Procedures described in this maintenance manual should be carried out by the person who took the maintenance-relevant trainings offered by YASKAWA.

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

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□□ INSTRUCTIONS
DX200/YRC1000 OPTIONS INSTRUCTIONS FOR HAND GUIDING FUNCTION DX200 INSTRUCTIONS
DX200 OPERATOR’S MANUAL (for each purpose)
DX200 MAINTENANCE MANUAL
DX200 OPTIONS INSTRUCTIONS FOR FUNCTIONAL SAFETY BOARD OPERATION
YRC1000 INSTRUCTIONS
YRC1000 OPERATOR’S MANUAL (GENERAL) (SUBJECT SPECIFIC)
YRC1000 MAINTENANCE MANUAL
YRC1000 OPTIONS INSTRUCTIONS FOR FUNCTIONAL SAFETY FUNCTION
YRC1000 ALARM CODES (MAJOR ALARMS) (MINOR ALARMS)

Please have the following information available when contacting Yaskawa Customer Support:

- System
- Primary Application
- Software Version (Located on Programming Pendant by selecting: (Main Menu) - (System Info) - {Version})
- Robot Serial Number (Located on robot data plate)
- Robot Sales Order Number (Located on controller data plate)

Part Number: 186985-1CD
Revision: 0
DANGER

- This manual explains the hand guiding function of the DX200/YRC1000 system. Read this manual carefully and be sure to understand its contents before handling the DX200/YRC1000. Any matter not described in this manual must be regarded as "prohibited" or "improper".

- General information related to safety are described in "Chapter 1. Safety" of the DX200/YRC1000 INSTRUCTIONS. To ensure correct and safe operation, carefully read "Chapter 1. Safety" of the DX200/YRC1000 INSTRUCTIONS.

CAUTION

- In some drawings in this manual, protective covers or shields are removed to show details. Make sure that all the covers or shields are installed in place 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 the product warranty.
NOTES FOR SAFE OPERATION

Read this manual carefully before installation, operation, maintenance, or inspection of the DX200/YRC1000.

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

DANGER
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Safety Signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards.

WARNING
Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. Hazards identified by the signal word WARNING present a lesser degree of risk of injury or death than those identified by the signal word DANGER.

CAUTION
Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

NOTICE
NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol should not be used with this signal word. As an alternative to “NOTICE”, the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury.

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 “DANGER”, “WARNING” and “CAUTION”.
Before operating the manipulator, make sure the servo power is turned off by pressing the emergency stop button on the front door of the DX200/YRC1000, on the programming pendant, and on the hand guiding device respectively. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

If operation of the manipulator cannot be stopped in an emergency, personal injury and/or equipment damage may result.

Fig. : Emergency Stop Button

Before releasing the emergency stop, make sure to remove the obstacle or error caused the emergency stop, if any, and then turn the servo power ON.

Failure to observe this instruction may cause unintended movement of the manipulator, which may result in personal injury.

Fig. : Release of Emergency Stop

Observe the following precautions when performing a teaching operation within the manipulator's operating range:

– Be sure to perform lockout by putting a lockout device on the safety fence when going into the area enclosed by the safety fence. In addition, the operator of the teaching operation must display the sign that the operation is being performed so that no other person closes the safety fence.

– View the manipulator from the front whenever possible.

– Always follow the predetermined operating procedure.

– Always keep in mind emergency response measures against the manipulator’s unexpected movement toward a person.

– Ensure a safe place to retreat in case of emergency.

Failure to observe this instruction may cause improper or unintended movement of the manipulator, which may result in personal injury.

Confirm that no person is present in the manipulator’s operating range and that the operator is in a safe location before:

– Turning ON the DX200/YRC1000 power

– Moving the manipulator by using the programming pendant

– Running the system in the check mode

– Performing automatic operations
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the DX200/YRC1000 controller, the DX200 programming pendant or the YRC1000 programming pendant, and the power 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 or YRC1000 controller</td>
<td>Controller</td>
</tr>
<tr>
<td>DX200 programming pendant or YRC1000 programming pendant</td>
<td>Programming pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and the controller</td>
<td>Power 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 /Symbol Keys</td>
<td>The keys which have characters or symbols printed on them are denoted with [].</td>
</tr>
<tr>
<td></td>
<td>e.g. [ENTER]</td>
</tr>
<tr>
<td>Axis Keys /Numeric Keys</td>
<td>[Axis Key] and [Numeric Key] are generic names for the keys for axis operation and number input.</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, e.g. [SHIFT]+[COORD].</td>
</tr>
<tr>
<td>Mode Switch</td>
<td>Mode Switch can select three kinds of modes that are denoted as follows: REMOTE, PLAY or TEACH. (For YRC1000, the switch names are denoted as symbols)</td>
</tr>
<tr>
<td>Button</td>
<td>The three buttons on the upper side of the programming pendant are denoted as follows: START, HOLD, or EMERGENCY STOP. (For YRC1000, the button names are denoted as symbols)</td>
</tr>
<tr>
<td>Displays</td>
<td>The menu displayed in the programming pendant is denoted with {}.</td>
</tr>
<tr>
<td></td>
<td>e.g. {JOB}</td>
</tr>
</tbody>
</table>

For DX200:

- Mode switch
- Start button
- Hold button
- Emergency stop button
- Page key
- Coordinate key
- Axis keys
- Shift key
- Enter key
- Numeric keys

For YRC1000:

- Start button
- Mode switch
- Hold button
- Emergency stop button
- Page key
- Coordinate key
- Axis keys
- Shift key
- Enter key
- Numeric keys

*The button/switch names are denoted as symbols.
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 [SELECT] 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 ™ are omitted.
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      7.2.2 YRC1000 ..................................................................................................7-4
1 Overview

This manual describes the hand guiding function to use for the DX200/ YRC1000.

The hand guiding function consists of the robot, the robot controller, the 6- axis force sensor, the hand guiding device, the presence detection sensor prepared by the customer, and the jig prepared by the customer.

1.1 System Configuration

The system configuration example for the hand guiding device is as follows. There are two types of the hand guiding devices: handle type and grip type.

System configuration example for the handle type
1 Overview
1.1 System Configuration

System configuration example for the grip type

Presence Detection Sensor
※Prepared by customer

Controller

Power cable

Robot

Jig
※Prepared by customer

System configuration example for the grip type
1.2 Component Parts List

The component parts list for the hand guiding device is as follows.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name</th>
<th>Type</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>Force sensor</td>
<td>WEF-6A1000-30-RG24-YB3</td>
<td>1</td>
</tr>
<tr>
<td>②</td>
<td>Hand guiding device (handle type)</td>
<td>HS1370872-A</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Hand guiding device (grip type)</td>
<td>HS1370870-A</td>
<td></td>
</tr>
<tr>
<td>③</td>
<td>Force sensor cable (controller side)</td>
<td>HB1370942-XX</td>
<td>1 or more</td>
</tr>
<tr>
<td>④</td>
<td>Force sensor cable (robot side)</td>
<td>HB1370943-XX</td>
<td>1</td>
</tr>
<tr>
<td>⑤</td>
<td>Hand guiding cable (controller side)</td>
<td>HS1470487-XX</td>
<td>1 or more</td>
</tr>
<tr>
<td>⑥</td>
<td>Hand guiding cable (robot side)</td>
<td>HS1470486-XX</td>
<td>1</td>
</tr>
<tr>
<td>⑦</td>
<td>Short circuit connector</td>
<td>HS1470614-A</td>
<td>1</td>
</tr>
</tbody>
</table>

* XX of the cable type shows the specified cable length.

The following bolts for mounting the hand guiding device are recommended.

<table>
<thead>
<tr>
<th>Name</th>
<th>Size</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolt</td>
<td>Hexagon socket head cap screw M6 (length: 20 mm)</td>
<td>4</td>
</tr>
<tr>
<td>Conical spring washer</td>
<td>2H-6</td>
<td>4</td>
</tr>
</tbody>
</table>

Tightening torque

Hand guiding device: 10 N•m

   Force sensor: 4.1 N•m
1.3 Components of Hand Guiding Device

Components of the hand guiding device are as follows.

Connect the hand guiding device with the controller to install to the force sensor.

The location of the screw holes on the hand guiding device and the force sensor is as shown in the figures below.

The handle type of the hand guiding device can be installed at an angle of 45°, 135°, 225°, and 315° to the force sensor.

The grip type of the hand guiding device can be installed at an angle of 0°, 90°, 180°, and 270° to the force sensor.
2 Connection Method of Device

2.1 Connection for Hand Guiding Device

Connect the hand guiding device as shown below.

* The figure below shows an example of connecting two cables of the controller side.

![Diagram of hand guiding device connections]

DX200 or YRC1000

Hand guiding cable
(Controller side) HS1470487-XX
(Controller side) HS1470487-XX
(Robot side) HS1470486-XX

Short circuit connector
HS1470614-A

Force sensor cable
(Controller side) HB1370942-XX
(Controller side) HB1370942-XX
(Robot side) HB1370943-XX

Grip type
HS1370870-A

Handle type
HS1370872-A

Force Sensor
2.2 Cable Connection Inside Control Panel

2.2.1 DX200

The cable (HS1370698) inside the DX200 is connected as shown in the figure below before shipment.
The cable inside the controller is connected as follows.

<table>
<thead>
<tr>
<th>Connector</th>
<th>PIN No.</th>
<th>Cable color</th>
<th>Marking notation</th>
<th>Connection destination</th>
<th>Terminal block</th>
<th>Terminal No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG1</td>
<td>1</td>
<td>BLUE</td>
<td>EXESP1+</td>
<td>Machine safety terminal block board (JANCD-YFC22-E)</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>BLUE</td>
<td>EXESP2+</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>GREEN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>YELLOW</td>
<td>9XT-B3 (IN01)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>WHITE</td>
<td>9XT-B16 (024VU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>GREEN</td>
<td>9XT-B18 (+24VU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>WHITE</td>
<td>9XT-B10 (OUT01)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>RED</td>
<td>9XT-A3 (IN02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>WHITE</td>
<td>9XT-A16 (024VU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>PURPLE</td>
<td>9XT-A18 (+24VU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>WHITE</td>
<td>9XT-A10 (OUT02)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>YELLOW</td>
<td>1 (XIN1_1+)</td>
<td>Functional safety terminal block board (JANCD-YFC24-E)</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>BLUE</td>
<td>3 (XIN1_2+)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>BLUE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HG2</td>
<td>1</td>
<td>BLUE</td>
<td>EXESP1-</td>
<td>Machine safety terminal block board (JANCD-YFC22-E)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>BLUE</td>
<td>EXESP2-</td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>GREEN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>BROWN</td>
<td>9XT-B4 (IN03)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>YELLOW</td>
<td>9XT-B17 (024VU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>WHITE</td>
<td>9XT-B19 (+24VU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>GREEN</td>
<td>9XT-B11 (OUT03)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>WHITE</td>
<td>9XT-A4 (IN04)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>RED</td>
<td>9XT-A17 (024VU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>WHITE</td>
<td>9XT-A19 (+24VU)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>PURPLE</td>
<td>9XT-A11 (OUT04)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>YELLOW</td>
<td>2 (XIN1_1-)</td>
<td>Functional safety terminal block board (JANCD-YFC24-E)</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>BLUE</td>
<td>4 (XIN1_2-)</td>
<td></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>14</td>
<td>BLUE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>BLUE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>BLUE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.2.2 YRC1000

The cable (HS1371179) inside the YRC1000 is connected as shown in the figure below before shipment.
The cable inside the controller is connected as follows.

<table>
<thead>
<tr>
<th>Connector</th>
<th>PIN No.</th>
<th>Cable color</th>
<th>Marking notation</th>
<th>Connection destination</th>
</tr>
</thead>
<tbody>
<tr>
<td>HG1</td>
<td></td>
<td></td>
<td></td>
<td>Terminal block</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>BLUE</td>
<td>-X18-5 (EXESP1+)</td>
<td>Safety terminal block board</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>GREEN</td>
<td>-X18-7 (EXESP2+)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>YELLOW</td>
<td>-X54-B3 (IN01)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>WHITE</td>
<td>-X54-B16 (024VU)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>GREEN</td>
<td>-X54-B18 (+24VU)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>WHITE</td>
<td>-X54-B10 (OUT01)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>RED</td>
<td>-X54-A3 (IN02)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>WHITE</td>
<td>-X54-A16 (024VU)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>PURPLE</td>
<td>-X54-A18 (+24VU)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>WHITE</td>
<td>-X54-A10 (OUT02)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>11</td>
<td>YELLOW</td>
<td>-X181-1 (XIN1_1+)</td>
<td>Expansion safety terminal block board</td>
</tr>
<tr>
<td>12</td>
<td>12</td>
<td>BLUE</td>
<td>-X181-3 (XIN1_2+)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>BLUE</td>
<td>-X18-6 (EXESP1-)</td>
<td>Safety terminal block board</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>BLUE</td>
<td>-X18-8 (EXESP2-)</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>BROWN</td>
<td>-X54-B4 (IN03)</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>16</td>
<td>YELLOW</td>
<td>-X54-B17 (024VU)</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>17</td>
<td>WHITE</td>
<td>-X54-B19 (+24VU)</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>18</td>
<td>GREEN</td>
<td>-X54-B11 (OUT03)</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>19</td>
<td>WHITE</td>
<td>-X54-A4 (IN04)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>RED</td>
<td>-X54-A17 (024VU)</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>WHITE</td>
<td>-X54-A19 (+24VU)</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>22</td>
<td>PURPLE</td>
<td>-X54-A11 (OUT04)</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>23</td>
<td>YELLOW</td>
<td>-X181-2 (XIN1_1-)</td>
<td>Expansion safety terminal block board</td>
</tr>
<tr>
<td>24</td>
<td>24</td>
<td>BLUE</td>
<td>-X181-4 (XIN1_2-)</td>
<td></td>
</tr>
</tbody>
</table>
3 Replacement and Removal of Hand Guiding Device

3.1 Replacement of Hand Guiding Device

Replacement procedure for the force sensor is described as follows.

The replacement and mounting must be performed carefully since the hand guiding device is precision equipment.

1. Move the robot for easy removal of the hand guiding device.
2. Turn OFF the controller.
3. Remove the connector of the hand guiding cable.
4. Loosen the bolt which is fixing the hand guiding device, and remove the hand guiding device from the force sensor.
5. Mount the hand guiding device for replacement.

* Tightening torque: 10 [N•m]

3.2 Removal of Hand Guiding Device

The hand guiding device needs to be removed in case of the following reasons.

The handling must be performed carefully since the hand guiding device is precision equipment.

- To remove the hand guiding device since the hand guiding function is not necessary.
- To operate the robot temporarily without the hand guiding device.

1. Short-circuit the external emergency stop signal by following chapter 7.2 “Robot Operating Method When Hand Guiding Device Disconnected” in “DX200/YRC1000 OPTIONS INSTRUCTIONS FOR HAND GUIDING FUNCTION (HW1485706)”.

Remove the hand guiding device by following the procedures from No.1 to No.4 in chapter 3.1 “Replacement of Hand Guiding Device”.
4 Replacement of Hand Guiding Cable

If a hand guiding cable disconnection etc. occurs, the cable needs to be replaced.

Replace the cable according to the following steps.

1. Turn OFF the controller.
2. Remove the connector of the hand guiding cable from the hand guiding device.
   - Turn only the lock part to the counterclockwise.
   - Disconnect the hand guiding cable to the arrow direction.

3. Remove the assembled part.
4. Remove the connector of the hand guiding cable from the controller.
4 Replacement of Hand Guiding Cable

5. Connect the connector of a new hand guiding cable to the controller.
6. Fix the assembly part of the hand guiding cable.
7. Connect the connector of the hand guiding cable to the hand guiding device.
5 Replacement of Force Sensor Cable

If a force sensor cable disconnection etc. occurs, the cable needs to be replaced.

Replace the cable according to the following steps.
1. Turn OFF the controller.
2. Remove the connector of the force sensor cable from the main unit of the sensor.
   - Hold the lock part.
   - Disconnect the force sensor cable to the arrow direction.
3. Remove the assembled part.
4. Remove the connector of the force sensor cable from the back side of the controller.
5. Connect the connector of a new force sensor cable to the back side of the controller.

6. Fix the assembly part of the force sensor cable.

7. Connect the connector of the force sensor cable to the main unit of the sensor.
6 Replacement of Device

6.1 Replacement of Force Sensor

Replacement procedure for the force sensor is described as follows.

The replacement and mounting must be performed carefully since the force sensor is precision equipment.

1. Move the robot for easy removal of the force sensor.
2. Turn OFF the controller.
3. Disconnect the tool installed to the robot’s tip.
4. Remove the connector of the force sensor cable.
5. Loosen the bolt which is fixing the force sensor, and remove the force sensor.
6. Mount the force sensor for replacement.
   * Tightening torque: 4.1 [N•m]
7. Perform the operation check by following procedures of chapter 3.7.4 “Setting Confirmation of Sensor Mounting Angle” in “DX200/YRC1000 OPTIONS INSTRUCTIONS FOR HAND GUIDING FUNCTION (HW1485706)”.

CAUTION

- After mounting the force sensor, make sure to perform the operation check.
- If the mounting direction of the force sensor is different from the sensor mounting angle setting, the actual operation may be different from the taught operation.

6.2 Replacement of Force Sensor Board

6.2.1 DX200

The communication board is fixed to the rack for the CPU unit board of the controller (JZNC-YRK21-1E). (Refer to chapter 14 “Description of Units and Circuit Boards” in “DX200 INSTRUCTIONS (RE-CTO-A220)”).

Turn OFF the robot controller power supply to replace the communication board (PCI-466102P011).

6.2.2 YRC1000

The communication board is fixed to the CPU unit of the controller (JZNC-ARK01-E). (Refer to chapter 14 “Description of Units and Circuit Boards” in “YRC1000 INSTRUCTIONS (RE-CTO-A221)”).

Turn OFF the robot controller power supply to replace the communication board (PEX-466102023).
7 Disabling Device

Disable procedure for the device is described as follows.

The handling must be performed carefully since the force sensor board is precision equipment.

7.1 Disabling Force Sensor

The force sensor needs to be removed in case of the following reasons. The handling must be performed carefully since the force sensor is precision equipment.

- To remove the force sensor since the hand guiding function is not necessary.
- To operate the robot temporarily without the force sensor.

1. Disable the force sensor communication board port by following chapter 7.1.1 “Disabling Force Sensor” in “DX200/YRC1000 OPTIONS INSTRUCTIONS FOR HAND GUIDING FUNCTION (HW1485706)”.

2. Remove the force sensor by following the procedures from No.1 to No.5 in chapter 6.1 “Replacement of Force Sensor”.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Once the force sensor communication board port is disable, the hand guiding function cannot be used.</td>
</tr>
<tr>
<td>• To enable the port again, refer to chapter 7.1.2 “Enabling Force Sensor” in “DX200/YRC1000 OPTIONS INSTRUCTIONS FOR HAND GUIDING FUNCTION (HW1485706)”.</td>
</tr>
</tbody>
</table>
7.2 Disabling Force Sensor Board

To remove the force sensor board for the reason that the hand guide function is not necessary etc., disable the board by following procedures, then remove the board.

**CAUTION**

- If the force sensor board is disabled and removed by the following procedures, the setting parameter of the hand guiding function will be deleted from the robot controller.
- To use the hand guiding function again, contact your YASKAWA representative.

### 7.2.1 DX200

1. Start up the controller in the maintenance mode, and set the mode to the management mode. Select in the following order: {SYSTEM} - {SETUP} - {OPTION BOARD}. Confirm that (NONE)s are shown in all on the setting window, and press [ENTER].
   * If [Interface466102] is shown, the force sensor board may not be removed yet.

![Option Board Setting Window]

2. The confirmation dialog shows up. Select {YES} and press [ENTER].

![Confirmation Dialog]
3. Set the mode to the safety mode and select in the following order: (FILE) - (INITIALIZE) - (Functional Safety Board FLASH Reset) under the Main Menu.

4. After pressing [ENTER], the confirmation dialog shows up. Select {YES} and press [ENTER].

5. Set the mode to the safety mode and select in the following order: (FILE) - (INITIALIZE) - (Machine Safety Board FLASH Reset) under the Main Menu.
7. Disabling Device  
7.2 Disabling Force Sensor Board

6. After pressing [ENTER], the confirmation dialog shows up. Select {YES} and press [ENTER].

7. Setting procedures are completed. Restart the controller.

7.2.2 YRC1000

1. Start up the controller in the maintenance mode, and set the mode to the management mode. Select in the following order: {SYSTEM} - {SETUP} - {OPTION BOARD}. Confirm that {NONE}s are shown in all settings on the setting window, and press [ENTER].
   * If [Interface466102] is shown, the force sensor board may not be removed yet.

2. The confirmation dialog shows up. Select {YES} and press [ENTER].
3. Set the mode to the safety mode and select in the following order: (FILE) - (INITIALIZE) - (Safety Board FLASH Reset) under the Main Menu.

4. After pressing [ENTER], the confirmation dialog shows up. Select (YES) and press [ENTER].

5. Setting procedures are completed. Restart the controller.
DX200/YRC1000
HAND GUIDING FUNCTION
MAINTENANCE INSTRUCTIONS

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