PAINT WORKPIECE SUPPLYING SYSTEM
MOTOFEEDER INSTRUCTIONS

TYPE:
YR-MF414B-A00(-B00), YR-MF214B-A00(-B00) (ARM LENGTH: 1400mm, WITHOUT MANIPULATOR)
YR-MF416A-A00(-B00), YR-MF216A-A00(-B00) (ARM LENGTH: 1600mm, WITH MANIPULATOR)
YR-MF416B-A00(-B00), YR-MF216B-A00(-B00) (ARM LENGTH: 1600mm, WITHOUT MANIPULATOR)
YR-MF418A-A00(-B00), YR-MF218A-A00(-B00) (ARM LENGTH: 1800mm, WITH MANIPULATOR)
YR-MF418B-A00(-B00), YR-MF218B-A00(-B00) (ARM LENGTH: 1800mm, WITHOUT MANIPULATOR)

※-A00 : Japanese standard  -B00 : FM standard

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

MOTOFEEDER INSTRUCTIONS
MOTOFEEDER INSTRUCTIONS
NX100 INSTRUCTIONS
NX100 OPERATOR’S MANUAL FOR PAINTING APPLICATION
NX100 MAINTENANCE MANUAL
MOTOMAN-EPX1250 INSTRUCTIONS
MOTOMAN-EPX1250 INSTRUCTIONS SUPPLEMENT
MOTOMAN-EPX2050 INSTRUCTIONS

The NX100 operator’s manuals above correspond to specific usage. Be sure to use the appropriate manual.

Part Number: 162354-1CD
Revision: 4
MANDATORY

- This manual describes the specifications, precautions for operation and required items for maintenance or inspections, for proper application of the MOTOFEEDER. Read this manual carefully and be sure to understand its contents before handling the MOTOFEEDER.

- General items related to safety are listed in Chapter 1: Safety of the NX100 Instructions. To ensure correct and safe operation, carefully read the NX100 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.

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

⚠️ WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

⚠️ CAUTION Indicates a potentially hazardous situation, 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 “CAUTION” and “WARNING.”
Before operating the MOTOFEEDER, check that servo power is turned OFF when the emergency stop buttons on the front door of the NX100, operation BOX and programming pendant are pressed. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the MOTOFEEDER during an emergency.

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 motion.

Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
- View the MOTOFEEDER from the front whenever possible.
- Always follow the predetermined operating procedure.
- Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended MOTOFEEDER operation may result in injury.

Confirm that no persons are present in the P-point maximum envelope of the MOTOFEEDER and that you are in a safe location before:
- Turning ON the NX100 power
- Moving the MOTOFEEDER 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 during operation. Always press an emergency stop button immediately if there are problems.

The emergency stop buttons are located on the right of the front door of the NX100, operation BOX and the programming pendant.
**CAUTION**

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

- Always return the programming pendant to the hook on the NX100 cabinet after use. The programming pendant can be damaged if it is left in the P-point maximum envelope of MOTOFEEDER, on the floor, or near fixtures.

- Read and understand the Explanation of the Warning Labels in the NX100 Instructions before operating the MOTOFEEDER.

**Definition of Terms Used Often in This Manual**

The MOTOFEEDER is the product of YASKAWA industrial robot workpiece supplying system.
The MOTOFEEDER usually consists of the MOTOFEEDER (the main body of workpiece supplying system), the controller, the programming pendant, and the manipulator 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>NX100 controller</td>
<td>NX100</td>
</tr>
<tr>
<td>NX100 programming pendant</td>
<td>Programming Pendant</td>
</tr>
<tr>
<td>Cable between the workpiece delivery system and the controller</td>
<td>Manipulator cable</td>
</tr>
</tbody>
</table>
Explanation of Warning Labels

The following warning labels are attached to the MOTOFEEDER. Always follow the warnings on the labels. Also, an identification label with important information is placed on the body of the MOTOFEEDER. Prior to operating the manipulator, confirm the contents.
1 Safety Precautions

2 Features
   2.1 Explosion-Protected Structure ........................................2-1
   2.2 Teaching ........................................................................2-2

3 Receiving
   3.1 Checking Package Contents ...........................................3-1
   3.2 Checking the Order Number ............................................3-2

4 Installation and Transport
   4.1 Requirements ...................................................................4-1
   4.2 Installation Area ...............................................................4-2
   4.3 Transportation Method ....................................................4-3
      4.3.1 Using a Crane ............................................................4-4

5 Installation
   5.1 Safeguard Installation .......................................................5-2
   5.2 Installation of MOTOFEEDER ...........................................5-2
      5.2.1 When the MOTOFEEDER and Robot are Installed on
               a Baseplate .....................................................................5-3
      5.2.2 Mounting the MOTOFEEDER Singly on the Floor ..........5-4
   5.3 Location ...........................................................................5-5
   5.4 System Configuration .......................................................5-6
6 Wiring and Piping
   6.1 Grounding ................................................................. 6-1
   6.2 Power Cable Connection .................................................. 6-3
      6.2.1 Connection to the MOTOFEEDER ............................... 6-3
      6.2.2 Connection to the NX100 ......................................... 6-3
      6.2.3 Example Method of Power Cable Construction ................. 6-5
   6.3 Piping and Wiring of Pressure Switch Box .......................... 6-6
   6.4 Operation Box .................................................................. 6-10
   6.5 Door interlock .................................................................. 6-13

7 Basic Specifications
   7.1 Basic Specifications .......................................................... 7-1
   7.2 Part Names and Working Axes .......................................... 7-2
   7.3 Dimensions and Working Envelope .................................... 7-2

8 Load Specifications and Jig Mounting Part
   8.1 Jig Mounting Part ............................................................. 8-1
   8.2 Double Spindle Unit (Optional) ........................................ 8-2

9 System Application
   9.1 Mounting the Jig .............................................................. 9-1

10 Electrical Equipment Specification
   10.1 Internal Wiring .............................................................. 10-1
11 Maintenance and Inspection

11.1 Inspection Schedule ................................................................. 11-1

11.2 Notes on Maintenance Procedures ......................................... 11-5

11.2.1 Battery Pack Replacement .................................................. 11-5

11.2.2 Grease Replenishment/Exchange for S1-Axis Speed Reducer ................................................................. 11-7

- Grease Replenishment
  (Refer to “Fig. 24  S1-Axis Speed Reducer”) ........................................ 11-8

- Grease Exchange
  (Refer to “Fig. 24  S1-Axis Speed Reducer”) ........................................ 11-8

11.2.3 Grease Replenishment/Exchange for Grease Bus in Main Body ...................................................................................... 11-9

- Grease Replenishment
  (Refer to “Fig. 26  Grease Bus in Main Body”) ........................................ 11-10

- Grease Exchange
  (Refer to “Fig. 26  Grease Bus in Main Body”) ........................................ 11-10

11.2.4 Grease Replenishment/Exchange for the End of S2-Axis Speed Reducer ................................................................. 11-11

- Grease Replenishment
  (Refer to “Fig. 27  End of S2-Axis”) ........................................................... 11-12

- Grease Exchange
  (Refer to “Fig. 27  End of S2-Axis”) ........................................................... 11-12

11.2.5 Double Spindle Unit (Optional) Grease Replenishment of Tensioner ................................................................. 11-13

- Grease Replenishment
  (Refer to “Fig. 28  Double Spindle Unit”) .................................................. 11-13

11.2.6 Double Spindle Unit (Optional) Grease Replenishment of Bearing Unit ................................................................. 11-14

- Grease Replenishment
  (Refer to “Fig. 29  Double Spindle Unit”) .................................................. 11-14

11.2.7 Inspection of Air Sealing for Internal Air Pressure .................... 11-15

- Gasket for Cover Part ........................................................................ 11-15

12 Recommended Spare Parts
1 Safety Precautions

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

(2) Specify the working regulations and the person in charge for the following operations:
   a) Turning the power to the robot ON/OFF, and RUN/STOP operations. To avoid any faulty operation, take measures such as putting up a notice to remind operators of procedures and precautions explained in the instruction manual.
   b) Warning sign or signal to inform operator of the robot operation status
      Starting an operation while someone is in the manipulator’s working envelope or while someone is doing maintenance checks or repairs may cause a serious accident. When on standby, the manipulator can be moved by an external signal. To avoid these accidents caused by a lack of information, put up a board or information, put up a board or indicator lamp to show the robot operation status.
   c) Action to be taken in case of a failure or an accident
      Appoint a person to be contacted and the action to be taken in case of a failure or an accident.
   d) Safety standards and the supervisor for safe operation
      Appoint a supervisor for the safe operation of the manipulator and establish the working regulations.
   e) Appoint a person to be in charge of teaching, maintenance and inspections and provide training or lectures on safety and the actions to be taken in case of an emergency.

Local regulations are applied to the MOTOFEEDER as well as the painting robot.
1 Safety Precautions

**WARNING**

- 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 NX100. 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 manipulator is in its standby position
  (c) When any abnormality occurs, immediately press the emergency stop button to stop the manipulator.
  (d) Before entering inside the manipulator working envelope, be sure to stop the manipulator and turn OFF the main power supply to the NX100.
- Brake release (Option)
  A braking system is provided on each axis of the manipulator to hold the arm in its position when a failure or fault occurs. When the brake is activated, the manipulator cannot be moved manually even if the power is OFF. To change the posture of the manipulator after a failure or fault, the brake can be released by the operation from the controller. When the brake is released with the manipulator’s power OFF, each axis falls down because of the arm weight. While two or more people are holding the arm in position before releasing the brake, change the posture of the manipulator within the minimum motion range.

Use the brake release function only when absolutely necessary.

**PROHIBITED**

Any modification of the MOTOFEEDER, and the following is strictly prohibited:
1. Explosion-proof devices and system installation
2. Safeguards and the safety devices mounted on these safeguards
3. Emergency stop button, and other safety devices
4. Robot control system such as the NX100 robot controller, the manipulator drive section and the power transmission section
2 Features

The MOTOFEEDER is designed for easy-handling and to consider safety first in operation.

2.1 Explosion-Protected Structure

The MOTOFEEDER with their Explosion-protected construction (fia2G4 / ia2G4) meets the requirements for Explosion-protected ratings:

- **The pressurized explosion-proof enclosure** prevents explosive gas from entering the manipulator by supplying a protective gas, such as clean air or an inert gas, to keep the internal air pressure constant.
- **The explosion-proof/intrinsically safe enclosure** prevents explosive gas from igniting by electric spark and heat.

<table>
<thead>
<tr>
<th>Pressurized type of explosion-protection</th>
<th>Japanese standard</th>
<th>FM standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressurized type of explosion-protection</td>
<td>f</td>
<td>pressurization</td>
</tr>
<tr>
<td>Intrinsic safety</td>
<td>ia</td>
<td>intrinsic safety</td>
</tr>
<tr>
<td>Flame proof grade explosion class</td>
<td>2</td>
<td>Class 1, Devision1, Groups C and D</td>
</tr>
<tr>
<td>Ignition group</td>
<td>G4</td>
<td>T4</td>
</tr>
</tbody>
</table>

**WARNING**

Select a location for the MOTOFEEDER, a “Division 1 area” or “Division 2 area.” Do not select a location which can be classified as a “Division 0 area” or a more hazardous location.
2.2 Teaching

The target positions, the motion speed, and the ON/OFF timing of the spray can be taught with the programming pendant while moving the MOTOFEEDER, which shortens the time required for teaching. And, the data can be corrected at any time. Because the teaching function and the correction function are integrated, the operations such as forward/reverse run, position modification, addition/deletion of points can be performed during teaching. And the management function, which manages the parameter settings, enables you to monitor the actual status during teaching. The on-screen guidance and the interactive system on the pull-down menus lead the operator through the operation procedures.

(1) Large-capacity backup as a standard feature
   The large-capacity drive for CF cards is provided as a standard feature of backup unit and enables data to be transmitted easily.

(2) High reliability
   a) The built-in microcomputer continuously checks the I/O data and the manipulator motion to ensure high-reliability.
   b) Can detect power supply faults and software faults with its self-diagnosis functions

(3) When an error such as an operation error or a controller fault occurs, the alarm code and message are displayed, and the date and time of the error occurrence with its explanation are stored in the alarm history to help you take a quick, corrective action.

Be sure to save the backup data for the controller, such as the data for jobs and constants, on a CF card. If not, the necessary data for the MOTOFEEDER may be lost if an internal memory fault occurs in the controller.
3 Receiving

**CAUTION**

- Confirm that the MOTOFEEDER, the manipulator and the NX100 have the same order number.

Special care must be taken when more than one MOTOFEEDER and the manipulator are to be installed.
Failure to observe this caution may cause injury or damage.

### 3.1 Checking Package Contents

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

**<Japanese standard>**
- Manipulator (robot main body)
- NX100
- Programming Pendant
- Power supply cables between the manipulator and the NX100 (2 or 4 cables)
- MOTOFEEDER
- Power supply cables between the MOTOFEEDER and the NX100 (4 cables)
- Intrinsically safe cable between the MOTOFEEDER and the NX100 (1 cable)
- Operation BOX cable between the operation BOX and the NX100 (1 cable)

**<FM standard>**
- Manipulator (robot main body)
- NX100
- Programming Pendant
- MOTOFEEDER
- Intrinsically safe cable between the MOTOFEEDER and the NX100 (1 cable)
- Operation BOX cable between the operation BOX and the NX100 (1 cable)
- Power supply cables between the BOX relay and the NX100 (6 cables)
- Power supply cables between the MOTOFEEDER, manipulator and the BOX relay (6 or 8 cables)
- BOX relay (only FM standard)
3.2 Checking the Order Number

Check that the order number of the MOTOFEEDER corresponds to the NX100. The order number is located on a label as shown below.

MOTOFEEDER AND THE CONTROLLER SHOULD HAVE SAME ORDER NUMBER.

ORDER.NO.

NJ3437

Check that the MOTOFEEDER and the NX100 have the same order number.

(a) NX100 (Front View)    (b) MOTOFEEDER (Side View)

Fig. 1 Location of Order Number Label
4 Installation and Transport

4.1 Requirements

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

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specifications</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>EPX1250+ MOTOFEEDER</strong></td>
<td><strong>EPX2050+ MOTOFEEDER</strong></td>
</tr>
<tr>
<td>1</td>
<td>Power supply</td>
<td>3-phase 200/220 VAC (+10% - -15%) 50/60Hz (±2 Hz) 3.0kVA (at peak)</td>
<td>3-phase 200/220 VAC (+10%) 50/60Hz (±2 Hz) 6.5kVA (at peak)</td>
</tr>
<tr>
<td>2</td>
<td>Air supply Pressurized</td>
<td>Required pressure: 0.35Mpa to 0.65Mpa Capacity: For the pressurized explosion-proof 50NL/min usually 300NL/min when scavenging Dryness: Freezing at -18 °C</td>
<td>Required pressure: 0.35Mpa-0.65Mpa Capacity: For the pressurized explosion-proof 50NL/min usually 1,000NL/min when scavenging Dryness: Freezing at -18 °C</td>
</tr>
<tr>
<td></td>
<td>explosion-proof enclosure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Grounding</td>
<td>Grounding resistance: 100 ohm or less (Non I.S. GND)</td>
<td>Grounding resistance: 100 ohm or less (Non I.S. GND)</td>
</tr>
</tbody>
</table>

**CAUTION**

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

This section describes the conditions of the installation area for the robot and MOTOFEEDER 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>Manipulator</td>
<td>○</td>
<td>–</td>
<td>0~40°C</td>
<td>Less than 80 % RH</td>
</tr>
<tr>
<td>Workpiece supplier</td>
<td>○</td>
<td>○</td>
<td>0~40°C</td>
<td>Less than 80 % RH</td>
</tr>
<tr>
<td>Controller (not explosion-proof)</td>
<td>×</td>
<td>○</td>
<td>0~45°C</td>
<td>Less than 90 % RH</td>
</tr>
<tr>
<td>Pneumatic unit (not explosion-proof)</td>
<td>×</td>
<td>○</td>
<td>0~45°C</td>
<td>Less than 85 % RH</td>
</tr>
<tr>
<td>Programming Pendant (not explosion-proof)</td>
<td>×</td>
<td>○</td>
<td>0~40°C</td>
<td>Less than 85 % RH</td>
</tr>
<tr>
<td>Programming pendant (explosion-proof) (Option)</td>
<td>○</td>
<td>○</td>
<td>0~40°C</td>
<td>Less than 85 % RH</td>
</tr>
<tr>
<td>Conveyor speed detector (not explosion-proof)</td>
<td>×</td>
<td>○</td>
<td>0~50°C</td>
<td>Less than 90 % RH</td>
</tr>
<tr>
<td>Conveyor speed detector (explosion-proof)</td>
<td>○</td>
<td>–</td>
<td>0~50°C</td>
<td>Less than 90 % RH</td>
</tr>
<tr>
<td>Converyor switch (explosion-proof)</td>
<td>○</td>
<td>–</td>
<td>0~50°C</td>
<td>Less than 90 % RH</td>
</tr>
<tr>
<td>Control panel for workpiece supplier (explosion-proof)</td>
<td>○</td>
<td>○</td>
<td>0~45°C</td>
<td>Less than 90 % RH</td>
</tr>
<tr>
<td>Control panel for workpiece supplier (not explosion-proof)</td>
<td>×</td>
<td>○</td>
<td>0~45°C</td>
<td>Less than 90 % RH</td>
</tr>
<tr>
<td>Safety devices</td>
<td>Selected according to the requirements of the customer. Refer to the appropriate instruction manual provided separately.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Box for emergency stop switches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety plugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit switches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flashing light Indicator lamps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photoelectric switches</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Installation Site
4.3 Transportation Method

- 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.
4.3.1 Using a Crane

(1) When transporting MOTOFEEDER alone

As a rule, the MOTOFEEDER should be lifted by a crane when removing it from the package and moving it. Lift the MOTOFEEDER using a four-leg bridle sling using the attached eyebolts.

Figure 2: Transporting Posture (MOTOFEEDER alone)
• Check that the eyebolts are securely fastened.
• The mass of the manipulator is approximately 420 kg including the shipping bolts and brackets. Use a wire rope strong enough to withstand the weight. (Arm length: 1800mm, on-manipulator type)
• Attached eyebolts are designed to support the MOTOFEEDER weight. Never use them for anything other than transporting the MOTOFEEDER.
• Mount the shipping bolts and brackets before transporting the MOTOFEEDER.
• With any transportation equipment, make sure to avoid external force on the table or motor unit when transporting the MOTOFEEDER.
• After transportation or installation, remove the eyebolts. If the operation starts with the eyebolts attached, a jig may interfere with the eyebolts. The eyebolts must be stored for future use, in the event that the MOTOFEEDER is moved again.
(2) When transporting On-Manipulator type MOTOFEEDER (on EPX1250)

Fig. 3 Transporting Position (On-Manipulator Type)
- Check that the eyebolts are securely fastened.
- The mass of the manipulator is approximately 650 kg including the shipping bolts and brackets. Use a wire rope strong enough to withstand the weight. (Arm length: 1800mm, on-manipulator type)
- Attached eyebolts are designed to support the MOTOFEEDER weight. Never use them for anything other than transporting the MOTOFEEDER.
- Mount the shipping bolts and brackets before transporting the MOTOFEEDER.
- With any transportation equipment, make sure to avoid external force on the table or motor unit when transporting the MOTOFEEDER.
- After transportation or installation, remove the eyebolts. If the operation starts with the eyebolts attached, a jig may interfere with the eyebolts. The eyebolts must be stored for future use, in the event that the MOTOFEEDER is moved again.
5 Installation of MOTOFEEDER

WARNING

• Install the safeguarding.
  Failure to observe this warning may result in injury or damage.

• Install the MOTOFEEDER in a location where moving the MOTOFEEDER 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 MOTOFEEDER 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 MOTOFEEDER 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.
5.1 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.

5.2 Installation of MOTOFEEDER

The MOTOFEEDER should be firmly mounted on a base or foundation strong enough to support the MOTOFEEDER and jigs, and withstand repulsion forces during acceleration and deceleration. During installation, if the flatness is not right, the MOTOFEEDER 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 "Table 3 Maximum Repulsion Forces of MOTOFEEDER" for the necessary strength required for the mounting area. Mount the manipulator base in either of the following ways described in 5.2.1 and 5.2.2.

<table>
<thead>
<tr>
<th>Table 3 Maximum Repulsion Forces of MOTOFEEDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm rotating maximum torque</td>
</tr>
<tr>
<td>(S1-axis moving direction)</td>
</tr>
<tr>
<td>3920 N·m (400 kgf·m)</td>
</tr>
<tr>
<td>Table rotating maximum torque</td>
</tr>
<tr>
<td>(S2-axis moving direction)</td>
</tr>
<tr>
<td>303.8 N·m (31 kgf·m)</td>
</tr>
</tbody>
</table>
5.2.1 When the MOTOFEEDER and Robot are Installed on a Baseplate

The common installation base should be rugged and durable to prevent shifting of the MOTOFEEDER or the robot. The thickness of the installation base plate and the size of the anchor bolt must be those recommended for the robot to be combined. Also, securely fix the MOTOFEEDER baseplate with four hexagon socket head cap screws M20 (JIS B1176, strength classification of 12.9) (60 mm long recommended) (a tightening torque of 676N·m). Tighten the bolts securely so that they will not work loose during operation.

![Fig. 4 Mounting the MOTOFEEDER on Baseplate](image)
5.2.2 Mounting the MOTOFEEDER Singly on the Floor

The floor should be strong enough to support the MOTOFEEDER. Construct a solid foundation with the appropriate thickness to withstand maximum repulsion forces of the MOTOFEEDER. 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. 5 Mounting the MOTOFEEDER on the Floor (Base Example)
5.3 Location

Install the MOTOFEEDER 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.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
</table>

- Do not install or operate MOTOFEEDER 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.
5.4 System Configuration

"Fig. 6-A System Configuration (manipulator mounted type)" and "Fig. 6-B System Configuration (manipulator unmounted type)" show the system configuration of the MOTOFEEDER.

The explosion-proof MOTOFEEDER and manipulator can be installed in hazardous locations such as in the painting booth.

"7.3 Dimensions and Working Envelopes" shows the dimensions and the working envelopes of the MOTOFEEDER.

![System Configuration Diagram](image-url)
Fig. 6-B  System Configuration (manipulator unmounted type)
6 Wiring and Piping

**WARNING**

- Ground resistance must be 100 Ω or less.

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

- Before wiring, make sure to turn the primary power supply OFF, and put up a warning sign. (ex. DO NOT TURN THE POWER ON.)

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

**CAUTION**

- Wiring must be performed by authorized or certified personnel.

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

- Do not cover the power cable between the MOTOFEEDER and the NX100 with heat insulating material, and avoid multiple cabling.

  The heat radiating from the cable will be trapped, and the accumulated heat may cause burns and injury.

6.1 Grounding

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

**NOTE**

- 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.
Put the grounding cable for the EPX1250 into the MOTOFEEDER through the case cutout on the back of the robot base, and take it out from the lower bulkhead plate.

Fig. 7  Grounding
6.2 Power Cable Connection

The power cables are available in four cables, EX1-11, EX1-21, EX2-11 and EX2-21 (Refer to Fig. 8 Power Cable Connection Part to the NX100, and Fig. 9 Power Cable Connection Part to the MOTOFEEDER) and each cable is connected to the NX100 and to the MOTOFEEDER base connectors.

6.2.1 Connection to the MOTOFEEDER

Before connecting the cables to the MOTOFEEDER, verify the numbers on both cables and the MOTOFEEDER base connectors. After inserting the cables, tighten each nut until it clicks.

6.2.2 Connection to the NX100

Remove the cover located in the lower part of the NX100 side, draw each cable of EX1-11, EX1-21, EX2-11 and EX2-21 through the cable entrance, and then tighten the screws. Refer to the NX100 Instruction Manual for the connection of the power cable to the NX100.

Fig. 8 Power Cable Connection Part to the NX100
Fix the power cable for the EPX1250 with two brackets.

Fig. 9  Power Cable Connection Part to the MOTOFEEDER
6.2.3 Example Method of Power Cable Construction

The construction example is shown as follows.

Fig. 10  Metal Pipe Construction Example (FM Standard only: for EPX1250)

Construct the signal cable and the peripheral device coupling cable as mentioned above.

※ For the explosion-proof approved parts, use only Cooper Industrial Inc-made sealing fitting compound only.
6.3 Piping and Wiring of Pressure Switch Box

When the pressure switch box is displaced from the MOTOFEEDER, the internal pressure error may occur while purging due to the pressure drop. To avoid this, please follow the instruction below.

Also, please be noted that the maximum length of the internal pressure air hose (air exhaust side) is 3m.

<table>
<thead>
<tr>
<th>Distance between MOTOFEEDER, robot and Pressure switch box (Length of the air hose: 10 dia. at exhaust side)</th>
<th>Preset purge pressure (can be changed from the air pressure unit which is installed inside of the NX100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 mm (maximum)</td>
<td>0.15 to 0.35 MPa</td>
</tr>
</tbody>
</table>

(1) For EPX-1250 (Japanese Standard)

![Diagram](image)
(2) For EPX-1250 (FM Standard)

Fig. 11-B Pressure Switch Box
(3) For EPX-2050 (Japanese Standard)

![Diagram showing wiring and piping setup for EPX-2050 and MOTOFEEDER](image)

**Fig. 12 Pressure Switch Box**
(4) For EPX-2050 (FM Standard)

Fig. 13  Pressure Switch Box
6.4 Operation BOX

Please connect operational BOX to NX100 in the following figure point.

Fig. 13-A Wiring of operational BOX (signal)
Disconnect the jumper wires

(EMG1, EMG1 (COM), EMG2, EMG2 (COM))
Operation BOX cables

<table>
<thead>
<tr>
<th>MXT</th>
<th>Operation BOX cables</th>
</tr>
</thead>
<tbody>
<tr>
<td>MXT - 19</td>
<td>EMG1 (COM)</td>
</tr>
<tr>
<td>MXT - 20</td>
<td>EMG1</td>
</tr>
<tr>
<td>MXT - 21</td>
<td>EMG2</td>
</tr>
<tr>
<td>MXT - 22</td>
<td>EMG2 (COM)</td>
</tr>
</tbody>
</table>

Fig. 13-B Wiring of operational BOX (Emergency stop)
Fig. 13-C Operational BOX overall size
6.5 Release door interlock

If the sensor or the doors is not used, please set a jumper to No. 5 and 33.

Fig. 13-D Wiring of door interchange unlocking
## 7 Basic Specifications

### 7.1 Basic Specifications

Table 4  Basic Specifications*1

<table>
<thead>
<tr>
<th>Item</th>
<th>Type</th>
<th>YR-MF414B</th>
<th>YR-MF416A</th>
<th>YR-MF416B</th>
<th>YR-MF418A</th>
<th>YR-MF418B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>YR-MF214B</td>
<td>YR-MF216A</td>
<td>YR-MF216B</td>
<td>YR-MF218A</td>
<td>YR-MF218B</td>
</tr>
<tr>
<td>Degree of Freedom</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable on-board mass</td>
<td>S2: Table (heavy</td>
<td></td>
<td></td>
<td>40 kgf</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>loading specifications)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S2: Table (high</td>
<td></td>
<td></td>
<td>20 kgf</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rotation specifications)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repetitive Positioning Accuracy*2</td>
<td>±0.55 mm (S2: Table, R: 300 mm position)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motion Range</td>
<td>S1: Arm</td>
<td>±180°</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S2: Table</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Continuous rotation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Speed</td>
<td>S1: Table</td>
<td>120°/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S2: Table (heavy</td>
<td></td>
<td></td>
<td>270°/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>loading specifications)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S2: Table (high</td>
<td></td>
<td></td>
<td>900°/s</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rotation specifications)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allowable Moment of Inertia (GD²/4)</td>
<td>S2: Table (heavy</td>
<td>2.8 kg•m²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>loading specifications)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S2: Table (high</td>
<td>1.4 kg•m² (single spindle)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rotation specifications)</td>
<td>0.7 kg•m² / Table (double spindle)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard painting color</td>
<td>YE blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td>400 kgf</td>
<td>430 kgf</td>
<td>416 kgf</td>
<td>420 kgf</td>
<td>406 kgf</td>
<td></td>
</tr>
<tr>
<td>Ambient Conditions</td>
<td>Temperature</td>
<td>0 to +40°C</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Humidity</td>
<td>20 to 80 %RH (non-condensing)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vibration</td>
<td>4.9 m/s² (0.5 G) or less</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>• Free from excessive electrical noise</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power Capacity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.5 kVA</td>
</tr>
</tbody>
</table>

*1 SI units are used in this table. Gravitational unit are also described in parentheses.

*2 Conformed to JIS B 8432
7.2 Part Names and Working Axes

Fig. 14  Part Names and Working Axes

7.3 Dimensions and Working Envelope

(1) Japanese Standard

Fig. 15  Dimensions and Working Envelope (mm)
(2) FM Standard

Fig. 16 Dimensions and Working Envelope (mm)
8 Load Specifications and Jig Mounting Part

8.1 Jig Mounting Part

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

Before using the jig, remove the corrosion-resistant paint (yellow) from the jig mounting face with thinner or light oil.
8.2 Double Spindle Unit (Optional)

The followings are the double spindle unit (optional) which can be installed on the main body of MOTOFEEDER.

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of working axis</td>
<td>2 axes (extract output from S2 rotary axis)</td>
</tr>
<tr>
<td>2</td>
<td>Control method</td>
<td>AC servo control</td>
</tr>
<tr>
<td>3</td>
<td>Payload</td>
<td>10 kg/Table</td>
</tr>
<tr>
<td>4</td>
<td>Repeatability</td>
<td>± 1.4 mm (Table, R: 370 mm position)</td>
</tr>
<tr>
<td>5</td>
<td>Motion range</td>
<td>Continuous rotation</td>
</tr>
<tr>
<td>6</td>
<td>Maximum speed</td>
<td>900°/s</td>
</tr>
<tr>
<td>7</td>
<td>Allowable inertia (GD²/4)</td>
<td>0.7 kg·m²</td>
</tr>
<tr>
<td>8</td>
<td>Mass</td>
<td>20 kg</td>
</tr>
<tr>
<td>9</td>
<td>Sheathing</td>
<td>YE blue (standard specification)</td>
</tr>
</tbody>
</table>

Fig. 18  Double Spindle Unit
9 System Application

9.1 Mounting the Jig

The device required for the system application can be mounted on the horizontal arm. Observe the following restrictions.

![Diagram of device mounting position]

**Table 5** Restriction when Mounting the Peripheral Devices

<table>
<thead>
<tr>
<th>Application</th>
<th>Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>When mounting the electrical device, use explosion-proof devices.</td>
<td>Up to 10 kg</td>
</tr>
</tbody>
</table>
10  Electrical Equipment Specifications

10.1 Internal Wiring

High reliability connectors which can be easily removed are used with each connector part.
Internal Cable Connection (Signals) : Japanese Standard
11 Maintenance and Inspection

**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**

- 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.

### 11.1 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 6 Inspection Schedule". Conduct periodical inspections according to the inspection schedule in "Table 6". In "Table 6", 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.

**NOTE**

- The inspection interval must be based on the servo power supply ON time.
### Table 6  Inspection Schedule

<table>
<thead>
<tr>
<th>Item a</th>
<th>Schedule</th>
<th>Method</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily</td>
<td>1000H Cycle</td>
<td></td>
<td>Check for grease leakage.*4</td>
</tr>
<tr>
<td>Daily</td>
<td>6000H Cycle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>① S1-axis motor</td>
<td>12000H Cycle</td>
<td>Visual</td>
<td></td>
</tr>
<tr>
<td>① S1-axis motor</td>
<td>24000H</td>
<td>Visual</td>
<td></td>
</tr>
<tr>
<td>① S1-axis motor</td>
<td>36000H</td>
<td>Visual</td>
<td></td>
</tr>
<tr>
<td>② S2-axis motor</td>
<td></td>
<td>Visual</td>
<td>Check for grease leakage.*4</td>
</tr>
<tr>
<td>③ Base mounting bolts</td>
<td></td>
<td>Spanner Wrench</td>
<td>Check for loose bolts. Replace if necessary.</td>
</tr>
<tr>
<td>④ Cover mounting screws</td>
<td></td>
<td>Screw-driver Wrench</td>
<td>Check for loose bolts. Replace if necessary.</td>
</tr>
<tr>
<td>⑤ Connectors</td>
<td></td>
<td>Manual</td>
<td>Check for loose connectors. Replace if necessary.</td>
</tr>
<tr>
<td>⑥ Air hose</td>
<td></td>
<td>Hearing</td>
<td>Check for air leak.</td>
</tr>
<tr>
<td>⑦ Gasket for internal pressure</td>
<td></td>
<td>Visual</td>
<td>Exchange at the time of degradation.</td>
</tr>
<tr>
<td>⑧ Wire harness in the power supply</td>
<td></td>
<td></td>
<td>Check for conduction between the main connector of base and the intermediate connector with manually shaking the cable.*7</td>
</tr>
<tr>
<td>⑨ Battery in MOTOFEEDER</td>
<td></td>
<td></td>
<td>Replace the battery unit when the battery alarm occurs or the manipulator drove for 36000H.*1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inspection Charge</th>
<th>Specified personnel</th>
<th>Licensee</th>
<th>Service Company</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>○ ○ ○</td>
<td>○ ○ ○</td>
<td>○ ○ ○</td>
</tr>
</tbody>
</table>

---

*3: 39/57 56 of 77

"HS1480155 56 of 77"
Check for malfunction. (Replace if necessary.) Replenish grease\(^2\) (6000H cycle). (See Chap. 11.2.2.) Replace grease\(^2\) (12000H cycle). (See Chap. 11.2.2.)

Check for malfunction. (Replace if necessary.) Replenish grease\(^2\) (6000H cycle). (See Chap. 11.2.3.) Replace grease\(^2\) (12000H cycle). (See Chap. 11.2.3.)

Check for malfunction. (Replace if necessary.) Replenish grease\(^2\) (6000H cycle). (See Chap. 11.2.4.) Replace grease\(^2\) (12000H cycle). (See Chap. 11.2.4.)

Table 7  Inspection Parts and Grease Used

<table>
<thead>
<tr>
<th>No.</th>
<th>Grease Used</th>
<th>Inspected Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>⑩</td>
<td>VIGO grease RE No. 0</td>
<td>Speed reducers for all axes, and the main body</td>
</tr>
</tbody>
</table>
11 Maintenance and Inspection

The work No. correspond to the inspection No. described in Table 6  Inspection Schedule.

### Table 8  Spindle Unit (Optional) Inspection Schedule

<table>
<thead>
<tr>
<th>Item</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>Specified personnel</td>
</tr>
<tr>
<td></td>
<td>1000H Cycle</td>
<td>6000H Cycle</td>
<td>12000H Cycle</td>
<td>24000H Cycle</td>
</tr>
<tr>
<td>14</td>
<td>Gasket</td>
<td>○</td>
<td>Visual</td>
<td>Exchange at the time of degradation. (See Chap. 11.2.8.)</td>
</tr>
<tr>
<td>15</td>
<td>Bolt of case</td>
<td>○</td>
<td>Spanner Wrench</td>
<td>Check for loose bolts. Replace if necessary.</td>
</tr>
<tr>
<td>16</td>
<td>Cover mounting screws</td>
<td>○</td>
<td>Screw-driver Wrench</td>
<td>Check for loose bolts. Replace if necessary.</td>
</tr>
<tr>
<td>17</td>
<td>Grease-up of tensioner</td>
<td>○</td>
<td>Grease Gun</td>
<td>Check for malfunction. (Replace if necessary.) Replenish grease² (6000H cycle). (See Chap. 11.2.4 and. 11.2.6)</td>
</tr>
<tr>
<td>18</td>
<td>Grease-up of bearing unit</td>
<td>○</td>
<td>Grease Gun</td>
<td>Check for malfunction. (Replace if necessary.) Replenish grease² (6000H cycle). (See Chap. 11.2.4 and. 11.2.7)</td>
</tr>
</tbody>
</table>

*² For the grease, refer to Table 9  Inspection Parts and Grease Used.

*³ Inspection No. correspond to the numbers in Fig. 21  Inspection Parts and Inspection Numbers

### Table 9  Inspection Parts and Grease Used

<table>
<thead>
<tr>
<th>No.</th>
<th>Grease Used</th>
<th>Inspected Parts</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td>VIGO grease RE No. 0</td>
<td>Speed reducers for all axes, and the main body</td>
</tr>
</tbody>
</table>

The work No. corresponds to the inspection No. described in Table 8  Spindle Unit
(Optional) Inspection Schedule.
11.2 Notes on Maintenance Procedures

11.2.1 Battery Pack Replacement
(Applicable for Japanese Standard only)

Two battery packs are installed in the locations shown in “Fig. 22 Battery Pack Location”. If a battery alarm occurs in the NX100, replace the battery pack in the following procedure:

Fig. 22 Battery Pack Location

Fig. 23 Battery Pack Connection

1. Battery pack before replacement
2. New battery pack
3. Wire harness in the manipulator
4. See step 4 below
5. See step 5 below

a. Crimped contact-pin (pin)
b. Crimped contact-pin (socket)
1. Turn OFF the power to the NX100.
2. Detach and pull out the connector base from the base.
3. Remove the battery pack mounting screws.
4. Connect two new battery pack.
5. Remove the old battery pack.

**NOTE**
Be sure to connect the new battery pack before disconnecting the old one so that the encoder absolute data does not disappear.

6. Mount the battery pack with screws and reinstall the cover.

**NOTE**
Do not allow plate to pinch the cables when reinstalling the cover.

The FM standard battery unit is stored in the NX100. Please refer to the manual and the NX100 INSTRUCTIONS SUPPLEMENTARY FOR NORTH AMERICAN STANDARD (ANSI/RIA) (Manual No.: RE-CTO-A213).
11.2.2 Grease Replenishment/Exchange for S1-Axis Speed Reducer

![Grease exhaust port](Hexagon socket head plug PT1/8)

![Grease inlet port](Hexagon socket head plug PT1/8)

Fig. 24 S1-Axis Speed Reducer
Grease Replenishment (Refer to “Fig. 24  S1-Axis Speed Reducer”)

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.

**NOTE**

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

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 the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded portion of the plug.)
7. Return the S1-axis to the home position or the 180° position.
8. Reinstall the motor cover.

**Grease Exchange (Refer to “Fig. 24  S1-Axis Speed Reducer”)**

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.

**NOTE**

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

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 the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded portion of the plug.)
11.2.3 Grease Replenishment/Exchange for Grease Bus in Main Body

Fig. 26 Grease Bus in Main Body
■ Grease Replenishment (Refer to “Fig. 26 Grease Bus in Main Body”)

1. Remove the plug from the grease exhaust port.

![NOTE]
If grease is added without removing the plug from the grease exhaust port, the 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. 2250 cc
  (Approx. 4500 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 the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded portion of the plug.)

■ Grease Exchange (Refer to “Fig. 26 Grease Bus in Main Body”)

1. Remove the plug from the grease exhaust port.

![NOTE]
If grease is added without removing the plug from the grease exhaust port, the 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. 6000 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 for a few minutes to discharge the excess grease before stoppering the grease exhaust port.
5. Wipe the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded portion of the plug.)
11.2.4 Grease Replenishment/Exchange for the End of S2-Axis Speed Reducer

Fig. 27  End of S2-Axis

Grease inlet ports (Hexagon socket head plug PT1/8)
Grease exhaust ports (Hexagon socket head plug PT1/8)
Grease Replenishment (Refer to “Fig. 27  End of S2-Axis”)

1. Remove the plug from the grease exhaust port.

   If grease is added without removing the plug from the grease exhaust port, the 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. 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 the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded portion of the plug.)

Grease Exchange (Refer to “Fig. 27  End of S2-Axis”)

1. Remove the plug from the grease exhaust port.

   If grease is added without removing the plug from the grease exhaust port, the 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 the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded portion of the plug.)
11.2.5 Double Spindle Unit (Optional) Grease Replenishment of Tensioner

Grease Replenishment (Refer to “Fig. 28  Double Spindle Unit”)

1. Inject grease into the grease inlet port.

   **Grease type:** VIGO grease RE No. 0
   **Amount of Grease to be injected:** approx. 6 cc
   **(Approx. 12 cc for the 1st supply)**

2. Move the S2-axis for a few minutes.
3. If the grease overflows from the grease inlet port, wipe it off with a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded portion of the plug.)
11.2.6 Double Spindle Unit (Optional) Grease Replenishment of Bearing Unit

**Grease Replenishment (Refer to “Fig. 29 Double Spindle Unit”)**

1. Remove the plug from the grease exhaust port.

   **NOTE** If grease is added without removing the plug from the grease exhaust port, the 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. 6 cc
   (Approx. 12 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 the discharged grease with a cloth, and reinstall the plug on the grease exhaust port. (Before reinstalling the plug, apply silicon caulk to the threaded portion of the plug.)
11.2.7 Inspection of Air Sealing for Internal Air Pressure

- Gasket for Cover Part

Check the gasket. When checking the gasket, remove the mounting bolts and the cover. Excessive oil contained in the air used to keep the internal pressure can damage the gasket, which result in air leakage. Replace the gasket if air leakage is found.

a) Arm Part

Fig. 30  Gasket Check (Arm Part)
b) Table (S2) Part

Fig. 31  Gasket Check (Table Part)
c) Arm (S1) Axis, Table (S2) Part

Fig. 32  Gasket Check (Arm Axis, Table Axis)

S1-axis gasket
S1-axis case
S2-axis gasket
S2-axis case
Hexagonal socket head cap screw M6, dacrotized
(6 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)
Gasket
Cover
(4 screws) (length: 12mm)
Phillips APS bolt M5

S1-axis gasket
S1-axis case
Hexagonal socket head cap screw M6, dacrotized
(6 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)

Fig. 33  Gasket Check (Base Part)

d) Base Part

Fig. 33  Gasket Check (Base Part)

S1-axis gasket
S1-axis case
Hexagonal socket head cap screw M6, dacrotized
(6 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)
Gasket
Cover
(8 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)
(6 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)
(8 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)
(8 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)
(8 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)
(8 screws) (length: 20mm)
Conical spring washer 2H-6, dacrotized
Tightening torque: 10N·m (1kgf·m)
e) Double Spindle Unit (Optional)

Fig. 34 Gasket Check (Double Spindle Part)
12  Recommended Spare Parts

It is recommended that the following parts and components be kept in stock as spare parts for the MOTOFEEDER. The spare parts list is shown below. Product performance cannot be guaranteed when using spare parts from any company other than Yaskawa.

- 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

To replace parts in Rank B or Rank C, contact your Yaskawa representative.

Table 10  Recommended Spare Parts for MOTOFEEDER

<table>
<thead>
<tr>
<th>Rank</th>
<th>Part 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</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>Grease</td>
<td>MP-1 grease</td>
<td>–</td>
<td>2.5 kg</td>
<td>–</td>
<td>For application to oil seal</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
<td>Battery</td>
<td>JARCR-XIS01</td>
<td>Yaskawa Electric Corporation</td>
<td>2</td>
<td>2</td>
<td>For Japanese standard type only</td>
</tr>
<tr>
<td>A</td>
<td>4</td>
<td>Oil seal</td>
<td>Y426012.5</td>
<td>NOK</td>
<td>4</td>
<td>4</td>
<td>For S1, S2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AE5205-E15X2 (NBR)</td>
<td>NOK</td>
<td>1</td>
<td>1</td>
<td>For S1 (casing part)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC5133-E02X2 (NBR)</td>
<td>NOK</td>
<td>1</td>
<td>1</td>
<td>For S1 (S head part)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AD6112-E01X0 (NBR)</td>
<td>NOK</td>
<td>1</td>
<td>1</td>
<td>For S1 (base part)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Y355212.5* fluorine*</td>
<td>NOK</td>
<td>2</td>
<td>2</td>
<td>For S2 shaft gear</td>
<td></td>
</tr>
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</table>
### 12 Recommended Spare Parts

<p>| | | | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>A</strong></td>
<td>5</td>
<td>Gasket</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B</strong></td>
<td>6</td>
<td>Belt</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>8</td>
<td>AC servomotor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Supplier</th>
<th>Quantity</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW1402220-1</td>
<td>Y355212.5* fluorne*</td>
<td>Yaskawa Electric Corporation</td>
<td>2</td>
<td>For S2 speed reducer unit</td>
</tr>
<tr>
<td>HW1402803-1</td>
<td>Yaskawa Electric Corporation</td>
<td>HW1402803-1</td>
<td>2</td>
<td>For S1, S2</td>
</tr>
<tr>
<td>HW1402805-1</td>
<td>Yaskawa Electric Corporation</td>
<td>HW1402805-1</td>
<td>2</td>
<td>For S2 shaft gear</td>
</tr>
<tr>
<td>HW1402807-1</td>
<td>Yaskawa Electric Corporation</td>
<td>HW1402807-1</td>
<td>2</td>
<td>For S2U arm tension adjustment</td>
</tr>
<tr>
<td>HW1402811-1</td>
<td>Yaskawa Electric Corporation</td>
<td>HW1402811-1</td>
<td>2</td>
<td>For S2U arm</td>
</tr>
<tr>
<td>250MTS5M1200G</td>
<td>MITSUBOSHI BELTING</td>
<td>2</td>
<td>For 1400mm belt for S2</td>
<td></td>
</tr>
<tr>
<td>1400-EV5GT-25</td>
<td>GATES UNITTA AJIA</td>
<td>2</td>
<td>For 1600mm belt for S2</td>
<td></td>
</tr>
<tr>
<td>BG-1595-UP5M-25-HC</td>
<td>TSUBAKIMOTO CHAIN CO.</td>
<td>2</td>
<td>For 1,800mm belt for S2</td>
<td></td>
</tr>
<tr>
<td>HW9380961-E</td>
<td>Nabtesco Corporation</td>
<td>1</td>
<td>For S1</td>
<td></td>
</tr>
<tr>
<td>HW1381691-A</td>
<td>Harmonic Drive Systems Inc.</td>
<td>1</td>
<td>For S2</td>
<td></td>
</tr>
<tr>
<td>SGMRS-12A2B-Y RA1</td>
<td>Yaskawa Electric Corporation</td>
<td>1</td>
<td>For S1</td>
<td></td>
</tr>
<tr>
<td>SGMRS-12A2B-Y RA1</td>
<td>Yaskawa Electric Corporation</td>
<td>1</td>
<td>For S2</td>
<td></td>
</tr>
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</table>
## Table 11  Recommended Spare Parts for Spindle Unit (Optional)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Part No.</th>
<th>Name</th>
<th>Type</th>
<th>Manufacturer</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>Bearing unit</td>
</tr>
<tr>
<td>A</td>
<td>2</td>
<td>Grease</td>
<td>MP-1 grease</td>
<td></td>
<td>2.5 kg</td>
<td>For application to oil seal</td>
</tr>
<tr>
<td>A</td>
<td>3</td>
<td>Oil seal</td>
<td>Y567812.5</td>
<td>NOK</td>
<td>2</td>
<td>For bearing unit</td>
</tr>
<tr>
<td>A</td>
<td>4</td>
<td>Oil seal</td>
<td>AE3932-A62x5 (NBR)</td>
<td>NOK</td>
<td>2</td>
<td>For table</td>
</tr>
<tr>
<td>A</td>
<td>5</td>
<td>Gasket</td>
<td>HW403266-1</td>
<td>Yaskawa Electric Corporation</td>
<td>2</td>
<td>For bearing unit inspection port</td>
</tr>
<tr>
<td>A</td>
<td>6</td>
<td>Gasket</td>
<td>HW1403259-1</td>
<td>Yaskawa Electric Corporation</td>
<td>1</td>
<td>For center pulley cover</td>
</tr>
<tr>
<td>A</td>
<td>7</td>
<td>Gasket</td>
<td>HW1403258-1</td>
<td>Yaskawa Electric Corporation</td>
<td>2</td>
<td>For tension inspection port</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>Belt</td>
<td>BG1120-UP8M25HC</td>
<td>TSUBAKIMOTO CHAIN CO.</td>
<td>2</td>
<td>Belt for spindle</td>
</tr>
</tbody>
</table>