

DX200

INSTRUCTIONS FOR HOT PENDANT REPLACEMENT FUNCTION

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

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS

DX200 INSTRUCTIONS

DX200 OPERATOR'S MANUAL (for each purpose)

DX200 MAINTENANCE MANUAL

The DX200 operator's manuals above correspond to specific usage. Be sure to use the appropriate manual.

Part Number: 175386-1CD

Revision: 0

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Printed in the United States of America

First Printing, 2015

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 **MANDATORY**

- This manual explains the controller of the DX200. Read this manual carefully and be sure to understand its contents before handling the DX200.
- General items related to safety are listed in the 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:

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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

 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”.
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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.

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 Button



- 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.



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:

Definitions 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

Equipment	Manual Designation
DX200 controller	DX200
DX200 programming pendant	Programming pendant
DX200 programming pendant cable	Pendant cable
Cable between controller and the pendant connection box	Relay cable
DX200 programming pendant extension cable	Pendant extension cable
Cable between the manipulator and the controller	Manipulator cable

Descriptions of the programming pendant, buttons, and displays are shown as follows:

Equipment		Manual Designation
Programming Pendant	Character Keys/ Symbol Keys	The keys which have characters printed on them are denoted with [].ex. [ENTER]
	Axis Keys/ Number Keys	“Axis Keys” and “Number Keys” are generic names for the keys for axis operation and number input.
	Keys pressed simultaneously	When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, ex. [SHIFT]+[COORD].
	Displays	The menu displayed in the programming pendant is denoted with { }. ex. {JOB}

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.

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In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of ® and ™ are omitted.

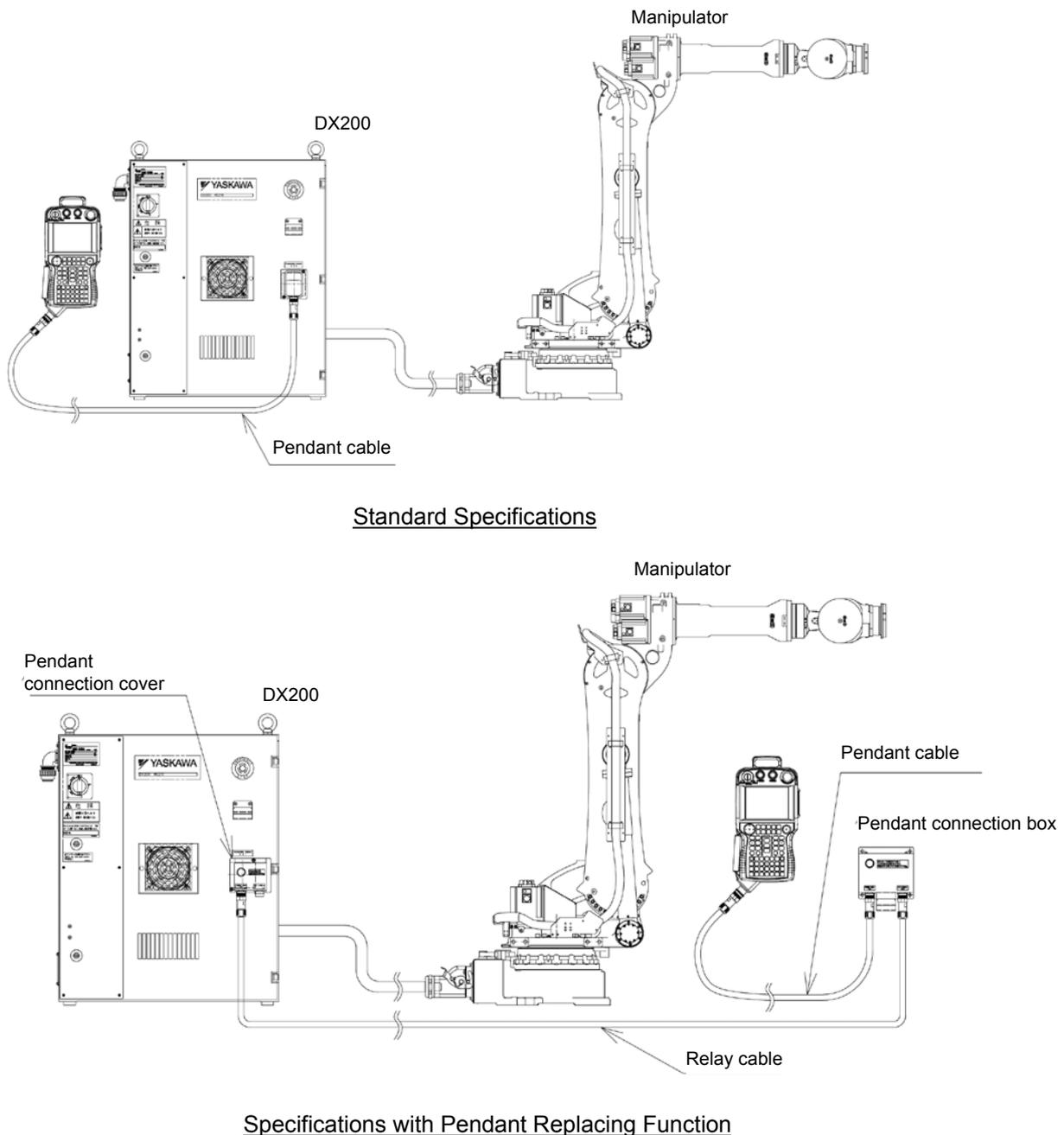
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1 Introduction

Hot pendant replacement function enables the standard length cable to be used for the teaching operation near the manipulator by disconnecting the programming pendant and the cable connected to the DX200 and connecting them to the box placed near the manipulator even if there is long distance between the DX200 and the manipulator.

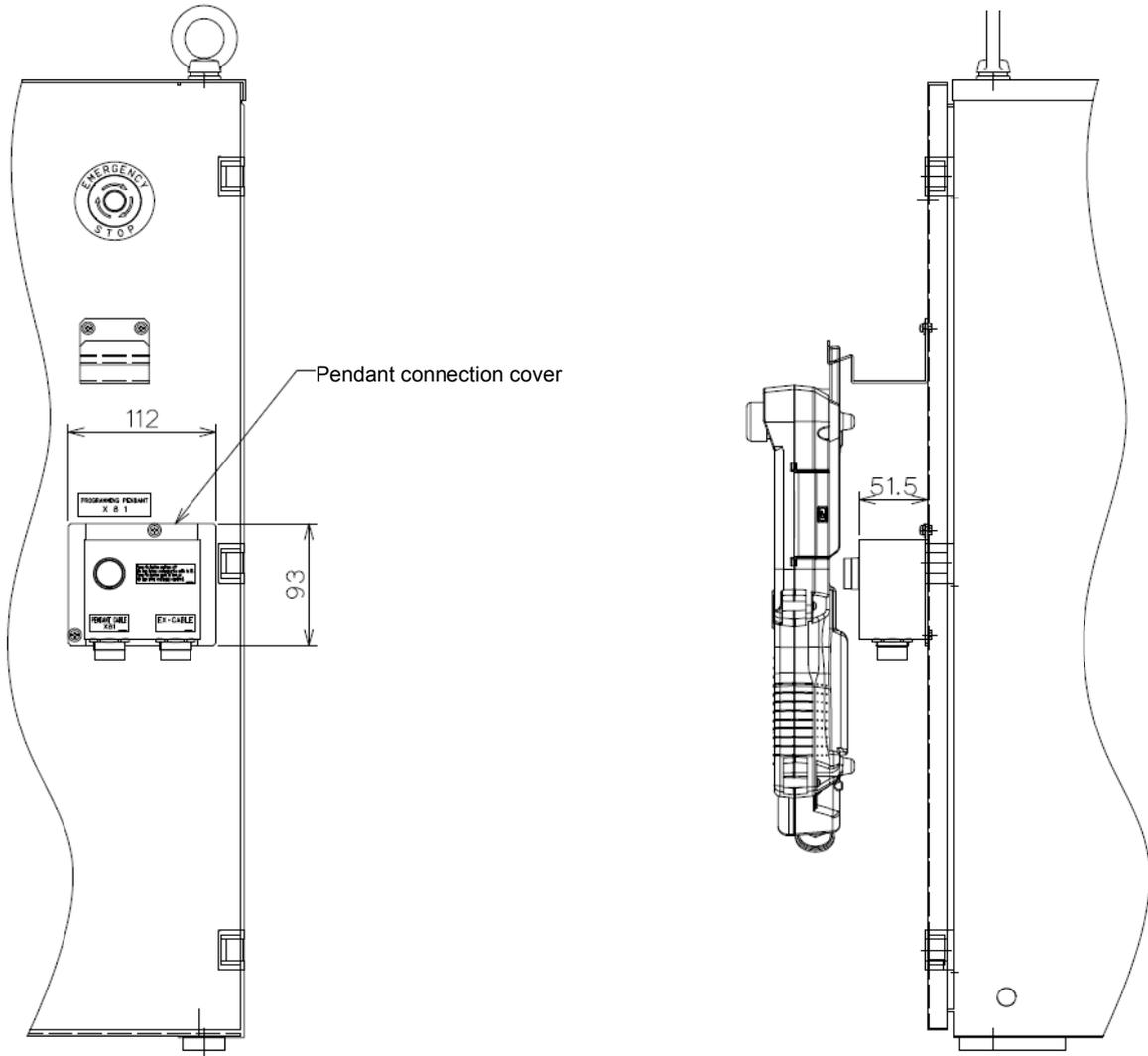
Fig. 1-1 Images of the DX200 Standard Specifications and Specifications with Pendant Replacing Function



2 Hardware Specifications

2.1 Outline Drawing

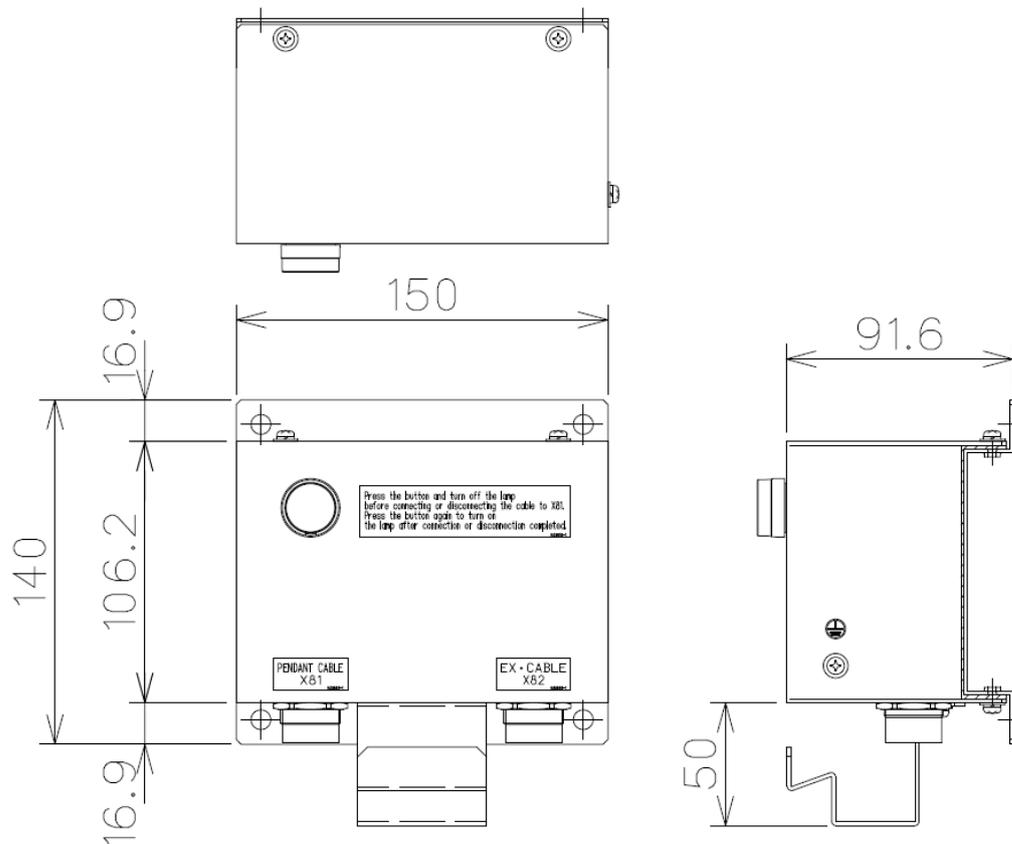
Fig. 2-1 Outline Drawing of the Pendant Connection Cover



Front View of the DX200

Right Side View of the DX200

Fig. 2-2 Outline Drawing of the Pendant Connection Box



2.2 Length of Relay Cable

The length of prepared standard cable between the DX200 and the pendant connection box is 8 m. If more length is needed, use the optional pendant extension cable.

Also, the pendant extension cable can be connected to the pendant cable.

For the length of the pendant extension cable for each type, refer to Table 1.

The total length of the cable should be within 36 m.

Table 1 Pendant Extension Cable

Length of pendant extension cable	Type
4 m	CBL-YRC062-1
8 m	CBL-YRC062-2
12 m	CBL-YRC062-3
16 m	CBL-YRC062-4
20 m	CBL-YRC062-5

Example) When the length of the pendant extension cable is 20 m:

Pendant cable: 8 m + Relay cable: 8 m + Pendant extension cable: 20 m = 36 m

Note 1) The relay cable and the pendant extension cable are connected with a connector.

Note 2) One extension cable can be connected at maximum.

3 Procedures for Replacing Operation

CAUTION

- When performing the replacement of the programming pendant, pay careful attention to steps and surroundings.
- When turning ON the power of the DX200, check that no person is present in the maximum envelope of the manipulator, and then perform the operation in a safe location.

If anyone carelessly enters the maximum envelope of the manipulator, injury may result due to the contact with the manipulator.

- When a trouble occurs, press the emergency stop button immediately.

The emergency stop buttons are located on the front door of the DX200 and at the right side of the programming pendant one by one.

(Caution)

The emergency stop button of the programming pendant only works when the programming pendant is connected to the DX200 or to the pendant connection box.

Make sure to use the programming pendant with connecting to either the DX200 or the pendant connection box.

- During the automatic operation, the pendant cannot be replaced. Make sure to turn OFF the servo for replacement.
When the programming pendant cable is disconnected without pressing the emergency stop button, the servo is turned OFF.
- If the pendant is disconnected while the programming pendant is accessing the Compact Flash or the USB memory (during saving to the external memory or automatic backup), the media may be damaged or the backup data may not be stored correctly. Do not disconnect the pendant while accessing the Compact Flash or the USB memory.
- When using the spare programming pendant for the first time, connect it to the DX200 and turn OFF/ON the power with the main breaker to perform the update confirmation of the software installed on the pendant. In case the software installed on the programming pendant and the DX200 system software are not the same, the software of the programming pendant is updated automatically when the power is turned ON.

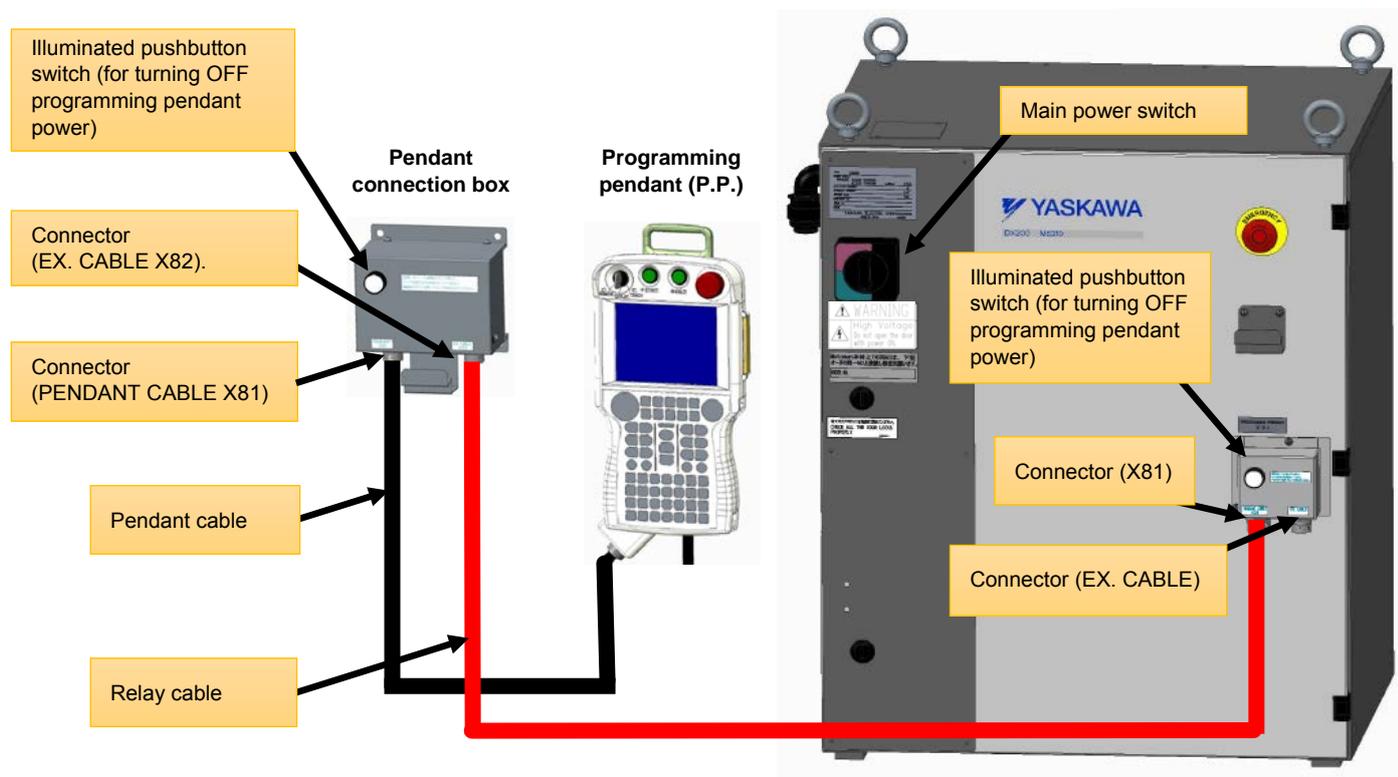
If the spare programming pendant is connected by pressing the illuminated pushbutton switch of the hot pendant replacement function without turning OFF/ON the DX200 power, software update confirmation is not performed. Therefore, the programming pendant software may not work properly. Make sure to connect it to the DX200 and turn OFF/ON the power with the main breaker to perform the software update confirmation.

Attach the protection caps to the unconnected connectors of the pendant connection cover and the pendant connection box. The protection caps are included in the DX200. If used without the protection caps, connection failure may be caused by foreign objects etc. Make sure to attach the protection caps.

3.1 Procedures to Replace the Programming Pendant from the DX200 to the Pendant Connection Box

Following is the operation procedures to replace the programming pendant from the DX200 to the pendant connection box. Replacement can be performed even if the main power switch is ON.

Fig. 3-1 Configuration of the Pendant Replacing Function
(After Replacing to Manipulator Side)



[Operation at the DX200 Side]

1. Confirm that the mode selecting switch of the programming pendant is in the teach mode. When not, stop the movement of the manipulator once, and then switch it to the teach mode.
2. Press the emergency stop button of the DX200 or the programming pendant.
3. Turn OFF (extinguish) the illuminated pushbutton switch by pressing it.
4. Disconnect the pendant cable connected to the connector (X81).
5. Connect the relay cable to the connector (X81) at the DX200 side.
6. Turn ON (lighten up) the illuminated pushbutton switch, which is operated at the step 3, by pressing it.

[Operation at Pendant Connection Box Side]

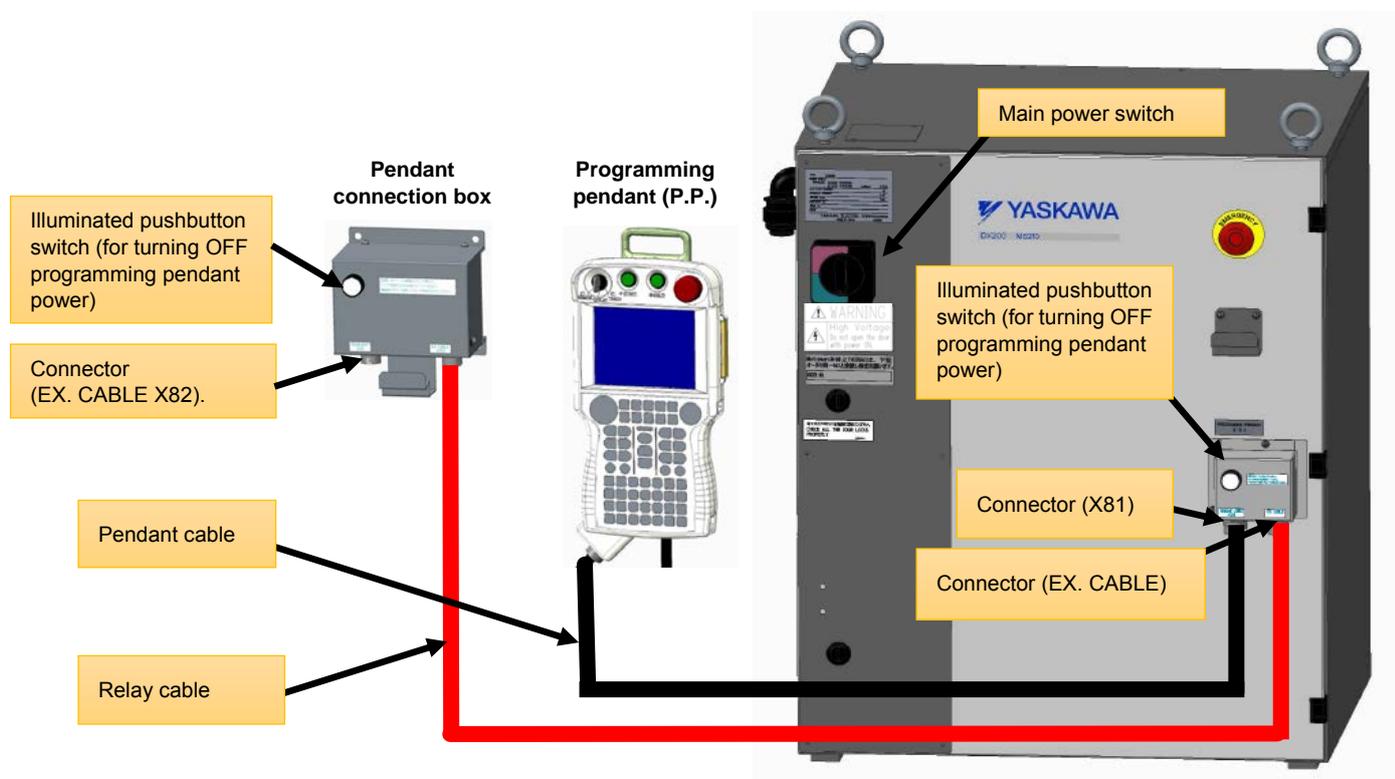
7. Turn OFF (extinguish) the illuminated pushbutton switch by pressing it.
8. Connect the relay cable to the connector (EX. CABLE X82).
9. Connect the pendant cable which is disconnected at the step 4 to the connector (PENDANT CABLE X81) of the pendant connection box.
10. Turn ON (lighten up) the illuminated pushbutton switch, which is operated at the step 7, by pressing it.
Confirm that the initial window is displayed after the start up window is displayed on the programming pendant screen. Confirm that the programming pendant started up properly, and then perform the ordinary operations.
11. Pay careful attention to surroundings, and restore the emergency stop button of the DX200 or the programming pendant.

3 Procedures for Replacing Operation

3.2 Procedures to Replace the Programming Pendant from the Pendant Connection Box to the DX200

Following is the operation procedures to replace the programming pendant from the pendant connection box to the DX200. Replacement can be performed even the main power switch is ON.

Fig. 3-2 Configuration of the Pendant Replacing Function (After Replacing to the DX200 Side)



[Operation at Pendant Connection Box Side]

1. Confirm that the mode selecting switch of the programming pendant is in the teach mode. When not, stop the movement of the manipulator once, and then switch it to the teach mode.
2. Restore the emergency stop button of the DX200 or the programming pendant.
3. Turn OFF (extinguish) the illuminated pushbutton switch by pressing it.
4. Disconnect the pendant cable connected to the connector at the pendant connection box (PENDANT CABLE X81).
5. Turn ON (lighten up) the illuminated pushbutton switch, which is operated at the step 3, by pressing it.

[Operation at the DX200 Side]

6. Turn OFF (extinguish) the illuminated pushbutton switch by pressing it.
7. Disconnect the relay cable connected to the connector (X81), and then connect the relay cable to the connector at the right side (EX. CABLE).
8. Connect the pendant cable to the connector (X81).
9. Turn ON (lighten up) the illuminated pushbutton switch, which is operated at the step 6, by pressing it.
10. Confirm that the initial window is displayed after the start up window is displayed on the programming pendant screen. Confirm that the programming pendant started up properly, and then perform the ordinary operations.
11. Pay careful attention to surroundings, and restore the emergency stop button of the DX200 or the programming pendant.

DX200

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Specifications are subject to change without notice

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