MOTOMAN-MH24, MA2010 OPTIONS INSTRUCTIONS

FOR MOTOR COVER ASSEMBLY/DISASSEMBLY PROCEDURES

TYPE
YR-MH00024-** (WITH S-, L-AXIS MOTOR COVER (OPTION))
YR-MH02010-** (WITH S-, L-AXIS MOTOR COVER (OPTION))

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

MOTOMAN INSTRUCTIONS
MOTOMAN-MH24 INSTRUCTIONS
MOTOMAN-MA2010 INSTRUCTIONS
DX200 INSTRUCTIONS
DX200 OPERATOR’S MANUAL (for each purpose)
DX200 MAINTENANCE MANUAL

The DX200 operator’s manual above corresponds to specific usage. Be sure to use the appropriate manual.

Part Number: 173231-1CD
Revision: 1
MANDATORY

• This manual explains the motor cover assembly/disassembly procedures of the MOTOMAN-MH24 and MA2010. Read this manual carefully and be sure to understand its contents before handling the DX200.

• General items related to safety are listed in Chapter 1: Safety of the DX200 Instructions. To ensure correct and safe operation, carefully read the DX200 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.
We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems (ANSI/RIA R15.06-2012). You can obtain this document from the Robotic Industries Association (RIA) at the following address:

Robotic Industries Association  
900 Victors Way  
P.O. Box 3724  
Ann Arbor, Michigan 48106  
TEL: (734) 994-6088  
FAX: (734) 994-3338  
www.roboticsonline.com

Ultimately, well-trained personnel are the best safeguard against accidents and damage that can result from improper operation of the equipment. The customer is responsible for providing adequately trained personnel to operate, program, and maintain the equipment. NEVER ALLOW UNTRAINED PERSONNEL TO OPERATE, PROGRAM, OR REPAIR THE EQUIPMENT!

We recommend approved Yaskawa training courses for all personnel involved with the operation, programming, or repair of the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the DX200.

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

**DANGER**
Indicates an imminent hazardous situation which, if not avoided, could result in death or serious injury to personnel.

**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.

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

• Before operating the manipulator, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the DX200 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:
  – Be sure to use a lockout device to the safeguarding when going inside. Also, display the sign that the operation is being performed inside the safeguarding and make sure no one closes the safeguarding.
  – 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 DX200.
  – 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 DX200 and the programming pendant.
Definition of Terms Used In this Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and the manipulator 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>DX200 controller</td>
<td>DX200</td>
</tr>
<tr>
<td>DX200 programming pendant</td>
<td>Programming pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and the DX200</td>
<td>Manipulator cable</td>
</tr>
</tbody>
</table>

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 DX200 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 DX200 Instructions before operating the manipulator:
Explanation of Warning Labels

The following warning labels are attached to the manipulator. 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 Label Locations (MH24)

Nameplate:

WARNING Label A:

WARNING Label B:

Moving parts may cause injury

Do not enter robot work area.
Figure 4: Warning Label Locations (MA2010)

- **WARNING Label B:**
  - Moving parts may cause injury

- **WARNING Label A:**
  - Do not enter robot work area.

**Nameplate:**

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YASKAWA MOTOMAN
MODEL: 
TYPE: 
FWLOAD: NL
MASS: NL
ORDER NO.: 
DATE: 
SERIAL NO.: 

YASKAWA ELECTRIC CORPORATION
5-1 Iwasaki-cho, Kitashinagawa,
Minato-ku, Tokyo, Japan
MADE IN JAPAN
NJ3247
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Customer Support Information

If you need assistance with any aspect of your MH24 and MA2010 Motor Cover Assembly system, please contact Motoman 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:

technicalsupport@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 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.

Please have the following information ready before you call Customer Support:

- System: MH24 and MA2010 Motor Cover Assembly
- Robots: ___________________________
- Primary Application: ___________________________
- Controller: DX200
- Software Version: Access this information on the Programming Pendant’s LCD display screen by selecting {MAIN MENU} - {SYSTEM INFO} - {SOFTWARE INFO}
- Robot Serial Number: Located on the robot data plate
- Robot Sales Order Number: Located on the DX200 controller data plate
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1 Introduction

This manual explains how to assemble and disassemble the S-, L-axis motor cover of the MOTOMAN-MH24 and MA2010 with the S-, L-axis motor cover (option). Before handling this manipulator, read this instruction manual throughly together with the following manuals.

MOTOMAN-MH24 INSTRUCTIONS
MOTOMAN-MA2010 INSTRUCTIONS
2 Mounting the S-, L-axis Motor Cover

The following figures show where to mount the S-, L-axis motor cover. Note that the manipulator cannot be lifted after the motor cover is mounted.

Fig. 2-1: Location to Mount the S-, L-axis Motor Cover (MH24)

Fig. 2-2: Location to Mount the S-, L-axis Motor Cover (MA2010)
3 Assembly and Disassembly of the Motor Cover Parts

• Refer to Fig. 3-1 “Assembly and Disassembly of the Motor Cover Parts”.

NOTE
The manipulator cannot be lifted after the motor cover is mounted. Before assembling the motor cover, install the manipulator.

Assembly
1. Turn OFF the DX200 power supply.
2. Temporarily mount the bracket on the S-head with the hexagon socket head cap screw and conical spring washer. (Torque management is not necessary.)
   For this procedure, refer to Fig. 3-2 “Mounting the Bracket”. Note that the bracket should be mounted with its side face parallel with the reference face of the S-head.
3. Temporarily mount the bracket on the S-head with the hexagon socket head cap screw and conical spring washer. (Torque management is not necessary.)
   For this procedure, refer to Fig. 3-2 “Mounting the Bracket”. Note that the bracket should be mounted with its side face parallel with the reference face of the S-head.
4. Temporarily mount the cover on the S-head with the hexagon socket head cap screws and conical spring washers. (Torque management is not necessary.)
5. Temporarily tighten the hexagon socket head cap screws and conical spring washers and check for the mounting.
   If the screws cannot be fully tightened, remove the cover and adjust the mounting position of the bracket.
6. After confirming the hexagon socket head cap screws and conical spring washers are fully tighten, remove the cover. Then tighten the hexagon socket head cap screws and conical spring washers with the tightening torque shown in Table 3-1 “S-, L-axis Motor Cover Parts Checklist”.
7. Mount the cover on the S-head with the hexagon socket head cap screws and conical spring washers. Then tighten them with the tightening torque shown in Table 3-1.
8. Mount the cover on the S-head with the hexagon socket head cap screws and conical spring washers. Then tighten them with the tightening torque shown in Table 3-1.
9. Mount the cover on the S-head with the hexagon socket head cap screws and conical spring washers. Then tighten them with the tightening torque shown in Table 3-1.

NOTE
Do not firmly tighten the hexagon socket head cap screws with the mounting faces between the cover and brackets tilted. This may lead to the deformation of the cover, the damage of the screws, etc.
Disassembly
1. Turn OFF the DX200 power supply.
2. Remove the hexagon socket head cap screws \( \odot \) from the cover \( \odot \).
3. Remove the hexagon socket head cap screws \( \odot \) from the cover \( \odot \).
4. Unscrew the hexagon socket head cap screws \( \odot \) and remove the cover \( \odot \) from the S-head.
5. Unscrew the hexagon socket head cap screw \( \odot \) and remove the bracket \( \odot \) from the S-head.
6. Unscrew the hexagon socket head cap screw \( \odot \) and remove the bracket \( \odot \) from the S-head.

Table 3-1: S-, L-axis Motor Cover Parts Checklist

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Qty</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Bracket HW1406473-1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>②</td>
<td>Hexagon socket head cap screw M5 (length:16mm) Conical spring washer 2H-5</td>
<td>1 each</td>
<td>Tightening Torque 6 N•m</td>
</tr>
<tr>
<td>③</td>
<td>Bracket HW1406474-1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>④</td>
<td>Hexagon socket head cap screw M5 (length:16mm) Conical spring washer 2H-5</td>
<td>1 each</td>
<td>Tightening Torque 6 N•m</td>
</tr>
<tr>
<td>⑤</td>
<td>Cover HW1200432-A</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>⑥</td>
<td>Hexagon socket head cap screw M6 (length:12mm) Conical spring washer 2H-6</td>
<td>2 each</td>
<td>Tightening Torque 10 N•m</td>
</tr>
<tr>
<td>⑦</td>
<td>Hexagon socket head cap screw M6 (length:12mm) Conical spring washer 2H-6</td>
<td>2 each</td>
<td>Tightening Torque 10 N•m</td>
</tr>
<tr>
<td>⑧</td>
<td>Hexagon socket head cap screw M6 (length:12mm) Conical spring washer 2H-6</td>
<td>2 each</td>
<td>Tightening Torque 10 N•m</td>
</tr>
</tbody>
</table>
Fig. 3-1: Assembly and Disassembly of the Motor Cover Parts

Mount the bracket in parallel with the S-head reference face.

Fig. 3-2: Mounting the Bracket

Mount the bracket in parallel with the S-head reference face.
MOTOMAN-MH24, MA2010 OPTIONS
INSTRUCTIONS
FOR MOTOR COVER ASSEMBLY/DISASSEMBLY PROCEDURES

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