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

MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS
DX100 INSTRUCTIONS
DX100 OPERATOR’S MANUAL
DX100 MAINTENANCE MANUAL

The DX100 operator’s manuals above correspond to specific usage. Be sure to use the appropriate manual.
MANDATORY

• This manual explains Job data simplified restoration function of the DX100 system. Read this manual carefully and be sure to understand its contents before handling the DX100.

• General items related to safety are listed in Chapter 1: Safety of the DX100 Instructions. To ensure correct and safe operation, carefully read the DX100 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.
Notes for Safe Operation

Read this manual carefully before maintenance or inspection of the DX100.

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

**WARNING**
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

**CAUTION**
Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.

**MANDATORY**
Always be sure to follow explicitly the items listed under this heading.

**PROHIBITED**
Must never be performed.

Even items described as “CAUTION” may result in a serious accident in some situations. At any rate, be sure to follow these important items.

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

- Before operating the manipulator, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the DX100 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

- Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
  - View the manipulator from the front whenever possible.
  - Always follow the predetermined operating procedure.
  - 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 DX100.
  - 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 DX100 and the programming pendant.
Definition of Terms Used Often in This Manual

The MOTOMAN manipulator is the YASKAWA industrial robot product.
The manipulator usually consists of the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX100 controller</td>
<td>DX100</td>
</tr>
<tr>
<td>DX100 programming pendant</td>
<td>Programming pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and the controller</td>
<td>Manipulator cable</td>
</tr>
</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</td>
<td>The keys which have characters printed on them are denoted with [ ]. ex. [ENTER]</td>
</tr>
</tbody>
</table>
| Symbol Keys                | The keys which have a symbol printed on them are not denoted with [ ] but depicted with a small picture.  
|                            | ex. page key                                                                        |
|                            | The cursor key is an exception, and a picture is not shown.                        |
| Axis Keys                  | "Axis Keys" and "Numeric Keys" are generic names for the keys for axis operation and number input. |
| Numeric Keys               |                                                                                     |
| 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.
1 Outline ............................................................................................................................................ 1-1

2 Job Data Restoration ...................................................................................................................... 2-1
   2.1 How to Check Job Data Inconsistent Status...................................................................... 2-1
   2.2 Job Data Restoration Method............................................................................................ 2-4
      2.2.1 In Case Same Position Data is Chained .................................................................. 2-4
      2.2.2 In Case Not-Registered Position Data is Chained................................................ 2-7
      2.2.3 In Case Not-Chained Position Data Exists......................................................... 2-10

3 If Fail in Simplified Restoration ................................................................................................... 3-1
   3.1 Rechecking Job Data...................................................................................................... 3-1
   3.2 If Data Inconsistency Alarm Occurs Again .................................................................... 3-2

4 Related Parameters ....................................................................................................................... 4-1

5 Specific Output Signal.................................................................................................................... 5-1
1 Outline

There are some cases where the data in file system becomes inconsistent status if the controller power is turned off during edit operation.

If this data inconsistent status is neglected, the following data errors (inconsistent status) might occur in rare cases.

This Job data simplified restoration function checks the inconsistent status of the file and restore the data error status of the file system.

[Inconsistent status]

inconsistent chain status between position data and instruction file

(1) Overlapped chain with same position data
(2) Unregistered position data is chained with instruction file
(3) Registered position data is not chained
2 Job Data Restoration

2.1 How to Check Job Data Inconsistent Status

* "FILE" in WRONG DATA LOG screen corresponds to the following data.

1. Detect data error
   - ALARM screen appears.

   - Execute Job data restoration in management mode.
   - Operation mode and editing mode permit monitoring only.
2. Press \{SYSTEM INFO\} under main menu and select \{SECURITY\}

3. Select “MANAGEMENT MODE”

- Input password to switch the mode to Management mode.

4. Press \{SETUP\} under main menu and select \{WRONG DATA LOG\}
2 Job Data Restoration
2.1 How to Check Job Data Inconsistent Status

– WRONG DATA LOG screen appears.

5. Check the details of data inconsistency

– Check the error contents, then execute restoration following chapter 2.2 “Job Data Restoration Method” at page 2-4.
2.2 Job Data Restoration Method

2.2.1 In Case Same Position Data is Chained

1. Press {UTILITY} to select {RESTORE}
   - Press {RESTORE} to reset the overlapped position data chain.
2 Job Data Restoration

2.2 Job Data Restoration Method

- The indication changes from “OCCURRED ON” to “RESTORED ON”.

![Image of DX100 system interface]

* If fail in the restoration

- If the indication doesn’t change from “OCCURRED ON” to “RESTORED ON”, refer to chapter 3 “If Fail in Simplified Restoration” at page 3-1.

2. Start up the system again

- After the restoration, the system must be started up again.
  Turn the control power OFF/ON and then execute the following checking operation.

3. Press {SETUP} under main menu and select {WRONG DATA LOG}
– WRONG DATA LOG screen appears.

4. Check the position
– Check the position of two lines indicated in the screen.
2.2.2 In Case Not-Registered Position Data is Chained

1. Press {UTILITY} and select {RESTORE}
   - Press (RESTORE) button to register the position of the file indicated in WRONG DATA LOG screen tentatively, which enables to register position again.
2.2 Job Data Restoration Method

- The indication changes from "OCCURRED ON" to "REGISTERED ON".

* If fail in the restoration
- If the indication doesn’t change from “OCCURRED ON” to “RESTORED ON”, refer to chapter 3 "If Fail in Simplified Restoration" at page 3-1.

2. Start up the system again
- After the restoration, the system must be started up again. Turn the control power OFF/ON and then execute the following checking operation.

3. Press {SETUP} under main menu and select {WRONG DATA LOG}
2 Job Data Restoration

2.2 Job Data Restoration Method

– WRONG DATA LOG appears.

4. Register teaching position again

– Register the position data of the file in the screen again.
2.2.3 In Case Not-Chained Position Data Exists

1. Press {UTILITY} and select {RESTORE}
   - Press {RESTORE} to correct the chain.
– The indication changes from “OCCURRED ON” to “REGISTERED ON”.

* If fail in the restoration
  – If the indication doesn’t change from “OCCURRED ON” to “RESTORED ON”, refer to chapter 3 “If Fail in Simplified Restoration” at page 3-1.

2. Start up the system again
  – After the restoration, the system must be started up again. Turn the control power OFF/ON.
3 If Fail in Simplified Restoration

Execute the following procedure if failing in the restoration by Job data simplified restoration method.

3.1 Rechecking Job Data

1. Select {RE CHECK} under {UTILITY}
   – Press {RE CHECK}

2. Restoration is completed.
   – * Proceed to the next operation chapter 3.2 “If Data Inconsistency Alarm Occurs Again” at page 3-2 if the alarm occurs again after this operation.
3.2 If Data Inconsistency Alarm Occurs Again

Execute the following procedure if the data inconsistency alarm occurs again even after rechecking Job data following chapter 3.1 “Rechecking Job Data” at page 3-1.

1. Re-register the position data after deleting the data of the file indicated in WRONG DATA LOG screen. Refer to chapter 2.2 "Job Data Restoration Method" at page 2-4 for checking operation after registration. (See the operations after procedure 2 "Start up the system again").

2. Execute the following procedures if the position data cannot be deleted or re-registered with the operation indicated above.
   (1) Save Job data and User Coordinate file and Robot Calibration.
       * Delete the position data of the file indicated in WRONG DATA LOG screen in case the following error occurs while saving.
       ERROR:  0040   Undefined robot position variable
       * Refer to “7.3.0.2 Saving Data” in “DX100 OPERATOR’S MANUAL” for details.
   (2) Initialize Job area in maintenance mode.
       * Refer to “8.18.1 Initializing Job File” in “DX100 INSTRUCTIONS” for details.
   (3) Load the data saved in the procedure 1.
       * Refer to “7.3.0.3. Loading Data” in “DX100 OPERATOR’S MANUAL” for details.
   (4) Check the motion of the manipulator after loading.
       * Refer to the procedure from procedure “2. Start up the system again” in chapter 2.2 “Job Data Restoration Method” at page 2-4.
## Related Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Meaning</th>
<th>Setting value</th>
<th>Initial value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2C303</td>
<td>Data inconsistency check specification</td>
<td>0:Valid, 1:nvalid</td>
<td>0</td>
</tr>
<tr>
<td>S2C304</td>
<td>Inconsistency detection method in play mode</td>
<td>0:Warning, 1:Stop with alarm</td>
<td>0</td>
</tr>
</tbody>
</table>
The following signal outputs the status of data inconsistency occurrence.

<table>
<thead>
<tr>
<th>Output signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>50696</td>
<td>Indicate the data inconsistency occurrence</td>
</tr>
</tbody>
</table>
DX100 OPTIONS

INSTRUCTIONS

FOR JOB DATA SIMPLIFIED RESTORATION FUNCTION

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

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

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

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

YASKAWA ELECTRIC KOREA CORPORATION
1F, Samyang Bldg. 89-1, Shinchun-dong, Donk-Ku, Daegu, Korea
Phone +82-53-382-7844  Fax +82-53-382-7845

YASKAWA ELECTRIC (SINGAPORE) PTE. LTD.
151 Lorong Chuan, #04-01, New Tech Park, Singapore 556741
Phone +65-6282-3003  Fax +65-6282-3003

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

YASKAWA ELECTRIC CORPORATION

YASKAWA

Specifications are subject to change without notice
for ongoing product modifications and improvements.
© Printed in Japan March 2010 10-03