

# DX200 OPTIONS INSTRUCTIONS

FOR SPOT MONITOR FUNCTION

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

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## MOTOMAN INSTRUCTIONS

MOTOMAN-□□□ INSTRUCTIONS  
DX200 INSTRUCTIONS  
DX200 OPERATOR'S MANUAL  
DX200 MAINTENANCE MANUAL

The DX200 operator's manual above corresponds to specific usage.  
Be sure to use the appropriate manual.

Part Number: 165840-1CD  
Revision: 0



## MANDATORY

- This manual explains the spot monitor of the DX200. 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 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.

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## 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 “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 DX200 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.

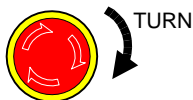
*Figure 1: Emergency Stop Button*



- 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:
  - 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 DX200.
  - 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 the front door of the DX200 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 DX200 cabinet 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:

## 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  |
|--|---------------------|
| DX200 controller                                 | DX200               |
| DX200 programming pendant                        | Programming pendant |
| Cable between the manipulator and the controller | Manipulator cable   |

## DX200 Spot Monitor

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

| Equipment           |                                | Manual Designation  |
|---------------------|--------------------------------|---|
| Programming Pendant | Character Keys/<br>Symbol Keys | The keys which have characters printed on them are denoted with [ ].<br>ex. [ENTER]                                     |
|                     | Axis Keys<br>Number Keys       | “Axis Keys” and “Number Keys” are generic names for the keys for axis operation and number input.                       |
|                     | Keys pressed<br>simultaneously | When two keys are to be pressed simultaneously, the keys are shown with a “+” sign between them, ex.<br>[SHIFT]+[COORD] |
|                     | Displays                       | The menu displayed in the programming pendant is denoted with { }.<br>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.

## Registered TradeMark

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## 1 Outline

The spot monitor function allows to store the history of welding results in the DX200 for the motor gun and the air gun usages.

Approximately 200 welding-point data can be stored in the DX200.

Also, the data stored in the robot can be sent to compact flash memories or PCs.



**NOTE** In order to use this function, use the power source which has the integrated timer function.



## 2 Storing Welding Results

When a spot welding instruction (SPOT instruction, SVSPOT instruction, or SVSPOTMOV instruction) is executed, the DX200 receives the welding result from the power source every time the instruction is executed. The result is stored in the DX200 with the robot's information. The following is an example data stored for every welding point:

Information about the robot

1. Date and time when the instruction is executed
2. Job name
3. Job line number
4. Job step number
5. Gun number
6. Gun pressure data file number (Omitted when an air gun is used.)
7. Gun axis position when the welding condition signal is output (Pulse) (Omitted when an air gun is used.)
8. Gun axis position when the welding complete signal is input (Pulse) (Omitted when an air gun is used.)

Information about the power source (Example)

9. Welding condition number
10. Fault code
11. Number of welding operation
12. #1 secondary current
13. #1 line voltage
14. #2 secondary current
15. #2 line voltage
16. Allowance rate
17. Resistance value
18. Target amount of heat
19. Input amount of heat



The information about the power source depends on its type.

The storable number of data depends on the type of the power source. The welding result is stored every time the welding instruction is executed. When the number of data exceeds the storable number of data, the new data overwrites the oldest data. When the results are written in the whole area, the specific output #51615 turns ON. The storable number of data can be output to the register. (Refer to *Chapter 7 "Parameters"*.)

### 3 Displaying Welding Results

1. Selecting {Main Menu} → {SPOT WELDING} → {SPOT MONITOR} displays the window of welding result list.
  - (List window)
  - Stored "FAULT CODE"s and "DATE"s of the executed weldings are displayed in reverse chronological order from the top.
  - In the frame at the bottom of the list, "JOB NAME", "LINE NO.", and "WELD COND. (welding condition)" of the data selected with the cursor are displayed. When moving the cursor, the displayed information in the frame changes according to the movement.

| No. | FAULT CODE | DATE                |
|-----|------------|---------------------|
| 1   | 0          | 2013/04/10 09:49:30 |
| 2   | 0          | 2013/04/10 09:49:28 |
| 3   | 0          | 2013/04/10 09:49:27 |
| 4   | 0          | 2013/04/10 09:49:25 |
| 5   | 0          | 2013/04/10 09:49:23 |
| 6   | 0          | 2013/04/10 09:49:21 |
| 7   | 0          | 2013/04/10 09:49:20 |
| 8   | 0          | 2013/04/10 09:49:18 |
| 9   | 0          | 2013/04/10 09:49:16 |
| 10  | 0          | 2013/04/10 09:49:14 |
| 11  | 0          | 2013/04/10 09:49:06 |
| 12  | 0          | 2013/04/10 09:49:04 |

J:TEST  
SCHEDULE No.: 2

2. When placing the cursor on the "No." area in the list window and then pressing [SELECT], it enables numerical value inputting and the welding result of the specific number can be displayed.
  - (Detailed window)
  - When placing the cursor on the "FAULT CODE" and "DATE" area in the list window and then pressing [SELECT], the detailed window is displayed.
  - When pressing [CANCEL], the window returns to the list window.

| SPOT MONITOR                  |                     |
|-------------------------------|---------------------|
| DATA                          | : 1 / 20            |
| DATE                          | 2013/04/10 09:49:30 |
| JOB NAME                      | TEST                |
| LINE NO.                      | 12                  |
| STEP NO.                      | 11                  |
| GUN NO.                       | 1                   |
| GUN PRESSURE DATA FILE NO.    | 4                   |
| FEEDBACK PULSE(WELD COND.)    | -376                |
| FEEDBACK PULSE(WELD COMPLETE) | -350                |
| SCHEDULE No.                  | 2                   |
| FAULT CODE                    | 0                   |
| SUB FAULT CODE                | 0                   |
| #1 SECOND. CURRENT            | 8.1 kA              |
| #1 LINE VOLTAGE               | 411 V               |
| #2 SECOND. CURRENT            | 0.0 kA              |

PAGE

- In the detailed window, all the information of the stored data is displayed.
- Pressing [PAGE] displays the welding result of the next data.

## 4 Initializing Welding Results

In the list window, pressing {DATA} of the menu area displays {DATA CLEAR}. (Only in the management mode or higher)

Selecting {DATA CLEAR} initializes all the welding results stored in the DX200.

When the welding results are initialized, the specific output #51615 turns OFF.

## 5 Saving Welding Results to External Memory Devices

For storing the welding results to the external memory devices, press {Main Menu} → {EX. MEMORY} → {SAVE} → {FILE/GENERAL DATA} → {SPOT MONITOR DATA}.

- The file can be stored in the CSV format.

| 1  | 2         | 3         | 4        | 5        | 6        | 7        | 8       | 9                 |          |                            |      |
|----|-----------|-----------|----------|----------|----------|----------|---------|-------------------|----------|----------------------------|------|
| 1  | //SPOTMON |           |          |          |          |          |         |                   |          |                            |      |
| 2  | NO.       | DATE      | TIME     | JOB NAME | LINE NO. | STEP NO. | GUN NO. | GUN PRESSURE DATA | FILE NO. | FEEDBACK PULSE(WELD COND.) | FEED |
| 3  | 1         | 2013/4/10 | 10:09:40 | TEST     | 12       | 11       | 1       |                   |          | 4                          | -372 |
| 4  | 2         | 2013/4/10 | 10:09:38 | TEST     | 11       | 10       | 1       |                   |          | 3                          | -246 |
| 5  | 3         | 2013/4/10 | 10:09:37 | TEST     | 10       | 9        | 1       |                   |          | 4                          | -376 |
| 6  | 4         | 2013/4/10 | 10:09:35 | TEST     | 9        | 8        | 1       |                   |          | 3                          | -250 |
| 7  | 5         | 2013/4/10 | 10:09:33 | TEST     | 8        | 7        | 1       |                   |          | 4                          | -376 |
| 8  | 6         | 2013/4/10 | 10:09:32 | TEST     | 7        | 6        | 1       |                   |          | 3                          | -251 |
| 9  | 7         | 2013/4/10 | 10:09:30 | TEST     | 6        | 5        | 1       |                   |          | 4                          | -373 |
| 10 | 8         | 2013/4/10 | 10:09:28 | TEST     | 5        | 4        | 1       |                   |          | 3                          | -251 |
| 11 | 9         | 2013/4/10 | 10:09:27 | TEST     | 4        | 3        | 1       |                   |          | 4                          | -376 |
| 12 | 10        | 2013/4/10 | 10:09:25 | TEST     | 3        | 2        | 1       |                   |          | 3                          | -257 |
| 13 | 11        | 2013/4/10 | 10:09:19 | TEST     | 12       | 11       | 1       |                   |          | 4                          | -375 |
| 14 | 12        | 2013/4/10 | 10:09:17 | TEST     | 11       | 10       | 1       |                   |          | 3                          | -250 |
| 15 | 13        | 2013/4/10 | 10:09:15 | TEST     | 10       | 9        | 1       |                   |          | 4                          | -376 |
| 16 | 14        | 2013/4/10 | 10:09:14 | TEST     | 9        | 8        | 1       |                   |          | 3                          | -250 |
| 17 | 15        | 2013/4/10 | 10:09:12 | TEST     | 8        | 7        | 1       |                   |          | 4                          | -376 |
| 18 | 16        | 2013/4/10 | 10:09:10 | TEST     | 7        | 6        | 1       |                   |          | 3                          | -251 |
| 19 | 17        | 2013/4/10 | 10:09:08 | TEST     | 6        | 5        | 1       |                   |          | 4                          | -375 |
| 20 | 18        | 2013/4/10 | 10:09:07 | TEST     | 5        | 4        | 1       |                   |          | 3                          | -251 |
| 21 | 19        | 2013/4/10 | 10:09:05 | TEST     | 4        | 3        | 1       |                   |          | 4                          | -378 |
| 22 | 20        | 2013/4/10 | 10:09:03 | TEST     | 3        | 2        | 1       |                   |          | 3                          | -251 |
| 23 | 21        | 2013/4/10 | 9:49:30  | TEST     | 12       | 11       | 1       |                   |          | 4                          | -376 |
| 24 | 22        | 2013/4/10 | 9:49:28  | TEST     | 11       | 10       | 1       |                   |          | 3                          | -248 |
| 25 | 23        | 2013/4/10 | 9:49:27  | TEST     | 10       | 9        | 1       |                   |          | 4                          | -376 |
| 26 | 24        | 2013/4/10 | 9:49:25  | TEST     | 9        | 8        | 1       |                   |          | 3                          | -250 |
| 27 | 25        | 2013/4/10 | 9:49:23  | TEST     | 8        | 7        | 1       |                   |          | 4                          | -368 |
| 28 | 26        | 2013/4/10 | 9:49:21  | TEST     | 7        | 6        | 1       |                   |          | 3                          | -250 |
| 29 | 27        | 2013/4/10 | 9:49:20  | TEST     | 6        | 5        | 1       |                   |          | 4                          | -367 |
| 30 | 28        | 2013/4/10 | 9:49:18  | TEST     | 5        | 4        | 1       |                   |          | 3                          | -252 |
| 31 | 29        | 2013/4/10 | 9:49:16  | TEST     | 4        | 3        | 1       |                   |          | 4                          | -378 |
| 32 | 30        | 2013/4/10 | 9:49:14  | TEST     | 3        | 2        | 1       |                   |          | 3                          | -257 |
| 33 | 31        | 2013/4/10 | 9:49:06  | TEST     | 12       | 11       | 1       |                   |          | 4                          | -376 |



The welding result file cannot be loaded.

Using the data transmission function enables to send the data to the host computer.

For details, refer to the "DX200 OPTIONS INSTRUCTIONS FOR DATA TRANSMISSION FUNCTION" (165309-1CD).

## 6 Specific Input/Output

(Specific input)

Initialization of the welding results (#41230)

Turning ON this signal enables to execute the initialization of all welding results.

(Specific output)

Welding results (#51615)

When this signal is OFF, it means the number of welding results have not reached the maximum storable number yet.

When this signal is ON, it means the number of welding results have reached the maximum storable number.

## 7 Parameters

AxP67: Output the storable number of welding results.

Outputs the storable number of welding results to the register of the concurrent I/O program.

AxP67 = 0: Any data is not output to the register.

AxP67 = x: The storable number of welding results is output to the register x.

# DX200

# INSTRUCTIONS

## FOR SPOT MONITOR FUNCTION

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