MITSUBISHI ELECTRIC

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MITSUBISHI CNC

MELSOFT

Instruction Manual

NC Trainer/NC Trainer plus

MELSOFT
Integrated FA Software

IB-1501044(ENG)-D

Introduction

This instruction manual describes how to use NC Trainer / NC Trainer plus. Incorrect handling may lead to unforeseen accidents, so make sure to read this instruction manual thoroughly before operation to ensure correct usage.
NC Trainer / NC Trainer plus support M700V/M70V/E70 series.

Notes on Reading This Manual

(1) This manual describes as many special operations as possible, but it should be kept in mind that operations not mentioned in this manual cannot be performed.
(2) For the specifications of individual machine tools, refer to the manuals issued by the respective machine tool builders. The "restrictions" and "available functions" described by the machine tool builders have precedence over this manual.

Precautions for Safety

Always read the specifications issued by the machine tool builder, this manual, related manuals and attached documents before installation, operation, programming, maintenance or inspection to ensure correct use.
Understand this numerical controller, safety items and cautions before using the unit.
This manual ranks the safety precautions into "DANGER", "WARNING" and "CAUTION".

⚠DANGER	**When the user may be subject to imminent fatalities or major injuries if handling is mistaken.**
⚠WARNING	**When the user may be subject to fatalities or major injuries if handling is mistaken.**
⚠CAUTION	**When the user may be subject to bodily injury or when physical damage may occur if handling is mistaken.**

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

The signs indicating prohibited and mandatory matters are explained below.

⃠	**Indicates a prohibited matter. For example, "Fire Prohibited" is indicated as .**
●	**Indicates a mandatory matter. For example, grounding is indicated as .**

The meaning of each pictorial sign is as follows.

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

⚠DANGER

Not applicable in this manual.

⚠WARNING

Not applicable in this manual.

⚠ CAUTION

1. Items related to product and manual

- ⚠ **For items described as "Restrictions" or "Usable State" in this manual, the instruction manual issued by the machine tool builder takes precedence over this manual.**
- ⚠ **Items not described in this manual must be interpreted as "not possible".**
- ⚠ **This manual is written on the assumption that all option functions are added. Confirm with the specifications issued by the machine tool builder before starting use.**
- ⚠ **Some screens and functions may differ depending on the NC system (or its version), and some functions may not be possible. Please confirm the specifications before use.**
- ⚠ **Never input parameter setting file (ALL.PRM) to actual machine. It may cause a breakdown.**

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I NC Trainer

1

Introduction

1.1 Outline of NC Trainer

NC Trainer is an application for operating the screen of MITSUBISHI CNC M700V/M70V/E70 Series and machining programs. This application can be used for mastering the operation of CNC and checking the machining program operations.
Machining programs created with NC Trainer can be used for NC (actual machine) after checking the operations.
NC control unit and dedicated display device are not required for NC Trainer.
The characteristics of NC Trainer are listed below.

- Displaying the NC screen
- Operation by pressing key and using mouse on the NC screen (correspond to operating on the touch-sensitive screen)
- Creating the machining programs and checking the operations
- Supporting the functions equivalent of M730V/M70V TypeA/M70V TypeB/E70

Note that the functions (such as tool length measurement) which must be connected to the peripheral device, such as servo and sensor, cannot be executed.

< Definitions of terms used in this manual >

- NC data: Parameters and the compensation amount retained in NC and the machining programs of NC memory are indicated here.
- Project: Data including models, types, the number of axes, NC options and NC data are indicated here.

Refer to the following manuals for operating procedure or programming, etc. of MITSUBISHI CNC M700V/M70V/E70 Series.

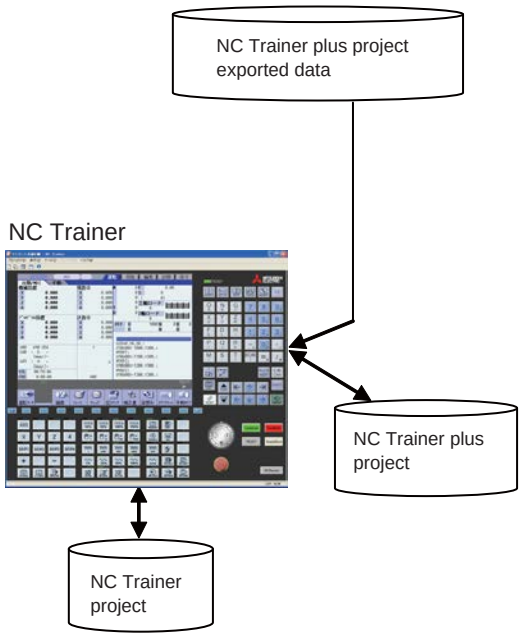
- M700V/M70V Series Instruction Manual IB-1500922
- M700V/M70V Series Programming Manual (Lathe System) IB-1500924
- M700V/M70V Series Programming Manual (Machining Center System) IB-1500926
- E70 Series Instruction Manual IB-1501186
- E70 Series Programming Manual (Lathe System) IB-1501193
- E70 Series Programming Manual (Machining Center System) IB-1501200

Contact the sales office or dealer for each manual.

1.2 Characteristics of NC Trainer

The following is the characteristics of NC Trainer.

- NC Trainer is a tool for end users. This tool can be used for creating machining programs and mastering NC operation.
- NC Trainer can be set for mastering machine tool operation by providing a project which is exported from NC Trainer plus to be imported by an NC Trainer user.



1.3 Functions of NC Trainer

Refer to the section "Appendix 1 Specifications List" for details of the functions of NC Trainer.
The functions not described in the specifications list will be explained in this section.

○ : Supported × : Not supported

Function	NC Trainer	Remarks
Export of projects	×	
Display of custom release screen (Interpreter method / Compilation method)	○ (Note 1)	
Display of custom release screen (Executing file registration method)	○	Cannot be started by an operation of NC Trainer / NC Trainer plus (directly start the executing file)
Source debug for custom release screen (Only for compilation method)	×	
Execution of APLC release module	○ (Note 1)	
Source debug for APLC release module	×	
Creation of custom machine operation panel	×	
Display of custom machine operation panel	○ (Note 1)	
Import of custom machine operation panel	×	
Import of NC data	×	

(Note 1) It is enabled when importing a project which is exported from NC Trainer plus to NC Trainer.

1.4 About a License for NC Trainer

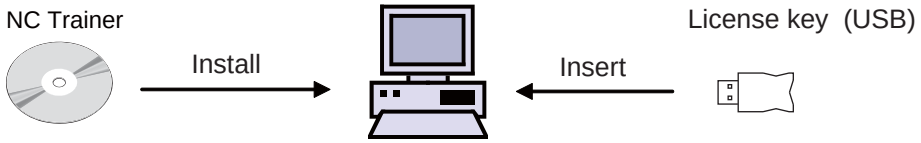
1.4.1 License Type for NC Trainer

A license key is required to be inserted into the USB port of a computer to start NC Trainer. There are two licence types depending on the license key type which is attached to the purchased NC Trainer.

(Note) There are separate license keys for NC Trainer and for NC Trainer plus. NC Trainer plus cannot be started with the license key attached to NC Trainer and NC Trainer cannot be started with the one attached to NC Trainer plus.

(1) Standalone type

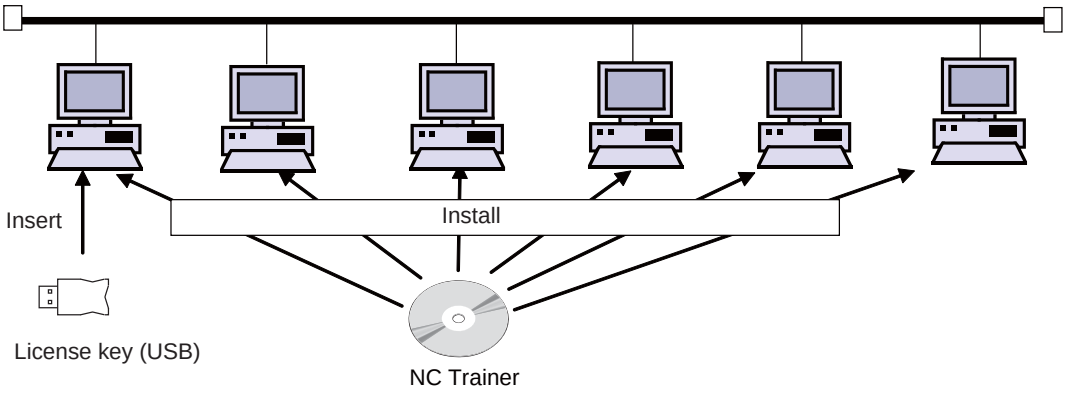
- Required to purchase one user licence per computer.
- Insert the license key of NC Trainer into a computer with NC Trainer installed.



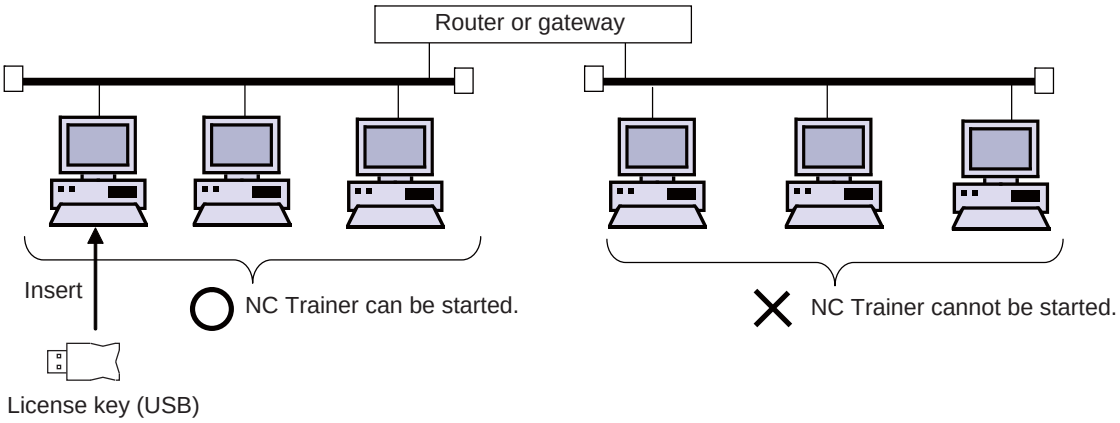
(2) Network connection type

- 10/20/30/50 user license types are available.
- NC Trainer can be installed on the computers more than the purchased user licence numbers, however, the number of the computers which can be started NC Trainer at a time is up to the number of purchased license.
- NC Trainer can be started at a time with one license key of NC Trainer on multiple computers in the same network. The number of the computers which can be started NC Trainer at a time is up to the number of purchased license.
- Insert the license key to one computer in the network. Other computers in the same network confirm to the computer with the license key via a network whether to start NC Trainer.

The term "the same network" in this explanation indicates a local area network which does not go beyond a router or gateway.



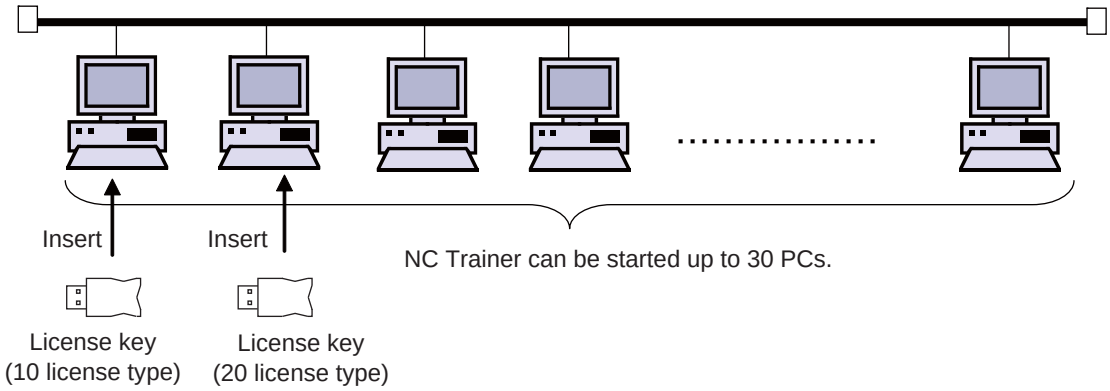
- NC Trainer cannot be started on computers in the separate network from the computer with a license key.



1.4.2 When Inserting Multiple License Keys

(1) When inserting multiple license keys of network connection type

The maximum number of the computers which can be started NC Trainer at a time is the total number of user licenses for these license keys.

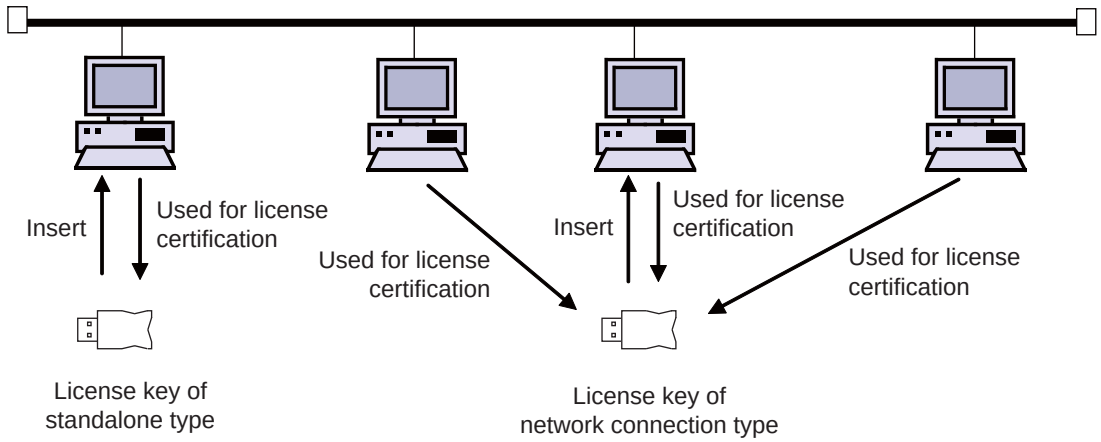


Multiple license keys can be inserted into one computer.

(2) When inserting license keys of standalone type and network connection type to separate computers

(Note) When the license key of NC Trainer for standalone type is used together with network connection type, insert them into separate computers.

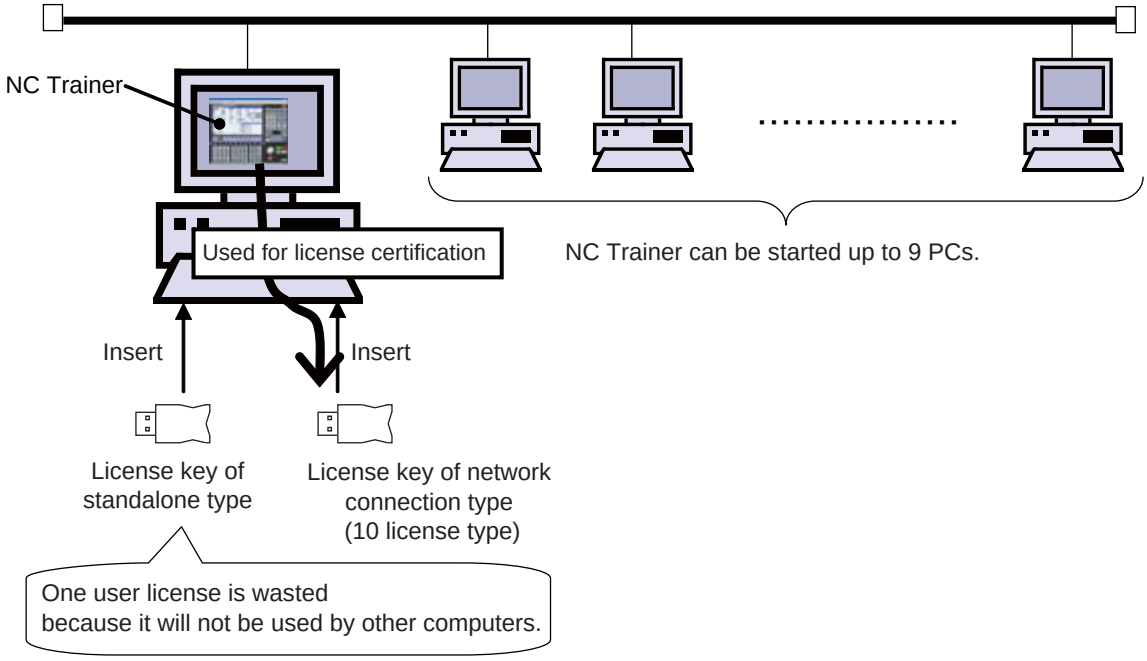
- When NC Trainer is started on the computer with a license key of standalone type, the license key of standalone type will always be used.
- When NC Trainer is started on the computer without a license key of standalone type, the license key of network connection type will always be used.



(3) When inserting license keys of standalone type and network connection type to the same computer

(Note) Refrain from inserting license keys of NC Trainer for standalone type and network connection type to the same computer.

- When NC Trainer is started on the computer with license keys of standalone type and network connection type, which key is used depends on the order of the license key insertion and the location of the USB port.
- When NC Trainer is started on other computers in the same network, the license key of network connection type will always be used. (A license key of standalone type will not be used by other computers.)
- When NC Trainer is started on the computer with license key, and license key of network connection type is used, the standalone type will be void. That is, the number of computers which can be started NC Trainer at a time in the same network will be one less than the total of purchased user license numbers.



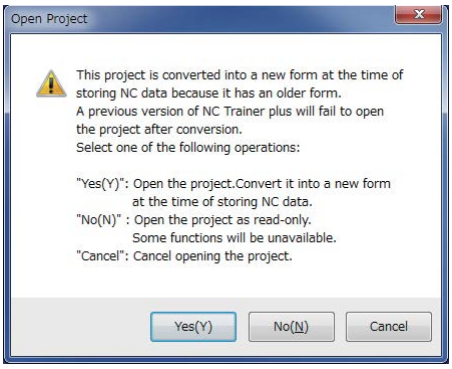
1.5 Precautions

When using NC Trainer, pay attention to the following.

- The displayed "Memory card (Only for a project of M70V TypeA/M70V TypeB/E70)" device is the path designated at the time of installation. "C:\NCTrainer Files\HD" is set by default.
- The displayed "HD (Only for a project of M730V)" device is the path designated at the time of installation. "C:\NCTrainer Files\HD" is set by default.
- When license key is not inserted at starting NC Trainer, the following dialog box is displayed and NC Trainer cannot be started. After pressing the "OK" button, insert license key and start NC Trainer again.

- More than one NC Trainer cannot start at a time.
- NC Trainer and NC Trainer plus cannot start at a time.
- When the license key of standalone type is used together with network connection type, insert them into separate computers.
- Refrain from inserting license keys of standalone type and network connection type to the same computer.
- When license key is removed while operating NC Trainer, the application will be force-quit regardless of the operation state. Project data may be corrupted depending on the operation state, so never remove license key during the operation.
- When the computer with a license key of network connection type is in a state where the network communication is disabled such as sleep or shutdown, NC Trainer on the license certificated computer will be force-quit. Project data may be corrupted depending on the operation state, so prevent the computer with a license key of network connection type from entering the network communication disabled state, such as sleep or shutdown.
- If the communication is lost for the disconnection of LAN cable, etc. when NC Trainer is started with a license key of network connection type, NC Trainer will be force-quit in the same way as when the license key is removed. Project data may be corrupted depending on the operation state, so prevent the computer from entering the communication disabled state, such as disconnection of LAN cable.
- When NC is executed on NC Trainer, Caps Lock on PC keyboard turns ON. Thus please be careful during setting operation.
- When restart "PR display" is required during NC operation, press the "NCRestart" button to restart NC.
- Although parameter setting file (ALL.PRM) can be output from [Mainte] - [Input/output] screen of NC standard screen, never input this file to actual machine. The parameter may not conform to the specification of the actual machine and cause a breakdown.
- When changing [Tool (T)] - [Set Machine Parameter (M)] while parameter screen of NC is displayed, environmental settings still cannot be set (or can be set). After entering another screen, environmental settings of NC can be set (or cannot be set).
- The password holding status cannot be changed by changing the value of the parameter "#11018 M password hold" (machine user password hold) from [Mainte] - [Param] screen of NC. The setting from [Tool] - [Set Machine Parameters] is applied.
- The floating-point arithmetic may result in an error between the CPU of the personal computer running NC Trainer and actual NC.
- When using the machining program which is created with NC Trainer on the actual machine, be sure to check the operation thoroughly. If the NC version is different between NC Trainer and the actual machine, the operations may differ.
- The NC option setting is not restored even if the data saved by data backup is restored.
- The free-form pocket machining function for NAVI MILL is not supported. Free-form pocket machining is handled as an EIA process when a program including free-form pocket machining is read.

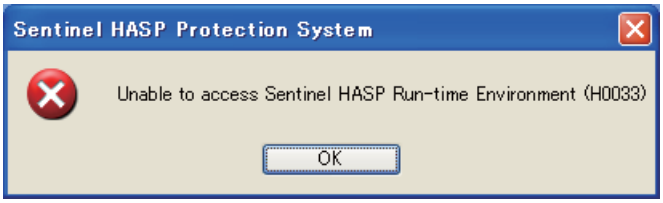
- - Do not import the project exported by NC Trainer plus to NC Trainer/NC Trainer plus version B0 or earlier version.
  An error will occur when importing the project, or the imported project will not activate normally.
- Do not activate the project created by NC trainer with NC trainer version B0 or earlier version. An error occurs when activating the project.
- When activating the project created by NC Trainer S/W version B0 or earlier version, the message that verifies the format conversion may appear.



  - When the project is converted to a new format, the project can not be opened by NC Trainer S/W version B0 or earlier version.
  - If there is no possibility to open the project by NC Trainer S/W version B0 or earlier version, click "Yes(Y)" to open the project.
  - If there is a possibility to open the project by NC Trainer S/W version B0 or earlier version, click "No(N)" to open by read-only.
  - To cancel opening the project, click "Cancel" button.
  - When project is opened by read-only, "(Read-only)" will display next to the project name of the title bar. Also, the following functions will be restricted.

Restricted functions	Restricted description
Saving the NC data	A parameter and a machining program of NC memory changed by NC operation can not be saved. The change settings will not reflected even if the NC is restarted when parameter settings are changed, etc. and NC is required to restart (when "PR" lights on the NC standard screen, etc). Confirming message to save NC data will not display when ending the NC project regardless of the valid/invalid setting of [Tool (T)] - [Confirm NC Data Storage (N)].
Import the actual NC data	NC data of the actual NC data can not be imported.
Input APLC release C language module	APLC release C language module (APLC.o) can not be input.
Change the option setting	To change the option setting, the format needs to be converted. Refer to "4.3.3 Changing the option of the project " for detail.
Export the project	To export the project, the format needs to be converted. Refer to "6.1 Exporting the NC Trainer plus project" of "II NC Trainer plus" for detail.

- When changing the project option setting created by NC Trainer S/W version B0 or earlier version, format conversion may be required as with a read-only project.
- Do not install the old version of NC Trainer/NC Trainer plus when the new version of NC Trainer/NC Trainer plus is already installed. When either NC Trainer or NC Trainer plus is uninstalled after the old version has been installed, the dialog box displays when activating the other application and it can not be started. If that happens, uninstall the application and install it again.



- Collecting sampling data can not be executed.

2

Installation and Setup

2.1 Operating Environment

The system environment necessary for the operation of NC Trainer is shown below.

Item	Description
OS	Windows 8 / Windows 7(32bit version / 64bit version) *WOW64 is used for 64-bit version. Windows Vista SP2 or later / Windows XP SP3 or later (32bit version each)
CPU	Speed of 1.8GHz or greater and containing 2 or more cores
Memory	2GB or more
Available hard disk space	200MB or more (excluding the free space necessary for running the OS)
Display	XGA (1024x768) or better resolution
Interface	USB 1.1 or higher 10/100/1000M Ethernet (For network connection type only)
Language	English / Japanese/ Simplified Chinese / Traditional Chinese

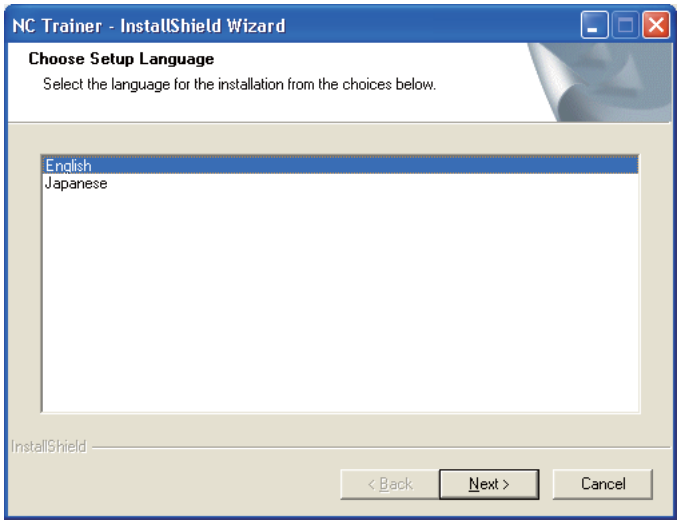
2.2 Procedure of the First Installation

(Note) Do not install license key until the installation of NC Trainer has been completed. When mistakenly install the Key and "add hardware wizard" is displayed, press the "cancel" button to cancel. After pressing the "cancel" button, remove the license key from the computer.

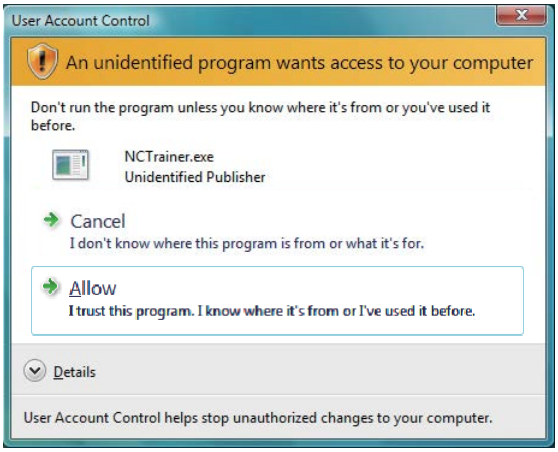
(1) Insert NC Trainer installation CD in computer's CD-ROM drive.

(2) Execute "NC Trainer.exe" in the installation CD.
After the selection screen for setting language is displayed, select the language to use for installation, and press the "Next" button.

(Note) When NC Trainer is installed on English-language version of Windows, select "English" as the setting language. If selecting "Japanese" for English-language version of Windows, the characters cannot be displayed properly in subsequent installation screens.

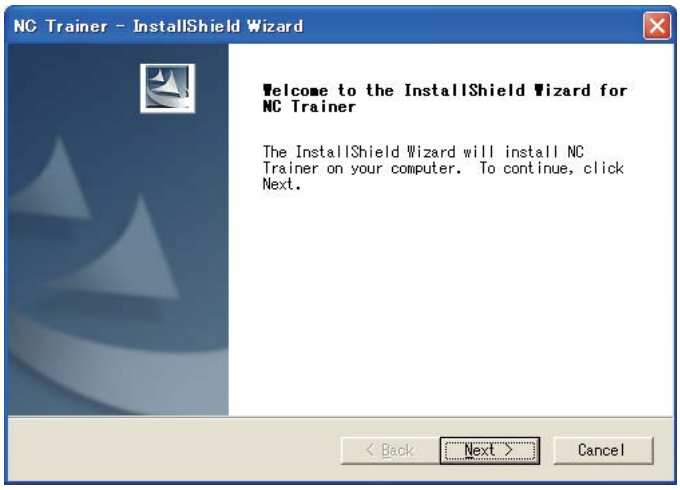


(Note) The installation of NC Trainer has to be carried out by the authority of the administrator.
If User Account Control in Windows8 or Windows7 or Windows Vista is enabled, the confirmation dialog box as below pops up. Then, select "Allow (A)" to start the installation.

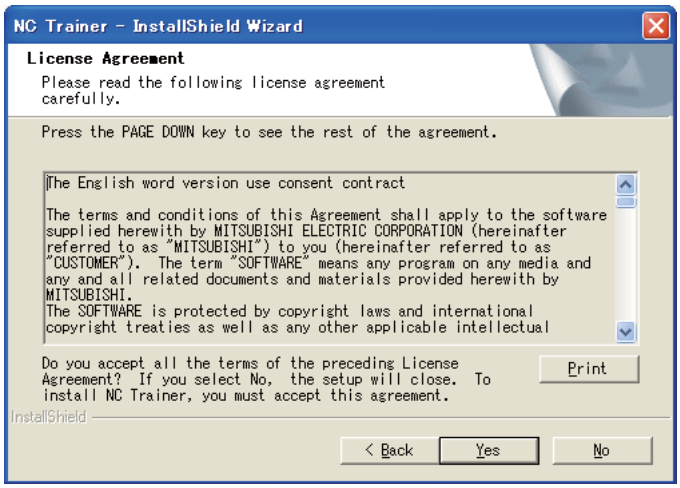


(3) Splash screen is displayed. Then the installer is started.

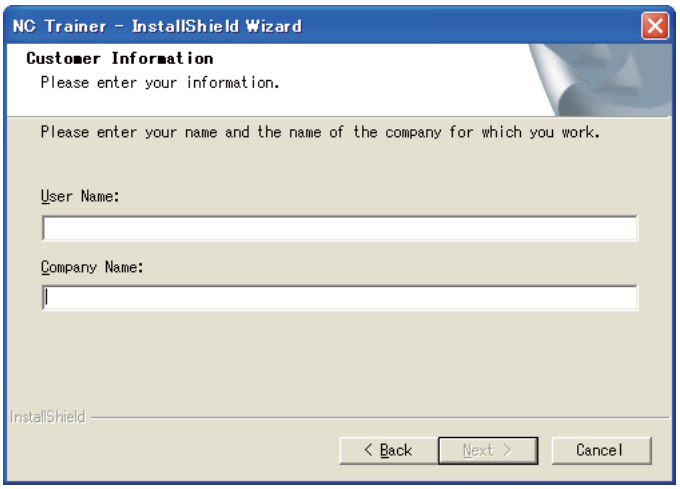
(4) The setup screen is displayed.
Press the "Next" button.



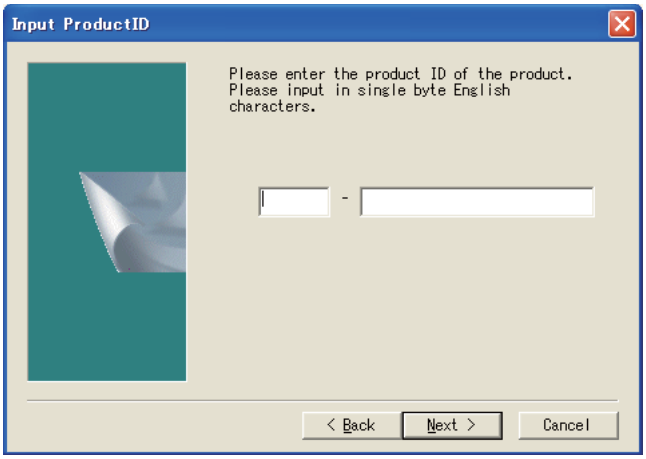
(5) The software license agreement is displayed.
Read the software license agreement carefully, and press the "Yes" button.
If "No" is selected (when you do not agree this agreement), the installation of NC Trainer is discontinued.



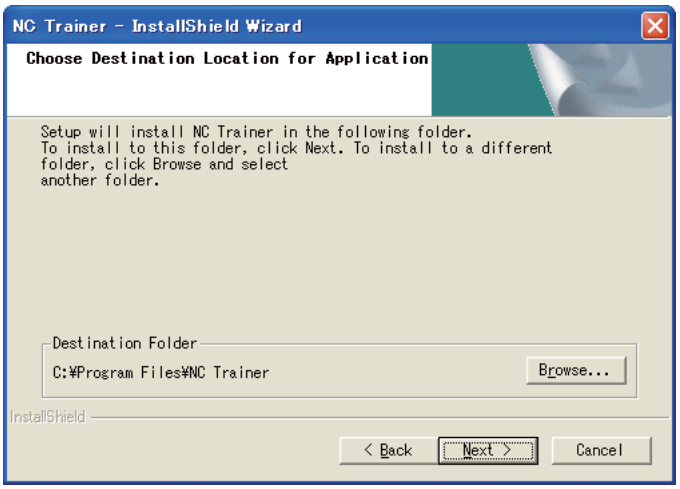
(6) The "Customer Information" screen is displayed. Input user name and company name and press the "Next" button.



(7) Input the product ID on the Input Product ID screen and press the "Next" button.



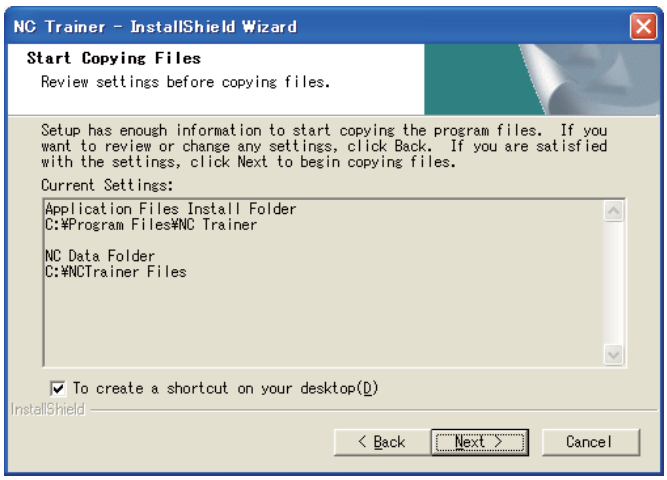
(8) The "Choose Designation Location" screen is displayed. Press "Browse" and select the installation destination when changing the installation destination. Press the "Next" button after the installation destination settings.



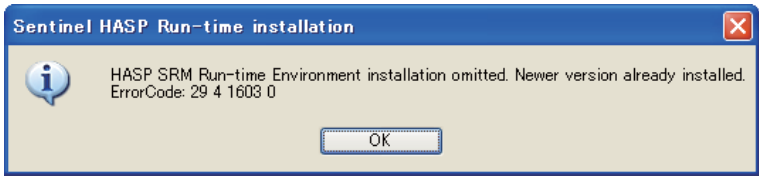
(9) The "Create a folder to store NC data file" screen is displayed.
Press "Browse" and select the folder to store NC data file when changing the folder.
Press the "Next" button after the settings.

(Note) The following are the precautions when changing the folder to store NC data file.
- Do not use kana-kanji as a folder name.
- A folder name over 19 characters cannot be set.
- When the OS is Windows Vista or later, do not designate a folder under C:/Program Files and C:/Windows. (Writing data to these folders is usually prohibited.)
-When installing both NC Trainer and NC Trainer plus, designate a different folder for each.
If designating the same folder, the same name project cannot be created for NC Trainer and NC Trainer plus. (Same for copying and renaming the project.)

(10) The "Start Copying Files" screen is displayed. Press the "Next" button after confirming the installation destination settings. (When the setting is changed, press the "Back".)
The setup starts.
If "To create a shortcut on your desktop (D)" is checked, the shortcut of NC Trainer is created on the desktop after the installation is completed.



(Note) The following message box might show up during installation. Click "OK" to continue installation.



(11) When the installation is correctly completed, the complete screen is displayed.
When "Finish" button is pressed, the installation completes.

2.3 Installation Procedure When Upgrading

When upgrading NC Trainer, carry out the following procedure.

(1) Refer to the section "2.4 Procedure of Uninstalling" and uninstall NC Trainer.

(2) Refer to the section "2.2 Procedure of the First Installation" and reinstall NC Trainer.

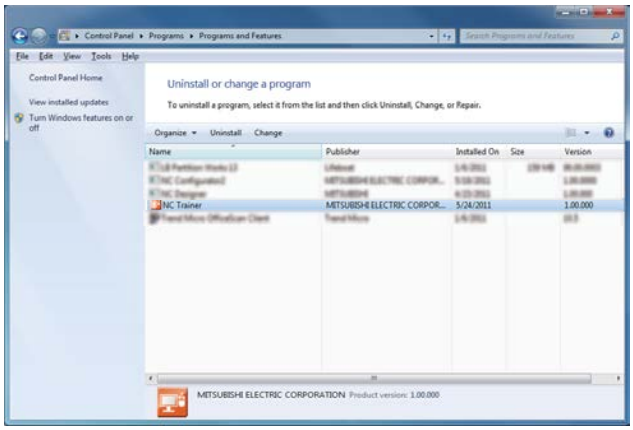
2.4 Procedure of Uninstalling

Uninstall NC Trainer from Control Panel.

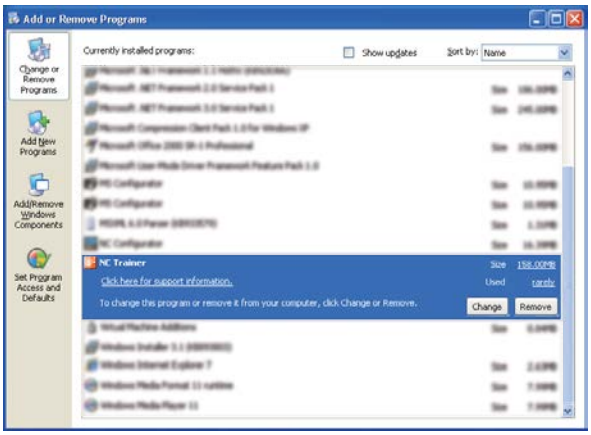
(Note) When a license key is inserted to the computer that NC Trainer is to be uninstalled, start the uninstallation after removing the key. Do not insert a license key until the uninstallation is completed.

2.4.1 Procedure of Uninstalling by the Control Panel

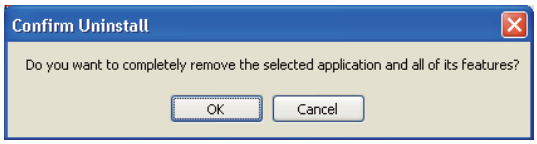
(1) For Windows 7 and Windows Vista, Select the [Start] - [Control Panel] - [Uninstall a program].
The "Uninstall or change a program" screen is displayed.
Select the NC Trainer from the list, and press the "Uninstall".



For Windows XP, select the [Start] - [Control Panel] - [Add or Remove Programs].
The "Add or Remove Programs" screen is displayed.
Select the NC Trainer from the list, and press the "Remove".

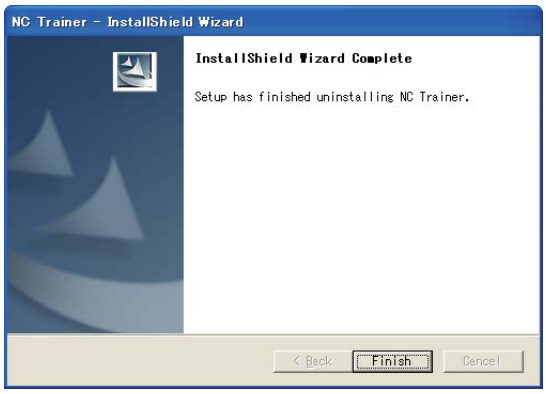


(2) The "Confirm Uninstall" screen is displayed.
When the "OK" is pressed, the uninstallation starts.
(When the "Cancel" is pressed, return to the Control Panel screen.)



(Note) After starting the uninstallation, it cannot be canceled.

(3) When the uninstallation is finished, the complete screen is displayed.
When "Finish" button is pressed, the uninstallation completes.



3

Configuration of the Screen

3.1 Configuration of the Screen

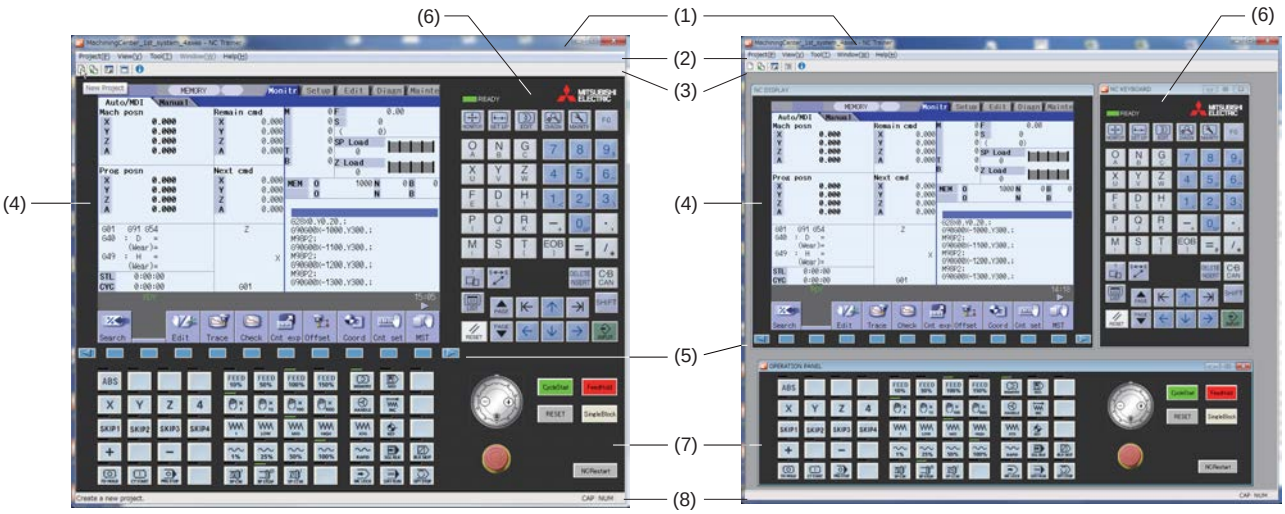
NC Trainer has two display modes.

(a) Standard display mode

NC screen, NC keyboard, and the machine operation panel are displayed in one window.
This mode can be displayed in full size.

(b) Multi-window display mode

Each window of NC screen, NC keyboard, and the machine operation panel are displayed in the NC Trainer screen.
Each window can be moved freely and changed whether to display or hide.
Note that NC screen window cannot be hidden.



(a) Standard display mode **(b) Multi-window display mode**

Display item

	Item	Description
(1)	Title bar	The project name, application name, maximize/minimize button, close button are displayed.
(2)	Menu bar	Possible to carry out functions such as project setting and display mode changeover.
(3)	Tool bar	Possible to use frequently used functions without selecting from the menu bar.
(4)	NC screen	The standard screen of NC and custom release screen are displayed. - Screen configuration of NC standard screen is the same as M700VW Series (10.4-type display unit).
(5)	NC menu key	Perform the same input operation as NC menu key of actual machine.
(6)	NC key board	Perform the same input operation as NC keyboard of actual machine.
(7)	Machine operation panel	Execute the operations such as the operation mode changeover, automatic operation startup and override settings.
(8)	Status bar	Input information of Caps Lock key , Num Lock key, selecting menu item, tool bar icon, and the description of machine operation panel button are displayed.

3.1.1 Standard Display Mode

When the window size is reduced with the window size change, scroll bar will appear at lower end or right end.
When the window size is enlarged, it is displayed at the center of the window and the margin is filled in color of black.

When the window size is reduced

When the window size is enlarged

3.1.2 Full Screen Display

Applications are displayed in full size display without the window frame. In full screen display, NC Trainer screen is displayed at the center of the desktop.

Pop-up menu can be displayed with right click on the application only in full size screen.

Pop-up menu item

Item	Description
Restore View Mode (U)	Cancel the full screen display.
Exit (X)	Exit from the application. - The state of full screen display is not retained. Next time the application is started, the full screen display is canceled.

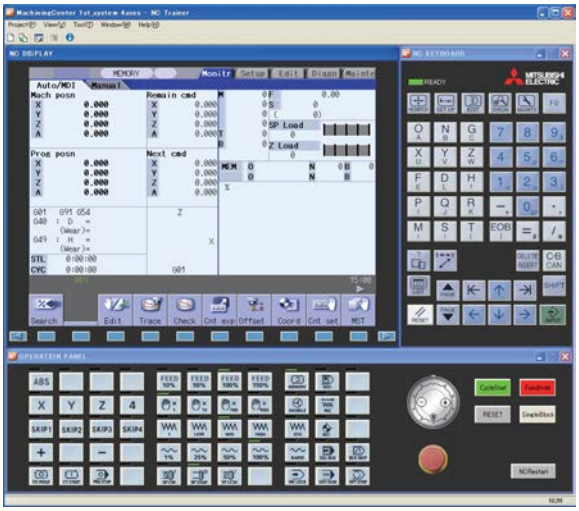
(Note) Select [Restore View Mode (U)] from pop-up menu to release the full screen display.

3.1.3 Multi-window Display Mode

NC key board window and machine operation panel window can be hidden by clicking the "X" button. To display the hidden window again, click the window name to display in menu bar or [Window (W)] of pop-up menu.
Also child windows can be changed to the minimum size by clicking the minimize button.
If child windows extend beyond client area of window when window size is reduced, scroll bar will appear at lower end or right end.

3.1.3.1 Arranging Windows

Arranging windows can be executed only in multi-window view mode.
To display each window of NC screen, NC keyboard and machine operation panel aligned, select [Window (W)] - [Arrange Window (A)] from menu bar.



(Note) Hidden child windows are not displayed even if arranging windows is executed, however, when displaying again, these windows are displayed on the arranged position.

3.2 Menu List

A list of pull-down menus of NC Trainer and the usage of each item are described below.

3.2.1 [Project (P)] Menu

Operation menu item

Item		Description
New Project (N)		Select to create a new project. Refer to "4.3.1 Creating a New Project" for details.
Change Project (O)		Select to change the project executed. Refer to "4.3.2 Changing the project" for details.
Set Project Option (S)		Select to change the settings of the existing project. Refer to "4.3.3 Changing the settings of project option" for details.
Rename Project (M)		Select to rename the existing project. Refer to "4.3.4 Renaming the project" for details.
Copy Project (C)		Select to copy the existing project. Refer to "4.3.5 Copying the project" for details.
Delete Project (D)		Select to delete the existing project. Refer to "4.3.6 Deleting the project" for details.
Export (E)		For NC Trainer, this is displayed in gray and cannot be selected.
Import (I)		Select to import the exported data from each application. It has following sub-menus.
	Project (P)	Select to read a project which is exported from NC Trainer plus as a project for NC Trainer. Refer to "4.3.7 Importing NC Trainer plus project" for details.
	Custom Machine Operation Panel (C)	For NC Trainer, this is displayed in gray and cannot be selected.
	NC DATA (N)	For NC Trainer, this is displayed in gray and cannot be selected.
Write APLC module (L)		For NC Trainer, this is displayed in gray and cannot be selected.
Exit (X)		Exit from the NC Trainer.

(Note) If no project has been registered, [Change Project (O)], [Set Project Option (S)], [Rename Project (M)], [Copy Project (C)], and [Delete Project (D)] cannot be selected.

3.2.2 [View (V)] Menu

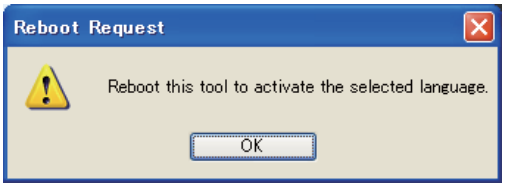
View menu item

Item	Description
View Mode (V)	Changes the view mode. Standard display mode or multi-window display mode can be selected for view mode. - A check mark will appear at the left of the selecting display mode. - Switching the display mode is carried out immediately.
Language (L)	Change the display language. The display language can be selected from Japanese, English, Simplified Chinese and Traditional Chinese. - If none of the system font for Japanese, Simplified Chinese or Traditional Chinese (MS UI Gothic, PMingLiU or SimSum) is installed in the OS, Japanese, Simplified Chinese or Traditional Chinese cannot be selected here (Refer to the language correspondence table in "3.2.2.1 Changing the Display Language"). - A check mark will appear at the left of the selecting display language. - When changing the display language, this setting will be validated after restarting NC Trainer.
Tool Bar (T)	Change whether to display or hide the tool bar. A check mark will appear at left of [Tool bar] menu when displaying.
Status Bar (S)	Change whether to display or hide the status bar. A check mark will appear at the left of [Status bar] menu when displaying.
Full Screen (F)	When in standard display mode, the executing project can be displayed in full screen. - When the project is not executed or multi-window display mode is selected, this cannot be selected.

3.2.2.1 Changing the Display Language

(1) To change the display language of NC Trainer, select [View (L)] - [Language (L)] -
[Japanese (J)],
[English (E)],
[Simplified Chinese (S)] ,
or [Traditional Chinese (T)]
from menu bar.
This operation changes the display language except for the NC screen (for example, menu bar, message box, dialog box, etc.). The display language of NC screen cannot be changed with this operation.

(2) When the display language is changed, Reboot Request message box will appear.
After restarting NC Trainer, screen is displayed in the selected language.



(Note 1) NC Trainer is not restarted automatically even if pressing the [OK] button.
(Note 2) To change the display language of NC screen, execute a project and change the language settings by the maintenance screen of NC.

<Language correspondence table>
○: Possible to display without adding the font
×: Impossible to display without adding the font

OS		Language			
		English	Japanese	Simplified Chinese	Traditional Chinese
Windows XP	English version (*1)	○	×	×	×
	Japanese version	○	○	○	○
	Simplified Chinese version (*2)	○	○	○	○
	Traditional Chinese version (*2)	○	○	○	○
Windows 8 Windows 7 Windows Vista	English version	○	○	○	○
	Japanese version	○	○	○	○
	Simplified Chinese version (*2)	○	○	○	○
	Traditional Chinese version (*2)	○	○	○	○

(*1) To display Japanese, Simplified Chinese or Traditional Chinese in English Windows XP, install East Asian Languages Support (Refer to the section "Appendix 2.1.2.5 To Display Japanese, Simplified Chinese or Traditional Chinese in English Windows XP" for details).
(*2) The description of NC option and additional unit are displayed in English. (Refer to "4.3.1 Creating a New Project" for details.)

3.2.3 [Tool (T)] Menu

Tool menu item

Item	Description
Set Machine Parameters (M)	"Input the password" message will disappear and each environmental settings for NC can be set. - A check mark will appear when it is enabled. - If this setting is changed while parameter screen of NC is displayed, the environmental settings for NC still cannot be set (or can be set). Entering another NC screen, and the environmental settings for NC can be set (or cannot be set).
Confirm NC Data Storage (N)	Normally, NC internal data such as parameters and machining program changed by the NC operation is saved automatically. Validate this item to display the confirmation message whether to save them automatically. - A check mark will appear when it is enabled.
IP address display of NC (I)	For NC Trainer, this is displayed in gray and cannot be selected.
APLC Debug Task Lock (T)	For NC Trainer, this is displayed in gray and cannot be selected.

3.2.4 [Window (W)] Menu

Window menu item

Item	Description
Arrange Window (A)	Windows of the NC screen, NC keyboard and operation panel are arranged.
NC Keyboard (K)	Change whether to display or hide the NC keyboard window. - A check mark will appear while displaying NC keyboard window.
Operation panel (O)	Change whether to display or hide the operation panel window. - A check mark will appear while displaying operation panel window.

(Note 1) This menu can be selected only in multi-window display mode. In standard display mode, this cannot be selected.

(Note 2) When selecting the item of "Arrange Window", windows including hidden child windows are arranged. Then displaying child windows after arranging the windows, they are displayed on the arranged state.

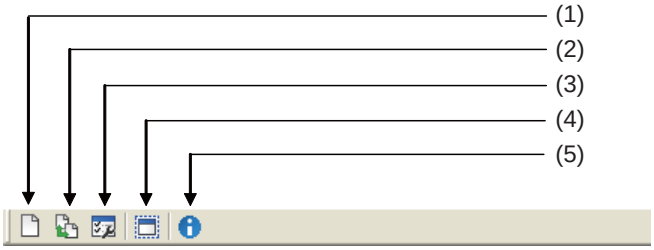
3.2.5 [Help (H)] Menu

Help menu item

Item	Description
Connect to MITSUBISHI CNC Site (C)	Start Internet browser and go to MITSUBISHI CNC site. To get the latest version of NC Trainer or Instruction Manual of CNC, FA membership registration (Free) is required before using this service. Note that this service is available only in the MITSUBISHI CNC site of Japanese version.
Version Information (A)	Display the dialog box of version information.

3.2.6 Tool Bar

The display of the project list etc. can be used without selecting from the menu bar. When the mouse cursor is positioned on the tool bar, the explanation of the function outline will appear.

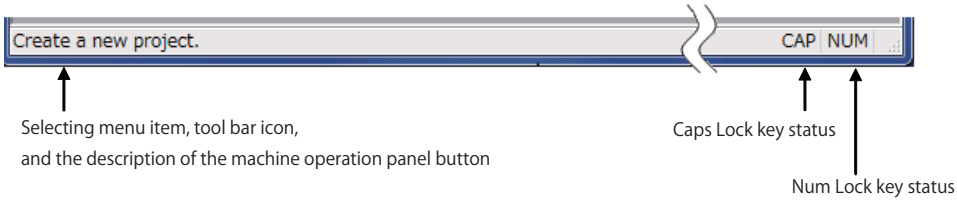


Tool bar item

	Item	Description
(1)	New Project	Display the dialog box of creating a new project.
(2)	Change Project	Display the dialog box of changing the project.
(3)	Set Project Option	Display the dialog box of setting the project option.
(4)	Full Screen	Switch the full-screen display.
(5)	Version Information	Display the dialog box of version information.

3.2.7 Status Bar

Selecting menu item, tool bar icon, and the description of the machine operation panel button are displayed. Also, the status of Caps Lock key and Num Lock key are displayed.



3.3 Operation of NC Screen

3.3.1 NC Keyboard

When each button on NC keyboard is left-clicked, the same operation as operating the actual NC machine by using NC keyboard can be carried out. Refer to the section "Appendix 3 Explanation of Keys" for details.

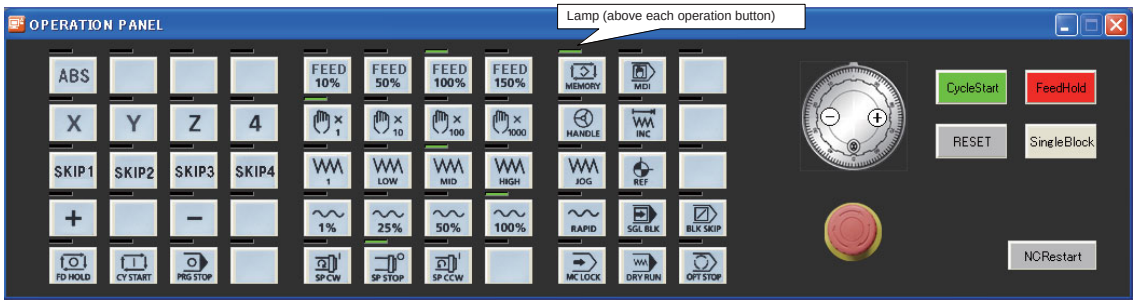
<ONG Keyboard (M array)>	<ONG Keyboard (L array)>
	

3.3.2 NC Menu Key

When each button on NC menu key is left clicked, menu on NC screen can be operated.
Refer to the section "Appendix 3 Explanation of Keys" for details.

3.3.3 Machine Operation Panel

In NC Trainer, the PLC program to operate the machine operation panel is running.
The machine operation panel consists of the buttons to operate NC and lamps to indicate the output signal status from NC.



Display item of machine operation panel

Item	Description
CycleStart	This is a button to start an automatic operation (Cycle Start). This button has the same function as CY START button. When the button is pressed, lamp of CY START button will light.
FeedHold	This is a button to stop automatic operation (Feed Hold). The button has the same function as FD HOLD button. When the button is pressed, lamp of FD HOLD button will light.
SingleBlock	ON/OFF of single block changes every time this button is pressed. The button has the same function as SGL BLK button. When single block is ON, lamp of SGL BLK button will light.
RESET	This is a button to reset NC (same as the [RESET] key on NC keyboard). This button is auto-repeated.
NCRestart	This is a button to restart NC. Refer to "3.3.3.1 Restarting NC" for details.

(Note) For all operations that can be performed with each part system, the 1st part system is the operation target.

Item	Description	
	This is a button to carry out a handle operation. Press [+] button to turn the handle to the right. Press [-] button to turn the handle to the left. [+] button and [-] button are auto-repeated. Magnification per pulse follows  ,  ,  and  buttons.	
	Emergency stop button. When the button is pressed, NC will enter an emergency stop state. To release the emergency stop state, press the button again.	
	Select the memory mode.	Lamp of the currently selected mode (any one of them) will light.
	Select the MDI mode.	
	Select the handle feed mode.	
	Select the incremental mode.	
	Select the jog feed mode.	
	Select the reference position return mode.	
	Select the rapid traverse feed mode.	
	Change ON/OFF of single block. When it is ON, lamp will light.	
	Change ON/OFF of optional block skip. When it is ON, lamp will light.	
	Change ON/OFF of manual machine lock and automatic machine lock. When it is ON, lamp will light.	
	Change ON/OFF of the dry run. When it is ON, lamp will light.	
	Change ON/OFF of the optional stop. When it is ON, output signal status will light.	
	Set the override value of the commanded speed (F) to 10%, 50%, 100% or 150% for cutting feed during automatic operation. Lamp of the currently selected value (any one of them) will light. When the button which is lighting is pressed again, override is set to 0%.	

(Note) For all operations that can be performed with each part system, the 1st part system is the operation target.

Item	Description	
×1 ×10 ×100 ×1000	Set the magnification per pulse of the handle to 1, 10, 100 or 1000. (When [+] button or [-] button of the handle is pressed once, one pulse is generated.) Lamp of the currently selected value (any one of them) will light.	
1 LOW MID HIGH	Set the feedrate for manual operation (jog feed, incremental feed mode, etc) to 1, 10, 100 or 1000 mm/min (inch/min). This speed is applied to the memory mode when dry run is ON and feedrate in MDI operation mode. Lamp of the currently selected value (any one of them) will light.	
1% 25% 50% 100%	Set the rapid traverse override to 1%, 25%, 50% or 100%. Lamp of the currently selected value (any one of them) will light.	
SP CW	Select to rotate the spindle manually in the forward direction during jog feed or rapid traverse feed.	Lamp of the currently selected mode (any one of them) will light.
SP CCW	Select to rotate the spindle manually in the reverse direction during jog feed or rapid traverse feed.	
SP STOP	Select to stop the spindle manually during jog feed or rapid traverse feed.	
ABS	Inform NC of the ON/OFF state of the manual absolute (ABS). This signal informs NC whether to update the program coordinate system or not by the amount moved with manual operation (jog, handle, etc.). When the manual absolute signal is ON, lamp will light.	
SKIP1 SKIP2 SKIP3 SKIP4	Informs NC of the PLC skip signal 1 to 4. The button is used to create the false skip signal with manual measure, G31.1 command, etc. To use the signal, skip related parameters of #1173 to #1180, etc. are required to be set.	
X Y Z 4	Select the axis to move in the jog feed mode, incremental feed mode, reference position return mode and handle feed mode. Lamp of the currently selected axis (any one of them) will light.	
+ −	Move the axis in +/- direction in the jog feed mode, incremental mode and reference position return mode. Lamp will light while the button is pressed.	
CY START	Start the automatic operation (Cycle Start). During the automatic operation startup, lamp will light.	
FD HOLD	Stop the automatic operation (Feed Hold). During the automatic operation pose, lamp will light.	
PRG STOP	This button is ignored even if it is pressed. When M00 (Program Stop) is commanded, lamp will light and block stops.	
	This button is ignored even if it is pressed.	

(Note) For all operations that can be performed with each part system, the 1st part system is the operation target.

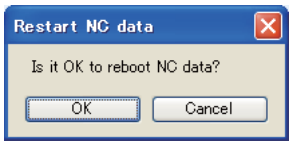
The default settings of the machine operation panel are shown below.

Item	Description	Default
	Operation mode	Memory mode
	Single block	OFF
	Optional block skip	OFF
	Manual and automatic machine lock	OFF
	Dry run	OFF
	Optional stop	OFF
	Cutting feed override	100%
	Handle ratio	1
	Feedrate for manual operation	MID (100 mm/min(inch/min))
	Rapid traverse override	100%
	Spindle command	SP STOP (Spindle stop)
	Manual absolute (ABS)	OFF

3.3.3.1 Restarting NC

Press the "NCRestart" button when parameter settings are changed, etc. and NC is required to restart (when "PR" lights on the NC standard screen, etc). After NC is restarted, changed settings will be reflected.

(1) The confirmation message "Is it OK to reboot NC data?" appears by pressing the "NCRestart" button.



(2) When the [OK] button is pressed, NC startup screen appears and NC is restarted.

(3) When restart is completed, NC standard screen is displayed.

(Note1) If restart is executed by pressing the "NCRestart" button, NC data of the executing project is automatically stored. Note that even if [Tool (T)] - [Confirm NC Data Storage (N)] is enabled, the confirmation message is not displayed and NC data is automatically stored.

(Note 2) When the executed project is read-only, NC data will not be saved even if the NC is restarted and changed settings will not be reflected.

4

How to Use NC Trainer

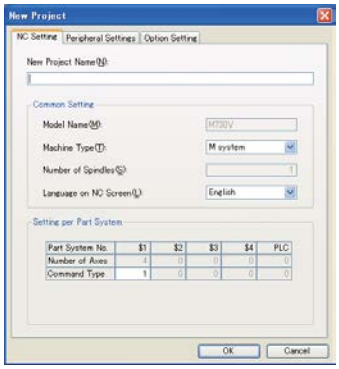
4.1 Starting NC Trainer

(1) Insert a license key into a USB port of a computer.
<Stand-alone type>
Insert a license key to a computer with NC Trainer installed.
<Network connection type>
Insert a license key to one computer with NC Trainer installed in the same network.

(Note) When license key is not inserted at starting NC Trainer, the following dialog box is displayed and NC Trainer cannot be started. After pressing the "OK" button, insert license key and start NC Trainer again.
When license key is removed while operating NC Trainer, the application will be force-quit regardless of the operation state. Project data may be corrupted depending on the operation state, so never remove license key during the operation.

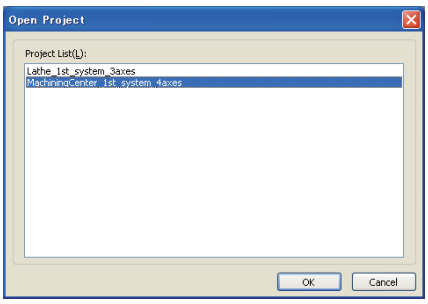
(2) For Windows 8, select NC Trainer (NC Trainer plus) from start screen.
For Windows 7/Windows Vista/Windows XP, select NC Trainer (NC Trainer plus) from "Start" menu.

(3) <When project has not been registered>
"New Project" dialog box will appear.



Refer to the section "4.3.1 Creating a New Project" for details.

<When project has been registered>
"Open Project" dialog box is displayed.
Select the project to execute from the dialog box and press the "OK" button. Then NC screen, NC menu keys, NC keyboard and machine operation panel are displayed.
The default cursor position in the "Open Project" dialog box is on the project displayed previously.



(Note) If [Cancel] is selected from the dialog box, only the main window is displayed.

(4) NC startup screen is displayed and NC is started.

(5) NC standard screen is displayed and the operation is enabled.

(Note) As the view mode (standard display mode / multi-window display mode) is retained, the screen is displayed in the mode previously selected.

4.2 Exiting from NC Trainer

Perform one of the following procedures to exit from NC Trainer.

(a) Select [Project (P)] - [Exit (X)] from the menu bar.

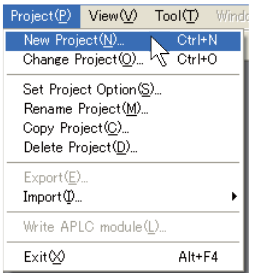
(b) Click on the X button on the title bar of the tool.

(c) Select [Exit (X)] from the pop-up menu.

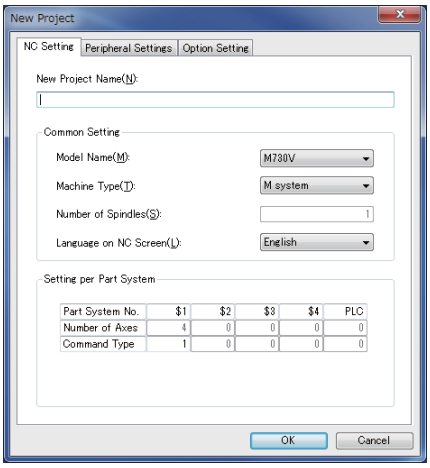
4.3 Creating a Project

4.3.1 Creating a New Project

(1) To create a new project, select [Project (P)] - [New Project (N)] from the menu bar.



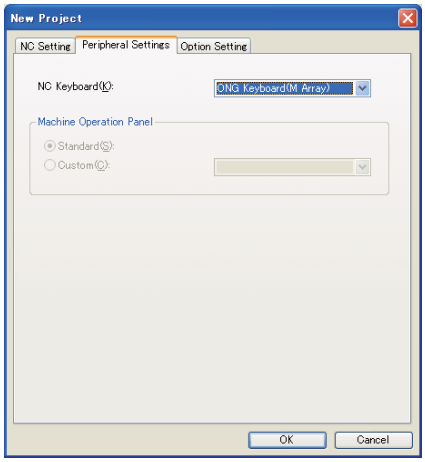
(2) Set the basic parameters for NC in the new project dialog box.



Display item of New Project dialog box

Item	Description
New Project Name (N)	Input the new project name. - A project name can be up to 80 one-byte characters. (Each two-byte character is equivalent to two characters.) - One-byte characters and two-byte characters can be used for a project name. - A project name is not case-sensitive. - The following characters cannot be used for a project name. \ / : * ? < > | " (Same as the prohibited characters for a file name) - A created project name cannot be designated. - Blank project name cannot be used. - Blank and Period (.) cannot be used for the first or last character of a project name. - CON, PRN, AUX, CLOCK$, NUL, COM0 to COM9 and LPT0 to LPT9 cannot be used for a project name.
Model Name (M)	Specify the NC model. The following models can be selected. M730V M70V TypeA M70V TypeB E70
Machine Type (T)	Designate the NC configuration. The following configuration can be selected. Machining center: M system Lathe: L system
Number of Spindles (S)	The number is fixed to 1.
Language on NC Screen (L)	Set the language displayed on NC Screen while executing a project. Languages supported in NC can be selected.
Number of Axes	Set the number of axes for each part system. If the number of axes in a part system is 0, the part system is invalid. (Note) NC Trainer will be controlled by one part system and the number of axes is fixed (M system: 4 axes (For E70: 3 axes), L system: 3 axes, PLC axis: None).
Command Type	Set the G code system and compensation type for programs. 1: List1 (for M system) Type A (one compensation amount for one compensation No.) 2: List1 (for M system) Type B (shape and wear compensation amounts for one compensation No.) 3: List2 (for L system) Type C (shape and wear compensation amounts for one compensation No.) 4: List3 (for L system) Ditto 5: List4 (for special L system) Ditto 6: List5 (for special L system) Ditto 7: List6 (for special L system) Ditto 8: List7 (for special L system) Ditto 9: List8 (for M system) M2 form at type A Type A (one compensation amount for one compensation No.) 10: List8 (for M system) M2 form at type B Type B (shape and wear compensation amounts for one compensation No.) - If M system is selected for the machine type, command types are common in all part systems. Therefore, set the same value to all part systems.
"OK" button	Create a new project.
"Cancel" button	Cancel to create a new project.

(3) Press the [Peripheral Settings] tab to select NC peripheral devices according to your environment.

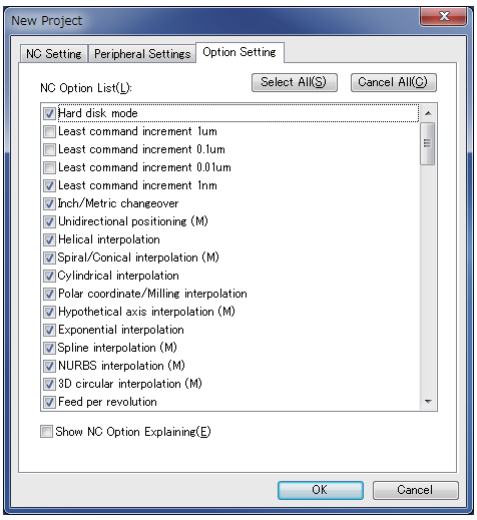


Display item of Peripheral Settings tab

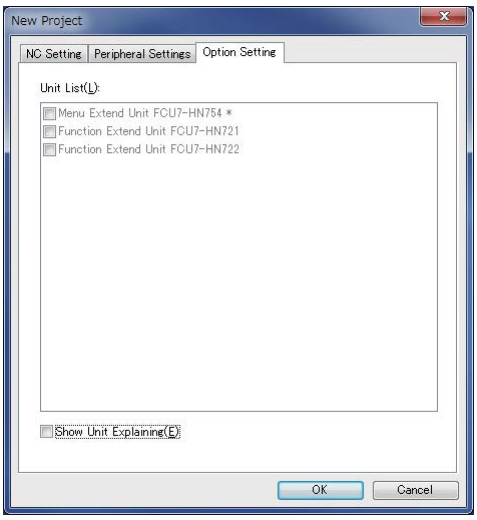
Item		Description
NC Keyboard (K)		Select NC Keyboard to be used. The following NC Keyboards can be selected. - ONG Keyboard (M array) : default - ONG Keyboard (L array)
Machine Operation Panel		Cannot be set with NC Trainer. For a new project created with NC Trainer, the standard machine operation panel is selected. For a project imported from NC Trainer plus, the custom machine operation panel which is set for the project of NC Trainer plus is selected.
	Standard (S)	
	Custom (C)	

(4) Press the [Option Setting] tab to select NC options according to your environment.

<M700V>



<M70V/E70>



(Note) Refer to the section "Appendix 1 Specifications list" for details on NC options.

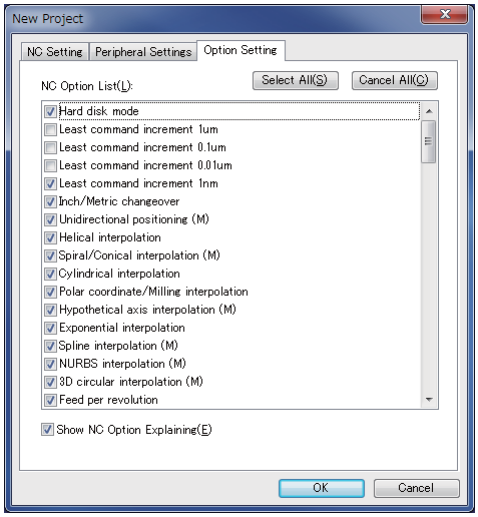
Display item of M700V Option Setting tab

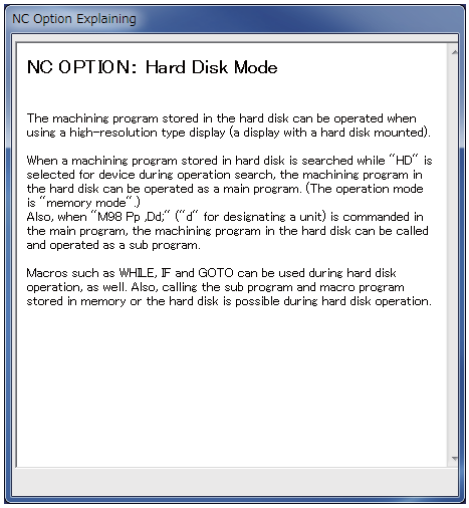
Item	Description
NC Option List (L)	Display the NC option list that can be selected for the project. To validate a NC option, check the check box. - For the option required to format NC memory, [*] mark is indicated at the end of the option name. - NC options involved changing user PLC are not included in NC Trainer.
Select All (S)	Check all items. - Note that the items are checked only on the maximum spec option, for options which cannot be selected concurrently such as least command increment, etc.
Cancel All (C)	Delete the check mark for all items. - Note that items are checked only on the minimum spec option, for options which cannot be selected at one time such as the least command increment, etc.
Display the description of NC option (E)	When this is checked, a dialog box appears showing the description of currently selected NC option.

Display item of M70V/E70 Option Setting tab

Item	Description
Additional Unit List(L)	Displays a list of units. To validate an additional unit, check the check box. - The selectable unit differ by the NC model of a project to create. No additional unit can be selected if the NC model is E70. - The function extension units FCU7-HN721 and -HN722 can not be selected at the same time. - There is "*" mark after the unit name if the unit needs the format of NC memory.
Display the Description of Units (E)	When this is checked, a dialog box appears showing the description of currently selected additional unit.

(Note) The dialog boxes for NC option and additional unit shows the description as below.
(Setting of NC option and additional unit is enabled while the dialog box is open.)





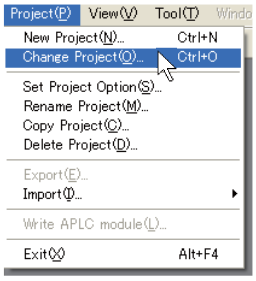
(5) Press the "OK" button, and the NC screen of created project is displayed. At this time, NC data of the executing project is automatically stored.
Note that if [Tool (T)] - [Confirm NC Data Storage (N)] is enabled, the confirmation message is displayed. When pressing the "OK" button, NC data is stored and NC screen of created project is displayed.

(Note) Created project is started in the state that NC memory and tool life management data are formatted.

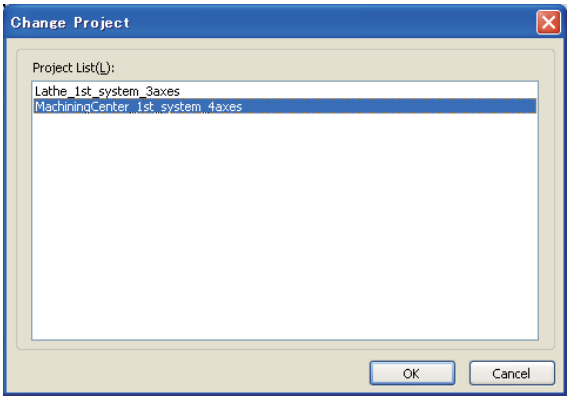
4.3.2 Changing the Project

Perform the following procedure to change the project to be executed from menu bar.

(1) Select [Project (P)] - [Change Project (O)] from menu bar.

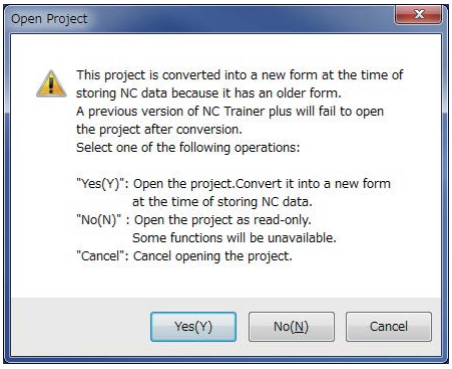


(2) Project list is displayed. Select the project to change.



(Note) NC Trainer does not display projects which were created with NC Trainer plus (except for projects imported from NC Trainer plus).

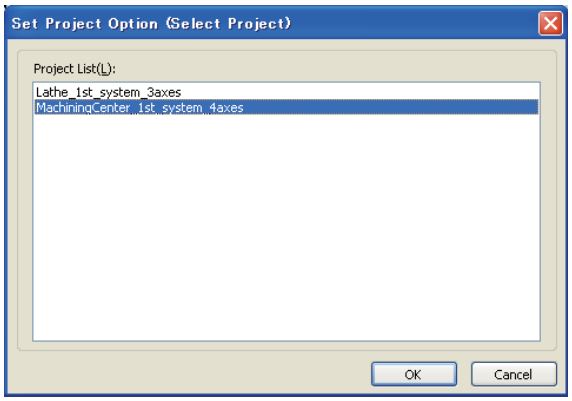
(3) Press the "OK" button, and NC screen of selected project is displayed. At this time, NC data of the executing project is automatically stored.
Note that if [Tool (T)] - [Confirm NC Data Storage (N)] is enabled, the confirmation message is displayed. When pressing the "OK" button, NC data is stored and NC screen of created project is displayed.
(Note1) If selecting the currently-executing project, the dialog box is closed.
(Note 2) If the project created by NC Trainer S/W version B0 or earlier version is selected, the following message box may appear.



-If there is no possibility to open the project by NC Trainer S/W version B0 or earlier version, click "Yes(Y)".
-If there is a possibility to open the project by NC Trainer S/W version B0 or earlier version, click "No(N)" to open by read-only.
-To cancel opening the project, click "Cancel" button.
-Refer to "1.5 Precautions" for the restraints of each function when the project is opened by read-only.

4.3.3 Changing the Settings of Project Option

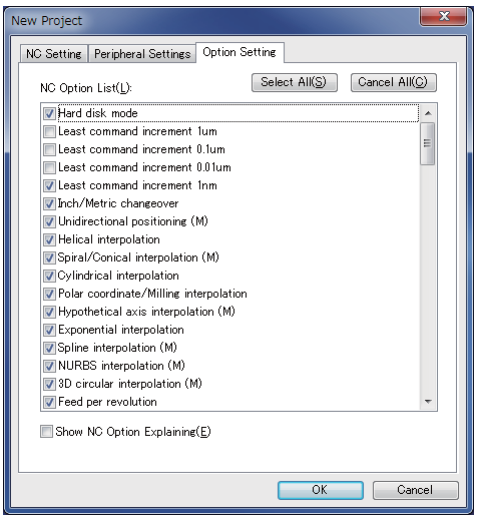
(1) Select [Project (P)] - [Set Project Option (P)] from menu bar to change or refer to settings of the project. Select Project dialog box is displayed.



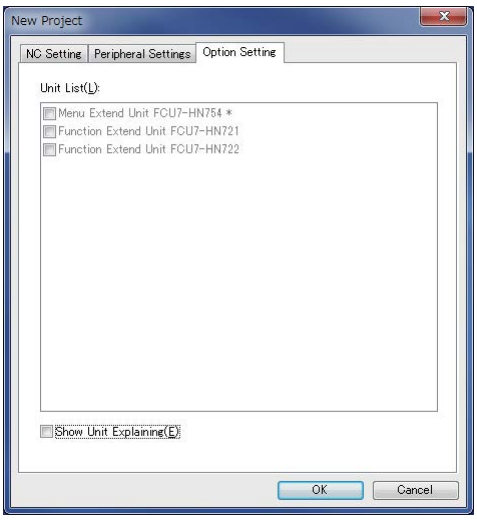
(Note) NC Trainer does not display projects which were created with NC Trainer plus (except for projects imported from NC Trainer plus).

(2) When selecting the project to change the settings and press the "OK" button, Option Setting dialog box is displayed.

<M700V>



<M70V/E70>



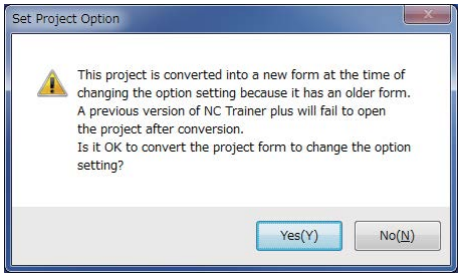
Display item of Set Project Option dialog box

Item	Description
NC Setting tab	This is a tab to set or display the NC models, NC configuration and the display language of NC screen. Refer to "4.3.1 Creating a New Project" for details. (Note) The settings of NC Setting tab is only displayed.
Peripheral Settings tab	This is a tab to set or display the type of machine operation panel. Refer to "4.3.1 Creating a New Project" for details.
Option Setting tab	This is a tab to set or display the NC options and the unit of a project. [*] mark indicates the options and the unit required to format NC memory. Refer to "4.3.1 Creating a New Project" for details.
"OK" button	Click to apply the changed settings of a project and close the dialog box.
"Cancel" button	Click to cancel the changed settings of a project and close the dialog box.

(Note 1) When the "OK" button is pressed after changing the setting, the operation will stop once, and then NC is restarted with the changed project settings. If changed project and executing project are the same, NC data at this point is stored and NC is restarted. If changed project and executing project are different, the confirmation message will be displayed depending on the state of [Tool (T)] - [Confirm NC Data Storage (N)]. And after pressing the "OK" button to store, NC is restarted with changed project settings. When pressing the "Cancel" button, changing the option settings is canceled and Set Project Option dialog box is displayed.

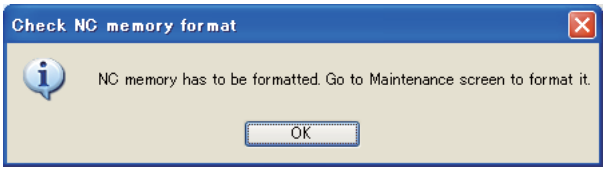
(Note 2) Although [NC setting tab] can be selected, the setting value cannot be changed. To change the setting value, create a new project. Refer to the section "4.3.1 Creating a New Project" on how to create a project.

(Note 3) On Set Project Option dialog box, if the project created by NC Trainer S/W version B0 or earlier version is selected, the following message box may appear.



To change the settings of project option, the project needs to be converted to the new format.
- If there is no possibility to open the project by NC Trainer S/W version B0 or earlier version, click "Yes(Y)" and set the NC options.
- To save the selected project in a format that allows the project to be opened with NC Trainer S/W version B0 or earlier version, click "No(N)". This stops changing the settings of project option and returns to Set Project Option dialog box.

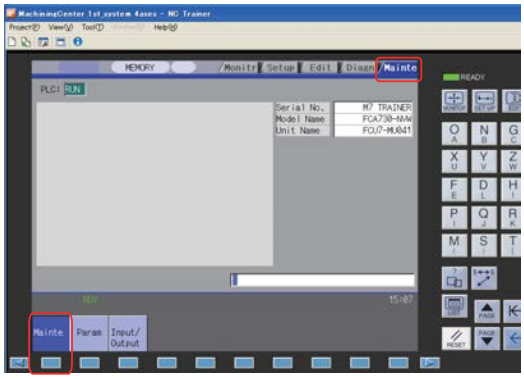
(3) When changing the option and the unit name that [*] mark is indicated at the end of the option name and pressing the "OK" button, a dialog prompts the user to format NC memory is displayed.
In this case, press the "OK" button and format the NC memory.



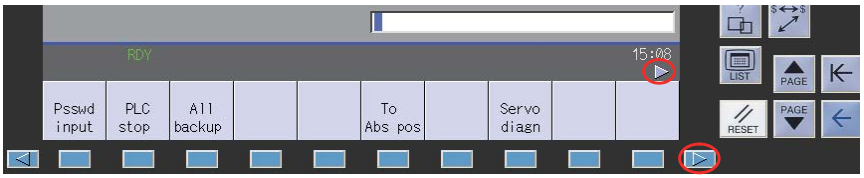
<Formatting NC memory>

All data in NC memory will be deleted after formatting. Save required data on other memory device (HD) with transfer function in advance.

(1) Select the [Mainte] tab on NC screen. After displaying the maintenance screen, press the [Mainte] menu.

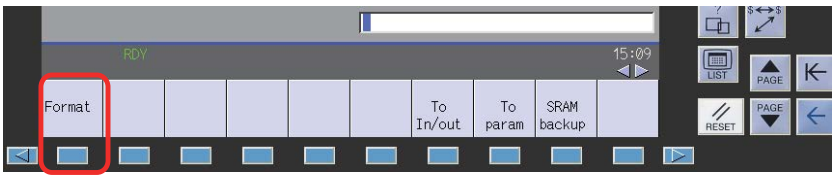


(2) Press the [▷] or [▷] button to display next menu.



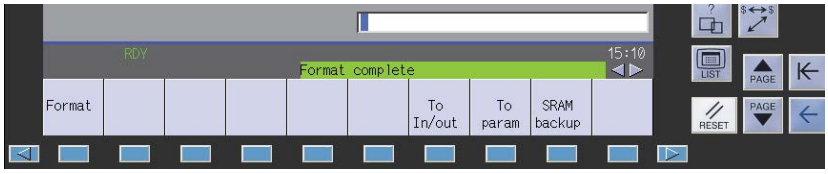
(3) Put [Set Machine Parameters (M)] in [Tool (T)] menu on menu bar into checked mode.

(4) Press the [Format] menu on the screen.



(5) When "Format NC memory? (Y/N)" message is displayed, press [Y].

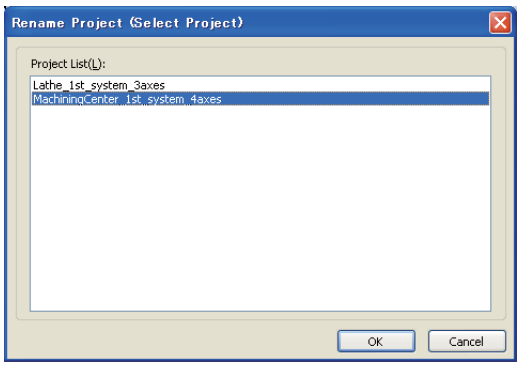
(6) When format is completed correctly, "Format complete" message will appears.



(7) Press the "NCRestart" button to restart NC. When it is restarted, NC standard screen will appear.

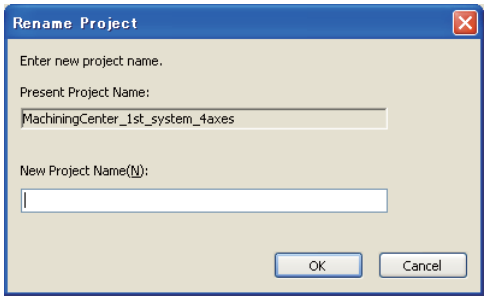
4.3.4 Renaming the Project

(1) Select [Project (P)] - [Rename Project (M)] from menu bar to change or refer to the project name. Select Project dialog box is displayed.



(Note) NC Trainer does not display projects which were created with NC Trainer plus (except for projects imported from NC Trainer plus).

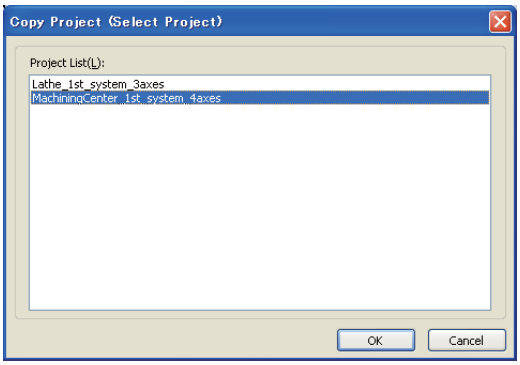
(2) Select the project to rename and press the "OK" button. Then Rename Project dialog box is displayed.



(Note) For currently-executing project, press the "OK" button and the operation will stop once, then NC is restarted with changed project name. Therefore, NC data is stored at this point.
When pressing the "Cancel" button, new project name is canceled and Select Project dialog box is displayed.

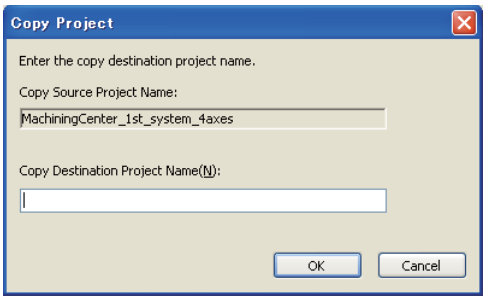
4.3.5 Copying the Project

(1) Select [Project (P)] - [Copy Project (C)] from menu bar to copy the project. Select Project dialog box is displayed.



(Note) NC Trainer does not display projects which were created with NC Trainer plus (except for projects imported from NC Trainer plus).

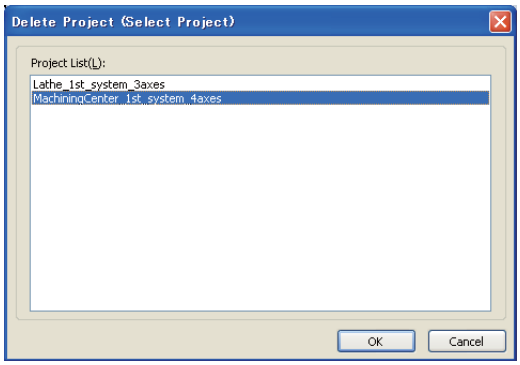
(2) Select the project to copy and press the "OK" button. Then Copy Project dialog box is displayed.



(Note) When selecting the executing project as the copy source, NC data stored at the last time is copied. Therefore, it may be different from the current NC data (parameters, machining programs, etc).

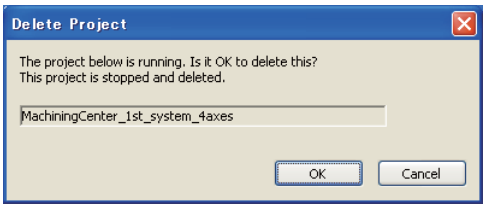
4.3.6 Deleting the Project

(1) Select [Project (P)] - [Delete Project (D)] from menu bar to delete the project. Select Project dialog box is displayed.

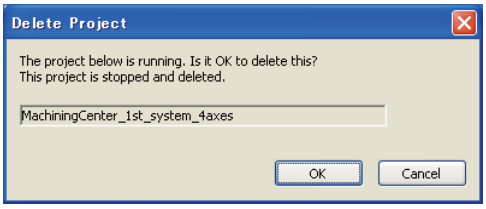


(Note) NC Trainer does not display projects which were created with NC Trainer plus (except for projects imported from NC Trainer plus).

(2) Select the project to delete and press the "OK" button, Delete Project dialog box is displayed. Press the "OK" button to delete.



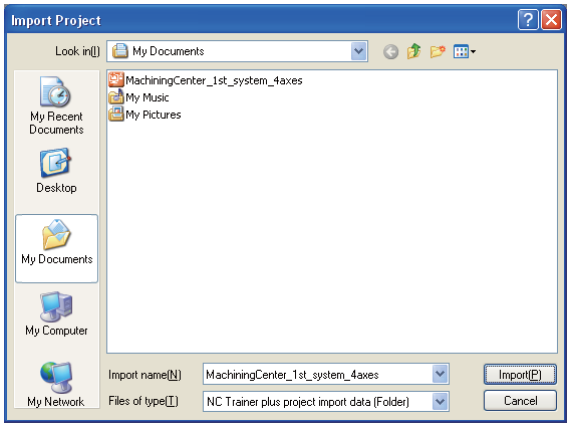
(Note) When selecting the executing project from Select Project dialog box, the following confirmation message is displayed. When pressing the "OK" button, the currently-executing project is stopped and then deleted.



4.3.7 Importing NC Trainer plus project

The project which is created with NC Trainer plus to be tailored to a machine tool (such as parameter, user PLC, and machine operation panel, etc.) can be operated with NC Trainer by importing the project (The project can also be imported to NC Trainer plus).
Below is an explanation of the procedure for importing project data which is exported from NC Trainer plus.

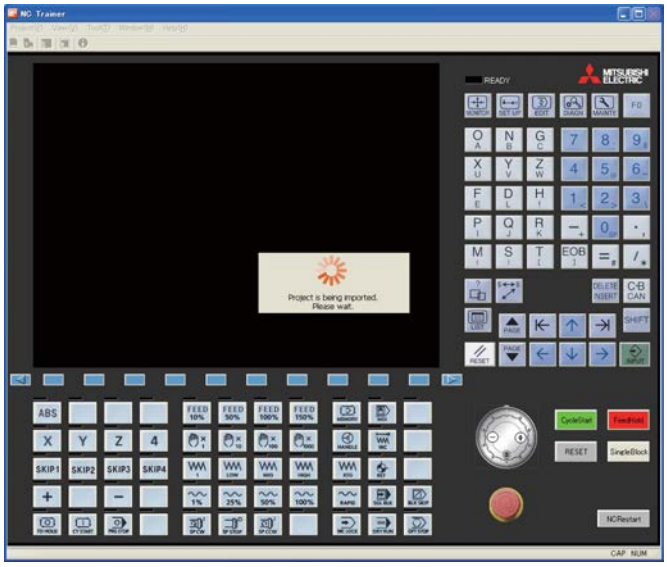
(1) Select [Project (P)] - [Import (I)] - [Project (P)] from menu bar.
The following dialog box is displayed.



(Note1) The import data is provided as a folder which contains various data files. The import data folder is displayed as  icon on the dialog box.

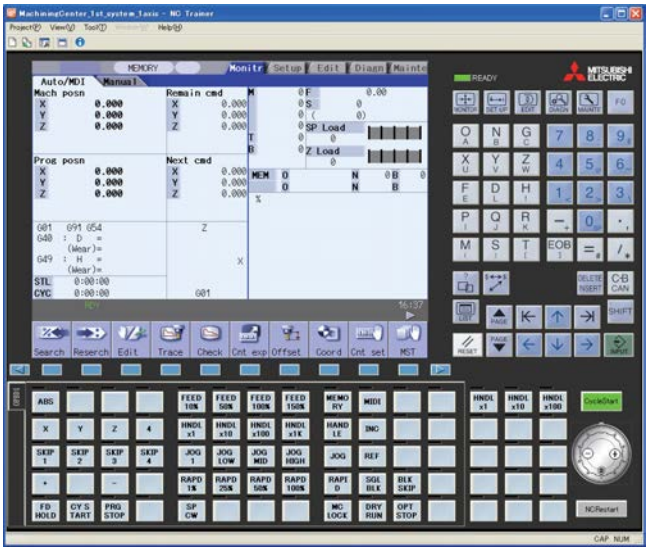
(Note2) The project name to be added by importing is the same as the folder name of import data. Select [Project (P)] - [Rename Project (M)] from menu bar after importing to change the project name.

(2) Press the "Import (I)" button after designating the folder name for the import data. Importing the project process starts.



(Note) When the NC is running, the NC will be stopped. When the setting of [Tool (T)] - [Confirm NC Data Storage (N)] on the menu bar is enabled, the confirmation message to save NC data appears before NC is stopped.

(3) After the import is completed, the NC starts with the added project.



II NC Trainer plus

1

Introduction

1.1 Outline of NC Trainer plus

NC Trainer plus enables to develop a custom software application without an NC control unit or dedicated display device. The characteristics of NC Trainer plus are listed below.

- Development support for custom screen (Can be debugged with a single personal computer even if there is no NC device)
- Development support for user PLC (ladder)
- Development support for APLC release function
- Providing a machine operating environment (custom machine operation panel) which meets the specifications of the user's machine tool

Note that the functions (such as tool length measurement) which must be connected to the peripheral device, such as servo and sensor, cannot be executed.

< Definitions of terms used in this manual >

- NC data: Parameters and the compensation amount retained in NC and the machining programs of NC memory are indicated here.
- Project: Data including models, types, the number of axes, NC options and NC data are indicated here.

Refer to the following manuals for operating procedure or programming, etc. of MITSUBISHI CNC M700V/M70V/E70 Series.

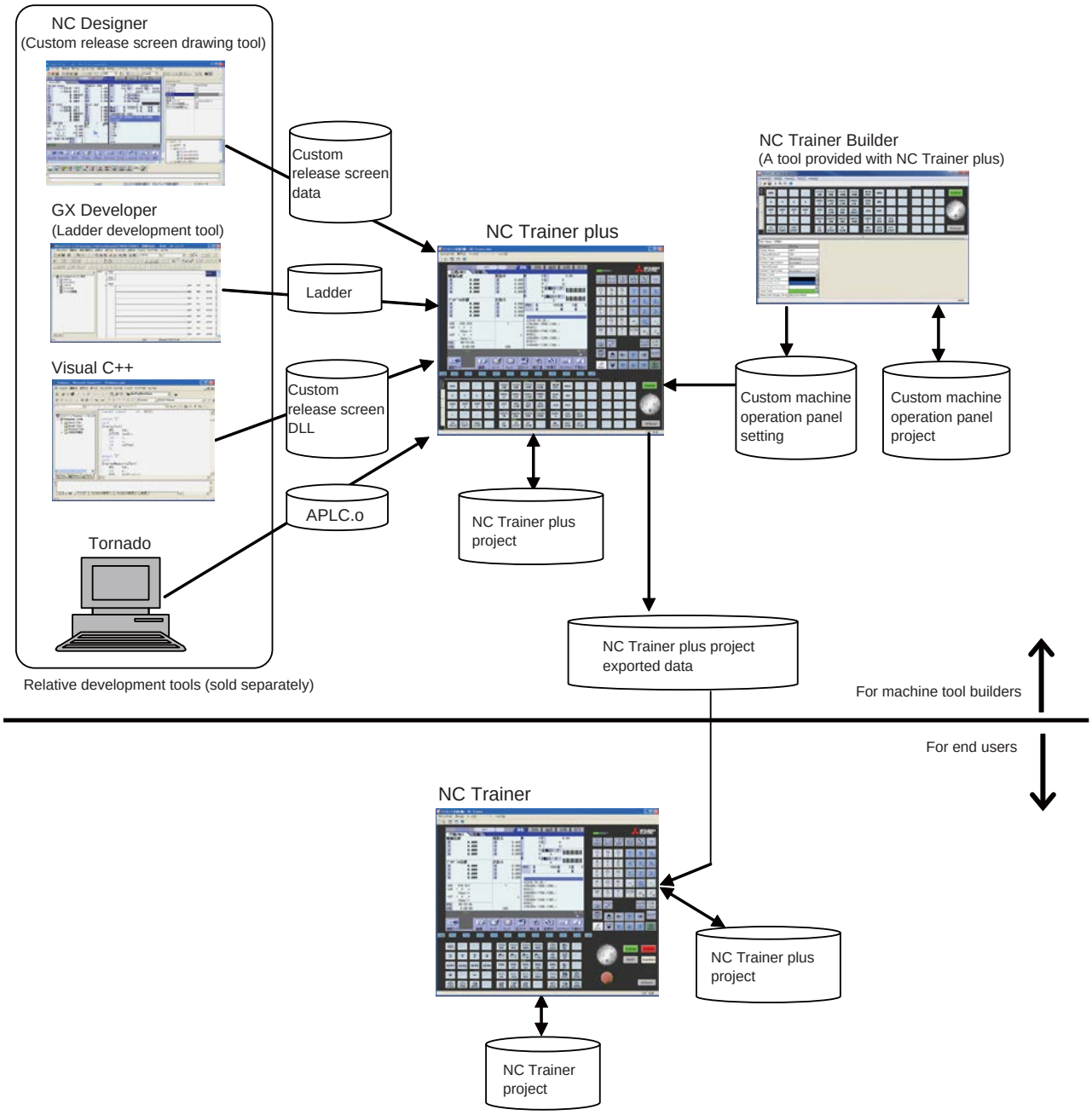
- M700V/M70V Series Instruction Manual IB-1500922
- M700V/M70V Series Programming Manual (Lathe System) IB-1500924
- M700V/M70V Series Programming Manual (Machining Center System) IB-1500926
- E70 Series Instruction Manual IB-1501186
- E70 Series Programming Manual (Lathe System) IB-1501193
- E70 Series Programming Manual (Machining Center System) IB-1501200

Contact the sales office or dealer for each manual.

1.2 Characteristics of NC Trainer plus

The following is the characteristics of NC Trainer and NC Trainer plus.

- NC Trainer is a tool for end users. This tool can be used for creating machining programs and mastering NC operation.
- NC Trainer plus is a tool for machine tool builders. This tool can be used for checking operation of machining programs created for a machine tool, ladders created with a relative development tool, custom release screens, and APLC.o.
- A custom machine operation panel which is matched to a machine tool can be created with NC Trainer Builder (a tool provided with NC Trainer plus).
- NC Trainer can be set for mastering machine tool operation by providing a project which is exported from NC Trainer plus to be imported by an NC Trainer user.



1.3 Differences of functions between NC Trainer and NC Trainer plus

Refer to the section "Appendix 1 Specifications List" for details of the differences of functions between NC Trainer and NC Trainer plus.
The differences of functions not described in the specifications list will be explained in this section.

○ : Supported ×: Not supported

Function	NC Trainer	NC Trainer plus	Remarks
Export of projects	×	○	
Display of custom release screen (Interpreter method / Compilation method)	○ (Note 1)	○	
Display of custom release screen (Executing file registration method)	○	○	Cannot be started by an operation of NC Trainer / NC Trainer plus (directly start the executing file)
Source debug for custom release screen (Only for compilation method)	×	○	Source debug can be executed with Microsoft Visual Studio (Note 2) .
Execution of APLC release module	○ (Note 1)	○	
Source debug for APLC release module	×	○	Source debug can be executed with Microsoft Visual Studio (Note 2).
Creation of custom machine operation panel	×	○	Created with NC Trainer Builder (Note 3).
Display of custom machine operation panel	○ (Note 1)	○	
Import of custom machine operation panel	×	○	The custom machine operation panel which is output from NC Trainer Builder (Note 3) can be read into.
Import of NC data	×	○	The backup data of actual NC is imported.

(Note 1) It is enabled when importing a project which is exported from NC Trainer plus to NC Trainer.
(Note 2) When using Microsoft Visual Studio, use Microsoft Visual Studio6.0 (Service Pack5 or later), or Microsoft Visual Studio 2005 / 2008 / 2010.
(Note 3) A tool provided with NC Trainer plus

1.4 About a License for NC Trainer plus

1.4.1 License Type for NC Trainer plus

The operating procedure is the same as that of NC Trainer. Refer to the section "1.4 About a License for NC Trainer" of "I NC Trainer" for details.
However, insert the license key of NC Trainer plus for using NC Trainer plus.

1.4.2 When Inserting Multiple License Keys

The operating procedure is the same as that of NC Trainer. Refer to the section "1.4.2 When Inserting Multiple License Keys" of "I NC Trainer" for details.
However, insert the license key of NC Trainer plus for using NC Trainer plus.

<When using the license key of NC Trainer with the license key of NC Trainer plus>

- The license key of NC Trainer and the license key of NC Trainer plus can be inserted together.
- The license key of NC Trainer and the license key of NC Trainer plus can be inserted to separate computers in the same network.

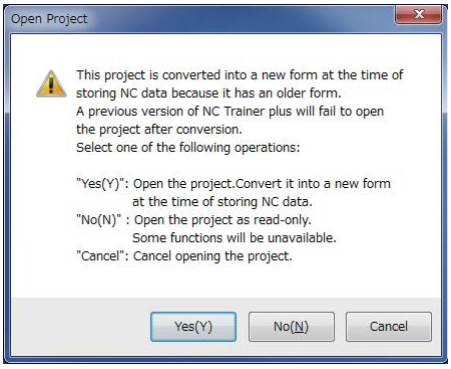
1.5 Precautions

When using NC Trainer plus, pay attention to the following.

- The displayed "Memory card (Only for a project of M70V TypeA/M70V TypeB/E70)" device is the path designated at the time of installation. "C:\NCTrnrplus Files\HD" is set by default.
- The displayed "HD (Only for a project of M730V)" device is the path designated at the time of installation. "C:\NCTrnrplus Files\HD" is set by default.
- When license key is not inserted at starting NC Trainer plus, the following dialog box is displayed and NC Trainer plus cannot be started. After pressing the "OK" button, insert license key and start NC Trainer plus again.

- More than one NC Trainer plus cannot start at a time.
- NC Trainer and NC Trainer plus cannot start at a time.
- More than one NC Trainer Builder cannot start at a time.
- When the license key of standalone type is used together with network connection type, insert them into separate computers.
- Refrain from inserting license keys of standalone type and network connection type to the same computer.
- When license key is removed while operating NC Trainer plus, the application will be force-quit regardless of the operation state. Project data may be corrupted depending on the operation state, so never remove license key during the operation.
- When the computer with a license key of network connection type is in a state where the network communication is disabled such as sleep or shutdown, NC Trainer plus on the license certificated computer will be force-quit. Project data may be corrupted depending on the operation state, so prevent the computer with a license key of network connection type from entering the network communication disabled state, such as sleep or shutdown.
- If the communication is lost for the disconnection of LAN cable, etc. when NC Trainer plus is started with a license key of network connection type, NC Trainer plus will be force-quit in the same way as when the license key is removed. Project data may be corrupted depending on the operation state, so prevent the computer from entering the communication disabled state, such as disconnection of LAN cable.
- When NC is executed on NC Trainer plus, Caps Lock on PC keyboard turns ON. Thus please be careful during setting operation.
- When restart "PR display" is required during NC operation, press the "NCRestart" button to restart NC.
- Although parameter setting file (ALL.PRM) can be output from [Mainte] - [Input/output] screen of NC standard screen, never input this file to actual machine. The parameter may not conform to the specification of the actual machine and cause a breakdown.
- When changing [Tool (T)] - [Set Machine Parameter (M)] while parameter screen of NC is displayed, environmental settings still cannot be set (or can be set). After entering another screen, environmental settings of NC can be set (or cannot be set).
- Standard operation mode cannot be used for PLC onboard screen.
- A memory card can be selected as an external device of PLC onboard for NC Trainer plus, however, the memory card is not a removable disk of the computer.
  The path which is designated at the installation is a substitute for memory card. The default setting is "C:\NCTrnrplus Files\M-CARD".
- The password holding status cannot be changed by changing the value of the parameter "#11018 M password hold" (machine user password hold) from [Mainte] - [Param] screen of NC. The setting from [Tool] - [Set Machine Parameters] is applied.
- Tools that can be connected with NC Trainer plus via a virtual network are GX Developer, NC Configurator2, and NC Explorer. Do not connect with NC Monitor (For some screens are not displayed correctly).

- The floating-point arithmetic may result in an error between the CPU of the personal computer running NC Trainer plus and actual NC.
- When using the machining program which is created with NC Trainer plus on the actual machine, be sure to check the operation thoroughly. If the NC version is different between NC Trainer plus and the actual machine, the operations may differ.
- The NC option setting is not restored even if the data saved by data backup is restored.
- The free-form pocket machining function for NAVI MILL is not supported. Free-form pocket machining is handled as an EIA process when a program including free-form pocket machining is read.
- Some PLC signals cannot be used. Refer to ”1.6 Restrictions for PLC signals" for details.
- The certification for automatic operation lock function always succeeds regardless of the password.
- The parameter "#3114 cax_para_chg Spindle/C axis parameter switch" is always operated as "0" in spindle position control.
- NC Explorer cannot access DS folder and HD folder of NC Trainer plus.
- Do not import the project exported by NC Trainer plus to NC Trainer/NC Trainer plus version B0 or earlier version. An error will occur when importing the project, or the imported project will not activate normally.
- The custom machine operation panel exported by NC Trainer Builder can not be imported to NC Trainer plus S/W version B0 or earlier version. It will cause an error when importing.
- When the project created by NC Trainer Builder S/W version B0 or earlier version is edited and saved, the project can not be opened by NC Trainer Builder S/W version B0 or earlier version.
  However, if saved without editing, the project can be opened.
- Do not open the project created by NC Trainer plus using NC Trainer plus version B0 or earlier version. An error may occur when activating the project.
- When opening the project created by NC Trainer plus S/W version B0 or earlier version, the message that verifies the format conversion may appear.

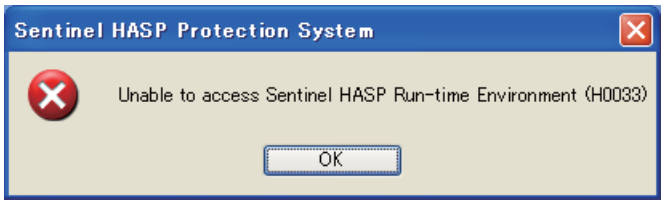


  - When the project is converted to a new format, the project can not be opened by NC Trainer plus S/W version B0 or earlier version.
  - If there is no possibility to open the project by NC Trainer plus S/W version B0 or earlier version, click "Yes(Y)" to open the project.
  - If there is a possibility to open the project by NC Trainer plus S/W version B0 or earlier version, click "No(N)" to open by read-only.
  - To cancel opening the project, click "Cancel" button.

- When a project is opened by read-only, "(Read-only)" will display next to the project name of the title bar. Also, the following functions will be restricted.

Restricted functions	Restricted description
Saving the NC data	A parameter and a machining program of NC memory changed by NC operation can not be saved. The change settings will not reflected even if the NC is restarted when parameter settings are changed, etc. and NC is required to restart (when "PR" lights on the NC standard screen, etc). Confirming message to save NC data will not display when ending the NC project regardless of the valid/invalid setting of [Tool (T)] - [Confirm NC Data Storage (N)].
Import the actual NC data	NC data of the actual NC data can not be imported.
Input APLC release C language module	APLC release C language module (APLC.o) can not be input.
Change the option setting	To change the option setting, the format needs to be converted. Refer to "4.5.7 Changing the option of the project " for detail.
Export the project	To export the project, the format needs to be converted. Refer to "4.6.1 Exporting the NC Trainer plus project" for detail.

- When changing the option setting of the project created by NC Trainer plus S/W version B0 or earlier version, format conversion may be required as with a read-only project.
- When exporting the project may appear created by NC Trainer plus S/W version B0 and earlier version, it must be converted to the same format as the read-only state project.
- Do not install the old version of NC Trainer/NC Trainer plus when the new version of NC Trainer/NC Trainer plus is already installed. When either NC Trainer or NC Trainer plus is uninstalled after the old version has been installed, the following dialog box displays when activating the other application and it can not be started. If that happens, uninstall the application and install it again.



- Collecting sampling data can not be executed.

1.6 Restrictions for PLC signals

The following PLC signals cannot be used for NC Trainer plus. Input signals (NC to PLC) always output 0 to the PLC. As for output signals (PLC to NC), even if the NC receives output signals from the PLC, it does not execute operations corresponding to those signals.

■Input signal (NC to PLC)

<X Device>

Device No.	Signal name
Common for part systems	
X70E	Battery warning
X70F	Battery alarm
X752	24 hours continuous operation

Part system 1	Part system 2	Part system 3	Part system 4	
X880 to X887	X888 to X88F	X890 to X897	X898 to X89F	Near reference position 1st to 8th axis
X8C0 to X8C7	X8C8 to X8CF	X8D0 to X8D7	X8D8 to X8DF	Zero point initialization set completed 1st to 8th axis
X8E0 to X8E7	X8E8 to X8EF	X8F0 to X8F7	X8F8 to X8FF	Zero point initialization set error completed 1st to 8th axis
X900 to X907	X908 to X90F	X910 to X917	X918 to X91F	In current limit 1st to 8th axis
X920 to X927	X928 to X92F	X930 to X937	X938 to X93F	Current limit reached 1st to 8th axis
XA60 to XA67	XA68 to XA6F	XA70 to XA77	XA78 to XA7F	Vertical axis pull-up prevented 1st to 8th axis
XC05	XD45	XE85	XFC5	In automatic initial set mode
XC09	XD49	XE89	XFC9	In tape mode *Tape operation cannot be executed although this signal turns ON/OFF by turning the device tape mode ON/OFF.
XC98, XC99	XDD8, XDD9	XF18, XF19	X1058, X1059	NC alarm 1, 2
XC9C	XDDC	XF1C	X105C	NC warning (Servo warning)
XCA7	XDE7	XF27	X1067	Absolute position warning
XCD8	XE18	XF58	X1098	Door open enable
XCE8	XE28	XF68	X10A8	Door open enable (2 channels per 1 part system)
XD1E to XD20	XE5E to XE60	XF9E to XFA0	X10DE to X10E0	Tool axis coordinate system, table coordinate system, and feature coordinate system in manual feed for 5-axis machining (2nd handle)
XD21 to XD23	XE61 to XE63	XFA1 to XFA3	X10E1 to X10E3	Tool axis coordinate system, table coordinate system, and feature coordinate system in manual feed for 5-axis machining (3rd handle)

1st spindle	2nd spindle	3rd spindle	4th spindle	5th spindle	6th spindle	
X1889	X18E9	X1949	X19A9	X1A09	X1A69	Current detection
X188A	X18EA	X194A	X19AA	X1A0A	X1A6A	Speed detection
X188B	X18EB	X194B	X19AB	X1A0B	X1A6B	In spindle alarm
X1897	X18F7	X1957	X19B7	X1A17	X1A77	In spindle torque limit
X1898	X18F8	X1958	X19B8	X1A18	X1A78	In motor 1 selection
X1899	X18F9	X1959	X19B9	X1A19	X1A79	In motor 2 selection
X189D	X18FD	X195D	X19BD	X1A1D	X1A7D	Speed detection 2
X189E	X18FE	X195E	X19BE	X1A1E	X1A7E	In M coil selection
X18B3	X1913	X1973	X19D3	X1A33	X1A93	Hob axis delay excess

Common for part systems	
X1CD0 to X1CFC	Handy terminal key 1 to 45

(Note) Forced output from [Diagn] - [I/F diagn] is possible.

<R register (input)>

Device No.	Signal name
Common for part systems	
R0 to R7	Analog input 1 to 8
R8	KEY IN 1
R26	Turret interference check status
R27	Interference object alarm information
R31	Diagnosis data output
R56	Battery drop cause
R57	Temperature warning cause
R58	5V/24V error cause
R59	Control unit temperature 2
R60	Control unit temperature
R96	Speed monitor door open possible
R97	Safety observation I/O signal status
R168 to R173	PLC axis alarm/warning No. 1st to 6th axis

Part system 1	Part system 2	Part system 3	Part system 4	
R574	R774	R974	R1174	In initialization
R575	R775	R975	R1175	Initialization incompletion
R580, R581	R780, R781	R980, R981	R1180, R1181	Near reference position (per reference position) 1st to 4th axis, 5th to 8th axis
R582	R782	R982	R1182	Presetter contact
R583	R783	R983	R1183	Presetter interlock
R4756 to R4771	R4772 to R4787	R4788 to R4803	R4804 to R4819	Servo deflection amount 1st to 8th axis
R4820 to R4835	R4836 to R4851	R4852 to R4867	R4868 to R4883	Motor rotation speed 1st to 8th axis
R4884 to R4899	R4900 to R4915	R4916 to R4931	R4932 to R4947	Motor load current 1st to 8th axis
R5332 to R5339	R5340 to R5347	R5348 to R5355	R5356 to R5363	Servo alarm/warning No. 1st to 8th axis

1st spindle	2nd spindle	3rd spindle	4th spindle	5th spindle	6th spindle	
R6529	R6579	R6629	R6679	R6729	R6779	Spindle alarm/warning No.
R6532, R6533	R6582, R6583	R6632, R6633	R6682, R6683	R6732, R6733	R6782, R6783	Synchronous tapping Current error width
R6534, R6535	R6584, R6585	R6634, R6635	R6684, R6685	R6734, R6735	R6784, R6785	Synchronous tapping Maximum error width
R6536, R6537	R6586, R6587	R6636, R6637	R6686, R6687	R6736, R6737	R6786, R6787	Synchronous tapping Current error angle
R6538, R6539	R6588, R6589	R6638, R6639	R6688, R6689	R6738, R6739	R6788, R6789	Synchronous tapping Maximum error angle
R8002	R8008	R8014	R8020	R8026	R8032	PLC axis indexing control status 2 (Note) The following bits cannot be used. bitB: Battery drop bitC: Absolute position power shutoff movement over bitD: Absolute position data loss bitE: Initialization setting completed bitF: Initialization setting error completed
R8003	R8009	R8015	R8021	R8027	R8033	PLC axis indexing control status 1 (Note) The following bits cannot be used. bit6: In torque limit

Device No.	Signal name
Common for part systems	
R10000 to R10007	RIO1 No. of error occurrences 1st to 8th ch
R10008 to R10015	RIO2 No. of error occurrences 1st to 8th ch
R10016 to R10023	RIO3 No. of error occurrences 1st to 8th ch
R10064	Connection status of each channel RIO1,2
R10065	Connection status of each channel RIO3
R10068	CRC warning channel RIO1,2
R10069	CRC warning channel RIO3

(Note) Forced output from [Diagn] - [I/F diagn] is possible.

■Output signal (PLC to NC)

<Y Device>

Device No.	Signal name
Common for part systems	
Y721	PLC axis 2nd handle valid
Y722	PLC axis 3rd handle valid
Y728	CRT changeover completion
Y729	Screen display request
Y73F	Interference check valid
Y742	Contactor shutoff test
Y747	Turret interference check valid
Y75D	Automatic power OFF request
Y764	Encoder 1 arbitrary pulse selection
Y765	Encoder 2 arbitrary pulse selection
Y766	Encoder 1 arbitrary pulse valid
Y767	Encoder 2 arbitrary pulse valid
Y768	Door open I

Part system 1	Part system 2	Part system 3	Part system 4	
Y960 to Y967	Y968 to Y96F	Y970 to Y977	Y978 to Y97F	Zero point initialization set mode 1st to 8th axis
Y980 to Y987	Y988 to Y98F	Y990 to Y997	Y998 to Y99F	Zero point initialization set start 1st to 8th axis
Y9A0 to Y9A7	Y9A8 to Y9AF	Y9B0 to Y9B7	Y9B8 to Y9BF	Current limit changeover 1st to 8th axis
Y9C0 to Y9C7	Y9C8 to Y9CF	Y9D0 to Y9D7	Y9D8 to Y9DF	Droop release request 1st to 8th axis
YAE0 to YAE7	YAE8 to YAEF	YAF0 to YAF7	YAF8 to YAFF	Vertical axis pull-up prevention request 1st to 8th axis
YC05	YD45	YE85	YFC5	Automatic initialization mode
YC09	YD49	YE89	YFC9	In tape mode *Tape operation cannot be executed although this signal of X device turns ON/OFF by turning the device tape mode ON/OFF.
YC0A	YD4A	YE8A	YFCA	Online operation mode (Computer link B)
YC48 to YC4C	YD88 to YD8C	YEC8 to YECC	Y1008 to Y100C	2nd handle axis selection code 1,2,4,8,16
YC4F	YD8F	YECF	Y100F	2nd handle valid
YC50 to YC54	YD90 to YD94	YED0 to YED4	Y1010 to Y1014	3rd handle axis selection code 1,2,4,8,16
YC57	YD97	YED7	Y1017	3rd handle valid
YCC0, YCC1	YE00, YE01	YF40, YF41	Y1080, Y1081	Current limit mode 1,2
YCE1	YE21	YF61	Y10A1	Door open II
YCE2	YE22	YF62	Y10A2	Door open signal input (spindle speed monitor)
YCE8	YE28	YF68	Y10A8	Door open II (2 channels per 1 part system)
YD1E to YD20	YE5E to YE60	YF9E to YFA0	Y10DE to Y10E0	Tool axis coordinate system, table coordinate system, and feature coordinate system in manual feed for 5-axis machining (2nd handle)
YD21 to YD23	YE61 to YE63	YFA1 to YFA3	Y10E1 to Y10E3	Tool axis coordinate system, table coordinate system, and feature coordinate system in manual feed for 5-axis machining (3rd handle)

Device No.						Signal name
1st spindle	2nd spindle	3rd spindle	4th spindle	5th spindle	6th spindle	
Y189A, Y189B	Y18FA, Y18FB	Y195A, Y195B	Y19BA, Y19BB	Y1A1A, Y1A1B	Y1A7A, Y1A7B	Spindle torque limit 1,2
Y18A2, Y18A3	Y1902, Y1903	Y1962, Y1963	Y19C2, Y19C3	Y1A22, Y1A23	Y1A82, Y1A83	Spindle position control (C axis) Cutting gain
Y18A6	Y1906	Y1966	Y19C6	Y1A26	Y1A86	M coil selection

<R register (output)>

Device No.	Signal name
Common for part systems	
R200 to R207	Analog output 1 to 8
R212	KEY OUT1
R215	Power OFF indication Y device No.
R272, R273	Near-point dog ignored (Axis 1 to 8 for part system 1,2), (Axis 1 to 8 for part system 3,4)
R279	PLC axis near-point dog ignored
R296	Speed monitor mode
R297	Handy terminal Data area top address
R298	Handy terminal Data valid number of registers
R299	Handy terminal Cause of communication
R342	Specified shape interference Shape No. designation
R356 to R359	Direct screen selection A,B,C,D
R365	Measures against tool setter chattering Movement amount
R396	User PLC info program format info
R456, R457	Encoder 1 arbitrary pulse 1,2
R458, R459	Encoder 2 arbitrary pulse 1,2
R2110	Pallet 1 Machining program device No. * 2: DS, 3: FD, and 4: Memory card cannot be used.
R2116	Pallet 2 Machining program device No. * 2: DS, 3: FD, and 4: Memory card cannot be used.
R2122	Pallet 1 180° Machining program device No. * 2: DS, 3: FD, and 4: Memory card cannot be used.
R2128	Pallet 1 270° Machining program No. * 2: DS, 3: FD, and 4: Memory card cannot be used.
R2134	Pallet 2 0° Machining program device No. * 2: DS, 3: FD, and 4: Memory card cannot be used.
R2140	Pallet 2 90° Machining program device No. * 2: DS, 3: FD, and 4: Memory card cannot be used.
R2146	Pallet 2 180° Machining program device No. * 2: DS, 3: FD, and 4: Memory card cannot be used.
R2152	Pallet 2 270° Machining program device No. * 2: DS, 3: FD, and 4: Memory card cannot be used.

Part system 1	Part system 2	Part system 3	Part system 4	
R2510, R2511	R2710, R2711	R2910, R2911	R3110, R3111	2nd handle feed magnification
R2512, R2513	R2712, R2713	R2912, R2913	R3112, R3113	3rd handle feed magnification
R2525	R2725	R2925	R3125	External search device No. * 2: IC card, 3: Floppy disk, 4: High-speed program server and 5: Tape cannot be used.
R2592	R2792	R2992	R3192	Reference position adjustment completion
R2593	R2793	R2993	R3193	Current limit changeover
R2594	R2794	R2994	R3194	Wear compensation No. (tool presetter)
R2596	R2796	R2996	R3196	Turret interference object tool No. designation

Operations and timings of the following PLC signals are different between actual NC and NC Trainer plus.

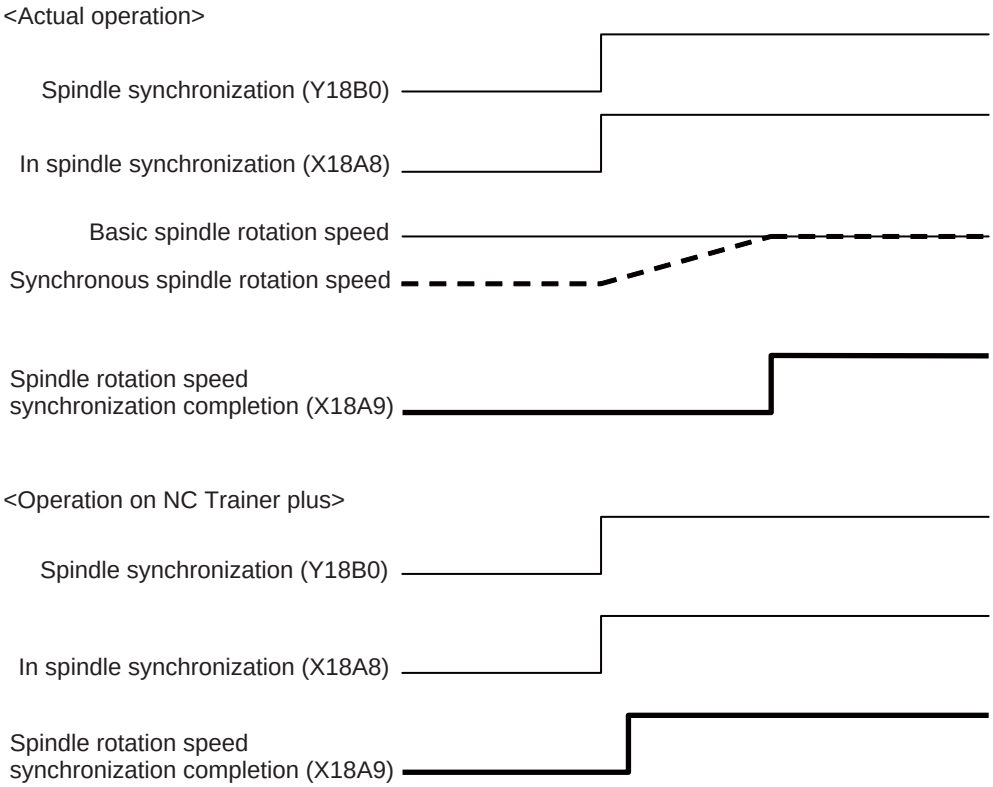
■Input signal (NC to PLC)

<X Device>

Device No.				Signal name
Part system 1	**Part system 2**	**Part system 3**	**Part system 4**	
X780 to X787	X788 to X78F	X790 to X797	X798 to X79F	Servo ready 1st to 8th axis
X940 to X947	X948 to X94F	X950 to X957	X958 to X95F	NC axis up-to-speed 1st to 8th axis
XC11	XD51	XE91	XFD1	Servo ready completion
XC19	XD59	XE99	XFD9	All axes in-position
XCB3	XDF3	XF33	X1073	Spindle-spindle polygon synchronization completion

1st spindle	2nd spindle	3rd spindle	4th spindle	5th spindle	6th spindle	
X1888	X18E8	X1948	X19A8	X1A08	X1A68	Spindle 2nd in-position
X188C	X18EC	X194C	X19AC	X1A0C	X1A6C	Zero speed
X188D	X18ED	X194D	X19AD	X1A0D	X1A6D	Spindle up-to-speed
X188E	X18EE	X194E	X19AE	X1A0E	X1A6E	Spindle in-position
X188F	X18EF	X194F	X19AF	X1A0F	X1A6F	In L coil selection
X1890	X18F0	X1950	X19B0	X1A10	X1A70	Spindle ready-ON
X1891	X18F1	X1951	X19B1	X1A11	X1A71	Spindle servo-ON
X1895	X18F5	X1955	X19B5	X1A15	X1A75	Z phase passed
X1896	X18F6	X1956	X19B6	X1A16	X1A76	Position loop in-position
X189F	X18FF	X195F	X19BF	X1A1F	X1A7F	Index positioning completion
X18A9	X1909	X1969	X19C9	X1A29	X1A89	Spindle rotation speed synchronization completion
X18AA	X190A	X196A	X19CA	X1A2A	X1A8A	Spindle phase synchronization completion
X18AC	X190C	X196C	X19CC	X1A2C	X1A8C	Chuck close confirmation
X18B5	X1915	X1975	X19D5	X1A35	X1A95	In spindle holding force up

Example) For Spindle rotation speed synchronization completion (X18A9)



2

Installation and Setup

2.1 Operating Environment

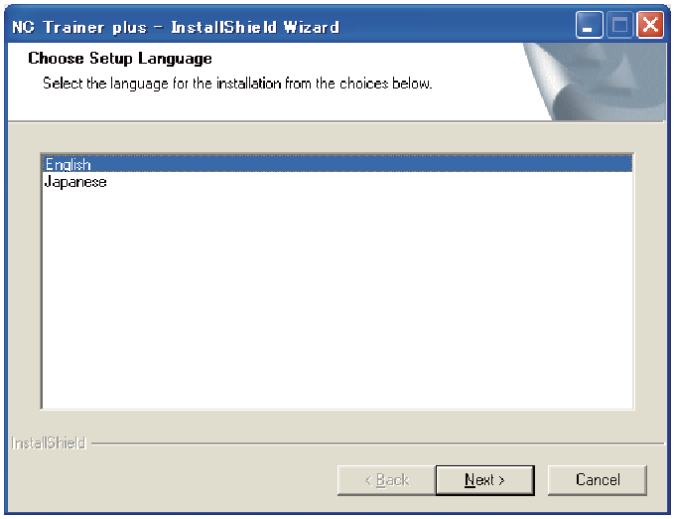
The operating environment is the same as that of NC Trainer. Refer to the section "2.1 Operating Environment" of "I NC Trainer" for details.

2.2 Procedure of the First Installation

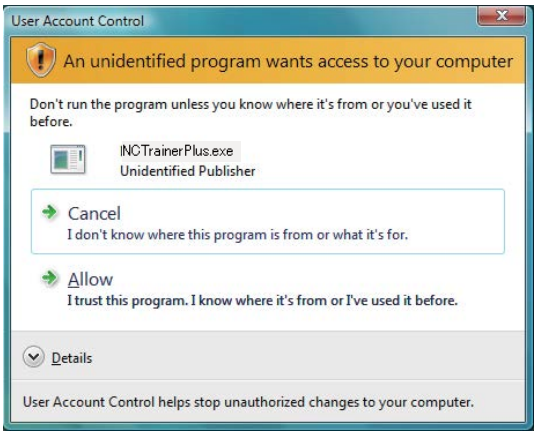
(Note) Do not install license key until the installation of NC Trainer plus has been completed. When mistakenly install the Key and "add hardware wizard" is displayed, press the "cancel" button to cancel. After pressing the "cancel" button, remove the license key from the computer.

(1) Insert NC Trainer plus installation CD in computer's CD-ROM drive.

(2) Execute "NCTrainerPlus.exe" in the installation CD.
After the selection screen for setting language is displayed, select the language to use for installation, and press the "Next" button.
(Note) When NC Trainer plus is installed on English-language version of Windows, select "English" as the setting language. If selecting "Japanese" for English-language version of Windows, the characters cannot be displayed properly in subsequent installation screens.

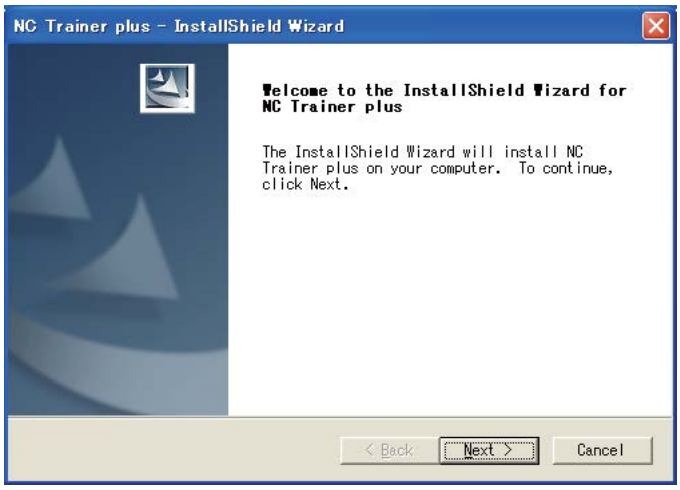


(Note) The installation of NC Trainer plus has to be carried out by the authority of the administrator.
If User Account Control in Windows8 or Windows7 or Windows Vista is enabled, the confirmation dialog box as below pops up. Then, select "Allow (A)" to start the installation.

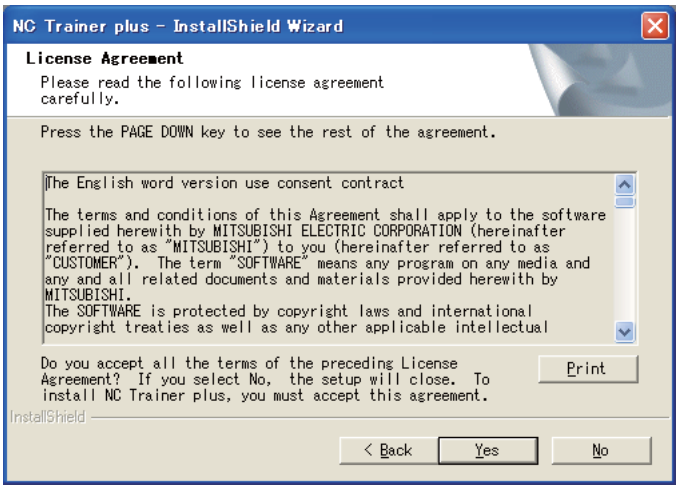


(3) Splash screen is displayed. Then the installer is started.

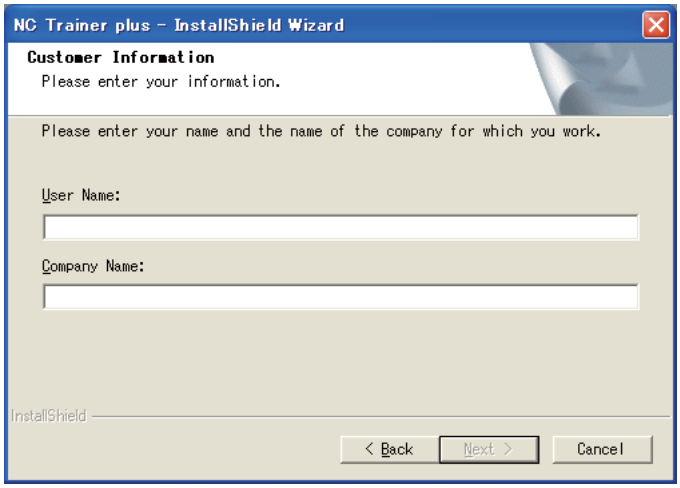
(4) The setup screen is displayed.
Press the "Next" button.



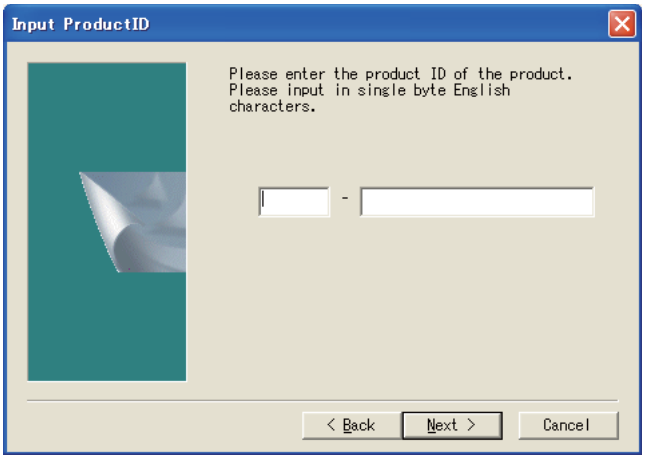
(5) The software license agreement is displayed.
Read the software license agreement carefully, and press the "Yes" button.
If "No" is selected (when you do not agree this agreement), the installation of NC Trainer plus is discontinued.



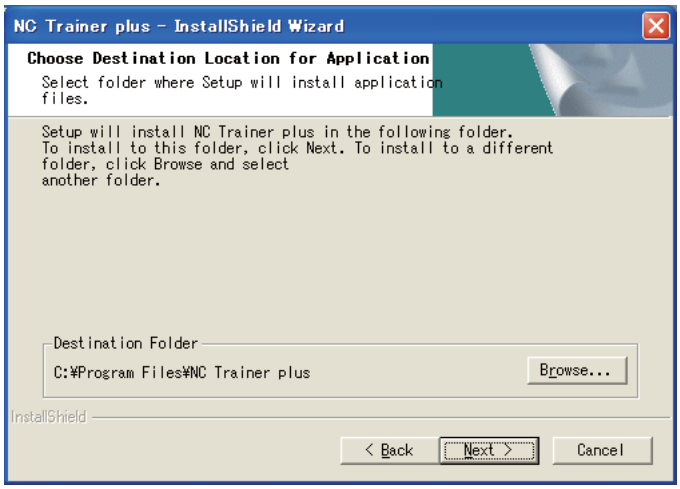
(6) The "Customer Information" screen is displayed. Input user name and company name and press the "Next" button.



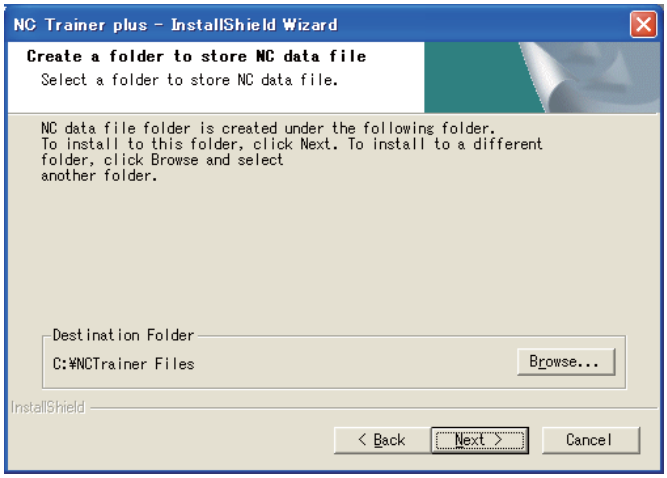
(7) Input the product ID on the Input Product ID screen and press the "Next" button.



(8) The "Choose Designation Location" screen is displayed. Press "Browse" and select the installation destination when changing the installation destination. Press the "Next" button after the installation destination settings.

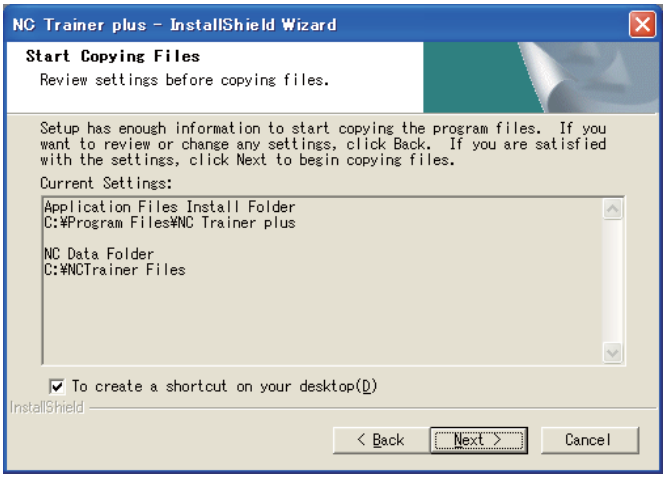


(9) The "Create a folder to store NC data file" screen is displayed.
Press "Browse" and select the folder to store NC data file when changing the folder.
Press the "Next" button after the settings.

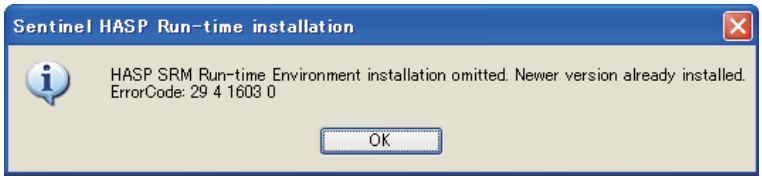


(Note) The following are the precautions when changing the folder to store NC data file.
- Do not use kana-kanji as a folder name.
- A folder name over 19 characters cannot be set.
- When the OS is Windows Vista or later, do not designate a folder under C:/Program Files and C:/Windows. (Writing data to these folders is usually prohibited.)
- When installing both NC Trainer and NC Trainer plus, designate a different folder for each.
If designating the same folder, the same name project cannot be created for NC Trainer and NC Trainer plus. (Same for copying and renaming the project.)

(10) The "Start Copying Files" screen is displayed. Press the "Next" button after confirming the installation destination settings. (When the setting is changed, press the "Back".)
The setup starts.
If "To create a shortcut on your desktop (D)" is checked, the shortcut of NC Trainer plus is created on the desktop after the installation is completed.



(Note 1) The following message box might show up during installation. Click "OK" to continue installation.



(Note2) The warning "The software you are installing has not passed Windows Logo testing. " can be displayed when installing a virtual network driver. Press "Continue" and continue to install.

(11) When the installation is correctly completed, the complete screen is displayed.
When "Finish" button is pressed, the installation completes.

After the installation is completed, set a virtual network. Refer to the section "2.3 Network Setting for Connecting with MELSOFT Peripheral Tool (GX-Developer)" for details.

2.3 Network Setting for Connecting with MELSOFT Peripheral Tool (GX-Developer)

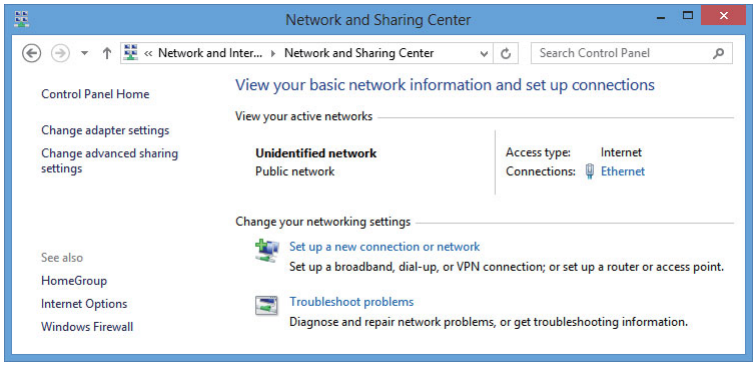
A virtual network driver for NC Trainer plus is required to be set to make the NC which is operated on NC Trainer plus communicate with , GX-Developer and NC peripheral tool (NC Configurator2, NC Explorer). Only communications between the applications on the same computer are enabled. A communication with an application on a different computer is not possible.
The method of setting the virtual network for NC Trainer plus is explained in this chapter (Set by the user with administrator authority).

<For Windows 8 / Windows 7 / Windows Vista>

(1) Open the setting screen for Network connection as follows.

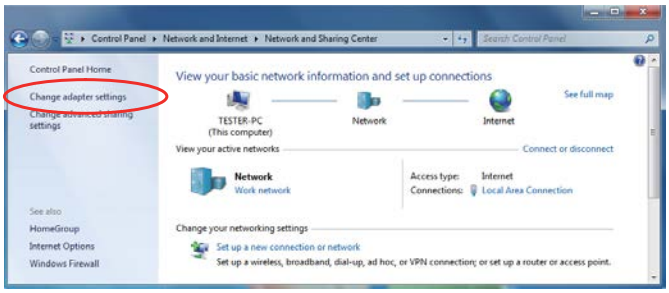
- Windows 8

Right-click on start screen then click [All Apps], and select [Control Panel]-[Network and Internet]-[Network and Sharing Center] from application list.
Select [Change adopter settings] on the left side of the screen [Network and Sharing Center].



- Windows 7

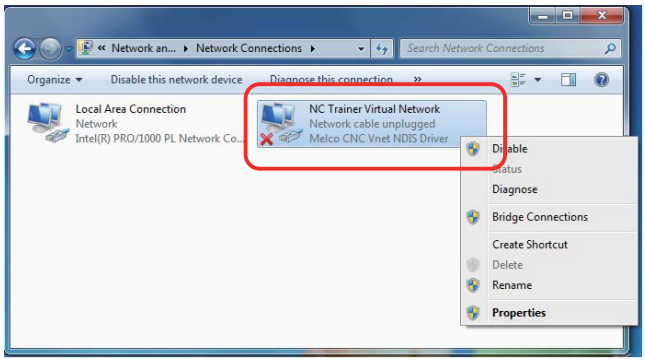
Select [Start]-[Control Panel]-[Network and Sharing Center] from task bar. When the following window dispalys, select the left side of the screen [Change adopter settings].
Double-click "NC Trainer Virtual Network" from local area connection.



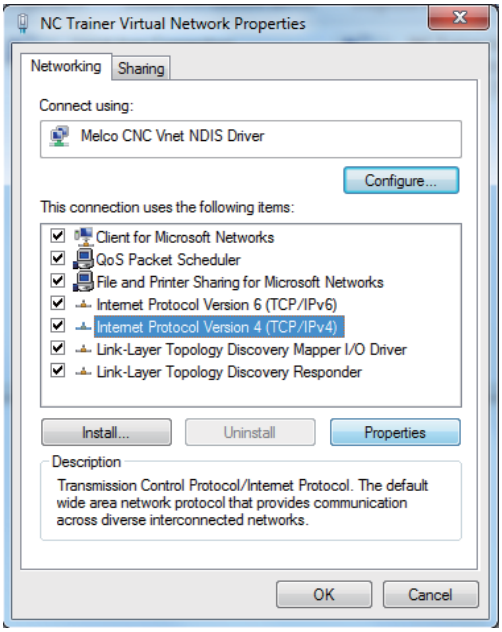
- Windows Vista

Select [Start]-[Control Panel]-[Network and Internet]-[Network and Sharing Center] from task bar.
Select [Manage network connections] from the left side of the screen [Network and Sharing Center].

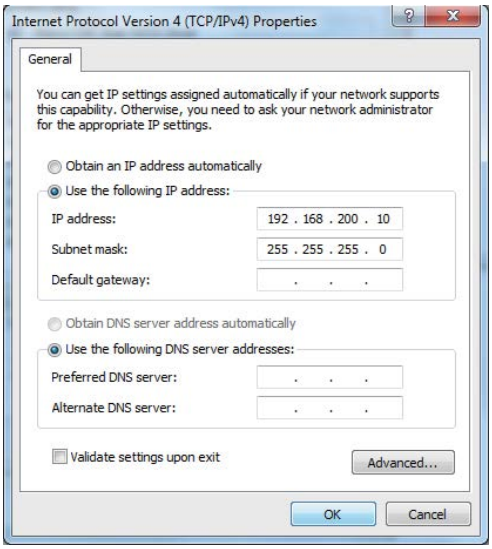
(2) Double-click "NC Trainer Virtual Network" on the setting screen of Network connection.
(The procedures described hereafter are for Windows 7. For Windows 8 and Windows Vista , the setting procedures are the same.).



(3) The following dialog box is displayed. Select [Internet Protocol Version 4 (TCP/IPv4)] and press the [Properties (R)] button.



(4) The following dialog box is displayed.
Enable [Use the following IP address (S)] and set the IP address and Subnet Mask.
Leave "Default Gateway" and "DNS server" blank.



The IP address set on the dialog box is the one for a software side to communicate with the NC on NC Trainer plus.

(Note 1) Set the network address for the virtual network driver (192.168.200 in the figure above) so as to be different from the network address for other local area connection. When the same network address is set to both, it cannot communicate correctly.
(Note 2) When setting the default gateway or DNS server, the communication via other network adapter cannot be executed.

(5) Press the [OK] button successively and complete the setting.
The IP address for NC side is allocated automatically based on the IP address for the virtual network driver as follows. (When the network address is 192.168.200)

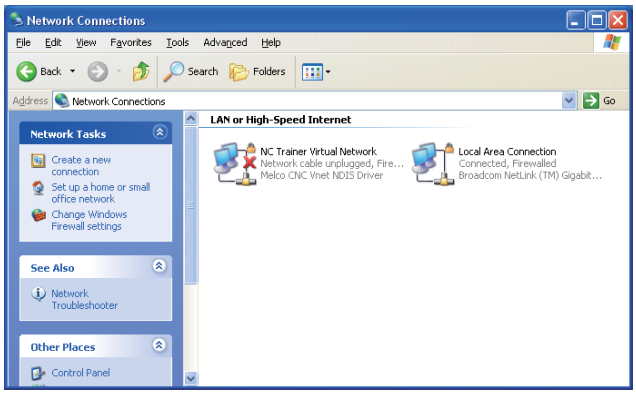
IP address for the virtual network driver	IP address for NC side (Note 1)
192.168.200.1	192.168.200.2
192.168.200.2	192.168.200.3
192.168.200.3	192.168.200.4
: : :	: : :
192.168.200.253	192.168.200.254
192.168.200.254	192.168.200.1

(Note 1) The IP address setting(#1926 Global IP address) of NC parameter is not be used.

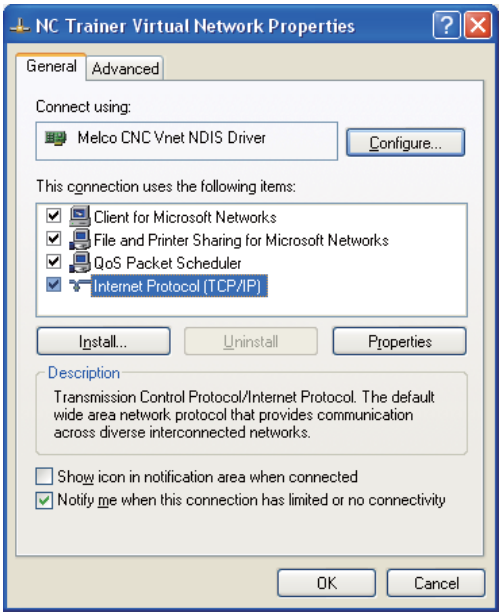
Refer to the section "5.2.1 User PLC Development Method with GX Developer" for details of the communication settings and connection procedure for GX Developer side.

<For Windows XP>

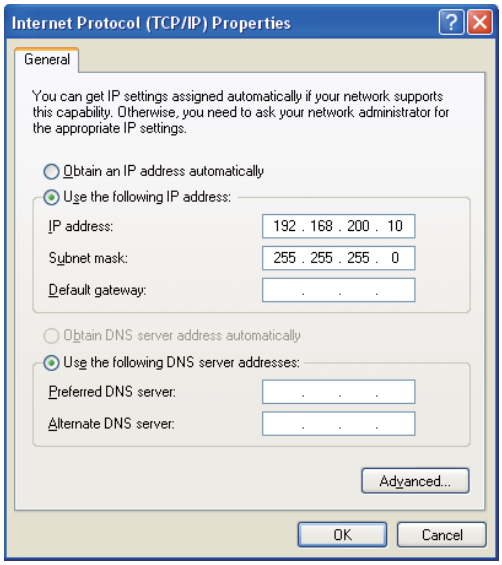
(1) Select [Start] - [Setting (P)] - [Network Connections (N)] from taskbar to display the network connection list. Double-click "NC Trainer Virtual Network" in the local area connection.



(2) The following dialog box is displayed. Select [Internet Protocol (TCP/IP)] and press the [Properties] button.



(3) The following dialog box is displayed.
Check [Use the following IP address (S)] and set the IP address and Subnet Mask for the virtual network driver.
Leave "Default Gateway" and "DNS server" blank.



The IP address set on the dialog box is the one for a software side to communicate with the NC on NC Trainer plus.

(Note 1) Set the network address for the virtual network driver (192.168.200 in the figure above) so as to be different from the network address for other local area connection. When the same network address is set to both, it cannot communicate correctly.
(Note 2) When setting the default gateway or DNS server, the communication via other network adapter cannot be executed.

(4) Press the [OK] button successively and complete the setting.
The IP address for NC side is allocated automatically based on the IP address for the virtual network driver. Refer to the preceding description in "For Windows 8 / Windows 7 / Windows Vista" for the rule.

Refer to the section "5.2.1 User PLC Development Method with GX Developer" for details of the communication settings and connection procedure for GX Developer side.

2.4 Installation Procedure When Upgrading

The operating procedure is the same as that of NC Trainer. Refer to the section "2.3 Installation Procedure When Upgrading" of "I NC Trainer" for details.

2.5 Procedure of Uninstalling

The operating procedure is the same as that of NC Trainer. Refer to the section "2.4 Procedure of Uninstalling" of "I NC Trainer" for details.

3

Configuration of the Screen

3.1 Configuration of the Screen

The configuration of the screen is the same as that of NC Trainer. Refer to the section "3.1 Configuration of the Screen" of "I NC Trainer" for details.

3.2 Menu List

A list of pull-down menus of NC Trainer plus and the usage of each item are described below.

3.2.1 [Project (P)] Menu

Operation menu item

Item		Description
New Project (N)		Select to create a new project. Refer to "4.3.1 Creating a New Project" for details.
Change Project (O)		Select to change the project executed. Refer to "4.3.2 Changing the project" for details.
Set Project Option (S)		Select to change the settings of the existing project. Refer to "4.3.3 Changing the settings of project option" for details.
Rename Project (M)		Select to rename the existing project. Refer to "4.3.4 Renaming the project" for details.
Copy Project (C)		Select to copy the existing project. Refer to "4.3.5 Copying the project" for details.
Delete Project (D)		Select to delete the existing project. Refer to "4.3.6 Deleting the project" for details.
Export (E)		Convert the data format of NC Trainer plus project to the format which can be operated with NC Trainer and output. Refer to "6.1 Exporting NC Trainer plus Project" for details.
Import (I)		Select to import the exported data from each application. It has following sub-menus.
	Project (P)	Select to read a project which is exported from NC Trainer plus as a project for NC Trainer plus. Refer to "6.2 Importing NC Trainer plus Project" for details.
	Custom Machine Operation Panel (C)	Select to register the custom machine operation panel which is created with NC Trainer Builder as a new machine operation panel for NC Trainer plus. Refer to "5.2.11 Adding the Custom Machine Operation Panel to NC Peripheral Device Setting" for details.
	NC DATA (N)	Select to import the NC data which is backed up with actual NC to the project of NC Trainer plus. Refer to "5.4.9 Importing the NC Data from Actual NC" for details.
Write APLC module (L)		Select to store APLC release C language module (APLC.o) in the NC memory of NC Trainer plus. Refer to "5.4.1 Writing APLC Release C Language Module" for details.
Exit (X)		Exit from the NC Trainer plus.

(Note) If no project has been registered, [Change Project (O)], [Set Project Option (S)], [Rename Project (M)], [Copy Project (C)], [Export (E)], [Write APLC module (L)], and [Delete Project (D)] cannot be selected.

3.2.2 [View (V)] Menu

[View (V)] menu is the same as that of NC Trainer. Refer to the section "3.2.2 [View (V)] Menu" of "I NC Trainer" for details.

3.2.2.1 Changing the Display Language

The operating procedure is the same as that of NC Trainer. Refer to the section "3.2.2.1 Changing the Display Language" of "I NC Trainer" for details.

3.2.3 [Tool (T)] Menu

Tool menu item

Item	Description
Set Machine Parameters (M)	"Input the password" message will disappear and each environmental settings for NC can be set. - A check mark will appear when it is enabled. - If this setting is changed while parameter screen of NC is displayed, the environmental settings for NC still cannot be set (or can be set). Entering another NC screen, and the environmental settings for NC can be set (or cannot be set).
Confirm NC Data Storage (N)	Normally, NC internal data such as parameters and machining program changed by the NC operation is saved automatically. Validate this item to display the confirmation message whether to save them automatically. - A check mark will appear when it is enabled.
IP address display of NC (I)	Display the IP address of NC which is executed on NC Trainer plus. Refer to "5.2.1 Development Methods for User PLC with GX Developer" for details.
APLC Debug Task Lock (T)	Can be selected only while debugging APLC.o with NC Trainer plus. Otherwise this is displayed in gray and cannot be selected. Refer to "5.4.7 Task Lock Function for APLC Debug" for details. - When the function is enabled, a check mark is attached.

3.2.4 [Window (W)] Menu

[Window (W)] menu is the same as that of NC Trainer. Refer to the section "3.2.4 [Window (W)] Menu" of "I NC Trainer" for details.

3.2.5 [Help (H)] Menu

[Help (H)] menu is the same as that of NC Trainer. Refer to the section "3.2.5 [Help (H)] Menu" of "I NC Trainer" for details.

3.2.6 Tool Bar

Tool bar is the same as that of NC Trainer. Refer to the section "3.2.6 Tool Bar" of "I NC Trainer" for details.

3.2.7 Status Bar

Status bar is the same as that of NC Trainer. Refer to the section "3.2.7 Status Bar" of "I NC Trainer" for details.

3.3 Operation of NC Screen

3.3.1 NC Keyboard

NC keyboard is the same as that of NC Trainer. Refer to the section "3.3.1 NC Keyboard" of "I NC Trainer" for details.

3.3.2 NC Menu Key

NC menu key is the same as that of NC Trainer. Refer to the section "3.3.2 NC Menu Key" of "I NC Trainer" for details.

3.3.3 Machine Operation Panel

In NC Trainer plus, the PLC program to operate the machine operation panel is running.
The machine operation panel consists of the buttons to operate NC and lamps to indicate the output signal status from NC.
When selecting the standard machine operation panel on NC Trainer plus, the following machine operation panel is used.

Refer to the section "5.2 Custom Machine Operation Panel" for details of custom machine operation panel.

Display item of machine operation panel

Display item of machine operation panel is the same as that of NC Trainer. Refer to the section "3.3.3 Machine Operation Panel" of "I NC Trainer" for details.

3.3.3.1 Restarting NC

The operating procedure is the same as that of NC Trainer. Refer to the section "3.3.3.1 Restarting NC" of "I NC Trainer" for details.

4

How to Use NC Trainer plus

4.1 Starting NC Trainer plus

The operating procedure is the same as that of NC Trainer. Refer to the section "4.1 Starting NC Trainer" of "I NC Trainer" for details.

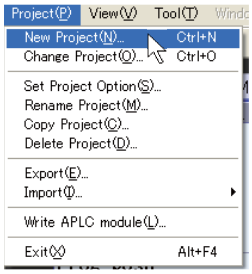
4.2 Exiting from NC Trainer plus

The operating procedure is the same as that of NC Trainer. Refer to the section "4.2 Exiting from NC Trainer" of "I NC Trainer" for details.

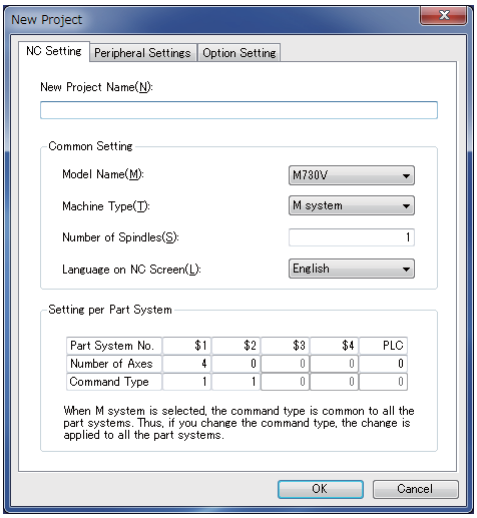
4.3 Creating a Project

4.3.1 Creating a New Project

(1) To create a new project, select [Project (P)] - [New Project (N)] from the menu bar.



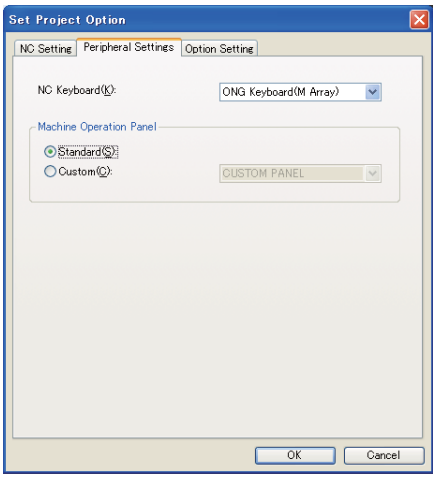
(2) Set the basic parameters for NC in the new project dialog box.



Display item of New Project dialog box

Item	Description
New Project Name (N)	Input the new project name. - A project name can be up to 80 one-byte characters. (Each two-byte character is equivalent to two characters.) - One-byte characters and two-byte characters can be used for a project name. - A project name is not case-sensitive. - The following characters cannot be used for a project name. \ / : * ? < > | " (Same as the prohibited characters for a file name) - A created project name cannot be designated. - Blank project name cannot be used. - Blank and Period (.) cannot be used for the first or last character of a project name. - CON, PRN, AUX, CLOCK$, NUL, COM0 to COM9 and LPT0 to LPT9 cannot be used for a project name.
Model Name (M)	Specify the NC model. The following models can be selected. M730V M70V TypeA M70V TypeB E70
Machine Type (T)	Designate the NC configuration. The following configuration can be selected. Machining center: M system Lathe: L system
Number of Spindles (S)	Set the number of axes. The setting range is 0 to 6. (For M system, 0 to 4)
Language on NC Screen (L)	Set the language displayed on NC Screen while executing a project. Languages supported in NC can be selected.
Number of Axes	Set the number of axes for each part system. If the number of axes in a part system is 0, the part system is invalid. (Note) NC Trainer will be controlled by one part system and the number of axes is fixed (M system: 4 axes (For E70: 3 axes), L system: 3 axes, PLC axis: None).
Command Type	Set the G code system and compensation type for programs. 1: List1 (for M system) Type A (one compensation amount for one compensation No.) 2: List1 (for M system) Type B (shape and wear compensation amounts for one compensation No.) 3: List2 (for L system) Type C (shape and wear compensation amounts for one compensation No.) 4: List3 (for L system) Ditto 5: List4 (for special L system) Ditto 6: List5 (for special L system) Ditto 7: List6 (for special L system) Ditto 8: List7 (for special L system) Ditto 9: List8 (for M system) M2 form at type A Type A (one compensation amount for one compensation No.) 10: List8 (for M system) M2 form at type B Type B (shape and wear compensation amounts for one compensation No.) - If M system is selected for the machine type, command types are common in all part systems. Therefore, set the same value to all part systems.
"OK" button	Create a new project.
"Cancel" button	Cancel to create a new project.

(3) Press the [Peripheral Settings] tab to select NC peripheral devices according to your environment.

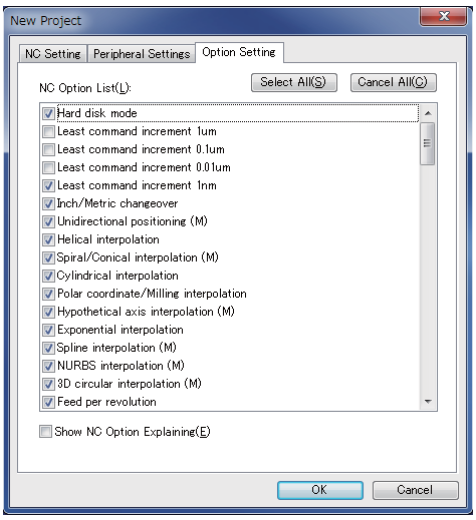


Display item of Peripheral Settings tab

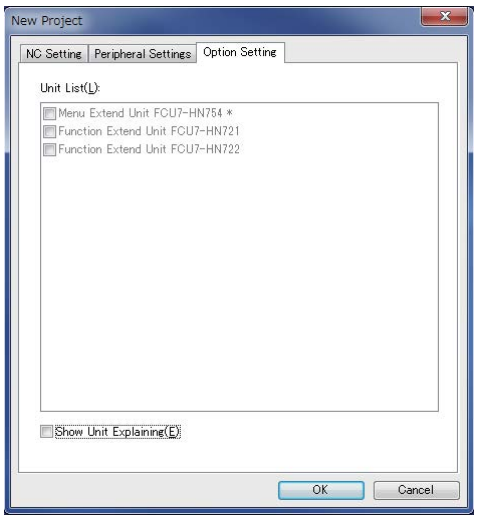
Item		Description
NC Keyboard (K)		Select NC Keyboard to be used. The following NC Keyboards can be selected. - ONG Keyboard (M array) : default - ONG Keyboard (L array)
Machine Operation Panel		This item can be set only for NC Trainer plus.
	Standard (S)	Select to use the standard machine operation panel. (default) Refer to "3.3.3 Machine Operation Panel" for details of the standard machine operation panel.
	Custom (C)	Select to use the imported custom machine operation panel. Select the custom machine operation panel to be used from drop-down list. This can be selected only when a custom machine operation panel is imported in advance. Refer to "5.1.11 Adding the Custom Machine Operation Panel to NC Peripheral Device Setting" for details of importing the custom machine operation panel.

(4) Press the [Option Setting] tab to select NC options according to your environment.

<M700V>



<M70V/E70>



(Note) Refer to the section "Appendix 1 Specifications list" for details on NC options.

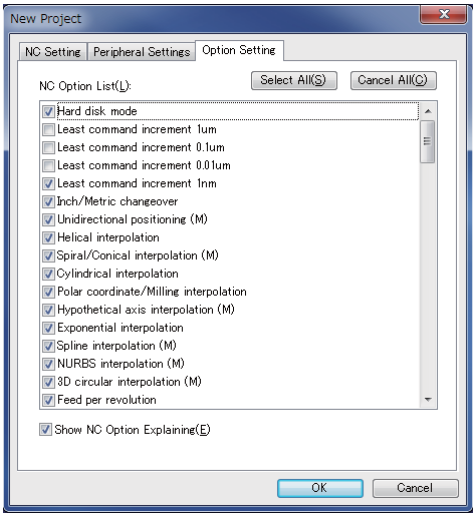
Display item of M700V Option Setting tab

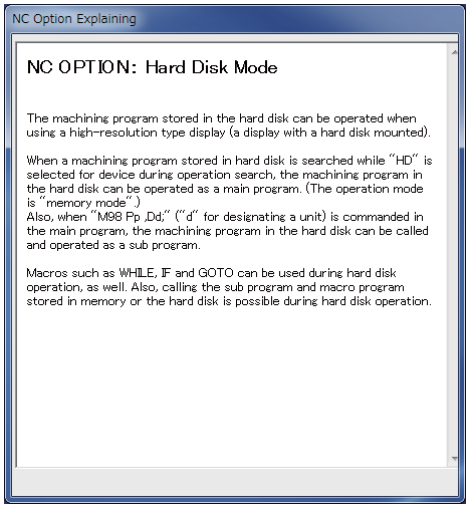
Item	Description
NC Option List (L)	Display the NC option list that can be selected for the project. To validate a NC option, check the check box. - For the option required to format NC memory, [*] mark is indicated at the end of the option name.
Select All (S)	Check all items. - Note that the items are checked only on the maximum spec option, for options which cannot be selected concurrently such as least command increment, etc.
Cancel All (C)	Delete the check mark for all items. - Note that items are checked only on the minimum spec option, for options which cannot be selected at one time such as the least command increment, etc.
Display the description of NC option (E)	When this is checked, a dialog box appears showing the description of currently selected NC option.

Display item of M70V/E70 Option Setting tab

Item	Description
Additional Unit List(L)	Displays a list of units. To validate an additional unit, check the check box. - The selectable unit differ by the NC model of a project to create. No additional unit can be selected if the NC model is E70. - The function extension units FCU7-HN721 and -HN722 can not be selected at the same time. - There is "*" mark after the unit name if the unit needs format of NC memory.
Display the description of the Units (E)	When this is checked, a dialog box appears showing the description of currently selected additional unit.

(Note) The dialog boxes for NC option and additional unit shows the description as below.
(Setting of NC option and additional unit is enabled while the dialog box is open.)





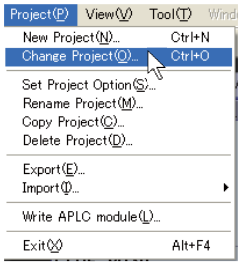
(5) Press the "OK" button, and the NC screen of created project is displayed. At this time, NC data of the executing project is automatically stored.
Note that if [Tool (T)] - [Confirm NC Data Storage (N)] is enabled, the confirmation message is displayed. When pressing the "OK" button, NC data is stored and NC screen of created project is displayed.

(Note) Created project is started in the state that NC memory and tool life management data are formatted.

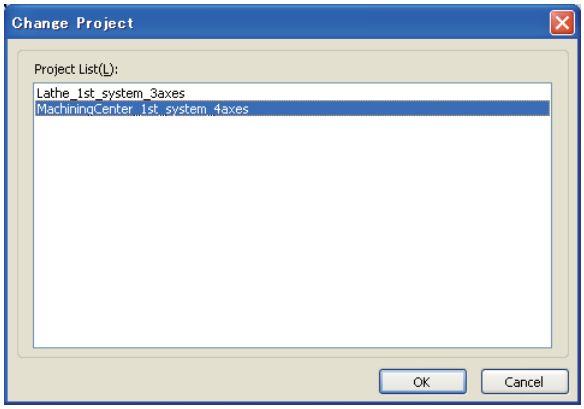
4.3.2 Changing the Project

Perform the following procedure to change the project to be executed from menu bar.

(1) Select [Project (P)] - [Change Project (O)] from menu bar.

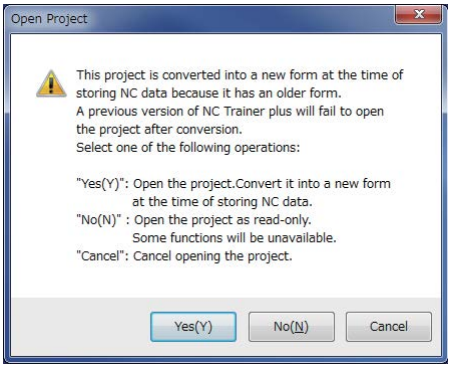


(2) Project list is displayed. Select the project to change.



(Note) NC Trainer plus does not display projects which were created with NC Trainer.

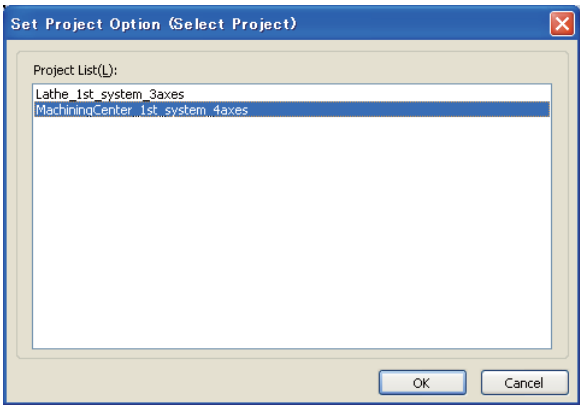
(3) Press the "OK" button, and NC screen of selected project is displayed. At this time, NC data of the executing project is automatically stored.
Note that if [Tool (T)] - [Confirm NC Data Storage (N)] is enabled, the confirmation message is displayed. When pressing the "OK" button, NC data is stored and NC screen of created project is displayed.
(Note1) If selecting the currently-executing project, the dialog box is closed.
(Note 2) If the project is created by NC Trainer plus S/W version B0 or earlier version is selected, the following message boxmay appear.



-If there is no possibility to open the project by NC Trainer plus S/W version B0 or earlier version, click "Yes(Y)".
-If there is a possibility to open the project by NC Trainer plus S/W version B0 or earlier version, click "No(N)" to open by read-only.
-To cancel opening the project, click "Cancel" button.
-Refer to "1.5 Precautions" for the restraints of each function when the project is opened by read-only.

4.3.3 Changing the Settings of Project Option

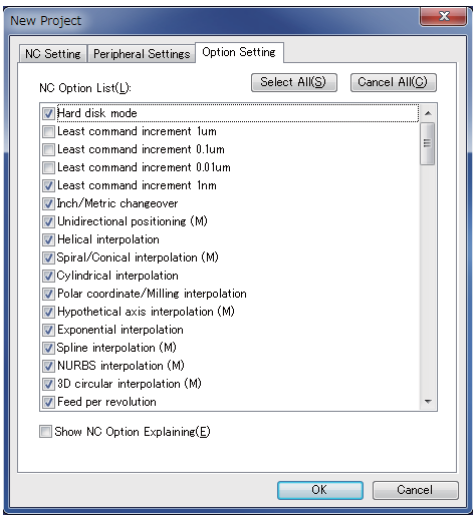
(1) Select [Project (P)] - [Set Project Option (P)] from menu bar to change or refer to settings of the project. Select Project dialog box is displayed.



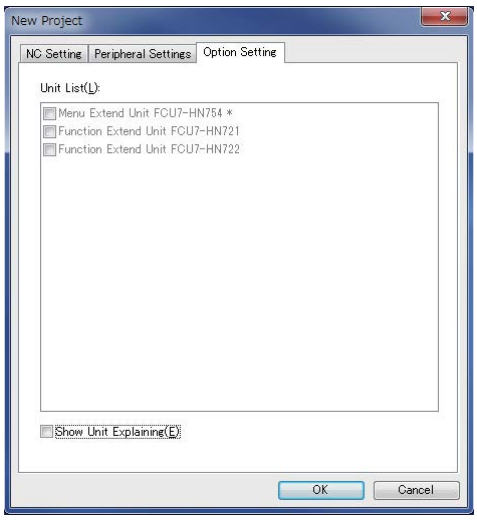
(Note) NC Trainer plus does not display projects which were created with NC Trainer.

(2) When selecting the project to change the settings and press the "OK" button, Option Setting dialog box is displayed.

<M700V>



<M70V/E70>



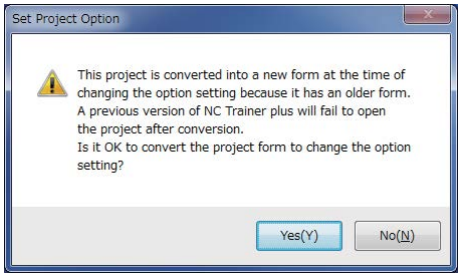
Display item of Set Project Option dialog box

Item	Description
NC Setting tab	This is a tab to set or display the NC models, NC configuration and the display language of NC screen. Refer to "4.3.1 Creating a New Project" for details. (Note) The settings of NC Setting tab is only displayed.
Peripheral Settings tab	This is a tab to set or display the type of machine operation panel. Refer to "4.3.1 Creating a New Project" for details.
Option Setting tab	This is a tab to set or display the NC options and the unit of a project. [*] mark indicates the options and the unit required to format NC memory. Refer to "4.3.1 Creating a New Project" for details.
"OK" button	Click to apply the changed settings of a project and close the dialog box.
"Cancel" button	Click to cancel the changed settings of a project and close the dialog box.

(Note 1) When the "OK" button is pressed after changing the setting, the operation will stop once, and then NC is restarted with the changed project settings. If changed project and executing project are the same, NC data at this point is stored and NC is restarted. If changed project and executing project are different, the confirmation message will be displayed depending on the state of [Tool (T)] - [Confirm NC Data Storage (N)]. And after pressing the "OK" button to store, NC is restarted with changed project settings. When pressing the "Cancel" button, changing the option settings is canceled and Set Project Option dialog box is displayed.

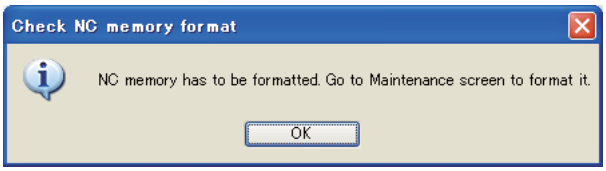
(Note 2) Although [NC setting tab] can be selected, the setting value cannot be changed. To change the setting value, create a new project. Refer to the section "4.3.1 Creating New Project" on how to create a project.

(Note 3) On Set Project Option dialog box,if there is no possibility to open the project by NC Trainer plus S/W version B0 or earlier version, click "Yes(Y)" to may appear.



To change the settings of the project option, the project needs to be converted to new format.
- If there is no possibility to open the project by NC Trainer plus S/W version B0 or earlier version, click "Yes(Y)" to activate.
- To save the selected project in a format that allows the project to be opened with NC Trainer plus S/W version B0 or earlier version, click "No(N)". This stops changing the settings of project option and returns to Set Project Option dialog box.

(3) When changing the option and the unit name that [*] mark is indicated at the end of the option name and pressing the "OK" button, a dialog prompts the user to format NC memory is displayed.
In this case, press the "OK" button and format the NC memory.



<Formatting NC memory>

The operating procedure is the same as that of NC Trainer. Refer to the section "4.3.3 Changing the Settings of Project Option" of "I NC Trainer" for details.

4.3.4 Renaming the Project

The operating procedure is the same as that of NC Trainer. Refer to the section "4.3.4 Renaming the Project" of "I NC Trainer" for details.

4.3.5 Copying the Project

The operating procedure is the same as that of NC Trainer. Refer to the section "4.3.5 Copying the Project" of "I NC Trainer" for details.

4.3.6 Deleting the Project

The operating procedure is the same as that of NC Trainer. Refer to the section "4.3.6 Deleting the Project" of "I NC Trainer" for details.

5

The Function of NC Trainer plus

5 The Function of NC Trainer plus

What is available on NC Trainer plus is as follows, and the same screen as user-developed machine tool can be displayed and the NC can be operated by the same operating method.

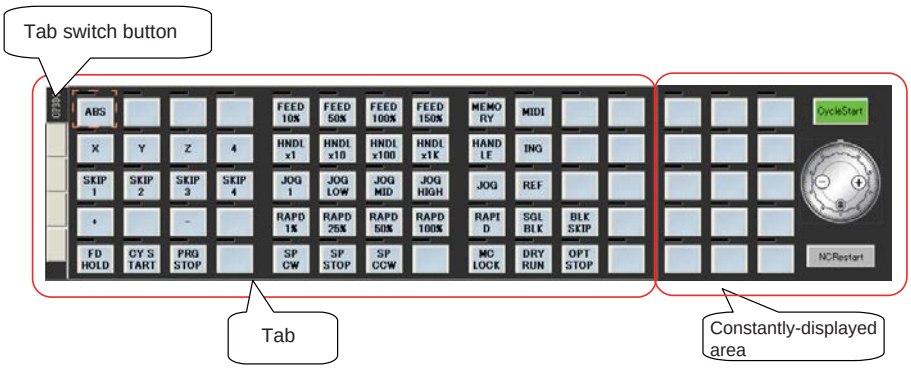
- Creating and displaying the custom machine operation panel
- Writing the user ladder
- Displaying the custom release screen
- Writing APLC release C language module (APLC.o)

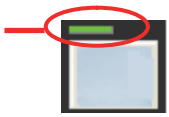
The functions available only for NC Trainer plus are explained in this chapter.

5.1 Custom Machine Operation Panel

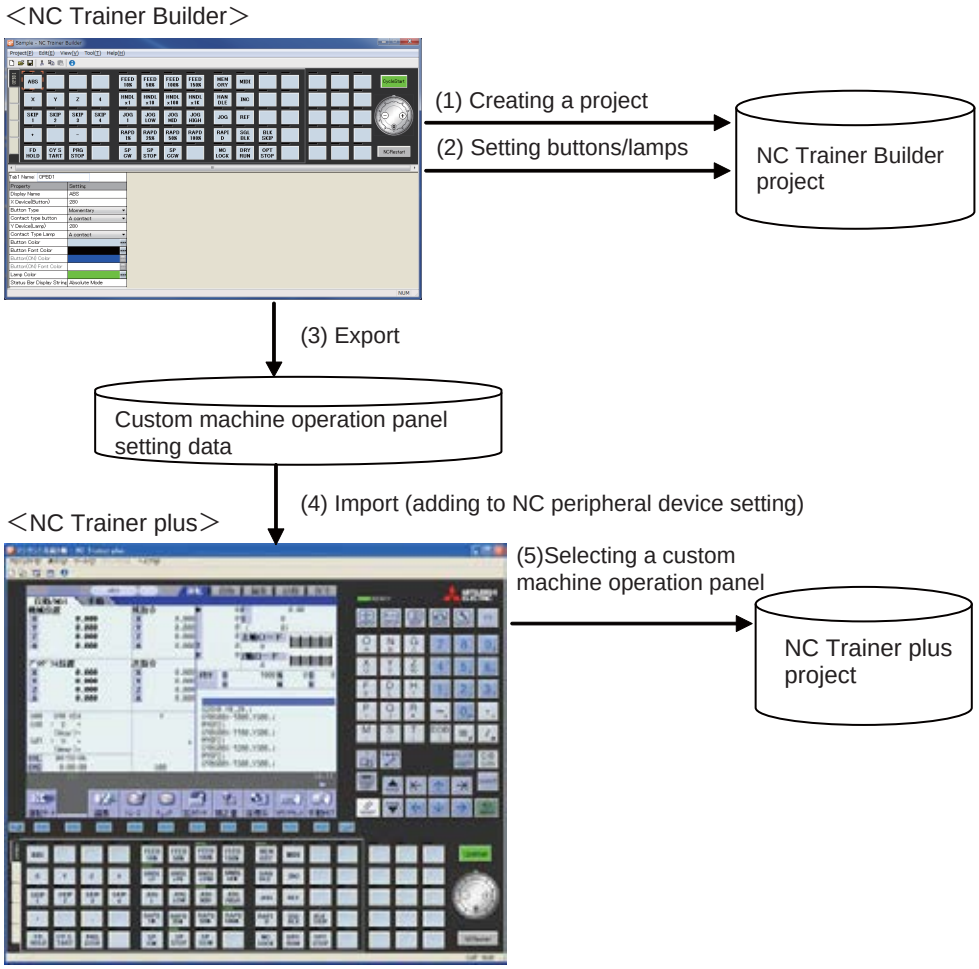
5.1.1 Custom Machine Operation Panel

The custom machine operation panel is used for arrangement of buttons/lamps which is matched to the image of the machine operation panel of machine tool builder, IO device allocation which is matched to the user PLC, and test environment for the user PLC, etc.
The button/lamp setting can be executed in batches by outputting device comments as a CSV file from GX Developer (after GX Converter add-in) and reading it with NC Trainer Builder. Refer to the section "5.1.12 Reading Device Comments" for details of button/lamp setting.
The interface of custom machine operation panel is as follows.



Item	Description
Tab	The buttons/lamps which are displayed on the area can be switched by pressing tab switch button. There are five tabs. Each tab is referred to as tab 1 to 5 beginning at the top.
Constantly-displayed area	The same buttons/lamps are always displayed in this area unlike the tab.
	This is a button attached with a lamp. The lamp is arranged above the button. Lamp (ON)  A device can be allocated to each button and lamp. Refer to "5.1.5 Setting of Custom Machine Operation Panel" for details of button/lamp setting.
	This is a button to start an automatic operation (Cycle Start). X device to start an automatic operation is required to be allocated to this button. (The user PLC determines the X device.) Refer to "5.1.5 Setting of Custom Machine Operation Panel" for details of the setting.
	This is a button to carry out a handle operation. Press [+] button to turn the handle to the right. Press [-] button to turn the handle to the left. [+] button and [-] button are auto-repeated. The setting cannot be changed for this button.
	This is a button to restart the NC. The setting cannot be changed for this button.

The custom machine operation panel is created with NC Trainer Builder. NC Trainer Builder is a tool provided with NC Trainer plus and it is installed at the same time as when NC Trainer plus is installed.
The workflow for creating a custom machine operation panel and using it with NC Trainer plus is shown below.



Start NC Trainer Builder.
(Refer to "5.1.3 Start and Exit NC Trainer Builder" for details.)

(1) Creating a project of the custom machine operation panel with NC Trainer Builder
(Refer to "5.1.4 Creating a Project of the Custom Machine Operation Panel" for details.)

(2) Setting buttons/lamps on the custom machine operation panel with NC Trainer Builder
(Refer to "5.1.5 Setting of Custom Machine Operation Panel" for details.)

(3) Exporting the custom machine operation panel with NC Trainer Builder
(Refer to "5.1.10 Exporting the Custom Machine Operation Panel" for details.)

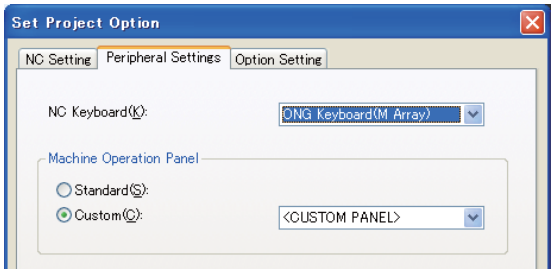
Start NC Trainer plus.
(Refer to "4.1 Starting NC Trainer" for details.)

(4) Importing the custom machine operation panel with NC Trainer plus
(Refer to "5.1.11 Adding the Custom Machine Operation Panel to NC Peripheral Device Setting" for details.)

(5) Selecting the custom machine operation panel as a machine operation panel of a project with NC Trainer plus
(Refer to "4.3.1 Creating a New Project" for details.)

< Custom machine operation panel of the project which is imported to NC Trainer / NC Trainer plus >

- The custom machine operation panel which is attached to the imported project can be used only for the project. It cannot be selected for other projects.
- The custom machine operation panel which is attached to the imported project is displayed on the Set Project Option with being enclosed in < > such as "<Custom machine operation panel name>".

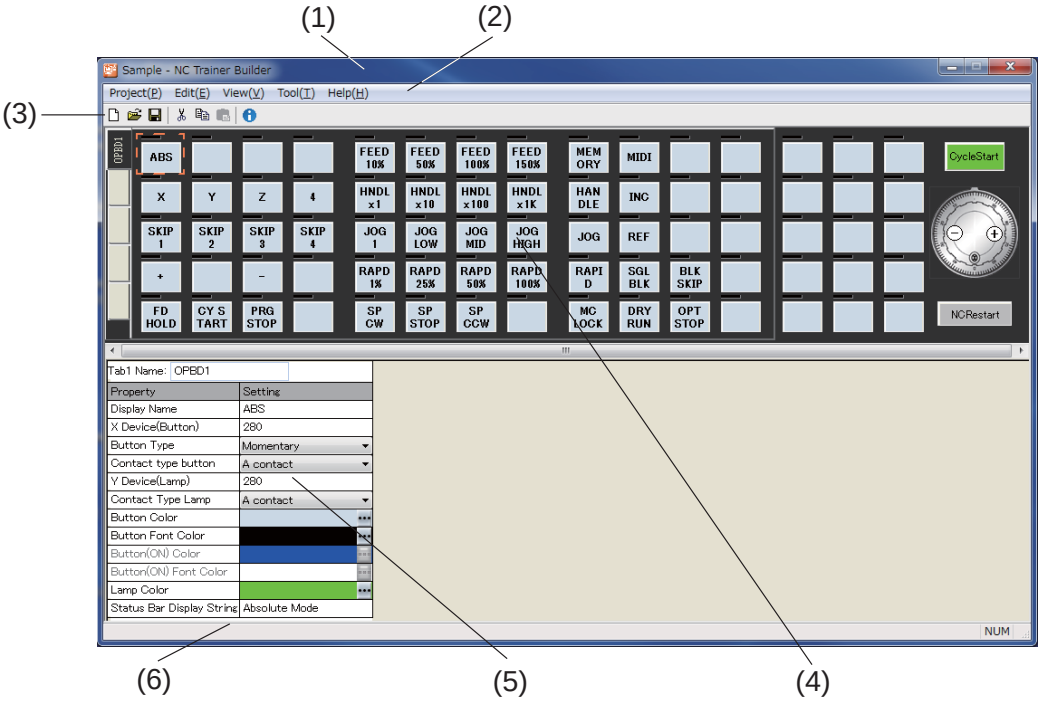


- The setting of the custom machine operation panel of the imported project cannot be changed with NC Trainer (The setting item for Machine Operation Panel on the Set Project Option dialog box is displayed in gray).

5.1.2 NC Trainer Builder Interface

NC Trainer Builder interface is as follows.

5.1.2.1 Configuration of the Screen



	Item	Description
(1)	Title bar	The project name, application name, maximize/minimize button, close button are displayed.
(2)	Menu bar	Possible to carry out functions such as project function and edit function.
(3)	Tool bar	Possible to use frequently used functions without selecting from the menu bar.
(4)	Machine operation panel window	Machine operation panel to be set is displayed.
(5)	Property window	The window to set the buttons and lamps on the machine operation panel.
(6)	Status bar	Input information of Caps Lock key, Num Lock key, selecting menu item, and the description of tool bar icon, are displayed.

5.1.2.2 Menu List

A list of pull-down menus and the usage of each item are described below.

5.1.2.2.1[Project (P)] Menu

Project menu item

Item	Description
New Project (N)	Create a new project.
Open project (O)...	Open an existing project.
Close (C)	Close the opening project.
Save (S)	Save the setting of the opening project.
Save As (A)...	Save the opening project with a different name. (Same as project copy.)
Export (E)...	Export the custom machine operation panel for NC Trainer plus.
(Project history) (Note 1)	The projects that opened in the past are displayed.(Up to the last 4 projects) A project can be opened by selecting it from the list.
Exit (X)	Exit from the NC Trainer Builder.

(Note 1) The project path list is displayed on the menu in the actual screen.

5.1.2.2.2[Edit (E)] Menu

Edit menu item

Item	Description
Cut (T)	Save the copy of selected object for pasting and then delete it.
Copy (C)	Save the copy of selected object for pasting.
Paste (P)	Paste the object which has been saved for pasting to the selected position.

5.1.2.2.3[View (V)] Menu

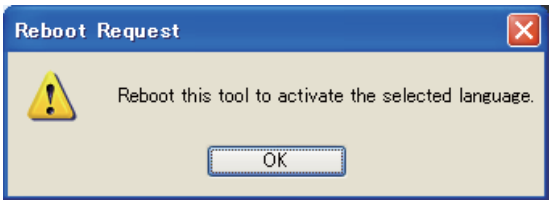
View menu item

Item		Description
Language (L)		Change the display language of the application. (The setting will be enabled after restarting the application.) It has following sub-menus.
	Japanese (J)	Display in Japanese.
	English (E)	Display in English.
	Chinese Simplified (S)	Display in Simplified Chinese.
	Chinese Traditional (T)	Display in Traditional Chinese
Tool Bar (T)		Change whether to display or hide the tool bar.
Status Bar (S)		Change whether to display or hide the status bar.

< Changing the Display Language >

(1) To change the display language of NC Trainer Builder, select [View (L)] - [Language (L)] -[Japanese (J)], [English (E)], [Chinese Simplified (S)] ,or [Chinese Traditional (T)] from the menu bar.
This operation changes the display language of menu bar, message box, dialog box, etc.

(2) When the display language is changed, Reboot Request message box will appear.
After restarting the tool, screen is displayed in the selected language.



(Note) The tool is not restarted automatically even if pressing the [OK] button.

5.1.2.2.4[Tool (T)] Menu

Tool menu item

Item	Description
Read Device Comment (R)...	Read a CSV file that the button/lamp setting is described and execute a batch setting of the button/lamp.
Write Button/Lamp's config File(W)...	Output the settings of button/lamp to CSV file.

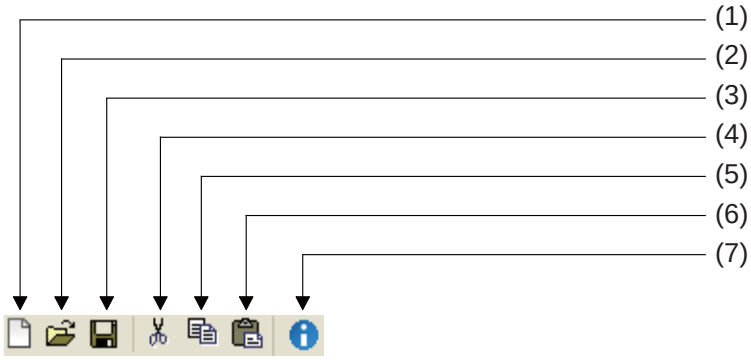
5.1.2.2.5[Help (H)] Menu

Help menu item

Item	Description
Version Information (V)	Display the version information.

5.1.2.2.6Tool Bar

The description of each icon on the tool bar is as follows.



Tool bar item

	Item	Description
(1)	New Project	Create a new project.
(2)	Open project	Open the existing project.
(3)	Save	Save the setting of the opening project.
(4)	Cut	Save the copy of selecting object for pasting and then delete it.
(5)	Copy	Save the copy of selecting object for pasting.
(6)	Paste	Paste the object which is saved for pasting to the selected position.
(7)	Version Information	Display the version information.

5.1.2.2.7 Status Bar

5.1.3 Start and Exit NC Trainer Builder

The following describes how to start NC Trainer Builder.

- For Windows 8

Execute the "NC Trainer Builder" from Windows "Start screen".

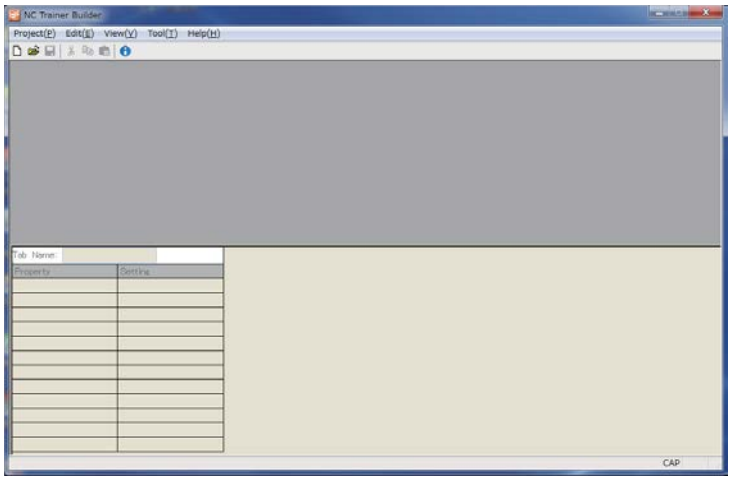
- For Windows 7/ Windows Vista

Select [All Programs] - [MELSOFT application] - [NC Trainer plus] - [NC TrainerBuilder] from the [Start] menu of Windows.

- For Windows XP

Select [Program (P)] - [MELSOFT application] - [NC Trainer plus] - [NC TrainerBuilder] from the [Start] menu of Windows.

The following main window is displayed after starting NC Trainer Builder.



To exit from NC Trainer Builder, execute any of the following procedures.

- Select [Project (P)] - [Exit (X)] from the menu bar.
- Click the button on the upper right of the main window.
- Click the icon and select "Close (C)" from the menu displayed.
- Press the [F4] key while pressing the [Alt] key.

5.1.4 Creating a Project of the Custom Machine Operation Panel

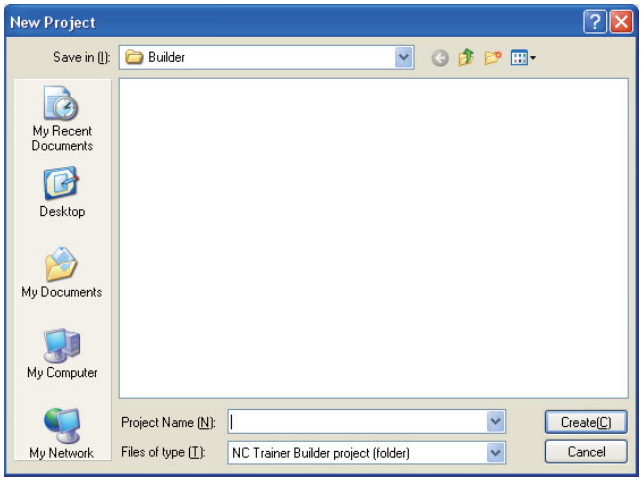
Create a project with NC Trainer Builder to create a custom machine operation panel. The information such as the setting of the custom machine operation panel or operating condition is saved in a project.
How to create a project is as follows.

(1) To create a new project, execute any of the following procedures.
- Select [Project (P)] - [New Project (N)] from the menu bar.

-Click the icon on the tool bar.

- Input Ctrl + N

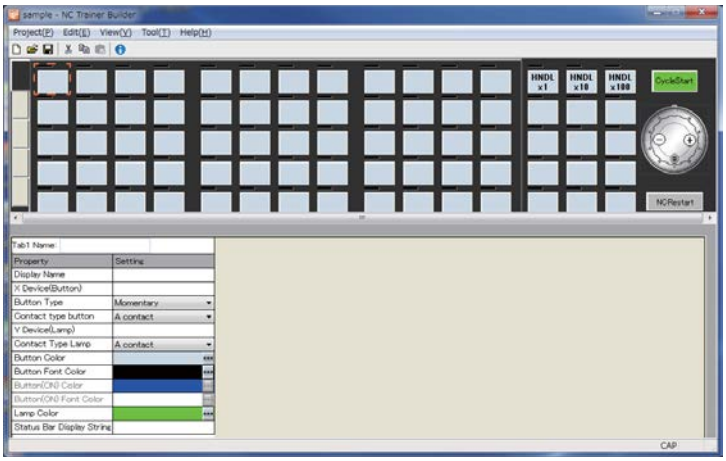
The following dialog box is displayed. Specify a project name.



(Note 1) A project name can be up to 32 one-byte characters. (Each two-byte character is equivalent to two characters.)
(Note 2) One-byte characters and two-byte characters can be used for a project name.
(Note 3) A project name is not case-sensitive.
(Note4) The following characters cannot be used for a project name.
\ / : * ? < > | " (Same as the prohibited characters for a file name)
(Note5) Blank and Period (.) cannot be used for the first or last character of a project name.
(Note6) CON, PRN, AUX, CLOCK$, NUL, COM0 to COM9 and LPT0 to LPT9 cannot be used for a project name.

(2) Press the "Create (C)" button after specifying a project name.
The folder of the same name as the project name is created under the folder to store a project, and the data files of the project are created in the folder.

(3) The following screen is displayed after creating a project. After that, a custom machine operation panel can be set.



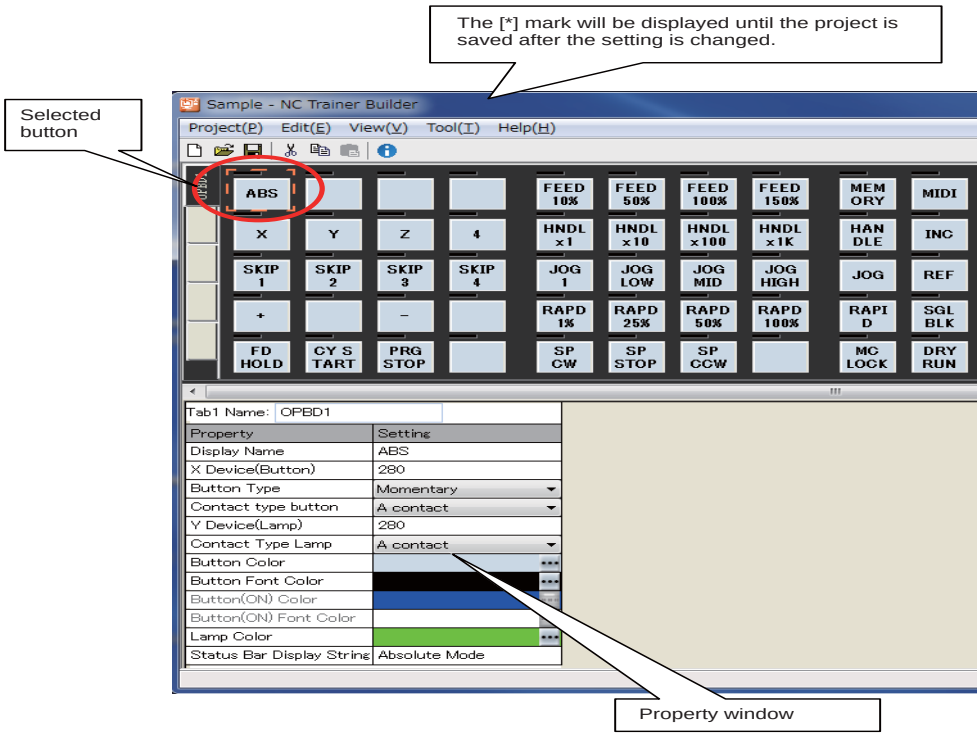
5.1.5 Setting of Custom Machine Operation Panel

(1) Setting of Button / Lamp

The setting procedure of button/lamp is as follows.

(a) Left-click the button/lamp to set on the machine operation panel window. The button/lamp is selected and enclosed in a selection marker (The selection of a button/lamp is also executed with TAB key and Shift+TAB key).

(b) The setting of selected button/lamp is displayed on the property window. Change the setting on the property window.



The property (setting item) of the button/lamp

Property name	Description
Display Name	- Characters to be displayed on the button - Up to 8 one-byte characters.(Each two-byte character is equivalent to two one-byte characters.) - When the character string longer than the button width (4 one-byte characters), a line feed is automatically inserted. - The maximum number of lines which can be displayed on the button is up to two. - To insert a line feed at arbitrary position, input \n (\n is not counted as the number of characters). - To display \, input \\ (\\ is counted as a one-byte character). - When inputting \x (x is a character other than n or \), \ is not displayed and only x is displayed (\x is counted as a one-byte character).
X Device (Button)	- Designate the number of the X device (0 to 2FF in hexadecimal) to be allocated to the button. - When the setting value is blank, no allocation. - X device can be input when both display name and X device are specified. (When either display name or X device is blank, X device will be 0 even if the button is pressed.)
Button Type	- Select from Momentary or Alternate. Momentary: Turns ON only while pressing the button. Alternate: ON and OFF is switched every time the button is pressed.
Contact type button	- Contact type button A contact: X device will be 1 while the button is ON. B contact: X device will be 1 while the button is OFF.
Y Device (Lamp)	- Designate the number of the Y device (0 to 2FF in hexadecimal) to be allocated to the lamp. - When the setting value is blank, no allocation. - Y device can be output when both display name and Y device are specified. (When either display name or Y device is blank, the lamp will not light even if the Y device is 1.)

Contact Type Lamp	- Select from A contact or B contact. A contact: It will light when Y device is 1 and will not light when Y device is 0. B contact: It will light when Y device is 0 and will not light when Y device is 1.
Button Color	Specifies the button color. Custom color can be selected.
Button Font Color	Specify the color of font on the button. Custom color can be specified.
Button (ON) Color	- Specify the color when alternate button is ON. Custom color can be specified. - It can be specified when "Button Type" is alternate. - When alternate button is OFF, the color can be specified by "Button Color".
Button Font (ON) Color	- Specify the font color when alternate button is ON. Custom color can be specified. - It can be specified when "Button Type" is alternate. - When alternate button is OFF, the font color can be specified by "Button Font Color".
Lamp Color	Specify the color when the lamp is ON.
Status Bar Display String	- Specify the description of the button that is displayed on the status bar of NC Trainer/NC Trainer plus.(displays when the cursor is on the button) - Up to 100 one-byte characters. (each two-byte character is equivalent to two one-byte characters.)

(Note 1) The same X device can be allocated to multiple buttons. X device will be 1 if any one of the buttons is in the state of setting X device to 1.

(Note 2) The same Y device can be allocated to multiple lamps. The statuses of all these lamps are changed according to the value of Y device.

The characters displayed on a button are arranged by centering vertically and horizontally.

The characters to be set (Example)	Display on the button
X	X
MDI	MDI
FEED50%	FEED 50%
FD\nHOLD	FD HOLD
A\\B	A¥B
A\3B	A3B

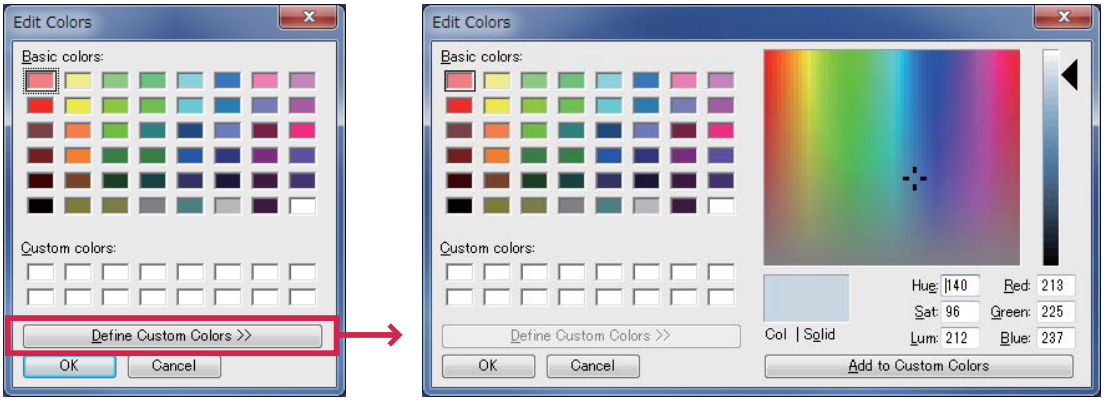
When the button type is Alternate, the graphic for the button ON/OFF which is displayed on NC Trainer / NC Trainer plus is as follows. (When the property of each button color is set to default.)

- When the button is ON : 

- When the button is OFF : 

(Initial state at starting a project)

To change the button/lamp color, select the "Edit colors" dialog box displayed by button of each property. By clicking the "Define Custom Colors" button on top of the dailog box, custom colors can be selected.

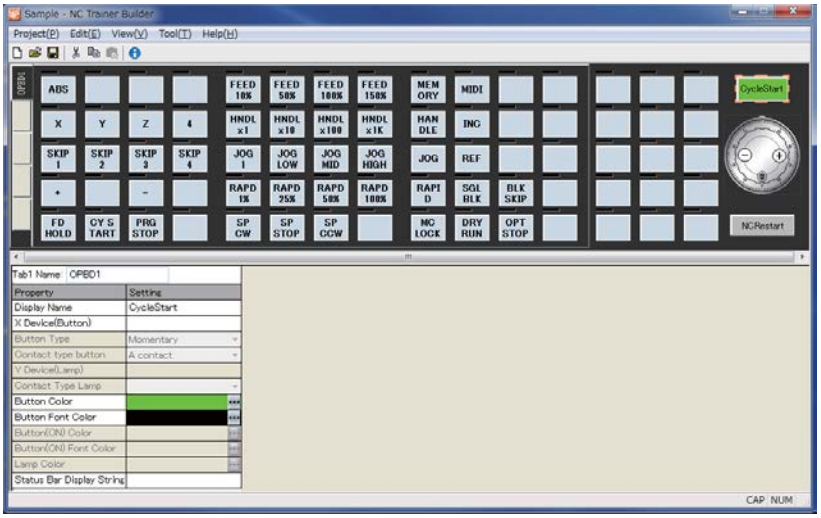


The default settings of button/lamp color are as follows.

Property name	Default settings (R, G, B)
Button color	(213, 225, 237)
Button character color	(0, 0, 0)
Button color (ON)	(0, 0, 255)
Button character color (ON)	(255, 255, 255)
Lamp color	(0, 255, 0)

(2) Setting of CycleStart button

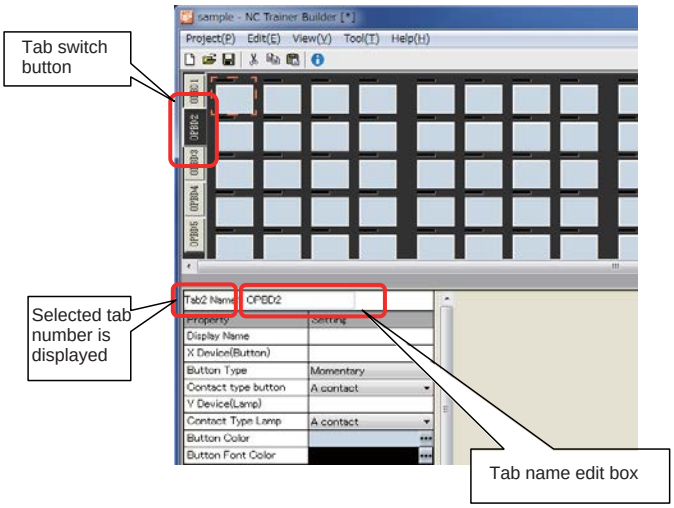
The CycleStart button on the machine operation panel can also be set. Select the CycleStart button on the machine operation panel and change the setting with property window.



The property (setting item) of the CycleStart

Property name	Description
Display Name	- Up to 10 one-byte characters of alphanumeric. (The default setting is CycleStart.)
X Device (Button)	- Designate the number of the X device (0 to 2FF in hexadecimal) to be allocated to the button. - When the setting value is blank, no allocation. - X device can be input when both display name and X device are specified. (When either display name or X device is blank, X device will be 0 even the button is pressed.)
Button Type	- Cannot be set (displayed in gray).Always set to Momentary.
Contact type button	- Cannot be set (displayed in gray).Always set to A contact.
Y Device (Lamp)	- Cannot be set (displayed in gray).
Contact Type Lamp	- Cannot be set (displayed in gray).
Button Color	- Specify the button color. Custom color can be selected. - The default color is (R, G, B) = (0, 255, 0)
Button Font Color	- Specify the color of character on the button. Custom color can be selected. - The default color is (R, G, B) = (0, 0, 0)
Button (ON) Color	- Can not be set (displayed in gray)
Button (On) Font Color	- Can not be set (displayed in gray9)
Lamp color	- Can not be set (displayed in gray9)
Status Bar Display String	- Specify the description of the button that is displayed on the status bar of NC Trainer/NC Trainer plus.(displays when the cursor is on the button) - Up to 100 one-byte characters. (each two-byte character is equivalent to two one-byte characters.)

(3) Switching of the tab and setting of the tab name
Click the tab switch button to switch the tab which is displayed on the machine operation panel window.



The tab name displayed on the tab switch button is set on the tab name edit box in the property window.
The tab name is up to 5 one-byte characters. (Each two-byte character is equivalent to two characters.)

(Note 1) When there is no button/lamp that a device is allocated in a tab, the tab and tab switch button is not displayed on NC Trainer / NC Trainer plus.
(Note 2) When there is no button/lamp that a device is allocated in all the tab, only tab 1 is displayed on NC Trainer / NC Trainer plus.

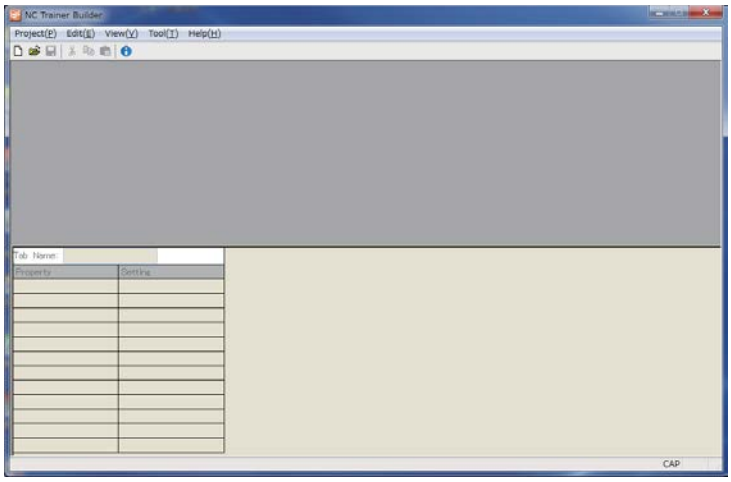
5.1.6 Saving the Custom Machine Operation Panel

Execute one of the following procedures to save the setting of the custom machine operation panel.

- Select [Project (P)] - [Save (S)] from the menu bar.
- Click  icon on the tool bar.
- Input Ctrl + S.

5.1.7 Closing the Project

Select [Project (P)] - [Close (C)] from the menu bar to close the opening project.
The following screen will appear after closing a project.

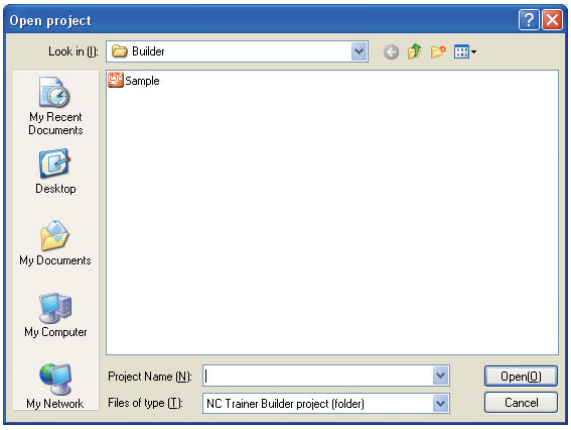


5.1.8 Opening the Existing Project

(1) Execute one of the following procedures to open an existing project.

- Select [Project (P)] - [Open project (O)] from the menu bar.
- Click  icon on the tool bar.
- Input Ctrl + O.

The following dialog box is displayed.

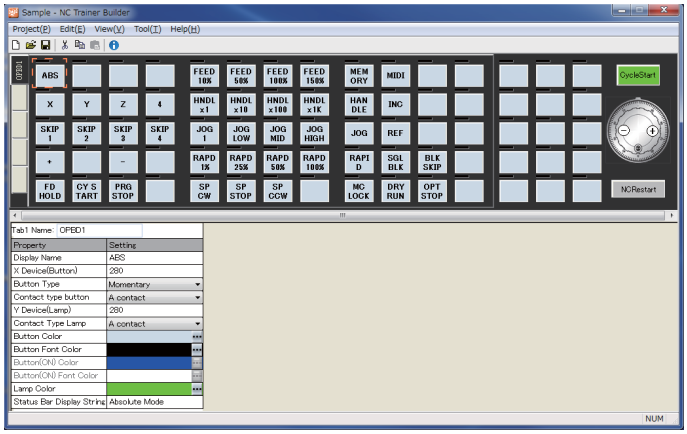


(Note) The folder for the project of NC Trainer Builder is displayed as  icon.

(2) Press the "Open project (O) " button after designating the project to be opened.

(Note) Refer to the section "5.1.4 Creating a Project of the Custom Machine Operation Panel" for available project name.

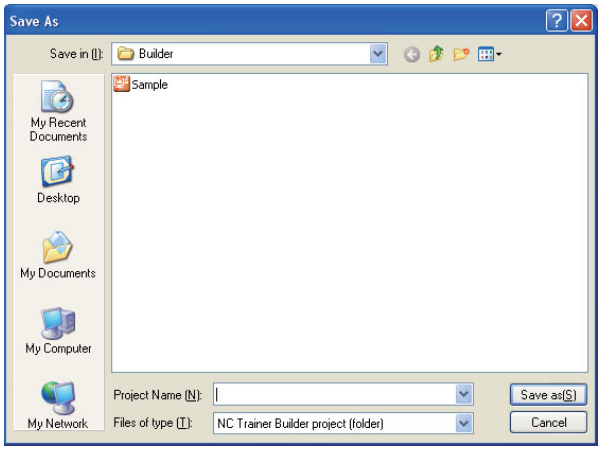
The following screen is displayed and the custom machine operation panel can be set.



5.1.9 Saving the Setting of the Custom Machine Operation Panel As a Different Name

The procedure to save the setting of the custom machine operation panel as a different project name is as follows.

(1) Select [Project (P)] - [Save As (A)] from the menu bar.
The following dialog box is displayed.



(Note) The folder for the project of NC Trainer Builder is displayed as  icon.

(2) Press the "Save (S) " button after inputting the new project name.

(Note) Refer to the section "5.1.4 Creating a Project of the Custom Machine Operation Panel" for available project name.

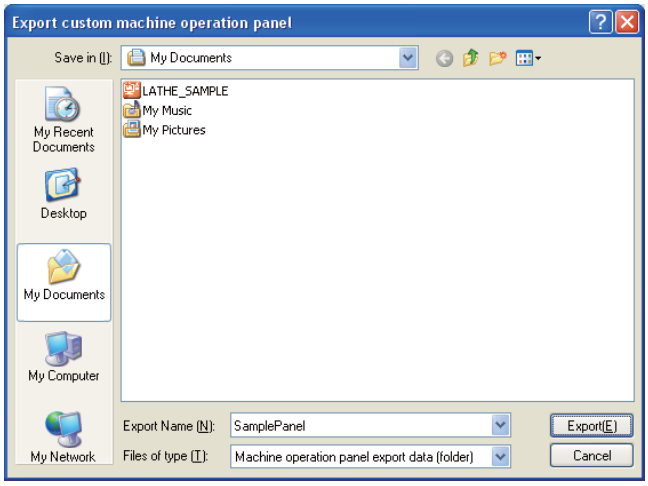
(3) The current project is closed after saving and the project which is named and saved is opened.

(Note) Be aware that the setting change is not saved for the project which has been opened (When executing "Save As" without saving after changing the setting, the setting change is not saved for the opening project but for the project which is named and saved).

5.1.10 Exporting the Custom Machine Operation Panel

Export the custom machine operation panel from NC Trainer Builder and import it with NC Trainer plus to use the created custom machine operation panel on NC Trainer plus.
Below is an explanation of the procedure for exporting the custom machine operation panel.

(1) Open the project of the machine operation panel to be exported.
(2) Select [Project (P)] - [Export (E)] from the menu bar.
The following dialog box is displayed.

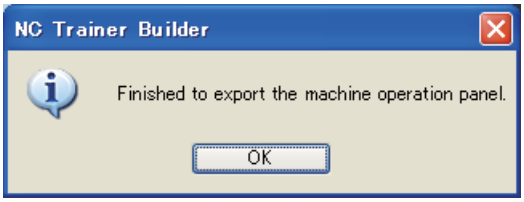


(Note 1) The folder for the export data of the machine operation panel is displayed as  icon.
(Note 2) The default setting for the export name is the project name.

(3) Press the "Export (E)" button after inputting the folder to create the export data and export name.
(Note) Available export name is the same as a project name of NC Trainer Builder. Refer to the section "5.1.4 Creating a Project of the Custom Machine Operation Panel" for details.

The folder of the same name as the export name is created under the folder to create the export data, and data files are created in the folder.

(4) The following message box will appear when the export is completed. Press the "OK" button.

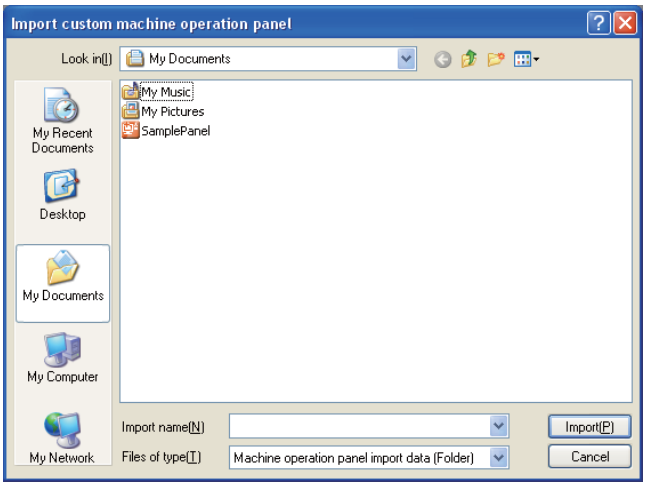


When providing the export data to other computers, provide the folder created by exporting in whole.

5.1.11 Adding the Custom Machine Operation Panel to NC Peripheral Device Setting

Below is an explanation of the procedure to import the custom machine operation panel which is exported from NC Trainer Builder to NC Trainer plus. This adds the custom machine operation panel which can be selected by NC peripheral devices.

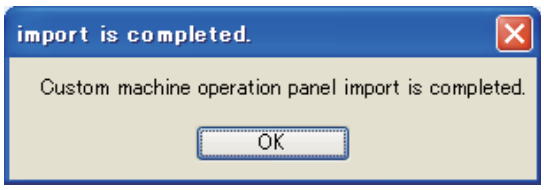
(1) Start NC Trainer plus.
(2) Select [Project (P)] - [Import (I)] - [Custom Machine Operation Panel (C)] from the menu bar.
The following dialog box is displayed.



(Note) The import data is provided as a folder which contains various data files. The import data folder is displayed as  icon in the dialog box.

(3) Press the "Import (P)" button after inputting the folder name for import data on "Import name (N) :".
The custom machine operation panel to be imported is added to NC Trainer plus with the specified name in "Import name (N):".
(Note 1) Available import name is the same as a project name of NC Trainer Builder. Refer to the section "5.1.4 Creating a Project of the Custom Machine Operation Panel" for details.
(Note 2) Even when the NC is running, the custom machine operation panel is imported without stopping the NC.

(4) The completion message box will appear when the import is completed. Press the "OK" button.



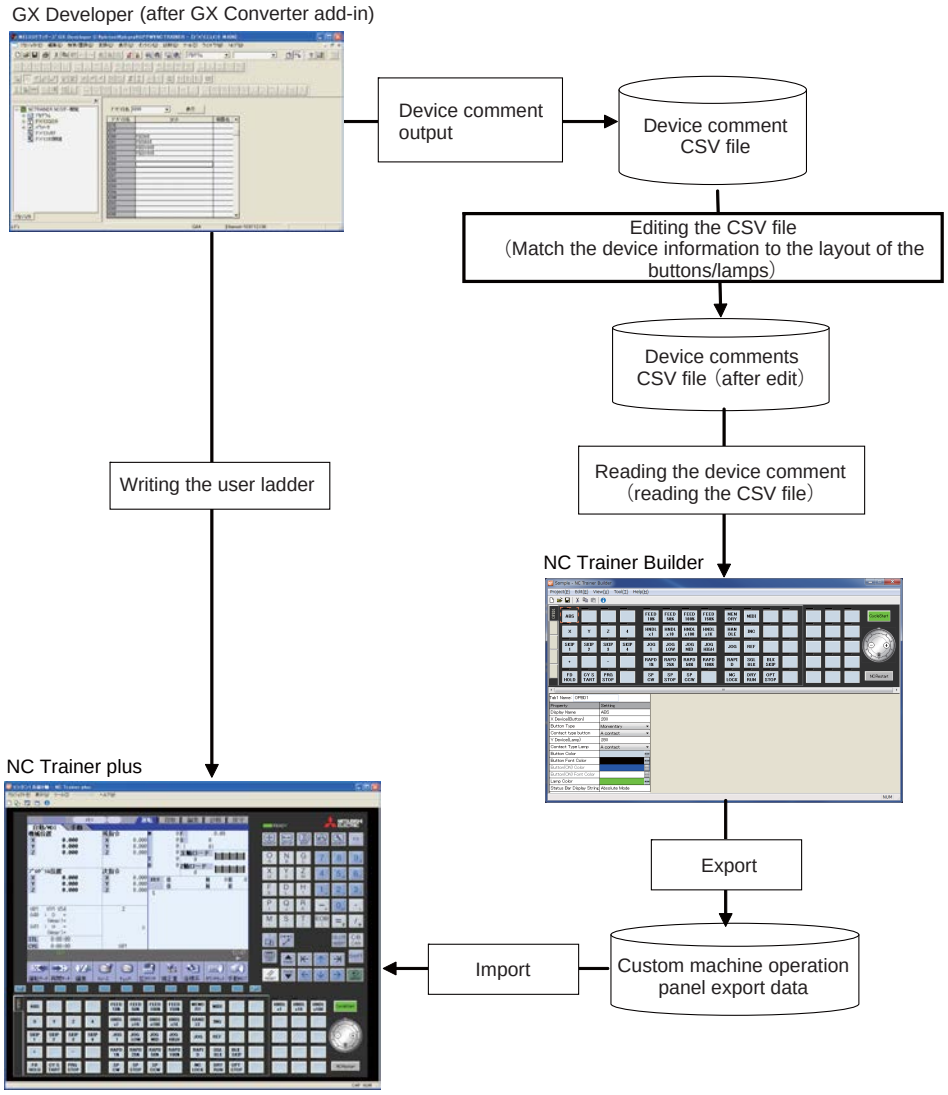
5.1.12 Reading Device Comments

(1) Outline

When GX Converter is installed on the GX Developer as an add-in, device comments can be output as a CSV file. The following button/lamp setting can be executed in batches by reading the CSV file with NC Trainer Builder.

- Devices allocated to buttons/lamps
- Characters displayed on buttons

This function enables to cut the time and effort to make the custom machine operation panel matching to the user PLC.



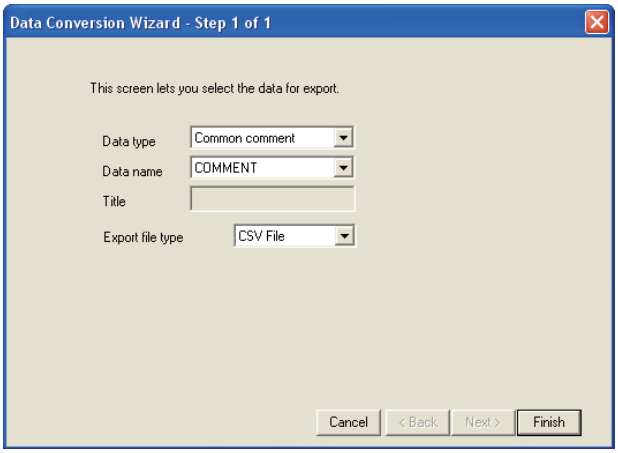
(2) The procedure to read device comments

Below is an explanation of the procedure to set the buttons/lamps in batches by reading the device comments.
Note that the batch setting can only be carried out for the buttons/lamps on the displayed tab.

[1] Start GX Developer (after GX Converter add-in) and open GX Developer project.

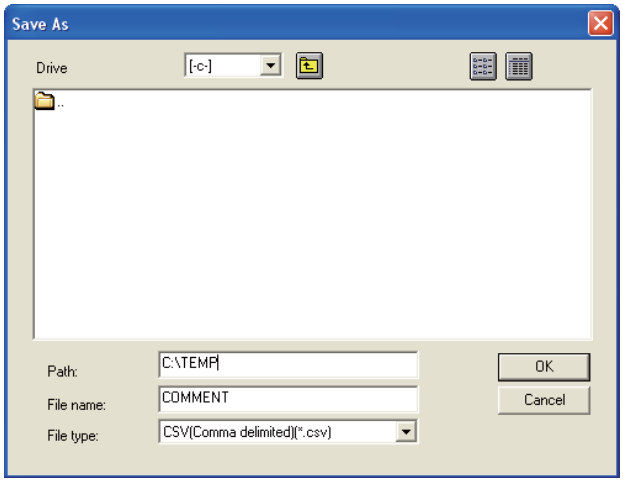
[2] Select [Project] -[Import file] - [Import from TEXT, CSV format file] from the menu bar.

[3] The following dialog box is displayed.



Select "Common comment" or "Program comment" for "Data type".
Select device comment to convert for "Data name".
Select CSV file for "Export file type".
Press the "Finish" button after the selections.

[4] The following dialog box is displayed.



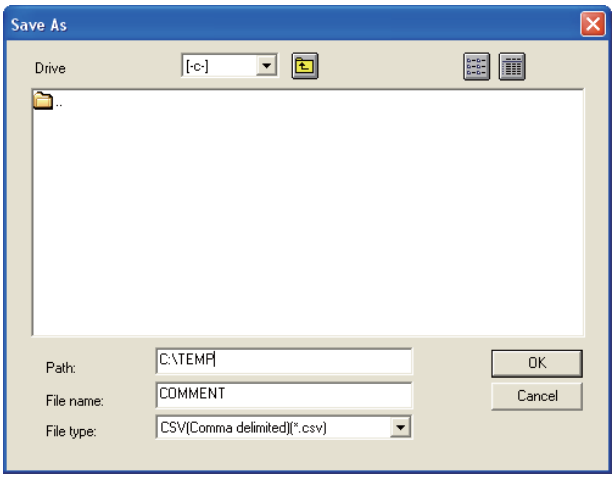
Press the "Save" button after designating an output file name of the CSV file of device.
(Select CSV (Comma Separated Value) as a file type.)

[5] Edit the contents of the CSV file to match to the layout of the buttons/lamps. Refer to the section "(c) CSV file format" for details.

[6] Start NC Trainer Builder, and open a project.

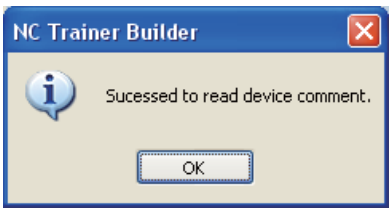
[7] Display the tab to set the buttons/lamps in batches.

[8] Select [Tool (T)] - [Read Device Comment (R)] from the menu bar. The following dialog box is displayed. Press the "Open (O)" button after selecting the CSV file of the device comments.



(Note) The setting of the buttons/lamps on the displayed tab is overwritten with the setting of the CSV file.

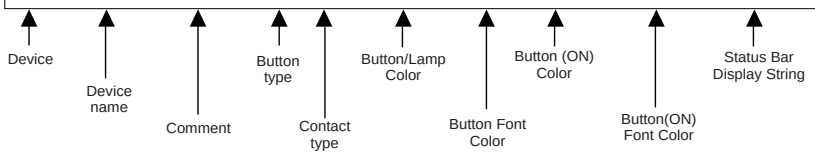
[9] The completion message box will appear when the batch setting of the buttons/lamps is completed. Press the "OK" button.



(3) CSV file format

The CSV file format which is read with "Read Device Comment" function is as follows.

```
X281, BTN01, FEED50%,  MON, A, 213:225:237, 0:0:0,         ,                , Set feed 50%
X282, BTN01, FEED100%, ALT, B, 213:255:237, 0:0:0, 0:0:255, 255:255:255, Set feed 100%
Y281, LED01, FEED50%,       , A,       0:255:0,       ,         ,                , Set feed 50%
Y282, LED02, FEED100%,      , B,       0:255:0,       ,         ,                , Set feed 100%
```



- Each column (field) is separated with a comma (,).
- Below is an explanation of each column.

Field	Explanation
Device	- Designate the device allocated on a button/lamp with one-byte character. - When designating any device other than X0 to X2FF and Y0 to Y2FF, the line will not be be regarded not as data but as a disabled line. - When only a comma is specified, position of button/lamp to set will be skipped. (Skip is to be described later.) - If the device is specified and the comment is blank, the button/lamp will not function.
Device name	-Always enter a comma although the device name is not used.
Comment	- Specify the display name of the button. - The display name will be set from top to the 8 one-byte characters.(each two-byte character is equivalent to two one-byte characters) - Input ¥n to start a new line on the character string of the button . (¥n does not count as character limit) - To display \ on the button, input \\. (\\ is count as an one-byte character) - \x in the comment is displayed as x only on the button. (\x is count as an one-byte character) - The one/two-byte space in front/back of the comment will not display. (The space in front/back of the comment does not count as one-byte character) - The display name will be blank if only comma is set. - Normally, X device comment is set to device name.(A case when Y device comment is displayed is to be described later.)
Button type	- Select the button type. MOM : momentary ALT : alternate (Other than those above is set to momentary) - This line is not used when the device is Y device, however, input a comma. - If it is only a comma, it is set as momentary.
Contact type	- Select the setting of the button/lamp. A : A contact B : B contact - For only comma, it is set to A contact.
Button/Lamp Color	- Specify the color of button/lamp. - To specify by RGB format, separate the each value (0 to 255) of R, G, B by a colon " ; " as follows "213:255:237". - If it is only by comma, it becomes 213:225:237(button)/0:255:0(lamp).
Button Font Color	- Specify the color displays on button. The specifying process is same as "Button/Lamp Color". - This line is not used if the device is Y device, however, input comma. It becomes 0:0:0 only by a comma.
Button (ON) Color	Specify the color when alternate button is ON. The specifying process is same as "Button/lamp color". - This line is not used if the device is Y device or when button type is alternate, however, input comma. It becomes 0:0:255 only by comma.
Button (ON) Font Color	Specify the color on button when alternate button is ON. The specifying process is same as "Button/lamp color". - This line is not used if the device is Y device or when button type is alternate, however, input comma. It becomes 255:255:255 only by comma.

Status Bar Display String	- Specify the character strings displayed on the status bar when the cursor is on the button. - Up to 100 one-byte characters. (each two-byte character is equivalent to two one-byte characters.) - The one/two-byte space in front/back of the comment will not display. (the space in front/back of the comment does not count as one-byte character) - Normally Status Bar Display String of X device is used. (When the Status Bar Display String of Y device is used is mentioned later) - This line can be omitted.

- When including a comma (,) for Device name, Comment, Status Bar Display String enclose before and after the characters with double quotation (").
- When including a double quotation (") for Device name, Comment, Status Bar Display String, enclose before and after the characters with double quotation ("). And then, enter a double quotation twice in a row at the position to display the double quotation.

The characters displayed on the button	Description in the CSV file
AB	AB
A,B	"A,B"
"AB"	"""AB"""
"AB"C"	"""AB""C"""

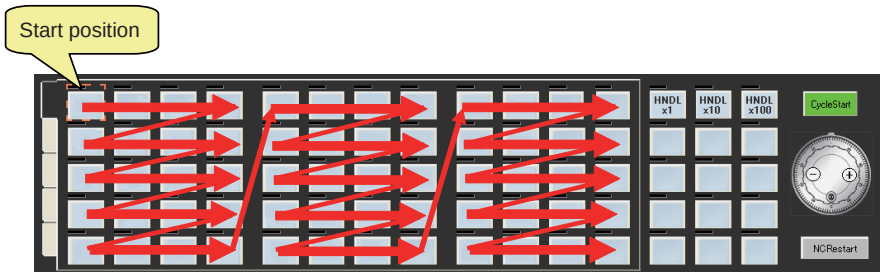
- If (\") is included in the comment, (\) of (\") will be set to the property of Display name. ((\) is treated as a double quotation to enclose the character string.) The end of Display name property becomes (\) and (\) will not be displayed on the button.
- Use UNICODE for CSCV file character code to use characters other than one-byte characters of alphanumeric, symbol, or space for Device name, Comment, and Status Bar Display String.
  (SJIS can be used only for Japanese. The character code of CSV file output by GX-Developer is SJIS.)

The CSV file which is output from GX Developer has no field for after Button type as follows. Add fields for after Button type if needed.

```
X280,   BTN00,   FEED0%
X281,   BTN01,   FEED50%
X282,   BTN02,   FEED100%
X283,   BTN03,   FEED150%
Y280,   LED00,   FEED0%
Y281,   LED01,   FEED50%
Y282,   LED02,   FEED100%
Y283,   LED03,   FEED150%
```

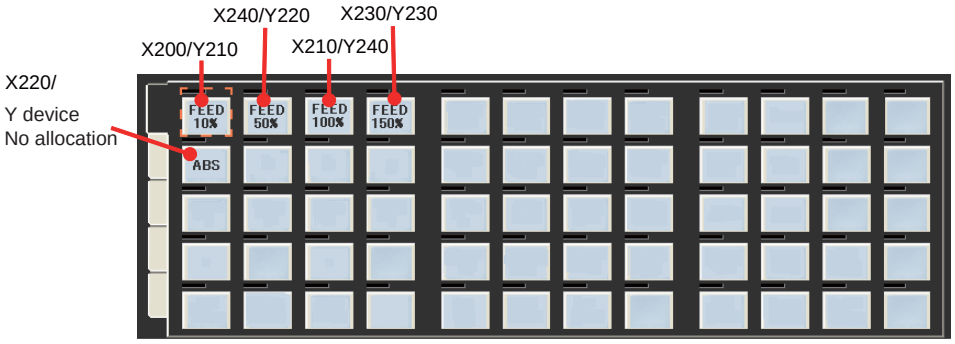
Setting of buttons/lamps on a tab is executed as follows.

- The X/Y devices are allocated to buttons/lamps according to the order in the CSV file.
- The allocation order of buttons on the tab is shown as below. The allocation order of the lamp on the tab is the same as of buttons.(Note that a device cannot be allocated on undisplayed tab and the buttons/lamps in constantly-displayed area.)



To change the position of buttons/lamps to allocate devices, edit the CSV file and change the order of the devices.
As an example, the allocation of the device to the buttons/lamps by the following CSV file is shown below.

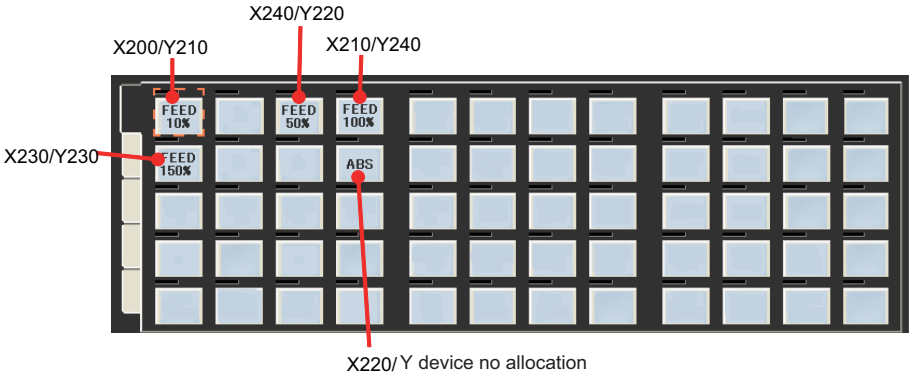
```
X200,, FEED10%
X240,, FEED50%
X210,, FEED100%
X230,, FEED150%
Y210,, FEED10%
Y220,, FEED50%
Y240,, FEED100%
Y230,, FEED150%
X220,, ABS
```



- A line consisting of a line feed character is not considered as a data. (invalid line)
- The position of button/lamp to be set can be skipped by inserting a line with only a comma in the CSV file.
  - When a line with only a comma is inserted above the line of X device, the position of the button to be set is skipped.
  - When a line with only a comma is inserted above the line of Y device, the position of the lamp to be set is skipped.

As an example, the allocation of devices to the buttons/lamps by the following CSV file is shown below.

```
X200,, FEED0%
,                    ← Skip the position of the button
X240,, FEED50%
X210,, FEED100%
X230,, FEED150%
Y210,, FEED10%
,                    ← Skip the position of the lamp
Y220,, FEED50%
Y240,, FEED100%
                     ← Invalid line
Y230,, FEED150%
,                    ← Skip the position of the button
,                    ← Skip the position of the button
X220,, ABS
```



Precautions: To blank the display name but to specify the device, put a comma (,) after the comment line.
If there is no comma after the comment line, that line will be invalid.

```
X200,, FEED0%
X240,,,          ← 240 will be set to X device and the display name will be set to blank.
X210,,           ← This line will be invalid.
X230,, FEED150%
```

- The display name of the button will be as follows depending on the allocation state of X/Y device.

Button \ Lamp		Y device allocation	
		Allocated	**Not allocated**
X device allocation	**Allocated**	X device comment	X device comment
	Not allocated	Y device comment	None

- The Status Bar Display String will be as follows depending on the allocation state of X/Y device.

Button \ Lamp		Y device allocation	
		Allocated	**Not allocated**
X device allocation	**Allocated**	Status Bar Display String of Y device	Status Bar Display String of X device
	Not allocated	Status Bar Display String of Y device	None

- The button/lamp on a tab which is not set by CSV file is set as follows.(The contents which are set before execution of "Read Device Comment" are overwritten.)

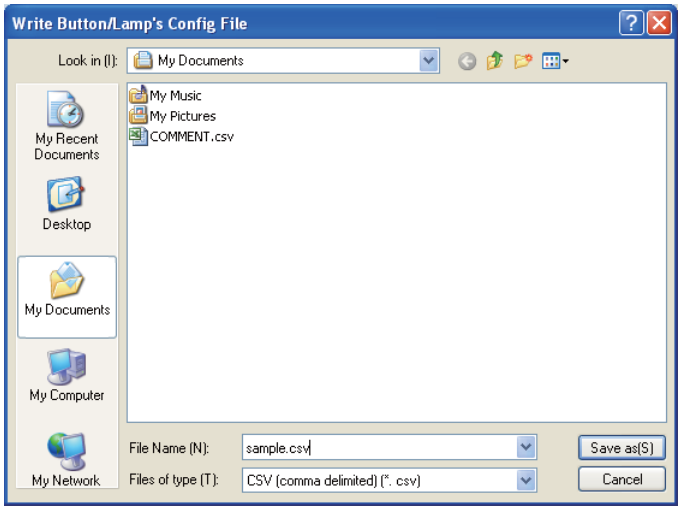
Setting item	Setting value
Display Name	(blank))
X Device (Button)	No allocation
Button Type	Momentary
Contact type button	A contact
Y Device (Lamp)	No allocation
Contact Type Lamp	A contact
Button Color	(R,G,B)=(213, 225, 237)
Button Font Color	(R,G,B)=(0, 0, 0)
Button (OM) color	(R,G,B)=(0, 0, 255)
Button (ON) Font color	(R,G,B)=(255, 255, 255)
Lamp Color	(R,G,B)=(0, 255, 0)
Status Bar Display String	(blank)

- When it is set to the last button/lamp on the tab, all the record on CSV file after it will be ignored.

5.1.13 Exporting the File of Button/Lamp Setting

Write the settings of button/lamp of custom machine operation panel on displaying tab to CSV file.
(The settings of button/lamp that are not on the tab does not export to CSV file)

(1) Start th NC Trainer Builder and open the project.
(2) Change the settings of button/lamp to the tab that exports CSV file.
(3) Execute [Tool (T)] - [Write Button/Lamp"s config File(W)...] on menu bar. The following dialog box displays. Input the exporting file name and click [Save (S)] button.



(4) When the writing of CSV file is finished, the completion message box will appear. Click the "OK" button.

- Refer to "(3) CSV file format " of "5.1.12 Reading Device Comments" for CSV file format.
- The character code of exporting CSV file is an UNICODE.

5.2 Creating User PLC (Ladder) and Checking the Operation

With NC Trainer plus, user PLCs can be created and the operation can be checked.
Note that the execution timing of ladder of NC Trainer plus is different from that of actual NC. Therefore NC Trainer plus cannot check the operation completely. The operation of user PLCs created with NC Trainer plus should be checked finally on actual NC.

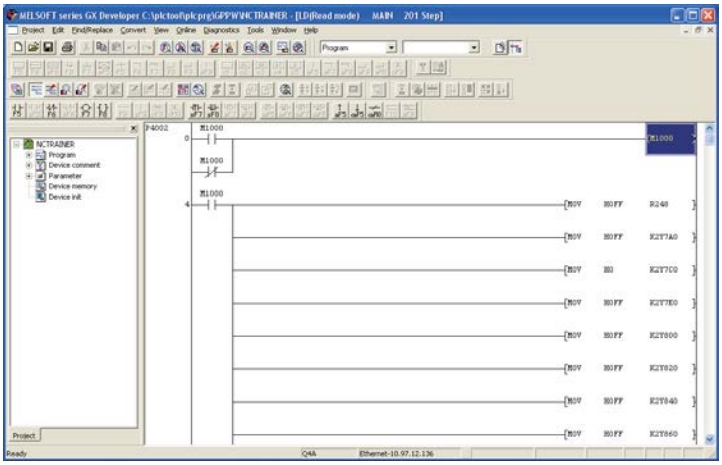
There are following two methods to develop the user PLC with NC Trainer plus.

(1) Using GX Developer
With NC Trainer plus, use MITSUBISHI Integrated FA Software MELSOFT Series GX Developer that is a PLC development tool of MITSUBISHI Programmable Controllers MELSEC Series. GX Developer is a Windows application and sold separately from NC Trainer plus.
Refer to the section "5.2.1 User PLC Development Method with GX Developer" for details.

(2) Using PLC onboard
MITSUBISHI CNC M700V/M70V/E70 Series have a PLC onboard as a built-in PLC edit function. PLC onboard (built-in PLC editing function) can also be used on NC Trainer plus.
Refer to the section "5.2.2 User PLC Development Method with PLC Onboard" for details.

5.2.1 User PLC Development Method with GX Developer

(1) Outline of GX Developer
GX Developer is a PLC development tool of MITSUBISHI Programmable Controllers MELSEC Series. A user PLC for MITSUBISHI CNC Series can be developed by the same operation as MELSEC Series.



To develop a user PLC with NC Trainer plus and GX Developer, use GX Developer Version8 (type name: SW8D5C-GPPW). Refer to the operation manual attached to GX Developer for details.

(2) Development method
Refer to the following manual about the user PLC development method for MITSUBISHI CNC with GX Developer.

MITSUBISHI CNC M700V/M70V/E70 Series PLC Programming Manual (IB-1500918 or later)

(3) Connection method

For NC Trainer plus and GX Developer, execute both software applications in the same computer and connect them via a virtual network.

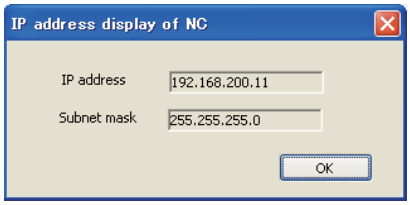
Below is an explanation of the connection method for NC Trainer plus and GX Developer.

[1] Confirm that the IP address setting of the virtual network driver is finished on NC Trainer plus. (Refer to the section "2.3 Network Setting for Connecting with MELSOFT Peripheral Tool (GX-Developer)".)

[2] Start NC Trainer plus.

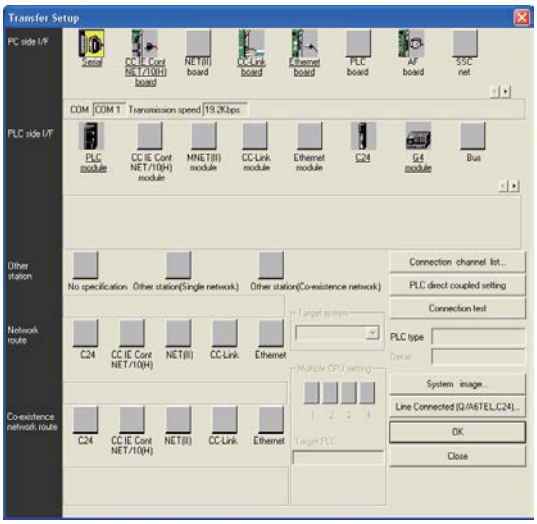
[3] Select a project on NC Trainer plus and start to execute the NC.

[4] Select [Tool (T)] - [IP address display of NC(I)] from the menu bar on NC Trainer plus. The following dialog box is displayed and then IP address of NC is displayed. Record the IP address of NC and press the "OK" button.

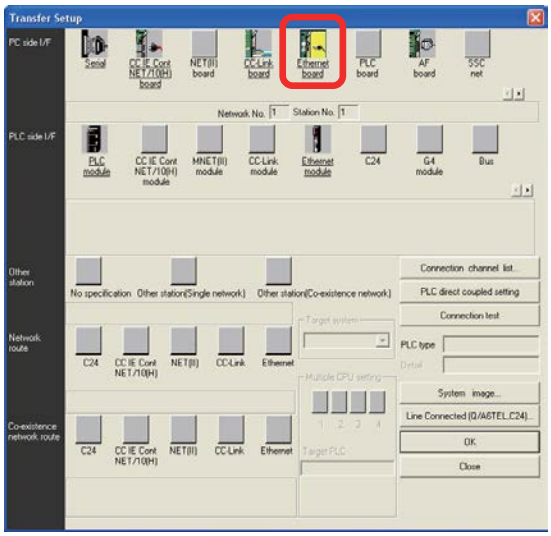


[5] Start GX Developer and open a project.

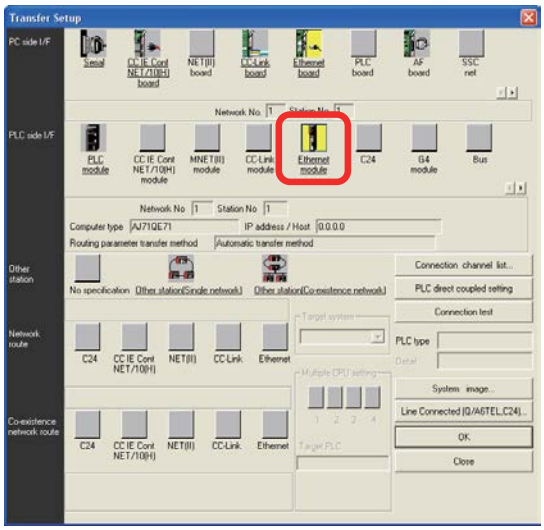
[6] Select [Online] - [Transfer Setup] from the menu bar on GX Developer. Connection setup dialog is displayed.



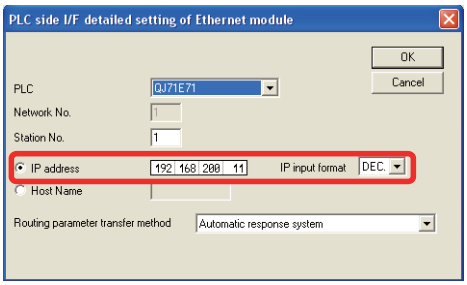
[7] Click [Ethernet board] from PC side I/F.



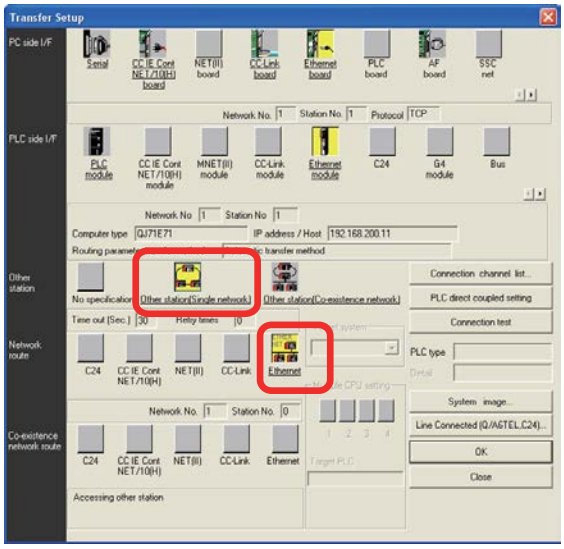
[8] Double-click [Ethernet module] from PLC side I/F.



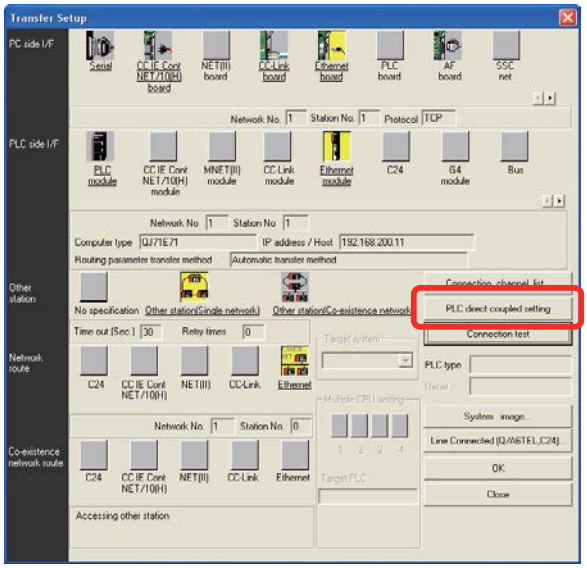
[9] PC side I/F detailed setting of Ethernet module dialog is displayed. Select [IP address], set the IP address recorded on step [4] and press the [OK] button



[10] On the Connection setup dialog, click [Other station (same network)] from Other station and [Ethernet] from Network route.



[11] On the Connection setup dialog of GX Developer, click the [Connection test] button.



When the setting is correct, the message box for connection success will appear.

[12] Click the [OK] button on Connection setup dialog on GX Developer.

(4) Precautions

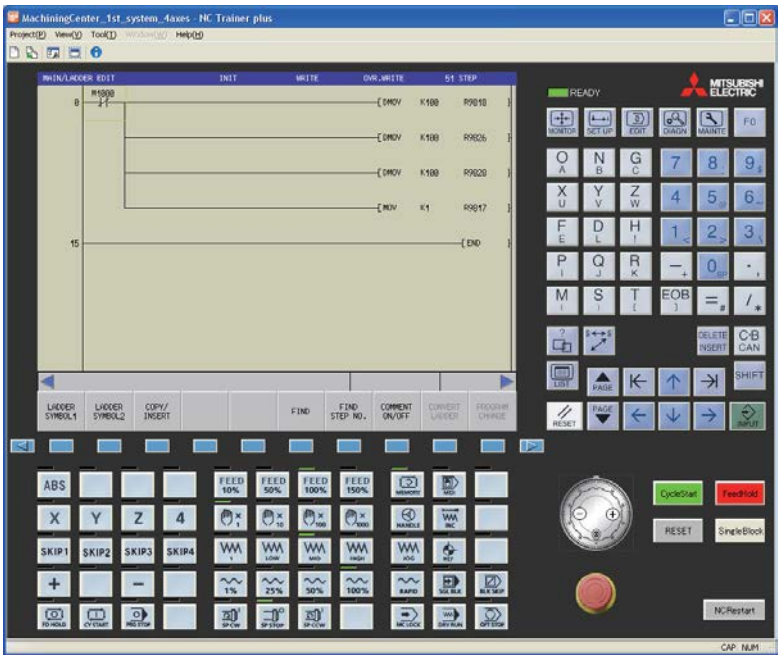
Below are the precautions for the user PLC development method with NC Trainer plus and GX Developer.

- NC Trainer plus cannot be connected with GX Developer in a different computer.
- Do not use the PLC onboard on NC Trainer plus and on GX Developer at a time. Some functions (updating ladder monitor, etc.) cannot be operated correctly if they are used together.

5.2.2 User PLC Development Method with PLC Onboard

(1) Outline of PLC onboard

The PLC onboard on NC Trainer plus can develop user PLCs for MITSUBISHI CNC as with the PLC onboard of MITSUBISHI CNC M700V/M70V/E70 Series, such as creating, editing, saving, reading and monitoring a user PLC.



(2) Development method

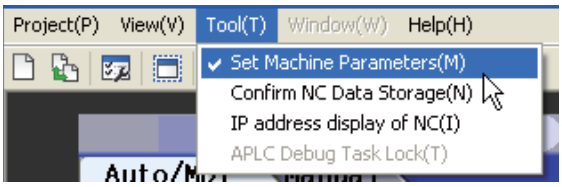
PLC onboard on NC Trainer plus is the same as PLC onboard function of M700VS. Refer to the explanation of PLC onboard function for M700VS in the following manual for details of the user PLC development method with PLC onboard.

MITSUBISHI CNC M700V/M70V/E70 Series PLC Programming Manual (IB-1500918 or later)

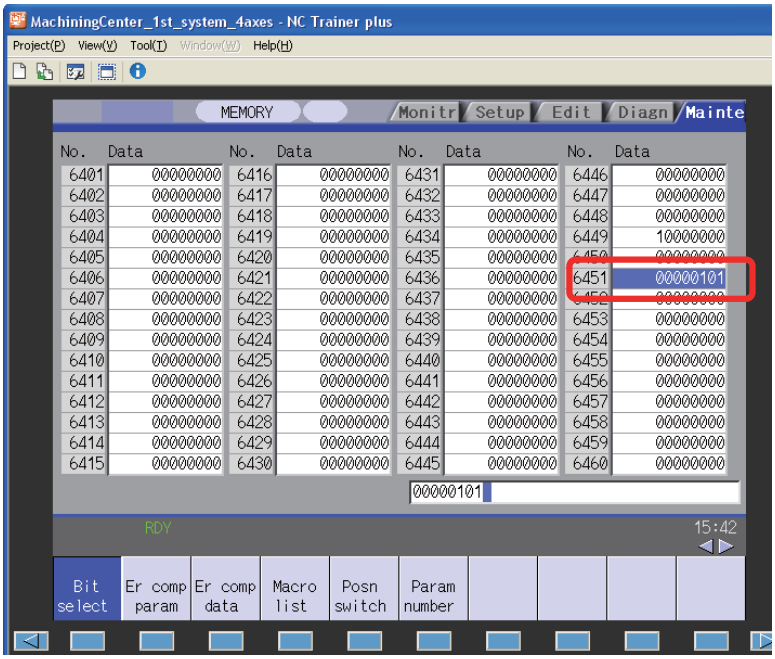
(3) Starting PLC onboard

[1] Start NC Trainer plus and execute a project.

[2] Select [Tool (T)]-[Set Machine Parameters (M)] from the menu bar on NC Trainer plus, and check the item.



[3] Set the bit selection parameter #6451 bit0 (onboard on) to 1 on NC maintenance screen.

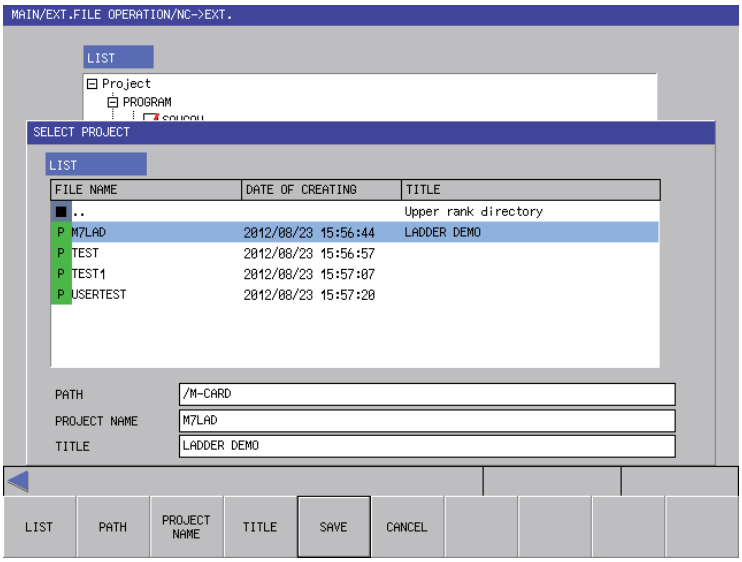


[4] Press the F0 key on NC keyboard or the Shift+F10 key on PC keyboard to display the PLC onboard screen.

(4) Operation for an external file

For the PLC onboard on NC Trainer plus, the "(folder name to store NC Trainer data)\M-CARD" folder of Windows is allocated as an external device virtually.
(Normally, M-CARD folder is allocated under C:\NCTrnrplus Files.)

To designate a file or directory on an external device, designate /M-CARD as the first directory of path. This /M-CARD directory corresponds to the "(folder name to store NC Trainer data)\M-CARD" folder of Windows.



For example, when /M-CARD/M7LAD directory is designated on PLC on-board, C:\NCTrnrplus Files\M-CARD\M7LAD folder of Windows is the target of input/output.

(5) Precautions

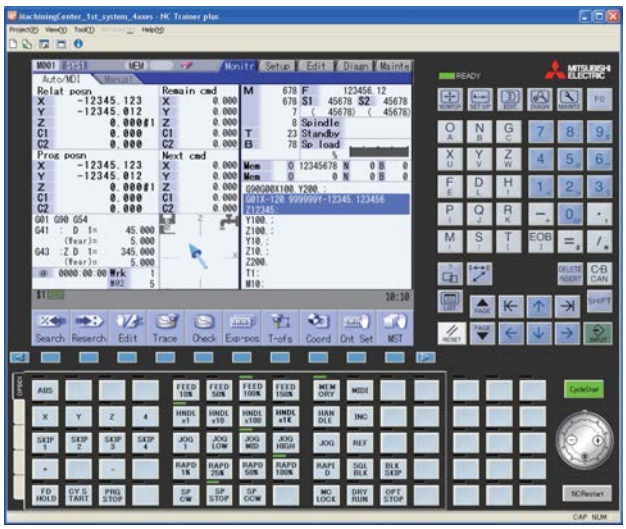
Below are the precautions for the user PLC development method with PLC onboard on NC Trainer plus.

- Do not use PLC onboard and GX Developer at a time. Some functions cannot be operated correctly if they are used together.
- Do not change the name of M-CARD folder. Input/output operation cannot be executed by external file operation if changed.

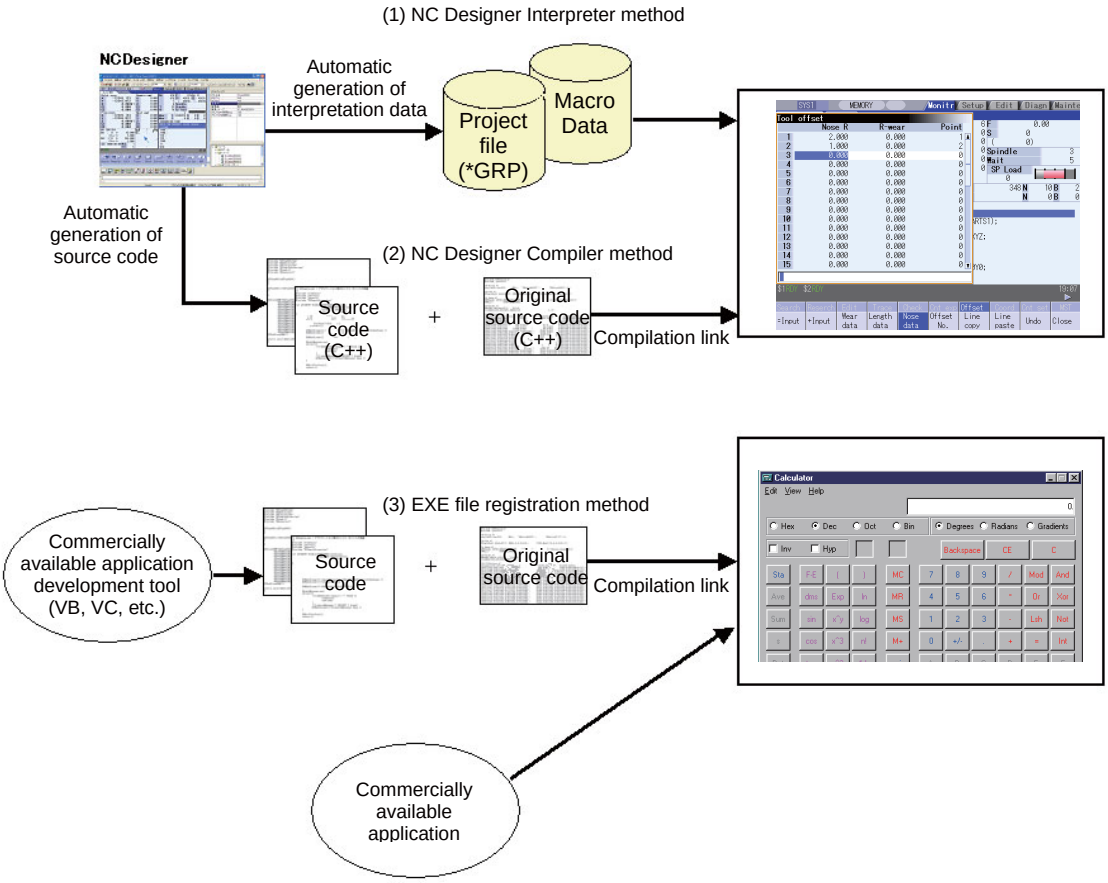
5.3 Display of Custom Release Screen

Custom release is a function which allows a user-original window to be displayed as a standard screen or another operation screen. A screen which is displayed by the custom release is called custom release screen.

NC Trainer plus can display a custom release screen which is created for M700V/M70V/E70 Series.
(NC Trainer can also display a custom release screen by importing a created project from NC Trainer plus.)



Custom release screens are developed with an NC peripheral tool NC Designer. Refer to "MITSUBISHI CNC NC Designer Instruction Manual" (IB-1500040-E or later) for details of the development method.



There are "NC Designer interpreter method", "NC Designer compilation method" and "Executing file registration method" for the execution method of the custom release screen. The "NC Designer interpreter method" and "NC Designer compilation method" can be used for the custom release screens on NC Trainer plus.

(Note 1) As with M700VW, custom release screens of NC Designer compilation method which are displayed on NC Trainer plus is created by compiling the source code with Microsoft Visual C++.
(Note 2) To display custom release screens of NC Designer compilation method developed for M700VS/M70V/E70, it is required to recompile the source code with Microsoft Visual C++.
(Note 3) Custom release screens of Executing file registration method cannot be displayed by an operation with NC Trainer plus, however, the operation can be checked by starting the executing file directly.

Below are the differences from the custom release of M700V/M70V/E70 Series.

5.3.1 The Folder to Store Necessary Files for Displaying Custom Release Screen

For NC Trainer plus, necessary files for displaying custom release screens are prepared for each project. The necessary files are stored under the folder to store NC Trainer plus data (normally, C:\NCTrnrplus Files)\projects\project name\custom.

(For M700VW, necessary files for displaying custom release screens are stored in D:\custom.)

5.3.2 Path Designation of GIP File and DLL File

To display custom release screens, the path of GIP file (*.GIP) or DLL file (*.DLL) of the custom release screens is required to be described in config.ini and customdef.ini. For NC Trainer plus, there are two methods of path designation as follows.

(1) Designation by absolute path
Designate the absolute path beginning with the folder to store NC Trainer plus data (normally, C:\NCTrnrplus Files)\custom\.

<Example of config.ini>

```
[INTERPRETER]
RUN=2
PROJECT01=C:\NCTrnrplus Files\custom\PANEL.GIP
PAGE_OFFSET01=7000
PROJECT02=C:\NCTrnrplus Files\custom\WINDOW.GIP
PAGE_OFFSET02=8000
```

(Note 1) Although the necessary files for displaying custom release screens are stored under the folder to store NC Trainer plus data\projects\project name\custom, the files that are copied under the folder to store NC Trainer plus data \custom are used for displaying the screen.
(Note 2) For M700VW, designate the path beginning with D:\custom\. To display a custom release screen whose operation was checked with NC Trainer plus on M700VW, change the path designation. For M700VS/M70V/E70, change it to a relative path.

(2) Designation by relative path
Designate the relative path from the folder to store NC Trainer plus data (normally, C:\NCTrnrplus Files)\custom\.
<Example of config.ini >

```
[INTERPRETER]
RUN=2
PROJECT01=PANEL.GIP
PAGE_OFFSET01=7000
PROJECT02=WINDOW.GIP
PAGE_OFFSET02=8000
```

(Note) It is the same designation method as M700VS/M70V/E70. When a custom release screen whose operation was checked with NC Trainer plus is displayed on M700VS/M70V/E70, the path designation is not required to be changed. For M700VW, change the path designation.

5.3.3 Display of Executing File Registration Method

The custom release screens of executing file registration method cannot be displayed by an operation with NC Trainer plus, however, the operation can be checked by starting the executing file directly.
Start after copying the executing file to the folder to install NC Trainer / NC Trainer plus/ncsys (normally C:\Program Files/NC Trainer or C:\Program Files/NC Trainer plus/ncsys).

(Note 1) The custom release screen is not displayed on NC screen of NC Trainer / NC Trainer plus, but it is displayed as an independent window.
(Note 2) To exit from NC Trainer / NC Trainer plus, close the executing file first. If not, NC Trainer / NC Trainer plus may not be exited normally.
(Note 3) When NC restart or project operation (such as changing projects) is executed on NC Trainer / NC Trainer plus, close the executing file first. If not, NC restart or project operation is failed.

5.3.4 Outline of Debug for Custom Release Screen

By using NC Trainer plus, custom release screens can be debugged without actual NC. The following methods of custom release screen can be debugged.

Method of custom release screen	Debug	Remarks
Interpreter method	×	Only the operation check is enabled.
Compilation method	○	Source level debug is enabled with Microsoft Visual Studio® Refer to “5.3.5 Source Level Debug of Custom Release Screen (Compilation Method)” for details.
Executing file registration method	○	Debug with Microsoft Visual Studio®, etc. as with a normal application debug.

5.3.5 Source Level Debug of Custom Release Screen (Compilation Method)

By using NC Trainer plus and Microsoft Visual Studio® (hereafter Visual Studio), the source level debug of custom release screens (compilation method) can be executed. Refer to the Instruction Manual of NC Designer for available version of Visual Studio.
The following is the debug procedure for custom release screen (compilation method).

(1) Open a project of custom release screen (compilation method) to debug with Visual Studio, and debug build the dll of the custom release screen.
(Note) When moving the project to different folder, rebuild the source code file of dll even though it is not modified. Otherwise the debug cannot be executed.

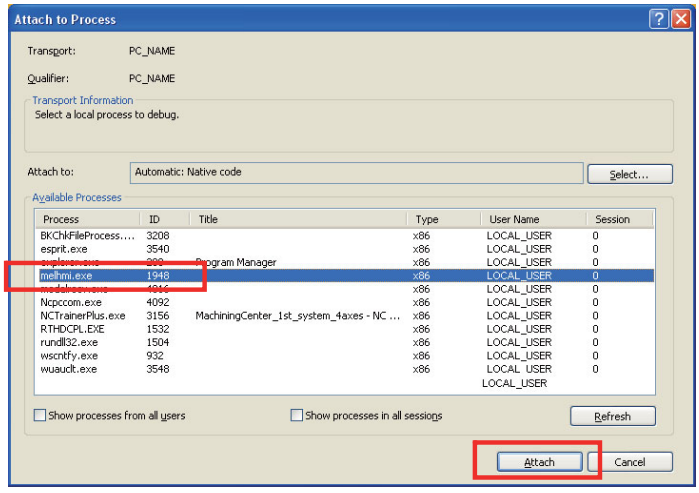
(2) Create a project for debug of the custom release screen with NC Trainer plus. After creating the project, once exit from NC Trainer plus.

(3) Copy the debug built dll of the custom release screen to the custom folder of the NC Trainer plus project for debug (the folder to store NC Trainer plus data\projects\project name\custom).

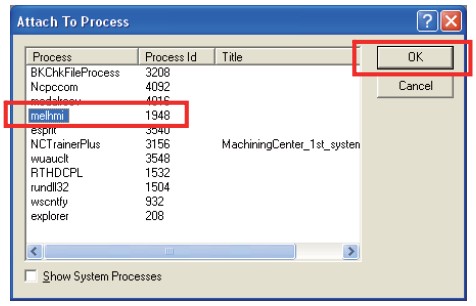
(4) Store config.ini and customdef.ini to display the custom release screen in the same folder.

(5) Start NC Trainer plus and execute the NC Trainer plus project for debug.

(6) When the NC standard screen is displayed on NC Trainer plus, attach to melhmi (executing process of NC screen) with Visual Studio.
<For Visual Studio2005/2008/2010>
Display [Attach to Process] dialog box by selecting [Debug (D)]-[Attach to Process (P)…] from the menu. Select melhmi.exe and click the [Attach (A)] button.



<For Visual Studio 6.0>
Display [Attach to Process] dialog box by selecting [Build (B)]-[Started Debugging (D)]-[Attach toProcess (A)...] from the menu. Select melhmi and click the [OK] button.



(7) Display the source code file of the custom release screen with Visual Studio and set the break point.
(8) Display the custom release screen with NC Trainer plus and debug the screen.
(9) To terminate the debug, exit from NC Trainer plus or restart the NC (click [NC Restart] button). When the NC screen disappears, the debug execution of Visual Studio is also terminated automatically.

(Note) When the debug execution is force-quit on Visual Studio 6.0 before exiting from NC Trainer plus, the NC screen cannot be displayed on NC Trainer plus. In that case, exit from NC Trainer plus or restart the NC.

5.3.6 Settings of Custom Release Start Up Screen

The bmp file of start up screen can be use as the start up screen when starting the NC by storing it in the project folder of NC Trainer plus(the folder to store NC Trainer plus data\projects\project). The name of the bmp file is fixed as "startupscreen.bmp". If there is no "startupscreen.bmp" in the NC Trainer plus project folder, the standard start up screen displays when staring the NC. For NC Trainer, by importing the project created by NC Trainer plus the Custom Release Start Up Screen can be displayed.

The specification of "startupscreen.bmp" on actual NC is as follows.

Models	Size	Number of colors
M700VW	Width640×Hight480	24bit
M700VS/M70V/E70	Width640×Hight440	8bit

(*) If the specification of "startupscreen.bmp" is different from actual NC, it will display as the start up screen on the NC Trainer plus. If the width is not 640 or hight is bigger than 480 on the actual NC M700VS/M70V/E70, it will display as the standard start up screen.

5.3.7 Restrictions for Custom Release Screen

- Custom release screens can be displayed with NC Trainer by importing a project created with NC Trainer plus. Note that custom release screens are not displayed when the files stored in the folder to store NC Trainer data (normally, C:\NCTrainer Files)\projects\project name\custom are changed.
- For a project of M70V TypeA/M70V TypeB/E70, read or write to a memory card cannot be done with the \IC1 directory specified by the custom API library. To read/write to a memory card from a custom release screen, specify a directory to store NC Trainer plus data using an absolute path (normally, C:\NCTrnrplus Files)\HD folder) in the custom API library function.

5.4 APLC release

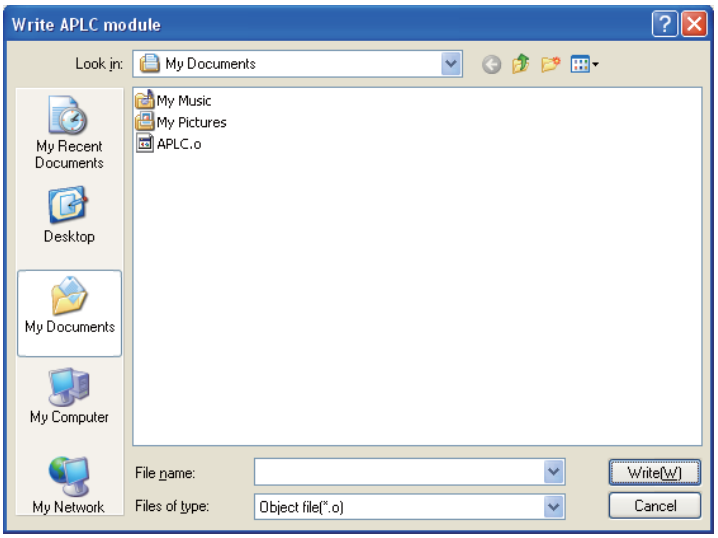
APLC release is a function which calls APLC release C language module (APLC.o) created by users from the NC. Complicated control operations that are difficult to be mounted by user PLC can be created with C language.
With NC Trainer plus, the C language module compiled for M700V/M70V/E70 Series can be written in the memory of the NC directly and the operation can be checked.

(Note) For NC Trainer plus, the execution of C language module from compact flashes is not supported.

5.4.1 Writing APLC Release C Language Module

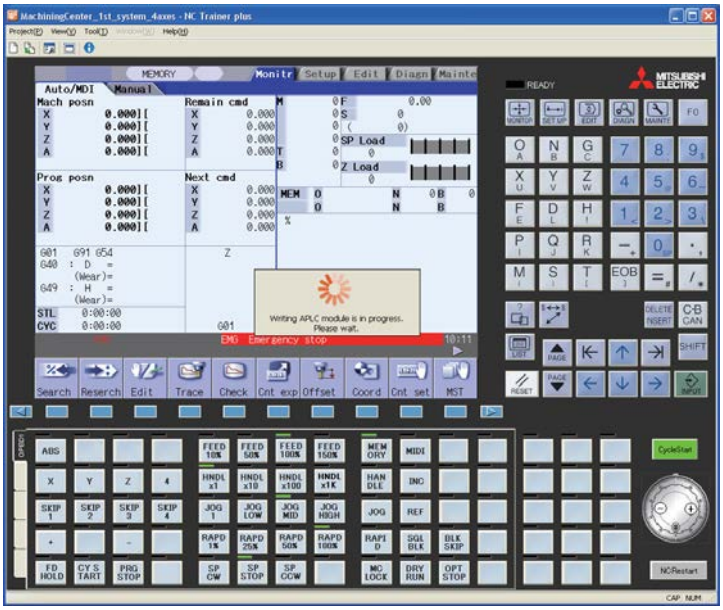
The following is the procedure to write APLC release C language module (APLC.o) in the NC memory of NC Trainer plus.

(1) Store C language module (APLC.o) to be stored in the NC memory to any folder. (The file name is fixed to APLC.o.)
(2) Start NC Trainer plus. Select the project to write C language module when the project list dialog is displayed. (When there is no project, the project list dialog is not displayed. Write C language module after creating a project.)
(3) After starting the NC, select [Project (P)] - [Write APLC module (L)] from the menu bar.
Designate APLC.o stored on step (1) and press the [Write (W)] button when the file selection dialog is displayed.
(Caution) If the project is opened by read-only (Refer to "1.5 Precautions"), [Write APLC module (L)] menu is displayed in gray and cannot be selected.

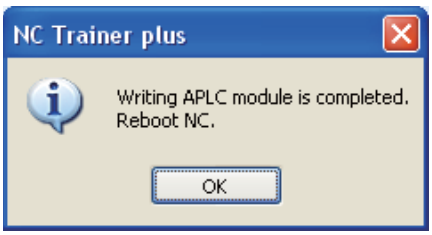


(4) The writing process of C language module is started.

(Note) When the writing process of C language module is executed, the NC will enter an emergency stop state.

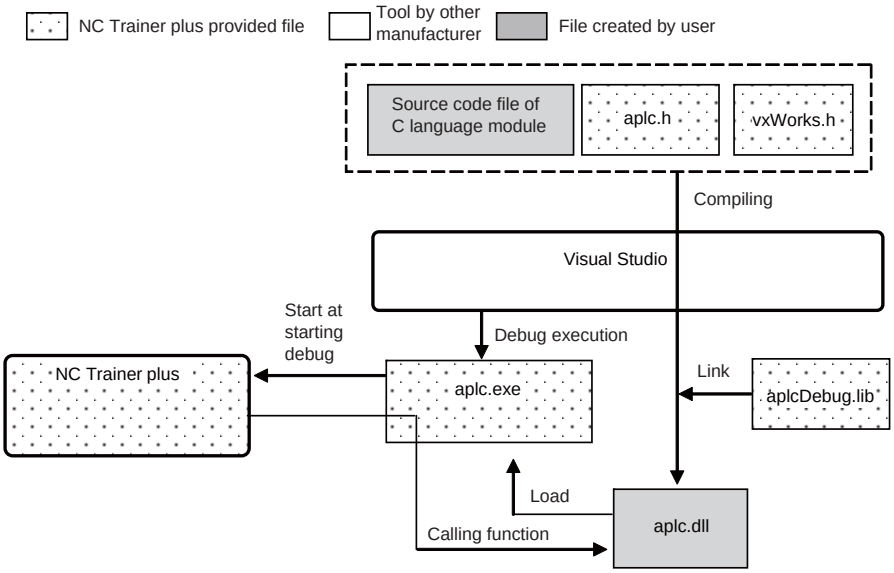


(5) The message box will appear after completing the writing process of C language module. To enable APLC, restart the NC with NC Restart button.



5.4.2 Outline for the Debug of APLC Release C Language Module

By using NC Trainer plus and Microsoft Visual Studio® (hereafter Visual Studio), the source level debug of APLC release C language module can be executed. The C language module which can be debugged is all types of type 1 (PLC asynchronous processing), type 2 (PLC synchronous processing) and type 3 (PLC calling processing).
The following is S/W configuration during debugging.



Name	Explanation
Visual Studio	Use for the compiling and the source level debug of C language module. The following versions are available. Visual Studio 6.0,Visual Studio 2005,Visual Studio 2008,Visual Studio 2010
Source code file of C language module	Source code file of C language module created by user
aplc.h	Header file of APLC release library It is included in the source code file of C language module.
vxWorks.h	Header file which defines the data types, etc. used for NC system It is included in the source code file of C language module.
aplcDebug.lib	Library file to link when C language module is compiled and generating aplc.dll.
aplc.dll	Dll file for the source level debug with Visual Studio
aplc.exe	Executing program for debug of C language module At the start, aplc.dll is loaded and then NC Trainer plus is started for debug.
NC Trainer plus	When starting from aplc.exe, call C language module dedicated to debug instead of C language module (APLC.o) created by user. It is not required to write APLC module before the debug.

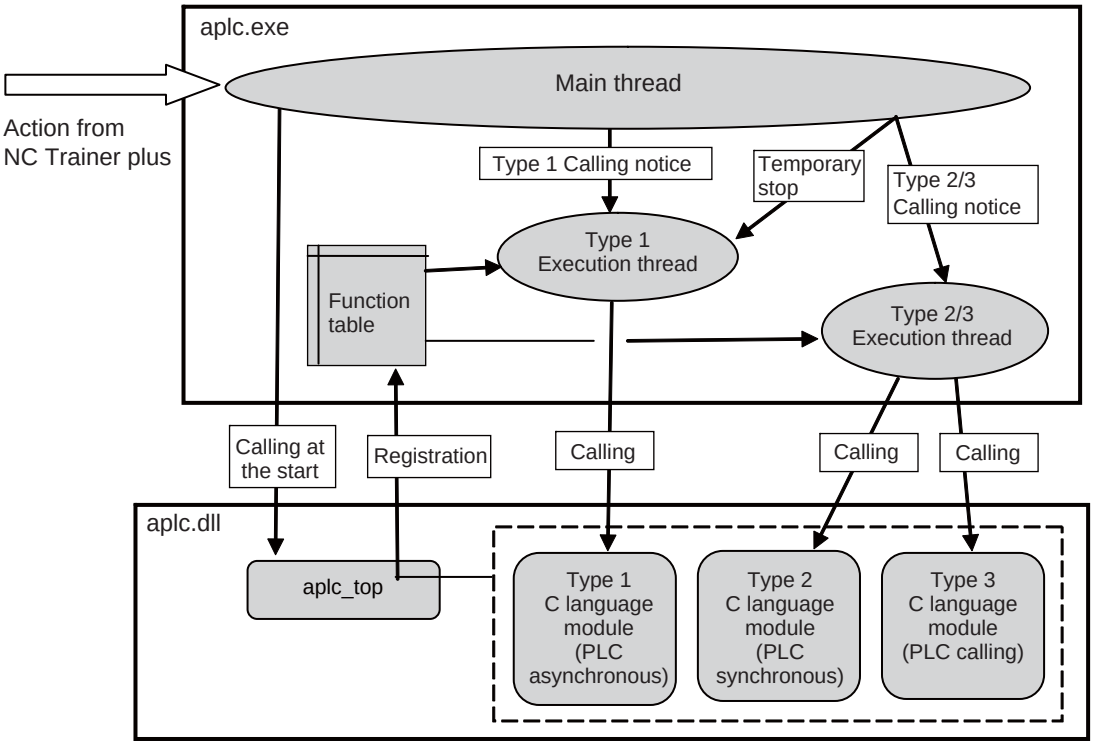
aplc.exe, aplc.h, vxWorks.h and aplcDebug.lib are stored under the folder to install NC Trainer plus.

```
The folder to install NC trainer plus (normally, C:\Program Files\NC Trainer plus)
├─ default
├─ ncsys
└─ aplc
    ├─ aplc exe
    ├─ h
    │  ├─ aplc.h
    │  └─ vxWorks.h
    └─ lib
       └─ aplcDebug.lib
```

5.4.3 Execution Procedure of C Language Module During Debugging

Below is an explanation of the execution procedure of C language module in aplc.dll during debugging.

- To execute C language module in aplc.dll during debugging, mount the initialization function aplc_top on aplc.dll and register C language module by the function (The same registration functions as of actual NC, setUserBaseMain, setUserPlcPreMain, and setUserPlcCallFunc are available). At the start of debug, aplc_top is called from aplc.exe. At that time, the function address of C language module is registered to the function table in aplc.exe. And then the registered C language module is called when C language module is called on NC Trainer plus side.



- Type 1 and Type 2/3 C language module are executed on the different threads. As with actual NC, type 2/3 C language module is executed by interrupting type 1 C language module.

5.4.4 Modification of Source Code File for Debug

To debug C language module at the source level, the source code file actually used for APLC release function should be modified for Visual Studio.

Item to be modified	Modification method
long long unsigned long long	Replace with LONGLONG type or ULONGLONG type defined by vxWorks.h.
Function other than APLC release library	Refer to the following lists. For unavailable functions, modify to the alternative processing.

The available functions on Visual Studio side are as follows.

APLC release library (All of them can be used.)

Function name	○ :Available × :Unavailable Name: Alternative function
getNCData	○
setNCData	○
scaldr	○
aplcSrch	○
melplcBset□ (Note 1)	○
melplcBrst□ (Note 1)	○
melplcBtst□ (Note 1)	○
melplcWset□ (Note 2)	○
melplcWtst□ (Note 2)	○
melplcLset□ (Note 2)	○
melplcLtst□ (Note 2)	○
abtol	○
ahtol	○
atobcd	○
atos	○
dchtoa	○
ltoa	○
ostrcmp	○

(Note 1) □=Device name: X,Y,M,L,F,SM,TI,TO,STI,STO,CI,CO
(Note 2) □=Device name: R,D

Function for automatic operation lock

Function name	○ :Available × :Unavailable Name: Alternative function
melplc_PasswordInfo	○ (Note 1)
melplc_PasswordWrite	○ (Note 2)

(Note 1) Always complete successfully without password certification.
(Note 2) Always complete successfully without password registration.

Standard library (stdlib)

Function name	○ :Available × :Unavailable Name: Alternative function
abs	○
atof	○
atoi	○
atol	○
bsearch	○
div	○
div_r	div
labs	○
ldiv	○
ldiv_r	ldiv
qsort	○
rand	○
srand	○
strtod	○
strtol	○
strtoul	○

Character string library

Function name	○ :Available × :Unavailable Name: Alternative function
memchr	○
memcmp	○
memcpy	○
memmove	○
memset	○
strcat	○
strchr	○
strcmp	○
strcoll	○
strcpy	○
strcspn	○
strerror_r	strerror
strerror	○
strlen	○
strncat	○
strncmp	○
strncpy	○
strpbrk	○
strrchr	○
strspn	○
strstr	○
strtok	○
strtok_r	strtok
strxfrm	○

Character type library

Function name	○ :Available × :Unavailable Name: Alternative function
isalnum	○
isalpha	○
iscntrl	○
isdigit	○
isgraph	○
islower	○
isprint	○
ispunct	○
isspace	○
isupper	○
isxdigit	○
tolower	○
toupper	○

Arithmetic operation library

(Note) The result of the calculation may differ from actual machine in the range of rounding error.

Function name	○ :Available × :Unavailable Name: Alternative function
asin	○
acos	○
atan	○
atan2	○
ceil	○
cosh	○
exp	○
fabs	○
floor	○
fmod	○
frexp	○
ldexp	○
log	○
log10	○
modf	○
pow	○
sin	○
cos	○
sinh	○
sqrt	○
tan	○
tanh	○

Time library

Function name	○ :Available × :Unavailable Name: Alternative function
asctime	○
asctime_r	asctime
clock	○
ctime	○
ctime_r	ctime
difftime	○
gmtime	○
gmtime_r	gmtime
localtime	○
localtime_r	localtime
mktime	○
strftime	○
time	○

Buffer operation library

Function name	○ :Available × :Unavailable Name: Alternative function
bcmp	memcmp
binvert	×
bswap	×
swab	×
uswab	×
bzero	memset
bcopy	memmove
bcoypBytes	memmove
bcopyWords	memmove
bcopyLongs	memmove
bfill	memset
bfillBytes	memset
index	strchr
rindex	strrchr

Character string format I/O library

Function name	○ :Available × :Unavailable Name: Alternative function
sprintf	○
vsprintf	○
sscanf	○

Memory operation library

Function name	○ :Available × :Unavailable Name: Alternative function
malloc	○
free	○
calloc	○
realloc	○
cfree	free
memalign	malloc

5.4.5 Preparation for Debug

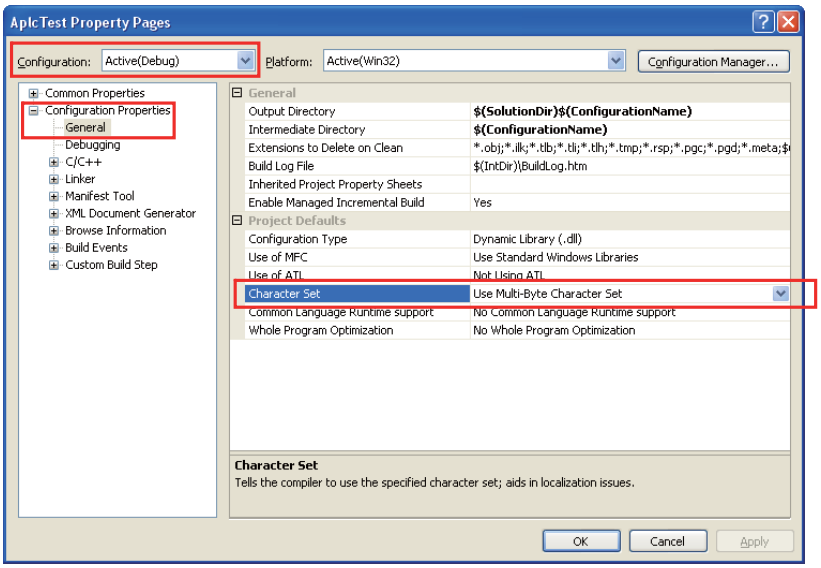
Prepare the source level debug of C language module according to the following procedures.
(The procedure is different between Visual Studio2005/2008/2010 and Visual Studio6.0.)

<For Visual Studio 2005/2008/2010>

(1) Create a new empty DLL project (32bit version) as a project for debug of C language module with Visual Studio. (Refer to the Help of Visual Studio for creation procedure of DLL project.)

(2) Add the source file of C language module to the project created on step 1).

(3) Select [Project (P)]-[Property (P)] from the menu bar of Visual Studio and open [Project name Property Pages] dialog box. Select [Active (Debug)] from [Configuration (C)]. At the category of [Configuration Properties]-[General], set to [Use Multi-Byte Character Set] for [Character Set].



(4) Set the project items according to the following table in the same way.

Category	Item	Details
Configuration Properties - Debug	Command	The folder to install NC Trainer plus\aplc \aplc.exe (normally, C:\Program Files\NC Trainer plus\aplc\aplc.exe)
	Command Arguments	The project name of NC Trainer plus which is started during debugging
	Working Directory	The solution folder for this project \Debug
Configuration Properties - C/C++ - GENERIC	Additional included directory	The folder to install NC Trainer plus \aplc \h (normally, C:\Program Files\NC Trainer plus\aplc\h)
	Correspond to 64bit porting	No (This item is not included in Visual Studio2010)
Configuration Properties - C/C++ - Code Generation	Run time library	Multi-threaded (/MT)
Configuration Properties - C/C++ - Language	Handle wchar_t as build-in type	No
Configuration Properties - Linker -GENERIC	Output File	The solution folder for this project \Debug\aplc.dll
	Additional library directory	The folder to install NC Trainer plus \aplc \lib (normally, C:\Program Files\NC Trainer plus\aplc\lib)
Configuration Properties - Linker - In	Additional Dependencies	aplcDebug.lib

(5) Close the [Project name Property Pages] dialog box with the [OK] button.

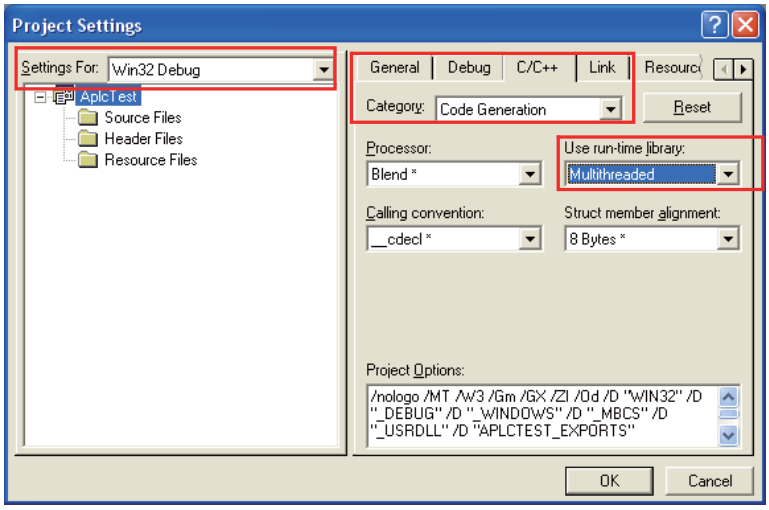
(6) Build aplc.dll by selecting [Build (B)]-[Build Solution (B)] from the menu bar on Visual Studio.

<For Visual Studio 6.0>

(1) Create a new empty DLL project as a project for debug of C language module with Visual Studio. (Refer to the Help of Visual Studio for creation procedure of DLL project.)

(2) Add the source file of C language module to the project created on step 1).

(3) Select [Project (P)]-[Set (S)] from the menu bar on Visual Studio and open [Project Settings] dialog box. Select [Win32 Debug] from [Settings For]. Select [C/C++] tab and at the category of [Code Generation], set to [Multithreaded] for [Use run-time library].



(4) Set the project items according to the following table in the same way.

Category	Item	Details
C/C++ tab - Preprocessor	Included file path	The folder to install NC Trainer plus\aplc \h (normally,C:¥Program Files¥NC Trainer plus¥aplc¥h)
Link tab - GENERIC	Output File	Debug/aplc.dl
	Object/library module	ADD aplcDebug.lib
Link tab - In	Additional library path	The folder to install NC Trainer plus\aplc \lib (normally, C:¥Program Files¥NC Trainer plus¥aplc¥lib)
Debug tab - GENERIC	Executable file for debug session	The folder to install NC Trainer plus\aplc \aplc.exe (normally, C:¥Program Files¥NC Trainer plus¥aplc¥aplc.exe)
	Directory for work	The folder for this project \Debug
	Program arguments	The project name of NC Trainer plus which is started during debugging

(5) Close the [Project Settings] dialog box with [OK] button.

(6) Build aplc.dll by selecting [Build (B)]-[Build (B)] from the menu bar of Visual Studio.

5.4.6 Debugging Procedure

Below is an explanation of the procedure for source level debug of C language module.

(1) When NC Trainer plus is already started, exit it and then set the break point to the source file of C language module with Visual Studio.

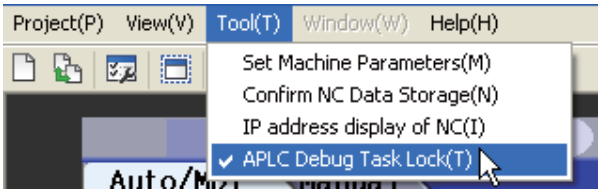
(2) Start debugging with Visual Studio. NC Trainer plus is started automatically and a debug is started.

(3) To terminate debug, exit from NC Trainer plus and then force-quit the debug on Visual Studio.

5.4.7 Task Lock Function for APLC Debug

Task lock function for APLC debug is a function which interrupts the execution processing of NC system while calling C language module of type 2 (PLC synchronous processing)/type 3 (PLC calling processing). This function is disabled while calling C language module of type 1(PLC asynchronous).
For NC Trainer plus, the processing execution timing of APLC is operated in asynchronous with NC system. Therefore this function is used to execute the processing of APLC synchronized with NC system by type 2/type 3.
Note that when this function is enabled, NC Trainer plus slows down because NC system is operated synchronously at anytime.

- To enable or disable the APLC debug task lock, select [Tool (T)]- [APLC Debug Task Lock (T)] from the menu bar on NC Trainer plus. It will be enabled immediately during debug.



- The menu [APLC Debug Task Lock (T)] above can be selected only when NC Trainer plus is started automatically by debug execution of C language module with Visual Studio.

5.4.8 Cautions for Source Level Debug

- When the NC is restarted with NC Trainer plus during debug, C language module on Visual C++ side is not called anymore and cannot be debugged. Exit NC Trainer plus first and exit (the debug execution of) Visual C++, and then start debugging again.

- For C language module on Visual Studio side, a bus error (example: access to the address which is not 4 byte boundary with int type pointer) does not occurred.

- The processing execution of NC system is interrupted even when creating a C language module with the source file describing both type 1 (PLC asynchronous processing) and type 2 (PLC synchronous processing)/type 3 (PLC calling processing), enabling the APLC debug task lock, and setting a break point for processing of type 1 (PLC asynchronous). Disable the APLC debug task lock not to interrupt the execution processing of NC system by the processing of type 1 (PLC asynchronous).

- If the initialize module (a module registered using the function setUserBaseIni or setUserPlcIni to register) is broken 120 seconds or longer, the error message "Failed to activate the NC" displays, the project is force-quit, and it can not be debugged.
  Do not break the initialize module is 120 seconds or longer.
  If the project has been force-quit, exit NC Trainer plus first and exit (the debug execution of) Visual C++, and then start debugging again.

5.4.9 Importing the NC Data from Actual NC

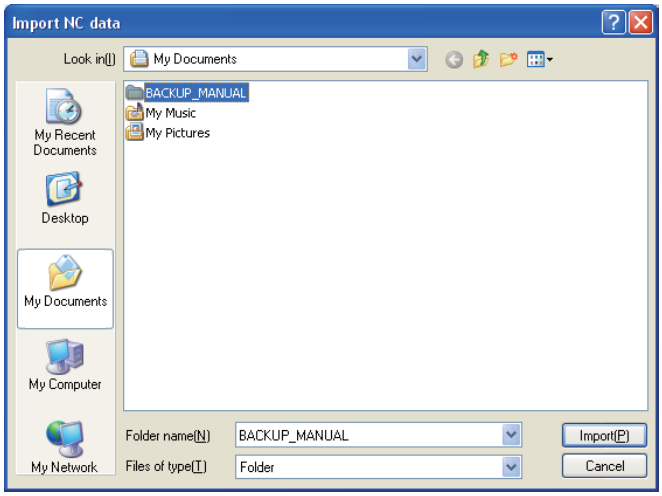
To simulate the same operation as actual NC on NC Trainer plus, import the NC data backed up with actual NC to NC Trainer plus.
The backup of actual NC is executed on [Mainte]- [All backup] screen.

The following data are backed up with NC data backup of M700V/M70V/E70 Series.

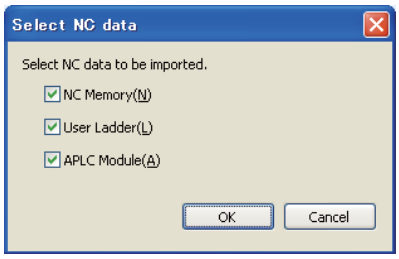
- The data stored in the NC memory (parameter, option, machining program, macro, etc.)
- User PLC
- APLC release C language module (APLC.o)

Below is an explanation of the procedure to import the NC data.

(1) Store the backup data of actual NC (whole folder) in a CF card or USB memory and connect with a personal computer.
(2) Create a new project. Select the machine operation panel matched to the user PLC to be imported.
(3) Display [Import NC data] dialog box by selecting [Project (P)] - [Import (I)] - [NC DATA (N)] from the menu bar of NC Trainer plus and press the [Import (P)] button after designating the folder to store NC data.



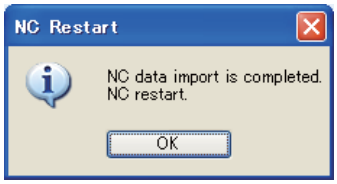
(4) [Select NC data] dialog box is displayed. Check the data to be imported and press the [OK] button.



(Note 1) NC memory that is different NC model can not be imported.

(5) NC data import is started.
(Note) When import process is executed, the NC will enter an emergency stop state.

(6) When NC data import is completed, a message box is displayed. Press the [OK] button and restart the NC.



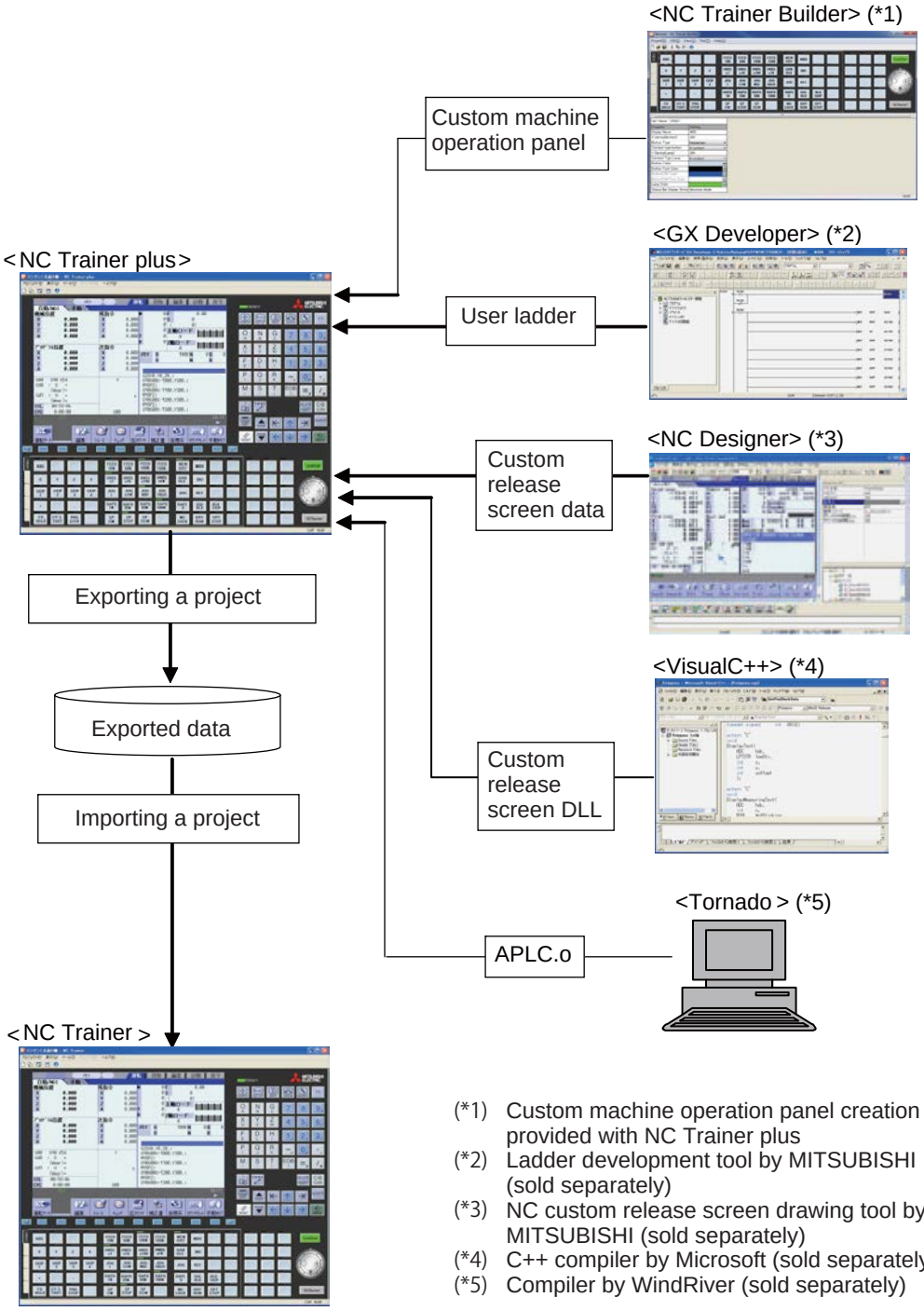
(Note 1) The function disabled on NC Trainer plus cannot be used even if NC data is imported.
(Note 2) NC option setting after import is not reflected in the NC option setting which is displayed on [Set Project Option] dialog box (Refer to the section "4.3.3 Changing the Settings of Project Option"). Check [Diagn] - [Option display] on NC standard screen for available NC options.
(Note 3) If the project is opened by read-only (Refer to "1.5 Precautions"), the NC data can not be imported.

6

Exporting and Importing NC Trainer plus Project

6.1 Exporting NC Trainer plus Project

The project exporting function of NC Trainer plus enables NC Trainer to be operated as a tool for mastering machine tool operation of customers.



(*1) Custom machine operation panel creation tool provided with NC Trainer plus
(*2) Ladder development tool by MITSUBISHI (sold separately)
(*3) NC custom release screen drawing tool by MITSUBISHI (sold separately)
(*4) C++ compiler by Microsoft (sold separately)
(*5) Compiler by WindRiver (sold separately)

The following data are stored for the export data of a project.

- Data to be stored in NC memory (parameter, machining program, macro, etc.)
- Project information
- User PLC
- Custom machine operation panel setting
- Custom release screen data (The folder to store NC Trainer plus data\Projects\Project name\custom folder)
- Custom release Start-up screen data(The folder to store NC Trainer plus data\Projects\Project name\startupscreen.bmp)
- APLC.o

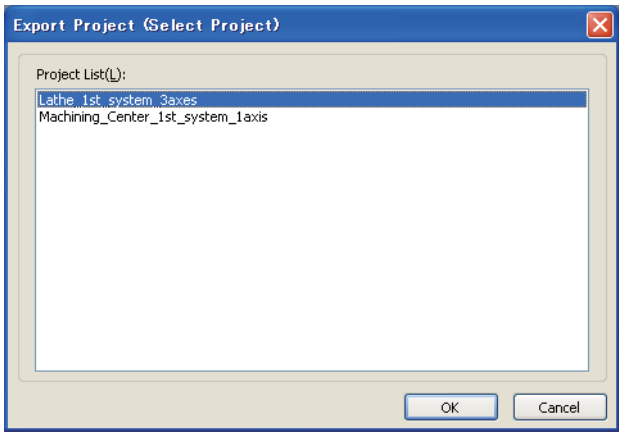
The following data are not stored for the export data of a project.

- The data which is stored in the folder corresponding to HD (The folder to store NC Trainer plus data \HD folder)
  (such as machining program)
- The data created on NAVI MILL/NAVI LATHE screen
- The data which is stored in the folder corresponding to memory card (The folder to store NC Trainer plus data \M-CARD folder) by the file operation on the onboard screen

Execute the following procedure to export a project.

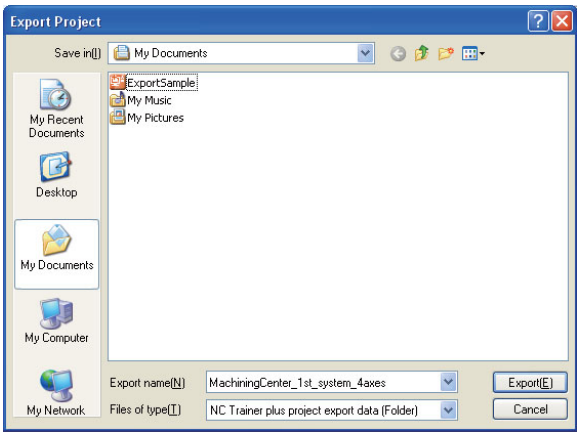
(Note 1) Export cannot be executed with NC Trainer.)

(1) Select [Project (P)] - [Export (E)] from the menu bar.
The dialog box of project list is displayed.

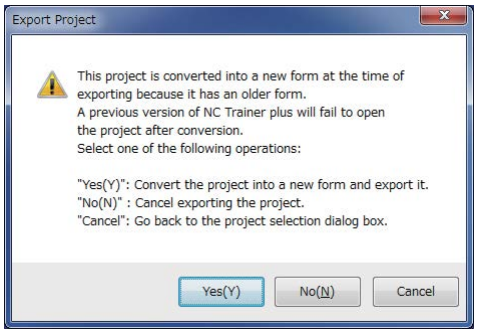


(Note) The project which is created with NC Trainer is not displayed.

(2) Select the project to export and press the "OK" button.
The following dialog box is displayed.
Specify a folder to store the export data and an export name.



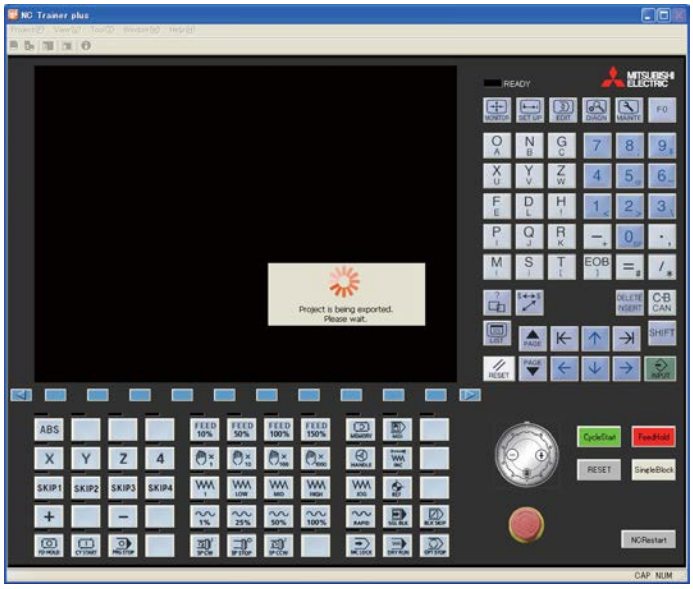
(Note 1) An export name can be up to 80 one-byte characters. (Each two-byte character is equivalent to two characters.)
(Note 2) One-byte characters and two-byte characters can be used for an export name.
(Note 3) An export name is not case-sensitive.
(Note 4) The following characters cannot be used for an export name.
\ / : * ? < > | " (Same as the prohibited characters for a file name)
(Note 5) Blank and Period (.) cannot be used for the first or last character of an export name.
(Note 6) CON, PRN, AUX, CLOCK$, NUL, COM0 to COM9 and LPT0 to LPT9 cannot be used for an export name.
(Note 7) When the project created by NC Trainer plus S/W version B0 or earlier version is selected and "OK" is clicked on the project list dialog box, the following message box may appear.



To export the project, the project needs to be converted to a new format.

- If there is no possibility to open the project by NC Trainer plus S/W version B0 or earlier version, click "Yes(Y)". A dialog box pops up, where a folder to store the exported data and an export name are specified.
- To leave the project in the format that allows the project to be opened by NC Trainer plus S/W version B0 or earlier version, click "No (N)" or "Cancel" button.
  When "No(N)" is clicked, exporting the project stops and the project list dialog box closes.
  When "Cancel" is clicked, the screen turns back to the project list dialog box and the project can be selected again.

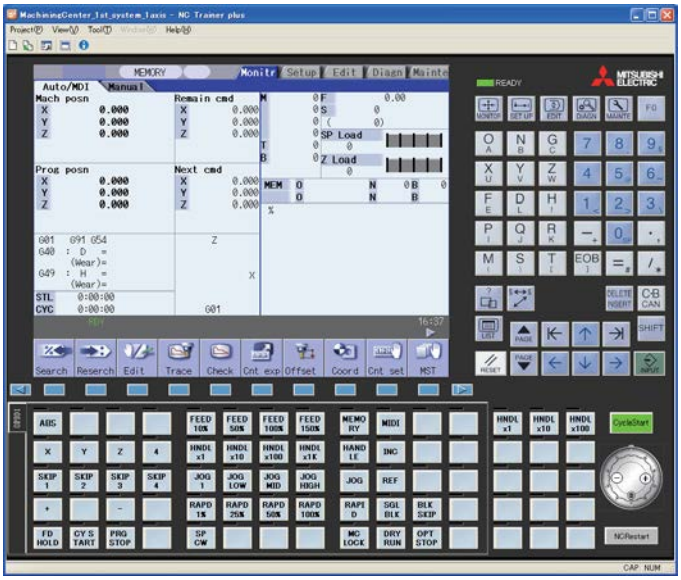
(3) Press the "Export (E)" button after entering the required information for exporting.
Project export is started. The folder whose name is the same as the export name is created under the folder to store, and various data files are stored in there.



(Note 1) When a project is executed, the NC is stopped before exporting.
(Note 2) When [Tool (T)] - [Confirm NC Data Storage (N)] on the menu bar is enabled, the confirmation message box for NC data storage is displayed before stopping the NC. Whether to store NC data can be selected on the message box.
(Note 3) When currently-executing project and project to be exported is the same, NC data is always stored regardless of the setting for [Tool (T)] - [Confirm NC Data Storage (N)].
(Note 4) Press the "Cancel" button to return to the display of Select Project dialog box.

(4) The following message will appear when the export is completed.

(5) Press the "OK" button on the message box and the NC screen of the selected project for exporting is displayed.



When providing the export data to other computer, provide the folder created by exporting in whole.

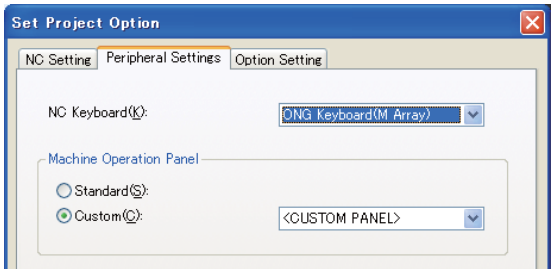
Refer to "6.2 Importing NC Trainer plus Project" for details of project import procedure. NC option and custom machine operation panel of the imported project are handled as follows.

< NC option of the project which is imported to NC Trainer >

- NC options which are set with NC Trainer plus project continue to operate after importing (NC options which cannot be set to be enabled on NC Trainer are also enabled).
- Some of NC options of NC Trainer plus are not displayed on the option setting for the project of NC Trainer. Select [Diagn] - [Option display] on the NC standard screen to check the status of NC options after importing.

< Custom machine operation panel of the project which is imported to NC Trainer / NC Trainer plus >

- The custom machine operation panel which is attached to the imported project can be used only for the project. It cannot be selected for other projects.
- The custom machine operation panel which is attached to the imported project is displayed on the Set Project Option with being enclosed in < > such as "<Custom machine operation panel name>".



- The setting of the custom machine operation panel of the imported project cannot be changed with NC Trainer (The setting item for Machine Operation Panel on the Set Project Option dialog box is displayed in gray).

6.2 Importing NC Trainer plus project

The operating procedure is the same as that of NC Trainer. Refer to the section "4.3.7 Importing NC Trainer plus Project" of "I NC Trainer" for details.

III Appendix

Appendix 1

Specifications List

Appendix 1 Specifications List

○Standard △Optional NC function that can be selected

Class	NC Trainer								NC Trainer plus							
	M system				L system				M system				L system			
	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70
1. Control axes																
1.1 Control axes																
1.1.1 Number of basic control axes (NC axes)	○ 3	○ 3	○ 3	○ 3	○ 2	○ 2	○ 2	○ 2	○ 3	○ 3	○ 3	○ 3	○ 2	○ 2	○ 2	○ 2
1.1.2 Max. number of axes (NC axes + Spindles + PLC axes)	5	5	5	5	4	4	4	4	16	9	11	6	16	9	11	6
1.1.2.1 Max. number of NC axes (in total for all the part systems)	4 (X,Y,Z,A)	4 (X,Y,Z,A)	4 (X,Y,Z,A)	3 (X,Y,Z)	3 (X,Z,C)	3 (X,Z,C)	3 (X,Z,C)	3 (X,Z,C)	16	5	8	3	16	5	9	3
1.1.2.2 Max. number of spindles	1	1	1	1	1	1	1	1	4	2	2	1	6	3	4	2
1.1.2.3 Max. number of PLC axes	0	0	0	0	0	0	0	0	6	6	6	2	6	6	6	2
1.1.3 Max. number of auxiliary axes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.1.4 Max. number of PLC indexing axes	—	—	—	—	—	—	—	—	6	4	4	1	6	4	4	1
1.1.5 Number of simultaneous contouring control axes	4	4	4	3	3	3	3	3	4	4	4	3	4	4	4	3
1.1.6 Max. number of NC axes in a part system	4	4	4	3	3	3	3	3	8	5	8	3	8	5	8	3
1.2 Control part system																
1.2.1 Standard number of part systems	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1.2.2 Max. number of part systems	○1	○1	○1	○1	○1	○1	○1	○1	○2	○1	○2	○1	○4	○1	○2	○1
1.3 Control axes and operation modes																
1.3.1 Tape (RS-232C input) mode	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.2 Memory mode	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
1.3.3 MDI mode	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
1.3.4 High-speed program server mode																
1.3.4.1 CF card in control unit	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1.3.5 Front IC card mode	—	○	○	○	—	○	○	○	—	○	○	○	—	○	○	○
1.3.6 Hard disk mode	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
2. Input command																
2.1 Data increment																
2.1.1 Least command increment																
2.1.1.1 Least command increment 1μm	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
2.1.1.2 Least command increment 0.1μm	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
2.1.1.3 Least command increment 0.01μm(10nm)	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
2.1.1.4 Least command increment 0.001μm(1nm)	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
2.1.2 Least control increment																
2.1.2.1 Least control increment 0.01μm(10nm)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2.1.2.2 Least control increment 0.001μm(1nm)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2.1.3 Indexing increment	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—
2.2 Unit system																
2.2.1 Inch/Metric changeover	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
2.2.2 Input command increment tenfold	○	○	○	○	—	—	—	—	○	○	○	○	—	—	—	—
2.3 Program format																
2.3.1 Program format																
2.3.1.1 Format 1 for Lathe	—	—	—	—	○	○	○	○	—	—	—	—	○	○	○	○
2.3.1.2 Format 2 for Lathe	—	—	—	—	○	○	○	—	—	—	—	—	○	○	○	—
2.3.1.3 Special format for lathe	—	—	—	—	○	○	○	○	—	—	—	—	○	○	○	○
2.3.1.4 Format 1 for Machining center	○	○	○	○	—	—	—	—	○	○	○	○	—	—	—	—
2.3.1.5 Format 2 for Machining center (M2 format)	○	○	○	—	—	—	—	—	○	○	○	—	—	—	—	—
2.3.1.6 MITSUBISHI CNC special format	—	—	—	—	○	○	○	—	—	—	—	—	○	○	○	—
2.4 Command value																
2.4.1 Decimal point input I, II	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2.4.2 Absolute/Incremental command	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
2.4.3 Diameter/Radius designation	—	—	—	—	○	○	○	○	—	—	—	—	○	○	○	○
3. Positioning/Interpolation																
3.1 Positioning																
3.1.1 Positioning	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3.1.2 Unidirectional positioning	△	○	○	○	—	—	—	—	△	○	○	○	—	—	—	—
3.2 Linear/Circular interpolation																
3.2.1 Linear interpolation	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3.2.2 Circular interpolation (Center/Radius designation)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
3.2.3 Helical interpolation	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
3.2.4 Spiral/Conical interpolation	△	—	○	—	—	—	—	—	△	—	○	—	—	—	—	—
3.2.5 Cylindrical interpolation	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
3.2.6 Polar coordinate interpolation	△	—	—	—	△	○	○	—	△	—	—	—	△	○	○	—
3.2.7 Milling interpolation	—	—	—	—	△	—	○	—	—	—	—	—	△	—	○	—
3.2.8 Hypothetical axis interpolation	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
3.3 Curve interpolation																
3.3.2 Exponential interpolation	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
3.3.3 Spline interpolation (1st part system only)	△	—	○	—	—	—	—	—	△	—	○	—	—	—	—	—
3.3.4 NURBS interpolation	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
3.3.5 3-dimensional circular interpolation	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—

○Standard △Optional NC function that can be selected

Class	NC Trainer								NC Trainer plus							
	M system				L system				M system				L system			
	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70
4. Feed																
4.1 Feed rate																
4.1.1 Rapid traverse rate (m/min)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
4.1.2 Cutting feed rate (m/min)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
4.1.3 Manual feed rate (m/min)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
4.1.4 Rotary axis command speed tenfold	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.2 Feed rate input methods																
4.2.1 Feed per minute	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.2.2 Feed per revolution	△	○	○	○	○	○	○	○	△	○	○	○	○	○	○	○
4.2.3 Inverse time feed	△	—	○	—	—	—	—	—	△	—	○	—	—	—	—	—
4.2.4 F 1-digit feed	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.2.5 Manual speed command	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
4.3 Override																
4.3.1 Rapid traverse override	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.3.2 Cutting feed override	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.3.3 2nd cutting feed override	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
4.3.4 Override cancel	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
4.4 Acceleration/Deceleration																
4.4.1 Automatic acceleration/deceleration after interpolation	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.4.2 Rapid traverse constant inclination acceleration/deceleration	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.4.3 Rapid traverse constant inclination multi-step acceleration/deceleration (1st part system only)	△	○	○	—	—	—	—	—	△	○	○	—	—	—	—	—
4.5 Thread cutting																
4.5.1 Thread cutting (Lead/Thread number designation)	△	○	○	○	○	○	○	○	△	○	○	○	○	○	○	○
4.5.2 Variable lead thread cutting	—	—	—	—	○	○	○	○	—	—	—	—	○	○	○	○
4.5.3 Synchronous tapping																
4.5.3.1 Synchronous tapping cycle	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
4.5.3.2 Pecking tapping cycle	△	○	○	—	—	—	—	—	△	○	○	—	—	—	—	—
4.5.3.3 Deep-hole tapping cycle	△	○	○	—	—	—	—	—	△	○	○	—	—	—	—	—
4.5.4 Chamfering	—	—	—	—	—	—	—	—	—	—	—	—	○	○	○	○
4.5.6 Circular thread cutting	—	—	—	—	△	—	—	—	—	—	—	—	△	—	—	—
4.5.8 High-speed synchronous tapping (OMR-DD)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4.5.9 C-axis interporation type thread cutting	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4.6 Manual feed																
4.6.1 Manual rapid traverse	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.6.2 Jog feed	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.6.3 Incremental feed	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.6.4 Handle feed	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
4.6.5 Manual feed rate B	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
4.6.6 Manual feed rate B surface speed control	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
4.7 Dwell																
4.7.1 Dwell (Time-based designation)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5. Program memory/editing																
5.1 Memory capacity																
5.1.1 Memory capacity (number of programs stored)																
5.1.1.1 15kB[40m] (64 programs)	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
5.1.1.2 30kB[80m] (128 programs)	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
5.1.1.3 60kB[160m] (200 programs)	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
5.1.1.4 125kB[320m] (200 programs)	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
5.1.1.5 230kB[600m] (400 programs)	△	—	—	○	△	—	—	○	△	—	—	○	△	—	—	○
5.1.1.6 500kB[1280m] (1000 programs)	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
5.1.1.7 1000kB[2560m] (1000 programs)	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
5.1.1.8 2000kB[5120m] (1000 programs)	△	—	△	—	△	—	△	—	△	—	△	—	△	—	△	—
5.2 Editing																
5.2.1 Program editing	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5.2.2 Background editing	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
5.2.3 Buffer correction	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Appendix 1 Specifications List

○Standard △Optional NC function that can be selected

Class	NC Trainer								NC Trainer plus							
	M system				L system				M system				L system			
	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70
6. Operation and display																
6.2 Operation methods and functions																
6.2.1 Operation input	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.2.2 Absolute value/Incremental value setting	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.2.5 Displayed part system switch	—	—	—	—	—	—	—	—	○	—	○	—	○	—	○	—
6.2.6 Menu list	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.2.7 Display switch by operation mode	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.2.8 External signal display switch	—	—	—	—	—	—	—	—	○	—	○	—	○	—	○	—
6.2.10 Screen saver, backlight OFF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6.2.11 Parameter/Operation guidance	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.2.12 Alarm guidance	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
6.2.13 Machining program input mistake check warning	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
6.2.15 Screen Capture	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6.2.16 User selectable menu configuration	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.2.17 PC-NC network automatic connection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6.2.18 Device open parameter	○	○	○	—	○	○	○	—	○	○	○	—	○	○	○	—
6.2.19 SRAM open parameter	○	○	○	—	○	○	○	—	○	○	○	—	○	○	○	—
6.2.20 MTB selectable menu configuration	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6.3 Display methods and contents																
6.3.1 Status display	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.2 Clock display	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.3 Operation screen display	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.4 Preparation screen display	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.5 Edit screen display	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.6 Diagnosis screen display	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.7 Maintenance screen display	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8 Additional languages																
6.3.8.1 Japanese	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.2 English	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.3 German	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.4 Italian	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.5 French	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.6 Spanish	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.7 Chinese																
6.3.8.7.1 Traditional Chinese characters	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.7.2 Simplified Chinese characters	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.8 Korean	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.9 Portuguese	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.10 Hungarian	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.11 Dutch	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.12 Swedish	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.13 Turkish	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.14 Polish	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.15 Russian	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
6.3.8.16 Czech	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7. Input/Output functions and devices																
7.1 Input/Output data																
7.1.1 Machining program input/output	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7.1.2 Tool offset data input/output	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7.1.3 Common variable input/output	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7.1.4 Parameter input/output	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7.1.5 History data output	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7.1.7 System configuration data output	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
7.2 Input/Output I/F																
7.2.1 RS-232C I/F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7.2.2 IC card I/F																
7.2.2.1 I/F for IC card in control unit [up to 2GByte]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7.2.2.2 Front IC card I/F [up to 2GByte]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7.2.3 Ethernet I/F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7.2.4 Hard disk I/F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7.2.6 USB memory I/F [up to 2GByte]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7.3 Computer link																
7.3.1 Computer link B	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7.4 Others																
7.4.1 Handy terminal connection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8. Spindle, Tool and Miscellaneous functions																
8.1 Spindle functions (S)																
8.1.1 Spindle control functions																
8.1.1.1 Spindle digital I/F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8.1.1.2 Spindle analog I/F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8.1.1.3 Coil switch	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
8.1.1.4 Automatic coil switch	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8.1.1.5 Encoder input I/F	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8.1.2 S code output	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8.1.3 Constant surface speed control	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
8.1.4 Spindle override	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
8.1.5 Multiple-spindle control																
8.1.5.1 Multiple-spindle control I	—	—	—	—	—	—	—	—	—	—	—	—	○	○	○	○
8.1.5.2 Multiple-spindle control II	—	—	—	—	—	—	—	—	○	○	○	—	○	○	○	○
8.1.6 Spindle orientation	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
8.1.7 Spindle position control (Spindle/C axis control)	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
8.1.8 Spindle synchronization																
8.1.8.1 Spindle synchronization I	—	—	—	—	—	—	—	—	—	—	—	—	△	○	○	—
8.1.8.2 Spindle synchronization II	—	—	—	—	—	—	—	—	—	—	—	—	△	○	○	—
8.1.8.3 Guide bushing spindle synchronization	—	—	—	—	—	—	—	—	—	—	—	—	△	—	—	—
8.1.9 Tool spindle synchronization I (Polygon)																
8.1.9.1 Tool spindle synchronization I A (Spindle-Spindle, Polygon)	—	—	—	—	—	—	—	—	—	—	—	—	△	○	○	—
8.1.9.2 Tool spindle synchronization I B (Spindle-Spindle, Polygon)	—	—	—	—	—	—	—	—	—	—	—	—	△	○	○	—
8.1.9.3 Tool spindle synchronization I C (Spindle-NC axis, Polygon)	—	—	—	—	—	—	—	—	—	—	—	—	△	—	○	—
8.1.10 Tool spindle synchronization II (Hobbing)	—	—	—	—	—	—	—	—	—	—	—	—	△	—	○	—
8.1.11 Spindle speed clamp	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8.2 Tool functions (T)																
8.2.1 Tool functions (T command)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8.3 Miscellaneous functions (M)																
8.3.1 Miscellaneous functions	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8.3.2 Multiple M codes in 1 block	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8.3.3 M code independent output	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8.3.4 Miscellaneous function finish	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
8.3.5 M code output during axis traveling	—	—	—	—	△	—	○	—	—	—	—	—	△	—	○	—
8.3.6 Miscellaneous function command high-speed output	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8.4 2nd miscellaneous functions (B)																
8.4.1 2nd miscellaneous functions	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

○Standard △Optional NC function that can be selected

Class	NC Trainer								NC Trainer plus							
	M system				L system				M system				L system			
	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70
9. Tool compensation																
9.1 Tool length/Tool position																
9.1.1 Tool length compensation	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
9.1.2 Tool position offset	○	○	○	—	—	—	—	—	○	○	○	—	—	—	—	—
9.1.3 Tool compensation for additional axes	—	—	—	—	—	—	—	—	—	—	—	—	○	○	○	○
9.2 Tool radius																
9.2.1 Tool radius compensation	○	○	○	○	—	—	—	—	○	○	○	○	—	—	—	—
9.2.2 3-dimensional tool radius compensation	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
9.2.3 Tool nose radius compensation (G40/41/42)	—	—	—	—	○	○	○	○	—	—	—	—	○	○	○	○
9.2.4 Automatic decision of nose radius compensation direction (G46/40)	—	—	—	—	○	○	○	○	—	—	—	—	○	○	○	○
9.2.5 Tool radius compensation diameter designation	○	○	○	—	—	—	—	—	○	○	○	—	—	—	—	—
9.3 Tool offset amount																
9.3.1 Number of tool offset sets																
9.3.1.1 20 sets	—	—	—	—	△	—	—	—	—	—	—	—	△	—	—	—
9.3.1.2 40 sets	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
9.3.1.3 80 sets	—	—	—	—	△	○	○	○	—	—	—	—	△	○	○	○
9.3.1.4 200 sets	△	—	—	○	—	—	—	—	△	—	—	○	—	—	—	—
9.3.1.5 400 sets	△	○	○	—	—	—	—	—	△	○	○	—	—	—	—	—
9.3.1.6 999 sets	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
9.3.1.7 (99× number of part systems) sets	—	—	—	—	△	—	—	—	—	—	—	—	△	—	—	—
9.3.2 Offset memory																
9.3.2.1 Tool shape/wear offset amount	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10. Coordinate system																
10.1 Coordinate system type and setting																
10.1.1 Machine coordinate system	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.2 Coordinate system setting	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.3 Automatic coordinate system setting	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.4 Workpiece coordinate system selection																
10.1.4.1 Workpiece coordinate system selection (6 sets)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.4.2 Extended workpiece coordinate system selection (48 sets) G54.1P1 to P48	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
10.1.4.3 Extended workpiece coordinate system selection (96 sets) G54.1P1 to P96	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
10.1.4.4 Extended workpiece coordinate system selection (300 sets) G54.1P1 to P300	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
10.1.5 External workpiece coordinate offset	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.6 Workpiece coordinate system preset (G92.1)	△	—	—	—	△	○	○	○	△	—	—	—	△	○	○	○
10.1.7 Local coordinate system	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.8 Coordinate system for rotary axis	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.9 Plane selection	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.10 Origin set/Origin cancel	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.1.11 Counter set	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.2 Return																
10.2.1 Manual reference position return	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.2.2 Automatic 1st reference position return	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.2.3 2nd, 3rd, 4th reference position return	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.2.4 Reference position check	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
10.2.5 Absolute position detection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10.2.6 Tool exchange position return	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11. Operation support functions																
11.1 Program control																
11.1.1 Optional block skip	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.1.2 Optional block skip addition	—	—	—	—	—	—	—	—	△	○	○	—	△	○	○	—
11.1.3 Single block	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.2 Program test																
11.2.1 Dry run	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.2.2 Machine lock	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.2.3 Miscellaneous function lock	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
11.2.4 Graphic check																
11.2.4.1 Graphic check	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
11.2.4.2 3D solid program check	△	—	○	—	—	—	—	—	△	—	○	—	—	—	—	—
11.2.4.3 Graphic check rotary axis drawing	—	—	—	—	△	—	△	—	—	—	—	—	△	—	△	—
11.2.5 Graphic trace																
11.2.5.1 Graphic trace	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
11.2.5.2 Graphic trace rotary axis drawing	—	—	—	—	△	—	△	—	—	—	—	—	△	—	△	—
11.2.6 Machining time computation	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.3 Program search/start/stop																
11.3.1 Program search	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.3.2 Sequence number search	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.3.3 Verification stop	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
11.3.4 Program restart	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
11.3.5 Automatic operation start	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.3.6 NC reset	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.3.7 Feed hold	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.3.8 Search & Start	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
11.3.10 Automatic restart	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
11.4 Interrupt operation																
11.4.1 Manual interruption	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.4.2 Automatic operation handle interruption	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
11.4.3 Manual absolute switch	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.4.4 Thread cutting cycle retract	—	—	—	—	△	○	○	—	—	—	—	—	△	○	○	—
11.4.5 Tapping retract	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
11.4.6 Manual numerical value command	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.4.7 Arbitrary reverse run	—	—	—	—	—	—	—	—	△	—	○	—	—	—	—	—
11.4.8 MDI interruption	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
11.4.9 Simultaneous operation of manual and automatic modes	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
11.4.10 Simultaneous operation of JOG and handle modes	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
11.4.11 Reference position retract	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
11.4.12 Tool retract and return	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
11.4.13 Skip retract	—	—	—	—	—	—	—	—	△	○	○	—	—	—	—	—
11.4.14 PLC interruption	—	—	—	—	—	—	—	—	△	○	○	—	△	○	○	—

Appendix 1 Specifications List

○Standard △Optional NC function that can be selected

Class	NC Trainer								NC Trainer plus							
	M system				L system				M system				L system			
	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70
12. Program support functions																
12.1 Machining method support functions																
12.1.1 Program																
12.1.1.1 Subprogram control	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers	○8layers
12.1.1.2 Figure rotation	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
12.1.1.3 Scaling	△	○	○	○	—	—	—	—	△	○	○	○	—	—	—	—
12.1.1.4 Axis name switch	—	—	—	—	○	○	○	—	—	—	—	—	○	○	○	—
12.1.2 Macro program																
12.1.2.1 User macro	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers	△4layers
12.1.2.2 Machine tool builder macro	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
12.1.2.3 Macro interruption	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
12.1.2.4 Variable command																
12.1.2.4.1 100 sets	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
12.1.2.4.2 200 sets	△	—	—	○	△	—	—	○	△	—	—	○	△	—	—	○
12.1.2.4.3 300 sets	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
12.1.2.4.4 600 sets	△	—	—	—	△	○	—	—	△	—	—	—	△	○	—	—
12.1.2.4.5 700 sets	△	○	○	—	△	—	○	—	△	○	○	—	△	—	○	—
12.1.2.4.6 8000 sets	△	—	△	—	△	—	△	—	△	—	△	—	△	—	△	—
12.1.2.4.7 (50+50× number of part systems) sets	—	—	—	—	—	—	—	—	△	—	—	—	△	—	—	—
12.1.2.4.8 (100+100×number of part systems) sets	—	—	—	—	—	—	—	—	△	—	—	—	△	—	—	—
12.1.2.4.9 (200+100×number of part systems) sets	—	—	—	—	—	—	—	—	△	—	—	—	△	—	—	—
12.1.2.4.10 (500+100×number of part systems) sets	—	—	—	—	—	—	—	—	△	—	—	—	△	—	—	—
12.1.2.4.11 (600+100×number of part systems) sets	—	—	—	—	—	—	—	—	△	—	○	—	△	—	○	—
12.1.2.4.12 (7900+100×number of part systems) sets	—	—	—	—	—	—	—	—	△	—	△	—	△	—	△	—
12.1.3 Fixed cycle																
12.1.3.1 Fixed cycle for drilling	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12.1.3.2 Fixed cycle for drilling (Type II)	—	—	—	—	—	—	—	—	—	—	—	—	○	○	○	○
12.1.3.3 Special fixed cycle	△	○	○	○	—	—	—	—	△	○	○	○	—	—	—	—
12.1.3.4 Fixed cycle for turning machining	—	—	—	—	○	○	○	○	—	—	—	—	○	○	○	○
12.1.3.5 Compound type fixed cycle for turning machining	—	—	—	—	△	○	○	○	—	—	—	—	△	○	○	○
12.1.3.6 Compound type fixed cycle for turning machining (Type II)	—	—	—	—	△	○	○	○	—	—	—	—	△	○	○	○
12.1.3.7 Small-diameter deep-hole drilling cycle	△	○	○	○	—	—	—	—	△	○	○	○	—	—	—	—
12.1.4 Mirror image																
12.1.4.1 Mirror image by parameter setting	○	○	○	—	○	○	○	—	○	○	○	—	○	○	○	—
12.1.4.2 Mirror image by external input	—	—	—	—	—	—	—	—	○	○	○	—	○	○	○	—
12.1.4.3 Mirror image by G code	○	○	○	○	—	—	—	—	○	○	○	○	—	—	—	—
12.1.4.4 Mirror image for facing tool posts	—	—	—	—	△	—	○	—	—	—	—	—	△	—	○	—
12.1.4.5 T code mirror image for facing tool posts	—	—	—	—	△	—	○	—	—	—	—	—	△	—	○	—
12.1.5 Coordinate system operation																
12.1.5.1 Coordinate rotation by program	△	○	○	○	△	—	○	—	△	○	○	○	△	—	○	—
12.1.5.2 Coordinate rotation by parameter	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
12.1.5.3 3-dimensional coordinate conversion	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
12.1.6 Dimension input																
12.1.6.1 Corner chamfering/Corner R	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
12.1.6.2 Linear angle command	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
12.1.6.3 Geometric command	△	○	○	○	○	○	○	○	△	○	○	○	○	○	○	○
12.1.6.4 Polar coordinate command	△	○	○	—	—	—	—	—	△	○	○	—	—	—	—	—
12.1.7 Axis control																
12.1.7.1 Chopping																
12.1.7.1.1 Chopping	—	—	—	—	—	—	—	—	△	○	○	—	△	○	○	—
12.1.7.2 Normal line control	△	—	○	—	—	—	—	—	△	—	○	—	—	—	—	—
12.1.7.3 Circular cutting	△	○	○	○	—	—	—	—	△	○	○	○	—	—	—	—
12.1.8 Multi-part system control																
12.1.8.1 Timing synchronization between part systems	—	—	—	—	—	—	—	—	○	—	○	—	○	—	○	—
12.1.8.2 Start point designation timing synchronization	—	—	—	—	—	—	—	—	○	—	○	—	○	—	○	—
12.1.8.3 Mixed control (cross axis control)																
12.1.8.3.1 Mixed control (cross axis control) I	—	—	—	—	—	—	—	—	—	—	—	—	△	—	○	—
12.1.8.3.2 Mixed control (cross axis control) II	—	—	—	—	—	—	—	—	—	—	—	—	△	—	○	—
12.1.8.4 Control axis superimposition																
12.1.8.4.1 Control axis superimposition I	—	—	—	—	—	—	—	—	—	—	—	—	△	—	—	—
12.1.8.4.2 Control axis superimposition II	—	—	—	—	—	—	—	—	—	—	—	—	△	—	—	—
12.1.8.5 Control axis synchronization across part systems																
12.1.8.5.1 Control axis synchronization across part systems I	—	—	—	—	—	—	—	—	—	—	—	—	△	—	○	—
12.1.8.5.2 Control axis synchronization across part systems II	—	—	—	—	—	—	—	—	—	—	—	—	△	—	○	—
12.1.8.6 Balance cut	—	—	—	—	—	—	—	—	—	—	—	—	△	—	○	—
12.1.8.7 Common memory for part systems	—	—	—	—	—	—	—	—	—	—	—	—	○	—	○	—
12.1.8.8 2-part system synchronous thread cutting	—	—	—	—	—	—	—	—	—	—	—	—	△	—	○	—
12.1.8.9 Multi-part system program management	—	—	—	—	—	—	—	—	○	—	○	—	○	—	○	—
12.1.9 Data input by program																
12.1.9.1 Parameter input by program	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
12.1.9.2 Compensation data input by program	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
12.1.10 Machining modal																
12.1.10.1 Tapping mode	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12.1.10.2 Cutting mode	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12.2 Machining accuracy support functions																
12.2.1 Automatic corner override	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12.2.2 Deceleration check																
12.2.2.1 Exact stop check mode	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12.2.2.2 Exact stop check	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12.2.2.3 Error detection	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
12.2.2.4 Programmable in-position check	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
12.3 High-speed and high-accuracy functions [kBPM:k Block per Minute]																
12.3.1 High-speed machining mode I (G5P1) Max.[kBPM]	△16.8	○	○	—	—	—	—	—	△16.8	○	○	—	—	—	—	—
12.3.2 High-speed machining mode II (G5P2) Max.[kBPM]	△168	—	○33.7	—	—	—	—	—	△168	—	○33.7	—	—	—	—	—
12.3.3 High-speed high-accuracy control 1 (G5.1Q1) Max.[kBPM] (1st part system only)	△33.7	○16.8	○16.8	—	—	—	—	—	△33.7	○16.8	○16.8	—	—	—	—	—
12.3.4 High-speed high-accuracy control 2 (G5P10000) Max.[kBPM] (limited to 1-part system	△168	—	○33.7	—	—	—	—	—	△168	—	○33.7	—	—	—	—	—
12.3.5 High-accuracy control1(G61.1/G08)	△	○	○	—	—	—	—	—	△	○	○	—	—	—	—	—
12.3.6 High-accuracy spline interpolation1(G61.2) (1st part system only)	△	—	○	—	—	—	—	—	△	—	○	—	—	—	—	—
12.3.7 High-accuracy spline interpolation2(G61.3) (1st part system only)	△	—	○	—	—	—	—	—	△	—	○	—	—	—	—	—
12.3.8 SSS control																
12.3.8.1 SSS control (1st part system only)	△	—	△	—	—	—	—	—	△	—	△	—	—	—	—	—
12.3.9 High-accuracy acceleration/deceleration time constant extension (1st part system only)	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
12.3.10 Machining condition selection I (1st part system only)	○	○	○	—	—	—	—	—	○	○	○	—	—	—	—	—
12.3.12 Direct command mode	—	—	—	—	△	—	—	—	—	—	—	—	△	—	—	—
12.3.13 High-accuracy control in 2 part systems	—	—	—	—	—	—	—	—	△	—	△	—	—	—	—	—
12.4 Programming support functions																
12.4.1 Playback	—	—	—	—	—	—	—	—	△	○	○	○	△	—	—	—
12.4.3 Simple programming	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
12.4.4 G code guidance	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○

○Standard △Optional NC function that can be selected

Class	NC Trainer								NC Trainer plus							
	M system				L system				M system				L system			
	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70
13. Machine accuracy compensation																
13.1 Static accuracy compensation																
13.1.1 Backlash compensation	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
13.1.2 Memory-type pitch error compensation	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
13.1.3 Memory-type relative position error compensation	△	○	○	○	△	○	○	○	△	○	○	○	△	○	○	○
13.1.4 External machine coordinate system compensation	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
13.1.5 Circular error radius compensation	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
13.1.6 Ball screw thermal expansion compensation	—	—	—	—	—	—	—	—	△	○	○	—	△	○	○	—
13.1.7 Machine rotation center error compensation	△	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
13.1.8 Position-dependent gradually increasing-type backlash compensation	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
13.1.9 Two-way pitch error compensation	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
13.2 Dynamic accuracy compensation																
13.2.1 Smooth high-gain (SHG) control	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13.2.2 Dual feedback	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13.2.3 Lost motion compensation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13.2.4 OMR II (Backlash with filter)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13.2.6 OMR-FF	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
13.2.7 Distance-coded reference position detection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14. Automation support functions																
14.1 Measurement																
14.1.1 Skip																
14.1.1.1 Skip	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
14.1.1.2 Multiple-step skip	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
14.1.1.4 PLC skip	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
14.1.1.5 Speed change skip	△	—	—	—	△	—	—	—	△	—	—	—	△	—	—	—
14.1.2 Automatic tool length measurement	—	—	—	—	—	—	—	—	△	○	○	—	△	○	○	—
14.1.3 Manual tool length measurement 1	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
14.1.4 Manual tool length measurement 2	—	—	—	—	—	—	—	—	△	○	○	—	△	○	○	—
14.1.5 Workpiece coordinate offset measurement	—	—	—	—	—	—	—	—	—	—	—	—	△	○	○	—
14.1.6 Workpiece position measurement	—	—	—	—	—	—	—	—	△	○	○	—	—	—	—	—
14.1.7 Rotation measurement	—	—	—	—	—	—	—	—	△	○	○	—	—	—	—	—
14.2 Tool life management																
14.2.1 Tool life management																
14.2.1.1 Tool life management I	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
14.2.1.2 Tool life management II	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
14.2.1.3 Tool life management III	—	—	—	—	—	—	—	—	△	○	○	○	—	—	—	—
14.2.2 Number of tool life management sets																
14.2.2.1 80 sets	—	—	—	—	—	—	—	—	—	—	—	—	△	○	○	○
14.2.2.2 200 sets	—	—	—	—	—	—	—	—	△	○	○	○	—	—	—	—
14.2.2.3 400 sets	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
14.2.2.4 600 sets	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
14.2.2.5 800 sets	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
14.2.2.6 1000 sets	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
14.3 Others																
14.3.1 Programmable current limitation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14.3.2 Auto power off	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
14.3.4 Load monitoring I	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15. Safety and maintenance																
15.1 Safety switches																
15.1.1 Emergency stop	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.1.2 Data protection key	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
15.2 Display for ensuring safety																
15.2.1 NC warning	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.2.2 NC alarm	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.2.3 Operation stop cause	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.2.4 Emergency stop cause	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.2.5 Thermal detection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.2.6 Battery alarm/warning	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.3 Protection																
15.3.1 Stroke end (Over travel)	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
15.3.2 Stored stroke limit																
15.3.2.1 Stored stroke limit I/II	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.3.2.2 Stored stroke limit IB	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
15.3.2.3 Stored stroke limit IIB	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
15.3.2.4 Stored stroke limit IC	△	○	○	—	△	○	○	—	△	○	○	—	△	○	○	—
15.3.3 Stroke check before travel	△	○	○	—	—	—	—	—	△	○	○	—	—	—	—	—
15.3.4 Chuck/Tailstock barrier check	—	—	—	—	○	○	○	○	—	—	—	—	○	○	○	○
15.3.5 Interlock	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
15.3.6 External deceleration	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
15.3.8 3D Machine Interference check	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.3.9 Door interlock																
15.3.9.1 Door interlock I	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.3.9.2 Door interlock II	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.3.10 Parameter lock	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
15.3.11 Program protection (Edit lock B, C)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.3.12 Program display lock	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.3.13 Safety observation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.3.14 Vertical axis pull-up	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4 Maintenance and troubleshooting																
15.4.1 Operation history	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)	○ (*1)
15.4.2 Data sampling	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4.3 NC data backup	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.4.4 MELDASNET																
15.4.4.1 Machine tool builder network system	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4.4.2 Anshin-net service	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4.5 Servo tuning support tools																
15.4.5.1 MS Configurator (Need to prepare separate S/W)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4.5.2 NC Analyzer (Need to purchase separate S/W)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4.6 Automatic backup	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
15.4.7 System setup	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
15.4.9 SRAM backup	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4.11 Application error detection	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4.12 NC Maintainer (Need to prepare separate S/W)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
15.4.13 Parameter setting tool																
15.4.13.1 NC Configurator2 (Need to purchase separate S/W)	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

(*1) The key history is not recorded.

Appendix 1 Specifications List

○Standard △Optional NC function that can be selected

Class	NC Trainer								NC Trainer plus							
	M system				L system				M system				L system			
	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70	M730V	M70V Type B	M70V Type A	E70
17. Machine support functions																
17.1 PLC																
17.1.1 Built-in PLC processing mode	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
17.1.2 PLC functions																
17.1.2.1 Built-in PLC basic function	—	—	—	—	—	—	—	—	○ (*2)	○	○	○	○ (*2)	○	○	○
17.1.2.2 PLC exclusive instruction	—	—	—	—	—	—	—	—	○	○	○	—	○	○	○	—
17.1.3 PLC support functions																
17.1.3.1 Alarm message display	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.3.2 Operator message display	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.3.3 Memory switch (PLC switch)																
17.1.3.3.1 PLC switch 32 points	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.3.3.2 PLC switch 64 points	—	—	—	—	—	—	—	—	△	—	—	—	△	—	—	—
17.1.3.4 Load meter display	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.3.5 User PLC version display	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.3.6 Multi-ladder program register and execution	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.3.7 Ladder program writing during RUN	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.3.8 PLC protection	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.4 Built-in PLC capacity																
17.1.4.1 Standard PLC capacity	○64000	○20000	○32000	○8000	○64000	○20000	○32000	○8000	○64000	○20000	○32000	○8000	○64000	○20000	○32000	○8000
17.1.4.2 Large PLC capacity	—	—	—	—	—	—	—	—	△128000	—	—	—	△128000	—	—	—
17.1.5 Machine contact input/output I/F	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
17.1.6 Ladder monitor	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.7 PLC development																
17.1.7.1 On-board development	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.7.2 MELSEC development tool (GX Developer)	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.8 PLC parameter																
17.1.8.1 PLC constant (150 points)	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.1.8.2 PLC constant extension (Up to 755 points)	—	—	—	—	—	—	—	—	○	—	—	—	○	—	—	—
17.1.10 Pallet program registration	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
17.1.11 Additional PLC engine	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.2 Machine construction																
17.2.1 Servo OFF	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.2.2 Axis detachment	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
17.2.3 Synchronous control	—	—	—	—	—	—	—	—	△	○	○	—	△	○	○	—
17.2.4 Inclined axis control	—	—	—	—	—	—	—	—	—	—	—	—	△	○	○	○
17.2.5 Position switch	—	—	—	—	—	—	—	—	○24	○24	○24	○24	○24	○24	○24	○24
17.2.7 Index table indexing	—	—	—	—	—	—	—	—	○	○	○	—	○	○	○	—
17.2.8 Auxiliary axis control (J2-CT)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.2.9 Tool length compensation along the tool axis	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
17.2.10 Tool handle feed & interruption	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
17.2.11 Tool center coordinate display	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.2.12 Tool center point control	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.2.13 Inclined surface machining command	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
17.2.14 Tool radius compensation for 5-axis machining	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.2.15 Workpiece installation error compensation	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.2.16 Manual feed for 5-axis machining	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
17.2.17 R-Navi	—	—	—	—	—	—	—	—	△	—	—	—	—	—	—	—
17.3 PLC operation																
17.3.1 Arbitrary feed in manual mode	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.3.2 Circular feed in manual mode	—	—	—	—	—	—	—	—	△	—	—	—	△	—	—	—
17.3.3 PLC axis control	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
17.3.5 PLC axis indexing	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
17.4 PLC interface																
17.4.1 CNC control signal	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
17.4.2 CNC status signal	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
17.4.3 PLC window	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
17.4.4 External search	—	—	—	—	—	—	—	—	△	○	○	○	△	○	○	○
17.5 Machine contact I/O																
17.5.5 MITSUBISHI CNC machine operation panel	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
17.6 External PLC link																
17.6.3 CC-Link (Master/Slave)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.6.4 PROFIBUS-DP (Master)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.6.5 DeviceNet (Master)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.6.6 FL-net	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.7 Installing S/W for machine tools																
17.7.1 Customization(NC Designer)(Need separate PC S/W)	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.7.1.1 Customization data storage capacity [MByte]	—	—	—	—	—	—	—	—	Depending on hard disk space	Depending on hard disk space	Depending on hard disk space	Depending on hard disk space	Depending on hard disk space	Depending on hard disk space	Depending on hard disk space	Depending on hard disk space
17.7.1.2 Customization workpiece data size [MByte]	—	—	—	—	—	—	—	—	6	3	3	1	6	3	3	1
17.7.2 User-defined key	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.7.3 EZSocket I/F (Need separate PC S/W)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.7.4 APLC release (Need separate PC S/W)	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.7.5 Custom API library (Need separate PC S/W)	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○
17.7.6 Direct socket communication interface	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.8 Others																
17.8.1 System lock	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.8.2 CNC Remote Operation Tool																
17.8.2.1 NC Monitor (Need separate PC S/W)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.8.2.2 NC Explorer (Need separate PC S/W)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
17.8.3 Automatic operation lock	—	—	—	—	—	—	—	—	○	○	○	—	○	○	○	—

(*2) Index qualification is available.

Appendix 2

Troubleshooting

Appendix 2.1 Troubleshooting

Remedies for common problems of NC Trainer / NC Trainer plus are shown below.

Appendix 2.1.1 Error Messages

The error messages listed below are shown when an error occurs during each operation of NC Trainer / NC Trainer plus.

Appendix 2.1.1.1 Error Messages Common Between NC Trainer and NC Trainer plus

Message	Cause	Remedy
Failed to find the data storage folder.	Data storage folder selected at the time of installation cannot be browsed.	Reinstall NC Trainer / NC Trainer plus.
Enter the project name.	A project name has not been entered.	Correct the entered project name.
Entered project name is too long. Shorten it to 80 characters or less (A double-byte character is counted as two characters).	Entered project name is too long.	
A project with the same name as the entered one exists. Enter another project name.	A project with the same name as the entered one exists.	
A project name made up of only null characters (spaces) is not usable.	Null characters are used as a project name.	
An unavailable character (\ / : * ? < > | ") is included in the entered project name.	An unavailable character is included in the entered project name.	
Entered project name is not available. Enter another name.	A reserved name for Windows is used as a project name.	
Entered command type is illegal. Correct the value.	A value out of the designated range is entered for Command Type of the New Project dialog box.	Refer to "4.3.1 Creating a New Project" and correct the entered value.
Entered value is illegal.Correct the value.	Non-numeric value is set for each setting section of the New Project dialog box.	
Failed to start Internet browser.	An Internet browser may not be installed.	Set up an internet access environment to connect to MITSUBISHI CNC site.
Failed to activate the application.	Requested processing cannot be executed for the reason such as: - Corruption of the executable file. - Hard disk capacity shortage. - Memory shortage.	- Quit other applications and then restart NC Trainer / NC Trainer plus. - Restart the computer. - Reinstall NC Trainer / NC Trainer plus. - Check the hard-disk space. - Check the hardware specification of the computer you are using.
Failed to activate the NC.		
Failed to quit the NC.		
Preparation for creating project has failed.		
Failed to save the application setting.		
Failed to create project.		
Failed to change project option.		
Failed to copy the project.		
Failed to rename the project.		
Failed to delete the project.		
Failed to open the project because it is illegal.	Any file inside of the project folder is broken.	Use the backup data of that project, if available, to open the project. Import the import data of that project, if available. Create a new project again.

Appendix 2.1.1.2 Error Messages Dedicated to NC Trainer plus

Message	Cause	Remedy
Specified number of spindles is exceeding the commandable range. Correct the entered value.	Specified number of spindles on the [New Project] dialog is exceeding the commandable range.	Refer to "4.3.1 Creating a New Project" and correct the entered value.
Make sure to specify 1 or greater for the number of axes in the 1st part system.	0 is specified for the number of axes in the 1st part system on the [New Project] dialog.	
To activate the number of axes in the 3rd part system, you also have to activate the number of axes in the lower part systems.	1 or greater is specified for the number of axes in the 3rd part system even though 0 is specified for the number of axes in the 2nd part system on the [New Project] dialog.	
To activate the number of axes in the 4th part system, you also have to activate the number of axes in the lower part systems.	1 or greater is specified for the number of axes in the 4th part system even though 0 is specified for the number of axes in the 2nd or 3rd part system on the [New Project] dialog.	
Up to 6 PLC axes can be set. Correct the entered value.	Over 6 PLC axes are set on the [New Project] dialog.	
Up to 8 axes can be set for each part system. Correct the entered value.	Over 8 axes are set for the number of axes on the [New Project] dialog.	
Up to 16 control axes (NC axes, spindles and PLC axes) can be set. Correct the entered value.	Over 16 control axes (NC axes, spindles and PLC axes) are set on the [New Project] dialog.	
Custom machine operation panel import data is illegal. Select import data again.	The folder which is not for custom machine operation panel import data is specified or the import data is damaged.	- Select custom machine operation panel import data again. - Export custom machine operation panel again with NC Trainer Builder and then import it.
NC data is not found.	The backup data of actual NC is not found in the specified folder for importing the NC data.	Select the folder which the backup data of actual NC has been stored.
The NC data is unsupported.	The backup data of actual NC other than M700V is specified when importing the NC data.	Select the backup data of actual M700V NC.
Files other than APLC.o can't be selected.	Files other than APLC.o are selected when writing APLC.o.	Select APLC.o.
File size is illegal.	File size of APLC.o which is selected when storing APLC.o is 0 byte or exceeds the maximum size (120 kbytes).	Select APLC.o of 120 kbytes or less.

Appendix 2.1.1.3 Error Messages Dedicated to NC Trainer Builder

Message	Cause	Remedy
Failed to find the data storage folder.	Data storage folder selected at the time of installation cannot be browsed.	Reinstall NC Trainer / NC Trainer plus.
Enter the project name.	A project name has not been entered.	Correct the entered project name.
Entered project name is too long. Shorten it to 32 characters or less (A double-byte character is counted as two characters).	Entered project name is too long.	
A project name made up of only null characters (spaces) is not usable.	Null characters are used as a project name.	
An unavailable character (\ / : * ? < > | ") is included in the entered project name.	An unavailable character is included in the entered project name.	
Entered project name is not available. Enter another name.	A reserved name for Windows is used as a project name.	
Enter the export name.	An export name has not been entered.	Correct the entered export name.
Entered export name is too long. Shorten it to 32 characters or less (A double-byte character is counted as two characters).	Entered export name is too long.	
An export name made up of only null characters (spaces) is not usable.	Null characters are used as an export name.	
An unavailable character (\ / : * ? < > | ") is included in the entered export name.	An unavailable character is included in the entered export name.	
Entered export name is not available. Enter another export name.	A reserved name for Windows is used as an export name.	
Failed to activate the application.	Requested processing cannot be executed for the reason such as: - Corruption of the executable file. - Hard disk capacity shortage. - Memory shortage.	- Quit other applications and then restart NC Trainer / NC Trainer plus. - Restart the computer. - Reinstall NC Trainer / NC Trainer plus. - Check the hard-disk space. - Check the hardware specification of the computer you are using.
Failed to save the application setting.	- Hard disk capacity shortage. - The setting file is write protected. - The setting file is access-prohibited by security setting.	- Check the hard-disk space. - Allow the setting file (*1) for the application to be written. - Allow the setting file for the application to be accessed by security setting.
Failed to save project.	- Hard disk capacity shortage. - The project file is write protected. - The project file is access-prohibited by security setting.	- Check the hard-disk space. - Allow the project related files (*2) to be written. - Allow the project related files to be accessed by security setting.
Failed to open project.	- The project file is damaged. - The project file is access-prohibited by security setting.	- Delete the project related files (*2) and folders, and recreate them. - Allow the project related files to be accessed by security setting.

(*1) Data storage folder (Normally C:\NCTrnrplus Files)\NCTrainerBuilder.ini

(*2) The files under the data storage folder (Normally C:\NCTrnrplus Files)\opepanels\project name folder

Appendix 2.1.2 FAQ

Appendix 2.1.2.1 3D Program Check Screen Is Not Displayed

Depending on the computer you are using, 3D program check screen on the NC screen might not be displayed correctly. Try either (1) or (2) as updating the graphic driver etc. might solve this.

(1) Update your graphic driver card
(Check with the graphic card manufacturer or the computer manufacturer for the latest graphic driver.)

(2) Set [Hardware acceleration] to "None".
(For Windows 7/Windows Vista, you need to have an administrator account.)
[Procedure]

1. For Windows 7, right-click on the desktop and click [Screen resolution].
   For Windows Vista, right-click on the desktop, click [Personalize] and select [Display Settings].
   For Windows XP, right click on the desktop, click [Properties] and select [Setting] tab in [Display Properties]

2. Select [Advanced Settings].

3. For Windows Windows 7/Windows Vista, select [Change settings] in [Troubleshoot] tab and move Hardware acceleration’s slider to "None". If Hardware acceleration’s settings cannot be changed from [Troubleshooting] tab, change the setting with utility provided by graphic card manufacturer.
   For Windows XP, move Hardware acceleration’s slider to "None" in the [Troubleshoot] tab.

4. Press the "OK" button and restart Windows.

Appendix 2.1.2.2 When Speed Change Skip Is Executed, a Program Error "P601 No spec: Skip" Occurs

Settings of the speed change skip option, skip option (the high-speed skip option) and multiple-step skip option are required to use the speed change skip function.
Refer to the section "4.3.3 Changing Project Option Settings" of "I NC Trainer" for details and enable these options.

Appendix 2.1.2.3 Displayed Key Is Different from the Key Input from Keyboard

When the PC keyboard is changed (when Japanese keyboard is changed to English keyboard, etc.) or multiple different types of PC keyboards are connected, Windows may not judge the types of PC keyboard. If this phenomenon occurs, the following method might solve this.

[When using keyboard connected by USB]

1. For Windows 8, right-click on start screen than click [All Apps], click [Run] from list of application, input [regedit], and press the enter key.
   For Windows 7, click [Start] button, then input "regedit" to [Search programs and files] box and press the enter key.
   For Windows Vista, click [Start], then input "regedit" to [Start Search] box and press the enter key.
   For Windows XP, click [Start], and select [Run…] box, then input "regedit" and press the enter key.

   * When the [User Account Control] screen is displayed, execute the following operation.
     When the dialog box that requires administrator's password is displayed, input an administrator's account password and press the "OK" or "Yes" button. When the dialog box that requires confirmation is displayed, press the "Continue" or "Yes" button.

2. [Registry Editor] is started. Then select the following registry sub key.
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\i8042prt\Parameters

3. Set the registry entry as the following table shows.

   < When using 106/109 Japanese keyboard >

Value Name	Value type	Value data
LayerDriver JPN	REG_SZ	kbd106.dll
OverrideKeyboardIdentifier	REG_SZ	PCAT_106KEY
OverrideKeyboardSubtype	REG_DWORD	2
OverrideKeyboardType	REG_DWORD	7

   < When using 101/102 English (US) keyboard >

Value Name	Value type	Value data
LayerDriver JPN	REG_SZ	kbd101.dll
OverrideKeyboardIdentifier	REG_SZ	PCAT_101KEY
OverrideKeyboardSubtype	REG_DWORD	0
OverrideKeyboardType	REG_DWORD	7

   * When changing the registry entry, right click the value name and select [Touch up].
     Delete the existing value displayed in [Value data] box. Input the setting values referring to the above table and select the "OK" button.

   * Create the registry entry if not existed. To create an entry, right click blank area of advances window and point [NEW]. Click [String value] when the value type is "REG_SZ", and select [DWORD Value] when the value type is "REG_DWORD". Then input the value name, and input the value data to [Value data] box referring to the above table and press the "OK" button.

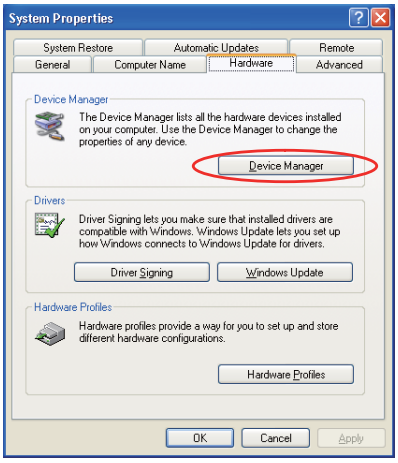
4. Exit from [Registry Editor]. Then restart Windows.

[When using the keyboard connected to PS/2]

1. Click [Start], then right click [My Computer] icon and select [Properties].

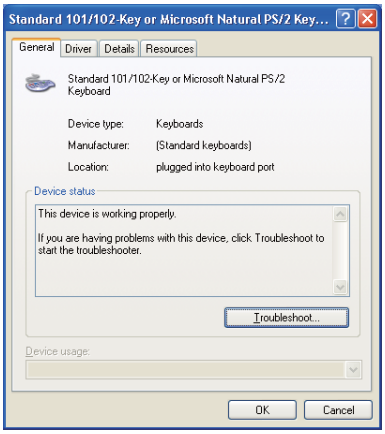
2. For Windows 8/Windows 7/Windows Vista, [System] screen is displayed. Press the "Device Manager" button.

For Windows XP, [System properties] screen is displayed. Select [Hardware] tab and press the "Device Manager" button.

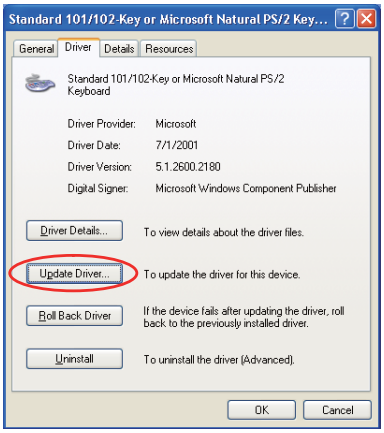


* If [User Account Control] screen is displayed, execute the following operation.
When the dialog box that requires administrator's password is displayed, input an administrator's account password and press the "OK" or "Yes" button. When the dialog box that requires confirmation is displayed, press the "Continue" or "Yes" button.

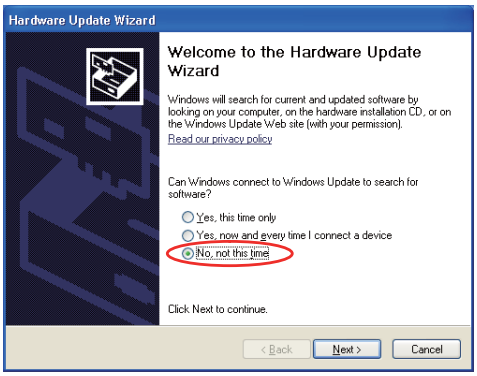
3. Expand [Keyboard] from device manager, and double-click PS/2 keyboard device to start properties of PS/2.



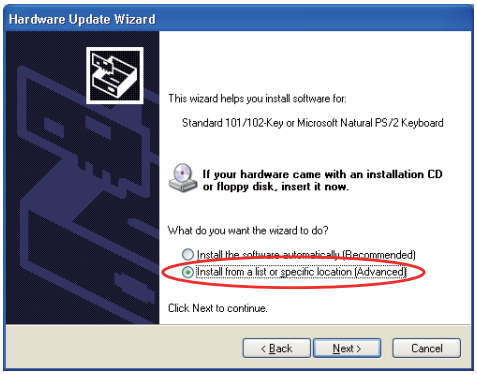
4. Press the "Update Driver" button in [Driver] tab to start Hardware Update Wizard.



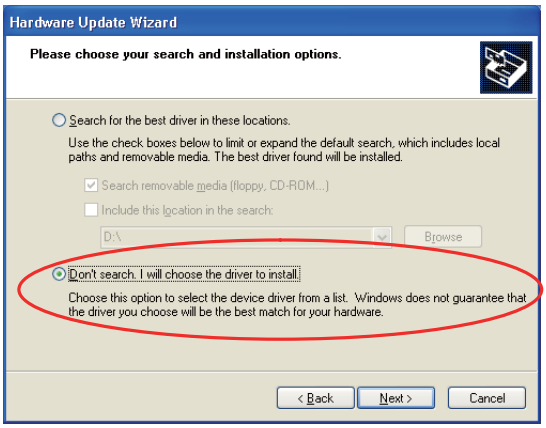
5. Select "No, not this time" and press the [Next] button.



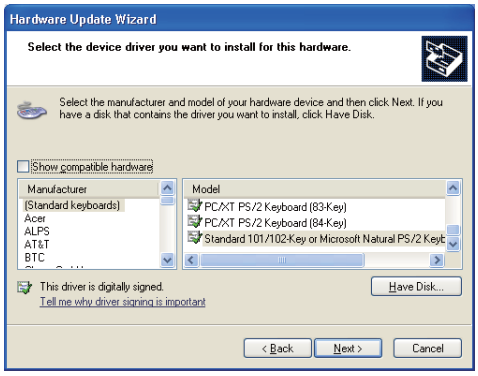
6. Select "Install from a list or specific location (Advanced)" and press the [Next] button.



7. Select "Don't search. I will choose the driver to install." and press the [Next] button.



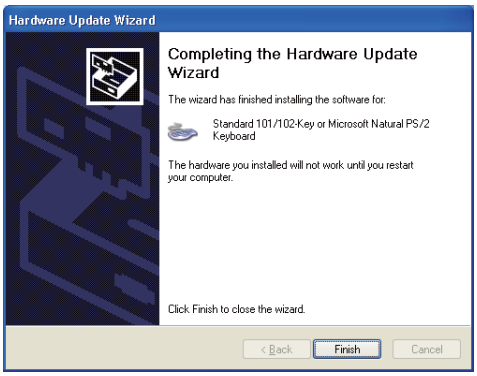
8. Uncheck the "Show compatible hardware" check box, and select "Japanese PS/2 Keyboard (106/109 Key)".



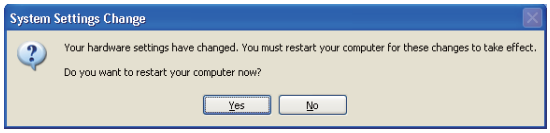
* When using 101/102 English keyboard, select "Standard 101/102-Key or Microsoft Natural PS/2 Keyboard".

9. Press the "Next" button and the upgrade warning message for driver will be displayed. Then press the "Yes" button.

10. When the installation is completed, next screen will appear. Press the "Complete" button.



11. When the message that requires to restart the computer is displayed, press the "Yes" button to restart Windows.



Appendix 2.1.2.4 Cannot Be Restarted After the Communication with a License Key of Network Connection Type is Lost

If the communication is lost for the disconnection of LAN cable, etc. when operating NC Trainer / NC Trainer plus up to the maximum number of license keys, NC Trainer / NC Trainer plus cannot be restarted for a while (about 10 minutes) even if reconnecting the LAN cable.
Wait for a while (about 10 minutes) or once remove the license key of network connection type and reinsert to start NC Trainer / NC Trainer plus.

Appendix 2.1.2.5 To Display Japanese, Simplified Chinese or Traditional Chinese in English Windows XP

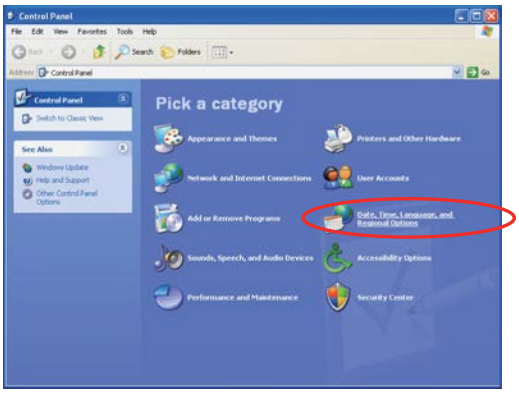
To change the display language to Japanese, Simplified Chinese or Traditional Chinese, install East Asian Languages Support according to the following procedure.

(Note 1) The installation CD for Windows XP is required.

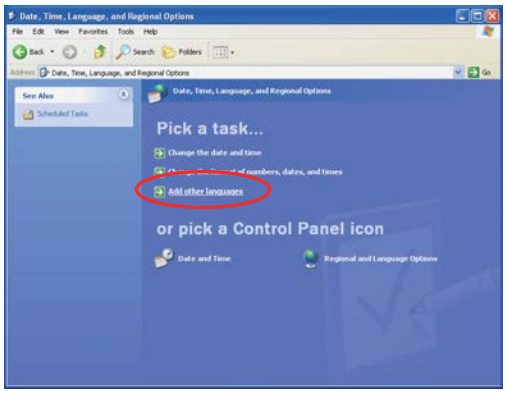
(Note 2) For many personal computers with Windows XP pre-installed, the files required for the installation are stored in the HDD. Contact the personal computer manufacturer for details.

1. Click the [Start] button on the taskbar and then click [Control Panel].

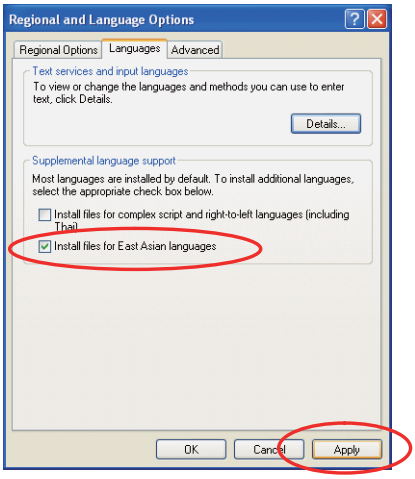
2. When the Control Panel is displayed, click [Date,Time,Language,and Regional Options].



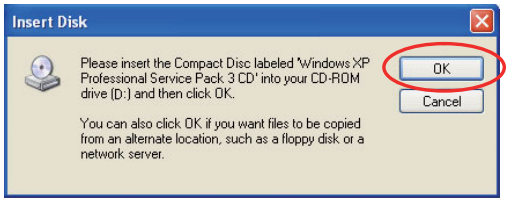
3. When the following screen is displayed, click [Add other languages].



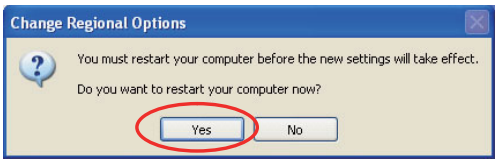
4. When the following dialog box is displayed, check [Install files for East Asian languages] and press the "Apply" button.



5. When the following message is displayed, set the installation CD for Windows XP and press the "OK" button (When the files required for the installation are already stored in the HDD, installation will be started without displaying the message).



6. When the installation is completed, the following message will appear. Press the "Yes" button and restart Windows XP.



Appendix 2.1.2.6 NC Configurator2 and NC Explorer cannot connect to NC Trainer plus

NC Configurator2 and NC Explorer may not connect to NC Trainer plus when Windows firewall function is enabled. Disable the firewall function or register NC Configurator2 and NC Explorer as an exception. (Carry out with the authority of the administrator.)

Appendix 2.1.2.7 The icon of NC Trainer/NC Trainer plus is not displayed correctly on start screen of Windows8

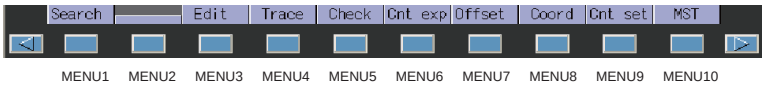
If NC Trainer/NC Trainer plus is installed to Windows8, the icon of NC Trainer/NC Trainer plus or NC Trainer Builder might not display correctly on start screen. In that case, unpin this application from start screen, and then pin it back to the screen to correctly display the icon on start screen.

Appendix 3

Explanation of Keys

Appendix 3.1 Explanation of Keys

On the NC Trainer, the following shortcut keys are available.

Key type	NC keyboard	Operation	PC keyboard
Function key (Function selection key)	MONITOR	This displays the screen related to "operations".	SHIFT+F1
	SET_UP	This displays the screen related to "setup".	SHIFT+F2
	EDIT	This displays the screen related to "editing".	SHIFT+F3
	DIAGN	This displays the screen related to "diagnosis".	SHIFT+F4
	MAINTE	This displays the screen related to "maintenance".	SHIFT+F5
		Custom release screen The screen differ according to the machine tool builder's specification.	CTRL+F3
			CTRL+F4
	SFP (Note 1)		SHIFT+F9
	F 0		SHIFT+F10
Part system changeover key	($ ⇔ $)	When using a multi-part system NC, this displays the data of the next part system. The screen does not change if it is a part system common screen or when only one part system is used.	CTRL+F1
Help key	?	This displays the operation guidance, parameter guidance and alarm guidance corresponding to the current operation.	CTRL+F2
Menu list key	MENU LIST	This displays each screen's menu configuration as a list.	CTRL+F8
Frame key	(Note 1)	This switches the tag.	CTRL+F9
	(Note 1)		CTRL+F10
Page changeover key	▲ Previous page key	When the displayed contents cover several pages, this displays the contents of the previous page. The "▲" mark at the top of the screen indicates that there is a previous page.	PageUp
	▼ Next page key	When the displayed contents cover several pages, this displays the contents of the next page. The "▼" mark at the top of the screen indicates that there is a next page.	PageDown
MENU key	MENU1	This changes the screen and displays the data.  	F1
	MENU2		F2
	MENU3		F3
	MENU4		F4
	MENU5		F5
	MENU6		F6
	MENU7		F7
	MENU8		F8
	MENU9		F9
	MENU10		F10
Menu changeover key	◁ (left side)	This changes the operation menu for the displayed screen to the current screen group screen selection menu. This is also used to cancel the menu operations of the displayed screen.	F11
	▷ (right side)	When all of the menus cannot be displayed at once, this displays the menus not currently displayed. The "◁" and"▷" marks at the bottom of the screen indicate that there are menus not displayed.	F12
Data delete key	DELETE	This deletes the character just before the cursor position in the data setting area.	DELETE
Data insert key	INSERT	This inputs the data insertion mode. When a data setting key is pressed, a character is inserted in front of the current cursor position. The overwrite mode is entered when the DELETE, C.B CAN, INPUT, cursor or TAB, etc., keys are pressed, or when the screen is changed.	INSERT
Cancel key	C.B.	This cancels the setting in the data setting area.	SHIFT+Home
	CAN		ESC
INPUT key	INPUT	This fixes the data in the data setting area, and writes it to the internal data. The cursor moves to the next position.	ENTER
Cursor key	↑	This moves the cursor up or down one when setting data in the screen display items.	↑
	↓		↓
	←	This moves the data input cursor one character to the left or right in the data setting area.	←
	→		→
Tab key	Right tab(| ←)	This moves the cursor one item to the left or right when selecting data in the screen display items. at cursor left end: Moves to the right end of previous line. at cursor right end: Moves to left end of next line.	SHIFT+TAB
	Left tab(→ |)		TAB
Lower case input key	ABC/abc… (Note 1)	This changes the input between upper case and lower case alphabetic characters.	Caps Lock

(Note 1) These keys are not provided in the NC key board. Use PC keyboard.

Revision History

Date of revision	Manual No.	Revision details
Aug. 2011	IB(NA)1501044-A	First edition created. (NC Trainer S/W version A0, Mitsubishi CNC M700V Series S/W version G5)
Feb. 2012	IB(NA)1501044-B	Simplified Chinese and Traditional Chinese display was supported. Contents were revised to correspond to NC Trainer software version A1. Contents were revised to correspond to Mitsubishi CNC M700V Series software version H1. - Revised the following chapters. Introduction 1.3 Precautions 2.1 Operating Environment 3.2.2 [View (V)] Menu 5. Specifications List - Added the following chapters. Appendix 1.1.2.4 Cannot Be Restarted After the Communication with a License Key of Network Connection Type is Lost Appendix 1.1.2.5 To Display Japanese, Simplified Chinese or Traditional Chinese in English Windows XP
Aug. 2012	IB(NA)1501044-C	NC Trainer plus was supported. Contents were revised to correspond to NC Trainer and NC Trainer plus software version B0. Contents were revised to correspond to Mitsubishi CNC M700V Series software version H3. - Revised the following chapters. Introduction 1 Introduction 2 Installation and Setup 3.2.1 [Project (P)] Menu 3.2.3 [Tool (T)] Menu 3.2.5 [Help (H)] Menu 3.3 Operation of NC Screen 4.1 Starting NC Trainer 4.3 Creating a Project Appendix 1 Specifications List Appendix 2 Troubleshooting - Added the following chapters. 1.2 Characteristics of NC Trainer 1.3 Functions of NC Trainer II NC Trainer plus Appendix 2.1.2.6 NC Configurator2 and NC Explorer cannot connect to NC Trainer plus Other contents were added/revised/deleted according to specification.
Oct. 2013	IB(NA)1501044-D	Contents were revised to correspond to NC Trainer, NC Trainer plus software version B1. Contents were revised to correspond to Mitsubishi CNC M700V/M70V/E70 Series software version J3. -Added the following chapters. I 3.2.7 Status Bar II 3.2.7 Status Bar II 5.1.2.7 Status Bar II 5.1.13 Exporting the File of Button/Lamp Setting II 5.3.6 Settings of Custom Release Start Up Screen Appendix 2.1.2.7 The icon of NC Trainer/NC Trainer plus is not displayed correctly on start screen of Windows8 (Continue to the next page)

Date of revision	Manual No.	Revision details
		(Continued from the previous page) - Revised the following chapters. I 1.1 Outline of NC Trainer I 1.5 Precautions I 2.1 Operating Environment I 2.2 Procedure of the First Installation I 2.4 Procedure of Uninstalling I 3.1 Configuration of the Screen I 3.2.2.1 Changing the Display Language I 3.2.3 [Tool (T)] Menu I 3.3.3.1 Restarting NC I 4.1 Starting NC Trainer I 4.3 Creating a Project II 1.1 Outline of NC Trainer plus II 1.2 Characteristics of NC Trainer plus II 1.5 Precautions II 2.2 Procedure of the First Installation II 2.3 Network Setting for Connecting with MELSOFT Peripheral Tool (GX- Developer) II 4.3 Creating a Project II 5.1.1 Custom Machine Operation Panel II 5.1.2 NC Trainer Builder Interface II 5.1.3 Start and Exit NC Trainer Builder II 5.1.4 Creating a Project of the Custom Machine Operation Panel II 5.1.5 Setting of Custom Machine Operation Panel II 5.1.7 Closing the Project II 5.1.8 Opening the Existing Project II 5.1.12 Reading Device Comments II 5.2 Creating User PLC (Ladder) and Checking the Operation II 5.2.1 User PLC Development Method with GX Developer II 5.2.2 User PLC Development Method with PLC Onboard II 5.3 Display of Custom Release Screen II 5.3.7 Restrictions for Custom Release Screen II 5.4 APLC release II 5.4.1 Writing APLC Release C Language Module II 5.4.8 Cautions for Source Level Debug II 5.4.9 Importing the NC Data from Actual NC II 6.1 Exporting NC Trainer plus Project Appendix 2.1.1.1 Error Messages Common Between NC Trainer and NC Trainer plus Appendix 2.1.2.1 3D Program Check Screen Is Not Displayed Appendix 2.1.2.3 Displayed Key Is Different from the Key Input from Keyboard Other contents were added/revised/deleted according to specification.

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Texas Service Satellites
GRAPEVINE, TEXAS 76051, U.S.A.
TEL: +1-678-258-4529 / FAX: +1-678-258-4519
HOUSTON, TEXAS 77001, U.S.A.
TEL: +1-678-258-4529 / FAX: +1-678-258-4519

Tennessee Service Satellite
Nashville, Tennessee, 37201, U.S.A.
TEL: +1-678-258-4529 / FAX: +1-678-258-4519

Florida Service Satellite
WEST MELBOURNE, FLORIDA 32904, U.S.A.
TEL: +1-678-258-4529 / FAX: +1-678-258-4519

Canada Region Service Center
4299 14TH AVENUE MARKHAM, ONTARIO L3R OJ2, CANADA
TEL: +1-905-475-7728 / FAX: +1-905-475-7935

Canada Service Satellite
EDMONTON, ALBERTA T5A 0A1, CANADA
TEL: +1-905-475-7728 FAX: +1-905-475-7935

Mexico Region Service Center
MARIANO ESCOBEDO 69 TLALNEPANTLA, 54030 EDO. DE MEXICO
TEL: +52-55-3067-7500 / FAX: +52-55-9171-7649

Monterrey Service Satellite
MONTERREY, N.L., 64720, MEXICO
TEL: +52-81-8365-4171

BRAZIL

MELCO CNC do Brasil Comércio e Serviços S.A

Brazil Region Service Center
ACESSO JOSE SARTORELLI, KM 2.1 CEP 18550-000, BOITUVA-SP, BRAZIL
TEL: +55-15-3363-9900 / FAX: +55-15-3363-9911

EUROPE

MITSUBISHI ELECTRIC EUROPE B.V.
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TEL: +49-2102-486-0 / FAX: +49-2102-486-5910

Germany Service Center
KURZE STRASSE. 40, 70794 FILDERSTADT-BONLANDEN, GERMANY
TEL: + 49-711-770598-121 / FAX: +49-711-770598-141

France Service Center DEPARTEMENT CONTROLE NUMERIQUE
25, BOULEVARD DES BOUVETS, 92741 NANTERRE CEDEX FRANCE
TEL: +33-1-41-02-83-13 / FAX: +33-1-49-01-07-25

France (Lyon) Service Satellite DEPARTEMENT CONTROLE NUMERIQUE
120, ALLEE JACQUES MONOD 69800 SAINT PRIEST FRANCE
TEL: +33-1-41-02-83-13 / FAX: +33-1-49-01-07-25

Italy Service Center
VIALE COLLEONI, 7 - CENTRO DIREZIONALE COLLEONI PALAZZO SIRIO INGRESSO 1
20864 AGRATE BRIANZA (MB), ITALY
TEL: +39-039-6053-342 / FAX: +39-039-6053-206

Italy (Padova) Service Satellite
VIA G. SAVELLI, 24 - 35129 PADOVA, ITALY
TEL: +39-039-6053-342 / FAX: +39-039-6053-206

U.K. Branch
TRAVELLERS LANE, HATFIELD, HERTFORDSHIRE, AL10 8XB, U.K.
TEL: +49-2102-486-0 / FAX: +49-2102-486-5910

Spain Service Center
CTRA. DE RUBI, 76-80-APDO. 420
08173 SAINT CUGAT DEL VALLES, BARCELONA SPAIN
TEL: +34-935-65-2236 / FAX: +34-935-89-1579

Poland Service Center
UL.KRAKOWSKA 50, 32-083 BALICE, POLAND
TEL: +48-12-630-4700 / FAX: +48-12-630-4701

Mitsubishi Electric Turkey A.Ş Ümraniye Şubesi
Turkey Service Center
ŞERIFALI MAH. NUTUK SOK. NO.5 34775
ÜMRANIYE / ISTANBUL, TURKEY
TEL: +90-216-526-3990 / FAX: +90-216-526-3995

Czech Republic Service Center
KAFKOVA 1853/3, 702 00 OSTRAVA 2, CZECH REPUBLIC
TEL: +420-59-5691-185 / FAX: +420-59-5691-199

Russia Service Center
213, B.NOVODMITROVSKAYA STR., 14/2, 127015 MOSCOW, RUSSIA
TEL: +7-495-748-0191 / FAX: +7-495-748-0192

Sweden Service Center
STRANDKULLEN, 718 91 FRÖVI , SWEDEN
TEL: +46-581-700-20 / FAX: +46-581-700-75

Bulgaria Service Center
4 ANDREJ LJAPCHEV BLVD. POB 21, BG-1756 SOFIA, BULGARIA
TEL: +359-2-8176009 / FAX: +359-2-9744061

Ukraine (Kharkov) Service Center
APTEKARSKIY LANE 9-A, OFFICE 3, 61001 KHARKOV, UKRAINE
TEL: +380-57-732-7774 / FAX: +380-57-731-8721

Ukraine (Kiev) Service Center
4-B, M. RASKOVOYI STR., 02660 KIEV, UKRAINE
TEL: +380-44-494-3355 / FAX: +380-44-494-3366

Belarus Service Center
OFFICE 9, NEZAVISIMOSTI PR.177, 220125 MINSK, BELARUS
TEL: +375-17-393-1177 / FAX: +375-17-393-0081

South Africa Service Center
P.O. BOX 9234, EDLEEN, KEMPTON PARK GAUTENG, 1625 SOUTH AFRICA
TEL: +27-11-394-8512 / FAX: +27-11-394-8513

ASEAN

MITSUBISHI ELECTRIC ASIA PTE. LTD. (ASEAN FA CENTER)

Singapore Service Center
307 ALEXANDRA ROAD #05-01/02 MITSUBISHI ELECTRIC BUILDING SINGAPORE 159943
TEL: +65-6473-2308 / FAX: +65-6476-7439

Malaysia (KL) Service Center
60, JALAN USJ 10 /1B 47620 UEP SUBANG JAYA SELANGOR DARUL EHSAN, MALAYSIA
TEL: +60-3-5631-7605 / FAX: +60-3-5631-7636

Malaysia (Johor Baru) Service Center
NO. 16, JALAN SHAH BANDAR 1, TAMAN UNGKU TUN AMINAH, 81300 SKUDAI, JOHOR MALAYSIA
TEL: +60-7-557-8218 / FAX: +60-7-557-3404

Philippines Service Center
UNIT NO.411, ALABAMG CORPORATE CENTER KM 25. WEST SERVICE ROAD
SOUTH SUPERHIGHWAY, ALABAMG MUNTINLUPA METRO MANILA, PHILIPPINES 1771
TEL: +63-2-807-2416 / FAX: +63-2-807-2417

VIETNAM

MITSUBISHI ELECTRIC VIETNAM CO.,LTD

Vietnam (Ho Chi Minh) Service Center
UNIT 01-04, 10TH FLOOR, VINCOM CENTER 72 LE THANH TON STREET, DISTRICT 1,
HO CHI MINH CITY, VIETNAM
TEL: +84-8-3910 5945 / FAX: +84-8-3910 5947

Vietnam (Hanoi) Service Satellite
SUITE 9-05, 9TH FLOOR, HANOI CENTRAL OFFICE BUILDING, 44B LY THUONG KIET STREET,
HOAN KIEM DISTRICT, HANOI CITY, VIETNAM
TEL: +84-4-3937-8075 / FAX: +84-4-3937-8076

INDONESIA

PT. MITSUBISHI ELECTRIC INDONESIA

Indonesia Service Center
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TEL: +62-21-3192-6461 / FAX: +62-21-3192-3942

THAILAND

MITSUBISHI ELECTRIC AUTOMATION (THAILAND) CO., LTD. (THAILAND FA CENTER)

Thailand Service Center
BANG-CHAN INDUSTRIAL ESTATE NO.111 SOI SERITHAI 54
T.KANNAYAO, A.KANNAYAO, BANGKOK 10230, THAILAND
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Thailand Service Center
898/19,20,21,22 S.V. CITY BUILDING OFFICE TOWER 1, FLOOR 7
RAMA III RD., BANGPONGPANG, YANNAWA, BANGKOK 10120, THAILAND
TEL: +66-2-682-6522 / FAX: +66-2-682-9750

INDIA

MITSUBISHI ELECTRIC INDIA PVT. LTD.

India Service Center
2nd FLOOR, TOWER A & B, DLF CYBER GREENS, DLF CYBER CITY,
DLF PHASE-III, GURGAON 122 002, HARYANA, INDIA
TEL: +91-124-4630 300 / FAX: +91-124-4630 399
Ludhiana satellite office
Jamshedpur satellite office

India (Pune) Service Center
EMERALD HOUSE, EL-3, J-BLOCK, MIDC BHOSARI. PUNE – 411 026, MAHARASHTRA, INDIA
TEL: +91-20-2710 2000 / FAX: +91-20-2710 2100
Baroda satellite office
Mumbai satellite office

India (Bangalore) Service Center
PRESTIGE EMERALD, 6TH FLOOR, MUNICIPAL NO. 2,
LAVELLE ROAD, BANGALORE - 560 043, KAMATAKA, INDIA
TEL: +91-80-4020-1600 / FAX: +91-80-4020-1699
Chennai satellite office
Coimbatore satellite office

OCEANIA

MITSUBISHI ELECTRIC AUSTRALIA LTD.

Australia Service Center
348 VICTORIA ROAD, RYDALMERE, N.S.W. 2116 AUSTRALIA
TEL: +61-2-9684-7269 / FAX: +61-2-9684-7245

CHINA

MITSUBISHI ELECTRIC AUTOMATION (CHINA) LTD. (CHINA FA CENTER)

China (Shanghai) Service Center
1-3,5-10,18-23/F, NO.1386 HONG QIAO ROAD, CHANG NING QU,
SHANGHAI 200336, CHINA
TEL: +86-21-2322-3030 / FAX: +86-21-2308-2830
China (Ningbo) Service Dealer
China (Wuxi) Service Dealer
China (Jinan) Service Dealer
China (Hangzhou) Service Dealer
China (Wuhan) Service Satellite

China (Beijing) Service Center
9/F, OFFICE TOWER 1, HENDERSON CENTER, 18 JIANGUOMENNEI DAJIE,
DONGCHENG DISTRICT, BEIJING 100005, CHINA
TEL: +86-10-6518-8830 / FAX: +86-10-6518-3907
China (Beijing) Service Dealer

China (Tianjin) Service Center
UNIT 2003, TIANJIN CITY TOWER, NO 35 YOUYI ROAD, HEXI DISTRICT,
TIANJIN 300061, CHINA
TEL: +86-22-2813-1015 / FAX: +86-22-2813-1017
China (Shenyang) Service Satellite
China (Changchun) Service Satellite

China (Chengdu) Service Center
ROOM 407-408, OFFICE TOWER AT SHANGRI-LA CENTER, NO. 9 BINJIANG DONG ROAD,
JINJIANG DISTRICT, CHENGDU, SICHUAN 610021, CHINA
TEL: +86-28-8446-8030 / FAX: +86-28-8446-8630

China (Shenzhen) Service Center
ROOM 2512-2516, 25/F., GREAT CHINA INTERNATIONAL EXCHANGE SQUARE, JINTIAN RD.S.,
FUTIAN DISTRICT, SHENZHEN 518034, CHINA
TEL: +86-755-2399-8272 / FAX: +86-755-8218-4776
China (Xiamen) Service Dealer
China (Dongguan) Service Dealer

KOREA

MITSUBISHI ELECTRIC AUTOMATION KOREA CO., LTD. (KOREA FA CENTER)

Korea Service Center
1480-6, GAYANG-DONG, GANGSEO-GU, SEOUL 157-200, KOREA
TEL: +82-2-3660-9602 / FAX: +82-2-3664-8668

Korea Taegu Service Satellite
4F KT BUILDING, 1630 SANGYEOK-DONG, BUK-KU, DAEGU 702-835, KOREA
TEL: +82-53-382-7400 / FAX: +82-53-382-7411

TAIWAN

MITSUBISHI ELECTRIC TAIWAN CO., LTD. (TAIWAN FA CENTER)

Taiwan (Taichung) Service Center (Central Area)
NO.8-1, INDUSTRIAL 16TH RD., TAICHUNG INDUSTRIAL PARK, SITUN DIST.,
TAICHUNG CITY 40768, TAIWAN R.O.C.
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Taiwan (Taipei) Service Center (North Area)
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TEL: +886-2-2833-5430 / FAX: +886-2-2833-5433

Taiwan (Tainan) Service Center (South Area)
11F-1., NO.30, ZHONGZHENG S. ROAD, YONGKANG DISTRICT, TAINAN CITY 71067, TAIWAN, R.O.C
TEL: +886-6-252-5030 / FAX: +886-6-252-5031

Notice

Every effort has been made to keep up with software and hardware revisions in the contents described in this manual. However, please understand that in some unavoidable cases simultaneous revision is not possible. Please contact your Mitsubishi Electric dealer with any questions or comments regarding the use of this product.

MITSUBISHI CNC

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

MODEL	NC Trainer/NC Trainer plus
MODEL CODE	100-298
Manual No.	IB-1501044

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