Ultra Compact SCARA Robot
Ultra Compact Cleanroom SCARA Robot

IX-NNN / NNC

Arm Length 120 mm / 150 mm / 180 mm

www.intelligentactuator.com
A Palm-Sized Unit Capable of Driving a Maximum Payload of 1 kg

New models of 180-mm arm length and cleanroom specification were added to the lineup, further extending the utility and applications of the IX-NNN/NNC series.

**Features**

- Standard and cleanroom specifications are available in three arm lengths of 120 mm, 150 mm and 180 mm.
- Optional connector-type cables for connection between the controller and actuator
  
  The motor/encoder cables can be specified as connector types (optional) for added ease of handling and replacement.
- Compact size ideal for installation in limited space
  
  A maximum work envelope of 360 mm can be ensured in a small installation space of 47 (W) x 132 (D) mm, enabling substantial size reduction of your production line.
- Ultra-compact size yet powerful - Offering rated and maximum load capacities of 0.2 kg and 1 kg, respectively (*)
  
  Despite their small size, a 0.2-kg load can be transferred at high speed. If the acceleration is reduced, a load of up to 1 kg can be transferred.
  
  (*) The rated load capacity indicates the maximum weight that can be operated at the maximum speed and rated continuous acceleration.
  
  The maximum load capacity indicates the maximum weight that can be transferred at lower speed and acceleration.
- High-speed performance achieving a cycle time (**) of 0.35 second
  
  The dynamic performance and highly rigid body ensures outstanding high-speed performance that is among the best in its class.
  
  (**) The cycle time was measured on the IX-NNN1205 based on reciprocating movements over a horizontal distance of 100 mm and vertical distance of 25 mm, carrying a 0.2-kg load.

**Model List**

<table>
<thead>
<tr>
<th>Arm length (mm)</th>
<th>Type</th>
<th>Load capacity</th>
<th>Model</th>
<th>Applicable page</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>Standard specification</td>
<td>0.2, 1.0</td>
<td>IX-NN1205-①-T2-②</td>
<td>P2</td>
</tr>
<tr>
<td></td>
<td>Cleanroom specification</td>
<td></td>
<td>IX-NNC1205-①-T2-②</td>
<td>P5</td>
</tr>
<tr>
<td>150</td>
<td>Standard specification</td>
<td></td>
<td>IX-NN1505-①-T2-②</td>
<td>P3</td>
</tr>
<tr>
<td></td>
<td>Cleanroom specification</td>
<td></td>
<td>IX-NNC1505-①-T2-②</td>
<td>P6</td>
</tr>
<tr>
<td>180</td>
<td>Standard specification</td>
<td></td>
<td>IX-NN1805-①-T2-②</td>
<td>P4</td>
</tr>
<tr>
<td></td>
<td>Cleanroom specification</td>
<td></td>
<td>IX-NNC1805-①-T2-②</td>
<td>P7</td>
</tr>
</tbody>
</table>

1 and ② indicate the cable length and option(s), respectively.

**Maintenance Parts**

- **Flange**
  
  Model: IX-FL-4
  
  Use this flange to install a load on the Z-axis shaft (weight: 12 g).

  Applicable models:
  
  IX-NN1205/1505/1805
  
  IX-NNC1205/1505/1805

- **Absolute Reset Adjustment Jig**
  
  Model: JG-5 (For arm length 120/150/180)
  
  Use this adjustment jig to perform an absolute reset if the absolute data stored in the encoder was lost.

- **Absolute Data Backup Battery (Replacement Battery)**
  
  Model: AB-6 (For arm length 120/150/180)
  
  This absolute data backup battery allows the current position to be retained even after the power is cut off. (One battery is shipped with the actuator as a standard accessory.)

**Note on Use**

If the load on the Z-axis is within the rated load capacity (0.2 kg), the Z-axis will not drop even after the power is cut off. If the rated load capacity is exceeded, however, the Z-axis may drop when the power is cut off or an emergency stop is actuated. If the Z-axis will be carrying a large load, specify a z-axis brake (optional).
IX-NNN1205 Ultra Compact SCARA Robot: Standard Type, Arm Length 120mm, Vertical Axis 50mm

Model specification items
- IX - NNN1205 - T2 - Option(s)
  - Model: IX-NNN1205-T2
  - Type: Standard type
  - Arm length: 120mm
  - Vertical axis: 50mm
  - Cable length: 3L: 3m (standard), 5L: 5m
  - Applicable controller: XSEL-PX/QX

Model/Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Axis configuration</th>
<th>Arm length (mm)</th>
<th>Motor capacity (W)</th>
<th>Work envelope (mm)</th>
<th>Positioning repeatability (mm)</th>
<th>Maximum operating speed (Note 1)</th>
<th>Cycle time (sec) (Note 2)</th>
<th>Load capacity (kg) (Note 3)</th>
<th>Axis 3 push thrust (N) (Note 4)</th>
<th>Axis 4 allowable load (N*m) (Note 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX-NNN1205-T2</td>
<td>Axis 1: Arm 1</td>
<td>45</td>
<td>12</td>
<td>±115° (XY)</td>
<td>±0.005 (XY)</td>
<td>2053mm/s (composite speed)</td>
<td>0.35</td>
<td>0.2</td>
<td>1.0</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>Axis 2: Arm 2</td>
<td>75</td>
<td>12</td>
<td>±145° (XY)</td>
<td>±0.010</td>
<td>720mm/s</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Axis 3: Vertical axis</td>
<td>–</td>
<td>12</td>
<td>50mm</td>
<td>±0.010</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Axis 4: Rotating axis</td>
<td>–</td>
<td>60</td>
<td>±360° (XY)</td>
<td>±0.005</td>
<td>1800°/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Common Specifications

- Encoder type: Absolute
- User wiring: 8-core, AWG26 cable with shield / Connector: SMP-08V-NC (JST)
- User piping: Air tube (outer diameter ø3/inner diameter ø2) x 2 (normal working pressure 0.7MPa)
- Alarm indicator (Note 6): Small red LED indicator x 1 (24-VDC power supply required)
- Ambient temperature/humidity: Temperature 0~40°C, humidity 20~85%RH or less (non-condensing)
- Weight: 2.7kg
- Cable length: 3L: 3m 5L: 5m

Dimensions

- The CAD drawings can be downloaded from IAI’s website.

Applicable Controller Specifications

<table>
<thead>
<tr>
<th>Applicable controller</th>
<th>Feature</th>
<th>Maximum I/O points (input/output)</th>
<th>Power supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-PX</td>
<td>Able to control SCARA + 2 axes</td>
<td>192 points /192 points</td>
<td>Three-phase 200VAC</td>
<td>P8</td>
</tr>
<tr>
<td>XSEL-QX</td>
<td>Conforming to safety category 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IX-NNN1505 Ultra Compact SCARA Robot: Standard Type, Arm Length 150mm, Vertical Axis 50mm

Model/Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Axis configuration</th>
<th>Arm length (mm)</th>
<th>Motor capacity (W)</th>
<th>Work envelope</th>
<th>Positioning repeatability (mm)</th>
<th>Maximum operating speed (Note 1)</th>
<th>Cycle time (sec) (Note 2)</th>
<th>Load capacity (kg) (Note 3)</th>
<th>Axis 3 push thrust (N)</th>
<th>Axis 4 allowable load (N • m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX-NNN1505-T2-</td>
<td>Axis 1 Arm 1</td>
<td>75</td>
<td>12</td>
<td>±125° (XY)</td>
<td>±0.005 (X-Y)</td>
<td>2304mm/s (composite speed)</td>
<td>0.35</td>
<td>0.2</td>
<td>1.0</td>
<td>9.8</td>
</tr>
<tr>
<td></td>
<td>Axis 2 Arm 2</td>
<td>75</td>
<td>12</td>
<td>±145°</td>
<td>±0.010 (XY)</td>
<td>2720mm/s (composite speed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Axis 3 Vertical axis</td>
<td>–</td>
<td>12</td>
<td>50mm</td>
<td>±0.005 (XY)</td>
<td>1800mm/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Axis 4 Rotating axis</td>
<td>–</td>
<td>60</td>
<td>±360°</td>
<td>±0.005 (XY)</td>
<td>1800mm/s</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Common Specifications

- Encoder type: Absolute
- User wiring: 8-core, AWG26 cable with shield / Connector: SMP-08V-NC (JST)
- User piping: Air tube (outer diameter ø3/inner diameter ø2) x 2 (normal working pressure 0.7MPa)
- Alarm indicator (Note 6): Small red LED indicator x 1 (24-VDC power supply required)

Dimensions

- Ambient temperature/humidity: Temperature 0~40°C, humidity 20~85%RH or less (non-condensing)
- Weight: 2.7kg
- Cable length: 3L: 3m 5L: 5m

Applicable Controller Specifications

<table>
<thead>
<tr>
<th>Applicable controller</th>
<th>Feature</th>
<th>Maximum I/O points (input/output)</th>
<th>Power-supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-PX</td>
<td>Able to control SCARA + 2 axes</td>
<td>192 points / 912 points</td>
<td>Three-phase 200VAC</td>
<td>P8</td>
</tr>
<tr>
<td>XSEL-QX</td>
<td>Conforming to safety category 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Caution

- Note 1: Based on PTP operation. In CP operation, the maximum speed is limited.
- Note 2: The cycle time is based on reciprocating movements over a horizontal distance of 100 mm and vertical distance of 25 mm, carrying a 0.2-kg load.
- Note 3: The load capacity indicates the maximum weight that can be transferred at lower speed and acceleration.
- Note 4: The value under "Push motion" indicates the thrust generated when a push command is executed from a program. The value under "Maximum thrust" indicates the maximum thrust during normal positioning operation.
- Note 5: The offset from the center of rotation of axis 4 to the gravity center of the tool must not exceed 17.5 mm.
- Note 6: For the ALM indicator to operate, the customer must provide a circuit that receives signals from an I/O output, etc., and applies 24 VDC to the LED terminal in the user wiring connector.
IX-NNN1805 Ultra Compact SCARA Robot: Standard Type, Arm Length 180mm, Vertical Axis 50mm

Model specification items

- **IX** - **NNN1805** - **T2** - Option(s)
  - Series
  - Standard type
  - Arm length 180mm
  - Vertical axis 50mm
  - Cable length
    - 3L: 3m (standard)
    - 5L: 5m
  - Applicable controller
    - XSEL-PX/QX
  - (Blank): No option
  - B: Z-axis brake
  - JY: Connector-type cable

Model/Specifications

### Common Specifications

<table>
<thead>
<tr>
<th>Encoder type</th>
<th>Absolute</th>
</tr>
</thead>
<tbody>
<tr>
<td>User wiring</td>
<td>8-core, AWG26 cable with shield / Connector: SMP-08V-NC (JST)</td>
</tr>
<tr>
<td>User piping</td>
<td>Air tube (outer diameter ø3/inner diameter ø2) x 2 (normal working pressure 0.7MPa)</td>
</tr>
<tr>
<td>Alarm indicator (Note 6)</td>
<td>Small red LED indicator x 1 (24-VDC power supply required)</td>
</tr>
</tbody>
</table>

| Dimensions | The CAD drawings can be downloaded from IAI’s website. |

2D CAD

- **Section A-A**
  - Detail view of vertical axis tip

2D CAD

- **Work envelope**
  - User connector, 8 pins SMP-08V-NC by JST
  - Quick joint ø3 (white)
  - Quick joint ø3 (black)

### 2D CAD

- **IX-NNN1805**
  - Page 4

### Encoder type

- Absolute

### User wiring

- 8-core, AWG26 cable with shield / Connector: SMP-08V-NC (JST)

### User piping

- Air tube (outer diameter ø3/inner diameter ø2) x 2 (normal working pressure 0.7MPa)

### Alarm indicator (Note 6)

- Small red LED indicator x 1 (24-VDC power supply required)

### Ambient temperature/humidity

- Temperature 0~40°C, humidity 20~85%RH or less (non-condensing)

### Weight

- 3.0kg

### Cable length

- 3L: 3m
- 5L: 5m

### Encoder type

- Absolute

### Model specification items

#### IX

- NNN1805
- T2

#### Option(s)

- (Blank): No option
- B: Z-axis brake
- JY: Connector-type cable

### Standard type

- Arm length 180mm
- Vertical axis 50mm

### Cable length

- 3L: 3m (standard)
- 5L: 5m

### Applicable controller

- XSEL-PX/QX
- B: Z-axis brake
- JY: Connector-type cable

### Applicable Controller Specifications

<table>
<thead>
<tr>
<th>Applicable controller</th>
<th>Feature</th>
<th>Maximum I/O points (input/output)</th>
<th>Power-supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-PX</td>
<td></td>
<td>192 points / 192 points</td>
<td>Three-phase 200VAC</td>
<td>P8</td>
</tr>
<tr>
<td>XSEL-QX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes

**Note 1:** The 2-M3, depth 6 extends through the arm.

**Note 2:** The 2-M3, depth 6 extends through the arm.

**Note 3:** The rated load capacity indicates the maximum weight that can be operated at the maximum speed and rated continuous acceleration. The maximum load capacity indicates the maximum weight that can be transferred at lower speed and acceleration.

**Note 4:** The value under "Push motion" indicates the thrust generated when a push command is executed from a program. The value under "Maximum thrust" indicates the maximum thrust during normal positioning operation.

**Note 5:** An equivalent allowable inertial moment at the center of rotation of axis 4. The offset from the center of rotation of axis 4 to the gravity center of the tool must not exceed 17.5 mm.

**Note 6:** An equivalent allowable moment at the center of rotation of axis 4. The offset from the center of rotation of axis 4 to the gravity center of the tool must not exceed 17.5 mm.

**Note 7:** Based on PTP operation. In CP operation, the maximum speed is limited.

**Note 8:** The cycle time is based on reciprocating movements over a horizontal distance of 100 mm and vertical distance of 25 mm, carrying a 0.2-kg load.

**Note 9:** The value under "Push motion" indicates the thrust generated when a push command is executed from a program. The value under "Maximum thrust" indicates the maximum thrust during normal positioning operation.

**Note 10:** An equivalent allowable moment at the center of rotation of axis 4. The offset from the center of rotation of axis 4 to the gravity center of the tool must not exceed 17.5 mm.
IX-NNC1205 Ultra Compact SCARA Robot: Cleanroom Type, Arm Length 120mm, Vertical Axis 50mm

Model specification items

- IX - NNC1205 - T2 -
  - Series: IX
  - Type: NNC1205
  - Cable length: 3L: 3m (standard) 5L: 5m
  - Applicable controller: XSEL-PX

* Refer to the cover for the details of model specification items.

### Model/Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Axis configuration</th>
<th>Arm length (mm)</th>
<th>Motor capacity (W)</th>
<th>Work envelope</th>
<th>Positioning repeatability (mm)</th>
<th>Maximum operating speed (Note 1)</th>
<th>Cycle time (sec) (Note 2)</th>
<th>Load capacity (kg) (Note 3)</th>
<th>Axis 3 push thrust (N) (Note 4)</th>
<th>Axis 4 allowable load (N • m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX-NNC1205</td>
<td>Axis 1 Arm 1</td>
<td>45</td>
<td>12</td>
<td>±115°</td>
<td>±0.005 (XY)</td>
<td>2053mm/s (composite speed)</td>
<td>0.38</td>
<td>0.2</td>
<td>1.0</td>
<td>7200mm/s</td>
</tr>
<tr>
<td></td>
<td>Axis 2 Arm 2</td>
<td>75</td>
<td>12</td>
<td>±130°</td>
<td>±0.010</td>
<td>120mm/s</td>
<td>0.38</td>
<td>1.0</td>
<td>0.9</td>
<td>1800°/s</td>
</tr>
<tr>
<td></td>
<td>Axis 3 Vertical axis</td>
<td>-</td>
<td>12</td>
<td>50mm</td>
<td>±0.005</td>
<td>1800°/s</td>
<td>0.38</td>
<td>1.0</td>
<td>0.9</td>
<td>1800°/s</td>
</tr>
<tr>
<td></td>
<td>Axis 4 Rotating axis</td>
<td>-</td>
<td>60</td>
<td>±360°</td>
<td>±0.005</td>
<td>1800°/s</td>
<td>0.38</td>
<td>1.0</td>
<td>0.9</td>
<td>1800°/s</td>
</tr>
</tbody>
</table>

### Common Specifications

- Encoder type: Absolute
- User wiring: 8-core, AWG26 cable with shield / Connector: SMP-08V-NC (JST)
- User piping: Air tube (outer diameter ø3/inner diameter ø2) x 2 (normal working pressure 0.7MPa)
- Alarm indicator (Note 6): Small red LED indicator x 1 (24-VDC power supply required)
- Suction pipe joint: Quick pipe joint, accepting tube of outer diameter ø6

### Dimensions

- The CAD drawings can be downloaded from IAI’s website.

**Note 1:** The hole is covered with a set screw. The ø3 M3, depth 6 extends through the arm. If the mounting screw is too long, the tip of the screw will contact the internal mechanism parts. Exercise caution.

**Note 2:** The ALM indicator to illuminate, the customer must provide a circuit that receives signals from the controller’s I/O output and applies 24 VDC to the LED terminal in the user wiring connector.

**Note 3:** The intended cleanliness performance can be achieved by maintaining negative pressure inside the robot via suction from the suction joint. (Dust will generate if internal air is not suctioned.)

**Note 4:** The value under “Push motion” indicates the thrust generated when a push command is executed from a program. The value under “Maximum thrust” indicates the maximum thrust during normal positioning operation.

**Note 5:** An equivalent allowable inertial moment at the center of rotation of axis 4. The offset from the center of rotation of axis 4 to the gravity center of the tool must not exceed 17.5 mm.

### Applicable Controller Specifications

<table>
<thead>
<tr>
<th>Applicable controller</th>
<th>Feature</th>
<th>Maximum I/O points (input/output)</th>
<th>Power-supply voltage</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>XSEL-PX</td>
<td></td>
<td>192 points / 192 points</td>
<td>Three-phase 200VAC</td>
<td>P8</td>
</tr>
<tr>
<td>XSEL-QX</td>
<td></td>
<td>Conforming to safety category 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
IX-NNC1505 Ultra Compact SCARA Robot: Cleanroom Type, Arm Length 150mm, Vertical Axis 50mm

Refer to the cover for the details of model specification items.

Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Axis configuration</th>
<th>Arm length (mm)</th>
<th>Motor capacity (W)</th>
<th>Work envelope</th>
<th>Positioning repeatability (mm)</th>
<th>Maximum operating speed (Note 1)</th>
<th>Cycle time (sec) (Note 2)</th>
<th>Load capacity (kg) (Note 3)</th>
<th>Axis 3 push thrust (N)</th>
<th>Axis 4 allowable load</th>
</tr>
</thead>
<tbody>
<tr>
<td>IX-NNC1205-T2-</td>
<td>Axis 1</td>
<td>Arm 1</td>
<td>75</td>
<td>12</td>
<td>±125°</td>
<td>±0.005 (XY)</td>
<td>2304mm/s (composite speed)</td>
<td>0.38</td>
<td>0.2</td>
<td>1.0</td>
</tr>
<tr>
<td></td>
<td>Axis 2</td>
<td>Arm 2</td>
<td>75</td>
<td>12</td>
<td>±134°</td>
<td>±0.010</td>
<td>720mm/s</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Axis 3</td>
<td>Vertical axis</td>
<td>–</td>
<td>12</td>
<td>50mm</td>
<td>±0.010</td>
<td>720mm/s</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Axis 4</td>
<td>Rotating axis</td>
<td>–</td>
<td>60</td>
<td>±360°</td>
<td>±0.005</td>
<td>1800°/s</td>
<td>47</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Common Specifications

- Encoder type: Absolute
- User wiring: 8-core, AWG26 cable with shield / Connector: SMP-08V-NC (JST)
- User piping: Air tube (outer diameter ø3/inner diameter ø2) x 2 (normal working pressure 0.7MPa)
- Alarm indicator (Note 6): Small red LED indicator x 1 (24-VDC power supply required)
- Suction pipe joint: Quick pipe joint, accepting tube of outer diameter ø6

Dimensions

- Work envelope: Arm length 150mm, Vertical Axis 50mm
- Cleanroom type: XSEL-PX/QX (Blank): No option
- Motor: IX-NNC1505
- Power-supply voltage: 200VAC
- Motor speed: 3000rpm

Applicable Controller Specifications

- Applicable controller: XSEL-PX, XSEL-QX
- Feature: Able to control SCARA + 2 axes, Conforming to safety category 4
- Maximum I/O points: 192 points
- Power-supply voltage: 200VAC

Caution

- Suction rate: 90N/min
- Suction rate can be achieved by maintaining negative pressure inside the robot via suction from the suction joint. (Dust will generate if internal air is not suctioned.)
- Weight: 2.8kg
- Weight (for suction (*3)) can be achieved by maintaining negative pressure inside the robot via suction from the suction joint. (Dust will generate if internal air is not suctioned.)
- Option(s): (blank): No option

References

- The CAD drawings can be downloaded from IAI’s website.
- Refer to the cover for the details of model specification items.
IX-NNC1805 Ultra Compact SCARA Robot: Cleanroom Type, Arm Length 180mm, Vertical Axis 50mm

Model specification items

<table>
<thead>
<tr>
<th>Model/Specifications</th>
<th>IX</th>
<th>NNC1805</th>
<th>T2</th>
<th>Option(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>Cleanroom type</td>
<td>Arm length 180mm</td>
<td>Vertical axis 50mm</td>
<td></td>
</tr>
<tr>
<td>Cable length</td>
<td>3L: 3m (standard)</td>
<td>5L: 5m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applicable controller</td>
<td>XSEL-PX/QX</td>
<td>(Blank): No option</td>
<td>B: 2-axis brake</td>
<td>IX: Connector-type cable</td>
</tr>
</tbody>
</table>

Refer to the cover for the details of model specification items.

User piping

- Air tube (outer diameter ø6, inner diameter ø2) x 2 (normal working pressure 0.7MPa)
- Quick joint

Encoder type

Absolute

User wiring

- 8-core, AWG26 cable with shield / Connector: SMP-08V-NC (JST)

User piping

- Air tube (outer diameter ø6, inner diameter ø2) x 2 (normal working pressure 0.7MPa)

Alarm indicator (Note 6)

Small red LED indicator x 1 (24-VDC power supply required)

Suction pipe joint

Quick pipe joint, accepting tube of outer diameter ø6

Suction rate

90N/min

Cleanliness level

Conforming to class 10

Ambient temperature/humidity

Temperature: 0~40°C, Humidity: 20~85%RH or less (non-condensing)

Weight

3.1kg

Cable length

3L: 3m, 5L: 5m

Common Specifications

- Encoder type: Absolute
- User wiring: 8-core, AWG26 cable with shield / Connector: SMP-08V-NC (JST)
- User piping: Air tube (outer diameter ø6, inner diameter ø2) x 2 (normal working pressure 0.7MPa)
- Alarm indicator (Note 6): Small red LED indicator x 1 (24-VDC power supply required)
- Suction pipe joint: Quick pipe joint, accepting tube of outer diameter ø6
- Suction rate: 90N/min
- Cleanliness level: Conforming to class 10
- Ambient temperature/humidity: Temperature: 0~40°C, Humidity: 20~85%RH or less (non-condensing)
- Weight: 3.1kg
- Cable length: 3L: 3m, 5L: 5m

Dimensions

The CAD drawings can be downloaded from IAI's website.

caution

1: The hole is covered with a set screw. The 2-M3, depth 6 extends through the arm. Exercise caution.

2: For the ALM indicator to illuminate, the customer must provide a circuit that receives signals from the controller’s I/O output and applies 24 VDC to the LED terminal in the user wiring connector.

3: For suction (*3)

4: Three-pin connectortype cable

5: The intended cleanliness performance can be achieved by maintaining negative pressure inside the robot via suction from the suction joint. (Dust will generate if internal air is not suctioned.)

Applicable Controller Specifications

- Applicable controller: XSEL-PX, XSEL-QX
- Maximum I/O points (input/output): 192 points / 192 points
- Power supply voltage: Three-phase 200VAC
- Page: P8

Note 1: Based on PTP operation. In CP operation, the maximum speed is limited.

Note 2: The cycle time is based on reciprocating movements over a horizontal distance of 100 mm and vertical distance of 25 mm, carrying a 0.2-kg load.

Note 3: The rated load capacity indicates the maximum weight that can be operated at the maximum speed and rated continuous acceleration. The maximum load capacity indicates the maximum weight that can be transferred at lower speed and acceleration.

Note 4: The value under "Push motion" indicates the maximum thrust when a push command is executed from a program. The value under "Maximum thrust" indicates the maximum thrust during normal/positioning operation.

Note 5: An equivalent allowable internal moment at the center of rotation of axis 4. The offset from the center of rotation of axis 4 to the gravity center of the tool must not exceed 17.5 mm.

Note 6: For the ALM indicator to operate, the customer must provide a circuit that receives signals from an I/O output, etc., and applies 24 VDC to the LED terminal in the user wiring connector.
Controller

XSEL-PX/QX

SCARA and single-axis robots can be controlled simultaneously with one controller.

Features

1. Controlling a maximum of 6 axes (SCARA robots + 2 single-axis robots)

   In addition to SCARA robots, up to two axes of single-axis robots or cartesian robots can be controlled (total output: 2400 W).

2. “Global type” for applications that require conformance to safety category 4

   The “global type” does not have a built-in drive-source cutoff circuit. Instead, it cuts off the drive source using an external safety circuit. This design conforms to safety category 4 under ISO 13849-1. Both the large-capacity type (PX) and large-capacity global type (QX) conform to the CE Mark standard.

3. Compact, high performance and CE-compliant

   ■ Approx. 40% slimmer than IAI’s conventional controllers (X-SEL general-purpose controllers)
   ■ Significantly faster than IAI’s conventional controllers (command processing time is roughly one-half)
   ■ Connectable to DeviceNet, CC-Link, Ethernet and other field networks
   ■ Conforming to the CE Mark standard

Model

<table>
<thead>
<tr>
<th>XSEL -</th>
<th>Controller type</th>
<th>IX robot type</th>
<th>Motor output of axis 5</th>
<th>Motor output of axis 6</th>
<th>Dedicated network slot</th>
<th>Standard I/O</th>
<th>Expansion I/O</th>
<th>I/O flat cable length</th>
<th>Power-supply voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>Controller type</td>
<td>IX robot type</td>
<td>Motor output of axis 5</td>
<td>Motor output of axis 6</td>
<td>Dedicated network slot</td>
<td>Standard I/O</td>
<td>Expansion I/O</td>
<td>I/O flat cable length</td>
<td>Power-supply voltage</td>
</tr>
<tr>
<td>PX4</td>
<td>Large-capacity, 4-axis type</td>
<td>(Inverse type)</td>
<td>Blank (No single axis)</td>
<td>Blank (No single axis)</td>
<td>Blank (No network)</td>
<td>(Not used)</td>
<td>(Not used)</td>
<td>(Not used)</td>
<td>2m (3m) 5V (0V)</td>
</tr>
<tr>
<td>PX5</td>
<td>Large-capacity, 5-axis type</td>
<td>(Wall mount type)</td>
<td>NNN1250-8040 (Standard type)</td>
<td>NSN5016-6016 (High-speed type)</td>
<td>NWW5015-8040 (Dustproof/spill-proof type)</td>
<td>NWN5016-8040</td>
<td>NWN5015-8040</td>
<td>(Not used)</td>
<td>3V (0V)</td>
</tr>
<tr>
<td>PX6</td>
<td>Large-capacity, 6-axis type</td>
<td>(Inverse type)</td>
<td>TNN3015-3515 (Wall mount type)</td>
<td>HNN5020-8040 (Ceiling mount type)</td>
<td>INNN5020-8040 (Inverse type)</td>
<td>NNC1205-8040</td>
<td>NNC1205-8040</td>
<td>(Not used)</td>
<td>3V (0V)</td>
</tr>
<tr>
<td>QX4</td>
<td>Large-capacity, 4-axis type</td>
<td>(Inverse type)</td>
<td>Blank (No single axis)</td>
<td>Blank (No single axis)</td>
<td>Blank (No network)</td>
<td>(Not used)</td>
<td>(Not used)</td>
<td>(Not used)</td>
<td>2m (3m) 5V (0V)</td>
</tr>
<tr>
<td>QX5</td>
<td>Large-capacity, 5-axis type</td>
<td>(Wall mount, inverse type)</td>
<td>NNW5015-8040 (Dustproof/spill-proof type)</td>
<td>HNN5020-8040 (Ceiling mount type)</td>
<td>KNNN5020-8040</td>
<td>NNC1205-8040</td>
<td>NNC1205-8040</td>
<td>(Not used)</td>
<td>3V (0V)</td>
</tr>
<tr>
<td>QX6</td>
<td>Large-capacity, 6-axis type</td>
<td>(Inverse type)</td>
<td>TNN3015-3515 (Wall mount type)</td>
<td>HNN5020-8040 (Ceiling mount type)</td>
<td>INNN5020-8040 (Inverse type)</td>
<td>NNC1205-8040</td>
<td>NNC1205-8040</td>
<td>(Not used)</td>
<td>3V (0V)</td>
</tr>
</tbody>
</table>

Notes:

1. Series
   Indicate the series name.

2. Controller type
   Indicate the controller type.
   PX4: Large-capacity, dedicated SCARA specification
   PX5: Large-capacity, 5-axis (SCARA + 1 axis) specification
   PX6: Large-capacity, 6-axis (SCARA + 2 axes) specification
   QX4: Large-capacity, dedicated SCARA specification
   QX5: Large-capacity, 5-axis (SCARA + 1 axis) specification
   QX6: Large-capacity, 6-axis (SCARA + 2 axes) specification

3. IX robot type
   Indicate the type of the SCARA robot to be operated.

4. Motor output of axis 5 (single-axis robot)
   Indicate the motor output of the single-axis robot to be connected to axis 5 of PX4, PX5, QX4 or QX6. In [ ], enter codes corresponding the encoder type and desired option(s).

   * If multiple options are to be specified, indicate the applicable codes in alphabetical order after the encoder type. If no option is installed, indicate only the encoder type.
   
   Encoder type A: Absolute / L: Incremental
   (Options B: Brake / C: Creep sensor / L: Limit switch / M: Master-axis designation in synchronized operation / S: Slave-axis designation in synchronized operation)

5. Motor output of axis 6 (single-axis robot)
   Indicate the motor output of the single-axis robot to be connected to axis 6 of PX6 or QX6. The same explanation for axis 5 applies to the codes to be entered in [ ]. Leave the space blank for PX4 or QX4.

6. Dedicated network slot
   Indicate an applicable code if you require connection to DeviceNet, CC-Link, Profinet or Ethercat.

7. Standard I/O
   (slot 1) Indicate the specification of the standard slot (slot 1).

8. Expansion I/O
   (slots 2 to 4) Indicate the specification of the expansion slots (slots 2 to 4). Take note that the external dimensions will change if the expansion slots are used.

9. I/O flat cable length
   Indicate the length of the signal wire connecting the I/O board and PLC.

10. Power-supply voltage
    Indicate the voltage of the main controller power supply.
## Specifications

<table>
<thead>
<tr>
<th></th>
<th>PX4</th>
<th>PX5/PX6</th>
<th>QX4</th>
<th>QX5/QX6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total output when maximum number of axes are connected</td>
<td>2400W</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control power input</td>
<td>Single-phase 200/230VAC, -15%, +10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor power input</td>
<td>Three-phase 200/230VAC, -10%, +10%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power-supply capacity</td>
<td>310VA (*1)</td>
<td>3350VA (*2)</td>
<td>310VA (*1)</td>
<td>3350VA (*2)</td>
</tr>
<tr>
<td>Safety circuit configuration</td>
<td>Redundant configuration not supported</td>
<td>Redundant configuration supported</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive-source cutoff method</td>
<td>Internal cutoff relay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enable input</td>
<td>Contact-B input (internal power supply type)</td>
<td>Contact-B input (external power supply type, redundant)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position detection method</td>
<td>Incremental encoder / absolute encoder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed setting (*3)</td>
<td>1mm / sec – 2000mm / sec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceleration/deceleration setting (*3)</td>
<td>0.01 G – 1 G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Programming language</td>
<td>Super SEL language</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of program steps</td>
<td>6000 steps (total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of positions</td>
<td>4000 positions (total)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of programs (number of multitasking programs)</td>
<td>64 programs (16 programs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambient operating temperature/humidity</td>
<td>0<del>40˚C, 10</del>95% (non-condensing)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (*4)</td>
<td>5.2kg</td>
<td>5.7kg</td>
<td>4.5kg</td>
<td>5kg</td>
</tr>
</tbody>
</table>

*2 Based on operation of two 750-watt axes of arm length 500/600.
*3 The maximum limit varies depending on the actuator type.
*4 The weight includes the absolute battery, brake mechanism and expansion I/O box.

## System Configuration

### Connectable Actuator

- **External Equipment**
  - External Equipment
  - Device Net
  - CC-Link
  - Profinet
  - Ethernet

- **Connection to Various Field Networks**
  - Serial Communication Port
  - Standard/RS232, 2 channels

- **Teaching Pendant**
  - Refer to P. 10

- **Motor Drive Power Supply**
  - Three-phase 200VAC

- **Control Power Supply**
  - Single-phase 200VAC

- **System I/O**
  - Emergency stop
  - Enable
  - System ready

- **Drive-source cutoff circuit**
  - (Provided by the customer)

- **Expansion I/O**
  - I/O board
  - Multipoint I/O board

**Notes**

The standard motor/encoder cables are not of connector type. If you require connector-type cables that permit replacement, specify the option for connector-type cables (code: JY).

* Applicable to the global type only (not required for the standard type).
Teaching Pendant

Model: IA-T-X (Standard)
IA-T-XD (With deadman switch)
IA-T-XA (ANSI/CE Mark compliant type)

Teaching devices offering functions for program/position input, test operation, monitoring and more.

* IA-T-XD of version 1.20 or older and IA-T-XA of version 1.10 or older cannot be used with the PX/QX controllers.

Regenerative Unit

Model: REU-1

This unit converts regenerative current produced when the motor decelerates, into heat. You need one or more regenerative units according to the total output of single-axis motors connected to the controller. (No regenerative unit is required for SCARA robots.) Refer to the table at right for the rough guideline on how to determine if your system needs a regenerative unit(s).

PC Software

Model: IA-101-X-MX

With a PC cable (D-sub, 9-pin connector on PC end)
For Windows 95/98/NT/2000/ME

Support software combining all functions needed for program/position input and debugging.

* Version 5.0.1.0 or older cannot be used with the PX/QX controllers.

Cables

Connector-type Motor Cable

Model CB-X-MA030(3m) CB-X-MA050(5m)

<table>
<thead>
<tr>
<th>Motor output</th>
<th>Horizontal application</th>
<th>Vertical application</th>
</tr>
</thead>
<tbody>
<tr>
<td>0~100W</td>
<td>Not required</td>
<td>Not required</td>
</tr>
<tr>
<td>-200W</td>
<td>Not required</td>
<td>1 unit</td>
</tr>
<tr>
<td>-400W</td>
<td>1 unit</td>
<td>1 unit</td>
</tr>
<tr>
<td>-600W</td>
<td>1 unit</td>
<td>1 unit</td>
</tr>
<tr>
<td>-800W</td>
<td>1 unit</td>
<td>1 unit</td>
</tr>
<tr>
<td>-1000W</td>
<td>1 unit</td>
<td>2 units</td>
</tr>
<tr>
<td>-1200W</td>
<td>2 units</td>
<td>2 units</td>
</tr>
<tr>
<td>-1500W</td>
<td>2 units</td>
<td>3 units</td>
</tr>
</tbody>
</table>

Connector-type Encoder Cable

Model CB-X1-PA030(3m) CB-X1-PA050(5m)

I/O Flat Cable (X-SEL)

Model CB-X-PIO

* Enter a desired cable length (L) up to 10 m in [ ]

Example) 080 = 8 m
External Dimensions

The external dimensions of X-SEL PX/QX controllers vary depending on the number of connected axes and specified option(s) (brake and/or expansion I/O). Refer to the table below and identify the number corresponding to the external dimensions of your controller, and reference the drawing bearing the same number.

<table>
<thead>
<tr>
<th>SCARA robot</th>
<th>Type</th>
<th>Brake</th>
<th>Controller</th>
<th>Large-capacity type (PX)</th>
<th>Large-capacity global type (QX)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NNN1205</td>
<td>Not equipped</td>
<td>External dimensions</td>
<td>1</td>
<td>External dimensions</td>
</tr>
<tr>
<td></td>
<td>NNN1505</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NNN1805</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NNC1205</td>
<td>Equipped</td>
<td>External dimensions</td>
<td>2</td>
<td>External dimensions</td>
</tr>
<tr>
<td></td>
<td>NNC1505</td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NNC1805</td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

(*1) If the direct-coupled axis has a brake or is of absolute encoder specification, refer to external dimensions.
(*2) If the direct-coupled axis has a brake or is of absolute encoder specification, refer to external dimensions.
(*3) If the direct-coupled axis has a brake or is of absolute encoder specification, refer to external dimensions.
(*4) If the direct-coupled axis has a brake or is of absolute encoder specification, refer to external dimensions.

All controller types have the same height.