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: 165639-1CD  
Revision: 1
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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 indication of (R) and ™ are omitted.
MANDATORY

- This manual explains the JARCR-XOI02B board of the DX200 system and general operations. 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 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.
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.

**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”.

• Do not use or keep the board in the following environmental conditions.
  – Where exposed to direct sunshine
  – Where vibration or impact occurs
  – Where high humidity exists
  – Where a strong magnetic field exists
  – Where much dust exists
  – Where a sudden change in the temperature occurs
  – Where corrosive gases occur
  – Where condensation occurs

Improper usage of the board may damage the board.
• Before operating the manipulator, check that servo power is turned OFF when the emergency stop buttons on the front door of the DX200 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.

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 for safeguarding when going inside. Display the sign that 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 no persons are present in the P-point maximum envelope of the manipulator and you are in a safe location before:
  – Turning ON the DX200 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 DX200 and programming pendant.
WARNING

• Do not touch the inside of the panel for five minutes after the power is turned OFF. The remaining charged voltage in the capacitor may cause an electric shock or an injury.

• Be sure to close the door and install the protection cover while the power is turned ON. Failure to observe this warning may result in a fire or an electric shock.

• The wiring and mounting must be performed by authorized and qualified personnel. Failure to observe this caution may result in a fire or an electric shock.
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:

- Make sure that there is no foreign matter such as metal chips on the board.

In case of malfunction, etc. it may result in an injury or damage the board.

- Make sure that there is no damage or deflection of parts on the board.

In case of malfunction, etc. it may result in an injury or damage the board.

- Correctly connect each cable and connector.

Failure to observe this caution may result in a fire or damage the board.

- Set the switches, etc. correctly.

Malfunction, caused by an incorrect setting, may result in an injury or damage the board.

- Never touch the mounting surfaces of the board parts directly with fingers.

The generated static electricity may damage the IC.

- Never touch the soldered surfaces of the board directly with fingers.

Protrusions on the soldered surface may result in an injury.

- No shock to the board.

The shock may damage the board.
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 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 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>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></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.
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   2.3 User Input/output Connectors ....................................................................... 2-2

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This instruction manual describes the I/O expansion board, the XOI02B. The XOI02B board can be used to expand the number of I/O points when more DX200 I/O points are needed.

1.1 System Configuration Example
2 Hardware Specifications

2.1 Board External View

2.2 Board Specifications

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board mounting position</td>
<td>Optional board mounting space in the DX200</td>
</tr>
<tr>
<td>Number of I/O points</td>
<td>Input: 40 points</td>
</tr>
<tr>
<td></td>
<td>Output: 40 points (PNP transistor output 24 points, relay output 16 points)</td>
</tr>
</tbody>
</table>
2.3 User Input/output Connectors

- Connector A detail (cable side)
  - Connector Model: FCN-361J040-AU (FUJITSU) (Soldered Pin type)
  - Hood Model: FCN-360C040-B (FUJITSU)

- Connector C detail (cable side)
  - Connector Model: 1903404-1 (Tyco Electronics Amp) (MT Type)

I/O expansion board (XOI02B board)

Connector A
- I/O Cable (XOI ~ external)

Connector B
- I/O Cable (YIU ~ Terminal Block)

Connector C
- I/O Cable (YIU ~ Terminal Block)

I/O Terminal Block
- Stripped length: 10mm
- Applicable max cable outside diameter: 3mm dia.

Model: TIFS553YS (KASUGA ELECTRIC)
3 Setting the Functions

3.1 Function Setting Switches

The section explains the switches that set the functions of the XOI02B board. Make the proper settings following the instructions. For details of the settings, refer to section 3.2 “Setting Method”.

S1: Sets the stations for the XOI02B board on the DX200.
   The setting range for a station is 1 (ST#01) to D (ST#13).
   Do not set the station to 0 (ST#00), E (ST#14), or F (ST#15).

JP1: Sets the communication speed.
   This switch sets the communication speed to 4 Mbps or 10 Mbps.
   **Be sure to set this switch to 4 Mbps.**
   Do not set it to 10 Mbps.
   If the number of I/O points on the XOI02B board does not appear on the Programming Pendant, check if the communication cable or power cable is connected correctly, referring to the I/O module setting in chapter 5 “I/O Signal Allocation”. When the cables are correctly connected, the JP1 may be set to 10 Mbps. Change the setting to 4 Mbps.

JP2: Sets the communication mode.
   This switch sets the communication mode to 16 bytes, 17 bytes, or 32 bytes.
   **Be sure to set this switch to 17 bytes.**
   Do not set it to 16 bytes and 32 bytes.
   If the number of I/O points on the XOI02B board does not appear on the Programming Pendant, check if the communication cable or power cable is connected correctly, referring to the I/O module setting in chapter 5 “I/O Signal Allocation”. When the cables are correctly connected, the JP2 may be set to 16 bytes or 32 bytes. Change the setting to 17 bytes.
## 3.2 Setting Method

### Switches

<table>
<thead>
<tr>
<th>S1</th>
<th>Station setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sets the stations.</td>
</tr>
<tr>
<td></td>
<td>The relation between the switch setting and the station is shown below.</td>
</tr>
<tr>
<td></td>
<td>Turn the arrow to the number corresponding to the desired station.</td>
</tr>
<tr>
<td></td>
<td>(Use a flat tip screwdriver.)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number</th>
<th>Station (ST#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Cannot be set</td>
</tr>
<tr>
<td>1</td>
<td>ST#01</td>
</tr>
<tr>
<td>2</td>
<td>ST#02</td>
</tr>
<tr>
<td>3</td>
<td>ST#03 (Default setting)</td>
</tr>
<tr>
<td>4</td>
<td>ST#04</td>
</tr>
<tr>
<td>5</td>
<td>ST#05</td>
</tr>
<tr>
<td>6</td>
<td>ST#06</td>
</tr>
<tr>
<td>7</td>
<td>ST#07</td>
</tr>
<tr>
<td>8</td>
<td>ST#08</td>
</tr>
<tr>
<td>9</td>
<td>ST#09</td>
</tr>
<tr>
<td>A</td>
<td>ST#10</td>
</tr>
<tr>
<td>B</td>
<td>ST#11</td>
</tr>
<tr>
<td>C</td>
<td>ST#12</td>
</tr>
<tr>
<td>D</td>
<td>ST#13</td>
</tr>
<tr>
<td>E</td>
<td>Can not be set</td>
</tr>
<tr>
<td>F</td>
<td>Can not be set</td>
</tr>
</tbody>
</table>

The number after ST# is the station number displayed on the programming pendant of the DX200 when setting I/O modules. The default setting is ST#03.

### JP1

- **Setting of the communication speed**
  - Short circuit between 1 and 2: 10 Mbps
    - *Setting unavailable*
  - Short circuit between 2 and 3: 4 Mbps
    - *(Default setting)*
    - *Setting indispensable*

### JP2

- **Setting of the I/O communication mode**
  - Short circuit between 1 and 2, 5 and 6: 16 byte mode
    - *Setting unavailable*
  - Short circuit between 3 and 4, 7 and 8: 17 byte mode
    - *(Default setting)*
    - *Setting indispensable*
  - Short circuit between 1 and 2, 3 and 4: 32 byte mode
    - *Setting unavailable*

---

**NOTE**

Do not set S1 to 0, E or F. Do not set more than one board to one ST#.

Improper settings may prevent the I/O module from being recognized correctly.

Also, do not set JP1 to 10 Mbps and do not set JP2 to 16 bytes or 32 bytes.

If 10 Mbps, 16 bytes, and 32 bytes are selected, the I/O module is not recognized.

---
4 Mounting the XOI02B Board

WARNING

- Before wiring, be sure to turn OFF the power supply and put up a warning sign, such as "DO NOT TURN ON THE POWER."

Failure to observe this warning may result in an electric shock or an injury.
- Do not touch the inside of the panel for five minutes after the power is turned OFF.

The remaining charged voltage in the capacitor may cause an electric shock or an injury.
- Be sure to close the door and install the protection cover while the power is turned ON.

Failure to observe this warning may result in a fire or an electric shock.
- The wiring and mounting must be performed by authorized and qualified personnel.

Failure to observe this caution may result in a fire or an electric shock.

CAUTION

- Make sure that there is no foreign matter such as metal chips on the board.

In case of malfunction, etc. it may result in an injury or damage the board.
- Make sure that there is no damage or deflection of parts on the board.

In case of malfunction, etc. it may result in an injury or damage the board.
- Correctly connect each cable and connector.

Failure to observe this caution may result in a fire or damage the board.
- Set the switches, etc. correctly.

Malfunction, caused by an incorrect setting, may result in an injury or damage the board.
- Never touch the mounting surfaces of the board parts directly with fingers.

The generated static electricity may damage the IC.
- Never touch the soldered surfaces of the board directly with fingers.

Protrusions on the soldered surface may result in an injury.
- No shock to the board.

The shock may damage the board.
4.1 Opening Front Door of the DX200

Mount the XOI02B board in the following manner.

1. Turn the two door locks on the front face of the DX200 clockwise for 90° with a coin or a flat tip screwdriver.

2. With the door locks turned clockwise for 90°, turn the main switch handle to the “OFF” position, and slowly open the door.

4.2 Confirming the Switch Settings on the XOI02B Board

1. Be sure that the settings of switches on the board are correct.
2. For the switch settings, refer to chapter 3 "Setting the Functions".

4.3 Mounting the XOI02B Board on the DX200

1. Be sure that the main power supply is OFF.
2. Fix the XOI02B board on the DX200 with the board fixing screws securely tightened.
### 4.4 Connecting Each Cable

1. Connect the 24 V\(_{\text{DC}}\) power supply cable to the CN02 on the XOI02B board.

2. Connect the I/O communication cable to the CN01 on the XOI02B board. Connect the terminal connector to the non-occupied CN01 on the XOI02B board.

3. Connect the I/O cables to the CN10 through CN13 on the XOI02B board.
A dummy connector is inserted into the CN02 of the 24 V\text{DC} power supply connector on the XO102B board.

Do not remove this connector because it is inserted to prevent incorrect cable connections. Removing this connector may result in incorrect connection of the 24 V\text{DC} power cable to the CN02. This prevents power from being supplied normally to the board, and the board may not start up.

* Do not remove the dummy connector inserted in this position.

**NOTE**

* Because the dummy connector is removed, the 24VDC power cable is incorrectly connected, and power cannot be supplied to the board.

### 4.5 Closing the Front Door of the DX200

1. Close the door slowly.
2. Turn the two door locks counterclockwise for 90° using a coin or a flat tip screwdriver.
5 I/O Signal Allocation

5.1 I/O Module Setting

In order to use a XOI02B board on the DX200, perform the I/O module setting in the following manner.

Make sure that the power supply to the DX200 is OFF. Then, mount the XOI02B board, for which all of its switches have been set, inside the DX200. For the board mounting method, refer to chapter 4 “Mounting the XOI02B Board”.

1. Turn the power supply ON again while pressing [MAIN MENU] simultaneously.
   – The main menu appears.

2. Select {SYSTEM} under the main menu.
   – The sub menu appears.

3. Change the security mode to management mode.
4. Select {SETUP}.
   – The SETUP window appears.

5. Select {I/O MODULE}.
   – The current mounted status of the I/O modules is shown as in the following example.

   ![I/O Module Setting Diagram]

   – To view the current mounted status of the I/O modules for stations that are not displayed, press [ENTER].
6. Confirm the status of the mounted I/O module.
   - Only the I/O modules mounted on DX200 are displayed. Confirm that each station (ST#) indicates the actual mounted status of the I/O module.
   - The following table lists the meanings of each line.

<table>
<thead>
<tr>
<th>ST#</th>
<th>Station address of I/O module</th>
</tr>
</thead>
<tbody>
<tr>
<td>DI</td>
<td>Number of digital input points</td>
</tr>
<tr>
<td>DO</td>
<td>Number of digital output points</td>
</tr>
<tr>
<td>AI</td>
<td>Number of analog input points</td>
</tr>
<tr>
<td>AO</td>
<td>Number of analog output points</td>
</tr>
<tr>
<td>BOARD</td>
<td>Circuit board type</td>
</tr>
</tbody>
</table>

1 A hyphen "-" indicates the corresponding I/O module is not mounted.
2 If the system cannot recognize the circuit board type, "*****" is shown. No problem will occur as long as the values displayed in DI, DO, AI, and AO are correct.

- In the example shown on the display, the configuration of boards are as follows.

ST#00: JANCD-YIO21-E board
   - This board is shown as YSF21 on the IO module display.
   - (digital input 40 points, digital output 40 points)
   - This board is fixed to ST#00.

ST#03: JARCR-XOI02B board
   - (digital input 40 points, digital output 40 points).
   - Switch S1: set to 3 (This value becomes the ST#).

7. Press [ENTER].
   - The confirmation dialog box appears.

8. Select “YES.”
   - When the mounted status of an I/O module is correct, select “YES.” The I/O module setting is updated, and the IO MODULE window changes to the EXTERNAL IO SETUP window.
If the window does not indicate the actual mounted status, recheck the cable connection and the switch setting.

If the mounted status is correct (but the window does not correspond), the following causes are suspected.

- Improper I/O communication settings
  The settings of JP1 and JP2 on the XOIO2B board may be incorrect, so the DX200 cannot recognize the board.

- Improper or overlapped station settings
  S1 may be erroneously set to 0, E, or F. Each station can be set to only one board. If S1 has been set to two boards, change the setting of S1 so only one board is assigned.

- Improper connection of the 24 VDC power cable and the I/O communication cable
  The 24 VDC cable and the I/O communication cable may not be connected properly. Recheck the cable connection referring to section 4.4 “Connecting Each Cable” on page 4-3. Improper connection of the 24 VDC power cable to the CN02 may prevent the board from starting up.

- I/O module failure
  When the above causes do not apply, and the display still does not correspond to the actual mounted status, failure of an I/O module is suspected. Contact your YASKAWA representative.

9. The EXTERNAL IO SETUP window appears.
10. Select {AUTO} or {MANUAL} in the ALLOCATION MODE.

   - The selection menu appears after selecting {AUTO} or {MANUAL}.

11. Select the allocation mode to set up.

   - Select {AUTO} to allocate I/O signal allocation automatically.
     Select {MANUAL} to allocate I/O signal allocation manually.

   - The selected allocation mode is set up.

NOTE

If the allocation mode is changed from {MANUAL} to {AUTO}, the set allocation data is discarded. The data will be allocated by AUTO MODE again. Save the set allocation data to the external devices in advance, if needed.
12. Select {DETAIL} of {EXTERNAL IO ALLOCATION}.
   
   - When select {AUTO}, the following procedures No.13 to 15 are not necessary. Operate the procedure from No.16.
   
   - When select {MANUAL}, operate the following procedures No.13 to 15 accordant with the setting manually.

13. Select the external I/O signal number (at the change source) to be changed. (In the setting example, select “#20060”.)
   
   - The select menu appears.
14. Select [MODIFY], and input the external input signal number (at the change destination) to be changed. (In the setting example, enter "#20190").

- The external input signal number is changed.

15. Likewise, select/modify the number of the external input signal.

- Repeat select/modify until it becomes the desired allocation to set up.

16. Press [ENTER].

- The allocation window of the external output signal appears.

17. Select/modify the number of the external output signal same as the external input signal.

- Repeat select/modify until it becomes the desired allocation to set up.
18. Press {ENTER}.
   – Confirmation dialog appears.

19. Select {YES}.
   – The settings are confirmed, and returns to the SETUP window.
## 5.2 I/O Data

The data to be transferred from the XOI02B board to the inside of the DX200 is of 40 input points (5 bytes) and 40 output points (5 bytes). The I/O data of the XOI02B board is allocated to external I/O signals of concurrent I/O.

### Concurrent I/O

| < Input > | 20010 to 25127 (4096 inputs) |
| < Output > | 30010 to 35127 (4096 outputs) |

When only a XOI02B board is mounted as an optional I/O board, the concurrent I/O allocation of each board is as follows.

(20010 to 20057 and 30010 to 30057 are used for standard I/O of the DX200.)
### 5.2.1 DX200 I/O Allocation example (For Handling)

Note 1) The following example is for the standard setting. When change the allocation of the external output signal or the concurrent ladder program, the allocation changes in accordance with the changes.

Note 2) As for the input data/output data of JANCD-YIO21-E (standard I/O board), refer to DX200 INSTRUCTIONS MANUAL for more details.

Note 3) JANCD-YIO21-E (standard I/O board) is displayed as YSF21 (base board of YIO21) in the I/O module setup display.

<table>
<thead>
<tr>
<th>JANCD-YIO21-E (Standard I/O)</th>
<th>I/O Input</th>
<th>External input signal</th>
<th>User input signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20010 to 20017</td>
<td>None (allocated on the system)</td>
<td>Input data (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20020 to 20027</td>
<td>None (allocated on the system)</td>
<td>Input data (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20030 to 20037</td>
<td>00010 to 00017 (IN0001 to IN0008)</td>
<td>Input data (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20040 to 20047</td>
<td>00020 to 00027 (IN0009 to IN0016)</td>
<td>Input data (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20050 to 20057</td>
<td>None (allocated on the system)</td>
<td>Input data (5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JANCD-YIO21-E (Standard I/O)</th>
<th>I/O Output</th>
<th>External output signal</th>
<th>User output signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>30010 to 30017</td>
<td>None (allocated on the system)</td>
<td>Output data (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30020 to 30027</td>
<td>None (allocated on the system)</td>
<td>Output data (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30030 to 30037</td>
<td>00010 to 00017 (OT0001 to OT0008)</td>
<td>Output data (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30040 to 30047</td>
<td>00020 to 00027 (OT0009 to OT0016)</td>
<td>Output data (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30050 to 30057</td>
<td>None (allocated on the system)</td>
<td>Output data (5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JANCD-XOI02B (For European I/O expansion)</th>
<th>I/O Input</th>
<th>External input signal</th>
<th>User input signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20060 to 20067</td>
<td>00030 to 00037 (IN0017 to IN0024)</td>
<td>Input data (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20070 to 20077</td>
<td>00040 to 00047 (IN0025 to IN0032)</td>
<td>Input data (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20080 to 20087</td>
<td>00050 to 00057 (IN0033 to IN0040)</td>
<td>Input data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20090 to 20097</td>
<td>00060 to 00067 (IN0041 to IN0048)</td>
<td>Input data (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20100 to 20107</td>
<td>00070 to 00077 (IN0049 to IN0056)</td>
<td>Input data (5)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JANCD-XOI02B (For European I/O expansion)</th>
<th>I/O Output</th>
<th>External output signal</th>
<th>User output signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30060 to 30067</td>
<td>10030 to 10037 (OT0017 to OT0024)</td>
<td>Output data (1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30070 to 30077</td>
<td>10040 to 10047 (OT0025 to OT0032)</td>
<td>Output data (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30080 to 30087</td>
<td>10050 to 10057 (OT0033 to OT0040)</td>
<td>Output data (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30090 to 30097</td>
<td>10060 to 10067 (OT0041 to OT0048)</td>
<td>Output data (4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30100 to 30107</td>
<td>10070 to 10077 (OT0049 to OT0056)</td>
<td>Output data (5)</td>
<td></td>
</tr>
</tbody>
</table>
### 5.2.2 DX200 I/O Allocation example (For Except Handling)

Note1) The following example is for the standard setting. When change the allocation of the external output signal or the concurrent ladder program, the allocation changes in accordance with the changes.

Note2) As for the input data/output data of JANCD-YIO21-E (standard I/O board), refer to DX200 INSTRUCTIONS MANUAL for more details.

Note3) JANCD-YIO21-E (standard I/O board) is displayed as YSF21 (base board of YIO21) in the IO module setup display.

<table>
<thead>
<tr>
<th>JANCD-YIO21-E</th>
<th>I/O Input</th>
<th>External input signal</th>
<th>User input signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Standard I/O)</td>
<td>20010 to 20017</td>
<td>None (allocated on the system)</td>
<td>None (allocated on the system)</td>
<td>Input data (1)</td>
</tr>
<tr>
<td></td>
<td>20020 to 20027</td>
<td>None (allocated on the system)</td>
<td>None (allocated on the system)</td>
<td>Input data (2)</td>
</tr>
<tr>
<td></td>
<td>20030 to 20037</td>
<td>00010 to 00017 (IN0001 to IN0008)</td>
<td>None (allocated on the system)</td>
<td>Input data (3)</td>
</tr>
<tr>
<td></td>
<td>20040 to 20047</td>
<td>00020 to 00027 (IN0009 to IN0016)</td>
<td>None (allocated on the system)</td>
<td>Input data (4)</td>
</tr>
<tr>
<td></td>
<td>20050 to 20057</td>
<td>00030 to 00037 (IN0017 to IN0024)</td>
<td>None (allocated on the system)</td>
<td>Input data (5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JANCD-XOI02B</th>
<th>I/O Input</th>
<th>External input signal</th>
<th>User input signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>(For European I/O expansion)</td>
<td>20060 to 20067</td>
<td>00040 to 00047 (IN0025 to IN0032)</td>
<td>None (allocated on the system)</td>
<td>Input data (1)</td>
</tr>
<tr>
<td></td>
<td>20070 to 20077</td>
<td>00050 to 00057 (IN0033 to IN0040)</td>
<td>None (allocated on the system)</td>
<td>Input data (2)</td>
</tr>
<tr>
<td></td>
<td>20080 to 20087</td>
<td>00060 to 00067 (IN0041 to IN0048)</td>
<td>None (allocated on the system)</td>
<td>Input data (3)</td>
</tr>
<tr>
<td></td>
<td>20090 to 20097</td>
<td>00070 to 00077 (IN0049 to IN0056)</td>
<td>None (allocated on the system)</td>
<td>Input data (4)</td>
</tr>
<tr>
<td></td>
<td>20100 to 20107</td>
<td>00080 to 00087 (IN0057 to IN0064)</td>
<td>None (allocated on the system)</td>
<td>Input data (5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JANCD-XOI02B</th>
<th>I/O Output</th>
<th>External output signal</th>
<th>User output signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>(For European I/O expansion)</td>
<td>30010 to 30017</td>
<td>None (allocated on the system)</td>
<td>None (allocated on the system)</td>
<td>Output data (1)</td>
</tr>
<tr>
<td></td>
<td>30020 to 30027</td>
<td>None (allocated on the system)</td>
<td>None (allocated on the system)</td>
<td>Output data (2)</td>
</tr>
<tr>
<td></td>
<td>30030 to 30037</td>
<td>00010 to 00017 (OT0001 to OT0008)</td>
<td>None (allocated on the system)</td>
<td>Output data (3)</td>
</tr>
<tr>
<td></td>
<td>30040 to 30047</td>
<td>00020 to 00027 (OT0009 to OT0016)</td>
<td>None (allocated on the system)</td>
<td>Output data (4)</td>
</tr>
<tr>
<td></td>
<td>30050 to 30057</td>
<td>10030 to 10037 (OT0017 to OT0024)</td>
<td>None (allocated on the system)</td>
<td>Output data (5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JANCD-XOI02B</th>
<th>I/O Output</th>
<th>External output signal</th>
<th>User output signal</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>(For European I/O expansion)</td>
<td>30060 to 30067</td>
<td>10040 to 10047 (OT0025 to OT0032)</td>
<td>None (allocated on the system)</td>
<td>Output data (1)</td>
</tr>
<tr>
<td></td>
<td>30070 to 30077</td>
<td>10050 to 10057 (OT0033 to OT0040)</td>
<td>None (allocated on the system)</td>
<td>Output data (2)</td>
</tr>
<tr>
<td></td>
<td>30080 to 30087</td>
<td>10060 to 10067 (OT0041 to OT0048)</td>
<td>None (allocated on the system)</td>
<td>Output data (3)</td>
</tr>
<tr>
<td></td>
<td>30090 to 30097</td>
<td>10070 to 10077 (OT0049 to OT0056)</td>
<td>None (allocated on the system)</td>
<td>Output data (4)</td>
</tr>
<tr>
<td></td>
<td>30100 to 30107</td>
<td>10080 to 10087 (OT0057 to OT0064)</td>
<td>None (allocated on the system)</td>
<td>Output data (5)</td>
</tr>
</tbody>
</table>
6 I/O Circuits

6.1 Input Circuit

The input circuit has 40-points, and all for input circuit 1.

6.1.1 Input Circuit 1 (CN10 to CN13)

<table>
<thead>
<tr>
<th>Circuit structure</th>
<th>Input circuit with photocoupler insulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current (max.)</td>
<td>8 mA per one point</td>
</tr>
<tr>
<td>Common</td>
<td>+24V common</td>
</tr>
</tbody>
</table>

Connection example

- When an internal power supply is used for the I/O power supply, the allocation to the 24 V_{DC} internal power supply of the DX200 is approximately 1.5A. If the total current consumption of the I/O circuits including that of other I/O boards exceeds 1.5A, use an external power supply. For connecting external power supply, refer to section 6.3 “Connection Example” on page 6-4.

- When an external power supply is used for the I/O power supply and the total current consumption of the I/O circuits exceeds 2A, use a 24 V_{DC} external power supply. However, do not use the 24 V_{DC} power supply from CN10 and CN11 for the 24 V_{DC} power supply used at the relay output contact.

- The I/O circuits of the XOI02B board are exclusive-use for 24 V_{DC}. Connecting a power supply other than 24 V_{DC} causes damages to the circuits and malfunction.
6.2 Output Circuits

The output circuit has 40 points from CN10 through CN13. Two types of circuits are provided: transistor output (24 points) and relay output (16 points). When the contact life of a relay should be considered because of frequent ON/OFF switchings, the transistor output can be used to control a relay mounted on an easily accessible position or a non-contact relay SSR (solid state relay).

**NOTE**
- When connecting an inductive load to the output circuit, connect a fly-wheel diode in parallel to the inductive load, to suppress the surge voltage. Not using a fly-wheel diode may damage the output circuit.
- When connecting a load with a large inrush current such as a lamp, connect a current limiting resistance in series to the load, so that the output current does not exceed its maximum value. Exceeding the maximum output current value may damage the output circuit.

6.2.1 Output Circuit 1  CN12 and CN13 (Transistor Output)

<table>
<thead>
<tr>
<th>Circuit structure</th>
<th>PNP transistor open-collector output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output current (max.)</td>
<td>50 mA per one point</td>
</tr>
<tr>
<td>Common</td>
<td>0V common</td>
</tr>
</tbody>
</table>

Connection example

![Connection Diagram]

Inside the board
### 6.2.2 Output Circuit 2  CN10 and CN11 (Relay Output)

<table>
<thead>
<tr>
<th>Circuit structure</th>
<th>Relay contact output (only DC load can be connected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output current (max.)</td>
<td>0.5A per point</td>
</tr>
<tr>
<td>Common</td>
<td>None (determined according to the external connection)</td>
</tr>
<tr>
<td>Contact resistance</td>
<td>30 mΩ or less</td>
</tr>
<tr>
<td>Min. applicable load for contact</td>
<td>0.1 V&lt;sub&gt;DC&lt;/sub&gt;, 0.1 mA</td>
</tr>
</tbody>
</table>
| Relay life                   | Electrical life: 300,000 times (with inductive load 24 V<sub>DC</sub>, 0.5A)  
                              | Mechanical life: 20,000,000 times                     |

Connection example
6.3 Connection Example

The following are allocation examples when the XOI02B board is added to the DX200: handling application; and arc welding, spot welding, and general-purpose applications. The "general-purpose applications" in this manual includes; assembling and cutting applications.

These examples are applied when only one XOI02B board is used as an optional I/O board. When any other optional I/O boards are added, the XOI02B board allocation will be changed depending on the I/O board allocation.
### 6.3.1 Handling Application

**CN12 User input/output (for handling application)**

* Remove Jumper-lead between CN303-1 and -3, CN303-2 and -4 when an external power supply is used.
European I/O Expansion
(JARCR-XOI02B) Board

6  I/O Circuits
6.3 Connection Example

CN13 User input/output (for handling application)

<table>
<thead>
<tr>
<th>Logical Number</th>
<th>Connector Number</th>
<th>Name</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>20074</td>
<td>B1</td>
<td>IN29</td>
<td>IN</td>
</tr>
<tr>
<td>20075</td>
<td>A1</td>
<td>IN30</td>
<td>IN</td>
</tr>
<tr>
<td>20076</td>
<td>B2</td>
<td>IN31</td>
<td>IN</td>
</tr>
<tr>
<td>20077</td>
<td>A2</td>
<td>IN32</td>
<td>IN</td>
</tr>
<tr>
<td>20080</td>
<td>B3</td>
<td>IN33</td>
<td>IN</td>
</tr>
<tr>
<td>20081</td>
<td>A3</td>
<td>IN34</td>
<td>IN</td>
</tr>
<tr>
<td>20082</td>
<td>B4</td>
<td>IN35</td>
<td>IN</td>
</tr>
<tr>
<td>20083</td>
<td>A4</td>
<td>IN36</td>
<td>IN</td>
</tr>
<tr>
<td>20084</td>
<td>B5</td>
<td>IN37</td>
<td>IN</td>
</tr>
<tr>
<td>20085</td>
<td>A5</td>
<td>IN38</td>
<td>IN</td>
</tr>
<tr>
<td>20086</td>
<td>B6</td>
<td>IN39</td>
<td>IN</td>
</tr>
<tr>
<td>20087</td>
<td>A6</td>
<td>IN40</td>
<td>IN</td>
</tr>
<tr>
<td>30074</td>
<td>B8</td>
<td>OUT29</td>
<td>OUT</td>
</tr>
<tr>
<td>30075</td>
<td>A8</td>
<td>OUT30</td>
<td>OUT</td>
</tr>
<tr>
<td>30076</td>
<td>B9</td>
<td>OUT31</td>
<td>OUT</td>
</tr>
<tr>
<td>30077</td>
<td>A9</td>
<td>OUT32</td>
<td>OUT</td>
</tr>
<tr>
<td>30080</td>
<td>B10</td>
<td>OUT33</td>
<td>OUT</td>
</tr>
<tr>
<td>30081</td>
<td>A10</td>
<td>OUT34</td>
<td>OUT</td>
</tr>
<tr>
<td>30082</td>
<td>B11</td>
<td>OUT35</td>
<td>OUT</td>
</tr>
<tr>
<td>30083</td>
<td>A11</td>
<td>OUT36</td>
<td>OUT</td>
</tr>
<tr>
<td>30084</td>
<td>B12</td>
<td>OUT37</td>
<td>OUT</td>
</tr>
<tr>
<td>30085</td>
<td>A12</td>
<td>OUT38</td>
<td>OUT</td>
</tr>
<tr>
<td>30086</td>
<td>B13</td>
<td>OUT39</td>
<td>OUT</td>
</tr>
<tr>
<td>30087</td>
<td>A13</td>
<td>OUT40</td>
<td>OUT</td>
</tr>
</tbody>
</table>

* Remove Jumper-lead between CN303-1 and -3, CN303-2 and -4 when a external power supply is used.
6 I/O Circuits

6.3 Connection Example

European I/O Expansion (JARCR-XOI02B) Board

CN10 User input/output (for handling application)

* Remove Jumper-lead between CN303-1 and -3, CN303-2 and -4 when a external power supply is used.
6.3 Connection Example

CN11 User input/output (for handling application)

* Remove Jumper-lead between CN303-1 and -3, CN303-2 and -4 when a external power supply is used.
6.3.2 Arc Welding, Spot Welding, and General-purpose Applications

CN12 User input/output
(for arc welding, spot welding, and general-purpose applications)
CN13 User input/output
(for arc welding, spot welding, and general-purpose applications)

* Remove Jumper-lead between CN303-1 and -3, CN303-2 and -4 when a external power supply is used.
European I/O Expansion (JARCR-XOI02B) Board

6 I/O Circuits
6.3 Connection Example

CN10 User input/output
(for arc welding, spot welding, and general-purpose applications)
European I/O Expansion
(JARCR-XOI02B) Board

I/O Circuits

6.3 Connection Example

CN11 User input/output
(for arc welding, spot welding, and general-purpose applications)

* Remove Jumper-lead between CN303-1 and -3, CN303-2 and -4 when a external power supply is used.
Specifications are subject to change without notice for ongoing product modifications and improvements.