• No part of this manual may be reproduced in any form.
• All specifications and designs are subject to change without notice.

The export of this product is subject to the authorization of the government of the country from where the product is exported.

In this manual we have tried as much as possible to describe all the various matters. However, we cannot describe all the matters which must not be done, or which cannot be done, because there are so many possibilities. Therefore, matters which are not especially described as possible in this manual should be regarded as “impossible”.

This manual contains the program names or device names of other companies, some of which are registered trademarks of respective owners. However, these names are not followed by ® or ™ in the main body.
SAFETY PRECAUTIONS

This manual includes safety precautions for protecting the user and preventing damage to the machine. Precautions are classified into Warnings and Cautions according to their bearing on safety. Also, supplementary information is described as Notes. Read the Warnings, Cautions, and Notes thoroughly before attempting to use the machine.

⚠️ WARNING
Applied when there is a danger of the user being injured or when there is a danger of both the user being injured and the equipment being damaged if the approved procedure is not observed.

⚠️ CAUTION
Applied when there is a danger of the equipment being damaged, if the approved procedure is not observed.

NOTE
Notes is used to indicate supplementary information other than Warnings and Cautions.

- Read this manual carefully, and store it in a safe place.
1.1 WARNINGS AND NOTES RELATING TO FANUC PICTURE

Warnings and notes relating to FANUC PICTURE are provided in this manual. Before using this software, read this manual thoroughly and read the Warnings, Cautions, and Notes in this manual carefully. In addition, "BE SURE TO READ THE FOLLOWING:" provided below summarizes items to bear in mind when FANUC PICTURE is used, which are not described in the chapters in this manual. Read this part before using the software.

1.2 BE SURE TO READ THE FOLLOWING:

The following summarizes items the user should bear in mind when using FANUC PICTURE. Before using FANUC PICTURE, be sure to read the following:

⚠️ CAUTION

1. This manual does not provide details on the operations and parameters that vary depending on CNC models and options. For information about such operations and parameters, refer to the relevant CNC manual or the manual supplied by the machine tool builder.

2. In this manual, we have tried as much as possible to describe all the various details. However, we cannot describe all the details which must not be done, or which cannot be done, because there are so many possibilities. Therefore, details which are not described as being possible in this manual should be regarded as "impossible."
PREFACE

Thank you for purchasing FANUC PICTURE.

This software, FANUC PICTURE, is designed to help the user to easily create CNC screens on a personal computer.

FANUC PICTURE runs on Microsoft® Windows2000®, and Microsoft® Windows XP®.

Read this manual thoroughly for the proper procedures to use FANUC PICTURE correctly.

NOTE
The copyright of this software is owned by FANUC. No part of this software may be distributed to a third party for application development purposes.

Microsoft, Windows 2000, XP are registered trademarks of Microsoft Corporation in the United States.
1.1 FEATURES OF FANUC PICTURE

FANUC PICTURE has the following features:

Features

- This software allows you to use a personal computer for designing CNC screens with a touch panel. CNC screens are displayed on the personal computer as if they were displayed on the CNC, so you can check and modify screen layouts easily.

- The following types of CNC are supported:
  FANUC Series 30i-MODEL A,
  FANUC Series 31i-MODEL A,
  FANUC Series 32i-MODEL A,
  FANUC Series 16i-MODEL A/B
  FANUC Series 18i-MODEL A/B
  FANUC Series 21i-MODEL A/B
  FANUC Power Mate i-MODEL D/H

- This software provides many controls such as touch switches.

- This software allows you to define detailed operations of touch switches, lamps, and so forth.

- You do not need to know programming languages such as C to create programs.

- Screen data is loaded into the CNC via a memory card. You can easily create MEM data files that are to be written in the memory card.

MEM data file:
After creating user screens by using FANUC PICTURE, convert them into MEM data files in memory card format for storage in the CNC. Then, together with the FANUC PICTURE driver (a program file in memory card format), load these MEM data files into the CNC as user applications running on the CNC.
1.2 CHECKING THE PRODUCT PACKAGE

This product package consists of the following:

- CD-ROM
  FANUC PICTURE disk (A08B-9010-J518#ZZ11)

**NOTE**
Be sure to read the release note (READMEE.TXT or READMEJ.TXT) on the first disk of this product package. The release note provides detailed information on this product package and additional information not included in the operator's manual.
1.3 ORGANIZATION OF THIS MANUAL

This manual is explained based on FANUC PICTURE Edition 1.04 (A08B-9010-J518/#ZZ11).
This manual is organized as follows:

SAFETY PRECAUTIONS
Describes general precautions that must be observed to ensure safety when using FANUC PICTURE.

PREFACE
Briefly describes main features of FANUC PICTURE. Also describes how to use this manual and other information to understand the use of FANUC PICTURE.

1. SETUP
Describes the operating environment of FANUC PICTURE and also describes how to set up FANUC PICTURE.

2. DEVELOPMENT OF CUSTOM SCREEN
Describes the functions and operation methods of menu buttons and describes the components provided by FANUC PICTURE.

3. FP FUNCTIONS
Describes the functions used in component properties.

4. EMBEDDING OF C APPLICATIONS
Describes how to use FANUC PICTURE together with application software created by C executor customers.

5. MEMORY SIZES OF CONTROLS AND RESTRICTIONS
Describes the approximate CNC main custom sizes required by various controls, as well as restrictions on them.
1.4 NOTATION CONVENTIONS IN THIS MANUAL

This manual is described according to the following notation conventions:

- **Notations and operations of keys**
  
<table>
<thead>
<tr>
<th>Notation example</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Enter] key</td>
<td>Key names are indicated in brackets [ ].</td>
</tr>
<tr>
<td>[Alt] + [→] key</td>
<td>When two or more keys are held down at the same time by pressing them sequentially, the keys are indicated by using &quot;+&quot; as shown to the left.</td>
</tr>
</tbody>
</table>

- **Notations of mouse operations**
  
<table>
<thead>
<tr>
<th>Notation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Click</td>
<td>To press then immediately release a mouse button.</td>
</tr>
<tr>
<td>Double-click</td>
<td>To quickly click a mouse button twice.</td>
</tr>
</tbody>
</table>

- **Folders**

  Directories and folders are collectively referred to as folders.
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1 SETUP

This chapter describes the operating environment of FANUC PICTURE. This chapter also describes how to set up FANUC PICTURE.
1.1 OPERATING ENVIRONMENT

The following operating environment is required to use this tool:

**Personal computer operating environment**

- **Personal computer**: PentiumIII-500MHz or higher processor
- **Basic software (OS)**: Windows 2000 or Windows XP
- **Application software**: Internet Explorer 6.00 or later
- **Internet Explorer 6.00SP1 or later is required. Be sure to prepare Internet Explorer 6.00SP1 or later.**
- **Memory**: 128Mbyte or more
- **Available hard-disk space**: 30Mbyte or more
- **VGA monitor**: 1024×768 pixel or more
- **65000 color or more**
- **Peripheral equipment**: PCMCIA-compliant memory card drive
- **At least a 16M byte memory card**
- **CD-ROM drive (required during installation)**

**Option specification**

- **Series 30i/31i/32i**

  1. To operate screens created with FANUC PICTURE, the corresponding option of FANUC PICTURE Function or FANUC PICTURE Function for non-touch panel display (both of functions with a usable custom software capacity of up to 6M bytes) is required.

     When screens created with FANUC PICTURE and a C executor application created by the machine tool builder are used together, the C executor option is required.

- **Series 16i/18i/21i, Power Mate i**

  1. To operate screens created with FANUC PICTURE, the option of touch panel C (with a usable main CPU custom software size of up to 6M bytes) of the Series 16i/18i/21i is required.

     With the Power Mate i, up to 6M bytes can be used when using the touch panel option (with a usable main CPU custom software size of up to 6M bytes).

     When screens created with FANUC PICTURE and a C executor application created by the machine tool builder are used together, the C executor option is required.

  2. To operate screens created with FANUC PICTURE on a non-touch panel display unit requires the optional FANUC PICTURE function (with a usable main CPU custom software size of up to 6M bytes) of the Series 16i/18i/21i instead of the options of (1) above.
Setting NC parameters on the CNC

To activate touch panel screens on the NC, set the following parameters:

8661 = 59  S-RAM variable area size (59K bytes)
8662 = 4   S-RAM file area size (4K bytes)
8781 = D-RAM size to be allocated to the C executor among the main CPU custom software size (where 64K bytes are assumed to be 1)

Example)
When allocating all the main CPU custom software size
6M bytes → 96 (with the Power Mate i, always set 96.)
5M bytes → 80
4M bytes → 64

When the macro executor is used at the same time, its required area size must be subtracted to obtain the value to be set in this parameter. When the macro executor uses 512K bytes, for example, the parameter value is obtained by subtracting 8. In the above example, set 88, 72, and 56, respectively.

• Series 16i/18i/21i
  For the touch panel C option, the main CPU custom software size for the macro executor is available separately. In this case, the size for the macro executor need not be subtracted from the setting of parameter No. 8781.
1.2 INSTALLING FANUC PICTURE

1.2.1 INSTALLING FANUC PICTURE disk / (A08B-9010-J518 #ZZ11)

This section explains how to install FANUC PICTURE.

Procedure

Installation of FANUC PICTURE disk / (A08B-9010-J518 #ZZ11)

1. When the CD-ROM of the product is inserted into the CD-ROM drive, installation is automatically started. Perform installation according to the dialog messages displayed.

2. If installation is not automatically started by step 1 above, activate SETUP.EXE in CD-ROM drive directly. This method of activation can be executed by reading drive

3. Upon completion of installation, the Start menu of Windows indicates the icon of FANUC PICTURE as shown below.
1.3 UNINSTALLING FANUC PICTURE

This section explains how to uninstall FANUC PICTURE. When FANUC PICTURE is reinstalled, it is recommended that uninstallation be performed before setup operation is performed again.

1. Select [Start] → [Settings] → [Control Panel] → [Add/Remove Programs].
2. Then click FANUC PICTURE that you want to uninstall.
3. Click Change/Remove.
4. Proceed to perform uninstallation operation according to the messages displayed in dialog boxes.
This chapter describes the method of activating and terminating FANUC PICTURE and the structure and function of each screen.
2.1 ACTIVATION AND TERMINATION

This section describes the method of activating and terminating FANUC PICTURE.

2.1.1 Activating FANUC PICTURE

This subsection describes the method of activating FANUC PICTURE. FANUC PICTURE is selected from the start menu of Windows, and this software is started.

The following FANUC PICTURE window is displayed:
2.1.2 Terminating FANUC PICTURE

This subsection describes the method of terminating FANUC PICTURE.

Click the menu button EXIT or click \(\times\) in the title bar to terminate.
2.2 CONFIGURATIONS AND FUNCTIONS OF BARS

2.2.1 Menu Bar and Tool Bar of FANUC PICTURE

This subsection describes the menu bar configuration and functions of FANUC PICTURE.
When FANUC PICTURE is started, the screen shown below appears first.

Explanation

The table below indicates the function/application of each item of the menu bar.
Each item of the tool bar can be displayed as an independent tool window.
Each menu item prefixed by an asterisk (*) may not be displayed, depending on the condition.

<table>
<thead>
<tr>
<th>Item in the main menu</th>
<th>Shortcut key</th>
<th>Icon in the tool bar</th>
<th>Functions</th>
<th>Chapter of explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>* File</td>
<td>Alt+F</td>
<td></td>
<td>Submenu related to the creation, setting, and saving of a project of custom screens</td>
<td>2.2.5</td>
</tr>
<tr>
<td>Project ▶</td>
<td></td>
<td></td>
<td>Creates a project of new custom screens.</td>
<td>2.2.5</td>
</tr>
<tr>
<td>New…</td>
<td></td>
<td></td>
<td>Selects a project of already created custom screens to be edited.</td>
<td>2.2.6</td>
</tr>
<tr>
<td>Open</td>
<td></td>
<td></td>
<td>Saves the project being edited.</td>
<td>2.2.6</td>
</tr>
<tr>
<td>Save</td>
<td></td>
<td></td>
<td>Closes the project being edited.</td>
<td>2.2.6</td>
</tr>
<tr>
<td>Close</td>
<td></td>
<td></td>
<td>Sets items, such as the PMC, display unit type, and option functions, common to a custom screen to be created.</td>
<td>2.2.7</td>
</tr>
</tbody>
</table>
### 2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>Item in the main menu</th>
<th>Shortcut key</th>
<th>Icon in the tool bar</th>
<th>Functions</th>
<th>Chapter of explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screen</strong></td>
<td>Alt+S</td>
<td></td>
<td>Opens a custom screen according to the edit type.</td>
<td></td>
</tr>
<tr>
<td><strong>New</strong></td>
<td>Ctrl+N(N)</td>
<td>![Screen Icon]</td>
<td>Opens a new custom screen form as an editing target.</td>
<td></td>
</tr>
<tr>
<td><strong>Open</strong></td>
<td>Ctrl+O(O)</td>
<td>![Screen Icon]</td>
<td>Selects a custom screen form to be edited, from the displayed file dialog box.</td>
<td></td>
</tr>
<tr>
<td><strong>Close</strong></td>
<td>Ctrl+S(S)</td>
<td>![Close Icon]</td>
<td>Closes the currently active screen form.</td>
<td></td>
</tr>
<tr>
<td><strong>Save</strong></td>
<td>Ctrl+S(S)</td>
<td>![Save Icon]</td>
<td>Saves the currently active screen form.</td>
<td></td>
</tr>
<tr>
<td><strong>Save as</strong></td>
<td>Ctrl+I(I)</td>
<td>![Save As Icon]</td>
<td>Saves the currently active screen form under a new name.</td>
<td></td>
</tr>
<tr>
<td><strong>Import from VB...</strong></td>
<td>Ctrl+I(I)</td>
<td>![Import Icon]</td>
<td>Imports and opens a custom screen form created by Microsoft Visual Basic, as an editing target.</td>
<td></td>
</tr>
<tr>
<td><strong>Save all</strong></td>
<td></td>
<td>![Save All Icon]</td>
<td>Saves all screen forms and project files opened for editing.</td>
<td></td>
</tr>
<tr>
<td><strong>Symbol</strong></td>
<td></td>
<td>![Symbol Icon]</td>
<td>Enables editing of a symbol data file dedicated to a custom screen project of FANUC PICTURE.</td>
<td>2.2.3</td>
</tr>
<tr>
<td><strong>Screen bitmap</strong></td>
<td>Ctrl+P(P)</td>
<td>![Bitmap Icon]</td>
<td>Obtains the bit map of the currently active screen form and saves the bit map to a file.</td>
<td>2.2.11.1</td>
</tr>
<tr>
<td><strong>Print...</strong></td>
<td>Ctrl+P(P)</td>
<td>![Print Icon]</td>
<td>Displays a dialog for printing the screen form that is currently active.</td>
<td></td>
</tr>
<tr>
<td><strong>Print Setup...</strong></td>
<td></td>
<td>![Print Setup Icon]</td>
<td>Displays the Printer Setup dialog.</td>
<td></td>
</tr>
<tr>
<td><strong>(Screen form opened in the past)</strong></td>
<td></td>
<td></td>
<td>A history of the names of the latest four screen forms opened is displayed. A desired screen form can be opened by pressing the key for the corresponding number from 1 to 4 indicated at the beginning.</td>
<td></td>
</tr>
<tr>
<td><strong>Exit</strong></td>
<td></td>
<td>![Exit Icon]</td>
<td>Quits FANUC PICTURE.</td>
<td></td>
</tr>
<tr>
<td><strong>[Edit]</strong></td>
<td>Alt+E</td>
<td>![Edit Icon]</td>
<td>A set of edit commands for controls on screen forms is provided.</td>
<td></td>
</tr>
<tr>
<td><strong>Undo</strong></td>
<td>Ctrl+Z(U)</td>
<td>![Undo Icon]</td>
<td>Returns the state of control editing operation back to the previous state.</td>
<td></td>
</tr>
<tr>
<td><strong>Redo</strong></td>
<td>Ctrl+Y(R)</td>
<td>![Redo Icon]</td>
<td>Performs a reversed operation of “Undo”, namely, returns the state of editing to the original state.</td>
<td></td>
</tr>
<tr>
<td><strong>Cut</strong></td>
<td>Ctrl+X(T)</td>
<td>![Cut Icon]</td>
<td>Cuts a selected control.</td>
<td></td>
</tr>
<tr>
<td><strong>Copy</strong></td>
<td>Ctrl+C(C)</td>
<td>![Copy Icon]</td>
<td>Creates a copy of a selected control.</td>
<td></td>
</tr>
<tr>
<td><strong>Paste</strong></td>
<td>Ctrl+V(P)</td>
<td>![Paste Icon]</td>
<td>Pastes a control cut or copied by [Cut] or [Copy].</td>
<td></td>
</tr>
<tr>
<td><strong>Delete</strong></td>
<td></td>
<td>![Delete Icon]</td>
<td>Deletes a selected control.</td>
<td></td>
</tr>
</tbody>
</table>
## 2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>Item in the main menu</th>
<th>Shortcut key</th>
<th>Icon in the tool bar</th>
<th>Functions</th>
<th>Chapter of explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Align</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left</td>
<td></td>
<td></td>
<td>Aligns the left side of the rectangle of each selected control with the left side of the reference control.</td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td></td>
<td></td>
<td>Aligns the right side of the rectangle of each selected control with the right side of the reference control.</td>
<td></td>
</tr>
<tr>
<td>Top</td>
<td></td>
<td></td>
<td>Aligns the upper side of the rectangle of each selected control with the upper side of the reference control.</td>
<td></td>
</tr>
<tr>
<td>Bottom</td>
<td></td>
<td></td>
<td>Aligns the lower side of the rectangle of each selected control with the lower side of the reference control.</td>
<td></td>
</tr>
<tr>
<td>Horizontal space</td>
<td></td>
<td></td>
<td>Moves the rectangle display positions of selected controls so that the rectangles are spaced at regular intervals horizontally.</td>
<td></td>
</tr>
<tr>
<td>Vertical space</td>
<td></td>
<td></td>
<td>Moves the rectangle display positions of selected controls so that the rectangles are spaced at regular intervals vertically.</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td></td>
<td></td>
<td>Matches the width of the rectangle of each control with the width of the reference control.</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td></td>
<td></td>
<td>Matches the height of the rectangle of each control with the height of the reference control.</td>
<td></td>
</tr>
<tr>
<td><strong>Order</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bring to Front</td>
<td></td>
<td></td>
<td>Moves a control overlapped by another control to the front (top layer).</td>
<td></td>
</tr>
<tr>
<td>Send to Back</td>
<td></td>
<td></td>
<td>Moves a control overlapping another control to the back (lower layer).</td>
<td></td>
</tr>
<tr>
<td>Bring Forward</td>
<td></td>
<td></td>
<td>Moves a control overlapped by another control to the front (one up layer).</td>
<td></td>
</tr>
<tr>
<td>Send Backward</td>
<td></td>
<td></td>
<td>Moves a control overlapping another control to the back (one down layer).</td>
<td></td>
</tr>
<tr>
<td>[View]</td>
<td>Alt+V</td>
<td></td>
<td>Chooses whether to display or hide each bar and chooses whether to set screen form grid display.</td>
<td></td>
</tr>
<tr>
<td>Tool bar</td>
<td></td>
<td></td>
<td>Chooses whether to display or hide the tool bar.</td>
<td></td>
</tr>
<tr>
<td>Status bar</td>
<td></td>
<td></td>
<td>Chooses whether to display or hide the status bar.</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td></td>
<td></td>
<td>Chooses whether to display or hide the control bar.</td>
<td></td>
</tr>
</tbody>
</table>
## 2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>Item in the main menu</th>
<th>Sub menu</th>
<th>Shortcut key</th>
<th>Icon in the tool bar</th>
<th>Functions</th>
<th>Chapter of explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draw</td>
<td></td>
<td></td>
<td></td>
<td>Chooses whether to display or hide the draw bar.</td>
<td></td>
</tr>
<tr>
<td>Grid</td>
<td></td>
<td></td>
<td></td>
<td>Chooses whether to set the grid interval function for setting a grid interval that is used as the guideline for placing controls on the screen form.</td>
<td></td>
</tr>
<tr>
<td>Window</td>
<td>Alt+W</td>
<td></td>
<td></td>
<td>A set of operations related to screen form windows is provided.</td>
<td></td>
</tr>
<tr>
<td>Cascade</td>
<td></td>
<td></td>
<td></td>
<td>Displays opened screen form windows one over another.</td>
<td></td>
</tr>
<tr>
<td>Tile</td>
<td></td>
<td></td>
<td></td>
<td>Tiles open screen form windows vertically and horizontally.</td>
<td></td>
</tr>
<tr>
<td>Icon</td>
<td></td>
<td></td>
<td></td>
<td>Rearranges the icons of closed screen form windows.</td>
<td></td>
</tr>
<tr>
<td>(Screen form window list)</td>
<td></td>
<td></td>
<td></td>
<td>Displays a list of open screen form windows. A desired screen form can be activated by keying the number displayed at the beginning.</td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td>Alt+P</td>
<td></td>
<td></td>
<td>The custom screen configuration and a set of operations related to screen data creation are provided.</td>
<td></td>
</tr>
<tr>
<td>Open screen…</td>
<td></td>
<td></td>
<td></td>
<td>Opens a screen form registered in the custom screen configuration project file.</td>
<td></td>
</tr>
<tr>
<td>Add screen</td>
<td></td>
<td></td>
<td></td>
<td>The screen form is registered in the custom screen configuration project file.</td>
<td></td>
</tr>
<tr>
<td>Delete screen</td>
<td></td>
<td></td>
<td></td>
<td>Deletes a specified screen form from those screen forms registered in the custom screen configuration project file.</td>
<td></td>
</tr>
<tr>
<td>Make MEM File…</td>
<td></td>
<td></td>
<td></td>
<td>Creates data for a custom screen registered in the custom screen configuration project file.</td>
<td>2.2.9</td>
</tr>
<tr>
<td>Write MEM File…</td>
<td></td>
<td></td>
<td></td>
<td>Creates, in a specified folder, a copy of the FP driver software and a copy of the screen data file produced by MEM file generation.</td>
<td>2.2.10</td>
</tr>
<tr>
<td>Output MEM File…</td>
<td></td>
<td></td>
<td></td>
<td>Composites and displays a parent screen and specified child screens making up a custom screen on one screen form.</td>
<td>2.2.11</td>
</tr>
<tr>
<td>Composite Screen…</td>
<td></td>
<td></td>
<td></td>
<td>Sets the operating environment of FANUC PICTURE.</td>
<td>2.2.12</td>
</tr>
<tr>
<td>Option</td>
<td>Alt+H</td>
<td></td>
<td></td>
<td>A set of help-related operations is provided.</td>
<td></td>
</tr>
<tr>
<td>Help Topics</td>
<td></td>
<td></td>
<td></td>
<td>Searches for FANUC PICTURE help topics.</td>
<td></td>
</tr>
<tr>
<td>About FANUC PICTURE</td>
<td></td>
<td></td>
<td></td>
<td>Provides FANUC PICTURE version and copyright indications.</td>
<td>2.2.13</td>
</tr>
</tbody>
</table>
Terminology: Project

When an operator’s panel is created for a target machine with FANUC PICTURE (which may be hereinafter abbreviated as FP), a set of custom screens built into the machine is referred to as a project. The start folder for project creation on the personal computer is referred to as the “project folder”, and a folder name is referred to as a project name.

Accordingly, to create a “new project” means to create a project folder for creating a new operator’s panel screen for a machine on the personal computer. “Project selection” means to choose from multiple projects of operator’s panel screens for different machines for editing, and means the specification or selection of a project folder location on the personal computer.

Multiple screen forms can be created in a project folder, but the custom screen to be displayed on the CNC is managed by the custom screen configuration project file.
2.2.2 FANUC PICTURE Tool Bar Controls and Draw Controls

Under the tool bar, the FANUC PICTURE controls and draw controls are displayed. Each item of these bars can be displayed as an independent tool window. The tables below indicate the function of each control.

<table>
<thead>
<tr>
<th>Control Name</th>
<th>Icon in the tool bar</th>
<th>Functions</th>
<th>Chapter of explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Screen Set Control</td>
<td></td>
<td>Control for setting the functions common to screen forms. This control is used as the background color of the CNC screen. When a new screen form is created, the control is placed as the background of the entire valid screen area.</td>
<td>2.3.2</td>
</tr>
<tr>
<td>2 Screen Structure Definition Control</td>
<td></td>
<td>When a parent screen is created, this control is pasted. This control is used to set the screen configuration of child screen functions and whether to use pop-up screens. This control is not displayed on the CNC screen.</td>
<td>2.3.3</td>
</tr>
<tr>
<td>3 Screen Switch Control</td>
<td></td>
<td>Control for performing screen switching operations with a parent screen switch button, child screen switch button, and so forth</td>
<td>2.3.4</td>
</tr>
<tr>
<td>4 Lamp Control</td>
<td></td>
<td>Control for lamp operation</td>
<td>2.3.5</td>
</tr>
</tbody>
</table>
### 2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>Control Name</th>
<th>Icon in the toolbar</th>
<th>Functions</th>
<th>Chapter of explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 Button Control</td>
<td>![Button Icon]</td>
<td>Control for button operations for signal output and so forth</td>
<td>2.3.6</td>
</tr>
<tr>
<td>6 Framed Button Control</td>
<td>![Framed Button Icon]</td>
<td>Signal output button operation control with a lamp function provided in the frame and central area</td>
<td>2.3.7</td>
</tr>
<tr>
<td>7 MDI Key Control</td>
<td>![MDI Key Icon]</td>
<td>Control for alphabetic key, numeric key, and function key operations. An input key code is sent to the key input buffer control or button control monitoring key input.</td>
<td>2.3.8</td>
</tr>
<tr>
<td>8 MDI Keyboard Control</td>
<td>![MDI Keyboard Icon]</td>
<td>Control serving as an MDI key set equivalent to the MDI unit</td>
<td>2.3.9</td>
</tr>
<tr>
<td>9 Key Input Buffer Control</td>
<td>![Key Input Buffer Icon]</td>
<td>A key input from the MDI unit or an MDI-related control is received in the buffer then the key buffer data is written to a control with input.</td>
<td>2.3.10</td>
</tr>
<tr>
<td>10 Numeral Indication Control with Key Input</td>
<td>![Numeral Indication Icon]</td>
<td>Control for numeric value display that can rewrite a display value with an input value from the key input buffer control</td>
<td>2.3.11</td>
</tr>
<tr>
<td>11 Numeral Indication Control for Calling a Ten-Key Pad</td>
<td>![Ten-Key Pad Icon]</td>
<td>Control for numeric value display that can rewrite a display value with an input value from the pop-up ten-key pad</td>
<td>2.3.12</td>
</tr>
<tr>
<td>12 PMC Area Character String Indication Control</td>
<td>![PMC Area Icon]</td>
<td>This control displays a character string written in the PMC area. This control can also write characters input from the key input buffer.</td>
<td>2.3.13</td>
</tr>
<tr>
<td>13 Numeral/Character String Indication Control</td>
<td>![Character String Icon]</td>
<td>Control for displaying numeric data and character string data</td>
<td>2.3.14</td>
</tr>
<tr>
<td>14 Label Control</td>
<td>![Label Icon]</td>
<td>Control for displaying a fixed character string</td>
<td>2.3.15</td>
</tr>
<tr>
<td>15 Text Character String Indication Control</td>
<td>![Text Icon]</td>
<td>Control for displaying a message statement selected from many text messages edited on the personal computer</td>
<td>2.3.16</td>
</tr>
<tr>
<td>16 Composite Message Indication Control</td>
<td>![Composite Message Icon]</td>
<td>Control for concatenating and displaying several message statements selected from many text messages edited on the personal computer. A concatenated message not longer than 32 characters can be displayed.</td>
<td>2.3.17</td>
</tr>
<tr>
<td>17 History Message Indication Control</td>
<td>![History Message Icon]</td>
<td>Control for displaying a display history of messages (such as alarms). This control can also display message summaries and detail messages.</td>
<td>2.3.18</td>
</tr>
<tr>
<td>18 Message Indication Control</td>
<td>![Message Icon]</td>
<td>Control for displaying one of the eight messages associated with the individual bits of a one-byte PMC signal</td>
<td>2.3.19</td>
</tr>
<tr>
<td>19 Image Display Control</td>
<td>![Image Display Icon]</td>
<td>Control for displaying a bit map or JPEG-format image</td>
<td>2.3.20</td>
</tr>
<tr>
<td>20 Clock Control</td>
<td>![Clock Icon]</td>
<td>Control for displaying date (year/month/day) and time (hours/minutes/seconds) data in digital form</td>
<td>2.3.21</td>
</tr>
<tr>
<td>Control Name</td>
<td>Icon in the tool bar</td>
<td>Functions</td>
<td>Chapter of explanation</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------------------</td>
<td>----------------------------------------------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>21 Meter Control</td>
<td></td>
<td>Control for displaying numerical data as a circle meter or bar meter</td>
<td>2.3.22</td>
</tr>
<tr>
<td>22 Graph Control</td>
<td></td>
<td>Control for displaying numerical data as a bar graph</td>
<td>2.3.23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Draw Control Name</th>
<th>Icon in the tool bar</th>
<th>Functions</th>
<th>Chapter of explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Pointer</td>
<td></td>
<td>This is not a control. On a screen form, the mouse pointer ã® becomes movable to enable various usual editing operations such as control selection.</td>
<td>2.4.1</td>
</tr>
<tr>
<td>2 Line</td>
<td></td>
<td>This control draws a straight line between two points of rectangular corner.</td>
<td>2.4.2</td>
</tr>
<tr>
<td>3 Rectangle</td>
<td></td>
<td>This control draws a rectangle.</td>
<td>2.4.3</td>
</tr>
<tr>
<td>4 Arc</td>
<td></td>
<td>This control draws an arc.</td>
<td>2.4.4</td>
</tr>
<tr>
<td>5 Circle</td>
<td></td>
<td>This control draws a circle.</td>
<td>2.4.5</td>
</tr>
<tr>
<td>6 Ellipse</td>
<td></td>
<td>This control draws an ellipse.</td>
<td>2.4.6</td>
</tr>
<tr>
<td>7 Letter</td>
<td></td>
<td>This control draws graphic characters with no background color.</td>
<td>2.4.7</td>
</tr>
</tbody>
</table>
2.2.3 Symbol Specification with FANUC PICTURE

With FANUC PICTURE, PMC signal addresses are used to create a custom screen. With the conventional specification method, absolute addresses such as R123.4 and D134 are used. With FANUC PICTURE of the new version, the symbol specification method usable with FANUC LADDER-III can also be used for PMC signal address specification.

2.2.3.1 Symbol data definition

When you click [File]-[Symbol] on the menu bar, the symbol data defined in the custom screen project is displayed.

When a new project is created, no symbol is registered. The symbol data file is a dedicated symbol data file defined in the custom screen project of FANUC PICTURE. So, to use a symbol defined with a ladder for the custom screen operator’s panel created with FANUC LADDER-III, the symbol can be imported by adding it to the FANUC PICTURE custom screen project with the import function. Moreover, a symbol newly defined on the custom screen side can be exported for use with FANUC LADDER-III.

Updating a symbol:
When you click the name of a symbol to be updated, the symbol data is copied to the text box for editing. Make a necessary modification then click the Alter button.

Inserting a symbol:
Key a symbol name, PMC signal address, type, and scope in the text box for editing then click the Insert button.
Deleting a symbol:
Select a symbol name to be deleted, by left-clicking the mouse singly or when the Shift key or Ctrl key is held down, then click the Delete button.

Import/Export:
Each of the Import (Mnemonic/CSV) button and the Export (CSV) button displays the file dialog box shown below. Specify an input/output destination file in each format then click the Open button to perform a desired operation.

2.2.3.2 Symbol specification method for signals with the property dialog box

With various FANUC PICTURE dialog boxes and the property dialog box of each control, fields for both of absolute address specification and symbol specification are provided as in the case of the button control property dialog box shown below.
The method of symbol specification is described below.

Symbol:
When you check the Symbol check box, the symbol specification method is selected for this PMC signal specification.

Combo box for symbol specification:
Specify a symbol in the format “scope.symbol”. When you specify a symbol with no scope, a symbol name only is entered. Type a desired symbol name in the combo box, or select a desired symbol from the list for setting in the combo box. When you select a symbol from the drop-down list, you can edit the symbol file by choosing [File]-[Symbol] on the menu bar. An input symbol may be undefined at this stage. However, register such a symbol in the symbol data file before performing [Make MEM File...].

⚠️ CAUTION
1. For the coding specifications of symbol data, refer to the pertinent manual of FANUC LADEER-III.
2. In the dialog boxes and property dialog boxes described below, the description of the property for symbol specification is omitted.

### 2.2.3.3 Symbol specification for signals used as FP function arguments

A property describing an FP function may specify a PMC signal area as an argument of the function. In such a case, “PMC-area_PMC-address_bit-position-or-type” is replaced with “:scope.symbol:” as indicated below. Arguments not related to a signal are to be successively coded in the same list as for absolute-format argument specification.

**Absolute format:**  
FP-function-name[PMC-area_PMC-address_bit-position-or-type data]

**Symbol format:**  
FP-function-name[:scope_symbol: data]

- Example)  
  wrpmcb[adrtype_snumber_bitpos_data] ⇒ wrpmcb[:Symbol: data]
  wrpmcb[5_0035_1_1] ⇒ wrpmcb[:DoorOpen: _1]
  rdpmc[adrtype_snumber_datatype] ⇒ rdpmc[:Symbol:]
  rdpmc[9_0123_2] ⇒ rdpmc[:D0123LONG:]
2.2.4 Custom Screen Creation Procedure

This flowchart indicates the procedure for creating a custom screen with FANUC PICTURE and the menu commands used.

Start

[File] Menu
[Project] ➤ [New]
[Creating new project]

[File] Menu
[Project] ➤ [Open]

New Project?

New

Yes

[File] Menu
[Project] ➤ [New]

[Create new project]

[File] Menu
[Screen] ➤ [Import(VB)]

Existing

No

Yes

Register in the project?

[File] Menu
[Screen] ➤ [Open Screen…]

Import of VB screen?

No

[File] Menu
[Screen] ➤ [Open]

Edit screen?

Yes

Edit of screen form

Continuance

Edit completion?

Completion

Save the screen form. Register the new making screen in the project.

[Project] Menu
[Make MEM File]

[Project] Menu
[Write to card]

[File] Menu
[Exit]

End

Click a desired control on the control bar then drag the control on the screen form to create a custom screen.

Double-click a placed control to display the property dialog box and set necessary properties.

When a new screen is saved, the screen form can be renamed here. Moreover, the system asks you whether to register the new screen in the project. Choose “Register”.

When you quit the project, the system asks you whether to save the modifications. Save the project before quitting the project.
To create a custom screen with FANUC PICTURE, perform operations on the personal computer according to the flowchart shown on the previous page. Basically, proceed according to the procedure described below.

**Work on the personal computer**
- <1> Create a project folder for custom screen creation.
- <2> Set the environment and conditions of the project such as the model of a target CNC
- <3> Add a new screen form.
- <4> Paste controls onto the screen form then set properties.
- <5> Register the created screen form with the project.
- <6> Set the custom screen option functions before MEM file generation.
- <7> Generate a MEM file.
- <8> Copy the custom screen data and FP driver software to the memory card.

**Work on the CNC**
- <1> Write the copied file to the F-ROM of the CNC.
- <2> Initialize the CNC (to set the CNC parameters and start the FP driver).
- <3> Debug the custom screen and PMC ladder.

See Section 2.5, which provides an example of creating a custom screen consisting of a parent screen and child screens.
2.2.5 Creating New Project

Create a new project by using the procedure below.

1. Click **New - Project** on the file menu bar.
2. The dialog box for entering a project name appears.

![Creating new project dialog box]

3. Click ![Browse for Folder] to display the Browse for Folder dialog box.

![Browse for Folder dialog box]

4. Select a folder to create a project in, then click **OK**. The directory name is set.
5. Enter a desired project name, then click **OK**.

![Creating new project dialog box with selected project name]
6. If, at this time, you want to create a new project for restoration from a backup of screen data for restoration sucked up from the F-ROM of the CNC control unit, check the Restoration from F-ROM check box.

7. Enter a desired project name, then click [OK].

8. When you press [OK], if the Restoration from F-ROM check box has been checked, the Open dialog box, shown below, appears. Specify the location and the name of the screen data MEM file (file name: FPF0xx or CEX0FPDT) containing a backup of screen data for restoration sucked up from the F-ROM of the CNC control unit, then press the [Open] button.

9. Then, a subfolder is created with the directory and project names specified in the Creating new project dialog box. After that, the Set Project dialog appears automatically. For the Setting of Project dialog, see Subsection 2.2.7.
2.2.6 Open Project

The menu item Open Project is used to modify a machine operation screen project currently being created or a machine operation screen project already created or to select a folder containing a project.

Click Open - Project on the file menu bar. When the Open dialog box appears, specify a desired project file, then click Open. The default file type is an FPicture Project file file. Open Project is used to specify only the project folder location and project file name. To edit a screen form, use another menu.


2.2.7 Setting of Project

Set up the common items for the entire project.

2.2.7.1 Setting of CNC system

Pressing the [Setting…] - [project]-[file menu bar] button causes the following dialog box to appear. For the items in the Setting of CNC system tab in the box, specify the configuration of the target CNC system prior to creating a custom screen. If the CNC system has a without touch panel display unit, the dialog box lets you specify also the number of soft keys, focus color, the type of a key to be used to call a data input pop-up screen for controls with input.

CNC system:
Select the model of the target CNC system from the following:
Series 30i/31i/32i i-MODEL A
Series 16i/18i/21i i-MODEL A/B
Power Mate i-MODEL D
Power Mate i-MODEL H
PMC type:
Select the PMC type used in the target CNC system from the following:
3Xi(PMC for Series 30i)
PMC/SB7
PMC/SB6
PMC/SB5
PMC/SD7

Display unit type
Resolution:
Choose whether the display unit of the target CNC is based on VGA (640×480 pixels) or XGA (1024×768 pixels).

Font:
Select a font size used for CNC display. One of the following two types, usually called 14” type and 9” type, can be selected:
Small(14inc)
Big(9inc)

Soft key:
If you turned it on, specify the number of soft keys to be used:
Specify how many soft keys the display unit uses.
This setting is referenced in specifying the font and size of characters in button and lamp captions on a form during screen editing and in creating screen data related to soft keys.
5 + 2 pieces (Display unit of alias nine inches)
10 + 2 pieces (Display unit of alias 14 inches)
10 + 2 +9 pieces (Display unit with vertical software key for Series 30i)

Call key to input pop-up screen
Creating screens for a non-touch panel display unit requires setting up this item.
To input data for a control with input, use one of the following three input methods: Key-in buffer, pop-up ten-key pad, and pop-up screen for data input. For the latter two input methods (pop-up type input methods), a pop-up screen for data input is called by touching a control with input on a touch panel display unit. For a non-touch panel display unit, a pop-up screen is called using a key rather than touching the control. A key for calling a pop-up screen for data input is selected and set up for an individual control with input. The following keys can be used for this purpose.
Numeric keys (0, 1, 2, 3, 4, 5, 6, 7, 8, 9, +, -, .)
Alphanumeric character keys (including numeric keys and special character keys as well letter keys)
F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, FR, FL (F6 - F10 cannot be specified if the number of soft keys to be used is 5+2.)
VF1, VF2, VF3, VF4, VF5, VF6, VF7, VF8, VF9 (vertical software key)
CAN, INPUT, ALTER, INSERT, DELETE (editing keys)
HELP key
Any numeric key or alphanumeric character key (any of those keys enclosed in parentheses) can be used to call a pop-up screen for input.

**Numeric Indication Control with Key Input**:
**Numeric Indication Control for Calling Ten-Key Pad**:
**PMC Area Character String Indication Control**:
Select a key type for calling a pop-up screen for input to each control type. For Numeric Indication Control with Key Input and PMC Area Character String Indication Control, data can be input from a key-in buffer. This setting applies only to the controls for which the pop-up screen input method is selected.

**Specify the common focus color**:
If you want to use the following display colors for any focused control with input throughout the project in common, turn on this check box. If you turned it on, these color settings are used instead of the focus colors specified for individual controls.
For the non-touch panel display unit, the check box is automatically turned on. For the touch panel display unit, this setting is optional.

**Focus background color**:
**Focus character color**:
If you turned on the check box for “Specify the common focus color,” specify a background color and character color for the focus.
2.2.7.2 Setting of Multi-language

Pressing the FANUC PICTURE menu bar [file]-[Project]-[Setting…] and clicking the [Setting of Multi-language] tab causes the Setting of Multi-language dialog box to appear.

Make a setting to use the multi-language display function to switch between multiple languages instead of using only a single language on the operator’s panel screen created with a custom screen project.

The multi-language display function is used.

Check this item to use the multi-language display function in the custom screen project. If you apply an existing custom screen project to the multi-language display function, the previously set captions are automatically set as those in the language of the first multi-language key (item number: 01) additionally registered during multi-language editing. By using the batch input tool, you can set the captions with any multi-language key.

Method of switching Multi-language display

For this item, select between the two types described below as the method of switching display languages on the CNC display unit.
The display language parameter of CNC is used:
Select this option button if the languages provided by the custom screen.

- **For Series 16i/18i/21i, Power Mate i**
  The same parameter bits as the language bits of language parameters Nos. 3102 and 3119 of the CNC are to be used for language switching.
  This enables the custom screen to be synchronized with the same language as that on the CNC screen, but a power disconnection alarm occurs at the time of language switching.

- **For Series 30i/31i/32i**
  The CNC language parameter is number parameter No. 3281.

The Multi-language display switch signal used.(1Byte):
Select this option button if switching between the display languages provided by the custom screen is to be accomplished by writing the language number associated with a display language to the PMC signal area. If you select this button, set the PMC area and the PMC address below. From a PMC ladder, language switching is accomplished by writing the language number registered with a multi-language key to the interface area. If an un-registered language number is written, the default language is used for display.

**PMC Area, PMC Address**:
If you select The Multi-language display switch signal used, above, set the type and address of the PMC signal area to specify where to reserve the space for the PMC signal area (1 byte).

* For the symbol specification property for PMC signal address specification, see Subsection 2.2.3, “Symbol Specification with FANUC PICTURE”.

---

⚠️ **CAUTION**
When the each country word display is switched while displaying the custom screen, the screen is displayed again. When the pop up screen is displayed, the pop up screen is shut by the re-display. Moreover, the output signal is turned off at the button control with the frame which does not maintain the state of the output signal. Please consider the interlock processing by the PMC ladder for the switch of the display language when this is inconvenient.
2.2.7.3 Collection of history

Pressing the FANUC PICTURE menu bar [File]-[Project]-[Setting…] and clicking the [Collection of history] tab causes the dialog box shown below to appear.

The history message indication control of FANUC PICTURE can display a summary of messages according to a message indication request from the PMC. A function is provided which collects such message display history. By specifying the data resulting from collecting message display history with a history message indication control, you can perform history display in addition to summary display. This dialog box tab is used to set up message indication history collection.

The history collection function conforms to the following specifications:
1. Collects history of message indication signals at up to four locations.
2. Records history of 300 message indication signals per location. A set or record of 300 signals at a single location is called a block.
3. The history items to be recorded are the number, occurrence time, and cancellation time of an indicated message, plus the history block deletion date and time for each block.
4. Supports both number I/F and bit I/F as the message indication interface (abbreviated I/F) for collecting history. For the number I/F, there may be up to 32 monitoring PMC areas; for the bit I/F, the monitoring PMC area may be of up to consecutive 512 bits.

⚠️ **CAUTION : IMPORTANT**  
1. An unused history collection block is always in the history deleted state. Thus, the history collection data in a block used once will be deleted when the use of the history block is stopped. History blocks will be cleared to zero and enter the history deleted state due to the rewriting of the values of parameters Nos. 8661 and 8662.

2. For bit signals, history collection can collect the on/off signal states of up to consecutive 512 bits at four locations. You must, however, adjust the number of history monitoring PMC signal areas by considering the control environment of the CNC control unit used and the display performance of the custom screen.

### History Block Number:
You can specify up to four blocks for recording message indication history for a history message indication control. Check the check box of the block number used.

### History Deletion Area/Address/Bit:
For each history block, specify the signal for deleting and initializing the history block. Keep this signal on for 500 ms or more. When the operator’s panel detects a rising edge of this signal, the corresponding history block is deleted and initialized.

### BitIF:
Check this check box to use the bit interface for the history message indication method.  
With the method using the bit interface, a single message indication is performed for each bit signal of the PMC. If multiple message indication request bits are detected at the same time, the request with the smallest signal and bit numbers will be recorded first.

### Search Start Area/Address/Bit:
Specify the start signal position of the area used to monitor message indication history signals with the bit interface.

### Search Bit Counter:
Specify the number of consecutive bits to be monitored, starting at the start of the search start signal. A number up to 512 can be specified.
NumberIF:
Check this check box to use the number interface for the history message indication method.
With the message using the number interface, up to 32 PMC indication request number specification areas with a length of either one or two bytes are provided, and message numbers are written from a PMC ladder to these areas to indicate messages. If multiple message indication request numbers are detected at the same time, the number written to the number specification area with the smallest number will be recorded first.

Message Area/Address:
Specify the start signal position of the areas used to monitor message indication history number signals with the number interface.

Message Number:
Specify the number of number areas to be reserved that will be reported with message indication requests with the number interface. The maximum allowable number is 32.

Message Area Size - 1Byte/2Bytes:
Specify either 1 byte or 2 bytes as the size of a single number area to be reported with a message indication request with the number interface.

Date & Time Display Format:
Specify the display format for the “history block deletion date and time” recorded for each history block by the history message indication data acquisition FP function and for the newest and oldest dates of the history data stored in the history block.
None This display item and subsequent ones will not be used.
YYYY 4-digit year
YY 2-digit year
MO 2-digit month
DD 2-digit day
HH 2-digit hours
MI 2-digit minutes
SS 2-digit seconds
You can enter a separator character between the above display format items.

⚠️ CAUTION
These dates are displayed in a specified format on the screen with the function specification of the numeral/character string indication control, and with the character type specified with this control. For this reason, the specified separator character may not be displayed with the character type specified with the indication control. Use caution when specifying a separator character.
2.2.8 Edit of Screen Form

2.2.8.1 Method of placing controls on a form

1. Click a desired control among the controls for FANUC PICTURE in the tool box of <1>. Only the controls provided by FANUC PICTURE can be used.
2. When the mouse pointer is moved onto the form, the shape of the mouse pointer changes from an arrow-shaped pointer to a +-shaped pointer. If this shape change is not made, start all over again from the control selection.
3. Move the mouse pointer to a desired upper-left corner position where the control is to be pasted. After moving the mouse pointer, paste the control according to the operation of <2>.
4. While holding down the left mouse button, drag the mouse diagonally from upper left to lower right. When a desired size is obtained, release the left button.
5. This completes the pasting of a control.
2.2.8.2 Setting of properties

To display the Property Pages dialog box (<3>), first place the mouse pointer on the control, then right-click. When the edit menu appears, select Properties... to display the dialog box. The Property Pages dialog box can also be displayed by double-clicking the control. By clicking a tab of the Property Pages dialog box, the user can set the property items related to the tab name. The user can quit the dialog box by clicking OK or Cancel.

2.2.8.3 Moving and resizing controls

[Movement]
To move the position of a control, move the mouse point onto the control then drag the mouse while holding down the left button.

[Resizing]
Select and click a desired control. At the four corners and the center of each side of the selected control, a handle (□) is displayed. To resize the control, place the mouse pointer on a handle. The shape of the mouse pointer changes to ∞. In this state, the control can be resized by dragging the mouse while holding down the left button.
2.2.8.4 Pop-up menu display

When you right-click the mouse on a screen form, the pop-up menu appears as shown below. This pop-up menu enables an editing operation to be performed quickly on the currently selected control.

2.2.8.5 Mouse operation and key operation for edit

In editing of a form, mouse buttons, [Ctrl], [Shift], and other keys can be combined for various operations. These operations are summarized below.

<table>
<thead>
<tr>
<th>Edit operation</th>
<th>Explanation</th>
<th>Mouse and key operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of control</td>
<td>When clicking the left button on a control, the control is selected as the target of movement, resizing, or displaying of its property dialog.</td>
<td>Left-click</td>
</tr>
<tr>
<td>Display of property dialog of control</td>
<td>When double-clicking the left button on a control, the property dialog of the control can be displayed.</td>
<td>Double-clicking</td>
</tr>
<tr>
<td>Pop-up menu display</td>
<td>When clicking the right button on a control, the frequently used pop-up menu for editing can be displayed.</td>
<td>Right-clicking</td>
</tr>
<tr>
<td>Group selection of control</td>
<td>When dragging from a starting point where no control is present, a group of controls completely enclosed by the drawn rectangle can be selected.</td>
<td>Drag</td>
</tr>
<tr>
<td></td>
<td>When dragging from a starting point where a control is present, if pressing [Ctrl], a group of controls completely enclosed by the drawn rectangle can be selected without moving the control under the starting point.</td>
<td>[Ctrl]+ Drag</td>
</tr>
<tr>
<td>Addition of control to group selection</td>
<td>When clicking the left button on a control while pressing the [Shift] key, the control can be added to the selected group.</td>
<td>[Shift]+Left-click</td>
</tr>
<tr>
<td>Addition and release of control to group selection</td>
<td>When clicking the left button on a selected control other than the last selected one (standard control) while pressing [Ctrl], the control can be deselected. When clicking the left button on an unselected control while pressing [Ctrl], the control can be added to the selected group. This operation can directly change a group selection standard control.</td>
<td>[Ctrl]+Left-click</td>
</tr>
<tr>
<td>Edit operation</td>
<td>Explanation</td>
<td>Mouse and key operation</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td>Change in group selection standard control</td>
<td>When pressing an arrow key with a group selected, the standard control can be changed.</td>
<td>Arrow key</td>
</tr>
<tr>
<td>Movement of control</td>
<td>When pressing the left button to select a control and then dragging it, all selected controls can be moved.</td>
<td>Drag</td>
</tr>
<tr>
<td></td>
<td>When pressing an arrow key while pressing [Ctrl], all selected controls can be moved one coordinate step at a time in the direction indicated by the arrow key.</td>
<td>[Ctrl]+Arrow key</td>
</tr>
<tr>
<td>Size change in control</td>
<td>When placing the cursor on a selected control and dragging it, the size can be changed.</td>
<td>Drag</td>
</tr>
<tr>
<td></td>
<td>When pressing an arrow key while pressing [Shift], the width or height of all selected controls can be increased or reduced one coordinate step at a time in the direction indicated by the arrow key.</td>
<td>[Shift]+Arrow key</td>
</tr>
</tbody>
</table>
2.2.9 Make MEM file

This step converts data to display a created machine operation screen with FANUC PICTURE on the CNC and creates an MEM file to be written to the F-ROM of the CNC.

By using the procedure below, convert a created custom screen to screen data for FANUC PICTURE to create data in memory card format.

2.2.9.1 Data conversion and MEM form file making procedure

<1> Click the Make MEM File… menu button. The Making of memory card file dialog box appears.

<2> In the Start-up screen pull-down list box, select a screen to be displayed when the power is turned on.

<3> The Form File Name field indicates [RETURN] and lists up screens that function as parent screens in created custom screens. So, double-click a screen to be called by using the CNC soft key, to open the Setting user screen dialog box.

The Form File Name field of the Making of memory card file dialog box includes a special screen, namely, [RETURN]. Specify this screen to display the user screen displayed immediately before switching to a CNC screen without specifying a user screen (base screen) created with FANUC PICTURE. Even in this case, the soft key for calling a user screen in the procedure above needs to be specified.
<4> In the Screen Number pull-down list box, specify a CNC screen to be replaced. For a screen number with the “C Executor” comment, the screen displayed on the CNC remains to be unchanged, and a free screen soft key is assigned. (For CNC units and available screen numbers, see APPENDIX B, "CNC SCREEN NUMBERS").

<5> In Key Caption, set a character string to be displayed for the CNC screen soft key. Specify a half-size alphanumeric character string in uppercase no longer than six characters.

<6> Check Select flag to enable calling from the CNC screen.

⚠️ CAUTION
Select flag must be specified at least once in the base screens including [RETURN].

<7> Making of backup to F-ROM
Checking the [Making of backup to F-ROM] check box causes the custom screen data in the project contained in the folder on the personal computer to be saved in a memory card format file. This enables you to restore the project on the personal computer by sucking up FANUC PICTURE screen data (this screen data MEM file usually assumes a file name of FPF0FPDT or CEX0FPDT) from the F-ROM of the CNC control unit to the memory card when altering the custom screen of the machine.

If you select [Making of backup to F-ROM] for the custom screen data for the project, collect the following data into the specified subfolders. When the custom screen data for a project that has been saved, the same subfolders are created.

1. Image file data → (project-folder-name)
2. VTS message file data → (project-folder-name)

For an explanation of the method of sucking up a screen data MEM file from the F-ROM of the CNC control unit and restoring a project on the personal computer, see the explanation of “New Project”.
<8> Click **OK** to return to the Making of memory card file dialog box.

Click **OK** in the Making of memory card file dialog box to create data in memory card format.

![Image](image.png)

The memory card file is successfully made.

When the memory card format file FPF0FPDT.mem or CEX0FPDT.mem is created, the dialog box indicating “The memory card file was normally made.” is displayed.

When Make MEM is used, the message dialog box indicating “XXX.DEF was not found.” may appear. This dialog box is displayed when no screen name is set or an incorrect screen name is set in the screen switch control. Check the property of the screen switch control.
Switching between the CNC screen and custom screen

Explain below are how a custom screen created using FANUC PICTURE is called from the CNC display unit and how switching occurs from the custom screen to a CNC-provided screen.

The following two methods can be used to display a custom screen from the CNC unit. Method A can be used only when the power is turned on. So, method B is used for ordinary screen switching.

A. When the CNC unit is turned on, a custom screen specified as a "Start up screen," which is an MEM-generated setup item, is displayed first.

B. A custom screen is displayed by pressing that screen select soft key which is prepared for each function key on the CNC unit according to a soft key number specified in MEM-generated replacement screen setting and the name of the custom screen.

To the contrary, switching from a custom screen to any other CNC screen can be performed by pressing a function key on the MDI unit or pressing the corresponding function key button placed as an MDI key control on the touch panel.

<table>
<thead>
<tr>
<th>Screen switching by method B</th>
</tr>
</thead>
<tbody>
<tr>
<td>In screen switching on the CNC unit, a screen is displayed using a soft key assigned to an individual function key as listed below. Method B performs screen switching by replacing a CNC screen having this screen number with a created custom screen. However, the &quot;Custom Screen&quot; listed in the following chart has a screen number that can be assigned to a custom screen call soft key created using FANUC PICTURE without replacement with an original screen on the CNC.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[POSITION] function key</th>
<th>[PROGRAM] function key</th>
<th>[OFFSET] function key</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Number/Name</td>
<td>Screen Number/Name</td>
<td>Screen Number/Name</td>
</tr>
<tr>
<td>[0x0000]Absolute</td>
<td>[0x0001]MDI program</td>
<td>[0x0002]Offset</td>
</tr>
<tr>
<td>[0x0100]Relative</td>
<td>[0x0101]Program</td>
<td>[0x0102]Setting parameter</td>
</tr>
<tr>
<td>[0x0200]All</td>
<td>[0x0201]Library</td>
<td>[0x0202]Work coordinates</td>
</tr>
<tr>
<td>[0x0300]Handle IRT.</td>
<td>[0x0301]Current block</td>
<td>[0x0302]Macro variable</td>
</tr>
<tr>
<td>(Other)</td>
<td>(Other)</td>
<td>(Other)</td>
</tr>
<tr>
<td>[0x0500]Custom screen</td>
<td>[0x0d01]Custom screen</td>
<td>[0x0d02]Custom screen</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>[SYSTEM] function key</th>
<th>[MESSAGE] function key</th>
<th>[GRAPHIC] function key (full keypad)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Number/Name</td>
<td>Screen Number/Name</td>
<td>Screen Number/Name</td>
</tr>
<tr>
<td>[0x0003]Parameter</td>
<td>[0x0004]Alarm</td>
<td>[0x0005]Graphic</td>
</tr>
<tr>
<td>[0x0103]Diagnosis</td>
<td>[0x0104]External MSG</td>
<td></td>
</tr>
<tr>
<td>[0x0203]PMC</td>
<td>[0x0204]Alarm history</td>
<td></td>
</tr>
<tr>
<td>[0x0303]System config.</td>
<td>[0x0304]MAP message</td>
<td>[CUSTOM]functionkey(for full keypad)</td>
</tr>
<tr>
<td>(Other)</td>
<td>(Other)</td>
<td>Screen Number/Name</td>
</tr>
<tr>
<td>[0x1903]Custom screen</td>
<td>[0x0a04]Custom screen</td>
<td>[0x0106]AUX</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0x0206]MACRO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0x0306]MENU</td>
</tr>
</tbody>
</table>

* The screen numbers are provided for the Series 16i/18i/21i/Power Mate i.
Cautions

Each CNC function key remembers a subscreen previously displayed with it.
When a function key other than the currently active function key is pressed, the subscreen previously displayed with the pressed function key appears. A concrete example follows.

<1> A screen select soft key corresponding to the “POSITION function key” is used to display custom screen A. The POSITION function key will memorize that it is displaying screen A.

↓

<2> On custom screen A, pressing the SYSTEM function key causes screen switching to the screen (say, parameter screen) memorized by the SYSTEM function key.

↓

<3> Pressing the POSITION function key displays custom screen A, which is memorized in this function key.

If switching to a CNC-side screen is performed by other than the function key to which custom screen A was assigned as shown above, switching to a sub screen other than custom screen A under the POSITION function key becomes impossible as shown in step <3>.

When using a function key to switch from a custom screen to a CNC-side screen, make sure that the function key is the one assigned to the custom screen. In the above example, the POSITION key is used to switch to the CNC screen.

This is also true for the CUSTOM function key. However, no inconvenience will be experienced because there is no CNC-provided screen under the CUSTOM function key. For an explanation of allocation to the CUSTOM function key and notes, see Subsection 2.2.9.3.
2.2.9.3 **Settings for calling a custom screen with the OPER/CUSTOM/GRAPH keys**

This subsection explains the method of calling a custom screen with the [OPER]/[CUSTOM] keys on the virtual keyboard and the [CUSTOM] key on the MDI unit of the Series 16i/18i/21i and the method of calling a custom screen with the [CUSTOM]/[GRAPH] keys on the virtual keyboard and the [GRAPH] key on the MDI unit of the Power Mate i-D/H.

The CUSTOM and GRAPH keys set up with these methods, as well as the blank key, are enabled for the switching to a custom screen only if the CNC screen is displayed as shown in the figure above. If a custom screen is already displayed, therefore, pressing these keys will start the corresponding operations, but does not eventually perform switching to the specified custom screen.

<table>
<thead>
<tr>
<th>CNC</th>
<th>For virtual board</th>
<th>For MDI unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Series 16i/18i/21i</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSSB connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display unit type</td>
<td>CUSTOM</td>
<td>OPER</td>
</tr>
<tr>
<td>CUSTOM</td>
<td>Assign the soft key number of bit 5 (0x0106), 6 (0x0206), or 7 (0x0306) of parameter No. 8652 to the custom screen to be called. (Note 1)</td>
<td>Assign the soft key number of 0x1903 to the custom screen to be called.</td>
</tr>
<tr>
<td>OPER</td>
<td>Same as the setting of the CUSTOM key on the virtual keyboard (Note 1)</td>
<td>Same as the setting of the CUSTOM key on the virtual keyboard (Note 1)</td>
</tr>
<tr>
<td>CUSTOM</td>
<td>Same as the setting of the CUSTOM key on the virtual keyboard (Note 1)</td>
<td></td>
</tr>
<tr>
<td>Display link connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power Mate i-D/H</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display unit type</td>
<td>CUSTOM</td>
<td>GRAPH</td>
</tr>
<tr>
<td>CUSTOM</td>
<td>Assign the soft key number of parameter No. 3195#0=1, and bit 0 (0x0106), 1 (0x0206), or 2 (0x0306) of parameter No. 8653 to the custom screen to be called. (Note 1)</td>
<td>Assign the soft key number of parameter No. 3195#0=0, and bit 0 (0x0106), 1 (0x0206), or 2 (0x0306) of parameter No. 8653 to the custom screen to be called. (Note 1)</td>
</tr>
<tr>
<td>GRAPH</td>
<td>To use “OPER” as the key top of each switching key, set bit 1 of parameter No. 3195 to 1.</td>
<td>Same as the setting of the GRAPH key on the virtual keyboard (Note 1)</td>
</tr>
</tbody>
</table>
• Select the same soft key number as that determined according to the table above from [Softkey Number] in the Setting user screen dialog box shown in Subsection 2.2.9.1.

NOTE
1. Of the three parameter bits, set only one to 1 and assign the soft key number corresponding to it. For this setting to take effect, the CNC unit must be turned off and back on.
2. In the presence of a macro executor option, the specification of the screen to switch to with this parameter is invalid.
3. If a macro executor option is attached, custom screens can be called with the CUSTOM (Series 16i type) or GRAPH (Power Mate i type) key by assigning the soft key numbers for the MDI unit to the custom screens to be called and setting corresponding conversational macro execution program numbers not existing in compilation parameters Nos. 9038 (AUX)/9040 (MCR)/9041 (MENU) for the individual soft key numbers.

2. If the MDI unit is of small key type, screen switching can be performed with the [CUSTOM/GRAPH] key. In this case, however, assign 0x0105 for 0x0106, 0x0205 for 0x0206, and 0x0305 for 0x0306 for soft key numbers.
3. The blank key is available if the MDI unit is of full key type.

For the Series 30i/31i/32i, the CUSTOM1 and CUSTOM2 function keys can be set to call a custom screen, without making special parameter settings. For the screen numbers of the CUSTOM function keys, see "B.2 Series 30i/31i/32i Screen Numbers."
2.2.9.4 Option function details setting

Click the Detail button to display the following dialog box. This dialog box is used to specify the various settings for the function for automatically calling screens from the PMC and the function for reporting the number of the screen currently displayed on the operator’s panel.

<table>
<thead>
<tr>
<th>Tab title</th>
<th>Function explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic screen call</td>
<td>The interface area to do “Automatic screen call from PMC” and “Displayed screen number notification” is set.</td>
</tr>
<tr>
<td>Display Number Setting</td>
<td>The screen number to do “Automatic screen call from PMC” and “Displayed screen number notification” is set.</td>
</tr>
<tr>
<td>Each Display Setting</td>
<td>Free of the memory is set to the screen which cannot be set by the screen structure definition control.</td>
</tr>
<tr>
<td>Signal display/OP ratio</td>
<td>Signal information set in the button control and the lamp control can be confirmed on CNC. And, the operation ratio can be changed from PMC at time related to the custom screen and time related to CNC executed by the background.</td>
</tr>
<tr>
<td>Buzzer Number Setting</td>
<td>When the custom screen is displayed, the touch operation sound of the touch panel can be output to the PMC area signal.</td>
</tr>
</tbody>
</table>

(1) Automatic screen call setting

![DETAIL Setting](image)
The automatic screen call is used:
Check this check box to use the function for automatically calling screens from the PMC.

Request Signal Area:
Specify the type of the PMC address of the signal conveying a request to call a screen from the PMC to the touch panel operator’s panel.

Request Signal Address:
Specify the address of the request signal.

Request Signal Bit:
Specify the bit position of the request signal address above by using a number 0 to 7.

Completion signal Area:
Specify the type of the PMC address of the signal reporting the completion of the call in response to a screen call request made from the touch panel operator’s panel to the PMC.

Completion signal Address:
Specify the address of the completion signal.

Completion signal Bit:
Specify the bit position of the signal address above by using a number 0 to 7.

Display Number Signal Area:
Specify the 2-byte interface area to which the screen number is to be written when a screen is to be automatically called from the PMC. For this item, specify the type of the PMC address of the area.

Display Number Signal Address:
Specify the address of the screen number interface area.

The NC screen call is used:
Check this check box to use the function for automatically calling CNC screens from the PMC.

When the screen made with FANUC PICTURE is displayed, this function can be switched to the screen on the CNC side by the switch demand by PMC.

The interface area to switch the screen uses the same PMC area as the automatic screen call function.

The automatic screen call function and the CNC screen call function are changed according to the following change signals. Please refer to the attached table for the number allocated to the screen on the CNC side.

Please refer to “B. CNC screen number list” of the appendix for the number allocated to the screen on the CNC side.

In the screen number notification function when the CNC screen call is done, 0 is notified while displaying CNC.

Change Signal Area:
The kind of the PMC address of the signal which changes the interface area of the automatic screen call function to the CNC screen call function is specified.
Change Signal Address:
Specify the address of the change signal.

Change Signal Bit:
Specify the bit position of the signal address above by using a number 0 to 7.

The screen number notification is used:
Check this check box to use the function by which the touch panel operator’s panel reports the number of the currently displayed screen to the PMC.
0 is set in the notification area while displaying the CNC screen.

Signal Area(Screen number notification function):
Specify the 2-byte interface area to which the screen number is to be written that is used when the touch panel operator’s panel is to report the number of the currently displayed screen to the PMC. For this item, specify the type of the PMC address of the area.

Signal Address(Screen number notification function):
Specify the address of the screen number report interface area.

Request and completion signals are controlled by reversing them to 0 and 1. If the exclusive logical sum of the signals is 1, the touch panel operator’s panel assumes that it has received a screen call request, and executes a screen call process. The PMC can set up a screen call if the exclusive logic sum is 0.

- Screen call & notification sequence

<table>
<thead>
<tr>
<th>Screen number</th>
<th>10 is set in the screen number.</th>
<th>11 is set in the screen number.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Request signal</td>
<td>Request signal is reversed.</td>
<td>Request signal is reversed.</td>
</tr>
<tr>
<td>Completion signal</td>
<td>500ms or more</td>
<td>500ms or more</td>
</tr>
<tr>
<td>Screen switch operation</td>
<td>No.10</td>
<td>No.11</td>
</tr>
<tr>
<td>Screen number notification output</td>
<td>Screen number before</td>
<td>Screen number 10</td>
</tr>
</tbody>
</table>
(2) Display Number Setting

Using the function for automatically calling screens from the PMC or the function for reporting the number of the screen currently displayed on the touch panel operator’s panel requires that screen numbers be allocated to automatically listed base screen form names. This dialog box is used to set such screen numbers. Screen numbers 1 to 65535 can be allocated.

Screen numbers have different meanings depending on the function, as described in the table below.

<table>
<thead>
<tr>
<th>Screen number</th>
<th>Automatic call screen</th>
<th>Screen number notification function</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Ignored.</td>
<td>Numberless or NC screen</td>
</tr>
<tr>
<td>1 to 65535</td>
<td>The base screen corresponding to the number is displayed.</td>
<td>The currently displayed base screen number is reported.</td>
</tr>
</tbody>
</table>

By using the Auto Set button, you can specify the screen number to be allocated to form name 1 so that consecutive numbers incrementing by +1 are automatically set for the subsequent form names.
(3) Each Display Setting

This menu item allows you to specify whether to free memory for those screens that cannot be set using the screen structure definition control. It does not allow you to change the specification as to whether to free memory for those screens that have been set using the screen structure definition control.

If the same screen has been set differently using the screen structure definition control, the system assumes that memory should be freed.

Form Name:
Displays the names of all created screens.

Free Memory:
Specify whether to free memory.
For an explanation of the memory freeing function, see Subsection 2.3.3, “Screen Structure Definition Control.”
0: Does not free memory.
The display speed increases at the second display and later.
1: Frees memory.
Frees the memory area containing screen data when the screen is closed. This allows efficient use of the memory area.
(4) Signal Display/OP ratio

The signal display function displays signal information set in the button control (Only the one that the shortcut key is defined can be displayed for non-touch panel display unit) and the lamp control (The lamp cannot be displayed for non-touch panel display unit) while displaying the screen made with FANUC PICTURE in CNC.

The signal set in ‘The signal display is used’ is turned on, and the control on the custom screen is displayed to following signal information while the operator is touching (The MDI key is operated for non-touch panel display unit).

Moreover, the touched control does not operate when the signal set in ‘The operation is invalidated’ is turned on at the same time and only the signal display is done. When this signal is turned on, the screen switch button operation is not done. Therefore, it is not possible to switch from the operation panel screen to other screens including the CNC screen. Please install the switch of this signal outside or make the ladder such as turning off this signal automatically when the fixed time passes by the timer for this measures.
The signal display is used:
Check this check box to use the function for Signal display.

Change Signal Area:
Specify the type of the PMC address of the change signal which displays pop-up window to display signal.

Change Signal Address:
Specify the address type of the change signal.

Change Signal Bit:
Specify the bit position of the change signal above by using a number 0 to 7.

The operation is invalidated:
When the function that the action of the button control is not executed is used, the check box is checked.

Change Signal Area:
Specify the type of the PMC address of the change signal not to execute action of button control.

Change Signal Address:
Specify the address type of the change signal not to execute action of button control.

Change Signal Bit:
Specify the bit position of the change signal above by using a number 0 to 7.

The operation ratio change function displaying the custom screen is used:
This function setting is valid for the Series 16i/18i/21i and Power Mate i-D/H.
If the RS232C-based ladder online monitor function and external device I/O control are used when a custom screen created with FANUC PICTURE is displayed, these operations abruptly slow down. This is because the same task is used for screen display and the CNC functions mentioned above, so processing time allocated per unit time is reduced, thus increasing the time required to complete processing.
With FANUC PICTURE, the ratio of (custom screen operation:CNC function operation) = (80%:20%) is used by default.
The operation ratio change function enables the operation ratio to be dynamically changed by a PMC ladder according to the status of the CNC.
Check this box to use this function. When this box is checked, the dark display of the following input items disappears:

Interface area for operation ratio change
Signal Area, Signal Address:
Specify a one-byte PMC area signal used under the following configuration for the interface signal area for operation ratio change:
2. DEVELOPMENT OF CUSTOM SCREEN

- Configuration of the interface area for operation ratio change

<table>
<thead>
<tr>
<th></th>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom screen ratio change request signal</td>
<td>By using seven bits from #0 to #6, specify the operation time ratio between the display of custom screens created with FANUC PICTURE and the processing of the CNC functions. Specify a binary value from 0% to 99% as a ratio of time to be allocated to custom screen display.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<1> Set the ratio of custom screen operation (#6-#0) with a PMC ladder, then turn on bit #7 “custom screen ratio change request signal”.

<2> The custom screen side monitors the request signal bit. When the request signal bit is turned on, the custom screen side reads the ratio (%) to change the screen display processing time so that the time ratio is changed in steps of 20%, not exceeding the upper limit 80%.

<3> When the request signal bit from the PMC is turned off, the setting is returned to the default (80%).

**NOTE**

The table below indicates the correspondence between a specified percentage and a ratio actually set.

<table>
<thead>
<tr>
<th>Percentage specified from PMC (#6-#0)</th>
<th>Ratio actually set</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>80%</td>
</tr>
<tr>
<td>1-20</td>
<td>20%</td>
</tr>
<tr>
<td>21-40</td>
<td>40%</td>
</tr>
<tr>
<td>41-60</td>
<td>60%</td>
</tr>
<tr>
<td>61-80</td>
<td>80%</td>
</tr>
<tr>
<td>81 or more</td>
<td>80%</td>
</tr>
</tbody>
</table>

** WARNING**

If the operation ratio for custom screen display is reduced, screen display and response to touch operations such as screen switching and button signal output slow down. So, if such a slowdown is disadvantageous to a machine operation, take proper actions such as changing the operation ratio with a ladder and stopping the affected machine operation or ensuring interlock.
(5) Buzzer Signal Setting

If a touch operation is performed while a custom screen created with FANUC PICTURE is displayed, the touch operation can be output to the PMC signal area. With this output signal, for example, the external buzzer can be sounded. However, this signal is not posted when a screen provided by the system on the CNC or PMC side is displayed.

The buzzer signal is used:
Check this box to use the function for posting a touch operation to the PMC signal area.

Buzzer Signal Area:
Buzzer Signal Address:
Buzzer Signal Bit:
Specify the type, address, and bit position of a PMC signal area to be used for the touch operation notification signal mentioned above.
2.2.9.5 **FP-PARAMETER SETTING screen**

When the operator’s panel screen created in FANUC PICTURE is displayed on the CNC, each type of control can operate in a different way. The operations can be controlled by setting the parameters on the [FP-PARAMETER SETTING] screen. To display the [FP-PARAMETER SETTING] screen, click the **FP-PARAM** button on the [Making memory card file] screen that can be displayed from the [Make MEM File...] menu.

The [FP-PARAMETER SETTING] screen is shown below.

On this screen, the parameter number, parameter name, and current settings are displayed. To change a parameter value, move the cursor to the [SETTING] field next to the desired parameter and then enter a new value.
To save the parameters specified on the [FP-PARAMETER SETTING] screen and then exit the screen, click the **OK** button.

**Cancel** button

To clear the parameters specified on the [FP-PARAMETER SETTING] screen and then exit the screen, click the [Cancel] button.

**Explain** button

To display the [FP-PARAMETER Explain] dialog box for the parameter which the cursor points to, click the [Explain] button. To see a description of another parameter, move the cursor to the parameter and then click the [Explain] button.

To close the [FP-PARAMETER Explain] dialog box, click the **OK** button.
2.2.10 Write to Card

Using the procedure described below, operator’s panel screen data (such as FPF0FPDT.MEM or CEX0FPDT.MEM) and the FP driver are copied to the memory card. Clicking "Output MEM File" on the menu displays the Write to card dialog box.

The file name, creation date, and memory size of operator’s panel screen data created with Make MEM are displayed.

In the Transfer Place edit box, specify a screen data transfer destination (copy destination). In this case, the memory card drive must always be specified. When screen data is to be transferred from the memory card to the F-ROM of the CNC, MEM data must be copied to the root directory of the memory card drive.

In the File name field, enter a desired file name at a location where a transfer destination file name is arbitrarily specified. This file name is a name used for file management by Windows and is not a file name on the F-ROM. The name FPF0FPDT or CEX0FPDT is assigned to this file.

In usual card write operation, screen data only is copied. However, when screen data is initially written to the CNC, or FANUC PICTURE is upgraded, however, the FP driver data also needs to be copied. In this case, check a check box for transfer to the driver system.

Depending on the type of the target CNC, a transfer driver software file indicated in the table below is automatically selected and copied. Clicking the OK button executes copy operation.

<table>
<thead>
<tr>
<th>No.</th>
<th>CNC Type</th>
<th>Name of FP-Driver</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Series 30i/31i/32i -MODEL A</td>
<td>BY27.mem</td>
</tr>
<tr>
<td>2</td>
<td>Series 16i/18i/21i-MODEL A/B</td>
<td>BY17.mem</td>
</tr>
<tr>
<td>3</td>
<td>Power Mate i-H</td>
<td>BY18.mem</td>
</tr>
<tr>
<td>4</td>
<td>Power Mate i-D</td>
<td>BY19.mem</td>
</tr>
</tbody>
</table>

FP driver: Short for FANUC PICTURE driver. The operation of the driver is displayed on the LCD with a touch panel on the CNC by analyzing touch panel screen data created on the personal computer.
Download from the memory card to F-ROM of the CNC
Operator’s panel data (FPF0FPDT.MEM or CEX0FPDT.MEM) or the FP driver can be downloaded to the F-ROM of the CNC by using the boot function of the CNC.
For the method of activating the boot function, refer to the relevant manual of each CNC system.

Example:
If no MDI unit is attached, turn on the power while holding the upper-left corner of the panel to activate the boot function software; if an MDI unit is attached, turn on the power while holding down the [7] and [6] keys on the ten-key pad to activate it.

2.2.11 Composite Forms
A base(main/parent) screen and sub(child) screens created separately from each other at the time of custom screen editing are composited on the personal computer into an image to be displayed on the CNC.
With the menu item Composite Forms, these partial screens can be composited so that the same screen structure as the entire screen displayed on the machine operator’s panel can be checked on the personal computer.
Click the Composite Screens… button on the menu. The dialog box shown below appears.

Clicking the [Base] pull-down list box displays a list of screens that make up the machine operator’s panel.
The screen names serve as the names for screens created under a project. As sub(child) screen names 1 through 5, sub(child) screen names specified in the base(main/parent) screen are indicated. If the screen switch button can be used for switching from one sub(child) screen to another, the pull-down list box on a sub(child) screen indicates a list of sub(child) screens as with the base(main/parent) screen. From these combo boxes, select a desired screen composite structure then click the [Indicate] button.

### 2.2.11.1 Saving the bit map of the active screen form

Click [File]-Screen bitmap on the menu bar to save the bit map of the currently active screen form to a file. Screen bitmap appears on the menu when there is an active screen form.
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2.2.12 Option

FANUC PICTURE allows you to set the operating environment for creating an operator's screen, optionally.

2.2.12.1 Color

The type of the color depth used on the screen can be selected.

Compatible:
The same depth colors as with the former FANUC PICTURE/A08B-9010-J514#ZZ11 are used.

Real:
Drawings are displayed in colors closer to the original as compared with Compatible.

2.2.13 Help

Clicking Help on the menu displays FANUC PICTURE help and version information.
2.3 CONTROLS

2.3.1 Procedure for Setting Properties Common to Controls

2.3.1.1 Description of general property setting items

OK button
This button validates property settings and quits the dialog box.

Cancel button
This button cancels the currently open property setting items (properties of General in the dialog box above) and quits the dialog box.
If any of the following operations is performed in the past, the properties are updated even when you click this button.
1. You have clicked the Apply button.
2. You have moved from the current tab to a different one.

Apply button
Click this button to apply the current property settings. The property dialog box is not terminated, but the display of the controls on the form is updated according to the settings. Moving from the currently displayed tab to another tab has the effect of clicking the Apply button. In other words, all updated items are reflected in the control display on the form.
Coordinate specification

A position on the screen is represented by two-dimensional coordinates (X,Y) with the upper-left corner of the screen set as the origin (0,0). (See the figure at left.) The following indicates the specifiable ranges:

The display unit resolution: For VGA

- (0,0) ≤ coordinates (X,Y) ≤ (639,479)
- (1,1) ≤ (width, height) ≤ (639,479)

The display unit resolution: For XGA

- (0,0) ≤ coordinates (X,Y) ≤ (1023,767)
- (1,1) ≤ (width, height) ≤ (1023,767)

[X] and [Y] on the General tab of the Property Pages of each control represent a control position on the screen. Precisely, [X] and [Y] specify the coordinates of the upper-left corner of the rectangle defining the outside figure of a control. [Width] and [Height] represent the width and height of a control, respectively.

The position and size of a control can be modified using the mouse on the editing screen. The position and size of a control can also be modified by updating the coordinates, and width and height values.

If the properties specifying coordinates and width and height values do not satisfy the condition described below, screen data is not output at the time of memory card file generation. If a control extending to the right edge or bottom is not displayed on the touch panel, check the coordinate-related properties.

VGA: (1,1) ≤ (X coordinate + width, Y coordinate + height) ≤ (639,479)
XGA: (1,1) ≤ (X coordinate + width, Y coordinate + height) ≤ (1023,767)
On Caption is copied onto Off Caption

The following controls, which have both On and Off captions, have a caption copy check box:
- Screen switch control
- Lamp control
- Button control
- Framed button control

Checking this check box causes the On caption settings to be automatically copied as the Off caption settings.

Optional new line mark of caption

New line can be described by “\n”.
## Character Type

The following table shows the characters displayable for each character type and their display sizes in the cases where the number of soft keys is 5 + 2 and 10 + 2 (including the cases where a touch panel is used).

<table>
<thead>
<tr>
<th>Character type</th>
<th>Uppercase alphanumeric characters</th>
<th>Lowercase alphabetic characters</th>
<th>Symbols</th>
<th>Kanji/ kana/ hiragana characters</th>
<th>Half-size characters in half-size kana characters</th>
<th>(width : height)pixel</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANK (displays a mixture of half-size and 2x-size characters)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>Half-size 8:16</td>
</tr>
<tr>
<td>X2 (Half-size characters set for a caption are displayed as 2x characters.)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>X</td>
<td>X</td>
<td>16:16</td>
</tr>
<tr>
<td>X4 (displays characters two times larger vertically and horizontally)</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>X</td>
<td>X</td>
<td>16:32</td>
</tr>
<tr>
<td>X6 (displays characters two times larger vertically and three times larger horizontally)</td>
<td>○</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>24:32</td>
</tr>
<tr>
<td>SMALL (displays characters smaller than half-size characters)</td>
<td>○</td>
<td>X</td>
<td>Δ partly</td>
<td>X</td>
<td>X</td>
<td>8:8</td>
</tr>
</tbody>
</table>

⚠️ **CAUTION:**
The same pixel size is used for double height and width size characters, regardless of the number of soft keys. When double height and width size (The Series 30i/31i/32i is not an object) or reduction is used frequently, the display of the entire screen slows down. So, the use of double height and width size and reduction should be minimized.
**Editing multi-language display captions**

The following explains how to edit the On and Off captions of buttons and lamps in each language.

The setting operation explained below is possible if The Multi-Language display function is used. is checked in the [Setting of project] tab. As an example, the explanation uses the caption-setting property in the Action tab in the property dialog box of a lamp control. The caption properties of other controls can also be set in each language with the same procedure.

![Diagram of property dialog box](image)

If the screen of a project created on a version of FANUC PICTURE into which the multi-language display function is not incorporated is to be converted into a multi-language display screen, the previously set captions will be automatically set as those for the language of the first multi-language key (item number: 01) additionally registered by performing a multi-language editing operation on the caption property; click the **Apply** button in the Character tab. During this editing operation, for a control that does not require multi-language switching, check the **[No use multi-language]** check box and click the **Apply** button.

**Properties related to multi-language input**

**No use multi-language**:
Check this item for a control that does not require multi-language display switching, as in a case in which the caption-related property may be the same characters regardless of the display language.

**Multi-language key**:
Select the multi-language key to be displayed or input for the caption-related property.
In a tab having captions, a property for multi-language input is provided, such as that shown in <1> in the above figure. The basic operation is to select the multi-language key to be set for a caption from the [Multi-language key] combo box and enter characters for the caption shown in <2>. In this way, a multi-language display language can be set.

Selecting another language for the multi-language key being edited causes the character strings set for the selected language to be displayed for the On and Off captions.

The above property dialog box is that of an MDI key control. There are cases in which the key top character as a caption item may be “#” for any language display. In such cases, check No use multi-language.
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**Color specification**

Clicking a color button on the Image tab opens the Color dialog box. In this dialog box, select a desired color, then click OK to set a color property. On the LCD on the CNC, a color closest to a specified color is displayed.
2. DEVELOPMENT OF CUSTOM SCREEN

2.3.1.2 Editing text message files

Structure of a text file and editing it

A text file has a spreadsheet structure such as that shown below.

<table>
<thead>
<tr>
<th>Number</th>
<th>Bit set</th>
<th>Char color</th>
<th>Message1</th>
<th>Message2</th>
<th>Message3</th>
<th>Message4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>10</td>
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<td>...</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Number:
If using numbers as the interface with the PMC, enter the text number. If this number is written to the number interface of the PMC, the written character string is displayed to a [Message] input cell.

Bit set:
If using bit correspondence specifications as the interface with the PMC, specify the serial number for the number of bits used. You can specify numbers up to 511, with the search start bit assumed to be 0.

Char color:
Specify the message display character color. Double-clicking the left mouse button causes a color setting dialog box to appear; select the desired color.

Message1-4:
Divide a message to be displayed with the text string display control into four and then input them. Up to 255 characters can be input in one cell. Messages of up to 1020 characters in total can be created.

Add row:
This spreadsheet contains 100 rows. If they are not enough, enter the number of additional rows in the [Add row] input field and click the [Add row] button, and the specified number of rows are added at the end of the last row.
**Insert Row:**
When a certain cell is selected entirely, moving the cursor to the position at which rows are to be inserted and clicking the **Insert Row** button causes the Number Setting dialog box to appear; enter the number of rows to be inserted. The specified number of rows are added at the row on the sheet on which the cursor is positioned.

![Number Setting dialog box](image)

**Del Row:**
Drag the cursor vertically to select the range of rows to be deleted at a time. Clicking the **Del Row** button causes the deletion confirmation dialog box to appear; click either **OK** or **Cancel**. If **OK** is selected, the selected rows are deleted.

![Del Row dialog box](image)

**Number Set:**
With the number of the number cell on which the cursor is positioned as the start number, this option automatically sets the specified number of numbers plus one number, starting with the cursor row in the downward direction.

![Number Setting dialog box](image)

**Bit set:**
With the bit of the Bit Set cell on which the cursor is positioned as the start number, this option automatically sets the specified bit number position of signals whose bit numbers increment by 1, starting with the cursor row.

![Bit Set Number Setting dialog box](image)
Check Char:
This option checks the message text on all lines to see if the set message character string contains characters that cannot be displayed with the character type of the character property of the control.

OK:
Terminates editing. Clicking it causes the [Save As] dialog box to appear, allowing you to save the message file with a new name. If you do not want to change the file name, select the [Same as Previous] file name and click the Save button.

Cancel:
Cancels a file editing operation.

Copy&Paste
Rectangular copy [CNTL+C] and paste [CNTL+V] in the direction of the row can be done to cells other than the character color. Moreover, the copy character can be done from the clipboard of Windows and the paste be done to the Windows application or the text message editor. However, please note the following items which are these limitations.

⚠️ CAUTION
1 The copy that there is new line in the cell such as EXCEL does not become new line in the cell in the text message editor. Therefore, please delete or replace new line in the cell such as EXCEL with “\n”.
2 Please give the copied direction of the row as one row. Please note that the character string of two or more cells enters the beginning cell of the paste (cell in left upper corner) for two rows or more.

Multi-language editing related to text messages
The following explains how to handle the multi-language display function of a type that writes messages to text message files (VTS files), as well as the editing method.
If you start editing of new text message file when The Multi-language display function is used. is checked in [Setting of project]-[Setting of Multi-language], the file type selection dialog box shown in the figure above appears. Select the desired type and click OK, and a text message setting sheet of the selected type appears. If you select Multi language, an editing dialog box appears, providing multiple sheets for individual multi-language keys. “Number”, “Bit set”, and “Char color” are common to all language sheets. Any changes made to these items on any of the sheets will be reflected in the other sheets.

If you start editing of existing text message file, the editing dialog box shown below appears. The Add sheet, Rename sheet name, and Delete sheet buttons are provided for multi-language editing, and the check box called [No use multi-language] is also provided. The previously created messages are registered with the language sheet of an item number of 01.

Add sheet button:
This button is effective if The Multi-language display function is used. is checked in [Setting of project]-[Setting of Multi-language]. Clicking this button will cause message setting sheets to be added for individual registered multi-language keys.
**Rename sheet name** button:

If, after adding a multi-language message sheet, you rename a multi-language key with [Setting of project], you must change the old sheet name to the same name as the new multi-language sheet name.

Select the tab of the sheet you want to rename by clicking it. Then, click the Rename sheet name button. From [Changed sheet name] in the dialog box that appears, select the multi-language key and click the **OK** button.

Alternatively, you can directly change the sheet name in the dialog box displayed by double-clicking the tab of the sheet you want to rename to the same name as that of the multi-language key.
Delete sheet button:
This button deletes an unnecessary sheet.
Select the tab of the sheet you want to delete by clicking it. Then, press the Delete sheet button. The dialog box for confirming deletion appears. Click either the OK or Cancel button.

No use multi-language:
For a text message file to which a sheet for multi-language input has been added, check this item if message switching due to multi-language display switching is not performed for the messages. If this item is checked, the message to be displayed will be the one created on the first sheet.
2.3.1.3 Creating custom screens for non-touch panel display units

Using FANUC PICTURE lets you create custom screens used on non-touch panel display units. The display units must be provided with graphic functions.

When creating a custom screen, you specify what display unit type the target CNC has, using the [Setting...]-[Project]- menu bar button on FANUC PICTURE. This menu button can also be used to reform an existing screen project for a touch panel into a non-touch panel screen project rather than newly creating a project.

Custom screens for monochrome display units can be created using exactly the same method as for color display units. If you want to forecast the brightness image of screens on a personal computer, however, create all screens by defining color palettes having four to eight White-Gray-Black tones and specifying these monotone “colors.”

In the same manner as for custom screens for touch panel display units, basic editing operations for those for non-touch panel display units are implemented by placing controls in a form and specifying properties for them. On top of this, specifying additional properties briefly described below completes custom screens for non-touch panel display units. These additional properties can be also used to create custom screens for touch panel display units without changing their settings. If a custom screen is designed by taking the characteristics of both types of display units into consideration, the created screen data can be used to run the custom screen on both display unit types, provided that the custom screen has 10+2 soft keys.

<table>
<thead>
<tr>
<th>Control Name</th>
<th>Tab - Property Name</th>
<th>Brief description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screen Switch</td>
<td>Shortcut key</td>
<td>A button operation set up on the Action tab can be executed, using a specified soft key or MDI key.</td>
</tr>
<tr>
<td>Button</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Framed Button</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Screen Set</td>
<td>Focus rule tab</td>
<td>This tab is used to specify movement rules applied in selecting (focusing) an input control on a form with the cursor key. It is also used to specify whether to enable the continuous input function.</td>
</tr>
<tr>
<td>Numeral Indication Control with Key Input</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numeral Indication Control for Calling a Ten-Key Pad</td>
<td>Focus tab</td>
<td>This tab is used to set up a focusing index number for determining the order in which the focus is to move. It is also used optionally to specify individual focus movement rules rather than common focus movement rules and disable the continuous input function.</td>
</tr>
<tr>
<td>PMC Area Character String Indication</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

⚠️ CAUTION
An MDI unit is necessary to use a non-touch panel display unit. Using the following controls in this configuration is meaningless; their existence within a custom screen does not do harm, however.
- MDI key control
- MDI keyboard control
## 2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control with input</td>
<td>This term collectively refers to the following controls:</td>
</tr>
<tr>
<td></td>
<td>1. Numeral Indication control with Key Input</td>
</tr>
<tr>
<td></td>
<td>2. Numeral Indication control for Calling a Ten-Key Pad</td>
</tr>
<tr>
<td></td>
<td>3. PMC Area character string Indication control</td>
</tr>
<tr>
<td>Focus</td>
<td>This term pertains to a state that a control with input on a screen has been selected for data input.</td>
</tr>
</tbody>
</table>

On a non-touch panel display unit, each button/switch is so configured that pressing a soft key or MDI key associated with the button executes the operation set up for the button. A shortcut key property is used to associate a button with a key.

On a display unit with touch panel, a control with input is selected by touching it. On a non-touch panel display unit, to the contrary, a control with input is selected by moving the focus to it with cursor keys, and data is input using the method corresponding to the selected control (Calling a Ten-Key Pad, Key-in buffer, or pop-up screen for input).

This is realized by setting up continuous focusing index numbers for individual controls with input on each form (main screen or sub screen). Assignment of focusing index numbers can be compared to assignment of uniform numbers (focusing index numbers) to individual players (controls with input) in each baseball team (form). Next, a common focus movement rule is set up. It determines which control is to gain the focus next time a cursor key is pressed.

### Example of specifying focusing index numbers for each screen and setting up a common focus movement rule

**Main screen**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

**Sub screen 1**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

**Sub screen 2**

<table>
<thead>
<tr>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Screen form Common focus movement rule**

<table>
<thead>
<tr>
<th>Screen form</th>
<th>Common focus movement rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main screen</td>
<td>1 ↓ 1 ←→ —— —— —— ——</td>
</tr>
<tr>
<td>Sub screen1</td>
<td>—3 ③ —1 ① —— —— —— ——</td>
</tr>
<tr>
<td>Sub screen2</td>
<td>—1 ① —2 ② —— —— —— ——</td>
</tr>
</tbody>
</table>

- Basic operation in accordance with a common focus movement rule
  - The focus is moved to a number obtained by adding an increment/decrement set up for a pressed cursor key to the current index number.
  - If the focus is at No. 1 on the main screen, pressing the down cursor key moves the focus to No. 3 (= 1 + ②).
  - Pressing the right cursor key moves the focus to No. 2 (= 1 + ①).

A direct-specification focus movement rule can optionally be set up. This setting can specify an arbitrary movement order directly for individual controls with input rather than a movement order determined according to the common focus movement rule.

### About focus indication and movement on a screen

No focus is displayed when a customer screen appears for the first time. Pressing a cursor key searches through controls with input in the order “main screen → subscreen 1 → . . . → subscreen 5” and puts the focus on a control having the lowest focusing index number within the
custom screen. After this, the focus moves in the direction corresponding to any pressed cursor key according to the common focus movement rule for the screen and the direct-specification focus movement rule. If the focus is on a control having the highest focusing index number within a screen, and there is no more control in the direction corresponding to a certain cursor key, pressing this cursor key moves the focus to a control having the lowest focusing index number on the next subscreen. Assuming that the focus is on a control having a maximum index number of 10 on the main screen in the previous example, “Example on specifying focusing index numbers for each screen and setting up a common focus movement rule,” pressing the → or ↓ cursor key moves the focus to a control having a minimum index number of 1 on subscreen 1. Under this condition, pressing the ↑ or ← cursor key moves the focus back to the control having the maximum index number (10) on the main screen. Pressing the CAN key causes the focus to disappear. If characters remain for a key-in buffer control, pressing the CAN key erases one of the characters rather than moving the focus. Pressing the CAN key can clear the focus only when there remains no character in the key-in buffer.

2.3.1.4 Continuous input function

On a data setting custom screen on which there are two or more numeral indication controls with key input, numeral indication controls for calling a ten-key pad, and PMC area character string indication controls, using the continuous input function can input data continuously without selecting a control after each item of data is input.

The continuous input function is implemented with the “focus movement function for selecting a control with input using cursor keys” that is necessary on a non-touch panel display unit. To put it another way, performing continuous inputs manually requires pressing a cursor key to move the focus to the next control each time data input for a control is completed. The continuous input function automatically performs operations equivalent to pressing of the cursor keys. An option is available which can be used to stop continuous input after data input for a control with input at a specific location is finished.

This function can be used on any display unit type, no matter whether it has a touch panel.
CAUTION
When using a pop-up screen to input data for a control with input, observe the following:
1. To perform continuous input, specify a pop-up main screen name for data input as a “Pop-up screen name” property.
2. Be sure to place a pop-up erase button on each pop-up main screen for data input. Otherwise, it will become impossible to:
   <1> Stop continuous input.
   <2> Automatically erase the pop-up screen after continuous data input is finished.

2.3.1.5 Explanations of additional property items

[Setting...] menu bar button

Pressing the [Setting...] menu bar button causes the following dialog box to appear. It lets you specify the configuration of the target CNC system before creating a custom screen. If the CNC system has a without touch panel display unit, the dialog box lets you specify also the number of soft keys, focus color, the type of a key to be used to call a data input pop-up screen for controls with input.
Shortcut key property

A “Shortcut key” property has been added to the Action tab for the following button/switch controls:
1. Screen Switch control
2. Button Control
3. Framed Button Control

Shortcut key:
If you want to execute an operation set up on the Action tab by pressing an associated shortcut key, turn on this check box. An operation associated to the shortcut key setting can be executed by pressing the key on the display unit, no matter whether it has a touch panel, or touching the corresponding button on the touch panel (if available).

The following key types can be selected:
1. Soft keys (FL, F1 – F10, and FR for 10 + 2 soft keys
   FL, F1 - F5, and FR for 5 + 2 soft keys
   VF1-VF8, and VF9 for the vertical soft keys)
2. Cursor / Page key (← → ↑ ↓ Page-UP, Page-DOWN)
3. Edit key (CAN, INPUT, ALTER, INSERT, DELETE)
4. HELP key
The figure below shows the soft key name and the position in case of 5+2 soft keys.

The figure below shows the soft key name and the position in case of 10+2, or 10+2+9 soft keys.
Control with additional focus-related properties

To the following indication controls, a focus tab is added:
1. Numeral Indication Control with Key Input
2. Numeral Indication Control for Calling a Ten-Key Pad
3. PMC Area Character String Indication Control

Focus index

For an individual screen (form), specify a focusing index number to be used to determine the order in which the focus moves through key controls with input and the order in which continuous inputs are performed, using either of the following two methods. These methods have their own features. Select one whichever is convenient for you.

Specify the focusing index of this control as:

Select this method if you want to use a property provided on this Focus tab to specify a focusing index number for determining the order in which the focus moves. The focusing index number must be input to the editbox on the line just below this option button. If the screen (form) has two or more focusing index numbers, they must be continuous. For a control to which the focus is not to move, specify 0 as its focusing index number. More than one focusing index can be 0.

0: The focus does not move to a control whose focusing index number is 0.
1 and greater:
These numbers indicate the order in which the focus moves through the controls. The focusing index numbers must be continuous within each screen.
Use TabIndex property for focusing index:
This setting cannot be used at present.

⚠️ CAUTION
1. If “Specify the focusing index” is selected, do not use the same number for two or more focusing indexes within one screen (form).
2. For both Focusing index and TabIndex numbers, the lowest number must not necessarily be 1, but all numbers used must be continuous.

Focus movement rule
If you want to move the focus directly to a specific control rather than putting it on a control determined according to the common focus movement rule set up on the Focus rule tab of the Screen Set control, set up a focusing index number for the control for an individual cursor key. This setting is referenced also in determining the continuous input order for the continuous input function.

UP key, DOWN key, LEFT key, RIGHT key:
As the property of each of the ↑, ↓, ←, and → keys, specify a focusing index number or TabIndex number assigned to a control to which the focus it to put next. The index numbers that can be specified are those within the current screen. If an index number out of range is specified, the focus will move to the next subscreen or to the first or last control with input on the current screen.
If the specified value is 0, the focus will move to the control obtained according to the “Common focus movement rule.”

Don’t move focus to the next control after data input operation:
If you want to stop continuous input after data is input to the control of interest, turn on the check box for the “Don’t move focus to the next control after data input operation.” This function can be used to disable continuous input, for example, after the last data input is finished for the input setup item group of interest if there are two or more input setup item groups on the screen.
Focus rule tab of Screen Set control

The property dialog of the Screen Set Control in the background of the screen form is displayed, and set up the property on the Focus rule tab. On this tab, it is possible to specify whether to enable or disable the common focus movement rule and the continuous input function for controls with input.

Listed below are how to determine the way the focus is to move basically according to the common focus movement rule. In “Control layout” below, each circled number (<1>,<2>,<3>) indicates an example location where the corresponding one of the listed rules is applied when one of the indicated cursor keys is pressed.

<1> When a cursor key is pressed, the focus will move to a control having a focusing index number obtained by adding the corresponding cursor key direction value (focus index increment/decrement) set up as the Common focus movement rule to the focusing index number of the control currently having the focus.

<2> If the focusing index number obtained above is not within the current screen, a check is made to see whether there is a row or column before or after the control with input of interest. If a row or column turns out to exist, the focus will move to the target control on the row or column.

<3> If the above step does not find a target column within the current screen, the focus will move to the next subscreen or, if there is no “next” subscreen, the focus will move to the first or last control with input on the current screen.
Common focus movement rule

UP key, DOWN key, LEFT key, RIGHT key :
Set up a common focus movement rule for controls with input placed on a screen. To be specific, specify index increment/decrement values to be added to the focusing index number for a control currently having the focus when the → or ↓ cursor is pressed. An increment/decrement value corresponding to the ← or ↑ cursor key is automatically set up. See “Focus Movement & Continuous Input setting example.”

Continuous input :
Turn on this check box if you want to input data continuously for controls with input. To use this function, also set up the following “Direction” property.

Direction :
The continuous input function causes the focus to move automatically (rather than by pressing a cursor key) after data is input. Specify the direction in which the focus is to move.
Focus Movement & Continuous Input setting example

(Focus movement specification example 1):

The screen has 5 rows × 4 columns of controls placed as shown at the left. Pressing the \( \downarrow \) cursor key moves the focus vertically and from the bottom row to the top of the next column. Also the continuous input function is enabled, and the focus is moved in the same order as stated above. Pressing the \( \uparrow \) cursor key causes the focus to move in the opposite direction.

1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 6 \rightarrow \ldots \rightarrow 17 \rightarrow 18 \rightarrow 19 \rightarrow 20 \rightarrow (1)

Pressing the \( \rightarrow \) cursor key causes the focus to move horizontally.

1 \rightarrow 6 \rightarrow 11 \rightarrow 16 \rightarrow 2 \rightarrow 7 \rightarrow \ldots \rightarrow 5 \rightarrow 10 \rightarrow 15 \rightarrow 20 \rightarrow (1)

Setting:

- Each control is assigned with a focusing index number or TabIndex number in the indicated order.
- The other controls and properties are set up as listed in the following tables.

### Example of specifying properties on the Focus rule tab of the Screen Set control

<table>
<thead>
<tr>
<th>Common focus movement rule</th>
<th>Continuous input</th>
<th>Direction(for Continuous input)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \rightarrow ) key</td>
<td>( \downarrow ) key</td>
<td>( \rightarrow ) ( \downarrow ) ( \leftarrow ) ( \uparrow )</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>☑</td>
</tr>
</tbody>
</table>

### Example of specifying properties on the Focus tab for each control with input

<table>
<thead>
<tr>
<th>Focus index or TabIndex number</th>
<th>Focus movement rule</th>
<th>Don’t move focus to the next control after data input operation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 0 0 0</td>
<td>☐</td>
</tr>
<tr>
<td>(Continuous numbers 2 to 19 are specified here.)</td>
<td>0 0 0 0</td>
<td>☐</td>
</tr>
<tr>
<td>20</td>
<td>0 0 0 0</td>
<td>☐</td>
</tr>
</tbody>
</table>
(Focus movement specification example 2):

The focus is moved in the same manner as in example 1 above. However, to specify the direction of continuous inputs as horizontal like 1 → 6 → 11 → 16 → 2 → . . . → 20 → disable, set up the screen set control as listed below.

| Example of specifying properties on the Focus rule tab of the Screen Set control |
|---------------------------------|---------------------------------|----------------|----------------|----------------|
| Common focus movement rule      | Continuous input               | Direction(for Continuous input) |
| → key                           | ↓ key                           | →       | ↓       | ←       | ↑       |
| 5                               | 1                               | ☑       | ☐       | ☑       | ☐       |

Example of setting up properties on the Focus tab for controls with input

<table>
<thead>
<tr>
<th>Focus Index or TabIndex number</th>
<th>Focus Movement rule</th>
<th>Don’t move focus to the next control after data input operation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-19</td>
<td>0 0 0 0</td>
<td>☑</td>
</tr>
<tr>
<td>20</td>
<td>0 0 0 0</td>
<td>☑</td>
</tr>
</tbody>
</table>

(Focus movement specification example 3):

There are three groups for 1 to 9, 2 to 15, and 3 to 21. Continuous input is disabled at the end (9, 15, or 21) of each group. (No continuous input is performed over a group.) The ← cursor key causes the focus to move in the direction opposite to that shown below.

1→4→5→6→7→8→9→ disable  
2→10→11→12→13→14→15→ disable  
3→16→17→18→19→20→21→ disable

Pressing the ↓ or ↑ key causes the focus to move as shown below:

1↔2↔3↔4↔7↔10↔13↔16↔19↔ ...↔18↔21↔ (1)

Setting:

Each control is assigned with a focusing index number or TabIndex number in the indicated order. The other controls and properties are set up as listed in the following tables.
### Example of specifying properties on the Focus rule tab of the Screen Set control

<table>
<thead>
<tr>
<th>Common focus movement rule</th>
<th>Continuous input</th>
<th>Direction(for Continuous input)</th>
</tr>
</thead>
<tbody>
<tr>
<td>→ key</td>
<td>1</td>
<td>✓</td>
</tr>
<tr>
<td>↓ key</td>
<td>3</td>
<td>◯</td>
</tr>
</tbody>
</table>

### Example of setting up properties on the Focus tab for controls with input

<table>
<thead>
<tr>
<th>Focus index or TabIndex number</th>
<th>Focus movement rule</th>
<th>Don’t move focus to the next control after data input operation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>21 4 2</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>9 10 3</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>15 16 4</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>1 0 0</td>
</tr>
<tr>
<td>(5-8)</td>
<td>0</td>
<td>0 0 0</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0 2 0</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>0 0 0</td>
</tr>
<tr>
<td>(11-14)</td>
<td>0</td>
<td>0 0 0</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>0 3 0</td>
</tr>
<tr>
<td>16</td>
<td>3</td>
<td>0 0 0</td>
</tr>
<tr>
<td>(17-20)</td>
<td>0</td>
<td>0 0 0</td>
</tr>
<tr>
<td>21</td>
<td>0</td>
<td>0 1 0</td>
</tr>
</tbody>
</table>

### Touch panel and MDI key operations for each control

<table>
<thead>
<tr>
<th>Control</th>
<th>Operating function</th>
<th>Touch panel operation</th>
<th>MDI key operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key-in buffer</td>
<td>Delete one character at the end of the buffer.</td>
<td>CAN button</td>
<td>CAN</td>
</tr>
<tr>
<td></td>
<td>Delete all characters from the buffer.</td>
<td>DELETE key button</td>
<td>DELETE</td>
</tr>
<tr>
<td></td>
<td>Input data (overwrite).</td>
<td>INPUT key button</td>
<td>INPUT</td>
</tr>
<tr>
<td></td>
<td>Input and add data (additive data input).</td>
<td>INSERT key button</td>
<td>INSERT</td>
</tr>
<tr>
<td>Numeral Indicator</td>
<td>Clear input data to 0.</td>
<td>CLEAR button</td>
<td>CAN</td>
</tr>
<tr>
<td>Control for Calling Ten-Key Pad</td>
<td>Erase a pop-up ten-key pad.</td>
<td>KEYCLR button</td>
<td>DELETE</td>
</tr>
<tr>
<td></td>
<td>Input data.</td>
<td>INPUT button</td>
<td>INPUT</td>
</tr>
<tr>
<td>Control with input (By Key-in buffer)</td>
<td>Display the focus.</td>
<td>Touch a control having no focus.</td>
<td>Any of the four cursor keys</td>
</tr>
<tr>
<td></td>
<td>Move the focus.</td>
<td>Touch a control for which the focus is not displayed.</td>
<td>Any of the four cursor keys</td>
</tr>
<tr>
<td></td>
<td>Erase the focus.</td>
<td>Touch a control for which the focus is displayed.</td>
<td>CAN(*1)</td>
</tr>
<tr>
<td></td>
<td>Manually disable continuous input.</td>
<td>Touch a control having no focus.</td>
<td>CAN</td>
</tr>
<tr>
<td>Control with input (By pop-up screen)</td>
<td>Causes the input screen to appear.</td>
<td>Touch the target control.</td>
<td>Any key</td>
</tr>
<tr>
<td></td>
<td>Display the focus.</td>
<td>(No operation)</td>
<td>Any of the four cursor key</td>
</tr>
<tr>
<td></td>
<td>Move the focus.</td>
<td>(No operation)</td>
<td>Any of the four cursor key</td>
</tr>
<tr>
<td></td>
<td>Erase the focus.</td>
<td>(No operation)</td>
<td>CAN</td>
</tr>
<tr>
<td></td>
<td>Manually disable continuous input.</td>
<td>Screen erase button</td>
<td>Shortcut key for the screen erase button</td>
</tr>
</tbody>
</table>
## Development of Custom Screen

### Control Operating Function

<table>
<thead>
<tr>
<th>Control</th>
<th>Operating function</th>
<th>Touch panel operation</th>
<th>MDI key operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes the input screen to appear.</td>
<td>Touch the target control.</td>
<td>Any key</td>
<td></td>
</tr>
<tr>
<td>Display the focus.</td>
<td>(No operation)</td>
<td>Any of the four cursor key</td>
<td></td>
</tr>
<tr>
<td>Move the focus.</td>
<td>(No operation)</td>
<td>Any of the four cursor key</td>
<td></td>
</tr>
<tr>
<td>Erase the focus.</td>
<td>(No operation)</td>
<td>CAN</td>
<td></td>
</tr>
<tr>
<td>Manually disable continuous input.</td>
<td>KEYCLR button</td>
<td>DELETE</td>
<td></td>
</tr>
</tbody>
</table>

*1 If there are characters in the key-in buffer, the last one of them is erased.

### Continuous Input Disabling Procedure

The following table lists the procedure for manually disabling continuous input.

<table>
<thead>
<tr>
<th>Control with input</th>
<th>Continuous input disabling procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1&gt; Input to a key-in buffer control</td>
<td>Continuous input is disabled by touching a control having the focus or using the CAN key.</td>
</tr>
<tr>
<td>Key-in buffer controls are usually in a continuous-input state.</td>
<td></td>
</tr>
<tr>
<td>Numeric Indication Control with Key Input or PMC Area Character String Indication Control</td>
<td></td>
</tr>
<tr>
<td>&lt;2&gt; Input by calling a pop-up screen</td>
<td>Continuous input is disabled by erasing the pop-up screen rather than performing input equivalent to [INPUT], which is a data input method for the pop-up screen. To erase the pop-up screen, touch the erase button for it or a shortcut key assigned to the erase button.</td>
</tr>
<tr>
<td>Continuous input is disabled by erasing the pop-up ten-key pad. To erase the pop-up ten-key pad, touch the [KEYCLR] or the [☒] button for it, or press the DELETE key.</td>
<td></td>
</tr>
</tbody>
</table>
### 2.3.1.6 Creating screens with the multi-language display function

The multi-language display function can be built into the operation board. As for this function, the caption on the custom screen is switched to the language of 20 countries. Creating a custom screen supporting multi-language switching can be accomplished with simple work including the following setting and language caption setting/editing. For existing screen projects, second and third languages can be added easily without the need for special conversion. The usable characters are alphabetic characters (upper and lower case), as well as Japanese kanji, katakana, and hiragana characters.

<table>
<thead>
<tr>
<th>No.</th>
<th>Work classification</th>
<th>Description of setting/editing</th>
</tr>
</thead>
</table>
| 1   | Multi-language setting work | <1> Enabling of multi-language display function  
[Setting of project] menu  
[Setting of Multi-language] tab  
<2> Setting of multi-language display switching interface  
<3> Editing of multi-language types and multi-language keys |
| 2   | Caption editing work | <1> Selection of language from combo box  
[Caption property of each control] tab  
<2> Setting of display language for caption property  
<3> Checking of display state on VB form screen |

Two methods are available for switching display languages on the display unit of FANUC CNC. Both display language switching methods have a very simple mechanism.

<table>
<thead>
<tr>
<th>No.</th>
<th>Switching method name</th>
<th>Outline of switching method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CNC parameter language switching method</td>
<td>Specify the language parameter of the CNC unit that matches the display language provided by the custom screen. With this method, the display language on the custom screen switches in synchronization with the language switching on the CNC.</td>
</tr>
<tr>
<td>2</td>
<td>PMC language switching method</td>
<td>Assign a language number to the display language provided by the custom screen. The display language on the custom screen is switched by writing the above-mentioned language number from a ladder to the 1-byte PMC signal area.</td>
</tr>
</tbody>
</table>
(1) Setting up the multi-language display function

The following explains the setting operation for making a custom screen project support the multi-language display function.

- Setting of project-Setting of Multi-language

Pressing the FANUC PICTURE menu bar button [File]-[Project]-[Setting…] and then clicking the [Setting of Multi-language] tab causes the Setting of Multi-language dialog box to appear.

In the Setting of Multi-language tab, check [The Multi-language display function is used.]. The custom screen becomes an operation board screen where the multi-language display is possible by this check.

The Multi-language display function is used. :

Check this item to use the multi-language display function in the custom screen project. If you apply an existing custom screen project to the multi-language display function, the previously set captions are automatically set as those in the language of the first multi-language key (item number: 01) additionally registered during multi-language editing.
Method of switching Multi-language display

For this item, select between the two types described below as the method of switching display languages on the CNC display unit.

The display language parameter of CNC is used. :
Select this option button if the languages provided by the custom screen.

- For Series 16i/18i/21i, Power Mate i
  The same parameter bits as the language bits of language parameters Nos. 3102 and 3119 of the CNC are to be used for language switching.
  This enables the custom screen to be synchronized with the same language as that on the CNC screen, but a power disconnection alarm occurs at the time of language switching.
- For Series 30i/31i/32i
  The CNC language parameter is number parameter No. 3281.

The Multi-language display switch signal is used.(1Byte) :
Select this option button if switching between the display languages provided by the custom screen is to be accomplished by writing the language number associated with a display language to the PMC signal area. If you select this button, set the PMC area and the PMC address below. If an un-registered language number is written, the default language is used for display.

PMC Area, PMC Address :
If you select The Multi-language display switch signal used, above, set the type and address of the PMC signal area to specify where to reserve the space for the PMC signal area (1 byte).

* For the symbol specification property for PMC signal address specification, see Section 2.2.3, “Symbol Specification with FANUC PICTURE”.

NOTE
When the each country word display is switched while displaying the custom screen, the screen is displayed again. When the pop up screen is displayed, the pop up screen is shut by the re-display. Moreover, the output signal is turned off at the button control with the frame which does not maintain the state of the output signal. Please consider the interlock processing by the PMC ladder for the switch of the display language when this is inconvenient.
- Registering, deleting, and editing language keys

Register the “Multi-language key” of the language to be created using the frame in the dialog box shown below. You can check the entire comment by using the horizontal scroll bar. For each language provided by the custom screen, register a unique “Multi-language key”. Registered multi-language keys will be used as list members in the combo box used to select the language to be set if setting a caption of a control and as the language sheet names of spreadsheets related to text messages. The “Select” setting is provided here, which is used to select the language to be created during the Make MEM step. If you have set a language for a caption property, but on the custom screen on the CNC, the language does not require switching display, the creation of the data for this language can be suppressed by unchecking Select.

Add button
This button is used to additionally register a new multi-language key. It displays the Language change setting dialog box.

Delete button
This button is used to delete a registered multi-language key. It displays a dialog box for confirming deletion.
Language key editing

Double-clicking a 2-digit numeric value in the [No.] column in the language key list display (such a number is called an item number in the remainder of this document) causes the Language change setting dialog box to appear, which is the same as that that appears when you click Add.

- Language change setting dialog box

![Language change setting dialog box]

Select :
Check this item to create the language data for this multi-language key during the make MEM step. If this language need not be displayed, you can uncheck this item to suppress the creation of screen data.

Multi-language key :
Enter a unique multi-language key of up to 20 single-byte characters that will be the header of the language provided on the custom screen.

Comment :
Enter a comment for the multi-language key.

Default display language :
If the language indicated by the language switching with the language switching interface cannot be found, the custom screen will be displayed in this default language. Only one language may be specified for a multi-language key.

Param No.:
If you select “The display language parameter of CNC is used.” as the display language switching interface, specify the parameter number and bit position of the language selection parameter bit.

- For Series 16i/18i/21i, Power Mate i
  Generally, specify parameter 3102 or 3119.
- For Series 30i/31i/32i
  Parameter 3281 is always used.
Param bit:
If you select "The display language parameter of CNC is used" as the display language switching interface, set the parameter bit number specified under [Param No.].
- Series 16i/18i/21i, Power Mate i
  Generally, specify the bit of the corresponding language of parameter No. 3102 or No. 3119.
- Series 30i/31i/32i
  Not used.

Number:
- For Series 16i/18i/21i, Power Mate i
  If you select “The Multi-language display switch signal is used (1Byte)” as the display language switching interface, set the language number for selecting the language. The valid range is from 0 to 255.
- For Series 30i/31i/32i
  (1) If you select "The display language parameter of CNC is used" as the display language switching interface, set the parameter language number specified under [Param No.]. Specify the number of the language specified by parameter No. 3281
  (2) If you select "The Multi-language display switch signal is used (1Byte)" as the display language switching interface, set the language number for selecting the language to a value between 0 and 255.

- Deletion of Language change dialog box

From the combo box, you can select the item number with which a multi-language key is registered to delete the key. Item numbers are 2-digit numeric values in the [No.] column displayed in the leftmost position in the multi-language key list display.
2.3.1.7 Setting the signal for the PMC/SD7 type

If you set SD7 for PMC type in [File]-[Project]-[Setting…]-[Setting of CNC system] tab, the signal setting properties of various dialog boxes will set SD7 notation signals using area and address properties. At this time, the bit position specification property used with SBx notation (this includes 3Xi type) is displayed as input not permitted.

If the signal properties of various dialog boxes are already set in SBx type signal notation, they are automatically converted into the signal notation of the SD7 type, like the interlock and lighting signal properties in the solid-line frame in the figure below. If, during this automatic conversion, SBx type signal notation cannot be converted into SD7 signal notation, the properties for area and address specification will be blank like the blinking signal properties in the broken-line frame in the figure below; set new signals in SD7 signal notation.

The following is a table of correspondence between SBx notation and SD7 notation in the PMC signal area selection combo box and a list of numbers of arguments for specifying signal areas with FP function arguments.
Table of correspondence between the PMC signal area combo box, FP function argument numbers, and signal areas

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Combo box list for selecting PMC signal area</th>
<th>Argument Number</th>
<th>FP-function-specification-time area selection argument</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SB7 %M</td>
<td>SB7 G</td>
<td>SD7 %QG</td>
</tr>
<tr>
<td>1</td>
<td>SB7 %R</td>
<td>SB7 F</td>
<td>SD7 %IF</td>
</tr>
<tr>
<td>2</td>
<td>SB7 Reserve</td>
<td>SB7 Y</td>
<td>SD7 %Q</td>
</tr>
<tr>
<td>3</td>
<td>SB7 Reserve</td>
<td>SB7 X</td>
<td>SD7 %I</td>
</tr>
<tr>
<td>4</td>
<td>SB7 %MK</td>
<td>SB7 A</td>
<td>SD7 %MA</td>
</tr>
<tr>
<td>5</td>
<td>SB7 %I</td>
<td>SB7 R</td>
<td>SD7 %M</td>
</tr>
<tr>
<td>6</td>
<td>SB7 %Q</td>
<td>SB7 T</td>
<td>SD7 Reserve</td>
</tr>
<tr>
<td>7</td>
<td>SB7 %QG</td>
<td>SB7 K</td>
<td>SD7 %MK</td>
</tr>
<tr>
<td>8</td>
<td>SB7 %IF</td>
<td>SB7 C</td>
<td>SD7 Reserve</td>
</tr>
<tr>
<td>9</td>
<td>SB7 %MA</td>
<td>SB7 D</td>
<td>SD7 %R</td>
</tr>
<tr>
<td>10</td>
<td>Reserve</td>
<td>Reserve</td>
<td>Reserve</td>
</tr>
<tr>
<td>11</td>
<td>Reserve</td>
<td>Reserve</td>
<td>Reserve</td>
</tr>
<tr>
<td>12</td>
<td>SB7 %ME</td>
<td>SB7 E</td>
<td>SD7 %ME</td>
</tr>
<tr>
<td>13</td>
<td>Reserve %S (R9016.0-R9499.7)</td>
<td>Reserve %S (R9016.0-R9499.7)</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Reserve %ST (R9008.0-R9015.7)</td>
<td>Reserve %ST (R9008.0-R9015.7)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Reserve %SA (A9000.0-A9299.7)</td>
<td>Reserve %SA (A9000.0-A9299.7)</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Reserve %SK (K900.0-A919.7)</td>
<td>Reserve %SK (K900.0-A919.7)</td>
<td></td>
</tr>
</tbody>
</table>

Comparison of SD7 and SB7 PMC addresses

<table>
<thead>
<tr>
<th>Name</th>
<th>Range</th>
<th>Size/Type</th>
<th>Attribute</th>
<th>Remarks</th>
<th>Corresponding PMC-SB7 references</th>
</tr>
</thead>
<tbody>
<tr>
<td>%I</td>
<td>1-1024</td>
<td>1bit(BOOL type)</td>
<td>Read-only</td>
<td>Input using I/O Link 1st channel</td>
<td>X0.0-X127.7</td>
</tr>
<tr>
<td></td>
<td>10001-11024</td>
<td></td>
<td></td>
<td>Input using I/O Link 2nd channel</td>
<td>X200.0-X327.7</td>
</tr>
<tr>
<td></td>
<td>80001-81024</td>
<td></td>
<td></td>
<td>Input using built-in I/O</td>
<td>X1000.0-X1127.7</td>
</tr>
<tr>
<td>%IF</td>
<td>1-6144</td>
<td>1bit(BOOL type)</td>
<td>Read-only</td>
<td>Input from CNC</td>
<td>F0.0-F767.7</td>
</tr>
<tr>
<td></td>
<td>10001-16144</td>
<td></td>
<td></td>
<td></td>
<td>F1000.0-F1767.7</td>
</tr>
<tr>
<td></td>
<td>20001-26144</td>
<td></td>
<td></td>
<td></td>
<td>F2000.0-F2767.7</td>
</tr>
<tr>
<td></td>
<td>30001-36144</td>
<td></td>
<td></td>
<td></td>
<td>F3000.0-F3767.7</td>
</tr>
<tr>
<td>%Q</td>
<td>1-1024</td>
<td>1bit(BOOL type)</td>
<td>Read-only</td>
<td>Output using I/O Link 1st channel</td>
<td>Y0.0-Y127.7</td>
</tr>
<tr>
<td></td>
<td>10001-11024</td>
<td></td>
<td></td>
<td>Output using I/O Link 2nd channel</td>
<td>Y200.0-Y327.7</td>
</tr>
<tr>
<td></td>
<td>80001-81024</td>
<td></td>
<td></td>
<td>Output using built-in I/O</td>
<td>Y1000.0-Y1127.7</td>
</tr>
<tr>
<td>%QG</td>
<td>1-6144</td>
<td>1bit(BOOL type)</td>
<td>Output to CNC</td>
<td>G0.0-G767.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10001-16144</td>
<td></td>
<td></td>
<td></td>
<td>G1000.0-G1767.7</td>
</tr>
<tr>
<td></td>
<td>20001-26144</td>
<td></td>
<td></td>
<td></td>
<td>G2000.0-G2767.7</td>
</tr>
<tr>
<td></td>
<td>30001-36144</td>
<td></td>
<td></td>
<td></td>
<td>G3000.0-G3767.7</td>
</tr>
<tr>
<td>%R</td>
<td>1-5000</td>
<td>16bit(WORD type)</td>
<td>Retentive</td>
<td>Data Register</td>
<td>D0.0-D9999.7</td>
</tr>
<tr>
<td>%M</td>
<td>1-64000</td>
<td>1bit(BOOL type)</td>
<td>Internal relay</td>
<td>R0.0-R7999.7</td>
<td></td>
</tr>
<tr>
<td>%ME</td>
<td>1-64000</td>
<td>1bit(BOOL type)</td>
<td>Internal relay</td>
<td>E0.0-E7999.0</td>
<td></td>
</tr>
<tr>
<td>%MA</td>
<td>1-2000</td>
<td>1bit(BOOL type)</td>
<td>Message display request</td>
<td>A0.0-A249.7</td>
<td></td>
</tr>
<tr>
<td>%MK</td>
<td>1-800</td>
<td>1bit(BOOL type)</td>
<td>Retentive</td>
<td>Internal relay</td>
<td>K0.0-K99.7</td>
</tr>
<tr>
<td>%S</td>
<td>1-3872</td>
<td>1bit(BOOL type)</td>
<td>Read-only</td>
<td>System area</td>
<td>R9016.0-R9499.7</td>
</tr>
<tr>
<td>%ST</td>
<td>1-64</td>
<td>1bit(BOOL type)</td>
<td>Read-only</td>
<td></td>
<td>R9008.0-R9015.7</td>
</tr>
<tr>
<td>%SA</td>
<td>1-2000</td>
<td>1bit(BOOL type)</td>
<td>Read-only</td>
<td></td>
<td>A9000.0-A9249.7</td>
</tr>
<tr>
<td>%SK</td>
<td>1-160</td>
<td>1bit(BOOL type)</td>
<td>Retentive</td>
<td></td>
<td>K900.0-K919.7</td>
</tr>
</tbody>
</table>

* In SD7, you will have to use %R, %M, or %ME for the SBx types T (timer address) and C (counter address).
2.3.2 Screen Set Control

Screen Set control is a control to do various setting of the screen. This control is a control to set necessary information at MEM make. This control is not displayed on the CNC screen. Only a single instance of this control can be placed in a form. More than one instance cannot be placed.

Displaying effective range display according to LCD unit resolution
The range of the resolution chosen by [Setting …] is displayed in the background color property. Even the screen display on CNC is effective to this background color. An effective range on the screen is displayed by the background color in case of pop up base screen.

Signal of notice screen display
It is a function to notify base screen to be displayed. When the screen is displayed, the set signal is turned on. There is a similar property in Screen Structure Definition control. When the signal is set in both Screen Structure Definition control and Screen Set control, setting Screen Structure Definition control is used.

Enable signal of each action control
This signal is used by the “FP function of indirect specification”. Please notify the FP function to have completed setting the argument for the FP function of indirect specification by this signal. In the FP function, execution begins when this signal is turned on.

Focus rule tab
This tab is used to enable or disable the common focus movement rules and the continuous input function for the input support controls placed on the entire screen.
Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X,Y:
Set the coordinates of the upper-left corner of the screen set control. This control is not displayed on the CNC screen. This means that any coordinates may be set.

Width, Height:
Set the width and height of the screen set control.

Background color:
Specify the background color of the screen form. The background color is enabled for a base screen on the CNC screen. The background color of the sub screen is not displayed on the CNC screen, so separately create the background using the rectangle drawing control or label control.
- Option

Use signal of notice screen display:
Check this box to output PMC signals when this screen is displayed.
Out PMC Area:
Select a type of PMC address where a signal is output.
Out PMC Address:
Specify a PMC address where a signal is output.
Out PMC Bit:
Specify the bit position of the signal address above by using a number from 0 to 7.

Use enable signal of each action control:
When the signal to permit the operation of each control is used, this box is checked.
Input PMC Area:
Select a type of PMC address where a signal is output.
Input PMC Address:
Specify a PMC address where a signal is output.
Input PMC Bit:
Specify the bit position of the signal address above by using a number from 0 to 7.
- Focus rule

Common focus movement rule
UP key, DOWN key, LEFT key, RIGHT key:
Set up a common focus movement rule for controls with input placed on a screen. To be specific, specify index increment/decrement values to be added to the focusing index number for a control currently having the focus when the → or ↓ cursor is pressed. An increment/decrement value corresponding to the ← or ↑ cursor key is automatically set up. See “Focus Movement & Continuous Input setting example.”

Continuous input:
Turn on this check box if you want to input data continuously for controls with input. To use this function, also set up the following “Direction” property.

Direction:
The continuous input function causes the focus to move automatically (rather than by pressing a cursor key) after data is input. Specify the direction in which the focus is to move.
2. DEVELOPMENT OF CUSTOM SCREEN

2.3.3 Screen Structure Definition Control

The screen structure definition control provides two types of specification: setting of a combination of sub screens to make up a single screen (base screen) and definition of a popup screen. Only a single instance of this control can be placed in a form. More than one instance cannot be placed. As an option function, this control provides a data change report function.

Definition of a Base Screen and Sub Screens

FANUC PICTURE allows you to create part of a screen as a sub screen and switch this sub screen to another sub screen. With this specification, define the combination of sub screens to make up a base screen.

The items to be set in the properties of this control are the name of the base screen and the name of the first of the sub screens to make up the base screens (i.e., the name of the first sub screen to be displayed after the power is turned on of all the sub screens to be displayed alternately in the same section on the base screen). On the first sub screen specified here, place a sub screen switch button and specify the next page sub screen. By calling a still another sub screen from the called sub screen, sub screen switching is accomplished.

On a single base screen, up to five sub screens may be displayed at the same time. That is, it is possible to create up to five partitions within the range of the screen resolution and switch screens between the partitions.

For the screen structure example shown below, set the underlined screen names as the names of the first sub screens in the properties of the screen structure definition control.

BASE1 (base screen name)

SUB10 → SUB11 → SUB12 (→ To SUB10)

SUB20 → SUB21 (→ To SUB20)

(*) Up to five sub screens can be specified for simultaneous display.

Place the control in the valid area within the range of the screen resolution.

Popup Screen Definition

Place the control in the valid area on the screen and expand it to the size of the rectangle used as a popup screen. Then, check Popup Screen, which is one of property items, to specify it as the pop-up base screen. The size and coordinates of the rectangle to pop up are determined by pasting this control. In this rectangle, place the necessary buttons and lamps to create a popup screen.

To return to the screen from which the popup screen was called, create on the popup screen a button for which “popup erasure” is specified as the “screen type” of the screen switch control. Clicking this screen switch button allows you to return to the screen from which the popup screen was called.
A popup screen with up to two layers can be displayed. If a popup screen is displayed, only the screen displayed last will be active. This means that the background screen terminates and buttons and the like will not respond when touched.

Data Change Report Function

The controls that provide a function for changing numeral and character string data are as follows. In the following explanation, these controls are referred to as controls with a change function. Touching such a control to enter the data change input state is described as bringing the control into focus.

- a. Numeral indication control with key input
- b. Numeral indication control for calling a ten-key pad
- c. PMC area character string indication control

The data change report function is a function that, if any of these controls is used, notifies the PMC that data has been changed with the change function provided by that control.

A unique identification number is allocated to each control with a change function, so that the PMC can decide what data has been changed. As the identification number of each control, a value in the range of 0 to 4095 can be set in “Identification number,” found in the action property page of that control. An identification number of 0 may be set for more than one control, and means that “no data change will be reported to the PMC.” An identification number 1 to 4095 can be allocated to a control that is to report a data change. Within a project, each identification number must be unique. In the following explanation, a control with a change function that has an identification number of 0 is referred to as a change non-report control, while that that has an identification number other than 0 is referred to as a change report control.

The data change report function requires that a 2-byte continuous area, with the structure shown below, be reserved on the PMC. Different change report areas can be specified for different base screens. The 2-byte change report area will be cleared to zero when the corresponding base screen is displayed.

<table>
<thead>
<tr>
<th>#15</th>
<th>#14</th>
<th>#13</th>
<th>#12</th>
<th>#11–#0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data change report</td>
<td>One or more changed</td>
<td>Reserved 0</td>
<td>Reserved 0</td>
<td>Identification number 0 to 4095 in binary format</td>
</tr>
</tbody>
</table>

Data change report bit (#15):

Reports that a data change has been made in the change report control identified by the identification number. It rebases ON for 200 msec or longer. Then, it remains ON until either of the off conditions is satisfied.

<On condition>
- A data change has been made in the control with a change function.
<Off conditions>
- The base screen that uses this change report area is displayed.
- A change report control other than the change report control that has reported a change is brought into focus (the focus is shifted to another control).

One or more changed bit (#14):
Reports that a data change has been made in at least one of the change report controls used on all the sub screens under a base screen since the base screen was displayed.

<On condition>
- A data change has been made in at least one control with a change function for the first time since the base screen was displayed.

<Off condition>
- The base screen that uses this change report area is displayed.

Reserved bits (#13 and #12):
Always off; however, may be on if used due to the addition of a new function.

Identification number (#11 to #0):
If a change report control is brought into focus, the identification number of that control in focus is output as a binary value. This identification number output is performed simply if a control is brought into focus, regardless of the data change report bit (#15). If this number is zero, this indicates either that all of the change report controls currently displayed are out of focus or that a change non-report control is in focus.

Data change report example
Description of the change report area

<table>
<thead>
<tr>
<th>No</th>
<th>State of change report area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0000 0</td>
<td>&lt;1&gt; All bits are cleared to zero immediately after a base screen is displayed.</td>
</tr>
<tr>
<td>2</td>
<td>0 - // 0</td>
<td>&lt;1&gt; A change report control is out of focus because of no data change.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;2&gt; A change non-report control is in focus. (If the data change report bit is off, the identification number is set to zero.)</td>
</tr>
<tr>
<td>3</td>
<td>0 - // identification number</td>
<td>&lt;1&gt; A data change has been made to the change report control having the output identification number.</td>
</tr>
<tr>
<td>4</td>
<td>11 // identification number</td>
<td>&lt;1&gt; A data change has been made to the change report control having the output identification number.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt;2&gt; A change non-report control is in focus. (If the data change report bit is on, the identification number is not set to zero.)</td>
</tr>
</tbody>
</table>
Popup screen to be called from a base screen

A popup screen may also have a change report area. If a popup screen does not use a change report area, it reports the data change state using the change report area of the base screen from which the popup screen was called. For this reason, a input popup screen for character change input in a PMC area character string indication control etc. must not use a change report area.

Property Pages

- General

![Property Pages screenshot]

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
1. Definition of a base screen and sub screens
   Coordinates of the upper-left corner of the screen structure definition control. This control is not displayed on the CNC screen. This means that any coordinates may be set.

2. Definition of a popup screen
   Define the display position of the screen.

Width, Height:
Width and height of the rectangle in which the control is placed. If a popup screen is defined, the size of the display area of this screen is indicated.
- Base screen

Screen Name:
Set the name of the form file where this component is placed.

Free Memory:
For high-speed screen display, screen data once read is stored in
the memory inside the touch panel. However, the memory space
is limited. If you check this box for a base screen that does not
need to be displayed at high speed, base screen display is
performed at low speed, allowing many other screens to share the
memory.

Use Out PMC:
Check this box to output PMC signals when this base screen is
displayed.

Out PMC Area:
Select a type of PMC address where a signal is output.

Out PMC Address:
Specify a PMC address where a signal is output.

Out PMC Bit:
Specify the bit position of the signal address above by using a
number from 0 to 7.

Use Popup Screen:
A popup screen can be displayed, overlapping the screen
displayed immediately before this base screen was displayed.
The procedure for setting the properties below applies to sub screen 1 through sub screen 5.

Use SubScreen n:
Check this box when using the property settings for sub screen n.

Save SubScreen n:
When this base screen is selected and displayed on the screen, check this box to display the sub screens selected when this base screen was displayed previously. If you do not check this check box, the sub screens set in SubScreen n are displayed.

Free Memory:
For high-speed screen display, screen data once read is stored in the memory inside the touch panel. However, the memory space is limited. If you check this box for a sub screen that does not need to be displayed at high speed, sub screen display is performed at low speed, allowing many other screens to share the memory.

SubScreen Name n:
Set the name of a sub screen to be displayed when a base screen is first displayed after the power is turned on.
- Options

Use Signal of Update notification:
Check this check box to use the function to notify the PMC that data is updated by the control change function, which was described earlier. The function is used when a change report control having a numeric value or string data is used on the base screen or on all the child screens called from the base screen.

Change Notice Area:
The signal for the change notice area uses two bytes. Specify the type of the PMC address.

Change Notice Address:
Specify a signal address.
2.3.4 Screen Switch Control

This control is used to switch from one screen to another. Touching the screen switch control on the screen switches the screen display to the screen set as a property of this control. Following types of screen switch operations are available.

1. Base screen switching
   When this type of switching is selected, the entire screen currently being displayed is erased, then a base screen is displayed. However, for switching to a pop-up screen, the pop-up screen is displayed in the forefront without erasing the screen currently displayed.

2. Sub screen switching
   When this type of switching is selected, a new screen is written over the current screen.

3. Switching to an NC screen
   This type of switching is used to switch from a user-created touch panel screen to a screen provided by the CNC such as the position display screen and parameter screen.

4. Popup screen erasure
   Erases the popup screen in which this screen switch control is placed, and returns the system to the screen from which the popup screen was called.

This button can be interlocked when functioning as a screen switching button. When the embedded-plug indication is selected, this control can be set not to function as a button.

In addition to the normal on/off-style indication the following three types of button style indications are supported: (normal indication), embedded-plug-style indication, embedded-plug-style indication by an invalid signal, and interlocking-style indication.

(1) Embedded-plug-style indication
   This indication displays the control as an embedded plug from the time of screen layout design. To switch to a button, change the property. This indication requires much less built-in memory in the CNC than the embedded-plug-style indication by an invalid signal. This embedded-plug-style indication cannot be used with either of the following indications described in items (2) and (3).

This embedded plug style is specified in [Property] on the [Image] tab.
(2) Embedded-plug-style indication by an invalid signal

When the invalid signal specified during power-up is turned on, the embedded-plug-style indication is used. The state of the invalid signal is obtained during power-up. Therefore, even if the state is changed by the PMC after this process has started, the style indication for the button is not affected. For the button with the invalid signal set to OFF, the normal button operation and the button style indication during input of the interlock signal described in item (3) can be used. Unlike the embedded-plug-style indication described in item (1), the indication type on the CNC screen can be determined by the signal state during power-up without changing the property. This embedded plug style is specified in [Property] on the [NoAction Image] tab.

(3) Interlocking-style indication

The button style indication during input of the interlock signal helps the operator visually check the state of the button by displaying the style that indicates the interlocking state. Since both the interlocking style and on/off style are included, this style requires more memory. This interlocking style is specified in [Property] on the [Interlock Image] tab.

There are several state indication check boxes for confirming the style indication on the form. When all of these boxes are checked, the style indications are prioritized as shown below. To confirm a lower-priority style indication, uncheck the check box for a higher-priority style indication.

Embedded-plug-style indication or embedded-plug-style indication by an invalid signal
> Interlocking-style indication
> On/off-style indication
Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the screen switch control.

Width, Height:
Set the width and height of the screen switch control.
- Character

No use multi-language:

Multi-language key:
See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.

Centering:
Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

On caption is copied onto Off caption:
Checking this check box causes the On caption settings to be automatically copied as the Off caption settings.

ON Caption:
Set a character string to be displayed on the screen switch control while the control is being held down.

X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

OFF Caption:
Set a character string to be displayed when the screen switch control is not held down.
**X, Y:**
Specify the display position of the caption by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

**Character Type:**
Specify the type of character used for a caption character string.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

**ON Caption Color:**
Specify the display caption color of the ON caption.

**OFF Caption Color:**
Specify the display caption color of the OFF caption.
- **Action**

![ 图像 ]

No Action:
Check this check box to disable the screen switch control function.
The control can be placed on the form, but can be disabled, in which case the display is embedded.
Set the embedded image for no action set in the Image tab.

Screen Type:
Select a screen switching type. One of base screen switching, sub screen switching, switching to an NC screen, and popup erasure can be selected.
Popup erasure: If the base screen is of the popup type, selecting this screen switching type erases the currently displayed popup screen, returning the system to the screen from which the popup screen was called.

Screen Name:
Set the name of a screen (name of a form) to which screen display is to switch. This item need not be set in the case of switching to an NC screen.

Key Code:
In the case of switching to an NC screen, select the function key code of an MDI key.
Specifically, choose from POSITION, PROGRAM, OFFSET, SYSTEM, MESSAGE, GRAPHIC, CUSTOM1, and CUSTOM2.
Shortcut key:
If you want to execute an operation set up on the Action tab by pressing an associated shortcut key, turn on this check box. An operation associated to the shortcut key setting can be executed by pressing the key on the display unit, no matter whether it has a touch panel, or touching the corresponding button on the touch panel (if available).

The following key types can be selected:
1. Soft keys (FL, F1 – F10, and FR for 10 + 2 soft keys
FL, F1 - F5, and FR for 5 + 2 soft keys
VF1 – VF8, and VF9 for the vertical soft keys)
2. Cursor / Page key (←, →, ↑, ↓, Page-UP, Page-DOWN)
3. Edit key (CAN, INPUT, ALTER, INSERT, DELETE)
4. HELP key

Interlock:
Check this check box to specify interlocking for screen switching.
When the interlock signal specification is ON, screen switching is not performed.

Interlock PMC Area:
Specify a type of PMC address.

Interlock PMC Address:
Specify an interlock signal address.

Interlock PMC Bit:
Specify the bit position of the signal address above by using a number from 0 to 7.

Blink:
Check this check box to specify a blink signal for the light section of the screen switch control. This function is enabled when the Light check box is checked. When a specified blink signal is turned on, the light section displays the ON state color and OFF state color alternately.

Blink PMC Area:
Specify a type of PMC address.

Blink PMC Address:
Specify a blink signal address.

Blink PMC Bit:
Specify the bit position of the signal address above by using a number from 0 to 7.

Light:
Check this check box to specify a light signal for the light section of the screen switch control. When a specified light signal is turned on, the light section displays the color set in the ON state color property.

Light PMC Area:
Specify a type of PMC address.

Light PMC Address:
Specify a light signal address.

Light PMC Bit:
Specify the bit position of the signal address above by using a number from 0 to 7.
- Image

Mask Image File:
The FIG file holding the button figures to be used when the No Action check box in the Action tab is checked can be selected.

Mask Style:
Select a type of button figure registered in Mask Image File.

Image File Name:
The FIG file holding the button figures to be used when the No Action check box in the Action tab is not checked (that is, when the function is enabled) can be selected.

Style:
Select a type of button figure registered in Image File Name.

On Color:
Select a color to be used for the light section when the button is pressed or turned on.

Off Color:
Select a color to be used for the light section when the button is not pressed or is turned off.

Border Color1:
Select a frame color for the upper edge and left edge of the button.

Border Color2:
Select a frame color for the lower edge and right edge of the button.

On preview:
Check this check box to confirm the control display state on the personal computer when the light section of the control is turned on. When this check box is checked, the caption display state can also be confirmed on the personal computer. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
- NoAction Image

This tab is valid when [NoAction] on the [Action] tab is checked.

NoAction Signal:
Check this check box to use the embedded-plug-style indication by an invalid signal. This function disables the function of the screen switching control and displays the embedded plug style when the invalid signal specified in the following boxes is detected during power-up.
When this check box is checked, the following items can be set.

Image File Name:
This box can be used to select the FIG file that contains the button styles used when the screen switching control is in the invalid state.

Style:
Select the type of the button styles registered in the file specified in [Image File Name].

State Color:
Select the color of the indicator lamp section.

Border Color1:
Select the color of the upper and left ends of the button.

Border Color2:
Select the color of the lower and right ends of the button.

PMC Area:
Specify the type of the PMC address of the invalid signal. The following areas can be specified.
R, D, K, X, Y, G, F, E(PMC-SB7)

Address:
Specify the PMC address of the invalid signal.
Bit:
Specify the bit position (between 0 and 7) of the above signal address.

Preview:
Check this check box to confirm the indication state on the form when the button control is in the invalid state.
This property is valid for the form display on a PC. This property does not affect the screen display of the CNC.
- Interlock Image

This tab is valid when [Interlock] on the [Action] tab is checked.

Display:
Check this check box to change the style indication of an interlocked button.
When [Interlock Signal] on the [Action] tab is set to ON, the function of the screen switching control can be disabled and the button style can be switched to the one that indicates the interlocking state.
When this check box is checked, the following boxes can be set.

Image File Name:
This box can be used to select the FIG file that contains the embedded plug styles used when the screen switching control is in the stop state.

Style:
Select the type of the button styles registered in the file specified in [Image File Name].

State Color:
Select the color of the indicator lamp section.

Border Color 1:
Select the color of the upper and left ends of the button.

Border Color 2:
Select the color of the lower and right ends of the button.

Preview:
Check this check box to confirm the style indication of an interlocked button on the form.
This property is valid for the form display on a PC. This property does not affect the screen display of the CNC.
2.3.5 Lamp Control

This control is used as a lamp whose light section color and caption change according to the state of an input signal from the PMC.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the lamp control.

Width, Height:
Set the width and height of the lamp control.
- Character

No use multi-language:

Multi-language key:

See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.

Centering:

Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

On caption is copied onto Off caption:

Checking this check box causes the On caption settings to be automatically copied as the Off caption settings.

ON Caption:

Set a character string to be displayed in the light section when the PMC monitor signal is on.
A character string that cannot be completed on one line can be continued by inserting “\n” before continuing onto the additional line.
Although no new line mark is indicated, new line operation is automatically performed at the right edge of the rectangle.
If a character string not containable in the rectangle is specified, those characters that overflow the rectangle are not displayed. If a character not using a FANUC-specified font is specified, “□” is displayed. In such a case, change the character to a displayable one.
X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. Specify the coordinates of the upper-left corner of the character string to be displayed. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

OFF Caption:
Set a character string to be displayed in the light section when the PMC monitor signal is off.
Line continuation can be performed as with an ON caption.

X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. Specify the coordinates of the upper-left corner of the character string to be displayed. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for a caption character string.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

ON Caption Color:
Specify the display caption color of the ON caption.
OFF Caption Color:
Specify the display caption color of the OFF caption.
- Action

No Action:
Check this check box to disable the lamp control function.
The control can be placed on the form, but can be disabled, in
which case the display is embedded.
Set the lamp image for no action set in the Image tab.

Watch PMC Area:
Specify a type of address for the PMC signal that turns on and
off the lamp. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)

Watch Address:
Specify a monitor PMC signal address.

Watch Bit:
Specify the bit position of the signal address above by using a
number from 0 to 7.

Use Blink:
Check this check box to cause the lamp to blink.

Blink Signal Area:
Specify the type of the address of the PMC signal for specifying
the blinking of the lamp. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)

Blink Signal Address:
Specify a monitor PMC signal address.

Blink Signal Bit:
Specify the bit position of the signal address above by using a
number from 0 to 7.
2. DEVELOPMENT OF CUSTOM SCREEN

- Image

Mask Image File:
The FIG file holding the lamp figures to be used when the No Action check box in the Action tab is checked can be selected.

Mask Style:
Select a type of lamp figure registered in Mask Image File.

Image File Name:
The FIG file holding the lamp figures to be used when the No Action check box in the Action tab is not checked (that is, when the function is enabled) can be selected.

Style:
Select a type of lamp figure registered in Image File Name.

On Color:
Select a color to be used for the light section when the monitor PMC signal is turned on.

Off Color:
Select a color to be used for the light section when the monitor PMC signal is turned off.

Back Color:
Specify the base color of the rectangle. This property has an effect for a lamp such as a round lamp.

Border Color 1:
Select a frame color for the upper edge and left edge of the lamp.

Border Color 2:
Select a frame color for the lower edge and right edge of the lamp.

On Preview:
Check this check box to confirm the display state on the form when the lamp is turned on. When this check box is checked, the caption display state can also be confirmed on the form. This property is valid for form display on a personal computer. This property does not affect the screen display of the CNC.
- Option

Use 7 Colors:
Check this box to use seven colors as the background colors of the numeral indication section.

Type:
Specify how to switch seven colors.
0:PMC (bit)
Allows you to switch the background color at the bit position of the PMC area specified with the signal area and the signal address.
1:PMC (big or small comparison)
Allows you to switch the background color by comparing the magnitudes of the value of the PMC area specified with the signal area and the signal address and the change beginning value.

Signal Area:
Specify the type of the address of the PMC signal used to control the 7-background color selection signal for the numeral indication section. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)

Signal Address:
Specify the address of the 7-background color selection signal for the numeral indication section. This signal requires one byte if 0 is specified for Type. As the background color, bit 0 takes precedence. If blink bit 7 turns on, blinking starts with the specified on and off colors.
If 1:PMC (big or small comparison) is specified for Type, a continuous area with the length specified as the data length (1, 2, or 4 bytes) is required.

Set Up Number:
If specifying 1:PMC (big or small comparison) for Type, specify the number of change beginning values to be used.
This option is not used if 0:PMC (bit) is specified for Type.
Data Length:
If specifying 1:PMC (big or small comparison) for Type, specify the data length of the PMC area specified with the signal area and the signal address.
0: 1 Byte (Signed)
1: 1 Byte (Unsigned)
2: 2 Byte (Signed)
3: 2 Byte (Unsigned)
4: 4 Byte (Signed)
5: 4 Byte (Unsigned)
This option is not used if 0:PMC (bit) is specified for Type.

Use Blink Signal:
Check this box to use blinking in the numeral indication section.
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Area:
Specify the type of the address of the PMC signal used to specify the blinking in the numeral indication section. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Address:
Specify the address of the blink signal.
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Bit:
Specify the bit position of the signal address above by using a number 0 to 7.
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Light Color #6 to #0:
Specify the ON color corresponding to each of the bits.

Character Color #6 to #0:
Specify the numeral indication character color corresponding to each of the bits.

Change Beginning Value:
Specify the value whose magnitude is to be compared with that of the value of the PMC area specified with the signal area and the signal address. If the value of the PMC area specified with the signal area and the signal address exceeds the value specified here, the lamp turns on in the ON color corresponding to the change beginning value.
This option takes effect if 1:PMC (big or small comparison) is specified for Type.
- NoAction Image

This tab is valid when [NoAction] on the [Action] tab is checked.

NoAction Signal:
Check this check box to use the embedded-plug-style indication by an invalid signal. This function disables the function of the screen switching control and displays the embedded plug style when the invalid signal specified in the following boxes is detected during power-up.
When this check box is checked, the following items can be set.

Image File Name:
This box can be used to select the FIG file that contains the button styles used when the screen switching control is in the invalid state.

Style:
Select the type of the button styles registered in the file specified in [Image File Name].

State Color:
Select the color of the indicator lamp section.

Border Color 1:
Select the color of the upper and left ends of the button.

Border Color 2:
Select the color of the lower and right ends of the button.

PMC Area:
Specify the type of the PMC address of the invalid signal. The following areas can be specified.
R, D, K, X, Y, G, F, E(PMC-SB7)

Address:
Specify the PMC address of the invalid signal.

Bit:
Specify the bit position (between 0 and 7) of the above signal address.
Preview:
Check this check box to confirm the indication state on the form when the button control is in the invalid state.
This property is valid for the form display on a PC. This property does not affect the screen display of the CNC.
2.3.6 Button Control

This control consists of a lamp section whose light section color and caption change according to the state of an input signal from the PMC, and a switch section that performs the following operations when the button section is pressed:

1. Setting of bits in the PMC area
2. Writing of fixed data to the PMC area
3. Calling of an FP function
4. Calling of a screen (used with momentary type)
5. Switching of history message indication control screens

The state of output to the PMC area is preserved after the screen is switched.

Two switch types are available: momentary type and alternate type. This button can be interlocked when functioning as a push button. When the embedded-plug indication is selected, this control can be set not to function as a button.

In addition to the normal on/off-style indication the following three types of button style indications are supported: (normal indication), embedded-plug-style indication, embedded-plug-style indication by an invalid signal, and interlocking-style indication.

1. Embedded-plug-style indication
   This indication displays the control as an embedded plug from the time of screen layout design. To switch to a button, change the property. This indication requires much less built-in memory in the CNC than the embedded-plug-style indication by an invalid signal. This embedded-plug-style indication cannot be used with either of the following indications described in items (2) and (3).
   This embedded plug style is specified in [Property] on the [Image] tab.

2. Embedded-plug-style indication by an invalid signal
   When the invalid signal specified during power-up is turned on, the embedded-plug-style indication is used. The state of the invalid signal is obtained during power-up. Therefore, even if the state is changed by the PMC after this process has started, the style indication for the button is not affected. For the button with the invalid signal set to OFF, the normal button operation and the button style indication during input of the interlock signal described in item (3) can be used. Unlike the embedded-plug-style indication described in item (1), the indication type on the CNC screen can be determined by the signal state during power-up without changing the property.
   This embedded plug style is specified in [Property] on the [NoAction Image] tab.
(3) Interlocking-style indication

The button style indication during input of the interlock signal helps the operator visually check the state of the button by displaying the style that indicates the interlocking state. Since both the interlocking style and on/off style are included, this style requires more memory.

This interlocking style is specified in [Property] on the [Interlock Image] tab.

There are several state indication check boxes for confirming the style indication on the form. When all of these boxes are checked, the style indications are prioritized as shown below. To confirm a lower-priority style indication, uncheck the check box for a higher-priority style indication.

Embedded-plug-style indication or embedded-plug-style indication by an invalid signal

> Interlocking-style indication

> On/off-style indication

⚠️ CAUTION

When using a non-touch panel display unit, do not use the momentary button attribute.

Even if the operator holds down the MDI key or soft key assigned to a button, the key can be released momentarily, depending on the state internal to the display unit. Thus, a button operation such as for signal output can result in chattering. Even for an alternate button, chattering occurs while the key is being held down, as with a momentary button.
Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the button control.

Width, Height:
Set the width and height of the button control.
- Character

No use multi-language:

Multi-language key:

See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.

Centering:

Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle.

On caption is copied onto Off caption:

Checking this check box causes the On caption settings to be automatically copied as the Off caption settings.

ON Caption:

Set a character string to be output to the light section when the PMC monitor signal is on.

A character string that cannot be completed on one line can be continued by inserting “\n” before continuing onto the additional line.

Although no new line mark is indicated, new line operation is automatically performed at the right edge of the rectangle.

If a character string not containable in the rectangle is specified, those characters that overflow the rectangle are not displayed. If a character not using a FANUC-specified font is specified, “□” is displayed. In such a case, change the character to a displayable one.

X, Y:

Specify the display position of the ON caption by using relative coordinates within the rectangle of the control. Specify the coordinates of the upper-left corner of the character string to be displayed. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.
OFF Caption:
Set a character string to be output to the light section when the PMC monitor signal is off.
Line continuation can be performed as with an ON caption.

X, Y:
Specify the display position of the OFF caption by using relative coordinates within the rectangle of the control. Specify the coordinates of the upper-left corner of the character string to be displayed. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for a caption character string.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

ON Caption Color:
Specify the display caption color of the ON caption.

OFF Caption Color:
Specify the display caption color of the OFF caption.
2. DEVELOPMENT OF CUSTOM SCREEN

- Action

NoAction:
Check this check box to disable the button control function. The control can be placed on the form, but can be disabled, in which case the display is embedded. Set the button image for no action set in the Image tab.

Switch Type:
Select a switch type. This property is valid for other than screen switch action.

Action Type:
Specify operations to be performed when a switch is pressed and released. Click the [Detail] button and set the detailed properties of the selected type.
For the method of setting, see [Action Detail Properties].
[Bit Set]
Performs bit operation in the PMC area.
[Data Set]
Writes fixed data as word-size data to the PMC area.
[Function Call]
Calls an FP function.
[Change Screen]
Calls another screen. (Used with momentary type)
[History Display]
Switches between the history message display control screens.
Shortcut key:
If you want to execute an operation set up on the Action tab by pressing an associated shortcut key, turn on this check box. An operation associated to the shortcut key setting can be executed by pressing the key on the display unit, no matter whether it has a touch panel, or touching the corresponding button on the touch panel (if available).
The following key types can be selected:
1. Soft keys (FL, F1 – F10, and FR for 10 + 2 soft keys
   FL, F1 - F5, and FR for 5 + 2 soft keys
   VF1 – VF8, and VF9 for the vertical soft keys)
2. Cursor / Page key (←, →, ↑, ↓, Page-UP, Page-DOWN)
3. Edit key (CAN, INPUT, ALTER, INSERT, DELETE)
4. HELP key
Watch:
Choose whether to change the state of the light section (lamp section) according to switch state (automatically) or a signal from the PMC.
[USER]
Specify USER to change the state of the light section according to a signal from the PMC. Pressing the button section does not change the light section.
[AUTO]
Display is turned on when the switch is turned on. Display is turned off when the switch is turned off. No signal bit in the PMC area needs to be assigned.
Watch PMC Area:
Specify a type of address for the PMC signal that turns on and off the light section. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)
Watch Address:
Specify a monitor PMC signal address.
Watch Bit:
Specify the bit position of the signal address above by using a number from 0 to 7.
Interlock:
A signal for disabling button action can be specified. When the specified signal is on, the interlock function operates to disable button action.
Check this item when using this function.
PMC Area:
Specify a type of address for an interlock signal. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)
Address:
Specify an interlock signal address.
Bit:
Specify the bit position of the signal above by using a number from 0 to 7.
Action **Detail** Properties

- **Detail[Momentary]-[Bit Set]**

  Specify which data to be output to which signal bit when the switch is on.

  **PMC Area:**
  Specify a type of address for a PMC signal to be output. The following areas can be specified:
  R, D, K, X, Y, G, F, E(PMC-SB7)

  **Address:**
  Specify an output signal address.

  **Bit:**
  Specify the bit position of the signal above by using a number from 0 to 7.

  **Bit Pattern:**
  - **[0:0]** Outputs 0 (LOW) to a bit specified for output.
  - **[1:1]** Outputs 1 (HIGH) to a bit specified for output.
  - **[2:Revers]** Outputs a bit specified for output after reversion of 0/1.

- **Detail[5:Alternate]-[Bit Set]**

  **[ON Action], [OFF Action]**
  Specify separately [ON Action] to be executed when the switch makes a transition from OFF to ON, and [OFF Action] to be executed when the switch makes a transition from ON to OFF.

  **PMC Area:**
  Specify a type of address for a PMC signal to be output. The following areas can be specified:
  R, D, K, X, Y, G, F, E(PMC-SB7)
Address:
Specify an output signal address.

Bit:
Specify the bit position of the signal above by using a number from 0 to 7.

Bit Pattern:
[0:0] Outputs 0 (LOW) to a bit specified for output.
[1:1] Outputs 1 (HIGH) to a bit specified for output.
[2:Revers] Outputs a bit specified for output after reversion of 0/1.

- Detail[Momentary]-[Data Set]

Specify which value to be output to which PMC area when the switch is on. The size of output data is word.

PMC Area:
Specify a type of address for a PMC signal to be output. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)

Address:
Specify an output signal address.

Word:
Specify a value from -32767 to +32767.

- Detail[5:Alternate]-[Data Set]

[ON Action], [OFF Action]
Specify separately [ON Action] to be executed when the switch makes a transition from OFF to ON, and [OFF Action] to be executed when the switch makes a transition from ON to OFF.

PMC Area:
Specify a type of address for a PMC signal to be output. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)
Address:
- Specify an output signal address.

Word:
- Specify a value from -32767 to +32767.

- **Detail[Momentary]-[Function Call]**

Specify a function to be called when the switch is turned on.

**Function:**
- Describe an FP function. For the method of description, see Chapter 3, “FP Functions.”

- **Detail[5:Alternate]-[Function Call]**

[ON Action], [OFF Action]
- Specify separately [ON Action] to be executed when the switch makes a transition from OFF to ON, and [OFF Action] to be executed when the switch makes a transition from ON to OFF.

**Function:**
- Describe an FP function. For the method of description, see Chapter 3, “FP Functions.”
- **Detail[Change Screen]**

Specify a main screen to be called when the switch is turned on.

**Screen Name:**
Specify a main screen name. For a screen name, enter the XXX portion of the project form file name XXX.XML.

- **Detail[Momentary]-[History Display]**

You can change the display contents of a specified history message indication control when the button changes to the on state.

**History Action Type**
Select the display operation of the history message indication control from among the items described below. The history display screen in the following explanation is not displayed if “Message Display” is selected for the “First Time Display” property in the Action tab of the history message indication control.

1. **Summary/History/Detail Switch Button**
   - This item creates a button for switching between summary and history display screens or a button for returning from a detail display screen to a summary or history display screen. If selecting this operation, set the following property:
   - Link Number at output button

2. **Detail Message Switch Button**
   - This item creates a button for switching from a indicated message on a summary or history display screen to a further detail screen. If selecting this operation, set the following properties:
   - Link Number at output button
   - Row Number at Detail
   - Detail Message File Name
<3> Page Switch Button
This item creates a Page Switch Button for a summary display or history display message. If selecting this operation, set the following properties:
- Link Number at output button
- MDI Key Code

Link Number at output button:
Specify the “Assign Link Number” set in the target history message indication control to specify on which history message indication control the set button operation is to be performed.

Row Number at Detail:
Set this item for the “Detail Message Switch Button” operation. When summary or history display is in progress, specify the line number of this indicated message. On a detail display screen, the system searches the detailed explanation of the summary/history displayed command line through a specified detail display file and displays it.
A line number of 0 means that the display contents of the detail display screen having the Link Number at output button are to be cleared.

Detail Message File Name:
Set this item for the “Detail Message Switch Button” operation. The system loads the details of the message indicated by the pressed detail switching button from the display file specified for this item and displays them on the screen. If you create multiple detail switching buttons for the same line, you can display different details by specifying different display file names for the buttons.

Edit button:
Clicking this button enables you to edit messages in a detail display file.
Message texts and detailed explanations are associated with one another if their “Number” or “Bit Set” items have the same numbers in their respective text files.

MDI Key Code:
Used to select between page-up and page-down as the “Page Switch Button” operation.
- Detail [Alternate]-[History Display]

[ON Action], [OFF Action]
Under [ON Action] and [OFF Action], specify separately the history message indication control operations to be executed when the button changes from the off state to the on state and from on to off.
The setting property is the same as that of the momentary operation history indication function button.
- Image

Mask Image File:
The FIG file holding the button figures to be used when the No Action check box in the Action tab is checked can be selected.

Style:
Select a type of button figure registered in Mask Image File.

Image File Name:
The FIG file holding the button figures to be used when the No Action check box in the Action tab is not checked (that is, when the function is enabled) can be selected.

Style:
Select a type of button figure registered in Image File Name.

On Color:
Select a color to be used for the light section when the light section is turned on by the monitor PMC signal or automatically.

Off Color:
Select a color to be used for the light section when the light section is turned off by the monitor PMC signal or automatically.

Border Color 1:
Select a frame color for the upper edge and left edge of the button.

Border Color 2:
Select a frame color for the lower edge and right edge of the button.

On Preview:
Check this check box to confirm the display state on the form when the button is turned on. When this check box is checked, the caption display state can also be confirmed on the form. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
- NoAction Image

This tab is valid when [NoAction] on the [Action] tab is checked.

NoAction signal:
Check this check box to use the embedded-plug-style indication by an invalid signal. This function disables the function of the button control and displays the embedded plug style when the invalid signal specified in the following boxes is detected during power-up.
When this check box is checked, the following items can be set.

Image File Name:
This box can be used to select the FIG file that contains the embedded plug styles used when the button control is in the invalid state.

Style:
Select the type of the embedded plug styles registered in the file specified in [Image File Name]

State Color:
Select the color of the indicator lamp section.

Border Color 1:
Select the color of the upper and left ends of the button.

Border Color 2:
Select the color of the lower and right ends of the button.

PMC Area
Specify the type of the PMC address of the invalid signal. The following areas can be specified.
R, D, K, X, Y, G, F, E(PMC-SB7)

Address:
Specify the PMC address of the invalid signal.

Bit:
Specify the bit position (between 0 and 7) of the above signal address.
Preview:
Check this check box to confirm the indication state on the form when the button control is in the invalid state.
This property is valid for the form display on a PC. This property does not affect the screen display of the CNC.
This tab is valid when [Interlock] on the [Action] tab is checked.

Display:
Check this check box to change the style indication of an interlocked button.
When [Interlock Signal] on the [Action] tab is set to ON, the function of the button control can be disabled and the button style can be switched to the one that indicates the interlocking state.
When this check box is checked, the following boxes can be set.

Image File Name:
This box can be used to select the FIG file that contains the embedded plug styles used when the button control is in the stop state.

Style:
Select the type of the button styles registered in the file specified in [Image File Name].

State Color:
Select the color of the indicator lamp section.

Border Color1:
Select the color of the upper and left ends of the button.

Border Color2:
Select the color of the lower and right ends of the button.

Preview:
Check this check box to confirm the style indication of an interlocked button on the form.
This property is valid for the form display on a PC. This property does not affect the screen display of the CNC.
2.3.7 Framed Button Control

This control consists of a lamp section whose light section color and caption change according to the state of an input signal from the PMC, a switch section that sets a specified PMC signal to on when the button section is pressed, and an outside frame whose color changes according to the state of the switch. PMC signal output is turned off automatically when the screen is switched. When [5:Alternate] is used, a setting can be made to preserve the output signal state even when the screen is switched. The following switch types are available:

- Momentary button (with no lamp)
- Momentary button with a lamp
- Actuator button
- Alternate button

This button can be interlocked when functioning as a bordered button. When the embedded-plug indication is selected, this control can be set not to function as a button.

In addition to the normal on/off-style indication the following three types of button style indications are supported: (normal indication), embedded-plug-style indication, embedded-plug-style indication by an invalid signal, and interlocking-style indication.

(1) Embedded-plug-style indication
This indication displays the control as an embedded plug from the time of screen layout design. To switch to a button, change the property. This indication requires much less built-in memory in the CNC than the embedded-plug-style indication by an invalid signal. This embedded-plug-style indication cannot be used with either of the following indications described in items (2) and (3).
This embedded plug style is specified in [Property] on the [Image] tab.

(2) Embedded-plug-style indication by an invalid signal
When the invalid signal specified during power-up is turned on, the embedded-plug-style indication is used. The state of the invalid signal is obtained during power-up. Therefore, even if the state is changed by the PMC after this process has started, the style indication for the button is not affected. For the button with the invalid signal set to OFF, the normal button operation and the button style indication during input of the interlock signal described in item (3) can be used. Unlike the embedded-plug-style indication described in item (1), the indication type on the CNC screen can be determined by the signal state during power-up without changing the property.
This embedded plug style is specified in [Property] on the [No Action Image] tab.
(3) Interlocking-style indication

The button style indication during input of the interlock1 signal helps the operator visually check the state of the button by displaying the style that indicates the interlocking state. Since both the interlocking style and on/off style are included, this style requires more memory.

This interlocking style is specified in [Property] on the [Interlock Image] tab.

There are several state indication check boxes for confirming the style indication on the form. When all of these boxes are checked, the style indications are prioritized as shown below. To confirm a lower-priority style indication, uncheck the check box for a higher-priority style indication.

- Embedded-plug-style indication or
- Embedded-plug-style indication by an invalid signal
  - Interlocking-style indication
  - On/off-style indication

⚠️ CAUTION

When using a non-touch panel display unit, do not use the momentary button attribute. Even if the operator holds down the MDI key or soft key assigned to a button, the key can be released momentarily, depending on the state internal to the display unit. Thus, a button operation such as for signal output can result in chattering. Even for an alternate button, chattering occurs while the key is being held down, as with a momentary button.

**Description of switch types**

[2: Momentary (No Lamp)]

This type of switch is on while the button is held down, and is off when the button is released. Depending on the switch state, the on (1) or off (0) signal is output to an address.

The display of the lamp section is as follows:

<table>
<thead>
<tr>
<th>Lamp light signal</th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame color</td>
<td>Frame off color</td>
<td>Frame on color</td>
</tr>
<tr>
<td>Light color</td>
<td>Lamp off color</td>
<td>Lamp on color</td>
</tr>
<tr>
<td>Caption color</td>
<td>Caption off color</td>
<td>Caption on color</td>
</tr>
</tbody>
</table>
[3: Momentary (Use Lamp)]
This type of switch is on while the button is held down, and is off when the button is released. Depending on the switch state, the on (1) or off (0) signal is output to an address. Display operation depends on the following:

If the blink signal is turned on after blink operation is enabled, the display blinks on and off repeatedly. (This operation is not performed when the lamp light signal is on.)

### Switch state

<table>
<thead>
<tr>
<th>Switch state</th>
<th>OFF</th>
<th>ON</th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp light signal</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Frame color</td>
<td>Frame off color</td>
<td>Frame off color</td>
<td>Frame on color</td>
<td>Frame on color</td>
</tr>
<tr>
<td>Light color</td>
<td>Lamp off color</td>
<td>Lamp on color</td>
<td>Lamp on color</td>
<td>Lamp off color</td>
</tr>
<tr>
<td>Caption color</td>
<td>Caption off color</td>
<td>Caption on color</td>
<td>Caption on color</td>
<td>Caption off color</td>
</tr>
<tr>
<td>Blink operation</td>
<td>Enabled</td>
<td>Disabled</td>
<td>Enabled</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

[4: Actuator]
Each time this button is pressed, this switch toggles between on and off. If a number other than 0 is set as a group number, when the switch that is currently off is turned on, the other switches of the same group number are turned off. Up to nine groups can be set on one screen (1 to 9). Depending on the switch state, the on (1) or off (0) signal is output to an address. Display operation depends on the following:

If the blink signal is turned on after blink operation is enabled, the display blinks on and off repeatedly. (This operation is not performed when the lamp light signal is on.)

In this mode, the button does not operate when the interlock 2 signal is off. The switch does not change state when the interlock 1 signal is on. When the screen display switches to another screen, the output signal of the button is turned off.

[5: Alternate]
Each time this button is pressed, this switch toggles between on and off. If a number other than 0 is set as a group number, when the switch that is currently off is turned on, the other switches of the same group number are turned off. Up to nine groups can be set on one screen (1 to 9). Depending on the switch state, the on (1) or off (0) signal is output to an address. The operation of the light section is the same as for the alternate button with a lamp.
When switching to another screen, the user can choose whether to turn off the switch or preserve the current state.

The operation is as follows:

<table>
<thead>
<tr>
<th>Switch state</th>
<th>OFF</th>
<th>ON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp light signal</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>Frame color</td>
<td>Frame off color</td>
<td>Frame on color</td>
</tr>
<tr>
<td>Light color</td>
<td>Lamp off color</td>
<td>Lamp on color</td>
</tr>
<tr>
<td>Caption color</td>
<td>Caption off color</td>
<td>Caption on color</td>
</tr>
<tr>
<td>Blink operation</td>
<td>Enabled</td>
<td>Disabled</td>
</tr>
</tbody>
</table>

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of a framed button control.

Width, Height:
Set the width and height of a framed button control.
No use multi-language:

Multi-language key:
See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.

Centering:
Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

On caption is copied onto Off caption:
Checking this check box causes the On caption settings to be automatically copied as the Off caption settings.

ON Caption:
Set a character string to be output to the light section when the PMC light signal is on.
A character string that cannot be completed on one line can be continued by inserting “\n” before continuing onto the additional line.
Although no new line mark is indicated, new line operation is automatically performed at the right edge of the rectangle.
If the character string not containable in the rectangle is specified, those characters that overflow the rectangle are not displayed. If a character not using a FANUC-specified font is specified, “□” is displayed. In such a case, change the character to a displayable one.
X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. Specify the coordinates of the upper-left corner of the character string to be displayed. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

OFF Caption:
Set a character string to be output to the light section when the PMC light signal is off. Line continuation can be performed as with an ON caption.

X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. Specify the coordinates of the upper-left corner of the character string to be displayed. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for a caption character string.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

ON Caption Color:
Specify the display caption color of the ON caption.

OFF Caption Color:
Specify the display caption color of the OFF caption.
- Action

No Action:
Check this check box to disable the function of the framed button control.
The control can be placed on the form, but can be disabled, in which case the display is embedded.
Set the image for no action set in the Image tab.

Keep State:
This check box can be specified when the button type [5:Alternate] is selected.
Check this check box to preserve the state of the output PMC signal even when the screen is switched. When this check box is not checked, the state of the output PMC signal is turned off.

Switch Type:
Select a switch type. This selection is valid for an action other than screen switch action.
[2: Momentary(No Lamp)]
[3: Momentary(Use Lamp)]
[4: Actuator]
[5: Alternate]
Group No:
A group number can be specified when the actuator button or alternate button is selected. A button with the same group number operates as a selector switch. In selector switch operation, only one switch operates in one group; if another switch is turned on, the switch previously turned on is turned off. A group number from 1 to 9 can be specified on the same screen. Number 0 specifies switches that operate alone.

Shortcut key:
If you want to execute an operation set up on the Action tab by pressing an associated shortcut key, turn on this check box. An operation associated to the shortcut key setting can be executed by pressing the key on the display unit, no matter whether it has a touch panel, or touching the corresponding button on the touch panel (if available). The following key types can be selected:
1. Soft keys (FL, F1 – F10, and FR for 10 + 2 soft keys
   FL, F1 - F5, and FR for 5 + 2 soft keys
   VF1 – VF8, and VF9 for the vertical soft keys)
2. Cursor / Page key (←, →, ↑, ↓, Page-UP, Page-DOWN)
3. Edit key (CAN, INPUT, ALTER, INSERT, DELETE)
4. HELP key

Interlock 1:
This function can be specified when the momentary button, actuator button, or alternate button is selected. When the interlock signal is on, push-button operation is interlocked.

Interlock 2:
This function can be specified when the actuator button is selected. When the interlock signal is off, push-button operation is interlocked. When this function is used together with InterLock1, push-button operation is enabled when both interlocks are released.

Interlock PMC Area 1, Interlock PMC Area 2:
Specify a type of PMC address for an interlock signal. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)

Interlock PMC Address 1, Interlock PMC Address 2:
Specify an interlock signal address.

Interlock PMC Bit 1, Interlock PMC Bit 2:
Specify the bit position of an interlock signal by using a number from 0 to 7.

Blink:
This check box can be specified when the momentary button (with a lamp), actuator button, or alternate button is selected. Check this check box to use the blink function.

Blink PMC (Blink PMC Area, Blink PMC Address, Blink PMC Bit):
Specify a signal for blinking the lamp section. Specify these items in the same way as for Interlock PMC Area, Interlock PMC Address, and Interlock PMC Bit.
Light PMC (Light PMC Area, Light PMC Address, Light PMC Bit):
These items can be specified when the momentary button (with a lamp), actuator button, or alternate button is selected. Specify a signal for turning on the lamp section.
Specify these items in the same way as for Interlock PMC Area, Interlock PMC Address, and Interlock PMC Bit.

OUT PMC (Out PMC Area, Out PMC Address, Out PMC Bit):
Specify a signal for switch state output.
Specify these items in the same way as for Interlock PMC Area, Interlock PMC Address, and Interlock PMC Bit.
- Image

Mask Image File:
The FIG file holding the button figures to be used when the No Action check box in the Action tab is checked can be selected.

Mask Style:
Select a type of button figure registered in Mask Image File.

Image File Name:
The FIG file holding the button figures to be used when the No Action check box in the Action tab is not checked (that is, when the function is enabled) can be selected.

Style:
Select a type of button figure registered in Image File Name.
Example: Specify No. 23 to select a push-button with a frame.

On Color:
Select a color to be used for the light section when the light section is turned on.

Off Color:
Select a color to be used for the light section when the light section is turned off.

Border Off Color:
For a framed figure button, select a button frame OFF color. For other types of buttons, select a frame color for the upper edge and left edge.
Border On Color:
For a framed figure button, select a button frame ON color. For other types of buttons, select a frame color for the lower edge and right edge.

On Preview:
Check this check box to confirm the display state on the form when the button is turned on. When this check box is checked, the caption ON state can also be confirmed on the form. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
- NoAction Image

This tab is valid when [No Action] on the [Action] tab is checked.

No Action Signal:
Check this check box to use the embedded-plug-style indication by an invalid signal. This function disables the function of the bordered button control and displays the embedded plug style when the invalid signal specified in the following boxes is detected during power-up.

When this check box is checked, the following items can be set.

Image File Name:
This box can be used to select the FIG file that contains the button styles used when the bordered button control is in the invalid state.

Style:
Select the type of the button styles registered in the file specified in [Image File Name].

State Color:
Select the color of the indicator lamp section.

Border Color 1:
Select the color of the upper and left ends of the button.

Border Color 2:
Select the color of the lower and right ends of the button.
PMC Area:
Specify the type of the PMC address of the invalid signal. The following areas can be specified.
R, D, K, X, Y, G, F, E(PMC-SB7)
Address:
Specify the PMC address of the invalid signal.
Bit:
Specify the bit position (between 0 and 7) of the above signal address.
Preview:
Check this check box to confirm the indication state on the form when the bordered button control is in the invalid state.
This property is valid for the form display on a PC. This property does not affect the screen display of the CNC.
This tab is valid when [Interlock1] on the [Action] tab is checked.

Display:
Check this check box to change the style indication of an interlocked button.
When [Interlock Signal] on the [Action] tab is set to ON, the function of the bordered button control can be disabled and the button style can be switched to the one that indicates the interlocking state.
[Interlock1] is used as the interlock signal.
When this check box is checked, the following boxes can be set.

Image File Name:
This box can be used to select the FIG file that contains the embedded plug styles used when the bordered button control is in the stop state.

Style:
Select the type of the button styles registered in the file specified in [Image File Name].

State Color:
Select the color of the indicator lamp section.

Border Color 1:
Select the color of the upper and left ends of the button.
Border Color2:
Select the color of the lower and right ends of the button.

Preview:
Check this check box to confirm the indication state on the form when the bordered button control is in the stopped state. This property is valid for the form display on a PC. This property does not affect the screen display of the CNC.
2.3.8 MDI Key Control

This control can be used to create a button on the touch panel that performs the same function as an MDI unit key. A ten-key pad can be created by placing multiple such MDI keys. With a system that has no MDI unit attached, the screen display can be switched to the CNC screen by placing function keys on the touch panel.

Property Pages

- General

![MDI Key Control Property Pages](image)

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the MDI key control.

Width, Height:
Set the width and height of the MDI key control.
- Action

No use multi-language:

Multi-language key:
See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.

Key Top:
Specify a caption for the MDI key.
A caption that cannot be completed on one line can be continued by inserting “\n” before continuing onto the additional line.
Although no new line mark is indicated, new line operation is automatically performed at the right edge of the rectangle.
If the character string not containable in the rectangle is specified, those characters that overflow the rectangle are not displayed. If a character not using a FANUC-specified font is specified, "□" is displayed. In such a case, change the character to a displayable one.

Centering:
Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. Specify the coordinates of the upper-left corner of the character string to be displayed. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Key Code:
Specify which MDI key code to be input to the operator’s panel when this button is pressed. Choose from the list box.
Character Type:
  Specify the type of character used for a caption character string.
  0: ANK (displays a mixture of half-size and 2x-size characters)
  1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
  2: X4 (displays characters two times larger vertically and horizontally)
  3: X6 (displays characters two times larger vertically and three times larger horizontally)
  4: SMALL (displays characters smaller than half-size characters)

ON Caption Color:
  Specify the color of key top characters to be displayed when the MDI key is pressed.

OFF Caption Color:
  Specify the color of key top characters to be displayed when the MDI key is not pressed.
Image File Name:
The FIG file holding MDI key figures can be selected.

Style:
Select a type of MDI key figure registered in Image File Name.

On Color:
Select a color to be used for the light section when the MDI key is pressed.

Off Color:
Select a color to be used for the light section when the MDI key is not pressed.

Back Color:
Specify the background color of the MDI key. This property is effective when a round figure is selected.

Border Color1:
Select a frame color for the upper edge and left edge of the MDI key.

Border Color2:
Select a frame color for the lower edge and right edge of the MDI key.

On Preview:
Check this check box to confirm the display state on the form when the MDI key is pressed. When this check box is checked, the key top character display state can also be confirmed on the form. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
2.3.9 MDI Keyboard Control

This control allows you to create on the touch panel a group of buttons that function in the same way as keys on the MDI unit. For system configurations without an MDI unit, placing this control on the touch panel allows the operator to enter keys in the same way as on an MDI unit.

Property Pages

- General

![Property Pages Image]

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X,Y:
Set the coordinates of the upper-left corner of the MDI keyboard control.

Width, Height:
Set the width and height of the MDI keyboard control.
- Action

Keyboard:
Select an MDI keyboard type.
0: Address key
1: Numeric key
2: Command key

CNC MODE(system):
Specify whether the CNC system on the touch panel is a “machining” or “lathe” system. This option can be specified only if the keyboard type is address key.
0: Arrangement of T series address key
1: Arrangement of M series address key

ON Caption Color:
Specify the display color of the character on the top of the key when the MDI key is clicked.

OFF Caption color:
Specify the display color of the character on the top of the key when the MDI key is not clicked.

0: Example of T series address
1: Numeric key
2: Command key
- Image

![Image](image.png)

**Image File Name:**
A FIG file holding a control figure can be selected.

**Style:**
Select a type of control figure registered in the “Image File Name.”

**On color:**
Select a color to be used for the light section when it is turned on.

**Off color:**
Select a color to be used for the light section when it is turned off.

**Back Color:**
Specify the background color of the control.

**Border Color 1:**
Specify a frame color for the upper edge and left edge of the control.

**Border Color 2:**
Specify a frame color for the lower edge and right edge of the control.

**ON Preview:**
Check this check box to confirm the display state of the control on the form when the keyboard is pressed. When this check box is checked, numeral indication can also be confirmed on the form. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
### 2.3.10 Key Input Buffer Control

This control is a key input buffer for data input that temporarily stores key codes entered from the keys on the MDI unit and MDI key controls. One key input buffer can be placed on one screen. This control is used together with a numeral indication control with key input. When the [INPUT] key is pressed on the MDI unit or the [INPUT] key code is entered through the MDI key control, the data stored in this key input buffer is written to the numeral indication control with key input where the focus is placed.

The key used by editing Key Input Buffer control is the following.

<table>
<thead>
<tr>
<th>KEY name</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPUT</td>
<td>The input (The value displayed in key input buffer is written in the area specified for the control to be input).</td>
</tr>
<tr>
<td>INSERT</td>
<td>+ input (The value to which key input buffer is displayed is written and the value added to the value of the area specified for the control to be input is written).</td>
</tr>
<tr>
<td>CAN</td>
<td>The back space (One character of the character string displayed in key input buffer in the back is deleted).</td>
</tr>
<tr>
<td>DELETE</td>
<td>Clear (The character string displayed in key input buffer is deleted).</td>
</tr>
</tbody>
</table>
Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the key input buffer control.

Width, Height:
Set the width and height of the key input buffer control.
- Character

Centering:
Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for a caption character string.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

Character Color:
Specify the display color of characters input into the key input buffer.
Screen Interlock:
Numeral input from an MDI key or MDI key control can be interlocked. This function is used to disable the setting of the numeral indication control with key input according to the machine state.

PMC Area:
Specify a type of address for an interlock signal. The areas below can be specified. When the signal is on, the interlock function is activated.
R, D, K, X, Y, G, F, E (PMC-SB7)

Address:
Specify an interlock signal address.

Bit:
Specify the bit position of an interlock signal by using a number from 0 to 7.

No use multi-language:

Multi-language key:
See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.

Interlock Message:
If an MDI key is input when the interlock function is activated, a message specified here is output to the key input buffer.

Character Color:
Specify the display color of an interlock message.

Number of digits specification:
Check this check box to specify the number of character input digits of the key input buffer. This causes the text box on the right to accept input; set the number of digits. The number of digits includes the digits of the decimal point and the sign, if used. If the character type or rectangle size is changed, the number of digits may have to be changed accordingly.
- Image

![Image](image.png)

**Image File Name:**
The FIG file holding key input buffer control figures can be selected.

**Style:**
Select a type of key input buffer control figure registered in Image File Name.

**Back Color:**
Specify the background color of the key input buffer control.

**Border Color1:**
Select a frame color for the upper edge and left edge of the key input buffer control.

**Border Color2:**
Select a frame color for the lower edge and right edge of the key input buffer control.

**Display Screen Interlock Message:**
Check this check box to confirm the display state of an interlock message on the form. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
2.3.11 Numeral Indication Control with Key Input

This control displays the value of a specified PMC area. Touching the numeral indication section changes the background color to the ON color (focused state), and allows numerals to be written from the key input buffer control by pressing the [INPUT] key.

For numeral input, this control needs to be used together with a key input buffer control. Only one control is focused on the screen. When another numeral indication control with key input not focused is touched, the focused state of the previously focused control is released, and the new touched control is focused. When the new focused control is touched again, the focused state of the control is released.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the numeral indication control with key input.

Width, Height:
Set the width and height of the numeral indication control with key input.

- 169 -
- Character

Centering:
Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for a caption character string.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

Focus Caption Color:
Specify a numeral indication color when the control is focused.

Off Caption Color:
Specify a numeral indication color when the control is not focused.

Check Caption Color:
Specify a numeral indication color when the control lights according to the check function.
- Action

No Action:
Check this check box to disable the function of the control. The control can be placed on the form, but can be disabled, in which case the display is embedded. Set the image for no action set in the Image tab.

In/Out Target:
Select a numeral data I/O destination. I/O by the PMC area or the FP function is selected.

PMC Area:
Specify a type of I/O target PMC address. The following areas can be specified: R, D, K, X, Y, G, F, E (PMC-SB7)

Address:
Specify an I/O target address.

ReadFunction:
Select a function for reading a numeral to be indicated.

WriteFunction:
Select a function for writing input data from the Key Input.

CheckFunction:
With a value returned from the function set in this field, the display color of the light section can be controlled. The light section is turned on when a value other than 0 is returned.

Data Type:
Specify the data size and numeral attribute of an I/O target. Numerals are stored in binary or floating.
0: 1 Byte (Signed)
1: 1 Byte (Unsigned)
2: 2 Byte (Signed)
3: 2 Byte (Unsigned)
4: 4 Byte (Signed)
5: 4 Byte(Unsigned)
6: RESERVE
7: Floating-Point(Ex. COMMON var. P-code var.)

In/Out Format:
Specify a numeral I/O format and numeral indication format.
0 : Decimal
1 : Binary
2 : Hexa Decimal
3 : BCD

Use Decimal Point:
Check this check box to provide a decimal point in numeral indication.
Do not use this check box when using the binary, hexadecimal, or BCD format.
This decimal point indication is for easy-to-read purpose only.
Numerals are actually stored as binary values with no decimal point.
Example) Indicated value: 1.234
       Stored value: Binary value (4D2H) of 1234

Decimal digits:
Set the number of decimal places.

Left Align:
A numeral indicated is left-justified.

Non Zero suppress:
Check this check box when leading zeroes are not to be removed in numeral indication.

Set max. and min. value:
Check this check box to set a valid numeral range for numeral input.
If a range check finds that a numeral written using the key input buffer control is outside the valid range, the key input buffer control indicates an error message.

Max. Value:
Set a maximum value to define a valid numeral range.

Min. Value:
Set a minimum value to define a valid numeral range.

Number of digits specification:
Check this check box to specify the number of display digits in the numeral indication section.
This causes the text box on the right to accept input; set the number of digits.
The number of digits includes the digits of the decimal point and the sign, if used.
If the character type or rectangle size is changed, the number of digits may have to be changed accordingly.

Discriminative number:
To use the data change report function, set the number used to identify this control, in the range of 1 to 4095. The identification number must be unique within the project.
If the data change report function is not used, set zero.
Popup Screen Name:
Specify the name of a pop-up base screen having a keyboard which can be used to update the value in the value display area. When using a key on the MDI unit or an MDI key control on the same format, do not specify this pop-up screen name.

- Focus

Focus index:
For an individual screen (form), specify a focusing index number to be used to determine the order in which the focus moves through key controls with input and the order in which continuous inputs are performed, using either of the following two methods. Tabindex number specification cannot be used at present.

Specify the focusing index of this control as:
Select this method if you want to use a property provided on this Focus tab to specify a focusing index number for determining the order in which the focus moves. The focusing index number must be input to the editbox on the line just below this option button. If the screen (form) has two or more focusing index numbers, they must be continuous. For a control to which the focus is not to move, specify 0 as its focusing index number. More than one focusing index can be 0.

0: The focus does not move to a control whose focusing index number is 0.
1 and greater:
These numbers indicate the order in which the focus moves through the controls. The focusing index numbers must be continuous within each screen.
CAUTION
1. If “Specify the focusing index” is selected, do not use the same number for two or more focusing indexes within one screen (form).
2. For both Focusing index and TabIndex numbers, the lowest number must not necessarily be 1, but all numbers used must be continuous.

Focus movement rule:
If you want to move the focus directly to a specific control rather than putting it on a control determined according to the common focus movement rule set up on the Focus rule tab of the Screen Set control, set up a focusing index number for the control for an individual cursor key. This setting is referenced also in determining the continuous input order for the continuous input function.

UP key, DOWN key, LEFT key, RIGHT key:
As the property of each of the ↑, ↓, ←, and → keys, specify a focusing index number or TabIndex number assigned to a control to which the focus is to put next. The index numbers that can be specified are those within the current screen. If an index number out of range is specified, the focus will move to the next subscreen or to the first or last control with input on the current screen.
If the specified value is 0, the focus will move to the control obtained according to the “Common focus movement rule.”

Don’t move focus to the next control after data input operation:
If you want to stop continuous input after data is input to the control of interest, turn on the check box for the “Don’t move focus to the next control after data input operation.” This function can be used to disable continuous input, for example, after the last data input is finished for the input setup item group of interest if there are two or more input setup item groups on the screen.
- Interlock

Use Interlock:
Numeral input can be disabled. This interlock function can be set for each control.

PMC Area:
Specify a type of PMC address for an interlock signal. The areas below can be specified. When the signal is on, the interlock function is activated.
R, D, K, X, Y, G, F, E(PMC-SB7)

Address:
Specify an interlock signal address.

Bit:
Specify the bit position of an interlock signal by using a number from 0 to 7.
- Image

Mask Image File:
The FIG file holding the embedded figures to be used when the NoAction check box in the Action tab is checked can be selected.

Mask Style:
Select a type of figure registered in MaskImageFile.

Image File Name:
The FIG file holding the figures to be used when the NoAction check box in the Action tab is not checked (that is, when the function is enabled) can be selected.

Style:
Select a type of figure registered in Image File Name.

Focus Color:
Select a background color to be used when the control is focused.

Off Color:
Select a background color to be used when the control is not focused.

Check Color:
Select a background color to be used when the control lights according to the check function.

Border Color 1:
Select a frame color for the upper edge and left edge of the control.

Border Color 2:
Select a frame color for the lower edge and right edge of the control.
Focus Preview, Check Preview:
Check the Focus Preview check box to confirm the display state of the control on the form when the control has focus. Check the Check Preview check box to confirm the display state of the control on the form when the control lights according to the check function. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
2. DEVELOPMENT OF CUSTOM SCREEN

2.3.12 Numeral Indication Control for Calling a Ten-Key Pad

This control is used to input and display numeric data inside the PMC and NC. Touching the numeral indication section displays a ten-key pad for numeral input.

Property Pages

- General

![Image]

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the numeral indication control for calling a ten-key pad.

Width, Height:
Set the width and height of the numeral indication control for calling a ten-key pad.
Centering:
Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

X, Y:
Specify the numeral display position by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for numeric character string indication.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)
Check Caption Color:
Specify a display caption color to be used when the check function returns a value other than zero.

OFF Caption Color:
Specify a display caption color to be used when the check function returns the value zero.

Focus Caption:
Specify a display character color when the control is focused.
- Action

No Action:
Check this check box to disable the function of the numeral indication control for calling a ten-key pad.
The control can be placed on the form, but can be disabled, in which case the display is embedded.
Set the embedded image for no action set in the Image tab.

Select Ten-key:
Select a type of ten-key pad that pops up when the numeral indication section is touched.
0: TenKey1
2: TenKey3
Ten-key pin pad that is larger and always displayed at the screen center
Depending on the position, the numeral indication section may be hidden behind the pad. So, a ten-key pad title for indicating input items can be set.
TenKey1 and TenKey3 are exactly the same.
1: TenKey2
Small ten-key pad that is displayed adjacent to the four corners of the numeral indication section

No use multi-language:
Multi-language key:
See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.
Ten-key Title :
When 0 (TenKey1) or 2 (TenKey3) is selected in Select Tenkey, a title entered in this field is displayed. The maximum character of the keys title is up to 20 characters in half-size.

Read Function:
Select a function for reading a numeral to be indicated.

Write Function:
Select a function for writing input data from the ten-key pad.

Check Function:
With a value returned from the function set in this field, the display color of the light section can be controlled. The light section is turned on when a value other than 0 is returned.

Data Type:
Specify the data size and numeral attribute of specified data.
Numerals are stored in binary.
0: 1 Byte(Signed)
1: 1 Byte(Unsigned)
2: 2 Bytes(Signed)
3: 2 Bytes(Unsigned)
4: 4 Bytes(Signed)
5: 4 Bytes(Unsigned)
6: RESERVE
7: Floating-Point (EX. COMMON var. P-code var.)

In/Out Format:
Specify a numeral I/O format and numeral indication format.
Only decimal I/O is allowed.

Use Decimal Point:
Check this check box to provide a decimal point in numeral indication or to specify the number of decimal places.
- When data types 0 to 5 are used, decimal point indication is for easy-to-read purpose only.
  Numerals are actually stored in the PMC area as binary values with no decimal point.
  Example) Indicated value: 1.234
  Stored value: Binary value (4D2H) of 1234
- When data type 7 (floating-point) is used, a numeral is indicated to the specified number of decimal places. If a numeral to be indicated has more decimal places than the specified number of decimal places, the decimal places beyond the specified number of decimal places are discarded.
  When the significant number of decimal places of a numeral to be indicated is 3 or more, all significant decimal places are indicated if this property is not checked, and data type 7 (floating-point) is specified. If the significant number of decimal places is less than 3, up to three decimal places are indicated with zeroes added.

Decimal digits:
Set the number of decimal places.

Left Align:
A numeral indicated is left-justified.
Non Zero suppress:
In numeral indication, leading zeroes are added.

Set max. and min. Values:
Check this check box to set a valid numeral range for numeral input.
If a range check finds that an input numeral is outside the valid range, the background color of the display section for the value entered through the ten-key pad changes to red.
When the number of decimal places is specified, a range check is made assuming that a decimal point is placed at the specified decimal place.

Max. value:
Set a maximum value to define a valid numeral range. If decimal places are specified, it is assumed that the same decimal places are specified in this setting.
Example: When the specified number of decimal places is 3 for 99999, 99.999 is assumed.

Min. value:
Set a minimum value to define a valid numeral range. Decimal places are handled in the same way as for Max Value.

Number of digits specification:
Check this check box to specify the number of display digits in the numeral indication section.
This causes the text box on the right to accept input; set the number of digits.
The number of digits includes the digits of the decimal point and the sign, if used.
If the character type or rectangle size is changed, the number of digits may have to be changed accordingly.

Discriminative number:
To use the data change report function, set the number used to identify this control, in the range of 1 to 4095. The identification number must be unique within the project.
If the data change report function is not used, set zero.
Figure of tenkey1 or tenkey3.
A decimal point key appears only when data type 7 (floating-point) is specified.

CLEAR : Clears the display section of NEWDATA to zero.
KEYCLR : Erases the pop-up ten-key pad.
INPUT : Writes a value entered in NEWDATA to an area specified using a write function. If a value entered in NEWDATA is within the valid range, the value is written, and the pop-up ten-key pad is erased. If an entered value is outside the valid range, the background color of the NEWDATA field becomes red. Pressing any key returns the background color to the original color, and clears the entered value, then performs the operation corresponding to the pressed key.

Figure of tenkey2. Only an entered value is indicated.

key performs the same operation as CLEAR above.

key performs the same operation as KEYCLR above.

key performs the same operation as INPUT above.
- Action 2

Use Interlock:
A numeral input disable function can be created. If the interlock signal is turned on, touching the numeral indication section does not cause the popup ten-key pad to appear. If the ten-key pad is displayed, turning the interlock signal on causes the ten-key pad to be automatically erased.

Interlock PMC Area:
Specify the type of the PMC address of the interlock signal. The following areas can be specified. The interlock takes effect when the signal is turned on.
R, D, K, X, Y, G, F, E(PMC-SB7)

Interlock PMC Address:
Specify the address of the interlock signal.

Interlock PMC Bit:
Specify the bit position of the interlock signal by using a number 0 to 7.
Focus index:
For an individual screen (form), specify a focusing index number to be used to determine the order in which the focus moves through key controls with input and the order in which continuous inputs are performed, using either of the following two methods. Tabindex number specification cannot be used at present.

Specify the focusing index of this control as:
Select this method if you want to use a property provided on this Focus tab to specify a focusing index number for determining the order in which the focus moves. The focusing index number must be input to the editbox on the line just below this option button. If the screen (form) has two or more focusing index numbers, they must be continuous. For a control to which the focus is not to move, specify 0 as its focusing index number. More than one focusing index can be 0.
0: The focus does not move to a control whose focusing index number is 0.
1 and greater:
These numbers indicate the order in which the focus moves through the controls. The focusing index numbers must be continuous within each screen.
**CAUTION**

1. If “Specify the focusing index” is selected, do not use the same number for two or more focusing indexes within one screen (form).
2. For both Focusing index and TabIndex numbers, the lowest number must not necessarily be 1, but all numbers used must be continuous.

Focus movement rule:

If you want to move the focus directly to a specific control rather than putting it on a control determined according to the common focus movement rule set up on the Focus rule tab of the Screen Set control, set up a focusing index number for the control for an individual cursor key. This setting is referenced also in determining the continuous input order for the continuous input function.

UP key, DOWN key, LEFT key, RIGHT key:

As the property of each of the ↑, ↓, ←, and → keys, specify a focusing index number or TabIndex number assigned to a control to which the focus is to put next. The index numbers that can be specified are those within the current screen. If an index number out of range is specified, the focus will move to the next subscreen or to the first or last control with input on the current screen.

If the specified value is 0, the focus will move to the control obtained according to the “Common focus movement rule.”

Don’t move focus to the next control after data input operation:

If you want to stop continuous input after data is input to the control of interest, turn on the check box for the “Don’t move focus to the next control after data input operation.” This function can be used to disable continuous input, for example, after the last data input is finished for the input setup item group of interest if there are two or more input setup item groups on the screen.
- Image

Mask Image File:
The FIG file holding the embedded figures to be used when the No Action check box in the Action tab is checked can be selected.

Mask Style:
Select a type of embedded figure registered in Mask Image File.

Image File Name:
The FIG file holding the control figures to be used when the No Action check box in the Action tab is not checked (that is, when the function is enabled) can be selected.

Style:
Select a type of control figure registered in Image File Name.

Back Color:
Specify the background color of the rectangle of the control.

Check Color:
Select a color to be used for the light section when the check function returns a value other than zero.

Off Color:
Select a color to be used for the light section when the check function returns zero.

Focus Color:
Select a color to be used for the light section when the control has focus.
Border Color 1:
Select a frame color for the upper edge and left edge of the control.

Border Color 2:
Select a frame color for the lower edge and right edge of the control.

Check Preview:
Focus Preview:
Check this check box to confirm the display state of the control on the form when the control is touched to call a ten-key pad or the control has focus. When this check box is checked, numeral indication can also be confirmed on the form. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
### Option

![Screenshot](image-url)

**Use 7 Colors:**
Check this box to use seven colors as the background colors of the numeral indication section. If this option function is enabled, the light color switching with the check function is disabled.

**Type:**
Specify how to switch seven colors.

0: PMC (bit)
Allows you to switch the background color at the bit position of the PMC area specified with the signal area and the signal address.

1: PMC (big or small comparison)
Allows you to switch the background color by comparing the magnitudes of the value of the PMC area specified with the signal area and the signal address and the change beginning value.

**Signal Area:**
Specify the type of the address of the PMC signal used to control the 7-background color selection signal for the numeral indication section. The following areas can be specified: R, D, K, X, Y, G, F, E(PMC-SB7)
Signal Address:
Specify the address of the 7-background color selection signal for the numeral indication section. This signal requires one byte if 0:PMC (bit) is specified for Type. As the background color, bit 0 takes precedence. If blink bit 7 turns on, blinking starts with the specified on and off colors.
If 1:PMC (big or small comparison) is specified for Type, a continuous area with the length specified as the data length (1, 2, or 4 bytes) is required.

Set Up Number:
If specifying 1:PMC (big or small comparison) for Type, specify the number of change beginning values to be used.
This option is not used if 0:PMC (bit) is specified for Type.

Data Length:
If specifying 1:PMC (big or small comparison) for Type, specify the data length of the PMC area specified with the signal area and the signal address.
0: 1 Byte (Signed)
1: 1 Byte (Unsigned)
2: 2 Bytes (Signed)
3: 2 Bytes (Unsigned)
4: 4 Bytes (Signed)
5: 4 Bytes (Unsigned)
This option is not used if 0:PMC (bit) is specified for Type.

Use Blink Signal:
Check this box to use blinking in the numeral indication section.
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Area:
Specify the type of the address of the PMC signal used to specify the blinking in the numeral indication section. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Address:
Specify the address of the blink signal.
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Bit:
Specify the bit position of the signal address above by using a number 0 to 7.
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Light Color #6 to #0:
Specify the ON color corresponding to each of the bits.

Character Color #6 to #0:
Specify the numeral indication character color corresponding to each of the bits.
Change Beginning Value:

Specify the value whose magnitude is to be compared with that of the value of the PMC area specified with the signal area and the signal address. If the value of the PMC area specified with the signal area and the signal address exceeds the value specified here, the background colors of numeral indication section in the light color corresponding to the change beginning value.
This control reads a character string from a specified PMC area and indicates it on the screen. The character string may include Japanese characters. The Japanese character code must be shift JIS code. On a popup screen for character string setting, an input screen can be created by creating MDI key controls and key input buffer controls.

Restrictions on this input screen:
1. ASCII characters can be input from the input screen. No Japanese codes may be input.
2. Those numeral indication controls with key input that accept data input via the same key input buffer control cannot be used.

Property Pages
- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the PMC area character string indication control.

Weight, Height:
Set the width and height of the PMC area character string indication control.
- Character

Centering:
Check this box to center the display position of the PMC area character string automatically in the vertical and horizontal directions within the rectangle of the control.

X,Y:
Specify the character string display position by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for character string indication.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

Focus Caption Color:
Specify the color of a character string to be displayed when the focus is placed on the character string.

Off Caption Color:
Specify the color of a character string to be displayed when the focus is not placed on the character string.
- Action

![ PMC Message Area: 
Specify which area of the PMC the character string to be displayed is located. 
Usually, the area to be specified is “D” or “R” or “E” (PMC-SB7). 

PMC Message Address: 
Specify the start address of the character string in the area specified above. 

PMC Message Bit: 
If specifying “A” for PMC Message Area, specify the character string registration bit. 

PMC Char Count: 
Specify the number of bytes of the character string to be displayed. 

Look Signal: 
Check this check box to display the character string in the PMC area only if the specified PMC signal is on. To use this option, specify the following three options. Character display or display character erasure is performed by looking at the signal for changes and, therefore, the signal change state must be retained for 500 msec or longer. 

Signal Area: 
Specify the signal area of the signal used to specify whether to display the character string. The following area can be specified: R, D, K, X, Y, G, F, A, E(PMC-SB7) 

Signal Address: 
Specify the signal address of the signal used to specify whether to display the character string. 

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Signal Bit:
Specify the signal bit of the signal used to specify whether to display the character string.

Interlock:
Check this check button to interlock the function for calling a popup screen in which a keyboard for changing the character string in the PMC area is placed. Specify the following three options.

Interlock PMC Area:
Specify the signal area of the popup screen call interlock signal. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)

Interlock PMC Address:
Specify the signal address of the popup screen call interlock signal.

Interlock PMC Bit:
Specify the bit position of the popup screen call interlock signal.

Popup Screen Name:
Specify the name of the popup screen in which the keyboard for changing the character string in the PMC area is placed.

Use Key-in-buffer:
Check this box to input a rewritten character string by using the key-in-buffer control placed on the same screen, instead of using the popup screen name mentioned above. Among these rewrite measures, this check has priority.

* When a PMC character string is to be just displayed and need not be rewritten, leave Popup Screen Name unspecified, and uncheck Use Key-in-buffer. When these settings are made, input operation is disabled even if the control is touched.

Discriminative number:
To use the data change report function, set the number used to identify this control in the range of 1 to 4095. The identification number must be unique within the project.
If the data change report function is not used, set zero.
Focus index:
For an individual screen (form), specify a focusing index number to be used to determine the order in which the focus moves through key controls with input and the order in which continuous inputs are performed, using either of the following two methods. Tabindex number specification cannot be used at present.

Specify the focusing index of this control as:
Select this method if you want to use a property provided on this Focus tab to specify a focusing index number for determining the order in which the focus moves. The focusing index number must be input to the editbox on the line just below this option button. If the screen (form) has two or more focusing index numbers, they must be continuous. For a control to which the focus is not to move, specify 0 as its focusing index number. More than one focusing index can be 0.

0: The focus does not move to a control whose focusing index number is 0.
1 and greater:
These numbers indicate the order in which the focus moves through the controls. The focusing index numbers must be continuous within each screen.
**CAUTION**

1. If "Specify the focusing index" is selected, do not use the same number for two or more focusing indexes within one screen (form).
2. For both Focusing index and TabIndex numbers, the lowest number must not necessarily be 1, but all numbers used must be continuous.

Focus movement rule:
If you want to move the focus directly to a specific control rather than putting it on a control determined according to the common focus movement rule set up on the Focus rule tab of the Screen Set control, set up a focusing index number for the control for an individual cursor key. This setting is referenced also in determining the continuous input order for the continuous input function.

UP key, DOWN key, LEFT key, RIGHT key:
As the property of each of the ↑, ↓, ←, and → keys, specify a focusing index number or TabIndex number assigned to a control to which the focus it to put next. The index numbers that can be specified are those within the current screen. If an index number out of range is specified, the focus will move to the next subscreen or to the first or last control with input on the current screen.
If the specified value is 0, the focus will move to the control obtained according to the “Common focus movement rule.”

Don’t move focus to the next control after data input operation.:
If you want to stop continuous input after data is input to the control of interest, turn on the check box for the “Don’t move focus to the next control after data input operation.” This function can be used to disable continuous input, for example, after the last data input is finished for the input setup item group of interest if there are two or more input setup item groups on the screen.
- Image

Image File Name:
A FIG file holding a control figure can be selected.

Style:
Select a type of control figure registered in the “Image File Name”.

Back Color:
Specify the background color of the control.

Focus Color:
Select the background color when the focus is placed on the control.
The common focus color specified for the project has priority.

Border Color 1:
Specify a frame color for the upper edge and left edge of the control.

Border Color 2:
Specify a frame color for the lower edge and right edge of the control.
2.3.14 Numeral/Character String Indication Control

This control is used to display character data or numerals in a PMC register or to call character data or numerals from the NC with an FP function for display. As a special application, a setting can be made which calls character data or a numeral with an FP function but does not display the called data or numeral.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the numeral/character string indication control.

Width, Height:
Set the width and height of the numeral/character string indication control.
- Character

Centering:
Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

X, Y:
Specify the numeral display position by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for display.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

Character Color:
Specify the color of a numeral or character string to be displayed.
- Action

No Action:
- Check this check box to disable the function of the numeral/character string indication control.
- The control can be placed on the form, but can be disabled, in which case the display is embedded.
- Set the embedded image for no action set in the Image tab.

Action Type:
- Choose whether to display the value of a PMC area or call an FP function.
  0: PMC
  1: Function

Watch PMC Area:
- Specify a type of PMC address to be referenced. The following areas can be specified:
  R, D, K, X, Y, G, F, E(PMC-SB7)

Watch Address:
- Specify a PMC address to be referenced.

Function Name:
- Specify a function to be called when 1 (Function) is selected in Action Type.
  * For argument setting, see Chapter 3, “FP Functions.”
Display:
   When the Display check box is unchecked, the control does not display the return value of a function. This function can be used to execute a function without displaying the return value of the function.

Data Type:
   Specify the data size and numeral attribute of an I/O target of specified data.
   Numerals are stored in binary.
   0: 1 Byte(Signed)
   1: 1 Byte(Unsigned)
   2: 2 Bytes(Signed)
   3: 2 Bytes(Unsigned)
   4: 4 Bytes(Signed)
   5: 4 Bytes(Unsigned)
   6: Character string
   7: Floating-Point (EX. COMMON var. P-code var.)
   8: Rectangular character string

Format:
   Select a numeral indication format.
   0: Decimal
   1: Binary
   2: Hexa Decimal

Use Decimal Point:
   Check this check box to provide a decimal point in numeral indication.
   Do not use this check box when using the binary or hexadecimal format.
   This decimal point indication is for easy-to-read purpose only.
   Numerals are actually stored as binary values with no decimal point.
   Example) Indicated value: 1.234
            Stored value: Binary value (4D2H) of 1234

Decimal digits:
   Set the number of decimal places.

Left Align:
   A numeral indicated is left-justified.

Non Zero suppress:
   In numeral indication, leading zeroes are added.

Number of digits specification:
   Check this check box to specify the number of display digits in the numeral indication section.
   This causes the text box on the right to accept input; set the number of digits.
   The number of digits includes the digits of the decimal point and the sign, if used.
   If the character type or rectangle size is changed, the number of digits may have to be changed accordingly.
- Image

Mask Image File:
The FIG file holding the embedded figures to be used when the No Action check box in the Action tab is checked can be selected.

Mask Style:
Select a type of embedded figure registered in Mask Image File.

Image File Name:
The FIG file holding the control figures to be used when the No Action check box in the Action tab is not checked (that is, when the function is enabled) can be selected.

Style:
Select a type of control figure registered in Image File Name.

Back Color:
Specify the background color of the control.

Border Color 1:
Select a frame color for the upper edge and left edge of the control.

Border Color 2:
Select a frame color for the lower edge and right edge of the control.
- Option

Use 7 Colors:
Check this box to use seven colors as the background colors of the numeral indication section.

Type:
Specify how to switch seven colors.
0: PMC (bit)
   Allows you to switch the background color at the bit position of the PMC area specified with the signal area and the signal address.
1: PMC (big or small comparison)
   Allows you to switch the background color by comparing the magnitudes of the value of the PMC area specified with the signal area and the signal address and the change beginning value.

Signal Area:
Specify the type of the address of the PMC signal used to control the 7-background color selection signal for the numeral indication section. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)
Signal Address:
Specify the address of the 7-background color selection signal for the numeral indication section. This signal requires one byte if 0:PMC (bit) is specified for Type. As the background color, bit 0 takes precedence. If blink bit 7 turns on, blinking starts with the specified on and off colors. If 1:PMC (big or small comparison) is specified for Type, a continuous area with the length specified as the data length (1, 2, or 4 bytes) is required.

Set Up Number:
If specifying 1:PMC (big or small comparison) for Type, specify the number of change beginning values to be used. This option is not used if 0:PMC (bit) is specified for Type.

Data Length:
If specifying 1:PMC (big or small comparison) for Type, specify the data length of the PMC area specified with the signal area and the signal address.
0: 1 Byte (Signed)
1: 1 Byte (Unsigned)
2: 2 Bytes (Signed)
3: 2 Bytes (Unsigned)
4: 4 Bytes (Signed)
5: 4 Bytes (Unsigned)
This option is not used if 0:PMC (bit) is specified for Type.

Use Blink Signal:
Check this box to use blinking in the numeral indication section. This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Area:
Specify the type of the address of the PMC signal used to specify the blinking in the numeral indication section. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)
This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Address:
Specify the address of the blink signal. This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Blink Signal Bit:
Specify the bit position of the signal address above by using a number 0 to 7. This option takes effect if 1:PMC (big or small comparison) is specified for Type.

Light Color #6 to #0:
Specify the ON color corresponding to each of the bits.

Character Color #6 to #0:
Specify the numeral indication character color corresponding to each of the bits.
Change Beginning Value:
Specify the value whose magnitude is to be compared with that of the value of the PMC area specified with the signal area and the signal address. If the value of the PMC area specified with the signal area and the signal address exceeds the value specified here, the numeral indication section in the light color corresponding to the change beginning value.
This option takes effect if 1:PMC (big or small comparison) is specified for Type.
- NoAction Image

NoAction signal:
Check this check box to use the embedded-plug-style indication by an invalid signal. This function disables the function of the button control and displays the embedded plug style when the invalid signal specified in the following boxes is detected during power-up.

When this check box is checked, the following items can be set.

Image File Name:
This box can be used to select the FIG file that contains the embedded plug styles used when the button control is in the invalid state.

Style:
Select the type of the embedded plug styles registered in the file specified in [Image File Name]

State Color:
Select the color of the indicator lamp section.

Border Color 1:
Select the color of the upper and left ends of the button.

Border Color 2:
Select the color of the lower and right ends of the button.

PMC Area:
Specify the type of the PMC address of the invalid signal. The following areas can be specified.
- R, D, K, X, Y, G, F, E(PMC-SB7)
Address:
   Specify the PMC address of the invalid signal.
Bit:
   Specify the bit position (between 0 and 7) of the above signal address.
Preview:
   Check this check box to confirm the indication state on the form when the button control is in the invalid state.
   This property is valid for the form display on a PC. This property does not affect the screen display of the CNC
2.3.15 Label Control

This control is used to display a rectangular figure or a fixed character string on the screen.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the label control.

Width, Height:
Set the width and height of the label control.
- Character

No Action:
Check this check box to disable the function of the label control. The control can be placed on the form, but can be disabled, in which case the display is embedded.
Set the embedded image for no action set in the Image tab.

No use multi-language:
Multi-language key:
See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.

Caption:
Enter a character string to be displayed.

Centering:
Check this check box to center the caption display position automatically in the vertical and horizontal directions within the rectangle of the control.

X, Y:
Specify the caption display position by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for character string display.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 characters (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

Character Color:
Specify the color of a character string to be displayed.

- Image

**Mask Image File:**
The FIG file holding the embedded figures to be used when the No Action check box in the Character tab is checked can be selected.

**Mask Style:**
Select a type of embedded figure registered in Mask Image File.

**Image File Name:**
The FIG file holding the control figures to be used when the No Action check box in the Action tab is not checked (that is, when the function is enabled) can be selected.

**Style:**
Select a type of control figure registered in Image File Name.

**Back Color:**
Specify the background color of the control.

**Border Color 1:**
Select a frame color for the upper edge and left edge of the control. Depending on the figure, a specified color applies to different portions.

**Border Color 2:**
Select a frame color for the lower edge and right edge of the control. Depending on the figure, a specified color applies to different portions.
- **NoAction Image**

NoAction signal:
Check this check box to use the embedded-plug-style indication by an invalid signal. This function disables the function of the display captions and displays the embedded plug style when the invalid signal specified in the following boxes is detected during power-up.

When this check box is checked, the following items can be set.

**Image File Name:**
This box can be used to select the FIG file that contains the embedded plug styles used when the button control is in the invalid state.

**Style:**
Select the type of the embedded plug styles registered in the file specified in [Image File Name]

**State Color:**
Select the color of the indicator lamp section.

**Border Color 1:**
Select the color of the upper and left ends of the button.

**Border Color 2:**
Select the color of the lower and right ends of the button.

**PMC Area**
Specify the type of the PMC address of the invalid signal. The following areas can be specified.
R, D, K, X, Y, G, F, E(PMC-SB7)

**Address:**
Specify the PMC address of the invalid signal.

**Bit:**
Specify the bit position (between 0 and 7) of the above signal address.
Preview:
Check this check box to confirm the indication state on the form when the button control is in the invalid state.
This property is valid for the form display on a PC. This property does not affect the screen display of the CNC.
2.3.16 Text Character String Indication Control

This control reads the text (character string) corresponding to the text number specified with a specified PMC area from F-ROM and indicates it.

Property Page
- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X,Y:
Set the coordinates of the upper-left corner of the text character string indication control.

Width, Height:
Set the width and height of the text character string indication control.
**Character**

X,Y:
Specify the character string display position by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. If you have checked the check box for automatic centering, coordinates after automatic calculation are set.

Character Type:
Specify the type of character used for character string indication.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)
The color of the character string to be displayed must be specified in the text file.
### Action

#### Bit Interface:
Select this option to use a PMC signal bit for the specification of the text message to be displayed. The message of the first ON bit found from the search start signal address is displayed.

#### Search Start Area:
- **Search Start Address:** Specify the start address of the bit-corresponding message signal area. As many bits as the search bit count, described below, will be used in ascending order, starting with this signal.

#### Search Bit Count:
Specify the number of bits used for the bit-corresponding message display signal area. A number up to 512 can be specified.

#### Number Interface:
Select this option use a 1- or 2-byte binary number in the PMC signal area for the specification of the text message to be displayed.

If specifying this option, specify the following four items:

#### Message Area:
Specify the PMC area used if the number interface is selected. Usually, use area R, D or E(PMC-SB7).

#### Message Address:
Specify the start address of the area specified above. If two bytes is specified as the size of the number area, this address and the next one, with a total of two bytes, are used.
Secure 1 byte, Secure 2 byte: (use byte)
   Select the size of the number area.
   If Secure 1 byte is selected, a text number of 1 to 255 can be specified.
   If Secure 2 byte is selected, a text number of 1 to 65535 can be specified.

File Name:
   Specify a text number and the name of the spreadsheet file describing the message character string.

Edit button:
   Click this button when a file (~.vts) for setting character strings used to create a message to be displayed is edited. For the method of editing, see “Text File Configuration and Editing” in the text character string display control.

Interface with the PMC area

For the number interface
   A text message is displayed on the operator’s panel via the 1- or 2-byte text number report interface, using the R or D or E(PMC-SB7) area of the PMC. If the text number is zero, the character previously displayed will be erased. Subsequently, the system monitors for a number change, and displays a text message only if a change is made. The system monitors for a number change periodically and, therefore, a number change must be retained for 500 msec or longer. If a change cannot be detected, the message cannot be displayed.
- Image

Image File Name:
A FIG file holding a control figure can be selected.

Style:
Select a type of control figure registered in the “Image File Name.”

Back Color:
Specify the background color of the control.

Border Color 1:
Specify a frame color for the upper edge and left edge of the control.

Border Color 2:
Specify a frame color for the lower edge and right edge of the control.
2.3.17 Composite Message Indication Control

This control reads the text (character string) corresponding to the text number specified with a specified PMC area from F-ROM and indicates it.

As the message indication interface, a number interface and bit interface are supplied.

For the number interface, a single message can be displayed by combining up to six phrases. For the bit interface, only a single phrase can be displayed. Up to 32 messages can be displayed, with each connected-phrase or mono-phrase message being assumed as one.

A function is provided which adds a connect word to each connected-phrase or mono-phrase message. As a connect word, a date and time can be selected.

Messages can be displayed on the display in two ways:

- List messages in a rectangular display area, one in each line.
- Run a telop of messages from right to left.

Number Interface Specification

Structure of phrases and specifying an PMC area

In the following example, two bytes are secured for all phrases (up to six phrases) in the number specification area for a single message, and consecutive 12 bytes, D200 to D211, are used.

<table>
<thead>
<tr>
<th>Example D200:</th>
<th>Phrase number 1</th>
<th>Phrase number 2</th>
<th>Phrase number 3</th>
<th>Phrase number 4</th>
<th>Phrase number 5</th>
<th>Phrase number 6</th>
</tr>
</thead>
</table>

Either one or two bytes can be selected as the size of a single phrase number specification area.

If one byte is selected, the PMC area requires less space; however, only phrase numbers 1 to 255 in the message text file can be specified.

The numbers specified in the PMC must be the ones that correspond to the messages registered in the message text files specified for the individual phrases.

As many message specification areas, such as that shown in the above example, as the specified number of messages are reserved consecutively as an array in the PMC area. The following shows an example of reserving the areas to display three 5-phrase messages.

<table>
<thead>
<tr>
<th>x →</th>
<th>0</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>D20: Phrase number 1</td>
<td>Phrase number 2</td>
<td>Phrase number 3</td>
<td>Phrase number 4</td>
<td>Phrase number 5</td>
<td></td>
</tr>
<tr>
<td>D21: Phrase number 1</td>
<td>Phrase number 2</td>
<td>Phrase number 3</td>
<td>Phrase number 4</td>
<td>Phrase number 5</td>
<td></td>
</tr>
<tr>
<td>D22: Phrase number 1</td>
<td>Phrase number 2</td>
<td>Phrase number 3</td>
<td>Phrase number 4</td>
<td>Phrase number 5</td>
<td></td>
</tr>
</tbody>
</table>

Up to 32 messages can be displayed.

A 1-bit read enable signal is required for each message.

The following shows an example of reserving read enable signals in a 2-byte area to display 11 messages.

<table>
<thead>
<tr>
<th>Placement of read enable signals</th>
<th>#7</th>
<th>#6</th>
<th>#5</th>
<th>#4</th>
<th>#3</th>
<th>#2</th>
<th>#1</th>
<th>#0</th>
</tr>
</thead>
<tbody>
<tr>
<td>R200</td>
<td>Message 8</td>
<td>Message 7</td>
<td>Message 6</td>
<td>Message 5</td>
<td>Message 4</td>
<td>Message 3</td>
<td>Message 2</td>
<td>Message 1</td>
</tr>
<tr>
<td>R201</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Message 11</td>
<td>Message 10</td>
<td>Message 9</td>
<td></td>
</tr>
</tbody>
</table>
When a read enable signal is set to 1, this control reads the message number specification area corresponding to this bit, and retrieves message phrases with the specified phrase numbers from the individual message files corresponding to this phrase. Thus, the retrieval of a single phrase is executed for the number of constituent phrases, and the phrases are combined in the order of phrase numbers 1 to 6, so that a single message is created. When the read enable signal is set to 0, the message is removed from the operator’s panel.

If two bytes is selected as the size of each phrase number specification area and thirty-two 6-phrase messages are to be displayed, $2 \times 6 \times 32 = 384$ bytes are required as well as 32 bits for the read enable signals. Thus, two continuous areas of 384 bytes and 4 bytes each are required in the PMC.

⚠️ CAUTION
1. Set the necessary phrase numbers from the PMC before turning the corresponding read enable signals on.
2. After setting a read enable signal to 1, do not change the corresponding phrase number.
3. Telop display is accomplished by shifting the character string gradually using software. The rate at which the character string runs is affected by the operating status of the NC unit. The shifting of the character string stops if there is a process that takes precedence over the telop display.
Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X,Y:
Set the coordinates of the upper-left corner of the composite message indication control.

Width, Height:
Set the width and height of the composite message indication control.
- Character

X,Y:
   Specify the character string display position by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string.

Character Type:
   Specify the type of character used for character string indication.
   0: ANK (displays a mixture of half-size and 2x-size characters)
   1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
   2: X4 (displays characters two times larger vertically and horizontally)
   3: X6 (displays characters two times larger vertically and three times larger horizontally)
   4: SMALL (displays characters smaller than half-size characters)
- Action

Bit IF:
Select this option to use a PMC signal bit for the specification of the text message to be displayed. A specified number of messages of ON bits that are found from the search start signal address are listed.

Number IF:
Check this check box to select the number interface to specify message phrases with numbers.

Sentence connect number:
Specify the number of phrases to make up a single message. For the number interface, a number 1 to 6 can be specified. For the bit interface, the number is fixed at 1.

Message number:
Specify the number of messages to be displayed, in the range of 1 to 32.

Edit Massage File:
Click this button to edit the file (.vts file) containing the character strings to create the messages to be displayed. For an explanation of how to edit the file, see “Structure of a text file and editing it” found in the explanation of the text character string indication control.
* Even if the color of characters in a message file is set, the specification of 1-6 [Character Color] is used when a message is displayed with this control.

Connect Words:
Specify the character string to be added to the beginning of a message. Select one from the combo box.
- Date (2000/06/30)
- Time (16:44)
- Date&Time(2000/06/30 16:44)
- None (no additional character string displayed)
* If date or time is specified, the date or time at the time when the composite message indication control receives a read enable signal is displayed.
1-6 Secure 1 byte: 1-6 Secure 2 byte:
   Used for the number interface.
   Select the size of the document number specification area for
   each phrase.
   If 1 byte is secured, a number 1 to 255 can be specified; if 2
   bytes, 1 to 65535.
1-6 File Name:
   Specify the name of the text message file containing a message to
   be displayed. Different files can be specified for different
   phrases.
1-6 Character Color:
   Specify the character color used to display a message character
   string.
1-6 Back Color:
   Specify the background color used to display a message
   character string.
Reference Area: Reference Address:
   Used for the number interface.
   Specify the type and the top address of the PMC area used as the
   first signal area in the phrase number specification area. An array
   of necessary message specification areas is secured starting with
   the interface area specified here. The following areas can be
   specified:
   R, D, X, Y, G, F, E(PMC-SB7)
Read Enable Area: Read Enable Addr: Read Enable Bit:
   Used for the number interface.
   Specify the first bit of the read enable signal area used to notify
   that the number interface area can be read. As many bits as the
   number of messages are used, starting with this bit. If the number
   of messages is four and D100.6 is specified, the following bits
   are allocated:
   D100.6 for message 1 read enable signal
   D100.7 for message 2 read enable signal
   D101.0 for message 3 read enable signal
   D101.1 for message 4 read enable signal
   The message corresponding to the read enable area bit that is on
   is displayed.
   The following areas can be specified:
   R, D, X, Y, G, F, E(PMC-SB7)
Search Start Area:
Search Start Address:
Search Start Bit:
   Used for the bit interface.
   Specify the start address of the bit-corresponding message signal
   area. As many bits as the search bit count, described below, will
   be used in ascending order, starting with this signal.
Search Bit Count:
   Specify the number of bits used for the bit-corresponding
   message display signal area. A number up to 512 can be
   specified.
Display format:
Specify the format in which the messages specified from the PMC are to be displayed.
For List Display, the messages are listed, each in one line.
For Telop Display, each message is displayed, shifting from right to left at the speed corresponding to the display speed level. If there are multiple messages, they are run one by one as they are generated.

Display Speed Level:
For Telop Display, specify the speed at which messages are to be displayed. The speed can be specified in the range of 1 to 7.

- Image

Image File Name:
A FIG file holding a control figure can be selected.
Style:
Select a type of control figure registered in the “Image File Name.”
Back Color:
Specify the background color of the control.
Border Color 1:
Specify a frame color for the upper edge and left edge of the control.
Border Color 2:
Specify a frame color for the lower edge and right edge of the control.
2.3.18 History Message Indication Control

This control is used to display a summary/history/detail screen of the contents of a “History Block” resulting from collecting and recording message display history with the history collection function. For another use of this control, a function is provided which allows you to display a summary/detail screen of display request messages from the PMC without specifying a “History Block”. This is similar to the text character string indication control. The history message indication control, however, allows you to display multiple messages at the same time. It also allows you to scroll through the screen, display a detail screen, and switch between summary and detail screens in cooperation with the history display operation button of a button control.

By specifying the history message indication data acquisition function for the function specification of a numeral/character string indication control, you can display various related information on the screen.
Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the history message indication control.

Weight, Height:
Set the width and height of the history message indication control.
The history message indication control offers three screen display types, summary, history, and detail. You can specify the display format of summary/history and that for detail separately.
X, Y:
Specify the display position of the caption by using relative coordinates within the rectangle of the control. With the upper-left corner of the rectangle of the control used as the reference, specify the coordinates of the upper-left corner of the character string. The second and subsequent rows will assume caption display positions relative to the upper-left corner of the rectangle as calculated with the row height specification.

Character Type:
Specify the character type of the character string to be displayed.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
3: X6 (displays characters two times larger vertically and three times larger horizontally)
4: SMALL (displays characters smaller than half-size characters)

Row Height:
Specify the row height from the upper-left corner of the rectangle of the control.
If the row height is 0, the default row height for a specified font size will be assumed.
- Action

No Action:
Check this check box to disable the function of the control itself. The control can be placed on the form, but can be disabled, in which case the display is embedded. Set the disabled-time control display image shape set in the Image tab.

First Time Display:
The history message indication control allows you switch between three types of display, summary, history, and detail, in cooperation with a button control. Select from the four types described below to specify which display type to use for the first time display when the power is turned on. Types <1> to <3> are for the screen types for history block display. Thus, select one of them to display the contents of a “History Block” collected with the history collection function. Specify <4> to simply display the message indication requests reported from the PMC directly on the operator’s panel without recording to a history block. Thus, for <4> Message Display, only summary and detail screens are possible. On the summary screen in this case, only message texts are displayed; other information such as occurring date and time cannot be displayed.

<1> Summary Display Specify a history block number.
<2> History Display Specify a history block number.
<3> Detail Display Specify a history block number.
<4> Message Display Select either the bit or number of the message indication interface.

File Name:
Specify the name of the spreadsheet file (VTS file name) in which to register the messages indicated by the message indication interface.
Edit button:
Click this button to edit the file (~.vts) for setting the character strings used to create messages to be displayed.
For an explanation of the editing method, see “Configuring and editing text files” located in the text character string indication control.

Assign Link Number:
To indicate the relation with the “History Display button control”, which is a function to be accomplished in cooperation with a button control, assign a necessary link number. Numbers from 0 to 30 can be specified throughout the custom screen project. A number of 0 may be specified if no link number is necessary; there may be multiple 0s. The history message indication control having the assign link number that matches the “Link Number at output button” of a history indication button control will perform the operation specified for the history indication button, such as page switching.

Reference Link Number:
If you have created a summary/history screen and a detail screen separately with two history message indication controls, when a detail display message display switching operation command is transferred from the button control linked with the control currently displaying a summary/detail screen to the control that displays a detail screen, the history message indication control that is assigned this “Reference Link Number”, specified for the control that displays a detail screen, is referenced to decide on which detail message to display. Specify the “Assign Link Number” of the control to be referenced so that the detailed message of that control is displayed. To switch between summary/history screen and detail screen using a single control, specify the same number as the “Assign Link Number” of the control. If you leave the number 0, the system will evaluate this as the absence of the control to be referenced, and a detail screen cannot be displayed.

Summary/History Display:
This item is checked if you select “Summary Display”, “History Display”, or “Detail Display” for the first time display property.

History Block Number:
For history display, select a number from 1 to 4 to specify the “History Display” whose contents are to be displayed.
You can specify the history block number 0 if the history message indication control is to be used for a detail screen only.

⚠️ CAUTION
The history message indication control indicated by the “Reference Link Number” of such a control for a detail screen only may be of the summary/history display type with a history block specification or of the message display type. Do not, however, mount a history display switch button for a control for a detail screen only.
Bit IF:
You can select this option if you select “Message Display” for the first time display property.
Select this option to use a PMC signal bit for the specification of the text message to be displayed. The message of the first ON bit that is found from the search start signal address is displayed.

Search Start Area/Bit/Address:
Specify the start address of the bit-corresponding message signal area. Usually, R, D, E (PMC-SB7), and A areas are used. As many bits as the search bit count, described below, will be used in ascending order, starting with this signal.

Search Bit Count:
Specify the number of bits used for the bit-corresponding message display signal area. A number up to 512 can be specified.

Number IF:
You can select this option if you select “Message Display” for the first time display property.
Select this option to use a PMC signal area for the specification of the text message to be displayed, with a 1- or 2-byte binary number specification.
If you select this interface, set up and select the four items described below.

Message Area:
Specify the start address of the PMC area for message indication number notification when the number interface is used.
For this property, specify the type of the PMC area. Usually, R, D, and E (PMC-SB7) areas are used.

Message Address:
Specify the start address of the area specified above.

Message Number:
Specify the maximum number of notification messages that can be displayed at a time, starting at the start of the specified message area. A number up to 32 can be specified.

Message Area Size - Secure 1 byte, Secure 2 byte:
Select the size of a single number area. A continuous area of the [Message Number x Message Area Size] size will be used.
For 1 byte, a text number from 1 to 255 can be specified.
For 2 bytes, a text number from 1 to 65535 can be specified.
History display screen setting example

**History Message Indication Control 1**
- First Time Display → Summary
- Assign link number → 1
- Reference link number → 0
- History block number → 1

**History Message Indication Control 2**
- First Time Display → Detail
- Assign link number → 2
- Reference link number → 1
- History block number → 1

<table>
<thead>
<tr>
<th>Button control/History Display button control</th>
<th>Link Number at output button</th>
<th>Explanation of cooperation action</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1&gt; Setting of detail message display switch button</td>
<td>2</td>
<td>When the button is pressed, “Line n of detail” is output to history message indication control 2, and history message indication control 2 displays the details of the message on “Line n” displayed by the history message indication control with reference link number 1.</td>
</tr>
<tr>
<td>&lt;2&gt; Setting of summary/history/detail switch button</td>
<td>1</td>
<td>When the button is pressed, a display screen type switching command is output to history message indication control 1. On history message indication control 1, screen type switching between summary and history is executed.</td>
</tr>
<tr>
<td>&lt;3&gt; Page Switch button</td>
<td>1</td>
<td>When the button is pressed, a page UP or DOWN switching command is output to history message indication control 1. On history message indication control 1, the page switching in accordance with the command is executed.</td>
</tr>
</tbody>
</table>
**Image**

Mask Image File:
You can select a FIG file containing the mask styles to be displayed when “No Action” in the Action tab is checked.

Mask Style:
From the styles contained in the “mask image file”, select the mask style for the control.

Image File Name
You can select a FIG file containing the styles for controls to be displayed when “No Action” in the Action tab is not checked (the function is enabled).

Style:
From the styles contained in the “image file name”, select the style to be displayed when the control is enabled.

Back Color:
Specify the background color of the rectangular base.

Border Color 1, Border Color 2:
Select a frame color for the upper edge and left edge of the rectangular style; for some styles, a color for the inner frame, outer frame, etc. and a frame color for the lower edge and right edge; and for others, a color for the inner frame, outer frame, etc.

Summary/History Display, Detail Display:
You can check the character display state for each display screen type on a form. This property is effective to the form display on the personal computer. It does not have an effect on screen display on the CNC.
- History Format

The settings in the “History Format” tab are mainly the properties to be assumed when the contents of a history block are displayed. For Message Display type, however, the “Ruled Line Interval” and “Ruled Line Color” properties will be effective.

History Display Order:
If a summary screen and a history screen are displayed, messages are displayed in a time series, from the top and bottom lines, according to the occurring dates and times of messages. For this property, specify the direction of the time series.

Row Display Order:
Specify the order of message display items in a single line on a summary screen and a history screen.

No : This display item and subsequent ones will not be used.
Occurring date&time : Displays the occurring date and time of the message.
Restore date&time : Displays the restore date and time of the message.
Duration Time : Displays the time that elapsed from occurrence to restoration.
Message : Display message
You can enter separator characters and ruled line between the above display format items.

Ruled Line Interval:
If a summary screen and a history screen are displayed, you can draw horizontal ruled line on each line. Specify whether to draw ruled line, and the line width and color.
These settings will be effective even if you specify the “Message Display” screen type for the first time display.
No : Does not display ruled line between lines.
1dot line : Draws straight ruled line with 1-dot width.
2dots line : Draws straight ruled line with 2-dot width.
Ruled Line Color:
Specify the line color.

Date & Time Display Format:
Specify the display format for the occurring date & time and the restore date & time described below. You can select the following types for the respective date and time items:
No : This display item and subsequent ones will not be used.
YYYY : 4-digit year
YY : 2-digit year
MO : 2-digit month
DD : 2-digit month
HH : 2-digit hours
MI : 2-digit minutes
SS : 2-digit seconds
You can enter a separator character between the above display format items.

Occurring date & time:
Specify the display format for the date and time at which a message indication request is received.

Restore date & time:
Specify the display format for the date and time at which a message indication request is stopped.

Duration Time:
Specify the display format for the time that elapsed from the message occurring date & time and restore date & time.
No : This display item and subsequent ones will not be used.
HHH : 3-digit hours
MI : 2-digit minutes
SS : 2-digit seconds
After the display time above, you can specify a single character that indicates a unit.

Date & Time Display Font Color:
Specify the display color for the character strings of occurring date and time, restore date and time, and duration time.

⚠️ CAUTION
The separator character and unit character in the occurring date and time, restore date and time, and duration time are displayed with the character type specified for Summary/History Display in the Character tab. Use caution because the specified separator character and unit character may not be displayed with this character type, depending on which characters are specified.
2.3.19 Message Indication Control

This control reads the value of one byte in the PMC area, and displays eight types of messages based on the on/off states of the bits. If multiple bits are on in a specified byte, a message is displayed with priority assigned to the lowest bit. To display multiple messages on the screen, set additional message indication controls at different display locations.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the message indication control.

Width, Height:
Set the width and height of the message indication control.
- Character

X, Y:
Specify the display position of a message character string. Specify the upper-left corner of a start character string by using relative coordinates within the rectangle of the control.

Character Type:
Specify the type of character used for message display.
0: ANK (displays a mixture of half-size and 2x-size characters)  
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)  
2: X4 (displays characters two times larger vertically and horizontally)  
3: X6 (displays characters two times larger vertically and three times larger horizontally)  
4: SMALL (displays characters smaller than half-size characters)

Watch Bit:
Select a message assignment bit from one byte in the PMC area specified in the Action tab. A number from 0 to 7 can be specified.
When a bit number is selected, the setting corresponding to the bit number can be checked in the item of ON, OFF below. To enter a new setting or modify the existing setting, open the edit dialog box by clicking the Edit button.

No use multi-language:
Multi-language key:
See [Editing multi-language display captions] in Subsection 2.3.1.1, “Description of general property setting items”.

ON, OFF:
The operation performed when a bit is turned on or off is described.
The setting items enclosed in the ON frame specify operation to be performed when a specified bit is turned on. The setting items enclosed in the OFF frame specify operation to be performed when a specified bit is turned off. The setting items of the ON and OFF frames can be specified in the same way.

In the list box, select one of the following:
- **Not Use**: No message is assigned.
- **Display**: A character string set in the Caption field is displayed, depending on the bit state.
- **Clear**: A character string is cleared (to space), depending on the bit state.

When assigning multiple messages to one byte, set “Display” in the ON or OFF side uniformly for all bits.

**Character Color:**
Specify the display character color of a caption.

**Caption:**
When Display is selected in the list box, set a character string to be displayed.
- Action

Watch PMC Area:
Specify a type of PMC area address where a message is set. The following areas can be specified:
R, D, K, X, Y, G, F, E(PMC-SB7)

Watch Address:
Specify a PMC address where a message is set.
- Image

Image File Name:
The FIG file holding control figures can be selected.

Style:
Select a type of figure registered in Image File Name.

Back Color:
Specify the background color of the message display section.

Border Color 1:
Select a frame color for the upper edge and left edge of the message display section.

Border Color 2:
Select a frame color for the lower edge and right edge of the message display section.

On Preview:
Check this check box to confirm the message display state on the form when a specified bit is turned on. When this check box is checked, caption display can also be confirmed on the form. This property is valid for form display on the personal computer. This property does not affect the screen display of the CNC.
2.3.20 Image Display Control

This control is used to display an image on the CNC screen. The types of image files that can be displayed are bit map (BMP) files and JPEG files. When image data is displayed on the touch panel, the number of usable colors is decreased to 256. The palette on the personal computer differs from the palette on the CNC. So, the vividness and color of an image displayed on a CNC differ from those of an image displayed on a personal computer.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the image display control.

Width, Height:
A specified screen is edited (namely, enlarged or reduced) to match the width and height specified here.

Image File Name:
Specify a BMP file or JPEG file. Clicking the button at the right edge displays a file dialog box, from which a desired file can also be selected.
2.3.21 Clock Control

This control is used to place a digital indication clock on the CNC screen. Only one piece can be specified in the form of the screen. The other clock display is made in the subscreen form at the layout of the division of the date and time.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the clock control.

Width, Height:
The fixed size dependent on each type of display character is automatically set. So, the user cannot change these properties.
- Character

Display Type:
Date and/or time data is displayed. Choose from the following:
0: TIME
1: DATE
2: DATE & TIME

Character Type:
Specify the type of character used for clock display.
0: ANK (displays a mixture of half-size and 2x-size characters)
1: X2 (Half-size characters set for a caption are displayed as 2x characters.)
2: X4 (displays characters two times larger vertically and horizontally)
4: SMALL (displays characters smaller than half-size characters)
* Do not select 6x-size characters. With the 6x-size font, “/” and “:” are not available.

Character Color:
Specify the color of characters used for clock display.
- **Image**

**Image File Name:**
- The FIG file holding control figures can be selected.

**Style:**
- Select a type of control figure registered in Image File Name.

**Back Color:**
- Specify the background color of the control.

**Border Color 1:**
- Select a frame color for the upper edge and left edge of the control.
- Depending on the figure, a specified color applies to different portions.

**Border Color 2:**
- Select a frame color for the lower edge and right edge of the control.
- Depending on the figure, a specified color applies to different portions.
2.3.22 Meter Control

This control reads the value of a PMC register, and provides a meter indication according to the setting of the properties. Display scale values and meter item names by using the label control.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the meter control.

Width, Height:
Set the width and height of the rectangle of the meter control.
### Setting

#### Function:
Specify a function for reading a meter indication.
Example: \( \text{rdpmc}[9\_100\_1] \)
This example reads two bytes from D100 as a meter indication.

#### Max Value:
Set a maximum value for a meter value specified in Function.  
In meter indication, this value represents the state where the meter has moved off the scale.

#### Min Value:
Set a minimum value for a meter value specified in Function.  
In meter indication, this value represents the lowest value.

#### Number of tics per division:
Specify the number of divisions for graduating the meter indicator.
- Image

Image File Name:
The FIG file holding meter control figures can be selected.

Style:
Select a type of meter figure registered in Image File Name.

Direction:
For a circular meter figure, specify the direction of increase in the graph.
0 : Clockwise
1 : Counterclockwise

Back Color:
Specify the background color of the meter section.

Indicator Style:
Select a meter indicator figure.
0: Pin Style
1: Belt Style

Indicator Color:
Specify the color of the meter pin.

Frame Color:
Specify the background color of the meter.

Border Color 1:
Select a frame color for the upper edge and left edge of the control.

Border Color 2:
Select a frame color for the lower edge and right edge of the control.
2.3.23 Graph Control

This control reads the value of a PMC register, and displays a bar graph according to the setting of the properties. Display scale values and graph item names by using the label control.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned. The user cannot change this ID.

X, Y:
Set the coordinates of the upper-left corner of the graph control.

Width, Height:
Set the width and height of one bar. Alternatively, set the width and height of a coordinate axis (scale) figure.
- Setting

This property tab can be set when a graph is specified in the item of Style of the Image tab. When a coordinate axis (scale) is specified, this property tab cannot be specified.

Function:
Specify a function for reading a bar graph indication.
Example: rdpmc[9_100_1]
   This example reads two bytes from D100 as a graph indication.

Max Value:
   Set a maximum value for a graph value specified in Function.
   This value represents the value corresponding to a maximum position in graph indication.

Min Value:
   Set a minimum value for a graph value specified in Function.
   This value represents the value corresponding to a minimum position in graph indication.
Image File Name:
The FIG file holding graph control figures can be selected.

Graph and Scale radio buttons:
Check Graph to select a bar graph figure.
Check Scale to select a coordinate axis (scale) figure to be used as the background of a bar graph.

Style:
Select a type of graph figure registered in Image File Name.

Back Color:
Graph : Specifies the background color of a bar graph.
Scale : Specifies the background color of a coordinate axis figure.

Graph Series Color: To be set only when Graph is selected
Specify the data value display color of a bar graph.

Border Color 1: To be set only when Scale is selected
Select a frame color for the upper edge and left edge of a coordinate axis figure.

Border Color 2: To be set only when Scale is selected
Select a frame color for the lower edge and right edge of a coordinate axis figure.

Scale Color: To be set only when Scale is selected
Select an axis color for a coordinate axis figure.
2.4 DRAW CONTROLS

2.4.1 Pointer Switching

This is not a control but is designed to switch from the draw pointer state to the standard pointer. Actually, the mouse pointer can be returned to the arrow (standard). This pointer state is convenient for editing operations such as control selection and pull-down menu selection.

2.4.2 Drawing of Line

This control draws a straight line between two points of rectangular corner.

Property Pages

- General

![Property Page Screenshot]

Object ID:
Object ID managed in the form. This ID is automatically assigned, so that the user cannot set this ID.

X, Y:
Set the coordinates of the upper-left corner of the rectangle formed by the start coordinates and end coordinates of a line.

Width, Height:
Set the width and height of the rectangle formed by the start coordinates and end coordinates.

Direction:
Select a line draw direction from the start coordinates to the end coordinates.
- Image

Image File Name:
A FIG file storing draw control styles can be selected.

Style:
Select a draw control style from those stored in the file indicated by Image File Name.

Back Color:
Specify a background color for the draw control. Some background colors cannot be selected, depending on the style.

Border Color1:
Select a display color for the line.
2.4.3 Drawing of Rectangle

This control draws a rectangle.

Property Pages

- General

```
Object ID:  
Object ID managed in the form. This ID is automatically assigned, so that the user cannot set this ID.

X, Y:  
Set the coordinates of the upper-left corner of a rectangle.

Width, Height:  
Set the width and height of the rectangle.
```
- Image

Image File Name:
A FIG file storing draw control styles can be selected.

Style:
Select a draw control style from those stored in the file indicated by Image File Name.

Back Color:
Specify the background color for the inside of the rectangle of the draw control.

Border Color1:
If there is a rectangular outer line, select a display color for the rectangular outer line.
2.4.4 Drawing of Arc

This control draws the arc determined by a start point, end point, center, and arc drawing rotation direction.

The start point, end point, or center can be dragged on a screen form. When the start point or end point is dragged, the center may position outside the screen form depending on the positions of the start point and end point, making the center invisible.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned, so that the user cannot set this ID.

X, Y:
Set the coordinates of the upper-left corner of a rectangle.

Width, Height:
Set the width and height of the rectangle.

Direction:
CW: Clockwise

X1, Y1:
X coordinate and Y coordinate of an arc drawing start point

X2, Y2:
X coordinate and Y coordinate of an arc drawing end point

Xc, Yc:
X coordinate and Y coordinate of an arc drawing center
- Image

Image File Name:
A FIG file storing draw control styles can be selected.

Style:
Select a draw control style from those stored in the file indicated by Image File Name.

Back Color:
Specify the background color for the inside of the rectangle of the draw control. Some background colors cannot be selected, depending on the style.

Border Color1:
Select a display color for the arc.
This control draws a circle.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned, so that the user cannot set this ID.

X, Y:
Set the coordinates of the upper-left corner of a rectangle.

Width, Height:
Set the width and height of the rectangle.
Image File Name:
A FIG file storing draw control styles can be selected.

Style:
Select a draw control style from those stored in the file indicated by Image File Name.

Back Color:
Specify the background color for the inside of the circle of the draw control.

Border Color1:
If there is a circular outer line, select a display color for the circular outer line.
2.4.6 Drawing of Ellipse

This control draws an ellipse.

Property Pages

- General

![Ellipse Property Page]

Object ID:
Object ID managed in the form. This ID is automatically assigned, so that the user cannot set this ID.

X, Y:
Set the coordinates of the upper-left corner of a rectangle.

Width, Height:
Set the width and height of the rectangle.
Image File Name:
A FIG file storing draw control styles can be selected.

Style:
Select a draw control style from those stored in the file indicated by Image File Name.

Back Color:
Specify the background color for the inside of the ellipse of the draw control.

Border Color1:
If there is an elliptical outer line, select a display color for the elliptical outer line.
2.4.7 Drawing of Graphic Characters

This control draws graphic characters with no background.

Property Pages

- General

Object ID:
Object ID managed in the form. This ID is automatically assigned, so that the user cannot set this ID.

X, Y:
Set the coordinates of the upper-left corner of a rectangle.

Width, Height:
Set the width and height of the rectangle.
2.DEVELOPMENT OF CUSTOM SCREEN

- Character

No Use multi-language:
Multi-language key:
   See “Editing multi-language display captions” in Subsection 2.3.1.1, “Description of general property setting items”.
Caption:
   Enter a character string to be displayed.
Centering:
   Check this check box to automatically center the caption display position vertically and horizontally in the rectangle of the control.
X, Y:
   Specify the caption display position as relative coordinates in the rectangle of the control. With respect to the upper-left corner of the rectangle of the control, specify the coordinate of the upper-left corner of the character string. If the check box for automatic centering is checked, coordinates after an automatic calculation are set.
Character Type:
   Specify a character type of the character string to be displayed.
   0: ANK (display using a mixture of half-size and double-size characters)
   1: Double size (display using double-size characters for half-size characters specified for the caption)
   2: Quadruple size (display using double height size and double width size characters)
   3: Sextuple size (display using double height size and triple width size characters)
   4: Reduced size (display using characters smaller than half-size characters)
Character Color:
   Specify the character color of the character string to be displayed.
2.5 CUSTOM SCREEN CREATION PROCEDURE AND GUIDELINE

2.5.1 About FANUC PICTURE and Customization Tools

FANUC PICTURE, when used with PMC ladders and other CNC customization tools, enables a man-machine interface custom screen for machine operation to be created easily and speedily. Moreover, by employing an operator’s panel of touch panel type, more operator-friendly machine operations can be provided. So, when using FANUC PICTURE, consider how to create a desired custom screen in association with these customization tools, before starting custom screen design work.

The figure below shows the relationships of the customization tools of FANUC PICTURE with the interface areas and various functions.
2.5.2 Custom Screen Design and Creation

In general, when a custom screen for the machine operator’s panel is created, the development work is divided into the four jobs below: <1>, <2>, <3>, and <4>. Job <4> may be unnecessary, depending on the design of the custom screen. FANUC PICTURE enables development job <2> to be performed easily and speedily.

<1> Custom screen design
   Overall machine operations from <2> through <4> below are designed. The type and configuration of machine operator’s panel screen and the role of each screen are designed. In detailed design, design of a map for PMC signal area assignment to the buttons and lamps on each screen is needed, and design of interface specifications is also needed if a customization tool such as the macro executor is used.
   • Design of a custom screen type to be created and screen specifications
     Machine operation, data setting, machine monitor, fault indication, maintenance screen, etc.
   • Hierarchical design of menu buttons displayed on each screen
   • Custom screen interface area design
     PMC signal area map → Buttons, lamps, interlock signals, etc.
     Display data area map → D/E area, P code variables, common variables, etc.
   • Design of layout and operation specifications of controls to be displayed on the custom screen

<2> FANUC PICTURE custom screen creation and incorporation into the CNC
   In conformity with the custom screen design of <1>, controls such as buttons, lamps, and numerical indicators are placed on the form according to each screen layout. For each control, property items such as a caption and signal assignment for style and operation determination are set. The following indicates the typical work items and work flow:
   • Creation and setting of a custom screen project
   • Creation of a parent screen for the custom screen
   • Creation of pop-up screens for the custom screen
   • Creation of child(=sub) screens for the custom screen
   • Placement of each control and setting of properties
   • Setting of a screen switch control
   • Setting of a custom screen call key in MEM file generation
   • Writing of a MEM file to CNC/F-ROM
   • Setting of parameters for custom screen display
<3> Creation of screen-related PMC ladders
   A ladder necessary for machine operation to be performed in response to button output signals from the custom screen is created. Moreover, a ladder is created to process the signals for turning on lamps and buttons for posting machine state from the ladder to the custom screen and to process the screen operation interlock signals.

<4> Creation of interfaces with other customization tools
   When data processing is allotted by using the macro executor and C language executor, programs on the customization tool side are created to perform desired processing in response to a trigger operation from the custom screen.
2. DEVELOPMENT OF CUSTOM SCREEN

2.5.3 Example of FANUC PICTURE Custom Screen Creation

Let us create custom screens as indicated below. The types of screens and screen configurations are as described below. As reference information, use a sample screen stored as a two-language display project (Japanese and English) in the installation folder SAMPLE\fp_Exercise_XXX. Basically, the form screen names and object IDs used in the text below are the same as those used in the sample.

1. Machine operator’s panel screen
   a. Coordinate display child screens (Four child screens: Absolute, relative, machine, and distance to go)
   b. Lamp display child screens (Three child screens: Lamp 1, lamp 2, and program in execution)
   c. Mode-matching operation button display child screens (Five child screens: Editing, automatic MEM/MDI, manual JOG/HNDL)
   d. Fault display/CNC state and CNC screen switch buttons (common child screen)
   e. Screen switch and menu buttons

2. Fault guidance and history display screen
   a. Current fault or fault history display
   b. Fault details and guidance display
   c. Fault display/CNC state and CNC screen switch buttons (common child screen)
   d. Screen switch and menu buttons

Machine operator’s panel screen

- Coordinate display child screens
- Lamp display child screens
- Mode-matching operation button display child screens
- Operation button screen switch
- Menu button screen switch
- Fault display/CNC state and CNC screen switch button (common child screen)
The machine operator’s panel screen consists of one parent (=base/main) screen for the machine operator’s panel and four types of child (=sub) screens, namely, coordinate child screen, lamp child screen, button child screen, and an alarm child screen. Each of the child screens other than the alarm child screen has a switching button for switching to a desired screen as required. The alarm child screen is not switched. This screen, however, is common to all parent screens, so that this screen, when made available as a child screen, can not only improve screen maintainability but also suppress the increase in screen data memory size.

Fault guidance and history display screen

The fault guidance and history display screen consists of screens a, b, and d in the parent screen portion, and the alarm child screen, which is a common child screen.

The current fault or fault history display is switched using the history display switch function of the button control, so that no child screen is required.

The table below indicates the setting for switching to the custom screen when the CNC screen is displayed or the power is turned on.

<table>
<thead>
<tr>
<th>Kind of custom screen switch</th>
<th>Softkey Number</th>
<th>Custom screen name</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-up screen</td>
<td></td>
<td>Machine operator’s panel screen</td>
<td></td>
</tr>
<tr>
<td>Function key of CUSTOM</td>
<td>0x0106</td>
<td></td>
<td>The screen display is switched to the previously displayed custom screen. If the machine operator’s panel screen is displayed previously, the screen display is switched to the machine operator’s panel. If the fault guidance screen is displayed previously, the screen display is switched to the fault guidance screen.</td>
</tr>
<tr>
<td>Function key of CUSTOM1</td>
<td>0x3206</td>
<td>[RETURN]</td>
<td></td>
</tr>
</tbody>
</table>
2.5.3.1 FANUC PICTURE creation procedure

The procedure for custom screen creation with FANUC PICTURE is as follows:

1. Creating new project
2. Setting of project
3. Creating and editing screen form
   - Create parent screen
   - Create pop-up screens
   - Create child screens
   - Place controls and set properties
   - Set screen switch control
4. Making memory card file
5. Write to card and write to CNC/F-ROM
6. Setting CNC parameters and S-RAM memory initialization
   alarm screen
   c: Debug actual CNC display screen
   
A: Open project
B: Display composite screen

Composition ?

<4>: Making memory card file
<5>: Write to card and write to CNC/F-ROM
<6>: Setting CNC parameters and S-RAM memory initialization
    alarm screen
    c: Debug actual CNC display screen

Completed
2.DEVELOPMENT OF CUSTOM SCREEN

<1> In “Creating new project”, a project folder for storing various files created in connection with a custom screen to be created is created.
   ➢ Specify a location and project folder name for creating and saving a custom screen on the hard disk for data saving on the personal computer.

<table>
<thead>
<tr>
<th>Dialog name</th>
<th>Tab name</th>
<th>Property item name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating new project</td>
<td>Restoration from F-ROM</td>
<td>A new project is created. → ☑ (This option is set in this example.) A project is restored from the screen data MEM file → ☑</td>
<td></td>
</tr>
<tr>
<td></td>
<td>◐Project Name</td>
<td>Enter a custom screen project name.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>◐Directory Name</td>
<td>Specify the location where the project folder above is to be created.</td>
<td></td>
</tr>
</tbody>
</table>

* Check if the property item names marked with ◐ must always be specified or the defaults may be used.

<2> In “Setting of project”, the conditions below that are common to the entire screen project and must be set before project editing for custom screen creation are set.
   ➢ CNC system type, PMC type, display unit type
   ➢ Setting of the multi-language display function
   ➢ Setting of the PMC message display history collection function

<table>
<thead>
<tr>
<th>Dialog name</th>
<th>Tab name</th>
<th>Property name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting of CNCsystem</td>
<td>◐CNC system</td>
<td>Select a CNC model.</td>
<td></td>
</tr>
<tr>
<td>Setting of CNCsystem</td>
<td>◐PMC type</td>
<td>Select a PMC type to be used.</td>
<td></td>
</tr>
<tr>
<td>Setting of CNCsystem</td>
<td>Display unit type</td>
<td>Set an LCD display unit type.</td>
<td></td>
</tr>
<tr>
<td>Setting of CNCsystem</td>
<td>Resolution, Font, Soft key</td>
<td>Specify the resolution of the display unit, the font size, the number of soft keys displayed at the bottom of the display unit, and so forth.</td>
<td></td>
</tr>
<tr>
<td>Setting of CNCsystem</td>
<td>Call key to input pop up screen</td>
<td>For the three types of controls with a pop-up key input screen, specify an MDI key for which a pop-up window is to be displayed on the screen when the MDI key is pressed.</td>
<td></td>
</tr>
<tr>
<td>Setting of Multi-language</td>
<td>◐The Multi-language display function is used.</td>
<td>The default is the setting for no use (unchecked). For this example of screen, “☑ checked” is used. In the sample project provided for reference information, the two languages (Japanese and English) are set. So, for some screens shown below, screen descriptions based on Japanese display and English display are provided.</td>
<td></td>
</tr>
</tbody>
</table>
2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>Dialog name</th>
<th>Tab name</th>
<th>Property name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting of project</td>
<td>Collection of history</td>
<td>(Content set in this tab.)</td>
<td>Setting tab for using the function that stores a history of alarm message display requests from the PMC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◎Block1 - 4</td>
<td>Up to four successive message display signals from the PMC can be stored. In this example, Block 1 only is used. Make the settings below for block 1.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◎History Deletion Signal</td>
<td>Specify one bit of the history storage area initialization signal for block 1.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◎Bit IF</td>
<td>Check the check box when using the interface where one message corresponds to one bit of the alarm notification PMC signal. For this example, this interface is used. → ☑</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◎The first signal bit and number of bits which does search</td>
<td>Specify the start of the successive signal bits used for alarm notification. The successive bits in ascending order starting with this bit as many as specified are monitored and collected as a notification area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number IF</td>
<td>Not used for this example → ☑</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Date&amp;Time Display Format</td>
<td>Use the default.</td>
</tr>
</tbody>
</table>

<3> In “Creating and editing screen form”, buttons and lamps are placed on a form (virtual screen) according to the layout design of the custom screen, and editing operations such as setting and modifying the properties for styles and operations of the controls are performed.

- For the method of creation and setting, see Subsection 2.5.3.2.

<4> In “Making memory card file”, screen data is created to operate the custom screen created in “Creating and editing screen form” on the CNC then is converted to a MEM file format.

- Select a start-up screen to be first displayed on the created custom screen when the power to the CNC is turned on.

- As required, set a soft key number for switching to the custom screen while the CNC screen is being displayed. At least one display switching key must be set. In this example, set only the [RETURN] screen for returning to the previously displayed custom screen.

- Click the [OK] button in the Making memory card file dialog box to start conversion processing.

<table>
<thead>
<tr>
<th>Dialog name</th>
<th>Tab name</th>
<th>Property item name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making memory card file</td>
<td></td>
<td>PMC type</td>
<td>Already set by project setting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◎Start-up screen</td>
<td>Select POP machine from the combo box.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>◎(Software key setting of each screen)</td>
<td>Set a soft key number for switching to the [RETURN] screen for indicating the previously displayed screen and parent screen of the custom screen. When you double-click the left button of the mouse on the parent screen name listed in [Form File Name] or [RETURN], the Setting user screen dialog box appears. In this example, double-click [RETURN].</td>
</tr>
</tbody>
</table>
### 2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>Dialog name</th>
<th>Tab name</th>
<th>Property item name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting user screen</td>
<td></td>
<td>☰Softkey number</td>
<td>Select the following number from the combo box: 0x0106 CREATION_CST_AUX (full key)-AUXILIARY (16/18/21i, Power Mate i) 0x3207 CUSTOM2-C Executor1(30i, 31i, 32i)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☰Key Caption</td>
<td>Set a name, not longer than 6 letters, to be displayed on the soft key caption indication area. In this example, specify “CUSTOM”. * When assignment to the CUSTOM key is made, this caption is not soft key display on the CNC screen.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>☰Select Flag</td>
<td>Check the check box to indicate that this user screen setting is selected.</td>
</tr>
</tbody>
</table>

<5> In “Write to card and write to CNC/F-ROM”, screen data created in MEM file generation and the MEM file of the FP driver software for displaying the screen data are written to the F-ROM on the CNC side.

- Write the screen data and a copy of the FP driver to the memory card.
- Insert the memory card into the memory card slot of the CNC (slot of the main CNC control unit when a display unit with the display link connected is used, or slot on the side of the display unit when a display unit of LCD-mounted type or a display unit with HSSB connected is used) to start boot processing.
- Write the screen data and FP driver software to the F-ROM by using the method of system data loading of the boot, which is the same method as for writing PMC ladder data to the F-ROM.

<table>
<thead>
<tr>
<th>Dialog name</th>
<th>Tab name</th>
<th>Property item name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Write to card</td>
<td></td>
<td>☰Transfer to:</td>
<td>Specify the memory card drive of the personal computer into which a write destination memory card is inserted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The FP driver is transferred to the memory card.</td>
<td>The FP driver for the CNC model specified in the project setting is automatically selected.</td>
</tr>
</tbody>
</table>

<6> Setting CNC parameters and S-RAM memory initialization alarm screen

- Set CNC parameters according to the table below.
- If the FP driver software is first run on the CNC, an alarm screen prompting the user to initialize the S-RAM area used by the C language executor may be displayed when the power is turned on.
- If this alarm screen is displayed, check that the parameter Nos. 8661, 8662, and 8781 are set to the values indicated in the table below, then turn on the power again to initialize the S-RAM area. This processing establishes a proper environment to display the custom screen in the next operation and afterward.
- If you write the screen data and FP driver for the first time, check that the parameters are set to the values indicated in the table below even when the alarm screen is not displayed.
### 2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>CNC Parameter number</th>
<th>All CNC common parameter setting</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>8661</td>
<td>59</td>
<td>S-RAM variable area size</td>
</tr>
<tr>
<td>8662</td>
<td>4</td>
<td>S-RAM file area size</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CNC Parameter number</th>
<th>Power Mate CNC</th>
<th>Series 16i/18i/21i -MODEL A/B</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>3195#0</td>
<td>=1</td>
<td></td>
<td>Uses the CUSTOM key for FP screen switching.</td>
</tr>
<tr>
<td>8653#0,#1,#2</td>
<td>=1. 0. 0</td>
<td></td>
<td>Switches the screen display with soft key number 0x0106.</td>
</tr>
<tr>
<td>8652#5,#6,#7</td>
<td>=1. 0. 0</td>
<td></td>
<td>Switches the screen display with soft key number 0x0106.</td>
</tr>
</tbody>
</table>

* D-ROM size allocated to the C language executor (FP driver)
  * Setting when touch plane C (touch plane is used with Power Mate i) and the FANUC PICTURE function option are selected

- Soft key number 0x0106 (auxiliary screen number for CUSTOM) can be used with FANUC PICTURE when the macro executor option is not selected.
- Parameter Nos. 3195, 8653, and 8652 can be set for the Series 16i/18i/21i or Power Mate i.
- For the Series 30i/31i/32i, set parameter Nos. 8661, 8662, and 8781 only.
2.5.3.2 Method of creating a parent screen and child screens

- When creating a screen including multiple child screens as in the case of a machine operator’s panel screen, first determine the layout display of the entire screen including composited child screens.
- If you attach a label control to the display area background of each child screen at this time, the area usable for creating another switchable child screen with the same size and display area can be indicated for child screen switching operation.
- When the layout of the entire screen is completed, select a group of controls for making up each child screen then move the controls to a new child screen form.
Fault guidance and history display screen

Removing the common child screen, namely, the alarm child screen from the layout of the fault guidance screen including the alarm child screen generates a parent screen for the fault guidance screen.

Creating a machine operator’s panel parent screen

- When a custom screen is created and displayed, the screen display is switched from one parent screen to another parent screen. So, a custom screen project must have at least one parent screen.
- A screen can be treated as a parent screen by attaching one screen structure definition control (FPPScrn) to the screen (no multiple controls cannot be attached). In other words, a screen with no screen structure definition control attached is treated as a child screen.
- With the screen structure definition control, define what child screens are used with the parent screen. No child screen, of course, may be specified. A specified child screen is also specified as a child screen to be first displayed when the power is turned on.
- The table below indicates the screen structure definition control for each parent screen and the settings of major properties of screen switch buttons.
- For the name of a child screen making up a parent screen or the switch screen name of a screen switch button, be sure to use a
screen name. Otherwise, an error occurs at the stage of MEM file generation for screen data creation.

### Table: Custom Screen Development

<table>
<thead>
<tr>
<th>xml name</th>
<th>Control name</th>
<th>Object ID</th>
<th>Tab/Property name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>POP_machine</td>
<td>FPScrn</td>
<td>Bace/Screen Name</td>
<td>POP_machine</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Use Sub Screen1</td>
<td>☑️</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Save Sub Screen1</td>
<td>☐️</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/SubScreenName1</td>
<td>COP_coord_abs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Use Sub Screen2</td>
<td>☑️</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Save Sub Screen2</td>
<td>☐️</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/SubScreenName2</td>
<td>COP_lamp_CNC</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Use Sub Screen3</td>
<td>☑️</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Save Sub Screen3</td>
<td>☐️</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/SubScreenName3</td>
<td>COP_mode_mem</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Use Sub Screen4</td>
<td>☑️</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Save Sub Screen4</td>
<td>☐️</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/SubScreenName4</td>
<td>CMN_alarm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Sub/Use Sub Screen5</td>
<td>☐️</td>
</tr>
<tr>
<td></td>
<td>FPButton1</td>
<td>FPButton1</td>
<td>Action/NoAction</td>
<td>☑️</td>
</tr>
<tr>
<td></td>
<td>FPButton5</td>
<td>FPButton4</td>
<td>Action/NoAction</td>
<td>☐️</td>
</tr>
<tr>
<td></td>
<td>FPButton7</td>
<td>FPButton8</td>
<td>Action/NoAction</td>
<td>☐️</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPButton8</td>
<td>Action/Action Type</td>
<td>Change Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPButton8</td>
<td>Action/Detail/Screen Name</td>
<td>POP_machine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPButton8</td>
<td>Action/Interlock</td>
<td>Enable &amp; Set R9091.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPButton8</td>
<td>Detail/Screen Name</td>
<td>PAL_fault</td>
</tr>
<tr>
<td></td>
<td>FPLabel1</td>
<td>FPLabel1</td>
<td>Character/Caption</td>
<td>MACHINE OPERATOR’S PANEL</td>
</tr>
<tr>
<td></td>
<td>FPLabel3</td>
<td>FPLabel3</td>
<td>Character/Caption</td>
<td>MODE</td>
</tr>
<tr>
<td></td>
<td>FPLabel4</td>
<td>FPLabel4</td>
<td>Character/Caption</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPLabel4</td>
<td>Character/Character Type</td>
<td>3:X6</td>
</tr>
<tr>
<td></td>
<td>FPLabel5</td>
<td>FPLabel5</td>
<td>Character/Caption</td>
<td>MM/MIN</td>
</tr>
<tr>
<td></td>
<td>FPNDisp1</td>
<td>FPNDisp1</td>
<td>Character/Character Type</td>
<td>3:X6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp1</td>
<td>Action/Action Type</td>
<td>Function</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp1</td>
<td>Action/Function Name</td>
<td>Actf</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp1</td>
<td>Action/Data Type</td>
<td>5:4Byte</td>
</tr>
<tr>
<td></td>
<td>FPLamp1</td>
<td>FPLamp1</td>
<td>Action/Watch PMC</td>
<td>D1106.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPLamp1</td>
<td>Image/Style</td>
<td>11:Ellipse(No.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPLamp1</td>
<td>Image/ (on/off Color)</td>
<td>Setting of on/off color,ETC</td>
</tr>
<tr>
<td></td>
<td>FPLamp2</td>
<td>FPLamp2</td>
<td>Action/Watch PMC</td>
<td>D1106.1</td>
</tr>
<tr>
<td></td>
<td>FPLamp3</td>
<td>FPLamp3</td>
<td>Action/Watch PMC</td>
<td>D1106.2</td>
</tr>
<tr>
<td></td>
<td>FPLamp4</td>
<td>FPLamp4</td>
<td>Action/Watch PMC</td>
<td>D1106.3</td>
</tr>
<tr>
<td></td>
<td>FPLamp5</td>
<td>FPLamp5</td>
<td>Action/Watch PMC</td>
<td>D1106.4</td>
</tr>
</tbody>
</table>

*Because FPScrn is put, this screen becomes main screen.*
Creating coordinate display child screens

- Based on a screen produced by screen movement from the layout display screen to each child screen form, create copies of forms as many as required.
- An example of creating coordinate display child screens is provided below.
- Based on the copy source child screen (COP_coord_abs.xml), make additional copies of the three child screens: relative coordinate child screen (COP_coord_rel.xml), distance-to-go child screen (COP_coord_dist.xml), and machine coordinate child screen (COP_coord_mcn.xml).
- Modify the coordinate title labels, rewrite the coordinate read function, and rename the child screen switch button screens.

<table>
<thead>
<tr>
<th>.xml name</th>
<th>Control name</th>
<th>Object ID</th>
<th>Tab/Property name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP_coord_abs</td>
<td>FPLabel</td>
<td>FPLabel2</td>
<td>Character/Caption</td>
<td>(ABSOLUTE)</td>
</tr>
<tr>
<td></td>
<td>FpNDisp</td>
<td>FPNDisp1</td>
<td>Action/Function Name</td>
<td>absolute[1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp2</td>
<td>Action/Function Name</td>
<td>absolute[2]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp3</td>
<td>Action/Function Name</td>
<td>absolute[3]</td>
</tr>
<tr>
<td></td>
<td>TFPChgScrn</td>
<td>TFPChgScrn1</td>
<td>Action/Screen Type</td>
<td>Sub Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Action/Screen Name</td>
<td>COP_coord_rel</td>
<td></td>
</tr>
<tr>
<td>COP_coord_rel</td>
<td>FPLabel</td>
<td>FPLabel2</td>
<td>Character/Caption</td>
<td>(RELATIVE)</td>
</tr>
<tr>
<td></td>
<td>FpNDisp</td>
<td>FPNDisp1</td>
<td>Action/Function Name</td>
<td>relative[1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp2</td>
<td>Action/Function Name</td>
<td>relative[2]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp3</td>
<td>Action/Function Name</td>
<td>relative[3]</td>
</tr>
<tr>
<td></td>
<td>TFPChgScrn</td>
<td>TFPChgScrn1</td>
<td>Action/Screen Type</td>
<td>Sub Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Action/Screen Name</td>
<td>COP_coord_dist</td>
<td></td>
</tr>
<tr>
<td>COP_coord_dist</td>
<td>FPLabel</td>
<td>FPLabel2</td>
<td>Character/Caption</td>
<td>(DISTANCE TO GO)</td>
</tr>
<tr>
<td></td>
<td>FpNDisp</td>
<td>FPNDisp1</td>
<td>Action/Function Name</td>
<td>distance[1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp2</td>
<td>Action/Function Name</td>
<td>distance[2]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp3</td>
<td>Action/Function Name</td>
<td>distance[3]</td>
</tr>
<tr>
<td></td>
<td>TFPChgScrn</td>
<td>TFPChgScrn1</td>
<td>Action/Screen Type</td>
<td>Sub Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Action/Screen Name</td>
<td>COP_coord_mcn</td>
<td></td>
</tr>
<tr>
<td>COP_coord_mcn</td>
<td>FPLabel</td>
<td>FPLabel2</td>
<td>Character/Caption</td>
<td>(MACHINE)</td>
</tr>
<tr>
<td></td>
<td>FpNDisp</td>
<td>FPNDisp1</td>
<td>Action/Function Name</td>
<td>machine[1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp2</td>
<td>Action/Function Name</td>
<td>machine[2]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FPNDisp3</td>
<td>Action/Function Name</td>
<td>machine[3]</td>
</tr>
<tr>
<td></td>
<td>TFPChgScrn</td>
<td>TFPChgScrn1</td>
<td>Action/Screen Type</td>
<td>Sub Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Action/Screen Name</td>
<td>COP_coord_abs</td>
<td></td>
</tr>
</tbody>
</table>
Display sub screen of power supply turning on

Specify the following coordinates sub screen with the sub screen switch button.

Absolute coordinates

Relative coordinates

Machine coordinates

Distance to go
Creating lamp display child screens

- An example of creating lamp display child screens is provided below.
- The method of creating lamp display child screens is basically the same as for creation of coordinate display child screens.
- Based on the copy source child screen (COP_lamp_CNC.xml), make additional copies of the machine lamp display child screen (COP_lamp_MCN.xml) and the program display child screen (COP_lamp_PRG.xml).
- Set the ON/OFF colors, captions, and signals to be turned on for the lamps placed on each child screen.
- For each lamp not used, check the disable property check box on the action tab. A lamp processed in this way is treated simply as a label indication. If the assignment of a lamp is needed later, the property for enabling use as a lamp may be set.

<table>
<thead>
<tr>
<th>.xml name</th>
<th>Control name</th>
<th>Object ID</th>
<th>Tab/Property name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP_lamp_CNC</td>
<td>FPLamp</td>
<td>FPLamp1 to FPLamp15</td>
<td>Character/ on/off Caption</td>
<td>Specify the character of lamp name</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/NoAction</td>
<td>When not using →</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Wath PMC</td>
<td>Lighting signal address of lamp</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Blink Signal</td>
<td>Blinking signal address of lamp(Opt.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Image/ on/off Color</td>
<td>Setting of on/off color,ETC</td>
</tr>
<tr>
<td>TFPChgScrn</td>
<td>TFPChgScrn1</td>
<td></td>
<td>Action/Screen Type</td>
<td>Sub Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Screen Name</td>
<td>COP_lamp_MCN</td>
</tr>
<tr>
<td>COP_lamp_MCN</td>
<td>FPLamp</td>
<td>FPLamp1 to FPLamp15</td>
<td>Character/ on/off Caption</td>
<td>Specify the character of lamp name</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/NoAction</td>
<td>When not using →</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Wath PMC</td>
<td>Lighting signal address of lamp</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Blink Signal</td>
<td>Blinking signal address of lamp(Opt.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Image/ on/off Color</td>
<td>Setting of on/off color,ETC</td>
</tr>
<tr>
<td>TFPChgScrn</td>
<td>TFPChgScrn1</td>
<td></td>
<td>Action/Screen Type</td>
<td>Sub Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Screen Name</td>
<td>COP_lamp_PRG</td>
</tr>
<tr>
<td>COP_lamp_PRG</td>
<td>FpNDisp</td>
<td>FpNDisp1</td>
<td>Action/Action Type</td>
<td>1:Function (Running program indication)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Function name</td>
<td>rdexecprog[0_99_0]</td>
</tr>
<tr>
<td>TFPChgScrn</td>
<td>TFPChgScrn1</td>
<td></td>
<td>Action/Screen Type</td>
<td>Sub Screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Screen Name</td>
<td>COP_lamp_CNC</td>
</tr>
</tbody>
</table>

Display sub screen of power supply turning on

Sub screen for lamp display related to CNC

Sub screen for lamp display related to machine

Sub screen for program display under execution
Creating mode-matching operation button display child screens

- An example of creating child screens with operation buttons prepared for each mode is provided below.
- The method of creating mode-matching operation button display child screens is basically the same as for creation of coordinate display child screens.
- Based on the copy source child screen (COP_mode_mem.xml), make additional copies of the COP_mode_edit.xml, COP_mode_mdi.xml, COP_mode_hndl.xml, and COP_mode_jog.xml child screens for the EDIT, MDI, HNDL, and JOG modes.
- Set the captions, output signals, signals to be turned on, and ON/OFF colors for the buttons required in each mode.
- Unnecessary buttons may be deleted. Then, a new user-friendly operation that can be easily placed, such as a numerical value display and input operation that allows numerical value display and numerical value setting can be incorporated on a screen such as the EDIT mode child screen.
- The FpNDisp1 control is attached to each operation button child screen, but is set so that the control is not visible on the CNC screen. The purpose of the control is to notify the PMC ladder that the operation button child screen is displayed and that the mode is switched, by turning on a bit of the one byte of D1106. For this bit notification processing, the FP function for writing to the PMC signal area (Example: wrpmc[9_1106_0_1]) is used. The signal bit turned on is specified as the interlock signal for the local child screen switch button. Thus, the switch button style can be placed in the on state, and the switch button operation can be interlocked at the same time.
## Table of switch button settings common to each operation button child screen

<table>
<thead>
<tr>
<th>.xml name</th>
<th>Control name</th>
<th>Object ID</th>
<th>Tab/Property name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>COP_mode_xxx</td>
<td>TFPChgScr1</td>
<td>Character/ on/off Caption</td>
<td>EDIT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Action/Screen Type</td>
<td>Sub screen</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Action/Screen Name</td>
<td>COP_mode_edit</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Action/Interlock</td>
<td>Enable &amp; Set D1106.0</td>
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<td>Action/Number of Digit</td>
<td>☑, 4 Digits</td>
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<td>Character/On Caption</td>
<td>Specify the On caption</td>
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<td>User</td>
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<td>Action/Detile/ PMC Signal</td>
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<td>FUNCTION/HANDLE</td>
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<td>1:Function (D1106,1byteWrite)</td>
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<td>User</td>
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<td>FUNCTION/JOG</td>
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2. DEVELOPMENT OF CUSTOM SCREEN

Display sub screen of power supply turning on:

- **EDIT mode**
- **MEM mode**
- **MDI mode**
- **JOG mode**
- **HANDLE mode**
2. DEVELOPMENT OF CUSTOM SCREEN

Creating a fault display/CNC state and CNC screen switch button display child screen

- An example of creating a child screen where fault information/CNC state and CNC screen switch buttons are displayed is provided below.
- This screen is a child screen common to parent screens. This means that each screen displays summarized fault information, CNC state, and CNC screen switch buttons.
- For machine alarm display, a property is set to display the currently issued alarm among those alarms accumulated by the function for collecting a history of various displayed alarms posted from the PMC.
- For CNC alarm display, a property is set to display the alarm message currently issued on the CNC by using the numeral/character string indication control with an FP function. To display a message with the alarm acquisition function of the CNC, allocate a character display width of 40 columns or more.

<table>
<thead>
<tr>
<th>.xml name</th>
<th>Control name</th>
<th>Object ID</th>
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<td>Display format of date and passing time</td>
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<td>Each setting to FpNDisp2 to FpNDisp7</td>
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Display sub screen of power supply turning on

Fault display, state of CNC, and CNC screen switch button
Creating a fault guidance and history display parent screen

- Create a screen structure definition control used for parent screen identification.
- Place a fault message display section and detail message display section.
- In the fault display section, create a button for switching between a summary indication and detail indication, and page switch button.
- In the fault display section, create a numeral indication control for indicating the ordinal number of the message displayed on the top line among all messages.
- Create a detail display selection button to the left of a fault message display line. This button sets a mechanism for posting details to be displayed in the detail display section.
- Create a message file for fault message display and for detail message display.

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<td>Action/Action Type</td>
<td>Change Screen</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Action/Detail/Screen Name</td>
<td>PAL_fault</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Action/Interlock</td>
<td>Enable &amp; Set R9091.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FPLabel</td>
<td>FPLabel1</td>
<td>Character/Caption</td>
<td>FAULT GUIDANCE&amp;HISTORY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FPLabel2</td>
<td>Character/Caption</td>
<td>Detail Time Fault Message…</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FPLabel3</td>
<td>Character/Caption</td>
<td>Detail Guidance Message…</td>
<td></td>
</tr>
</tbody>
</table>

* Because FPPScrn is put, this screen becomes main screen.
## 2. DEVELOPMENT OF CUSTOM SCREEN

<table>
<thead>
<tr>
<th>.xml name</th>
<th>Control name</th>
<th>Object ID</th>
<th>Tab/Property name</th>
<th>Setting/Change/Point</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Character/Summary/History</td>
<td>Start position, Line interval, Char Type</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/First Time Display</td>
<td>Summary Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/File Name</td>
<td>VtsData\McnFultMsg.vts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/EDIT Button</td>
<td>FANUC PICTURE Message Editer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Assigne Link Number</td>
<td>1 (ID number of this control)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/History BlockNumber</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>FPHistory1</td>
<td></td>
<td>Format/Row Display Order</td>
<td>Specify that data on a fault message line is displayed in the order of FPLabel2 titles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Format/Date&amp;Time Display Format</td>
<td>Specify the format of date and time information for each data unit displayed on the line above.</td>
</tr>
<tr>
<td></td>
<td>FPHistory2</td>
<td></td>
<td>Character/Detail Display</td>
<td>Start position, Line interval, Char Type</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/First Time Display</td>
<td>Details Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Assigne Link Number</td>
<td>2 (ID number of this control)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Reference Link Number</td>
<td>1 (Specify in detail of message ID where to be displayed.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/History BlockNumber</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>FPHistory</td>
<td></td>
<td>Action/On Caption</td>
<td>Seven from one. the order on the button</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Action Type</td>
<td>History Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detail/History Action Type</td>
<td>Detail Message Switch button</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detail/Link Number at output</td>
<td>2(assigne link number/ID of FPHistory)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detail/Row Number at Detail</td>
<td>In button order from 1 to 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detail/Detail Message File</td>
<td>VtsData\McnFultGudMsg.vts</td>
</tr>
<tr>
<td></td>
<td>FButton1 to FButton7</td>
<td></td>
<td>Character/On Caption</td>
<td>Summary\nFrom History</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Action Type</td>
<td>History Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/ History Action Type</td>
<td>Summary/History/Detail Switch BTM</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/Button Output Link Number</td>
<td>1(assigne link number/ID of FPHistory)</td>
</tr>
<tr>
<td></td>
<td>FButton8</td>
<td></td>
<td>Action/Action Type</td>
<td>History Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/ History Action Type</td>
<td>Page Switch Bottom</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/Link Number at output</td>
<td>1(assigne link number/ID of FPHistory)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/MDI Key code</td>
<td>Page-Up</td>
</tr>
<tr>
<td></td>
<td>FButton9</td>
<td></td>
<td>Action/Action Type</td>
<td>History Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/ History Action Type</td>
<td>Page Switch Bottom</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/Link Number at output</td>
<td>1(assigne link number/ID of FPHistory)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/MDI Key code</td>
<td>Page-Down</td>
</tr>
<tr>
<td></td>
<td>FButton10</td>
<td></td>
<td>Action/Action Type</td>
<td>History Display</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/ History Action Type</td>
<td>Page Switch Bottom</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/Link Number at output</td>
<td>1(assigne link number/ID of FPHistory)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Detale/MDI Key code</td>
<td>Page-Down</td>
</tr>
<tr>
<td></td>
<td>FpNDisp</td>
<td></td>
<td>Character/Centering</td>
<td>ø</td>
</tr>
<tr>
<td></td>
<td>FpNDisp1</td>
<td></td>
<td>Action/Action Type</td>
<td>1:Function</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Function Name</td>
<td>msghis[1_4_1] (&quot;head / entire number&quot; Display)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Data Type</td>
<td>6: String</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Action/Number Digits</td>
<td>ø, 7Digits</td>
</tr>
</tbody>
</table>
### 2. DEVELOPMENT OF CUSTOM SCREEN

**Control placement on a fault guidance and history display parent screen**

#### FANUC PICTURE Message Editor

<table>
<thead>
<tr>
<th>Dialog name</th>
<th>Spreadsheet item name</th>
<th>Setting point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>When the number interface is selected for the interface with the message indication control, register a message number.</td>
<td></td>
</tr>
<tr>
<td>Bit Set</td>
<td>When the bit interface is selected for the interface with the message indication control, register relative bit position numbers in ascending order with the first bit position of the bit interface being 0.</td>
<td></td>
</tr>
<tr>
<td>Char color</td>
<td>Specify a display color for the characters registered with messages 1 to 4 below. The [Set color] dialog box is displayed by double-clicking the left mouse button.</td>
<td></td>
</tr>
<tr>
<td>Message1 - 4</td>
<td>Enter an alarm message for a fault together with details and action to be taken. Each cell can hold up to 255 characters. If one cell is insufficient, enter characters in the next cell for the nth message. Enter &quot;\n&quot; to perform a new line operation at a desired position. An alarm title and details are written in separate VTS files. However, pairing messages are to be written at the same bit specification number.</td>
<td></td>
</tr>
</tbody>
</table>

![Image of message editor interface]
3 FP FUNCTIONS
3.1  FP FUNCTION INTERFACE

3.1.1  Method of specifying FP function

This section explains the functions that can be set in the function field of FANUC PICTURE.

- FP functions are set in the function name fields of FANUC PICTURE property page dialog boxes. See each function reference item presented below for function names and data types. Note that function names are case-sensitive.
  The return value of each function is indicated in the control display area. If a function results in an error, as many asterisks (*) or ‘E’s as they can fit to the screen are displayed.

- Setting a function name with arguments
  When “[Format/with arguments]” is indicated in the function reference below, arguments must be given. When setting a FANUC PICTURE function name, enclose an argument in brackets [ ]. When giving more than one argument, use “_” to separate them from each other. Do not insert any blank.
  Example)
  Reading a parameter
  rdparam[1422_1_8]

- Path specification for multipath control units
  If a multipath control unit is used, “_(path-number)” can be appended to an argument specification to specify the data for the desired path. For functions without arguments, the “_” specification is not required. Specify “1” for the data for path 1, “2” for the data for path 2, and “5” for the loader axis path.
  Example)
  absolute[3_2]: Reads the absolute value of the third axis of path 2.
  actf[2]: Reads the actual feedrate of path 2.
  In the absence of a path number specification, the path number set with the path number setting function is assumed.
  In [Functions] below, those functions that accept a path specification are indicated by underlining their function names.

The function without the path specification in the [Functions] list is as follows.

1.35 setpath  Writing a path number (for multipath systems)
1.39 getpath  Reading a path number (for multipath systems)
1.45 rdopmsg  Reading operator's message
1.51 rdmemsiz  Reading amount of D-RAM memory use
1.52 GetDrvVersion  Reading FP driver version
1.65 settimer  Presetting calendar and clock
1.67 msghis  Obtaining history message indication data
• Processing result notification of FP function
In the FP function, Read/Write is done by using CNC/PMC window library function of C Language Executor.
In the processing result notification of the FP function, the return value when the error occurs by the called function is written in the area of PMC specified by the argument of the FP function.
Argument explanation: [..._pmc_address...]

- pmc: kind of the pmc address
  5: R
  9: D
  12: E (PMC-SB7, PMC for Series 30i)
  99: Processing result is not notified

- address: Written PMC address (The area in two bytes is used from the specified address)
  Please specify 0 when you specify 99 for a kind of the PMC address.

Example)
5_1000: The return value of the result is written from R1000 in two bytes.
99_0: The return value writing of the result is not done.

In [Functions], the function for which the processing result notification can be used is the following functions:

1.40 Writing tool offset amount
1.41 Writing setting parameter
1.42 Reading custom macro variable
1.43 Writing custom macro variable
1.44 Reading modal data
1.45 Reading operator’s message
1.46 Reading program directory
1.47 Delete specified program
1.48 Search specified program
1.49 Reading executing program
1.65 Presetting calendar and clock
1.66 Obtaining CNC alarm
1.68 Reading program directory2

• Specification of indirect data number of FP function of indirect specification
By using the FP function of indirect specification, data at a variable location can be read/written with a control that enables function call.
Moreover, the FP function of indirect specification is able not to be executed by specifying the signal which enables the operation of the screen set control while rewriting indirect data information.
Argument explanation: [kind_datanum]

- kind: The kind of the area indirectly specified (The figure of the treble is specified).
  When the specified number is YXX
  Y: Kind of indirect data
  0: Reserve, currently not used (reserved)
  1: Indirect data number specification/PMC area specification

- datanum: The data number indirectly specified

- address: Written PMC address (The area in two bytes is used from the specified address)
  Please specify 0 when you specify 99 for a kind of the PMC address.
2: Indirect data number specification/custom macro variable specification
3: Indirect data number specification/P code variable (floating point) specification

XX : data area
Y=1 (PMC area specification) :
  00 : G
  01 : F
  02 : Y
  03 : X
  04 : A
  05 : R
  06 : T
  07 : K
  08 : C
  09 : D
  12 : E (PMC-SB7, PMC for Series 30i)
Y=2, 3 : Please specify 00

datum Number :
The number of beginning of the storage of the argument of
indirect specification is specified.
Y=1 : The specification of the argument of PMC area of
the XX specification storage start number is
specified.
Y=2 : The argument specification storage beginning
custom macro variable number is specified.
Y=3 : Argument specification storage beginning code
variable number is specified.

It is necessary to secure the area with which all arguments which contain the system number regardless of the number of path of CNC systems when the FP function of indirect specification is used are specifiable. The order of the arguments that must be specified does not change regardless of the value of Y.

A necessary number must be referred to from the specified number as an argument when you specify the custom macro variable or P code variable for a place of indirect specification.

Offset from the first variable number

<table>
<thead>
<tr>
<th>Offset</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set argument number type pmc address path</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When # 500 is a head
#500: number, #501: type, #502: pmc, #503: address, #504: path

When PMC area is specified for a place of indirect specification, the following size explanations are described in each function explanation because the size of the argument is different depending on the function used.

Offset from the first PMC address(byte)

<table>
<thead>
<tr>
<th>Offset</th>
<th>0-1</th>
<th>2</th>
<th>3</th>
<th>4-5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set argument number type pmc address path</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When D100 is a head
D100-101: number, D102: type, D103: pmc, D104-105: address, D106: path
### 3.1.2 FANUC PICTURE CNC window library

**[Functions]**

* Those functions whose names are underlined accept a path specification.

<table>
<thead>
<tr>
<th>Function name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 sysinfo</td>
<td>Reading CNC system information</td>
</tr>
<tr>
<td>1.2 rdproginfo</td>
<td>Reading program information</td>
</tr>
<tr>
<td>1.3 rdprgnum</td>
<td>Reading the current program number</td>
</tr>
<tr>
<td>1.4 rdseqnum</td>
<td>Reading the current sequence number</td>
</tr>
<tr>
<td>1.5 actf</td>
<td>Reading the actual feedrate (F) of the controlled axis</td>
</tr>
<tr>
<td>1.6 acts</td>
<td>Reading the actual spindle speed (S)</td>
</tr>
<tr>
<td>1.7 absolute</td>
<td>Reading the absolute position of a controlled axis</td>
</tr>
<tr>
<td>1.8 machine</td>
<td>Reading the machine position of a controlled axis</td>
</tr>
<tr>
<td>1.9 relative</td>
<td>Reading the relative position of a controlled axis</td>
</tr>
<tr>
<td>1.10 distance</td>
<td>Reading the remaining amount of travel along a controlled axis</td>
</tr>
<tr>
<td>1.11 skip</td>
<td>Reading the skip position of a controlled axis</td>
</tr>
<tr>
<td>1.12 srvdelay</td>
<td>Reading the servo delay of a controlled axis</td>
</tr>
<tr>
<td>1.13 accdecldy</td>
<td>Reading the acceleration/deceleration delay of a controlled axis</td>
</tr>
<tr>
<td>1.14 statinfo</td>
<td>Reading CNC status information</td>
</tr>
<tr>
<td>1.15 alarm</td>
<td>Reading the alarm status</td>
</tr>
<tr>
<td>1.16 rdtofs</td>
<td>Reading the tool offset value</td>
</tr>
<tr>
<td>1.17 rdzofs</td>
<td>Reading the workpiece origin offset</td>
</tr>
<tr>
<td>1.18 rdparam</td>
<td>Reading a parameter</td>
</tr>
<tr>
<td>1.19 rdset</td>
<td>Reading a setting</td>
</tr>
<tr>
<td>1.20 rpitchr</td>
<td>Reading pitch error compensation data (with the input range specified)</td>
</tr>
<tr>
<td>1.21 diagnosis</td>
<td>Reading diagnosis data</td>
</tr>
<tr>
<td>1.22 adcnv</td>
<td>Reading A/D conversion data</td>
</tr>
<tr>
<td>1.23 rdgrp</td>
<td>Reading tool life management data (tool group number)</td>
</tr>
<tr>
<td>1.24 rdngrp</td>
<td>Reading tool life management data (the number of tool groups)</td>
</tr>
<tr>
<td>1.25 rdntool</td>
<td>Reading tool life management data (the number of tools)</td>
</tr>
<tr>
<td>1.26 rdlife</td>
<td>Reading tool life management data (tool life)</td>
</tr>
<tr>
<td>1.27 rdcount</td>
<td>Reading tool life management data (tool life counter)</td>
</tr>
<tr>
<td>1.28 rd1length</td>
<td>Reading tool life management data (tool length compensation number 1)</td>
</tr>
<tr>
<td>1.29 rd2length</td>
<td>Reading tool life management data (tool length compensation number 2)</td>
</tr>
<tr>
<td>1.30 rd1radius</td>
<td>Reading tool life management data (cutter compensation number 1)</td>
</tr>
<tr>
<td>1.31 rd2radius</td>
<td>Reading tool life management data (cutter compensation number 2)</td>
</tr>
<tr>
<td>1.32 t1info</td>
<td>Reading tool life management data (tool information 1)</td>
</tr>
</tbody>
</table>
1.33 t2info  Reading tool life management data (tool information 2)
1.34 toolnum  Reading tool life management data (tool number)
1.35 setpath  Writing a path number (for multipath systems)
1.36 rdpmacro  Reading a P code variable
1.37 wrpmacro  Writing a P code variable
1.38 loadtorq  Reading abnormal torque (estimated torque) data
1.39 getpath  Reading a path number (for multipath systems)
1.40 wrtofs  Writing tool offset amount
1.41 wrset  Writing setting parameter
1.42 rdmacro  Reading custom macro variable
1.43 wrmacro  Writing custom macro variable
1.44 rdmodal  Reading modal data
1.45 rdopmsg  Reading operator’s message
1.46 rdprgdir  Reading program directory
1.47 progdell  Delete specified program
1.48 progsrch  Search specified program
1.49 rdxexecprog  Reading executing program
1.50 rdncstats  Reading CNC status information
1.51 rdmemsize  Reading amount of D-RAM memory use
1.52 GetDrvVersion  Reading FP driver version
1.53 idrdtofs2  Reading tool offset amount (indirect specification)
1.54 idwrtofs  Writing tool offset amount (indirect specification)
1.55 idrdmac  Reading custom macro variable (indirect specification)
1.56 idwrmac  Writing custom macro variable (indirect specification)
1.57 idprogdel  Delete specified program (indirect specification)
1.58 idprogsrch  Search specified program (indirect specification)
1.59 idrdset2  Reading setting parameter (indirect specification)
1.60 idwrset  Writing setting parameter (indirect specification)
1.61 idrdpmac2  Reading a P code variable (indirect specification)
1.62 idwrpmac2  Writing a P code variable (indirect specification)
1.63 absolute2  Reading the absolute position of a controlled axis (type 2)
1.64 relative2  Reading the relative position of a controlled axis (type 2)
1.65 settimer  Presetting calendar and clock
1.66 rdalmingfo  Obtaining CNC alarm
1.67 msghis  Obtaining history message indication data
1.68 rdprgdir2  Reading program directory2
1.69 setrdprgtop  Increment/decrement of display pointer of rdprgdir2
[Function reference]

1.1 Reading CNC system information

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-:unavailable</td>
</tr>
</tbody>
</table>

[Function name]
sysinfo

[Data type]
6: Character string

[Format/with arguments]
sysinfo[type]

[Arguments]
type = 0 CNC type (character string in ASCII)
  1 M/T/TT type (character string in ASCII)
  2 Series (character string in ASCII)
  3 Edition (character string in ASCII)
  4 Number of controlled axes (character string in ASCII)

[Return value]
CNC system information for the specified type

[Example]
Specify a character string as the property/action data type. In the Series 16i-MA (ROM series: B0F1, edition: 10) 4-axis system, executing this function provides the following information:
sysinfo[0] => “16”
sysinfo[1] => “M”
sysinfo[2] => “B0F1”

1.2 Reading program information

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-:unavailable</td>
</tr>
</tbody>
</table>

[Function name]
rdproginfo

[Data type]
5: 4 bytes

[Format/with arguments]
rdproginfo[type]

[Arguments]
type = 0 Number of registered programs
  1 Number of programs not registered
  2 Used memory area (the number of characters)
  3 Unused memory area (the number of characters)

[Return value]
Program information for the specified type
1.3 Reading the current program number

<table>
<thead>
<tr>
<th>Function name</th>
<th>rdprgnum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>3: 2 bytes</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>rdprgnum[type]</td>
</tr>
</tbody>
</table>
| Arguments     | type = 0  Current program number  
|               | 1 Main program number |
| Return value  | Program number for the specified type |

1.4 Reading the current sequence number

<table>
<thead>
<tr>
<th>Function name</th>
<th>rdseqnum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>5: 4 bytes</td>
</tr>
<tr>
<td>Format</td>
<td>rdseqnum[]</td>
</tr>
<tr>
<td>Arguments</td>
<td>--------</td>
</tr>
<tr>
<td>Return value</td>
<td>Sequence number</td>
</tr>
</tbody>
</table>

1.5 Reading the actual feedrate (F) of the controlled axis

<table>
<thead>
<tr>
<th>Function name</th>
<th>actf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>5: 4 bytes</td>
</tr>
<tr>
<td>Format</td>
<td>actf[]</td>
</tr>
<tr>
<td>Arguments</td>
<td>--------</td>
</tr>
<tr>
<td>Return value</td>
<td>Actual feedrate of the controlled axis</td>
</tr>
<tr>
<td>Setting</td>
<td>Parameter 3105#0=1</td>
</tr>
</tbody>
</table>
1.6 Reading the actual spindle speed

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
</table>

[Function name] acts
[Data type] 5: 4 bytes
[Format] acts[]
[Arguments] 
[Return value] Actual spindle speed
[Setting] Parameter 3105#2=1

1.7 Reading the absolute position of a controlled axis

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
</table>

[Function name] absolute
[Data type] 4: 4 bytes (signed)
[Format/with arguments] absolute[axis]
[Arguments] axis Axis number (= from 1 to the maximum number of controlled axes)
[Return value] Absolute position for the specified axis number
In the Series 30i/31i/32i, coordinates equal with the absolute function can be read.

1.8 Reading the machine position of a controlled axis

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
</table>

[Function name] machine
[Data type] 4: 4 bytes (signed)
[Format/with arguments] machine[axis]
[Arguments] axis Axis number (= from 1 to the maximum number of controlled axes)
[Return value] Machine position for the specified axis number
1.9 Reading the relative position of a controlled axis

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
</table>

[Function name]
relative

[Data type]
4: 4 bytes (signed)

[Format/with arguments]
relative[axis]

[Arguments]
axis Axis number

(= from 1 to the maximum number of controlled axes)

[Return value]
Relative position for the specified axis number
In the Series 30i/31i/32i, coordinates equal with the relative2 function can be read.

1.10 Reading the remaining amount of travel along a controlled axis

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
</table>

[Function name]
distance

[Data type]
4: 4 bytes (signed)

[Format/with arguments]
distance[axis]

[Arguments]
axis Axis number

(= from 1 to the maximum number of controlled axes)

[Return value]
Remaining amount of travel for the specified axis number

1.11 Reading the skip position of a controlled axis

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
</table>

[Function name]
skip

[Data type]
4: 4 bytes (signed)

[Format/with arguments]
skip[axis]

[Arguments]
axis Axis number

(= from 1 to the maximum number of controlled axes)

[Return value]
Skip position for the specified axis number
1.12 Reading the servo delay of a controlled axis

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
<th>- : unavailable</th>
</tr>
</thead>
</table>

[Function name] 
svrdelay
[Data type] 
4: 4 bytes (signed)
[Format/with arguments] 
svrdelay[axis]
[Arguments] 
axis Axis number 
(= from 1 to the maximum number of controlled axes)
[Return value] 
Servo delay for the specified axis number

1.13 Reading the acceleration/deceler ation delay of a controlled axis

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
<th>- : unavailable</th>
</tr>
</thead>
</table>

[Function name] 
accdecdly
[Data type] 
4: 4 bytes (signed)
[Format/with arguments] 
accdecdly[axis]
[Arguments] 
axis Axis number 
(= from 1 to the maximum number of controlled axes)
[Return value] 
Acceleration/deceleration delay for the specified axis number

1.14 Reading CNC status information

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
<th>- : unavailable</th>
</tr>
</thead>
</table>

[Function name] 
statinfo
[Data type] 
3: 2 bytes
[Format/with arguments] 
statinfo[type]
[Arguments] 
type = 0: Operation mode
1: Automatic operation status
2: Axis movement and dwell statuses
3: M, S, T, and B function statuses
4: Emergency stop and reset statuses
5: Alarm status
6: Program edit status
[Return value]
Number indicating the CNC status information for the specified type

1.15 Reading the alarm status

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-: unavailable</td>
</tr>
</tbody>
</table>

[Function name]
alarm

[Data type]
3: 2 bytes

[Format]
alarm[]

[Arguments]
--------

[Return value]
Alarm status
* Use 1.66 rdalinfo when obtaining, as a character string, an alarm message issued in the CNC.

1.16 Reading the tool offset value

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-: unavailable</td>
</tr>
</tbody>
</table>

[Function name]
rdtofs

[Data type]
4: 4 bytes (signed)

[Format/with arguments]
rdtofs[number_type]

[Arguments]
number_offset number

type Offset type

Machining center system
0: Cutter compensation/wear compensation value
1: Cutter compensation/geometric compensation value
2: Tool length compensation/wear compensation value
3: Tool length compensation/geometric compensation value

Lathe system
0: X-axis wear compensation value
1: X-axis geometric compensation value
2: Z-axis wear compensation value
3: Z-axis geometric compensation value
4: Tool-nose radius wear compensation value
5: Tool-nose radius geometric compensation value
6: Virtual tool tip direction
7: Virtual tool tip direction
8: Y-axis wear compensation value
9: Y-axis geometric compensation value
When the tool geometry compensation option is not provided, specify wear compensation.

[Return value]
Tool offset value for the specified type

1.17 Reading the workpiece origin offset

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
</table>

[Function name]
rdzofs

[Data type]
4: 4 bytes (signed)

[Format/with arguments]
rdzofs[number_axis]

[Arguments]
number Offset number
0 : External workpiece origin offset
1 to 6 : Workpiece origin offset of G54 to G59
7 to 306 : Workpiece origin offset of G54.1P1 to G54.1P300
axis Axis number
 (= from 1 to the maximum number of controlled axes)

[Return value]
Workpiece origin offset

1.18 Reading a parameter

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
</table>

[Function name]
rdparam

[Data type]
4: 4 bytes (signed)
5: 4 bytes
One of the data type is determined according to whether the parameter number is signed or unsigned.

[Format/with arguments]
rdparam[number_axis_length]

[Arguments]
number Parameter number
axis Axis number
 (= from 1 to the maximum number of controlled axes, or 0)
length Data block length
 (= 4 + parameter byte size)
Bit/byte type parameter => 5
Word type parameter => 6
Two-word type parameter => 8

[Return value]
Parameter
1.19 Reading a setting

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>unavailable</td>
</tr>
</tbody>
</table>

[Function name] rdset
[Data type] 4: 4 bytes (signed)
[Format/with arguments] rdset[number_axis_length]

[Arguments]
number Setting data number
axis Axis number
(= from 1 to the maximum number of controlled axes, or 0)
length Data block length
(= 4 + byte size of setting)
Bit/byte type setting => 5
Word type setting => 6
Two-word type setting => 8

[Return value] Setting

1.20 Reading pitch error compensation data

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-</td>
<td>O</td>
<td>O</td>
<td>unavailable</td>
</tr>
</tbody>
</table>

[Function name] rdpitchr
[Data type] 2: 2 bytes (signed)
[Format/with arguments] rdpitchr[number]

[Arguments]
number Pitch error compensation data number with which input starts

[Return value] Pitch error compensation data

[Explanation] The pitch error compensation data with the specified number is read.

1.21 Reading diagnosis data

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>unavailable</td>
</tr>
</tbody>
</table>

[Function name] diagnoss
[Data type] 4: 4 bytes (signed)
[Format/with arguments] diagnoss[number_axis_length]
[Arguments]
  number Diagnosis data
  axis Axis number
    (= from 1 to the maximum number of controlled axes, or 0)
  length Data block length
    (= 4 + byte size of diagnosis data)
  Bit/byte type diagnosis data => 5
  Word type diagnosis data => 6
  Two-word type diagnosis data => 8

[Return value]
  Diagnosis data

1.22 Reading A/D conversion data

<table>
<thead>
<tr>
<th></th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-: unavailable</td>
</tr>
</tbody>
</table>

[Function name]
  adcnv

[Data type]
  2: 2 bytes (signed)

[Format/with arguments]
  adcnv[inptype_avtype]

[Arguments]
  inptype Type of analog voltage (= 0, 2)
  avtype Specification of an input channel or CNC controlled
    axis
    (= 0 to 3, or from 1 to the maximum number of
    controlled axes)

[Return value]
  A/D conversion data

1.23 Reading tool life management data (tool group number)

<table>
<thead>
<tr>
<th></th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-: unavailable</td>
</tr>
</tbody>
</table>

[Function name]
  rdgrpid

[Data type]
  5: 4 bytes

[Format/with arguments]
  rdgrpid[number]

[Arguments]
  number Tool number

[Return value]
  Tool group number

1.24 Reading tool life management data (the number of tool groups)

<table>
<thead>
<tr>
<th></th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-: unavailable</td>
</tr>
</tbody>
</table>

[Function name]
  rdngrp
[Data type]
5: 4 bytes

[Format]
rdngrp[]

[Arguments]
--------

[Return value]
Number of tool groups

1.25 Reading tool life management data (the number of tools)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ ○ ○ ○ ○</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>○</td>
<td>-</td>
</tr>
</tbody>
</table>

[Function name]
rdntool

[Data type]
5: 4 bytes

[Format/with arguments]
rdntool[number]

[Arguments]
number Tool group number

[Return value]
Number of tools

1.26 Reading tool life management data (tool life)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ ○ ○ ○ ○</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>○</td>
<td>-</td>
</tr>
</tbody>
</table>

[Function name]
rdlife

[Data type]
5: 4 bytes

[Format/with arguments]
rdlife[number]

[Arguments]
number Tool group number

[Return value]
Tool life value

1.27 Reading tool life management data (tool life counter)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>○ ○ ○ ○ ○</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>○</td>
<td>-</td>
</tr>
</tbody>
</table>

[Function name]
rdcount

[Data type]
5: 4 bytes

[Format/with arguments]
rdocument[number]

[Arguments]
number Tool group number
1.28 Reading tool life management data (tool length compensation number 1)

<table>
<thead>
<tr>
<th>Function name</th>
<th>rd1length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>5: 4 bytes</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>rd1length[grpnum_toolnum]</td>
</tr>
<tr>
<td>Arguments</td>
<td>grpnum Tool group number</td>
</tr>
<tr>
<td>Return value</td>
<td>Tool length compensation number 1</td>
</tr>
</tbody>
</table>

1.29 Reading tool life management data (tool length compensation number 2)

<table>
<thead>
<tr>
<th>Function name</th>
<th>rd2length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>5: 4 bytes</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>rd2length[grpnum_tusenum]</td>
</tr>
<tr>
<td>Arguments</td>
<td>grpnum Tool group number</td>
</tr>
<tr>
<td>Return value</td>
<td>Tool length compensation number 2</td>
</tr>
</tbody>
</table>

1.30 Reading tool life management data (cutter compensation number 1)

<table>
<thead>
<tr>
<th>Function name</th>
<th>rd1radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>5: 4 bytes</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>rd1radius[grpnum_toolnum]</td>
</tr>
<tr>
<td>Arguments</td>
<td>grpnum Tool group number</td>
</tr>
<tr>
<td>Return value</td>
<td>Cutter compensation number 1</td>
</tr>
</tbody>
</table>
1.31 Reading tool life management data (cutter compensation number 2)

<table>
<thead>
<tr>
<th>Function name</th>
<th>rd2radius</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>5: 4 bytes</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>rd2radius[grpnum_tusenum]</td>
</tr>
<tr>
<td>Arguments</td>
<td>grpnum  Tool group number</td>
</tr>
<tr>
<td></td>
<td>tusenum  Tool change order number</td>
</tr>
<tr>
<td>Return value</td>
<td>Cutter compensation number 2</td>
</tr>
</tbody>
</table>

1.32 Reading tool life management data (tool information 1)

<table>
<thead>
<tr>
<th>Function name</th>
<th>t1info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>5: 4 bytes</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>t1info[grpnum_toolnum]</td>
</tr>
<tr>
<td>Arguments</td>
<td>grpnum  Tool group number</td>
</tr>
<tr>
<td></td>
<td>toolnum  Tool number</td>
</tr>
<tr>
<td>Return value</td>
<td>Tool information 1</td>
</tr>
</tbody>
</table>

1.33 Reading tool life management data (tool information 2)

<table>
<thead>
<tr>
<th>Function name</th>
<th>t2info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>5: 4 bytes</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>t2info[grpnum_tusenum]</td>
</tr>
<tr>
<td>Arguments</td>
<td>grpnum  Tool group number</td>
</tr>
<tr>
<td></td>
<td>tusenum  Tool change order number</td>
</tr>
<tr>
<td>Return value</td>
<td>Tool information 2</td>
</tr>
</tbody>
</table>
1.34 Reading tool life management data (tool number)

<table>
<thead>
<tr>
<th></th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMt-D</th>
<th>PMt-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>- unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

[Function name]
toolnum

[Data type]
5: 4 bytes

[Format/with arguments]
toolnum[grpnum_tusenum]

[Arguments]
grpnum Tool group number
tusenum Tool change order number

[Return value]
Tool number

1.35 Writing a path number (for multipath systems)

<table>
<thead>
<tr>
<th></th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMt-D</th>
<th>PMt-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>- unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>-</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

[Function name]
setpath

[Data type]
3: 2 bytes

[Format/with arguments]
setpath[path]

[Arguments]
path 1: Sets the first path. 2: Sets the second path.

[Return value]
None

1.36 Reading a P code variable

A P-code variable having a variable number of 10000 or greater can be read.

For Series 16i/18i/21i, Power Mate i-D/H

Numbers after twenty thousand change with the value that the user sets in parameter No. 9044. This value is obtained from the part program storage and NC program size by using the calculation method explained in the programming manual for the macro executor.

For Series 30i/31i/32i

The specifiable number of P-code variables with variable numbers from 2000 to 2999 varies with the NC parameter setting.
(a) For specification of the ten-key pad read function or numeral indication control

- Function name - rdpmacro
- Data type - 7: Floating-Point
- Format/with arguments - rdpmacro[type_number]
- Arguments -
  - type: Always 0
  - number: P code macro variable number
    (#10000 to #16000, #20000 and up)

(b) For specification of a control other than in (a)

- Function name - rdpmacro
- Data type - 4: 4 bytes(Signed)
- Format/with arguments - rdpmacro[type_number]
- Arguments -
  - type: Data type
    - 0: Reads a variable value.
    - 1: Reads the number of decimal positions.
  - number: P code macro variable number
    (#10000 to #16000, #20000 and up)

### 1.37 Writing a P code variable

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>- unavailable</td>
</tr>
</tbody>
</table>

A P-code variable having a variable number of 10000 or greater can be written.

For Series 16i/18i/21i, Power Mate i-D/H

Numbers after twenty thousand change with the value that the user sets in parameter No. 9044. This value is obtained from the part program storage and NC program size by using the calculation method explained in the programming manual for the macro executor.

For Series 30i/31i/32i

The specifiable number of P-code variables with variable numbers from 2000 to 2999 varies with the NC parameter setting.

(a) For specification of the ten-key pad write function or numeral indication control

- Function name - wrpmacro
- Data type - 2: 2 bytes(Signed)
- Format/with arguments - wrpmacro[number_data_decimal]
1.38 Reading abnormal torque (estimated torque) data

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM±D</th>
<th>PM±H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>~unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

[Function name]
loadtorq

For a servo motor, returns the abnormal torque of a specified axis, as well as the load current value [Apeak].
For a spindle motor, returns the ratio (as percentage) of the torque to the maximum torque of a specified spindle. The value to be returned is rounded up at the digit after the specified decimal places and then converted into a whole number.
Example) For 98.12%, 9812 is returned.

[Data type]
5 : 4 bytes (unsigned)

[Format/with arguments]
loadtorq[motor_axis_coefficient_deccnt]

[Arguments]
Motor type:
0 : Servo motor
1 : Spindle motor
Axis number (=1 to maximum number of controlled axes)
For a spindle, specify the spindle number such as the first or second spindle.
Coefficient:
(1) For a servo motor
Specify the constant N used to calculate the load current value.
The value of the parameter No. 2162 is filled in.
(2) For a spindle motor, specify 0.
deccnt: Number of decimal places = (0 to 3)
Specify the number of decimal places of the load
current value or load ratio.

[Return value]
The load current value or load ratio raised to the nth power (n:
number of decimal places) yields a whole number before being
returned.

NOTE
To use a numeral indication control, the decimal
point display property must be set to the same
number of decimal places as the deccnt argument.
This causes 1234 to be displayed as 12.34%.
If specifying a spindle with a deccnt value of 2 in a
meter indication control, specify max=20000,
min=0 if the meter range is 200% to 0%.

1.39 Reading a path number (for multipath systems)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>- unavailable</th>
</tr>
</thead>
</table>

[Function name]
getpath
[Data type]
3 : 2 bytes
[Format/with arguments]
getpath[type]
[Arguments]
type 0 : Current selected path number
1 : Maximum path number
[Return value]
Path information corresponding to type

1.40 Writing tool offset amount

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>- unavailable</th>
</tr>
</thead>
</table>

[Function name]
wrtofs
[Data type]
4 : 4 bytes(signed)
[Format/with arguments]
wrtofs[number_type_data_pmc_address]
[Arguments]
number Offset number
type Offset type
Machining center system
0: Cutter compensation/wear compensation value
1: Cutter compensation/geometric compensation value
2: Tool length compensation/wear compensation value
3: Tool length compensation/geometric compensation value
Lathe system
0: X-axis wear compensation value
1: X-axis geometric compensation value
2: Z-axis wear compensation value
3: Z-axis geometric compensation value
4: Tool-nose radius wear compensation value
5: Tool-nose radius geometric compensation value
6: Virtual tool tip direction
7: Virtual tool tip direction
8: Y-axis wear compensation value
9: Y-axis geometric compensation value
data Writing data value (0 is specified at the ten keys input.)

pmc Kind of PMC address for processing result notification
5 : R
9 : D
12 : E (PMC-SB7, PMC for Series 30i)
99 : Processing result is not notified

address PMC address where processing result is written (The area in two bytes is used from the specified address)
Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
Alters the tool offset amount stored in the CNC.

[Example]
wrtofs[10_1_0_9_200]
Data is written in X-axis geometric compensation value of offset number 10 by the ten keys input in the CNC of the lathe system, and processing result is written in D200.
wrtofs[10_1_123456_99_0_2]
Data 123.456 is written in Tool length compensation/wear compensation value of 2path side offset number 10 in the button control when specified that the offset is the treble decimal position in the CNC of the machining center system, and this processing result is not notified.

[Value of processing result written in specified PMC area]
0 Successful.
2 Incorrect data block length “length”.
3 Incorrect offset number “number”.
   (This return code is returned in case that any value except 1,...,(maximum number of offset) was specified in offset number “number”.
4 Incorrect offset type “type”.
6 There are no additional tool offset options required for the specified offset number to be written.
-1 Attempted to execute this function while the other low-speed window function is being executed. Retry after completing currently executed window’s process.

1.41 Writing setting parameter

<table>
<thead>
<tr>
<th>Function name</th>
<th>wrset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>4 : 4 bytes (signed)</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>wrset[number_axis_length_data_pmc_address]</td>
</tr>
<tr>
<td>Arguments</td>
<td></td>
</tr>
<tr>
<td>number</td>
<td>Setting parameter number</td>
</tr>
<tr>
<td>axis</td>
<td>Axis number</td>
</tr>
<tr>
<td></td>
<td>Data usual (It is not an axis type) =&gt; axis = 0</td>
</tr>
<tr>
<td></td>
<td>Axis data specified of axis type data =&gt; axis = 1,...amount of controlled axes</td>
</tr>
<tr>
<td>length</td>
<td>Data block length (=4+byte size of the setting parameter)</td>
</tr>
<tr>
<td></td>
<td>Bit/byte type setting data =&gt; 5</td>
</tr>
<tr>
<td></td>
<td>Word type setting data =&gt; 6</td>
</tr>
<tr>
<td></td>
<td>Two word type setting data =&gt; 8</td>
</tr>
<tr>
<td>data</td>
<td>Writing data value (0 is specified at the ten keys input.)</td>
</tr>
<tr>
<td>pmc</td>
<td>Kind of PMC address for processing result notification</td>
</tr>
<tr>
<td></td>
<td>5 : R</td>
</tr>
<tr>
<td></td>
<td>9 : D</td>
</tr>
<tr>
<td></td>
<td>12 : E (PMC-SB7, PMC for Series 30i)</td>
</tr>
<tr>
<td></td>
<td>99 : Processing result is not notified</td>
</tr>
<tr>
<td>address</td>
<td>PMC address where processing result is written (The area in two bytes is used from the specified address)</td>
</tr>
<tr>
<td></td>
<td>Please specify 0 when you specify 99 for a kind of the PMC address.</td>
</tr>
<tr>
<td>Description</td>
<td>Alters the setting parameter stored in the CNC.</td>
</tr>
<tr>
<td></td>
<td>Data types of CNC setting parameter are as follows. The data types of setting parameter are different for every setting parameter number.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter type</th>
<th>Use</th>
<th>Byte size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit parameter</td>
<td>Every bits have each definition.</td>
<td>1</td>
</tr>
<tr>
<td>Byte parameter</td>
<td>1-byte data is stored.</td>
<td>1</td>
</tr>
<tr>
<td>Word parameter</td>
<td>2-byte data is stored.</td>
<td>2</td>
</tr>
<tr>
<td>2-Word parameter</td>
<td>4-byte data is stored.</td>
<td>4</td>
</tr>
</tbody>
</table>

It is impossible to write any bit setting parameter bit by bit. Do the following process to change bit data, Read eight bits (i.e. 1 byte) which belong to the same setting parameter number. Change the target bit. Write above eight bits at the same time.
[Example]

wrset[5421_2_8_0_9_200]
Data from which ten keys are input to the second axis of axis type setting data number 5421(four byte type data) is written, and this processing result is written in D200.

wrset[5410_0_8_1000_99_0_2]
Data 1000 is written in setting data number 5410(four byte type data) on 2path side usual (It is not an axis type) in the button control, and this processing result is not notified.

[Value of processing result written in specified PMC area]

0 Successful.
2 Incorrect data block length “length”.
3 Incorrect setting parameter number “datano”.
4 Incorrect axis number “type”.
   Any data other than -1, 0 or (1,..,amount of controlled axes) has been specified.
5 Invalid value of the setting parameter to be written.
   For example, when any data other than 0,...3 was attempted to write for I/O device number, this return code is returned.
-1 Attempted to execute this function while the other low-speed window function is being executed.
   Retry after completing currently executed window’s process.

1.42 Reading custom macro variable

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-unavailable</th>
</tr>
</thead>
</table>

[Function name]
rdmacro

[Data type]
7: Floating-Point

[Format/with arguments]
rdmacro[number_pmc_address]

[Arguments]

number  Custom macro variable number
   Readable. The local variables which belong to the macro program just being executed when the application program calls this function are read.
   Common variables ( #100,..,#149, #500,..,#531 )
   Readable. In case that Custom macro common variable addition option is added, #100,..,#199 and #500,..,#999 are available to be read.
   System variables ( #1000,.. )
   Readable.

pmc  Kind of PMC address for processing result notification
   5 : R
   9 : D
   12 : E (PMC-SB7, PMC for Series 30i)
   99 : Processing result is not notified
address  PMC address where processing result is written (The area in two bytes is used from the specified address)
Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
Reads the custom macro variable data stored in the CNC.

[Example]

rdmacro[100_9_200]
The data of common variable #100 is read, and this processing result is written in D200.

rdmacro[1000_99_0_2]
The data of system variable #1000 on 2path side is read, and this processing result is not notified.

[Value of processing result written in specified PMC area]
0  Successful.
2  Incorrect data block length “length”.
3  Incorrect custom macro variable number “number”.
5  Value of the custom macro variable is out of the limit.
6  There are no required options.
The related options;
-  Custom macro.
-  Custom macro common variable addition (#100,...,#199, #500,...,#999).
-1  It has been failed to read custom macro variable because the other application program has already started writing custom macro variable. Or attempted to execute this function while the other low-speed window function is being executed.
Retry after completing currently executed window’s process.

1.43 Writing custom macro variable

<table>
<thead>
<tr>
<th>Function name</th>
<th>wrmacro</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Data type]</td>
<td>2: 2 bytes (signed)</td>
</tr>
<tr>
<td>[Format/with arguments]</td>
<td>wrmacro[number_data1_data2_pmc_address]</td>
</tr>
<tr>
<td>[Arguments]</td>
<td>number</td>
</tr>
</tbody>
</table>

Custom macro variable number

Local variables ( #1,..,#33 )
Writable. The local variables which belong to the macro program just being executed when the application program calls this function are altered.

Common variables ( #100,..,#149, #500,..,#531 )
Writable. In case that Custom macro common variable addition option is added, #100,..,#199 and #500,..,#999 are available to be written.
System variables ( #1000,.. )
  Writable for only changeable variables.

data1  Variable value converted into integer. (0 is specified at the ten keys input.)
data2  Digit number after decimal point. (0 is specified at the ten keys input.)

pmc Kind of PMC address for processing result notification
  5 : R
  9 : D
  12 : E (PMC-SB7, PMC for Series 30i)
  99 : Processing result is not notified

address PMC address where processing result is written (The area in two bytes is used from the specified address)
Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
Writes the custom macro variable data in the CNC.
Data1 and data2 are set as follows.

<table>
<thead>
<tr>
<th>written value</th>
<th>data1</th>
<th>data2</th>
</tr>
</thead>
<tbody>
<tr>
<td>void</td>
<td>0</td>
<td>-1</td>
</tr>
<tr>
<td>0.000</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>0.0000001</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>00000.100</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>00001.000</td>
<td>1000</td>
<td>3</td>
</tr>
<tr>
<td>00010.000</td>
<td>10000</td>
<td>3</td>
</tr>
<tr>
<td>999999999</td>
<td>99999999</td>
<td>0</td>
</tr>
<tr>
<td>-00123.000</td>
<td>-123000</td>
<td>3</td>
</tr>
</tbody>
</table>

When “123.” is written, “data1=123000, data2=3” isn’t only available format like above but also “data1=123, data2=0” or “data1=1230, data2=1”, etc, are available.
“void” can be written.

[Example]

wrmacro[100_0_0_9_10]
Data is written in common variable #100 in the ten keys input, and this processing result is written in D10.
wrmacro[1000_123456_2_99_0_2]
1234.56 is written in system variable # 1000 on 2path side in the button control, and this processing result is not notified.

[Value of processing result written in specified PMC area]

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Successful</td>
</tr>
<tr>
<td>2</td>
<td>Incorrect data block length “length”</td>
</tr>
<tr>
<td>3</td>
<td>Incorrect custom macro variable number “number”</td>
</tr>
<tr>
<td>5</td>
<td>Value of the custom macro variable is out of the limit.</td>
</tr>
<tr>
<td>6</td>
<td>There are no required options.</td>
</tr>
</tbody>
</table>

The related options;
- Custom macro.
- Custom macro common variable addition (#100,..,#199, #500,..,#999).
1.44 Reading modal data

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMI-D</th>
<th>PMI-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available - unavailable</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Function name</th>
<th>rdmodal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>6: String</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>rdmodal[type_block_inp_pmc_address]</td>
</tr>
<tr>
<td>Arguments type</td>
<td>Kind of modal data</td>
</tr>
<tr>
<td>type</td>
<td>0,...,99 : G code group number</td>
</tr>
<tr>
<td>type</td>
<td>100,... : modal address</td>
</tr>
<tr>
<td>type</td>
<td>100: B (2nd auxiliary function)</td>
</tr>
<tr>
<td>type</td>
<td>101: D</td>
</tr>
<tr>
<td>type</td>
<td>102: - (reserved)</td>
</tr>
<tr>
<td>type</td>
<td>103: F</td>
</tr>
<tr>
<td>type</td>
<td>104: H [M]</td>
</tr>
<tr>
<td>type</td>
<td>105: L</td>
</tr>
<tr>
<td>type</td>
<td>106: M</td>
</tr>
<tr>
<td>type</td>
<td>107: S</td>
</tr>
<tr>
<td>type</td>
<td>108: T</td>
</tr>
<tr>
<td>type</td>
<td>109: R [M]</td>
</tr>
<tr>
<td>type</td>
<td>110: P [M]</td>
</tr>
<tr>
<td>type</td>
<td>111: Q [M]</td>
</tr>
<tr>
<td>type</td>
<td>112: M (2nd M code)</td>
</tr>
<tr>
<td>type</td>
<td>113: M (3rd M code)</td>
</tr>
</tbody>
</table>

[M] is read as a modal data on Machining center system and a commanded data on Lathe system.

<table>
<thead>
<tr>
<th>Arguments block</th>
<th>Objective block</th>
</tr>
</thead>
<tbody>
<tr>
<td>block 0 : Currently executed block</td>
<td></td>
</tr>
<tr>
<td>block 1 : Next block</td>
<td></td>
</tr>
<tr>
<td>block 2 : Next to next block</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Arguments inp</th>
<th>Display type by presence of instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>inp 0 : Modal information is displayed regardless of the presence of the buffering and the instruction.</td>
<td></td>
</tr>
<tr>
<td>inp 1 : Modal information is displayed when there is an instruction in the buffered block.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Arguments pmc</th>
<th>Kind of PMC address for processing result notification</th>
</tr>
</thead>
<tbody>
<tr>
<td>pmc 5 : R</td>
<td></td>
</tr>
<tr>
<td>pmc 9 : D</td>
<td></td>
</tr>
<tr>
<td>pmc 12 : E (PMC-SB7, PMC for Series 30i)</td>
<td></td>
</tr>
<tr>
<td>pmc 99 : Processing result is not notified</td>
<td></td>
</tr>
</tbody>
</table>
address  PMC address where processing result is written (The area in two bytes is used from the specified address) Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
Modality in the specified G modal code and the address is read. The readable modal data are modal G code, M/S/T code or commanded data such as F.

[Example]
rdmodal[0_0_0_9_10]
The modal information on the G code group number 0 in the block currently being executed is read and the processing results are written in D10.

[Value of processing result written in specified PMC area]
0 Successful.
3 Incorrect kind of data “type”.
4 Incorrect objective block “block”.
-1 It has been failed to read modal data because the CNC software was updating the modal data.

1.45 Reading operator’s message

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td></td>
<td></td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-: unavailable</td>
</tr>
</tbody>
</table>

[Function name]
r dopmsg

[Data type]
6: String

[Format/with arguments]
r dopmsg[type_pmc_address]

[Arguments]
type  Kind of the operator’s message (Always 0)

pmc   Kind of PMC address for processing result notification

address PMC address where processing result is written (The area in two bytes is used from the specified address) Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
Reads the contents of the operator’s message displayed in the CNC’s screen.
For the Series 30i, turn off and back on the power for the change in parameter No. 6310 or bit 1 of parameters No. 6301 to take effect.

[Example]
r dopmsg[0_9_10]
The operator message is read, the content is displayed on the screen, and this processing result is written in D10.
[Value of processing result written in specified PMC area]

0  Successful.
4  The specification of the kind of operator’s message (type) is wrong.
6  The external message or external data input option is not specified.

### 1.46 Reading program directory

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-H</th>
<th>PM-D</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available/unavailable</th>
</tr>
</thead>
</table>

[Function name]
rdprgdir

[Data type]
8 : Rectangle String

[Format/with arguments]
rdprgdir[type_sprg_eprg_pmc_address]

[Arguments]

- **type** Format of program list
  - 0 : O number only
  - 1 : O number and comment
  - 2 : O number, comment, and the use number of characters

- **sprg** Start program number to be read

- **eprg** End program number to be read.

- **pmc** Kind of PMC address for processing result notification
  - 5 : R
  - 9 : D
  - 12 : E (PMC-SB7, PMC for Series 30i)
  - 99 : Processing result is not notified

- **address** PMC address where processing result is written (The area in two bytes is used from the specified address)
  - Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
Reads the list of program numbers (program directory) of all CNC programs registered in CNC.
For instance, when the following CNC programs are registered, it is displayed as follows.

<table>
<thead>
<tr>
<th>Program number (COMMENT)</th>
<th>Character number</th>
</tr>
</thead>
<tbody>
<tr>
<td>O0012 (TEST) ;</td>
<td>420</td>
</tr>
<tr>
<td>O0200 (WORK1) ;</td>
<td>352</td>
</tr>
<tr>
<td>O0201 ;</td>
<td>537</td>
</tr>
<tr>
<td>O9001 (SUB-PRO1) ;</td>
<td>781</td>
</tr>
</tbody>
</table>

- **type=0** (Change line by the unit of O number when the display reaches a right edge)
  - O0012 O0200 O0201 O9001
- **type=1**
  - O0012 (TEST)
  - O0200 (WORK1)
3.FP FUNCTIONS

O0201
O9001 (SUB-PRO1)
- type=2
O0012 (TEST) 420
O0200 (WORK1) 352
O0201 537
O9001 (SUB-PRO1) 781

[Example]
rdprgdir[0_12_9001_9_10]
The list of the program number of all registered the
processing programs is read from program number O0012
of the [Description] with Type0, and this processing result
is written in D10.

[Value of processing result written in specified PMC area]
0 Successful.
2 Incorrect buffer size “length”.
3 Incorrect format of program “type”.
5 Program number is incorrect.
-1 CNC program directory reading command has been
rejected.
   This code is returned under one of following conditions.
   • CNC is executing other requested command
     (downloading, comparing, uploading or reading
     program directory).
   • The operation mode of CNC is background editing
     mode or MDI mode.
   • P/S 000 or P/S 101 alarm is set.
-2 The CNC has been reset. In this case, the process of reading
program directory has been completed normally.

1.47 Delete specified program

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
</table>

[Function name]
progdel

[Data type]
2: 2 bytes (signed)

[Format/with arguments]
progdel[number_pmc_address]

[Arguments]
number Program number (0 is specified at the ten keys input.)
   All program deletion can be done by specifying -1.
pmc Kind of PMC address for processing result notification
   5 : R
   9 : D
   12 : E (PMC-SB7, PMC for Series 30i)
   99 : Processing result is not notified
address PMC address where processing result is written (The
   area in two bytes is used from the specified address)
   Please specify 0 when you specify 99 for a kind of the
   PMC address.

- 320 -
[Description]
Deletes all CNC programs registered in CNC.
When the specified program is in operation, it cannot be deleted.

[Example]
progsrch[20, 99, 0]
The CNC instruction data of program number 20 is deleted, and this processing result is not notified.

[Value of processing result written in specified PMC area]
0 Successful.
5 There is no specified program.
7 Tape memory of CNC is protected, or the target program is protected.
-1 Specified program deletion command has been rejected.
   This code is returned under one of following conditions.
   • CNC is executing other requested command (downloading, comparing, uploading or reading program directory).
   • Any automatic operation is being executed. (Automatic operating signal “OP”<F000#7> is “ON”).
   • P/S 000, P/S 101 or any BP/S alarm is set.

1.48 Search specified program

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
<th>- unavailable</th>
</tr>
</thead>
</table>

[Function name]
progsrch

[Data type]
4: 4 bytes (signed)

[Format/with arguments]
progsrch[number_pmc_address]

[Arguments]
number Program number (0 is specified at the ten keys input.)

pmc Kind of PMC address for processing result notification
   5 : R
   9 : D
   12 : E (PMC-SB7, PMC for Series 30i)
   99 : Processing result is not notified

address PMC address where processing result is written (The area in two bytes is used from the specified address)
   Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
Searches the CNC program already registered in CNC.
This function is used to select one CNC program before memory operation is executed in CNC.

[Example]
progsrch[100, 9, 200, 2]
The program of program number 100 is searched, and this processing result is written in D200.
3. FP FUNCTIONS

[Value of processing result written in specified PMC area]
- 0  Successful.
- 5  The specified CNC program is not registered in CNC.
- 7  Tape memory of CNC is protected.
- -1 Program search command has been rejected.

This code is returned under one of following conditions.

- CNC is executing other requested command (downloading, comparing, uploading or reading program directory).
- CNC’s mode is EDIT or MEM and Automatic operating signal “OP”<F000#7> is “ON”.
- CNC’s mode is EDIT or MEM and P/S 000 or P/S 101 alarm is set.

1.49 Reading executing program

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>-unavailable</td>
</tr>
</tbody>
</table>

[Function name] rdexecprog
[Data type] 8 : Rectangle String
[Format/with arguments] rdexecprog[block_pmc_address]
[Arguments]
block  Always 0
pmc    Kind of PMC address for processing result notification
       5 : R
       9 : D
       12 : E (PMC-SB7, PMC for Series 30i)
       99 : Processing result is not notified
address PMC address where processing result is written (The area in two bytes is used from the specified address)
       Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
Reads the contents of the CNC program following the currently executing block. For example, while the following CNC program is being executed, the next string is got by this function.

```
O1234 ;
N20 G0 X20. Y30. Z40. ;  <-- This function is called when
N30 G0 X30. Y40. Z50. ;  this block is being executed.
N40 G0 X40. Y50. Z60. ;
M30 ;
%
```

String to be read.

```
N20 G0 X20. Y30. Z40. ;
N30 G0 X30. Y40. Z50. ;
N40 G0 X40. Y50. Z60. ;
M30 ;
%
```

- 322 -
[Example]
rdexecprog[0_9_10]
The program of executing is read, and this processing result is written in D10.

1.50 Reading CNC status information

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available - unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td></td>
</tr>
</tbody>
</table>

[Function name] rdncstats
[Data type] 6 : String
[Format/with arguments] rdncstats[kind]

[Arguments] kind
0 : Operation mode
1 : Status of automatic operation
2 : Status of axis motion and dwelling
3 : Status of M,S,T,B functions
4 : Status of emergency stop and reset (Reverse display)
5 : Status of alarm (Reverse display)

[Description] Specified CNC status information is read.
kind = 0 : Operation mode
Display Meaning
MDI Manual data input mode
MEM Automatic operation mode
**** Not used
EDIT Memory editing mode
HND Manual handle feed mode
JOG Manual continuous feed mode
TJOG TEACH IN JOG mode
THND TEACH IN HANDLE mode
INC Manual incremental feed mode
REF Manual reference position return mode
RMT Automatic operation (Tape command) mode

kind = 1 : Status of automatic operation
Display Meaning
**** Reset state
STOP Automatic operation stop state
HOLD Feed hold state
STRT Cycle start state

kind = 2 : Status of axis motion and dwelling
Display Meaning
*** Not in motion or dwelling
MTN Any axis in motion
Dwl In dwelling
kind = 3 : Status of M,S,T,B functions
   Display Meaning
      *** Not in waiting FIN signal
      FIN In executing auxiliary functions (waiting FIN signal)

kind = 4 : Status of emergency stop and reset
   Display Meaning
      blank Not emergency stop or resetting
      --EMG-- Emergency stop
      -RESET- Resetting

kind = 5 : Status of alarm
   Display Meaning
      *** No alarms or warnings
      ALM Alarm
      BAT Battery low

[Example]
   rdncstats[1]
   Status information in the state of the automatic operative method is read.

1.51 Reading amount of D-RAM memory use

<table>
<thead>
<tr>
<th></th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-: unavailable</td>
</tr>
</tbody>
</table>

[Function name]
   rdmemsize
[Data type]
   4 : 4 bytes (signed)
[Format/with arguments]
   rdmemsize[kind]
[Arguments]
   kind 0 : Occupied D-RAM size (byte)
   l : Empty size (byte)
[Description]
   Information on the D-RAM status is read.

1.52 Reading FP driver version

<table>
<thead>
<tr>
<th></th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>-: unavailable</td>
</tr>
</tbody>
</table>

[Function name]
   GetDrvVersion
[Data type]
   6 : String
[Format]
   GetDrvVersion[]
[Arguments]
   -----------
[Description]
   The version of the FP driver which operates on CNC is read.
1.53 Reading tool offset amount (indirect specification)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
</tr>
</thead>
<tbody>
<tr>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
</tbody>
</table>

[Function name]
idrDtofs2

[Data type]
4 : 4 bytes (signed)

[Format/with arguments]
idrDtofs2[kind_datanum]

[Arguments]
kind Kind and data division of indirect specification
datanum Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]
number_type_pmc_address_path
number Offset number
type Offset type
pmc Kind of PMC address for processing result notification
address PMC address where processing result is written (The area in two bytes is used from the specified address)
path Path number

Row of argument when PMC area is specified
Offset from head PMC address (byte)
+0  +1  +2  +3  +4-5  +6

Set argument number type pmc address path

[Example]
When the value of the 10th offset number of Tool length compensation/wear compensation value on 2path side is read, and processing result is written in D200.

idrDtofs2[109_10]

D10 in PMC area is used for indirect data.
D10,11(number) = 10
D12(type) = 2
D13(pmc) = 9
D14,15(address) = 200
D16(path) = 2 (1 is specified for 1path side)

idrDtofs2[200_100]

#100 in custom macro variable is used for indirect data.
#100(number) = 10
#101(type) = 2
#102(pmc) = 9
#103(address) = 200
#104(path) = 2 (1 is specified for 1path side)

idrDtofs2[300_10000]

#10000 in P code variable is used for indirect data.
#10000(number) = 10
#10001(type) = 2
#10002(pmc) = 9
#10003(address) = 200
#10004(path) = 2 (1 is specified for 1path side)
1.54 Writing tool offset amount (indirect specification)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
</tr>
</thead>
</table>

[Function name]
Idwrtofs

[Data type]
4 : 4 bytes (signed)

[Format/with arguments]
Idwrtofs[kind_datanum]

[Arguments]
kind Kind and data division of indirect specification
datanum Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]
number_type_data_pmc_address_path
number Offset number
type Offset type
data Output data (signed 4 bytes)
PMC Kind of PMC address for processing result notification
address PMC address where processing result is written (The area in two bytes is used from the specified address)
path Path number

Row of argument when PMC area is specified
Offset from head PMC address (byte)
+0-1 +2 +3-6 +7 +8-9 +10

Set argument number type data pmc address path

[Example]
When 20 is written in the 10th offset numbers of Tool length compensation/wear compensation value on 2path side, and processing result is written in D200.
Idwrtofs[109_10]
D10 in PMC area is used for indirect data.
D10,11(number) = 10
D12(type) = 2
D13,14,15,16(data) = 20 (0 is specified at the ten keys input.)
D17(pmc) = 9
D18,19(address) = 200
D20(path) = 2 (1 is specified for 1path side)
Idwrtofs[200_100]
#100 in custom macro variable is used for indirect data.
#100(number) = 10
#101(type) = 2
#102(data) = 20 (0 is specified at the ten keys input.)
#103(pmc) = 9
#104(address) = 200
#105(path) = 2 (1 is specified for 1path side)
idwrtofs[300_10000]

#10000 in P code variable is used for indirect data.
#10000(number)  = 10
#10001(type)    = 2
#10002(data)    = 20 (0 is specified at the ten keys input.)
#10003(pmc)     = 9
#10004(address) = 200
#10005(path)    = 2 (1 is specified for 1path side)

1.55 Reading custom macro variable (indirect specification)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-unavailable</th>
</tr>
</thead>
</table>

[Function name]
idrdmac

[Data type]
7: Double(Decimal point)

[Format/with arguments]
idrdmac[kind_datanum]

[Arguments]

kind Kind and data division of indirect specification
datanum Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]
number_pmc_address_path
number Custom macro variable number
pmc Kind of PMC address for processing result notification
address PMC address where processing result is written (The area in two bytes is used from the specified address)
path Path number

Row of argument when PMC area is specified
Offset from head PMC address (byte)
+0-1 +2 +3-4 +5

Set argument number pmc address path

[Example]
When the 100th custom macro variables on 2path side are read, and processing result is written in D200.
idrdmac[109_10]

D10 in PMC area is used for indirect data.
D10,11(number)  = 100
D12(pmc)       = 9
D13,14(address) = 200
D15(path)      = 2 (1 is specified for 1path side)
idrdmac[200_100]

#100 in custom macro variable is used for indirect data.
#100(number)    = 100
#101(pmc)       = 9
#102(address)   = 200
#103(path)      = 2 (1 is specified for 1path side)
idrdmac[300_10000]

#10000 in P code variable is used for indirect data.
  #10000(number) = 100
  #10001(pmc) = 9
  #10002(address) = 200
  #10003(path) = 2 (1 is specified for 1path side)

1.56 Writing custom macro variable (indirect specification)

<table>
<thead>
<tr>
<th>Support CNC</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Function name</th>
<th>idwrmac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data type</td>
<td>2: 2 bytes (signed)</td>
</tr>
<tr>
<td>Format/with arguments</td>
<td>idwrmac[kind_datanum]</td>
</tr>
</tbody>
</table>

[Arguments]
  kind Kind and data division of indirect specification
  datanum Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]
  number_data1_data2_pmc_address_path
  number Custom macro variable number
  data1 Output data (custom macro variable value)
  data2 Output data (decimal position)
  pmc Kind of PMC address for processing result notification
  address PMC address where processing result is written (The area in two bytes is used from the specified address)
  path Path number

Row of argument when PMC area is specified
  Offset from head PMC address (byte)
    +0-1 +2-5 +6 +7 +8-9 +10

Set argument number data1 data2 pmc address path

[Example]
To the custom macro variable on 2path side when the value of 123.456 is written, and to the 100th processing result is written in D200.

idwrmac[109_10]

D10 in PMC area is used for indirect data.
  D10,11(number) = 100
  D12,13,14,15(data1) = 123456 (0 is specified at the ten keys input.)
  D16(data2) = 3 (0 is specified at the ten keys input.)
  D17(pmc) = 9
  D18,19(address) = 200
  D20(path) = 2 (1 is specified for 1path side)
idwrmac[200_100]
	#500 in custom macro variable is used for indirect data.
	#500(number) = 100
	#501(data1) = 123456 (0 is specified at the ten keys input.)
	#502(data2) = 3 (0 is specified at the ten keys input.)
	#503(pmc) = 9
	#504(address) = 200
	#505(path) = 2 (1 is specified for 1path side)

idwrmac[300_10000]
	#10000 in P code variable is used for indirect data.
	#10000(number) = 100
	#10001(data1) = 123456 (0 is specified at the ten keys input.)
	#10002(data2) = 3 (0 is specified at the ten keys input.)
	#10003(pmc) = 9
	#10004(address) = 200
	#10005(path) = 2 (1 is specified for 1path side)

1.57 Delete specified program (indirect specification)

<table>
<thead>
<tr>
<th></th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMI-D</th>
<th>PMI-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-unavailable</td>
</tr>
</tbody>
</table>

[Function name] idprogdel
[Data type] 4: 4 bytes(signed)
[Format/with arguments] idprogdel[kind_datanum]
[Arguments]
	number_pmc_address_path
	number Program number
	pmc Kind of PMC address for processing result notification

target_address PMC address where processing result is written (The area in two bytes is used from the specified address)

target_path Path number

Row of argument when PMC area is specified

Offset from head PMC address (byte)

Set argument number_pmc_address_path

-329-
When program number 100 on 2path side is deleted, and processing result is written in D200.

```
idprogdel[109_10]
D10 in PMC area is used for indirect data.
D10,11,12,13(number) = 100 (0 is specified at the ten keys input.)
D14(pmc) = 9
D15,16(address) = 200
D17(path) = 2 (1 is specified for 1path side)
```

```
idprogdel[200_100]
#100 in custom macro variable is used for indirect data.
#100(number) = 100 (0 is specified at the ten keys input.)
#101(pmc) = 9
#102(address) = 200
#103(path) = 2 (1 is specified for 1path side)
```

```
idprogdel[300_10000]
#10000 in P code variable is used for indirect data.
#10000(number) = 100 (0 is specified at the ten keys input.)
#10001(pmc) = 9
#10002(address) = 200
#10003(path) = 2 (1 is specified for 1path side)
```

### 1.58 Search specified program (indirect specification)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
</table>

- [Function name]
  - idprogrsrch

- [Data type]
  - 4: 4 bytes(signed)

- [Format/with arguments]
  - idprogrsrch[kind_datanum]

- [Arguments]
  - **kind** Kind and data division of indirect specification
  - **datanum** Number of beginning of storage of argument of indirect specification

- [Argument of indirect specification destinations]
  - **number_pmc_address_path**
  - **number** Program number
  - **pmc** Kind of PMC address for processing result notification
  - **address** PMC address where processing result is written (The area in two bytes is used from the specified address)
  - **path** Path number
Row of argument when PMC area is specified
Offset from head PMC address (byte)
+0-3 +4 +5-6 +7
Set argument number pmc address path

[Example]
When program number 100 on 2path side is searched, and processing result is written in D200.
idprogsrch[109_10]
D10 in PMC area is used for indirect data.
D10,11,12,13(number)= 100 (0 is specified at the ten keys input.)
D14(pmc) = 9
D15,16(address) = 200
D17(path) = 2 (1 is specified for 1path side)
idprogsrch[200_100]
#100 in custom macro variable is used for indirect data.
#100(number) = 100 (0 is specified at the ten keys input.)
#101(pmc) = 9
#102(address) = 200
#103(path) = 2 (1 is specified for 1path side)
idprogsrch[300_10000]
#10000 in P code variable is used for indirect data.
#10000(number) = 100 (0 is specified at the ten keys input.)
#10001(pmc) = 9
#10002(address) = 200
#10003(path) = 2 (1 is specified for 1path side)

1.59 Reading setting parameter (indirect specification)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O: available</th>
<th>-unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Function name]</td>
<td>idrdset2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Data type]</td>
<td>4: 4 bytes(signed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Format/with arguments]</td>
<td>idrdset2[kind_datanum]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| [Arguments] | kind Kind and data division of indirect specification
datnum Number of beginning of storage of argument of indirect specification |
| [Argument of indirect specification destinations] | number_axis_length_pmc_address_path
number Setting parameter number
axis Axis number |
length  Data block length
       (= 4 + byte size of setting)
Bit/byte type setting => 5
Word type setting => 6
Two-word type setting => 8
pmc  Kind of PMC address for processing result notification
address  PMC address where processing result is written (The area in two bytes is used from the specified address)
path  Path number

Row of argument when PMC area is specified
Offset from head PMC address (byte)
   +0-1  +2  +3  +4  +5-6  +7
Set argument number axis length pmc address path

[Example]
When the data of the second axis of setting data number 5421(4 byte type data) on 2path side is read, and processing result is written in D200.

idrdset2[109_10]
  D10 in PMC area is used for indirect data.
  D10,11(number) = 5421
  D12(axis) = 2
  D13(length) = 8
  D14(pmc) = 9
  D15,16(address) = 200
  D17(path) = 2 (1 is specified for 1path side)

idrdset2[200_100]
  #100 in custom macro variable is used for indirect data.
  #100(number) = 5421
  #101(axis) = 2
  #102(length) = 8
  #103(pmc) = 9
  #104(address) = 200
  #105(path) = 2 (1 is specified for 1path side)

idrdset2[300_10000]
  #10000 in P code variable is used for indirect data.
  #10000(number) = 5421
  #10001(axis) = 2
  #10002(length) = 8
  #10003(pmc) = 9
  #10004(address) = 200
  #10005(path) = 2 (1 is specified for 1path side)

1.60 Writing setting parameter (indirect specification)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>idwrset</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

[Function name] idwrset
[Data type]
2: 2 bytes(signed)

[Format/with arguments]
idwrset[kind_datanum]

[Arguments]
kind Kind and data division of indirect specification
datanum Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]
number_axis_length_data_pmc_address_path
number Setting parameter number
axis Axis number
length Data block length
  (= 4 + byte size of setting)
Bit/byte type setting => 5
Word type setting => 6
Two-word type setting => 8
data Output data
pmc Kind of PMC address for processing result notification
address PMC address where processing result is written (The area in two bytes is used from the specified address)
path Path number

Row of argument when PMC area is specified
  Offset from head PMC address (byte)
+0-1 +2 +3 +4-7 +8 +9-10 +11

Set argument number axis length data pmc address path

NOTE
Even when the data length is one byte, pmc begins with +8 since the remaining three bytes of dummy data are reserved.

[Example]
When 123 is written in the second axis of setting data number 5421(4 byte type data) on 2path side, and processing result is written in D200.
idwrset[109_10]

D10 in PMC area is used for indirect data.
D10,11(number) = 5421
D12(axis) = 2
D13(length) = 8
D14,15,16,17(data) = 123 (0 is specified at the ten keys input.)
D18(pmc) = 9
D19,20(address) = 200
D21(path) = 2 (1 is specified for 1path side)

idwrset[200_100]

#100 in custom macro variable is used for indirect data.
#100(number) = 5421
#101(axis) = 2
#102(length) = 8
#103(data) = 123 (0 is specified at the ten keys input.)
#104(pmc) = 9
#105(address) = 200
#106(path) = 2 (1 is specified for 1path side)

idwsret[300_10000]

#10000 in P code variable is used for indirect data.
#10000(number) = 5421
#10001(axis) = 2
#10002(length) = 8
#10003(data) = 123 (0 is specified at the ten keys input.)
#10004(pmc) = 9
#10005(address) = 200
#10006(path) = 2 (1 is specified for 1path side)

1.61 Reading a P code variable (indirect specification)

<table>
<thead>
<tr>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PM-D</th>
<th>PM-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Function name]
idrdpmac2

[Data type]
7: Floating-Point

[Format/with arguments]
idrdpmac2[kind_datanum]

[Arguments]
kinds Kind and data division of indirect specification
datanum Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]
number_pmc_address_path

data number P code variable number
pmcs Kind of PMC address for processing result notification
addresss PMC address where processing result is written (The area in two bytes is used from the specified address)
paths Path number

Row of argument when PMC area is specified
Offset from head PMC address (byte)
+0-3 +4 +5-6 +7

Set argument number pmc address path

[Example]
When the data of P code variable number 10100 on 2path side is read, and processing result is written in D200.
idrdpmac2[109_10]

D10 in PMC area is used for indirect data.
D10,11,12,13(number) = 10100
D14(pmc) = 9
D15,16(address) = 200
D17(path) = 2 (1 is specified for 1path side)
1.62 Writing a P code variable (indirect specification)

| Support CNC | 16i | 18i | 21i | PMi-D | PMi-H | 30i | 31i | 32i | O:available
|--------------|-----|-----|-----|-------|-------|-----|-----|-----|--------------
|              | O   | O   | O   | O     | O     | O   | O   | O   | -:unavailable |

[Function name]

idwrpmac2

[Data type]

2: 2 bytes (signed)

[Format/with arguments]

idwrpmac2[kind_datanum]

[Arguments]

- kind: Kind and data division of indirect specification
- datanum: Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]

- number: P code variable number
- data1: Output data (Integer)
- data2: Output data (decimal position)
- pmc: Kind of PMC address for processing result notification
- address: PMC address where processing result is written (The area in two bytes is used from the specified address)
- path: Path number

Row of argument when PMC area is specified

Offset from head PMC address (byte)

+0-3 +4-7 +8 +9 +10-11 +12

Set argument number data1 data2 pmc address path

[Example]

When 123.456 is written in P code variable number 10100 on 2path side, and processing result is written in D200.

idwrpmac2[109_10]

D10 in PMC area is used for indirect data.

D10,11,12,13(number)= 10100
D14,15,16,17(data1) = 123456 (0 is specified at the ten keys input.)
D18(data2) = 3 (0 is specified at the ten keys input.)
D19(pmc) = 9
D20,21(address) = 200
D22(path) = 2 (1 is specified for 1path side)

idwrpmac2[200_100]
#100 in custom macro variable is used for indirect data.
#100(number) = 10100
#101(data1) = 123456 (0 is specified at the ten keys input.)
#102(data2) = 3 (0 is specified at the ten keys input.)
#103(pmc) = 9
#104(address) = 200
#105(path) = 2 (1 is specified for 1path side)

idwrpmac2[300_10000]
#10000 in P code variable is used for indirect data.
#10000(number) = 10100
#10001(data1) = 123456 (0 is specified at the ten keys input.)
#10002(data2) = 3 (0 is specified at the ten keys input.)
#10003(pmc) = 9
#10004(address) = 200
#10005(path) = 2 (1 is specified for 1path side)

1.63 Reading the absolute position of a controlled axis (type 2)

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMI-D</th>
<th>PMI-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
<th>-:unavailable</th>
</tr>
</thead>
</table>

[Function name]
absolute2

[Data type]
4: 4 bytes (signed)

[Format/with arguments]
absolute2[axis]

[Arguments]
axis Axis number
(= from 1 to the maximum number of controlled axes)

[Return value]
Absolute position for the specified axis number
The same value as the absolute position displayed on the position display screen of the CNC is read.
For the Series 30i/31i/32i, the absolute function can be used to read the same coordinate value.
1.64 Reading the relative position of a controlled axis (type 2)

<table>
<thead>
<tr>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

[Function name] relative2

[Data type] 4: 4 bytes (signed)

[Format/with arguments] relative2[axis]

[Arguments] axis Axis number (= from 1 to the maximum number of controlled axes)

[Return value] Relative position for the specified axis number
The same value as the relative position displayed on the position display screen of the CNC is read.
For the Series 30i/31i/32i, the relative function can be used to read the same coordinate value.

1.65 Presetting calendar and clock

<table>
<thead>
<tr>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

This function is used only for the function specification property of a button control.

[Function name] settimer

[Data type] 4: 4 bytes (signed)

[Format/with arguments] settimer[type_area_presetadr_pmc_address]

[Arguments] type 0 : Date setting
1 : Time setting
2 : Date and time
area 5 : R (Internal relay)
9 : D (Data table)
12 : E (PMC-SB7, PMC for Series 30i / Internal relay)
presetadr Start PMC address in which the preset value of the calendar timer is stored
It is a pattern of three or six bytes depending on the type, with each item being one byte, as shown in the table below.
type address +0 +1 +2 +3 +4 +5
0 : Year Month Day
1 : Hour Minute Second
2 : Year Month Day Hour Minute Second
pmc Type of the PMC address for processing result notification
5 : R
9 : D
12 : E (PMC-SB7, PMC for Series 30i)
99 : Does not perform processing result notification

address PM address to which a processing result is to be written (an area of two bytes starting with the specified address is used.)
If you specify 99 as the PMC address type, specify 0.

[Value of the processing result to be written to the specified PMC area]
0 Normal termination.
5 The type, year/month/day or hour/minute/second value is not correct.
-1 Data could not be set in the calendar timer LSI chip. The cause may be a hardware fault.

1.66 Obtaining CNC alarm

<table>
<thead>
<tr>
<th>type</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available -unavailable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support CNC</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

This function obtains information about the alarm that has occurred on the CNC. The message will be the character string in the display language of the CNC.

[Function name]
rdalminfo

[Data type]
6 : Character string (only one line is displayed)
8 : Rectangular character string

[Format/with arguments]
rdalminfo[type_almtype_num_pmc_address(_path)]

[Arguments]
type Display format
0 : Alarm number only
1 : Alarm number and message
almtype Type of the alarm to be obtained
  • Series 30i/31i/32i
    0 : Parameter write switch on (SW)
    1 : Input of a parameter that requires power-off (PW)
    2 : I/O error (IO)
    3 : P/S alarm for foreground (PS)
    4 : Overtravel alarm / external data input alarm (OT)
    5 : Overheat alarm (OH)
    6 : Servo alarm (SV)
    7 : Data I/O error (SR)
    8 : Macro alarm (MC)
    9 : Spindle alarm (SP)
   10 : Other DS alarms (DS)
   11 : Alarm related to prevention of malfunction (IE)
   12 : P/S alarm for background (BG)
13 : Synchronization deviation excess error (SN)
14 : (Reserved)
15 : External alarm message (EX)
16 : (Reserved)
17 : (Reserved)
18 : (Reserved)
19 : PMC error (PC)
99 : All types

- Series 16i/18i/21i, Power Mate i
  0 : P/S100
  1 : P/S000
  2 : P/S101
  3 : Other P/S alarms
  4 : Overtravel alarm
  5 : Overheat alarm
  6 : Servo alarm
  8 : APC alarm
  9 : Spindle alarm
 10 : P/S5000
 99 : All types

num Number of alarms to be obtained (= 1 to 50)
If a value out of the valid range is specified, 1 is assumed.

pmc Type of the PMC address for processing result notification
  5 : R
  9 : D
 12 : E (PMC-SB7, PMC for Series 30i)
 99 : Does not perform processing result notification

address PMC address to which a processing result is to be
written (an area of two bytes starting with the specified
address is used.)
If you specify 99 as the PMC address type, specify 0.

(path) CNC path number specification. Optional

[Value of the processing result to be written to the specified PMC
area]
  0 Normal termination.
  3 The type specification is not correct.
  5 The almtype specification is not correct.

1.67 Obtaining history message indication data

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>- unavailable</td>
</tr>
</tbody>
</table>

This function obtains various information from history data in
accordance with a specified history message indication collection
block or in accordance with the history block number specified by the
message history indication control.

[Function name]
msghis
[Data type]
6 : Character string

[Format/with arguments]
msghis[block_item_linkout]

[Arguments]
block : Specify the block from which various history message indication data is to be obtained. Both direct and indirect specifications are available.
0 : [Indirect specification] Obtains various information in accordance with the history block number specified for the history message indication control specified for the linkout argument.
    If, however, the history block number is other than 1 to 4 or if “Message Display” is specified for the first time display property, the data for history data category arguments 0 to 2 cannot be obtained. In this case, the return value will be a null character string.
1 to 4 : [Direct specification] Specify the number of the history block from which data is to be obtained. In this case, set the linkout argument to 0. In this case, data for history data category arguments 0 to 3 can be obtained.

item : History data category
0 : Data deletion date and time
1 : Oldest history retention date and time
2 : Newest history retention date and time
3 : Depending on the screen type of the screen displayed by the history message indication control specified for linkout, the following data can be obtained as “zero-suppressed numeric values of up to three digits”.
    History Display : Total number of history items retained
    Summary Display : Total number of messages that have occurred up to present
    Detail Display : Either of the items mentioned above will be assumed depending on whether the history message indication control of the reference link number has performed history or summary display.
4 : Depending on the screen type of the screen displayed by the history message indication control specified for linkout, the following data can be obtained as “zero-suppressed numeric values of up to three digits/zero-suppressed numeric values of up to three digits”.

- 340 -
History Display : Indication page start history record number/Total number of history items retained
Summary Display : Number of the indication page start message that has occurred up to present/total number of messages
Detail Display : Either of the items mentioned above will be assumed depending on whether the history message indication control of the reference link number has performed history or summary display.

*1 For data categories 3 and 4, the data to be obtained will vary depending on which of history, summary, and detail screens is displayed by the history message indication control specified for linkout. If “Message Display” is specified for the first time display property, either summary or detail display screen will be assumed, and history display will not be assumed.

*2 If the history data category argument is either 2 or 3 and no history data has been registered, The numeric value positions of a date will be replaced by an asterisk (*). Example: ****/**/** **:**:**

linkout : To identify the history message indication control with which to obtain history information, specify the assigned link number of that control.

### 1.68 Reading program directory2

<table>
<thead>
<tr>
<th>Support CNC</th>
<th>16i</th>
<th>18i</th>
<th>21i</th>
<th>PMi-D</th>
<th>PMi-H</th>
<th>30i</th>
<th>31i</th>
<th>32i</th>
<th>O:available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

[Function name] rdprgdir2

[Data type] 8 : Rectangle String

[Format/with arguments] rdprgdir2[type_num_pmc_address]

[Arguments]
- **type** Format of program list
  - 0 : O number only
  - 1 : O number and comment
  - 2 : O number, comment, and the use number of characters
- **num** Read program number(program display number in one page)
- **pmc** Kind of PMC address for processing result notification
  - 5 : R
  - 9 : D
  - 12 : E (PMC-SB7, PMC for Series 30i)
99 : Processing result is not notified
address PMC address where processing result is written (The area in two bytes is used from the specified address)
Please specify 0 when you specify 99 for a kind of the PMC address.

[Description]
A list of program numbers of machining programs registered in the CNC is read. The first program number in rectangle string of the read number list, the display pointer, varies with the specification by the setrdprgtop function.
For example, when the following CNC program is registered, the display pointer changes as follows:

<table>
<thead>
<tr>
<th>Program number (COMMENT)</th>
<th>Character number</th>
</tr>
</thead>
<tbody>
<tr>
<td>O0012 (TEST) ;</td>
<td>420</td>
</tr>
<tr>
<td>O0200 (WORK1) ;</td>
<td>352</td>
</tr>
<tr>
<td>O0201 ;</td>
<td>537</td>
</tr>
<tr>
<td>O9001 (SUB-PRO1) ;</td>
<td>781</td>
</tr>
</tbody>
</table>

- type=0 (Change line by the unit of O number when the display reaches a right edge)
  O0012 O0200 O0201 O9001

- type=1
  O0012 (TEST)
  O0200 (WORK1)
  O0201
  O9001 (SUB-PRO1)

- type=2
  O0012 (TEST) 420
  O0200 (WORK1) 352
  O0201 537
  O9001 (SUB-PRO1) 781

[Example]
rdprgdir2[0_8_9_10]
A list of up to eight program numbers is read in type 0 format and the result is written to D10.

[Value of processing result written in specified PMC area]
0 Successful.
4 Incorrect format of “type”.

NOTE
1 The program information obtained by this function is only O numbers. The arbitrary file name program name or subfolder cannot be obtained.
2 Only the programs that are present in foreground folders can be obtained.
3 The rdprgdir function and rdprgdir2 function cannot be used together.
4 In addition, the rdprgdir2 function cannot be used from multiple controls on one screen.
1.69 Increment/decrement of display pointer of rdprgdir2

| Support CNC | 16i | 18i | 21i | PMi-D | PMi-H | 30i | 31i | 32i | O:available
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>O</td>
<td>O</td>
<td>-</td>
</tr>
</tbody>
</table>

[Function name]
setrdprgtop

[Data type]
--------

[Format/with arguments]
setrdprgtop[top]

[Arguments]
top Increment value of the program display pointer of rdprgdir2.
A negative value can be specified.

[Description]
The display pointer of a list of program numbers read by the rdprgdir2 function is incremented or decremented.

An argument of 0 is ignored and the display pointer does not change.
Even when an attempt is made to increment the display pointer on the last page where the last program is displayed, the pointer does not change. In addition, even when an attempt is made to decrement the display pointer on the first page, the pointer does not change (remains at 1).
### 3.1.3 FANUC PICTURE PMC window library

#### Functions

<table>
<thead>
<tr>
<th>Function name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 wrpmcb</td>
<td>PMC write (bit)</td>
</tr>
<tr>
<td>2.2 rdpmc</td>
<td>PMC read (1/2/4 bytes)</td>
</tr>
<tr>
<td>2.3 wrpmc</td>
<td>PMC write (1/2/4 bytes)</td>
</tr>
<tr>
<td>2.4 rdpmc</td>
<td>PMC read (bit)</td>
</tr>
<tr>
<td>2.5 idrdpmcb</td>
<td>PMC read (bit) (indirect specification)</td>
</tr>
<tr>
<td>2.6 idwrpmcb</td>
<td>PMC write (bit) (indirect specification)</td>
</tr>
<tr>
<td>2.7 idrdpmc</td>
<td>PMC read (1/2/4 bytes) (indirect specification)</td>
</tr>
<tr>
<td>2.8 idwrpmc</td>
<td>PMC write (1/2/4 bytes) (indirect specification)</td>
</tr>
</tbody>
</table>

#### Function reference

**2.1 PMC write (bit)**

- **Function name**: wrpmcb
- **Data type**: 1 : 1 byte
- **Format/with arguments**: `wrpmcb[adrtype_snumber_bitpos_data]

- **Arguments**
  - `adrtype` PMC address type
    - 0 : G (PMC → CNC)
    - 1 : F (CNC → PMC)
    - 2 : Y (PMC → machine)
    - 3 : X (machine → PMC)
    - 4 : A (message request)
    - 5 : R (internal relay)
    - 6 : T (variable timer)
    - 7 : K (keep relay)
    - 8 : C (counter)
    - 9 : D (data table)
    - 12 : E (PMC-SB7, PMC for Series 30i/internal relay)
  - `snumber` PMC address where data is written
  - `bitpos` Bit position (0 to 7)
  - `data` Output data (0 is specified at the ten keys input)
    - 0 : 0 is written in the bit.
    - 1 : 1 is written in the bit.
    - 2 : The bit is reversed.

- **Description**
  
  Writing 1 or 0 in the bit in the specified PMC area or the bit data is reversed.

- **Example**
  - `wrpmcb[9_0_0_0]` Writes 0 in D[0] bit 0.
2.2 PMC read (1/2/4 bytes)

[Function name]
rdpmc

[Data type]
0 : 1 byte (Signed)
1 : 1 byte
2 : 2 byte (Signed)
3 : 2 byte
4 : 4 byte (Signed)
5 : 4 byte

[Format/with arguments]
rdpmc[adrtype_snumber_datatype]

[Arguments]
adrtype PMC address type
0 : G
1 : F
2 : Y
3 : X
4 : A
5 : R
6 : T
7 : K
8 : C
9 : D
12 : E (PMC-SB7, PMC for Series 30i/ internal relay)
snumber PMC address where data is read
datatype PMC data type (The same size as the [Data type] is specified)
0 : 1 byte
1 : 2 bytes
2 : 4 bytes

[Description]
The data of specified PMC area is read.

[Example]
rdpmc[9_1000_0] Reads 1-byte data from D[1000].
rdpmc[5_2000_0] Reads 1-byte data from R[2000].
rdpmc[9_500_1] Reads 2-byte data from D[500].
rdpmc[5_2500_1] Reads 2-byte data from R[2500].

2.3 PMC write (1/2/4 bytes)

[Function name]
wrpmc

[Data type]
0 : 1 byte (Signed)
1 : 1 byte
2 : 2 byte (Signed)
3 : 2 byte
4 : 4 byte (Signed)
5 : 4 byte

[Format/with arguments]
wrpmc[adrtype_snumber_datatype]

3.FP FUNCTIONS

2.4 PMC read (bit)

[Function name]
rdpmcb

[Data type]
1: 1byte

[Format/with arguments]
rdpmcb[adrtype_snumber_bitpos]

[Arguments]

<table>
<thead>
<tr>
<th>adrtype</th>
<th>PMC address type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>G</td>
</tr>
<tr>
<td>1</td>
<td>F</td>
</tr>
<tr>
<td>2</td>
<td>Y</td>
</tr>
<tr>
<td>3</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td>A</td>
</tr>
<tr>
<td>5</td>
<td>R</td>
</tr>
<tr>
<td>6</td>
<td>T</td>
</tr>
<tr>
<td>7</td>
<td>K</td>
</tr>
<tr>
<td>8</td>
<td>C</td>
</tr>
<tr>
<td>9</td>
<td>D</td>
</tr>
<tr>
<td>12</td>
<td>E (PMC-SB7, PMC for Series 30i/series 30i)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>snumber</th>
<th>PMC address where data is read</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>datatype</th>
<th>PMC data type (The same size as the [Data type] is specified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1 byte</td>
</tr>
<tr>
<td>1</td>
<td>2 bytes</td>
</tr>
<tr>
<td>2</td>
<td>4 bytes</td>
</tr>
</tbody>
</table>

| data     | Output data (0 is specified at the ten keys input) |

[Description]
1 bit of the specified PMC area is read.

[Example]
wrpmc[9_1000_0_-128]  Writes -128 (1-byte data) in D[1000].
wrpmc[9_500_1_-32768] Writes -32768 (2-byte data) in D[500].
wrpmc[9_2500_1_32767] Writes 32767 (2-byte data) in D[2500].
2.5 PMC read (bit) (indirect specification)

[Example]
rdpmbc[9_100_0] The data of bit 1 of D100 is read.

2.6 PMC write (bit) (indirect specification)

[Example]
idrpmbc[200_100]
#100 in custom macro variable is used for indirect data.
#100(adrtype) = 9
#101(snumber) = 10
#102(bitpos) = 7
datanum Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]

<table>
<thead>
<tr>
<th>adrtype</th>
<th>snumber</th>
<th>bitpos</th>
<th>data</th>
</tr>
</thead>
<tbody>
<tr>
<td>adrtype</td>
<td>snumber</td>
<td>bitpos</td>
<td>data</td>
</tr>
<tr>
<td>Kind of PMC address</td>
<td>read PMC address</td>
<td>Bit position</td>
<td>Output data(0, 1, 2(reverse))</td>
</tr>
</tbody>
</table>

Row of argument when PMC area is specified
Offset from head PMC address (byte)
+0 +1 +2 +3 +4
Set argument adrtype snumber bitpos data

[Example]
When you read the data of bit 7 of D100 of PMC area.
idwrpmcb[109_10]
D10 in PMC area is used for indirect data.
D10(adrtype) = 9
D11,12(snumber) = 100
D13(bitpos) = 7
D14(data) = 1 (0 is specified at the ten keys input.)

idwrpmcb[200_100]
#100 in custom macro variable is used for indirect data.
#100(adrtype) = 9
#101(snumber) = 100
#102(bitpos) = 7
#103(data) = 1 (0 is specified at the ten keys input.)

idwrpmcb[300_10000]
#10000 in P code variable is used for indirect data.
#10000(adrtype) = 9
#10001(snumber) = 100
#10002(bitpos) = 7
#10003(data) = 1 (0 is specified at the ten keys input.)

2.7 PMC read (1/2/4 bytes) (indirect specification)

[Function name]
idrdpmc

[Data type]
0: 1byte (signed)
1: 1byte
2: 2bytes (signed)
3: 2bytes
4: 4bytes (signed)
5: 4bytes

[Format/with arguments]
idrdpmc[kind_datanum]

[Arguments]
kkind Kind and data division of indirect specification
datanum Number of beginning of storage of argument of indirect specification

[Argument of indirect specification destinations]

<table>
<thead>
<tr>
<th>adrtype</th>
<th>snumber</th>
<th>datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kind of PMC address</td>
<td>read PMC address</td>
<td>PMC data type (The same size as the [Data type] is specified)</td>
</tr>
</tbody>
</table>

Row of argument when PMC area is specified

Offset from head PMC address (byte)

+0  +1-2  +3

Set argument

<table>
<thead>
<tr>
<th>adrtype</th>
<th>snumber</th>
<th>datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kind of PMC address</td>
<td>read PMC address</td>
<td>PMC data type (The same size as the [Data type] is specified)</td>
</tr>
</tbody>
</table>

[Example]
When you read the data of 4 bytes from D100 of PMC area.

`idrdpmc[109_10]`

D10 in PMC area is used for indirect data.

D10(adrtype) = 9
D11,12(snumber) = 100
D13(datatype) = 2

`idrdpmc[200_100]`

#100 in custom macro variable is used for indirect data.

#100(adrtype) = 9
#101(snumber) = 100
#102(datatype) = 2

`idrdpmc[300_10000]`

#10000 in P code variable is used for indirect data.

#10000(adrtype) = 9
#10001(snumber) = 100
#10002(datatype) = 2

2.8 PMC write (1/2/4 bytes) (indirect specification)

[Function name]

`idwrpmc`

[Data type]

| 0: | 1 bytes (signed) |
| 1: | 1 bytes |
| 2: | 2 bytes (signed) |
| 3: | 2 bytes |
| 4: | 4 bytes (signed) |
| 5: | 4 bytes |

[Format/with arguments]

`idwrpmc[kind_datanum]`

[Arguments]

<table>
<thead>
<tr>
<th>kind</th>
<th>Kind and data division of indirect specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>datanum</td>
<td>Number of beginning of storage of argument of indirect specification</td>
</tr>
</tbody>
</table>

[Argument of indirect specification destinations]

<table>
<thead>
<tr>
<th>adrtype</th>
<th>snumber</th>
<th>datatype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kind of PMC address</td>
<td>read PMC address</td>
<td>PMC data type (The same size as the [Data type] is specified)</td>
</tr>
</tbody>
</table>
datatype  PMC data type (The same size as the [Data type] is specified)
data  Output data

Row of argument when PMC area is specified
1 byte type data
Offset from head PMC address (byte)
+0   +1-2   +3   +4
Set argument  adrtype  snumber  datatype  data

2 byte type data
Offset from head PMC address (byte)
+0   +1-2   +3   +4-5
Set argument  adrtype  snumber  datatype  data

4 byte type data
Offset from head PMC address (byte)
+0   +1-2   +3   +4-7
Set argument  adrtype  snumber  datatype  data

[Example]
When you write 123 in 4 bytes in D100 of PMC area.

idwrpmc[100_10]
D10 in PMC area is used for indirect data.
D10(adrtype)  =  9
D11,12(snumber)  =  100
D13(datatype)  =  2
D14,15,16,17(data)  =  123 (0 is specified at the ten keys input.)

idwrpmc[200_100]
#100 in custom macro variable is used for indirect data.
#100(adrtype)  =  9
#101(snumber)  =  100
#102(datatype)  =  2
#103(data)  =  123 (0 is specified at the ten keys input.)

idwrpmc[300_10000]
#10000 in P code variable is used for indirect data.
#10000(adrtype)  =  9
#10001(snumber)  =  100
#10002(datatype)  =  2
#10003(data)  =  123 (0 is specified at the ten keys input.)
This chapter describes how to use FANUC PICTURE together with customer-created application software that uses the C executor.
4.1 SOFTWARE REQUIRED FOR C APPLICATION DEVELOPMENT

The following software programs are required to use FANUC PICTURE together with the C executor. They must be prepared by the machine tool builder.

1. C executor

   C application development requires the C executor library suitable to the CNC model used, as well as the C executor option on the target CNC.

2. C compiler

   (The following is an excerpt from the C executor manual.)
   - For Series 16i/18i/21i, Power Mate i-D/H
     Microsoft C compiler (MS-C) Ver. 6, Ver. 7, or Ver. 8 (either Japanese or English version). MS-C (Microsoft Visual C/C++) of versions other than Ver. 6/Ver. 7/Ver. 8 cannot be used
   - For Series 30i/31i/32i
     Use the WindRiver Diab C/C++ Power-PC compiler.

3. Linker. (The following is an excerpt from the C executor manual.)

   - For Series 16i/18i/21i, Power Mate i-D/H
     Systems&Software Link&Locate PM or Link&Locate 386. (Link&Locate PM and Link&Locate 386 refer to the same product.) The linker xlink386 and the librarian xlib386 contained in Link&Locate PM/386 are used. The versions of the xlink386 that can be used (confirmed to operate properly) are as follows:
     xlink386 Ver.2.0, 2.2a, 2.5a
     Note that xlink386 Ver.1.6 and Ver.1.6b cannot be used to develop C executor applications. It has been confirmed that Ver.2.1 may not be capable of establishing links normally.
   - For Series 30i/31i/32i
     Use the linker attached to the WindRiver Diab C/C++ Power-PC compiler.

4. Personal computer DOS environment

   (The following is an excerpt from the C executor manual.)
   - For Series 16i/18i/21i, Power Mate i-D/H
     C executor applications can be developed on MS-DOS (or PC-DOS or IBM-DOS). The DOS prompt of Windows can also be used.
     DPMI is required to run MS-C Ver.7. The linker xlink386 requires VCPI or DPMI.
     VCPI: Virtual Control Program Interface
     DPMI: DOS Protected Mode Interface
Both are interface specifications required for DOS application to gain access to expanded memory. Therefore, the memory manager used on DOS must support either VCPI or DPMI. Be sure to use either of the following memory managers. (Enclosed in parentheses are the interfaces supported by each memory manager.)

**PC-9800 series PCs**
- Memory Server (VCPI, DPMI) of IO Data Kiki Sha
- Meleware (VCPI) of Melco

**IBM PCs or compatibles**
- EMM386.EXE supplied with DOS(VCPI) of Microsoft or IBM
- QEMM386 (VCPI, DPMI) of Quarterdeck Office Systems
- 386MAX (VCPI, DPMI) of Qualitas

Both PC-9800 series PCs and IBM PCs or compatibles

DOS prompt of Windows 2000/XP

If using MS-C Ver.7, prepare an environment supporting DPMI; if MS-C Ver.6 or MS-C Ver.8, prepare an environment supporting VCPI or DPMI.

(5) Reference

- For Series 16i/18i/21i, Power Mate i-D/H

The development environment of the FANUC PICTURE library is as follows:
- Microsoft C compiler Ver.7.00
- Link&Locate PM/386(xlink386) Ver.2.0b
4.2 CREATION OF APPLICATIONS USING TASKS

(1) Main task

The main function exists in the FANUC PICTURE library. The outline of the FANUC PICTURE library is as follows.

```
<table>
<thead>
<tr>
<th>Initialization</th>
<th>Screen display</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Action monitor</td>
</tr>
<tr>
<td></td>
<td>Screen switch check</td>
</tr>
<tr>
<td>(Switching)</td>
<td>Error check</td>
</tr>
<tr>
<td>(Error)</td>
<td>End</td>
</tr>
</tbody>
</table>
```

From within the FANUC PICTURE library, predetermined functions are called at the following locations. Patterns (UserFunc.c) of the following functions are supplied so that the machine tool builder can make the necessary modifications to them for use.

<table>
<thead>
<tr>
<th>Location in which to call</th>
<th>Function name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of the power (initialization)</td>
<td>void User_Pon_Func(void)</td>
</tr>
<tr>
<td>Start of screen display (always before screen display)</td>
<td>void User_Dsp_Func(void)</td>
</tr>
<tr>
<td>End of screen display (always after screen switching)</td>
<td>void User_Clr_Func(void)</td>
</tr>
<tr>
<td>All-time call (during action monitoring)</td>
<td>void User_All_Func(void)</td>
</tr>
</tbody>
</table>

From those controls that can call FANUC PICTURE functions, functions created by the machine tool builder must be specified in properties. A specified function is called with char* as an argument(Note 1) during FANUC PICTURE library action monitoring by registering its function name(User_Pon(Func) when the power is turned on, using the following function. The argument must be analyzed in each function created by the machine tool builder that has been called.

```
long SetUserFunc(char *funcname, void (*funcadrs)())
  char *funcname : Function name (of up to 30 characters, the first four characters of which is fixed to “usr ”.)
  void (*funcadrs)() : Function pointer
  Return value : 0 Normal termination
                -1 Not enough space to register the function name (memory allocation failure)
                -2 Invalid function name (not beginning with “usr_”)```

- 354 -
-3 Too long function name
(exceeding 30 characters)

NOTE
1 Pointer to the argument character string specified
   with a function call control.
   If user_Func[123_456] is specified with a function
   call control, a pointer to the character string
   “123_456” is passed as an argument and,
   therefore, create a function with “usr_Func(char*)”.

Notes:
• The function name must always start with the four characters
  “usr_”.
• The maximum number of characters in a function is 40, including
  those in the argument section.
• No blanks can be used to specify an argument with a function
  call control.
• An argument must always be enclosed in “[“ and “]”.
• For a read function in a ten-key pad call control, create the
  function as one that returns the data value that has been read.
  Example: Function to return a custom macro variable value
  long usr_rmacro(char *param)
  {
    int ret;
    struct odbpm buf;
    int num;
    // Analysis of param
    // For example,
    // decide the common variable number (num)
    ret = cnc_rdsmacro(num, 10, buf);
    if (ret != 0) {
      // Error handling
    }
    return buf.mcr_val;
  }
• For a write function in a ten-key pad call control, the function is
  called with the unsigned long argument added to the write
  function argument specified with ten-key pad call control.

Example 1
Calling a user function with only a write data argument
Create a user function with usr_wmacro(unsigned long data).
Specify usr_wmacro[] as the write function specification in the
ten-key pad control.
The function is called with usr_wmacro (data) from the ten-key
call control. (data is the input value from the ten-key pad.)
Example 2
If an argument other than write data is required in a user function
Create a user function with `usr_wmacro(char *param, unsigned long data)`.
Specify `usr_wmacro[param]` as the write function specification in
the ten-key pad call control.
The function is called with `usr_wmacro(param, data)` from the
ten-key pad call control.
(data is the input value from the ten-key pad.)

```c
void usr_wmacro(char *param, unsigned long data)
{
    int ret;
    int dec;
    int num;
    // Analysis of param
    // For example, decide the common variable number (num)
    // and number of decimal places (dec).
    ret = cnc_wrmacro(num, 10, data, dec);
    if (ret != 0) {
        // Error handling
    }
}
```

(2) **Communication task, alarm task, window task, and high-level task**
The main function of each task must be created by the machine tool
builder.
From the main function created by the machine tool builder, the
functions necessary to run the FANUC PICTURE library must be
called.
Currently, the functions necessary to run FANUC PICTURE are as
follows.

<table>
<thead>
<tr>
<th>Task name</th>
<th>Function name</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication task</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Alarm task</td>
<td>void Fanuc_Alarm_Task_Init(void)</td>
<td>Optimum period 128ms</td>
</tr>
<tr>
<td></td>
<td>void Fanuc_Alarm_Task_Main(void)</td>
<td></td>
</tr>
<tr>
<td>Window task</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>High-level task</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Currently, those tasks for which no function names are listed do not
require any functions to run the FANUC PICTURE library. Tasks that
require functions may be added in the future due to upgrades.
A pattern (Back1.c) of the alarm task main function is supplied so that the machine tool builder can make the necessary modifications to it for use.

**NOTE**

1. A pattern of the communication task main function (Back2.c) is supplied to develop C executor applications.
2. If the time required to process the above tasks increases, the execution speed of the touch panel screen of the main task will be affected severely. The alarm task must be designed to be processed in a short time so that the main task can use as much time as possible.

(3) Linking the FANUC PICTURE library

The following two types of FANUC PICTURE library must be prepared by the machine tool builder.

A pattern (Makefile) of the make file is supplied so that the machine tool builder can make the necessary modifications to it for use.

The files that must be linked may be changed due to upgrades. In this case, the make file pattern is changed. The changes must be reflected in the make file created by the machine tool builder.

For MS-C development

- FPTASK1.LNK  Library for the main task
- FPTASK3.LNK  Library for the alarm task

4.3 DRAM AND SRAM

The machine tool builder must prepare DRAM and SRAM in accordance with the specifications of the C executor. The FANUC PICTURE library requires these RAM areas to run and, therefore, the machine tool builder must add the necessary RAM definitions to the supplied patterns (Dramver.c and Sramver.c).

The size that the FANUC PICTURE library requires may increase due to upgrades. In this case, the patterns are changed. The changes must be reflected in the source files created by the machine tool builder.
4.4 NOTES AND RESTRICTIONS

The following items may be added due to upgrades:

- The operating environment of FANUC PICTURE runs with the following settings:
  Settings of the method of switching between CNC and user screens (crt_setswt)
  - CNC software cannot recognize the function keys on the MDI panel.
  - Whether to automatically switch to an alarm screen of the NC if an alarm occurs while a CNC screen is displayed is determined with the user screen.
  - Switching from a user screen to a CNC screen is prohibited.
  Setting of CRT display mode (crt_setmode)
  - VGA display 80-column-by-30-row mode.
  - Reduced display is accomplished using a 14-inch font with 9-inch VGA.
  Setting of video mode (_setvideomode)
  - Size 640 × 480, palette of 256 colors (PC-AT)
  Setting of all palettes (_remapallpalette)
  - The palette created with FANUC PICTURE (MEM generation), which is a tool on the PC, is set.

The environment described above must not be changed in the functions created by the machine tool builder. Otherwise, the FANUC PICTURE library will not run normally.

The following color number acquisition function is supplied for graphic processing purposes:

short GetPaletteNumber(short nBlue, short nGreen, short nRed)
short nBlue : Value of B of an RGB color
short nGreen : Value of G of an RGB color
short nRed : Value of R of an RGB color
Return value : Color number

- The following functions are controlled by FANUC PICTURE. Do not use them in the functions created by the machine tool builder.
  crt_setuserscrn Registers the screen number of a user screen.
  crt_setuserskey Customizes the soft keys on a CNC screen.
  crt_cncscrn Switches to a CNC screen.

- Function key input is monitored by the action monitor portion shown in the figure in (1) in Section 4.2. When controlling function key input using a function created by the machine tool builder, use great caution not to affect the operation of the FANUC PICTURE library.

- As the version of the C executor application displayed on the NC, a pattern containing the version of FANUC PICTURE (Version.c) is supplied. Subsequent management must be performed by the machine tool builder.
• In the FANUC PICTURE library, graphic pages 0, 1, and 2 are used with a "crt_setgraphpage(-2)" declaration. Do not use the graphic pages in the functions created by the machine tool builder.

• If the user uses Version.c, the user can obtain the version information for the FANUC PICTURE driver, using the following function:
  
  ```
  char* GetDrvVersion()
  Returns a pointer to the version character string of the FANUC PICTURE driver.
  ```
4.5 COMBINATION OF USER APPLICATION FOR Series 30i

4.5.1 Outline

FANUC PICTURE is a software application for C language executors. Therefore, a user-created application for C language executors (referred to below as a user application) and FANUC PICTURE cannot be used at the same time on one CNC unit without alteration. By converting FANUC PICTURE into a library (referred to below as the FP library) and then combining it with a user application to execute two C language executor applications as one application (referred to below as a combined application), a user application and FANUC PICTURE can be used together.

This subsection describes how to develop a combined application for the Series 30i/31i/32i.

4.5.2 Content of Files

[FPLink30]
MAKE.BAT Compilation, Link, Batch file for MEM file generation.

[FPLink30\FPLib]
FANUC PICTURE file related to library
FPMAINLIB.A  FP library 1 for the main task
FJPEGLIB.A  FP library 2 for the main task
FPSUBLIB.A  FP library for the alarm task
FPDRAM.C  Defined file of DRAM variables used by FANUC PICTURE
DRAMVER.H  Declared file of DRAM variables used by FANUC PICTURE
FPSRAM.C  Defined file of SRAM variables used by FANUC PICTURE
SRAMVER.H  Declared file of SRAM variables used by FANUC PICTURE
CMNSTRUCT.H  Defined file of the symbols used by FANUC PICTURE
DEFCONST.H  Defined file of the symbols used by FANUC PICTURE
VARTYPE.H  Defined file of the symbols used by FANUC PICTURE
CEXE_DEF.H  Definition file of symbol used with FANUC PICTURE
CMMNTOOL.H  Definition file of symbol used with FANUC PICTURE
FS30ICEX.H  Definition file of symbol used with FANUC PICTURE
FS30IDEF.H  Definition file of symbol used with FANUC PICTURE

[FPLink30\UserSample]
Sample application of C language executor
4.5.3 Preparation for Development Environment

First, install the C language executor development environment. For the procedure, refer to the manual of the C language executor. Copy the FPLib folder of the FP library and the UserSample folder of the C language executor samples to the C language executor development folder (same level as LIB, INC, and TOOL).

4.5.4 Interface between FANUC PICTURE and C Language Executor

Create a dummy parent screen for FANUC PICTURE and call a user function for user screen display to allow coexistence of a user-created screen display application and FANUC PICTURE.

(1) Calling a user function for user screen display from the FANUC PICTURE screen
Create a dummy screen and paste the parent screen control and value/character display control.
Make the settings of the value/character display control as follows:
[Action] tab
- Action Type: “1:function”
- Function Name: “usr_Dispxxx[param]”
  param: Argument character string of function
  (Maximum 40 characters, the blank cannot be used.)
- Display Check Box: No check
(2) User function for user screen display
(a) User function name
The first eight characters of the name of a user function for user screen display must be "usr_Disp" to separate it from the other user functions.
Example) usr_DispSample()

(b) Return value of user function
As the return value of the user function, specify the screen to which the previous screen is switched.
For the CNC screen, specify either the CNC screen number or the key code of the screen switching MDI key. When specifying the MDI key, add a value of 0x10000000 to the return value.
For the FANUC PICTURE screen, add a value of 0x20000000 to the screen number.
Example1) To make switching to the system diagnosis screen
   return (CRT_SYS_DGN);
Example2) To make the same screen switching as if MDI key [POS] were pressed
   return (0x10000000 | MDIKEY_POS);
Example3) To make switching to FANUC PICTURE screen 3
   return (0x20000000 | 3);

(c) Processing structure of user function
A user function for user screen display must have a structure in which a loop is always made within the function while the screen is displayed and the function is terminated with a return value indicating the switching destination screen number when the user screen is cleared.

usr_DispSample()
   ↓
Initialization of display
   ↓
Update of display
   ↓
Screen change demand?  No
   ↓
Yes
Termination of display
   ↓
RETURN/ The screen number switched after the return is returned.
(d) Library function which cannot be used by user function
The following functions cannot be used in a user function for user screen display.

- `crt_setswt()`
- `crt_setuserscrn()`
- `crt_setuserskey()`
- `crt_cncscrn()`

(3) Registration of user function
Registration of a user function for user screen display is added to the `User_Pon_Func()` function of `USERFUNC.C`. The `SetUserFunc()` function is used to register a user function.

## Example
Registration of user function
```
void User_Pon_Func(void)
{
    long ret;
    ret = SetUserFunc("usr_DispSample", usr_DispSample);
    switch (ret) {
        case UFUNCERR_ALOC:
            // Error processing
            break;
        case UFUNCERR_NAME:
            // Error processing
            break;
        default:
            break;
    }
    return;
}
```
### Function specification of SetUserFunc()

**[Function]**
Registers a user function.

**[Format]**
```
long SetUserFunc(char *funcname, void (*funcadrs)())
```

**[Arguments]**

- `funcname` Registered user function name
  A function name must begin with "usr_" and be 30 characters or less.

- `funcadrs` Pointer of registered user function

**[Return value]**

- 0 normal return
- -1 The result failed in the reservation of the registered area.
- -2 The user function name is not correct.
- -3 The user function name exceeds 30 characters.

**[Attention]**
The first eight characters of a user function for user screen display must be "usr_Disp".
When a user function with a name other than "usr_DispXXX" is registered, screen switching or other processing is not correctly performed because the function is treated as a normal user function.

### 4.5.5 Making of Screen Data of FANUC PICTURE

1. **Making of project**
   - Newly creates a project for FANUC PICTURE.
   - For the creation procedure, refer to the manual of FANUC PICTURE.

2. **Making of parent(=base) screen of dummy**
   - Newly creates a dummy parent screen and pastes the parent screen control.
   - The screen name is entered with the property of the parent screen control.

3. **Putting of Numeral/Character String Indication Control**
   - Pastes the value/character display control on a dummy parent screen.
   - On the property action definition tab, the setting for calling a user function for user screen display is made.

4. **Setting for making MEM file**
   - Selects MEM file generation in the FANUC PICTURE menu.
   - CNC screen assignment to the user screen is made as shown below.

   **Setting user screen**
   - **Softkey Number:** CNC screen number to which the user screen is assigned
   - **Key Caption:** Display character string of software key to user(=custom) screen
   - **Select flag:** Check on
   - **[FP Parameter]**
     - **Rule of the screen Switch:** Set to “0”
       - The NC screen switch rule is followed.

5. **Making of MEM file**
   - Upon completion of the above settings, select OK to perform MEM generation.
4.5.6 Making of Combining Application Program

4.5.6.1 Combining of the main task

(1) Create a user function for user screen display.

(2) Add registration of the user function to USERFUNC.C.

(3) Add the source files configuring TASK1.
   In CEXE.MAK in the UserSample folder, the FP libraries
   (USERFUNC.O, ..\FPLIB\FPJPEGLIB.A, ..\FPLIB\FPMAINLIB.B.A) are defined as TASK1.
   Example)
   Addition of USERMAIN.O USERSCRN.O
   TASK1=USERFUNC.O ..\FPLIB\FPJPEGLIB.A ..\FPLIB\FPMAINLIB.A\USERMAIN.O USERSCRN.O

4.5.6.2 Combining of alarm task

Add processing of the alarm task for user applications to BACK1.C.
In CEXE.MAK in the UserSample folder, the FP library
(FPSUBLIB.O) is added to TASK3.
   TASK3 = BACK1.O ..\FPLIB\FPSUBLIB.A

(1) User_Alarm_Task_Init() function
   Add the initialization of the alarm task of the user application
   program.

(2) User_Alarm_Task_Main() function
   Add the processing of the alarm task of the user application
   program.

The longer the processing time of the alarm task is, the lower the
display speed of the main task and the response of key input become.
Therefore, it is necessary to allocate as much CPU time as possible to
the main task during design.
Even when the alarm task is not used by a user application, be sure to
specify "BACK1.OBJ" for "TASK3=" of MAKEFILE.

4.5.6.3 Combining of communication task

Add processing of the communication task for a user application to
BACK2.C.
The longer the processing time of the communication task is, the
lower the display speed of the main task and the response of key input
become. Therefore, it is necessary to allocate as much CPU time as
possible to the main task during design.
Even when the communication task is not used by a user application,
be sure to specify "BACK2.OBJ" for "TASK2=" of MAKEFILE.
4.5.6.4 Combining of window task

Add processing of the window tasks for a user application to TASK4.C.
Since the window task is not used by FANUC PICTURE, it is possible to design it freely.
When the window task is not used, do not specify an object for "TASK4=" of MAKEFILE.

4.5.6.5 Combining of high-level task

Add processing of the high level task for a user application to TASK5.C.
Since the high level task is not used by FANUC PICTURE, it is possible to design it freely.
When the high level task is not used, do not specify an object for "TASK5=" of MAKEFILE.

4.5.6.6 Combining of common variable (DRAM variable and SRAM variable)

(1) Combining of DRAM variable
Add the definitions of DRAM variables for a user application to DRAMVER.C.
Before using DRAMVER.C, copy it from the TEMPLATE folder to the working folder.

(2) Combining of SRAM variable
Add the SRAM variable definition for a user application to SRAMVER.C.
Before using SRAMVER.C, copy it from the TEMPLATE folder to the working folder.
4.5.6.7 Making of memory card form file (*.MEM)

Edit the CEXE.MAK file according to the configuration of a combined application, open the Windows command prompt, and execute MAKE.BAT.

Defined in MAKE.BAT are the FP libraries and the object names (FPMAINLIB.A, USERFUNC.O, BACK1.O, BACK2.O, etc.) of the individual tasks, which are already described above.

By performing MAKE with the MAKEFILE, the memory card form file of the combined application is created.

## Example) MAKEFILE for combining application program making ##############

#-----------------------------------------------------------------------
# Task definition block. Modify here for your application.  
#----------------------------------------------------------------------

TASK1=USERFUNC.O
USERMAIN.O ..\FPLIB\FJPJEGLIB.A ..\FPLIB\FPMAINLIB.A
TASK2 = BACK2.O
TASK3 = BACK1.0 ..\FPLIB\FPSUBLIB.A
TASK4 = TASK4.O
TASK5 = TASK5.O

# Select one of the following FROMSIZE variables according to F-ROM size.  
# Remove the leading comment mark (#) of the selected FROMSIZE variable.

#FROMSIZE = 0_5M # MEMORY CARD 0.5MB  
#FROMSIZE = 1_0M # MEMORY CARD 1.0MB  
#FROMSIZE = 2_0M # MEMORY CARD 2.0MB  
#FROMSIZE = 3_0M # MEMORY CARD 3.0MB  
#FROMSIZE = 4_0M # MEMORY CARD 4.0MB  
#FROMSIZE = 5_0M # MEMORY CARD 5.0MB  
#FROMSIZE = 6_0M # MEMORY CARD 6.0MB
taskجار

###############################################################################
This chapter describes the memory sizes that the various controls provided by FANUC PICTURE consume on the CNC, as well as restrictions and notes.
## 5.1 MEMORY SIZES OF CONTROLS

Amounts of memory used by the controls on screens created with FANUC PICTURE

<table>
<thead>
<tr>
<th>Use of basic memory, control name</th>
<th>Amount of memory used</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP driver</td>
<td>1800Kbyte</td>
<td></td>
</tr>
<tr>
<td>Temporary work area/maximum per popup screen *1</td>
<td>310Kbyte</td>
<td></td>
</tr>
<tr>
<td>Temporary work area/JPG display, maximum *1</td>
<td>620Kbyte</td>
<td></td>
</tr>
<tr>
<td>Temporary work area/BMP display, maximum *1</td>
<td>310Kbyte</td>
<td></td>
</tr>
<tr>
<td>PMC screen call (if 50 screens are registered)</td>
<td>0.7Kbyte</td>
<td></td>
</tr>
<tr>
<td>Popup screen/occupied area per dot *6</td>
<td>1byte ( \times ) (total number of dots on the screen)</td>
<td></td>
</tr>
<tr>
<td>Screen switching/lighting and blinking not used</td>
<td>2.2Kbyte</td>
<td>TFPChgScrn</td>
</tr>
<tr>
<td>Screen switching/lighting and blinking not used and interlock image</td>
<td>4.0Kbyte</td>
<td>TFPChgScrn</td>
</tr>
<tr>
<td>Screen switching/lighting and blinking used</td>
<td>6.4Kbyte</td>
<td>TFPChgScrn</td>
</tr>
<tr>
<td>Screen switching/lighting and blinking used and interlock image</td>
<td>7.7Kbyte</td>
<td>TFPChgScrn</td>
</tr>
<tr>
<td>Screen switching/lighting and blinking used and no action &amp; interlock image</td>
<td>9.5Kbyte</td>
<td>TFPChgScrn</td>
</tr>
<tr>
<td>Button</td>
<td>2.2Kbyte</td>
<td>FPButton</td>
</tr>
<tr>
<td>Button and interlock image</td>
<td>4.0Kbyte</td>
<td>FPButton</td>
</tr>
<tr>
<td>Button and no action &amp; interlock image</td>
<td>5.8Kbyte</td>
<td>FPButton</td>
</tr>
<tr>
<td>Framed button/momentary (with no lamp) *4</td>
<td>2.2Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/momentary (with no lamp) and interlock image</td>
<td>4.0Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/momentary (with lamp + with blinking) *4</td>
<td>2.9Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/momentary (with lamp + with blinking) and interlock image *4</td>
<td>3.2Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/momentary (with lamp + without blinking) *4</td>
<td>2.1Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/momentary (with lamp + without blinking) / and interlock image *4</td>
<td>2.5Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/alternate (with blinking) *4</td>
<td>2.6Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/alternate (with blinking) and interlock image</td>
<td>3.0Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/alternate (without blinking) *4</td>
<td>1.0Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/alternate (without blinking) and interlock image *4</td>
<td>1.4Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/actuator (with blinking) *4</td>
<td>2.9Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/actuator (with blinking) and interlock image *4</td>
<td>3.2Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/actuator (without blinking) *4</td>
<td>2.1Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/actuator (without blinking) and interlock image *4</td>
<td>2.5Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Framed button/actuator (with blinking) and no action &amp; interlock image *4</td>
<td>4.0Kbyte</td>
<td>TFPOpBtn</td>
</tr>
<tr>
<td>Clock</td>
<td>0.4Kbyte</td>
<td>FPClock</td>
</tr>
<tr>
<td>Graph/scale</td>
<td>0.9Kbyte</td>
<td>FPGraph</td>
</tr>
<tr>
<td>Graph/bar graph</td>
<td>0.05Kbyte</td>
<td>FPGraph</td>
</tr>
<tr>
<td>Image display</td>
<td>0.04Kbyte</td>
<td>FPImage</td>
</tr>
<tr>
<td>Lamp/1 on color</td>
<td>2.7Kbyte</td>
<td>FPLamp</td>
</tr>
<tr>
<td>Lamp/7 on colors + blinking</td>
<td>2.7Kbyte</td>
<td>FPLamp</td>
</tr>
<tr>
<td>Lamp/7 on colors + blinking and no action image</td>
<td>5.0Kbyte</td>
<td>FPLamp</td>
</tr>
<tr>
<td>Meter/bar meter (if the number of divisions is 10)</td>
<td>0.9Kbyte</td>
<td>FPMeter</td>
</tr>
<tr>
<td>Meter/sector meter (if the number of divisions is 10)</td>
<td>1.1Kbyte</td>
<td>FPMeter</td>
</tr>
<tr>
<td>Label</td>
<td>0.9Kbyte</td>
<td>FPLabel</td>
</tr>
<tr>
<td>Numeral/character string display (with no background color changes)</td>
<td>1.0Kbyte</td>
<td>FPNDisp</td>
</tr>
<tr>
<td>Numeral/character string display (7 background colors)</td>
<td>2.0Kbyte</td>
<td>FPNDisp</td>
</tr>
<tr>
<td>Numeral indication control for calling a ten-key pad (with no background color changes)</td>
<td>1.9Kbyte</td>
<td>TFPInput</td>
</tr>
</tbody>
</table>
### Use of basic memory, control name

<table>
<thead>
<tr>
<th>Use of basic memory, control name</th>
<th>Amount of memory used</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeral indication control for calling a ten-key pad (with no background color changes) and check function</td>
<td>3.3Kbyte</td>
<td>TFPInput</td>
</tr>
<tr>
<td>Numeral indication control for calling a ten-key pad (7 background colors)</td>
<td>3.3Kbyte</td>
<td>TFPInput</td>
</tr>
<tr>
<td>Numeral indication control for calling a ten-key pad (7 background colors) and check function</td>
<td>3.3Kbyte</td>
<td>TFPInput</td>
</tr>
<tr>
<td>Numeral indication control with key input</td>
<td>1.9Kbyte</td>
<td>FPIInput</td>
</tr>
<tr>
<td>Numeral indication control with key input and check function</td>
<td>3.3Kbyte</td>
<td>FPIInput</td>
</tr>
<tr>
<td>Key input buffer</td>
<td>1.0Kbyte</td>
<td>FPKylnBf</td>
</tr>
<tr>
<td>MDI key</td>
<td>2.9Kbyte</td>
<td>FPKey</td>
</tr>
<tr>
<td>PMC area character string indication/ if half-size 40 characters are specified</td>
<td>2.9Kbyte</td>
<td>FPPMCStrDisp</td>
</tr>
<tr>
<td>PMC area character string display (with a popup screen)</td>
<td>*2, *3</td>
<td>FPPMCStrDisp</td>
</tr>
<tr>
<td>MDI keyboard/numeral keyboard</td>
<td>26.4Kbyte</td>
<td>FPKeybord</td>
</tr>
<tr>
<td>MDI keyboard/command keyboard</td>
<td>26.4Kbyte</td>
<td>FPKeybord</td>
</tr>
<tr>
<td>MDI keyboard/alphabetic keyboard</td>
<td>30.7Kbyte</td>
<td>FPKeybord</td>
</tr>
<tr>
<td>Text character string display (1-phrase display, display width of 70 characters)</td>
<td>1.3Kbyte</td>
<td>FPTxtMsg</td>
</tr>
<tr>
<td>Composite message indication (1 line, display width of 70 characters)</td>
<td>7.8Kbyte</td>
<td>FPTxtMsgLst</td>
</tr>
<tr>
<td>Composite message indication (32 lines, display width of 70 characters)</td>
<td>13.7Kbyte</td>
<td>FPTxtMsgLst</td>
</tr>
<tr>
<td>Composite message display (telop)</td>
<td>9.2Kbyte</td>
<td>FPTxtMsgLst</td>
</tr>
<tr>
<td>History message indication control *5</td>
<td>3.6Kbyte</td>
<td>FPHistory</td>
</tr>
</tbody>
</table>

*1 1 K byte is equal to 1024 bytes.

*2 Of the three work areas, the largest one must be reserved.

*3 The amount of memory used by the components created in the popup screen is not included.

*4 The button shape is “23:Rectangle with lamp” is specified.

*5 Added on Edition 4.00 or later. Because of this, an S-RAM space of about 15 Kbytes is constantly used as a history record area.

---

**Character type**

<table>
<thead>
<tr>
<th>Character type</th>
<th>Soft keys (10+2)</th>
<th>Soft keys (5+2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Height</td>
</tr>
<tr>
<td>ANK</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>X2</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>X4</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>X6</td>
<td>24</td>
<td>32</td>
</tr>
<tr>
<td>SMALL</td>
<td>8</td>
<td>8</td>
</tr>
</tbody>
</table>

The size of each character type is given in the table above.
*6 The maximum rectangular size × 1 byte is required for the display screen on the second layer of the pop-up screen.

Method of estimation:
Find the sum of the FP driver, the largest temporary work area, the popup screen display area (dot/byte), and the memory size of the control to be placed on the screen to be developed × total number of screens. The size must not exceed the main CPU custom size (A02B-XXXX-J738#XX). When touch panel C option is used, the total od DRAM is 6Mbyte or less.

Amount of F-ROM space used by a screen created with FANUC PICTURE
The maximum amount of F-ROM space that can be used is the same as the main custom size. For touch panel C (Series 16i/18i/21i) and the touch panel (Power Mate i-D/H) option, up to 6 Mbytes is available, and subtracting 2 MBytes for use by FP driver software, 4 Mbytes will be the custom screen data size (CEX0FPDT.MEM or FPF0FPDT.MEM size). Depending on the ordering specifications of modules, the actual total F-ROM size varies in 8- or 16-Mbyte units, and there may be cases in which FANUC PICTURE custom screen data exceeding 4Mbytes can be written. According to the basic specifications for using FANUC PICTURE, however, the size is 4 Mbytes.
### 5.2 Restrictions, Cautions

<table>
<thead>
<tr>
<th>Restriction or Note</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests of connecting the touch panel operator’s panel to the CNC/PMC must be conducted after storing FP driver software and screen data to the CNC.</td>
<td>If getting a target CNC ready, select a DRAM/FROM module slightly larger than necessary. For frequently used screens, store screen data; for infrequently used ones, free memory.</td>
</tr>
<tr>
<td>If you select to store screen data, the screen data must not exceed the main custom size. Otherwise, a shortage of memory is reported with an alarm when a screen is displayed on the CNC screen. If not all screens can be stored in memory, all screens may be displayed by specifying whether to free memory for each screen.</td>
<td></td>
</tr>
<tr>
<td>If you specify that memory should be freed for a created screen, this screen is displayed more slowly than if a screen stored in DRAM memory is displayed because the necessary data is read from FROM to display that screen.</td>
<td></td>
</tr>
<tr>
<td>If many controls that perform dynamic operation, such as lamp, button, character string, and numeral indication controls, are used on the touch panel, response will be slow because the display update period increases. If this occurs, reduce the number of controls used so that the operator does not feel stress in touch panel operation.</td>
<td>If getting a target CNC ready, specify a high-speed CPU card.</td>
</tr>
<tr>
<td>The maximum number of work files that can be generated during MEM generation is 5000. If a dialog box indicating this appears, reduce the total number of controls in the project.</td>
<td></td>
</tr>
<tr>
<td>Only one key input buffer control can be used in the parent and child screens on a single screen. Only one clock control can be used on one screen. Only one screen definition control can be used on one screen.</td>
<td></td>
</tr>
<tr>
<td>On the character string setting popup screen of a PMC character string indication control, numeral indication controls with key input cannot be used.</td>
<td></td>
</tr>
<tr>
<td>The maximum allowable total number of buttons and numeral indicators (including those with popup ten-key pad input and with key input) per parent or child screen is 200.</td>
<td></td>
</tr>
<tr>
<td>Input and output signals to and from a control can be specified in the property setting items such as X, Y, F, and G. In reality, there are some that cannot be written from the touch panel operator’s panel because of signal characteristics. Thus, select a proper signal area considering these characteristics.</td>
<td></td>
</tr>
<tr>
<td>If FANUC PICTURE is used together with C applications, too much load on alarm task processing affects the screen display speed of the main task. The customer is responsible for the necessary design and adjustment to avoid this.</td>
<td></td>
</tr>
<tr>
<td>A user-defined function call affects the screen display speed. The customer is responsible for the necessary design and adjustment to avoid this.</td>
<td></td>
</tr>
<tr>
<td>If a popup ten-key pad or a popup screen is displayed, only the popup screen section last displayed is active. The service on the called screen in the background is stopped.</td>
<td></td>
</tr>
<tr>
<td>If controls whose color or shape change due to the on/off states of signals, as well as numeral/character string indication controls, overlap with each other, the overlapping section will be painted by the display changes. Remove any overlapping of competing controls.</td>
<td></td>
</tr>
</tbody>
</table>
### Restriction or note

<table>
<thead>
<tr>
<th>Restriction or note</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>If a custom screen is displayed using the CNC screen display function, 0x000/Position-Absolute cannot be used as the screen number to be assigned to the custom screen. 0x000 is reserved for the initial screen on the CNC screen display.</td>
<td></td>
</tr>
<tr>
<td>The interlock signals located on the PMC area character string indication control and the numeral indication control with key input are those effective both to calling a pop-up screen for input and to data input.</td>
<td></td>
</tr>
<tr>
<td>For the telop display of the composite message indication control, the maximum allowable total number of characters of a concatenated paragraph is 80. Operation cannot be guaranteed for a specification exceeding 80 characters.</td>
<td></td>
</tr>
<tr>
<td>The display speed for SMALL and x4 characters are lower than that for ANK, x2, and x6 characters. If a large number of SMALL and 4x characters are used on a single screen, the display speed of the entire screen will be lower. On display link displays, in particular, the effect on the display speed will increase because large amount of data converges at once. For the Series 30i, the restriction is not imposed on x4 characters.</td>
<td>Use SMALL and x4 characters only where necessary and use ANK, x2, and x6 characters where possible.</td>
</tr>
</tbody>
</table>
### 5.3 DIFFERENCES FROM FANUC PICTURE OF OLD VERSION

The differences from FANUC PICTURE/A08B-9010-J514#ZZ11 of the old version are described below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Specifications of the old product (A08B-9010-J514#ZZ11)</th>
<th>Specifications of the new software product (A08B-9010-J518#ZZ11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pop-up screen area specification</td>
<td>The rectangle of the screen structure definition control serves as a displayable area. The background of the rectangle is transparent, and base screen data is displayed in an area where no control is placed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The rectangle of the screen structure definition control serves as a displayable area as with the old FP. However, the background of the rectangle is filled using the screen background color specified by the screen set control. So, the pop-up rectangle area is filled using the screen background color specified by the screen set control, so that no base screen data remains displayed in the periphery and in an area within the rectangle where no control is placed.</td>
</tr>
<tr>
<td>2</td>
<td>Acquisition of screen data stored in the F-ROM</td>
<td>Screen data stored in the F-ROM is expanded to the internal format and acquired when a screen call is first generated. Whether to save or discard data acquired in the internal format can be set using a property.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When the power is turned on, all of the FP driver software and screen data files related to FANUC PICTURE are read from the F-ROM to the D-RAM. Then, when a screen call is first generated, the screen data is expanded to the internal format and acquired. The specification for saving/discarding data acquired in the internal format is the same as for FP of the old version.</td>
</tr>
<tr>
<td>3</td>
<td>Size of a created screen</td>
<td>With FANUC PICTURE supporting the Series 30i, the size of the FP driver and the custom screen display method differ from those of FANUC PICTURE of the old version to achieve full screen display performance. So, note that the specifications of the new version do not guarantee that the number of screens displayable with FANUC PICTURE of the old version can be displayed. If data in the internal format cannot be saved due to a shortage of memory, all screens can be made displayable by using the function for freeing the data storage area.</td>
</tr>
</tbody>
</table>
APPENDIX
This appendix explains error messages.

Error messages displayed while an application is running under CNC

- **Cannot open screen for the above reason**
  For the reason indicated, a screen change failed.

- **CRT file error !!**
  A screen data file contains invalid data. Recreate the definition data file and screen data file by using FANUC PICTURE.

- **Function name is illegal !!**
  In the function action definition for a special key or soft key, an invalid function name is set. The functions that can be set are the four FANUC PICTURE cursor movement functions (fp_crlmv, fp_crrmv, fp_crumv, and fp_crdmv).

- **Impossible to open CRT file !!**
  A screen data file could not be opened. Check whether the screen data file set with the basic screen name in the entire screen definition is present.

- **Impossible to open file: XXXX**
  The XXXX definition data file could not be opened. Check whether the definition data file with the screen name set in the screen action definition for a special key or soft key, or the definition data file with the screen name set in FPINTENV.DAT (environment setting file), is present.

- **Impossible to open FP_PAT.DAT file !!**
  The pattern data file (FP_PAT.DAT) could not be opened. Check the settings in the CEXEC.D2M command file to see whether the pattern data file (FP_PAT.DAT) was included during the creation of a memory card file using dat2mem.com.

- **Insufficient memory**
  This error message is generated if there is no memory space enough to store a custom screen. The corrective action is to reduce the memory space occupied, by increasing the number of memory release type screens in comparison with memory storage type screens.

- **Intermediate data file name has not been defined**
  The basic screen name (text and graphic data file name) is not set in the definition data file. Using FANUC PICTURE, set the basic screen name in the entire screen definition and recreate the definition data file.

- **XXXX(YY) WARNING: Illegal data**
  There is invalid data in line YY of the XXXX definition data file. Recreate the definition data file by using FANUC PICTURE.
It is a screen number for which “O” mark of each CNC device can be used in the following correspondence tables. The screen numbers of “X” mark cannot be used with the CNC device.
### B.1 FOR Series 16i/18i/21i/ Power Mate i

#### <POSITION>

<table>
<thead>
<tr>
<th>CNC screen number</th>
<th>Screen</th>
<th>Series 16i/18i/21i-M</th>
<th>Series 16i/18i/21i-T</th>
<th>Power Mate i</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0000</td>
<td>ABSOLUTE</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0100</td>
<td>RELATIVE</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0200</td>
<td>ALL</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0300</td>
<td>HANDLE INTERRUPT</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0400</td>
<td>OPERATING MONITOR</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0500</td>
<td>C Executor 1</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0800</td>
<td>C Executor 2</td>
<td>O*1</td>
<td>O*1</td>
<td>X</td>
</tr>
<tr>
<td>0x0900</td>
<td>C Executor 3</td>
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<td>O*1</td>
<td>X</td>
</tr>
<tr>
<td>0x0a00</td>
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<td>O*1</td>
<td>X</td>
</tr>
<tr>
<td>0x0b00</td>
<td>C Executor 5</td>
<td>O*1</td>
<td>O*1</td>
<td>X</td>
</tr>
</tbody>
</table>

*1 Specifiable for the MODEL-B and later.

#### <PROGRAM>

<table>
<thead>
<tr>
<th>CNC screen number</th>
<th>Screen</th>
<th>Series 16i/18i/21i-M</th>
<th>Series 16i/18i/21i-T</th>
<th>Power Mate i</th>
</tr>
</thead>
<tbody>
<tr>
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<td>MDI PROGRAM</td>
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<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0101</td>
<td>PROGRAM</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0201</td>
<td>LIBRARY</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0301</td>
<td>CURRENT BLOCK</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0401</td>
<td>NEXT BLOCK</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0501</td>
<td>PROGRAM CHECK</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
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<td>0x0601</td>
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<td>FLOPPY DIRECTORY</td>
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<td>C.A.P.</td>
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<td>0</td>
<td>X</td>
</tr>
<tr>
<td>0x0901</td>
<td>SCHEDULE</td>
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<td>0</td>
<td>X</td>
</tr>
<tr>
<td>0x0a01</td>
<td>CYCLE TIME</td>
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<td>0</td>
<td>X</td>
</tr>
<tr>
<td>0x0b01</td>
<td>DATA SERVER DIRECTORY</td>
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<td>0</td>
<td>X</td>
</tr>
<tr>
<td>0x0c01</td>
<td>JOG</td>
<td>0</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>0x0d01</td>
<td>C Executor</td>
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<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x1200</td>
<td>C Executor 2</td>
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<td>O*1</td>
<td>X</td>
</tr>
<tr>
<td>0x1300</td>
<td>C Executor 3</td>
<td>O*1</td>
<td>O*1</td>
<td>X</td>
</tr>
<tr>
<td>0x1400</td>
<td>C Executor 4</td>
<td>O*1</td>
<td>O*1</td>
<td>X</td>
</tr>
<tr>
<td>0x1500</td>
<td>C Executor 5</td>
<td>O*1</td>
<td>O*1</td>
<td>X</td>
</tr>
</tbody>
</table>

*1 Specifiable for the MODEL-B and later.

#### <OFFSET>

<table>
<thead>
<tr>
<th>CNC screen number</th>
<th>Screen</th>
<th>Series 16i/18i/21i-M</th>
<th>Series 16i/18i/21i-T</th>
<th>Power Mate i</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0002</td>
<td>OFFSET (GEOM,WEAR)</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0102</td>
<td>SETTING PARAMETER</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0202</td>
<td>WORK COORDINATE</td>
<td>0</td>
<td>0</td>
<td>X</td>
</tr>
<tr>
<td>0x0302</td>
<td>MACRO VARIABLE</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0402</td>
<td>MENU</td>
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<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0502</td>
<td>OPERATOR'S PANEL</td>
<td>0</td>
<td>0</td>
<td>O</td>
</tr>
<tr>
<td>0x0602</td>
<td>TOOL LIFE</td>
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<td>0</td>
<td>X</td>
</tr>
<tr>
<td>0x0702</td>
<td>CHOPPING PARAMETER</td>
<td>0</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>0x0802</td>
<td>TOOL LENGTH MES.-B</td>
<td>0</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
### B.CNC SCREEN NUMBERS LIST

#### APPENDIX

<table>
<thead>
<tr>
<th>CNC screen number</th>
<th>Screen</th>
<th>Series 16/i/18/21-M</th>
<th>Series 16/i/18/21-T</th>
<th>Power Mate i</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0902</td>
<td>INTERFERENCE CHECK</td>
<td>O</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>0x0a02</td>
<td>C Executor</td>
<td>O</td>
<td>X</td>
<td>O</td>
</tr>
<tr>
<td>0x0702</td>
<td>WORK SHIFT</td>
<td>X</td>
<td>O</td>
<td>X</td>
</tr>
<tr>
<td>0x0802</td>
<td>Y-AXIS OFFSET (GEOM,WEAR)</td>
<td>X</td>
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<td>X</td>
</tr>
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<td>TOOL FORM</td>
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<td>BARRIER</td>
<td>X</td>
<td>O</td>
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</tr>
<tr>
<td>0x0b02</td>
<td>B-AXIS OFFSET</td>
<td>X</td>
<td>O</td>
<td>X</td>
</tr>
<tr>
<td>0x0c02</td>
<td>2ND OFFSET GEOMETRY</td>
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<td>X</td>
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<td>X</td>
</tr>
<tr>
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<td>O</td>
<td>X</td>
</tr>
<tr>
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<td>O *1</td>
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</tr>
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<td>O *1</td>
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<tr>
<td>0x1600</td>
<td>C Executor 5</td>
<td>O *1</td>
<td>O *1</td>
<td>X</td>
</tr>
</tbody>
</table>

*1 Specifiable for the MODEL-B and later.

---

### <SYSTEM>

<table>
<thead>
<tr>
<th>CNC screen number</th>
<th>Screen</th>
<th>Series 16/i/18/21-M</th>
<th>Series 16/i/18/21-T</th>
<th>Power Mate i</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0003</td>
<td>PARAMETER</td>
<td>O</td>
<td>O</td>
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</tr>
<tr>
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<td>DIAGNOSE</td>
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<tr>
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<td>PMC</td>
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<td>O</td>
</tr>
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<td>C-OPER</td>
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<tr>
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<td>SERCOS INTERFACE DISPLAY</td>
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<td>VGA COLOR SETTING</td>
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*1 Specifiable for the MODEL-B and later.
### MESSAGE

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*1 Specifiable for the MODEL-B and later.

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<td>MENU</td>
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B.2 FOR Series 30i/31i/32i

The screen numbers that can be replaced with a custom screen are the numbers of the basic screens and the screens whose options are valid. In addition, it is possible to specify the screens from "C Executor" to "C Executor 5", which are present for each function key.

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<td>HANDLE INTERRUPT</td>
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<td>OPERATING MONITOR</td>
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