Pro-face with MotoEIP®
QUICKSTART GUIDE

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

MOTOMAN INSTRUCTIONS
MOTOMAN XXXXXX INSTRUCTIONS
DX100 INSTRUCTIONS
DX100 OPERATOR’S MANUAL
DX100 MAINTENANCE MANUAL

The DX100 operator’s manual above corresponds to specific usage.
Be sure to use the appropriate manual.
This system manual provides an overview of the Pro-face with MotoEIP® system. It gives general information about the system, a description of its major components, and the procedures for installation, system operation, and programming. Be sure to read and understand this manual thoroughly before installing and operating the Pro-face with MotoEIP® system.

General items related to safety are listed in Section 2 of the Robot Controller Manual. To ensure correct and safe operation, carefully read the Robot Controller Manual before reading this manual.

Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure that 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 a 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 Yaskawa Pro-face with MotoEIP® display. 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.

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

![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 cabinet of the DX100 controller after use.
  The Programming Pendant can be damaged if it is left in the manipulator’s work area, on the floor, or near fixtures.
• Read and understand the Explanation of Warning Labels in the DX100 Controller Manual before operating the Pro-face with MotoEIP® system.
Before operating the manipulator, check that servo power is turned OFF by pressing the EMERGENCY STOP buttons on the operator station or Programming Pendant (refer to Figure 1). When 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

Release the EMERGENCY STOP button (refer to Figure 2). Once this button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn servo power ON.

Injury may result from unintentional or unexpected manipulator motion.

Figure 2: Release of EMERGENCY STOP Button

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.
- Ensure that you have a safe place to retreat to 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 controller.
- 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 operator station and on the Programming Pendant.
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 the controller</td>
<td>Manipulator cable</td>
</tr>
<tr>
<td>Menu</td>
<td>The menus displayed on screen are denoted with { }. ex. {TOOL}.</td>
</tr>
<tr>
<td>Button</td>
<td>The buttons, check boxes, radio buttons displayed on screen are denoted with [ ]. ex. [Close]; [Sync] check box; [Fast] radio button.</td>
</tr>
</tbody>
</table>

Description of the Operation Procedure

In the explanation of the operation procedure, the expression "Select • • • " means the following operations:

• To move the cursor to the object item and left-click on it with the mouse.
• To pick out the object item by the tab key and press the [Enter] key.

(In case of selecting a menu, use arrow keys instead of the tab key to pick out the object item, then press the [Enter] key.)

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 (refer to Figure 3). Always follow the warnings on the labels.

Also, an identification label with important information is placed on the body of the manipulator. Prior to operating the manipulator, confirm the contents.

Figure 3: Warning Labels Location

WARNING
Do not enter robot work area.

WARNING Label A:

WARNING Label B:

Nameplate:

WARNING Label A:

WARNING Label B:
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   1.1.1 Major Components ...............................................................................................1-3
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1 Introduction

The Pro-face operator station is part of the Yaskawa family of standardized solutions. It is a fully integrated hardware/software system, supported by Yaskawa America Inc. The Pro-face operator interface is mounted in a NEMA enclosure and is available as a stand-alone pedestal or fence mount unit. MotoEIP is used to communicate directly with the robot controller.

*Fig. 1-1: Pro-face with MotoEIP®*

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**NOTE**

The use of this package assumes prior knowledge of Ethernet/IP (Industrial Protocol) communications. For details on the communication protocol, please reference the ODVA specification available through http://www.odva.org

1.1 System Requirements

Pro-face with MotoEIP® works with the DX100 robot controller. System requirements are shown in the table below:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robot Controller</td>
<td>DX100</td>
</tr>
<tr>
<td>Compact Flash memory card (ATA Flash)</td>
<td>64 MB (or larger)</td>
</tr>
<tr>
<td></td>
<td>“CFI-***MBA” made by HAGIWARA sys-com.</td>
</tr>
<tr>
<td></td>
<td>“SDCFBI-<strong>-</strong>***” made by SUN DISK.</td>
</tr>
<tr>
<td>Pro-face Software</td>
<td>Version 4.0 or greater</td>
</tr>
<tr>
<td>MotoEIP Software</td>
<td>MotoEIP v2.0.0 or greater</td>
</tr>
<tr>
<td>Ethernet Cable</td>
<td>8 pin shielded Ethernet crossover cable with M12 connectors (male to male)</td>
</tr>
<tr>
<td></td>
<td>Note: If using a networking hub/switch, you will need industrial Ethernet straight cable (category 5 or more) with RJ-45 LAN connectors.</td>
</tr>
</tbody>
</table>

1.2 About This Document

This manual is intended as an introduction and quick-start guide for personnel who are familiar with the operation of their Yaskawa robot model, Pro-face software, and robot programming.

This Quick Start Guide provides a description of functionality, usage instructions, as well as application examples for the Pro-face operator interface. For detailed information on specific system components, please refer to the documentation package included with your system.

This manual documents a standard Motoman system. If your system is custom or modified, please use this manual in conjunction with the drawings, schematics, and parts listing (Bill of Material) for your specific system. The drawings, schematics, and parts listing are included in the documentation package supplied with your Motoman system.

This manual contains the following sections:

Section 1 – Introduction

This section provides general information about the Pro-face with MotoEIP® display, a list of reference documents, and customer support contact information.

Section 2 – Installation and Setup

This section provides installation procedures for the Pro-face with MotoEIP® display.

Section 3 – Programming

This section provides a quick start overview of loading programs to the Pro-face with MotoEIP® display.
1.2.1 Major Components

The Pro-face with MotoEIP® system includes the following major components:

- Pro-face operator station (pedestal or fence mount)
- DX100 connector plate
- MotoEIP communication software

1.2.2 Optional Equipment

The following optional equipment is available for use with the Pro-face with MotoEIP® system:

- Pro-face GP-Pro Ex software
- Ethernet hub
- 8 pin Ethernet M12 cable shielded (male to male)
- Development computer

1.3 Reference Documentation

For additional information on individual components of the Pro-face with MotoEIP® system, refer to the following documentation that is included with your system:

- Yaskawa DX100 MotoEIP (P/N 157832-1CD)
- Yaskawa Manipulator Manual
- Yaskawa DX100 Controller Manual (P/N 155494-1CD)
- Yaskawa DX100 Maintenance Manual (P/N 155492-1CD)
- Yaskawa Operator's Manual for your Application
- Yaskawa DX100 Concurrent I/O Manual (P/N 155491-1CD)
- Yaskawa DX100 Independent/Coordinated Control Function Manual
- Yaskawa INFORM User’s Manual DX100 (P/N 155493-1CD)
- Vendor manuals for system components not manufactured by Motoman

1.4 Customer Support Information

If you need assistance with any aspect of your Pro-face with MotoEIP® system, please contact Yaskawa Customer Support at the following 24-hour telephone number:

(937) 847-3200

For routine technical inquiries, you can also contact Motoman Customer Support at the following e-mail address:

techsupport@motoman.com
When using e-mail to contact Motoman Customer Support, please provide a detailed description of your issue, along with complete contact information. Please allow approximately 24 to 36 hours for a response to your inquiry.

Please have the following information ready before you call:

- **System**
  - Pro-face with MotoEIP®

- **Robots**
  - 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

**NOTE**

Please use e-mail for routine inquiries only. If you have an urgent or emergency need for service, replacement parts, or information, you must contact Motoman Customer Support at the telephone number shown above.
2 Installation and Setup

The instructions given in this section are general guidelines for installing Pro-face with MotoEIP®. Refer to relevant vendor component manuals for specific installation information (see Section 1.3).

All system components and most hardware items required for installation of the Pro-face operator interface are included with your shipment. There are, however, some required items that the customer must supply, such as typical installation and maintenance tools and special anchor bolts (for pedestal unit).

2.1 Equipment Description

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGP-3300T (6” unit) or AGP-3500T (10.4” unit)</td>
<td>1</td>
</tr>
<tr>
<td>8 pin EuroFast M12 cable shielded crossover (male to male)</td>
<td>1</td>
</tr>
<tr>
<td>MotoEIP</td>
<td></td>
</tr>
<tr>
<td>Robot controller</td>
<td>1</td>
</tr>
<tr>
<td>Personal computer (option)</td>
<td>1</td>
</tr>
<tr>
<td>Pro-face GP-Pro Ex software (option)</td>
<td></td>
</tr>
<tr>
<td>Ethernet hub (option)</td>
<td>1</td>
</tr>
<tr>
<td>Ethernet cable - straight (option)</td>
<td>2</td>
</tr>
</tbody>
</table>

Fig. 2-2: Standard Equipment
2.1.1 Pro-face Operator Station

The Pro-face operator interface is mounted in a NEMA enclosure and is available as a stand-alone pedestal or fence mount unit. Both the 6” and 10.4” units provide a bright, crisp, and clear QVGA display with a wide angle viewing area, and a high resolution no-grid analog resistive touch screen for high level screen clarity. For more detailed information, refer to the Pro-face documentation included with your system.

- **Controller Cable Connector**
  Provides power for the unit and E-Stop and Cycle Start signal connections.

- **M12 Industrial Ethernet Connector**
  Provides communication between the DX100 controller and the Pro-face operator interface.

- **Cycle Start/Cycle Latched**

  ![WARNING]

  The operation of the CYCLE START/CYCLE LATCHED button is dependent on the structure of the Control Master job. Any alteration of the Control Master Job could result in injury to personnel or damage to equipment.

  Pushing the green CYCLE START/CYCLE LATCHED button initiates a positioner sweep cycle if the robots are in HOME (Safe) position. If the CYCLE START/CYCLE LATCHED push button is pressed while the robots are welding, or otherwise not in HOME (Safe) position, the Cycle Start command is “latched” into (stored in) the DX100 controller circuitry. When the robots return to HOME (Safe) position, the “latched” Cycle Start command is executed and the positioner sweeps. Circuitry in the DX100 controller prevents the positioner from continuously cycling should the operator depress and hold the CYCLE START/CYCLE LATCHED push button.

- **Emergency Stop (E-STOP)**
  Pressing the red Emergency Stop (E-STOP) button removes servo power and stops all system operation. Brakes are applied to the robot, and all motion is stopped.
2 Installation and Setup

2.2 Installation

2.2.1 Pro-face Operator Station Installation

1. Unload the operator station.
2. Remove the protective plastic wrapping from the operator station.
3. Inspect the equipment for shipping damage.
4. Locate the operator station outside your system’s safety fencing and mount to the fence (fence mount unit) or anchor to foundation (pedestal).

**NOTE** Notify your shipping contractor if you notice any shipping damage.

**CAUTION**

Be absolutely certain of the correct location for the pedestal operator station before securing it with anchor (lag) bolts.

2.2.2 Cable Connections (Standard)

After the Pro-face operator station is anchored in it’s correct location, locate the interconnect cables for the system and route them according to the system drawings and schematics included in your system documentation package.

A shielded, male-to-male, M12 industrial ethernet cable (8-Pin) is required for all ethernet connections. If you are not using a switch/router, you may require a cross-over Ethernet cable. Be sure to ground only one end of the ethernet cable to avoid ground loop problems.

*Fig. 2-3: Standard Equipment Connections*
2.2.3 Cable Connections (Ethernet Hub/Switch Option)

A managed switch is recommended for use on EtherNet/IP networks with multiple devices. The managed switch should also have IGMP snooping enabled to reduce multicast packet traffic to individual nodes.

*Fig. 2-4: Optional Hub Connections*

Connect the Ethernet hub/switch using industrial Ethernet cable (category 5 or more) to the CN104 RJ-45 LAN connector located on the front face of the YCP01 board inside the CPU rack. Cutouts are available on the sides of the controller cabinet for cable routing to the development computer.

*NOTE*

There are two RJ-45 connectors at the front face of the YCP01 board. CN104 is the bottom one used for the Ethernet function. Do not use the CN105 connection as it is used exclusively for the programming pendant.

*Fig. 2-5: Ethernet Connection*
2.3 PC Setup

2.3.1 Pro-face Software Setup

Install the Pro-face GP-Pro EX software. Refer to Pro-face documentation for PC requirements and detailed instructions.

1. Start the GP-Pro EX software. The Initial Wizard screen appears.
2. Use the drop down menus to select your specific Pro-face model.
3. Configure the DX100 controller as an ODVA E/IP PLC.
4. Click the [New Screen] button to finish the wizard.
5. Click the [System Settings] button on the upper left of the screen.

6. Click on the “Device/PLC” link from the menu on the left to configure the communication settings with the DX100 controller.

- **Wait To Send**
  Sets a delay, in milliseconds, between each E/IP explicit message sent from the device. A higher number improves performance of the DX100. A lower number improves responsiveness of the Pro-face HMI. Recommended setting is 30 - 60 ms. Lower values can be used.

- **Device Name**
  Provides a string label for the “PLC” (DX). Change this to something meaningful, such as “DX100.”

- **IP Address**
  The button next to the Device Name text box allows you to specify the IP address of the DX100. The robot controller must be set with a static IP address.
2.3.2 Configure Network Settings (for Ethernet Transfer)

When connecting a development computer directly to the Pro-face operator interface, you will need to set the computer’s IP address. This is only required when transferring programming directly to the Pro-face unit via a LAN connection. Refer to Section 3.2 for instruction on transferring programming using a CF/USB memory card.

The following steps are for demonstration purposes only. Contact your network administrator for specifics regarding your computer network.

1. Open Network Connections in Control Panel. {Start} > {Settings} > {Control Panel} > {Network Connections}.

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

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 Installation and Setup

2.3 PC Setup

Fig. 2-7: IP Address Settings

4. Select the [Use the following IP address] radio button. Use the local IP address “192.168.255.xx” (xx is a decimal number from 0 to 255). Set the last bit of the IP address to an known open value and set the Subnet mask as follows:

   IP address: 192.168.255.11
   Subnet mask: 255.255.255.0
   Default gateway: Leave blank

   NOTE The IP addresses for the PC, robot controller and Pro-face interface must all be set on the same network.

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

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

6. Click [OK] and close all open windows.
2.4 Custom Control Example

This section provides one example of how to set up a custom control on your Pro-face HMI to communicate over MotoEIP. Please refer to the MotoEIP user manual for details on all possible settings.

1. With GP-Pro EX software running, click the [Edit] button at the top of the screen.

2. Select a control (data display, button, lamp, etc.) from the menu bar and add it to the screen.

3. Double click the control. The Data Display configuration window appears.

4. Click on the input address button. The Input Address window appears.

5. Specify the contents of the explicit message linked with this control. Reference the MotoEIP Pro-face object library for details on available messages. The above example displays the value of robot variable I000.
3 Programming

The Pro-face operator interface is programmed using the GP-Pro EX HMI Development Software. Once a program is created, it can be transferred to the display using either a direct Ethernet connection or indirectly using a Compact Flash or USB card.

3.1 EtherNet

Please refer to Section 33.3 “Transferring Project Files via Ethernet” of the Pro-face GP-Pro EX documentation for detailed instructions.

3.2 Compact Flash / USB

3.2.1 Load Program onto CF/USB Card

To load a program into the display using Compact Flash, you must have a CF card formatted as FAT32.

Observe the following precautions when using a CF card.

• Handle compact flash with care to protect the stored data.

• Do not store compact flash where strong static electricity or electronic noise may occur.

• Do not drop or exert any shock or strong force to the compact flash.

• Do not remove the compact flash or turn OFF power when accessing the compact flash (writing-in or reading-out compact flash data). The data in the compact flash may be lost.

• Back up data from the compact flash to other media such as floppy disks or hard disks.

1. Start the GP-Pro EX software.

2. Click the [Transfer Project] button from the top menu.

   The Transfer Tool window appears.
3. Click the [Memory Loader] button.

4. Click the [Create Backup File] button.

5. Navigate to the drive for your CF card and click OK.

6. Wait for the process to finish.

**3.2.2 Transfer Program to Display**

1. Turn the DX100 power OFF.
2. Open the operator station enclosure.
3. With a program loaded on the CF/USB card, insert card into the display unit. Do not forcibly insert the card.
4. After inserting the card, be sure to close the cover before starting operation.

1. Turn DX100 power ON.
2. Once the Pro-face unit completes boot-up, touch the top-right then the bottom-left corner, or top-left then bottom-right corner.

3. When transferring project data to the display unit for the first time (for a newly purchased display unit), the “Initial Transfer Mode” screen appears when you turn power ON.

4. Touch [CF/USB] > [CF startup] to launch the Memory Loader Tool.

The Memory Loader Tool launches.

5. Touch the [Download (CF->Main Unit)] button.

6. Touch the [Select File] button and select the file you want to transfer and touch [Start].
3. Enter password (if required) and touch the [Start] button.

**NOTE** Once you start downloading, all project data on the display unit is deleted, including data in internal memory.
Pro-face with MotoEIP®
QUICKSTART GUIDE

HEAD OFFICE
2-1 Kurosaki-Shiroishi, Yahatanishi-ku, Kitakyusyu-shi, 806-0004, Japan
Phone +81-93-645-7745 Fax +81-93-645-7746

MOTOMAN INC. HEADQUARTERS
305 Liberty Lane, West Carrollton, OH 45449, U.S.A.
Phone +1-937-847-6200 Fax +1-937-847-6277

MOTOMAN ROBOTICS EUROPE AB
Franska Vagen 10, Box 4004, SE-390 04 Kalmar, Sweden
Phone +46-480-417800 Fax +46-480-417999

MOTOMAN ROBOTEC GmbH
Kammerfeld strasse 1, 85391 Allershausen, Germany
Phone +49-8166-90-100 Fax +49-8166-90-103

YASKAWA ELECTRIC KOREA CORPORATION
1F, Samyang Bldg. 89-1, Shinchun-dong, Doni-Ku, Daegu, Korea
Phone +82-53-352-7844 Fax +82-53-362-7845

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
151 Lorong Chuan, #04-01, New Tech Park, Singapore 556741
Phone +65-6292-3000 Fax +65-6289-3003

YASKAWA ELECTRIC (MALAYSIA) SDN. BHD.
Unit 47-1 and 2, Jalan PJU 5/G, Dataran Sunway, Kota Damansara, 47810, Petaling Jaya Selangor, Malaysia
Phone +60-3614-08919 Fax +60-3614-08929

YASKAWA ELECTRIC (THAILAND) CO., LTD.
252/246, 4th Floor. Muang Thai-Phatra office Tower II Rechadapisek Road, Huaykwang Bangkok 10320, Thailand
Phone +66-2-693-2200 Fax +66-2-693-4200

SHOU GANG MOTOMAN ROBOT CO., LTD.
No.7, Yongchang-North Road, Beijing Economic and Technological and Development Area, Beijing 100076, China
Phone +86-10-6788-0541 Fax +86-10-6788-0542

MOTOMAN MOTHERSON ROBOTICS LTD.
910, DLF Galleria, DLF City Phase IV, Gurgaon - 122002 Haryana, india
Phone +91-124-414-0514 Fax +91-124-414-0816

Specifications are subject to change without notice for ongoing product modifications and improvements.