

DX100 OPTIONS INSTRUCTIONS

SUPPLEMENTARY FOR SPEED OVERRIDE FUNCTION

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 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.

DX100

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



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.

DX100

**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 DX100 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 DX100 Instructions before operating the manipulator:


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:

Equipment	Manual Designation
DX100 controller	DX100
DX100 programming pendant	Programming pendant
Cable between the manipulator and the controller	Manipulator cable

DX100

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

Equipment		Manual Designation
Programming Pendant	Character Keys	The keys which have characters printed on them are denoted with []. ex. [ENTER]
	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 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.

1	Specification for Speed Override in AUTO Cycle Operation.....	1-1
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.

DX100

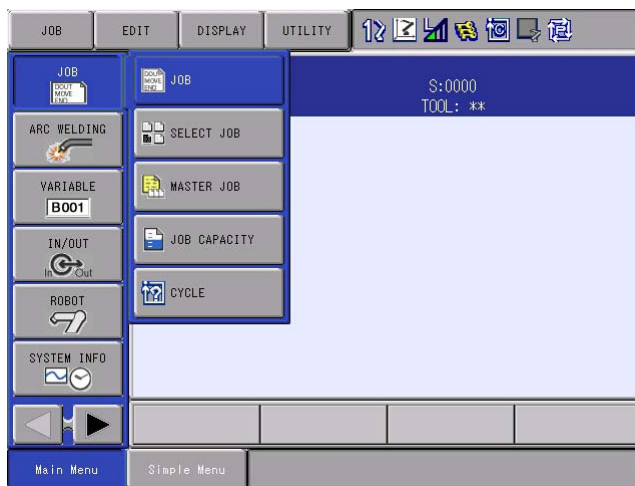
- 1 Specification for Speed Override in AUTO Cycle Operation
- 1.2 Setting the Speed Override Function

1.2 Setting the Speed Override Function



Set the mode selection switch to PLAY.

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



– The PLAYBACK screen appears.

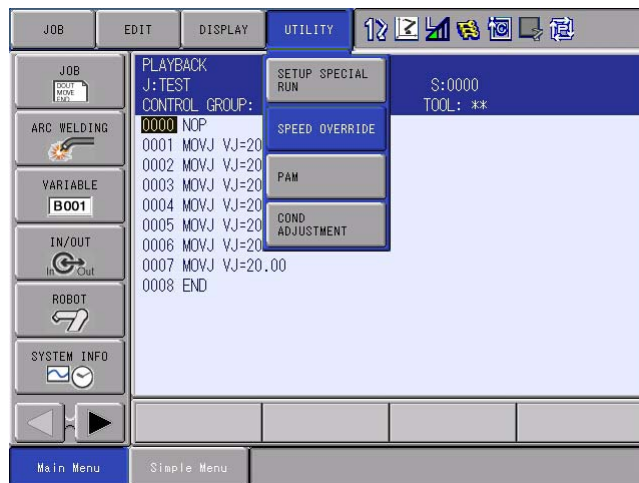


1 Specification for Speed Override in AUTO Cycle Operation
 1.2 Setting the Speed Override Function

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.)

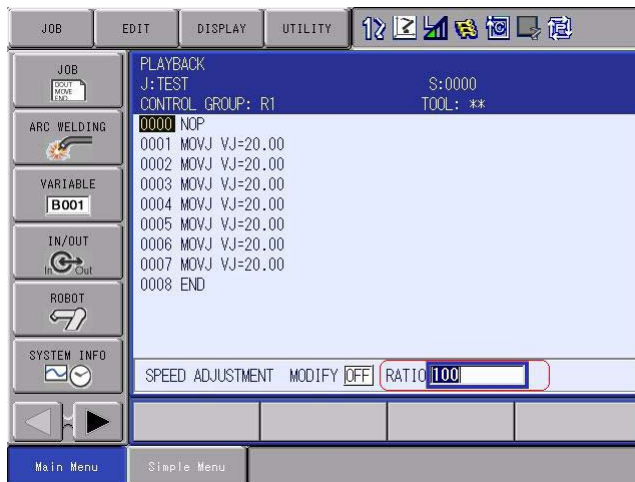


DX100

1 Specification for Speed Override in AUTO Cycle Operation

1.2 Setting the Speed Override Function

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



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



- 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 Specification for Speed Override in AUTO Cycle Operation
- 1.5 Disabling the Speed Override Function

1.5 Disabling the Speed Override Function

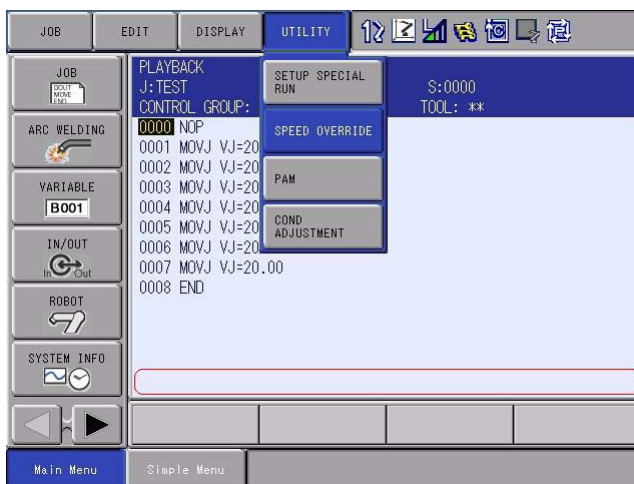
- 1. Select {UTILITY} in the Menu Area.



- 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 disappears.)



-
- 1 Specification for Speed Override in AUTO Cycle Operation
 - 1.5 Disabling the Speed Override Function
-

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.

DX100

- 1 Specification for Speed Override in AUTO Cycle Operation
- 1.6 Enabling an Automatic Setting of Speed Override

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.

Manual Speed	Applicable Percentage
Inching	Maximum jog operation link speed x S1CxG045
Low	Maximum jog operation link speed x S1CxG045
Medium	Maximum jog operation link speed x S1CxG046
High	Maximum jog operation link speed x S1CxG047

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 TEACH mode.

1.8 Parameter

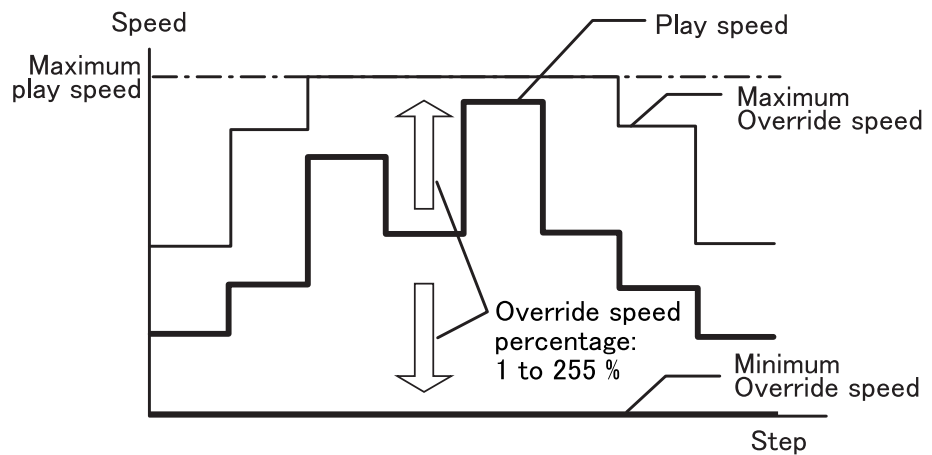
Parameter	Description	Details	Setting Value
S2C699	Automatic change of manual speed to LOW	Automatically sets the manual speed to LOW. 	0
S2C701	Speed Override setting	Specifies the usage of Speed Override. 0: Disables continuous cycle operation; Enables speed modification (standard specification). 1: Enables the Continuous Cycle operation; Disables speed modification.	0
S2C702	Automatic Speed Override Setting 1 in mode change (When S2C701 = 1)	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.	0 to 1
S2C709	Automatic Speed Override Setting 2 in mode change (When S2C701 = 1)	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.	0 to 1

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



NOTE

- 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.

DX100

- 2 Specification for Speed Override with Input Signals
- 2.2 Performing the Speed Override Function

2.2 Performing the Speed Override Function

NOTE

- Set the mode selection switch to PLAY.
- Refer to *chapter 2.4 "Parameters"* when performing Speed Override with this specification.

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.



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.

DX100	2	Specification for Speed Override with Input Signals
	2.4	Parameters

2.4 Parameters

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

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.



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.