PAINT WORKPIECE SUPPLYING SYSTEM
MOTOFEEDER II OPERATING 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)
*-A00: Japanese Standard/-B00: FM/-C00: ATEX

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

• This instruction manual is intended to explain mainly on the mechanical part of the MOTOFEEDER II 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 MOTOFEEDER II.

• 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 Victor 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.

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

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WARNING

• Before operating the MOTOFEEDER II, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the DX200 and the programming pendant. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the 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 manipulator. 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 use a lockout device to the safety fence when going inside. Also, display the sign that the operation is being performed inside the safety fence and make sure no one 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 manipulator 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.

The emergency stop buttons are located on the right of front door of the DX200 and the programming pendant.
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

• The table-rotation axis (S2) of the MOTOFEEDER II has two specifications: The indexed rotation and the spindle rotation. Before using the MOTOFEEDER II, be sure to understand the specifications.

• Switching the table-rotation axis (S2) specifications must be performed by following authorized personnel.
  – The personnel who can perform the operation in the management mode or higher.
  – The personnel who has finished the robot school.
  – Yaskawa representative (written on the back cover).

• For the method to switch the specifications, refer to chapter 7 “Switching the Specification of the Table Rotation Axis (S2 Axis)”.

• The switching operation must be performed at the home position (S1,S2) of the MOTOFEEDER II. For home position calibration, refer to chapter 6 “Home Positioning”.

• 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 MOTOFEEDER II is the Yaskawa industrial robot product.
The MOTOFEEDER II usually consists of the MOTOFEEDER II, the controller, the programming pendant, and 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>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>
</tbody>
</table>

Description of the Operation Procedure

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

Registered Trademark

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.

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 MotoFeeder II 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:

technicalsupport@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: MotoFeeder II
- 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 MOTOFEEDERII Overview

The MOTOFEEDERII is the rotary typed workpiece supplying equipment with the external 2-axis structure.

The MOTOFEEDERII operations are controlled by the concurrent I/O and JOB of the DX200.

(The specific operation program is incorporated in the robot controller DX200.)

The operation including the paint operation can be performed by installing wiring, setting the initial settings, and creating paint programs.

The MOTOFEEDERII transfers the workpiece set on the work-set side to the painting side through arm-rotation axis.

The workpiece transferred to the painting side is rotated through the table-rotation axis, and is painted by the robot.

The table-rotation axis enables the indexed rotation and spindle rotations, and those motions can be changed by the setting.

While the workpiece is painted on the painting side, the workpiece can be set on the work-set side.

When the workpiece set is completed in the work-set side even if the work is in progress on the painting side, pressing {START} on the operation BOX makes the start reservation, and will rotate the arm-rotation axis to transfer the workpiece after the paint is completed.

To eject the last workpiece, pressing {Complete} on the operation BOX will rotate the arm-rotation axis to transfer the painted workpiece to the work-set side.
2 Control Configuration

2.1 Control Axes

The DX200 controls the MOTOFEEDER II operation with external 2-axis. The arm-rotation axis S1 and table-rotation axis S2 are set as station axes.

The table-rotation axes, the work-set side and the painting side, have the common station axis, and the station axis operates on only the painting side.

Although the basic settings were set in shipping, change the setting when the workpiece to be loaded, moment of inertia including the jig, or equipment to be configured is changed.

As shown in the above figure, when the arm-rotation axis S1 is at the home position, the table-rotation axis: S2 axis becomes the painting side.

Both the workpiece set position and the paint position of the arm-rotation axis S1 cannot be changed to a position other than 0° and 180° positions.
2.2 Restriction on Axis Motion

The MOTOFEEDER II has a structure in which either of the table-rotation axes, work-set side or painting side, is selected and controlled by one motor. Therefore, the MOTOFEEDER II cannot be operated under a condition other than the following conditions because of restriction of mechanical structure. Attempting to operate the MOTOFEEDER II under a condition other than the following conditions will issue an alarm (in play mode) or a message (during teaching) about the axis block to block the motion. If this alarm or message is issued, adjust the position to meet the following conditions before performing the operation.

“Operational conditions”

<Condition under which the S1-axis can move>

The S1-axis can move only when the S2-axis stops at the home position.

<Condition under which the S2-axis can move>

The S2-axis can move only when the S1-axis stops at 0° or 180° position.
3 System

3.1 Devices

3.1.1 Japanese Standard and FM Specification

For the terminal arrangement definition of I/O signals and the capacity of I/O terminals, refer to section 14.13 Universal I/O Signal Assignment in DX200 INSTRUCTIONS.
4 Settings

Set the following settings depending on the MOTOFEEDER II application.
For instructions on how to change each variable, refer to section 3.9.3 Editing User Variables” in “DX200 Operator’s Manual for Painting”.

4.1 Settings of Table-Rotation Axis (S2 Axis)

4.1.1 Variable Setting: Heavy-Load Indexed Rotation

Byte variable: \texttt{B097 = 0}

The indexed rotation operates the table-rotation axis S2 in synchronization with the manipulator.
The paint job must be created that register the position of the table-rotation axis S2 as well as the manipulator position.

4.1.2 Variable Setting: High-Speed Spindle Rotation

Byte variable: \texttt{B097 = 1}

The spindle rotation operates the table-rotation axis S2 asynchronously with the manipulator.
The paint job must be created that registers the position of only the manipulator.
4.2 Setting of Spindle Speed

When using the MOTOFEEDER II’s table-rotation axis S2 in the spindle rotation, use a variable to set the rotation speed to be used.

Byte variable: B000 = *** [rpm] (1-150 rpm)

**NOTE**

If the spindle motion speed (B00) is set to a value greater than 150 rpm, the speed is limited to 150 rpm.

4.3 Setting of Manipulator Work Standby Position

Register the robot work standby position (the common position where the robot stops before starting the paint operation and after finishing the operation).

The work standby position must be registered, where there is no interference with the paint workpiece and jigs even if the MOTOFEEDER II’s arm-rotation axis S1 or table-rotation axis S2 stops or rotates.

Position (robot) variable: P000 (robot work standby position)
5 Creating Paint Jobs

Create the paint job (work job) depending on the MOTOFEEDER II application.

5.1 Creating Paint Jobs for Heavy-Load Indexed Rotation Specification

5.1.1 Registration of Control Groups

Prepare to create the paint operation job in which the robot operation is synchronized with the table-rotation axis S2.

Register the following control groups as new ones because they are not registered.

For instructions on how to register them, refer to section 2.4.1 “Registering Group Combination” in “DX200 OPTIONS INSTRUCTIONS FOR INDEPENDENT/COORDINATED CONTROL FUNCTION”.

For the registration of the control groups, the security must be set to [MANAGEMENT MODE].

5.1.2 Creating Paint Jobs

Create the paint operation job in which the robot operation is synchronized with the table-rotation axis S2.

For instructions on how to create jobs, refer to section 3.1.3 Registration of Jobs” in “DX200 Operator’s Manual for Painting”.

Select {R1 + S2} for the control group of the job to be registered.

Enter a job name (a maximum of 8 one-byte characters).
Select {ROBOT JOB}.
Press {EXECUTE} to create the job.
5.1.3 Teaching

Perform teaching operations for motions of the robot and table-rotation axis S2.

Rotate the table-rotation axis S2 on the painting side to the position where the paint can be easily performed by the robot, and then perform teaching operations for the paint motions of the robot and table-rotation axis S2.

- For the initial and end positions of the job, perform teaching operations with the robot on the work standby position and with the table-rotation axis S2 at the home position (0°).
- The table-rotation axis S2 cannot be operated unless the arm-rotation axis S1 is at 0° or 180° position.
- The arm-rotation axis S1 cannot be operated unless the table-rotation axis S2 is at the home position (0°).

5.1.4 Job Example

[Reference paint job]

<table>
<thead>
<tr>
<th>Line</th>
<th>Instruction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>NOP</td>
<td></td>
</tr>
</tbody>
</table>
| 0001 | MOVJ VJ=40.00 | Robot: work standby position  
Table-rotation axis S2: home position (0°) (Step 1) |
| 0002 | MOVJ VJ=40.00 | Robot: to paint the start position (starting point of path 1)  
Table-rotation axis S2: rotate to the paint position (Step 2) |
| 0003 | SPYON       | Spray ON    |
| 0004 | MOVL V=400.0 | Robot: to the end point of path 1  
Table-rotation axis S2: same as Step 2 (Step 3) |
| 0005 | SPYOF       | Spray OFF   |
| 0006 | MOVL V=400.0 | Robot: to starting point of path 2  
Table-rotation axis S2: rotate to the paint position (Step 4) |
| 0007 | SPYON       | Spray ON    |
| 0008 | MOVL V=400.0 | Robot: to end point of path 2  
Table-rotation axis S2: same as Step 4 (Step 5) |
| 0009 | SPYOF       | Spray OFF   |
| 0010 | MOVJ V=40.00 | Robot: work standby position  
Table-rotation axis S2: home position (0°) (Step 6) |
| 0011 | END         |             |
5.1.5 Registration of Paint Jobs

To perform the operation including the MOTOFEEDER II motion, register the created paint job in JOB REGISTRATION.

For instructions on how to register jobs in JOB REGISTRATION, refer to section 9.12.5 in “DX200 Operator’s Manual for Painting Application”.

Register the paint job in the following location.

[Job registration table]

TABLE NUMBER.: 1

Paint job for the table-rotation axis A: No. 0001
Paint job for the table-rotation axis B: No. 0002

The common location is used for the paint job for indexing and the paint job for spindle.

When using the job with the method changed from indexing to spindle or from spindle to indexing, be sure to change the job in the job registration table depending on the method to be used.
5.2 Creating Paint Jobs for High-Speed Spindle Rotation Specification

5.2.1 Creating Paint Jobs
Create the paint operation job for only the robot motion. The job for the table-rotation axis S2 for spindle rotation does not need to be created because it has already been set.

For instructions on how to create jobs, refer to section 3.1.3 “Registration of Jobs” in “DX200 Operator’s Manual for Painting”.
Select {R1} for the control group of the job to be registered.

5.2.2 Teaching
Perform teaching operations for the robot.
Perform teaching operations for the paint operation for the workpiece rotated by the spindle rotation.

- For the initial and end positions of the job, perform teaching operations with the robot on the work standby position.
- Because the spindle motion of the table-rotation axis S2 is disabled during teaching, perform teaching operations on the assumption of the rotation.
- The table-rotation axis S2 cannot be operated unless the arm-rotation axis S1 is at 0° or 180° position.
- The arm-rotation axis S1 cannot be operated unless the table-rotation axis S2 is at the home position (0°).

5.2.3 Spindle Reverse Instruction
The spindle rotation rotates in a given direction, and can be reversed by calling the following job at a desired location in the paint job.

Name of the job for reverse: SPIN_REV
### 5.2.4 Job Example

[Reference paint job]

<table>
<thead>
<tr>
<th>Line</th>
<th>Instruction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0000</td>
<td>NOP</td>
<td></td>
</tr>
<tr>
<td>0001</td>
<td>MOVJ VJ=40.00</td>
<td>Robot: work standby position (Step 1)</td>
</tr>
<tr>
<td>0002</td>
<td>MOVJ VJ=40.00</td>
<td>Robot: to paint the start position (starting point of path 1) (Step 2)</td>
</tr>
<tr>
<td>0003</td>
<td>SPYON</td>
<td>Spray ON</td>
</tr>
<tr>
<td>0004</td>
<td>MOVL V=400.0</td>
<td>Robot: to the end point of path 1 (Step 3)</td>
</tr>
<tr>
<td>0005</td>
<td>MOVL V=400.0</td>
<td>Robot: to the end point of path 2 (Step 4)</td>
</tr>
<tr>
<td>0006</td>
<td>MOVL V=400.0</td>
<td>Robot: to the end point of path 2 (Step 5)</td>
</tr>
<tr>
<td>0007</td>
<td>SPYOF</td>
<td>Spray OFF</td>
</tr>
<tr>
<td>0008</td>
<td>CALL JOB: SPIN_REV</td>
<td>Calling the spindle reverse job Spindle reverse start</td>
</tr>
<tr>
<td>0009</td>
<td>MOVL V=400.0</td>
<td>Robot: to the starting point of path 3 (Step 6)</td>
</tr>
<tr>
<td>0010</td>
<td>SPYON</td>
<td>Spray ON</td>
</tr>
<tr>
<td>0011</td>
<td>MOVL V=400.0</td>
<td>Robot: to the end point of path 3 (Step 7)</td>
</tr>
<tr>
<td>0012</td>
<td>MOVL V=400.0</td>
<td>Robot: to the end point of path 4 (Step 8)</td>
</tr>
<tr>
<td>0013</td>
<td>MOVL V=400.0</td>
<td>Robot: to the end point of path 4 (Step 9)</td>
</tr>
<tr>
<td>0014</td>
<td>SPYOF</td>
<td>Spray OFF</td>
</tr>
<tr>
<td>0015</td>
<td>MOVJ V=40.00</td>
<td>Robot: work standby position (Step 10)</td>
</tr>
<tr>
<td>0016</td>
<td>END</td>
<td></td>
</tr>
</tbody>
</table>
5 Creating Paint Jobs
5.2 Creating Paint Jobs for High-Speed Spindle Rotation Specification

5.2.5 Registration of Paint Jobs

To perform the operation including the MOTOFEEDER II motion, register the created paint job in the registration table.

For instructions on how to register jobs in the register table, refer to section 9.12.5 CALL in “DX200 Operator’s Manual for Painting Application”.

Register the paint job in the following location.

[JOB REGISTRATION]

TABLE NUMBER.: 1

Paint job for the table-rotation axis A: No. 0001
Paint job for the table-rotation axis B: No. 0002

The common location is used for the paint job for indexing and the paint job for spindle.

When using the job with the method changed from indexing to spindle or from spindle to indexing, be sure to change the job in the job registration table depending on the method to be used.
5.3 Operation

5.3.1 Operational Preparation (DX200 Operation)

- Make sure that no person is present in the motion range of the manipulator and the MOTOFEEDERII before starting the operation.
- Before starting the following operations, make sure that the manipulator is at the position where the manipulator does not interfere with anything even if it directly moves to the work standby position.

Use the following procedure to operate the DX200.

If the manipulator and the MOTOFEEDERII are not at the work standby positions when the DX200 operation starts, they automatically move to the work standby position in the sequence of the manipulator, table-rotation axis S2, and arm-rotation axis S1.

(The work standby position for the arm-rotation axis S1 of the MOTOFEEDERII is 0° or 180° position.)

<table>
<thead>
<tr>
<th>Operating procedure</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Set {MODE} of the programming pendant to PLAY.</td>
</tr>
<tr>
<td>2</td>
<td>Press {SERVO ON READY} on the programming pendant. SERVO becomes ON, and {SERVO ON} is lit on the programming pendant. After entering into the PLAY mode and SERVO ON, the master job is automatically called.</td>
</tr>
<tr>
<td>3</td>
<td>Press {START} on the programming pendant. {START} is lit on the programming pendant, the operation start, and then the state becomes waiting for {START} from the operation BOX.</td>
</tr>
</tbody>
</table>

5.3.2 Operation (Production Operation)

Use the following procedure to perform the paint operation by the MOTOFEEDERII and manipulator.

The paint operation is performed with the prepared job and the created paint job.

<table>
<thead>
<tr>
<th>Operating procedure</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Press {START} on the operation BOX •The arm-rotation axis S1 rotates to transfer the set workpiece to the painting side and to paint the workpiece with the created paint job. (The spindle motion automatically rotates at the specified speed) •Pressing {START} again will transfer the workpiece on the work-set side to the painting side to paint the workpiece.</td>
</tr>
<tr>
<td>2</td>
<td>Press (Complete) on the operation BOX The arm-rotation axis S1 rotates to transfer the painted workpiece to the work-set side. In this case, the manipulator does not perform paint operation.</td>
</tr>
</tbody>
</table>
6 Home Positioning

6.1 Home positioning

The data of home position data may be deleted when dismount the power cable.
In this case, calibrate the home position again.

6.1.1 Home position calibration

MOTOFEEDER II has [S1: Arm-rotation axis] part and [S2: Table-rotation axis] part. Insert a specified aligning pin to each part and calibrate the respective home position, and then register.

- Procedures
  1. Register the home position of S2-axis (table-rotation axis) first. Register the position without any modification since the position is calibrated before shipping.
     Note: Do not move the S2-axis till the home position is registered because it is already calibrated before shipping.
  2. Move the S1-axis and register its home position. When adjusting the position, use the specified aligning pin.

6.2 Aligning Pin Position

Aligning pins are delivered with MOTOFEEDER II, please use them.


7 Switching the Specification of the Table Rotation Axis (S2 Axis)

There are two specifications for the table rotation axis (S2 axis): the heavy loading specification for the indexed rotation and the high-speed rotary specification for the spindle rotation.

Table 7-1: Rotary specification

<table>
<thead>
<tr>
<th>Table rotation method</th>
<th>Indexed rotation / Spindle rotation (selecting available)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum on-board mass</td>
<td>Per 1 table</td>
</tr>
<tr>
<td>When using the indexed rotation: 40 kg</td>
<td>When using the spindle rotation: 20 kg</td>
</tr>
<tr>
<td>Repetitive positioning accuracy</td>
<td>±0.55 mm</td>
</tr>
<tr>
<td>(R for the center of the table: 300 mm position)</td>
<td></td>
</tr>
<tr>
<td>Maximum speed</td>
<td></td>
</tr>
<tr>
<td>Arm rotation speed: 120°/s</td>
<td>Table rotation speed (indexed rotation): 270°/s</td>
</tr>
<tr>
<td>Table rotation speed (spindle rotation): 900°/s</td>
<td></td>
</tr>
<tr>
<td>Allowable inertia (GD²/4)</td>
<td>Indexed rotation axis specification 2.8 kgm²</td>
</tr>
<tr>
<td>Indexed rotation axis specification 2.8 kgm²</td>
<td></td>
</tr>
<tr>
<td>Spindle rotation specification (1 table): 1.4 kgm²</td>
<td></td>
</tr>
</tbody>
</table>

If switching a specification, perform it under the following conditions.

1. Home position of the S1 for the MOTOFEEDERII
2. Home position of the S1 for the MOTOFEEDERII
3. Operating authority: Management mode of the Maintenance mode *1

*1 Switching a specification of the table rotation axis (S2 axis) for the MOTOFEEDERII is performed by the qualified worker.

- A worker who finishes the robot school.
MotoFeeder II

7 Switching the Specification of the Table Rotation Axis (S2 Axis)

■ Procedures for Switching the specification of the table rotation axis (S2 axis)
1. Setting of the Maintenance mode

1.1 Turn ON the power supply while pressing [Main Menu] of the programming pendant.

1.2. Window of the Maintenance mode appears.

1.3. Select {SYSTEM} under the Main Menu.
Select {SECURITY} from SETUP, VERSION, CONTROLLER INFORMATION, ALARM HISTORY, and SECURITY.
1.4. The mode selection window appears.

1.5 Press [SELECT].

Set the cursor to "MANAGEMENT MODE", which is out of OPERATING MODE, EDITING MODE, MANAGEMENT MODE, and SAFETY MODE, and press [SELECT].
1.6 Password entry window appears.

![Password Entry Window](image1)

1.7 Enter the password “9999999999999999” and press [ENTER].

![Password Entry Window](image2)

Setting of the Maintenance mode is complete.
2. Setting the specification of the table rotation axis (S2 axis)

2.1 Select {SYSTEM} - {SETUP}.

2.2 Set the cursor to "OPTION FUNCTION" and press [SELECT].
2.3 Set the cursor to “MOTOFEEDER Specification” and press [SELECT].

2.4 Set the cursor to “Heavy Load” / “High-Speed” and press [SELECT].
2.5 Set the cursor to [YES] and press [SELECT].

Setting the specification of the table rotation axis (S2 axis) is complete.

3. After switching the specification, execute the operation check. *2

*2. Due to switching the specification, the type and the type described on the NP attached to the MOTOFEEDER II may be different.

When contacting Yaskawa, let us know the type displayed on the programming pendant.

Confirmation window : MOTOFEEDER Specification in the OPTION FUNCTION window

: Robot axis configuration window
PAINT WORKPIECE SUPPLYING SYSTEM
MOTOFEEDER II OPERATING INSTRUCTIONS

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