

DX100 OPTIONS INSTRUCTIONS

FOR TEACHING POINT ADJUSTMENT FUNCTION WITH PROGRAMMING PENDANT

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.

Part Number: 157794-1CD

Revision: 0





MANDATORY

- This manual explains the teaching point adjustment function with programming pendant of the DX100 system and general operations. 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 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.

DX 100

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 when the emergency stop buttons on the front door of the DX100 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.

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 persons are 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 are problems. The emergency stop buttons are located on the right of the front door of the DX100 and the programming pendant.



CAUTION

- Perform the following inspection procedures prior to conducting manipulator teaching. If problems are found, repair them immediately, and be sure that all other necessary processing has been performed.
 - Check for problems in manipulator movement.
 - Check for damage to insulation and sheathing of external wires.
- Always return the programming pendant to the hook on the cabinet of the 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

DX 100

Descriptions of the programming pendant keys, 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 Numeric Keys	“Axis Keys” and “Numeric Keys” are generic names for the keys for axis operation and number input.
	Keys pressed simultaneously	When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, ex. [SHIFT]+[COORD]
	Displays	The menu displayed in the programming pendant is denoted with { }. ex. {JOB}

Description of the Operation Procedure

In the explanation of the operation procedure, the expression “Select •••” means that the cursor is moved to the object item and the SELECT key is pressed, or that the item is directly selected by touching the screen.



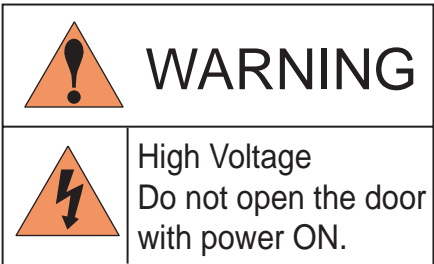
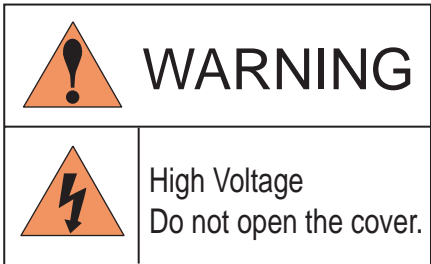
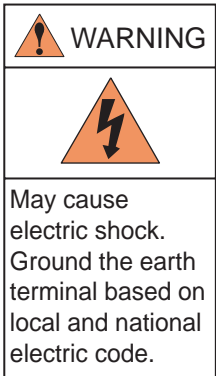
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DX 100

Explanation of Warning Labels

The following warning labels are attached to the manipulator and DX100.
Fully comply with the precautions on the warning labels.

 WARNING		
<ul style="list-style-type: none"> The label described below is attached to the manipulator. <p>Observe the precautions on the warning labels. Failure to observe this caution may result in injury or damage to equipment.</p>		
		
<p>Refer to the manipulator manual for the warning label location.</p>		
<ul style="list-style-type: none"> The following warning labels are attached to DX100. <p>Observe the precautions on the warning labels. Failure to observe this warning may result in injury or damage to equipment.</p>		
		
<p>Refer to the DX100 INSTRUCTIONS for the warning label location.</p>		

1	Outline	1-1
2	How to Adjust the Teaching Point.....	2-1
3	Position Adjustment Display	3-1
3.1	For Robot Axes (including Base Axes).....	3-1
3.2	For Station Axes	3-3
4	Parameters	4-1

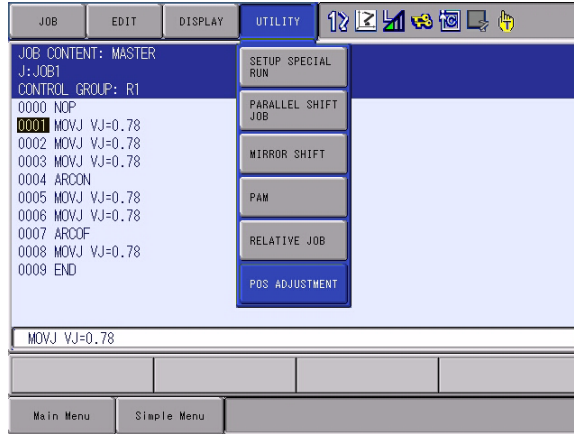
1 Outline

This manual describes how to modify the position data of the teaching point by entering numeric data with the Programming Pendant to adjust the teaching point without moving the manipulator.

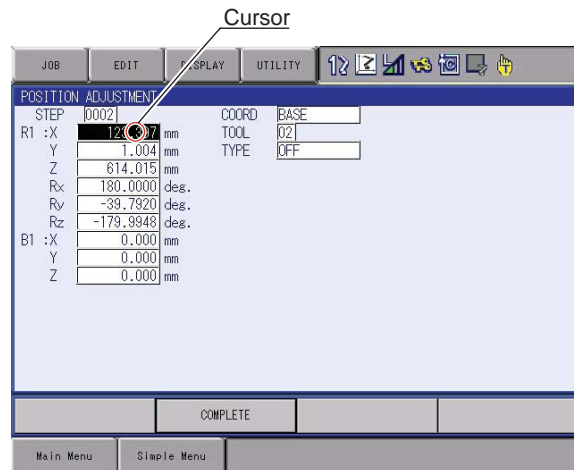
This teaching point adjustment function with the Programming Pendant enables simplified offline teaching by using CAD data and fine adjustment of the position data in any coordinate system.

2 How to Adjust the Teaching Point

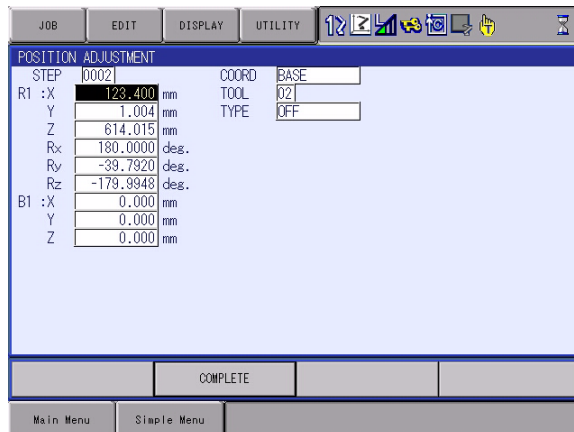
1. In the JOB CONTENT display, select {POS ADJUSTMENT} under {UTILITY}.
 - When {POS ADJUSTMENT} is selected from the pull-down menu, POSITION ADJUSTMENT display appears.



2. Move the cursor to the numeric value to be modified, and enter any position data. Then press [ENTER].

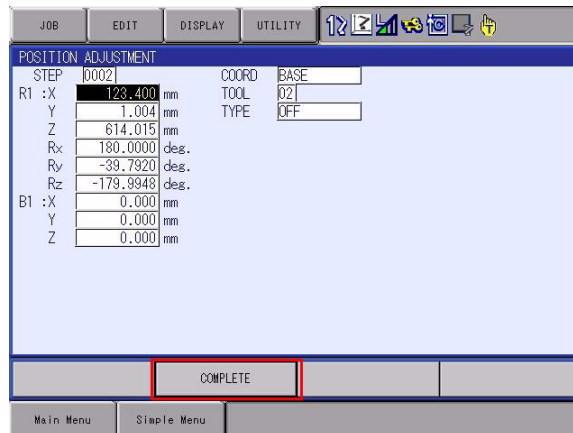


3. When [ENTER] is pressed again, an hourglass wait cursor is displayed and the entered position data can be reflected in the job.



2 How to Adjust the Teaching Point

4. Select "COMPLETE" or press [CANCEL] on the programming pendant to end the position adjustment function.
 - The display returns to the JOB CONTENT display.



- After a numeric value is entered and [ENTER] is pressed, the DX100 checks the soft limit, the axis interference, etc. for the new position data. If the entered value is out of the P-point maximum envelope of the manipulator, the message "Step exceeding operation range is made" appears. Also, "/OV" appears for the STEP of the JOB CONTENT display.
- While adjusting the teaching point, test runs and FWD/BWD key operations are disabled.
- After having modified the numeric value of the position data, always perform the FWD/BWD key operations to confirm that the teaching point is adjusted correctly.

3 Position Adjustment Display

The contents of the POSITION ADJUSTMENT display depend on the control group and the coordinate system whose teaching point is to be adjusted.

3.1 For Robot Axes (including Base Axes)

Fig. : For a Cartesian Coordinate System

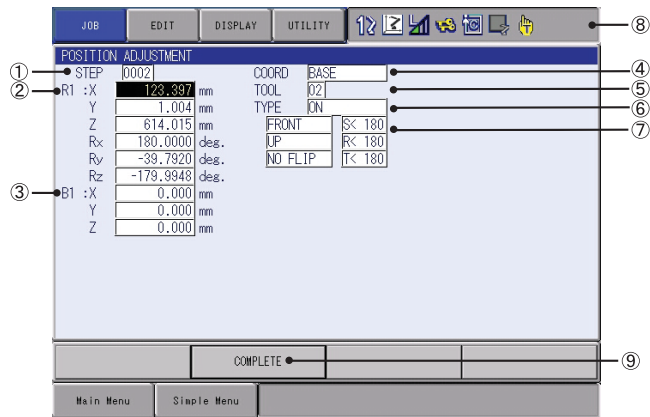
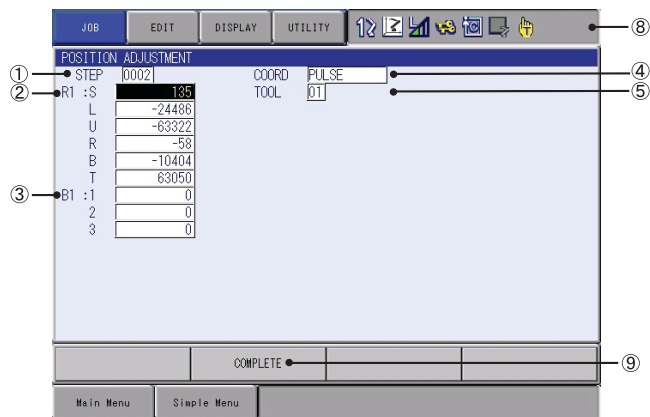


Fig. : For a Pulse Coordinate System



①STEP

Indicates the step number whose teaching point is to be adjusted.
 The step number of the job for which "POS ADJUSTMENT" is selected is displayed as the initial value.
 Enter a step number by using the number keys to view the position data of the step.

②R1

Displays the teaching point of the manipulator.
 Modify the values in absolute values by using the number keys.

③B1

Displays the teaching point of the existing base axes.
 Modify the values in absolute values by using the number keys.

3 Position Adjustment Display

3.1 For Robot Axes (including Base Axes)

④ COORD (Initial setting: BASE)

Displays the coordinates needed to adjust the teaching point.

A “BASE”, “ROBOT”, “USER# (*)”, “MASTER TOOL”, or “PULSE” coordinate can be selected. A “MASTER TOOL” coordinate can be selected only for a coordinated job.

For relative jobs, the teaching coordinate used to convert the standard job into the relative job is selected.

⑤ TOOL

Displays the taught tool.

The tool can be changed by selecting a tool number from 0 to 23 by using the number keys.

⑥ TYPE (Initial setting: OFF)

Sets the display of TYPE to “ON/OFF”.


Every time [SELECT] is pressed, the display switches between “OFF” and “ON”.

⑦ State of TYPE

Displays the state of TYPE when the TYPE is set to “ON” and allows modification of the state of TYPE.

⑧ Icon for the page key

Appears when the job axis configuration includes more than one control group.

Press the page key  on the programming pendant to turn the pages for each control group in the following order:

“R1” → “R2” → “R3” → “S1” → ……

The contents of the position adjustment display for station axes are different from those for the robot axes. Refer to *chapter 3.2 “For Station Axes”* at page 3-3.

⑨ “COMPLETE”

Select “COMPLETE”, and the display returns to the JOB CONTENT display.

Pressing [CANCEL] on the programming pendant also ends the POSITION ADJUSTMENT function.



- A parameter setting is required to select “PULSE” as the coordinate type. Contact your Yaskawa representative for more information.
- The parameter S3C1110 must be set to “1” to change the coordinates of the relative job.
- The parameter S2C431 must be set to “1” to change the taught tool.
- If the parameter S2C430 for specifying the relative job conversion method is set to “1” (TYPE REGARD), the TYPE cannot be changed.
- For the parameter settings, refer to *chapter 4 “Parameters”* at page 4-1.

3.2 For Station Axes

Fig. : For a Cartesian Coordinate System

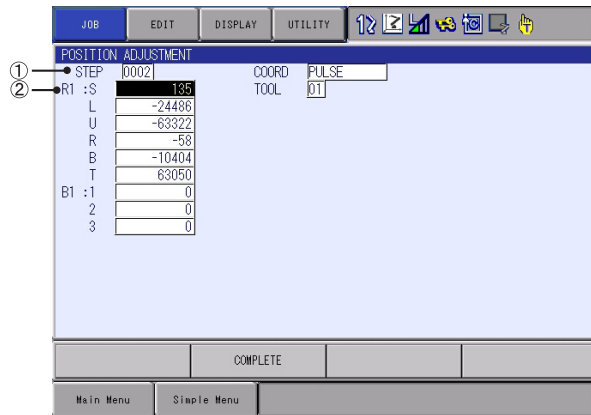
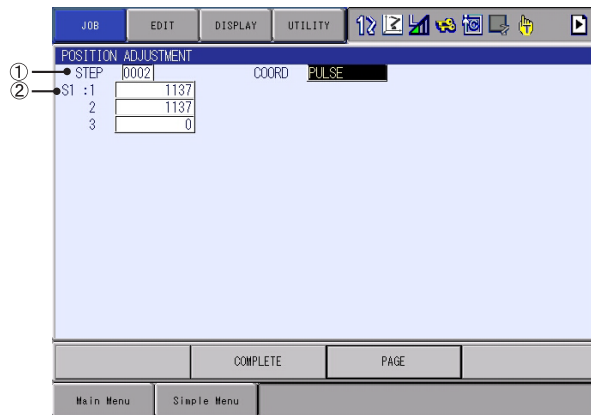


Fig. 3-1: For a Pulse Coordinate System



①STEP

Indicates the step number whose teaching point is to be adjusted.

The step number of the job for which "POS ADJUSTMENT" is selected is displayed as the initial value.

Enter a step number by using the number keys to view the position data of the step.

②S1

Displays the teaching point of the station.

Modify the values in absolute values by using the number keys.



The position data of each station axis is displayed in the units defined in the system configuration ("mm" or "degree": Parameters S2C264 and S2C265 to S2C276). For the parameter settings, refer to *chapter 4 "Parameters" at page 4-1*.

DX100

4 Parameters

Parameter	Setting	Setting Range/Units	Initial Setting
S2C430	Relative job conversion method specification	0: STEP REGARD 1: TYPE REGARD 2: STEP REGARD (R-axis minimum)	0
S2C431	Tool number selection	0: Not possible, 1: Possible	0
S3C1110	Selection of coordinates for adjusting the teaching point of the relative job	0: Not possible, 1: Possible	0
S2C264	Station axis current value display	0: Disabled, 1: Enabled	0
S2C265	The units of the position data of Station axis 1 (S1)	Bit specification (0: angle, 1: distance)	0
S2C266	The units of the position data of Station axis 2 (S2)	Bit specification (0: angle, 1: distance)	0
S2C267	The units of the position data of Station axis 3 (S3)	Bit specification (0: angle, 1: distance)	0
S2C268	The units of the position data of Station axis 4 (S4)	Bit specification (0: angle, 1: distance)	0
S2C269	The units of the position data of Station axis 5 (S5)	Bit specification (0: angle, 1: distance)	0
S2C270	The units of the position data of Station axis 6 (S6)	Bit specification (0: angle, 1: distance)	0
S2C271	The units of the position data of Station axis 7 (S7)	Bit specification (0: angle, 1: distance)	0
S2C272	The units of the position data of Station axis 8 (S8)	Bit specification (0: angle, 1: distance)	0
S2C273	The units of the position data of Station axis 9 (S9)	Bit specification (0: angle, 1: distance)	0
S2C274	The units of the position data of Station axis 10 (S10)	Bit specification (0: angle, 1: distance)	0
S2C275	The units of the position data of Station axis 11 (S11)	Bit specification (0: angle, 1: distance)	0
S2C276	The units of the position data of Station axis 12 (S12)	Bit specification (0: angle, 1: distance)	0
S2C277	The units of the position data of Station axis 12 (S13)	Bit specification (0: angle, 1: distance)	0
S2C278	The units of the position data of Station axis 12 (S14)	Bit specification (0: angle, 1: distance)	0
S2C279	The units of the position data of Station axis 12 (S15)	Bit specification (0: angle, 1: distance)	0
S2C280	The units of the position data of Station axis 12 (S16)	Bit specification (0: angle, 1: distance)	0
S2C281	The units of the position data of Station axis 12 (S17)	Bit specification (0: angle, 1: distance)	0
S2C282	The units of the position data of Station axis 12 (S18)	Bit specification (0: angle, 1: distance)	0
S2C283	The units of the position data of Station axis 12 (S19)	Bit specification (0: angle, 1: distance)	0
S2C284	The units of the position data of Station axis 12 (S20)	Bit specification (0: angle, 1: distance)	0

DX100

Parameter	Setting	Setting Range/Units	Initial Setting
S2C285	The units of the position data of Station axis 12 (S21)	Bit specification (0: angle, 1: distance)	0
S2C286	The units of the position data of Station axis 12 (S22)	Bit specification (0: angle, 1: distance)	0
S2C287	The units of the position data of Station axis 12 (S23)	Bit specification (0: angle, 1: distance)	0
S2C288	The units of the position data of Station axis 12 (S24)	Bit specification (0: angle, 1: distance)	0

DX100 OPTIONS INSTRUCTIONS

FOR TEACHING POSITION ADJUSTMENT FUNCTION WITH PROGRAMMING PENDANT

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