mode] in the [Online] menu on the menu bar.

6] Select [PC Communication Settings] in the [Tool] menu on the menu bar. Select Ethernet on the dialog to set the IP address and Port No. checked in the step 3] and 4].

7] Connect in the online mode, and it will be successful.

Q7. I don't understand the meanings of the message which appears when opening a CSV file in the I/O monitor sheet and the choice [Current value / Setting value] on the message.

A7. If you choose the Current value, data stored as the current value at the time of CSV file save can be read out into the Setting value field. This is a useful function when replacing the CPU module and transferring data, etc. If you choose the Setting value, data stored as the setting value at the time of CSV file save is read out into the Setting value field as it is. (See on 6-1 page.)

Q8. Timer cannot be input.

A8. Unlike the LADDER EDITOR, the icons are different between normal coil and timer coil. Use the icon for timer coil .

Q9. What is the System Processing Time on the Operation Parameters window?

A9. The scan time increases by adding the setting value time to the scan time. The CPU module performs the system processing (mainly communication processing), not program execution, using this time at every scan END. When a program is short and a scan time is extremely-short (almost 1ms or less), the frequency of END processing is increased and as a result, the communication processing may get compress. In such case, set the system processing time to 1 to 5ms. (See on 3-14 page.)

Q10. The convert tool shuts down when attempting to convert prn file.

A10. If prn file is "Read-only" setting, this phenomenon occurs. Disable it in property of the file.

Q11. While LADDER EDITOR for Windows displays remaining steps, Control Editor displays used steps. How to calculate remaining steps in the Control Editor? Exact memory is not fully clear for example; memory size of EHV-CPU128 is 128,000 or 131,072 steps (=128 × 1024)?

A11. Control Editor has no function to indicate the remaining number of steps. However, if a program is build and the size exceeds the capacity of the CPU module specified in I/O configuration window, an error message will appear, which prevents downloading wrong program. Exact CPU capacity is as follows.

- EHV-CPU128:   131,070 steps (128 × 1024 – 2)
- EHV-CPU64:   65,534 steps (64 × 1024 – 2)
- EHV-CPU32:   32,766 steps (32 × 1024 – 2)
- EHV-CPU16:   16,382 steps (16 × 1024 – 2)
- MICRO-EHV: 16,382 steps (16 × 1024 – 2)

Q12. When a PRJ file is opened or PLC Upload operation is executed, the following dialog appears and [ERROR] shown below is displayed in the Output result window. When the Build operation is executed, [ERROR] shown below is displayed in the Output result window.
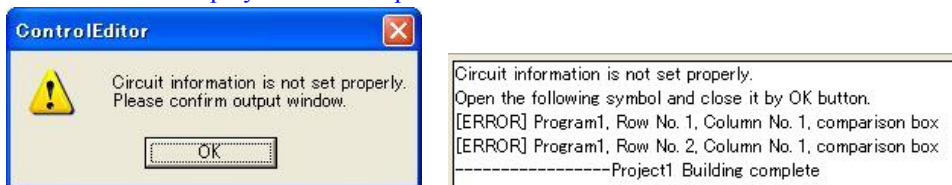
A12. Since the circuit information cannot be registered properly, the error has occurred. Therefore, register the circuit information again after verifying them. The steps are as follows.

1) Open the Properties window for symbol by double-clicking the circuit at the row No. and column No. on the sheet of the error message indicated on the Output result window.

2) Check the information indicated on the opened dialog.

3) If there are some errors in the information, correct these to click the [OK] button. If there is no error, click the [OK] button without changing them.

Q13. When a PRJ file is opened or PLC Upload operation is executed, the following dialogs appear.

[Open PRJ file]
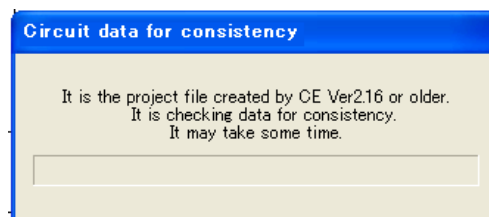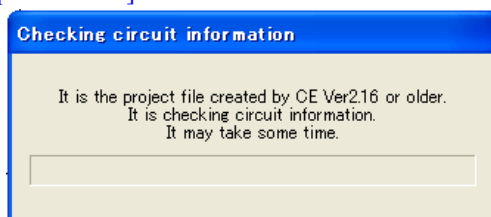
[PLC Upload]
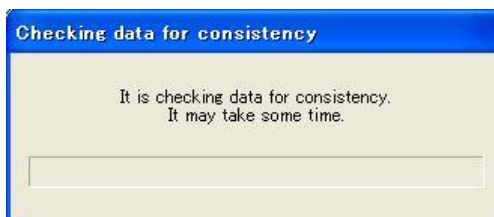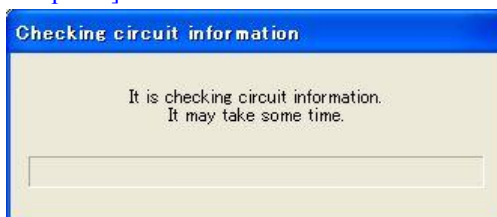
A13. Circuit information check and Data consistency check are being performed. These processings are performed when opening the PRJ file created by Ver.2.15 or lower and when executing the PLC Upload. When the circuit information cannot be registered properly, the dialog described in Q12 and A12 appears and [ERROR] is displayed in the Output result window. When the inconsistency data exists, the following dialog appears.

[Open PRJ file]

```
ControlEditor                                              ✕

  ⚠    The inconsistency data exists.
        Please choose the menu, in order to correct inconsistency data.
            menu bar – [Tool] – [correct the inconsistency data]
        However, when inconsistency data is corrected, it is necessary to build again.
        If it built, it may not connectable in on-direct mode.
        Because it is to assign a DIF number in build again.
        Online change cannot be executed if not connectable in on-direct mode.
        In this case, please execute PLC Download again.

                        [     OK     ]
```

[PLC Upload]

```
ControlEditor                                              ✕

  ⚠    The inconsistency data exists.
        Please select the menu after connection in on-direct mode,
        in order to correct the inconsistency data in CPU.
            menu bar – [Tool] – [correct the inconsistency data]
        If it built except on-direct mode, it may not connectable in on-direct mode.
        Online change cannot be executed if not connectable in on-direct mode.
        In this case, please execute PLC Download again.

                        [     OK     ]
```

In the data inconsistency, the inconsistency of data exists between the information on the Ladder window and the information managed within the CPU module. As a result, the information exists only inside the CPU module. If the Correct the inconsistency data in the Tool menu on the menu bar is chosen, the information which exists only internally will be deleted and the information on the Ladder window will be consistent with the information managed inside.

When the inconsistency of data is corrected, choose the following menu.

Menu bar – [Tool] – [Correct the inconsistency data]

Since the * mark is attached to the sheet of which the inconsistency data has been corrected, the Build operation is necessary.

```
ControlEditor                                      ✕

  ⚠    The inconsistency data is corrected.
        * mark is attached to the corrected sheet.
        Please build.

              [     OK     ]
```
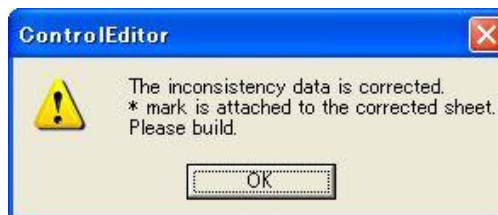
Q14. Although program is verified successfully by PLC Verify operation, it's not possible to enter On-direct mode.

A14. Although the PLC Verify operation is performed with data on the window, the On-direct connection is verified with SUM value. When the programs are matched by the PLC Verify but the On-direct connection cannot be executed, there are the following causes.

[DIF/DFN No. mismatch]

When build operation in off-line or on-line mode, all DIF/DFN numbers are internally assigned by Control Editor automatically. It is not necessary for users to put DIF/DFN number. In case of on-direct mode, DIF/DFN number in only changed circuits are renumbered. So the order of DIF/DFN number may not be ascending after getting out of on-direct mode. If build operation is done in off-line or on-line mode, all DIF/DFN are renumbered and calculated SUM value is also different. For this reason, it is not possible to enter on-direct mode although visible circuits are the same.

In this case, upload the program from PLC then enter on-direct mode. If it is possible to stop the CPU, make stop the CPU and download the program before entering on-direct mode. It is not possible to change internal DIF/DFN numbers.

[ID mismatch of comparison box / processing box / circuit comment box]

Comparison box, processing box and circuit comment box have internal ID, which is assigned automatically when creation of the boxes. For this reason, internal ID can be different depending on creating order of boxes, which results in different SUM value. PLC verify operation does not check the ID, but SUM value is checked when entering on-direct mode.

In this case, upload the program from PLC then enter on-direct mode. It is not possible to change internal ID.

Q15. When a PRJ file is opened or PLC Upload operation is executed, the following dialog appears.
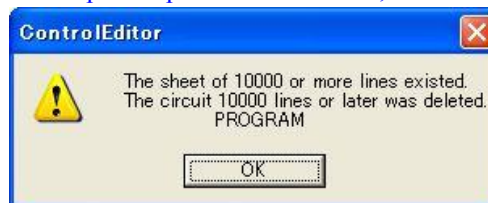
A.15 One sheet of Control Editor is up to 9,999 lines. Ver.2.16 or higher checks the number of rows in each sheet because a program exceeding 10,000 lines can be created using Ver.2.15 or lower (up to 9,999 lines are displayed on the window). If a sheet which has over 10,000 lines is found, the circuit after the 10,000th line is deleted and the above dialog appears. The appropriate sheet name is displayed on the dialog.

Especially, if the PRN file exceeds 10,000 lines, this dialog appears and the 10,000th and later lines are deleted because the prj file converted by a convert tool also has sheets exceeding 10,000 lines. In this case, change the number of lines to up to 9,999 by divide of the PRN file, etc. to convert.

Q16. In "Verify with PLC", many data mismatching are found.

A16. Data memory without configured as retentive area is not kept during power failure and reset at RUN starting. For this reason, it could be possible to see many data mismatching after power cycling or RUN starting.

Q17. In "Verify with file", no data mismatching is found although both data must be different.

A17. Data memory information is not verified in this function. For this reason, no data mismatching is found by verifying data memory between prj file and current data of Control Editor.

Q18. If comment is uploaded from CPU by Ver.2.40 or higher, warning occurs and comment can not be uploaded.

```
× ---------------- PLC Transfer : Upload (PC<-PLC) ----------------
  Uploading program...
  Uploading comments...
  [WARNING] The data size of comment information is incorrect.
  ----------------Project1 PLC Transfer : PLC Uploading complete
  |◄ ◄ ► ►|\ Build \ PLC up/download / Address exchange \ Verify \ Result of check /
```
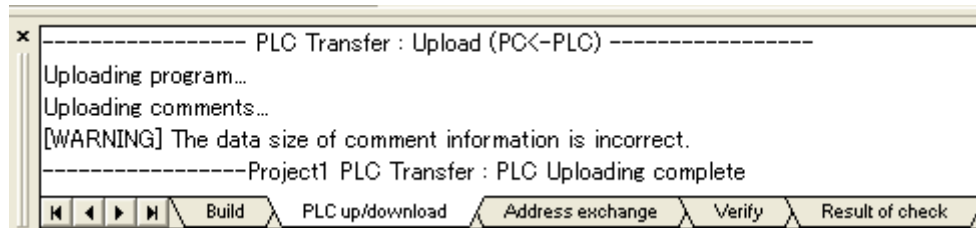
A18. Multi-Comment is supported in Ver.2.41 or higher. If comment is uploaded from CPU with Multi-Comment by Ver.2.40 or higher, warning occurs and comment cannot be uploaded. If Multi-Comment would like to be uploaded from CPU, please use Ver.2.41 or higher which supports Multi-Comment.

Q19. When building a project containing a sheet exceeding 10,000 lines, the following dialog is displayed.

ControlEditor

⚠ Build is impossible because there are sheets exceeding 10000 lines.
Please divide the sheet so that it is less than 9999 lines.
[Sample]

OK
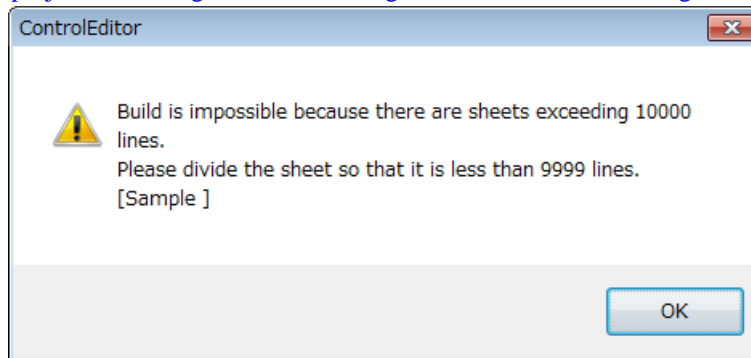
A19. The maximum number of lines that can be building in one program is 9,999 lines.
In Ver. 6.02 or higher, it became possible to create programs with more than 10,000 lines. In addition, project files (* .Prj, *. Prjh, *. Prjx) exceeding 10,000 lines can be read. In particular, it is now possible to read (*.prj) files that converted (*.prn) files exceeding 10,000 lines using the Convert tool.
Therefore, before converting with the Convert tool, work which was divided by LADDER EDITOR for Windows becomes unnecessary, it becomes possible to divide it with Control Editor after conversion with Convert tool.
When building a project composed of multiple programs, the name of the program exceeding 10,000 lines is displayed on the message window, please divide it into multiple sheets so that it is less than 9,999 lines.

Appendix 1   Function Menu List

Table Appendix 1   List of Function menu

Menu	Classification	Classification	Description	Page
File	New	New Project	Creates a new project.	P2-8
		New Program	Adds another program sheet.	P2-8
	Open		Opens saved prj file.	P2-9
	Close		Closes the project.	P2-9
	Save		Saves the prj file.	P2-9
	Save As		Saves the prj file as a named file.	P2-9
	Verify With file		Verify with the saved prj file.	P2-12
	OBC export		Makes OBC file.	P2-12
	OBC import		Reads OBC file.	P2-12
	Data Memory view		Opens Data Memory view window.	P2-12
	Open CPU Log File		Opens saved CPU Log file.	P2-12
	Print		Prints.	P8-1
	Print Preview		Preview the print.	P8-1
	Exit		Shut down Control Editor.	P2-12
Edit	Build		Build program (Compiling)	P4-13
	Build without I/O Config		Build program (Compiling)	P4-14
	Reverse Build		Returns to the last Built circuits.	P4-17
	Undo		Undo an operation.	—
	Redo		Redo an operation.	—
	Cut		Cuts the specified symbol and range.	P4-18
	Copy		Copies the specified range to the clipboard.	P4-18
	Paste		Pastes from the clipboard.	P4-18
	Paste Mode (Insert)		Switches paste mode.	P4-18
	Edit Circuit	Copy	Block copy of the specified circuit No.	P4-20
		Move	Block move of the specified circuit No.	P4-20
		Delete	Block delete of the specified circuit No.	P4-20
	Auto Programming		Auto creation of circuit.	P4-34
	Change I/O Addresses	Change I/O addresses	Replacement of I/O addresses.	P4-31
		Slot number	Change by slot numbers.	P4-32
		Remote number	Change by remote numbers.	P4-32
		Contact type	Change by contact type.	P4-32
	Find		Opens Find / Replace / Jump windows.	P4-36
	Contact <=> Coil		Finds coil from contact, or contact from coil.	P4-39
	Find Next		Finds continually when there are some targets to find.	P4-39
	Jump to Top		Jumps to top of active program sheet.	P4-8
	Jump to Bottom		Jumps to bottom of active program sheet.	P4-8
	Properties		Property of each symbol.	P4-8

\<Continued from the preceding page\>

Menu	Classification	Classification	Description	Page
View	Project Tree		Switches whether to display or not the project tree.	P2-13
	Output Window		Switches whether to display or not the Output window.	P2-13
	I/O comment Window		I/O comment input windows.	P4-23
	Multi-Comment		Multi-Comment window is displayed.	P4-27
	Circuit Comment Window		Displays the Circuit Comment.	P4-26
	Random Circuit Monitor		Opens the Random Circuit Monitor window.	P6-15
	Time Chart Monitor		Opens the Time Chart Monitor window.	P6-23
	Add I/O Monitor Sheet		Adds the I/O Monitor Sheet.	P6-1
	Simplified positioning trial operation		Open the Simplified Positioning Trial Operation window based on channel.	P3-31
	FL-net monitor		Opens the FL-net Monitor window.	P6-34
	Toolbar	Customize	Customizes icons of each function.	P2-28
Online	Mode	Offline	Shifts to the Offline mode.	P5-1
		Online	Shifts to the Online mode.	P5-1
		On-direct	Shifts to the On-direct mode.	P5-1
	Circuit Monitor		Monitors a circuit.	P6-12
	PLC Transfer	Upload (PLC to PC)	Uploads a program, etc. from PLC to PC.	P5-11
		Download (PC to PLC)	Downloads a program, etc from PC to PLC.	P5-8
		Verify With PLC	Verifies a program of PLC.	P5-14
	Operate CPU	RUN	Remote RUN.	P6-15
		STOP	Remote STOP.	P6-15
		Release Occupation	Releases occupation.	P5-6
		Initialize	Initializes CPU.	P5-6
		Input refresh disabled	MICRO-EHV does not refresh the input.	P6-22
		Output refresh disabled	MICRO-EHV does not refresh the output.	P6-22
	Set/Reset		Set/Reset I/O.	P6-5
	Force Output		Outputs only one point in CPU STOP mode.	P6-7
	Force Input		Open the Force Input window with indicated I/O whose values are set	P6-8
Debug	Breakpoints		Display the breakpoint list in the output result window.	(*2)
	1 scan		Execute once from the beginning of the program to END command.	(*2)
	N scans		Execute N times from the beginning of the program to END command.	(*2)
	Step run	Step into	Execute one command. If the cursor position is immediately before the CAL command, the process transits to the subroutine.	(*2)
		Step over	Execute one command. If the cursor position is CAL command, and stops at the next command CAL command by executing a subroutine.	(*2)
		Step out	Execute one command. If the cursor position is within the subroutine, exit from the subroutine and stop at the command following the CAL command.	(*2)
	Continue		Restart execution from the stopped position.	(*2)
	Stop		Stop execution.	(*2)
	CPU reset		Return to the initial state. Do not initialize the program.	(*2)

<Continued from the preceding page>

Menu	Classification	Classification	Description	Page
Tool	Parameter Settings	I/O Configuration	Sets I/O configuration.	P3-2
		Retentive Area	Sets the retentive area.	P3-14
		Operation Parameters	Sets each operation condition.	P3-15
		Link Parameters	Sets the link area.	P3-20
		FL-net Parameters	Sets the FL-net module.	P3-22
		Data Logging Setting	Sets data logging parameters.	P3-26
	Extended parameter settings	Simplified positioning parameter setting	Open the Simplified Positioning Parameter Setting window used to set simplified positioning parameter.	P3-27
	CPU Settings	IP Address	Sets the IP address of Ethernet port.	P7-3
		NTP Server	Sets the NTP server of Ethernet port.	P7-4
		Serial Communication	Sets the serial port.	P7-5
		Ethernet (Task code)	Sets the task code.	P7-7
		Ethernet (ASR)	Sets ASR communication.	P7-8
		Modbus-TCP	Sets Modbus-TCP parameter.	P7-12
		Modbus-TCP/RTU	Sets Modbus-TCP/RTU parameter.	P7-13
		Calendar Clock	Sets the calendar in CPU.	P7-16
		Option board settings	Sets the Option board settings.	P7-17
	Cross Reference	Address-Line No.	Displays the location of the specified I/O.	P4-40
		Address List	Indicates use or un-used of the specified I/O symbol.	P4-42
	Tool	Convert Tool	Convert Tool started.	PA2-5
	PC Communication Settings		Selects Ethernet, USB, or Serial.	P5-2
	Project Password		Password protections function for a project.	P4-48
	Sheet Password		Password protections function for a program.	P4-49
	CPU Status		Reads CPU status.	P6-10
	CPU Log		Reads error information from CPU.	P6-20
	Data Logging status		Reads data logging status from CPU.	P3-26
	Program Check		Duplex coil check and edge command count.	P4-46
	Circuits alignment		Circuits are aligned.	P4-16
	Correct the inconsistency data		Corrects the inconsistency of data.	P10-4
	Deletion of unused I/O comment		Deletes I/O comments which do not exist in program.	P4-25
	Options	Keyboard Setting	Key customizes function by user.	P8-15
	Simulation		Switch to simulation mode and start simulator.	(*2)
	simulation settings		Set the simulation operation Open the Simulation setting window.	(*2)
Window	Tile Horizontal		Arranges windows horizontally.	—
	Tile Vertical		Arranges windows vertically.	—
Help	Contents		Opens the help file.	—
	List of Special Internal Output		Displays the list of Special internal output.	—
	About Control Editor		Displays Control Editor Version information.	—

*1 Current Control Editor does not support these functions.

*2 For details, refer to "Ladder programming software Control Editor Simulator Edition (NJI - 641 *)".

MEMO

A 1 – 4

Appendix 2 Convert Tool

Appendix 2.1 Position of Convert tool

Convert tool is a software to support converting ladder program created with LADDER EDITOR for Control Editor.
The relation between convert tool and Control Editor is shown below.

In Control Editor Ver.4.21 (Convert Tool Ver.1.1.3) or newer version, if I/O comment file (*.iot) and box comment file
(*.boc) are located in the same folder as program file (*.prn), they will be converted.

From Control Editor Ver.5.00(Convert Tool Ver.1.1.5), it is feasible to convert I/O configuration, Operation
Parameters(Operation Control, Delay Check Time, Operation Mode in Exception, Transfer Mode in Exception, CPU
Link Parameters).(*1)

Additionally, for those comments of special internal outputs which are not defined by I/O comment file (*2), Control
Editor will automatically replace them and add I/O comments for them by the special internal output file of Control
Editor.(*3)

Table A2.1.1 Convert Tool and Control Editor versions

No.	Software / Version		Remarks
	Control Editor	Convert Tool	
1	Ver.3.01 or lower Ver.4.01 to 4.07	Ver.1.1.1 or lower	Ver.1.1.1 or lower Convert Tool is the lower version incorporated in the Control Editor.
2	Ver.4.10 to 4.20	Ver.1.1.2	—
3	Ver.4.21	Ver.1.1.3	—
4	Ver.5.00	Ver.1.1.5	—
5	Ver.5.01	Ver.1.1.6	—
6	Ver.6.00	Ver.1.1.8	—
7	Ver.6.02	Ver.1.1.9	—
8	Ver.7.01	Ver.1.1.10	—

Table A2.1.2 Version of Convert Tool and Converted Data

Source File	Converted Data	Version								Remarks
		1	2	3	4	5	6	7	8	
Program (*.pm)	Ladder Program	✓	✓	✓	✓	✓	✓	✓	✓	—
	Operation Control	—	—	—	✓	✓	✓	✓	✓	—
	Delay Check Time	—	—	—	✓	✓	✓	✓	✓	—
	Operation Mode in Exception	—	—	—	✓	✓	✓	✓	✓	—
	Transfer Mode in Exception	—	—	—	✓	✓	✓	✓	✓	—
	CPU Link Parameters	—	—	—	✓	✓	✓	✓	✓	—
I/O Comments (*.iot)	I/O Comments	—	—	✓	✓	✓	✓	✓	✓	Convert to I/O Comments
Box Comments (*.boc)	Box Comments	—	—	✓	✓	✓	✓	✓	✓	Convert to Box Comments
Memo Comments (*.mec)	Memo Comments	—	—	✓	✓	✓	✓	✓	✓	Convert to Box Comments
Circuit Comments (*.cic)	Circuit Comments	—	—	—	—	—	—	—	—	—

✓ : Data is converted

— : Data is not converted

Notation: For the versions shown in the above, the upper one is the version of Convert Tool, and the lower one is the version of Control Editor.
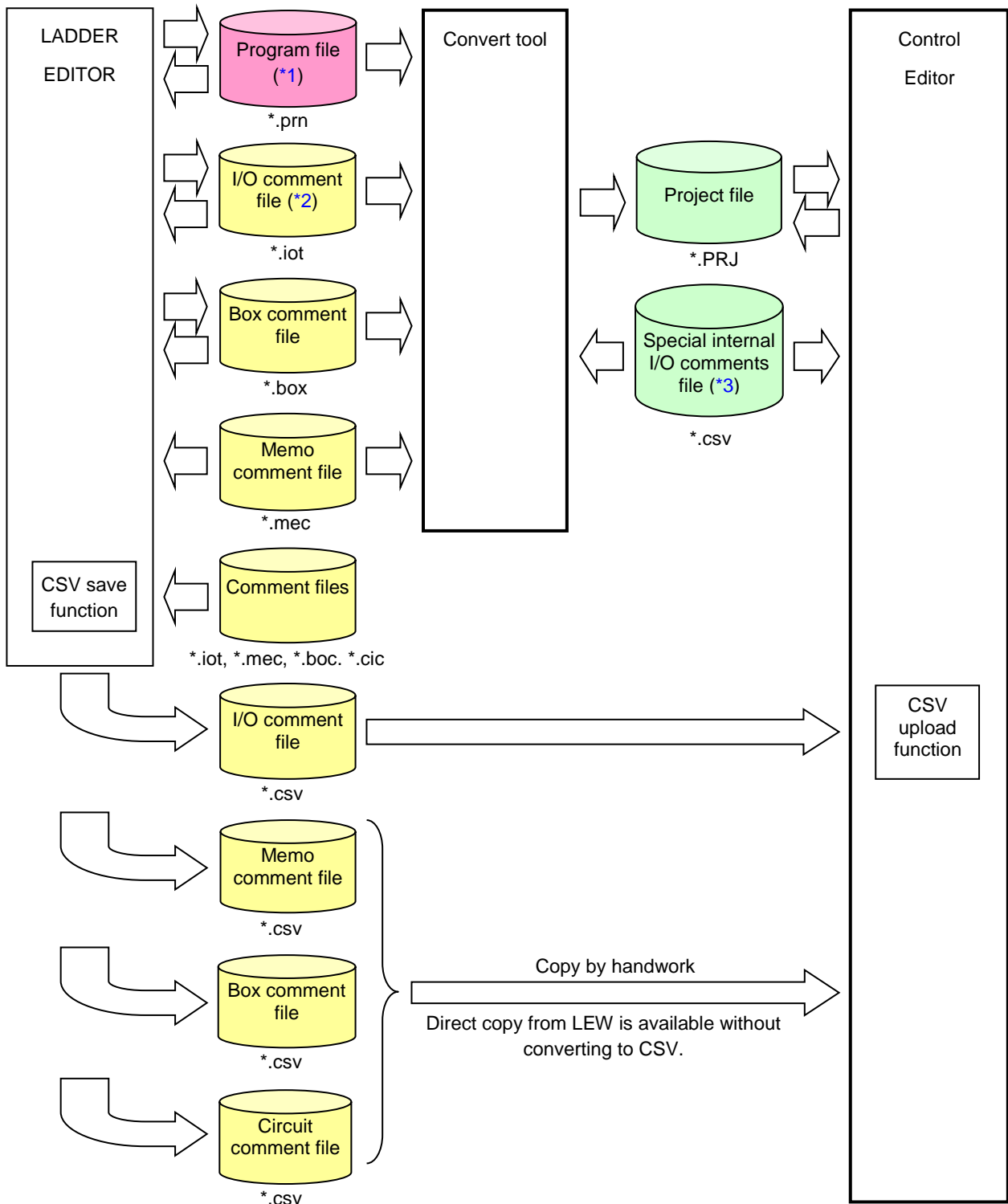
Fig. A2.1.1　Convert Tool and Control Editor Placement

Chooses PRN file to convert. Project file (*.PRJ) of same name as the PRN file is created in the folder by clicking the [Open] button.
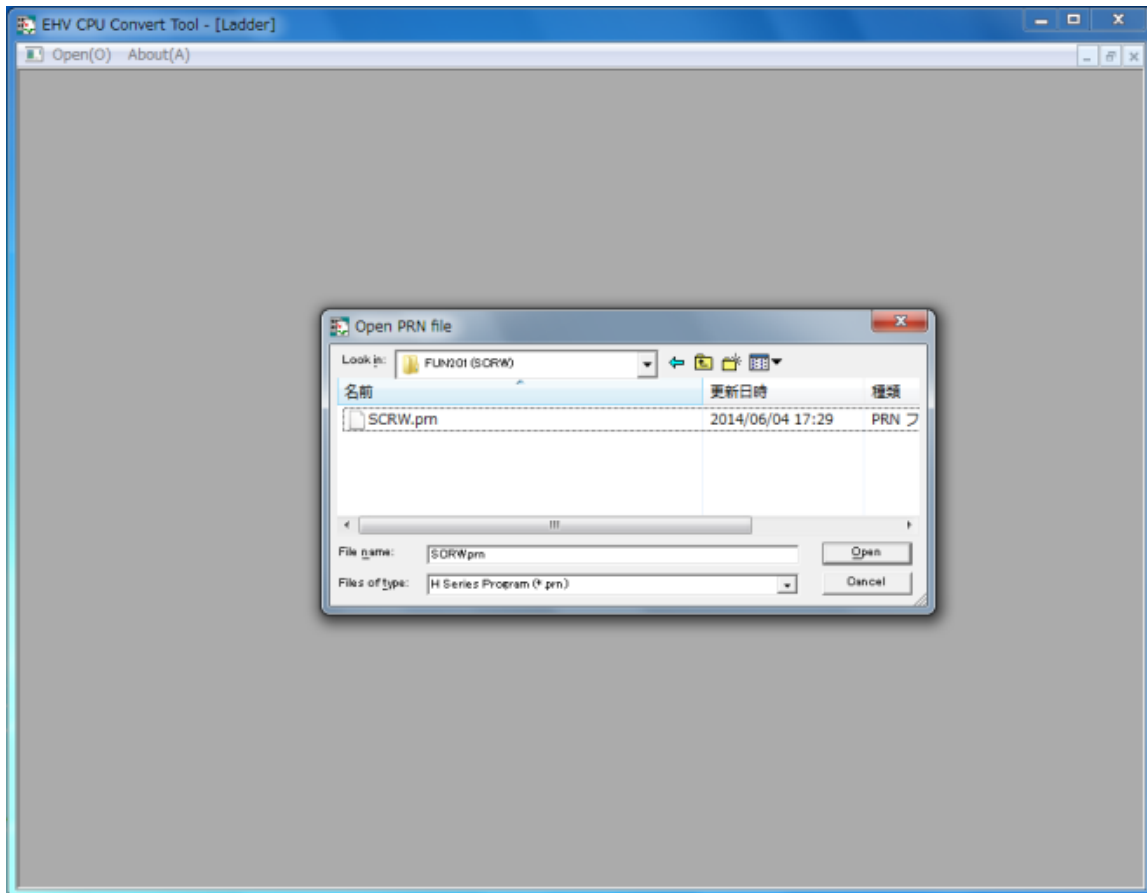
Fig. A2.1.2   Starting window for convert tool

■Start Convert Tool

Convert Tool has been included in Control Editor since Ver.4.10. It

is started by the Tool menu as below. (Fig. A2.1.3)

Menu : [Tool (T)]-[Tool]-[Convert Tool]

■Operation of Convert Tool

1] Start Convert Tool (Fig. A2.1.4)

2] Choose prn file to convert in the Open PRN file dialog.

(This dialog can be opened by the open menu.)

3] Choose Source CPU type and Convert CPU type and click [OK]

button. (Fig. A2.1.5)

4] New prj file with same name and new txt file containing

converted result are created in the same folder as prn file.

5] If all the circuits are converted properly, message "Successfully

converted" appears as below. (Fig. A2.1.6)

If not, it is requested to open result list. (Fig. A2.1.7)

6] If another file to be converted, repeat from [2].

Fig. A2.1.3   Start Convert Tool
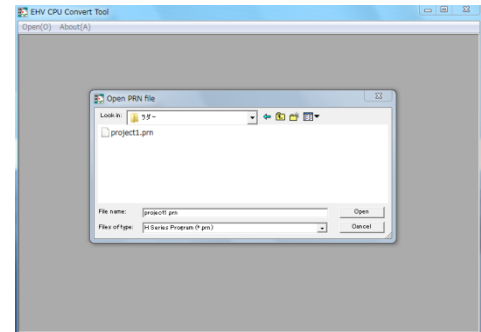
Fig. A2.1.4   Open PRN file in Convert Tool
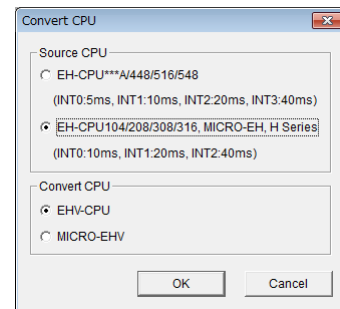
Fig. A2.1.5   Choose CPU type
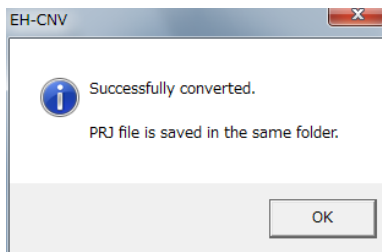
Fig. A2.1.6   Message when
successfully converted.
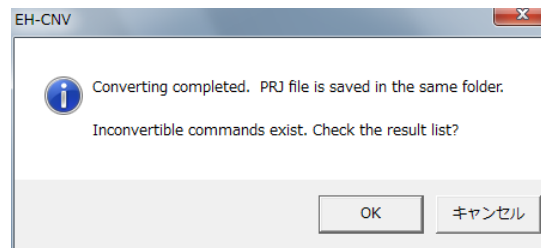
Fig. A2.1.7   Message when not all the command
successfully converted.

■Converted prj file

In converted prj file, circuit comments are added automatically in 2 lines at the top (only for Convert Tool

Ver.1.1.0 or higher). If it is not necessary, delete them.

Fig. A2.1.8   Added circuit comment

Appendix 2.2   Caution on Conversion

(1) About extension Timer TM

Since EHV-CPU and MICRO-EHV has extended the point of On-delay timer TD; EHV-CPU: 2,560 points, MICRO-EHV: 2,048 points, the extension timer TM currently in use is not supported. Note that the extension timer is converted as follows.

In Control Editor Ver.5.00 or higher (Convert Tool Ver.1.1.5 or higher), please notify that the conversion of extended TM was changed as indicating in the following.

Table A2.2.1   Extension Timer TM Conversion Table (Convert Tool Ver.1.1.5 or higher)

Extension Timer TM, Progress value TV	After conversion	Countermeasure
TM0, TV0	TD512, TC512	
TM1, TV1	TD513, TC513	
TM2, TV2	TD514, TC514	
to	to	
TM1534, TV1534	TD2046, TC2046	
TM1535, TV1535	TD2047, TC2047	
TM1536, TV1536	TD2048, TC2048	
TM1537, TV1537	TD2049, TC2049	
to	to	
TM2045, TV2045	TD2557, TC2557	
TM2046, TV2046	TD2558, TC2558	
TM2047, TV2047	TD2559, TC2559	

2,048 points

(2) MEMC and BOXC commands

Commands such as MEMC and BOXC not supported by EHV-CPU and MICRO-EHV are converted as ASCII characters as follows. "Build" operation is possible, but delete the commands after copy by handwork because it is not necessary normally.

Original program

```
BOXC ( WR0 )
MEMC ( WR1 )
```

Program after conversion

```
WREFF0.ASC.30 = " Check BOXC(254) cmd."
WREFF0.ASC.30 = " Check MEMC(255) cmd."
```

Fig. A2.2.1   Conversion of Memo Comment・Circuit Comment

(3) Cycle scan (INT command)

Cycle time of INT command is different depending on CPU types. Choose right CPU type in Source CPU.

1] Source CPU : [EH-CPU104/208/308/316, MICRO-EH, H-series]

INT 0 ⟶ INT (10)

INT 1 ⟶ INT (20)

INT 2 ⟶ INT (40)

2] Source CPU : [EH-CPU***A/448/516/548]

INT 0 ⟶ INT (5)

INT 1 ⟶ INT (10)

INT 2 ⟶ INT (20)

INT 3 ⟶ INT (40)

(4) FUN commands with ADRIO command

FUN commands used with ADRIO command can be converted properly since Convert Tool Ver.1.1.0 however, if all the related commands are not included in one processing box, converting fails and warning message is printed in the processing box as below. In this case, modify the program manually according to command format.

Original program (prn)   Converted program (prj)

Ver1.0.19 or lower

```
WR0 = 15
ADRIO ( WR1, WR100 )
ADRIO ( WR2, WR200 )
ASC ( WR0 )
```
⟶
```
WR0 = 15
DR1 = ADR ( WR100 )
DR2 = ADR ( WR200 )
WREFF0.ASC.30 = "Warning! Check ASC cmd."
```

Failed to convert

Ver.1.1.0 or higher

```
WR0 = 15
ADRIO ( WR1, WR100 )
ADRIO ( WR2, WR200 )
ASC ( WR0 )
```
⟶
```
WR0 = 15
ASC ( WR200, WR100, WR0 )
```

Converted successfully

Ver.1.1.0 or higher

```
WR0 = 15
ADRIO ( WR1, WR100 )
ADRIO ( WR2, WR200 )
```
⟶
```
WR0 = 15
DR1 = ADR ( WR100 )
DR2 = ADR ( WR200 )
```

```
ASC ( WR0 )
```
⟶
```
WREFF0.ASC.30 = "Warning! Check ASC cmd."
```

Failed to convert because related commands are separated in two processing boxes.

Fig. A2.2.2   Conversion Example of Combining ADRIO with FUN Commands

(5) Operation Definition Conversion

In Control Editor Ver.5.00 or higher (Convert Tool Ver.1.1.5 or higher), although it is feasible to convert the operation parameters, please check the converted contents if external input "X" is used.
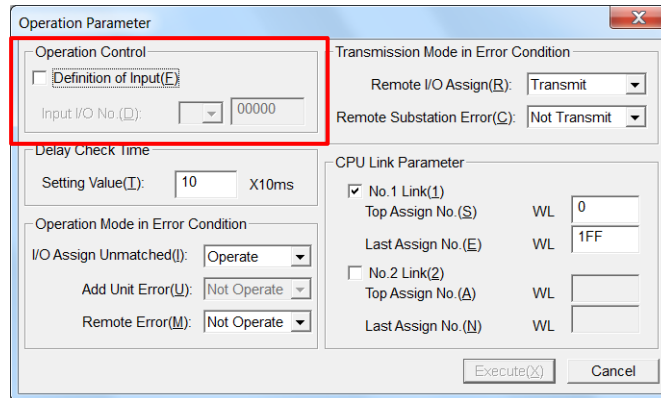
Fig. A2.2.3   LEW Operation Parameters Window
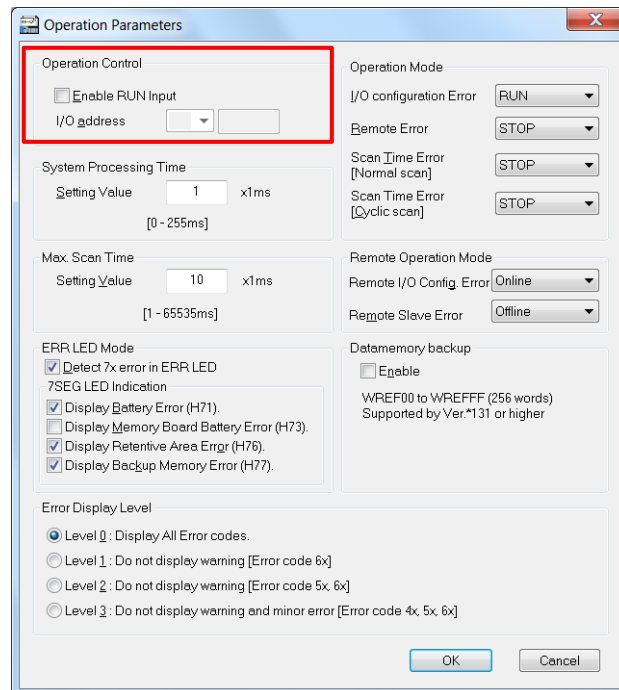
Fig. A2.2.4   Control Editor Operation Parameters Window

Table A2.2.2   Overview of Conversion

No.	Source			Target			Remark
1	X00000	to	X4FF95	X00000			Target will be fixed to X00000. Please set it again in Control Editor.
2	R000	to	RFFF	R000	to	RFFF	—
3	L00000	to	L03FFF	L00000	to	L03FFF	—
	L10000	to	L13FFF	L10000	to	L13FFF	—
4	M00000	to	M7FFFF	M00000	to	M7FFFF	—

(6) Delay Check Time

In Control Editor Ver.5.00 or higher (Convert Tool Ver.1.1.5 or higher), it is feasible to convert the delay check time of operation parameters. Since the units in Ladder Editor and Control Editor are different, please conform their units and convert.
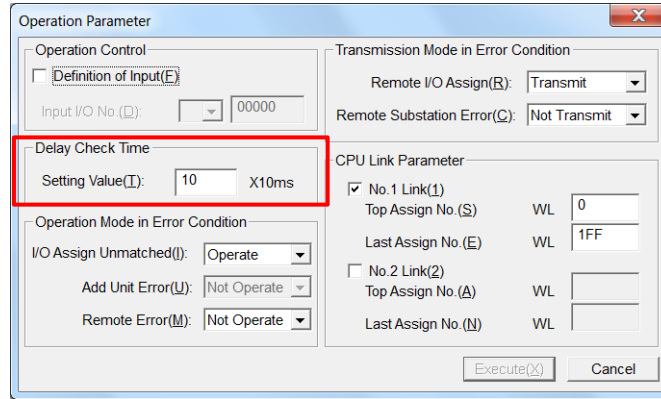
Fig. A2.2.5　　LEW Operation Parameters Window
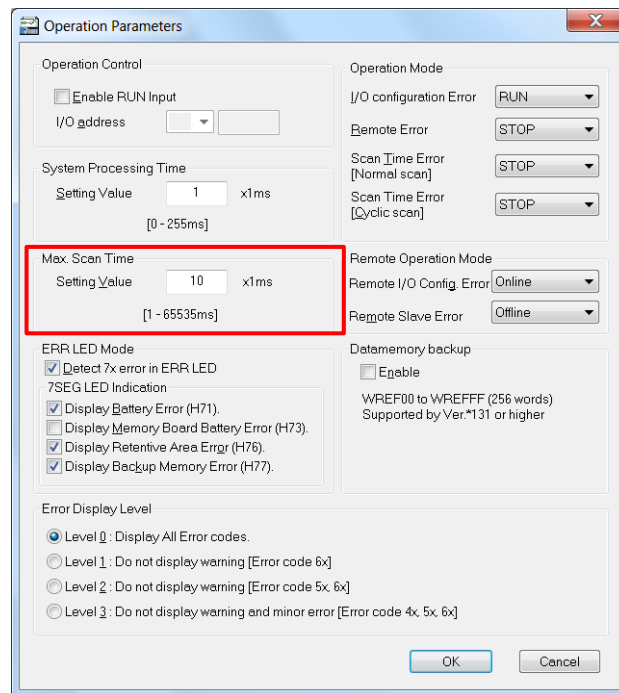
Fig. A2.2.6　　Control Editor Operation Parameters Window

Table A2.2.3　　Delay Check Time and Units

No.	Source		Target		Remark
	Range	Unit	Converted Value	Unit	
1	2 to 255	10[ms]	20 to 2550	1[ms]	—

(7) Run Mode in Exception・Transfer Mode in Exception

In Control Editor Ver.5.00 or higher (Convert Tool Ver.1.1.5 or higher), it is feasible to convert the run mode in exception and transfer mode in exception.
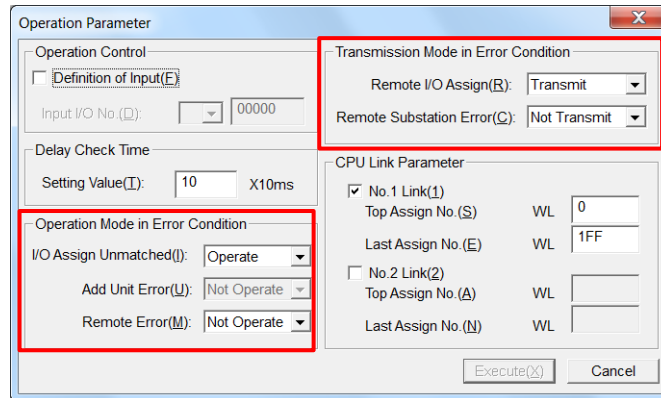
Fig. A2.2.7   LEW Operation Parameters Window
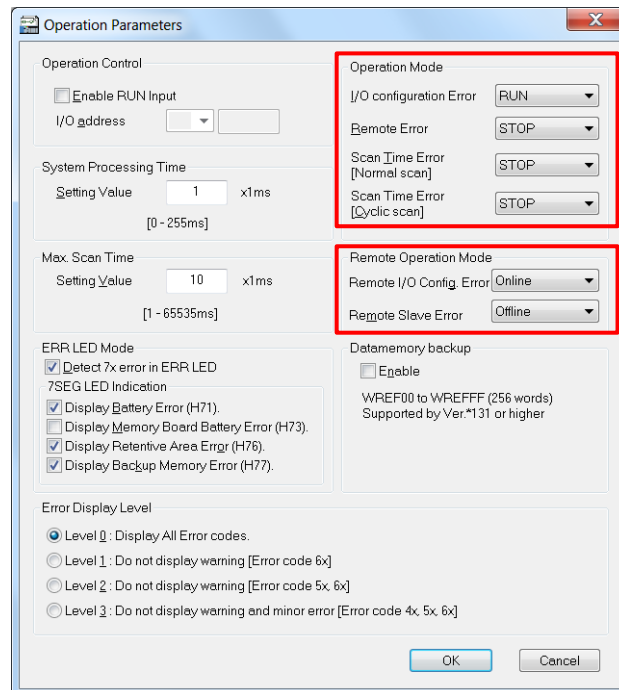
Fig. A2.2.8   Control Editor Operation Parameters Window

Table A2.2.4   Overview of Corresponding Conversion Items

No.	Source		Target	
1	Transfer Mode in Exception	Inconsistent I/O Configuration	Operation Mode	Inconsistent I/O Configuration
2		Expansion Unit Error		
3		Remote Error		Remote Error
4	Transfer Mode in Exception	Remote I/O Configuration	Remote Transfer Mode Control	Inconsistent Remote I/O Configuration
5		Remote Sub-station Error		Remote Sub-station Error

(8) CPU Link Parameter

In Control Editor Ver.5.00 or higher (Convert Tool Ver.1.1.5 or higher), it is feasible to convert the CPU link parameters of operation parameters.
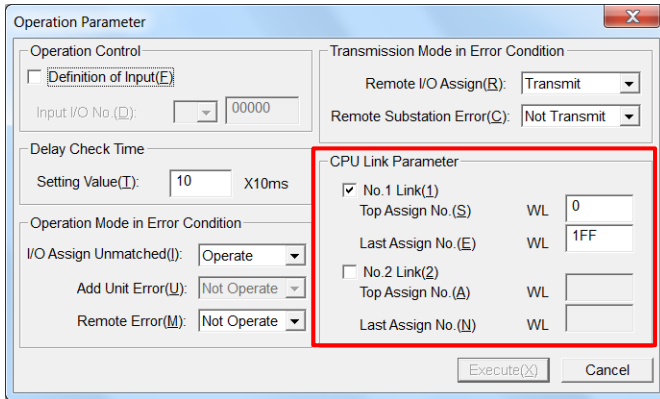
Fig. A2.2.9   LEW Operation Parameters Window
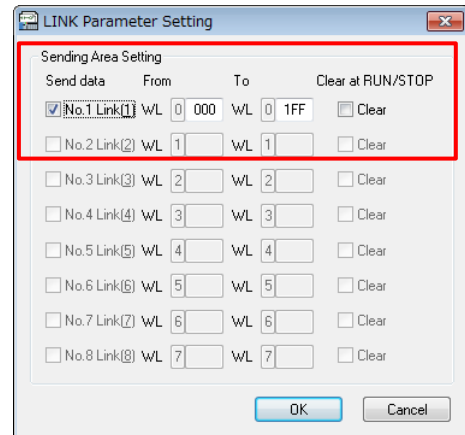
Fig. A2.2.10 CTE Link Parameters Window

Although It is able to set CPU link parameters regardless of link modules configuration in Ladder Editor, link modules configuration is necessary in Control Editor. Convert Toll will convert the CPU link parameters for the link modules with configured I/O. Since the configuration is saved in conversion result list files, please refer the conversion result list files if it is necessary to change setting in Control Editor.

Table A2.2.5   Relationship Between Link Module Configuration and CPU Link Parameters

No.	Source			Target		
	Count of Configured I/O	Setting Presented		Count of Configured I/O	Conversion	
		No.1	No.2		No.1	No.2
1	0	No	No	0	No	No
2		No	Yes		No	No
3		Yes	No		No	No
4		Yes	Yes		No	No
5	1	No	No	1	No	No
6		No	Yes		No	No
7		Yes	No		Yes	No
8		Yes	Yes		Yes	No
9	2	No	No	2	No	No
10		No	Yes		No	Yes
11		Yes	No		Yes	No
12		Yes	Yes		Yes	Yes

(9) Retentive Aria

In Control Editor Ver.5.00 or higher (Convert Tool Ver.1.1.5 or higher), it is feasible to convert the retentive Area.
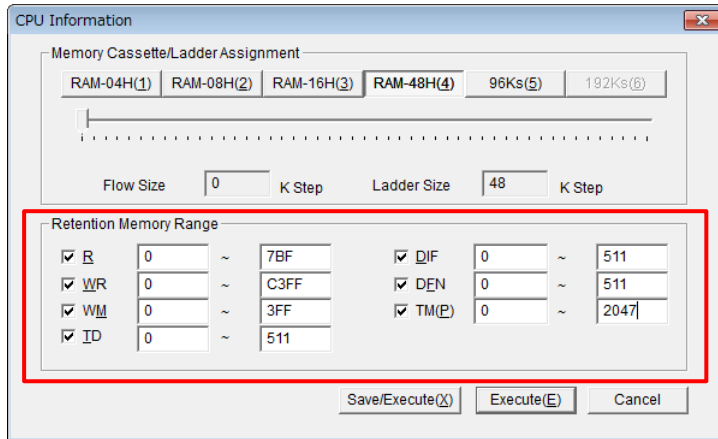
Fig. A2.2.11   LEW CPU Information (Retention Memory Range) window
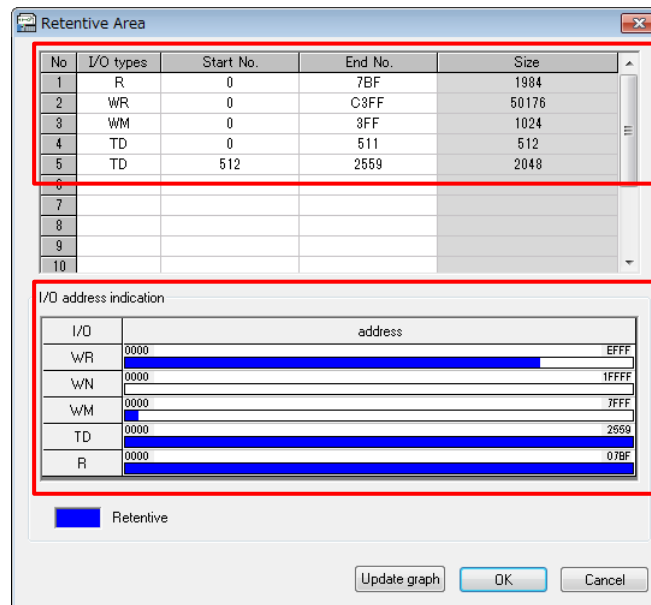
Fig. A2.2.12   CTE Retentive Area window

Table A2.2.6   Conversion table of I/O type and address range

No.	Source			Target			Remark
	I/O type	Address No.		I/O type	Address No.		
		Start	End		Start	End	
1	R	0	7BF	R	0	7BF	—
2	WR	0	C3FF	WR	0	C3FF	—
3	WM	0	3FF	WM	0	3FF	—
4	TD	0	511	TD	0	511	—
5	DIF	0	511	—	—	—	Not supported
6	DFN	0	511	—	—	—	Not supported
7	TM	0	2047	TD	512	2559	

(10) Conversion of I/O assignment

Indicates the conversion list of the I/O assignment. In the conversion source, allocated modules may become blank after conversion. Please check the I/O assignment before operation.

In Convert Tool Ver.1.1.10 or higher, the function to select I/O assignment individually for conversion of modules with multiple conversion destination candidates has been added. Use this when the conversion destination module has been confirmed.

If this function is available, a selection window will be displayed during conversion. Please select "Individual conversion". If you want to perform automatic conversion as before, select "Batch conversion".
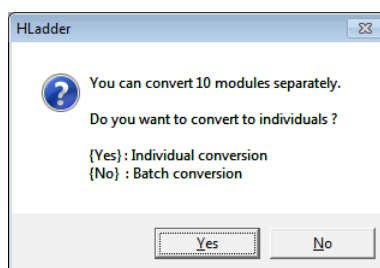
Fig. A2.2.13   Conversion method selection window

Table A2.2.7   Conversion list of the I/O assignment

No.	I/O assignment	Individual conversion target	Converted I/O assignment	Batch conversion	Remarks
1	Empty 0		(blank)		-
2	Empty 16		(blank)		-
3	Empty 32		(blank)		-
4	Empty 48		(blank)		-
5	Empty 64		(blank)		-
6	Empty 128		(blank)		-
7	Bit X 16		X16		-
8	Bit X 32		X32		-
9	Bit X 48		X48		-
10	Bit X 64		X64		-
11	Bit Y 16		Y16		-
12	Bit Y 32		Y32		-
13	Bit Y 48		Y48		-
14	Bit Y 64		Y64		-
15	Word X4W		X4W		-
16	Word X8W	✓	X8W	✓	*1
			DBW (C) 3		
17	Word Y4W		Y4W		*1
18	Word Y8W	✓	Y8W	✓	*1
			DBW (C) 1		
			Y4W		
19	Word 4W/4W	✓	X4Y4W	✓	*1
			X4Y4W(CUELX)		
			X4Y4W(SIO)		
			X4Y4W(I/F)		
			DBW (C) 2		
20	Remote 2		REMOTE2		-
21	Remote		REMOTE(RMM)		-

Table A2.2.7   Conversion list of the I/O assignment (Continuation)

No.	I/O assignment	Individual conversion target	Converted I/O assignment	Batch conversion	Remarks
22	CPU link	✓	LINK	✓	*1
			LINK(FL)		
23	COMM	✓	COMM(ETH)	✓	*1
			COMM(ELK)		
			(blank)		
			X4Y4W(SIO)		
24	BASIC		(blank)		-
25	GPIB	✓	COMM(ETH)	✓	*2
			COMM(ELK)		
			(blank)		
			X4Y4W(SIO)		
26	Interrupt		(blank)		-
27	Bit B1/1	✓	X1Y1W(B1/1)	✓	*1
			X1Y1W		
			DBW (C) 6 to E		
			DBW (S) 0 to 8		
28	Bit B2/1		X1Y2W(B1/2)		-
29	Bit B1/2		X2Y1W(B2/1)		-
30	Bit B2/2	✓	X2Y2W(B2/2)	✓	*1
			POS4A(B2/2)		
31	FUN0		X5/Y3W(FUN0)		-
32	FUN1		X3Y5W(FUN1)		-
33	FUN2	✓	X6Y2W(FUN2)	✓	*1
			X6Y2W		
			DBW (C) 4		
34	FUN3	✓	X2Y6W(FUN3)	✓	*1
			X2Y6W		
			X2Y6W(CUELC)		
			DBW (C) 5		
35	FUN4		X7Y1W(FUN4)		-
36	FUN5		X1Y7W(FUN5)		-
37	FUN6		X2Y2W(FUN6)		-

*1 Add "Assignment confirmation required !!" to the content to be output to the conversion result list file and output it.

To "Assignment confirmation required !!" Is added to the conversion result of I/O Configuration, please change to the product type used on the [I/O Configuration] window of Control Editor.

*2 "I/O Configuration (Unit: n, Slot: n) COMM -> COMM(ETH) Assignment confirmation required !!" is output to the conversion result list file.

(11) Convert of wrong connection

Convert tool can convert the ladder diagram with wrong connection from Ver.1.1.6 (This version's tool is included from Control Editor Ver.5.01). As to the converted circuit (wrong connection), error message and number of circuit is saved in the result list file (*.txt) as the convert error circuit. If these error message appears, Please confirm to the circuit after conversion.

Example
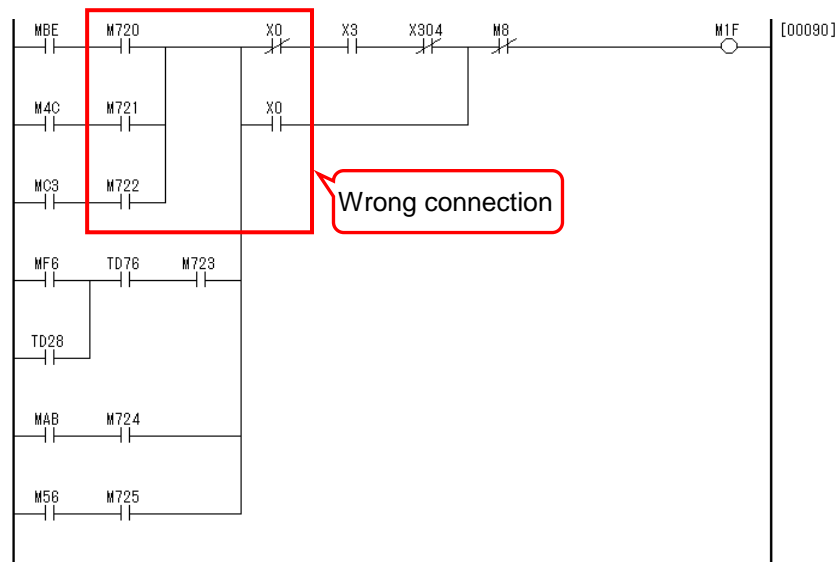
Fig. A2.2.14   Ladder diagram before conversion (wrong connection)

Description of the result list file

An error occurred during PRN file converting. [Source:90 Circuit, Target:92 Circuit, rtc=215] Please check the converted circuit before operating.
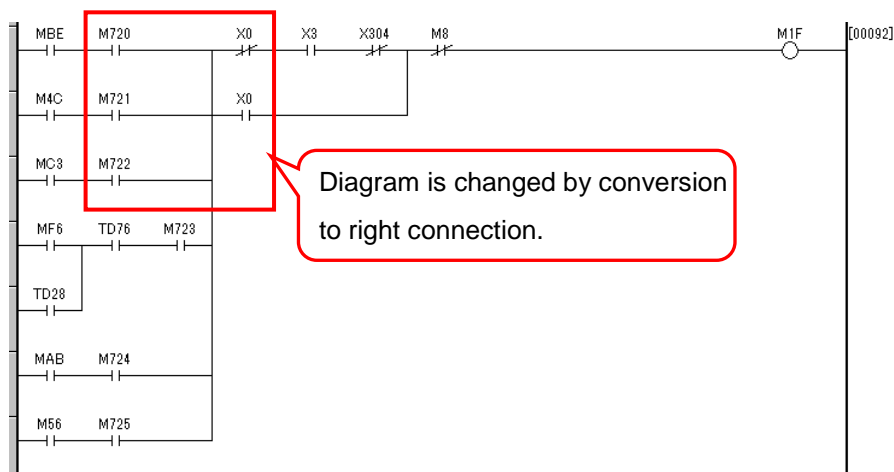
Fig. A2.2.15   Ladder diagram after conversion

(12) Conversion of special internal output

The special internal output used in the conversion source program is directly converted to the conversion destination project. Depending on the special internal output, the functions assigned at the conversion source and the conversion destination may be different.

In particular, different results may be obtained if the range allocated to "system use area" is used in the conversion destination. Be sure to check before operation.

Table A2.2.8   Difference in function assignment of special internal output

I/O address	Conversion source (MICRO-EH)	Destination (MICRO-EHV)
WRF056	Strobe Complete flag	System use area
WRF057	Detailed information of counter setting errors	System use area
WRF058	PI/O function individual setting request 1	System use area
WRF059	PI/O function individual setting request 2	System use area
WRF05A	PI/O function individual setting request 3	System use area
WRF05B	PI/O function individual setting request 4	System use area
WRF05C	Undefined	System use area
WRF05D	Undefined	System use area
WRF05E	Undefined	System use area
WRF05F	Undefined	System use area
WRF078	On-duty value, Off-preset value	System use area
WRF079	On-duty value, Off-preset value	System use area
WRF07A	Pre-load value, Pulse output value	System use area
WRF07B	Pre-load value, Pulse output value	System use area
WRF07C	Pre-load value, Pulse output value	System use area
WRF07D	Pre-load value, Pulse output value	System use area
WRF07E	Input edge	System use area
WRF07F	Input filtering time	System use area

N o t e

The system use area described in "Table A2.2.8 Difference in function assignment of special internal output" is the area used for polynomial calculation. Even if it is used other than polynomial, it is available only in the main program. It cannot be used in subroutine programs or periodic programs.
If it is in use, "Fig. A2.2.16 Warning message" is displayed and circuit writing is not possible.
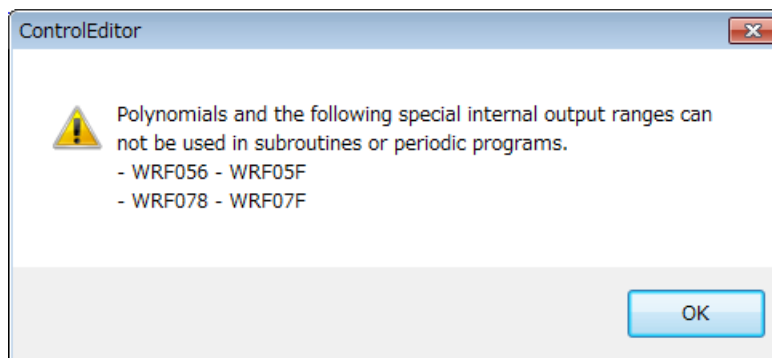
Fig. A2.2.16   Warning message

(13) Error code (rtc)

Indicates the error code (rtc) of the conversion error message that is output to the conversion result list.

The error code (rtc) is output as the value obtained by adding the error code and the sub error code. Refer to "Table A2.2.9 Error code list" for error code and "Table A2.2.10 Sub error code list" for sub error code.

If a conversion error message is output to the conversion result list, it indicates that there is an error in the conversion source circuit. Please open the conversion source file once with Ladder Editor for Windows® and check the circuit.

Example

Contents of conversion list indicated by conversion of wrong connection.

Source:90 Circuit, Target:92 Circuit, rtc=215

rtc = 215 = 200 + 15

Error code   200 ： Ladder error

Sub error code   15 ： Right end treatment, Short nested circuit exist.

Therefore, it indicates that there is an correct of wrong connection in the 90th circuit of the conversion source prn file and the 92nd circuit of the conversion destination prj file.

Table A2.2.9   Error code list

Error code	Target processing	Remarks
100	I/O error	—
200	Ladder error	—
300	Memory over	—
400	Timer error	—
500	Low-ranked machine error.	—

Table A2.2.10   Sub error code list

Sub error code	Target processing	Error contents
01	Left grid point processing	Incorrect position of processing box.
02	Left grid point processing	Error in left branch.
03	Right grid point processing	Error in right branch.
04	Left end processing	No termination of left branch.
05	Left end processing	No beginning of right branch.
06	Right end treatment	Incorrect right symbol exist.
07	Normally open-contact processing	I/O symbol error of contact point.
08	Normally closed-contact processing	I/O symbol error of B contact point.
09	undefined	Error for no setting.
10	Coil processing	Coil No. is incorrect.
11	Timer / counter processing	Incorrect timer/counter.
12	Bit I/O No. processing	Bit I/O No. error.
13	Word I/O No. processing	Word I/O No. error.
14	Right end treatment	Incorrect pair of branch.
15	Right end treatment	Short nested circuit exist.
16	Left end processing	Left vertical line with no end.
17	Right end treatment	Right vertical line with no end.
18	Master set processing	Direct coil error.
19	Master reset processing	Contact point exist before page break.
20	Non conversion domain check	Inconvertible symbol exist.

Table A2.2.10   Sub error code list (Continuation)

Sub error code	Target processing	Error contents
21	NOT processing	"NOT" exist on top of circuit.
22	Timer / counter processing	Duplication error of timer/counter.
23	undefined	Error for no setting.
24	Processing box comparison operation expression	Incorrect comparing operator in left side.
25	undefined	Error for no setting.
26	Master set processing	Master set I/O No. error.
27	Master reset processing	Master reset I/O No. error.
28	Processing box conversion processing	No expression in processing box.
29	Anti-flow circuit check	Anti-flow circuit exists.
30	Processing Box Argument Test	Incorrect argument in processing box.
31	Processing box conversion processing	Undefined operation code in processing box.
32	Processing box substitution	Incorrect substitution operation in left side
33	Processing box label	Incorrect label No. in processing box.
34	Page break	Contact point exist before page break.
35	Page break	Cannot write page break with other operation code.
36	Normally open-contact processing	DIF/DFN exists on top of circuit.
37	Normally open-contact processing	Contact point exists on coil position.
38	Normally closed-contact processing	B contact point exists on coil position.
39	NOT processing	"NOT" exist on coil position.
40	Constant processing	Can not specify constant of double word.
41	Processing box substitution	Incorrect index of array operation.
42	Processing box substitution	Data type of substitution operation is different between right and left side.
43	Processing box substitution	Incorrect substitution operation in right side.
44	Processing box comparison operation expression	Incorrect comparing expression in right side.
45	Processing box FOR	Incorrect loop numbers of ""FOR"" instruction.
46	Comparing box	Incorrect position of comparing box.
47	Processing box FUN	Incorrect description in processing box.
48	Contact processing	Incorrect No. of DIF/DFN.
49	Timer / counter processing	Incorrect coil position.
50	Timer / counter processing	MCS, MCR exist in same circuit.
51	Timer / counter processing	Setting error.
52	Timer / counter processing	Incorrect 2nd setting value.
53	Timer / counter processing	Set 1st setting value < 2nd setting value.
54	Timer / counter processing	I/O symbol error of timer/counter.
55	Coil processing	Put "always on" contact point after 2nd line of set/reset coil multiple coil.
56	Coil processing	I/O symbol error of coil.
57	Comparison box processing	Incorrect parameter in comparing box.
58	Master set processing	Coil exist other than MCS.
59	Master reset processing	Coil exist other than MCR.
60	Timer / counter processing	Set timer No. 0-63 to specify 0.01s.
61	Timer / counter processing	Time base is undefined.
62	Comparison box processing	Incorrect operation symbol in comparing box.
63	Constant parameter processing	Undefined as constant
64	Processing box processing	Label is undefined.
65	Master set processing	I/O symbol error of master set.
66	Master reset processing	I/O symbol error of master reset
67	Comparison box processing	Cannot compare signed constant with unsigned operation.
68	Comparison box processing	Cannot compare word I/O with signed comparing operation.

Table A2.2.10   Sub error code list (Continuation)

Sub error code	Target processing	Error contents
69	undefined	undefined
70	undefined	undefined
71	undefined	undefined
72	undefined	undefined
73	undefined	undefined
74	undefined	undefined
75	undefined	undefined
76	undefined	undefined
77	undefined	undefined
78	undefined	undefined
79	undefined	undefined
80	Lower model check	Unsupported data length.
81	Lower model check	No upper and lower limit data.
82	Lower model check	Operand range error.
83	Lower model check	Unsupported instruction is included.
84	undefined	undefined
85	undefined	undefined
86	undefined	undefined
87	undefined	undefined
88	undefined	undefined
89	undefined	undefined
90	Auto programming processing	Processing box and coil exist in same circuit.
91	Main processing	Conversion step number over.
92	Main processing	Incorrect Ladder symbol.
93	Main processing	Multiple short nested circuit exist.
94	Horizontal line processing	No coil in coil position.
95	Circuit extraction processing	Over line numbers in circuit."
96	Automatic edit processing	Processing box is one for one circuit.
97	Processing box processing	Circuit over in processing box.
98	undefined	undefined
99	Determination of comparison operation formula data	Parameter type of comparing operator is unmatched."

MEMO

Appendix 2.3   Conversion Format

(1) Arithmetic commands

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
Substitution statement	d = s d Substitution destination s source	WR0 = WX0	WR0 = WX0	
Addition	d = s1 + s2 d = s1 B+ s2 d Substitution destination s1 Augend s2 Addend	WR2 = WR0 + WR1 WL2 = WL0 B+ WL1	WR2 = WR0 + WR1 WL2 = WL0 B+ WL1	
Subtraction	d = s1 - s2 d = s1 B- s2 d Substitution destination s1 Minuend s2 Subtrahend	WR2 = WR0 - WR1 WR3 = WR4 B- WR5	WR2 = WR0 - WR1 WR3 = WR4 B- WR5	
Multiplication	d = s1 $\times$ s2 d = s1 B$\times$ s2 d = s1 S$\times$ s2 d Substitution destination s1 Multiplicand s2 Multiplier	WR12 = WR10 * WR11 WR16 = WR14 B* WR15 DR31 = DR26 S* DR28	WR12 = WR10 * WR11 WR16 = WR14 B* WR15 DR31.S = DR26.S * DR28.S	
Division	d = s1 / s2 d = s1 B/ s2 d = s1 S/ s2 d Substitution destination s1 Dividend s2 Divisor	WR42 = WR40 / WR41 WR51 = WR49 B/ WR50 DR60 = DR56 S/ DR58	WR42 = WR40 / WR41 WR51 = WR49 B/ WR50 DR60.S = DR56.S / DR58.S	

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
Logical disjunction (OR)	d = s1 OR s2 　d　　Substitution destination 　s1　　Comparand 　s2　　Comparative value	WR102 = WR100 OR WR101	WR102 = WR100 OR WR101	
Logical disjunction (AND)	d = s1 AND s2 　d　　Substitution destination 　s1　　Comparand 　s2　　Comparative value	WR102 = WR100 AND WR101	WR102 = WR100 AND WR101	
Exclusive disjunction (XOR)	d = s1 XOR s2 　d　　Substitution destination 　s1　　Comparand 　s2　　Comparative value	WR102 = WR100 XOR WR101	WR102 = WR100 XOR WR101	
Comparison expression	d = s1 == s2 d = s1 S== s2 d = s1 <> s2 d = s1 S<> s2 d = s1 < s2 d = s1 S< s2 d = s1 <= s2 d = s1 S<= s2 　d　　Substitution destination 　s1　　Comparand 　s2　　Relational number	M0 = WX0 == WX1 M = DR0 S== DR2 Y0 = WR0 <> WR1 Y100 = DR0 S<> DR2 L10000 = TC100 < TC101 R100 = DM0 S< DM2 Y1 = WL3FF <= WL13FF Y100 = DL3FE S<= DL13FE	M0 = WX0 == WX1 M = DR0.S == DR2.S Y0 = WR0 <> WR1 Y100 = DR0.S <> DR2.S L10000 = TC100 < TC101 R100 = DM0.S < DM2.S Y1 = WL3FF <= WL13FF Y100 = DL3FE.S <= DL13FE.S	

(2) Application commands

| Command | LADDER EDITOR | | Convert Tool | |
	Command format	Sample format	Converted command format	Remarks
Bit set	BSET (d, n) d — I/O to be set the bit n — Bit location to be set	BSET (DR100, WX0)	BSET (DR100, WX0)	
Bit reset	BRES (d, n) d — I/O to be set the bit n — Bit location to be reset	BRES (DR102, WX0)	BRES (DR102, WX0)	
Bit test	BTS (d, n) d — I/O to be tested n — Bit location to be tested	BTS (DR104, WX0)	BTS (DR104, WX0)	
Shift right	SHR (d, n) d — I/O to be shifted n — Number of bits to be shifted	SHR (DR0, 1)	SHR (DR0, 1)	
Shift left	SHL (d, n) d — I/O to be shifted n — Number of bits to be shifted	SHL (DR0, 1)	SHL (DR0, 1)	
Rotate right	ROR (d, n) d — I/O to be rotated n — Number of bits to be rotated	ROR (WR0, 1)	ROR (WR0, 1)	
Rotate left	ROL (d, n) d — I/O to be rotated n — Number of bits to be rotated	ROL (DR0, 1)	ROL (DR0, 1)	
Logical shift right	LSR (d, n) d — I/O to be shifted n — Number of bits to be shifted	LSR (WR0, 1)	LSR (WR0, 1)	
Logical shift left	LSL (d, n) d — I/O to be shifted n — Number of bits to be shifted	LSL (WR0, 1)	LSL (WR0, 1)	

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
BCD shift right	BSR (d, n) d I/O to be shifted n Number of digits to be shifted	BSR (WR0, 1)	BSR (WR0, 1)	
BCD shift left	BSL (d, n) d I/O to be shifted n Number of digits to be shifted	BSL (WR0, 1)	BSL (WR0, 1)	
Batch shift right (SHIFT RIGHT BLOCK)	WSHR (d, n) d Head I/O to be shifted n Number of bits (words) to be shifted	WSHR (WR100, 3)	WSHR (WR100, 3)	
Batch shift left (SHIFT LEFT BLOCK)	WSHL (d, n) d Head I/O to be shifted n Number of bits (words) to be shifted	WSHL (WR100, 3)	WSHL (WR100, 3)	
Batch shift right (BCD SHIFT RIGHT BLOCK)	WBSR (d, n) d Head I/O to be shifted n Number of words to be shifted	WBSR (WR100, 3)	WBSR (WR100, 3)	
Batch shift left (BCD SHIFT LEFT BLOCK)	WBSL (d, n) d Head I/O to be shifted n Number of words to be shifted	WBSL (WR100, 3)	WBSL (WR100, 3)	
Block transfer (MOVE)	MOV (d, s, n) d Transfer destination head I/O s Transfer source head I/O n Number of bits (words) to be transferred	MOV (WL1000, WL20, 64)	MOV (WL1000, WL20, 64)	
Copy	COPY (d, s, n) d Copy destination head I/O s Copy source head I/O n Number of bits (words) to be copied	COPY (WR100, H2020, 255)	COPY (WR100, H2020, 255)	

| Command | LADDER EDITOR | | Convert Tool | |
	Command format	Sample format	Converted command format	Remarks
Block exchange (EXCHANGE)	XCG (d1, d2, n) d1 — Block exchange (EXCHANGE) d2 — Exchange source head I/O n — Number of bits (words) to be exchanged	XCG (WL0, WL1000, 255)	XCG (WL0, WL1000, 255)	
NOT	NOT (d) d — I/O to be reversed	NOT (WR0)	NOT (WR0, WR0)	
Two's complement (NEGATE)	NEG (d) d — I/O to take complement	NEG (WR0)	WR0 = NEG (WR0)	
Absolute value	ABS (d, s) d — I/O after absolute value is taken s — I/O before absolute value is taken	ABS (WR0, WX0)	WR0 = ABS (WX0.S)	
Sign addition (SIGN GET)	SGET (d, s) d — I/O after absolute value is taken s — I/O before absolute value is taken	SGET (WR1, WX0)	WR1.S = SGET (WX0)	
Sign expansion (EXTEND)	EXT (d, s) d — I/O after sign expansion s — I/O before sign expansion	EXT (DR100, WX0)	DR100.S = EXT (WX0.S, 16)	
Binary → BCD conversion	BCD (d, s) d — I/O after conversion (BCD) s — I/O before conversion (BIN)	BCD (WY10, WL0)	BCD (WY10, WL0)	
BCD → Binary conversion	BIN (d, s) d — I/O after conversion (BIN) s — I/O before conversion (BCD)	BIN (WY10, WL0)	BIN (WY10, WL0)	
Decode	DECO (d, s, n) d — Decode destination head I/O s — Word I/O to be decoded n — Number of bits to be decoded	DECO (R0, WX0, 4)	DECO (R0, WX0, 4)	

Command	LADDER EDITOR		Sample format	Convert Tool	
	Command format			Converted command format	Remarks
Encode	ENCO (d, s, n)		ENCO (WR0, R0, 4)	ENCO (WR0, R0, 4)	
	d	Decode destination head I/O			
	s	Word I/O to be encoded			
	n	Number of bits to be encoded			
7 segment decode	SEG (d, s)		SEG (DR2, WR0)	SEG (DR2, WR0)	
	d	Decode destination head I/O			
	s	Decode contents			
Square root	SQR (d, s)		SQR (WR1, DR20)	WR1 = BSQR (DR20)	
	d	Square Root (BCD)			
	s	Take square root (BCD)			
Bit count	BCU (d, s)		BCU (WR0, DR20)	BCU (WR0, DR20)	
	d	Number of bits set to 1			
	s	I/O that counts the bits set to 1			
Swap	SWAP (d)		SWAP (WR10)	WR10 = SWAP (WR10)	
	d	I/O to be exchanged			
FIFO initialization	FIFIT (p, n)		FIFIT (WR0, 10)	FIFIT (WR0, 10)	
	p	FIFO head I/O			
	n	Size of FIFO			
FIFO write	FIFWR (p, s)		FIFWR (WR0, HFF)	FIFWR (WR0, HFF)	
	p	Head I/O of FIFO			
	s	Data to be written to FIFO			
FIFO read	FIFRD (p, d)		FIFRD (WR0, WL0)	FIFRD (WR0, WL0)	
	p	FIFO head I/O			
	d	I/O that stores the read data			
Unit	UNIT (d, s, n)		UNIT (WY10, WR0, 4)	UNIT (WY10, WR0, 4)	
	d	Unity result write destination I/O			
	s	Unity destination head I/O			
	n	Numbers of words to be united			

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
Distribute	DIST (d, s, n)	DIST (WR0, WX10, 4)	DIST (WR0, WX10, 4)	
	d	Distribution result write destination head I/O			
	s	I/O to be distributed			
	n	Number of words to be distributed			
I/O address conversion	ADRIO (d, s)	ADRIO (WR1000, WR0)	DR1000 = ADR (WR0)	
	d	Conversion address			
	s	I/O to be converted			

(3) Control commands

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
Normal scan end	END	EBD	END	
Scan conditional end	CEND (s) s Scan end condition	CEND (R0)	CEND (R0)	
Unconditional jump (JUMP)	JMP n n Code number	JMP 0	JMP 0	0 to 255 (Decimal)
Conditional jump	CJMP n (s) n Code number s Jump condition	CJMP 0 (R0)	CJMP 0 (R0)	
Label	LBL n n Code number	LBL 0	LBL 0	0 to 255 (Decimal)
FOR	FOR n (s) n Code number s Number of times repeated	FOR 0 (WR0)	FOR 0 (WR0)	0 to 49 (Decimal)
NEXT	NEXT n n Code number	NEXT 0	NEXT 0	0 to 49 (Decimal)
Call subroutine	CAL n n Code number	CAL 0	CAL 0	0 to 99 (Decimal)
Start subroutine program	SB n n Code number	SB 0	SB 0	0 to 99 (Decimal)
End of subroutine program (RETURN SUBROUTINE)	RTS	RTS	RTS	
Start interrupt scan program (INTERRUPT)	INT (n) n Interrupt priority	INT (0)	INT (5)	0 to 2 (Decimal) Refer to "(3) Cycle scan (INT command)" for conversion details
End interrupt scan program (RETURN INTERRUPT)	RTI	RTI	RTI	

(4) High-function module transfer commands

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
Data transmission and reception instructions for SIO-H, CLOCK-H, REM-MMH, REM-LMH	TRNS1 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+16 t — Top I/O of communication control bit t+5	TRNS1 (WY4, WM10, M0)	WREFF0.ASC.30 = "TRNS1 is not supported."	
Data transmission and reception instructions for SIO-H, CLOCK-H, REM-MMH, REM-LMH	QTRNS1 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+17 t — Top I/O of communication control bit t+5	QTRNS1 (WY24, WM110, M1000)	WREFF0.ASC.30 = "QTRNS1 is not supported."	
Data transmission and reception instruction for the ASCII module	TRNS2 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+20 t — Top I/O of communication control bit t+5	TRNS2 (WY34, WM10, M0)	WREFF0.ASC.30 = "TRNS2 is not supported."	
Data transmission and reception instruction for the ASCII module	QTRNS2 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+21 t — Top I/O of communication control bit t+5	QTRNS2 (WY44, WM10, M1000)	WREFF0.ASC.30 = "QTRNS2 is not supported."	
Data transmission instruction for 1 axis positioning module (POSIT - H)	TRNS3 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+10 t — Top I/O of communication control bit t+4	TRNS3 (WY34, WM10, M0)	WREFF0.ASC.30 = "TRNS3 is not supported."	
Data receiving instruction for 1 axis positioning module (POSIT - H)	RECV3 (d, s, t) d — Position to mount a module s — Top I/O in parameter area t — Top I/O of communication control bit	RECV3 (WX30, WM30, M20)	WREFF0.ASC.30 = "RECV3 is not supported."	

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
High speed data transmission instruction for 1 axis positioning module (POSIT - H)	QTRNS3 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+13 t — Top I/O of communication control bit t+4	QTRNS3 (WY34, WM0, M0)	WREFF0.ASC.30 = "QTRNS3 is not supported."	
Data transmission and reception command for 2 axis positioning module (POSIT-2H, POSITA2H)	TRNS4 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+16 t — Top I/O of communication control bit s+5	TRNS4 (WY34, WM10, M0)	WREFF0.ASC.30 = "TRNS4 is not supported."	
High speed data transmission and reception instruction for 2 axis positioning module (POSIT-2H, POSITA2H)	QTRNS4 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+19 t — Top I/O of communication control bit t+5	QTRNS4 (WY34, WM10, M0)	WREFF0.ASC.30 = "QTRNS4 is not supported."	
Data transmission and reception instruction for 1 amount counter module (XCU-001H)	TRNS5 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+10 t — Top I/O of communication control bit t+2	TRNS5 (WY4, WM10, M0)	TRNS5 (WY4, WM10, M0)	In Ver.1.1.10 or higher
Data transmitting and receiving instructions for 2 amount counter module (XCU-232H)	TRNS6 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+24 t — Top I/O of communication control bit t+2	TRNS6 (WY44, WM10, M0)	TRNS6 (WY44, WM10, M0)	In Ver.1.1.10 or higher
Data transmission instruction for ID reader interface module (EH-ID)	TRNS7 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+16 t — Top I/O of communication control bit t+5	TRNS7 (WY4, WM100, M0)	TRNS7 (WY4, WM100, M0)	

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
Data receiving instruction for ID reader interface module (EH-ID)	RECV7 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+17 t — Top I/O of communication control bit t+5	RECV7 (WX0, WM200, M30)	RECV7 (WX0, WM200, M30)	
Telecommunication command	TRNS8 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+10 t — Top I/O of communication control bit t+13	TRNS8 (WY0, WR20, R10)	TRNS8 (WR20, R10)	
Data transfer instruction for serial communication interface module (EH - SIO)	TRNS9 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+13 t — Top I/O of communication control bit t+4	TRNS9 (WY4, WR0, M0)	TRNS9 (WY4, WR0, M0)	

(5) Transfer commands

Command	LADDER EDITOR		Convert Tool	
	Command format	Sample format	Converted command format	Remarks
General-purpose port transmission command	TRNS0 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+14 t — Top I/O of communication control bit t+11	TRNS0 (WY10, WM100, R0)	TRNS0 (WM100, R0)	
General-purpose port receiving command	RECV0 (d, s, t) d — Position to mount a module s — Top I/O in parameter area s+14 t — Top I/O of communication control bit t+11	RECV0 (WX0, WL0, L100)	RECV0 (WL0, L100)	

(6) Fun commands

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
PID operation initialization	FUN 0 (s) [PIDIT (s)] s PID control table	PIDIT (WR0)	PIDIT (WR0)	
PID operation control	FUN 1 (s) [PIDOP (s)] s PID control table	PIDOP (WR0)	PIDOP (WR0)	
PID calculation process	FUN 2 (s) [PIDCL (s)] s Word table	PIDCL (WR0)	PIDCL (WR0)	
Process stepping	FUN 4 (s) [IFR (s)] s Former project input I/O ADRIO s+1 Project start I/O ADRIO s+2 Next project input I/O ADRIO s+3 Reserved (used by system)	ADRIO (WR0, M0) ADRIO (WR1, M200) ADRIO (WR2, M201) IRF (WR0)	 DR0 = ADR (M0) DR1 = ADR (M200) DR2 = ADR (M201) IFR (WR0)	The following correction is necessary. DR0 = ADR (M0) DR2 = ADR (M200) DR4 = ADR (M201)
SIN function	FUN 10 (s) [SIN (s)] s 0 to 360 s+1 Calculation result (Fractional part) s+2 Calculation result (Integer part)	WR0 = 40 SIN (WR0)	WR0 = 40 DR1 = SIN (WR0)	
COS function	FUN 11 (s) [COS (s)] s 0 to 360 s+1 Calculation result (Fractional part) s+2 Calculation result (Integer part)	WR0 = 110 COS (WR0)	WR0 = 110 DR1 = COS (WR0)	
TAN function	FUN 12 (s) [TAN (s)] s 0 to 360 s+1 Calculation result (Fractional part) s+2 Calculation result (Integer part)	WR0 = 45 TAN (WR0)	WR0 = 45 DR1 = TAN (WR0)	
ARC SIN function	FUN 13 (s) [ASIN (s)] s Fractional part s+1 Integer part s+2 Calculation result	DR0 = HA48E ASIN (WR0)	DR0 = HA48E WR2 = ASIN (DR0)	

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
ARC COS function	FUN 14 (s) [ACOS (s)] s Fractional part s+1 Integer part s+2 Calculation result	DR0 = HFFFFA871 ACOS (WR0)	DR0 = HFFFFA871 WR2 = ACOS (DR0)	
ARC TAN function	FUN 15 (s) [ATAN (s)] s Fractional part s+1 Integer part s+2 Calculation result	DR0 = H10000 ATAN (WR0)	DR0 = H10000 WR2 = ATAN (DR0)	
Data search	FUN 20 (s) [DSRCH (s)] s Search data s+1 Top I/O ADRIO s+2 Number of words s+3 Data position s+4 Number of hits	WR0 = H1010 ADRIO (WR1 , WM0) WR2 = H100 DSRCH (WR0)	WR0 = H1010 WR2 = H100 DSRCH (WR3, WR0, WM0, WR2)	
Table search	FUN 21 (s) [TSRCH (s)] s Top I/O of Data table ADRIO s+1 One block length s+2 Search block No. s+3 Top I/O of Searched table ADRIO	ADRIO (WR0 , WM0) WR1 = H2 WR2 = HA ADRIO (WR3 , WM100) TSRCH (WR0)	WR1 = H2 WR2 = HA TSRCH (WM100, WM0, WR1, WR2)	
Check code calculation	FUN 22 (s) s Specifying calculation method s+1 Specifying start byte/storage byte s+2 I/O type for calculation s+3 I/O No. for calculation s+4 Number of data s+5 Storage I/O type of calculation result s+6 Storage I/O No. of calculation result	WR0 = H11 WR1 = H101 WR2 = HC WR3 = H100 WR4 = 10 WR5 = HC WR6 = H200 FUN 22 (WR0)	WR0 = H11 WR1 = H101 WR2 = HC WR3 = H100 WR4 = 10 WR5 = HC WR6 = H200 CCCL (WR0)	The following correction is necessary. Delete of command Delete of command Addition of command DR2 = ADR (WM100) Delete of command Delete of command Addition of command DR5 = ADR (WM200)

Command	LADDER EDITOR			Convert tool	
	Command format		Sample format	Converted command format	Remarks
Check code verification	FUN 23 (s)				The following correction is necessary.
	s	Specifying calculation method	WR0 = H11	WR0 = H11	
	s+1	Specifying start byte	WR1 = H101	WR1 = H101	
	s+2	I/O type for calculation	WR2 = HC	WR2 = HC	Delete of command
	s+3	I/O No. for calculation	WR3 = H100	WR3 = H100	Delete of command
	s+4	Number of data			Addition of command DR2 = ADR (WM100)
	s+5	I/O type of verification check code			
	s+6	I/O No. of verification check code	WR4 = 10	WR4 = 10	
	s+7	Verification result	WR5 = HC	WR5 = HC	Delete of command
	s+8	Calculation result (Lowest)	WR6 = H200	WR6 = H200	Delete of command
	s+9	Calculation result (Upper)			Addition of command DR5 = ADR (WM200)
			FUN 23 (WR0)	CCCMP (WR7, WR0)	Results are stored in WR7 to 9.
16-bit binary →Decimal ASCII conversion	FUN 30 (s) [BINDA (s)]		WR0 = 12345 BINDA (WR0)	WR0 = 12345 BINDA (WR1, WR0)	Results are stored in WR1 to 3.
	s	Conversion source data			
	s+1 to 3	Conversion result data			
32-bit signed binary →Decimal ASCII conversion	FUN 31 (s) [DBINDA (s)]		DR0 = -1234567 DBINDA (WR0)	DR0.S = -1234567 SBINDA (WR2, DR0.S)	Results are stored in WR2 to 7.
	s	Conversion source data (Lowest)			
	s+1	Conversion source data (Upper)			
	s+2 to 7	Conversion result data			
16-bit signed binary →Hexadecimal ASCII conversion	FUN 32 (s) [BINHA (s)]		WR0 = H1234 BINHA (WR0)	WR0 = H1234 BINHA (WR1, WR0)	Results are stored in WR1 to 3.
	s	Conversion source data			
	s+1	Conversion result data (Lowest)			
	s+2	Conversion result data (Upper)			
	s+3	0000			
32-bit signed binary →Hexadecimal ASCII conversion	FUN 33 (s) [DBINHA (s)]		DR0 = H1289AB DBINHA (WR0)	DR0 = H1289AB BINHA (WR2, DR0)	Results are stored in WR2 to 6.
	s	Conversion source data (Lowest)			
	s+1	Conversion source data (Upper)			
	s+2 to 5	Conversion result data			
	s+6	0000			

Command	LADDER EDITOR			Convert tool	
	Command format		Sample format	Converted command format	Remarks
16-bit BCD →Decimal ASCII Conversion	FUN 34 (s) [BCDDA (s)] s Conversion source data s+1 Conversion result data (Lowest) s+2 Conversion result data (Upper) s+3 0000			WR0 = H1234 BCDDA (WR0)	WR0 = H1234 BCDDA (WR1, WR0)	Results are stored in WR1 to 3.
32-bit BCD →Decimal ASCII conversion	FUN 35 (s) [DBCDDA (s)] s Conversion source data (Lowest) s+1 Conversion source data (Upper) s+2 to 5 Conversion result data s+6 0000			DR0 = H120567 DBCDDA (WR0)	DR0 = H120567 BCDDA (WR2, DR0)	Results are stored in WR2 to 6.
5-digit decimal ASCII →16-bit binary conversion	FUN 36 (s) [DABIN (s)] s to +2 Conversion source data s+3 Conversion result data		WR0 = H3132 WR1 = H3334 WR2 = H3500 DABIN (WR0)	WR0 = H3132 WR1 = H3334 WR2 = H3500 DABIN (WR3, WR0)	
10-digit singed decimal ASCII →32-bit binary conversion	FUN 37 (s) [DDABIN (s)] s to +5 Conversion source data s+6 Conversion result data (Lowest) s+7 Conversion result data (Upper)		WR0 = H2D32 WR1 = H3134 WR2 = H3734 WR3 = H3833 WR4 = H3634 WR5 = H3800 DDABIN (WR0)	WR0 = H2D32 WR1 = H3134 WR2 = H3734 WR3 = H3833 WR4 = H3634 WR5 = H3800 SDABIN (DR6.S, WR0)	
4-digit hexadecimal ASCII →16-bit binary conversion	FUN 38 (s) [HABIN (s)] s Conversion source data (Lowest) s+1 Conversion source data (Upper) s+2 Conversion result data		WR0 = H3132 WR1 = H4142 HABIN (WR0)	WR0 = H3132 WR1 = H4142 HABIN (WR2, WR0)	
8-digit hexadecimal ASCII →32-bit binary conversion	FUN 39 (s) [DHABIN (s)] s to +3 Conversion source data s+4 Conversion result data (Lowest) s+5 Conversion result data (Upper)		WR0 = H4645 WR1 = H4443 WR2 = H4241 WR3 = H3938 DHABIN (WR0)	WR0 = H4645 WR1 = H4443 WR2 = H4241 WR3 = H3938 HABIN (DR4, WR0)	
4-digit decimal ASCII →16-bit BCD conversion	FUN 40 (s) [DABCD (s)] s Conversion source data (Lowest) s+1 Conversion source data (Upper) s+2 Conversion result data		WR0 = H2020 WR1 = H3031 DABCD (WR0)	WR0 = H2020 WR1 = H3031 DABCD (WR2, WR0)	

Command	LADDER EDITOR			Convert tool	
	Command format		Sample format	Converted command format	Remarks
→32-bit BCD conversion	FUN 41 (s) [DDABCD (s)]		WR0 = H3938	WR0 = H3938	
	s to +3	Conversion source data	WR1 = H3736	WR1 = H3736	
	s+4	Conversion result data (Lowest)	WR2 = H3534	WR2 = H3534	
	s+5	Conversion result data (Upper)	WR3 = H3332	WR3 = H3332	
			DDABCD (WR0)	DABCD (DR4, WR0)	
16-digit binary →Hexadecimal ASCII conversion	FUN 42 (s) [ASC (s)]		WR0 = 15	WR0 = 15	
	s	Number of conversions	ADRIO (WR1 , WR100)	ASC (WM0, WR100, WR0)	
	s+1	Top I/O of conversion source data ADRIO	ADRIO (WR2 , WM0)		
	s+2	Top I/O of conversion result data ADRIO	ASC (WR0)		
16-digit ASCII →Hexadecimal binary conversion	FUN 43 (s) [HEX (s)]		WR0 = 15	WR0 = 15	
	s	Number of conversions	ADRIO (WR1 , WM0)	HEX (WR100, WM0, WR0)	
	s+1	Top I/O of conversion source data ADRIO	ADRIO (WR2 , WR100)		
	s+2	Top I/O of conversion result data ADRIO	HEX (WR0)		
String concatenation	FUN 44 (s) [SADD (s)]		ADRIO (WR0 , WM10)	SADD (WM30, WM10, WM20)	
	s	String 1 Top I/O ADRIO	ADRIO (WR1 , WM20)		
	s+1	String 2 Top I/O ADRIO	ADRIO (WR2 , WM30)		
	s+2	String top I/O after concatenation ADRIO	SADD (WR0)		
String comparison	FUN 45 (s) [SCMP (s)]		ADRIO (WR0 , WM0)	SCMP (WR2, WM0, WM10)	
	s	String 1 Top I/O ADRIO	ADRIO (WR1 , WM10)		
	s+1	String 2 Top I/O ADRIO	SCMP (WR0)		
	s+2	Comparison result			
Word →Byte conversion	FUN 46 (s) [WTOB (s)]		ADRIO (WR0 , WM0)	WR2 = H4	
	s	Top I/O of conversion source data ADRIO	ADRIO (WR1 , WM10)	WTOB (WM10, WM0, WR2)	
	s+1	Top I/O of conversion result data ADRIO	WR2 = H4		
	s+2	Number of conversion bytes	WTOB (WR0)		
Byte →word conversion	FUN 47 (s) [BTOW (s)]		ADRIO (WR0 , WM0)	WR2 = H4	
	s	Top I/O of conversion source data ADRIO	ADRIO (WR1 , WM10)	BTOW (WM10, WM0, WR2)	
	s+1	Top I/O of conversion result data ADRIO	WR2 = H4		
	s+2	Number of conversion bytes	BTOW (WR0)		
Byte shift right	FUN 48 (s) [BSHR (s)]		WR0 = 4	WR0 = 4	
	s	Number of shifted bytes	ADRIO (WR1 , WM100)	BSHR (WM100, WR0)	
	s+1	Data top I/O ADRIO	BSHR (WR0)		

Command	LADDER EDITOR			Convert tool	
	Command format		Sample format	Converted command format	Remarks
Byte shift left	FUN 49 (s) [BSHL (s)]		WR0 = 5	WR0 = 5	
	s	Number of shifted bytes	ADRIO (WR1 , WM100)	BSHL (WM100, WR0)	
	s+1	Data top I/O ADRIO	BSHL (WR0)		
Sampling trace set	FUN 50 (s) [TRSET (s)]		TRSET (WR0)	WREFF0.ASC.30 = "Check TRSET cmd."	
	s				
Sampling trace execute	FUN 51 (s) [TRACR (s)]		TRACR (WR0)	WREFF0.ASC.30 = "Check TRACE cmd."	
	s				
Sampling trace reset	FUN 52 (s) [TRRES (s)]		TRRES (WR0)	WREFF0.ASC.30 = "Check TRRES cmd."	
	s				
Binary square root	FUN 60 (s) [BSQR (s)]		DR0 = H12345678	DR0 = H12345678	
	s	Argument (Lowest)	BSQR (WR0)	WR2 = BSQR (DR0)	
	s+1	Argument (Upper)			
	s+2	Verification result			
Dynamic scan pulse	FUN 61 (s) [PGEN (s)]		WR0 = 2	WR0 = 2	Reference I / O change is required.
	s	Number of On scans	WR1 = 3	WR1 = 3	
	s+1	Number of OFF scans	ADRIO (WR2 , M100)	DR2 = ADR (M100)	WR3 → WR4
	s+2	Pulse output I/O ADRIO	PGEN (WR0)	PGEN (WR0)	WR4 → WR5
	s+3	System area (ON scan progress value)			
	s+4	System area (OFF scan progress value)			
Average·minimum· maximum search	FUN 63 (s) [VSRCH (s)]		WR = 0	WR = 0	
	s	Search value type	ADRIO (WR1, WM100)	WR2 = WR100	
	s+1	Top I/O of the searching area ADRIO	WR2 = WR100	VSRCH (WR3, WR0, WM100, WR2)	
	s+2	Data count of searching area	VSRCH (WR0)		
	s+3	Searching result			
I/O refresh (Whole points)	FUN 80 (s) [ALREF (s)]		ALREF (WR0)	ALREF	
	s	Dummy			
I/O refresh (Specifying type)	FUN 81 (s) [IOREF (s)]		WR0 = 1	WR0 = 1	
	s	I/O type	IOREF (WR0)	IOREF (WR0)	

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
I/O refresh (Specifying slot)	FUN 82 (s) [SLREF (s)] s Number of slots (n) n≦64 s+1 to n Slot position	WR0 = H2 WR1 = H0 WR2 = H12 SLREF (WR0)	WR0 = H2 WR1 = H0 WR2 = H12 SLREF (WR0)	
Extended timer initialize	FUN 90 (s) [ETDIT (s)] s	ETDIT (WR0)	WREFF0.ASC.30 = "Check ETDIT cmd."	
Extended timer run	FUN 91 (s) [ETD (s)] s	ETD (WR0)	WREFF0.ASC.30 = "Check ETD cmd."	
Extended up-down counter Initialize	FUN 92 (s) [ECUIT (s)] s	ECUIT (WR0)	WREFF0.ASC.30 = "Check ECUIT cmd."	
Extended up-down counter Run	FUN 93 (s) [ECU (s)] s	ECU (WR0)	WREFF0.ASC.30 = "Check ECU cmd."	
Extended up-down counter Count up	FUN 94 (s) [ECTU (s)] s	ECTU (WR0)	WREFF0.ASC.30 = "Check ECTU cmd."	
Extended up-down counter Count down	FUN 95 (s) [ECTD (s)] s	ECTD (WR0)	WREFF0.ASC.30 = "Check ECTD cmd."	
Extended counter	FUN 96 (s) [ECL (s)] s	ECL (WR0)	WREFF0.ASC.30 = "Check ECL cmd."	
Read extended link area	FUN 97 (s) [WNRED (s)] s	WNRED (WR0)	WREFF0.ASC.30 = "Check WNRED cmd."	
Write extended link area	FUN 98 (s) [WNWRT (s)] s	WNWRT (WR0)	WREFF0.ASC.30 = "Check ECTU cmd."	
Extended encode· decode	FUN 99 (s) [FUN 99 (s)] s	FUN 99 (WR0)	WREFF0.ASC.30 = "Check FUN 99 cmd."	
Real number →Integer number (word)	FUN 100 (s) [INTW (s)] s Real number (Lowest) s+1 Real number (Upper) s+2 Conversion result (Integer number)	DR0 = H46FFFE00 INTW (WR0)	DR0 = H46FFFE00 DR2.S = INTG (DR0.FL)	

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks

Real number →Integer number (D word)	FUN 101 (s) [INTD (s)]
	s Real number (Lowest)
	s+1 Real number (Upper)
	s+2 Conversion result
	     (Integer number) (Lowest)
	s+3 Conversion result
	     (Integer number) (Upper)
		DR0 = H4EFFFFFF
		INTD (WR0)
			DR0.FL = H4EFFFFFF
			WR2.S = INTG (DR0.FL)	

Integer(word) →Real number (Floating pointer number calculation)	FUN 102 (s) [FLOAT (s)]
	s Integer
	s+1 Convert result
	     (real number) (Lowest)
	s+2 Convert result
	     (real number) (Upper)
		WR0 = H7FFF
		FLOAT (WR0)
			WR0.S = H7FFF
			DR1.FL = FLOAT (WR0.S)	

Integer(D word) →Real number (Floating pointer number calculation)	FUN 103 (s) [FLOATD (s)]
	s Integer (Lowest)
	s+1 Integer (Upper)
	s+2 Convert result
	     (real number) (Lowest)
	s+3 Convert result
	     (real number) (Upper)
		DR0 = H20001
		FLOATD (WR0)
			DR0.S = H20001
			DR2.FL = FLOART (DR0.S)	

Add (Floating pointer number calculation)	FUN 104 (s) [FADD (s)]
	s Real number 1 (Lowest)
	s+1 Real number 1 (Upper)
	s+2 Real number 2 (Lowest)
	s+3 Real number 2 (Upper)
	s+4 Calculation result
	     (real number) (Lowest)
	s+5 Calculation result
	     (real number) (Upper)
		DR0 = H42C90000
		DR2 = H43488000
		FADD (WR0)
			DR0.FL = H42C90000
			DR2.FL = H43488000
			DR4.FL = DR0.FL + DR2.FL	

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
Subtract (Floating pointer number calculation)	FUN 105 (s) [FSUB (s)] s — Real number 1 (Lowest) s+1 — Real number 1 (Upper) s+2 — Real number 2 (Lowest) s+3 — Real number 2 (Upper) s+4 — Calculation result (real number) (Lowest) s+5 — Calculation result (real number) (Upper)	DR0 = H43488000 DR2 = H42C90000 FSUB (WR0)	DR0.FL = H43488000 DR2.FL = H42C90000 DR4.FL = DR0.FL – DR2.FL	
Multiply (Floating pointer number calculation)	FUN 106 (s) [FMUL (s)] s — Real number 1 (Lowest) s+1 — Real number 1 (Upper) s+2 — Real number 2 (Lowest) s+3 — Real number 2 (Upper) s+4 — Calculation result (real number) (Lowest) s+5 — Calculation result (real number) (Upper)	DR0 = H43488000 DR2 = H42C90000 DMUL (WR0)	DR0.FL = H43488000 DR2.FL = H42C90000 DR4.FL = DR0.FL * DR2.FL	
Divide (Floating pointer number calculation)	FUN 107 (s) [FDIV (s)] s — Real number 1 (Lowest) s+1 — Real number 1 (Upper) s+2 — Real number 2 (Lowest) s+3 — Real number 2 (Upper) s+4 — Calculation result (real number) (Lowest) s+5 — Calculation result (real number) (Upper)	DR0 = H43488000 DR2 = H42C88000 FDIV (WR0)	DR0.FL = H43488000 DR2.FL = H42C88000 DR4.FL = DR0.FL / DR2.FL	
Angle→radian convert (Floating pointer number calculation)	FUN 108 (s) [FRAD (s)] s — Real number (Lowest) s+1 — Real number (Upper) s+2 — Calculation result (real number) (Lowest) s+3 — Calculation result (real number) (Upper)	DR0 = H42C80000 FRAD (WR0)	DR0.FL = H42C80000 DR2.FL = RAD (DR0.FL)	

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
Radian →angle convert (Floating pointer number calculation)	FUN 109 (s) 　[FDEG (s)] 　s　Real number (Lowest) 　s+1　Real number (Upper) 　s+2　Calculation result (real number) (Lowest) 　s+3　Calculation result (real number) (Upper)	DR0 = H3FDF66F3 FDEG (WR0)	DR0.FL = H3FDF66F3 DR2.FL = DEG (DR0.FL)	
SIN function (Floating pointer number calculation)	FUN 110 (s) 　[FSIN (s)] 　s　Real number (radian) (Lowest) 　s+1　Real number (radian) (Upper) 　s+2　Calculation result (real number) (Lowest) 　s+3　Calculation result (real number) (Upper)	DR0 = H3F060A92 FSIN (WR0)	DR0.FL = H3F060A92 DR2.FL = SINR (DR0.FL)	
COS function (Floating pointer number calculation)	FUN 111 (s) 　[FCOS (s)] 　s　Real number (radian) (Lowest) 　s+1　Real number (radian) (Upper) 　s+2　Calculation result (real number) (Lowest) 　s+3　Calculation result (real number) (Upper)	DR0 = H3F060A92 FCOS (WR0)	DR0.FL = H3F060A92 DR2.FL = COSR (DR0.FL)	
TAN function (Floating pointer number calculation)	FUN 112 (s) 　[FTAN (s)] 　s　Real number (radian) (Lowest) 　s+1　Real number (radian) (Upper) 　s+2　Calculation result (real number) (Lowest) 　s+3　Calculation result (real number) (Upper)	DR0 = H3F060A92 FTAN (WR0)	DR0.FL = H3F060A92 DR2.FL = TANR (DR0.FL)	
ARC SIN function (Floating pointer number calculation)	FUN 113 (s) 　[FASIN (s)] 　s　Real number (Lowest) 　s+1　Real number (Upper) 　s+2　Calculation result (real number)(radian) (Lowest) 　s+3　Calculation result (real number)(radian) (Upper)	DR0 = H3F800000 FASIN (WR0)	DR0.FL = H3F800000 DR2.FL = ASINR (DR0.FL)	

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
ARC COS function (Floating pointer number calculation)	FUN 114 (s) [FACOS (s)] s — Real number (Lowest) s+1 — Real number (Upper) s+2 — Calculation result (real number)(radian) (Lowest) s+3 — Calculation result (real number)(radian) (Upper)	DR0 = H3F800000 FACOS (WR0)	DR0.FL = H3F800000 DR2.FL = ACOSR (DR0.FL)	
ARC TAN function (Floating pointer number calculation)	FUN 115 (s) [FATAN (s)] s — Real number (Lowest) s+1 — Real number (Upper) s+2 — Calculation result (real number)(radian) (Lowest) s+3 — Calculation result (real number)(radian) (Upper)	DR0 = HC0000000 FATAN (WR0)	DR0.FL = HC0000000 DR2.FL = ATANR (DR0.FL)	
Square root (Floating pointer number calculation)	FUN 116 (s) [FSQR (s)] s — Real number (Lowest) s+1 — Real number (Upper) s+2 — Calculation result (real number) (Lowest) s+3 — Calculation result (real number) (Upper)	DR0 = H40000000 FSQR (WR0)	DR0.FL = H40000000 DR2.FL = SQR (DR0.FL)	
Exponential (Floating pointer number calculation)	FUN 117 (s) [FEXP (s)] s — Real number (Lowest) s+1 — Real number (Upper) s+2 — Calculation result (real number) (Lowest) s+3 — Calculation result (real number) (Upper)	DR0 = H40000000 FEXP (WR0)	DR0.FL = H40000000 DR2.FL = EXP (DR0.FL)	
Natural logarithm (Floating pointer number calculation)	FUN 118 (s) [FLOG (s)] s — Real number (Lowest) s+1 — Real number (Upper) s+2 — Calculation result (real number) (Lowest) s+3 — Calculation result (real number) (Upper)	DR0 = H3F000000 FLOG (WR0)	DR0.FL = H3F000000 DR2.FL = LOG (DR0.FL)	

Command	LADDER EDITOR			Convert tool	
	Command format		Sample format	Converted command format	Remarks
Index set (argument d)	FUN 120 (s) [INDXD (s)]		INDXD (WR0)	WREFF0.ASC.30 = "Check INDXD cmd."	
	s	Integer			
Index set	FUN 121 (s) [INDXS (s)]		INDXS (WR1)	WREFF0.ASC.30 = "Check INDXS cmd."	
	s	Integer			
Index remove	FUN 122 (s) [INDXC (s)]		INDXC (WR0)	WREFF0.ASC.30 = "Check INDXC cmd."	
	s	Integer			
Increment (word)	FUN 123 (s) [INC (s)]		WR0 = H0	WR0 = H0	
	s	Integer	INC (WR0)	INC (WR0)	
Increment (D word)	FUN 124 (s) [INCD (s)]		DR0 = H0	DR0 = H0	
	s	Integer (Lowest)	INCD (WR0)	INC (DR0)	
	s+1	Integer (Upper)			
Decrement (word)	FUN 125 (s) [DEC (s)]		WR0 = HFFFF	WR0 = HFFFF	
	s	Integer	DEC (WR0)	DEC (WR0)	
Decrement (D word)	FUN 126 (s) [DECD (s)]		DR0 = HFFFFFFFF	DR0 = HFFFFFFFF	
	s	Integer (Lowest)	DECD (WR0)	DEC (DR0)	
	s+1	Integer (Upper)			
Bit→Word expansion	FUN 127 (s) [BITTOW (s)]		ADRIO (WR0, M100)	WR1 = H4	
	s	Top I/O of bit ADRIO	WR1 = H4	BITTOW (WM200, M100, WR1)	
	s+1	Count of bits	ADRIO (WR2, WM200)		
	s+2	Top I/O of word ADRIO	BITTOW (WR0)		
Word→Bit expansion	FUN 128 (s) [WTOBIT (s)]		ADRIO (WR0, WM100)	WR1 = H4	
	s	Top I/O of word ADRIO	WR1 = H4	WTOBIT (M200, WM100, WR1)	
	s+1	Count of words	ADRIO (WR2, M200)		
	s+2	Top I/O of bit ADRIO	WTOBIT (WR0)		
File memory Block initialize	FUN 130 (s) [FIBIT (s)]		WR0 = HF	WR0 = HF	
	s	Word variables	FIBIT (WR0)	WREFF0.ASC.30 = "Check FIBIT cmd."	
File memory Block delete	FUN 131 (s) [FIBES (s)]		WR0 = HF	WR0 = HF	
	s	Word variables	FIBES (WR0)	WREFF0.ASC.30 = "Check FIBES cmd."	

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
File memory Block write	FUN 132 (s) [FIBWRT (s)] s Word variables	WR0 = HF FIBWRT (WR0)	WR0 = HF WREFF0.ASC.30 = "Check FIBWRT cmd."	
File memory Block transfer	FUN 133 (s) [FIBMOV (s)] s Word variables	WR0 = HF FIBMOV (WR0)	WR0 = HF WREFF0.ASC.30 = "Check FIBMOV cmd."	
File memory Block exchange	FUN 134 (s) [FIBCHG (s)] s Word variables	WR0 = HF FIBCHG (WR0)	WR0 = HF WREFF0.ASC.30 = "Check FIBCHG cmd."	
File memory Read by word	FUN 135 (s) [FIWRED (s)] s Word variables	WR0 = HF FIWRED (WR0)	WR0 = HF WREFF0.ASC.30 = "Check FIWRED cmd."	
File memory Write by word	FUN 136 (s) [FIWWRT (s)] s Word variables	WR0 = HF FIWWRT (WR0)	WR0 = HF WREFF0.ASC.30 = "Check FIWWRT cmd."	
FL-net user message	FUN 160 (s) s Dummy	FUN 160 (WR0)	FLMEEX (WR0)	

FL-net user message Execute send and receive	FUN 161 (s)
	  s Top I/O of controller flag ADRIO
	  s+1 Top I/O of sending area ADRIO
	  s+2 Top I/O of sending error code ADRIO
	  s+3 Top I/O of receiving area ADRIO
	  s+4 Top I/O of receiving error code ADRIO
		ADRIO (WR0, WM100)
		ADRIO (WR1, WM200)
		ADRIO (WR2, WM101)
		ADRIO (WR3, WM300)
		ADRIO (WR4, WM102)
		FUN 161 (WR0)
			DR0 = ADR (WM100)
			DR1 = ADR (WM200)
			DR2 = ADR (WM101)
			DR3 = ADR (WM300)
			DR4 = ADR (WM102)
			FLMEIT (WM100)	

Explicit message Execute s end and receive	FUN 162 (s) s Dummy	FUN 162 (WR0)	EXMEEX	

Command	LADDER EDITOR			Convert tool	
	Command format		Sample format	Converted command format	Remarks
Explicit message Send and receive setting initialize	FUN 163 (s)				The following correction is necessary.
	s	[0]Count of modules (Maximum is 4)	WR0 = 1	WR0 = 1	
	s+1	[1]No. of slot (0 to 7)	WR1 = 0	WR1 = 0	
	s+2	[2]Top I/O of controller flag ADRIO	ADRIO (WR2, WM100)	DR2 = ADR (WM100)	DR2 = ADR (WM100)
	s+3	[3]Top address of sending area ADRIO	ADRIO (WR3, WM200)	DR3 = ADR (WM200)	DR4 = ADR (WM200)
	s+4	[4]Top address of receiving area ADRIO	ADRIO (WR4, WM300)	DR4 = ADR (WM300)	DR6 = ADR (WM300)
	s+5	[5]Sending error code	FUN 163 (WR0)	EXMEIT (WR0)	
	s+6	[6]Receiving error code			Reference I / O change is required.
	s+7 to 18	to			WR5 → WR8
	s+19	[H13][1]No. of slot			WR6 → WR9
	s+20	[H14][2]Top I/O of controller flag ADRIO			
	s+21	[H15][3]Top address of sending area ADRIO			
	s+22	[H16][4]Top address of receiving area ADRIO			
	s+23	[H17][5]Sending error code			
	s+24	[H18][6]Receiving error code			
Inverter Control	FUN 190 (s)		ADRIO (WR0, WM100)	DR0 = ADR (WM100)	
	s	Top I/O of control bit area ADRIO	ADRIO (WR1, WM200)	DR1 = ADR (WM200)	
	s+1	Top I/O of command input area ADRIO	ADRIO (WR2, WM300)	DR2 = ADR (WM300)	
	s+2	Top I/O of responds store area ADRIO	FUN 190 (WR0)	WREFF0.ASC.30 = "Check FUN 190 cmd."	
	s+3	Timeout			
	s+4	Transmission speed			
	s+5	Transmission format			
Primary expression interpolation	FUN 198 (s)		ADRIO (WR0, WM100)	DR0 = ADR (WM100)	The following correction is necessary.
	s	Top address of data table ADRIO	WR1 = 1000	WR1 = 1000	WR2 = 1000
	s+1	Count of elements of table	WR2 = 0	WR2 = 0	WR3 = 0
	s+2	Primary expression calculated address (start)	WR3 = H40	WR3 = H40	WR4 = H40
	s+3	Primary expression calculated address (end)	FUN 198 (WR0)	INTPL (WR0)	

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Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
XY area Read Write command	FUN 200 (s)			The following correction is necessary.
	s	Area code	WR3 = H3	WR3 = H3	
	s+1	System area	WR4 = H0	WR4 = H0	
	s+2	(cannot be used by user)	ADRIO (WR5, M0)		
	s+3	Control type	ADRIO (WR6, WM100)	DR6 = ADR (WM100)	DR5 = ADR (WM100)
	s+4	Top of the target area	WR7 = H18	WR7 = H18	
	s+5	I/O No. of reading·writing control bit ADRIO	FUN 200 (WR0)	XYRW (WR0, M0)	
	s+6	Top I/O No. of transfer source(target) ADRIO			
	s+7	Size			
Status controller area Read Write command	FUN 201 (s)			The following correction is necessary.
	s	Area code	WR3 = H3	WR3 = H3	
	s+1	System area	WR4 = H0	WR4 = H0	
	s+2	(cannot be used by user)	ADRIO (WR5, M0)		
	s+3	Control type	ADRIO (WR6, WM100)	DR6 = ADR (WM100)	DR5 = ADR (WM100)
	s+4	Top of the target area	WR7 = H9	WR7 = H9	
	s+5	I/O No. of reading·writing control bit ADRIO	FUN 201 (WR0)	SCRW (WR0, M0)	
	s+6	Top I/O No. of transfer source(target)			
	s+7	Size			
Data logging Initialize	FUN 210 (s)		ADRIO (WR2, WR400)	DR2 = ADR (WR400)	
	s	Error code	WR3 = H110	WR3 = H110	
	s+1	Initialize result	ADRIO (WR4, WM100)	DR4 = ADR (WM100)	
	s+2	I/O No. of logging information table ADRIO	ADRIO (WR5, R200)	DR5 = ADR (R200)	
	s+3	Initialization indication	FUN 210 (WR0)	WREFF0.ASC.30 = "Check FUN 210 cmd."	
	s+4	I/O No. of logging write parameters ADRIO			
	s+5	I/O No. of logging clear parameters ADRIO			
Data logging Write	FUN 211 (s)		FUN 211 (WR0)	WREFF0.ASC.30 = "Check FUN 211 cmd."	
	s	Error code			
Data logging	FUN 212 (s)		FUN 212 (WR0)	WREFF0.ASC.30 = "Check FUN 212 cmd."	
	s	Error code			

Command	LADDER EDITOR		Convert tool	
	Command format	Sample format	Converted command format	Remarks
Data logging Read	FUN 213 (s) s — Error code s+1 — Logging data address of transfer source (lower bit) s+2 — Logging data address of transfer source (upper bit) s+3 — Top I/O No. of transfer target ADRIO s+4 — Size (1~128 word)	WR1 = HA WR2 = H0 ADRIO (WR3, WM100) WR4 = H5 FUN 213 (WR0)	WR1 = HA WR2 = H0 DR3 = ADR (WM100) WR4 = H5 WREFF0.ASC.30 = "Check FUN 213 cmd."	
Box comment	FUN 254 (s) [BOXC (s)] s — Dummy constant	WR0 = H1 BOXC (WR0)	WR0 = H1 WREFF0.ASC.30 = "Check BOXC(1) cmd."	
Memo comment	FUN 255 (s) [MEMC (s)] s — Dummy constant	WR0 = H2 MEMC (WR0)	WR0 = H2 WREFF0.ASC.30 = "Check MEMC(2) cmd."	

Appendix 3   USB Driver

Appendix 3.1   Installation Procedure of USB Driver

Driver folder

    X:/EH-CTE-E/driver

      (X : Drive letter)

    or

    [Control Editor install folder]/Driver/USB

Installation Procedure

  1. Select "DriverInst.exe" in the driver folder and press the [Enter] key or double-click directly.

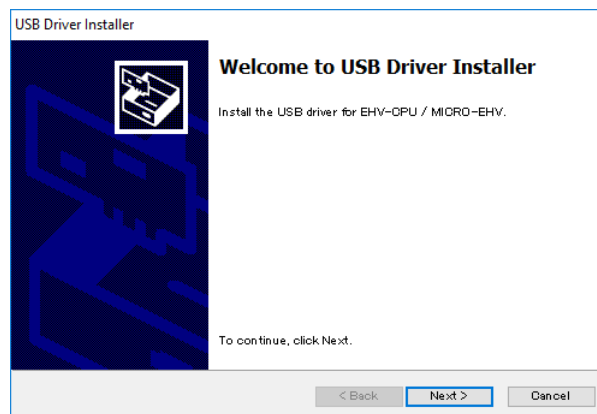 2. When the USB Driver Installer window, click "Next >".

Fig. A3.1.1   USB Driver Installer window

  3. When the message "Installation of the USB driver is completed" is displayed, click "Finish". Installation is

     complete.
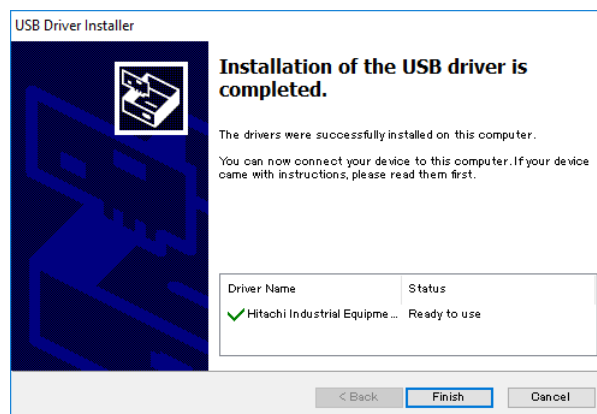
Fig. A3.1.2   USB Driver Installer window

Confirm installation

1. Switch on the power supply of EHV-CPU module or MICRO-EHV.

2. Connect the B connector of USB cable prepared by user to USB port of USB module.

3. Connect the A connector of USB cable to USB port of your personal computer.

4. Press the [Windows] + [R] keys.

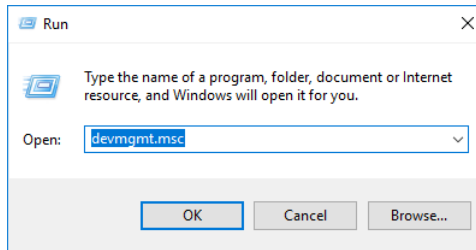5. When the Run window is displayed, enter "devmgmt.msc" in the "Open" field and press the [Enter] key.

Fig. A3.1.3   Run window

6. When the Device Manager window is display, please confirm that "EHVUSBD USB Device" or "ehvusbd-win32 device" is displayed.
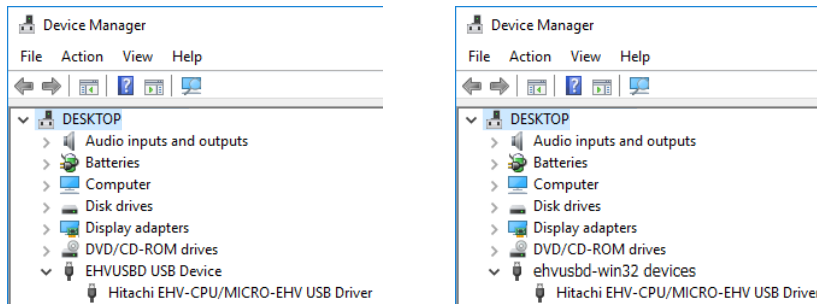
Fig. A3.1.4   Device Manager window

Now, communication between EHV-CPU module / MICRO-EHV and USB is available.

Appendix 3.2   Update Procedure of USB Driver

Driver folder

    X:/EH-CTE-E/driver

      (X : Drive letter)

    or

    [Control Editor install folder]/Driver/USB

Update Procedure

    1. Select "DriverInst.exe" in the driver folder and press the [Enter] key or double-click directly.

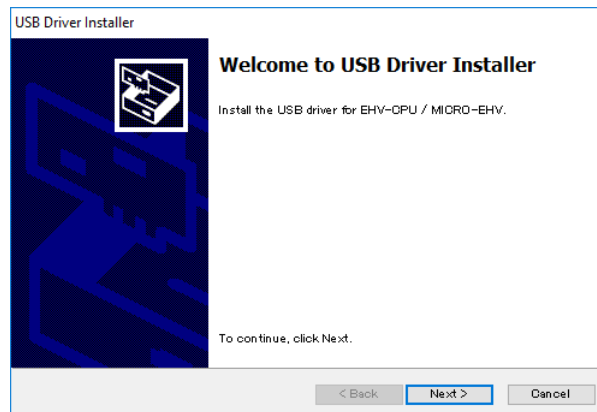   2. When the USB Driver Installer window, click "Next >".

Fig. A3.2.1   USB Driver Installer window

    3. When the message "Installation of the USB driver is completed" is displayed, click "Finish". Update is complete.
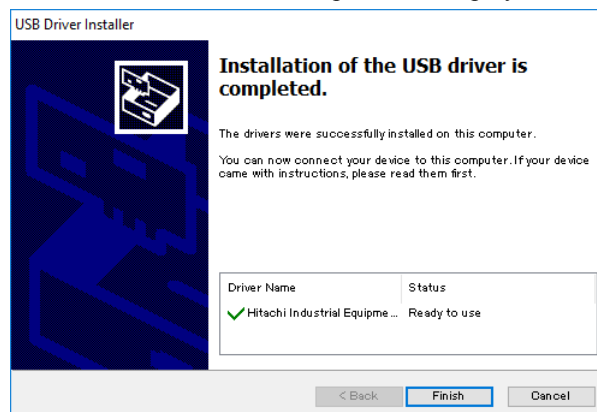

Fig. A3.2.2   USB Driver Installer window

Confirm update

1. Switch on the power supply of EHV-CPU module or MICRO-EHV.

2. Connect the B connector of USB cable prepared by user to USB port of USB module.

3. Connect the A connector of USB cable to USB port of your personal computer.

4. Press the [Windows] + [R] keys.

5. When the Run window is displayed, enter "devmgmt.msc" in the "Open" field and press the [Enter] key.
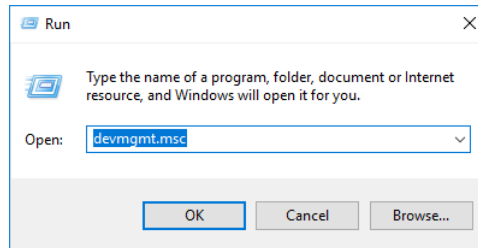

Fig. A3.2.3   Run window

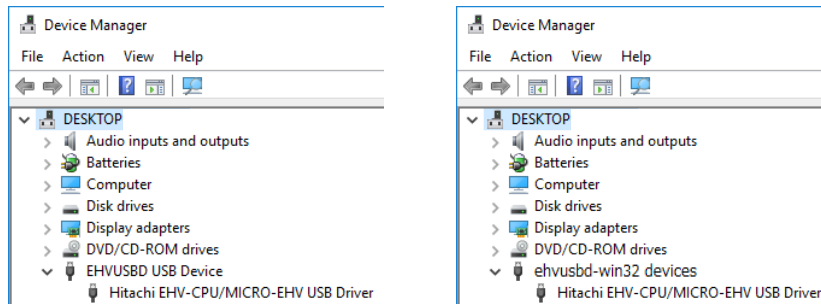6. When the Device Manager window is display, please confirm that "EHVUSBD USB Device" or "ehvusbd-win32 device" is displayed.

Fig. A3.2.4   Device Manager window