PAINT WORKPIECE SUPPLYING SYSTEM
AIR PANEL INSTRUCTIONS
FOR MOTOFEEDER

TYPE:
YR-MFAIR1D (one-gun specification)
YR-MFAIR2D (two-guns specification)

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

AIR PANEL INSTRUCTIONS FOR MOTOFEEDER

MOTOFEEDER INSTRUCTIONS
MOTOFEEDER OPERATING INSTRUCTIONS
NX100 INSTRUCTIONS
NX100 OPERATOR’S MANUAL FOR PAINTING APPLICATION
NX100 MAINTENANCE MANUAL

The NX100 operator’s manual above corresponds to a specific usage. Make sure to use the appropriate manual.

Part Number: 177046-1CD
Revision: 1
DANGER

• This instruction manual is intended to explain mainly the mechanical part of the Motofeeder Air Panel for the application to the actual operation and for proper maintenance and inspection. Read this manual carefully and be sure to understand its contents before handling the NX100.

• 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 NX100.

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

**DANGER**
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. Safety Signs identified by the signal word DANGER should be used sparingly and only for those situations presenting the most serious hazards.

**WARNING**
Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury. Hazards identified by the signal word WARNING present a lesser degree of risk of injury or death than those identified by the signal word DANGER.

**CAUTION**
Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury. It may also be used without the safety alert symbol as an alternative to “NOTICE”.

**NOTICE**
NOTICE is the preferred signal word to address practices not related to personal injury. The safety alert symbol should not be used with this signal word. As an alternative to “NOTICE”, the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury.

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

Motofeeder Air Panel

DANGEROUS

• Maintenance and inspection must be performed by specified personnel.
Failure to observe this caution may result in electric shock or injury.
• For disassembly or repair, contact your YASKAWA representative.
• Do not remove the motor, and do not release the brake.
Failure to observe these safety precautions may result in death or serious injury from unexpected turning of the manipulator's arm.
WARNING

• Before operating the manipulator, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the NX100 and the programming pendant.

  When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.

*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 manipulator 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 safeguarding when going inside. Also, display the sign that the operation is being performed inside the safeguarding and make sure no one closes the safeguarding.
  – View the manipulator from the front whenever possible.
  – Always follow the predetermined operating procedure.
  – Keep in mind the emergency response measures against the manipulator’s unexpected motion toward you.
  – Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

• Confirm that no person is present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
  – Turning ON the power for the NX100.
  – Moving the manipulator with the programming pendant.
  – Running the system in the check mode.
  – Performing automatic operations.

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an emergency stop button immediately if there is a problem.

The emergency stop buttons are located on the right of front door of the NX100 and the programming pendant.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.

The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and supply cables.

In this manual, the equipment is designated as follows:

<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 manipulator and the controller</td>
<td>Manipulator cable</td>
</tr>
<tr>
<td>Air Panel for Motofeeder</td>
<td>Air Panel</td>
</tr>
</tbody>
</table>

Registered Trademark

In this manual, names of companies, corporations, or products are trademarks, registered trademarks, or bland names for each company or corporation. The indications of (R) and ™ are omitted.
**Explanation of Warning Labels**

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

**Fig. : Warning Label Locations**

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**Nameplate**

**FM standard**

**Japanese standard**

**Explosion-proof certification label**
Customer Support Information

If assistance is needed with any aspect of the Motofeeder Air Panel system, please contact YASKAWA Customer Support at the following 24-hour telephone number:

(937) 847-3200

YASKAWA Customer Support also has an e-mail address for routine technical inquiries, to contact YASKAWA Customer Support through e-mail use the following address:

techsupport@motoman.com

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

**DANGER**

- Maintenance and inspection must be performed by specified personnel.

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

- For disassembly or repair, contact your YASKAWA representative.

- Do not remove the motor, and do not release the brake.

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

**NOTICE**

Use e-mail for routine inquiries only. If there is an urgent or emergency need for service, replacement parts, or information, contact YASKAWA Customer Support at the telephone number shown above.
Have the following information ready before calling Customer Support:

- **System**: Motofeeder Air Panel
- **Primary Application**: Paint
- **Controller**: NX100
- **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 NX100 controller data plate
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This description indicates Air Panel corresponding to MOTOFEEDER.

### 1.1 System Configuration

Air Panel is a Panel for controlling the paint guns corresponding to MOTOFEEDER.

There are one-gun and two-guns specifications depending on the number of paint guns.

The following figure is a system configuration example of a MOTOFEEDER package.

*Fig. 1-1: System Configuration of a Standard Package (EPX1250 mount)*
## 2 Basic Specification

### 2.1 Basic Specification

**Table 2-1: Basic Specification**

<table>
<thead>
<tr>
<th>Specification</th>
<th>One-gun Specification</th>
<th>Two-guns Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>YR-MFAIR1D</td>
<td>YR-MFAIR1D</td>
</tr>
<tr>
<td>External Dimension</td>
<td>W=150 x H=1400 x D=550 Attached to a NX100</td>
<td></td>
</tr>
<tr>
<td>Connection Diameter</td>
<td>$\Phi 16 \times 2$ (Back of Air Panel)</td>
<td></td>
</tr>
<tr>
<td>Mist Separator</td>
<td>• AFM40-04B-X2009 (SMC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Degrease Specification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Low-angle flow rate 1100 L/min (At input pressure 0.7MPa)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Used pressure 0.05 - 1.0 MPa</td>
<td></td>
</tr>
<tr>
<td>Electro-Pneumatic Control</td>
<td>• ITV2050-312L-DH00031 (SMC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Non-step specifications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Individual Control of Automation, Pattern, and Discharge Amount</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Degrease Specifications</td>
<td></td>
</tr>
<tr>
<td>Specified Pressure Range</td>
<td>0.005 - 0.9MPa</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Connection Diameter $\Phi 12$ (Back of Air Panel)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Quantity 3 pcs</td>
<td>6 pcs</td>
</tr>
<tr>
<td></td>
<td>• Quantity 3 pcs</td>
<td>6 pcs</td>
</tr>
<tr>
<td>Paint Machine Control</td>
<td>• Gauge Pressure Display 0 - 1.0 MPa (Front of Air Panel)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Direct Operated Precision Regulator</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• ARP30-03BG-3-X2009 (SMC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• For adjusting the solenoid valve source pressure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Degrease Specifications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Specified Pressure Range 0.008 - 0.6MPa</td>
<td></td>
</tr>
<tr>
<td>3 Port Solenoid Valve</td>
<td>• VQZ215-5LO1-X3 (SMC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Degrease Specifications</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Connection Diameter $\Phi 6$ (Back of Air Panel)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Quantity 3 pcs (Gun trigger x1, Reserve x2)</td>
<td>4 pcs (Gun trigger x2, Reserve x2)</td>
</tr>
</tbody>
</table>
2.2 Outline Drawing

Fig. 2-1: One-gun Specification

Fig. 2-2: Two-gun Specification
2.3 Air Distribution Diagram

2.3.1 One-gun Specification

Fig. 2-3(a): Air Distribution Diagram (One-gun Specification)
Fig. 2-3(b): Air Distribution Diagram (One-gun Specification)

2 Port Solenoid Valve V0221S-SL01-X2
Sub-plate V02200-S-02
Connector Assembly SY103-30-4A-10

3 Port Solenoid Valve V0221S-SL01-X3
Sub-plate V02200-S-02
Connector Assembly SY103-30-4A-10
Fig. 2-3(c): Air Distribution Diagram (One-gun Specification)
2.3.2 Two-guns Specification

Fig. 2-4(a): Air Distribution Diagram (Two-guns Specification)

- Primary air
- Primary air
- Atomization 1
- Pattern 1
- Discharge 1
Fig. 2-4(c): Air Distribution Diagram (Two-guns Specification)
2.4 Elementary Wiring Diagram

2.4.1 One-gun Specification
Fig. 2-5(a): Elementary Wiring Diagram (One-gun Specification)
Output for controller

<table>
<thead>
<tr>
<th>7XT-7</th>
<th>30130</th>
<th>TR2-ANALOG</th>
<th>ANALOG</th>
<th>NYK-EQ</th>
<th>ANALOG</th>
<th>TR2-24</th>
</tr>
</thead>
<tbody>
<tr>
<td>7XT-15</td>
<td>30141</td>
<td>TR2-SPRAY1</td>
<td>SPRAY1</td>
<td>SPRAY1</td>
<td>SPRAY1</td>
<td>TR2-24</td>
</tr>
<tr>
<td>7XT-21</td>
<td>30147</td>
<td>TR2-SP2</td>
<td>SP2</td>
<td>SPRAY1</td>
<td>SPRAY1</td>
<td>TR2-24</td>
</tr>
<tr>
<td>7XT-23</td>
<td>30246</td>
<td>TR2-SP1</td>
<td>SP1</td>
<td>SPRAY1</td>
<td>SPRAY1</td>
<td>TR2-24</td>
</tr>
</tbody>
</table>

Analog1 ON
Spray1 ON
Reserve2 (Coil)
Reserve1 (Coil)
Fig. 2-5(c): Elementary Wiring Diagram (One-gun Specification)

Spray1 ON

Reserve2 (Valve)

Reserve1 (Valve)
2.4.2 Two-guns Specification
Fig. 2-6(a): Elementary Wiring Diagram (Two-guns Specification)
Fig. 2-6(b): Elementary Wiring Diagram (Two-guns Specification)

- Analog1 ON
- Analog2 ON
- Spray1 ON
- Reserve1 (Coil)
- Spray2 ON
- Reserve2 (Coil)
Fig. 2-6(c): Elementary Wiring Diagram (Two-guns Specification)

Spray1 ON

Reserve1 (Valve)

Spray2 ON

Reserve2 (Valve)
3 Installation

3.1 When uniting with the Controller

Refer to the following document for operation and installation of Air Panel.

- NX100 Operation Manual (3 Installation)
- MOTOFEEDER Operation Manual (4 Installation and Conveyance) (5 Installation)

3.2 In the Case of an Air Panel Independence

First, attach an air panel to NX100.
Then, install like 3.1 clause.

3.2.1 Fixing of an Air Panel

Refer to Figure 3-1 "Fixing of Air Panel" and fix NX100 and Air Panel.
1. Remove the plate of NX100. (Three plates)
2. Remove the cover of Air Panel.
3. Fix Air Panel and NX100 with a bolt. (four places)

3.2.2 Wiring Between Air Panel and NX100.

Refer to Figure 2-5(a “Elementary Wiring Diagram (One-gun Specification)” and Figure 2-6(a “Elementary Wiring Diagram (Two-guns Specification)” and perform wiring between Air Panel and NX100.
1. Power supply
   - NX100 □□□QF1
   - Air Panel □□□TB1
2. Analog Signal Output
   - NX100 □□□71XT (one-gun / two-guns), 72XT (two-guns)
   - Air Panel □□□TB2 (one-gun / two-guns), TB3 (two-guns)
3. Electromagnetic Valve Output Signal
   - NX100 □□□7XT
   - Air Panel □□□TB2 (one-gun / two-guns), TB3 (two-guns)
Fig. 3-1: Fixing of Air Panel
4 Connection

4.1 Connection of Primary Power Cable

*Fig. 4-1: Primary Power Cable Connections*

Insert the primary power cable from primary power cable entrance, and connect to the circuit breaker of the NX100.

Store the power cable to the cable duct in the Air Panel, and wire through the hole at the power cable service entrance using a 13-20 mm² cable.
4.2 Connection of Air

Fig. 4-2: Air Tube Connection (One-gun Specification)

<table>
<thead>
<tr>
<th>Item</th>
<th>One-gun Specification</th>
<th>Two-guns Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Air</td>
<td>$\phi 16 \times 2$</td>
<td>$\phi 16 \times 2$</td>
</tr>
<tr>
<td>Automation</td>
<td>$\phi 12$</td>
<td>$\phi 12 \times 2$</td>
</tr>
<tr>
<td>Pattern</td>
<td>$\phi 12$</td>
<td>$\phi 12 \times 2$</td>
</tr>
<tr>
<td>Discharge</td>
<td>$\phi 12$</td>
<td>$\phi 12 \times 2$</td>
</tr>
<tr>
<td>Gun Trigger</td>
<td>$\phi 6$</td>
<td>$\phi 6 \times 2$</td>
</tr>
<tr>
<td>Reserve (Valve)</td>
<td>$\phi 6 \times 2$</td>
<td>$\phi 6 \times 2$</td>
</tr>
</tbody>
</table>

See Table 4-1 for air tube connections.
5 Maintenance and Inspection

5.1 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 5-1 “Inspection Schedule”.

Conduct periodical inspections according to the inspection schedule in Table 5-1. In Table 5-1, the inspection items are classified into three types of operation: operations which can be performed by personnel authorized of the user, operations which can be performed by personnel being trained, and operations which can be performed by service company personnel. Only specified personnel are to do inspection work.
## Table 5-1: Inspection Schedule

<table>
<thead>
<tr>
<th>Item</th>
<th>Schedule</th>
<th>Method</th>
<th>Operation</th>
<th>Specified Personnel</th>
<th>License</th>
<th>Service Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Gauge Pressure</td>
<td>Daily</td>
<td>Visual</td>
<td>Check Range of Air pressure</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2) The Screw of Covers</td>
<td>1000H Cycle</td>
<td>Screw-driver Wrench</td>
<td>Check for loose bolts. Replace if necessary</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3) Connectors</td>
<td>6000H Cycle</td>
<td>Manual</td>
<td>Check for loose connectors. Replace if necessary</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4) Air hose</td>
<td>12000H Cycle</td>
<td>Hearing</td>
<td>Check for air leak</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5)</td>
<td>24000H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6)</td>
<td>36000H</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Inspection number correspond to numbers in Figure 5-1.

### Fig. 5-1: Check Place and Job Number

The diagram shows various parts of the Motofeeder Air Panel, with numbered tags corresponding to the items in the table. The figures 1, 2, 3, and 4 indicate specific locations for inspection.
6  Recommended Spare Parts

It is recommended that the following parts and components be kept in stock as spare parts for the Air Panel. 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

**NOTICE**

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

<table>
<thead>
<tr>
<th>Rank</th>
<th>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>B</td>
<td>1</td>
<td>Electro-Pneumatic Regulator</td>
<td>ITV2050-312L-DIH00031</td>
<td>SMC</td>
<td>3</td>
<td>One-gun Specification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Solenoid Valve</td>
<td>VQZ215-5LO1-X3</td>
<td>SMC</td>
<td>3</td>
<td>Two-guns Specification</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Mist Separator</td>
<td>AFM40-04B-X2009</td>
<td>SMC</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Direct-Operated Precision Regulator</td>
<td>ARP30-03BG-3-X2009</td>
<td>SMC</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>