

## DX200 INSTRUCTIONS

FOR EXPLOSION-PROOF SPECIFICATIONS

---

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

---

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

THE DX200 OPERATOR'S MANUAL ABOVE CORRESPONDS TO A SPECIFIC USAGE.  
BE SURE TO USE THE APPROPRIATE MANUAL.

Part Number: 180367-1CD  
Revision: 0

MANUAL NO.

**HW1484081** 

Copyright © 2017 YASKAWA America, Inc.

#### Terms of Use and Copyright Notice

All rights reserved. This manual is freely available as a service to YASKAWA customers to assist in the operation of Motoman robots, related equipment and software. This manual is copyrighted property of YASKAWA and may not be sold or redistributed in any way. You are welcome to copy this document to your computer or mobile device for easy access but you may not copy the PDF files to another website, blog, cloud storage site or any other means of storing or distributing online content.

Printed in the United States of America

First Printing, 2017

YASKAWA America, Inc.  
Motoman Robotics Division  
100 Automation Way  
Miamisburg, OH 45342  
Phone: 937-847-6200

[www.motoman.com](http://www.motoman.com)

## 1 Safety Information



### MANDATORY

- This instruction manual is intended to explain mainly the mechanical part of the DX200 Explosion-Proof Specification for the application to the actual operation and for proper maintenance and inspection. It describes on safety and handling, details on specifications, necessary items on maintenance and inspection, to explain operating instructions and maintenance procedures. Be sure to read and understand this instruction manual thoroughly before installing and operating the manipulator.
- 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.

## 1.1 Safety Standards for Industrial Robots and Robot Systems

We suggest that you obtain and review a copy of the ANSI/RIA National Safety Standard for Industrial Robots and Robot Systems (ANSI/RIA R15.06-2012). You can obtain this document from the Robotic Industries Association (RIA) at the following address:

Robotic Industries Association

900 Victors Way

P.O. Box 3724

Ann Arbor, Michigan 48106

TEL: (734) 994-6088

FAX: (734) 994-3338

[www.roboticsonline.com](http://www.roboticsonline.com)

Ultimately, well-trained personnel are the best safeguard against accidents and damage that can result from improper operation of the equipment. The customer is responsible for providing adequately trained personnel to operate, program, and maintain the equipment. **NEVER ALLOW UNTRAINED PERSONNEL TO OPERATE, PROGRAM, OR REPAIR THE EQUIPMENT!**

We recommend approved YASKAWA training courses for all personnel involved with the operation, programming, or repair of the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

## 1.2 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 “DANGER”, “WARNING”, “CAUTION”, “MANDATORY”, or “PROHIBITED”.



**DANGER**

Indicates an imminent hazardous situation which, if not avoided, could result in death or serious injury to personnel.



**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 “DANGER”, “CAUTION” and “WARNING”.



**DANGER**

- Maintenance and inspection must be performed by specified personnel.

Failure to observe this caution may result in electric shock or injury.

- For disassembly or repair, contact your YASKAWA representative.
- Do not remove the motor, and do not release the brake.

Failure to observe these safety precautions may result in death or serious injury from unexpected turning of the manipulator's arm.

### 1.3 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 the manipulator cables.

In this manual, the equipment is designated as follows:

Equipment	Manual Designation
DX200 controller	Controller
DX200 programming pendant	Programming pendant
Cable between the manipulator and the DX200	Manipulator cable

### 1.4 Registered Trademark

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or brand names for each company or corporation. The indications of (R) and <sup>TM</sup> are omitted.

### 1.5 Safeguarding Tips

All operators, programmers, maintenance personnel, supervisors, and anyone working near the system must become familiar with the operation of this equipment. All personnel involved with the operation of the equipment must understand potential dangers of operation. General safeguarding tips are as follows:

- Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation of this equipment, the operator's manuals, the system equipment, and options and accessories should be permitted to operate this equipment.
- Improper connections can damage the equipment. All connections must be made within the standard voltage and current ratings of the equipment.
- The system must be placed in Emergency Stop (E-Stop) mode whenever it is not in use.
- In accordance with ANSI/RIA R15.06-2012, section 4.2.5, Sources of Energy, use lockout/tagout procedures during equipment maintenance. Refer also to Section 1910.147 (29CFR, Part 1910), Occupational Safety and Health Standards for General Industry (OSHA).

## **1.6 Mechanical Safety Devices**

The safe operation of this equipment is ultimately the users responsibility. The conditions under which the equipment will be operated safely should be reviewed by the user. The user must be aware of the various national codes, ANSI/RIA R15.06-2012 safety standards, and other local codes that may pertain to the installation and use of this equipment.

Additional safety measures for personnel and equipment may be required depending on system installation, operation, and/or location. The following safety equipment is provided as standard:

- Safety barriers
- Door interlocks
- Emergency stop palm buttons located on operator station

Check all safety equipment frequently for proper operation. Repair or replace any non-functioning safety equipment immediately.

## 1.7 Programming, Operation, and Maintenance Safety

All operators, programmers, maintenance personnel, supervisors, and anyone working near the system must become familiar with the operation of this equipment. Improper operation can result in personal injury and/or damage to the equipment. Only trained personnel familiar with the operation, manuals, electrical design, and equipment interconnections of this equipment should be permitted to program, or maintain the system. All personnel involved with the operation of the equipment must understand potential dangers of operation.

- Inspect the equipment to be sure no potentially hazardous conditions exist. Be sure the area is clean and free of water, oil, debris, etc.
- Be sure that all safeguards are in place. Check all safety equipment for proper operation. Repair or replace any non-functioning safety equipment immediately.
- Check the E-Stop button on the operator station for proper operation before programming. The equipment must be placed in Emergency Stop (E-Stop) mode whenever it is not in use.
- Back up all programs and jobs onto suitable media before program changes are made. To avoid loss of information, programs, or jobs, a backup must always be made before any service procedures are done and before any changes are made to options, accessories, or equipment.
- Any modifications to the controller unit can cause severe personal injury or death, as well as damage to the robot! Do not make any modifications to the controller unit. Making any changes without the written permission from YASKAWA will void the warranty.
- Some operations require a standard passwords and some require special passwords.
- The equipment allows modifications of the software for maximum performance. Care must be taken when making these modifications. All modifications made to the software will change the way the equipment operates and can cause severe personal injury or death, as well as damage parts of the system. Double check all modifications under every mode of operation to ensure that the changes have not created hazards or dangerous situations.
- This equipment has multiple sources of electrical supply. Electrical interconnections are made between the controller and other equipment. Disconnect and lockout/tagout all electrical circuits before making any modifications or connections.
- Do not perform any maintenance procedures before reading and understanding the proper procedures in the appropriate manual.
- Use proper replacement parts.
- Improper connections can damage the equipment. All connections must be made within the standard voltage and current ratings of the equipment.



## **1.8 Maintenance Safety**

Turn the power OFF and disconnect and lockout/tagout all electrical circuits before making any modifications or connections.

Perform only the maintenance described in this manual. Maintenance other than specified in this manual should be performed only by YASKAWA-trained, qualified personnel.

## **1.9 Summary of Warning Information**

This manual is provided to help users establish safe conditions for operating the equipment. Specific considerations and precautions are also described in the manual, but appear in the form of Dangers, Warnings, Cautions, and Notes.

It is important that users operate the equipment in accordance with this instruction manual and any additional information which may be provided by YASKAWA. Address any questions regarding the safe and proper operation of the equipment to YASKAWA Customer Support.

### 1.10 Customer Support Information


If you need assistance with any aspect of your DX200 Explosion-Proof Specification system, please contact YASKAWA Customer Support at the following 24-hour telephone number:

**(937) 847-3200**

For **routine** technical inquiries, you can also contact YASKAWA Customer Support at the following e-mail address:

[techsupport@motoman.com](mailto:techsupport@motoman.com)

When using e-mail to contact YASKAWA Customer Support, please provide a detailed description of your issue, along with complete contact information. Please allow approximately 24 to 36 hours for a response to your inquiry.



**NOTE**

Please use e-mail for **routine** inquiries only. If you have an urgent or emergency need for service, replacement parts, or information, you must contact YASKAWA Customer Support at the telephone number shown above.

Please have the following information ready before you call Customer Support:

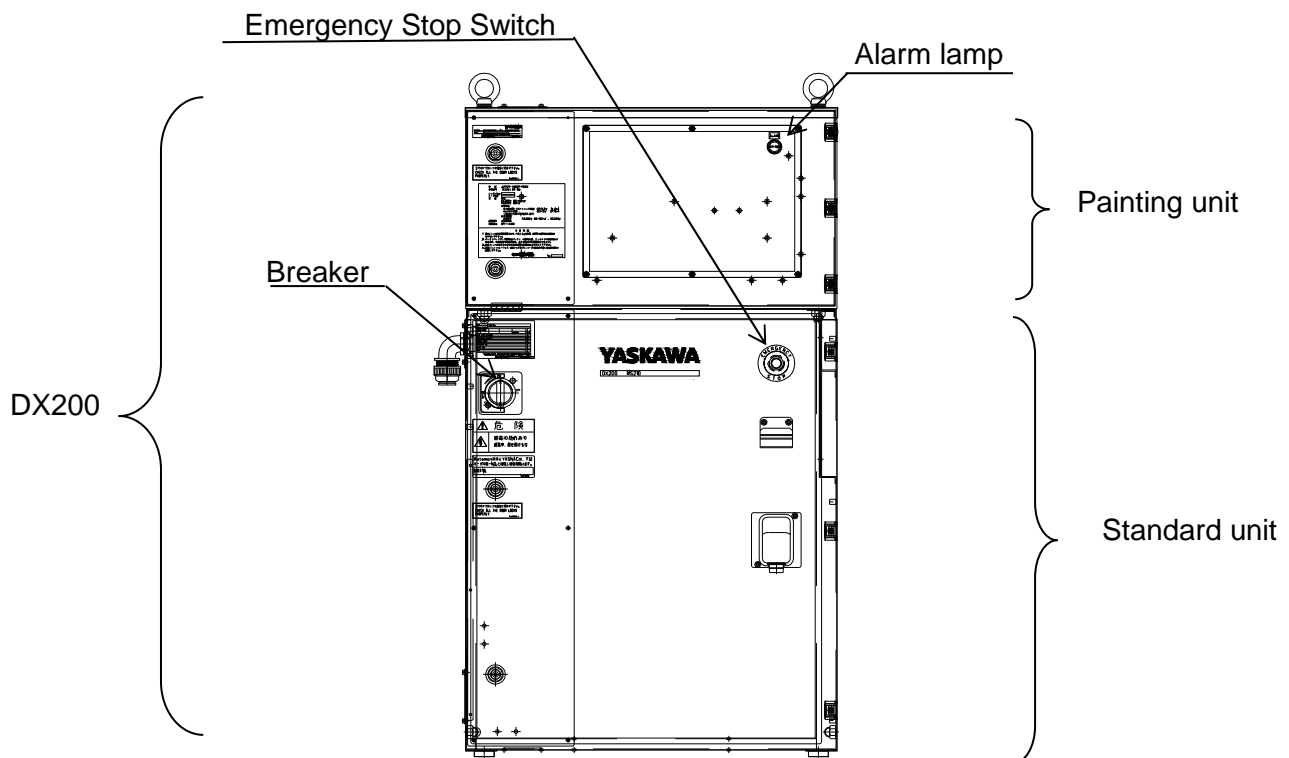
- |                            |  |
|----------------------------|--|
| • System                   | DX200 Explosion-Proof Specification  |
| • Primary Application      | _____  |
| • Controller               | DX200  |
| • Software Version         | Access this information on the Programming Pendant's LCD display screen by selecting {MAIN MENU} - {SYSTEM INFO} - {VERSION} |
| • Robot Serial Number      | Located on the robot data plate  |
| • Robot Sales Order Number | Located on the DX200 controller data plate   |

## 2 Introduction



Before using this product, read this manual and all other documents carefully to ensure knowledge about the product and safety, including all the cautions.

As seen in the figure below, the DX200 consists of the painting unit part and The standard unit part.



Hereinafter, the DX200 which consists of the painting unit part and the standard unit part is referred to as the "DX200".

## 3 Indications on Electric Equipment

### 3.1 Explosion-Proof Indication Label and Warning Label

Warning labels are attached on the controller “DX200”.

For the details of the warning labels, refer to the INSTRUCTIONS for explosion-proof specifications and strictly observe the items mentioned. Also, identification labels with important information are placed on the controller. Prior to operating the controller, thoroughly understand the contents of the label.

### 3.2 Standards

This manipulator (or external axis) and controller meets the following requirements:

- IEC60079-0:  
for electrical apparatus for explosive gas atmospheres  
- Part 0: General requirements
- IEC 60079-2:  
for electrical apparatus for explosive gas atmospheres  
- Part 2: Pressurized enclosures “p”
- IEC60079-11:  
for electrical apparatus for explosive gas atmospheres  
- Part 11: Intrinsic safety “ i ”

When classifying a manipulator (or external axis) environment as a hazardous area (zone), observe the “Guidelines for the Avoidance of Dangers due to Explosive Atmospheres with Collection of Examples - Explosion Protection Guidelines - (EX-Directives)”.

In special cases, or if you are not sure about the specification of areas with the risk of explosion, contact the competent authorities or YASKAWA and have them decide.

### 3.3 Using in the hazardous area

Controller(DX200) must not be installed in hazardous area.

Controller(DX200) must be installed in Non-hazardous area (safety area).

## 4 System Configuration

### 4.1 Manipulator

The explosion-proof manipulator (or external axis) is to be installed in hazardous locations such as in the painting booth and performs operations to workpieces.

### 4.2 DX200

The DX200 consists of the painting unit and the standard unit.

The DX200 has a built-in microcomputer that controls all motion of the manipulator by saving motion signals when teaching and sending these signals to the manipulator(or external axis).

The painting unit has barriers connected to intrinsically equipments.

### 4.3 Pressure Switch Unit

The pressure switch unit supplies protective air or gas to the manipulator to prevent explosive gas from entering into the manipulator.

Never disassemble/remodel the pressure switch unit.

It is very dangerous to disassemble/remodel the pressure switch unit or to operate a manipulator in the explosive environment after removing the pressure switch unit.

# 5 Installation

## 5.1 Place of Installation

The conditions listed below must be met before installing the DX200:

- Non-Hazardous area
- Ambient temperature must be 0 to 45° C (32 to 113°F) during operation and -10 to 60°C (14 to 140°F) during transportation and maintenance.
- Humidity must be low with no condensation (10~90%RH).
- It must be a place with little dirt, dust, or water.
- No flammable or corrosive liquids or gases, etc. in the area.
- Little jarring or potential for striking of the DX200 (under 0.5G oscillation).
- No large electric noise source nearby.
- No potential for collision with moving equipment such as forklifts.



If the external electric noise applies, the alarm occurs and the manipulator may stop.

When the alarm occurs and the manipulator stops, refer to DX200 maintenance manual and reset the alarm.



### WARNING

Devices that are not explosion-proof must not be installed in hazardous locations. Failure to observe this warning may result in a fire.

## 5.2 Transport and Installation

- For the details of the Transport and Installation for "DX200", refer to the INSTRUCTIONS for explosion-proof specifications.

Connection

## 5.3 Connection

### 5.3.1 Connecting the primary power supply

If the transformer unit is not attached to the DX200, refer to the “DX200 INSTRUCTIONS” to connect the primary power supply cable and ground wire. For the details of Connection for "DX200", refer to the INSTRUCTIONS for explosion-proof specifications.



The power capacity shown above is the continuous rating value. When the robot is rapidly accelerated, the power capacity of several times the continuous rating value may be needed instantly.

### 5.3.2 Connecting the Manipulator Cable

Confirm the apparatus sign of the connector of the manipulator cable, connect the manipulator cable to the connectors on the back side of the DX200. For the details of Connection for "DX200", refer to the INSTRUCTIONS for explosion-proof specifications.



#### WARNING

- Ground resistance must be 100  $\Omega$  or less.  
Failure to observe this warning may result in fire or electric shock.
- Before wiring, make sure to turn the primary power supply OFF, and put up a warning sign. (ex. DO NOT TURN THE POWER ON.)  
Failure to observe this warning may result in fire or electric shock.

### 5.3.3 Ground wire (Explosion proof programming pendant)

For the details of Connection for "DX200", refer to the INSTRUCTIONS for explosion-proof specifications.

#### MANDATORY

- **Ground resistance to be connected to the backside of the painting unit must be 10 ohms or less with independent ground connection.**

The performance of explosion proof programming pendant cannot be maintained.



The customer must prepare the ground wire.

### 5.3.4 Intrinsically safe cable

Draw the intrinsically safe cable into the painting unit through the cable inlets for intrinsically safe cable on the back side of the painting unit.

For the details of Connection for "DX200", refer to the INSTRUCTIONS for explosion-proof specifications.



#### CAUTION

- **Connect the intrinsically safe cable through the cable inlets for intrinsically safe cable so that the intrinsically safe cable is separated from other cables.**

The performance of explosion proof cannot be maintained.

- **The intrinsically safe cable must be fixed on the support, which is already mounted, after tied with the cable tie.**



## 6 Operation (Initial Start-Up Included)

Prior to start operations of the manipulator, refer to the INSTRUCTIONS for explosion-proof specifications.



Before using this product, read this manual and all other documents carefully to ensure knowledge about the product and safety, including all the cautions.

## 7 Maintenance

Conduct daily and periodic inspections to ensure the long life of the manipulator and its performance.

Proper inspections are essential not only to assure that the mechanism will be able to function for a long period, but also to prevent malfunctions and assure safe operation.

For the details of maintenance and inspections such as inspection intervals, inspection items, and operations, refer to the INSTRUCTIONS for explosion-proof specifications



### WARNING

- Turn OFF the power supply before opening the DX200 doors.  
Failure to observe this caution may result in electric shock.
- To prevent anyone inadvertently turning ON the power supply during maintenance, put up a warning sign such as "DO NOT TURN ON THE POWER" at the primary power supply (knife switch, wiring circuit breaker, etc.) and at the DX200 and related controllers and use accepted lockout/tag out Procedures.

Failure to observe this caution may result in electric shock or injury.

- After maintenance is completed, carefully check that no tools are left inside the DX200 and that the doors are securely closed.

Failure to observe this caution may result in electric shock or injury.



### DANGER

- Maintenance and inspection must be performed by specified personnel.  
Failure to observe this caution may result in electric shock or injury.

- For disassembly or repair, contact your Yaskawa representative.

# MOTOMAN-MPO10

# INSTRUCTIONS

## FOR EXPLOSION-PROOF SPECIFICATIONS

---

### HEAD OFFICE

2-1 Kurosakishiroishi, Yahatanishi-ku, Kitakyushu 806-0004, Japan  
Phone +81-93-645-7703 Fax +81-93-645-7802

YASKAWA America Inc. (Motoman Robotics Division)  
100 Automation Way, Miamisburg, OH 45342, U.S.A.  
Phone +1-937-847-6200 Fax +1-937-847-6277

YASKAWA Europe GmbH (Robotics Division)  
Yaskawastrasse 1, 85391 Allershausen, Germany  
Phone +49-8166-90-100 Fax +49-8166-90-103

YASKAWA Nordic AB  
Verkstadsгатan 2, Box 504, SE-385 25 Torsas, Sweden  
Phone +46-480-417-800 Fax +46-486-414-10

YASKAWA Electric (China) Co., Ltd.  
22F, One Corporate Avenue, No.222, Hubin Road, Huangpu District, Shanghai 200021, China  
Phone +86-21-5385-2200 Fax +86-21-5385-3299

YASKAWA SHOUGANG ROBOT Co. Ltd.  
No7 Yongchang North Road, Beijing E&T Development Area, China 100176  
Phone +86-10-6788-2858 Fax +86-10-6788-2878

YASKAWA India Private Ltd. (Robotics Division)  
#426, Udyog Vihar, Phase- IV, Gurgaon, Haryana, India  
Phone +91-124-475-8500 Fax +91-124-475-8542

YASKAWA Electric Korea Corporation  
35F, Three IFC, 10 Gukjegeumyung-ro, Yeongdeungpo-gu, Seoul, Korea 07326  
Phone +82-2-784-7844 Fax +82-2-784-8495

YASKAWA Electric Taiwan Corporation  
12F, No.207, Sec. 3, Beishin Rd., Shindian District, New Taipei City 23143, Taiwan  
Phone +886-2-8913-1333 Fax +886-2-8913-1513

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.  
59,1st-5th Floor, Flourish Building, Soi Ratchadapisek 18,Ratchadapisek Road,  
Huaykwang, Bangkok 10310, THAILAND  
Phone +66-2-017-0099 Fax +66-2-017-0199

PT. YASKAWA Electric Indonesia  
Secure Building-Gedung B Lantai Dasar & Lantai 1 Jl. Raya Protokol Halim Perdanakusuma,  
Jakarta 13610, Indonesia  
Phone +62-21-2982-6470 Fax +62-21-2982-6741

---

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

# YASKAWA

MANUAL NO.

# HW1484081