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

MOTOMAN INSTRUCTIONS

MOTOMAN-MANIPULATOR MANUAL
DX100 INSTRUCTIONS
DX100 OPERATOR'S MANUAL
DX100 MAINTENANCE MANUAL

The DX100 operator's manuals above correspond to specific usage.
Be sure to use the appropriate manual.
This manual explains the details on Online Manual Function of the DX100. Read this manual carefully and be sure to understand its contents before handling the DX100.

General items related to safety are listed in Chapter 1: Safety of the DX100 INSTRUCTIONS. To ensure correct and safe operation, carefully read the DX100 Instructions before reading this manual.

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 DX100.

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 operating the manipulator, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the DX100 and the programming pendant. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned 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 buttons do not function.

Figure 1: Emergency Stop Button

• 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.

Figure 2: Release of Emergency Stop

• Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
  – 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.

• Confirm that no person is present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
  – Turning ON the power for the DX100.
  – Moving the manipulator with the programming pendant.
  – Running the system in the check mode.
  – Performing automatic operations.

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an emergency stop button immediately if there is a problem.

The emergency stop buttons are located on the right of front door of the DX100 and the programming pendant.
CAUTION

- Perform the following inspection procedures prior to conducting manipulator teaching. If problems are found, repair them immediately, and be sure that all other necessary processing has been performed.
  - Check for problems in manipulator movement.
  - Check for damage to insulation and sheathing of external wires.
- Always return the programming pendant to the hook on the DX100 cabinet after use.

The programming pendant can be damaged if it is left in the P-point maximum envelope of the manipulator, on the floor, or near fixtures.

- Read and understand the Explanation of Warning Labels in the DX100 Instructions before operating the manipulator.

**Definition of Terms Used Often in This Manual**

The MOTOMAN manipulator is the YASKAWA industrial robot product. The manipulator usually consists of the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX100 Controller</td>
<td>DX100</td>
</tr>
<tr>
<td>DX100 Programming Pendant</td>
<td>Programming Pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and DX100</td>
<td>Manipulator Cable</td>
</tr>
</tbody>
</table>
Descriptions of the programming pendant keys, buttons, and displays are shown as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Programming Pendant</td>
<td></td>
</tr>
<tr>
<td>Character Keys</td>
<td>The keys which have characters printed on them are denoted with [ ]. ex. [ENTER]</td>
</tr>
<tr>
<td>Symbol Keys</td>
<td>The keys which have a symbol printed on them are not denoted with [ ] but depicted with a small picture. ex. page key [ ] The cursor key is an exception, and a picture is not shown.</td>
</tr>
<tr>
<td>Axis Keys</td>
<td>&quot;Axis Keys&quot; and &quot;Numeric Keys&quot; are generic names for the keys for axis operation and number input.</td>
</tr>
<tr>
<td>Numeric Keys</td>
<td></td>
</tr>
<tr>
<td>Keys pressed simultaneously</td>
<td>When two keys are to be pressed simultaneously, the keys are shown with a &quot;+&quot; sign between them, ex. [SHIFT]+[COORD]</td>
</tr>
<tr>
<td>Displays</td>
<td>The menu displayed in the programming pendant is denoted with { }. ex. {JOB}</td>
</tr>
</tbody>
</table>

Description of the Operation Procedure

In the explanation of the operation procedure, the expression "Select • • • " means that the cursor is moved to the object item and the SELECT key is pressed, or that the item is directly selected by touching the screen.

Registered Trademark

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<table>
<thead>
<tr>
<th></th>
<th>Table of Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Online Manual Function</td>
</tr>
<tr>
<td>2</td>
<td>Basic Specification</td>
</tr>
<tr>
<td>2.1</td>
<td>Corresponding Software Version</td>
</tr>
<tr>
<td>3</td>
<td>Store the Manual to the USB device</td>
</tr>
<tr>
<td>4</td>
<td>Display Configuration</td>
</tr>
<tr>
<td>5</td>
<td>Operation Procedure</td>
</tr>
<tr>
<td>5.1</td>
<td>To Activate the Online Manual Function</td>
</tr>
<tr>
<td>5.2</td>
<td>Viewer Area</td>
</tr>
<tr>
<td>5.3</td>
<td>Operation Button Area</td>
</tr>
<tr>
<td>5.4</td>
<td>A Table of Contents Dialog</td>
</tr>
<tr>
<td>5.5</td>
<td>Search Dialog</td>
</tr>
<tr>
<td>5.6</td>
<td>Selecting the File Dialog</td>
</tr>
<tr>
<td>5.7</td>
<td>Specifying the Page Dialog</td>
</tr>
<tr>
<td>6</td>
<td>Error Message</td>
</tr>
</tbody>
</table>
1 Online Manual Function

Online manual function is a function which can display the manual on the programming pendant from a USB device, such as a flash drive or a memory card.

By using this online manual function, it is able to read and confirm the setting of the controller or the operation instructions through the programming pendant. This function also enables to display the manipulator manual and PDF files on the screen which are made by users.
To operate online manual function, store the manuals from the Robot Controller Manuals (CD-ROM) to the USB device or create a Motoman file for saving the PDF files in the USB device, and then insert the USB device to the programming pendant.

Refer to **DX100 INSTRUCTIONS (162536-1CD)** for recommended USB devices. When connect the USB device to the programming pendant, the waterproof function does not perform. Keep connecting the USB device causes a risk of falling off the USB device.

While the online manual function is running, following keys and keys to the online manual function can be used. (Refer to chapter 5 “Operation Procedure” at page 5-1)

- Start button
- Hold button
- Emergency stop
- Mode key
- Enable switch

Because of the limitation of the keys which show above, the manipulator operation (JOG operation) at the teach mode cannot be performed. The manipulator will stop when trying to perform the online manual function during the operation. The termination of the online manual function enables to use keys. Please do not terminate the online manual function while pressing the axis operation key. It may cause danger.

Even though playback continues as valid (S2C437=), playback continuing display does not appear during the online manual function operation. It will appear when the online manual function operation is terminated.
2 Basic Specification

2.1 Corresponding Software Version

The online manual function can perform with DS3.30.00A (--)- or later versions.

---

**Table: Items and Specifications**

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
</table>
| Manuals  | • DX100 MANUALS  
  DX100 INSTRUCTION  
  DX100 OPERATOR'S MANUAL FOR MATERIAL HANDLING, PRESS TENDING, CUTTING, AND OTHER APPLICATIONS  
  DX100 OPERATOR'S MANUAL FOR ARC WELDING  
  DX100 OPERATOR'S MANUAL FOR SPOT WELDING USING MOTOR GUN  
  DX100 OPERATOR'S MANUAL FOR SPOT WELDING USING AIR GUN  
  DX100 OPERATOR'S MANUAL FOR SPOT AND ARC WELDING USING MOTOR GUN  
  DX100 MAINTENANCE MANUAL  
  DX100 FOR INFORM LANGUAGE  
  DX100 FOR CONCURRENT I/O  
  • USER'S MANUAL (PDF files in the Motoman file)  
  Maximum length of PDF file name 200 characters |
| Function | • Operation by keys  
  Switching page  
  Scrolling screen  
  Termination of the online manual function  
  • Operation by operation buttons  
  Switching page  
  Zoom in / Zoom out  
  Full view  
  Fit width view  
  Termination of the online manual function  
  • Changing the displayed manual by selecting the files  
  • Specifying the page or the number of the page  
  • Searching a text string |

---

- For each application, the displayed manual may vary.
- (e.g. When system setting is for the arc welding, the online manual function displays the DX100 operator's manual for arc welding.)
- When bilingual function is valid, it can display the DX100 manual in English.
3 Store the Manual to the USB device

The followings are the procedures for saving the manual from the Robot Controller Manuals (CD-ROM) to the USB device.

1. Insert the Robot Controller Manuals into the CD-ROM drive.

2. Make a copy of a fscommand folder which is in the Robot Controller Manuals, and then paste it to the USB device.
For saving the user’s manual, perform the following procedures.

1. Create a Motoman file under the USB device icon.
2. Store the desired PDF files to Motoman file.
4  Display Configuration

The online manual function display is configured from the following two areas.

- Viewer area
- Operation button area

A. Viewer area

- Displays the manuals.
- By touching the viewer area or pressing the area key to move the focus area can operate the viewer area.
- When the manual do not fit in the viewer area, scroll bars (horizontal/vertical) will appear.
- When the manual fit in the viewer area, scroll bars do not appear.

E.g. Full view
Online Manual Function

4 Display Configuration

B. Operation button area
Displays the operation buttons.

By touching the operation button area or pressing the area key to move the focus will be able to operate the area.

Displayed buttons turn into the active or inactive by moving the focus area.

e.g. Previous page button

<table>
<thead>
<tr>
<th>Normal Button</th>
<th>Active Button</th>
<th>Inactive Button</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prev Page</td>
<td>Prev Page</td>
<td>Prev Page</td>
</tr>
</tbody>
</table>

There are two operation button lines which can be switched by pressing the switch button.

C. Switch button
Switches to the different display indication.

D. Bookmarks button
Displays the table of contents.
(If there is no table of contents, it will turn the invalid indication.)

E. Prev Page button
Displays the previous page.
(If there is no previous page, it will turn the invalid indication.)

F. Next Page button
Displays the next page.
(If there is no next page, it will turn the invalid indication.)

G. Zoom Out button
Zoom out the display.
25% zoom out for each time. The lowest zoom out is 25%.
(If zoom-out does not work, it will turn the invalid indication.)

H. Zoom In button
Zoom in the display.
25% zoom in for each time. The maximum zoom in is 200%.
(If zoom-in does not work, it will turn the invalid indication.)

I. Find button
Displays the searching dialog.
Online Manual Function

J. Close button
Terminates the online manual function.

K. Open button
Displays the select file dialog.

L. First Page button
Displays the first page of the manual.
(When the screen displays the first page already, it will turn the invalid indication.)

M. Go To Page button
Displays the specifying page dialog.

N. Last Page button
Displays the last page of the manual.
(When the screen displays the last page already, it will turn the invalid indication.)

O. Fit Page button
Displays the full view.

P. Fit Width button
Displays the fit width view.
5 Operation Procedure

5.1 To Activate the Online Manual Function

1. Select {ONLINE MANUAL} from the main menu.
   - INSTRUCTIONS appear in the sub menu.

2. Select the desired DX100 manual from the sub menu.
   - Online manual function activates, and then selected DX100 manual appears.
   - When it is the first time to display the manual after tuning the power supply ON, it will appear the first page without zoom.
   - The manual which has already been used in this function after turning the power supply ON appears the last viewed page with zoom.
   - (The displayed information will be renewed every time when the power supply is turned OFF.)

After selecting the DX100 manual, the following massage appears when the USB device is not found or the manual is saved in the wrong area, the manual is not found in the USB device and the manual is not recognized.
5 Operation Procedure
5.1 To Activate the Online Manual Function

3. Select the {USERS MANUAL} from the sub menu.
   - Online manual function activates, and then user’s manual which has
     been displayed last time appears.
     If none of the user’s manual has been displayed after turning the power
     supply ON, the select file dialog will appear.
     The manual which has already been used in this function after turning
     the power supply ON appears the last viewed page with zoom.
     (The displayed information will be renewed every time when the power
     supply is turned OFF.)

4. Select the {MANUAL LIST} from the sub menu.
   - Online manual function activates, and then select file dialog
     appears.

After selecting the user’s manual or manual list, the following massage
appears when the USB device is not found or the manual is saved in the
wrong area, the manual is not found in the USB device and the manual is
not recognized.
5.2 Viewer Area

When the viewer area is active, the following keys can be used.

In order to activate the viewer area, touch the area or move the focus area by pressing the area key.

- **[CURSOR] key**
  To scroll up, down, left and right in the display when the scroll bar(s) appear(s).
  Touching the scroll bar(s) directory to the display also operate the viewer area.
  Pressing [SHIFT] + [CURSOR] can display the top, down, left and right corner of the screen.

- **Page key**
  Going to a next page.
  Go to a previous page by pressing the [SHIFT] key + page key.

- **Area key**
  Move the focus area in the viewer and operation button areas.
5.3 Operation Button Area

Pressing the key when the operation buttons are active or touching on the screen executes the operation.

In order to activate the operation button area, touch the area on the screen or move the focus area by pressing the area key.

- **[CURSOR] key**
  Pressing the up or down cursor key moves the focus area.
  Pressing the left or right cursor key switches the indication of the operation button line.

- **Page key**
  Going to a next page.
  Go to a previous page by pressing the [SHIFT] key + page key.

- **Area key**
  Move the focus area in the viewer and operation button areas.

- **[SELECT] key**
  Executes a command from the active button, and also touching the operation buttons on the screen as well.
5.4  **A Table of Contents Dialog**

Displays the table of contents of the manual by pressing the {Bookmarks}.

Select the page from the table of contents. Selected page appears by pressing the {OK} in the dialog.

![A Table of Contents Dialog](image)

5.5  **Search Dialog**

Executes searching for a text string in the manual by pressing the {Find}.

For searching the text string, perform the following procedures.

![Search Dialog](image)
5  Operation Procedure
5.5  Search Dialog

1. Press {Keypad} button.
   - Keypad for typing text appears.

2. Type the text.
   - After typing the text string, press {Enter}, and then the text string appears in the dialog.
3. Press the {Find} key.

- Searching for the text string is executed. When the text string is found, it will be displayed in a blue box in the page.

- Searching for the text string may take some time.
- The status of the searching can be checked on the progress bar.
### 5.6 Selecting the File Dialog

Displays the manual list by pressing the {Open} in the operation button area.

Select the desired PDF file, and press {OK} to display the file.

![Image of Selecting the File Dialog](image)

### 5.7 Specifying the Page Dialog

Displays the specified page by pressing the {Go To Page} in the operation button area.

For displaying the specified page, operate the following procedures.

1. Press [NUMBER] key(s).
   - Input the numeric character(s) of the desired page by pressing the button.
   
   To clear the input information, press [SHIFT] key + [DOWN CURSOR] key.

2. Press {JUMP} button.

3. Required page will be appear.
If an error occur during the operation, such as a file operation error or a processing error, the online manual function will deliver the following error messages.

When an error message appears, press (OK) to remove the message and then take the following actions.

<table>
<thead>
<tr>
<th>Error message</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failed to open file.</td>
<td>Check if the USB device is securely connected to the device, there is a manual in</td>
</tr>
<tr>
<td>I finished the Online Manual.</td>
<td>the USB device and the manual is saved in the collect area.</td>
</tr>
<tr>
<td></td>
<td>Refer to chapter 3 Store the Manual to the USB device on page 3-1</td>
</tr>
<tr>
<td></td>
<td>Confirm all of the above status, and restart the online manual function after fixed</td>
</tr>
<tr>
<td></td>
<td>the status.</td>
</tr>
<tr>
<td>File was not found.</td>
<td>Check if the USB device is securely connected to the device, there is a manual in</td>
</tr>
<tr>
<td>I finished the Online Manual.</td>
<td>the USB device and the manual is saved in the collect area.</td>
</tr>
<tr>
<td></td>
<td>Refer to chapter 3 Store the Manual to the USB device on page 3-1</td>
</tr>
<tr>
<td></td>
<td>Confirm all of the above status, and restart the online manual function after fixed</td>
</tr>
<tr>
<td></td>
<td>the status.</td>
</tr>
<tr>
<td>Failed to access file.</td>
<td>Check if the USB device is securely connected to the device.</td>
</tr>
<tr>
<td>I finished the Online Manual.</td>
<td></td>
</tr>
<tr>
<td>Space capacity of memory is short.</td>
<td>Terminate the other activate applications.</td>
</tr>
<tr>
<td>I finished the Online Manual.</td>
<td></td>
</tr>
<tr>
<td>SDK error occurred.</td>
<td>An error occurs during the internal processing.</td>
</tr>
<tr>
<td>I finished the Online Manual.</td>
<td>Restart the online manual function.</td>
</tr>
<tr>
<td>After switching language, file not found.</td>
<td>Store the different manual which is written another language to the USB device.</td>
</tr>
<tr>
<td>I finished the Online Manual.</td>
<td>After stored the manual, restart the online manual function, and switch the</td>
</tr>
<tr>
<td>Search string not found.</td>
<td>language.</td>
</tr>
<tr>
<td>Invalid page index.</td>
<td>Type the numerical character from 1 to the last page number.</td>
</tr>
</tbody>
</table>
DX100 OPTIONS
INSTRUCTIONS
FOR ONLINE MANUAL FUNCTION

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