MITSUBISHI ELECTRIC

*Changes for the Better*

Numerical Control (CNC)

# Instruction Manual

# NC Trainer2/NC Trainer2 plus

**MELSOFT**
**Integrated FA Software**

IB-1501318(ENG)-L

# Introduction

This instruction manual describes how to use NC Trainer2 / NC Trainer2 plus. Incorrect handling may lead to unforeseen accidents, so make sure to read this instruction manual thoroughly before operation to ensure correct usage.
NC Trainer2/NC Trainer2 plus support the following series.

| Supported models | Details |
|---|---|
| M800VW Series | M830VW |
| M800VS Series | M830VS |
| M80V Series | M80V TypeA, M80V TypeB |
| M800W Series | M830W |
| M800S Series | M830S |
| M80 Series | M80 TypeA, M80 TypeB |
| E80 Series | E80 TypeA, E80 TypeB |
| C80 Series (Note) | C80 |

(Note) C80 Series is supported only by NC Trainer2 plus. C80 Series is not supported by NC Trainer2.

| Supported models | Details |
|---|---|
| M700VW Series | M730VW |
| M700VS Series | M730VS |
| M70V Series | M70V TypeA, M70V TypeB |
| E70 Series | E70 |

Abbreviations in this manual are as follows:

| Abbreviations | Supported models |
|---|---|
| M800V, M800V Series | M800VW Series/M800VS Series |
| M80V, M80V Series | M80V Series |
| M8V, M8V Series | M800VW Series/M800VS Series/M80V Series |
| M800, M800 Series | M800W Series/M800S Series |
| M80, M80 Series | M80 Series |
| M8, M8 Series | M800W Series/M800S Series/M80 Series/E80 Series |

| Abbreviations | Supported models |
|---|---|
| M700V, M700V Series | M700VW Series/M700VS Series |
| M7, M7 Series | M700VW Series/M700VS Series/M70V Series/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.**
- ⚠ **To protect the availability, integrity and confidentiality of the NC system against cyber-attacks including unauthorized access, denial-of-service (Dos) (*1) attack, and computer virus from external sources via a network, take security measures such as firewall, VPN, and anti-virus software.**
  **(*1) Denial-of-service (Dos) refers to a type of cyber-attack that disrupts services by overloading the system or by exploiting a vulnerability of the system.**
- ⚠ **Mitsubishi Electric assumes no responsibility for any problems caused to the NC system by any type of cyber-attacks including DoS attack, unauthorized access and computer virus.**

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# CONTENTS

# I NC Trainer2

# 1

# Introduction

# 1.1 Outline of NC Trainer2

NC Trainer2 is an application for operating the screen of M800V/M80V/M800/M80/E80/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 Trainer2 can be used for NC (actual machine) after checking the operations.
NC control unit and dedicated display device are not required for NC Trainer2.
The characteristics of NC Trainer2 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 M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB/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 M800V/M80V Series.

- M800V/M80V Series Instruction Manual IB-1501618
- M800V/M80V Series Programming Manual Lathe System (1/2) IB-1501619
- M800V/M80V Series Programming Manual Lathe System (2/2) IB-1501620
- M800V/M80V Series Programming Manual Machining Center System (1/2) IB-1501621
- M800V/M80V Series Programming Manual Machining Center System (2/2) IB-1501622

Refer to the following manuals for operating procedure or programming, etc. of M800/M80/E80/C80 Series.

- M800/M80/E80 Series Instruction Manual IB-1501274
- M800/M80/E80/C80 Series Programming Manual Lathe System (1/2) IB-1501275
- M800/M80/E80/C80 Series Programming Manual Lathe System (2/2) IB-1501276
- M800/M80/E80/C80 Series Programming Manual Machining Center System (1/2) IB-1501277
- M800/M80/E80/C80 Series Programming Manual Machining Center System (2/2) IB-1501278

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

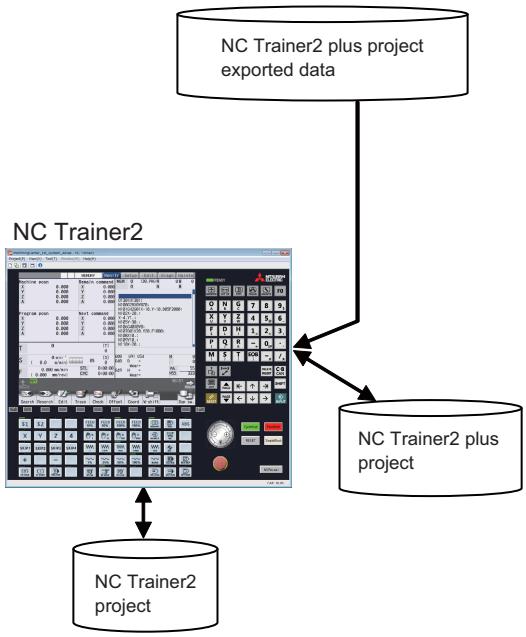
- M700V/M70V Series Instruction Manual IB-1500922
- M700V/M70V Series Programming Manual (Lathe System) IB-1500924
- M700V/M70V Series Programming Manual (Machining Center System) IB-1500926
- E70 Series Instruction Manual IB-1501186
- E70 Series Programming Manual (Lathe System) IB-1501193
- E70 Series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

Refer to MITSUBISHI ELECTRIC FA Global Website for each manual.
MITSUBISHI ELECTRIC FA Global Website: http://www.mitsubishielectric.com/fa/index.html

## 1.2 Characteristics of NC Trainer2

The following is the characteristics of NC Trainer2.

- NC Trainer2 is a tool for end users. This tool can be used for creating machining programs and mastering NC operation.
- NC Trainer2 can be set for mastering machine tool operation by providing a project which is exported from NC Trainer2 plus to be imported by an NC Trainer2 user.



# 1.3 Functions of NC Trainer2

Refer to the section "Appendix 1 Specifications List" for details of the functions of NC Trainer2.
The functions not described in the specifications list will be explained in this section.

○ : Supported × : Not supported

| Function | NC Trainer2 | 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 Trainer2 plus when using F0 release (directly start the executing file) |
| Source debug for custom release screen (Only for compilation method) | × | |
| Execution of user PLC ladder | × | |
| PLC onboard | × | |
| 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 Trainer2 plus to NC Trainer2.

# 1.4 About a License for NC Trainer2

## 1.4.1 License Type for NC Trainer2

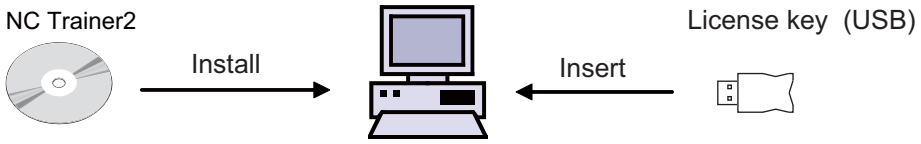
A license key is required to be inserted into the USB port of a computer to start NC Trainer2.

(Note1) There are separate license keys for NC Trainer2 and for NC Trainer2 plus. NC Trainer2 plus cannot be started with the license key attached to NC Trainer2 and NC Trainer2 cannot be started with the one attached to NC Trainer2 plus.

(Note2) NC Trainer cannot be started with the license key attached to NC Trainer2 and NC Trainer2 cannot be started with the one attached to NC Trainer.

**<Stand-alone type>**

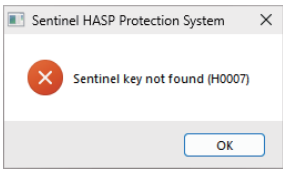
- Required to purchase one user licence per computer.
- Insert the license key of NC Trainer2 into a computer with NC Trainer2 installed.



# 1.5 Precautions

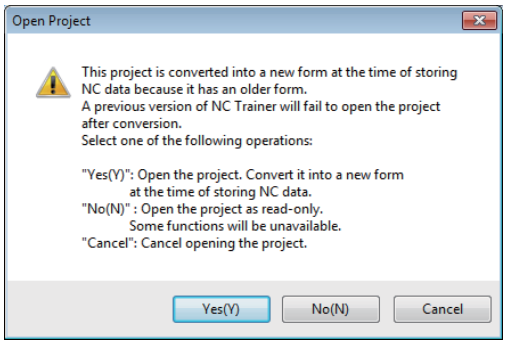
When using NC Trainer2, pay attention to the following.

- The displayed "Memory card (Only for a project of M80V TypeA/M80V TypeB/M80 TypeA/M80 TypeB/M70V TypeA/M70V TypeB/E70)" device is the path designated at the time of installation. "C:\MELCNC\NCT2\HD" is set by default.
- The displayed "HD (Only for a project of M830V/M830/M730V)" device is the path designated at the time of installation. "C:\MELCNC\NCT2\HD" is set by default.
- When license key is not inserted at starting NC Trainer2, the following dialog box is displayed and NC Trainer2 cannot be started. After pressing the "OK" button, insert license key and start NC Trainer2 again.




- More than one NC Trainer2 cannot start at a time.
- NC Trainer2 and NC Trainer2 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 Trainer2, 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 Trainer2 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 Trainer2 is started with a license key of network connection type, NC Trainer2 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 Trainer2, 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.
- Date and time cannot be changed from an NC screen.
- The floating-point arithmetic may result in an error between the CPU of the personal computer running NC Trainer2 and actual NC.

- When using the machining program which is created with NC Trainer2 on the actual machine, be sure to check the operation thoroughly. If the NC version is different between NC Trainer2 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 Trainer2 plus to NC Trainer/NC Trainer plus.
  An error will occur when importing the project, or the imported project will not activate normally.
- Do not activate the project created by NC Trainer2 with NC Trainer. An error occurs when activating the project.
- When activating the project created by NC Trainer, the message that verifies the format conversion may appear.

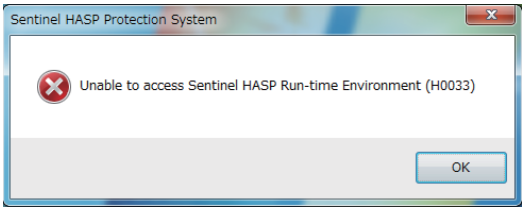



  - When the project is converted to a new format, the project can not be opened by NC Trainer.
  - If there is no possibility to open the project by NC Trainer, click "Yes(Y)" to open the project.
  - If there is a possibility to open the project by NC Trainer, click "No(N)" to open by read-only.
  - 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.<br>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).<br>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 Trainer2 plus project" of "II NC Trainer2 plus" for detail. |

- When changing the project option setting created by NC Trainer, format conversion may be required as with a read-only project.
- Background check is not available with M830V/M830 project. Foreground check is always used.

- Do not install NC Trainer plus when NC Trainer2 is already installed. Similarly, do not install NC Trainer when NC Trainer2 plus is already installed. When either NC Trainer or NC Trainer plus is uninstalled after NC Trainer2 or NC Trainer2 plus has been installed, the following dialog box may appear when activating the other application and it cannot be started, or the application may be force-quit sometime after starting. If that happens, uninstall the application and install it again.




- Do not use the data created by NC Trainer2 with NC Trainer. The application may not work normally when using it.
- Collecting sampling data can not be executed.
- Safety ladder cannot be operated.
  Also, the safety ladder cannot be input or output. Specifically, the following input/output functions are restricted.
  <M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB project>

| Restricted functions | Restricted contents |
|---|---|
| The [Mainte] - [I/O] screen of the NC screen | Data cannot be transferred. |
| Batch backups | Data cannot be backed up and restored. |
| Automatic backups | Data cannot be backed up. |

- A gesture operation is available with M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB project.
- The following miscellaneous functions (M codes) are allocated to the spindle control function or spindle/C axis control function with the standard user ladder.

| Code | Function | Code | Function |
|---|---|---|---|
| M03 | 1st spindle forward run | M45 | 4th spindle stop |
| M04 | 1st spindle reverse run | M53 | 5th spindle forward run |
| M05 | 1st spindle stop | M54 | 5th spindle reverse run |
| M17 | C axis servo off signal ON | M55 | 5th spindle stop |
| M18 | C axis servo off signal OFF | M63 | 6th spindle forward run |
| M23 | 2nd spindle forward run | M64 | 6th spindle reverse run |
| M24 | 2nd spindle reverse run | M65 | 6th spindle stop |
| M25 | 2nd spindle stop | M73 | 7th spindle forward run |
| M33 | 3rd spindle forward run | M74 | 7th spindle reverse run |
| M34 | 3rd spindle reverse run | M75 | 7th spindle stop |
| M35 | 3rd spindle stop | M83 | 8th spindle forward run |
| M43 | 4th spindle forward run | M84 | 8th spindle reverse run |
| M44 | 4th spindle reverse run | M85 | 8th spindle stop |

(Note 1) M17 or M18 command operate on the C axis of the designated part system.

- The alarm "P482 Illegal axis (mill)" will occur by executing the cylindrical interpolation command (G07.1) while performing the graphic check or finish shape view programming under the following conditions.
  - Any project of M830V/M830 Series is selected
  - "Arbitrary axis exchange control" specification is ON

  Set "Arbitrary axis exchange control" specification to OFF when you execute the cylindrical interpolation command (G07.1) without using the arbitrary axis exchange control function.
- A custom tool management screen specified by a setting file created by machine tool builders cannot be displayed for a M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB project.

- A logo created by machine tool builders cannot be displayed on the NC standard screen for a M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB project.
- A comment of device release screen specified by a comment file created by machine tool builders cannot be displayed.
- When NC Trainer2 is uninstalled with NC Visualizer installed, the driver is reinstalled when the NC Visualizer license key is installed. After the completion of driver reinstallation, NC Visualizer can be started.
- When NC Trainer2 and some MELSOFT products such as GX works3, etc. are to be installed on the same PC, if NC Trainer2 is installed before MELSOFT products are installed, project creation/startup may fail with NC Trainer2.
  Install NC Trainer2 after installing other MELSOFT products. When the creation/switching of the project fails as a result of installing MELSOFT products after NC Trainer2, reinstall NC Trainer2.

# 2

# Installation and Setup

# 2.1 Operating Environment

The system environment necessary for the operation of NC Trainer2 is shown below.

| Item | Description |
|---|---|
| OS | Windows 11 / Windows 10 (32bit version / 64bit version)<br>*WOW64 is used for 64-bit version. |
| CPU | Speed of 2.66GHz or greater and containing 2 or more cores |
| Memory | 4GB or more |
| Available hard disk space | 4GB or more (excluding the free space necessary for running the OS) |
| Display | Video adapter with FHD (1920x1080) or better resolution and a monitor (the number of colors that can be displayed simultaneously is 65536 or more,16.77 million colors are recommended) |
| Interface | USB 1.1 or higher<br>10/100/1000M Ethernet (For network connection type only) |
| Display language | English / Japanese/ Simplified Chinese / Traditional Chinese |

## 2.2 Procedure of the First Installation

(Note 1) Do not install license key until the installation of NC Trainer2 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.

(Note 2) When NC Trainer2 and some MELSOFT products such as GX works3, etc. are to be installed on the same PC, if NC Trainer2 is installed before MELSOFT products are installed, project creation/startup may fail with NC Trainer2.
Install NC Trainer2 after installing other MELSOFT products. When the creation/switching of the project fails as a result of installing MELSOFT products after NC Trainer2, reinstall NC Trainer2.

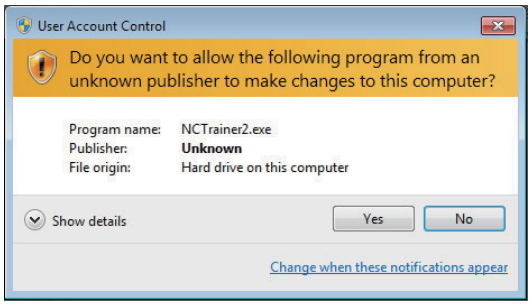
(1) Insert NC Trainer2 installation CD in computer's CD-ROM drive.

(2) Execute "NC Trainer2.exe" in the installation CD.

(Note 1) The installation screens are displayed in Japanese when installing on Japanese-language version of Windows. They are displayed in English when installing on other language versions of Windows.

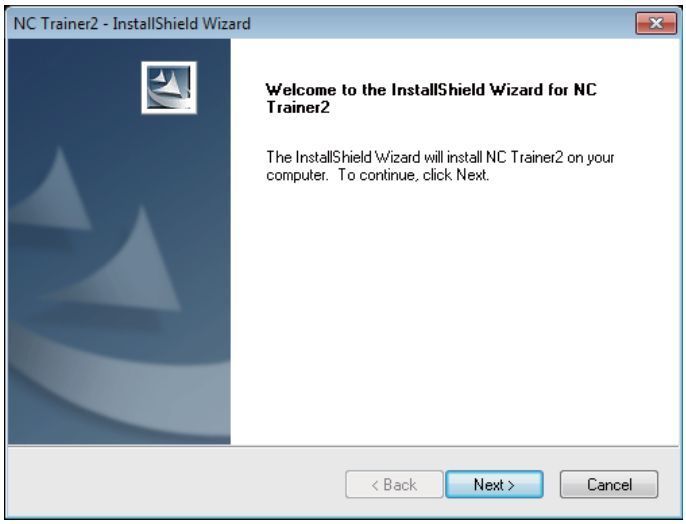
(Note 2) When NC Trainer has been installed on the computer, uninstallation of NC Trainer is started. Install NC Trainer2 after uninstalling NC Trainer. Refer to the section "2.4 Procedure of Uninstalling" for details.

(Note 3) The installation of NC Trainer2 has to be carried out by the authority of the administrator.
If User Account Control is enabled, the confirmation dialog box as below pops up. Then, select "YES" to start the installation.

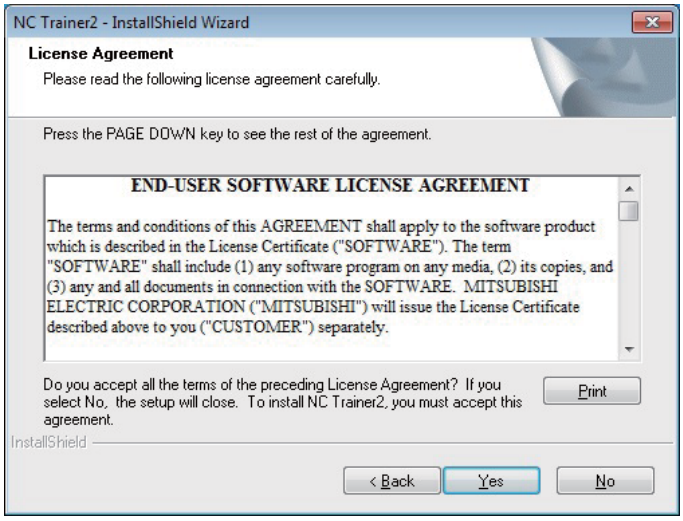


(3) Splash screen is displayed. Then the installer is started.

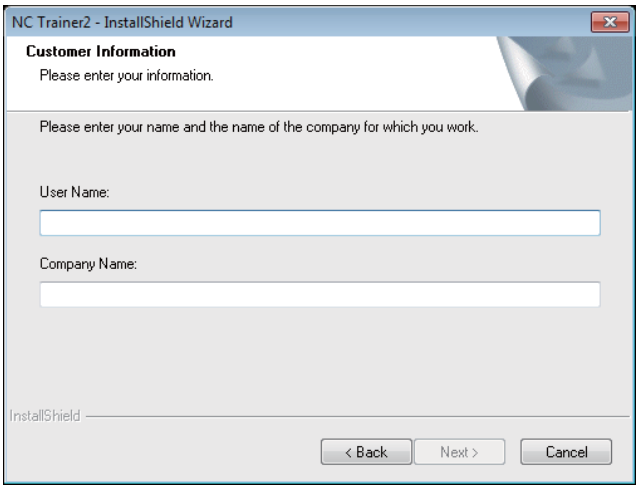

(4) The setup screen is displayed.
Press the "Next" button.



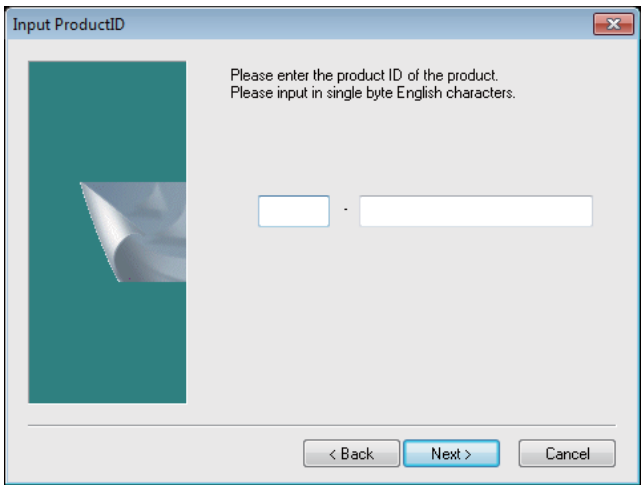

(5) The software license agreement is displayed.
Read the software license agreement carefully, and press the "Yes" button.
If "No" is selected (when you do not agree this agreement), the installation of NC Trainer2 is discontinued.



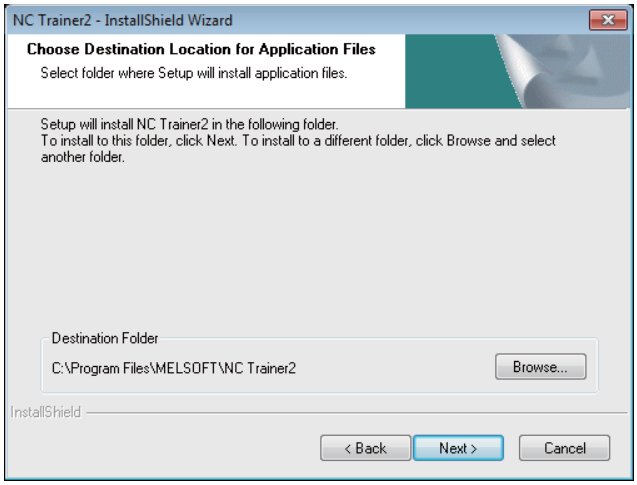
(6) The "Customer Information" screen is displayed. Input user name and company name and press the "Next" button.




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

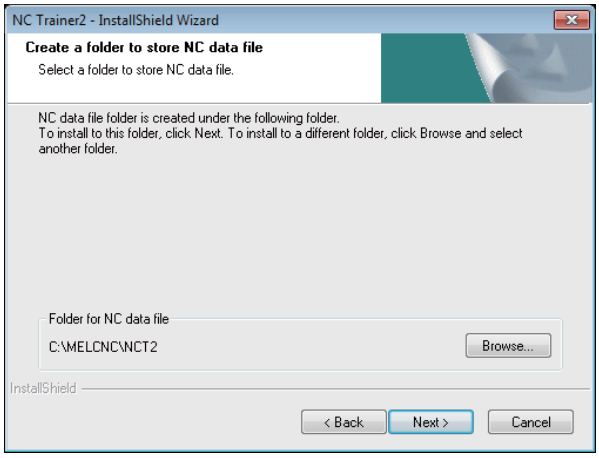



(8) The "Choose Designation Location" screen is displayed. Press "Browse" and select the installation destination when changing the installation destination. Press the "Next" button after the installation destination settings.




(Note) To change the folder to install the application file, specify the full path of the folder using up to 80 characters. A full path over 80 characters cannot be set.

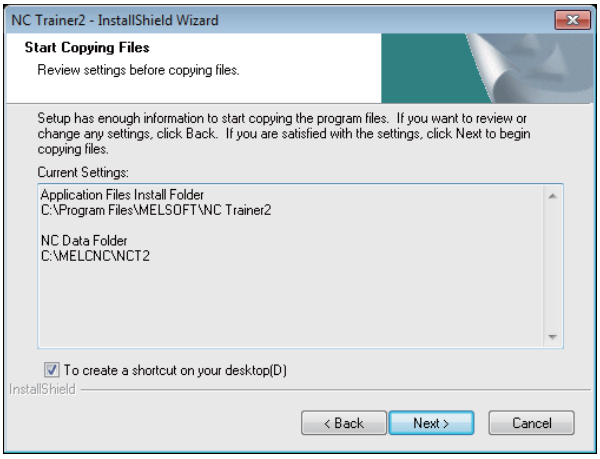
(9) The "Create a folder to store NC data file" screen is displayed.
Press "Browse" and select the folder to store NC data file when changing the folder.
Press the "Next" button after the settings.




(Note 1) If NC Trainer was used in the past, the data created by NC Trainer can be taken over automatically when selecting the same data storage folder as in the past. When selecting a different folder from the one used for NC Trainer to store NC data file, the data can be taken over by copying the data created by NC Trainer to the folder after installing NC Trainer2. For a project that contains custom screen data designated with absolute path, however, you need to change the path described in config.ini and customdef.ini according to the change of the data storage folder. Refer to the section "5.3.2 Path Designation of GIP File and DLL File" of "II NC Trainer2 plus" for details.

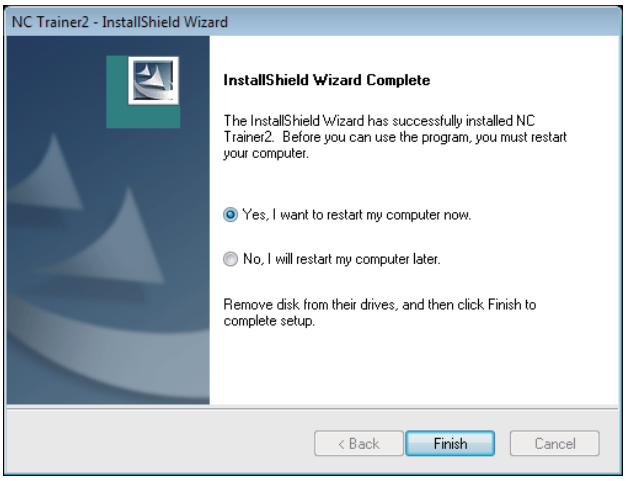
(Note 2) The following are the precautions when changing the folder to store NC data file.
- Do not use kana-kanji as a folder name.
- A folder name over 19 characters cannot be set.
- Do not designate a folder under C:/Program Files and C:/Windows. (Writing data to these folders is usually prohibited.)
- When installing both NC Trainer2 and NC Trainer2 plus, designate a different folder for each.
If designating the same folder, the same name project cannot be created for NC Trainer2 and NC Trainer2 plus. (Same for copying and renaming the project.)
- Do not designate a drive other than C or D. If designating a drive other than C or D, the operation for the file in HD or memory card device may not be executed.

(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 Trainer2 is created on the desktop after the installation is completed.




(Note) The "HASP SRM Run-time Environment installation omitted. Newer version already installed." 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 Trainer2, carry out the following procedure.

(1) Refer to the section "2.4 Procedure of Uninstalling" and uninstall NC Trainer2.

(2) Refer to the section "2.2 Procedure of the First Installation" and reinstall NC Trainer2.

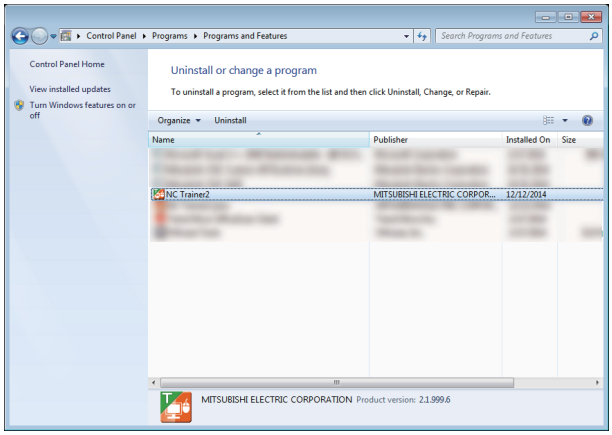
## 2.4 Procedure of Uninstalling

Uninstall NC Trainer2 from Control Panel.

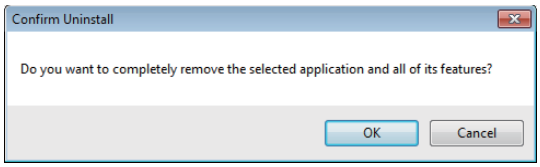
(Note) When a license key is inserted to the computer that NC Trainer2 is to be uninstalled, start the uninstallation after removing the key. Do not insert a license key until the uninstallation is completed.

### 2.4.1 Procedure of Uninstalling by the Control Panel

(1) Select the [All apps] - [Control Panel] - [Programs] - [Programs and Features] from the [Start] menu.
Select the NC Trainer2 from the list, and press the "Uninstall".

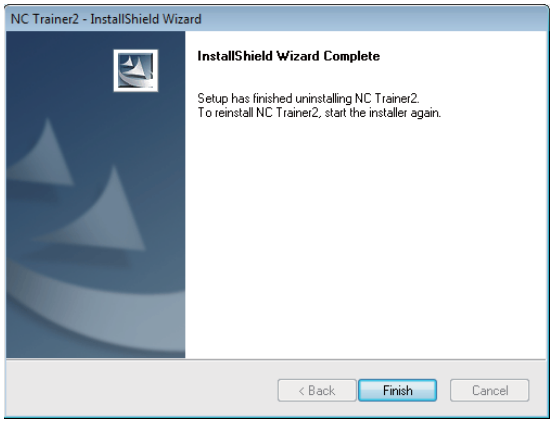


(2) The "Confirm Uninstall" screen is displayed.
When the "OK" is pressed, the uninstallation starts.
(When the "Cancel" is pressed, return to the Control Panel screen.)




(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 Trainer2 has two display modes.

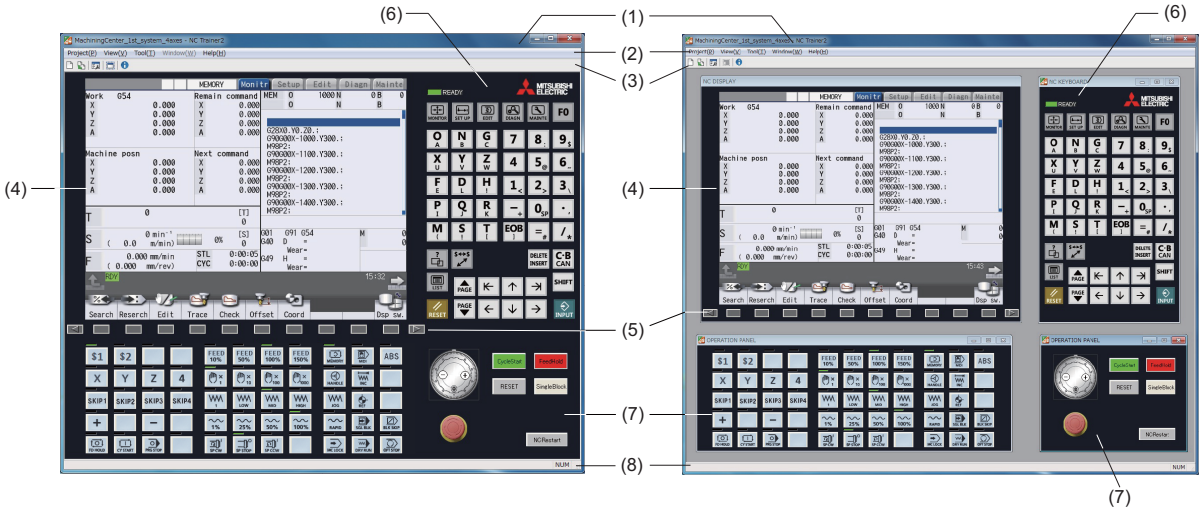
**(a) Standard display mode**

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**

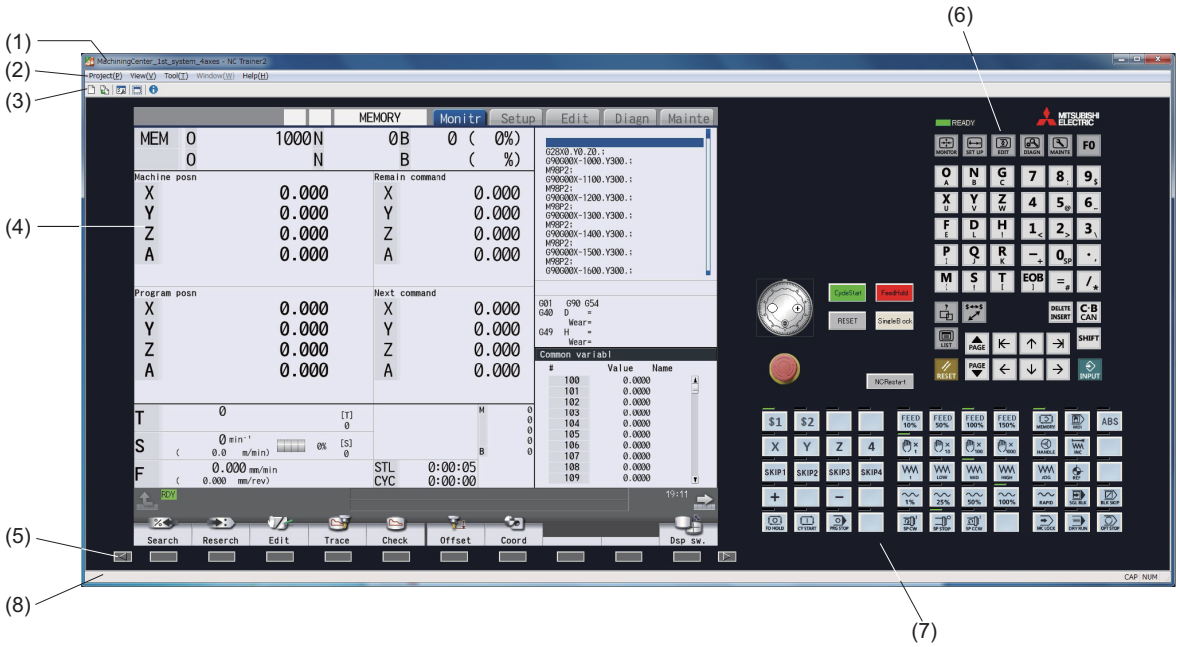
Each window of NC screen, NC keyboard, and the machine operation panel are displayed in the NC Trainer2 screen.
Each window can be moved freely and changed whether to display or hide.
Note that NC screen window cannot be hidden.

**< For 10.4-type NC screen >**

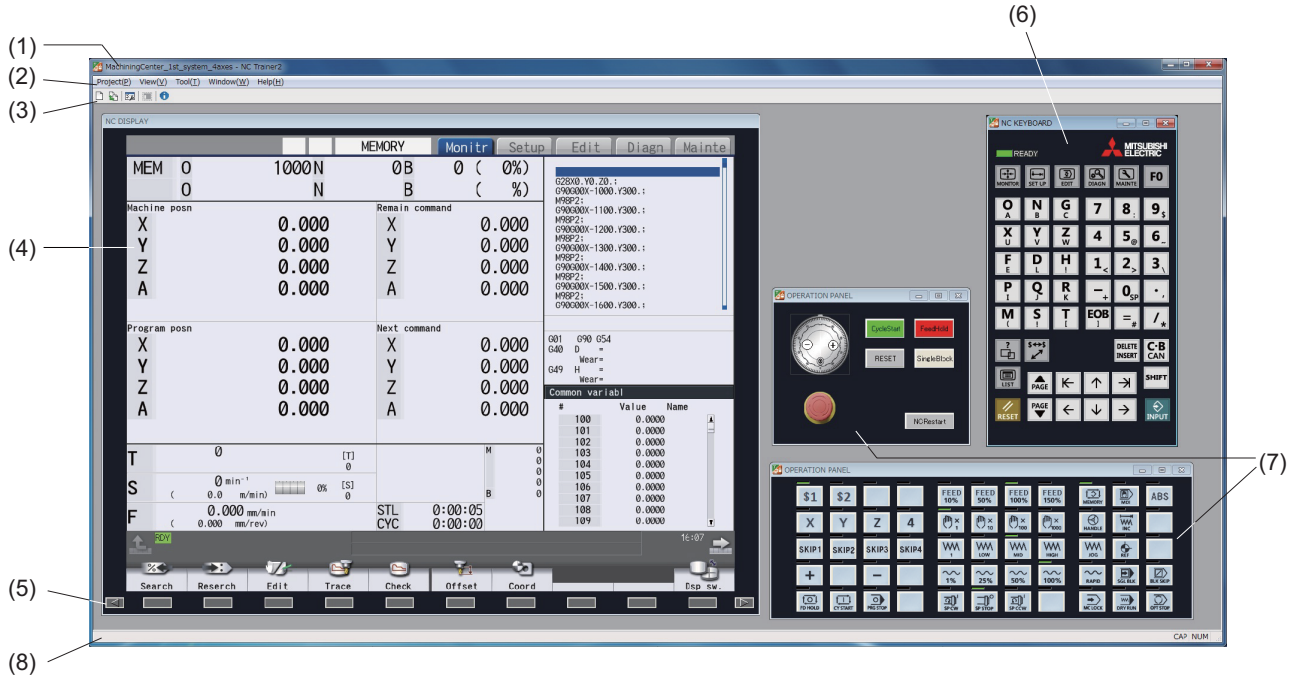



**(a) Standard display mode** **(b) Multi-window display mode**

**< For 15-type NC screen >**




**(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. |
| (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

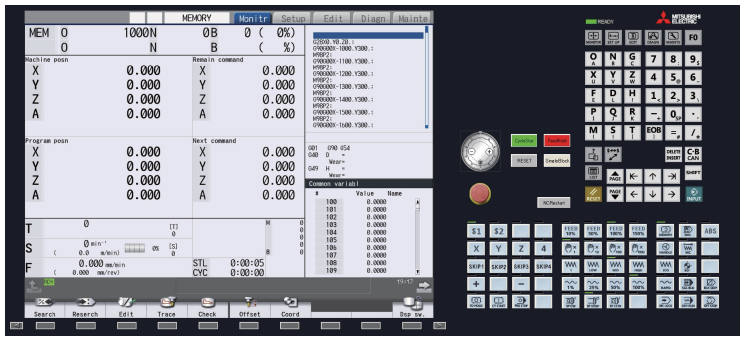
When the window size is enlarged

### 3.1.2 Full Screen Display

Applications are displayed in full size display without the window frame. In full screen display, NC Trainer2 screen is displayed at the center of the desktop.

**< For 10.4-type NC screen >**

**< For 15-type NC screen >**



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.<br>- 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

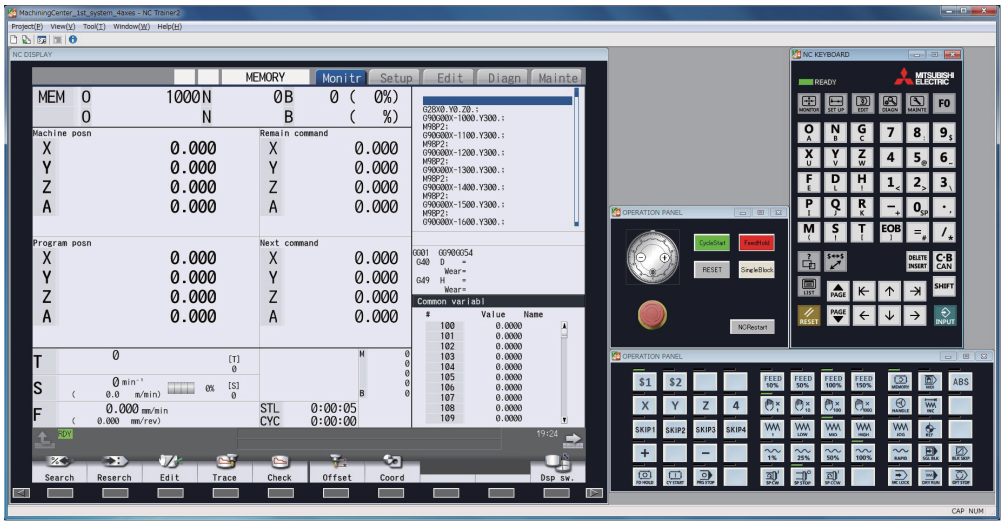
NC key board window and machine operation panel window can be hidden by clicking the "X" button. To display the hidden window again, click the window name to display in menu bar or [Window (W)] of pop-up menu.
Also child windows can be changed to the minimum size by clicking the minimize button.
If child 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.

**< For 10.4-type NC screen >**

**< For 15-type NC screen >**



(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 Trainer2 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.<br>Refer to "4.3.1 Creating a New Project" for details. |
| Change Project (O) | | Select to change the project executed.<br>Refer to "4.3.2 Changing the Project" for details. |
| Set Project Option (S) | | Select to change the settings of the existing project.<br>Refer to "4.3.3 Changing the Settings of Project Option" for details. |
| Rename Project (M) | | Select to rename the existing project.<br>Refer to "4.3.4 Renaming the Project" for details. |
| Copy Project (C) | | Select to copy the existing project.<br>Refer to "4.3.5 Copying the Project" for details. |
| Delete Project (D) | | Select to delete the existing project.<br>Refer to "4.3.6 Deleting the Project" for details. |
| Export (E) | | For NC Trainer2, this is displayed in gray and cannot be selected. |
| Import (I) | | Select to import the exported data from each application.<br>It has following sub-menus. |
| | Project (P) | Select to read a project which is exported from NC Trainer2 plus as a project for NC Trainer2.<br>Refer to "4.3.7 Importing NC Trainer2 plus Project" for details. |
| | Custom Machine Operation Panel (C) | For NC Trainer2, this is displayed in gray and cannot be selected. |
| | NC DATA (N) | For NC Trainer2, this is displayed in gray and cannot be selected. |
| Write APLC module (L) | | For NC Trainer2, this is displayed in gray and cannot be selected. |
| Exit (X) | | Exit from the NC Trainer2. |

(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

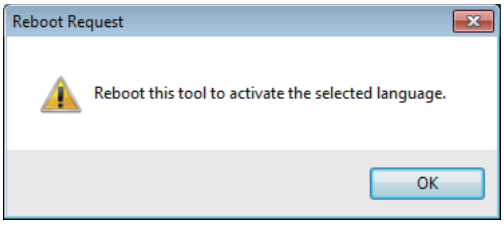
**View menu item**

| Item | Description |
|---|---|
| View Mode (V) | Changes the view mode.<br>Standard display mode or multi-window display mode can be selected for view mode.<br>- A check mark will appear at the left of the selecting display mode.<br>- Switching the display mode is carried out immediately. |
| Language (L) | Change the display language.<br>The display language can be selected from Japanese, English, Simplified Chinese and Traditional Chinese.<br>- 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, 中文 ( 简体 ) or 中文 ( 繁體 ) cannot be selected here (Refer to the language correspondence table in "3.2.2.1 Changing the Display Language").<br>- A check mark will appear at the left of the selecting display language.<br>- When changing the display language, this setting will be validated after restarting NC Trainer2. |
| Tool Bar (T) | Change whether to display or hide the tool bar.<br>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.<br>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.<br>- 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 Trainer2, select [View (L)] - [Language (L)] -
[Japanese (J)],
[English (E)],
[ 中文 ( 简体 ) (S)],
or [ 中文 ( 繁體 ) (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 Trainer2, screen is displayed in the selected language.




(Note 1) NC Trainer2 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.

### 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.<br>- A check mark will appear when it is enabled.<br>- 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.<br>- A check mark will appear when it is enabled. |
| Network Settings of NC (W) | For NC Trainer2, this is displayed in gray and cannot be selected. |
| APLC Debug Task Lock (T) | For NC Trainer2, this is displayed in gray and cannot be selected. |
| [EN]_Connection destination GX Simulator3 settings | For NC Trainer2, this is displayed in gray and cannot be selected. |
| NC Virtual Simulator Collaboration (V) | For NC Trainer2, 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.<br>- A check mark will appear while displaying NC keyboard window. |
| Operation panel (O) | Change whether to display or hide the operation panel window.<br>- 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.

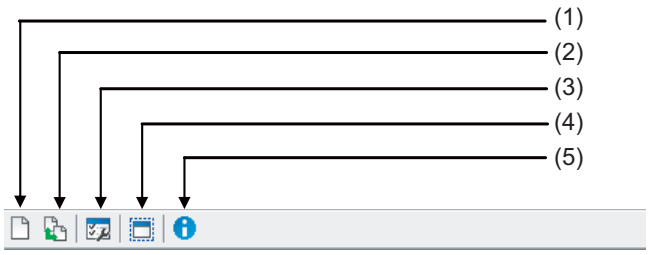
### 3.2.5 [Help (H)] Menu

**Help menu item**

| Item | Description |
|---|---|
| Connect to MITSUBISHI ELECTRIC FA Global Website (C) | Start Internet browser and go to MITSUBISHI ELECTRIC FA Global Website.<br>To get the latest version of NC Trainer2 or Instruction Manual of CNC, FA membership registration (Free) is required before using this service.<br>Note that this service is available only in the 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.

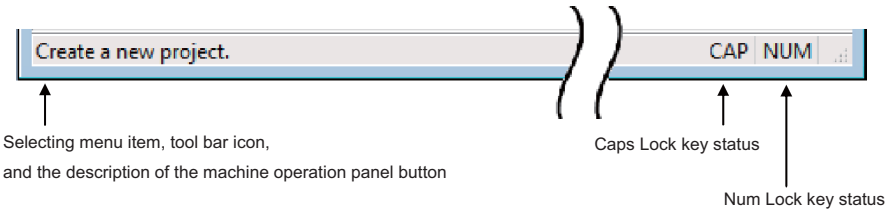



**Tool bar item**

| | 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.

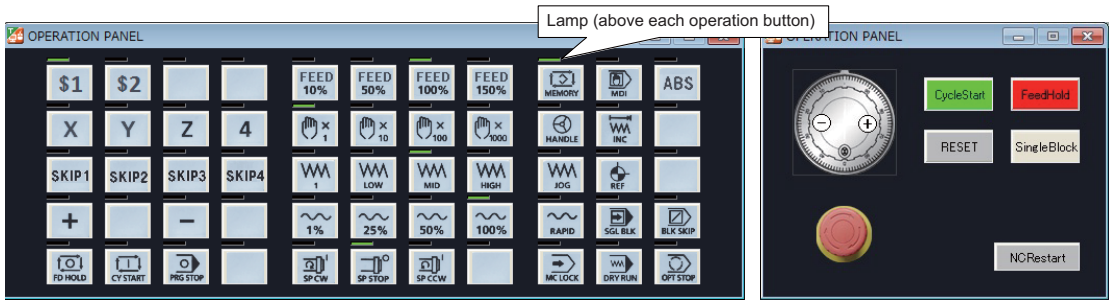
| | <ONG Keyboard (M array)> | <ONG Keyboard (L array)> |
|---|---|---|
| M8V /M8 |  |  |
| M7 |  |  |

### 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

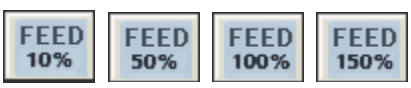
In NC Trainer2, the sequence program to operate the machine operation panel is running.
The machine operation panel consists of the buttons to operate NC and lamps to indicate the output signal status from NC.




**Display item of machine operation panel**

| Item | Description |
|---|---|
| CycleStart | This is a button to start an automatic operation (Cycle Start).<br>This button has the same function as CY START button.<br>When the button is pressed, lamp of CY START button will light. |
| FeedHold | This is a button to stop automatic operation (Feed Hold).<br>The button has the same function as FD HOLD button.<br>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.<br>The button has the same function as SGL BLK button.<br>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).<br>This button is auto-repeated. |
| NCRestart | This is a button to restart NC.<br>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.<br>Press [+] button to turn the handle to the right. Press [-] button to turn the handle to the left. [+] button and [-] button are auto-repeated.<br>Magnification per pulse follows  ,  ,  and  buttons. | |
|  | Emergency stop button.<br>When the button is pressed, NC will enter an emergency stop state.<br>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.<br>When it is ON, lamp will light. | |
|  | Change ON/OFF of optional block skip.<br>When it is ON, lamp will light. | |
|  | Change ON/OFF of manual machine lock and automatic machine lock.<br>When it is ON, lamp will light. | |
|  | Change ON/OFF of the dry run.<br>When it is ON, lamp will light. | |
|  | Change ON/OFF of the optional stop.<br>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.<br>Lamp of the currently selected value (any one of them) will light.<br>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 | |
|---|---|---|
|  | Set the magnification per pulse of the handle to 1, 10, 100 or 1000.<br>(When [+] button or [-] button of the handle is pressed once, one pulse is generated.)<br>Lamp of the currently selected value (any one of them) will light. | |
|  | Set the feedrate for manual operation (jog feed, incremental feed mode, etc) to 1, 10, 100 or 1000 mm/min (inch/min).<br>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. | |
|  | Set the rapid traverse override to 1%, 25%, 50% or 100%.<br>Lamp of the currently selected value (any one of them) will light. | |
|  | 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. |
|  | Select to rotate the spindle manually in the reverse direction during jog feed or rapid traverse feed. | |
|  | Select to stop the spindle manually during jog feed or rapid traverse feed. | |
|  | Inform NC of the ON/OFF state of the manual absolute (ABS).<br>This signal informs NC whether to update the program coordinate system or not by the amount moved with manual operation (jog, handle, etc.).<br>When the manual absolute signal is ON, lamp will light. | |
|  | Switch the control to valid or invalid for the target part system.<br>When the control is valid, corresponding lamp will light. | |
|  | 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.<br>To use the signal, skip related parameters of #1173 to #1180, etc. are required to be set. | |
|  | Select the axis to move in the jog feed mode, incremental feed mode, reference position return mode and handle feed mode.<br>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.<br>Lamp will light while the button is pressed. | |
|  | Start the automatic operation (Cycle Start).<br>During the automatic operation startup, lamp will light. | |
|  | Stop the automatic operation (Feed Hold).<br>During the automatic operation pose, lamp will light. | |
|  | This button is ignored even if it is pressed.<br>When M00 (Program Stop) is commanded, lamp will light and block stops. | |
|  | This button is ignored even if it is pressed. | |

(Note 1) An operation that can be executed individually for each part system applies to all the part systems for which the control switch button ( $1 $2 $3 $4 ) is ON.

(Note 2) When you switch the part system control to valid, NC screen display is also switched to that system.

(Note 3) Lamp on each button will light even if a signal is output to one of the all part systems with control enabled.

(Note 4) If you disable the control of a certain part system, a signal input to the part system is retained, however a lamp whose signal is output to the part system only turns OFF. When you enable the part system control next time, the lamp will light according to the status of the input signal before it is invalidated.

Example) When the memory mode is selected for the 1st part system and the manual handle feed mode is selected for the 2nd part system in 2-part system.

(1) Both MEMORY and HANDLE lamps light.

(2) When you disable the 2nd part system control by pressing $2 button, the lamp of HANDLE button will turn off.

The other lamps such as MEMORY button, etc. will not turn off since these buttons are already turned ON in the 1st part system.

(3) When you enable the 2nd part system control again by pressing $2 button, the lamp of HANDLE button will light.

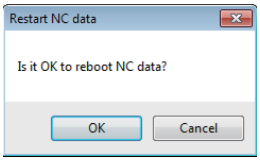
The default settings of the machine operation panel are shown below.

| 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 |
|  | Part system control switch | ON up to the valid number of part systems |

### 3.3.3.1 Restarting NC

Press the "NCRestart" button to restart NC 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) Select "OK" button, then NC screen disappears once.

(3) NC startup screen appears and NC is restarted.


(4) 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.

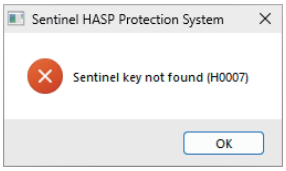
# 4

# How to Use NC Trainer2

# 4.1 Starting NC Trainer2

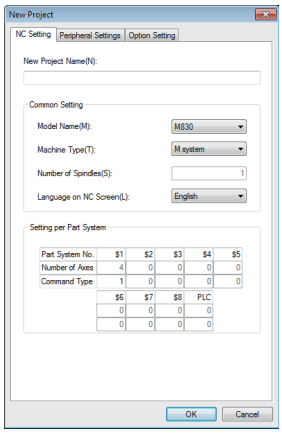
(1) Insert a license key into a USB port of a computer.
<Stand-alone type>
Insert a license key to a computer with NC Trainer2 installed.

(Note) When license key is not inserted at starting NC Trainer2, the following dialog box is displayed and NC Trainer2 cannot be started. After pressing the "OK" button, insert license key and start NC Trainer2 again.
When license key is removed while operating NC Trainer2, 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.



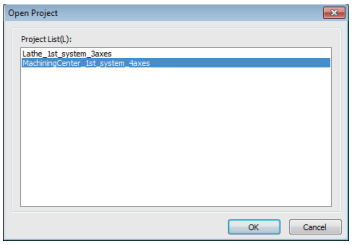

(2) Select [All apps] - [MELSOFT application] - [NC Trainer2(NC Trainer2 plus)] from "Start" menu.

(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 Trainer2

Perform one of the following procedures to exit from NC Trainer2.

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

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

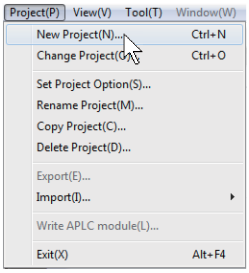
(c) Select [Exit (X)] from the pop-up menu.

## 4.3 Creating a Project

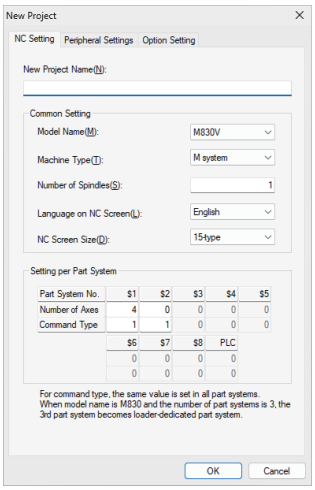
### 4.3.1 Creating a New Project

The following are the procedures to create a new project.

(1) Select [Project (P)] - [New Project (N)] from the menu bar.




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

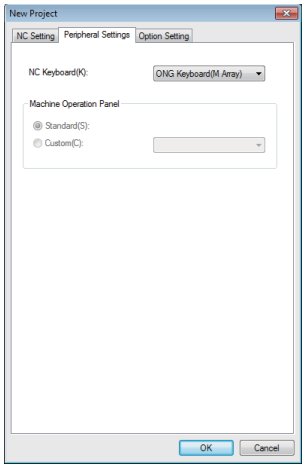


## Display item of New Project dialog box

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>New Project Name (N)</td><td>Input the new project name.<br>- A project name can be up to 80 one-byte characters.<br>(Each two-byte character is equivalent to two characters.)<br>- One-byte characters and two-byte characters can be used for a project name.<br>- A project name is not case-sensitive.<br>- The following characters cannot be used for a project name.<br>\ / : * ? < > | " (Same as the prohibited characters for a file name)<br>- A created project name cannot be designated.<br>- Blank project name cannot be used.<br>- Blank and Period (.) cannot be used for the first or last character of a project name.<br>- CON, PRN, AUX, CLOCK$, NUL, COM0 to COM9 and LPT0 to LPT9 cannot be used for a project name.</td></tr>
<tr><td>Model Name (M)</td><td>Specify the NC model. The following models can be selected.<br>M830V<br>M80V TypeA<br>M80V TypeB<br>M830<br>M80 TypeA<br>M80 TypeB<br>E80 TypeA<br>E80 TypeB<br>M730V<br>M70V TypeA<br>M70V TypeB<br>E70</td></tr>
<tr><td>Machine Type (T)</td><td>Designate the NC configuration. The following configuration can be selected.<br>Machining center: M system<br>Lathe: L system</td></tr>
<tr><td>Number of Spindles (S)</td><td>Set the number of axes.<br>The setting range differs depending on the model name and machine type, and is shown in the following table.
<table>
<tr><th>Machine Type / Model Name</th><th>M system</th><th>L system</th></tr>
<tr><td>M830V</td><td>0 to 6</td><td>0 to 8</td></tr>
<tr><td>M80V TypeA</td><td>0 to 4</td><td>0 to 6</td></tr>
<tr><td>M80V TypeB</td><td>0 to 2</td><td>0 to 4</td></tr>
<tr><td>M830</td><td>0 to 4</td><td>0 to 8</td></tr>
<tr><td>M80 TypeA</td><td>0 to 2</td><td>0 to 5</td></tr>
<tr><td>M80 TypeB</td><td>0 to 2</td><td>0 to 4</td></tr>
<tr><td>E80 TypeA</td><td>0 to 1</td><td>0 to 3</td></tr>
<tr><td>E80 TypeB</td><td>0 to 1</td><td>0 to 3</td></tr>
<tr><td>M730V</td><td>0 to 4</td><td>0 to 6</td></tr>
<tr><td>M70V TypeA</td><td>0 to 2</td><td>0 to 4</td></tr>
<tr><td>M70V TypeB</td><td>0 to 2</td><td>0 to 3</td></tr>
<tr><td>E70</td><td>0 to 1</td><td>0 to 2</td></tr>
</table></td></tr>
<tr><td>Language on NC Screen (L)</td><td>Set the language displayed on NC Screen while executing a project.<br>Languages supported in NC can be selected.</td></tr>
<tr><td>NC Screen Size (D)</td><td>Set the NC screen size. The following size can be selected.<br>15-type<br>10.4-type<br>* 15-type can be selected only when the model name is M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/M730V.</td></tr>
<tr><td>Number of Axes</td><td>Set the number of axes for each part system.<br>If the number of axes in a part system is 0, the part system is invalid.<br>(Note 1) You can set up to 4 part systems, and maximum 4 axes can be set for one part system. Since the setting of the number of PLC axis is fixed to 0, you cannot change it.<br>(Note 2) The setting items for 5th to 8th part systems are displayed only when M830V/M830 is selected on Model Name.<br>(Note 3) When selecting M830 for Model Name and M system for Machine Type, and having three part systems, the project is created with the third part system set as a loader-dedicated part system. To change the loader-dedicated part system, change the parameter "#11811 LDR Dedicated Sys" (Loader-dedicated part system (For M system only)) after creating a project.</td></tr>
</table>

| Item | Description |
|---|---|
| Command Type | Set the G code system and compensation type for programs.<br>1: List1 (for M system) Type I (one compensation amount for one compensation No.)<br>2: List1 (for M system) Type II (shape and wear compensation amounts for one compensation No.)<br>3: List2 (for L system) Type III (shape and wear compensation amounts for one compensation No.)<br>4: List3 (for L system) Ditto<br>5: List4 (for special L system) Ditto<br>6: List5 (for special L system) Ditto<br>7: List6 (for special L system) Ditto<br>8: List7 (for special L system) Ditto<br>9: List8 (for M system)<br>M2 format type Type I (one compensation amount for one compensation No.)<br>10: List8 (for M system)<br>M2 format type Type II (shape and wear compensation amounts for one compensation No.)<br><br>- 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.

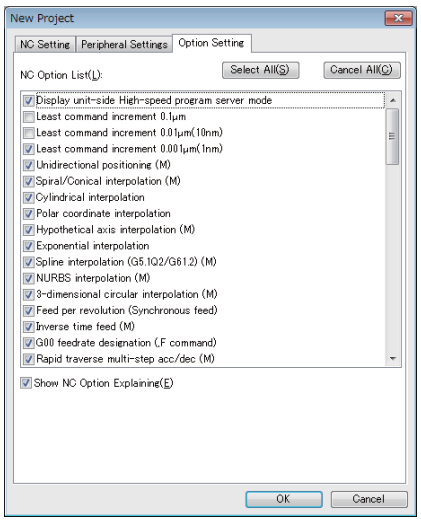



**Display item of Peripheral Settings tab**

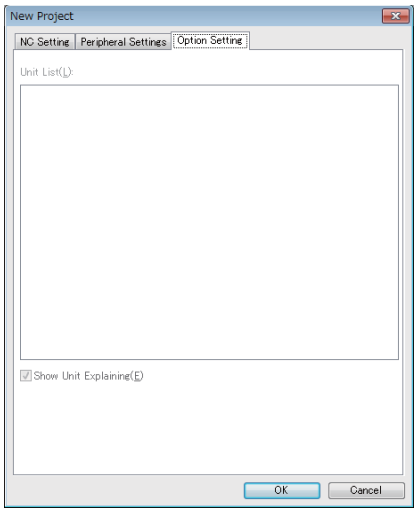
| Item | | Description |
|---|---|---|
| NC Keyboard (K) | | Select NC Keyboard to be used. The following NC Keyboards can be selected.<br>- ONG Keyboard (M array) : default<br>- ONG Keyboard (L array) |
| Machine Operation Panel | | Cannot be set with NC Trainer2.<br>For a new project created with NC Trainer2, the standard machine operation panel is selected.<br>For a project imported from NC Trainer2 plus, the custom machine operation panel which is set for the project of NC Trainer2 plus is selected. |
| | Standard (S) | |
| | Custom (C) | |

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

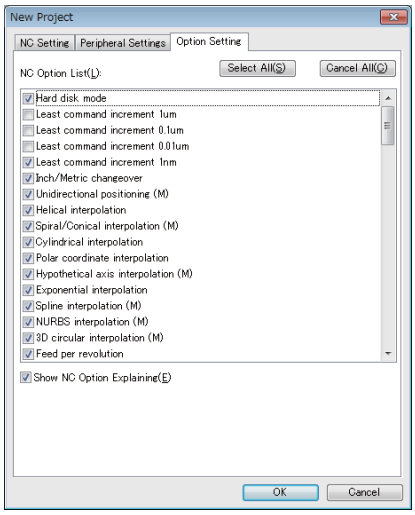
**<M800V/M800>**



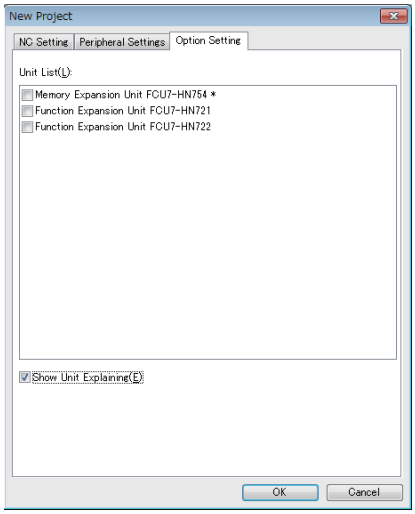

**<M80V/M80/E80>**




**<M700V>**




**<M70V/E70>**




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

## Display item of M800V/M800/M700V Option Setting tab

| Item | Description |
|---|---|
| NC Option List (L) | Display the NC option list that can be selected for the project.<br>Check the check box to validate an NC option.<br>- For the option required to format NC memory, [*] mark is indicated at the end of the option name.<br>- NC options involved changing user PLC are not included in NC Trainer2. |
| Select All (S) | Check all items.<br>- 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.<br>- 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. |

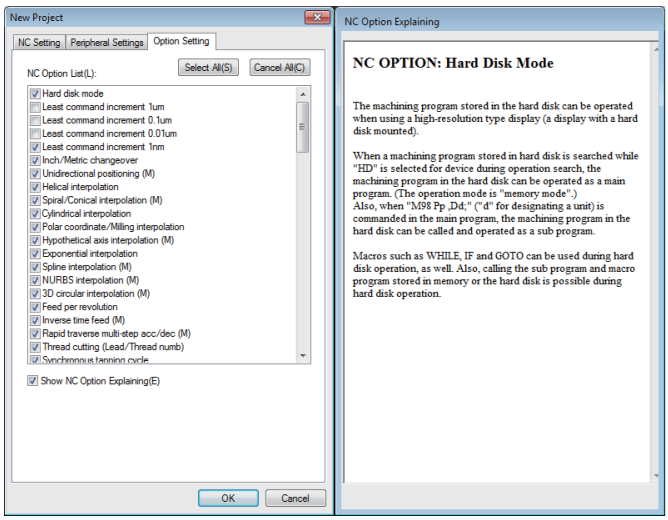
### Display item of M80V/M80/E80 Option Setting tab

| Item | Description |
|---|---|
| Additional Unit List (L) | There is no option which can be changed for M80V/M80/E80. |
| Display the Description of Units (E) | Always disabled and the description for the option is not displayed. |

### Display item of M70V/E70 Option Setting tab

| Item | Description |
|---|---|
| Additional Unit List (L) | Displays a list of additional units.<br>Check the check box to validate an additional unit.<br>- 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.<br>- The function extension units FCU7-HN721 and -HN722 can not be selected at the same time.<br>- 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.)



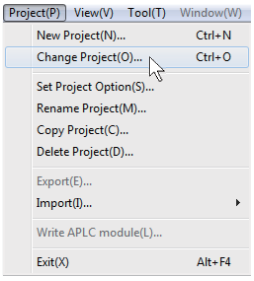

(5) Press the "OK" button, and the NC screen of created project is displayed. At this time, NC data of the executing project is automatically stored.
Note that if [Tool (T)] - [Confirm NC Data Storage (N)] is enabled, the confirmation message is displayed. When pressing the "OK" button, NC data is stored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

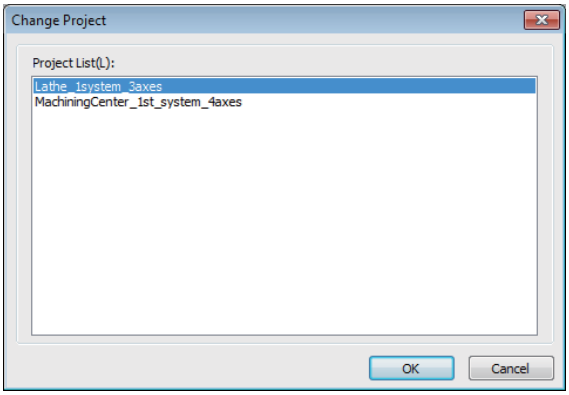
### 4.3.2 Changing the Project

The following are the procedures to change the project.

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

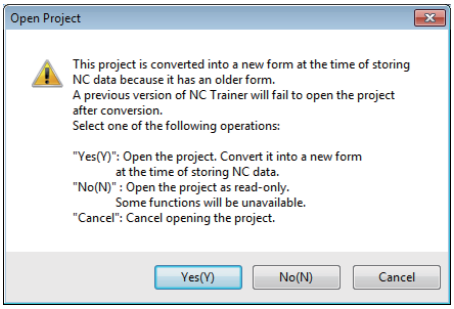



(2) Project list is displayed. Select the project to change.




(Note) NC Trainer2 does not display projects which were created with NC Trainer2 plus (except for projects imported from NC Trainer2 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 "Yes" button, NC data is stored and NC screen of created project is displayed.
(Note 1) If selecting the currently-executing project, the dialog box is closed.
(Note 2) If the project created by NC Trainer/NC Trainer plus is selected, the following message box may appear.

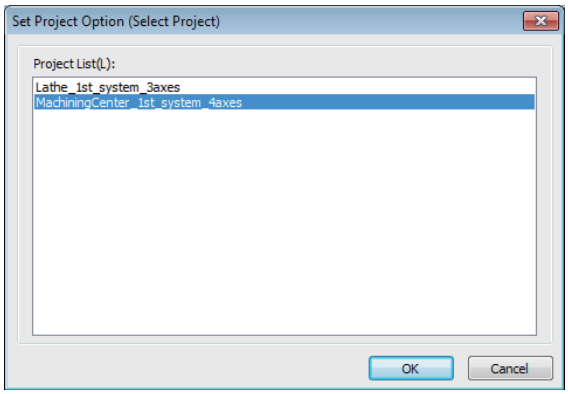



-If there is no possibility to open the project by NC Trainer, click "Yes(Y)".
-If there is a possibility to open the project by NC Trainer, click "No(N)" to open by read-only.
-To cancel opening the project, click "Cancel" button.
-Refer to "1.5 Precautions" for the restraints of each function when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

### 4.3.3 Changing the Settings of Project Option

The following are the procedures to change the settings of the project option.

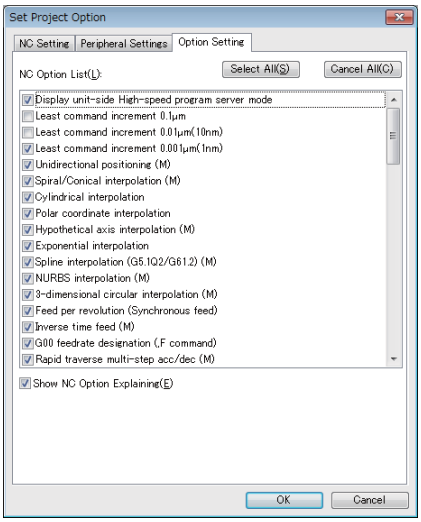
(1) Select [Project (P)] - [Set Project Option (P)] from menu bar. Select Project dialog box is displayed.



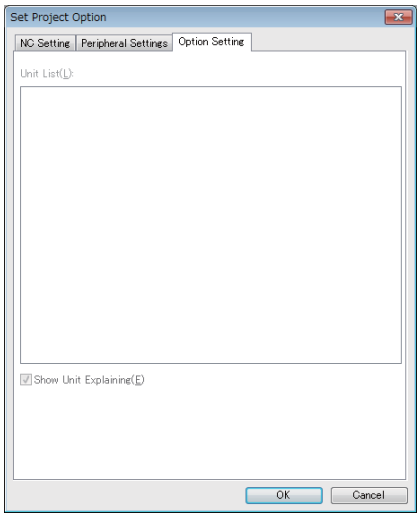

(Note) NC Trainer2 does not display projects which were created with NC Trainer2 plus (except for projects imported from NC Trainer2 plus).

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

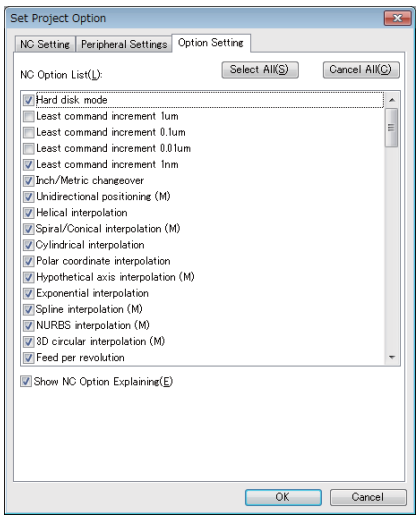
**<M800V/M800>**



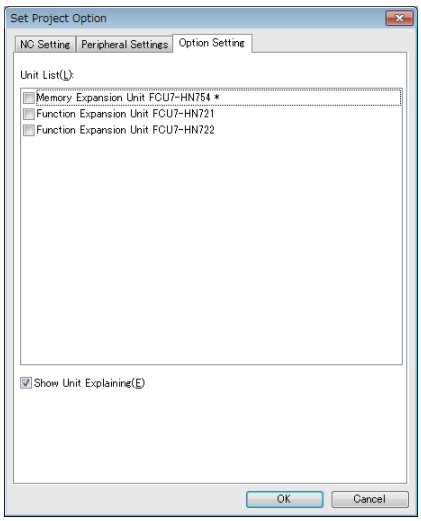

**<M80V/M80/E80>**




**<M700V>**




**<M70V/E70>**



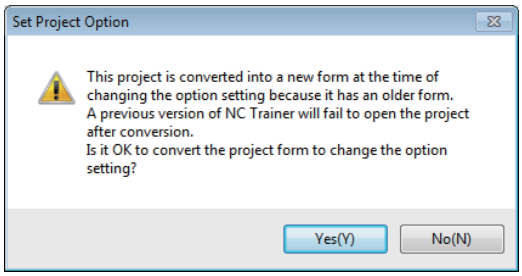
**Display item of Set Project Option dialog box**

| 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.<br>Refer to "4.3.1 Creating a New Project" for details. |
| Peripheral Settings tab | This is a tab to set or display the type of machine operation panel.<br>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.<br>[*] mark indicates the options and the unit required to format NC memory.<br>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.

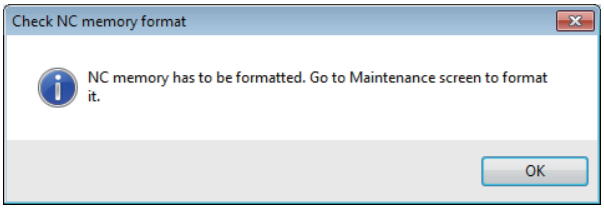
(Note 2) Only "NC Screen Size" can be changed on [NC Setting tab]. To change other setting values, create a new project. Refer to the section "4.3.1 Creating a New Project" on how to create a project.

(Note 3) On Set Project Option dialog box, if the project created by NC Trainer 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, 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, click "No(N)". This stops changing the settings of project option and returns to Set Project Option dialog box.

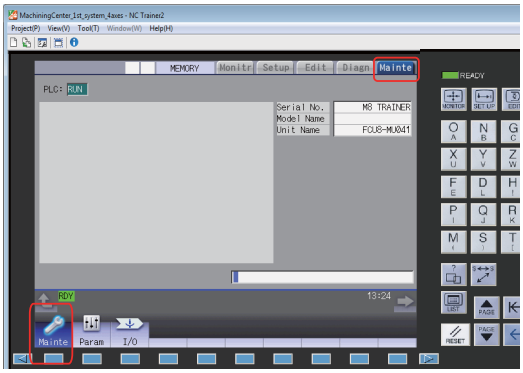
(3) When changing the option and the unit name that [*] mark is indicated at the end of the option name and pressing the "OK" button, a dialog prompts the user to format NC memory is displayed.
In this case, press the "OK" button and format the NC memory.



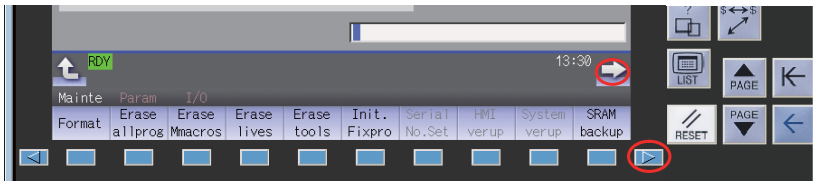
**<Formatting NC memory>**

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

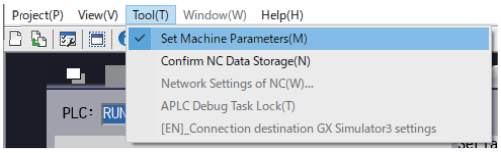
(1) Select the [Mainte] tab on NC screen. After displaying the maintenance screen, press the [Mainte] menu.




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



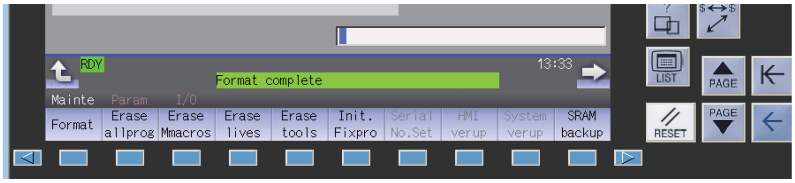

(3) Put [Set Machine Parameters (M)] in [Tool (T)] menu on menu bar into checked mode.




(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 appear.

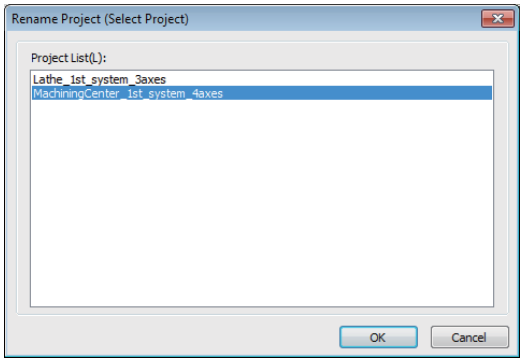



(7) Press the "NCRestart" button to restart NC. When it is restarted, NC standard screen will appear.

### 4.3.4 Renaming the Project

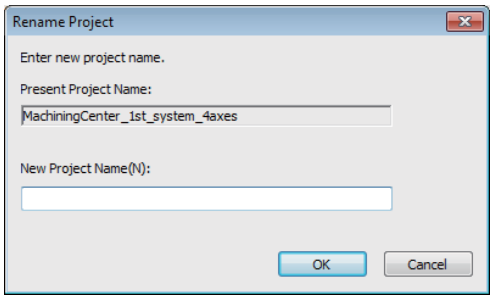
The following are the procedures to change the project name.

(1) Select [Project (P)] - [Rename Project (M)] from menu bar. Select Project dialog box is displayed.




(Note) NC Trainer2 does not display projects which were created with NC Trainer2 plus (except for projects imported from NC Trainer2 plus).

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

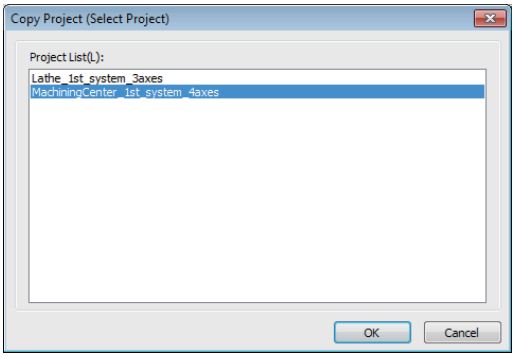



(Note) For currently-executing project, press the "OK" button and the operation will stop once, then NC is restarted with changed project name. Therefore, NC data is stored at this point.
When pressing the "Cancel" button, new project name is canceled and Select Project dialog box is displayed.

### 4.3.5 Copying the Project

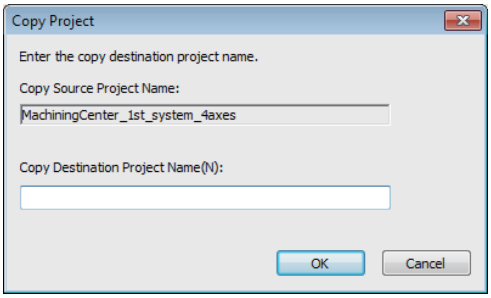
The following are the procedures to copy the project.

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




(Note) NC Trainer2 does not display projects which were created with NC Trainer2 plus (except for projects imported from NC Trainer2 plus).

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

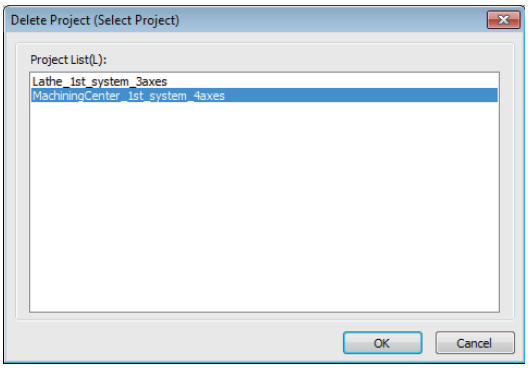



(Note) When selecting the executing project as the copy source, NC data stored at the last time is copied. Therefore, it may be different from the current NC data (parameters, machining programs, etc).

### 4.3.6 Deleting the Project

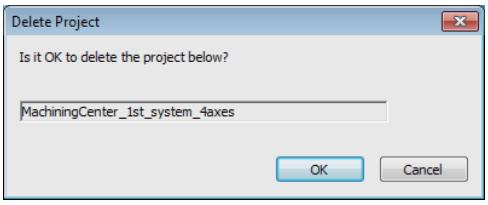
The following are the procedures to delete the project.

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

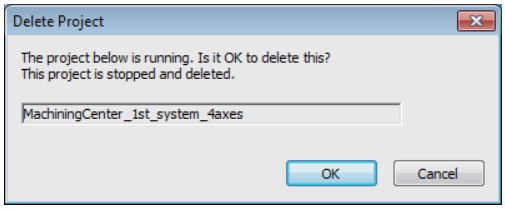



(Note) NC Trainer2 does not display projects which were created with NC Trainer2 plus (except for projects imported from NC Trainer2 plus).

(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.



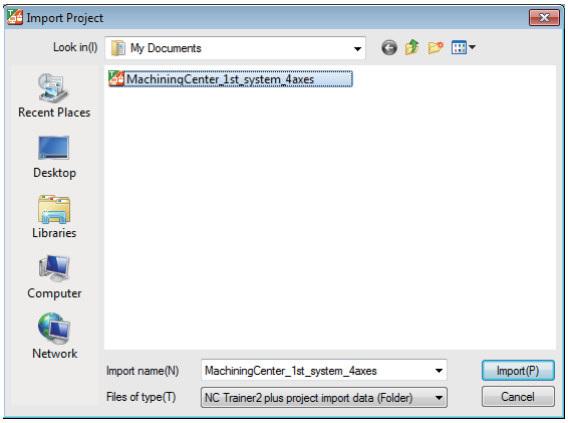
## 4.3.7 Importing NC Trainer2 plus Project

The project which is created with NC Trainer2 plus to be tailored to a machine tool (such as parameter, user PLC, and machine operation panel, etc.) can be operated with NC Trainer2 by importing the project (The project can also be imported to NC Trainer2 plus).

(Note) The project which is created with NC Trainer plus can be imported to NC Trainer2/NC Trainer2 plus.

Below is an explanation of the procedure for importing project data which is exported from NC Trainer2 plus.

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



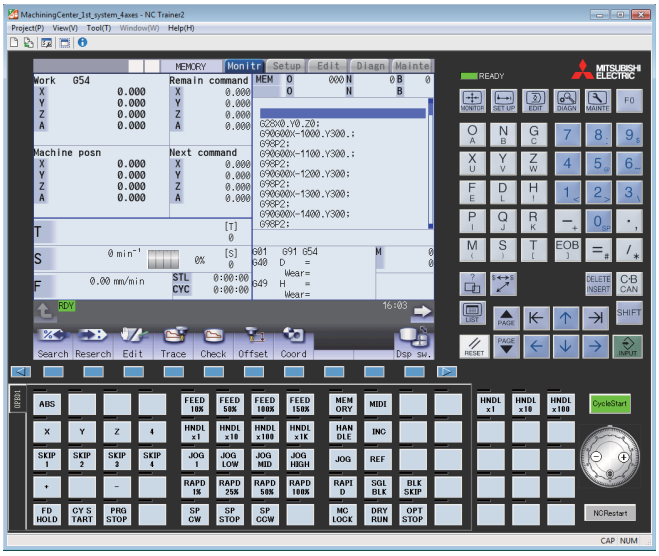

(Note1) The import data is provided as a folder which contains various data files. The import data folder is displayed as  icon on the dialog box.

(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 (P)" 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 Trainer2 plus

# 1

# Introduction

# 1.1 Outline of NC Trainer2 plus

NC Trainer2 plus enables to develop a custom software application without an NC control unit or dedicated display device.
The characteristics of NC Trainer2 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
- Support for the functions corresponding to C80

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 M800V/M80V Series.

- M800V/M80V Series Instruction Manual IB-1501618
- M800V/M80V Series Programming Manual Lathe System (1/2) IB-1501619
- M800V/M80V Series Programming Manual Lathe System (2/2) IB-1501620
- M800V/M80V Series Programming Manual Machining Center System (1/2) IB-1501621
- M800V/M80V Series Programming Manual Machining Center System (2/2) IB-1501622

Refer to the following manuals for operating procedure or programming, etc. of M800/M80/E80/C80 Series.

- M800/M80/E80 Series Instruction Manual IB-1501274
- C80 Series Instruction Manual IB-1501453
- M800/M80/E80/C80 Series Programming Manual Lathe System (1/2) IB-1501275
- M800/M80/E80/C80 Series Programming Manual Lathe System (2/2) IB-1501276
- M800/M80/E80/C80 Series Programming Manual Machining Center System (1/2) IB-1501277
- M800/M80/E80/C80 Series Programming Manual Machining Center System (2/2) IB-1501278

Refer to the following manuals for operating procedure or programming, etc. of 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

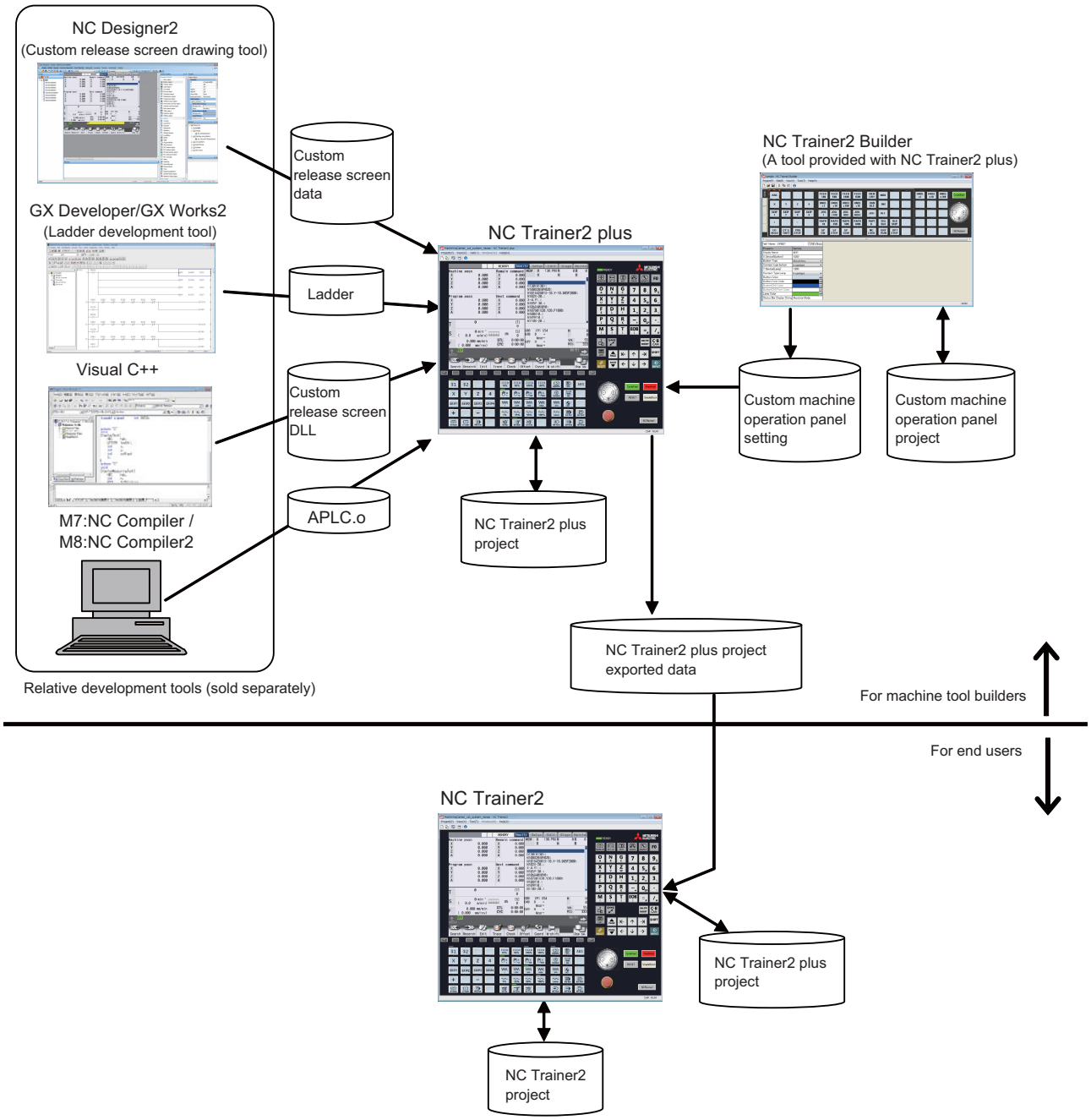
Refer to MITSUBISHI ELECTRIC FA Global Website for each manual.
MITSUBISHI ELECTRIC FA Global Website: http://www.mitsubishielectric.com/fa/index.html

# 1.2 Characteristics of NC Trainer2 plus

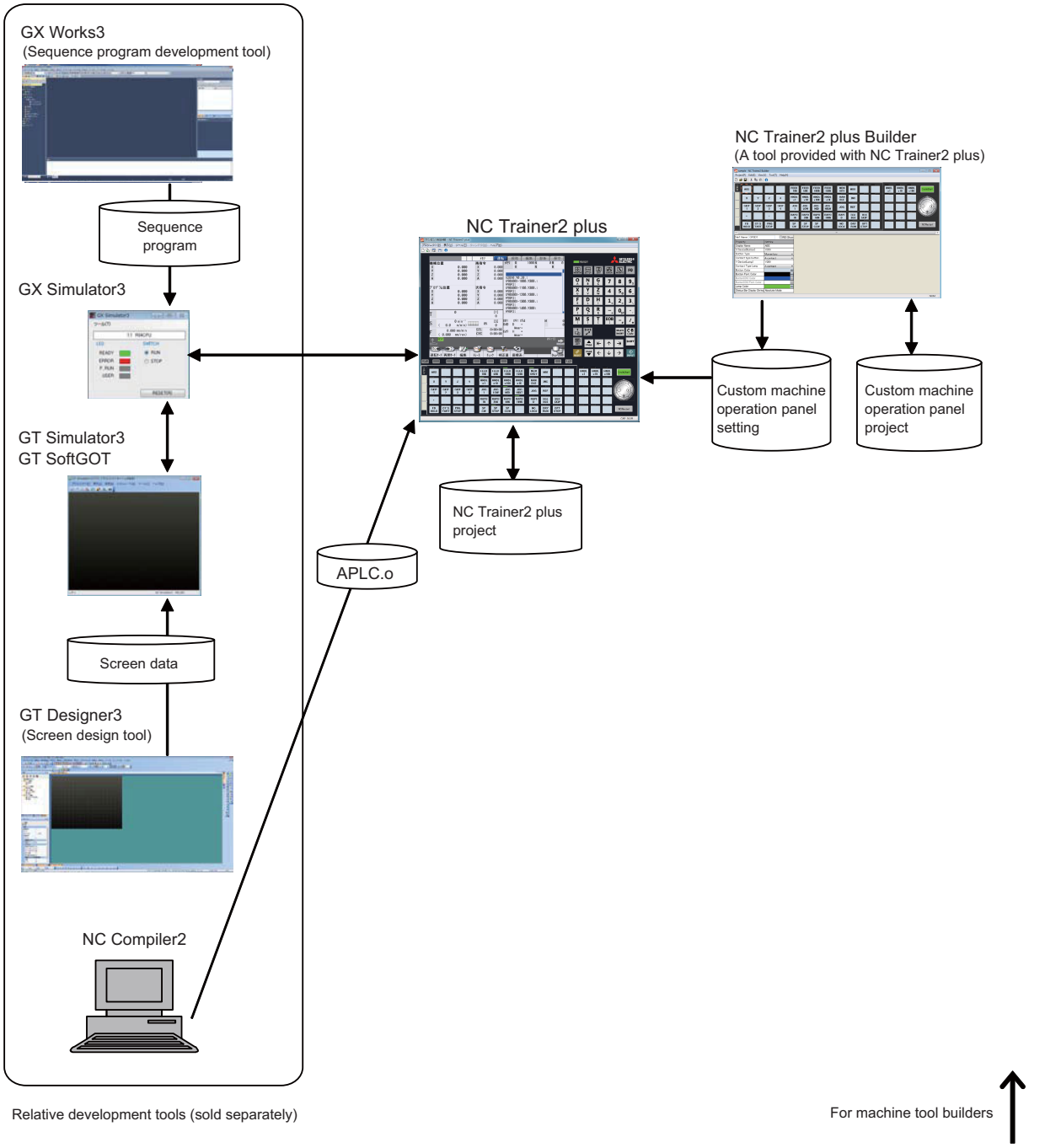
The following is the characteristics of NC Trainer2 and NC Trainer2 plus.

- NC Trainer2 is a tool for end users. This tool can be used for creating machining programs and mastering NC operation.
- NC Trainer2 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 Trainer2 Builder (a tool provided with NC Trainer2 plus).
- NC Trainer2 can be set for mastering machine tool operation by providing a project which is exported from NC Trainer2 plus to be imported by an NC Trainer2 user.

## 1.2.1 M800V/M80V Series, M800/M80/E80 Series, M700V/M70V/M700/M70 Series, and E70



### 1.2.2 C80




(Note 1) A sequence program operates with the GX Works3 simulation function GX Simulator3. Start GX Simulator3 before starting or switching a C80 project, or changing the settings of a project option on NC Trainer2 plus.

(Note 2) Reading or writing PLC devices from GX Works3 or GT Simulator3 is only possible via GX Simulator3 on a PC running both NC Trainer2 plus and GX Simulator3.

(Note 3) Set the Simulator No. of GX Simulator3 in the "Set GX Simulator3 connection" dialog. Refer to the section "5.8 Set GX Simulator3 Connection" for details of the "Set GX Simulator3 connection" dialog.

# 1.3 Differences of Functions between NC Trainer2 and NC Trainer2 plus

Refer to the section "Appendix 1 Specifications List" for details of the differences of functions between NC Trainer2 and NC Trainer2 plus.
The differences of functions not described in the specifications list will be explained in this section.

○ : Supported × : Not supported

| Function | NC Trainer2 | | NC Trainer2 plus | | Remarks |
|---|---|---|---|---|---|
| | M8V/M8/M7 | C80 | M8V/M8/M7 | C80 | |
| 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 Trainer2 plus when using F0 release (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 user PLC ladder | × | × | ○ | ○ | GX-Developer/GX Works2 (Note 5)/GX Works3 (Note 6) is required. |
| PLC onboard | × | × | ○ | × | |
| Execution of APLC release module | ○ (Note 1) | × | ○ | ○ | |
| Source debug for APLC release module | × | × | ○ | ○ | Source debug can be executed with Microsoft Visual Studio (Note 3). |
| Creation of custom machine operation panel | × | × | ○ | ○ | Created with NC Trainer2 Builder (Note 4). |
| Display of custom machine operation panel | ○ (Note 1) | × | ○ | ○ | |
| Import of custom machine operation panel | × | × | ○ | ○ | The custom machine operation panel which is output from NC Trainer2 Builder (Note 4) 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 Trainer2 plus to NC Trainer2.
(Note 2) Refer to "NC Designer2 Instruction Manual" for the available version of Visual Studio.
(Note 3) When using Microsoft Visual Studio, use Microsoft Visual Studio 2012 / 2013 / 2015 / 2017 / 2019.
(Note 4) A tool provided with NC Trainer2 plus
(Note 5) Ladder development tool by MITSUBISHI (sold separately)
(Note 6) Sequence program development tool by MITSUBISHI (sold separately)

# 1.4 About a License for NC Trainer2 plus

## 1.4.1 License Type for NC Trainer2 plus

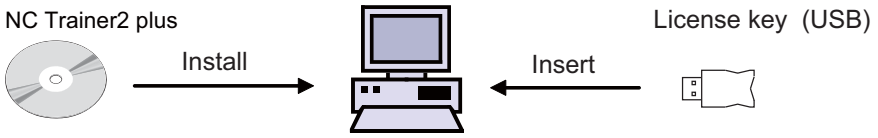
A license key is required to be inserted into the USB port of a computer to start NC Trainer2. There are two licence types depending on the license key type which is attached to the purchased NC Trainer2.

(Note1) There are separate license keys for NC Trainer2 and for NC Trainer2 plus. NC Trainer2 plus cannot be started with the license key attached to NC Trainer2 and NC Trainer2 cannot be started with the one attached to NC Trainer2 plus.

(Note2) NC Trainer plus cannot be started with the license key attached to NC Trainer2 plus and NC Trainer2 plus cannot be started with the one attached to NC Trainer plus.

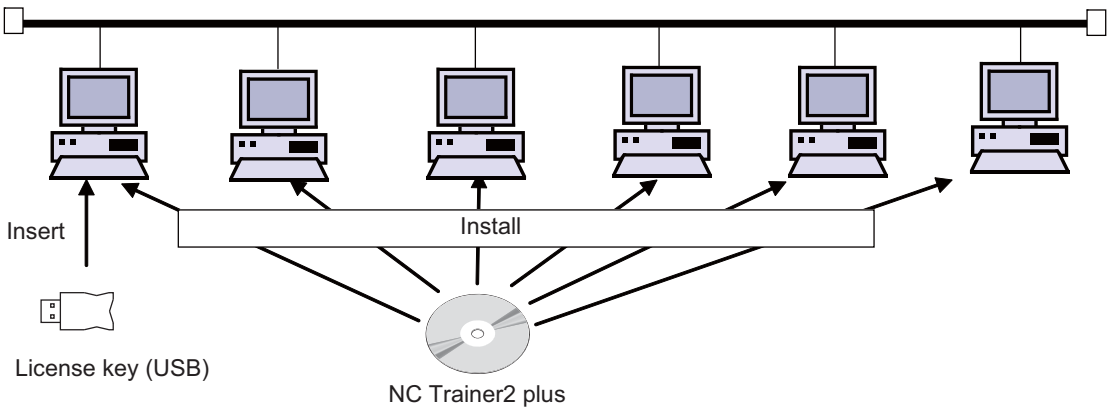
**(1) Standalone type**

- Required to purchase one user licence per computer.
- Insert the license key of NC Trainer2 plus into a computer with NC Trainer2 plus installed.

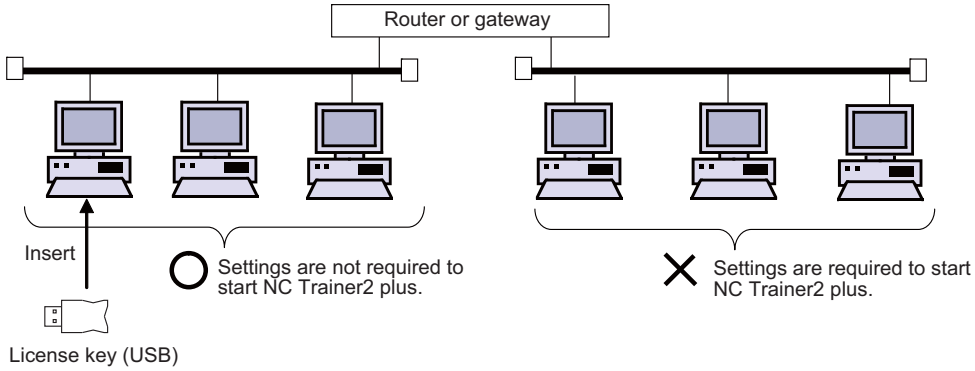



**(2) Network connection type**

- 3/50 user license types are available.
- NC Trainer2 plus can be started at a time with one license key of NC Trainer2 plus on multiple computers in the network. The number of the computers which can be started NC Trainer2 plus 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 network confirm to the computer with the license key via a network whether to start NC Trainer2 plus.

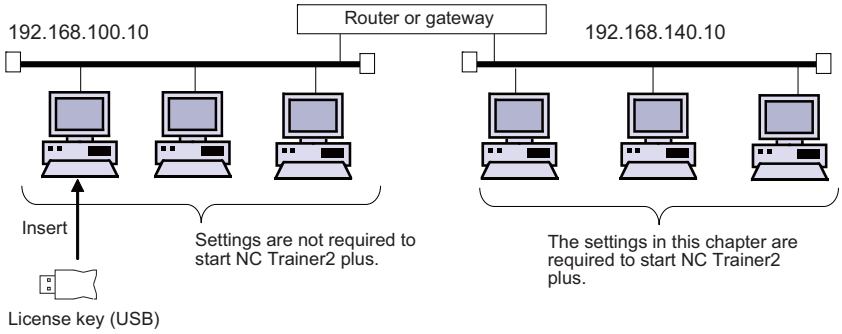



- Settings are required to start NC Trainer2 plus from a computer on a different network from the computer to which the license key is inserted. Refer to "1.4.2 When Using a Network Connection Type License Key Inserted into a Computer on Another Network".



## 1.4.2 When Using a Network Connection Type License Key Inserted into a Computer on Another Network

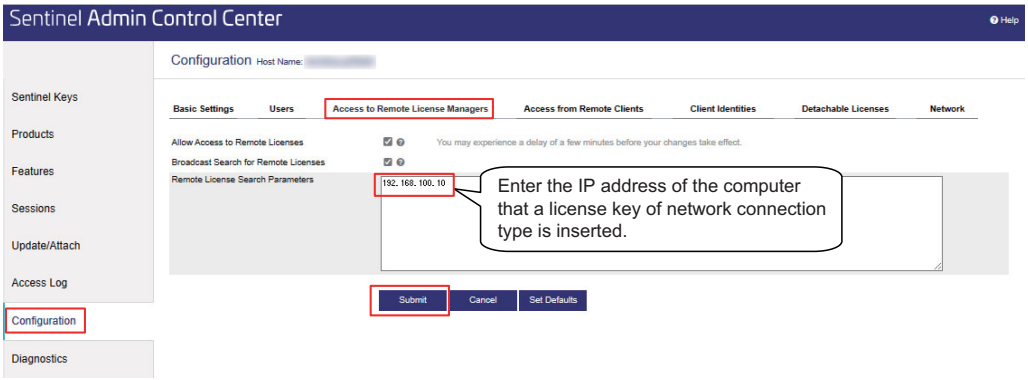
When starting NC Trainer2 plus from a computer on a different network from the computer to which the license key of network connection type is inserted, configure the following settings.




(Note) The license key provided with NC Trainer2 plus cannot open NC Trainer plus. Also, the license key provided with NC Trainer plus cannot open NC Trainer2 plus.

**[Procedure]**

(1) Access "http://localhost:1947" with a browser.
The browser will access to the local host, and the screen below will be displayed.




(2) Select "Configuration" in "Options" at the left of the screen.

(3) Select the "Access to Remote License Managers" tab.

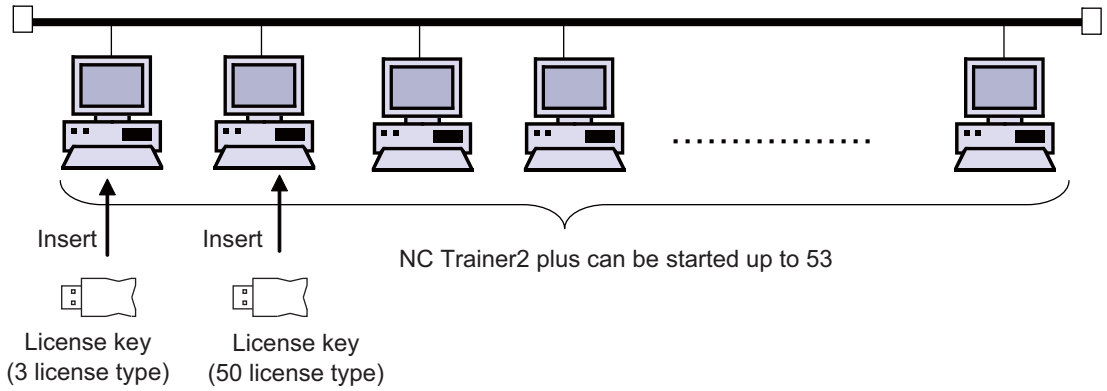
(4) Enter the address of the computer that the license key of network connection type is inserted in "Remote License Search Parameters" and click "submit".

(5) Close the browser.
NC Trainer2 plus can be started using a license key on another network.

### 1.4.3 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 Trainer2 plus at a time is the total number of user licenses for these license keys.

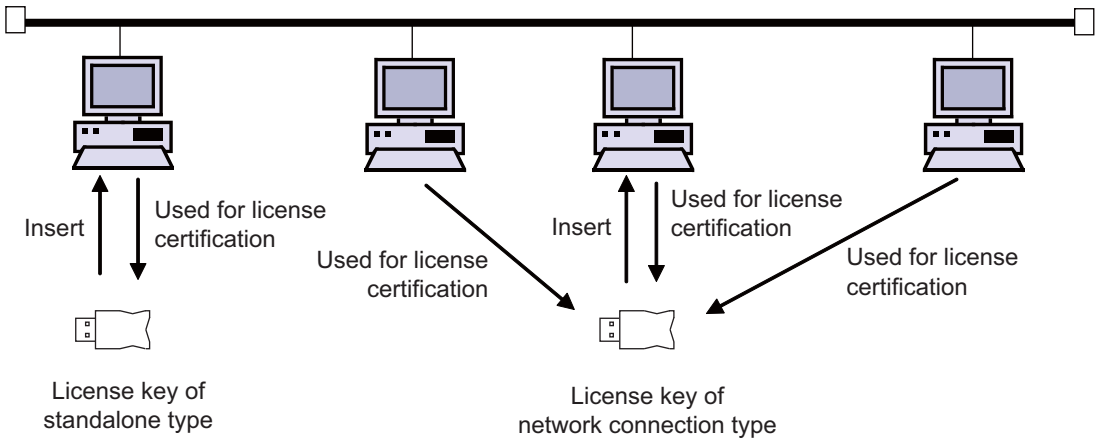



Multiple license keys can be inserted into one computer.

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

(Note) When the license key of NC Trainer2 plus for standalone type is used together with network connection type, insert them into separate computers.

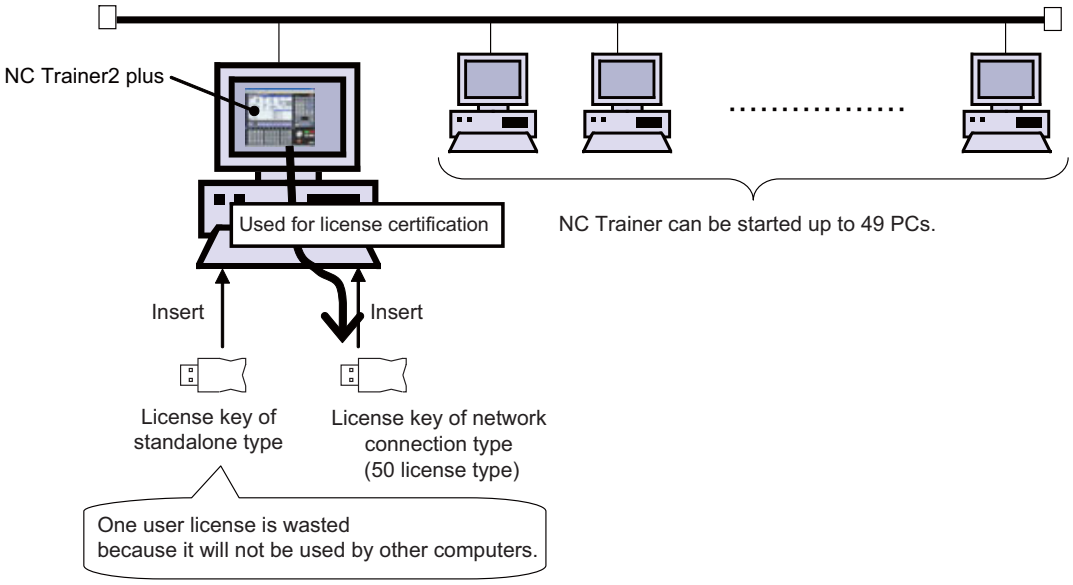
- When NC Trainer2 plus is started on the computer with a license key of standalone type, the license key of standalone type will always be used.
- When NC Trainer2 plus is started on the computer without a license key of standalone type, the license key of network connection type will always be used.



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

(Note) Refrain from inserting license keys of NC Trainer2 plus for standalone type and network connection type to the same computer.

- When NC Trainer2 plus 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 Trainer2 plus 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 Trainer2 plus 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 Trainer2 plus at a time in the same network will be one less than the total of purchased user license numbers.



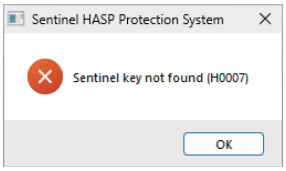

**<When using the license key of NC Trainer2 with the license key of NC Trainer2 plus>**

- The license key of NC Trainer2 and the license key of NC Trainer2 plus can be inserted together.
- The license key of NC Trainer2 and the license key of NC Trainer2 plus can be inserted to separate computers in the same network.

# 1.5 Precautions

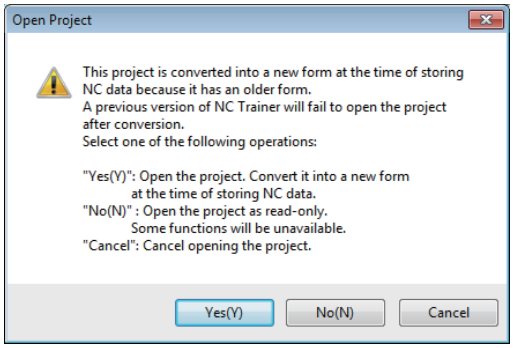
When using NC Trainer2 plus, pay attention to the following.

- The displayed "Memory card (Only for a project of M80V TypeA/M80V TypeB/M80 TypeA/M80 TypeB/M70V TypeA/M70V TypeB/E70)" device is the path designated at the time of installation. "C:\MELCNC\NCT2\HD" is set by default.
- The displayed "HD (Only for a project of M830V/M830/M730V/C80)" device is the path designated at the time of installation. "C:\MELCNC\NCT2\HD" is set by default.
- When license key is not inserted at starting NC Trainer2 plus, the following dialog box is displayed and NC Trainer2 plus cannot be started. After pressing the "OK" button, insert license key and start NC Trainer2 plus again.




- More than one NC Trainer2 plus cannot start at a time.
- NC Trainer2 and NC Trainer2 plus cannot start at a time.
- More than one NC Trainer2 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 Trainer2 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 Trainer2 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 Trainer2 plus is started with a license key of network connection type, NC Trainer2 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 Trainer2 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 with the project of M730V/M70V TypeA/ M70V TypeB/E70.
- A memory card can be selected as an external device of PLC onboard for NC Trainer2 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:\MELCNC\NCT2P\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.
- Date and time cannot be changed from an NC screen.

- 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 Trainer2 plus on the actual machine, be sure to check the operation thoroughly. If the NC version is different between NC Trainer2 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.
- For direct robot control, NC Trainer2 plus can connect to a robot simulator only. Do not connect to an actual robot.
- For a project of C80, PLC errors and warnings cannot be displayed on the NC screen. Check PLC errors and warnings in GX Works3 module diagnostics or GX Simulator3.
  Example) "A01 Another CPU module moderate error 1220" multi CPU error
- Do not import the project exported by NC Trainer2 plus to NC Trainer/NC Trainer plus. 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 be imported to NC Trainer2 plus, but the custom machine operation panel exported by NC Trainer2 Builder cannot be imported to NC Trainer plus. It will cause an error when importing.
- When the project created by NC Trainer Builder is edited and saved with NC Trainer2 Builder, the project can not be opened by NC Trainer Builder.
  However, if saved without editing, the project can be opened.
- Do not open the project created by NC Trainer2 plus using NC Trainer plus. An error may occur when activating the project.
- When opening the project created by NC Trainer plus, the message that verifies the format conversion may appear.

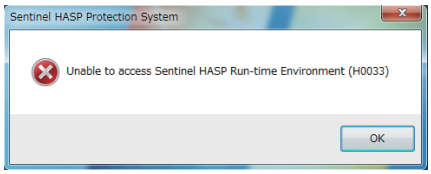



  - When the project is converted to a new format, the project can not be opened by NC Trainer plus.
  - If there is no possibility to open the project by NC Trainer plus, click "Yes(Y)" to open the project.
  - If there is a possibility to open the project by NC Trainer plus, click "No(N)" to open by 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.<br>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).<br>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 Trainer2 plus project" for detail. |

- When changing the option setting of the project created by NC Trainer plus, format conversion may be required as with a read-only project.
- When exporting the project may appear created by NC Trainer plus, it must be converted to the same format as the read-only state project.
- Background check is not available with M830V/M830 project. Foreground check is always used.
- Do not install NC Trainer plus when NC Trainer2 is already installed. Similarly, do not install NC Trainer when NC Trainer2 plus is already installed. When either NC Trainer or NC Trainer plus is uninstalled after NC Trainer2 or NC Trainer2 plus has been installed, the following dialog box may appear when activating the other application and it cannot be started, or the application may be force-quit sometime after starting. If that happens, uninstall the application and install it again.




- A sequence program operates with the GX Works3 simulation function (GX Simulator3). Start GX Simulator3 before starting or switching a C80 project, or changing the settings of a project option on NC Trainer2 plus.
- Do not use the data created by NC Trainer2 plus with NC Trainer plus. The application may not work normally when using it.
- Collecting sampling data can not be executed.
- Safety ladder cannot be operated.
  Also, the safety ladder cannot be input or output. Specifically, the following input/output functions are restricted.
  <M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB project>

| Restricted functions | Restricted contents |
|---|---|
| The [Mainte] - [I/O] screen of the NC screen | Data cannot be transferred. |
| Batch backups | Data cannot be backed up and restored. |
| Automatic backups | Data cannot be backed up. |

<C80 project>

| Restricted functions | Restricted contents |
|---|---|
| The I/O screen on the maintenance screen of the NC screen | Data cannot be transferred. |

- A gesture operation is available with M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB project.

- When enabling the safety observation/smart safety observation option for the project of M830V/M830/C80 or functional safety expansion unit for the project of M80V TypeA/M80V TypeB/M80 TypeA/M80 TypeB, parameters related to the smart safety observation can be displayed and changed. However, the safety observation/smart safety observation function itself does not work.
- The following miscellaneous functions (M codes) are allocated to the spindle control function or spindle/C axis control function with the standard user ladder.

| Code | Function | Code | Function |
|---|---|---|---|
| M03 | 1st spindle forward run | M45 | 4th spindle stop |
| M04 | 1st spindle reverse run | M53 | 5th spindle forward run |
| M05 | 1st spindle stop | M54 | 5th spindle reverse run |
| M17 | C axis servo off signal ON | M55 | 5th spindle stop |
| M18 | C axis servo off signal OFF | M63 | 6th spindle forward run |
| M23 | 2nd spindle forward run | M64 | 6th spindle reverse run |
| M24 | 2nd spindle reverse run | M65 | 6th spindle stop |
| M25 | 2nd spindle stop | M73 | 7th spindle forward run |
| M33 | 3rd spindle forward run | M74 | 7th spindle reverse run |
| M34 | 3rd spindle reverse run | M75 | 7th spindle stop |
| M35 | 3rd spindle stop | M83 | 8th spindle forward run |
| M43 | 4th spindle forward run | M84 | 8th spindle reverse run |
| M44 | 4th spindle reverse run | M85 | 8th spindle stop |

(Note 1) M17 or M18 command operate on the C axis of the designated part system.

- The alarm "P482 Illegal axis (mill)" will occur by executing the cylindrical interpolation command (G07.1) while performing the graphic check or finish shape view programming under the following conditions.
  - Any project of M830V/M830 Series is selected
  - "Arbitrary axis exchange control" specification is ON

  Set "Arbitrary axis exchange control" specification to OFF when you execute the cylindrical interpolation command (G07.1) without using the arbitrary axis exchange control function.
- A custom tool management screen specified by a setting file created by machine tool builders cannot be displayed for a M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 Type A/E80 Type B project.
- A logo created by machine tool builders cannot be displayed on the NC standard screen for a M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 Type A/E80 Type B project.
- A comment of device release screen specified by a comment file created by machine tool builders cannot be displayed.
- When NC Trainer2 plus is uninstalled with NC Visualizer installed, the driver is reinstalled when the NC Visualizer license key is installed. After the completion of driver reinstallation, NC Visualizer can be started.
- When NC Trainer2 plus and some MELSOFT products such as GX works3, etc. are to be installed on the same PC, if NC Trainer2 plus is installed before MELSOFT products are installed, project creation/startup may fail with NC Trainer2 plus.

  Install NC Trainer2 plus after installing other MELSOFT products. When the creation/switching of the project fails as a result of installing MELSOFT products after NC Trainer2 plus, reinstall NC Trainer2 plus.
- When the laser processing control function is enabled, an unused channel from RIO 1ch, 2ch, or 4ch will be used in a project. When there is no channel available, the "Z111 Laser I/F unit not connected" alarm will occur after starting the NC. When using a custom machine operation panel while the laser processing control function is enabled, do not allocate the devices corresponding to RIO 1ch, 2ch, or 4ch to the custom machine operation panel settings. Note that RIO 4ch cannot be used for M80V TypeA/M80V TypeB projects.

# 1.6 Restrictions for PLC Signals

The following PLC signals cannot be used for NC Trainer2 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<br>*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,<br>R6533 | R6582,<br>R6583 | R6632,<br>R6633 | R6682,<br>R6683 | R6732,<br>R6733 | R6782,<br>R6783 | Synchronous tapping Current error width |
| R6534,<br>R6535 | R6584,<br>R6585 | R6634,<br>R6635 | R6684,<br>R6685 | R6734,<br>R6735 | R6784,<br>R6785 | Synchronous tapping Maximum error width |
| R6536,<br>R6537 | R6586,<br>R6587 | R6636,<br>R6637 | R6686,<br>R6687 | R6736,<br>R6737 | R6786,<br>R6787 | Synchronous tapping Current error angle |
| R6538,<br>R6539 | R6588,<br>R6589 | R6638,<br>R6639 | R6688,<br>R6689 | R6738,<br>R6739 | R6788,<br>R6789 | Synchronous tapping Maximum error angle |
| R8002 | R8008 | R8014 | R8020 | R8026 | R8032 | PLC axis indexing control status 2<br>(Note) The following bits cannot be used.<br>bitB: Battery drop<br>bitC: Absolute position power shutoff movement over<br>bitD: Absolute position data loss<br>bitE: Initialization setting completed<br>bitF: Initialization setting error completed |
| R8003 | R8009 | R8015 | R8021 | R8027 | R8033 | PLC axis indexing control status 1<br>(Note) The following bits cannot be used.<br>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<br>*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 |
| 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.<br>* 2: DS, 3: FD, and 4: Memory card cannot be used. |
| R2116 | Pallet 2 Machining program device No.<br>* 2: DS, 3: FD, and 4: Memory card cannot be used. |
| R2122 | Pallet 1 180° Machining program device No.<br>* 2: DS, 3: FD, and 4: Memory card cannot be used. |
| R2128 | Pallet 1 270° Machining program No.<br>* 2: DS, 3: FD, and 4: Memory card cannot be used. |
| R2134 | Pallet 2 0° Machining program device No.<br>* 2: DS, 3: FD, and 4: Memory card cannot be used. |
| R2140 | Pallet 2 90° Machining program device No.<br>* 2: DS, 3: FD, and 4: Memory card cannot be used. |
| R2146 | Pallet 2 180° Machining program device No.<br>* 2: DS, 3: FD, and 4: Memory card cannot be used. |
| R2152 | Pallet 2 270° Machining program device No.<br>* 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.<br>* 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 Trainer2 plus.

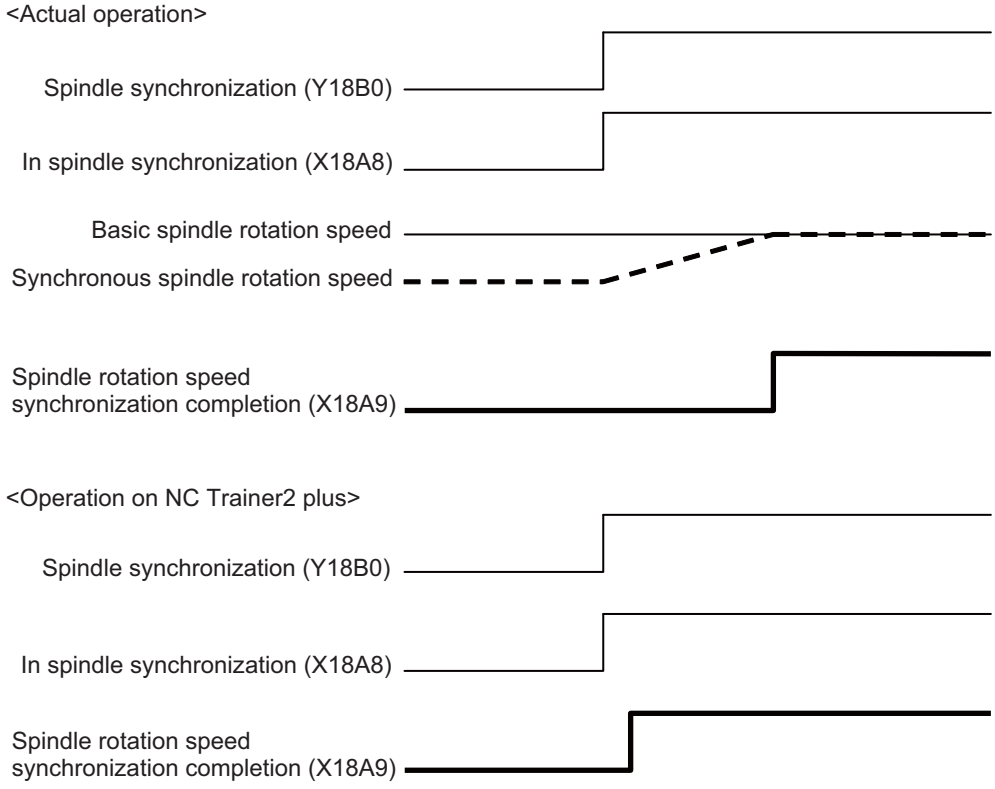
**■Input signal (NC to PLC)**

<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 |

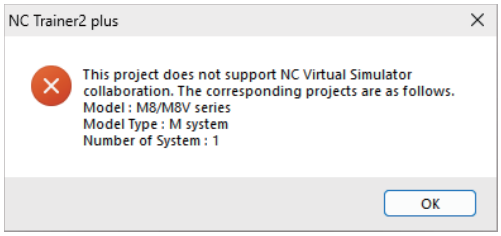
| 1st spindle | 2nd spindle | 3rd spindle | 4th spindle | 5th spindle | 6th spindle | |
|---|---|---|---|---|---|---|
| X1888 | X18E8 | X1948 | X19A8 | X1A08 | X1A68 | Spindle 2nd in-position |
| X188C | X18EC | X194C | X19AC | X1A0C | X1A6C | Zero speed |
| X188D | X18ED | X194D | X19AD | X1A0D | X1A6D | 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)**



# 1.7 Restrictions for NC Virtual Simulator Collaboration

- To quit linking with NC Virtual Simulator, exit NC Virtual Simulator manually.
- When attempting to switch to an NC Trainer2 plus project that does not support NC Virtual Simulator collaboration while NC Trainer2 plus is linked with NC Virtual Simulator, the following message appears, and the project cannot be switched. Switch projects after exiting NC Virtual Simulator.




- Edit a machining program in an "HD" or "memory card" when operation search is not being performed. When operation search is performed, the machining programs for which operation search is performed cannot be edited in the edit screen because they are linked with the NC Virtual Simulator machining programs display. Machining programs in "memory" or "memory 2" of NC Trainer2 plus can be edited.
- When performing restart search, NC Virtual Simulator shows simulation results from the restarted position.
- If moving an axis manually, the axis does not move in NC Virtual Simulator.
- When executing a manual numerical value command, the command is not executed in NC Virtual Simulator.
- When switching tabs in NC Virtual Simulator while a program is running, the single block function stops the program operation in NC Trainer2 plus and the simulation in NC Virtual Simulator.
- If the simulation stops in NC Virtual Simulator due to machine interference, the single block function stops NC Trainer2 plus.
- When linking with NC Virtual Simulator, select "Use the virtual network" under "Tool" - "Network Settings of NC" in NC Trainer2 plus. When "Use IP address of this PC" is selected, NC Trainer2 plus cannot link with NC Virtual Simulator.
- When switching tabs in NC Virtual Simulator while a program is running, NC Virtual Simulator may become unresponsive and operation may not be possible. In this case, operation will become possible again after a small wait.
- Do not display the "Display program" sub-display in NC Virtual Simulator while a program is running. If it is displayed, NC Virtual Simulator may not execute the machining simulation until the end of the machining program. In this case, hide "Display program" and execute the program again.
- NC data cannot be imported when linked with NC Virtual Simulator. By importing data when linked, NC Trainer2 plus may wait for a response and become unable to operate. In that case, restart the computer.
- A project linked with NC Virtual Simulator cannot be used with NC Trainer2. Exporting the project when linked from NC Trainer2 plus and importing it to NC Trainer2 may cause incorrect operation.

# 2

# Installation and Setup

# 2.1 Operating Environment

The following is the operating environment for the operation of NC Trainer2 plus.

**Operating environment for each model**

| Item | Description |
|---|---|
| C80 | GX Works3 (Sequence program development tool by Mitsubishi Electric) |

For the other operating environment, refer to the section "2.1 Operating Environment" of "I NC Trainer2".

# 2.2 Procedure of the First Installation

(Note 1) Do not install license key until the installation of NC Trainer2 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.

(Note 2) When NC Trainer2 plus and some MELSOFT products such as GX works3, etc. are to be installed on the same PC, if NC Trainer2 plus is installed before MELSOFT products are installed, project creation/startup may fail with NC Trainer2 plus.
Install NC Trainer2 plus after installing other MELSOFT products. When the creation/switching of the project fails as a result of installing MELSOFT products after NC Trainer2 plus, reinstall NC Trainer2 plus.

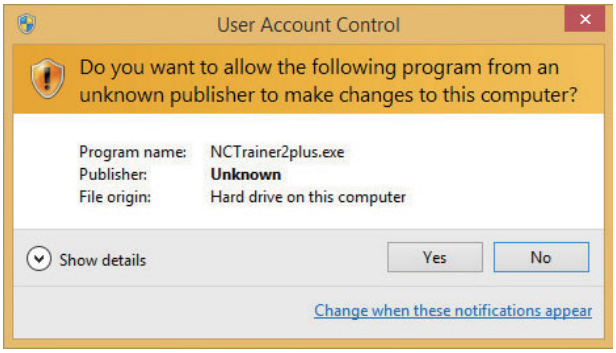
(1) Insert NC Trainer2 plus installation CD in computer's CD-ROM drive.

(2) Execute "NCTrainer2Plus.exe" in the installation CD.

(Note 1) The installation screens are displayed in Japanese when installing on Japanese-language version of Windows. They are displayed in English when installing on other language versions of Windows.

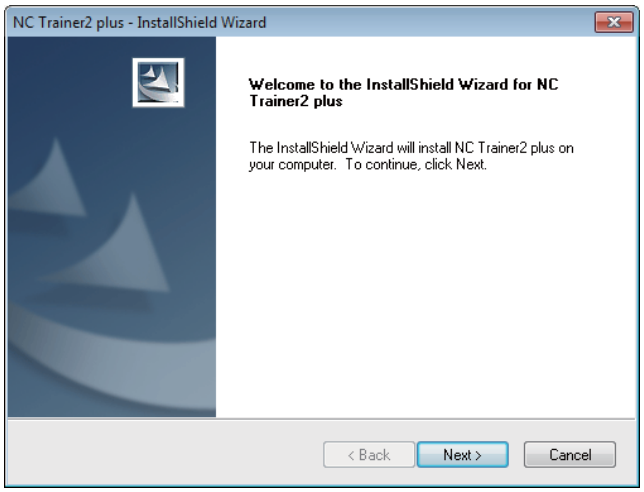
(Note 2) When NC Trainer plus has been installed on the computer, uninstallation of NC Trainer plus is started. Install NC Trainer2 plus after uninstalling NC Trainer plus. Refer to the section "2.5 Procedure of Uninstalling" for details.

(Note 3) The installation of NC Trainer2 plus has to be carried out by the authority of the administrator.
If User Account Control is enabled, the confirmation dialog box as below pops up. Then, select "Yes" to start the installation.

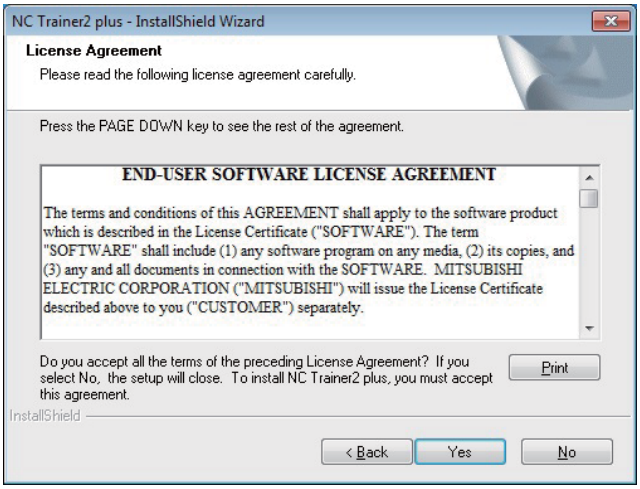


(3) Splash screen is displayed. Then the installer is started.

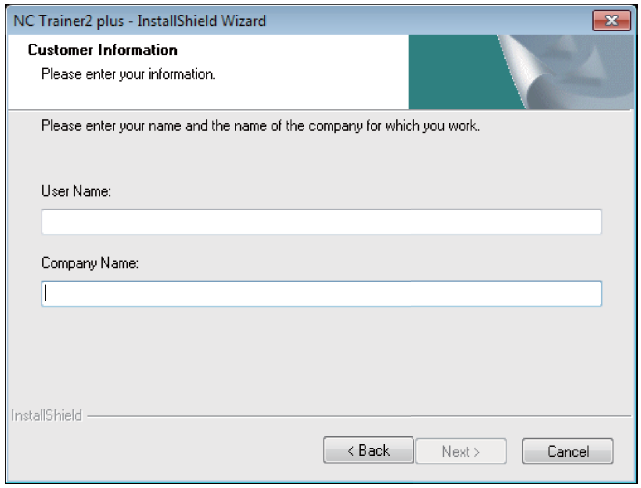

(4) The setup screen is displayed.
Press the "Next" button.



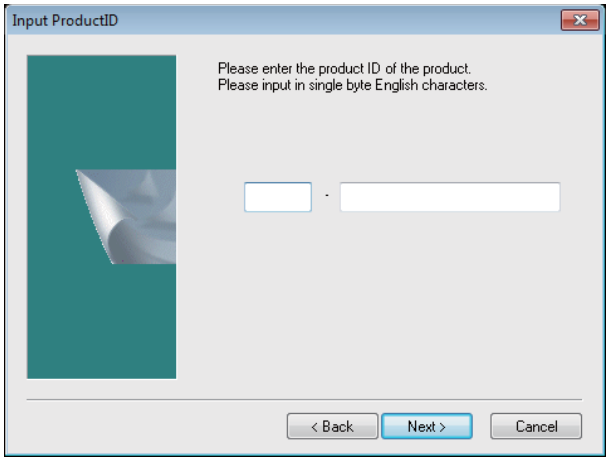

(5) The software license agreement is displayed.
Read the software license agreement carefully, and press the "Yes" button.
If "No" is selected (when you do not agree this agreement), the installation of NC Trainer2 plus is discontinued.



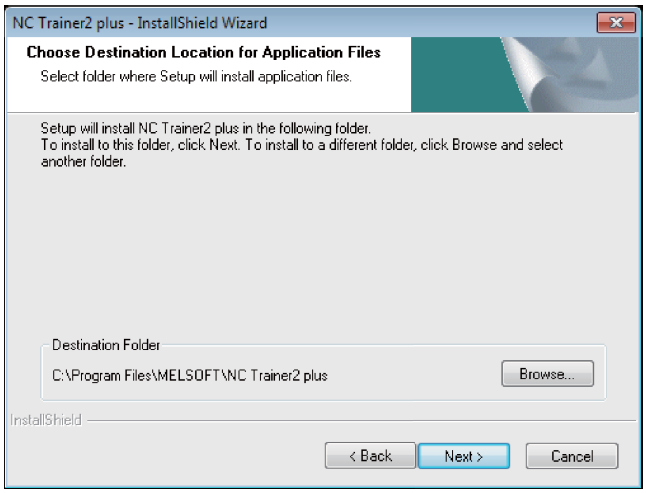
(6) The "Customer Information" screen is displayed. Input user name and company name and press the "Next" button.




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

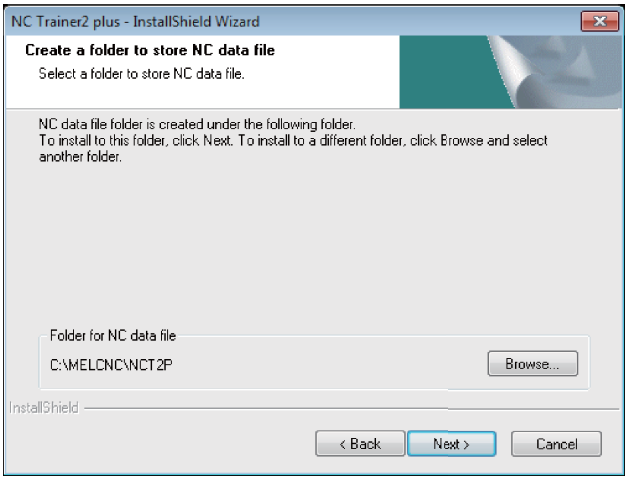



(8) The "Choose Designation Location" screen is displayed. Press "Browse" and select the installation destination when changing the installation destination. Press the "Next" button after the installation destination settings.




(Note) To change the folder to install the application file, specify the full path of the folder using up to 80 characters. A full path over 80 characters cannot be set.

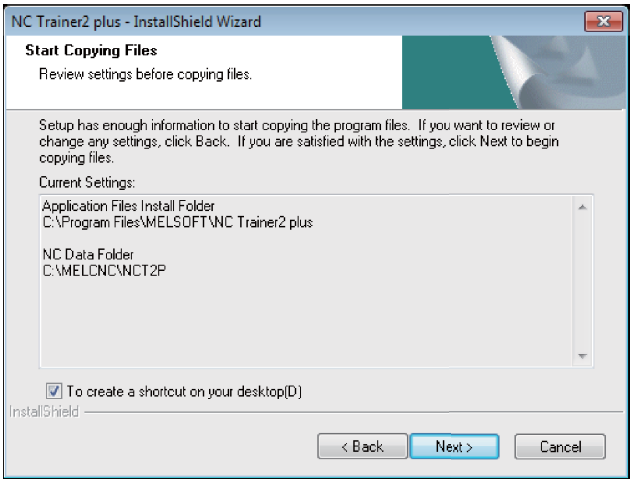
(9) The "Create a folder to store NC data file" screen is displayed.
Press "Browse" and select the folder to store NC data file when changing the folder.
Press the "Next" button after the settings.




(Note 1) If NC Trainer plus was used in the past, the data created by NC Trainer plus can be taken over automatically when selecting the same data storage folder as in the past. When selecting a different folder from the one used for NC Trainer plus to store NC data file, the data can be taken over by copying the data created by NC Trainer plus to the folder after installing NC Trainer2 plus. For a project that contains custom screen data designated with absolute path, however, you need to change the path described in config.ini and customdef.ini according to the change of the data storage folder. Refer to the section "5.3.2 Path Designation of GIP File, DLL File, and Executing File" for details.

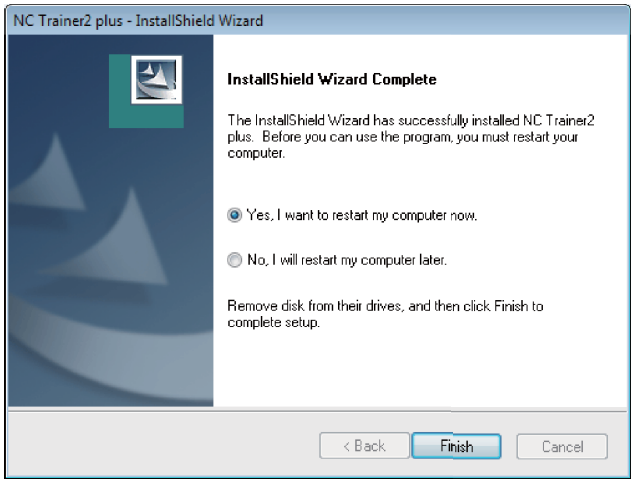
(Note 2) The following are the precautions when changing the folder to store NC data file.
- Do not use kana-kanji as a folder name.
- A folder name over 19 characters cannot be set.
- Do not designate a folder under C:\Program Files and C:\Windows. (Writing data to these folders is usually prohibited.)
- When installing both NC Trainer2 and NC Trainer2 plus, designate a different folder for each.
If designating the same folder, the same name project cannot be created for NC Trainer2 and NC Trainer2 plus. (Same for copying and renaming the project.)
- Do not designate a drive other than C or D. If designating a drive other than C or D, the operation for the file in HD or memory card device may not be executed.

(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 Trainer2 plus is created on the desktop after the installation is completed.



(Note 1) The "HASP SRM Run-time Environment installation omitted. Newer version already installed." message box might show up during installation. Click "OK" to continue installation.
(Note 2) 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 "5.6 Network Connection Setting" for details.
Settings are required to use a network connection type license key on a different network from the computer that NC Trainer2 plus is installed. Refer to "1.4.2 When Using a Network Connection Type License Key Inserted into a Computer on Another Network".

## 2.3 Installation Procedure When Upgrading

The operating procedure is the same as that of NC Trainer2. Refer to the section "2.3 Installation Procedure When Upgrading" of "I NC Trainer2" for details.

## 2.4 Procedure of Uninstalling

The operating procedure is the same as that of NC Trainer2. Refer to the section "2.4 Procedure of Uninstalling" of "I NC Trainer2" 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 Trainer2. Refer to the section "3.1 Configuration of the Screen" of "I NC Trainer2" for details.

# 3.2 Menu List

A list of pull-down menus of NC Trainer2 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.<br>Refer to "4.3.1 Creating a New Project" for details. |
| Change Project (O) | | Select to change the project executed.<br>Refer to "4.3.2 Changing the project" for details. |
| Set Project Option (S) | | Select to change the settings of the existing project.<br>Refer to "4.3.3 Changing the settings of project option" for details. |
| Rename Project (M) | | Select to rename the existing project.<br>Refer to "4.3.4 Renaming the project" for details. |
| Copy Project (C) | | Select to copy the existing project.<br>Refer to "4.3.5 Copying the project" for details. |
| Delete Project (D) | | Select to delete the existing project.<br>Refer to "4.3.6 Deleting the project" for details. |
| Export (E) | | Convert the data format of NC Trainer2 plus project to the format which can be operated with NC Trainer2 and output.<br>Refer to "6.1 Exporting NC Trainer2 plus Project" for details. |
| Import (I) | | Select to import the exported data from each application.<br>It has following sub-menus. |
| | Project (P) | Select to read a project which is exported from NC Trainer2 plus as a project for NC Trainer2 plus.<br>Refer to "6.2 Importing NC Trainer2 plus Project" for details. |
| | Custom Machine Operation Panel (C) | Select to register the custom machine operation panel which is created with NC Trainer2 Builder as a new machine operation panel for NC Trainer2 plus.<br>Refer to "5.1.7 Adding the Custom Machine Operation Panel to "Peripheral Settings"" for details. |
| | NC DATA (N) | Select to import the NC data which is backed up with actual NC to the project of NC Trainer2 plus.<br>Refer to "5.5 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 Trainer2 plus.<br>Refer to "5.4.1 Writing APLC Release C Language Module" for details. |
| Exit (X) | | Exit from the NC Trainer2 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 Trainer2. Refer to the section "3.2.2 [View (V)] Menu" of "I NC Trainer2" for details.

### 3.2.2.1 Changing the Display Language

The operating procedure is the same as that of NC Trainer2. Refer to the section "3.2.2.1 Changing the Display Language" of "I NC Trainer2" 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.<br>- A check mark will appear when it is enabled.<br>- 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.<br>- A check mark will appear when it is enabled. |
| Network settings of NC (W) | Set the network connection of NC which is executed on NC Trainer2 plus.<br>Refer to "5.6 Network Connection Setting" for details. |
| APLC Debug Task Lock (T) | Can be selected only while debugging APLC.o with NC Trainer2 plus. Otherwise this is displayed in gray and cannot be selected.<br>Refer to "5.4.7 Task Lock Function for APLC Debug" for details.<br>- When the function is enabled, a check mark is attached. |
| Set GX Simulator3 connection (C) | For a project of C80, set the simulator No. of GX Simulator3 that connects with NC Trainer2 plus. Refer to the section "5.8 Set GX Simulator3 Connection" for details. |
| NC Virtual Simulator Collaboration (V) | Selecting this checks/unchecks the item.<br>This is enabled when NC Virtual Simulator is installed and the opened project supports NC Virtual Simulator. In any other case, this item is displayed in gray and cannot be selected.<br>For details, refer to "5.9 NC Virtual Simulator Collaboration". |

### 3.2.4 [Window (W)] Menu

[Window (W)] menu is the same as that of NC Trainer2. Refer to the section "3.2.4 [Window (W)] Menu" of "I NC Trainer2" for details.

### 3.2.5 [Help (H)] Menu

[Help (H)] menu is the same as that of NC Trainer2. Refer to the section "3.2.5 [Help (H)] Menu" of "I NC Trainer2" for details.

### 3.2.6 Tool Bar

Tool bar is the same as that of NC Trainer2. Refer to the section "3.2.6 Tool Bar" of "I NC Trainer2" for details.

### 3.2.7 Status Bar

Status bar is the same as that of NC Trainer2. Refer to the section "3.2.7 Status Bar" of "I NC Trainer2" for details.

## 3.3 Operation of NC Screen

### 3.3.1 NC Keyboard

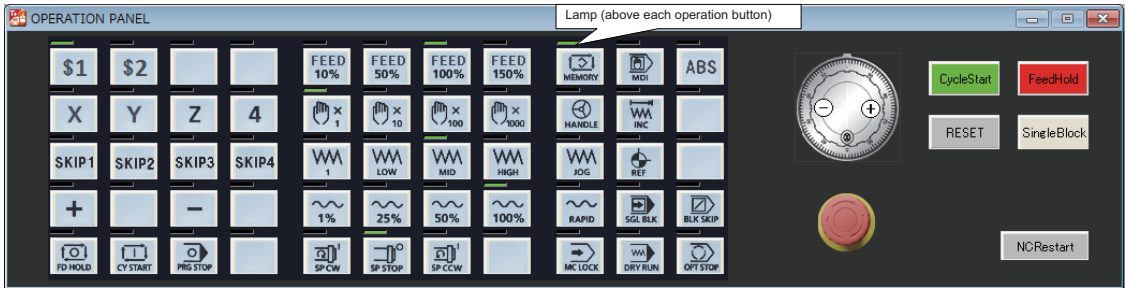
NC keyboard is the same as that of NC Trainer2. Refer to the section "3.3.1 NC Keyboard" of "I NC Trainer2" for details.

### 3.3.2 NC Menu Key

NC menu key is the same as that of NC Trainer2. Refer to the section "3.3.2 NC Menu Key" of "I NC Trainer2" for details.

### 3.3.3 Machine Operation Panel

In NC Trainer2 plus, the sequence 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 Trainer2 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 Trainer2. Refer to the section "3.3.3 Machine Operation Panel" of "I NC Trainer2" for details.

#### 3.3.3.1 Restarting NC

The operating procedure is the same as that of NC Trainer2. Refer to the section "3.3.3.1 Restarting NC" of "I NC Trainer2" for details.

# 4

# How to Use NC Trainer2 plus

# 4.1 Starting NC Trainer2 plus

The operating procedure is the same as that of NC Trainer2. Refer to the section "4.1 Starting NC Trainer2" of "I NC Trainer2" for details.

(Note) When using a license key of network connection type, insert the license key into the computer that is on the network and has NC Trainer2 plus installed.

# 4.2 Exiting from NC Trainer2 plus

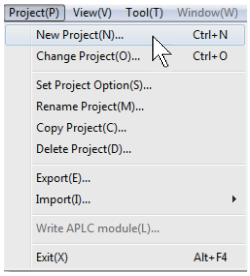
The operating procedure is the same as that of NC Trainer2. Refer to the section "4.2 Exiting from NC Trainer2" of "I NC Trainer2" for details.

# 4.3 Creating a Project

## 4.3.1 Creating a New Project

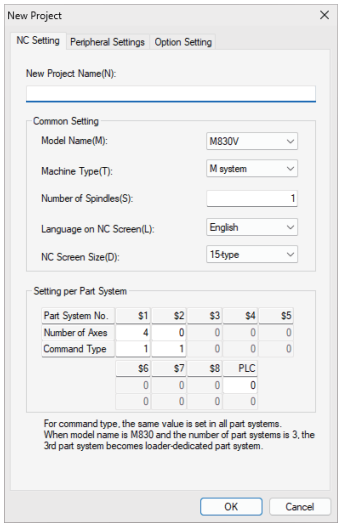
The following are the procedures to create a new project.

(1) Select [Project (P)] - [New Project (N)] from the menu bar.




(Note) For C80, start GX Simulator3, then create a new project.

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

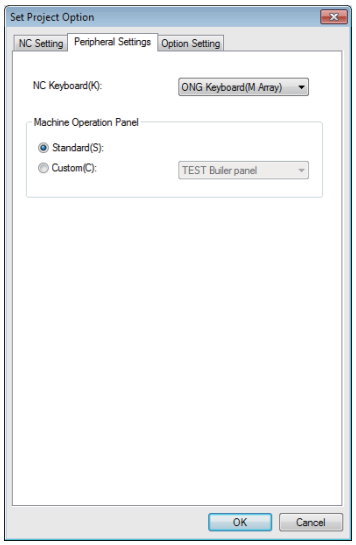


**Display item of New Project dialog box**

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>New Project Name (N)</td><td>Input the new project name.<br>- A project name can be up to 80 one-byte characters.<br>(Each two-byte character is equivalent to two characters.)<br>- One-byte characters and two-byte characters can be used for a project name.<br>- A project name is not case-sensitive.<br>- The following characters cannot be used for a project name.<br>\ / : * ? < > | " (Same as the prohibited characters for a file name)<br>- A created project name cannot be designated.<br>- Blank project name cannot be used.<br>- Blank and Period (.) cannot be used for the first or last character of a project name.<br>- CON, PRN, AUX, CLOCK$, NUL, COM0 to COM9 and LPT0 to LPT9 cannot be used for a project name.</td></tr>
<tr><td>Model Name (M)</td><td>Specify the NC model. The following models can be selected.<br>M830V<br>M80V TypeA<br>M80V TypeB<br>M830<br>M80 TypeA<br>M80 TypeB<br>E80 TypeA<br>E80 TypeB<br>C80<br>M730V<br>M70V TypeA<br>M70V TypeB<br>E70</td></tr>
<tr><td>Machine Type (T)</td><td>Designate the NC configuration. The following configuration can be selected.<br>Machining center: M system<br>Lathe: L system</td></tr>
<tr><td>Number of Spindles (S)</td><td>Set the number of axes.<br>The setting range differs depending on the model name and machine type, and is shown in the following table.<br><table><tr><th>Machine Type / Model Name</th><th>M system</th><th>L system</th></tr><tr><td>M830V</td><td>0 to 6</td><td>0 to 8</td></tr><tr><td>M80V TypeA</td><td>0 to 4</td><td>0 to 6</td></tr><tr><td>M80V TypeB</td><td>0 to 2</td><td>0 to 4</td></tr><tr><td>M830</td><td>0 to 4</td><td>0 to 8</td></tr><tr><td>M80 TypeA</td><td>0 to 2</td><td>0 to 5</td></tr><tr><td>M80 TypeB</td><td>0 to 2</td><td>0 to 4</td></tr><tr><td>E80 TypeA</td><td>0 to 1</td><td>0 to 3</td></tr><tr><td>E80 TypeB</td><td>0 to 1</td><td>0 to 3</td></tr><tr><td>C80</td><td>0 to 7</td><td>0 to 7</td></tr><tr><td>M730V</td><td>0 to 4</td><td>0 to 6</td></tr><tr><td>M70V TypeA</td><td>0 to 2</td><td>0 to 4</td></tr><tr><td>M70V TypeB</td><td>0 to 2</td><td>0 to 3</td></tr><tr><td>E70</td><td>0 to 1</td><td>0 to 2</td></tr></table></td></tr>
<tr><td>Language on NC Screen (L)</td><td>Set the language displayed on NC Screen while executing a project.<br>Languages supported in NC can be selected.</td></tr>
<tr><td>NC Screen Size (D)</td><td>Set the NC screen size. The following size can be selected.<br>15-type<br>10.4-type<br>* 15-type can be selected only when the model name is M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/M730V.</td></tr>
<tr><td>Number of Axes</td><td>Set the number of axes for each part system.<br>If the number of axes in a part system is 0, the part system is invalid.<br>(Note 1) The setting items for 5th to 8th part systems are displayed only when M830V/M830/C80 is selected on Model Name.<br>(Note 2) When selecting M830 for Model Name and M system for Machine Type, and having three part systems, the project is created with the third part system set as a loader-dedicated part system. To change the loader-dedicated part system, change the parameter "#11811 LDR Dedicated Sys" (Loader-dedicated part system (For M system only)) after creating a project.</td></tr>
</table>

| Item | Description |
|---|---|
| Command Type | Set the G code system and compensation type for programs.<br>1: List1 (for M system) Type I (one compensation amount for one compensation No.)<br>2: List1 (for M system) Type II (shape and wear compensation amounts for one compensation No.)<br>3: List2 (for L system) Type III (shape and wear compensation amounts for one compensation No.)<br>4: List3 (for L system) Ditto<br>5: List4 (for special L system) Ditto<br>6: List5 (for special L system) Ditto<br>7: List6 (for special L system) Ditto<br>8: List7 (for special L system) Ditto<br>9: List8 (for M system)<br>M2 form at type Type I (one compensation amount for one compensation No.)<br>10: List8 (for M system)<br>M2 form at type Type II (shape and wear compensation amounts for one compensation No.)<br>- 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.

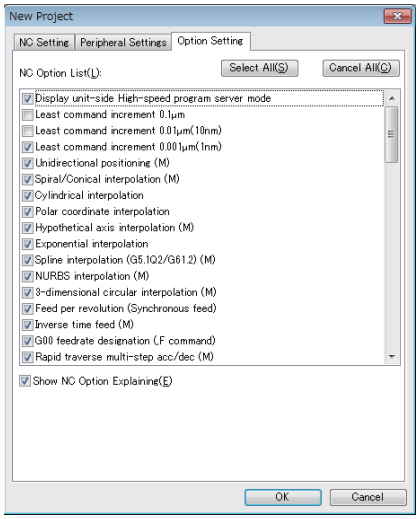



**Display item of Peripheral Settings tab**

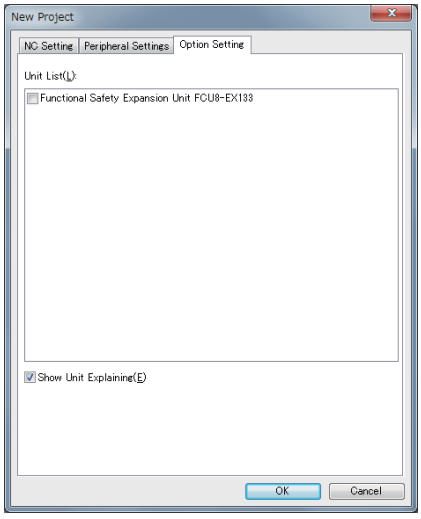
| Item | | Description |
|---|---|---|
| NC Keyboard (K) | | Select NC Keyboard to be used. The following NC Keyboards can be selected.<br>- ONG Keyboard (M array) : default<br>- ONG Keyboard (L array) |
| Machine Operation Panel | | This item can be set only for NC Trainer2 plus. |
| | Standard (S) | Select to use the standard machine operation panel. (default)<br>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.<br>Select the custom machine operation panel to be used from drop-down list.<br>This can be selected only when a custom machine operation panel is imported in advance.<br>Refer to "5.1.7 Adding the Custom Machine Operation Panel to "Peripheral Settings"" for details of importing the custom machine operation panel. |

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

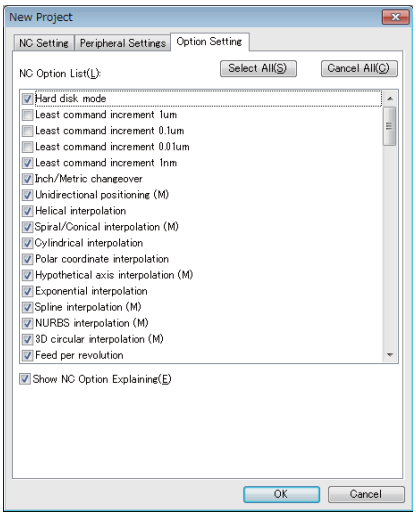
**<M800V/M800/C80>**



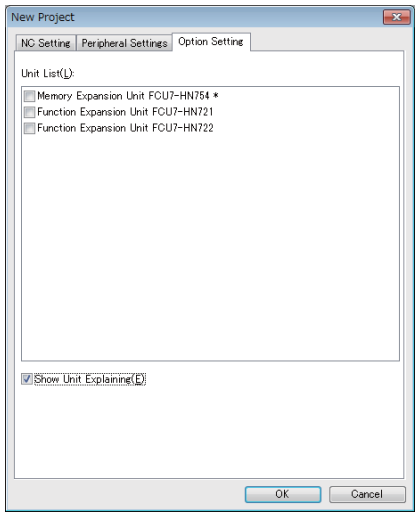

**<M80V/M80/E80>**




**<M700V>**




**<M70V/E70>**




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

## Display item of M800V/M800/C80/M700V Option Setting tab

| Item | Description |
|---|---|
| NC Option List (L) | Display the NC option list that can be selected for the project.<br>Check the check box to validate an NC option.<br>- For the option required to format NC memory, [*] mark is indicated at the end of the option name. |
| Select All (S) | Check all items.<br>- 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.<br>- 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. |

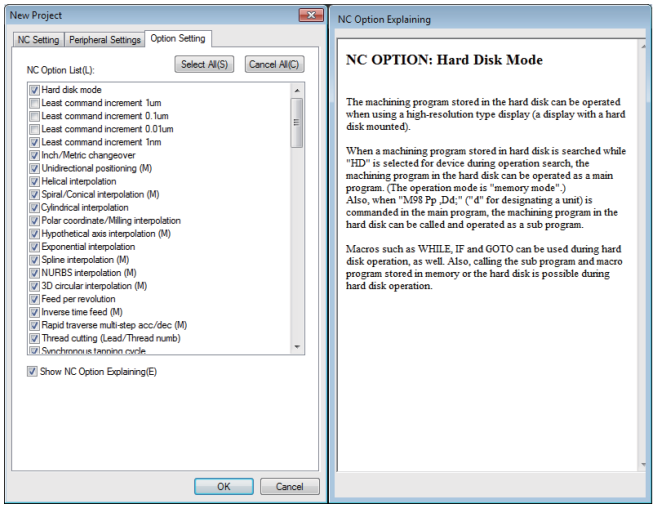
### Display item of M80V/M80/E80 Option Setting tab

| Item | Description |
|---|---|
| Additional Unit List (L) | Displays a list of additional units.<br>Check the check box to validate an additional unit.<br>- The selectable unit differ by the NC model of a project to create. No additional unit can be selected if the NC model is E80. |
| Display the description of the Units (E) | When this is checked, a dialog box appears showing the description of currently selected additional unit. |

### Display item of M70V/E70 Option Setting tab

| Item | Description |
|---|---|
| Additional Unit List (L) | Displays a list of units.<br>Check the check box to validate an additional unit.<br>- 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.<br>- The function extension units FCU7-HN721 and -HN722 can not be selected at the same time.<br>- 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 1) 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.)




(Note 2) For a C80 project, press the "OK" button, and the "Set GX Simulator3 connection" dialog is displayed. Select the simulator No. of GX Simulator3.
Refer to "5.8 Set GX Simulator3 Connection" for "Set GX Simulator3 connection" dialog.

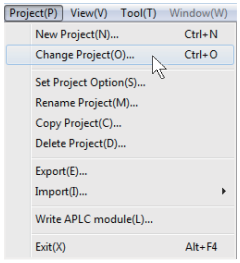
(5) Press the "OK" button, and the NC screen of created project is displayed. At this time, NC data of the executing project is automatically stored.
Note that if [Tool (T)] - [Confirm NC Data Storage (N)] is enabled, the confirmation message is displayed. When pressing the "OK" button, NC data is stored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

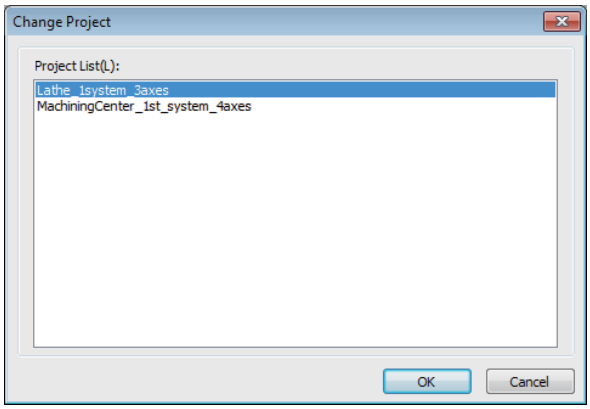
The following are the procedures to change the project.

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




(Note) For C80, start GX Simulator3, then create a new project.

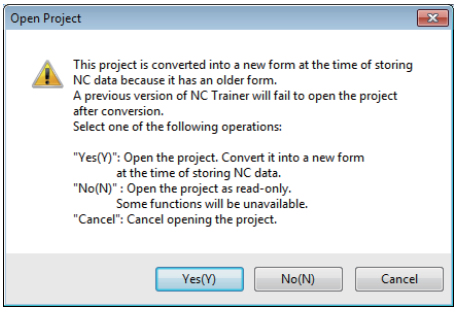
(2) Project list is displayed. Select the project to change.




(Note 1) NC Trainer2 plus does not display projects which were created with NC Trainer2.

(Note 2) For a C80 project, press the "OK" button, and the "Set GX Simulator3 connection" dialog is displayed. Select the simulator No. of GX Simulator3. If selecting the currently-executing project to change, "Set GX Simulator3 connection" dialog is not displayed.
Refer to "5.8 Set GX Simulator3 Connection" for "Set GX Simulator3 connection" dialog.

(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 "Yes" button, NC data is stored and NC screen of created project is displayed.
(Note 1) If selecting the currently-executing project, the dialog box is closed.
(Note 2) If the project is created by NC Trainer/NC Trainer plus is selected, the following message box may appear.

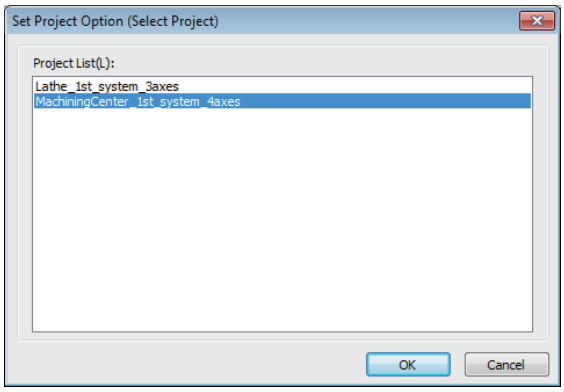



-If there is no possibility to open the project by NC Trainer plus, click "Yes(Y)".
-If there is a possibility to open the project by NC Trainer plus, click "No(N)" to open by read-only.
-To cancel opening the project, click "Cancel" button.
-Refer to "1.5 Precautions" for the restraints of each function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

### 4.3.3 Changing the Settings of Project Option

The following are the procedures to change the settings of the project option.

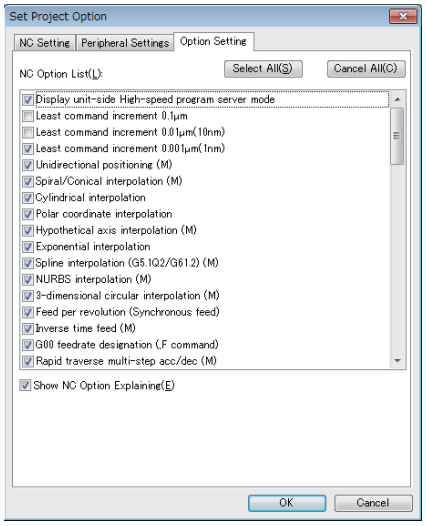
(1) Select [Project (P)] - [Set Project Option (P)] from menu bar to change or refer to settings of the project. Select Project dialog box is displayed.



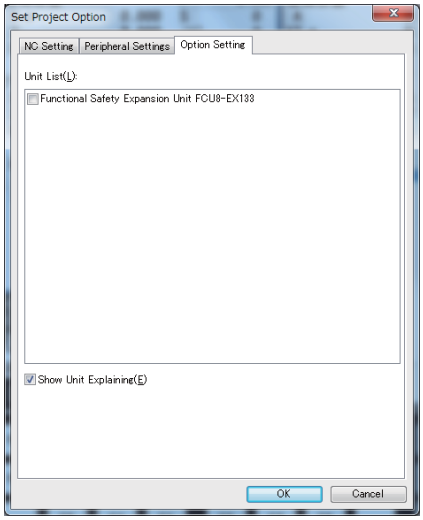

(Note 1) For C80, start GX Simulator3, then create a new project.
(Note 2) NC Trainer2 plus does not display projects which were created with NC Trainer2.

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

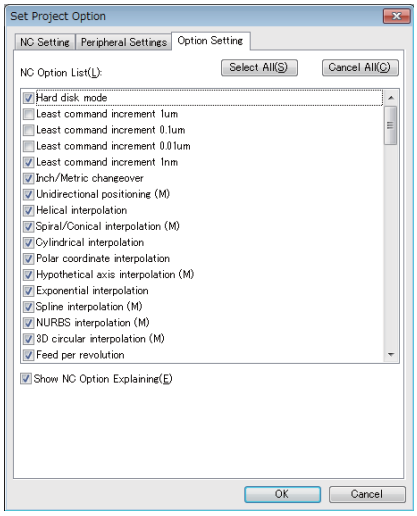
**<M800V/M800/C80>**



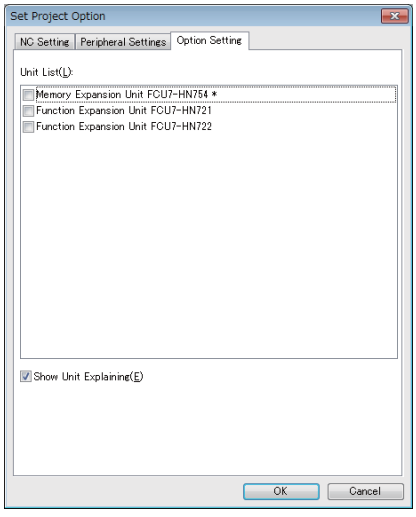

**<M80V/M80/E80>**




**<M700V>**




**<M70V/E70>**



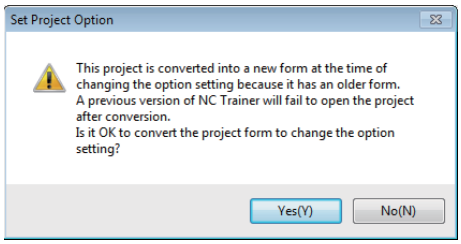
**Display item of Set Project Option dialog box**

| 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.<br>Refer to "4.3.1 Creating a New Project" for details. |
| Peripheral Settings tab | This is a tab to set or display the type of machine operation panel.<br>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.<br>[*] mark indicates the options and the unit required to format NC memory.<br>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.

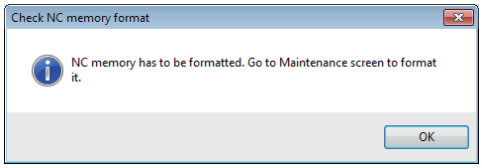
(Note 2) Only "NC Screen Size" can be changed on [NC Setting tab]. To change other setting values, create a new project. Refer to the section "4.3.1 Creating New Project" on how to create a project.

(Note 3) On Set Project Option dialog box, if the project created by NC Trainer plus is selected, the following message box 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, click "Yes(Y)" to activate.
- To save the selected project in a format that allows the project to be opened with NC Trainer plus, 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 Trainer2. Refer to the section "4.3.3 Changing the Settings of Project Option" of "I NC Trainer2" for details.

### 4.3.4 Renaming the Project

The operating procedure is the same as that of NC Trainer2. Refer to the section "4.3.4 Renaming the Project" of "I NC Trainer2" for details.

### 4.3.5 Copying the Project

The operating procedure is the same as that of NC Trainer2. Refer to the section "4.3.5 Copying the Project" of "I NC Trainer2" for details.

### 4.3.6 Deleting the Project

The operating procedure is the same as that of NC Trainer2. Refer to the section "4.3.6 Deleting the Project" of "I NC Trainer2" for details.

# 5

# The Function of NC Trainer2 plus

What is available on NC Trainer2 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)
- Exporting NC Trainer2 plus project (Importing to NC Trainer2)

The functions available only for NC Trainer2 plus are explained in this chapter.

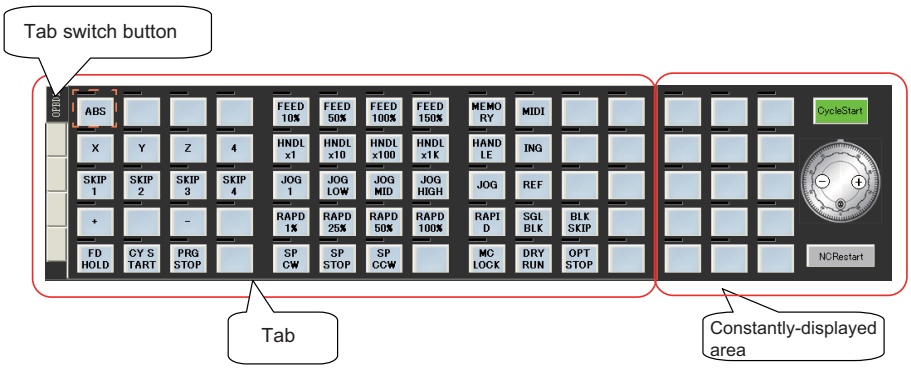
# 5.1 Custom Machine Operation Panel

## 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.

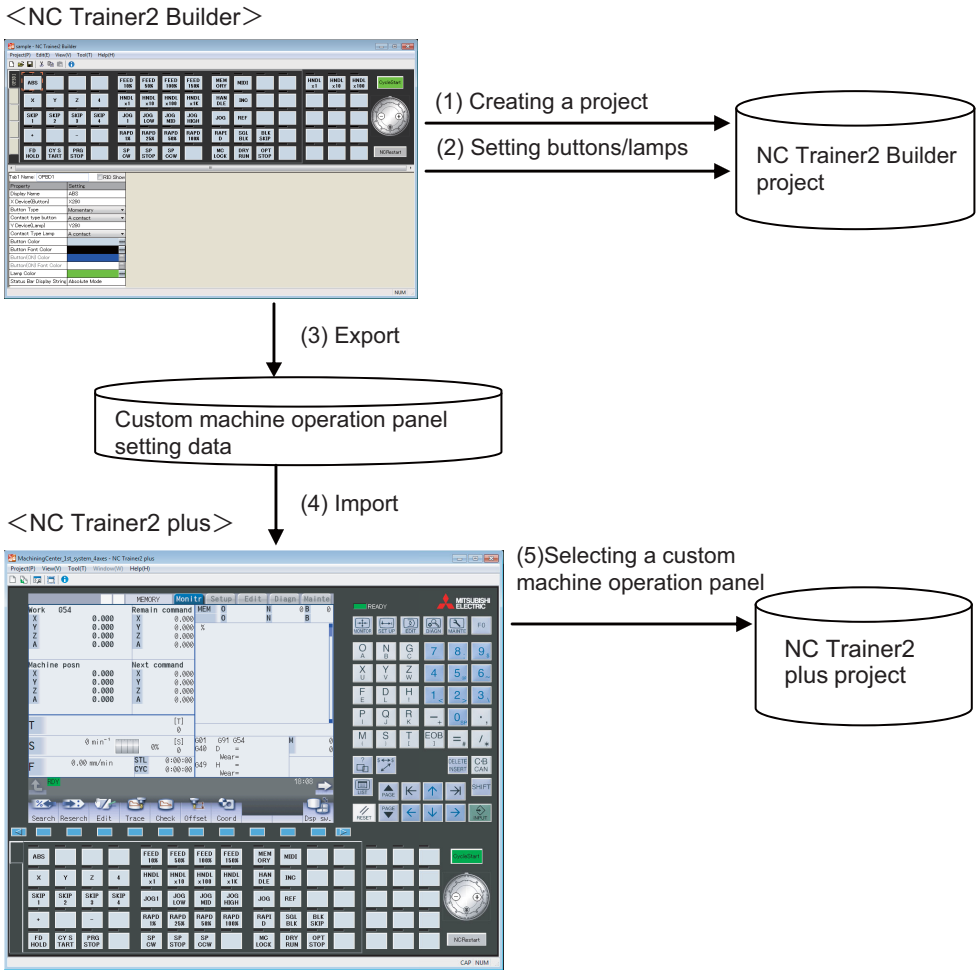
The button/lamp setting can be executed in batches by outputting device comments as a CSV file from GX Developer (after GX Converter add-in) and reading it with NC Trainer2 Builder. Refer to the section "5.1.8 Reading Device Comments" for details of button/lamp setting.

The interface of custom machine operation panel is as follows.




| Item | | Description |
|---|---|---|
| Tab | | The objects (buttons/lamps) which are displayed on the area can be switched by pressing tab switch button.<br>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.<br>  <br>A device can be allocated to each button and lamp.<br>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).<br>Input device to start an automatic operation is required to be allocated to this button. (The user PLC determines the input device.)<br>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.<br>Press [+] button to turn the handle to the right. Press [-] button to turn the handle to the left. [+] button and [-] button are auto-repeated.<br>The setting cannot be changed for this button. |
| |  | This is a button to restart the NC.<br>The setting cannot be changed for this button. |

The custom machine operation panel is created with NC Trainer2 Builder. NC Trainer2 Builder is a tool provided with NC Trainer2 plus and it is installed at the same time as when NC Trainer2 plus is installed.
The workflow for creating a custom machine operation panel and using it with NC Trainer2 plus is shown below.




Start NC Trainer2 Builder.
(Refer to "5.1.3 Start and Exit NC Trainer2 Builder" for details.)

(1) Creating a project of the custom machine operation panel with NC Trainer2 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 Trainer2 Builder
(Refer to "5.1.5 Setting of Custom Machine Operation Panel" for details.)

(3) Exporting the custom machine operation panel with NC Trainer2 Builder
(Refer to "5.1.6 Exporting the Custom Machine Operation Panel" for details.)

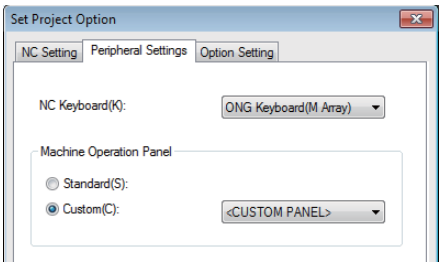
Start NC Trainer2 plus.
(Refer to "4.1 Starting NC Trainer2 plus" for details.)

(4) Importing the custom machine operation panel with NC Trainer2 plus
(Refer to "5.1.7 Adding the Custom Machine Operation Panel to "Peripheral Settings"" for details.)

(5) Selecting the custom machine operation panel as a machine operation panel of a project with NC Trainer2 plus
(Refer to "4.3.1 Creating a New Project" for details.)

**< Custom machine operation panel of the project which is imported to NC Trainer2 / NC Trainer2 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>".

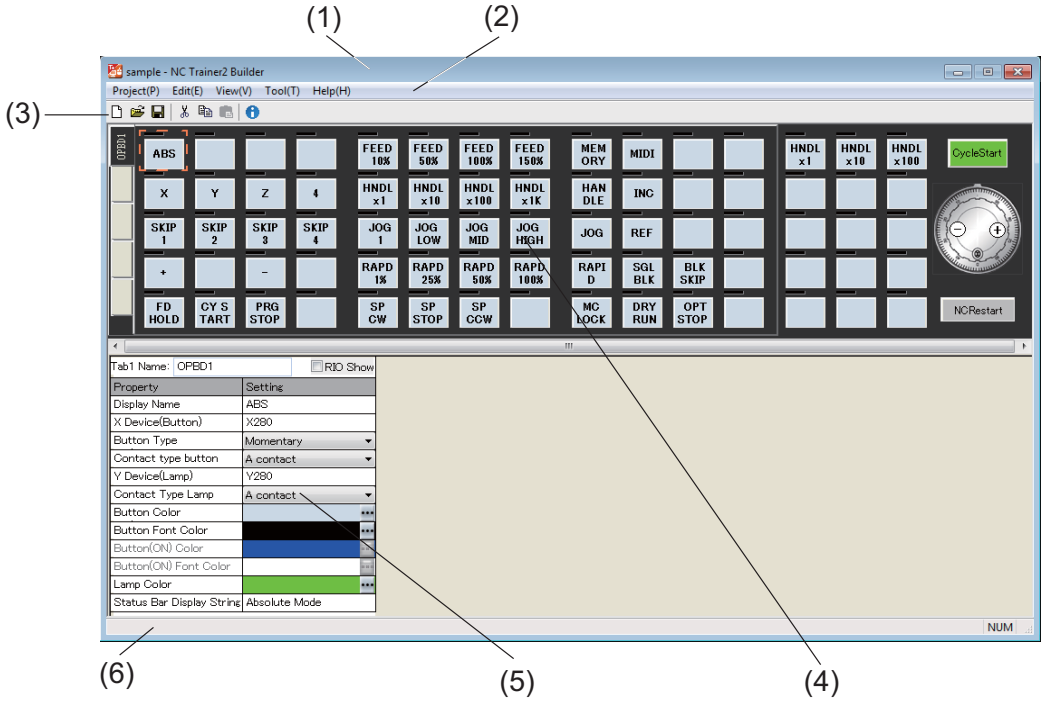



- The setting of the custom machine operation panel of the imported project cannot be changed with NC Trainer2 (The setting item for Machine Operation Panel on the Set Project Option dialog box is displayed in gray).

## 5.1.2 NC Trainer2 Builder Interface

NC Trainer2 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 Trainer2 plus. |
| (Project history) (Note 1) | The projects that opened in the past are displayed.(Up to the last 4 projects)<br>A project can be opened by selecting it from the list. |
| Exit (X) | Exit from the NC Trainer2 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

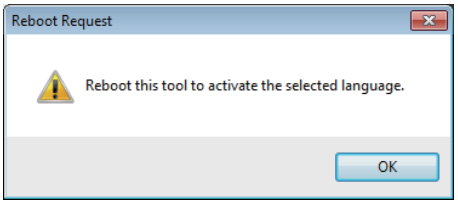
**View menu item**

| Item | | Description |
|---|---|---|
| Language (L) | | Change the display language of the application.<br>(The setting will be enabled after restarting the application.)<br>It has following sub-menus. |
| | Japanese (J) | Display in Japanese. |
| | English (E) | Display in English. |
| | 中文 ( 简体 ) (S) | Display in Simplified Chinese. |
| | 中文 ( 繁體 ) (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 Trainer2 Builder, select [View (L)] - [Language (L)] -[Japanese (J)], [English (E)], [ 中文 ( 简体 ) (S)], or [ 中文 ( 繁體 ) (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 File (W)... | Output the settings of button/lamp to CSV file. |

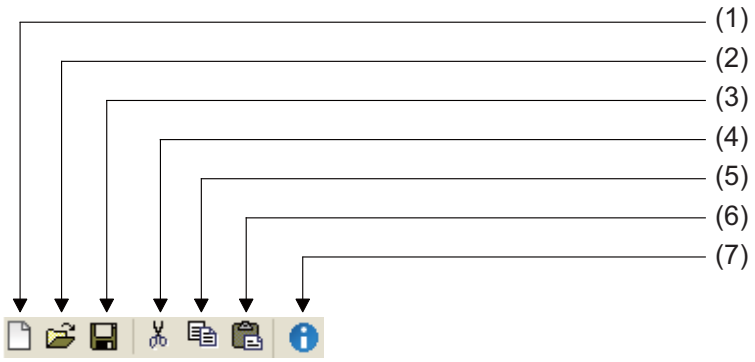
### 5.1.2.2.5 [Help (H)] Menu

**Help menu item**

| Item | Description |
|---|---|
| Version Information (A) | Display the version information. |

### 5.1.2.2.6 Tool Bar

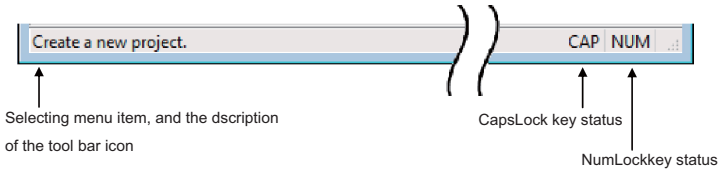
The description of each icon on the tool bar is as follows.




**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

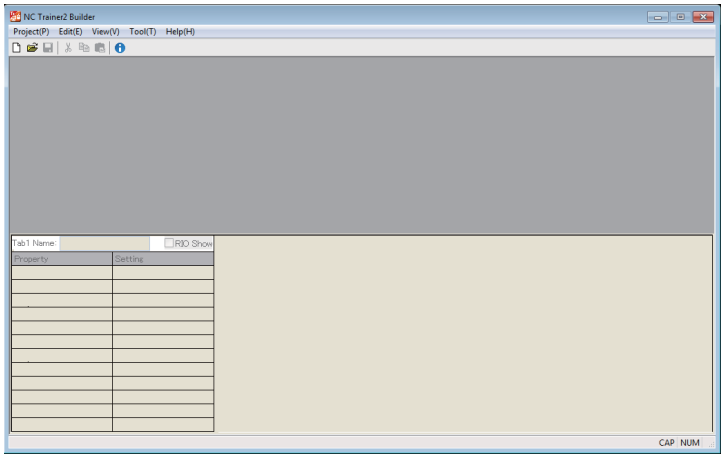


### 5.1.3 Start and Exit NC Trainer2 Builder

The following describes how to start NC Trainer2 Builder.

Select [All apps] - [MELSOFT application] - [NC Trainer2 Builder] from the [Start] menu of Windows.

The following main window is displayed after starting NC Trainer2 Builder.




To exit from NC Trainer2 Builder, execute any of the following operations.

- 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 Trainer2 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.

### 5.1.4.1 Creating a New Project

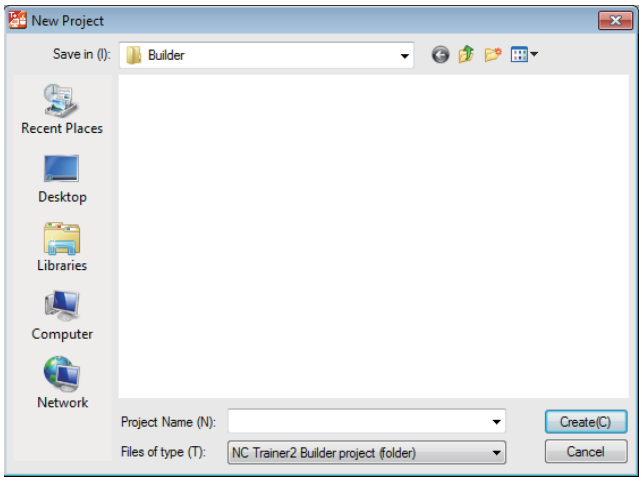
The following are the procedures to create a new project of NC Trainer2 Builder.

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

-Click the  icon on the tool bar.

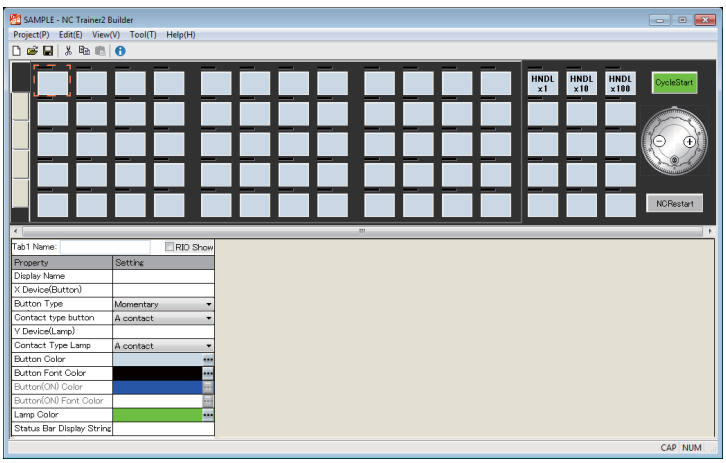
- Input Ctrl + N

(2) [New Project] dialog is displayed. Specify a project name to create.




(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.
(Note 4) The following characters cannot be used for a project 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 a project name.
(Note 6) CON, PRN, AUX, CLOCK$, NUL, COM0 to COM9 and LPT0 to LPT9 cannot be used for a project name.

(3) Press the "Create (C)" button to create the project.




(Note) The folder of the same name as the project name is created to a saving destination specified by [New Project] dialog. The data files of the project are created in the folder.

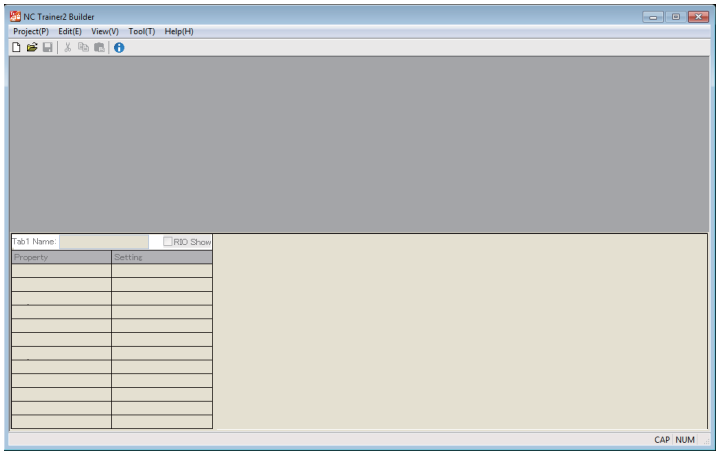
### 5.1.4.2 Saving the Project

Execute one of the following operations 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.

### 5.1.4.3 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.

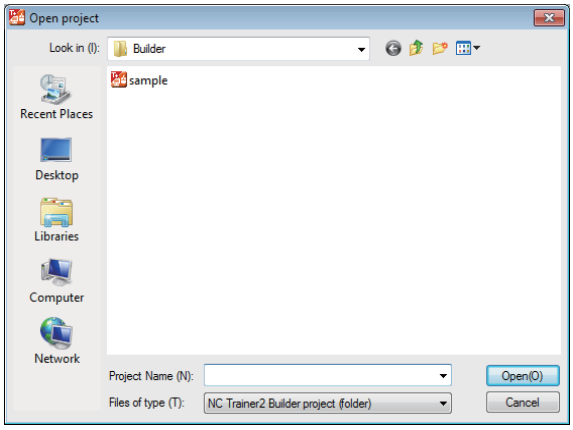


### 5.1.4.4 Opening the Project

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

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

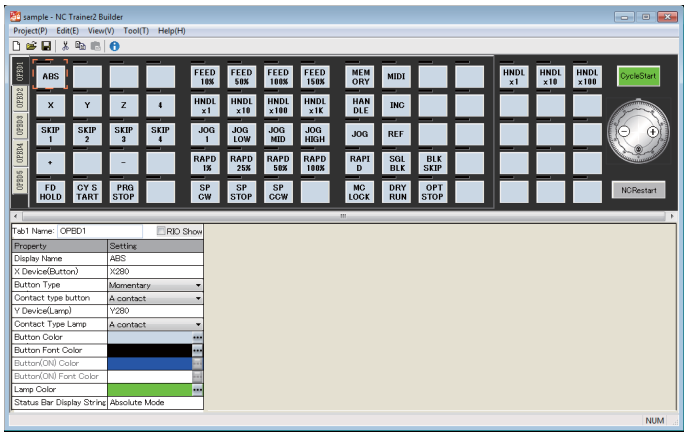
The following dialog box is displayed.




(Note) The folder for the project of NC Trainer2 Builder is displayed as  icon.

(2) Press the "Open project (O) " button after designating the project to be opened.
(Note) Refer to the section "5.1.4.1 Creating a New Project" for available project name.

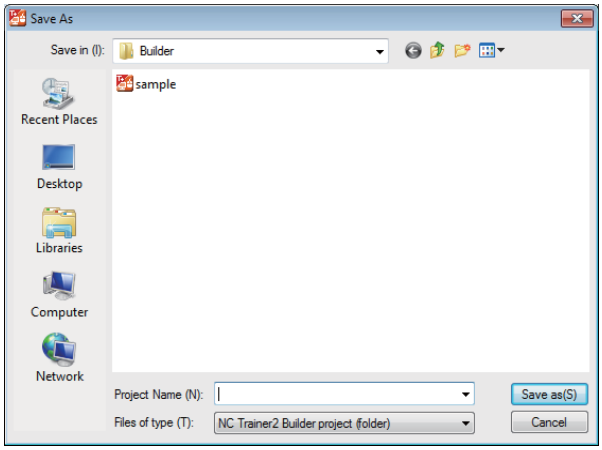
The following screen is displayed and the custom machine operation panel can be set.



### 5.1.4.5 Saving the Project 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 Trainer2 Builder is displayed as  icon.

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

(Note) Refer to the section "5.1.4.1 Creating a New Project" 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).

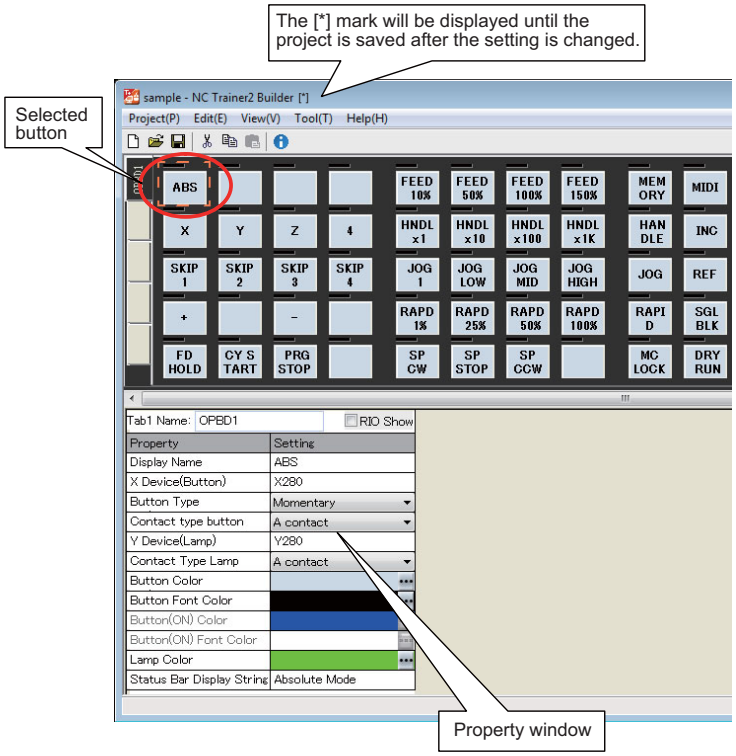
## 5.1.5 Setting of Custom Machine Operation Panel

(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<br>- Up to 8 one-byte characters.(Each two-byte character is equivalent to two one-byte characters.)<br>- When the character string longer than the button width (4 one-byte characters), a line feed is automatically inserted.<br>- The maximum number of lines which can be displayed on the button is up to two.<br>- To insert a line feed at arbitrary position, input \n (\n is not counted as the number of characters).<br>- To display \, input \\ (\\ is counted as a one-byte character).<br>- 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). |
| Input Device (Button) | - Designate the number of the input device (X0 to X2BF in hexadecimal, ZR5000.0 to ZR5111.F, ZR5200.0 to ZR5311.F, or ZR5412.0 to ZR5511.F in decimal) to be allocated to the button.<br>- When the setting value is blank, no allocation.<br>- Device can be input when both display name and input device are specified. (When either display name or input device is blank, input device will be 0 even if the button is pressed.) |
| Button Type | - Select from Momentary or Alternate.<br>Momentary: Turns ON only while pressing the button.<br>Alternate: ON and OFF is switched every time the button is pressed. |
| Contact type button | - Contact type button<br>A contact: Input device will be 1 while the button is ON.<br>B contact: Input device will be 1 while the button is OFF. |
| Output Device (Lamp) | - Designate the number of the output device (Y0 to Y2BF in hexadecimal, ZR6000.0 to ZR6111.F, ZR6200.0 to ZR6311.F, or ZR6412.0 to ZR6511.F in decimal) to be allocated to the lamp.<br>- When the setting value is blank, no allocation.<br>- Device can be output when both display name and output device are specified. (When either display name or output device is blank, the lamp will not light even if the output device is 1.) |
| Contact Type Lamp | - Select from A contact or B contact.<br>A contact: It will light when output device is 1 and will not light when Y device is 0.<br>B contact: It will light when output 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.<br>- It can be specified when "Button Type" is alternate.<br>- 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.<br>- It can be specified when "Button Type" is alternate.<br>- 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 Trainer2/NC Trainer2 plus.(displays when the cursor is on the button)<br>- Up to 100 one-byte characters. (each two-byte character is equivalent to two one-byte characters.) |

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

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

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

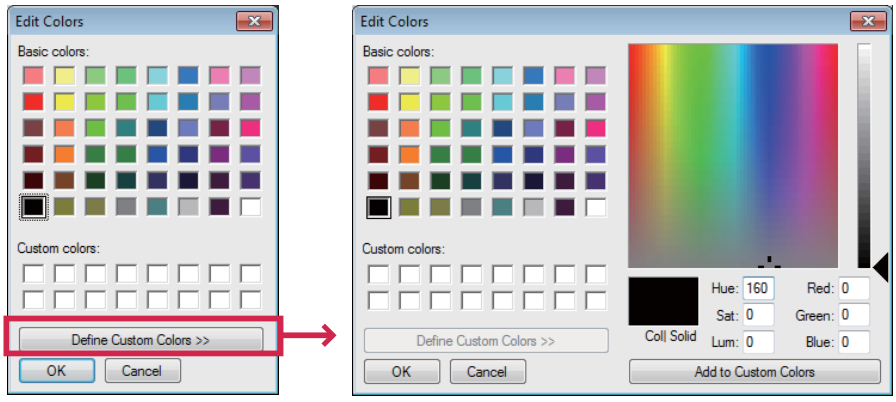
| The characters to be set (Example) | Display on the button |
|---|---|
| X |  |
| MDI |  |
| FEED50% |  |
| FD\nHOLD |  |
| A\\B |  |
| A\3B |  |

When the button type is Alternate, the graphic for the button ON/OFF which is displayed on NC Trainer2 / NC Trainer2 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 dialog box, custom colors can be selected.

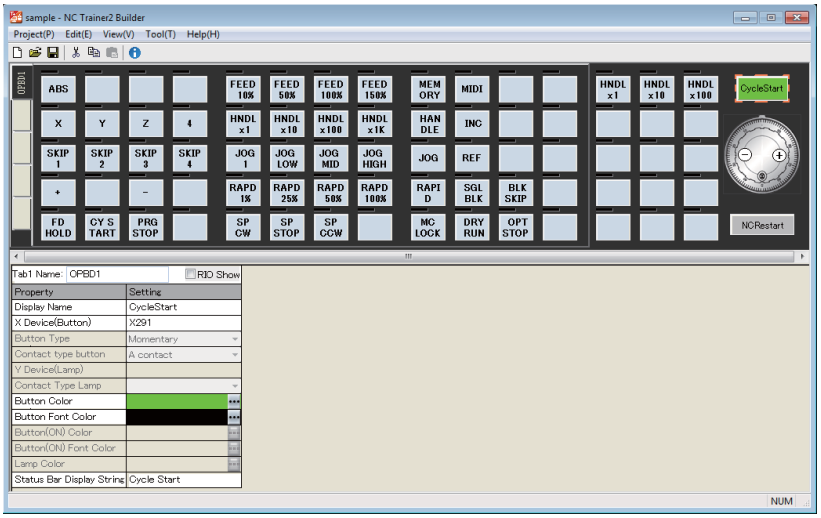



The default settings of button/lamp color are as follows.

| 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.

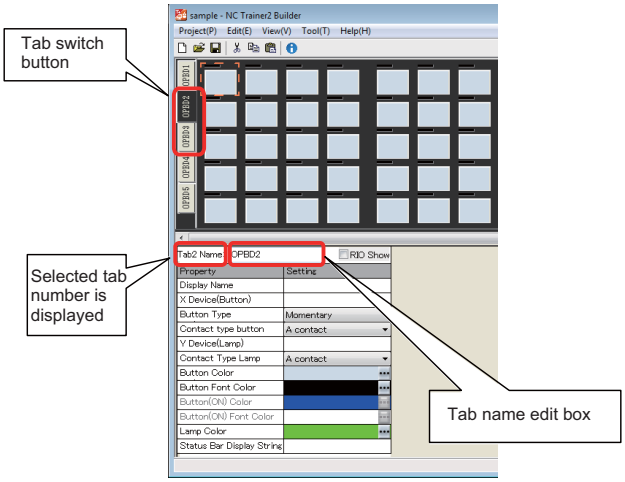



The property (setting item) of the CycleStart

| Property name | Description |
|---|---|
| Display Name | - Up to 10 one-byte characters of alphanumeric. (The default setting is CycleStart.) |
| Input Device (Button) | - Designate the number of the input device (X0 to X2BF in hexadecimal, ZR5000.0 to ZR5111.F, ZR5200.0 to ZR5311.F, or ZR5412.0 to ZR5511.F in decimal) to be allocated to the button.<br>- When the setting value is blank, no allocation.<br>- Device can be input when both display name and input device are specified. (When either display name or input device is blank, input 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. |
| Output 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.<br>- 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.<br>- 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 Trainer2/NC Trainer2 plus.(displays when the cursor is on the button)<br>- 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.



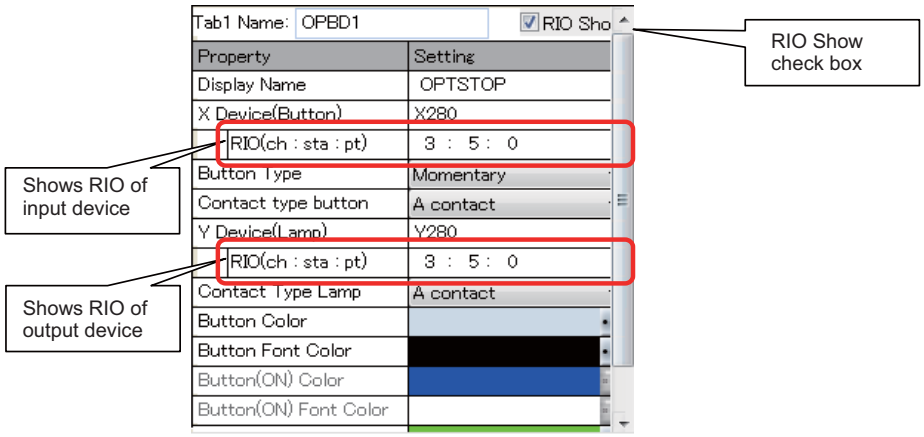

The tab name displayed on the tab switch button is set on the tab name edit box in the property window.
The tab name is up to 5 one-byte characters. (Each two-byte character is equivalent to two characters.)

(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 Trainer2 / NC Trainer2 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 Trainer2 / NC Trainer2 plus.

(4) Showing RIO of device

The RIO (Remote I/O) device channel (ch), station number (sta), and point (pt) can be displayed by checking the RIO Show check box.




(Note 1) The display range is 1 to 4 for ch, 1 to 64 for sta, and 0 to 31 for pt.

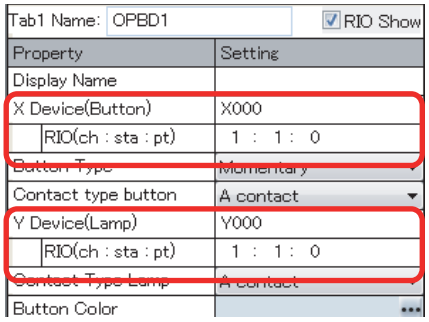
(Note 2) To create a custom machine operation panel using the RIO device random allocation function of NC, set the device for RIO fixed allocation on "Property". Refer to the Instruction Manual of CNC for details of the RIO device random allocation function.

Usage examples)

When using device X100, Y100 while the head device setting parameter for RIO device random allocation on NC is set as follows;

| RIO slave channel | Allocation PLC device (DI/DO) |
|---|---|
| ch1 sta 1 | X100(DI), Y100(DO) |

"X100, Y100" is allocated to "RIO ch2 sta 1 pt 0" for RIO fixed allocation. However, for the allocation above, "X100, Y100" is allocated to "RIO ch1 sta 1 pt 0".
To use the device "X100, Y100" with the above allocation on the custom machine operation panel of NC Trainer2/NC Trainer2 plus, set "X000, Y000" for the RIO fixed allocation "ch1 sta 1 pt 0" of RIO unit, which is actually used on the custom machine operation panel.




The devices that can be used in the custom machine operation panel are determined by the NC model.
The devices corresponding to the channels, station numbers, and points of the RIO fixed allocations shown below can be used from the custom machine operation panel in NC Trainer2/NC Trainer2 plus.
Clicking a button to which an unavailable input device is allocated, will not change the value from 0. Moreover, a lamp to which an unavailable output device is allocated will not turn ON even when the output device becomes 1.

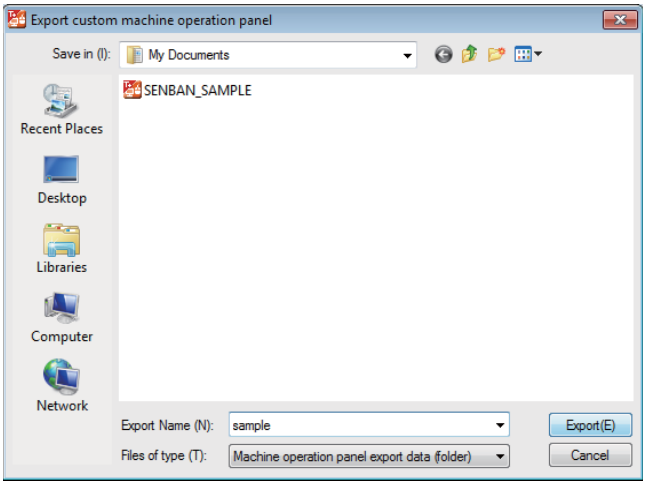
| NC model | ch | Station number | Point |
|---|---|---|---|
| M830V<br>C80 | 1 to 4 | 1 to 64 | 0 to 31 |
| M830<br>M80 TypeA<br>M80 TypeB<br>E80 TypeA<br>E80 TypeB<br>M80V TypeA<br>M80V TypeB | 1 to 3 | 1 to 64 | 0 to 31 |
| M730V | 1 to 3 | 1 to 8 | 0 to 31 |
| M70V TypeA<br>M70V TypeB<br>E70V | 1, 3 | 1 to 8 | 0 to 31 |

(Note) The devices corresponding to station numbers 7 to 14 of channel 3 cannot be used.

### 5.1.6 Exporting the Custom Machine Operation Panel

Export the custom machine operation panel from NC Trainer2 Builder and import it with NC Trainer2 plus to use the created custom machine operation panel on NC Trainer2 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.
"Export custom machine operation panel" dialog is displayed.

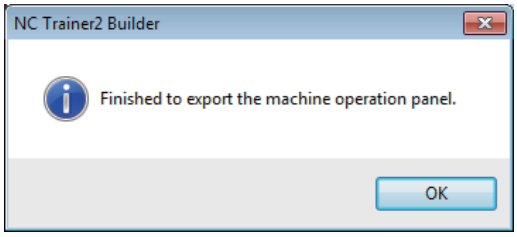



(Note 1) The folder for the export data of the machine operation panel is displayed as  icon.
(Note 2) The default setting for the export name is the project name.

(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 Trainer2 Builder. Refer to the section "5.1.4.1 Creating a New Project" 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.

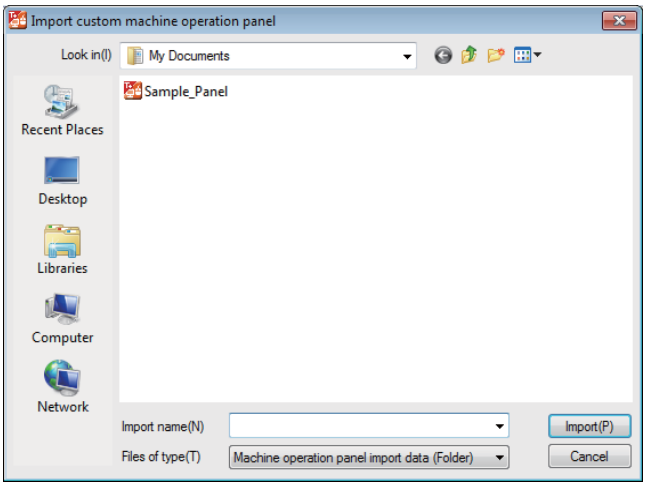



When providing the export data to other computers, provide the folder created by exporting in whole.

### 5.1.7 Adding the Custom Machine Operation Panel to "Peripheral Settings"

Below is an explanation of the procedure to import the custom machine operation panel which is exported from NC Trainer2 Builder to NC Trainer2 plus. This adds the custom machine operation panel which can be selected by "Peripheral Settings".

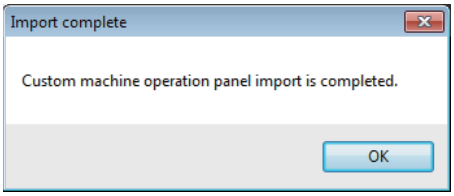
(1) Start NC Trainer2 plus.
(2) Select [Project (P)] - [Import (I)] - [Custom Machine Operation Panel (C)] from the menu bar.
The following dialog box is displayed.




(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 Trainer2 plus with the specified name in "Import name (N):".
(Note 1) Available import name is the same as a project name of NC Trainer2 Builder. Refer to the section "5.1.4.1 Creating a New Project" 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.

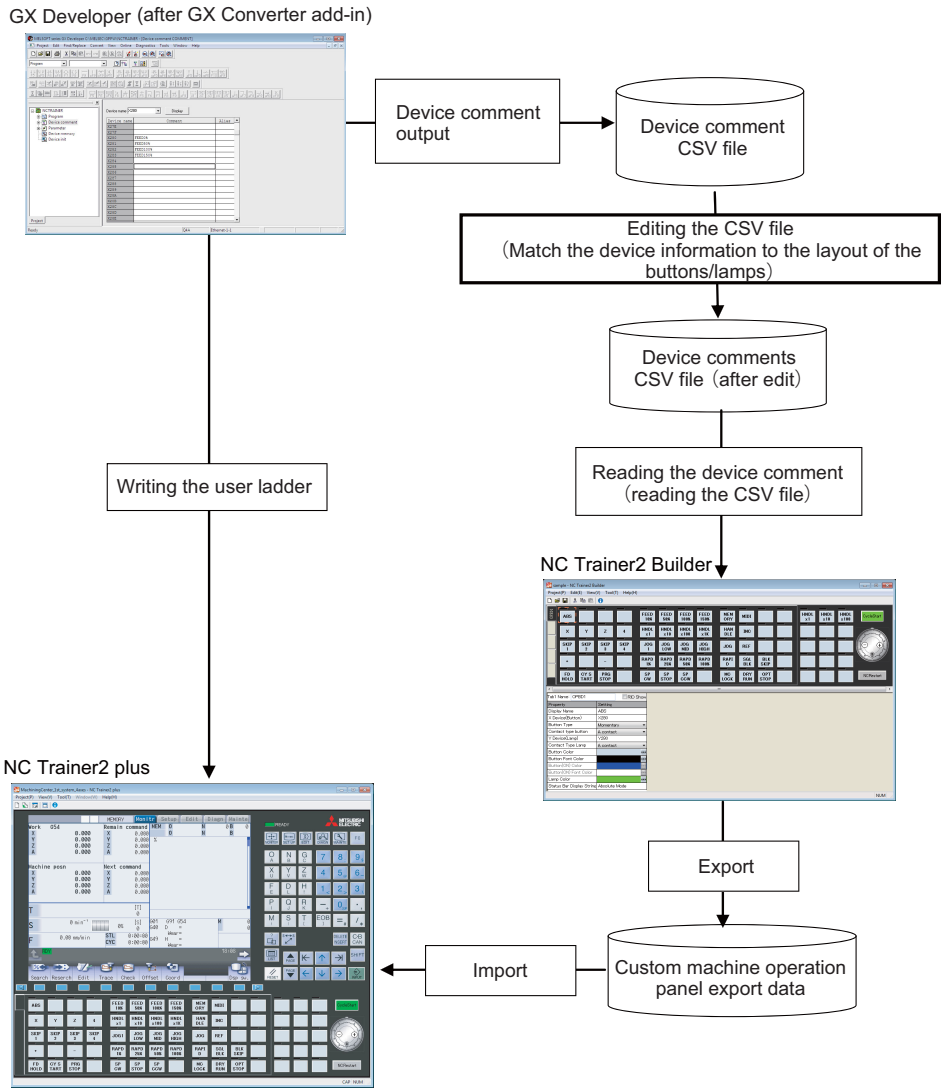


## 5.1.8 Reading Device Comments

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 Trainer2 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.



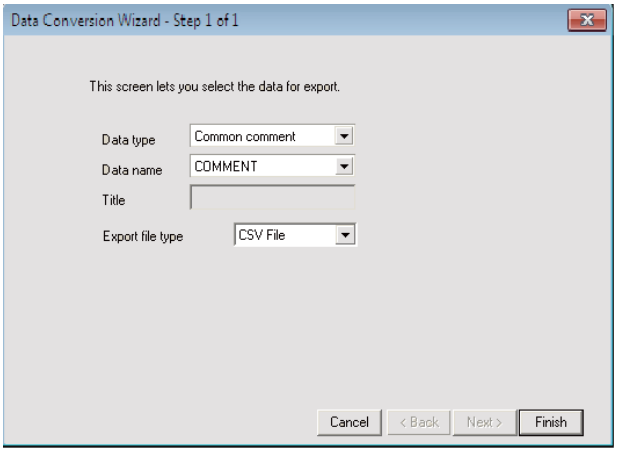
### 5.1.8.1 The Procedure to Read Device Comments

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.

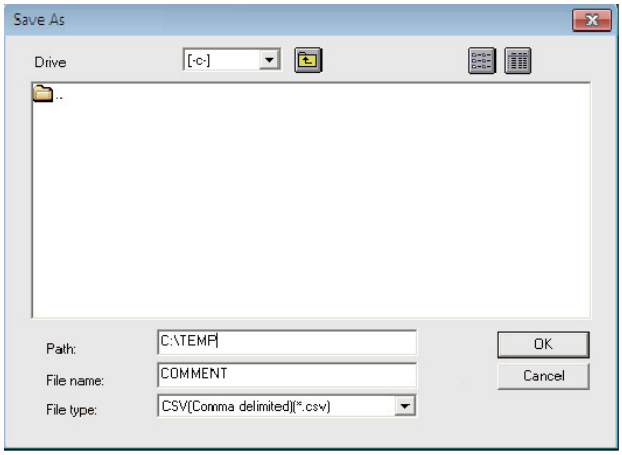
(2) Select [Project] -[Import file] - [Import from TEXT, CSV format file] from the menu bar.

(3) "Data Conversion Wizard - Step 1 of 1" dialog is displayed.




| Item | Description |
|---|---|
| Data type | Select "Common comment" or "Program comment". |
| Data name | Select device comment to convert. |
| Export file type | Select "CSV File". |

(4) The "Save As" dialog is displayed by pressing "Finish".
Designate the output file name of the CSV file to which the device comments will be written, and press the "OK" button.
(Select CSV (Comma delimited) as a file type.)

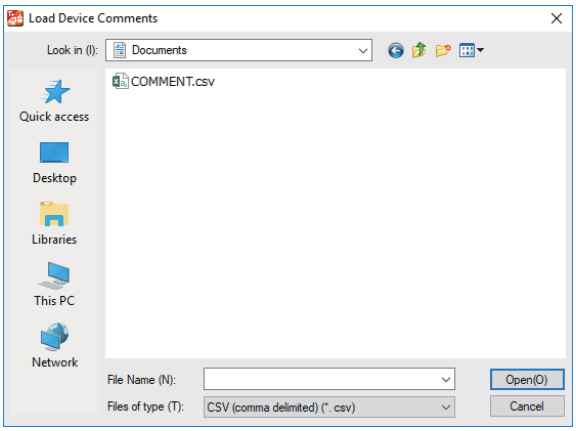



(5) Edit the contents of the CSV file to match to the layout of the buttons/lamps. Refer to the section "5.1.8.2 Device Comment File" for details.

(6) Start NC Trainer2 Builder, and open a project.

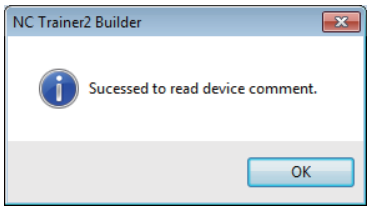
(7) Display the tab to set the buttons/lamps in batches.

(8) Select [Tool (T)] - [Load Device Comment (R)] from the menu bar. "Load Device Comments" dialog 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.




### 5.1.8.2 Device Comment File

The device comment file (CSV file) format which is read with "Read Device Comment" 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%
```

Device
Device name
Comment
Button type
Contact type
Button/Lamp Color
Button Font Color
Button (ON) Color
Button(ON) Font Color
Status Bar Display String

- 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.<br>- When designating any device other than X0 to X2BF, Y0 to Y2BF, ZR5000.0 to ZR5111.F, ZR5200.0 to ZR5311.F, ZR5412.0 to ZR5511.F, ZR6000.0 to ZR6111.F, ZR6200.0 to ZR6311.F, and ZR6412.0 to ZR6511.F, the line will not be regarded not as data but as a disabled line.<br>- When only a comma is specified, position of button/lamp to set will be skipped. (Skip is to be described later.)<br>- 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.<br>- 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)<br>- Input ¥n to start a new line on the character string of the button. (¥n does not count as character limit)<br>- To display \ on the button, input \\. (\\ is count as an one-byte character)<br>- \x in the comment is displayed as x only on the button. (\x is count as an one-byte character)<br>- 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)<br>- The display name will be blank if only comma is set.<br>- Normally, input device comment is set to device name.(A case when output device comment is displayed is to be described later.) |
| Button type | - Select the button type.<br>MOM : momentary<br>ALT : alternate<br>(Other than those above is set to momentary)<br>- This line is not used when the device is output device, however, input a comma.<br>- If it is only a comma, it is set as momentary. |
| Contact type | - Select the setting of the button/lamp.<br>A : A contact<br>B : B contact<br>- For only comma, it is set to A contact. |
| Button/Lamp Color | - Specify the color of button/lamp.<br>- To specify by RGB format, separate the each value (0 to 255) of R, G, B by a colon " ; " as follows "213:255:237".<br>- 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".<br>- This line is not used if the device is output 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".<br>- This line is not used if the device is output 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".<br>- This line is not used if the device is output 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.<br>- Up to 100 one-byte characters. (each two-byte character is equivalent to two one-byte characters.)<br>- 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)<br>- Normally Status Bar Display String of input device is used. (When the Status Bar Display String of output device is used is mentioned later)<br>- 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""" |

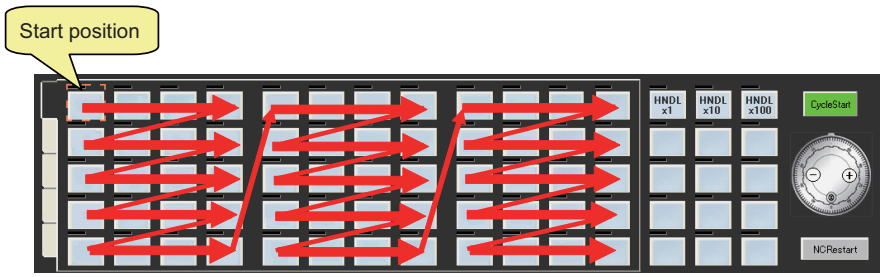
- If (\") is included in the comment, (\) of (\") will be set to the property of Display name. ((\) is treated as a double quotation to enclose the character string.) The end of Display name property becomes (\) and (\) will not be displayed on the button.
- Use Unicode for CSV file character code to 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.)

(Note) 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%
```

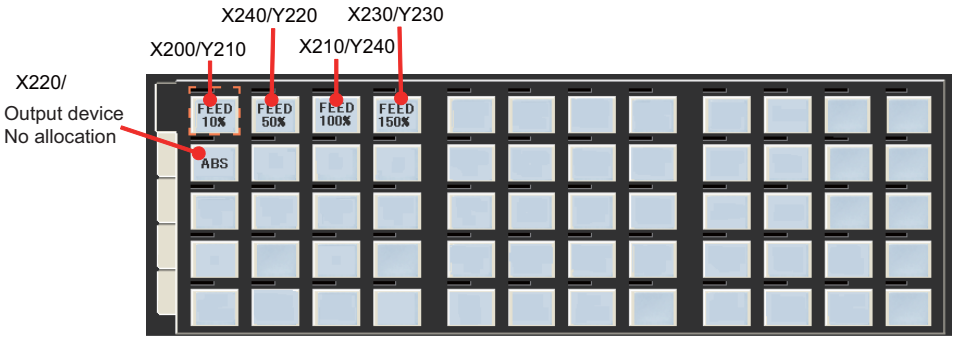
Setting of buttons/lamps on a tab is executed as follows.

- The input/output 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
```

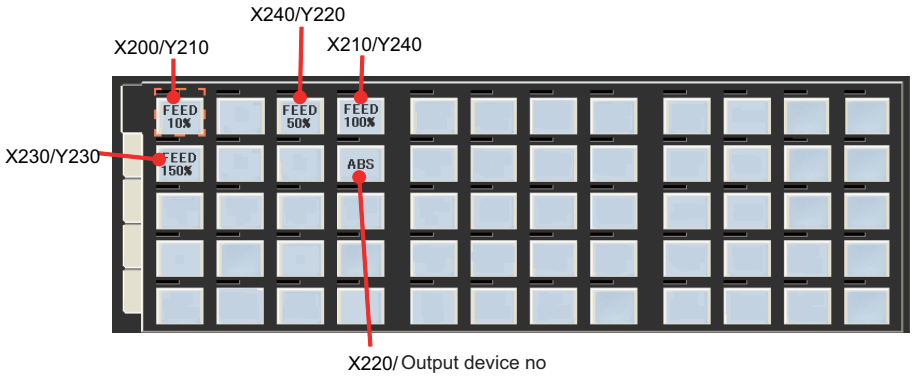



- A line consisting of a line feed character is not considered as a data. (invalid line)
- The position of button/lamp to be set can be skipped by inserting a line with only a comma in the CSV file.
  - When a line with only a comma is inserted above the line of input device, the position of the button to be set is skipped.
  - When a line with only a comma is inserted above the line of output 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%
,
X240,, FEED50%
X210,, FEED100%
X230,, FEED150%
Y210,, FEED10%
,
Y220,, FEED50%
Y240,, FEED100%
Y230,, FEED150%
,
,
X220,, ABS
```

← Skip the position of the button
← Skip the position of the lamp
← Invalid line
← Skip the position of the button
← Skip the position of the button




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 input/output device.

| Button / Lamp | | Output device allocation | |
|---|---|---|---|
| | | **Allocated** | **Not allocated** |
| **Input device allocation** | **Allocated** | Input device comment | Input device comment |
| | **Not allocated** | Output device comment | None |

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

| Button / Lamp | | Output device allocation | |
|---|---|---|---|
| | | **Allocated** | **Not allocated** |
| **Input device allocation** | **Allocated** | Status Bar Display String of Output device | Status Bar Display String of Input device |
| | **Not allocated** | Status Bar Display String of Output 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.)

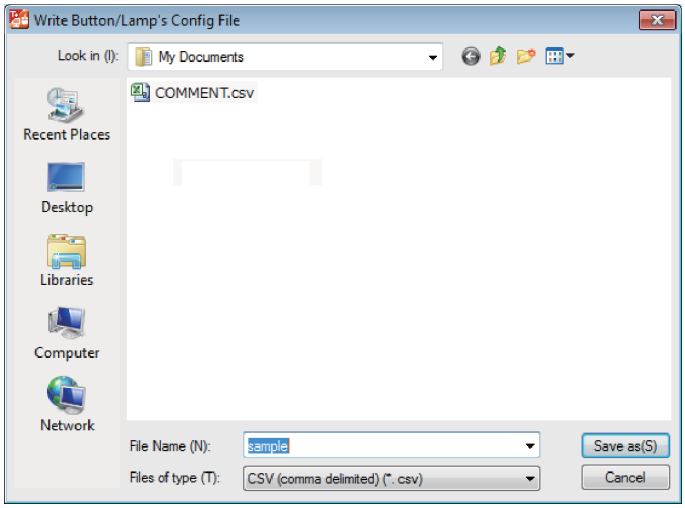
| The characters displayed on the button | Description in the CSV file |
|---|---|
| Display Name | (blank) |
| Input Device (Button) | No allocation |
| Button Type | Momentary |
| Contact type button | A contact |
| Output Device (Lamp) | No allocation |
| Contact Type Lamp | A contact |
| Button Color | (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.

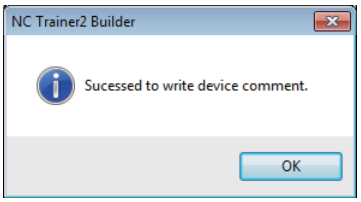
## 5.1.9 Exporting the File of Button/Lamp Setting

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 the NC Trainer2 Builder and open the project.
(2) Change the settings of button/lamp to the tab that exports CSV file.
(3) Select [Tool (T)] - [Write Button/Lamp's config File(W)...] on menu bar to display "Write Button/Lamp's Config File" dialog. 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 "5.1.8.2 Device Comment File" of "5.1.8 Reading Device Comments" for CSV file format.
- The character code of exporting CSV file is an UNICODE.

## 5.2 Creating User PLC and Checking the Operation

With NC Trainer2 plus, user PLCs can be created and the operation can be checked.
Note that the execution timing of ladder of NC Trainer2 plus is different from that of actual NC. Therefore NC Trainer2 plus cannot check the operation completely. The operation of user PLCs created with NC Trainer2 plus should be checked finally on actual NC.

There are following methods to develop the user PLC with NC Trainer2 plus.

(1) Using GX Developer
With NC Trainer2 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 Trainer2 plus.
Refer to the section "5.2.1 User PLC Development Method with GX Developer" for details.

(2) Using GX Works2
With NC Trainer2 plus, use MITSUBISHI Integrated FA Software MELSOFT Series GX Works2 that is a PLC development tool of MITSUBISHI Programmable Controllers MELSEC Series.
GX Works2 is a Windows application and sold separately from NC Trainer2 plus.
Refer to the section "5.2.2 User PLC Development Method with GX Works2" for details.

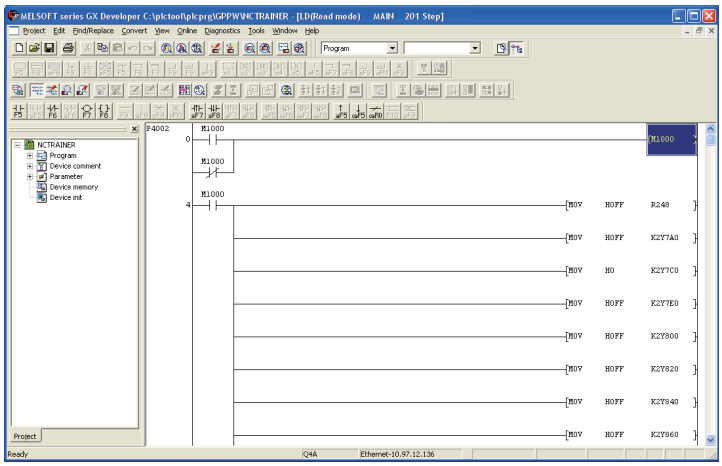
(3) Using PLC onboard
M800V/M80V Series, M800/M80/E80 Series, and M700V/M70V/E70 Series have a PLC onboard as a built-in PLC edit function. (On-board refers generically to the PLC related operations carried out with the CNC unit and hereafter referred to as "PLC Onboard".)
PLC onboard can be used on NC Trainer2 plus for all projects.
Refer to the section "5.2.3 User PLC Development Method with PLC Onboard" for details.

(4) Using GX Works3
For C80 Series, use FA Integrated Engineering Software MELSOFT Series GX Works3. A sequence program created by GX Works3 operates with the simulation function (GX Simulator3).
Refer to GX Works3 Operating Manual 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 Electric CNC Series can be developed by the same operation as MELSEC Series.



To develop a user PLC with NC Trainer2 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 Electric CNC with GX Developer.

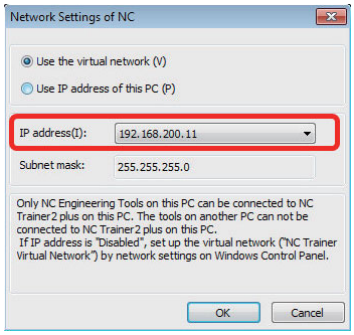
M800V/M80V Series PLC Development Manual (IB-1501614-A or later)
M800V/M80V Series PLC Programming Manual (1/2) (IB-1501667-A or later)
M800V/M80V Series PLC Programming Manual (2/2) (IB-1501668-A or later)
M800/M80/E80 Series PLC Development Manual (IB-1501270-A or later)
M800/M80/E80 Series PLC Programming Manual (IB-1501271-A or later)
M700V/M70V/E70 Series PLC Programming Manual (IB-1500918 or later)

(3) Connection method

For NC Trainer2 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 Trainer2 plus and GX Developer.

[1] Start NC Trainer2 plus, and confirm that the network connection has been set.
(Refer to the section "5.6 Network Connection Setting".)

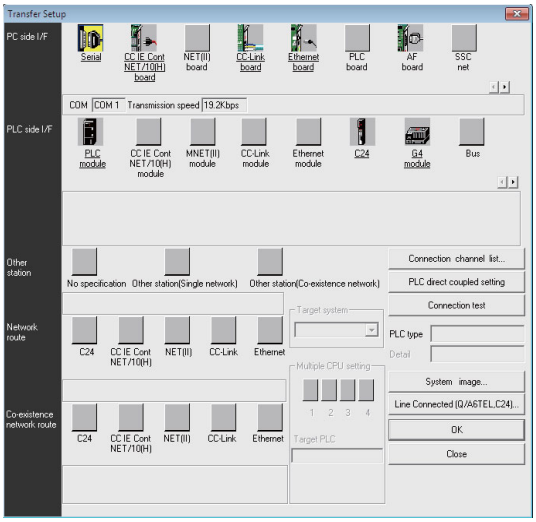
[2] Select [Tool (T)] - [Network Settings of NC (W)] from the menu bar on NC Trainer2 plus.
The following dialog box is displayed and then IP address of NC is displayed. Record the IP address of NC and press the "OK" button.



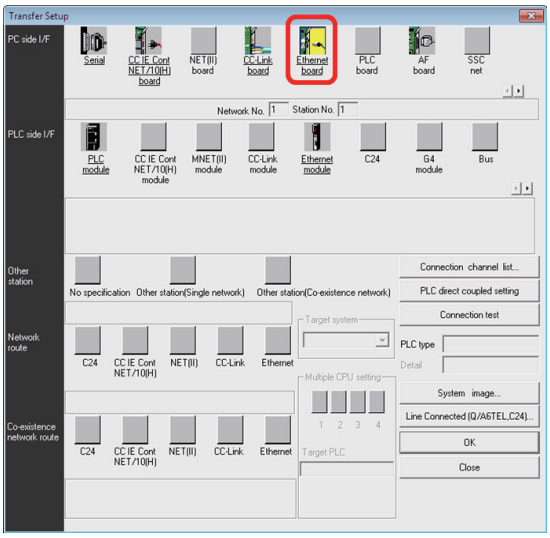
[3] Select a project on NC Trainer2 plus and start to execute the NC.

[4] Start GX Developer and open a project.

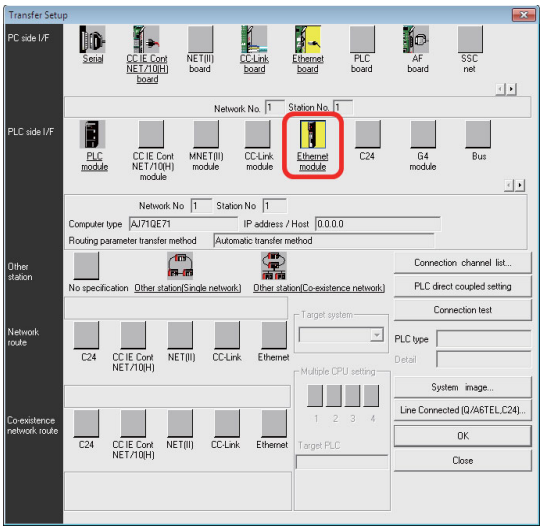
[5] Select [Online] - [Transfer Setup] from the menu bar on GX Developer. Connection setup dialog is displayed.



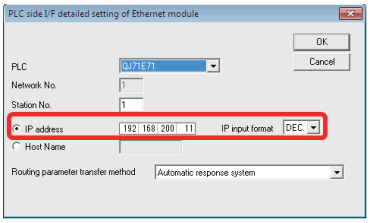

[6] Click [Ethernet board] from PC side I/F.



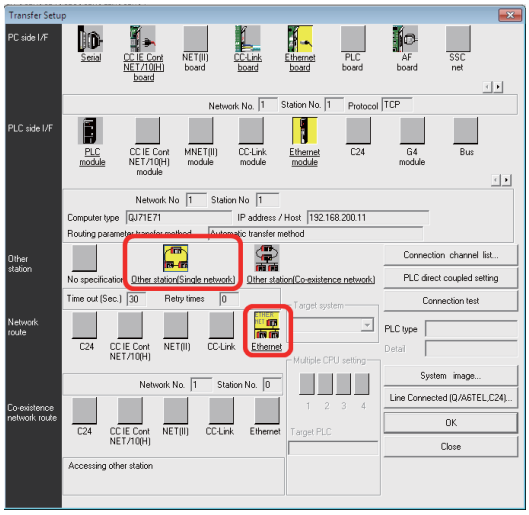

[7] Double-click [Ethernet module] from PLC side I/F.



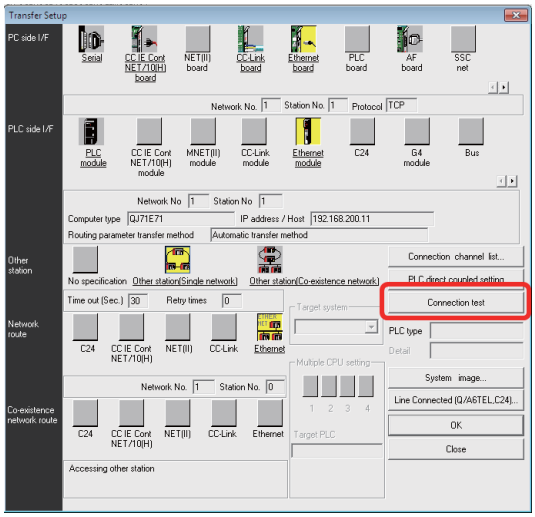
[8] PLC side I/F detailed setting of Ethernet module dialog is displayed. Select [IP address], set the IP address recorded on step [2] and press the [OK] button



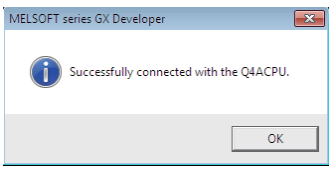

[9] On the Connection setup dialog, click [Other station (same network)] from Other station and [Ethernet] from Network route.




[10] 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.




[11] 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 Trainer2 plus and GX Developer.

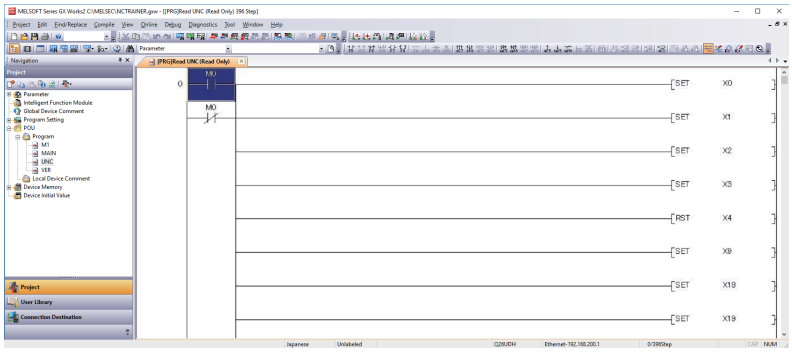
- Do not use more than two among the PLC onboard on NC Trainer2 plus, GX Developer, and GX Works2 at a time. Some functions (updating ladder monitor, etc.) cannot be operated correctly if they are used together.

## 5.2.2 User PLC Development Method with GX Works2

### (1) Outline of GX Works2

GX Works2 is a PLC development tool of MITSUBISHI Programmable Controllers MELSEC Series. A user PLC for Mitsubishi Electric CNC Series can be developed by the same operation as MELSEC Series.

Screen of GX Works2



Refer to the operation manual attached to GX Works2 for function details.

### (2) Development method

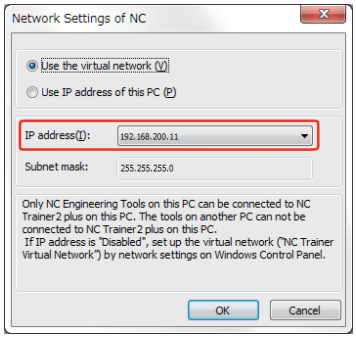
The user PLC development method with NC Trainer2 plus and GX Works2 is basically the same as using an actual NC and GX Works2. Refer to the following manual about the user PLC development method for Mitsubishi Electric CNC with GX Works2.

M800V/M80V Series PLC Development Manual (IB-1501614-A or later)
M800V/M80V Series PLC Programming Manual (1/2) (IB-1501667-A or later)
M800V/M80V Series PLC Programming Manual (2/2) (IB-1501668-A or later)
M800/M80/E80 Series PLC Development Manual (IB-1501256-F or later)
M800/M80/E80 Series PLC Programming Manual (IB-1501257-F or later)

### (3) Connection method

For NC Trainer2 plus and GX Works2, 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 Trainer2 plus and GX Works2.

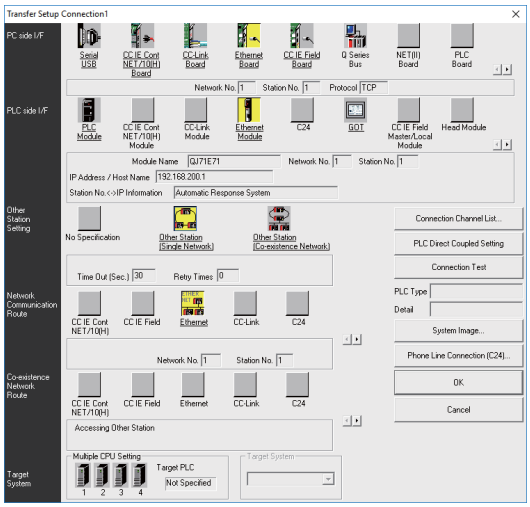
[1] Start NC Trainer2 plus, and confirm that the network connection has been set.
(Refer to the section "5.6 Network Connection Setting".)
[2] Select [Tool (T)] - [Network Settings of NC (W)] from the menu bar on NC Trainer2 plus.
The following dialog box is displayed and then IP address of NC is displayed.
Record the IP address of NC and press the [OK] button.



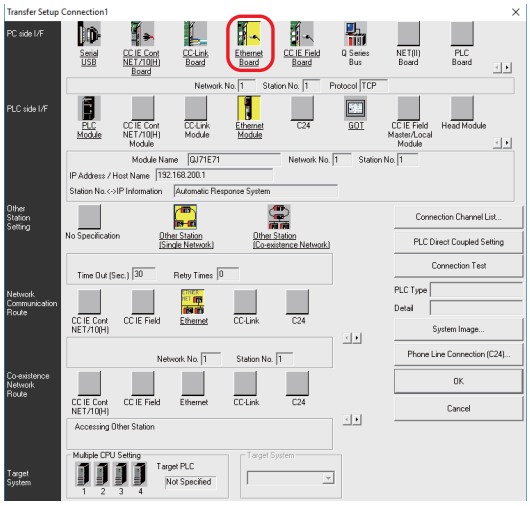
[3] Select a project on NC Trainer2 plus and start to execute the NC.

[4] Start GX Works2 and open a project.

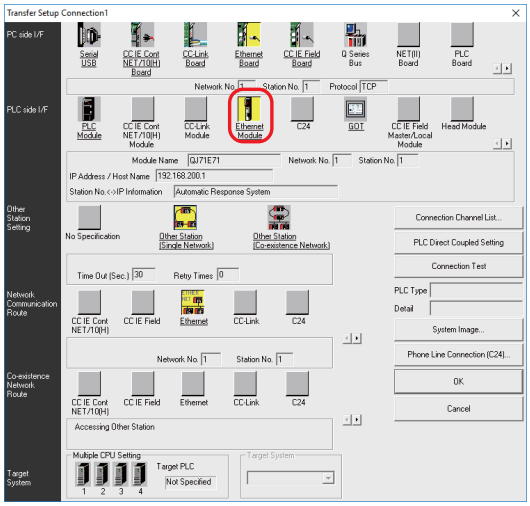
[5] Select the connection destination to use from the connection destination view of the GX Works2 navigation window.
Connection setup dialog is displayed.



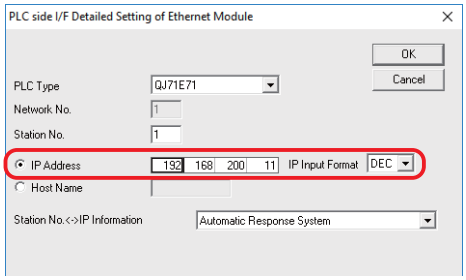

[6] Click [Ethernet Board] from PC side I/F.



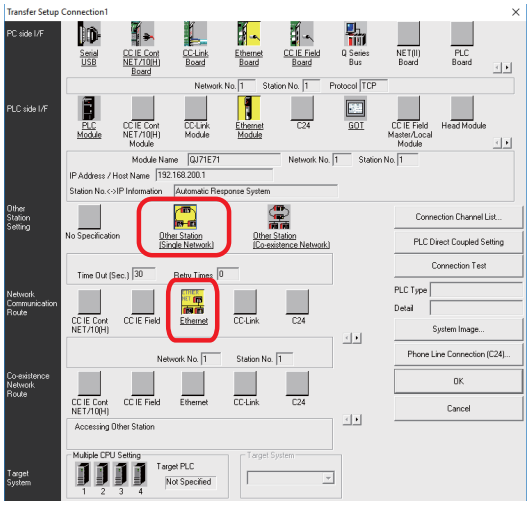
[7] Double-click [Ethernet Module] from PLC side I/F.



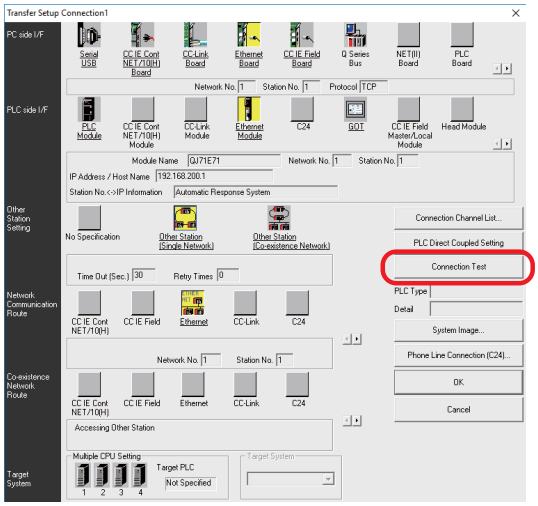

[8] PLC side I/F detailed setting of Ethernet module dialog is displayed. Select [IP Address], set the IP address recorded on the step [2] and press the [OK] button.



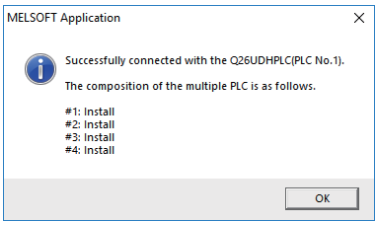

[9] On the Connection setup dialog, click [Other station (Single Network)] from Other Station Setting and [Ethernet] from Network Communication Route.



[10] On the Connection setup dialog of GX Works2, click the [Connection Test] button.




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




[11] Click the [OK] button on Connection setup dialog on GX Works2.

### (4) Precautions

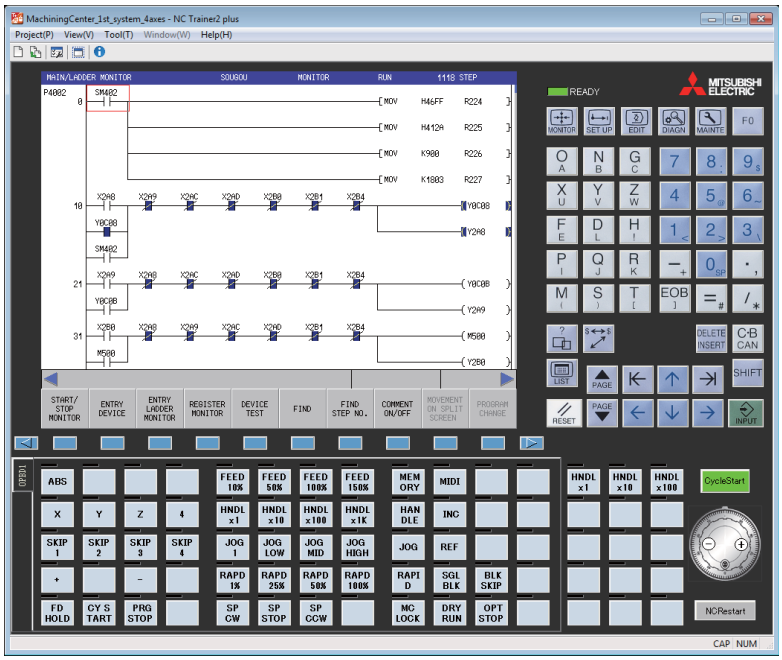
Below are the precautions for the user PLC development method with NC Trainer2 plus and GX Works2.

- Do not use more than two among the PLC onboard on NC Trainer2 plus, GX Developer, and GX Works2 at a time. Some functions cannot be operated correctly if they are used together at a time.
- Projects of NC Trainer2 plus M730V/M70V TypeA/M70V TypeB/E70 cannot be connected to GX Works2. Use GX Developer or PLC onboard.

## 5.2.3 User PLC Development Method with PLC Onboard

### (1) Outline of PLC onboard

The PLC onboard on NC Trainer2 plus can develop user PLCs for Mitsubishi Electric CNC as with the PLC onboard of M800V/M80V Series, M800/M80/E80 Series, and M700V/M70V/E70 Series, such as creating, editing, saving, reading and monitoring a user PLC.




### (2) Development method

PLC onboard on NC Trainer2 plus is the same as PLC onboard function of M800V/M80V Series for the project of M830V/M80V TypeA/M80V TypeB, and is the same as PLC onboard function of M800/M80/E80 Series for the project of M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB. PLC onboard on NC Trainer2 plus is the same as that of M700VS for the project of M730V/M70V TypeA/M70V TypeB/E70. Refer to the explanation of built-in edit function in the following manual for details of the user PLC development method with PLC onboard.

M800V/M80V Series PLC Development Manual (IB-1501614-A or later)
M800V/M80V Series PLC Programming Manual (1/2) (IB-1501667-A or later)
M800V/M80V Series PLC Programming Manual (2/2) (IB-1501668-A or later)
M800/M80/E80 Series PLC Development Manual (IB-1501270-A or later)
M800/M80/E80 Series PLC Programming Manual (IB-1501271-A or later)
M700V/M70V/E70 Series PLC Programming Manual (IB-1500918 or later)

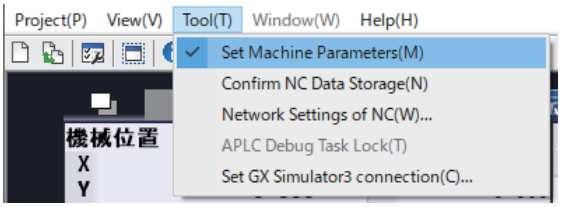
### (3) Starting PLC onboard

There are two methods used to start the PLC Onboard.

1) Start from the NC screen

[1] Start NC Trainer2 plus and execute a project.

[2] Select [Tool (T)]-[Set Machine Parameters (M)] from the menu bar on NC Trainer2 plus, and check the item.




[3] The PLC Onboard screen is displayed by clicking [Ladder Monitor] menu on the maintenance screen of NC.

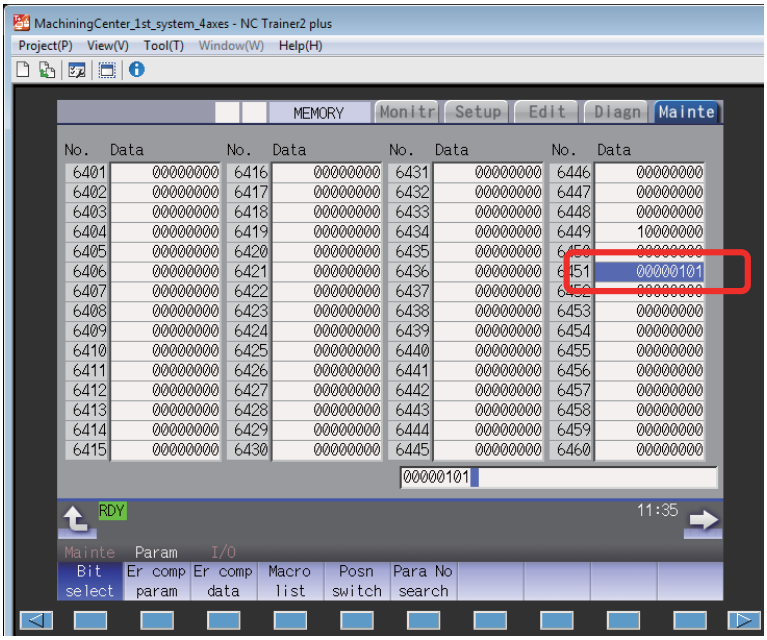

* The PLC Onboard cannot be started from the NC screen with the project of M730V/M70V TypeA/M70V TypeB/E70.

2) Start by pressing the [F0] key

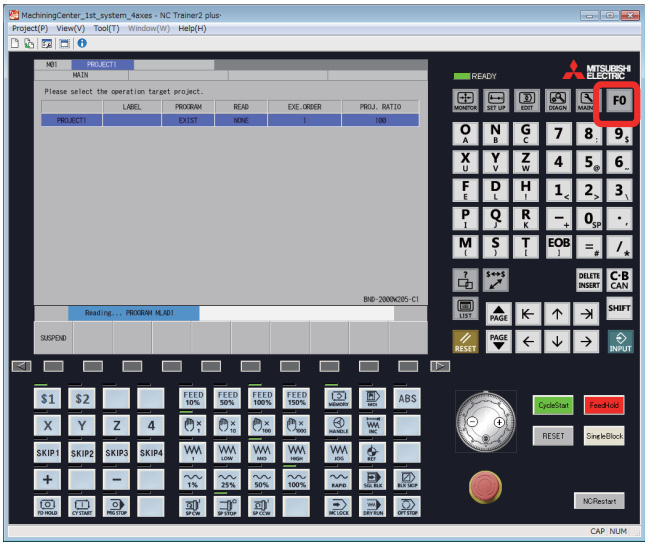
[1] Start NC Trainer2 plus and execute a project.

[2] Select [Tool (T)]-[Set Machine Parameters (M)] from the menu bar on NC Trainer2 plus, and check the item.

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



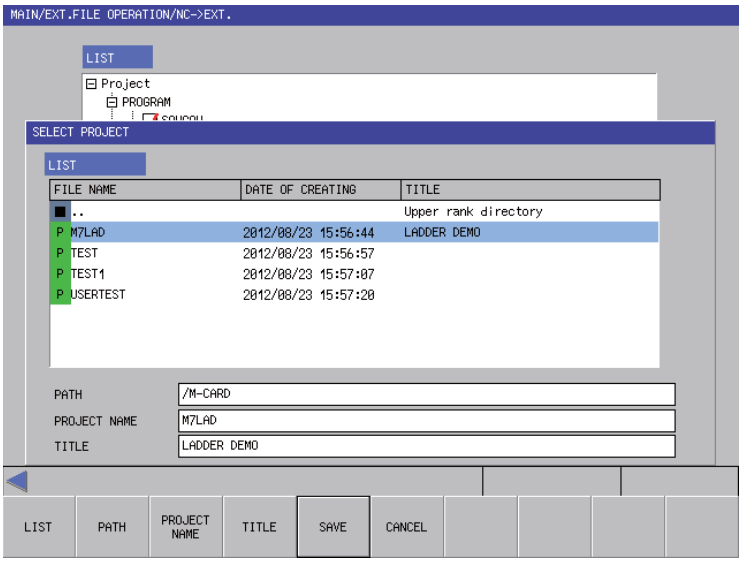

[4] Press the F0 key on NC keyboard or the Shift+F10 key on PC keyboard to display the PLC onboard screen.



### (4) Operation for an external file

For the PLC onboard on NC Trainer2 plus, the "(folder name to store NC Trainer2 data)\M-CARD" folder of Windows is allocated as an external device virtually.
(Normally, M-CARD folder is allocated under C:\MELCNC\NCT2P.)

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 Trainer2 data)\M-CARD" folder of Windows.




For example, when /M-CARD/M7LAD directory is designated on PLC on-board, C:\MELCNC\NCT2P\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 Trainer2 plus.

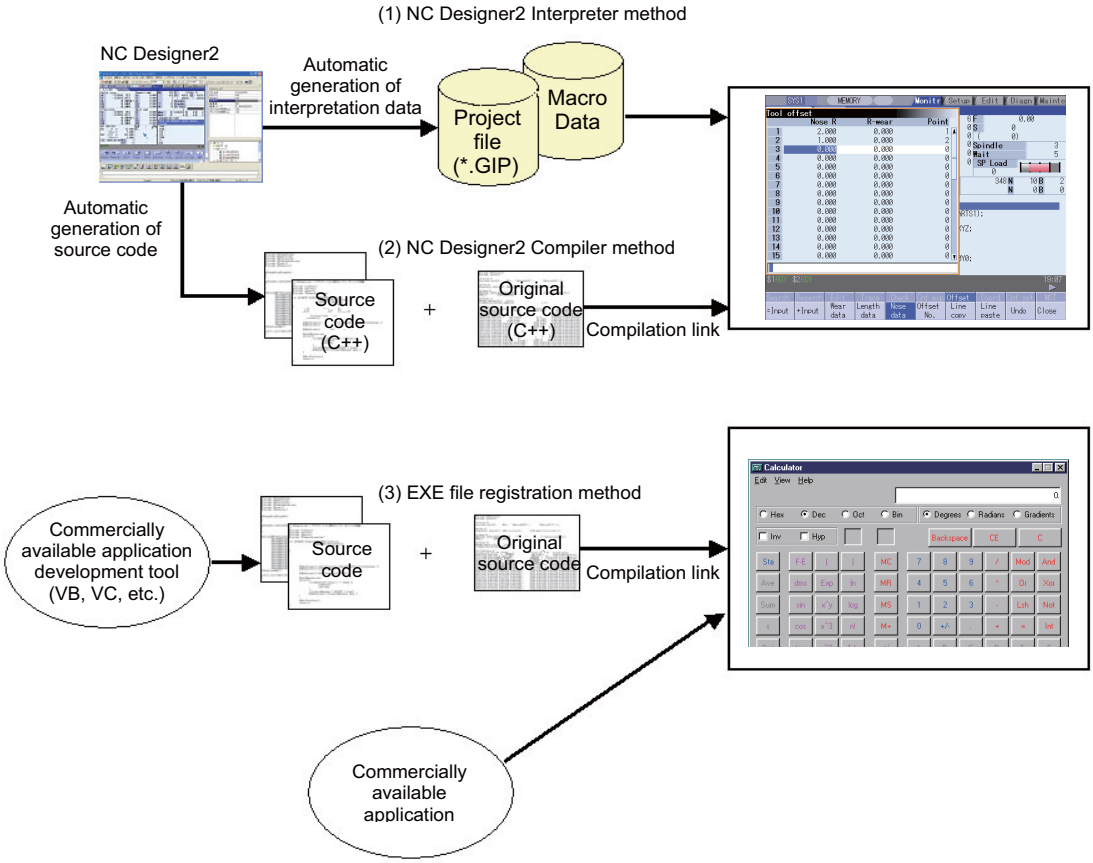
- Do not use more than two among the PLC onboard on NC Trainer2 plus, GX Developer, and GX Works2 at a time. Some functions cannot be operated correctly if they are used together.
- Do not change the name of M-CARD folder. Input/output operation cannot be executed by external file operation if changed.

# 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 Trainer2 plus can display a custom release screen ("NC Designer2 interpreter method", "NC Designer2 compilation method" and "Executing file registration method") which is created for M800V/M80V Series, M800/M80/E80 Series, and M700V/M70V/E70 Series.
(NC Trainer2 can also display a custom release screen, "NC Designer2 interpreter method", "NC Designer2 compilation method", and "Executing file registration method" (menu release) by importing a created project from NC Trainer2 plus.)

Custom release screens are developed with an NC engineering tool NC Designer2. Refer to "Designer2 Instruction Manual" for details of the development method.




(Note 1) To display custom release screens of NC Designer2 compilation method developed for M800VS/M80V/M800S/M80/E80/M700VS/M70V/E70, it is required to recompile the source code with Microsoft Visual C++.

(Note 2) Custom release screens of Executing file registration method (F0 release) cannot be displayed by a key operation with NC Trainer2/NC Trainer2 plus, however, the operation can be checked by starting the executing file directly.
Custom release screens of Executing file registration method (menu release) can be displayed by pressing the menu of NC Trainer2/NC Trainer2 plus.

(Note 3) The custom release screens developed with NC Designer can also be displayed.

Below are the differences from the custom release of M800V/M80V Series, M800/M80/E80 Series, and M700V/M70V/E70 Series.

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

For NC Trainer2 plus, necessary files for displaying custom release screens are prepared for each project. The necessary files are stored under the folder to store NC Trainer2 plus data (normally, C:\MELCNC\NCT2P)\projects\project name\custom.

(For M800VW/M800W/M700VW, necessary files for displaying custom release screens are stored in D:\custom.)

### 5.3.2 Path Designation of GIP File, DLL File, and Executing File

To display custom release screens, the path of GIP file (*.GIP), DLL file (*.DLL), and executing file (*.EXE) of Executing file registration method (menu release) of the custom release screens is required to be described in config.ini and customdef.ini. For NC Trainer2 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 Trainer2 plus data (normally, C:\MELCNC\NCT2P)\custom\.

<Example of config.ini>

```
[INTERPRETER]
RUN=2
PROJECT01=C:\MELCNC\NCT2P\custom\PANEL.GIP
PAGE_OFFSET01=7000
PROJECT02=C:\MELCNC\NCT2P\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 Trainer2 plus data\projects\project name\custom, the files that are copied under the folder to store NC Trainer2 plus data \custom are used for displaying the screen.

(Note 2) For M800VW/M800W/M700VW, designate the path beginning with D:\custom\. To display a custom release screen whose operation was checked with NC Trainer2 plus on M800VW/M800W/M700VW, change the path designation. For M800VS/M80V/M800S/M80/E80/M700VS/M70V/E70, change it to a relative path.

(Note 3) When there are spaces in the path for the executing file (*.EXE) of executing file registration method (menu release), the described executing file may not run. Designate a path that does not have spaces.

(2) Designation by relative path
Designate the relative path from the folder to store NC Trainer2 plus data (normally, C:\MELCNC\NCT2P)\custom\.
<Example of config.ini >

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

(Note 1) It is the same designation method as M800VS/M80V/M800S/M80/E80/M700VS/M70V/E70. When a custom release screen whose operation was checked with NC Trainer2 plus is displayed on M800VS/M80V/M800S/M80/E80/M700VS/M70V/E70, the path designation is not required to be changed. For M800VW/M800W/M700VW, change the path designation.

(Note 2) Custom release screens of Executing file registration method (menu release) cannot be displayed by relative path designation. Designate the executing file by absolute path.

### 5.3.3 Display of Executing File Registration Method

The custom release screens (F0 release) of executing file registration method cannot be displayed by an operation with NC Trainer2 plus, however, the operation can be checked by starting the executing file directly.
For custom release screens of Executing file registration method (F0 release), create the following BAT file or VB script in the same folder as the executing file and start the BAT file or VB script. (The installation folder is "C:\Program Files\MELSOFT\NC Trainer2 plus" and the executing file name is "custom.exe" for the following example. Change these settings depending on the execution environment of NC Trainer2 plus and executing file.)

○For M800V (BAT file)

```
@echo off
set PATH=C:\Program Files\MELSOFT\NC Trainer2 plus\M8V;%PATH%
start custom.exe
```

(VB script)

```
Set objShell = WScript.CreateObject("WScript.Shell")
Set objEnv = objShell.Environment("Process")
objEnv("PATH") = "C:\Program Files\MELSOFT\NC Trainer2 plus\M8V;" & objEnv("PATH")
objShell.run "custom.exe"
```

○For M800 (BAT file)

```
@echo off
set PATH=C:\Program Files\MELSOFT\NC Trainer2 plus\M8;%PATH%
start custom.exe
```

(VB script)

```
Set objShell = WScript.CreateObject("WScript.Shell")
Set objEnv = objShell.Environment("Process")
objEnv("PATH") = "C:\Program Files\MELSOFT\NC Trainer2 plus\M8;" & objEnv("PATH")
objShell.run "custom.exe"
```

○For M700V (BAT file)

```
@echo off
set PATH=C:\Program Files\MELSOFT\NC Trainer2 plus\M7;%PATH%
start custom.exe
```

(VB script)

```
Set objShell = WScript.CreateObject("WScript.Shell")
Set objEnv = objShell.Environment("Process")
objEnv("PATH") = "C:\Program Files\MELSOFT\NC Trainer2 plus\M7;" & objEnv("PATH")
objShell.run "custom.exe"
```

The following are the precautions for the Executing file registration method (F0 release and menu release).

(Note 1) The custom release screen is not displayed on NC screen of NC Trainer2 plus, but it is displayed as an independent window.

(Note 2) To exit from NC Trainer2 plus, close the executing file first. If not, NC Trainer2 plus may not be exited normally.

(Note 3) When NC restart or project operation (such as changing projects) is executed on NC Trainer2 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 Trainer2 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®<br>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 Trainer2 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 Designer2 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.

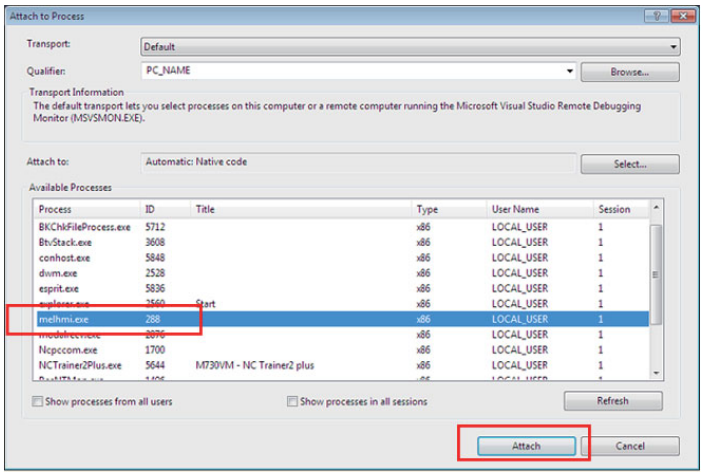
(2) Create a project for debug of the custom release screen with NC Trainer2 plus. After creating the project, once exit from NC Trainer2 plus.

(3) Copy the debug built dll of the custom release screen to the custom folder of the NC Trainer2 plus project for debug (the folder to store NC Trainer2 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 Trainer2 plus and execute the NC Trainer2 plus project for debug.

(6) When the NC standard screen is displayed on NC Trainer2 plus, attach to melhmi (executing process of NC screen) with Visual Studio.
<For Visual Studio2010>
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.



(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 Trainer2 plus and debug the screen.
(9) To terminate the debug, exit from NC Trainer2 plus or restart the NC (click [NC Restart] button). When the NC screen disappears, the debug execution of Visual Studio is also terminated automatically.

### 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 Trainer2 plus (the folder to store NC Trainer2 plus data\projects\project). The name of the bmp file is fixed as "startupscreen.bmp" (for 10.4-type NC screen) or "startupscreen_xga.bmp" (for 15-type NC screen). If there is no "startupscreen.bmp" in the NC Trainer2 plus project folder, the standard start up screen displays when staring the NC. For NC Trainer2, by importing the project created by NC Trainer2 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 |
|---|---|---|
| M800VW/M80VW/M800W/M80W/M700VW | Width640×Height480 | 24bit |
| M800VS/M80V/M800S/M80/E80 | Width640×Height440 | 8bit or 24bit |
| M700VS/M70V/E70 | Width640×Height440 | 8bit |

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

| Models | Size | Number of colors |
|---|---|---|
| M800VW/M80VW/M800W/M80W/M700VW | Width1024×Height768 | 24bit |
| M800VS/M80V/M800S/M80 | Width1024×Height728 | 8bit or 24bit |
| M700VS | Width1024×Height728 | 8bit |

(*) If the specification of "startupscreen.bmp" and "startupscreen_xga.bmp" is different from actual NC, it will display as the start up screen on the NC Trainer2 plus. If the width is not 640 or height is bigger than 480 on the actual NC M800VS/M80V/M800S/M80/E80/M700VS/M70V/E70 (display:10-type), it will display as the standard start up screen.
If the width is not 1024 or height is bigger than 768 on the actual NC M800VS/M80V/M800S/M80/ M700VS (display:15-type), it will display as the standard start up screen.

### 5.3.7 Settings of Home Screen

For M830V/M80V TypeA, M80V TypeB, M830/M80 TypeA, M80 TypeB, E80 TypeA, and E80 TypeB projects, the axes displayed in the machine state display part of the home screen can be changed to match the machine configuration of the project. Additionally, registered applications (custom release screen) can be called by pressing the application button on the home screen.

The setting files of the home screen are stored in folders which are different from those of M800V/M80V/M800/M80/E80 Series. The following are the necessary files for setting the home screen with NC Trainer2 plus, and the folders in which each file is stored.

| File name | Folder to store |
|---|---|
| Config.ini | The folder to store NC Trainer2 plus data (normally, C:\MELCNC\NCT2P)\projects\project name\custom |
| M8HomeScreen.ini | The folder to store NC Trainer2 plus data (normally, C:\MELCNC\NCT2P)\projects\project name\custom\ExtApp |
| HomeScrnCustomConfig.ini | |
| HomeScrn_○○○○_xxx.ini | |
| HomeScrn_○○○○_xxx.ini | |
| M8ManualScreen_xxx.ini | |
| Manual file(PDF format) | The folder to store NC Trainer2 plus data (normally, C:\MELCNC\NCT2P)\projects\project name\custom\ExtApp\Manual |

(Note 1) Refer to "M800V/M80V Series Instruction Manual" or "M800/M80 Series Instruction Manual" for details of each setting file.

(Note 2) Refer to chapters 5.3.1 to 5.3.3 for the necessary files to display applications (custom release screen).

(Note 3) Applications that are registered with an executing file and the manual are displayed in separate windows.

(Note 4) For NC Trainer2, the home screen settings can be changed by importing the project created with NC Trainer2 plus.

### 5.3.8 G Code Guidance Release Setting

For the project of M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB, original G code (G code macro) guidance can be displayed in the G code guidance display area on the edit screen by creating a guidance file for G code macro (HTML format) and storing under the custom folder of NC Trainer2 plus project (the folder to store NC Trainer2 plus data\projects\project name\custom\gcode_guide). The following is the description method of the setting file.

○ Example of config.ini

< Designation by absolute path >

```
[HTML_BROWSER]
HTMLDATA_GCODE=C:\MELCNC\NCT2P\custom\gcode_guide\
```

< Designation by relative path >

```
[HTML_BROWSER]
HTMLDATA_GCODE=gcode_guide\
```

(Note 1) Refer to "M800V/M80V Series Instruction Manual" or "M800/M80 Series Instruction Manual" for details of HTML file.

(Note 2) The files that are copied under the folder to store NC Trainer2 plus data \custom are used for displaying the screen.

### 5.3.9 M Code Guidance Release Setting

For the project of M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB, original M code (M code macro) guidance can be displayed in the G code guidance display area on the edit screen by creating a guidance file for M code macro (HTML format) and storing under the custom folder of NC Trainer2 plus project (the folder to store NC Trainer2 plus data\projects\project name\custom\mcode_guide). The following is the description method of the setting file.

○ Example of config.ini

< Designation by absolute path >

```
[HTML_BROWSER]
HTMLDATA_MCODE=C:\MELCNC\NCT2P\custom\mcode_guide\
```

< Designation by relative path >

```
[HTML_BROWSER]
HTMLDATA_MCODE=mcode_guide\
```

(Note 1) Refer to "M800V/M80V Series Instruction Manual" for details of HTML file.

(Note 2) The files that are copied under the folder to store NC Trainer2 plus data \custom are used for displaying the screen.

### 5.3.10 Custom Cycle Setting for Interactive Cycle Insertion

For the project of M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB, original cycle can be added in the interactive cycle insertion function on the edit screen by creating cycle data and storing under the custom folder of NC Trainer2 plus project (the folder to store NC Trainer2 plus data\projects\project name\custom\comm_cycle).

(Note 1) Refer to "M800V/M80V Series Instruction Manual", or "M800/M80 Series Instruction Manual" for details of cycle data.

(Note 2) The files that are copied under the folder to store NC Trainer2 plus data \custom are used for displaying the screen.

### 5.3.11 Restrictions for Custom Release Screen

- Custom release screens can be displayed with NC Trainer2 by importing a project created with NC Trainer2 plus. Note that custom release screens are not displayed and the default screen is displayed in the machine state display part on the home screen when the files stored in the folder to store NC Trainer2 data (normally, C:\MELCNC\NCT2)\projects\project name\custom are changed.
- For a project of M80V TypeA/M80V TypeB/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB/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 Trainer2 plus data using an absolute path (normally, C:\MELCNC\NCT2P)\HD folder) in the custom API library function.
- When the base common parameter "#11080 HomeScreen display" is set to "1" or "2" for the project of M830V/ M80V TypeA/M80V TypeB/M830/ M80TypeA/M80 TypeB/E80 TypeA/E80 TypeB, the standard screen and home screen are switched by pressing the screen display key , and the custom release screen assigned to the screen display key will not be displayed. To display the custom release screen assigned to the screen display key, set "#11080 HomeScreen display" to "0" (Not display the home screen).

# 5.4 APLC release

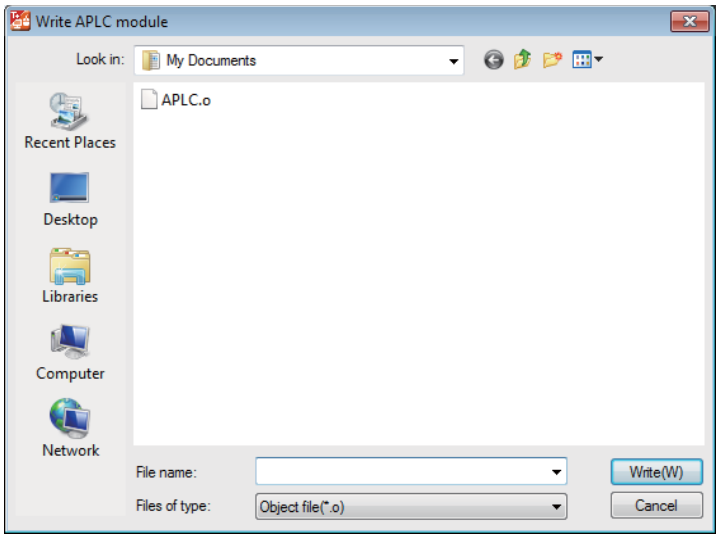
APLC release is a function which calls APLC release C language module (APLC.o) created by users from the NC. Complicated control operations that are difficult to be mounted by user PLC can be created with C language.
With NC Trainer2 plus, the C language module compiled for M800V/M80V Series, M800/M80/E80/C80 Series, and M700V/M70V/E70 Series can be written in the memory of the NC directly and the operation can be checked.

(Note) For NC Trainer2 plus, the execution of C language module from compact flashes is not supported.

## 5.4.1 Writing APLC Release C Language Module

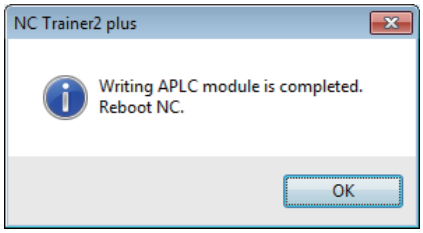
The following is the procedure to write APLC release C language module (APLC.o) in the NC memory of NC Trainer2 plus.

(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 Trainer2 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.



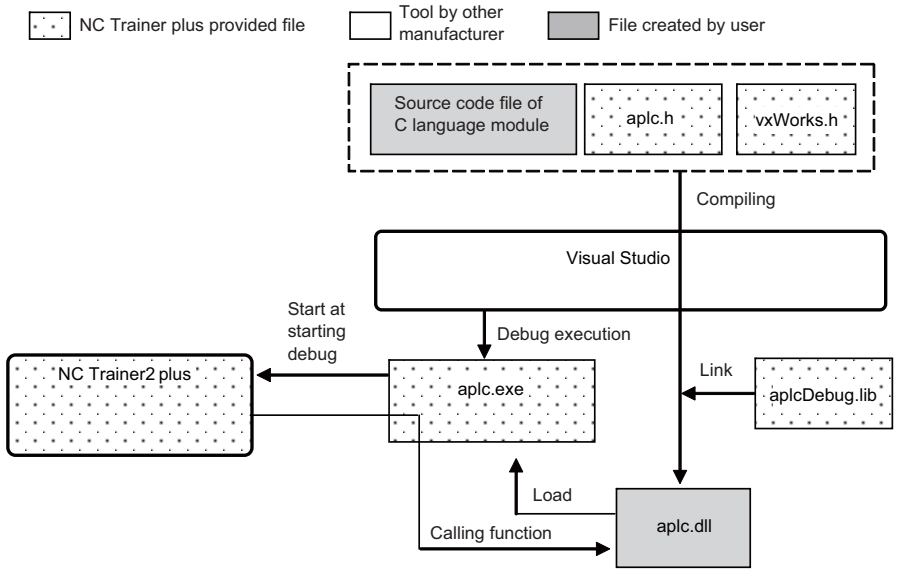
(4) The writing process of C language module is started.
(Note) When the writing process of C language module is executed, the NC will enter an emergency stop state.


(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.



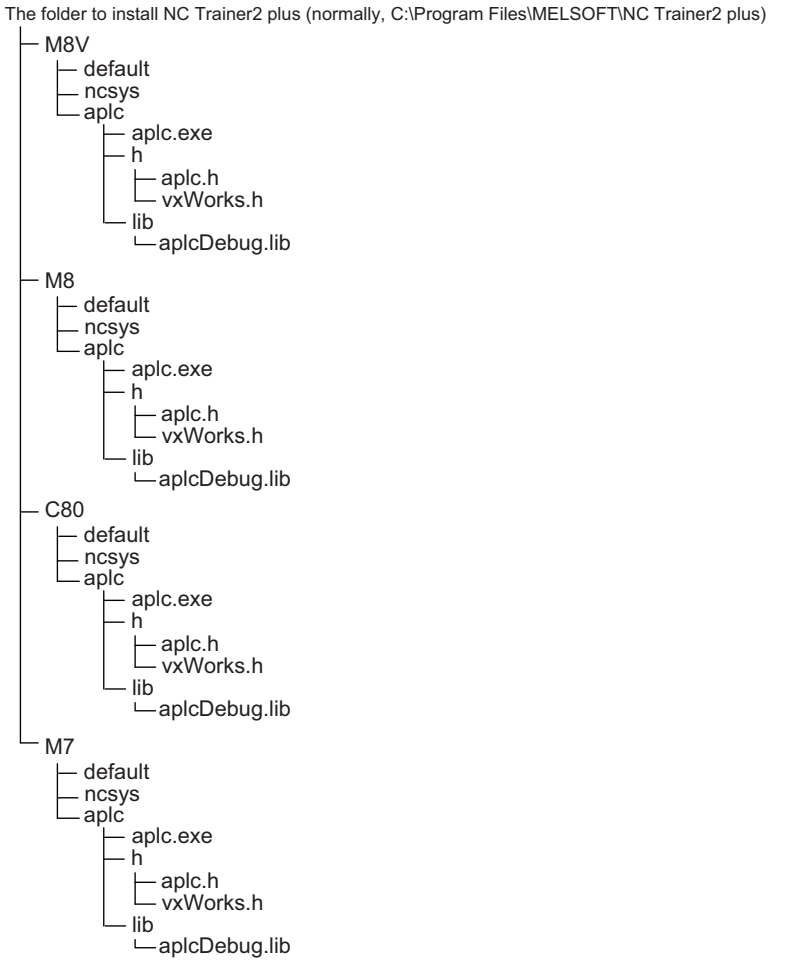
## 5.4.2 Outline for the Debug of APLC Release C Language Module

By using NC Trainer2 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.<br>The following versions are available.<br>Visual Studio 2012, Visual Studio 2013, Visual Studio 2015, Visual Studio 2017, Visual Studio 2019 |
| 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<br>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<br>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<br>At the start, aplc.dll is loaded and then NC Trainer2 plus is started for debug. |
| NC Trainer2 plus | When starting from aplc.exe, call C language module dedicated to debug instead of C language module (APLC.o) created by user.<br>It is not required to write APLC module before the debug. |

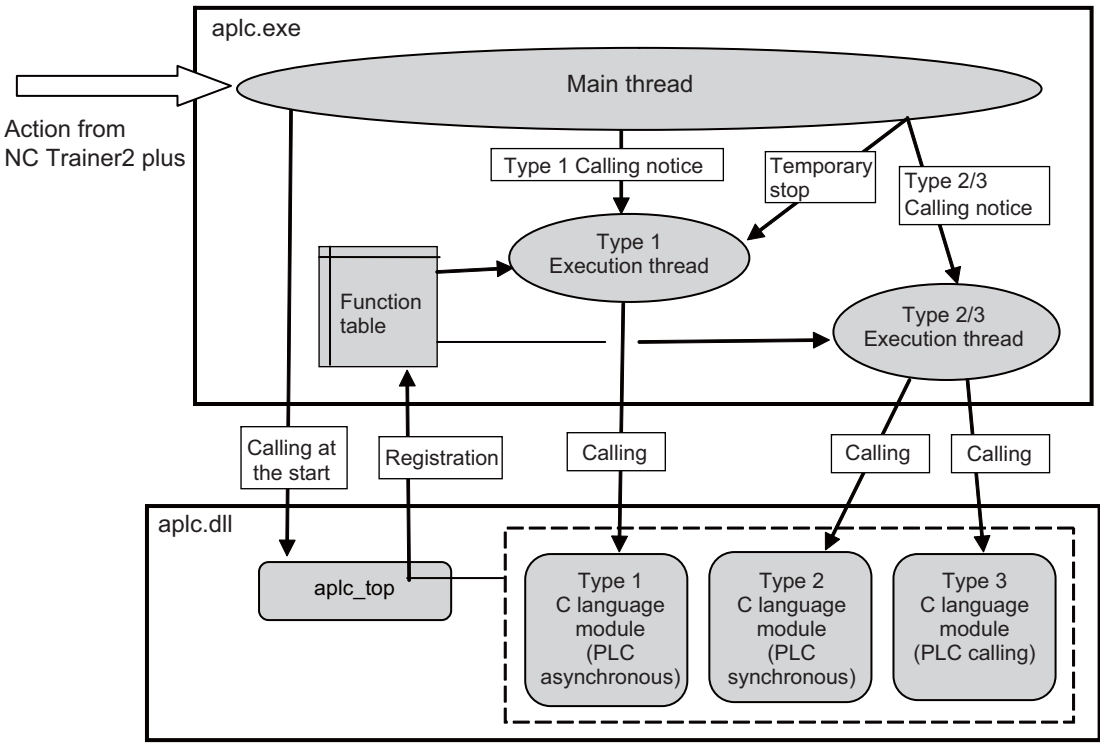
aplc.exe, aplc.h, vxWorks.h and aplcDebug.lib are stored under the folder to install NC Trainer2 plus.



### 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 Trainer2 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 |
|---|---|
| Include aplc.h and vxWorks.h | Include the source code file of C language module aplc.h and vxWorks.h. |
| long long<br>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.<br>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.)**

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability | | | |
|---|---|---|---|---|
| | M8V | M8 | M7 | C80 |
| getNCData | ○ | ○ | ○ | ○ |
| setNCData | ○ | ○ | ○ | ○ |
| scaldr | ○ | ○ | ○ | ○ |
| aplcSrch | ○ | ○ | ○ | ○ |
| melplcBset ☐ (Note 1) (Note 3) | ○ | ○ | ○ | ○ |
| melplcBrst ☐ (Note 1) (Note 3) | ○ | ○ | ○ | ○ |
| melplcBtst ☐ (Note 1) (Note 3) | ○ | ○ | ○ | ○ |
| melplcWset ☐ (Note 2) (Note 4) | ○ | ○ | ○ | ○ |
| melplcWtst ☐ (Note 2) (Note 4) | ○ | ○ | ○ | ○ |
| melplcLset ☐ (Note 2) (Note 4) | ○ | ○ | ○ | ○ |
| melplcLtst ☐ (Note 2) (Note 4) | ○ | ○ | ○ | ○ |
| melplcBset ☐ _Ex (Note 3) | ○ | ○ | × | × |
| melplcBrst ☐ _Ex (Note 3) | ○ | ○ | × | × |
| melplcBtst ☐ _Ex (Note 3) | ○ | ○ | × | × |
| melplcWset ☐ _Ex (Note 4) | ○ | ○ | × | × |
| melplcWtst ☐ _Ex (Note 4) | ○ | ○ | × | × |
| melplcLset ☐ _Ex (Note 4) | ○ | ○ | × | × |
| melplcLtst ☐ _Ex (Note 4) | ○ | ○ | × | × |
| abtol | ○ | ○ | ○ | ○ |
| ahtol | ○ | ○ | ○ | ○ |
| atobcd | ○ | ○ | ○ | ○ |
| atos | ○ | ○ | ○ | ○ |
| dchtoa | ○ | ○ | ○ | ○ |
| ltoa | ○ | ○ | ○ | ○ |
| ostrcmp | ○ | ○ | ○ | ○ |

(Note 1) □=Device name: X,Y,M,L,F,SM,TI,TO,STI,STO,CI,CO
(For a project of M730V/M70 TypeA/M70 TypeB/E70/C80)

(Note 2) □=Device name: R,D
(For a project of M730V/M70 TypeA/M70 TypeB/E70/C80)

(Note 3) □=Device name: X,Y,M,L,F,SM,TI,TO,STI,STO,CI,CO,B,SB
(For a project of M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB)

(Note 4) □=Device name: R,D,ZR,W,SW,SD
(For a project of M830V/M80V TypeA/M80V TypeB/M830/M80 TypeA/M80 TypeB/E80 TypeA/E80 TypeB)

### Function for automatic operation lock

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| 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)

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| abs | ○ |
| atof | ○ |
| atoi | ○ |
| atol | ○ |
| bsearch | ○ |
| div | ○ |
| div_r | div |
| labs | ○ |
| ldiv | ○ |
| ldiv_r | ldiv |
| qsort | ○ |
| rand | ○ |
| srand | ○ |
| strtod | ○ |
| strtol | ○ |
| strtoul | ○ |

## Character string library

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| 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

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| 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.

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| asin | ○ |
| acos | ○ |
| atan | ○ |
| atan2 | ○ |
| ceil | ○ |
| cosh | ○ |
| exp | ○ |
| fabs | ○ |
| floor | ○ |
| fmod | ○ |
| frexp | ○ |
| ldexp | ○ |
| log | ○ |
| log10 | ○ |
| modf | ○ |
| pow | ○ |
| sin | ○ |
| cos | ○ |
| sinh | ○ |
| sqrt | ○ |
| tan | ○ |
| tanh | ○ |

## Time library

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| asctime | ○ |
| asctime_r | asctime |
| clock | ○ |
| ctime | ○ |
| ctime_r | ctime |
| difftime | ○ |
| gmtime | ○ |
| gmtime_r | gmtime |
| localtime | ○ |
| localtime_r | localtime |
| mktime | ○ |
| strftime | ○ |
| time | ○ |

### Buffer operation library

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| 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

○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| sprintf | ○ |
| vsprintf | ○ |
| sscanf | ○ |

### Memory operation library

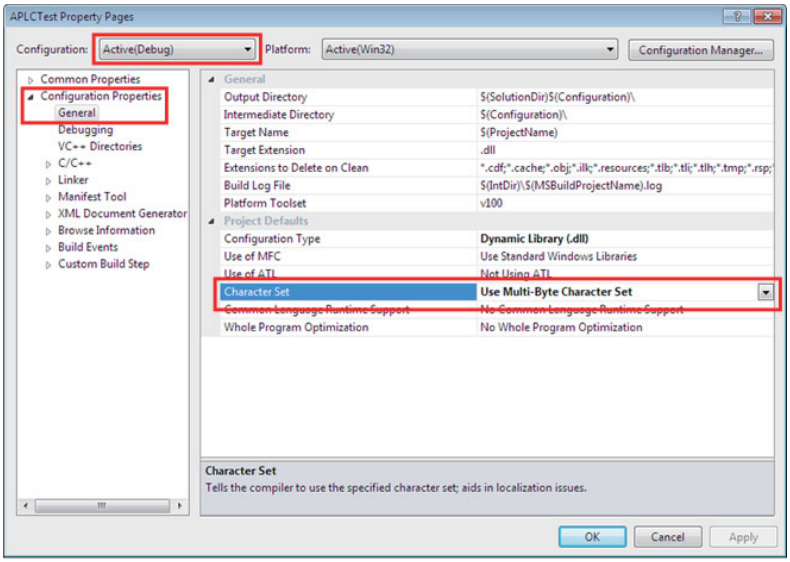
○: Available ×: Unavailable Name: Alternative function

| Function name | Availability |
|---|---|
| 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.

(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<br>- Debug | Command | For a project of M8V<br>The folder to install NC Trainer2 plus\M8V\aplc\aplc.exe<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\M8V\aplc\aplc.exe) |
| | | For a project of M8<br>The folder to install NC Trainer2 plus\M8\aplc\aplc.exe<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\M8\aplc\aplc.exe) |
| | | For a project of M7<br>The folder to install NC Trainer2 plus\M7\aplc\aplc.exe<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\M7\aplc\aplc.exe) |
| | | For a project of C80<br>The folder to install NC Trainer2 plus\C80\aplc\aplc.exe<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\C80\aplc\aplc.exe) |
| | Command Arguments | The project name of NC Trainer2 plus which is started during debugging |
| | Working Directory | The solution folder for this project\Debug |
| Configuration Properties<br>- C/C++<br>- GENERIC | Additional included directory | For a project of M8V<br>The folder to install NC Trainer2 plus\M8V\aplc\h<br>(normally, C:\Program Files\ MELSOFT\NC Trainer2 plus\M8V\aplc\h) |
| | | For a project of M8<br>The folder to install NC Trainer2 plus\M8\aplc\h<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\M8\aplc\h) |
| | | For a project of M7<br>The folder to install NC Trainer2 plus\M7\aplc\h<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\M7\aplc\h) |
| | | For a project of C80<br>The folder to install NC Trainer2 plus\C80\aplc\h<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\C80\aplc\h) |
| | Correspond to 64bit porting | No<br>(This item is not included in Visual Studio2012/2013/2015/2017/2019) |
| Configuration Properties<br>- C/C++<br>- Code Generation | Run time library | Multi-threaded (/MT) |
| Configuration Properties<br>- C/C++<br>- Language | Handle wchar_t as build-in type | No |

| Category | Item | Details |
|---|---|---|
| Configuration Properties<br>- Linker<br>-GENERIC | Output File | The solution folder for this project \Debug\aplc.dll |
| | Additional library directory | For a project of M8V<br>The folder to install NC Trainer2 plus \M8V\aplc\lib<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\M8V\aplc\lib) |
| | | For a project of M8<br>The folder to install NC Trainer2 plus\M8\aplc\lib<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\M8\aplc\lib) |
| | | For a project of M7<br>The folder to install NC Trainer2 plus\M7\aplc\lib<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\M7\aplc\lib) |
| | | For a project of C80<br>The folder to install NC Trainer2 plus\C80\aplc\lib<br>(normally, C:\Program Files\MELSOFT\NC Trainer2 plus\C80\aplc\lib) |
| Configuration Properties<br>- Linker<br>- In | Additional Dependencies | aplcDebug.lib |
| | Ignore specific library | LIBC.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.

### 5.4.6 Debugging Procedure

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

(1) When NC Trainer2 plus is already started, exit it and then set the break point to the source file of C language module with Visual Studio.

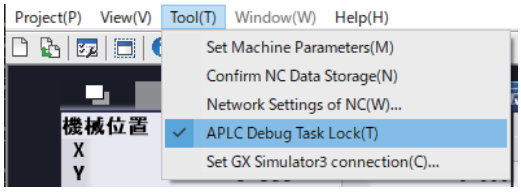
(2) Start debugging with Visual Studio. NC Trainer2 plus is started automatically and a debug is started.

(3) To terminate debug, exit from NC Trainer2 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 Trainer2 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 Trainer2 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 Trainer2 plus. It will be enabled immediately during debug.




- The menu [APLC Debug Task Lock (T)] above can be selected only when NC Trainer2 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 Trainer2 plus during debug, C language module on Visual C++ side is not called anymore and cannot be debugged. Exit NC Trainer2 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 Trainer2 plus first and exit (the debug execution of) Visual C++, and then start debugging again.

# 5.5 Importing the NC Data from Actual NC

To simulate the same operation as actual NC on NC Trainer2 plus, import the NC data backed up with actual NC to NC Trainer2 plus.
The backup of actual NC is executed on [Mainte]- [All backup] screen.

The import target data are the following data which are backed up with NC data backup of M800V/M80V Series, M800/M80/E80 Series, M700V/M70V Series, and E70.

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

The following data which are backed up with M800V Series and M800 Series cannot be imported to NC Trainer2 plus. However, safety parameters can be transferred from the [Mainte] - [I/O] screen of the NC screen.

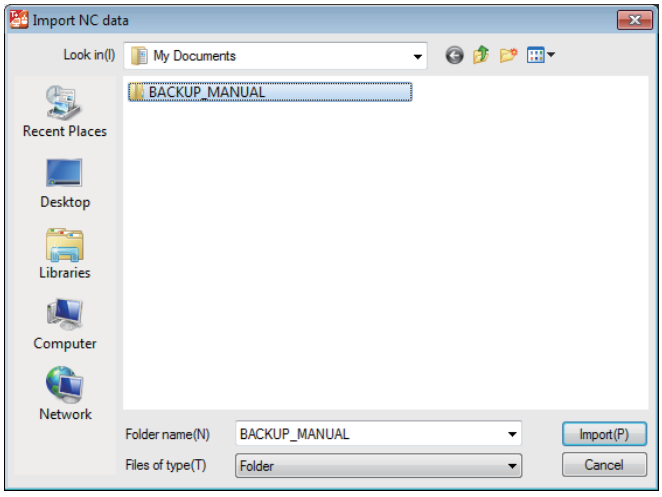
- Safety parameter
- Safety ladder

The following data which are backed up with M800VS/M80V Series, M800S/M80/E80 Series, M700VS/M70V Series, and E70 cannot be imported to NC Trainer2 plus.

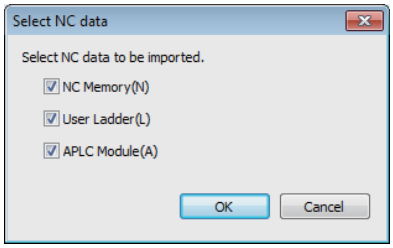
- Custom data

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

(1) Store the backup data of actual NC (whole folder) in a SD 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 Trainer2 plus and press the [Import (P)] button after designating the folder to store NC data.



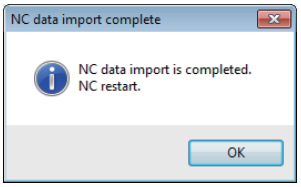

(4) [Select NC data] dialog box is displayed. Check the data to be imported and press the [OK] button.




(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 Trainer2 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.

# 5.6 Network Connection Setting

NC which is operated on NC Trainer2 plus can communicate the NC engineering tool with a network connection.
The network connection setting for NC Trainer2 plus is explained in this chapter.

(Note 1) The tools that can be connected with NC Trainer2 plus are GX Developer, GX Works2, NC Configurator2, and NC Explorer. For NC Explorer, use version C5 or later.

(Note 2) Do not connect with NC Monitor2 or NC Analyzer2. If these tools are connected, some screens are not displayed correctly and some functions (such as servo adjustment) do not operate.

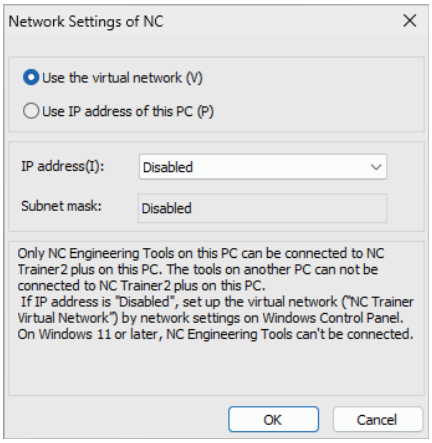
(Note 3) When connecting multiple NC engineering tools to NC Trainer2 plus, make sure to connect no more than a total of nine simultaneously.

(Note 4) When connecting multiple NC engineering tools to NC Trainer2 plus simultaneously, make sure that the same type of tool is not connected multiple times.

### 5.6.1 Network Connection Setting Method

(1) Select "Tool (T)" - "Network Settings of NC (W)" from the menu bar.

(2) An Network Settings of NC dialog box appears.
Set each setting item of network communication.




| Setting item | Description |
|---|---|
| Use the virtual network (V) | Select this when communicating using the virtual network for NC Trainer2 plus.<br><br>(*) Only communications between the executing NC Trainer2 plus and NC engineering tools on the same computer are enabled. A connection with an executing NC engineering tools on a different computer is not possible.<br>(*) This cannot be selected using Windows 11. |
| Use IP address of this PC (P) | Select this when using the IP address and the subnet mask of the computer on the NC. Connecting an executing NC engineering tools on a different computer with NC Trainer2 plus is possible.<br><br>(*) When executing NC Trainer2 plus and NC engineering tools on the same computer, execute NC Trainer2 plus first. When executing NC engineering tools first, NC Trainer2 plus may not be connected. |
| IP address (I) (Note 1) | The IP address of the NC is displayed.<br>If the computer has multiple network cards when selecting [Use IP address of this PC], select the IP address from drop-down list.<br>If "Disabled" is displayed when selecting [Use the virtual network], virtual network driver setting is required.<br>Refer to "5.7 Virtual Network Driver Setting Method". |
| Subnet mask | The subnet mask of the NC is displayed. |

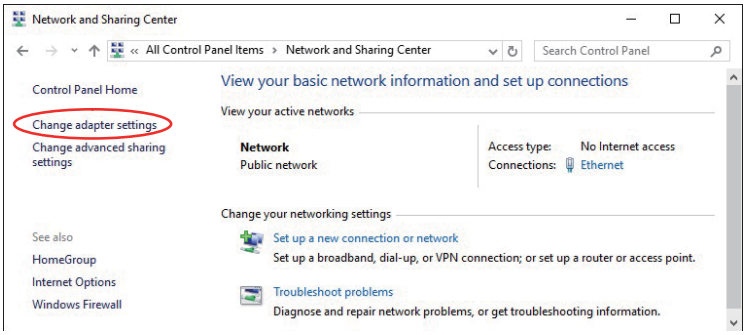
(Note 1) When multiple IP addresses are set to a network card, IP address is disabled when selecting [Use IP address of this PC]. Do not set multiple IP addresses to a network card when selecting [Use IP address of this PC].

(3) Click [OK] button. The settings will be valid from the next time of the NC startup.

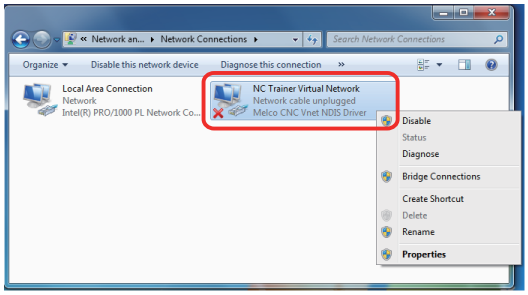
# 5.7 Virtual Network Driver Setting Method

The method of setting the virtual network driver for NC Trainer2 plus is explained. (Set by the user with administrator authority.)
For Windows 11, a connection using a virtual network is not possible. Use the same IP address as the computer.
For Windows 10, set the virtual network driver following the procedure below.

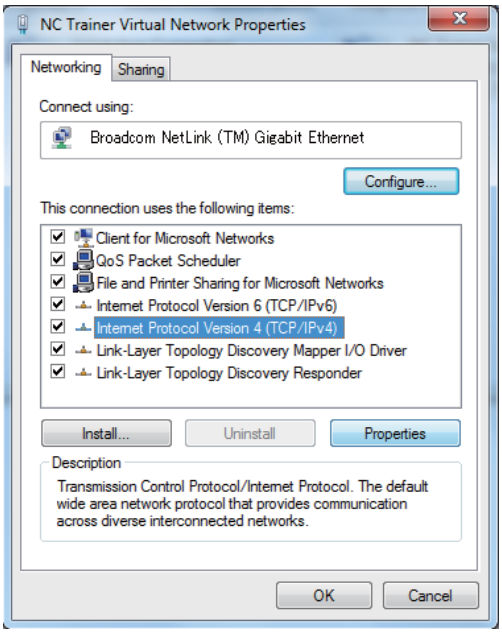
(1) Select [Start]-[All apps]-[Windows System]-[Control Panel]-[Network and Internet]-[Network and Sharing Center] from task bar, and then select [Change adapter settings] on the left side of the screen [Network and Sharing Center] to open the setting screen of Network connection.



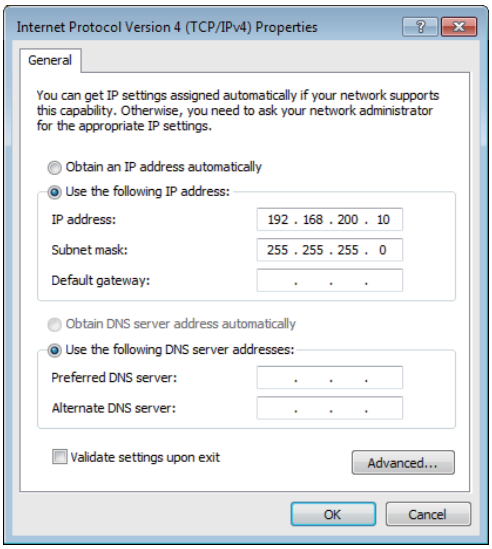

(2) Double-click "NC Trainer Virtual Network" on the setting screen of Network connection.



(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 Trainer2 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 |
| :<br>:<br>: | :<br>:<br>: |
| 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.

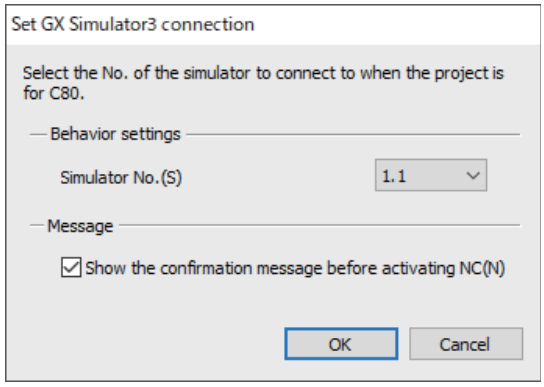
# 5.8 Set GX Simulator3 Connection

For a project of C80, set the simulator No. of GX Simulator3 that connects with NC Trainer2 plus. The set data is enabled by restarting the NC.

## 5.8.1 GX Simulator3 Connection Setting Method

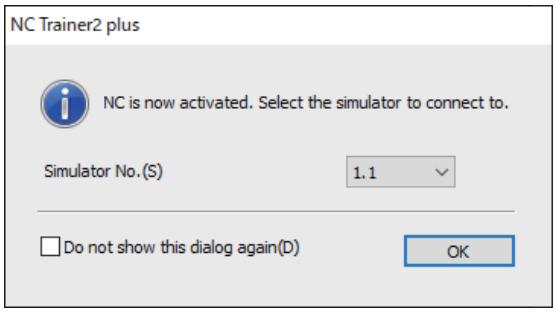
(1) Select "Tool (T)" - "Set GX Simulator3 connection(C)" from the menu bar.

(2) A "Set GX Simulator3 connection" dialog appears.




| Setting item | Description |
|---|---|
| Simulator No.(S) | For a project of C80, set the simulator No. of GX Simulator3 that connects with NC Trainer2 plus.<br>The following simulator Nos. can be selected.<br>"1.1", "2.1", "3.1", and "4.1". |
| Show the confirmation message before activating NC(N) | If checked, a message confirming simulator No. setting appears when the NC is started. (Note 1) |

(Note 1) When starting or switching a C80 project, a message confirming simulator No. setting appears before the NC starts.




| Setting item | Description |
|---|---|
| Simulator No.(S) | For a project of C80, set the simulator No. of GX Simulator3 that connects with NC Trainer2 plus.<br>The following simulator Nos. can be selected.<br>"1.1", "2.1", "3.1", and "4.1". |
| Do not show this dialog again(D) | If checked, this dialog does not appear when starting or switching a C80 project.<br>Also, "Show the confirmation message before activating NC(N)" in the "Set GX Simulator3 connection" dialog is unchecked. |

## 5.9 NC Virtual Simulator Collaboration

NC Virtual Simulator is an application in which analysis can be conducted from various angles digitally (on a PC) using the same machining conditions as used by the actual machine tool and machine simulation using machine models can be performed. It simulates the motion of the CNC realistically, including smoothing, acceleration/ deceleration and delay in servo response.
By linking with NC Virtual Simulator, NC Trainer2 plus enables machine tool builders to design machines, debug ladder circuits, and check machine operations digitally.
Selecting [Tool (T)] - [NC Virtual Simulator Collaboration (V)] enables/disables the link with NC Virtual Simulator.
The enabled/disabled status of the link with NC Virtual Simulator is saved in each project. When executing an enabled project, the project starts with NC Virtual Simulator automatically linked.
To use the machine simulation function, machine models need to be imported using NC Virtual Simulator.
For details, refer to the manual of NC Virtual Simulator.

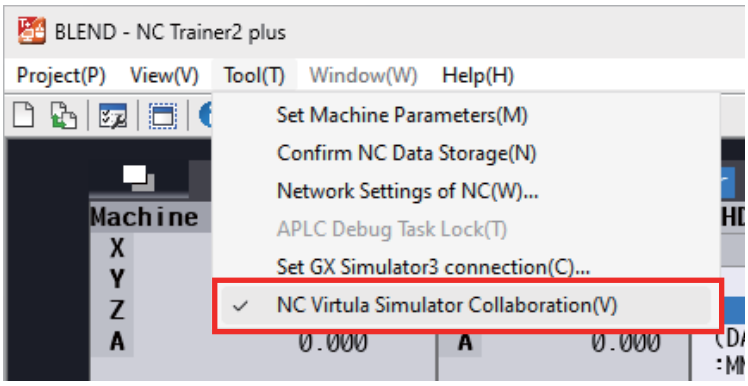
(Note) There are limitations to the model types and the number of part systems that can be linked with NC Virtual Simulator.

### 5.9.1 Procedure for NC Virtual Simulator Collaboration

The following is an example of the procedure for linking a project running in NC Trainer2 plus with NC Virtual Simulator.

(1) Start NC Trainer2 plus and execute the project to be linked with NC Virtual Simulator.

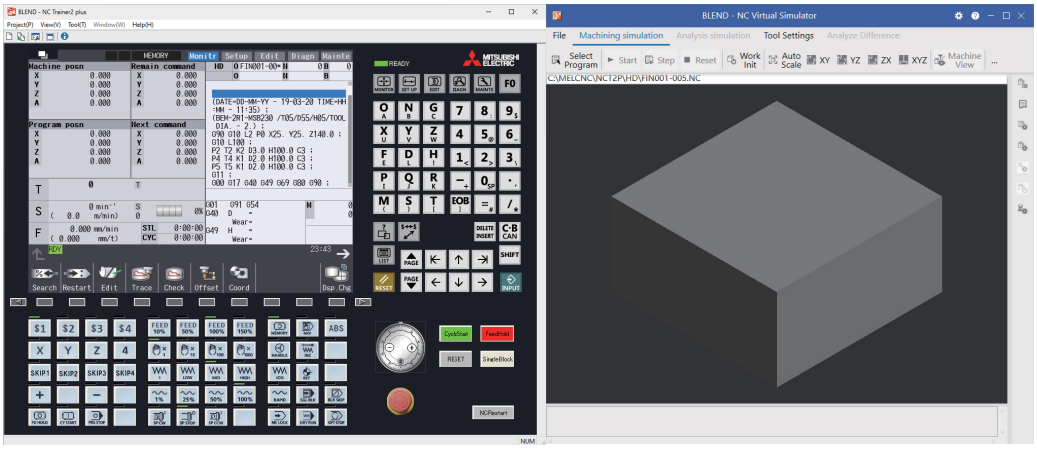
(2) Enable "[Tool (T)] - [NC Virtual Simulator Collaboration (V)]" in NC Trainer2 plus. The enabled/disabled status is saved as project data when changed.




(Note) When starting a project that cannot be linked with NC Virtual Simulator due to a limitation, the "NC Virtual Simulator Collaboration (V)" menu is displayed in gray and cannot be selected.

(3) Click the "NCRestart" button in NC Trainer2 plus to restart the NC.

(4) When the project has finished restarting, the screen of NC Trainer2 plus is displayed.
Then, NC Virtual Simulator starts using the data of the project running in NC Trainer2 plus.




## 5.9.2 Ending NC Virtual Simulator Collaboration

To end linking with NC Virtual Simulator, exit NC Virtual Simulator manually.
(NC Trainer2 plus does not close.)
Note that closing NC Trainer2 plus while it is linked with NC Virtual Simulator, will also close NC Virtual Simulator.

### 5.9.3 Operations while NC Virtual Simulator Is Linked

The operation of the following functions will be synchronized in NC Virtual Simulator when operated in NC Trainer2 plus while NC Virtual Simulator is linked.

| Function | NC Trainer2 plus operation | Standard button |
|---|---|---|
| Start simulation | Cycle Start |  |
| Pause simulation | Feed Hold |  |
| Enable/disable single block | Same as left |  |
| Reset | Same as left |  |
| NC Restart | Same as left |  |
| Enable/disable optional block skip | Same as left |  |
| Enable/disable M1 command ignored | Same as left |  |
| Program search | Operation search | |

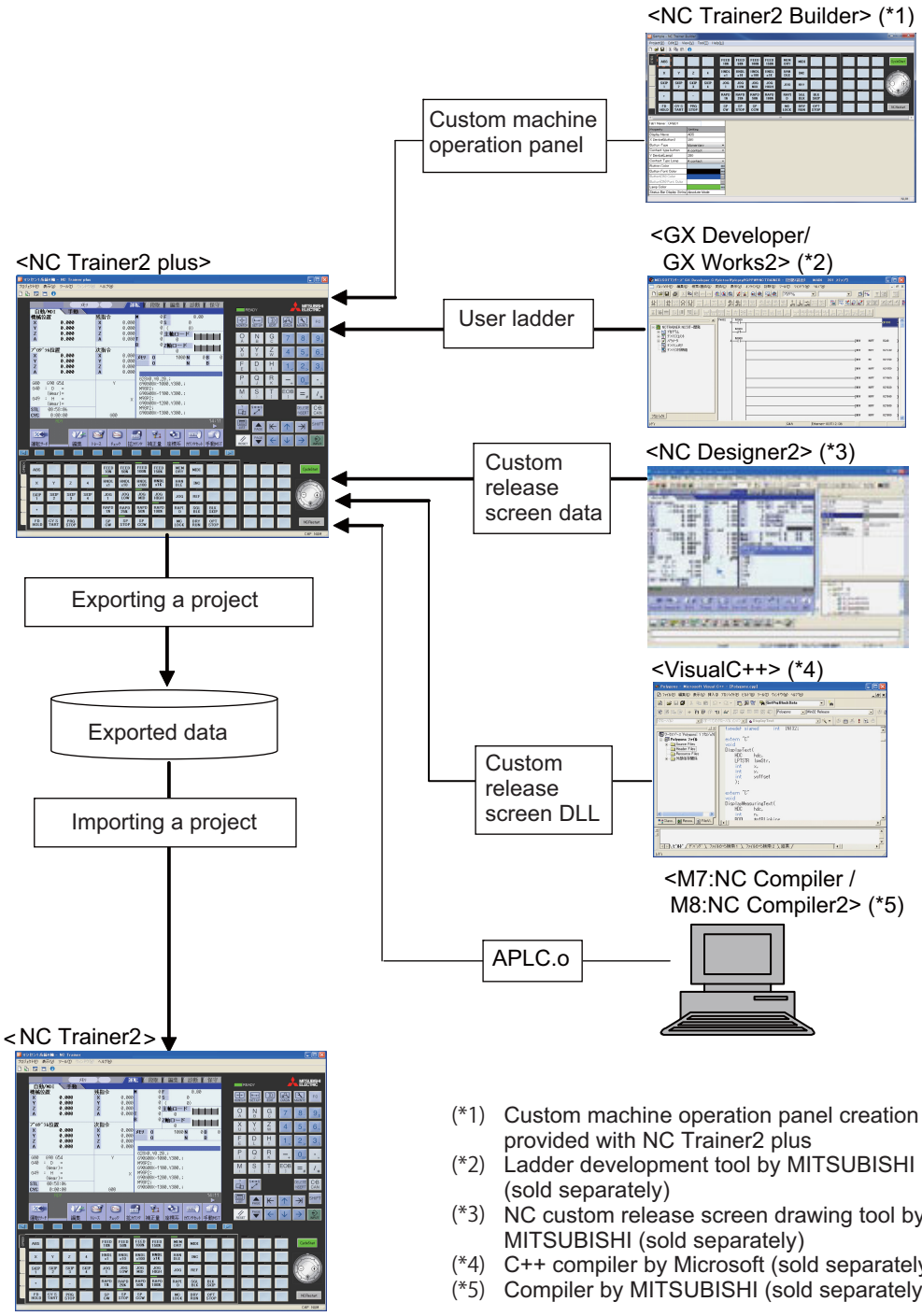
(Note) The buttons related to manual operations do not function.

# 6

# Exporting and Importing NC Trainer2 plus Project

# 6.1 Exporting NC Trainer2 plus Project

The project exporting function of NC Trainer2 plus enables NC Trainer2 to be operated as a tool for mastering machine tool operation of customers.




(*1) Custom machine operation panel creation tool provided with NC Trainer2 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 MITSUBISHI (sold separately)

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

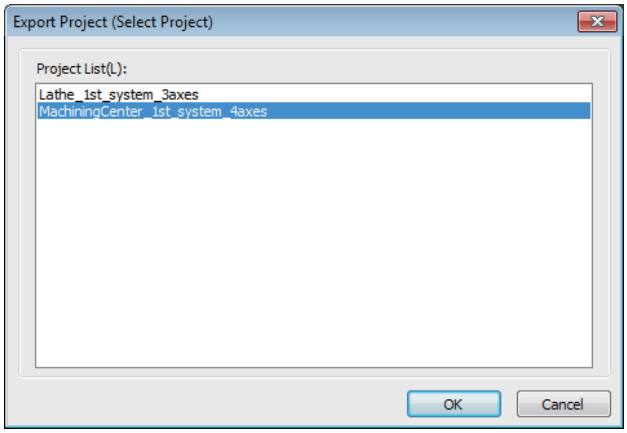
- Data to be stored in NC memory (parameter, machining program, macro, etc.)
- Project information
- User PLC
- Custom machine operation panel setting
- Custom release screen data (The folder to store NC Trainer2 plus data\Projects\Project name\custom folder)
- Custom release Start-up screen data (The folder to store NC Trainer2 plus data\Projects\Project name\startupscreen.bmp or startupscreen_xga.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 Trainer2 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 Trainer2 plus data \M-CARD folder) by the file operation on the onboard screen

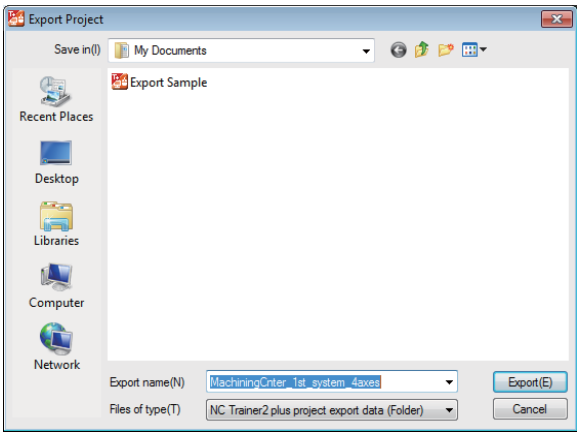
Execute the following procedure to export a project.

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

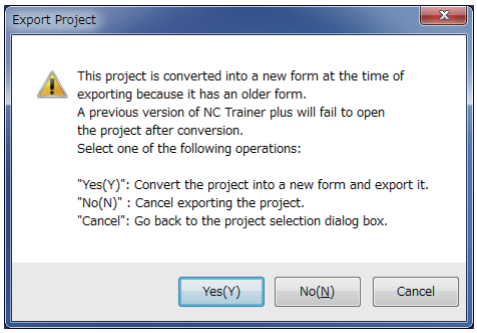



(Note 1) The project which is created with NC Trainer2 is not displayed.
(Note 2) The C80 project is not displayed.

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



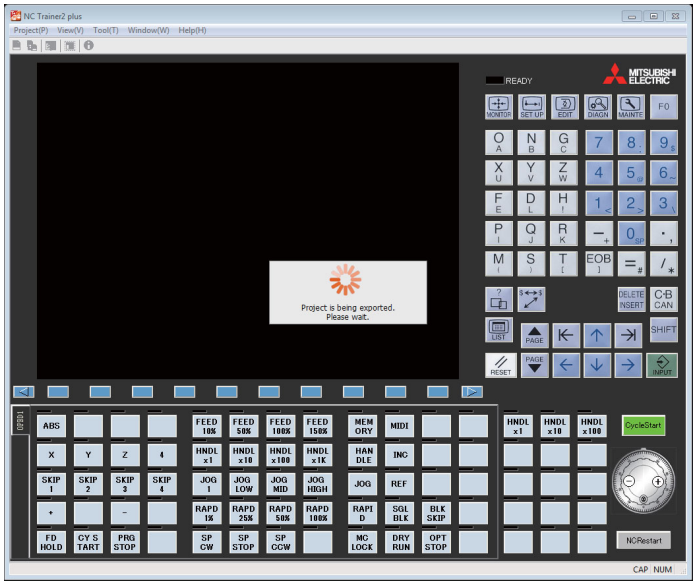

(Note 1) An export name can be up to 80 one-byte characters. (Each two-byte character is equivalent to two characters.)
(Note 2) One-byte characters and two-byte characters can be used for an export name.
(Note 3) An export name is not case-sensitive.
(Note 4) The following characters cannot be used 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 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.

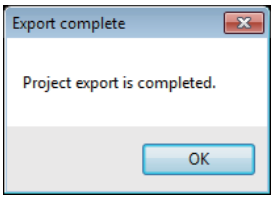
- If there is no possibility to open the project by NC Trainer plus, click "Yes(Y)". A dialog box pops up, where a folder to store the exported data and an export name are specified.
- To leave the project in the format that allows the project to be opened by NC Trainer plus, click "No (N)" or "Cancel" 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.

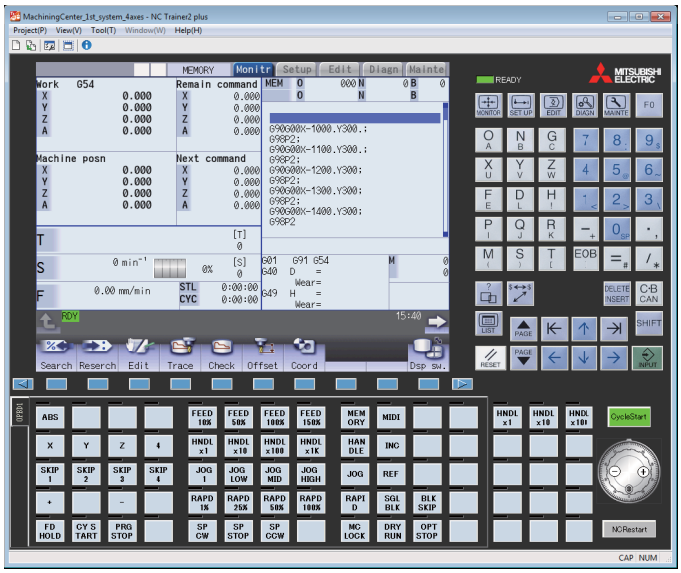



(Note 1) When a project is executed, the NC is stopped before exporting.
(Note 2) When [Tool (T)] - [Confirm NC Data Storage (N)] on the menu bar is enabled, the confirmation message box for NC data storage is displayed before stopping the NC. Whether to store NC data can be selected on the message box.
(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.

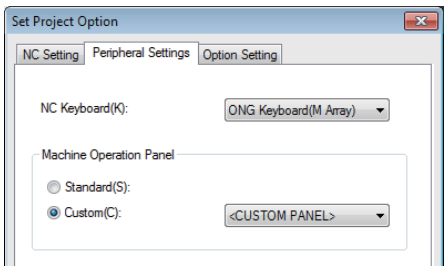
Refer to "6.2 Importing NC Trainer2 plus Project" for details of project import procedure. NC option and custom machine operation panel of the imported project are handled as follows.

**< NC option of the project which is imported to NC Trainer2 >**

- NC options which are set with NC Trainer2 plus project continue to operate after importing (NC options which cannot be set to be enabled on NC Trainer2 are also enabled).
- Some of NC options of NC Trainer2 plus are not displayed on the option setting for the project of NC Trainer2. 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 Trainer2 / NC Trainer2 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 Trainer2 (The setting item for Machine Operation Panel on the Set Project Option dialog box is displayed in gray).

## 6.2 Importing NC Trainer2 plus Project

The operating procedure is the same as that of NC Trainer2. Refer to the section "4.3.7 Importing NC Trainer2 plus Project" of "I NC Trainer2" for details.

# III Appendix

# Appendix 1

## Specifications List

# Appendix 1.1 M830V/M80V Specifications List

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **1. Control axes** | | | | | | | | | | | | |
| **1.1 Control axes** | | | | | | | | | | | | |
| 1.1.1 Number of basic control axes (NC axes) | ○3 | ○3 | ○3 | ○2 | ○2 | ○2 | ○3 | ○3 | ○3 | ○2 | ○2 | ○2 |
| 1.1.2 Max. number of axes (NC axes + Spindles + PLC axes) | 14 | 11 | 6 | 24 | 13 | 9 | ○32 | 11 | 9 | ○32 | 13 | 9 |
| 1.1.2.1 Max. number of NC axes (in total for all the part systems) | 8 | 8 | 4 | ○16 | 8 | 7 | ○16 | 9 | 5 | ○32 | 10 | 7 |
| 1.1.2.2 Max. number of spindles | 6 | 4 | 2 | 8 | 6 | 4 | 6 | 4 | 2 | 8 | 6 | 4 |
| 1.1.2.3 Max. number of PLC axes | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 6 | 6 | 8 | 6 | 6 |
| 1.1.4 Max. number of PLC indexing axes | — | — | — | — | — | — | 8 | 4 | 4 | 8 | 4 | 4 |
| 1.1.5 Number of simultaneous contouring control axes | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 1.1.6 Max. number of NC axes in a part system | 4 | 4 | 4 | 4 | 4 | 4 | 16 | 8 | 5 | 16 | 8 | 5 |
| 1.1.7 Axis name extension | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **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 |
| 1.2.2 Max. number of part systems (main + sub) | ○2 | ○2 | ○1 | ○4 | ○4 | ○2 | ○2 | ○2 | ○1 | ○8 | ○4 | ○2 |
| 1.2.2.1 Max. number of main part systems | ○2 | ○2 | ○1 | ○4 | ○2 | ○2 | ○2 | ○2 | ○1 | ○8 | ○2 | ○2 |
| 1.2.2.2 Max. number of sub part systems | — | — | — | ○4 | ○2 | ○1 | ○2 | — | — | ○8 | ○2 | ○1 |
| **1.3 Control axes and operation modes** | | | | | | | | | | | | |
| 1.3.2 Memory mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 1.3.3 MDI mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 1.3.4 High-speed program server mode | | | | | | | | | | | | |
| 1.3.4.2 Display unit-side High-speed program server mode | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| 1.3.5 Front-side SD card mode | — | ○ | ○ | — | ○ | ○ | — | ○ | ○ | — | ○ | ○ |
| **2. Input command** | | | | | | | | | | | | |
| **2.1 Data increment** | | | | | | | | | | | | |
| 2.1.1 Least command increment | | | | | | | | | | | | |
| Least command increment 1μm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Least command increment 0.1μm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Least command increment 0.01μm(10nm) | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| Least command increment 0.001μm(1nm) | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| 2.1.2 Least control increment | | | | | | | | | | | | |
| Least control increment 0.01μm(10nm) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 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 (G Code List 2, 3) | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ |
| 2.3.1.2 Format 2 for Lathe (G Code List 4, 5) | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ |
| 2.3.1.3 Special format for lathe (G Code List 6, 7) | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ |
| 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 | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ |
| 2.3.2 Program format switch | — | — | — | △ | — | — | — | — | — | △ | — | — |
| **2.4 Command value** | | | | | | | | | | | | |
| 2.4.1 Decimal point input I, II | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.4.2 Absolute/Incremental command | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.4.3 Diameter/Radius designation | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ |
| 2.4.4 Diameter/Radius designation switch | ○ | — | — | ○ | ○ | ○ | ○ | — | — | ○ | ○ | ○ |
| **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 | △ | — | — | — | — | — | △ | — | — | — | — | — |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **3.3 Curve interpolation** | | | | | | | | | | | | |
| 3.3.1 Involute interpolation | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| 3.3.2 Exponential interpolation | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| 3.3.3 Spline interpolation (G05.1Q2/G61.2) | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| 3.3.4 NURBS interpolation | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 3.3.5 3-dimensional circular interpolation | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| 3.3.6 Spline interpolation2 (G61.4) | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| **4. Feed** | | | | | | | | | | | | |
| **4.1 Feedrate** | | | | | | | | | | | | |
| 4.1.1 Rapid traverse rate (m/min) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 4.1.2 Cutting feedrate (m/min) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 4.1.3 Manual feedrate (m/min) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 4.1.4 Rotary axis command speed tenfold | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **4.2 Feedrate input methods** | | | | | | | | | | | | |
| 4.2.1 Feed per minute (Asynchronous feed) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.2.2 Feed per revolution (Synchronous feed) | △ | ○ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | ○ |
| 4.2.3 Inverse time feed | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| 4.2.4 F 1-digit feed | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.2.5 Manual speed command | — | — | — | — | — | — | △ | ○ | ○ | △ | ○ | ○ |
| 4.2.7 G00 feedrate designation (,F command) | △ | ○ | — | △ | ○ | — | △ | ○ | — | △ | ○ | — |
| 4.2.8 Selection of axis (axes) for feedrate 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-gradient acceleration/deceleration | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.4.3 Rapid traverse constant-gradient multi-step acceleration/deceleration | △ | ○ | ○ | — | — | — | △ | ○ | ○ | — | — | — |
| **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 | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |
| 4.5.10 Thread recutting | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |
| 4.5.11 Thread cutting override | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |
| 4.5.12 Variable feed thread cutting | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |
| 4.5.13 Thread cutting time constant switch | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **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 feedrate B | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.6.6 Manual feedrate B surface speed control | — | — | — | — | — | — | △ | — | — | — | — | — |
| 4.6.8 Manual speed clamp | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **4.7 Dwell** | | | | | | | | | | | | |
| 4.7.1 Dwell (Time-based designation) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.7.2 Dwell (Revolution-based designation) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **5. Program memory/editing** | | | | | | | | | | | | |
| **5.1 Memory capacity** | | | | | | | | | | | | |
| 5.1.1 Memory capacity (number of programs stored) | | | | | | | | | | | | |
| 230kB[600m] (400 programs) | — | — | — | — | — | — | — | — | — | — | — | — |
| 500kB[1280m] (1000 programs) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 1000kB[2560m] (1000 programs) | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| 2000kB[5120m] (1000 programs) | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| 5.1.2 Extended Memory | | | | | | | | | | | | |
| 2000KB[5120m] (1000 programs) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **5.2 Editing** | | | | | | | | | | | | |
| 5.2.1 Program editing | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5.2.2 Background editing | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5.2.3 Buffer correction | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5.2.5 Multi-part system simultaneous program editing | ○ | — | — | ○ | ○ | ○ | ○ | — | — | ○ | ○ | ○ |
| 5.2.6 Special program editing display for synchronization between part systems | △ | ○ | — | △ | ○ | ○ | △ | ○ | — | △ | ○ | ○ |
| 5.2.7 Finish shape view programming | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| **6. Operation and display** | | | | | | | | | | | | |
| **6.2 Operation methods and functions** | | | | | | | | | | | | |
| 6.2.1 Operation input | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.2 Absolute/Incremental 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 Parameter guidance | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.11 Alarm guidance | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.12 Machining program input mistake check warning | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| 6.2.15 User selectable menu configuration | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.17 Device open parameter | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.18 SRAM open parameter | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.19 MTB selectable menu configuration | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **6.3 Display methods and contents** | | | | | | | | | | | | |
| 6.3.1 Status display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.2 Clock display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.3 Monitor screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.4 Setup screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.5 Edit screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.6 Diagnosis screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.7 Maintenance screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.9 Home screen | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10 Additional languages | | | | | | | | | | | | |
| 6.3.10.1 Japanese | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.2 English | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.3 German | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.4 Italian | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.5 French | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.6 Spanish | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.7 Chinese | | | | | | | | | | | | |
| 6.3.10.7.1 Chinese (Traditional Chinese characters) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.7.2 Chinese (Simplified Chinese characters) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.8 Korean | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.9 Portuguese | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.10 Hungarian | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.11 Dutch | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.12 Swedish | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.13 Turkish | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.14 Polish | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.15 Russian | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.16 Czech | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.17 Indonesian | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.18 Vietnamese | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **8. Spindle, Tool and Miscellaneous functions** | | | | | | | | | | | | |
| **8.1 Spindle functions (S)** | | | | | | | | | | | | |
| 8.1.1 Spindle control functions | | | | | | | | | | | | |
| 8.1.1.3 Coil switch | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 8.1.1.6 Spindle-mode servo motor control | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 8.1.1.7 Spindle-mode rotary axis control | — | — | — | — | — | — | △ | ○ | — | — | — | — |
| 8.1.1.8 Turret gear change control | — | — | — | — | — | — | — | — | — | △ | ○ | ○ |
| 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) | | | | | | | | | | | | |
| 8.1.7.1 Spindle position control (Spindle/C axis control) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8.1.7.2 C axis control during Spindle synchronization | △ | — | — | △ | ○ | ○ | △ | — | — | △ | ○ | ○ |
| 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8.1.14 Spindle superimposition control | — | — | — | △ | — | — | — | — | — | △ | — | — |
| 8.1.15 Multiple spindle synchronization set control | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8.4.2 2nd miscellaneous function name extension | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **9. Tool compensation** | | | | | | | | | | | | |
| **9.1 Tool length/Tool position** | | | | | | | | | | | | |
| 9.1.1 Tool length offset | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9.1.2 Tool position offset | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ | — | — | — |
| 9.1.3 Tool compensation for additional axes | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ |
| 9.1.4 Tool position compensation (G43.7) | △ | — | — | — | — | — | △ | — | — | — | — | — |
| **9.2 Tool radius** | | | | | | | | | | | | |
| 9.2.1 Tool radius compensation | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ | — | — | — |
| 9.2.2 3-dimensional tool radius compensation | △ | — | — | △(*1) | — | — | △ | — | — | △(*1) | — | — |
| 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 | | | | | | | | | | | | |
| 99 sets | — | — | — | — | — | ○ | — | — | — | — | — | ○ |
| 128 sets | — | — | — | ○ | — | — | — | — | — | ○ | — | — |
| 200 sets | ○ | — | — | — | — | — | ○ | — | — | — | — | — |
| 256 sets | — | — | — | — | ○ | — | — | — | — | — | ○ | — |
| 400 sets | △ | ○ | ○ | △ | — | — | △ | ○ | ○ | △ | — | — |
| 999 sets | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| 9.3.2 Offset memory | | | | | | | | | | | | |
| 9.3.2.1 Tool shape/wear offset amount | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9.3.2.2 Compensation type selection by parameter | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ | — | — | — |
| 9.3.3 Number of tool offset sets allocation to part systems | ○ | — | — | ○ | ○ | ○ | ○ | — | — | ○ | ○ | ○ |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 10.1.12 Workpiece position offset for rotary axis | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| 10.1.13 Workpiece coordinate system shift | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 10.2.6 Tool exchange position return | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

(*1) For L system this function is available only while performing the program format switch function.

○Standard △Optional NC function that can be selected □Selection

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 11.2.7 Manual arbitrary reverse run (Program check operation) | — | — | — | — | — | — | △ | ○ | ○ | △ | ○ | ○ |
| 11.2.8 High-speed simple program check | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| **11.3 Program search/start/stop** | | | | | | | | | | | | |
| 11.3.1 Program search | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 11.3.2 Sequence number search | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 11.3.3 Collation and 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 Auto-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 | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 11.4.16 Machining interruption | — | — | — | — | — | — | — | — | — | — | — | — |

○Standard △Optional NC function that can be selected □Selection

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **12. Program support functions** | | | | | | | | | | | | |
| **12.1 Machining method support functions** | | | | | | | | | | | | |
| 12.1.1 Program | | | | | | | | | | | | |
| 12.1.1.1 Subprogram control [Layers] | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 |
| 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 [Layers] | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 |
| 12.1.2.2 Machine tool builder macro | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.2.3 Macro interruption | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.2.4 Variable command | | | | | | | | | | | | |
| 200 sets | — | — | — | — | — | — | — | — | — | — | — | — |
| 600 sets | — | — | — | — | — | ○ | — | — | — | — | — | ○ |
| 700 sets | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 8000 sets | △ | ○ | — | △ | ○ | — | △ | ○ | — | △ | ○ | — |
| (600+100×number of part systems) sets | ○ | ○ | — | ○ | ○ | — | ○ | ○ | — | ○ | ○ | — |
| (7900+100×number of part systems) sets | △ | ○ | — | △ | ○ | — | △ | ○ | — | △ | ○ | — |
| 12.1.2.5 Extended Common Variable | — | — | — | — | — | — | — | — | — | — | — | — |
| 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 | ○ | ○ | ○ | △ | — | — | ○ | ○ | ○ | △ | — | — |
| 12.1.3.8 Two-dimensional barcode engraving 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 | | | | | | | | | | | | |
| 12.1.8.3.1 Mixed control (cross axis control) | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |
| 12.1.8.3.2 Arbitrary axis exchange control | △ | ○ | — | △ | ○ | — | △ | ○ | — | △ | ○ | — |
| 12.1.8.4 Control axis superimposition | | | | | | | | | | | | |
| 12.1.8.4.1 Control axis superimposition | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |
| 12.1.8.4.2 Arbitrary axis superimposition control | — | — | — | △ | — | — | — | — | — | △ | — | — |
| 12.1.8.5 Control axis synchronization between part systems | — | — | — | △ | ○ | ○ | — | — | — | △ | ○ | ○ |
| 12.1.8.6 Balance cut | — | — | — | ○ | ○ | — | — | — | — | ○ | ○ | — |
| 12.1.8.7 Common memory for part systems | — | — | — | ○ | ○ | — | — | — | — | ○ | ○ | — |
| 12.1.8.8 Multi-part system simultaneous thread cutting | | | | | | | | | | | | |
| 12.1.8.8.1 Two-part system simultaneous thread cutting | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |
| 12.1.8.8.2 Multi-part system simultaneous thread cutting | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |
| 12.1.8.9 Multi-part system program management | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ |
| 12.1.8.10 Synchronization between part systems | | | | | | | | | | | | |
| 12.1.8.10.1 Single block between part systems | — | — | — | △ | ○ | ○ | — | — | — | △ | ○ | ○ |
| 12.1.8.10.2 Dwell/Miscellaneous function time override | — | — | — | △ | ○ | ○ | — | — | — | △ | ○ | ○ |
| 12.1.8.10.3 Synchronization between part systems OFF | △ | — | — | △ | ○ | ○ | — | — | — | △ | ○ | ○ |
| 12.1.8.11 Sub part system control I | — | — | — | — | — | — | △ | — | — | △ | ○ | ○ |
| 12.1.8.12 Sub part system control II | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| 12.1.9 Data input/output by program | | | | | | | | | | | | |
| 12.1.9.1 Parameter input by program | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.9.2 Compensation data input by program | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.9.3 Tool/Material shape input by program | ○A1 | ○ | ○ | ○A1 | ○ | ○ | ○A1 | ○ | ○ | ○A1 | ○ | ○ |
| 12.1.9.5 API section and sub-section Nos. input/output by program | ○A1 | ○ | ○ | ○A1 | ○ | ○ | ○A1 | ○ | ○ | ○A1 | ○ | ○ |
| 12.1.9.6 R-Navi data input by program | — | — | — | — | — | — | △ | ○ | — | — | — | — |
| 12.1.10 Machining modal | | | | | | | | | | | | |
| 12.1.10.1 Tapping mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.10.2 Cutting mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.11 High-speed parts machining | | | | | | | | | | | | |
| 12.1.11.1 Rapid traverse block overlap | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| **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 | | | | | | | | | | | | |
| 12.3.1.1 High-speed machining mode I (G05P1) maximum [kBPM] | △33.7 | ○33.7 | ○16.8 | △33.7 | ○33.7 | — | △33.7 | ○33.7 | ○16.8 | △33.7 | ○33.7 | — |
| 12.3.1.2 High-speed machining mode II (G05P2) maximum [kBPM] | △168 | ○101 | ○101 | △168 | ○67.5 | — | △168 | ○101 | ○101 | △168 | ○67.5 | — |
| 12.3.2 High-accuracy control | | | | | | | | | | | | |
| 12.3.2.1 High-accuracy control (G61.1/G08) | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 12.3.2.2 Multi-part system simultaneous high-accuracy control | △ | ○ | — | △ | — | — | △ | ○ | — | △ | — | — |
| 12.3.2.3 SSS control | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 12.3.2.4 Tolerance control | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 12.3.2.5 Variable-acceleration pre-interpolation acceleration/deceleration | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 12.3.2.6 High-accuracy acceleration/deceleration time constant extension | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 12.3.2.7 Axis-specific acceleration tolerance control | △ | — | — | △ | — | — | △ | — | — | △ | — | — |
| 12.3.3 High-speed high-accuracy control | | | | | | | | | | | | |
| 12.3.3.1 High-speed high-accuracy control I (G05.1Q1) maximum [kBPM] | △67.5 | ○33.7 | ○33.7 | △67.5 | ○33.7 | — | △67.5 | ○33.7 | ○33.7 | △67.5 | ○33.7 | — |
| 12.3.3.2 High-speed high-accuracy control II (G05P10000) maximum [kBPM] | △168 | ○101 | ○101 | △168 | ○67.5 | — | △168 | ○101 | ○101 | △168 | ○67.5 | — |
| 12.3.3.3 High-speed high-accuracy control III (G05P20000) maximum [kBPM] | △540 | ○202 | — | — | — | — | △540 | ○202 | — | — | — | — |
| 12.3.3.4 Smooth fairing | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| 12.3.4 Machining condition selection I | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 12.3.5 Direct command mode | — | — | — | △ | — | — | — | — | — | △ | — | — |
| **12.4 Programming support functions** | | | | | | | | | | | | |
| 12.4.1 Playback | — | — | — | — | — | — | ○ | ○ | ○ | △ | — | — |
| 12.4.3 Interactive cycle insertion | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 12.4.4 Simple programming (NAVI MILL/LATHE) | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 12.4.5 G code guidance | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.4.7 DXF data input | △ | ○ | — | △ | ○ | — | △ | ○ | — | △ | ○ | — |
| **13. Machine accuracy compensation** | | | | | | | | | | | | |
| **13.1 Static accuracy compensation** | | | | | | | | | | | | |
| 13.1.1 Backlash compensation | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 13.1.2 Memory-type pitch error compensation [sets] | ○32 | ○16 | ○16 | ○32 | ○16 | ○16 | ○32 | ○16 | ○16 | ○32 | ○16 | ○16 |
| 13.1.3 Memory-type relative position error compensation | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 13.1.4 External machine coordinate system compensation | — | — | — | — | — | — | △ | ○ | ○ | △ | ○ | ○ |
| 13.1.5 Circular radius error compensation | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 13.1.6 Ball screw thermal expansion compensation | — | — | — | — | — | — | △ | ○ | ○ | △ | ○ | ○ |
| 13.1.7 Rotation center error compensation | — | — | — | — | — | — | △ | ○ | — | △ | — | — |
| 13.1.8 Position-dependent gradually increasing-type backlash compensation | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 13.1.9 Bidirectional pitch error compensation | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 13.1.10 Cyclic error compensation | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ | △ | ○ | ○ |
| 13.1.11 Spatial error compensation | — | — | — | — | — | — | △ | — | — | — | — | — |
| 13.1.12 Backlash compensation II | △ | ○ | ○ | — | — | — | △ | ○ | ○ | — | — | — |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **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 | | | | | | | | | | | | |
| 99 sets | — | — | — | — | — | — | — | — | — | — | — | ○ |
| 128 sets | — | — | — | — | — | — | — | — | — | ○ | — | — |
| 200 sets | — | — | — | — | — | — | ○ | ○ | ○ | — | — | — |
| 256 sets | — | — | — | — | — | — | — | — | — | — | ○ | — |
| 400 sets | — | — | — | — | — | — | △ | — | — | △ | — | — |
| 999 sets | — | — | — | — | — | — | △ | — | — | △ | — | — |
| 14.2.3 Tool life management set allocation to part systems | — | — | — | — | — | — | ○ | — | — | ○ | ○ | ○ |
| **14.3 Others** | | | | | | | | | | | | |
| 14.3.7 Direct robot control | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **15.3 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 | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.7 Interference check III | — | — | — | — | — | — | △ | — | — | △ | — | — |
| 15.3.10 Parameter lock | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.11 Program protection (Edit lock B, C) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.12 Program display lock | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.13 Data protection by user's level | △A1 | ○ | ○ | △A1 | ○ | ○ | △A1 | ○ | ○ | △A1 | ○ | ○ |
| 15.3.17 Interference check between part systems | — | — | — | — | — | — | — | — | — | ○ | ○ | — |
| **15.4 Maintenance and troubleshooting** | | | | | | | | | | | | |
| 15.4.1 Operation history | ○(*2) | ○(*2) | ○(*2) | ○(*2) | ○(*2) | ○(*2) | ○(*2) | ○(*2) | ○(*2) | ○(*2) | ○(*2) | ○(*2) |
| 15.4.3 NC data backup | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.4.5 Automatic backup | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.4.10 NC Configurator2 | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |

(*2) The key history is not recorded.

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **15.5 Functional safety** | * Only displaying and changing parameters are available for NCTrainer2/NC Trainer2 plus. The safety observation/smart safety observation function itself does not work. | | | | | | | | | | | |
| 15.5.1 Safety observation | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2 Smart Safety observation | | | | | | | | | | | | |
| 15.5.2.1 Safety-related I/O observation | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.2 Emergency stop observation | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.3 Drive safety function | | | | | | | | | | | | |
| 15.5.2.3.1 SLS (Safely-Limited Speed) | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.3.2 SLP (Safely-Limited Position) | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.3.3 SOS (Safe Operating Stop) | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.3.4 SSM (Safe Speed Monitor) | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.3.5 SBC/SBT (Safe Brake Control/Safe Brake Test) | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.3.6 SCA (Safe Cam) | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.3.7 SS1/SS2 (Safe Stop) | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| 15.5.2.3.8 STO (Safe Torque Off) | — | — | — | — | — | — | △ | △ | △ | △ | △ | △ |
| **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 | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.2.1.1 Index modification | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.2.1.2 Multi-program [number of programs] | — | — | — | — | — | — | ○120 | ○60 | ○60 | ○120 | ○60 | ○60 |
| 17.1.2.1.3 Multi-project [number of projects stored] | | | | | | | | | | | | |
| Number of PLC projects: 2 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | — | ○ |
| Number of PLC projects: 3 | — | — | — | — | — | — | △ | ○ | — | △ | ○ | — |
| Number of PLC projects: 6 | — | — | — | — | — | — | △ | — | — | △ | — | — |
| 17.1.2.1.4 Function block (FB) | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.2.1.5 Label programming | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.2.1.6 ST language | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.2.2 PLC exclusive instruction | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.2.3 Enhanced PLC Security Mode | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 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 Memory switch (PLC switch) 32 points | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.3.3.2 Memory switch (PLC switch) 64 points | — | — | — | — | — | — | △ | ○ | ○ | △ | ○ | ○ |
| 17.1.3.3.3 Memory switch (PLC switch) 96 points | — | — | — | — | — | — | △ | — | — | △ | — | — |
| 17.1.3.4 Load meter display | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.3.5 User PLC version display | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.3.6 Ladder program writing during RUN | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.3.7 PLC program protection | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.4 Built-in PLC capacity | | | | | | | | | | | | |
| 17.1.4.1 Standard PLC capacity [number of steps] | ○ 128K | ○ 64K | ○ 32K | ○ 128K | ○ 64K | ○ 32K | ○ 128K | ○ 64K | ○ 32K | ○ 128K | ○ 64K | ○ 32K |
| 17.1.4.2 Large PLC capacity: 256K steps | — | — | — | — | — | — | △ | — | — | △ | — | — |
| 17.1.4.3 Large PLC capacity: 512K steps | — | — | — | — | — | — | △ | — | — | △ | — | — |
| 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) | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.7.3 MELSEC development tool (GX Works2) | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.8 PLC parameter | | | | | | | | | | | | |
| 17.1.8.1 PLC constant (150 points) | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.8.2 PLC constant extension (Up to 750 points) | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.9 GOT connection | | | | | | | | | | | | |
| 17.1.9.1 Ethernet connection | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.10 Pallet program registration | — | — | — | — | — | — | △ | — | — | — | — | — |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | NC Trainer2 plus | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | L system | | | M system | | | L system | | |
| | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B | M830V | M80V Type A | M80V Type B |
| **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 |
| 17.2.7 Index table indexing | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.2.8 Tool length compensation along the tool axis | — | — | — | — | — | — | △ | — | — | △(*1) | — | — |
| 17.2.9 Tool handle feed & interruption | — | — | — | — | — | — | △ | — | — | — | — | — |
| 17.2.12 Inclined surface machining command | — | — | — | — | — | — | △ | ○ | — | △ | ○ | — |
| 17.2.13 Simple inclined surface machining command | — | — | — | △ | ○ | ○ | — | — | — | △ | ○ | ○ |
| 17.2.16 3-dimensional manual feed | — | — | — | — | — | — | △ | ○ | — | △ | ○ | — |
| 17.2.17 R-Navi | — | — | — | — | — | — | △ | ○ | — | — | — | — |
| 17.2.18 Simple synchronous control | — | — | — | — | — | — | △ | ○ | — | — | — | — |
| 17.2.23 Multiple-axis synchronization control | — | — | — | — | — | — | △ | ○ | ○ | — | — | — |
| **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 | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.3.6 NC axis/PLC axis switchover | — | — | — | — | — | — | △ | ○ | ○ | △ | ○ | ○ |
| **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 | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.4.5 Direct Screen Selection | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| **17.7 Installing S/W for machine tools** | | | | | | | | | | | | |
| 17.7.1 Customization(NC Designer2) | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.7.1.1 Customization data storage capacity [MB] | — | — | — | — | — | — | 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 working memory size [MB] | — | — | — | — | — | — | 6 | 6 | 6 | 6 | 6 | 6 |
| 17.7.3 EZSocket I/F | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.7.4 APLC release | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.7.5 Custom API library | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.7.6 MES interface library | — | — | — | — | — | — | △ | ○ | ○ | △ | ○ | ○ |
| 17.7.7 SLMP Server | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| **17.8 Others** | | | | | | | | | | | | |
| 17.8.3 Automatic operation lock | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.8.8 Laser Processing Control | ○(*2) | ○(*2) | ○(*2) | — | — | — | ○(*2) | ○(*2) | ○(*2) | — | — | — |

(*1) For L system this function is available only while performing the program format switch function.

(*2) A project can be operated by using the parameters that enable laser processing control. However, laser processing control will not be operated.

# Appendix 1.2 M830/M80/E80/C80 Specifications List

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **1. Control axes** | | | | | | | | | | | | | | | | | | | | | | |
| **1.1 Control axes** | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.1 Number of basic control axes (NC axes) | ○3 | ○3 | ○3 | ○ 3 | ○ 3 | ○2 | ○2 | ○2 | ○ 2 | ○ 2 | ○3 | ○3 | ○3 | ○ 3 | ○ 3 | ○ 3 | ○2 | ○2 | ○2 | ○ 2 | ○ 2 | ○ 2 |
| 1.1.2 Max. number of axes (NC axes + Spindles + PLC axes) | 12 | 10 | 6 | 5 | 4 | 24 | 12 | 9 | 7 | 6 | ○32 | 11 | 9 | 6 | 4 | 16 | ○32 | 12 | 9 | 8 | 6 | 16 |
| 1.1.2.1 Max. number of NC axes (in total for all the part systems) | 8 | 8 | 4 | 4 | 3 | ○16 | 8 | 7 | 4 | 4 | ○16 | 8 | 5 | 5 (*1) | 3 | 16 | ○32 | 10 | 7 | 5 | 4 | 16 |
| 1.1.2.2 Max. number of spindles | 4 | 2 | 2 | 1 | 1 | 8 | 5 | 4 | 3 | 3 | 4 | 2 | 2 | 1 | 1 | 7 | 8 | 5 | 4 | 3 | 3 | 7 |
| 1.1.2.3 Max. number of PLC axes | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 6 | 6 | 2 | 0 | 8 | 8 | 6 | 6 | 3 | 3 | 8 |
| 1.1.4 Max. number of PLC indexing axes | — | — | — | — | — | — | — | — | — | — | 8 | 4 | 4 | 1 | 0 | 8 | 8 | 4 | 4 | 1 | 1 | 8 |
| 1.1.5 Number of simultaneous contouring control axes | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| 1.1.6 Max. number of NC axes in a part system | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 12 | 8 | 5 | 5 (*1) | 3 | 8 | 12 | 8 | 5 | 5 | 4 | 8 |
| 1.1.7 Axis name extension | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | — | — | ○ | ○ | ○ | ○ | — | — | ○ |
| **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 | 1 | 1 | 1 | 1 | 1 |
| 1.2.2 Max. number of part systems (main + sub) | ○3(*2) | ○2 | ○1 | ○1 | ○1 | ○4 | ○4 | ○2 | ○1 | ○1 | ○3(*2) | ○2 | ○1 | ○1 | ○1 | ○7 | ○8 | ○4 | ○2 | ○1 | ○1 | ○7 |
| 1.2.2.1 Max. number of main part systems | ○2 | ○2 | ○1 | ○1 | ○1 | ○4 | ○2 | ○2 | ○1 | ○1 | ○2 | ○2 | ○1 | ○1 | ○1 | ○7 | ○8 | ○2 | ○2 | ○1 | ○1 | ○7 |
| 1.2.2.2 Max. number of sub part systems | — | — | — | — | — | ○4 | ○2 | ○1 | — | — | ○2 | — | — | — | — | — | ○8 | ○2 | ○1 | — | — | ○2 |
| **1.3 Control axes and operation modes** | | | | | | | | | | | | | | | | | | | | | | |
| 1.3.2 Memory mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 1.3.3 MDI mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 1.3.4 High-speed program server mode | | | | | | | | | | | | | | | | | | | | | | |
| 1.3.4.2 Display unit-side High-speed program server mode | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 1.3.5 Front-side SD card mode | — | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | — | — | ○ | ○ | ○ | ○ | — |
| **2. Input command** | | | | | | | | | | | | | | | | | | | | | | |
| **2.1 Data increment** | | | | | | | | | | | | | | | | | | | | | | |
| 2.1.1 Least command increment | | | | | | | | | | | | | | | | | | | | | | |
| Least command increment 1μm | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Least command increment 0.1μm | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Least command increment 0.01μm(10nm) | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| Least command increment 0.001μm(1nm) | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 2.1.2 Least control increment | | | | | | | | | | | | | | | | | | | | | | |
| Least control increment 0.01μm(10nm) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 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 (G Code List 2, 3) | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.3.1.2 Format 2 for Lathe (G Code List 4, 5) | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.3.1.3 Special format for lathe (G Code List 6, 7) | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 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 | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.3.2 Program format switch | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — |
| **2.4 Command value** | | | | | | | | | | | | | | | | | | | | | | |
| 2.4.1 Decimal point input I, II | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.4.2 Absolute/Incremental command | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.4.3 Diameter/Radius designation | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.4.4 Diameter/Radius designation switch | ○ | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| **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** | | | | | | | | | | | | | | | | | | | | | | |
| 3.3.1 Involute interpolation | △ | ○ | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | — |
| 3.3.2 Exponential interpolation | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 3.3.3 Spline interpolation (G05.1Q2/G61.2) | △ | ○ | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ | — | — | — | — | — | — |
| 3.3.4 NURBS interpolation | △ | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | — |
| 3.3.5 3-dimensional circular interpolation | △ | ○ | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | — |
| 3.3.6 Spline interpolation2 (G61.4) | △ | ○ | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ | — | — | — | — | — | — |

(*1) Up to one rotary axis

(*2) The 3rd part system is a loader-dedicated part system.

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **4. Feed** | | | | | | | | | | | | | | | | | | | | | | |
| **4.1 Feedrate** | | | | | | | | | | | | | | | | | | | | | | |
| 4.1.1 Rapid traverse rate (m/min) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 4.1.2 Cutting feedrate (m/min) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| 4.1.3 Manual feedrate (m/min) | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 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 Feedrate input methods** | | | | | | | | | | | | | | | | | | | | | | |
| 4.2.1 Feed per minute (Asynchronous feed) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.2.2 Feed per revolution (Synchronous feed) | △ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.2.3 Inverse time feed | △ | ○ | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ | — | — | — | — | — | — |
| 4.2.4 F 1-digit feed | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.2.5 Manual speed command | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | ○ | — | △ | △ | ○ | ○ | ○ | ○ | △ |
| 4.2.7 G00 feedrate designation (,F command) | △ | ○ | — | — | — | △ | ○ | — | — | — | △ | ○ | — | — | — | △ | △ | ○ | — | — | — | △ |
| 4.2.8 Selection of axis (axes) for feedrate 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-gradient acceleration/deceleration | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.4.3 Rapid traverse constant-gradient multi-step acceleration/deceleration | △ | ○ | ○ | — | — | — | — | — | — | — | △ | ○ | ○ | — | — | △ | — | — | — | — | — | — |
| **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 | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | △ | △ | ○ | ○ | ○ | ○ | △ |
| 4.5.3.4 Synchronous tapping with multiple spindles | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ |
| 4.5.4 Chamfering | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.5.6 Circular thread cutting | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — |
| 4.5.10 Thread recutting | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ |
| 4.5.11 Thread cutting override | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ |
| 4.5.12 Variable feed thread cutting | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ |
| 4.5.13 Thread cutting time constant switch | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| **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 feedrate B | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.6.6 Manual feedrate B surface speed control | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | — |
| 4.6.8 Manual speed clamp | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **4.7 Dwell** | | | | | | | | | | | | | | | | | | | | | | |
| 4.7.1 Dwell (Time-based designation) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 4.7.2 Dwell (Revolution-based designation) | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| **5. Program memory/editing** | | | | | | | | | | | | | | | | | | | | | | |
| **5.1 Memory capacity** | | | | | | | | | | | | | | | | | | | | | | |
| 5.1.1 Memory capacity (number of programs stored) | | | | | | | | | | | | | | | | | | | | | | |
| 230kB[600m] (400 programs) | — | — | — | — | — | — | — | — | ○ | ○ | — | — | — | — | — | — | — | — | — | ○ | ○ | — |
| 500kB[1280m] (1000 programs) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | — | ○ |
| 1000kB[2560m] (1000 programs) | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | △ | △ | — | — | — | — | △ |
| 2000kB[5120m] (1000 programs) | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | △ | △ | — | — | — | — | △ |
| **5.2 Editing** | | | | | | | | | | | | | | | | | | | | | | |
| 5.2.1 Program editing | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5.2.2 Background editing | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5.2.3 Buffer correction | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 5.2.5 Multi-part system simultaneous program editing | ○ | — | — | — | — | ○ | ○ | ○ | — | — | ○ | — | — | — | — | — | ○ | ○ | ○ | — | — | ○ |
| 5.2.6 Special program editing display for synchronization between part systems | △ | ○ | — | — | — | △ | ○ | ○ | — | — | △ | ○ | — | — | — | — | △ | ○ | ○ | — | — | △ |
| 5.2.7 Finish shape view programming | △ | ○ | ○ | — | — | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | — | — | — | △ | ○ | ○ | ○ | ○ | — |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **6. Operation and display** | | | | | | | | | | | | | | | | | | | | | | |
| **6.2 Operation methods and functions** | | | | | | | | | | | | | | | | | | | | | | |
| 6.2.1 Operation input | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.2 Absolute/Incremental 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 Parameter guidance | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.11 Alarm guidance | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.12 Machining program input mistake check warning | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 6.2.15 User selectable menu configuration | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.17 Device open parameter | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 6.2.18 SRAM open parameter | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 6.2.19 MTB selectable menu configuration | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **6.3 Display methods and contents** | | | | | | | | | | | | | | | | | | | | | | |
| 6.3.1 Status display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.2 Clock display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.3 Monitor screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.4 Setup screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.5 Edit screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.6 Diagnosis screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.7 Maintenance screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.9 Home screen | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 6.3.10 Additional languages | | | | | | | | | | | | | | | | | | | | | | |
| 6.3.10.1 Japanese | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.2 English | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.3 German | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.4 Italian | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.5 French | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.6 Spanish | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.7 Chinese | | | | | | | | | | | | | | | | | | | | | | |
| 6.3.10.7.1 Chinese (Traditional Chinese characters) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.7.2 Chinese (Simplified Chinese characters) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.8 Korean | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.9 Portuguese | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.10 Hungarian | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.11 Dutch | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.12 Swedish | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.13 Turkish | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.14 Polish | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.15 Russian | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.16 Czech | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.10.17 Indonesian | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **8. Spindle, Tool and Miscellaneous functions** | | | | | | | | | | | | | | | | | | | | | | |
| **8.1 Spindle functions (S)** | | | | | | | | | | | | | | | | | | | | | | |
| 8.1.1 Spindle control functions | | | | | | | | | | | | | | | | | | | | | | |
| 8.1.1.3 Coil switch | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8.1.1.6 Spindle-mode servo motor control | △ | ○ | ○ | — | — | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | — | — | △ | △ | ○ | ○ | ○ | ○ | △ |
| 8.1.1.7 Spindle-mode rotary axis control | — | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | — |
| 8.1.1.8 Turret gear change control | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | ○ | — | — |
| 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) | | | | | | | | | | | | | | | | | | | | | | |
| 8.1.7.1 Spindle position control (Spindle/C axis control) | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8.1.7.2 C axis control during Spindle synchronization | △ | — | — | — | — | △ | ○ | ○ | — | — | △ | — | — | — | — | △ | △ | ○ | ○ | — | — | △ |
| 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8.1.14 Spindle superimposition control | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | △ |
| 8.1.15 Multiple spindle synchronization set control | — | — | — | — | — | ○ | ○ | ○ | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | — | — | ○ |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 8.4.2 2nd miscellaneous function name extension | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **9. Tool compensation** | | | | | | | | | | | | | | | | | | | | | | |
| **9.1 Tool length/Tool position** | | | | | | | | | | | | | | | | | | | | | | |
| 9.1.1 Tool length offset | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9.1.2 Tool position offset | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — |
| 9.1.3 Tool compensation for additional axes | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| 9.1.4 Tool position compensation (G43.7) | △ | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | — |
| **9.2 Tool radius** | | | | | | | | | | | | | | | | | | | | | | |
| 9.2.1 Tool radius compensation | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — |
| 9.2.2 3-dimensional tool radius compensation | △ | — | — | — | — | △(*3) | — | — | — | — | △ | — | — | — | — | — | △(*3) | — | — | — | — | — |
| 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 | | | | | | | | | | | | | | | | | | | | | | |
| 99 sets | — | — | — | — | ○ | — | — | ○ | ○ | ○ | — | — | — | — | ○ | — | — | — | ○ | ○ | ○ | — |
| 128 sets | — | — | — | — | — | ○ | — | — | — | — | — | — | — | — | — | — | ○ | — | — | — | — | ○ |
| 200 sets | ○ | — | — | ○ | — | — | — | — | — | — | ○ | — | — | ○ | — | ○ | — | — | — | — | — | — |
| 256 sets | — | — | — | — | — | — | ○ | — | — | — | — | — | — | — | — | — | — | ○ | — | — | — | △ |
| 400 sets | △ | ○ | ○ | — | — | △ | — | — | — | — | △ | ○ | ○ | — | — | △ | △ | — | — | — | — | — |
| 999 sets | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 9.3.2 Offset memory | | | | | | | | | | | | | | | | | | | | | | |
| 9.3.2.1 Tool shape/wear offset amount | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 9.3.2.2 Compensation type selection by parameter | ○ | ○ | ○ | — | — | — | — | — | — | — | ○ | ○ | ○ | — | — | — | — | — | — | — | — | — |
| 9.3.3 Number of tool offset sets allocation to part systems | ○ | — | — | — | — | ○ | ○ | ○ | — | — | ○ | — | — | — | — | — | ○ | ○ | ○ | — | — | — |

(*3) For L system this function is available only while performing the program format switch function.

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
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| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 10.1.12 Workpiece position offset for rotary axis | △ | ○ | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | — |
| 10.1.13 Workpiece coordinate system shift | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 10.2.6 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 11.2.7 Manual arbitrary reverse run (Program check operation) | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | — | — | △ | △ | ○ | ○ | ○ | ○ | △ |
| 11.2.8 High-speed simple program check | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **11.3 Program search/start/stop** | | | | | | | | | | | | | | | | | | | | | | |
| 11.3.1 Program search | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 11.3.2 Sequence number search | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 11.3.3 Collation and 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 Auto-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 | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 11.4.16 Machining interruption | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **12. Program support functions** | | | | | | | | | | | | | | | | | | | | | | |
| **12.1 Machining method support functions** | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.1 Program | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.1.1 Subprogram control [Layers] | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○10 | ○8 | ○10 | ○10 | ○10 | ○10 | ○10 | ○8 |
| 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 [Layers] | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 | ○4 |
| 12.1.2.2 Machine tool builder macro | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.2.3 Macro interruption | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.2.4 Variable command | | | | | | | | | | | | | | | | | | | | | | |
| 200 sets | — | — | — | — | ○ | — | — | — | — | ○ | — | — | — | — | ○ | — | — | — | — | — | ○ | — |
| 600 sets | — | — | — | ○ | — | — | — | ○ | ○ | — | — | — | — | ○ | — | — | — | — | ○ | ○ | — | — |
| 700 sets | ○ | ○ | ○ | — | — | ○ | ○ | — | — | — | ○ | ○ | ○ | — | — | ○ | ○ | ○ | — | — | — | ○ |
| 8000 sets | △ | ○ | — | — | — | △ | ○ | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| (600+100×number of part systems) sets | ○ | ○ | — | — | — | ○ | ○ | — | — | — | ○ | ○ | — | — | — | ○ | ○ | ○ | — | — | — | ○ |
| (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 | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.8.3.1 Mixed control (cross axis control) | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ |
| 12.1.8.3.2 Arbitrary axis exchange control | △ | ○ | — | — | — | △ | ○ | — | — | — | △ | ○ | — | — | — | △ | △ | ○ | — | — | — | △ |
| 12.1.8.4 Control axis superimposition | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.8.4.1 Control axis superimposition | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — |
| 12.1.8.4.2 Arbitrary axis superimposition control | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — |
| 12.1.8.5 Control axis synchronization between part systems | — | — | — | — | — | △ | ○ | ○ | — | — | — | — | — | — | — | — | △ | ○ | ○ | — | — | △ |
| 12.1.8.6 Balance cut | — | — | — | — | — | ○ | ○ | — | — | — | — | — | — | — | — | — | ○ | ○ | — | — | — | ○ |
| 12.1.8.7 Common memory for part systems | — | — | — | — | — | ○ | ○ | — | — | — | — | — | — | — | — | — | ○ | ○ | — | — | — | ○ |
| 12.1.8.8 Multi-part system simultaneous thread cutting | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.8.8.1 Two-part system simultaneous thread cutting | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | ○ |
| 12.1.8.8.2 Multi-part system simultaneous thread cutting | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — |
| 12.1.8.9 Multi-part system program management | ○ | ○ | — | — | — | ○ | ○ | ○ | — | — | ○ | ○ | — | — | — | ○ | ○ | ○ | ○ | — | — | ○ |
| 12.1.8.10 Synchronization between part systems | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.8.10.1 Single block between part systems | — | — | — | — | — | △ | ○ | ○ | — | — | — | — | — | — | — | — | △ | ○ | ○ | — | — | △ |
| 12.1.8.10.2 Dwell/Miscellaneous function time override | — | — | — | — | — | △ | ○ | ○ | — | — | — | — | — | — | — | — | △ | ○ | ○ | — | — | △ |
| 12.1.8.10.3 Synchronization between part systems OFF | △ | — | — | — | — | △ | ○ | ○ | — | — | — | — | — | — | — | — | △ | ○ | ○ | — | — | △ |
| 12.1.8.11 Sub part system control I | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | ○ | ○ | — | — | △ |
| 12.1.8.12 Sub part system control II | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ |
| 12.1.8.13 Loader Control Part System | ○ | — | — | — | — | — | — | — | — | — | ○ | — | — | — | — | — | — | — | — | — | — | — |
| 12.1.9 Data input/output by program | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.9.1 Parameter input by program | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.9.2 Compensation data input by program | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.9.3 Tool/Material shape input by program | ○A1 | ○ | ○ | ○ | ○ | ○A1 | ○ | ○ | ○ | ○ | ○A1 | ○ | ○ | ○ | ○ | ○ | ○A1 | ○ | ○ | ○ | ○ | ○ |
| 12.1.9.5 API section and sub-section Nos. input/output by program | ○A1 | ○ | ○ | ○ | ○ | ○A1 | ○ | ○ | ○ | ○ | ○A1 | ○ | ○ | ○ | ○ | ○ | ○A1 | ○ | ○ | ○ | ○ | ○ |
| 12.1.9.6 R-Navi data input by program | — | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | — |
| 12.1.10 Machining modal | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.10.1 Tapping mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.10.2 Cutting mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.1.11 High-speed parts machining | | | | | | | | | | | | | | | | | | | | | | |
| 12.1.11.1 Rapid traverse block overlap | △ | ○ | ○ | — | — | △ | ○ | ○ | — | — | △ | ○ | ○ | — | — | △ | △ | ○ | ○ | — | — | △ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **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 | | | | | | | | | | | | | | | | | | | | | | |
| 12.3.1.1 High-speed machining mode I (G05P1) maximum [kBPM] | △33.7 | ○33.7 | ○16.8 | — | — | △33.7 | ○33.7 | — | — | — | △33.7 | ○33.7 | ○16.8 | — | — | △33.7 | △33.7 | ○33.7 | — | — | — | △33.7 |
| 12.3.1.2 High-speed machining mode II (G05P2) maximum [kBPM] | △168 | ○67.5 | ○67.5 | — | — | △168 | ○67.5 | — | — | — | △168 | ○67.5 | ○67.5 | — | — | △67.5 | △168 | ○67.5 | — | — | — | △67.5 |
| 12.3.2 High-accuracy control | | | | | | | | | | | | | | | | | | | | | | |
| 12.3.2.1 High-accuracy control (G61.1/G08) | △ | ○ | ○ | ○ | — | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | — | △ | △ | ○ | ○ | ○ | ○ | △ |
| 12.3.2.2 Multi-part system simultaneous high-accuracy control | △ | ○ | — | — | — | △ | — | — | — | — | △ | ○ | — | — | — | △ | △ | — | — | — | — | — |
| 12.3.2.3 SSS control | △ | ○ | ○ | — (*4) | — | △ | ○ | ○ | — (*4) | — (*4) | △ | ○ | ○ | — (*4) | — | △ | △ | ○ | ○ | — (*4) | — (*4) | — |
| 12.3.2.4 Tolerance control | △ | ○ | ○ | ○ | — | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | — | △ | △ | ○ | ○ | ○ | ○ | — |
| 12.3.2.5 Variable-acceleration pre-interpolation acceleration/deceleration | △ | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | — |
| 12.3.2.6 High-accuracy acceleration/deceleration time constant extension | △ | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | — |
| 12.3.2.7 Axis-specific acceleration tolerance control | △ | — | — | — | — | △ | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 12.3.3 High-speed high-accuracy control | | | | | | | | | | | | | | | | | | | | | | |
| 12.3.3.1 High-speed high-accuracy control I (G05.1Q1) maximum [kBPM] | △67.5 | ○33.7 | ○33.7 | — | — | △67.5 | ○33.7 | — | — | — | △67.5 | ○33.7 | ○33.7 | — | — | △33.7 | △67.5 | ○33.7 | — | — | — | △33.7 |
| 12.3.3.2 High-speed high-accuracy control II (G05P10000) maximum [kBPM] | △168 | ○67.5 | ○67.5 | — | — | △168 | ○67.5 | — | — | — | △168 | ○67.5 | ○67.5 | — | — | △67.5 | △168 | ○67.5 | — | — | — | △67.5 |
| 12.3.3.3 High-speed high-accuracy control III (G05P20000) maximum [kBPM] | △270 | ○135 | — | — | — | — | — | — | — | — | △270 | ○135 | — | — | — | △135 | — | — | — | — | — | — |
| 12.3.3.4 Smooth fairing | △ | ○ | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ | — | — | — | — | — | — |
| 12.3.4 Machining condition selection I | ○ | ○ | ○ | ○ | — | ○ | ○ | — | — | — | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | — | — | — | ○ |
| 12.3.5 Direct command mode | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — |
| **12.4 Programming support functions** | | | | | | | | | | | | | | | | | | | | | | |
| 12.4.1 Playback | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | — | ○ | △ | — | — | — | — | — |
| 12.4.3 Interactive cycle insertion | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | — | △ | ○ | ○ | ○ | ○ | — |
| 12.4.4 Simple programming (NAVI MILL/LATHE) | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | ○ | ○ | — | △ | ○ | ○ | ○ | ○ | — |
| 12.4.5 G code guidance | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 12.4.7 DXF data input | △ | ○ | — | — | — | △ | ○ | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| **13. Machine accuracy compensation** | | | | | | | | | | | | | | | | | | | | | | |
| **13.1 Static accuracy compensation** | | | | | | | | | | | | | | | | | | | | | | |
| 13.1.1 Backlash compensation | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 13.1.2 Memory-type pitch error compensation [sets] | ○32 | ○16 | ○16 | ○16 | ○16 | ○32 | ○16 | ○16 | ○16 | ○16 | ○32 | ○16 | ○16 | ○16 | ○16 | ○10 | ○32 | ○16 | ○16 | ○16 | ○16 | ○10 |
| 13.1.3 Memory-type relative position error compensation | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 13.1.4 External machine coordinate system compensation | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | ○ | ○ | △ | △ | ○ | ○ | ○ | ○ | △ |
| 13.1.5 Circular radius error compensation | △ | ○ | ○ | — | — | △ | ○ | ○ | — | — | △ | ○ | ○ | — | — | △ | △ | ○ | ○ | — | — | △ |
| 13.1.6 Ball screw thermal expansion compensation | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | ○ | ○ | △ | △ | ○ | ○ | ○ | ○ | △ |
| 13.1.7 Rotation center error compensation | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 13.1.8 Position-dependent gradually increasing-type backlash compensation | △ | ○ | ○ | ○ | ○ | △ | ○ | ○ | — | — | △ | ○ | ○ | ○ | ○ | △ | △ | ○ | ○ | — | — | △ |
| 13.1.9 Bidirectional pitch error compensation | △ | ○ | ○ | — | — | △ | ○ | ○ | — | — | △ | ○ | ○ | — | — | △ | △ | ○ | ○ | — | — | △ |
| 13.1.10 Cyclic error compensation | △ | ○ | ○ | — | — | △ | ○ | ○ | — | — | △ | ○ | ○ | — | — | — | △ | ○ | ○ | — | — | — |
| 13.1.11 Spatial error compensation | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | — |
| 13.1.12 Backlash compensation II | △ | ○ | ○ | ○ | ○ | — | — | — | — | — | △ | ○ | ○ | ○ | ○ | — | — | — | — | — | — | — |
| **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 | | | | | | | | | | | | | | | | | | | | | | |
| 99 sets | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | — |
| 128 sets | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ○ | — | — | — | — | ○ |
| 200 sets | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | — | — | — | — | — | — |
| 256 sets | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ○ | — | — | — | △ |
| 400 sets | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 999 sets | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 14.2.3 Tool life management set allocation to part systems | — | — | — | — | — | — | — | — | — | — | ○ | — | — | — | — | — | ○ | ○ | ○ | — | — | ○ |
| **14.3 Others** | | | | | | | | | | | | | | | | | | | | | | |
| 14.3.7 Direct robot control | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |

(*4) eSSS supported

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **15.3 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 | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.7 Interference check III | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 15.3.10 Parameter lock | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.11 Program protection (Edit lock B, C) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.12 Program display lock | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.13 Data protection by user's level | △A1 | ○ | ○ | ○ | ○ | △A1 | ○ | ○ | ○ | ○ | △A1 | ○ | ○ | ○ | ○ | △ | △A1 | ○ | ○ | ○ | ○ | △ |
| 15.3.17 Interference check between part systems | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ○ | ○ | — | — | — | — |
| **15.4 Maintenance and troubleshooting** | | | | | | | | | | | | | | | | | | | | | | |
| 15.4.1 Operation history | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○ | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○(*5) | ○ |
| 15.4.3 NC data backup | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.4.5 Automatic backup | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 15.4.10 NC Configurator2 | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **15.5 Functional safety** | *** Only displaying and changing parameters are available for NCTrainer2/NC Trainer2 plus. The safety observation/smart safety observation function itself does not work.** | | | | | | | | | | | | | | | | | | | | | |
| 15.5.1 Safety observation | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | — | △ | △ | △ | — | — | — |
| 15.5.2 Smart Safety observation | | | | | | | | | | | | | | | | | | | | | | |
| 15.5.2.1 Safety-related I/O observation | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.2 Emergency stop observation | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.3 Drive safety function | | | | | | | | | | | | | | | | | | | | | | |
| 15.5.2.3.1 SLS (Safely-Limited Speed) | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.3.2 SLP (Safely-Limited Position) | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.3.3 SOS (Safe Operating Stop) | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.3.4 SSM (Safe Speed Monitor) | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.3.5 SBC/SBT (Safe Brake Control/Safe Brake Test) | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.3.6 SCA (Safe Cam) | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.3.7 SS1/SS2 (Safe Stop) | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |
| 15.5.2.3.8 STO (Safe Torque Off) | — | — | — | — | — | — | — | — | — | — | △ | △ | △ | — | — | △ | △ | △ | △ | — | — | △ |

(*5) The key history is not recorded.

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **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 | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) |
| 17.1.2.1.1 Index modification | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) |
| 17.1.2.1.2 Multi-program [number of programs] | — | — | — | — | — | — | — | — | — | — | ○120 | ○60 | ○60 | ○60 | ○60 | △ (MELSEC) | ○120 | ○60 | ○60 | ○60 | ○60 | △ (MELSEC) |
| 17.1.2.1.3 Multi-project [number of projects stored] | | | | | | | | | | | | | | | | | | | | | | |
| Number of PLC projects: 2 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | — | ○ | — | ○ | ○ | ○ | — |
| Number of PLC projects: 3 | — | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — | △ | ○ | — | — | — | — |
| Number of PLC projects: 6 | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 17.1.2.1.4 Function block (FB) | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) |
| 17.1.2.1.5 Label programming | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) |
| 17.1.2.2 PLC exclusive instruction | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | — | — | △ (MELSEC) | ○ | ○ | ○ | — | — | △ (MELSEC) |
| 17.1.2.3 Enhanced PLC Security Mode | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 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 Memory switch (PLC switch) 32 points | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 17.1.3.3.2 Memory switch (PLC switch) 64 points | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | — | — | — | △ | ○ | ○ | — | — | — |
| 17.1.3.3.3 Memory switch (PLC switch) 96 points | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 17.1.3.4 Load meter display | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.3.5 User PLC version display | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.3.6 Ladder program writing during RUN | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) |
| 17.1.3.7 PLC program protection | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) |
| 17.1.4 Built-in PLC capacity | | | | | | | | | | | | | | | | | | | | | | |
| 17.1.4.1 Standard PLC capacity [number of steps] | ○ 128K | ○ 64K | ○ 32K | ○ 20000 | ○ 20000 | ○ 128K | ○ 64K | ○ 32K | ○ 20000 | ○ 20000 | ○ 128K | ○ 64K | ○ 32K | ○ 20000 | ○ 20000 | △ (MELSEC) | ○ 128K | ○ 64K | ○ 32K | ○ 20000 | ○ 20000 | △ (MELSEC) |
| 17.1.4.2 Large PLC capacity: 256K steps | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 17.1.4.3 Large PLC capacity: 512K steps | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △ | — | — | — | — | — |
| 17.1.5 Machine contact input/output I/F | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) | ○ | ○ | ○ | ○ | ○ | △ (MELSEC) |
| 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) | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 17.1.7.3 MELSEC development tool (GX Works2) | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 17.1.7.4 MELSEC development tool (GX Works3) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ○ | — | — | — | — | — | ○ |
| 17.1.8 PLC parameter | | | | | | | | | | | | | | | | | | | | | | |
| 17.1.8.1 PLC constant (150 points) | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.8.2 PLC constant extension (Up to 750 points) | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | — | — | — | ○ | ○ | ○ | — | — | — |
| 17.1.9 GOT connection | | | | | | | | | | | | | | | | | | | | | | |
| 17.1.9.1 Ethernet connection | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.10 Pallet program registration | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | — |
| **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 | ○24 | ○24 | ○ |
| 17.2.7 Index table indexing | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.2.8 Tool length compensation along the tool axis | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | △(*3) | — | — | — | — | — |
| 17.2.9 Tool handle feed & interruption | — | — | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — | — | — | — | — |
| 17.2.12 Inclined surface machining command | — | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ | △ | ○ | — | — | — | — |
| 17.2.16 3-dimensional manual feed | — | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | △ | △ | ○ | — | — | — | — |
| 17.2.17 R-Navi | — | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | — |
| 17.2.18 Simple synchronous control | — | — | — | — | — | — | — | — | — | — | △ | ○ | — | — | — | — | — | — | — | — | — | — |
| 17.2.23 Multiple-axis synchronization control | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | ○ | — | — | — | — | — | — | — | — |

(*3) For L system this function is available only while performing the program format switch function.

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | | | NC Trainer2 plus | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | | L system | | | | | M system | | | | | | L system | | | | | |
| | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 | M830 | M80 Type A | M80 Type B | E80 Type A | E80 Type B | C80 |
| **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 | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.3.6 NC axis/PLC axis switchover | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | — | — | △ | △ | ○ | ○ | — | — | △ |
| **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 | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.4.5 Direct Screen Selection | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **17.7 Installing S/W for machine tools** | | | | | | | | | | | | | | | | | | | | | | |
| 17.7.1 Customization(NC Designer2) | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 17.7.1.1 Customization data storage capacity [MB] | — | — | — | — | — | — | — | — | — | — | 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 | Depending on hard disk space | Depending on hard disk space | — |
| 17.7.1.2 Customization working memory size [MB] | — | — | — | — | — | — | — | — | — | — | 6 | 3 | 3 | 1 | 1 | — | 6 | 3 | 3 | 1 | 1 | — |
| 17.7.3 EZSocket I/F | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 17.7.4 APLC release | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.7.5 Custom API library | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 17.7.6 MES interface library | — | — | — | — | — | — | — | — | — | — | △ | ○ | ○ | ○ | ○ | — | △ | ○ | ○ | ○ | ○ | — |
| 17.7.7 SLMP Server | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | — | ○ | ○ | ○ | ○ | ○ | — |
| 17.7.10 GOT2000 screen design tool GT Works3 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ○ | — | — | — | — | — | ○ |
| **17.8 Others** | | | | | | | | | | | | | | | | | | | | | | |
| 17.8.3 Automatic operation lock | — | — | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

# Appendix 1.3 M700VW/M70V/E70 Specifications List

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | 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) | 12 | 6 | 10 | 4 | 16 | 7 | 11 | 6 | 16 | 9 | 11 | 6 | 16 | 9 | 11 | 7 |
| 1.1.2.1 Max. number of NC axes (in total for all the part systems) | 8 | 4 | 8 | 3 | 16 | 4 | 8 | 4 | 16 | 5 | 8 | 3 | 16 | 5 | 9 | 4 |
| 1.1.2.2 Max. number of spindles | 4 | 2 | 2 | 1 | 6 | 3 | 4 | 2 | 4 | 2 | 2 | 1 | 6 | 3 | 4 | 2 |
| 1.1.2.3 Max. number of PLC axes 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 6 | 6 | 2 | 6 | 6 | 6 | 3 |
| 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 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 |
| 1.1.6 Max. number of NC axes in a part system | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 8 | 5 | 8 | 3 | 8 | 5 | 8 | 4 |
| **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 | ○2 | ○1 | ○2 | ○1 | ○4 | ○1 | ○2 | ○1 | ○2 | ○1 | ○2 | ○1 | ○4 | ○1 | ○2 | ○1 |
| **1.3 Control axes and operation modes** | | | | | | | | | | | | | | | | |
| 1.3.2 Memory mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 1.3.3 MDI mode | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 1.3.4 High-speed program server mode | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | |
| 2.1.2.2 Least control increment 0.01μm(10nm) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 2.1.2.3 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 □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | 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 (with digital I/F spindle) | | | | | | | | | | | | | | | | |
| 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 | — | — | — | — | △ | — | △ | — | — | — | — | — | △ | — | △ | — |
| 4.5.10 Thread recutting | — | — | — | — | △ | — | △ | — | — | — | — | — | △ | — | △ | — |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
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| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | 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 | — | — | — | — | — | — | — | — | ○ | — | ○ | — | ○ | — | ○ | — |
| 6.2.11 Parameter/Operation guidance | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.2.12 Alarm guidance | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ |
| 6.2.13 Machining program input mistake check warning | △ | — | — | — | △ | — | — | — | △ | — | — | — | △ | — | — | — |
| 6.2.16 User selectable menu configuration | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 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 Monitor screen display | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 6.3.4 Setup 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 |
| **8. Spindle, Tool and Miscellaneous functions** | | | | | | | | | | | | | | | | |
| **8.1 Spindle functions (S)** | | | | | | | | | | | | | | | | |
| 8.1.1 Spindle control functions | | | | | | | | | | | | | | | | |
| 8.1.1.3 Coil switch | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **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 (Compensation vector designation type) | △ | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |
| 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 |
| **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 | | | | | | | | | | | | | | | | |
| 10.1.4.0.1 Workpiece coordinate system selection (6 sets) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 10.1.4.0.2 Extended workpiece coordinate system selection (48 sets) G54.1P1 to P48 | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ |
| 10.1.4.0.3 Extended workpiece coordinate system selection (96 sets) G54.1P1 to P96 | △ | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |
| 10.1.4.0.4 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 10.2.6 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 | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **11.4 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 | — | — | — | — | — | — | — | — | △ | ○ | ○ | — | △ | ○ | ○ | — |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | 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 between part systems | | | | | | | | | | | | | | | | |
| 12.1.8.5.1 Control axis synchronization between part systems I | — | — | — | — | △ | — | ○ | — | — | — | — | — | △ | — | ○ | — |
| 12.1.8.5.2 Control axis synchronization between part systems II | — | — | — | — | — | — | — | — | — | — | — | — | △ | — | ○ | — |
| 12.1.8.6 Balance cut | — | — | — | — | △ | — | ○ | — | — | — | — | — | △ | — | ○ | — |
| 12.1.8.7 Common memory for part systems | — | — | — | — | ○ | — | ○ | — | — | — | — | — | ○ | — | ○ | — |
| 12.1.8.8 Two-part system simultaneous 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 |
| **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 (G05P1) Max.[kBPM] | △16.8 | ○ | ○ | — | — | — | — | — | △16.8 | ○ | ○ | — | — | — | — | — |
| 12.3.2 High-speed machining mode II (G05P2) Max.[kBPM] | △168 | — | ○33.7 | — | — | — | — | — | △168 | — | ○33.7 | — | — | — | — | — |
| 12.3.3 High-speed high-accuracy control 1 (G05.1Q1) 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 (G05P10000) Max.[kBPM] (limited to 1-part system configuration) | △168 | — | ○33.7 | — | — | — | — | — | △168 | — | ○33.7 | — | — | — | — | — |
| 12.3.5 High-accuracy control1(G61.1/G08) (1st part system only) | △ | ○ | ○ | — | — | — | — | — | △ | ○ | ○ | — | — | — | — | — |
| 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 (The separate option of high-accuracy control etc., is required.) | △ | — | △ | — | — | — | — | — | △ | — | △ | — | — | — | — | — |
| **12.4 Programming support functions** | | | | | | | | | | | | | | | | |
| 12.4.1 Playback | — | — | — | — | — | — | — | — | △ | ○ | ○ | ○ | △ | — | — | — |
| 12.4.3 Simple programming | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ |
| 12.4.4 G code guidance | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ | △ | ○ | ○ | ○ |
| **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 Rotation center error compensation | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |
| 13.1.8 Position-dependent gradually increasing-type backlash compensation | △ | ○ | ○ | — | △ | ○ | ○ | — | △ | ○ | ○ | — | △ | ○ | ○ | — |
| 13.1.9 Two-way pitch error compensation | △ | ○ | ○ | — | △ | ○ | ○ | — | △ | ○ | ○ | — | △ | ○ | ○ | — |
| **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 | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 |
| **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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **15.3 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 | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.10 Parameter lock | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.11 Program protection (Edit lock B, C) | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.12 Program display lock | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.3.16 Interference check between part systems | — | — | — | — | — | — | — | — | — | — | — | — | ○ | — | ○ | — |
| **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) |
| 15.4.3 NC data backup | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.4.6 Automatic backup | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 15.4.7 System setup | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 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.

○Standard △Optional NC function that can be selected □Selection

| Class | NC Trainer2 | | | | | | | | NC Trainer2 plus | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M system | | | | L system | | | | M system | | | | L system | | | |
| | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | M70V Type B | M70V Type A | E70 | M700VW | 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 Memory switch (PLC switch) 32 points | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.3.3.2 Memory switch (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) (Need to purchase separate S/W) | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.8 PLC parameter | | | | | | | | | | | | | | | | |
| 17.1.8.1 PLC constant (150 points) | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.1.8.2 PLC constant extension (Up to 755 points) | — | — | — | — | — | — | — | — | ○ | — | — | — | ○ | — | — | — |
| 17.1.9 GOT connection | | | | | | | | | | | | | | | | |
| 17.1.10 Pallet program registration | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |
| **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 | — | — | — | — | — | — | — | — | ○ | ○ | ○ | — | ○ | ○ | ○ | — |
| 17.2.9 Tool length compensation along the tool axis | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |
| 17.2.10 Tool handle feed & interruption | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |
| 17.2.13 Inclined surface machining command | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |
| 17.2.16 3-dimensional manual feed | — | — | — | — | — | — | — | — | △ | — | — | — | — | — | — | — |
| 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 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **17.7 Installing S/W for machine tools** | | | | | | | | | | | | | | | | |
| 17.7.1 Customization(NC Designer) (Need to purchase separate 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 working memory size [MByte] | — | — | — | — | — | — | — | — | 6 | 3 | 3 | 1 | 6 | 3 | 3 | 1 |
| 17.7.1.3 Direct screen selection | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.7.3 EZSocket I/F (Need to purchase separate S/W) | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.7.4 APLC release (Need to purchase separate S/W) | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| 17.7.5 Custom API library (Need to purchase separate S/W) | — | — | — | — | — | — | — | — | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| **17.8 Others** | | | | | | | | | | | | | | | | |
| 17.8.3 Automatic operation lock | — | — | — | — | — | — | — | — | ○ | ○ | ○ | — | ○ | ○ | ○ | — |

(*2) Index qualification is available.

# Appendix 2

## Troubleshooting

# Appendix 2.1 Troubleshooting

Remedies for common problems of NC Trainer2 / NC Trainer2 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 Trainer2 / NC Trainer2 plus.

### Appendix 2.1.1.1 Error Messages Common Between NC Trainer2 and NC Trainer2 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 Trainer2 / NC Trainer2 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. | |
| A null character (space) and period cannot be placed at the beginning or end of the project name. Correct the name. | A null character (space) or period is used at the beginning or end of the 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. | |
| Enter the import name. | An import name has not been entered. | Correct the entered import name. |
| Entered import name is too long. Shorten it to 80 characters or less (A double-byte character is counted as two characters). | Entered import name is too long. | |
| An import name made up of only null characters (spaces) is not usable. | Null characters are used as an import name. | |
| An unavailable character (\ / : * ? < > \| ") is included in the entered import name. | An unavailable character is included in the entered import name. | |
| Entered import name is not available. Enter another import name. | A reserved name for Windows is used as an import name. | |
| A null character (space) and period cannot be placed at the beginning or end of the import name. Correct the name. | A null character (space) or period is used at the beginning or end of the import name. | |
| Project import data is illegal. Select import data again. | The wrong folder is selected for the import data of the project, or the import data is broken. | - Select correct import data of the project.<br>- Export the project data using NC Trainer2 plus, and import it again. |
| Failed to start Internet browser. | An Internet browser may not be installed. | Set up an internet access environment to connect to MITSUBISHI ELECTRIC FA Global Website. |

| Message | Cause | Remedy |
|---|---|---|
| Failed to activate the application.<br>Failed to activate the NC.<br>Failed to quit the NC.<br>Preparation for creating project has failed.<br>Failed to save the application setting.<br>Failed to create project.<br>Failed to change project option.<br>Failed to copy the project.<br>Failed to rename the project.<br>Failed to delete the project. | Requested processing cannot be executed for the reason such as:<br>- Corruption of the executable file.<br>- Hard disk capacity shortage.<br>- Memory shortage. | - Quit other applications and then restart NC Trainer2 / NC Trainer2 plus.<br>- Restart the computer.<br>- Reinstall NC Trainer2 / NC Trainer2 plus.<br>- Check the hard-disk space.<br>- Check the hardware specification of the computer you are using. |
| 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.<br>Import the import data of that project, if available.<br>Create a new project again. |
| Failed to activate the application. NC Virtual Simulator is running. Please exit NC Virtual Simulator. | Attempting to start the application while NC Virtual Simulator is open. | Close NC Virtual Simulator and then restart the application. |
| Sentinel key not found(H0007) | - A license key is not inserted.<br>- A license key of network connection type for another network is used without configuring settings.<br>- A HASP key driver was not installed when installing NC Trainer2 plus.<br>- The HASP key driver is stopped when using a license key of network connection type. | - Check that a license key is correctly inserted.<br>- Refer to "1.4.2 When Using a Network Connection Type License Key Inserted into a Computer on Another Network"<br>- Uninstall NC Trainer2 plus and then reinstall it.<br>- The service program of the license key may be stopped. Refer to "Appendix 2.1.2.10 Cannot Communicate with a License Key of Network Connection Type" |

## Appendix 2.1.1.2 Error Messages Dedicated to NC Trainer2 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. (*1) | Over 6 PLC axes are set on the [New Project] dialog. (*1) | |
| Up to 12 axes can be set for each part system. Correct the entered value. (*1) | Over 12 axes are set for the number of axes on the [New Project] dialog. (*1) | |
| Up to 16 control axes (NC axes, spindles and PLC axes) can be set. Correct the entered value. (*1) | Over 16 control axes (NC axes, spindles and PLC axes) are set on the [New Project] dialog. (*1) | |
| Enter export name. | An export name has not been entered. | Correct the entered export name. |
| Entered export name is too long. Shorten it to 80 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. | |
| A null character (space) and period cannot be placed at the beginning or end of the export name. Correct the name. | A null character (space) or period is used at the beginning or end of the export name. | |
| 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.<br>- Export custom machine operation panel again with NC Trainer2 Builder and then import it. |
| Entered import name is too long. Shorten it to 32 characters or less. (A double-byte character is counted as two characters). | Import name entered by the custom machine operation panel import function is too long. | Correct the entered import name. |
| 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 (M8V Series: 512 kbytes, M8/M7 Series: 120 kbytes). | Select APLC.o of 512 kbytes or less for M8V Series and 120 kbytes or less for M8/M7 Series. |
| Selected GX Simulator3 is not activated.<br>Simulator No.: ☐<br>☐ : Indicates the connection destination simulator number set as the connection destination. | NC Trainer2 plus cannot connect to the GX Simulator3 set as the connection destination because it is not started. | Check the connection destination simulator No., and start or switch a project after starting GX Simulator3. |

| Message | Cause | Remedy |
|---|---|---|
| This project does not support NC Virtual Simulator collaboration. The corresponding projects are as follows.<br>Model : M8/M8V series<br>Model Type : M system<br>Number of System : 1 | This project does not support NC Virtual Simulator collaboration. | Close NC Virtual Simulator and then switch the project. |
| Failed to activate the NC Virtual Simulator. | Requested processing cannot be executed for the reason such as:<br>- Corruption of the executable file.<br>- Hard disk capacity shortage.<br>- Memory shortage. | - Quit other applications and then restart NC Trainer2 / NC Trainer2 plus.<br>- Restart the computer.<br>- Reinstall NC Virtual Simulator.<br>- Check the hard-disk space.<br>- Check the hardware specification of the computer you are using.<br>- Update NC Virtual Simulator. |
| The license for NC Virtual Simulator has not been registered or has expired. | The license for NC Virtual Simulator is not registered or expired. | Register the license for NC Virtual Simulator.<br>For registration methods, refer to the manual of NC Virtual Simulator. |

(*1) The number of axes which can be set depends on the NC model.

## Appendix 2.1.1.3 Error Messages Dedicated to NC Trainer2 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 Trainer2 / NC Trainer2 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:<br>- Corruption of the executable file.<br>- Hard disk capacity shortage.<br>- Memory shortage. | - Quit other applications and then restart NC Trainer2 / NC Trainer2 plus.<br>- Restart the computer.<br>- Reinstall NC Trainer2 / NC Trainer2 plus.<br>- Check the hard-disk space.<br>- Check the hardware specification of the computer you are using. |
| Failed to save the application setting. | - Hard disk capacity shortage.<br>- The setting file is write protected.<br>- The setting file is access-prohibited by security setting. | - Check the hard-disk space.<br>- Allow the setting file (*1) for the application to be written.<br>- Allow the setting file for the application to be accessed by security setting. |
| Failed to save project. | - Hard disk capacity shortage.<br>- The project file is write protected.<br>- The project file is access-prohibited by security setting. | - Check the hard-disk space.<br>- Allow the project related files (*2) to be written.<br>- Allow the project related files to be accessed by security setting. |
| Failed to open project. | - The project file is damaged.<br>- The project file is access-prohibited by security setting. | - Delete the project related files (*2) and folders, and recreate them.<br>- Allow the project related files to be accessed by security setting. |

(*1) Data storage folder (Normally C:\MELCNC\NCT2P)\NCTrainer2Builder.ini

(*2) The files under the data storage folder (Normally C:\MELCNC\NCT2P)\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".
(You need to have an administrator account.)
**[Procedure]**

1. Right-click on the desktop and click [Screen resolution].

2. Select [Advanced Settings].

3. 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.

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 Trainer2" 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. Input "regedit" to [Search the web and Windows] box on the task bar and press the Enter key. Then click [regedit Run command].

   * 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]. 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 setting values to [Value data] referring to the above table and press the "OK" button.

4. Exit from [Registry Editor]. Then 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 Trainer2 / NC Trainer2 plus up to the maximum number of license keys, NC Trainer2 / NC Trainer2 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 Trainer2 / NC Trainer2 plus.

### Appendix 2.1.2.5 NC Configurator2 Cannot Connect to NC Trainer2 plus

NC Configurator2 may not connect to NC Trainer2 plus when Windows firewall function is enabled. Disable the firewall function or register NC Configurator2 as an exception.
(Carry out with the authority of the administrator.)

### Appendix 2.1.2.6 The Message Related to a Digital Signature Is Displayed at Installation and NC Trainer2/NC Trainer2 plus Cannot Be Installed

NC Trainer2/NC Trainer2 plus might not be installed when the message "Windows requires a digitally signed driver. A recently installed program tried to install an unsigned driver...." is displayed. When a security countermeasure software is installed, temporary stop the function or uninstall the software and try to install NC Trainer2/NC Trainer2 plus again. Or, install NC Trainer2/NC Trainer2 plus after uninstalling the windows update program "KB3004394".

## Appendix 2.1.2.7 Screen Is Displayed Smaller and Buttons Are Difficult to Press or Screen Is Not Displayed Properly Due to the Display Resolution

When the display resolution is high (4K or 3K, etc.), the screen is displayed smaller and the buttons are difficult to press. Also, when the size of text or other items on a screen are set in Windows settings to a value other than the default value (96 DPI, 100%, 9 pt), the screen may not display properly. For example, the characters on a dialog screen are cut off in the middle of a sentence.

**[When the screen is displayed smaller and the buttons are difficult to press]**
For Windows 10 (Ver. 1703 or later) and Windows 11 (1), display NC Trainer2 / NC Trainer2 plus using high DPI scaling (3) with the Windows function (2).

**[When the screen is not displayed properly]**
Perform any of the following procedures to display the screen properly.

- Return the size of the text on the screen or other items to the default value (96 DPI, 100%, 9 pt).
- For Windows 10 (Ver. 1703 or later) (1), display NC Trainer2 / NC Trainer2 plus using high DPI scaling (3) with the Windows function (2).

(1) The Windows version can be checked by the following procedure.
1. Press Windows key + [R], or select [Run] from the context menu displayed by right-clicking the Start menu of Windows.
2. Enter 'winver' in the "Run" dialog.
3. Check the version in the displayed dialog.

(2) The following are the operation procedures for Windows 10 function.
1. Select NCTrainer2.exe or NCTrainer2Plus.exe, then select [Properties] on the right-click menu. (4)
2. Select "Override high DPI scaling behavior. Scaling performed by:" in the [Compatibility] tab, then select "System" from the pull-down list.
3. Click the [OK] button.

(3) The NC Trainer2 / NC Trainer2 plus display will be blurred by enlarging.
The following lists the setting values for "Change the size of text, apps, and other items" and the recommended display resolution for each setting value in Windows 10.

| Setting value | Display resolution |
|---|---|
| 100 % | 1024 × 768 dots or more |
| 125 % | 1900 × 1200 dots or more |
| 150 % | 1900 × 1200 dots or more |
| 175 % | 2880 × 1620 dots or more |
| 200 % | 2880 × 1620 dots or more |
| 225 % | 3840 × 2160 dots or more |
| 250 % | 3840 × 2160 dots or more |

(4) NCTrainer2.exe or NCTrainer2Plus.exe is stored in the folder in which NC Trainer2 or NC Trainer2 plus is installed. When the installation destination folder is set as the default, they are stored in the following folders.
[NC Trainer2]
64 bit OS: C:\Program Files (x86)\MELSOFT\NC Trainer2\bin\NCTrainer2.exe
32 bit OS: C:\Program Files\MELSOFT\NC Trainer2\bin\NCTrainer2.exe
[NC Trainer2 plus]
64 bit OS: C:\Program Files (x86)\MELSOFT\NC Trainer2 plus\bin\NCTrainer2Plus.exe
32 bit OS: C:\Program Files\MELSOFT\NC Trainer2 plus\bin\NCTrainer2Plus.exe

## Appendix 2.1.2.8 NC Trainer2 / NC Trainer2 plus Is Forcefully Closed When an Application Using the Same Driver that the License Key Uses Is Installed

When NC Trainer2 / NC Trainer2 plus is installed when there is an installed application using a different version of the HASP driver (HASP driver (Note 1)) that the license key uses, NC Trainer2 / NC Trainer2 plus may be forcefully closed. Try either of the following.

(1) Access the support page (Note 2) of Gemalto, which provides the HASP driver, and download and apply the latest HASP driver.
(2) Install NC Trainer2 / NC Trainer2 plus after uninstalling the application using a different version of the HASP driver that the license key uses

(Note 1) Provided by Gemalto
(Note 2) https://sentinelcustomer.gemalto.com/sentineldownloads/

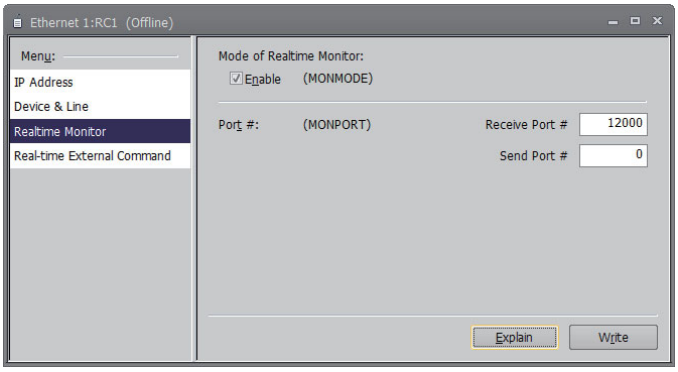
## Appendix 2.1.2.9 Cannot Connect to the RT ToolBox3 Simulator from NC Trainer2 plus

When NC Trainer2 plus and RT ToolBox3 Simulator are started with the same PC, NC Trainer2 plus cannot connect to RT ToolBox3 Simulator. Try connecting by the following method. Note that the connecting method varies depending on "Network Settings of NC" in NC Trainer2 plus.

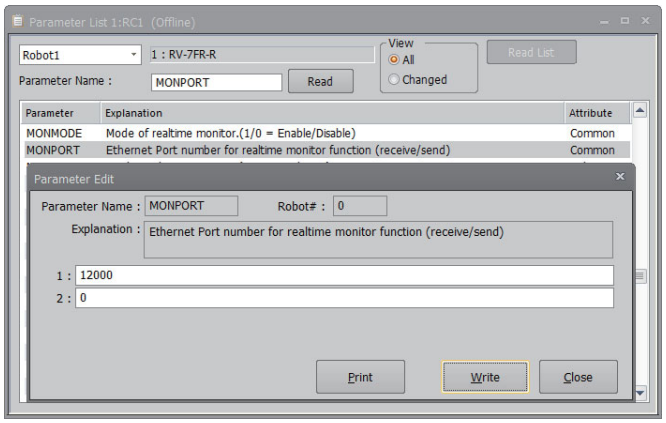
**[When "Use IP address of this PC" is selected for "Network Settings of NC"]**
Set "Send Port number (Number 2 of MONPORT)", which is the parameter related to the RT ToolBox3 realtime monitor function, to "0" (Note 1). (Note 2)

(Note 1) "0" is a special value that is returned for the send port number that is set in the UDP header information of the start packet data received by the robot controller.
(Note 2) Set the parameter by either of the following methods in RT ToolBox3.

**[Setting from the Ethernet parameter screen]**




**[Setting from the Parameter List screen]**

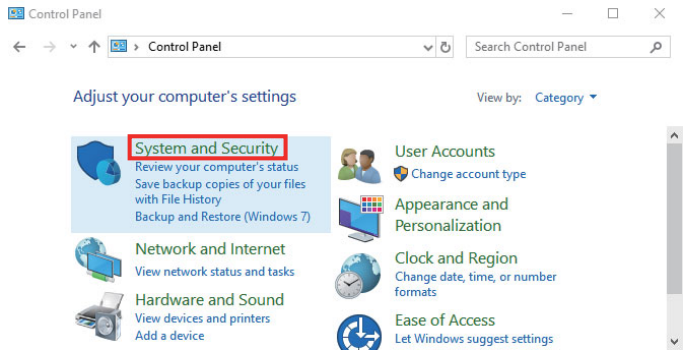


**[When "Use the virtual network" is selected for "Network Settings of NC"]**
Set the IP address of the virtual network driver to the CNC parameter "#11911 RC IP address (Robot controller IP address)."

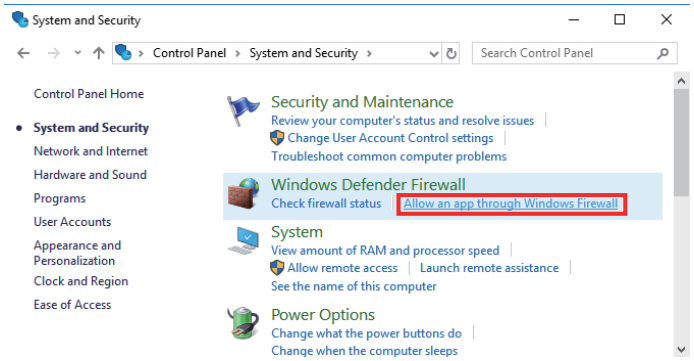
When Windows Firewall function is enabled, the firewall function needs to be disabled, or RT ToolBox3 Simulator needs to be registered as an exception.
To register a Windows Firewall exception, follow the procedures below. (Carry out with the authority of the administrator.)

**[Procedure]**
(1) Open the [Control Panel].
Windows 10: Click [All apps] - [Windows System] - [Control Panel] from the [Start] menu on the task bar.

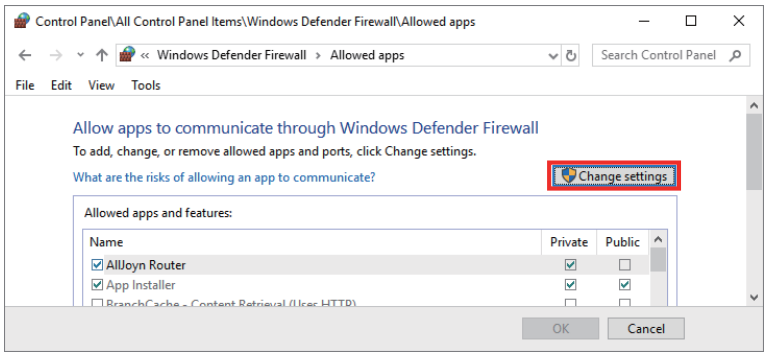
(2) Click [System and Security].



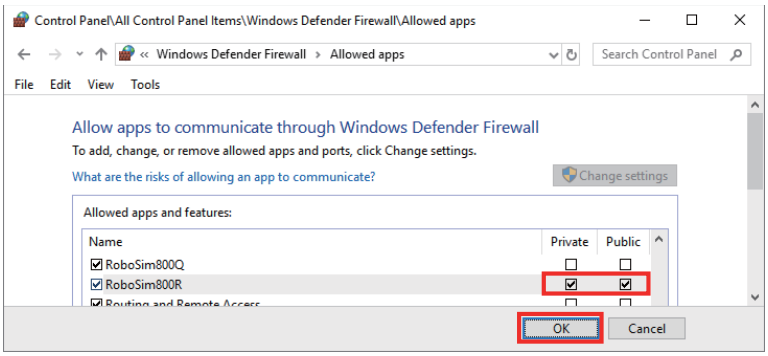

(3) Click [Allow an app through Windows Firewall].



(4) Click the [Change settings] button to enable changes to check boxes and the [OK] button.




(5) Check the [Private] and [Public] check boxes next to RT ToolBox3 Simulator, and click the [OK] button.
The name displayed in "Allowed apps and features" varies with the robot controller selected by the RT ToolBox3 project. When "FR-R Series CR800-R" is selected, "RoboSim800R" is displayed.

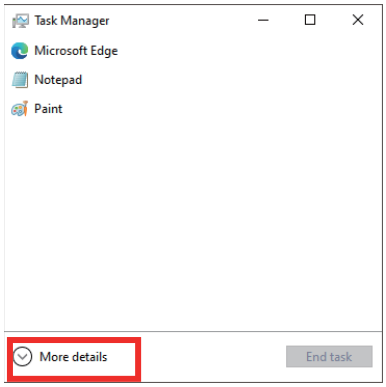


## Appendix 2.1.2.10 Cannot Communicate with a License Key of Network Connection Type

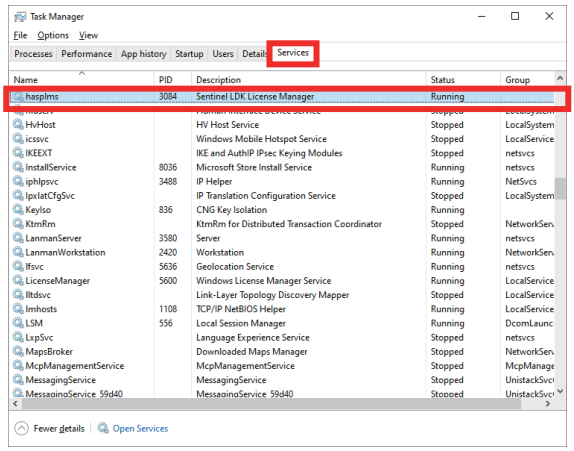
When hasplms stops in the computer to which a license key of network connection type is inserted, other computers on the network can no longer connect to it. When connecting is not possible, check the status of hasplms. If hasplms has stopped, start the service.

**[Procedure]**

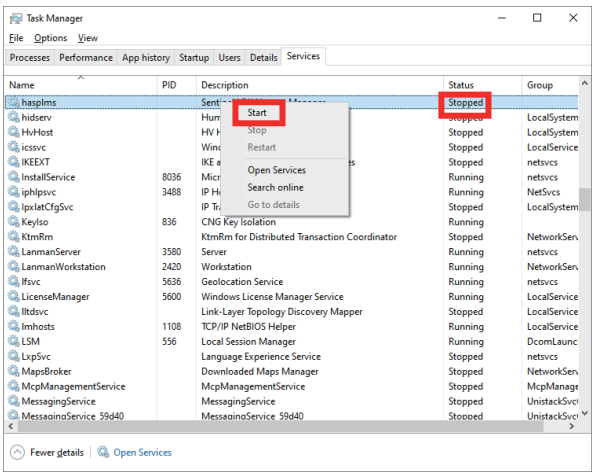
(1) Open [Task Manager] and click [More details].




(2) Select the [Services] tab and check the status of [hasplms].




(3) When the status is stopped, right-click [hasplms] and then select [Start].
When the status changes to running, connecting to the computer to which a license key of network connection type is inserted is possible.



## Appendix 2.1.2.11 Cannot Recognize a License Key of Network Connection Type from Another Computer

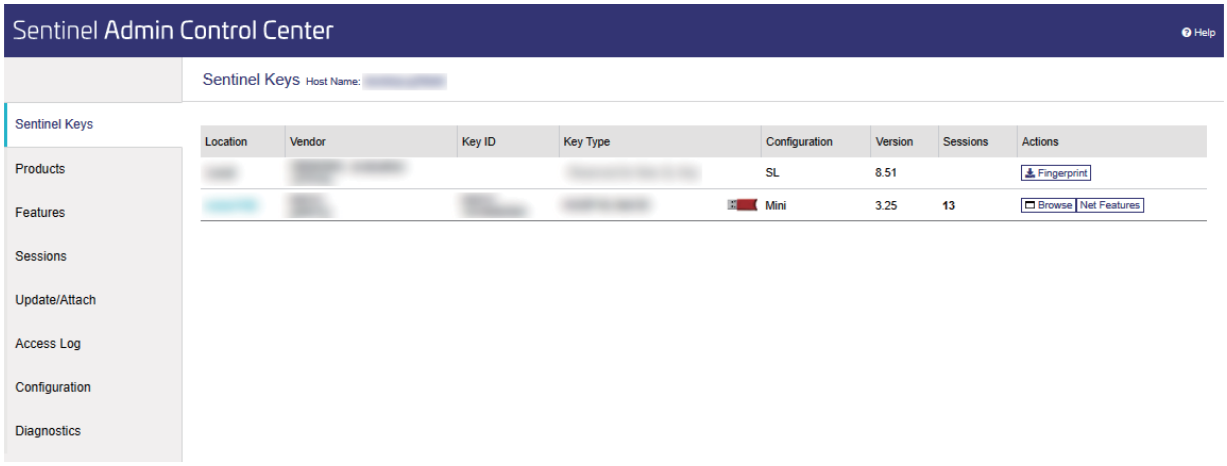
When a license key of network connection type is inserted in a computer, connection to the license key from another computer on the network may not be possible.
In this case, check if the license key can be detected from another computer following the procedure below. If it cannot be detected, change the firewall settings of the computer to which the license key of network connection type is inserted.

**[Detecting license key]**

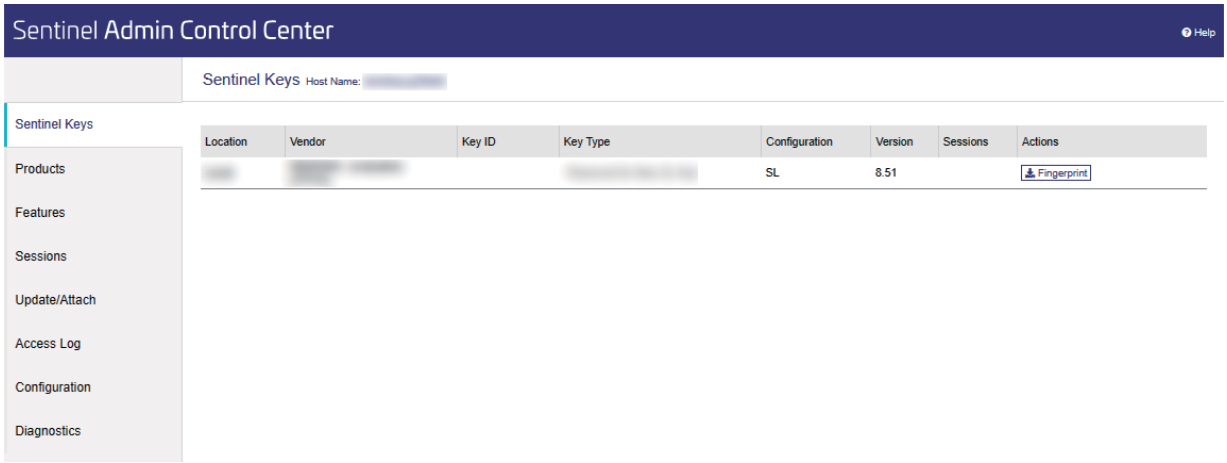
(1) Access "http://localhost:1947" with a browser from a computer in which a license key of network connection type is not inserted.

(2) Click [Sentinel Keys] in the [Option] tab.

(3) Check if the license key of network connection type is detected from the computer on the network.
If the license key of network connection type is detected, it is displayed on the list.

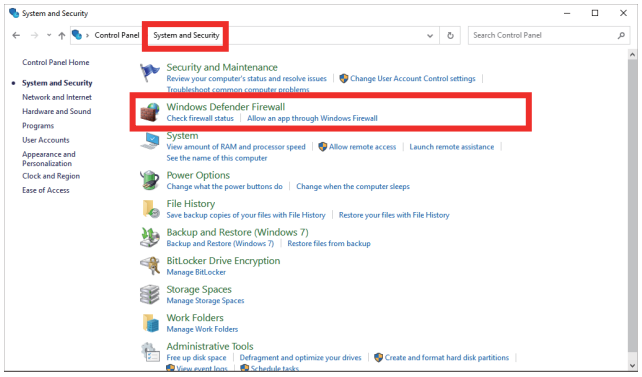



If the license key of network connection type is not detected, it is not displayed on the list.

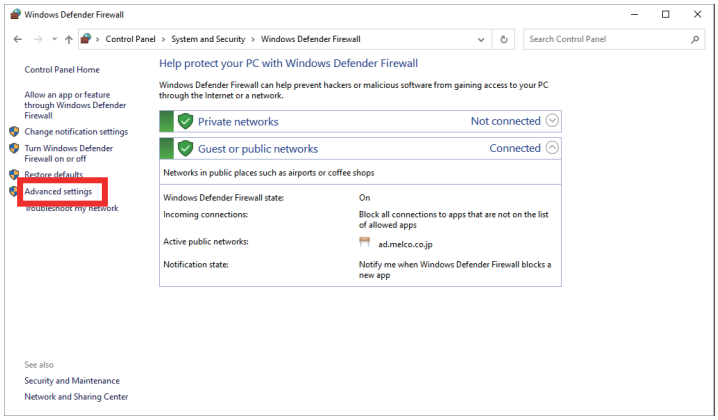


**[Changing firewall settings]**

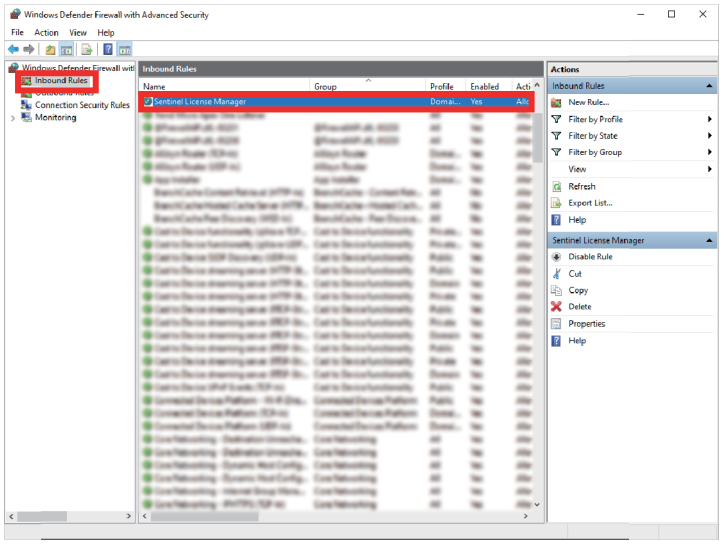
(1) Select [Start] - [Control Panel] - [System and Security] - [Windows Defender Firewall].



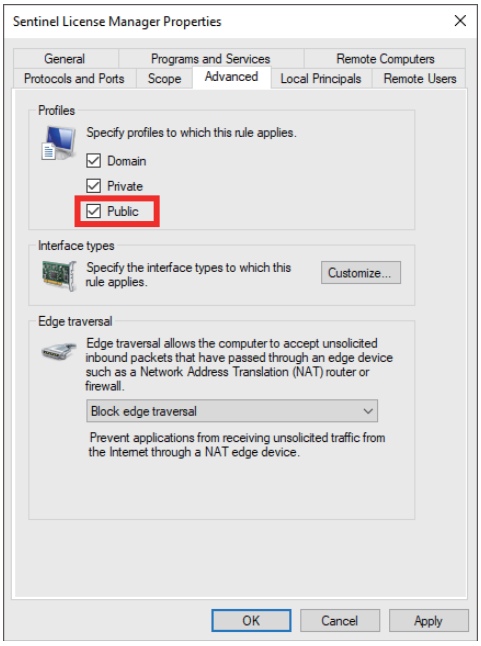

(2) Select [Advanced settings] - [Inbound Rules].



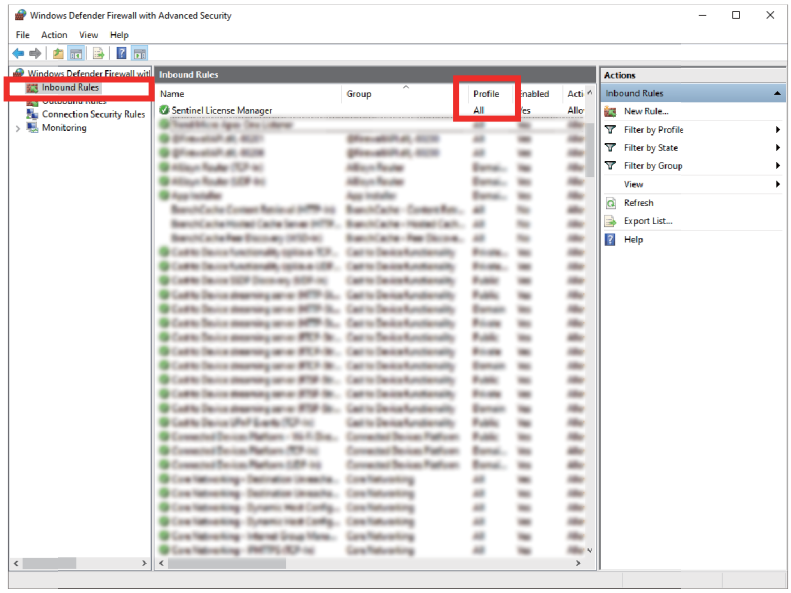

(3) Double-click [Sentinel License Manager] to open the properties.



(4) Select the [Advanced] tab, insert a check in the [Public] check box in [Profiles], click [Apply], then [OK].




When the [Profile] status of [Sentinel License Manager] in [Inbound Rules] is updated to "All", the settings are completed. The license key of network connection type can now be connected from another computer on the network.

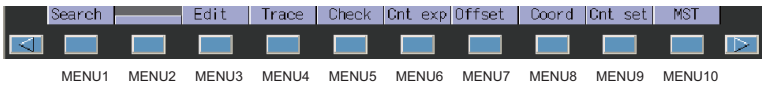


# Appendix 3

## Explanation of Keys

# Appendix 3.1 Explanation of Keys

On the NC Trainer2 / NC Trainer2 plus, 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<br>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.<br>  | 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.<br>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 | Left tab(\| ← ) | This moves the cursor one item to the left or right when selecting data in the screen display items.<br>at cursor left end: Moves to the right end of previous line.<br>at cursor right end: Moves to left end of next line. | SHIFT+TAB |
| | Right 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 |
|---|---|---|
| Jan. 2015 | IB(NA)1501318-A | First edition created.<br>(NC Trainer2, NC Trainer2 plus S/W version A0) |
| Jun. 2015 | IB(NA)1501318-B | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version A1.<br>Contents were revised to correspond to Mitsubishi CNC M800/M80 Series software version A1.<br><br>- Revised the following chapters.<br>Introduction<br>I 1.3 Functions of NC Trainer2<br>I 1.5 Precautions<br>I 4.3.1 Creating a New Project<br>I 4.3.3 Changing the Settings of Project Option<br>II 1.3 Differences of functions between NC Trainer2 and NC Trainer2 plus<br>II 1.5 Precautions<br>II 4.3.1 Creating a New Project<br>II 4.3.3 Changing the Settings of Project Option<br>II 5.1.5 Setting of Custom Machine Operation Panel<br>II 5.2 Creating User PLC (Ladder) and Checking the Operation<br>II 5.2.1 User PLC Development Method with GX Developer<br>II 5.2.2 User PLC Development Method with PLC Onboard<br>II 5.3 Display of Custom Release Screen<br>II 5.3.2 Path Designation of GIP File and DLL File<br>II 5.3.6 Settings of Custom Release Start Up Screen<br>II 5.3.7 Restrictions for Custom Release Screen<br>II 5.4 APLC release<br>II 5.4.9 Importing the NC Data from Actual NC<br>Appendix 1 Specifications List<br><br>Other contents were added/revised/deleted according to specification. |
| Oct. 2015 | IB(NA)1501318-C | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version A3.<br>Contents were revised to correspond to Mitsubishi CNC M800/M80 Series software version A4.<br>Corresponded to M700V/M70V/E70 Series software version K8.<br><br>- Revised the following chapters.<br>I 1.5 Precautions<br>I 2.1 Operating Environment<br>I 2.2 Procedure of the First Installation<br>I 3.1 Configuration of the Screen<br>I 3.1.2 Full Screen Display<br>I 3.1.3.1 Arranging Windows<br>I 3.3.1 NC Keyboard<br>I 3.3.3 Machine Operation Panel<br>I 4.3.1 Creating a New Project<br>I 4.3.3 Changing the Settings of Project Option<br>II 1.3 Differences of Functions between NC Trainer2 and NC Trainer2 plus<br>II 1.5 Precautions<br>II 2.2 Procedure of the First Installation<br>II 5.2 Creating User PLC (Ladder) and Checking the Operation<br>II 5.2.1 User PLC Development Method with GX Developer<br>II 5.2.2 User PLC Development Method with PLC Onboard<br>II 5.3.6 Settings of Custom Release Start Up Screen<br>II 5.4.2 Outline for the Debug of APLC Release C Language Module<br>II 5.4.5 Preparation for Debug<br>II 6.1 Exporting NC Trainer2 plus Project<br>Appendix 1 Specifications List<br>Appendix 2.1.2.7 The Message Related to a Digital Signature Is Displayed at Installation and NC Trainer2/NC Trainer2 plus Cannot Be Installed<br><br>Other contents were added/revised/deleted according to specification. |
| Mar. 2016 | IB(NA)1501318-D | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version A4.<br>Contents were revised to correspond to Mitsubishi CNC M800/M80 Series software version B2.<br>Corresponded to M700V/M70V/E70 Series software version L1.<br><br>- Revised the following chapters.<br>I 2.1 Operating Environment<br>I 2.2 Procedure of the First Installation<br>I 3.2.5 [Help (H)] Menu<br>I 4.1 Starting NC Trainer2<br>(Continue to the next page) |

| Date of revision | Manual No. | Revision details |
|---|---|---|
| | | (Continued)<br><br>II 1.3 Differences of Functions between NC Trainer2 and NC Trainer2 plus<br>II 2.3 Network Setting for Connecting with GX-Developer<br>II 5.1.3 Start and Exit NC Trainer2 Builder<br>II 5.3.8 Restrictions for Custom Release Screen<br>II 5.4.2 Outline for the Debug of APLC Release C Language Module<br>II 5.4.5 Preparation for Debug<br>Appendix 1 Specifications List<br>Appendix 2 Troubleshooting<br><br>- The following chapter was added.<br>II 5.3.7 Settings of Home Screen (Machine State Display Part)<br><br>Other contents were added/revised/deleted according to specification. |
| Sep. 2016 | IB(NA)1501318-E | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version A5.<br>Contents were revised to correspond to Mitsubishi CNC M800/M80 Series software version C0.<br>Corresponded to CNC M700V/M70V/E70 Series software version L3.<br><br>- Revised the following chapters.<br>I 1.1 Outline of NC Trainer2<br>I 1.5 Precautions<br>I 2.1 Operating Environment<br>I 2.2 Procedure of the First Installation<br>I 3.3.1 NC Keyboard<br>I 3.3.3.1 Restarting NC<br>I 4.1 Starting NC Trainer2<br>I 4.3.1 Creating a New Project<br>II 1.1 Outline of NC Trainer2 plus<br>II 1.5 Precautions<br>II 2.2 Procedure of the First Installation<br>II 2.3 Network Setting for Connecting with GX-Developer<br>II 4.3.1 Creating a New Project<br>II 4.3.3 Changing the Settings of Project Option<br>II 5.1.3 Start and Exit NC Trainer2 Builder<br>II 5.3.6 Settings of Custom Release Start Up Screen<br>II 5.4.4 Modification of Source Code File for Debug<br>II 5.4.5 Preparation for Debug<br>Appendix 1 Specifications List<br>Appendix 2.1.2.3 Displayed Key Is Different from the Key Input from Keyboard<br><br>- The following chapter was deleted.<br>Appendix 2.1.2.6 The Icon of NC Trainer2/NC Trainer2 plus Is Not Displayed Correctly on Start Screen of Windows 8<br><br>Other contents were added/revised/deleted according to specification. |
| Jun. 2017 | IB(NA)1501318-F | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version A6.<br>Contents were revised to correspond to Mitsubishi CNC M800/M80 Series software version C3.<br>Contents were revised to correspond to Mitsubishi CNC M700V/M70V/E70 Series software version L6.<br><br>- Revised the following chapters.<br>I 1.2 Characteristics of NC Trainer2<br>I 1.5 Precautions<br>I 2.2 Procedure of the First Installation<br>I 3.1 Configuration of the Screen<br>I 3.1.1 Standard Display Mode<br>I 3.1.2 Full Screen Display<br>I 3.1.3 Multi-window Display Mode<br>I 3.3.3 Machine Operation Panel<br>I 4.1 Starting NC Trainer2<br>I 4.3.1 Creating a New Project<br>II 1.2 Characteristics of NC Trainer2 plus<br>II 1.5 Precautions<br>II 1.6 Restrictions for PLC Signals<br>II 2.2 Procedure of the First Installation<br>II 3.3.3 Machine Operation Panel<br>II 4.3.1 Creating a New Project<br>II 5.2.2 User PLC Development Method with PLC Onboard<br>II 5.3.6 Settings of Custom Release Start Up Screen<br>(Continue to the next page) |

| Date of revision | Manual No. | Revision details |
|---|---|---|
| | | (Continued)<br><br>Appendix 1 Specifications List<br>Appendix 2.1.1 Error Messages<br><br>- The following chapter was deleted.<br>II 5.3.7 Settings of Home Screen (Machine State Display Part)<br><br>Other contents were added/revised/deleted according to specification. |
| Feb. 2018 | IB(NA)1501318-G | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version A7.<br>Contents were revised to correspond to Mitsubishi CNC M800/M80 Series software version C8.<br><br>- Revised the following chapters.<br>Precautions for Safety<br>I 1.1 Outline of NC Trainer2<br>I 1.3 Functions of NC Trainer2<br>I 1.5 Precautions<br>I 3.2.3 [Tool (T)] Menu<br>I 4.3.3 Changing the Settings of Project Option<br>II 1.1 Outline of NC Trainer2 plus<br>II 1.3 Differences of Functions between NC Trainer2 and NC Trainer2 plus<br>II 1.5 Precautions<br>II 2.2 Procedure of the First Installation<br>II 3.2.3 [Tool (T)] Menu<br>II 5.2.1 User PLC Development Method with GX Developer<br>II 5.3 Display of Custom Release Screen<br>II 5.3.2 Path Designation of GIP File, DLL File, and Executing File<br>II 5.3.3 Display of Executing File Registration Method<br>II 5.4.7 Task Lock Function for APLC Debug<br>Appendix 1.1 M830/M80 Specifications List<br><br>- The following chapters were added.<br>II 5.3.7 G Code Guidance Release Setting<br>II 5.4.10 Network Connection Setting<br>II 5.4.11 Network Connection Setting Method<br>II 5.4.12 Virtual Network Driver Setting Method<br><br>- The following chapter was deleted.<br>II 2.3 Network Setting for Connecting with GX-Developer<br><br>Other contents were added/revised/deleted according to specification. |
| Apr. 2019 | IB(NA)1501318-H | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version A8.<br>Contents were revised to correspond to Mitsubishi CNC M800/M80/E80 Series software version D8.<br><br>- Revised the following chapters.<br>Introduction<br>I 1.1 Outline of NC Trainer2<br>I 1.5 Precautions<br>I 4.3.1 Creating a New Project<br>I 4.3.3 Changing the Settings of Project Option<br>II 1.2 Characteristics of NC Trainer2 plus<br>II 1.3 Differences of Functions between NC Trainer2 and NC Trainer2 plus<br>II 1.5 Precautions<br>II 2.2 Procedure of the First Installation<br>II 4.3.1 Creating a New Project<br>II 4.3.3 Changing the Settings of Project Option<br>II 5.2 Creating User PLC (Ladder) and Checking the Operation<br>II 5.2.1 User PLC Development Method with GX Developer<br>II 5.2.3 User PLC Development Method with PLC Onboard<br>II 5.3 Display of Custom Release Screen<br>II 5.3.2 Path Designation of GIP File, DLL File, and Executing File<br>II 5.3.6 Settings of Custom Release Start Up Screen<br>II 5.3.7 G Code Guidance Release Setting<br>II 5.3.9 Restrictions for Custom Release Screen<br>II 5.4 APLC release<br>II 5.4.4 Modification of Source Code File for Debug<br>II 5.4.5 Preparation for Debug<br>II 5.4.9 Importing the NC Data from Actual NC<br>II 5.4.10 Network Connection Setting<br>(Continue to the next page) |

| Date of revision | Manual No. | Revision details |
|---|---|---|
| | | (Continued)<br>II 5.4.11 Network Connection Setting Method<br>II 6.1 Exporting NC Trainer2 plus Project<br><br>Appendix 1.1 M830/M80/E80 Specifications List<br><br>- The following chapters were added.<br>II 5.2.2 User PLC Development Method with GX Works2<br>II 5.3.8 Custom Cycle Setting for Interactive Cycle Insertion<br><br>Other contents were added/revised/deleted according to specification. |
| Jul. 2021 | IB(NA)1501318-J | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version A9.<br>Contents were revised to correspond to Mitsubishi CNC M800/M80/E80 Series software version F0.<br>Contents were revised to correspond to Mitsubishi CNC C80 Series software version B6.<br><br>- Revised the following chapters.<br>Introduction<br>Precautions for Safety<br>I 1.5 Precautions<br>I 2.1 Operating Environment<br>I 2.2 Procedure of the First Installation<br>I 3.2.3 [Tool (T)] Menu<br>I 3.3.3.1 Restarting NC<br>I 4 How to Use NC Trainer2 plus<br>II 1.1 Outline of NC Trainer2 plus<br>II 1.2.1 M800/M80/E80 Series, M700V/M70V/M700/M70 Series, and E70<br>II 1.3 Differences of Functions between NC Trainer2 and NC Trainer2 plus<br>II 1.5 Precautions<br>II 2.1 Operating Environment<br>II 2.2 Procedure of the First Installation<br>II 3.2.1 [Project (P)] Menu<br>II 3.2.3 [Tool (T)] Menu<br>II 4.3.1 Creating a New Project<br>II 4.3.2 Changing the Project<br>II 4.3.3 Changing the Settings of Project Option<br>II 5.1.1 Custom Machine Operation Panel<br>II 5.1.2.1 Configuration of the Screen<br>II 5.1.3 Start and Exit NC Trainer2 Builder<br>II 5.1.4 Creating a Project of the Custom Machine Operation Panel<br>II 5.2 Creating User PLC and Checking the Operation<br>II 5.3 Display of Custom Release Screen<br>II 5.3.2 Path Designation of GIP File, DLL File, and Executing File<br>II 5.4.1 Writing APLC Release C Language Module<br>II 5.4.2 Outline for the Debug of APLC Release C Language Module<br>II 5.4.4 Modification of Source Code File for Debug<br>II 5.4.5 Preparation for Debug<br>II 5.4.7 Task Lock Function for APLC Debug<br>II 5.5 Importing the NC Data from Actual<br>II 5.6 Network Connection Setting<br>II 5.6.1 Network Connection Setting Method<br>II 5.7 Virtual Network Driver Setting Method<br>II 6.1 Exporting NC Trainer2 plus Project<br>Appendix 1.1 M830/M80/E80/C80 Specifications List<br>Appendix 2.1.1.2 Error Messages Dedicated to NC Trainer2 plus<br>Appendix 2.1.2.3 Displayed Key Is Different from the Key Input from Keyboard<br><br>- The following chapters were added.<br>II 1.2.2 C80<br>II 5.8 Set GX Simulator3 Connection<br>Appendix 2.1.2.7 Screen Is Displayed Smaller and Buttons Are Difficult to Press or Screen Is Not Displayed Properly Due to the Display Resolution<br>Appendix 2.1.2.8 NC Trainer2 / NC Trainer2 plus Is Forcefully Closed When an Application Using the Same Driver that the License Key Uses is Installed<br>Appendix 2.1.2.9 Cannot Connect to the RT ToolBox3 Simulator from NC Trainer2 plus<br><br>Other contents were added/revised/deleted according to specification |
| May. 2022 | IB(NA)1501318-K | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version AA.<br>Contents were revised to correspond to M800V/M80V/M8V Series software version A1.<br>(Continue to the next page) |

| Date of revision | Manual No. | Revision details |
|---|---|---|
| May. 2022 | IB(NA)1501318-K | (Continued)<br>- Revised the following chapters.<br>Introduction<br>I 1.1 Outline of NC Trainer2<br>I 1.5 Precautions<br>I 3.3.1 NC Keyboard<br>I 3.3.3 Machine Operation Panel<br>I 4.3.1 Creating a New Project<br>I 4.3.3 Changing the Settings of Project Option<br>II 1.1 Outline of NC Trainer2 plus<br>II 1.2.1 M800V/M80V Series, M800/M80/E80 Series, M700V/M70V/M700/M70 Series, and E70<br>II 1.3 Differences of Functions between NC Trainer2 and NC Trainer2 plus<br>II 1.5 Precautions<br>II 3.3.3 Machine Operation Panel<br>II 4.3.1 Creating a New Project<br>II 4.3.3 Changing the Settings of Project Option<br>II 5.2 Creating User PLC and Checking the Operation<br>II 5.3 Display of Custom Release Screen<br>II 5.4 APLC release<br>II 5.4.2 Outline for the Debug of APLC Release C Language<br>II 5.4.4 Modification of Source Code File for Debug<br>II 5.4.5 Preparation for Debug<br>II 5.5 Importing the NC Data from Actual NC<br>Appendix 1.2 M830/M80/E80/C80 Specifications List<br>Appendix 2.1.1.2 Error Messages Dedicated to NC Trainer2 plus<br><br>- The following chapter was added.<br>Appendix 1.1 M830V/M80V Specifications List<br><br>Other contents were added/revised/deleted according to specification. |
| Dec. 2023 | IB(NA)1501318-L | Contents were revised to correspond to NC Trainer2, NC Trainer2 plus software version AB.<br>Contents were revised to correspond to M800V/M80V/M8V Series software version A4.<br>Contents were revised to correspond to M800/M80/E80 Series software version F8.<br><br>- Revised the following chapters.<br>I 1.5 Precautions<br>I 2.1 Operating Environment<br>I 2.2 Procedure of the First Installation<br>I 2.4 Procedure of Uninstalling<br>I 3.2.3 [Tool (T)] Menu<br>I 4.1 Starting NC Trainer2<br>I 4.3.1 Creating a New Project<br>II 1.4.1 License Type for NC Trainer2 plus<br>II 1.4.3 When Inserting Multiple License Keys<br>II 1.5 Precautions<br>II 3.2.3 [Tool (T)] Menu<br>II 4.1 Starting NC Trainer2 plus<br>II 4.3.1 Creating a New Project<br>II 5.1.3 Start and Exit NC Trainer2 Builder<br>II 5.1.5 Setting of Custom Machine Operation Panel<br>II 5.1.8.2 Device Comment File<br>II 5.3.9 M Code Guidance Release Setting<br>II 5.6.1 Network Connection Setting Method<br>II 5.7 Virtual Network Driver Setting Method<br>Appendix 1.1 M830V/M80V Specifications List<br>Appendix 1.2 M830/M80/E80/C80 Specifications List<br>Appendix 2.1.1.1 Error Messages Common Between NC Trainer2 and NC Trainer2 plus<br>Appendix 2.1.1.2 Error Messages Dedicated to NC Trainer2 plus<br>Appendix 2.1.2.3 Displayed Key Is Different from the Key Input from Keyboard<br>Appendix 2.1.2.7 Screen Is Displayed Smaller and Buttons Are Difficult to Press or Screen Is Not Displayed Properly Due to the Display Resolution<br>Appendix 2.1.2.9 Cannot Connect to the RT ToolBox3 Simulator from NC Trainer2 plus<br><br>- The following chapters were added.<br>II 1.4.2 When Using a Network Connection Type License Key Inserted into a Computer on Another Network<br>II 1.7 Restrictions for NC Virtual Simulator Collaboration<br>II 2.2 Procedure of the First Installation<br>II 5.9 NC Virtual Simulator Collaboration<br>Appendix 2.1.2.10 Cannot Communicate with a License Key of Network Connection Type<br>(Continue to the next page) |

| Date of revision | Manual No. | Revision details |
|---|---|---|
| Dec. 2023 | IB(NA)1501318-L | (Continued)<br>Appendix 2.1.2.11 Cannot Recognize a License Key of Network Connection Type from Another Computer<br><br>Other contents were added/revised/deleted according to specification. |
| | | |

# Global Service Network

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**Hartford, CT Service Satellite**
**Knoxville, TN Service Satellite**
**Nashville, TN Service Satellite**
**Huntsville, AL Satellite**
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TEL: +48-12-347-6500 / FAX: +48-12-630-4701

**Hungary Service Center**
**MITSUBISHI ELECTRIC EUROPE B.V. HUNGARIAN BRANCH**
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**Turkey Service Center**
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## INDONESIA

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**Johor Bahru Service Center**
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TEL: 07-3642250 / 2256

**Pulau Pinang Service Center**
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101, TRUE DIGITAL PARK OFFICE, 5TH FLOOR, SUKHUMVIT ROAD, BANGCHAK, PHRA KHANONG,
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ICC-Devi GAURAV TECHNOLOGY PARK, UNIT NO.402, FOURTH FLOOR, NORTH WING,
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**Tianjin Service Center**
**Xian Service Center**
**Dalian Service Center**
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## TAIWAN

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**Notice**

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

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

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|---|---|
| MODEL | NC Trainer2/NC Trainer2 plus |
| MODEL CODE | 100-406 |
| Manual No. | IB-1501318 |

IB(NA)1501318(ENG)-L(2312)MEE
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