FS100 OPTIONS
INSTRUCTIONS
FOR SOFTWARE PENDANT

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.

MOTOMAN INSTRUCTIONS
MOTOMAN-□□□ INSTRUCTIONS
FS100 INSTRUCTIONS
FS100 OPERATOR’S MANUAL
FS100 MAINTENANCE MANUAL

Part Number: 159662-1CD
Revision: 0
MANDATORY

• This manual explains the software pendant of the FS100 system. Read this manual carefully and be sure to understand its contents before handling the FS100.

• General items related to safety are listed in Chapter 1: Safety of the FS100 Instructions. To ensure correct and safe operation, carefully read the FS100 Instructions before reading this manual.

CAUTION

• Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure all covers and shields are replaced before operating this product.

• The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.

• YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications. If such modification is made, the manual number will also be revised.

• If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.

• YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product's warranty.
Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the FS100.

In this manual, the Notes for Safe Operation are classified as “WARNING”, “CAUTION”, “MANDATORY”, or “PROHIBITED”.

![WARNING]
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

![CAUTION]
Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.

![MANDATORY]
Always be sure to follow explicitly the items listed under this heading.

![PROHIBITED]
Must never be performed.

Even items described as “CAUTION” may result in a serious accident in some situations.

At any rate, be sure to follow these important items.

NOTE
To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “CAUTION” and “WARNING”.

WARNING

• Before using the software pendant, the user must supply the emergency stop button.

• Before operating the manipulator, check to be sure that the servo power is turned OFF by pressing the user-supplied emergency stop button. When the servo power is turned OFF, the SERVO ON LED on the software pendant turns OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop button does not function.

Fig. : Emergency Stop Button

• In the case of not using the programming pendant, be sure to supply the emergency stop button on the equipment. Then before operating the manipulator, check to be sure that the servo power is turned OFF by pressing the emergency stop button.

Connect the external emergency stop button to the 5-6 pin and 16-17 pin of the robot system signal connector (CN2).

• Upon shipment of the FS100, this signal is connected by a jumper cable in the dummy connector. To use the signal, make sure to supply a new connector, and then input it.

If the signal is input with the jumper cable connected, it does not function, which may result in personal injury or equipment damage.

• Once the emergency stop button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn the servo power ON.

Injury may result from unintentional or unexpected manipulator motion.

Fig. : Release of Emergency Stop

• Observe the following precautions when performing teaching operations by using the software pendant:
  – Perform the operation from outside of the manipulator’s operating range.
  – View the manipulator from the front whenever possible.
  – Always follow the predetermined operating procedure.
  – Keep in mind the emergency response measures against the manipulator’s unexpected motion toward you.
  – Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.
**WARNING**

- Confirm that no person is present in the manipulator’s operating range and that you are in a safe location before:
  - Turning ON the power for the FS100.
  - Moving the manipulator by using the software pendant.
  - Running the system in the check mode.
  - Performing automatic operations.

Injury may result if anyone enters the manipulator’s operating range during operation. Always press the emergency stop button immediately if there is a problem.

**CAUTION**

- Perform the following inspection procedures prior to conducting manipulator teaching. If a problem is found, correct it and take all other necessary actions immediately.
  - Check for problems in manipulator movement.
  - Check for damage to insulation and sheathing of external wires.
- If communication between the software pendant and the FS100 is interrupted, the operation cannot be performed from the software pendant.

After the interruption of communication with the software pendant, the FS100 enters into the following conditions:
  - Mode: REMOTE
  - Emergency stop signal of the programming pendant: Released
  - HOLD signal of the programming pendant: Released

After the interruption of communication with the software pendant, the FS100 enters into the REMOTE mode, the emergency stop signal of the programming pendant is short-circuited, and the HOLD signal of the programming pendant is short-circuited.

- Read and understand the Explanation of Warning Labels in the FS100 Instructions before operating the manipulator.
- The pendant switches cannot be operated while the character input field, CHANGE FONT, CHANGE BUTTON, or CHANGE WINDOW PATTERN window, or a warning dialog box is displayed. Be sure to close the window and dialog box before operating the pendant switches.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the FS100 controller, manipulator cables, the FS100 programming pendant (optional), and the FS100 programming pendant dummy connector (optional).

In this manual, the equipment is designated as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>FS100 controller</td>
<td>FS100</td>
</tr>
<tr>
<td>FS100 programming pendant</td>
<td>Programming pendant</td>
</tr>
<tr>
<td>FS100 software pendant</td>
<td>Software pendant</td>
</tr>
<tr>
<td>FS100 programming pendant dummy connector</td>
<td>Programming pendant dummy connector</td>
</tr>
</tbody>
</table>
Descriptions of the keys, buttons, and screen of the software pendant and the keyboard keys and screen of the PC (personal computer) are shown as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Pendant Key</td>
<td><strong>Character Key and Symbol Key</strong></td>
</tr>
<tr>
<td></td>
<td>The keys which have characters printed on them are denoted with [ ].</td>
</tr>
<tr>
<td></td>
<td>e.g. [ENTER], [SHIFT]</td>
</tr>
<tr>
<td>Axis Key and Numeric Key</td>
<td><strong>&quot;Axis Keys&quot; and &quot;Numeric Keys&quot; are generic names for the keys for axis operation</strong></td>
</tr>
<tr>
<td></td>
<td>and number input.</td>
</tr>
<tr>
<td>Cursor Key</td>
<td>Denoted as “cursor key”, or by an arrow [↑], [↓], [←], or [→].</td>
</tr>
<tr>
<td>Keys Pressed Simultaneously</td>
<td>To press two keys simultaneously on the software pendant, click or double-click</td>
</tr>
<tr>
<td></td>
<td>[SHIFT], and then click the desired key, e.g. [COORD].</td>
</tr>
<tr>
<td></td>
<td>The keys are denoted with a “+” sign between them, e.g. [SHIFT]+[COORD].</td>
</tr>
<tr>
<td>Pendant Screen Button</td>
<td><strong>The button shown on the screen is denoted with { }.</strong></td>
</tr>
<tr>
<td></td>
<td>e.g. {REMOTE} button</td>
</tr>
<tr>
<td>Pendant Screen Screen</td>
<td><strong>The menu shown on the screen is denoted with { }.</strong></td>
</tr>
<tr>
<td></td>
<td>e.g. {JOB}</td>
</tr>
<tr>
<td>PC Keyboard and Screen</td>
<td><strong>Keyboard</strong></td>
</tr>
<tr>
<td></td>
<td>Denoted by the key name.</td>
</tr>
<tr>
<td></td>
<td><strong>Screen</strong></td>
</tr>
<tr>
<td></td>
<td>Denoted with { }.</td>
</tr>
<tr>
<td></td>
<td>e.g. { } screen</td>
</tr>
</tbody>
</table>

**Description of the Operation Procedure**

In the explanation of operation procedure, the expression “Click • • •” means moving the cursor to the item and clicking [SELECT], or clicking the item on the screen by using the mouse.

**Registered Trademark**

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and TM are omitted.
# FS100 Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
</tr>
<tr>
<td>1.1</td>
<td>Overview of Software Pendant</td>
</tr>
<tr>
<td>1.2</td>
<td>Terms and Conditions of Use</td>
</tr>
<tr>
<td>1.3</td>
<td>Limitations</td>
</tr>
<tr>
<td>2</td>
<td>Installation Procedure</td>
</tr>
<tr>
<td>2.1</td>
<td>Environments for Installation</td>
</tr>
<tr>
<td>2.2</td>
<td>Installation of Software Pendant</td>
</tr>
<tr>
<td>2.3</td>
<td>Installation of Hardware Key Driver</td>
</tr>
<tr>
<td>3</td>
<td>Network Configuration</td>
</tr>
<tr>
<td>3.1</td>
<td>Changing Network Configuration</td>
</tr>
<tr>
<td>4</td>
<td>Operations</td>
</tr>
<tr>
<td>4.1</td>
<td>Wiring</td>
</tr>
<tr>
<td>4.2</td>
<td>Startup of Software Pendant</td>
</tr>
<tr>
<td>4.3</td>
<td>Connection to FS100</td>
</tr>
<tr>
<td>4.4</td>
<td>Description of Buttons</td>
</tr>
<tr>
<td>4.5</td>
<td>Teaching</td>
</tr>
<tr>
<td>4.6</td>
<td>Playback</td>
</tr>
<tr>
<td>4.7</td>
<td>Exit of Software Pendant</td>
</tr>
<tr>
<td>5</td>
<td>Frequently Asked Questions</td>
</tr>
<tr>
<td>5.1</td>
<td>Connection to FS100 Cannot Be Established</td>
</tr>
<tr>
<td>5.2</td>
<td>What Folder Is Used for External Memory?</td>
</tr>
<tr>
<td>5.3</td>
<td>Software Pendant Does Not Start</td>
</tr>
<tr>
<td>5.4</td>
<td>Software Pendant Behavior is Unstable</td>
</tr>
<tr>
<td>5.5</td>
<td>To Use PC with Multiple Network Adapters</td>
</tr>
<tr>
<td>5.6</td>
<td>If Hardware Key Driver Is Installed with USB-type Key Plugged into PC</td>
</tr>
<tr>
<td>5.7</td>
<td>If Hardware Key Driver of Version Older than Currently Installed One Is Installed</td>
</tr>
<tr>
<td>5.8</td>
<td>To Start FS100 in Maintenance Mode</td>
</tr>
<tr>
<td>5.9</td>
<td>To Check Firewall Settings</td>
</tr>
</tbody>
</table>
6 Upgrade of Software Pendant

6.1 Obtaining Latest Version of Software Pendant

6.2 Uninstallation of Software Pendant

6.3 Installation of Software Pendant
1 Introduction

1.1 Overview of Software Pendant

The software pendant on the PC provides functions equivalent to those of the programming pendant for the FS100 (excluding some functions).

The software pendant enables the following operations:

- Creating, editing, or executing the job of manipulator motion without using the programming pendant
- Monitoring the playback state of the manipulator in the same way as the programming pendant
- Connecting to the FS100 on the same network as the PC

**NOTE**

To connect the software pendant, the FS100 must meet the following conditions:

- The programming pendant dummy connector is connected to the X81 terminal.
- Another software pendant is not connected.
1.2 Terms and Conditions of Use

The following shows the Terms and Conditions of Use for the software pendant. To use the software pendant, the user must agree to these Terms and Conditions of Use.

1. Before using the software pendant, confirm that no person is present in the manipulator’s operating range and that you are in a safe location. Injury may result if anyone enters the working envelope of the manipulator during operation.

2. Before using the software pendant, the user must supply the emergency stop button that can turn OFF the servo power supply. Connect the emergency button to the external emergency stop signal for the FS100. Then, before operating the manipulator, check that pressing the emergency stop button turns OFF the servo power supply. When the servo power is turned OFF, the SERVO ON LED on the key sheet of the software pendant turns OFF. If the manipulator cannot be stopped during an emergency, personal injury or equipment damage may result.

3. Once the emergency stop button is released, clear an obstacle or a failure that caused an emergency stop. Then turn ON the servo power.

4. View the manipulator from the front whenever possible. Improper operation or unexpected manipulator motion during teaching or operation may result in personal injury or equipment damage.

5. Before using the software pendant, exit other applications and the screen-saver. Improper operation of the software pendant may result due to another application running.
1.3 Limitations

The following shows the limitations in using the software pendant.

1. When conducting manipulator teaching by using the software pendant, it is required to perform teaching outside of the safeguarding. If the safeguarding is open, the servo power cannot be turned ON by using the software pendant.

2. The following functions cannot be used by the software pendant. To use one of these functions, use the programming pendant for the FS100.
   - Overrun release
   - Manual brake release
   - External memory in the maintenance mode
   - Automatic backup (save destination: CompactFlash of programming pendant)
   - Zeroing (optional)
   - Programming pendant customization (optional)
2 Installation Procedure

2.1 Environments for Installation

The environments to install the software pendant are shown below.

<table>
<thead>
<tr>
<th></th>
<th>Windows 7 Professional Edition (32-bit version)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU</td>
<td>Intel Core2 Duo 2 GHz or more</td>
</tr>
<tr>
<td>Memory</td>
<td>2 GB or more</td>
</tr>
<tr>
<td>Hard disk</td>
<td>Free space of 500 MB or more</td>
</tr>
<tr>
<td>Display</td>
<td>Display (256 colors or more) supported by MS-Windows</td>
</tr>
<tr>
<td>Mouse</td>
<td>Mouse supported by MS Windows</td>
</tr>
</tbody>
</table>
2.2 Installation of Software Pendant

1. Double-click “setup.exe”.

   Installation must be performed as the administrator of the PC.

   – The setup wizard starts.

   ![Software Pendant Setup Wizard](image)
2. Click the {Next} button.
   – “License Agreement” appears.

   ![License Agreement dialog box](image)

   **NOTE** To use the software pendant, the user must agree to this Software License Agreement.

3. Carefully read the Software License Agreement. If you agree, select “I Agree” and click the (Next) button.

   – “Select Installation Folder” appears.

   ![Select Installation Folder dialog box](image)
4. Select the install destination, select the user, and then click the {Next} button.
   - “Confirm Installation” appears.

5. Click the {Next} button.
   - The installation starts.
   - “Installation Complete” appears.
2.3 Installation of Hardware Key Driver

To operate the software pendant properly, be sure to connect the hardware key (USB-stick type) supplied with the package to the PC in advance.

Before connecting the key to the PC, be sure to perform the following procedures “Note on PC” and “Installation of driver”, and then connect the key to the USB port.

- **Note on PC**

  Due to the hardware configuration, multiple USB-stick type keys cannot be connected to one USB port by connecting the keys each other. Thus, connect one key to one USB port.

  To install multiple pieces of offline software and connect multiple USB-stick type keys to one PC, use the PC which has the same number of USB ports as that of pieces of offline software.

- **Installation of driver**

  ![NOTE]
  
  The key must be removed from the PC before installing the driver.

  To install the driver, execute the "\SentinelDriver-7.6.3\Sentinel Protection Installer 7.6.3.exe" in the install CD-ROM.

  For the installation procedure, refer to "\SentinelDriver-7.6.3\Manual\SafeNet_Sentinel_EndUser_Guide.pdf."
3 Network Configuration

The software pendant communicates with the FS100. Thus, the network configuration of the PC on which the software pendant runs must be changed so that the software pendant is connected to the same network as the FS100.

3.1 Changing Network Configuration

1. Click “Control Panel” from the Start menu.

The “All Control Panel Items” window appears.

NOTE

The network configuration must be changed as the administrator of the PC.

– The “All Control Panel Items” window appears.
2. Click “Network and Sharing Center”.
   – The “Network and Sharing Center” window appears.

3. Click “Change adapter settings”.
   – The “Network Connections” window appears.

4. Select the desired network device, and then click “Properties”.
   – The “Local Area Connection Properties” window appears.
3 Network Configuration

3.1 Changing Network Configuration

5. Select “Internet Protocol Version 4 (TCP/IPv4)”, and then click “Properties”.

6. Select “Use the following IP address”, and then enter the IP address appropriate to the user's network configuration.

The FS100 network configuration is factory-set to the following values:

- **IP address**: 10.0.0.2
- **Subnet mask**: 255.255.255.0

**NOTE**
If the PC network configuration is set the same as that of the FS100, the IP address conflict may occur to cause a failure on the network operation.
4 Operations

4.1 Wiring

1. Connect the programming pendant dummy connector to the X81 terminal on the front of the FS100.

CAUTION

• Before connecting or disconnecting the programming pendant dummy connector or the programming pendant to the X81 terminal, be sure to turn OFF the power supply of the FS100.

2. Open the FS100 front cover.
3. Plug the LAN cable into the Ethernet terminal to connect to the user’s PC.

NOTE

Use the LAN cable that has noise immunity with CAT5e or better and that suits the user’s usage environment.
4.2 Startup of Software Pendant

1. Click the shortcut on the desktop, or click “SoftwarePendant” from the Start menu.

- The “Safety Precautions” window appears.

NOTE: The software pendant cannot be started unless the hardware key is connected to the USB port of the PC.
2. Carefully read the precautions, and click the {agree} button if you agree.

**NOTE**

To use the software pendant, the user must agree to these safety precautions.

- The “Programming Pendant Startup” window appears.

**NOTE**

The software pendant communicates with the FS100. If the block warning appears due to the firewall, release the block, and then use the software pendant.
4.3 Connection to FS100

1. Click the “Connect to FS100” button.

- The “Select FS100” window appears. In this window, the user can select the FS100 to be connected on the network.

- To sort items, click the tab “RC Name”, “IP Address”, etc.

- To search for the FS100 on the network again, click “Search”.
2. Select the FS100 to be connected, and then click the {Connect} button.

- The FS100 is connected, and the pendant screen and the key sheet are displayed.
4.4 Description of Buttons

The software pendant can be controlled similarly to the programming pendant, but mouse-clicking is used instead of button-pressing, switch-turning, or screen-touching.

For usage of buttons not described in this chapter, refer to “FS100 Operator’s Manual” and “FS100 Instructions”.

Image: Interface of the software pendant with buttons and options.
### Pendant Switch

When a button is selected, it is displayed in blue.

<table>
<thead>
<tr>
<th>Button</th>
<th>Function and application</th>
</tr>
</thead>
<tbody>
<tr>
<td>REMOTE</td>
<td>Mode switch</td>
</tr>
<tr>
<td></td>
<td>Remote mode state</td>
</tr>
<tr>
<td>PLAY</td>
<td>Mode switch</td>
</tr>
<tr>
<td></td>
<td>Play mode state</td>
</tr>
<tr>
<td>TEACH</td>
<td>Mode switch</td>
</tr>
<tr>
<td></td>
<td>Teach mode state</td>
</tr>
<tr>
<td>START</td>
<td>(START) button</td>
</tr>
<tr>
<td>HOLD</td>
<td>(HOLD) button</td>
</tr>
<tr>
<td>SERVO OFF</td>
<td>(SERVO ON/OFF) button</td>
</tr>
<tr>
<td>R.STOP</td>
<td>(R.STOP) button</td>
</tr>
</tbody>
</table>

- **CAUTION**

  • The pendant switches cannot be operated while the character input field, CHANGE FONT, CHANGE BUTTON, or CHANGE WINDOW PATTERN window, or a warning dialog box is displayed. Be sure to close the window and dialog box before operating the pendant switches.
### Correspondence Between Software Pendant Keys and Keyboard Keys

#### Table 4-2: Software Pendant Keys and Keyboard Keys (Sheet 1 of 3)

<table>
<thead>
<tr>
<th>Key</th>
<th>Corresponding key on keyboard</th>
<th>Function and application</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELECT</td>
<td>Space key</td>
<td>Works as described below.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Selects menu items in the main menu area and the pull-down menu area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Makes the selected item ready to be set in the general-purpose display area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Displays multiple messages in the message area.</td>
</tr>
<tr>
<td>Cursor</td>
<td>Arrow keys</td>
<td>Moves the cursor in the direction of the arrow.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The size of the cursor and the range or place where the cursor can move will vary depending on the window.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If [↑] is pressed when the cursor is on the [NOP] line, the cursor will move to the [END] line.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[SHIFT] + [↑] Scrolls the screen upward.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[SHIFT] + [↓] Scrolls the screen downward.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[SHIFT] + [→] Scrolls the screen to the right.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[SHIFT] + [←] Scrolls the screen to the left.</td>
</tr>
<tr>
<td>CANCEL</td>
<td>Esc</td>
<td>Cancels the current status.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Deletes the sub menu in the main menu area and the pull-down menu area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cancels the input data or the input status in the general-purpose display area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cancels the multiple-message display in the message area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cancels the occurred error.</td>
</tr>
<tr>
<td>AREA</td>
<td>Tab</td>
<td>Moves the cursor in the following order: &quot;Menu Area&quot;→&quot;General-Purpose Display Area&quot;→&quot;Message Area&quot;→&quot;Main Menu Area&quot;. If no item is displayed, the cursor does not move.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[SHIFT] + [AREA] The language can be switched when the bilingual function is valid. (Bilingual function is optional.)</td>
</tr>
</tbody>
</table>
### 4.4 Description of Buttons

**SHIFT**

Changes the functions of other keys by pressing together.

Can be used with [MAIN MENU], [ASSIST], [COORD], [AREA], [MOTION TYPE], cursor key or numeric key to access alternate functions.

Single-clicking [SHIFT] makes [SHIFT] “pressed state”, and then clicking another key makes them pressed simultaneously. With single-clicking, the pressed state of [SHIFT] is canceled with each action.

Double-clicking [SHIFT] makes [SHIFT] remain in “pressed state”, so clicking another key does not cancel the pressed state. Thus, the simultaneous pressing of keys can be performed continuously. To cancel the pressed state, click [SHIFT] again.

**INTERLOCK**

Changes the functions of other keys by pressing together. Can be used with [ASSIST], [MULTI], [TEST START], [FWD], or numeric key (numeric key customize function) to access alternate functions.

Single-clicking [INTERLOCK] makes [INTERLOCK] “pressed state”, and then clicking another key makes them pressed simultaneously. With single-clicking, the pressed state of [INTERLOCK] is canceled with each action.

Double-clicking [INTERLOCK] makes [INTERLOCK] remain in “pressed state”, so clicking another key does not cancel the pressed state. Thus, the simultaneous pressing of keys can be performed continuously. To cancel the pressed state, click [INTERLOCK] again.

**ENTER**

Registers instructions, data, current position of the manipulator, etc.

Clicking [ENTER] moves the instruction or data displayed in the input buffer line to the cursor position to complete a registration, insertion, or modification.

<table>
<thead>
<tr>
<th>Key</th>
<th>Corresponding key on keyboard</th>
<th>Function and application</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHIFT</td>
<td>Shift</td>
<td>Changes the functions of other keys by pressing together. Can be used with [MAIN MENU], [ASSIST], [COORD], [AREA], [MOTION TYPE], cursor key or numeric key to access alternate functions. Single-clicking [SHIFT] makes [SHIFT] “pressed state”, and then clicking another key makes them pressed simultaneously. With single-clicking, the pressed state of [SHIFT] is canceled with each action. Double-clicking [SHIFT] makes [SHIFT] remain in “pressed state”, so clicking another key does not cancel the pressed state. Thus, the simultaneous pressing of keys can be performed continuously. To cancel the pressed state, click [SHIFT] again.</td>
</tr>
<tr>
<td>INTERLOCK</td>
<td></td>
<td>Changes the functions of other keys by pressing together. Can be used with [ASSIST], [MULTI], [TEST START], [FWD], or numeric key (numeric key customize function) to access alternate functions. Single-clicking [INTERLOCK] makes [INTERLOCK] “pressed state”, and then clicking another key makes them pressed simultaneously. With single-clicking, the pressed state of [INTERLOCK] is canceled with each action. Double-clicking [INTERLOCK] makes [INTERLOCK] remain in “pressed state”, so clicking another key does not cancel the pressed state. Thus, the simultaneous pressing of keys can be performed continuously. To cancel the pressed state, click [INTERLOCK] again.</td>
</tr>
<tr>
<td>ENTER</td>
<td>Enter</td>
<td>Registers instructions, data, current position of the manipulator, etc. Clicking [ENTER] moves the instruction or data displayed in the input buffer line to the cursor position to complete a registration, insertion, or modification.</td>
</tr>
</tbody>
</table>
4 Operations

4.4 Description of Buttons

Table 4-2: Software Pendant Keys and Keyboard Keys (Sheet 3 of 3)

<table>
<thead>
<tr>
<th>Key</th>
<th>Corresponding key on keyboard</th>
<th>Function and application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numeric Keys</td>
<td>0 to 9 - . (period)</td>
<td>Enters the number or symbol when the “&gt;” prompt appears on the input line.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “.” is the decimal point. “-” is a minus sign or hyphen.</td>
</tr>
</tbody>
</table>

The backspace key on the keyboard can be used to delete one character.
4.5 Teaching

1. Click the {TEACH} button.

2. Click [SERVO ON READY].

   – The SERVO ON lamp lights up.

3. Click the (SERVO ON/OFF) button.

   – “Notice of safety” dialog box appears.

4. Confirm that no person is present in the range of motion of the manipulator, and then click the {Yes} button.

   – The servo power supply turns ON and the (SERVO ON/OFF) button lights up.

**NOTE**
The servo power supply cannot be turned ON unless it is confirmed that no person is present in the range of motion of the manipulator.

**WARNING**

- The servo power supply cannot be turned ON if the safeguarding is open.
The software pendant must be operated from outside of the safeguarding.
5. While pressing the Ctrl key on the keyboard, click the JOG key button.

![Image of control panel]

6. The manipulator moves.
   Move the manipulator to the desired position and perform teaching.

**SUPPLEMENT**

When clicking the [START] button, [FWD], [BWD], [TEST START], or a JOG-related button, be sure to press the Ctrl key on the keyboard simultaneously.

**SUPPLEMENT**

For detailed instructions on teaching, refer to “FS100 Instructions” and “FS100 Operator’s Manual”.
4.6 Playback

1. Click the {PLAY} button.

2. Click [SERVO ON READY].

   - The servo power supply turns ON, and the {SERVO ON/OFF} button lights up.

3. While pressing the Ctrl key on the keyboard, click the {START} button.

   - The playback starts.

When clicking the {START} button, [FWD], [BWD], [TEST START], or a JOG-related button, be sure to press the Ctrl key on the keyboard simultaneously.
4.7 Exit of Software Pendant

1. Click the {×} button at the right end of the title bar.

   ![Confirmation dialog box]

   A confirmation dialog box appears.

2. Click the {OK} button to exit out of the software pendant.

   **CAUTION**

   • After the termination of communication with the software pendant, the FS100 enters into the following conditions:
     - Mode: REMOTE
     - Emergency stop signal of the programming pendant: Released
     - HOLD signal of the programming pendant: Released

   After the termination of communication with the software pendant, the FS100 enters into the REMOTE mode, the emergency stop signal of the programming pendant is short-circuited, and the HOLD signal of the programming pendant is short-circuited.

   **SUPPLEMENT**

   During the external memory operation, the software pendant cannot be exited. After the external memory operation is completed, perform the exit operation again.
4. Operations

4.7 Exit of Software Pendant

- The “Programming Pendant Startup” window appears.

3. Click the \( \times \) button at the right end of the title bar.

- The software pendant exits.
5 Frequently Asked Questions

5.1 Connection to FS100 Cannot Be Established

To connect the software pendant to the FS100, the FS100 must meet the following conditions:

• The programming pendant dummy connector is connected to the X81 terminal.

• Another software pendant is not connected.

• The software pendant (Ypp.exe, Yppmain.exe) is not blocked by the firewall.

If the above conditions are met and the connection is still not established, the PC and the FS100 may not be network-connected. To check the network connection, use the Command Prompt.

1. Click “Command Prompt” from the Start menu.

   - The Command Prompt starts.

   *Command Prompt*

   ```
   C:\Users\Default User> whoami
   NT权威用户
   ```

   (example)

   The user name is changed when the command is executed.

   The Command Prompt can be used to check whether the software pendant (Ypp.exe, Yppmain.exe) is blocked by the firewall.

   ```
   C:\Users\Default User> netstat -an
   ```

   (example)

   If there are no visible results, the software pendant (Ypp.exe, Yppmain.exe) is blocked by the firewall.

   ```
   C:\Users\Default User> netstat -an
   ```

   (example)

   If there are visible results, the software pendant (Ypp.exe, Yppmain.exe) is not blocked by the firewall.

   The software pendant (Ypp.exe, Yppmain.exe) can be made available by changing to an administrator with elevated permissions.

   ```
   C:\Users\Default User> netstat -an
   ```

   (example)

   The result will be different depending on the user name and settings. For example, the result for the local network may not be visible.

   ```
   C:\Users\Default User> netstat -an
   ```

   (example)

   If there are visible results, the software pendant (Ypp.exe, Yppmain.exe) is not blocked by the firewall.

   The software pendant (Ypp.exe, Yppmain.exe) can be made available by changing to an administrator with elevated permissions.
2. Enter the command as follows:
   
   \[
   >\text{ping 10.0.0.2 (IP address of the FS100 to be connected)}
   \]
   
   - If the network is established, a response is returned.

   ![Ping Command Example](image)

   *NOTE*

   If the response is not returned, a network failure has occurred. Contact your network administrator to correct the failure.

   *SUPPLEMENT*

   The FS100 network configuration is factory-set to the following values:
   
   - IP address: 10.0.0.2
   - Subnet mask: 255.255.255.0

### 5.2 What Folder Is Used for External Memory?

The folder of the external memory for the software pendant is “Documents\SWP\PC-HDD\”. The save, load, or verification can be performed for the data in the folder.

*Example*:

- Local Disk (C:) ▼ User ▼ “username” ▼ Documents ▼ SWP ▼ PC-HDD

![Folder Structure Example](image)
5.3 Software Pendant Does Not Start

To use the software pendant, the dedicated hardware key is necessary.

To purchase the hardware key, contact your Yaskawa representative.

If the hardware key is not connected properly, the following dialog box appears.

5.4 Software Pendant Behavior is Unstable

Before using the software pendant, other applications and screen-saver must be exited. Another application with high execution priority may cause the improper operation of the software pendant.

Also, the power-saving setting of the PC may cause the unstable behavior of the software pendant. When using the software pendant, disable the power-saving setting.
5.5 To Use PC with Multiple Network Adapters

When using the software pendant on the PC with multiple network adapters (multiple IP addresses), the network adapter can be selected.

1. Click the (Transmission Setting) button in the startup screen.

   – The “Select network interface” window appears.

2. Select the IP address of the desired network adapter, and then click the (Select) button.

   Click the (Search) button to retrieve the IP address set to the PC.

   NOTE: If the IP address is not set, a network failure has occurred. Contact your network administrator to correct the failure.
5.6 If Hardware Key Driver Is Installed with USB-type Key Plugged into PC

1. With the USB-type key plugged into the PC, delete the drive registered as “unknown device” by using “Device Manager”.

2. Uninstall the driver (Sentinel System Driver) from “Programs and Features”.

3. Install the driver with the USB-type key removed from the PC.
   This allows the software pendant to operate properly.

5.7 If Hardware Key Driver of Version Older than Currently Installed One Is Installed

Installing the hardware key driver of a version older than the currently installed one may cause a problem. Uninstall the driver from “Programs and Features”, and then reinstall it.

For details of installation, refer to chapter 2.3 “Installation of Hardware Key Driver” at page 2-5.

NOTE

To display the “Programs and Features” menu, go to the Start menu, click “Control Panel”, and then click “Programs and Features”.
5.8 To Start FS100 in Maintenance Mode

To start the FS100 in the maintenance mode by using the software pendant, follow the procedure below.

1. Click the (Special Mode) button in the startup screen.

   - The “Select Mode” window appears.
2. Click the {Maintenance Mode} button.
   – The “Select FS100” window appears.

   ![Select FS100 window](image)

3. Click the FS100 to be started in the maintenance mode.
   – The {Connect} button appears.

   ![Connect button](image)
4. Click the {Connect} button.
   - The FS100 restarts in the maintenance mode.

**NOTE**
In the case that the servo power is turned ON, the “Restart confirmation” dialog box appears before connecting to the FS100. If the maintenance mode is connected while the servo power is turned ON, the manipulator stops its operation, and then the FS100 restarts in the maintenance mode.
5.9 To Check Firewall Settings

To connect the software pendant to the FS100, communication through Windows Firewall of the PC must be allowed.

1. Click “Windows Firewall” from “Control Panel”.
   - The “Windows Firewall” window appears.

2. Click “Allow a program or feature through Windows Firewall”.

![Image of Windows Firewall window]

- Control Panel Home
- Allow a program or feature through Windows Firewall
- Change notification settings
- Turn Windows Firewall on or off
- Restore defaults
- Advanced settings
- Troubleshoot my network
3. Make sure that the check boxes for “Ypp SWP”, “YppMain Application”, and corresponding networks are selected.

- The “Allowed Programs” window appears.

**NOTE**

The firewall must be set or checked as the administrator of the PC.

**NOTE**

The software pendant cannot be connected to the FS100 unless the communication of “Ypp SWP” and “YppMain Application” through the firewall is allowed. Be sure to allow the communication before using the software pendant.
6 Upgrade of Software Pendant

To connect the software pendant to the latest FS100, the software pendant must be upgraded.

6.1 Obtaining Latest Version of Software Pendant

For the latest version of the software pendant, contact your Yaskawa representative.

6.2 Uninstallation of Software Pendant

To upgrade the software pendant, uninstall the software pendant currently installed in the PC.

1. Click “Control Panel” from the Start menu.

   – The “All Control Panel Items” window appears.
2. Click “Programs and Features”.
   – The “Programs and Features” window appears.

3. Double-click “SoftwarePendant”.
   – A confirmation dialog box appears.

4. Click the (Yes) button to uninstall the software pendant.
   – Uninstallation is started and completed automatically.

**NOTE**
Uninstallation must be performed as the administrator of the PC.

6.3 Installation of Software Pendant

Install the software pendant by referring to chapter 2.2 “Installation of Software Pendant” at page 2-2.
Specifications are subject to change without notice for ongoing product modifications and improvements.