ROTATING WORKPIECE SUPPLYING SYSTEM FOR PAINTING MOTOFEEDER II INSTRUCTIONS

**TYPE:**
- YR-MF412AD-*00, YR-MF212AD-*00 (ARM LENGTH: 1200 mm, WITH MPX1150)
- YR-MF412BD-*00, YR-MF212BD-*00 (ARM LENGTH: 1200 mm, NO MANIPULATOR)
- YR-MF414BD-*00, YR-MF214BD-*00 (ARM LENGTH: 1400 mm, NO MANIPULATOR)
- YR-MF416BD-*00, YR-MF216BD-*00 (ARM LENGTH: 1600 mm, NO MANIPULATOR)
- YR-MF418BD-*00, YR-MF218BD-*00 (ARM LENGTH: 1800 mm, NO MANIPULATOR)

*-*00: Japanese Standard / -B00: FM / -G00: ATEX

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

MOTOFEEDER II INSTRUCTIONS

MOTOFEEDER II OPERATOR'S MANUAL
MOTOFEEDER II MAINTENANCE MANUAL
DX200 INSTRUCTIONS
DX200 OPERATOR'S MANUAL FOR PAINTING APPLICATION
DX200 MAINTENANCE MANUAL

Part Number: 182394-1CD
Revision: 2
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Yaskawa America, Inc.
Motoman Robotics Division
100 Automation Way
Miamisburg, OH 45342
Phone: 937-847-6200

www.motoman.com
MANDATORY

This instruction manual is intended to explain mainly on the mechanical part of the MOTOFEEDERII 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 MOTOFEEDERII.

- 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.
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

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.
# Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the MOTOFEEDER II.

In this manual, the Notes for Safe Operation are classified as “DANGER”, “WARNING”, “CAUTION”, or “NOTICE”.

## 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.

---

**NOTE**

To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as “DANGER”, “WARNING” and “CAUTION”.

---

**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.
**WARNING**

- Before operating the MOTOFEEDER II, check that servo power is turned OFF pressing the emergency stop buttons. 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 MOTOFEEDER II during an emergency.

*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 MOTOFEEDER II. Then turn the servo power ON.

Injury may result from unintentional or unexpected MOTOFEEDER II motion.

*Fig. : Release of Emergency Stop*

- Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
  - Be sure to perform lockout by putting a lockout device on the safety fence when going into the area enclosed by the safety fence. In addition, the operator of the teaching operation must display the sign that the operation is being performed so that no other person closes the safety fence.
  - View the MOTOFEEDER II from the front whenever possible.
  - Always follow the predetermined operating procedure.
  - Keep in mind the emergency response measures against the MOTOFEEDER II’s unexpected motion toward you.
  - Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended MOTOFEEDER II operation may result in injury.

- Confirm that no person is present in the P-point maximum envelope of the MOTOFEEDER II and that you are in a safe location before:
  - Turning ON the power for the DX200.
  - Moving the MOTOFEEDER II 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 MOTOFEEDER II during operation. Always press an emergency stop button immediately if there is a problem.
CAUTION

- Perform the following inspection procedures prior to conducting MOTOFEEDER II teaching. If problems are found, repair them immediately, and be sure that all other necessary processing has been performed.
  - Check for problems in MOTOFEEDER II movement.
  - Check for damage to insulation and sheathing of external wires.
- Always return the programming pendant to the hook on the cabinet of the DX200 after use.

If the programming pendant is left unattended on the MOTOFEEDER II, on a fixture, or on the floor, etc., the Enable Switch may be activated due to surface irregularities of where it is left, and the servo power may be turned ON. In addition, in case the operation of the MOTOFEEDER II starts, the MOTOFEEDER II or the tool may hit the programming pendant left unattended, which may result in personal injury and/or equipment damage.

- Read and understand the Explanation of Warning Labels in the DX200 Instructions before operating the MOTOFEEDER II.

CAUTION

- Switching the table-rotation axis (S2) specification of the MOTOFEEDER II must be performed by the qualified personnel for the operation.
  - The operational authority is the management mode or higher.
  - The personnel who has finished the robot school.
  - YASKAWA representative (written on the back cover).
- The table-rotation axis (S2) has two specifications: The indexed rotation and the spindle rotation. Before using the MOTOFEEDER II, be sure to understand the specifications.
  - For confirming the specifications, refer to MOTOFEEDER II INSTRUCTIONS.
  - The switching operation must be performed at the home position (S1,S2) of the MOTOFEEDER II.
- Be sure to check the operation after the specifications are switched.
- Due to the switch of the specifications, the type may be different from the contents written on NP which is attached on the MOTOFEEDER II.
  - For inquiries, contact your YASKAWA representative and tell the type which is shown on the programming pendant.
Definition of Terms Used Often in This Manual

The MOTOFEEDERII is the product of the YASKAWA industrial robot workpiece supplying system.

The MOTOFEEDERII usually consist of the MOTOFEEDERII which is the main body of rotating workpiece supplying system, the controller, the programming pendant, and power 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>Robot</td>
<td>Manipulator</td>
</tr>
<tr>
<td>DX200 controller</td>
<td>DX200</td>
</tr>
<tr>
<td>DX200 programming pendant</td>
<td>Programming pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and the controller</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Workpiece delivery system</td>
<td>MOTOFEEDERII</td>
</tr>
<tr>
<td>Cable between the workpiece delivery system and the controller</td>
<td>Power supply cable</td>
</tr>
<tr>
<td>Cable between the pressure switch unit and the controller</td>
<td>Intrinsically safe cable</td>
</tr>
</tbody>
</table>

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 TM are omitted.

Explanation of Warning Labels

The following warning labels are attached to the MOTOFEEDERII.

Always follow the warnings on the labels.

Also, an identification label with important information is placed on the body of the MOTOFEEDERII. Prior to operating the manipulator, confirm the contents.
## Explosion-Proof Indication Label

*Fig. : Explosion-Proof Indication Label (TIIS)*

### 型 式
YRT-PMU0909-A 00

### 防爆記号
外部軸モータユニット：Ex ib px [B] T4 Gb/Ex ib [B] T4 Gb
塗装ユニット：[Ex ib] [B]

### シリアルNo:

### オーダNo:

### 定 格

#### 外部軸モータユニット
- 最大電圧：三相 AC200V (−15%, +10%) 50/60Hz
- AC220V (−15%, +10%) 60Hz
- 最大電流：2.3 A
- 最大容量：1.7 kW
- 最大電力：0.8 kVA
- 周囲温度
  - 外部軸モータユニット：0℃～+40℃
  - 塗装ユニット：0℃～+45℃

#### 非本安回路
- バッテリバックアップ回路：DC4.5V 37.9mA
  - （二極化鉄リチウム電池（ENERGIZER L91））
- 許容電圧：AC250V 50/60Hz, DC250V
- 保護ガスの最小換気流量：250 L/min
- 輸気時の設定圧力範囲：0.26〜0.28 MPa
- 最小換気時間：1 min
- 保護ガスの最小流量：10 NL/min
- 最大換気量：10 NL/min
- 最小内圧：5 kPa
- 最大内圧：50 kPa
- 運転時の設定圧力範囲：0.01〜0.02 MPa
- 保護ガス温度範囲：0℃〜+40℃

### 内圧保護システム
- 内圧保護システムに加える最小供給圧力：0.35 MPa
- 内圧保護システムに加える最大供給圧力：0.65 MPa

### ルーチン試験
- 合格

### 警 告
1. 外部軸モータユニット、リレー単位、絶縁装置、隔離装置及びエンコーダ分離基板（塗装ユニット内蔵）の本質安全防爆構造及び内圧防爆構造の組合せ機器は、構成機器、配線等を変更または改造しないで下さい。
2. バッテリバックアップ回路は、バッテリユニット、位置検出器、エンコーダ分離基板から構成され、制御装置の電源遮断時、または上電中に本安回路となります。
3. 塗装ユニットの接地はII種接地工事に準じて行って下さい。
4. リレー単位、絶縁装置及びエンコーダ分離基板（塗装ユニット内蔵）の非危険場所に設置して下さい。
5. バッテリの交流は、爆発性雰囲気の恐れがある場合に限り、確認して行って下さい。
6. 爆発性雰囲気が存在するおそれのあるときはカバを開けないで下さい。
7. 内圧容器となります。
8. 取扱説明書参照して下さい。
9. 接続または電源供給を再開する前に、このエンクロージャーからすべてのほこりを取り除いて下さい。

![図番]

株式会社 安川電機  NJ

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Fig. : Explosion-Proof Indication Label (ATEX)

YASKAWA ELECTRIC CORPORATION
2-1 Kurosakishiroishi, Yahatanishi-ku
Kitakyushu 806-0004 Japan

Serial No:
Year of Manufacture:
Maximum Voltage:
Maximum Current:
Maximum Capacity:
Maximum Power:
Ambient Temperature:
External axis motor unit:
Painting Unit:

Intrinsically Safe Circuitry
Pressure Switch/Flow Switch Circuitry
Battery Back Up Circuitry
(Lithium Iron Disulfide Batteries (ENERGIZER L91))

Non Intrinsically Safe Circuit
Allowable Voltage:
Minimum Dilution Flow Rate:
Setting Pressure for Purging:
Minimum Purge Flow Time:
Minimum Flow Rate of Protective Gas:
Maximum Leakage:
Minimum Over Pressure(input):
Maximum Over Pressure(input):
Setting Pressure for Operating:
Protective Gas Temperature:
Pressurization System
Minimum Line Pressure:
Maximum Line Pressure:
Routine Test:

WARNINGS:
1. Do not make any changes of the equipments and wiring in the external axis motor unit, relay barrier, isolated barrier and encoder separation board (inside the painting unit) and combination equipment of Internal pressure explosion-proof structure.
2. Battery backup circuit is consisted of battery unit, position detector and encoder separation board. The circuit is intrinsically safe circuit when the power supply of the controller is shut down or purging air.
3. The painting unit combined shall be grounded at 100 ohms or less.
4. Relay barrier, isolated barrier and encoder separation board (inside the painting unit) shall be installed in a non-hazardous area.
5. Pressurized enclosure, do not open when energised.
Enclosure contains lithium battery.
6. Do not open when an explosive atmosphere is present.
7. This is inner pressurized enclosure.
8. Refer to instructions in the manual before opening.
9. Remove all dust from this enclosure before connecting or restoring the electrical supply.

Note/注記:
1. The place of production may be replaced with the following address
   YASKAWA Europe Gmbh
   Yaskawastr.1, D-85391
   Allershausen Germany

Notified Body Number
CML 16ATEX1293X
Ex ib Gb] B T4 Gb/Ex ib] B T4 Gb
[Ex ib Gb] B

CML 16ATEX1293X
Ex ib px] B T4 Gb/Ex ib] B T4 Gb
[Ex ib Gb] B

YRT-PMU0909-C00
II2G
External axis motor unit
Painting Unit

Minimum Flow Rate of Protective Gas: 10 NL/min
50 kPa
5 kPa
Minimum Over Pressure(input):
Maximum Over Pressure(input):
Minimum Line Pressure:
Maximum Line Pressure:
Ambient Temperature:
Minimum Purge Flow Time:
Setting Pressure for Purging:
Minimum Dilution Flow Rate:
Setting Pressure for Operating:
Protective Gas Temperature:

Maximum Power:
Maximum Voltage:
Maximum Current:
Minimum Capacity:
Maximum Capacity:

Maximum Line Pressure: 0.65 MPa
0.35 MPa
Minimum Line Pressure:
Ambient Temperature:

Maximum Leakage:
0.8 kVA
0°C to +40°C
0°C to +45°C

External axis motor unit
Painting Unit

Ex ib px] B T4 Gb/Ex ib] B T4 Gb
[Ex ib Gb] B

Battery Back Up Circuitry
(Lithium Iron Disulfide Batteries (ENERGIZER L91))

Non Intrinsically Safe Circuit
Allowable Voltage:
Minimum Dilution Flow Rate:
Setting Pressure for Purging:
Minimum Purge Flow Time:
Minimum Flow Rate of Protective Gas:
Maximum Leakage:
Minimum Over Pressure(input):
Maximum Over Pressure(input):
Setting Pressure for Operating:
Protective Gas Temperature:
Pressurization System
Minimum Line Pressure:
Maximum Line Pressure:
Routine Test:

WARNINGS:
1. Do not make any changes of the equipments and wiring in the external axis motor unit, relay barrier, isolated barrier and encoder separation board (inside the painting unit) and combination equipment of Internal pressure explosion-proof structure.
2. Battery backup circuit is consisted of battery unit, position detector and encoder separation board. The circuit is intrinsically safe circuit when the power supply of the controller is shut down or purging air.
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Enclosure contains lithium battery.
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7. This is inner pressurized enclosure.
8. Refer to instructions in the manual before opening.
9. Remove all dust from this enclosure before connecting or restoring the electrical supply.

Note/注記:
1. The place of production may be replaced with the following address
   YASKAWA Europe Gmbh
   Yaskawastr.1, D-85391
   Allershausen Germany
Fig. : Explosion-Proof Indication Label (FM)

TYPE X PRESSURIZATION FOR:
CLASS I, DIVISION 1, GROUPS C,D, T4, Ta=0-40°C
CLASS I, ZONE 1, AEx/Ex ia px IIB Gb, T4, Ta=0-40°C
FM APPROVALS CERTIFICATE NUMBER : FM17US0147

PER YASKAWA ELECTRIC DRAWING HS1381470 HS1381471
MANUFACTURER:YASKAWA ELECTRIC CORPORATION.
ADDRESS     :2-1 SHIROISHI KUROSAKI YAHATANISHI-KU
             KITAKYUSHU-CITY FUKUOKA 806-0004 JAPAN
EXTERNAL AXIS MOTOR UNIT : MODEL YRT-PMU0909-B00
SERIAL No.   :

Minimum Purging Flow Rate: 250 L/min
Minimum Purging Duration : 1 min
Minimum Overpressure : 5 kPa
Maximum Overpressure : 50 kPa
Minimum Supply Pressure : 0.35 MPa
Maximum Supply Pressure : 0.65 MPa
Maximum Leakage Rate : 10 NL/min

"WARNING"
"ENCLOSURE SHALL NOT BE OPENED UNLESS THE AREA IS
KNOWN TO BE NONHAZARDOUS, OR UNLESS ALL DEVICES WITHIN
HAVE BEEN DE-ENERGIZED.
POWER SHALL NOT BE RESTORED AFTER THE ENCLOSURE HAS
BEEN OPENED UNTIL THE ENCLOSURE HAS BEEN PURGED FOR
1 MINUTES."

"AVERTISSEMENT"
"LE BOITIER NE DOIT PAS ETRE OUVERT SAUF SI LA PLACE EST
CONNUE D'ETRE SANS DANGER, OU SAUF SI TOUS LES DISPOSITIFS
DEDANS ONT ETE MIS HORS TENSION.
LE COURANT NE DOIT PAS ETRE RESTAURE APRES QUE LE BOITIER
A ETE OUVERT JUSQU'A CE QUE L' AIR DANS LE BOITIER A ETE
PURGE PENDANT 1 MINUTES."
Fig. : Warning Label Locations

**WARNING**

This pressurized enclosure contains a battery which remains connected after the external power has been isolated. Refer to instructions in the manual before carrying out frequent inspection and exchanging periodically. The battery is only to be replaced by Licensee when the area is known to be safe.

<table>
<thead>
<tr>
<th>Battery unit type</th>
<th>Battery type</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENERGIZER L91</td>
<td>YASKAWA Electric Corporation</td>
<td></td>
</tr>
</tbody>
</table>

---

**WARNING**

Collision hazard
Can cause severe injury.
Keep away from the robot during automatic operation.

---

**WARNING**

Crush hazard
Can cause severe injury.
Keep clear of all moving parts.

---

**WARNING**

Explosion-proof safety Device
Do not change any Parameters.
Safety Precautions for Painting Manipulator

Respect the law, local regulations, and safety codes for connecting the painting robot.

Standards

This MOTOFEEDERII meets the following requirements:

For the details of the standards, refer to "Standards" section in the instruction manual of each manipulator.

- MOTOFEEDERII 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”

In special cases, such that the specification of areas which has a risk of explosion cannot be specified, contact the competent authorities or YASKAWA representative.
Explosion-Proof Structure

The explosion-proof structure of the MOTOFEEDERII consists of intrinsic safety and inner pressure explosion preventing system.

Following notations show the explosion-proof structure for each country's explosion-proof standard.

<table>
<thead>
<tr>
<th>Explosion-proof structure</th>
<th>Power ON</th>
<th>Power OFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIIS</td>
<td>Ex lb px IIB T4 Gb</td>
<td>Ex lb IIB T4 Gb</td>
</tr>
<tr>
<td>ATEX/ CAT.2</td>
<td>II2G ExibpxbIIBT4Gb</td>
<td>II2G ExibIIBT4Gb</td>
</tr>
</tbody>
</table>

**DANGER**

In case installing the MOTOFEEDERII in the hazardous area, classify the manipulator environment by following the local explosion-proof standard and then, on the basis of the explosion-proof structure notation on the MOTOFEEDERII, confirm that the manipulator is possible to install in that area.

**DANGER**

The motor unit of the MOTOFEEDERII is a pressurized explosion-proof apparatus in which high-pressure air is contained. Do not loosen the fixing bolt of the cover on the MOTOFEEDERII when high pressure air remains inside the MOTOFEEDERII.

Failure to observe this instruction may result in serious personal injury.

Before loosening the fixing bolt of the cover on the MOTOFEEDERII, make sure to confirm that the air supply to the MOTOFEEDERII is stopped and that there is no residual pressure in the MOTOFEEDERII.

**PROHIBITED**

- Any modification of the MOTOFEEDERII, and the following is strictly prohibited:
  1. Explosion-proof devices and system installation
  2. Safeguarding and the safety devices mounted on these safeguards
  3. Emergency stop button, and other safety devices
  4. Robot control system such as the DX200 robot controller, the manipulator drive section and the power transmission section
DANGER

- Take the following measures when teaching, correcting, inspecting, or adjusting the manipulator when the motor power supply is ON:
  
  (a) Appoint a personnel to stay beside the emergency stop button of the DX200. And perform the operations holding the programming pendant with the emergency stop.
  
  (b) Before the operation, verify the correct robot motion and that the emergency stop works.
  
  - Observe the following precautions during an automatic operation:
    
    (a) Do not enter inside the safeguards during operation.
    
    (b) Confirm the following before starting the operation:
    
    - No person is inside the manipulator working envelope
    - No obstacles such as unnecessary workpieces and tools are inside the manipulator working envelope
    - The MOTOFEEDERII is in its standby position
    
    (c) When any abnormality occurs, immediately press the emergency stop button to stop the MOTOFEEDERII.
    
    (d) Before entering inside the manipulator working envelope, be sure to stop the manipulator and turn OFF the main power supply to the DX200.
  
  - Brake release (Optional)

A braking system is provided on each axis of the MOTOFEEDERII to hold the arm in its position when a failure or fault occurs. When the brake is activated, the MOTOFEEDERII cannot be moved manually even if the power is OFF. To change the posture of the MOTOFEEDERII after a failure or fault, the brake can be released by the operation from the controller.
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).

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.
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.
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.

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.
Customer Support Information

If you need assistance with any aspect of your MotoFeederII 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

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.

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: MotoFeederII
- 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
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1 Receiving

1.1 Checking Package Contents

When the package arrives, check its contents. The following eight items are included in the standard specification in combination with the manipulator. (Any additional options ordered should be checked as well.):

<TIS specifications>
• Manipulator (robot main body)
• DX200
• Programming Pendant
• Power supply cables between the manipulator and the DX200 (2 cables)
• MOTOFEEDER II
• Power supply cables between the MOTOFEEDER II and the DX200 (4 cables)
• Intrinsically safe cable between the pressure switch unit and the DX200 (1 cable)
• Operation BOX cable between the operation BOX and the DX200 (1 cable) (optional)

<FM specifications>
• Manipulator (robot main body)
• DX200
• Programming Pendant
• Power supply cables between the manipulator and the DX200 (2 cables)
• MOTOFEEDER II
• Power supply cables between the MOTOFEEDER II and the DX200 (4 cables)
• Intrinsically safe cable between the pressure switch unit and the DX200 (1 cable)
• Operation BOX cable between the operation BOX and the DX200 (1 cable) (optional)

CAUTION

• Confirm that the MOTOFEEDER II, the manipulator and the DX200 have the same order number.
Special care must be taken when more than one MOTOFEEDER II and the manipulator are to be installed.
Failure to observe this caution may cause injury or damage.
1 Receiving
1.1 Checking Package Contents

Fig. 1-1: Checking Package Contents

- Pressure switch unit
- Power supply cable (2 cables)
- CD-ROM which is connected to the USB connector
  - Complete Set of Manuals
  - (in the CD-ROM which is connected to the USB connector)
1.2 Checking the Order Number

Check that the order number of the MOTOFEEDERII corresponds to the DX200. The order number is located on a label as shown below.

Fig. 1-2: Location of Order Number Label

Check that the MOTOFEEDERII and the DX200 have the same order number.

(a) DX200 (Front View)  
(b) MOTOFEEDERII
2 Transport

2.1 Transportation Method

CAUTION

- Sling applications and crane or forklift operations must be performed by authorized personnel only.

Failure to observe this warning may result in injury or damage.

- Avoid excessive vibration or shock during transport.

The system consists of precision components. Failure to observe this caution may adversely affect performance.

**NOTE**

- Check that eyebolts are securely fastened.
- The weight of the manipulator is shown in the table below.
- Use the wire strong enough to withstand the weight.
- Attach bolts and brackets for transporting the MotoFeeder II.
- Avoid applying external force on the arm or motor units when transporting by a crane, forklift, or other equipment.
- Remove eyebolts after transportation and installation. Operating the MotoFeeder II with eyebolts on may cause the jig to interfere with eyebolts.

Eyebolts must be stored for future use in the event that the MotoFeeder II must be moved again.
2 Transport
2.1 Transportation Method

- **With MOTOMAN-MPX1150 type**

<table>
<thead>
<tr>
<th>Maximum loading mass Per one table</th>
<th>40 kg</th>
<th>20 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>YR-MF412AD-*00</td>
<td>YR-MF212AD-*00</td>
</tr>
<tr>
<td>Pitch between tables</td>
<td>1200 mm</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>675</td>
<td>675</td>
</tr>
</tbody>
</table>

- **No Manipulator type**

<table>
<thead>
<tr>
<th>Maximum loading mass Per one table</th>
<th>40 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>YR-MF412BD-*00</td>
</tr>
<tr>
<td>Pitch between tables</td>
<td>1200 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>588</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Maximum loading mass Per one table</th>
<th>20 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>YR-MF212BD-*00</td>
</tr>
<tr>
<td>Pitch between tables</td>
<td>1200 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>588</td>
</tr>
</tbody>
</table>
2.2 Using a Crane

2.2.1 When Transporting MOTOFEEDER II Alone

As a rule, the MOTOFEEDER II should be lifted by a crane when removing it from the package and moving it.

Lift the MOTOFEEDER II using a four-leg bridle sling using the attached eyebolts.

Fig. 2-1: Transporting Posture (MOTOFEEDER II alone)
2.2.2 When Transporting MOTOFEEDERII With MOTOMAN-MPX1150

Fig. 2-2: Transporting Example: With MOTOMAN-MPX1150 Type

<table>
<thead>
<tr>
<th>Axis</th>
<th>Angle</th>
<th>Pulse setting value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>0°</td>
<td>0</td>
</tr>
<tr>
<td>L</td>
<td>-10°</td>
<td>-13653</td>
</tr>
<tr>
<td>U</td>
<td>-70°</td>
<td>-83627</td>
</tr>
<tr>
<td>R</td>
<td>0°</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>-30°</td>
<td>-27307</td>
</tr>
<tr>
<td>T</td>
<td>0°</td>
<td>0</td>
</tr>
</tbody>
</table>

Center of gravity

Wire length (2.5 m)

Hexagon socket
/ head cap screw M24
(Trivalent chromium,
length: 65 mm)
(2 places) (2 screws)
Conical spring washer 2H-24
Tightening torque: 120 N•m (12.3 kgf•m)
Eyebolt M24 (4 bolts)

Hexagon socket
/ head cap screw M10
(Trivalent chromium,
length: 16 mm)
(2 places) (4 screws)
Conical spring washer 2H-10
Tightening torque: 82 N•m (8.3 kgf•m)
2.2.3 Shipping Bolts and Brackets

Fig. 2-3: Shipping Jig

- **Hexagon socket head cap screw M24**
  - Trivalent chromium, length: 65 mm
  - (2 places) (2 screws)
  - Conical spring washer 2H-24
  - Tightening torque: 120 N•m (12.3 kgf•m)

- **Eyebolt M24** (4 bolts)

- **Hexagon socket head cap screw M10**
  - Trivalent chromium, length: 16 mm
  - (2 places) (4 screws)
  - Conical spring washer 2H-10
  - Tightening torque: 82 N•m (8.3 kgf•m)

- **Power supply cable** for the MOTOFEEDERII
  - Power cable (1 set), Encoder cable (1 set)

- **Power supply cable** for the MPX1150
  - 1BC (1 set), 2BC (1 set)

- **Power supply cable** for the MOTOFEEDERII
  - Power cable (2 sets), Encoder cable (2 sets)
3 Installation of MOTOFEEDERII

WARNING

- Install the safeguarding.
  Failure to observe this warning may result in injury or damage.
- Install the MOTOFEEDERII in a location where moving the MOTOFEEDERII with its tool mounted will not reach the wall, safeguarding, etc.
  Failure to observe this warning may result in injury or damage.
- Do not start the MOTOFEEDERII or even turn ON the power before it is firmly anchored.
  The manipulator may overturn and cause injury or damage.

CAUTION

- Do not install or operate MOTOFEEDERII that is damaged or lacking parts.
  Failure to observe this caution may cause injury or damage.
- Before turning ON the power, check to be sure that the shipping bolts and brackets are removed.
  Failure to observe this caution may result in damage to the driving parts.
3.1 Safeguard Installation

To ensure safe, be sure to install safeguards. They prevent unforeseen accidents with personnel and damage to equipment. The following is quoted for your information and guidance (ISO 10218).

Responsibility for Safeguarding

The user of a manipulator or robot system shall ensure that safeguards are provided and used in accordance with Section 6, 7, and 8 of this standard. The means and degree of safeguarding, including any redundancies, shall correspond directly to the type and level of hazard presented by the robot system consistent with the robot application. Safeguarding may include but not be limited to safeguarding devices, barriers, interlock barriers, perimeter guarding, awareness barriers, and awareness signals.

3.2 Installation of MOTOFEEDERII

The MOTOFEEDERII should be firmly mounted on a base or foundation strong enough to support the MOTOFEEDERII and jigs, and withstand repulsion forces during acceleration and deceleration. During installation, if the flatness is not right, the MOTOFEEDERII shape may change and its functional ability may be compromised. The flatness for installation must be kept at 0.5 mm or less. In this consequences, refer to Table 3-1 “Maximum Repulsion Forces of MOTOFEEDERII” for the necessary strength required for the mounting area. Mount the MOTOFEEDERII base by referring to section 3.2.1 “Installation of the MOTOFEEDERII Alone” basically.

### Table 3-1: Maximum Repulsion Forces of MOTOFEEDERII

<table>
<thead>
<tr>
<th>Description</th>
<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm rotating maximum torque</td>
<td>3920 N•m</td>
</tr>
<tr>
<td>(S1-axis moving direction)</td>
<td>(400 kgf•m)</td>
</tr>
<tr>
<td>Table rotating maximum torque</td>
<td>650 N•m</td>
</tr>
<tr>
<td>(S2-axis moving direction)</td>
<td>(66 kgf•m)</td>
</tr>
</tbody>
</table>
3 Installation of MOTOFEEDER II
3.2 Installation of MOTOFEEDER II

Fig. 3-1: Installation

![Diagram showing installation of MotoFeeder II](image)

- Table-rotation axis: S2 axis
- Arm-rotation axis: S1 axis
- Pressure switch unit
- Driving unit for table-rotation axis
- Driving unit for arm-rotation axis
- Table
- Arm
3.2.1 Installation of the MOTOFEEDERII Alone

The floor should be strong enough to support the MOTOFEEDERII. Construct a solid foundation with the appropriate thickness to withstand maximum repulsion forces of the MOTOFEEDERII. When the thickness of a concrete floor is 200 mm or more, repair the surface asperities and cracks on the floor, and then fix the baseplate (of a thickness of 30 mm or more) with anchor bolts M20. A non-concrete floor or a floor less than 200 mm thick is insufficient for mounting, even if the floor is concrete.

Fig. 3-2: Installation
3.3 Location

Install the MOTOFEEDERII in a location that has the following environmental conditions:

- Ambient operating temperature: 0 to +40 °C
- 20 to 80%RH (no moisture, non-condensing)
- Free from dust, dirt, oil mist, and water drop
- Free from corrosive gases or liquid, or explosive gases or liquid
- Free from excessive impact or vibration (less than 4.9 m/s² (0.5 G))
- Free from large electrical noise (TIG welder, etc.)
- The flatness for installation is 0.5 mm or less.

NOTE

When the operation is started after the manipulator has been out of operation and left in the low temperature (almost 0°C) for a long period, the alarm may occur since the resistance of the drive unit is large.

If the alarm occurs, perform the break-in for few minutes.
4 Wiring and Piping

4.1 Grounding

Follow the local regulations for grounding line size. A line of 5.5 mm² or more is recommended.

**WARNING**

- Ground resistance must be 100 Ω or less.
- Before wiring, make sure to turn the primary power supply OFF, and put up a warning sign. (ex. DO NOT TURN THE POWER ON.)

**MANDATORY**

- Do not use this line in common with other ground lines or grounding electrodes for other electric power, motor power, welding devices, etc.
- Where metal ducts, metallic conduits, or distributing racks are used for cable laying, ground in accordance with Electric Equipment Technical Standards.
4 Wiring and Piping
4.1 Grounding

Fig. 4-1: Grounding

Pressure switch unit

Bolt M8
Washer (for grounding)
Delivered with the MOTOFEEDERII

5.5 mm² or more

View A
4.2 Cable Connection

**CAUTION**

Air tubes for purging are connected to the cover part of the power cables.

In case the tube is bent or foreign substances are stuck inside the tube, air may not be appropriately supplied which would result in malfunction.

For this reason, treat air tubes with great care when connecting.

The connection of the power supply cable or the air tube to the MOTOFEEDER II, or the connection of the intrinsically safe cable to the pressure switch unit are performed by the authorized personnel who is trained by YASKAWA or your YASKAWA representative.

Refer to the DX200 Instruction Manual for the connection of the power cable and the intrinsically safe cable to the DX200. The air hose for the pressure switch, the intrinsically safe cable, and the crimped terminals should be prepared by the customer.

Furthermore, inside the painting booth, the power supply cables are required to be protected by the wire blade prepared by YASKAWA (length should be specified) or to be put either in the ditch on the floor and be covered with the metal plate or through the metal pipe.

**DANGER**

- For the cable gland, it is required to use the specified one for the explosion-proof certification. It is highly recommend to use the cable gland prepared by YASKAWA which is the exclusively one. Also, please do not detach reassemble or remodel the cable gland since it is already an assembled parts. Contact your YASKAWA representatives when any abnormalities are found.

**DANGER**

The motor unit of the MOTOFEEDER II is a pressurized explosion-proof apparatus in which high-pressure air is contained. Do not loosen the fixing bolt of the cover on the MOTOFEEDER II when high pressure air remains inside the MOTOFEEDER II.

Failure to observe this instruction may result in serious personal injury.

Before loosening the fixing bolt of the cover on the MOTOFEEDER II, make sure to confirm that the air supply to the MOTOFEEDER II is stopped and that there is no residual pressure in the MOTOFEEDER II.
4 Wiring and Piping
4.2 Cable Connection

Fig. 4-2: Cable Connections (Between the DX200 and the MOTOFEEDER II)

Pressure switch unit

DX200 side

Motor unit for table-rotation axis

Power cable EX-X23

Encoder cable EX-X13

MOTOFEEDER II side

Motor unit for arm-rotation axis

Arm-rotation axis: S1 axis

Inside the motor unit

Power cable EX-X24

Table-rotation axis: S2 axis

Inside the motor unit

Encoder cable EX-X14

Table: Arm

Motor unit for table-rotation axis

Motor unit for arm-rotation axis
Intrinsically safe cable
Connect the cable with the one connector out of four connectors.

Fig. 4-3: Power Cable Connection to the DX200

Back View of the DX200
4 Wiring and Piping
4.3 Intrinsically Safe Cable Connection

**Fig. 4-4: Connection of Intrinsically Safe Terminal Block of the Pressure Switch Unit and Barrier**

1) Intrinsically safe cable

   ① Cable type (applied):
   - CVV-S, 1.25 mm² (2, 4, 6, 8, 10, 12 cores),
   - CVV-SB, 1.25 mm² (2, 4, 6, 8, 10, 12 cores), or
   - UL2586-SB, 1.25 mm² (2, 4, 6, 8, 10, 12 cores)
   (SUMIDEN HITACHI CABLE Ltd.)
   - The cable to be connected with terminal blocks
     P1 to N3, and 1 to 2 are different.
   - P1 to N3 and 1 to 2 are separated by the shield.

2) Cable connection

<table>
<thead>
<tr>
<th>Intrinsically safe terminal block on the pressure switch unit side</th>
<th>DX200</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>P1</td>
</tr>
<tr>
<td>N1</td>
<td>N1</td>
</tr>
<tr>
<td>P2</td>
<td>P2</td>
</tr>
<tr>
<td>N2</td>
<td>N2</td>
</tr>
<tr>
<td>P3</td>
<td>P3</td>
</tr>
<tr>
<td>N3</td>
<td>N3</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Note) The barriers between P2 and N2 in the DX200 are short-circuited by the wire.
Do not remove the wire.
On the manipulator side, however, since a short-circuit does not exist, there is no wire.
Also, no wiring exists on each manipulator side and the DX200 side between P2 and between N2.

2) Pressure switch unit side : Crimped terminals

   For connecting the intrinsically safe cable to the intrinsically safe terminal block
   - For terminal block P1 to 2

3) Controller side: Crimped terminals

   For connecting the intrinsically safe cable to the relay barrier in the DX200
   - For terminal block P1 to N3

   ③ For connecting the intrinsically safe cable to the insulation barrier in the DX200
   - For terminal block 1 to 2

The intrinsically safe device connected to the relay barrier must satisfy the following conditions.

Intrinsically safe circuit: Pressure detection / flow switch circuit
- Allowable voltage: 13.2 V
- Allowable current: 14.2 mA
- Allowable electric power: 46.9 mW
- Internal inductance: 32.9 μH
- Internal capacitance: 32.6 nF
4.4 Requirements

Prepare the power supply, the air supply, and the grounding according to the following specifications.

### Table 4-1: Specifications

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specifications</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply</td>
<td>3-phase AC200 V (-15 to +10%) 50/60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC220 V (-15 to +10%) 60 Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>When connecting with the MPX1150: 1.5 kVA (at peak)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>When connecting with the MPX2600: 3.5 kVA (at peak)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>When connecting with the MPX3500: 3.5 kVA (at peak)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Air supply</td>
<td>Required pressure: 0.35MPa-0.65MPa</td>
<td>Use dry air for the pressurized explosion-proof construction for the motor unit.</td>
</tr>
<tr>
<td></td>
<td>Pressurized explosion-proof enclosure for the motor unit</td>
<td>Capacity:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>For the pressurized explosion-proof</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>At operating: 15 NL/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>At purging: 1000 NL/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dryness: Freezing at -18°C</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Grounding</td>
<td>Grounding resistance: 100 Ω or less</td>
<td></td>
</tr>
</tbody>
</table>

**CAUTION**

Use dry air for the pressurized explosion-proof enclosure. Moisture in the air supply may damage the electronic parts.
4.5 Installation Area

This section describes the conditions of the installation area for the robot and the MOTOFEEDERII system. Only devices that are approved as explosion-proof can be installed in hazardous locations. Refer to the local regulations and safety codes for the definition of a hazardous location.

Install the controller and control panels in a location free from water drops, dust, and dirt.

<table>
<thead>
<tr>
<th>System Components</th>
<th>Hazardous Location (Inside Painting Booth)</th>
<th>Non-hazardous Location (Outside Painting Booth)</th>
<th>Ambient Temperature</th>
<th>Ambient Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOTOFEEDERII</td>
<td>○</td>
<td></td>
<td>0 to 40°C</td>
<td>Less than 80% RH</td>
</tr>
<tr>
<td>Pressure switch unit</td>
<td>○</td>
<td>×</td>
<td>0 to 40°C</td>
<td>Less than 85% RH</td>
</tr>
</tbody>
</table>

○: Installation available  
×: Installation not available

**DANGER**

- In case installing the MOTOFEEDERII in the hazardous area, classify the MOTOFEEDERII environment by following the local explosion-proof standard and then, on the basis of the explosion-proof structure notation on the MOTOFEEDERII, confirm that the MOTOFEEDERII is possible to install in that area.

**WARNING**

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

Fig. 4-5 “System Configuration and Installation Area” shows the system configuration of the MOTOFEEDERII.
4 Wiring and Piping

4.5 Installation Area

Fig. 4-5: System Configuration and Installation Area

Non-hazardous location

Program selector (optional)

Programing pendant (non explosion proof type)

Primary power supply
3-phase AC200/220 V
50/60 Hz

Grounding resistance

Motor cable (0.9 kW)

Hazardous location

Intrinsically safe cable

Primary air
(0.35 Mpa~0.65 Mpa)

Intrinsically safe cable

Pressure switch unit

0.9 kW Motor unit

0.9 kW Motor unit

Programing pendant
(Explosion-proof: optional)

(PP)

MOTOFEEDERII

Motor cable (0.9 kW)

Cable

Air hose
4.6 Wiring of the Interlock Release for S1 axis

**Fig. 4-6: Wiring of S1 axis Interlock Release**

- **CAUTION**
  - When not using the interlock device for S1 axis, connect A1 and 024VU of the 8XT terminal block with the jumper connection.
4 Wiring and Piping

4.7 Function for the Servo Power Supply Individual Control

MOTOFEEDERII applies the Servo Power Supply Individual Control specifications to secure the safety of the working personnel during replacing workpieces and to prevent the damage of the device caused by misuse.

When satisfying the judgment condition, the DX200 sends the instruction to each ONEN terminal of the machine safety board from the external output terminal to control the servo power supply.

<table>
<thead>
<tr>
<th>Judgment condition</th>
<th>Servo power supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode Status</td>
<td>S1</td>
</tr>
<tr>
<td>Teach - When ordinary teaching</td>
<td>ON</td>
</tr>
<tr>
<td>Teach - When the S1 and S2 are</td>
<td>OFF</td>
</tr>
<tr>
<td>Teach - Misaligned around from the</td>
<td></td>
</tr>
<tr>
<td>Teach - Home position simultaneously</td>
<td></td>
</tr>
<tr>
<td>Play - During the S1 rotating</td>
<td>ON</td>
</tr>
<tr>
<td>Play - When the S1 rotation is</td>
<td>OFF</td>
</tr>
<tr>
<td>Play - Complete</td>
<td></td>
</tr>
<tr>
<td>Play - After 0.5 seconds</td>
<td></td>
</tr>
<tr>
<td>Play - During the painting operation</td>
<td>OFF</td>
</tr>
<tr>
<td>Play - Misaligned around from the</td>
<td>OFF</td>
</tr>
<tr>
<td>Play - Home position simultaneously</td>
<td></td>
</tr>
</tbody>
</table>

For applying this function, the following wiring is performed in the DX200 when shipping.

<table>
<thead>
<tr>
<th>7XT terminal block</th>
<th>Machine safety terminal block</th>
<th>Axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>A14</td>
<td>31</td>
<td>S1</td>
</tr>
<tr>
<td>B14</td>
<td>32</td>
<td>S1</td>
</tr>
<tr>
<td>A15</td>
<td>29</td>
<td>S2</td>
</tr>
<tr>
<td>B15</td>
<td>30</td>
<td>S2</td>
</tr>
<tr>
<td>A12</td>
<td>35</td>
<td>S2</td>
</tr>
<tr>
<td>B12</td>
<td>36</td>
<td>S2</td>
</tr>
<tr>
<td>A13</td>
<td>33</td>
<td>S2</td>
</tr>
<tr>
<td>B13</td>
<td>34</td>
<td>S2</td>
</tr>
</tbody>
</table>
4.8 Wiring of Operation BOX

4.8.1 For TIIS Specifications

Fig. 4-7: Wiring of Operation BOX for TIIS Specifications (Signal)
4 Wiring and Piping

4.8 Wiring of Operation BOX

Fig. 4-8: Wiring of Operation BOX for TIIS Specifications (Emergency Stop)
Fig. 4-9: Dimensions of Operation BOX for TIIS Specifications
4.8.2 For FM Specifications

Fig. 4-10: Wiring of Operation BOX for FM Specifications (Signal and Emergency Stop)

Back View of the DX200

Internal Front View of the DX200

Operation BOX cable
Select the one place of seven places and connect it.

Barrier terminal block
Operation BOX

Connection Position of the Barrier Terminal Block and the Operation BOX Cable
Fig. 4-11: Dimensions of Operation BOX for FM Specifications
## 5 Basic Specifications

### 5.1 Basic Specifications

<table>
<thead>
<tr>
<th>Table 5-1: Basic Specifications [With MOTOMAN-MPX1150 specification]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum loading mass:</td>
</tr>
<tr>
<td>Per one table</td>
</tr>
<tr>
<td>Type</td>
</tr>
<tr>
<td>Pitch between tables</td>
</tr>
<tr>
<td>Number of the operating axis</td>
</tr>
<tr>
<td>Control method</td>
</tr>
<tr>
<td>Table-rotation method</td>
</tr>
<tr>
<td>Repetitive positioning accuracy$^1$</td>
</tr>
<tr>
<td>Maximum Speed</td>
</tr>
<tr>
<td>Arm rotation speed:</td>
</tr>
<tr>
<td>Table rotation speed (indexed rotation):</td>
</tr>
<tr>
<td>Table rotation speed (spindle rotation):</td>
</tr>
<tr>
<td>Allowable Moment of Inertia$^2$,$^3$ (GD$^2$/4)</td>
</tr>
<tr>
<td>Indexed rotation axis specification</td>
</tr>
<tr>
<td>Spindle rotation specification (one table):</td>
</tr>
<tr>
<td>Mass (when the robot is mounted)</td>
</tr>
<tr>
<td>Ambient Conditions</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Explosion-proof configuration</td>
</tr>
<tr>
<td>Explosion-proof certification</td>
</tr>
</tbody>
</table>

1 Conformed to ISO9283.
2 For the allowable moment, the value shows when the type is the heavy load specification for 40 kg or the type is the high-speed rotation specification for 20 kg.
3 The loading mass and the moment of inertia are calculated by considering the center-of-gravity offset value from the table-rotation center. These two values must not exceed the allowable value.
Table 5-2: Basic Specifications [Maximum payload when no manipulator is loaded Maximum payload: per one table for 40 kg model specification]

<table>
<thead>
<tr>
<th>Maximum loading mass: Per one table</th>
<th>40 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td></td>
</tr>
<tr>
<td>YR-MF412BD-*00</td>
<td></td>
</tr>
<tr>
<td>YR-MF414BD-*00</td>
<td></td>
</tr>
<tr>
<td>YR-MF416BD-*00</td>
<td></td>
</tr>
<tr>
<td>YR-MF418BD-*00</td>
<td></td>
</tr>
<tr>
<td>Pitch between tables</td>
<td></td>
</tr>
<tr>
<td>1200 mm</td>
<td>1400 mm</td>
</tr>
<tr>
<td>1600 mm</td>
<td>1800 mm</td>
</tr>
<tr>
<td>Number of the operating axis</td>
<td></td>
</tr>
<tr>
<td>Two axes for the driving axis: Switch the table driving by changing the gear.</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td></td>
</tr>
<tr>
<td>AC servo control: robot external axis controlled</td>
<td></td>
</tr>
<tr>
<td>Table rotation method</td>
<td></td>
</tr>
<tr>
<td>Selecting available: Indexed rotation / Spindle rotation (endless rotation)</td>
<td></td>
</tr>
<tr>
<td>Repetitive positioning accuracy(^1)</td>
<td>(\pm0.55) mm (R for the center of the table: 300 mm position)</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td></td>
</tr>
<tr>
<td>Arm rotation speed: (130^\circ/s / 2.27) rad/s</td>
<td></td>
</tr>
<tr>
<td>Table rotation speed (indexed rotation): (270^\circ/s / 4.71) rad/s</td>
<td></td>
</tr>
<tr>
<td>Table rotation speed (spindle rotation): (900^\circ/s / 15.7) rad/s</td>
<td></td>
</tr>
<tr>
<td>Allowable Moment of Inertia(^2)(^3) (GD(^2/4))</td>
<td></td>
</tr>
<tr>
<td>Indexed rotation axis specification 2.8 kg m(^2)</td>
<td></td>
</tr>
<tr>
<td>Spindle rotation specification (one table): 1.4 kg m(^2)</td>
<td></td>
</tr>
<tr>
<td>Mass (when the robot is not mounted)</td>
<td>470 kg 475 kg 490 kg 495 kg</td>
</tr>
<tr>
<td>Ambient Conditions</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>0°C to 40°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>20 to 80%RH (non-condensing)</td>
</tr>
<tr>
<td>Vibration</td>
<td>4.9 m/s(^2) (0.5 G) or less</td>
</tr>
<tr>
<td>Others</td>
<td>Free from excessive electrical noise</td>
</tr>
<tr>
<td>Explosion-proof configuration</td>
<td>The motor for the pressurized explosion-proof construction is used for the external axis of the robot.</td>
</tr>
<tr>
<td>Explosion-proof certification</td>
<td>*-A00:Japanese Standard/-B00: FM/-C00:ATEX</td>
</tr>
</tbody>
</table>

1 Conformed to ISO9283.  
2 For the allowable moment, the value shows when the type is the heavy load specification for 40 kg or the type is the high-speed rotation specification for 20 kg.  
3 The loading mass and the moment of inertia are calculated by considering the center-of-gravity offset value from the table-rotation center. These two values must not exceed the allowable value.
### Table 5-3: Basic Specifications [Maximum payload when no manipulator is loaded Maximum payload: per one table for 20 kg model specification]

<table>
<thead>
<tr>
<th>Maximum loading mass: Per one table</th>
<th>20 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pitch between tables</td>
<td></td>
</tr>
<tr>
<td>YR-MF212BD-*00</td>
<td>1200 mm</td>
</tr>
<tr>
<td>YR-MF214BD-*00</td>
<td>1400 mm</td>
</tr>
<tr>
<td>YR-MF216BD-*00</td>
<td>1600 mm</td>
</tr>
<tr>
<td>YR-MF218BD-*00</td>
<td>1800 mm</td>
</tr>
<tr>
<td>Number of the operating axis</td>
<td></td>
</tr>
<tr>
<td>Two axes for the driving axis:</td>
<td></td>
</tr>
<tr>
<td>Switch the table driving by changing the gear.</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>AC servo control: robot external axis controlled</td>
</tr>
<tr>
<td>Table rotation method</td>
<td>Selecting available: Indexed rotation / Spindle rotation (endless rotation)</td>
</tr>
<tr>
<td>Repetitive positioning accuracy1)</td>
<td>±0.55 mm (R for the center of the table: 300 mm position)</td>
</tr>
<tr>
<td>Maximum Speed</td>
<td>Arm rotation speed: 130°/s / 2.27 rad/s</td>
</tr>
<tr>
<td></td>
<td>Table rotation speed (indexed rotation): 270°/s / 4.71 rad/s</td>
</tr>
<tr>
<td></td>
<td>Table rotation speed (spindle rotation): 900°/s / 15.7 rad/s</td>
</tr>
<tr>
<td>Allowable Moment of Inertia2) 3) (GD²/4)</td>
<td>Indexed rotation axis specification 2.8 kg m²</td>
</tr>
<tr>
<td></td>
<td>Spindle rotation specification (one table): 1.4 kg m²</td>
</tr>
<tr>
<td>Mass (when the robot is not mounted)</td>
<td>470 kg</td>
</tr>
<tr>
<td>Ambient Conditions</td>
<td></td>
</tr>
<tr>
<td>Temperature</td>
<td>0°C to 40°C</td>
</tr>
<tr>
<td>Humidity</td>
<td>20 to 80%RH (non-condensing)</td>
</tr>
<tr>
<td>Vibration</td>
<td>4.9 m/s² (0.5 G) or less</td>
</tr>
<tr>
<td>Others</td>
<td>Free from excessive electrical noise</td>
</tr>
<tr>
<td>Explosion-proof configuration</td>
<td>The motor for the pressurized explosion-proof construction is used for the external axis of the robot.</td>
</tr>
<tr>
<td>Explosion-proof certification</td>
<td>-*A00:Japanese Standard/-B00: FM/-C00:ATEX</td>
</tr>
</tbody>
</table>

1 Conformed to ISO9283.
2 For the allowable moment, the value shows when the type is the heavy load specification for 40 kg or the type is the high-speed rotation specification for 20 kg.
3 The loading mass and the moment of inertia are calculated by considering the center-of-gravity offset value from the table-rotation center. These two values must not exceed the allowable value.
5.2 Part Names and Working Axes

Fig. 5-1: Part Names and Working Axes

Arm-rotation axis: S1 axis

Table-rotation axis: S2 axis

Driving unit for table-rotation axis

Driving unit for arm-rotation axis

Pressure switch unit

Table for the work-set side

Table for the painting side

Arm
5.3 Dimension and the operating range of the MOTOFEEDERII

5.3.1 With MOTOMAN-MPX1150 Specification: 1200 mm Pitch Between Tables

![Diagram of MOTOFEEDERII dimensions and specifications]

**Type Loading mass Explosion-proof certification**

<table>
<thead>
<tr>
<th>Type</th>
<th>Loading mass</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>YR-MF412AD-A00</td>
<td>40 kg</td>
<td>Japanese standard</td>
</tr>
<tr>
<td>YR-MF212AD-A00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF412AD-B00</td>
<td>40 kg</td>
<td>FM</td>
</tr>
<tr>
<td>YR-MF212AD-B00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF412AD-C00</td>
<td>40 kg</td>
<td>ATEX</td>
</tr>
<tr>
<td>YR-MF212AD-C00</td>
<td>20 kg</td>
<td></td>
</tr>
</tbody>
</table>
5.3 Dimension and the operating range of the MOTOFEEDER II

5.3.2 1200 mm Pitch Between Tables Specification

*The table of the workpiece feeding side does not turn.

**Table**

<table>
<thead>
<tr>
<th>Arm Motor unit for table-rotation axis</th>
<th>Motor unit for arm-rotation axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(800)(Maximum-size of workpiece)</td>
<td></td>
</tr>
</tbody>
</table>

**Workpiece feeding side**

Pressure switch unit

**Painting side**

Table

Motor unit for table-rotation axis

Motor unit for arm-rotation axis

### Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Loading mass</th>
<th>Explosion-proof certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>YR-MF412BD-A00</td>
<td>40 kg</td>
<td>Japanese standard</td>
</tr>
<tr>
<td>YR-MF212BD-A00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF412BD-B00</td>
<td>40 kg</td>
<td>FM</td>
</tr>
<tr>
<td>YR-MF212BD-B00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF412BD-C00</td>
<td>40 kg</td>
<td>ATEX</td>
</tr>
<tr>
<td>YR-MF212BD-C00</td>
<td>20 kg</td>
<td></td>
</tr>
</tbody>
</table>
5.3.3 1400 mm Pitch Between Tables Specification

<table>
<thead>
<tr>
<th>Type</th>
<th>Loading mass</th>
<th>Explosion-proof certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>YR-MF414BD-A00</td>
<td>40 kg</td>
<td>Japanese standard</td>
</tr>
<tr>
<td>YR-MF214BD-A00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF414BD-B00</td>
<td>40 kg</td>
<td>FM</td>
</tr>
<tr>
<td>YR-MF214BD-B00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF414BD-C00</td>
<td>40 kg</td>
<td>ATEX</td>
</tr>
<tr>
<td>YR-MF214BD-C00</td>
<td>20 kg</td>
<td></td>
</tr>
</tbody>
</table>
5.3.4 1600 mm Pitch Between Tables Specification

<table>
<thead>
<tr>
<th>Type</th>
<th>Loading mass</th>
<th>Explosion-proof certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>YR-MF416BD-A00</td>
<td>40 kg</td>
<td>Japanese standard</td>
</tr>
<tr>
<td>YR-MF216BD-A00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF416BD-B00</td>
<td>40 kg</td>
<td>FM</td>
</tr>
<tr>
<td>YR-MF216BD-B00</td>
<td>20 kg</td>
<td>ATEX</td>
</tr>
<tr>
<td>YR-MF416BD-C00</td>
<td>40 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF216BD-C00</td>
<td>20 kg</td>
<td></td>
</tr>
</tbody>
</table>

*The table of the workpiece feeding side does not turn.*
5 Basic Specifications

5.3 Dimension and the operating range of the MOTOFEEDERII

5.3.5 1800 mm Pitch Between Tables Specification

<table>
<thead>
<tr>
<th>Type</th>
<th>Loading mass</th>
<th>Explosion-proof certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>YR-MF418BD-A00</td>
<td>40 kg</td>
<td>Japanese standard</td>
</tr>
<tr>
<td>YR-MF218BD-A00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF418BD-B00</td>
<td>40 kg</td>
<td>FM</td>
</tr>
<tr>
<td>YR-MF218BD-B00</td>
<td>20 kg</td>
<td></td>
</tr>
<tr>
<td>YR-MF418BD-C00</td>
<td>40 kg</td>
<td>ATEX</td>
</tr>
<tr>
<td>YR-MF218BD-C00</td>
<td>20 kg</td>
<td></td>
</tr>
</tbody>
</table>
5.3.6 Jig Mounting Part

When mounting the jig, it is recommended to position the table and jig with the inside knock and dowel pin, or the dowel pin (2 places). The dowel pin must be prepared by the customer.

Fig. 5-2: Jig Mounting Part
6.1 Internal Wiring

High reliability connectors which can be easily removed are used with each connector part.
7 Maintenance and Inspection

DANGER

- Maintenance and inspection must be performed by the specified personnel.
  Failure to observe this caution may result in electric shock or injury.
- For disassembly or repair, contact your YASKAWA representative.
- Do not disconnect the motor, and do not release the brake.
 Unexpected table motion may cause injury or damage to the equipment.

WARNING

- Before maintenance or inspection, be sure to turn the main power supply OFF, and put up a warning sign such as “DO NOT TURN THE POWER ON”.
  Failure to observe this caution may result in electric shock or injury.

CAUTION

- The battery pack must be connected before removing detection connector when maintenance and inspection.
  Failure to observe this caution may result in the loss of home position data.
7.1 Inspection Schedule

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. Inspection intervals are displayed in the levels shown in Table 7-1 “Inspection Schedule”. Conduct periodical inspections according to the inspection schedule in Table 7-1. In Table 7-1, the inspection items are classified into three types of operation: operations which can be performed by personnel authorized of the user, operations which can be performed by personnel being trained, and operations which can be performed by service company personnel. Only specified personnel are to do inspection work.

- The inspection interval must be based on the servo power supply ON time.
### Table 7-1: Inspection Schedule

<table>
<thead>
<tr>
<th>Items</th>
<th>Schedule</th>
<th>Method</th>
<th>Operation</th>
<th>Inspection Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000H/Cycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6000H/Cycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12000H/Cycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24000H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3600H</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 S1-axis motor</td>
<td>Visual</td>
<td></td>
<td>Check grease leakage.</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(1) The occurrence of a grease leakage indicates the possibility that grease has seeped into the motor. This can cause a motor breakdown. Contact your YASKAWA representative.</td>
<td></td>
</tr>
<tr>
<td>2 S2-axis motor</td>
<td>Visual</td>
<td></td>
<td>Check grease leakage.</td>
<td>•</td>
</tr>
<tr>
<td>3 Base mounting bolts</td>
<td>Spanner Wrench</td>
<td></td>
<td>Tighten loosen bolts.</td>
<td>•</td>
</tr>
<tr>
<td>4 Cover mounting screws</td>
<td>Screwdriver Wrench</td>
<td></td>
<td>Tighten loosen bolts.</td>
<td>•</td>
</tr>
<tr>
<td>5 Connectors</td>
<td>Manual</td>
<td></td>
<td>Check for loose connectors.</td>
<td>•</td>
</tr>
<tr>
<td>6 Air tube</td>
<td>Hearing</td>
<td></td>
<td>Check for air leak.</td>
<td>•</td>
</tr>
<tr>
<td>7 Gasket for internal pressure</td>
<td>Visual</td>
<td></td>
<td>Exchange at the time of degradation.</td>
<td>•</td>
</tr>
<tr>
<td>8 Internal cables</td>
<td>Visual</td>
<td></td>
<td>Check for conduction between the main connector of base and the intermediate connector with manually shaking the cable.</td>
<td>•</td>
</tr>
<tr>
<td>9 Battery in MOTOFEEDERII</td>
<td>Visual</td>
<td></td>
<td>Replace when the battery alarm on the DX200 occurs or the MOTOFEEDERII drove for 36000H.</td>
<td>•</td>
</tr>
<tr>
<td>10 S1-axis speed reducer</td>
<td>Grease Gun</td>
<td></td>
<td>Check for malfunction. (Replace if necessary.) Supply grease (6000H cycle).</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exchange grease (12000H cycle).</td>
<td>•</td>
</tr>
<tr>
<td>11 Grease-up of main body</td>
<td>Grease Gun</td>
<td></td>
<td>Check for malfunction. (Replace if necessary.) Supply grease (6000H cycle).</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exchange grease (12000H cycle).</td>
<td>•</td>
</tr>
<tr>
<td>12 S2-axis speed reducer</td>
<td>Grease Gun</td>
<td></td>
<td>Check for malfunction. (Replace if necessary.) Supply grease (6000H cycle).</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exchange grease (12000H cycle).</td>
<td>•</td>
</tr>
<tr>
<td>13 Overhaul</td>
<td></td>
<td></td>
<td></td>
<td>•</td>
</tr>
</tbody>
</table>

1. Inspection No. correspond to the numbers in Fig. 7-1 “Inspection Parts and Inspection Numbers”.
2. The occurrence of a grease leakage indicates the possibility that grease has seeped into the motor. This can cause a motor breakdown. Contact your YASKAWA representative.
3. When checking for conduction with multimeter, remove connectors on detector side for each axis from the motor.
4. For the grease replenishment and exchange procedures, refer to section 7.2 “Notes on Maintenance Procedures”.

---

**Notes on Maintenance Procedures**

- Grease Type: SRT5-22 or equivalent. The grease is supplied in a 400g container. Each container is enough for two motors. The grease is supplied at 6000H cycle.
- For the grease replenishment and exchange procedures, please refer to section 7.2 “Notes on Maintenance Procedures”.

---

**Part Numbers**

- SRT5-22: 085374-1CD
- 182394-1CD
- 213074-1CD
- 213075-1CD
- 213076-1CD
7.1 Inspection Schedule

Fig. 7-1: Inspection Parts and Inspection Numbers
7.2 Notes on Maintenance Procedures

7.2.1 Grease Replenishment/Exchange for S1-Axis Speed Reducer

7.2.1.1 Grease Replenishment

1. Remove the motor cover.
2. Rotate the S1-axis to the position where the exhaust port can be checked.
3. Remove the plug from the grease exhaust port.
4. Inject grease into the grease inlet port.
   - Grease type: VIGO grease RE No. 0
   - Amount of grease to be injected: approx. 315 cc
     (Approx. 630 cc for the 1st supply)
5. Move the S1-axis for a few minutes to discharge the excess grease before stoppering the grease exhaust port.
6. Wipe off discharged grease by using a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded part of the plug.)
7. Return the S1-axis to the home position or the 180° position.
8. Reinstall the motor cover.

NOTE: If grease is added without removing the plug from the grease exhaust port, grease will go inside a motor, which results in damage to the motor. Make sure to remove the plug.
7 Maintenance and Inspection

7.2 Notes on Maintenance Procedures

7.2.1.2 Grease Exchange

1. Remove the motor cover.

2. Rotate the S1-axis to the position where the exhaust port can be checked.

3. Remove the plug from the grease exhaust port.

4. Inject grease into the grease inlet port.
   - Grease type: VIGO grease RE No. 0
   - Amount of grease to be injected: approx. 840 cc

5. The grease exchange is completed when new grease appears from the grease exhaust port. (The new grease is distinguished from the old grease by color.)

6. Move the S1-axis for a few minutes to discharge the excess grease before stoppering the grease exhaust port. (Return the S1-axis to the home position or the 180° position.)

7. Wipe off discharged grease by using a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded part of the plug.)

If grease is added without removing the plug from the grease exhaust port, grease will go inside a motor, which results in damage to the motor. Make sure to remove the plug.
7.2.2 Grease Replenishment/Exchange for Grease Bus in Main Body

7.2.2.1 Grease Replenishment

1. Remove the plug from the grease exhaust port.

If grease is added without removing the plug from the grease exhaust port, grease will go inside a motor, which results in damage to the motor. Make sure to remove the plug.

2. Inject grease into the grease inlet port.
   - Grease type: VIGO grease RE No. 0
   - Amount of grease to be injected: approx. 4500 cc
     (Approx. 9000 cc for the 1st supply)

3. Move the S1-axis for a few minutes to discharge the excess grease before stoppering the grease exhaust port.

4. Wipe off discharged grease by using a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded part of the plug.)
7.2.2.2 Grease Exchange

1. Remove the plug from the grease exhaust port.

2. Inject grease into the grease inlet port.
   - Grease type: VIGO grease RE No. 0
   - Amount of grease to be injected: approx. 12000 cc

3. The grease exchange is completed when new grease appears from the grease exhaust port. (The new grease is distinguished from the old grease by color.)

4. Move the table axis for a few minutes to discharge the excess grease before stoppering the grease exhaust port.

5. Wipe off discharged grease by using a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded part of the plug.)

**NOTE**

If grease is added without removing the plug from the grease exhaust port, grease will go inside a motor, which results in damage to the motor. Make sure to remove the plug.
7.2.3 Grease Replenishment/Exchange for the End of S2-Axis Speed Reducer

7.2.3.1 Grease Replenishment

1. Remove the plug from the grease exhaust port.
2. Inject grease into the grease inlet port.

If grease is added without removing the plug from the grease exhaust port, grease will go inside a motor, which results in damage to the motor. Make sure to remove the plug.

- Grease type: VIGO grease RE No. 0
- Amount of grease to be injected: approx. 30 cc
  (Approx. 60 cc for the 1st supply)

3. Move the S2-axis for a few minutes to discharge the excess grease before stoppering the grease exhaust port.

4. Wipe off discharged grease by using a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded part of the plug.)
7.2.3.2 Grease Exchange

1. Remove the plug from the grease exhaust port.

   **NOTE**
   
   If grease is added without removing the plug from the grease exhaust port, grease will go inside a motor, which results in damage to the motor. Make sure to remove the plug.

2. Inject grease into the grease inlet port.
   - Grease type: VIGO grease RE No. 0
   - Amount of grease to be injected: approx. 75 cc

3. The grease exchange is completed when new grease appears from the grease exhaust port. (The new grease is distinguished from the old grease by color.)

4. Move the S2-axis for a few minutes to discharge the excess grease before stoppering the grease exhaust port.

5. Wipe off discharged grease by using a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded part of the plug.)
7.2.4 Battery Pack Replacement

**WARNING**

Before replacing the battery pack, turn OFF the power supply of the DX200, and check that no explosive atmosphere exists around the battery pack.

Four batteries are installed in the locations shown in Fig. 7-2 “Battery Pack Location”.

Battery pack type: HW1372692

![Diagram of battery pack](image)

- **Wire lead (red)**
  Connector (CN) number: 1
- **Wire lead (black)**
  Connector (CN) number: 2

L91/ENERGIZER Battery (3 batteries)
If a battery alarm occurs in the DX200, replace the battery in the following procedures.

1. Turn OFF the power supply of the DX200.
2. Ventilate the environment around the MOTOFEEDER II to remove explosive gas.
3. Remove the cover (hexagon socket head cap screw M6 (4 screws)).
4. Remove the battery pack from the brackets (hexagon socket head cap screw M4 (2 screws) which are fixed to the battery pack).
5. In accordance with the Table 7-2 “Battery Type and Label”, connect the new battery.

**Table 7-2: Battery Type and Label**

<table>
<thead>
<tr>
<th>Battery pack type</th>
<th>Label</th>
<th>Axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW1372692-A</td>
<td>BAT1</td>
<td>S1-, S2-axis</td>
</tr>
</tbody>
</table>
7. Remove the old battery.

**NOTE** Be sure to connect the new batteries before disconnecting the old one so that the data does not disappear.

6. Remove the old battery pack.

7. Mount the battery pack on the bracket by using the hexagon socket head cap screw M4 (2 screws).

8. Mount the cover.
7.2.5 Connector for the Motor Detection (With Caution Label)

If the connector for detecting the motor is disconnected without connecting the battery pack, the home position data will disappear. Be sure to connect a battery pack before disconnecting the connector for detecting the motor.

Connector for the backup is attached to connector for detecting each motor. For details of the connection, refer to Fig. 7-4 “Battery Pack Connection of the Motor Backup Battery for the S1 axis and S2 axis”.

Perform the connection in accordance with the following procedures.

1. Connect the backup connector of the connector part for the motor detecting with the battery.

2. After completing the inspection, check all connectors are connected, and then remove the battery pack.

**NOTE** Do not remove the battery pack in the motor unit.

Fig. 7-4: Battery Pack Connection of the Motor Backup Battery for the S1 axis and S2 axis
8 Recommended Spare Parts

It is recommended that the following parts and components be kept in stock as spare parts for the MOTOFEEDER II. The spare parts list for the MOTOFEEDER II is shown below.

Product performance cannot be guaranteed when using spare parts from any company other than YASKAWA. The spare parts are ranked as follows:

- Rank A: Expendable and frequently replaced parts
- Rank B: Parts for which replacement may be necessary as a result of frequent operation
- Rank C: Drive units

**Table 8-1: Spare Parts for the MOTOFEEDER II (Sheet 1 of 2)**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Parts No.</th>
<th>Name</th>
<th>Type</th>
<th>Manufacturer</th>
<th>Qty</th>
<th>Qty per Unit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>Grease</td>
<td>VIGO grease RE No.0</td>
<td>YASKAWA Electric Corporation</td>
<td>16 kg</td>
<td>-</td>
<td>For each axis speed reducer</td>
</tr>
<tr>
<td>A</td>
<td>2</td>
<td>Battery</td>
<td>HW1372692-A</td>
<td>YASKAWA Electric Corporation</td>
<td>2</td>
<td>2</td>
<td>Inside the motor unit</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
<td>Oil seal</td>
<td>TC30458 <em>fluorine</em></td>
<td>NOK</td>
<td>2</td>
<td>2</td>
<td>For the input shaft of S2-axis</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>Oil seal</td>
<td>Y355212.5</td>
<td>NOK</td>
<td>2</td>
<td>2</td>
<td>Driving parts of S2-axis</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>Oil seal</td>
<td>TB48054028</td>
<td>NOK</td>
<td>1</td>
<td>1</td>
<td>Driving parts of S2-axis</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>Oil seal</td>
<td>TC18021016</td>
<td>NOK</td>
<td>1</td>
<td>1</td>
<td>Driving parts of S2-axis</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td>Oil seal</td>
<td>Y426012.5</td>
<td>NOK</td>
<td>2</td>
<td>4</td>
<td>S1 axis motor unit, S2 axis motor unit</td>
</tr>
</tbody>
</table>
Table 8-1: Spare Parts for the MOTOFEEDER II (Sheet 2 of 2)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Parts No.</th>
<th>Name</th>
<th>Type</th>
<th>Manufacturer</th>
<th>Qty</th>
<th>Qty per Unit</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 4</td>
<td>Gasket</td>
<td>HS1400591-1</td>
<td>YASKAWA Electric Corporation</td>
<td>1</td>
<td>1</td>
<td>Motor unit</td>
<td></td>
</tr>
<tr>
<td>A 1</td>
<td>Gasket</td>
<td>HS1400737-1</td>
<td>YASKAWA Electric Corporation</td>
<td>2</td>
<td>2</td>
<td>Arm</td>
<td></td>
</tr>
<tr>
<td>A 1</td>
<td>Gasket</td>
<td>HS1400743-1</td>
<td>YASKAWA Electric Corporation</td>
<td>2</td>
<td>2</td>
<td>Arm</td>
<td></td>
</tr>
<tr>
<td>A 1</td>
<td>Gasket</td>
<td>HS1400745-1</td>
<td>YASKAWA Electric Corporation</td>
<td>2</td>
<td>2</td>
<td>Arm</td>
<td></td>
</tr>
<tr>
<td>A 1</td>
<td>Gasket</td>
<td>HS1400747-1</td>
<td>YASKAWA Electric Corporation</td>
<td>2</td>
<td>2</td>
<td>Driving parts of S2-axis</td>
<td></td>
</tr>
<tr>
<td>B 5</td>
<td>Belt</td>
<td>BG1025-UP5M25HC</td>
<td>TSUBAKIMOTO CHAIN CO.</td>
<td>2</td>
<td>2</td>
<td>1200 mm pitch</td>
<td></td>
</tr>
<tr>
<td>B 5</td>
<td>Belt</td>
<td>BG1225-UP5M25HC</td>
<td>TSUBAKIMOTO CHAIN CO.</td>
<td>2</td>
<td>2</td>
<td>1400 mm pitch</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Belt</td>
<td>1440-EV5GT-25</td>
<td>Gates Unitta Asia Company</td>
<td>2</td>
<td>2</td>
<td>1600 mm pitch</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Belt</td>
<td>1630-EV5GT-25</td>
<td>Gates Unitta Asia Company</td>
<td>2</td>
<td>2</td>
<td>1800 mm pitch</td>
<td></td>
</tr>
<tr>
<td>B 6</td>
<td>Speed reducer</td>
<td>HW1381691-A</td>
<td>Nabetesco Corporation</td>
<td>1</td>
<td>1</td>
<td>Driving parts of S1-axis</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Speed reducer</td>
<td>HW9380961-E</td>
<td>Harmonic Drive Systems Inc.</td>
<td>2</td>
<td>2</td>
<td>Driving parts of S2-axis</td>
<td></td>
</tr>
<tr>
<td>C 7</td>
<td>AC servomotor</td>
<td>SGMRV-09ANA-YRA1</td>
<td>YASKAWA Electric Corporation</td>
<td>1</td>
<td>1</td>
<td>S1-axis motor unit</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>AC servomotor</td>
<td>SGMRV-09ANA-YRA1</td>
<td>YASKAWA Electric Corporation</td>
<td>1</td>
<td>1</td>
<td>S2-axis motor unit</td>
<td></td>
</tr>
</tbody>
</table>
ROTATING WORKPIECE SUPPLYING SYSTEM FOR PAINTING
MOTOFEEDER II INSTRUCTIONS

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
Verkstads gatesan 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