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

MOTOMAN INSTRUCTIONS

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

Part Number: 157303-1CD
Revision: 1
MANDATORY

• This manual supplementarily explains the Speed Override 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 installation, operation, 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 DX100 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 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 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:

<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, 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>Character Keys: The keys which have characters printed on them are denoted with [ ].</td>
</tr>
<tr>
<td></td>
<td>ex. [ENTER]</td>
</tr>
<tr>
<td>Symbol Keys</td>
<td>The keys which have a symbol printed on them are not denoted with [ ] but depicted with a small picture.</td>
</tr>
<tr>
<td></td>
<td>ex. page key</td>
</tr>
<tr>
<td></td>
<td>The cursor key is an exception, and a picture is not shown.</td>
</tr>
<tr>
<td>Axis Keys</td>
<td>“Axis Keys” and “Number Keys” are generic names for the keys for axis operation and number input.</td>
</tr>
<tr>
<td>Number 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.
1 Specification for Speed Override in AUTO Cycle Operation
   1.1 Functional Overview ........................................................................................................... 1-1
   1.2 Setting the Speed Override Function .............................................................................. 1-2
   1.3 Performing the Speed Override Function ....................................................................... 1-5
   1.4 Modifying the Speed Override Percentage ..................................................................... 1-5
   1.5 Disabling the Speed Override Function ........................................................................ 1-6
   1.6 Enabling an Automatic Setting of Speed Override ......................................................... 1-8
   1.7 Manual Speed in the TEACH Mode .............................................................................. 1-8
   1.8 Parameter ...................................................................................................................... 1-9

2 Specification for Speed Override with Input Signals .................................................... 2-1
   2.1 Functional Overview ........................................................................................................ 2-1
   2.2 Performing the Speed Override Function ....................................................................... 2-2
   2.3 Disabling the Speed Override Function ......................................................................... 2-3
   2.4 Parameters ................................................................................................................... 2-4
1 Specification for Speed Override in AUTO Cycle Operation

1.1 Functional Overview

This specification allows the manipulator to temporarily change its operation speed during playback. The operation speed is specified by setting the Speed Override percentage (1 to 100% in increments of 1%) for the operation speed (play speed) specified in the current job. This function also enables an automatic setting of the Speed Override function when changing modes from TEACH to PLAY. Speed Override function can be performed with this specification by setting the parameter S2C701.
1.2 Setting the Speed Override Function

NOTE
Set the mode selection switch to PLAY.

1. Select {JOB} under the Main Menu, and press {JOB}.

– The PLAYBACK screen appears.
2. Select {UTILITY} in the Menu Area.

3. Select {SPEED OVERRIDE}.

– The Speed Override setting is enabled. (As shown below, an asterisk ** appears beside {SPEED OVERRIDE}, and "SPEED ADJUSTMENT" appears in the input buffer line.)
4. Set the override ratio.
   - 1. Move the cursor to highlight the RATIO edit box.
   - 2. Hold the SHIFT key and press the cursor key (up or down) to modify the percentage.

   - *To directly enter the value, perform:
     1. Move the cursor to highlight the RATIO edit box, and press [SELECT].
     2. Enter the desired percentage using the numeric keypad.
     3. Press [ENTER].

5. Setting completed.
1.3 Performing the Speed Override Function

**NOTE**
Set the mode selection switch to PLAY.

1. Start the job.
   - Press [START].
2. Speed Override is executed.
   - The manipulator moves in the specified speed percentage.

1.4 Modifying the Speed Override Percentage

**NOTE**
- Set the mode selection switch to PLAY.
- This operation can be performed during playback.

1. Modify the override ratio.
   - Highlight the RATIO edit box, and hold the SHIFT key and press the cursor key (up or down) when SPEED ADJUSTMENT is displayed in the input buffer line.
   *The value is increased or decreased by 1% increments.

2. Modification completed.
   - The manipulator moves in the specified speed percentage.
1.5 Disabling the Speed Override Function

1. Select {UTILITY} in the Menu Area.

2. Select {*SPEED OVERRIDE}.

   – The Speed Override function is disabled. (As shown below, the asterisk beside {SPEED OVERRIDE} and the "SPEED ADJUSTMENT" input buffer line dissapears.)
3. Operation completed.
   - Additionally, the Speed Override function is automatically disabled when:
     • Setting the Dry-Run Speed mode.
     • Changing the mode to any mode other than PLAY.
     • Alarm or error occurs.
     • Power is turned OFF.
1.6 Enabling an Automatic Setting of Speed Override

The function is enabled by setting the parameter S2C702.

This function allows Speed Override to be automatically set when the operation mode is changed from TEACH to PLAY. The percentage corresponds to the manual speed selected during the TEACH mode.

<table>
<thead>
<tr>
<th>Manual Speed</th>
<th>Applicable Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inching</td>
<td>Maximum jog operation link speed x S1CxG045</td>
</tr>
<tr>
<td>Low</td>
<td>Maximum jog operation link speed x S1CxG045</td>
</tr>
<tr>
<td>Medium</td>
<td>Maximum jog operation link speed x S1CxG046</td>
</tr>
<tr>
<td>High</td>
<td>Maximum jog operation link speed x S1CxG047</td>
</tr>
</tbody>
</table>

1.7 Manual Speed in the TEACH Mode

The function is enabled by setting the parameter S2C699.

The manual speed (inching, low, medium, and high) in the TEACH mode is changed by using the MANUAL SPEED keys on the programming pendant.

The manual speed is automatically set at LOW when:

- Changing modes from PLAY to TEACH.
- Changing coordinate system in the TEACH mode.
- Turning OFF the SERVO power in the TEAC mode.
## 1.8 Parameter

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Details</th>
<th>Setting Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2C699</td>
<td>Automatic change of manual speed to LOW</td>
<td>Automatically sets the manual speed to LOW.</td>
<td>0</td>
</tr>
<tr>
<td>S2C701</td>
<td>Speed Override setting</td>
<td>Specifies the usage of Speed Override. 0: Disables continuous cycle operation; Enables speed modification (standard specification). 1: Enables the Continuous Cycle operation; Disables speed modification.</td>
<td>0</td>
</tr>
<tr>
<td>S2C702</td>
<td>Automatic Speed Override Setting 1 in mode change (When S2C701 = 1)</td>
<td>Specifies whether to automatically set Speed Override when the mode is changed to PLAY. 0: Disables Speed Override. 1: Sets the percentage corresponding to the manual speed.</td>
<td>0 to 1</td>
</tr>
<tr>
<td>S2C709</td>
<td>Automatic Speed Override Setting 2 in mode change (When S2C701 = 1)</td>
<td>Specifies whether to automatically set Speed Override when the mode is changed to PLAY. 0: Disables Speed Override. 1: Sets the percentage applied last time.</td>
<td>0 to 1</td>
</tr>
</tbody>
</table>
2 Specification for Speed Override with Input Signals

2.1 Functional Overview

This specification allows the manipulator to temporarily change its operation speed during playback using the external input signals. The operation speed is specified by setting the Speed Override percentage (1 to 255% in increments of 1%) for the operation speed (play speed) specified in the current job.

Fig. 2-1: Play Speed and Override Speed

- The Speed Override function can be continued in the AUTO Cycle operation.
- The play speed data of the job will not be modified.
- The maximum and minimum manipulator speeds limit the play speed modified by Speed Override.
2.2 Performing the Speed Override Function

1. Playback a job.

2. Input the external signals for Speed Override.
   - The message "Over-riding speed" and the Speed Override percentage appear on the screen.

   ![Image showing speed override overlay](image)

   **NOTE**
   • Set the mode selection switch to PLAY.
   • Refer to chapter 2.4 “Parameters” when performing Speed Override with this specification.

3. Speed Override is executed.
   - The manipulator moves in the specified speed percentage.
2.3 Disabling the Speed Override Function

Speed Override is disabled when:

- External signals are OFF.
- Changing modes from PLAY to TEACH.
### 2.4 Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Details</th>
<th>Setting Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S2C701</td>
<td>Speed Override setting</td>
<td>Specifies the usage of Speed Override. <em>To enable Speed Override with external signals, set &quot;1&quot; for the setting value.</em> 0: Disables the Continuous Cycle operation; Enables speed modification (standard spec). 1: Enables the Continuous Cycle operation; Disables speed modification.</td>
<td>1</td>
</tr>
<tr>
<td>S4C287</td>
<td>Universal Input Group number setting (signals 1 to 8)</td>
<td>Specifies the signals to be used. Eight Universal Input points correspond to the signals 1 to 8 of S4C288 to S4C295.</td>
<td>1 to 256</td>
</tr>
<tr>
<td>S4C288</td>
<td>Speed percentage (%) Signal 1</td>
<td>Specifies the speed percentage by the Universal Input signals set in S4C287. Priority: Signal 1 &gt; Signal 8</td>
<td>0 to 255</td>
</tr>
<tr>
<td>S4C289</td>
<td>Speed percentage (%) Signal 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4C290</td>
<td>Speed percentage (%) Signal 3</td>
<td>If S4C288 to S4C295 are all &quot;0&quot;, the input status 1 to 255 of the Universal input signals (8 points) will be applied to the speed percentage.</td>
<td>0 to 255</td>
</tr>
<tr>
<td>S4C291</td>
<td>Speed percentage (%) Signal 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4C292</td>
<td>Speed percentage (%) Signal 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4C293</td>
<td>Speed percentage (%) Signal 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4C294</td>
<td>Speed percentage (%) Signal 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S4C295</td>
<td>Speed percentage (%) Signal 8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Override Speed percentage can be specified with the parameters (S4C288 to S4C295) in two ways as follows:

**Setting a Speed Percentage with Respect to Each Signal**

- Specify the speed percentage 1 to 255 in the parameters (S4C288 to S4C295). As to the speed percentage for unused signals, set "0": Speed Override will not take effect even when the external signals are input.
- The signal priority is: "Signal 1 > Signal 8". For example, when the signals 1 to 3 are input simultaneously, Speed Override will be performed applying the speed percentage of signal 1.

**Using Eight Points of External Signals as the Speed Percentage Data**

- Set "0" for all the parameters (S4C288 to S4C295).
- Speed Override will be performed applying the input status of signals 1 to 255 as the speed percentage. For example, when the signals 5 and 7 are input simultaneously, Speed Override will be performed applying 80% of the speed percentage.

**NOTE**

When this function is enabled, Speed Override cannot be operated with a programming pendant.
DX100 OPTIONS

INSTRUCTIONS

SUPPLEMENTARILY FOR SPEED OVERRIDE FUNCTION

HEAD OFFICE
2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu 806-0004 Japan
Phone +81-93-645-7745 Fax +81-93-645-7746

YASKAWA America Inc. MOTOMAN Robotics Division
805 Liberty Lane, West Carrollton, OH 45449, U.S.A.
Phone +1-937-847-6200 Fax +1-937-847-6277

YASKAWA Nordic AB
Franska vagen 10, Box 4004, 390 04 Kalmar, Sweden
Phone +46-480-417800 Fax +46-480-417999

YASKAWA Europe GmbH Robotics Division
Kammerfeld strasse 1, 85391 Allershausen, Germany
Phone +49-8166-90-100 Fax +49-8166-90-103

YASKAWA Electric Korea Co., Ltd.
7F, Doore Bldg.; 24, Yeoido-Dong Youngdungpo-ku, Seoul, KOREA
Phone +82-2-784-7844 Fax +82-2-784-8495

YASKAWA Electric (Singapore) PTE Ltd.
151 Lorong Chuan, #04-02A, New Tech Park, Singapore 556741
Phone +65-6282-3003 Fax +65-6289-3003

YASKAWA Electric (Thailand) Co., Ltd.
252/246, 4th Floor, Muang Thai-Phatra Office Tower II Rachadaphisek Road, Huaykwang Bangkok, 10320 Thailand
Phone +66-2-693-2200 Fax +66-2-693-4200

Shougang MOTOMAN Robot Co. Ltd.
No.7, Yongchang-North Road, Beijing E&T Development Area, China 100176
Phone +86-10-6788-2858 Fax +86-10-6788-2878

MOTOMAN Motherson Robotics Ltd.
Plot No.195-196, 1st Floor, Sec.4 IMT Manesar, Gurgaon 122050, Haryana
Phone +91-124-475-8500 Fax +91-124-414-8016

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