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

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS
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.

Part Number: 158834-1CD
Revision: 0
MANDATORY

• This manual explains the pendant remote display for the DX100 system and general operations. 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 Instruction 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 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 when the emergency stop buttons on the front door of the DX100 and programming pendant are pressed. 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.

*Fig. : 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.

*Fig. : 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 persons are present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
  - Turning ON the DX100 power
  - 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 are problems. The emergency stop buttons are located on the right of the front door of the DX100 and the programming pendant.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, 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 the controller</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>“Axis Keys” and “Numeric Keys” 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 “+” 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**

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.
Explanation of Warning Labels

The following warning labels are attached to the manipulator and DX100. Fully comply with the precautions on the warning labels.

**WARNING**

- The label described below is attached to the manipulator. Observe the precautions on the warning labels. Failure to observe this caution may result in injury or damage to equipment. Please refer to the manipulator manual for the warning label location.

- The following warning labels are attached to DX100. Observe the precautions on the warning labels. Failure to observe this warning may result in injury or damage to equipment. Please refer to the DX100 INSTRUCTIONS for the warning label location.
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</tr>
</thead>
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1 Introduction

1.1 Overview

This manual describes how to start and manage the remote display function through the normal pendant user interface rather than accessing it through the Windows CE environment of the pendant.

The DX100 controller has the capability to display the pendant screen and receive input from a remote PC through the remote display function. The Pendant Remote Display is used to start and manage the remote display function (CE-HOST) application from the pendant user interface rather than the Windows CE environment of the pendant.

Fig. 1-1: Layout

1.1.1 System Requirements

Table 1-1: Pendant Remote Display System Requirements for DX100

<table>
<thead>
<tr>
<th>Function</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robot Controller</td>
<td>DX100</td>
</tr>
<tr>
<td>Controller Software</td>
<td>N/A</td>
</tr>
<tr>
<td>DX100 Pendant</td>
<td>64 MB Pendant</td>
</tr>
<tr>
<td>Computer</td>
<td>Pentium 4, 800 MHz or higher processor</td>
</tr>
<tr>
<td>Operating System</td>
<td>Microsoft Windows XP, Vista, Windows 7</td>
</tr>
<tr>
<td>Ethernet Switch</td>
<td>user supplied or P/N 158693</td>
</tr>
</tbody>
</table>
1.2 About this Document

This manual is intended as an introduction and overview for personnel who are familiar with the operation of their Motoman robot model and robot programming.

This User’s Manual provides a description of functionality, usage instructions, as well as application examples for the Pendant Remote Display system. For detailed information on specific system components listed in this document, please refer to the documentation package included with your system.

1.3 Reference to Other Documentation

For additional information refer to the following:

- Motoman Manipulator Manual
- Motoman DX100 Controller Manual (P/N 155494-1CD)
- Motoman DX100 Maintenance Manual (P/N 155492-1CD)
- Motoman DX100 Operator’s Manual
- Motoman DX100 Concurrent I/O Manual (P/N 155491-1CD)
- Motoman INFORM User’s Manual DX100 (P/N 155493-1CD)
- Vendor manuals for system components not manufactured by Yaskawa

1.4 Customer Support Information

If you need technical assistance with any aspect of your Pendant Remote Display application, please contact Motoman Customer Support. Please have the following information ready before you call:

- System Pendant Remote Display
- Robot HP165, HP20, etc.
- Primary Application Select {MAIN MENU} > {SYSTEM INFO} > {VERSION} - APPLI:
- Controller DX100
- Software Version Select {MAIN MENU} > {SYSTEM INFO} > {VERSION} - SYSTEM:
- Robot Serial Number Located on a data plate on the rear of each robot arm
- Robot Sales Order Number Located on a data plate on the front door of the controller
2 Installation and Setup

2.1 Hardware Setup

Installation of the ethernet switch and software are typically performed by a Yaskawa technician. The ethernet switch is installed inside the robot controller and is connected between the programming pendant and the YCP01 board. The customer-supplied computer is then connected to the ethernet switch.

*Fig. 2-1: Layout*

2.2 PC Setup and Configuration

2.2.1 Software

All robot controller software is installed at the factory or by a Yaskawa technician. A copy of the “cehost.exe” application must reside on the customer supplied computer. The “cehost.exe” application is provided on a single DVD-ROM with a browser/installer utility. (Motoman DVD-ROM Browser, P/N 141720-1). You must copy the “cehost.exe” application from the Motoman DVD Browser onto your hard drive; you cannot run the program from the DVD. Please refer to the CD Browser for detailed installation instructions.

1. Insert the DVD-ROM browser into your DVDRom drive.
2. The setup program executes automatically.
Setup executes automatically when the DVD is inserted into the DVD-ROM drive unless auto execute has been disabled on your computer. If the setup program fails to auto execute, refer to the directions on the DVD label for more information. You may be required to reboot your PC before continuing with the installation.

3. Click the [Utilities] button.
4. Click the [Remote Pendant Display Host] button.
5. Select [Software] (for software download) or [Manual] (for manual download).

### 2.2.2 Configure Network Settings

1. Open Network Connections in Control Panel. (Start) > (Control Panel) > (Network Connections).

2. In Network Connections, right-click the desired connection (typically Local Area Connection) and select Properties. The Local Area Connection Properties window appears.

*Fig. 2-2: Local Area Connection Properties window*

3. From the General tab, highlight Internet Protocol (TCP/IP) from the “This connection uses the following items:” list and click on the Properties button. The Internet Protocol (TCP/IP) Properties window appears.
2.2 PC Setup and Configuration

Fig. 2-3: IP Address Setting

4. From the General tab, select the “Use the following IP address” radio button. The recommended IP address is the remote display default value of 10.0.0.3 but the last bit of the IP address is arbitrary and can be set to any value greater than 4. Set the Subnet mask as follows:

IP address: 10.0.0.3
Subnet mask: 255.255.255.0
Default gateway: Leave blank

5. Select the [Use the following DNS server addresses:] radio button.

Preferred DNS server: Leave blank
Alternate DNS server: Leave blank

6. Click [OK] and close all open windows.
3 Operation

3.1 First-Time Startup

The “cehost.exe” program must be running on the computer before starting the remote display pendant application. Any computer firewalls must be configured to permit “cehost.exe” program communications.

1. Run the “cehost.exe” application on the computer.

   \[Fig. 3-1: “cehost.exe” Application\]

2. Start the Pendant Remote Display application on the robot controller by selecting [APPLICATION] button from the main menu and selecting [Remote Display] from the sub menu.

\[CAUTION\]

The customer is responsible for providing trained operators to run the equipment. The customer is also responsible for making sure that all equipment is operated in accordance with the ANSI/RIA R15.06-1999 Robot Safety standard, as well as any other local or state standards.

\[WARNING\]

- Do not use Pendant Remote Display with the Interface Panel function.
- YASKAWA is not responsible for incidents arising from unauthorized use of its products. Unauthorized use voids your product’s warranty.

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\[WARNING\]

- Do not use Pendant Remote Display with the Interface Panel function.
- YASKAWA is not responsible for incidents arising from unauthorized use of its products. Unauthorized use voids your product’s warranty.
3. In the Settings window, enter the Host IP Address of the computer.

The IP addresses for the computer, robot controller and programming pendant must all be set to the same network IP Address (10.0.0.xxx).

4. You must read and accept the user agreement before proceeding.

5. Click the [Connect] button. The pendant screen is displayed in the “cehost.exe” application.
### 3.2 Interface

*Fig. 3-4: Pendant Remote Display Interface*

#### Connect/Disconnect

The [Connect/Disconnect] button allows you to connect or disconnect to the "cehost" application running on a PC.

#### Host IP Address

The "Host IP Address" textbox allows you to enter the PC IP address. Normally that value is set to 10.0.0.3 but can be changed to any address within the 10.0.0.5 and 10.0.0.255 range. The "Host IP Address" can only be set when disconnected from a host PC.

#### Connect on Startup

The "Connect on Startup" checkbox causes the application to attempt to connect to the Host PC when the "Pendant Remote Display" application is first started. A "Delay" value can be entered to delay the connection for the indicated amount of seconds. This allows the "cehost" application on the PC to start before the pendant attempts to connect to it.

#### Hide on Startup

The "Hide on Startup" checkbox cause the application to hide when initially started. Note that the screen may quickly flash on the pendant before disappearing.

#### Close

The "Close" button hides the "Pendant Remote display" application. It can be shown again by selecting [PP APP] ' [Remote Display] from the pendant menu.

#### Mouse Interaction

Mouse clicks are transmitted to the pendant and act as the equivalent of the pendant touch screen interaction. Any action available through the pendant touch screen can be duplicated using the PC mouse.

---

**NOTE**

When the application is running, the button text displays that action taken [Connect] or [Disconnect] if the button is pressed, not [Connect/Disconnect].
Manipulations using the PC mouse are actually more precise than using of the pendant touch screen.

- **Keyboard Interaction**
  
  Keyboard key strokes are also relayed to the pendant. The following lists the keyboard keys and their equivalent pendant keys:
  
  - F1 = Main menu
  - Esc = Cancel
  - Tab = Area key
  - Arrow keys = Pendant arrows
  - Enter = Enter
  - Space = Select
  - Ctrl = Interlock

  **NOTE**  
  Keyboard interaction is not available on all pendant screens.

  Other pendant keys are not available through the computer keyboard.
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FOR PENDANT REMOTE DISPLAY

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